Algorithm Development Using the SMAP Algorithm Testbed

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The Soil Moisture Active and Passive (SMAP) mission will provide active and passive observations of the land surface, from which global soil moisture and freeze/thaw estimates will be derived. The SMAP instrument consists of an L-band radiometer and an L-band synthetic aperture radar, sharing a large conically-scanning deployable mesh reflector. Algorithms for retrieving soil moisture and free/thaw state from SMAP observations are under development for operation in a variety of terrain conditions. The SMAP Science Algorithm Testbed is used to simulate observations acquired by the SMAP instrument. The Testbed provides a capability to assess soil moisture and freeze/thaw algorithm performance for SMAP and to evaluate various science, instrument, and mission trades, including impacts of orbit and instrument sampling and error characteristics. The Testbed assists in evaluating the relative merits of microwave models, retrieval algorithms, and ancillary data based on a common set of input and processing conditions. The Testbed is implemented in three domains, regional (south-central U.S.), continental (N. America), and global. The impacts of vegetation, water bodies, urban areas, and topography will be studied using the Testbed. In addition to conducting tests using simulated data, there will also be capabilities for applying SMAP candidate retrieval algorithms to experimental data sets acquired during ground-based and airborne campaigns. This presentation will provide results from the initial implementation of the Testbed, and examples of applications to airborne data..