Earth System

Science

Data

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Supplement of

The global long-term microwave Vegetation Optical Depth Climate Archive (VODCA)

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1 Description of data variables & summary of flags

Here all the variables in the netcdf files are described, as well as a short summary of all flags. Most of this information is also in the metadata.

- **VOD:** Unitless, Vegetation Optical Depth of the respective band

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- **sensor_flag:** Bit-flag indicating which sensors contributed to each observation.

  - 1 = AMSR-E
  - 2 = AMSR2
  - 3 = SSM/I F8
  - 4 = SSM/I F11
10
  - 5 = SSM/I F13
  - 6 = TMI
  - 7 = WindSat

- **processing_flag:** Bit-flag indicating irregularities during processing affecting the quality of the VOD values

Table 1. Summary of all quality bit-flags indicating irregular processing. For more details see the referenced section. Currently only C-band VODCA is sometimes processed in a non standard way, for the Ku- and X-band they are always zero, indicating that everything was processed in in the standard way

Bit	Section	Short description	Potential spatial occurrence	Reduction of quality
10	3.1	AMSR-2 7.3 GHz band is used instead of 6.9 GHz	Global, usually high RFI areas	Very small
11	3.2.4	Sensor is scaled to matched TMI instead of AMSR-E	35°S - 35°N	Small
12	3.2.4	Sensor scaled without temporally overlapping observations	Global, mostly outside 35°S - 35°N	Possibly very large if the years 2010-2014 were very irregular.

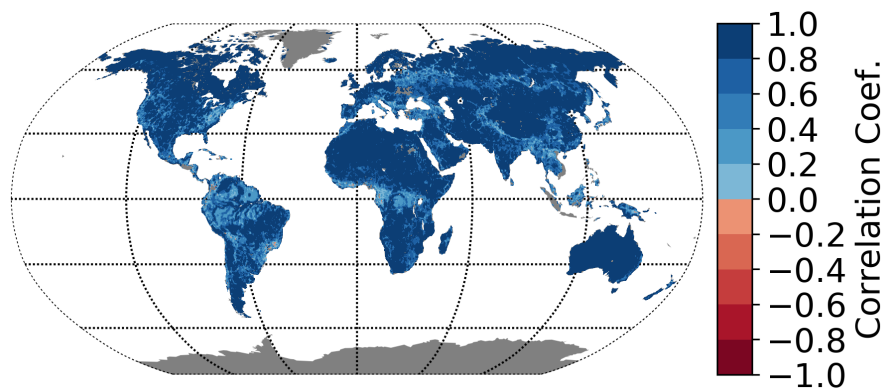- **time/lon/lat:** Dimensions of the data.

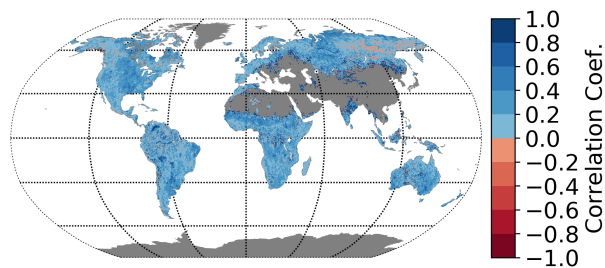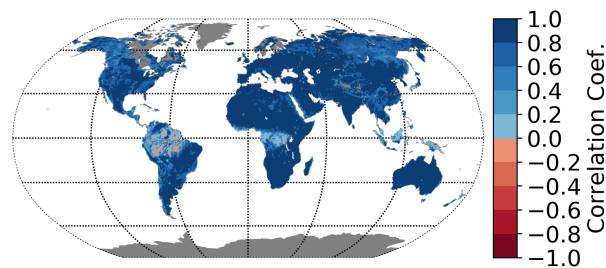15
2 Supplementary figures

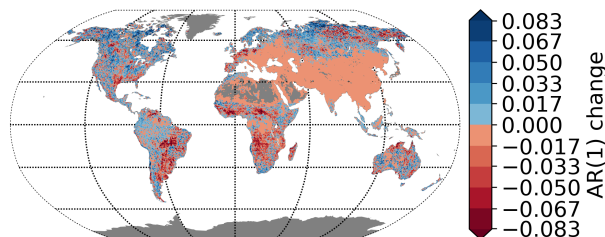**Figure 1.** Correlation between the AMSR2 6.9 and 7.3 GHz band
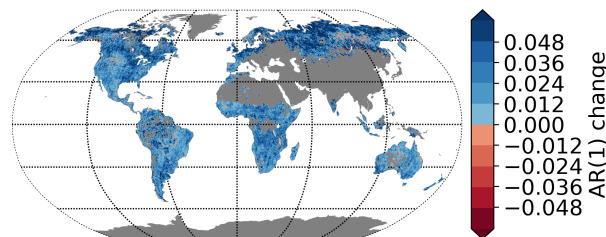

(a) L-band LPRM-SMAP vs. LPRM-SMOS

(b) Ku-band AMSR-E vs. WindSat

Figure 2. Correlations between different sensors of the same band. The Ku-band WindSat vs. AMSR-E plot is similar to all other sensor combinations in the Ku, X, and C band.

(a) SMAP

(b) SMOS

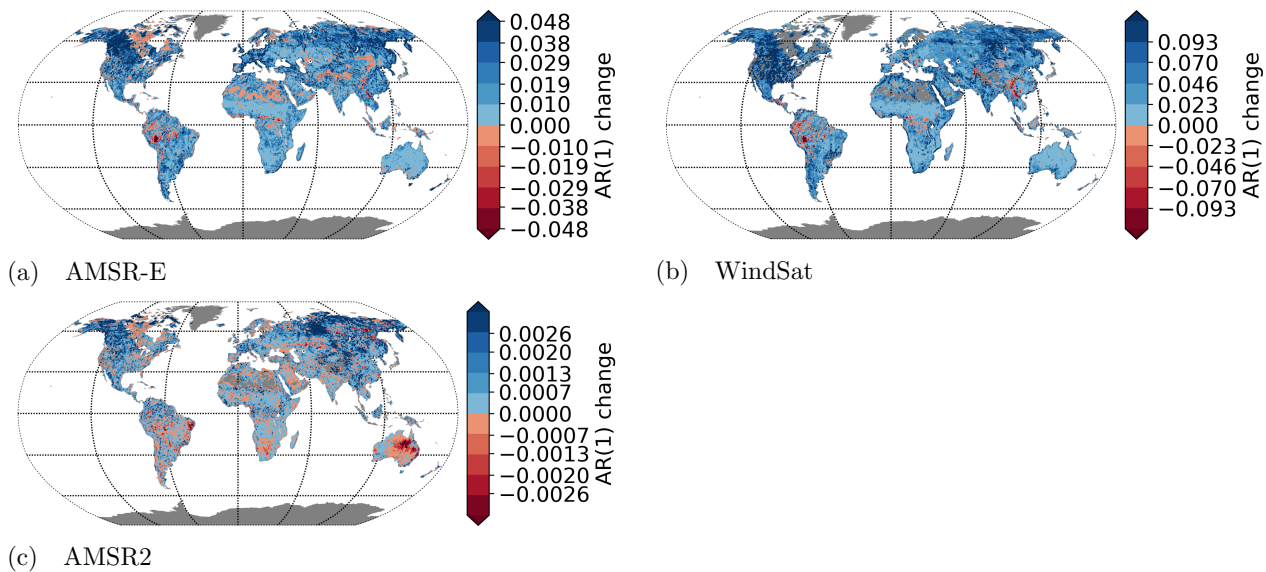**Figure 3.** First-order auto-correlation change due to experimental merging of L-band data for each sensor

(a)   AMSR-E   (b)   WindSat

(c)   AMSR2

Figure 4. First-order auto-correlation change due to merging of C-band data for each sensor
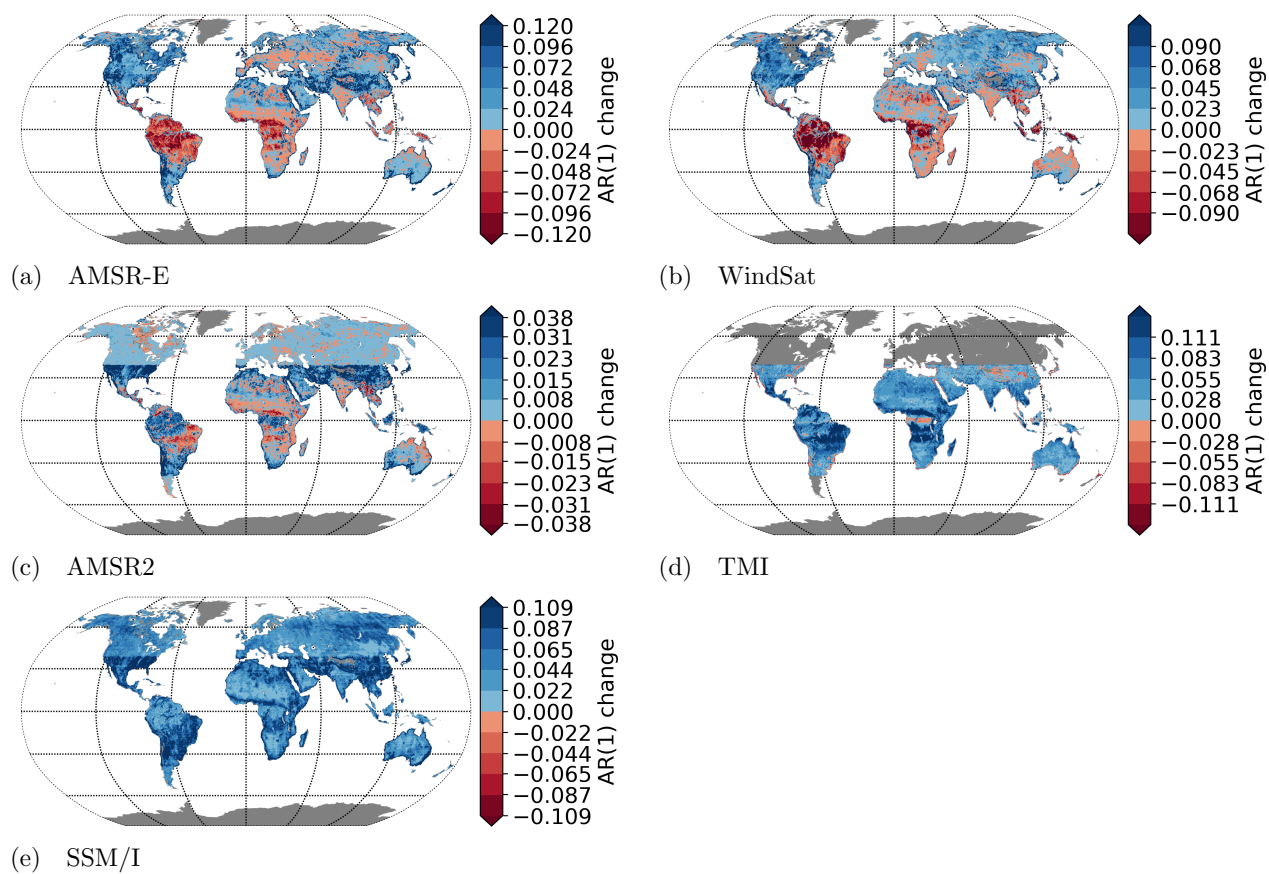

(a)   AMSR-E   (b)   WindSat

(c)   AMSR2   (d)   TMI
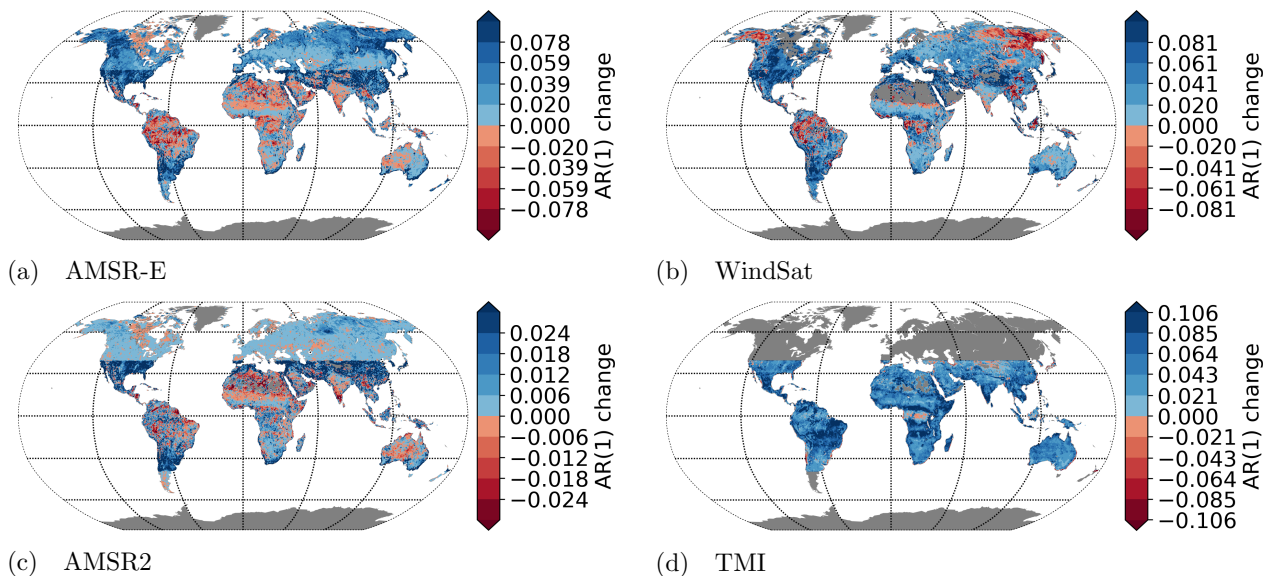
Figure 5. First-order auto-correlation change due to merging of X-band data for each sensor

Figure 6. First-order auto-correlation change due to merging of Ku-band data for each sensor
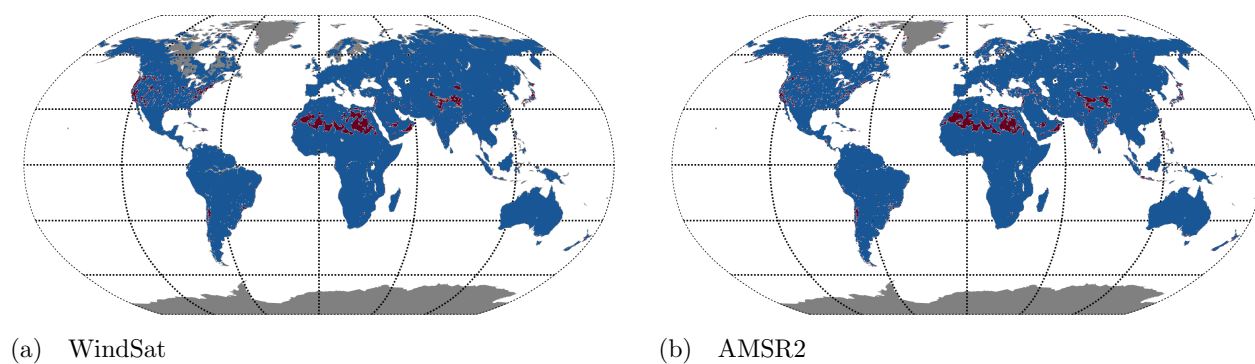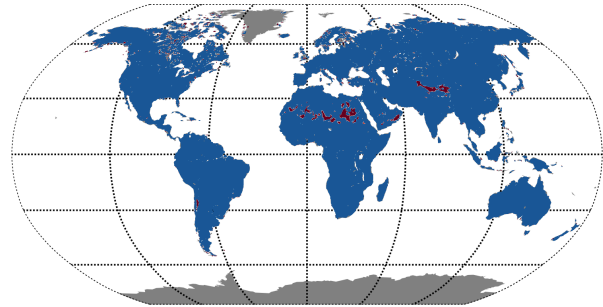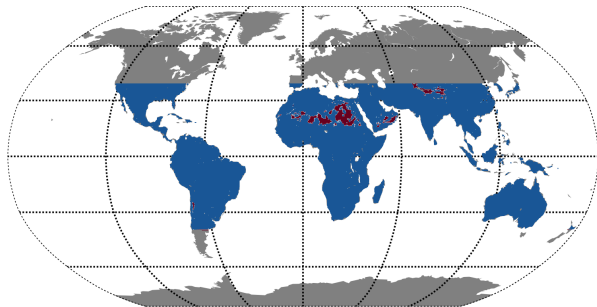
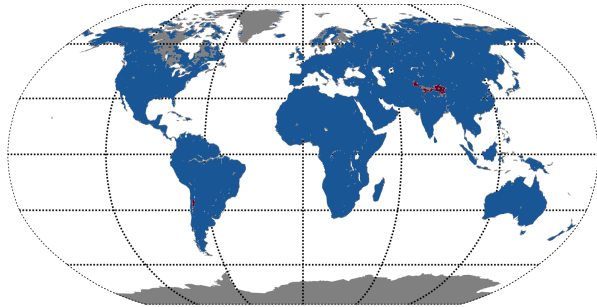

Figure 7. C-band data loss due to failed CDF matching
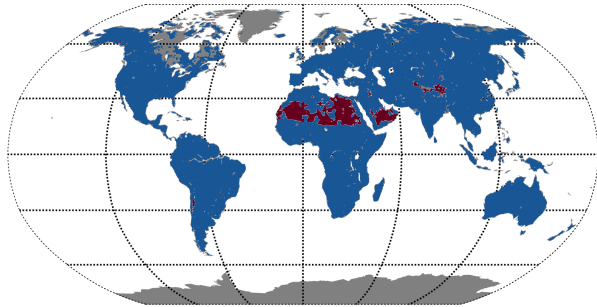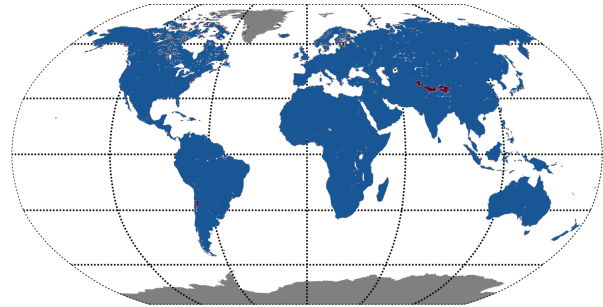
(a) WindSat
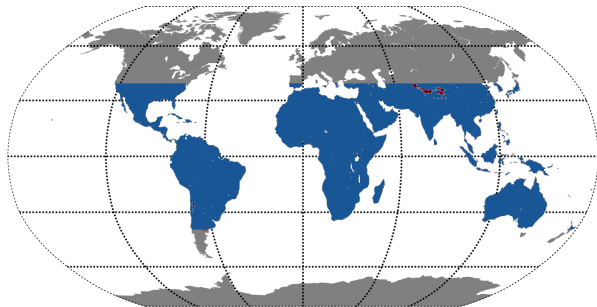

(b) AMSR2

(c) TMI

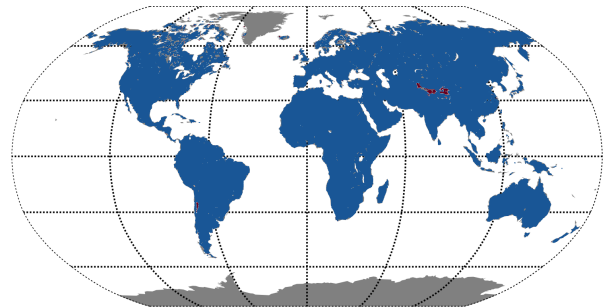**Figure 8.** X-band data loss due to failed CDF matching

(a) WindSat

(b) AMSR2

(c) TMI

(d) SSM/I

Figure 9. Ku-band data loss due to failed CDF matching