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Altimeter derived Soil Moisture Determination in support of SMOS Validation Activities

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The successful launch of the SMOS mission offers the exciting potential for direct determination of global soil surface moisture. However, validating the SMOS measurements is complex, in part because ground truth is confined to small areas of the earth's land surface. To complement the dedicated campaign measurements, a technique has been developed to derive surface soil moisture over arid and semi-arid regions using satellite radar altimetry. This involves the construction of detailed Dry Earth Response models, to encapsulate the high frequency spatial variation in the earth's response to Ku band nadir illumination, and the derivation of soil surface moisture from altimeter backscatter measurements, re-calculated over land surfaces and cross-calibrated to ensure consistency between different missions.

This technique has now been validated over two regions of Australia, the Western Desert and the Simpson desert, using ground truth from the detailed AussieGRASS model run by the Queensland Climate Change Centre. This paper presents methodology and results from this work, and makes the first definition of areas within which this unique technique will be used for SMOS validation.