Osmium isotope record of Cretaceous seawater from umbers in the accretionary complexes

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The Os isotopic composition of seawater is mainly controlled by influxes from continent (187Os/188Os=1.0-1.3), mantle (187Os/188Os=0.13), and cosmic dust (187Os/188Os=0.127), 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 isotope record over the past 80 Ma has been reconstructed from marine ferromanganese sediments (e.g. hydrothermal metalliferous sediments, Fe-Mn crusts and Fe-Mn oxides in the deep-sea pelagic environments), as Os in seawater are absorbed to Fe oxyhydroxides in these sediments. In addition, the metalliferous sedimentary rocks (umbers) in the accretionary complexes are used to reconstruct the pre-80 Ma seawater Os isotope record (Ravizza et al., 1999). Since 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.

The 187Os/188Os ratios of umber in the Japanese accretionary complexes and the Oman ophiolite are reported in the present contribution. The 187Os/188Os ratios of umbers are as follows; Yokonami (141-135Ma): 0.40-0.56, Aki (125-112Ma): 0.51-0.67, Oman (97.5-95Ma): 0.65-0.80, Mugi (78-74Ma): 0.49-0.62, and Ryujin (78-65Ma): 0.42-0.55. These results reveal that the secular change of Os isotopic composition of Cretaceous seawater is analogous to that of Sr isotopic composition, except for near the K-T boundary.