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Plain Language Summary: This paper aims to develop a graupel and hail identification algorithm for GPM DPR. This algorithm is constructed using a precipitation type index (PTI) defined for DPR. The PTI is effective in separating hydrometeor types and is calculated using measurements of reflectivity, dual-frequency ratio, and storm top height data. The output of the algorithm is a Boolean product representing the existence of graupel or hail along with the vertical profile for each Ku- and Ka-band matched footprint. Cross validation is performed with the Weather Service Radar (WSR-88D) network over continental United States as well as during the Remote sensing of Electrification, Lightning, and Mesoscale/Microscale Processes with Adaptive Ground Observations (RELAMPAGO) experiment. Evaluation of this identification algorithm is performed on a global basis, which illustrates promising comparisons with the global lightning and hail precipitation maps generated using radar and radiometer.

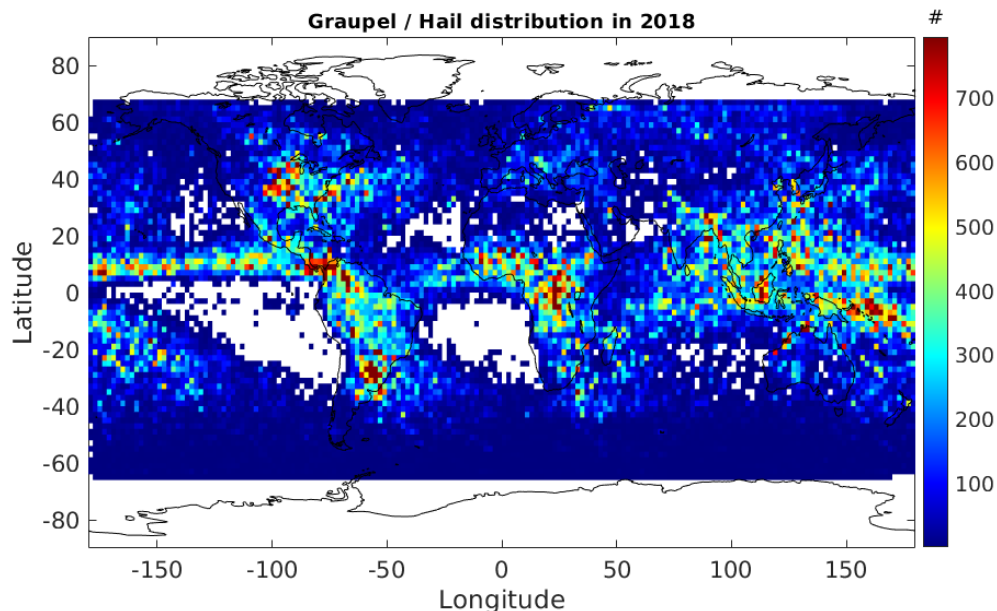


Figure 1, Global distribution of “flagGraupelHail” count mapping to the 2° x 2° Lat / Lon box for year 2018. “flagGraupelHail” is a Boolean product in GPM DPR level-2 Experimental Module.

- Graupel and hail identification algorithm is developed for GPM DPR in this paper. The Boolean output is available at each Ku- and Ka- matched footprint.
- Successful ground validations have been performed in both continental United States and RELAMPAGO campaign in South America.
- Figure 1 illustrates the global distribution of “flagGraupelHail” count mapping to the 2° x 2° Lat / Lon box for year 2018. Promising comparisons are found between this product and the global lightning and hail precipitation maps.