

Tracing ocean circulation in the Western Equatorial Pacific with carbon, nitrate, and neodymium isotopes

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The western equatorial Pacific (WEP) is a water mass cross road, where key elements of the iconographic “ocean conveyor” can be monitored: The Indonesian Throughflow (ITF) is the only tropical inter-ocean current, linking the equatorial Pacific and Indian Oceans, a critical component of the return branch of the thermohaline circulation. At the same time, subsurface/intermediate waters from both hemispheres impinge on the margin in the low latitude western Pacific, making this an ideal site to monitor cross-hemispheric and inter-basin ocean circulation. Finally, the WEP is tightly connected to the eastern equatorial Pacific (EEP) through equatorial current systems.

Here we will present water column profiles collected during the RV SONNE 228 expedition of $\delta^{13}\text{C}_{\text{DIC}}$, $\delta^{15}\text{N}_{\text{NO}_3}$, and eNd from the SE tip of the Philippines, off Mindanao, and north of Papua New Guinea (PNG). These profiles allow identification of Antarctic Intermediate Waters off PNG, and their erosion as they flow north. The North Pacific Intermediate Water is identified at the entrance of the ITF. Finally, differences in the nitrate isotopic composition off PNG and off Mindanao imply different sub-thermocline water masses in the northern and southern WEP, respectively. These latter findings will be discussed in the context of nitrogen isotope variability of the WEP during the last glacial-interglacial cycle.