



The International Soil Moisture Network (ISMN) in support of Satellite Soil Moisture Validation

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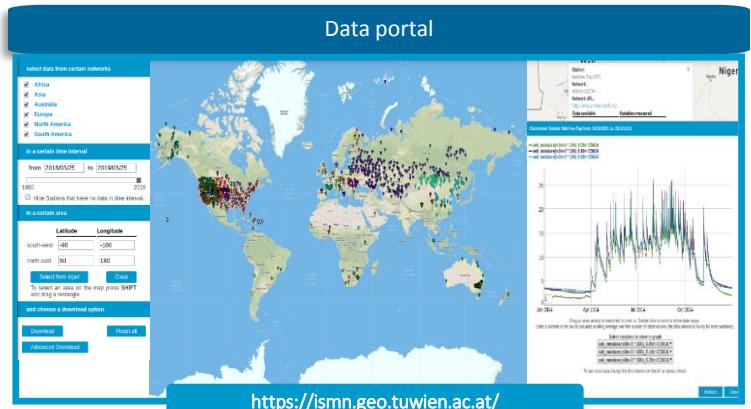


Figure: available stations in ISMN Data viewer

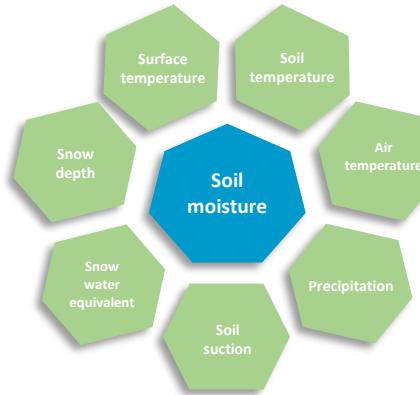
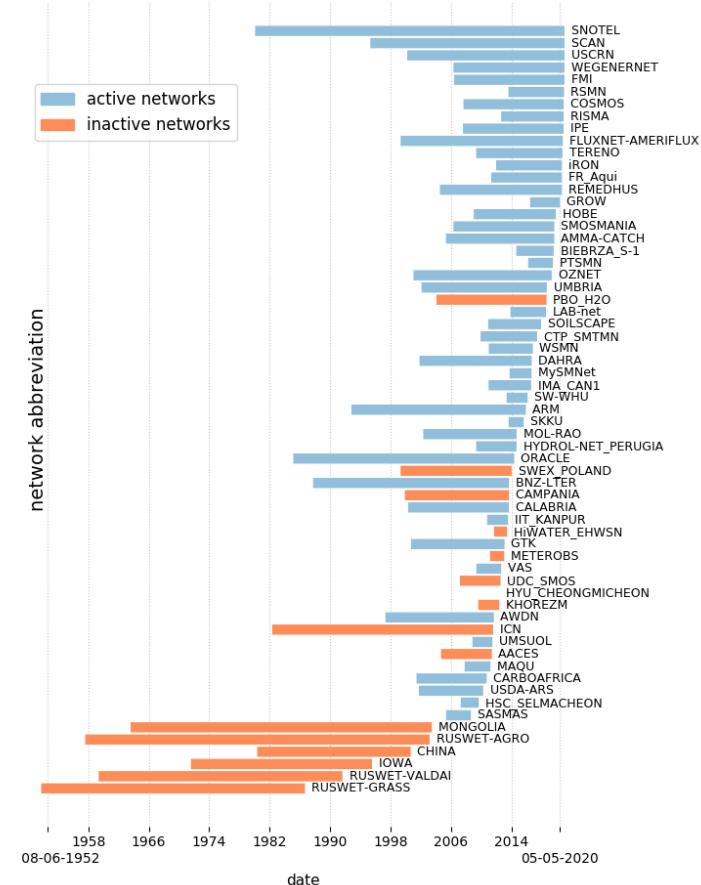


Figure: Additional variables at ISMN

- 💧 The ISMN collects **in situ soil moisture data**
- 💧 harmonizes the data (units and sampling rates)
- 💧 applies **advanced quality controls**
- 💧 stores the processed data and
- 💧 distributes the data for **FREE**

- In situ data + metadata
- Soil moisture + 7 additional variables integrated in the DB
- 63 networks participate (status May 2020)
- Daily update of 6 NRT networks -> 943 stations (status May 2020)
- > 1100 Peer reviewed publications making use of ISMN data



Graph: Temporal coverage of all 63 contributing networks



Data Collection

Data Harmonization

Quality Control

Database Storage

Data Portal

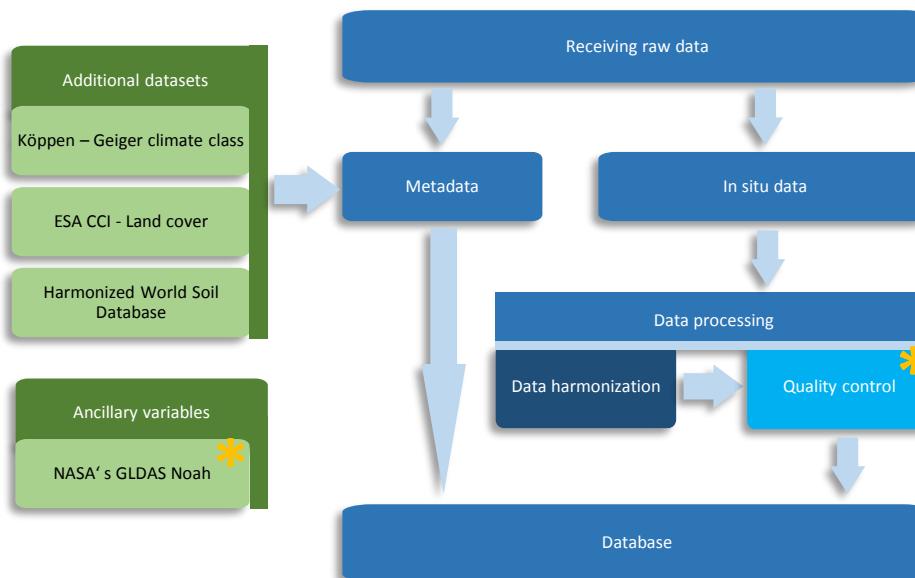


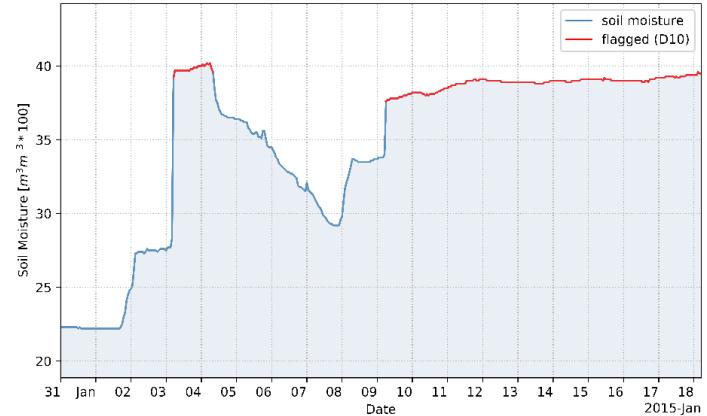
Figure: ISMN processing – from raw data to database storage

- 💧 unified data format
- 💧 hourly data
- UTC
- Same units

Quality control

Flag D10 – Saturated Plateau

HOBE, 1.07, Decagon STE-A, Depth: 0.05m, id: 73818



Plot: Suspicious values on plateau flagged with value "D10"

Flag category	Flag values	Definition
C	C01 - C03	Threshold based flags for all variables used in the ISMN (soil moisture, soil temperature, temperature air, etc.)
D	D01 - D10	Questionable /dubious
M		Parameter value missing OR derived parameter can not be computed
G		Good



Applications/Products using ISMN data



ESA CCI Soil Moisture

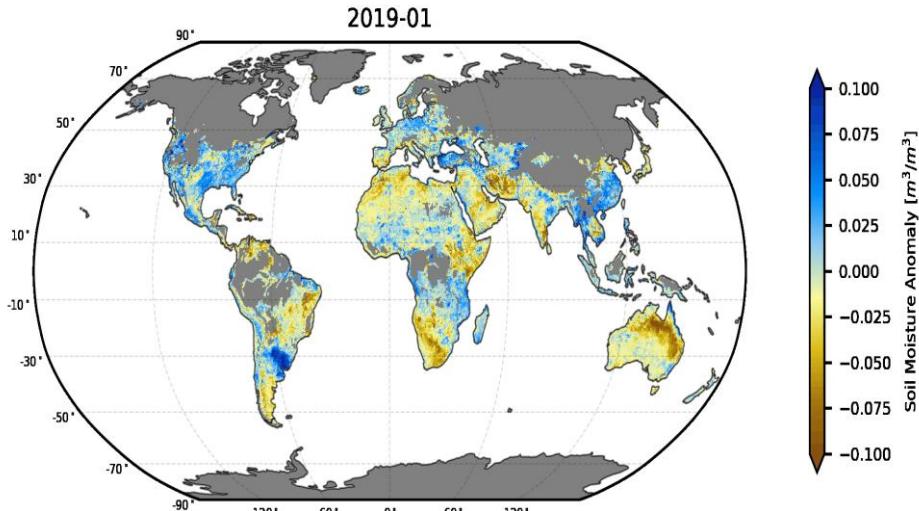


Figure: ESA CCI Soil Moisture Product (v04.7)

Quality Assurance for Soil Moisture

The figure shows a screenshot of the "Quality Assurance for Soil Moisture" web application. The interface is divided into several sections:

- Data:** Includes dropdowns for Dataset (C3S), Version (v201706), and Variable (sm). Below these are filter options for various quality flags (e.g., Filter dataset, Variable in valid geophysical range, Data with no inconsistencies detected (flag = 0), Not freezing and no snow-cover (flag != 1), No dense vegetation (flag != 2), Ascending mode only, Descending mode only).
- Reference:** Includes dropdowns for Dataset (ISMN), Version (20180712 mini testset), and Variable (soil moisture). Below these are filter options for valid geophysical range and quality flags.
- Spatial Subsetting:** Allows specifying a bounding box for spatial subsetting.
- Validation Period:** Allows specifying a validation period from 1978-01-01 to 2020-05-05.
- Anomalies:** A section for viewing anomalies.
- Scaling:** A section for scaling data.
- Name your validation:** A text input field for naming the validation.
- Validate:** A blue button at the bottom right.

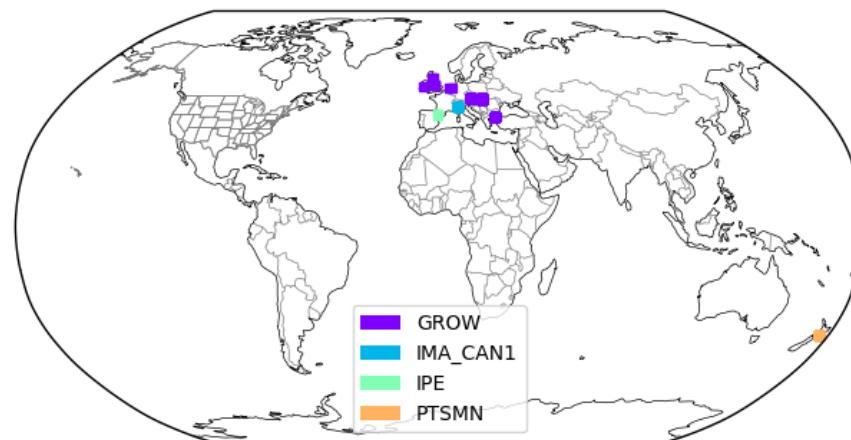
<https://www.esa-soilmoisture-cci.org/>

<https://qa4sm.eodc.eu/>



Please share your in situ data with us

Welcome to our newest contributors!



Plot: Stations of new networks mapped with ISMN data reader

ISMN - <https://ismn.geo.tuwien.ac.at/>
ISMN data reader - <https://github.com/TUW-GEO/ismn> 
contact - ismn@geo.tuwien.ac.at