

## **Thorium-234 distribution along the Eastern Pacific GEOTRACES transect and implications for export and reminerzalization of carbon and trace metals**

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<sup>234</sup>Th ( $t_{1/2} \sim 24$  days) is a naturally occurring radioisotope whose disequilibrium with parent <sup>238</sup>U can be exploited to quantify fluxes of other elements traveling out of the upper ocean on sinking particulate matter ( $>51 \mu\text{m}$ ). High-resolution <sup>234</sup>Th sampling during the 2013 U.S. GEOTRACES Eastern Pacific Zonal Transect cruise (EPZT) showed a relatively consistent and extensive vertical export of <sup>234</sup>Th out of surface ocean (0 -100 m) at  $1600 \text{ dpm m}^{-2} \text{ day}^{-1}$  ( $\pm 400$  std. dev.). This value is double the average that was observed on the U.S. North Atlantic section (NAZT;  $800 \pm 300 \text{ dpm m}^{-2} \text{ day}^{-1}$ ). Carbon export across the EPZT, calculated using C/<sup>234</sup>Th particulate ratios and assuming a 1-D system, averaged  $2 \text{ mmolC m}^{-2} \text{ day}^{-1}$ . If upwelling at the Peruvian margin is considered, carbon export increases substantially in the shelf region. <sup>234</sup>Th activities in excess of <sup>238</sup>U in the subsurface were observed throughout the EPZT, suggesting widespread remineralization. These features were most pronounced along the upper boundary of the Peruvian oxygen minimum zone. Near  $84^\circ$  and  $89^\circ\text{W}$ , remineralization of <sup>234</sup>Th averaged 80% of surface export. Further analyses using <sup>234</sup>Th to constrain nutrient and trace metal budgets in these regions will follow as particulate metal data is made available.