

Improving Microwave Volume Scattering Based SWE Retrieval Performance using SnowEx 2017 SnowSAR Observations

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ABSTRACT

Numerous efforts have been recently made geared toward a satellite mission to observe SWE from space. This paper evaluates the performance of the previously developed active microwave volume scattering algorithm to retrieve SWE. Validation is explored by comparing measurements of the backscattering coefficient (σ_{ov}) of snow with *in situ* snow observations including snow grain size, temperature, density, and depth which are direct contributors to microwave signatures.

Specifically, we used volume scattering observations from the ESA (European Space Agency) airborne SnowSAR during SnowEx 2017 along with *in situ* snowpit measurements. X- and Ku-band SnowSAR observations are compared with a forward radiative transfer model such as DMRT-Bic. Comparison statistics of retrieved SWE and observed SWE will be reported. In addition, results from sensitivity studies using *in situ* and modeled snow observations are demonstrated to evaluate the influence of snow microstructures and the background contribution of the lower boundary of the snowpack on the microwave volume scattering signals.

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