Assimilation of ASCAT, AMSR-E and SMOS soil moisture products over Europe: an assessment of the relative impact of each satellite dataset

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The ESA CCI for soil moisture will produce a multi-year soil moisture dataset from various satellite datasets: ASCAT (Advanced SCATterometer), AMSR-E (Advanced Microwave Scanning Radiometer - Earth Observing System), SSMR (Scanning Multichannel Microwave Radiometer), SSM/I (Special Sensor Microwave Imager), TMI (TRMM Microwave Imager) and the ERS Scatterometer. Furthermore, in the future, the following satellite datasets are also likely to be used: Windsat, AMSR-E-2, Feng Yun and SMOS (Soil Moisture and Ocean Salinity).

To add value to this product, data assimilation experiments where these satellite data are assimilated singly and together over the European domain of the NILU Ensemble Kalman Filter (EnKF) system, are being carried out. In the first instance, these experiments will be carried out for the period of northern summer 2011 using ASCAT, AMSR-E and SMOS soil moisture. The results of these experiments provide information on the relative strengths and weaknesses of each satellite dataset, and provide soil moisture analyses, which can add value to the satellite datasets, singly and merged, and help assess their error characteristics.

In this presentation, we show preliminary results from these assimilation experiments, including an assessment of the error characteristics of the soil moisture analyses by comparison against independent ground-based in situ soil moisture data from the ISMN (International Soil Moisture Network), and an assessment of the relative contribution of each satellite dataset to soil moisture analyses over Europe. This presentation will also discuss the combined assimilation of these satellite datasets, and the ensuing benefits.