

## Chemical compositions of Holocene and fossil hydrothermal manganese deposits from the Izu-Ogasawara arc

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This study investigated Holocene and fossil hydrothermal manganese deposits in the Izu-Ogasawara arc. Mineralogically, these deposits comprise 10 Å and 7 Å manganate minerals, and the fossil samples showed higher 10 Å stabilities. Chemical compositions of the Holocene samples are typical of other hydrothermal manganese deposits, including low Fe/Mn ratios, low trace metals, and low rare earth elements. Although the fossil samples generally have similar chemical characteristics, they exhibit significant enrichment in Ni, Cu, Zn, Cd, Ba, REE, Tl, and Pb contents. Furthermore, the chondrite-normalized REE patterns showed more light REE enrichment trends. These chemical characteristics suggest post-depositional uptake of these metals from seawater.

Keywords: manganese deposit, seafloor hydrothermal activity