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Toward a new AMSR-E SWE operational algorithm

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Daily operational estimates of SWE are currently produced from the Advanced Microwave Scanning Radiometer for EOS (AMSR-E) observations, launched on NASA's EOS Aqua spacecraft on May 4, 2002. The maintenance, validation and improvement of the current algorithm can be achieved by refining key aspects of the retrieval algorithm and continuing the validation. Supporting the maintenance of the current product is essential for the ultimate development of a robust long-term data set, potentially extending back 30 years. AMSR-E measurements are the latest in a lineage of passive microwave measurements dating back to 1979. Starting with the Nimbus-7 Scanning Multi-channel Microwave Radiometer (SMMR, November 1978 - August 1987) and Special Sensor Microwave Imager (SSM/I, July 1987 - today), these instruments potentially constitute a long time series of SWE maps at regional to global scales. It is therefore essential that this product be maintained and refined to achieve an elevated validation status for climatologic, hydrologic and numerical modeling applications.
In this talk, I will discuss the steps undertaken toward the new operational AMSR-E SWE algorithm. In particular I will discuss the choice of using an emissivity-based approach to retrieve SWE rather than one based on brightness temperatures; I will talk about the impact of sub-grid fraction water bodies within grid cells in lake rich areas and on reducing the uncertainty on the retrieval by improving the correction of attenuation effects from vegetation transmissivity (especially from forests); finally I will discuss the extension of the algorithm from a single linear coefficient approach to a multi-dimensional sigmoidal one, derived from a neural network-based analysis.