JEPP/HARIMAU radar – wind profiler network over the Indonesian maritime continent

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- Significance of Indonesian “maritime continent”
- The JEPP/HARIMAU project (JFY 2005-2009)
- Contribution to MAHASRI/CEOP/GEWEX/WCRP and GEOSS
- Process studies by using HARIMAU radar-profiler network
- Further study for social application and benefits

Hydrometeorological Array for ISV-Monsoon Automonitoring (HARIMAU)

Japan EOS Promotion Program (JEPP) + Indonesian Research/Technology Grant

Aceh Lampung Padang Surabaya Biak Pontianak Manado

BMG CDRs Palau XDR+WPR JAMSTEC

Kototabang EAR,BLR,XDR KU + LAPAN

MIA XDR

Serpong CDR

Mirai CDR JAMSTEC

BPPT

Pontianak WPR Manado WPR Biak WPR
HARIMA2006 in collaboration with MISMO during October 28 – November 27, 2006

For better understanding on atmospheric and oceanic variability in MJO convection onset, and role of diurnal variations in MJO onset, maintenance, and modulation over the MC region.
HARIMAU2006 Intensive Observation

- **Background and Objective**
  To better understand structures and dynamics of diurnally generated convective systems over the southwestern coastal region of Sumaetra Island, and their interactions with intraseasonal variation (MJO).

- **Observation Sites**
  X-band Doppler radars at MIA (JEPP) and Tiku (Hokkaido Univ)
  Soundings at Tabing and Siberut

- **Observation Period**
  October 28 – November 27, 2006

- **Status**
  Various kinds of convections (e.g., isolated, organized, hazardous) embedded in diurnally developed cloud systems during MJO inactive phase were frequently observed.

TRMM PR annual rainfall amount (1998-2006)
Nocturnal re-development of coastal precipitation

Reflectivity

Precipitation

Accumulated Rainfall Amount

Topography

(a) Reflectivity (dBZ)

(b) Rainfall Intensity (mm h⁻¹)

(c) Convective Rain Fraction (%)
Coastal Rain Bands in South-Southeastern Asian Monsoon Region

Rainfall distribution (JJA) observed with TRMM PR and related coastal mountain ranges in Asian region (Xie et al. 2006 JC)

QSCAT sea surface wind (Xie et al. 2006 JC)
SE-Asian floods by cross-equatorial monsoon

“Cold surge” (northerly from Siberia) across the Equator, synchronizing with ISV

Exciting the diurnal-cycle precipitating clouds

Jakarta flood (Jan-Feb 2007)
> 100 psns killed,
> 300 thousand psns suffered

(Wu et al., 2007)
Situ Gintung death toll reaches 97, but 100 still missing

The Jakarta Post, Jakarta | Sun, 03/29/2009 3:21 PM | National

Before dam burst (12 Sep 2007)

After dam burst (28 Mar 2009)
Situ Gintung Dam Burst, Jakarta, Indonesia
15-18LT 26 March 2009
HARIMAU2010 Intensive Observation

• Questions
  + What synoptic environment causes torrential rainfall over the Asian megacity, Jakarta, during the winter monsoon?
  + Detailed meso-scale structure and dynamics of diurnal convective activity which generate torrential rain there?
  + How locally developed diurnal convections interact with the monsoon cold surge and/or MJO for extreme events?
  + Role of the planetary boundary layer (including developments of convective mixing layer) on the torrential rain.

• Period
  15 January – 14 February (31 days), 2010

• Methodology
  A C-band Doppler radar and a wind profiler at Serpong, intensive sounding array, AWS network, and experimental forecast by using NHM (Non-Hydrostatic Model, MRI)
OSA: Outer Sounding Array for MJO/Monsoon Disturbances (only for routine observation)

ISA: Inner Sounding/AWS Array for Regional Circulations
CDR coverage and intensive sounding array

BMKG surface observation network
1. Methodology and logistics of IOP
   + We plan to emphasize more on the regional scale study over the JABODETABEK and make a sounding array there to observe diurnal local circulation and related convective activity in detail in time and space.
   + Synoptic disturbance (i.e., monsoon cold surge and MJO) over the Jawa sea in relation to the regional phenomena shall be analyzed by using NCEP and/or JRA reanalysis dataset.
   + Mesoscale surface and pilot balloon observations at BMKG stations are essential.

2. Sounding array (Vaisala System)
   + Pramka, Bogor, Seran (BMG pilot balloon station), and Karawang (AWS site for BPPT) are reselected for sounding array by using our Vaisala system.
   + We plan to make 4 launches a day for 31 days by 4 staff (2 Japanese and 2 Indonesian).
+ If we get additional budget, we make another 4 launches a day for 2 weeks in the middle of the IOP by 6 staff (2 Japanese and 4 Indonesian).

3. Extra Launching at BMG Cenkareng (Meisei System)
+ Same as the original plan, we request the BMKG at Cenkareng to make extra 2 launches a day for 31 days. We supply Mesisei transmitters (RS-01G2 GPS) and 500g (or 600g) balloons.

4. Data collection for BMKG surface and pilot balloon observation
+ We request the BMKG to share the AWS/ARG digital data during the IOP.