

# Global Warming: Understanding of Indonesian Rainfall Variability and Its Association with Atmospheric-Oceanic Circulation over Indo-Pacific

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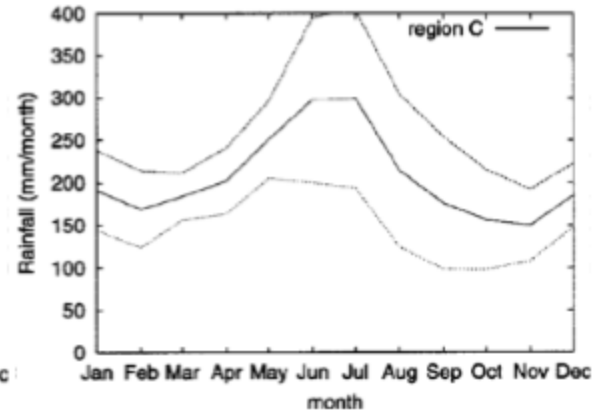
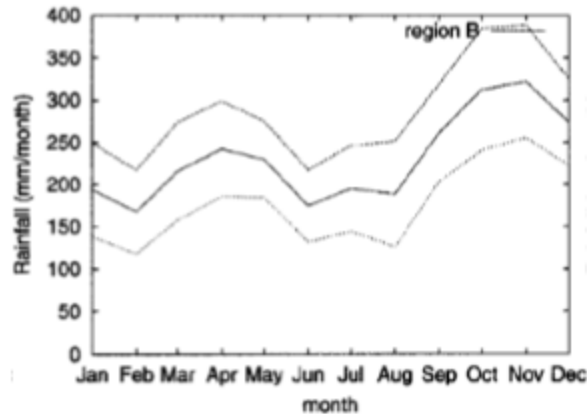
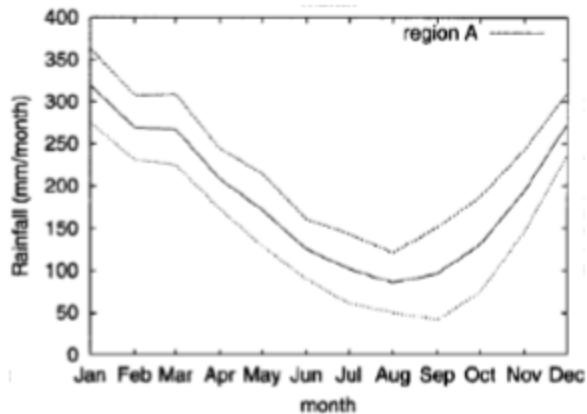
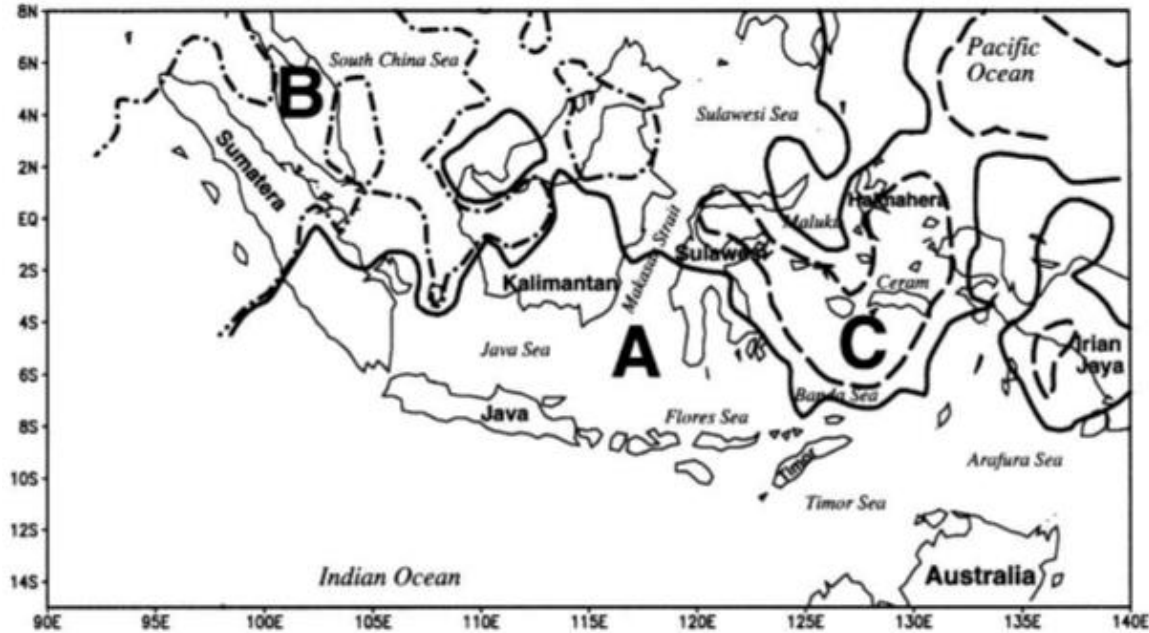
## Background :

The simulations under GHG emission scenario with coupled ocean atmosphere circulation models showed spatial variation in sea surface temperature (SST) and rainfall changes over the tropic for the first half of 21<sup>th</sup> century. The tropical Pacific warming was higher than in the southeast subtropics, and tropical precipitation changes were positively correlated with SST warming from the tropical mean (Xie et al. 2010).

## Aims :

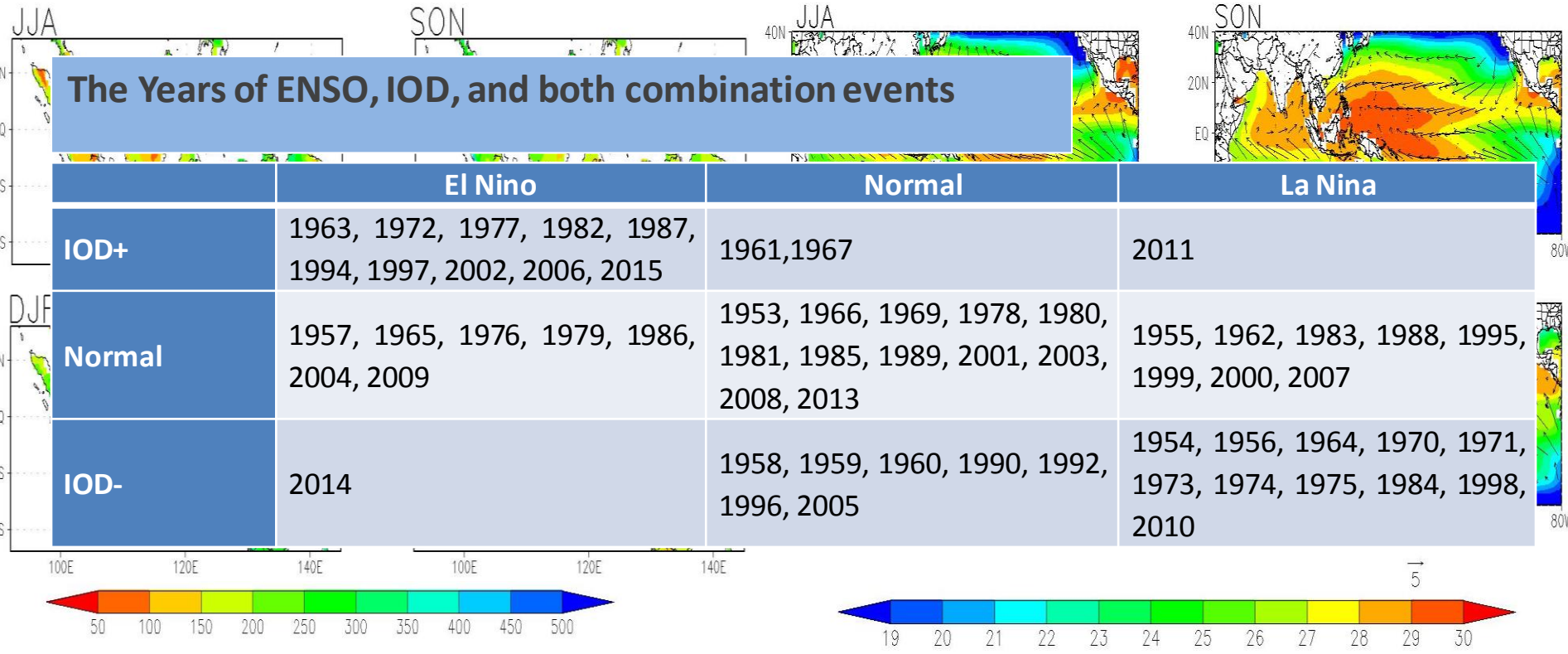
To understand Indonesian rainfall variability in multi-time scale (daily, monthly, seasonally, and long-term variation) in history and prediction and also to analyze its physical mechanisms in association with couple oceans-atmosphere over Indo-Pacific.

# INDONESIAN RAINFALL PATTERNS



Aldrian E, Susanto RD. 2003. Identification of three dominant rainfall regions within Indonesia and their relationship to sea surface temperature. *International Journal of Climatology*; **23**:1425-1452.

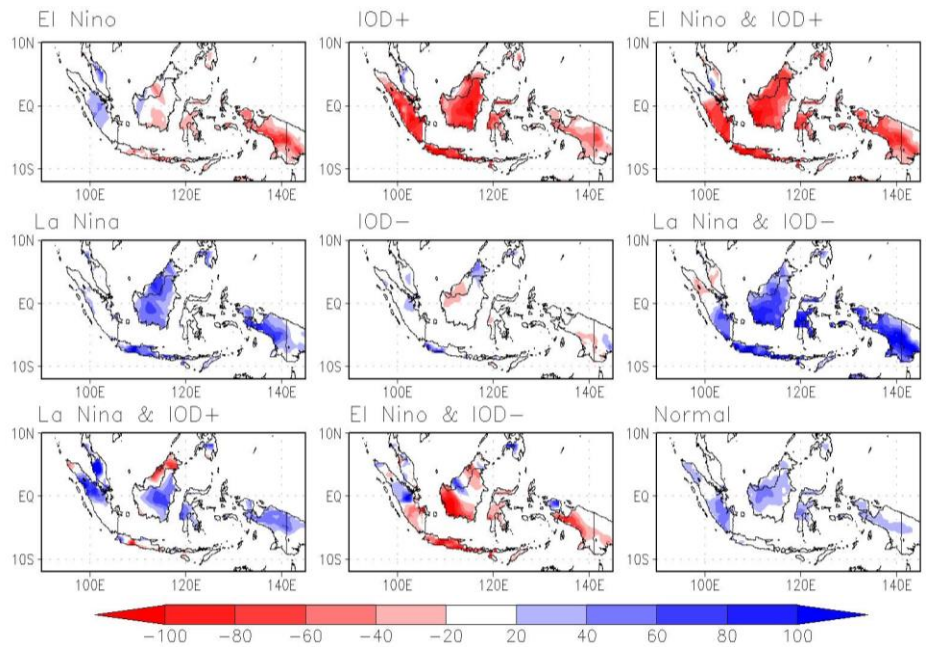
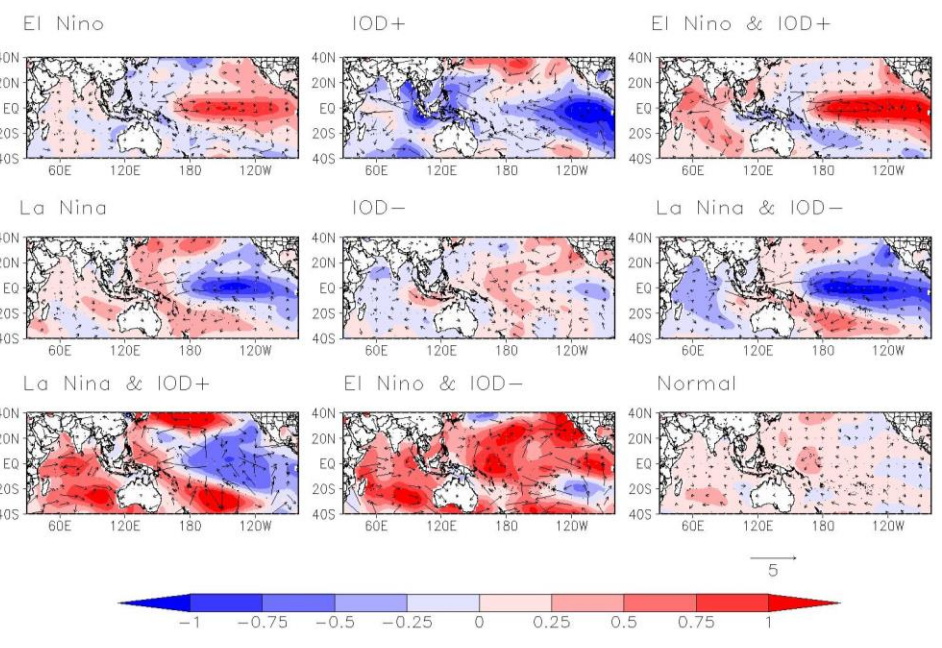
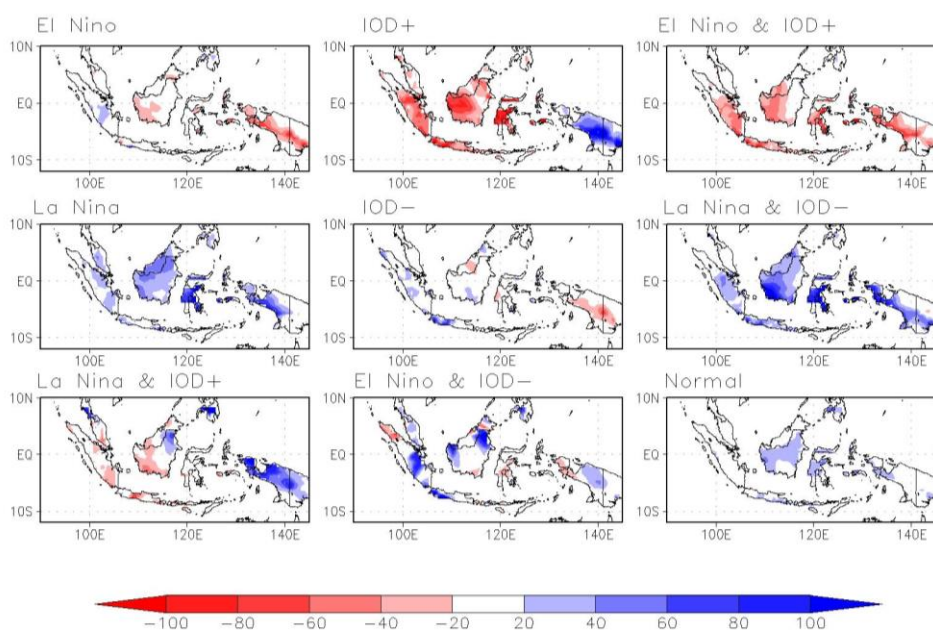
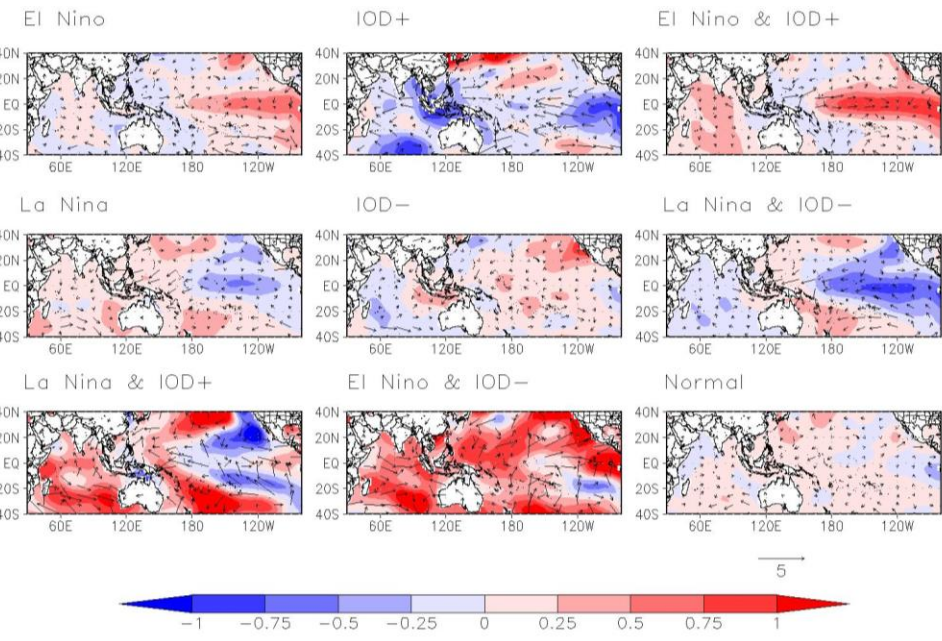
# Climatology (1961-2000) of Rainfall (mm/month), SST (°C, m/s), & Horizontal Wind (m/s)



- Monsoon activities (northwest and southeast monsoon) influence the Indonesian climate (Wet and Dry season).
- Indonesian region is also influenced by ENSO and IOD phenomena.
- They (ENSO & IOD) are able to disrupt the usually climate condition over Indonesia.

- Used monthly data during 1951-2015 periods
- Extended Reconstructed Sea Surface Temperature V3B (ERSST (Smith et al. 2008)
- Reanalysis Product, Horizontal wind at 1000-100 hPa (Kalnay et al 2006)
- CRU (Climatic Research Unit) : Precipitation data (Mitchell & Jones 2005)

# Condition at JJA (upper) and SON (below)



- Beside of those phenomena, Indonesian rainfall is maybe influenced by others phenomena.
- Further analysis methods are needed to see how the monsoon condition will be occurred by considered the other global climate variability, so that the adverse effects that may be generated can be reduced.