



Validation of SURFEX Simulated Soil Moisture over the Valencia Anchor Station using SMOS products and in situ measurements.

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Soil moisture is an important variable in agriculture, hydrology, meteorology and related disciplines. Despite its importance, it is complicated to obtain an appropriate representation of this variable, mainly because of its high temporal and spatial variability. SVAT (Soil-Vegetation-Atmosphere-Transfer) models can be used to simulate the temporal behaviour and spatial distribution of soil moisture in a given area.

In this work, we use the SURFEX (Surface Externalisée) model developed at the Centre National de Recherches Météorologiques (CNRM) at Météo-France (<http://www.cnrm.meteo.fr/surfex/>) to simulate soil moisture at the Valencia Anchor Station. SURFEX integrates the ISBA (Interaction Sol-Biosphère-Atmosphère; surfaces with vegetation) module to describe the land surfaces (<http://www.cnrm.meteo.fr/isbadoc/model.html>) and we introduced the ECOCLIMAP for the description of land covers.

The Valencia Anchor Station was chosen as a validation site for the SMOS (Soil Moisture and Ocean Salinity) mission and as one of the hydrometeorological sites for the HyMeX (HYdrological cycle in Mediterranean EXperiment) programme. This site represents a reasonably homogeneous and mostly flat area of about 50x50 km². The main cover type is vineyards (65%), followed by fruit trees, shrubs, and pine forests, and a few number of small industrial and urban areas. Except for the vineyard growing season, the area remains mostly under bare soil conditions. In spite of its relatively flat topography, the small altitude variations of the region clearly influence climate. This oscillates between semiarid and dry-sub-humid. Annual mean temperatures are between 12 °C and 14.5 °C, and annual precipitation is about 400-450 mm. The duration of frost free periods is from May to November, with maximum precipitation in spring and autumn.

The first part of this investigation consists in simulating soil moisture fields to be compared with level-2 and level-3 soil moisture maps generated from SMOS over the Valencia Anchor Station, as a continuation to the previous work carried out around SMOS launch and commissioning phase (Juglea et al., 2010). In situ measurements are also available as reference from a network of stations covering the reduced number of different vegetation cover and soil types. An L-band radiometer from ESA (European Space Agency), ELBARA-II, is installed in the area to monitor SMOS validation conditions over a vineyard crop. Different interpolation methods will be applied to all significant atmospheric forcing parameters from the two met stations available in the area (pressure, temperature, relative humidity and precipitation) in order to obtain a good representation of soil conditions to be compared to level-2 and -3 SMOS soil moisture products. The period of investigation covers the complete 2012 period and we will particularly focus on selected periods from September to November 2012 where there were extreme rain events in our study area.