

Distribution of dissolved Te species in the eastern Indian Ocean

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Tellurium (Te) is assigned as one of the technology-critical elements (TCEs) useful for industrial products such as a DVD. Te occurs at a high concentration in marine ferromanganese crusts in the seafloor sediments and the enrichment mechanism of Te from seawater is important for scientific and economical points of view [1]. Te(IV) and Te(VI) occur in typical seawater and the redox transformation in the marine environment is important for better understanding of the biogeochemical cycles of Te in the ocean [2]. However, the knowledge of Te species in the open ocean is greatly lacking due to extremely low concentration and difficulty in the analysis. The basin-scale distributions of Te(IV) and Te(VI) are therefore required to be clarified in various marine environments including oxygen depleted regions.

The eastern Indian Ocean has unique geochemical properties, such as large rivers runoff to the Bay of Bengal, strong stratification and oxygen-depleted water.

We have clarified the vertical distributions of Te(IV) and Te(VI) in the eastern North Indian Ocean for the first time. Seawater samples were collected during the KH-18-6 cruise of R/V Hakuho-Marui and analysed by Mg(OH)₂ coprecipitation, separation of Te species using an anion exchange resin column and measurement with an ICPSFMS assisted by a ¹²⁵Te-enriched isotope spike. The concentrations of Te(IV) and Te(VI) were high in surface water and decreased with depth. Te(VI) concentration decreased with depth more rapidly compared to Te(IV). Te(IV)/Te(VI) ratios were high in surface and deep waters (0.65–0.70) while intermediate oxygen-depleted waters showed lowest values of the ratios (0.33). These results suggest that Te may be useful as a redox sensitive indicator in the marine environments.

[1] Hein J.R. *et al.* (2003) *Geochim. Cosmochim. Acta* **67**, 1117–1127.

[2] Lee D.S. and Edmond J.M. (1985) *Nature* **313**, 782–785.