Special Session S4: Remote sensing of high resolution soil moisture

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Soil moisture (SM) is recognized as one of the Essential Climate Variables by the Global Climate Observing System (GCOS) of the World Meteorological Organization (WMO). SM significantly influences hydrological and atmospheric processes across multiple spatial scales—local, regional, and global.

Remote sensing has made significant progress in delivering reliable SM estimates. Currently, satellite-based SM products at coarse spatial resolutions (e.g., 10–40 km) are operational. Meanwhile, higher resolution SM products (e.g., 0.1–1.0 km) are transitioning from the research phase to systematic generation. Synthetic Aperture Radar (SAR) systems operating in C- and L-bands are well-suited to resolve fine-scale SM heterogeneity. Thus, the Copernicus Sentinel-1 mission, as well as the forthcoming ROSE-L and NISAR missions, offer capabilities to improve our quantitative understanding of the soil-vegetation-atmosphere system and enhance applications such as mapping the impact of irrigation on local water budgets, assess the effects of local SM variability on atmospheric instability, and improve the hydrological modeling at regional scales.

In this context, we encourage contributions presenting recent advancement in high resolution SM retrieval. Topics of interest include:

- methodological innovations in SM retrieval;
- synergistic use of multi-frequency SAR data;
- uncertainty characterization of SM products;
- applications of SM products in scientific and operational disciplines.