

# Hafnium isotope geochemistry of desert and loess samples from northern China: Implications for the generation of the seawater Nd-Hf isotope relationships

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[1] To investigate the mechanisms of the offset of seawater radiogenic Nd-Hf isotope compositions from those of the upper continental crust rocks, combined Nd-Hf isotope compositions of desert and loess samples from northern China (which integrate a wide range of lithologies and ages of continental rocks) are presented in this study. The results show significant and systematic fractionation of Hf isotopes between fine-grained detritals/leachates (<5  $\mu\text{m}$ ) and coarser fractions (>75  $\mu\text{m}$ ) of the same samples. A small but systematic difference of Nd isotope compositions between leachates and detrital silicates is also revealed. Overall, the leaching data either plot along or slightly above the Nd-Hf seawater array, providing strong direct support that the seawater Nd-Hf isotope relationship is predominantly generated by weathering of upper continental crust. Our study supports the application of dissolved Hf isotopes as a proxy for different modes of weathering regimes rather than for continental source provenances. **Key words:** Chen, T.-Y., G. Li, M. Frank, and H.-F. Ling (2013), Hafnium isotope fractionation during continental weathering: Implications for the generation of the seawater Nd-Hf isotope relationships, *Geochimica et Cosmochimica Acta*, 40, 916–920, doi:10.1002/grl.50217.

## 1. Introduction

[2] Since the finding of a strong Hf-rare earth element (REE) fractionation revealed by the REE patterns of the upper continental crust (UCC) rocks, the REE patterns of the UCC rocks have been widely used to trace the continental source of the seawater Nd-Hf isotope relationships. However, the REE patterns of the UCC rocks are highly variable, and the REE patterns of the seawater Nd-Hf isotope relationships are also highly variable. This has led to the development of the REE patterns of the UCC rocks as a proxy for different modes of weathering regimes rather than for continental source provenances.

## 2. Materials and Methods

[4] The desert and loess samples of this study were collected through the efforts of the Institute of Surficial Geochemistry at Nanjing University, and have been described in detail elsewhere (Cao et al., [2007], Li et al., [2009]; see Supporting Information Figure S1 and Table S1).

[5]

the leaching experiments of GPC3 supports that the leaching protocol is robust in extracting the exchangeable component



Rickli, J., et al. (2010), Hafnium and neodymium isotopes in surface