GPM DPR Profile Classification Algorithm: Enhancement from V6X to V7

Chandrasekar V Chandra and Minda Le

CSU, ECE, Fort Collins , CO, United States of America (chandra@engr.colostate.edu)

The profile classification module in GPM DPR level-2 algorithm outputs various products such as rain type classification, melting layer detection and identification of surface snowfall , as well as presence of graupel and hail. Extensive evaluation and validation activities have been performed on these products and have illustrated excellent performance. The latest version of these products is 6X. With increasing interests on severe weather such as hail and extreme precipitation, in the next version (version 7), we development a flag to identify hail along the vertical profile using precipitation type index (PTI).

Precipitation type index (PTI) plays an important role in a couple of algorithms in the profile classification module. PTI is a value calculated for each dual-frequency profile with precipitation observed by GPM DPR. DFRm slope, the maximum value of the Zm(Ku) , and storm top height are used in calculating PTI. PTI is effective in separating snow and Graupel/Hail profiles. In version 7, we zoom in further into PTI for Graupel/ hail profiles and separate them into graupel and hail profiles with different PTI thresholds. A new Boolean product of "flagHail" is a hail only identifier for each vertical profile. This hail product will be validated with ground radar products and other DPR products from Trigger module of DPR level-2 algorithm. In version 7, we make improvements of the surface snowfall algorithm. An adjustment is made accounting for global variability of storm top profiles.. A storm top normalization is introduced to obtain a smooth transition of surface snowfall identification algorithm along varying latitudes globally.