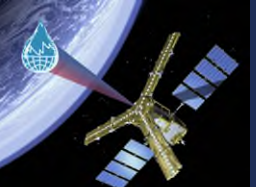


FRM4SM

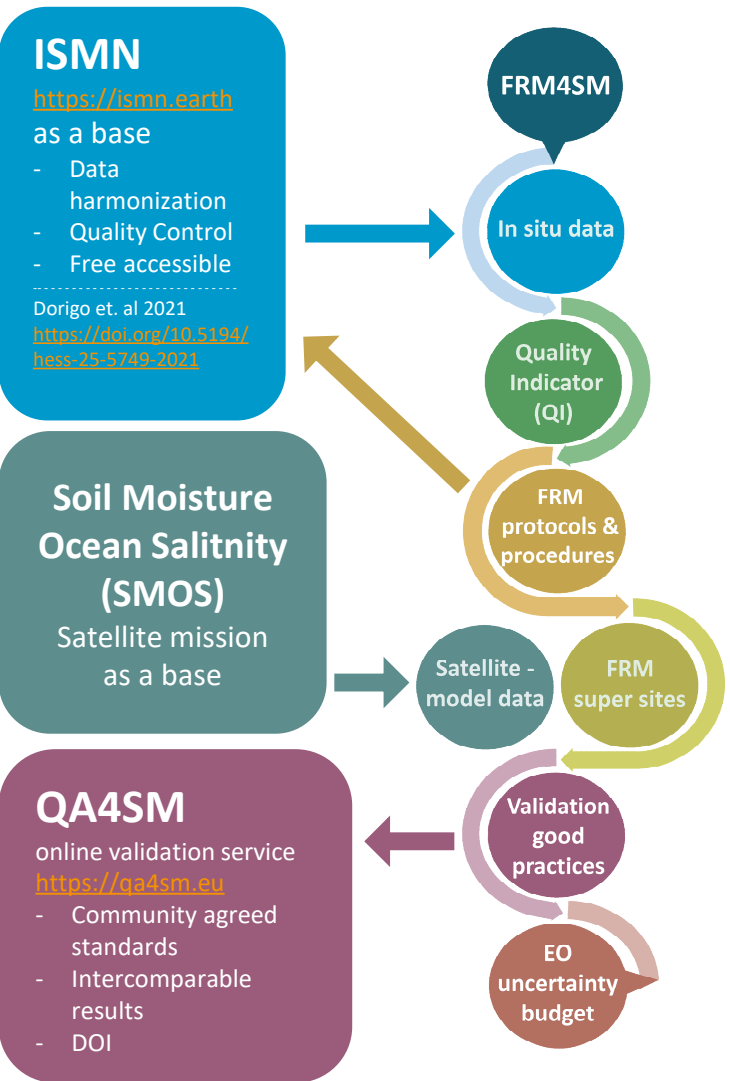
Fiducial Reference Measurement for Soil Moisture II May 2021 – May 2023

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ESA's Fiducial Reference Measurement for Soil Moisture (FRM4SM)

May 2021 – May 2023 || 4 partners || Scientific Advisory group (10 experts)



Fiducial Reference Measurements (FRMs)

- Fully characterized & traceable in situ measurements following community agreed guidelines (GEOS/CEOS QA4EO framework)
 - EO data easily & openly accessible
 - Data with associated Quality Indicator (QI) → to evaluate its fitness for purpose
 - Traceable QIs → internationally agreed reference standards (SI if possible)

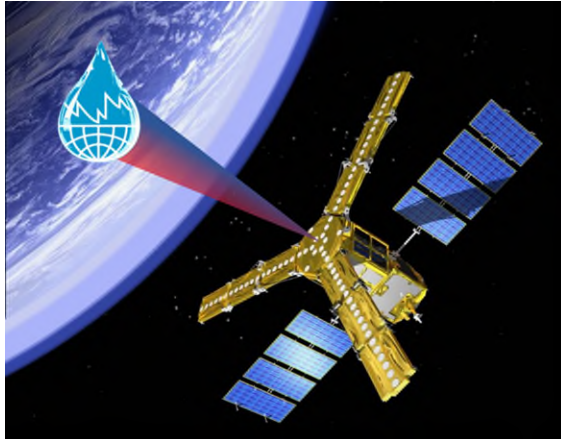
ESA's FRM activities typically comprise activities:

- Establishing ground-based FRM networks for a particular variable
- Specify the protocols and procedures to establish and use such FRM data
- Validate relevant satellite products against established FRM data

FRM4SM targets all the above goals through:

- Evolution of the International Soil Moisture Network (ISMN)
- Evolution of the Quality Assurance for Soil Moisture online validation service (QA4SM)
- Development of a set of in situ soil moisture Qis fully describing uncertainty characteristics
- Development of an "FRM Protocols and Procedures" document – building upon community agreed standards
- Improvement of uncertainty understanding in SSM observations — ISMN/ SMOS validation case studies

→ More info on <https://project-frm4sm.geo.tuwien.ac.at/>



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³ CESBIO: www.cesbio.cnrs.fr

⁴ ESA: <https://earth.esa.int/eogateway>

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Building new ISMN DOI system upon following references:

[1] [Recommendations of the Working Group on Data Citation \(WGDC\)](#)

[2] [Raubert et. al 2021](https://doi.org/10.1162/99608f92.be565013); <https://doi.org/10.1162/99608f92.be565013>

[3] [FAIR principles](#)

Bircher et al. (2016): "Soil moisture sensor calibration for organic soil surface layers", <https://doi.org/10.5194/gi-5-109-2016>

Kerr et al. (2016): "Overview of SMOS performance in terms of global soil moisture monitoring after six years in operation", <https://doi.org/10.1016/j.rse.2016.02.042>

Diez-Garcia et al. (2022): "SMOS v724 Third Mission Reprocessing: Brightness Temperature Quality and Stability", DOI: [10.1109/TGRS.2022.3206118](https://doi.org/10.1109/TGRS.2022.3206118)