

Aerosol deposition and fractional solubility of trace elements in the remote ocean

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Atmospheric deposition is recognized as a significant, though episodic, input flux of trace elements and other chemical species to the surface waters of the open ocean. However, direct observations are difficult to obtain. Island-based sampling stations have helped to constrain flux estimates in some regions. Satellite products report optical properties but these are not necessarily representative of aerosol deposition. Surface ocean sampling for chemical tracers of atmospheric deposition are useful but subject to particular caveats. Modeling efforts are dependent on direct observations to “ground-truth” their output.

The US GEOTRACES program has completed three section cruises since 2010. This paper will report direct observations from the two most recent cruises which sampled aerosols over the Eastern subtropical Pacific Ocean (2013) and the Western Arctic Ocean (2015). Both regions are relatively under represented in the aerosol literature. Aerosol iron and its fractional solubility are emphasized because of the role of this biolimiting element in marine primary production through much of the surface ocean. Other elements of interest include aluminum for its role as a dust proxy and lead as an indicator of anthropogenic emissions. The cosmogenic isotope Be-7 serves to constrain the bulk aerosol flux estimate.