

Drastic deepening of the barrier layer off the western coast of Sumatra due to the MJO passage during the Pre-YMC

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Drastic deepening of the barrier layer off the western coast of Sumatra (4°S, 102°E, 800 m depth) due to the MJO passage observed during December 2015 is investigated. The Research Vessel Mirai observation captured the drastic increase of isothermal depth from 20 m to 100 m for only 4 days due to the westerly burst (5-9 m/s) associated with the MJO. While, the mixed layer was deepened from 10 m to 40 m because of the strong stratification of the salinity in the ocean surface layer. As a result, the barrier layer depth was deepened from 10 m to 80 m. This drastic deepening of the barrier layer was associated with the increase of turbulent energy dissipation rate. Because the current speed in the surface layer off the western coast of Sumatra was very slower (less than 20 cm/s) than that over the open ocean (more than 50 cm/s), the vertical mixing due to the westerly burst could be a main factor for the barrier layer deepening.

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