A first glance at AMSR2 soil moisture observations across Australia

Christoph Rüdiger[1], Jeffrey Walker[1], Ichirow Kaihotsu[2], Hideyuki Fujii[3], Mei Sun Yee[1], Alessandra Monerris[1]

[1]*Department of Civil Engineering, Monash University, Australia*

[2]*Department of Natural Environmental Sciences, Hiroshima University, Japan*

[3]*Department of Civil Engineering, The University of Tokyo, Japan*

As part of the Global Change Observation Mission (GCOM) of the Japan Aerospace Exploration Agency (JAXA), the GCOM-W1 satellite was launched on 18 May 2012 and has been operational since. The instrument on board is the Advanced Microwave Scanning Radiometer 2 (AMSR2), measuring the brightness temperatures at six different frequencies from 6.9 to 89 Ghz, building on the inheritance of AMSR-E and WindSat instruments, as well as the Scanning Multichannel Microwave Radiometer (SMMR). AMSR-2 is able to cover the majority of the Earth's surface within 2 days, providing a swath of 1,450km due to its conically scanning mode. The commissioning phase was finalised at the end of 2012 and brightness temperatures are now being provided since January 2013. The preliminary soil moisture products in version 0.1 and 0.5 have been distributed to the validation project PIs since July 2012. In this paper we provide a first assessment of those soil moisture products, using the OzNet in-situ monitoring network across south-eastern Australia as a reference site.

In a qualitative assessment of the early version of the AMSR2 soil moisture product, it was found that AMSR2 appears to be able to describe the spatial structure of soil moisture well. In particular large storm fronts are well detected, though some problems are observed in the mountainous region of eastern Australia. At the point scale, due to the difference in the spatial scale of in-situ measurement and satellite product, the initial approach is to assume a nearest neighbour relationship between the point measurements and the gridded AMSR2 soil moisture product. A first analysis of the relationships shows that most in-situ stations show only a little bias (-0.01 to 0.05 m3/m3) between ground-based and satellite soil moisture product, with only two stations having a bias in excess of 0.05m3/m3. The RMSD of the stations considered for this study ranges from 0.04 to 0.09 m3/m3, which is consistent with earlier studies using AMSR-E soil moisture products. The time series assessment suggests that a strong response in the ground-based soil moisture measurements was underestimated by the satellite. This may be due to the local extent of the storm event, and will be investigated further.

Eventually, the data will be compared against the SMOS and ASCAT soil moisture products for cross-validation and quantitative assessment of the anomaly detection capabilities of the retrieval algorithms.