



## **Benchmarking the SMOS upper soil moisture product with a land surface model over the Iberian Peninsula**

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The recent availability of remotely sensed products for soil moisture opens new possibilities for validating land surface model state variables. Here we compare the Soil Moisture and Ocean Salinity (SMOS) level 2 soil moisture product with the output of the ORCHIDEE land surface model. ORCHIDEE has a very high vertical resolution and simulates soil moisture over the nominal penetration depth of SMOS (5cm) with 5 layers. Over the Iberian Peninsula, the annual cycle and the response to rainfall events of the simulated and remote sensed products are in good agreement. In a small sub-catchment of the Duero basin, the two soil moisture products are also highly correlated to the aggregated in-situ observations. On the other hand, spatial correlations between modelled and remote sensed upper-soil moisture are weak. The correlation between soil moisture and rainfall spatial structures showed lower values for SMOS than for ORCHIDEE. This study asks the question whether the spatial scales of remote sensed soil moisture are driven by small scale hydrological processes or if, as in land surface models, they are dominated by the atmospheric forcing.