Geophysical Research Abstracts
Vol. 13, EGU2011-8283-1, 2011
EGU General Assembly 2011

SMOS Soil Moisture product evaluation over West Africa

Claire Gruhier (1), Thierry Pellarin (2), Richard de Jeu (3), Patricia de Rosnay (4), and Yann Kerr (1)

(1) Centre d'Études Spatiales de la BIOsphère (CESBIO), Toulouse Cedex 9, France (claire.gruhier@cesbio.cnes.fr), (2) Laboratoire d'étude des Transferts en Hydrologie et Environnement (LTHE), Grenoble, France, (3) Vrije Universiteit Amsterdam (VUA), Amsterdam, The Netherlands, (4) European Centre for Medium Range Weather Forecast (ECMWF), Reading, UK

Soil moisture is a crucial variable which influences land surface processes. Numerous studies have shown that low frequency microwaves are particularly suitable to retrieve soil moisture values. SMOS (Soil Moisture and Ocean Salinity), launched the November 2th 2009, is the first space mission dedicated to soil moisture observations.

Although soil moisture is important for water cycle at the global scale, it is particularly true over the Sahelian region, where soil moisture is considered to great impact on the precipitation rates. Sahel is under the influence of the West African monsoon which provide an area with similar vegetation and soil moisture seasonal cycles. This phasing between soil moisture and vegetation dynamics is crucial for soil moisture retrieval accuracy and it might impact performances.

The evaluation is based on ground soil moisture network measurements from AMMA (African Monsoon Multidisciplinary Analysis) sites specifically designed to address the validation of remotely sensed soil moisture measurements. SMOS soil moisture products provide very realistic soil moisture values. Drying out and low volumetric values are well captured by SMOS. The comparison with ground measurements over Benin site shows a very good adequacy despite of the importance of the vegetation optical depth. At the regional scale, the West African monsoon is also perfectly seen by SMOS. The amplitude of values between May and August is very realistic as well as the latitudinal gradient.

SMOS soil moisture values were analysed with ground knowledge and placed in the context of previous soil moisture products. Several soil moisture products are already provided based on passive microwaves sensor. Even though the contribution of vegetation and atmospheric properties is greater for higher frequencies, these bands still contains information on soil moisture. Products used for this study are based on AMSR-E and TMI sensors and provided by Vrije Universiteit Amsterdam and National Snow and Ice Data Center.