



## **Potential of dual-polarized microwave radiometer for snow precipitation detection**

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Space-borne microwave radiometers can be used to observe global snow precipitation, which plays an important role in energy balance and water cycle. However, lack of knowledge on complex microphysics of snow particles hampers snowfall parameterization in numerical weather prediction and climate models. Dual polarized microwave radiometer could offer specific information on snow micro-physical parameters, compared to traditional microwave radiometers with one-single polarization. Therefore, microwave polarimetry will be beneficial to snowfall detection.

This study focuses on polarized signals originating from snow precipitation at millimeter-wave band, in order to gain a deeper insight into snow microphysics. The relationship between observed brightness temperatures and polarized signals (TB-PD) is built up with explanations from radiative transfer simulations. The existing space-borne microwave radiometric observations, including both China meteorological satellite FengYun-3 microwave payloads and Global Precipitation Mission (GPM) Microwave Imager (GMI), will be investigated in this study. The two spaceborne sensors were designed with dual polarized channels at 150 GHz and 166 GHz, respectively. The results presented in this study will provide information for the design of microwave radiometer on-board China second-generation global precipitation mission.