

EGU21-16145

<https://doi.org/10.5194/egusphere-egu21-16145>

EGU General Assembly 2021

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## More than 10 years of The International Soil Moisture Network (ISMN) in support of EO science

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The International Soil Moisture Network (ISMN, ) is a unique centralized global and open freely available in-situ soil moisture data hosting facility. Initiated in 2009 as a community effort through international cooperation (ESA, GEWEX, GTN-H, WMO, etc.), with continuous financial support through the European Space Agency (formerly SMOS and IDEAS+ programs, currently QA4EO program), the ISMN is more than ever an essential means for validating and improving global satellite soil moisture products, land surface -, climate- , and hydrological models.

Following, building and improving standardized measurement protocols and quality techniques, the network evolved into a widely used, reliable and consistent in-situ data source (surface and sub-surface) collected by a myriad of data organizations on a voluntary basis. 66 networks are participating (status January 2021) with more than 2750 stations distributed on a global scale and a steadily increasing number of user community, > 3200 registered users strong. Time series with hourly timestamps from 1952 – up to near real time are stored in the database and are available through the ISMN web portal for free (), including daily near-real time updates from 6 networks (~ 1000 stations).

About 10'000 datasets are available through the web portal and the number of networks and stations covered by the ISMN is still growing as well as most datasets, that are already contained in the database, are continuously being updated.

The ISMN evolved in the past decade into a platform of benchmark data for several operational services such as ESA CCI Soil Moisture, the Copernicus Climate Change (C3S), the Copernicus Global Land Service (CGLS), the online validation service Quality Assurance for Soil Moisture (QA4SM) and many more applications, services, products and tools. In general, ISMN data is widely used in a variety of scientific fields with hundreds of studies making use of ISMN data (e.g. climate, water, agriculture, disasters, ecosystems, weather, biodiversity, etc.).

In this session, we want to inform ISMN users about the evolution of the ISMN over the past decade, including a description of network and dataset updates and new quality control procedures. Besides, we provide a review of existing literature making use of ISMN data in order

to identify current limitations in data availability, functionality and challenges in data usage in order to help shape potential future modes in operation of this unique community- based data repository.