SMOS SOIL MOISTURE VALUES EVALUATION OVER SAHELIAN AREA

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1. ABSTRACT

Soil moisture is one of the most important variable that influences the soil-vegetation-atmosphere fluxes. However, due to its high temporal and spatial variability, it is difficult to provide accurate quantitative information on soil moisture at regional and global scales. Different approaches exist, but remote sensing is the more appropriated to measure soil moisture values and its variations. It can provide spatially integrated information over large areas. Microwave remote sensing at low frequencies is the most efficient approach to characterize soil moisture from space [1].
SMOS (Soil Moisture and Ocean Salinity), launched on November 2th 2009, records brightness temperature in L-band at space resolution of 50km. SMOS is the first sensor dedicate to soil water content measurements.

Although soil moisture is important for water cycle at the global scale, it is particularly true over the Sahelian region, where soil moisture has an great feedback on precipitation. Sahel is under the influence of the West African monsoon which provide an area with phased vegetation and soil moisture cycle. This phasing between soil moisture and vegetation dynamics is crucial for soil moisture retrieval accuracy and it might impact performances.
In the context of the AMMA (African Monsoon Multidisciplinary Analysis) project, the Gourma region, located in Mali, was instrumented. This site is representative of climatic, hydrological and environmental conditions of semi-arid areas [2]. The soil moisture network is specifically designed to address the validation of remotely sensed soil moisture in the context of the preparation of the SMOS project. An up-scaling function is applied to local information to convert to kilometer scale prior comparison with large scale informations [3].

Several soil moisture products are already provided based on active and passive microwaves sensor. Even though the contribution of vegetation and atmospheric moisture is greater, this band still contains information on soil moisture. Soil moisture seasonal variations are captured by remote sensing products. However, the validations studies over Sahelian area show few products do not provide low soil moisture values [4, 5].

This paper aims to introduce first soil moisture values based on SMOS brightness temperature measurements. This data will be first after the commissioning phase of six months. In this context, this paper proposes preliminary analyses of the accuracy of SMOS soil moisture values. A comparison of the product to the ground measurements over Sahelian region during the

dry season should show the capability of SMOS product to provide realistic soil moisture cycle in semi-arid area. The results obtained over this area will be shown in the context of the performances of other soil moisture products.

2. REFERENCES

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