
Supplement 2: Processed Research Data Tables

Supplement 2 of the paper "Impacts of Radiometric Uncertainty and Weather-Related Surface Conditions on Soil Moisture Retrievals with Sentinel-1" in the journal Remote Sensing.

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-----CONTENT-----

The CSV-files contain the following for each of the study fields:

1. Date and time of the Sentinel-1 observations in Central European Time (CET), which is the local standard (winter) time: Column 1.
2. Masks: Column 2 to Column 5.
3. Meteorological conditions: Column 6 to Column 25.
4. Sentinel-1 backscatter observations: From Column 26 to End.

The file 'Locations_StudyFields_WGS84.csv' contains the coordinates of the study fields and their surface areas.

-----2. MASKS-----

Column 2 to Column 5 contain whether masks for Frozen Conditions, Snow, Rain interception and Dew apply (=1) or do not apply (=0). See the Research Paper for details about the masking rules.

-----3. METEOROLOGICAL CONDITIONS-----

- Column 6 to Column 8: Air temperature, linearly interpolated to the time of the Sentinel-1 observation (in degrees Celsius).
- Column 9 to Column 11: Snow depth, linearly interpolated to the time of the Sentinel-1 observation (in cm).
- Column 12 to Column 15: Sum of rainfall in hour of the Sentinel-1 observation and the 12 preceding hours (in mm).
- Column 16 to Column 19: Rainfall in the hour of the Sentinel-1 observation (=1) or no rainfall in the hour of the Sentinel-1 observation (=0).
- Column 20 to Column 22: Relative humidity, linearly interpolated to the time of the Sentinel-1 observation (in %).
- Column 23 to Column 25: Average wind speed in the hour of the Sentinel-1 observation (in m/s).

Local tipping bucket rain gauge measurements (Davis Rain Collector 7857M, maintained by University of Twente - Faculty of Geo-Information Science and Earth Observation ITC) were available for Meadow I, and Cultivated Fields I and II (for some periods). These are in Columns 12 and 16.

Additional precipitation measurements, air temperature, relative humidity and wind speed are measured by the Royal Netherlands Meteorological Institute ("Koninklijk Nederlands Meteorologisch Instituut", KNMI). These are hourly measurements. The KNMI stations Twenthe, Heino and Hupsel are in the study region Twente.

Snow depth measurements are available at 09:00 CET each day from KNMI precipitation stations. There are 24 precipitation stations in the study region Twente. Columns 9 to 11 show the interpolated measurements of the three precipitation stations nearest to a study field.

The KNMI data were downloaded from:

<http://www.knmi.nl/nederland-nu/klimatologie-metingen-en-waarnemingen>

-----4. SENTINEL-1 BACKSCATTER OBSERVATIONS-----

- Column 26: Relative Sentinel-1 orbit.
- Forests: Processed Sentinel-1 VV observations are in column 27 to 42 (surface areas of 0.25 ha to 10 ha) and VH observations are in column 43 to 58 (surface areas of 0.25 ha to 10 ha).
- Meadows and Cultivated Fields: Processed Sentinel-1 VV observations are in column 27 and VH observations are in column 28.

Level-1 Sentinel-1 images were downloaded from the Copernicus Open Access Hub:

<https://scihub.copernicus.eu/>

The downloaded Level-1 Ground Range Detected (GRDH) Interferometric Wide Swath (IW) Sentinel-1 images were pre-processed with the Sentinel Application Platform (SNAP) V6.0 software using the following operations:

1. Apply Orbit File
2. Thermal Noise Removal
3. Range Doppler Terrain Correction

The SNAP software can be downloaded at: <https://step.esa.int/main/toolboxes/snap/>

Then, the Sentinel-1 backscatter observations were averaged over selected areas (see Research Paper) and converted to Decibel.