Argo Trajectory Measurement Code Tables

This document contains only the measurement code (MC) tables used to help create Argo v3.1 trajectory files. The DAC Trajectory cookbook containing these tables plus more detailed information on how to create Argo v3.1 trajectory files can be found here: http://doi.org/10.13155/29824

Table of Contents

Contents

APEX APF8

Argo program measurement codes (MC) for APEX APF8 floats in REAL TIME				
Code (timing)	**APF8 name in float data output**	**Description**	**Units and data profile number**	**JULD_STATUS**
0	Float does not know when it is launched. If the launch time and location are available from the ship, enter that time and location If the launch time and location are not available, use fill value.	Launch time and location	Time, position	0: value is estimated from pre-deployment information found in the metafile Or 9: value is not immediately known, but believe it can be estimated later
100 (DST)	TET from previous cycle OR Fill Value	If TET is estimated in real time, use the TET from previous cycle. OR If TET is not estimated in real time, use FillValue	Time	1: value is estimated using information not transmitted by the float or by procedures that rely on typical float behaviour OR 9: value is not immediately known, but believe it can be estimated later
200 (DET)	Not available, so use Fill Value			9: value is not immediately known, but believe it can be estimated later
250 (PST)	Not available, so use Fill Value			9: value is not immediately known, but believe it can be estimated later
During the drift phase, the APF8 makes drift measurements. Common codes are listed below. See 3.4.1.1 for CTD measurements during drift for APEX floats				
296	Average pressure	Any averaged measurements	Pressure	9: value is not immediately

	Average temperature	made during drift	Temp	known, but believe it can be estimated later
297	Minimum pressure Minimum temperature	Minimum value taken during drift	Pressure Temp	9: value is not immediately known, but believe it can be estimated later
298	Maximum pressure Maximum temperature	Maximum value taken during drift	Pressure Temp	9: value is not immediately known, but believe it can be estimated later
End of drift measurements				
300 (PET)	Not available, so use Fill Value CTD performed at end of drift		Time P, T, S	9: value is not immediately known, but believe it can be estimated later
301	Average pressure during drift	Best estimate of drift depth. See section 2.4.3 for more details	Pressure	9: value is not immediately known, but believe it can be estimated later
400 (DDET)	Not available, so use Fill Value			9: value is not immediately known, but believe it can be estimated later
500 (AST)	If PARK and PROFILE depths are equal and TET is estimated in real time: AST(i)=TET(i) – UP TIME OR FillValue		Time	1: value is estimated using information not transmitted by the float or by procedures that rely on typical float behaviour OR 9: value is not immediately known, but believe it can be estimated later
501	DownTimeEpoch/UNIX epoch when the down-time expired	Down-time end time – time out	Time	2: value is transmitted by the float
502	Time of profile initiation provided in auxiliary engineering data See Ascent Start Time provided by APEX floats in DAC Trajectory cookbook for more details. AST_{FL} = $DTET_{FL}$ + TPI minutes		Time	3: value is directly computed from relevant, transmitted float information
600 (AET)	Float does not know when it reaches the surface, so Fill Value		Time	9: value is not immediately known, but believe it can be estimated later
602	Time of MC=701 minus 10 minutes		Time	3: value is directly computed from relevant, transmitted float information
700 (TST)	Based on Argos messages. See Annex C in DAC Trajectory	Based on Argos messages	Time	3: value is directly computed

	cookbook for more information.			from relevant, transmitted float information
701 TST sent by APEX floats	TST_{FL} = $DTET_{FL}$ + TOTPI minutes	See Transmission Start Time provided by APEX Argos floats in DAC Trajectory Cookbook for more information	Time	3: value is directly computed from relevant, transmitted float information
702 (FMT)	Earliest time of all Argos messages received	Time	Time	4: value is determined by satellite
703 (ST)	All Argos times and locations		Time, Position	4: value is determined by satellite
704 (LMT)	Latest time of all Argos messages received		Time	4: value is determined by satellite
800 (TET)	See Annex B in DAC Trajectory Cookbook for more information. OR FillValue	DACs can choose to make this estimate in real time or not. Annex B explains how to make the estimate. The Transmission End Time determination section for APF8 floats in the DAC Trajectory cookbook gives guidance how to implement the method in Annex B	Time	1: value is estimated using information not transmitted by the float or by procedures that rely on typical float behaviour OR 9: value is not immediately known, but believe it can be estimated later

APEX APF9a or APF9t

Argo trajectory file measurement codes (MC) for APEX APF9a or APF9t				
Code (timing)	**Name in float data output**	**Description**	**Units and data profile number**	**JULD_STATUS**
0 (launch)	Best option is time, lat, long taken from metadata records on ship launch date/time. If the launch time and location are not available, use fill value.	Launch time and location Occurs only once in a trajectory file.	Time, position N = 0	0 if taken from ship metdata 9 if not available

Argo trajectory file measurement codes (MC) for APEX APF9a or APF9t				
Code (timing)	**Name in float data output**	**Description**	**Units and data profile number**	**JULD_STATUS**
100 (DST)	DOWN TIME EXPIRED EPOCH (GMT) minus DOWN TIME INTERVALS (HOURS or MINUTES)	Down TimeExpiredEpoch from current message cycle minus Down Time interval from cycle 0 message. Notice one time is in days another in hours or minutes.	Time DownTimeEpoch from N Down Time interval from Cy 0	3: value is directly computed from relevant, transmitted float information
If an APEX isopycnal float				
189	Descent() Pressure: XX.X Found in Auxiliary Engineering data, so sometimes not available every cycle	Descending CTD measurements starting at a programmed time after DST (often six hours) and following every 60 minutes	Time Pressure (bars)	3: value is directly computed from relevant, transmitted float information OR 9: value is not immediately known, but believe it can be estimated later
Endif an APEX isopycnal float				
190	Descent() Pressure: XX.X Found in Auxiliary Engineering data, so sometimes not available every cycle	Descending CTD measurements starting at a programmed time after DST (often six hours) and following every 60 minutes. See section 2.4.2.2 for more details	Time Pressure (bars)	3: value is directly computed from relevant, transmitted float information OR 9: value is not immediately known, but believe it can be estimated later
200 (DET)	Not available, so use Fill Value			9: value is not immediately known, but believe it can be estimated later

Argo trajectory file measurement codes (MC) for APEX APF9a or APF9t				
Code (timing)	**Name in float data output**	**Description**	**Units and data profile number**	**JULD_STATUS**
250 (PST)	DST + PARK DESCENT PERIOD (HOURS)	Descent Start Time from above plus Park Descent Period from Cycle 0. Notice one time is in days another in hours. Note that this is a time-out value and does not indicate when float actually stabilizes at drift pressure.	Time DST from N Park Descent Period from Cy 0	3: value is directly computed from relevant, transmitted float information
During the drift phase, the APF9a and APF9t floats measure time pressure and temperature hourly, but these are not reported. Instead, a statistical pack of information is sent and the following measurement codes may apply. Please check all the relative MCs for transitioning towards MC300 to see which are appropriate :				
296	Average pressure Average temperature	Any averaged measurements made during drift	Pressure Temp	9: value is not immediately known
286	Any supporting measurements for average measurements. An example is pressure at average temperature		Pressure Temp	9: value is not immediately known
295	Median pressure Median temperature	Median of measurements made during drift	Pressure Temp	9: value is not immediately known
285	Any supporting measurements for the median measurements. An example is pressure at median temperature		Pressure Temp	9: value is not immediately known
294	Standard deviation of measurements taken during drift		Pressure Temp	9: value is not immediately known
297	Minimum pressure Minimum temperature	Minimum value taken during drift	Pressure Temp	9: value is not immediately known

Argo trajectory file measurement codes (MC) for APEX APF9a or APF9t				
Code (timing)	**Name in float data output**	**Description**	**Units and data profile number**	**JULD_STATUS**
298	Maximum pressure Maximum temperature	Maximum value taken during drift	Pressure Temp	9: value is not immediately known
287	Pressure at minimum temperature		Pressure	9: value is not immediately known
288	Pressure at maximum temperature		Pressure	9: value is not immediately known
End of drift measurements				
300 (PET)	DOWN TIME EXPIRED EPOCH (GMT) minus DEEP PROFILE DESCENT PERIOD (HOURS)	Down TimeExpiredEpoch from current message cycle minus Deep Profile Descent Period from cycle 0 message. Notice one time is in days another in hours.	Time DST from N Deep Profile Descent Period from Cy 0	3: value is directly computed from relevant, transmitted float information
400 (DDET)	Same as AST		Time N	3: value is directly computed from relevant, transmitted float information
500 (AST)	DOWN TIME EXPIRED EPOCH (GMT) plus TIME INITIATED TO EPOCH (MINUTES)	Time that float actually starts ascending; can be the same, or even less than the Down Time Expired Epoch if the float times out before reaching profile pressure because Time Initiated to Epoch can be negative. Otherwise, float begins to ascend as soon as profile pressure is reached. Notice one time is in days another in minutes.	Time N	3: value is directly computed from relevant, transmitted float information

Argo trajectory file measurement codes (MC) for APEX APF9a or APF9t				
Code (timing)	**Name in float data output**	**Description**	**Units and data profile number**	**JULD_STATUS**
501	DOWN TIME EXPIRED EPOCH (GMT)		Time N	2. value is transmitted by the float
600 (AET)	700 minus 10 minutes	Assume that float finishes ascent ten minutes before transmission start time	Time N	3: value is directly computed from relevant, transmitted float information
602	701 minus 10 minutes	Assume that float finishes ascent ten minutes before transmission start time	Time N	3: value is directly computed from relevant, transmitted float information
Float is on the surface				
700 (TST)	Based on Argos messages		Time N	3: value is directly computed from relevant, transmitted float information
701 TST from APEX float	DOWN TIME EXPIRED EPOCH (GMT) Plus START OF TRANSMISSION FROM EPOCH		Time N	3: value is directly computed from relevant, transmitted float information
702	Earliest of all Argos messages received: +99.999 +999.999 2012/12/04 7:34:55 000 A 0	FillValue for LATITUDE FillValue for LONGITUDE JULD (First time from Argos) Unknown SATELLITE_NAME FillValue for POSITION_ACCURACY	Degrees Degrees Time Unknown N/A N/A N	4: value is determined by satellite
703	All Argos times and locations. -32.440 -141.872 2012/12/04 7:39:39 015 A 2 -32.443 -141.881 2012/12/04 8:31:22 011 L 1 -32.439 -141.889 2012/12/04 9:18:39 010 A 1 -32.448 -141.874 2012/12/04 9:33:48 015 P 2 -32.446 -141.871 2012/12/04 10:09:44 007 N 1	LATITUDE LONGITUDE JULD Unknown SATELLITE_NAME POSITION_ACCURACY	Degrees Degrees Time Unknown N/A N/A N	4: value is determined by satellite

Argo trajectory file measurement codes (MC) for APEX APF9a or APF9t				
Code (timing)	**Name in float data output**	**Description**	**Units and data profile number**	**JULD_STATUS**
	-32.449 -141.855 2012/12/04 11:18:52 013 P 2 -32.448 -141.850 2012/12/04 11:49:51 009 N 2 -32.445 -141.830 2012/12/04 13:33:44 005 N 1 -32.441 -141.835 2012/12/04 13:34:57 006 K 1 -32.434 -141.807 2012/12/04 15:16:00 005 K 1 -32.423 -141.796 2012/12/04 16:19:01 007 M 3 -32.403 -141.789 2012/12/04 18:13:44 007 L 2 -32.402 -141.788 2012/12/04 18:55:13 011 A 3			
704	Latest time of all Argos messages received +99.999 +999.999 2012/12/04 18:59:50 000 A 0	FillValue for LATITUDE FillValue for LONGITUDE JULD (Last time from Argos) Unknown SATELLITE_NAME FillValue for POSITION_ACCURACY	Degrees Degrees Time Unknown N/A N/A N	4: value is determined by satellite
800 (TET)	DOWN TIME EXPIRED EPOCH (GMT) Plus UP TIME INTERVALS (HOURS)		Time N	3: value is directly computed from relevant, transmitted float information

APEX floats with APF9i controller and NAVIS floats

Argo trajectory file measurement codes (MC) for APF9i and Seabird NAVIS floats				
Code (timing)	**Name in float data output**	**Description**	**Units and data profile number**	**JULD_STATUS**
0 (launch)	Best option is time, lat, long taken from metadata records on ship launch date/time. If not available, from *.000.msg file (this may be hours before float actually launched):	Launch time and location Occurs only once in a	Time, position n = 0	0 if taken from ship metdata 2 if taken from

Argo trajectory file measurement codes (MC) for APF9i and Seabird NAVIS floats				
Code (timing)	**Name in float data output**	**Description**	**Units and data profile number**	**JULD_STATUS**
	# GPS fix obtained in 38 seconds. # lon lat mm/dd/yyyy hhmmss nsat Fix: 119.906 -60.007 12/15/2015 043710 10	trajectory file.		000.msg file
100 DST transmitted (first choice)	Best option from APEX and NAVIS log files: (Jan 14 2016 04:45:15, 7 sec) DescentInit() Deep profile 5 initiated at mission-time 853679sec. Alternative option from NAVIS msg file: TimeStartDescent=1478131066 Nov 02 2016 23:57:46 *In some older Navis floats, the TimeStartDescent was not available and cannot be used.	Descent start time	Time n	2. value is transmitted by the float
100 DST calculated (800 TET calculated)	if PST (code 250) is not empty: DST = PST – ParkDescentTime/24/60 Obtain ParkDescentTime from msg file: $ ParkDescentTime(300) [min] Can be applied to TET for n-1 profile.	Descent start time	Time n	3. value is directly computed from relevant, transmitted float information
190 DSP	Taken preferably from log file: (Feb 10 2018 05:03:38, 724 sec) Descent() Pressure: 49.8 (Feb 10 2018 05:51:38, 3604 sec) Descent() Pressure: 408.8 (Feb 10 2018 06:51:38, 7204 sec) Descent() Pressure: 731.5 (Feb 10 2018 07:51:38, 10804 sec) Descent() Pressure: 938.4 (Feb 10 2018 08:51:38, 14404 sec) Descent() Pressure: 993.9 (Feb 10 2018 09:51:38, 18004 sec) Descent() Pressure: 993.9 A non-time stamped, low-resolution version (need to multiply by 10) is available from the msg file: ParkDescentP[0]=5 ParkDescentP[1]=41 ParkDescentP[2]=73 ParkDescentP[3]=94	Descending CTD measurements	Time, Pressure n	2. value is transmitted by the float

Argo trajectory file measurement codes (MC) for APF9i and Seabird NAVIS floats				
Code (timing)	**Name in float data output**	**Description**	**Units and data profile number**	**JULD_STATUS**
	ParkDescentP[4]=99 ParkDescentP[5]=99			
189	Optional buoyancy adjustment times when float begins descent: (Nov 22 2008 02:25:22, 0 sec) DescentInit() Deep profile 3 initiated at mission-time 878770sec. (Nov 22 2008 02:25:24, 2 sec) DescentInit() Surface pressure: 0.2dbars. (Nov 22 2008 02:25:29, 7 sec) PistonMoveAbsWTO() 211->070	Active adjustments to buoyancy on descent	Time, n	2. value is transmitted by the float
During the drift phase				
200 DET transmitted (best choice)	From the log file: For a float that overshoots: (Feb 06 2018 05:23:02, 620 sec) Descent() Pressure: 8.1 (Feb 06 2018 05:42:45, 1804 sec) Descent() Pressure: 168.8 (Feb 06 2018 06:12:45, 3604 sec) Descent() Pressure: 413.4 (Feb 06 2018 06:42:45, 5404 sec) Descent() Pressure: 632.8 (Feb 06 2018 07:12:44, 7204 sec) Descent() Pressure: 837.5 (Feb 06 2018 07:42:44, 9004 sec) Descent() Pressure: 997.9 (Feb 06 2018 08:12:44, 10804 sec) Descent() Pressure: 1120.7 DET, time of overshoot (Feb 06 2018 08:42:43, 12604 sec) Descent() Pressure: 1227.7 (Feb 06 2018 09:12:43, 14404 sec) Descent() Pressure: 1271.7 (Feb 06 2018 09:42:42, 16204 sec) Descent() Pressure: 1301.6 For a non-overshoot float: (Feb 10 2018 05:03:38, 724 sec) Descent() Pressure: 49.8 (Feb 10 2018 05:51:38, 3604 sec) Descent() Pressure: 408.8 (Feb 10 2018 06:51:38, 7204 sec) Descent() Pressure: 731.5 (Feb 10 2018 07:51:38, 10804 sec) Descent() Pressure: 938.4 (Feb 10 2018 08:51:38, 14404 sec) Descent() Pressure: 993.9 DET, within 3% of mission park (1000db) (Feb 10 2018 09:51:38, 18004 sec) Descent() Pressure: 993.9 (Feb 10 2018 09:51:38, 18004 sec) ParkInit() For NAVIS floats and newer APEX floats, CONFIGURED drift pressure is found in the .msg file at the start	Descent end time. Time when float first approaches within 3% of the CONFIGURED drift pressure. Float may be transitioning from the surface or from a deep profile. This variable is based on pressure only and can be measured or estimated by fall-rate (see below). In the case of a float that overshoots the drift pressure on descent, DET is the time of the overshoot.	Time n	2. Value is transmitted by the float

Argo trajectory file measurement codes (MC) for APF9i and Seabird NAVIS floats				
Code (timing)	**Name in float data output**	**Description**	**Units and data profile number**	**JULD_STATUS**
	$ ParkPressure(1000) [dbar].			
200 DET estimated (use if transmitted DET is not available)	DET = PST or you can calculate DET based on the fall rate using times associated with descending park measurements. For Navis and Apex floats, you can calculate DET from the .msg file using the values output with ParkDescentP. ParkDescentP[1] is always made at DST+1796 seconds. ParkDescentP[n] measurements are then made every 1800 seconds. The output is pressure rounded to the nearest bar. The most accurate way to calculate fall rate is from the change in pressure and the change in net seconds from the Descent() lines in the .log file. But it can be estimated from ParkDescentP[n] in the .log file. Pressure samples 1 to n are made 1800 seconds (30 minutes) apart. The value output by ParkDescentP is pressure rounded to the nearest bar. The time between ParkDescentP[0] and ParkDescentP[1] should not be used as the timing between the two samples is variable.	See above Fall rate is not output, only can be calculated from Descent() in .log files*	Time n	3. value is directly computed from relevant, transmitted float information
250 PST	From the log file: (Feb 06 2018 09:42:44, 16206 sec) ParkInit() In some floats, eg Navis, the msg file may contain: TimeStartPark=1517910164 Feb 06 2018 09:42:44 If either of the above is unavailable, use first park point from msg file: ParkPts: Feb 06 2018 09:43:08 1517910188 16230 1301.58 5.0065 34.4284	Time of park start Time when float transitions to its Park or Drift mission. This variable is based on float logic	Time n	2. Value is transmitted by the float
290 PTM	If float is programmed to take one sample, 299, otherwise use 290. Usually Navis floats only record one ParkPts during profile *.001 From the msg file: ParkPts: Feb 10 2018 09:52:10 1518256330 18036 993.93 4.8352 34.3890 ParkPts: Feb 10 2018 10:52:07 1518259927 21633 997.28 4.7839 34.3902 ParkPts: Feb 10 2018 11:52:07 1518263527 25233 998.61 4.7770 34.3908 ParkPts: Feb 10 2018 12:52:07 1518267127 28833 993.30 4.7229 34.3888 ParkPts: Feb 10 2018 13:52:07 1518270727 32433 994.89 4.6988 34.3971 ParkPts: Feb 10 2018 14:52:07 1518274327 36033 997.07 4.6915 34.3956 ParkPts: Feb 10 2018 15:52:07 1518277927 39633 1000.34 4.7448 34.3929 ParkPts: Feb 10 2018 16:52:07 1518281527 43233 996.92 4.7109 34.3895	A series of pressure measurements taken daily during drift.	Time, pressure, temp, PSAL, etc. n	

Argo trajectory file measurement codes (MC) for APF9i and Seabird NAVIS floats				
Code (timing)	**Name in float data output**	**Description**	**Units and data profile number**	**JULD_STATUS**
	ParkPts: Feb 10 2018 17:52:07 1518285127 46833 991.47 4.6570 34.3980 ParkPts: Feb 10 2018 18:52:07 1518288727 50433 995.81 4.6700 34.3968 ParkPts: Feb 10 2018 19:52:07 1518292327 54033 997.65 4.6712 34.3970 ParkPts: Feb 10 2018 20:52:07 1518295927 57633 1005.26 4.8114 34.3890 ParkPts: Feb 10 2018 21:52:07 1518299527 61233 998.14 4.7660 34.3889 ParkPts: Feb 10 2018 22:52:07 1518303127 64833 991.14 4.6677 34.3995 ParkPts: Feb 10 2018 23:52:07 1518306727 68433 1000.03 4.7145 34.3938 ParkPts: Feb 11 2018 00:52:07 1518310327 72033 1004.18 4.7084 34.3950 ParkPts: Feb 11 2018 01:52:07 1518313927 75633 995.84 4.7796 34.3916 ParkPts: Feb 11 2018 02:52:07 1518317527 79233 1000.93 4.8089 34.3897 ParkPts: Feb 11 2018 03:52:07 1518321127 82833 1002.78 4.7672 34.3917 .... ParkPts: Feb 19 2018 07:52:10 1519026730 788436 998.07 4.1888 34.4374 ParkPts: Feb 19 2018 08:52:10 1519030330 792036 1007.68 4.2876 34.4312 ParkPts: Feb 19 2018 09:52:10 1519033930 795636 1010.83 4.3498 34.4274 ParkPts: Feb 19 2018 10:52:10 1519037530 799236 1008.37 4.3494 34.4277 ParkPts: Feb 19 2018 11:52:10 1519041130 802836 1005.17 4.2945 34.4317 $ Profile 9640.087 terminated: Mon Feb 19 23:53:36 2018			
299	From the log file: (Feb 19 2018 12:52:00, 806426 sec) ParkTerminate() Piston Position:74 Vacuum:79 Vq:196 Aq:5 Vsbe:181 Asbe:9 (Feb 19 2018 12:52:28, 806454 sec) ParkTerminate() PTS: 999.3dbars 4.2391C 34.4367PSU From the msg file, no date/time stamp available: $ Profile 9640.087 terminated: Mon Feb 19 23:53:36 2018 $ Discrete samples: 2 $ p t s 999.30 4.2391 34.4367 (Park Sample) 2000.29 2.2072 34.6579 # Feb 19 2018 23:59:06 Sbe41cpSerNo[6437] NSample[21714] NBin[998] * For both Apex and Navis floats, the discrete sample labelled (Park Sample) is always taken at the termination of the parking phase. If there is a second discrete sample, it is taken at the start of profiling, but it is taken after ascent start and after 500 (AST) is output in the .log file as ProfileInit() or in the .msg file as TimeStartProfile = *** (for Navis floats). This second discrete sample should go in as 503 since continuous profiling will start later. See code 503.*	Any measurement recorded during transition toward PET.	Time, pressure, temperature, salinity n	2: value transmitted by the float

Argo trajectory file measurement codes (MC) for APF9i and Seabird NAVIS floats				
Code (timing)	**Name in float data output**	**Description**	**Units and data profile number**	**JULD_STATUS**
300 PET transmitted (best choice)	From the log file: (Feb 19 2018 12:52:28, 806454 sec) ParkTerminate() PTS: 999.3dbars 4.2391C 34.4367PSU (Feb 19 2018 12:52:28, 806454 sec) GoDeepInit() Moving piston. If the GoDeepInit line is not there, use the ParkTerminate line. For Navis floats: From the msg file, there may be: TimeStartProfileDescent=1518719438 Feb 15 2018 18:30:38 If neither is available, use the last park time from msg file.	Time when float exits from its Park or Drift mission. It may next rise to the surface (AST) or sink to profile depth (DDET)	Time n	2: value transmitted by the float
300 PET calculated (second choice)	If PET is not available from methods above, it can be estimated which relies on DST being known. PET = DST + DownTime/60/24 - DeepProfileDescentTime/60/24; From msg file, get DownTime and DeepProfileDescentTime: $ DownTime(14030) [min] $ DeepProfileDescentTime(270) [min]	Time when float exits from its Park or Drift mission. It may next rise to the surface (AST) or sink to profile depth (DDET)	Time n	3. value is directly computed from relevant, transmitted float information
301	Average of hourly pressure measurements from MC 290.	Representative park pressure	Pressure n	3: value is directly computed from relevant, transmitted float information
End of drift measurements				
400 DDET	Same as AST (code 500)	Time when float first approaches within 3% of the eventual deep profile pressure. This variable is based on pressure only and can be measured or estimated by fall-rate.	Time n	2: value transmitted by the float
500 AST transmitted (best choice)	From the log file: ProfileInit() PrfId:098 Pressure:1964.6dbar pTable[1]:1950dbar	Ascent start time	Time n	2: value transmitted by the float

Argo trajectory file measurement codes (MC) for APF9i and Seabird NAVIS floats				
Code (timing)	**Name in float data output**	**Description**	**Units and data profile number**	**JULD_STATUS**
	For Navis Floats: From the msg file, there may be: TimeStartProfile=1518727187 Feb 15 2018 20:39:47 * For Navis floats, the time in TimeStartProfile in the .msg file corresponds to the time the GoDeep() command is executed because it actually executed the ProfileInit() command*			
500 AST calculated (second choice)	If the above values are not available, AST can be estimated. However, relies on DST being known. * Analysis of Navis data found that when you do calculate AST, the mean difference is about 12 hours. The difference changes throughout the course of the deployment as the ascent and descent rates are optimized.* AST = DST + DownTime[min]/60/24 From the msg file: $ DownTime(13740) [min] If the calculated AST using value above is earlier than PET (eg, in the case the float hits the bottom), then use PET + DeepProfileDescentTime as the AST estimate. From the msg file: $ DeepProfileDescentTime(300) [min] if AST < PET or AST > AET AST = PET + DeepProfileDescentTime/60/24; if AST < PET or AST > AET AST = NaN; end end If TimeOfDay setting is enabled in mission (BGC floats): *Yes, this is an option available in Navis BGCi floats. If it is in the firmware you will see the following line in the n.msg file. In this case TimeOfDay is disabled.* $ TimeOfDay(DISABLED) [min] DownTime will be affected if TimeOfDay value is enabled and set. To enable a float to surface at a particular time of day, DownTime should be set to one day less than the entire cycle length, then the TimeOfDay value added to the DownTime Value;	Ascent start time	Time n	3: value computed from relevant, transmitted float information

Argo trajectory file measurement codes (MC) for APF9i and Seabird NAVIS floats				
Code (timing)	**Name in float data output**	**Description**	**Units and data profile number**	**JULD_STATUS**
	Eg: For a 10-day cycle with the float scheduled to surface around midday GMT: DownTime = 12960 min (9 days), and TimeOfDay = 100 min (or number of minutes after midnight local time to ensure arrival at the surface at time required). If time of profile start (AST) has to be calcuated use either: AST = DST + DownTime/60/64 + TimeOfDay/60/64;			
503	For both Apex and Navis floats, where there are 2 discrete samples, the second one is Sample 0 at profile initiation time and should be recorded in MC 503 as it occurs after the AST. From the msg file, no date/time stamp available: $ Profile 9640.087 terminated: Mon Feb 19 23:53:36 2018 $ Discrete samples: 2 $ p t s 999.30 4.2391 34.4367 (Park Sample) 2000.29 2.2072 34.6579 # Feb 19 2018 23:59:06 Sbe41cpSerNo[6437] NSample[21714] NBin[998] From the log file: (Feb 19 2018 17:46:38, 824104 sec) GoDeep() Sequence point detected at 2000.3dbar. (Feb 19 2018 17:46:41, 824107 sec) ProfileInit() PrfId:087 Pressure:2000.3dbar pTable[0]:2000dbar (Feb 19 2018 17:47:19, 824145 sec) Profile() Sample 0 initiated at 2000.3dbars for bin 0 [2000dbars]. PTS: 2000.3dbars 2.2072C 34.6579PSU	Deepest bin reached during ascending profile	Time, Pressure, Temp, Salinity n	2: value transmitted by the float
589	Optional. Buoyancy adjustment times on the Ascent. (Feb 19 2018 17:46:41, 824107 sec) ProfileInit() PrfId:087 Pressure:2000.3dbar pTable[0]:2000dbar (Feb 19 2018 17:47:19, 824145 sec) Profile() Sample 0 initiated at 2000.3dbars for bin 0 [2000dbars]. PTS: 2000.3dbars 2.2072C 34.6579PSU (Feb 19 2018 17:47:19, 824145 sec) PistonMoveAbsWTO() 020->042 021 022 023 024 [30sec, 12.5Volts, 0.830Amps, CPT:1013sec]	Active adjustments to buoyancy on ascent	Time n	2: value transmitted by the float

Argo trajectory file measurement codes (MC) for APF9i and Seabird NAVIS floats				
Code (timing)	**Name in float data output**	**Description**	**Units and data profile number**	**JULD_STATUS**
	(Feb 19 2018 17:47:59, 824185 sec) PistonMoveAbsWTO() 024->042 025 026 027 028 [30sec, 12.6Volts, 0.822Amps, CPT:1043sec] (Feb 19 2018 17:50:07, 824313 sec) Sbe41cpStartCP() Continuous profile started. (Feb 19 2018 17:50:07, 824313 sec) PistonMoveAbsWTO() 029->042 030 031 032 033 [30sec, 12.6Volts, 0.866Amps, CPT:1073sec] (Feb 19 2018 17:50:49, 824355 sec) PistonMoveAbsWTO() 033->042 034 035 036 037 [30sec, 12.6Volts, 0.842Amps, CPT:1103sec] (Feb 19 2018 17:51:31, 824397 sec) PistonMoveAbsWTO() 037->042 038 039 040 041 [30sec, 12.6Volts, 0.846Amps, CPT:1133sec] (Feb 19 2018 17:52:13, 824439 sec) PistonMoveAbsWTO() 041->042 042 [2sec, 12.6Volts, 0.846Amps, CPT:1135sec] (Feb 19 2018 18:38:15, 827201 sec) AscentControlAgent() Bouyancy nudge to 52 (v=0.078dbar/sec).			
590	For some Navis bio floats, the discrete sample information is included in the log files. (Jul 10 2016 20:34:13, 13162 sec) Profile() Sample 0 initiated at 1601.5dbars for bin 8 [1600dbars]. PTS/O2Ph,O2T/FlBbCd/OcrI/OcrR/EcoFlBbCd/Crv: 1597.1dbars,3.0014C,34.5900PSU / 26.211u,1.091539V / 63,466,213 / 130827,13 2055,131162,131012 / 130820,131443,131096,131516 / 16959,16959,16959 / 15547 -0.02200 (Jul 10 2016 20:43:24, 13713 sec) Profile() Sample 2 initiated at 1501.5dbars for bin 10 [1500dbars]. PTS/O2Ph,O2T/FlBbCd/OcrI/OcrR/EcoFlBbCd/Crv: 1497.3dbars,3.2007C,34.5710PSU / 26.072u,1.085170V / 66,444,207 / 130835,1 32049,131168,130998 / 130812,131448,131090,131518 / 16959,16959,16959 / 15547 -0.02200 (Jul 10 2016 20:53:07, 14296 sec) Profile() Sample 4 initiated at 1401.3dbars for bin 12 [1400dbars]. PTS/O2Ph,O2T/FlBbCd/OcrI/OcrR/EcoFlBbCd/Crv: 1397.4dbars,3.4660C,34.5450PSU / 25.717u,1.076850V / 61,473,203 / 130838,1 32037,131166,131000 / 130825,131444,131110,131520 / 16959,16959,16959 / 15546 -0.02100 (Jul 10 2016 21:03:23, 14912 sec) Profile() Sample 6 initiated at 1301.4dbars for bin 14 [1300dbars]. PTS/O2Ph,O2T/FlBbCd/OcrI/OcrR/EcoFlBbCd/Crv: 1297.6dbars,3.7270C,34.5230PSU / 25.302u,1.068646V / 63,448,200 / 130831,1 32047,131152,131003 / 130806,131441,131106,131520 / 16959,16959,16959 / 15547 -0.02200 (Jul 10 2016 21:14:24, 15573 sec) Profile() Sample 8 initiated at 1200.5dbars for bin 16 [1200dbars]. PTS/O2Ph,O2T/FlBbCd/OcrI/OcrR/EcoFlBbCd/Crv: 1197.1dbars,4.0622C,34.5010PSU / 24.853u,1.058171V / 62,451,194 / 130836,1 32036,131163,130999 / 130812,131444,131105,131514 / 16959,16959,16959 / 15548 -0.02200 (Jul 10 2016 21:26:08, 16277 sec) Profile() Sample 10 initiated at 1101.1dbars for bin 18 [1100dbars]. PTS/O2Ph,O2T/FlBbCd/OcrI/OcrR/EcoFlBbCd/Crv: 1098.0dbars,4.4999C,34.4720PSU / 24.226u,1.044719V / 64,444,189 / 130844,	Series of measurements transitioning towards AET	Time, Pressure, Temp, Salinity n	2: value transmitted by the float

Argo trajectory file measurement codes (MC) for APF9i and Seabird NAVIS floats				
Code (timing)	**Name in float data output**	**Description**	**Units and data profile number**	**JULD_STATUS**
	132039,131158,131003 / 130808,131435,131106,131517 / 16959,16959,16959 / 15546 -0.02100 (Jul 10 2016 21:39:23, 17072 sec) Profile() Sample 12 initiated at 1000.7dbars for bin 20 [1000dbars]. PTS/O2Ph,O2T/FlBbCd/OcrI/OcrR/EcoFlBbCd/Crv: 997.8dbars,5.1208C,34.4510PSU / 23.597u,1.025704V / 58,448,179 / 130844,1 32038,131152,130992 / 130801,131438,131112,131505 / 16959,16959,16959 / 15548 -0.02200			
600 AET	From log file: (Feb 06 2018 03:42:10, 856511 sec) SurfaceDetect() SurfacePressure:-0.0dbars Pressure:4.0dbars BuoyancyPosition:556 (Feb 06 2018 03:42:10, 856512 sec) Sbe41cpStopCP() Continuous profile stopped. * For Navis floats, SurfaceDetect() triggers the ProfileTerminate() command, which then writes TimeStopProfile then $Profile lines to the .msg file. This is when the CTD turns off. From msg file: $ Profile 0800.021 terminated: Fri Feb 16 03:12:43 2018 From msg file, some floats (eg Navis), may have: TimeStopProfile=1518750763 Feb 16 2018 03:12:43 *This is written by the same command. See comment above	Time float switches from ascent mode to surface mode	Time n	2: value transmitted by the float
Float is on the surface				
Notes on how float behaves when it reaches the surface	From log file, (matches with the TimeStartTelemetry indicated in Navis msg files): (Feb 06 2018 03:48:41, 856902 sec) TelemetryInit() Profile 20. (Npf ARGO FwRev: 170210) ** TelelmetryInit() starts a sequence where the bladder is inflated to get the antenna mast above the surface, then it tries to get a GPS position, the first GPS position is defined by gga, then it starts trying to connect to the modem with CLogin, and doesn't make the connection until the login() command is executed with the Login successful message. *			
703 ST	From the log file (fixes are from the PREVIOUS cycle, and should be added to the n-1 cycle): (Jan 14 2016 03:15:47, 848318 sec) GpsServices() Profile 4 GPS fix obtained in 26 seconds. (Jan 14 2016 03:15:47, 848318 sec) GpsServices() lon lat mm/dd/yyyy hhmmss nsat (Jan 14 2016 03:15:48, 848318 sec) GpsServices() Fix: 118.333 -59.042 01/14/2016 031520 10 From the msg file (fixes relate to the CURRENT cycle, add to n cycle) # GPS fix obtained in 167 seconds. # lon lat mm/dd/yyyy hhmmss nsat	Satellite times and locations. One for each fix, in chronological order.	Time, Position n-1 if from the log file, n if from the msg file.	4. value is determined by satellite

Argo trajectory file measurement codes (MC) for APF9i and Seabird NAVIS floats				
Code (timing)	**Name in float data output**	**Description**	**Units and data profile number**	**JULD_STATUS**
	Fix: 118.333 -59.042 01/14/2016 031520 10			
700 TST	When the float first connects to the modem: (Dec 17 2016 21:48:18, 47230 sec) login() Login successful. * For Navis and APEX floats, the login() command with the following text is the true time telemetry starts* If this time is not available, can use: - Time of last GPS fix (Apr 12 2018 09:16:35, 11053 sec) GpsServices() Fix: 154.3182 -33.8677 04/12/2018 091700 9 - Time of TelemetryInit() (Apr 12 2018 09:15:16, 10975 sec) TelemetryInit() Profile 0. (Npf ARGO FwRev: 170425) - TimeStartTelemetry (some NAVIS msg files) TimeStartTelemetry=1523524515 Apr 12 2018 09:15:15	Time of change of float phase to telemetry.	Time n-1 if from the log file, n if from the msg file.	2. Value transmitted by the float
702 FMT, and 704 LMT	Not necessary for Iridium floats	Time of first/last iridium message		
800 TET transmitted (best choice)	For consistency, it might be best to use the last time that the Telemetry() command is executed. The TelemetryTerminate() is also executed during ice evasion. This could lead to confusing results since the float never surfaces when evading ice. (Feb 06 2018 05:12:40, 861943 sec) Telemetry() Telemetry cycle complete: PrfId=20 ConnectionAttempts=4 Connections=4	Time of the end of transmission for the float.	Time, Position n-1	2. Value transmitted by the float
800 TET estimated (second choice)	TET can be estimated using the final position fix from 703 ST.	Time of the end of transmission for the float.	Time, Position n-1	2. Value transmitted by the float

Argo trajectory file measurement codes (MC) for APF9i and Seabird NAVIS floats				
Code (timing)	**Name in float data output**	**Description**	**Units and data profile number**	**JULD_STATUS**
903	Taken from surface pressure in msg file: SurfacePressure=0.01 Or from log file: (Dec 22 2008 18:49:46, 0 sec) DescentInit() Deep profile 6 initiated at mission-time 888601sec. (Dec 22 2008 18:49:48, 2 sec) DescentInit() Surface pressure: 0.3dbars. *This is the pressure in dbar as sampled by the CTD. This is in all versions of Navis firmware. The only tricky bit is that when the floats are in ice evasion mode and not coming to the surface, the SurfacePressure is not updated until the float surfaces again. So the value of SurfacePressure is the pressure taken the last time the float surfaced. In some case this could be several months prior.*	Surface pressure offset value	Pressure n	2. Value transmitted by the float

APEX APF11 with Argos

The following measurement codes are set by the Coriolis decoder for Apex APF11 Argos floats (Firmware version 2.8.0 or 2.10.4, Coriolis version 2.8.0 or 2.8.4, Decoder Id 1021 or 1022).

Argo trajectory file measurement codes (MC) for Apex APF11 Argos floats				
Code (timing)	**Name in float data output**	**Description and name of data file where this is found**	**Units and data profile number**	**JULD_STATUS**
0 (launch position)	Provided by PI (from deployment team).	From Coriolis Excel deployment file provided at Coriolis DAC by float PI.	Time, latitude, longitude. Cycle #-1 (convention).	4 (value is determined by satellite)

100 (DST)	Duplication of TET of the previous cycle.		Time. Cycle #N.	3 (value is directly computed from relevant, transmitted float information)
Start of the drift phase				
287 = PET-13 (minimum meas of park-level PT samples supporting meas)	'Pressure associated with Tmin of park-level PT samples' and 'Minimum temperature of park-level PT samples'.	Argos float data message.	PRES, TEMP. Cycle #N.	No time
288 = PET-12 (maximum meas of park-level PT samples supporting meas)	'Pressure associated with Tmax of park-level PT samples' and 'Maximum temperature of park-level PT samples'.	Argos float data message.	PRES, TEMP. Cycle #N.	No time
293 = PET-7 (mean PRES diff of park-level PT samples)	'Mean pressure diff of park-level PT samples'.	Argos float data message.	PRES. Cycle #N.	No time
294 = PET-6 (standard deviation of meas of park-level PT samples)	'Standard deviation of pressure of park-level PT samples' and 'Standard deviation of temperature of park-level PT samples'.	Argos float data message.	PRES, TEMP. Cycle #N.	No time
296 = PET-4 (mean TEMP of park-level PT samples)	'Mean temperature of park-level PT samples'.	Argos float data message.	TEMP. Cycle #N.	No time
297 = PET-3 (minimum meas of park-level PT samples)	'Minimum pressure of park-level PT samples' and 'Minimum temperature of park-level PT samples'.	Argos float data message.	PRES, TEMP. Cycle #N.	No time
298 = PET-2 (maximum meas of park-level PT samples)	'Maximum pressure of park-level PT samples' and 'Maximum temperature of park-level PT samples'.	Argos float data message.	PRES, TEMP. Cycle #N.	No time
300 (PET)	PET is not set when PARK_PRESSURE = PROFILE_PRESSURE (since PET = AST) otherwise PET = TET – UpTime – DeepDescentTimeout.		Time. Cycle #N.	3 (value is directly computed from relevant, transmitted float information)

301 (representative park measurement)	Average value of measurements stored with MC=287 and MC=288. REPRESENTATIVE_PARK_PRESSURE_STATUS = 5.		PRES, TEMP. Cycle #N.	No time
End of drift measurements				
501	DOWN_TIME_END = 'RTC time when down time expired'.	Argos float data message.	Time. Cycle #N.	2 (value is transmitted by the float)
400 (DDET)	DDET = AST.		Time. Cycle #N.	2 (value is transmitted by the float)
Start of profile				
500 (AST)	AST = DOWN_TIME_END.		Time. Cycle #N.	2 (value is transmitted by the float)
503 (deepest measurement)	Deepest value of PTS profile.	Argos float data message.	PRES, TEMP. Cycle #N.	No time
Float is on the surface				
700 (TST)	Computed from Argos satellite times (and float transmission strategy).	Argos float data message and CLS information.	Time. Cycle #N.	1 (value is estimated using information not transmitted by the float or by procedures that rely on typical float behaviour)
701 (TST transmitted by the float)	Computed from 'Time when telemetry phase was initiated relative to down time end'. This time is stored in Real Time only; in Delayed Mode, once checked this value should replace TST.	Argos float data message.	Time. Cycle #N.	3 (value is directly computed from relevant, transmitted float information)
702 (FMT)	Earliest time of current cycle Argos messages.	CLS information (Argos message dates).	Time. Cycle #N.	4 (value is determined by satellite)
703 (surface location)	All Argos fixes provided.	CLS information (Argos fixes estimated by CLS).	Time, latitude, longitude, location class. Cycle #N.	4 (value is determined by satellite)

704 (LMT)	Latest time of current cycle Argos messages.	CLS information (Argos message dates).	Time. Cycle #N.	4 (value is determined by satellite)
800 (TET)	TET = DOWN_TIME_END + UpTime. If UpTime is unknown (and couldn't be estimated) TET is estimated from LMTs.		Time. Cycle #N.	3 (value is directly computed from relevant, transmitted float information)

APEX APF11 with Iridium

Coriolis decoder for Apex APF11 Iridium floats (Firmware version 2.10.1 or 2.11.1, Coriolis version 2.10.1 or 2.11.1, Decoder Id 1321 or 1322).

Notes:

1. Cycle times DST, PST, PET and AET are provided in science_log and system_log files (associated timestamps may be slightly different however). Coriolis decided to keep the science_log file ones so that one can consistently associate a pressure to each time using the CTD_P measurements provided in this file.

2. Cycle time adjustment: cycle times can be adjusted in real time from float clock drift that can be estimated from 'GPS Skew' information provided in system_log file.

Coriolis chooses to include as much data as possible from the floats which is great, but not some measurements codes are not required including buoyancy adjustments. These are highlighted in grey in the following table.

Argo trajectory file measurement codes (MC) for APF11				
Code (timing)	**Name in float data output**	**Description and name of data file where this is found**	**Units and data profile number**	**JULD_STATUS**

Argo trajectory file measurement codes (MC) for APF11				
Code (timing)	**Name in float data output**	**Description and name of data file where this is found**	**Units and data profile number**	**JULD_STATUS**
0 (launch)	Ideally would come from Ship deployment records/logs. From zero cycle file system log **000** In pressure activated mode – time of activation: 20171212T112421|5|IDLE|Activation pressure detected: 168.99 dbar 20171212T112421|5|go_to_state|Mission state IDLE -> PRELUDE Later GPS fix appears in the file twice: 20171212T121045|5|update_almanac|Updating GPS Almanac 12/12/2017 12:10 20171212T122549|3|read_str|COM6 RX Overrun Detected! 20171212T122550|5|RMC|Set Clock: 12/12/2017 12:25:50 20171212T122550|5|GPS|GPS TimeToFix: 2 secs 20171212T122550|5|GPS|GPS Skew: -2 secs 20171212T122550|5|GPS|GPS Fix: 12/12/2017 12:25:50,-28.79842,-158.99509,9 20171212T122550|5|wait_for_done|GPS time/location set 20171212T122550|5|test|RF Board Max Current: 37.4 mA 20171212T122550|5|test|Battery Min Voltage: 15.1 V 20171212T122550|5|test| GPS Test : <<PASS>> 20171212T122552|5|update_almanac|Updating GPS Almanac 12/12/2017 12:25 20171212T124058|5|update_offset|Surface Offset Pressure: 0.0300 20171212T124058|5|PRELUDE| Self Test : <<PASS>> 20171212T124059|5|RMC|Set Clock: 12/12/2017 12:40:59 20171212T124059|5|GPS|GPS TimeToFix: 2 secs 20171212T124059|5|GPS|GPS Skew: 0 secs 20171212T124059|5|GPS|GPS Fix: 12/12/2017 12:40:59,-28.79814,-158.99414,9 Do we include these positions as launch, or as TST? Would need to expand this for manual activation – need an example	Time of launch Position at end of prelude cycle	Time, position N = 0	0 if taken from ship metdata 2 if taken from 000.msg file
90 = DST – 10 (relative series of measurements)	All timestamped measures provided in science_log files (CTD_P, CTD_PT, CTD_PTS, CTD_PTSH, O2, etc… depending on the sensors mounted on the float) that have been sampled after deployment and before DST.	science_log file	Time, all available measurements. n.	2 (value is transmitted by the float)

Argo trajectory file measurement codes (MC) for APF11				
Code (timing)	**Name in float data output**	**Description and name of data file where this is found**	**Units and data profile number**	**JULD_STATUS**
100 DST	Change in state to park descent. From *.system.log file: 20180202T081820|5|go_to_state|Mission state SURFACE -> PARKDESCENT OR From *.science_log file: Message,20180202T081826,Park Descent Mission*********	System_log file Or Science_log file	Time, PRES,n	2. value is transmitted by the float
189 = DET-11 (buoyancy actions)	Could put buoyancy adjustments in here if you wanted to (optional) From the *.system_log.txt file: 20180201T214841|5|ASCENT|Adjusting Buoyancy to 578 20180201T214842|5|buoyancy_engine_task|Buoyancy Start Position: 280 20180201T215035|5|buoyancy_engine_task|Buoyancy engine destination 578 reached after 01:52 . 20180201T215610|5|start_profile|Continuous Profile Started********** 20180201T221848|5|ASCENT|Ascending Too Slowly: 0.079 dbar/sec @ 1851.3 dbar 20180201T221854|5|ASCENT|Ascending Too Slowly: 0.079 dbar/sec @ 1850.9 dbar 20180201T221907|5|ASCENT|Ascending Too Slowly: 0.079 dbar/sec @ 1849.8 dbar 20180201T221907|5|do_ascent|target_position: 742.000000	Buoyancy adjustments made during descent (between DST and DET) in system_log file	Time, PRES Cycle #N	2. value is transmitted by the float
190 = DET-10 (relative series of measurements)	All timestamped measures provided in science_log files (CTD_P, CTD_PT, CTD_PTS, CTD_PTSH, O2, etc… depending on the sensors mounted on the float) that have been sampled between DST and DET. From *.science_log file: Message,20171115T174117,Park Descent Mission********** CTD_P,20171115T175601,25.99 CTD_P,20171115T175603,26.24 CTD_P,20171115T185606,524.39 CTD_P,20171115T185608,524.58 CTD_P,20171115T195613,843.10 CTD_P,20171115T195615,843.19 CTD_P,20171115T205620,1021.85 CTD_P,20171115T205622,1021.90	Descending CTD measurements Science_log file	Time, all available measurements. n.	2. value is transmitted by the float

Argo trajectory file measurement codes (MC) for APF11				
Code (timing)	**Name in float data output**	**Description and name of data file where this is found**	**Units and data profile number**	**JULD_STATUS**
200 DET	**Best option and set this MC here only if it occurs before PST:** From science_log file CTD_P data, as the first time the float enters in the [PARK_PRES-3%;PARK_PRES+3%] interval. Associated pressure is the first CTD_P of [PARK_PRES-3%;PARK_PRES+3%] interval. Data looks like this: Message,20171212T131937,Park Descent Mission********* CTD_P,20171212T133305,27.990 CTD_P,20171212T143309,516.390 CTD_P,20171212T153314,881.230 CTD_P,20171212T163319,1095.690 Message,20171212T163325,Park Mission***************** **2nd option and set this MC here only if it occurs before PST:** When the float has reached park depth. From the *.system_log.txt file: 20171212T163320|5|PARKDESCENT|Reached Park Depth: 1095.80 dbar **3rd option and set this MC after PST if a timeout:** If 'Reached Park Depth' not available in the *.system_log.txt file due to a timeout, look for: 20180112T001404|4|PARKDESCENT|Park Descent Timeout: 314 min @ 962.1 dbar	Descent end time. Time when float first approaches within 3% of the configured drift pressure. Float may be transitioning from the surface or from a deep profile. This variable is based on pressure only and can be measured or estimated by fall-rate. In the case of a float that overshoots the drift pressure on descent, DET is the time of the overshoot. Science_log file Or system_log file	Time n	2. Value is transmitted by the float Or 2. Value is transmitted by the float Or 2. Value is transmitted by the float
239 = PST-11 (buoyancy actions)	Could put buoyancy adjustments in here if you wanted to (optional) Buoyancy action (time and pressure, if available) recorded in system_log file between DET and PST. Might only occur in a float that comes up to park after a deep descent?	Buoyancy adjustments made during descent (between DET and PST) system_log file	Time, PRES. n.	2 (value is transmitted by the float)
240 = PST-10 (relative series of measurements)	All timestamped measures provided in science_log files (CTD_P, CTD_PT, CTD_PTS, CTD_PTSH, O2, etc… depending on the sensors mounted on the float) that have been sampled between DET and PST.	science_log file	Time, all available measurements. n.	2 (value is transmitted by the float)

Argo trajectory file measurement codes (MC) for APF11				
Code (timing)	**Name in float data output**	**Description and name of data file where this is found**	**Units and data profile number**	**JULD_STATUS**
Start of the drift phase				
250 PST	From 'Park Mission' of science_log file. Associated pressure is the CTD_P measurement with the same timestamp if exists; otherwise the average value of the 2 surrounding CTD_P measurements. OR Based on float logic. A statement that it has reached the depth. From the *.system_log.txt file: 20171116T090439|5|go_to_state|Mission state PARKDESCENT -> PARK	Time of park start Time when float transitions to its Park or Drift mission. This variable is based on float logic. Science_log file OR System_log file	Time n	2. Value is transmitted by the float
289 = PET-11 (buoyancy actions)	Could put buoyancy adjustments in here if you wanted to (optional) Buoyancy action (time and pressure) recorded in system_log file between PST and PET. From the *.system_log.txt file: 20171214T170956|5|PARK|Adjusting Buoyancy to 1091 Pressure comes from matching time stamp in science_log file, if available, otherwise the closest pressure to the timestamp: CTD_P,20171214T170956,1161.590	Time of active buoyancy adjustment during park phase system_log and science_log files	Time, PRES. n	2 (value is transmitted by the float)
290 = PET-10 (relative series of measurements)	All timestamped measures provided in science_log files (CTD_P, CTD_PT, CTD_PTS, CTD_PTSH, O2, etc… depending on the sensors mounted on the float) that have been sampled between PST and PET. Message,20171116T090444,Park Mission********** CTD_P,20171116T090447,1026.53 CTD_PTSH,20171116T090509,1027.10,1.5959,34.7070,-0.977961 O2,20171116T090512,231.35490,52.98427,1.60344,42.96755,40.87555,49.02606,8.1505 1,488.42319,802.80371,648.11133 CTD_P,20171116T090514,1027.25 CTD_P,20171116T100518,1045.72 CTD_PTSH,20171116T100541,1045.70,1.5607,34.7050,-0.978141 O2,20171116T100544,235.17410,53.80836,1.56928,42.78669,40.69469,48.86159,8.1669	A series of pressure measurements taken daily during drift. Can assign JULD values for APF11 floats. Science_log file	Time, all available measurements. n	2: value transmitted by the float

Argo trajectory file measurement codes (MC) for APF11				
Code (timing)	**Name in float data output**	**Description and name of data file where this is found**	**Units and data profile number**	**JULD_STATUS**
	0,485.97198,803.06158,649.16498 CTD_P,20171116T100546,1045.68 CTD_P,20171116T110550,1054.54 Message,20171212T163830,Deep Descent Mission**********			
300 PET	From the *.system_log.txt file: 20171116T193820|5|go_to_state|Mission state PARK -> DEEPDESCENT In the case of a float going from park to ascent, it might look like this: 20171116T193820|5|go_to_state|Mission state PARK -> ASCENT OR From the science_log file: From 'Deep Descent Mission' (or 'Profiling Mission' in the case of a float going from park to ascent) of science_log file. Associated pressure is the CTD_P measurement with the same timestamp if exists; otherwise the average value of the 2 surrounding CTD_P measurements.	Time when float exits from its Park or Drift mission. It may next rise to the surface (AST) or sink to profile depth (DDET) System_log file or science_log file	Time, PRES. n	2: value transmitted by the float
301 (representative park measurement)	Averaged values of CTD_PTS, CTD_PTSH and O2 measurements sampled during the [Park start time;Park end time] time interval (MC = 290). REPRESENTATIVE_PARK_PRESSURE_STATUS = 1.	science_log file	All available measurements. n	3: value is directly computed from relevant, transmitted float information
End of drift measurements				
389 = DDET-11 (buoyancy actions)	Could put buoyancy adjustments in here if you wanted to (optional) Buoyancy action (time and pressure) recorded in system_log file between PET and DDET. From the system_log.txt file 20180303T234252|5|DEEPDESCENT|Adjusting Buoyancy to 326 Pressure comes from matching time stamp in science_log file, if available, otherwise the closest pressure to the timestamp:	Buoyancy adjustments made during deep descent (between PET and DDET) system_log and sciene_log files	Time, PRES. n.	2: value transmitted by the float

Argo trajectory file measurement codes (MC) for APF11				
Code (timing)	**Name in float data output**	**Description and name of data file where this is found**	**Units and data profile number**	**JULD_STATUS**
	CTD_P,20180303T234250,1013.630			
390 = DDET-10 (relative series of measurements)	All timestamped measures provided in science_log files (CTD_P, CTD_PT, CTD_PTS, CTD_PTSH, O2, etc… depending on the sensors mounted on the float) that have been sampled between PET and DDET. Measurements between: Message,20171116T193828,Deep Descent Mission********** And DDET (400) – See MC400 on calculating DDET. From the *.science_log.csv file: Message,20171116T193828,Deep Descent Mission********** CTD_P,20171116T194757,1088.93 CTD_P,20171116T194759,1089.14 CTD_P,20171116T195304,1133.28 CTD_P,20171116T195306,1133.51 CTD_P,20171116T195811,1177.30 CTD_P,20171116T195813,1177.49 CTD_P,20171116T200318,1219.82 CTD_P,20171116T200320,1220.02 CTD_P,20171116T200825,1260.75 CTD_P,20171116T200827,1260.97 CTD_P,20171116T201332,1301.30 CTD_P,20171116T201334,1301.51	Time stamped measurements collected down to deep descent. science_log file	Time, all available measurements. n.	2: value transmitted by the float
400 DDET	Calculate this from the measurements between: Message,20171116T193828,Deep Descent Mission********** And Message,20171116T222642,Profiling Mission**********	Time when float first approaches within 3% of the eventual deep profile pressure. This variable is based on pressure only and can be measured or estimated by fall-rate.	Time, PRES. n.	2: value transmitted by the float

Argo trajectory file measurement codes (MC) for APF11				
Code (timing)	**Name in float data output**	**Description and name of data file where this is found**	**Units and data profile number**	**JULD_STATUS**
	400 is the first value within 3% of configured deep depth. **This MC is set only if it occurs before AST.** From the *.science_log.csv file (continued on from the snippet in code 399, above): CTD_P,20171116T220101,1922.43 390 CTD_P,20171116T220606,1940.07 400 DDET (first measurement within 3% of 2000db) CTD_P,20171116T220608,1940.15 490 (measurements between 400 DDET and 500 AST) CTD_P,20171116T221113,1956.34 490 CTD_P,20171116T221115,1956.43 490 CTD_P,20171116T221620,1971.78 490 CTD_P,20171116T221622,1971.86 490 CTD_P,20171116T222127,1986.43 490 CTD_P,20171116T222129,1986.53 490 CTD_P,20171116T222634,1999.88 490 CTD_P,20171116T222636,1999.92 490 Message,20171116T222642,Profiling Mission**********	science_log file		
489 = AST-11 (buoyancy actions)	Could put buoyancy adjustments in here if you wanted to (optional) Buoyancy action (time and pressure) recorded in system_log file between DDET and AST. 20171224T010513|5|DEEPDESCENT|Adjusting Buoyancy to 270 Pressure comes from matching time stamp in science_log file, if available, otherwise the closest pressure to the timestamp: CTD_P,20171224T010511,1014.890	Buoyancy adjustments made during descent (between DDET and AST) system_log and science_log files	Time, PRES. n.	2 (value is transmitted by the float)
490 = AST-10 (relative series of measurements)	All timestamped measures provided in science_log files (CTD_P, CTD_PT, CTD_PTS, CTD_PTSH, O2, etc… depending on the sensors mounted on the float) that have been sampled between DDET and AST. From the *.science_log.csv file (same snippet from code 400, above): CTD_P,20171116T220608,1940.15 490 (measurements between 400 DDET and 500	A series of measurements transitioning towards 500, AST. science_log file	Time, all available measurements. n.	2: value transmitted by the float

Argo trajectory file measurement codes (MC) for APF11				
Code (timing)	**Name in float data output**	**Description and name of data file where this is found**	**Units and data profile number**	**JULD_STATUS**
	AST) CTD_P,20171116T221113,1956.34 490 CTD_P,20171116T221115,1956.43 490 CTD_P,20171116T221620,1971.78 490 CTD_P,20171116T221622,1971.86 490 CTD_P,20171116T222127,1986.43 490 CTD_P,20171116T222129,1986.53 490 CTD_P,20171116T222634,1999.88 490 CTD_P,20171116T222636,1999.92 490 Message,20171116T222642,Profiling Mission**********			
500 AST	From *.system_log.txt file: 20171116T222637|5|go_to_state|Mission state DEEPDESCENT -> ASCENT In the case of a float going from park to ascent, it might look like this: 20171116T193820|5|go_to_state|Mission state PARK -> ASCENT OR From the science_log file: Message,20171224T035753,Profiling Mission********** From 'Profiling Mission' of science_log file. Associated pressure is the CTD_P measurement with the same timestamp if exists; otherwise the average value of the 2 surrounding CTD_P measurements. CTD_P,20171224T035747,2006.190 Message,20171224T035753,Profiling Mission********** CTD_P,20171224T035755,2006.490	System_log file Or Science_log file	Time n	2: value transmitted by the float
503 (deepest measurement)	Deepest value from CTD_CP, CTD_CP_H or profile CTD_PTS, CTD_PTSH measurements. CTD_P,20190223T030201,2003.44 Message,20190223T030208,Profiling Mission********** CTD_P,20190223T030413,1997.99 CTD_PTS,20190223T030435,1995.69,2.3582,34.6403	science_log file	Time, (if available), all available measurements. n.	2: value transmitted by the float

Argo trajectory file measurement codes (MC) for APF11				
Code (timing)	**Name in float data output**	**Description and name of data file where this is found**	**Units and data profile number**	**JULD_STATUS**
	At end of CP upload (time is not the time of the sample, cannot record the timestamp if this value is used). CTD_CP,20190223T111810,1990.04,2.3667,34.6393,18 CTD_CP,20190223T111810,1991.55,2.3648,34.6396,10 All lines above are from the same file – we would use the green line.			
589 = AET-11 (buoyancy actions)	Could put buoyancy adjustments in here if you wanted to (optional) Buoyancy action (time and pressure) recorded in system_log file between AST and AET. From the *.system_log.txt file: 20190223T030209|5|ASCENT|Adjusting Buoyancy to 674 Pressure comes from matching time stamp in science_log file, if available, otherwise the closest pressure to the timestamp: CTD_P,20190223T030201,2003.44	Buoyancy adjustments made during descent (between AST and AET) system_log and science_log files	Time, PRES. n.	2: value transmitted by the float
590 = AET-10 (relative series of measurements)	All timestamped measures provided in science_log files (CTD_P, CTD_PT, CTD_PTS, CTD_PTSH, O2, etc… depending on the sensors mounted on the float) that have been sampled between AST and AET. Cyan rows are the profile data and go in the profile netcdf. They can be duplicated in the trajectory file if desired. Green rows are rise rate and go in traj file with code 590. From the *.science_log.csv file: Message,20171116T222642,Profiling Mission********** CTD_P,20171116T222645,2000.28 CTD_P,20171116T222646,2000.33 CTD_P,20171116T222846,1998.49 CTD_PTSH,20171116T222908,1996.50,0.7812,34.6920,-0.981964 O2,20171116T222911,244.32410,54.70848,0.79020,42.75586,40.66386,48.78920,8.12534,482.74139,807.42743,673.09949 CTD_P,20171116T222913,1995.97 CTD_P,20171116T223017,1990.00 CTD_P,20171116T223019,1989.82	Point sample pressures on ascent to surface. science_log file	Time, all available measurements. n.	2: value transmitted by the float

Argo trajectory file measurement codes (MC) for APF11				
Code (timing)	**Name in float data output**	**Description and name of data file where this is found**	**Units and data profile number**	**JULD_STATUS**
	CTD_P,20171116T223123,1983.93 CTD_P,20171116T223125,1983.82 CTD_P,20171116T223229,1977.94 CTD_P,20171116T223231,1977.76 CTD_P,20171116T223335,1972.03 CTD_P,20171116T223337,1971.84 CTD_P,20171116T223441,1966.22 CTD_P,20171117T045001,4.32 CTD_P,20171117T045017,3.41 CTD_P,20171117T045019,3.34 Message,20171117T045024,Surface Mission**********			
600 AET	From the *.system_log.txt file: 20190223T111350|5|go_to_state|Mission state ASCENT -> SURFACE OR From the science_log file: Message,20190223T111355,Surface Mission********** Associated pressure is the CTD_P measurement with the same timestamp if exists; otherwise the average value of the 2 surrounding CTD_P measurements. From Surface Mission' of science_log file: CTD_P,20190223T111349,3.64 Message,20190223T111355,Surface Mission********** CTD_P,20190223T111357,3.28	Time of change to surface mission. Will likely be before the float reaches the surface. System_log file OR science_log file	Time n	2: value transmitted by the float
Float is on the surface				
690 = TST-10 (relative series of measurements)	All timestamped measures provided in science_log files except O2 relative ones (CTD_P, CTD_PT, CTD_PTS, CTD_PTSH, etc… depending on the sensors mounted on the float) that have been sampled between AET and TST. Cyan rows are the profile data and go in the profile netcdf.	science_log file	Time, all available measurements. n.	2: value transmitted by the float

Argo trajectory file measurement codes (MC) for APF11				
Code (timing)	**Name in float data output**	**Description and name of data file where this is found**	**Units and data profile number**	**JULD_STATUS**
	Green rows are rise rate and go in traj file with code 690. Cyan rows can be duplicated in trajectory file optionally. From the *.science_log.csv file: Message,20171117T045024,Surface Mission********** CTD_P,20171117T045027,2.91 O2,20171117T045030,455.84921,106.81990,2.44480,34.04538,31.95338,40.09203,8.13864,365.06180,793.09192,622.04797 O2,20171117T045034,457.45291,107.19470,2.44442,34.00274,31.91074,40.04744,8.13670,364.97290,795.85962,622.05969 O2,20171117T045037,457.38000,107.17520,2.44360,34.00512,31.91312,40.04768,8.13456,364.97250,795.31378,622.08533 O2,20171117T045040,457.36591,107.16930,2.44273,34.00597,31.91397,40.04765,8.13368,364.99860,795.03693,622.11218 O2,20171117T045043,457.31201,107.15360,2.44166,34.00799,31.91599,40.04819,8.13220,364.95480,794.82538,622.14563 CTD_P,20171117T045044,2.18 CTD_P,20171117T045451,-0.18 O2,20171117T045454,432.71149,101.31300,2.41379,34.70084,32.60884,40.75949,8.15065,375.40649,798.32751,623.01233 O2,20171117T045458,433.17749,101.45360,2.42524,34.68132,32.58932,40.73376,8.14444,374.96951,797.25812,622.65613 O2,20171117T045501,434.01859,101.65920,2.42837,34.65574,32.56374,40.70784,8.14410,374.65811,796.17328,622.55872 O2,20171117T045504,433.89139,101.65520,2.43774,34.65422,32.56223,40.70248,8.14026,374.51981,795.59772,622.26740 O2,20171117T045507,434.57581,101.76270,2.41859,34.64531,32.55331,40.69226,8.13895,374.36719,795.31073,622.86310 CTD_P,20171117T045509,-0.14 CTD_P,20171117T045539,-0.21 Message,20171117T045545,CP Already Stopped Message,20171117T045551,CP Already Stopped CTD_P,20171117T045553,-0.24 O2,20171117T045556,430.72559,100.85890,2.41775,34.75532,32.66332,40.80583,8.14251,376.25970,797.60468,622.88922 O2,20171117T045600,428.93710,100.43030,2.41414,34.80857,32.71657,40.85670,8.14014,384.30829,796.62189,623.00128 O2,20171117T045603,428.75229,100.45670,2.43979,34.79982,32.70782,40.84566,8.137			

Argo trajectory file measurement codes (MC) for APF11				
Code (timing)	**Name in float data output**	**Description and name of data file where this is found**	**Units and data profile number**	**JULD_STATUS**
	84,376.82040,795.68542,622.20367 O2,20171117T045606,429.25531,100.52570,2.42186,34.79519,32.70319,40.83806,8.13486,376.96509,795.18903,622.76129 O2,20171117T045609,430.68561,100.89640,2.43492,34.74706,32.65506,40.79170,8.13664,376.64001,794.90558,622.35529 CTD_P,20171117T045611,-0.21			
700 TST	From the *.system_log.txt file for cycle n-1: 20171117T050104|5|connect|Received CONNECT Or From first occurrence of 'Found the sky.' in system_log file, occurs near end in some files belongs in cycle n. 20190104T081134|5|sky_search|Found the sky For RBR prototype float, this is the n profile for this float. 20180519T031207|5|network_quality|Modem Quality = 5 %taken from the end of the file. Not the start, which is associated with n-1 and is not used for trajectory files.	Time of first z-modem activity. System_log file	Time **Cycle n-1** Or Time. Cycle n.	2: value transmitted by the float
703 ST	Multiple fixes may appear and all should be included here. The first fix in the science_log and system_log files is the location for profile n-1, the last fix is the location for profile n. Every fix is additional to any from previous profile files. Also, the float may produce additional files for any given profile if the float has trouble connecting. These files will be smaller but contain more GPS fixes and surface pressure measurements and they will apply to profile n. EG: -rw-rw-rw- 1 18157 argo-hf 240 Feb 23 10:56 f8157.007.20180202T081336.vitals_log.bin -rw-rw-rw- 1 18157 argo-hf 433 Feb 23 10:55 f8157.007.20180202T081336.vitals_log.csv -rw-rw-rw- 1 18157 argo-hf 15236 Feb 23 10:56 f8157.007.20180202T081758.science_log.bin -rw-rw-rw- 1 18157 argo-hf 39696 Feb 23 10:56 f8157.007.20180202T081758.science_log.csv -rw-rw-rw- 1 18157 argo-hf 12716 Feb 23 10:56 f8157.007.20180212T073604.system_log.txt	Satellite times and locations. One for each fix.	Time, Position n-1 and n	4. value is determined by satellite

Argo trajectory file measurement codes (MC) for APF11				
Code (timing)	**Name in float data output**	**Description and name of data file where this is found**	**Units and data profile number**	**JULD_STATUS**
	-rw-rw-rw- 1 18157 argo-hf 169 Feb 23 10:56 f8157.007.20180212T073834.vitals_log.bin -rw-rw-rw- 1 18157 argo-hf 361 Feb 23 10:56 f8157.007.20180212T073834.vitals_log.csv -rw-rw-rw- 1 18157 argo-hf 247 Feb 23 10:56 f8157.007.20180212T082954.science_log.bin -rw-rw-rw- 1 18157 argo-hf 550 Feb 23 10:56 f8157.007.20180212T082954.science_log.csv -rw-rw-rw- 1 18157 argo-hf 6155 Feb 23 10:55 f8157.007.20180212T110402.system_log.txt From the *.system_log.txt file: 20180202T081758|5|GPS|GPS Skew: 0 secs 20180202T081758|5|GPS|GPS Fix: 02/02/2018 08:17:58,-31.62194,-164.89915,77 Fix for profile n-1 20180202T081758|5|wait_for_done|GPS time/location set 20180202T081820|5|go_to_state|Mission state SURFACE -> PARKDESCENT 20180212T073341|5|stop_profilers|Stopping profilers 20180212T073352|5|update_offset|Surface Offset Pressure: 0.4900 20180212T073603|5|RMC|Set Clock: 02/12/2018 07:36:03 20180212T073603|5|GPS|GPS TimeToFix: 126 secs 20180212T073603|5|GPS|GPS Skew: 0 secs 20180212T073603|5|GPS|GPS Fix: 02/12/2018 07:36:03,-31.71048,-165.08408,67 Fix for profile n 20180212T073603|5|wait_for_done|GPS time/location set 20180212T073603|5|SURFACE|Completing Mission No.: 7 From the *.science_log.csv file: Message,20180202T081758,Firmware: 03/06/17 21:21:20 APF11-2MB-v2.5.2 Message,20180202T081758,FloatId/Username: f8157 GPS,20180202T081758,-31.6219,-164.8992,7 Fix for profile n-1 CTD_P,20180202T081759,0.110 Message,20180212T073055,Surface Mission********** CTD_P,20180212T073057,0.410 CTD_P,20180212T073310,0.390			

Argo trajectory file measurement codes (MC) for APF11				
Code (timing)	**Name in float data output**	**Description and name of data file where this is found**	**Units and data profile number**	**JULD_STATUS**
	CTD_P,20180212T073341,0.280 CTD_P,20180212T073352,0.490 GPS,20180212T073603,-31.7105,-165.0841,6 Fix for profile n.			
702 FMT, and 704 LMT	Don't use for APF11 floats	Time of first/last iridium message	Time n-1	4. value is determined by satellite
790 = TET-10 (relative series of measurements)	All timestamped measures provided in science_log files (CTD_P, CTD_PT, CTD_PTS, CTD_PTSH, O2, etc… depending on the sensors mounted on the float) that have been sampled between TST and TET.	science_log file	Time, all available measurements. Cycle #N.	2: value transmitted by the float
800 TET	End of upload of files to the modem. Applies to cycle n-1. From the *.system_log.txt file: 20180202T081728|5|zmodem_upload_files|Uploaded: f8157.006.20180123T085222.science_log.bin.gz 20180202T081728|5|zmodem_upload_files|Uploaded: f8157.006.20180202T081104.system_log.txt.gz 20180202T081728|5|zmodem_upload_files|Uploaded: f8157.006.20180123T084118.vitals_log.bin.gz 20180202T081728|5|zmodem_upload_files|Uploaded 12489 bytes in 99 secs at 126.1515 bytes/sec	Time of last z-modem activity	Time n-1	2: value transmitted by the float
710 (in-water samples, part of surface sequence)	For O2 floats only. All O2 relative measurements sampled between AET and 'Inflating air bladder' time (provided in system_log file).	science_log file	Time, all available measurements. n.	2: value transmitted by the float
711 (in-air samples, part of surface sequence)	For O2 floats only. All O2 relative measurements sampled between 'Inflating air bladder' time (provided in system_log file) and TST.	science_log file	Time, all available measurements. n.	2: value transmitted by the float
901 (grounded cycle)	Grounding detection (time and pressure) recorded in system_log file.	system_log file	Time, PRES. n.	2: value transmitted by the float

Argo trajectory file measurement codes (MC) for APF11				
Code (timing)	**Name in float data output**	**Description and name of data file where this is found**	**Units and data profile number**	**JULD_STATUS**
903	Surface pressure measurements. From the *.system_log.txt file: 20180518T135447|5|update_offset|Surface Offset Pressure: 0.0900	Surface pressure offset value	Pressure n	2: value transmitted by the float

HM2000

Argo program measurement codes (MC) for HM2000 floats				
Code (timing)	**HM2000 Variable**	**Description**	**Units and data profile number**	**JULD_STATUS**
0 (launch)	Launch time and location as recorded by deployer If not recorded, use Fill Value	Time and location		0: value is estimated from pre-deployment information found in the metafile 9: value is not immediately available but may be estimated at a later date
100 (DST)	Estimated from engineering data: TST minus time consumed at each phase under water.		YYYY/MM/DD HH:MM:SS	3: value is directly computed from relevant, transmitted float information
150 (FST)	HM2000 float doesn't transmit FST, use Fill Value			
189	None, use Fill Value	Next two stabilization times given as hours and minutes elapsed since DST.		
200 (DET)	Estimated from engineering data: AET minus time consumed from its start of drifting phase.		YYYY/MM/DD HH:MM:SS	3: value is directly computed from relevant, transmitted float

Argo program measurement codes (MC) for HM2000 floats				
Code (timing)	**HM2000 Variable**	**Description**	**Units and data profile number**	**JULD_STATUS**
				information
250 (PST)	Use Fill Value			
During the drift phase, HM2000 floats measure pressure, temperature and salinity every 3 or 6 hours				
290	Series of pressure	A series of pressure measurements taken daily during drift. No time can be assigned to these pressures, so use Fill Value in JULD	Pressure	2: value is transmitted by the float
End of drift measurements				
300 (PET)	Use Fill Value			
301	Estimated from all drift depth	Best estimate of drift depth	Pressure	3: value is directly computed from relevant, transmitted float information
400 (DDET)	Use Fill Value			
500 (AST)	Estimated from engineering data: AET minus time consumed by air pump (3 minutes) minus time consumed by ascent phase.		YYYY/MM/DD HH:MM:SS	3: value is directly computed from relevant, transmitted float information
590	none	Transmitted data is of the elapsed time for each vertical slice of ascent (from the max pressure to 2000 db for the first slice; and for each 100 dbar think slice until the surface)		
600 (AET)	Computed from TST - 3 min (fixed)		YYYY/MM/DD HH:MM:SS	3: value is directly computed from relevant, transmitted float information
700 (TST)	starting acquisition date of the BDS/GPS fix(es).		Time	2: value is transmitted by the float
702 (FMT)	Earliest time of all BDS messages received		YYYY/MM/DD	4: value is determined by

Argo program measurement codes (MC) for HM2000 floats				
Code (timing)	**HM2000 Variable**	**Description**	**Units and data profile number**	**JULD_STATUS**
			HH:MM:SS	satellite
703 (ST)	All times from BDS or GPS		Time, Position	4: value is determined by satellite
704 (LMT)	Last time of all BDS messages received		Time	4: value is determined by satellite
800 (TET)	Last time of float transmission		Time	2: value is transmitted by the float

NEMO

Argo program measurement codes (MC) for NEMO floats				
Code (timing)	**NEMO Variable**	**Description**	**Units**	**JULD_STATUS**
0 (launch)	Launch time and location as recorded by deployer If not recorded, use Fill Value	Time and location		0: value is estimated from pre-deployment information found in the metafile 9: value is not immediately known, but believe it can be estimated later
100 (DST)	Descent_start_time OR Descent_starttime	See section 3.2.2.3.1	Time Time	2: value is transmitted by the float 2: value is transmitted by the float
200 (DET)	Not usually available, so use Fill Value unless timeout error is triggered. If timeout occurs, enter time of abort	If float doesn't reach parking depth in time, the descent is aborted and a timeout error is reported. If this happens, enter this		9: value is not immediately known, but believe it can be estimated later

Argo program measurement codes (MC) for NEMO floats				
Code (timing)	**NEMO Variable**	**Description**	**Units**	**JULD_STATUS**
		value into DET. If not, use Fill Value. See section 3.2.2.3.3		2: value is transmitted by the float
250 (PST)	Parking_start_time Not available, so use Fill Value	Only available for newer floats. Do not enter this if timeout error occurs. Use Fill Value in that case. See section 3.2.2.3.3	Time	2: value is transmitted by the float 9: value is not immediately known, but believe it can be estimated later
During the drift phase, NEMO floats measure time pressure and temperature				
290	What kind of drift measurements are made?? A series, an average??			
End of drift measurements				
300 (PET)	Upcast_start_time	Only available for newer floats. See section 3.2.2.3.4		2: value is transmitted by the float
301	Average pressure during drift	Best estimate of drift depth	Pressure	3: value is directly computed from relevant, transmitted float information
500 (AST)	Ascent_start_time Or Ascent_starttime	See section 3.2.2.3.6 Is this a time out value?? Does float start ascending if it hits profile pressure?	Time Time	2: value is transmitted by the float 2: value is transmitted by the float
600 (AET)	Surfacingtime Or Ascent_end_time	See section 3.2.2.3.7 Is this a time out value or does float know it is at the surface?	Time Time	2: value is transmitted by the float 2: value is transmitted by the float
700 (TST)	End_of_profile_time	See section 3.2.2.3.8	Time	2: value is transmitted by the

Argo program measurement codes (MC) for NEMO floats				
Code (timing)	**NEMO Variable**	**Description**	**Units**	**JULD_STATUS**
	Or Surface_start_time		 Time	float 2: value is transmitted by the float
702 (FMT)	Earliest time of all Argos messages received		Time	4: value is determined by satellite
703 (ST)	All Argos times and locations		Time, Position	4: value is determined by satellite
704 (LMT)	Latest time of all Argos messages received		Time	4: value is determined by satellite
800 (TET)	Not available, so use Fill Value	See section 3.2.2.3.9		9: value is not immediately known, but believe it can be estimated later

NINJA

Argo program measurement codes (MC) for NINJA 300001, 300002, 300003 floats				
Code (timing)	**NINJA Variable**	**Description**	**Units**	**JULD_STATUS**
0 (launch)	Launch time and location as recorded by deployer If not recorded, use Fill Value	Time and location		0: value is estimated from pre-deployment information found in the metafile 9: value is not immediately available but may be estimated at a later date
100 (DST)	Descent_Start_Day	See section 3.2.2.4.1.1	Day number in the month, hours,	2: value is transmitted by the float

Argo program measurement codes (MC) for NINJA 300001, 300002, 300003 floats				
Code (timing)	**NINJA Variable**	**Description**	**Units**	**JULD_STATUS**
			minutes and seconds	
150 (FST)	First Stabilization Time Pressure provided with time	First of three stabilization times provided as hours and minutes elapsed since DST. See section 3.2.2.4.1.2	Time (hours and minutes since DST) Pressure	2: value is transmitted by the float 2: value is transmitted by the float
189	Second and Third Stabilization Times Pressure provided with time.	Next two stabilization times given as hours and minutes elapsed since DST. See section 3.2.2.4.1.2	Time (hours and minutes since DST) Pressure	2: value is transmitted by the float 2: value is transmitted by the float
200 (DET)	Not available, so use Fill Value			9: value is not immediately known, but believe it can be estimated later
250 (PST)	Parking_Depth_in_Time Pressure	See section 3.2.2.4.1.3	Day number in the month, hours, minutes and seconds Pressure	2: value is transmitted by the float 2: value is transmitted by the float
During the drift phase, NINJA 300001, 300002, 300003 floats measure pressure daily.				
290	Series of pressure	A series of pressure measurements taken daily during drift. No time can be assigned to these pressures, so use Fill Value in JULD	Pressure	2: value is transmitted by the float

Argo program measurement codes (MC) for NINJA 300001, 300002, 300003 floats				
Code (timing)	**NINJA Variable**	**Description**	**Units**	**JULD_STATUS**
End of drift measurements				
300 (PET)	Not available, so use Fill Value Pressure	See section 3.2.2.4.1.4	 Pressure	9: value is not immediately known, but believe it can be estimated later
301	Average pressure during drift	Best estimate of drift depth	Pressure	3: value is directly computed from relevant, transmitted float information
400 (DDET)	Not available, so use Fill Value	See section 3.2.2.4.1.5		9: value is not immediately known, but believe it can be estimated later
500 (AST)	Ascent_Start_Day	See section 3.2.2.4.1.6	Day number in the month, hours, minutes and seconds	2: value is transmitted by the float
590	Times associated with ascending CTD measurements	Transmitted data is of the elapsed time for each vertical slice of ascent (from the max pressure to 2000 db for the first slice; and for each 100 dbar think slice until the surface)	Time	2: value is transmitted by the float
600 (AET)	AST + profile duration	See section 3.2.2.4.1.6	Day number in the month, hours, minutes and seconds	3: value is directly computed from relevant, transmitted float information
700 (TST)	ARGOS_Start_day	See section 3.2.2.4.1.8	Day number in the month, hours, minutes and seconds	2: value is transmitted by the float

Argo program measurement codes (MC) for NINJA 300001, 300002, 300003 floats				
Code (timing)	**NINJA Variable**	**Description**	**Units**	**JULD_STATUS**
702 (FMT)	Earliest time of all Argos messages received		Time	4: value is determined by satellite
703 (ST)	All Argos times and locations		Time, Position	4: value is determined by satellite
704 (LMT)	Latest time of all Argos messages received		Time	4: value is determined by satellite
800 (TET)	Not available, so use Fill Value	See section 3.2.2.4.1.9		9: value is not immediately known, but believe it can be estimated later

Deep NINJA

Argo program measurement codes (MC) for DeepNINJA floats				
Code (timing)	**DeepNINJA Variable**	**Description**	**Units**	**JULD_STATUS**
0 (launch)	Launch time and location as recorded by deployer If not recorded, use Fill Value	Time and location		0: value is estimated from pre-deployment information found in the metafile 9: value is not immediately available but may be estimated at a later date
100 (DST)	Descent_Start_Time Pressure provided with time.	Time when float starts descending to the parking depth from	Date and Time Pressure (dbar)	2: value is transmitted by the float 2: value is transmitted by the

Argo program measurement codes (MC) for DeepNINJA floats				
Code (timing)	**DeepNINJA Variable**	**Description**	**Units**	**JULD_STATUS**
		sea surface.		float
150 (FST)	Not available, so use Fill Value			9: value is not immediately known, but believe it can be estimated later
200 (DET)	Descent_End_Time Pressure provided with time.	Time when float reaches the parking depth and start drifting	Date and Time Pressure(dbar)	2: value is transmitted by the float 2: value is transmitted by the float
250 (PST)	Use DET	Time when float reaches the parking depth and start drifting	Date and Time Pressure(dbar)	2: value is transmitted by the float 2: value is transmitted by the float
During the drift phase, DeepNINJA floats measure time pressure, temperature and salinity hourly.				
290	Series of time, pressure, temperature and salinity measured during drift	A series of pressure measurements taken daily during drift.	Date and Time Pressure (dbar) Temperature (°C) Salinity(psu)	2: value is transmitted by the float
End of drift measurements				
300 (PET)	Deep_Descent_Start_Time Pressure provided with time.	Time when float start descending from the parking depth to the profile	Date and Time Pressure(dbar)	2: value is transmitted by the float 2: value is transmitted by the float

Argo program measurement codes (MC) for DeepNINJA floats				
Code (timing)	**DeepNINJA Variable**	**Description**	**Units**	**JULD_STATUS**
		depth.		
301	Average pressure during drift	Best estimate of drift depth	Pressure	3: value is directly computed from relevant, transmitted float information
400 (DDET)	Deep_Descent_End_Time Pressure provided with time.	Time when float reaches the profile depth.	Date and Time Pressure(dbar)	2: value is transmitted by the float 2: value is transmitted by the float
500 (AST)	Ascent_Start_Time Pressure provided with time.	Time when float starts ascending to the sea surface	Date and Time Pressure(dbar)	2: value is transmitted by the float 2: value is transmitted by the float
600 (AET)	Ascent_End_Time Pressure provided with time.	Time when float reaches the sea surface and stop ascending.	Date and Time Pressure(dbar)	2: value is transmitted by the float 2: value is transmitted by the float
703 (ST)	GPS fix		Time, Position	2: value is transmitted by the float
700 (TST)	First Message Time Pressure provided with time	Time when the float transmits the first message	Date and Time Pressure(dbar)	2: value is transmitted by the float 2: value is transmitted by the float
702 (FMT)	Time when the first message is received		Date and Time	4: value is determined by satellite
704 (LMT)	Time when the last message is received		Date and Time	4: value is determined by

Argo program measurement codes (MC) for DeepNINJA floats				
Code (timing)	**DeepNINJA Variable**	**Description**	**Units**	**JULD_STATUS**
				satellite
800 (TET)	Transmit_END_Time Pressure provided with time.	Time when float stops transmitting. 	Date and Time Pressure(dbar)	2: value is transmitted by the float 2: value is transmitted by the float

NOVA

Argo program measurement codes (MC) for NOVA floats				
Code (timing)	**NOVA Variable**	**Description**	**Units**	**JULD_STATUS**
0 (launch)	Time of last GPS fix – PARAM 12 setting (accurate to +/-5 minutes) Time of activation (within one hour of GPS fix)	Launch time and location. See section 3.2.2.5.1 Launch time and location. See section 3.2.2.5.1	Time (seconds), position Time (seconds), position	3: value is directly computed from relevant, transmitted float information 2: value is transmitted by the float
100 (DST)	NVS/3 + time stamp of previous Iridium transmission	See section 3.2.2.5.2 DST not transmitted by float	NVS (no unit) Time of Iridium message	3: value is directly computed from relevant, transmitted float information
150 (FST)	FST: start byte is 5 and bit length is 8 Decoding equation: y = 0.1 * x	Time in the day when the float first activated the value during descent. It is measured in hours with a minimum value of zero and a maximum value of 23.9.	Time (hours)	2: value is transmitted by the float
190	CTD taken during first descent after activation	CTD only taken on descent only after activation	Time (hours) Pressure (dbar)	2: value is transmitted by the float

Argo program measurement codes (MC) for NOVA floats				
Code (timing)	**NOVA Variable**	**Description**	**Units**	**JULD_STATUS**
			Temp (deg C) Salinity (psu)	
200 (DET)	Deepest Temp,Pres pair taken during first descent after activation	CTD only taken on descent only after activation	Time (hours) Pressure (dbar) Temp (deg C) Salinity (psu)	2: value is transmitted by the float
250 (PST)	EDT: The start byte is 4 and the bit length is 8. The equation to calculate it is y = 0.1 * x.	Float recognizes when it has stabilized at depth and changes into park phase. PST is called EDT and is the time in the day when the float ended its descent to parking. It is measured in hours, has a minimum value of zero and a maximum value of 23.9. This time can change from cycle to cycle because the float recognizes it is stable at the parking depth.	Time (hours)	2: value is transmitted by the float
During the drift phase, NOVA floats measure time pressure and temperature at variable times. Choose the measurement code below that most appropriately describes what types of measurements are taken:				
290	Series of pressure Series of temperature Series of salinity	A series of CTD measurements taken during drift at user specified times	Time (hours) Pressure (dbar) Temp (deg C) Salinity (psu)	2: value is transmitted by the float
297	Minimum pressure	Minimum pressure recorded during drift phase	Pressure (dbar)	2: value is transmitted by the float
298	Maximum pressure	Maximum pressure recorded during drift phase	Pressure (dbar)	2: value is transmitted by the float
End of drift measurements				
300 (PET)	DDST: The start byte is 6 and the bit length is 8. The equation to calculate it is y = 0.1 * x.	PET is called DDST and is the time in the day when the float started its descent to profile depth. The unit is hours, has a	Time (hours)	3: value is directly computed from relevant, transmitted float information

Argo program measurement codes (MC) for NOVA floats				
Code (timing)	**NOVA Variable**	**Description**	**Units**	**JULD_STATUS**
		minimum value of zero and a maximum value of 23.9		
301	Average pressure during drift	Best estimate of drift depth	Pressure	3: value is directly computed from relevant, transmitted float information
400 (DDET)	DDET : The start byte is 7 and the bit length is 8. The decoding equation is y = 0.1 * x.	DDET is called DDET and is the time in the day when the float achieved its profile depth. The unit is hours, has a minimum value of zero and a maximum value of 23.9. The float recognizes when it is at the profile pressure and and reports this time as DDET. It can change from profile to profile.	Time (hours)	2: value is transmitted by the float
500 (AST)	SAT : The start byte is 8 and the bit length is 8. The decoding equation is y = 0.1 * x.	AST is called SAT and is the time in the day when the float started its ascending profile. The unit is hours, has a minimum value of zero and a maximum value of 23.9. This time is set in PARAMETER 2, but should be sufficiently after DDET.	Time (hours)	2: value is transmitted by the float
600 (AET)	EAT : The start byte is 9 and the bit length is 8. The decoding equation is y = 0.1 * x.	AET is called EAT and is the time in the day when the float ended its ascending profile. The unit is hours, has a minimum value of zero and a maximum value of 23.9 Once the CTD stops profiling at 6 db, the internal bladder is emptied and the float rises to the surface. At that time, the EAT is	Time (hours)	2: value is transmitted by the float

Argo program measurement codes (MC) for NOVA floats				
Code (timing)	**NOVA Variable**	**Description**	**Units**	**JULD_STATUS**
		recorded. Afterwards, GPS acquisition starts and then Iridium transmission.		
703 (surface fixes)	All GPS fixes		Time, Position	2: value is transmitted by the float
700 (TST)	AET + SBDT from previous message	The TST should be set to fill value for the current cycle in the JULD variable in the N_MEASUREMENT array with an MC = 700 and STATUS set to 9. When the next cycle arrives, the TST should be filled in the JULD (or JULD_ADJUSTED if clock offset has been applied) variable in the N_MEASUREMENT array with an MC = 700 and STATUS set to 3	Time (AET in hours, SBDT in seconds)	3: value is directly computed from relevant, transmitted float information
702 (FMT)	Not necessary		Time (AET in hours, SBDT in seconds)	3: value is directly computed from relevant, transmitted float information
704 (LMT)	Not necessary		Time (TST in hours, SBDT in seconds)	3: value is directly computed from relevant, transmitted float information
800 (TET)	TST + SBDT from previous cycle	The TET should be set to fill value for the current cycle in the JULD variable in the N_MEASUREMENT array with an MC = 800 and STATUS set to 9. When the next cycle arrives, the TET should be filled in the JULD (or JULD_ADJUSTED if clock offset has been applied) variable in the N_MEASUREMENT array	Time (TST in hours, SBDT in seconds)	3: value is directly computed from relevant, transmitted float information

Argo program measurement codes (MC) for NOVA floats				
Code (timing)	NOVA Variable	Description	Units	JULD_STATUS
		with an MC = 800 and STATUS set to 3.		

Arvor Argos

The following measurement codes are set by the Coriolis decoder for Arvor Argos floats (Firmware version 5605B05, Coriolis version 4.54, Decoder Id 32).

Argo trajectory file measurement codes (MC) for Arvor Argos floats.				
Code (timing)	Name in float data output	Description and name of data file where this is found	Units and data profile number	JULD_STATUS
0 (launch position)	Provided by PI (from deployment team).	From Coriolis Excel deployment file provided at Coriolis DAC by float PI.	Time, latitude, longitude. Cycle #-1 (convention).	4 (value is determined by satellite)
89 = DST-11 (buoyancy action)	Cycle start time (buoyancy reduction start time). From: 'Cycle start gregorian day' 'Cycle start gregorian month' 'Cycle start hour' + day of the first descent of the float.	Tech message #2.	Time. Cycle #N.	2 (value is transmitted by the float)
100 (DST)	Descent to park Start Time. From: 'Descent Start Time' and Cycle start time (MC=89).	Tech message #2.	Time. Cycle #N.	2 (value is transmitted by the float)
150 = FST	First Stabilization Time during descent to park. From: 'Float Stabilisation Time' and DST '1st Stabilisation Pressure'.	Tech message #2.	Time, PRES. Cycle #N.	2 (value is transmitted by the float)
190 = DET-10 (relative series of measurements)	Dated levels of the descending profile. The first measurement of each message is dated from: transmitted time + DST.	Descent profile data message.	Time, all available measurements. Cycle #N.	2 (value is transmitted by the float)

203 (deepest measurement)	Deepest level of the descending profile.	Descent profile data message.	Time (if available), all available measurements. Cycle #N.	2 (when time is available) (value is transmitted by the float)
198 = DET-2	Max Pressure sampled during descent to park depth. From: 'Max pressure in descent to Parking Depth'.	Tech message #2.	PRES. Cycle #N.	No time
Start of the drift phase				
250 (PST)	Park drift Start Time. From: 'End of descent time' and FST	Tech message #2.	Time. Cycle #N.	2 (value is transmitted by the float)
290 = PET-10 (relative series of measurements)	Measurements sampled during the drift at park depth. Times are computed: - For the first measurement of each packet: from transmitted measurement date + transmitted measurement time + DST - For following measurements: from drift sampling period (configuration parameter MC8).	Submerged drift data message.	Time, all available measurements. Cycle #N.	2 (value is transmitted by the float) for the time of the first measurement of each packet 1 (value is estimated using information not transmitted by the float or by procedures that rely on typical float behaviour) for the following measurements
300 (PET)	Park drift End Time. From: 'Descent to Profile Depth Start time' **and DDET**.	Tech message #2.	Time. Cycle #N.	2 (value is transmitted by the float)
297 = PET-3	Min Pressure sampled during park drift. From: 'Min Pressure in Drift'.	Tech message #2.	PRES. Cycle #N.	No time
298 = PET-2	Max Pressure sampled during park drift. From: 'Max Pressure in Drift'.	Tech message #2.	PRES. Cycle #N.	No time
301 (representative park measurement)	Averaged values of measurements sampled during the [Park start time;Park end time] time interval. REPRESENTATIVE_PARK_PRESSURE_STATUS = 1.	Submerged drift data message.	All available measurements. Cycle #N.	No time

End of drift measurements				
398 = DDET-2	Max Pressure sampled during descent to profile depth. From: 'Max Pressure in descent Profile Depth'.	Tech message #2.	PRES. Cycle #N.	No time
450 (DPST)	Deep Park Start Time. From: 'Descent to Profile Depth Stop time' **and AST.**	Tech message #2.	Time. Cycle #N.	2 (value is transmitted by the float)
497 = AST-3	Min Pressure sampled during deep park drift. From: 'Min Pressure in Drift at Profile Depth'.	Tech message #2.	PRES. Cycle #N.	No time
498 = AST-2	Max Pressure sampled during deep park drift. From: 'Max Pressure in Drift at Profile Depth'.	Tech message #2.	PRES. Cycle #N.	No time
Start of profile				
500 (AST)	Ascent Start Time. From: 'Ascent Profile Start time' **and AET.**	Tech message #2.	Time. Cycle #N.	2 (value is transmitted by the float)
503 (deepest measurement)	Deepest level of the ascending profile.	Ascent profile data message.	Time (if available), all available measurements. Cycle #N.	2 (when time is available) (value is transmitted by the float)
590 = AET-10 (relative series of measurements)	Dated levels of the ascending profile. The first measurement of each message is dated from: transmitted time + AST.	Ascent profile data message.	Time, all available measurements. Cycle #N.	2 (value is transmitted by the float)
600 (AET)	Ascent End Time. AET = **TST** – (14 minutes) for Arvor float AET = **TST** – (16 minutes) for Provor float.		Time. Cycle #N.	2 (value is transmitted by the float)
Float is on the surface				
700 (TST)	Transmission Start Time. From: 'Ascent Profile Stop time' **and time of first Argos message.**	Tech message #2.	Time. Cycle #N.	2 (value is transmitted by the float)

702 (FMT)	Earliest time of current cycle Argos messages.	CLS information (Argos message dates).	Time. Cycle #N.	4 (value is determined by satellite)
703 (surface location)	All Argos fixes provided.	CLS information (Argos fixes estimated by CLS).	Time, latitude, longitude, location class. Cycle #N.	4 (value is determined by satellite)
704 (LMT)	Latest time of current cycle Argos messages.	CLS information (Argos message dates).	Time. Cycle #N.	4 (value is determined by satellite)
800 (TET)	Transmission End Time. Set as the cycle start time (MC=89) of the next cycle.	Tech message #2.	Time. **Cycle #N-1**.	2 (value is transmitted by the float)
Miscellaneous				
901 (grounded cycle)	Grounding information. From: '1st Grounding day relative to cycle start' and cycle start time (MC=89) '1st Grounding Hour' '1st grounding Pressure'.	Tech packet #1.	Time, PRES. Cycle #N.	2 (value is transmitted by the float)

ProvorCTS3 & Arvor Iridium

The following measurement codes are set by the Coriolis decoder for:

- Provor CTS3 Iridium floats (Firmware version 5900A04, Coriolis version 5.75, Decoder Id 214),
- Arvor Iridium floats (Firmware version 5900A04, Coriolis version 5.46, Decoder Id 217).

Argo trajectory file measurement codes (MC) for Provor CTS3 Iridium and Arvor Iridium floats.				
Code (timing)	**Name in float data output**	**Description and name of data file where this is found**	**Units and data profile number**	**JULD_STATUS**

0 (launch position)	Provided by PI (from deployment team).	From Coriolis Excel deployment file provided at Coriolis DAC by float PI.	Time, latitude, longitude. Cycle #-1 (convention).	4 (value is determined by satellite)
89 = DST-11 (buoyancy action)	Cycle start time (buoyancy reduction start time). From: 'Cycle start gregorian day' 'Cycle start gregorian month' 'Cycle start gregorian year' 'Cycle start time'.	Tech packet #1.	Time. Cycle #N.	2 (value is transmitted by the float)
100 (DST)	Descent to park Start Time. From: 'Descent start time' and Cycle start time (MC=89).	Tech packet #1.	Time. Cycle #N.	2 (value is transmitted by the float)
189 = DET-11 (buoyancy actions)	Buoyancy action (time and pressure) between DST and DET.	Hydraulic packets.	Time, PRES. Cycle #N.	2 (value is transmitted by the float)
150 = FST	First Stabilization Time during descent to park. From: 'Float 1st stabilisation time' and DST 'Float 1st stabilisation pressure'.	Tech packet #1.	Time, PRES. Cycle #N.	2 (value is transmitted by the float)
190 = DET-10 (relative series of measurements)	Dated levels of the descending profile. The first measurement of each packet is dated from: transmitted time + day of the first descent of the float.	Descending profile packets.	Time, all available measurements. Cycle #N.	2 (value is transmitted by the float)
203 (deepest measurement)	Deepest level of the descending profile.	Descending profile packets.	Time (if available), all available measurements. Cycle #N.	2 (when time is available) (value is transmitted by the float)
198 = DET-2	Max Pressure sampled during descent to park depth. From: 'Max pressure in descent to parking depth'.	Tech packet #1.	PRES. Cycle #N.	No time
Start of the drift phase				
250 (PST)	Park drift Start Time. From: 'End of descent time' and FST	Tech packet #1.	Time. Cycle #N.	2 (value is transmitted by the float)
289 = PET-11 (buoyancy actions)	Buoyancy action (time and pressure) between PST and PET.	Hydraulic packets.	Time, PRES. Cycle #N.	2 (value is transmitted by the float)

290 = PET-10 (relative series of measurements)	Measurements sampled during the drift at park depth. Times are computed: - For the first measurement of each packet: from transmitted measurement date + day of the first descent of the float - For following measurements: from drift sampling period (configuration parameter MC9).	Submerged drift packets. Parameter data packet.	Time, all available measurements. Cycle #N.	2 (value is transmitted by the float) for the time of the first measurement of each packet 1 (value is estimated using information not transmitted by the float or by procedures that rely on typical float behaviour) for the following measurements
300 (PET)	Park drift End Time. From: 'Descent to profile depth start time' **and DDET**.	Tech packet #1.	Time. Cycle #N.	2 (value is transmitted by the float)
297 = PET-3	Min Pressure sampled during park drift. From: 'Min pressure during drift at parking depth'.	Tech packet #1.	PRES. Cycle #N.	No time
298 = PET-2	Max Pressure sampled during park drift. From: 'Max pressure during drift at parking depth'.	Tech packet #1.	PRES. Cycle #N.	No time
301 (representative park measurement)	Averaged values of measurements sampled during the [Park start time;Park end time] time interval. REPRESENTATIVE_PARK_PRESSURE_STATUS = 1.	Submerged drift packets.	All available measurements. Cycle #N.	No time
End of drift measurements				
389 = DDET-11 (buoyancy actions)	Buoyancy action (time and pressure) between PET and DDET.	Hydraulic packets.	Time, PRES. Cycle #N.	2 (value is transmitted by the float)
398 = DDET-2	Max Pressure sampled during descent to profile depth. From: 'Max pressure during descent to profile depth'.	Tech packet #1.	PRES. Cycle #N.	No time
450 (DPST)	Deep Park Start Time. From: 'Descent to profile depth end time' **and AST.**	Tech packet #1.	Time. Cycle #N.	2 (value is transmitted by the float)

489 = AST-11 (buoyancy actions)	Buoyancy action (time and pressure) between DPST and AST.	Hydraulic packets.	Time, PRES. Cycle #N.	2 (value is transmitted by the float)
497 = AST-3	Min Pressure sampled during deep park drift. From: 'Min Pressure during drift at profile depth'.	Tech packet #1.	PRES. Cycle #N.	No time
498 = AST-2	Max Pressure sampled during deep park drift. From: 'Max Pressure during drift at profile depth'.	Tech packet #1.	PRES. Cycle #N.	No time
Start of profile				
500 (AST)	Ascent Start Time. From: 'Ascent profile start time' **and AET.**	Tech packet #1.	Time. Cycle #N.	2 (value is transmitted by the float)
503 (deepest measurement)	Deepest level of the ascending profile.	Ascending profile packets.	Time (if available), all available measurements. Cycle #N.	2 (when time is available) (value is transmitted by the float)
589 = AET-11 (buoyancy actions)	Buoyancy action (time and pressure) between AST and AET.	Hydraulic packets.	Time, PRES. Cycle #N.	2 (value is transmitted by the float)
590 = AET-10 (relative series of measurements)	Dated levels of the ascending profile. The first measurement of each packet is dated from: transmitted time + day of the first descent of the float.	Ascending profile packets.	Time, all available measurements. Cycle #N.	2 (value is transmitted by the float)
599 = AET-1 (relative single measurement)	Last pumped CTD measurement sampled during ascending profile. From: 'Sub-Surface pressure' 'Sub-Surface temperature' 'Sub-Surface salinity' 'Sub-Surface C1PHASE' etc…	Tech packet #2.	All available measurements. Cycle #N.	No time
600 (AET)	Ascent End Time. AET = **TST** – (10 minutes) – TC4 for cycles without 'Near Surface & In Air' sequence AET = **TST** – (10 minutes) – 2*MC31 – TC22 for cycles with 'Near Surface & In Air' sequence TC4, TC22 and MC31 are configuration parameters reported in parameter data packet.	Parameter data packet.	Time. Cycle #N.	2 (value is transmitted by the float)

Float is on the surface				
700 (TST)	Transmission Start Time. From: 'Ascent profile end time' **and time of first GPS fix.**	Tech packet #1.	Time. Cycle #N.	2 (value is transmitted by the float)
702 (FMT)	Earliest time of current cycle Iridium sessions.	Iridium e-mail.	Time. Cycle #N.	4 (value is determined by satellite)
703 (surface location)	All GPS fixes provided (one for each Iridium session).	Tech packet #1.	Time, latitude, longitude. Cycle #N.	4 (value is determined by satellite)
704 (LMT)	Latest time of current cycle Iridium sessions.	Iridium e-mail.	Time. Cycle #N.	4 (value is determined by satellite)
800 (TET)	Transmission End Time. Set as the cycle start time (MC=89) of the next cycle.	Tech packet #1.	Time. **Cycle #N-1**.	2 (value is transmitted by the float)
Miscellaneous				
710 (in-water samples, part of surface sequence)	For DO floats only. For cycles with 'Near Surface & In Air' sequence. Measurements sampled during the 'Near Surface' phase. Times are computed: - For the first measurement of each packet: from transmitted measurement date + day of the first descent of the float - For following measurements: from sampling period (configuration parameter MC30).	Near surface packets. Parameter data packet.	Time, all available measurements. Cycle #N.	2 (value is transmitted by the float) for the time of the first measurement of each packet 1 (value is estimated using information not transmitted by the float or by procedures that rely on typical float behaviour) for the following measurements
711 (in-air samples, part of surface sequence)	For DO floats only. For cycles with 'Near Surface & In Air' sequence. Measurements sampled during the 'In Air' phase. Times are computed: - For the first measurement of each packet: from transmitted measurement date + day of the first descent of the float - For following measurements: from sampling period (configuration	In air packets. Parameter data packet.	Time, all available measurements. Cycle #N.	2 (value is transmitted by the float) for the time of the first measurement of each packet 1 (value is estimated

	parameter MC30).			using information not transmitted by the float or by procedures that rely on typical float behaviour) for the following measurements
901 (grounded cycle)	Grounding information. From: '1st grounding day relative to cycle start' and cycle start time (MC=89) '1st grounding hour' '1st grounding Pressure' '2nd grounding day relative to cycle start' '2nd grounding hour' '2nd grounding Pressure'.	Tech packet #2.	Time, PRES. Cycle #N.	2 (value is transmitted by the float)

SOLO

Real time:

All cycle times (DST, FST, DET, PST, PET, DDET, DPST, AST, AET, TST, TET) cannot be filled in real time for SOLO floats and should be filled with fill value. The corresponding status variables for these timing variables should all be a "9" for time unknown. No times should be filled from information provided in the meta files.

SOLO-II

Argo program measurement codes (MC)				
Code (timing)	**SOLO II Variable**	**Description**	**Units**	**JULD_STATUS**
0	Cy 0: GPS ID=0x00 (Variable Code=1)	GPS fix from surfacing after short ~100dbar test dive	Time,position	1
100 (DST)	Cy>0: Fall ID=0x40 (Variable Code=1)	Typically, thefirst T,P pair [taken as valve opened to leave surface]	Time,P(0.04db)	2
199	Cy=0: Eng ID=0xe0 (Variable Code=7)	P,T,S triplet taken when float realizes it is under the surface and pumps to return to the surface (Eng	P(0.04db),T(0.00 1°C), S(0.001psu)	2

Argo program measurement codes (MC)				
Code (timing)	**SOLO II Variable**	**Description**	**Units**	**JULD_STATUS**
		ID=0xe0 bytes 39-47)		
139/140	Cy>0: Fall ID=0x40	All pre-FST T,P Fall pairs not assigned to other MC (139 used for buoyancy adjustments)	Time,P(0.04db)	2
150 (FST)	Cy>0: Fall ID=0x40 (Variable Code=2)	T,P Fall pair ~ 100dbar	Time,P(0.04db)	2
189/190	Cy>0:Fall ID=0x40	All other pre-DET T,P Fall pairs (189 used for buoyancy adjustments)	Time,P(0.04db)	2
200 (DET)	Cy=0:Rise ID=0x50	Typically, Deepest T,P pair	Time,P(0.04db)	2
	Cy>0: Fall ID=0x40	Choice of T,P pair that is first within 3% of pressure at beginning of drift (see Eng ID=0xe2 bytes 63-65)	Time,P(0.04db)	2
n=239/240	Cy>0: Fall ID=0x40	All post DET T,P pairs. MC239 are used for buoyancy adjustments. If n is the number of stabilizations (see Argo ID=0xf0), the T,P n+1 from end of Fall record is a stabilization. Each later T,P pair excluding the last will be an additional stabilization. Note: for some floats there are stabilizations during drift.	Time,P(0.04db)	2
if there is a drift phase (drift pressure defined) (common to cycles > 1)				
250 (PST)	Cy>0: Fall ID=0x40 (Variable Code=4)	Last T,P Fall pair	Time,P(0.04db)	2
296	Cy>0: Eng ID=0xe2	Drift broken into two averaged halves. Stored in Eng ID=0xe2 bytes 63-80; Time estimated from the last Fall ID=0x40 T,P pair [note: not DET] and first Rise ID=0x50 T,P pair	P(0.04db),T(0.001°C), S(0.001psu)	2
290	Cy>0 with park phase Drift ID 0x98	The SOLOII can return the raw drift measurements.	P(0.04db),T(0.001°C), S(0.001psu)	3

Argo program measurement codes (MC)				
Code (timing)	**SOLO II Variable**	**Description**	**Units**	**JULD_STATUS**
		Time is not returned, but can be estimated within a few seconds.		
300 (PET)	Cy>0: Rise ID=0x50	First T,P Rise pair [taken as valve opened]	Time,P(0.04db)	2
301		Best estimate of drift depth (average of two averaged halves)	Pressure	1
Endif				
if there is a deep dive (profile pressure > drift pressure and drift pressure defined)				
389/390	Cy>1: Rise ID=0x50	All pre-DDET T,P Rise pairs (389 indicates time of buoyancy adjustedment)	Time,P(0.04db)	2
400 (DDET)	Cy>1: Rise ID=0x50	DDET is determined by a) 2nd derivative of Rise pair series or b) within 3% of profile depth (see Eng ID=0xe2 bytes 39-41).	Time,P(0.04db)	2
489/490	Cy>1: Rise ID=0x50	All post-DDET/pre-AST T,P Rise pairs (489 indicates time of buoyancy adjustment)	Time,P(0.04db)	2
500 (AST)	Cy>1: Rise ID=0x50; Eng ID=0xe2 (Typically Variable Code =7)	AST is determined by 2nd derivative of Rise pair series.	Time,P(0.04db); P(0.04db),T(0.001°C), S(0.001psu)	2
Else				
500 (AST)	Cy=0: Rise ID=0x50; (Variable Code=7) Cy=1 Eng ID=0xe2 (Typically Variable Code =7)	First T,P Rise pair [taken as valve opened] AST is determined by 2nd derivative of Rise pair series	Time,P(0.04db); P(0.04db),T(0.001°C), S(0.001psu)	2 2
Endif				
589/590	Cy>=0: Rise ID=0x50	All T,P Rise pairs post AST excluding last or last two. 589 indicates buoyancy adjustment.	Time,P(0.04db)	2

Argo program measurement codes (MC)				
Code (timing)	**SOLO II Variable**	**Description**	**Units**	**JULD_STATUS**
599	Cy=0: Eng ID=0xe0	last P,T,S triplet taken before turning off CTD (Eng ID=0xe0 bytes 48-56)	P(0.04db),T(0.001°C), S(0.001psu)	2
	Cy>0: Eng ID=0xe2	last P,T,S triplet taken before turning off CTD (Eng ID=0xe2 bytes 45-50)	P(0.04db),T(0.001°C), S(0.001psu)	2
600 (AET)	Cy>-1: Rise ID=0x50 (Variable Code=8)	Last or 2nd to last T,P Rise pair	Time,P(0.04db)	2
703	Cy=0: GPS ID=0x00	GPS Fix	Time, Position	2
	Cy>0: GPS ID=0x02	GPS Fix	Time, Position	2
700 (TST)		TST is not recorded by the float, but it is within a minute of the first message	Time	1
702 (FMT)	Time in SBD email	Time of first SBD message	Time	4
704 (LMT)	Time in SBD email	Time of last SBD message	Time	4
800 (TET)		TET is not recorded by the float, but it is within a few seconds of the last message	Time	3
703	Cy>0: GPS ID=0x01	GPS Fix: May be multiple GPS fixes, depending on float settings	Time, Position	2