



The ESA SMOS Validation Rehearsal Campaign at the Valencia Anchor Station Area in the Framework of the SMOS Cal/Val AO Project no. 3252

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Since 2001, the *Valencia Anchor Station* is currently being prepared for the validation of SMOS land products. The site has recently been selected by the Mission as a core validation site, mainly due to the reasonable homogeneous characteristics of the area which make it appropriate to undertake the validation of SMOS Level 2 land products during the *Mission Commissioning Phase*, before attempting more complex areas.

Close to SMOS launch, ESA defined and designed the *SMOS Validation Rehearsal Campaign Plan* with the purpose of repeating the *Commissioning Phase* execution with all centers, all tools, all participants, all structures, all data available, assuming that all tools and structures are ready and trying to produce as close as possible the post-launch conditions. The aim was to test the readiness, the ensemble coordination and the speed of operations to be able to avoid as far as possible any unexpected deficiencies of the plan and procedure during the real *Commissioning Phase* campaigns.

For the rehearsal activity which successfully took place in April 2008, a control area of 10 x 10 km² was chosen at the *Valencia Anchor Station* study area where a network of ground soil moisture measuring stations is being set up based on the definition of homogeneous physio-hydrological units, attending to climatic, soil type, lithology, geology, elevation, slope and vegetation cover conditions. These stations are linked via a wireless communication system to a master post accessible via internet.

Complementary to the ground measurements, flight operations were performed over the control area using the *Helsinki University of Technology* TKK Short Skyvan research aircraft. The payload for the campaign consisted of the following instruments: (i) L-band radiometer EMIRAD (*Technical University of Denmark*, TUD), (ii) HUT-2D L-band imaging interferometric radiometer (TKK), (iii) PARIS GPS reflectrometry system (*Institute for Space Studies of Catalonia*, IEEC), (iv) IR sensor (*Finnish Institute of Maritime Research*, FIMR).

Together with the ground soil moisture measurements, other ground and meteorological measurements from the *Valencia Anchor Station* area, kindly provided by other institutions, are currently being used to simulate passive microwave brightness temperature to have satellite “*match ups*” for validation purposes and to test the retrieval algorithms. The spatialization of the ground measurements up to a SMOS pixel is carried out by using a *Soil-Vegetation-Atmosphere-Transfer* (SVAT) model (SURFEX, *SURFace EXternalisée*) from Météo France. Output data, particularly soil moisture, will then be used to simulate the L-band surface emission through the use of the L-MEB (*L-band Microwave Emission of the Biosphere*) model. For that purpose, the microwave model uses specific ground information regarding the soil and vegetation properties provided by the validation teams. The aggregation of the brightness temperatures at the SMOS pixel scale is then carried out in an operational way taking into account the SMOS viewing configuration and antenna properties.

This paper presents an overview of the ESA *SMOS Validation Rehearsal Campaign* at the *Valencia Anchor Station* area making more emphasis on the development of the ground activities which are significant for the performance of the different validation components and giving an outline of the methodology to be used for the whole *SMOS Reference Pixel*.