



Passive microwave soil moisture retrieval using a ground-based L-band (1.26 GHz) radiometer acquired during the corn growing season of 2002

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In the corn growing season of 2002, a tower-based L-band (1.26 GHz) microwave radiometer (Lrad) and a truck-mounted C- and L-band (5.3 and 1.4 GHz) radar were installed and operated along the side of the corn grown OPE³* experimental site managed by the USDA-ARS** Hydrology and Remote Sensing Laboratory (HRSL) in Beltsville, Maryland. The radiometer was programmed to acquire data automatically every hour, while the radar observations were collected once a week at four different times during the day. The radiometer as well as radar collected several individual observations within an azimuth of 120 degrees at various incidence angles (25, 35, 45, 55 and 60 for the radiometer and 15, 35 and 55 degrees for the radar). Simultaneous to the microwave observations, an extensive ground truth data set was collected, which includes soil moisture, soil surface roughness, vegetation moisture and vegetation geometry.

In this investigation, soil moisture retrieval results are presented primarily based on the passive microwave OPE³ data set. The soil moisture retrieval algorithm is employed targeting the direct retrieval of the H (horizontal) - and V (vertical) - polarized optical depth from H- and V-polarized L-band brightness temperatures (T_B). The methodology can be directly applied to observations that will be acquired by the Soil Moisture

and Ocean Salinity (SMOS) sensor and requires only input of the temperature of the emitting layer, surface roughness and single scattering albedo.

*Optimizing Production Inputs for Economic and Environmental Enhancement (OPE3)

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