Heterogeneity of Os isotopes in the Yungbwa ophiolite

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Mantle peridotites from the Yungbwa ophiolite, which belongs to the Indus-Yarlung Zangbo Suture (IYS), southwest Tibet Plateau, have been measured for Re-Os isotopes. Samples are mainly composed of spinel harzburgites, and anorthitic plagioclases have been discovered in three samples. Mineral data suggest that they have experienced large degree of partial melting and later modified by slab-derived hydrous melts [1]. The spinel harzburgites have Os contents of 2.89-5.39 ppb and Re contents of 0.04-0.44ppb. Two plagioclase harzburgites have very low Os contents (0.66-0.69 ppb) and Re contents (0.05-0.06 ppb). The Yungbwa peridotites have a big range of $^{187}Os/^{188}Os$ ratios with 0.12228-0.12868 in the spinel harzburgites and 0.12477-0.12734 in the plagioclase harzburgites. The Os isotope compositions of the Yungbwa peridotites were little affected by late melt metasomatism and refertilization processes.

Consistent with the previous studies on abyssal peridotites and ophiolites [2], our results suggest that the asthenospheric mantle, from which the Yungbwa ophiolite derived, is highly heterogeneous in Os isotopes. The sample with the most unradiogenic $^{187}Os/^{188}Os$ ratio gives a Re depletion age (T_{RD}) of 1 billion years, reflecting the long-time preservation of ancient domains in the asthenosphere. A previous study on Os alloys of chromite from the Luobusha ophiolite, which locates at the eastern IYS, obtained relative homogeneous $^{187}Os/^{188}Os$ (0.12645±4) [3]. This reflects that the Os heterogeneities in the asthenospheric mantle were erased by partial melting and later mixing of melts.

[1] Liu *et al*. (2008) *Geochim. Cosmochim. Acta* **72**, A555. [2] Liu *et al*. (2008) *Nature* **452**, 311-316. [3] Shi *et al*. (2007) *Earth Planet. Sci. Lett.* **261**, 33-48.

Variations in content and isotopic composition of sulfate in Changjiang (Yangtz River) water

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Biogeochemical cycling of sulfur is often coupled with that of carbon and other nutrients, and affects evolution of ecological system and chemical weathering of river basin. Our former study on chemical and strontium isotopic composition of the Changjiang water indicates that four major reservoirs (carbonates, silicates, evaporites and agriculture/urban effluents) contribute to the total dissolved solutes. The contribution of the anthropogenic inputs to the cationic TDS of the Changjiang was estimated to be 15%~20% for the most downstream stations. The study suggested that the Changjiang is strongly impacted by human activities and is very sensitive to the change of land use. This work mainly deals with variations in content and isotopic composition of sulfate in Changjiang and discusses the source and biogeochemical processes controlling the migration and transformation of sulfate in Changjiang catchment.

Sulfate concentrations of the mainstream and main tributary water of Changjiang vary from 100 μmol/L to near 600 μmol/L, with the both lowest and highest values in the studied tributaries. $\delta^{34}S$ and $\delta^{18}O$ values of sulfate in the studied water samples rang from +2.5‰ to +11.0‰ and from +4.0‰ to +8.0‰, respectively. The water from mainstream and tributaries in the upper reaches of Changjiang show higher sulfate concentration, $\delta^{34}S$ and $\delta^{18}O$ values, as compared to that from the lower reaches. High concentration and isotopic values of sulfate suggest that the sulfate in the upper reaches is derived from dissolution of evaporite of sulfate, while the sulfate in the lower reaches mainly from oxidation of organic or biological sulfur, and from inputs of human activities, which is also supported by the lower values of both $\delta^{13}C$ of dissolved inorganic carbon and $\delta^{34}S$.

This work was financially supported by Chinese Academy of Sciences trough the International Partnership Project.