



Roughness characterizations in active and passive microwave soil moisture retrieval

Ying Gao (1), Jeffrey Walker (1), Rocco Panciera (2), Alessandra Monerri (1), and Dongryeol Ryu (3)

(1) Department of Civil Engineering, Monash University, Australia, (2) Cooperative Research Centre for Spatial Information, The University of Melbourne, Australia, (3) Department of Infrastructure Engineering, The University of Melbourne, Australia

Passive microwave remote sensing at L-band is widely recognized as the preferred technique to measure surface soil moisture globally, with resolution ranging from 40-100km. However, passive microwave soil moisture retrieval is highly dependent on ancillary data such as surface roughness, which is difficult to characterize at such a large footprint by ground measurement. NASA's Soil Moisture Active Passive (SMAP) mission, scheduled for launch in Nov 2014, will deploy both active and passive microwave instruments to enhance soil moisture retrieval capabilities. This provides an opportunity to characterize the roughness parameter in passive observations with active measurements. However, the roughness parameters derived from active measurements cannot be directly used in the passive soil moisture retrieval models. While roughness is usually characterized by surface Root Mean Square (RMS) height in active microwave, roughness in passive microwave is described using a parameter H_R . This paper compares the two roughness parameters, retrieved from active and passive scattering and emission models respectively, using data sets from the third Soil Moisture Active Passive Experiment (SMAPEX-3) conducted in south-eastern Australia in 2011. Analysis was done over a series of grassland surfaces located within the experiment focus areas. The retrieved surface RMS heights from active measurements were validated against ground samples, after which the relationship between H_R and RMS was examined.