

Role of the Banda Sea in MJO propagation through the Maritime Continent and 2019 YMC Banda Sea cruise

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Quezon City, Philippines

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YMC Banda Sea Cruise (November – December 2019)

Participating Institutes:

Indonesia - BMKG, BPPT, LIPI, ITB, IBP

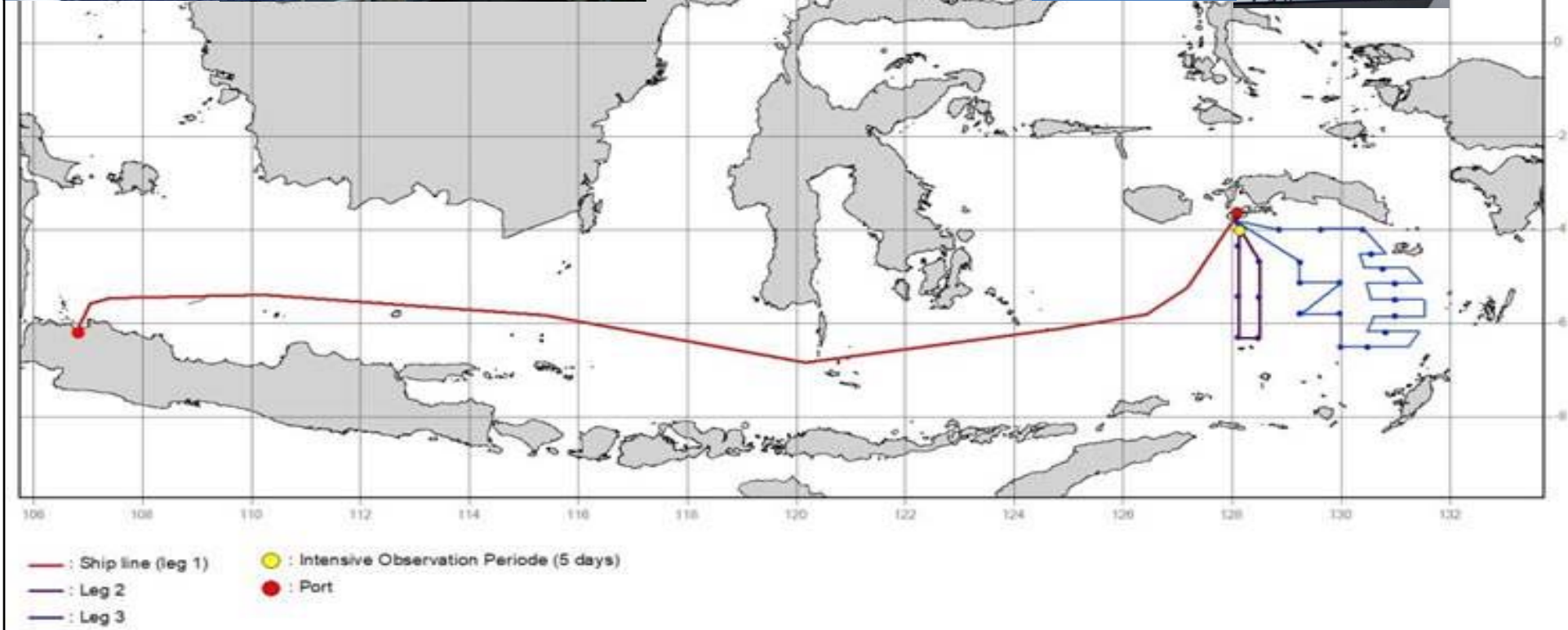
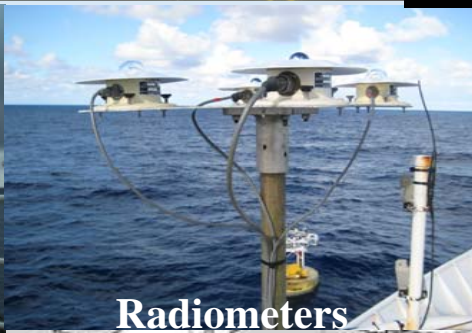
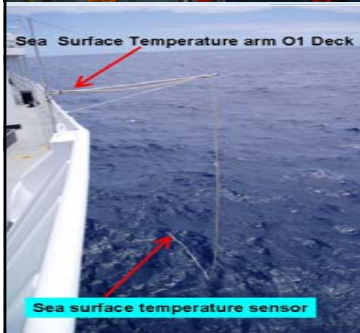
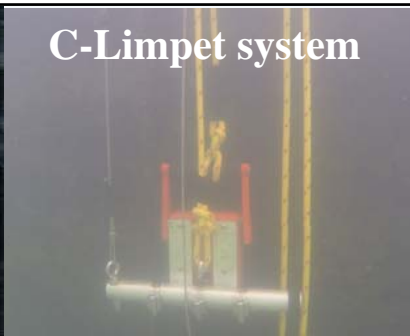
US - PMEL, ESRL, UW, SIO

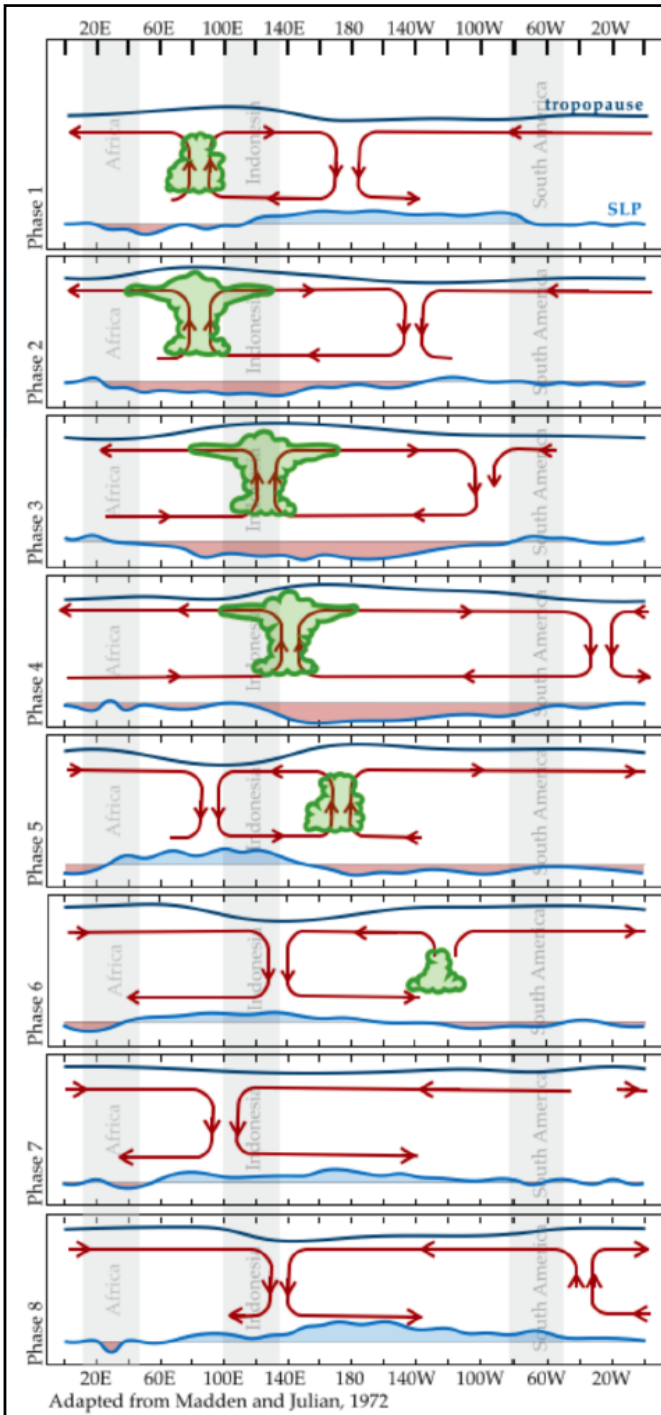


Baruna Jaya I

Objective: To study

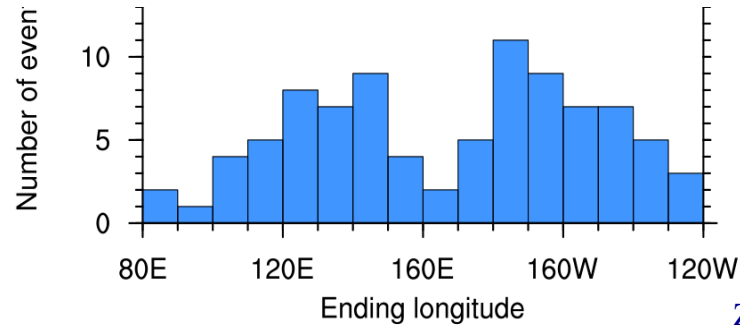
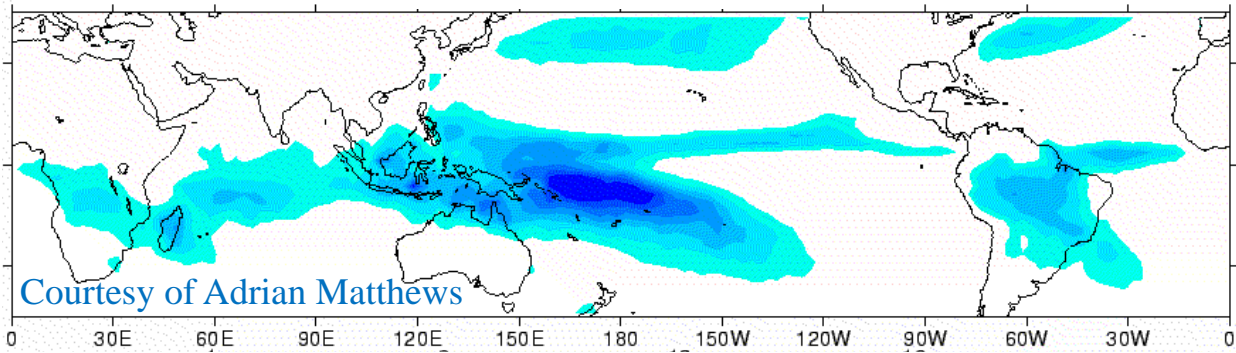
- air-sea interaction, the diurnal cycle, and the MJO
- validation of NWP and wave models
- water quality
- distribution of scrombidae larva associated with air-sea interaction, influence of ocean dynamic on the primary production and micro plastic, upper-ocean bio-physical response to the MJO
- bathymetric mapping for submarine hydrothermal activities, gas seeps and marine activities around the seamount at the Banda volcanic arc





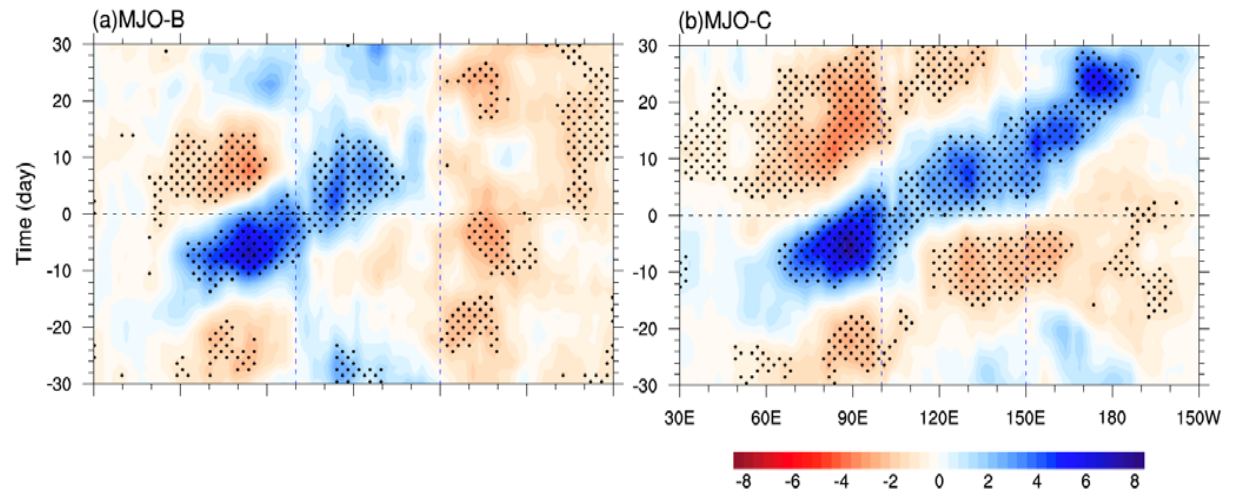
Total

MJO



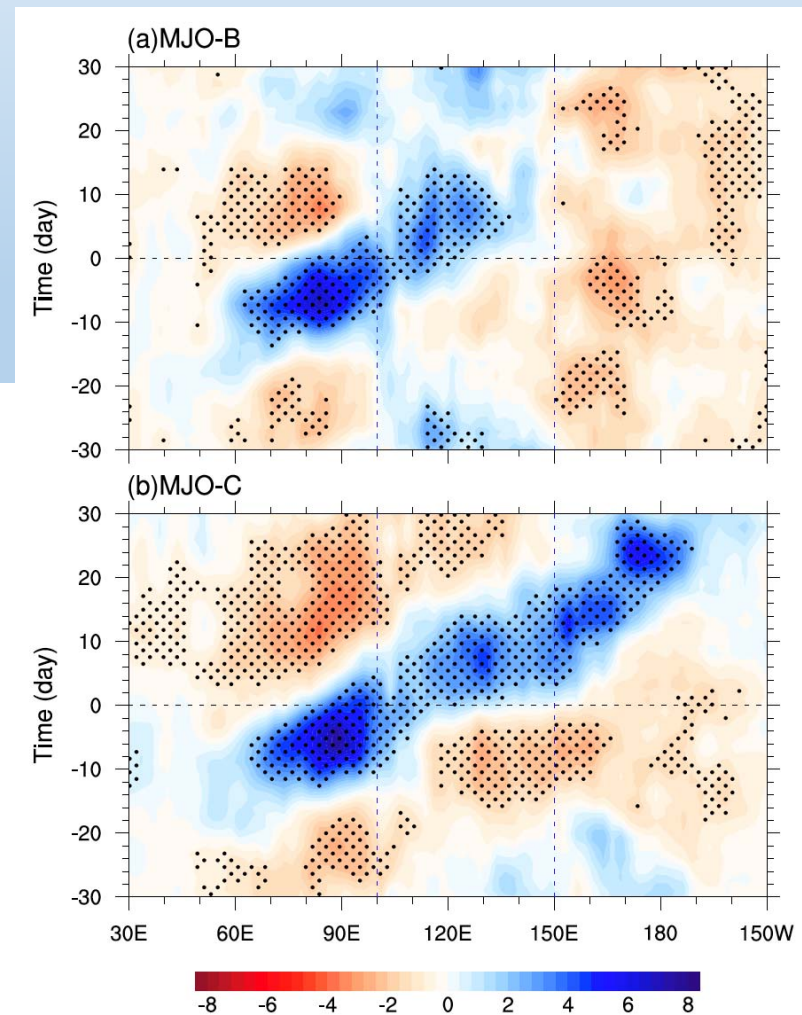
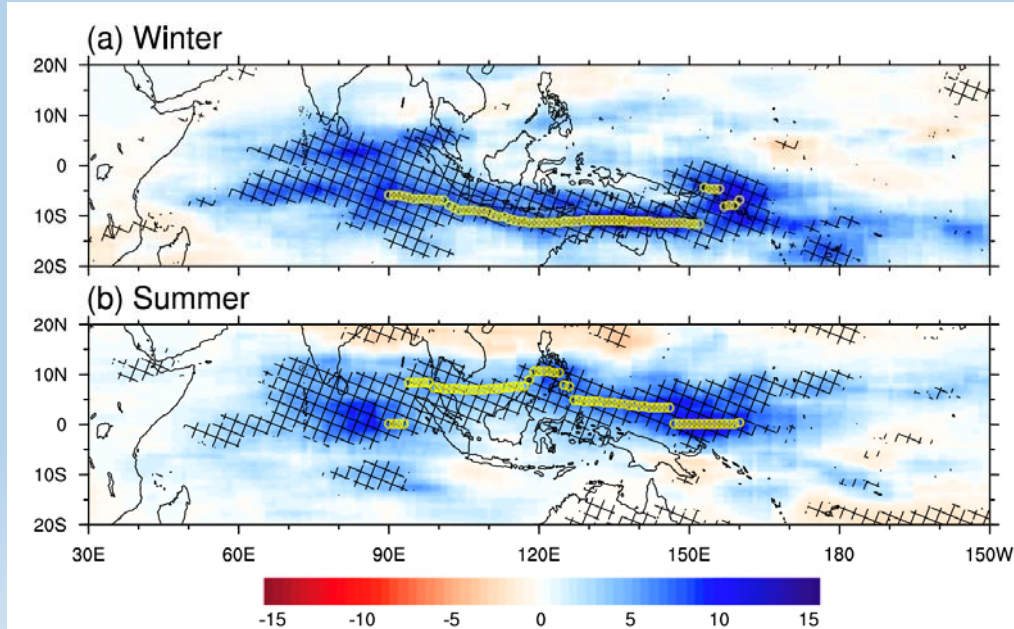
Zhang and Ling (2017)

Barrier Effect of the MJO

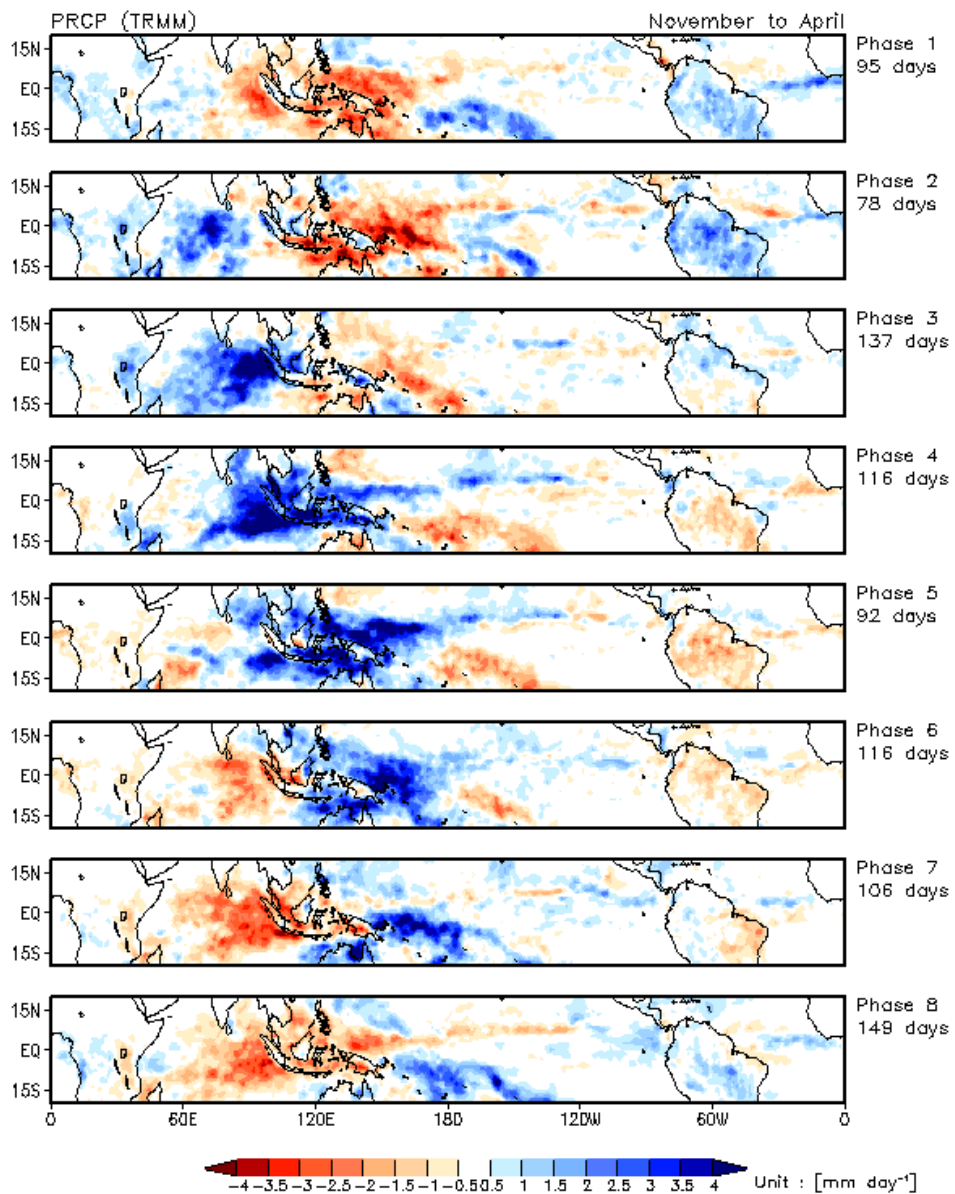


Possible Mechanisms for the Barrier Effect:

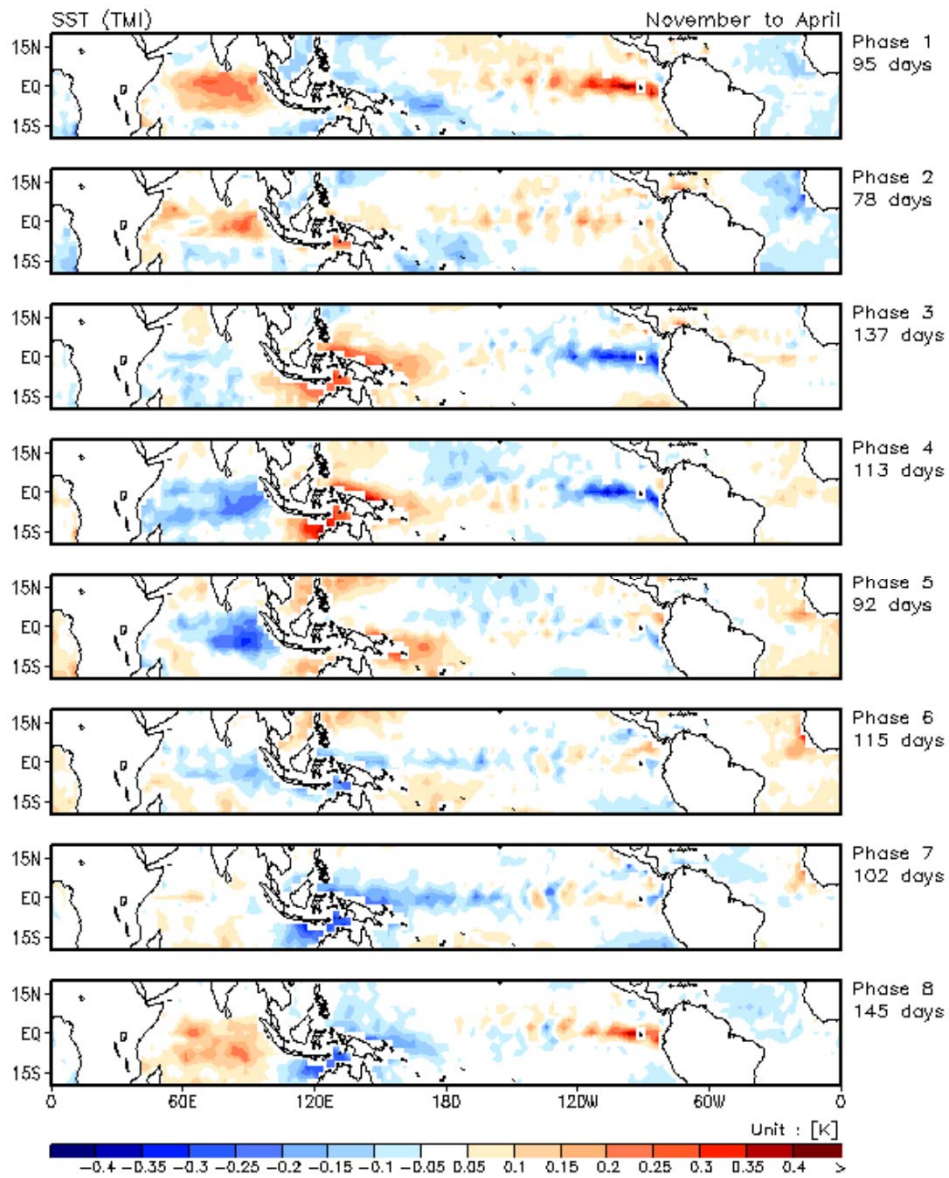
- Topographic interference with the MJO low-level circulation
- Reduction in surface evaporation by land
- Background state in moisture and circulation
- *Diurnal cycle*
- *Air-Sea Interaction?*



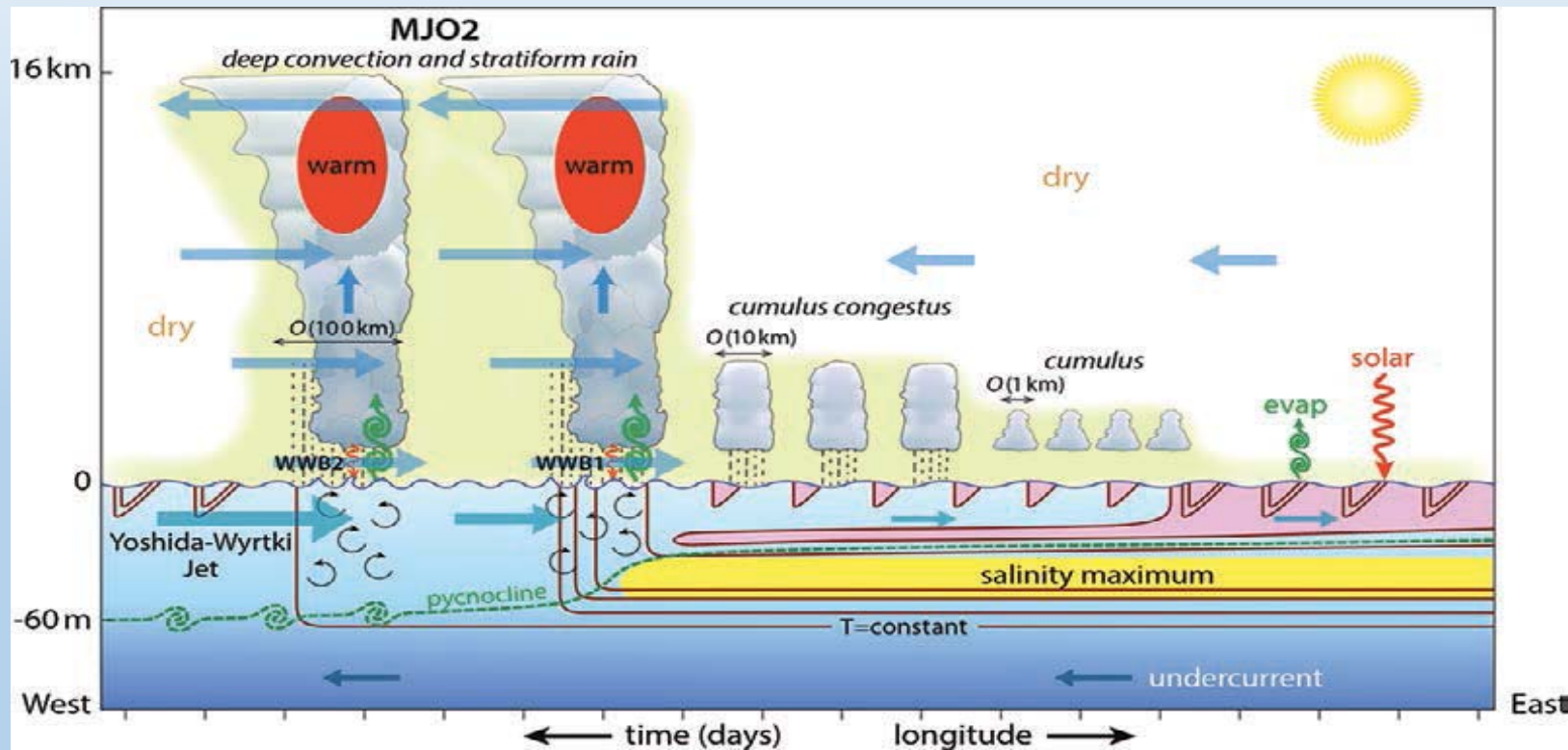
MJO Life cycle composite



MJO Life cycle composite



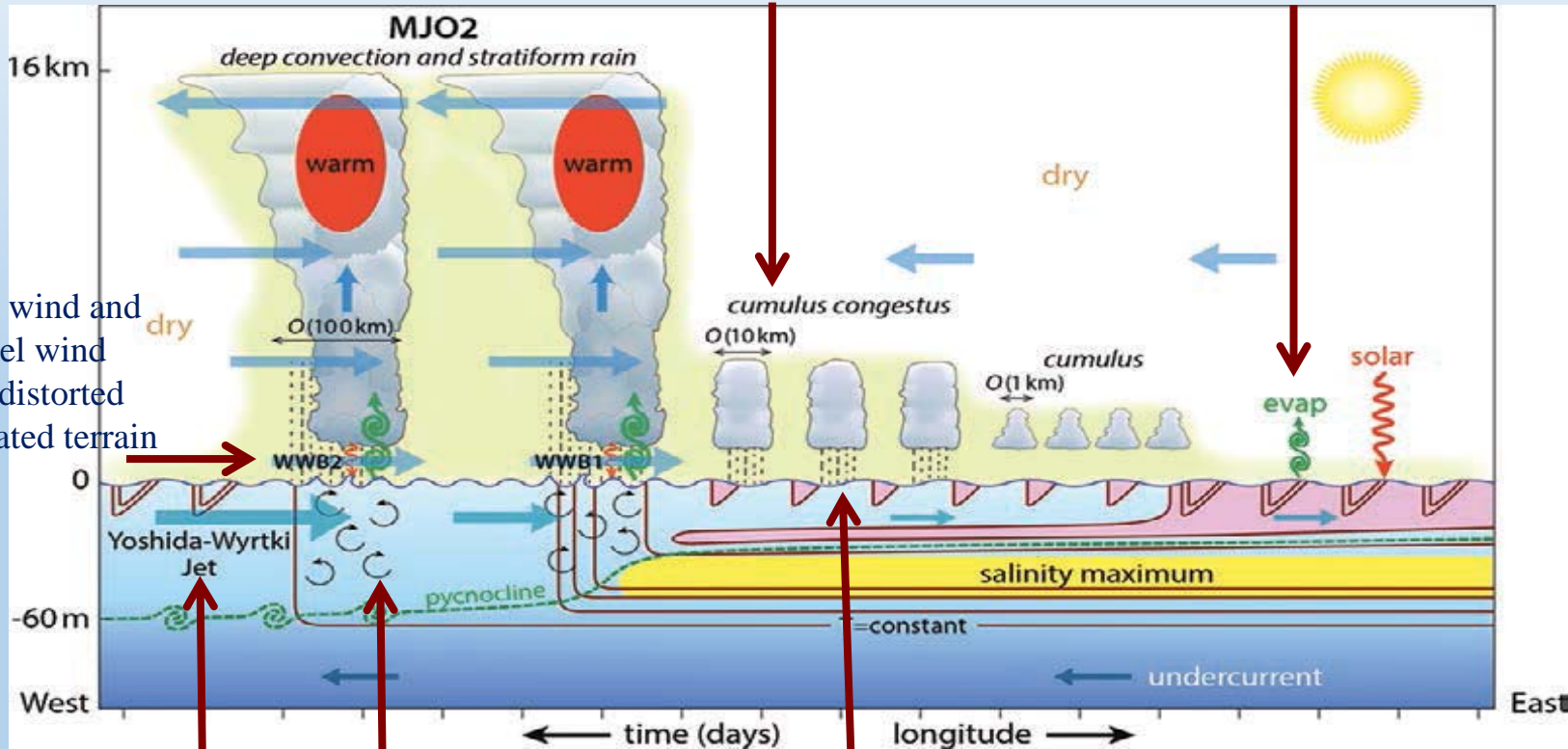
Schematic of MJO Air-Sea Interaction over the Open Ocean



Moum et al. (2014)

Complication of MJO Air-Sea Interaction due to the MC

Deep diurnal convection over land Surface flux blocked islands



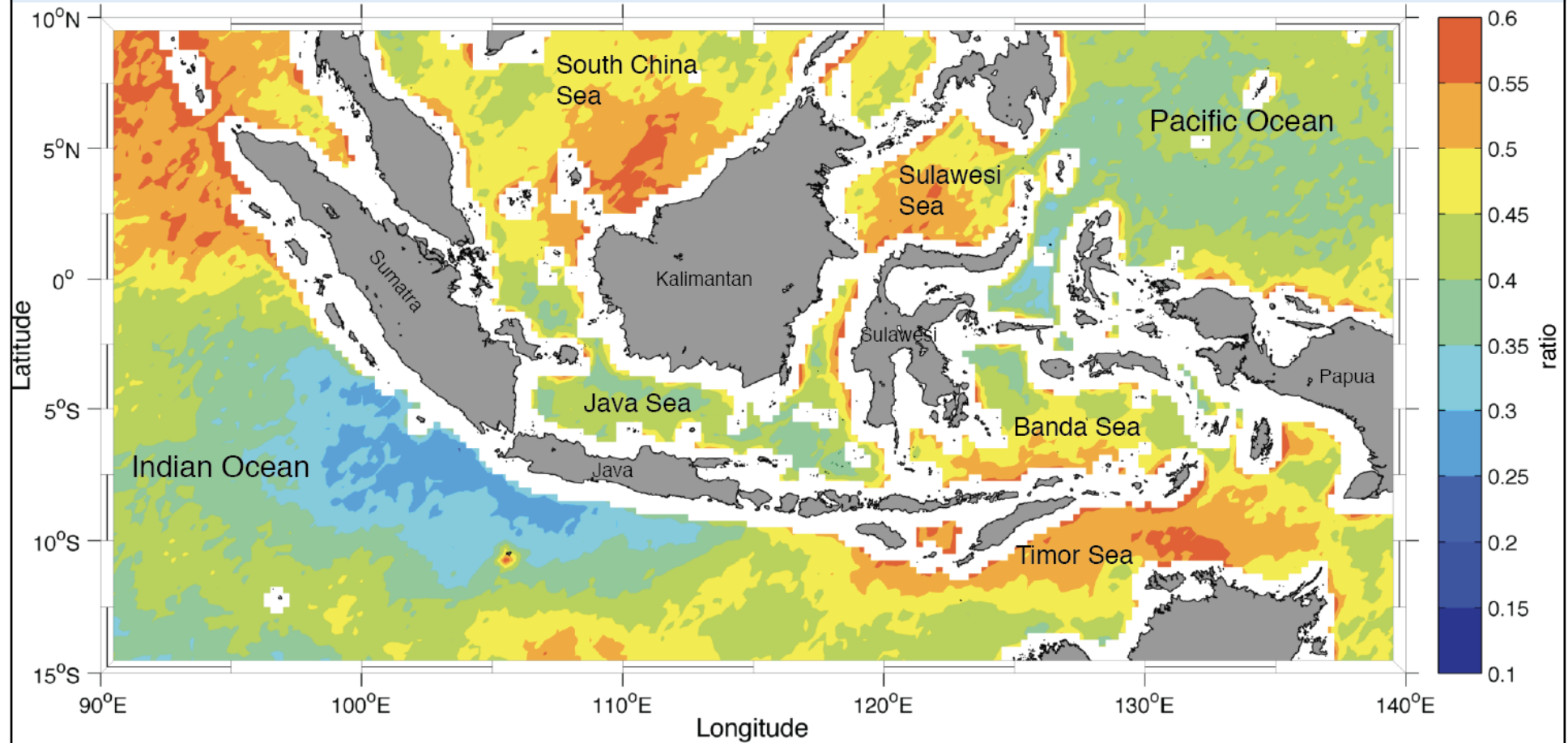
Surface wind and low-level wind pattern distorted by elevated terrain

Complicated ocean currents

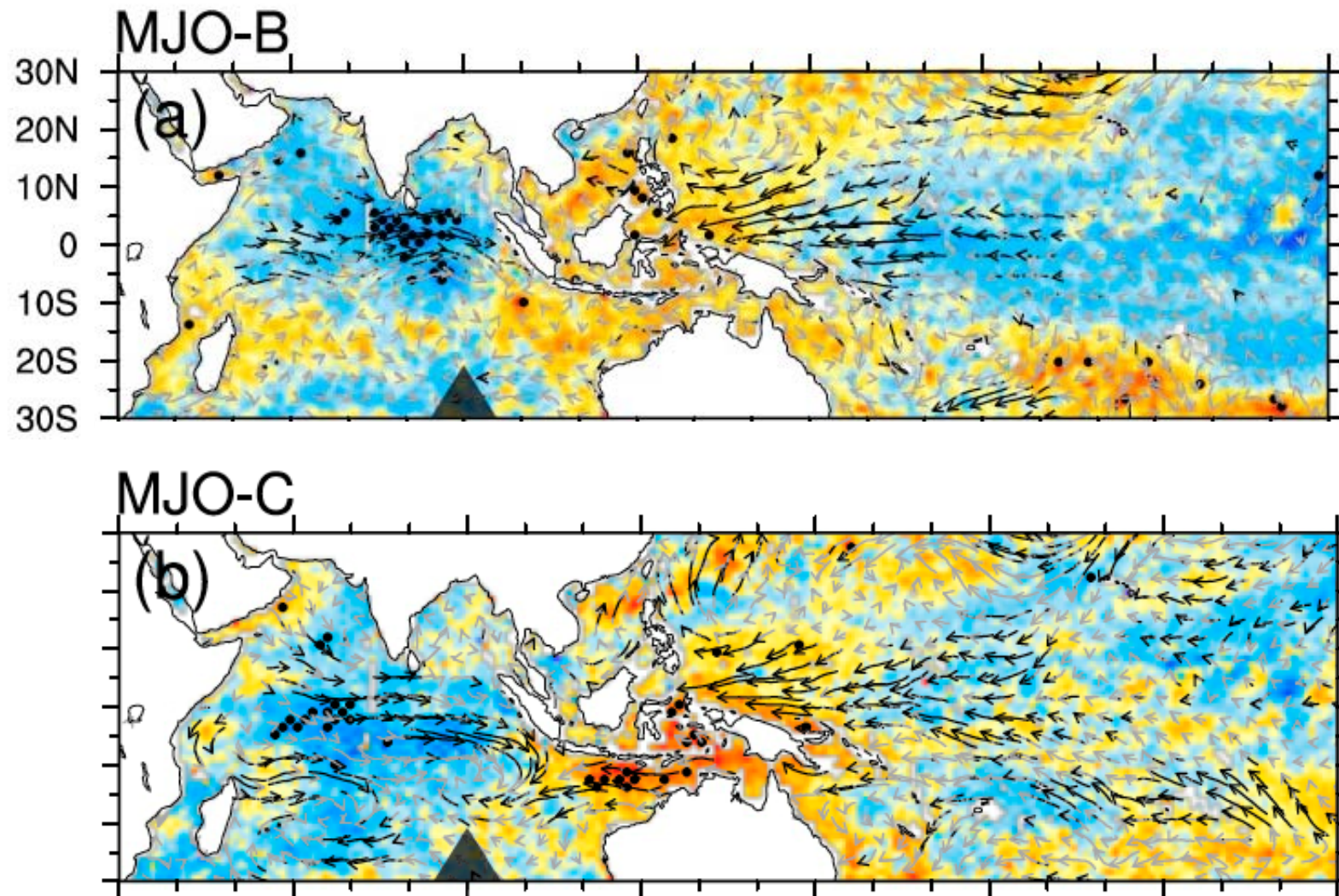
Additional mixing mechanisms

Freshwater input from river runoff

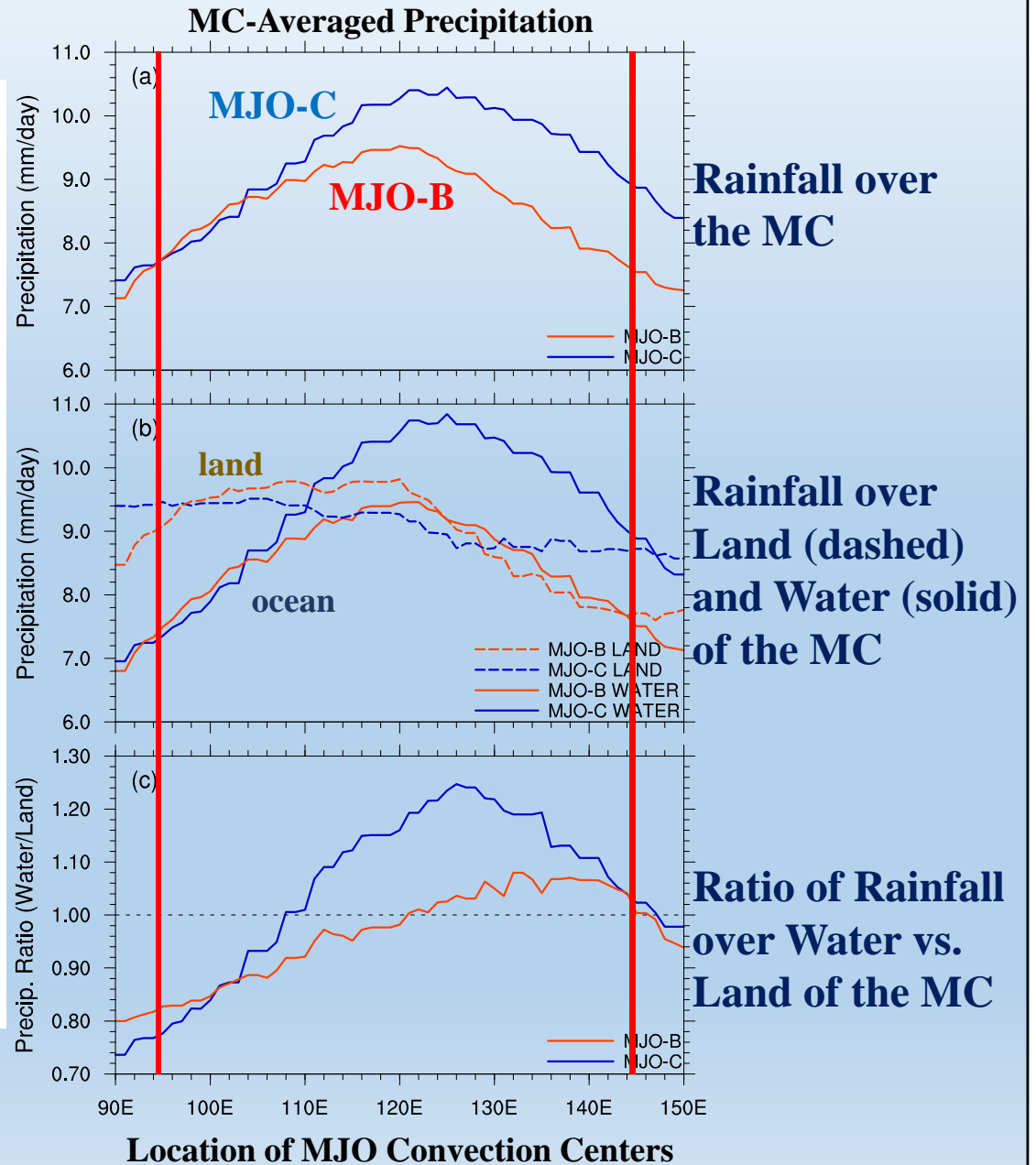
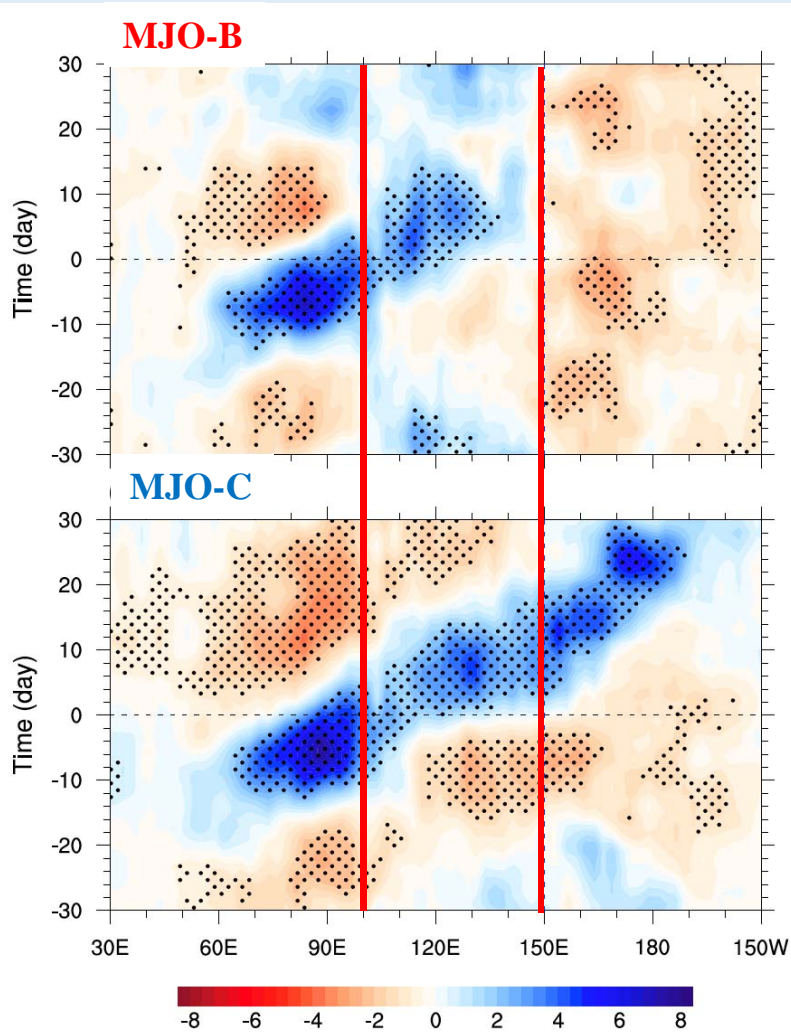
Intraseasonal SST Variability in the Indonesian Seas

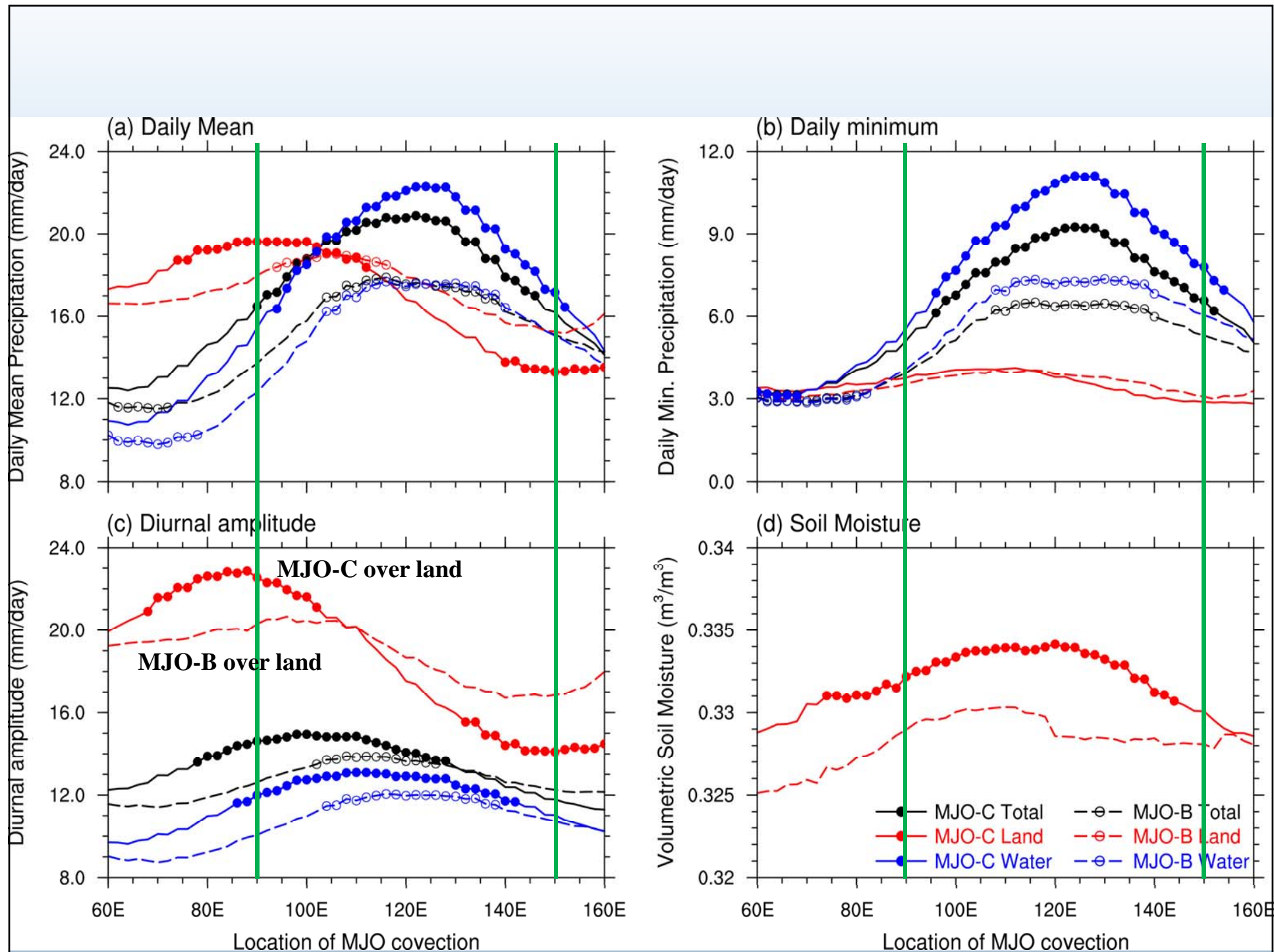


Higher SST in the Banda and Timor Seas for MJO-C than MJO-B before their convection centers enter the MC

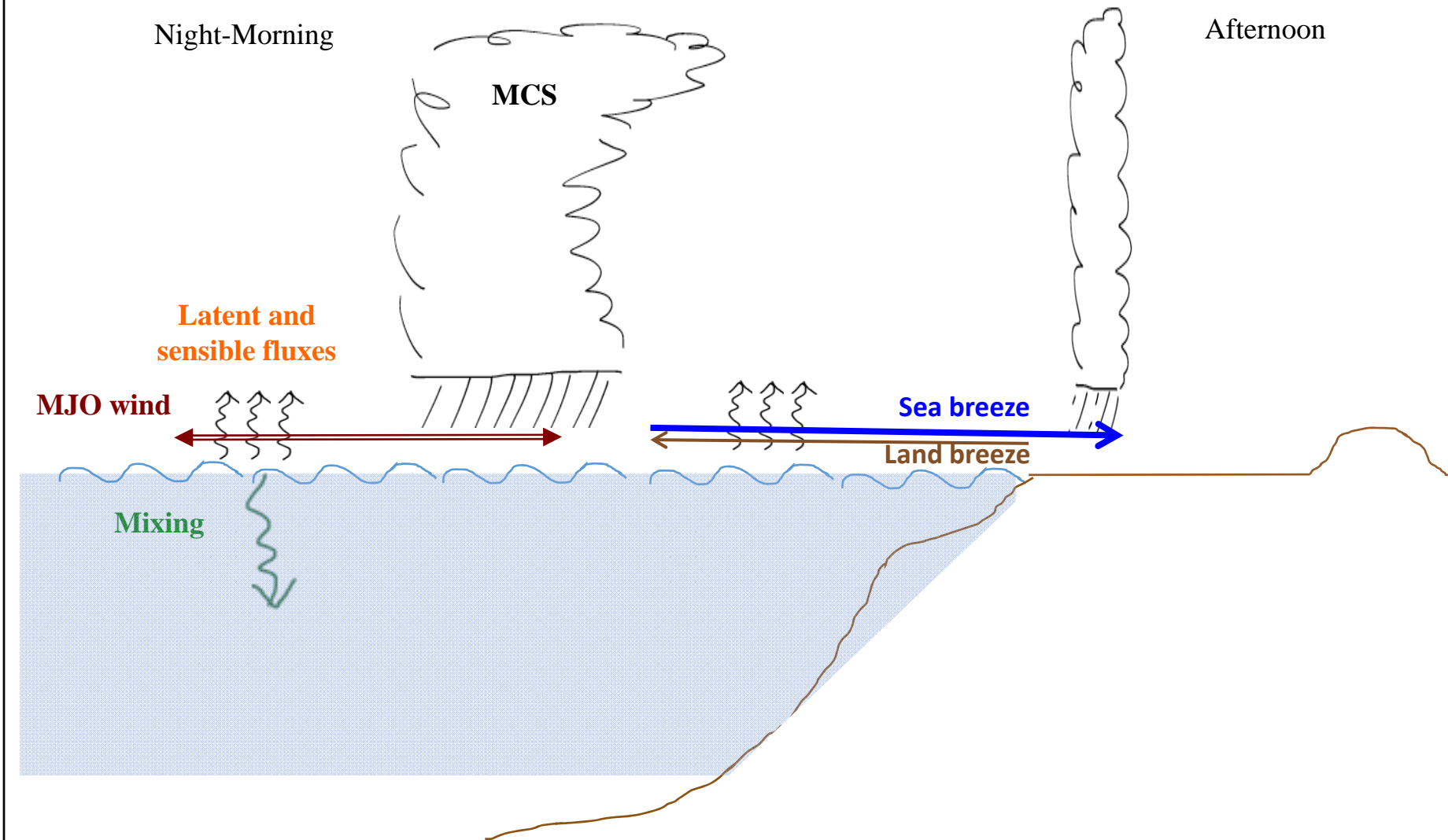


Possible Role of the Diurnal Cycle in the Barrier Effect

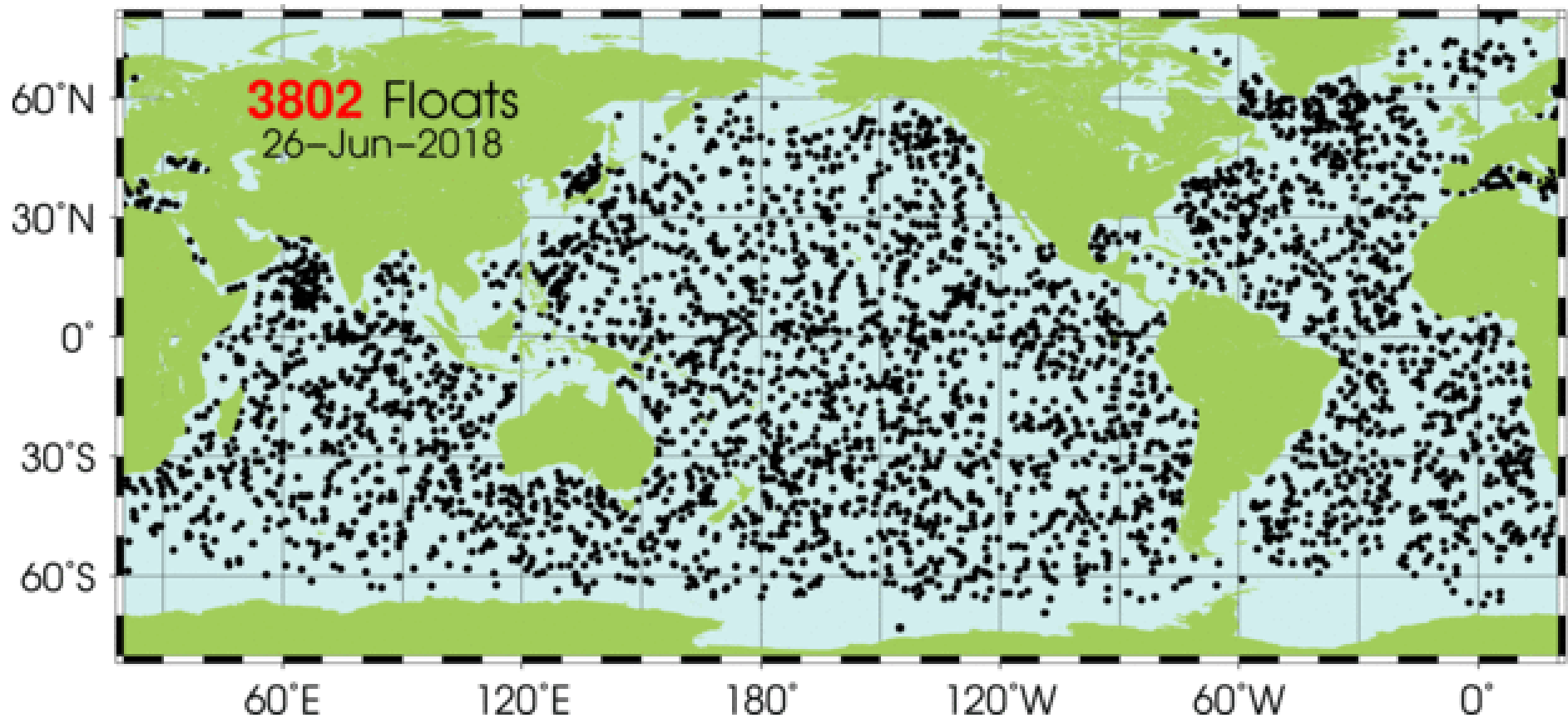




Interaction between the diurnal cycle and MJO



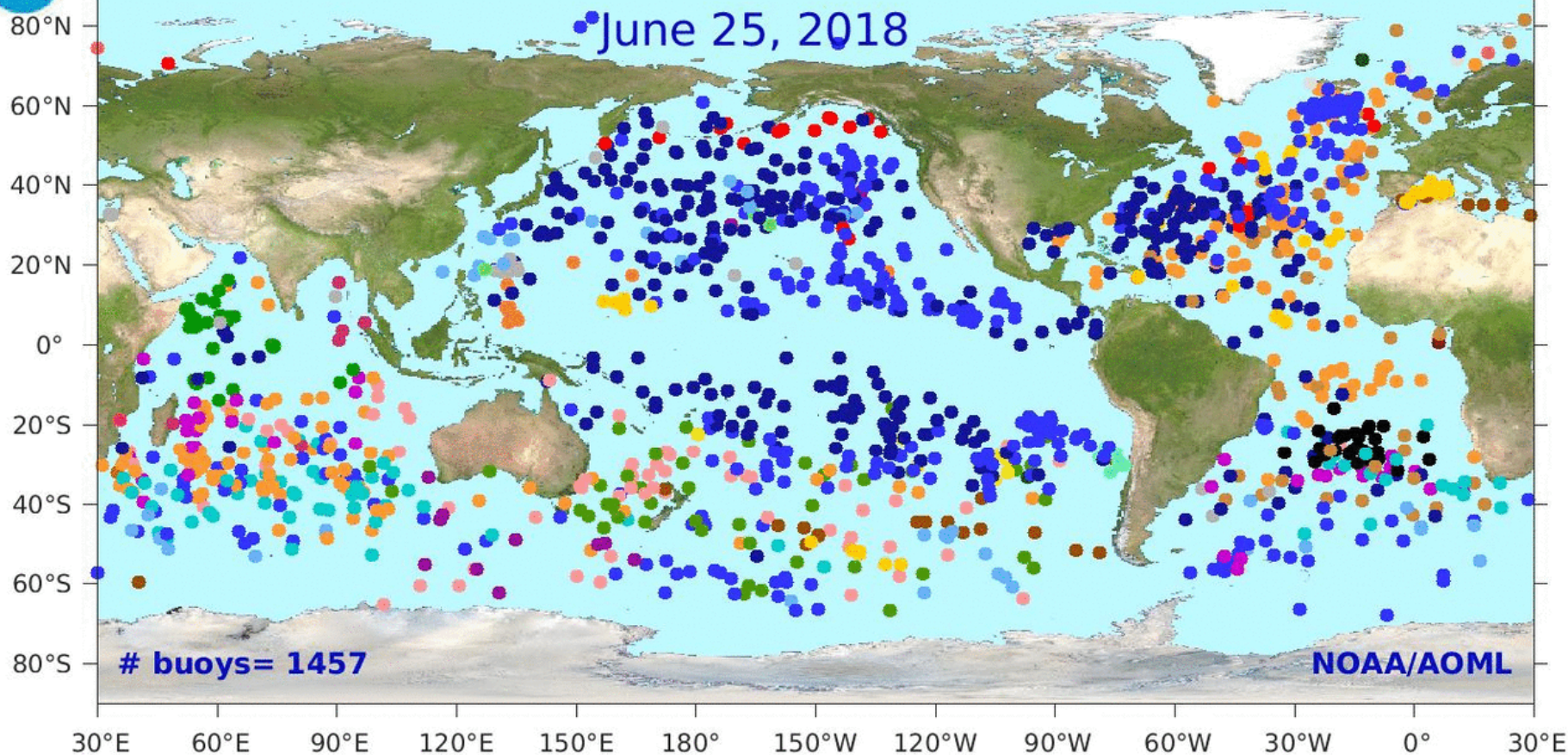
Argo floats-present





STATUS OF GLOBAL DRIFTER ARRAY

June 25, 2018



buoys = 1457

NOAA/AOML

Deploying Country

- | | | | | | |
|------------------|----------------|-----------------------|--------------------|---------------------|-------------------|
| ● Australia (65) | ● Europe (3) | ● Indonesia (6) | ● Mauritius (1) | ● Peru (9) | ● UK (42) |
| ● Brazil (23) | ● France (185) | ● Italy (27) | ● New Zealand (46) | ● Senegal (2) | ● USA-NOAA (342) |
| ● Canada (26) | ● Gabon (1) | ● Japan (13) | ● Netherlands (5) | ● Seychelles (1) | ● USA-other (386) |
| ● Chile (7) | ● Germany (30) | ● Kenya (27) | ● Norway (2) | ● South Africa (65) | ● Unknown (21) |
| ● China (4) | ● India (17) | ● Korea, Rep. of (41) | ● Palau (13) | ● Spain (47) | |

Summary:

The Indonesia-US Joint YMC Banda Sea Cruise will be the first one in the Banda Sea to make simultaneous measurements of the upper ocean, atmosphere, and air-sea interaction in the Banda Sea.

It is anticipated that the observations to be collected from the cruise will shed light on the role of the Banda Sea in the barrier effect and MJO-diurnal cycle interaction.

The synergy between the Banda Sea cruise, Investigator cruise, and Terra Maris will provide broader perspectives regarding the general issues of the YMC.