Geophysical Research Abstracts,
Vol. 11, EGU2009-9736, 2009
EGU General Assembly 2009

Validation of SMOS soil moisture using Ku band satellite radar altimetry

P.A.M. Berry (1), S.M.S Bramer (1), and J. Carter (2)

(1) De Montfort University, EAPRS Lab, Faculty of Technology, Leicester, United Kingdom (pamb@dmu.ac.uk, 0044 116 2078159), (2) Queensland Climate Change Centre of Excellence, Environmental Protection Agency, Indooroopilly, Brisbane, Australia

In order to validate the soil moisture SMOS product, a number of campaigns have been planned to make soil moisture measurements coincident with SMOS overflights,. A major uncertainty is the disparity in spatial scale between the necessarily detailed ground measurements and the much more coarse SMOS pixel resolution. In order both to address this, and to provide validation data on a continental scale, a novel technique has been developed and validated to derive soil surface moisture from satellite radar altimetry. The technique requires development of a detailed surface model of the brightness of the earth's land surface to Ku band nadir illumination; analysis of multi-mission altimeter sigma0 shows that this surface response generally changes on a spatial scale of a few tens of metres.

Having developed these models over much of the earth's arid and semi-arid terrain, the next stage is to validate the soil moisture estimates using this technique. To this end, two areas in Australia, the Simpson Desert and the whole of Western Australia have been used as test regions, and soil moisture estimates from ERS2 and EnviSat have been validated using a soil moisture model run daily for all Australia by the Queensland Climate Change Centre.

This paper presents the results of this analysis, and identifies those regions of the earth's land surface that can be utilised as validation areas for SMOS using this technique. The next step in this development is a detailed study of areas where soil moisture campaigns are being run, in order to develop models to transfer the small-scale in-situ measurements to long arcs of altimeter data which transect SMOS pixels.