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## The impact of the Indonesian Throughflow and tidal mixing on the Seasonal Sea Surface Temperature in the Indonesian Seas

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We utilize a numerical ocean model to investigate how the Indonesian Throughflow and tidal mixing may affect the Sea Surface Temperature in the Indonesian Seas. The Indonesian Throughflow is found to play a major role on the SST only during summer, especially on its spatial variability. This is because the Throughflow weakens the impact of coastal upwelling that is forced by the Northwestern Monsoonal wind. Without the Indonesian Throughflow, a cold SST region will establish along Nusa Tenggara in summer. The heat balance of the surface mixed layer shows the warming effect of the Throughflow comparable to the cooling effect of coastal upwelling and wind-induced mixing. The Indonesian Throughflow does not significantly impact the SST in other seasons. The seasonal variability of the Indonesian Throughflow transport is also found not to affect the seasonal SST variability significantly. The importance of the Throughflow on the seasonal SST variability is through its net presence throughout the year, not its seasonal variability.

The impact of tidal mixing on the SST is found to be trapped locally on the annual mean. However, this impact is found to contain large seasonal variability with cooling of the SST occurring mostly in summer and winter. This seasonality is induced because the Monsoonal winds force upwelling in summer and winter. Moreover, the Ekman transport is directed toward the interior of the Banda Sea during summer so the cold tidally mixed water is efficiently spread throughout the basin. Our model experiments suggest that the impact of tidal mixing is likely to be limited only where tidal mixing is strong without the wind-driven circulation. Tidal mixing on the shelves, on the other hand, is found to have only a limited impact along the shelf-break.

Keywords: Indonesian Seas, Sea Surface Temperature, Tidal mixing, Indonesian Throughflow