Title: Assimilation of land surface satellite data for operational Numerical Weather Prediction at ECMWF

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Abstract: Land surface is a key component of numerical weather forecasting systems. Land surfaces determine the bottom boundary condition of the atmosphere and processes that occur at this interface control the surface branch of the continental hydrological cycle. Land surface processes are represented in weather forecasting models using coupled land-surface-atmosphere models. Initialization of the the land surface models conditions is needed to ensure accurate forecast of surface and near surface weather conditions. It is also the basis of a large range of applications related to water management, flood forecast and drought prediction.
Satellite data from the current generation of active and passive microwave sensors, such as ASCAT, SMOS and SMAP provide relevant information on soil moisture at global scale. They are being increasingly used for data assimilation developments and for operational monitoring in Numerical Weather Prediction (NWP) systems. Satellite observations also provide useful information on snow cover. The Interactive Multi-Sensor Snow and Ice Mapping System (IMS) is widely used by the NWP community, including ECMWF, to analyse snow depth.
This paper describes the current status of the exploitation of satellite data to constrain the land surface variables of the ECMWF operational NWP system. It describes radiative transfer modelling activities conducted at ECMWF to use data from passive microwave sensors such as SMOS and SMAP. Perspectives to use future generations of satellite observations to consistently constrain NWP and flood forecast systems are also discussed.