

Years of the Maritime Continent (YMC) Banda Sea Cruise

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Abstract

The Indo-Pacific Maritime Continent (MC), a unique mixture of land and ocean straddling the equator, is the largest archipelago on Earth. Sitting in the middle of the warmest body of water known as the Indian and western Pacific warm pool, the MC plays a pivotal role in the global weather-climate continuum. Its complex distributions of land, sea, and topography make prediction of high-impact events in this region extremely challenging.

One of the most intricate processes in the MC region that are poorly understood is air-land-sea interaction. This interaction is directly connected to the diurnal cycle of atmospheric convection overland and its related land-sea breezes. It has been hypothesized that air-land-sea interaction is a central process for large-scale and climatic distribution and variability of precipitation in the MC region that drives the global atmospheric circulation and affects ocean circulations in the Indian and Pacific Oceans. However, there is no in situ observation of land-sea breezes over the water and related upper-ocean and atmospheric structures in the MC region. This lack of observations has severely impeded the progress of understanding the important issue of air-land-sea interaction in the MC region.

“Years of the Maritime Continent (YMC)” is a multi-year (2017 – 2020) international project. Its overarching goal is to expedite the progress of improving understanding and prediction of local multi-scale variability of the MC weather-climate system and its global impact through observations and modeling exercises. Scientists from 12 countries are participating in YMC with field observations, data analysis, numerical simulations, and prediction experiments.

The YMC Banda Sea Cruise is one of the contributions to YMC by the National Oceanic and Atmospheric Administration (NOAA). The YMC cruise is schedule to be in January 2019 with up to 30 days in the Banda Sea. An Indonesian ship will be chartered with ship time shared by NOAA and Indonesian agencies.

The objective of the YMC Banda Sea cruise is to observe the upper ocean, atmosphere, and their interface for the study of the role of land-sea breezes in the diurnal variability of the ocean and atmosphere during different phases of the MJO. The main observations (instruments) of the YMC Banda sea cruise include upper-ocean temperature and salinity to 500 m (Underway Conductivity Temperature Depth profiler), water temperature and salinity at 2 and 3 meters (C-Limpet system), surface water temperature and salinity (Sea Snake), air-sea fluxes of sensible and latent heating (surface meteorological instruments), surface long- and short-wave radiation (radiometers), cloud base height (ceilometer), and atmospheric profiles of wind, temperature, humidity (radiosondes), ocean drifters, etc.