

## Algorithm Refinement for Aqua/AMSR-E Soil Moisture Retrieval

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### Abstract

The Advanced Microwave Scanning Radiometer (AMSR-E) is one of six instruments launched in May 2002 on the Aqua spacecraft as part of NASA's Earth Observing System (EOS). The AMSR-E instrument was developed by the National Space Development Agency (NASDA) of Japan. It operates at six frequencies in the range 6.9 to 89 GHz, with coverage over a wide swath, providing global observations every 2-3 days. The low-frequency data channels provide a capability for estimating soil moisture at a spatial resolution of about 60 km, over land areas of limited vegetation cover, based on use of the 6.9 GHz frequency channels. The initial AMSR-E soil moisture algorithm emphasized use of the 6.9 GHz channels to maximize vegetation penetration while minimizing atmospheric effects. In post-launch evaluations the 6.9 GHz channel data were found to be contaminated by radio frequency interference (RFI) over many regions, especially in the United States. Calibration biases in the processed sensor data also hampered use of the low-frequency channel observations over land. Modifications to the soil moisture retrieval algorithm have been made that avoid the RFI problem by using 10.7 GHz and higher frequency data. A revised instrument calibration algorithm has also been implemented recently by the AMSR-E processing team. Limitations on the soil moisture sensing capability that result from eliminating use of the 6.9 GHz data are a reduction of soil moisture sensitivity in vegetated areas and an increase in sensitivity to atmospheric moisture. A benefit is the improved spatial resolution available at 10.7 GHz. Updated AMSR-E soil moisture products using the revised calibration and soil moisture algorithm are currently being generated and re-evaluations of the products are being carried out. In this paper we provide assessments of the revised products and an outlook on the utility of the AMSR-E soil moisture measurements.

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