Rainfall Variability Grouped by the Type of Precipitation Systems

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A number of snapshots of precipitation systems have been recorded by the Precipitation Radar (PR) aboard the Tropical Rainfall Measuring Mission (TRMM) satellite for more than a decade. The long-term data average enabled us to examine precipitation variability in less time and in fine scale. The first part of this study was conducted to try to extract the group characteristics of precipitation systems for understanding the regional variation of surface rainfall. In this study, PR-captured precipitation systems (PR-PSs) were determined in contiguous regions of rain-certain pixels^[1]. The study on the occurrence frequency of rainfall due to different storms confirmed that relatively few large PR-PSs were responsible for most of the regional rainfall characteristics. The error reduction owing to sampling increase of the grouped PR-PSs will be also shown. This would exemplify the potential of the decadal TRMM PR data for the climatic use. The second part deals with the sampling and rainfall estimate uncertainty on the gridded product accuracy. The rainfall comparisons between the 10-year TRMM PR data and a rain-gauge dataset over Japan showed the systematic rainfall biases inherent to the regional variation of dominant precipitation systems and observation properties. Results have increased awareness of the need for the data evaluation on the basis of rainfall regimes.

Keywords: TRMM PR; Precipitation system climatology; Rainfall regime; Sampling and retrieval error.

References

[1] M. Hirose, J. Meteor. Soc. Japan. 87A, 353-368 (2009)