

Vertical distributions of lead and bismuth in the Japan Trench

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Lead has been released through a variety of industrial activities and supplied to the ocean for more than a century. Anthropogenic sources include metal refining, smelting, leaded gasoline consumption and coal burning. Due to the historical variation in the supply rate from the individual sources, the distribution of Pb in the North Atlantic has been changing. This indicates the importance of continuous investigation of Pb as a tracer in the modern and future oceans [1]. Although the source of bismuth is less constrained, literature data suggest the importance of anthropogenic sources for Bi. In this work, we investigate Pb and Bi in the Japan Trench in the western North Pacific.

Because a large number of samples needs to be processed for GEOTRACES section studies, an effort was made for development of a high-throughput method for Pb in open ocean waters. The method utilizes commercially available chelating resin column as used for other studies but solutions were added to the column directly by using a micropipette, enabling rapid handling of samples. Our first trial of this method gave a detection limit of ~ 3 pmol/kg, which is comparable to or slightly higher than other published values. Measurements of Pb in SAFe reference samples were 51 ± 1 and 28 ± 2 pmol/kg ($n = 2$) for S and D2, respectively, found comparable to consensus values.

The method was applied to samples collected at a station (34°N 142°E) at the Japan Trench during the KS-13-T3 cruise of R/V Shinsei-Maru (Oct-Nov. 2013). Pb is generally high in upper waters with a subsurface maximum at 300 m, decreases with depth and shows slight elevation near the bottom inside the trench. This study presents the first Pb data from the Japan Trench. We will also report Bi data at the same location.

[1] Boyle *et al.* (2014) *Oceanography* **27**, 69-75.