Metropolitan Los Angeles
GRS-S Chapter

NASA's Soil Moisture Active Passive Mission: Measuring Soil Moisture from Earth Orbit Through a Combined Radar-Radiometer Approach

Presented By
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California Institute of Technology, Moore Laboratory, Room 080

NASA´s proposed Soil Moisture Active/Passive (SMAP) satellite mission will provide soil moisture information across the globe. Soil moisture is a key control on evaporation and transpiration at the land-atmosphere boundary. Since large amounts of energy are required to vaporize water, soil moisture also has a significant impact on the surface energy flux. Thus, soil moisture variations affect weather and climate across continental regions. SMAP objectives support the understanding of processes linking terrestrial water, energy and carbon cycles, the quantification of net carbon flux and the extension of capabilities for weather and climate prediction models.

SMAP is currently in mission formulation with a planned launch date in late 2014. The instrument architecture will incorporate an L-band (1.26 GHz) radar and an L-band (1.41 GHz) radiometer that share a single feedhorn and parabolic mesh reflector. Individually, the SMAP radiometer and radar instruments suffer from limitations in their capability to measure soil moisture. However a unique feature of SMAP is the combined radar/radiometer package, which will enable combining the active and passive microwave data streams to generate an accurate, intermediate resolution soil moisture product.

This presentation reviews objectives and applications of the SMAP soil moisture measurement and the algorithm approach applied to retrieve soil moisture using the combined radar/radiometer SMAP instrument package.

This work was performed at the Jet Propulsion Laboratory, California Institute of Technology, under contract to the National Aeronautics and Space Administration.

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