

Dissolved Bismuth in the Subarctic North Pacific

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Bismuth (Bi) is mainly introduced to the surface ocean by eolian input and rapidly removed from the water column by particles. The concentration of Bi in the ocean is extremely low (<1 pmol/kg). Lee et al. [1] have reported pronounced Bi maximum at salinity minimum of the North Pacific Intermediate Water in the subtropical eastern North Pacific. Recently, we clarified the distribution of dissolved Bi in the western North Pacific and found that it shows maximum at subsurface layers occupied by mode water masses developed in summer [2]. These lines suggest that Bi is a unique indicator of water masses in the North Pacific.

In this study, we have investigated the subarctic North Pacific where no data for Bi is reported. Ten stations from western (BD 7, 9, 11), central (BD 14, 15) and eastern regions (BD17, 18, 19, 20, 22) were occupied during the KH-12-4 cruise of R/V Hakuho-Maru (July-Aug. 2012). Water samples were collected with clean Niskin-X bottles mounted on a CTD carousel multi-sampling system, filtered through a 0.2 μ m AcroPak capsule cartridge filter and acidified with ultra-high purity HCl. The samples were analyzed by an established method [3]. The distributions of dissolved Bi at stations BD 7, 9, 11 (47°N, 160-180°E) showed low concentrations of 75-214 fmol/kg in the surface water, rapid increase to the maximum at intermediate depth and exponential decay toward the minimum at the bottom. Similar 'scavenging type' profiles were obtained at the central region stations BD 14 (47°N, 170°W) and 15 (50°N, 160°W). The eastern region stations display striking features; Bi more sharply decreased with depth below intermediate depth and an anomalous maximum was found at 2,267 m at BD 22 (48° 30'N, 127°W) and 2,953 m at BD19 (45°N, 132°W), probably due to the hydrothermal source from the Juan de Fuca ridge.

[1] Lee *et al.* (1985/86) *Earth Planet. Sci. Lett.* **76**, 254-262.

[2] Norisuye *et al.* (2012; 2014) *Ocean Sciences Meeting*.

[3] Norisuye & Sohrin (2012) *Anal. Chim. Acta* **727**, 71-77.