EMS Annual Meeting Abstracts
Vol. 16, EMS2019-805, 2019

Soil Moisture and Surface Flux relations over different Land Covers. Analysis from in situ data, satellite data and models

Carlos Román-Cascón (1,2), Marie Lothon (2), Fabienne Lohou (2), Aurore Brut (3), Oscar Hartogensis (4), Olivier Merlin (3), Nitu Ojha (3), and Carlos Yagüe (5)

(1) Centre Nationale d'Études Spatiales, CNES, France, (2) Laboratoire d'Aérologie, Université Toulouse Paul Sabatier, CNRS, France, (3) CESBIO, France, (4) Meteorology and Air Quality Section. Wageningen University, The Netherlands, (5) Departamento de Física de la Tierra y Astrofísica. Universidad Complutense de Madrid, Spain

Soil moisture is a key variable of the water and energy cycles close to the earth surface. Plants provide a path-way for soil-moisture to the atmosphere through transpiration at the leaf surface as the plant opens its stomata to take up CO_2 for photosynthesis. In this way, the availability of soil moisture and vegetation determine the partitioning of available energy between evapotranspiration and the sensible heat flux. In modelling these processes there are two main issues. The first is related to how plants regulate their stomatal behaviour under soil moisture limited conditions. The second is related to the representation of the availability of soil moisture, especially in heterogeneous terrains in terms of land use and topography.

This work tries to gain knowledge about these relationships by analysing data from different sources and confronting it with model outputs using different options. We present a preliminary study of the relationships found between soil moisture and surface fluxes over different land-use areas in Southern France. First, this relation is analysed from in situ data at sites with different crops, available from the Boundary-Layer Late Afternoon and Sunset Turbulence (BLLAST) field campaign and from two long-term ICOS (Integrated Carbon Observation System) stations. Secondly, the land use-soil moisture relation over several surfaces is also analysed at a larger scale from remote sensing data: soil moisture from the DISPATCH (DISaggregation based on Physical And Theoretical scale CHange) product at 1 km of horizontal resolution and high-resolution land-use maps from satellite. Finally, several tests are done with the atmospheric Weather Research and Forecasting (WRF) model coupled with the noah-MP land-surface model.

Some of the preliminary results from the observational study show the decoupling between the soil moisture and the surface energy fluxes, especially when the leaf area index (LAI) of the crops increase. Is it then necessary to include accurate information of croplands state in the models to have better simulations of surface fluxes?