SOIL MOISTURE DETERMINATION WITH USE OF SMMR DATA

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ABSTRACT

A radiative transfer model for simulating microwave brightness temperatures over land surfaces is described. The model takes into account sensor viewing characteristics (spacecraft altitude, viewing angle, frequency, polarization) and atmospheric parameters, over a surface characterized by its moisture, roughness and temperature, and covered with a layer of vegetation characterized by its temperature, integrated water content, single scattering albedo, structure, and percent coverage.

In order to reduce the influence of atmospheric and surface temperature effects, the brightness temperature are expressed as polarization ratios, which depend primarily on the soil moisture and roughness, canopy water content, and percentage cover.

The paper describes the model used and investigates the sensitivity of the polarization ratio to these parameters. Simulation of temporal evolution of the microwave signal over semi-arid areas in the African Sahel is presented and compared to actual satellite data from the SMMR instrument on Nimbus-7.

Finally an inversion algorithm is described together with the first results gained over the Sahelian zone.