Wind Profiler Radar Observations over Indonesian Maritime Continent

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The Indonesian Maritime Continent (IMC) consists of about 17500 islands surrounded by seas with the warmest surface temperature in the world. Because of wealthy water vapor supply from warm seas and heating by strong solar radiation, it is one of the most active convection regions on the globe. Diurnal variation is the most prominent meteorological phenomenon over IMC. In the active phase of Intraseasonal variation (ISV), Super Cloud Cluster (SCC) passes through IMC, and is thought be modulated by topography of IMC. However, in the eastward region from Sumatera Island, the lack of observational data have prevented from studying such meteorological features.

Under the project of HARIMAU (Hydrometeorological Array for ISV-Monsoon Automonitoring), two wind profiler radars (WPRs) were installed at Pontianak (West Kalimantan) and Biak (Papua) in February and March 2007, respectively (see Figure). Local characteristics of convective activity around two areas are investigated.

By the following results, it was found that Biak had a feature of offshore region over New Guinea Island, while Pontianak had a feature of land.

- Diurnal variation of horizontal wind at Pontianak is consistent with sea-land breeze of Kalimantan Island, whereas that at Biak is consistent with sea-land breeze of New Guinea Island.
- Development of the mixing layer is clearly seen at Pontianak, but is not so clear at Biak.
- Maximum precipitation occurrence is 15 LT at Pontianak, and deep convective clouds are dominant around that time. During 18-2 LT, stratiform type clouds are dominant.
- Maximum precipitation occurrence is 5-12 LT at Biak, and stratiform clouds are dominant in that period.

In Kalimantan Island, cumulus activity starts around the coastline and migrates to inland, which is different from earlier study in Sumatera Island. On the other hand, cloud system migrates offshore direction around New Guinea Island.

During the passage of SCC in the active phase of ISV, diurnal cumulus activity exists, but less dominant at Pontianak. Precipitations did not concentrate on SCC passage period. On the other hand, diurnal cumulus activity was not seen and precipitation concentrated on SCC passage at Biak. Dry air intrusion was seen at Pontianak, but not seen at Biak. Further investigation of SCC is needed for further understanding of intraseasonal variations.

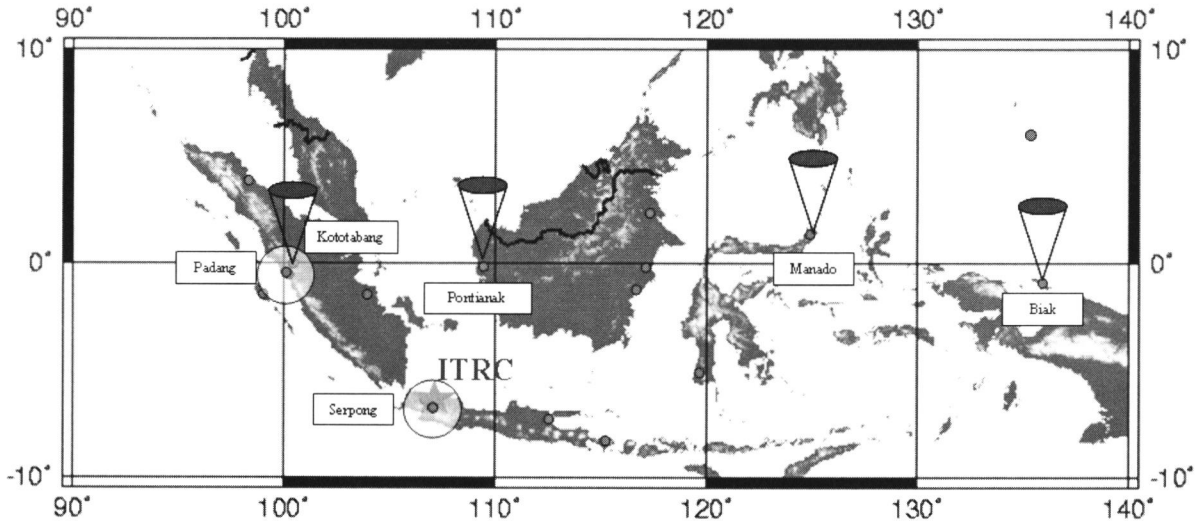

Figure: Distribution of radars and profilers planned by HARIMAU in addition to preinstalled Japanese equipment. ITRC shows International Tropical Research Center Planned to be established in Jakarta. Another WPR is going to be installed at Manado in 2008.