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A Potential Ground Calibration Target for SMOS

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It has long been hypothesised that arid areas such as the Simpson Desert would make an ideal ground calibration target for passive microwave missions, due to their supposed temporally and spatially consistent microwave emission characteristics. With the imminent launch of the European Space Agency's Soil Moisture and Ocean Salinity (SMOS) mission, it is important to answer this question now so that such targets can be included in the planning for initial post-launch calibration activities. A recent airborne campaign to the Australian arid zone has assessed i) the Simpson Desert, ii) Lake Eyre and iii) some gibber plains for this purpose. SMOS sized pixels of approximately 50x50km have been mapped in entirety at 1km resolution during the scheduled 6am SMOS overpass time, using thermal infrared sensors and the Polarimetric L-band Multibeam Radiometer (PLMR) which operates at the same frequency as SMOS. Such observations were supplemented by high resolution (50m) PLMR measurements and coincident ground observations over targeted areas identified from an initial reconnaissance flight. Despite unanticipated rainfall events in the area, it was found that the gibber plains showed the greatest potential for use as a ground calibration target, with a 1km brightness temperature standard deviation of less than 4K across the 50km pixel. The Simpson Desert showed a standard deviation in brightness temperature of around 10k while Lake Eyre showed more than 250k variation across the 50km pixel.