

Neodymium isotopes along the GEOTRACES GP16 Eastern Pacific Zonal Transect

YINGZHE WU¹, CHANDRANATH BASAK², JESSE M
MURATLI³, LEOPOLDO D. PENA⁴, LOUISE BOLGE¹,
BRIAN A HALEY⁵ AND STEVEN L. GOLDSTEIN¹

¹Lamont-Doherty Earth Observatory of Columbia University

²University of Delaware

³CEOAS, Oregon State University, Corvallis, OR 97331, USA

⁴Universitat de Barcelona

⁵Oregon State University, College of Earth, Ocean, and
Atmospheric Sciences

Presenting Author: yingzhe@ldeo.columbia.edu

The GEOTRACES Eastern Pacific Zonal Transect (EPZT, GP16) from Peru to Tahiti provides a great opportunity to understand sources, sinks and cycling of neodymium (Nd) in the ocean as well as how well Nd isotopes behave as a conservative water mass tracer because the EPZT crosses different environments, including a continental margin, an oxygen minimum zone, an oceanic ridge, and open ocean. We report the distribution of dissolved Nd isotopes from 21 stations in the EPZT. Most of the surface samples, from 0 to ~10 m, show ϵNd -values between -2 and -1, reflecting terrigenous contributions from South America. ϵNd -values of shallow samples, from ~10 to ~500 m, range between -4 and -1, consistent with ϵNd -values of Equatorial Subsurface Water, Eastern South Pacific Intermediate Water, and South Pacific Central Water. Below ~500m, intermediate and deep water mass end-members were defined for Equatorial Pacific Intermediate Water, Antarctic Intermediate Water, Pacific Deep Water, Circumpolar Deep Water, and Antarctic Bottom Water using the extreme values within this transect. Predicted ϵNd -values were calculated based on Optimal Multi-parameter Analysis of the fractional water mass compositions. Our results show that 50% of intermediate and deep samples are within analytical error of the predicted values from water mass mixing and 92% of samples are within 0.9 ϵNd -units (~3 times the analytical error). These results indicate that Nd isotopes in intermediate and deep water largely behave as a conservative water mass tracer along the EPZT.