Geophysical Research Abstracts
Vol. 13, EGU2011-1869, 2011
EGU General Assembly 2011

Monitoring of Mediterranean droughts: verification and use in a land surface model of the new ECMWF ERA-Interim reanalysis

Camille Szczypta (1), Jean-Christophe Calvet (1), Clément Albergel (1), Gianpaolo Balsamo (2), Souhail Boussetta (2), Dominique Carrer (1), Sébastien Lafont (1), Stéphanie Faroux (1), Bertrand Decharme (1), and Catherine Meurey (1)

(1) CNRM/GAME, (Météo-France, CNRS), URA 1357, Toulouse, France, (2) European Centre for Medium-range Weather Forecasts (ECMWF), Reading, UK

Soil moisture is a key factor of hydrological processes and plant growth, in particular in Mediterranean regions, often affected by drought. In the framework of the HYMEX project (www.hymex.org), aiming at characterizing the water cycle of the Mediterranean basin, a climatology of soil moisture and of other biophysical variables (LAI) and fluxes (latent and sensible heat fluxes, CO_2) is being built over the whole Mediterranean basin and evaluated with in situ and satellite data. SURFEX (Surface Externalisee), a modelling platform including a land surface model (ISBA-A-gs), able to monitor soil moisture, water and carbon fluxes, is used in this study. The model is driven by the new ECMWF ERA-Interim global analysis.

First, an evaluation of the global ECMWF atmospheric reanalysis ERA-Interim (with a 0.5° grid) is performed over France, based on the high resolution (8km) SAFRAN atmospheric reanalysis. The ERA-Interim precipitation, incoming solar radiation (ISR), air temperature, air humidity, and wind speed, are compared with their SAFRAN counterparts. Also, interpolated in situ ISR observations are used in order to consolidate the evaluation of this variable. The daily precipitation estimates produced by ERA-Interim over France correlate very well with SAFRAN. However, the values are underestimated by 26%, on average. A GPCP-corrected version of ERA-Interim is less biased (10-15%). The ERA-Interim estimates of ISR correlate very well with SAFRAN and with in situ observations on a daily basis. Whereas SAFRAN underestimates ISR by 6-8 Wm^{-2}, ERA-Interim overestimates ISR by 9-10 $W.m^{-2}$. In order to assess the impact of the ERA-Interim errors, simulations of the ISBA-A-gs land surface model are performed over the SMOSREX grassland site in southwestern France using ERA-Interim (with and without GPCP rescaling) and SAFRAN. Latent and sensible heat fluxes are simulated, together with carbon dioxide fluxes. The rescaled ERA-Interim performs better than the original ERA-Interim and permits to achieve flux scores similar to those obtained with SAFRAN. The ISBA-A-gs simulations are extended to the whole France using the 0.5° grid of ERA-Interim, forced by either ERA-Interim (with or without rescaled precipitation) or aggregated SAFRAN variables. This shows the impact of ERA-Interim errors. The simulations obtained from SAFRAN aggregated on the ERA-Interim 0.5° grid are compared with simulations obtained from the high resolution (8km) SAFRAN in order to study the impact of the aggregation.

Second, the verification of the ERA-Interim precipitation is extended to the whole Mediterranean basin (Ecoclimap2 area) by comparison with the GPCP and GPCC products, and the land surface simulations are generated over the whole Ecoclimap2 area. In order to verify the simulation quality, the generated biogeophysical variables and fluxes are compared with satellite products. All these comparisons and verifications will permit to build a soil moisture and water/carbon flux climatology for the whole Mediterranean basin, and to constrain the drought-monitoring system.