

Altimeter-derived soil moisture determination – global scope and validation

PHILIPPA A. M. BERRY¹ & JOHN CARTER²

1 De Montfort University, EAPRS Lab, Faculty of Technology, Leicester LE1 9BH, UK
pamb@dmu.ac.uk

2 Queensland Climate Change Centre of Excellence, Department of Environment and Resource Management, Ecosciences Precinct, 41 Boggo Rd. Dutton Park 4102, Australia

Abstract The SMOS mission offers the exciting potential for global soil surface moisture data; earlier soil moisture estimates are available from several remote sensing techniques, but these encounter difficulties in arid regions. However, there is one technique that can yield soil moisture estimates in arid areas globally: satellite radar altimetry. This novel approach involves the construction of detailed Dry Earth Response (DER) models using multi-mission altimeter backscatter measurements, to encapsulate the high frequency spatial variation in the Earth's response to Ku band nadir illumination. This removes the requirement for detailed surface geophysical data and allows the derivation of soil surface moisture. This technique has now been validated over two regions of Australia, the Western Desert and the Simpson Desert, using ground truth from the AussieGRASS model run by the Queensland Climate Change Centre. This paper presents the quantitative results from this validation and assesses the global scope of this novel technique.

Key words soil moisture; satellite altimetry; arid regions