

Study on 2 - 10 days Variations of Wave Disturbances Observed during 9 November - 25 December 2015 Pre-Year of Maritime Continent Campaign in Bengkulu and western off Sumatra Water

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Japan Agency for Marine-Earth Science and Technology (JAMSTEC) together with the host Agency for Meteorology Climatology and Geophysics (BMKG) and Agency for the Assessment and Application of Technology (BPPT) have been conducted pre-Year Maritime Continent (YMC) campaign in Bengkulu and western off Sumatra water using R/V Mirai during 9 November - 25 December 2015. The selections of Bengkulu in the mainland Sumatra and surrounding waters as the sites of pre-YMC determined based on the TRMM NOAA satellite of highest December average rainfall in the region over 15 years (1998 - 2012). In this presentation, we are interested to study how 2 - 10 days variations of wave disturbances exist and cause the rainfall extreme over this area, especially due to topographic effect along the northeastern part of 50 km from coast of Bengkulu. Hovmöller diagram of potential temperature anomaly, zonal and meridional wind, and relative humidity from sounding data at meteorological station of Fatmawati Bengkulu Class III and on board Mirai at western off Sumatra waters show very clear these 2 - 10 days variations of wave disturbances at 3 different layers: Atmospheric Boundary Layer (ABL) in the range of 0 - 2 km, above ABL to below tropopause (2 - 12 km), and above tropopause 12 km until 16 km as maximum layer from the sounding data. How the characteristics of these wave disturbances from three different layers and how they interact each other are very interesting subjects need to be addressed in the near future study. Firstly, we will identify what kinds of variations and wave disturbances occurred during the pre-YMC using dispersion relation analysis (Kiladis, 1998) and how these wave disturbances related to 2 - 10 days heavy rainfalls observed during the period of campaign. We will perform 2 dimensional wavenumber - frequency spectral analysis as introduced by Wheeler and Kiladis (1999) to see the wave propagation and its characteristics. Figure 1 shows the preliminary results from the two sites soundings data at BMKG meteorological station in Bengkulu and on board Mirai. It revealed quite clear 2 days variations in the ABL, westward Rossby mixed gravity wave in the middle layer of troposphere and eastward Kelvin wave in the above tropopause. These evidences should be clarified in the further analysis and will be presented during the blue earth symposium.

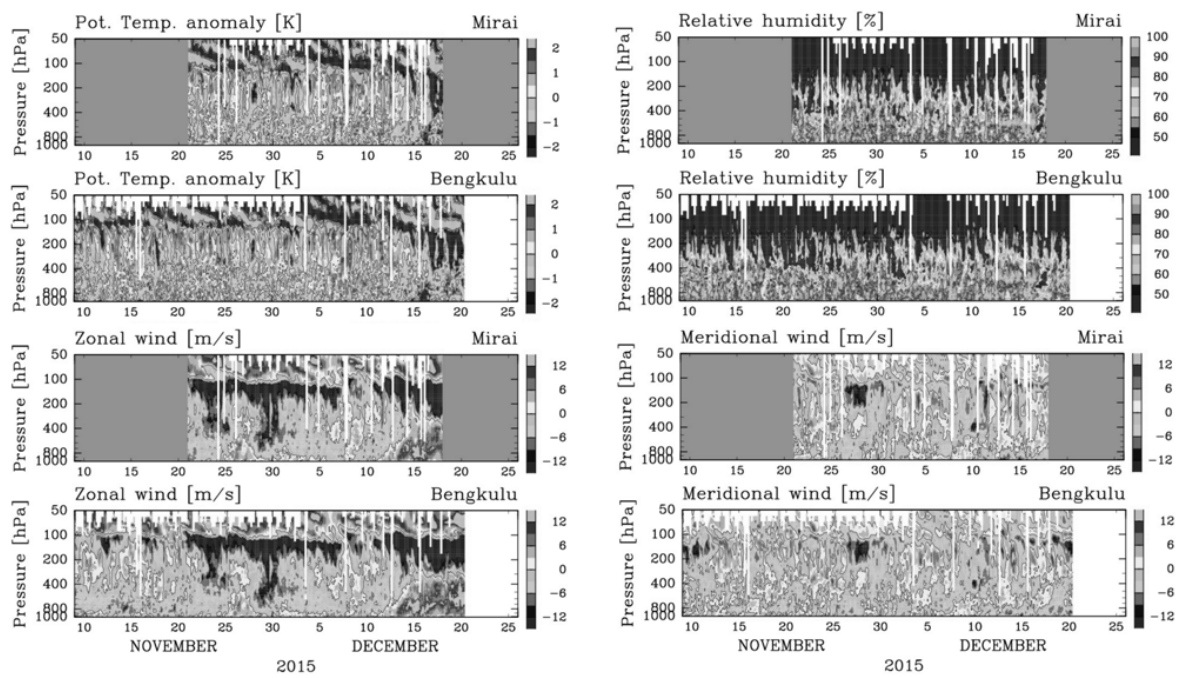


Figure 1. Time-height cross sections of potential temperature anomaly, relative humidity, and meridional and zonal winds from the two sites soundings location at BMKG meteorological station Fatmawati Bengkulu and on board Mirai during November 9 - December 20, 2015 (http://www.jamstec.go.jp/ymc/campaigns_files/in_situ/in_situ.html).