Trace metals and zinc complexing ligands in seawaters at a shallow hydrothermally active area in Japan

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Introduction

Recently, dissolved Zn enrichments near the hydrothermal vents have been observed [1, 2], which suggested mantle-derived Zn from the hydrothermal vents could be one of important sources of dissolved Zn in the ocean. Moreover, organic ligands in hydrothermal fluids and plumes could potentially stabilize dissolved Zn in seawater. To understand the Zn cycles around the hydrothermal vents, we determined dissolved trace metal (Mn, Fe, Cu, and Zn) concentrations, Zn organic speciation, and dissolved sulfide in seawaters in Tachibana Bay near the coast of Obama hot springs, Japan.

Results and Discussion

In Tachibana Bay, the ranges of dissolved Mn (13.3 – 39.3 nM), dissolved Fe (1.8 – 16.5 nM), and dissolved Cu (1.8 – 2.6 nM) were within the concentration levels in the East China Sea. The dissolved Zn concentrations ranged from 0.3 to 3.1 nM, which was also at the similar concentration level to that in the East China Sea.

Vertical distributions of dissolved trace metals (Mn, Fe, Cu, and Zn) at the coastal hydrothermal area showed different features compared to those at the center of Tachibana Bay. At the coastal area, dissolved Mn and Fe concentrations were generally high and increased toward the bottom, whereas dissolved Cu and Zn concentrations were decreased. On the other hand, vertical distributions of trace metals at the center of the bay were relatively constant. We detected nanomolar of sulfide in bottom water at one station near the coast. We will discuss the role of organic complexing ligands and sulfide on Zn and Cu distributions in the coastal hydrothermal environment.

[1] Conway & John (2014) *Global Biogeochem. Cy.*, **28**, 1111-1128. [2] Roshan et al. (2016) *Mar. Chem.*, **183**, 25–32.