NOAA Atlas 14

Precipitation-Frequency Atlas of the United States

Volume 11 Version 2.0: Texas

Sanja Perica, Sandra Pavlovic, Michael St. Laurent,
Carl Trypaluk, Dale Unruh, Orlan Wilhite

U.S. Department
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National Oceanic
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Library of Congress Classification Number
G1046
.C8
U6
no.14
v.11
(2018)

Table of Contents

1. Abstract

NOAA Atlas 14 contains precipitation frequency estimates for the United States and U.S. affiliated territories with associated lower and upper bounds of the 90% confidence interval and supplementary information on temporal distribution of heavy precipitation, analysis of seasonality and trends in annual maximum series data, etc. It includes pertinent information on development methodologies and intermediate results. The results are published through the Precipitation Frequency Data Server (PFDS).

The Atlas is divided into volumes based on geographic sections of the country. It is intended as the U.S. Government source of precipitation frequency estimates and associated information for the United States and U.S. affiliated territories.

2. Preface to Volume 11

NOAA Atlas 14 Volume 11 contains precipitation frequency estimates for selected durations and frequencies with associated lower and upper bounds of the 90% confidence interval and supplementary information on the temporal distribution of heavy precipitation, analysis of seasonality and trends in annual maximum series data, etc., for the state of Texas. The results are published through the PFDS.

NOAA Atlas 14 Volume 11 was developed by the Hydrometeorological Design Studies Center within the Office of Water Prediction of the National Oceanic and Atmospheric Administration's National Weather Service. Any use of trade names in this publication is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Citation and version history. This documentation and associated artifacts such as maps, grids, and point-and-click results from the PFDS are part of a whole with a single version number and can be referenced as:
Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite (2018). NOAA Atlas 14 Volume 11 Version 2, *Precipitation-Frequency Atlas of the United States, Texas*. NOAA, National Weather Service, Silver Spring, MD.

The version number has the format P.S, where P is a primary version number representing a number of successive releases of primary information. Primary information is essentially the data. S is a secondary version number representing successive releases of secondary information. Secondary information includes documentation and metadata. S reverts to zero (or nothing; i.e., Version 2 and Version 2.0 are equivalent) when P is incremented. When documentation is completed and added without changing any prior information, the version number is not incremented.

The primary version number is stamped on the artifact or is included as part of the filename where the format does not allow for a version stamp (for example, files with gridded precipitation frequency estimates). All location-specific output from the PFDS is stamped with the version number and date of download.

Table 2.1 lists the version history associated with the NOAA Atlas 14 Volume 11 precipitation frequency project and indicates the nature of changes made.

Table 2.1. Version history of NOAA Atlas 14 Volume 11.

Version	Release date	Notes
Version 1	November 2017	Draft data used in peer review
Version 2	September 2018	Final data released

3. Introduction

3.1. Objective

NOAA Atlas 14 Volume 11 provides precipitation frequency estimates for durations of 5-minute through 60-day at average recurrence intervals of 1-year through 1,000-year for the State of Texas. The estimates and associated upper and lower bounds of the 90% confidence interval are provided at 30-arc second resolution. The Atlas also includes information on temporal distributions for heavy precipitation amounts for selected durations and seasonal information for annual maxima data used in the frequency analysis. In addition, the potential effects of climate change as trends in historic annual maximum series are examined.

The precipitation frequency estimates in NOAA Atlas 14 Volume 11 supersede the estimates published in the following publications:

a. NOAA Technical Memorandum NWS HYDRO-35, *Five- to 60-Minute Precipitation Frequency for the Eastern and Central United States* (Frederick et al., 1977) for 5-minute to 60-minute durations;

b. Weather Bureau Technical Paper No. 40, *Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years* (Hershfield, 1961) for 2-hour to 24-hour durations;

c. Weather Bureau Technical Paper No. 49, *Two- to Ten-Day Precipitation for Return Periods of 2 to 100 Years in the Contiguous United States* (Miller, 1964) for 2-day to 10-day durations.

3.2. Approach and deliverables

Precipitation frequency estimates have been computed for a range of frequencies and durations using a regional frequency analysis approach based on L-moment statistics calculated from annual maximum series. This section provides an overview of the approach; greater detail is provided in Section 4.

The annual maximum series (AMS) were extracted for a range of durations between 15-minute and 60-day from precipitation measurements recorded at variable or constant time increments, from 1-minute to 1-day, obtained from various sources. The tables in Appendix A.1 give detailed information on all stations whose data were used in the frequency analysis. The annual maximum series data were screened for data quality. The 1-day and 1-hour annual maximum series data were also analyzed for potential trends (Appendix A.2).

A region of influence approach was used for the regional L-moments computation at each station across all selected durations. A variety of probability distribution functions were examined for each region and duration and the most suitable distribution was selected. Distribution parameters, and consequently precipitation frequency estimates, were determined based on the mean of the annual maximum series at the station and the regionally determined higher order L-moments. Precipitation frequency estimates were smoothed across durations to ensure consistency. Partial duration series-based precipitation frequency estimates were calculated indirectly from AMS-based precipitation frequency estimates using Langbein's formula.

For areas where snowfall contributes to the precipitation AMS, empirical equations may be developed to produce frequency estimates for rainfall (i.e., liquid precipitation only) from corresponding precipitation frequency estimates. In the NOAA Atlas Volume 11 project area, the contribution of snowfall to AMS is trivial due to geo-climatic conditions, so no separate rainfall frequency analysis was needed.

A Monte-Carlo simulation approach was used to produce upper and lower bounds of the 90% confidence interval for the precipitation frequency estimates. 5-minute and 10-minute estimates were computed by applying scaling factors to matching 15-minute estimates.

Grids of precipitation frequency estimates were determined based on grids of mean annual maxima and at-station precipitation frequency estimates. The mean annual maxima grid for each duration was derived from at-station mean annual maxima using PRISM interpolation methodology (Appendix A.3). The grids of precipitation frequency estimates for all frequencies were then derived in an iterative process using the inherently strong linear relationship that exists between mean annual maxima and precipitation frequency estimates at the 2-year average recurrence interval and between precipitation frequency estimates at consecutive frequencies for a given duration (Section 4.8.2). The resulting grids were examined and adjusted in cases where inconsistencies occurred between durations and frequencies. Both spatially interpolated and point estimates for selected durations and frequencies were subject to external peer review (Appendix A.4). A similar approach was used to derive grids of lower and upper bounds of the 90% confidence interval.

Climate regions were delineated based on characteristics of annual maximum data. The regions were used in the extraction and seasonality analysis of annual maxima and calculations of temporal distributions of heavy precipitation. Temporal distributions, expressed in probability terms as cumulative percentages of precipitation totals, were computed for precipitation magnitudes exceeding precipitation frequency estimates for the 2-year average recurrence interval for selected durations (Appendix A.5). The seasonality analysis was done by tabulating the number of annual maxima exceeding precipitation frequency estimates for several selected threshold frequencies (Appendix A.6).

NOAA Atlas 14 Volume 11 precipitation frequency estimates for any location in the project area are available in a variety of formats through the PFDS via a point-and-click interface; more details are provided in Section 5. Additional results and information available there include:

- ASCII grids of partial duration series-based and annual maximum series-based precipitation frequency estimates and related confidence limits for a range of durations and frequencies with associated metadata;
- cartographic maps of partial duration series-based precipitation frequency estimates for selected frequencies and durations;
- final, quality controlled annual maximum series for all observing locations used in the analysis;
- temporal distributions;
- seasonality analysis of annual maxima.

Cartographic maps were created to serve as visual aids and are not recommended for estimating precipitation frequency estimates. Users are advised to take advantage of the PFDS interface or the downloadable underlying ASCII grids for obtaining precipitation frequency estimates.

Please notice that precipitation frequency estimates from this Atlas are estimates for a point location and are not directly applicable for an area. Also, precipitation frequency estimates for each volume of NOAA Atlas 14 were computed independently using all available data at the time. Some discrepancies between volumes at project boundaries are inevitable and they will generally be more pronounced for rarer frequencies.

4. Frequency analysis

4.1. Project area

The project area encompasses the entire state of Texas (Figure 4.1.1), which is the second largest state in the United States by both area and population. The vast expanse of the state contains great regional differences. While there is not a standard classification system, the following four regions are usually recognized as the principal geographic regions of the state: the Gulf Coastal Plain, the Great Plains, the North Central Plains, and the Basin & Range Province. Due to their size and complexity, those regions are often further divided into sub-regions in order to adequately depict their physical characteristics.

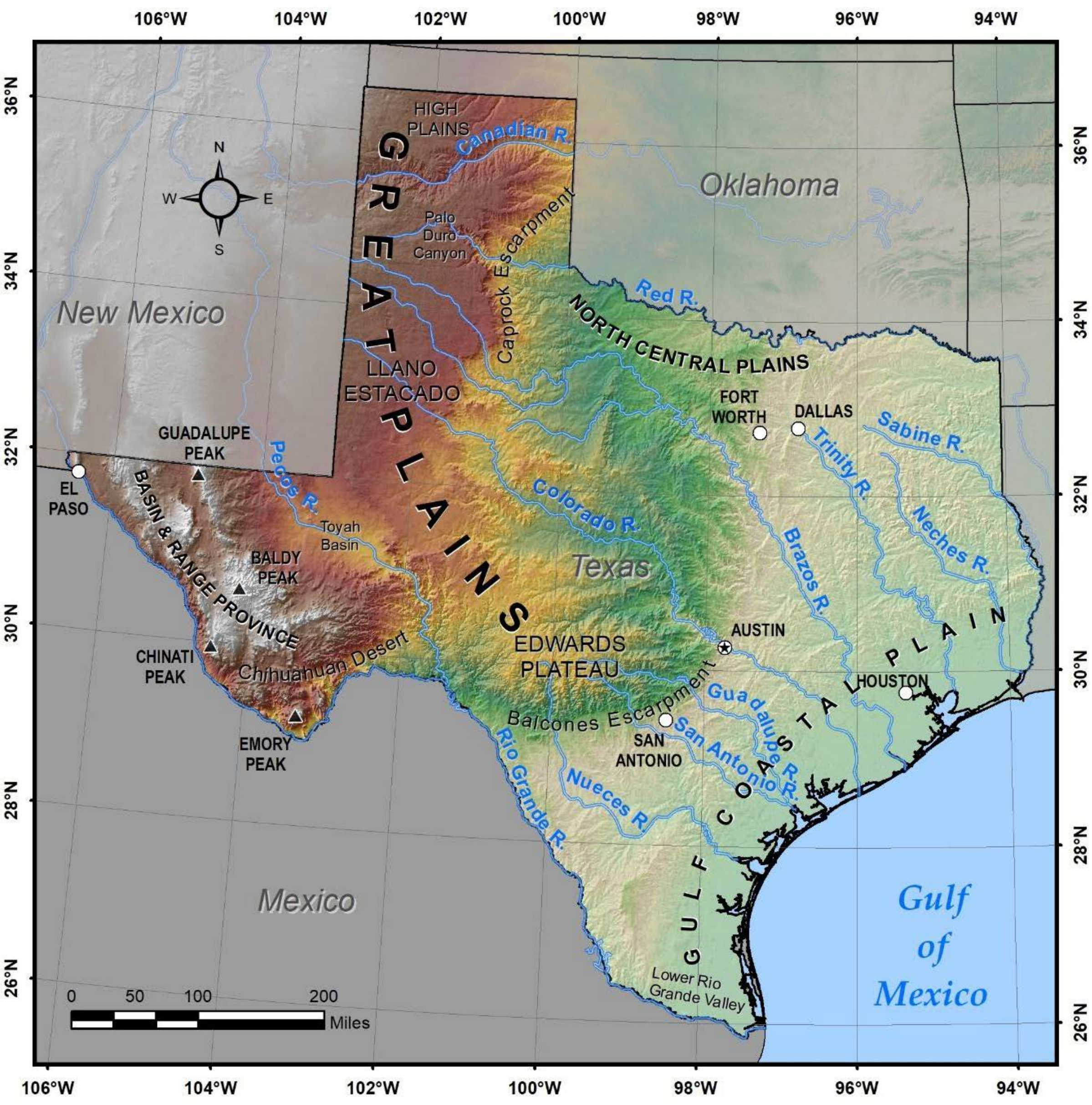


Figure 4.1.1. Project area for NOAA Atlas 14 Volume 11 (shaded relief was obtained from USGS EROS Data Center).

The Gulf Coastal Plain is the area of relatively flat, low-lying terrain stretching from extreme southeast Texas to the Louisiana border and encompasses over 100,000 mi^2 in Texas. This region continues through the Southeastern United States to the Florida Panhandle. Much of the coastal plain is treeless prairie, except for a few forested belts of land known as cross timbers. Inland elevation gradually increases west towards the Balcones Fault and Escarpment, which begins at the Rio Grande and extends north past the City of Austin.

West of the Balcones Escarpment lies the Edwards Plateau, which is part of the Great Plains region. The Great Plains region is a large area of relatively flat higher elevations that spans from northwestern Texas to North Dakota. To the northwest of the Edwards Plateau is another relatively flat area of higher elevation known as the Llano Estacado or Staked Plains. The Llano Estacado stretches north to the Canadian River. The High Plains are a portion of higher elevated Great Plains in the northern panhandle of Texas. The High Plains gradually increase in elevation from about 2,700 feet in the east to over 4,000 feet near the New Mexico border. In the Panhandle region of Texas, the eastern edge of the Great Plains is defined by the Caprock Escarpment.

The North Central Plains make up the area east of the Caprock Escarpment and north of the Colorado River. This region is part of the interior or central lowlands that stretch through the Midwestern States and into Canada. The majority of the western portion of this region, the Rolling Plains, is between 1,000 and 3,000 feet above sea-level. The eastern section contains the Grand Prairie and Western Cross Timbers.

The Basin and Range Province is in extreme western Texas. This region stretches far into Mexico and the inland western United States and is the only mountainous part of Texas. This area of the state is dominated by several mountain ranges which include the Davis, Chisos, Guadalupe and Chinati ranges. The highest peak in the project area is Guadalupe Peak (Guadalupe Mountains) near the New Mexico border at 8,751 feet, but many summits rise above 7,000 feet including: Baldy Peak (Davis Mountains) at 8,378 feet, Chinati Peak (Chinati Mountains) at 7,728 feet and Emory Peak (Chisos Mountains) at 7,824 feet. The Basin and Range Province is also a part of the Chihuahuan Desert. The Chihuahuan Desert is the second largest desert in North America, after the Great Basin Desert. It stretches into northern Mexico, southern New Mexico, and Arizona.

Climatology of extreme precipitation. One of the most distinct characteristics of the precipitation climatology of Texas is the variation in moisture across the state. This is caused by the predominantly westerly winds bringing dry continental air down off the mountains in the west and the proximity to the Gulf of Mexico supplying ample moisture over the eastern portion of the state. Most of the Texas Great Plains and higher elevations of the Basin and Range Province are considered semi-arid, with lower elevations classified as desert. To the east of approximately longitude 100^0W is where the state transitions from a semi-arid to a humid subtropical region. Mean annual precipitation (MAP) is largest near the Louisiana border and decreases to the west and south. East of Houston, MAP values range from 55-60 inches. Moving southward along the coast, values decrease to 25-30 inches in Brownsville. MAP continues to decrease to the west, with San Antonio receiving around 30-35 inches, decreasing to a minimum of 8-10 inches over El Paso.

In general, most extreme precipitation events occur between the late spring and early fall at hourly durations. At daily durations, the rainy season is slightly longer, beginning in early spring and ending in late fall. The rainy season tends to become shorter moving from east to west. Only extreme eastern Texas has a daily rainy season that extends the entire year. A large portion of annual maxima occur during the spring and fall during favorable large-scale synoptic patterns. Cold, dry air in the upper levels of the atmosphere approaches from the Rocky Mountains, colliding with warm, moist subtropical air transported from strong low-level southerly flow off the Gulf of Mexico. This interaction creates an environment of high instability and wind shear that is favorable for severe convection. Severe storms are initiated and intensified by the combination of this unstable atmosphere and dynamic forcing through the passing of an upper level trough, convergence boundary, dry line or cold front. Frontal boundaries tend to have a north-south alignment but can shift more east-west and become stationary, producing heavy rain over one area for several days. Often in Texas, a distinct north-south boundary known as a dry line forms with a sharp decrease in moisture from east to west. This boundary is often seen in the spring and summer over the central portion of the state, but it can move eastward or westward during the course of the day. Heavy rainfall can also result from training thunderstorms, where consecutive storms follow the path of the preceding storm, producing copious amounts of rainfall over one area for several hours. In the central Texas Hill Country, rainfall can be enhanced further due to the orographic effects and soil moisture gradients of the Balcones Escarpment. In extreme western Texas, most significant events occur during the summer monsoon season when there tends to be weaker dynamic forcing and solar insolation plays a more dominant factor for convective initiation of brief, heavy downpours.

Texas' proximity to the Gulf of Mexico makes it highly susceptible to extreme rainfall caused by tropical cyclones (TCs), especially during the late summer and early fall. The amount of rainfall produced varies with the speed and size of the TC. Larger and slower-moving TCs often produce the most significant events. Interactions with frontal boundaries or elevated terrain can enhance the amount of rainfall produced. The remnants of Eastern Pacific TCs are also capable of causing extreme rainfall in Texas. Some of the notable TCs to cause extreme rainfall of roughly 25 inches or more include the September Hurricane (1921), Hurricane Alice (1954), unnamed storm (1960), Hurricane Beulah (1967), Hurricane Fern (1971), Tropical Storm Amelia (1978), Tropical Storm Claudette (1979), Tropical Storm Allison (2001), and Hurricane Harvey (2017). Harvey's 7-day rainfall total of 60.58 inches in Nederland is the record amount for the continental United States, with many areas surrounding Houston exceeding 40 inches over a 4-day period. Claudette produced a U.S. 24-hour record precipitation of 43 inches over Alvin. Other U.S. records in Texas include: 3.95 inches in 14 minutes in Galveston on 4 June 1871 from a TC, 15 inches in 2 hours and 22 inches in 2.75 hours at Woodward Ranch on 21 May 1935, and 36.40 inches in 18 hours at Thrall on 9 September 1921 from a TC.

NOAA Atlas 14 Volume 11 climate regions. Based on the climatology of extreme precipitation and the seasonality analysis of annual maxima (Appendix A.6), three climate regions, shown in Figure 4.1.2, were delineated to assist in extraction of the annual maximum series data (Section 4.3) and in portraying the temporal distributions of extreme events (Appendix A.5). Climate regions were attuned to make them consistent with climate regions from NOAA Atlas 14 Volumes 8 and 9.

Figure 4.1.2. Climate regions delineated for NOAA Atlas 14 Volume 11.

4.2. Precipitation data collection and formatting

Precipitation measurements were obtained for 11,934 stations from a number of federal, state, and local agencies. The majority of the stations were from the NWS Cooperative Observer Program (COOP) database maintained by the National Centers for Environmental Information (NCEI). In order to have a uniform system of numbering, each station was assigned a unique six-digit identification number (SID). Except for NCEI stations, assigned identification numbers do not match identification numbers assigned by agencies that collected or provided the data. Table 4.2.1 lists all agencies that provided the data (not necessarily agencies that collected the data) along with the datasets' names, their abbreviations used in Appendix A.1, and the first two digits of the stations' identification numbers that are common for all stations from the same dataset.

Table 4.2.1. List of agencies, datasets with their abbreviated names used in Appendix A.1, data reporting intervals, and common SID's digits.

Agency/network	**Dataset**	**Abbr.**	**Reporting interval**	**Common SID's digits**
National Centers for Environmental Information	DSI-3240	NCEI	1-hour	03$^{(1)}$, 05$^{(1)}$, 14$^{(1)}$, 16$^{(1)}$, 29$^{(1)}$, 34$^{(1)}$, 41$^{(1)}$
	DSI-3260	NCEI	15-min	03$^{(1)}$, 05$^{(1)}$, 14$^{(1)}$, 16$^{(1)}$, 29$^{(1)}$, 34$^{(1)}$, 41$^{(1)}$
	Global Historical Climatological Network (GHCN) Daily	NCEI	1-day	03$^{(1)}$, 05$^{(1)}$, 14$^{(1)}$, 16$^{(1)}$, 29$^{(1)}$, 34$^{(1)}$, 41$^{(1)}$. 69$^{(2)}$, 79$^{(2)}$, 90$^{(2)}$, 98$^{(3)}$
	Automated Surface Observing System	NCEI	1-min	78
	Integrated Surface Data – Lite	NCEI	1-hour 1-day	64
	Climate Database Modernization Program (CDMP)	NCEI	1-hour 1-day	99$^{(4)}$
	Quality Controlled Local Climatological Data	NCEI	1-hour	56
	Unedited Local Climatological Data	NCEI	1-hour	55
	Unedited/Raw Sub-Hourly/Hourly Precipitation Data	NCEI	15-min	66
City of Austin	ALERT Network	COA	varying	65$^{(5)}$
City of Dallas	ALERT Network	COD	varying	81
Earth Observing Laboratory	NWS Hydrometeorological Automated Data System	HADS	1-hour	85
Edwards Aquifer Authority		EAA	1-hour	62
Guadalupe-Blanco River Authority			6-min	77$^{(6)}$
Harris County Flood Control District	Flood Warning System	HCFCD	varying	60
Jefferson County Drainage District 6	ALERT Network	DD6	varying	82
Lower Colorado River Authority	LCRA Hydromet	LCRA	varying	63
Midwestern Regional Climate Center	CDMP 19th Century Forts and Voluntary Observers Database	FORTS	1-day	52
National Atmospheric Deposition Program		NADP	1-day	54
National Estuarine Research Reserve System	Wide Monitoring Program Data		15-min 1-hour	57$^{(6)}$
Oklahoma Mesonet		OKM	15-min 1-day	86
Sabine River Authority			1-day	58$^{(6)}$
San Antonio River Authority			varying	91$^{(6)}$
Servicio Meteorologico Nacional, Mexico		SMN	1-day	61

Tarrant Regional Water District	Tarrant County Urban Flood Control Network	TRWD	15-min	83
Texas A&M University	Texas Evapotranspiration Network	TEN	1-hour 1-day	89
Texas Commission on Environmental Quality	Air Quality Network	TCEQ	1-hour	75
Texas Tech University	West Texas Mesonet	WTM	5-min	80
Texas Water Development Board			1-hour 1-day	84(6)
Titus County	Fresh Water Supply District No. 1	TCWS	1-day	53
U.S. Bureau of Reclamation	HydroMet	USBR	1-hour 1-day	87
U.S. Dept. of Agriculture (USDA), Agricultural Research Service	Grassland Soil and Water Research Laboratory's Riesel Rainfall	USDA	varying	94
USDA, Forest Service	Remote Automated Weather Station Network	RAWS	1-hour	76
USDA, Natural Resources Conservation Service	Soil Climate Analysis Network	SCAN	1-hour	88
U.S. Geological Survey	Nation Water Information System	NWIS	15-min	59

(1) SIDs by state: 03 - Arkansas, 05 - Colorado, 14 - Kansas, 16 - Louisiana, 29 - New Mexico, 34 - Oklahoma, 41 - Texas.
(2) 69 - Community Collaborative Rain, Hail, & Snow (CoCoRaHS) Network, 79 - stations with a Weather Bureau Army Navy (WBAN) identifier, 90 - Mexico.
(3) Two stations 200+ miles apart (Loma Alta and Loma Alto) were mistakenly combined into a single station in NCEI's GHCN dataset. The later part of this data (2005-2016) was separated and assigned to Loma Alto station with a new SID (98-0001).
(4) NCEI's stations for which additional data were digitized using information from the CDMP through the NCEI-developed Environmental Document Access and Display System, Version 2 (EV2) application.
(5) City of Austin ALERT data was acquired via LCRA Hydromet.
(6) Dataset not used in frequency analysis; not included in Appendix A.1.

In areas of high importance or scarce data, additional precipitation data were digitized to improve analysis by extending record lengths and/or including extreme events missing in digitized datasets. The additional digitized data were collected from the NCEI CDMP dataset and consist mainly of data from NOAA Work Projects Administration (WPA) Precipitation Tabulations (hourly), Climate Records Books (daily), and Original COOP observer forms (daily). Figure 4.2.1 shows locations of hourly and daily stations for which up to 50 and 89 additional years, respectively, were digitized. In many cases, the highest extracted annual maxima came from the digitized periods. For example, several of the largest AMS values for the NCEI's daily station Taylor (41-8861) came from the newly digitized data from 1903 to 1932, including the 7-11 September 1921 extreme event when 23.11 inches fell in 24 hours. All stations for which additional data were digitized are listed in Table A.1.6 of Appendix A.1.

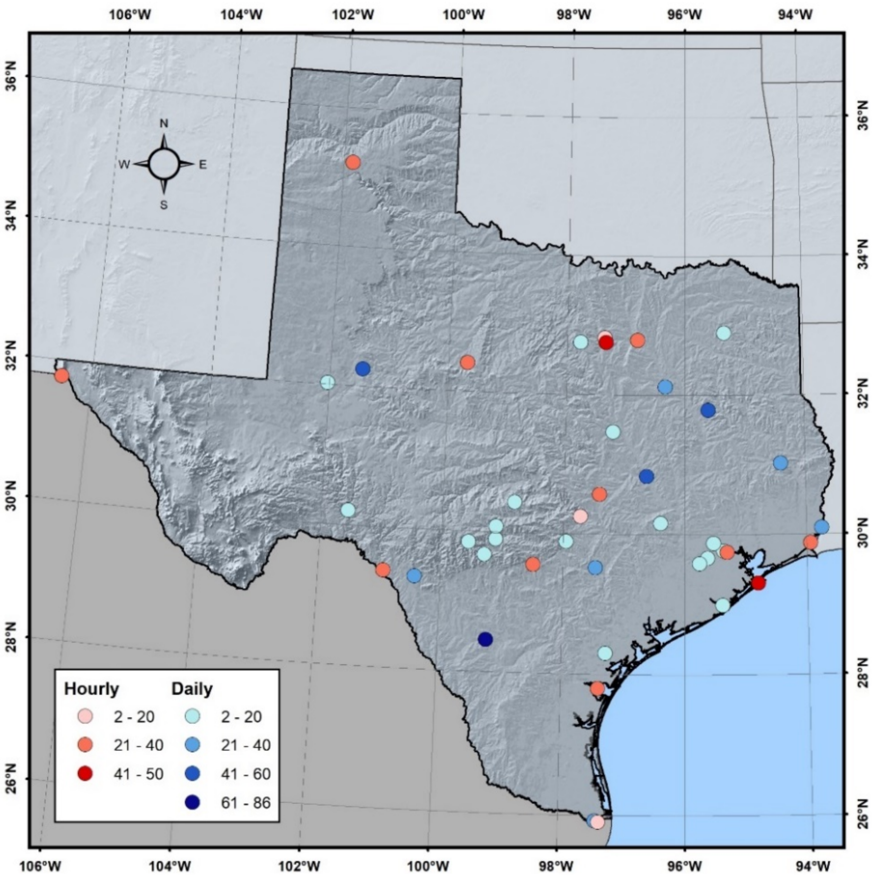


Figure 4.2.1. The locations of stations where hourly and daily records were extended through digitization. Legend indicates number of data years that were digitized.

All data were formatted to a common format at one of three base durations that corresponded to the original reporting period: 15-minute, 1-hour, or 1-day. Data recorded at variable time steps were formatted at 15-minute increments. Where available, records extended through December 2017, with a few stations updated through June 2018 to account for an extreme event in Southern Texas (e.g., Weslaco, SID 41-9588). Table 4.2.2 lists the total number of stations that were obtained and formatted for each interval.

Table 4.2.2. The number of stations that were obtained per formatting interval.

Formatting interval	Abbr.	Number of stations
1-day	DLY	6,541
1-hour	HLY	3,704
15-minute	15M	1,689
TOTAL		**11,934**

In addition, monthly maxima for various n-minute durations (5-minute through 60-minute) were obtained for 106 NCEI stations to which any available data from the NWS and Federal Aviation Administration's Automated Surface Observing System (ASOS) network (archived by NCEI) were added; they were used to develop scaling factors for generation of precipitation frequency estimate grids at 5-minute and 10-minute durations (Section 4.8.2).

4.3. Annual maximum series extraction

The precipitation frequency analysis approach used in this project is based on analysis of annual maximum series (AMS) across a range of durations. AMS for each station were obtained by extracting the highest precipitation amount for a particular duration in each successive year. Based on the distribution of heavy precipitation events for this project area, calendar year was used rather than a standard water year (October - September) so that a year begins and ends during a relatively dry season. Annual maximum data at stations were extracted for all durations equal to or longer than the base duration (or reporting interval) up to 60 days. AMS for the 1-day through 60-day durations were compiled from daily, hourly, and 15-minute records. To accomplish this, 15-minute and 1-hour data were first aggregated to constrained 1-day (hours 0 to 24) values before extracting 1-day and longer duration annual maxima. Hourly and 15-minute data were used to compile AMS for 1-hour through 12-hour durations, where 15-minute data were aggregated first to constrained 1-hour (0 to 60 minutes) values before extracting annual maximum value. 15-minute data were also used to compile AMS for 15-minute and 30-minute durations.

The procedure for developing an AMS from a precipitation dataset used similar criteria as in previous volumes that were designed to extract only reasonable maxima if a year was incomplete or had accumulated data. Accumulated data occur in some records where observations were not taken regularly, so recorded numbers represent accumulated amounts over extended periods of time. Since the precipitation distribution over the period is unknown, the total amount was distributed uniformly across the whole period. All annual maxima that resulted from accumulated data were flagged and screened to ensure that the incomplete data did not result in erroneously low maxima (Section 4.5.1).

The criteria for AMS extraction also exclude maxima if there were too many missing or accumulated data during the year and more specifically during critical months when precipitation maxima were most likely to occur ("wet season"). Wet seasons were resolved by assessing the periods in which two-thirds of AM occurred at each station and by inspecting histograms of annual maxima for the 1-day and 1-hour durations in a region. The final wet season months assisted in the determination of the climate regions depicted in Figure 4.1.2. The assigned wet season months for each region are shown in Table 4.3.1.

Table 4.3.1. Wet season months for each region for daily and sub-daily durations.

Region	**Wet season months**	
	Daily durations	**Sub-daily durations**
Interior Highlands (1)	May - October	May - September
Central Plains (2)	April - October	May - September
Gulf Coast (3)	January - December	April - October

The flowchart in Figure 4.3.1 depicts the AMS extraction criteria for all durations. Various thresholds for acceptable amounts of missing or accumulated data were applied to the year and wet season. The extracted maximum value of a given duration for a given year had to pass through all of the criteria in the flowchart to be accepted. Various codes were assigned to both accepted and rejected maxima based on the amount of missing and accumulated data in each year (see Figure 4.3.1) to assist in further quality control of AMS as described in Section 4.5.1.

For example, in a year with less than 20% of the measurements missing in the whole year and during the assigned wet season, if more than 66% of the measurements were accumulated, then the maxima for that year was (conditionally) rejected and assigned code 130. If the year had between 33% and 66% accumulated data, then it was further screened by assessing the lengths of the accumulation periods. If the lengths of the accumulation periods for more than 33% of the accumulated data were equal to or longer than threshold accumulation period lengths (D_{thresh}), then the maximum for that year was (conditionally) rejected (code 140). Threshold accumulation period lengths were defined as matching the selected duration for durations less than 2 days, as equal to half of duration period for durations between 2 days and 20 days, and as equal to 15 days for durations equal to or longer than 30 days. If the year had less than 33% accumulated data, the extracted maximum was passed to another set of criteria for accumulations during its wet season, etc.

If a rejected annual maximum was higher than 85% of the accepted maxima at that station, then it was kept in the series (code 30). Also, if a rejected 1-day annual maximum was higher than any accumulated amount in a year, then it was kept in the series and assigned code 40. Years in which a maximum was rejected were marked as missing in the series.

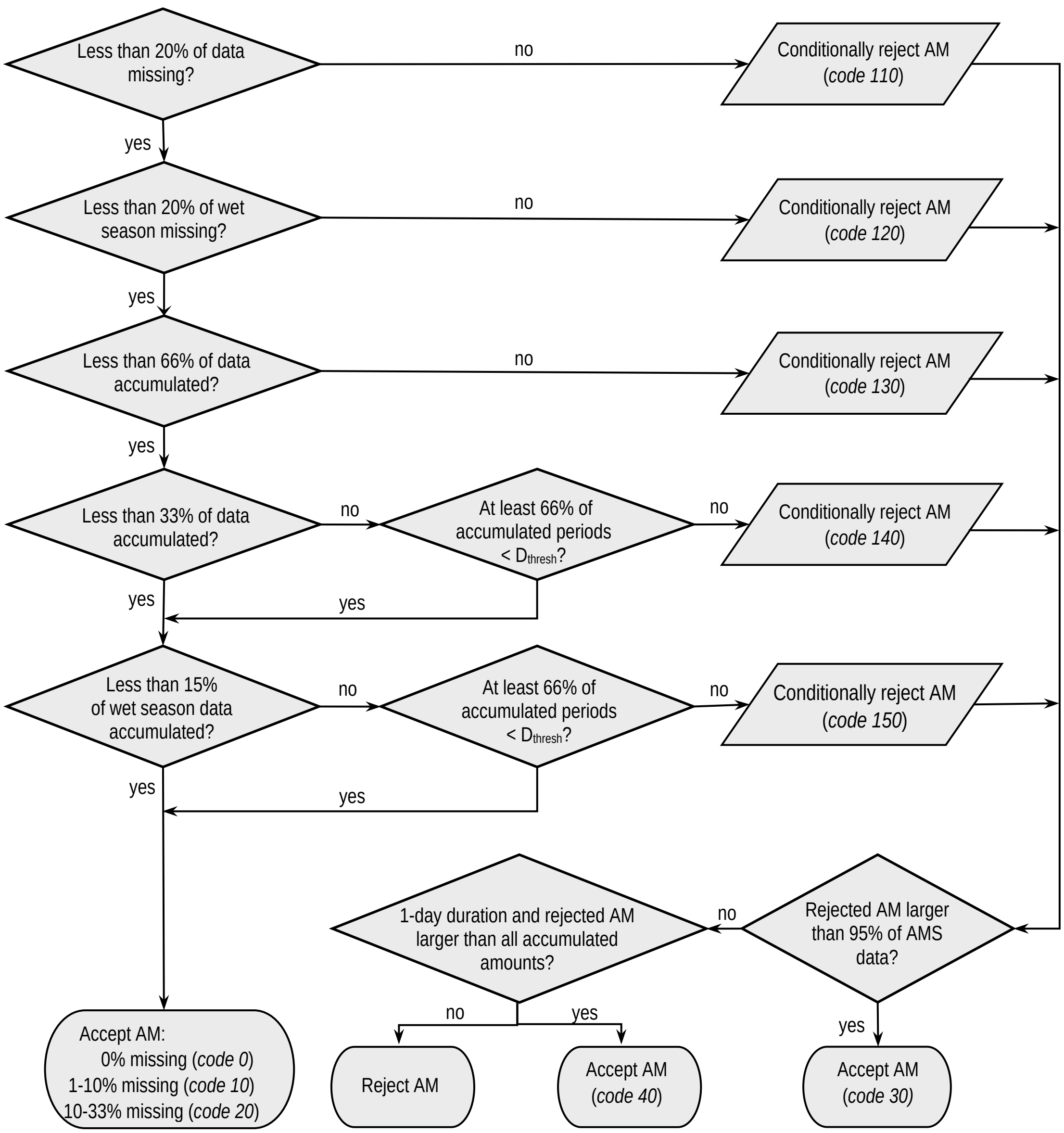


Figure 4.3.1. Criteria used to extract annual maxima. Data quality codes were assigned based on acceptance and rejection; D_{thresh} depends on duration.

4.4. Station screening

Station screening was done in the following order: a) examination of geospatial data, b) screening for duplicate records at co-located daily, hourly, and/or 15-minute stations and extending records using data from co-located stations, c) screening nearby stations for potentially merging records or removing shorter, less reliable records in station dense areas, and d) screening for sufficient number of years with usable data.

Geospatial data. Latitude, longitude, and elevation data for all stations were screened for errors. Several stations had to be re-located because they plotted in a different state or were clearly misplaced based on inspection of satellite images and maps. Misplacement was typically the result of no seconds recorded in latitude and longitude data. There were also several stations with no elevation data; for those stations, elevation was estimated from high-resolution digital elevation model (DEM) grids. Several corrections to metadata were also made based on input received during the peer review (see Appendix A.4).

Co-located stations. Co-located stations were defined as stations that have the same geospatial data but report precipitation amounts at different time intervals. The screening of co-located stations was done as follows:

- If co-located 15-minute and hourly stations provided data for the same period and there were no differences in AMS for constrained 1-hour maxima (15-minute data aggregated on the clock hour), only the 15-minute station was retained and used to extract AMS for all longer durations.
- If a 15-minute or hourly station provided data for the same period as a co-located daily station and there were no differences in AMS for constrained 1-day maxima (15-minute or 1-hour data aggregated from 0 to 24 hours), only the 15-minute or hourly station was retained and used to extract AMS for all longer durations.
- If periods of record at co-located stations were consistent but did not completely overlap, aggregated data from the station with the shorter reporting interval were used to extend the record of the station with the longer reporting interval.
- If the station with the longer reporting interval had a longer period of record, then it was retained in the dataset in addition to the co-located station with the shorter reporting interval.

AMS data consistency across durations was ensured in later quality control procedures (Section 4.5.4).

Nearby stations. Nearby stations were defined as stations located within three miles with consideration to elevation differences. However, in areas of flat terrain, stations up to five miles apart or farther may have been considered. The records of nearby stations were considered for merging to increase record lengths. In station-dense areas, such as around Houston, Dallas/Fort Worth, and Austin, some stations were removed from the analysis if a nearby station had a longer overlapping record, better quality data, or was highly correlated.

Record length. Record length was characterized by the number of years for which annual maxima could be extracted (i.e., data years) rather than the entire period of record. Daily stations were considered for frequency analysis if they had at least 30 data years, but allowances were made for isolated stations. A minimum of 20 data years was required for stations recording at sub-daily durations, with a few exceptions (for example, a station that caught an extreme event).

Figure 4.4.1 shows histograms for the number of AMS data years of stations retained for frequency analysis across daily, hourly, and sub-hourly durations after all the screenings were done. The average and median record lengths as well as corresponding ranges of record lengths are given in Table 4.4.1.

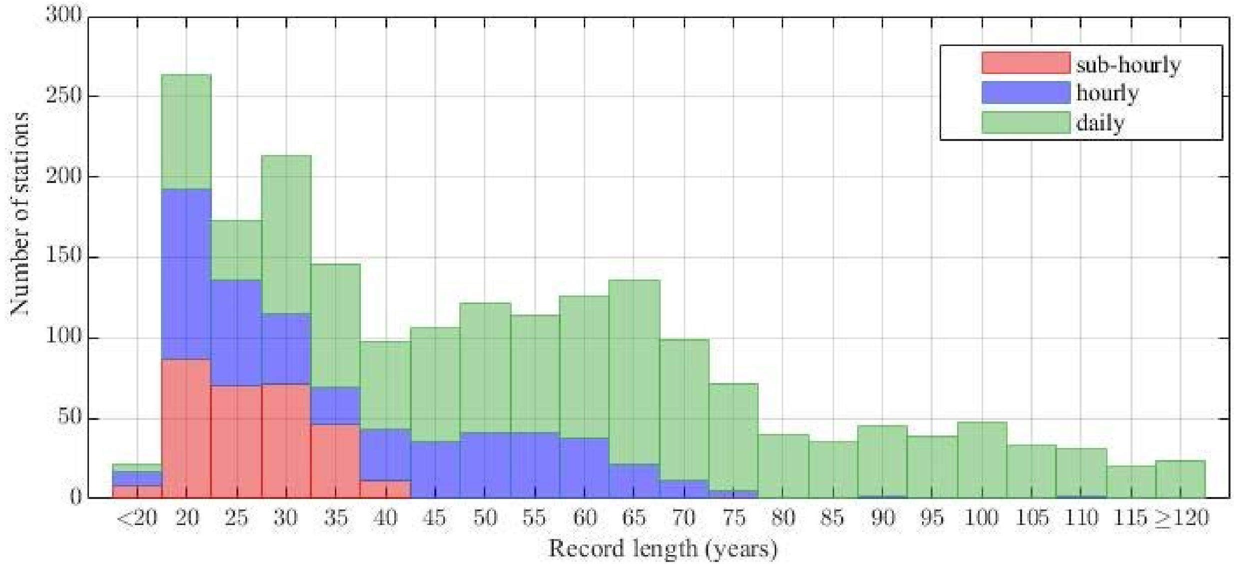


Figure 4.4.1. Number of stations available for precipitation frequency analysis across sub-hourly, hourly and daily durations.

Table 4.4.1. Record length statistics for stations used in frequency analysis for different durations.

Duration (D)	**Number of stations**	**Record length (data years)**		
		average	**median**	**range**
Daily (1-day ≤ D ≤ 60-day)	1,231	60	63	17-150
Hourly (1-hr ≤ D < 24-hr)	478	41	37	12-114
Sub-hourly (15-min ≤ D < 60-min)	294	28	28	15-77

Locations of stations recording precipitation data at 1-day intervals that were used in the frequency analysis are shown in Figure 4.4.2 and locations of stations recording at 1-hour and sub-hourly intervals, as well as n-minute stations, are shown in Figure 4.4.3. More detailed information on each station whose data were used to calculate precipitation frequency estimates is given in the following six tables in Appendix A.1.

Table A.1.1 shows Texas locations for which precipitation frequency estimates were derived. The table shows each location's state (for consistency with table A.1.2), name, identification number (SID), latitude, longitude, elevation, and AMS record lengths (data years) across sub-hourly, hourly, and daily durations. It also lists SIDs for stations that contributed data to each location for sub-hourly, hourly, and/or daily durations.

Table A.1.2 shows similar information for stations in Arkansas (AR), Colorado (CO), Kansas (KS), Louisiana (LA), New Mexico (NM), and in the United Mexican States (MX).

Details on contributing stations' metadata are provided in Table A.1.3 for Texas stations and in Table A.1.4 for stations outside Texas. The tables show each station's state, name, SID, shortest formatting interval (see Table 4.2.2), latitude, longitude, elevation, dataset identifier (see Table 4.2.1), and the period of record. Similar information is shown in Table A.1.5 for stations used in derivation of n-minute scaling factors (see Section 4.6.3).

Finally, Table A.1.6 lists stations for which additional data were digitized (Section 4.2), showing each station's state, name, SID, formatting interval (Table 4.2.2), dataset identifier (Table 4.2.1), and the period(s) of record for which data were digitized.

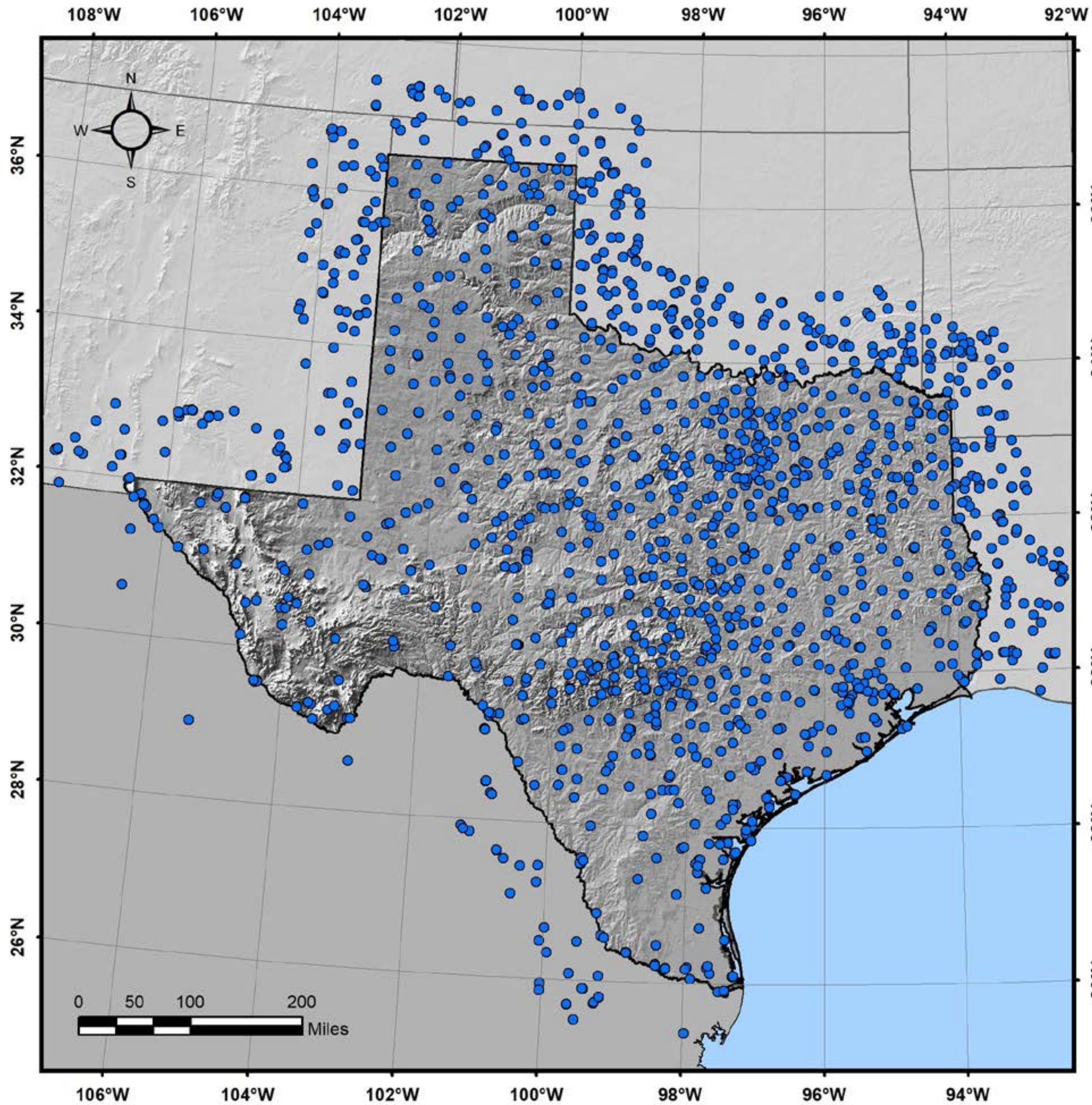


Figure 4.4.2. Map of stations recording at 1-day intervals used in frequency analysis.

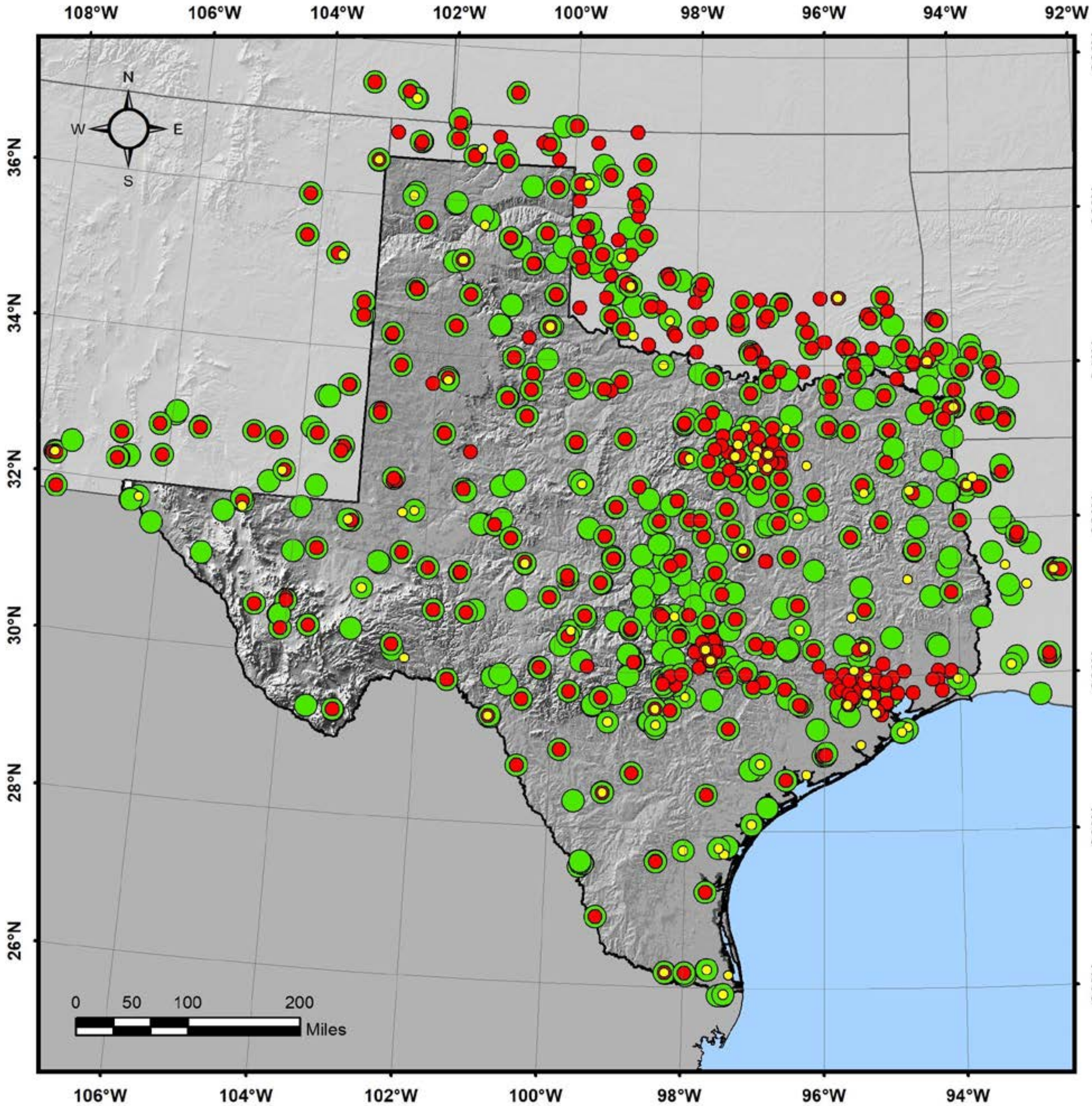


Figure 4.4.3. Map of stations recording at 1-hour (green circles) and 15-minute or variable intervals (red circles) used in the analysis; n-minute stations are shown as yellow circles.

4.5. AMS screening and quality control

4.5.1. Outliers

For this project, outliers are defined as annual maxima which depart significantly from the trend of the corresponding remaining maxima. Since data at both high and low extremities can considerably affect precipitation frequency estimates, they have to be carefully investigated and either corrected or removed from the AMS if erroneous or due to measurement errors. The high and low outliers' thresholds from the Grubbs-Beck statistical test (Interagency Advisory Committee on Water Data, 1982) and the median +/- two standard deviations thresholds were used to identify low and high outliers for all durations. Low outliers, which frequently came from years with missing and/or accumulated data, were typically removed from the annual maximum series. All values identified as high outliers were mapped with concurrent measurements at nearby stations. Questionable values that could not be confirmed were investigated further using climatological observation forms, radar data, monthly storm data reports and other historical weather event publications. Depending on the outcome of each investigation, values were either kept as is, corrected, or removed from the datasets.

An example of an outlier examination is shown in Figure 4.5.1. Statistical tests indicated that the 24-hour annual maximum amount of 9.90 inches recorded on 21 December 1991 at Morgan, TX (41-6058) was a high outlier. Investigation of the original observation form for the month in question showed that the recorded value was a 2-day accumulation, but the storm data for nearby stations indicated that most of the rainfall from this event occurred in less than 24 hours. For example, the nearest station in Meridian, 7 miles away, received 6.50 inches in 10 hours. Instead of equally distributing 2-day accumulation at Morgan in daily increments, which would likely underestimate the extracted 1-day annual maximum for 1991, 1-day to 2-day rainfall ratios from Meridian were applied and 8.40 inches was then extracted as the 1-day AM value for that year.

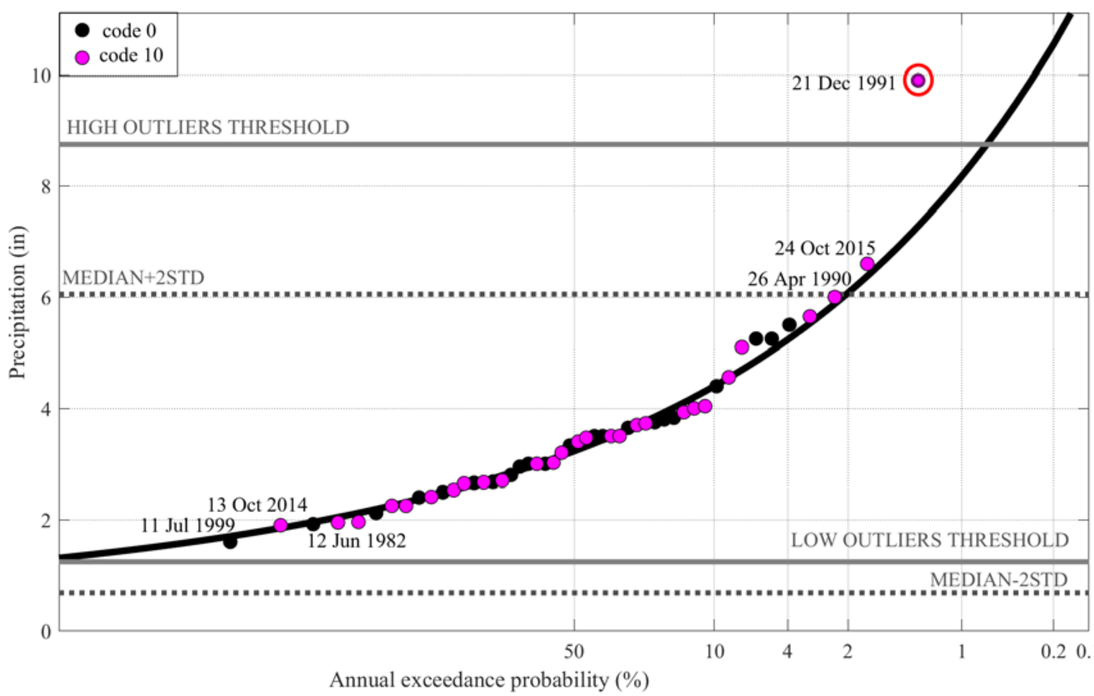


Figure 4.5.1. Outlier tests for 1-day AMS at Morgan, TX (41-6058). Data quality codes in the legend were assigned to annual maxima during the extraction process (Section 4.3).

4.5.2. Missing significant events in records

Precipitation frequency estimates can be significantly affected by an incomplete data record, particularly if one of the highest observed amounts is missing, either because it occurred outside a station's period of record (POR), because the rain gauge was destroyed during an event, or due to data that was never archived or digitized or was otherwise lost over time. Less commonly, the rainfall amounts were misread from the observation forms, or the station was discontinued.

Several significant events that were either missing, underestimated, or recorded erroneously in various stations' records were added, if they were well documented and/or recorded at nearby stations. Table 4.5.1 shows the most notable cases with the reference to where these events were documented. For example, the Langtry hourly gauge stopped recording during Hurricane Alice in June of 1954 and a significant portion of the event was missing from its hourly record. Because of this, AM amounts extracted for that year were low for a range of durations. Missing hourly data were filled in using the estimated mass rainfall curve for this station found in Weather Bureau's storm data reports and used to update AM values for this year. As a result, the 24-hour AM value increased by almost 10 inches.

Table 4.5.1. List of the most significant events that were corrected or added to the stations' records.

Name (SID)	Date	Original	Updated	References
Benavides 2 (41-0690)	30 May 1987	1.22 in/1-day	12.20 in/1-day	a) 1987-05 cooperative observation form for Benavides 2, TX b) Duval County Picture newspaper, 03 June 1987
Bonham 3NNE (41-0923)	13 May 1982	2.6 in/1-day	12.60 in/1-day	1982-05 cooperative observation form for Bonham 3NNE, TX
Brackettville (41-1007)	15 Jun 1899		18.00 in/1-day	CD publication of 1899-06 for Texas(1)
Houston Hobby AP (79-0042)	27-28 Aug 1945		14.58 in/1-day 16.09 in/2-day	CD publication of 1945-08 for Texas(2)
Houston Satsuma (41-4329)	5-6 Dec 1935		16.49 in/2-day	*Major Texas Floods of 1935* (Dalrymple et al., 1937)(3)
Langtry (41-5048)	26-27 Jun 1954	12.83 in/24-hour	22.71 in/24-hour	NCEI's EV2 database(4)
Liberty (41-5196)	20 May 2000	1.91 in/1-day	19.10 in/1-day	2000-05 cooperative observation form for Liberty, TX
Medina 1NE (41-5742)	2-3 Aug 1978		26.01 in/1-day 31.19 in/2-day	a) 1978-08 cooperative observation form for Medina 1NE, TX; b) *Floods in Central Texas, August 1-4, 1978* (Schroder et al., 1985)(5)
Valley Junction (41-9280)	28-30 Jun 1899		30.00 in/1-day 36.45 in/2-day 39.55 in/3-day	a) 1899-06 cooperative observation form for Valley Junction, TX; b) *Excessive Rainfall in Texas* (pp 7, 25, 27; Vance, 1934)(6)
Vanderpool 10N (41-9312)	1-2 Jul 1932		22.50 in/1-day 33.50 in/2-day	*Major Texas Floods of 1936* (Dalrymple et al., 1939)(7)

(1) Amount from digitized data for Fort Clark, TX.
(2) Retrieved from Houston daily precipitation.
(3) Event occurred outside POR.
(4) Estimate from mass rainfall curve at Langtry.
(5) Estimate from mass rainfall curve at Medina 3W.
(6) Amount from digitized data for Valley Junction. Event was recorded at nearby Hearne, TX and is an estimate.
(7) Outside POR. Estimate from Humble Pipe Line Co. (12 miles north of Vanderpool)

4.5.3. Correction for constrained observations

Daily durations. The majority of AMS data used in this project came from daily stations at which readings were taken once per day (usually around 8 am local time, but this can vary over the course of a station's record and from station to station). Due to the fixed beginning and ending of observation times at daily stations, the true 24-hour (unconstrained) annual maximum could be up to 100 percent larger than the corresponding 1-day (constrained) value extracted from the daily records.

For extreme events, unconstrained 24-hour AM values were determined by inspection of information from nearby gauges, and by reviewing storm reports, storm data, and radar data. For some events, weather observers computed their own 24-hour rainfall totals or made special observations that made it possible to determine more accurate unconstrained values. For example, for the April 1991 thunderstorm in Harlingen, which caused significant flooding in the area, the observer noted that the rain began after midnight on the 5th and that 14.76 inches fell by noon next day. Even though most of the 2-day accumulated rainfall fell in less than 12 hours, digitized records show 7.00 inches of rain on the 5th and 9.79 inches on the following day because the observer measured the rainfall at 7 am local time, which was roughly in the middle of the event. In this case, the observer's estimate was accepted as the 24-hour AM value for 1991. Table 4.5.2 lists the most notable cases for which AM values were corrected.

Table 4.5.2. Examples of significant adjustments on 1-day AM values to account for fixed-clock observations. Bold font indicates 1-day AM values before correction.

Station name	SID	Date	1-day AM values (in) from digital records		24-hour AM value (in)
			day 1	day 2	
Center	41-1578	14-15 Sep 1978	6.50	**9.20**	15.70
Harlingen	41-3943	05-06 Apr 1991	7.00	**9.79**	14.76
Henderson	41-4081	20-21 Jun 1993	**7.52**	6.63	14.15
Karnes City	41-4696	30-31 Aug 1981	3.75	**11.00**	14.75
McCamey	41-5707	04-05 Oct 1986	**9.13**	8.68	16.21
Sommerville	41-8445	03-04 Dec 1913	5.00	**7.75**	12.75
Terrell	41-8929	19-20 Apr 1976	**8.32**	4.80	13.12

At all daily stations, correction factors were applied to AM to account for the likely failure of capturing the true unconstrained values. The correction factor for each daily duration was estimated as the coefficient of a zero-intercept regression model using concurrent (occurring within +/- 1 day) constrained and unconstrained annual maxima from hourly stations as independent and dependent model variables, respectively. Correction factors for all daily durations are given in Table 4.5.3.

Table 4.5.3. Correction factors applied to constrained AMS data across daily durations.

Duration (days)	1	2	3	4	7	>7
Correction factor	1.11	1.04	1.03	1.02	1.01	1.00

Hourly durations. While significant underestimations due to constrained observations are commonly seen for daily stations, 'clock-hour' observations also affect hourly measurements at stations recording at 1-hour intervals. Data from stations recording at sub-hourly durations or from first-order hourly stations, which often report unconstrained amounts, were used to make corrections. For example, the maximum 1-hour value of 3.29 inches recorded at 6:00 pm local time on 27 February 1921 at Del Rio WB City hourly station was increased by 1.63 inches based on the corresponding 60-min value of 4.82 inches reported at the first-order hourly station (also in Jennings,1963).

For other AM data extracted at hourly stations, the correction factors were developed from concurrent (occurring within +/- 1 hour) annual maxima at co-located hourly (constrained) and 15-minute (unconstrained) stations using a similar approach as for daily stations. Correction factors applied to constrained AMS data across hourly durations are shown in Table 4.5.4.

Table 4.5.4. Correction factors applied to constrained AMS data across hourly durations.

Duration (hours)	1	2	3	6	>6
Correction factor	1.10	1.04	1.02	1.01	1.00

Sub-hourly durations. Because sub-hourly measurements are also constrained by a fixed beginning and end measurement, as a further enhancement, a similar adjustment was done for sub-hourly durations. The correction factors for sub-hourly AMS were developed from zero-intercept regression models using concurrent (occurring within +/- 1 hour) constrained and unconstrained annual maxima for each duration estimated from 1-min stations; they are shown in Table 4.5.5.

Table 4.5.5. Correction factors applied to constrained AMS data across sub-hourly durations.

Duration (minutes)	15	30	45	>45
Correction factor	1.10	1.05	1.03	1.00

4.5.4. Inconsistencies across durations

At co-located stations, it was not unusual that corresponding annual maxima differed for some years during their overlapping periods of record. Related 1-day maxima at co-located daily and hourly stations were compared, and each pair of significantly different estimates was investigated. Effort was made to identify the source of the error and to correct erroneous observations across all durations that were affected.

Annual maxima at each station were also compared across all durations in each year to ensure that every extracted amount for a longer duration was at least equal to the corresponding amount for the successive shorter duration. Inconsistencies of this type occurred at stations with a significant number of missing and/or accumulated data and resulted from different AMS extraction rules applied for different durations (Section 4.3), or from the correction for constrained observations (Section 4.5.3). In those cases, shorter duration annual maxima were used to replace annual maxima extracted for longer durations. Typically, adjustments of this type were small.

4.5.5. Trend analysis

The precipitation frequency analysis methods used in NOAA Atlas 14 are based on the assumption that the annual maximum series used in the analysis are stationary. Statistical tests for trends in AMS and the main findings for this project area are described in more detail in Appendix A.2. Briefly, the stationarity assumption was tested by applying a parametric *t*-test and non-parametric Mann-Kendal test for trends in means and Levene’s test for trends in variance in the 1-day and 1-hour AMS data at the 5% significance level. For the 1-day duration, testing was done on stations with at least 70 years of data; for the 1-hour duration, the minimum number of data years was lowered to 40 to increase sample size. Overall, the Mann-Kendall test detected slightly more positive trends in the means than the *t*-test, but neither test detected trends in almost 90% of the stations at both durations. Levene’s test did not detect trends in variance in more than 95% of stations at both durations. Spatial maps did not reveal any spatial coherence in trend results.

The relative magnitude of any trend in the AMS means was also assessed for three climate regions delineated for this project (see Figure 4.1.2). AMS from all stations in each region were rescaled by corresponding mean values and then regressed against time. The regression results were tested as a set against a null hypothesis of zero serial correlation. The null hypothesis of no trends in AMS data could not be rejected at 5% significance level at any region.

4.6. Precipitation frequency estimates with confidence limits at stations

4.6.1. Overview of methodology and related terminology

Precipitation magnitude-frequency relationships at individual stations have been computed using a regional frequency analysis approach based on L-moment statistics. Frequency analyses were carried out on annual maximum series (AMS) for the following seventeen durations: 15-minute, 30-minute, 1-hour, 2-hour, 3-hour, 6-hour, 12-hour, 1-day, 2-day, 3-day, 4-day, 7-day, 10-day, 20-day, 30-day, 45-day, and 60-day. Frequency estimates based on partial duration series (PDS), which include all amounts for a specified duration at a given station above a pre-defined threshold regardless of year, were developed from AMS data using a formula that allows for conversion between AMS and PDS frequencies. Precipitation frequency estimates at 5-minute and 10-minute durations were derived from corresponding 15-minute estimates. To assess the uncertainty in estimates, 90% confidence intervals were constructed on both AMS and PDS frequency curves.

Frequency analysis involves fitting an assumed distribution function to the data. The following distribution functions were analyzed with the aim to identify a distribution that provides the best precipitation frequency estimates for the project area across all frequencies and durations: 3-parameter Generalized Extreme Value (GEV), Generalized Normal, Generalized Pareto, Generalized Logistic, and Pearson Type III distributions; 4-parameter Kappa distribution; and 5-parameter Wakeby distribution.

When fitting a distribution to a precipitation annual maximum series extracted at a given location (and selected duration), the result is a frequency distribution relating precipitation magnitude to its annual exceedance probability (AEP). The inverse of the AEP is frequently referred to as the average recurrence interval (ARI), also known as return period. When used with the AMS-based frequency analysis, ARI does not represent the “true” average period between exceedances of a given precipitation magnitude, but the average period between years in which a given precipitation magnitude is exceeded at least once. Those two average periods can be considerably different for more frequent events. The “true” average recurrence interval (ARI) between exceedances of a particular magnitude can be obtained through frequency analysis of PDS.

Differences in magnitudes of corresponding frequency estimates (i.e., quantiles) from the two series are negligible for ARIs greater than about 15 years, but notable at smaller ARIs (especially for ARI $\leq$ 5 years). Because the PDS can include more than one event in any particular year, the results from a PDS analysis are more reliable for designs based on frequent events (e.g., Laurenson, 1987). To avoid confusion, herein the term AEP is used with AMS frequency analysis and ARI with PDS frequency analysis. The term “frequency” is interchangeably used to specify the ARI and AEP.

L-moments (Hosking and Wallis, 1997) provide an alternative way of describing frequency distributions to traditional product moments (conventional moments) or the maximum likelihood approach. Since sample estimators of L-moments are linear combinations of ranked observations, they are less susceptible to the presence of outliers in the data than conventional moments and are well suited for the analysis of data that exhibit significant skewness. L-moments typically used to calculate parameters of various frequency distributions include 1st and 2nd order L-moments: L-location (λ_1) and L-scale (λ_2), and the following L-moment ratios: L-CV (τ), L-skewness (τ_3), and L-kurtosis (τ_4). L-CV, which stands for “coefficient of L-variation”, is calculated as the ratio of L-scale to L-location (λ_2 / λ_1). L-skewness and L-kurtosis represent ratios of the 3rd order (λ_3) and 4th order (λ_4) L-moments to the 2nd order (λ_2) L-moment, respectively, and thus are independent of scale.

One of the primary problems in precipitation frequency analysis is the need to provide estimates for average recurrence intervals that are significantly longer than available records. Regional approaches, which use data from stations that are expected to have similar frequency distributions, have been shown to yield more accurate estimates of extreme quantiles than approaches that use only data from a single station. The number of stations used to define a region should be large enough to smooth variability in at-station estimates, but also small enough that regional estimates still adequately represent local conditions. The region-of-influence approach (Burn, 1990) used in this volume defines regions such that each station has its own region with a potentially unique combination of nearby stations. Stations are selected based on the maximum allowable distance from the target station that is defined in a geographic space and in a space of selected statistical attribute variables. Like with other regionalization approaches, there is a level of subjectivity involved in the process, for example, in choosing attribute variables, selecting the maximum allowable distance as well as attributes' weights and transformations for similarity distance algorithms. One of the advantages of the region-of-influence approach is that it results in a smooth transition in estimates across regional boundaries, which is relevant for the mapping of precipitation frequency estimates.

A frequency curve that is calculated from sample data represents some average estimate of the population frequency curve, but there is a high probability that the true value lies above or below the sample estimate. Confidence limits provide a measure of the uncertainty. They represent values between which one would expect the true value to lie with a certain confidence; they are not necessarily equidistant from the estimates. The width of a confidence interval between the upper and lower confidence limits is affected by several factors, such as the degree of confidence, sample size, exceedance probability, and so on. In this volume, simulation-based procedures were used to estimate confidence limits of a 90% confidence interval.

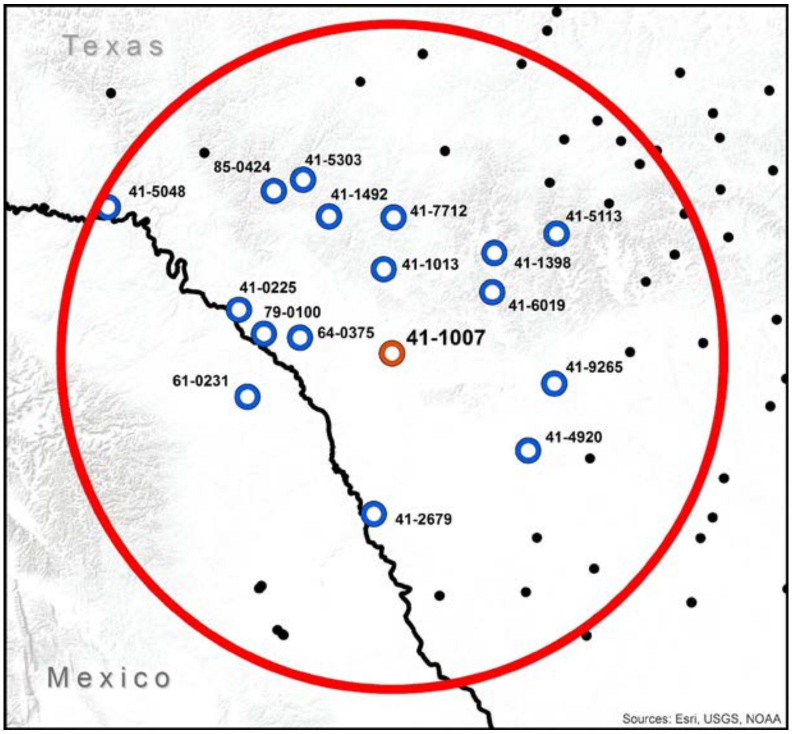
It should be noted that precipitation frequency estimates from NOAA Atlas 14 are point estimates and are not directly applicable to larger areas. The conversion of a point to an areal estimate is usually done by applying an appropriate areal reduction factor to the average of the point estimates within the subject area. Areal reduction factors are generally a function of the size of an area and the duration of the precipitation. The depth-area-duration curves from the Technical Paper No. 29 (U.S. Weather Bureau, 1957), developed for the contiguous United States, can be used for this purpose.

Also, precipitation frequency estimates for each NOAA Atlas 14 volume were computed independently using all available data at the time. Some discrepancies between volumes at project boundaries are inevitable and they will generally be more pronounced for more rare frequencies.

4.6.2. Regionalization

For each station, an initial region was created by grouping the closest 15 stations. Any station within a 60-mile radius that captured the highest observed 1-hour or 1-day amount was also automatically included in the initial region. Stations were then added to or removed from the region based on examination of their distance from a target station, inspection of their locations with respect to mountain ridges, elevation difference, difference in mean annual maxima, maximum recorded values and record lengths for selected durations, etc. (see an example in Figure 4.6.1) and assessment of similarities/dissimilarities in the progression of relevant L-moment statistics across durations compared with other stations in the region (see Figure 4.6.2). While highly dependent on station density, typical regions included between 15 and 25 stations with a cumulative number of data years between 700 and 1,800 for daily durations and 200 and 700 for hourly durations. However, in some areas of low station density some regions may have less 10 stations, with a cumulative number of data years as low as 200 for daily durations and 59 for hourly durations.

Regional L-moments calculation. For a given duration, regional estimates of L-moment ratios (L-CV, L-skewness and L-kurtosis) were obtained by averaging corresponding station-specific estimates weighted by record lengths. Regional L-moment ratios were then used to estimate higher order L-moments at each station.



Index	SID	Distance (mi)	Elev (ft)	Elev diff (ft)	N 24h	N 1hr	MAM 24h (in)	MAM diff (in)	MAX 1h (in)	MAX 6h (in)	MAX 24h (in)	MAX 10d (in)
SELECTED STATIONS												
1	41-1007		1119		131	0	3.85	0.00	-	-	19.98	21.00
2	41-1013	20.33	1759	640	35	0	3.48	-0.37	-	-	8.30	16.16
3	64-0375	22.51	1082	-37	34	0	3.57	-0.28	-	-	11.65	15.27
4	41-6019	28.24	1302	183	31	0	4.15	0.30	-	-	22.26	23.39
5	79-0100	31.21	1001	-118	111	95	3.38	-0.47	4.82	10.95	17.48	20.93
6	41-7712	32.61	1726	607	37	0	3.17	-0.68	-	-	8.99	17.92
7	41-1398	34.46	1480	361	59	0	3.85	-0.00	-	-	9.29	16.16
…												
BACKUP STATIONS												
17	41-5048	76.90	1289	170	83	65	3.01	-0.84	6.84	17.63	22.71	23.54
18	41-7706	50.21	2382	1263	73	55	3.54	-0.31	3.00	6.00	10.55	12.98
19	41-0560	53.90	745	-374	32	0	3.42	-0.43	-	-	7.23	10.87
20	41-7232	55.82	2051	932	52	0	4.03	0.18	-	-	9.08	13.61
…												
Enter SID for station(s) you want to remove from "Selected stations" list:												
Enter SID for station(s) you want to add from "Backup stations" list:												

Figure 4.6.1. An example of a spatial plot with accompanying table used in an interactive process for adding or removing stations assigned to the Brackettville (41-1007) station's region.

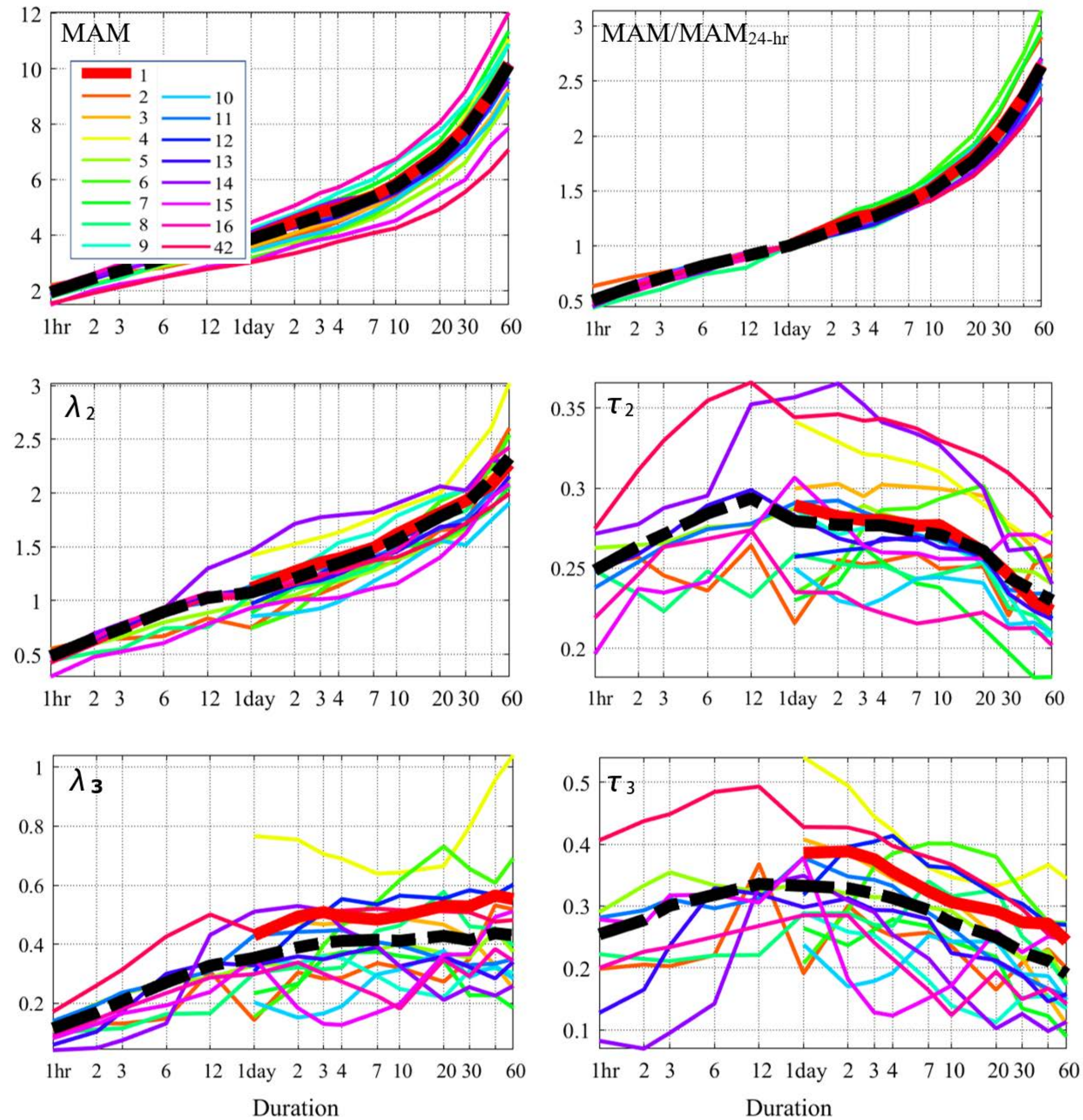


Figure 4.6.2. An example of plots of L-moments (left panels), MAM/MAM$_{24\text{-}hr}$ and L-moment ratios (right panels) across hourly and daily durations for stations assigned to the Brackettville's region. Thick red lines show statistics for the target station, thin colored lines show statistics for other stations in the region, and thick dashed black lines show corresponding regional estimates.

Station dependence. Since stations were selected based on geographic proximity to a target station, it was likely that some of the extracted annual maxima at nearby stations came from the same storm events. Dependence in AMS data for stations within a region was analyzed using a *t*-test for the significance of a correlation coefficient at the 5% level. Analysis indicated that cross-correlation among stations was often statistically significant in areas with a dense network of rain gauges and that the number of dependent station pairs increased with duration length. The impact of station dependence was accounted for during the construction of confidence intervals on estimates where it could have substantial influence (see Section 4.6.5).

4.6.3. AMS-based estimates

Choice of distribution. A goodness-of-fit test based on L-moment statistics for 3-parameter distributions, as suggested by Hosking and Wallis (1997), was used to assess which of the five 3-parameter distributions listed in Section 4.6.1 provide acceptable fit to the AMS data. Results of χ^2- and Kolmogorov-Smirnov tests and visual inspection of probability plots for all seven distributions for 1-hour, 1-day, and 10-day durations, like the one shown in Figure 4.6.3, were considered during distribution selection.

Although it is not required to use the same type of distribution across all durations and/or regions, changes in distribution type for different durations or regions often lead to considerable discontinuities in frequency estimates across durations or between nearby locations, particularly at more rare frequencies. Based on the test results, the GEV distribution, which is generally recommended for analysis of extreme event, provided an acceptable fit to data more frequently than any other distribution. Accordingly, the GEV distribution was adopted across all stations and for all durations.

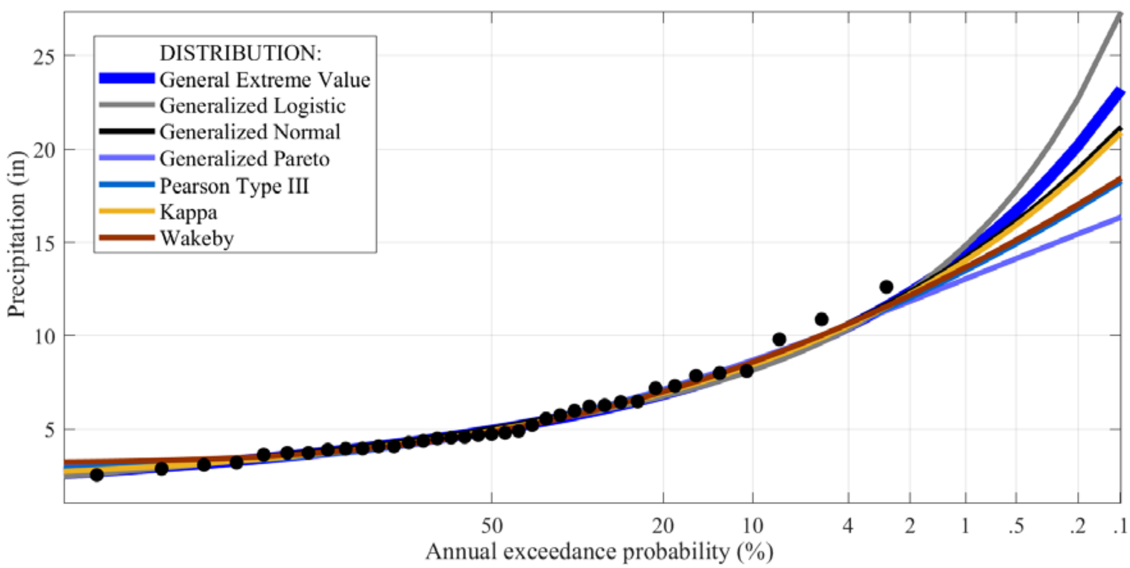


Figure 4.6.3. Probability plots for selected distributions for 1-day AMS at the Cotulla, TX (99-2048) station.

Frequency estimates for hourly and daily durations. For each station and for each hourly and daily duration, L-moment statistics were used to calculate the parameters of the GEV distribution and to produce precipitation frequency estimates for the following annual exceedance probabilities (AEPs): 1/2 (50%), 1/5, 1/10, 1/25, 1/50, 1/100, 1/200, 1/500, and 1/1000. This calculation was repeated for all durations and for all stations. Since L-moments, and consequently, precipitation frequency estimates, were calculated independently for each duration, the resulting depth-duration-frequency (DDF) curves did not always look smooth. Smoothing of quantiles using PCHIP (Piecewise Cubic Hermite Interpolating Polynomial) function (Fritsch and Carlson, 1980) improved the shape of DDF curves. Figure 4.6.4 illustrates precipitation depth-duration-frequency curves before and after smoothing for Dallas Fort Worth International Airport, TX (79-0018).

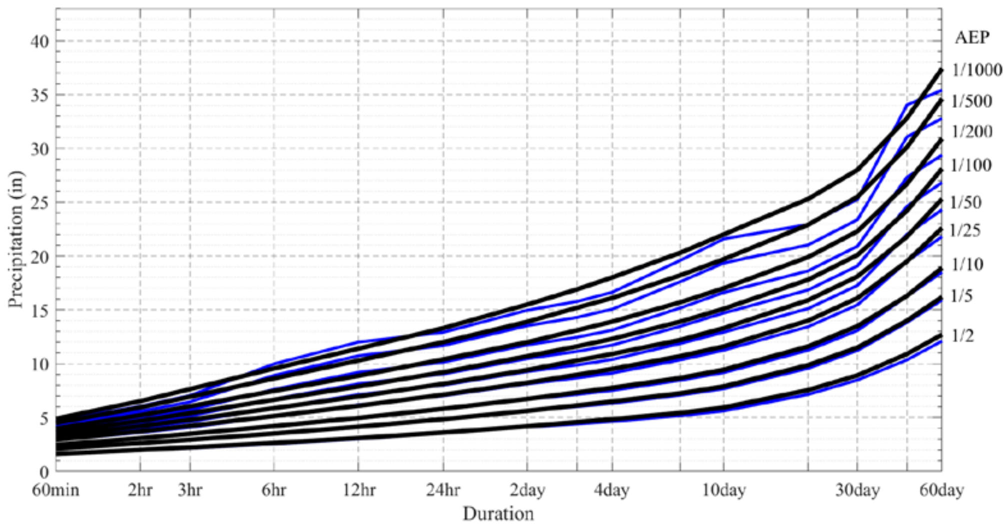


Figure 4.6.4. DDF curve for the Dallas Fort Worth International Airport, TX (79-0018) station. Black lines represent original estimates; blue lines represent smoothed estimates.

DDF adjustment for stations affected by Hurricane Harvey. Hurricane Harvey made landfall in Texas as Category 4 hurricane on 25 August 2017. The massive storm landed and stalled around southern Texas for days, dumping as much as 26.5 inches of rainfall in 24-hours and more than 40 inches in seven days over a large area in and around the vicinity of Houston and Port Arthur. Harvey broke all multi-day rainfall records and became the official highest amount of rainfall ever to fall on the continental U.S. from a single storm, with total of 60.58 inches over a 7-day period.

The investigation of the effect of Harvey on DDF curves indicated that the large multi-day amounts observed during Harvey unduly affected GEV distribution parameterization and consequently precipitation frequency estimates, especially for 1000-year ARI between 2-day and 20-day durations (see Figure 4.6.5 as an example).

The 1000-year 24-hour and the 1000-year 30-day estimates, which were not significantly skewed due to Harvey, were used as anchor points for adjusting 1000-year estimates between 2-day and 20-day durations. Final adjustments were made based on inspection of spatial patterns for 100-year and 1000-year estimates across affected durations.

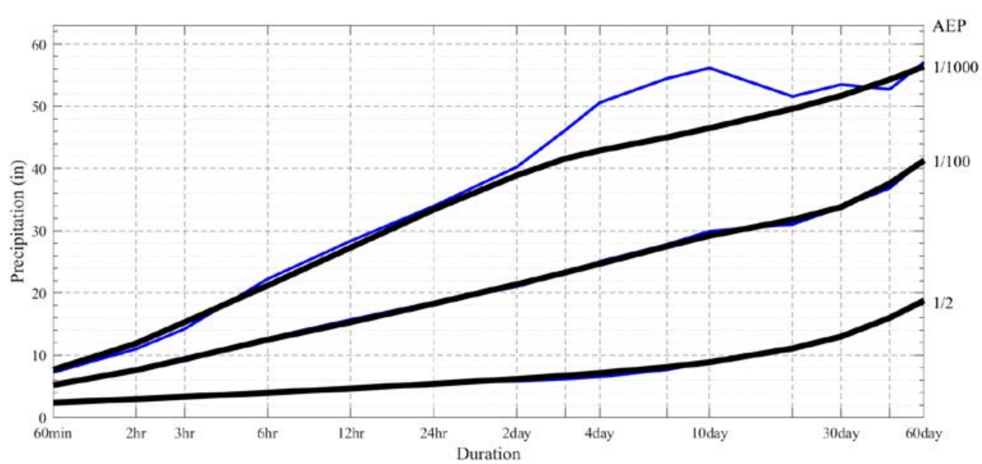


Figure 4.6.5. Adjustment on the multi-day 1000-year (1/1000 AEP) precipitation frequency estimates at Liberty, TX (41-5196) station to account for Harvey's impact. Blue lines represent original estimates; black lines represent adjusted estimates.

Frequency estimates for sub-hourly durations. The shortest duration at which AMS data were extracted was 15 minutes. Regional L-moment statistics were calculated for the 15-minute and 30-minute durations at stations that had 15-minute AMS data available for at least one station assigned to their region. L-moments were then used to produce precipitation frequency estimates in the same manner as for hourly and daily durations. However, in many cases, resulting precipitation frequency estimates were implausible, especially for AEPs of 1/100 (1%) or less. The primary cause of this was the sample size, as very few stations with measurements at sub-hourly durations were available, and when they were available, they typically had short periods of record. This resulted in unreliable moments (especially higher-order moments), and consequently, unreliable precipitation frequency estimates. λ_1 moments (i.e., mean annual maxima) were less sensitive to sample size and were generally in line with corresponding estimates at nearby stations. λ_1 moments were also, for the most part, consistent with the expected progression across hourly and daily durations (see top left panel of Figure 4.6.2). For that reason, mean annual maxima at 15-minute and 30-minute durations were retained for derivation of MAM grids (see Section 4.8.1). At-station quantiles, which were assessed as unreliable, were not interpolated to create precipitation frequency grids; an alternative approach described in Section 4.8.2 was used for that purpose.

Similarly, for the 5-minute and 10-minute durations, very few n-minute stations were available to compute precipitation frequency estimates using regional L-moments or to develop MAM grids. Therefore, an alternative approach described in Section 4.8.2 was used to develop these estimates, as well.

4.6.4. PDS-based estimates

PDS-based precipitation frequency estimates were calculated indirectly from Langbein's formula (Langbein, 1949) which transforms a PDS-based average recurrence interval (ARI) to an annual exceedance probability (AEP):

$$\mathrm{AEP} = 1 - \exp\left(-\frac{1}{\mathrm{ARI}}\right).$$

PDS-based frequency estimates were calculated for the same durations as AMS-based estimates for 1-, 2-, 5-, 10-, 25-, 50-, 100-, 200-, 500-, and 1,000-year ARIs. Selected ARIs were first converted to AEPs using the above formula and then precipitation frequency estimates were calculated for those AEPs following the same approach that was used in the AMS analysis.

4.6.5. Confidence limits

A Monte Carlo simulation procedure that accounts for inter-station dependence described in Hosking and Wallis (1997), was used to construct 90% confidence intervals (i.e., 5% and 95% confidence limits) on both AMS-based and PDS-based precipitation frequency curves (see Section 4.6.2 for spatial dependence analysis). At each station, 1,000 simulated data sets per duration were used to generate precipitation quantiles. Estimates were sorted from smallest to largest and the 50th value was selected as the lower confidence limit, while the 950th value was selected as the upper confidence limit. It should be noted that confidence intervals constructed through this approach account for uncertainties in distribution parameters, but not for other sources of uncertainties (for example, distribution selection) that could also significantly impact the total error, particularly at more rare frequencies.

For some stations, due to differences in record lengths across hourly and daily durations, confidence intervals for hourly durations were wider than corresponding intervals at daily durations; therefore, they were restricted by the corresponding values at 24-hour duration. Confidence limits for sub-hourly durations were calculated using similar approaches that were used to calculate frequency estimates at those durations. Since confidence limits were derived for each duration independently, like precipitation frequency estimates, they could fluctuate from duration to duration and were smoothed across durations using cubic spline functions.

4.7. Rainfall (liquid precipitation) frequency estimates

Precipitation frequency estimates from Section 4.6 represent precipitation magnitudes regardless of the type of precipitation. For some applications it may be important to know frequency estimates from liquid precipitation (i.e., rainfall) only. For example, rainfall is treated differently from snowfall in watershed modeling because of different runoff producing mechanisms. While the rainfall generates runoff almost immediately, snowfall generally goes into storage until it melts and produces runoff at a later time.

For NOAA Atlas 14 project areas where snowfall contributes to the precipitation AMS, empirical equations were developed to produce frequency estimates for rainfall (i.e., liquid precipitation only) from corresponding precipitation frequency estimates (see for example, Section 4.7 of Volume 7). In the NOAA Atlas Volume 11 project area, the contribution of snowfall to AMS is trivial due to geo-climatic conditions, so no separate rainfall frequency analysis was needed.

4.8. Derivation of grids

4.8.1. Mean annual maximum precipitation

Grids of mean annual maxima (MAM) served as the basis for deriving gridded precipitation frequency estimates at different frequencies and durations. The station mean annual maximum values for the 17 durations from 15-minute and 60-day were spatially interpolated to produce corresponding mean annual maximum grids at 30 arc-seconds resolution using a hybrid statistical-geographic approach for mapping climate data named Parameter-elevation Regressions on Independent Slopes Model (PRISM), developed by Oregon State University's PRISM Climate Group (e.g., Daly et al., 2002).

Several iterations with the PRISM Climate Group were made to ensure satisfactory MAM patterns. Gauged locations where interpolated MAMs for selected base durations (15-minute, 1-hour, 1-day, 10-day) were more than 10% different (determined by jackknife analysis) than the expected at-station MAMs were carefully re-examined. As a result of those reviews, some MAM estimates were adjusted. MAMs were also estimated for a couple of locations to better anchor the spatial interpolation in coastal and varied terrain areas and/or where the lack of stations with sufficiently long records unduly influenced expected spatial patterns, particularly at hourly durations. MAMs were raised for several stations southwest of Houston in the vicinity of El Campo and Bay City area to improve the steep spatial gradient and improve patterns that were due to a couple of missing significant events in a low-density station area. This adjustment was made as a result of comments received during the peer review process (see Appendix A.4).

Appendix A.3 provides detailed information on the PRISM-based methodology for creating the mean annual maximum grids. In summary, a unique regression function was developed for each target grid cell to derive mean annual maximum values for each duration that accounted for the difference between an observing station's and the target cell's mean annual precipitation, topographic facet, coastal proximity, the distance of an observing station to the target cell, etc. Jackknife cross-validation indicated that the overall percent bias was less than 0.5% and the mean absolute error was less than 4% across all durations.

4.8.2. Precipitation frequency estimates with confidence limits

Estimates for 60-minute through 60-day durations. The spatial interpolation technique used in this volume developed grids of AMS-based and PDS-based precipitation frequency estimates along the frequency dimension for a given duration. Hence, the evolution of frequency-dependent spatial patterns for a given duration was independent of other durations. The technique utilizes the inherently strong linear relationship that was found to exist between precipitation frequency estimates for consecutive frequencies, as well as mean annual maxima and 2-year precipitation frequency estimates. For example,

Figure 4.8.1 a) shows the relationship between the 50-year and 100-year estimates for the 24-hour duration for this project area together with regression lines for a linear model and zero-intercept model. The R^2 values are very close to 1.0, which was common for all relationships. Another common occurrence was a negligible intercept coefficient in the linear model regression equations, so a zero-intercept model was adopted for all frequencies and durations. The slope coefficient of the zero-intercept model represents an average domain-wide ratio between consecutive quantiles; in this case, 1.148 is an average ratio between 100-year and 50-year quantiles for the 24-hour duration for the whole project area. Although the correlation coefficients were very high, when plotted on a map, at-station ratios showed some regional features (as shown in Figure 4.8.1 b) for the same example); this finding was used in the grid generation process.

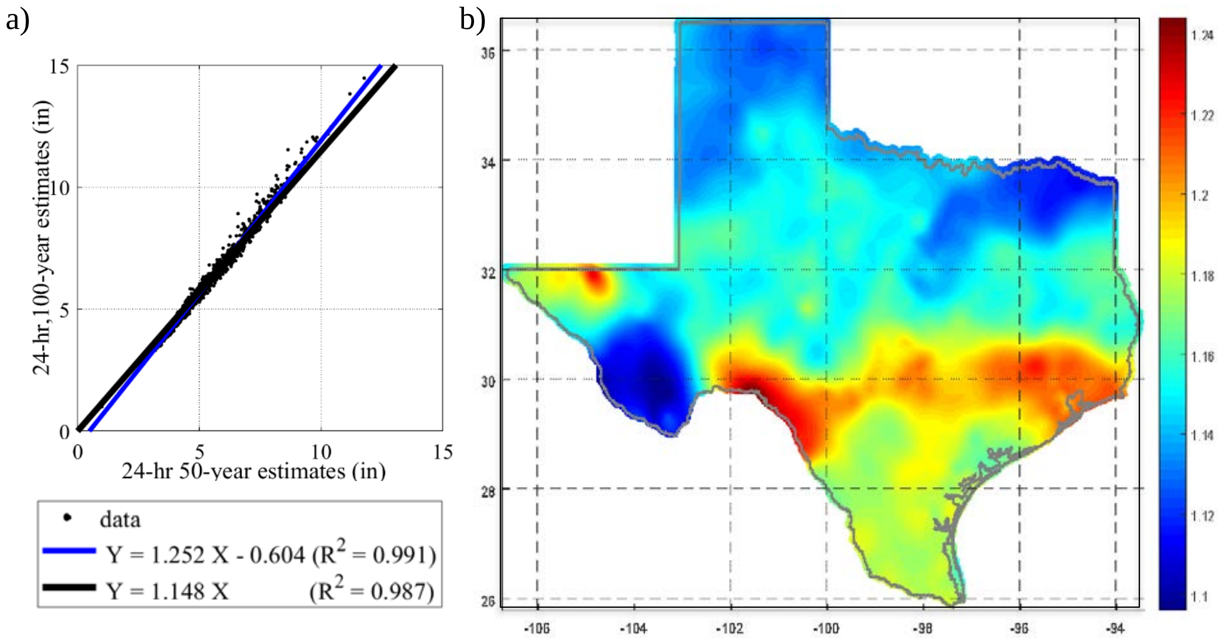


Figure 4.8.1. a) Scatter plot of 100-year versus 50-year 24-hour precipitation frequency estimates. Linear model and zero-intercept linear model regression lines are also shown. b) Spatially interpolated ratios used to calculate 24-hour 100-year precipitation frequency grid from the 24-hour 50-year grid.

For each duration, the calculation began with the PRISM-derived MAM grid as the initial predictor grid and the grid of 2-year precipitation frequency estimates as the resulting subsequent grid. At-station ratios between the 2-year estimates and corresponding MAM estimates were spatially interpolated to a grid using a natural neighbor interpolation method, which provides a smooth approximation to the underlying "true" function while remaining true to the at-station estimates. Gridded MAM estimates were then multiplied by corresponding gridded ratios to create a grid of 2-year precipitation frequency estimates. In the subsequent run, ratios between the 5-year and 2-year estimates were interpolated and used to calculate the 5-year precipitation grid from the 2-year grid, and so forth. The grid of 2-year precipitation frequency estimates was also used to create a grid of 1-year estimates. The same process was repeated for all hourly and daily durations.

During the review process, station-driven contour lines were showing up in cartographic maps in flat terrain areas (see Appendix A.4). The majority of these were driven by small differences in MAM estimates at nearby stations and selected mapping contour intervals, but to reduce a number of station-driven contours in the final cartographic maps, a dynamic filter was applied to the precipitation frequency grids. Parameters of the filter, which controlled the amount of smoothing, were a function of elevation gradients and proximity to the coastline. Parameters were selected such that minimal smoothing was applied at the coastline or in the mountains, maximum smoothing was applied in flat terrain, and the transition from one to another was gradual. The resulting smoothed grid then served in the subsequent run as the basis for the derivation of the next grid.

To ensure consistency in grid cell values across all durations and frequencies (e.g., 24-hour estimate has to be at least equal to 12-hour estimate), duration-based internal consistency checks were conducted. For inconsistent cases, the longer duration grid cell value was adjusted by multiplying the shorter duration grid cell value by 1.01 to provide a 1% difference between the values. After grid cell consistency was ensured across durations, it was performed across frequencies to ensure that there were no frequency-based inconsistencies caused by the adjustment across durations.

A jackknife cross-validation was used to evaluate the spatial interpolation technique's performance for interpolating precipitation frequency estimates. It was cost prohibitive to re-create the PRISM mean annual maximum grids for each cross-validation iteration. For this reason, the cross-validation results reflect the accuracy of the interpolation procedure based on the same mean annual maximum grids. Figure 4.8.2 shows validation results for 100-year estimates for the 1-hour and 24-hour durations as histograms showing the distribution of differences in estimates with and without each station (errors). Overall, the spatial interpolation technique adequately reproduced values. Errors in 100-year estimates were less than ±5% for 95% of stations for the 1-hour duration and for 99% of stations for the 24-hour duration.

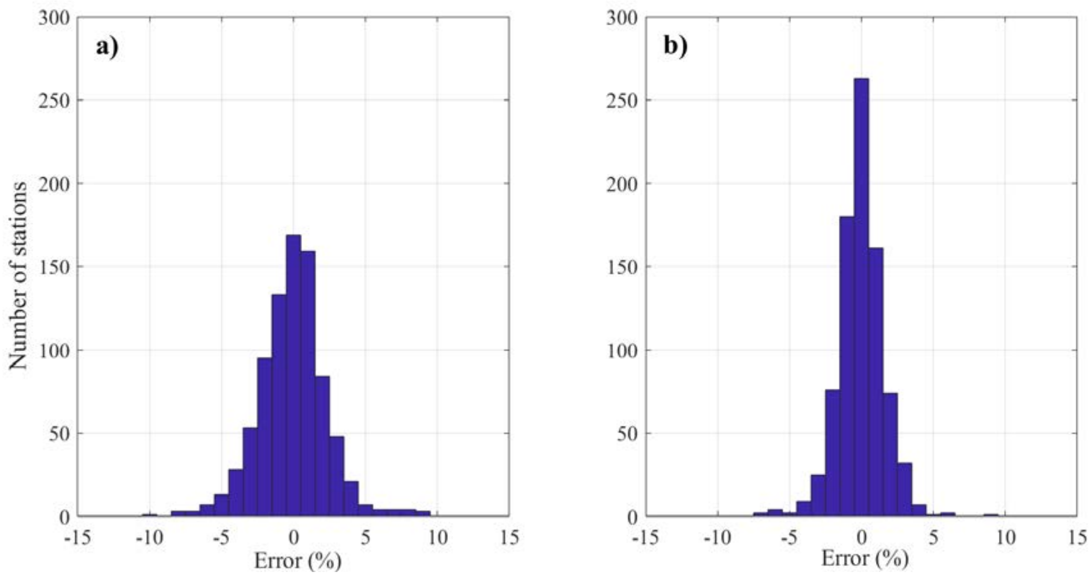


Figure 4.8.2. NOAA Atlas 14 Volume 11 jackknife cross-validation results for: a) 100-year 1-hour estimates, and b) 100-year 24-hour estimates.

Estimates for 5-minute through 30-minute durations. A similar approach to the one used to derive grids of precipitation frequency estimates for hourly and daily durations was used to derive gridded estimates for the 15-minute and 30-minute durations. For 15-minute, a grid of 2-year precipitation frequency estimates was calculated by multiplying the 15-minute MAM grid with a grid of ratios between the 2-year estimates and corresponding MAM estimates. In the subsequent run, a grid of ratios between the 5-year and 2-year estimates was used to calculate the 5-year grid from the 2-year grid, and so forth. The main difference is that, due to concerns about the soundness of at-station precipitation frequency estimates computed directly from AMS for sub-hourly durations, instead of using interpolating gridded ratios from sub-hourly estimates, corresponding 60-minute ratio grids were assumed to characterize 15-minute ratio grids. The same process was used for 30-minute duration, as well.

Precipitation frequency grids for 5-minute and 10-minute durations were derived by multiplying the 15-minute precipitation frequency grids by scaling factors. Scaling factors were obtained from n-minute stations; they were calculated as average ratios of 5-minute and 10-minute annual maxima to corresponding 15-minute annual maxima. Given that relatively few n-minute stations were available, and that at-station scaling factors varied little across the project area, they were assumed to be uniform for the whole area: 0.57 for 5-minute duration and 0.82 for 10-minute duration. The scaling factors were applied to the 15-minute precipitation frequency grids for all frequencies to create matching 5-minute and 10-minute grids.

Confidence limits. Grids of upper and lower limits of the 90% confidence interval for the precipitation frequency estimates between 5-minute and 60-day durations were derived using same procedures that were used to create grids of precipitation frequency estimates.

5. Precipitation Frequency Data Server

NOAA Atlas 14 precipitation frequency estimates are delivered entirely in digital form in order to make the estimates more widely available and to provide them in various formats. Precipitation Frequency Data Server (PFDS) provides a point-and-click web portal for precipitation frequency estimates and associated information.

In early 2011 the PFDS underwent a major redesign to make PFDS pages interactive. Since then, PFDS pages were enhanced on several occasions to improve the usability and readability of the PFDS website's content, to increase data download speeds, and to provide additional information. In order to keep this section of the documentation up-to-date for all volumes, the PFDS section is offered as a separate document. This document is updated as needed and is available for download from here.

6. Peer review

A peer review of preliminary results for the NOAA Atlas 14 (NA14) Volume 11 precipitation frequency project was carried out in the period between 20 November 2017 and 19 January 2018. The request for review was sent via email to individuals who were suggested by agencies that funded this work as potential reviewers, expressed interest in participating in the review, or who have subscribed to the HDSC mailing list-server.

The review package included the following items:

a. Station metadata. Reviewers were asked to examine the accuracy of stations' metadata and provide comments on suggested station deletions and merges. Station metadata were grouped into three categories: a) Texas stations used in the frequency analysis, b) stations outside Texas that assisted in the analysis, and c) stations that were examined but not retained for the analysis. The metadata tables included information on each station's name, state, source of data, latitude, longitude, elevation, and period of record. The tables also provided basic information on other stations that contributed data to each station for sub-hourly, hourly, and/or daily durations, if applicable. If station data was collected but not used in the analysis, a brief comment on why the data was not used was also provided. Generally, stations were not used because there was another nearby station with a longer period of record, station data were assessed unreliable for this specific purpose, or the station's period of record was not long enough and it was not a candidate for merging with any nearby station.

b. At-station depth-duration-frequency (DDF) curves. Reviewers were asked to examine the DDF curves for stations retained in the analysis for 1-hour to 10-day durations and for 2-year through 100-year average recurrence intervals and to comment on their reasonableness.

c. Spatially-interpolated estimates. Reviewers were invited to comment on the overall and local spatial patterns in spatially-interpolated precipitation frequency estimates for 2-year and 100-year ARIs and for 60-minute, 6-hour, 24-hour, and 10-day durations. To illustrate how much estimates changed in the project area, cartographic maps showing the differences between NOAA Atlas 14 and superseded NOAA 100-year estimates for 60-minute, 6-hour, 24-hour, and 10-day durations were also shared.

As part of the peer review process, several meetings and panel discussions were arranged to address any questions or concerns reviewers may have had after looking over the information shared. Comments were received from twenty-six individuals representing various federal, state, and local agencies. Their reviews provided critical feedback that improved the estimates. Reviewers' comments regarding station metadata, at-station precipitation frequency estimates, and their spatial patterns can be found in Appendix A.4 along with HDSC responses.

7. Comparison with previous NOAA publications

The precipitation frequency estimates in NOAA Atlas 14 (NA14) Volume 11 supersede the estimates published in the following publications:

a. NOAA Technical Memorandum NWS HYDRO-35, *Five- to 60-Minute Precipitation Frequency for the Eastern and Central United States* (Frederick et al., 1977) for 5-minute to 60-minute durations;
b. Weather Bureau Technical Paper No. 40, *Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years* (Hershfield, 1961) for 2-hour to 24-hour durations;
c. Weather Bureau Technical Paper No. 49, *Two- to Ten-Day Precipitation for Return Periods of 2 to 100 Years in the Contiguous United States* (Miller, 1964) for 2-day to 10-day durations.

Precipitation frequency estimates at the 100-year average recurrence interval from NOAA Atlas 14 were examined in relation to corresponding estimates from NOAA Technical Memorandum NWS HYDRO-35 (HYDRO35) for the 60-minute duration and the Weather Bureau Technical Paper No. 40 (TP40) for the 24-hour duration. Corresponding grids from HYDRO35 and TP40, which were used in the comparison, were obtained by interpolating digitized isopluvials from paper cartographic maps using the standard spatial interpolation tools available in ArcGIS.

100-year 60-minute. The maps in Figures 7.1 and 7.2 illustrate the differences between NA14 and HYDRO35 100-year 60-minute estimates in inches and in percentages, respectively. The contour lines superimposed on the maps represent isopluvials from HYDRO35. 100-year 60-minute precipitation frequency estimates at specific locations across the project area changed between -1.39 and 1.24 inches, or from -39% to 36%. The increase of more than one inch occurred in South Texas from Del Rio to Brackettville, extending south to Eagle Pass. Other areas with notable increases in estimates include the vicinity of Houston, where estimates increased in the range of 0.51 - 0.75 inches, areas of the Texas Hill Country to the west of San Antonio with increases in the range of 0.51 - 1.0 inches, and Austin and surrounding areas with increases in the range of 0.51 - 0.75 inches. The largest decreases of up to 1.39 inches occurred in Southwest Texas, in and around the vicinity of Big Bend National Park, including Rio Grande Village. Another large area that experienced a decrease includes portions of the Edwards Plateau in the vicinity of Junction, where estimates decreased between 0.50 and 0.74 inches.

The differences in estimates between the two publications are attributed to several factors. Firstly, differences in data quality control procedures and frequency analysis approaches (such as distribution selection, parameter estimation method, regional versus at-station methods) affect estimates, especially at higher ARIs. Section 4.6.1 of this document describes the methods used in NA14 and their advantages. Secondly, differences in spatial interpolation techniques impact estimates at ungauged locations. Isopluvials in HYDRO35 were based solely on station data without incorporating topographic features; NA14 estimates were based on PRISM products that integrate topography (see Section 4.8 for more details). Finally, the increase in the amount of available data from HYDRO35 to NA14, both in the number of stations and their record lengths, has a considerable effect on estimates. HYDRO35 was published in 1977 using data from 1948 to 1972. Stations retained for analysis in HYDRO35 had between 15 and 25 years of data. At those stations, 46 additional years of data were potentially available for the NA14 analyses. Also, many stations that were rejected at the time due to short records (less than 15 years) were included in NA14. For example, for Big Bend National Park in Brewster County, which saw some of the most significant decreases in estimates (up to 39%), not a single sub-daily station was used in HYDRO35 due to short periods of record, whereas for the NA14 analysis 59 years of data was available at one station in the area.

A detailed comparison of the numbers of stations and record lengths available to each of the two projects could not be provided since the HYDRO35 project covered a significantly larger area and the necessary information was not available in the HYDRO35 document.

100-year 24-hour. The maps in Figures 7.3 and 7.4 illustrate the differences between NA14 and TP40 100-year 24-hour estimates in inches and in percentages, respectively. The contour lines superimposed on the maps represent isopluvials from TP40. 100-year 24-hour precipitation frequency estimates at specific locations across the project area changed between -2.63 and 6.91 inches, or from -40% to 152%. Some of the largest increases occurred in the area surrounding the Guadalupe Mountains in West Texas, with an increase of up to almost 7 inches (~150%) in the vicinity of Guadalupe Peak, the highest point in Texas. NA14 analysis by design accounts for topographic effects, but also could rely on stations in the area with relatively long records. In contrast, the TP40 analysis, which did not account for orographic impacts, was unable to resolve the effect of mountainous terrain on estimates without a single observation site in the vicinity.

Much of Southeast Texas along the Gulf Coast, including the Houston area, experienced increases in estimates of more than 3 inches, and as high as 6 inches (increase of ~50%) in Liberty. Areas further down the coast towards Corpus Christi experienced increases in the range of 2–3 inches (up to 30%). Estimates increased up to 5 inches in the Texas Hill Country in the vicinity of Medina, embedded within a large area that increased 3 to 4 inches from Langtry, Del Rio, and Eagle Pass extending eastward all the way to San Marcos. Estimates decreased as much as 2.63 inches (40% decrease) in Southwest Texas, in and around the vicinity of Big Bend National Park, including Rio Grande Village.

Differences in estimates can be attributed to similar factors as for the 60-minute duration: different data quality control techniques, frequency analysis approaches, and spatial interpolation techniques. Also, many stations that were rejected at the time due to short records (less than 15 years) were included in NA14 and 60 additional data years were potentially available at stations used in TP40 for the NA14 analysis, since TP40 was published in 1961 with data collected through 1957. A more detailed comparison of the numbers of stations and their record lengths between the two projects could not be provided since the necessary information was not available in the TP40 document.

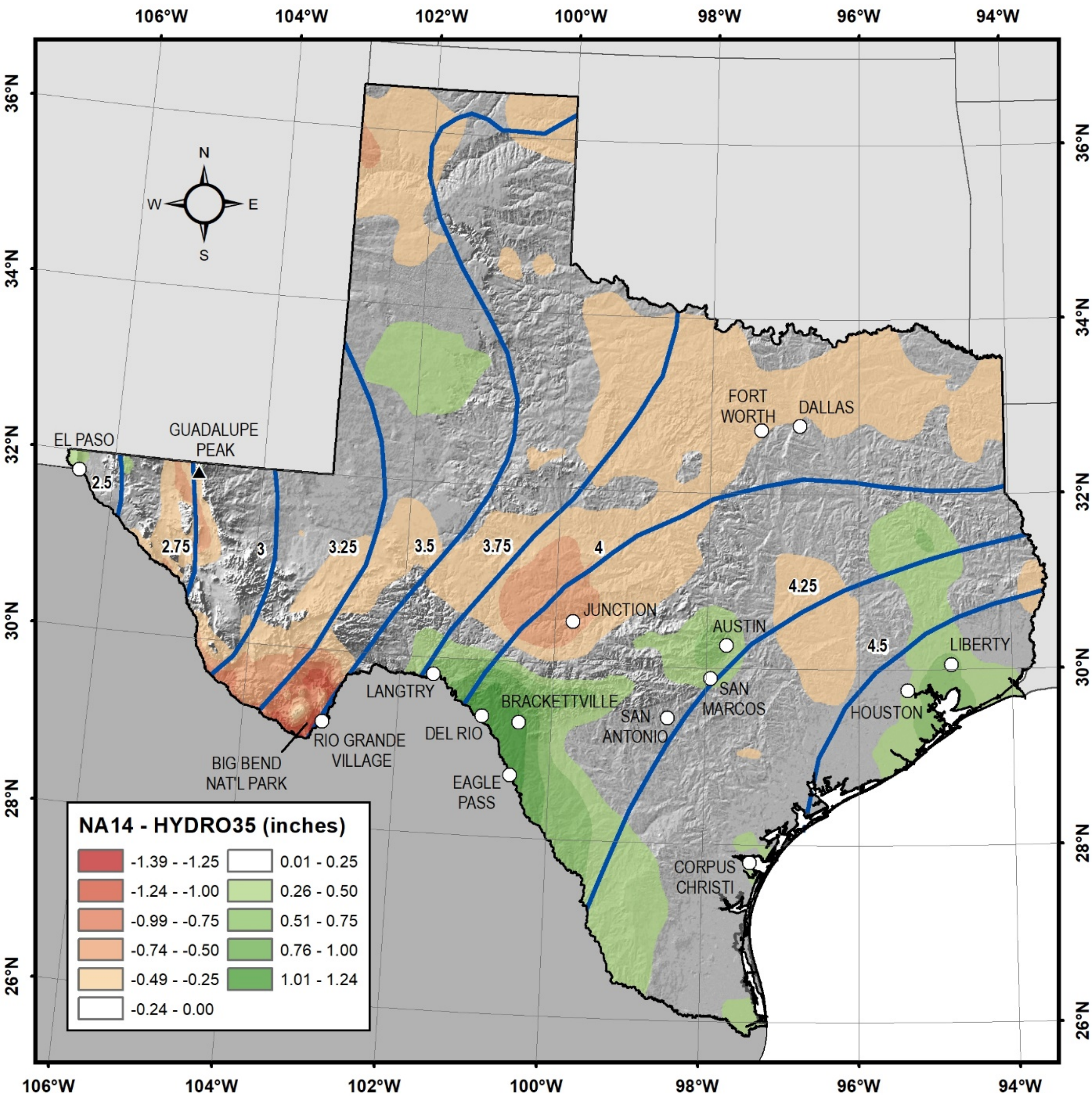


Figure 7.1. Map showing differences in 100-year 60-minute estimates (in inches) between NA14 and HYDRO35 for Texas. Superimposed on the map are isopluvials (blue lines) from HYDRO35.

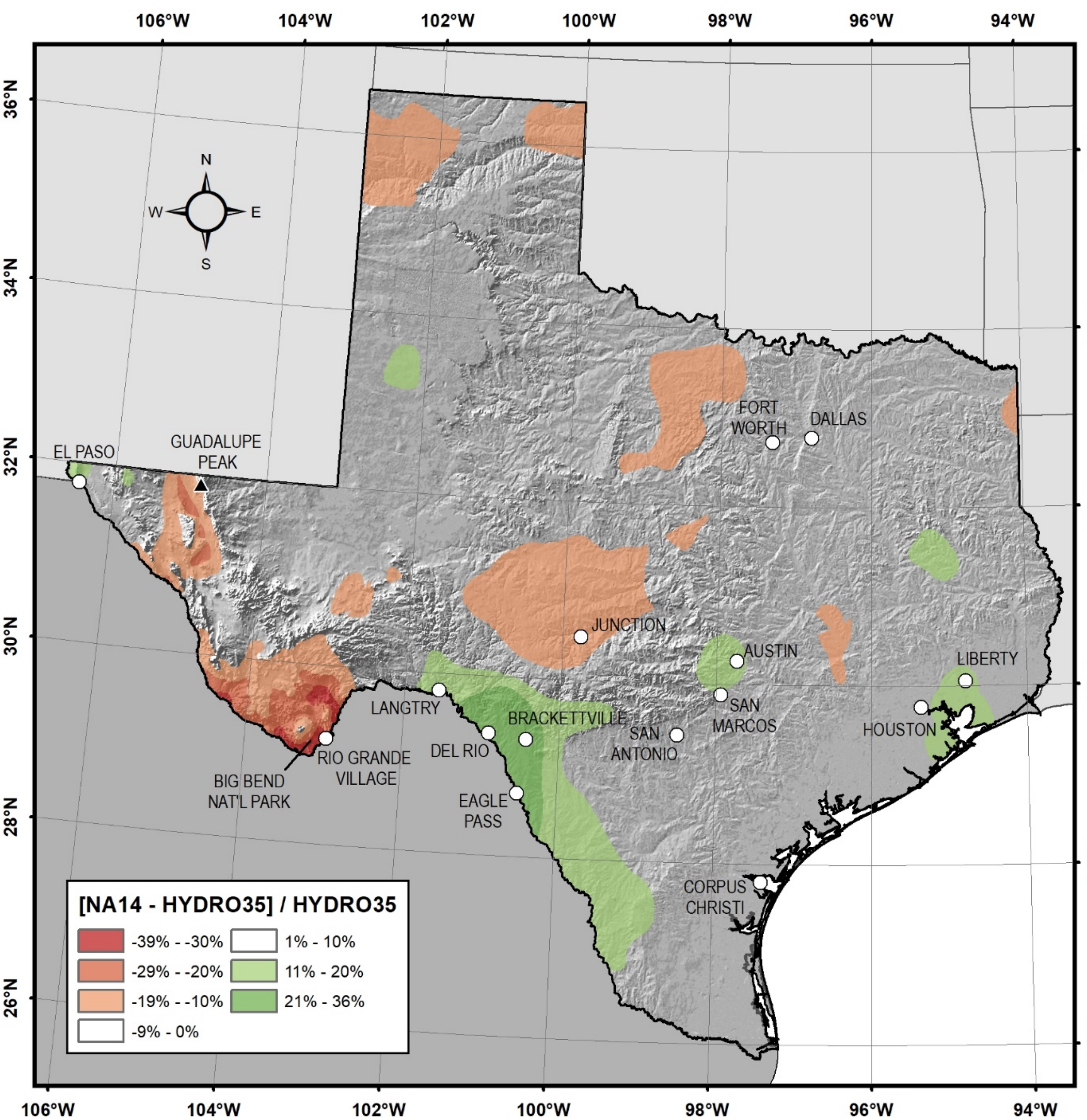


Figure 7.2. Map showing percent differences in 100-year 60-minute estimates between NA14 and HYDRO35 for Texas.

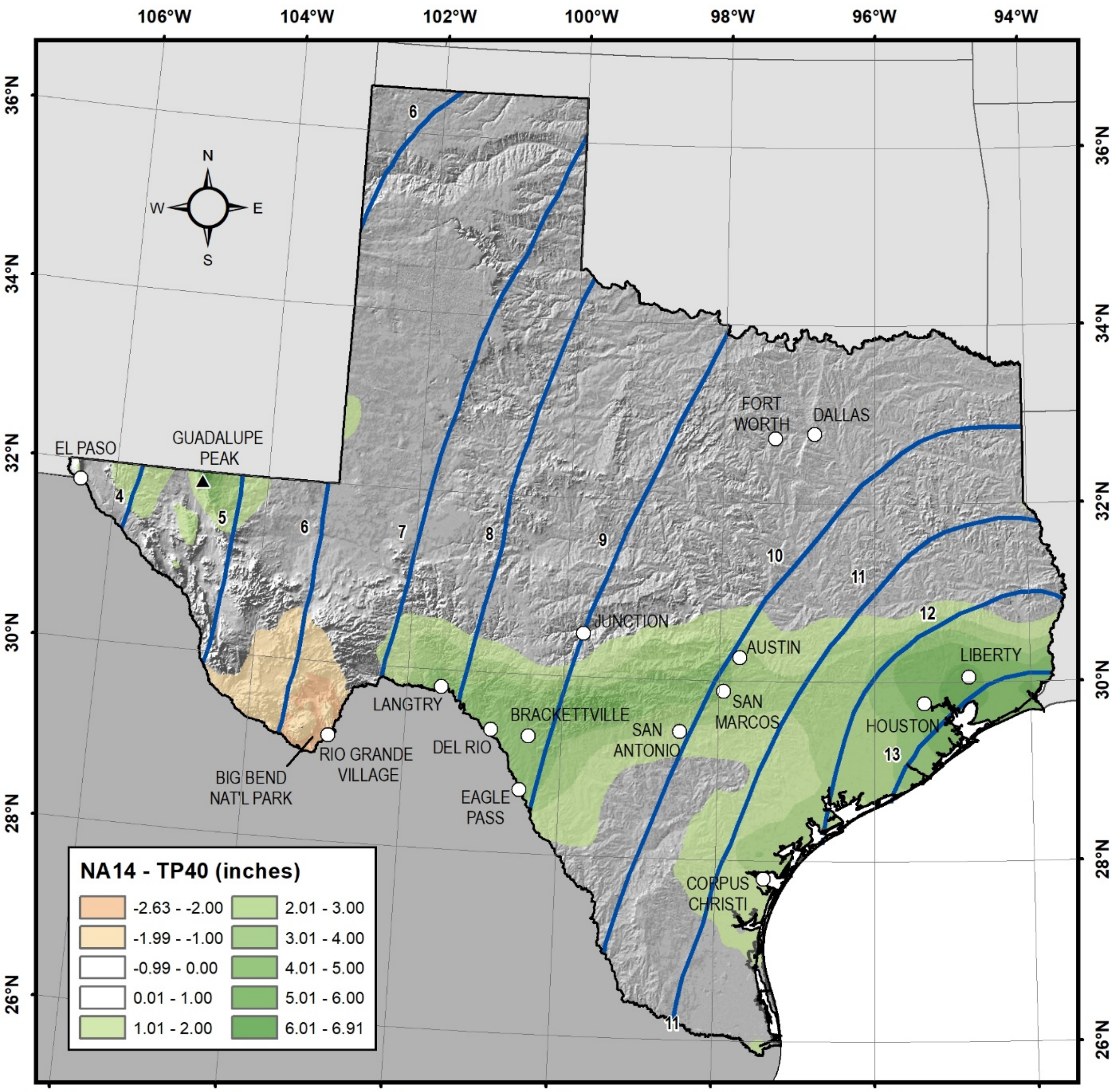


Figure 7.3. Map showing differences in 100-year 24-hour estimates (in inches) between NA14 and TP40 for Texas. Superimposed on the map are isopluvials (blue lines) from TP40.

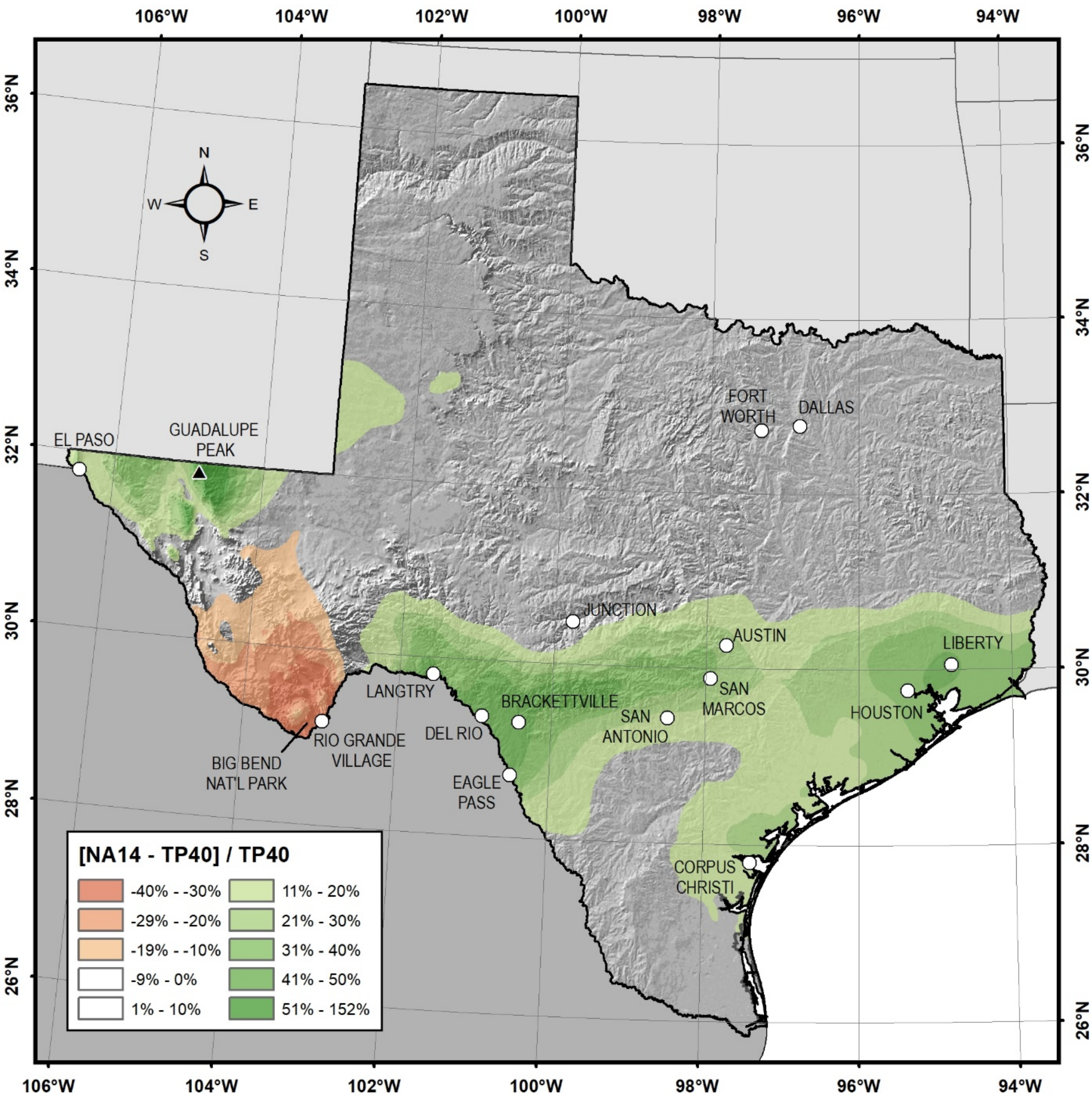


Figure 7.4. Map showing percent differences in 100-year 24-hour estimates between NA14 and TP40.

Appendix A.1. Metadata for stations used to prepare precipitation frequency estimates.

Table A.1.1. Texas locations for which precipitation frequency estimates were directly derived. The table shows each location's state (for consistency with table A.1.2), name, identification number (SID), latitude, longitude, elevation, and AMS record lengths (data years) across sub-hourly, hourly, and daily durations. It also lists SIDs for stations that contributed data to this location for sub-hourly, hourly, and/or daily durations. Details on contributing stations' metadata are provided in Tables A.1.3 and A.1.4.

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years			Contributing stations		
						<1hr	hourly	daily	<1hr	hourly	daily
TX	ABERNATHY	41-0012	33.8400	-101.8581	3360	0	0	71			41-0012 DLY
TX	ABILENE RGNL AP	79-0090	32.4106	-99.6822	1791	0	110	109		99-0017 HLY 56-0163 HLY 55-0086 HLY 41-0016 HLY	99-0017 HLY 56-0163 HLY 55-0086 HLY 41-0016 HLY 41-0016 HLY 79-0090 DLY
TX	ACKER RCH	41-0025	28.1569	-98.5142	436	0	0	38			98-0001 DLY 41-0025 DLY
TX	ACKERLY 4SE	41-0034	32.4899	-101.6635	2765	0	0	57			41-0034 DLY
TX	ADAMSVILLE	41-0050	31.2833	-98.1500	1030	0	20	23		41-0050 HLY	41-0050 HLY 41-0050 DLY
TX	ALBANY	41-0120	32.7047	-99.3011	1440	0	0	113			41-0120 DLY
TX	ALEDO 4 SE	41-0129	32.6444	-97.5617	791	0	0	48			69-2294 DLY 41-0129 DLY
TX	ALICE	41-0144	27.7283	-98.0678	200	0	17	99		55-0047 HLY 56-0116 HLY	79-0053 DLY 41-0144 DLY
TX	ALPINE	41-0174	30.3764	-103.6600	4449	25	30	87	41-0174 15M	41-0174 HLY	41-0174 DLY
TX	ALTO 5 SW	41-0190	31.6094	-95.1342	279	0	0	64			41-0190 DLY
TX	ALVARADO 4NE	41-0202	32.4644	-97.1831	705	0	0	52			41-0201 DLY 41-0202 HLY 41-0202 DLY
TX	ALVIN	41-0204	29.3653	-95.2336	30	0	0	107			69-0719 DLY 41-0204 DLY
TX	ALVORD 3 N	41-0206	33.3869	-97.7164	856	3	56	62	66-0206 15M 41-0206 15M	66-0206 15M 41-0206 HLY	41-0206 HLY 41-0206 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	AMARILLO	79-0116	35.2333	-101.7089	3586	0	76	77		78-0007 15M 56-0183 HLY 41-0211 HLY	41-0211 HLY 79-0116 DLY
TX	AMARILLO	99-0212	35.2063	-101.8358	3663	0	37	37		99-0212 HLY	99-0212 HLY
TX	AMISTAD DAM	41-0225	29.4608	-101.0286	1158	0	0	54			41-0225 DLY
TX	ANAHUAC	41-0235	29.7878	-94.6342	23	0	0	99			82-2250 15M 41-0235 DLY
TX	ANDERSON	41-0244	30.4833	-95.9833	351	0	0	53			41-0244 DLY
TX	ANDICE 2 SW	41-0246	30.7569	-97.8619	1060	0	0	48			41-0246 DLY
TX	ANDREWS	41-0248	32.3483	-102.5517	3192	39	67	72	66-0250 15M 80-0008 15M 41-0248 15M	66-0250 15M 80-0008 15M 41-0248 15M 41-0248 HLY	66-0250 15M 80-0008 15M 41-0248 15M 41-0248 HLY 41-0248 HLY 41-0248 DLY
TX	ANGLETON 2 W	41-0257	29.1572	-95.4592	26	0	0	102			69-0721 DLY 41-0257 DLY
TX	ANNA	41-0262	33.3500	-96.5167	679	0	43	59		41-0262 HLY	69-0988 DLY 41-0262 HLY 41-0262 DLY
TX	ANSON	41-0268	32.7667	-99.8900	1719	0	0	53			41-0268 DLY
TX	ANTELOPE	41-0271	33.4414	-98.3689	1024	0	0	77			41-0271 DLY
TX	ARANSAS PASS 2	41-0302	27.9167	-97.1333	20	0	0	30			69-0543 DLY 41-0302 DLY
TX	ARANSAS WR	41-0305	28.3081	-96.8047	16	0	18	75		76-0025 HLY 64-0662 HLY	41-0437 DLY 76-0025 HLY 64-0662 HLY 41-0305 DLY
TX	ARCHER CITY 1E	41-0313	33.5947	-98.6117	1053	0	0	66			41-0313 DLY
TX	ARLINGTON SIX FLAGS	41-0337	32.7572	-97.0736	535	0	0	72			69-2419 DLY 41-0337 DLY
TX	ARMAND BYU AT GENOARED BLF RD	60-0022	29.6345	-95.1123	15	31	31	31	60-0024 15M 60-0022 15M	60-0024 15M 60-0022 15M	60-0024 15M 60-0022 15M

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	ARTHUR CITY	41-0367	33.8756	-95.5022	427	26	31	100	41-6834 15M	41-6834 HLY	41-6834 HLY 41-0367 DLY
TX	ASPERMONT	41-0394	33.1525	-100.2333	1670	0	0	102			41-0394 DLY
TX	ATHENS	41-0404	32.1633	-95.8300	449	0	0	68			41-0404 DLY
TX	ATLANTA	41-0408	33.1244	-94.1661	315	0	0	65			41-0408 DLY
TX	AUSTIN	41-0420	30.2682	-97.7426	523	31	46	127	65-0089 15M 63-0193 15M	99-0420 HLY 65-0089 15M 63-0193 HLY	52-0438 DLY 52-7207 DLY 52-0434 DLY 52-0420 DLY 99-0420 HLY 65-0089 15M 63-0193 HLY 41-0432 DLY 41-0420 DLY
TX	AUSTIN BERGSTROM AP	79-0073	30.1831	-97.6800	479	31	31	80	65-0091 15M 78-0010 15M 63-0201 15M	65-0091 15M 64-0309 HLY 55-0073 HLY 63-0201 HLY 41-0429 HLY	41-4185 DLY 64-0319 DLY 55-0073 HLY 63-0201 HLY 41-0429 HLY 79-0073 DLY
TX	AUSTIN SAN ANTONIO	79-0064	29.7036	-98.0281	633	0	20	19		55-0056 HLY 56-0128 HLY	79-0064 DLY
TX	AUSTIN-CAMP MABRY	79-0086	30.3208	-97.7603	669	31	74	79	65-0064 15M 78-0009 15M	56-0159 HLY 55-0082 HLY 41-0428 HLY	79-0086 DLY
TX	AUSTWELL	41-0436	28.3889	-96.8389	23	0	0	57			41-0436 DLY
TX	AVALON	41-0440	32.2067	-96.7958	531	0	0	35			41-0440 DLY
TX	AYISH BAYOU	85-0308	31.3961	-94.1508	230	0	22	23		85-0308 HLY	85-0308 HLY
TX	BAKERSFIELD	41-0482	30.8878	-102.3008	2546	0	0	72			41-0482 DLY
TX	BALLINGER 2 NW	41-0493	31.7414	-99.9764	1755	0	0	114			41-0493 DLY
TX	BALMORHEA	41-0498	30.9844	-103.7403	3222	0	0	87			41-0498 DLY
TX	BANDERA 0.2 N	69-0640	29.7284	-99.0735	1257	0	15	17		85-0323 HLY	85-0323 HLY 69-0634 DLY 69-0640 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	BANKERSMITH	41-0509	30.1400	-98.8189	1749	37	72	74	63-0154 15M 41-0509 15M	63-0154 HLY 41-0509 HLY	63-0154 HLY 41-0509 HLY 41-0509 DLY
TX	BARDWELL DAM	41-0518	32.2631	-96.6369	463	29	37	52	41-0518 15M	41-0518 HLY	41-0518 DLY
TX	BARTON CRK AT LOOP 360, AUSTIN	63-0192	30.2442	-97.8021	527	30	31	31	65-0031 15M 63-0192 15M	65-0031 15M 63-0192 15M	65-0031 15M 63-0192 15M
TX	BARTON CRK AT SH 71 N OAK HILL	63-0191	30.2963	-97.9256	763	31	31	31	65-0032 15M 63-0191 15M	65-0032 15M 63-0191 15M	65-0032 15M 63-0191 15M
TX	BATESVILLE	41-0560	28.9567	-99.6228	745	0	0	32			41-0560 DLY
TX	BAY CITY WTR WKS	41-0569	28.9797	-95.9750	52	31	73	82	63-0236 15M 41-0569 15M	63-0236 15M 41-0569 15M 63-0236 HLY 41-0572 HLY 41-0569 HLY	63-0236 15M 41-0569 15M 41-0569 HLY 41-0569 DLY
TX	BAYTOWN	41-0586	29.7917	-95.0436	26	0	0	58			41-0586 DLY
TX	BEAUMONT CITY	41-0611	30.0969	-94.0997	20	0	0	113			41-0611 DLY
TX	BEAUMONT RSCH CTR	41-0613	30.0689	-94.2928	26	24	24	54	82-5100 15M	82-5100 15M	41-0613 DLY
TX	BEDIAS	41-0635	30.7833	-95.9500	335	0	0	35			41-0635 DLY
TX	BEEVILLE 5 NE	41-0639	28.4575	-97.7061	256	35	46	111	66-0639 15M 41-0639 15M	66-0639 15M 41-0639 HLY	41-0639 DLY
TX	BEEVILLE CHASE NAAS	79-0049	28.3667	-97.6667	197	0	0	38			79-0049 DLY
TX	BELTON DAM	41-0665	31.1000	-97.4833	663	0	38	49		41-0665 HLY	69-0596 DLY 41-0665 HLY 41-0665 DLY
TX	BENAVIDES 2	41-0690	27.5969	-98.4161	381	32	68	75	66-0690 15M 41-0689 15M 41-0690 15M	66-0690 15M 41-0689 HLY 41-0690 HLY	66-0690 15M 41-0689 HLY 41-0690 HLY 66-0690 15M 41-0689 HLY 41-0690 DLY
TX	BENBROOK DAM	41-0691	32.6475	-97.4439	791	24	58	67	66-0691 15M 41-0691 15M	66-0691 15M 41-0691 HLY	41-0691 DLY
TX	BENJAMIN 4 SSE	41-0704	33.5333	-99.7667	1401	0	0	31			41-0704 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years			Contributing stations		
						<1hr	hourly	daily	<1hr	hourly	daily
TX	BERTRAM 3 ENE	41-0738	30.7603	-98.0164	1138	31	47	50	66-0738 15M 41-0738 15M	66-0738 15M 41-0738 HLY	41-0738 DLY
TX	BIG LAKE 2	41-0779	31.2000	-101.4625	2733	34	60	70	80-0011 15M 41-0776 15M 41-0779 15M	80-0011 15M 41-0776 HLY 41-0779 HLY	41-0776 HLY 41-0779 DLY
TX	BIG SPRING	79-0113	32.2442	-101.4536	2510	0	0	110			99-0786 DLY 41-0786 HLY 79-0113 DLY
TX	BIG SPRING FLD STN	41-0784	32.2683	-101.4858	2510	36	50	58	66-0784 15M 41-0784 15M	66-0784 15M 41-0784 HLY	41-0784 HLY 41-0784 DLY
TX	BIG WELLS 2W	41-0787	28.5731	-99.6044	541	0	0	82			41-0787 DLY
TX	BISHOP 0.4 ENE	69-2228	27.5861	-97.7908	62	0	0	36			41-0805 DLY 69-2228 DLY
TX	BLANCO	41-0832	30.1061	-98.4286	1381	0	0	120			41-0832 DLY
TX	BLOYS CAMPGROUND	41-0861	30.5333	-104.1333	5764	0	0	35			41-5854 DLY 41-0861 DLY
TX	BOERNE	41-0902	29.7986	-98.7353	1444	0	0	121			41-0902 DLY
TX	BON WIER	41-0917	30.7333	-93.6500	89	0	29	66		41-0917 HLY	41-0917 DLY
TX	BONHAM 3NNE	41-0923	33.6403	-96.1661	591	0	0	102			41-0923 DLY
TX	BONITA 4NW	41-0926	33.8472	-97.6528	984	30	66	73	66-0926 15M 41-0926 15M	66-0926 15M 41-0926 HLY	41-0926 HLY 41-0926 DLY
TX	BOOKER	41-0944	36.4533	-100.5394	2749	0	0	77			41-0944 DLY
TX	BORGER	41-0958	35.6364	-101.4542	3211	0	0	67			41-0958 DLY
TX	BOWIE	41-0984	33.5511	-97.8472	1079	0	0	90			41-0984 DLY
TX	BOXELDER 3 NNE	41-0991	33.5164	-94.8608	440	0	0	52			41-0991 DLY
TX	BOYD	41-0996	33.0800	-97.5639	732	0	0	59			83-0010 15M 41-0996 DLY
TX	BOYS RANCH	41-1000	35.5303	-102.2564	3192	0	0	72			41-8852 DLY 41-1000 DLY
TX	BRACKETTVILLE	41-1007	29.3167	-100.4144	1119	0	0	131			99-3260 DLY 99-1007 DLY 41-1007 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	BRACKETTVILLE 22 N	41-1013	29.6100	-100.4519	1759	0	19	35		66-1013 15M 41-1013 HLY	41-1013 DLY
TX	BRADY	41-1017	31.1444	-99.3492	1709	35	67	82	66-1017 15M 41-1017 15M	66-1017 15M 85-0354 HLY 41-1017 HLY	41-1017 DLY
TX	BRAVO	41-1033	35.6200	-103.0072	4075	0	0	74			41-1033 DLY
TX	BRAZOS	41-1035	32.6489	-98.1336	840	0	0	69			41-1035 DLY
TX	BRECKENRIDGE	41-1042	32.7500	-98.9017	1171	0	0	86			41-1043 DLY 41-1042 DLY
TX	BREMOND	41-1045	31.1589	-96.6825	469	0	0	54			41-1045 DLY
TX	BRENHAM	41-1048	30.1592	-96.3972	312	0	0	126			99-1048 DLY 41-1048 DLY
TX	BRICE 2 S	41-1057	34.6833	-100.9000	2228	0	38	40		41-1057 HLY	41-1057 HLY
TX	BRIDGEPORT	41-1063	33.2064	-97.7761	768	0	0	103			41-1063 DLY
TX	BRIGGS	41-1068	30.8833	-97.9333	1090	0	49	51		41-1068 HLY	41-1068 HLY
TX	BRITTON	41-1081	32.5500	-97.0667	561	0	25	31		41-1081 HLY	41-1081 HLY 41-1081 DLY
TX	BROADDUS	41-1089	31.3050	-94.2703	246	0	0	64			41-4523 DLY 41-1089 DLY
TX	BRONSON	41-1094	31.3500	-94.0167	322	0	0	46			41-1094 DLY
TX	BRONTE 11 NNE	79-0009	32.0408	-100.2494	1998	0	0	55			41-6495 DLY 79-0009 DLY
TX	BROWNFIELD #2	41-1128	33.1908	-102.2681	3301	0	0	100			41-1127 DLY 41-1128 DLY
TX	BROWNSVILLE	79-0043	25.9156	-97.4186	23	0	93	150		99-1137 HLY 56-0108 HLY 41-1136 HLY	99-1137 HLY 56-0108 HLY 41-1136 HLY 99-1137 DLY 99-0003 DLY 41-1133 DLY 41-1136 HLY 79-0043 DLY
TX	BROWNWOOD 2ENE	41-1138	31.7383	-98.9456	1401	0	0	114			41-1138 DLY

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TX	BUCHANAN DAM	41-1165	30.7500	-98.4167	1020	0	23	34		63-0066 15M 63-0067 15M 41-1165 HLY	41-1253 DLY 63-0067 15M 41-1165 DLY
TX	BUCKNERS CRK NR MULDOON	63-0224	29.8452	-97.0447	299	0	23	23		63-0224 15M 63-0224 HLY	63-0224 15M 63-0224 HLY
TX	BUFFALO	41-1188	31.4667	-96.0500	358	0	0	47			41-1188 DLY
TX	BULER 4 NNW	41-1203	36.1833	-100.8333	2972	0	0	32			41-1203 DLY
TX	BULVERDE	41-1215	29.7386	-98.4522	1079	0	0	73			41-1215 DLY
TX	BUNKER HILL	41-1224	36.1500	-102.9333	4347	0	0	40			41-1224 DLY
TX	BURKETT	41-1239	31.9917	-99.2203	1555	0	0	58			41-1239 DLY
TX	BURLESON	41-1246	32.5067	-97.3444	761	29	32	71	66-1246 15M 41-1246 15M	66-1246 15M 41-1245 HLY 41-1246 HLY	41-1245 DLY 41-1246 DLY
TX	BURNET	41-1250	30.7586	-98.2339	1286	0	0	103			63-0143 HLY 41-1250 DLY
TX	BURNET 6 SSE	63-0142	30.6686	-98.2110	1101	0	26	26		63-0142 HLY	63-0142 HLY
TX	CALDWELL	41-1314	30.5328	-96.7022	364	0	0	53			41-1314 DLY
TX	CALLIHAM	41-1337	28.4658	-98.3539	217	0	0	38			41-1337 DLY
TX	CAMERON	41-1348	30.8458	-96.9700	364	0	0	92			41-1348 DLY
TX	CAMP VERDE	41-1395	29.8947	-99.1050	1604	0	0	23			99-1395 DLY 41-1395 DLY
TX	CAMP WOOD	41-1398	29.6703	-100.0097	1480	0	0	59			41-1398 DLY
TX	CANADIAN	41-1412	35.9092	-100.3883	2300	0	0	89			89-0087 DLY 41-1412 DLY
TX	CANDELARIA	41-1416	30.1383	-104.6822	2877	0	0	69			41-1416 DLY
TX	CANTON 5 W	41-1425	32.5669	-95.9578	486	0	0	45			41-1425 DLY
TX	CANYON	41-1430	34.9806	-101.9264	3589	0	0	93			41-1430 DLY
TX	CANYON DAM	41-1429	29.8608	-98.1958	1010	29	34	56	66-1429 15M 41-1429 15M	66-1429 15M 85-0382 HLY 41-1429 HLY	41-1429 HLY 41-1429 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years			Contributing stations		
						<1hr	hourly	daily	<1hr	hourly	daily
TX	CANYON DAM #1	41-1431	29.8617	-98.2919	981	0	0	53			69-1037 DLY 41-8414 DLY 41-1431 HLY 41-1431 DLY
TX	CANYON DAM #3	41-1433	29.9464	-98.3969	1234	0	34	51		41-1433 HLY	41-1433 HLY 41-1433 DLY
TX	CANYON DAM #4	41-1434	29.9111	-98.3714	1168	25	43	51	66-1434 15M 41-1434 15M	66-1434 15M 41-1434 HLY	41-1434 HLY 41-1434 DLY
TX	CARRIZO SPRINGS 3S	41-1486	28.4894	-99.8733	614	0	0	84			41-1486 DLY
TX	CARROLLTON	41-1490	32.9850	-96.9258	545	0	0	74			41-1490 DLY
TX	CARTA VALLEY	41-1492	29.7908	-100.6742	1850	0	27	43		41-1492 HLY	41-1492 DLY
TX	CARTHAGE	41-1500	32.1614	-94.3397	305	0	0	62			41-1500 DLY
TX	CASE RCH 3 S	41-1511	31.6333	-101.0333	2478	0	0	34			41-1511 DLY
TX	CASTOLON	41-1524	29.1344	-103.5150	2169	0	0	37			41-1524 DLY
TX	CATARINA	41-1528	28.3392	-99.6328	561	0	29	39		41-1528 HLY	41-1528 DLY
TX	CEDAR BYU AT US 90	60-0121	29.9729	-94.9855	48	31	31	31	60-0121 15M	60-0121 15M	60-0121 15M
TX	CEDAR CREEK 5 S	41-1541	30.0164	-97.4786	436	32	30	38	41-7497 15M 41-1541 15M	41-7497 HLY 41-1541 HLY	41-7497 HLY 41-1541 HLY 41-1541 DLY
TX	CELINA	41-1573	33.3167	-96.8000	679	0	0	45			69-1189 DLY 41-1573 DLY
TX	CENTER	41-1578	31.8075	-94.1642	325	0	0	77			41-1578 DLY
TX	CENTER CITY	41-1580	31.4683	-98.4106	1365	0	0	54			63-0249 HLY 41-1580 DLY
TX	CENTERVILLE	41-1596	31.2581	-95.9744	322	0	0	78			41-1596 DLY
TX	CHALK MTN	41-1625	32.1561	-97.9369	1132	0	0	48			41-1625 DLY
TX	CHANNING	41-1646	35.6869	-102.3342	3799	33	59	69	41-1646 15M	41-1646 HLY	41-1649 DLY 41-1646 HLY 41-1646 DLY
TX	CHAPMAN RCH	41-1651	27.5892	-97.4547	26	0	0	40			41-1651 DLY
TX	CHARLOTTE 5 NNW	41-1663	28.9275	-98.7494	440	0	0	48			41-1663 DLY

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TX	CHEAPSIDE	41-1671	29.3092	-97.4061	367	29	59	71	66-1671 15M 41-1671 15M	66-1671 15M 41-1671 HLY	41-1671 HLY 41-1671 DLY
TX	CHEROKEE 2 NNW	63-0051	31.0167	-98.7221	1540	0	45	45		41-1680 HLY 63-0051 HLY	41-1680 HLY 63-0051 HLY
TX	CHEROKEE 4 SSE	63-0113	30.9232	-98.6846	1443	0	24	26		63-0113 HLY	63-0113 HLY
TX	CHEROKEE 8 NNE	63-0046	31.0648	-98.6030	1600	0	25	26		63-0046 HLY	63-0046 HLY
TX	CHILDRESS MUNI AP	79-0104	34.4272	-100.2831	1952	29	46	111	41-1698 15M 78-0018 15M	41-1696 HLY 56-0174 HLY 55-0095 HLY 41-1698 HLY	41-1696 HLY 41-1696 DLY 79-0104 DLY
TX	CHILLICOTHE	41-1701	34.2500	-99.5167	1401	0	0	66			41-1701 DLY
TX	CHISOS BASIN	41-1715	29.2703	-103.3003	5299	0	0	72			41-1715 DLY
TX	CHOKE CANYON DAM	41-1720	28.4675	-98.2525	230	0	0	94			41-9009 DLY 41-1720 DLY
TX	CIBOLO CREEK	41-1741	29.0167	-97.9333	312	0	0	32			41-1741 DLY
TX	CLARENDON	79-0123	34.9325	-100.8903	2700	0	0	105			79-0123 DLY
TX	CLARKSVILLE 1W	41-1773	33.6108	-95.0717	427	40	65	103	66-1773 15M 41-1773 15M	66-1773 15M 41-1774 HLY 41-1773 HLY	66-1773 15M 41-1772 DLY 41-1773 DLY
TX	CLAUDE	41-1778	35.1100	-101.3619	3396	0	0	80			41-1778 DLY
TX	CLEAR CK AT BAY AREA BLVD	60-0011	29.4977	-95.1599	2	30	30	30	60-0010 15M 60-0011 15M	60-0010 15M 60-0011 15M	60-0010 15M 60-0011 15M
TX	CLEBURNE	41-1800	32.3139	-97.4061	784	0	0	106			41-1800 DLY
TX	CLEVELAND	41-1810	30.3636	-95.0839	197	0	0	64			41-1810 DLY
TX	CLIFTON 10 E	41-1823	31.8000	-97.4333	669	0	0	63			41-1823 DLY
TX	COLDSPRING 5 SSW	41-1870	30.5333	-95.1500	354	0	0	48			41-1870 DLY
TX	COLDWATER	41-1874	36.4000	-102.5667	4131	0	0	32			41-1874 DLY
TX	COLEMAN	41-1875	31.8281	-99.4339	1732	0	0	118			41-1875 DLY
TX	COLLEGE STN	79-0017	30.5892	-96.3647	305	0	21	122		55-0018 HLY 56-0082 HLY	41-1888 DLY 55-0018 HLY 79-0017 DLY
TX	COLORADO CITY	41-1903	32.3978	-100.8594	2110	0	0	74			41-1903 DLY

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TX	COLORADO RIVER AT BASTROP	63-0212	30.1047	-97.3192	316	0	29	29		63-0212 HLY	63-0212 HLY
TX	COLUMBUS	41-1911	29.6989	-96.5731	226	0	28	82		63-0229 HLY	41-1911 DLY
TX	COMANCHE	41-1914	31.8983	-98.6033	1385	0	0	93			76-0045 HLY 41-1914 DLY
TX	COMFORT 2	41-1920	29.9614	-98.8944	1434	0	0	29			41-1920 HLY 41-1920 DLY
TX	COMMERCE 4SW	41-1921	33.1997	-95.9283	551	34	66	73	66-1921 15M 41-1921 15M	66-1921 15M 41-4392 HLY 41-1921 HLY	41-4392 HLY 41-1921 HLY 41-1921 HLY 41-1921 DLY
TX	CONCORD	41-1937	31.9167	-94.5833	541	0	20	20		41-1937 HLY	41-1937 HLY
TX	CONLEN	41-1946	36.2353	-102.2406	3819	0	0	69			41-1946 DLY
TX	CONROE	41-1956	30.3303	-95.4831	246	28	61	91	78-0025 15M 41-1956 15M	85-0402 HLY 76-0046 HLY 55-0114 HLY 56-0199 HLY 41-1956 HLY	69-2190 DLY 41-1956 DLY
TX	COOPER	41-1970	33.3744	-95.6933	486	0	0	65			41-1970 DLY
TX	COPE RCH	41-1974	31.5333	-101.2842	2480	0	0	69			41-1974 DLY
TX	COPPERAS COVE 5 NW	41-1990	31.1603	-97.9564	1230	0	0	96			41-1986 DLY 69-1151 DLY 41-1984 DLY 41-1990 DLY
TX	CORNUDAS SVC STN	41-2012	31.7800	-105.4700	4308	0	0	59			69-1570 DLY 41-2012 DLY
TX	CORPUS CHRISTI	41-2014	27.8000	-97.4000	10	0	45	90		99-2014 HLY 41-2014 HLY	69-2229 DLY 52-2011 DLY 99-2014 HLY 41-2014 HLY 41-2014 HLY 41-2014 DLY
TX	CORPUS CHRISTI	79-0048	27.7839	-97.5108	46	0	70	70		56-0112 HLY 41-2015 HLY	79-0048 DLY

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TX	CORPUS CHRISTI NAS	79-0050	27.6833	-97.2833	20	0	0	88			41-1073 DLY 69-2225 DLY 79-0050 DLY
TX	CORRIGAN 1 ENE	41-2017	31.0033	-94.8161	200	0	0	20			41-2017 DLY
TX	CORSICANA	41-2019	32.1225	-96.4867	449	0	0	115			41-2019 DLY
TX	CORSICANA 8 E	41-2020	32.1183	-96.3256	377	0	0	56			69-2256 DLY 99-2020 DLY 41-2020 DLY
TX	CORSICANA CAMPBELL FLD	79-0142	32.0311	-96.3989	449	0	20	19		55-0121 HLY 56-0206 HLY	79-0142 DLY
TX	CORYELL CITY	41-2024	31.5500	-97.6167	973	0	36	37		41-2024 HLY	41-2024 HLY
TX	COTTONWOOD	41-2040	30.1606	-99.1356	2123	0	0	92			41-1481 DLY 41-2040 DLY
TX	COTULLA	99-2048	28.4567	-99.2183	476	32	54	102	78-0021 15M 41-2048 15M	55-0049 HLY 56-0120 HLY 41-2048 HLY	79-0058 DLY 99-2048 DLY
TX	CRANDALL	41-2080	32.6297	-96.4581	430	0	0	32			69-1815 DLY 41-2080 DLY
TX	CRANE	41-2082	31.4072	-102.3578	2556	25	54	71	41-2082 15M	41-2082 HLY	41-2082 HLY 41-2082 DLY
TX	CRANFILLS GAP	41-2086	31.7717	-97.8239	978	27	51	61	66-2086 15M 41-2086 15M	66-2086 15M 41-2086 HLY	41-2086 HLY 41-2086 DLY
TX	CRESSON	41-2096	32.5286	-97.6189	1040	31	63	69	66-2096 15M 41-2096 15M	66-2096 15M 41-2096 HLY	41-2096 DLY
TX	CRIDER RCH	41-2104	30.0667	-99.7333	2199	0	0	33			41-2104 DLY
TX	CROCKETT	41-2114	31.3072	-95.4508	348	0	0	103			41-2114 DLY
TX	CROSBYTON	41-2121	33.6517	-101.2450	3009	0	0	121			41-2121 DLY
TX	CROSS PLAINS	41-2128	32.1167	-99.1667	1742	35	62	74	66-2131 15M 41-2131 15M	66-2131 15M 41-2128 HLY 41-2131 HLY	66-2131 15M 41-2128 HLY 41-2131 HLY 41-2128 HLY 41-2131 HLY 41-2128 HLY 41-2128 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	CROWELL	41-2142	33.9900	-99.7303	1480	0	0	99			41-2142 DLY
TX	CRYSTAL CITY	41-2160	28.6794	-99.8311	581	0	0	69			69-2922 DLY 41-2160 DLY
TX	CUERO	41-2173	29.0892	-97.3433	213	0	0	111			41-2173 DLY
TX	CUMMINS CRK NR FRELSBURG	63-0228	29.8258	-96.5807	228	0	22	22		63-0228 15M 63-0228 HLY	63-0228 15M 63-0228 HLY
TX	CYPRESS	41-2206	30.0211	-95.7069	151	31	29	70	66-2206 15M 60-0094 15M 41-2206 15M	66-2206 15M 60-0094 15M 41-2206 HLY	60-0094 15M 41-2206 DLY
TX	CYPRESS CK AT KUYKENDAHL RD	60-0082	30.0244	-95.4764	85	30	30	31	60-0083 15M 60-0082 15M	60-0083 15M 60-0082 15M	60-0083 15M 60-0082 15M
TX	DACUS	41-2218	30.4364	-95.7919	240	0	0	53			41-2218 DLY
TX	DAINGERFIELD 9 S	41-2225	32.9203	-94.7225	299	0	0	72			41-2225 DLY
TX	DALHART MUNI AP	79-0149	36.0167	-102.5500	3990	0	21	109		41-2238 HLY 56-0259 HLY 55-0162 HLY 41-2240 HLY	41-2239 DLY 79-0149 DLY
TX	DALLAS FT WORTH AP	79-0018	32.8978	-97.0189	561	0	70	76		41-3283 HLY 78-0028 15M 41-2242 HLY	41-3283 HLY 78-0028 15M 41-2242 HLY 79-0018 DLY
TX	DALLAS HENSLEY FLD NAS	79-0150	32.7333	-96.9667	492	24	24	70	81-0038 15M	81-0038 15M	81-0038 15M 79-0150 DLY
TX	DALLAS LOVE FLD	79-0088	32.8519	-96.8556	440	32	72	77	41-2244 15M 78-0026 15M	56-0161 HLY 55-0084 HLY 41-2244 HLY	79-0088 DLY
TX	DALLAS REDBIRD AP	79-0029	32.6808	-96.8681	659	26	26	26	81-0027 15M 78-0066 15M	81-0027 15M 78-0066 15M 81-0027 15M 55-0028 HLY 56-0092 HLY	81-0027 15M 79-0029 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	DALLAS WFAA	41-2247	32.7667	-96.7833	479	24	50	64	81-0041 15M 81-0040 15M	81-0041 15M 81-0040 15M 99-2243 HLY	41-2243 DLY 81-0041 15M 81-0040 15M 81-0040 15M 79-0155 DLY 41-2247 DLY
TX	DANEVANG 1 W	41-2266	29.0567	-96.2319	69	0	0	121			41-2266 DLY
TX	DARROUZETT	41-2282	36.4453	-100.3264	2539	0	0	69			41-2282 DLY
TX	DAVILLA 2N	41-2295	30.8014	-97.2689	558	0	0	61			41-2295 DLY
TX	DECATUR	41-2334	33.2733	-97.5769	978	0	0	65			41-2334 HLY 41-2334 DLY
TX	DECKER POWER PLANT	65-0100	30.3036	-97.6143	562	31	31	31	63-0203 15M 65-0100 15M	63-0203 15M 65-0100 15M	63-0203 15M 65-0100 DLY
TX	DEKALB	41-2352	33.4797	-94.6175	341	0	0	61			69-0786 DLY 41-2352 DLY
TX	DEL RIO INTL AP	79-0100	29.3783	-100.9269	1001	24	96	112	41-2360 15M 78-0031 15M	99-2357 HLY 41-2361 HLY 56-0171 HLY 55-0093 HLY 41-2357 HLY 41-2360 HLY	99-2357 HLY 41-2364 DLY 41-2357 HLY 79-0099 DLY 79-0100 DLY
TX	DELL CITY 5SSW	41-2354	31.8769	-105.2369	3796	0	0	37			69-1573 DLY 41-2354 DLY
TX	DENISON DAM	41-2394	33.8167	-96.5667	614	0	52	86		41-2394 HLY	41-2397 DLY 41-2394 DLY
TX	DENTON 2 SE	41-2404	33.1992	-97.1050	630	28	59	101	66-2404 15M 41-2404 15M	66-2404 15M 41-2404 HLY	41-2404 DLY
TX	DENTON MUNI AP	79-0031	33.2061	-97.1989	643	0	21	34		55-0032 HLY 56-0098 HLY	41-2403 DLY 55-0032 HLY 56-0098 HLY 79-0031 DLY
TX	DEPORT 4 NW	41-2415	33.5639	-95.3742	436	0	48	49		41-2415 HLY	41-2415 HLY 41-2415 DLY
TX	DERBY 1 S	41-2417	28.7528	-99.1353	489	0	0	33			41-2417 DLY

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TX	DEVINE 0.4 S	69-2146	29.1400	-98.9053	650	0	0	21			41-2430 DLY 69-2146 DLY
TX	DIALVILLE 2 W	41-2444	31.8614	-95.2619	617	0	0	114			41-2444 DLY
TX	DILLEY	41-2458	28.6806	-99.1833	551	0	0	93			41-2458 DLY
TX	DIME BOX	41-2462	30.3561	-96.8289	335	26	24	69	66-2462 15M 41-2462 15M	66-2462 15M 41-2462 HLY	41-2462 DLY
TX	DIMMITT 2 N	41-2464	34.5858	-102.3120	3852	0	0	58			41-2464 DLY
TX	DIMMITT 6 E	41-2463	34.5500	-102.2167	3812	0	0	60			41-2463 DLY
TX	DRY DEVILS RVR N COMSTOCK 22NE	85-0424	29.8767	-100.8967	1467	0	22	22		41-3103 HLY 85-0424 HLY	41-3103 HLY 85-0424 HLY
TX	DRYER 1 NW	41-2595	29.3833	-97.2667	302	0	0	44			69-1214 DLY 41-2595 DLY
TX	DUBLIN 2SE	41-2598	32.0628	-98.3047	1467	0	0	97			41-2598 DLY
TX	DUMAS	41-2617	35.8731	-101.9725	3655	0	0	70			41-2617 DLY
TX	DUMONT	41-2621	33.8094	-100.5169	2011	23	30	45	66-2621 15M 41-2621 15M	66-2621 15M 41-2621 HLY	41-2621 DLY
TX	DUNDEE 6 NNW	41-2633	33.8158	-98.9317	1050	0	0	86			41-2633 DLY
TX	E FORK SAN JACINTO AT FM 1485	60-0068	30.1453	-95.1245	58	28	28	29	60-0068 15M	60-0068 15M	60-0068 15M
TX	EAGLE LAKE RESCH CTR	41-2676	29.6211	-96.3661	177	31	40	40	66-2676 15M 41-2675 15M 41-2676 15M	66-2676 15M 41-2675 HLY 41-2676 HLY	41-2675 HLY 41-2676 HLY 41-2676 HLY 41-2676 DLY
TX	EAGLE MTN LAKE DAM	41-2678	32.8833	-97.4667	679	0	0	63			41-2677 DLY 69-2454 DLY 85-0462 HLY 83-0015 15M 41-2678 DLY
TX	EAGLE PASS 3N	41-2679	28.7569	-100.4792	814	36	66	115	66-2679 15M 41-2679 15M	66-2679 15M 41-2679 HLY	66-2679 15M 41-2679 HLY 41-2679 DLY
TX	EASTLAND	41-2715	32.3989	-98.8175	1437	20	37	90	41-2715 15M	41-2715 HLY	41-2715 HLY 41-2715 DLY

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TX	EDEN	41-2741	31.2208	-99.8494	2051	26	48	66	63-0032 15M 41-2744 15M	63-0032 HLY 41-2744 HLY	41-2744 HLY 41-2741 DLY
TX	EDNA HWY 59 BRG	41-2768	28.9667	-96.6833	69	0	0	82			41-2769 DLY 41-2768 DLY
TX	EDOM	41-2772	32.3656	-95.6089	509	0	0	72			69-2672 DLY 41-2772 DLY
TX	EL CAMPO	41-2786	29.2000	-96.2653	112	0	0	108			69-2734 DLY 41-7020 DLY 41-2786 DLY
TX	EL INDIO 7ESE	41-2824	28.4747	-100.2147	807	0	0	39			41-2824 DLY
TX	EL PASO	79-0125	31.7587	-106.4843	3773	0	45	60		99-2870 HLY 41-2870 HLY 75-0009 HLY	99-2870 HLY 41-2870 HLY 75-0009 HLY 41-2870 HLY 75-0009 HLY 52-2799 DLY 79-0125 DLY
TX	EL PASO INTL AP	79-0115	31.8111	-106.3758	3917	0	74	78		56-0182 HLY 41-2797 HLY	41-2797 HLY 79-0115 DLY
TX	ELAM CREEK - LAKE JUNE RD	81-0022	32.7344	-96.6950	460	25	25	25	81-0022 15M	81-0022 15M	81-0022 15M
TX	ELDORADO	41-2809	30.8694	-100.5994	2441	0	42	58		41-2811 HLY	41-2811 HLY 41-2809 DLY
TX	ELECTRA	41-2818	34.0308	-98.9117	1217	0	0	57			69-2903 DLY 41-2818 DLY
TX	ELGIN	41-2820	30.3492	-97.3683	581	0	0	56			41-2820 DLY
TX	EMORY	41-2902	32.8711	-95.7797	486	0	0	58			69-2332 DLY 41-2902 DLY
TX	ENCINAL	41-2906	27.9775	-99.3847	545	0	0	100			41-2906 DLY
TX	ENNIS	41-2925	32.3333	-96.6333	525	0	0	47			69-1250 DLY 41-2925 DLY
TX	EVADALE	41-3000	30.3333	-94.0833	33	0	0	51			41-3000 DLY

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TX	EVANT 1SSW	41-3005	31.4625	-98.1619	1247	20	50	65	41-3005 15M	85-0470 HLY 41-3005 HLY	85-0470 HLY 41-3005 HLY 41-3005 DLY
TX	F.M.1406 - NORTH FORK TAYLORS	82-5500	29.9478	-94.4003	31	26	26	26	82-5500 15M	82-5500 15M	82-5500 15M
TX	FABENS	41-3033	31.5000	-106.1500	3612	0	23	31		41-3033 HLY	41-3033 DLY
TX	FAIR OAKS RCH	41-3038	29.7500	-98.6333	1302	0	0	34			69-1841 DLY 41-3038 DLY
TX	FAIRFIELD 3W	41-3047	31.7322	-96.2078	433	0	0	52			41-3047 DLY
TX	FALCON DAM	41-3060	26.5581	-99.1372	322	0	0	57			61-0536 DLY 41-3060 DLY
TX	FALFURRIAS	41-3063	27.1353	-98.1203	138	0	0	100			41-3063 DLY
TX	FALLS CITY 7 WSW	41-3065	28.9614	-98.1103	344	0	0	69			41-3065 DLY
TX	FARMERSVILLE	41-3080	33.1414	-96.2933	627	0	0	52			41-3080 DLY
TX	FEDOR	41-3112	30.3164	-97.0545	482	0	0	49			41-3112 DLY
TX	FERRIS	41-3133	32.5339	-96.6608	469	31	60	73	66-3133 15M 41-3133 15M	66-3133 15M 41-3133 HLY	41-3133 HLY 41-3133 DLY
TX	FIFE	41-3142	31.3833	-99.3667	1391	0	0	31			41-3142 DLY
TX	FISCHERS STORE	41-3156	29.9756	-98.2647	1161	30	55	107	66-3156 15M 41-1436 15M 41-3156 15M	66-3156 15M 41-1436 HLY 41-3156 HLY	41-3156 DLY
TX	FLAT	41-3171	31.3089	-97.6306	850	19	47	61	41-3171 15M	41-3171 HLY	69-1150 DLY 41-3171 HLY 41-3171 DLY
TX	FLATONIA 4SE	41-3183	29.6339	-97.0644	469	0	0	109			41-3183 DLY
TX	FLINT	41-3192	32.2000	-95.3500	479	0	0	39			41-3192 DLY
TX	FLOMOT 4 NE	41-3196	34.2675	-100.9336	2359	0	0	65			41-3196 DLY
TX	FLORENCE	41-3199	30.8392	-97.7925	988	0	0	53			41-3199 DLY
TX	FLORESVILLE	41-3201	29.1333	-98.1628	400	0	0	97			41-3201 DLY
TX	FLOYDADA	41-3214	33.9850	-101.3339	3222	0	0	72			41-3214 DLY
TX	FLOYDADA 9 SE	41-3215	33.8761	-101.2464	3130	0	0	65			41-3215 DLY
TX	FOLLETT	41-3225	36.4328	-100.1369	2583	0	0	80			41-3225 DLY

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TX	FORESTBURG 5 S	41-3247	33.4773	-97.5598	1109	0	0	76			41-3247 DLY
TX	FORSAN	41-3253	32.1117	-101.3642	2749	0	0	58			41-3253 DLY
TX	FORT MCKAVETT	41-3270	30.9303	-100.1125	2215	38	44	53	66-3270 15M 41-3270 15M	66-3270 15M 41-3270 HLY	41-3270 HLY 41-3270 DLY
TX	FOWLERTON	41-3299	28.5033	-98.8392	299	0	0	81			41-3299 DLY
TX	FRANKLIN	41-3321	31.0328	-96.4889	466	0	0	44			41-3321 DLY
TX	FREDERICKSBURG	41-3329	30.2392	-98.9089	1686	0	59	95		63-0152 HLY 41-3329 HLY	41-3329 DLY
TX	FREEPORT 2 NW	41-3340	28.9844	-95.3808	7	0	0	94			99-3340 DLY 41-3340 DLY
TX	FREER	41-3341	27.8722	-98.6175	561	0	0	59			41-3341 DLY
TX	FRIONA	41-3368	34.6400	-102.7231	4009	0	0	79			41-3368 DLY
TX	FRISCO	41-3370	33.1925	-96.7931	748	0	42	51		66-3370 15M 41-3370 HLY	41-3370 DLY
TX	FROST	41-3379	32.0833	-96.8000	522	0	0	42			69-2254 DLY 41-3379 DLY
TX	FT DAVIS	41-3262	30.5997	-103.8869	4865	0	0	100			41-3262 DLY
TX	FT GRIFFIN	41-3265	32.9236	-99.2225	1227	0	0	31			52-0248 DLY 52-3265 DLY 41-3265 DLY
TX	FT HANCOCK 8SSE	41-3266	31.1853	-105.7414	3502	0	0	42			41-3266 DLY
TX	FT MC INTOSH	41-3267	27.5000	-99.5167	459	0	0	62			61-0534 DLY 41-3267 HLY 41-3267 DLY
TX	FT MCKAVETT	41-3257	30.8275	-100.1103	2168	0	0	69			41-4627 DLY 41-2630 DLY 52-3257 DLY 41-3257 DLY
TX	FT STOCKTON 35 SSW	41-3278	30.3833	-103.0333	4393	0	26	25		41-3278 HLY	41-3278 HLY
TX	FT STOCKTON PECOS AP	79-0126	30.9119	-102.9167	3009	0	26	129		41-3280 HLY 55-0110 HLY 56-0189 HLY	41-3277 DLY 52-3280 DLY 41-3280 DLY 79-0126 DLY

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TX	FT WORTH MEACHAM FLD	79-0089	32.8192	-97.3614	686	37	70	72	41-3284 15M 78-0038 15M	99-3284 HLY 56-0162 HLY 55-0085 HLY 41-3284 HLY	41-3284 HLY 79-0089 DLY
TX	FT WORTH NAS	79-0077	32.7667	-97.4500	607	0	0	55			64-0363 DLY 79-0077 DLY
TX	FT WORTH VICKERY BLV	41-3286	32.7333	-97.3333	659	0	41	61		99-0001 HLY	99-0001 HLY 41-3290 DLY 41-3286 DLY
TX	FT WORTH WSFO	41-3285	32.8339	-97.2975	643	42	52	55	66-3285 15M 41-3285 15M	66-3285 15M 41-3285 HLY	41-3285 HLY 41-3285 DLY
TX	FUNK RCH	41-3401	31.4775	-100.7978	2070	0	0	54			41-3401 DLY
TX	GAGEBY 3 WNW	41-3410	35.6317	-100.3922	2778	32	61	61	66-3410 15M 41-3410 15M	66-3410 15M 41-3410 HLY	66-3410 15M 41-3410 HLY
TX	GAIL	41-3411	32.7744	-101.4539	2530	16	16	75	80-0031 15M	80-0031 15M	80-0031 15M 41-3411 DLY
TX	GAINESVILLE	41-3415	33.6358	-97.1447	781	27	53	106	66-3415 15M 41-3415 15M	66-3415 15M 41-3415 HLY	66-3415 15M 41-3415 HLY 41-3415 DLY
TX	GALVESTON	79-0055	29.3048	-94.7934	7	0	104	137		99-3430 HLY 41-3430 HLY	99-3430 HLY 41-3430 HLY 52-3430 DLY 79-0055 DLY
TX	GALVESTON SCHOLES FLD	79-0047	29.2733	-94.8592	7	0	19	39		41-3431 HLY 55-0043 HLY 56-0111 HLY	41-3431 HLY 55-0043 HLY 56-0111 HLY 79-0047 DLY
TX	GARDEN CITY	41-3445	31.8667	-101.4814	2654	0	0	88			41-3445 DLY
TX	GARDEN CITY 16 E	41-3446	31.8333	-101.2000	2461	0	23	25		41-0463 HLY 41-3446 HLY	41-0463 HLY 41-3446 HLY
TX	GATESVILLE	41-3485	31.4144	-97.7019	827	0	0	101			41-3485 DLY
TX	GEORGE WEST 2 SSW	41-3508	28.3064	-98.1222	226	0	0	97			41-3508 DLY

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TX	GEORGETOWN LAKE	41-3507	30.6836	-97.7172	840	20	25	80	66-3507 15M 41-3507 15M	66-3507 15M 85-0509 HLY 41-3507 HLY	41-3506 DLY 41-3507 DLY
TX	GIDDINGS 5E	41-3525	30.1872	-96.8594	436	0	0	77			41-3525 DLY
TX	GILMER 4 WNW	41-3546	32.7464	-95.0497	390	27	58	85	41-3546 15M	85-0512 HLY 76-0058 HLY 41-3546 HLY	85-0512 HLY 76-0058 HLY 41-3546 DLY
TX	GLADEWATER 3 WSW	41-3565	32.5269	-94.9600	243	0	0	29			41-9709 DLY 41-3565 DLY
TX	GLEN ROSE 2 W	41-3591	32.2342	-97.7853	656	0	0	36			41-3591 DLY
TX	GOLD	41-3605	30.3481	-98.6861	1640	0	0	67			41-3605 DLY
TX	GOLDTHWAITE 1 WSW	41-3614	31.4403	-98.5903	1506	0	0	82			41-3614 DLY
TX	GOLIAD	41-3618	28.6617	-97.3850	141	0	0	100			41-3620 DLY 41-3618 DLY
TX	GONZALES 1N	41-3622	29.5175	-97.4597	381	0	0	111			99-3622 DLY 41-3622 DLY
TX	GOOSE CREEK	41-3640	29.7333	-94.9667	23	31	43	76	60-0119 15M	60-0119 15M 41-0587 HLY	60-0119 15M 41-0587 HLY 41-3640 DLY
TX	GORDON 1SW	41-3639	32.5408	-98.3814	1020	0	0	66			41-9015 DLY 41-3639 DLY
TX	GORDONVILLE	41-3642	33.7953	-96.8531	722	17	47	61	41-3642 15M	41-3642 HLY	69-1377 DLY 41-3642 HLY 41-3642 DLY
TX	GORMAN 2 NNE	41-3646	32.2422	-98.6631	1381	0	44	45		41-3646 HLY	41-3646 HLY 41-3646 DLY
TX	GRAHAM	41-3668	33.1203	-98.5669	1079	0	0	98			41-3668 DLY
TX	GRANDFALLS 3SSE	41-3680	31.3028	-102.8222	2425	0	0	75			41-3680 DLY
TX	GRANGER	41-3685	30.7150	-97.4483	571	0	0	39			41-3685 DLY
TX	GRANGER DAM	41-3686	30.7189	-97.3211	554	24	27	37	66-3686 15M 41-3686 15M	66-3686 15M 41-3686 HLY	41-3686 DLY
TX	GRAPELAND	41-3689	31.4833	-95.4833	479	0	0	32			41-3689 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	GRAPEVINE DAM	41-3691	32.9506	-97.0553	584	36	56	85	66-3691 15M 41-3691 15M	66-3691 15M 41-3691 HLY	41-3691 DLY
TX	GREENS BYU AT MT HOUSTON PKWY	60-0104	29.8920	-95.2380	24	29	30	31	60-0116 15M 60-0104 15M	60-0116 15M 60-0104 15M	60-0116 15M 60-0104 15M
TX	GREENVILLE KGVL RADIO	41-3734	33.1678	-96.0983	545	0	0	109			41-3734 DLY
TX	GROESBECK	41-3770	31.5167	-96.5333	469	24	24	36	41-3771 15M	41-3771 HLY	41-3771 HLY 41-3770 DLY
TX	GROVETON	41-3778	31.0611	-95.1344	351	0	0	54			41-3778 DLY
TX	GRUVER	41-3787	36.2631	-101.4050	3169	0	0	72			41-3787 DLY
TX	GUADELUPE PEAK	76-0061	31.9250	-104.8253	7755	0	27	28		85-0504 HLY 76-0061 HLY	85-0504 HLY 76-0061 HLY
TX	GUNTER 5 S	41-3822	33.3750	-96.7611	735	0	0	51			41-3822 DLY
TX	GUTHRIE	41-3828	33.6267	-100.3369	1759	0	0	62			41-3828 DLY
TX	HAGANSPORT	41-3846	33.3361	-95.2486	361	0	0	88			41-3846 DLY
TX	HALL RCH	41-3871	30.1333	-99.6000	2280	0	32	33		41-3871 HLY	41-3871 HLY
TX	HALLETTSVILLE 2 N	41-3873	29.4706	-96.9397	276	0	0	120			41-3873 DLY
TX	HAMILTON 2E	41-3884	31.7044	-98.0853	1125	0	0	49			41-3884 DLY
TX	HAMLIN 1SW	41-3890	32.8694	-100.1211	1719	0	0	82			69-1803 DLY 41-3890 DLY
TX	HARLETON	41-3941	32.6761	-94.5781	344	0	0	62			69-1687 DLY 41-3941 DLY
TX	HARLINGEN	41-3943	26.2028	-97.6728	39	0	0	103			41-3943 DLY
TX	HARLINGEN RIO GRANDE AP	79-0034	26.2281	-97.6542	33	0	21	30		55-0034 HLY 56-0100 HLY	55-0034 HLY 79-0034 DLY
TX	HARPER 1W	41-3954	30.3011	-99.2681	2060	0	0	73			41-3954 DLY
TX	HARRY STONE PARK - MILLMAR DR	81-0016	32.8261	-96.6753	528	25	25	25	81-0016 15M	81-0016 15M	81-0016 15M
TX	HART	41-3972	34.3697	-102.1175	3665	0	0	56			41-3972 DLY
TX	HARTLEY 4 ESE	41-3981	35.8656	-102.3319	3904	0	0	71			41-3979 DLY 41-3981 DLY
TX	HASKELL	41-3992	33.1497	-99.7350	1578	0	0	109			41-3992 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	HAWKINS	41-4020	32.5781	-95.2033	335	0	0	62			41-4020 DLY
TX	HAWLEY 3 NE	41-4026	32.6500	-99.7333	1650	0	0	48			41-6494 DLY 41-4026 DLY
TX	HEBBRONVILLE	41-4058	27.3194	-98.6775	581	0	0	94			41-4058 DLY
TX	HEMPHILL 6 NE	41-4077	31.4072	-93.7842	180	0	0	42			41-4076 DLY 41-4077 DLY
TX	HEMPSTEAD	41-4080	30.1000	-96.0833	253	0	0	83			60-0235 15M 41-4080 DLY
TX	HENDERSON	41-4081	32.1808	-94.7964	420	0	0	109			41-4081 DLY
TX	HENLY	41-4088	30.2000	-98.2167	1270	0	0	36			63-0169 HLY 41-4088 DLY
TX	HENRIETTA	41-4093	33.8128	-98.2003	932	0	0	101			41-4093 DLY
TX	HEREFORD	41-4098	34.8172	-102.4003	3819	35	57	86	80-0037 15M 59-0001 15M 41-4098 15M	80-0037 15M 59-0001 15M 41-4100 HLY 41-4098 HLY	41-4100 HLY 41-4098 DLY
TX	HEWITT	41-4122	31.4667	-97.2000	659	0	0	118			99-4122 DLY 41-4122 DLY
TX	HICO	41-4137	31.9844	-98.0311	1043	28	26	93	41-4137 15M	41-4137 HLY	41-4137 DLY
TX	HIGGINS	41-4140	36.1161	-100.0239	2566	0	0	67			41-4140 DLY
TX	HILLSBORO	41-4182	32.0161	-97.1094	551	0	0	110			41-4182 DLY
TX	HINDES	41-4191	28.7167	-98.8000	360	19	53	55	41-4191 15M	41-4191 HLY	41-4191 HLY
TX	HONDO MUNI AP	79-0062	29.3600	-99.1742	919	0	21	118		56-0126 HLY 55-0054 HLY 41-4256 HLY	41-4254 DLY 55-0054 HLY 79-0062 DLY
TX	HONEY GROVE	41-4257	33.5842	-95.8994	663	37	57	96	66-4257 15M 41-4258 15M 41-4257 15M	66-4257 15M 41-4258 HLY 41-4257 HLY	41-4257 DLY
TX	HORDS CREEK DAM	41-4278	31.8456	-99.5606	1942	0	48	64		63-0017 HLY 85-0556 HLY 41-4278 HLY	63-0017 HLY 41-4278 HLY 41-4278 DLY
TX	HORGER	41-4280	31.0000	-94.1667	112	0	0	36			41-4280 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years			Contributing stations		
						<1hr	hourly	daily	<1hr	hourly	daily
TX	HOUSTON ADDICKS	41-4309	29.7689	-95.6439	91	29	69	68	41-4309 15M 60-0006 15M 60-0005 15M	85-0310 HLY 41-4309 15M 60-0006 15M 60-0005 15M 41-0054 HLY 41-4309 HLY	85-0310 HLY 41-4309 15M 60-0006 15M 60-0005 15M 41-0054 HLY 41-4309 HLY
TX	HOUSTON ALIEF	41-4311	29.7147	-95.5947	72	32	65	72	60-0039 15M 60-0038 15M 41-4311 15M	60-0039 15M 60-0038 15M 41-4311 HLY	60-0039 15M 60-0038 15M 41-4311 HLY 41-4311 DLY
TX	HOUSTON BARKER	41-4313	29.8142	-95.7275	128	0	0	72			69-1674 DLY 69-1627 DLY 60-0129 15M 41-4313 HLY 41-4313 DLY
TX	HOUSTON DEER PARK	41-4315	29.7283	-95.1306	36	0	0	63			41-4315 DLY
TX	HOUSTON HEIGHTS	41-4321	29.7914	-95.4261	66	0	0	57			41-4321 DLY
TX	HOUSTON HOBBY AP	79-0042	29.6381	-95.2819	43	0	0	85			99-4307 DLY 79-0042 DLY
TX	HOUSTON INDEP HTS	41-4323	29.8667	-95.4167	92	28	29	73	60-0221 15M 60-0056 15M 60-0115 15M	60-0221 15M 60-0056 15M 60-0115 15M	60-0221 15M 60-0056 15M 60-0115 15M 41-4323 DLY
TX	HOUSTON INTERCONT AP	79-0061	29.9800	-95.3600	95	0	48	48		64-0236 HLY 60-0067 15M 56-0124 HLY 41-4300 HLY	79-0061 DLY
TX	HOUSTON NORTH HOUSTON	41-4327	29.8733	-95.5275	112	0	0	76			99-4327 DLY 41-4327 DLY
TX	HOUSTON SAN JACINTO DA	41-4328	29.9167	-95.1500	59	30	30	64	60-0064 15M 60-0122 15M 60-0065 15M	60-0064 15M 60-0122 15M 60-0065 15M	60-0064 15M 60-0122 15M 60-0065 15M 60-0122 15M 60-0065 15M 41-4328 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	Data years hourly	Data years daily	Contributing stations <1hr	Contributing stations hourly	Contributing stations daily
TX	HOUSTON SATSUMA	41-4329	29.9333	-95.6333	121	33	74	76	60-0085 15M 60-0087 15M 41-4329 15M	60-0085 15M 60-0087 15M 41-4329 15M 41-4329 HLY	60-0085 15M 60-0087 15M 41-4329 15M 41-4329 HLY 41-4329 DLY
TX	HOUSTON SPRING BRANCH	41-4331	29.8042	-95.4914	92	21	22	67	60-0141 15M	60-0141 15M	41-3043 DLY 41-4317 DLY 60-0141 15M 41-4331 DLY
TX	HOUSTON WB CITY	79-0056	29.7622	-95.3593	52	29	90	125	60-0220 15M 60-0219 15M 60-0135 15M	99-4305 HLY 60-0220 15M 60-0219 15M 60-0135 15M 41-4305 HLY	99-4305 DLY 99-4305 HLY 60-0220 15M 60-0219 15M 60-0135 15M 41-4305 HLY 60-0220 15M 60-0219 15M 60-0135 15M 41-4305 HLY 79-0056 DLY
TX	HOUSTON-PORT	41-4326	29.7456	-95.2800	20	29	29	29	60-0227 15M 60-0134 15M 60-0226 15M	60-0227 15M 60-0134 15M 60-0226 15M	60-0227 15M 60-0134 15M 60-0226 15M 41-4326 DLY
TX	HOUSTON-WESTBURY	41-4325	29.6600	-95.6275	49	0	0	74			99-4325 DLY 41-4325 DLY
TX	HUCKABAY	41-4343	32.3389	-98.2972	1414	0	0	39			41-4343 DLY
TX	HUDSPETH RIVER RANCH	41-4348	30.0050	-101.1772	1631	0	0	35			41-0479 DLY 41-4348 DLY
TX	HUMBLE	41-4362	30.0000	-95.2500	102	29	29	60	60-0067 15M	60-0067 15M	60-0067 15M 41-4362 DLY
TX	HUMBLE PUMP STN 5 WN	41-4363	30.3606	-100.3056	2201	0	0	60			41-4363 DLY
TX	HUNT 10 W	41-4375	30.0628	-99.5050	2011	33	33	37	66-4375 15M 41-4375 15M	66-4375 15M 41-4375 15M	41-4375 15M 41-4375 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	HUNT 3 SW	41-4374	30.0294	-99.3614	1870	0	0	60			69-1900 DLY 41-4374 DLY
TX	HUNTSVILLE	41-4382	30.7064	-95.5422	495	0	0	111			41-4382 DLY
TX	HURST SPRINGS	41-4390	31.6544	-97.7086	1030	0	0	46			41-4390 DLY
TX	HYE	41-4402	30.2533	-98.5711	1457	0	0	64			41-4402 DLY
TX	IMPERIAL	41-4425	31.2667	-102.7000	2402	0	40	68		41-1185 HLY 41-4425 HLY	41-1185 HLY 41-1185 DLY 41-4425 DLY
TX	INDIAN GAP	41-4440	31.6667	-98.4167	1575	0	37	52		41-7274 HLY 41-4440 HLY	41-7274 HLY 41-7274 DLY 41-4440 DLY
TX	IOWA PARK EXP STN	41-4471	33.9167	-98.6500	981	0	0	32			41-9730 DLY 41-4471 DLY
TX	IREDELL	41-4476	31.9808	-97.8731	902	36	43	45	66-4476 15M 41-4476 15M	66-4476 15M 41-4476 HLY	66-4476 15M 41-4476 HLY
TX	ITASCA	41-4505	32.1597	-97.1422	705	0	0	31			41-4503 DLY 41-4505 DLY
TX	JACKSBORO	41-4517	33.2206	-98.1561	1083	30	65	70	66-4517 15M 41-4520 15M 41-4517 15M	41-4520 15M 41-4517 15M 66-4517 15M 41-4520 HLY 85-0570 HLY 41-4517 HLY	85-0570 HLY 41-4517 HLY 41-4517 DLY
TX	JACKSONVILLE	41-4525	31.9622	-95.2736	561	0	0	75			41-4524 DLY 41-4525 DLY
TX	JARRELL	41-4556	30.8472	-97.5994	850	0	0	83			41-4556 DLY
TX	JASPER	41-4563	30.9153	-94.0097	207	0	0	66			41-4563 DLY
TX	JAYTON	41-4570	33.2544	-100.5725	2011	37	64	79	66-4570 15M 41-4570 15M	66-4570 15M 41-4570 HLY	41-4570 HLY 41-4570 DLY
TX	JEDDO 3S	41-4575	29.7664	-97.3164	417	0	0	77			41-4575 DLY
TX	JEFFERSON	41-4577	32.7692	-94.3558	207	0	31	95		41-4577 HLY	41-4577 DLY
TX	JEWETT	41-4591	31.3500	-96.1500	509	0	46	61		41-4591 HLY	41-4591 HLY 41-4591 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	JOE POOL LAKE	41-4597	32.6406	-96.9747	591	0	0	33			41-4597 HLY 41-4597 DLY
TX	JOHNSON CITY	41-4605	30.2861	-98.4089	1188	0	29	48		63-0165 HLY	63-0165 HLY 41-4605 DLY
TX	JOLLYVILLE 2 SW	63-0187	30.4208	-97.7975	731	31	31	31	65-0097 15M 63-0187 15M	65-0097 15M 63-0187 15M	65-0097 15M 63-0187 15M
TX	JOURDANTON	41-4647	28.9122	-98.5425	518	0	0	64			69-0574 DLY 41-4647 DLY
TX	JUNCTION 4SSW	41-4670	30.4453	-99.8045	1749	34	62	109	66-4670 15M 41-4670 15M	66-4670 15M 41-4670 HLY	41-4670 HLY 41-4670 DLY
TX	JUNCTION KIMBLE CO AP	79-0094	30.5108	-99.7664	1749	0	0	41			55-0089 HLY 56-0166 HLY 79-0094 DLY
TX	JUSTIN	41-4679	33.0806	-97.2967	640	38	53	58	66-4679 15M 41-4679 15M	66-4679 15M 41-4679 HLY	41-4679 HLY 41-4679 DLY
TX	KARNACK	41-4693	32.6664	-94.1781	256	0	0	72			85-0379 HLY 76-0035 HLY 41-4693 DLY
TX	KARNES CITY 2N	41-4696	28.9069	-97.8756	449	0	0	77			41-4696 DLY
TX	KATY CITY	41-4704	29.8025	-95.8197	154	28	34	68	60-0124 15M	60-0124 15M 41-4704 HLY	41-4704 HLY 41-4704 DLY
TX	KAUFMAN 3 SE	41-4705	32.5589	-96.2725	420	0	0	113			69-1823 DLY 41-4705 DLY
TX	KENT 8SE	41-4770	31.0158	-104.1108	4603	0	0	59			41-4767 DLY 41-4770 DLY
TX	KERRVILLE 3 NNE	41-4782	30.0747	-99.1081	1785	0	0	121			99-4780 DLY 41-4780 DLY 41-4782 DLY
TX	KILLEEN	41-4792	31.0658	-97.6919	814	0	24	64		64-0337 HLY 41-4792 HLY	41-4791 DLY 64-0337 DLY 79-0021 DLY 41-4792 DLY
TX	KINGSVILLE	41-4810	27.5311	-97.8497	56	0	0	81			41-4810 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	KINGSVILLE 6.5 SSE	69-1828	27.4214	-97.8236	59	0	0	68			41-7580 DLY 69-1828 DLY
TX	KINGSVILLE NAAS	79-0051	27.5000	-97.8167	56	0	0	64			79-0051 DLY
TX	KIRBYVILLE	41-4819	30.6167	-93.9167	200	0	0	66			69-1806 DLY 41-4819 DLY
TX	KNAPP 2 SW	41-4841	32.6258	-101.1503	2290	0	0	74			41-4841 DLY
TX	KNICKERBOCKER	41-4848	31.2667	-100.6333	2051	0	0	36			69-2393 DLY 41-4848 DLY
TX	KNOX CITY	41-4852	33.4167	-99.8167	1532	0	0	31			41-4852 DLY
TX	KOPPERL 5 NNE	41-4866	32.1347	-97.4786	620	24	57	65	41-4866 15M	41-4866 HLY	41-4866 HLY 41-4866 DLY
TX	KOUNTZE	41-4878	30.3750	-94.2994	62	0	38	65		41-4876 HLY 41-4878 HLY	41-4878 HLY 41-4878 DLY
TX	KRESS	41-4880	34.3708	-101.7483	3480	35	74	72	66-4880 15M 41-4880 15M	66-4880 15M 41-4880 HLY	66-4880 15M 41-4880 HLY
TX	L.B.J. NATIONAL GRASSLANDS	54-0219	33.3917	-97.6397	1024	0	0	28			54-0219 DLY
TX	LA GRANGE	41-4903	29.9175	-96.8769	358	0	28	105		63-0222 15M 76-0072 HLY 63-0222 HLY	63-0222 15M 76-0072 HLY 63-0222 HLY 41-4903 DLY
TX	LA JOYA	41-4911	26.2422	-98.3992	180	0	0	102			41-5972 DLY 41-4911 DLY
TX	LA PRYOR	41-4920	28.9831	-99.8686	758	35	59	85	66-4920 15M 41-4920 15M	66-4920 15M 41-4920 HLY	41-4920 DLY
TX	LA TUNA 1 S	41-4931	31.9800	-106.5975	3799	0	0	69			69-1312 DLY 41-4931 DLY
TX	LACKLAND AIR FORCE BASE (KELL	64-0301	29.3830	-98.5830	690	0	0	54			41-4731 HLY 56-0103 HLY 79-0037 DLY 64-0301 DLY
TX	LAJITAS	41-4950	29.2694	-103.7575	2402	0	0	37			41-4950 DLY
TX	LAKE ABILENE STATE PARK	41-4960	32.2403	-99.8792	1972	0	0	50			41-4960 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	LAKE ALAN HENRY	41-4967	33.0642	-101.0489	2280	0	0	48			41-7146 DLY 41-4967 DLY
TX	LAKE BOB SANDLIN	53-0001	33.0826	-95.0008	338	0	0	22			53-0001 DLY
TX	LAKE BRIDGEPORT DAM	41-4972	33.2250	-97.8317	869	36	62	70	66-4972 15M 83-0021 15M 41-4972 15M	66-4972 15M 83-0021 15M 41-4972 HLY	41-4972 HLY 41-4972 DLY
TX	LAKE COLORADO CITY	41-4974	32.3333	-100.9167	2100	0	27	35		41-4974 HLY	41-4974 HLY 41-4974 DLY
TX	LAKE CROCKETT	41-4975	33.7411	-95.9217	530	28	36	38	41-4975 15M	85-0389 HLY 76-0037 HLY 41-4975 HLY	85-0389 HLY 76-0037 HLY 41-4975 HLY
TX	LAKE JUNE BRANCH - ST AUGUSTIN	81-0021	32.7361	-96.6567	469	22	23	21	81-0021 15M	81-0021 15M	81-0021 15M
TX	LAKE KEMP	41-4982	33.7542	-99.1442	1168	21	32	47	66-4982 15M 41-4982 15M	66-4982 15M 41-4982 HLY	41-4982 HLY 41-4982 DLY
TX	LAKE LBJ AT 1431 BRIDGE	63-0069	30.6576	-98.4276	840	0	22	21		63-0069 HLY	63-0069 HLY
TX	LAKE TAWAKONI	41-4980	32.8522	-95.8864	449	0	0	42			41-4483 DLY 41-4980 DLY
TX	LAMESA 1 SSE	41-5013	32.7228	-101.9456	2966	0	0	105			41-5013 DLY
TX	LAMPASAS	41-5018	31.0717	-98.1847	1033	0	0	115			69-2052 DLY 41-5018 DLY
TX	LAMPASAS RIVER NEAR KEMPER	85-0588	31.0817	-98.0164	902	0	22	21		85-0588 HLY	85-0588 HLY
TX	LANGTRY	41-5048	29.8097	-101.5603	1289	38	65	84	66-5048 15M 41-5048 15M	66-5048 15M 41-5049 HLY 41-5048 HLY	41-5049 HLY 41-5049 DLY 41-5048 HLY 41-5048 DLY
TX	LAREDO 2	41-5060	27.5683	-99.4983	430	0	44	103		64-0286 HLY 85-0606 HLY 41-5060 HLY 41-5058 HLY 56-0102 HLY 41-5057 HLY	79-0044 DLY 41-5056 DLY 56-0102 HLY 79-0036 DLY 41-5060 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	LATEX	41-5081	32.3500	-94.1000	302	0	29	55		41-6788 HLY 16-0786 HLY 41-5081 HLY	16-3877 DLY 41-6788 HLY 16-0786 HLY 41-5081 HLY 16-0786 DLY 41-0715 DLY 41-6788 HLY 16-0786 HLY 41-5081 HLY 41-5081 HLY 41-5081 DLY
TX	LAUGHLIN AFB AIRPORT	64-0375	29.3670	-100.7830	1082	0	0	34			79-0098 DLY 64-0375 DLY
TX	LAVON DAM	41-5094	33.0353	-96.4861	509	23	42	68	41-5094 15M	41-5094 HLY	41-5094 HLY 41-5094 DLY
TX	LAWN	41-5097	32.1414	-99.7528	1949	0	0	60			41-5097 DLY
TX	LEAKEY	41-5113	29.7392	-99.7611	1621	26	52	65	66-5113 15M 41-5113 15M	66-5113 15M 41-5113 HLY	66-5113 15M 41-5114 DLY 41-5113 HLY 41-5113 DLY
TX	LEANDER 5 SW	63-0180	30.5384	-97.9289	1105	0	24	24		63-0180 HLY	63-0180 HLY
TX	LEFORS	87-0043	35.4333	-100.8000	2831	0	28	28		85-0608 HLY 87-0043 HLY	85-0608 HLY 87-0043 HLY
TX	LENORAH	41-5158	32.3081	-101.8775	2844	0	0	69			41-5158 DLY
TX	LEVELLAND	41-5183	33.5500	-102.3758	3514	0	0	76			41-5183 DLY
TX	LEWISVILLE DAM	41-5192	33.0694	-97.0094	558	20	53	65	66-5192 15M 41-5192 15M	66-5192 15M 41-3476 HLY 41-5192 HLY	41-5191 DLY 41-3476 HLY 41-3476 DLY 41-5192 DLY
TX	LEXINGTON	41-5193	30.4064	-97.0136	466	33	68	77	66-5193 15M 41-5193 15M	66-5193 15M 41-5193 HLY	41-5193 HLY 41-5193 DLY
TX	LIBERTY	41-5196	30.0592	-94.7950	36	15	16	112	60-0243 15M	60-0243 15M	41-5196 DLY
TX	LILLIAN 3 W	41-5218	32.5000	-97.2333	745	0	0	34			41-5216 DLY 41-5218 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	LINDALE 5 SE	41-5228	32.4500	-95.3667	449	0	0	34			41-5228 DLY
TX	LINDEN	41-5229	33.0161	-94.3675	417	0	0	69			41-5229 DLY
TX	LIPAN 4NW	41-5243	32.5683	-98.0819	988	0	0	64			41-5243 DLY
TX	LIPSCOMB	41-5247	36.2358	-100.2675	2451	26	52	74	41-5247 15M	41-5247 HLY	41-5247 HLY 41-5247 DLY
TX	LITTLEFIELD	41-5265	33.9378	-102.3447	3576	0	0	86			41-5263 DLY 41-5265 DLY
TX	LIVINGSTON 2 NNE	41-5271	30.7394	-94.9256	177	0	0	75			41-5271 DLY
TX	LLANO	41-5272	30.7425	-98.6542	1020	0	29	120		63-0114 HLY	63-0114 HLY 41-5272 DLY
TX	LLANO RIVER NR MASON	63-0094	30.6601	-99.1085	1269	0	29	29		63-0094 HLY	63-0094 HLY
TX	LOCKHART 2SW	41-5285	29.8569	-97.6958	489	0	0	71			41-5284 DLY 41-5285 DLY
TX	LOMA ALTA	41-5303	29.9173	-100.7794	1903	0	20	20		41-5303 HLY	41-5303 HLY
TX	LONDON 3N	41-5312	30.7131	-99.5681	1801	25	53	60	41-5312 15M	41-1053 HLY 41-5312 HLY	41-1053 HLY 41-5312 HLY 41-5312 HLY 41-5312 DLY
TX	LONGVIEW	41-5341	32.4725	-94.7172	331	0	0	114			41-5344 DLY 41-5341 DLY
TX	LONGVIEW WSMO	79-0027	32.3500	-94.6500	407	32	31	42	66-5348 15M 41-5348 15M	66-5348 15M 41-5348 HLY	79-0027 DLY
TX	LOOP	41-5351	32.9000	-102.4167	3245	0	0	42			41-5351 DLY
TX	LORAINE	41-5358	32.4167	-100.7167	2270	0	32	34		41-5358 HLY	41-5358 HLY
TX	LORENZO	41-5363	33.6667	-101.5333	3169	0	0	36			41-5363 DLY
TX	LOVELADY	41-5398	31.1333	-95.4500	302	0	44	44		41-5398 HLY	41-5398 HLY 41-5398 DLY
TX	LUBBOCK	79-0114	33.6542	-101.8136	3258	0	62	73		56-0181 HLY 41-5411 HLY	41-5411 HLY 79-0114 DLY
TX	LUBBOCK 9 N	41-5410	33.6897	-101.8219	3245	41	65	104	66-5410 15M 41-5410 15M	66-5410 15M 41-5410 HLY	41-5410 HLY 41-5410 DLY
TX	LUFKIN 11 NW	41-5415	31.4269	-94.8942	217	0	0	33			41-5415 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	LUFKIN ANGELINA CO AP	79-0159	31.2361	-94.7544	289	0	0	104			79-0159 DLY
TX	LULING	41-5429	29.6756	-97.6578	400	0	20	116		41-5429 HLY	41-5429 DLY
TX	LYTLE 3W	41-5454	29.2358	-98.8433	722	0	0	52			69-2152 DLY 41-6205 DLY 41-5454 DLY
TX	MABANK 4 SW	41-5463	32.3317	-96.1506	360	26	60	60	66-5463 15M 41-5463 15M	66-5463 15M 41-5461 HLY 41-5463 HLY	66-5463 15M 41-5461 HLY 41-5463 HLY
TX	MADISONVILLE	41-5477	30.9392	-95.9203	253	0	0	82			41-5477 DLY
TX	MALONE 3ENE	41-5528	31.9442	-96.8464	485	0	29	34		85-0674 HLY 41-5528 HLY	85-0674 HLY 41-5528 HLY
TX	MANCHACA	41-5538	30.1333	-97.8333	702	31	31	49	65-0071 15M 63-0199 15M	65-0071 15M 63-0199 15M	65-0071 15M 63-0199 15M 41-5538 DLY
TX	MARATHON	41-5579	30.1925	-103.2717	3990	0	0	70			41-5579 DLY
TX	MARBLE FALLS	41-5580	30.5667	-98.2833	771	0	0	58			63-0139 HLY 41-5580 DLY
TX	MARBLE FALLS 10 SSW	63-0141	30.4476	-98.3379	1364	0	24	24		63-0141 HLY	63-0141 HLY
TX	MARBLE FALLS 4 WSW	63-0137	30.5545	-98.3368	790	0	26	26		63-0137 HLY	63-0137 HLY
TX	MARBLE FALLS 6 ENE	63-0145	30.5993	-98.1709	982	0	23	25		63-0145 HLY	63-0145 HLY
TX	MARFA 3W	41-5596	30.3125	-104.0722	4790	27	31	44	41-5596 15M	41-5596 HLY	41-5596 HLY 41-5596 DLY
TX	MARFA CHARCO M R	41-5591	30.4833	-104.1167	5300	0	25	26		41-8400 HLY 41-5591 HLY	41-8400 HLY 41-5591 HLY
TX	MARLIN 3 NE	41-5611	31.3336	-96.8581	384	0	0	85			41-5611 DLY
TX	MARSHALL	41-5618	32.5403	-94.3508	351	0	0	109			41-5618 DLY
TX	MASON	41-5650	30.7478	-99.2306	1549	0	0	69			41-5650 DLY
TX	MATADOR	41-5658	34.0044	-100.8250	2415	36	63	75	41-5656 15M	41-5658 HLY 41-5656 HLY	41-5658 HLY 41-5656 HLY 41-5658 HLY 41-5658 DLY
TX	MATAGORDA NO 2	41-5659	28.6836	-95.9733	10	0	0	103			41-5659 DLY

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TX	MATHIS 4 SSW	41-5661	28.0372	-97.8725	138	0	0	52			41-5661 DLY
TX	MAUD	41-5667	33.3322	-94.3436	305	0	0	68			41-5667 DLY
TX	MAYHAW BAYOU - WILBER ROAD	82-7000	29.8075	-94.2619	9	23	24	23	82-7000 15M	82-7000 15M	82-7000 15M
TX	MAYPEARL	41-5695	32.3114	-97.0158	548	0	42	51		41-5695 HLY	41-5695 HLY 41-5695 DLY
TX	MC LEAN	41-5770	35.2361	-100.5922	2872	36	63	77	80-0049 15M 66-5770 15M 41-5770 15M	80-0049 15M 66-5770 15M 41-5770 HLY	80-0049 15M 66-5770 15M 41-5770 HLY 41-5770 DLY
TX	MCALLEN MILLER INTL AP	79-0060	26.1839	-98.2539	102	0	21	76		55-0051 HLY 78-0059 15M 41-5702 HLY	41-5701 DLY 79-0060 DLY
TX	MCCAMEY	41-5707	31.1331	-102.2217	2461	0	0	83			41-5707 DLY
TX	MCCOOK	41-5721	26.4842	-98.3907	220	0	0	67			41-5721 DLY
TX	MCCREE BRANCH - WHITE ROCK TRA	81-0004	32.8717	-96.7286	475	22	22	21	81-0004 15M	81-0004 15M	81-0004 15M
TX	MCGREGOR	41-5757	31.4350	-97.4011	722	0	0	101			41-5757 DLY
TX	MCKINNEY MUNICIPAL AIRPORT	41-5766	33.1835	-96.5895	587	0	0	99			56-0207 HLY 41-5766 DLY
TX	MEDINA 1NE	41-5742	29.8100	-99.2497	1487	0	0	48			41-5742 DLY
TX	MEMPHIS	41-5821	34.7261	-100.5372	2090	0	0	103			41-5821 DLY
TX	MENARD	41-5822	30.9044	-99.7864	1982	0	0	106			41-5822 DLY
TX	MERCEDES 6 SSE	41-5836	26.0619	-97.8997	75	0	0	62			41-5836 DLY
TX	MERIDIAN	41-5845	31.9300	-97.6608	771	0	0	45			41-5847 DLY 41-5845 DLY
TX	MERTZON	41-5859	31.2667	-100.8167	2228	0	0	42			41-5859 DLY
TX	MEXIA	41-5869	31.6181	-96.4497	502	0	0	99			41-5869 DLY
TX	MIAMI	41-5875	35.6936	-100.6392	2746	0	0	97			41-5875 DLY
TX	MIDLAND 4 ENE	41-5891	32.0186	-102.0258	2776	0	0	95			99-5891 DLY 41-5891 DLY
TX	MIDLAND ODESSA	79-0109	31.9433	-102.1889	2867	0	69	87		56-0177 HLY 41-5890 HLY	79-0109 DLY

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TX	MIDLOTHIAN	41-5897	32.4842	-96.9942	751	30	31	62	66-5897 15M 41-5897 15M	66-5897 15M 41-5897 HLY	41-5896 DLY 41-5897 HLY 41-5897 DLY
TX	MIDWAY 4 NE	41-5904	31.0706	-95.7150	236	0	0	35			41-5904 DLY
TX	MINEOLA	41-5954	32.6350	-95.4822	367	0	0	65			41-5954 DLY
TX	MINEOLA 8 ENE	41-5956	32.7167	-95.3667	384	0	0	32			41-5956 DLY
TX	MINERAL WELLS 1 SSW	41-5957	32.7864	-98.1183	845	32	47	48	66-5957 15M 41-5957 15M	66-5957 15M 41-5957 15M 41-5957 HLY	66-5957 15M 41-5957 15M 41-5957 HLY
TX	MINERAL WELLS AP	79-0157	32.7817	-98.0603	972	0	22	61		56-0275 HLY 55-0174 HLY 41-5958 HLY	79-0157 DLY
TX	MOBEETIE	41-5987	35.5333	-100.4333	2680	0	0	40			52-5987 DLY 41-5987 DLY
TX	MOLINE	41-5996	31.3933	-98.3081	1385	22	55	60	41-5996 15M	41-5996 HLY	41-5996 HLY
TX	MONAHANS	41-5999	31.5414	-102.9122	2546	0	0	45			41-5999 DLY
TX	MONTELL	41-6019	29.5333	-100.0167	1302	0	0	31			41-6019 DLY
TX	MONTGOMERY	41-6024	30.3908	-95.6969	322	0	0	64			41-6024 HLY 41-6024 DLY
TX	MORGAN	41-6058	32.0139	-97.6131	728	0	0	50			41-6058 DLY
TX	MORGAN MILL	41-6060	32.3842	-98.1703	1056	0	0	58			41-6060 DLY
TX	MORSE	41-6070	36.0608	-101.4747	3179	0	0	48			41-6070 DLY
TX	MORTON	41-6074	33.7183	-102.7586	3773	0	0	69			41-6074 DLY
TX	MT LOCKE	41-6104	30.6716	-104.0225	6791	28	64	83	66-6104 15M 41-6104 15M	66-6104 15M 41-5737 HLY 41-6104 HLY	41-6104 DLY
TX	MT PLEASANT	41-6108	33.1689	-95.0056	427	27	48	97	41-6108 15M	41-6108 HLY	41-6108 DLY
TX	MT VERNON	41-6119	33.1964	-95.2236	446	0	0	51			41-6119 DLY
TX	MUENSTER	41-6130	33.6564	-97.3769	1037	0	0	74			41-6130 DLY
TX	MULESHOE #1	41-6135	34.2192	-102.7328	3829	41	63	96	66-6136 15M 80-0054 15M 41-6136 15M	66-6136 15M 80-0054 15M 41-6136 15M 41-6136 HLY	41-6136 HLY 41-6135 DLY

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TX	MULESHOE 19 S	79-0007	33.9558	-102.7739	3743	0	0	38			41-6137 DLY 79-0007 DLY
TX	MULLIN	41-6140	31.5833	-98.6667	1493	0	0	50			41-6140 DLY
TX	MUNDAY 1W	41-6147	33.4500	-99.6364	1486	0	0	98			41-6146 DLY 41-6147 DLY
TX	N FORK RED RIVER NR SHAMROCK	87-0032	35.2642	-100.2414	2217	0	23	21		87-0032 HLY	87-0032 HLY
TX	NACOGDOCHES	41-6177	31.6164	-94.6431	436	24	49	116	41-6177 15M	41-6176 HLY 41-6177 HLY	41-6176 DLY 41-6177 DLY
TX	NAPLES 5 NE	41-6195	33.2425	-94.6736	289	0	0	86			41-6190 DLY 41-6195 DLY
TX	NAVARRO MILLS DAM	41-6210	31.9611	-96.6881	453	37	50	55	66-6210 15M 41-6210 15M	66-6210 15M 41-6210 HLY	41-6210 HLY 41-6210 DLY
TX	NEGLEY 4 SSW	41-6247	33.7042	-95.0700	404	0	0	52			41-6247 DLY
TX	NEUVILLE	41-6265	31.6503	-94.1519	479	0	0	45			41-6265 DLY
TX	NEW BOSTON	41-6270	33.4547	-94.4089	344	37	35	44	66-6270 15M 41-6270 15M	66-6270 15M 41-6270 HLY	41-6270 HLY 41-6270 DLY
TX	NEW BRAUNFELS	41-6276	29.7192	-98.1189	620	0	0	115			69-1087 DLY 41-6276 DLY
TX	NEW CANEY 2 E	41-6280	30.1375	-95.1783	73	0	0	64			41-6280 DLY
TX	NEW GULF	41-6286	29.2667	-95.8950	72	0	0	50			41-6286 DLY
TX	NEW SUMMERFIELD 2W	41-6335	31.9747	-95.1381	371	25	40	53	66-6335 15M 41-6335 15M	66-6335 15M 41-6335 HLY	41-6335 HLY 41-6335 DLY
TX	NEWPORT 1SW	41-6331	33.4561	-98.0253	1060	0	0	54			41-6331 DLY
TX	NEWTON	41-6341	30.8331	-93.7369	151	0	0	35			41-6339 DLY 41-6341 DLY
TX	NIX STORE 1 W	41-6367	31.1081	-98.3794	1362	0	0	58			41-6367 DLY
TX	NIXON	41-6368	29.2828	-97.7675	341	0	0	87			41-6368 DLY
TX	NORTHFIELD	41-6433	34.2606	-100.6014	2070	0	0	67			80-0056 15M 41-6433 DLY
TX	NORTHINGTON RCH	41-6448	29.8642	-98.6581	1526	0	0	31			41-6448 DLY
TX	NOTLA 3 SE	41-6477	36.1014	-100.5894	2900	0	0	69			41-6477 DLY

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TX	O C FISHER DAM	41-6499	31.4539	-100.4933	1965	0	0	55			69-2400 DLY 41-7940 DLY 41-6499 DLY
TX	O DONNELL	41-6504	32.9711	-101.8247	3046	41	70	71	66-6504 15M 80-0058 15M 41-6504 15M	66-6504 15M 80-0058 15M 41-6504 HLY	66-6504 15M 80-0058 15M 41-6504 HLY
TX	OAKWOOD	41-6496	31.5914	-95.8442	285	0	0	80			69-1355 DLY 41-5327 DLY 41-6496 DLY
TX	ODESSA	41-6502	31.8797	-102.3592	2910	0	0	65			41-6502 DLY
TX	OLNEY	41-6636	33.3733	-98.7664	1194	0	0	50			41-6636 DLY
TX	OLNEY 5 NNW	41-6641	33.4372	-98.7806	1184	0	0	59			41-6641 DLY
TX	OLTON	41-6644	34.1797	-102.1356	3642	0	0	61			41-6644 DLY
TX	ORANGE	41-6664	30.0858	-93.7417	10	0	0	107			99-6664 DLY 41-6664 DLY
TX	ORANGE 9 N	41-6680	30.2264	-93.7394	20	0	0	63			41-2436 DLY 41-6680 DLY
TX	OVERTON	41-6722	32.2667	-94.9833	499	0	0	55			89-0038 DLY 41-6722 DLY
TX	OZONA	41-6734	30.7169	-101.2061	2346	0	0	64			41-6734 HLY 41-6734 DLY
TX	OZONA 8 WSW	41-6736	30.6819	-101.3375	2550	28	49	49	41-6736 15M	41-6736 HLY	41-6736 HLY
TX	PADUCAH	41-6740	34.0067	-100.2989	1900	0	0	99			41-6743 DLY 41-6740 HLY 41-6740 DLY
TX	PADUCAH 10S	41-6745	33.8758	-100.3831	1949	0	0	43			41-5086 DLY 41-6745 DLY
TX	PADUCAH 15 S	41-6742	33.8083	-100.2981	1831	0	0	44			41-6742 DLY
TX	PAINT ROCK	41-6747	31.5536	-99.8500	1588	0	0	89			41-6747 DLY
TX	PALACIOS MUNI AP	79-0054	28.7247	-96.2536	13	0	0	75			79-0054 DLY
TX	PALESTINE 2 NE	79-0153	31.7831	-95.6039	466	0	60	133		66-6757 15M 41-6757 HLY	99-6757 DLY 41-6757 HLY 79-0153 DLY

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TX	PALO PINTO	41-6766	32.7664	-98.3083	1040	0	0	62			41-6766 DLY
TX	PAMPA 2	41-6776	35.5544	-100.9736	3150	33	61	91	66-6776 15M 41-6776 15M	66-6776 15M 41-6775 HLY 41-6776 HLY	41-6775 HLY 79-0119 DLY 41-6776 HLY 41-6776 DLY
TX	PANDALE 1 N	41-6780	30.2061	-101.5575	1690	0	0	62			99-6780 DLY 41-6780 DLY
TX	PANHANDLE	41-6785	35.3514	-101.3897	3465	0	0	88			41-6785 DLY
TX	PANTHER JUNCTION	41-6792	29.3272	-103.2061	3740	34	55	62	41-6792 15M	85-0722 HLY 76-0089 HLY 41-6792 HLY	41-6792 DLY
TX	PARIS	41-6794	33.6744	-95.5586	541	0	0	113			41-6794 DLY
TX	PEARSALL	41-6879	28.8889	-99.0897	636	0	0	107			41-6879 DLY
TX	PECAN BAYOU NR MULLIN	63-0022	31.5172	-98.7414	1244	0	29	29		85-0675 HLY 63-0022 HLY	85-0675 HLY 63-0022 HLY
TX	PECOS	41-6892	31.4167	-103.5000	2612	0	0	67			41-6892 DLY
TX	PECOS 8W	41-6893	31.3783	-103.6331	2723	35	49	56	66-6893 15M 41-6893 15M	66-6893 15M 41-6893 HLY	66-6893 15M 41-6893 HLY 41-6893 DLY
TX	PENWELL	41-6932	31.7356	-102.5897	2933	0	0	65			41-4661 DLY 41-6932 DLY
TX	PEP	41-6935	33.8153	-102.5578	3660	42	59	57	66-6935 15M 41-6935 15M	66-6935 15M 41-6935 15M 41-6935 HLY	66-6935 15M 41-6935 15M 41-6935 HLY
TX	PERRYTON	41-6950	36.3897	-100.8239	2943	0	0	103			41-6950 DLY
TX	PERRYTON 11 WNW	41-6953	36.4408	-100.9961	3009	0	0	73			41-6953 DLY
TX	PERRYTON 21 S	41-6952	36.1017	-100.7394	2986	0	0	37			41-6952 DLY
TX	PERSIMMON GAP	41-6959	29.6603	-103.1736	2864	0	0	34			41-6959 DLY
TX	PFLUGERVILLE	41-6992	30.4333	-97.6167	679	31	31	49	65-0041 15M 63-0202 15M	65-0041 15M 63-0202 15M	65-0041 15M 63-0202 15M 41-6992 DLY
TX	PILOT POINT ISL DU BOI	41-7028	33.3658	-97.0122	689	0	0	80			41-7028 DLY

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TX	PINE SPRINGS	41-7044	31.8903	-104.8078	5591	0	0	39			54-0213 DLY 80-0034 15M 76-0091 HLY 41-7044 DLY
TX	PINELAND	41-7040	31.2447	-93.9658	220	0	0	40			41-7040 DLY
TX	PITCHFORK RCH	41-7060	33.5992	-100.5319	1946	0	25	37		66-7060 15M 41-7060 HLY	41-7060 DLY
TX	PITTSBURG 5 SSE	41-7066	32.9264	-94.9392	364	0	46	63		41-7066 HLY	41-7066 DLY
TX	PLAINS	41-7074	33.1869	-102.8281	3675	40	64	81	80-0067 15M 66-7074 15M 41-7074 15M	80-0067 15M 66-7074 15M 41-7074 HLY	80-0067 15M 41-7074 HLY 41-7074 DLY
TX	PLAINVIEW	41-7079	34.1892	-101.7022	3369	0	0	108			41-7079 DLY
TX	PLEMONS	41-7116	35.7667	-101.3333	2802	0	0	30			41-7116 HLY 41-7116 DLY
TX	POINT COMFORT	41-7140	28.6575	-96.5553	20	29	50	57	66-7140 15M 41-7140 15M	66-7140 15M 41-7140 HLY	41-7140 DLY
TX	PORT ARANSAS	41-7170	27.8381	-97.0592	13	0	0	31			41-7170 DLY
TX	PORT ARTHUR SE TX AP	79-0041	29.9506	-94.0206	16	0	65	70		56-0106 HLY 41-7174 HLY	79-0041 DLY
TX	PORT ARTHUR WB CITY	41-7173	29.8691	-93.9343	10	0	35	97		99-7173 HLY 41-7173 HLY	99-7173 HLY 41-7172 DLY 41-7173 HLY 41-7173 DLY
TX	PORT ISABEL	41-7179	26.0942	-97.3094	16	0	0	75			69-1119 DLY 41-7179 DLY
TX	PORT LAVACA	41-7183	28.6078	-96.6417	20	0	0	60			41-7182 DLY 41-7183 DLY
TX	PORT MANSFIELD	41-7184	26.5578	-97.4264	10	0	0	61			41-7184 DLY
TX	PORT O'CONNOR	41-7186	28.4342	-96.4278	7	0	0	42			41-7186 DLY
TX	POSSUM KINGDOM DAM	41-7205	32.8667	-98.4333	902	0	0	35			41-7205 DLY
TX	POST	41-7206	33.1986	-101.3744	2612	0	0	102			41-7206 DLY
TX	POTEET	41-7215	29.0283	-98.5686	427	0	0	71			41-7215 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	POYNOR 1 NE	41-7230	32.0833	-95.5833	531	0	0	30			41-7230 DLY
TX	PRADE RCH	41-7232	29.9167	-99.7908	2051	0	0	53			41-7232 DLY
TX	PRAIRIE MTN	41-7243	30.5767	-98.8767	1447	33	69	66	63-0106 15M 41-7243 15M	63-0106 HLY 41-7243 15M 41-7243 HLY	63-0106 HLY 41-7243 15M 41-7243 HLY 41-7243 DLY
TX	PRESIDIO 2	41-7264	29.5600	-104.3728	2569	0	0	79			41-7262 DLY 41-7264 DLY
TX	PRESTON ROAD - OLIVE TREE	81-0008	33.0128	-96.7958	679	23	22	22	81-0008 15M	81-0008 15M	81-0008 15M
TX	PRICE 2 SW	41-7271	32.1167	-94.9667	371	0	0	34			41-7271 DLY
TX	PROCTOR RSVR	41-7300	31.9633	-98.4942	1220	19	31	54	41-7300 15M	41-7300 HLY	41-7300 DLY
TX	PUTNAM	41-7327	32.3664	-99.1925	1631	0	0	106			41-7327 DLY
TX	QUANAH 2 SW	41-7336	34.2761	-99.7578	1601	0	0	101			41-7336 DLY
TX	QUITAQUE	41-7361	34.3667	-101.0500	2572	0	0	44			85-0380 HLY 41-1441 HLY 76-0036 HLY 41-7361 DLY
TX	QUITMAN 2	41-7365	32.7931	-95.4350	413	0	0	52			41-7363 DLY 41-7365 DLY
TX	RAINBOW	41-7388	32.2619	-97.7064	650	0	0	77			41-7388 DLY
TX	RANDOLPH AFB	79-0039	29.5439	-98.2736	761	37	68	72	66-7422 15M 41-7422 15M	66-7422 15M 41-7422 HLY	66-7422 15M 41-7422 HLY 69-1425 DLY 79-0039 DLY
TX	RANGER 1 W	41-7426	32.4667	-98.7000	1542	0	0	33			41-7425 DLY 41-7426 DLY
TX	RANKIN	41-7431	31.2286	-101.9461	2615	22	52	55	41-7431 15M	41-7431 HLY	41-7431 HLY 41-7431 DLY
TX	RAYMONDVILLE	41-7458	26.7069	-97.7833	30	0	0	101			41-7458 DLY
TX	RED BLUFF CROSSING	41-7480	31.2175	-98.5833	1234	0	28	62		63-0043 HLY	63-0043 HLY 41-7480 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	RED BLUFF DAM	41-7481	31.8950	-103.9183	2848	0	49	56		41-7481 HLY	41-7481 HLY 41-7481 DLY
TX	RED ROCK	41-7497	29.9667	-97.4500	522	0	0	34			41-7497 HLY 41-7497 DLY
TX	RED SPRINGS 3 N	41-7499	33.6494	-99.4042	1351	30	53	58	41-7499 15M	41-7499 HLY	41-7499 HLY
TX	REESE AFB	79-0108	33.6000	-102.0500	3327	0	0	46			64-0405 DLY 80-0071 15M 79-0108 DLY
TX	REFUGIO	41-7529	28.3000	-97.2833	49	0	0	64			99-7530 DLY 41-7530 DLY 41-7529 DLY
TX	RENO	41-7556	32.9536	-97.5739	770	28	54	53	41-7556 15M	41-7556 HLY	41-7556 HLY
TX	RG75A	94-0008	31.4706	-96.8833	556	77	76	77	94-0010 15M 94-0008 15M	94-0010 15M 94-0008 15M	94-0010 15M 94-0008 15M
TX	RICHARDS	41-7586	30.5381	-95.8458	315	0	0	47			41-7586 DLY
TX	RICHARDSON	41-7588	32.9964	-96.7428	679	0	0	67			41-7588 DLY
TX	RICHLAND SPRINGS	41-7593	31.2700	-98.9486	1381	0	0	55			41-7593 DLY
TX	RICHMOND	41-7594	29.5839	-95.7553	102	0	49	83		41-2073 HLY 41-7596 HLY 41-7594 HLY	99-7594 DLY 41-7594 HLY 41-7594 DLY
TX	RINGGOLD	41-7614	33.8167	-97.9333	896	0	0	48			41-7614 DLY
TX	RIO GRANDE CITY	41-7622	26.3769	-98.8117	171	0	0	132			52-7623 DLY 52-7622 DLY 41-7622 DLY
TX	RIO GRANDE VILLAGE	41-7624	29.1853	-102.9622	1857	0	0	63			41-4299 DLY 41-0950 DLY 41-7624 DLY
TX	RIOMEDINA	41-7628	29.4417	-98.8800	850	0	0	90			41-7628 DLY
TX	RISING STAR 1S	41-7633	32.0817	-98.9658	1634	0	0	62			41-7633 DLY
TX	RIVERSIDE	41-7651	30.8500	-95.4000	240	0	0	46			60-0194 15M 85-0763 HLY 41-7651 DLY
TX	ROANOKE	41-7659	33.0050	-97.2331	640	0	0	75			41-7659 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	ROBERT LEE	41-7669	31.8836	-100.5358	1916	0	0	63			69-0931 DLY 41-7669 DLY
TX	ROBSTOWN	41-7677	27.7894	-97.6619	85	0	0	69			41-7677 DLY
TX	ROBY	41-7678	32.7333	-100.3833	1982	0	0	54			41-7678 DLY
TX	ROCKDALE	41-7685	30.6431	-97.0372	528	0	0	52			69-2164 DLY 41-7685 DLY
TX	ROCKLAND 2 NW	41-7700	31.0167	-94.4000	89	0	32	75		41-7700 HLY	99-7700 DLY 41-7700 HLY 41-7700 DLY
TX	ROCKPORT	41-7704	28.0286	-97.0567	10	0	0	77			41-7705 DLY 41-7704 DLY
TX	ROCKPORT ARANSAS CO AP	79-0065	28.0836	-97.0464	23	0	21	21		55-0057 HLY 56-0129 HLY	55-0057 HLY 79-0065 DLY
TX	ROCKSPRINGS	41-7706	30.0239	-100.2119	2382	28	53	73	41-7706 15M	41-7718 HLY 41-7706 HLY	41-7706 HLY 41-7706 DLY
TX	ROCKSPRINGS 18 SW	41-7712	29.7902	-100.4151	1726	0	0	37			69-1221 DLY 41-7712 DLY
TX	ROCKWALL	41-7707	32.9331	-96.4647	545	0	0	73			89-0089 DLY 69-2315 DLY 41-7708 DLY 41-7707 DLY
TX	ROSCOE	41-7743	32.4481	-100.5264	2379	0	0	81			41-7743 DLY
TX	ROSEBUD	41-7744	31.0736	-96.9789	410	0	0	36			41-7744 DLY
TX	ROSSER	41-7773	32.4611	-96.4494	364	0	0	73			41-7773 DLY
TX	ROTAN	41-7782	32.8556	-100.4611	1936	0	0	88			41-7782 DLY
TX	ROUND MTN	41-7787	30.4247	-98.3492	1289	0	0	50			41-7787 DLY
TX	ROUND ROCK 3 NE	41-7791	30.5414	-97.6350	722	0	0	47			41-7791 DLY
TX	RUNGE	41-7836	28.8297	-97.7133	295	0	0	115			41-7836 DLY
TX	RUSK	41-7841	31.8092	-95.1428	696	0	0	74			41-7841 DLY
TX	SABINAL	41-7873	29.3283	-99.4653	955	0	0	104			41-7873 DLY
TX	SALT FLAT	41-7920	31.7456	-105.0806	3724	0	0	30			41-7922 HLY 79-0122 DLY 41-7920 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	Data years hourly	Data years daily	Contributing stations <1hr	Contributing stations hourly	Contributing stations daily
TX	SAM RAYBURN DAM	41-7936	31.0619	-94.1011	190	24	29	50	66-7936 15M 41-7936 15M	66-7936 15M 41-7936 HLY	41-7936 DLY
TX	SAN ANGELO WFO	41-7944	31.3706	-100.4942	1900	0	69	106		66-7944 15M 56-0179 HLY 55-0100 HLY 41-7943 HLY	79-0110 DLY 41-7944 DLY
TX	SAN ANTONIO INTL AP	79-0045	29.5442	-98.4839	791	0	114	134		99-0002 HLY 78-0068 15M 41-7945 HLY	99-0002 HLY 78-0068 15M 41-7945 HLY 52-7954 DLY 52-7950 DLY 41-7945 HLY 79-0045 DLY
TX	SAN ANTONIO STINSON AP	79-0063	29.3389	-98.4719	571	0	40	73		41-7948 HLY 56-0127 HLY 55-0055 HLY 41-8653 HLY	41-7948 HLY 41-7948 DLY 79-0063 DLY
TX	SAN AUGUSTINE	41-7951	31.5069	-94.1072	312	0	0	55			41-7951 HLY 41-7951 DLY
TX	SAN BENITO	41-7952	26.1333	-97.6333	39	0	0	48			69-1126 DLY 41-7952 DLY
TX	SAN MARCOS	41-7983	29.8833	-97.9494	666	0	0	118			99-7983 DLY 41-7983 DLY
TX	SAN SABA	41-7992	31.1966	-98.7164	1194	0	29	82		85-0814 HLY 63-0041 HLY	85-0814 HLY 63-0041 HLY 69-2376 DLY 69-2377 DLY 41-7992 DLY
TX	SAN SABA 15 ESE	63-0053	31.1577	-98.4725	1326	0	24	25		63-0053 HLY	63-0053 HLY
TX	SANDERSON	41-8022	30.1414	-102.3917	2789	0	0	75			41-8022 HLY 41-8022 DLY
TX	SANDERSON 5 NNW	41-8023	30.2156	-102.4164	3081	20	51	53	41-8023 15M	41-8023 HLY	41-8023 HLY 41-8023 DLY
TX	SANDY CRK NR KINGSLAND	63-0133	30.5577	-98.4722	875	0	27	29		63-0133 HLY	63-0133 HLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	SANGER	41-8043	33.3633	-97.1744	676	0	0	43			69-1191 DLY 41-8043 DLY
TX	SANTA ANNA	41-8047	31.7428	-99.3106	1745	29	60	67	66-8047 15M 41-8047 15M	66-8047 15M 41-8047 HLY	66-8047 15M 41-8047 HLY
TX	SARITA 7 E	41-8081	27.2169	-97.6956	39	27	60	113	66-8081 15M 41-8081 15M	66-8081 15M 41-8081 HLY	66-8081 15M 41-8081 15M 41-8081 HLY 41-8081 DLY
TX	SCHULENBURG	41-8126	29.6825	-96.8564	289	0	0	89			41-8126 DLY
TX	SEALY 0.3 WNW	69-0550	29.7757	-96.1581	194	0	0	86			41-8160 DLY 69-0550 DLY
TX	SECO CREEK AT MILLER RANCH	87-0031	29.5731	-99.4028	1283	0	21	20		62-0098 HLY 85-0816 HLY	62-0098 HLY 85-0816 HLY 87-0031 DLY
TX	SEGUIN 1 SSW	41-8187	29.5519	-97.9697	502	0	0	74			41-8186 DLY 41-8187 DLY
TX	SEMINOLE	41-8201	32.7131	-102.6597	3337	0	0	88			41-8201 DLY
TX	SEYMOUR 3NW	41-8221	33.6325	-99.2897	1302	0	0	97			80-0076 15M 41-8221 DLY
TX	SHAMROCK	41-8235	35.2000	-100.2500	2323	0	0	88			41-8236 DLY 41-8235 DLY
TX	SHEFFIELD	41-8252	30.6886	-101.8272	2175	31	61	68	41-8252 15M	41-8252 HLY	41-8252 HLY 41-8252 DLY
TX	SHEPHERD 2 SE	41-8265	30.4833	-95.0000	180	0	22	23		41-8265 HLY	41-8265 HLY
TX	SHERMAN	41-8274	33.7033	-96.6419	860	0	0	115			41-8274 DLY
TX	SIERRA BLANCA 2 E	41-8305	31.1831	-105.3542	4590	0	42	50		41-8305 HLY	69-1574 DLY 41-8305 HLY 41-8305 DLY
TX	SILVER VALLEY	41-8326	31.9550	-99.5439	2011	0	0	69			41-6484 DLY 41-8326 DLY
TX	SILVERTON	41-8323	34.4722	-101.3006	3281	0	0	73			41-8323 DLY
TX	SIMMS 4 WNW	41-8335	33.3667	-94.5667	322	0	27	28		41-8335 HLY	41-8333 DLY 41-8335 HLY 41-8335 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	SINTON	41-8354	28.0353	-97.4972	52	0	0	78			41-8354 DLY
TX	SISTERDALE	41-8358	29.9756	-98.7217	1325	0	0	25			69-1875 DLY 41-8358 DLY
TX	SLATON	41-8373	33.4367	-101.6472	3081	0	0	64			41-8373 DLY
TX	SLIDELL	41-8378	33.3583	-97.3933	984	0	0	52			41-8378 DLY
TX	SLOAN	41-8382	31.1561	-98.9173	1302	0	0	40			41-8382 DLY
TX	SMITHVILLE	41-8415	30.0067	-97.1689	341	0	21	94		63-0220 15M 41-1186 HLY 63-0220 HLY	41-8415 DLY
TX	SNYDER	41-8433	32.7100	-100.9111	2320	0	0	98			41-8433 DLY
TX	SOMERVILLE DAM	41-8446	30.3367	-96.5403	262	0	63	92		85-0802 HLY 41-8445 HLY 41-8446 HLY	41-8445 HLY 41-8445 DLY 41-8446 HLY 41-8446 DLY
TX	SONORA	41-8449	30.5831	-100.6503	2139	0	0	71			41-8449 DLY
TX	SONORA	54-0210	30.2613	-100.5551	2283	0	0	60			41-8721 DLY 41-8450 DLY 54-0210 DLY
TX	SOUTH WICHITA RIVER NR BENJAMI	85-0328	33.6500	-99.8000	1358	0	22	21		85-0328 HLY	85-0328 HLY
TX	SPEAKS 2	41-8519	29.2728	-96.6858	144	0	0	70			41-7299 DLY 41-8519 DLY
TX	SPEARMAN	41-8523	36.1981	-101.1847	3094	0	0	81			41-8523 DLY
TX	SPICEWOOD	41-8531	30.4828	-98.1597	850	27	43	50	66-8531 15M 63-0147 15M 41-8531 15M	66-8531 15M 63-0147 HLY 41-8531 15M 41-8531 HLY	41-8531 15M 41-8531 HLY 41-8531 DLY
TX	SPRING BRANCH 2SE	41-8544	29.8653	-98.3797	1004	22	42	59	66-8544 15M 41-8544 15M	66-8544 15M 41-1432 HLY 41-8544 HLY	41-8544 DLY
TX	SPRINGTOWN 4 S	41-8563	32.9086	-97.6786	1053	31	33	34	66-8563 15M 41-8563 15M	66-8563 15M 41-8563 HLY	66-8563 15M 41-8563 HLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	SPUR	41-8566	33.4792	-100.8761	2297	0	33	82		41-8567 HLY 80-0080 15M 41-8566 HLY	80-0080 15M 41-8566 DLY
TX	STAMFORD 1	41-8583	32.9403	-99.8036	1640	30	61	97	66-8583 15M 41-8584 15M 41-8583 15M	66-8583 15M 41-8584 HLY 41-8583 HLY	41-8583 HLY 41-8583 DLY
TX	STATE HIGHWAY 365 - GREEN POND	82-5400	29.9453	-94.3261	20	25	26	25	82-5400 15M	82-5400 15M	82-5400 15M
TX	STATE HWY 124 - HILLEBRANDT BA	82-2300	30.0358	-94.1489	16	26	25	26	82-2400 15M 82-2300 15M	82-2400 15M 82-2300 15M	82-2400 15M 82-2300 15M
TX	STEPHENVILLE	79-0028	32.2314	-98.2319	1289	30	37	76	66-8623 15M 41-8623 15M	66-8623 15M 41-8623 HLY	41-8623 HLY 79-0028 DLY
TX	STEPHENVILLE 7 WSW	41-8625	32.1667	-98.3167	1450	0	27	27		41-8625 HLY	41-8625 HLY
TX	STERLING CITY	41-8630	31.8347	-100.9828	2280	26	30	84	66-8630 15M 41-8630 15M	66-8630 15M 41-8630 HLY	41-8630 DLY
TX	STERLING CITY 8 NE	41-8631	31.9186	-100.8786	2710	0	25	54		41-3462 HLY 41-8631 HLY	41-3462 HLY 41-8631 HLY 41-8631 DLY
TX	STILLHOUSE HOLLOW DAM	41-8646	31.0372	-97.5283	705	28	47	54	66-8646 15M 41-8646 15M	66-8646 15M 41-8646 HLY	41-8646 DLY
TX	STINNETT	41-8647	35.8185	-101.4425	3130	0	26	30		41-8647 HLY	41-8647 HLY 41-8647 DLY
TX	STOCKDALE 6N	41-8658	29.3258	-97.9753	531	0	0	41			41-8658 DLY
TX	STRATFORD	41-8692	36.4414	-102.0775	3602	0	0	87			41-8692 DLY
TX	STRAWN 8 NNE	41-8696	32.6592	-98.4678	1181	0	0	68			41-8696 DLY
TX	SUGAR LAND	41-8728	29.6219	-95.6567	85	0	0	112			69-1325 DLY 64-0315 HLY 60-0169 15M 60-0160 15M 55-0061 HLY 56-0134 HLY 79-0069 DLY 41-8728 DLY
TX	SULPHUR SPRINGS	41-8743	33.1481	-95.6269	495	23	57	104	41-8743 15M	41-8743 HLY	41-8743 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	SUNRAY 4 SW	41-8761	35.9667	-101.8667	3543	0	27	34		41-2619 HLY 41-8761 HLY	41-2619 HLY 41-8761 HLY 41-8761 HLY 41-8761 DLY
TX	SWAN 4 NW	41-8778	32.4561	-95.4231	450	36	47	48	66-8778 15M 41-8778 15M	66-8778 15M 41-8778 15M 41-8778 HLY	66-8778 15M 41-8778 15M 41-8778 HLY
TX	SWEETWATER CREEK NEAR KELTON	87-0038	35.4667	-100.1206	2276	0	29	29		85-0597 HLY 87-0038 HLY	85-0597 HLY 87-0038 HLY
TX	TAHOKA	41-8818	33.1714	-101.7981	3120	0	0	87			41-8818 DLY
TX	TAMPICO	41-8833	34.4667	-100.8167	2251	0	0	41			41-8833 DLY
TX	TARPLEY	41-8845	29.6675	-99.2883	1391	28	59	76	41-8845 15M	41-8845 HLY	99-8845 DLY 41-8845 HLY 41-8845 DLY
TX	TATUM	41-8859	32.3000	-94.5167	269	0	32	32		41-8859 HLY	41-8859 HLY
TX	TAYLOR 1NW	41-8862	30.5844	-97.4156	571	0	32	116		99-8861 HLY	99-8861 HLY 41-8861 DLY 41-8862 DLY
TX	TAYLOR RCH	41-8863	30.9731	-98.9433	1831	0	0	63			41-5930 DLY 41-8863 DLY
TX	TEAGUE RCH	41-8877	30.4333	-98.8097	1719	0	0	74			99-7612 DLY 41-7612 DLY 41-8877 DLY
TX	TELEGRAPH	41-8897	30.3289	-99.9067	1868	0	0	65			63-0078 HLY 41-8897 DLY
TX	TEMPLE	41-8910	31.0781	-97.3183	636	0	33	119		85-0842 HLY 41-8907 HLY 41-8911 HLY 76-0102 HLY	85-0842 HLY 41-8907 HLY 41-8911 HLY 76-0102 HLY 41-8910 DLY
TX	TERLINGUA	41-8924	29.3486	-103.5950	2635	0	0	39			41-8714 DLY 41-8924 HLY 41-8924 DLY
TX	TERRELL	41-8929	32.7336	-96.3225	495	0	0	66			79-0141 DLY 41-8929 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	TESCO	41-8939	32.5000	-100.2500	2001	0	0	31			41-9853 DLY 41-8939 DLY
TX	TEXARKANA	41-8942	33.4367	-94.0772	390	32	31	49	41-8942 15M	41-8942 HLY	41-8942 DLY
TX	THOMPSONS 3 WSW	41-8996	29.4822	-95.6314	69	0	42	59		41-8996 HLY	41-8996 DLY
TX	THORNDALE	41-9001	30.6147	-97.2086	476	0	0	50			41-9001 DLY
TX	THORNTON 1SSE	41-9004	31.3917	-96.5656	476	0	0	72			41-9004 DLY
TX	THROCKMORTON	41-9014	33.1806	-99.1897	1371	0	0	69			41-9014 DLY
TX	TILDEN 4 SSE	41-9031	28.4114	-98.5294	344	0	0	51			41-9031 DLY
TX	TINNIN RCH	41-9037	31.3167	-103.9833	3232	0	24	26		41-9037 HLY	41-9037 HLY
TX	TOMBALL	41-9076	30.1003	-95.6114	210	0	0	71			69-1652 DLY 41-9076 DLY
TX	TORNILLO 2 SSE	41-9088	31.4028	-106.0581	3524	0	0	32			41-9088 DLY
TX	TOW	41-9099	30.8836	-98.4708	1027	0	0	38			41-9099 DLY
TX	TOWN BLUFF DAM	41-9101	30.7931	-94.1819	213	0	0	64			41-8568 DLY 41-9101 DLY
TX	TOYAH	41-9106	31.3000	-103.8000	2945	0	0	30			41-9106 DLY
TX	TRENT	41-9122	32.4906	-100.1197	1909	0	0	62			41-9122 DLY
TX	TRENTON	41-9125	33.4311	-96.3397	755	0	0	65			41-9125 DLY
TX	TRINIDAD PWR PLT	41-9137	32.1333	-96.1000	292	0	0	54			85-0833 HLY 41-9136 DLY 41-9137 DLY
TX	TROY	41-9153	31.2061	-97.2956	699	0	0	73			69-0598 DLY 41-9153 DLY
TX	TRUSCOTT 3 W	41-9163	33.7569	-99.8617	1572	25	58	68	66-9163 15M 41-9163 15M	66-9163 15M 41-9163 HLY	41-9163 HLY 41-9163 DLY
TX	TULIA	41-9175	34.5475	-101.7614	3481	0	0	69			41-9175 DLY
TX	TULIA 6 NE	41-9176	34.6000	-101.7000	3504	0	0	38			41-9176 DLY
TX	TURKEY	41-9191	34.3956	-100.8972	2329	0	0	64			41-9191 DLY
TX	TURKEY CK AT FM 1959	60-0019	29.5845	-95.1869	28	30	31	30	60-0098 15M 60-0020 15M 60-0019 15M	60-0098 15M 60-0020 15M 60-0019 15M	60-0098 15M 60-0020 15M 60-0019 15M
TX	TYLER	41-9207	32.3067	-95.2969	551	0	0	34			41-9207 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	TYLER POUNDS FLD	79-0093	32.3542	-95.4025	545	0	0	35			55-0088 HLY 79-0093 DLY
TX	UMBARGER	41-9224	34.9578	-102.1044	3747	0	0	69			41-9224 DLY
TX	UVALDE	41-9265	29.2167	-99.7667	912	0	0	94			41-9268 DLY 41-9265 DLY
TX	VALENTINE	41-9270	30.5908	-104.4914	4439	28	49	57	41-9270 15M	41-9270 HLY	41-9270 HLY 41-9270 DLY
TX	VALENTINE 10 WSW	41-9275	30.5525	-104.6467	4393	0	0	80			41-9275 DLY
TX	VALLEY JUNCTION	41-9280	30.8333	-96.6333	269	0	12	91		55-0149 HLY 64-0042 HLY 56-0235 HLY	99-9280 DLY 55-0149 HLY 64-0042 HLY 56-0235 HLY 41-9280 DLY
TX	VALLEY VIEW	41-9286	33.4869	-97.1572	725	0	0	53			41-9286 DLY
TX	VAN HORN	41-9295	31.0417	-104.8372	4065	0	0	68			41-9295 DLY
TX	VANDERPOOL 10 N	41-9312	29.8451	-99.5516	2264	0	0	45			41-9813 DLY 99-9312 DLY 41-9312 DLY
TX	VEGA 2NW	41-9330	35.2775	-102.4633	3999	0	0	73			41-9330 DLY
TX	VERNON	41-9346	34.1517	-99.3256	1211	0	0	80			41-9346 DLY
TX	VICTORIA CP&L	41-9365	28.7875	-97.0106	62	0	31	89		41-9363 HLY 85-0859 HLY	79-0046 DLY 69-2646 DLY 85-0859 HLY 41-9365 DLY
TX	VICTORIA RGNL AP	79-0040	28.8614	-96.9303	115	0	61	67		56-0105 HLY 41-9364 HLY	41-9364 HLY 79-0040 DLY
TX	VOSS 1 WSW	41-9410	31.6167	-99.5833	1650	0	0	31			41-9410 DLY
TX	WACO	41-9421	31.5333	-97.0667	381	0	0	53			41-9421 DLY
TX	WACO DAM	41-9417	31.6003	-97.2169	495	26	42	52	66-9417 15M 41-9417 15M	66-9417 15M 41-9417 HLY	41-9417 HLY 41-9417 DLY
TX	WACO RGNL AP	79-0087	31.6189	-97.2283	499	0	76	77		56-0160 HLY 41-9419 HLY	79-0087 DLY
TX	WAELDER 7 S	41-9424	29.6000	-97.3167	341	0	0	40			41-9424 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	WALLER	41-9448	30.0486	-95.9250	144	30	30	73	60-0089 15M 60-0091 15M	60-0089 15M 60-0091 15M	60-0089 15M 60-0091 15M 41-9448 DLY
TX	WASHINGTON SP	41-9491	30.3236	-96.1594	217	23	48	67	66-9491 15M 41-9491 15M	66-9491 15M 41-9491 15M 41-9491 HLY	41-9491 DLY
TX	WATER VALLEY	41-9499	31.6725	-100.7283	2119	35	54	69	66-9499 15M 41-9499 15M	66-9499 15M 41-9499 HLY	41-9499 HLY 41-9499 DLY
TX	WATER VALLEY 11 NNE	41-9501	31.8136	-100.6286	2454	0	0	56			41-9501 DLY
TX	WATSON	41-9504	30.9328	-98.0197	1004	0	0	50			41-9504 DLY
TX	WAXAHACHIE	41-9522	32.4281	-96.8422	627	0	0	107			41-9522 DLY
TX	WAYSIDE	41-9527	34.7933	-101.5483	3400	32	48	52	66-9527 15M 41-9527 15M	66-9527 15M 41-9527 HLY	66-9527 15M 41-9527 HLY
TX	WEATHERFORD	41-9532	32.7483	-97.7700	955	36	60	120	66-9532 15M 41-9532 15M	66-9532 15M 41-9532 HLY	99-9532 DLY 41-9532 DLY
TX	WELDER WILDLIFE FNDN	41-9559	28.1136	-97.4178	49	0	0	47			41-9559 DLY
TX	WELLINGTON	41-9565	34.8422	-100.2103	2041	27	44	70	41-9570 15M 41-9565 15M	41-9570 HLY 41-9565 HLY	41-9565 DLY
TX	WESLACO	41-9588	26.1781	-97.9708	75	24	48	104	66-9588 15M 41-9588 15M	66-9588 15M 88-2205 HLY 41-9588 HLY	41-5274 DLY 66-9588 15M 88-2205 HLY 41-9588 HLY 41-9588 DLY
TX	WF TRINITY R NR JACKSBORO	85-0568	33.2933	-98.0786	915	0	22	22		85-0568 HLY	85-0568 HLY
TX	WHARTON	41-9655	29.3178	-96.0847	112	0	0	73			85-0879 HLY 63-0234 HLY 41-9655 DLY
TX	WHEELOCK	41-9665	30.9003	-96.3953	420	23	57	63	41-9665 15M	41-9665 HLY	41-9665 HLY
TX	WHITNEY DAM	41-9715	31.8611	-97.3750	574	33	56	68	66-9715 15M 41-9715 15M	66-9715 15M 41-9715 HLY	41-9715 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
TX	WHITSETT	41-9717	28.6611	-98.2553	259	0	0	94			41-9716 DLY 41-9717 DLY
TX	WICHITA FALLS MUNI AP	79-0092	33.9786	-98.4928	1017	0	77	111		56-0164 HLY 41-9729 HLY	79-0092 DLY
TX	WILBARGER CRK NR ELGIN	63-0209	30.2318	-97.4327	373	0	23	23		63-0209 HLY	63-0209 HLY
TX	WILDWOOD	41-9754	30.5347	-94.4456	200	0	0	75			41-4397 DLY 41-9480 DLY 41-9754 DLY
TX	WILLS POINT	41-9800	32.7019	-96.0150	522	0	0	94			41-9800 DLY
TX	WIMBERLEY 1 NW	41-9815	30.0017	-98.1047	906	25	25	33	66-9815 15M 41-9815 15M	66-9815 15M 41-9815 HLY	41-9815 DLY
TX	WINCHELL 1 WNW	41-9816	31.4833	-99.1833	1381	32	48	55	63-0006 15M 41-9817 15M	63-0006 HLY 41-5840 HLY 41-9816 HLY 41-9817 HLY	63-0006 HLY 41-5840 HLY 41-9816 HLY 41-9817 HLY 41-9816 DLY
TX	WINGATE	41-9847	32.0444	-100.1069	2008	0	0	45			41-9847 DLY
TX	WINK	41-9829	31.7667	-103.1500	2790	18	44	47	41-9829 15M	41-9829 HLY	41-9829 HLY
TX	WINKLER CO AP	79-0112	31.7800	-103.2017	2808	0	21	73		56-0180 HLY 55-0101 HLY 41-9830 HLY	79-0112 DLY
TX	WINNSBORO 6 SW	41-9836	32.8892	-95.3331	430	0	0	69			69-2728 DLY 99-9836 DLY 41-9836 DLY
TX	WINTERS 9 NNE	41-9845	32.1000	-99.9000	1972	0	0	36			41-9845 DLY
TX	WOLF CREEK DAM	41-9858	36.2333	-100.6667	2703	0	31	32		41-9858 HLY	41-9858 HLY 41-9858 DLY
TX	WOLFE CITY	41-9859	33.3675	-96.0675	659	0	0	58			41-9859 DLY
TX	WOODSBORO	41-9892	28.2333	-97.3333	49	0	0	46			41-9892 DLY
TX	WOODSON	41-9893	33.0178	-99.0539	1263	27	64	74	66-9893 15M 41-9893 15M	66-9893 15M 41-9893 HLY	41-9893 HLY 41-9893 DLY
TX	WORLDS END RCH	41-9904	29.9828	-99.4290	1923	0	0	36			41-5449 DLY 41-9904 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	Data years hourly	Data years daily	Contributing stations <1hr	Contributing stations hourly	Contributing stations daily
TX	WRIGHT PATMAN DM & LK	41-9916	33.3039	-94.1583	282	22	36	67	41-9916 15M	41-8944 HLY 41-9916 HLY	41-5710 DLY 41-8944 DLY 41-9916 DLY
TX	YOAKUM	41-9952	29.2739	-97.1556	295	0	0	87			41-9952 DLY
TX	YORKTOWN	41-9953	28.9803	-97.5186	259	0	0	67			41-9953 DLY
TX	YSLETA	41-9966	31.6953	-106.3217	3671	0	0	90			69-1274 DLY 41-8435 DLY 41-9966 DLY
TX	ZAPATA 1 S	41-9976	26.8706	-99.2536	322	26	57	65	41-9976 15M	41-9976 HLY	41-9976 HLY 41-9976 DLY

Table A.1.2. Same as Table A.1.1, but for locations in Arkansas (AR), Colorado (CO), Kansas (KS), Louisiana (LA), New Mexico (NM), and in the United Mexican States (MX).

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
AR	AMITY 1N	03-0150	34.2808	-93.4614	459	0	0	97			03-0150 DLY
AR	ANTOINE	03-0178	34.0292	-93.4211	285	25	52	69	66-0178 15M 03-0178 15M	66-0178 15M 03-0178 HLY	03-0178 DLY
AR	ASHDOWN 4 SSE	03-0286	33.6194	-94.0994	322	0	0	66			03-0286 DLY
AR	ATHENS	03-0300	34.3253	-93.9811	961	0	0	60			03-0300 DLY
AR	BIG FORK 1 SSE	03-0664	34.4653	-93.9932	1200	0	0	69			03-0664 DLY
AR	BLUFF CITY 3 SW	03-0800	33.6919	-93.1622	361	0	0	69			76-0001 HLY 03-0800 DLY
AR	BONNERDALE 1 ESE	03-0820	34.3811	-93.3497	682	0	0	50			03-0820 DLY
AR	BOUGHTON	03-0848	33.8667	-93.3333	249	0	0	47			03-0848 DLY
AR	COSSATOT RIVER	85-0005	34.0500	-94.2167	394	0	23	23		85-0005 HLY	85-0005 HLY
AR	COVE	03-1666	34.4314	-94.4175	1060	0	0	68			03-1666 DLY
AR	DAISY	03-1814	34.2500	-93.7333	630	0	26	24		03-1814 HLY	03-1814 DLY
AR	DE QUEEN DAM	03-1952	34.1003	-94.3725	558	27	40	41	78-0027 15M 03-1952 15M	55-0124 HLY 56-0208 HLY 03-1952 HLY	79-0144 DLY 03-1952 HLY 03-1952 DLY
AR	DEQUEEN	03-1948	34.0464	-94.3481	407	0	0	81			03-1948 DLY
AR	DIERKS	03-2015	34.1267	-94.0172	469	0	0	55			03-2015 DLY
AR	DIERKS DAM	03-2020	34.1475	-94.0889	686	0	26	35		03-2020 HLY	69-0041 DLY 03-2020 HLY 03-2020 DLY
AR	FOREMAN	03-2544	33.7222	-94.3975	423	0	45	64		03-2544 HLY	03-2544 HLY 03-2544 DLY
AR	FULTON	03-2670	33.6128	-93.8136	259	0	0	91			03-2670 DLY
AR	GILLHAM DAM	03-2810	34.2056	-94.2464	520	24	27	32	03-2810 15M	03-2810 HLY	03-2810 HLY
AR	GLENWOOD	03-2842	34.3347	-93.5503	581	0	0	77			03-2842 DLY
AR	GRANNIS	03-2908	34.2500	-94.3333	922	0	0	34			03-2908 DLY
AR	GURDON	03-3074	33.9167	-93.1333	220	0	0	35			03-3074 DLY
AR	HOPE 3 NE	03-3428	33.7092	-93.5564	374	0	0	103			03-3428 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
AR	HORATIO	03-3442	33.9353	-94.3597	338	0	0	66			03-3442 DLY
AR	LANGLEY	03-4060	34.3244	-93.8464	771	0	0	61			03-4060 DLY
AR	LEWISVILLE	03-4185	33.3614	-93.5675	341	35	35	69	03-6804 15M 66-4185 15M 03-4185 15M	03-6804 HLY 66-4185 15M 03-4185 HLY	03-6804 DLY 03-4185 DLY
AR	MAGNOLIA	03-4548	33.2950	-93.2325	325	31	46	68	03-4550 15M 03-4548 15M	03-4550 HLY 03-4548 HLY	69-0003 DLY 03-4548 DLY
AR	MENA	03-4756	34.5731	-94.2494	1129	25	60	119	66-4756 15M 03-4756 15M	66-4756 15M 03-4756 HLY	03-4756 DLY
AR	MILLWOOD DAM	03-4839	33.6772	-93.9903	316	22	36	42	03-4839 15M	03-4839 HLY	03-4839 HLY
AR	MURFREESBORO 1W	03-5079	34.0783	-93.7019	459	0	0	52			03-5078 DLY 03-5079 DLY
AR	NARROWS DAM	03-5110	34.1453	-93.7139	436	39	54	60	66-5110 15M 03-5110 15M	66-5110 15M 03-5110 HLY	03-5110 HLY 03-5110 DLY
AR	NASHVILLE	03-5112	33.9294	-93.8583	400	36	56	78	66-5112 15M 03-5112 15M	66-5112 15M 03-5114 HLY 03-5112 HLY	03-5112 DLY
AR	NEWHOPE 3 E	03-5174	34.2284	-93.8300	850	0	0	40			03-5174 DLY
AR	NEWHOPE 6 S	03-5177	34.1469	-93.8936	630	0	0	67			03-5158 DLY 03-5177 DLY
AR	OKAY	03-5376	33.7667	-93.9167	299	0	0	67			03-5376 DLY
AR	PINEY GROVE	03-5770	34.1728	-93.2050	381	0	0	36			03-5770 DLY
AR	PRESCOTT 2 NNW	03-5908	33.8203	-93.3878	308	28	56	120	66-5908 15M 03-5908 15M	66-5908 15M 03-5910 HLY 03-5908 HLY	03-5908 DLY
AR	RAVANA	03-6016	33.0667	-94.0333	249	0	20	20		03-6016 HLY	03-6016 HLY
AR	SALINE RIVER	85-0017	33.9667	-94.0667	348	0	23	23		85-0017 HLY	85-0017 HLY
AR	SITE 2-LITTLE RIVER	85-0014	33.9181	-94.3897	335	0	22	22		85-0014 HLY	85-0014 HLY
AR	TAYLOR	03-7038	33.0986	-93.4647	249	0	0	55			03-7038 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
AR	TEXARKANA WEBB FLD	79-0096	33.4536	-94.0075	361	0	43	118		55-0091 HLY 56-0168 HLY 78-0078 15M 03-7048 HLY	55-0091 HLY 56-0168 HLY 78-0078 15M 03-7048 HLY 79-0096 DLY
AR	WHITE CLIFFS	03-7812	33.8000	-94.0667	392	0	0	53			03-7812 DLY
CO	CAMPO 7 S	05-1268	37.0158	-102.5550	4117	0	0	55			05-1268 DLY
CO	KIM 10SSE	05-4546	37.1150	-103.2986	5299	0	0	73			05-8468 DLY 05-4546 DLY
CO	KIM 15 NNE	05-4538	37.4536	-103.3219	5190	39	60	64	66-4538 15M 05-4538 15M	66-4538 15M 05-4538 HLY	05-4538 HLY 05-4538 DLY
CO	SPRINGFIELD	05-7862	37.4000	-102.6167	4413	0	0	74			69-0043 DLY 69-0052 DLY 05-7862 DLY
CO	SPRINGFIELD 7 WSW	05-7866	37.3694	-102.7428	4623	22	26	58	05-7866 15M	05-7866 HLY	05-6705 DLY 05-7871 DLY 05-7866 DLY
CO	SPRINGFIELD 8 S	05-7867	37.2823	-102.6417	4505	0	41	43		55-0002 HLY 56-0054 HLY 05-7867 HLY	79-0002 DLY 05-7867 HLY 05-7867 DLY
CO	STONINGTON	05-7992	37.2931	-102.1864	3802	0	0	56			05-7992 DLY
CO	WALSH 1 W	05-8793	37.3822	-102.2986	3980	0	0	50			05-8793 DLY
KS	ASHLAND	14-0365	37.1942	-99.7633	1972	0	0	118			14-0365 DLY
KS	CIMARRON RIVER	85-0028	37.0314	-100.2100	2195	0	23	22		85-0028 HLY	85-0028 HLY
KS	COLDWATER	14-1704	37.2733	-99.3289	2116	0	0	113			14-1704 DLY
KS	ELKHART	14-2432	37.0058	-101.8867	3599	21	46	104	14-2432 15M	14-2437 HLY 14-2432 HLY	14-2432 DLY
KS	ENGLEWOOD 1 NW	14-2560	37.0458	-99.9964	1972	21	52	69	14-2560 15M	14-2560 HLY	14-2560 HLY 14-2560 DLY
KS	FOWLER 3 NNE	14-2855	37.4167	-100.1833	2480	0	0	40			14-2855 DLY
KS	HUGOTON	14-3855	37.1639	-101.3400	3110	0	0	107			14-3855 DLY
KS	KISMET NEAR	14-4363	37.3333	-100.8833	2908	0	0	36			69-0087 DLY 14-4363 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
KS	LIBERAL	14-4695	37.0222	-100.9294	2835	0	0	109			14-4695 DLY
KS	MEADE	14-5171	37.2850	-100.3450	2477	0	0	67			14-5171 DLY
KS	MINNEOLA	14-5371	37.4500	-100.0167	2552	0	0	57			69-0063 DLY 14-5371 DLY
KS	PLAINS	14-6427	37.2667	-100.6000	2762	0	0	68			69-0078 DLY 69-0075 DLY 14-6427 DLY
KS	RICHFIELD	14-6808	37.2633	-101.7886	3386	0	0	105			14-6808 DLY
KS	RICHFIELD 10 WSW	14-6813	37.2294	-101.9511	3530	0	0	75			14-6813 DLY
KS	SUBLETTE 7WSW	14-7922	37.4414	-100.9792	2949	31	37	96	66-7922 15M 14-7922 15M	66-7922 15M 14-7922 HLY	14-7922 DLY
KS	WILMORE 16SE	14-8914	37.1317	-99.0556	1699	0	0	31			14-8914 DLY
LA	ALEXANDRIA	16-0098	31.3206	-92.4611	89	20	33	122	16-0098 15M	16-0098 HLY	16-0098 DLY
LA	ALEXANDRIA 5 SSE	16-0103	31.2489	-92.4489	85	0	0	55			16-0101 DLY 16-7825 DLY 16-0103 DLY
LA	ALEXANDRIA INTL AP	79-0154	31.3347	-92.5586	85	0	41	54		64-0505 HLY 78-0004 15M 56-0264 HLY	64-0505 DLY 79-0080 DLY 79-0154 DLY
LA	ARCADIA	16-0277	32.5511	-92.9186	400	0	0	56			16-0277 DLY
LA	ASHLAND	16-0349	32.1292	-93.1164	240	0	0	67			16-0349 DLY
LA	BARKSDALE AIR FORCE BASE	64-0265	32.5000	-93.6670	166	0	0	43			79-0082 DLY 64-0265 DLY
LA	BEAVER FIRE TWR	16-0617	30.7925	-92.4953	105	0	0	38			16-0617 DLY
LA	BIENVILLE 3 NE	16-0800	32.3744	-92.9433	308	0	0	68			16-5365 DLY 16-0800 DLY
LA	BOYCE 3 WNW	16-1232	31.3944	-92.7164	112	0	0	42			16-1232 DLY
LA	COLFAX	16-1941	31.5183	-92.7142	112	0	0	45			16-1941 DLY
LA	CONVERSE	16-2023	31.7500	-93.7000	220	0	0	33			16-2023 DLY
LA	COTTON VALLEY 5 NNW	16-2121	32.8869	-93.4569	259	0	0	62			16-2121 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
LA	COUSHATTA 1 SE	16-2140	32.0167	-93.3333	151	0	0	37			16-2145 DLY 16-2143 DLY 16-2140 HLY 16-2140 DLY
LA	DE QUINCY	16-2361	30.4347	-93.4692	82	0	0	56			16-2361 DLY
LA	DE RIDDER	16-2367	30.8428	-93.2869	190	0	0	90			16-2367 DLY
LA	ELIZABETH	16-2800	30.8500	-92.7833	151	0	0	78			16-2800 DLY
LA	GORUM FIRE TWR	16-3741	31.4358	-92.8828	308	0	0	46			16-3741 DLY
LA	GRAND CANE FIRE TWR	16-3794	32.1333	-93.8000	269	0	0	75			16-4800 DLY 16-3657 DLY 16-3794 DLY
LA	HACKBERRY 8 SSW	16-3979	29.8894	-93.4019	7	0	0	73			16-3979 DLY
LA	HANNA 4 SSE	16-4050	31.9158	-93.3183	118	0	0	54			16-5081 DLY 16-4050 DLY
LA	HAYNESVILLE	16-4131	32.9683	-93.1297	302	0	0	46			16-4131 DLY
LA	HODGES GARDENS	16-4288	31.3747	-93.3911	420	0	0	63			16-4384 DLY 16-4288 DLY
LA	HOMER 1N	16-4355	32.8100	-93.0625	217	0	0	69			16-4355 DLY
LA	HOSSTON	16-4398	32.8867	-93.8733	246	0	0	70			16-4398 DLY
LA	JENNINGS	16-4700	30.2003	-92.6642	26	30	31	118	16-4702 15M 16-4700 15M	16-4702 HLY 16-4700 HLY	16-4700 DLY
LA	KEITHVILLE	16-4816	32.3550	-93.8619	200	0	26	77		16-4816 HLY	16-4816 DLY
LA	KINDER 3 W	16-4884	30.5000	-92.9000	49	0	0	43			16-4884 DLY
LA	KORAN	16-4931	32.4169	-93.4428	174	0	0	66			16-4931 DLY
LA	LAKE ARTHUR 7 SW	16-5065	30.0206	-92.7681	10	0	0	90			16-5065 DLY
LA	LAKE CHARLES	79-0022	30.1250	-93.2158	13	0	56	57		56-0087 HLY 16-5078 HLY	79-0022 DLY
LA	LAKE CHARLES 2 N	16-5074	30.2544	-93.2186	7	0	0	55			16-5075 DLY 16-5074 DLY
LA	LAKE CHARLES CHENAULT	79-0081	30.2167	-93.1500	16	0	21	67		99-5077 HLY 16-5077 HLY	99-5077 HLY 79-0081 DLY
LA	LEESVILLE	16-5266	31.1417	-93.2397	265	0	41	92		16-5266 HLY	16-5266 DLY

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LA	LEESVILLE 6 SSW	16-5287	31.0517	-93.2789	259	0	0	46			16-1446 DLY 16-5287 DLY
LA	LOGANSPORT 4 ENE	16-5527	31.9833	-93.9500	210	20	35	112	16-5527 15M	16-5527 HLY	16-5522 DLY 16-5527 HLY 16-5527 DLY
LA	LONGVILLE	16-5584	30.6000	-93.2333	115	0	0	43			16-5584 DLY
LA	LSU DEAN LEE RSCH STN	16-5630	31.1783	-92.4108	69	0	0	37			16-5630 DLY
LA	MANSFIELD	16-5874	32.0389	-93.7053	394	0	0	54			16-5874 DLY
LA	MANY	16-5892	31.5769	-93.4817	256	0	0	59			16-5890 HLY 16-5892 DLY
LA	MERMENTAU	16-6142	30.1900	-92.5906	16	0	0	48			16-6144 DLY 16-6142 DLY
LA	MINDEN	16-6244	32.6053	-93.2947	184	39	57	119	66-6244 15M 16-6244 15M	66-6244 15M 16-6245 HLY 16-6246 HLY 16-6244 HLY	16-6244 DLY
LA	MITTIE 2 SE	16-6271	30.7000	-92.8833	121	0	0	30			16-6271 DLY
LA	MONTGOMERY	16-6324	31.6667	-92.9000	102	0	20	24		16-6324 HLY	16-6324 HLY 16-6324 DLY
LA	MOORINGSPORT 1 N	16-6364	32.7053	-93.9603	200	0	0	41			16-6364 DLY
LA	NATCHITOCHES #2	16-6584	31.8142	-93.0856	141	32	37	93	16-6582 15M 66-6584 15M 16-6584 15M	16-6582 HLY 66-6584 15M 16-6584 HLY	16-6582 DLY 16-3804 DLY 16-6584 DLY
LA	OAKDALE	16-6836	30.8214	-92.6697	112	0	0	59			16-6836 DLY
LA	OBERLIN FIRE TWR	16-6938	30.6036	-92.7739	66	0	0	65			16-6938 DLY
LA	PLAIN DEALING	16-7344	32.8919	-93.6944	253	0	0	114			16-7344 DLY
LA	POLLOCK FOREST NURSERY	16-7421	31.5000	-92.4667	230	0	0	31			16-7421 DLY
LA	RED RIVER - LOCK & DAM #4	85-0085	31.9394	-93.2756	112	0	21	22		85-0085 HLY	85-0085 HLY
LA	RED RIVER RSCH STN	16-7738	32.4219	-93.6381	154	32	41	52	66-7738 15M 16-2235 15M 16-7738 15M	66-7738 15M 16-2235 HLY 16-7738 HLY	16-2235 DLY 16-7738 DLY

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LA	ROBELINE	16-7905	31.6833	-93.3000	151	0	0	59			16-7905 DLY
LA	ROBSON	16-7924	32.3556	-93.6425	161	0	0	49			16-7924 DLY
LA	ROCKEFELLER WL REFUGE	16-7932	29.7286	-92.8181	3	0	22	53		16-7932 HLY	16-7932 DLY
LA	ROSEPINE RSCH STN	16-8046	30.9461	-93.2789	240	0	0	40			16-8046 DLY
LA	SAILES FIRE TWR	16-8094	32.3625	-93.1400	276	0	0	44			16-4590 DLY 16-8094 DLY
LA	SHREVEPORT	79-0085	32.4506	-93.8411	272	0	62	146		78-0070 15M 16-8440 HLY	79-0085 DLY
LA	SHREVEPORT DWTN	16-8436	32.5158	-93.7447	180	0	0	39			16-8436 DLY
LA	SPRINGHILL	16-8683	32.9922	-93.4417	240	0	0	53			16-8263 DLY 16-8683 DLY
LA	SUGARTOWN	16-8828	30.8500	-93.0167	171	0	0	54			16-8828 DLY
LA	SULPHUR	16-8831	30.2383	-93.3447	10	0	0	44			69-0099 DLY 16-8831 DLY
LA	TOLEDO BEND LAKE	16-9074	31.2022	-93.5725	180	0	0	41			41-9068 DLY 16-9074 DLY
LA	VERNON	76-0011	31.0167	-93.1869	350	0	18	18		85-0069 HLY 76-0011 HLY	85-0069 HLY 76-0011 HLY
LA	VINTON	16-9375	30.1922	-93.5811	13	0	0	31			16-9375 DLY
LA	VIVIAN	16-9392	32.9033	-93.9819	220	0	0	69			16-7950 DLY 16-9392 DLY
LA	WOODWORTH 2 SE	16-9865	31.1167	-92.4667	115	0	0	56			16-9860 DLY 16-9865 DLY
MX	ALLENDE	90-0001	28.3300	-100.8300	1227	0	0	36			90-0001 DLY
MX	ALLENDE (SMN)	61-0214	28.3333	-100.8333	1227	0	0	44			61-0214 DLY
MX	ALLENDE II (DGE)	61-0268	28.3478	-100.8536	1247	0	0	30			61-0268 DLY
MX	ANAHUAC	61-0339	27.2383	-100.1314	636	0	0	74			61-0339 DLY
MX	CERRALVO (DGE)	61-0327	26.0900	-99.6175	919	0	0	41			61-0327 DLY
MX	EJIDO MARIN	61-0418	25.8586	-100.0222	1322	0	0	32			61-0418 DLY
MX	EJIDO SAN MIGUEL	61-0223	28.6367	-102.9483	3478	0	0	35			61-0223 DLY
MX	EL CUCHILLO	61-0333	25.7181	-99.2558	476	0	0	68			61-0333 DLY

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MX	EL CUCHILLO	90-0011	25.7300	-99.2500	430	0	0	44			90-0011 DLY
MX	FRANCISCO GONZALEZ VILLARREAL	61-0519	25.3661	-97.9792	43	0	0	38			61-0519 DLY
MX	GARZA AYALA	61-0337	26.4914	-100.0583	843	0	0	35			61-0337 DLY
MX	GENERAL BRAVO	90-0012	25.8000	-99.1800	407	0	0	33			90-0012 DLY
MX	GENERAL BRAVO (SMN)	61-0388	25.7928	-99.1808	423	0	0	39			61-0388 DLY
MX	HIGUERAS (SMN)	61-0340	25.9500	-100.0167	1706	0	0	32			61-0340 DLY
MX	JUAREZ	61-0252	27.6139	-100.7250	919	0	0	59			61-0252 DLY
MX	LAMPAZOS (SMN)	61-0343	27.0781	-100.4908	935	0	0	70			61-0343 DLY
MX	LAS ENRAMADAS	61-0353	25.5014	-99.5214	755	0	0	50			61-0353 DLY
MX	LOS ALDAMAS	61-0354	26.0644	-99.1967	338	0	0	36			61-0354 DLY
MX	LOS HERRERAS	61-0355	25.8975	-99.4008	459	0	0	45			90-0013 DLY 61-0355 DLY
MX	LOS RAMONES	61-0356	25.6914	-99.6306	689	0	0	62			61-0356 DLY
MX	LOS RAMONES	90-0014	25.7000	-99.6300	682	0	0	37			90-0014 DLY
MX	LUIS L. LEON	61-0043	28.9786	-105.3117	3543	0	0	45			61-0043 DLY
MX	NUEVA ROSITA	61-0229	27.9167	-101.2500	1211	0	0	41			61-0229 DLY
MX	OJINAGA (DGE)	61-0182	29.5500	-104.4000	2625	0	0	80			61-0027 DLY 90-0007 DLY 61-0021 DLY 61-0182 DLY
MX	PALESTINA (DGE)	61-0231	29.1586	-100.9883	1115	0	0	64			61-0265 DLY 90-0002 DLY 61-0231 DLY
MX	PARAS	61-0385	26.4933	-99.5242	492	0	0	35			61-0385 DLY
MX	PRESA VENUSTIANO CARRANZA	61-0238	27.5189	-100.6197	892	0	0	57			61-0238 DLY
MX	SABINAS (DGE)	61-0241	27.8467	-101.1228	1112	0	0	67			90-0004 DLY 61-0241 DLY
MX	SALINILLAS	61-0369	27.4292	-100.3739	787	0	0	65			61-0369 DLY

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MX	SALINILLAS	90-0015	27.4500	-100.1200	741	0	0	40			90-0015 DLY
MX	SAMALAYUCA	61-0105	31.3425	-106.4764	4088	0	0	51			61-0105 DLY
MX	SOMBRERETILLO	61-0374	26.3414	-99.9400	1017	0	0	30			61-0374 DLY
MX	VALLECILLO (DGE)	61-0377	26.6581	-99.9864	869	0	0	43			61-0377 DLY
MX	VALLECILLO (SMN)	61-0390	26.6597	-99.9869	873	0	0	42			61-0390 DLY
MX	VILLA AHUMADA	61-0134	30.6186	-106.5122	3937	0	0	64			61-0134 DLY
MX	VILLA JUAREZ	90-0006	27.6200	-100.7200	900	0	0	36			90-0006 DLY
MX	ZARAGOZA	90-0005	28.5000	-100.9200	1173	0	0	33			90-0005 DLY
MX	ZARAGOZA (SMN)	61-0249	28.4917	-100.9286	1181	0	0	32			61-0249 DLY
NM	ABBOTT 1 SE	29-0022	36.3028	-104.2497	6152	0	0	91			29-0022 DLY
NM	AFTON 6 NE	29-0125	32.1167	-106.8667	4190	0	0	51			29-0125 DLY
NM	ALAMOGORDO	29-0199	32.9181	-105.9550	4380	0	39	102		29-0208 HLY 29-0199 HLY	69-0406 DLY 69-0393 DLY 29-0199 HLY 29-0199 DLY
NM	ALAMOGORDO 1	29-0200	32.8667	-105.9333	4576	0	0	49			69-0376 DLY 29-0200 DLY
NM	ALEMAN RCH	29-0268	32.9308	-106.9328	4521	0	0	48			29-0268 DLY
NM	AMISTAD 5 SSW	29-0377	35.8742	-103.1819	4446	0	0	88			29-0377 DLY
NM	ARTESIA 6S	29-0600	32.7547	-104.3836	3366	37	63	106	66-0600 15M 29-0600 15M	66-0600 15M 29-0600 HLY	29-0600 DLY
NM	BELL RANCH	29-0858	35.5297	-104.0936	4330	0	0	104			29-0858 DLY
NM	BRANTLEY DAM	29-1153	32.5433	-104.3807	3254	0	0	32			29-4747 DLY 29-1153 DLY
NM	BUEYEROS 4 NW	29-1269	36.0167	-103.7333	4682	0	0	32			29-1269 DLY
NM	CAMBRAY	29-1309	32.2333	-107.3333	4232	0	0	48			69-0352 DLY 29-1309 DLY
NM	CAMERON	29-1332	34.9039	-103.4428	4747	0	0	58			29-1332 DLY
NM	CANNON AFB AIRPORT	64-0408	34.3830	-103.3170	4295	0	0	38			79-0105 DLY 64-0408 DLY
NM	CANTON	29-1423	34.2753	-104.1636	4055	0	0	62			29-1423 DLY

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NM	CAPROCK	29-1445	33.3433	-103.6783	4350	0	27	34		29-1446 HLY 29-1445 HLY	29-1446 HLY 29-1446 DLY 29-1445 DLY
NM	CAPROCK	76-0014	32.9278	-103.8567	4210	0	27	27		85-0155 HLY 76-0014 HLY	85-0155 HLY 76-0014 HLY
NM	CAPULIN 6 SSE	29-1452	36.6667	-103.9500	6771	0	0	39			29-1452 DLY
NM	CARLSBAD	29-1469	32.3478	-104.2225	3120	31	58	114	66-1469 15M 29-1469 15M	66-1469 15M 29-1469 HLY	29-1469 DLY
NM	CARLSBAD 3.4 N	69-0306	32.4539	-104.2378	3136	0	0	74			29-4736 DLY 69-0306 DLY
NM	CARLSBAD CAVERN CITY AP	79-0148	32.3336	-104.2581	3232	0	0	71			79-0148 DLY
NM	CARLSBAD CAVERNS	29-1480	32.1783	-104.4433	4436	0	20	80		85-0151 HLY 76-0012 HLY	85-0151 HLY 76-0012 HLY 29-1480 DLY
NM	CLAYTON 9 SSE	29-1881	36.3333	-103.1000	4720	0	0	32			29-1881 DLY
NM	CLAYTON MUNI AIR PK	79-0118	36.4486	-103.1539	4961	22	64	111	29-1887 15M 78-0017 15M	56-0185 HLY 29-1887 HLY	29-1887 HLY 79-0118 DLY
NM	CLOUDCROFT	29-1931	32.9544	-105.7353	8678	0	0	95			69-0387 DLY 29-1927 DLY 29-1931 DLY
NM	CLOVIS	29-1939	34.4289	-103.1992	4295	25	53	99	29-1939 15M	29-1956 HLY 29-1939 HLY	69-0134 DLY 29-1939 DLY
NM	CLOVIS 13 N	29-1963	34.5989	-103.2161	4436	32	57	67	29-1963 15M	29-1963 HLY	29-1963 DLY
NM	COLUMBUS	79-0121	31.8297	-107.6389	4065	26	55	98	29-2024 15M	29-2024 HLY	79-0121 DLY
NM	CONCHAS DAM	29-2030	35.4072	-104.1906	4245	37	58	81	29-2030 15M	29-2030 HLY	29-2030 DLY
NM	CROSSROADS 2	29-2207	33.5133	-103.3403	4137	25	27	66	29-2203 15M 29-2207 15M	29-2203 15M 29-2207 HLY	29-2207 HLY 29-2207 DLY
NM	DEMING	29-2436	32.2531	-107.7531	4301	35	51	120	78-0030 15M 29-2440 15M 29-2436 15M	29-2436 15M 55-0109 HLY 56-0188 HLY 29-2440 HLY	64-0426 DLY 79-0124 DLY 69-0350 DLY 29-2436 DLY
NM	DES MOINES	29-2453	36.7500	-103.8333	6621	0	0	76			29-2453 DLY
NM	DRIPPING SPRINGS	76-0015	32.3233	-106.5867	6172	0	22	21		76-0015 HLY	76-0015 HLY

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NM	ELIDA	29-2854	33.9403	-103.6572	4396	0	0	94			29-2854 DLY
NM	ELK	29-2865	32.9161	-105.3381	5935	0	0	67			29-2865 DLY
NM	ELKINS	29-2871	33.7000	-104.0667	4032	0	0	32			29-2871 DLY
NM	FLORIDA	29-3225	32.4333	-107.4833	4449	0	42	49		29-3225 HLY	29-3225 DLY
NM	FLOYD	29-3231	34.2167	-103.5500	4120	0	0	30			29-3231 DLY
NM	FLYING H	29-3237	33.0000	-105.1000	5102	0	0	46			29-3174 DLY 29-3237 DLY
NM	FT SUMNER	29-3294	34.4667	-104.2319	4026	0	0	91			29-3294 DLY
NM	FT SUMNER 5 S	29-3296	34.3942	-104.2503	4049	0	0	68			29-3296 DLY
NM	GRENVILLE	29-3706	36.5939	-103.6192	6001	0	0	72			29-3706 DLY
NM	HATCH	29-3855	32.6775	-107.1958	4075	0	0	77			29-3855 DLY
NM	HOBBS	29-4026	32.7264	-103.1314	3661	0	0	86			29-4026 DLY
NM	HOBBS 13W	29-4030	32.7125	-103.3539	3835	27	53	92	66-4030 15M 29-6659 15M 29-4030 15M	29-6659 HLY 66-4030 15M 29-4030 HLY	29-6659 HLY 29-6659 DLY 66-4030 15M 29-4030 DLY
NM	HOOSIER RCH	29-4106	35.8667	-104.1667	5682	0	0	36			29-4106 DLY
NM	HOPE	29-4112	32.8111	-104.7386	4085	33	38	69	66-4112 15M 29-4112 15M	66-4112 15M 29-4112 HLY	29-4112 HLY 29-4112 DLY
NM	HOUSE	29-4175	34.6344	-103.8903	4700	0	0	75			69-0421 DLY 29-4175 DLY
NM	IONE	29-4306	35.7500	-103.3000	4705	0	0	48			29-4306 DLY
NM	JAL	29-4346	32.1103	-103.1872	3054	0	0	78			29-4346 DLY
NM	JORNADA EXP RANGE	29-4426	32.6161	-106.7403	4318	40	67	94	66-4426 15M 29-4426 15M	66-4426 15M 64-0600 HLY 29-4426 HLY	64-0600 HLY 29-4426 HLY 29-4426 DLY
NM	LOVINGTON 2 WNW	29-5204	32.9667	-103.3833	3904	0	0	49			69-0334 DLY 69-0333 DLY 29-5204 DLY
NM	MALJAMAR	29-5370	32.8567	-103.7625	4154	28	52	63	29-5370 15M	29-5370 HLY	29-5370 HLY 29-5370 DLY

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NM	MAYHILL	54-0197	32.9096	-105.4710	6634	0	0	86			69-0383 DLY 29-5502 DLY 54-0197 DLY
NM	MCCARTY RCH	29-5516	35.6022	-103.3644	4409	0	0	41			29-7451 DLY 29-5516 DLY
NM	MELROSE	29-5617	34.4278	-103.6250	4600	0	0	99			29-5617 DLY
NM	MONTOYA 10 SE	29-5874	35.0000	-103.9333	4344	0	0	33			29-5874 DLY
NM	MOSQUERO 1 NE	29-5937	35.8022	-103.9439	5466	0	0	93			29-5931 DLY 29-5937 DLY
NM	MTN PARK	29-5960	32.9539	-105.8225	6804	0	0	93			29-5960 DLY
NM	NARA VISA	29-6040	35.6167	-103.1000	4193	0	0	34			29-6040 DLY
NM	NEWKIRK	29-6115	35.0700	-104.2575	4564	0	0	75			29-6115 DLY
NM	OBAR	29-6258	35.5500	-103.2000	4104	0	0	38			29-6258 DLY
NM	OCHOA	29-6281	32.1664	-103.4250	3399	0	0	62			29-6281 DLY
NM	OROGRANDE	29-6435	32.3789	-106.0925	4222	25	53	101	29-6435 15M	29-6435 HLY	29-6435 HLY 29-6435 DLY
NM	PADUCA	76-0019	32.1797	-103.7217	3510	0	27	27		85-0171 HLY 76-0019 HLY	85-0171 HLY 76-0019 HLY
NM	PALO VERDE (1)	29-6540	35.9667	-104.1833	5879	0	0	34			29-6540 DLY
NM	PASAMONTE	29-6619	36.2994	-103.7408	5650	0	0	102			29-6619 DLY
NM	PENNINGTON	29-6728	36.3167	-103.5833	5604	0	0	33			29-6728 DLY
NM	PORTALES	29-7008	34.1742	-103.3519	4009	0	0	100			29-7008 DLY
NM	PORTER 2 E	29-7026	35.2333	-103.2833	4078	0	0	54			29-7026 DLY
NM	PRAIRIEVIEW	29-7054	33.1167	-103.2000	3855	0	0	30			29-7054 DLY
NM	QUAY 2 S	29-7168	34.9000	-103.7500	4304	0	0	31			29-7168 DLY
NM	QUEEN	29-7172	32.1936	-104.7403	5840	0	0	27			29-7176 DLY 69-0315 DLY 29-7172 DLY
NM	RAGLAND 3 SSW	29-7226	34.7800	-103.7492	4867	0	0	79			29-7226 DLY

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NM	RATON 26 ESE	79-0013	36.7778	-103.9817	7231	0	0	46			29-1450 DLY 29-1454 DLY 54-0199 DLY 79-0013 DLY
NM	ROY	29-7638	35.9450	-104.1981	5889	29	52	100	29-7638 15M	29-7638 HLY	29-7638 DLY
NM	SACRAMENTO	29-7735	32.7924	-105.5620	7316	24	55	69	29-7736 15M	29-7735 HLY 29-7736 HLY	29-7735 HLY 29-7736 HLY 29-7735 HLY 29-7735 DLY
NM	SAN JON	29-7867	35.1086	-103.3283	4034	0	0	109			29-7867 DLY
NM	SEDAN 7 NW	29-8187	36.2000	-103.2167	4774	0	0	53			69-0442 DLY 29-8187 DLY
NM	ST VRAIN	29-7741	34.4167	-103.5000	4452	0	0	30			29-7741 DLY
NM	STATE UNIV	29-8535	32.2822	-106.7597	3888	32	62	125	66-8535 15M 29-8535 15M	66-8535 15M 29-0131 HLY 29-8535 HLY	29-0131 DLY 29-8535 DLY
NM	TATUM	29-8713	33.2422	-103.3611	4012	0	0	90			29-8713 DLY
NM	TUCUMCARI	29-9148	35.1667	-103.7000	4042	0	0	45			29-9148 DLY
NM	TUCUMCARI 4 NE	29-9156	35.2006	-103.6867	4085	36	58	112	66-9156 15M 29-9156 15M	66-9156 15M 29-9156 HLY	29-9156 DLY
NM	TUCUMCARI MUNI AP	79-0117	35.1822	-103.6031	4065	0	0	44			79-0117 DLY
NM	UTE DAM	29-9284	35.3600	-103.4433	3825	0	0	65			29-5056 DLY 29-9284 DLY
NM	WHITE SANDS NATL MON	29-9686	32.7822	-106.1758	4006	30	63	75	66-9686 15M 29-9686 15M	66-9686 15M 29-9686 HLY	29-9686 DLY
OK	ACME_4WNW	86-0136	34.8083	-98.0233	1302	21	21	23	86-0136 15M	86-0136 15M	86-0136 DLY
OK	ADA_2NNE	86-0137	34.7985	-96.6691	972	21	24	107	86-0137 15M	34-0017 HLY 86-0137 15M 56-0211 HLY	34-0017 DLY 86-0137 DLY
OK	ALTUS 3S MESONET	34-0180	34.5872	-99.3381	1365	37	36	100	86-0138 15M 34-0179 15M	86-0138 15M 34-0179 HLY	34-0179 DLY 34-0180 DLY
OK	ALTUS AFB AIRPORT	64-0436	34.6500	-99.2670	1382	0	0	35			79-0071 DLY 64-0436 DLY

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OK	ALTUS DAM	34-0184	34.8847	-99.2964	1526	0	23	66		87-0001 HLY	34-0184 DLY
OK	ANADARKO 3 E	34-0224	35.0619	-98.1989	1168	0	0	81			34-0224 DLY
OK	ANTHON 6 W	34-0242	35.7500	-99.1000	1821	0	20	22		34-0242 HLY	34-0242 HLY
OK	ANTLERS	34-0256	34.2208	-95.6150	469	38	59	93	86-0142 15M 86-0141 15M 34-0256 15M	86-0142 15M 86-0141 15M 34-0256 HLY	86-0142 DLY 86-0141 DLY 34-0256 HLY 34-0256 DLY
OK	APACHE	34-0260	34.8892	-98.3592	1306	0	0	95			86-0143 DLY 69-0461 DLY 34-0260 DLY
OK	ARAPAHO	34-0277	35.5833	-98.9667	1667	0	0	34			34-0277 DLY
OK	ARDMORE	34-0292	34.1772	-97.1617	840	44	53	114	66-0292 15M 86-0145 15M 86-0144 15M 34-0293 15M 34-0292 15M	86-0145 15M 86-0144 15M 34-0293 15M 34-0292 15M 66-0292 15M 56-0210 HLY 86-0145 15M 86-0144 15M 34-0293 HLY 34-0292 HLY	56-0210 HLY 86-0145 15M 86-0144 15M 34-0293 HLY 34-0292 HLY 34-0292 DLY
OK	ARNETT 3NE	34-0332	36.1669	-99.7214	2428	0	0	82			34-0332 DLY
OK	ARNETT_8WSW	86-0146	36.0720	-99.9031	2352	21	21	24	86-0146 15M	86-0146 15M	34-0338 DLY 86-0146 DLY
OK	ATOKA	34-0391	34.3983	-96.1400	564	0	0	48			34-0391 DLY
OK	ATOKA DAM	34-0394	34.4500	-96.0667	594	0	0	33			34-0394 DLY
OK	BATTIEST	34-0567	34.3850	-94.8981	777	0	0	40			34-1873 DLY 34-0562 DLY 34-0567 DLY
OK	BEAR MTN TWR	34-0584	34.1394	-94.9519	801	0	0	44			34-0584 DLY
OK	BEAVER	34-0593	36.8125	-100.5308	2464	20	20	92	86-0148 15M	86-0148 15M	34-0593 DLY
OK	BENGAL 4 NNW	34-0670	34.8822	-95.0906	666	34	55	64	34-0670 15M	34-0670 HLY	34-0670 HLY 34-0670 DLY

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OK	BESSIE_4WNW	86-0150	35.4019	-99.0585	1681	20	20	23	86-0150 15M	86-0150 15M	34-0684 DLY 86-0150 DLY
OK	BOISE CITY 2 E	34-0908	36.7236	-102.4806	4134	32	58	91	86-0153 15M 66-0908 15M 34-0908 15M	86-0153 15M 66-0908 15M 34-0912 HLY 34-0908 HLY	34-0908 DLY
OK	BOSWELL 1 S	34-0980	34.0211	-95.8722	551	0	0	49			34-0980 DLY
OK	BROKEN BOW 1 N	34-1162	34.0497	-94.7381	476	0	0	78			85-0192 HLY 76-0021 HLY 34-1162 DLY
OK	BROKEN BOW DAM	34-1168	34.1333	-94.7000	443	0	29	30		34-1168 HLY	34-1168 DLY
OK	BROKEN BOW_6.5E	86-0157	34.0433	-94.6244	375	20	20	22	86-0147 15M 86-0157 15M	86-0147 15M 86-0157 15M	86-0147 DLY 86-0157 DLY
OK	BUFFALO_0.5SW	86-0158	36.8313	-99.6410	1832	21	21	99	86-0158 15M	86-0158 15M	34-1243 DLY 34-1240 DLY 86-0158 DLY
OK	BUTLER_5SW	86-0161	35.5915	-99.2706	1704	21	21	24	86-0161 15M	86-0161 15M	34-1270 DLY 86-0161 DLY
OK	BYARS_3ESE	86-0162	34.8497	-97.0033	1137	21	21	24	86-0162 15M	86-0162 15M	34-1283 DLY 86-0162 DLY
OK	CAMARGO	34-1396	36.0167	-99.2833	1942	0	0	72			34-1404 DLY 86-0164 DLY 34-1396 DLY
OK	CANEY 1 E	34-1437	34.2300	-96.1950	564	0	44	54		34-1437 15M 34-1436 HLY	34-1436 HLY 34-1436 DLY 34-1437 15M 34-1437 DLY
OK	CARNASAW TWR	34-1499	34.1442	-94.6378	1001	0	0	51			34-1499 DLY
OK	CARNEGIE 5 NE	34-1504	35.1756	-98.5794	1480	0	0	82			34-1504 DLY
OK	CARTER TWR	34-1544	34.2505	-94.7812	1301	26	52	67	34-1544 15M	34-1544 HLY	34-1544 DLY
OK	CENTRAHOMA_1E	86-0167	34.6090	-96.3331	687	21	21	24	86-0167 15M	86-0167 15M	34-1644 DLY 86-0167 DLY
OK	CHATTANOOGA	34-1706	34.4225	-98.6497	1148	0	0	108			34-1706 DLY

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OK	CHEYENNE	34-1738	35.6000	-99.6833	2005	0	25	81		87-0044 HLY	87-0044 HLY 34-1738 DLY
OK	CHEYENNE_6SW	86-0170	35.5461	-99.7279	2267	20	20	24	86-0170 15M	86-0170 15M	34-1743 DLY 86-0170 DLY
OK	CHICKASAW NRA	34-1745	34.5019	-96.9717	1056	0	0	99			34-8587 DLY 34-1745 DLY
OK	CHICKASHA EXP STATION	34-1750	35.0489	-97.9158	1086	36	49	114	66-1750 15M 34-1750 15M	66-1750 15M 34-1750 HLY	34-1747 DLY 34-1750 DLY
OK	CHRISTS 40 ACRE CAMP	85-0237	34.5283	-94.9311	896	0	22	22		85-0237 HLY	85-0237 HLY
OK	CLINTON	34-1909	35.5014	-98.9772	1572	0	0	75			69-0520 DLY 34-1909 DLY
OK	CLINTON SHERMAN AP	79-0020	35.3400	-99.2000	1910	0	21	32		55-0021 HLY 56-0085 HLY	55-0021 HLY 56-0085 HLY 79-0020 DLY
OK	CLOUD CHIEF 2 SE	34-1927	35.2333	-98.8167	1503	0	0	71			34-1927 DLY
OK	CLOUDY_5SSE	86-0174	34.2232	-95.2487	735	21	21	22	86-0174 15M	86-0174 15M	86-0174 DLY
OK	COALGATE 1 WNW	34-1954	34.5500	-96.2333	610	0	0	42			34-1954 DLY
OK	COMANCHE	34-2054	34.3622	-97.9736	1024	0	0	62			34-2054 DLY
OK	CORDELL	34-2125	35.3008	-98.9958	1565	0	0	72			69-0521 DLY 34-2125 DLY
OK	COX CITY 2 NE	34-2196	34.7422	-97.7039	1234	0	0	30			34-2196 DLY
OK	CUSTER CITY 3 SE	34-2334	35.6472	-98.8281	1755	23	22	23	34-2334 15M	34-2334 HLY	34-2334 HLY
OK	DAISY 4 ENE	34-2354	34.5433	-95.6764	755	0	0	69			34-2354 DLY
OK	DUNCAN	34-2660	34.5011	-97.9592	1125	24	50	77	34-2654 15M	34-2654 15M 34-2665 HLY	34-2654 15M 34-2660 DLY
OK	DUNCAN 10 W	34-2668	34.4933	-98.1419	1115	0	0	64			34-0466 DLY 34-2668 DLY
OK	DURANT	34-2678	34.0000	-96.3686	600	0	0	108			34-2678 DLY
OK	DURANT_6SSE	86-0178	33.9207	-96.3203	656	21	21	22	86-0178 15M	86-0178 15M	86-0178 DLY
OK	ELDORADO	34-2836	34.4667	-99.6500	1460	0	0	38			34-2836 DLY
OK	ELK CITY 4 W	34-2849	35.3925	-99.5064	2119	24	45	78	34-2849 15M	34-2849 HLY	34-2849 DLY

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OK	ELMORE CITY 3 SW	34-2872	34.6100	-97.4222	1020	0	0	31			34-2872 DLY
OK	ERICK	34-2944	35.2164	-99.8628	2060	0	0	99			34-2944 DLY
OK	ERICK_4ESE	86-0181	35.2049	-99.8034	1980	20	24	24	86-0181 15M	86-0181 15M 85-0216 HLY	86-0181 15M 85-0216 HLY 86-0181 DLY
OK	EVA	34-3002	36.7975	-101.9075	3574	23	55	54	66-3002 15M 34-3002 15M	66-3002 15M 34-3002 HLY	66-3002 15M 34-3002 HLY
OK	FARGO	34-3070	36.3736	-99.6244	2116	0	0	67			34-3070 DLY
OK	FLASHMAN TWR	34-3182	34.4796	-95.0101	1752	0	0	39			34-3182 DLY
OK	FORT SILL	34-3300	34.6667	-98.3833	1201	0	0	76			34-5068 DLY 79-0083 DLY 64-0446 DLY 52-3300 DLY 34-3300 DLY
OK	FREDERICK	34-3353	34.3861	-99.0200	1286	0	0	100			34-3353 DLY
OK	FREEDOM	34-3358	36.7647	-99.1128	1516	0	0	64			34-3358 DLY
OK	FT COBB	34-3281	35.1036	-98.4428	1286	35	61	76	86-0187 15M 34-3281 15M	86-0187 15M 34-3281 HLY	86-0187 DLY 69-0468 DLY 34-3281 HLY 34-3281 DLY
OK	FT SUPPLY 3SE	34-3304	36.5442	-99.5350	2031	0	52	91		34-3304 HLY	34-8627 DLY 69-0525 DLY 34-3304 DLY
OK	GAGE AP	79-0095	36.2967	-99.7689	2192	0	21	75		56-0167 HLY 55-0090 HLY 34-3407 HLY	79-0095 DLY
OK	GATE	34-3489	36.8500	-100.0569	2251	0	0	57			34-3489 DLY
OK	GLOVER RIVER	85-0230	34.1014	-94.9061	427	0	22	20		85-0230 HLY	85-0230 HLY
OK	GOODWELL RSCH STN	34-3628	36.5914	-101.6181	3278	38	67	95	86-0188 15M 66-3628 15M 34-3628 15M	86-0188 15M 66-3628 15M 34-3628 HLY	54-0204 DLY 34-3628 DLY
OK	GRANDFIELD_3.3W	86-0189	34.2394	-98.7436	1121	21	21	72	86-0190 15M 86-0189 15M	86-0190 15M 86-0189 15M	34-3709 DLY 86-0190 DLY 86-0189 DLY

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OK	GUYMON MUNI AP	79-0003	36.6817	-101.5053	3123	0	0	47			34-3835 DLY 79-0003 DLY
OK	HAMMON 3 SSW	34-3871	35.5850	-99.3953	1821	0	0	78			34-3871 DLY
OK	HEALDTON 3 E	34-4001	34.2333	-97.4203	902	0	0	99			34-4001 DLY
OK	HEE MTN TWR	34-4017	34.3413	-94.6572	1503	0	0	37			34-4017 DLY
OK	HENNEPIN 5 N	34-4052	34.5797	-97.3511	965	38	63	67	34-4051 15M 66-4052 15M 34-4052 15M	34-4051 HLY 66-4052 15M 34-4052 HLY	34-4051 HLY 34-4051 DLY 34-4052 HLY 34-4052 DLY
OK	HOBART	34-4202	35.0258	-99.1058	1552	37	51	59	34-4202 15M	34-4202 HLY	34-4202 HLY 34-4202 DLY
OK	HOBART MUNI AP	79-0158	34.9894	-99.0525	1555	24	28	107	86-0195 15M 78-0045 15M	86-0195 15M 56-0276 HLY 34-4204 HLY	86-0195 15M 56-0276 HLY 34-4204 HLY 79-0158 DLY
OK	HOLLIS_3W	86-0197	34.6855	-99.8333	1637	20	20	93	86-0197 15M	86-0197 15M	34-4249 DLY 34-4250 DLY 86-0197 DLY
OK	HOOKER_1W	86-0198	36.8552	-101.2255	2993	20	21	98	86-0198 15M	86-0198 15M	34-4298 DLY 86-0198 DLY
OK	HUGO	34-4384	34.0211	-95.5381	522	42	66	100	86-0199 15M 34-4384 15M	86-0199 15M 34-4384 HLY	86-0199 DLY 34-4384 DLY
OK	HUGO DAM	34-4386	34.0000	-95.4000	466	0	38	38		85-0235 HLY 34-4386 HLY	85-0235 HLY 34-4386 HLY
OK	IDABEL	34-4451	33.9336	-94.8278	364	0	0	91			34-4451 DLY
OK	IDABEL_5SW	86-0200	33.8301	-94.8803	368	21	21	22	86-0200 15M	86-0200 15M	86-0200 DLY
OK	KENTON	34-4766	36.9031	-102.9650	4350	0	0	86			34-4766 DLY
OK	KENTON_5SE	86-0203	36.8294	-102.8782	4342	21	21	22	86-0203 15M	86-0203 15M	86-0203 DLY
OK	KETCHUM RANCH_7NW	86-0204	34.5289	-97.7648	1122	21	21	24	86-0204 15M	86-0204 15M	34-9130 DLY 86-0204 DLY
OK	KINGSTON 5 SSE	34-4865	33.9300	-96.6961	686	18	52	63	34-4865 15M	34-4865 HLY	69-0498 DLY 34-4865 HLY 34-4865 DLY

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OK	LANE_1WNW	86-0208	34.3088	-95.9972	599	21	21	24	86-0208 15M	86-0208 15M	34-5020 DLY 86-0208 DLY
OK	LAVERNE	34-5045	36.6992	-99.8967	2116	0	0	67			34-5045 DLY
OK	LAWTON	34-5063	34.6097	-98.4572	1152	0	0	102			34-5063 DLY
OK	LAWTON MUNI AP	79-0026	34.5583	-98.4172	1070	0	21	21		55-0024 HLY 56-0089 HLY	55-0024 HLY 79-0026 DLY
OK	LEEDEY	34-5090	35.8781	-99.3433	2080	0	0	67			34-5090 DLY
OK	LEHIGH 4 SW	34-5108	34.4339	-96.2717	696	23	54	75	66-5108 15M 34-5108 15M	66-5108 15M 34-5108 HLY	34-5108 HLY 34-5108 DLY
OK	LINDSAY 2 W	34-5216	34.8261	-97.6386	981	0	0	63			34-5216 DLY
OK	MACKIE 4 NNW	34-5463	35.7481	-99.8178	2149	22	46	47	34-1744 15M 34-5463 15M	34-7714 HLY 34-1744 HLY 34-7588 HLY 34-5463 HLY	34-7714 HLY 34-1744 HLY 34-1744 DLY 34-7588 HLY 34-5463 HLY 34-5463 HLY 34-5463 DLY
OK	MADILL	34-5468	34.0919	-96.7708	771	0	0	74			34-5468 DLY
OK	MADILL_4.5NNW	86-0209	34.0358	-96.9439	765	20	20	23	86-0209 15M	86-0209 15M	34-5474 DLY 86-0209 DLY
OK	MANGUM	34-5509	34.8911	-99.5017	1594	0	0	85			34-5509 DLY
OK	MANGUM_5SE	86-0210	34.8359	-99.4240	1511	20	20	24	86-0210 15M	86-0210 15M	34-5514 DLY 86-0210 DLY
OK	MARIETTA 5SW	34-5563	33.8761	-97.1642	801	0	0	78			34-5563 DLY
OK	MARLOW 1 WSW	34-5581	34.6367	-97.9786	1263	0	0	117			34-5581 DLY
OK	MAY RANCH_16NNE	86-0213	36.9871	-99.0111	1823	21	20	24	86-0213 15M	86-0213 15M	34-3660 DLY 86-0213 DLY
OK	MAYFIELD	34-5648	35.3392	-99.8769	2005	41	62	62	66-5648 15M 34-5648 15M	66-5648 15M 34-5648 HLY	66-5648 15M 34-5648 HLY
OK	MCALESTER RGNL AP	79-0156	34.8822	-95.7831	771	36	35	98	86-0214 15M 34-5664 15M 78-0060 15M	86-0214 15M 34-5664 15M 78-0060 15M	79-0156 DLY

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OK	MCGEE CREEK DAM	34-5713	34.3097	-95.8675	673	0	0	66			34-3083 DLY 34-5713 DLY
OK	MEDICINE PARK_3W	86-0216	34.7292	-98.5694	1607	21	21	24	86-0216 15M	86-0216 15M	34-5775 DLY 86-0216 DLY
OK	MORAVIA 2 NNE	34-6035	35.1464	-99.4956	1690	0	0	71			34-6035 DLY
OK	MUTUAL	34-6139	36.2283	-99.1700	1890	0	0	94			34-6139 DLY
OK	N FORK RED RIVER AT CARTER	87-0006	35.1681	-99.5069	1680	0	22	21		87-0006 HLY	87-0006 DLY
OK	N. CANADIAN RIVER	85-0259	36.1833	-98.9167	1729	0	23	22		85-0259 HLY	85-0259 HLY
OK	NINNEKAH_2NNW	86-0223	34.9677	-97.9520	1172	21	29	34	86-0223 15M	86-0223 15M 34-6328 HLY	86-0223 15M 34-6328 HLY 86-0223 DLY
OK	NORTH FORK RED RIVER NR SAYRE	87-0029	35.2847	-99.6217	1783	0	24	21		87-0029 HLY	87-0029 HLY
OK	OPTIMA LAKE	34-6740	36.6500	-101.1333	2835	0	20	35		34-6740 HLY	34-3902 DLY 34-6740 HLY 34-6740 DLY
OK	PAOLI 2 W	34-6859	34.8231	-97.2850	931	36	57	62	66-6859 15M 34-6859 15M	66-6859 15M 34-6859 HLY	66-6859 15M 34-6859 HLY
OK	PINE CREEK DAM	34-7080	34.1167	-95.0833	489	0	25	29		34-7080 HLY	34-7080 HLY 34-7080 DLY
OK	PONTOTOC	34-7214	34.4997	-96.6275	1024	0	0	67			34-7214 DLY
OK	PUTNAM_3N	86-0239	35.8990	-98.9604	1934	21	21	24	86-0239 15M	86-0239 15M	34-7343 DLY 86-0239 DLY
OK	RANDLETT 9 E	34-7403	34.1578	-98.3108	997	0	0	47			34-7403 DLY
OK	RANGE	34-7412	36.5447	-101.0842	2710	31	59	61	66-7412 15M 34-7412 15M	66-7412 15M 34-7412 HLY	66-7412 15M 34-7412 HLY 34-7412 DLY
OK	RED RIVER	85-0266	33.8833	-97.9333	869	0	23	23		85-0266 HLY	85-0266 HLY
OK	REGNIER	34-7534	36.9425	-102.6314	4019	0	0	63			34-7534 DLY
OK	RETROP_10ENE	86-0241	35.1228	-99.3600	1766	20	20	35	86-0241 15M	86-0241 15M	34-7565 DLY 34-7570 DLY 86-0241 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
OK	REYDON 2SSE	34-7579	35.6256	-99.9106	2385	0	0	57			34-7579 DLY
OK	RIVERSIDE 4 W	34-7660	36.7889	-100.4183	2450	27	52	49	66-7660 15M 34-7660 15M	66-7660 15M 34-7660 HLY	66-7660 15M 34-7660 HLY
OK	ROFF 2 WNW	34-7705	34.6372	-96.8822	1257	34	55	58	66-7705 15M 34-7705 15M	66-7705 15M 34-7705 HLY	66-7705 15M 34-7705 HLY 34-7705 DLY
OK	ROOSEVELT	34-7727	34.8511	-99.0208	1463	0	0	72			34-7727 DLY
OK	SAYRE	34-7952	35.3061	-99.6275	1900	0	0	80			34-7952 DLY
OK	SEILING_7WNW	86-0244	36.1903	-99.0403	1788	20	20	23	86-0244 15M	86-0244 15M	34-8027 DLY 86-0244 DLY
OK	SHATTUCK 1NW	34-8101	36.2892	-99.8933	2195	32	56	61	66-8101 15M 34-8101 15M	66-8101 15M 34-8101 HLY	66-8101 15M 34-8092 DLY 34-8101 HLY 34-8101 DLY
OK	SLAPOUT_8W	86-0247	36.5975	-100.2619	2546	21	20	22	86-0247 15M	86-0247 15M	86-0247 DLY
OK	SMITHVILLE	34-8285	34.4660	-94.6589	823	0	0	72			34-8285 DLY
OK	SNYDER 1 N	34-8299	34.6867	-98.9483	1371	0	0	72			34-8299 DLY
OK	SOBOL TWR	34-8305	34.1335	-95.2389	751	0	0	34			34-8305 DLY
OK	STUART_3SE	86-0251	34.8764	-96.0698	841	21	21	22	86-0251 15M	86-0251 15M	86-0251 DLY
OK	SULPHUR_4NNE	86-0252	34.5661	-96.9505	1049	20	21	24	86-0252 15M	86-0252 15M	34-8570 DLY 86-0252 DLY
OK	TALIHINA_4SE	86-0255	34.7107	-95.0115	679	20	20	21	86-0255 15M	86-0255 15M	86-0255 DLY
OK	TALOGA	34-8708	36.0381	-98.9592	1706	24	26	72	34-8708 15M	34-8708 15M 34-8708 HLY	34-8711 DLY 34-8708 DLY
OK	TIPTON 4S MESONET	34-8879	34.4397	-99.1375	1270	20	27	63	86-0256 15M	86-0256 15M 34-8879 HLY	86-0256 DLY 34-8879 DLY
OK	TISHOMINGO NATL WR	34-8884	34.1925	-96.6442	643	0	0	111			34-8884 DLY
OK	TOM STEED RSVR (MTN PARK DAM)	87-0040	34.7381	-98.9881	1408	0	26	27		85-0250 HLY 87-0040 HLY	85-0250 HLY 87-0040 HLY
OK	TURPIN 4 SSE	34-9017	36.8136	-100.8636	2707	0	0	32			69-0454 DLY 34-9017 DLY

State	Name	SID	Latitude	Longitude	Elev. (ft)	Data years <1hr	hourly	daily	Contributing stations <1hr	hourly	daily
OK	TUSKAHOMA	34-9023	34.6147	-95.2803	600	31	63	95	86-0173 15M 34-9023 15M	86-0173 15M 34-9023 15M 34-9023 HLY	86-0173 DLY 34-9023 HLY 34-9023 DLY
OK	VALLIANT 3 W	34-9118	33.9981	-95.1433	476	0	0	71			34-9118 DLY
OK	VICI	34-9172	36.1508	-99.3003	2264	0	0	56			34-9172 DLY
OK	VINSON	34-9212	34.9003	-99.8614	1880	0	0	67			34-9212 DLY
OK	WALTERS_4NW	86-0263	34.3996	-98.3457	1051	21	21	93	86-0264 15M 86-0263 15M	86-0264 15M 86-0263 15M	34-9278 DLY 86-0264 DLY 86-0263 DLY
OK	WASHINGTON_6SSW	86-0265	34.9822	-97.5211	1131	0	0	35			54-0202 DLY 34-9346 DLY 86-0265 DLY
OK	WASHITA RIVER	85-0198	35.5317	-98.9658	1499	0	23	23		85-0198 HLY	85-0198 HLY
OK	WASHITA RIVER NEAR ANADARKO	87-0002	35.0850	-98.2431	1157	0	26	25		85-0183 HLY 87-0002 HLY	85-0183 HLY 87-0002 HLY
OK	WAURIKA 1ENE MESONET	34-9400	34.1678	-97.9883	928	20	21	103	86-0267 15M	86-0267 15M	34-9395 DLY 34-9400 DLY
OK	WAYNOKA	34-9404	36.5758	-98.8797	1509	22	55	79	66-9404 15M 34-9404 15M	66-9404 15M 34-9404 HLY	34-9404 HLY 34-9404 DLY
OK	WICHITA MTN WR	34-9629	34.7325	-98.7125	1667	23	64	104	66-9629 15M 34-9629 15M	85-0273 HLY 76-0023 HLY 66-9629 15M 34-9629 HLY	34-9629 DLY
OK	WILBURTON 9 ENE	34-9634	34.9458	-95.1546	636	0	0	57			34-9634 DLY
OK	WILLOW	34-9668	35.0522	-99.5125	1745	0	0	35			34-9668 DLY
OK	WOODWARD	34-9760	36.4408	-99.3817	1886	0	0	107			34-9760 DLY
OK	WOODWARD FLD STN	34-9762	36.4167	-99.4000	1991	20	50	53	86-0274 15M	86-0274 15M 34-9762 HLY	86-0274 DLY 34-9762 HLY 34-9762 DLY
OK	ZOE 1 S	34-9985	34.7500	-94.6333	640	0	0	35			34-8462 DLY 34-9985 DLY

Table A.1.3. Metadata for Texas stations whose data were used in this Volume showing each station's state, name, station identification number (SID), formatting interval (see Table 4.2.2), latitude, longitude, elevation, dataset identifier (see Table 4.2.1), and the period of record.

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	11100 HWY 71 WEST	65-0032	15M	30.2890	-97.9177	925	COA	1987-2015
TX	12W LUBBOCK (REESE)	80-0071	15M	33.6076	-102.0460	3343	WTM	2000-2018
TX	1E MCLEAN	80-0049	15M	35.2372	-100.5749	2863	WTM	2005-2017
TX	1N O'DONNELL	80-0058	15M	32.9799	-101.8322	3054	WTM	2001-2018
TX	1S NORTHFIELD	80-0056	15M	34.2730	-100.6044	2088	WTM	2008-2017
TX	1W SPUR	80-0080	15M	33.4809	-100.8764	2287	WTM	2002-2017
TX	1WNW BIG LAKE	80-0011	15M	31.1931	-101.4694	2701	WTM	2011-2018
TX	2 ESE GAIL	80-0031	15M	32.7551	-101.4144	2547	WTM	2001-2018
TX	2E ANDREWS	80-0008	15M	32.3201	-102.5167	3169	WTM	2006-2018
TX	2NW HEREFORD	80-0037	15M	34.8308	-102.4248	3863	WTM	2004-2018
TX	2SSW MULESHOE	80-0054	15M	34.2064	-102.7424	3806	WTM	2001-2017
TX	3N PLAINS	80-0067	15M	33.2281	-102.8394	3711	WTM	2001-2018
TX	3NW SEYMOUR	80-0076	15M	33.6323	-99.2910	1302	WTM	2009-2018
TX	5400 HWY 183 SOUTH	65-0091	15M	30.1773	-97.6898	491	COA	1987-2015
TX	ABERNATHY	41-0012	DLY	33.8400	-101.8581	3360	NCEI	1943-2017
TX	ABILENE	99-0017	HLY	32.4499	-99.7391	1728	NCEI	1905-1940
TX	ABILENE REGIONAL AIRPORT	55-0086	HLY	32.4103	-99.6817	1790	NCEI	1996-2007
TX	ABILENE REGIONAL AIRPORT	56-0163	HLY	32.4105	-99.6822	1790	NCEI	2007-2017
TX	ABILENE RGNL AP	41-0016	HLY	32.4106	-99.6822	1790	NCEI	1940-2013
TX	ABILENE RGNL AP	79-0090	DLY	32.4106	-99.6822	1791	NCEI	1948-2017
TX	ACKER RCH	41-0025	DLY	28.1569	-98.5142	436	NCEI	1978-2005
TX	ACKERLY 4SE	41-0034	DLY	32.4899	-101.6635	2765	NCEI	1940-2002
TX	ADAMSVILLE	41-0050	HLY	31.2833	-98.1500	1030	NCEI	1963-1985
TX	ADAMSVILLE	41-0050	DLY	31.2833	-98.1500	1030	NCEI	1963-1987
TX	ADDICKS	41-0054	HLY	29.7667	-95.6500	102	NCEI	1947-1948
TX	ADDICKS DAM	60-0006	15M	29.7913	-95.6236	82	HCFCD	2000-2017
TX	ALBANY	41-0120	DLY	32.7047	-99.3011	1440	NCEI	1893-2017
TX	ALEDO 2.9 SW	69-2294	DLY	32.6640	-97.6370	892	NCEI	2011-2017
TX	ALEDO 4 SE	41-0129	DLY	32.6444	-97.5617	791	NCEI	1960-2002
TX	ALICE	41-0144	DLY	27.7283	-98.0678	200	NCEI	1893-2008

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	ALICE INTERNATIONAL ARPT	55-0047	HLY	27.7411	-98.0247	170	NCEI	2001-2007
TX	ALICE INTERNATIONAL ARPT	56-0116	HLY	27.7410	-98.0270	180	NCEI	2007-2017
TX	ALICE INTL AP	79-0053	DLY	27.7411	-98.0247	174	NCEI	1948-2017
TX	ALPINE	41-0174	15M	30.3764	-103.6600	4450	NCEI	1978-2006
TX	ALPINE	41-0174	HLY	30.3764	-103.6600	4450	NCEI	1971-2006
TX	ALPINE	41-0174	DLY	30.3764	-103.6600	4449	NCEI	1900-2017
TX	ALTO 5 SW	41-0190	DLY	31.6094	-95.1342	279	NCEI	1941-2008
TX	ALVARADO	41-0201	DLY	32.4167	-97.2167	689	NCEI	1940-1964
TX	ALVARADO 4NE	41-0202	HLY	32.4644	-97.1831	706	NCEI	1977-1987
TX	ALVARADO 4NE	41-0202	DLY	32.4644	-97.1831	705	NCEI	1987-2017
TX	ALVIN	41-0204	DLY	29.3653	-95.2336	30	NCEI	1898-2013
TX	ALVIN 1.6 SW	69-0719	DLY	29.4176	-95.2673	43	NCEI	2012-2017
TX	ALVORD 3 N	66-0206	15M	33.3866	-97.7163	1010	NCEI	2013-2017
TX	ALVORD 3 N	41-0206	15M	33.3869	-97.7164	856	NCEI	1971-2013
TX	ALVORD 3 N	41-0206	HLY	33.3869	-97.7164	856	NCEI	1942-2013
TX	ALVORD 3 N	41-0206	DLY	33.3869	-97.7164	856	NCEI	1948-2017
TX	AMARILLO	99-0212	HLY	35.2063	-101.8358	3663	NCEI	1902-1940
TX	AMARILLO	79-0116	DLY	35.2333	-101.7089	3586	NCEI	1947-2017
TX	AMARILLO INTL AP	78-0007	15M	35.2295	-101.7042	3604	NCEI	2000-2017
TX	AMARILLO RICK HUSBAND INTL AIR	56-0183	HLY	35.2295	-101.7042	3604	NCEI	2007-2017
TX	AMARILLO WSO AP	41-0211	HLY	35.2294	-101.7042	3604	NCEI	1941-2013
TX	AMISTAD DAM	41-0225	DLY	29.4608	-101.0286	1158	NCEI	1964-2017
TX	ANAHUAC	41-0235	DLY	29.7878	-94.6342	23	NCEI	1909-2017
TX	ANDERSON	41-0244	DLY	30.4833	-95.9833	351	NCEI	1914-1972
TX	ANDICE 2 SW	41-0246	DLY	30.7569	-97.8619	1060	NCEI	1968-2017
TX	ANDREWS	41-0248	15M	32.3483	-102.5517	3192	NCEI	1972-2010
TX	ANDREWS	41-0248	HLY	32.3483	-102.5517	3192	NCEI	1942-2010
TX	ANDREWS	41-0248	DLY	32.3483	-102.5517	3192	NCEI	1914-2010
TX	ANDREWS 2	66-0250	15M	32.3123	-102.5606	3216	NCEI	2013-2017
TX	ANGLETON 1.3 E	69-0721	DLY	29.1696	-95.4068	23	NCEI	2012-2017
TX	ANGLETON 2 W	41-0257	DLY	29.1572	-95.4592	26	NCEI	1895-2017
TX	ANNA	41-0262	HLY	33.3500	-96.5167	680	NCEI	1946-1995
TX	ANNA	41-0262	DLY	33.3500	-96.5167	679	NCEI	1898-1995

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	ANNA 3.7 SSW	69-0988	DLY	33.3076	-96.5853	581	NCEI	2008-2017
TX	ANSON	41-0268	DLY	32.7667	-99.8900	1719	NCEI	1898-2017
TX	ANTELOPE	41-0271	DLY	33.4414	-98.3689	1024	NCEI	1910-2017
TX	ANTHONY 1.0 ENE	69-1312	DLY	31.9989	-106.5750	3967	NCEI	2013-2017
TX	ARANSAS	76-0025	HLY	28.3044	-96.8233	0	RAWS	1999-2015
TX	ARANSAS COUNTY AIRPORT	55-0057	HLY	28.0840	-97.0460	19	NCEI	1996-2007
TX	ARANSAS COUNTY AIRPORT	56-0129	HLY	28.0836	-97.0464	19	NCEI	2007-2017
TX	ARANSAS PASS 2	41-0302	DLY	27.9167	-97.1333	20	NCEI	1897-1971
TX	ARANSAS PASS 6.1 NNW	69-0543	DLY	27.9727	-97.1349	20	NCEI	2012-2017
TX	ARANSAS WILDLIFE REF	41-0437	DLY	28.2667	-96.8000	20	NCEI	1940-1970
TX	ARANSAS WR	41-0305	DLY	28.3081	-96.8047	16	NCEI	1971-2013
TX	ARCHER CITY 1E	41-0313	DLY	33.5947	-98.6117	1053	NCEI	1910-2017
TX	ARLINGTON 3.0 NNW	69-2419	DLY	32.7321	-97.1539	541	NCEI	2007-2014
TX	ARLINGTON SIX FLAGS	41-0337	DLY	32.7572	-97.0736	535	NCEI	1893-2017
TX	ARMAND BYU AT GENOARED BLF RD	60-0022	15M	29.6345	-95.1123	15	HCFCD	1986-2017
TX	ARTHUR CITY	41-0367	DLY	33.8756	-95.5022	427	NCEI	1891-1970
TX	ASPERMONT	41-0394	DLY	33.1525	-100.2333	1670	NCEI	1911-2017
TX	ATHENS	41-0404	DLY	32.1633	-95.8300	449	NCEI	1903-2017
TX	ATLANTA	41-0408	DLY	33.1244	-94.1661	315	NCEI	1930-2017
TX	AUSTIN	52-0420	DLY	30.2678	-97.7433	493	FORTS	1856-1892
TX	AUSTIN	52-0434	DLY	30.2708	-97.7422	512	FORTS	1859-1867
TX	AUSTIN	52-0438	DLY	30.2778	-97.7378	530	FORTS	1890-1892
TX	AUSTIN	52-7207	DLY	30.2792	-97.7750	495	FORTS	1849-1875
TX	AUSTIN	41-0420	DLY	30.2682	-97.7426	523	NCEI	1893-1942
TX	AUSTIN (CITY)	99-0420	HLY	30.2682	-97.7426	496	NCEI	1926-1940
TX	AUSTIN BERGSTROM	41-0429	HLY	30.1831	-97.6800	480	NCEI	1940-2013
TX	AUSTIN BERGSTROM AP	78-0010	15M	30.1831	-97.6799	480	NCEI	2005-2017
TX	AUSTIN BERGSTROM AP	79-0073	DLY	30.1831	-97.6800	479	NCEI	1948-2017
TX	AUSTIN MONTOPOLIS BRG	41-0432	DLY	30.2500	-97.6833	512	NCEI	1903-1963
TX	AUSTIN SAN ANTONIO	79-0064	DLY	29.7036	-98.0281	633	NCEI	1998-2017
TX	AUSTIN-BERGSTROM INTL AIRPORT	64-0309	HLY	30.1830	-97.6800	480	NCEI	1999-2016
TX	AUSTIN-BERGSTROM INTL APT	55-0073	HLY	30.1831	-97.6799	495	NCEI	1997-2007
TX	AUSTIN-CAMP MABRY	78-0009	15M	30.3208	-97.7604	670	NCEI	2000-2017

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	AUSTIN-CAMP MABRY	41-0428	HLY	30.3208	-97.7603	670	NCEI	1942-2013
TX	AUSTIN-CAMP MABRY	79-0086	DLY	30.3208	-97.7603	669	NCEI	1938-2017
TX	AUSTIN-CAMP MABRY ARMY NATIONA	56-0159	HLY	30.3208	-97.7604	658	NCEI	2007-2017
TX	AUSTWELL	41-0436	DLY	28.3889	-96.8389	23	NCEI	1897-2017
TX	AVALON	41-0440	DLY	32.2067	-96.7958	531	NCEI	1964-2003
TX	AYISH BAYOU	85-0308	HLY	31.3961	-94.1508	230	HADS	1995-2017
TX	BACKBONE CRK AT MARBLE FALLS	63-0139	HLY	30.5837	-98.2841	767	LCRA	1995-2018
TX	BADE RCH	41-0463	HLY	31.8333	-101.1667	2432	NCEI	1943-1949
TX	BAKERS CROSSING	41-0479	DLY	29.9500	-101.1500	1509	NCEI	1981-1987
TX	BAKERSFIELD	41-0482	DLY	30.8878	-102.3008	2546	NCEI	1942-2017
TX	BALLINGER 2 NW	41-0493	DLY	31.7414	-99.9764	1755	NCEI	1897-2017
TX	BALMORHEA	41-0498	DLY	30.9844	-103.7403	3222	NCEI	1923-2017
TX	BANDERA 0.2 N	69-0640	DLY	29.7284	-99.0735	1257	NCEI	1998-2017
TX	BANDERA 3.2 W	69-0634	DLY	29.7202	-99.1262	1362	NCEI	2009-2017
TX	BANKERSMITH	41-0509	15M	30.1400	-98.8189	1750	NCEI	1976-2012
TX	BANKERSMITH	41-0509	HLY	30.1400	-98.8189	1750	NCEI	1940-2012
TX	BANKERSMITH	41-0509	DLY	30.1400	-98.8189	1749	NCEI	1948-2012
TX	BARDWELL DAM	41-0518	15M	32.2631	-96.6369	461	NCEI	1975-2013
TX	BARDWELL DAM	41-0518	HLY	32.2631	-96.6369	461	NCEI	1965-2013
TX	BARDWELL DAM	41-0518	DLY	32.2631	-96.6369	463	NCEI	1965-2017
TX	BARKER DAM	60-0005	15M	29.7697	-95.6466	101	HCFCD	2000-2017
TX	BARTON CRK AT LOOP 360, AUSTIN	63-0192	15M	30.2442	-97.8021	527	LCRA	2005-2018
TX	BARTON CRK AT SH 71 N OAK HILL	63-0191	15M	30.2963	-97.9256	763	LCRA	2005-2018
TX	BATESVILLE	41-0560	DLY	28.9567	-99.6228	745	NCEI	1965-2001
TX	BAY CITY 2 N	41-0572	HLY	29.0000	-95.9667	49	NCEI	1947-1965
TX	BAY CITY WTR WKS	41-0569	15M	28.9797	-95.9750	52	NCEI	1977-2013
TX	BAY CITY WTR WKS	41-0569	HLY	28.9797	-95.9750	52	NCEI	1940-2013
TX	BAY CITY WTR WKS	41-0569	DLY	28.9797	-95.9750	52	NCEI	1909-2017
TX	BAYTOWN	41-0586	DLY	29.7917	-95.0436	26	NCEI	1946-2017
TX	BAYTOWN 2	41-0587	HLY	29.7500	-95.0167	30	NCEI	1947-1969
TX	BEAMER DITCH AT HUGHES RD	60-0020	15M	29.5919	-95.2221	27	HCFCD	1986-2017
TX	BEAUMONT CITY	41-0611	DLY	30.0969	-94.0997	20	NCEI	1901-2017
TX	BEAUMONT RSCH CTR	41-0613	DLY	30.0689	-94.2928	26	NCEI	1947-2017

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	BEDIAS	41-0635	DLY	30.7833	-95.9500	335	NCEI	1940-1985
TX	BEEVILLE 5 NE	66-0639	15M	28.4575	-97.7061	255	NCEI	2013-2017
TX	BEEVILLE 5 NE	41-0639	15M	28.4575	-97.7061	255	NCEI	1971-2013
TX	BEEVILLE 5 NE	41-0639	HLY	28.4575	-97.7061	255	NCEI	1953-2013
TX	BEEVILLE 5 NE	41-0639	DLY	28.4575	-97.7061	256	NCEI	1894-2017
TX	BEEVILLE CHASE NAAS	79-0049	DLY	28.3667	-97.6667	197	NCEI	1945-1992
TX	BELTON 2.3 NNW	69-0596	DLY	31.0984	-97.4816	669	NCEI	2010-2017
TX	BELTON DAM	41-0665	HLY	31.1000	-97.4833	664	NCEI	1951-1992
TX	BELTON DAM	41-0665	DLY	31.1000	-97.4833	663	NCEI	1951-1992
TX	BEN WHEELER 3.9 ESE	69-2672	DLY	32.4312	-95.6385	518	NCEI	2014-2017
TX	BENAVIDES	41-0689	15M	27.6000	-98.4167	381	NCEI	1976-1984
TX	BENAVIDES	41-0689	HLY	27.6000	-98.4167	381	NCEI	1940-1984
TX	BENAVIDES 2	66-0690	15M	27.5969	-98.4162	380	NCEI	2013-2017
TX	BENAVIDES 2	41-0690	15M	27.5969	-98.4161	380	NCEI	1982-2013
TX	BENAVIDES 2	41-0690	HLY	27.5969	-98.4161	380	NCEI	1982-2013
TX	BENAVIDES 2	41-0690	DLY	27.5969	-98.4161	381	NCEI	1962-2017
TX	BENBROOK DAM	66-0691	15M	32.6475	-97.4439	790	NCEI	2013-2017
TX	BENBROOK DAM	41-0691	15M	32.6475	-97.4439	790	NCEI	1984-2013
TX	BENBROOK DAM	41-0691	HLY	32.6475	-97.4439	790	NCEI	1949-2013
TX	BENBROOK DAM	41-0691	DLY	32.6475	-97.4439	791	NCEI	1949-2017
TX	BENJAMIN 4 SSE	41-0704	DLY	33.5333	-99.7667	1401	NCEI	1940-1975
TX	BERGSTROM AFB/AUSTI	64-0319	DLY	30.2000	-97.6830	541	NCEI	1971-1993
TX	BERTRAM 3 ENE	66-0738	15M	30.7625	-98.0213	1129	NCEI	2013-2017
TX	BERTRAM 3 ENE	41-0738	15M	30.7603	-98.0164	1139	NCEI	1984-2013
TX	BERTRAM 3 ENE	41-0738	HLY	30.7603	-98.0164	1139	NCEI	1968-2013
TX	BERTRAM 3 ENE	41-0738	DLY	30.7603	-98.0164	1138	NCEI	1968-2017
TX	BETHANY	41-0715	DLY	32.3833	-94.0500	371	NCEI	1983-1988
TX	BIG ISLE SLGH AT FAIRMNT PKWY	60-0024	15M	29.6516	-95.0760	19	HCFCD	1986-2017
TX	BIG LAKE 2	41-0779	15M	31.2000	-101.4625	2734	NCEI	1990-2013
TX	BIG LAKE 2	41-0779	HLY	31.2000	-101.4625	2734	NCEI	1990-2013
TX	BIG LAKE 2	41-0779	DLY	31.2000	-101.4625	2733	NCEI	1963-2017
TX	BIG LAKE LCRA 140	41-0776	15M	31.2000	-101.4667	2690	NCEI	1975-1990
TX	BIG LAKE LCRA 140	41-0776	HLY	31.2000	-101.4667	2690	NCEI	1940-1990

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TX	BIG SPRING	41-0786	HLY	32.2442	-101.4536	2510	NCEI	1940-1953
TX	BIG SPRING	99-0786	DLY	32.2442	-101.4536	2510	NCEI	1899-1950
TX	BIG SPRING	79-0113	DLY	32.2442	-101.4536	2510	NCEI	1948-2017
TX	BIG SPRING FLD STN	66-0784	15M	32.2683	-101.4858	2509	NCEI	2013-2017
TX	BIG SPRING FLD STN	41-0784	15M	32.2683	-101.4858	2509	NCEI	1971-2013
TX	BIG SPRING FLD STN	41-0784	HLY	32.2683	-101.4858	2509	NCEI	1953-2013
TX	BIG SPRING FLD STN	41-0784	DLY	32.2683	-101.4858	2510	NCEI	2011-2017
TX	BIG WELLS 2W	41-0787	DLY	28.5731	-99.6044	541	NCEI	1916-2006
TX	BISHOP	41-0805	DLY	27.5842	-97.8031	66	NCEI	1934-2012
TX	BISHOP 0.4 ENE	69-2228	DLY	27.5861	-97.7908	62	NCEI	2001-2016
TX	BLACKLAND EXPERIMENTAL STATION	41-8907	HLY	31.0500	-97.3500	640	NCEI	1940-1946
TX	BLANCO	41-0832	DLY	30.1061	-98.4286	1381	NCEI	1896-2017
TX	BLOYS CAMPGROUND	41-0861	DLY	30.5333	-104.1333	5764	NCEI	1968-1978
TX	BOERNE	41-0902	DLY	29.7986	-98.7353	1444	NCEI	1893-2017
TX	BOERNE 12.4 N	69-1875	DLY	29.9717	-98.6992	1283	NCEI	2011-2017
TX	BON WIER	41-0917	HLY	30.7333	-93.6500	89	NCEI	1940-1974
TX	BON WIER	41-0917	DLY	30.7333	-93.6500	89	NCEI	1914-1988
TX	BONHAM 3NNE	41-0923	DLY	33.6403	-96.1661	591	NCEI	1903-2017
TX	BONITA 4NW	41-0926	DLY	33.8472	-97.6528	984	NCEI	1948-2017
TX	BONITA 7NW	66-0926	15M	33.8186	-97.7336	980	NCEI	2013-2017
TX	BONITA 7NW	41-0926	15M	33.8186	-97.7336	980	NCEI	1978-2013
TX	BONITA 7NW	41-0926	HLY	33.8186	-97.7336	980	NCEI	1940-2013
TX	BOOKER	41-0944	DLY	36.4533	-100.5394	2749	NCEI	1922-2017
TX	BOQUILLAS RS	41-0950	DLY	29.1853	-102.9622	1857	NCEI	1910-2006
TX	BORGER	41-0958	DLY	35.6364	-101.4542	3211	NCEI	1949-2017
TX	BOWIE	41-0984	DLY	33.5511	-97.8472	1079	NCEI	1897-2017
TX	BOXELDER 3 NNE	41-0991	DLY	33.5164	-94.8608	440	NCEI	1949-2002
TX	BOYD	83-0010	15M	33.0853	-97.5583	702	TRWD	2003-2016
TX	BOYD	41-0996	DLY	33.0800	-97.5639	732	NCEI	1946-1999
TX	BOYS RANCH	41-1000	DLY	35.5303	-102.2564	3192	NCEI	1964-2017
TX	BRACKETTVILLE	41-1007	DLY	29.3167	-100.4144	1119	NCEI	1900-2017
TX	BRACKETTVILLE 22 N	66-1013	15M	29.6101	-100.4520	1760	NCEI	2013-2017
TX	BRACKETTVILLE 22 N	41-1013	HLY	29.6100	-100.4519	1760	NCEI	1995-2013

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TX	BRACKETTVILLE 22 N	41-1013	DLY	29.6100	-100.4519	1759	NCEI	1978-2017
TX	BRACKETVILLE	99-1007	DLY	29.3167	-100.4144	1119	NCEI	1877-1881
TX	BRADY	66-1017	15M	31.1444	-99.3491	1710	NCEI	2013-2018
TX	BRADY	41-1017	15M	31.1444	-99.3492	1710	NCEI	1973-2013
TX	BRADY	41-1017	HLY	31.1444	-99.3492	1710	NCEI	1940-2013
TX	BRADY	41-1017	DLY	31.1444	-99.3492	1709	NCEI	1893-2017
TX	BRADY CREEK AT BRADY	85-0354	HLY	31.1381	-99.3347	1686	HADS	2007-2017
TX	BRAVO	41-1033	DLY	35.6200	-103.0072	4075	NCEI	1941-2017
TX	BRAYS BYU AT BELLAIRE BLVD	60-0039	15M	29.7039	-95.5657	66	HCFCD	1999-2017
TX	BRAYS BYU AT BELLE PARK DR	60-0038	15M	29.7090	-95.5826	56	HCFCD	1986-2017
TX	BRAZOS	41-1035	DLY	32.6489	-98.1336	840	NCEI	1908-2013
TX	BRECKENRIDGE	41-1042	DLY	32.7500	-98.9017	1171	NCEI	1898-2017
TX	BRECKENRIDGE 2 WNW	41-1043	DLY	32.7667	-98.9333	1332	NCEI	1973-1975
TX	BREMOND	41-1045	DLY	31.1589	-96.6825	469	NCEI	1963-2017
TX	BRENHAM	99-1048	DLY	30.1592	-96.3972	312	NCEI	1885-1947
TX	BRENHAM	41-1048	DLY	30.1592	-96.3972	312	NCEI	1897-2017
TX	BREWERS STORE 5 SW	41-1053	HLY	30.6833	-99.5500	1762	NCEI	1940-1956
TX	BRICE 2 S	41-1057	HLY	34.6833	-100.9000	2228	NCEI	1941-1982
TX	BRIDGEPORT	41-1063	DLY	33.2064	-97.7761	768	NCEI	1908-2017
TX	BRIGGS	41-1068	HLY	30.8833	-97.9333	1090	NCEI	1940-1998
TX	BRIGHTON	41-1073	DLY	27.6500	-97.3000	10	NCEI	1893-1920
TX	BRITTON	41-1081	HLY	32.5500	-97.0667	561	NCEI	1946-1974
TX	BRITTON	41-1081	DLY	32.5500	-97.0667	561	NCEI	1940-1952
TX	BROADDUS	41-1089	DLY	31.3050	-94.2703	246	NCEI	1977-2010
TX	BROADDUS	41-4523	DLY	31.3167	-94.2833	269	NCEI	1942-1976
TX	BRONSON	41-1094	DLY	31.3500	-94.0167	322	NCEI	1924-1979
TX	BRONTE 11 NNE	79-0009	DLY	32.0408	-100.2494	1998	NCEI	2006-2017
TX	BROWNFIELD	41-1127	DLY	33.1833	-102.2667	3383	NCEI	1914-1954
TX	BROWNFIELD #2	41-1128	DLY	33.1908	-102.2681	3301	NCEI	1953-2017
TX	BROWNSVILLE	99-1137	HLY	25.9025	-97.4994	35	NCEI	1922-1942
TX	BROWNSVILLE	99-0003	DLY	25.9025	-97.4994	35	NCEI	1878-1900
TX	BROWNSVILLE	41-1133	DLY	25.9008	-97.5039	20	NCEI	1906-2005
TX	BROWNSVILLE	79-0043	DLY	25.9156	-97.4186	23	NCEI	1898-2017

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TX	BROWNSVILLE INTL AP	41-1136	HLY	25.9142	-97.4231	24	NCEI	1942-2013
TX	BROWNSVILLE/S PADRE ISLAND INT	56-0108	HLY	25.9060	-97.4260	22	NCEI	2007-2017
TX	BROWNWOOD 2ENE	41-1138	DLY	31.7383	-98.9456	1401	NCEI	1893-2017
TX	BUCHANAN DAM	41-1165	HLY	30.7500	-98.4167	1020	NCEI	1946-1964
TX	BUCHANAN DAM	41-1165	DLY	30.7500	-98.4167	1020	NCEI	1943-1964
TX	BUCHANAN DAM 1 ENE	63-0067	15M	30.7443	-98.4177	1017	LCRA	2012-2018
TX	BUCHANAN DAM 2 NNW	63-0066	15M	30.7648	-98.4526	1024	LCRA	2005-2012
TX	BUCKNERS CRK NR MULDOON	63-0224	15M	29.8452	-97.0447	299	LCRA	2005-2018
TX	BUCKNERS CRK NR MULDOON	63-0224	HLY	29.8452	-97.0447	299	LCRA	1994-2018
TX	BUDA AT FM 967	65-0071	15M	30.0867	-97.8486	687	COA	1987-2015
TX	BUENAVISTA 2 NNW	41-1185	HLY	31.2500	-102.6667	2384	NCEI	1942-1963
TX	BUENAVISTA 2 NNW	41-1185	DLY	31.2500	-102.6667	2384	NCEI	1912-1951
TX	BUESCHER LAKE GAGE 2	41-1186	HLY	30.0500	-97.1500	380	NCEI	1941-1943
TX	BUFFALO	41-1188	DLY	31.4667	-96.0500	358	NCEI	1940-1988
TX	BUFFALO BYU AT MILAM STREET	60-0135	15M	29.7651	-95.3612	1	HCFCD	1986-2017
TX	BUFFALO BYU AT TURNING BASIN	60-0134	15M	29.7494	-95.2911	10	HCFCD	1988-2017
TX	BUFFALO BYU AT US 90	60-0124	15M	29.7857	-95.8270	134	HCFCD	1988-2017
TX	BULER 4 NNW	41-1203	DLY	36.1833	-100.8333	2972	NCEI	1941-1977
TX	BULL CREEK DAM	65-0097	15M	30.4220	-97.8104	789	COA	1987-2017
TX	BULVERDE	41-1215	DLY	29.7386	-98.4522	1079	NCEI	1940-2017
TX	BUNKER HILL	41-1224	DLY	36.1500	-102.9333	4347	NCEI	1941-1990
TX	BURKETT	41-1239	DLY	31.9917	-99.2203	1555	NCEI	1948-2017
TX	BURLESON	66-1246	15M	32.5066	-97.3444	762	NCEI	2013-2017
TX	BURLESON	41-1246	15M	32.5067	-97.3444	762	NCEI	1982-2013
TX	BURLESON	41-1246	HLY	32.5067	-97.3444	762	NCEI	1982-2013
TX	BURLESON	41-1246	DLY	32.5067	-97.3444	761	NCEI	1985-2017
TX	BURLESON 2 SSW	41-1245	HLY	32.5167	-97.3333	771	NCEI	1957-1957
TX	BURLESON 2 SSW	41-1245	DLY	32.5167	-97.3333	771	NCEI	1943-1985
TX	BURNET	41-1250	DLY	30.7586	-98.2339	1286	NCEI	1893-2017
TX	BURNET 1 WSW	63-0143	HLY	30.7568	-98.2353	1309	LCRA	1999-2018
TX	BURNET 6 SSE	63-0142	HLY	30.6686	-98.2110	1101	LCRA	1991-2018
TX	BURNET 9 WSW	41-1253	DLY	30.7247	-98.3842	889	NCEI	2000-2011
TX	CADDO	76-0037	HLY	33.7411	-95.9219	800	RAWS	2000-2015

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TX	CADDO LAKE	76-0035	HLY	32.6583	-94.1164	200	RAWS	2002-2015
TX	CADDO LAKE	85-0379	HLY	32.6583	-94.1164	0	HADS	2003-2017
TX	CADDO WILDLIFE MANAGEMENT AREA	85-0389	HLY	33.7458	-95.9261	541	HADS	2005-2017
TX	CALDWELL	41-1314	DLY	30.5328	-96.7022	364	NCEI	1936-2017
TX	CALLIHAM	41-1337	DLY	28.4658	-98.3539	217	NCEI	1978-2017
TX	CAMERON	41-1348	DLY	30.8458	-96.9700	364	NCEI	1908-2009
TX	CAMP MABRY ARMY NATL GRDB	55-0082	HLY	30.3208	-97.7604	658	NCEI	1996-2007
TX	CAMP VERDE	99-1395	DLY	29.8947	-99.1050	1604	NCEI	1979-1997
TX	CAMP VERDE	41-1395	DLY	29.8947	-99.1050	1604	NCEI	1997-2017
TX	CAMP WOOD	41-1398	DLY	29.6703	-100.0097	1480	NCEI	1944-2013
TX	CAMPBELL FLD-CORSICANA MU	55-0121	HLY	32.0311	-96.3989	443	NCEI	1998-2007
TX	CAMPBELL FLD-CORSICANA MU	56-0206	HLY	32.0270	-96.3980	446	NCEI	2007-2017
TX	CANADIAN	89-0087	DLY	35.9128	-100.3820	2424	TEN	2012-2016
TX	CANADIAN	41-1412	DLY	35.9092	-100.3883	2300	NCEI	1906-2001
TX	CANDELARIA	41-1416	DLY	30.1383	-104.6822	2877	NCEI	1940-2011
TX	CANTON 5 W	41-1425	DLY	32.5669	-95.9578	486	NCEI	1944-2001
TX	CANYON	41-1430	DLY	34.9806	-101.9264	3589	NCEI	1923-2017
TX	CANYON DAM	66-1429	15M	29.8607	-98.1959	1000	NCEI	2013-2017
TX	CANYON DAM	41-1429	15M	29.8608	-98.1958	1000	NCEI	1984-2013
TX	CANYON DAM	41-1429	HLY	29.8608	-98.1958	1000	NCEI	1978-2013
TX	CANYON DAM	41-1429	DLY	29.8608	-98.1958	1010	NCEI	1961-2017
TX	CANYON DAM #1	41-1431	HLY	29.8617	-98.2919	980	NCEI	1961-2002
TX	CANYON DAM #1	41-1431	DLY	29.8617	-98.2919	981	NCEI	1996-2002
TX	CANYON DAM #3	41-1433	HLY	29.9464	-98.3969	1235	NCEI	1961-2004
TX	CANYON DAM #3	41-1433	DLY	29.9464	-98.3969	1234	NCEI	2004-2017
TX	CANYON DAM #4	66-1434	15M	29.9111	-98.3713	1168	NCEI	2013-2017
TX	CANYON DAM #4	41-1434	15M	29.9111	-98.3714	1168	NCEI	1984-2013
TX	CANYON DAM #4	41-1434	HLY	29.9111	-98.3714	1168	NCEI	1961-2013
TX	CANYON DAM #4	41-1434	DLY	29.9111	-98.3714	1168	NCEI	2009-2017
TX	CANYON DAM #6	41-1436	15M	29.9469	-98.3011	1137	NCEI	1984-2008
TX	CANYON DAM #6	41-1436	HLY	29.9469	-98.3011	1137	NCEI	1961-2008
TX	CANYON DAM 2	41-1432	HLY	29.8333	-98.3500	1194	NCEI	1961-1989
TX	CANYON LAKE 2.8 N	69-1037	DLY	29.9150	-98.2644	1010	NCEI	2008-2017

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TX	CANYON WEATHER	85-0382	HLY	29.8611	-98.1958	1007	HADS	2009-2017
TX	CAPROCK	76-0036	HLY	34.4106	-101.0492	2561	RAWS	2004-2015
TX	CAPROCK CANYON SP	41-1441	HLY	34.4125	-101.0678	2645	NCEI	2010-2013
TX	CAPROCK CANYONS STATE PARK	85-0380	HLY	34.4106	-101.0492	2589	HADS	2004-2017
TX	CARR RCH	41-1481	DLY	30.1667	-99.1167	2001	NCEI	1920-1961
TX	CARRIZO SPRINGS 3S	41-1486	DLY	28.4894	-99.8733	614	NCEI	1912-2017
TX	CARROLLTON	41-1490	DLY	32.9850	-96.9258	545	NCEI	1923-2001
TX	CARTA VALLEY	41-1492	HLY	29.7908	-100.6742	1851	NCEI	1963-1995
TX	CARTA VALLEY	41-1492	DLY	29.7908	-100.6742	1850	NCEI	1963-2014
TX	CARTHAGE	41-1500	DLY	32.1614	-94.3397	305	NCEI	1908-2017
TX	CASE RCH 3 S	41-1511	DLY	31.6333	-101.0333	2478	NCEI	1948-1983
TX	CASTOLON	41-1524	DLY	29.1344	-103.5150	2169	NCEI	1947-2017
TX	CATARINA	41-1528	HLY	28.3392	-99.6328	560	NCEI	1960-2003
TX	CATARINA	41-1528	DLY	28.3392	-99.6328	561	NCEI	1959-2001
TX	CEDAR BYU AT SH 146	60-0119	15M	29.7701	-94.9167	0	HCFCD	1986-2017
TX	CEDAR BYU AT US 90	60-0121	15M	29.9729	-94.9855	48	HCFCD	1986-2017
TX	CEDAR CREEK 5 S	41-1541	15M	30.0164	-97.4786	436	NCEI	2001-2013
TX	CEDAR CREEK 5 S	41-1541	HLY	30.0164	-97.4786	436	NCEI	2001-2013
TX	CEDAR CREEK 5 S	41-1541	DLY	30.0164	-97.4786	436	NCEI	1978-2013
TX	CELINA	41-1573	DLY	33.3167	-96.8000	679	NCEI	1946-1983
TX	CELINA 4.4 WSW	69-1189	DLY	33.2955	-96.8550	610	NCEI	2008-2017
TX	CENTER	41-1578	DLY	31.8075	-94.1642	325	NCEI	1922-2017
TX	CENTER CITY	41-1580	DLY	31.4683	-98.4106	1365	NCEI	1963-2012
TX	CENTERVILLE	41-1596	DLY	31.2581	-95.9744	322	NCEI	1937-2017
TX	CHALK MTN	41-1625	DLY	32.1561	-97.9369	1132	NCEI	1963-2013
TX	CHANNING	41-1646	15M	35.6869	-102.3342	3800	NCEI	1971-2013
TX	CHANNING	41-1646	HLY	35.6869	-102.3342	3800	NCEI	1941-2013
TX	CHANNING	41-1646	DLY	35.6869	-102.3342	3799	NCEI	1904-1951
TX	CHANNING 2	41-1649	DLY	35.6831	-102.3300	3789	NCEI	1967-2008
TX	CHAPMAN RCH	41-1651	DLY	27.5892	-97.4547	26	NCEI	1959-2003
TX	CHARLOTTE 5 NNW	41-1663	DLY	28.9275	-98.7494	440	NCEI	1962-2012
TX	CHEAPSIDE	66-1671	15M	29.3091	-97.4062	368	NCEI	2013-2017
TX	CHEAPSIDE	41-1671	15M	29.3092	-97.4061	368	NCEI	1976-2013

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TX	CHEAPSIDE	41-1671	HLY	29.3092	-97.4061	368	NCEI	1940-2013
TX	CHEAPSIDE	41-1671	DLY	29.3092	-97.4061	367	NCEI	1948-2017
TX	CHEROKEE	41-1680	HLY	30.9833	-98.7167	1490	NCEI	1941-1972
TX	CHEROKEE 2 NNW	63-0051	HLY	31.0167	-98.7221	1540	LCRA	1991-2018
TX	CHEROKEE 4 SSE	63-0113	HLY	30.9232	-98.6846	1443	LCRA	1991-2018
TX	CHEROKEE 8 NNE	63-0046	HLY	31.0648	-98.6030	1600	LCRA	1991-2018
TX	CHILDRESS 3 W	41-1696	HLY	34.4333	-100.2500	1972	NCEI	1940-1975
TX	CHILDRESS 3 W	41-1696	DLY	34.4333	-100.2500	1972	NCEI	1893-1946
TX	CHILDRESS MUNI AP	78-0018	15M	34.4272	-100.2831	1951	NCEI	2005-2017
TX	CHILDRESS MUNI AP	41-1698	15M	34.4272	-100.2831	1951	NCEI	1975-1999
TX	CHILDRESS MUNI AP	41-1698	HLY	34.4272	-100.2831	1951	NCEI	1947-2013
TX	CHILDRESS MUNI AP	79-0104	DLY	34.4272	-100.2831	1952	NCEI	1948-2017
TX	CHILDRESS MUNICIPAL ARPT	55-0095	HLY	34.4340	-100.2880	1943	NCEI	1996-2007
TX	CHILDRESS MUNICIPAL ARPT	56-0174	HLY	34.4272	-100.2831	1952	NCEI	2007-2017
TX	CHILLICOTHE	41-1701	DLY	34.2500	-99.5167	1401	NCEI	1895-1975
TX	CHISOS BASIN	41-1715	DLY	29.2703	-103.3003	5299	NCEI	1943-2017
TX	CHOKE CANYON DAM	41-1720	DLY	28.4675	-98.2525	230	NCEI	1983-2017
TX	CIBOLO CREEK	41-1741	DLY	29.0167	-97.9333	312	NCEI	1944-1982
TX	CLARENDON	79-0123	DLY	34.9325	-100.8903	2700	NCEI	1904-2017
TX	CLARKSVILLE (NEAR) SCS #5	41-1774	HLY	33.6167	-95.0667	457	NCEI	1942-1946
TX	CLARKSVILLE 1W	66-1773	15M	33.6108	-95.0716	426	NCEI	2013-2017
TX	CLARKSVILLE 1W	41-1773	15M	33.6108	-95.0717	426	NCEI	1971-2013
TX	CLARKSVILLE 1W	41-1773	HLY	33.6108	-95.0717	426	NCEI	1940-2013
TX	CLARKSVILLE 1W	41-1773	DLY	33.6108	-95.0717	427	NCEI	1948-2010
TX	CLARKSVILLE 2NE	41-1772	DLY	33.6164	-95.0717	436	NCEI	1903-2010
TX	CLAUDE	41-1778	DLY	35.1100	-101.3619	3396	NCEI	1904-2001
TX	CLEAR CK AT BAY AREA BLVD	60-0011	15M	29.4977	-95.1599	2	HCFCD	1999-2017
TX	CLEAR CK AT FM 528	60-0010	15M	29.5181	-95.1788	0	HCFCD	1986-2017
TX	CLEBURNE	41-1800	DLY	32.3139	-97.4061	784	NCEI	1907-2017
TX	CLEVELAND	41-1810	DLY	30.3636	-95.0839	197	NCEI	1954-2017
TX	CLIFTON 10 E	41-1823	DLY	31.8000	-97.4333	669	NCEI	1911-1975
TX	COLDSPRING 5 SSW	41-1870	DLY	30.5333	-95.1500	354	NCEI	1954-2002
TX	COLDWATER	41-1874	DLY	36.4000	-102.5667	4131	NCEI	1893-1983

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	COLEMAN	41-1875	DLY	31.8281	-99.4339	1732	NCEI	1894-2017
TX	COLLEGE STN	79-0017	DLY	30.5892	-96.3647	305	NCEI	1951-2017
TX	COLLEGE STN 6 SW	41-1888	DLY	30.5333	-96.4167	174	NCEI	1882-1984
TX	COLORADO CITY	41-1903	DLY	32.3978	-100.8594	2110	NCEI	1898-2009
TX	COLORADO RIVER ABOVE LA GRANGE	63-0222	15M	29.9125	-96.8969	262	LCRA	2005-2018
TX	COLORADO RIVER ABOVE LA GRANGE	63-0222	HLY	29.9125	-96.8969	262	LCRA	1988-2018
TX	COLORADO RIVER AT BASTROP	63-0212	HLY	30.1047	-97.3192	316	LCRA	1988-2018
TX	COLORADO RIVER AT BAY CITY	63-0236	15M	28.9748	-96.0107	49	LCRA	2005-2018
TX	COLORADO RIVER AT BAY CITY	63-0236	HLY	28.9748	-96.0107	49	LCRA	1991-2018
TX	COLORADO RIVER AT COLUMBUS	63-0229	HLY	29.7064	-96.5374	201	LCRA	1988-2018
TX	COLORADO RIVER AT SMITHVILLE	63-0220	15M	30.0120	-97.1622	318	LCRA	2005-2018
TX	COLORADO RIVER AT SMITHVILLE	63-0220	HLY	30.0120	-97.1622	318	LCRA	1994-2018
TX	COLORADO RIVER AT WHARTON	63-0234	HLY	29.3095	-96.1035	101	LCRA	1988-2018
TX	COLORADO RIVER AT WHARTON	85-0879	HLY	29.3089	-96.1036	121	HADS	1998-2017
TX	COLORADO RIVER AT WINCHELL	63-0006	15M	31.4686	-99.1623	1330	LCRA	2005-2018
TX	COLORADO RIVER AT WINCHELL	63-0006	HLY	31.4686	-99.1623	1330	LCRA	1988-2018
TX	COLORADO RIVER NR SAN SABA	63-0043	HLY	31.2179	-98.5636	1168	LCRA	1988-2018
TX	COLUMBUS	41-1911	DLY	29.6989	-96.5731	226	NCEI	1903-2017
TX	COMANCHE	76-0045	HLY	31.9242	-98.5972	1312	RAWS	2007-2015
TX	COMANCHE	41-1914	DLY	31.8983	-98.6033	1385	NCEI	1901-2015
TX	COMFORT 2	41-1920	HLY	29.9614	-98.8944	1433	NCEI	1990-2013
TX	COMFORT 2	41-1920	DLY	29.9614	-98.8944	1434	NCEI	1985-2017
TX	COMMERCE 4SW	66-1921	15M	33.1997	-95.9283	550	NCEI	2013-2017
TX	COMMERCE 4SW	41-1921	15M	33.1997	-95.9283	550	NCEI	1975-2013
TX	COMMERCE 4SW	41-1921	HLY	33.1997	-95.9283	550	NCEI	1948-2013
TX	COMMERCE 4SW	41-1921	DLY	33.1997	-95.9283	551	NCEI	1948-2017
TX	CONCORD	41-1937	HLY	31.9167	-94.5833	541	NCEI	1962-1983
TX	CONLEN	41-1946	DLY	36.2353	-102.2406	3819	NCEI	1941-2017
TX	CONROE	41-1956	15M	30.3303	-95.4831	245	NCEI	1978-2013
TX	CONROE	76-0046	HLY	30.2364	-95.4828	120	RAWS	1995-2015
TX	CONROE	85-0402	HLY	30.2364	-95.4828	187	HADS	2005-2017
TX	CONROE	41-1956	HLY	30.3303	-95.4831	245	NCEI	1947-2013
TX	CONROE	41-1956	DLY	30.3303	-95.4831	246	NCEI	1897-2017

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TX	CONROE 0.7 E	69-2190	DLY	30.3227	-95.4596	197	NCEI	2012-2017
TX	CONROE MONTGOMERY CO AP	78-0025	15M	30.3567	-95.4139	230	NCEI	2005-2017
TX	COOPER	41-1970	DLY	33.3744	-95.6933	486	NCEI	1944-2017
TX	COPE RCH	41-1974	DLY	31.5333	-101.2842	2480	NCEI	1948-2017
TX	COPPERAS COVE	41-1984	DLY	31.1167	-97.9000	1070	NCEI	1915-1983
TX	COPPERAS COVE 0.8 ESE	69-1151	DLY	31.1129	-97.8900	1093	NCEI	2013-2017
TX	COPPERAS COVE 2	41-1986	DLY	31.1214	-97.9225	1240	NCEI	1966-1970
TX	COPPERAS COVE 5 NW	41-1990	DLY	31.1603	-97.9564	1230	NCEI	1983-2017
TX	CORINTH ST INTAKE - WEST LEVEE	81-0041	15M	32.7547	-96.8033	411	COD	1991-2016
TX	CORNUDAS 0.1 N	69-1570	DLY	31.7809	-105.4716	4314	NCEI	2012-2015
TX	CORNUDAS SVC STN	41-2012	DLY	31.7800	-105.4700	4308	NCEI	1940-2007
TX	CORPUS CHRISTI	99-2014	HLY	27.7969	-97.3951	7	NCEI	1901-1941
TX	CORPUS CHRISTI	41-2014	HLY	27.7969	-97.3951	10	NCEI	1940-1948
TX	CORPUS CHRISTI	52-2011	DLY	27.7978	-97.3936	6	FORTS	1846-1892
TX	CORPUS CHRISTI	41-2014	DLY	27.8000	-97.4000	10	NCEI	1946-1980
TX	CORPUS CHRISTI	79-0048	DLY	27.7839	-97.5108	46	NCEI	1948-2017
TX	CORPUS CHRISTI 9.1 NW	69-2229	DLY	27.8029	-97.3932	4	NCEI	2007-2017
TX	CORPUS CHRISTI AP	41-2015	HLY	27.7742	-97.5122	44	NCEI	1947-2013
TX	CORPUS CHRISTI INTERNATIONAL A	56-0112	HLY	27.7730	-97.5130	44	NCEI	2007-2017
TX	CORPUS CHRISTI NAS	79-0050	DLY	27.6833	-97.2833	20	NCEI	1945-2017
TX	CORRIGAN 1 ENE	41-2017	DLY	31.0033	-94.8161	200	NCEI	1992-2012
TX	CORSICANA	41-2019	DLY	32.1225	-96.4867	449	NCEI	1893-2017
TX	CORSICANA 8 E	99-2020	DLY	32.1183	-96.3256	377	NCEI	1955-1989
TX	CORSICANA 8 E	41-2020	DLY	32.1183	-96.3256	377	NCEI	1992-2007
TX	CORSICANA CAMPBELL FLD	79-0142	DLY	32.0311	-96.3989	449	NCEI	1998-2017
TX	CORYELL CITY	41-2024	HLY	31.5500	-97.6167	973	NCEI	1944-1989
TX	COTTONWOOD	41-2040	DLY	30.1606	-99.1356	2123	NCEI	1962-2017
TX	COTULLA	99-2048	DLY	28.4567	-99.2183	476	NCEI	1901-2002
TX	COTULLA LA SALLE CO AP	78-0021	15M	28.4567	-99.2183	476	NCEI	2005-2017
TX	COTULLA LA SALLE CO AP	41-2048	15M	28.4567	-99.2183	476	NCEI	1975-2003
TX	COTULLA LA SALLE CO AP	41-2048	HLY	28.4567	-99.2183	476	NCEI	1956-2013
TX	COTULLA LA SALLE CO AP	79-0058	DLY	28.4567	-99.2183	476	NCEI	1949-2017
TX	COTULLA-LA SALLE CO ARPT	55-0049	HLY	28.4580	-99.2200	469	NCEI	2001-2007

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TX	COTULLA-LA SALLE CO ARPT	56-0120	HLY	28.4567	-99.2183	479	NCEI	2007-2017
TX	CRABB 2 W	41-2073	HLY	29.5333	-95.7500	112	NCEI	1948-1964
TX	CRANDALL	41-2080	DLY	32.6297	-96.4581	430	NCEI	1960-1994
TX	CRANDALL 1.6 SSE	69-1815	DLY	32.6088	-96.4428	427	NCEI	2007-2009
TX	CRANE	41-2082	15M	31.4072	-102.3578	2554	NCEI	1975-2013
TX	CRANE	41-2082	HLY	31.4072	-102.3578	2554	NCEI	1943-2013
TX	CRANE	41-2082	DLY	31.4072	-102.3578	2556	NCEI	1928-2017
TX	CRANFILLS GAP	66-2086	15M	31.7716	-97.8238	979	NCEI	2013-2016
TX	CRANFILLS GAP	41-2086	15M	31.7717	-97.8239	979	NCEI	1975-2013
TX	CRANFILLS GAP	41-2086	HLY	31.7717	-97.8239	979	NCEI	1940-2013
TX	CRANFILLS GAP	41-2086	DLY	31.7717	-97.8239	978	NCEI	1948-2017
TX	CRESSON	66-2096	15M	32.5286	-97.6188	1039	NCEI	2013-2017
TX	CRESSON	41-2096	15M	32.5286	-97.6189	1039	NCEI	1980-2013
TX	CRESSON	41-2096	HLY	32.5286	-97.6189	1039	NCEI	1946-2013
TX	CRESSON	41-2096	DLY	32.5286	-97.6189	1040	NCEI	1948-2017
TX	CRIDER RCH	41-2104	DLY	30.0667	-99.7333	2199	NCEI	1940-1975
TX	CROCKETT	41-2114	DLY	31.3072	-95.4508	348	NCEI	1904-2017
TX	CROSBYTON	41-2121	DLY	33.6517	-101.2450	3009	NCEI	1893-2017
TX	CROSS PLAINS	41-2128	HLY	32.1167	-99.1667	1742	NCEI	1940-1947
TX	CROSS PLAINS	41-2128	DLY	32.1167	-99.1667	1742	NCEI	1939-1976
TX	CROSS PLAINS #2	66-2131	15M	32.1266	-99.1605	1790	NCEI	2013-2017
TX	CROSS PLAINS #2	41-2131	15M	32.1267	-99.1606	1790	NCEI	1971-2013
TX	CROSS PLAINS #2	41-2131	HLY	32.1267	-99.1606	1790	NCEI	1947-2013
TX	CROWELL	41-2142	DLY	33.9900	-99.7303	1480	NCEI	1916-2017
TX	CRYSTAL CITY	41-2160	DLY	28.6794	-99.8311	581	NCEI	1941-2008
TX	CRYSTAL CITY 0.5 ESE	69-2922	DLY	28.6859	-99.8185	604	NCEI	2008-2017
TX	CUERO	41-2173	DLY	29.0892	-97.3433	213	NCEI	1901-2017
TX	CUMMINS CRK NR FRELSBURG	63-0228	15M	29.8258	-96.5807	228	LCRA	2005-2018
TX	CUMMINS CRK NR FRELSBURG	63-0228	HLY	29.8258	-96.5807	228	LCRA	1994-2018
TX	CYPRESS	66-2206	15M	30.0210	-95.7069	150	NCEI	2013-2018
TX	CYPRESS	41-2206	15M	30.0211	-95.7069	150	NCEI	1991-2013
TX	CYPRESS	41-2206	HLY	30.0211	-95.7069	150	NCEI	1991-2013
TX	CYPRESS	41-2206	DLY	30.0211	-95.7069	151	NCEI	1943-2017

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TX	CYPRESS CK AT GRANT RD	60-0085	15M	29.9736	-95.5987	116	HCFCD	1986-2017
TX	CYPRESS CK AT HUFFMEISTER RD	60-0087	15M	29.9616	-95.6310	128	HCFCD	1988-2017
TX	CYPRESS CK AT KATY-HOCKLEY RD	60-0089	15M	29.9500	-95.8084	160	HCFCD	1986-2017
TX	CYPRESS CK AT KUYKENDAHL RD	60-0082	15M	30.0244	-95.4764	85	HCFCD	1996-2017
TX	CYPRESS CK AT STUEBNER AIR RD	60-0083	15M	30.0066	-95.5119	92	HCFCD	1986-2017
TX	DACUS	41-2218	DLY	30.4364	-95.7919	240	NCEI	1954-2012
TX	DAINGERFIELD 9 S	41-2225	DLY	32.9203	-94.7225	299	NCEI	1944-2017
TX	DAL-FTW WSCMO AP	78-0028	15M	32.8978	-97.0189	560	NCEI	2000-2017
TX	DAL-FTW WSCMO AP	41-2242	HLY	32.8978	-97.0189	560	NCEI	1974-2013
TX	DALHART	41-2238	HLY	36.0606	-102.5211	3984	NCEI	1941-1946
TX	DALHART EXP STN	41-2239	DLY	36.0167	-102.5833	4003	NCEI	1905-1953
TX	DALHART FAA AP	41-2240	HLY	36.0167	-102.5500	3990	NCEI	1950-2013
TX	DALHART MUNI AP	79-0149	DLY	36.0167	-102.5500	3990	NCEI	1948-2017
TX	DALHART MUNICIPAL AIRPORT	55-0162	HLY	36.0230	-102.5470	3989	NCEI	2000-2007
TX	DALHART MUNICIPAL AIRPORT	56-0259	HLY	36.0230	-102.5470	3994	NCEI	2007-2017
TX	DALLAS	41-2243	DLY	32.7744	-96.8214	371	NCEI	1897-1916
TX	DALLAS EXECUTIVE AIRPORT	55-0028	HLY	32.6810	-96.8680	657	NCEI	1998-2007
TX	DALLAS EXECUTIVE AIRPORT	56-0092	HLY	32.6808	-96.8681	671	NCEI	2007-2017
TX	DALLAS FAA AP	78-0026	15M	32.8519	-96.8555	440	NCEI	2000-2017
TX	DALLAS FAA AP	41-2244	15M	32.8519	-96.8556	440	NCEI	1975-2001
TX	DALLAS FAA AP	41-2244	HLY	32.8519	-96.8556	440	NCEI	1940-2013
TX	DALLAS FT WORTH AP	79-0018	DLY	32.8978	-97.0189	561	NCEI	1948-2017
TX	DALLAS HENSLEY FLD NAS	79-0150	DLY	32.7333	-96.9667	492	NCEI	1945-1997
TX	DALLAS LOVE FIELD	55-0084	HLY	32.8470	-96.8510	476	NCEI	1997-2007
TX	DALLAS LOVE FIELD AIRPORT	56-0161	HLY	32.8470	-96.8510	488	NCEI	2007-2017
TX	DALLAS LOVE FLD	79-0088	DLY	32.8519	-96.8556	440	NCEI	1939-2017
TX	DALLAS REDBIRD AP	78-0066	15M	32.6808	-96.8681	658	NCEI	2005-2017
TX	DALLAS REDBIRD AP	79-0029	DLY	32.6808	-96.8681	659	NCEI	1998-2017
TX	DALLAS WB CITY	99-2243	HLY	32.7847	-96.7986	457	NCEI	1913-1940
TX	DALLAS WBO	79-0155	DLY	32.7667	-96.7833	435	NCEI	1913-1940
TX	DALLAS WFAA	41-2247	DLY	32.7667	-96.7833	479	NCEI	1941-1951
TX	DANEVANG 1 W	41-2266	DLY	29.0567	-96.2319	69	NCEI	1896-2017
TX	DARROUZETT	41-2282	DLY	36.4453	-100.3264	2539	NCEI	1941-2017

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TX	DAVILLA 2N	41-2295	DLY	30.8014	-97.2689	558	NCEI	1943-2017
TX	DE KALB 0.1 SE	69-0786	DLY	33.5077	-94.6161	410	NCEI	2009-2011
TX	DECATUR	41-2334	HLY	33.2733	-97.5769	977	NCEI	1945-1948
TX	DECATUR	41-2334	DLY	33.2733	-97.5769	978	NCEI	1904-2017
TX	DECKER POWER PLANT	65-0100	15M	30.3036	-97.6143	562	COA	1987-2017
TX	DECKER POWER PLANT	65-0100	DLY	30.3036	-97.6143	562	COA	1987-2017
TX	DEKALB	41-2352	DLY	33.4797	-94.6175	341	NCEI	1944-2017
TX	DEL RIO	41-2361	HLY	29.3842	-100.9094	1064	NCEI	1996-2013
TX	DEL RIO 4 SW	41-2364	DLY	29.3317	-100.9297	869	NCEI	1923-1949
TX	DEL RIO AP	41-2360	15M	29.3783	-100.9269	999	NCEI	1984-1996
TX	DEL RIO AP	41-2360	HLY	29.3783	-100.9269	999	NCEI	1951-2013
TX	DEL RIO INTERNATIONAL AIRPORT	56-0171	HLY	29.3670	-100.9220	1027	NCEI	2007-2017
TX	DEL RIO INTERNATIONAL ARPT	55-0093	HLY	29.3784	-100.9270	1027	NCEI	1996-2007
TX	DEL RIO INTL AP	78-0031	15M	29.3784	-100.9270	999	NCEI	2000-2017
TX	DEL RIO INTL AP	79-0100	DLY	29.3783	-100.9269	1001	NCEI	1951-2017
TX	DEL RIO LAUGHLIN AFB	79-0098	DLY	29.3667	-100.7833	1073	NCEI	1953-1970
TX	DEL RIO WB CITY	99-2357	HLY	29.3667	-100.9000	961	NCEI	1905-1940
TX	DEL RIO WB CITY	41-2357	HLY	29.3667	-100.9000	961	NCEI	1940-1951
TX	DEL RIO WB CITY	79-0099	DLY	29.3667	-100.9000	961	NCEI	1946-2004
TX	DELL CITY 1.4 SW	69-1573	DLY	31.9231	-105.2180	3737	NCEI	2012-2017
TX	DELL CITY 5SSW	41-2354	DLY	31.8769	-105.2369	3796	NCEI	1979-2017
TX	DENISON DAM	41-2394	HLY	33.8167	-96.5667	613	NCEI	1940-1997
TX	DENISON DAM	41-2394	DLY	33.8167	-96.5667	614	NCEI	1940-1997
TX	DENISON HWY 60 BRG	41-2397	DLY	33.8167	-96.5333	551	NCEI	1906-1949
TX	DENTON	41-2403	DLY	33.2333	-97.1333	659	NCEI	1949-1965
TX	DENTON 2 SE	66-2404	15M	33.1991	-97.1049	630	NCEI	2013-2017
TX	DENTON 2 SE	41-2404	15M	33.1992	-97.1050	630	NCEI	1984-2013
TX	DENTON 2 SE	41-2404	HLY	33.1992	-97.1050	630	NCEI	1946-2013
TX	DENTON 2 SE	41-2404	DLY	33.1992	-97.1050	630	NCEI	1913-2017
TX	DENTON MUNI AP	79-0031	DLY	33.2061	-97.1989	643	NCEI	1998-2017
TX	DENTON MUNICIPAL	55-0032	HLY	33.2061	-97.1989	642	NCEI	1996-2007
TX	DENTON MUNICIPAL AIRPORT	56-0098	HLY	33.2060	-97.1990	642	NCEI	2007-2017
TX	DEPORT 4 NW	41-2415	HLY	33.5639	-95.3742	436	NCEI	1944-2001

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TX	DEPORT 4 NW	41-2415	DLY	33.5639	-95.3742	436	NCEI	1948-2001
TX	DERBY 1 S	41-2417	DLY	28.7528	-99.1353	489	NCEI	1978-2016
TX	DEVINE	41-2430	DLY	29.1500	-98.9000	689	NCEI	1893-1954
TX	DEVINE 0.4 S	69-2146	DLY	29.1400	-98.9053	650	NCEI	2010-2017
TX	DEVINE 6.7 NNE	69-2152	DLY	29.2376	-98.8686	748	NCEI	2012-2017
TX	DEWEYVILLE 5 S	41-2436	DLY	30.2333	-93.7333	20	NCEI	1954-1986
TX	DIALVILLE 2 W	41-2444	DLY	31.8614	-95.2619	617	NCEI	1897-2017
TX	DILLEY	41-2458	DLY	28.6806	-99.1833	551	NCEI	1910-2008
TX	DIME BOX	66-2462	15M	30.3561	-96.8288	335	NCEI	2013-2017
TX	DIME BOX	41-2462	15M	30.3561	-96.8289	335	NCEI	1984-2013
TX	DIME BOX	41-2462	HLY	30.3561	-96.8289	335	NCEI	1981-2013
TX	DIME BOX	41-2462	DLY	30.3561	-96.8289	335	NCEI	1941-2017
TX	DIMMITT 2 N	41-2464	DLY	34.5858	-102.3120	3852	NCEI	1959-2017
TX	DIMMITT 6 E	41-2463	DLY	34.5500	-102.2167	3812	NCEI	1923-1985
TX	DITCH A 22 - BURNEY ROAD	60-0160	15M	29.6295	-95.6340	76	HCFCD	2001-2017
TX	DRIPPING SPRINGS 8 W	63-0169	HLY	30.1963	-98.2227	1341	LCRA	1999-2018
TX	DRY DEVILS RVR N COMSTOCK 22NE	85-0424	HLY	29.8767	-100.8967	1467	HADS	1995-2017
TX	DRYER 1 NW	41-2595	DLY	29.3833	-97.2667	302	NCEI	1940-1975
TX	DUBLIN 2SE	41-2598	DLY	32.0628	-98.3047	1467	NCEI	1898-2011
TX	DUMAS	41-2617	DLY	35.8731	-101.9725	3655	NCEI	1937-2017
TX	DUMAS 8 NE	41-2619	HLY	35.9500	-101.8833	3553	NCEI	1947-1955
TX	DUMONT	66-2621	15M	33.8094	-100.5169	2010	NCEI	2013-2018
TX	DUMONT	41-2621	15M	33.8094	-100.5169	2010	NCEI	1984-2013
TX	DUMONT	41-2621	HLY	33.8094	-100.5169	2010	NCEI	1971-2013
TX	DUMONT	41-2621	DLY	33.8094	-100.5169	2011	NCEI	1971-2017
TX	DUNCAN WILSON RCH	41-2630	DLY	30.8000	-100.1667	2119	NCEI	1966-1996
TX	DUNDEE 6 NNW	41-2633	DLY	33.8158	-98.9317	1050	NCEI	1922-2013
TX	E FORK SAN JACINTO AT FM 1485	60-0068	15M	30.1453	-95.1245	58	HCFCD	1988-2017
TX	EAGLE LAKE	41-2675	15M	29.6000	-96.3333	177	NCEI	1976-1986
TX	EAGLE LAKE	41-2675	HLY	29.6000	-96.3333	177	NCEI	1965-1986
TX	EAGLE LAKE RESCH CTR	66-2676	15M	29.6212	-96.3660	176	NCEI	2013-2018
TX	EAGLE LAKE RESCH CTR	41-2676	15M	29.6211	-96.3661	176	NCEI	1986-2013
TX	EAGLE LAKE RESCH CTR	41-2676	HLY	29.6211	-96.3661	176	NCEI	1986-2013

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TX	EAGLE LAKE RESCH CTR	41-2676	DLY	29.6211	-96.3661	177	NCEI	2011-2017
TX	EAGLE MOUNTAIN RESERVOIR ABOVE	85-0462	HLY	32.8775	-97.4747	673	HADS	1997-2017
TX	EAGLE MTN LAKE	41-2677	DLY	32.8692	-97.4497	761	NCEI	1978-2002
TX	EAGLE MTN LAKE DAM	41-2678	DLY	32.8833	-97.4667	679	NCEI	1940-1975
TX	EAGLE PASS 3N	66-2679	15M	28.7570	-100.4792	812	NCEI	2013-2017
TX	EAGLE PASS 3N	41-2679	15M	28.7569	-100.4792	812	NCEI	1971-2013
TX	EAGLE PASS 3N	41-2679	HLY	28.7569	-100.4792	812	NCEI	1941-2013
TX	EAGLE PASS 3N	41-2679	DLY	28.7569	-100.4792	814	NCEI	1891-2017
TX	EAGLEMTNLAKE	83-0015	15M	32.8775	-97.4747	673	TRWD	2003-2016
TX	EASTERWOOD FIELD	55-0018	HLY	30.5880	-96.3640	328	NCEI	1997-2007
TX	EASTERWOOD FIELD AIRPORT	56-0082	HLY	30.5880	-96.3640	328	NCEI	2007-2017
TX	EASTLAND	41-2715	15M	32.3989	-98.8175	1438	NCEI	1984-2010
TX	EASTLAND	41-2715	HLY	32.3989	-98.8175	1438	NCEI	1961-2010
TX	EASTLAND	41-2715	DLY	32.3989	-98.8175	1437	NCEI	1893-2010
TX	EDEN	41-2741	DLY	31.2208	-99.8494	2051	NCEI	1923-2017
TX	EDEN 2	41-2744	15M	31.2167	-99.8500	2070	NCEI	1972-1987
TX	EDEN 2	41-2744	HLY	31.2167	-99.8500	2070	NCEI	1940-1987
TX	EDEN 3 S	63-0032	15M	31.1708	-99.8479	2051	LCRA	2007-2018
TX	EDEN 3 S	63-0032	HLY	31.1708	-99.8479	2051	LCRA	2007-2018
TX	EDNA 3 SW	41-2769	DLY	28.9500	-96.6833	69	NCEI	1909-1968
TX	EDNA HWY 59 BRG	41-2768	DLY	28.9667	-96.6833	69	NCEI	1968-1995
TX	EDOM	41-2772	DLY	32.3656	-95.6089	509	NCEI	1940-2013
TX	EL CAMPO	41-2786	DLY	29.2000	-96.2653	112	NCEI	1941-2017
TX	EL CAMPO 1.0 NW	69-2734	DLY	29.2061	-96.2890	105	NCEI	2008-2017
TX	EL INDIO 7ESE	41-2824	DLY	28.4747	-100.2147	807	NCEI	1978-2017
TX	EL PASO	99-2870	HLY	31.7587	-106.4843	3711	NCEI	1881-1939
TX	EL PASO	52-2799	DLY	31.7586	-106.4889	3717	FORTS	1850-1892
TX	EL PASO	79-0125	DLY	31.7587	-106.4843	3773	NCEI	1921-1942
TX	EL PASO (CITY)	41-2870	HLY	31.7587	-106.4843	3975	NCEI	1942-1942
TX	EL PASO AP	41-2797	HLY	31.8111	-106.3758	3918	NCEI	1942-2013
TX	EL PASO INTERNATIONAL AIRPORT	56-0182	HLY	31.8110	-106.3760	3916	NCEI	2007-2017
TX	EL PASO INTL AP	79-0115	DLY	31.8111	-106.3758	3917	NCEI	1942-2017
TX	EL PASO UTEP	75-0009	HLY	31.7683	-106.5013	3856	TCEQ	1998-2017

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TX	ELAM CREEK - LAKE JUNE RD	81-0022	15M	32.7344	-96.6950	460	COD	1991-2016
TX	ELDORADO	41-2809	DLY	30.8694	-100.5994	2441	NCEI	2003-2017
TX	ELDORADO 1 N	41-2811	HLY	30.8833	-100.6000	2419	NCEI	1940-1995
TX	ELECTRA	41-2818	DLY	34.0308	-98.9117	1217	NCEI	1945-2005
TX	ELECTRA 0.1 SE	69-2903	DLY	34.0295	-98.9175	1230	NCEI	2008-2013
TX	ELGIN	41-2820	DLY	30.3492	-97.3683	581	NCEI	1962-2017
TX	EMORY	41-2902	DLY	32.8711	-95.7797	486	NCEI	1897-2012
TX	ENCINAL	41-2906	DLY	27.9775	-99.3847	545	NCEI	1907-2017
TX	ENNIS	41-2925	DLY	32.3333	-96.6333	525	NCEI	1940-1991
TX	ENNIS 0.7 SSW	69-1250	DLY	32.3282	-96.6315	535	NCEI	2013-2017
TX	EVADALE	41-3000	DLY	30.3333	-94.0833	33	NCEI	1944-2004
TX	EVANT 1SSW	41-3005	15M	31.4625	-98.1619	1245	NCEI	1977-2010
TX	EVANT 1SSW	41-3005	HLY	31.4625	-98.1619	1245	NCEI	1943-2010
TX	EVANT 1SSW	41-3005	DLY	31.4625	-98.1619	1247	NCEI	1941-2009
TX	EVANT HIGH SCHOOL	85-0470	HLY	31.4739	-98.1517	1263	HADS	2007-2017
TX	F.M.1406 - NORTH FORK TAYLORS	82-5500	15M	29.9478	-94.4003	31	DD6	1991-2017
TX	FABENS	41-3033	HLY	31.5000	-106.1500	3612	NCEI	1953-1977
TX	FABENS	41-3033	DLY	31.5000	-106.1500	3612	NCEI	1939-1977
TX	FAIR OAKS RANCH 2.2 NNW	69-1841	DLY	29.7667	-98.6465	1339	NCEI	2007-2017
TX	FAIR OAKS RCH	41-3038	DLY	29.7500	-98.6333	1302	NCEI	1946-1973
TX	FAIRFIELD 3W	41-3047	DLY	31.7322	-96.2078	433	NCEI	1941-2007
TX	FALCON DAM	41-3060	DLY	26.5581	-99.1372	322	NCEI	1962-2017
TX	FALFURRIAS	41-3063	DLY	27.1353	-98.1203	138	NCEI	1907-2017
TX	FALLS CITY 7 WSW	41-3065	DLY	28.9614	-98.1103	344	NCEI	1946-2017
TX	FARMERSVILLE	41-3080	DLY	33.1414	-96.2933	627	NCEI	1946-2016
TX	FAWCETT RCH	41-3103	HLY	29.8667	-100.9000	1503	NCEI	1946-1949
TX	FEDOR	41-3112	DLY	30.3164	-97.0545	482	NCEI	1963-2017
TX	FERRIS	66-3133	15M	32.5338	-96.6608	470	NCEI	2013-2017
TX	FERRIS	41-3133	15M	32.5339	-96.6608	470	NCEI	1984-2013
TX	FERRIS	41-3133	HLY	32.5339	-96.6608	470	NCEI	1946-2013
TX	FERRIS	41-3133	DLY	32.5339	-96.6608	469	NCEI	1940-2017
TX	FIFE	41-3142	DLY	31.3833	-99.3667	1391	NCEI	1941-1975
TX	FISCHERS STORE	66-3156	15M	29.9745	-98.2670	1180	NCEI	2013-2017

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TX	FISCHERS STORE	41-3156	15M	29.9756	-98.2647	1160	NCEI	1995-2013
TX	FISCHERS STORE	41-3156	HLY	29.9756	-98.2647	1160	NCEI	1995-2013
TX	FISCHERS STORE	41-3156	DLY	29.9756	-98.2647	1161	NCEI	1887-2017
TX	FLAT	41-3171	15M	31.3089	-97.6306	850	NCEI	1984-2008
TX	FLAT	41-3171	HLY	31.3089	-97.6306	850	NCEI	1950-2008
TX	FLAT	41-3171	DLY	31.3089	-97.6306	850	NCEI	1951-2007
TX	FLATONIA 4SE	41-3183	DLY	29.6339	-97.0644	469	NCEI	1908-2017
TX	FLINT	41-3192	DLY	32.2000	-95.3500	479	NCEI	1910-1949
TX	FLOMOT 4 NE	41-3196	DLY	34.2675	-100.9336	2359	NCEI	1946-2017
TX	FLORENCE	41-3199	DLY	30.8392	-97.7925	988	NCEI	1963-2017
TX	FLORESVILLE	41-3201	DLY	29.1333	-98.1628	400	NCEI	1916-2017
TX	FLOUR BLUFF 1.6 SW	69-2225	DLY	27.6613	-97.3031	16	NCEI	2007-2017
TX	FLOYDADA	41-3214	DLY	33.9850	-101.3339	3222	NCEI	1911-2017
TX	FLOYDADA 9 SE	41-3215	DLY	33.8761	-101.2464	3130	NCEI	1947-2017
TX	FOLLETT	41-3225	DLY	36.4328	-100.1369	2583	NCEI	1930-2017
TX	FORESTBURG 5 S	41-3247	DLY	33.4773	-97.5598	1109	NCEI	1893-2017
TX	FORSAN	41-3253	DLY	32.1117	-101.3642	2749	NCEI	1949-2008
TX	FORT BROWN	99-1137	DLY	25.9025	-97.4994	35	NCEI	1849-1877
TX	FORT CLARK	99-3260	DLY	29.3000	-100.4500	1102	NCEI	1852-1900
TX	FORT ELLIOTT	52-5987	DLY	35.5103	-100.4417	2630	FORTS	1879-1890
TX	FORT GRIFFON	52-0248	DLY	32.9328	-99.2292	1211	FORTS	1877-1882
TX	FORT GRIFFON	52-3265	DLY	32.9272	-99.2328	1284	FORTS	1869-1880
TX	FORT MCKAVETT	52-3257	DLY	30.8269	-100.1075	2172	FORTS	1877-1883
TX	FORT MCKAVETT	41-3270	DLY	30.9303	-100.1125	2215	NCEI	1852-1880
TX	FORT RINGGOLD	52-7623	DLY	26.3761	-98.8078	166	FORTS	1849-1893
TX	FORT STOCKTON	52-3280	DLY	30.8881	-102.8747	2952	FORTS	1859-1886
TX	FORT STOCKTON-PECOS CO APT	55-0110	HLY	30.9119	-102.9167	3010	NCEI	1996-2007
TX	FORT STOCKTON-PECOS CO APT	56-0189	HLY	30.9119	-102.9167	3010	NCEI	2007-2017
TX	FORT WORTH 12.5 NW	69-2454	DLY	32.8746	-97.4433	686	NCEI	2011-2017
TX	FORT WORTH NAVAL AIR STATION	64-0363	DLY	32.7670	-97.4500	608	NCEI	1971-2016
TX	FOWLERTON	41-3299	DLY	28.5033	-98.8392	299	NCEI	1913-2013
TX	FRANKLIN	41-3321	DLY	31.0328	-96.4889	466	NCEI	1962-2013
TX	FREDERICKSBURG	41-3329	HLY	30.2392	-98.9089	1685	NCEI	1940-1975

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TX	FREDERICKSBURG	41-3329	DLY	30.2392	-98.9089	1686	NCEI	1896-2017
TX	FREDERICKSBURG 10 SSE	63-0154	15M	30.1429	-98.8069	1795	LCRA	2005-2018
TX	FREDERICKSBURG 10 SSE	63-0154	HLY	30.1429	-98.8069	1795	LCRA	2001-2018
TX	FREEPORT	99-3340	DLY	28.9844	-95.3808	7	NCEI	1920-1930
TX	FREEPORT 2 NW	41-3340	DLY	28.9844	-95.3808	7	NCEI	1931-2017
TX	FREER	41-3341	DLY	27.8722	-98.6175	561	NCEI	1947-2017
TX	FRIONA	41-3368	DLY	34.6400	-102.7231	4009	NCEI	1927-2017
TX	FRISCO	66-3370	15M	33.1924	-96.7930	747	NCEI	2013-2017
TX	FRISCO	41-3370	HLY	33.1925	-96.7931	747	NCEI	1966-2013
TX	FRISCO	41-3370	DLY	33.1925	-96.7931	748	NCEI	1966-2017
TX	FROST	41-3379	DLY	32.0833	-96.8000	522	NCEI	1946-1985
TX	FROST 1.3 WNW	69-2254	DLY	32.0838	-96.8293	509	NCEI	2007-2016
TX	FT DAVIS	41-3262	DLY	30.5997	-103.8869	4865	NCEI	1902-2017
TX	FT GRIFFIN	41-3265	DLY	32.9236	-99.2225	1227	NCEI	1989-2017
TX	FT HANCOCK 8SSE	41-3266	DLY	31.1853	-105.7414	3502	NCEI	1966-2017
TX	FT HOOD	79-0021	DLY	31.1333	-97.7167	925	NCEI	1961-2014
TX	FT MC INTOSH	41-3267	HLY	27.5000	-99.5167	459	NCEI	1940-1943
TX	FT MC INTOSH	41-3267	DLY	27.5000	-99.5167	459	NCEI	1897-1931
TX	FT MCKAVETT	41-3257	DLY	30.8275	-100.1103	2168	NCEI	1877-2017
TX	FT MCKAVETT 7 N	66-3270	15M	30.9302	-100.1125	2215	NCEI	2013-2017
TX	FT MCKAVETT 7 N	41-3270	15M	30.9303	-100.1125	2215	NCEI	1971-2013
TX	FT MCKAVETT 7 N	41-3270	HLY	30.9303	-100.1125	2215	NCEI	1961-2013
TX	FT STOCKTON	41-3280	HLY	30.9072	-102.9153	3038	NCEI	1955-1960
TX	FT STOCKTON	41-3280	DLY	30.9072	-102.9153	3038	NCEI	1940-2017
TX	FT STOCKTON 1	41-3277	DLY	30.8833	-102.8833	3051	NCEI	1897-1948
TX	FT STOCKTON 35 SSW	41-3278	HLY	30.3833	-103.0333	4393	NCEI	1958-1987
TX	FT STOCKTON PECOS AP	79-0126	DLY	30.9119	-102.9167	3009	NCEI	1998-2017
TX	FT WORTH BOTANIC GDN	41-3290	DLY	32.7342	-97.3678	591	NCEI	2009-2017
TX	FT WORTH MEACHAM	99-3284	HLY	32.8192	-97.3614	687	NCEI	1940-1942
TX	FT WORTH MEACHAM FLD	78-0038	15M	32.8192	-97.3614	687	NCEI	2005-2017
TX	FT WORTH MEACHAM FLD	41-3284	15M	32.8192	-97.3614	687	NCEI	1971-2001
TX	FT WORTH MEACHAM FLD	41-3284	HLY	32.8192	-97.3614	687	NCEI	1940-2013
TX	FT WORTH MEACHAM FLD	79-0089	DLY	32.8192	-97.3614	686	NCEI	1946-2017

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TX	FT WORTH MEACHAM INTL ARPT	55-0085	HLY	32.8190	-97.3610	706	NCEI	1997-2007
TX	FT WORTH MEACHAM INTL ARPT	56-0162	HLY	32.8190	-97.3610	706	NCEI	2007-2017
TX	FT WORTH NAS	79-0077	DLY	32.7667	-97.4500	607	NCEI	1949-2017
TX	FT WORTH VICKERY BLV	41-3286	DLY	32.7333	-97.3333	659	NCEI	1953-1966
TX	FT WORTH WB AP	41-3283	HLY	32.8333	-97.0500	574	NCEI	1940-1984
TX	FT WORTH WB CITY	99-0001	HLY	32.7493	-97.3334	624	NCEI	1899-1940
TX	FT WORTH WSFO	66-3285	15M	32.8338	-97.2975	644	NCEI	2013-2017
TX	FT WORTH WSFO	41-3285	15M	32.8339	-97.2975	644	NCEI	1971-2013
TX	FT WORTH WSFO	41-3285	HLY	32.8339	-97.2975	644	NCEI	1948-2013
TX	FT WORTH WSFO	41-3285	DLY	32.8339	-97.2975	643	NCEI	1948-2017
TX	FUNK RCH	41-3401	DLY	31.4775	-100.7978	2070	NCEI	1948-2004
TX	G BUSH INTERCONTINENTAL AP/HO	64-0236	HLY	29.9800	-95.3600	95	NCEI	1972-2016
TX	G BUSH INTERCONTINENTAL AP/HOU	56-0124	HLY	29.9800	-95.3600	105	NCEI	2007-2017
TX	GAGEBY 3 WNW	66-3410	15M	35.6317	-100.3923	2778	NCEI	2013-2017
TX	GAGEBY 3 WNW	41-3410	15M	35.6317	-100.3922	2778	NCEI	1971-2013
TX	GAGEBY 3 WNW	41-3410	HLY	35.6317	-100.3922	2778	NCEI	1941-2013
TX	GAIL	41-3411	DLY	32.7744	-101.4539	2530	NCEI	1897-2017
TX	GAINESVILLE	66-3415	15M	33.6358	-97.1447	780	NCEI	2014-2017
TX	GAINESVILLE	41-3415	15M	33.6358	-97.1447	780	NCEI	1971-2013
TX	GAINESVILLE	41-3415	HLY	33.6358	-97.1447	780	NCEI	1941-2013
TX	GAINESVILLE	41-3415	DLY	33.6358	-97.1447	781	NCEI	1897-1987
TX	GALVESTON	99-3430	HLY	29.3048	-94.7934	4	NCEI	1892-1948
TX	GALVESTON	41-3430	HLY	29.3048	-94.7934	10	NCEI	1940-2011
TX	GALVESTON	41-3431	HLY	29.2733	-94.8592	5	NCEI	1948-2013
TX	GALVESTON	52-3430	DLY	29.3072	-94.7917	6	FORTS	1865-1892
TX	GALVESTON	79-0055	DLY	29.3048	-94.7934	7	NCEI	1897-2011
TX	GALVESTON SCHOLES FLD	79-0047	DLY	29.2733	-94.8592	7	NCEI	1946-2017
TX	GARDEN CITY	41-3445	DLY	31.8667	-101.4814	2654	NCEI	1912-2013
TX	GARDEN CITY 16 E	41-3446	HLY	31.8333	-101.2000	2461	NCEI	1949-1973
TX	GARLINGTON RCH	41-3462	HLY	31.9167	-100.8833	2621	NCEI	1943-1949
TX	GARNERS BYU AT BELTWAY 8	60-0116	15M	29.9344	-95.2341	38	HCFCD	1986-2017
TX	GATESVILLE	41-3485	DLY	31.4144	-97.7019	827	NCEI	1900-2017
TX	GATESVILLE 12.0 SE	69-1150	DLY	31.3371	-97.5704	764	NCEI	2011-2017

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TX	GEORGE WEST 2 SSW	41-3508	DLY	28.3064	-98.1222	226	NCEI	1916-2017
TX	GEORGETOWN	41-3506	DLY	30.6333	-97.6833	748	NCEI	1896-1983
TX	GEORGETOWN LAKE	66-3507	15M	30.6763	-97.7208	874	NCEI	2013-2017
TX	GEORGETOWN LAKE	41-3507	15M	30.6764	-97.7208	874	NCEI	1984-2013
TX	GEORGETOWN LAKE	41-3507	HLY	30.6764	-97.7208	874	NCEI	1981-2013
TX	GEORGETOWN LAKE	41-3507	DLY	30.6836	-97.7172	840	NCEI	1981-2017
TX	GIDDINGS 5E	41-3525	DLY	30.1872	-96.8594	436	NCEI	1940-2017
TX	GILLELAND CRK NR MANOR	63-0203	15M	30.2978	-97.5681	460	LCRA	2005-2018
TX	GILMER	76-0058	HLY	32.7017	-94.9447	500	RAWS	2002-2015
TX	GILMER (RAWS)	85-0512	HLY	32.7017	-94.9447	390	HADS	2002-2017
TX	GILMER 4 WNW	41-3546	15M	32.7464	-95.0497	390	NCEI	1979-2012
TX	GILMER 4 WNW	41-3546	HLY	32.7464	-95.0497	390	NCEI	1941-2013
TX	GILMER 4 WNW	41-3546	DLY	32.7464	-95.0497	390	NCEI	1929-2012
TX	GLADEWATER 3 WSW	41-3565	DLY	32.5269	-94.9600	243	NCEI	1946-1976
TX	GLEN ROSE 2 W	41-3591	DLY	32.2342	-97.7853	656	NCEI	1963-2000
TX	GOLD	41-3605	DLY	30.3481	-98.6861	1640	NCEI	1948-2017
TX	GOLDTHWAITE 1 WSW	41-3614	DLY	31.4403	-98.5903	1506	NCEI	1923-2017
TX	GOLDTHWAITE 10 ENE	63-0249	HLY	31.4744	-98.4118	1424	LCRA	2006-2018
TX	GOLIAD	41-3618	DLY	28.6617	-97.3850	141	NCEI	1912-2014
TX	GOLIAD 1 E	41-3620	DLY	28.6703	-97.3778	171	NCEI	1949-2005
TX	GONZALES 1N	99-3622	DLY	29.5175	-97.4597	381	NCEI	1904-1939
TX	GONZALES 1N	41-3622	DLY	29.5175	-97.4597	381	NCEI	1915-2017
TX	GOOSE CREEK	41-3640	DLY	29.7333	-94.9667	23	NCEI	1921-1956
TX	GORDON 1SW	41-3639	DLY	32.5408	-98.3814	1020	NCEI	1991-2013
TX	GORDONVILLE	41-3642	15M	33.7953	-96.8531	722	NCEI	1977-2013
TX	GORDONVILLE	41-3642	HLY	33.7953	-96.8531	722	NCEI	1942-2013
TX	GORDONVILLE	41-3642	DLY	33.7953	-96.8531	722	NCEI	1948-2013
TX	GORDONVILLE 3.3 NNW	69-1377	DLY	33.8364	-96.8817	689	NCEI	2013-2017
TX	GORMAN 2 NNE	41-3646	HLY	32.2422	-98.6631	1380	NCEI	1951-1999
TX	GORMAN 2 NNE	41-3646	DLY	32.2422	-98.6631	1381	NCEI	1951-1999
TX	GRAHAM	41-3668	DLY	33.1203	-98.5669	1079	NCEI	1897-2015
TX	GRANDFALLS 3SSE	41-3680	DLY	31.3028	-102.8222	2425	NCEI	1909-2015
TX	GRANGER	41-3685	DLY	30.7150	-97.4483	571	NCEI	1968-2012

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	GRANGER DAM	66-3686	15M	30.7188	-97.3211	555	NCEI	2013-2017
TX	GRANGER DAM	41-3686	15M	30.7189	-97.3211	555	NCEI	1984-2013
TX	GRANGER DAM	41-3686	HLY	30.7189	-97.3211	555	NCEI	1980-2013
TX	GRANGER DAM	41-3686	DLY	30.7189	-97.3211	554	NCEI	1980-2017
TX	GRAPELAND	41-3689	DLY	31.4833	-95.4833	479	NCEI	1935-1975
TX	GRAPEVINE DAM	66-3691	15M	32.9506	-97.0553	585	NCEI	2013-2017
TX	GRAPEVINE DAM	41-3691	15M	32.9506	-97.0553	585	NCEI	1971-2013
TX	GRAPEVINE DAM	41-3691	HLY	32.9506	-97.0553	585	NCEI	1949-2013
TX	GRAPEVINE DAM	41-3691	DLY	32.9506	-97.0553	584	NCEI	1897-2017
TX	GREENS BYU AT MT HOUSTON PKWY	60-0104	15M	29.8920	-95.2380	24	HCFCD	1992-2017
TX	GREENVILLE KGVL RADIO	41-3734	DLY	33.1678	-96.0983	545	NCEI	1900-2017
TX	GROESBECK	41-3770	DLY	31.5167	-96.5333	469	NCEI	1963-1975
TX	GROESBECK 2	41-3771	15M	31.5253	-96.5306	465	NCEI	1977-2013
TX	GROESBECK 2	41-3771	HLY	31.5253	-96.5306	465	NCEI	1977-2013
TX	GROVETON	41-3778	DLY	31.0611	-95.1344	351	NCEI	1923-2004
TX	GRUVER	41-3787	DLY	36.2631	-101.4050	3169	NCEI	1941-2017
TX	GUADALUPE BOWL RAWS	85-0504	HLY	31.9250	-104.8253	7874	HADS	1999-2017
TX	GUADALUPE MOUNTAINS NATIONAL P	54-0213	DLY	31.9069	-104.8050	5594	NADP	1984-2015
TX	GUADALUPE RIVER AT VICTORIA	85-0859	HLY	28.7928	-97.0128	79	HADS	1995-2017
TX	GUADELUPE PEAK	76-0061	HLY	31.9250	-104.8253	7755	RAWS	1985-2015
TX	GUM GULLY AT DIAMOND HD BLVD	60-0122	15M	29.9110	-95.0904	15	HCFCD	1986-2017
TX	GUNTER 5 S	41-3822	DLY	33.3750	-96.7611	735	NCEI	1948-2000
TX	GUTHRIE	41-3828	DLY	33.6267	-100.3369	1759	NCEI	1947-2017
TX	HAGANSPORT	41-3846	DLY	33.3361	-95.2486	361	NCEI	1909-2009
TX	HALL RCH	41-3871	HLY	30.1333	-99.6000	2280	NCEI	1940-1976
TX	HALLETTSVILLE 2 N	41-3873	DLY	29.4706	-96.9397	276	NCEI	1893-2017
TX	HALLS BYU AT AIRLINE DR	60-0115	15M	29.8927	-95.3969	75	HCFCD	1986-2017
TX	HAMILTON 2E	41-3884	DLY	31.7044	-98.0853	1125	NCEI	1915-2016
TX	HAMLIN 0.6 WSW	69-1803	DLY	32.8855	-100.1421	1732	NCEI	2013-2017
TX	HAMLIN 1SW	41-3890	DLY	32.8694	-100.1211	1719	NCEI	1910-2014
TX	HARLETON	41-3941	DLY	32.6761	-94.5781	344	NCEI	1949-2013
TX	HARLETON 2.5 S	69-1687	DLY	32.6407	-94.5707	374	NCEI	2011-2013
TX	HARLINGEN	41-3943	DLY	26.2028	-97.6728	39	NCEI	1911-2017

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TX	HARLINGEN RIO GRANDE AP	79-0034	DLY	26.2281	-97.6542	33	NCEI	1952-2017
TX	HARPER 1W	41-3954	DLY	30.3011	-99.2681	2060	NCEI	1909-2017
TX	HARRY STONE PARK - MILLMAR DR	81-0016	15M	32.8261	-96.6753	528	COD	1991-2016
TX	HART	41-3972	DLY	34.3697	-102.1175	3665	NCEI	1947-2017
TX	HARTLEY	41-3979	DLY	35.8783	-102.3850	3888	NCEI	2005-2017
TX	HARTLEY 4 ESE	41-3981	DLY	35.8656	-102.3319	3904	NCEI	1893-2014
TX	HASKELL	41-3992	DLY	33.1497	-99.7350	1578	NCEI	1893-2017
TX	HAWKINS	41-4020	DLY	32.5781	-95.2033	335	NCEI	1924-2017
TX	HAWLEY 3 NE	41-4026	DLY	32.6500	-99.7333	1650	NCEI	1973-1994
TX	HEARNE MUNICIPAL AIRPORT	55-0149	HLY	30.8720	-96.6220	285	NCEI	2003-2007
TX	HEARNE MUNICIPAL AIRPORT	56-0235	HLY	30.8719	-96.6222	285	NCEI	2007-2017
TX	HEARNE MUNICIPAL AIRPORT	64-0042	HLY	30.8720	-96.6220	285	NCEI	2006-2016
TX	HEBBRONVILLE	41-4058	DLY	27.3194	-98.6775	581	NCEI	1905-2017
TX	HEMPHILL	41-4076	DLY	31.3500	-93.8333	299	NCEI	1967-1992
TX	HEMPHILL 6 NE	41-4077	DLY	31.4072	-93.7842	180	NCEI	1992-2011
TX	HEMPSTEAD	41-4080	DLY	30.1000	-96.0833	253	NCEI	1903-1978
TX	HENDERSON	41-4081	DLY	32.1808	-94.7964	420	NCEI	1908-2017
TX	HENLY	41-4088	DLY	30.2000	-98.2167	1270	NCEI	1948-1965
TX	HENRIETTA	41-4093	DLY	33.8128	-98.2003	932	NCEI	1897-2006
TX	HEREFORD	41-4098	15M	34.8172	-102.4003	3820	NCEI	1971-2013
TX	HEREFORD	41-4098	HLY	34.8172	-102.4003	3820	NCEI	1955-2013
TX	HEREFORD	41-4098	DLY	34.8172	-102.4003	3819	NCEI	1905-2017
TX	HEREFORD 1 SE	41-4100	HLY	34.8167	-102.4000	3822	NCEI	1941-1955
TX	HEWITT	99-4122	DLY	31.4667	-97.2000	659	NCEI	1894-1899
TX	HEWITT	41-4122	DLY	31.4667	-97.2000	659	NCEI	1879-2003
TX	HICO	41-4137	15M	31.9844	-98.0311	1043	NCEI	1977-2009
TX	HICO	41-4137	HLY	31.9844	-98.0311	1043	NCEI	1977-2009
TX	HICO	41-4137	DLY	31.9844	-98.0311	1043	NCEI	1910-2009
TX	HIGGINS	41-4140	DLY	36.1161	-100.0239	2566	NCEI	1907-2017
TX	HILL'S RANCH	41-4185	DLY	30.2333	-97.6833	476	NCEI	1916-1930
TX	HILLSBORO	41-4182	DLY	32.0161	-97.1094	551	NCEI	1903-2017
TX	HINDES	41-4191	15M	28.7167	-98.8000	360	NCEI	1977-1999
TX	HINDES	41-4191	HLY	28.7167	-98.8000	360	NCEI	1940-1999

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TX	HONDO	41-4254	DLY	29.3364	-99.1383	876	NCEI	1899-2017
TX	HONDO MUNI AP	41-4256	HLY	29.3600	-99.1742	920	NCEI	1996-2013
TX	HONDO MUNI AP	79-0062	DLY	29.3600	-99.1742	919	NCEI	1975-2017
TX	HONDO MUNICIPAL AIRPORT	55-0054	HLY	29.3601	-99.1742	915	NCEI	1996-2007
TX	HONDO MUNICIPAL AIRPORT	56-0126	HLY	29.3590	-99.1740	930	NCEI	2007-2017
TX	HONEY GROVE	66-4257	15M	33.5841	-95.8994	664	NCEI	2013-2017
TX	HONEY GROVE	41-4257	15M	33.5842	-95.8994	664	NCEI	1971-2013
TX	HONEY GROVE	41-4257	HLY	33.5842	-95.8994	664	NCEI	1944-2013
TX	HONEY GROVE	41-4257	DLY	33.5842	-95.8994	663	NCEI	1898-2017
TX	HONEY GROVE 2	41-4258	15M	33.5833	-95.9000	659	NCEI	1972-1975
TX	HONEY GROVE 2	41-4258	HLY	33.5833	-95.9000	659	NCEI	1972-1975
TX	HOOD AAF AIRPORT	64-0337	HLY	31.1330	-97.7170	924	NCEI	1999-2016
TX	HOOD AAF AIRPORT	64-0337	DLY	31.1330	-97.7170	924	NCEI	1978-2016
TX	HORDS CK LAKE	85-0556	HLY	31.8328	-99.5606	1903	HADS	1998-2017
TX	HORDS CREEK DAM	41-4278	HLY	31.8456	-99.5606	1942	NCEI	1956-2003
TX	HORDS CREEK DAM	41-4278	DLY	31.8456	-99.5606	1942	NCEI	1953-2017
TX	HORDS CRK LAKE NR VALERA	63-0017	HLY	31.8329	-99.5609	1906	LCRA	2008-2018
TX	HORGER	41-4280	DLY	31.0000	-94.1667	112	NCEI	1944-1982
TX	HOT SPRINGS	41-4299	DLY	29.1833	-103.0000	1990	NCEI	1939-1951
TX	HOUSTON ADDICKS	41-4309	15M	29.7689	-95.6439	91	NCEI	1984-1997
TX	HOUSTON ADDICKS	41-4309	HLY	29.7689	-95.6439	91	NCEI	1943-2013
TX	HOUSTON ALIEF	41-4311	15M	29.7147	-95.5947	71	NCEI	1984-1997
TX	HOUSTON ALIEF	41-4311	HLY	29.7147	-95.5947	71	NCEI	1940-2013
TX	HOUSTON ALIEF	41-4311	DLY	29.7147	-95.5947	72	NCEI	1948-1964
TX	HOUSTON BARKER	41-4313	HLY	29.8142	-95.7275	127	NCEI	1943-1948
TX	HOUSTON BARKER	41-4313	DLY	29.8142	-95.7275	128	NCEI	1943-2013
TX	HOUSTON BUSH INTL AP	41-4300	HLY	29.9800	-95.3600	95	NCEI	1970-2013
TX	HOUSTON DEER PARK	41-4315	DLY	29.7283	-95.1306	36	NCEI	1945-2011
TX	HOUSTON FAIRBANKS	41-3043	DLY	29.8000	-95.5000	89	NCEI	1947-1948
TX	HOUSTON FAIRBANKS	41-4317	DLY	29.8000	-95.5167	89	NCEI	1943-1954
TX	HOUSTON HEIGHTS	41-4321	DLY	29.7914	-95.4261	66	NCEI	1948-2012
TX	HOUSTON HOBBY AP	99-4307	DLY	29.6381	-95.2819	44	NCEI	1942-1946
TX	HOUSTON HOBBY AP	79-0042	DLY	29.6381	-95.2819	43	NCEI	1930-2017

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TX	HOUSTON INDEP HTS	41-4323	DLY	29.8667	-95.4167	92	NCEI	1943-1995
TX	HOUSTON INTERCONT AP	79-0061	DLY	29.9800	-95.3600	95	NCEI	1969-2017
TX	HOUSTON NORTH HOUSTON	41-4327	DLY	29.8733	-95.5275	112	NCEI	1947-2017
TX	HOUSTON SAN JACINTO DA	41-4328	DLY	29.9167	-95.1500	59	NCEI	1954-1996
TX	HOUSTON SATSUMA	41-4329	15M	29.9333	-95.6333	122	NCEI	1984-1990
TX	HOUSTON SATSUMA	41-4329	HLY	29.9333	-95.6333	122	NCEI	1940-1990
TX	HOUSTON SATSUMA	41-4329	DLY	29.9333	-95.6333	121	NCEI	1948-1964
TX	HOUSTON SPRING BRANCH	41-4331	DLY	29.8042	-95.4914	92	NCEI	1954-2000
TX	HOUSTON SUGARLAND MEM	79-0069	DLY	29.6222	-95.6564	82	NCEI	2000-2017
TX	HOUSTON WB CITY	99-4305	HLY	29.7622	-95.3593	37	NCEI	1909-1940
TX	HOUSTON WB CITY	41-4305	HLY	29.7622	-95.3593	52	NCEI	1940-1970
TX	HOUSTON WB CITY	99-4305	DLY	29.7622	-95.3593	52	NCEI	1883-1909
TX	HOUSTON WB CITY	79-0056	DLY	29.7622	-95.3593	52	NCEI	1883-1990
TX	HOUSTON-PORT	41-4326	DLY	29.7456	-95.2800	20	NCEI	1991-2014
TX	HOUSTON-WESTBURY	41-4325	DLY	29.6600	-95.6275	49	NCEI	1948-2017
TX	HUCKABAY	41-4343	DLY	32.3389	-98.2972	1414	NCEI	1963-2010
TX	HUDSPETH RIVER RANCH	41-4348	DLY	30.0050	-101.1772	1631	NCEI	1988-2017
TX	HUMBLE	41-4362	DLY	30.0000	-95.2500	102	NCEI	1954-1985
TX	HUMBLE PUMP STN 5 WN	41-4363	DLY	30.3606	-100.3056	2201	NCEI	1948-2017
TX	HUNT 10 W	66-4375	15M	30.0627	-99.5050	2010	NCEI	2013-2017
TX	HUNT 10 W	41-4375	15M	30.0628	-99.5050	2010	NCEI	1976-2013
TX	HUNT 10 W	41-4375	DLY	30.0628	-99.5050	2011	NCEI	1992-2017
TX	HUNT 3 SW	41-4374	DLY	30.0294	-99.3614	1870	NCEI	1941-1999
TX	HUNTSVILLE	41-4382	DLY	30.7064	-95.5422	495	NCEI	1903-2017
TX	HURST SPRINGS	41-4390	DLY	31.6544	-97.7086	1030	NCEI	1963-2009
TX	HURT	41-4392	HLY	33.2167	-95.9667	679	NCEI	1940-1948
TX	HYATT	41-4397	DLY	30.5667	-94.4000	112	NCEI	1935-1953
TX	HYE	41-4402	DLY	30.2533	-98.5711	1457	NCEI	1948-2017
TX	I-45 - HOV NORTH TRAVIS	60-0219	15M	29.7656	-95.3609	25	HCFCD	2000-2017
TX	I-45 - NORTH MAIN	60-0220	15M	29.7891	-95.3714	46	HCFCD	2000-2017
TX	I-45 - WEST ROAD HOV ENTRANCE	60-0221	15M	29.9203	-95.4125	85	HCFCD	2000-2017
TX	IH 610 - SHIP CHANNEL	60-0226	15M	29.7253	-95.2665	0	HCFCD	2000-2017
TX	IH 610 EL N/B - CLINTON DR.	60-0227	15M	29.7382	-95.2649	25	HCFCD	2011-2017

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TX	IMPERIAL	41-4425	HLY	31.2667	-102.7000	2400	NCEI	1963-1993
TX	IMPERIAL	41-4425	DLY	31.2667	-102.7000	2402	NCEI	1940-1993
TX	INDIAN GAP	41-4440	HLY	31.6667	-98.4167	1575	NCEI	1951-1983
TX	INDIAN GAP	41-4440	DLY	31.6667	-98.4167	1575	NCEI	1943-1983
TX	INGRAM 8.6 WSW	69-1900	DLY	30.0219	-99.3642	1824	NCEI	2007-2017
TX	IOWA PARK EXP STN	41-4471	DLY	33.9167	-98.6500	981	NCEI	1940-1964
TX	IREDELL	66-4476	15M	31.9808	-97.8731	902	NCEI	2014-2017
TX	IREDELL	41-4476	15M	31.9808	-97.8731	902	NCEI	1975-2013
TX	IREDELL	41-4476	HLY	31.9808	-97.8731	902	NCEI	1963-2013
TX	IRON BRG DAM	41-4483	DLY	32.8167	-95.9167	449	NCEI	1975-1993
TX	ITASCA	41-4503	DLY	32.1667	-97.1500	712	NCEI	1940-1949
TX	ITASCA	41-4505	DLY	32.1597	-97.1422	705	NCEI	1992-2017
TX	JACKSBORO	66-4517	15M	33.2205	-98.1561	1082	NCEI	2013-2017
TX	JACKSBORO	41-4517	15M	33.2206	-98.1561	1082	NCEI	2003-2013
TX	JACKSBORO	41-4517	HLY	33.2206	-98.1561	1082	NCEI	1940-2013
TX	JACKSBORO	41-4517	DLY	33.2206	-98.1561	1083	NCEI	1941-2017
TX	JACKSBORO 1 NNE	41-4520	15M	33.2381	-98.1444	1020	NCEI	1977-2003
TX	JACKSBORO 1 NNE	41-4520	HLY	33.2381	-98.1444	1020	NCEI	1977-2003
TX	JACKSBURRO	85-0570	HLY	33.2219	-98.1583	1102	HADS	2013-2017
TX	JACKSONVILLE	41-4525	DLY	31.9622	-95.2736	561	NCEI	1953-2017
TX	JACKSONVILLE EXP STN	41-4524	DLY	31.9833	-95.2833	659	NCEI	1897-1963
TX	JARRELL	41-4556	DLY	30.8472	-97.5994	850	NCEI	1926-2017
TX	JASPER	41-4563	DLY	30.9153	-94.0097	207	NCEI	1878-2017
TX	JAYTON	66-4570	15M	33.2544	-100.5724	2010	NCEI	2013-2018
TX	JAYTON	41-4570	15M	33.2544	-100.5725	2010	NCEI	1971-2013
TX	JAYTON	41-4570	HLY	33.2544	-100.5725	2010	NCEI	1940-2013
TX	JAYTON	41-4570	DLY	33.2544	-100.5725	2011	NCEI	1910-2017
TX	JEDDO 3S	41-4575	DLY	29.7664	-97.3164	417	NCEI	1940-2017
TX	JEFFERSON	41-4577	HLY	32.7692	-94.3592	211	NCEI	1944-1978
TX	JEFFERSON	41-4577	DLY	32.7692	-94.3558	207	NCEI	1903-2017
TX	JEFFERSON BLVD - IRA AVE	81-0038	15M	32.7475	-96.9164	481	COD	1991-2016
TX	JEWETT	41-4591	HLY	31.3500	-96.1500	510	NCEI	1941-1991
TX	JEWETT	41-4591	DLY	31.3500	-96.1500	509	NCEI	1904-1991

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TX	JOE POOL LAKE	41-4597	HLY	32.6406	-96.9747	591	NCEI	2007-2013
TX	JOE POOL LAKE	41-4597	DLY	32.6406	-96.9747	591	NCEI	1984-2017
TX	JOHNSON CITY	41-4605	DLY	30.2861	-98.4089	1188	NCEI	1964-2017
TX	JOLLYVILLE 2 SW	63-0187	15M	30.4208	-97.7975	731	LCRA	2005-2018
TX	JONES CB RCH	41-4627	DLY	30.8167	-100.1333	2090	NCEI	1948-1964
TX	JOURDANTON	41-4647	DLY	28.9122	-98.5425	518	NCEI	1916-2011
TX	JOURDANTON 0.6 NW	69-0574	DLY	28.9202	-98.5475	472	NCEI	2014-2017
TX	JUDKINS	41-4661	DLY	31.7167	-102.6333	2904	NCEI	1943-1955
TX	JUNCTION 4SSW	66-4670	15M	30.4452	-99.8044	1747	NCEI	2013-2018
TX	JUNCTION 4SSW	41-4670	15M	30.4453	-99.8044	1747	NCEI	1971-2013
TX	JUNCTION 4SSW	41-4670	HLY	30.4453	-99.8044	1747	NCEI	1940-2013
TX	JUNCTION 4SSW	41-4670	DLY	30.4453	-99.8045	1749	NCEI	1897-2017
TX	JUNCTION KIMBLE CO AP	79-0094	DLY	30.5108	-99.7664	1749	NCEI	1948-2017
TX	JUSTIN	66-4679	15M	33.0805	-97.2966	640	NCEI	2013-2017
TX	JUSTIN	41-4679	15M	33.0806	-97.2967	640	NCEI	1971-2013
TX	JUSTIN	41-4679	HLY	33.0806	-97.2967	640	NCEI	1954-2013
TX	JUSTIN	41-4679	DLY	33.0806	-97.2967	640	NCEI	2001-2017
TX	KARNACK	41-4693	DLY	32.6664	-94.1781	256	NCEI	1942-2008
TX	KARNES CITY 2N	41-4696	DLY	28.9069	-97.8756	449	NCEI	1919-2006
TX	KATY 6.0 ENE	69-1674	DLY	29.8207	-95.7256	131	NCEI	2013-2014
TX	KATY 6.2 ESE	69-1627	DLY	29.7495	-95.7355	105	NCEI	2009-2013
TX	KATY CITY	41-4704	HLY	29.8025	-95.8197	153	NCEI	1940-1946
TX	KATY CITY	41-4704	DLY	29.8025	-95.8197	154	NCEI	1952-2017
TX	KAUFMAN 2.9 S	69-1823	DLY	32.5407	-96.3160	430	NCEI	1998-2017
TX	KAUFMAN 3 SE	41-4705	DLY	32.5589	-96.2725	420	NCEI	1901-2012
TX	KELLY FLD	41-4731	HLY	29.3833	-98.5667	682	NCEI	1941-1942
TX	KENT 5 E	41-4767	DLY	31.0667	-104.1500	4183	NCEI	1893-1976
TX	KENT 8SE	41-4770	DLY	31.0158	-104.1108	4603	NCEI	1988-2017
TX	KERRVILLE	99-4780	DLY	30.0500	-99.1500	1640	NCEI	1895-1901
TX	KERRVILLE	41-4780	DLY	30.0500	-99.1500	1640	NCEI	1897-1974
TX	KERRVILLE 3 NNE	41-4782	DLY	30.0747	-99.1081	1785	NCEI	1974-2017
TX	KILLEEN	41-4792	HLY	31.0658	-97.6919	815	NCEI	1978-2003
TX	KILLEEN	41-4791	DLY	31.1167	-97.7000	801	NCEI	1912-1978

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TX	KILLEEN	41-4792	DLY	31.0658	-97.6919	814	NCEI	1978-2017
TX	KIMBLE COUNTY AIRPORT	55-0089	HLY	30.5110	-99.7660	1693	NCEI	1997-2007
TX	KIMBLE COUNTY AIRPORT	56-0166	HLY	30.5108	-99.7664	1749	NCEI	2007-2017
TX	KINGSVILLE	41-4810	DLY	27.5311	-97.8497	56	NCEI	1902-2017
TX	KINGSVILLE 6.5 SSE	69-1828	DLY	27.4214	-97.8236	59	NCEI	2007-2017
TX	KINGSVILLE NAAS	79-0051	DLY	27.5000	-97.8167	56	NCEI	1945-2017
TX	KIRBYVILLE	41-4819	DLY	30.6167	-93.9167	200	NCEI	1929-1999
TX	KIRBYVILLE 1.5 SE	69-1806	DLY	30.6405	-93.8851	118	NCEI	2007-2017
TX	KNAPP 2 SW	41-4841	DLY	32.6258	-101.1503	2290	NCEI	1931-2013
TX	KNICKERBOCKER	41-4848	DLY	31.2667	-100.6333	2051	NCEI	1904-1932
TX	KNICKERBOCKER 3.2 SW	69-2393	DLY	31.2467	-100.6723	2087	NCEI	2008-2017
TX	KNOX CITY	41-4852	DLY	33.4167	-99.8167	1532	NCEI	1935-1965
TX	KOPPERL 5 NNE	41-4866	15M	32.1347	-97.4786	620	NCEI	1978-2010
TX	KOPPERL 5 NNE	41-4866	HLY	32.1347	-97.4786	620	NCEI	1940-2010
TX	KOPPERL 5 NNE	41-4866	DLY	32.1347	-97.4786	620	NCEI	1900-2009
TX	KOUNTZE	41-4876	HLY	30.4000	-94.3333	89	NCEI	1980-1983
TX	KOUNTZE	41-4878	HLY	30.3750	-94.2994	61	NCEI	1940-1979
TX	KOUNTZE	41-4878	DLY	30.3750	-94.2994	62	NCEI	1948-2017
TX	KRESS	66-4880	15M	34.3708	-101.7483	3480	NCEI	2013-2018
TX	KRESS	41-4880	15M	34.3708	-101.7483	3480	NCEI	1978-2013
TX	KRESS	41-4880	HLY	34.3708	-101.7483	3480	NCEI	1940-2013
TX	L.B.J. NATIONAL GRASSLANDS	54-0219	DLY	33.3917	-97.6397	1024	NADP	1983-2015
TX	LA GRANGE	76-0072	HLY	29.9075	-96.8600	155	RAWS	2000-2015
TX	LA GRANGE	41-4903	DLY	29.9175	-96.8769	358	NCEI	1910-2014
TX	LA JOYA	41-4911	DLY	26.2422	-98.3992	180	NCEI	1995-2017
TX	LA PRYOR	66-4920	15M	28.9838	-99.8684	782	NCEI	2013-2017
TX	LA PRYOR	41-4920	15M	28.9831	-99.8686	759	NCEI	1976-2013
TX	LA PRYOR	41-4920	HLY	28.9831	-99.8686	759	NCEI	1940-2013
TX	LA PRYOR	41-4920	DLY	28.9831	-99.8686	758	NCEI	1915-2017
TX	LA TUNA 1 S	41-4931	DLY	31.9800	-106.5975	3799	NCEI	1943-2012
TX	LACKLAND AIR FORCE BASE (KELL	64-0301	DLY	29.3830	-98.5830	690	NCEI	1971-2016
TX	LACKLAND AIR FORCE BASE (KELLY	56-0103	HLY	29.3840	-98.5810	691	NCEI	2007-2017
TX	LADY BIRD LAKE NR LONGHORN DAM	63-0193	15M	30.2493	-97.7203	440	LCRA	2005-2018

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	LADY BIRD LAKE NR LONGHORN DAM	63-0193	HLY	30.2493	-97.7203	440	LCRA	1999-2018
TX	LAGUNA VISTA 0.3 N	69-1119	DLY	26.1047	-97.2927	10	NCEI	2011-2017
TX	LAJITAS	41-4950	DLY	29.2694	-103.7575	2402	NCEI	1978-2017
TX	LAKE ABILENE STATE PARK	41-4960	DLY	32.2403	-99.8792	1972	NCEI	1962-2017
TX	LAKE ALAN HENRY	41-4967	DLY	33.0642	-101.0489	2280	NCEI	1994-2017
TX	LAKE ANAHUAC CLCND	82-2250	15M	29.7736	-94.6871	5	DD6	2007-2017
TX	LAKE BOB SANDLIN	53-0001	DLY	33.0826	-95.0008	338	TCWS	1992-2015
TX	LAKE BRIDGEPORT DAM	66-4972	15M	33.2250	-97.8316	870	NCEI	2013-2017
TX	LAKE BRIDGEPORT DAM	41-4972	15M	33.2250	-97.8317	870	NCEI	1976-2013
TX	LAKE BRIDGEPORT DAM	41-4972	HLY	33.2250	-97.8317	870	NCEI	1946-2013
TX	LAKE BRIDGEPORT DAM	41-4972	DLY	33.2250	-97.8317	869	NCEI	1940-2017
TX	LAKE COLORADO CITY	41-4974	HLY	32.3333	-100.9167	2100	NCEI	1954-1993
TX	LAKE COLORADO CITY	41-4974	DLY	32.3333	-100.9167	2100	NCEI	1954-1993
TX	LAKE CROCKETT	41-4975	15M	33.7411	-95.9217	530	NCEI	1973-2013
TX	LAKE CROCKETT	41-4975	HLY	33.7411	-95.9217	530	NCEI	1973-2013
TX	LAKE GEORGETOWN	85-0509	HLY	30.6675	-97.7106	810	HADS	2000-2017
TX	LAKE JUNE BRANCH - ST AUGUSTIN	81-0021	15M	32.7361	-96.6567	469	COD	1991-2016
TX	LAKE KEMP	66-4982	15M	33.7542	-99.1442	1167	NCEI	2013-2017
TX	LAKE KEMP	41-4982	15M	33.7542	-99.1442	1167	NCEI	1984-2013
TX	LAKE KEMP	41-4982	HLY	33.7542	-99.1442	1167	NCEI	1974-2013
TX	LAKE KEMP	41-4982	DLY	33.7542	-99.1442	1168	NCEI	1962-2017
TX	LAKE LBJ AT 1431 BRIDGE	63-0069	HLY	30.6576	-98.4276	840	LCRA	1995-2018
TX	LAKE TAWAKONI	41-4980	DLY	32.8522	-95.8864	449	NCEI	1994-2017
TX	LAKEBRIDGEPORT	83-0021	15M	33.2228	-97.8317	246	TRWD	2003-2016
TX	LAMESA 1 SSE	41-5013	DLY	32.7228	-101.9456	2966	NCEI	1910-2017
TX	LAMPASAS	41-5018	DLY	31.0717	-98.1847	1033	NCEI	1897-2012
TX	LAMPASAS 2.7 ENE	69-2052	DLY	31.0815	-98.1409	1020	NCEI	2009-2017
TX	LAMPASAS RIVER NEAR KEMPER	85-0588	HLY	31.0817	-98.0164	902	HADS	1995-2017
TX	LANGTRY	66-5048	15M	29.8097	-101.5604	1290	NCEI	2013-2017
TX	LANGTRY	41-5048	15M	29.8097	-101.5603	1290	NCEI	1971-2013
TX	LANGTRY	41-5048	HLY	29.8097	-101.5603	1290	NCEI	1942-2013
TX	LANGTRY	41-5048	DLY	29.8097	-101.5603	1289	NCEI	1897-2017
TX	LANGTRY 2	41-5049	HLY	29.8084	-101.5617	1342	NCEI	1965-1969

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TX	LANGTRY 2	41-5049	DLY	29.8084	-101.5617	1342	NCEI	1964-1968
TX	LAREDO	41-5056	DLY	27.5333	-99.4667	499	NCEI	1891-1978
TX	LAREDO 2	41-5060	HLY	27.5683	-99.4983	430	NCEI	1965-1972
TX	LAREDO 2	41-5060	DLY	27.5683	-99.4983	430	NCEI	1946-2017
TX	LAREDO AFB	79-0036	DLY	27.5333	-99.4667	505	NCEI	1965-2017
TX	LAREDO CITY	41-5058	HLY	27.5500	-99.5000	425	NCEI	1943-1944
TX	LAREDO INTERNATIONAL AIRPORT	56-0102	HLY	27.5440	-99.4610	508	NCEI	2007-2017
TX	LAREDO INTERNATIONAL AIRPORT	64-0286	HLY	27.5330	-99.4670	494	NCEI	2008-2016
TX	LAREDO MUNI AP	41-5057	HLY	27.5333	-99.4667	496	NCEI	1944-1965
TX	LAREDO WB AP	79-0044	DLY	27.5333	-99.4667	499	NCEI	1915-1965
TX	LATEX	41-5081	HLY	32.3500	-94.1000	302	NCEI	1942-1963
TX	LATEX	41-5081	DLY	32.3500	-94.1000	302	NCEI	1942-1963
TX	LATIMER RCH	41-5086	DLY	33.8833	-100.3833	1949	NCEI	1971-1994
TX	LAUGHLIN AFB AIRPORT	64-0375	DLY	29.3670	-100.7830	1082	NCEI	1973-2016
TX	LAVON DAM	41-5094	15M	33.0353	-96.4861	510	NCEI	1971-2013
TX	LAVON DAM	41-5094	HLY	33.0353	-96.4861	510	NCEI	1949-2013
TX	LAVON DAM	41-5094	DLY	33.0353	-96.4861	509	NCEI	1949-2017
TX	LAWN	41-5097	DLY	32.1414	-99.7528	1949	NCEI	1948-2010
TX	LEAKEY	66-5113	15M	29.7393	-99.7612	1622	NCEI	2013-2017
TX	LEAKEY	41-5113	15M	29.7392	-99.7611	1622	NCEI	1975-2013
TX	LEAKEY	41-5113	HLY	29.7392	-99.7611	1622	NCEI	1940-2013
TX	LEAKEY	41-5113	DLY	29.7392	-99.7611	1621	NCEI	1894-2017
TX	LEAKEY 2	41-5114	DLY	29.7242	-99.7627	1601	NCEI	1963-1971
TX	LEANDER 5 SW	63-0180	HLY	30.5384	-97.9289	1105	LCRA	1991-2017
TX	LEFORS	85-0608	HLY	35.4417	-100.8114	2831	HADS	1995-2017
TX	LEFORS	87-0043	HLY	35.4333	-100.8000	2831	USBR	1989-2016
TX	LENORAH	41-5158	DLY	32.3081	-101.8775	2844	NCEI	1941-2017
TX	LEVELLAND	41-5183	DLY	33.5500	-102.3758	3514	NCEI	1926-2017
TX	LEWISVILLE	41-5191	DLY	33.0500	-97.0000	489	NCEI	1941-1959
TX	LEWISVILLE DAM	66-5192	15M	33.0694	-97.0094	556	NCEI	2013-2017
TX	LEWISVILLE DAM	41-5192	15M	33.0694	-97.0094	556	NCEI	1984-2013
TX	LEWISVILLE DAM	41-3476	HLY	33.0667	-97.0167	561	NCEI	1949-1964
TX	LEWISVILLE DAM	41-5192	HLY	33.0694	-97.0094	556	NCEI	1964-2013

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TX	LEWISVILLE DAM	41-3476	DLY	33.0667	-97.0167	561	NCEI	1949-1963
TX	LEWISVILLE DAM	41-5192	DLY	33.0694	-97.0094	558	NCEI	1964-2017
TX	LEXINGTON	66-5193	15M	30.4065	-97.0134	423	NCEI	2013-2017
TX	LEXINGTON	41-5193	15M	30.4064	-97.0136	465	NCEI	1978-2013
TX	LEXINGTON	41-5193	HLY	30.4064	-97.0136	465	NCEI	1940-2013
TX	LEXINGTON	41-5193	DLY	30.4064	-97.0136	466	NCEI	1948-2017
TX	LIBERTY	41-5196	DLY	30.0592	-94.7950	36	NCEI	1903-2017
TX	LILLIAN	41-5216	DLY	32.5000	-97.1833	751	NCEI	1940-1959
TX	LILLIAN 3 W	41-5218	DLY	32.5000	-97.2333	745	NCEI	1981-1997
TX	LINDALE 5 SE	41-5228	DLY	32.4500	-95.3667	449	NCEI	1931-1965
TX	LINDEN	41-5229	DLY	33.0161	-94.3675	417	NCEI	1940-2017
TX	LIPAN 4NW	41-5243	DLY	32.5683	-98.0819	988	NCEI	1949-2017
TX	LIPSCOMB	41-5247	15M	36.2358	-100.2675	2450	NCEI	1971-2005
TX	LIPSCOMB	41-5247	HLY	36.2358	-100.2675	2450	NCEI	1940-2005
TX	LIPSCOMB	41-5247	DLY	36.2358	-100.2675	2451	NCEI	1948-2017
TX	LITTLE MOUND CK AT MATHIS RD	60-0091	15M	30.0053	-95.9080	204	HCFCD	1986-2017
TX	LITTLEFIELD	41-5263	DLY	33.9167	-102.3333	3563	NCEI	1916-1966
TX	LITTLEFIELD	41-5265	DLY	33.9378	-102.3447	3576	NCEI	1966-2017
TX	LIVINGSTON 2 NNE	41-5271	DLY	30.7394	-94.9256	177	NCEI	1937-2017
TX	LK HOUSTON DAM SPILLWAY	60-0065	15M	29.9163	-95.1413	42	HCFCD	1986-2017
TX	LLANO	41-5272	DLY	30.7425	-98.6542	1020	NCEI	1893-2017
TX	LLANO 19 SW	63-0106	15M	30.5591	-98.8848	1542	LCRA	2005-2018
TX	LLANO 19 SW	63-0106	HLY	30.5591	-98.8848	1542	LCRA	2000-2018
TX	LLANO GRANDE	41-5274	DLY	26.2000	-97.9500	85	NCEI	1908-1916
TX	LLANO RIVER AT LLANO	63-0114	HLY	30.7512	-98.6697	992	LCRA	1988-2018
TX	LLANO RIVER NR MASON	63-0094	HLY	30.6601	-99.1085	1269	LCRA	1988-2018
TX	LOCKHART	41-5284	DLY	29.8858	-97.6917	548	NCEI	1940-2002
TX	LOCKHART 2SW	41-5285	DLY	29.8569	-97.6958	489	NCEI	1997-2017
TX	LOMA ALTA	41-5303	HLY	29.9173	-100.7794	1903	NCEI	1942-1963
TX	LOMA ALTO	98-0001	DLY	28.1569	-98.5142	436	NCEI	2005-2016
TX	LONDON 3N	41-5312	15M	30.7131	-99.5681	1800	NCEI	1971-2009
TX	LONDON 3N	41-5312	HLY	30.7131	-99.5681	1800	NCEI	1956-2009
TX	LONDON 3N	41-5312	DLY	30.7131	-99.5681	1801	NCEI	1948-2017

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	LONG LAKE 5 SW	41-5327	DLY	31.6167	-95.8500	312	NCEI	1904-1980
TX	LONGVIEW	41-5341	DLY	32.4725	-94.7172	331	NCEI	1902-2017
TX	LONGVIEW #2	41-5344	DLY	32.5183	-94.7189	372	NCEI	2002-2017
TX	LONGVIEW 11 SE	66-5348	15M	32.3466	-94.6533	407	NCEI	2013-2017
TX	LONGVIEW 11 SE	41-5348	15M	32.3467	-94.6533	407	NCEI	1978-2013
TX	LONGVIEW 11 SE	41-5348	HLY	32.3467	-94.6533	407	NCEI	1975-2013
TX	LONGVIEW WSMO	79-0027	DLY	32.3500	-94.6500	407	NCEI	1975-2017
TX	LOOP	41-5351	DLY	32.9000	-102.4167	3245	NCEI	1941-1995
TX	LORAINE	41-5358	HLY	32.4167	-100.7167	2270	NCEI	1940-1984
TX	LORENZO	41-5363	DLY	33.6667	-101.5333	3169	NCEI	1947-1995
TX	LOVELADY	41-5398	HLY	31.1333	-95.4500	302	NCEI	1940-1986
TX	LOVELADY	41-5398	DLY	31.1333	-95.4500	302	NCEI	1948-1986
TX	LTL CYP CK AT CYP ROSEHILL RD	60-0094	15M	30.0159	-95.6974	157	HCFCD	1986-2017
TX	LTL WHT OAK BYU AT TIDWELL RD	60-0056	15M	29.8454	-95.3998	61	HCFCD	1986-2017
TX	LUBBOCK	79-0114	DLY	33.6542	-101.8136	3258	NCEI	1947-2017
TX	LUBBOCK 9 N	66-5410	15M	33.6897	-101.8219	3245	NCEI	2013-2018
TX	LUBBOCK 9 N	41-5410	15M	33.6897	-101.8219	3245	NCEI	1971-2013
TX	LUBBOCK 9 N	41-5410	HLY	33.6897	-101.8219	3245	NCEI	1942-2013
TX	LUBBOCK 9 N	41-5410	DLY	33.6897	-101.8219	3245	NCEI	1911-2017
TX	LUBBOCK INTERNATIONAL AIRPORT	56-0181	HLY	33.6658	-101.8233	3268	NCEI	2007-2017
TX	LUBBOCK INTL AP	41-5411	HLY	33.6658	-101.8233	3268	NCEI	1940-2013
TX	LUFKIN 11 NW	41-5415	DLY	31.4269	-94.8942	217	NCEI	1983-2016
TX	LUFKIN ANGELINA CO AP	79-0159	DLY	31.2361	-94.7544	289	NCEI	1906-2017
TX	LULING	41-5429	HLY	29.6756	-97.6578	400	NCEI	1943-1965
TX	LULING	41-5429	DLY	29.6756	-97.6578	400	NCEI	1901-2017
TX	LYNXHAVEN RCH	41-5449	DLY	29.9667	-99.4500	2001	NCEI	1941-1976
TX	LYTLE 3W	41-5454	DLY	29.2358	-98.8433	722	NCEI	1976-2007
TX	MABANK 4 SW	66-5463	15M	32.3316	-96.1505	360	NCEI	2013-2017
TX	MABANK 4 SW	41-5463	15M	32.3317	-96.1506	360	NCEI	1977-2013
TX	MABANK 4 SW	41-5461	HLY	32.3333	-96.1500	341	NCEI	1940-1977
TX	MABANK 4 SW	41-5463	HLY	32.3317	-96.1506	360	NCEI	1977-2013
TX	MADISONVILLE	41-5477	DLY	30.9392	-95.9203	253	NCEI	1918-2017
TX	MALONE	85-0674	HLY	31.9178	-96.8961	492	HADS	2006-2017

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	MALONE 3ENE	41-5528	HLY	31.9442	-96.8464	485	NCEI	1973-2004
TX	MANCHACA	41-5538	DLY	30.1333	-97.8333	702	NCEI	1948-1965
TX	MARATHON	41-5579	DLY	30.1925	-103.2717	3990	NCEI	1896-2017
TX	MARBLE FALLS	41-5580	DLY	30.5667	-98.2833	771	NCEI	1908-1952
TX	MARBLE FALLS 10 SSW	63-0141	HLY	30.4476	-98.3379	1364	LCRA	1991-2018
TX	MARBLE FALLS 4 WSW	63-0137	HLY	30.5545	-98.3368	790	LCRA	1991-2018
TX	MARBLE FALLS 6 ENE	63-0145	HLY	30.5993	-98.1709	982	LCRA	1991-2018
TX	MARFA 3W	41-5596	15M	30.3125	-104.0722	4790	NCEI	1971-2009
TX	MARFA 3W	41-5596	HLY	30.3125	-104.0722	4790	NCEI	1968-2009
TX	MARFA 3W	41-5596	DLY	30.3125	-104.0722	4790	NCEI	1958-2009
TX	MARFA CHARCO M R	41-5591	HLY	30.4833	-104.1167	5300	NCEI	1949-1968
TX	MARLIN 3 NE	41-5611	DLY	31.3336	-96.8581	384	NCEI	1902-2017
TX	MARSHALL	41-5618	DLY	32.5403	-94.3508	351	NCEI	1893-2017
TX	MARYS CK AT WINDING RD	60-0098	15M	29.5435	-95.2172	29	HCFCD	1999-2017
TX	MASON	41-5650	DLY	30.7478	-99.2306	1549	NCEI	1941-2017
TX	MATADOR	41-5658	HLY	34.0044	-100.8250	2415	NCEI	1941-1965
TX	MATADOR	41-5658	DLY	34.0044	-100.8250	2415	NCEI	1947-2017
TX	MATADOR NO 2	41-5656	15M	34.0044	-100.8250	2415	NCEI	1971-2013
TX	MATADOR NO 2	41-5656	HLY	34.0044	-100.8250	2415	NCEI	1965-2013
TX	MATAGORDA NO 2	41-5659	DLY	28.6836	-95.9733	10	NCEI	1910-2017
TX	MATHIS 4 SSW	41-5661	DLY	28.0372	-97.8725	138	NCEI	1964-2017
TX	MAUD	41-5667	DLY	33.3322	-94.3436	305	NCEI	1940-2017
TX	MAYHAW BAYOU - WILBER ROAD	82-7000	15M	29.8075	-94.2619	9	DD6	1992-2017
TX	MAYPEARL	41-5695	HLY	32.3117	-97.0161	549	NCEI	1943-1995
TX	MAYPEARL	41-5695	DLY	32.3114	-97.0158	548	NCEI	1948-2017
TX	MC ALLEN MILLER INTL ARPT	55-0051	HLY	26.1750	-98.2380	112	NCEI	1996-2007
TX	MC CARTNEY BRG	41-5710	DLY	33.3167	-94.1667	230	NCEI	1947-1954
TX	MC KINNEY MUNICIPAL ARPT	56-0207	HLY	33.1800	-96.5900	585	NCEI	2007-2017
TX	MC LEAN	66-5770	15M	35.2360	-100.5923	2632	NCEI	2013-2017
TX	MC LEAN	41-5770	15M	35.2361	-100.5922	2872	NCEI	1971-2013
TX	MC LEAN	41-5770	HLY	35.2361	-100.5922	2872	NCEI	1940-2013
TX	MC LEAN	41-5770	DLY	35.2361	-100.5922	2872	NCEI	1907-2008
TX	MCALLEN	41-5701	DLY	26.1917	-98.2511	102	NCEI	1941-2017

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	MCALLEN INTL AP	41-5702	HLY	26.1839	-98.2539	100	NCEI	2004-2013
TX	MCALLEN MILLER INTL AP	78-0059	15M	26.1839	-98.2539	100	NCEI	2005-2017
TX	MCALLEN MILLER INTL AP	79-0060	DLY	26.1839	-98.2539	102	NCEI	1961-2017
TX	MCCAMEY	41-5707	DLY	31.1331	-102.2217	2461	NCEI	1932-2017
TX	MCCOOK	41-5721	DLY	26.4842	-98.3907	220	NCEI	1941-2017
TX	MCCREE BRANCH - WHITE ROCK TRA	81-0004	15M	32.8717	-96.7286	475	COD	1993-2016
TX	MCDONALD OBSERVATORY	41-5737	HLY	30.6797	-104.0249	6255	NCEI	1942-1946
TX	MCGREGOR	41-5757	DLY	31.4350	-97.4011	722	NCEI	1893-2013
TX	MCKINNEY MUNICIPAL AIRPORT	41-5766	DLY	33.1835	-96.5895	587	NCEI	1903-2008
TX	ME20	62-0098	HLY	29.5594	-99.4058	1281	EAA	2002-2008
TX	MEDINA 1NE	41-5742	DLY	29.8100	-99.2497	1487	NCEI	1966-2017
TX	MEDINA RIVER	85-0323	HLY	29.7236	-99.0697	1230	HADS	1997-2017
TX	MEMPHIS	41-5821	DLY	34.7261	-100.5372	2090	NCEI	1905-2017
TX	MENARD	41-5822	DLY	30.9044	-99.7864	1982	NCEI	1893-2017
TX	MERCEDES 6 SSE	41-5836	DLY	26.0619	-97.8997	75	NCEI	1914-2013
TX	MERCURY	41-5840	HLY	31.4167	-99.1667	1440	NCEI	1965-1975
TX	MERIDIAN	41-5845	DLY	31.9300	-97.6608	771	NCEI	1982-2008
TX	MERIDIAN SP	41-5847	DLY	31.8833	-97.7000	1027	NCEI	1963-1982
TX	MERRILL RCH	41-5854	DLY	30.5333	-104.0500	5472	NCEI	1939-1967
TX	MERTZON	41-5859	DLY	31.2667	-100.8167	2228	NCEI	1941-2017
TX	MEXIA	41-5869	DLY	31.6181	-96.4497	502	NCEI	1904-2016
TX	MHMR SOUTH 8TH & WASHINGTON BL	82-2400	15M	30.0578	-94.1236	16	DD6	1992-2017
TX	MIAMI	41-5875	DLY	35.6936	-100.6392	2746	NCEI	1889-2015
TX	MIDLAND 4 ENE	99-5891	DLY	32.0186	-102.0258	2776	NCEI	1885-1891
TX	MIDLAND 4 ENE	41-5891	DLY	32.0186	-102.0258	2776	NCEI	1894-2017
TX	MIDLAND INTERNATIONAL AIRPORT	56-0177	HLY	31.9475	-102.2086	2862	NCEI	2007-2017
TX	MIDLAND INTL AP	41-5890	HLY	31.9475	-102.2086	2862	NCEI	1941-2013
TX	MIDLAND ODESSA	79-0109	DLY	31.9433	-102.1889	2867	NCEI	1930-2017
TX	MIDLOTHIAN	66-5897	15M	32.4841	-96.9941	750	NCEI	2013-2017
TX	MIDLOTHIAN	41-5897	15M	32.4842	-96.9942	750	NCEI	1976-2013
TX	MIDLOTHIAN	41-5897	HLY	32.4842	-96.9942	750	NCEI	1974-2013
TX	MIDLOTHIAN	41-5896	DLY	32.4833	-97.0000	751	NCEI	1940-1964
TX	MIDLOTHIAN	41-5897	DLY	32.4842	-96.9942	751	NCEI	1997-2017

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TX	MIDWAY 4 NE	41-5904	DLY	31.0706	-95.7150	236	NCEI	1978-2015
TX	MILLER RCH	41-5930	DLY	30.9667	-98.9333	1991	NCEI	1948-1965
TX	MILLERS RANCH - SECO CRK	85-0816	HLY	29.5731	-99.4028	1312	HADS	1997-2017
TX	MINEOLA	41-5954	DLY	32.6350	-95.4822	367	NCEI	1946-2017
TX	MINEOLA 8 ENE	41-5956	DLY	32.7167	-95.3667	384	NCEI	1966-2000
TX	MINERAL WELLS 1 SSW	66-5957	15M	32.7863	-98.1183	845	NCEI	2013-2017
TX	MINERAL WELLS 1 SSW	41-5957	15M	32.7864	-98.1183	845	NCEI	1971-2013
TX	MINERAL WELLS 1 SSW	41-5957	HLY	32.7864	-98.1183	845	NCEI	1952-2013
TX	MINERAL WELLS AIRPORT	55-0174	HLY	32.7817	-98.0603	970	NCEI	2000-2007
TX	MINERAL WELLS AIRPORT	56-0275	HLY	32.7816	-98.0602	972	NCEI	2007-2017
TX	MINERAL WELLS AP	41-5958	HLY	32.7817	-98.0603	972	NCEI	1948-2013
TX	MINERAL WELLS AP	79-0157	DLY	32.7817	-98.0603	972	NCEI	1948-2017
TX	MISSION 4 W	41-5972	DLY	26.2167	-98.4000	135	NCEI	1910-1994
TX	MISSOURI CITY	99-4325	DLY	29.6600	-95.6275	49	NCEI	1939-1948
TX	MOBEETIE	41-5987	DLY	35.5333	-100.4333	2680	NCEI	1910-1974
TX	MOLINE	41-5996	15M	31.3933	-98.3081	1385	NCEI	1978-2007
TX	MOLINE	41-5996	HLY	31.3933	-98.3081	1385	NCEI	1940-2007
TX	MONAHANS	41-5999	DLY	31.5414	-102.9122	2546	NCEI	1959-2009
TX	MONTELL	41-6019	DLY	29.5333	-100.0167	1302	NCEI	1912-1944
TX	MONTGOMERY	41-6024	HLY	30.3908	-95.6969	320	NCEI	1940-1948
TX	MONTGOMERY	41-6024	DLY	30.3908	-95.6969	322	NCEI	1954-2017
TX	MONTGOMERY COUNTY AIRPORT	55-0114	HLY	30.3567	-95.4139	247	NCEI	1997-2007
TX	MONTGOMERY COUNTY AIRPORT	56-0199	HLY	30.3567	-95.4139	247	NCEI	2007-2017
TX	MOPAC AT LOOP 360	65-0031	15M	30.2443	-97.8020	546	COA	1987-2015
TX	MORGAN	41-6058	DLY	32.0139	-97.6131	728	NCEI	1965-2016
TX	MORGAN MILL	41-6060	DLY	32.3842	-98.1703	1056	NCEI	1949-2017
TX	MORSE	41-6070	DLY	36.0608	-101.4747	3179	NCEI	1941-1998
TX	MORTON	41-6074	DLY	33.7183	-102.7586	3773	NCEI	1935-2017
TX	MT LOCKE	66-6104	15M	30.7053	-104.0232	6790	NCEI	2013-2017
TX	MT LOCKE	41-6104	15M	30.6716	-104.0225	6790	NCEI	1984-2013
TX	MT LOCKE	41-6104	HLY	30.6716	-104.0225	6790	NCEI	1948-2013
TX	MT LOCKE	41-6104	DLY	30.6716	-104.0225	6791	NCEI	1935-2017
TX	MT PLEASANT	41-6108	15M	33.1689	-95.0056	425	NCEI	1971-2013

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TX	MT PLEASANT	41-6108	HLY	33.1689	-95.0056	425	NCEI	1940-2013
TX	MT PLEASANT	41-6108	DLY	33.1689	-95.0056	427	NCEI	1905-2017
TX	MT VERNON	41-6119	DLY	33.1964	-95.2236	446	NCEI	1966-2017
TX	MUENSTER	41-6130	DLY	33.6564	-97.3769	1037	NCEI	1941-2017
TX	MULESHOE # 2	66-6136	15M	34.2192	-102.7327	3830	NCEI	2013-2018
TX	MULESHOE # 2	41-6136	15M	34.2192	-102.7328	3830	NCEI	1971-2013
TX	MULESHOE # 2	41-6136	HLY	34.2192	-102.7328	3830	NCEI	1941-2013
TX	MULESHOE #1	41-6135	DLY	34.2192	-102.7328	3829	NCEI	1921-2017
TX	MULESHOE 19 S	79-0007	DLY	33.9558	-102.7739	3743	NCEI	2004-2017
TX	MULESHOE NTL WR	41-6137	DLY	33.9544	-102.7783	3740	NCEI	1980-2017
TX	MULLIN	41-6140	DLY	31.5833	-98.6667	1493	NCEI	1948-2001
TX	MUNDAY	41-6146	DLY	33.4539	-99.6158	1480	NCEI	1912-2003
TX	MUNDAY 1W	41-6147	DLY	33.4500	-99.6364	1486	NCEI	2011-2017
TX	N FORK RED RIVER NR SHAMROCK	87-0032	HLY	35.2642	-100.2414	2217	USBR	1991-2016
TX	NACOGDOCHES	41-6177	15M	31.6164	-94.6431	435	NCEI	1974-2013
TX	NACOGDOCHES	41-6176	HLY	31.6000	-94.6500	312	NCEI	1947-1961
TX	NACOGDOCHES	41-6177	HLY	31.6164	-94.6431	435	NCEI	1947-2013
TX	NACOGDOCHES	41-6176	DLY	31.6000	-94.6500	312	NCEI	1900-1973
TX	NACOGDOCHES	41-6177	DLY	31.6164	-94.6431	436	NCEI	1948-2017
TX	NAPLES 1 SW	41-6190	DLY	33.1833	-94.6833	361	NCEI	1909-1981
TX	NAPLES 5 NE	41-6195	DLY	33.2425	-94.6736	289	NCEI	1982-1997
TX	NATALIA	41-6205	DLY	29.2000	-98.8500	712	NCEI	1909-1976
TX	NAVARRO MILLS DAM	66-6210	15M	31.9611	-96.6880	454	NCEI	2013-2017
TX	NAVARRO MILLS DAM	41-6210	15M	31.9611	-96.6881	454	NCEI	1975-2013
TX	NAVARRO MILLS DAM	41-6210	HLY	31.9611	-96.6881	454	NCEI	1962-2013
TX	NAVARRO MILLS DAM	41-6210	DLY	31.9611	-96.6881	453	NCEI	1963-2017
TX	NEGLEY 4 SSW	41-6247	DLY	33.7042	-95.0700	404	NCEI	1946-2003
TX	NEUVILLE	41-6265	DLY	31.6503	-94.1519	479	NCEI	1940-2008
TX	NEW BOSTON	66-6270	15M	33.4547	-94.4088	345	NCEI	2013-2017
TX	NEW BOSTON	41-6270	15M	33.4547	-94.4089	345	NCEI	1973-2013
TX	NEW BOSTON	41-6270	HLY	33.4547	-94.4089	345	NCEI	1973-2013
TX	NEW BOSTON	41-6270	DLY	33.4547	-94.4089	344	NCEI	1980-2017
TX	NEW BRAUNFELS	41-6276	DLY	29.7192	-98.1189	620	NCEI	1893-2017

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TX	NEW BRAUNFELS 1.5 NNW	69-1087	DLY	29.7236	-98.1278	715	NCEI	2014-2017
TX	NEW BRAUNFELS MUNICIPAL AP	55-0056	HLY	29.7089	-98.0458	640	NCEI	1996-2007
TX	NEW BRAUNFELS MUNICIPAL AP	56-0128	HLY	29.7089	-98.0458	645	NCEI	2007-2017
TX	NEW CANEY 2 E	41-6280	DLY	30.1375	-95.1783	73	NCEI	1952-2017
TX	NEW GULF	41-6286	DLY	29.2667	-95.8950	72	NCEI	1946-1999
TX	NEW SUMMERFIELD 2W	66-6335	15M	31.9747	-95.1380	372	NCEI	2013-2017
TX	NEW SUMMERFIELD 2W	41-6335	15M	31.9747	-95.1381	372	NCEI	1984-2013
TX	NEW SUMMERFIELD 2W	41-6335	HLY	31.9747	-95.1381	372	NCEI	1962-2013
TX	NEW SUMMERFIELD 2W	41-6335	DLY	31.9747	-95.1381	371	NCEI	1992-2017
TX	NEWPORT 1SW	41-6331	DLY	33.4561	-98.0253	1060	NCEI	1947-2006
TX	NEWTON	41-6339	DLY	30.8500	-93.7667	190	NCEI	1966-1977
TX	NEWTON	41-6341	DLY	30.8331	-93.7369	151	NCEI	1980-2013
TX	NIX STORE 1 W	41-6367	DLY	31.1081	-98.3794	1362	NCEI	1948-2017
TX	NIXON	41-6368	DLY	29.2828	-97.7675	341	NCEI	1921-2017
TX	NORTH HOUSTON	99-4327	DLY	29.8733	-95.5275	112	NCEI	1939-1947
TX	NORTHFIELD	41-6433	DLY	34.2606	-100.6014	2070	NCEI	1944-2017
TX	NORTHINGTON RCH	41-6448	DLY	29.8642	-98.6581	1526	NCEI	1986-2017
TX	NOTLA 3 SE	41-6477	DLY	36.1014	-100.5894	2900	NCEI	1940-2017
TX	NOVICE 1 E	41-6484	DLY	31.9833	-99.6167	1982	NCEI	1948-1973
TX	NUGENT 1 ESE	41-6494	DLY	32.6833	-99.6667	1591	NCEI	1940-1972
TX	O C FISHER DAM	41-6499	DLY	31.4539	-100.4933	1965	NCEI	1975-2008
TX	O DONNELL	66-6504	15M	32.9711	-101.8247	3046	NCEI	2013-2018
TX	O DONNELL	41-6504	15M	32.9711	-101.8247	3046	NCEI	1971-2013
TX	O DONNELL	41-6504	HLY	32.9711	-101.8247	3046	NCEI	1940-2013
TX	OAK CREEK LAKE	41-6495	DLY	32.0567	-100.2958	2008	NCEI	1962-2017
TX	OAKWOOD	41-6496	DLY	31.5914	-95.8442	285	NCEI	1980-2010
TX	OAKWOOD 4.2 NE	69-1355	DLY	31.6334	-95.8063	266	NCEI	2008-2017
TX	ODESSA	41-6502	DLY	31.8797	-102.3592	2910	NCEI	1950-2017
TX	OLNEY	41-6636	DLY	33.3733	-98.7664	1194	NCEI	1956-2011
TX	OLNEY 5 NNW	41-6641	DLY	33.4372	-98.7806	1184	NCEI	1941-2004
TX	OLTON	41-6644	DLY	34.1797	-102.1356	3642	NCEI	1928-2017
TX	ONION CRK AT BUDA	63-0199	15M	30.0864	-97.8485	673	LCRA	2006-2018
TX	ONION CRK AT HWY 183, AUSTIN	63-0201	15M	30.1773	-97.6890	481	LCRA	2005-2018

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TX	ONION CRK AT HWY 183, AUSTIN	63-0201	HLY	30.1773	-97.6890	N/A	LCRA	1989-2018
TX	ORANGE	99-6664	DLY	30.0858	-93.7417	10	NCEI	1883-1937
TX	ORANGE	41-6664	DLY	30.0858	-93.7417	10	NCEI	1903-2017
TX	ORANGE 9 N	41-6680	DLY	30.2264	-93.7394	20	NCEI	1986-2017
TX	OVERTON	89-0038	DLY	32.2956	-94.9753	480	TEN	2004-2016
TX	OVERTON	41-6722	DLY	32.2667	-94.9833	499	NCEI	1943-1987
TX	OYSTER CREEK - SH 6	60-0169	15M	29.6345	-95.6513	75	HCFCD	2001-2017
TX	OZONA	41-6734	HLY	30.7169	-101.2061	2345	NCEI	1940-2013
TX	OZONA	41-6734	DLY	30.7169	-101.2061	2346	NCEI	1948-2013
TX	OZONA 8 WSW	41-6736	15M	30.6819	-101.3375	2550	NCEI	1973-2002
TX	OZONA 8 WSW	41-6736	HLY	30.6819	-101.3375	2550	NCEI	1951-2002
TX	PADUCAH	41-6740	HLY	34.0067	-100.2989	1900	NCEI	1957-1957
TX	PADUCAH	41-6740	DLY	34.0067	-100.2989	1900	NCEI	1944-2017
TX	PADUCAH 10S	41-6745	DLY	33.8758	-100.3831	1949	NCEI	1994-2017
TX	PADUCAH 15 S	41-6742	DLY	33.8083	-100.2981	1831	NCEI	1971-2017
TX	PADUCAH 2 WNW	41-6743	DLY	34.0333	-100.3167	1890	NCEI	1913-1950
TX	PAINT ROCK	41-6747	DLY	31.5536	-99.8500	1588	NCEI	1918-2017
TX	PALACIOS MUNI AP	79-0054	DLY	28.7247	-96.2536	13	NCEI	1943-2017
TX	PALESTINE 2 NE	66-6757	15M	31.7831	-95.6039	465	NCEI	2013-2017
TX	PALESTINE 2 NE	41-6757	HLY	31.7831	-95.6039	465	NCEI	1940-2013
TX	PALESTINE 2 NE	99-6757	DLY	31.7831	-95.6039	465	NCEI	1882-1929
TX	PALESTINE 2 NE	79-0153	DLY	31.7831	-95.6039	466	NCEI	1930-2017
TX	PALO PINTO	41-6766	DLY	32.7664	-98.3083	1040	NCEI	1949-2012
TX	PAMPA #2	66-6776	15M	35.5544	-100.9736	3150	NCEI	2013-2017
TX	PAMPA 2	41-6776	15M	35.5544	-100.9736	3150	NCEI	1974-2013
TX	PAMPA 2	41-6776	HLY	35.5544	-100.9736	3150	NCEI	1953-2013
TX	PAMPA 2	41-6776	DLY	35.5544	-100.9736	3150	NCEI	1964-2017
TX	PAMPA WB AP	41-6775	HLY	35.5333	-100.9667	3232	NCEI	1941-1953
TX	PAMPA WB AP	79-0119	DLY	35.5333	-100.9667	3232	NCEI	1908-1964
TX	PANDALE	99-6780	DLY	30.2061	-101.5575	1690	NCEI	1943-1947
TX	PANDALE 1 N	41-6780	DLY	30.2061	-101.5575	1690	NCEI	1909-2011
TX	PANHANDLE	41-6785	DLY	35.3514	-101.3897	3465	NCEI	1911-2017
TX	PANOLA 1 WSW	41-6788	HLY	32.3500	-94.1167	322	NCEI	1970-1973

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TX	PANTHER JUNCTION	41-6792	15M	29.3272	-103.2061	3740	NCEI	1972-2013
TX	PANTHER JUNCTION	76-0089	HLY	29.3167	-103.2000	3750	RAWS	2003-2015
TX	PANTHER JUNCTION	41-6792	HLY	29.3272	-103.2061	3740	NCEI	1955-2013
TX	PANTHER JUNCTION	41-6792	DLY	29.3272	-103.2061	3740	NCEI	1955-2017
TX	PANTHER JUNCTION RAWS	85-0722	HLY	29.3250	-103.2083	3776	HADS	2003-2017
TX	PARIS	41-6794	DLY	33.6744	-95.5586	541	NCEI	1896-2017
TX	PAT MAYSE DAM	41-6834	15M	33.8536	-95.5167	495	NCEI	1971-2004
TX	PAT MAYSE DAM	41-6834	HLY	33.8536	-95.5167	495	NCEI	1966-2004
TX	PEARSALL	41-6879	DLY	28.8889	-99.0897	636	NCEI	1902-2017
TX	PECAN BAYOU	85-0675	HLY	31.5172	-98.7403	1280	HADS	1998-2014
TX	PECAN BAYOU NR MULLIN	63-0022	HLY	31.5172	-98.7414	1244	LCRA	1988-2018
TX	PECOS	41-6892	DLY	31.4167	-103.5000	2612	NCEI	1904-2000
TX	PECOS 8W	66-6893	15M	31.3782	-103.6330	2724	NCEI	2013-2017
TX	PECOS 8W	41-6893	15M	31.3783	-103.6331	2724	NCEI	1977-2013
TX	PECOS 8W	41-6893	HLY	31.3783	-103.6331	2724	NCEI	1960-2013
TX	PECOS 8W	41-6893	DLY	31.3783	-103.6331	2723	NCEI	2000-2017
TX	PEDERNALES RIVER NR JOHNSON C	63-0165	HLY	30.2922	-98.3994	1138	LCRA	1988-2018
TX	PEDERNALES RVR NR FRDRCKSBRG	63-0152	HLY	30.2206	-98.8700	1604	LCRA	1988-2018
TX	PENWELL	41-6932	DLY	31.7356	-102.5897	2933	NCEI	1955-2013
TX	PEP	66-6935	15M	33.8153	-102.5578	3660	NCEI	2013-2018
TX	PEP	41-6935	15M	33.8153	-102.5578	3660	NCEI	1971-2013
TX	PEP	41-6935	HLY	33.8153	-102.5578	3660	NCEI	1956-2013
TX	PERRYTON	41-6950	DLY	36.3897	-100.8239	2943	NCEI	1893-2017
TX	PERRYTON 11 WNW	41-6953	DLY	36.4408	-100.9961	3009	NCEI	1945-2017
TX	PERRYTON 21 S	41-6952	DLY	36.1017	-100.7394	2986	NCEI	1978-2017
TX	PERSIMMON GAP	41-6959	DLY	29.6603	-103.1736	2864	NCEI	1952-2017
TX	PFLUGERVILLE	41-6992	DLY	30.4333	-97.6167	679	NCEI	1948-1965
TX	PFLUGERVILLE 3 SSE	63-0202	15M	30.4062	-97.6030	645	LCRA	2007-2018
TX	PFLUGERVILLE HIGH SCHOOL	65-0041	15M	30.4461	-97.6372	783	COA	1986-2015
TX	PIERCE 1 E	41-7020	DLY	29.2353	-96.1817	105	NCEI	1904-2014
TX	PILOT POINT ISL DU BOI	41-7028	DLY	33.3658	-97.0122	689	NCEI	1916-2003
TX	PINE SPRINGS	41-7044	DLY	31.8903	-104.8078	5591	NCEI	1939-2008
TX	PINE SPRINGS, GMNP	80-0034	15M	31.8913	-104.8100	5571	WTM	2010-2017

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TX	PINELAND	41-7040	DLY	31.2447	-93.9658	220	NCEI	1965-2017
TX	PINERY	76-0091	HLY	31.8944	-104.7978	5381	RAWS	2001-2015
TX	PITCHFORK RCH	66-7060	15M	33.5992	-100.5319	1945	NCEI	2013-2018
TX	PITCHFORK RCH	41-7060	HLY	33.5992	-100.5319	1945	NCEI	1971-2013
TX	PITCHFORK RCH	41-7060	DLY	33.5992	-100.5319	1946	NCEI	1971-2017
TX	PITTSBURG 5 SSE	41-7066	HLY	32.9264	-94.9392	365	NCEI	1949-2013
TX	PITTSBURG 5 SSE	41-7066	DLY	32.9264	-94.9392	364	NCEI	1949-2017
TX	PLAINS	66-7074	15M	33.1869	-102.8281	3675	NCEI	2013-2018
TX	PLAINS	41-7074	15M	33.1869	-102.8281	3675	NCEI	1971-2013
TX	PLAINS	41-7074	HLY	33.1869	-102.8281	3675	NCEI	1942-2013
TX	PLAINS	41-7074	DLY	33.1869	-102.8281	3675	NCEI	1925-2017
TX	PLAINVIEW	41-7079	DLY	34.1892	-101.7022	3369	NCEI	1908-2017
TX	PLEMONS	41-7116	HLY	35.7667	-101.3333	2802	NCEI	1940-1959
TX	PLEMONS	41-7116	DLY	35.7667	-101.3333	2802	NCEI	1906-1951
TX	POINT 3.7 ESE	69-2332	DLY	32.9133	-95.8100	469	NCEI	2007-2017
TX	POINT COMFORT	66-7140	15M	28.6575	-96.5553	20	NCEI	2013-2017
TX	POINT COMFORT	41-7140	15M	28.6575	-96.5553	20	NCEI	1984-2013
TX	POINT COMFORT	41-7140	HLY	28.6575	-96.5553	20	NCEI	1957-2013
TX	POINT COMFORT	41-7140	DLY	28.6575	-96.5553	20	NCEI	1957-2017
TX	POLAR	41-7146	DLY	33.0167	-101.0667	2352	NCEI	1940-1975
TX	PORT ARANSAS	41-7170	DLY	27.8381	-97.0592	13	NCEI	1986-2017
TX	PORT ARANSAS 32 NNE	64-0662	HLY	28.3050	-96.8230	15	NCEI	2007-2016
TX	PORT ARTHUR AP	41-7174	HLY	29.9506	-94.0206	16	NCEI	1947-2013
TX	PORT ARTHUR CITY	99-7173	HLY	29.8691	-93.9343	7	NCEI	1917-1940
TX	PORT ARTHUR CITY	41-7173	HLY	29.8691	-93.9343	7	NCEI	1940-1953
TX	PORT ARTHUR CITY	41-7172	DLY	29.9044	-93.9708	7	NCEI	1975-2017
TX	PORT ARTHUR SE TX AP	79-0041	DLY	29.9506	-94.0206	16	NCEI	1947-2017
TX	PORT ARTHUR WB CITY	41-7173	DLY	29.8691	-93.9343	10	NCEI	1911-1967
TX	PORT ISABEL	41-7179	DLY	26.0942	-97.3094	16	NCEI	1896-2014
TX	PORT LAVACA	41-7183	DLY	28.6078	-96.6417	20	NCEI	2004-2015
TX	PORT LAVACA 2	41-7182	DLY	28.6167	-96.6333	20	NCEI	1901-1988
TX	PORT MANSFIELD	41-7184	DLY	26.5578	-97.4264	10	NCEI	1958-2017
TX	PORT O'CONNOR	41-7186	DLY	28.4342	-96.4278	7	NCEI	1948-2013

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TX	POSSUM KINGDOM DAM	41-7205	DLY	32.8667	-98.4333	902	NCEI	1939-1975
TX	POST	41-7206	DLY	33.1986	-101.3744	2612	NCEI	1910-2017
TX	POTEET	41-7215	DLY	29.0283	-98.5686	427	NCEI	1941-2017
TX	POWELL 1.0 SW	69-2256	DLY	32.1060	-96.3405	374	NCEI	2009-2017
TX	POYNOR 1 NE	41-7230	DLY	32.0833	-95.5833	531	NCEI	1944-1975
TX	PRADE RCH	41-7232	DLY	29.9167	-99.7908	2051	NCEI	1955-2017
TX	PRAIRIE MTN	41-7243	15M	30.5767	-98.8767	1448	NCEI	1971-2009
TX	PRAIRIE MTN	41-7243	HLY	30.5767	-98.8767	1448	NCEI	1940-2009
TX	PRAIRIE MTN	41-7243	DLY	30.5767	-98.8767	1447	NCEI	1948-2017
TX	PRESIDIO	41-7262	DLY	29.5711	-104.3714	2612	NCEI	1927-2013
TX	PRESIDIO 2	41-7264	DLY	29.5600	-104.3728	2569	NCEI	2009-2015
TX	PRESTON ROAD - OLIVE TREE	81-0008	15M	33.0128	-96.7958	679	COD	1991-2016
TX	PRICE 2 SW	41-7271	DLY	32.1167	-94.9667	371	NCEI	1941-1975
TX	PRIDDY 1 NE	41-7274	HLY	31.6667	-98.4833	1470	NCEI	1984-2003
TX	PRIDDY 1 NE	41-7274	DLY	31.6667	-98.4833	1470	NCEI	1984-1997
TX	PROCTOR RSVR	41-7300	15M	31.9633	-98.4942	1221	NCEI	1984-2013
TX	PROCTOR RSVR	41-7300	HLY	31.9633	-98.4942	1221	NCEI	1973-2013
TX	PROCTOR RSVR	41-7300	DLY	31.9633	-98.4942	1220	NCEI	1963-2017
TX	PROVIDENT CITY	41-7299	DLY	29.2833	-96.6333	151	NCEI	1944-1966
TX	PUTNAM	41-7327	DLY	32.3664	-99.1925	1631	NCEI	1911-2017
TX	QUANAH 2 SW	41-7336	DLY	34.2761	-99.7578	1601	NCEI	1893-2013
TX	QUITAQUE	41-7361	DLY	34.3667	-101.0500	2572	NCEI	1934-1976
TX	QUITMAN	41-7363	DLY	32.7833	-95.4333	374	NCEI	1948-1987
TX	QUITMAN 2	41-7365	DLY	32.7931	-95.4350	413	NCEI	1999-2015
TX	RAINBOW	41-7388	DLY	32.2619	-97.7064	650	NCEI	1934-2017
TX	RANDOLPH AFB	66-7422	15M	29.5325	-98.2623	728	NCEI	2013-2017
TX	RANDOLPH AFB	41-7422	15M	29.5325	-98.2622	728	NCEI	1975-2013
TX	RANDOLPH AFB	41-7422	HLY	29.5325	-98.2622	728	NCEI	1940-2013
TX	RANDOLPH AFB	79-0039	DLY	29.5439	-98.2736	761	NCEI	1948-1970
TX	RANGER	41-7425	DLY	32.4667	-98.6833	1430	NCEI	1946-1952
TX	RANGER 1 W	41-7426	DLY	32.4667	-98.7000	1542	NCEI	1940-1975
TX	RANKIN	41-7431	15M	31.2286	-101.9472	2615	NCEI	1984-2013
TX	RANKIN	41-7431	HLY	31.2286	-101.9472	2615	NCEI	1948-2013

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TX	RANKIN	41-7431	DLY	31.2286	-101.9461	2615	NCEI	1948-1984
TX	RAYMONDVILLE	41-7458	DLY	26.7069	-97.7833	30	NCEI	1910-2017
TX	RED BLUFF CROSSING	41-7480	DLY	31.2175	-98.5833	1234	NCEI	1948-2017
TX	RED BLUFF DAM	41-7481	HLY	31.8950	-103.9183	2847	NCEI	1942-2004
TX	RED BLUFF DAM	41-7481	DLY	31.8950	-103.9183	2848	NCEI	1939-2003
TX	RED ROCK	41-7497	15M	29.9667	-97.4500	520	NCEI	1975-2000
TX	RED ROCK	41-7497	HLY	29.9667	-97.4500	520	NCEI	1967-2000
TX	RED ROCK	41-7497	DLY	29.9667	-97.4500	522	NCEI	1965-2000
TX	RED SPRINGS 3 N	41-7499	15M	33.6494	-99.4042	1351	NCEI	1971-2013
TX	RED SPRINGS 3 N	41-7499	HLY	33.6494	-99.4042	1351	NCEI	1943-2013
TX	REESE AFB	79-0108	DLY	33.6000	-102.0500	3327	NCEI	1950-1970
TX	REESE AFB/LUBBOCK	64-0405	DLY	33.6000	-102.0500	3337	NCEI	1973-1997
TX	REFUGIO	41-7529	DLY	28.3000	-97.2833	49	NCEI	1948-1984
TX	REFUGIO 3 SW	99-7530	DLY	28.2939	-97.3297	56	NCEI	1988-1991
TX	REFUGIO 3 SW	41-7530	DLY	28.2939	-97.3297	56	NCEI	1991-2017
TX	RENO	41-7556	15M	32.9536	-97.5739	770	NCEI	1971-2004
TX	RENO	41-7556	HLY	32.9536	-97.5739	770	NCEI	1946-2004
TX	RG75A	94-0008	15M	31.4706	-96.8833	556	USDA	1938-2015
TX	RG89	94-0010	15M	31.4672	-96.8825	561	USDA	1938-2015
TX	RICARDO	41-7580	DLY	27.4167	-97.8167	59	NCEI	1909-1975
TX	RICHARDS	41-7586	DLY	30.5381	-95.8458	315	NCEI	1954-2013
TX	RICHARDSON	41-7588	DLY	32.9964	-96.7428	679	NCEI	1946-2017
TX	RICHLAND SPRINGS	41-7593	DLY	31.2700	-98.9486	1381	NCEI	1948-2009
TX	RICHMOND	41-7594	HLY	29.5839	-95.7553	101	NCEI	1967-2013
TX	RICHMOND	99-7594	DLY	29.5839	-95.7553	102	NCEI	1935-1946
TX	RICHMOND	41-7594	DLY	29.5839	-95.7553	102	NCEI	1919-2017
TX	RICHMOND 2	41-7596	HLY	29.5833	-95.7500	102	NCEI	1964-1967
TX	RILEY BEN RANCH	99-7612	DLY	30.4333	-98.8167	1631	NCEI	1942-1948
TX	RILEY BEN RCH	41-7612	DLY	30.4333	-98.8167	1631	NCEI	1948-1965
TX	RINGGOLD	41-7614	DLY	33.8167	-97.9333	896	NCEI	1940-1994
TX	RIO GRANDE CITY	52-7622	DLY	26.3778	-98.8136	166	FORTS	1879-1891
TX	RIO GRANDE CITY	41-7622	DLY	26.3769	-98.8117	171	NCEI	1892-2017
TX	RIO GRANDE NEAR LAREDO	85-0606	HLY	27.5000	-99.5000	397	HADS	2003-2017

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TX	RIO GRANDE VALLEY INT'L AP	55-0034	HLY	26.2261	-97.6617	35	NCEI	1996-2007
TX	RIO GRANDE VILLAGE	41-7624	DLY	29.1853	-102.9622	1857	NCEI	2006-2017
TX	RIOMEDINA	41-7628	DLY	29.4417	-98.8800	850	NCEI	1922-2017
TX	RISING STAR 1S	41-7633	DLY	32.0817	-98.9658	1634	NCEI	1942-2011
TX	RIVERSIDE	41-7651	DLY	30.8500	-95.4000	240	NCEI	1903-1970
TX	ROANOKE	41-7659	DLY	33.0050	-97.2331	640	NCEI	1941-2017
TX	ROBERT LEE	41-7669	DLY	31.8836	-100.5358	1916	NCEI	1908-2017
TX	ROBERT LEE 0.5 NNE	69-0931	DLY	31.9024	-100.4809	1870	NCEI	2009-2014
TX	ROBSTOWN	41-7677	DLY	27.7894	-97.6619	85	NCEI	1922-2017
TX	ROBY	41-7678	DLY	32.7333	-100.3833	1982	NCEI	1893-1975
TX	ROCKDALE	41-7685	DLY	30.6431	-97.0372	528	NCEI	1963-2016
TX	ROCKDALE 0.5 NE	69-2164	DLY	30.6608	-97.0032	476	NCEI	2008-2017
TX	ROCKLAND	99-7700	DLY	31.0167	-94.4000	89	NCEI	1903-1940
TX	ROCKLAND 2 NW	41-7700	HLY	31.0167	-94.4000	88	NCEI	1940-1975
TX	ROCKLAND 2 NW	41-7700	DLY	31.0167	-94.4000	89	NCEI	1904-1979
TX	ROCKPORT	41-7704	DLY	28.0286	-97.0567	10	NCEI	1959-2013
TX	ROCKPORT ARANSAS CO AP	79-0065	DLY	28.0836	-97.0464	23	NCEI	1998-2017
TX	ROCKPORT MARINE LAB	41-7705	DLY	28.0167	-97.0500	10	NCEI	1901-1958
TX	ROCKSPRINGS	41-7706	15M	30.0239	-100.2119	2382	NCEI	1975-2013
TX	ROCKSPRINGS	41-7706	HLY	30.0239	-100.2119	2382	NCEI	1940-2013
TX	ROCKSPRINGS	41-7706	DLY	30.0239	-100.2119	2382	NCEI	1894-2014
TX	ROCKSPRINGS 17.2 SW	69-1221	DLY	29.8355	-100.4084	1886	NCEI	1998-2015
TX	ROCKSPRINGS 18 SW	41-7712	DLY	29.7902	-100.4151	1726	NCEI	1963-1993
TX	ROCKSPRINGS 2	41-7718	HLY	30.0167	-100.2000	2421	NCEI	1971-1975
TX	ROCKWALL	89-0089	DLY	32.9364	-96.4592	547	TEN	2012-2016
TX	ROCKWALL	41-7707	DLY	32.9331	-96.4647	545	NCEI	1941-2009
TX	ROCKWALL	41-7708	DLY	32.9327	-96.4584	600	NCEI	1950-1956
TX	ROCKWALL 0.8 WNW	69-2315	DLY	32.9270	-96.4701	479	NCEI	2007-2015
TX	ROSCOE	41-7743	DLY	32.4481	-100.5264	2379	NCEI	1935-2017
TX	ROSEBUD	41-7744	DLY	31.0736	-96.9789	410	NCEI	1965-2015
TX	ROSSER	41-7773	DLY	32.4611	-96.4494	364	NCEI	1941-2017
TX	ROTAN	41-7782	DLY	32.8556	-100.4611	1936	NCEI	1924-2017
TX	ROUND MTN	41-7787	DLY	30.4247	-98.3492	1289	NCEI	1958-2011

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TX	ROUND ROCK 3 NE	41-7791	DLY	30.5414	-97.6350	722	NCEI	1968-2015
TX	RUNGE	41-7836	DLY	28.8297	-97.7133	295	NCEI	1895-2017
TX	RUSK	41-7841	DLY	31.8092	-95.1428	696	NCEI	1942-2017
TX	S MAYDE CK AT MORTON RD	60-0129	15M	29.8171	-95.7411	113	HCFCD	2014-2017
TX	SABINAL	41-7873	DLY	29.3283	-99.4653	955	NCEI	1903-2017
TX	SALT FLAT	41-7920	DLY	31.7456	-105.0806	3724	NCEI	1978-1998
TX	SALT FLAT CAA AP	41-7922	HLY	31.7500	-105.0833	3717	NCEI	1942-1955
TX	SALT FLAT CAA AP	79-0122	DLY	31.7500	-105.0833	3717	NCEI	1946-1957
TX	SAM RAYBURN DAM	66-7936	15M	31.0619	-94.1011	189	NCEI	2013-2017
TX	SAM RAYBURN DAM	41-7936	15M	31.0619	-94.1011	189	NCEI	1979-2013
TX	SAM RAYBURN DAM	41-7936	HLY	31.0619	-94.1011	189	NCEI	1968-2013
TX	SAM RAYBURN DAM	41-7936	DLY	31.0619	-94.1011	190	NCEI	1968-2017
TX	SAN ANGELO	79-0110	DLY	31.3711	-100.4922	1890	NCEI	1907-2017
TX	SAN ANGELO 2.2 WSW	69-2400	DLY	31.4318	-100.4853	1880	NCEI	2011-2017
TX	SAN ANGELO DAM	41-7940	DLY	31.4667	-100.4833	1962	NCEI	1953-1975
TX	SAN ANGELO MATHIS FLD	41-7943	HLY	31.3517	-100.4950	1916	NCEI	1948-2013
TX	SAN ANGELO REGIONAL/MATHS FIEL	55-0100	HLY	31.3517	-100.4950	1916	NCEI	1996-2007
TX	SAN ANGELO REGIONAL/MATHS FIEL	56-0179	HLY	31.3510	-100.4940	1892	NCEI	2007-2017
TX	SAN ANGELO WFO	66-7944	15M	31.3705	-100.4941	1900	NCEI	2013-2018
TX	SAN ANGELO WFO	41-7944	DLY	31.3706	-100.4942	1900	NCEI	1947-2017
TX	SAN ANTONIO	52-7950	DLY	29.4258	-98.4900	641	FORTS	1849-1892
TX	SAN ANTONIO	52-7954	DLY	29.4239	-98.4936	645	FORTS	1870-1873
TX	SAN ANTONIO INT'L AP	41-7945	HLY	29.5442	-98.4839	789	NCEI	1941-2013
TX	SAN ANTONIO INTL AP	78-0068	15M	29.5443	-98.4839	789	NCEI	2000-2017
TX	SAN ANTONIO INTL AP	79-0045	DLY	29.5442	-98.4839	791	NCEI	1946-2017
TX	SAN ANTONIO KELLY AFB	79-0037	DLY	29.3833	-98.5833	682	NCEI	1949-1970
TX	SAN ANTONIO NURSERY	41-7948	HLY	29.3000	-98.4667	591	NCEI	1944-1968
TX	SAN ANTONIO NURSERY	41-7948	DLY	29.3000	-98.4667	591	NCEI	1893-1951
TX	SAN ANTONIO STINSON AP	41-8653	HLY	29.3389	-98.4719	571	NCEI	2002-2013
TX	SAN ANTONIO STINSON AP	79-0063	DLY	29.3389	-98.4719	571	NCEI	1998-2017
TX	SAN ANTONIO WB CITY	99-0002	HLY	29.4245	-98.4919	653	NCEI	1902-1941
TX	SAN AUGUSTINE	41-7951	HLY	31.5069	-94.1072	310	NCEI	1962-1978
TX	SAN AUGUSTINE	41-7951	DLY	31.5069	-94.1072	312	NCEI	1909-2017

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TX	SAN BENITO	41-7952	DLY	26.1333	-97.6333	39	NCEI	1920-1975
TX	SAN BENITO 0.6 SSE	69-1126	DLY	26.1301	-97.6306	33	NCEI	2012-2015
TX	SAN JACINTO RVR AT US 59	60-0067	15M	30.0265	-95.2582	43	HCFCD	1986-2017
TX	SAN JACINTO RVR AT US 90	60-0064	15M	29.8764	-95.0936	2	HCFCD	1986-2017
TX	SAN MARCOS	99-7983	DLY	29.8833	-97.9494	666	NCEI	1897-1901
TX	SAN MARCOS	41-7983	DLY	29.8833	-97.9494	666	NCEI	1893-2017
TX	SAN SABA	41-7992	DLY	31.1966	-98.7164	1194	NCEI	1901-2000
TX	SAN SABA 0.4 E	69-2376	DLY	31.1960	-98.7187	1204	NCEI	2008-2015
TX	SAN SABA 1.5 E	69-2377	DLY	31.1972	-98.6997	1201	NCEI	2008-2015
TX	SAN SABA 15 ESE	63-0053	HLY	31.1577	-98.4725	1326	LCRA	1991-2018
TX	SAN SABA RIVER AT SAN SABA	63-0041	HLY	31.2139	-98.7197	1200	LCRA	1988-2018
TX	SAN SABA RIVER AT SAN SABA	85-0814	HLY	31.2131	-98.7192	1220	HADS	1999-2017
TX	SANDERSON	41-8022	HLY	30.1414	-102.3917	2788	NCEI	1942-2013
TX	SANDERSON	41-8022	DLY	30.1414	-102.3917	2789	NCEI	1897-2013
TX	SANDERSON 5 NNW	41-8023	15M	30.2156	-102.4164	3080	NCEI	1982-2008
TX	SANDERSON 5 NNW	41-8023	HLY	30.2156	-102.4164	3080	NCEI	1947-2008
TX	SANDERSON 5 NNW	41-8023	DLY	30.2156	-102.4164	3081	NCEI	1947-1951
TX	SANDY CRK NR KINGSLAND	63-0133	HLY	30.5577	-98.4722	875	LCRA	1988-2018
TX	SANGER	41-8043	DLY	33.3633	-97.1744	676	NCEI	1941-1999
TX	SANGER 1.8 WSW	69-1191	DLY	33.3504	-97.2063	692	NCEI	2008-2017
TX	SANTA ANNA	66-8047	15M	31.7427	-99.3105	1745	NCEI	2013-2018
TX	SANTA ANNA	41-8047	15M	31.7428	-99.3106	1745	NCEI	1980-2013
TX	SANTA ANNA	41-8047	HLY	31.7428	-99.3106	1745	NCEI	1940-2013
TX	SARITA 7 E	66-8081	15M	27.2169	-97.6955	38	NCEI	2014-2018
TX	SARITA 7 E	41-8081	15M	27.2169	-97.6956	38	NCEI	1978-2013
TX	SARITA 7 E	41-8081	HLY	27.2169	-97.6956	38	NCEI	1941-2013
TX	SARITA 7 E	41-8081	DLY	27.2169	-97.6956	39	NCEI	1899-2017
TX	SCHERTZ 2.2 N	69-1425	DLY	29.5856	-98.2554	764	NCEI	2008-2017
TX	SCHOLES FIELD	55-0043	HLY	29.2650	-94.8600	54	NCEI	1996-2007
TX	SCHOLES INTL AT GLSTON APT	56-0111	HLY	29.2650	-94.8600	9	NCEI	2007-2017
TX	SCHULENBURG	41-8126	DLY	29.6825	-96.8564	289	NCEI	1926-2017
TX	SEALY	41-8160	DLY	29.7714	-96.1456	197	NCEI	1910-2003
TX	SEALY 0.3 WNW	69-0550	DLY	29.7757	-96.1581	194	NCEI	2007-2017

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TX	SECO CREEK AT MILLER RANCH	87-0031	DLY	29.5731	-99.4028	1283	USBR	2006-2016
TX	SEGUIN	41-8186	DLY	29.5833	-97.9500	512	NCEI	1922-1972
TX	SEGUIN 1 SSW	41-8187	DLY	29.5519	-97.9697	502	NCEI	1992-2017
TX	SEMINOLE	41-8201	DLY	32.7131	-102.6597	3337	NCEI	1922-2017
TX	SEYMOUR 3NW	41-8221	DLY	33.6325	-99.2897	1302	NCEI	1905-2017
TX	SH 6 -SH 290	60-0235	15M	30.1144	-96.0756	231	HCFCD	2002-2017
TX	SHAMROCK	41-8235	DLY	35.2000	-100.2500	2323	NCEI	1929-1987
TX	SHAMROCK 2	41-8236	DLY	35.2150	-100.2503	2359	NCEI	1962-2017
TX	SHEFFIELD	41-8252	15M	30.6886	-101.8272	2175	NCEI	1978-2013
TX	SHEFFIELD	41-8252	HLY	30.6886	-101.8272	2175	NCEI	1942-2013
TX	SHEFFIELD	41-8252	DLY	30.6886	-101.8272	2175	NCEI	1938-2011
TX	SHEPHERD 2 SE	41-8265	HLY	30.4833	-95.0000	180	NCEI	1940-1965
TX	SHEPPARD AFB/WICHITA FALLS MUN	56-0164	HLY	33.9786	-98.4928	1030	NCEI	2007-2017
TX	SHERMAN	41-8274	DLY	33.7033	-96.6419	860	NCEI	1897-2017
TX	SHOAL CREEK AT W 45TH STREET	65-0064	15M	30.3187	-97.7489	602	COA	1987-2017
TX	SIERRA BLANCA 0.7 NNE	69-1574	DLY	31.1836	-105.3517	4551	NCEI	2013-2013
TX	SIERRA BLANCA 2 E	41-8305	HLY	31.1831	-105.3542	4590	NCEI	1942-2007
TX	SIERRA BLANCA 2 E	41-8305	DLY	31.1831	-105.3542	4590	NCEI	1893-2002
TX	SILVER VALLEY	41-8326	DLY	31.9550	-99.5439	2011	NCEI	1973-2017
TX	SILVERTON	41-8323	DLY	34.4722	-101.3006	3281	NCEI	1925-2017
TX	SIMMS 3 W	41-8333	DLY	33.3500	-94.5500	322	NCEI	1981-1981
TX	SIMMS 4 WNW	41-8335	HLY	33.3667	-94.5667	322	NCEI	1944-1973
TX	SIMMS 4 WNW	41-8335	DLY	33.3667	-94.5667	322	NCEI	1948-1973
TX	SINTON	41-8354	DLY	28.0353	-97.4972	52	NCEI	1921-2017
TX	SISTERDALE	41-8358	DLY	29.9756	-98.7217	1325	NCEI	1988-2017
TX	SITE 1-RESERVOIR	85-0310	HLY	29.7697	-95.6469	89	HADS	1995-2017
TX	SLATON	41-8373	DLY	33.4367	-101.6472	3081	NCEI	1949-2017
TX	SLIDELL	41-8378	DLY	33.3583	-97.3933	984	NCEI	1947-2000
TX	SLOAN	41-8382	DLY	31.1561	-98.9173	1302	NCEI	1935-1975
TX	SMITH BROTHERS RCH	41-8400	HLY	30.4833	-104.1000	5300	NCEI	1942-1949
TX	SMITHSONS VALLEY	41-8414	DLY	29.8167	-98.3333	1302	NCEI	1946-1955
TX	SMITHVILLE	41-8415	DLY	30.0067	-97.1689	341	NCEI	1917-2017
TX	SNYDER	41-8433	DLY	32.7100	-100.9111	2320	NCEI	1911-2017

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	SOCORRO	41-8435	DLY	31.6500	-106.2833	3661	NCEI	1918-1950
TX	SOCORRO 3.5 NW	69-1274	DLY	31.6716	-106.3142	3675	NCEI	2012-2017
TX	SOMERVILLE	41-8445	HLY	30.3500	-96.5167	249	NCEI	1940-1963
TX	SOMERVILLE	41-8445	DLY	30.3500	-96.5167	249	NCEI	1908-1951
TX	SOMERVILLE DAM	41-8446	HLY	30.3367	-96.5403	263	NCEI	1963-1994
TX	SOMERVILLE DAM	41-8446	DLY	30.3367	-96.5403	262	NCEI	1963-2017
TX	SOMERVILLE LAKE	85-0802	HLY	30.3167	-96.5333	226	HADS	1995-2017
TX	SONORA	54-0210	DLY	30.2613	-100.5551	2283	NADP	1984-2015
TX	SONORA	41-8449	DLY	30.5831	-100.6503	2139	NCEI	1902-2017
TX	SONORA EXP ST	41-8450	DLY	30.2667	-100.5667	2285	NCEI	1959-1964
TX	SOUTH LLANO RIVER AT TELEGRAPH	63-0078	HLY	30.3234	-99.9058	1839	LCRA	2007-2018
TX	SOUTH WICHITA RIVER NR BENJAMI	85-0328	HLY	33.6500	-99.8000	1358	HADS	1995-2017
TX	SOUTHEAST TEXAS REGIONAL AIRPO	56-0106	HLY	29.9506	-94.0206	16	NCEI	2007-2017
TX	SPEAKS 2	41-8519	DLY	29.2728	-96.6858	144	NCEI	1967-2017
TX	SPEARMAN	41-8523	DLY	36.1981	-101.1847	3094	NCEI	1920-2003
TX	SPICEWOOD	66-8531	15M	30.4827	-98.1597	850	NCEI	2013-2017
TX	SPICEWOOD	41-8531	15M	30.4828	-98.1597	850	NCEI	1984-2013
TX	SPICEWOOD	41-8531	HLY	30.4828	-98.1597	850	NCEI	1968-2013
TX	SPICEWOOD	41-8531	DLY	30.4828	-98.1597	850	NCEI	1968-2017
TX	SPICEWOOD 2 NNE	63-0147	15M	30.4977	-98.1483	821	LCRA	2005-2018
TX	SPICEWOOD 2 NNE	63-0147	HLY	30.4977	-98.1483	821	LCRA	2004-2018
TX	SPRING BRANCH 2SE	66-8544	15M	29.8652	-98.3796	1005	NCEI	2013-2017
TX	SPRING BRANCH 2SE	41-8544	15M	29.8653	-98.3797	1005	NCEI	1988-2013
TX	SPRING BRANCH 2SE	41-8544	HLY	29.8653	-98.3797	1005	NCEI	1988-2013
TX	SPRING BRANCH 2SE	41-8544	DLY	29.8653	-98.3797	1004	NCEI	1956-2017
TX	SPRING BRANCH AT BINGLE RD	60-0141	15M	29.7963	-95.5004	72	HCFCD	1996-2017
TX	SPRINGTOWN 4 S	66-8563	15M	32.9086	-97.6786	1053	NCEI	2013-2017
TX	SPRINGTOWN 4 S	41-8563	15M	32.9086	-97.6786	1053	NCEI	1977-2013
TX	SPRINGTOWN 4 S	41-8563	HLY	32.9086	-97.6786	1053	NCEI	1977-2013
TX	SPUR	41-8566	HLY	33.4792	-100.8761	2297	NCEI	1947-1964
TX	SPUR	41-8566	DLY	33.4792	-100.8761	2297	NCEI	1911-2017
TX	SPUR (NEAR)	41-8567	HLY	33.4833	-100.9000	2311	NCEI	1940-1946
TX	STAMFORD 1	66-8583	15M	32.9402	-99.8036	1640	NCEI	2013-2018

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	STAMFORD 1	41-8583	15M	32.9403	-99.8036	1640	NCEI	1980-2013
TX	STAMFORD 1	41-8583	HLY	32.9403	-99.8036	1640	NCEI	1947-2013
TX	STAMFORD 1	41-8583	DLY	32.9403	-99.8036	1640	NCEI	1911-2017
TX	STAMFORD 2	41-8584	15M	32.9500	-99.8000	1601	NCEI	1971-1980
TX	STAMFORD 2	41-8584	HLY	32.9500	-99.8000	1601	NCEI	1940-1980
TX	STATE HIGHWAY 365 - GREEN POND	82-5400	15M	29.9453	-94.3261	20	DD6	1991-2017
TX	STATE HWY 124 - HILLEBRANDT BA	82-2300	15M	30.0358	-94.1489	16	DD6	1993-2017
TX	STEPHENVILLE	66-8623	15M	32.2313	-98.2319	1290	NCEI	2013-2017
TX	STEPHENVILLE	41-8623	15M	32.2314	-98.2319	1290	NCEI	1978-2013
TX	STEPHENVILLE	41-8623	HLY	32.2314	-98.2319	1290	NCEI	1940-2013
TX	STEPHENVILLE	79-0028	DLY	32.2314	-98.2319	1289	NCEI	1918-2016
TX	STEPHENVILLE 7 WSW	41-8625	HLY	32.1667	-98.3167	1450	NCEI	1947-1975
TX	STERLING CITY	66-8630	15M	31.8347	-100.9827	2280	NCEI	2013-2018
TX	STERLING CITY	41-8630	15M	31.8347	-100.9828	2280	NCEI	1984-2013
TX	STERLING CITY	41-8630	HLY	31.8347	-100.9828	2280	NCEI	1977-2013
TX	STERLING CITY	41-8630	DLY	31.8347	-100.9828	2280	NCEI	1926-2017
TX	STERLING CITY 8 NE	41-8631	HLY	31.9186	-100.8786	2710	NCEI	1949-1977
TX	STERLING CITY 8 NE	41-8631	DLY	31.9186	-100.8786	2710	NCEI	1949-2007
TX	STILLHOUSE HOLLOW DAM	66-8646	15M	31.0372	-97.5283	706	NCEI	2013-2017
TX	STILLHOUSE HOLLOW DAM	41-8646	15M	31.0372	-97.5283	706	NCEI	1984-2013
TX	STILLHOUSE HOLLOW DAM	41-8646	HLY	31.0372	-97.5283	706	NCEI	1964-2013
TX	STILLHOUSE HOLLOW DAM	41-8646	DLY	31.0372	-97.5283	705	NCEI	1963-2017
TX	STINNETT	41-8647	HLY	35.8185	-101.4425	3130	NCEI	1959-1992
TX	STINNETT	41-8647	DLY	35.8185	-101.4425	3130	NCEI	1929-1944
TX	STINSON MINICIPAL AIRPORT	55-0055	HLY	29.3389	-98.4720	577	NCEI	1998-2007
TX	STINSON MINICIPAL AIRPORT	56-0127	HLY	29.3370	-98.4710	577	NCEI	2007-2017
TX	STOCKDALE 6N	41-8658	DLY	29.3258	-97.9753	531	NCEI	1940-2017
TX	STRATFORD	41-8692	DLY	36.4414	-102.0775	3602	NCEI	1911-2017
TX	STRAWN 8 NNE	41-8696	DLY	32.6592	-98.4678	1181	NCEI	1949-2017
TX	STUDY BUTTE	41-8714	DLY	29.3286	-103.5531	2562	NCEI	1993-2007
TX	SUBSTN 14	41-8721	DLY	30.2667	-100.5833	2268	NCEI	1922-1952
TX	SUGAR LAND	41-8728	DLY	29.6219	-95.6567	85	NCEI	1893-2013
TX	SUGAR LAND .5 SE	69-1325	DLY	29.6107	-95.6335	95	NCEI	2007-2017

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TX	SUGAR LAND MUNI/HULL FIELD	55-0061	HLY	29.6219	-95.6567	82	NCEI	2000-2007
TX	SUGAR LAND REGIONAL ARPT	56-0134	HLY	29.6219	-95.6567	82	NCEI	2007-2017
TX	SUGAR LAND REGIONAL ARPT	64-0315	HLY	29.6220	-95.6570	84	NCEI	2005-2016
TX	SULPHUR SPRINGS	41-8743	15M	33.1481	-95.6269	495	NCEI	1978-2013
TX	SULPHUR SPRINGS	41-8743	HLY	33.1481	-95.6269	495	NCEI	1941-2013
TX	SULPHUR SPRINGS	41-8743	DLY	33.1481	-95.6269	495	NCEI	1893-2017
TX	SUNRAY 4 SW	41-8761	HLY	35.9667	-101.8667	3543	NCEI	1955-1984
TX	SUNRAY 4 SW	41-8761	DLY	35.9667	-101.8667	3543	NCEI	1932-1984
TX	SWAN 4 NW	66-8778	15M	32.4561	-95.4230	450	NCEI	2013-2017
TX	SWAN 4 NW	41-8778	15M	32.4561	-95.4231	450	NCEI	1974-2013
TX	SWAN 4 NW	41-8778	HLY	32.4561	-95.4231	450	NCEI	1957-2013
TX	SWEETWATER CREEK	85-0597	HLY	35.4667	-100.1206	2290	HADS	1995-2017
TX	SWEETWATER CREEK NEAR KELTON	87-0038	HLY	35.4667	-100.1206	2276	USBR	1989-2016
TX	TAHOKA	41-8818	DLY	33.1714	-101.7981	3120	NCEI	1913-2017
TX	TAMPICO	41-8833	DLY	34.4667	-100.8167	2251	NCEI	1940-1984
TX	TARPLEY	41-8845	15M	29.6675	-99.2883	1390	NCEI	1976-2013
TX	TARPLEY	41-8845	HLY	29.6675	-99.2883	1390	NCEI	1940-2013
TX	TARPLEY	99-8845	DLY	29.6675	-99.2883	1391	NCEI	1978-1996
TX	TARPLEY	41-8845	DLY	29.6675	-99.2883	1391	NCEI	1937-2017
TX	TASCOSA	41-8852	DLY	35.5667	-102.3000	3412	NCEI	1941-1984
TX	TATUM	41-8859	HLY	32.3000	-94.5167	269	NCEI	1940-1975
TX	TAYLOR	99-8861	HLY	30.5689	-97.4093	555	NCEI	1901-1934
TX	TAYLOR	41-8861	DLY	30.5700	-97.4092	564	NCEI	1929-2001
TX	TAYLOR 1NW	41-8862	DLY	30.5844	-97.4156	571	NCEI	2000-2017
TX	TAYLOR RCH	41-8863	DLY	30.9731	-98.9433	1831	NCEI	1965-2017
TX	TEAGUE RCH	41-8877	DLY	30.4333	-98.8097	1719	NCEI	1966-2017
TX	TELEGRAPH	41-8897	DLY	30.3289	-99.9067	1868	NCEI	1948-2009
TX	TEMPLE	76-0102	HLY	31.0564	-97.3469	573	RAWS	2003-2015
TX	TEMPLE	85-0842	HLY	31.0564	-97.3469	650	HADS	2004-2017
TX	TEMPLE	41-8910	DLY	31.0781	-97.3183	636	NCEI	1893-2003
TX	TEMPLE 3 SE	41-8911	HLY	31.0500	-97.3500	650	NCEI	1947-1968
TX	TERLINGUA	41-8924	HLY	29.3486	-103.5950	2633	NCEI	1942-1963
TX	TERLINGUA	41-8924	DLY	29.3486	-103.5950	2635	NCEI	1948-2017

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	TERRELL	41-8929	DLY	32.7336	-96.3225	495	NCEI	1941-2017
TX	TERRELL MUNI AP	79-0141	DLY	32.7100	-96.2672	476	NCEI	1998-2017
TX	TESCO	41-8939	DLY	32.5000	-100.2500	2001	NCEI	1944-1971
TX	TEXARKANA	41-8942	15M	33.4367	-94.0772	390	NCEI	1973-2013
TX	TEXARKANA	41-8942	HLY	33.4367	-94.0772	390	NCEI	1968-2013
TX	TEXARKANA	41-8942	DLY	33.4367	-94.0772	390	NCEI	1968-2017
TX	TEXARKANA DAM	41-8944	HLY	33.3000	-94.1667	282	NCEI	1955-1972
TX	TEXARKANA DAM	41-8944	DLY	33.3000	-94.1667	282	NCEI	1955-1974
TX	THOMPSONS 3 WSW	41-8996	HLY	29.4822	-95.6314	70	NCEI	1957-2010
TX	THOMPSONS 3 WSW	41-8996	DLY	29.4822	-95.6314	69	NCEI	1942-2017
TX	THORNDALE	41-9001	DLY	30.6147	-97.2086	476	NCEI	1968-2017
TX	THORNTON 1SSE	41-9004	DLY	31.3917	-96.5656	476	NCEI	1944-2017
TX	THREE RIVERS	41-9009	DLY	28.4667	-98.1833	151	NCEI	1922-1987
TX	THROCKMORTON	41-9014	DLY	33.1806	-99.1897	1371	NCEI	1924-1999
TX	THURBER 5 NE	41-9015	DLY	32.5333	-98.3333	965	NCEI	1910-1991
TX	TIERRA BLANCA CK NR FM 1259	59-0001	15M	34.8129	-102.3899	3767	NWIS	2013-2016
TX	TILDEN 4 SSE	41-9031	DLY	28.4114	-98.5294	344	NCEI	1903-2010
TX	TINNIN RCH	41-9037	HLY	31.3167	-103.9833	3232	NCEI	1942-1969
TX	TOLEDO BEND DAM	41-9068	DLY	31.1750	-93.5653	190	NCEI	1975-2005
TX	TOMBALL	41-9076	DLY	30.1003	-95.6114	210	NCEI	1941-2014
TX	TOMBALL 2.7 ENE	69-1652	DLY	30.1135	-95.5748	164	NCEI	2012-2017
TX	TORNILLO 2 SSE	41-9088	DLY	31.4028	-106.0581	3524	NCEI	1946-2017
TX	TOW	41-9099	DLY	30.8836	-98.4708	1027	NCEI	1978-2017
TX	TOWN BLUFF DAM	41-8568	DLY	30.7931	-94.1819	210	NCEI	1953-1970
TX	TOWN BLUFF DAM	41-9101	DLY	30.7931	-94.1819	213	NCEI	1970-2017
TX	TOYAH	41-9106	DLY	31.3000	-103.8000	2945	NCEI	1943-1977
TX	TRA RIVERSIDE	60-0194	15M	30.8447	-95.3992	198	HCFCD	2008-2017
TX	TRENT	41-9122	DLY	32.4906	-100.1197	1909	NCEI	1940-2006
TX	TRENTON	41-9125	DLY	33.4311	-96.3397	755	NCEI	1946-2017
TX	TRINIDAD 1 SW	41-9136	DLY	32.1344	-96.1053	240	NCEI	1915-1966
TX	TRINIDAD PWR PLT	41-9137	DLY	32.1333	-96.1000	292	NCEI	1966-1990
TX	TRINITY RIVER - US 90 LIBERTY	60-0243	15M	30.0576	-94.8170	30	HCFCD	1995-2017
TX	TRINITY RIVER AT RIVERSIDE	85-0763	HLY	30.8592	-95.3986	131	HADS	2006-2017

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	TRINITY RIVER AT TRINIDAD	85-0833	HLY	32.1347	-96.1056	312	HADS	2001-2017
TX	TROY	41-9153	DLY	31.2061	-97.2956	699	NCEI	1940-2008
TX	TROY 3.1 SE	69-0598	DLY	31.1636	-97.2694	620	NCEI	2011-2017
TX	TRUSCOTT 3 W	66-9163	15M	33.7570	-99.8618	1571	NCEI	2013-2017
TX	TRUSCOTT 3 W	41-9163	15M	33.7569	-99.8617	1571	NCEI	1984-2013
TX	TRUSCOTT 3 W	41-9163	HLY	33.7569	-99.8617	1571	NCEI	1940-2013
TX	TRUSCOTT 3 W	41-9163	DLY	33.7569	-99.8617	1572	NCEI	1948-2017
TX	TULIA	41-9175	DLY	34.5475	-101.7614	3481	NCEI	1948-2017
TX	TULIA 6 NE	41-9176	DLY	34.6000	-101.7000	3504	NCEI	1896-1952
TX	TURKEY	41-9191	DLY	34.3956	-100.8972	2329	NCEI	1941-2017
TX	TURKEY CK AT FM 1959	60-0019	15M	29.5845	-95.1869	28	HCFCD	1986-2017
TX	TURNER RD. - DITCH 600	82-5100	15M	30.0642	-94.3153	34	DD6	1991-2017
TX	TYLER	41-9207	DLY	32.3067	-95.2969	551	NCEI	1984-2017
TX	TYLER POUNDS FIELD	55-0088	HLY	32.3542	-95.4025	544	NCEI	1998-2007
TX	TYLER POUNDS FLD	79-0093	DLY	32.3542	-95.4025	545	NCEI	1898-2017
TX	UMBARGER	41-9224	DLY	34.9578	-102.1044	3747	NCEI	1941-2012
TX	UPPER A SUMP - 1200 INDUSTRIAL	81-0040	15M	32.7614	-96.7961	403	COD	1993-2016
TX	UVALDE	41-9265	DLY	29.2167	-99.7667	912	NCEI	1905-1985
TX	UVALDE 3 SW	41-9268	DLY	29.1850	-99.8325	919	NCEI	1985-2005
TX	VALENTINE	41-9270	15M	30.5908	-104.4914	4440	NCEI	1980-2013
TX	VALENTINE	41-9270	HLY	30.5908	-104.4914	4440	NCEI	1959-2013
TX	VALENTINE	41-9270	DLY	30.5908	-104.4914	4439	NCEI	1978-2017
TX	VALENTINE 10 WSW	41-9275	DLY	30.5525	-104.6467	4393	NCEI	1897-2017
TX	VALLEY INTERNATIONAL ARPT	56-0100	HLY	26.2280	-97.6540	35	NCEI	2007-2017
TX	VALLEY JUNCTION	41-9280	DLY	30.8333	-96.6333	269	NCEI	1902-1977
TX	VALLEY JUNCTION HEARNE	99-9280	DLY	30.8333	-96.6333	269	NCEI	1888-1946
TX	VALLEY VIEW	41-9286	DLY	33.4869	-97.1572	725	NCEI	1947-2002
TX	VAN HORN	41-9295	DLY	31.0417	-104.8372	4065	NCEI	1939-2017
TX	VANDERPOOL 10 N	41-9312	DLY	29.8451	-99.5516	2264	NCEI	1996-2017
TX	VANDERPOOL 10N	99-9312	DLY	29.8451	-99.5516	2264	NCEI	1986-1996
TX	VEGA 2NW	41-9330	DLY	35.2775	-102.4633	3999	NCEI	1923-2017
TX	VERNON	41-9346	DLY	34.1517	-99.3256	1211	NCEI	1904-2017
TX	VICTORIA 6.4 SSW	69-2646	DLY	28.7423	-97.0268	62	NCEI	2013-2017

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	VICTORIA ASOS	41-9364	HLY	28.8614	-96.9303	115	NCEI	1940-2013
TX	VICTORIA CP&L	41-9365	DLY	28.7875	-97.0106	62	NCEI	1893-2003
TX	VICTORIA REGIONAL AIRPORT	56-0105	HLY	28.8614	-96.9303	117	NCEI	2007-2017
TX	VICTORIA RGNL AP	79-0040	DLY	28.8614	-96.9303	115	NCEI	1953-2017
TX	VICTORIA WB AP	41-9363	HLY	28.7833	-97.0833	115	NCEI	1946-1961
TX	VICTORIA WB AP	79-0046	DLY	28.7833	-97.0833	115	NCEI	1946-1961
TX	VOSS 1 WSW	41-9410	DLY	31.6167	-99.5833	1650	NCEI	1949-1981
TX	WACO	41-9421	DLY	31.5333	-97.0667	381	NCEI	1883-1957
TX	WACO DAM	66-9417	15M	31.6003	-97.2169	495	NCEI	2013-2017
TX	WACO DAM	41-9417	15M	31.6003	-97.2169	495	NCEI	1984-2013
TX	WACO DAM	41-9417	HLY	31.6003	-97.2169	495	NCEI	1965-2013
TX	WACO DAM	41-9417	DLY	31.6003	-97.2169	495	NCEI	1965-2017
TX	WACO REGIONAL AIRPORT	56-0160	HLY	31.6110	-97.2290	508	NCEI	2007-2017
TX	WACO RGNL AP	41-9419	HLY	31.6189	-97.2283	500	NCEI	1941-2013
TX	WACO RGNL AP	79-0087	DLY	31.6189	-97.2283	499	NCEI	1941-2017
TX	WAELDER 7 S	41-9424	DLY	29.6000	-97.3167	341	NCEI	1944-1993
TX	WALLER	41-9448	DLY	30.0486	-95.9250	144	NCEI	1943-1999
TX	WARREN 2 S	41-9480	DLY	30.5833	-94.4000	112	NCEI	1935-1992
TX	WASHINGTON SP	66-9491	15M	30.3237	-96.1594	215	NCEI	2013-2018
TX	WASHINGTON SP	41-9491	15M	30.3236	-96.1594	215	NCEI	1978-2013
TX	WASHINGTON SP	41-9491	HLY	30.3236	-96.1594	215	NCEI	1952-2013
TX	WASHINGTON SP	41-9491	DLY	30.3236	-96.1594	217	NCEI	1915-2017
TX	WATER VALLEY	66-9499	15M	31.6725	-100.7283	2120	NCEI	2013-2018
TX	WATER VALLEY	41-9499	15M	31.6725	-100.7283	2120	NCEI	1971-2013
TX	WATER VALLEY	41-9499	HLY	31.6725	-100.7283	2120	NCEI	1953-2013
TX	WATER VALLEY	41-9499	DLY	31.6725	-100.7283	2119	NCEI	1898-2017
TX	WATER VALLEY 11 NNE	41-9501	DLY	31.8136	-100.6286	2454	NCEI	1959-2017
TX	WATSON	41-9504	DLY	30.9328	-98.0197	1004	NCEI	1968-2017
TX	WAXAHACHIE	41-9522	DLY	32.4281	-96.8422	627	NCEI	1897-2012
TX	WAYSIDE	66-9527	15M	34.7933	-101.5483	3400	NCEI	2013-2017
TX	WAYSIDE	41-9527	15M	34.7933	-101.5483	3400	NCEI	1971-2013
TX	WAYSIDE	41-9527	HLY	34.7933	-101.5483	3400	NCEI	1941-2013
TX	WEATHERFORD	66-9532	15M	32.7483	-97.7700	955	NCEI	2013-2017

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	WEATHERFORD	41-9532	15M	32.7483	-97.7700	955	NCEI	1971-2013
TX	WEATHERFORD	41-9532	HLY	32.7483	-97.7700	955	NCEI	1947-2013
TX	WEATHERFORD	99-9532	DLY	32.7483	-97.7700	955	NCEI	1883-1901
TX	WEATHERFORD	41-9532	DLY	32.7483	-97.7700	955	NCEI	1902-2017
TX	WEBBERVILLE ROAD	65-0089	15M	30.2636	-97.7126	473	COA	1986-2017
TX	WELDER WILDLIFE FNDN	41-9559	DLY	28.1136	-97.4178	49	NCEI	1964-2017
TX	WELLINGTON	41-9565	15M	34.8422	-100.2103	2040	NCEI	1985-2013
TX	WELLINGTON	41-9565	HLY	34.8422	-100.2103	2040	NCEI	1949-2013
TX	WELLINGTON	41-9565	DLY	34.8422	-100.2103	2041	NCEI	1912-2017
TX	WELLINGTON 2	41-9570	15M	34.8500	-100.2167	2031	NCEI	1971-1983
TX	WELLINGTON 2	41-9570	HLY	34.8500	-100.2167	2031	NCEI	1971-1983
TX	WESLACO	66-9588	15M	26.1780	-97.9708	75	NCEI	2013-2018
TX	WESLACO	41-9588	15M	26.1781	-97.9708	75	NCEI	1975-2013
TX	WESLACO	88-2205	HLY	26.1555	-97.9593	57	SCAN	2013-2016
TX	WESLACO	41-9588	HLY	26.1781	-97.9708	75	NCEI	1947-2013
TX	WESLACO	41-9588	DLY	26.1781	-97.9708	75	NCEI	1914-2017
TX	WF TRINITY R NR JACKSBORO	85-0568	HLY	33.2933	-98.0786	915	HADS	1995-2017
TX	WHARTON	41-9655	DLY	29.3178	-96.0847	112	NCEI	1902-2017
TX	WHEELOCK	41-9665	15M	30.9003	-96.3953	420	NCEI	1979-2006
TX	WHEELOCK	41-9665	HLY	30.9003	-96.3953	420	NCEI	1940-2006
TX	WHITE OAK 1 WSW	41-9709	DLY	32.5164	-94.8914	315	NCEI	2000-2005
TX	WHITNEY DAM	66-9715	15M	31.8611	-97.3750	574	NCEI	2013-2017
TX	WHITNEY DAM	41-9715	15M	31.8611	-97.3750	574	NCEI	1975-2013
TX	WHITNEY DAM	41-9715	HLY	31.8611	-97.3750	574	NCEI	1952-2013
TX	WHITNEY DAM	41-9715	DLY	31.8611	-97.3750	574	NCEI	1949-2017
TX	WHITSETT	41-9717	DLY	28.6611	-98.2553	259	NCEI	1964-2015
TX	WHITSETT 3 SW	41-9716	DLY	28.6333	-98.2667	210	NCEI	1914-1964
TX	WICHITA FALLS MUNI AP	41-9729	HLY	33.9786	-98.4928	1017	NCEI	1940-2013
TX	WICHITA FALLS MUNI AP	79-0092	DLY	33.9786	-98.4928	1017	NCEI	1897-2017
TX	WICHITA VALLEY FARM 29	41-9730	DLY	33.9333	-98.5833	961	NCEI	1939-1972
TX	WILBARGER CRK NR ELGIN	63-0209	HLY	30.2318	-97.4327	373	LCRA	1994-2018
TX	WILDWOOD	41-9754	DLY	30.5347	-94.4456	200	NCEI	1992-2016
TX	WILLS POINT	41-9800	DLY	32.7019	-96.0150	522	NCEI	1905-2017

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	WILSON RCH	41-9813	DLY	29.9000	-99.6000	2280	NCEI	1941-1962
TX	WIMBERLEY 1 NW	66-9815	15M	30.0016	-98.1048	905	NCEI	2013-2017
TX	WIMBERLEY 1 NW	41-9815	15M	30.0017	-98.1047	905	NCEI	1989-2013
TX	WIMBERLEY 1 NW	41-9815	HLY	30.0017	-98.1047	905	NCEI	1989-2013
TX	WIMBERLEY 1 NW	41-9815	DLY	30.0017	-98.1047	906	NCEI	1984-2017
TX	WINCHELL	41-9817	15M	31.4658	-99.1708	1460	NCEI	1976-2013
TX	WINCHELL	41-9817	HLY	31.4658	-99.1708	1460	NCEI	1953-2013
TX	WINCHELL 1 WNW	41-9816	HLY	31.4833	-99.1833	1381	NCEI	1949-1953
TX	WINCHELL 1 WNW	41-9816	DLY	31.4833	-99.1833	1381	NCEI	1948-1965
TX	WINGATE	41-9847	DLY	32.0444	-100.1069	2008	NCEI	1968-2017
TX	WINK	41-9829	15M	31.7667	-103.1500	2790	NCEI	1976-1997
TX	WINK	41-9829	HLY	31.7667	-103.1500	2790	NCEI	1942-1997
TX	WINK FAA AP	41-9830	HLY	31.7800	-103.2017	2807	NCEI	1947-2013
TX	WINKLER CO AP	79-0112	DLY	31.7800	-103.2017	2808	NCEI	1938-2017
TX	WINKLER COUNTY AIRPORT	55-0101	HLY	31.7800	-103.2010	2820	NCEI	2000-2007
TX	WINKLER COUNTY AIRPORT	56-0180	HLY	31.7800	-103.2010	2820	NCEI	2007-2017
TX	WINNSBORO	99-9836	DLY	32.8892	-95.3331	430	NCEI	1944-1947
TX	WINNSBORO 0.7 SSW	69-2728	DLY	32.9470	-95.2960	495	NCEI	2009-2017
TX	WINNSBORO 6 SW	41-9836	DLY	32.8892	-95.3331	430	NCEI	1947-2013
TX	WINTERS 9 NNE	41-9845	DLY	32.1000	-99.9000	1972	NCEI	1911-1968
TX	WITT RCH	41-9853	DLY	32.4833	-100.3000	2090	NCEI	1972-1975
TX	WOLF CREEK DAM	41-9858	HLY	36.2333	-100.6667	2703	NCEI	1941-1974
TX	WOLF CREEK DAM	41-9858	DLY	36.2333	-100.6667	2703	NCEI	1948-1951
TX	WOLFE CITY	41-9859	DLY	33.3675	-96.0675	659	NCEI	1944-2008
TX	WOODSBORO	41-9892	DLY	28.2333	-97.3333	49	NCEI	1916-1964
TX	WOODSON	66-9893	15M	33.0177	-99.0538	1263	NCEI	2013-2018
TX	WOODSON	41-9893	15M	33.0178	-99.0539	1263	NCEI	1980-2013
TX	WOODSON	41-9893	HLY	33.0178	-99.0539	1263	NCEI	1941-2013
TX	WOODSON	41-9893	DLY	33.0178	-99.0539	1263	NCEI	1948-2017
TX	WOODY BRANCH - WESTMORELAND RD	81-0027	15M	32.6739	-96.8828	N/A	COD	1991-2016
TX	WORLDS END RCH	41-9904	DLY	29.9828	-99.4290	1923	NCEI	1976-1983
TX	WRIGHT PATMAN DM & LK	41-9916	15M	33.3039	-94.1583	282	NCEI	1984-2013
TX	WRIGHT PATMAN DM & LK	41-9916	HLY	33.3039	-94.1583	282	NCEI	1981-2013

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	WRIGHT PATMAN DM & LK	41-9916	DLY	33.3039	-94.1583	282	NCEI	1974-2017
TX	YOAKUM	41-9952	DLY	29.2739	-97.1556	295	NCEI	1917-2017
TX	YOAKUM 6.2 WNW	69-1214	DLY	29.3354	-97.2363	413	NCEI	2007-2017
TX	YORKTOWN	41-9953	DLY	28.9803	-97.5186	259	NCEI	1940-2012
TX	YSLETA	41-9966	DLY	31.6953	-106.3217	3671	NCEI	1939-2009
TX	ZAPATA 1 S	41-9976	15M	26.8706	-99.2536	320	NCEI	1976-2008
TX	ZAPATA 1 S	41-9976	HLY	26.8706	-99.2536	320	NCEI	1940-2008
TX	ZAPATA 1 S	41-9976	DLY	26.8706	-99.2536	322	NCEI	1909-2014

Table A.1.4. Same as Table A.1.3, but for stations in Arkansas (AR), Colorado (CO), Kansas (KS), Louisiana (LA), New Mexico (NM) and in the United Mexican States (MX).

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
AR	AMITY 1N	03-0150	DLY	34.2808	-93.4614	459	NCEI	1896-2017
AR	ANTOINE	03-0178	DLY	34.0292	-93.4211	285	NCEI	1940-2017
AR	ANTOINE 1 SW	66-0178	15M	34.0275	-93.4332	300	NCEI	2013-2018
AR	ANTOINE 1 SW	03-0178	15M	34.0275	-93.4333	300	NCEI	1984-2013
AR	ANTOINE 1 SW	03-0178	HLY	34.0275	-93.4333	300	NCEI	1950-2013
AR	ASHDOWN 4 SSE	03-0286	DLY	33.6194	-94.0994	322	NCEI	1893-2017
AR	ATHENS	03-0300	DLY	34.3253	-93.9811	961	NCEI	1948-2013
AR	BIG FORK 1 SSE	03-0664	DLY	34.4653	-93.9932	1200	NCEI	1944-2017
AR	BLUFF CITY	76-0001	HLY	33.6922	-93.1625	360	RAWS	2004-2015
AR	BLUFF CITY 3 SW	03-0800	DLY	33.6919	-93.1622	361	NCEI	1941-2012
AR	BONNERDALE 1 ESE	03-0820	DLY	34.3811	-93.3497	682	NCEI	1965-2017
AR	BOUGHTON	03-0848	DLY	33.8667	-93.3333	249	NCEI	1935-1982
AR	COSSATOT RIVER	85-0005	HLY	34.0500	-94.2167	394	HADS	1995-2017
AR	COVE	03-1666	DLY	34.4314	-94.4175	1060	NCEI	1946-2017
AR	DAISY	03-1814	HLY	34.2500	-93.7333	630	NCEI	1948-1975
AR	DAISY	03-1814	DLY	34.2500	-93.7333	630	NCEI	1948-1974
AR	DE QUEEN DAM	03-1952	15M	34.1003	-94.3725	557	NCEI	1984-2008
AR	DE QUEEN DAM	03-1952	HLY	34.1003	-94.3725	557	NCEI	1973-2008
AR	DE QUEEN DAM	03-1952	DLY	34.1003	-94.3725	558	NCEI	2002-2007
AR	DE QUEEN SEVIER CO AP	78-0027	15M	34.0500	-94.4008	355	NCEI	2005-2017
AR	DE QUEEN SEVIER CO AP	79-0144	DLY	34.0500	-94.4008	354	NCEI	2003-2017
AR	DEQUEEN	03-1948	DLY	34.0464	-94.3481	407	NCEI	1902-2017
AR	DIERKS	03-2015	DLY	34.1267	-94.0172	469	NCEI	1959-2017
AR	DIERKS DAM	03-2020	HLY	34.1475	-94.0889	686	NCEI	1973-2005
AR	DIERKS DAM	03-2020	DLY	34.1475	-94.0889	686	NCEI	1994-2005
AR	FOREMAN	03-2544	HLY	33.7222	-94.3975	423	NCEI	1948-2013
AR	FOREMAN	03-2544	DLY	33.7222	-94.3975	423	NCEI	1917-2017
AR	FULTON	03-2670	DLY	33.6128	-93.8136	259	NCEI	1892-2004
AR	GILLHAM DAM	03-2810	15M	34.2056	-94.2464	520	NCEI	1971-2001

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
AR	GILLHAM DAM	03-2810	HLY	34.2056	-94.2464	520	NCEI	1966-2002
AR	GLENWOOD	03-2842	DLY	34.3347	-93.5503	581	NCEI	1935-2016
AR	GRANNIS	03-2908	DLY	34.2500	-94.3333	922	NCEI	1919-1957
AR	GURDON	03-3074	DLY	33.9167	-93.1333	220	NCEI	1948-1986
AR	HOPE 3 NE	03-3428	DLY	33.7092	-93.5564	374	NCEI	1892-2017
AR	HORATIO	03-3442	DLY	33.9353	-94.3597	338	NCEI	1946-2013
AR	J.L. HELMS SEVIER CO ARPT	55-0124	HLY	34.0500	-94.4008	355	NCEI	2003-2007
AR	J.L. HELMS SEVIER CO ARPT	56-0208	HLY	34.0470	-94.3990	355	NCEI	2007-2017
AR	LANGLEY	03-4060	DLY	34.3244	-93.8464	771	NCEI	1948-2017
AR	LEWISVILLE	66-4185	15M	33.3613	-93.5674	340	NCEI	2013-2017
AR	LEWISVILLE	03-4185	15M	33.3614	-93.5675	340	NCEI	1991-2013
AR	LEWISVILLE	03-4185	HLY	33.3614	-93.5675	340	NCEI	1991-2013
AR	LEWISVILLE	03-4185	DLY	33.3614	-93.5675	341	NCEI	1991-2017
AR	LOCKESBURG 9.6 NNE	69-0041	DLY	34.1008	-94.1136	479	NCEI	2001-2017
AR	MAGNOLIA	03-4548	15M	33.2950	-93.2325	325	NCEI	1977-2013
AR	MAGNOLIA	03-4548	HLY	33.2950	-93.2325	325	NCEI	1948-2013
AR	MAGNOLIA	03-4548	DLY	33.2950	-93.2325	325	NCEI	1948-2017
AR	MAGNOLIA 2	03-4550	15M	33.2667	-93.2333	289	NCEI	1971-1984
AR	MAGNOLIA 2	03-4550	HLY	33.2667	-93.2333	289	NCEI	1951-1984
AR	MENA	66-4756	15M	34.5979	-94.2900	1152	NCEI	2013-2018
AR	MENA	03-4756	15M	34.5731	-94.2494	1130	NCEI	1984-2013
AR	MENA	03-4756	HLY	34.5731	-94.2494	1130	NCEI	1948-2013
AR	MENA	03-4756	DLY	34.5731	-94.2494	1129	NCEI	1890-2017
AR	MILLWOOD DAM	03-4839	15M	33.6772	-93.9903	316	NCEI	1984-2013
AR	MILLWOOD DAM	03-4839	HLY	33.6772	-93.9903	316	NCEI	1963-2013
AR	MURFREESBORO	03-5078	DLY	34.0667	-93.6833	371	NCEI	1916-1925
AR	MURFREESBORO 1W	03-5079	DLY	34.0783	-93.7019	459	NCEI	1970-2017
AR	NARROWS DAM	66-5110	15M	34.1452	-93.7138	435	NCEI	2013-2018
AR	NARROWS DAM	03-5110	15M	34.1453	-93.7139	435	NCEI	1971-2013
AR	NARROWS DAM	03-5110	HLY	34.1453	-93.7139	435	NCEI	1950-2013
AR	NARROWS DAM	03-5110	DLY	34.1453	-93.7139	436	NCEI	1950-2017
AR	NASHVILLE	66-5112	15M	33.9294	-93.8583	400	NCEI	2013-2017

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
AR	NASHVILLE	03-5112	15M	33.9294	-93.8583	400	NCEI	1975-2013
AR	NASHVILLE	03-5112	HLY	33.9294	-93.8583	400	NCEI	1966-2013
AR	NASHVILLE	03-5114	HLY	33.9500	-93.8667	371	NCEI	1948-1966
AR	NASHVILLE	03-5112	DLY	33.9294	-93.8583	400	NCEI	1899-2017
AR	NATHAN 4 WNW	03-5158	DLY	34.1167	-93.8667	541	NCEI	1948-1985
AR	NEWHOPE 3 E	03-5174	DLY	34.2284	-93.8300	850	NCEI	1940-1983
AR	NEWHOPE 6 S	03-5177	DLY	34.1469	-93.8936	630	NCEI	1985-2017
AR	OKAY	03-5376	DLY	33.7667	-93.9167	299	NCEI	1915-1992
AR	PINEY GROVE	03-5770	DLY	34.1728	-93.2050	381	NCEI	1966-2002
AR	PRESCOTT 2 NNW	66-5908	15M	33.8204	-93.3879	308	NCEI	2013-2017
AR	PRESCOTT 2 NNW	03-5908	15M	33.8203	-93.3878	308	NCEI	1984-2013
AR	PRESCOTT 2 NNW	03-5908	HLY	33.8203	-93.3878	308	NCEI	1982-2013
AR	PRESCOTT 2 NNW	03-5908	DLY	33.8203	-93.3878	308	NCEI	1890-2017
AR	PRESCOTT SCS	03-5910	HLY	33.8000	-93.3833	322	NCEI	1948-1982
AR	RAVANA	03-6016	HLY	33.0667	-94.0333	249	NCEI	1948-1970
AR	SALINE RIVER	85-0017	HLY	33.9667	-94.0667	348	HADS	1995-2017
AR	SITE 2-LITTLE RIVER	85-0014	HLY	33.9181	-94.3897	335	HADS	1995-2017
AR	STAMPS	03-6804	15M	33.3667	-93.4833	270	NCEI	1971-1990
AR	STAMPS	03-6804	HLY	33.3667	-93.4833	270	NCEI	1969-1990
AR	STAMPS	03-6804	DLY	33.3667	-93.4833	269	NCEI	1897-1987
AR	TAYLOR	03-7038	DLY	33.0986	-93.4647	249	NCEI	1943-2001
AR	TEXARKANA REGIONAL AIRPORT-WEB	56-0168	HLY	33.4536	-94.0074	399	NCEI	2007-2017
AR	TEXARKANA WEBB FLD	78-0078	15M	33.4536	-94.0074	361	NCEI	2005-2017
AR	TEXARKANA WEBB FLD	03-7048	HLY	33.4536	-94.0075	361	NCEI	1948-2013
AR	TEXARKANA WEBB FLD	79-0096	DLY	33.4536	-94.0075	361	NCEI	1892-2017
AR	TXRKNA RGNL-WEBB FLD ARPT	55-0091	HLY	33.4533	-93.9897	399	NCEI	1996-2007
AR	WALDO 4.2 S	69-0003	DLY	33.2919	-93.2938	308	NCEI	2011-2017
AR	WHITE CLIFFS	03-7812	DLY	33.8000	-94.0667	392	NCEI	1904-1961
CO	CAMPO 7 S	05-1268	DLY	37.0158	-102.5550	4117	NCEI	1954-2017
CO	COMANCHE NATIONAL GRASSLAND	56-0054	HLY	37.2830	-102.6140	4380	NCEI	2007-2017
CO	COMANCHE NATL GRASSLAND	55-0002	HLY	37.2833	-102.6139	4387	NCEI	1998-2007
CO	KIM 10SSE	05-4546	DLY	37.1150	-103.2986	5299	NCEI	1988-2017

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
CO	KIM 15 NNE	66-4538	15M	37.4536	-103.3220	5190	NCEI	2013-2018
CO	KIM 15 NNE	05-4538	15M	37.4536	-103.3219	5190	NCEI	1972-2013
CO	KIM 15 NNE	05-4538	HLY	37.4536	-103.3219	5190	NCEI	1948-2013
CO	KIM 15 NNE	05-4538	DLY	37.4536	-103.3219	5190	NCEI	1948-2017
CO	PRITCHETT 5 ESE	05-6705	DLY	37.3167	-102.7167	4590	NCEI	1943-1951
CO	SPRINGFIELD	05-7862	DLY	37.4000	-102.6167	4413	NCEI	1893-1985
CO	SPRINGFIELD 0.5 NW	69-0052	DLY	37.4114	-102.6226	4377	NCEI	2010-2017
CO	SPRINGFIELD 0.7 NNW	69-0043	DLY	37.4169	-102.6194	4360	NCEI	2006-2010
CO	SPRINGFIELD 7 WSW	05-7866	15M	37.3694	-102.7428	4622	NCEI	1976-2002
CO	SPRINGFIELD 7 WSW	05-7866	HLY	37.3694	-102.7428	4622	NCEI	1972-2002
CO	SPRINGFIELD 7 WSW	05-7866	DLY	37.3694	-102.7428	4623	NCEI	1956-2002
CO	SPRINGFIELD 8 S	05-7867	HLY	37.2823	-102.6417	4505	NCEI	1948-1972
CO	SPRINGFIELD 8 S	05-7867	DLY	37.2823	-102.6417	4505	NCEI	1948-1964
CO	SPRINGFIELD 8 SW	05-7871	DLY	37.3167	-102.7167	4590	NCEI	1951-1956
CO	SPRINGFIELD COMANCHE	79-0002	DLY	37.2833	-102.6139	4383	NCEI	1998-2017
CO	STONINGTON	05-7992	DLY	37.2931	-102.1864	3802	NCEI	1941-1999
CO	TROY 1 SE	05-8468	DLY	37.1333	-103.3000	5351	NCEI	1941-1987
CO	WALSH 1 W	05-8793	DLY	37.3822	-102.2986	3980	NCEI	1940-2017
KS	ASHLAND	14-0365	DLY	37.1942	-99.7633	1972	NCEI	1900-2017
KS	CIMARRON RIVER	85-0028	HLY	37.0314	-100.2100	2195	HADS	1995-2017
KS	COLDWATER	14-1704	DLY	37.2733	-99.3289	2116	NCEI	1893-2017
KS	ELKHART	14-2432	15M	37.0058	-101.8867	3599	NCEI	1984-2013
KS	ELKHART	14-2432	HLY	37.0058	-101.8867	3599	NCEI	1949-2013
KS	ELKHART	14-2432	DLY	37.0058	-101.8867	3599	NCEI	1900-2017
KS	ELKHART 3 N	14-2437	HLY	37.0500	-101.9000	3543	NCEI	1948-1967
KS	ENGLEWOOD 1 NW	14-2560	15M	37.0458	-99.9964	1970	NCEI	1984-2008
KS	ENGLEWOOD 1 NW	14-2560	HLY	37.0458	-99.9964	1970	NCEI	1948-2008
KS	ENGLEWOOD 1 NW	14-2560	DLY	37.0458	-99.9964	1972	NCEI	1890-1951
KS	FOWLER 3 NNE	14-2855	DLY	37.4167	-100.1833	2480	NCEI	1946-1987
KS	HUGOTON	14-3855	DLY	37.1639	-101.3400	3110	NCEI	1904-2017
KS	KISMET 11.4 NW	69-0087	DLY	37.3303	-100.8350	2864	NCEI	2010-2017
KS	KISMET NEAR	14-4363	DLY	37.3333	-100.8833	2908	NCEI	1909-1947

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
KS	LIBERAL	14-4695	DLY	37.0222	-100.9294	2835	NCEI	1893-2017
KS	MEADE	14-5171	DLY	37.2850	-100.3450	2477	NCEI	1895-2017
KS	MINNEOLA	14-5371	DLY	37.4500	-100.0167	2552	NCEI	1912-1974
KS	MINNEOLA 4.1 SSE	69-0063	DLY	37.3850	-99.9980	2579	NCEI	2006-2017
KS	PLAINS	14-6427	DLY	37.2667	-100.6000	2762	NCEI	1910-1974
KS	PLAINS CITY 0.3 NW	69-0075	DLY	37.2666	-100.5950	2782	NCEI	2006-2007
KS	PLAINS CITY 0.3 W	69-0078	DLY	37.2631	-100.5950	2762	NCEI	2011-2016
KS	RICHFIELD	14-6808	DLY	37.2633	-101.7886	3386	NCEI	1893-2017
KS	RICHFIELD 10 WSW	14-6813	DLY	37.2294	-101.9511	3530	NCEI	1941-2017
KS	SUBLETTE 7WSW	66-7922	15M	37.4415	-100.9793	2949	NCEI	2013-2018
KS	SUBLETTE 7WSW	14-7922	15M	37.4414	-100.9792	2949	NCEI	1971-2013
KS	SUBLETTE 7WSW	14-7922	HLY	37.4414	-100.9792	2949	NCEI	1958-2013
KS	SUBLETTE 7WSW	14-7922	DLY	37.4414	-100.9792	2949	NCEI	1918-2017
KS	WILMORE 16SE	14-8914	DLY	37.1317	-99.0556	1699	NCEI	1986-2017
LA	ALEXANDRIA	16-0098	15M	31.3206	-92.4611	87	NCEI	1971-1996
LA	ALEXANDRIA	16-0098	HLY	31.3206	-92.4611	87	NCEI	1948-1996
LA	ALEXANDRIA	16-0098	DLY	31.3206	-92.4611	89	NCEI	1892-2017
LA	ALEXANDRIA #2	16-0101	DLY	31.3167	-92.4500	43	NCEI	1948-1967
LA	ALEXANDRIA 5 SSE	16-0103	DLY	31.2489	-92.4489	85	NCEI	1992-2017
LA	ALEXANDRIA INT	64-0505	HLY	31.3170	-92.5500	89	NCEI	1959-1999
LA	ALEXANDRIA INT	64-0505	DLY	31.3170	-92.5500	89	NCEI	1971-2000
LA	ALEXANDRIA INTL AIRPORT	56-0264	HLY	31.3347	-92.5586	80	NCEI	2007-2017
LA	ALEXANDRIA INTL AP	78-0004	15M	31.3347	-92.5586	84	NCEI	2005-2017
LA	ALEXANDRIA INTL AP	79-0154	DLY	31.3347	-92.5586	85	NCEI	1948-2017
LA	ARCADIA	16-0277	DLY	32.5511	-92.9186	400	NCEI	1929-2017
LA	ASHLAND	16-0349	DLY	32.1292	-93.1164	240	NCEI	1943-2014
LA	BARKSDALE AIR FORCE BASE	64-0265	DLY	32.5000	-93.6670	166	NCEI	1973-2016
LA	BEAVER FIRE TWR	16-0617	DLY	30.7925	-92.4953	105	NCEI	1973-2017
LA	BETHANY	16-0786	HLY	32.3833	-94.0500	370	NCEI	1963-1970
LA	BETHANY	16-0786	DLY	32.3833	-94.0500	371	NCEI	1963-1983
LA	BIENVILLE 3 NE	16-0800	DLY	32.3744	-92.9433	308	NCEI	1972-2017
LA	BOYCE 3 WNW	16-1232	DLY	31.3944	-92.7164	112	NCEI	1976-2017

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LA	CAMP POLK	16-1446	DLY	31.0667	-93.2000	351	NCEI	1938-1959
LA	COLFAX	16-1941	DLY	31.5183	-92.7142	112	NCEI	1926-2011
LA	CONVERSE	16-2023	DLY	31.7500	-93.7000	220	NCEI	1944-1986
LA	COTTON VALLEY 5 NNW	16-2121	DLY	32.8869	-93.4569	259	NCEI	1943-2009
LA	COUSHATTA 1 SE	16-2140	HLY	32.0167	-93.3333	151	NCEI	1954-1966
LA	COUSHATTA 1 SE	16-2140	DLY	32.0167	-93.3333	151	NCEI	1893-1951
LA	COUSHATTA 2	16-2143	DLY	32.0167	-93.3500	141	NCEI	1892-1895
LA	COUSHATTA 2 SW	16-2145	DLY	31.9944	-93.3764	121	NCEI	1981-2000
LA	CURTIS 1 SSE	16-2235	15M	32.4167	-93.6333	161	NCEI	1971-1975
LA	CURTIS 1 SSE	16-2235	HLY	32.4167	-93.6333	161	NCEI	1966-1975
LA	CURTIS 1 SSE	16-2235	DLY	32.4167	-93.6333	161	NCEI	1966-1975
LA	DE QUINCY	16-2361	DLY	30.4347	-93.4692	82	NCEI	1940-2003
LA	DE RIDDER	16-2367	DLY	30.8428	-93.2869	190	NCEI	1903-2016
LA	ELIZABETH	16-2800	DLY	30.8500	-92.7833	151	NCEI	1924-2002
LA	ENGLAND AFB	79-0080	DLY	31.3167	-92.5500	89	NCEI	1952-1970
LA	GLOSTER 1 W	16-3657	DLY	32.2000	-93.8333	259	NCEI	1947-1981
LA	GORUM FIRE TWR	16-3741	DLY	31.4358	-92.8828	308	NCEI	1953-2012
LA	GRAND CANE FIRE TWR	16-3794	DLY	32.1333	-93.8000	269	NCEI	1907-1985
LA	GRAND ECORE	16-3804	DLY	31.8078	-93.0867	151	NCEI	1914-2011
LA	GREENWOOD FIRE TWR	16-3877	DLY	32.4175	-94.0003	351	NCEI	1952-2008
LA	HACKBERRY 8 SSW	16-3979	DLY	29.8894	-93.4019	7	NCEI	1939-2017
LA	HANNA 4 SSE	16-4050	DLY	31.9158	-93.3183	118	NCEI	1972-2017
LA	HAYNESVILLE	16-4131	DLY	32.9683	-93.1297	302	NCEI	1940-2012
LA	HODGES GARDENS	16-4288	DLY	31.3747	-93.3911	420	NCEI	1963-2017
LA	HOMER 1N	16-4355	DLY	32.8100	-93.0625	217	NCEI	1893-2017
LA	HORNBECK HODGES EXP A	16-4384	DLY	31.3833	-93.4000	361	NCEI	1943-1963
LA	HOSSTON	16-4398	DLY	32.8867	-93.8733	246	NCEI	1940-2014
LA	JAMESTOWN NEAR SCS 16	16-4590	DLY	32.3500	-93.1500	281	NCEI	1941-1943
LA	JENNINGS	16-4700	15M	30.2003	-92.6642	25	NCEI	1971-2013
LA	JENNINGS	16-4700	HLY	30.2003	-92.6642	25	NCEI	1969-2013
LA	JENNINGS	16-4700	DLY	30.2003	-92.6642	26	NCEI	1897-2017
LA	JENNINGS 2	16-4702	15M	30.2500	-92.6667	30	NCEI	1973-1975

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
LA	JENNINGS 2	16-4702	HLY	30.2500	-92.6667	30	NCEI	1973-1975
LA	KEATCHIE	16-4800	DLY	32.1833	-93.9000	327	NCEI	1942-1946
LA	KEITHVILLE	16-4816	HLY	32.3550	-93.8619	200	NCEI	1948-1973
LA	KEITHVILLE	16-4816	DLY	32.3550	-93.8619	200	NCEI	1940-2017
LA	KINDER 3 W	16-4884	DLY	30.5000	-92.9000	49	NCEI	1943-1986
LA	KORAN	16-4931	DLY	32.4169	-93.4428	174	NCEI	1947-2017
LA	LAKE ARTHUR 7 SW	16-5065	DLY	30.0206	-92.7681	10	NCEI	1901-2017
LA	LAKE CHARLES	16-5075	DLY	30.2274	-93.2158	16	NCEI	1949-1959
LA	LAKE CHARLES	79-0022	DLY	30.1250	-93.2158	13	NCEI	1961-2017
LA	LAKE CHARLES 2 N	16-5074	DLY	30.2544	-93.2186	7	NCEI	1972-2017
LA	LAKE CHARLES AP	16-5078	HLY	30.1247	-93.2283	9	NCEI	1962-2013
LA	LAKE CHARLES CHENAULT	99-5077	HLY	30.2167	-93.1500	16	NCEI	1940-1947
LA	LAKE CHARLES CHENAULT	16-5077	HLY	30.2167	-93.1500	16	NCEI	1947-1961
LA	LAKE CHARLES CHENAULT	79-0081	DLY	30.2167	-93.1500	16	NCEI	1930-1963
LA	LAKE CHARLES REGIONAL AIRPORT	56-0087	HLY	30.1247	-93.2283	9	NCEI	2007-2017
LA	LAKE END	16-5081	DLY	31.9167	-93.3000	131	NCEI	1942-1972
LA	LEESVILLE	16-5266	HLY	31.1417	-93.2397	265	NCEI	1947-1992
LA	LEESVILLE	16-5266	DLY	31.1417	-93.2397	265	NCEI	1903-2017
LA	LEESVILLE 6 SSW	16-5287	DLY	31.0517	-93.2789	259	NCEI	1988-2017
LA	LIBERTY HILL	16-5365	DLY	32.3167	-92.9167	250	NCEI	1893-1918
LA	LOGANSPORT	16-5522	DLY	31.9672	-94.0003	190	NCEI	1903-2017
LA	LOGANSPORT 4 ENE	16-5527	15M	31.9833	-93.9500	210	NCEI	1971-1993
LA	LOGANSPORT 4 ENE	16-5527	HLY	31.9833	-93.9500	210	NCEI	1955-1993
LA	LOGANSPORT 4 ENE	16-5527	DLY	31.9833	-93.9500	210	NCEI	1968-1993
LA	LONGVILLE	16-5584	DLY	30.6000	-93.2333	115	NCEI	1944-1990
LA	LSU DEAN LEE RSCH STN	16-5630	DLY	31.1783	-92.4108	69	NCEI	1976-2016
LA	MANSFIELD	16-5874	DLY	32.0389	-93.7053	394	NCEI	1896-2017
LA	MANY	16-5890	HLY	31.5667	-93.4833	230	NCEI	1947-1957
LA	MANY	16-5892	DLY	31.5769	-93.4817	256	NCEI	1953-2011
LA	MERMENTAU	16-6142	DLY	30.1900	-92.5906	16	NCEI	1943-1988
LA	MERMENTAU 1 NNE	16-6144	DLY	30.2036	-92.5747	20	NCEI	1989-1993
LA	MINDEN	66-6244	15M	32.6052	-93.2947	185	NCEI	2013-2017

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
LA	MINDEN	16-6244	15M	32.6053	-93.2947	185	NCEI	1971-2013
LA	MINDEN	16-6244	HLY	32.6053	-93.2947	185	NCEI	1964-2013
LA	MINDEN	16-6244	DLY	32.6053	-93.2947	184	NCEI	1893-2017
LA	MINDEN 2	16-6245	HLY	32.6167	-93.2833	249	NCEI	1960-1964
LA	MINDEN 4 NNW	16-6246	HLY	32.6833	-93.3000	240	NCEI	1947-1960
LA	MITTIE 2 SE	16-6271	DLY	30.7000	-92.8833	121	NCEI	1954-1985
LA	MONTGOMERY	16-6324	HLY	31.6667	-92.9000	102	NCEI	1947-1968
LA	MONTGOMERY	16-6324	DLY	31.6667	-92.9000	102	NCEI	1896-1951
LA	MOORINGSPORT 1 N	16-6364	DLY	32.7053	-93.9603	200	NCEI	1975-2017
LA	NATCHITOCHES	16-6582	15M	31.7722	-93.0956	130	NCEI	1971-2008
LA	NATCHITOCHES	16-6582	HLY	31.7722	-93.0956	130	NCEI	1968-2009
LA	NATCHITOCHES	16-6582	DLY	31.7722	-93.0956	131	NCEI	1893-2010
LA	NATCHITOCHES #2	66-6584	15M	31.8142	-93.0856	141	NCEI	2013-2017
LA	NATCHITOCHES #2	16-6584	15M	31.8142	-93.0856	141	NCEI	2009-2013
LA	NATCHITOCHES #2	16-6584	HLY	31.8142	-93.0856	141	NCEI	2009-2013
LA	NATCHITOCHES #2	16-6584	DLY	31.8142	-93.0856	141	NCEI	2008-2017
LA	OAKDALE	16-6836	DLY	30.8214	-92.6697	112	NCEI	1953-2017
LA	OBERLIN FIRE TWR	16-6938	DLY	30.6036	-92.7739	66	NCEI	1952-2017
LA	PLAIN DEALING	16-7344	DLY	32.8919	-93.6944	253	NCEI	1892-2017
LA	POLLOCK FOREST NURSERY	16-7421	DLY	31.5000	-92.4667	230	NCEI	1935-1965
LA	RED RIVER - LOCK & DAM #4	85-0085	HLY	31.9394	-93.2756	112	HADS	1995-2017
LA	RED RIVER RSCH STN	66-7738	15M	32.4219	-93.6380	155	NCEI	2013-2017
LA	RED RIVER RSCH STN	16-7738	15M	32.4219	-93.6381	155	NCEI	1975-2013
LA	RED RIVER RSCH STN	16-7738	HLY	32.4219	-93.6381	155	NCEI	1975-2013
LA	RED RIVER RSCH STN	16-7738	DLY	32.4219	-93.6381	154	NCEI	1975-2017
LA	RICHLAND PLANTATION	16-7825	DLY	31.2833	-92.4167	89	NCEI	1912-1923
LA	ROBELINE	16-7905	DLY	31.6833	-93.3000	151	NCEI	1896-1957
LA	ROBSON	16-7924	DLY	32.3556	-93.6425	161	NCEI	1948-2012
LA	ROCKEFELLER WL REFUGE	16-7932	HLY	29.7286	-92.8181	4	NCEI	1964-1990
LA	ROCKEFELLER WL REFUGE	16-7932	DLY	29.7286	-92.8181	3	NCEI	1964-2017
LA	RODESSA	16-7950	DLY	32.9667	-94.0000	200	NCEI	1940-1985
LA	ROSEPINE RSCH STN	16-8046	DLY	30.9461	-93.2789	240	NCEI	1901-2010

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
LA	SAILES FIRE TWR	16-8094	DLY	32.3625	-93.1400	276	NCEI	1952-2017
LA	SAREPTA 5 N	16-8263	DLY	32.9500	-93.4500	302	NCEI	1947-1954
LA	SHREVEPORT	79-0085	DLY	32.4506	-93.8411	272	NCEI	1939-2017
LA	SHREVEPORT AP	16-8440	HLY	32.4472	-93.8244	254	NCEI	1947-2013
LA	SHREVEPORT BARKSDALE AFB	79-0082	DLY	32.5000	-93.6667	177	NCEI	1949-1970
LA	SHREVEPORT DWTN	16-8436	DLY	32.5158	-93.7447	180	NCEI	1977-2017
LA	SHREVEPORT RGNL AP	78-0070	15M	32.4472	-93.8244	254	NCEI	2000-2017
LA	SPRINGHILL	16-8683	DLY	32.9922	-93.4417	240	NCEI	1955-2017
LA	SUGARTOWN	16-8828	DLY	30.8500	-93.0167	171	NCEI	1893-1992
LA	SULPHUR	16-8831	DLY	30.2383	-93.3447	10	NCEI	1972-2017
LA	SULPHUR 2.2 E	69-0099	DLY	30.2339	-93.3205	16	NCEI	2008-2017
LA	TOLEDO BEND LAKE	16-9074	DLY	31.2022	-93.5725	180	NCEI	2004-2017
LA	VERNON	76-0011	HLY	31.0167	-93.1869	350	RAWS	2000-2015
LA	VERNON - FTS	85-0069	HLY	31.0167	-93.1869	325	HADS	2001-2017
LA	VINTON	16-9375	DLY	30.1922	-93.5811	13	NCEI	1915-2003
LA	VIVIAN	16-9392	DLY	32.9033	-93.9819	220	NCEI	1985-2013
LA	WOODWORTH 2 SE	16-9865	DLY	31.1167	-92.4667	115	NCEI	1956-1985
LA	WOODWORTH 3 ESE	16-9860	DLY	31.1333	-92.4500	69	NCEI	1928-1956
MX	ALLENDE	90-0001	DLY	28.3300	-100.8300	1227	NCEI	1907-1989
MX	ALLENDE (SMN)	61-0214	DLY	28.3333	-100.8333	1227	SMN	1907-1986
MX	ALLENDE II (DGE)	61-0268	DLY	28.3478	-100.8536	1247	SMN	1972-2013
MX	ANAHUAC	61-0339	DLY	27.2383	-100.1314	636	SMN	1933-2013
MX	CERRALVO (DGE)	61-0327	DLY	26.0900	-99.6175	919	SMN	1961-2011
MX	CORRALES U.G.R.CH.	61-0021	DLY	29.5622	-104.3986	2559	SMN	1970-1990
MX	EJIDO MARIN	61-0418	DLY	25.8586	-100.0222	1322	SMN	1979-2013
MX	EJIDO SAN MIGUEL	61-0223	DLY	28.6367	-102.9483	3478	SMN	1960-2013
MX	EL CUCHILLO	61-0333	DLY	25.7181	-99.2558	476	SMN	1938-2013
MX	EL CUCHILLO	90-0011	DLY	25.7300	-99.2500	430	NCEI	1938-1986
MX	FRANCISCO GONZALEZ VILLARREAL	61-0519	DLY	25.3661	-97.9792	43	SMN	1952-2003
MX	GARZA AYALA	61-0337	DLY	26.4914	-100.0583	843	SMN	1969-2013
MX	GENERAL BRAVO	90-0012	DLY	25.8000	-99.1800	407	NCEI	1953-1990
MX	GENERAL BRAVO (SMN)	61-0388	DLY	25.7928	-99.1808	423	SMN	1944-1987

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MX	HIGUERAS (SMN)	61-0340	DLY	25.9500	-100.0167	1706	SMN	1944-1979
MX	JUAREZ	61-0252	DLY	27.6139	-100.7250	919	SMN	1943-2013
MX	LAMPAZOS (SMN)	61-0343	DLY	27.0781	-100.4908	935	SMN	1934-2013
MX	LAS ENRAMADAS	61-0353	DLY	25.5014	-99.5214	755	SMN	1946-2013
MX	LOS ALDAMAS	61-0354	DLY	26.0644	-99.1967	338	SMN	1941-1993
MX	LOS HERRERAS	61-0355	DLY	25.8975	-99.4008	459	SMN	1943-2012
MX	LOS HERRERAS	90-0013	DLY	25.9000	-99.4200	469	NCEI	1943-1986
MX	LOS RAMONES	61-0356	DLY	25.6914	-99.6306	689	SMN	1944-2013
MX	LOS RAMONES	90-0014	DLY	25.7000	-99.6300	682	NCEI	1944-1986
MX	LUIS L. LEON	61-0043	DLY	28.9786	-105.3117	3543	SMN	1964-2013
MX	NUEVA ROSITA	61-0229	DLY	27.9167	-101.2500	1211	SMN	1924-1971
MX	NUEVO LAREDO	61-0534	DLY	27.4864	-99.5081	423	SMN	1961-1991
MX	OJINAGA	90-0007	DLY	29.5700	-104.4200	2759	NCEI	1922-1998
MX	OJINAGA (DGE)	61-0182	DLY	29.5500	-104.4000	2625	SMN	1974-2013
MX	OJINAGA (SMN)	61-0027	DLY	29.5644	-104.4164	2625	SMN	1922-1984
MX	PALESTINA	90-0002	DLY	29.1500	-100.9800	1083	NCEI	1944-1990
MX	PALESTINA (DGE)	61-0231	DLY	29.1586	-100.9883	1115	SMN	1987-2013
MX	PALESTINA (SMN)	61-0265	DLY	29.1644	-100.9867	1083	SMN	1932-1982
MX	PARAS	61-0385	DLY	26.4933	-99.5242	492	SMN	1961-2013
MX	PRESA FALCON	61-0536	DLY	26.5833	-99.1833	325	SMN	1961-1990
MX	PRESA VENUSTIANO CARRANZA	61-0238	DLY	27.5189	-100.6197	892	SMN	1942-2013
MX	SABINAS	90-0004	DLY	27.8732	-101.2195	1115	NCEI	1941-1998
MX	SABINAS (DGE)	61-0241	DLY	27.8467	-101.1228	1112	SMN	1944-2013
MX	SALINILLAS	61-0369	DLY	27.4292	-100.3739	787	SMN	1941-2013
MX	SALINILLAS	90-0015	DLY	27.4500	-100.1200	741	NCEI	1941-1986
MX	SAMALAYUCA	61-0105	DLY	31.3425	-106.4764	4088	SMN	1946-1999
MX	SOMBRERETILLO	61-0374	DLY	26.3414	-99.9400	1017	SMN	1967-2010
MX	VALLECILLO (DGE)	61-0377	DLY	26.6581	-99.9864	869	SMN	1961-2013
MX	VALLECILLO (SMN)	61-0390	DLY	26.6597	-99.9869	873	SMN	1941-1988
MX	VILLA AHUMADA	61-0134	DLY	30.6186	-106.5122	3937	SMN	1903-1993
MX	VILLA JUAREZ	90-0006	DLY	27.6200	-100.7200	900	NCEI	1943-1990
MX	ZARAGOZA	90-0005	DLY	28.5000	-100.9200	1173	NCEI	1932-1977

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
MX	ZARAGOZA (SMN)	61-0249	DLY	28.4917	-100.9286	1181	SMN	1926-1976
NM	ABBOTT 1 SE	29-0022	DLY	36.3028	-104.2497	6152	NCEI	1909-2017
NM	AFTON 6 NE	29-0125	DLY	32.1167	-106.8667	4190	NCEI	1942-1999
NM	ALAMOGORDO	29-0199	HLY	32.9181	-105.9550	4380	NCEI	1968-2010
NM	ALAMOGORDO	29-0199	DLY	32.9181	-105.9550	4380	NCEI	1909-2009
NM	ALAMOGORDO 1	29-0200	DLY	32.8667	-105.9333	4576	NCEI	1892-1943
NM	ALAMOGORDO 1.6 NNE	69-0393	DLY	32.9058	-105.9481	4373	NCEI	2006-2015
NM	ALAMOGORDO 2.0 N	69-0406	DLY	32.9125	-105.9511	4390	NCEI	2012-2017
NM	ALAMOGORDO 2.1 SE	69-0376	DLY	32.8598	-105.9377	4524	NCEI	2005-2017
NM	ALAMOGORDO FLTR PLAN	29-0208	HLY	32.9667	-105.9333	4724	NCEI	1958-1968
NM	ALEMAN RCH	29-0268	DLY	32.9308	-106.9328	4521	NCEI	1943-2000
NM	AMISTAD 5 SSW	29-0377	DLY	35.8742	-103.1819	4446	NCEI	1925-2017
NM	ARTESIA 6S	66-0600	15M	32.7547	-104.3835	3366	NCEI	2013-2017
NM	ARTESIA 6S	29-0600	15M	32.7547	-104.3836	3366	NCEI	1973-2013
NM	ARTESIA 6S	29-0600	HLY	32.7547	-104.3836	3366	NCEI	1947-2013
NM	ARTESIA 6S	29-0600	DLY	32.7547	-104.3836	3366	NCEI	1905-2017
NM	BAT DRAW RAWS	85-0151	HLY	32.1783	-104.4406	4406	HADS	1997-2017
NM	BATDRAW	76-0012	HLY	32.1786	-104.4419	4300	RAWS	1997-2015
NM	BELL RANCH	29-0858	DLY	35.5297	-104.0936	4330	NCEI	1899-2010
NM	BRANTLEY DAM	29-1153	DLY	32.5433	-104.3807	3254	NCEI	1987-2017
NM	BUEYEROS 4 NW	29-1269	DLY	36.0167	-103.7333	4682	NCEI	1929-1968
NM	CAMBRAY	29-1309	DLY	32.2333	-107.3333	4232	NCEI	1899-1940
NM	CAMERON	29-1332	DLY	34.9039	-103.4428	4747	NCEI	1927-1998
NM	CANNON AFB AIRPORT	64-0408	DLY	34.3830	-103.3170	4295	NCEI	1956-2016
NM	CANTON	29-1423	DLY	34.2753	-104.1636	4055	NCEI	1942-2012
NM	CAPROCK	76-0014	HLY	32.9278	-103.8567	4210	RAWS	1990-2015
NM	CAPROCK	29-1445	HLY	33.3433	-103.6783	4350	NCEI	2007-2013
NM	CAPROCK	29-1445	DLY	33.3433	-103.6783	4350	NCEI	2007-2017
NM	CAPROCK 6 SE	29-1446	HLY	33.3500	-103.6333	4272	NCEI	1947-1971
NM	CAPROCK 6 SE	29-1446	DLY	33.3500	-103.6333	4272	NCEI	1929-1951
NM	CAPROCK RAWS	85-0155	HLY	32.9278	-103.8567	4183	HADS	1995-2017
NM	CAPULIN	29-1450	DLY	36.7386	-103.9936	6841	NCEI	1995-2017

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NM	CAPULIN 6 SSE	29-1452	DLY	36.6667	-103.9500	6771	NCEI	1930-1969
NM	CAPULIN NM	29-1454	DLY	36.7785	-103.9801	7252	NCEI	1966-1979
NM	CAPULIN VOLCANO NATIONAL MONUM	54-0199	DLY	36.7790	-103.9810	7185	NADP	1984-2012
NM	CARLSBAD	66-1469	15M	32.3479	-104.2224	3120	NCEI	2013-2017
NM	CARLSBAD	29-1469	15M	32.3478	-104.2225	3120	NCEI	1974-2013
NM	CARLSBAD	29-1469	HLY	32.3478	-104.2225	3120	NCEI	1947-2013
NM	CARLSBAD	29-1469	DLY	32.3478	-104.2225	3120	NCEI	1900-2017
NM	CARLSBAD 3.4 N	69-0306	DLY	32.4539	-104.2378	3136	NCEI	2005-2017
NM	CARLSBAD 33.3 WSW	69-0315	DLY	32.1908	-104.7477	5853	NCEI	2007-2017
NM	CARLSBAD CAVERN CITY AP	79-0148	DLY	32.3336	-104.2581	3232	NCEI	1930-2017
NM	CARLSBAD CAVERNS	29-1480	DLY	32.1783	-104.4433	4436	NCEI	1935-2017
NM	CLAYTON 14.6 SSW	69-0442	DLY	36.2700	-103.3122	5066	NCEI	2007-2017
NM	CLAYTON 9 SSE	29-1881	DLY	36.3333	-103.1000	4720	NCEI	1907-1959
NM	CLAYTON MUNI AIR PK	78-0017	15M	36.4486	-103.1539	4960	NCEI	2000-2017
NM	CLAYTON MUNI AIR PK	79-0118	DLY	36.4486	-103.1539	4961	NCEI	1896-2017
NM	CLAYTON MUNI ARPK AP	29-1887	15M	36.4486	-103.1539	4960	NCEI	1984-1998
NM	CLAYTON MUNI ARPK AP	29-1887	HLY	36.4486	-103.1539	4960	NCEI	1947-2013
NM	CLAYTON MUNICIPAL AIRPARK AIRP	56-0185	HLY	36.4460	-103.1540	4972	NCEI	2007-2017
NM	CLOUDCROFT	29-1927	DLY	32.9667	-105.7500	8621	NCEI	1901-1987
NM	CLOUDCROFT	29-1931	DLY	32.9544	-105.7353	8678	NCEI	1987-2017
NM	CLOUDCROFT 0.5 NNW	69-0387	DLY	32.9601	-105.7413	8839	NCEI	2005-2017
NM	CLOUDCROFT 16 ESE	69-0383	DLY	32.8937	-105.4779	6578	NCEI	2005-2013
NM	CLOVIS	29-1939	15M	34.4289	-103.1992	4295	NCEI	1978-2011
NM	CLOVIS	29-1939	HLY	34.4289	-103.1992	4295	NCEI	1949-2011
NM	CLOVIS	29-1939	DLY	34.4289	-103.1992	4295	NCEI	1910-2011
NM	CLOVIS 1.1 NE	69-0134	DLY	34.4204	-103.1884	4275	NCEI	2014-2017
NM	CLOVIS 13 N	29-1963	15M	34.5989	-103.2161	4435	NCEI	1973-2013
NM	CLOVIS 13 N	29-1963	HLY	34.5989	-103.2161	4435	NCEI	1949-2013
NM	CLOVIS 13 N	29-1963	DLY	34.5989	-103.2161	4436	NCEI	1949-2017
NM	CLOVIS 3 W	29-1956	HLY	34.4167	-103.2333	4272	NCEI	1947-1949
NM	CLOVIS CANNON AFB	79-0105	DLY	34.3833	-103.3167	4295	NCEI	1951-1970
NM	COLUMBUS	29-2024	15M	31.8297	-107.6389	4065	NCEI	1978-2011

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NM	COLUMBUS	29-2024	HLY	31.8297	-107.6389	4065	NCEI	1947-2011
NM	COLUMBUS	79-0121	DLY	31.8297	-107.6389	4065	NCEI	1909-2010
NM	CONCHAS DAM	29-2030	15M	35.4072	-104.1906	4244	NCEI	1971-2013
NM	CONCHAS DAM	29-2030	HLY	35.4072	-104.1906	4244	NCEI	1947-2013
NM	CONCHAS DAM	29-2030	DLY	35.4072	-104.1906	4245	NCEI	1936-2017
NM	CROSSROADS	29-2203	15M	33.5167	-103.3333	4150	NCEI	1977-1993
NM	CROSSROADS 2	29-2207	15M	33.5133	-103.3403	4138	NCEI	1975-2007
NM	CROSSROADS 2	29-2207	HLY	33.5133	-103.3403	4138	NCEI	1971-2007
NM	CROSSROADS 2	29-2207	DLY	33.5133	-103.3403	4137	NCEI	1929-2001
NM	DEMING	29-2436	15M	32.2531	-107.7531	4300	NCEI	1982-2011
NM	DEMING	29-2436	DLY	32.2531	-107.7531	4301	NCEI	1892-2010
NM	DEMING 1.5 S	69-0350	DLY	32.2395	-107.7526	4314	NCEI	1998-2014
NM	DEMING 19 ENE	69-0352	DLY	32.2626	-107.3970	4183	NCEI	1998-2017
NM	DEMING FAA AP	29-2440	15M	32.2500	-107.7000	4302	NCEI	1977-1982
NM	DEMING FAA AP	29-2440	HLY	32.2500	-107.7000	4302	NCEI	1961-1982
NM	DEMING MUNI	64-0426	DLY	32.2500	-107.7170	4314	NCEI	1973-2005
NM	DEMING MUNI AP	78-0030	15M	32.2622	-107.7206	4301	NCEI	2005-2017
NM	DEMING MUNI AP	79-0124	DLY	32.2622	-107.7206	4301	NCEI	1961-2017
NM	DEMING MUNICIPAL AIRPORT	55-0109	HLY	32.2622	-107.7206	4314	NCEI	2000-2007
NM	DEMING MUNICIPAL AIRPORT	56-0188	HLY	32.2620	-107.7210	4324	NCEI	2007-2017
NM	DES MOINES	29-2453	DLY	36.7500	-103.8333	6621	NCEI	1916-1994
NM	DRIPPING SPRINGS	76-0015	HLY	32.3233	-106.5867	6172	RAWS	1994-2015
NM	ELIDA	29-2854	DLY	33.9403	-103.6572	4396	NCEI	1910-2013
NM	ELK	29-2865	DLY	32.9161	-105.3381	5935	NCEI	1895-2017
NM	ELKINS	29-2871	DLY	33.7000	-104.0667	4032	NCEI	1909-1948
NM	FELIX	29-3174	DLY	33.0000	-105.1000	5102	NCEI	1917-1964
NM	FLORIDA	29-3225	HLY	32.4333	-107.4833	4450	NCEI	1947-1992
NM	FLORIDA	29-3225	DLY	32.4333	-107.4833	4449	NCEI	1929-1992
NM	FLOYD	29-3231	DLY	34.2167	-103.5500	4120	NCEI	1929-1959
NM	FLYING H	29-3237	DLY	33.0000	-105.1000	5102	NCEI	1965-1978
NM	FT SUMNER	29-3294	DLY	34.4667	-104.2319	4026	NCEI	1909-2011
NM	FT SUMNER 5 S	29-3296	DLY	34.3942	-104.2503	4049	NCEI	1948-2016

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NM	GRENVILLE	29-3706	DLY	36.5939	-103.6192	6001	NCEI	1940-2017
NM	HATCH	29-3855	DLY	32.6775	-107.1958	4075	NCEI	1894-2008
NM	HOBBS	29-4026	DLY	32.7264	-103.1314	3661	NCEI	1912-2017
NM	HOBBS 13W	66-4030	15M	32.7125	-103.3538	3836	NCEI	2013-2015
NM	HOBBS 13W	29-4030	15M	32.7125	-103.3539	3836	NCEI	1996-2012
NM	HOBBS 13W	29-4030	HLY	32.7125	-103.3539	3836	NCEI	1996-2012
NM	HOBBS 13W	29-4030	DLY	32.7125	-103.3539	3835	NCEI	1996-2015
NM	HOOSIER RCH	29-4106	DLY	35.8667	-104.1667	5682	NCEI	1911-1949
NM	HOPE	66-4112	15M	32.8110	-104.7385	4085	NCEI	2013-2017
NM	HOPE	29-4112	15M	32.8111	-104.7386	4085	NCEI	1972-2013
NM	HOPE	29-4112	HLY	32.8111	-104.7386	4085	NCEI	1965-2013
NM	HOPE	29-4112	DLY	32.8111	-104.7386	4085	NCEI	1905-2017
NM	HOUSE	29-4175	DLY	34.6344	-103.8903	4700	NCEI	1940-2017
NM	HOUSE 0.1 S	69-0421	DLY	34.6459	-103.9030	4701	NCEI	2010-2017
NM	IONE	29-4306	DLY	35.7500	-103.3000	4705	NCEI	1910-1961
NM	JAL	29-4346	DLY	32.1103	-103.1872	3054	NCEI	1919-2017
NM	JORNADA EXP RANGE	66-4426	15M	32.6161	-106.7404	4318	NCEI	2013-2018
NM	JORNADA EXP RANGE	29-4426	15M	32.6161	-106.7403	4318	NCEI	1977-2013
NM	JORNADA EXP RANGE	29-4426	HLY	32.6161	-106.7403	4318	NCEI	1947-2013
NM	JORNADA EXP RANGE	29-4426	DLY	32.6161	-106.7403	4318	NCEI	1914-2017
NM	LAKE AVALON	29-4736	DLY	32.4833	-104.2500	3212	NCEI	1914-1979
NM	LAKE MC MILLAN	29-4747	DLY	32.5944	-104.3473	3281	NCEI	1940-1949
NM	LAS CRUCES 20 N	64-0600	HLY	32.6140	-106.7410	4327	NCEI	2007-2016
NM	LOGAN	29-5056	DLY	35.3667	-103.4167	3832	NCEI	1906-1960
NM	LOVINGTON 0.9 NNW	69-0333	DLY	32.9578	-103.3568	3930	NCEI	2005-2017
NM	LOVINGTON 1.4 NW	69-0334	DLY	32.9610	-103.3653	3937	NCEI	2005-2010
NM	LOVINGTON 2 WNW	29-5204	DLY	32.9667	-103.3833	3904	NCEI	1919-1967
NM	MALJAMAR	29-5370	15M	32.8567	-103.7625	4154	NCEI	1976-2012
NM	MALJAMAR	29-5370	HLY	32.8567	-103.7625	4154	NCEI	1948-2012
NM	MALJAMAR	29-5370	DLY	32.8567	-103.7625	4154	NCEI	1942-2012
NM	MAYHILL	54-0197	DLY	32.9096	-105.4710	6634	NADP	1984-2015
NM	MAYHILL RS	29-5502	DLY	32.8833	-105.4833	6565	NCEI	1917-1976

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NM	MCCARTY RCH	29-5516	DLY	35.6022	-103.3644	4409	NCEI	1983-2016
NM	MELROSE	29-5617	DLY	34.4278	-103.6250	4600	NCEI	1908-2017
NM	MONTOYA 10 SE	29-5874	DLY	35.0000	-103.9333	4344	NCEI	1909-1957
NM	MOSQUERO 1	29-5931	DLY	35.7833	-103.9667	5584	NCEI	1915-1943
NM	MOSQUERO 1 NE	29-5937	DLY	35.8022	-103.9439	5466	NCEI	1926-2017
NM	MTN PARK	29-5960	DLY	32.9539	-105.8225	6804	NCEI	1894-2017
NM	NARA VISA	29-6040	DLY	35.6167	-103.1000	4193	NCEI	1905-1966
NM	NEWKIRK	29-6115	DLY	35.0700	-104.2575	4564	NCEI	1926-2009
NM	OBAR	29-6258	DLY	35.5500	-103.2000	4104	NCEI	1926-1968
NM	OCHOA	29-6281	DLY	32.1664	-103.4250	3399	NCEI	1942-2016
NM	OROGRANDE	29-6435	15M	32.3789	-106.0925	4221	NCEI	1984-2013
NM	OROGRANDE	29-6435	HLY	32.3789	-106.0925	4221	NCEI	1947-2013
NM	OROGRANDE	29-6435	DLY	32.3789	-106.0925	4222	NCEI	1904-2015
NM	PADUCA	76-0019	HLY	32.1797	-103.7217	3510	RAWS	1990-2015
NM	PADUCA RAWS 14W JAL	85-0171	HLY	32.1797	-103.7217	3530	HADS	1995-2017
NM	PALO VERDE (1)	29-6540	DLY	35.9667	-104.1833	5879	NCEI	1911-1947
NM	PASAMONTE	29-6619	DLY	36.2994	-103.7408	5650	NCEI	1910-2017
NM	PEARL	29-6659	15M	32.6500	-103.3833	3800	NCEI	1975-1996
NM	PEARL	29-6659	HLY	32.6500	-103.3833	3800	NCEI	1947-1996
NM	PEARL	29-6659	DLY	32.6500	-103.3833	3799	NCEI	1906-1996
NM	PENNINGTON	29-6728	DLY	36.3167	-103.5833	5604	NCEI	1925-1959
NM	PORTALES	29-7008	DLY	34.1742	-103.3519	4009	NCEI	1905-2017
NM	PORTER 2 E	29-7026	DLY	35.2333	-103.2833	4078	NCEI	1923-1984
NM	PRAIRIEVIEW	29-7054	DLY	33.1167	-103.2000	3855	NCEI	1911-1950
NM	QUAY 2 S	29-7168	DLY	34.9000	-103.7500	4304	NCEI	1923-1959
NM	QUEEN	29-7172	DLY	32.1936	-104.7403	5840	NCEI	2000-2005
NM	QUEEN RS	29-7176	DLY	32.2000	-104.7333	5853	NCEI	1963-1975
NM	RAGLAND 3 SSW	29-7226	DLY	34.7800	-103.7492	4867	NCEI	1935-2017
NM	RATON 26 ESE	79-0013	DLY	36.7778	-103.9817	7231	NCEI	2010-2014
NM	RINESTINE RCH	29-7451	DLY	35.6000	-103.3333	4383	NCEI	1968-1983
NM	ROY	29-7638	15M	35.9450	-104.1981	5890	NCEI	1974-2013
NM	ROY	29-7638	HLY	35.9450	-104.1981	5890	NCEI	1947-2013

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NM	ROY	29-7638	DLY	35.9450	-104.1981	5889	NCEI	1905-2014
NM	SACRAMENTO	29-7735	HLY	32.7924	-105.5620	7316	NCEI	1947-1974
NM	SACRAMENTO	29-7735	DLY	32.7924	-105.5620	7316	NCEI	1905-1951
NM	SACRAMENTO #2	29-7736	15M	32.7908	-105.5606	7382	NCEI	1979-2013
NM	SACRAMENTO #2	29-7736	HLY	32.7908	-105.5606	7382	NCEI	1974-2013
NM	SAN JON	29-7867	DLY	35.1086	-103.3283	4034	NCEI	1907-2017
NM	SEDAN 7 NW	29-8187	DLY	36.2000	-103.2167	4774	NCEI	1911-1960
NM	ST VRAIN	29-7741	DLY	34.4167	-103.5000	4452	NCEI	1912-1946
NM	STATE UNIV	66-8535	15M	32.2823	-106.7598	3886	NCEI	2013-2018
NM	STATE UNIV	29-8535	15M	32.2822	-106.7597	3886	NCEI	1977-2013
NM	STATE UNIV	29-0131	HLY	32.2833	-106.7500	3914	NCEI	1947-1959
NM	STATE UNIV	29-8535	HLY	32.2822	-106.7597	3886	NCEI	1959-2013
NM	STATE UNIV	29-0131	DLY	32.2833	-106.7500	3914	NCEI	1892-1959
NM	STATE UNIV	29-8535	DLY	32.2822	-106.7597	3888	NCEI	1959-2017
NM	TATUM	29-8713	DLY	33.2422	-103.3611	4012	NCEI	1919-2017
NM	TUCUMCARI	29-9148	DLY	35.1667	-103.7000	4042	NCEI	1909-1956
NM	TUCUMCARI 4 NE	66-9156	15M	35.2005	-103.6866	4086	NCEI	2013-2017
NM	TUCUMCARI 4 NE	29-9156	15M	35.2006	-103.6867	4086	NCEI	1971-2013
NM	TUCUMCARI 4 NE	29-9156	HLY	35.2006	-103.6867	4086	NCEI	1947-2013
NM	TUCUMCARI 4 NE	29-9156	DLY	35.2006	-103.6867	4085	NCEI	1904-2017
NM	TUCUMCARI MUNI AP	79-0117	DLY	35.1822	-103.6031	4065	NCEI	1948-2017
NM	UTE DAM	29-9284	DLY	35.3600	-103.4433	3825	NCEI	1965-2015
NM	WHITE SANDS NATL MON	66-9686	15M	32.7822	-106.1759	4006	NCEI	2013-2018
NM	WHITE SANDS NATL MON	29-9686	15M	32.7822	-106.1758	4006	NCEI	1984-2013
NM	WHITE SANDS NATL MON	29-9686	HLY	32.7822	-106.1758	4006	NCEI	1947-2013
NM	WHITE SANDS NATL MON	29-9686	DLY	32.7822	-106.1758	4006	NCEI	1939-2017
OK	ACME_4WNW	86-0136	15M	34.8083	-98.0233	1302	OKM	1994-2015
OK	ACME_4WNW	86-0136	DLY	34.8083	-98.0233	1302	OKM	1994-2016
OK	ADA	34-0017	HLY	34.7864	-96.6850	1015	NCEI	1957-1957
OK	ADA	34-0017	DLY	34.7864	-96.6850	1014	NCEI	1907-2011
OK	ADA MUNICIPAL AIRPORT	56-0211	HLY	34.8052	-96.6741	1002	NCEI	2007-2017
OK	ADA_2NNE	86-0137	15M	34.7985	-96.6691	968	OKM	1994-2015

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OK	ADA_2NNE	86-0137	DLY	34.7985	-96.6691	972	OKM	1994-2016
OK	ALTUS 3S MESONET	34-0180	DLY	34.5872	-99.3381	1365	NCEI	2009-2017
OK	ALTUS AFB	79-0071	DLY	34.6500	-99.2667	1358	NCEI	1953-1970
OK	ALTUS AFB AIRPORT	64-0436	DLY	34.6500	-99.2670	1382	NCEI	1973-2016
OK	ALTUS DAM	34-0184	DLY	34.8847	-99.2964	1526	NCEI	1945-2017
OK	ALTUS DAM, N FORK RED RIVER	87-0001	HLY	34.8875	-99.2964	1540	USBR	1990-2016
OK	ALTUS IRIG RSCH STN	34-0179	15M	34.5903	-99.3344	1380	NCEI	1970-2011
OK	ALTUS IRIG RSCH STN	34-0179	HLY	34.5903	-99.3344	1380	NCEI	1948-2011
OK	ALTUS IRIG RSCH STN	34-0179	DLY	34.5903	-99.3344	1381	NCEI	1903-2013
OK	ALTUS_3S	86-0138	15M	34.5872	-99.3381	1365	OKM	1994-2015
OK	ANADARKO	85-0183	HLY	35.0850	-98.2431	1194	HADS	1995-2017
OK	ANADARKO 3 E	34-0224	DLY	35.0619	-98.1989	1168	NCEI	1893-2016
OK	ANTHON 6 W	34-0242	HLY	35.7500	-99.1000	1821	NCEI	1947-1973
OK	ANTLERS	34-0256	15M	34.2208	-95.6150	470	NCEI	1971-2001
OK	ANTLERS	34-0256	HLY	34.2208	-95.6150	470	NCEI	1947-2001
OK	ANTLERS	34-0256	DLY	34.2208	-95.6150	469	NCEI	1918-2017
OK	ANTLERS_3WNW	86-0141	15M	34.2497	-95.6684	564	OKM	1994-2015
OK	ANTLERS_3WNW	86-0141	DLY	34.2497	-95.6684	565	OKM	1994-2016
OK	ANTLERS_5W	86-0142	15M	34.2244	-95.7006	587	OKM	1994-2015
OK	ANTLERS_5W	86-0142	DLY	34.2244	-95.7006	593	OKM	1994-2016
OK	APACHE	34-0260	DLY	34.8892	-98.3592	1306	NCEI	1909-2017
OK	APACHE 0.4 W	69-0461	DLY	34.8891	-98.3593	1293	NCEI	2008-2017
OK	APACHE_4ENE	86-0143	DLY	34.9142	-98.2922	1454	OKM	1994-2016
OK	ARAPAHO	34-0277	DLY	35.5833	-98.9667	1667	NCEI	1893-1930
OK	ARDMORE	66-0292	15M	34.1773	-97.1617	841	NCEI	2013-2017
OK	ARDMORE	34-0292	15M	34.1772	-97.1617	841	NCEI	1981-2013
OK	ARDMORE	34-0292	HLY	34.1772	-97.1617	841	NCEI	1957-2013
OK	ARDMORE	34-0292	DLY	34.1772	-97.1617	840	NCEI	1901-2017
OK	ARDMORE #2	34-0293	15M	34.1500	-97.1500	850	NCEI	1971-1994
OK	ARDMORE #2	34-0293	HLY	34.1500	-97.1500	850	NCEI	1960-1994
OK	ARDMORE DOWNTOWN EXEC ARPT	56-0210	HLY	34.1469	-97.1225	844	NCEI	2007-2017
OK	ARDMORE_3.5ENE	86-0144	15M	34.1926	-97.0857	873	OKM	1994-2015

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
OK	ARDMORE_3ENE	86-0145	15M	34.1922	-97.0850	873	OKM	1994-2015
OK	ARNETT 3NE	34-0332	DLY	36.1669	-99.7214	2428	NCEI	1911-2017
OK	ARNETT 8WSW MESONET	34-0338	DLY	36.0719	-99.9031	2359	NCEI	2009-2017
OK	ARNETT_8WSW	86-0146	15M	36.0720	-99.9031	2359	OKM	1994-2015
OK	ARNETT_8WSW	86-0146	DLY	36.0720	-99.9031	2352	OKM	1994-2016
OK	ATOKA	34-0391	DLY	34.3983	-96.1400	564	NCEI	1926-2017
OK	ATOKA DAM	34-0394	DLY	34.4500	-96.0667	594	NCEI	1963-1999
OK	BAIRD 4 N	34-0466	DLY	34.5333	-98.1667	1089	NCEI	1952-1980
OK	BATTIEST	34-0562	DLY	34.3850	-94.8981	777	NCEI	1948-1951
OK	BATTIEST	34-0567	DLY	34.3850	-94.8981	777	NCEI	1985-2017
OK	BEAR MTN TWR	34-0584	DLY	34.1394	-94.9519	801	NCEI	1938-1998
OK	BEAVER	34-0593	DLY	36.8125	-100.5308	2464	NCEI	1896-2017
OK	BEAVER_1SSW	86-0148	15M	36.8025	-100.5301	2487	OKM	1994-2015
OK	BENGAL 4 NNW	34-0670	15M	34.8822	-95.0906	667	NCEI	1971-2013
OK	BENGAL 4 NNW	34-0670	HLY	34.8822	-95.0906	667	NCEI	1947-2013
OK	BENGAL 4 NNW	34-0670	DLY	34.8822	-95.0906	666	NCEI	1900-2017
OK	BESSIE 4WNW MESONET	34-0684	DLY	35.4017	-99.0583	1677	NCEI	2009-2017
OK	BESSIE_4WNW	86-0150	15M	35.4019	-99.0585	1677	OKM	1994-2015
OK	BESSIE_4WNW	86-0150	DLY	35.4019	-99.0585	1681	OKM	1994-2016
OK	BOISE CITY 2	34-0912	HLY	36.7333	-102.5000	4163	NCEI	1965-1983
OK	BOISE CITY 2 E	66-0908	15M	36.7236	-102.4805	4133	NCEI	2013-2017
OK	BOISE CITY 2 E	34-0908	15M	36.7236	-102.4806	4133	NCEI	1983-2013
OK	BOISE CITY 2 E	34-0908	HLY	36.7236	-102.4806	4133	NCEI	1947-2013
OK	BOISE CITY 2 E	34-0908	DLY	36.7236	-102.4806	4134	NCEI	1908-2016
OK	BOISE CITY_3SSE	86-0153	15M	36.6926	-102.4971	4157	OKM	1994-2015
OK	BOSWELL 1 S	34-0980	DLY	34.0211	-95.8722	551	NCEI	1941-1999
OK	BROKEN BOW	76-0021	HLY	34.0500	-94.7372	500	RAWS	1999-2015
OK	BROKEN BOW 1 N	34-1162	DLY	34.0497	-94.7381	476	NCEI	1917-2017
OK	BROKEN BOW DAM	34-1168	HLY	34.1333	-94.7000	443	NCEI	1964-1997
OK	BROKEN BOW DAM	34-1168	DLY	34.1333	-94.7000	443	NCEI	1964-2017
OK	BROKEN BOW RAWS	85-0192	HLY	34.0500	-94.7400	518	HADS	2004-2017
OK	BROKEN BOW_6.5E	86-0157	15M	34.0433	-94.6244	371	OKM	1994-2015

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OK	BROKEN BOW_6.5E	86-0157	DLY	34.0433	-94.6244	375	OKM	1994-2016
OK	BROKEN BOW_7E	86-0147	15M	34.0144	-94.6131	371	OKM	1994-2015
OK	BROKEN BOW_7E	86-0147	DLY	34.0144	-94.6131	372	OKM	1994-2016
OK	BUFFALO 1SW MESONET	34-1240	DLY	36.8314	-99.6411	1834	NCEI	2009-2017
OK	BUFFALO 2 SSW	34-1243	DLY	36.8003	-99.6400	1932	NCEI	1907-2013
OK	BUFFALO_0.5SW	86-0158	15M	36.8313	-99.6410	1834	OKM	1994-2015
OK	BUFFALO_0.5SW	86-0158	DLY	36.8313	-99.6410	1832	OKM	1994-2016
OK	BUTLER 5SW MESONET	34-1270	DLY	35.5914	-99.2706	1706	NCEI	2009-2017
OK	BUTLER_5SW	86-0161	15M	35.5915	-99.2706	1706	OKM	1994-2015
OK	BUTLER_5SW	86-0161	DLY	35.5915	-99.2706	1704	OKM	1994-2016
OK	BYARS 3ESE MESONET	34-1283	DLY	34.8494	-97.0031	1132	NCEI	2009-2017
OK	BYARS_3ESE	86-0162	15M	34.8497	-97.0033	1132	OKM	1994-2015
OK	BYARS_3ESE	86-0162	DLY	34.8497	-97.0033	1137	OKM	1994-2016
OK	CAMARGO	34-1396	DLY	36.0167	-99.2833	1942	NCEI	1923-1975
OK	CAMARGO 4WNW MESONET	34-1404	DLY	36.0286	-99.3464	1932	NCEI	2009-2017
OK	CAMARGO_4WNW	86-0164	DLY	36.0287	-99.3465	1924	OKM	1994-2016
OK	CANEY 1 E	34-1437	15M	34.2300	-96.1950	565	NCEI	1978-2010
OK	CANEY 1 E	34-1437	DLY	34.2300	-96.1950	564	NCEI	2000-2009
OK	CANEY 1 NNE	34-1436	HLY	34.2333	-96.2167	531	NCEI	1947-1978
OK	CANEY 1 NNE	34-1436	DLY	34.2333	-96.2167	531	NCEI	1947-1951
OK	CARNASAW TWR	34-1499	DLY	34.1442	-94.6378	1001	NCEI	1938-2001
OK	CARNEGIE 5 NE	34-1504	DLY	35.1756	-98.5794	1480	NCEI	1914-2005
OK	CARTER TWR	34-1544	15M	34.2505	-94.7812	1301	NCEI	1971-2010
OK	CARTER TWR	34-1544	HLY	34.2505	-94.7812	1301	NCEI	1947-2010
OK	CARTER TWR	34-1544	DLY	34.2505	-94.7812	1301	NCEI	1939-2008
OK	CENTRAHOMA 1E MESONET	34-1644	DLY	34.6089	-96.3331	682	NCEI	2009-2017
OK	CENTRAHOMA_1E	86-0167	15M	34.6090	-96.3331	682	OKM	1994-2015
OK	CENTRAHOMA_1E	86-0167	DLY	34.6090	-96.3331	687	OKM	1994-2016
OK	CHATTANOOGA	34-1706	DLY	34.4225	-98.6497	1148	NCEI	1905-2017
OK	CHEYENNE	34-1738	DLY	35.6000	-99.6833	2005	NCEI	1923-1994
OK	CHEYENNE 11 NW	34-1744	15M	35.7539	-99.7628	2330	NCEI	2003-2007
OK	CHEYENNE 11 NW	34-1744	HLY	35.7539	-99.7628	2330	NCEI	2003-2007

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OK	CHEYENNE 11 NW	34-1744	DLY	35.7539	-99.7628	2329	NCEI	2003-2007
OK	CHEYENNE 6SW MESONET	34-1743	DLY	35.5461	-99.7278	2277	NCEI	2009-2017
OK	CHEYENNE_6SW	86-0170	15M	35.5461	-99.7279	2277	OKM	1994-2015
OK	CHEYENNE_6SW	86-0170	DLY	35.5461	-99.7279	2267	OKM	1994-2016
OK	CHICKASAW NRA	34-1745	DLY	34.5019	-96.9717	1056	NCEI	1978-2017
OK	CHICKASHA	34-1747	DLY	35.0333	-97.9500	1089	NCEI	1901-1966
OK	CHICKASHA EXP STATION	66-1750	15M	35.0488	-97.9158	1085	NCEI	2013-2017
OK	CHICKASHA EXP STATION	34-1750	15M	35.0489	-97.9158	1085	NCEI	1971-2013
OK	CHICKASHA EXP STATION	34-1750	HLY	35.0489	-97.9158	1085	NCEI	1958-2013
OK	CHICKASHA EXP STATION	34-1750	DLY	35.0489	-97.9158	1086	NCEI	1953-2017
OK	CHRISTS 40 ACRE CAMP	85-0237	HLY	34.5283	-94.9311	896	HADS	1995-2017
OK	CLAYTON_3NNE	86-0173	15M	34.6566	-95.3260	610	OKM	1994-2015
OK	CLAYTON_3NNE	86-0173	DLY	34.6566	-95.3260	614	OKM	1994-2016
OK	CLEBIT 2 ESE	34-1873	DLY	34.3833	-94.9833	830	NCEI	1978-1982
OK	CLINTON	34-1909	DLY	35.5014	-98.9772	1572	NCEI	1936-2005
OK	CLINTON 5.2 SSW	69-0520	DLY	35.4369	-99.0096	1631	NCEI	2008-2017
OK	CLINTON SHERMAN AP	79-0020	DLY	35.3400	-99.2000	1910	NCEI	1958-2017
OK	CLINTON-SHERMAN AIRPORT	55-0021	HLY	35.3400	-99.2000	1910	NCEI	1996-2007
OK	CLINTON-SHERMAN AIRPORT	56-0085	HLY	35.3400	-99.2000	1910	NCEI	2007-2017
OK	CLOUD CHIEF 2 SE	34-1927	DLY	35.2333	-98.8167	1503	NCEI	1893-1975
OK	CLOUDY_5SSE	86-0174	15M	34.2232	-95.2487	725	OKM	1994-2015
OK	CLOUDY_5SSE	86-0174	DLY	34.2232	-95.2487	735	OKM	1994-2016
OK	COALGATE 1 WNW	34-1954	DLY	34.5500	-96.2333	610	NCEI	1904-1982
OK	COMANCHE	34-2054	DLY	34.3622	-97.9736	1024	NCEI	1952-2017
OK	CORDELL	34-2125	DLY	35.3008	-98.9958	1565	NCEI	1936-2013
OK	CORDELL 0.8 SW	69-0521	DLY	35.2901	-98.9887	1558	NCEI	2010-2013
OK	COX CITY 2 NE	34-2196	DLY	34.7422	-97.7039	1234	NCEI	1980-2013
OK	CUSTER CITY 3 SE	34-2334	15M	35.6472	-98.8281	1755	NCEI	1973-2004
OK	CUSTER CITY 3 SE	34-2334	HLY	35.6472	-98.8281	1755	NCEI	1973-2004
OK	DAISY 4 ENE	34-2354	DLY	34.5433	-95.6764	755	NCEI	1944-2017
OK	DAM-TOM STEED LAKE-W.OTTER CRE	85-0250	HLY	34.7333	-98.9833	1453	HADS	1995-2017
OK	DUNCAN	34-2660	DLY	34.5011	-97.9592	1125	NCEI	1936-2017

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OK	DUNCAN 1 SSW	34-2665	HLY	34.4833	-97.9667	1130	NCEI	1947-1979
OK	DUNCAN 10 W	34-2668	DLY	34.4933	-98.1419	1115	NCEI	1981-2017
OK	DUNCAN AP	34-2654	15M	34.4831	-97.9578	1105	NCEI	1979-2012
OK	DURANT	34-2678	DLY	34.0000	-96.3686	600	NCEI	1901-2017
OK	DURANT_6SSE	86-0178	15M	33.9207	-96.3203	646	OKM	1994-2015
OK	DURANT_6SSE	86-0178	DLY	33.9207	-96.3203	656	OKM	1994-2016
OK	ELDORADO	34-2836	DLY	34.4667	-99.6500	1460	NCEI	1903-1975
OK	ELK CITY 4 W	34-2849	15M	35.3925	-99.5064	2120	NCEI	1971-2008
OK	ELK CITY 4 W	34-2849	HLY	35.3925	-99.5064	2120	NCEI	1947-2008
OK	ELK CITY 4 W	34-2849	DLY	35.3925	-99.5064	2119	NCEI	1904-2017
OK	ELMORE CITY 3 SW	34-2872	DLY	34.6100	-97.4222	1020	NCEI	1947-2017
OK	ERICK	85-0216	HLY	35.2064	-99.8000	1991	HADS	1995-2017
OK	ERICK	34-2944	DLY	35.2164	-99.8628	2060	NCEI	1904-2017
OK	ERICK_4ESE	86-0181	15M	35.2049	-99.8034	1978	OKM	1994-2015
OK	ERICK_4ESE	86-0181	DLY	35.2049	-99.8034	1980	OKM	1994-2016
OK	EVA	66-3002	15M	36.7975	-101.9075	3574	NCEI	2013-2017
OK	EVA	34-3002	15M	36.7975	-101.9075	3574	NCEI	1984-2013
OK	EVA	34-3002	HLY	36.7975	-101.9075	3574	NCEI	1947-2013
OK	FARGO	34-3070	DLY	36.3736	-99.6244	2116	NCEI	1942-2017
OK	FARRIS 3 WNW	34-3083	DLY	34.2667	-95.9167	509	NCEI	1944-1995
OK	FLASHMAN TWR	34-3182	DLY	34.4796	-95.0101	1752	NCEI	1938-1984
OK	FORT COBB 0.4 NNW	69-0468	DLY	35.1046	-98.4443	1309	NCEI	2013-2017
OK	FORT COBB_4NNW	86-0187	15M	35.1489	-98.4661	1385	OKM	1994-2015
OK	FORT COBB_4NNW	86-0187	DLY	35.1489	-98.4661	1381	OKM	1994-2016
OK	FORT SILL	52-3300	DLY	34.6708	-98.3869	1160	FORTS	1870-1892
OK	FORT SILL	34-3300	DLY	34.6667	-98.3833	1201	NCEI	1870-1908
OK	FORT SUPPLY 4.2 SE	69-0525	DLY	36.5312	-99.5179	2067	NCEI	2011-2017
OK	FREDERICK	34-3353	DLY	34.3861	-99.0200	1286	NCEI	1904-2011
OK	FREEDOM	34-3358	DLY	36.7647	-99.1128	1516	NCEI	1948-2015
OK	FREEDOM 16NNE MESONET	34-3660	DLY	36.9869	-99.0108	1821	NCEI	2009-2017
OK	FT COBB	34-3281	15M	35.1036	-98.4428	1285	NCEI	1977-2007
OK	FT COBB	34-3281	HLY	35.1036	-98.4428	1285	NCEI	1952-2007

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OK	FT COBB	34-3281	DLY	35.1036	-98.4428	1286	NCEI	1938-1975
OK	FT SILL POST FLD AF	79-0083	DLY	34.6500	-98.4000	1211	NCEI	1949-1970
OK	FT SUPPLY 3SE	34-3304	HLY	36.5442	-99.5350	2030	NCEI	1947-2012
OK	FT SUPPLY 3SE	34-3304	DLY	36.5442	-99.5350	2031	NCEI	1940-2013
OK	GAGE AIRPORT	55-0090	HLY	36.2970	-99.7750	2202	NCEI	1996-2007
OK	GAGE AIRPORT	56-0167	HLY	36.2967	-99.7689	2202	NCEI	2007-2017
OK	GAGE AP	34-3407	HLY	36.2967	-99.7689	2191	NCEI	1948-2013
OK	GAGE AP	79-0095	DLY	36.2967	-99.7689	2192	NCEI	1904-2017
OK	GATE	34-3489	DLY	36.8500	-100.0569	2251	NCEI	1959-2017
OK	GLOVER RIVER	85-0230	HLY	34.1014	-94.9061	427	HADS	1995-2017
OK	GOODWELL RESEARCH STATION	54-0204	DLY	36.5908	-101.6175	3278	NADP	1985-2015
OK	GOODWELL RSCH STN	66-3628	15M	36.5913	-101.6180	3278	NCEI	2013-2017
OK	GOODWELL RSCH STN	34-3628	15M	36.5914	-101.6181	3278	NCEI	1978-2013
OK	GOODWELL RSCH STN	34-3628	HLY	36.5914	-101.6181	3278	NCEI	1947-2013
OK	GOODWELL RSCH STN	34-3628	DLY	36.5914	-101.6181	3278	NCEI	1910-2017
OK	GOODWELL_2E	86-0188	15M	36.6018	-101.6013	3271	OKM	1994-2015
OK	GRANDFIELD 4 NW	34-3709	DLY	34.2833	-98.7333	1060	NCEI	1941-1994
OK	GRANDFIELD_3.3W	86-0189	15M	34.2394	-98.7436	1119	OKM	1994-2015
OK	GRANDFIELD_3.3W	86-0189	DLY	34.2394	-98.7436	1121	OKM	1994-2016
OK	GRANDFIELD_3WNW	86-0190	15M	34.2392	-98.7397	1122	OKM	1994-2015
OK	GRANDFIELD_3WNW	86-0190	DLY	34.2392	-98.7397	1122	OKM	1994-2016
OK	GUYMON	34-3835	DLY	36.7028	-101.4781	3071	NCEI	1909-2010
OK	GUYMON MUNI AP	79-0003	DLY	36.6817	-101.5053	3123	NCEI	1998-2017
OK	HAMMON 3 SSW	34-3871	DLY	35.5850	-99.3953	1821	NCEI	1920-2005
OK	HARDESTY	34-3902	DLY	36.6167	-101.1833	2904	NCEI	1941-1957
OK	HEALDTON 3 E	34-4001	DLY	34.2333	-97.4203	902	NCEI	1894-2017
OK	HEE MTN TWR	34-4017	DLY	34.3413	-94.6572	1503	NCEI	1948-1995
OK	HENNEPIN	34-4051	15M	34.5167	-97.3500	942	NCEI	1971-1974
OK	HENNEPIN	34-4051	HLY	34.5167	-97.3500	942	NCEI	1948-1974
OK	HENNEPIN	34-4051	DLY	34.5167	-97.3500	942	NCEI	1948-1951
OK	HENNEPIN 5 N	66-4052	15M	34.5797	-97.3510	966	NCEI	2013-2017
OK	HENNEPIN 5 N	34-4052	15M	34.5797	-97.3511	966	NCEI	1974-2013

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OK	HENNEPIN 5 N	34-4052	HLY	34.5797	-97.3511	966	NCEI	1974-2013
OK	HENNEPIN 5 N	34-4052	DLY	34.5797	-97.3511	965	NCEI	1993-2017
OK	HENRY POST AAF AIRPORT	64-0446	DLY	34.6500	-98.4000	1189	NCEI	1973-2016
OK	HOBART	34-4202	15M	35.0258	-99.1058	1552	NCEI	1971-2010
OK	HOBART	34-4202	HLY	35.0258	-99.1058	1552	NCEI	1952-2010
OK	HOBART	34-4202	DLY	35.0258	-99.1058	1552	NCEI	2010-2017
OK	HOBART MUNI AP	78-0045	15M	34.9894	-99.0525	1556	NCEI	2005-2017
OK	HOBART MUNI AP	79-0158	DLY	34.9894	-99.0525	1555	NCEI	1910-2017
OK	HOBART MUNICIPAL AIRPORT	34-4204	HLY	34.9894	-99.0525	1556	NCEI	1947-2013
OK	HOBART MUNICIPAL AIRPORT	56-0276	HLY	34.9894	-99.0525	1570	NCEI	2007-2017
OK	HOBART_4SE	86-0195	15M	34.9897	-99.0528	1552	OKM	1994-2015
OK	HOLLIS 5E	34-4249	DLY	34.6808	-99.8136	1621	NCEI	1922-2013
OK	HOLLIS 5E MESONET	34-4250	DLY	34.6856	-99.8333	1631	NCEI	2011-2017
OK	HOLLIS_3W	86-0197	15M	34.6855	-99.8333	1631	OKM	1994-2015
OK	HOLLIS_3W	86-0197	DLY	34.6855	-99.8333	1637	OKM	1994-2016
OK	HOOKER	34-4298	DLY	36.8650	-101.2103	2989	NCEI	1906-2017
OK	HOOKER_1W	86-0198	15M	36.8552	-101.2255	2992	OKM	1994-2015
OK	HOOKER_1W	86-0198	DLY	36.8552	-101.2255	2993	OKM	1994-2016
OK	HUGO	34-4384	15M	34.0211	-95.5381	520	NCEI	1972-1999
OK	HUGO	34-4384	HLY	34.0211	-95.5381	520	NCEI	1947-1999
OK	HUGO	34-4384	DLY	34.0211	-95.5381	522	NCEI	1915-2007
OK	HUGO 7E - DAM - KIAMICHI RVR	85-0235	HLY	34.0117	-95.3803	423	HADS	1995-2017
OK	HUGO DAM	34-4386	HLY	34.0000	-95.4000	466	NCEI	1969-1997
OK	HUGO_2NW	86-0199	15M	34.0308	-95.5401	574	OKM	1994-2015
OK	HUGO_2NW	86-0199	DLY	34.0308	-95.5401	573	OKM	1994-2016
OK	IDABEL	34-4451	DLY	33.9336	-94.8278	364	NCEI	1907-2017
OK	IDABEL_5SW	86-0200	15M	33.8301	-94.8803	361	OKM	1994-2015
OK	IDABEL_5SW	86-0200	DLY	33.8301	-94.8803	368	OKM	1994-2016
OK	INDIAHOMA	85-0273	HLY	34.7744	-98.7458	2037	HADS	1995-2017
OK	KENTON	34-4766	DLY	36.9031	-102.9650	4350	NCEI	1900-2006
OK	KENTON_5SE	86-0203	15M	36.8294	-102.8782	4337	OKM	1994-2015
OK	KENTON_5SE	86-0203	DLY	36.8294	-102.8782	4342	OKM	1994-2016

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
OK	KESSLER FARM FIELD LABORATORY	54-0202	DLY	34.9800	-97.5214	1086	NADP	1983-2015
OK	KETCHUM RANCH_7NW	86-0204	15M	34.5289	-97.7648	1119	OKM	1994-2015
OK	KETCHUM RANCH_7NW	86-0204	DLY	34.5289	-97.7648	1122	OKM	1994-2016
OK	KINGSTON 4.9 SSE	69-0498	DLY	33.9374	-96.6887	696	NCEI	2012-2017
OK	KINGSTON 5 SSE	34-4865	15M	33.9300	-96.6961	684	NCEI	1984-2009
OK	KINGSTON 5 SSE	34-4865	HLY	33.9300	-96.6961	684	NCEI	1947-2009
OK	KINGSTON 5 SSE	34-4865	DLY	33.9300	-96.6961	686	NCEI	1946-2008
OK	LANE 1WNW MESONET	34-5020	DLY	34.3086	-95.9969	594	NCEI	2009-2017
OK	LANE_1WNW	86-0208	15M	34.3088	-95.9972	594	OKM	1994-2015
OK	LANE_1WNW	86-0208	DLY	34.3088	-95.9972	599	OKM	1994-2016
OK	LAVERNE	34-5045	DLY	36.6992	-99.8967	2116	NCEI	1939-2010
OK	LAWTON	34-5063	DLY	34.6097	-98.4572	1152	NCEI	1912-2017
OK	LAWTON 2N	34-5068	DLY	34.6500	-98.4000	1122	NCEI	1936-1950
OK	LAWTON MUNI AP	79-0026	DLY	34.5583	-98.4172	1070	NCEI	1998-2017
OK	LAWTON-FORT SILL REG AP	55-0024	HLY	34.5680	-98.4160	1108	NCEI	1996-2007
OK	LAWTON-FORT SILL RGNL ARPT	56-0089	HLY	34.5680	-98.4160	1108	NCEI	2007-2017
OK	LEEDEY	34-5090	DLY	35.8781	-99.3433	2080	NCEI	1941-2017
OK	LEHIGH 4 SW	66-5108	15M	34.4339	-96.2717	695	NCEI	2013-2017
OK	LEHIGH 4 SW	34-5108	15M	34.4339	-96.2717	695	NCEI	1984-2013
OK	LEHIGH 4 SW	34-5108	HLY	34.4339	-96.2717	695	NCEI	1947-2013
OK	LEHIGH 4 SW	34-5108	DLY	34.4339	-96.2717	696	NCEI	1893-2017
OK	LINDSAY 2 W	34-5216	DLY	34.8261	-97.6386	981	NCEI	1938-2010
OK	MACKIE 4 NNW	34-5463	15M	35.7481	-99.8178	2150	NCEI	1974-2002
OK	MACKIE 4 NNW	34-5463	HLY	35.7481	-99.8178	2150	NCEI	1970-2002
OK	MACKIE 4 NNW	34-5463	DLY	35.7481	-99.8178	2149	NCEI	2000-2002
OK	MADILL	34-5468	DLY	34.0919	-96.7708	771	NCEI	1936-2017
OK	MADILL 11WSW MESONET	34-5474	DLY	34.0356	-96.9433	761	NCEI	2009-2017
OK	MADILL_4.5NNW	86-0209	15M	34.0358	-96.9439	761	OKM	1994-2015
OK	MADILL_4.5NNW	86-0209	DLY	34.0358	-96.9439	765	OKM	1994-2016
OK	MANGUM	34-5509	DLY	34.8911	-99.5017	1594	NCEI	1920-2017
OK	MANGUM 5SE MESONET	34-5514	DLY	34.8358	-99.4239	1509	NCEI	2009-2017
OK	MANGUM_5SE	86-0210	15M	34.8359	-99.4240	1509	OKM	1994-2015

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
OK	MANGUM_5SE	86-0210	DLY	34.8359	-99.4240	1511	OKM	1994-2016
OK	MARIETTA 5SW	34-5563	DLY	33.8761	-97.1642	801	NCEI	1937-2017
OK	MARLOW 1 WSW	34-5581	DLY	34.6367	-97.9786	1263	NCEI	1900-2017
OK	MAY RANCH_16NNE	86-0213	15M	36.9871	-99.0111	1821	OKM	1994-2015
OK	MAY RANCH_16NNE	86-0213	DLY	36.9871	-99.0111	1823	OKM	1994-2016
OK	MAYFIELD	66-5648	15M	35.3391	-99.8769	2005	NCEI	2013-2017
OK	MAYFIELD	34-5648	15M	35.3392	-99.8769	2005	NCEI	1971-2013
OK	MAYFIELD	34-5648	HLY	35.3392	-99.8769	2005	NCEI	1947-2013
OK	MCALESTER REGIONAL AIRPORT	34-5664	15M	34.8822	-95.7831	770	NCEI	1980-2006
OK	MCALESTER RGNL AP	78-0060	15M	34.8822	-95.7830	770	NCEI	2005-2017
OK	MCALESTER RGNL AP	79-0156	DLY	34.8822	-95.7831	771	NCEI	1893-2017
OK	MCALESTER_4S	86-0214	15M	34.8823	-95.7810	755	OKM	1994-2015
OK	MCGEE CREEK DAM	34-5713	DLY	34.3097	-95.8675	673	NCEI	1982-2017
OK	MEDICINE PARK_3W	86-0216	15M	34.7292	-98.5694	1598	OKM	1994-2015
OK	MEDICINE PARK_3W	86-0216	DLY	34.7292	-98.5694	1607	OKM	1994-2016
OK	MEDICINE PK 3W MESONET	34-5775	DLY	34.7292	-98.5694	1598	NCEI	2009-2017
OK	MORAVIA 2 NNE	34-6035	DLY	35.1464	-99.4956	1690	NCEI	1941-2017
OK	MUTUAL	34-6139	DLY	36.2283	-99.1700	1890	NCEI	1915-2017
OK	N FORK RED RIVER AT CARTER	87-0006	HLY	35.1681	-99.5069	1680	USBR	1991-2016
OK	N FORK RED RIVER AT CARTER	87-0006	DLY	35.1681	-99.5069	1680	USBR	1990-2016
OK	N. CANADIAN RIVER	85-0259	HLY	36.1833	-98.9167	1729	HADS	1995-2017
OK	NINNEKAH	34-6328	HLY	34.9500	-97.9333	1161	NCEI	1947-1966
OK	NINNEKAH_2NNW	86-0223	15M	34.9677	-97.9520	1168	OKM	1994-2015
OK	NINNEKAH_2NNW	86-0223	DLY	34.9677	-97.9520	1172	OKM	1994-2016
OK	NORTH FORK RED RIVER NR SAYRE	87-0029	HLY	35.2847	-99.6217	1783	USBR	1991-2016
OK	OPTIMA LAKE	34-6740	HLY	36.6500	-101.1333	2834	NCEI	1973-1994
OK	OPTIMA LAKE	34-6740	DLY	36.6500	-101.1333	2835	NCEI	1985-1994
OK	PAOLI 2 W	66-6859	15M	34.8230	-97.2850	931	NCEI	2013-2017
OK	PAOLI 2 W	34-6859	15M	34.8231	-97.2850	931	NCEI	1972-2013
OK	PAOLI 2 W	34-6859	HLY	34.8231	-97.2850	931	NCEI	1947-2013
OK	PINE CREEK DAM	34-7080	HLY	34.1167	-95.0833	490	NCEI	1965-1997
OK	PINE CREEK DAM	34-7080	DLY	34.1167	-95.0833	489	NCEI	1994-2015

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
OK	PONTOTOC	34-7214	DLY	34.4997	-96.6275	1024	NCEI	1941-2017
OK	PUTNAM 3N MESONET	34-7343	DLY	35.8989	-98.9603	1932	NCEI	2009-2017
OK	PUTNAM_3N	86-0239	15M	35.8990	-98.9604	1932	OKM	1994-2015
OK	PUTNAM_3N	86-0239	DLY	35.8990	-98.9604	1934	OKM	1994-2016
OK	RANDLETT 9 E	34-7403	DLY	34.1578	-98.3108	997	NCEI	1941-2016
OK	RANGE	66-7412	15M	36.5447	-101.0841	2710	NCEI	2013-2017
OK	RANGE	34-7412	15M	36.5447	-101.0842	2710	NCEI	1976-2013
OK	RANGE	34-7412	HLY	36.5447	-101.0842	2710	NCEI	1947-2013
OK	RANGE	34-7412	DLY	36.5447	-101.0842	2710	NCEI	1948-2012
OK	RED RIVER	85-0266	HLY	33.8833	-97.9333	869	HADS	1995-2017
OK	REGNIER	34-7534	DLY	36.9425	-102.6314	4019	NCEI	1890-2006
OK	RETROP	34-7565	DLY	35.1597	-99.3658	1781	NCEI	1980-2017
OK	RETROP 2S MESONET	34-7570	DLY	35.1228	-99.3600	1765	NCEI	1959-2015
OK	RETROP_10ENE	86-0241	15M	35.1228	-99.3600	1765	OKM	1994-2015
OK	RETROP_10ENE	86-0241	DLY	35.1228	-99.3600	1766	OKM	1994-2016
OK	REYDON 2SSE	34-7579	DLY	35.6256	-99.9106	2385	NCEI	1941-2007
OK	REYDON 7 NNE	34-7588	HLY	35.7500	-99.8667	2172	NCEI	1947-1965
OK	RIVERSIDE 4 W	66-7660	15M	36.7888	-100.4183	2450	NCEI	2013-2017
OK	RIVERSIDE 4 W	34-7660	15M	36.7889	-100.4183	2450	NCEI	1976-2013
OK	RIVERSIDE 4 W	34-7660	HLY	36.7889	-100.4183	2450	NCEI	1947-2013
OK	ROFF 2 WNW	66-7705	15M	34.6373	-96.8821	1255	NCEI	2013-2017
OK	ROFF 2 WNW	34-7705	15M	34.6372	-96.8822	1255	NCEI	1971-2013
OK	ROFF 2 WNW	34-7705	HLY	34.6372	-96.8822	1255	NCEI	1947-2013
OK	ROFF 2 WNW	34-7705	DLY	34.6372	-96.8822	1257	NCEI	1901-1951
OK	ROLL	34-7714	HLY	35.7833	-99.7167	2303	NCEI	1947-1970
OK	ROOSEVELT	34-7727	DLY	34.8511	-99.0208	1463	NCEI	1943-2017
OK	SAYRE	34-7952	DLY	35.3061	-99.6275	1900	NCEI	1936-2017
OK	SEILING 7WNW MESONET	34-8027	DLY	36.1903	-99.0403	1788	NCEI	2009-2017
OK	SEILING_7WNW	86-0244	15M	36.1903	-99.0403	1788	OKM	1994-2015
OK	SEILING_7WNW	86-0244	DLY	36.1903	-99.0403	1788	OKM	1994-2016
OK	SHATTUCK	34-8092	DLY	36.2667	-99.8833	2241	NCEI	1921-1948
OK	SHATTUCK 1NW	66-8101	15M	36.2892	-99.8932	2195	NCEI	2013-2017

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
OK	SHATTUCK 1NW	34-8101	15M	36.2892	-99.8933	2195	NCEI	1976-2013
OK	SHATTUCK 1NW	34-8101	HLY	36.2892	-99.8933	2195	NCEI	1947-2013
OK	SHATTUCK 1NW	34-8101	DLY	36.2892	-99.8933	2195	NCEI	1943-1954
OK	SLAPOUT_8W	86-0247	15M	36.5975	-100.2619	2539	OKM	1994-2015
OK	SLAPOUT_8W	86-0247	DLY	36.5975	-100.2619	2546	OKM	1994-2016
OK	SMITHVILLE	34-8285	DLY	34.4660	-94.6589	823	NCEI	1888-2008
OK	SNYDER 1 N	34-8299	DLY	34.6867	-98.9483	1371	NCEI	1906-2013
OK	SOBOL TWR	34-8305	DLY	34.1335	-95.2389	751	NCEI	1952-1991
OK	STAPP CCC	34-8462	DLY	34.7500	-94.6333	684	NCEI	1940-1942
OK	STUART_3SE	86-0251	15M	34.8764	-96.0698	840	OKM	1994-2015
OK	STUART_3SE	86-0251	DLY	34.8764	-96.0698	841	OKM	1994-2016
OK	SULPHUR 4NNE MESONET	34-8570	DLY	34.5658	-96.9503	1050	NCEI	2009-2017
OK	SULPHUR PLATT NAT'L PK	34-8587	DLY	34.5000	-96.9667	991	NCEI	1917-1978
OK	SULPHUR_4NNE	86-0252	15M	34.5661	-96.9505	1050	OKM	1994-2015
OK	SULPHUR_4NNE	86-0252	DLY	34.5661	-96.9505	1049	OKM	1994-2016
OK	SUPPLY 1 E	34-8627	DLY	36.5667	-99.5500	1972	NCEI	1893-1975
OK	TALIHINA_4SE	86-0255	15M	34.7107	-95.0115	669	OKM	1994-2015
OK	TALIHINA_4SE	86-0255	DLY	34.7107	-95.0115	679	OKM	1994-2016
OK	TALOGA	34-8708	15M	36.0406	-98.9625	1715	NCEI	1971-2013
OK	TALOGA	34-8708	HLY	36.0406	-98.9625	1715	NCEI	1957-2013
OK	TALOGA	34-8708	DLY	36.0381	-98.9592	1706	NCEI	1900-2017
OK	TALOGA NEAR	34-8711	DLY	36.0500	-98.9667	1650	NCEI	1938-1944
OK	TIPTON 4S MESONET	34-8879	HLY	34.4397	-99.1375	1269	NCEI	1947-1955
OK	TIPTON 4S MESONET	34-8879	DLY	34.4397	-99.1375	1270	NCEI	1938-2017
OK	TIPTON_4S	86-0256	15M	34.4397	-99.1376	1270	OKM	1994-2015
OK	TIPTON_4S	86-0256	DLY	34.4397	-99.1376	1272	OKM	1994-2016
OK	TISHOMINGO NATL WR	34-8884	DLY	34.1925	-96.6442	643	NCEI	1902-2017
OK	TOM STEED RSVR (MTN PARK DAM)	87-0040	HLY	34.7381	-98.9881	1408	USBR	1991-2016
OK	TURPIN 4 SSE	34-9017	DLY	36.8136	-100.8636	2707	NCEI	1982-2013
OK	TURPIN 6.1 SSE	69-0454	DLY	36.7878	-100.8392	2602	NCEI	2013-2017
OK	TUSKAHOMA	34-9023	15M	34.6147	-95.2803	600	NCEI	1984-2013
OK	TUSKAHOMA	34-9023	HLY	34.6147	-95.2803	600	NCEI	1947-2013

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
OK	TUSKAHOMA	34-9023	DLY	34.6147	-95.2803	600	NCEI	1917-2013
OK	VALLIANT 3 W	34-9118	DLY	33.9981	-95.1433	476	NCEI	1941-2015
OK	VELMA 7NW MESONET	34-9130	DLY	34.5289	-97.7647	1119	NCEI	2009-2017
OK	VICI	34-9172	DLY	36.1508	-99.3003	2264	NCEI	1955-2017
OK	VINSON	34-9212	DLY	34.9003	-99.8614	1880	NCEI	1940-2017
OK	WALTERS	34-9278	DLY	34.3603	-98.3006	1004	NCEI	1914-2013
OK	WALTERS_1NW	86-0264	15M	34.3647	-98.3203	1010	OKM	1994-2015
OK	WALTERS_1NW	86-0264	DLY	34.3647	-98.3203	1017	OKM	1994-2016
OK	WALTERS_4NW	86-0263	15M	34.3996	-98.3457	1060	OKM	1994-2015
OK	WALTERS_4NW	86-0263	DLY	34.3996	-98.3457	1051	OKM	1994-2016
OK	WASHINGTON 6SSW MESONET	34-9346	DLY	34.9819	-97.5208	1132	NCEI	2009-2017
OK	WASHINGTON_6SSW	86-0265	DLY	34.9822	-97.5211	1131	OKM	1994-2016
OK	WASHITA RIVER	85-0198	HLY	35.5317	-98.9658	1499	HADS	1995-2017
OK	WASHITA RIVER NEAR ANADARKO	87-0002	HLY	35.0850	-98.2431	1157	USBR	1991-2016
OK	WASHITA RIVER NEAR CHEYENNE	87-0044	HLY	35.6264	-99.6681	1923	USBR	1990-2016
OK	WAURIKA	34-9395	DLY	34.1747	-97.9964	912	NCEI	1910-2008
OK	WAURIKA 1ENE MESONET	34-9400	DLY	34.1678	-97.9883	928	NCEI	2009-2017
OK	WAURIKA_0.5ENE	86-0267	15M	34.1677	-97.9882	928	OKM	1994-2015
OK	WAYNOKA	66-9404	15M	36.5758	-98.8797	1508	NCEI	2013-2017
OK	WAYNOKA	34-9404	15M	36.5758	-98.8797	1508	NCEI	1984-2013
OK	WAYNOKA	34-9404	HLY	36.5758	-98.8797	1508	NCEI	1947-2013
OK	WAYNOKA	34-9404	DLY	36.5758	-98.8797	1509	NCEI	1938-2017
OK	WICHITA	76-0023	HLY	34.7744	-98.7458	1800	RAWS	1992-2015
OK	WICHITA MTN WR	66-9629	15M	34.7325	-98.7125	1665	NCEI	2013-2017
OK	WICHITA MTN WR	34-9629	15M	34.7325	-98.7125	1665	NCEI	1979-2013
OK	WICHITA MTN WR	34-9629	HLY	34.7325	-98.7125	1665	NCEI	1947-2013
OK	WICHITA MTN WR	34-9629	DLY	34.7325	-98.7125	1667	NCEI	1906-2017
OK	WILBURTON 9 ENE	34-9634	DLY	34.9458	-95.1546	636	NCEI	1921-2004
OK	WILLOW	34-9668	DLY	35.0522	-99.5125	1745	NCEI	1980-2017
OK	WOODWARD	34-9760	DLY	36.4408	-99.3817	1886	NCEI	1895-2017
OK	WOODWARD FLD STN	34-9762	HLY	36.4167	-99.4000	1987	NCEI	1949-1979
OK	WOODWARD FLD STN	34-9762	DLY	36.4167	-99.4000	1991	NCEI	1936-1979

State	Station name	SID	Formatting interval	Latitude	Longitude	Elev (ft)	Dataset	Period of record
OK	WOODWARD_2WSW	86-0274	15M	36.4233	-99.4168	2051	OKM	1994-2015
OK	WOODWARD_2WSW	86-0274	DLY	36.4233	-99.4168	2036	OKM	1994-2016
OK	ZOE 1 S	34-9985	DLY	34.7500	-94.6333	640	NCEI	1951-1987

Table A.1.5. Metadata for n-minute stations used in derivation of 5- and 10-minute scaling factors (see Section 4.6.3) showing each station's state, name, SID, latitude, longitude, elevation, dataset identifier (see Table 4.2.1), and the period of record.

State	Station name	SID	Latitude	Longitude	Elev (ft)	Dataset	Period of record
AR	DE QUEEN SEVIER CO AP	78-0027	34.0500	-94.4008	355	NCEI	2005-2017
AR	TEXARKANA WEBB FLD	78-0078	33.4536	-94.0074	361	NCEI	1998-2017
CO	SPRINGFIELD COMANCHE	78-0072	37.2833	-102.6139	4383	NCEI	2005-2017
LA	ALEXANDRIA INTL AP	78-0004	31.3347	-92.5586	84	NCEI	2005-2017
LA	FT POLK FULLERTON LNDG STRIP	78-0013	31.1500	-92.9667	310	NCEI	2006-2017
LA	LAKE CHARLES REGIONAL AP	16-5078	30.1247	-93.2283	9	NCEI	1973-1998
LA	LAKE CHARLES RGNL AP	78-0055	30.1247	-93.2283	9	NCEI	1998-2017
LA	PEASON RIDGE RANGE	78-0008	31.4000	-93.2833	365	NCEI	2006-2017
LA	SHREVEPORT DWTN AP	78-0032	32.5428	-93.7450	179	NCEI	2005-2017
LA	SHREVEPORT REGIONAL AP	16-8440	32.4472	-93.8244	254	NCEI	1973-1998
LA	SHREVEPORT RGNL AP	78-0070	32.4472	-93.8244	254	NCEI	1998-2017
NM	CARLSBAD CAVERN CITY AP	78-0020	32.3335	-104.2580	3232	NCEI	2005-2017
NM	CLAYTON MUNI AIR PK	78-0017	36.4486	-103.1539	4960	NCEI	1998-2017
NM	CLAYTON MUNICIPAL AIR PARK	29-1887	36.4486	-103.1539	4960	NCEI	1973-1998
NM	DEMING MUNI AP	78-0030	32.2622	-107.7206	4301	NCEI	2005-2017
NM	TUCUMCARI MUNI AP	78-0075	35.1822	-103.6031	4045	NCEI	2005-2017
OK	CLINTON-SHERMAN AP	78-0024	35.3568	-99.2042	1922	NCEI	1998-2017
OK	FREDERICK MUNI AP	78-0036	34.3520	-98.9840	1255	NCEI	2005-2017
OK	GAGE AP	78-0039	36.2967	-99.7689	2191	NCEI	1998-2017
OK	GUYMON MUNI AP	78-0044	36.6817	-101.5053	3113	NCEI	2004-2017
OK	HOBART MUNI AP	78-0045	34.9894	-99.0525	1556	NCEI	2005-2017
OK	LAWTON MUNI AP	78-0052	34.5584	-98.4172	1069	NCEI	1998-2017
OK	MCALESTER RGNL AP	78-0060	34.8822	-95.7830	770	NCEI	1998-2017
TX	ABILENE REGIONAL AP	41-0016	32.4105	-99.6822	1790	NCEI	1973-1998
TX	ABILENE RGNL AP	78-0002	32.4105	-99.6822	1790	NCEI	1998-2017
TX	ALICE INTL AP	78-0006	27.7411	-98.0247	173	NCEI	2005-2017
TX	AMARILLO INTERNATIONAL AIRPORT	41-0211	35.2295	-101.7042	3604	NCEI	1973-1998
TX	AMARILLO INTL AP	78-0007	35.2295	-101.7042	3604	NCEI	1998-2017
TX	ANGLETON BRAZORIA AP	78-0054	29.1097	-95.4619	25	NCEI	2005-2017
TX	ARLINGTON MUNI AP	78-0042	32.6636	-97.0939	622	NCEI	2005-2017

State	Station name	SID	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	AUSTIN BERGSTROM AP	78-0010	30.1831	-97.6799	480	NCEI	1998-2017
TX	AUSTIN-CAMP MABRY	41-0428	30.3208	-97.7604	670	NCEI	1973-1998
TX	AUSTIN-CAMP MABRY	78-0009	30.3208	-97.7604	670	NCEI	1999-2017
TX	BORGER HUTCHINSON CO AP	78-0012	35.6950	-101.3950	3042	NCEI	1998-2017
TX	BROWNSVILLE INTL AP	78-0016	25.9141	-97.4230	24	NCEI	1998-2017
TX	BROWNSVILLE S PADRE ISLAND INT	41-1136	25.9141	-97.4230	24	NCEI	1973-1998
TX	BURNET MUNI AP	78-0014	30.7406	-98.2354	1288	NCEI	2005-2017
TX	CHILDRESS MUNI AP	78-0018	34.4272	-100.2831	1951	NCEI	1998-2017
TX	COLLEGE STN	78-0019	30.5892	-96.3647	305	NCEI	1998-2017
TX	CONROE MONTGOMERY CO AP	78-0025	30.3567	-95.4139	230	NCEI	1998-2017
TX	CORPUS CHRISTI CABANISS FLD	78-0062	27.7000	-97.4333	19	NCEI	2007-2017
TX	CORPUS CHRISTI INTL AP	41-2015	27.7742	-97.5122	44	NCEI	1973-1998
TX	CORPUS CHRISTI INTL AP	78-0022	27.7742	-97.5122	44	NCEI	1998-2017
TX	CORSICANA CAMPBELL FLD	78-0023	32.0311	-96.3989	443	NCEI	2005-2017
TX	COTULLA LA SALLE CO AP	78-0021	28.4567	-99.2183	476	NCEI	2005-2017
TX	DAL-FTW WSCMO AP	41-2242	32.8978	-97.0189	560	NCEI	1978-1998
TX	DAL-FTW WSCMO AP	78-0028	32.8978	-97.0189	560	NCEI	1998-2017
TX	DALHART FAA AP	78-0029	36.0167	-102.5500	3990	NCEI	2005-2017
TX	DALLAS FAA AP	41-2244	32.8519	-96.8555	440	NCEI	1973-1997
TX	DALLAS FAA AP	78-0026	32.8519	-96.8555	440	NCEI	1999-2017
TX	DALLAS REDBIRD AP	78-0066	32.6808	-96.8681	658	NCEI	2005-2017
TX	DEL RIO INTERNATIONAL AP	41-2360	29.3784	-100.9270	999	NCEI	1973-1998
TX	DEL RIO INTL AP	78-0031	29.3784	-100.9270	999	NCEI	1998-2017
TX	DENTON MUNI AP	78-0033	33.2061	-97.1989	646	NCEI	2005-2017
TX	DRYDEN TERRELL CO AP	78-0001	30.0481	-102.2131	2303	NCEI	2005-2017
TX	EL PASO INTL AP	41-2797	31.8111	-106.3758	3918	NCEI	1973-1998
TX	EL PASO INTL AP	78-0035	31.8111	-106.3758	3918	NCEI	1998-2017
TX	FORT WORTH WB AP	41-3283	32.8333	-97.0500	574	NCEI	1973-1998
TX	FT STOCKTON PECOS AP	78-0037	30.9119	-102.9167	3010	NCEI	1998-2017
TX	FT WORTH ALLIANCE AP	78-0005	32.9733	-97.3181	685	NCEI	2005-2017
TX	FT WORTH MEACHAM FLD	78-0038	32.8192	-97.3614	687	NCEI	1998-2017
TX	GALVESTON	41-3430	29.3333	-94.7717	10	NCEI	1973-1994

State	Station name	SID	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	GALVESTON SCHOLES FLD	78-0043	29.2733	-94.8592	5	NCEI	1998-2017
TX	HARLINGEN RIO GRANDE AP	78-0048	26.2281	-97.6542	34	NCEI	2005-2017
TX	HONDO MUNI AP	78-0046	29.3601	-99.1742	920	NCEI	2005-2017
TX	HOUSTON CLOVER FLD	78-0057	29.5189	-95.2417	40	NCEI	2005-2017
TX	HOUSTON HOBBY AP	78-0047	29.6381	-95.2819	44	NCEI	2005-2017
TX	HOUSTON HOOKS MEM AP	78-0034	30.0675	-95.5561	153	NCEI	2005-2017
TX	HOUSTON INTERCONT AP	78-0049	29.9800	-95.3600	95	NCEI	1998-2017
TX	HOUSTON INTERCONTINENTAL AP	41-4300	29.9800	-95.3600	95	NCEI	1973-1998
TX	HOUSTON SUGARLAND MEM	78-0069	29.6219	-95.6567	84	NCEI	2005-2017
TX	HOUSTON WB CITY	41-4305	29.7667	-95.3667	52	NCEI	1973-1990
TX	HUNTSVILLE MUNI AP	78-0080	30.7439	-95.5861	348	NCEI	2005-2017
TX	JUNCTION KIMBLE CO AP	78-0051	30.5108	-99.7664	1713	NCEI	2005-2017
TX	LONGVIEW E TX RGNL AP	78-0041	32.3847	-94.7117	365	NCEI	1998-2017
TX	LUBBOCK INTERNATIONAL AP	41-5411	33.6656	-101.8231	3254	NCEI	1973-1998
TX	LUBBOCK INTL AP	78-0053	33.6658	-101.8233	3268	NCEI	1998-2017
TX	LUFKIN ANGELINA CO AP	78-0056	31.2361	-94.7544	288	NCEI	2005-2017
TX	MCALLEN MILLER INTL AP	78-0059	26.1839	-98.2539	100	NCEI	1998-2017
TX	MCKINNEY MUNI AP	78-0076	33.1835	-96.5895	565	NCEI	2005-2017
TX	MIDLAND INTERNATIONAL AP	41-5890	31.9475	-102.2086	2862	NCEI	1973-1998
TX	MIDLAND INTL AP	78-0058	31.9475	-102.2086	2862	NCEI	1998-2017
TX	MINERAL WELLS AP	78-0061	32.7817	-98.0603	930	NCEI	2005-2017
TX	NEW BRAUNFELS MUNI AP	78-0011	29.7089	-98.0458	645	NCEI	2005-2017
TX	ODESSA SCHLEMEYER FLD	78-0063	31.9206	-102.3867	3001	NCEI	2005-2017
TX	PALACIOS MUNI AP	78-0065	28.7247	-96.2536	12	NCEI	2005-2017
TX	PINE SPRINGS NP	78-0040	31.8331	-104.8089	5456	NCEI	2005-2017
TX	PORT ARTHUR SE TX AP	78-0015	29.9506	-94.0206	16	NCEI	1998-2017
TX	PORT ARTHUR SE TX REGIONAL AP	41-7174	29.9506	-94.0206	16	NCEI	1973-1998
TX	PORT ISABEL CAMERON AP	78-0064	26.1658	-97.3458	12	NCEI	2005-2017
TX	ROCKPORT ARANSAS CO AP	78-0067	28.0836	-97.0464	22	NCEI	2005-2017
TX	SAN ANGELO MATHIS FIELD	41-7943	31.3517	-100.4950	1916	NCEI	1973-1998
TX	SAN ANGELO MATHIS FLD	78-0071	31.3517	-100.4950	1916	NCEI	1998-2017
TX	SAN ANTONIO INTL AP	41-7945	29.5443	-98.4839	789	NCEI	1973-1998

State	Station name	SID	Latitude	Longitude	Elev (ft)	Dataset	Period of record
TX	SAN ANTONIO INTL AP	78-0068	29.5443	-98.4839	789	NCEI	1998-2017
TX	SAN ANTONIO STINSON AP	78-0074	29.3389	-98.4720	571	NCEI	2005-2017
TX	TERRELL MUNI AP	78-0077	32.7100	-96.2672	475	NCEI	2005-2017
TX	TYLER POUNDS FLD	78-0079	32.3542	-95.4025	544	NCEI	1998-2017
TX	VICTORIA REGIONAL AP	41-9364	28.8614	-96.9303	115	NCEI	1973-1998
TX	VICTORIA RGNL AP	78-0081	28.8614	-96.9303	115	NCEI	1998-2017
TX	WACO REGIONAL AP	41-9419	31.6189	-97.2283	500	NCEI	1973-1998
TX	WACO RGNL AP	78-0003	31.6189	-97.2283	500	NCEI	1998-2017
TX	WICHITA FALLS MUNI AP	78-0073	33.9786	-98.4928	1017	NCEI	1998-2017
TX	WICHITA FALLS MUNICIPAL AP	41-9729	33.9786	-98.4928	1017	NCEI	1973-1998
TX	WINKLER CO AP	78-0050	31.7801	-103.2018	2807	NCEI	2005-2017

Table A.1.6. List of stations for which additional data were digitized (Section 4.2) showing each station's state, name, SID, formatting interval, dataset identifier (Table 4.2.1), and the period(s) of record for which data were digitized.

State	Station name	SID	Formatting interval	Dataset	Period of record
TX	ABILENE	41-0016	HLY	NCEI	1905-1940
TX	AMARILLO	99-0212	HLY	NCEI	1902-1940
TX	AUSTIN	63-0193	HLY	NCEI	1926-1940
TX	BIG SPRING	79-0113	DLY	NCEI	1900-1950
TX	BRACKETTVIILE/FORT CLARK	41-1007	DLY	NCEI	1853-1899
TX	BRENHAM	41-1048	DLY	NCEI	1886-1901
TX	CAMP VERDE	41-1395	DLY	NCEI	1988-1996
TX	CORPUS CHRISTI	41-2014	HLY	NCEI	1902-1940
TX	CORSICANA 8 E	41-2020	DLY	NCEI	1955-1989
TX	COTULLA	41-2048	DLY	NCEI	1902-2002
TX	DALLAS WB CITY	99-2243	HLY	NCEI	1913-1940
TX	DEL RIO WB CITY	41-2360	HLY	NCEI	1906-1940
TX	EL PASO	75-0009	HLY	NCEI	1906-1940
TX	FORT BROWN/BROWNSVILLE	79-0043	DLY	NCEI	1849-1900
TX	FORT WORTH MEACHAM	41-3284	HLY	NCEI	1903-1940
TX	FORT WORTH WB CITY	99-0001	HLY	NCEI	1899-1940
TX	FREEPORT	41-3340	DLY	NCEI	1920-1930
TX	GALVESTON	41-3430	HLY	NCEI	1892-1940, 1947
TX	GONZALES	41-3622	DLY	NCEI	1904-1939
TX	HEARNE/VALLEY JUNCTION	41-9280	DLY	NCEI	1888-1946
TX	HEWITT	41-4122	DLY	NCEI	1894-1899
TX	HOUSTON WB CITY	41-4305	HLY	NCEI	1910-1940
TX	HOUSTON WB CITY	79-0056	DLY	NCEI	1883-1909
TX	KERRVILLE	41-4782	DLY	NCEI	1895-1901
LA	LAKE CHARLES CHENAULT	16-5077	HLY	NCEI	1940-1947
TX	MIDLAND 4 ENE	41-5891	DLY	NCEI	1885-1891
TX	MISSOURI CITY	41-4325	DLY	NCEI	1939-1948
TX	NORTH HOUSTON	41-4327	DLY	NCEI	1939-1947
TX	ORANGE	41-6664	DLY	NCEI	1883-1903, 1914-1937
TX	PALESTINE 2 NE	79-0153	DLY	NCEI	1882-1929
TX	PANDALE	41-6780	DLY	NCEI	1943-1947

State	Station name	SID	Formatting interval	Dataset	Period of record
TX	PORT ARTHUR CITY	41-7173	HLY	NCEI	1917-1939
TX	REFUGIO 3 SW	41-7529	DLY	NCEI	1988-1991
TX	RICHMOND	41-7594	DLY	NCEI	1935-1946
TX	RILEY BEN RANCH	41-8877	DLY	NCEI	1942-1948
TX	ROCKLAND	41-7700	DLY	NCEI	1903-1940
TX	SAN ANTONIO	41-7945	HLY	NCEI	1903-1940
TX	SAN MARCOS	41-7983	DLY	NCEI	1897-1901
TX	TARPLEY	41-8845	DLY	NCEI	1978-1996
TX	TAYLOR	99-8861	HLY	NCEI	1902-1933
TX	VANDERPOOL 10N	41-9312	DLY	NCEI	1986-1996
TX	WEATHERFORD	41-9532	DLY	NCEI	1883-1901
TX	WINNSBORO	41-9836	DLY	NCEI	1944-1947

Appendix A.2. Annual maximum series trend analysis

1. Selection of statistical tests for detection of trends in AMS

The precipitation frequency analysis methods used in NOAA Atlas 14 assume that annual maximum series (AMS) data used in the analysis are stationary. Several parametric and non-parametric statistical tests were used for the detection of trends in AMS mean and variance. The selection of statistical tests was made in consideration of the data tested and the limitations of each of the tests.

First, AMS were graphed to observe types of trends in the data for all stations in the project area at 1-hour and 1-day durations. Visual inspection of time series plots did not detect any abrupt changes or apparent cycles in the AMS but suggested the possibility of slight trends at some locations. Changes appeared to be gradual and approximately linear.

The null hypotheses that there are no trends in AMS mean and/or variance were tested on 1-day and 1-hour AMS data at each station in the project area. The hypotheses were tested at the level of significance $\alpha = 5\%$. The hypothesis that there are no trends in AMS means was also tested for each climate region (see Figure 4.1.2) as a whole.

Levene's test (Levene, 1960) was used to test for homogeneity of variance in the AMS data. The test has been proven to be less sensitive to non-normality in data than some other commonly used tests (such as the Barlett test). The test statistic, *W*, is defined as follows:

$$W = \frac{(N-k)\sum_{i=1}^{k} N_i\,(Z_{i\cdot} - Z_{\cdot\cdot})^2}{(k-1)\sum_{i=1}^{k}\sum_{j=1}^{N_i} N_i\left(Z_{ij} - Z_{i\cdot}\right)^2}$$

where k is the number of sub-groups, N is the sample size, N_i is the sample size of the i^{th} subgroup, Y_{ij} is the value of the j^{th} sample from the i^{th} subgroup, and Z_{ij} is the absolute deviation of Y_{ij} from the mean of the i^{th} subgroup. Levene's test rejects the hypothesis that the variances are equal if $W > F_{\alpha, k-1, N-k}$, where $F_{\alpha, k-1, N-k}$ is the upper critical value of the *F* distribution with *k*-1 and *N*-*k* degrees of freedom at a significance level of α.

At-station trends in AMS means were inspected using the parametric *t*-test and non-parametric Mann-Kendall test (e.g., Maidment, 1993). Both tests are extensively used for trend analysis in environmental sciences and are appropriate for records that have undergone a gradual change. The tests are fairly robust, readily available, and easy to use and interpret. Since each test is based on different assumptions and different test statistics, the rationale was that if both tests have similar outcomes there can be more confidence about the results; if the outcomes are different, it would provide an opportunity to investigate reasons for discrepancies.

Parametric tests in general have been shown to be more powerful than non-parametric tests when the data are approximately normally distributed and when the assumption of homoscedasticity (homogeneous variance) holds (e.g., Hirsch et al., 1991), but are less reliable when those assumptions do not hold. The parametric *t*-test for trend detection is based on linear regression, and therefore checks only for a linear trend in data. A linear trend assumption seemed adequate here, since time series plots indicated, if any, monotonic, linear changes in AMS. The Pearson correlation coefficient (*r*) was used as a measure of linear association between annual maximum series data and time for the *t*-test. The hypothesis that the data are not dependent on time (and also that they are independent and normally distributed values) was tested using the *t*-statistic that follows Student's distribution defined as:

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$$

where n is the record length of the AMS. The hypothesis is rejected when the absolute value of the computed t-statistic is greater than the critical value obtained from Student's distribution with (n - 2) degrees of freedom and exceedance probability of α/2 %, where α is the significance level. The sign of the t-statistic indicates the direction of the trend, positive or negative.

Non-parametric tests have advantages over parametric tests since they make no assumption of probability distribution and are performed without specifying whether trend is linear or nonlinear. They are also more resilient to outliers in data because they do not operate on data directly. One of the disadvantages of non-parametric tests is that they do not account for the magnitude of the data. The Mann-Kendall test (M-K test) was selected among various non-parametric tests because it can accommodate missing values in a time series, which was a frequent occurrence in the AMS data. The Mann-Kendall test compares the relative magnitudes of annual maximum data. If annual maximum values are indexed based on time, and x_i is the annual maximum value that corresponds to year t_i, then the Mann-Kendall statistic is given by:

$$S = \sum_{k=1}^{n-1} \sum_{i=k+1}^{n} \operatorname{sign}(x_i - x_k)$$

The test statistic Z is then computed using a normal approximation and standardization of the statistic S. The null hypothesis that there is no trend in the data is rejected at significance level α if the computed Z value is greater, in absolute terms, than the critical value obtained from a standard normal distribution that has probability of exceedance of α/2 %. The sign of the statistic indicates the direction of the trend, positive or negative.

In addition to an at-station trend analysis, the relative magnitude of any trend in AMS for each of three climate regions (see Figure 4.1.2) as a whole was assessed by linear regression techniques. 1-hour and 1-day station-specific AMS for stations with at least 70 years of data for the 1-day duration and with at least 40 years of data for the 1-hour duration were rescaled by corresponding mean annual maximum values and then regressed against time, where time was defined as year of occurrence minus 1900. The regression results from all stations were tested against a null hypothesis of zero serial correlation (zero regression slopes).

2. Trend analysis results and conclusion

The stationarity assumption was tested by applying a parametric t-test and non-parametric Mann-Kendal test for trends in means and the Levene's test for trends in variance in the 1-day and 1-hour AMS data at 5% significance level. For the 1-day duration, testing was done on stations with at least 70 years of data; for the 1-hour duration, the minimum number of data years was lowered to 40 to increase the sample size. 164 and 325 stations satisfied the record length criterion for the 1-hour duration and 1-day duration, respectively. For 1-hour, the t-test and Mann-Kendall test indicated no statistically significant trends in the mean at about 90% and 87% of stations, respectively. In the 1-day dataset, the t-test and Mann-Kendall test results, no trends were detected at about 90% and 88% of stations, respectively. Levene's test indicated non-homogeneous variance in less than 5% of stations for both the 1-hour duration and 1-day durations. More details are provided in Table A.2.1. The spatial distribution of the results for all three tests for 1-hour and 1-day AMS are shown in Figures A.2.1 and A.2.2, respectively. Small clusters of stations where tests indicated positive trends are often due to AMS data sampled from the same storm events at several nearby locations.

Results from the regional trend analysis also indicated that the null hypothesis, that there are no trends in AMS, could not be rejected at the 5% significance level for either climate region for the 1-hour and 1-day durations.

Because tests at both the 1-hour and 1-day durations indicated no statistically significant trends in the data, the assumption of stationary AMS was accepted for this project area and no adjustment to AMS data was recommended.

Table A.2.1. Trend analysis results for 1-hour and 1-day AMS data.

Number of stations	**1-hour**			**1-day**		
	***t*-test**	**M-K test**	**Levene's**	***t*-test**	**M-K test**	**Levene's**
no trend	148	142	157	294	287	308
positive trend	16	21	7	29	34	17
negative trend	0	1		2	4	

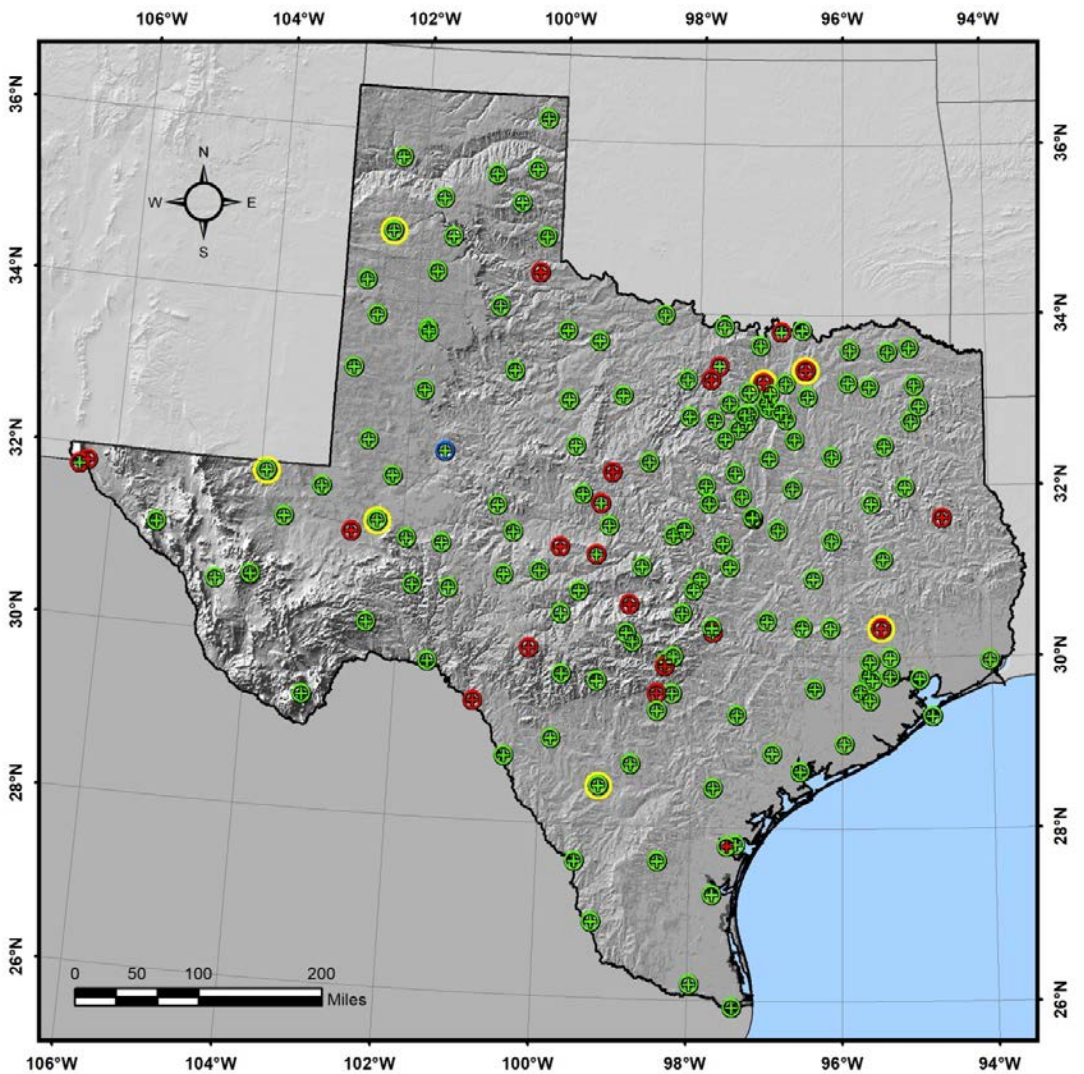

Figure A.2.1. Spatial distribution of results of t-, Mann-Kendall, and Levene's tests for 1-hour AMS. Circles (except yellow) were used to present t-test results and plus signs were used to present Mann-Kendal test results. Red color indicates positive trends, green no trend, and blue negative trends. Yellow circles show locations where Levene's test detected changes in variance.

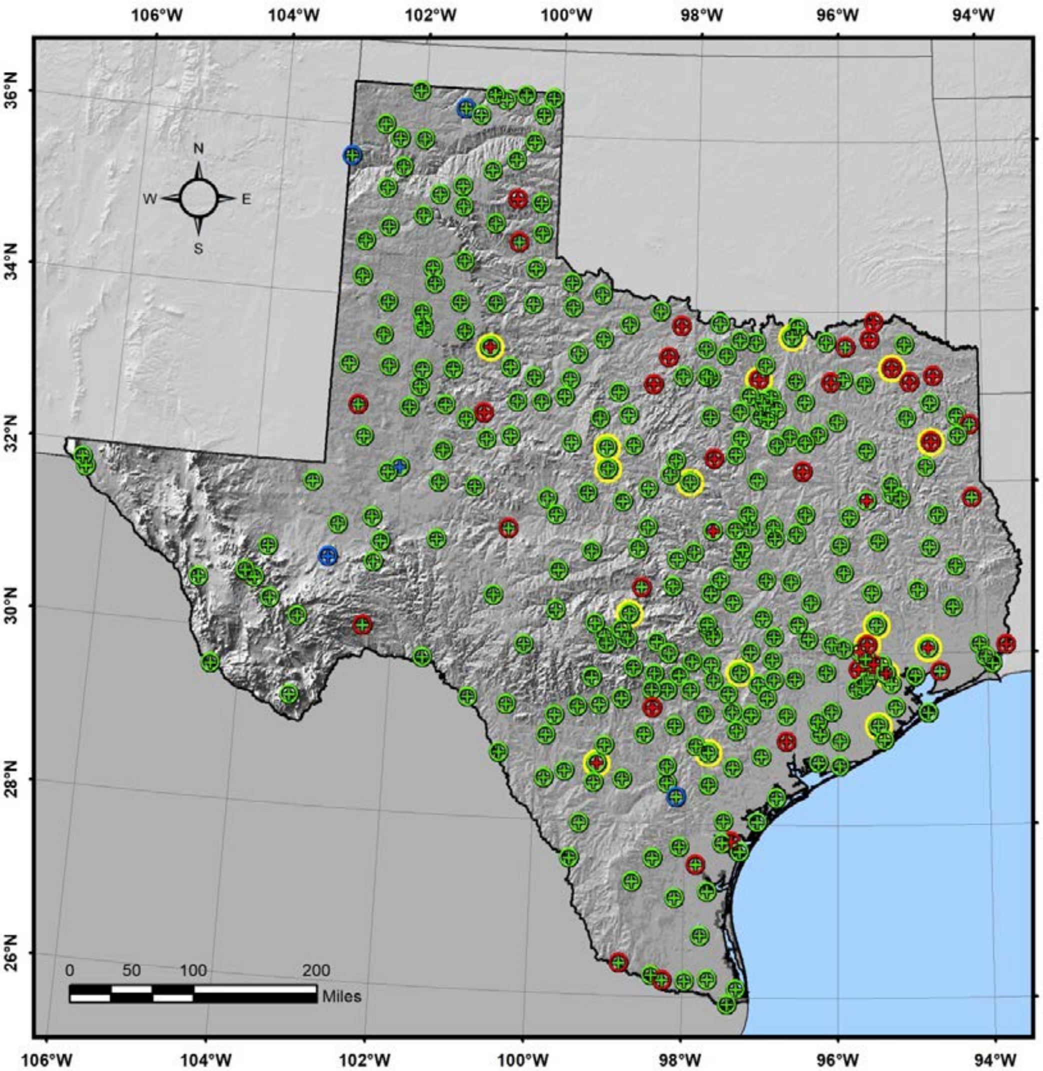

Figure A.2.2. Same as in Figure A.2.1, but for 1-day duration.

Appendix A.3. PRISM report

Final Report

Production of Rainfall Frequency Grids for Texas Using a Specifically Optimized PRISM System

Prepared for
National Weather Service, Hydrometeorological Design Service Center
Silver Spring, Maryland

Prepared by
Christopher Daly
PRISM Climate Group
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October 2018

1. Project goal

The Hydrometeorological Design Studies Center (HDSC) within the Office of Water Prediction of NOAA's National Weather Service is updating precipitation frequency estimates for the state of Texas. In order to complete the spatial interpolation of point estimates, HDSC requires spatially interpolated grids of MAM (Mean Annual Maximum) precipitation. The contractor, the PRISM Climate Group at Oregon State University (OSU), was tasked with producing a series of grids for rainfall frequency estimation using an optimized system based on the Parameter-elevation Regressions on Independent Slopes Model (PRISM) and HDSC-calculated point estimates for Texas.

2. Background

HDSC used L-moment based regional frequency analysis approach to estimate precipitation frequencies. In this approach, the mean of the underlying precipitation frequency distribution is estimated at point locations with a sufficient history of observations. The form of the distribution and its parameters are estimated regionally. Once the form of the distribution has been selected and its parameters have been estimated, precipitation frequency estimates can be computed from grids of the MAM. The grids that are the subject of this report are spatially interpolated grids of the point estimates of the MAM for various precipitation durations. The point estimates of the MAM were provided by HDSC. HDSC selected an appropriate precipitation frequency distribution along with regionally estimated parameters and used this information with the grids of the MAM to derive grids of precipitation frequency estimates.

The PRISM Climate Group has performed similar work previously to produce spatially interpolated MAM grids for updates of precipitation frequency estimates in the Semiarid Southwest United States, the Ohio River Basin and Surrounding States, Puerto Rico/US Virgin Islands, Hawaiian Islands, California, Alaska, Midwest/Southeast, and Northeast study areas.

3. Report

This report describes tasks performed to produce mean annual maximum (MAM) grids for 17 precipitation durations: 15 and 30 minutes; 1, 2, 3, 6, and 12 hours; and 1, 2, 3, 4, 7, 10, 20, 30, 45, and 60 days for Texas. The tasks described were not necessarily performed in the order described, nor were they performed just once. The process was dynamic and had numerous feedbacks.

3.1. Adapting the PRISM system

The PRISM modeling system was adapted for use in this project after a small investigation was performed for the Semiarid Southwest United States, and subsequently used in the Ohio River Basin and Surrounding States, Puerto Rico/Virgin Islands, Hawaiian Islands, California, Alaska, Midwest/Southeast, and Northeast study areas. This investigation and adaptation procedure is summarized below.

PRISM is a knowledge-based system that uses point data, a digital elevation model (DEM), and many other geographic data sets to generate gridded estimates of climatic parameters (Daly et al. 1994, 2002, 2003, 2006, 2008) at monthly to daily time scales. Originally developed for precipitation estimation, PRISM has been generalized and applied successfully to temperature, among other parameters. PRISM has been used extensively to map precipitation, dew point, minimum and maximum temperature, and vapor pressure deficit over the United States, Canada, China, and other countries. Details on PRISM formulation can be found in Daly et al. (2002, 2003, 2008, 2015), which are available from http://prism.oregonstate.edu/docs/.

Adapting the PRISM system for mapping precipitation frequencies required an approach slightly different than the standard modeling procedure. The amount of station data available to HDSC for precipitation frequency was much less than that available for high-quality precipitation maps, such as the peer-reviewed PRISM 1971-2000 mean precipitation maps (Daly et al. 2008). Data sources suitable for long-term mean precipitation but not for precipitation frequency included snow courses, short-term COOP stations, remote storage gauges, and others. In addition, data for precipitation durations of less than 24 hours were available from hourly precipitation stations only. This meant that mapping precipitation frequency using HDSC stations would sacrifice a significant amount of the spatial detail present in the long-term mean precipitation maps.

A pilot project to identify ways of capturing more spatial detail in the precipitation frequency maps was undertaken. Early tests showed that mean annual precipitation (MAP) was an excellent predictor of precipitation frequency in a local area, much better than elevation, which is typically used as the underlying, gridded predictor variable in PRISM applications. In these initial tests, the DEM, the predictor grid in PRISM, was replaced by the official USDA digital map of MAP for the lower 48 states (USDA-NRCS 1998, Daly et al. 2000). Detailed information on the creation of the USDA PRISM precipitation grids is available from Daly and Johnson (1999). MAP was found to have superior predictive capability over the DEM for locations in the southwestern US. The relationships between MAP and precipitation frequency were strong because many of the effects of various physiographic features on mean precipitation patterns had already been incorporated into the MAP grid from PRISM. Preliminary PRISM maps of 2-year and 100-year, 24-hour precipitation were made for the Semiarid Southwest and compared to hand-drawn HDSC maps of the same statistics. Differences were minimal, and mostly related to differences in station data used.

Further investigation found that the square-root transformation of MAP produced more linear, tighter and cleaner regression functions, and hence, more stable predictions, than the untransformed values; this transformation was incorporated into subsequent model applications. Square-root MAP was a good local predictor of not only longer-duration precipitation frequency statistics, but for short-duration statistics, as well. Therefore, it was determined that a modified PRISM system that used square-root MAP as the predictive grid was suitable for producing high-quality precipitation frequency maps for this project.

For this study, the latest official USDA grid of MAP for the study region (1981-2010 average) was used (Figure A.3-1). This grid was developed under funding from the USDA Natural Resources Conservation Service, and is an update to the 1971-2000 grids described in Daly et al. (2008).

3.2. PRISM configuration and operation for Texas

In general, PRISM interpolation consists of a local moving-window regression function between a predictor grid and station values of the element to be interpolated. The regression function is guided by an encoded knowledge base and inference engine (Daly et al., 2002, 2008). This knowledge base/inference engine is a series of rules, decisions and calculations that set weights for the station data points entering the regression function. In general, a weighting function contains knowledge about an important relationship between the climate field and a geographic or meteorological factor. The inference engine sets values for input parameters by using default values, or it may use the regression function to infer grid cell-specific parameter settings for the situation at hand. PRISM acquires knowledge through assimilation of station data, spatial data sets such as MAP and others, and a control file containing parameter settings.

The other center of knowledge and inference is that of the user. The user accesses literature, previously published maps, spatial data sets, and a graphical user interface to guide the model application. One of the most important roles of the user is to form expectations for the modeled climatic patterns, i.e., what is deemed “reasonable.” Based on knowledgeable expectations, the user selects the station weighting algorithms to be used and determines whether any parameters should be changed from their default values. Through the graphical user interface, the user can click on any grid cell, run the model with a given set of algorithms and parameter settings, view the results graphically, and access a traceback of the decisions and calculations leading to the model prediction.

For each grid cell, the moving-window regression function for MAM vs. MAP took the form

$$\text{MAM value} = \beta_1 * \text{sqrt(MAP)} + \beta_0 \qquad (1)$$

where β_1 is the slope and β_0 is the intercept of the regression equation, and MAP is the grid cell value of mean annual precipitation.

Upon entering the regression function, each station was assigned a weight that is based on several factors. For PRISM MAP mapping (used as the predictor grid in this study), the combined weight of a station was a function of distance, elevation, cluster, vertical layer, topographic facet, coastal proximity, and effective terrain weights, respectively. A full discussion of the general PRISM station weighting functions is available from Daly et al. (2008).

Given that the MAP grid incorporated detailed information about the complex spatial patterns of precipitation, only a subset of these weighting functions was needed for this study. For Texas, the combined weight of a station was a function of distance and clustering, respectively. A station is down-weighted when it is relatively distant from the target grid cell, or when it is clustered with other stations (which can lead to over-representation).

The moving-window regression function was populated by station data provided by the HDSC. A PRISM GUI snapshot of the moving-window relationship between sqrt(MAP) and 24-hour MAM in west Texas is shown in Figure A.3-2.

There were relatively few stations with data for durations of 12 hours or less from which to perform the interpolation. In addition, it was clear that the spatial patterns of durations of 12 hours or less could be very different than those of durations of 24 hours or more. This issue was encountered in a previous study for Puerto Rico. During that study the following procedure was developed, and adopted here:

(1) Convert available ≤ 12-hour station values to an MAM/24-hr MAM ratio (termed R24) by dividing by the 24-hour values;

(2) using the station R24 data in (1), interpolate R24 values for each ≤ 12-hour duration (15, 30, and 60 minutes; and 2, 3, 6, and 12 hours) using PRISM;

(3) using bi-linear interpolation from the cells in the R24 grids from (2), estimate R24 at the location of each station having data for ≥ 24-hour durations only;

(4) multiply the estimated R24 values from (3) by the 24-hour value at each ≥ 24-hour station to obtain estimated ≤ 12-hour values;

(5) append the estimated stations from (4) to the ≤ 12-hour station list to generate a station list that matches the density of that for ≥ 24 hours; and

(6) interpolate MAM values for ≤ 12-hour durations with PRISM, using MAP as the predictor grid.

Investigation of the little available data failed to provide convincing evidence that the spatial patterns of R24 values in Texas were strongly affected by coastal proximity, topographic facets, or other physiographic factors. Therefore, the slope of the moving-window regression function for R24 vs. MAP of the form

$$R24 = \beta_1 * \mathrm{sqrt}(MAP) + \beta_0 \quad (2)$$

was forced to zero everywhere. This meant that the interpolated value of R24 was a function of distance and cluster weighting only (essentially inverse-distance weighting).

Relevant PRISM parameters for applications to 60-minute R24 and 24-hour MAM statistics are listed in Tables 1 and 2, respectively. Further explanations of these parameters and associated equations are available in Daly et al. (2002, 2008).

The values of radius of influence (*R*), the minimum number of total (s_t) stations required in the regression were based on information from user assessment via the PRISM graphical user interface, and on a jackknife cross-validation exercise, in which each station was deleted from the data set one at a time, a prediction made in its absence, and mean absolute error statistics compiled (see Results section).

The input parameter that changed readily among the various durations was the default slope (β_{1d}) of the regression function. Slopes are expressed in units that are normalized by the average observed value of the precipitation in the regression data set for the target cell. Evidence gathered during PRISM model development indicates that this method of expression is relatively stable in both space and time (Daly et al. 1994).

Bounds were put on the slopes to minimize unreasonable slopes that might occasionally be generated due to local station data patterns; if the slope is out of bounds and cannot be brought within bounds by the PRISM outlier deletion algorithm, the default slope is invoked (Daly et al., 2002). The maximum slope bound was set to a uniformly high value of 30.0, to accommodate a large range of valid slopes; lower values were not needed to handle extreme values, because all values were within reasonable ranges. Slope default values were based on PRISM diagnostics that provided information on the distribution of slopes across the modeling region. The default value was set to approximate the average regression slope calculated by PRISM. For these applications, default slopes typically increased with increasing duration (Table A.3-3). In general, the longer the duration, the larger the slope. This is primarily a result of higher precipitation amounts at the longer durations, and the tendency for longer-duration MAM statistics to bear a stronger and steeper relationship with MAP than shorter-duration statistics.

3.3. Preparation and review of draft grids

Draft grids for the 60-minute, 24-hour and 10-day durations were produced and made available to HDSC for evaluation. All of the necessary station data were provided by HDSC. The process began with a careful scrutiny of the station data and PRISM behavior. A version of PRISM which predicts for stations locations in the absence of each station (termed jackknifing) was run, and stations predicted poorly by PRISM were identified, and sent to HDSC for review. HDSC removed the stations, modified their values, or determined that the stations were accurate as-is. This process was performed iteratively, until an acceptable station data set was produced. The draft PRISM grids were subsequently completed and submitted to HDSC for review. HDSC submitted the draft PRISM grids for external review, and revised the station data accordingly.

3.4. Final grids

Having found the revised draft grids acceptable, HDSC requested that grids for all durations be completed. Before delivering the final grids to HDSC, the PRISM Climate Group checked them for internal consistency. In other words, the value of the MAM at each grid point for each duration must have been greater than the value for shorter durations at the same grid point. If an inconsistency of this nature occurred, the convention was to start with the 24 duration as a baseline, and set longer durations to slightly higher values and shorter durations to slightly lower values.

The final delivered grids inherited the spatial resolution of the latest 1981-2010 PRISM mean annual precipitation grids for Texas, which is 30 arc-seconds (~800 meters). The grid cell units are in mm*100. Final MAM grids delivered to HDSC are as follows (17 durations):15-minute, 30-minute, 60-minute, 2-hour, 3-hour, 6-hour, 12-hour, 24-hour, 48-hour, 3-day, 4-day, 7-day, 10-day, 20-day, 30-day, 45-day, 60-day.

3.5. Performance evaluation

PRISM cross-validation statistics for 60-minute/24-hour MAM ratio and the 60-minute and 24-hour MAM intensities were compiled and summarized in Table A.3-4. These errors were estimated using an omit-one jackknife method, where each station is omitted from the data set, estimated in its absence, then replaced. Since the 60-minute/24-hour MAM ratio was expressed as a percent, the percent bias and mean absolute error are the given as the bias and MAE in the original percent units (not as a percentage of the percent).

For the 60-minute/24-hour MAM ratio, the overall percent bias was -0.15% and the mean absolute error (MAE) 2.09 percent. For the 60-minute, 24-hour, and 10-day MAM intensities, biases were 0.14 percent or less, and the MAEs less than 4 percent. Biases were less than 0.5% for all durations. MAEs generally decreased from 3.8 percent at the 15-minute duration to 2.9 percent at the 60-day duration. Given the lack of independent data at durations of less than 24 hours, one would have expected the 15-minute to 12-hour MAM errors to be substantially higher than those for the 24-hour to 60-day MAMs. A likely reason why this was not the case was that the addition of many synthesized stations, derived from a PRISM interpolation of R24 values, resulted in a station data set that was spatially consistent, and thus, somewhat easier to interpolate with each station deleted from the data set. Therefore, it is likely that the true interpolation errors for the 60-minute MAM are higher than those shown in Table A.3-4.

Table A.3-1. Values of relevant PRISM parameters for interpolation of 60-minute/24-hour mean annual maximum ratio (60-minute R24) for Texas. See Daly et al. (2002) for details on PRISM parameters.

Name	**Description**	**Value**
<u>Regression Function</u>		
R	Radius of influence	10 km*
s_t	Minimum number of total stations desired in regression	45 stations
β_{1m}	Minimum valid regression slope	0.0^+
β_{1x}	Maximum valid regression slope	0.0^+
β_{1d}	Default valid regression slope	0.0^+
<u>Distance Weighting</u>		
A	Distance weighting exponent	2.0
F_d	Importance factor for distance weighting	1.0
D_m	Minimum allowable distance	0.0 km
<u>Elevation Weighting</u>		
B	MAP weighting exponent	NA/NA
F_z	Importance factor for MAP weighting	NA/NA
Δz_m	Minimum station-grid cell MAP difference below which MAP weighting is maximum	NA/NA
Δz_x	Maximum station-grid cell MAP difference above which MAP weight is zero	NA/NA

* Expands to encompass minimum number of total stations desired in regression (s_t).

$^+$ Slopes are expressed in units that are normalized by the average observed value of the precipitation in the regression data set for the target cell. Units here are 1/[sqrt(MAP(mm))*1000].

Table A.3-2. Values of relevant PRISM parameters for modeling of 24-hour mean annual maximum statistics for the Texas. See Daly et al. (2002) for details on PRISM parameters.

Name	Description	Value
Regression Function		
R	Radius of influence	3 km*
s_t	Minimum number of total stations desired in regression	25 stations
β_{1m}	Minimum valid regression slope	0.0^{+}
β_{1x}	Maximum valid regression slope	30.0^{+}
β_{1d}	Default valid regression slope	2.8^{+}
Distance Weighting		
A	Distance weighting exponent	2.0
F_d	Importance factor for distance weighting	1.0
D_m	Minimum allowable distance	0.0 km
Elevation Weighting		
B	Elevation weighting exponent	0.0
F_z	Importance factor for elev weighting	0.0
Δz_m	Minimum station-grid cell elev difference below which MAP weighting is maximum	NA
Δz_x	Maximum station-grid cell elevation difference above which station is eliminated from data set	NA

* Expands to encompass minimum number of total stations desired in regression (s_t).

+ Slopes are expressed in units that are normalized by the average observed value of the precipitation in the regression data set for the target cell. Units here are 1/[sqrt(MAP(mm))*1000].

Table A.3-3. Values of PRISM slope parameters for modeling of MAM statistics for Texas for all durations. For durations of 12 hours and below, station data were expressed as the ratio of the given duration's MAM value to the 24-hour MAM value, and interpolated; this was followed by an interpolation of the actual MAM values. See text for details. See Table A.3-1 for definitions of parameters.

Duration	**Slope Parameters**		
	β_{1m}	β_{1x}	β_{1d}
15m/24h ratio	0.0	0.0	0.0
30m/24h ratio	0.0	0.0	0.0
1h/24h ratio	0.0	0.0	0.0
2h/24h ratio	0.0	0.0	0.0
3h/24h ratio	0.0	0.0	0.0
6h/24h ratio	0.0	0.0	0.0
12h/24h ratio	0.0	0.0	0.0
15 minute MAM	0.0	30.0	2.3
30 minute MAM	0.0	30.0	2.3
1 hour MAM	0.0	30.0	2.3
2 hour MAM	0.0	30.0	2.3
3 hour MAM	0.0	30.0	2.4
6 hour MAM	0.0	30.0	2.5
12 hour MAM	0.0	30.0	2.7
24 hour MAM	0.0	30.0	2.8
48 hour MAM	0.0	30.0	3.0
3 day MAM	0.0	30.0	3.1
4 day MAM	0.0	30.0	3.2
7 day MAM	0.0	30.0	3.6
10 day MAM	0.0	30.0	3.8
20 day MAM	0.0	30.0	4.2
30 day MAM	0.0	30.0	4.5
45 day MAM	0.0	30.0	4.6
60 day MAM	0.0	30.0	4.8

Table A.3-4. PRISM cross-validation errors for 60-minute/24-hour MAM ratio, and 60-minute, 24-hour, and 10-day MAM applications to Texas. Since the 60-minute/24-hour MAM ratio was expressed as a percent, the percent bias and mean absolute error are given as the bias and MAE in the original percent units (not as a percentage of the percent).

Statistic	**N**	**% Bias**	**% MAE**
60-min/24-hr MAM ratio	214	-0.15	2.09
60-minute MAM	701	0.14	3.48
24-hour MAM	701	0.14	3.55
10-day MAM	701	0.02	3.29

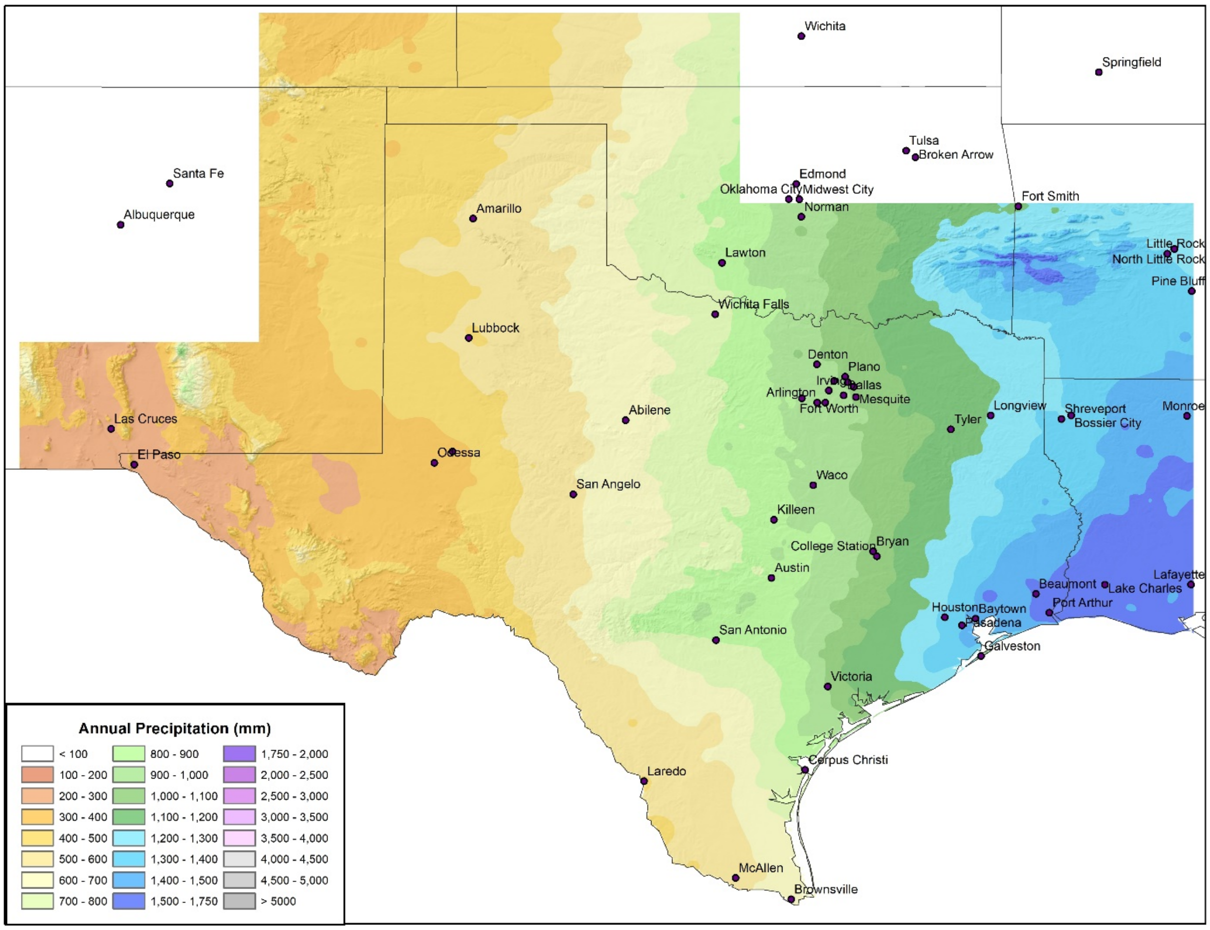

Figure A.3-1. PRISM 1981-2010 mean annual precipitation (MAP) grid for the Texas study region.

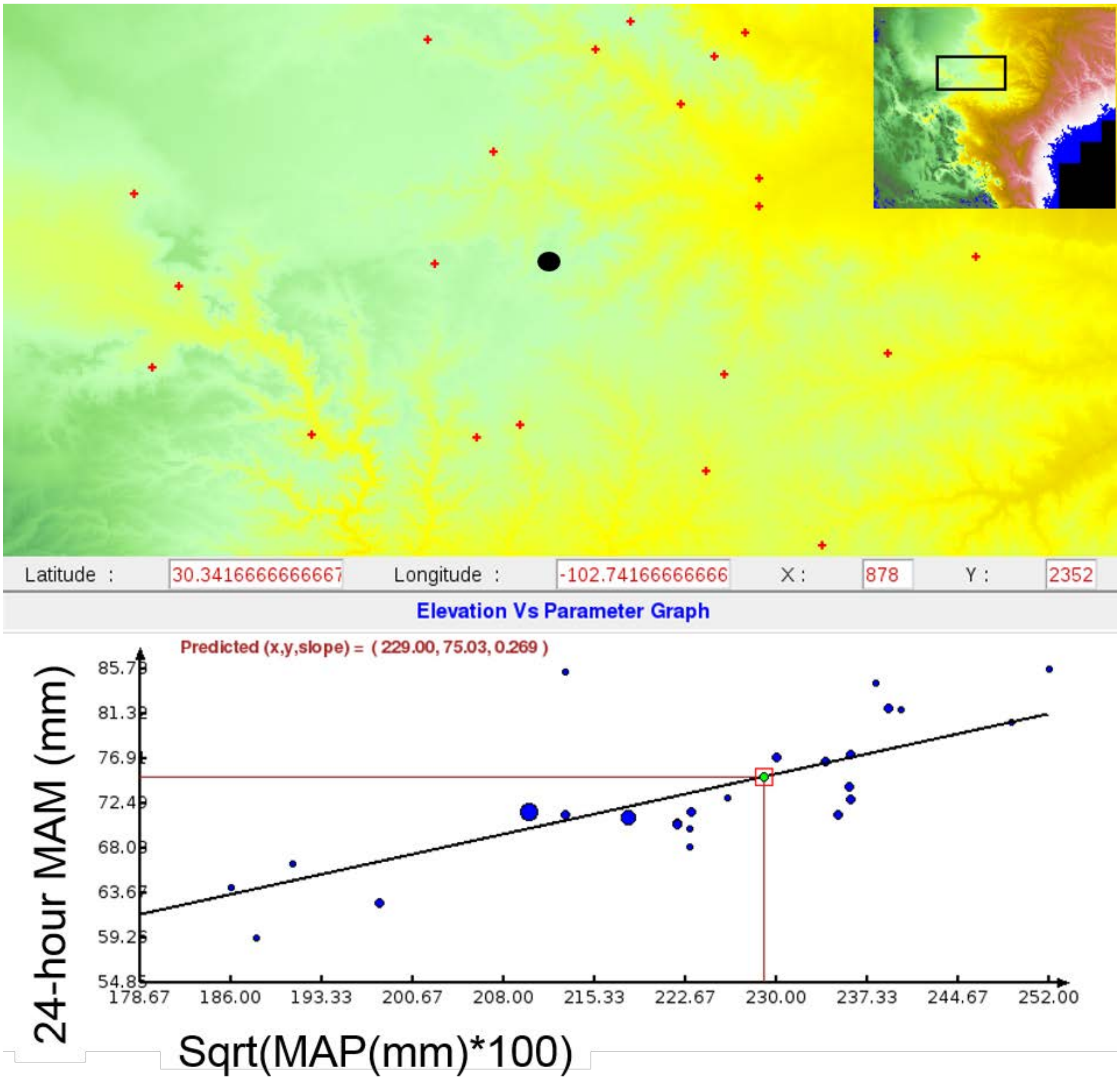

Figure A.3-2. PRISM GUI snapshot of the moving-window weighted regression between the square root of mean annual precipitation and 24-hour mean annual maximum precipitation (MAM) in west Texas. Model is being run for the black dot location; stations are shown as red pluses.

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Appendix A.4. Peer review comments and responses

A peer review of preliminary results for the NOAA Atlas 14 (NA14) Volume 11 precipitation frequency project was carried out in the period between 20 November 2017 and 19 January 2018. The request for review was sent via email to individuals who were suggested by agencies that funded this work as potential reviewers, expressed interest in participating in the review, or who have subscribed to the HDSC mailing list-server.

The review package included the following items:

a. Station metadata. Reviewers were asked to examine the accuracy of stations' metadata and provide comments on suggested stations' deletions and merges. Stations were presented in three tables:
NA14Vol11_Stations used_TX.xlsx for Texas stations used in frequency analysis,
NA14Vol11_Stations used_Other.xlsx for stations outside Texas that assisted in the analysis, and
NA14Vol11_Stations not used.xlsx for stations that were examined but not retained for the analysis.

The metadata tables included information on each station's name, state, name of agency that provided the data, latitude, longitude, elevation, and period of record. The tables also included basic information on other stations that contributed data to that station for sub-hourly, hourly, and daily durations, if applicable. If station data was collected but not used in the analysis, a brief comment on why the data was not used was also provided. Generally, stations were not used either because there was another nearby station with a longer period of record, station data were assessed unreliable for this specific purpose, or the station's period of record was not long enough and the station was not a candidate for merging with any nearby station.

b. At-station depth-duration-frequency (DDF) curves. Reviewers were asked to examine the DDF curves for stations retained in the analysis for 60-minute to 10-day durations and for 2-year through 100-year average recurrence intervals and to comment on their reasonableness.

c. Spatially-interpolated estimates. Reviewers were invited to comment on the overall and local spatial patterns in spatially-interpolated precipitation frequency estimates for 2-year and 100-year ARIs and for 60-minute, 6-hour, 24-hour, and 10-day durations. To illustrate how much estimates changed in the project area, cartographic maps showing differences between NOAA Atlas 14 and superseded NOAA estimates (see Section 5.4 of this Appendix) for 100-year ARI and 60-minute, 6-hour, 24-hour, and 10-day durations were also shared.

As part of the peer review process, several meetings and panel discussions were arranged to address any questions or concerns reviewers may have after looking over the information shared.

Comments were received from twenty-six individuals representing various federal, state, and local agencies. Their reviews provided critical feedback that improved the estimates.

Reviewers' comments and HDSC's responses (in italic font) are shown below. The comments and their respective HDSC responses have been grouped into following sections:

1. Metadata
   1.1. Metadata errors
   1.2. Period of record vs record length
2. Station cleanup
   2.1. Merges and extensions
   2.2. Deletes
3. Data quality
   3.1 Data QC
   3.2. Historic events missing in records
4. Depth-duration-frequency (DDF) curves
   4.1. General
   4.2. Hurricane Harvey's effect on DDF
5. Spatial patterns, general
   5.1. Regionalization and stations density
   5.2. Terrain and smoothing
   5.3. Influence of Hurricane Harvey and other extreme events
   5.4. Comparisons between NA14 and HYDRO35/TP 40/TP49
   5.5. Discrepancies at boundaries with other NA14 Volumes
   5.6. Other
6. Spatial patterns, specific duration-frequency combination
   6.1. 60-minute patterns
   6.2. 6-hour patterns
   6.3. 24-hour patterns
   6.4. 10-day patterns
7. NA14 terminology and methods
   7.1. Terminology
   7.2. Statistical extrapolation
   7.3. Confidence limits
   7.4. AMS trends and effects of non-stationary climate on estimates

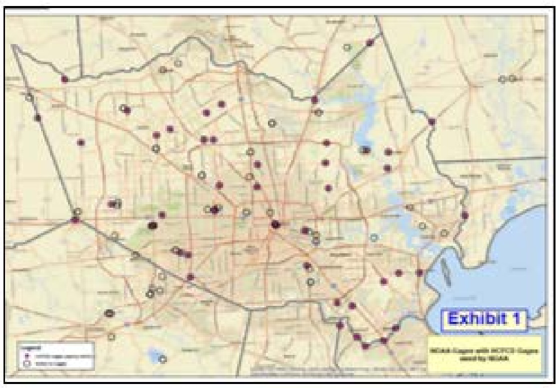
1. METADATA

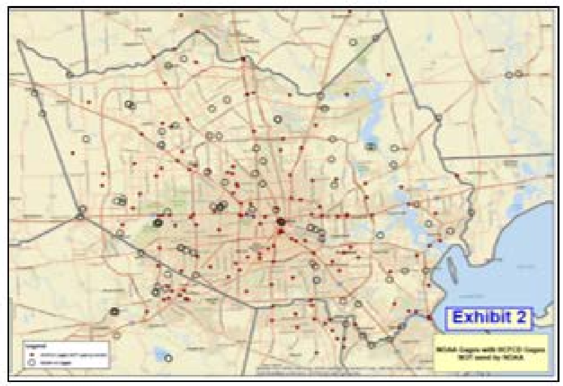
1.1. Metadata errors

1.1.1. For several HCFCD gauges used, the lat/long information did not match HCFCD's information. For the most part, the differences appear to be inconsequential.

- 60-0006
- 60-0065
- 60-0091
- 60-0098
- 60-0116
- 60-0122
- 60-0124
- 60-0134

Three exhibits are attached. Exhibit 1 shows the HCFCD gauges used by NOAA (this illustrates a number of sites used that were not HCFCD sites). Exhibit 2 shows HCFCD gauges not used by NOAA (illustrating the density of HCFCD sites and NOAA sites). Exhibit 3 shows the HCFCD gauges (with HCFCD lat/long) used by NOAA with all gauges used by NOAA (with NOAA lat/long) to indicate location differences based on the two sets of lat/long. It is noted that the differences indicated in Exhibit 3 are not significant.





We screen metadata for each station considered in the analysis to make sure it appears accurate according to the station's name, elevation, historical records and satellite imagery. Stations that are clearly misplaced (often due to no seconds recorded in latitude and longitude information provided to us) are re-located based on inspection of satellite images and maps. Elevation information is compared with elevation estimates from the EPA's NHDPlus Ver.2 National Elevation dataset, which for Texas has a resolution of at least 1/3-arc sec (~10-m), and modified as appropriate.

For the stations listed above, we did not alter the original coordinates, but rounded them to four decimal points for consistency with other datasets. For example, we rounded the original lat/lon coordinates of 29.7913400/-95.6235600 to 29.7913/-95.6236 for HCFCD station 60-0006 15M (see an excerpt from the peer review "NA14Vol11_Stations used_TX.xlsx" file in Figure A.4-1). We merged this station with 60-0005 15M and co-located with 41-4309 HLY and assigned 41-4309 HLY coordinates (29.7689 /-95.6439) for their combined records (see also the response to comment 2.1.1 on merges and co-locations).

Station ID	Type	Latitude	Longitude	Elevation (ft)	Original period of record	Final period of record	Co-located stations for sub-hourly, hourly and daily durations	Merged stations	Contributed data to stations
60-0006	15M	29.7913	-95.6236	82	01/2000 - 10/2017				60-0005 15M, 41-4309 HLY
60-0005	15M	29.7697	-95.6466	101	01/2000 - 10/2017	01/1984 - 10/2017	60-0005 15M, 41-4309 HLY, 41-4309 HLY	41-4309 15M, 60-0006 15M	
41-4309	HLY	29.7689	-95.6439	91	01/1984 - 04/1997				60-0005 15M, 41-4309 HLY

Figure A.4-1. An excerpt from the "NA14Vol11_Stations used_TX.xlsx" file.

1.1.2. On the DDF for the Lampasas River near Kempner, Lampasas is spelled incorrectly. Dalhart's DDF is labeled only as "Municipal Airport" in the pull down menu.

We corrected stations' names according to the information provided.

1.2. Period of record vs record length

1.2.1. Several of the gauges have gaps in the data, particularly for the longer period of record gauges such as Austin, Houston, and others. When these gauges have gaps, it would be good to know the coverage of the period of record like the NCDC presents in their datasets, so that the only visible metric of historic data is not just the overall period of record. For example: Houston WB (79-0056 DLY) has a record from 1883-2017, however there is a substantial gap (missing approximately 12% of the records for 88% data coverage) between the 41-4305 HLY records in 1970 to the 60-0135 15M records in 1986.

We make a distinction between the entire period of record and record length (or data years), which characterizes the number of years for which an annual maximum was extracted and retained after it passed all quality control tests. In the metadata tables shared with reviewers, we showed only the period of record for each station, as record lengths often vary with duration. Since we provide online access to AMS data for stations used in the analysis (Time series data), record lengths for any station of interest could be retrieved with ease. For example, the AMS file for Houston WB (79-0056 DLY) shows that there is only a gap in the hourly record, but that it has a nearly continuous daily record from 1889 until 2017 (ftp://hdsc.nws.noaa.gov/pub/hdsc/data/_TimeSeries_stations/TX_79-0056_ams.txt).

For consistency, all AMS data are shown as constrained values, even if the recorded value captured the true-interval maximum amount, so correction factors must be applied to the published AMS data in order to estimate unconstrained values. More information on conversion factors for Texas is available in Section 4.5.3.

1.2.2. Austin (41-0420 DLY) has a period of record from 1849 to 2017, however there are gaps between the FORTS dataset (52-0420 DLY) ending in 1892 to the Montopolis Bridge (41-0432 DLY) beginning in 1903, and from the Montopolis Bridge (41-0432 DLY) ending in 1963 to the

Webberville Road (65-0089 15M) beginning in 1986. The Austin gauge is missing approximately 20% of the records, for 80% data coverage.

Please refer to comment 1.2.1.

1.2.3. In the station metadata, it appears that stations have variations in periods of records. Given that sample size is an important factor in a statistical approach, longer records at stations are naturally preferred. However, there is not a very clear indicator showing the actual sample size of data after the filtering, organizing and merging processes.

Please refer to comment 1.2.1.

1.2.4. For Galveston, I found this following information:

GALVESTON, TX (52-3430 DLY)

Agency: FORTS, Agency ID: USC00413430
Latitude: 29.3072, Longitude: -94.7917, Elevation: 6 ft
Period of record: 07/1865 - 12/1892
Co-located stations:
Merged stations:
Contributed data to stations: 79-0055 DLY

Is the period of record correct, 1865 to 1892? It appears that periods of missing record are not listed. This is inconsistent with the climate summary for Galveston. That source indicates multiple times to site was relocated and incomplete weather records for 1871.

As indicated, the period of record for the Galveston, TX (52-3430 DLY) station is 07/1865 - 12/1892 and this station contributed data to station 79-0055 DLY.

An excerpt from the "NA14Vol11_Stations used_TX.xlsx" file, in Figure A.4-2 below, shows that the 79-0055 DLY station was co-located with 41-3430 HLY, whose record was extended using data from 99-3430 HLY (99-xxxx indicates data that we digitized from NCEI's paper records), and that their combined period of record is 01/1892 - 08/2011. The table also shows that at daily durations, three stations contributed data to 79-0055 DLY: 41-3430 HLY (merged with 99-3430 HLY) and 52-3430 DLY.

After all the merges and extensions, the final period of record for 79-0055 DLY is 07/1865 to 09/2011. Please note that its record length at a given duration could be shorter than its period of record (refer to comment 1.2.1).

Station name	Station ID	Station type	Agency/ dataset	Original period of record	Final period of record	Co-located stations for sub-hourly, hourly and daily durations	Merged stations	Contributed data to stations
GALVESTON	79-0055	DLY	NCEI	01/1897 - 03/2011	07/1865 - 09/2011	N/A, 41-3430 HLY, 79-0055 DLY	99-3430 HLY, 41-3430 HLY, 52-3430 DLY	
GALVESTON	41-3430	HLY	NCEI	01/1940 - 08/2011	01/1892 - 08/2011	N/A, 41-3430 HLY, 79-0055 DLY	99-3430 HLY	
GALVESTON	52-3430	DLY	FORTS	07/1865 - 12/1892				79-0055 DLY
GALVESTON	99-3430	HLY	NCEI	01/1892 - 02/1948				41-3430 HLY, 79-0055 DLY
GALVESTON	41-3431	HLY	NCEI	01/1948 - 12/2013				56-0111 HLY, 79-0047 DLY

Figure A.4-2. An excerpt from the "NA14Vol11_Stations used_TX.xlsx" file.

2. STATION CLEANUP

2.1. Merges and extensions

2.1.1. It is not clear how the merging of data and extending of the period of record was done. Can NOAA clarify?

We define co-located stations as stations that have the same (or very similar) geospatial data, but report precipitation amounts at different time intervals. The screening of co-located stations is described in Section 4.4.

We also examine nearby stations to determine if they can be merged to form a single longer record. We perform merges with consideration to elevations and locations in respect to the coast and mountain ridges, visual inspection of AMS plots at three base durations (15-minute, 1-hour and 1-day), and statistical tests (double-mass-curve and correlation analyses) where possible. Once we determine that stations are good candidates for merging, their records (or parts of the records) are combined. For overlapping periods of record, we use time series plots to decide which station to use. For the combined records, we usually assign the station ID of the station that has the longest record or is currently in service.

We showed all merges and co-locations in the "NA14Vol11_Stations used_TX.xlsx" file. The "Contributed data to stations" column indicates if a station's data was used to extend records at nearby stations, and the "Co-located stations for sub-hourly, hourly and daily durations" and "Merged stations" columns show if data from other station(s) were used to extend its record and for which durations. For example, as shown in Figure A.4-3, we appended data from the 1986-1995 period from station 60-0083 15M to the station 60-0082 15M record, and assigned the 60-0082 15M ID to the merged records.

Station ID	Type	Latitude	Longitude	Elevation (ft)	Original period of record	Final period of record	Co-located stations for sub-hourly, hourly and daily durations	Merged stations	Contributed data to stations
60-0082	15M	30.0244	-95.4764	85	01/1996 - 10/2017	04/1986 - 10/2017		60-0083 15M	
60-0083	15M	30.0066	-95.5119	92	04/1986 - 10/2017				60-0082 15M

Figure A.4-3. An excerpt from the "NA14Vol11_Stations used_TX.xlsx" file.

2.1.2. The following information is not available for review, but they are crucial, thus should be included in future published documentation. What were the criteria for merging different stations? It seems that merging involves aggregating data of smaller interval into data of larger interval, but what exactly did "merging" involve?

Please refer to comment 2.1.1.

2.1.3. In the NOAA Atlas 14 Vol. 9, merging has been applied to extend period of record based on a 3 mile distance. What was the logic behind this threshold and does it differ for various durations and frequencies? Has there been an examining step that investigates the spatial correlation of point rainfall values and makes sure the threshold distance doesn't overlook variation at short spatial lag?

Please refer to comment 2.1.1.

2.1.4. The period of record for Station 41-4323 was extended by assuming that 60-0115 was co-located. Why this station and not 60-0056 which appears to be a little closer (1.8 miles vs. 2.1 miles)? Why choose one over the other (both 60-0056 and 60-0115 have same period of record)?

Geographic proximity is only one of several criteria we use to determine if stations are good candidates for merging (see also comment 2.1.1). We considered both the 60-0056 15M and 60-0115 15M stations for extending the 41-4323 DLY record and decided that 60-0115 15M was a slightly better fit to 41-4323 DLY based on inspection of 1-day AMS plots of their overlapping data. As a result of this merge, we extended the daily record at station 41-4323 DLY by 30 years.

2.1.5. Alvin gauge (41-0204 DLY) can be merged or populated with Alvin 1.6 SW (69-0719 DLY) and Chocolate Bayou nr Alvin (85-0287 HLY) to get a continuous record from 1898 to present. The Alvin gauge (41-0204 DLY) was discontinued in 2010, with a few additional measurements in 2013. Since other gauges in Southeast Texas were specifically augmented with data so that the effects of Hurricane Harvey would be included in the analysis, it is important to account for Hurricane Harvey in Alvin and provide consistency by augmenting this gauge with nearby gauge data. Further, there may be other gauges within the state with a similar issue that were not identified in this analysis.

We accepted the recommendation to merge 41-0204 DLY with 69-0719 DLY. The combined record for the Alvin gauge now extends until the end of 2017 and accounts for Hurricane Harvey. We decided against merging station 85-0287 HLY as it is about 5.2 miles away from 41-0204 DLY, did not capture any rainfall during Hurricane Harvey, and has some data quality issues.

2.1.6. Several Harris County gauges had less than 20 years of data (all of these appear to have been used only to contribute data to other stations).

- 60-0006
- 60-0039
- 60-0098
- 60-0129
- 60-0160
- 60-0169
- 60-0194
- 60-0219
- 60-0220
- 60-0221
- 60-0227
- 60-0235

Stations with less than 30 years of data at daily durations or 20 years of data at sub-daily durations are not used in frequency analysis except in some extremely data sparse areas, especially at higher elevations. Though the stations listed above have less than 20 years of data, they were merged with other stations to create longer periods of record, so their data is being used in this project.

2.2. Deletes

2.2.1. The following information is not available for review, but they are crucial, thus should be included in future published documentation. What data were removed or modified and why these decisions were made?

In the "NA14Vol11_Stations not used.xlsx" file, we provide the most influential reason for the removal of each station, but often there was more than one reason. We typically deleted stations for the following reasons: data quality concerns (missing, accumulated, repeating, or erroneous data unsuitable for extraction of AMS), data sampling issues (inconsistency in mean annual maximum data with nearby stations with longer records), location in close proximity of other stations that had similar data with longer records, or inadequate number of years with reliable annual maxima (after all merges and extensions were implemented and extracted AMS were quality controlled).

We reviewed AMS data for all stations across all durations up to 60 days using a set of criteria designed to extract only reasonable maxima (see Sections 4.3 and 4.5.1 for more information).

We retained only stations with more than 30 years of usable AMS data at daily durations or 20 years at sub-daily durations except in some data sparse areas, especially at higher elevations. Figure 4.4.1 shows ranges of record lengths for stations used in frequency analysis across daily, hourly, and sub-hourly durations.

2.2.2. Many of the data sets excluded in Texas were due to short-periods of record. Was 20 years the minimum period?

Please refer to comment 2.2.1.

2.2.3. What is the minimum period of record for inclusion? Should that threshold be mentioned somewhere?

Please refer to comment 2.2.1.

2.2.4. Several HCFCD gauges were omitted from consideration even though they had 30+ years of record. Each of these fell into three categories for omission (listed below). For the "duplicate data" and "data dense area" categories, why were certain gauges chosen over others?

AMS quality concerns

- 60-0029
- 60-0032
- 60-0033
- 60-0035
- 60-0047
- 60-0050
- 60-0055
- 60-0096
- 60-0099
- 60-0102
- 60-0103
- 60-0105
- 60-0107
- 60-0123
- 60-0125
- 60-0126
- 60-0128
- 60-0132

Duplicate data

- 60-0023
- 60-0045
- 60-0057
- 60-0081
- 60-0109
- 60-0117

Data dense areas

- 60-0015
- 60-0027
- 60-0031
- 60-0036
- 60-0052
- 60-0063
- 60-0070
- 60-0114
- 60-0137

For the overview of reasons why some stations were not used in the frequency analysis, please see our response to comment 2.2.1. The following two examples illustrate why a station with 30+ years of data may still be omitted from frequency analysis:

We deleted station 60-0023 15M from the "Duplicate data" list above in favor of nearby station 60-0022 15M (3.57 miles away) that had more reliable data for the same period of record.

We deleted station 60-0015 15M from the "Data dense area" group because 3 miles away is station 79-0042 DLY with 85 years of AMS data and 4.9 miles away is the 85-0558 HLY station. 85-0558 HLY was co-located with 60-0026 15M, which has AMS data for the same period as 60-0015 15M for sub-hourly durations and a much longer record for hourly durations.

2.2.5. Several stations used were identified as "HCFCD," which are owned and operated by TxDOT or the Trinity River Authority (it is noted that they show up in the HCFCD database of monitoring sites at www.harriscountyfws.org). It is my understanding that these stations may not be maintained as well as those owned and operated by HCFCD, and therefore may not be as reliable as those maintained by HCFCD.

- 60-0160
- 60-0169
- 60-0194
- 60-0219
- 60-0220
- 60-0221
- 60-0227
- 60-0235

The "Agency" label does not show the agency that owns/operates the data. It is based on the agency that provided the data to us (either directly or we downloaded the data from the agency's web page)..

We used stations from the list above primarily to assist in calculation of corrections for constrained 1-hour observations (for more information see Section 4.5.3). We also used their data to fill in record gaps at nearby stations, but only after we confirmed that the data for the period of interest were reasonable. For example, we used 60-0219 15M to replace data in 60-0135 15M during hurricane Allison (5-15 June 2001) that were low, and for the 1 October 2008 - 30 April 2009 period which contained only zeros in the record.

3. DATA QUALITY

3.1. Data QC

3.1.1. In layman or general technical terms, what is considered the AMS standard of quality for a station to be included?

We conduct tests for high outliers on the annual maximum series for every station. High outliers are then examined further by comparing the raw data, observation forms, nearby stations, radar data, and storm data documentation in order to determine if the event is real. Please see Sections 4.3 and 4.5.1 for an in-depth explanation of our AMS extraction and quality control processes.

3.1.2. There is concern about the quality of some of the agencies precipitation data based on inadequate station maintenance. We would like to request NOAA to double check the data quality from non-HCFCD stations on the regional Flood Warning System website.

Please refer to comment 2.2.5.

3.1.3. Recently I have undertaken some internal analysis of stations used within the HDSC Volume 11 Version 1 effort. During the course of my analysis I have come across a couple of anomalies. These are included below for your reference.

Floresville, TX (41-3201 DLY). Significant rain event noted on 5/23/1993 & 5/24/1993 – both days shown as 7.55" for total of 15.1". Values look suspect, especially given that two-day total rainfall was much less at Karnes City 2N (0.96") and Runge (1.65"). Karnes City, TX (41-4696 DLY). Bad value (90) on 18-Feb-1982.

Repeating, significant rainfall values are often indicators of suspect data. For the Floresville, TX (41-3201 DLY) station, the COOP observer form confirmed 7.55 inches of rain on 23 May 1993, but not on the 24th, so we corrected it to zero inches. Another COOP station, Stockdale 6 N (41-8658 DLY, approximately 18 miles away), measured 5.66 inches on the 23rd and no rain on the 24th. We also confirmed this event in NOAA Storm Data Publication for May 1993, which mentions that on the 23rd, 8 to 11 inches of rain fell across most of Wilson County.

We exclude physically impossible values, like 90 inches per day, early in the quality control process. For the Karnes City, TX station (41-4696 DLY), we set the 18 February 1982 value to zero after looking at the original COOP form for the station.

3.2. Historic events missing in records

3.2.1. Given that most of the data sets end in December 2016, I am pleased to see the incorporation of extreme rainfall associated with Hurricane Harvey (August 2017); use of the 2017 AMS data for many of the stations affected by the hurricane seems imperative to avoid many of the problems associated with TP40's legacy data. Kudos for making this addition.

For the peer review, most of the data sets ended in December 2016, but we appended 2017 AM data for a number of stations affected by Hurricane Harvey. After the peer review, we extended records for all stations through December 2017 (where available).

3.2.2. Many of the extreme events were not included in the prior studies and I am curious were the early events that only have short periods of record such as 1921 Thrall flood, were these included? I realize this is a very open-ended question with all the tropical storm graveyard over TX but that would obviously lead to some big bullseyes or at least a boost the range of possibilities from the earlier TP40/49 evaluations.

We looked at various historical weather events publications, monthly storm data reports, and climatological observation forms in search of historic events that could be missing or underestimated in datasets we obtained.

Among others, we investigated the 8-10 September 1921 event centered at Thrall, TX. The often cited maximum 24-hour rainfall amount of 38.2 inches recorded near Thrall was from a bucket survey. For the closest NWS/Weather Bureau's recording station Taylor (41-8861 DLY/41-8862 DLY, approximately 7 miles away from Thrall), we had digital data for the 01/1929 - 12/2016 period. To extend its record, we digitized daily data for 1902-1928 and hourly data for 1902-1933 from NWS paper records. For this event, 16.11 inches in one day was recorded at the daily station (this amount was considered in the TP40 analyses), but we estimated from hourly data that the actual 24-hour amount was about 23.11 inches (with 14.16 inches falling in 6 hours) and we used those values in analysis.

We added back or adjusted 1-day/24-hour amounts for several other historic events; more details are provided in Section 4.5.2. As we normally do at the completion of each volume, we will send all implemented data corrections to the National Centers for Environmental Information for consideration.

3.2.3. Will the study include more analyzed TX events such as Memorial Day, Brenham, Tax Day, etc.?

All of the events listed, together with other historic events, were included in the NA14 analysis (also, refer to comment 3.2.2). However, if this comment is in reference to our annual exceedance probability (AEP) maps, we provide analysis and create AEP maps only for selected historic storms, typically in response to requests from NWS regional offices or other federal agencies. More details on the analysis and the up-to-date list of analyzed storms are available on the AEP storm analysis page. So far, we have created AEP maps for the following six TX events: San Antonio, 25 May 2013; Central Texas, 23 May 2015; Corsicana, 24 October 2015; Austin, 30 October 2015; and Hurricane Harvey, 25 August 2017.

3.2.4. Examination of the Corpus Christi station graph shows no unusual precipitation in 1919, when Corpus Christi was struck by a devastating hurricane. Stations farther inland reported as much as 12" of rainfall. Please check the Corpus Christi rainfall totals. It may be appropriate to impute a value for 1919 if the existing value is suspicious.

Speaking of historical precipitation, I am aware of a few observations of exceptional precipitation amounts in sparsely observed areas at stations with short periods of record. One particularly worth mentioning is the July 1899 event in central Texas, in which Hearne reportedly received 35" of rainfall. Rainfall observations are sparse, but observations of disastrous flooding downstream along the Brazos River are plentiful. The event demonstrates the possibility of very heavy and widespread rainfall farther inland than seems to be indicated by the one-day and multi-day 100-year maps. I don't know if the event is included in the input data, or whether anything can be done if it's not.

For Corpus Christi, the 24-hour rainfall from the 1919 hurricane was estimated at 3.33 inches from the original monthly record of observations for September 1919. From the Climatological Data section document for Texas in September 1919, we found the following rainfall totals (in inches) recorded at nearby stations in the coastal area on the 15th or 16th: 10.50 in Alice, 8.85 in Ricardo, 8.00 in Mathis, and 4.53 at Woodsboro, so it is likely that the Corpus Christi estimate is low. We decided against the adjustment since the adjustment would have minimal effect on estimates; we already had several significant 24-hour AM values in Corpus Christi's record and the event was accounted for, as it was captured at the Alice station that was included in Corpus Christi station's region.

NCEI's Valley Junction station (41-9280), before being relocated from nearby Hearne, captured the June 1899 Hearne event but was not available in the digitized dataset. We found additional data forms and digitized data for a missing period. Records show that the gauge overflowed at 24 inches on June 30th, but the observer estimated that about 30 inches fell during a 24-hour period. Through regionalization (see comment 5.1.1), the inclusion of this event helped ensure that estimates are not underestimated at this station as well as other stations in the area, such as Brenham and College Station.

3.2.5. If a gauge went out in Harvey but not in previous events, was the dataset still used? If so, was the Harvey data adjusted for the study or thrown out?

If a station didn't capture Harvey or any other significant event, we likely would not extract annual maxima for that year at least for some durations but would keep the station if it passed other criteria (see Sections 4.3 and 4.5.1). Since we use a regional frequency approach that uses data from several stations to calculate estimates at one station (see Section 4.6.2), it is likely that the event will be accounted for through another station in the region that captured rainfall amounts for the event.

4. DEPTH-DURATION-FREQUENCY (DDF) CURVES

4.1. General

4.1.1. Comparison was made between NOAA Atlas 14 and standard HCFCD rainfall near downtown Houston (HCFCD data was derived from USGS WRIR 98-4044). A summary of this comparison is presented in the following table.

Duration	2-Year HCFCD	2-Year NOAA	Diff (inches)	Diff (%)	100-Year HCFCD	100-Year NOAA	Diff (inches)	Diff (%)
60-min	2.0	2.3	0.3	15%	4.3	4.9	0.6	14%
6-hr	3.1	3.8	0.7	23%	8.9	11.8	2.9	33%
24-hr	4.4	5.2	0.8	18%	13.2	16.7	3.5	27%
10-day	N/A	8.4			N/A	25.5		

Without having the data used in the HCFCD analysis and knowing all the details about the frequency analysis methods used by HCFCD, it is hard to discuss with certainty what factors contributed the most to differences in estimates.

We believe that differences in 2-year estimates from the table above are mainly because NA14 estimates shown in the table are partial duration (PDS)-based and HCFCD estimates are AMS-based. Differences in magnitudes of corresponding estimates from two time series are negligible for ARIs greater than 10-year, but notable at smaller ARIs, where PDS-based estimates are higher than corresponding AMS-based estimates. Please refer to Section 4.6.4 for more information.

We speculate that differences in 100 year-estimates are also primarily due to data, although at least some could be due to the use of different frequency analysis methods in the two studies (regional NA14 vs. at-station HCFCD, use of different distributions, etc.). We found several significant events in this area missing in original datasets. For example, we identified a significant event missing in the NCEI's digitized record for the Houston Hobby Airport (79-0042 DLY) station, as well as two events that were being underestimated due to the fixed 24-hour observation interval. Figure A.4-4 (left panel) shows the original (black) and adjusted (red) 24-hour AMS for this location. Just through addition of the missing event and adjusted values, the 100-year 24-hour estimate, for example, increased from 15 to 17.2 inches (right panel).

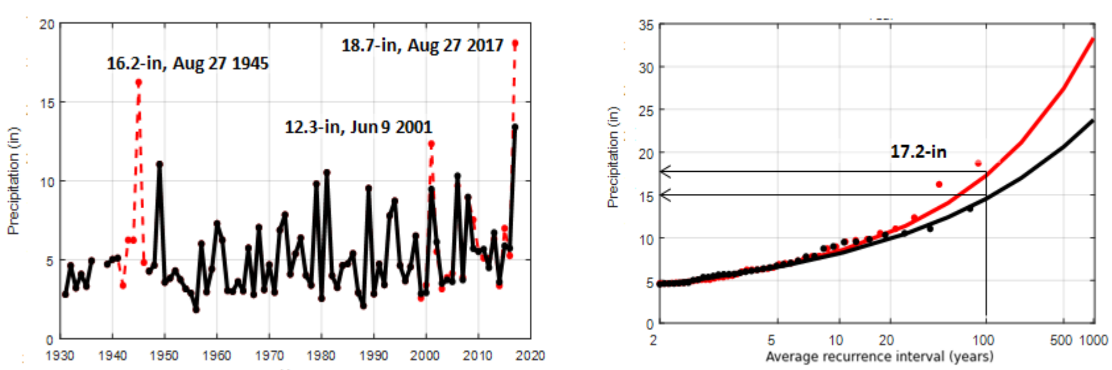


Figure A.4-4. 24-hour AMS data (left panel) and GEV frequency curves (right panel) for Houston Hobby Airport station before (black) and after (red) adjustments.

4.1.2. On the 100-year difference maps, there is an interesting contrast between the 6-hour and 10-day versions in the area around Palestine in East Texas. The 6-hour values have gotten wetter in this area while the 10-day values have gotten drier. Data from multiple sites support this, and the DDF charts have a noticeable "convex" shape (steep then gentle slope from shorter to longer durations).

"Concave" shapes (steepening slope with increasing duration) tend to dominate the I-20 corridor to the Red River. I'm not sure why these artifacts are regionally consistent, but it must mean something.

Since precipitation mechanisms influencing heavy precipitation events and the climatologies of heavy precipitation are similar for nearby stations, it is to be expected that DDF curves will be regionally consistent. Convex or concave shape would indicate how they change with duration.

4.1.3. Based on a review of the DDF from Volume 9 (Southern States) and the data prepared so far for Volume 11 (Texas), it appears that the webpage/map will give you a different rainfall depth depending on where you click (i.e., where you place the crosshairs). This will be impractical for design. Harris County will need to define appropriate DDF precipitation for regions of the county, or for each watershed.

NA14 precipitation frequency estimates are used in a very wide variety of applications, and that is why we provide estimates at high spatial resolution (30-arc sec) for a range of durations (5-min to 60-day) and frequencies (1-year to 1000-year). When estimates are needed for a specific location, the simplest way to retrieve estimates is from an interactive map on the PFDS. When estimates are needed for a region, they can be retrieved from the GIS Grids page which accesses the gridded data directly.

Keep in mind that NA14 estimates are point estimates and are not directly applicable to a larger region. An average of point estimates for a region can be easily obtained from the GIS grids by averaging estimates from grid cells inside the region. However, for applications relying on areal estimates, the average of the point estimates within the region also must be converted to an areal estimate, which is usually done by multiplying it with an appropriate areal reduction factor (ARF). ARF is generally a function of the size of an area and the duration of the precipitation. The depth-area-duration curves from the Technical Paper No. 29 (U.S. Weather Bureau, 1957), developed for the contiguous U.S., can be used for this purpose if no more accurate ARF information is available.

For regions spanning more than one NA14 volume, precipitation frequency estimates can be retrieved from the NA14 Conus product. This product combines NA14 estimates for durations between 60-minute and 7-day from published NA14 Volumes that cover contiguous US states. The estimates along the volumes' boundaries were altered to reduce discrepancies, which are unavoidable as each volume was completed independently and at a different time (see comment 5.5.1). For more information on this product and for instructions on how to extract estimates for a user-specified area defined by a latitude-longitude bounding box, please see AEP storm analysis.

4.1.4. Are precipitation frequency estimates at the station what you expect? No. Point analysis of several gauges indicate a significant deviation from the expected value based on individual point analysis. Simple rank plotting of distributions P=m/(1+n) indicates that many of the DDF charts show a substantial difference between the Atlas 14 DDF values and the rank-plotted gauge values.

In Figure 6, the gauge at Alvin shows a pronounced difference in the proposed DDF when the additional gauge data referenced above in the suggested merges and co-locations section. There is an overestimation of 25-year and smaller events, and an underestimation of the 100-year event, especially if the suggested merge of 41-0204 DLY with 69-0719 DLY and 85-0287 HLY is accepted. A 100-year, 24-hour depth at this location should be 20 inches at a minimum.

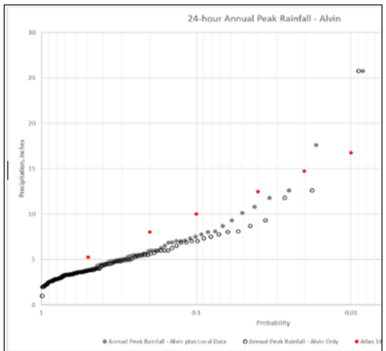


Figure 6: Precipitation Gauge Analysis at Alvin (41-0204 DLY) for Daily Annual Peak

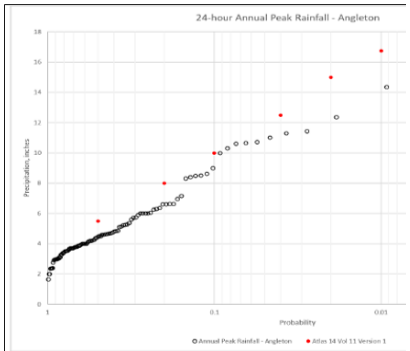


Figure 7: Precipitation Gauge Analysis at Angleton (41-0257 DLY) for Daily Annual Peak

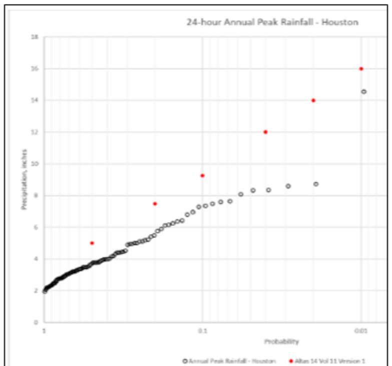


Figure 9: Precipitation Gauge Analysis at Houston (79-0056 DLY) for Daily Annual Peak

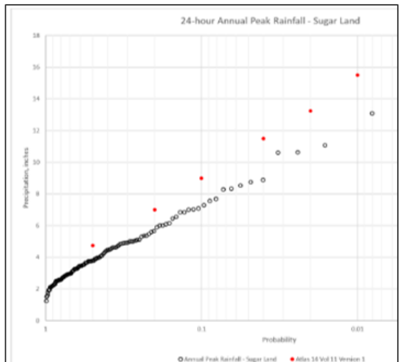


Figure 10: Precipitation Gauge Analysis at Sugar Land (41-8728 DLY) for Daily Annual Peak

Existing practice in selection of a distribution is, among others, to look at its ability to fit the observed data with plotting position determined using the Weibull formula. We also use that formula in visual inspection of probability plots during the distribution selection task (see Section 4.6.3 for more information). However, one must keep in mind that fit also depends on the selection of plotting position formula. There are many plotting position formulas with various justifications; they all give similar plotting positions in the middle of a distribution but produce considerably different positions near the tails, so it is not uncommon that the largest of the extremes look like outliers when relying on an arbitrary plotting position.

For the station at Alvin (41-0204 DLY with suggested merges), we determined that the differences between NA14 and recommended estimates are mainly due to differences in frequency analysis approaches. In NA14 we rely on regional frequency approaches to calculate estimates at a station by using data from several stations with similar attributes of interest (see Section 4.6.2 for more information). For Alvin, for example, we calculated the 100-year 24-hour frequency estimate of 17.09 inches based on the regional statistics that included information from 23 stations. Cumulatively these 23 stations carry information on 1,737 annual maximum amounts. If we used only 104 AM data extracted at Alvin, the corresponding estimate would end up being above 20 inches (exact value is 21.24 inches). After the peer review, we re-investigated the regional information for this and surrounding stations. The final 100-yr 24-hour estimate did increase to 17.7 inches after improvements were made to the station's region and to AMS improvements at nearby stations. Please refer to comment 6.3.3 for more information.

4.2. Hurricane Harvey's effect on DDF

Please refer to Section 5.3 of this Appendix.

5. SPATIAL PATTERNS, GENERAL

5.1. Regionalization and stations density

5.1.1. Recommend using a much larger regional zone in developing the precipitation frequency estimate at each gauge. This is especially true for precipitation frequency estimates that have shorter or insufficient effective records; E.G. larger than 50 year periods or shorter than 6 hour durations.

In NA14 we rely on regional frequency approaches that pull together data from several stations to calculate regional statistics that are then used to calculate precipitation frequency estimates at one station. We use a so-called region-of-influence approach, where each station has its own region with a potentially unique combination of nearby stations, and we calculate regional statistics by averaging corresponding station-specific estimates weighted by record lengths. This approach avoids discontinuities in estimates across regional boundaries, which is relevant for the mapping of precipitation frequency estimates.

We assign stations to a target station's region based on their distance and similarities in selected attributes, including elevation, location with respect to the coast and mountain ridges, progression of relevant L-moment statistics across durations, etc. When determining the maximum allowable distance and selecting an optimal number of stations to assign to a target station's region, we aim to include enough stations to smooth variability in at-station estimates, but also still adequately represent local conditions. In this volume, regions typically comprise between 15 and 25 stations with at least 1000 cumulative data years for daily durations and 500 for sub-daily durations (numbers could be lower in areas with low station density). For more information, please see Section 4.6.2.

For Version 1 we considered stations up to 50 miles from the target station, but in response to comments received during the peer review and to achieve more realistic patterns in areas with low station density and along the coast, we expanded the search to 75 miles for Version 2. In station dense areas, we consider that AM at nearby stations are often extracted from the same storm events, and as such could bias estimates. We use cross-correlation analysis results to decide what stations to keep. After the peer review, we inspected regions from Version 1 for stations in urban areas and further improved them to minimize that effect.

5.1.2. There is too much local spatial variation for the maps of shorter duration. Since these maps are the main bases for hydrologic and hydraulic practices, they should be given extra consideration. Regionalization techniques can potentially reduce some of the existing variation at small spatial scales.

Please refer to comment 5.1.1.

5.1.3. When it comes to regionalization, I would like to see a larger area within the regionalization circle. Also, increase the grouping of closest station. I think on the phone call you all said that you included 10, but I would like to see the 25 closest stations.

Please refer to comment 5.1.1.

5.1.4. Questions concerning effects of gage density continue to surface. Explanations have been provided and discussed supporting non-effect, but results just seem to be somewhat reflective in some, maybe explainable, way. Have you compared a gage density difference map from the previous study to this one? Or maybe even a period of record (POR) map?

Please refer to comment 5.1.1.

5.1.5. Is the density of the stations in the Houston and Beaumont areas affecting the results?

Please refer to comment 5.1.1.

5.1.6. The use of 875+ stations outside of Texas, including those in Mexico, is laudable and densifies the overall data sets. The large numbers appear appropriate to balance in state data. Stations Examined But [Not] Used appear appropriate as, largely, their period of record is too short to be relevant.

No action required.

5.1.7. Station density used to develop the DDF curves is appropriate, particularly in urbanized areas. Stations becomes less dense in less developed areas of the state, which is expected.

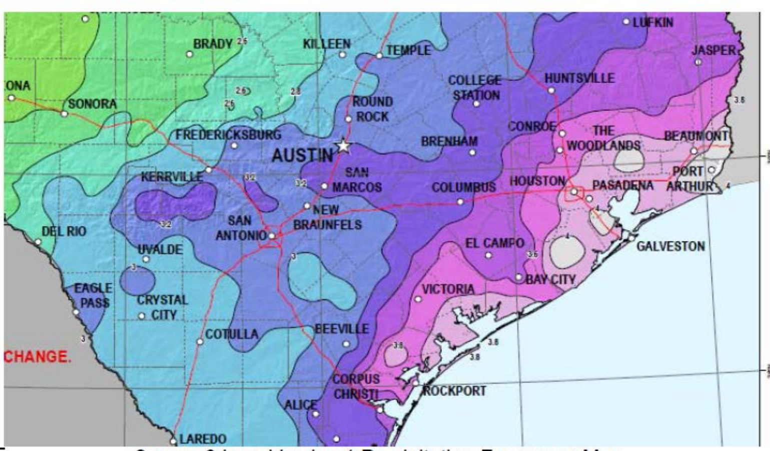
No action required.

5.2. Terrain and smoothing

5.2.1. Does NOAA Atlas 14 Volume 11 account for mountainous effects (TP 40 did not)?

We use the hybrid statistical-geographical PRISM-based interpolation technique for mapping climate data to account for mountainous effects and this allows for significant improvements in areas of complex terrain when compared to TP40. In addition, more stations are now available in mountainous areas and while their records are still not as long as records at other stations retained for the analysis, the data we have there provide valuable information. For more information on the NA14 interpolation method, please see Section 4.8.

5.2.2. Check all frequency and duration maps for unexplainable bull's eyes and smooth accordingly. For example, see the 2-year, 6-hour precip-freq map below.



2-year, 6-hour Version 1 Precipitation-Frequency Map

NA14 interpolation at each duration starts with the PRISM-based MAM grid. At-station ratios between the 2-year estimates and corresponding MAM estimates are then interpolated to a grid and multiplied by corresponding MAM grids to create a grid of 2-year precipitation frequency estimates. In the subsequent run, ratios between the 5-year and 2-year estimates are interpolated and used to calculate the 5-year precipitation grid from the 2-year grid, and so forth (see Section 4.8 for more information).

We use a natural neighbor interpolation method to interpolate ratios that is based on construction of Thiessen polygons from the Delauney triangulation of irregularly spaced gauged locations. The *advantage of this method is that it remains true to the estimates at gauged locations and the resulting function is continuous everywhere within the project area. The disadvantage is that station-driven contour lines pop up in cartographic maps. Most of the contours are driven by small differences in MAM estimates at nearby stations and the selected mapping contour interval.*

For the peer review we deliberately applied only a minimal smoothing across the whole project area and that is why so many bullseyes, especially in flat terrain areas, were showing up in the maps. For the final product, we applied a dynamic filter to the precipitation frequency grids to reduce the number of station-driven contours. Parameters of the filter, which control the amount of smoothing, are a function of elevation gradients and proximity to the coastline. Parameters were selected such that no smoothing was applied in the mountains, some smoothing was applied along the coast, maximum smoothing was applied in flat terrain, and the transition from one to another was gradual. This smoothing provided more visually appealing maps while still preserving gradients where appropriate. Figure A.4-5 shows Version 2 of the 2-year 6-hour precipitation frequency map for the same area as in the Figure above.

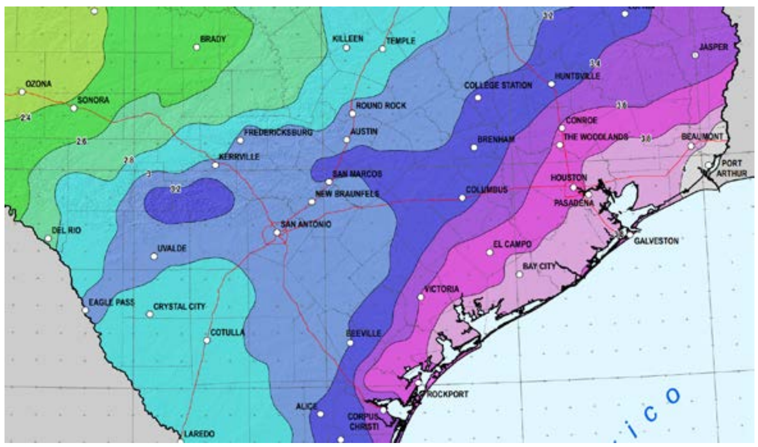


Figure A.4-5. An excerpt from the revised 2-year 6-hour map.

5.2.3. In looking over the information, believe some smoothing of the concentration around Harris Co. and the Beaumont areas as well the western increase at the one location by the E/W NM border may be warranted, especially for the 100 year and 500 year RI storms.

Please refer to comments 5.2.1 and 5.2.2.

5.2.4. Unphysical gradients: Texas topography does influence precipitation in a variety of ways. I have commented about suspicious gradients and have advocated greater smoothing in extreme cases. However, there are parts of Texas where strong gradients are appropriate. An obvious example is the high-relief area of the Trans Pecos. Another less obvious area is the Balcones Escarpment, where a strong north-south gradient in central Texas (with high precipitation along the south-facing slope and lower precipitation farther to the north) is physically correct. Addressing issues in the low-relief areas of southeast Texas should be done in a way that does not degrade the physically-justified strong gradient over the Hill Country.

On the other hand, Eagle Pass is a bit far removed from the Balcones Escarpment for one to expect it to be a local maximum of heavy rainfall. Probably that area has simply been historically unlucky, and thus probably won't be so unlucky in the future.

Please refer to comments 5.2.1 and 5.2.2 for general comments. We reviewed estimates for the Eagle Pass area and we think that the patterns are reasonable and supported by the data from two *very long record stations at Eagle Pass and Del Rio, which have 114 and 111 years of data, respectively. For example, over the course of their records, Eagle Pass has consistently observed larger events and has a 24-hour mean annual maximum that is 16% higher than at Del Rio. This justifies estimates to be slightly higher at Eagle Pass, which is reflected in the current patterns. The 100-year 24-hour estimate of 12.27 inches at Eagle Pass has also already been twice exceeded significantly, in 1936 and 2014.*

5.2.5. For [areas with local peaks/sinks with no apparent topographic/orographic explanation], I'm wondering if some smoothing techniques should be used to eliminate most or all of these. I believe it would be an interesting contour comparison to plot isohyetal map, using same contouring method, of max precip value of a given duration within the frequency of highest accumulation. Another comparison would be average precip within frequency intervals (2yr, 10yr, 30yr, POR).

Please refer to comments 5.2.1 and 5.2.2 on contouring and Section 4.6.2 on how POR was accounted for in calculation of regional statistics.

5.2.6. For areas with local peaks/sinks with no apparent topographic/orographic explanation], I'm wondering if some smoothing techniques should be used to eliminate most or all of these. In general, the lower frequency (ie. 100yr) maps compared with same durations have more of this definition that is concerning compared to the higher frequency maps (ie. 2yr). While I can't prove it, I do believe that it may be an artifact of data POR... meaning that the further out on the curve one goes, the more uncertainty with values there will be.

Please refer to comments 5.2.1 and 5.2.2 on contouring and Section 4.6.2 on how POR was accounted for in calculation of regional statistics.

5.2.7. The bullseyes near Austin (excess), Del Rio-Eagle Pass (excess), and Victoria-Beeville (deficit) on the 100-year, 60-minute and 6-hour charts have no clear meteorological/ climatological explanation. Application of a moderate smoothing function may help, but of course, the statistical integrity of the analysis must be maintained. The 100-year, 24-hour and 10-day charts look good.

Please refer to comment 5.2.2.

5.2.8. I would like to see smoother and more-defined contours. For example, on the 24 hour, 100-yr, the 8-9inch contour juts out into Fort Worth and the 9-10inch contour juts out NW of Brownwood. I would to see a smooth line drawn between these. There are many more instances throughout these maps, so I won't go into detail on each map, but smoother, less "blobby" iso contours would be appreciated and in my opinion, more likely to give a reliable PF estimate.

Please refer to comment 5.2.2.

5.2.9. Try to eliminate Bulls-eyes as much as possible. I know there are some Bullseyes that make meteorological sense, such as in the Hill Country/Balcones Escarpment area. But for example, on the 2 year -24 hour map, the bulls-eyes around Crystal City, and Del Rio need to be smoothed over. Also, the multiple bulls-eyes Southeast of Kerrville, need to either be merged or smoothed over.

Please refer to comment 5.2.2.

5.2.10. The contour legend used in this version might contain a little too many levels. The patterns can be smoother from the less contour levels, reducing the circular patterns at small regional scales.

Please refer to comment 5.2.2.

5.3. Influence of Hurricane Harvey and other extreme events

5.3.1. Most all of the Version 1 precip-freq maps appear to be influenced by the Harvey event. Was Harvey tested as a potential outlier? How would the maps look without Harvey?

The NA14 precipitation frequency analysis approach is based on statistical analysis of AMS data. High (and low) outliers in AMS, which we define as annual maxima that significantly depart from the trend of the corresponding remaining maxima, could considerably affect precipitation frequency estimates. We investigate high outliers carefully and correct or remove them from the AMS only if due to measurement errors, as they benefit the analysis.

For the peer review, most of the data sets ended in December 2016, but we appended 2017 AM data for several stations affected by Hurricane Harvey. [After the peer review, we extended records for all stations through December 2017 (where available) and double checked 2017 AM extracted before the peer review to ensure we have accurate values.]

Estimates in the Houston area did increase significantly relative to TP40 across all durations and frequencies, but that is not all due to Hurricane Harvey. In fact, Harvey's effect is noteworthy only at longer durations and rarer frequencies (100-year ARI or above). Increases in and around the Harris County observed in 2-year maps are mainly due to higher mean annual maxima (MAM) that reflect increased annual rainfall for this area when compared to surrounding areas. Also, three out of the five highest continental U.S. storm total rainfall amounts are in or around Harris County, indicating that this area is more prone to higher rainfall amounts than its surrounding areas. Other factors contributing to the increase include longer records, additional significant events that occurred in the area in more recent years, better spatial coverage, and improved frequency analysis methods for NA14. As an example, Figure A.4-6 shows differences in inches between NA14 Version 1 and TP40 24-hour 100-year estimates for the area (left figure) and how much NA14 estimates increased after Hurricane Harvey's data was added in the analysis (right figure).

After the peer review, we inspected and further improved the regions delineated for stations in the area to minimize potential biasing of estimates through inclusion of multiple stations sampling from the same historic events and ultimately improved patterns of precipitation frequency estimates across all durations and frequencies.

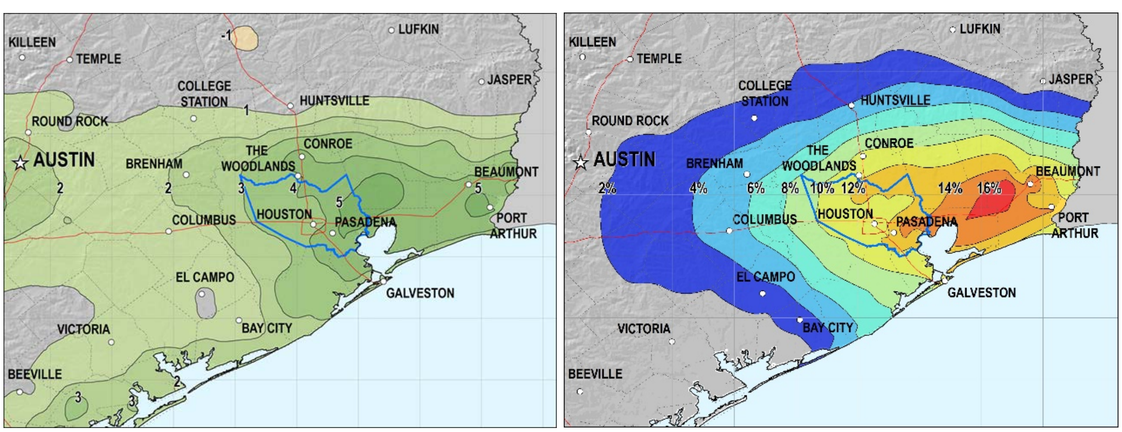
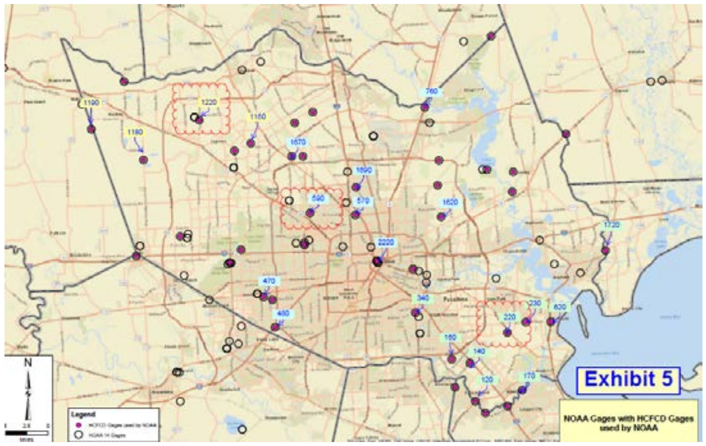


Figure A.4-6. Left figure shows difference in inches between 24-hour 100-year estimates from NA14 Vol11 Ver1 and TP40 in Houston area. Right figure shows how much NA14 estimates changed (in percent) after Hurricane Harvey's data was added to the analysis.

5.3.2. A subsequent analysis was undertaken using the Extreme Value Probability (Gumbel) Type I distribution for five gauges in the Houston area. Three of the gauges are HCFCD sites. Exhibit 5 illustrates the range of possible sites that could be examined for the analysis of HCFCD gauges. The labeled gauge stations are representative of sites with 30+ years of data (although 32 appears to be the maximum length of record).



The HCFCD gauges chosen for this evaluation were Stations 0220, 0590, and 1220, all with 32 years of record and all used in the NOAA analysis. These gauges were chosen based on the availability of continuous rainfall records (minimum of 30 years with 1-hour increments), colocation with rain gauges used in the Atlas 14 analysis (see Exhibit 1 in comment 2.1.2), and locations in each of the three identified hydrologic regions in Harris County, respectively, to provide adequate representation across the County. The two remaining sites consist of several sets of merged historic records from National Weather Service gauges at Hobby Airport (Station 41-4307 for the periods 1948 to 1952, 1968 to 1970, and 1998 to 2013, while Stations 722435-12918 and 999999-12918 were used for the period 2013 to 2017 and to fill in gaps in the previous record), and Bush Airport (Station 41-4300 for the period 1973 to 2013, Station 999999-12960 for the period 1969 to 1972, and Station 722430-12960 for the period 2013 to 2017 and to fill in gaps in the previous records). These sites were chosen based on availability and continuity of data. NWS gauges at Alief (Station 41-4311), Addicks (Station 41-4307), and Ellington Field Airport (Station 722436-12906) were also investigated but lacked sufficient records to complete an analysis. After merging records, the two sites and Hobby and Bush airports consisted of 26 and 48 years of record, respectively. These sites were analyzed for the 2-year and 100-year (3-hour, 6-hour, and 24-hour) events for comparison with the NOAA Atlas 14 data.

The Extreme Value Type 1 (Gumbel) distribution is one of the most common and generally accepted methods for statistical analysis of rainfall data and was used in the development of TP40. Using parametric methods to fit a given dataset to the Gumbel distribution, the rainfall depth associated with different recurrence intervals (i.e. exceedance probabilities) can be determined. Although the distribution can be approximated with probability-weighted moments using the mean and standard deviation of the sample dataset (Product-Moments), these product-moment estimators have been found to be highly dependent upon sample size and contain bias for both large and small sample sizes (Wallis et al., 1974). A more recent alternative method, using L-Moments, is generally accepted as an unbiased predictor of the underlying probability distribution for small sample sizes because it decreases the influence of outlier values (Vogel and Fennessey, 1993). As a result, the L-Moment method was opted for use in the analysis of these gauging stations.

By removing Harvey from the period of record, it is noted that the 100-year rainfall is reduced significantly for the each gauge analyses (Figures 6a through 6e). Similar reductions might be expected if Harvey is omitted from the NOAA analysis.

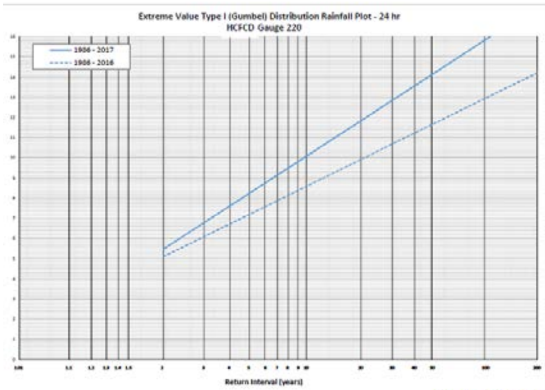


Exhibit 6a

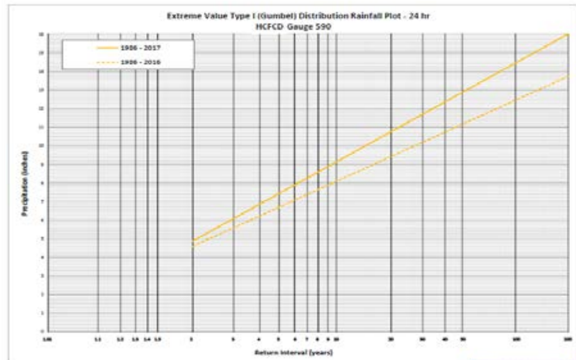


Exhibit 6b

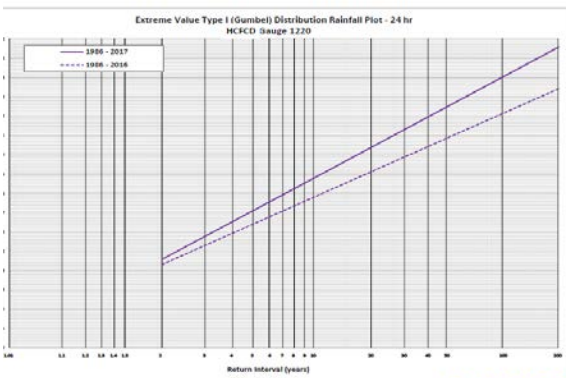


Exhibit 6c

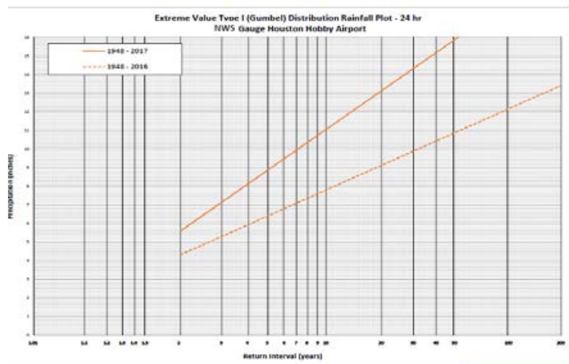


Exhibit 6d

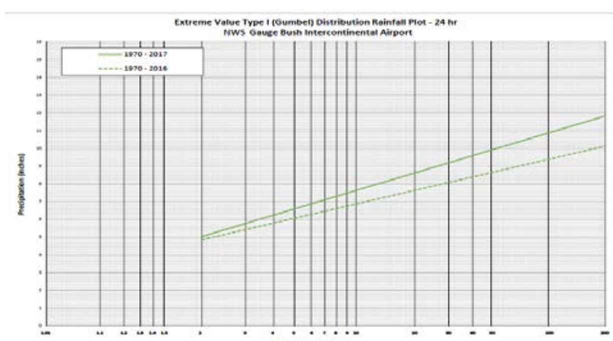
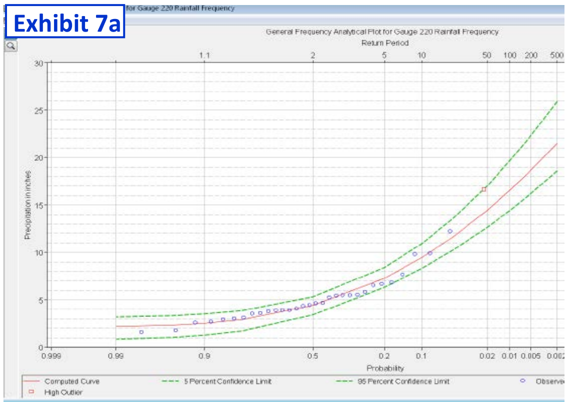
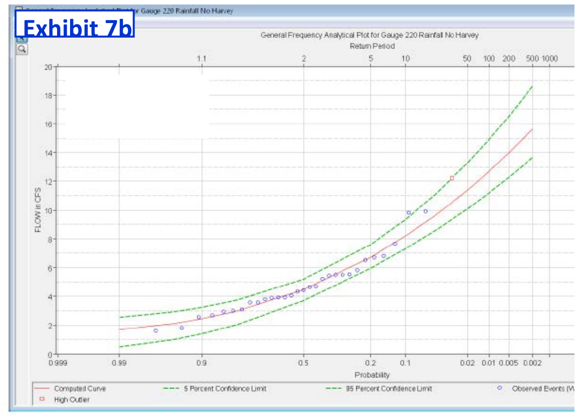


Exhibit 6e

Subsequently and to quickly verify the general trend of these results, HCFCD Gauge 220 was also analyzed using the HEC-SSP program which allows for analysis of rainfall using the General Frequency Analysis option to fit curves to the data using a Pearson Type III distribution. As with the Gumbel analysis, the removal of Harvey from the dataset significantly reduced the estimate of the 24-hour 100-year rainfall (Figures 7a and 7b).



HCFCD Gauge 220 - Generalized Frequency Analysis (Full Record)



HCFCD Gauge 220 - Generalized Frequency Analysis (Omits Hurricane Harvey)

The figures above indicate that precipitation frequency estimates would reduce significantly if Hurricane Harvey's data were not used in the analysis. The reduction is especially prominent at the Houston Hobby Airport location (Exhibit 6d). A statement was made that "similar reductions might be expected if Harvey is omitted from the NOAA analysis."

To investigate how much NA14 estimates would decrease if Harvey data were not considered, we performed analysis for the Houston Hobby Airport station (79-0042 DLY) with and without the 2017 AM value and plotted frequency curves for the 24-hour duration (Figure A.4-7). For easier comparison we estimated precipitation amounts for several ARIs from Exhibit 6d and displayed them in the figure as well. As can be seen from the figure, inclusion/exclusion of Harvey had a considerably smaller effect on NA14 estimates than on the estimates shown in Exhibit 6d. Initially we attributed this outcome to differences in frequency analysis approaches: the regional frequency approach used in NA14 vs. the at-station frequency approach used in derivation of Exhibit 6d. However, frequency curves derived using only 85 (or 84 without Harvey) AM values extracted at Hobby airport looked very similar to corresponding curves developed using regional methods.

Without knowing details on the frequency analysis methods used and not having the data used to create the figures above, it is hard to explain the differences in results. Based on the information provided in the comment and judging from Exhibits 7a and 7b, we speculate that the frequency curves shown in the figures above were developed from very short records (less than 50 years) for which inclusion of a historic event like Harvey would have a profound effect on estimates.

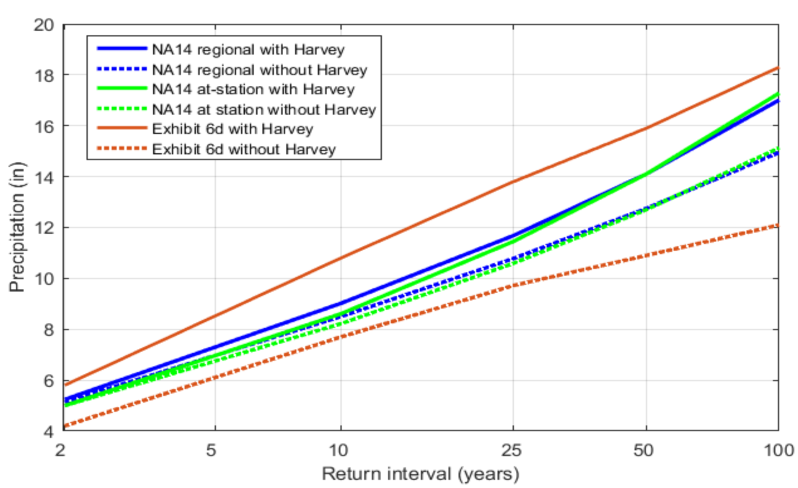


Figure A.4-7. Variants of 24-hour frequency curves at Houston Hobby Airport.

5.3.3. A subsequent analysis was undertaken using the Extreme Value Probability (Gumbel) Type I distribution for five stations in the Houston area. By removing Harvey from the period of record, it is noted that the 100-year rainfall is reduced significantly. Would similar results be expected if Harvey were omitted from the NOAA analysis?

Please refer to comments 5.3.1 and 5.3.2.

5.3.4. Is there a way we can see the DDF curves before Harvey was added to the study?

Please refer to comments 5.3.1 and 5.3.2.

5.3.5. The maps look like they were influenced by Harvey. Was Harvey tested as a potential outlier?

Please refer to comments 5.3.1 and 5.3.2.

5.3.6. How would the maps look without Harvey?

Please refer to comments 5.3.1 and 5.3.2.

5.3.7. The cartographic map showing the 100-year 24-hour estimates appears to mirror maximum rainfalls consistent with H. Harvey and earlier extreme events.

Please refer to comments 5.3.1 and 5.3.2.

5.3.8. Comparing the contour maps of 2-year and 100-year maps of various durations, one can tell distinct difference in the patterns around Harris County. Is this much related to Hurricane Harvey?

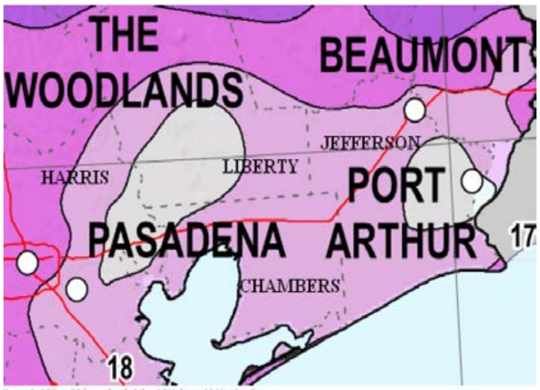
Please refer to comments 5.3.1 and 5.3.2.

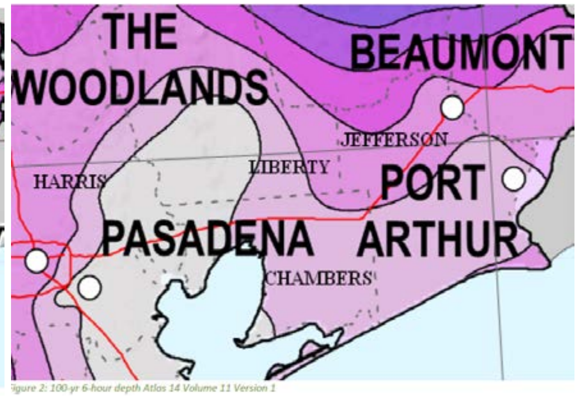
5.3.9. There is little doubt that Hurricane Harvey was an unusually heavy rainfall event. However, the previous CONUS record of 48” (1899) and now 51” for a 4 day rainfall event appears to undermine some reports that Harvey was in excess of a 500-year recurrence interval event. Any findings that project beyond a 500-year event ignore the less than 220 years limitations of the data availability.

When talking about the frequency of a n-year event, the following three elements should be specified: duration, location, and area size. For example, the same amount of point rainfall for a given location can be categorized as a 1000-year event or a 10-year event, depending on duration (please see FAQs “3.2. What is a 100-year rainfall event and how often is it exceeded?” and “3.3. Why do 1000-year (100-year) events happen so often?” on the FAQ page for more information).

We analyzed annual exceedance probabilities (AEPs) for Hurricane Harvey and created an AEP map for 4-day duration that showed the lowest exceedance probabilities (less than 1/1000-year or more than 1000-year ARI) for the largest area. For more information on the AEP analysis please see the AEP storm analysis page.

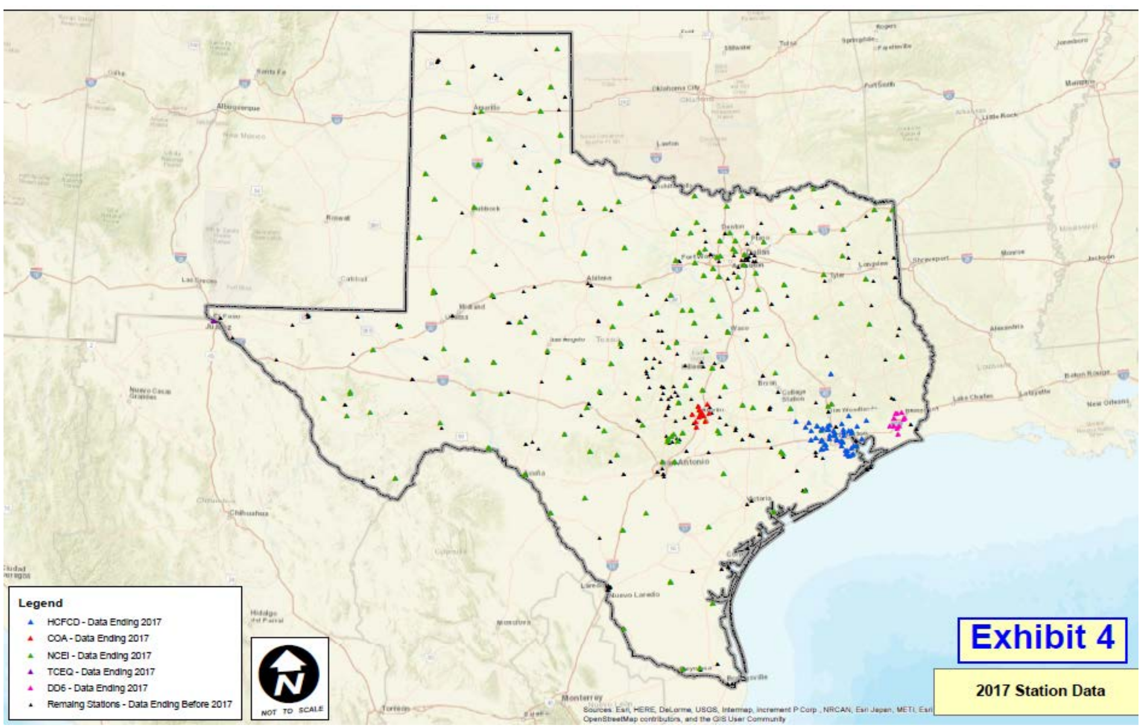
5.3.10. Spatial patterns appear to have been influenced by recent storm events, as shown in the locations which have substantial increases in 24-hour depths such as the Austin area (Halloween storms) and Southeast Texas (Harvey). In Harris County, 89 of 343 total available gauges (26%) were used to develop the point rainfall statistics for Atlas 14, whereas in neighboring Chambers County only 1 of the 33 total gauges (3%) was used. In Jefferson County, 19 of 103 total gauges (18%) were used in the calculations. The mapped depths in Chambers County are visibly different than depths in Harris and Jefferson Counties (refer to Figure 1 and Figure 2), and even different than depths in Liberty County to the north, which did record substantial Harvey rainfall depths. The resulting interpolation of many gauges on either side of a single gauge shows that the single gauge in Chambers County has undue influence over the output. Using more than one gauge in Chambers County may resolve these problems.





For analysis of the effects of Hurricane Harvey on estimates, please refer to comments 5.3.1 and 5.3.2. For discussion on regionalization and interpolation, please see comments 5.1.1 and 5.2.2.

5.3.11. It is noted that most of the stations that have data to 2017 are concentrated in a few areas. Of the 104 stations containing data from 2017, which would include Harvey, 52% of them are in the Houston area (HCFCD), 11% in the Beaumont area (DD6), 7% are in the Austin area (COA and TCEQ), and the remaining 30% are scattered across the State of Texas (NCEI). Wouldn't that skew the data toward the areas hardest hit by Harvey due to the heavy concentration of data in these localized areas, especially when these stations have 32 years of record or less? Exhibit 4 is attached showing this geographic distribution of the stations used in the NOAA Atlas 14 study.



For analysis of effects of Hurricane Harvey on estimates, please refer to comments 5.3.1 and 5.3.2. For discussion on regionalization and interpolation, please see comments 5.1.1 and 5.2.2.

5.4. Comparisons between NA14 and HYDRO35/TP 40/TP49

5.4.1. Does NOAA Atlas 14 Volume 11 account for mountainous effects (TP 40 did not)?

Please refer to comment 5.2.1.

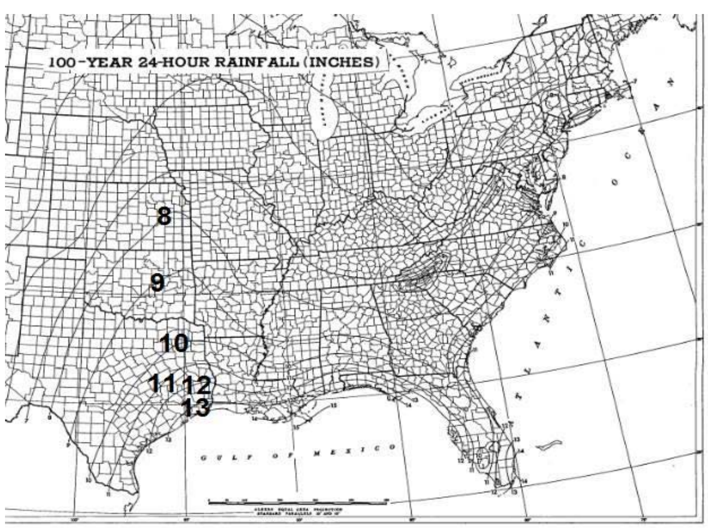
5.4.2. The cartographic maps of precipitation frequency estimates appear consistent and logical. The differences in 100-year 24-hour estimates between NA14 and TP40 appear consistent with expectations, particularly given that TP40 data was compiled circa 1961 and published following what we now recognize was a lengthy and largely nationwide period of drought.

No action required.

5.4.3. 60-minute values on the 100-year difference maps are markedly drier for much of the state. With a wet trend since the previous iteration, this is not what I would've expected.

The differences in HYDRO35 and NA14 estimates could be attributed to a number of factors. Firstly, differences in data quality control procedures and frequency analysis approaches (distribution selection, parameter estimation method, regional versus at-station methods) affect estimates, especially at higher ARIs. Secondly, differences in spatial interpolation techniques impact estimates at ungauged locations. Isopluvials in HYDRO35 were based solely on station data without incorporating topographic features; NA14 estimates were based on PRISM products that integrate topography (see Section 4.8). Finally, the increase in the amount of available data from HYDRO35 to NA14, both in the number of stations and their record lengths, has a considerable effect on estimates. HYDRO35 was published in 1977, so potentially about 40 additional years of data at existing stations were available for the NA14 analyses. Also, many stations that were not suitable for frequency analysis in HYDRO35 due to short records could be included in NA14. We have fairly long hourly record lengths in many locations which should help in reasonably estimating the 100-year storm for 60-min.

5.4.4. Draft Atlas 14 does bump up values compared to the underestimated TP40 values. However, the analysis does not take into account that Harvey rainfall could occur anywhere in Texas. Using observed rainfall records only to estimate design rainfalls, Atlas 14 misses this point. Let's start by looking at TP40's 100-year 24-hour:



Despite what we now know to be pretty substantial underestimates, the appeal of TP40 is the simplicity. There are basically two processes responsible for the map above: proximity to the coastline (which provides an access to large reservoir of high dewpoint air), and the bulge in the Great Plains that I guess to be related to the well-studied Great Plains Low Level Jet – essentially a temporary increase in winds about 2-4K feet above the ground that can increase moisture advection and hence rainfall rates as storms come off the Rocky Mts. That basically summarizes the whole map.

Atlas 14 takes an entirely different mindset – instead using physical mechanism first, they just assume that all of those processes will be "baked" into the individual rain gage time series. And the baking will be very efficient if multiple stations are used, which aggregate many, many extreme events together and hopefully smooth out the local noise. This is the essence of the 'Regional Precip-Frequency Curve' method that Atlas 14 uses. Unfortunately, it does not appear that our rain gage record is long enough to be able to fully dismiss the arguments of the physical process method. Hence, we end up with totally spurious "hot spots" as seen in the TX prelim 100-year 24-hour values.

TP40 and NA14 methodologies are actually very similar conceptually; they are both statistical frequency analysis methods that calculate precipitation frequency estimates by fitting a mathematical model to annual maximum series extracted from the historical record. In contrast, traditional Probable Maximum Precipitation (PMP) methods are more in line with the approach discussed in the comment that is based on the analysis of physical mechanisms. The precipitation frequency estimates and PMP estimates are not the same products and are used in different applications.

The differences in TP40 and NA14 estimates could be attributed to several factors, including availability of data in terms of number of stations and record lengths, quality control procedures, and frequency analysis approaches and interpolation techniques, all of which have improved since the 1960s when the TP40 study was done.

The simplicity of the TP40, referred to in the comment as an advantage of that study, is primarily due to the very limited data that was available for the analysis at the time. For comparison, only 250 daily gauges within Texas with an average record length of 23 years were used in the TP40 analysis, while in NA14 we used data from more than 2,500 gauges with an average record length of 60 years for daily durations. Lack of stations with adequate data resulted in very smooth spatial patterns in TP40, but because of that it failed to reproduce local characteristics of extreme precipitation that are of interest for many applications.

5.4.5. I didn't take the time for rigorous examination of local areas, but some that consistently stick out with regard to product contouring (frequency or difference maps) being unusual with peaks/sinks are the following:

- Guadalupe Peak
- Big Bend
- Eagle Pass
- Southern metros (Austin, Corpus, Houston).

The TP40 and TP49 studies were done on a national level using relatively few stations and consequently cartographic maps show very smooth isohyets representing large scale patterns in precipitation frequency estimates (see also the response to comment 5.4.3). In contrast, NA14 maps were produced from high resolution gridded estimates derived from a significantly larger pool of stations with longer records and using spatial interpolation techniques that integrate topography. That is why some of the largest differences compared to past studies are seen in the

Guadalupe Peak and Big Bend areas. In addition, some of the other areas mentioned (such as the Eagle Pass/Del Rio area extending east to Austin) have all seen consistent increases in precipitation magnitudes. We comment in more detail about those areas in response to comments in Sections 5.1, 5.2, 5.3 and 6 of this Appendix.

5.4.6. On the 100yr est. difference map analysis... is it reasonable to assume a consistent percent increase/decrease among the different durations? For example in the Austin area, the 60min duration shows 0.5in increase (111%); the 6hr shows 3in increase (142%); the 24hr shows 2.5in increase (124%); and the 10day shows +/-2in, but lets assume ~2in increase (112%).

Percent increase/decrease between NA14 and TP40 estimates does not have to be similar across durations.

5.5. Discrepancies at boundaries with other NA14 Volumes

5.5.1. My comment is broad in scope and not specifically related to any particular observation location. Although the usage of all available data for each of the volumes is understandable, the relatively slow update process has caused significant discrepancies between the analyzed time period for each area analyzed (now exceeding a decade).

Under the current model, funding for NOAA Atlas 14 work comes from external sources. This funding approach requires that work is completed in volumes determined by state boundaries and each volume is completed independently and at different times depending on funding availability. Typically, that is a one-time funding opportunity and, consequently, there is no funding in place to update the already published volumes. We recognize how this process is inefficient and creates issues for NOAA and for users. We are working with other federal agencies to change the Atlas 14 funding approach from one-time developments that are requested and funded by the users to more consistent and reliable funding where estimates would be updated for the whole country simultaneously in regular intervals (10-15 years). However, it is uncertain if or when that will happen.

To provide some continuity in estimates at boundaries of adjacent volumes, we extend the analysis beyond each volume's geographic domain. However, differences in estimates at project boundaries are inevitable, and are generally more pronounced for rarer frequencies. We considered different approaches to address the issue, but none of them are practical. Adjusting present-day estimates to blend them with estimates from previous volumes would be straightforward, but not an ideal approach, considering more recent estimates are developed with longer records and current data. Adjusting estimates from older volumes along the boundaries of the newest volume is not a trivial task since it requires modification and republishing of numerous underlying grids of data, cartographic maps and other associated information (documentation, temporal analysis results, etc.). Unfortunately, as mentioned above, we have no funding in place to support such efforts.

For now, for larger-scale applications such as frequency analysis of historic storm events, we recommend use of the NOAA Atlas 14 CONUS product that combines blended NA14 precipitation frequency estimates for durations between 60 minutes and 7 days from volumes that cover contiguous US states. The estimates along the volumes' boundaries in this product were altered to reduce discrepancies. More information on this product and instructions on how to use it are available from the AEP storm analysis page.

5.5.2. I'm also curious about how these results compare/align with similar studies with neighboring states. In some brief comparison with the 100/2yr10d and 100/2yr60min products, I did notice discontinuities across state boundaries (ie. TX/LA), not to mention the use of inconsistent/different color scales. These maps will no doubt be mosaic'd by some user communities and these artifacts naturally questioned. To me, these discontinuities speak toward the data density and analysis methods. I would recommend that some exercise be utilized to ensure continuity across political boundaries and the use of consistent color scales among maps of same product.

NA14 cartographic maps are created for selected ARIs and durations to serve as visual aids only. We advise to retrieve estimates from the GIS Grids page which accesses the gridded data used in development of maps directly. We use the same color map for all maps, but scale is adjusted so there are between 10 and 15 contours for each map. Since precipitation ranges vary among volumes, they are not consistent across all volumes. Also, please refer to our response to comment 5.5.1 regarding discontinuities along volumes' boundaries.

5.5.3. This discrepancy in base period and methodology has contributed to spatial discrepancies in the rainfall frequency data which may not be of concern for small-scale engineering applications but is already noticeable for larger-scale applications such as storm event analysis.

Please refer to comment 5.5.1.

5.5.4. How will inconsistencies between isohyets across state lines be adjusted (differences are noticeable along the Sabine River between Louisiana and Texas)? If indeed it turns out that Texas (Volume 11) is dramatically affected by Harvey, should the Southern States (Volume 9) be updated to reflect Harvey?

Please refer to comment 5.5.1.

5.5.5. How will inconsistencies between isohyets across state lines be adjusted such as along the Sabine River between Louisiana and Texas?

Please refer to comment 5.5.1.

5.5.6. As currently indicated, NOAA Atlas 14 Vol 11 will include rainfall data spanning Hurricane Harvey, a particularly extreme and record-breaking event which will likely leave a significant impact on the resulting rainfall frequency calculations. This could produce one of the largest discrepancies yet when looking at NOAA Atlas 14 as a whole, although this could not be quantified because the resulting data was not made available in such a way that a comparison between Texas and Oklahoma/Arkansas/Louisiana could be easily made. I would strongly suggest that the HDSC weigh the benefits of using the additional rainfall data which spans Hurricane Harvey against the costs, which include reduced consistency between volumes and spatial discrepancies which have to be addressed by the end-user.

Please refer to comment 5.5.1.

5.5.7. Will the southern Gulf States (Volume 9) be updated to reflect Harvey?

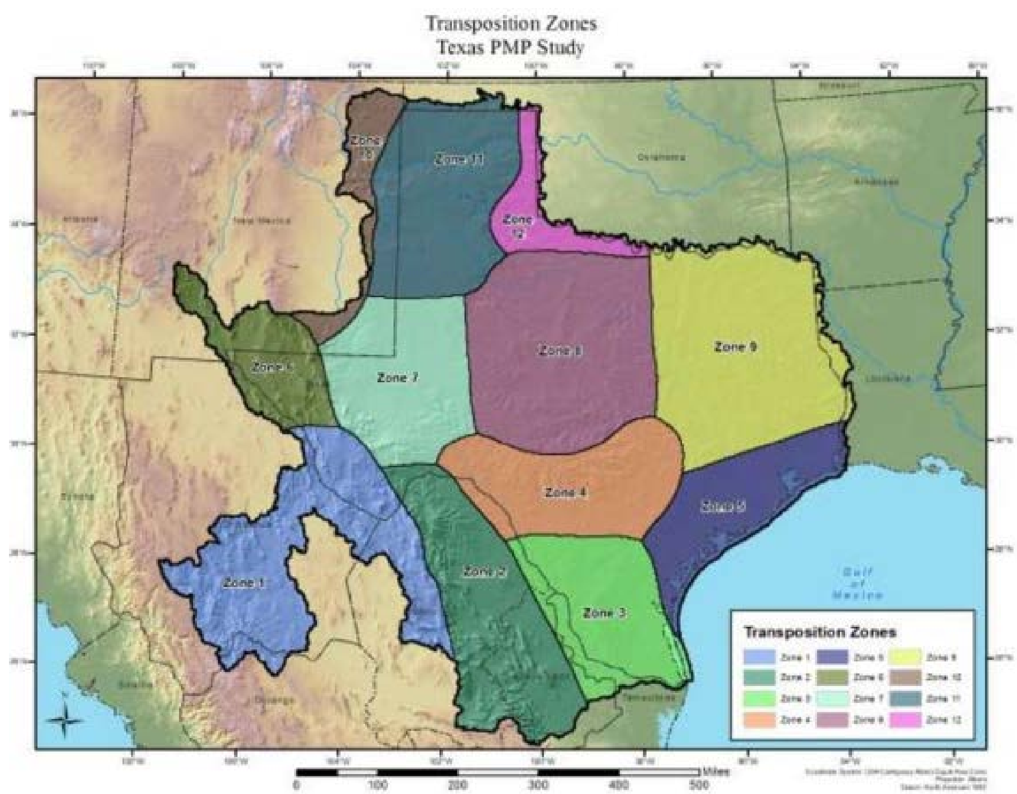
Please refer to comment 5.5.1.

5.6. Other

5.6.1. Spatial patterns of the increases also do not match recent analysis of PMP in Texas (by TCEQ, published in January 2017). For the purposes of comparison, we will use the 10-sq. mi. storm since Atlas 14 is based on point precipitation at the 6-hour and 24-hour durations and those are the only comparable storm durations between the two products.

The PMP analysis (Figure 3 and Figure 4) shows a ten percent reduction or more in the 6-hour duration depths for Zones 3, 4, and 5, and a four percent reduction in the 24-hour duration depths for Zones 4 and 5, and a nine percent reduction in Zone 3. These reductions are inconsistent with the Atlas 14 dataset (Figure 5) as the major increases of rainfall depth are in Zones 4 and 5 where the 10-sq. mi. PMP has slightly decreased. For Alvin, Angleton, Austin, Houston, and Sugar Land, the 100-year 6-hour storm depth is increasing by a minimum of 30 percent (Sugar Land) up to a maximum of 44 percent (Houston). For the same locations, the 100-year 24-hour storm depth is increasing by a minimum of 18 percent (Austin) and a maximum of 31 percent (Alvin).

When comparing the Atlas 14 depths to the PMP depths at Alvin, Angleton, Austin, Houston, and Sugar Land (Zone 4 and Zone 5), the 100-year 6-hour storm is approximately 40 percent of the PMP depth for a 10-sq. mi. storm. The 100-year 24-hour storm is approximately 35 percent of the PMP depth for a 10-sq. mi. storm. When comparing the Atlas 14 Depths to the PMP depths at Dallas (Zone 9), the 100-year 6-hour storm is approximately 25 percent of the PMP depth for a 10-sq. mi. storm, and the 100-year 24-hour storm is approximately 23 percent of the PMP depth for a 10-sq. mi. storm. PMP values for the 10-sq. mi. storm in Dallas also decreased by a comparable amount for the 6-hour and 24-hour durations, and the Atlas 14 DDF values are consistent with this change. Generally, the currently accepted precipitation depths as documented by Asquith and Roussel in 2004 are approximately 25 percent of the PMP depth for a 10-sq. mi. storm, as shown in Table 11.4 of the PMP analysis reproduced below.



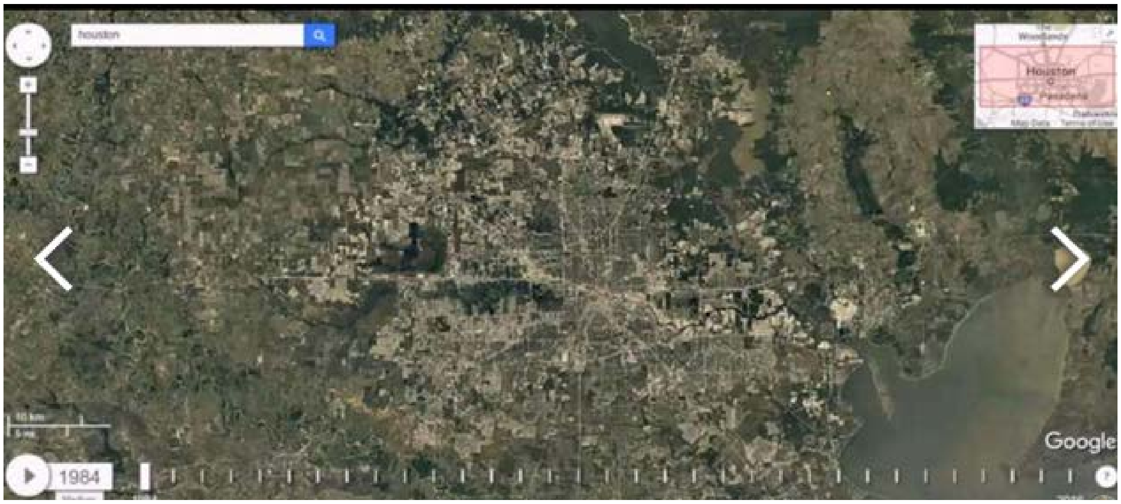
Duration	Area	Zone 3	Zone 4	Zone 5	Zone 7	Zone 8	Zone 9	Zone 10	Zone 11	Zone 12
6-hour	10-sqmi	-18%	-10%	-11%	-31%	-16%	-15%	-28%	-28%	-20%
6-hour	200-sqmi	-14%	-8%	-3%	-30%	-15%	-11%	-31%	-27%	-19%
6-hour	1,000-sqmi	-13%	-7%	-11%	-35%	-20%	-12%	-37%	-33%	-23%
6-hour	5,000-sqmi	-10%	-5%	3%	-39%	-15%	-2%	-51%	-47%	-20%
6-hour	10,000-sqmi	-18%	-14%	-3%	-40%	-23%	-7%	-47%	-42%	-27%
6-hour	20,000-sqmi	-19%	-11%	-7%	-38%	-25%	-9%	-49%	-38%	-30%
12-hour	10-sqmi	-9%	-4%	-3%	-34%	-18%	-7%	-37%	-33%	-21%
12-hour	200-sqmi	-9%	-2%	-5%	-26%	-10%	-5%	-29%	-24%	-11%
12-hour	1,000-sqmi	-18%	-10%	-10%	-25%	-14%	-8%	-25%	-21%	-13%
12-hour	5,000-sqmi	-4%	0%	9%	-29%	-12%	9%	-41%	-34%	-16%
12-hour	10,000-sqmi	-4%	2%	11%	-35%	-10%	11%	-44%	-37%	-16%
12-hour	20,000-sqmi	-7%	0%	7%	-28%	-11%	5%	-43%	-33%	-15%
24-hour	10-sqmi	-9%	-3%	-4%	-33%	-15%	-4%	-33%	-27%	-15%
24-hour	200-sqmi	-10%	-2%	-8%	-18%	-2%	-4%	-15%	-10%	2%
24-hour	1,000-sqmi	-10%	-3%	-16%	-10%	4%	-7%	-3%	2%	13%
24-hour	5,000-sqmi	-13%	-3%	-2%	-17%	-7%	2%	-12%	-8%	-1%
24-hour	10,000-sqmi	-4%	8%	8%	-17%	2%	12%	-29%	-20%	3%
24-hour	20,000-sqmi	7%	18%	21%	-9%	11%	21%	-36%	-14%	12%
48-hour	10-sqmi	-8%	-5%	-9%	-23%	-5%	-8%	-22%	-16%	-3%
48-hour	200-sqmi	4%	10%	-4%	-5%	15%	6%	-3%	4%	19%
48-hour	1,000-sqmi	-1%	6%	-4%	-2%	13%	2%	1%	8%	21%
48-hour	5,000-sqmi	-12%	-5%	4%	-15%	-4%	4%	-10%	-7%	1%
48-hour	10,000-sqmi	-9%	1%	4%	-22%	-5%	7%	-21%	-19%	-6%
48-hour	20,000-sqmi	-2%	8%	12%	-16%	2%	14%	-30%	-18%	1%
72-hour	10-sqmi	-14%	-9%	-15%	-25%	-10%	-13%	-25%	-19%	-8%
72-hour	200-sqmi	-6%	0%	-9%	-10%	5%	-3%	-6%	-1%	12%
72-hour	1,000-sqmi	-10%	-4%	-1%	-10%	2%	0%	-4%	1%	11%
72-hour	10,000-sqmi	-20%	-8%	4%	-22%	-9%	3%	-18%	-14%	-6%
72-hour	10,000-sqmi	-23%	-11%	-1%	-27%	-11%	-1%	-29%	-25%	-9%
72-hour	20,000-sqmi	-20%	-10%	-4%	-25%	-13%	-4%	-34%	-23%	-12%

Figure 4: Percent Change of Texas PMP Zones, TCEQ 2017

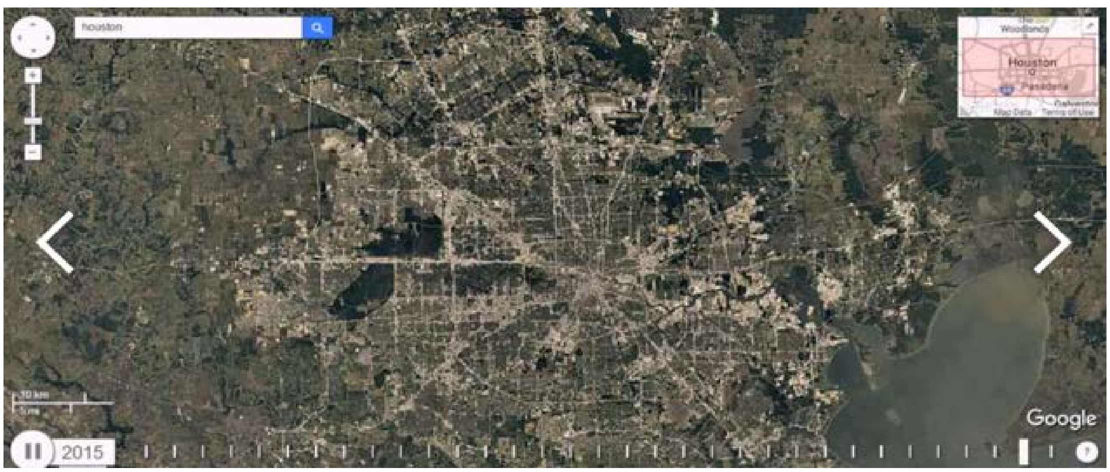
Gridded Average by Transposition Zone				
Transposition Zone	24hr 10mi^2 PMP (inches)	100yr 24hr Precip (inches)	100yr 24hr Precip Percent of PMP	Ratio of PMP to 100yr 24hr Precip
Zone 1	20.67	4.94	24%	4.2
Zone 2	31.78	7.09	22%	4.5
Zone 3	41.38	8.98	22%	4.6
Zone 4	41.29	9.24	22%	4.5
Zone 5	45.86	12.35	27%	3.7
Zone 6	16.89	4.19	25%	4.0
Zone 7	23.86	5.68	24%	4.2
Zone 8	33.88	8.09	24%	4.2
Zone 9	42.01	10.71	25%	3.9
Zone 10	21.58	5.48	25%	3.9
Zone 11	24.93	6.17	25%	4.0
Zone 12	31.31	7.60	24%	4.1

Without having the data and knowing all the details of this analysis, we cannot comment on why NA14 spatial patterns do not match recent analysis of PMP in Texas. Also, please see our response to comment 5.4.3.

5.6.2. While I understand the observation sites east of Houston do record more rainfall, due to their proximity to the Gulf of Mexico moisture maximums and tropical system tracks, I suggest NOAA further considers my proposed adjustment based on documented empirical observations due to urban impervious surfaces, because there is no predicted slow-down to the development (and addition of new concrete) to this region. Here's a satellite view of the Houston metro from 1984 when the population was approximately 1.6 million.



Here's the same view from 2015: Notice how expansive the building has become in the last 30 years with more neighborhoods, plazas and highways, with a population of approximately 2.5 million.



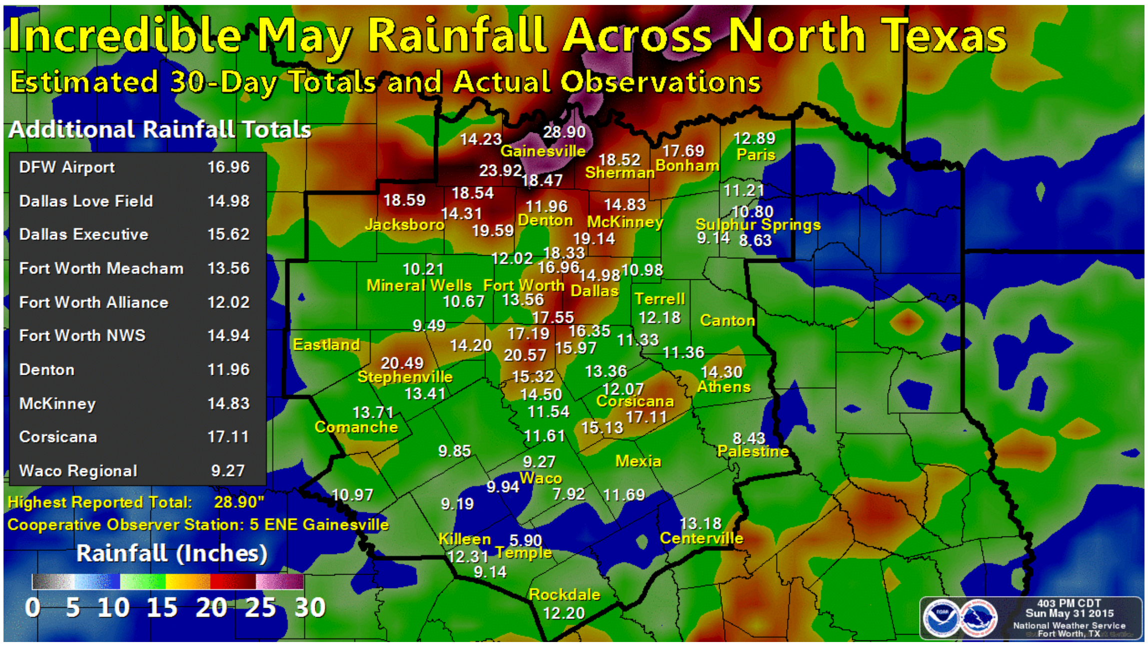
Further, due to geological considerations with clay-based oceanic crust, the growingly heavy city has experienced documented land subsidence (link), compounding the flooding problem and reducing the total inches needed on any rainfall event to threaten life and property. When huge events like Harvey happen, the city sink further. According to NASA, Houston sank up to 2cm under the weight of flood water from Harvey. This effect becomes amplified when the tide is high in Galveston Bay, preventing the bayou drainage systems (which go to the Bay) to expel stormwater, much as New Orleans experiences when the tide is high from storm surge or astronomical events. Houston's many underpasses actually go beneath the water table and are sealed only by concrete retaining structures. They commonly experience pump failures in times of heavy rain, leading to extreme and sudden flooding to roadways and adjacent property. The largely unregulated and expanding hydrophobic surfaces continue to promoting rapid and severe flooding with even, "lessor" events with no sign of any slow-down in this expansion.

Factors you mentioned, including urbanization, could have a profound effect on the flood frequency estimates used in engineering design. The U.S. Geological Survey provides guidance on how to account for some of those factors (Bulletin 17C). NA14 precipitation frequency estimates are developed based on statistical analysis of precipitation data. Effects of urbanization, etc. would be accounted for only indirectly if reflected in the precipitation data.

6. SPATIAL PATTERNS, SPECIFIC DURATION-FREQUENCY COMBINATION

6.1. 60-minute patterns

6.1.1. 60-minute 2-year. On the 2-year frequency estimate maps, the 60-minute bull's eye near Gainesville is supported by a couple of extreme events (June 2007 and May 2015). May 2015 is likely a significant contributor to the similar bull's eye near Stephenville in multiple durations of the 2-year frequency estimate maps, but since it's even more pronounced than Gainesville's, there must be something else involved. (I haven't had the chance to research this.) Below is a map of monthly precipitation totals from May 2015.



The Gainesville hourly station's (41-3415 HLY) digitized record has three 1-hour events above 3.5 inches (1989, 1999 and 2007), but the station did not capture the 2015 event. After the peer review, we accounted for that event as well through regionalization and that elevated estimates at longer durations and improved spatial patterns in the area surrounding Gainesville. The local peak that previously existed centered at Gainesville is now gone, as estimates were smoothed down slightly to below 1.8 inches. The pattern near Stephenville did not change significantly at 2-year 60-minute other than the slight improvement in the pattern from smoothing.

6.1.2. 60-minute 100-year. The 2-year map looks fine, but the 100-year map has a lot of patchiness that is untethered to any geographical or meteorological phenomena. There seems to be no reason that San Antonio would have a value 0.76" lower than Austin to the northeast and 1.25" lower than Eagle Pass to the southwest, other than the randomness of weather over the past century. Likewise, it seems odd that College Station would be 1" lower than locations both to the northwest and southeast. It seems that greater smoothing is appropriate, perhaps in the higher-order moments, enforcing greater fidelity to the pattern of normal precipitation.

The regional frequency analysis approach we use in NA14 helps reduce the effect of weather randomness on patterns through pooling together information from multiple stations in the analysis (see Section 4.6.2). After the peer review, we made some improvements to MAM estimates (which are the basis for calculation of gridded precipitation frequency estimates), revisited and *improved at-station and regional statistics where needed, and applied a dynamic filter to precipitation frequency grids (see comment 5.2.2 for more details) which reduced patchiness and improved patterns in the area.*

However, Eagle Pass/Del Rio and Austin (and stations in the Houston area) have had some of the largest 60-minute rainfall measurements for the entire project area. The Eagle Pass station, for example, had two 1-hour measurements over 5 inches in its 66-year-long hourly record, so we think that estimates are reasonable.

100-year 60-minute estimates at College Station (79-0017) are actually very similar to estimates at locations both to the northwest and southeast. The bullseye near College Station in the Version 1 map was merely an artifact of the contour interval chosen, with values varying only slightly on either side of the contour. In the new version, the variability of estimates has decreased and patterns have been improved, with local peaks and sinks removed in the vicinity of Austin, Eagle Pass, and San Antonio. Additionally, the 4.25-inch contour now extends the entire length of the hill country.

6.2. 6-hour patterns

6.2.1. 6-hour 100-year. The southeastern half of the map seems to be dominated by a small handful of widespread precipitation events. Locations affected by Beulah, Allison, Harvey, the October 1994 flood, and the October 1998 flood seem to stand out, while places not affected, such as Victoria and McAllen, have relatively small values. Unlike the 2-year map, where apparent stochastically-generated misestimates are at most 4%, here differences are 8% or more. The spatial pattern of the 24-hour 100-year map is much more consistent with my expectations for extreme rainfall patterns, and I think that most 6-hour maxima correspond to 24-hour maxima on the same day (this is testable). Since the 24-hour 100-year map was directly influenced by a much greater number of stations, it should be more objectively realistic, confirming my subjective expectations. I don't know what approach can be taken to force the 6-hour 100-year values to spatially conform more closely to the 24-hour 100-year values, but something should be done. Perhaps use a larger smoothing radius, and/or use the 24-hour patterns as a first guess for the 6-hour patterns. I understand that the current algorithm uses the previous higher-frequency analysis as a first guess. The problem with this is that inadequately-sampled and randomly inhomogeneous weather events reinforce themselves in the spatial pattern as the analysis progresses to higher and higher return periods. Despite the duration gap, I think that even the 100-year 60-minute pattern would be drastically improved by better correspondence to the 100-year 24-hour pattern.

Assessing the correspondence between two types of estimates from cartographic maps may be misleading, as selection of the number of contours and contouring intervals also plays a role. To ensure consistency in estimates across all durations and frequencies, we normally apply several duration-frequency based internal consistency checks, all of them initiated at 24-hour duration since we consider it to be the most reliable. During the AM quality control and regionalization tasks we also investigate relationships in magnitudes and dates of occurrence of n-hour and 24-hour AM, and while there are substantial similarities in both attributes between 24-hour and 12-hour data, they diminish quickly as duration shortens. After the peer review, however, we improved patterns at hourly durations across the whole project area through regionalization and enhanced smoothing (see comments 5.1.1 and 5.2.2). Significant improvements were made in the vicinities of Victoria, Bay City, and El Campo in the new 100-year 6-hour map.

6.2.2. 6-hour 100-year. In the timespan of a 6 hours 100-year event, I would suggest reducing the [Houston's 100 year precip threshold] from 11.5-12"/6hrs, to 10.5"-11"/6hrs. (The Memorial Day flooding event would serve as clear evidence of the impacts of said rainfall in that period of time.)

After the peer review, we made some improvements to the MAM estimates that are the basis for calculation of gridded precipitation frequency estimates, revisited and improved at-station and regional statistics where needed, and applied a dynamic filter to precipitation frequency grids to improve spatial patterns (see comments 5.1.1 and 5.1.2 for more details). However, after re-inspecting the AMS data, statistics, and DDF curves for stations in the area, we think that estimates in the Houston area are reasonable.

6.3. 24-hour patterns

6.3.1. 24-hour 2-year. Even in the 2-year map, which ought to be statistically quite robust, there's evidence of influence of a couple of statistical flukes. The most remarkable is the relative lack of extreme daily rainfall at Bay City and surrounding stations and the relative and more localized surplus of extreme daily rainfall at Angleton. Angleton was a bulls-eye even in the annual normal precipitation using the 1971-2000 reference period. Back then, I looked at the Angleton data, and I could not identify any obvious problems in the patterns of the data. Even now, the annual maxima time series show 10 events for Angleton and 1 for Bay City. I cannot completely rule out a gauge bias, but I think it's just one of those things. Meanwhile, while Bay City and surrounding stations have historically received less intense 1-day rainfall than stations up or down the coast, the multi-station observations and lack of any explanatory geographical features suggest that this is a statistical fluke. There is a 10% difference between the 2-year amounts for Bay City and Angleton, so larger smoothing to reflect the expected large-scale pattern would have as much as a 4% change in the values, which is not a whole lot.

After the peer review, we re-examined the AMS data at Bay City (41-0569) and Angleton (41-0257 DLY) stations, and while Bay City has had only one 24-hour rainfall amount exceeding 10 inches in the record, Angleton has had 10 exceedances and that translates to differences in MAMs. In NA14, MAM grids together with at-station 2-year precipitation frequency estimates are the basis for calculation of 2-year gridded precipitation frequency estimates, and patterns in 2-year estimates closely match MAM patterns (correlation coefficients are regularly above 0.99). After the peer review, we did revise MAM information for some stations in the area and, together with regionalization improvements and increased smoothing along the coastline, that benefited 24-hour 2-year patterns (see comments 5.1.1 and 5.2.2 for more details).

6.3.2. 24-hour 2-year map. Looks very good. The suspicious features, such as the Bay City/Angleton thing and the strong north-south gradient near Corpus Christi, are relatively minor in amplitude.

Please refer to comment 6.3.1.

6.3.3. 24-hour 100-year map. The most noticeable suspicious aspect to this map is in Southeast Texas, where the 100-year amounts seem to have been strongly affected by a small number of recent events such as Allison and Harvey that could equally well have happened a few counties farther east or west. I would expect, for example, similar return periods for Conroe and Bay City, but the randomness of the weather has apparently resulted in an estimate at Conroe that's 20% higher than the estimate at Bay City.

To test the effect of storm locations, I took the largest 1-day precipitation amounts in Conroe and Brenham (obtained from ACIS) and compared them (see ConroeVBrenham spreadsheet). Note that this is not the same as the annual maxima, but it should have similar statistical characteristics. The sorted amounts consistently have Conroe's values about 11% higher than Brenham's values until the highest 13 (and especially the highest 8) values are reached. For those, Conroe is substantially higher, as much as 67%, except for the very highest value. (See the graph labeled "Actual".) This sort of difference would preferentially affect the higher-order moments and thus the tails of the distributions, and would affect the overall estimates if the same pattern shows up at other stations.

It turns out that about half of the heaviest one-day events at Conroe coincided with heavy one-day events at Brenham, so it appears that these events have a large enough footprint to persist after geographical smoothing. I examined the dates of the recent events and found that most of them were very or moderately likely to be swappable in my opinion, meaning that the weather pattern could just as easily happened at the other station and produced a similar precipitation total. These events, and their associated highest daily totals, are:

	Brenham	Conroe
October 1994	10.38	14.35
October 1998	10.25	6.50
June 2001	3.71	12.50
September 2008	2.30	9.93
October 2015	6.88	2.25
May 2016	20.50	Missing
August 2017	7.48	13.64

When I simply swap these events between Conroe and Brenham, the scatter diagram looks well-behaved even at the extremes (see the graph labeled "Swapped"), and the regression line gives a constant of proportionality of 11%, the same value obtained from the lesser totals.

Based on this evidence and my experience, I believe that Brenham has been historically lucky and Conroe has been historically unlucky. More broadly, because of a handful of events that happened to affect many gauges in the Houston area, I believe that the 100-year rain event is overestimated in the Houston area and underestimated in places such as Jasper, Huntsville, El Campo, and Victoria.

We use a regional frequency analysis method to calculate estimates and that helps in reducing the effects of historically unlucky/lucky stations. However, in choosing stations to assign to a region for a station of interest, we still want to adequately represent local conditions (see comment 5.1.1). Since Bay City and Conroe are approximately 100 miles apart, the stations that contributed to their regions are largely different. Historically, many more intense 1-day rainfalls have occurred at Conroe compared to Bay City (eight versus one event with more than 10 inches in 24 hours), so it is not surprising that 24-hour 100-year estimates at Bay City are a bit lower. After the peer review, we re-examined AMS data and estimates in the area, especially around Bay City, to ensure they are not too low compared to areas to the east. Through regionalization and revised smoothing for coastal areas, we did improve patterns but estimates themselves did not change much.

Estimates in the El Campo area went up after the peer review primarily because we found and corrected two among the largest 24-hour AM values that were being considerably underestimated. The first one is for El Campo station (41-2786), where 8.03 inches and 8.00 inches were recorded for 21 and 22 November 2004 (as a result, we extracted 8.03 inches as an AM value for that year). This was a major flood event for the area, and through analysis of storm data and radar data, we determined that approximately 16 inches of rain fell during 24 hours. Similarly, we initially estimated the 24-hour AM value for 1945 at Danevang station (41-2266) as a half of 19.29 inches measured in 2-days starting on 27 August 1945. Through post-storm analysis documents, we *determined that the actual 24-hour maximum amount from the storm was close to 18.7 inches. After we adjusted both AM values, 100-year estimates increased and patterns in the area improved.*

Conroe and Brenham are both long record stations. More intense 1-day rainfalls have been consistently measured at Conroe resulting in the 1-day MAM being about 17% higher at Conroe and that translated to differences in precipitation frequency estimates. While estimates did not change much, we did improve patterns in the area through regionalization and revised smoothing for coastal areas (see comments 5.1.1 and 5.2.2).

6.3.4. 24-hour 100-year. The high density of rain gauges near populous areas tends to skew the results and cause substantial gradients in the total depth. For example, the 24-hour 100-year depth is 14 inches on the west side of Fort Bend County and 16.5 inches on the east side.

Please refer to comments 5.1.1 and 5.2.2. After we improved regions in the area and increased smoothing, precipitation frequency estimates' gradients in the area also improved.

6.3.5. 24-hour 100-year. In the Atlas 14 data, I found no META data errors but would strongly recommend that NOAA consider empirical factors such as urban sprawl, city subsidence and tidal impacts with Houston's drainage system. In determining 100-year precipitation. I would suggest pushing the maximum isopluvial values farther east of Houston, therefore reducing Houston's 100 year precip in a 24 hour period from 16"-17", to 15"-16" and curve the isopluvials to match the current and projected future boundaries of urban landscape. (I'd recommend everything inside of Beltway 8" be reduced in estimated rainfall to be classified as a 100 year event.).

After the peer review, we re-examined AMS data, statistics, and at-station estimates in this area. They did not change much, but spatial patterns improved as a result of improvements in regionalization and smoothing (see comments 5.1.1 and 5.2.2).

6.3.6. Looking at the 100-year/24-hour event on the NOAA Atlas 14 maps provided, what makes the Houston-Beaumont area climatologically/atmospherically/orographically so different from Corpus Christi? Could the differences in rainfall estimates be due to the density of the gauges in the Houston area? It is noted that USGS WRIR 98-4044 (which HCFCD uses for determining DDF) and TP40 indicate similar 100-year/24-hour rainfall for Houston-Beaumont and Corpus Christi, with a difference of 1.0 inch maximum between the two locations. NOAA Atlas 14 seems to indicate a 2.5-inch minimum difference.

The NA14 frequency analysis approach relies on statistical analysis of historical data. We use a regional frequency analysis method to calculate estimates and carefully consider which stations to retain in station dense areas in order to not bias estimates. While we aim to reduce the effects of historically unlucky/lucky stations on estimates, we still expect regions to adequately represent local conditions.

In contrast to stations in the Corpus Christi area that did not record a single 1-day value greater than 17 inches, the stations in the Houston area and vicinity have measured 20 inches or more in a single day. In fact, some HCFCD gauges have seen two events exceeding 20 inches in 24 hours or less in approximately 31 years. There have been multiple events that are contributing to the higher estimates in the Houston area, such as Claudette in 1979, the October 1994 flood event, Allison in June 2001, and Harvey in August 2017. Also, we decided against adjusting the 1-day AM value of 25.75 inches from Claudette in 1979 at Alvin station (41-0204), although (at least) 43 inches is a widely accepted estimate for a nearby location, and that would further increase 100-year 24-hour precipitation estimates in the area.

Regarding Corpus Christi, Houston, and Beaumont estimates – they went up at all three locations, but differences among estimates are similar to some other studies. 24-hour 100-year estimates for those locations are ~11.5, ~12.5, and ~13 inches respectively according to TP40, and ~12, ~12, ~14.5 inches, respectively from the USGS DDF Atlas (2003). In both studies the Beaumont estimate is the highest and according to the USGS study it is also about 2.5 inches higher than estimates at the other two locations.

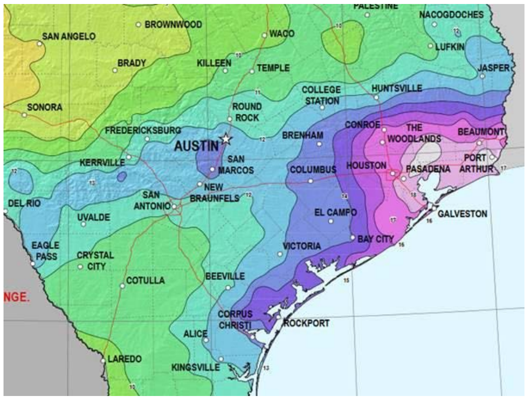
After the peer review, we re-examined estimates in this area, and while they did not change much, spatial patterns improved as a result of improvements in regionalization and smoothing (see comments 5.1.1 and 5.2.2).

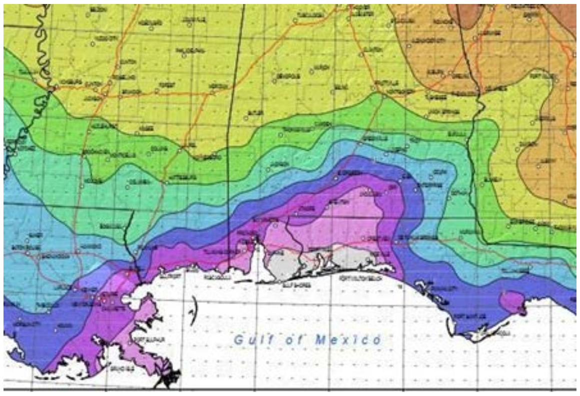
6.3.7. Regarding the 100-year/24-hour Version 1 precip-freq map (screen shot shown below), what makes the Houston-Beaumont area climatologically so different from El Campo and Corpus Christi?

Please refer to comment 6.3.6.

6.3.8. There's absolutely no basis why Houston should be 17-18 while El Campo is 13-14. Or why Austin has a local maxima probably related to the high rain gage density there.

In fact, these spurious local maxima can be seen elsewhere too. For example, southern Alabama.





The only way to fix these issue would involve a substantial re-working of the whole method. The current method is simply: Precipitation Frequency Curve (PF) = function (gages within 50 or 100 miles around a gage of interest). Whereas the more rigorous method should be: PF Curve = function (gages within 50 or 100 miles, topography, distance from coastline, local/regional atmospheric enhancement). If you were to do that, the whole coast from Corpus Christ through Wilmington or Cape Hatteras would probably be 16+ inches for a 100-year 24-hour event, a significant increase over current values.

In NA14 we rely on regional frequency approaches to calculate estimates at one station. We use a so-called region-of-influence approach where each station has its own region with a potentially unique combination of nearby stations. We assign stations to a target station's region not only based on their distance, but also based on similarities in selected attributes that include elevation, location with respect to the coast and mountain ridges, etc., (see discussion and an example in Section 4.6.2). Stations close to the coastline, for example, will typically have regions that are elongated along the coast. In addition to considering elevation during regionalization, the effects of topography are also included using PRISM-based MAM grids that initiate interpolation (see comment 5.2.2 for more information).

We disagree with the assessment that the 100-year 24-hour estimates along the coast from Corpus Christi through Wilmington or Cape Hatteras should be similar in values but do agree that Version 1 estimates in the El Campo area were low. We discuss how we improved estimates there in response to comment 6.3.3.

We also disagree that Austin's local maxima is related to the high rain gauge density there (see comment 5.1.1) and think that estimates are reasonable. Both Austin and San Marcos are consistently more prone to extreme rainfall compared to surrounding gauges such as Taylor, which is contributing to slight maxima over Austin. Both Taylor and Austin (~30 miles distance) have very long records, but the Austin gauge has measured 11 instances of events exceeding 7 inches in a single day while the gauge at Taylor has only done so twice. The difference is also evident in the PRISM-derived MAM grids. Also, contouring on the cartographic map makes the differences look bigger than they actually are; they are on average around 5%.

6.4. 10-day patterns

6.4.1. 10-day 100-year. The 2-year map looks fine. The 100-year map looks fine except for southeast Texas, where Harvey and to a lesser extent Allison produced large multi-day totals. According to ACIS, the 10-day maxima for Liberty, TX are:

2017	41.75
1994	26.77
2015	24.55
1915	21.21
1949	17.55
1998	16.35
2006	16.30
1981	16.04
1989	14.97
1943	14.85

Frankly, it's frightening how many of these events are in recent years, and this phenomenon presumably contributed to the large change in odds of multi-day events estimated by Risser and Wehner (2017 GRL) in the context of Harvey.

The gradient in the 100-year 10-day amounts heading southwest toward Corpus Christi is plausible, since a large multi-day total is aided by a pure tropical influx of moisture, and continental influences are stronger under cyclonic flow farther southwest. But eastward transposition might possible, probably for any of the events listed for Liberty. Here's the corresponding list for Orange:

2017	36.39
1963	24.16
1959	17.15
2002	16.39
1958	16.05
2001	15.51
1979	13.48
1983	12.67
1970	12.33
1998	12.26

Orange is systematically drier than Liberty at the extremes, and it doesn't look like two or three different storms would matter much. The 1994 and 1998 events in particular might have required upper-air patterns that could exist over central Texas but not over eastern Texas, so maybe the geographical pattern is warranted.

Harvey was an extremely unusual multi-day event. Its largest impact on return period amounts should be at the multi-day rare end of the spectrum, such as 10-day 100-year amounts. I'm working on research to assess exactly how rare Harvey was. We already know that it broke plenty of rainfall records. In the context of the behavior of Harvey that led to extreme rainfall (an intense tropical cyclone stalling along the coast), preliminary research I presented in December 2017 at AGU found that the storm behavior was unprecedented along the United States coast but had happened at other locations in the Atlantic Basin. I do not yet have an estimate for the return period of a storm behaving like Harvey, but it seems from preliminary analysis that such a storm is equally likely anywhere along the Gulf and Atlantic coasts from Victoria Texas to Charleston South Carolina. If this is so, the 100-year multi-day amounts should be overestimated in southeast Texas and underestimated elsewhere else along the Gulf Coast.

I don't know whether anything can be done to the official numbers now that is scientifically justifiable, but in the future it may be possible to do something like the following: take the amounts estimated including Harvey and the amounts estimated excluding Harvey, and interpolate using the estimated return period of Harvey. In order to lay the groundwork for this, the return probabilities and amounts should be calculated with and without Harvey. I suppose the numbers including Harvey should be used now, but once a scientifically rigorous and robust estimate of Harvey's return period (which may emerge over the next few months) is available, knowledge of the exceptional nature of Harvey could be used to better infer the true probability distribution of extreme rain.

10-day 100-year spatial patterns reflect the largest multi-day events being measured in the Houston-Beaumont area, but 100-year estimates in the range of 24-30 inches do not seem unreasonable given that 10-day measurements exceeding 35 inches (in some locations even 40 inches) were recorded at several stations during Hurricanes Allison and Harvey. Also, 10-day MAM is about 33 percent higher in Liberty than further to the west at Brenham, so it is to be expected that 100-year estimates in Liberty will also be higher in Liberty than in Brenham where 100-year estimates are around 19 inches.

We did notice that large multi-day events, particularly Hurricane Harvey, skew GEV distribution parameterization and consequently estimates, especially for ARI > 100 years across a range of daily durations (see discussion in Section 4.6.3 and Figure 4.6.5).

7. NA14 TERMINOLOGY AND METHODS

7.1. Terminology

7.1.1. For the benefit/education of users, should an explanation of return period vs. probability of exceedance be included?

We describe NA14 terminology, methods and products in enough depth to allow the knowledgeable user to understand the basis of the estimates and their scope and applicability in the NA14 documentation accompanying each volume. We provide an explanation on average *recurrence interval (return period) vs. annual exceedance in Section 4.6.1. Similar information is provided on the FAQ page in response to FAQ 3.1.*

7.1.2. As a way to facilitate media and public understanding of ARIs, could a statement in the Atlas narrative discussion be included along the lines of: "The ARIs (or probabilities) are regionalized values for design purposes. For many heavy rainfall events, one or more raingauge observations may exceed a given ARI. This does not imply the entire area be characterized as receiving a 1-in-N event.

We discuss issues related to interpretation and uses of ARIs/AEPs in NA14 documentation (Sections 4.6.1 and 5.4) and on the FAQ page *(in response to FAQs "3.2. What is a 100-year rainfall event and how often is it exceeded?" and "3.3. Why do 1000-year (100-year) events happen so often?") but will consider adding additional interpretation similar to what you suggest.*

We agree that it is important to emphasize that NA14 precipitation frequency estimates are point estimates and they indicate only ARIs/AEPs for a limited area around a location for which they were extracted. The conversion of a point to an areal estimate is usually done by applying an appropriate areal reduction factor to the average of the point estimates within the area of interest. Areal reduction factors are generally a function of the size of an area and the duration of the precipitation.

7.2. Statistical extrapolation

7.2.1. My only question I continue to struggle with is when we NOAA publish the 1/1000th event. A 1000-year event or <0.001 storm seems a mathematical stretch when we have say 100-150 years of data. I still prefer the way the USGS does it and once they hit a 0.2% they just go <.2% chance event or 500 year event.

We understand that there is a great deal of uncertainty associated with computing precipitation frequency estimates for rarer frequencies (ARI > 100-year) given that the average record lengths of daily stations is about 63 years and 41 years for hourly stations. We use regional statistical approaches to reduce the uncertainty in rare frequency estimates and provide 95% confidence limits on estimates to quantify them (for more information, please see Section 4.6.5).

In 2003, we considered discontinuing publishing 500-year and 1000-year estimates on the PFDS, but ultimately decided against that in response to solicited opinions from our federal partners and state agencies relying on this product (for more information, please see 1000-yr_responses.pdf). However, while we strongly discourage extrapolation of NA14 estimates beyond 1,000-year ARI, we are aware that some users routinely extrapolate them up to 1,000,000-year or even more.

7.2.2. The following information is not available for review, but they are crucial, thus should be included in future published documentation. Was statistical extrapolation for a certain return period applied on the existing station record regardless of the length of record? Or was there any decision-making process that differentiates the lengths of record?

NA14 frequency analysis relies on regional statistical approaches that use data from several stations that are expected to have similar characteristics of extreme precipitation. The contribution of each station in calculation of regional statistics is weighted based on its record length. For details, please see comment 5.1.1 and Section 4.6.

7.3. Confidence limits

7.3.1. On the topic of uncertainty or confidence intervals... are there any methods for applying a kind of sensitivity analysis to the statistical methods used for this precip freq analysis to answer some questions concerning "what are the most sensitive parameters in this analysis?" and "given those sensitivities, how can we show or address uncertainty.

NA14 frequency estimates are calculated from sample data and represent "average" estimates of the population frequency curves. On the [PFDS](), we also provide lower and upper bounds of the 90% confidence interval on the estimates. The purpose for publishing confidence limits is to help users recognize that the actual value might be different from an "average" value and to encourage them to look at a range of possible scenarios in their designs. The widths of confidence intervals are affected by several factors; record lengths, distribution selection/ parameterization, and ARI/AEP all have a profound effect on estimates.

7.4. AMS trends and effects of non-stationary climate on estimates

7.4.1. Selection of statistical tests for detection of trends in AMS for the State of Texas: for all other studied areas of the United States, the results suggest "little consistent observable effects of climate change on the annual maximum series." I wanted to verify that this was also true for Texas.

In all NA14 volumes we use several parametric and non-parametric statistical tests to search for trends in the AMS data, both in term of long-term averages and in variability; please see Appendix A.2 for more information on the type of tests used.

Like in previous volumes, tests applied on the AMS data for this project area did not detect statistically significant trends in over 80% of stations tested (we looked only at stations with at least 70 years of data). We did not observe any consistent large-scale patterns in tests' results. However, it is possible that testing done on the AMS data biases results. For more information on our current efforts to detect and address non-stationarity, please see comment 7.4.4.

7.4.2. Will trends be analyzed for Volume 11 as they were in Volume 9 for temporal changes? What about testing for seasonality of rainfall intensities?

Similar to what we did in previous NA14 volumes, we delineated climate regions based on characteristics of annual maxima data and looked at seasonal characteristics of annual maxima. The seasonality analysis was done by tabulating the number of annual maxima exceeding precipitation frequency estimates for several selected threshold frequencies. More details on this analysis is provided in Appendix A.6. Please refer to our response to comment 7.4.1 regarding AMS trend analysis.

7.4.3. Will trends be analyzed for Volume 11 as they were in Volume 9 for seasonal or temporal changes? What about testing for seasonality of rainfall intensities? Based on the 1/11/2018 conference call with NOAA, it appears that a temporal trend analysis was done across the state, with varying results.

Please refer to our responses to comments 7.4.1 and 7.4.2.

7.4.4. While it's beyond the scope of the Atlas to include the potential effects of climate change,[..],research indicates an increasing frequency of heavy rain events. Given one primary use of the Atlas is the design of hydrologic structures, could a statement be included along the lines of: "Atlas ARIs are based on observed historical data. Users should consider the potential effects of climate change in addition to Atlas values."

Current NOAA Atlas 14 frequency analysis methods assume stationarity in both the historical data used in making the estimates and in the future conditions. We test the assumption of stationarity by applying various statistical tests to the AMS data. So far, tests have shown very little observable or geographically consistent temporal change in these data (see comment 7.4.1).

There has been a growing concern among users of NA14 products that they have been developed for stationary conditions and as such may not appropriate in the presence of non-stationary climate. For example, estimates are calculated from AMS data that, in contrast to PDS data, is not sensitive to changes in the rate of extreme events if not accompanied with a significant change in magnitudes and also by assuming that distribution parameterization is constant in time.

To understand the potential impact of non-stationary climate conditions on precipitation frequency estimates, the Federal Highway Administration tasked HDSC to conduct a pilot project to look into this issue. With help from academia, we aim to develop a method that will allow non-stationary climate effects to be integrated into the NA14 process and that will, at the same time, produce credible precipitation frequency estimates which can be relied upon by Federal water agencies.

So far, we have investigated and selected several methods for performing frequency analysis under non-stationary conditions and started testing the feasibility of incorporating climate projections into precipitation frequency analysis and assessing the added value of new precipitation frequency estimates with respect to traditional NA14 estimates. Despite the significant effort we put into this task, we still do not have a definite answer to whether a non-stationary approach is advantageous for the NA14 process (similar conclusions have been reported in several recently published papers on the subject). For additional comments, please see our response to comment 7.4.5; for more information on the progress of this project, please follow our Quarterly Progress Reports available here: Current Projects.

7.4.5. In the future, or even right now, people may wish to make climate-change-informed estimates of return frequencies by making some assumption about the rate of increase with time or with global temperature. To make such an estimate possible, it is necessary to know how much the existing estimates might already be out-of-date because of climate change. This will vary from place to place, because the period of record of precipitation observations varies from place to place. A location whose observations date from the 1950s will have an estimate more consistent with current climate than a location whose observations date from the 1880s.

It would be great if you could use your data and software to produce estimates of the extent to which a background trend would affect the return period values. (And I'd be happy to help with this.) I propose using two reference values: 7% per century linear trend, and 7% per degree C dependence on smoothed global temperatures. For example, for the linear trend, all historical precipitation data would be multiplied by 1.0007 times the number of years prior to 2017. Then, if somebody wants to assume that there actually is a global-warming-caused 7% per century increase in extreme rainfall, they can use your 7% scenario output as a starting point and then add an additional 0.0007 per year for a future adjustment. I suspect that things scale linearly, so that users would easily be able apply different trend values using the information contained in the conventional and reference return period amounts.

Please refer to our response to comment 7.4.4 that describes in more detail NA14 assumptions and our ongoing work on investigating the effects of non-stationary climate on estimates. As indicated, *we are still uncertain if non-stationary methods are advantageous for performing precipitation frequency analysis. There is substantial uncertainty associated with modeling precipitation frequency estimates associated with different components of the process and uncertainty due to the stationarity assumption must be evaluated relative to other sources that often have a significantly larger impact on estimates. As an example, in order to address non-stationarity we would have to change the current distribution parameterization method, and that change often has a larger impact on estimates than inclusion/exclusion of non-stationarity. Also, there is tremendous uncertainty associated with our ability to predict future extreme precipitation at high resolution spatial and temporal scales of interest to NA14 products. Nonetheless, as mentioned in response to comment 7.4.4, we continue investigation on this topic with our partners from academia. We will gladly accept any suggestion or contribution. If you would like to follow the progress of this project, please check the latest Quarterly Progress Report published here: Current Projects.*

7.4.6. For report inclusion, may be helpful to address how non-stationary may affect analysis methods (ie. violate statistical method assumptions).

Please refer to our responses to comments 7.4.4 and 7.4.5.

7.4.7. Climate change: I recognize that standard practice does not allow for consideration of climate change effects, partly due to the uncertainty of estimating such effects. That is a shame. The observed increase in heavy rain intensity is associated with medium to high confidence with climate change. If indeed there is an underlying linear trend in extreme rainfall (or more physically likely, extreme rainfall increasing at a rate proportional to global temperatures), the new estimates are already out of date, because the temporal smoothing inherent in the frequency analysis means they apply to some fuzzy period decades ago.

Please refer to our responses to comments 7.4.4 and 7.4.5.

7.4.8. I suggest that NOAA be aware that the Houston-Galveston region is growing at an immense rate. Those of us who are residents of the New England (myself) and much of the east coast are astounded when visiting TX, which I do at least yearly. My point is that the on-going growth there creates consa well known factor in skewing extreme rainfall. Prior data from long-term gaging stations cannot reflect these increases in impervious area. The changes are not simply in housing expansion (which in TX are almost never mitigated), but in highway widening and commercial/industrial construction.

I am aware the NA14 exercise is one of projecting probable rainfall events based on historic data, and that the atlas data becomes only one aspect of flooding projections. Regardless, the rate of urbanization, particularly in Houston, Austin and the Dallas areas is similar to what was seen in older urban areas of this country between 1880-1960. The region is not static, and predictions should be sensitive, whenever possible, to this phenomena.

When we discuss non-stationarity in extreme precipitation, we typically bring up the effects of non-stationary climate on precipitation frequency estimates. We do not look at underlying causes of non-stationarity, so all potentially relevant factors would be collectively considered in the analysis. For more information on non-stationary NA14 methods, please refer to comments 7.4.4 and 7.4.5.

Appendix A.5. Temporal distributions

1. Introduction

Temporal distributions of precipitation amounts exceeding precipitation frequency estimates for the 2-year recurrence interval are provided for 6-, 12-, 24-, and 96-hour durations. The temporal distributions are expressed in probability terms as cumulative percentages of precipitation totals at various time steps. To provide detailed information on the varying temporal distributions, separate temporal distributions were also derived for four precipitation cases defined by the duration quartile in which the greatest percentage of the total precipitation occurred.

Stations were grouped into three climate regions, shown in Figure 4.1.1, and separate temporal distributions were derived for each climate region. Regions were delineated based on the climatology of extreme precipitation and the seasonality analysis of annual maxima from stations through the project area.

2. Methodology and results

The methodology used to produce the temporal distributions is like the one developed by Huff (1967) except in the definition of precipitation cases. In accordance with the way a precipitation case ("event") was defined for the precipitation frequency analysis, a precipitation case for the temporal distribution analysis was computed as the total accumulation over a specific duration (6-, 12-, 24-, or 96-hours) and may contain parts of one or more storms. Because of that, temporal distribution curves presented here may be different from corresponding temporal distribution curves obtained from the analysis of single storms. Also, precipitation cases for this project always start with precipitation but do not necessarily end with precipitation, resulting in potentially more front-loaded cases when compared with distributions derived from the single storm approach. Cases were selected from all events of a given duration that exceeded the 2-year average recurrence interval at each station.

For each precipitation case, cumulative precipitation amounts were converted into percentages of the total precipitation amount at one-hour time increments. All cases for a specific duration were then combined and probabilities of occurrence of precipitation totals were computed at each hour. The temporal distribution curves for nine deciles (10% to 90%) were smoothed using a linear programming method (Bonta and Rao, 1988) and plotted in the same graph.

The cases were further divided into four categories by the quartile in which the greatest percentage of the total precipitation occurred. Table A.5.1 shows the total number of precipitation cases and number of cases in each quartile for each region and duration. Unlike the cases of 12-, 24-, and 96-hour durations in which the number of data points can be equally divided by four, the cases of 6-hour duration contain only six data points and they cannot be evenly distributed into four quartiles. Therefore, in this analysis, for the 6-hour duration, the first quartile contains precipitation cases where the most precipitation occurred in the first hour, the second quartile contains precipitation cases where the most precipitation occurred in the second and third hours, the third quartile contains precipitation cases where the most precipitation occurred in the fourth hour, and the fourth quartile contains precipitation cases where the most precipitation occurred in the fifth and sixth hours. This uneven distribution affects the number of cases contained in each quartile for the 6-hour duration.

From the PFDS page for Texas, regional temporal distribution data are available in a tabular form for a selected location under the "Supplementary information" tab or through the Temporals page. For 6-, 12-

and 24-hour durations, temporal distribution data are provided in 0.5-hour increments and for 96-hour duration in hourly increments.

Table A.5.1. Total number of precipitation cases and number (and percent) of cases in each quartile for selected durations for Interior Highlands (1), Central Plains (2) and Gulf Coast (3) regions.

Duration	Region	All	First quartile	Second quartile	Third quartile	Fourth quartile
6-hour	1	1,530	916 (60%)	353 (23%)	174 (11%)	87 (06%)
	2	6,206	2,574 (41%)	2,002 (32%)	1,073 (17%)	557 (09%)
	3	2,331	735 (32%)	806 (35%)	525 (23%)	265 (11%)
12-hour	1	1,559	983 (63%)	277 (18%)	190 (12%)	109 (07%)
	2	6,318	3,124 (49%)	1,570 (25%)	1,029 (16%)	595 (09%)
	3	2,306	883 (38%)	656 (28%)	477 (21%)	290 (13%)
24-hour	1	1,516	892 (59%)	223 (15%)	188 (12%)	213 (14%)
	2	6,153	3,027 (49%)	1,196 (19%)	1,099 (18%)	831 (14%)
	3	2,243	866 (39%)	507 (23%)	472 (21%)	398 (18%)
96-hour	1	1,409	656 (47%)	290 (21%)	262 (19%)	201 (14%)
	2	5,886	2,753 (47%)	1,283 (22%)	1,001 (17%)	849 (14%)
	3	2,093	894 (43%)	443 (21%)	399 (19%)	357 (17%)

3. Interpretation

Figures A.5.1 through A.5.4 show, as an example, temporal distribution curves for the first-, second-, third-, and fourth-quartile cases in the Interior Highlands region for 6-hour, 12-hour, 24-hour and 96-hour durations, respectively. First-quartile plots show temporal distribution curves for cases where the greatest percentage of the total precipitation fell during the first quarter of the duration (e.g., the first 3 hours of a 12-hour duration). The second, third, and fourth quartile plots are similarly for cases where the most precipitation fell in the second, third, or fourth quarter of the duration. Figure A.5.5 shows the temporal distribution curves of all precipitation cases in the Interior Highlands region for the 6-, 12-, 24-, and 96-hour durations. For these plots, time steps were converted into percentages of total durations for easier comparison.

The temporal distribution curves represent averages of many cases and illustrate the temporal distribution patterns with 10% to 90% occurrence probabilities in 10% increments. For example, the 10% curve in any figure indicates that 10% of the corresponding precipitation cases had distributions that fell above and to the left of the curve. Similarly, 10% of the cases had temporal distribution falling to the right and below the 90% curve. The 50% curve represents the median temporal distribution.

Temporal distribution curves are provided in order to show the range of possibilities. Care should be taken in the interpretation and use of temporal distribution curves. For example, the use of different temporal distribution data in hydrologic models may result in very different peak flow estimates. Therefore, they should be selected and used in a way to reflect users' objectives.

The following is an example of how to interpret the results using the figure in the upper left panel of Figure A.5.1 for 6-hour first-quartile cases in the Interior Highlands region (region 1):

- In 10% of the first-quartile cases, 50% of the total precipitation fell in half an hour and 90% of the total precipitation fell in less than 1.5 hours.
- A median case of this type will drop half of the precipitation (50% on the y-axis) in approximately 1.25 hours.
- In 90% of the cases, 50% of the total precipitation fell by 2.1 hours and 90% of precipitation fell in less than 5.1 hours.

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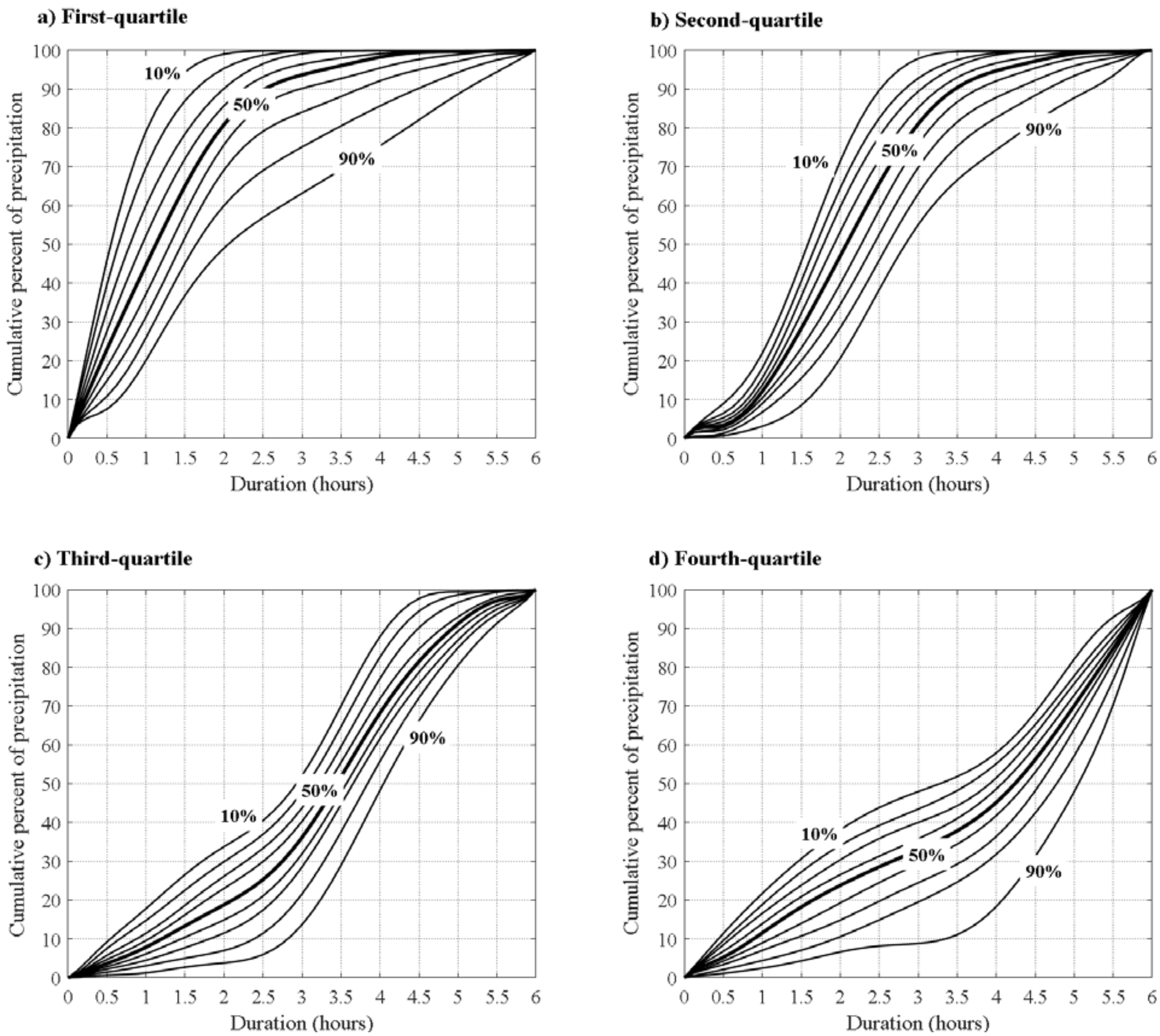

*Figure A.5.1. 6-hour temporal distribution curves for the Interior Highlands region (region 1)**:** a) first-quartile, b) second-quartile, c) third-quartile, and d) fourth-quartile cases.*

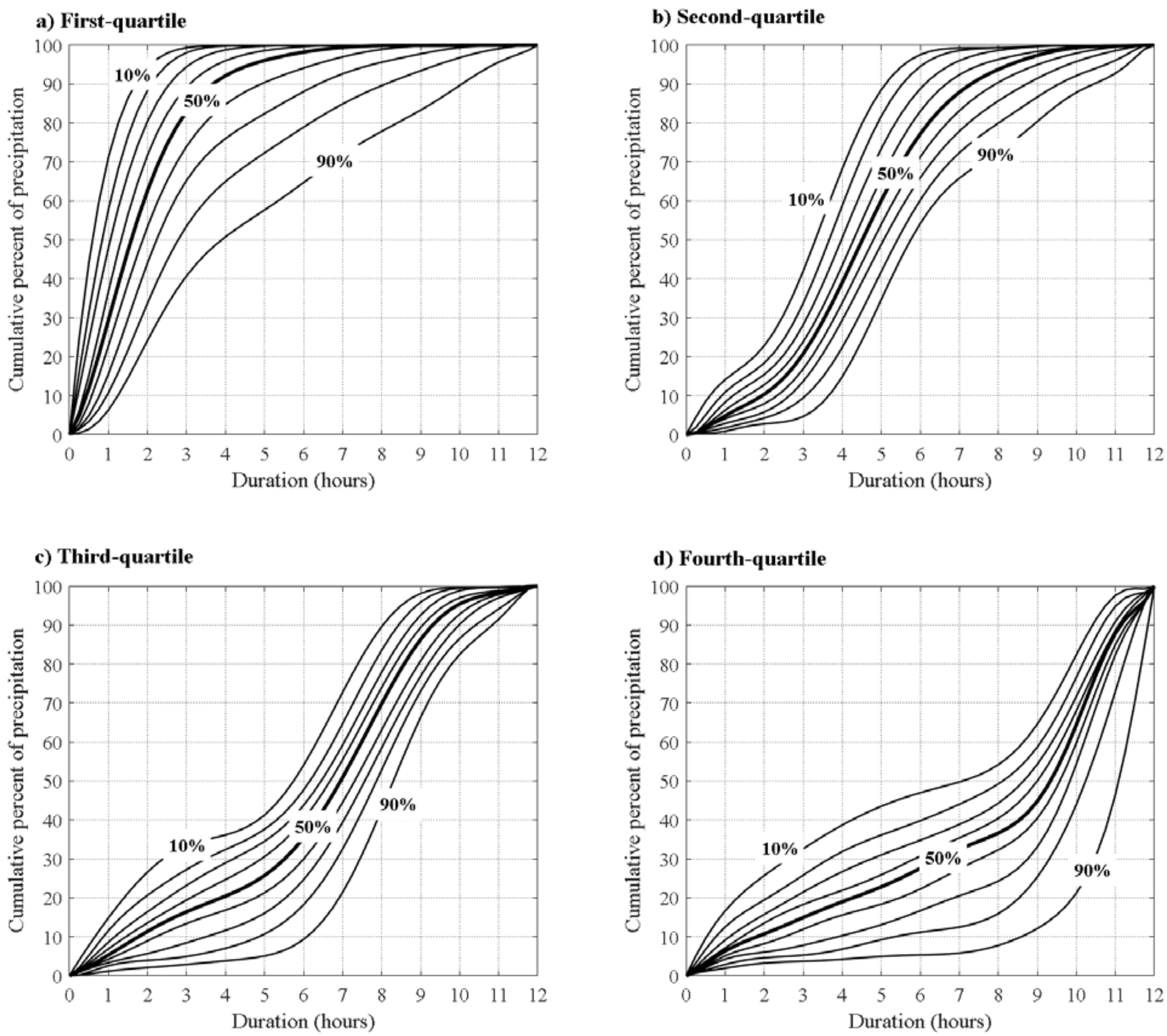

Figure A.5.2. 12-hour temporal distribution curves for the Interior Highlands region (region 1): a) first-quartile, b) second-quartile, c) third-quartile, and d) fourth-quartile cases.

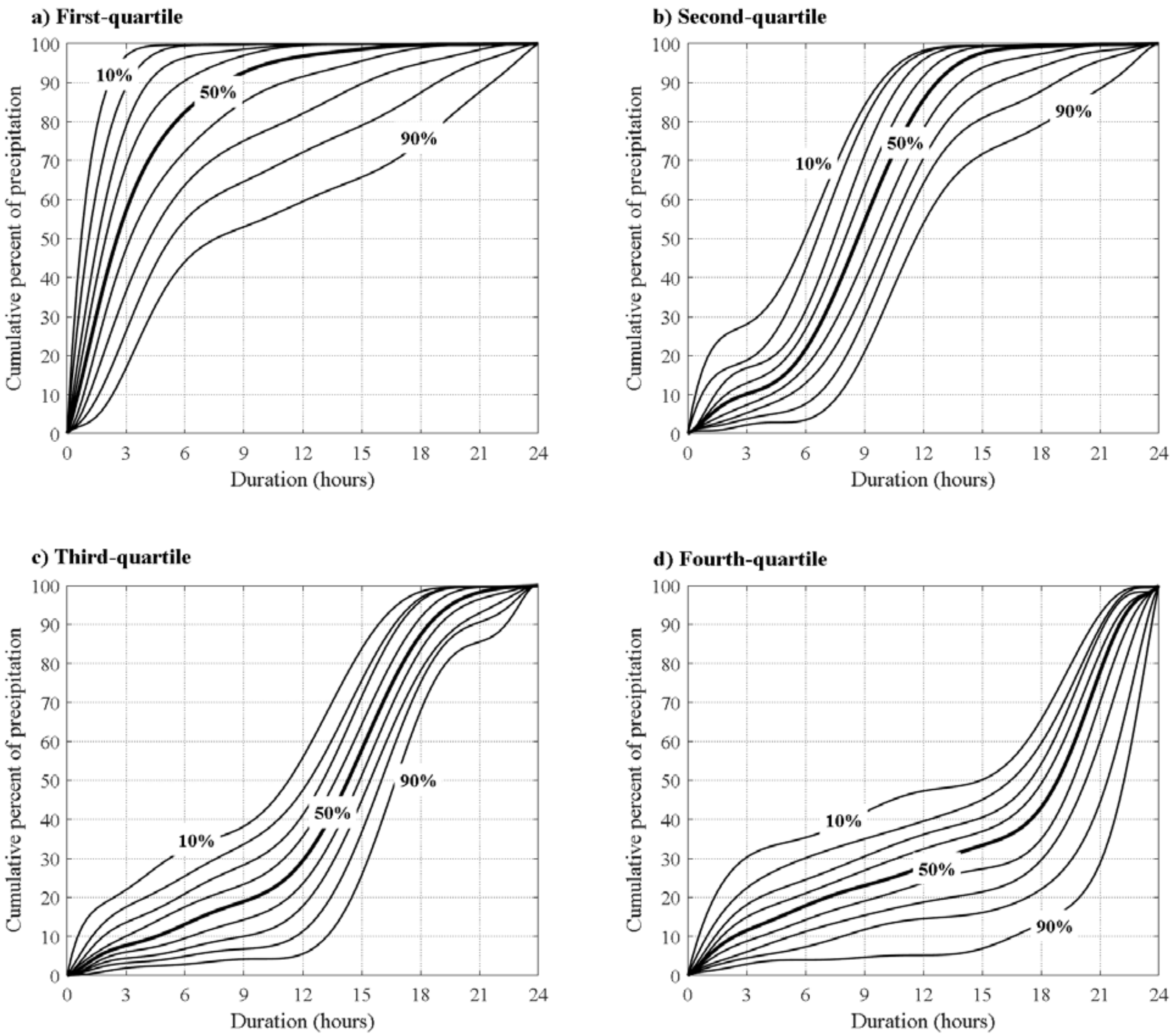

Figure A.5.3. 24-hour temporal distribution curves for the Interior Highlands region (region 1): a) first-quartile, b) second-quartile, c) third-quartile, and d) fourth-quartile cases.

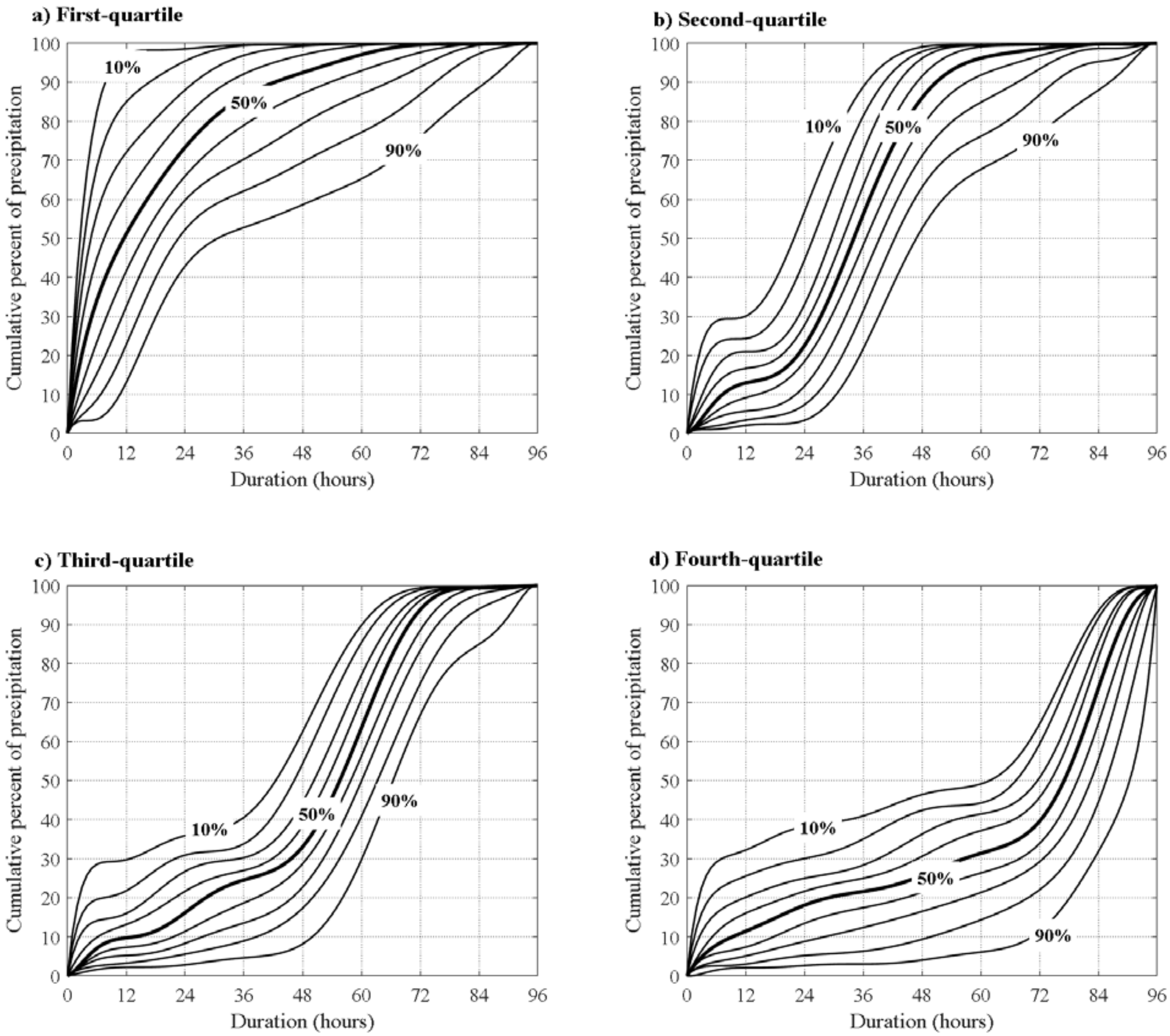

Figure A.5.4. 96-hour temporal distribution curves for the Interior Highlands region (region 1): a) first-quartile b) second-quartile, c) third-quartile, and d) fourth-quartile cases.

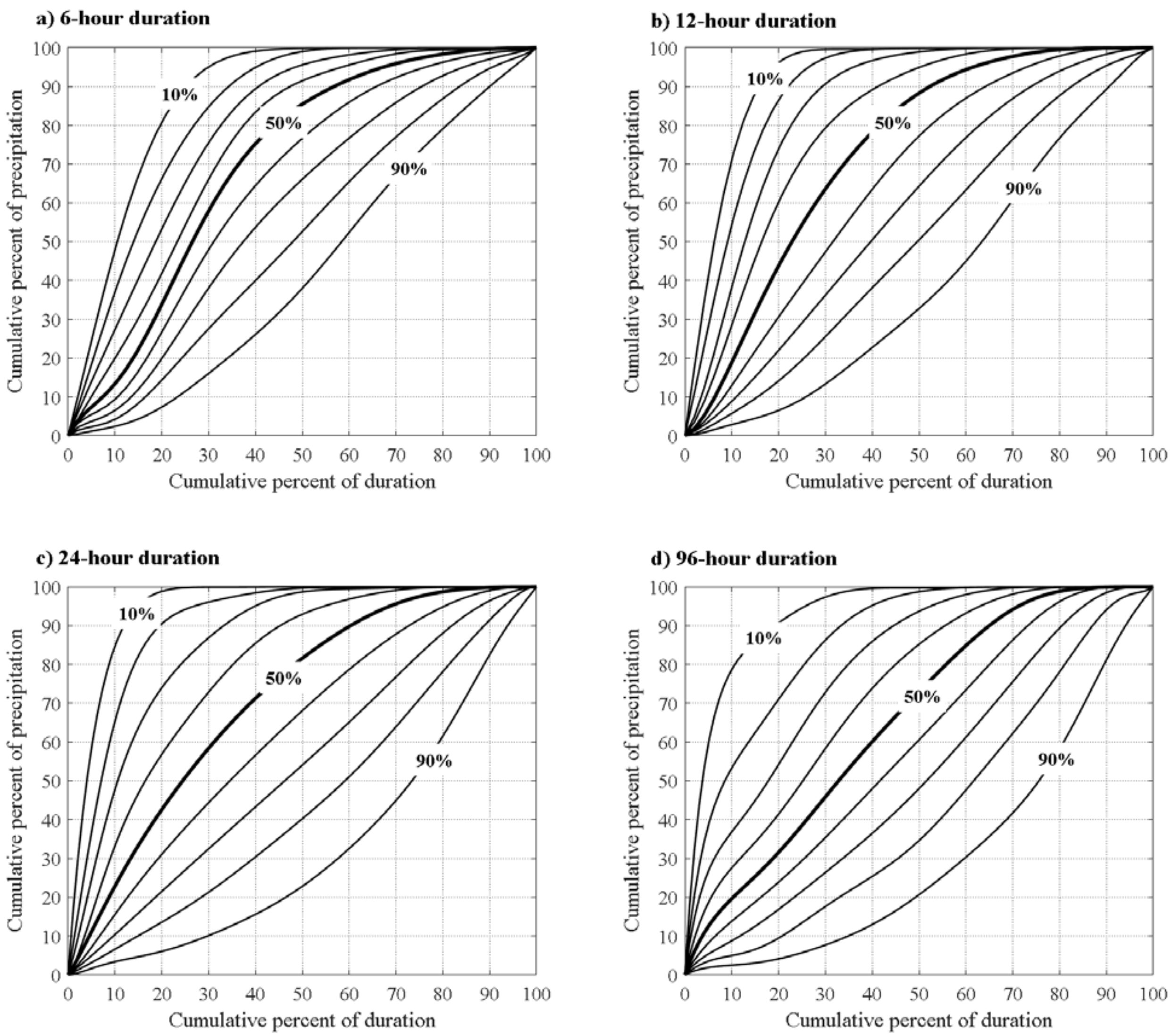

Figure A.5.5. Temporal distribution curves of all precipitation cases for the Interior Highlands region (region 1) for: a) 6-hour, b) 12-hour, c) 24-hour, and d) 96-hour durations.

Appendix A.6. Seasonality

1. Introduction

To portray the seasonality of extreme precipitation throughout the project area, annual maxima that exceeded precipitation frequency estimates (quantiles) with selected annual exceedance probabilities (AEPs) for chosen durations were examined for the three climate regions described in Section 4.1. Graphs showing the monthly variation of the exceedances for a region are provided for each location in the project area via the Precipitation Frequency Data Server (PFDS). For a selected location, seasonal exceedance graphs can be viewed by selecting "V. Seasonality analysis" from the "Supplementary information" tab on the output page.

2. Method

Separate seasonal exceedance graphs were created for each of three delineated regions shown in Figure 4.1.2. They show the percentage of annual maxima for a given duration from all stations in a region that exceeded corresponding precipitation frequency estimates at selected AEP levels in each month. Results are provided for 60-minute, 24-hour, 2-day, and 10-day durations and for AEPs of 1/2, 1/5, 1/10, 1/25, 1/50, and 1/100.

To prepare the graphs, first the number of annual maxima exceeding the precipitation frequency estimate at a station for a given AEP was tabulated for each duration. Those numbers were then combined for all stations in the region, sorted by month, normalized by the total number of data years in the region, and finally plotted via the PFDS.

3. Results

The exceedance graphs for a selected location (example in Figure A.6.1) indicate percent of annual maxima exceeding the quantiles with selected AEPs for various durations. The percentages are based on regional statistics. On average, 1% of annual maxima for a given duration in a year (i.e., the sum of percentages of all twelve months) are expected to exceed the 1/100 AEP quantile, 4% is expected to exceed the 1/25 AEP quantile, etc.

Note that seasonality graphs are not intended to be used to derive seasonal precipitation frequency estimates.

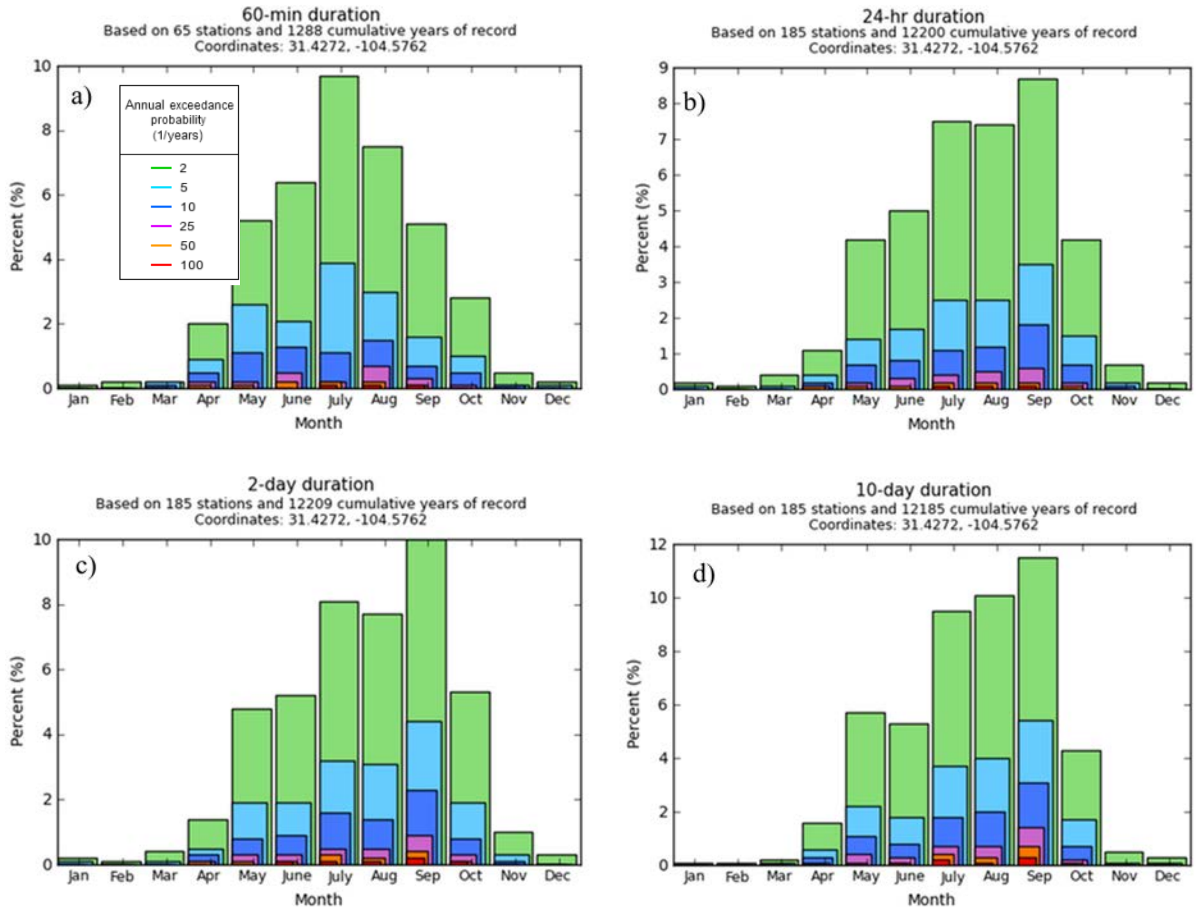

Figure A.6.1. Example of seasonal exceedance graphs for a location in the Interior Highlands region (region 1) for the: a) 60-minute, b) 24-hour, c) 2-day, and d) 10-day durations.

Acknowledgments

Funding for this project was provided by the U.S. Army Corps of Engineers (USACE) Fort Worth District, Texas Department of Transportation, Brazos River Authority, City of Austin, City of Fort Worth, Harris County Flood Control District, San Antonio River Authority, and Tarrant County. Jerry L. Cotter and Maxwell Strickler from the USACE were instrumental in promoting NOAA Atlas 14 and raising funds and Kornel Kerenyi coordinated activities of the Federal Highway Administration's Transportation Pooled Fund Program used to transfer funds to NOAA. The North Central Texas Council of Governments helped raise funds and promote this project.

We acknowledge many colleagues who provided data for this Volume beyond what was available from NCEI's archive, including (agencies by alphabetical order): Roy Alaquinez and David Wegmann, Bexar County Public Works Department; Susan Janek, City of Austin; Jim Winterle and Marcus Gary, Edwards Aquifer Authority; Charlie Hickman, Guadalupe-Blanco River Authority; Mark Moore, Harris County Flood Control District; David Walker and Bob Huber, Lower Colorado River Authority; Leslie Stoecker and Nancy Westcott, Midwestern Regional Climate Center; Bob Larson, National Atmospheric Deposition Program; Taylor McCorkle and Alex Laney, Oklahoma Mesonet Observation Network; Karlyle Haaland, PivoTrac Monitoring, LLC; John Payne, Sabine River Authority; Wayne Tschirhart, San Antonio River Authority; Courtney Jalbert and Joshua Adams, Tarrant Regional Water District; Charles Swanson, Guy Fipps, and David Flahive, Texas Evapotranspiration Network; Andrew Weinberg, Texas Water Development Board; Judy Barton, Titus County Fresh Water Supply District No. 1; Darren Knuteson and Daren Critelli, U.S. Bureau of Reclamation; Angus Goodbody and Daren Harmel, U.S. Department of Agriculture; William H. Asquith and Lynne Fahlquist, U.S. Geological Survey; Wesley Burgett, West Texas Mesonet; and Michelle Breckner, Western Regional Climate Center. We also acknowledge two student interns, Paul Roberts and Morgan Domingue from USACE Fort Worth District, who helped with data digitization.

The following colleagues provided feedback during the peer review and/or served in the peer review board and coordinated various review related activities (in alphabetical order): William H. Asquith, Texas Tech University/U.S. Geological Survey; Simeon Benson, USACE Fort Worth District; Ted Cassidy, Dewberry; Jerry L. Cotter, USACE Fort Worth District; Jeffry Evans, NWS Houston/Galveston Weather Forecast Office; Nick Fang, University of Texas at Arlington; Steve Fitzgerald, Harris County Flood Control District; Brooks Garner, KHOU 11; Patrick C. Garner, Patrick C. Garner Co., Inc.; Daniel Huckaby, NWS Fort Worth Weather Forecast Office; Alan A. Johnson, Federal Emergency Management Agency; Katie Landry-Guyton, NWS Houston/Galveston Weather Forecast Office; Craig Loftin, USACE Fort Worth District; Richard Koehler, NWS Office of the Chief Learning Officer; W. Scott Lincoln, NWS Lower Mississippi River Forecast Center; Paul Mckee, NWS West Gulf River Forecast Center; Helena Mosser, USACE Fort Worth District; John W. Nielsen-Gammon, Texas A&M University; Jim Noel, NWS Ohio River Forecast Center; Saul Nuccitelli, Texas Department of Transportation; Steve Pilney, USACE Fort Worth District; Kent Prochazka, NWS Houston/Galveston Weather Forecast Office; Dong-Jun Seo, University of Texas at Arlington; Dmitry Smirnov, Dewberry; Mathini Sreetharan, Dewberry; Maxwell Strickler, USACE, Fort Worth District; Chris Yetsko, ConocoPhillips; and Jon W.Zeitler, NWS Austin/San Antonio Weather Forecast Office.

Jesse Bickel, Freddy Camacho, Kelley Eicher and James Manderson from the OWP developed web pages for the peer review, and Timothy McCalmant and his team from Orion Network Solutions Inc. built final PFDS web pages for this volume. Maureen O'Leary, NOAA/NWS Communications Office was instrumental in coordinating communications with various media outlets, and Geoffrey Bonnin (retired), Mark Glaudemans and Ken Pavelle from the OWP provided wide-ranging support.

We would like to thank them all for their help and apologize in advance to those who were unintentionally omitted.

Acronyms, abbreviations
(For list of abbreviations used to identify data sources, please see Table 4.2.1.)

AEP	Annual Exceedance Probability
AMS	Annual Maximum Series
ARI	Average Recurrence Interval
ASCII	American Standard Code for Information Interchange
ASOS	Automated Surface Observing System
CDMP	Climate Database Modernization Program
COOP	NWS Cooperative Observer Program
CV	Coefficient of Variation
DEM	Digital Elevation Model
GEV	Generalized Extreme Value
GHCN	Global Historical Climatology Network
HDSC	Hydrometeorological Design Studies Center
MAM	Mean Annual Maximum
MAP	Mean Annual Precipitation
NA14	NOAA Atlas 14
NCEI	National Centers for Environmental Information
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
OWP	Office of Water Prediction
PCHIP	Piecewise Cubic Hermite Interpolating Polynomial
PDS	Partial Duration Series
PFDS	Precipitation Frequency Data Server
PMP	Probable Maximum Precipitation
POR	Period of Record
PRISM	Parameter-Elevation Regressions on Independent Slopes Model
SID	Station Identification Number
TC	Tropical Cyclone
TP	Technical Publication
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
WPA	NOAA's Work Projects Administration

Glossary

(All definitions are given relative to precipitation frequency analyses in NOAA Atlas 14 Volume 11.)

ANNUAL EXCEEDANCE PROBABILITY (AEP) – The probability associated with exceeding a given amount in any given year at least once; the inverse of AEP provides a measure of the average time between years (and not events) in which a particular value is exceeded at least once. The term is associated with analysis of annual maximum series (see also AVERAGE RECCURENCE INTERVAL).

ANNUAL MAXIMUM SERIES (AMS) – Time series of the largest precipitation amounts in a continuous 12-month period (calendar or water year) for a specified duration at a given station.

ASCII GRID – Grid format with a 6-line header, which provides location and size of the grid and precedes the actual grid data. The grid is written as a series of rows, which contain one ASCII integer or floating point value per column in the grid. The first element of the grid corresponds to the upper-left corner of the grid.

AVERAGE RECURRENCE INTERVAL (ARI; a.k.a. RETURN PERIOD, AVERAGE RETURN PERIOD) – Average time between *cases of a particular precipitation magnitude* for a specified duration and at a given location; the term is associated with the analysis of partial duration series. However, ARI is frequently calculated as the inverse of AEP for the annual maximum series; in this case it represents the average period between years in which a given precipitation magnitude is exceeded at least once.

CONSTRAINED OBSERVATION – A precipitation measurement or observation bound by clock hours and occurring in regular intervals. This observation requires conversion to an unconstrained value (see UNCONSTRAINED OBSERVATION) because maximum 60-minute or 24-hour amounts seldom fall within a single hourly or daily observation period.

DATA YEARS – See RECORD LENGTH.

DEPTH-DURATION-FREQUENCY (DDF) CURVE – Graphical depiction of precipitation frequency estimates in terms of depth, duration, and frequency (ARI or AEP).

DISTRIBUTION FUNCTION (CUMULATIVE DISTRIBUTION FUNCTION) – Mathematical description that completely describes frequency distribution of a random variable, here precipitation. Distribution functions commonly used to describe precipitation data include 3-parameter distributions such as Generalized Extreme Value (GEV), Generalized Normal, Generalized Pareto, Generalized Logistic, and Pearson type III, the 4-parameter Kappa distribution, and the 5-parameter Wakeby distribution.

FREQUENCY – General term for specifying the average recurrence interval or annual exceedance probability associated with specific precipitation magnitude for a given duration.

FREQUENCY ANALYSIS – Process of derivation of a mathematical model that represents the relationship between precipitation magnitudes and their frequencies.

FREQUENCY ESTIMATE – Precipitation magnitude associated with specific average recurrence interval or annual exceedance probability for a given duration.

INTENSITY-DURATION-FREQUENCY (IDF) CURVE – Graphical depiction of precipitation frequency estimates in terms of intensity, duration and frequency.

INTERNAL CONSISTENCY – Term used to describe the required behavior of the precipitation frequency estimates from one duration to the next or from one frequency to the next. For instance, it is required that the 100-year 3-hour precipitation frequency estimates be greater than (or at least equal to) corresponding 100-year 2-hour estimates.

L-MOMENTS – L-moments are summary statistics for probability distributions and data samples. They are analogous to ordinary moments, providing measures of location, dispersion, skewness, kurtosis, and other aspects of the shape of probability distributions or data samples, but are computed from linear combinations of the ordered data values (hence the prefix L).

MEAN ANNUAL PRECIPITATION (MAP) – The average precipitation for a year (usually calendar) based on the whole period of record or for a selected period (usually 30 year period such as 1971-2000).

PARTIAL DURATION SERIES (PDS) – Time series that includes all precipitation amounts for a specified duration at a given station above a pre-defined threshold regardless of year; it can include more than one event in any particular year.

PRECIPITATION FREQUENCY DATA SERVER (PFDS) – The on-line portal for all NOAA Atlas 14 deliverables, documentation, and information (https://hdsc.nws.noaa.gov/hdsc/pfds/).

PARAMETER-ELEVATION REGRESSIONS ON INDEPENDENT SLOPES MODEL (PRISM) – Hybrid statistical-geographic approach to mapping climate data developed by Oregon State University's PRISM Climate Group.

QUANTILE – Generic term to indicate the precipitation frequency estimate associated with either ARI or AEP.

RECORD LENGTH – Number of years in which enough precipitation data existed to extract meaningful annual maxima in a station's period of record (or data years).

UNCONSTRAINED OBSERVATION – A precipitation measurement or observation for a defined duration. However, the observation is not made at a specific repeating time, rather the duration is a moveable window through time.

WATER YEAR – Any 12-month period, usually selected to begin and end during a relatively dry season. In Volume 11, it is defined as the calendar year (January 1 to December 31).

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