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Implementation of SMOS data monitoring in the Integrated Forecast System. Preliminary results.

Joaquin Muñoz Sabater (1), Patricia de Rosnay (1), Mathias Drusch (2), Mohamed Dahoui (1), Steven Delwart (2), and Norrie Wright (2)

(1) European Centre for Medium Range Weather Forecasts, Reading, UK, (2) European Space Agency, ESTEC, Holland.

The Soil Moisture and Ocean Salinity (SMOS) mission of the European Space Agency (ESA) was successfully launched on November 2nd 2009. Using a novel concept based on the Synthetic Aperture Radar technique, it is expected that SMOS observations will provide global accurate maps of brightness temperatures (TB) and soil moisture at L-band every 3 days and at 50 km ground-spatial resolution. Thus, SMOS data will soon provide a valuable input for numerical weather prediction (NWP), hydrological and land surface systems, among others.

Operational numerical weather forecast systems are widely used to evaluate and analyse new types of satellite observations. NWP centres use these observations in their analyses to derive level 2 retrieved geophysical parameters (e.g. soil moisture and ocean salinity for SMOS) from the observed radiances. The European Centre for Medium Range Weather Forecasts is monitoring the first flow of SMOS level 1C TB over sea and land. Monitoring, i.e. the systematic comparison between observations and the corresponding model parameters, is a mandatory step prior to data assimilation. Consequently, monitoring provides an overall quality assessment of SMOS data based on departures values between SMOS observations and the modelled equivalent in the observation space. This is a significant contribution to the calibration / validation activities during the SMOS commissioning phase. Any systematic error or spikes in the data become visible and can be reported to ESA and the other calibration and validation teams without significant delays. Furthermore, the monitored data at global scale will help to calibrate the SMOS instrument at key decision points during the commissioning phase.

In this paper the first SMOS data over land is monitored. Special emphasis is given to the effect of different parametrisations and auxiliary data sets on the simulated TB. This is a first step towards the assimilation of SMOS TB to improve the initialization of soil moisture for NWP systems.