

## Sea surface temperature variability of the Indonesian Seas

Shinichiro Kida<sup>1\*</sup>, H. Annamalai<sup>2</sup>, Keiko Takahashi<sup>1</sup>

<sup>1</sup>Earth Simulator Center, JAMSTEC, <sup>2</sup>International Pacific Research Center

We investigate the dynamics of the Indonesian Seas and its possible impact on Pacific and Indian Ocean basin scale climate variability using a high resolution ocean model. Indonesian Seas are where precipitation and river run-off play an important role on freshening the sea surface. Understanding SST variability in the Indonesian Seas is crucial for understanding not only the Pacific-Indian Ocean water mass exchange (the Indonesian Throughflow) but also on tropical climate variability since atmospheric deep convection is located directly above these seas.

Our model simulations show that the seasonal SST variability is induced primarily by the Monsoonal winds. In summer, the spatially uniform northwesterly Monsoonal wind results in warm SST basin wide. In winter, on the contrary, the southeasterly Monsoonal wind establishes a significantly cold SST region in the east through Ekman upwelling. We find the shelf-break playing an important role on preventing warm water from entering the shelf and thus allowing the formation of such cold SST region. Possible mechanism of how inter-annual SST variability over the Indonesian Seas may affect basin scale climate variability is described. El Nino events that co-occur with the Indian Ocean Dipole are stronger than those without and we suggest that the inter-annual SST variability over the Indonesian Seas is capable of inducing such behavior of ENSO.

We will briefly introduce a recently developed ocean model, the Multi-Scale Simulator for the Geo-environment (MSSG-O). The model simulates realistic features from basin scale to laboratory scale successfully which will be useful tool for various multi-scale process modeling studies.

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