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Sequential assimilation of Copernicus vegetation products for better constraining soil-plant parameters and variables in the ISBA land surface model

Jean-Christophe Calvet, Clément Albergel, Alina Barbu, Dominique Carrer, Hélène Dewaele, Delphine Leroux, Catherine Meurey, and Simon Munier

CNRM (Météo-France, CNRS), GMME/VEGEO, Toulouse, France (jean-christophe.calvet@meteo.fr)

CNRM has developed a global Land Data Assimilation System (LDAS-Monde) based on the SURFEX open-source modeling platform. SURFEX includes the ISBA (Interactions between Soil, Biosphere, and Atmosphere) land surface model. This is now the only LDAS chain able to sequentially assimilate vegetation products, jointly with soil moisture products. In particular, LAI and surface soil moisture from the Copernicus Global Land Service (land.copernicus.eu/global) are assimilated. It is shown that:
(1) since the assimilation of LAI impacts the soil moisture analysis, and vice versa, the consistency between these products can be evaluated,
(2) the impact of the assimilation of EO data into SURFEX on river discharge can be assessed (SURFEX is coupled to the CTRIP hydrological model),
(3) the assimilation of LAI can be used to retrieve key soil-plant parameters such as the maximum available soil water content.
A new method able to disaggregate 1-km LAI products is presented. LAI disaggregation is needed to better represent specific vegetation types such as crops. In the framework of the eartH_2Observe project (www.earth2observe.eu), a global reanalysis of vegetation and water variables was produced by LDAS-Monde from 2000 to 2013, at a spatial resolution of 1 degree. Enhanced spatial resolutions can be achieved over selected areas (e.g. 0.5 degree over Europe, 0.1 over France). Further technical work is ongoing in order to:
(1) optimize the LDAS-Monde chain in order to achieve better spatial resolutions at a global scale,
(2) allow near-real-time operations,
(3) assimilate LAI at a spatial resolution of 300 m.