Water column silicon isotope profiles from Lake Baikal, Siberia

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We present the first large-scale silicon isotope profiles of Lake Baikal's water column with a comparison of data collected in winter and summer providing a comparison of $\delta^{30}Si_{DSi}$ signatures both pre- and post- diatom growing seasons. Samples were collected along a water profile (surface to 180m) at numerous sites across the lake, with deep-water endmembers at 400m and c. 1500m. Water temperature, conductivity, pH, dissolved oxygen and Chl a were measured in-situ while samples for dissolved silicon (DSi) concentrations and silicon isotopic signatures ($\delta^{30}Si_{DSi}$) were filtered and acidified in the field. All isotopic analayses were conducted on a Neptune + Multi-Collector ICP-MS at NIGL, UK, using wet plasma mode with Mg doping of samples and standard-sample-standard bracketing. Analytical reproducibility is 0.12‰ (2σ) and blanks are <1% of signal intensity.

DSi concentrations of March water surface samples (South Basin only) range between c. 0.74 and 1.23ppm while those collected in August are all <0.70 ppm, following seasonal diatom utilisation. In turn Chl a values from South Basin profiles in August are greater (between c. 3 to 11 µg/L) than March surface values (<1.5 µg/L). Indeed, March $\delta^{30}Si_{DSi}$ surface values range between c. +2.16 and +2.45‰ and while summer surface values range between c. +2.2 and +2.84‰ (preliminary data) reflecting residual pool depletion after summer diatom utilisation. $\delta^{30}Si_{DSi}$ lake values are >1‰ more enriched than dominant lake water inflows again reflecting Si alteration in Lake Baikal. Indeed, annual open sediment traps deployed down Lake Baikal's water column yield $\delta^{30}Si_{diatom}$ signatures of +1.25‰, which when $\delta^{30}Si_{DSi}$ signatures of lake surface waters are c. +2.5‰, suggests the isotopic fractionation factor of diatoms (-1.1‰[1]), compares well to ocean environments and other lake studies.

[1] De La Rocha, *et al* (1997). *GCA*, **61**, 5051-5056.