

# Basin-scale distributions of 9 trace metals (Al, Mn, Fe, Co, Ni, Cu, Zn, Cd, and Pb) in the entire Pacific Ocean

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The Pacific Ocean is the largest ocean among the three major oceans and its northeastern part is the “end” of the thermohaline circulation. The GEOTRACES program is an international research initiative aimed at studying the biogeochemical cycles of trace elements and isotopes in the oceans. We have analyzed ~2400 seawater samples from 4 GEOTRACES transects: GP19 along 170°W in the South Pacific, GPc06 along 160°W, GP02 along 47°N, and GP18 along 165°E in the North Pacific. We present the basin scale distributions of 9 trace metals (Al, Mn, Fe, Co, Ni, Cu, Zn, Cd, and Pb) in dissolved and labile particulate fractions to discuss the first order mechanisms controlling the distribution.

We found that the northern continental margins, including the Aleutian Islands, the Kamchatka Peninsula, and the Vancouver Island in the subarctic Pacific Ocean are important sources of trace metals particularly for Mn, Fe, and Co [1]. Pb shows a subsurface maximum centered at 35°N, ~200 m in depth, suggesting the influence of anthropogenic aerosols from China, Japan, and Russia. Tropical and subtropical islands and Australia are major sources of Al, suggesting the influence of kaolinite-dominated soils generated via the intensive weathering. The stagnant deep-water circulation in the North Pacific Ocean accumulates nutrient-type Ni, Cu, Zn, and Cd in the Pacific Deep Water. Scavenging affects not only the scavenged-type trace metals but also the nutrient-type trace metals, and its intensity differs among oceanic regions in the Pacific Ocean [2,3].

[1] Zheng, L. *et al.* (2019), *Geochim. Cosmochim. Acta* **254**, 102-121.

[2] Zheng, L., Minami, T., Takano, S., Ho, T. Y. & Sohrin, Y. (2021), *Global Biogeochem. Cy.* **35**, e2020GB006558.

[3] Zheng, L., Minami, T., Takano, S., & Sohrin, Y (submitted). *Global Biogeochem. Cy.*