Multi-scale Climatology of Coastal Heavy Rainbands Over the Indonesian Maritime Continent Using Satellite and Ground Based Radar Observations

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Satellite climatology of coastal heavy rainbands (hereafter referred to as CHeRs) over the Asian monsoon region is planned to be examined in terms of various kinds of environment conditions, e.g., diurnal, intraseasonal, monsoonal, ENSO, and IOD variations based on TRMM PR 12 years (1998-2009) dataset. In particular, mesoscale structure and dynamics of CHeRs along the southwestern coastline of Sumatera and the eastern bay of Sulawesi Islands in Indonesia are examined in detail by using ground based Doppler radars as well as by the satellite dataset from the point of multi-scale interactions. The CHeRs are widely confirmed in Asian monsoon region and some of them are explained well by synoptic wind-terrain interaction, however, their climatology, structure, and dynamics have not been examined in detail. Previous studies showed that most of their locations are quite similar to where the convective diurnal variation is predominant, and heavy rain over the coastal sea falls mainly in the night time. In addition, some of those heavy rainbands are confirmed in another monsoon seasons even when the wind-terrain interaction does not explain them well. These results suggest that the CHeRs seem to be generated and maintained by not only the "synoptic" wind-terrain effect but also "mesoscale" convections which developed nocturnally everyday along coastlines.

We plane to carry out the following themes and activities in this study: (1) Satellite climatology of CHeRs in Asian monsoon region: Climatological satellite dataset focused on the CHeRs in the Asian monsoon region is established in terms of diurnal, intraseasonal, monsoonal, ENSO, and IOD variations. (2) Mesoscale dynamics of CHeRs in Indonesian maritime continent: Doppler radar observations in Sumatera and Sulawesi Islands are conducted to examine mesoscale convective systems which may be organized into the CHeRs. (3) Multi-scale interaction to generate and maintain CHeRs: Datasets observed with both TRMM satellite and ground based radar are analyzed regarding physical processes of multi-scale interaction how mesoscale convections are organized into CHeRs in specific environment conditions are one of the most important issues to be examined in detail.