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ASSIMILATION OF REMOTE SENSING DATA IN A SVAT MODEL WITH A SIMPLIFIED 1D-VAR SCHEME

J. Muñoz-Sabater, J.-C. Calvet
Météo-France/CNRM, 31057 Toulouse Cedex 1, France
E: joaquin.munoz-sabater@cnrm.meteo.fr;
T: +33 561079312; F: +33 561079626

Data assimilation systems are designed in order to decrease the discrepancy between the model-generated outputs and the available observations. The level of correction is modulated by taking into account the information of their associated incertitudes. In land surface processes, the root zone soil moisture (w2) and the biomass of the vegetation are key variables due to the slow variation of their large reservoirs. Their precise prediction is fundamental as they are low-level inputs for the Numerical Weather Prediction Models. However the lack of global observations at sufficiently fine spatial-temporal resolution limits their accuracy. This leads to the use of an assimilation system to partially counteract the possible deficiencies of the model.

In this paper a simplified 1D-var assimilation scheme is used due to (1) the better performance showed with regards to another variational schemes that do not include a memory term, (2) it can be several orders faster than an ensemble-based sequential method. The period of study includes the years from 2001 to 2004, with very contrasted climatic conditions in the SMOSREX site in the South-West of France. In situ soil-surface moisture (wg) and LAI observations, as well as brightness temperatures and reflectances over a fallow, are assimilated in the ISBA-A-gs SVAT model. Though, in general, during the whole period the w2 is well retrieved by only assimilating wg observations, the biomass evolution is poorly recalled. Inversely, the results obtained for the retrieval of w2 by assimilating only LAI measurements show that wg observations must be also included in the assimilation scheme. In this paper, reflectances and brightness temperatures are also combined in a single simplified 1D-var assimilation scheme to retrieve, at the same time, the w2 and the biomass of the vegetation.