



## **ESA CCI and C3S Soil Moisture - Recent advances and quality assurance based on the online validation platform QA4SM**

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Quality assurance of satellite-derived soil moisture datasets is key for ensuring users are provided with datasets of sufficient quality to their applications. Currently, such activities are undertaken on an ad-hoc basis or using a protocol designed for a specific product. These results are useful, but differ in terms of output validation data, plots and reports and therefore are difficult to inter-compare.

The aim of the Quality Assurance for Soil Moisture (QA4SM) ([www.qa4sm.eodc.eu](http://www.qa4sm.eodc.eu)) project (supported by the Austrian Space Application Programme) is to bring together methodologies and protocols used for the validation and quality control of soil moisture data products and develop this into a coherent methodology allowing the provision of standardised, and above all traceable validation results to the user community. QA4SM is driven by validation best practice guidelines resulting from a collaborative effort of the entire satellite soil moisture validation community, including the Committee on Earth Observation Satellites, the Global Climate Observing System, and the validation teams of the individual satellite missions.

An easy-to-use functional, web-based test application has been made available to the user community. The application currently allows users to compare medium coarse resolution satellite datasets to in-situ validation data (made available through the International Soil Moisture Network (ISMN) (<http://ismn.geo.tuwien.ac.at>)) and global land surface models. Later updates of the system will allow the upload and comparison of user's own datasets as well as the validation of high resolution (1 km) products.

The web-based graphical front-end allows users to easily select specific criteria for the comparison process including control of the masking applied to each dataset, the metrics calculated and so on. The validation results are provided as a netCDF file which includes traceability data in the global attributes as well as plots of each metric.

Various satellite-derived soil moisture products are available for validation within the QA4SM system including SMAP L3 and the SMOS IC soil moisture products as well as the European Space Agency (ESA) Climate Change Initiative (CCI) and EU Copernicus Climate Changes Services (C3S) soil moisture products. These latter two products are produced by systematically combining Level-2 datasets from separate missions. The combination of individual Level 2 datasets into a single product gives us the opportunity to profit from the advantages of individual missions, and to obtain homogenised CDRs with improved spatial and temporal coverage.

The accuracy of the ESA CCI and C3S products are routinely assessed (each time a new version is generated) through comparison to in-situ (ISMN) and global models. The quality assessment also includes consideration of the stability of the product and a completeness / consistency check. The aim of these assessments is to ensure that the highest quality product is provided to the data users. With the availability of the QA4SM system, this can now be achieved in a robust and traceable manner.

The goal of this presentation is to present the QA4SM system, show validation results for both the ESA CCI and C3S soil moisture products using the system, and collect feedback from the wider satellite soil moisture validation/calibration community.