Geophysical Research Abstracts,
Vol. 11, EGU2009-7064, 2009
EGU General Assembly 2009

Brightness temperatures provided by SMOS simulations compared to current passive microwaves measurements over semi-arid region.

C. GRUHIER (1), F. CABOT (1), Y. KERR (1), and P. DE ROSNAY (2)

(1) Centre d'Études Spatiales de la BIOsphère (CESBIO), Toulouse, France (claire.gruhier@cesbio.cnes.fr), (2) European Centre for Medium Range weather Forecast (ECMWF), Reading, UK

Soil Moisture and Ocean Salinity (SMOS) is the first space mission dedicated to soil moisture observations. This passive microwaves sensor will be launched in July 2009. It will record brightness temperatures in L-band (1.4 GHz), which is the more sensitive to soil moisture variable.

To validate the soil moisture retrieval model, a complete simulation of SMOS instrument is developed. The aim of this study is to compare SMOS end-to-end simulations to actual passive microwave sensor measurements. A period of two months in 2008 is selected for this study.

Any operational sensor measures earth emissivity in L-band. The only passive microwaves sensor in L-band was Skylab from 1973 to 1974. Currently, the nearest measurements usable are from Advanced Microwave Scanning Radiometer – EOS (AMSR-E) launched in 2002. This passive microwave sensor records brightness temperatures from 6.9 to 89 GHz at 56 to 5.4 kilometres of spatial resolution, respectively.

The selected study area is a semi-arid region because of the great influence of soil moisture on soil-vegetation-atmosphere fluxes. In the context of African Monsoon Multidisciplinary Analysis (AMMA) project, a site located in Mali has been instrumented. The soil moisture network was specifically designed for SMOS soil moisture product validation. The study area extends from 14.5 to 17.5° N and from 1 to 2°E and is influenced by monsoon precipitations during July, August, and September.

The ground data set necessary relies on ground measurements used as input data: soil moisture, soil and air temperature, and LAI. Before being used as input data, ground measurements are spatialised over the study area. Brightness temperature at instrument input plane are computed with the same radiative transfer as will be used at retrieval level. This simulations are compared to AMSR-E measurements. Due to different channel used by sensors, the brightness temperatures can not directly compared. However, the temporal variation and amplitude must be similar and representative of ground soil moisture conditions.