Hafnium and Neodymium Isotope Systematics in the Rivers of Eastern Tibet

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Hafnium and neodymium isotope systems are strongly coupled in terrestrial rocks but become decoupled during weathering and transport to the oceans, such that the seawater array has a different slope than the terrestrial array on an $\varepsilon_{Hf}-\varepsilon_{Nd}$ plot [1, 2]. In order to understand the sources and processes involved in continental weathering, we investigated the two isotope systematics for the river suspended and bed material of the eastern Tibetan Plateau. Select samples from the Huang He (Yellow), Chang Jiang (Yangtze), Hong (Red), Mekong and Salween were studied.

The Hf and Nd concentrations in the solid were 1-45 ppb and 0.2 – 6 ppm, respectively, and in the dissolved load were 1-84 ppt and 10-390 ppt, respectively. While the Zr/Hf ratio in the suspended load is relatively constant at ~70, in the dissolved load it varies between 20 and 230. Thus, it is difficult to use the dissolved Zr as a proxy for dissolved Hf which occurs in much lower concentrations. The $\varepsilon_{Hf}(0)$ values of all solid samples ranged from -20 to +6, but most fall between -10 and 0. The suspended load is more radiogenic than the silt or sand size fractions of the bed load. The highest values are seen for the suspended load of rivers draining igneous complexes in the Hong and Mekong river drainages and the lowest values for bed load draining sedimentary rocks in the Hong drainage.

References

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