

Mooring Measurement of the Abyssal Circulations in the Western Pacific Ocean

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A scientific observing network in the western tropical Pacific has initially been established by the Institute of Oceanology, Chinese Academy of Sciences (IOCAS). Using fifteen moorings that gives unprecedented measurements in the intermediate and abyssal layers, we present multi-timescale variations of the deep ocean circulations prior to and during 2015 El Niño event. The deep ocean velocities increase equatorward with high standard deviation and nearly zero mean. The deep ocean currents mainly flow in meridional direction in the central Philippine Basin, and are dominated by a series of alternating westward and eastward zonal jets in the Caroline Basin. The currents in the deep channel connecting the East and West Mariana Basins mainly flow southeastward. Seasonal variation is present in the deep jets in the Caroline Basin, associating with vertical propagating annual Rossby wave. The high-frequency flow bands are dominated by diurnal, and semi-diurnal tidal currents, and near-inertial currents. The rough topography has a strong influence on the abyssal circulations, including the intensifications in velocity and internal tidal energy, and the formation of upwelling flow.

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