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The effect of spatial scale and ancillary datasets on the evaluations of EO soil moisture products

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With this presentation we follow up on the results of our previous paper that assessed the quality of the ASAR GM 1 km soil moisture product with the use of AWRA-L landscape hydrological model at 1 km scale. In that paper we concluded that that RMSE and R can be predicted with use of the error assessment of ASAR GM solely. The goal of this presentation is to study a) if and how do the results of the absolute and relative evaluation measures change with spatial scale, b) if the conclusion introduced in the previous paper holds independent of scale, and c) where do the differences between different relative and absolute evaluation measures stem from.

The continental average absolute evaluation measures over Australia ranged between 2.65 % (Error Propagation (EP)) and 8.44 % (RMSE) of saturated soil moisture. The relative evaluation measures spanned from 0.39 (Spearman Correlation coefficient (RS) when computed with AWRA-L SSM) to 0.57 (RS when computed with GLDAS dataset). Clearly, the results varied between different absolute and different relative evaluation techniques and were as well influenced by the selection of the ancillary dataset. As expected, RS and R corresponded and demonstrated significantly different spatial patterns to any of the absolute measures. Surprisingly, however, the spatial patterns of the EP significantly differed from RMSE at 5 km scale. This is in contrary result to the similar analyses performed at 1 km scale (Doubková et al., 2012) and suggests that the selection of spatial scale has an important impact on the evaluation results.

The findings and suggestions originating from the discussion are transferable to other satellite-derived soil moisture data. Of special interest is its transfer to data from the planned Sentinel-1 SAR sensor that shares similar technical characteristics but has an improved retrieval error comparable to the ASAR GM sensor. The operationally available medium resolution soil moisture from Sentinel-1 with a well-characterized error is likely to yield benefits for modelling and monitoring of land surface-atmosphere fluxes, crop growth and water balance applications