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Biomass and Soil Moisture simulation and assimilation over Hungary

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In the framework of ImagineS (Implementation of Multi-scale AGricultural INdicators Exploiting Sentinels) project a Land Data Assimilation System (LDAS) is applied at the Hungarian Meteorological Service (HMS) to monitor the above ground biomass, surface fluxes (carbon and water) and the associated root-zone soil moisture at the regional scale (spatial resolution of 8km x 8km) in quasi real time. In this system the Surfex model is used, which applies the ISBA-A-gs photosynthesis scheme to describe the evolution of vegetation. Surfex is forced using the outputs of the ALADIN numerical weather prediction model run operationally at HMS. First, Surfex is run in open-loop (i.e. no assimilation) mode for period 2008-2013. Secondly the Extend Kalman Filter (EKF) method is used to assimilate LAI Spot/Vegetation and SWI ASCAT/Metop satellite measurements.
The EKF run is compared to the open-loop simulation and to observations (LAI and Soil Moisture satellite measurements) over the whole country and also to a selected site in West-Hungary (Hegyhátsál). In Hegyhátsál the measurements (LAI, moisture and CO_2 fluxes) are made at 3 m and 82 m heights of the tower. The results are evaluated with both kinds of samples. It is shown that with data assimilation we got more realistic biomass and soil moisture analyses than with open-loop mode.