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Rainfall characteristics over continent studied from cloud system resolving model and TRMM/PR and TMI

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We studied the characteristics of rainfall over the continental area of tropics using the cloud system resolving model (Non-hydrostatic ICosahedral Atmospheric Model; NICAM) and TRMM/PR and TMI. In NICAM simulation, semi-diurnal variation of surface rainfall was found over continental area such as Africa, India and Amazon. No semi-diurnal variation of rainfall is represented over the ocean such as Pacific and Indian Ocean, while diurnal variation of rainfall is significant over the ocean area. Slight signal of semi-diurnal variation is seen near larger island over maritime continent. This semi-diurnal variation of rainfall over the continental area, with primary peak in the afternoon and secondary peak at early in the morning in NICAM simulation, is confirmed in TRMM/PR and TMI observation. The timing of the primary peak is almost same between TRMM observations and NICAM simulation, while secondary peak in TRMM/PR and TMI observation is earlier than NICAM.
In detail analysis of semi-diurnal variation of rainfall over the Africa by the METEOSAT infrared observations by revealed that afternoon peak is associated with the large number of small size deep convection. This is interpreted as large number of developing stage of deep convection appears at this time of the day. This is consistent with the larger percentage of convective rainfall observed by TRMM/PR and TMI for the afternoon peak. Early morning peak of rainfall is rather corresponding to the smaller percentage of convective rain by TRMM/PR and TMI.