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Validation of SMOS soil moisture in the Murray Darling Basin

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Soil moisture plays an important role in the global energy and water balance calculations of land surface models. Consequently, it is important that such models can provide realistic time evolution of soil moisture. The recently launched Soil Moisture and Ocean Salinity (SMOS) mission of ESA is the first dedicated satellite mission for long-term monitoring of soil moisture, providing a unique opportunity to validate the soil moisture predictions of current generation land surface models, and update the model states if required. However, the soil moisture product(s) from SMOS must first be validated with independent ground observations of soil moisture. Two extensive field campaigns have been conducted in the Murrumbidgee sub-catchment of the Murray Darling Basin in 2010 for the purpose of validating SMOS; the Australian Airborne Cal/val Experiments for SMOS (AACES). The unique diversity of this catchment, ranging from flat semi-arid areas in the west (mainly used for dryland farming) to alpine humid ranges in the east, makes it an ideal validation site that is representative of much of the Murray Darling Basin. Data collected during the field campaigns include airborne L-band passive microwave observations at 1km resolution covering several SMOS pixels in their entirety, underpinned by intensive ground measurements of soil moisture and ancillary data at focus farms. Moreover, there are long-term measurements of soil moisture and temperature at more than 60 stations across the catchment, providing the opportunity for validation under a wider range of soil moisture conditions. This paper will present results from the validation of SMOS derived soil moisture using a combination of aircraft derived soil moisture over 50,000 square kilometres together with long-term in situ soil moisture measurements for several well monitored pixels.