

Particle dynamics in the central Pacific Ocean: Insights from Th and Pa isotopes

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Thorium-232 ($t_{1/2} \sim 14$ Ga), Thorium-230 ($t_{1/2} \sim 75.7$ ka), and Protactinium-231 ($t_{1/2} \sim 32.8$ ka), are naturally-occurring, powerful tools for evaluating large scale particle dynamics, sources of trace elements and isotopes (TEIs) to the ocean, and the internal fluxes of key chemical constituents, such as organic carbon and iron. Dissolved and size-fractionated particulate samples were collected in the fall of 2018 along the GP15 152°W GEOTRACES transect (Alaska to Tahiti). Filtered seawater samples, as well as subsamples of particulate matter filters were analyzed for Th isotopes and ²³¹Pa in our labs. Preliminary results indicate that the distributions of these elements are influenced by both atmospheric sources (e.g., dust arriving to the North Pacific from Asian sources) and boundary processes (i.e., inputs from the Alaskan margin). We will discuss the relative importance of these factors to the different biogeochemical regimes crossed on our N-S transect and how different processes may impact the fluxes of TEIs and organic carbon. Interestingly, the dissolved ²³¹Pa/²³⁰Th ratios near the Alaskan Margin are atypically low compared to those found on previous GEOTRACES campaigns (e.g., at the Peruvian margin) and increase away from the margin. We will examine this divergence from ‘classical’ boundary scavenging and its implications for TEI cycling in the North Pacific.