Os isotopic composition of middle Eocene seawater by Fe-Mn sediment in the accretionary complex

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The Os isotopes have unradiogenic Os (188Os) and radiogenic Os (187Os) that produces from radioactive decay of 187Re (half-life 4.16x1010 years). The time-integrated 187Os/188Os ratios of geological samples are variable widely, because the degree of incompatibility of Os and Re is different. For example, continental crust has high 187Os/188Os ratios. On the other hand, mantle-derived rocks and extraterrestrial materials have low 187Os/188Os ratios. The Os isotope composition in seawater reflects the relative contributions of continental crust, mantle-derived rocks and extraterrestrial materials. The Os isotope record of seawater is known to remain in marine ferromanganese sediments including manganese nodules, hydrothermal metalliferous sediments and Fe-Mn oxides in the deep-sea pelagic sediments. These sediments have been used to reconstruct secular variation of Os isotope composition of seawater over the past 80 Ma.

We report Os isotope composition of Fe-Mn sediments (umber) in the Mineoka Ophiolite (40-50 Ma). As a result, the 187Os/188Os ratios of umber show from 3.82 to 4.61. This value is very similar to that of hydrothermal sediments during 38-53 Ma. It suggests that we can use Fe-Mn sediments in the accretionary complex as recorders of past variations in the Os isotope composition of seawater.