

## **Using the short-lived radionuclide thorium-234 to explore particle fluxes in marine systems.**

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The movement of material from the surface ocean to depth plays a critical role in our understanding of a suite of elemental biogeochemical cycles. Understanding the mechanisms that control and mediate the composition and flux of that material on its downward path to deep waters and ultimate burial in marine sediments remains one of our biggest challenges. The short lived radionuclide, thorium-234, has proven to be an invaluable tool for exploring particle formation and remineralization at high spatial and temporal resolution throughout the world's oceans. Here, an overview of the  $^{234}\text{Th}$  method and its application to examining particulate organic carbon and trace element fluxes is presented, including recent results from the Hawaiian Ocean Time-Series, the EXport Processes in the Ocean from RemoTe Sensing (EXPORTS) field campaign and other programs.