

Title: Assimilation of SMOS neural-network-retrieved soil moisture for numerical Weather Prediction at ECMWF

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Abstract:

The first results of an experiment of land data assimilation (DA) on a numerical weather prediction (NWP) model will be presented. The model is the NWP model by ECMWF, which include a state-of-the-art land-surface-atmosphere coupling. The observational data to be assimilated are soil moisture fields obtained from SMOS satellite brightness temperatures measurements using a neural network approach. The neural networks have been trained on ECMWF models, therefore, although the retrieval is driven by the input data, the neural network output shows no global bias with respect to the ECMWF models used as reference

for the training. In addition, this approach does not require the complex radiative transfer computations needed to assimilate directly the brightness temperatures.

A surface-only Simplified Extended Kalman Filter (SEKF) has been used off-line, using atmospheric forcing from a fully coupled experiment. The following numerical experiments will be discussed: Open Loop (no data assimilation), Control (using screen level variables DA only), ASCAT (screen level and ASCAT scatterometer soil moisture DA), SMOS (screen level and SMOS DA), SMOS+ASCAT (screen level, ASCAT and SMOS DA). Analysed soil moisture fields obtained from this set of experiments are used to initialise the land surface in NWP forecast models. The skills obtained with the Open Loop, Control, and DA experiments using various combinations of satellite products and screen level observations will be discussed.