**Better Understanding GPM Radiometer Measurements Using Ground-Based Radar**

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Global Precipitation Mission (GPM) Microwave Imager (GMI) brightness temperatures have been paired with ground-based dual-polarization radar measurements from the GPM Validation Network. Retrieval of hydrometeor type (hail, graupel, aggregates, liquid rain, etc.) from the dual-polarization radar allows characterization of which hydrometeor types occur most often (and how often they do occur) for given brightness temperature values. Research is underway using combinations of GMI frequencies to help constrain the interpretations of hydrometeor type.

The initial research is weighted heavily toward observations from the central and eastern United States. The relationships between brightness temperatures and hydrometeor types are likely qualitatively similar in other parts of the world, but relationships may differ quantitatively. A next phase of this research will involve contrasting relationships between different parts of the United States (for example, northeast versus southeast versus midwest), and incorporating relevant dual-polarization radar datasets from outside the continental United States. The Validation Network now includes a more diverse set of radar locations, including Kwajalein, La Reunion, Brazil, Korea, Alaska, and others. Additional radar data from the RELAMPAGO field campaign focusing on intense convective systems in Argentina should also be added. This diverse set of locations will be used to refine the relationships between brightness temperature and hydrometeor type, and to characterize variability and uncertainty when extrapolating results from one region to another.

The relationships between brightness temperatures and hydrometeor type will be applied to the large archive of brightness temperature measurements from the GPM constellation and pre-GPM era constellation members. Analysis efforts will range from identifying and understanding how storm system types relate to particular regions, seasons, and atmospheric conditions, to establishing GPM precipitation retrieval error characteristics as related to particular hydrometeor types.