GPM/DPR観測による降水特性：TRMM/PR観測との比較
Precipitation characteristics observed with GPM DPR, in comparison with TRMM PR

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Improvements in precipitation measurements with the Dual-frequency Precipitation Radar (DPR) on board the Global Precipitation Measurement (GPM) core satellite, compared to the TRMM/PR are three folds: Extension of the observational region from 36N-36S to 65N-65S, an addition of high-sensitivity Ka-band radar to make the dual frequency measurements available, an improvement of the sensitivity of Ku-band radar itself. In this study, observed characteristics of precipitation by the GPM DPR measurements with those by the TRMM PR measurements are compared in various ways. Rainfall events are defined with contiguous rainfall areas observed with the GPM DPR for March 2014 to December 2015. Size and intensity characteristics of rainfall events in the tropical region (30N-30S) and the mid-latitude regions (30N-65N and 30S-65S) are compared. Area-weighted size histogram comparisons reveal that rainfall events over the tropical oceans have two peaks at meso-alpha and at meso-beta scales, while large meso-alpha size dominates over the mid-latitude oceans. Over land, largest frequency is found in the meso-beta size bin in the tropics, while smaller size bins exhibit more frequency in the mid-latitudes. Maximum precipitation intensity histograms normalized for each 4 categories by event size exhibit larger frequency for heaviest precipitation tails for larger size categories in all N-midlat, N-tropics, S-tropics and S-midlat regions, but dependency on event size is larger in the tropics and more frequent heavy precipitation is found with the largest category in the tropics.
Impacts of the radar sensitivity increase are examined (Hamada and Takayabu, 2016), by comparing Ku-band measurements of with two sensitivity thresholds of corrected reflectivity factors; 12 dBZ and 18 dBZ, representing DPR and PR sensitivity, respectively. Increase of sensitivity results in ~21% in frequency and ~2% in rainfall amount between 40N and 40S. It is shown that, in addition, there is a scientifically significant impact by detecting light anvil precipitation in the upper troposphere with increasing sensitivity with the GPM/DPR observations.

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