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The soil moisture and ocean saminity Mission (SMOS) Where are we?

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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 is 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. 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. This paper will describe the SMOS concept in terms of instrument (characteristics an specifications) and will investigate the main aspects of the retrieval capabilities of the 2-D microwave interferometer for monitoring soil moisture, vegetation biomass and sea surface salinity. The analysis is based on model inversion taking into account the instrument characteristics. Nevertheless, retrieving surface variables from such an instrument is not necessarily straightforward. Over land the main issues are linked to mixed pixels varying water bodies, snow and ice, and topography. It might also include RFI (Radio Frequency Interferences). Using other sensors/mission (ERS, MetOp, Aquarius), auxiliary data sets and assimilation techniques will be used to address these issues.

The project is currently in phase C/D and the science teams are busy with field experiments, algorithm development for the Level 1 and 2, and Cal-Val preparation.

The presentation will give an overview of the SMOS level 2 processor concept together with the main products to be delivered over land including level 3 and 4 data sets. A particular attention will be devoted to the potential applications of SMOS in terms of large scale hydrology with potential methods and application to basin-scale hydrology, including dis aggregation techniques