



Estimation of soil moisture from SMOS data: Methods and approaches, first results

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Surface soil moisture is a key variable of water and energy exchanges at the land surface / atmosphere interface. But currently there are no means to assess it on a global and timely fashion. One way to overcome this issue would be to use an adequate space-borne Instrument. The most promising instrument would then be an L-band microwave remote sensing sensors as they are able to provide estimates of surface soil moisture, on spatial and temporal scales compatible with applications in the fields of climatology, meteorology and large scale hydrology.

The ESA Earth Explorer Opportunity mission Soil Moisture and Ocean Salinity (SMOS) is the first attempt to fulfil such a gap. The Hydros mission being a second opportunity. SMOS is based upon an L-band 2-D interferometer. It is thus an innovative concept of bi-dimensional aperture synthesis method to obtain surface measurement with an appropriate resolution from a tractable space-borne instrument. Moreover, the sensor has new and very significant capabilities especially in terms of multi-angular view configuration. SMOS is scheduled for launch in 2007. The Hydros concept relies on a real aperture system with revisit and spatial resolutions close to those of SMOS but with an active system operating at L band as well. Hydros is scheduled for a 2010 launch which should provide an overlap with SMOS.

This paper will describe the SMOS concept in terms of instrument (characteristics and specifications) and will investigate the main aspects of the retrieval capabilities of the 2-D microwave interferometer for monitoring soil moisture, vegetation biomass mainly. This presentation will highlight the different activities related to the elaboration

tion of the SMOS retrieval algorithms and hence the different approaches to establish the models, retrieval approaches and results. The main topics will be the field experiments and in particular the SMOSREX campaign (set up and main results), the CoSMOS airborne campaign (organisation, schedule and expected outcome) in relation with the development plans for the level 2 processors. For the development of synthetic data and the validation of the modelling approach, global maps at L, C and X band were produced and compared to existing SMMR measurements (6 months ion 1987). The main results of this study will be described.

Finally, a short description of the CAL/VAL activities and related plans will be outlined.