



Dissolved rhenium in the rivers of eastern Tibet: proxy for weathering of organic carbon?

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Dissolved rhenium in rivers was analyzed with the aim of using it as a proxy for weathering of reduced sediments. One objective was to constrain the weathering rate of organic carbon, a source of atmospheric CO₂ and hence important for climate change over geologic timescales. Another objective was to estimate the importance of sulfuric acid, generated from oxidation of sulfide minerals, relative to carbonic acid, ultimately from atmospheric CO₂, as agents of silicate weathering. This is important in constraining the atmospheric CO₂ uptake by silicate weathering.

A reconnaissance was made of the large rivers draining the eastern Tibetan Plateau (the Huang He, Chang Jiang, Hong, Mekong, and Salween) and eastern Siberia (the Lena, Yana, Indigirka, Kolyma, and Anadyr).

Rhenium concentrations range from 0.5 to 240 pmol/kg but most are below ~30 pmol/kg. Re shows correlations with sulfate, but the slope differs for different basins. Correlations with two other redox-sensitive elements, uranium and molybdenum, also have slopes that differ from one region to the next. If we use the C_{org}/Re molar ratio of 2×10^7 (Dalai et al., 2002), we obtain rates of CO₂ release by organic carbon weathering that is about an order of magnitude less than rates of CO₂ uptake by weathering of silicates in the same region.

(reference)

Dalai T. K., Singh S. K., Trivedi J. R., and Krishnaswami S. (2002) Dissolved rhenium in the Yamuna River System and the Ganga in the Himalaya: Role of black shale weathering on the budgets of Re, Os, and U in rivers and CO₂ in the atmosphere. *Geochim. Cosmochim. Acta* 66(1), 29-43.