

## Deciphering the chemical evolution of the Cenozoic seawater using ferromanganese crust

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We report the secular variation in the Os concentration and isotope ratio from the Middle Miocene to present using Fe-Mn crust samples collected from the Takuyo Daigo Seamount. Both the Os/Fe ratio and Os isotope ratio increased exponentially toward present. Based on the flux calculation using a simple box model, these increase tendencies can be almost explained by the increase of riverine Os flux to the ocean and the present seawater Os mass is estimated to be ca. 1.85 times the size of that in 10 Ma. Therefore, the seawater Os mass may not be constant through the Earth history and a Fe-Mn crust is one of the most appropriate materials to unravel the chemical evolution of the paleo-seawater.

Keywords: ferromanganese crust, seawater, chemical evolution, Os geochemistry, Takuyo Daigo Seamount, Pacific Ocean