Distribution of recycled-type trace metals (Ni, Cu, Zn, and Cd) in dissolved and labile particulate fractions in the North Pacific Ocean

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The North Pacific Ocean acts as an interface between Asia/North America continents and has boundaries with the marginal seas such as the Bering Sea, Sea of Okhotsk, and Sea of Japan via weathering, erosion, sedimentation, and gas exchange processes. Trace metals in seawater play an important role as regulators of processes including marine ecosystem dynamics and carbon cycle[1]. We used an off-line automated solid-phase extraction system with Nobias Chelate-PA1 resin[2] to preconcentrate trace metals from the samples that were collected during the KH-05-2 (along 160°W), KH-11-7 (along 165°E), and KH-12-4 (along 47°N) cruises of R/V *Hakuho Maru* in the North Pacific as a part of GEOTRACES ocean section study. The concentrations of dissolved trace metals (dMs) and total dissolvable trace metals (tdMs) were analysed using filtered and unfiltered seawater respectively in order to obtain information on speciation. The concentrations of labile particulate metals (lpMs) were defined as the difference between tdMs and dMs.

All of dNi, dCu, dZn, and dCd showed minima at the south end of the study area under the influence of Lower Circumpolar Deep Water, increasing with deep water circulation and by supply of North Pacific Intermediate Water. In general, lpNi, lpZn, and lpCd were less than the detection limit, but significant concentrations of lpZn and lpCd were observed to the north of 30°N. Both dCu and lpCu increased with depth. Different to the Atlantic Ocean, dCu showed strong linear relationship with Si only in the upper 2000 m in depth, being substantially increased in deep water. We will discuss the characteristics of the North Pacific Ocean in comparison with the Atlantic Ocean on the basis of distribution of the trace metals.

[1] SCOR Working Group. (2007), Chem. Erde - Geochem. 67, 85-131.
[2] Minami, T. et al. (2015), Anal. Chim. Acta 854, 183-190.