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Geophysical Research Abstracts,
Vol. 11, EGU2009-12131-1, 2009
EGU General Assembly 2009

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In the framework of ESA's SMOS (*Soil Moisture and Ocean Salinity*) Mission, several studies are being carried out over different types of land surfaces to study their microwave L-band emission (1.4 GHz). These studies are being integrated in the SMOS emission model (L-MEB, *L-band Microwave Emission of the Biosphere*, Wigneron et al. 2007), which is the core of the SMOS algorithm for the retrieval of land surface parameters from SMOS data.

To contribute to Cal/Val activities at the *Valencia Anchor Station* (VAS) area (Caudete de las Fuentes, Valencia, Spain), one of the primary validation areas for SMOS land data and products (ESA SMOS Cal/Val AO, Project ID 3252, Lopez-Baeza et al., 2005), a number of experiments have been carried out to study the vegetation influence over the L-band emission proceeding from the soil surface. In the VAS area, a reduced number of homogeneous units have been defined according to the type and use of the soil, mainly, shrubs, vineyards, orchards (almond-and olive-trees) and Mediterranean pine forests.

In order to implement the SMOS algorithm over this reference area, it is necessary to characterize and calibrate the L-MEB model for the different cover types. This work is significantly contributing to the definition of the VAS site as a validation area for SMOS land products of the size of a SMOS pixel (*SMOS reference pixel*).

Shrubs and vineyards are the two most significant vegetation types which cover a large percentage of the area and for which very little information at L-band is available in the literature. These two types of vegetation covers have been studied in two separate dedicated experiments under the common name of MELBEX (*Mediterranean Ecosystem L-Band characterisation EXperiment*). The first one (MELBEX-I) took place over a shrub area characterised by a significant proportion of bare soil with superficial stones. The second one (MELBEX-II) was carried out from March to December 2007 over a large vineyard area. During the time period of both experiments, there was a large range of vegetation and soil moisture conditions related to significant rainfall events, different temperature and vegetation biomass conditions, etc.

The experiments consisted on the continuous acquisition of L-band polarimetric and multi angular measurements (from 20 to 60 degrees of elevation) over both types of vegetation using the EMIRAD L-band radiometer from the *Electromagnetic System Group* (EMI) of the *Technical University of Denmark*. In addition, measurements of infrared temperature, gravimetric and volumetric soil moisture, soil temperature profile, soil roughness and Leaf Area Index (LAI) were also monitored with an adequate frequency.

This paper presents the main results from both experiments. In particular, the main L-MEB parameters that characterize these two significant Mediterranean Ecosystem species have been computed and evaluated for soil moisture retrieval purposes in the framework of the imminent SMOS over land measurements.

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