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Validation of a land data assimilation system using river discharge and agricultural yield observations

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Meteo-France develops the ISBA-A-gs generic Land Surface Model (LSM) able to represent the diurnal cycle of the surface fluxes together with the seasonal, interannual and decadal variability of the vegetation biomass. The LSM is embedded in the SURFEX modeling platform together with a simplified extended Kalman filter. These tools form a Land Data Assimilation System (LDAS). The current version of the LDAS assimilates SPOT-VGT LAI and ASCAT surface soil moisture (SSM) products over France (8km x 8km), and a passive monitoring of albedo, FAPAR and Land Surface temperature (LST) is performed (i.e. the simulated values are compared with the satellite products). The vegetation biomass is analysed together with the root-zone soil moisture. The LDAS was coupled to the MODCOU hydrological model, and this allowed the use of in situ river discharge observations for the validation of the whole system. Moreover, open-loop (i.e. without integrationg satellite observations into the model) simulations of the above-ground biomass of straw cereals were compared with the analyzed values (i.e. after integration of satellite observations into the model), and with agricultural yield observations. It is shown that the assimilation of satellite observations sharply enhances the overall correlation of the simulated above-ground biomass with the agricultural yield observations.