

## **Measurement and quantification of the air-sea exchange of mercury: PI: Robert Mason**

The Geotraces Alaska-Tahiti transect will provide an opportunity to obtain crucial detailed information on the air-sea exchange of mercury (Hg) in the Pacific and the importance of geogenic versus anthropogenic inputs. Our recent high resolution underway sampling of elemental Hg (Hg<sup>0</sup>) in surface waters and atmosphere, along with collection of precipitation and aerosols, has allowed detailed examination of the inputs and outputs of Hg at the air-sea surface. This cruise will provide important information that can be linked with data from prior cruises: 1) the US Geotraces zonal section in 2013 (Mason et al., submission 8/16); 2) the 2011 Metzyme equatorial Pacific cruise (Soerensen et al., 2014); and 3) the Arctic Geotraces cruise (paper in preparation). There are large contrasts between these high resolution datasets with the ocean acting as a net source (Hg<sup>0</sup> evasion > wet+dry deposition) or sink depending on location. Examination of Hg in aerosols, and its relationship to crustal elements, has provided information on the extent of anthropogenic enrichment, which is greater in the North Atlantic. The proposed cruise will provide an opportunity to examine crustal and anthropogenic inputs from Asia, and examine the importance of marine boundary layer oxidation of Hg<sup>0</sup>, first demonstrated in the subtropical North Pacific during the 2002 IOC cruise (Laurier et al., 2003). Overall, the cruise will allow contrast with previous studies and lead to a better understanding of the importance of the atmosphere-ocean exchange in the global ocean Hg cycle. This work would be done in conjunction and consultation with the research groups of Hammerschmidt and Lamborg.

### References

- Laurier, F.J.G., Mason, R.P., Whalin, L. and Kato, S., 2003. Reactive gaseous mercury formation in the North Pacific Ocean's marine boundary layer: A potential role of halogen chemistry. *Journal of Geophysical Research-Atmospheres*, 108(D17).
- Soerensen, A.L. et al., 2014. Elemental mercury concentrations and fluxes in the tropical atmosphere and ocean. *Environmental Science & Technology*, 48(19): 11312-11319.