

Coastal Heavy Rainbands Formed along Sumatera Island Studied by HARIMAU Project in Indonesia

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Coastal heavy rainbands (CHeRs) are widely identified over Asian monsoon region (e.g., Western Ghats, Bay of Bengal, Gulf of Thailand, southwestern Sumatera Island, northwestern Kalimantan Island, and western Philippines) by satellite observations. Some of them are explained well by synoptic wind-terrain interaction (Xie et al., 2006 JC) because they are anchored along mountain ranges face to southwest direction and predominant during boreal summer southwesterly monsoon season. Most Asian megacities are located in coastal regions, thus they have much risk to be suffered from torrential rainfall embedded in CHeRs which may cause flash floods in downtown cities and landslides in mountainous regions. Moreover, rainfall amount over the coastal land varies quite largely if those CHeRs change their lateral location a little, therefore water resource management for social community is seriously sensitive to their variability.

Satellite observations show that CHeRs are modified by various kinds of environmental variations, e.g., diurnal, intraseasonal/MJO, monsoonal, ENSO, and IOD. However, climatology, structure, and mechanism of CHeRs have not been examined in detail from mesoscale points of view because there are quite few studies based on ground based radar observations. Previous studies (e.g., Mori et al. 2004 MWR, 2011 JMSJ; Sakurai et al. 2009, 2011 JMSJ; Yamanaka et al. 2008 JDR; Wu et al. 2007 SOLA) showed most CHeRs in Indonesia are identified along coastlines where convective diurnal variation is predominant, and coastal heavy rain are brought mainly in the nighttime observed with a radar-profiler network deployed by Hydrometeorological ARray for Intraseasonal variation (ISV) - Monsoon AUTomonitoring (HARIMAU) project. In addition, they are confirmed even in the seasons when the wind-terrain interaction cannot explain them well. These results suggest that CHeRs are formed by not only the synoptic wind-terrain effect but also mesoscale convections which developed nocturnally everyday along coastlines.

We carried out HARIMAU2011 campaign observation over Sumatera Island during 01-31 December 2011 to study the CHeR formed along southwestern coastline of Sumatera Island by using an X-band Doppler and a dual-polarimetric (DP) radars, intensive soundings at two stations, disdrometers, and surface observation network. Overview of the campaign is presented and its preliminary results mainly observed with two radars are discussed at the presentation.

Keywords: mesoscale convective system, diurnal variation, radar meteorology, Asian monsoon, MAHASRI

