



Semiannually alternating exchange of intermediate waters east of the Philippines

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Intermediate water exchange in the northwest tropical Pacific is explored with the temperature, salinity, and current measurements of a mooring system deployed at 8°N, 127.05°E during 2010–2014. For the first time, prominent semiannual variability (SAV; with the maximum power at ~ 187 days) of subthermocline meridional flow along the Mindanao coast is revealed. A significant correlation between meridional flow and salinity is found at intermediate depths. This provides direct evidence for the alternating transports of South Pacific and North Pacific Intermediate Waters by northward and southward undercurrents, respectively. Further analysis with an eddy-resolving ocean general circulation model demonstrates that the SAV is generated locally near the western boundary, manifesting as large-scale subthermocline recirculation and leading to alternating northward and southward flows near the Mindanao coast, which plays an efficient role in the intermediate water exchange of the northwest tropical Pacific. Mechanisms underlying the observed SAV are discussed