



TECHNISCHE
UNIVERSITÄT
WIEN



QA4SM - Development of a traceable online satellite soil moisture validation system

Wolfgang Preimesberger¹, Tracy Scanlon¹, Doris Baum²,
Zoltan Bakcsa², Alexander Boresch², Wouter Dorigo¹

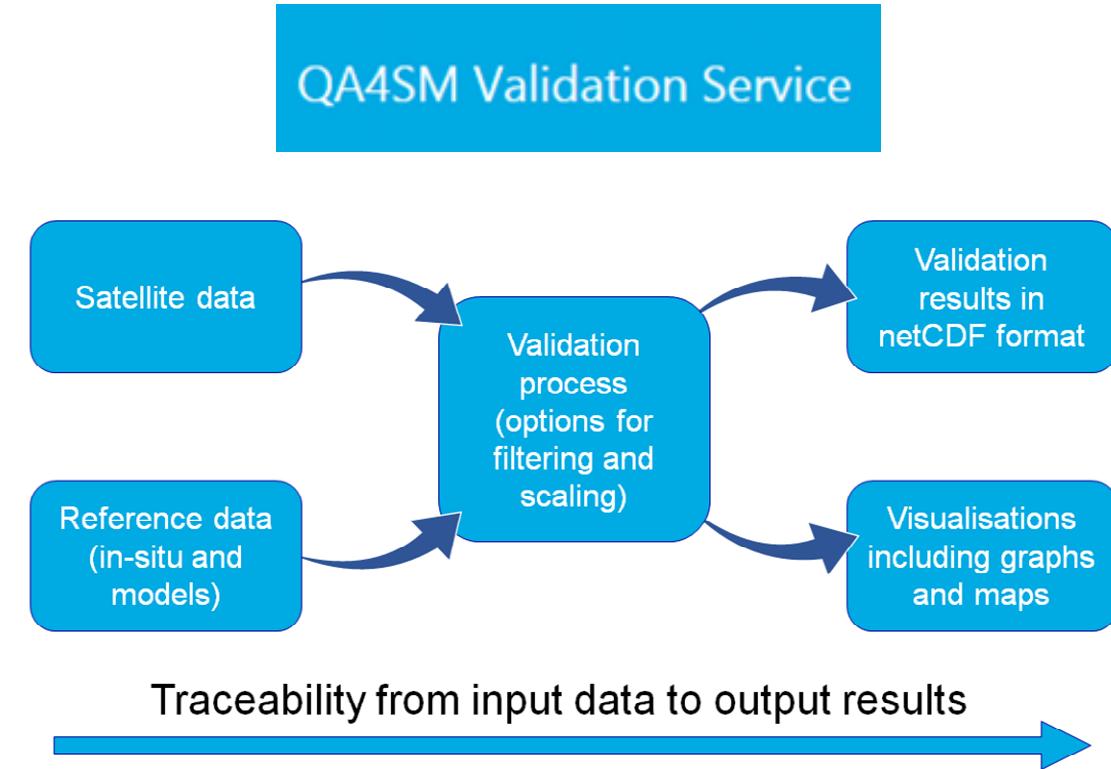
¹ TU Wien (Vienna, Austria), ² AWST GmbH (Vienna, Austria)

contact: wolfgang.preimesberger@geo.tuwien.ac.at

EGU Online 2020-05-06
Session: HS6.3

Overview

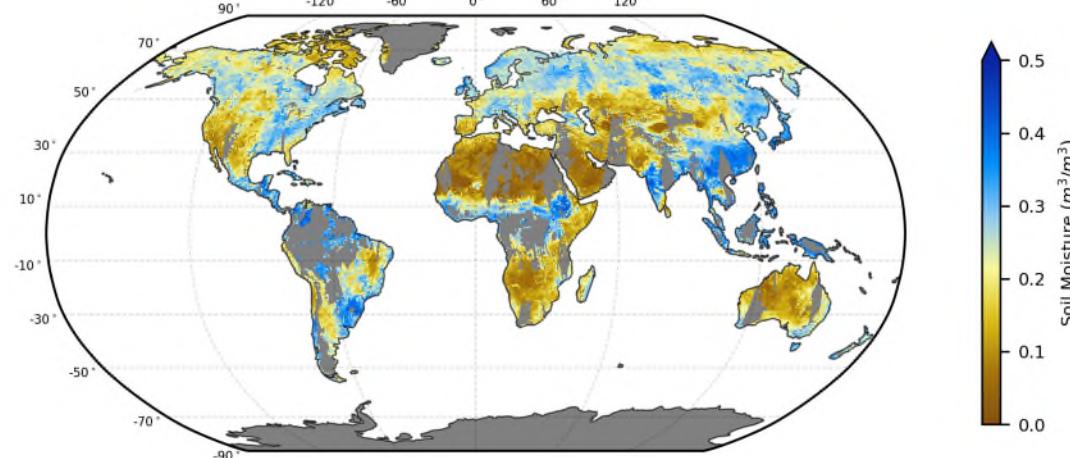
- Online validation service
 - free to use (registration)
- Soil Moisture (SM) validation
 - online data access (no data download)
 - cloud processing (EODC)
 - online output storage
 - output visualisations
- Under development
 - next project phase to focus on high-res SM products



Available Data Sets

- Satellite SM
 - [ESA CCI SM](#) / [C3S SM](#)
 - [SMAP L3 SM](#)
 - [SMOS IC SM](#)
 - [HSAF ASCAT SSM](#)
- Reference SM
 - [ISMN \(insitu\) SM](#)
 - [GLDAS SM](#)
 - [ERA5 / ERA5-Land SM](#)
- More data will be added

Satellite SM from ESA CCI SM (COMBINED) at 2019-07-01



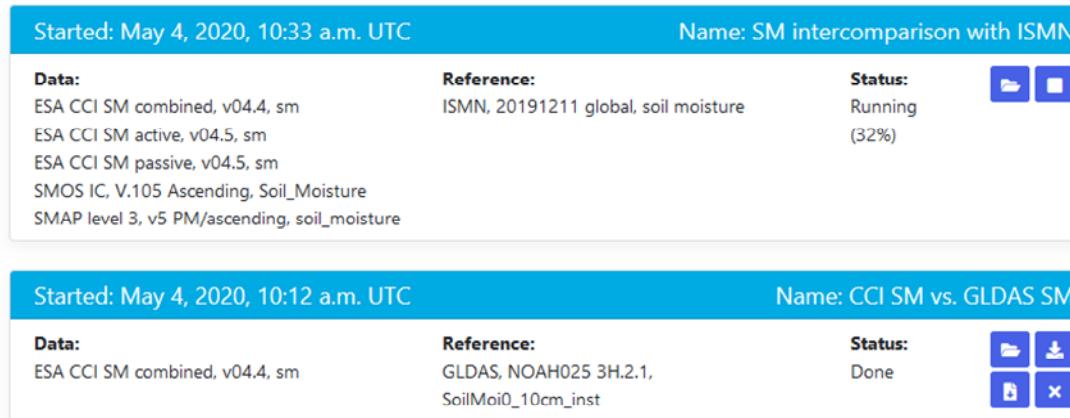
In situ stations currently available in the ISMN



Features

- Filtering & sub-setting
 - orbit, snow-cover, flags,...
 - spatial / temporal subsets
- Intercomparison
 - up to 5 data sets + reference
- Anomaly validation & scaling

Validation Results Manager

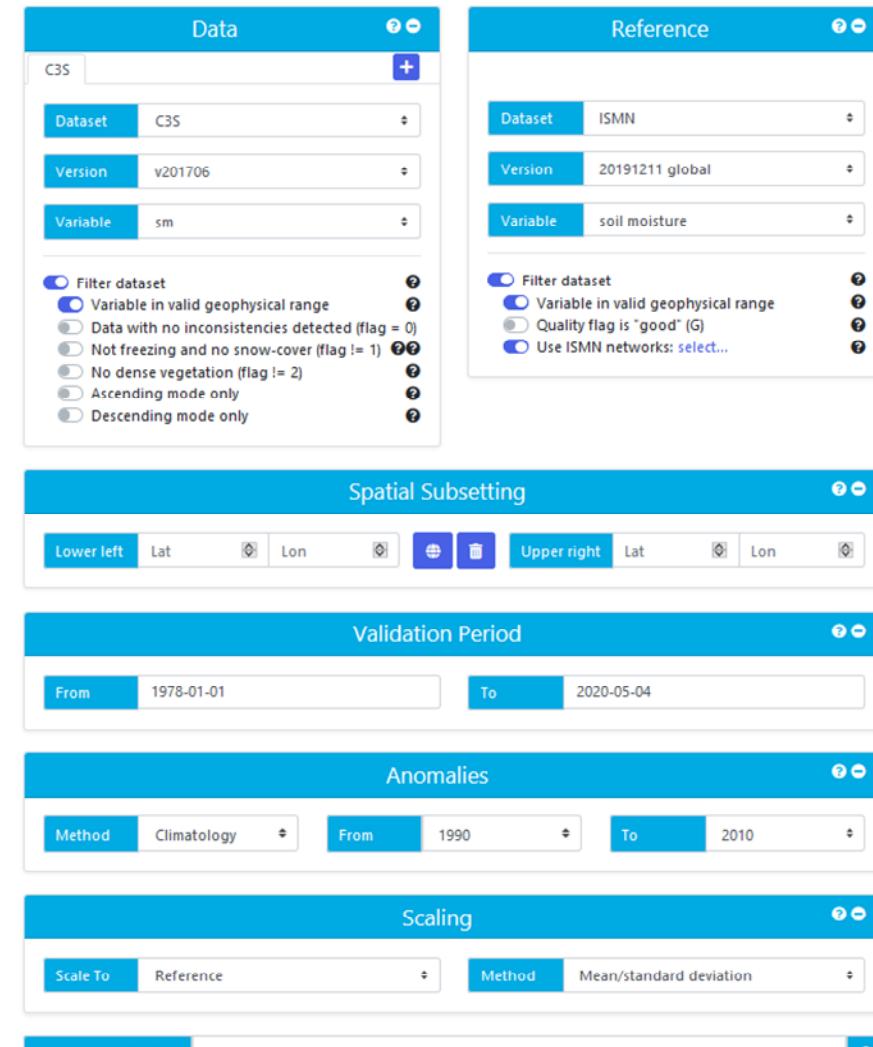


The screenshot displays two validation results in a grid:

- Top Card:** Started: May 4, 2020, 10:33 a.m. UTC. Name: SM intercomparison with ISMN. Data: ESA CCI SM combined, v04.4, sm. Reference: ISMN, 20191211 global, soil moisture. Status: Running (32%).
- Bottom Card:** Started: May 4, 2020, 10:12 a.m. UTC. Name: CCI SM vs. GLDAS SM. Data: ESA CCI SM combined, v04.4, sm. Reference: GLDAS, NOAH025 3H.2.1, SoilMoi0_10cm_inst. Status: Done.

qa4sm.eodc.eu

Validation Framework User Interface



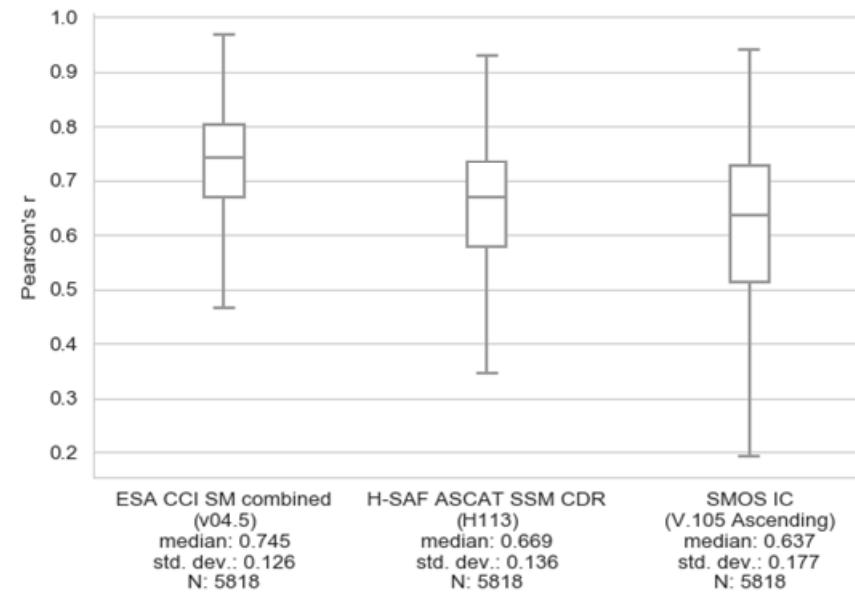
The screenshot shows the Validation Framework User Interface with the following panels:

- Data:** Dataset: C3S, Version: v201706, Variable: sm. Filter options include: 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:** Dataset: ISMN, Version: 20191211 global, Variable: soil moisture. Filter options include: Filter dataset, Variable in valid geophysical range, Quality flag is "good" (G), Use ISMN networks: select...
- Spatial Subsetting:** Lower left Lat: [] Lon: [] Upper right Lat: [] Lon: []
- Validation Period:** From: 1978-01-01 To: 2020-05-04
- Anomalies:** Method: Climatology, From: 1990, To: 2010
- Scaling:** Scale To: Reference, Method: Mean/standard deviation. Name your validation: [] Validate: []

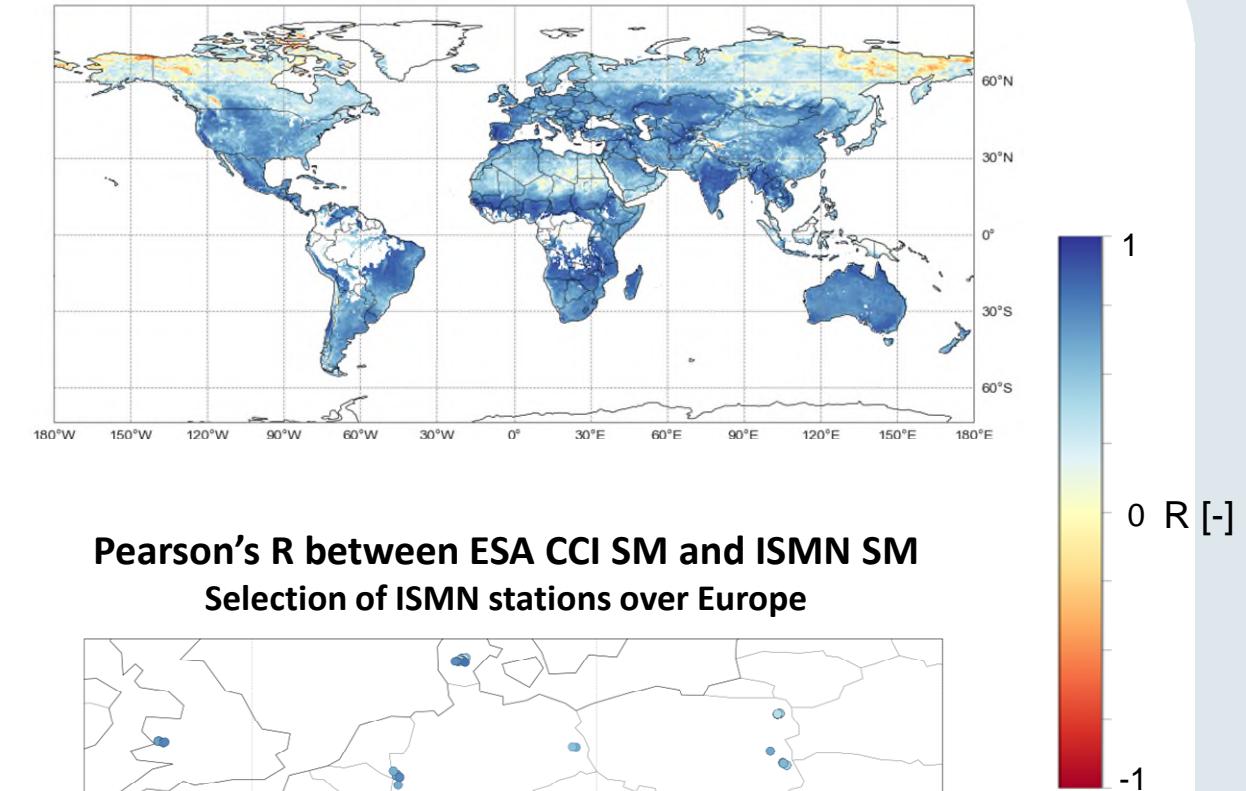
Output

- Validation results for download
 - in netCDF format
- Visualisations
 - maps and box plots

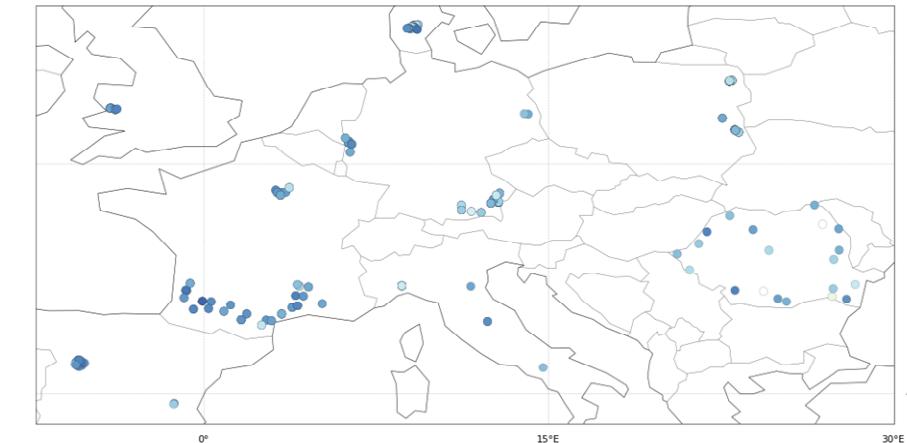
Intercomparison (Pearson's R) of SM over Europe
with ERA5 as the reference



Pearson's R between ESA CCI SM and GLDAS Noah SM



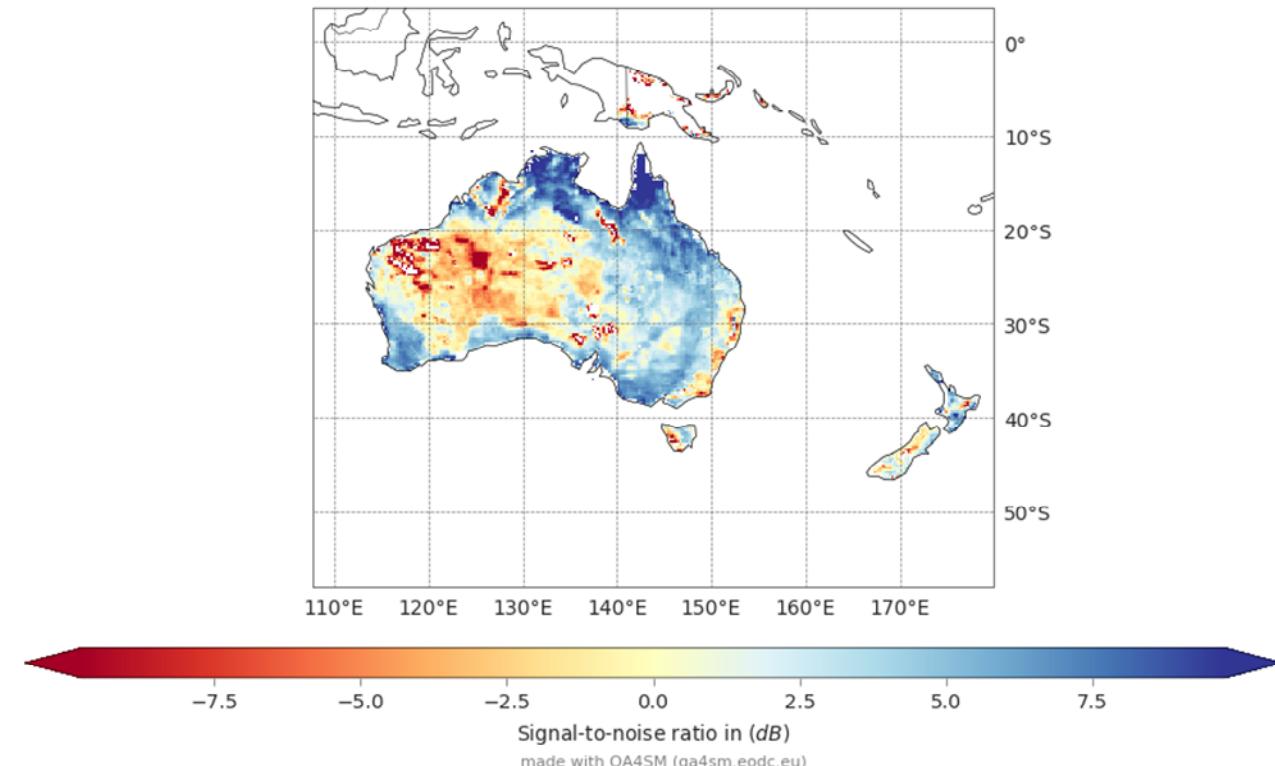
Pearson's R between ESA CCI SM and ISMN SM
Selection of ISMN stations over Europe



Future updates

- High resolution SM data
- New validation metrics
 - Including triple collocation
- Improved traceability
 - DOIs for validation results
- User data upload

Signal-to-noise ratio (ESA CCI SM ACTIVE)
with ESA CCI SM (PASSIVE) and ERA5-Land



Try it out*: <https://qa4sm.eodc.eu>

Feedback: qa4sm@awst.at

* Performance varies depending on concurrent users/validation runs, please choose spatial subsets for testing