Lack of snow cover scattering signature over south Greenland and its impact on GSMaP passive microwave snowfall retrieval

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Global Satellite Mapping of Precipitation (GSMaP) by Japan Aerospace Exploration Agency (JAXA) provides hourly near-global precipitation maps with 0.1 spatial resolution. The recent update of the passive microwave (WM) algorithm for GSMaP (product version V05) extended its target domain to the poler region. However, Greenland is being masked even in the latest product due to spurious snowfall estimates. This study shows that the unique microwave characteristics of the Greenland snow cover surface can be the reason for the snowfall overestimation of GSMaP in the region. Normally, GMI observation over snow cover surfaces shows a scattering signature (i.e., TB19V > TB89V). However, such a signature is absent in south Greenland. The spatial pattern of the GSMaP snowfall overestimation in the region well corresponds to the absence of the snow cover scattering signature. It suggests a need for a separate surface class and lookup table for Greenland snowfall estimation by GSMaP.