Geophysical Research Abstracts
Vol. 20, EGU2018-7930, 2018
EGU General Assembly 2018

Equatorial Line Observations – a comprehensive study of coupled atmospheric and oceanic processes within the Maritime Continent

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Organized, eastward propagating equatorial convection is a primary source of subseasonal variability within the Maritime Continent (MC). For example, Convectively Coupled Kelvin wave (CCKW) and Madden-Julian Oscillation (MJO) events bring excess amounts of precipitation to Indonesian islands and alter characteristics of the local diurnal cycle of convection. These phenomena have numerous global teleconnections, but their interactions with the MC environment are poorly understood.
A new international (Indonesia-USA-UK-Poland-Japan) effort - Equatorial Line Observations (ELO) - aims to improve our understanding of the influence of coupled air-sea processes of non-linear interactions between propagating convection (MJO, CCKWs) and local atmospheric and oceanic environment (diurnal cycle). The goal is to improve model simulations and predictive skill of subseasonal forecast by investigating the key physical mechanisms that block or favor propagation of atmospheric convection across the Indonesian seas, including the role of the differential diurnal cycle in land-sea heating and its interaction with CCKW and MJO events in the enhancement or decay of atmospheric convection. The ELO field project is designed to study convective-dynamical atmospheric systems and their land and ocean interactions along the equator within the MC. The main objective is to collect atmospheric and oceanic data that characterize diurnal cycles of atmospheric convection and upper ocean temperature during CCKW and MJO propagation across the MC region. The ELO observational network will consist of 3 land-based (2 near Padang in western Sumatra, and 1 at Pontianak, Borneo) and 2 ocean-based stations (ocean gliders west of Sumatra and moored buoys in Karimata Strait between Sumatra and Borneo). We will discuss meteorological and oceanographic deployment plans to measure upper ocean dynamics and thermodynamics. The intensive observing phase of ELO will be over the 4-month period approximately from 1 November 2018 to 28 February 2019 during the International Years of the Maritime Continent programme.