PRとTMIの降水経年変動の違い
A difference in the interannual variability of precipitation between PR and TMI

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Precipitation has an important role in maintaining the hydrological cycle on the earth's climate, so that understanding the long-term variability of precipitation is essential to provide for the future such as the decadal climate variability or the climate change. It is, however, well known that the interannual variability of precipitation associated with El Nino Southern Oscillation (ENSO) is different between the Tropical Rainfall Measuring Mission (TRMM) Precipitation Radar (PR) and the TRMM Microwave Imager (TMI) estimates (Robertson et al. 2003; Wang et al. 2008; Lau and Wu 2011). The current study is aimed to explore the origin of the difference of the interannual variability of precipitation between PR and TMI.
The current study focuses on the differences in the precipitation type (convective and stratiform types) and its interannual variability. The precipitation estimates derived from PR (2A25; Iguchi et al. 2009) and TMI (2A12; Kummerow et al. 2011) products are individually divided into stratiform and convective precipitation estimates. The PR product contains results of the precipitation type in each pixel, but the TMI product contains together in same pixel. These data are projected onto a common 0.5 degrees gridded instantaneous data with ascending and descending orbits and sampled only where PR and TMI observations are available. Data are analyzed in the El Nino season (December 1997 to May 19998) and the La Nina season (December 1999 to May 2000) and compared between PR and TMI. Differences in unconditional precipitation average of convective and stratiform types over semi-global (35S-35N) oceans are overall same between PR and TMI in the La Nina season, because the database for the TMI retrieval was generated by means of the PR observation in this period. On the other hand, the difference in the convective precipitation between PR and TMI (TMI is generally higher than PR) are obviously found in the El Nino season, while the stratiform precipitation is similar between PR and TMI. The regions where the difference in convective precipitation between PR and TMI are large are found in warm sea surface temperatures (SSTs) for 300 to 303 K and moist column water vapors (CWVs) for 66 to 75 mm and frequently located over the central Pacific in the El Nino season. In the El Nino event, the ratio of stratiform precipitation against total precipitation central Pacific was increased (Schumacher and Houze 2003), which implies that the TMI does not follows the interannual nature-variability of the precipitation characteristics observed by the PR.

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