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## QA4SM: Development of a traceable online satellite soil moisture validation system

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The Quality Assurance for Soil Moisture (QA4SM) service is an online validation tool to evaluate and intercompare the performance of state-of-the-art open-access satellite soil moisture data records (<https://qa4sm.eodc.eu>). QA4SM implements routines to preprocess, intercompare, store and visualise validation results based on community best practices and requirements set by the Global Climate Observing System and the Committee on Earth Observation Satellite. The focus on traceability in terms of input data, software and validation results improves reproducibility and sets the basis for a community wide standard for future validation studies.

Within the validation framework a number of up-to-date soil moisture datasets are provided. Satellite data include multi-sensor records such as the European Space Agency's Climate Change Initiative (ESA CCI) and the Copernicus Climate Changes Services (C3S) Soil Moisture datasets and single sensor products e.g. from SMAP, SMOS or Metop ASCAT. Reference data within the service include the full in-situ data archive of the the International Soil Moisture Network (ISMN; <https://ismn.geo.tuwien.ac.at/>) and land surface model/reanalysis products, e.g. from the European Centre for Medium-Range Weather Forecasts (ECMWF). General validation metrics between dataset pairs (such as correlation or RMSD amongst others) and triples (Triple Collocation) are part of the service. QA4SM allows users to select from a number of input parameters to specify temporal or spatial subsets of data to evaluate and provides options for data filtering, validation of anomalies and the use of different scaling methods.

Within this study we show the current status of the service, present its scope of operation and give an outlook on future developments such as the integration of high resolution data.

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