The Performance of the Land Parameter Retrieval Model (LPRM) at Different Scales and Frequencies

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In the past the Land Parameter Retrieval Model (LPRM) has been successfully applied to retrieve soil moisture from space borne passive microwave observations. Based on a series of validation studies the accuracy of the satellite derived surface soil moisture is on average 0.06 m³/m³ for sparse to moderate vegetated regions. In these cases the microwave channels C-, X- or Ku band were used at high stable incidence angles (50-55 degrees). However LPRM has never been applied to lower angles, or to L-band (airplane) observations. This paper describes the parameterization and performance of LPRM using data from the National Airborne Field Experiment 2005 (NAFE'05). This experiment was undertaken in November 2005 in the Goulburn River catchment, which is located in south-eastern Australia. The parameterization was forced on the roughness and revealed that this calibration parameter is strongly related to both incidence angle and soil moisture. These findings were integrated in LPRM, resulting in one uniform solution for all sites. The parameterized LPRM correlated well with field observations at 5 cm depth (r = 0.89, RMSE = 0.07 m³/m³) with a negligible bias. These results demonstrate the possibility to obtain a general solution for soil moisture retrieval from L-band observations and are a promising step towards the extension of LPRM at different scales and frequencies.

1839 Hydrologic scaling
1843 Land/atmosphere interactions (1218, 1631, 3322)