

A Parameterized Microwave Snow Emissivity Model

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Determination of land surface emissivity is important for both satellite data assimilation schemes and retrievals of geophysical parameters from satellite measurements. This paper presents a multi-frequency-polarization parameterized snow emissivity model for SSMR, SSM/I, TMI, AMSR-E, and Fy3/MWRI. We established the snow emission database covering a wide range of snow and underground properties for each passive microwave satellite sensors with a multi-scattering microwave snow emission model, which includes the Dense media Radiative Transfer Model (DMRT) and Advanced Integrated Emission Model (AIEM) to simulate dry snow emission with Matrix Doubling approach. With the emission database, we developed a parameterized snow emissivity model according to the emission source and the zeroth-order radiative model formulation. This parameterized emission model for SSM/I, TMI, AMSR-E, and Fy3/MWRI could reach the accuracy of 0.01 compared with the simulation database, While the emissivity error of SMMR at H-pol could reach 0.016.

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