

Secular variation of Os isotopic composition of the Phanerozoic seawater based on umbers in the Japanese accretionary complexes

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The Os isotopic composition of seawater is mainly controlled by influxes from continent ($^{187}\text{Os}/^{188}\text{Os}=1.0-1.4$), mantle and cosmic dust ($^{187}\text{Os}/^{188}\text{Os}\sim 0.13$), and thus the marine Os isotope record can be used as a good indicator of secular variation of these influxes during the geologic history. The marine Os isotopic record over the past 80 Ma has been reconstructed by marine sediments such as hydrothermal metalliferous sediments and pelagic carbonates, as Os in seawater are absorbed to Fe oxyhydroxides in these sediments. However, we can not obtain pre-180 Ma marine sediments on seafloor owing to the subduction of the oceanic plate. Consequently, the ancient hydrothermal metalliferous sediments (umbers) in the accretionary complexes are used to reconstruct the pre-80Ma seawater Os isotope record.

There are numerous umbers in the accretionary complexes in Japan. The geochemical characteristics of umbers are very similar to those of modern hydrothermal metalliferous sediments at mid-oceanic ridge, it is very likely that umbers preserve well primary Os concentrations and isotopic compositions even though they have experienced emplacement on land. Therefore, the umbers are considered to be one of the best recorders of Os isotopic composition of ancient seawater. We report the secular variation of Os isotopic composition of the seawater over the past 360 Ma based on umbers in the Japanese accretionary complexes.