Silicon isotope compositions of Lake Baikal's major tributaries

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We present the first large-scale results of silicon isotopic compositions of Lake Baikal's main inflows, the world's oldest and largest lake, alongside major elemental concentrations. Samples were collected along an upstream transect of the five dominant Lake Baikal inflows, as well as the Selenga Delta, which account for >90% of the annual riverine flow to the lake. Water temperature, conductivity and pH 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. Isotopic analyses were conducted on a Neptune + Multi-Collector ICP-MS using wet plasma mode with Mg doping of samples and standard-sample-standard bracketing. Analytical reproducibility is 0.11‰ (2σ) and blanks are <1% of signal intensity.

The DSi concentration of all river inflow samples varies between c. 2.5 and 6.3 ppm, which contrasts with concentrations of < 1ppm from the Angara River – the lake's only outflow. River course $\delta^{30}Si_{DSi}$ varies between c. + 0.94 and +1.52‰ while lake water and outflows have a higher composition of c. +2.50‰. Rock endmembers from the Selenga River catchment were also analysed and $\delta^{30}Si_{rock}$ signatures vary between -0.40 and +0.54‰. DSi concentrations, across the Selenga Delta are within the range of those recorded from the Selenga River proper, although there is more variability in $\delta^{30}Si_{DSi}$ mpositions within the delta suggesting local alteration. Modern lake water compositions (c. +2.50‰) indicate, in a closed system model, that c. 60% of DSi entering the lake is exported by siliceous productivity into the sediment record (when applying a diatom fractionation factor of ε = -1.1‰[1]). These data indicate that sediment cores from the lake can be used to monitor past changes in the lake's biogeochemical cycle and further highlight haow the continental silicon cycle can be significantly affected by biological activity, thereby impacting upon global silicon cycles.

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