

## **The Soil Moisture Active Passive Experiments (SMAPEX) for SMAP Algorithm Development**

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The availability of global L-band observations from passive (the recently launched SMOS), and active (such as the PALSAR) microwave sensors has boosted the interest in making joint use of the two techniques to improve the retrieval of global near-surface soil moisture at unprecedented resolutions. The Soil Moisture Active Passive (SMAP) mission (scheduled launch, 2014) will fully exploit this synergy by providing concurrent active (radar) and passive (radiometer) microwave observations, resulting in passive-only, active-only and a merged active-passive soil moisture products at spatial resolutions of respectively 40km, 3km and 9km. The Soil Moisture Active Passive Experiments (SMAPEX) are a series of airborne field experiments specifically designed for algorithm development for SMAP and currently ongoing in the context of the SMAP pre-launch cal/val activities for Australia. Four SMAPEX campaigns are scheduled across the 2010-2011 seasonal cycle, with the first campaign (SMAPEX-1) successfully conducted on moderately wet winter conditions (July 5-10, 2010) and the second campaign (SMAPEX-2), scheduled for the summer (December 4-8, 2010). SMAPEX is making use of a novel SMAP airborne simulator, including an L-band radar and radiometer to collect SMAP-like data over a well monitored semi-arid agricultural area in the Murrumbidgee catchment in south-eastern Australia. High resolution radar and radiometer observations collected during SMAPEX are supported by extensive ground sampling of soil moisture and ancillary data, allowing for testing of a variety of algorithms over semi-arid agricultural areas, typical of the Australian environment but similar to large areas of the central continental USA, including radiometer-only, radar-only, merged active-passive, downscaling and radar change-detection algorithms. In this paper a preliminary assessment of the performance of the radar-only and radiometer-only retrieval algorithms proposed as baseline for SMAP is presented. The soil moisture retrieved from active and passive microwave airborne observations collected during the SMAPEX-1 campaign is compared with extensive spatial data collected at focus areas. The quality of the individual retrievals is discussed in relation with different land surface conditions, ranging from intensive cropping to dryland grassland areas.