Silicon isotopes in large river sediments: imprint of modern-day weathering *vs*. continental recycling

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River sediments inherit their chemical and isotope compositions from their parent rock and the effects of the modern-day weathering processes. Silicon (Si) and lithium (Li) are liberated during chemical weathering, and taken up by secondary minerals in soils or during river transport. This fractionates their isotopes with respect to bedrock, with lighter isotopes enriched in secondary solids. Therefore, river sediment Si and Li isotope compositions depend on the effect of ancient weathering (as reflected in their source rock composition), as well as on modern weathering processes. The Li isotope composition (δ^{7}Li) of large river sediments depends on their grain size and shows the dominant role of recycling of ancient-weathered sedimentary rocks in the present erosion cycle [1], while the Si isotope composition (δ^{30}Si) of shales displays a similar grain-size trend [2]. Little is known about in large river sediments and how the relative influence of modern *vs*. ancient weathering processes reflects on a major element such as Si.

In this study, we present the Si isotope composition of large river sediments. δ^{30}Si vary with grain size in a similar way as δ^{7}Li: lighter Si is enriched in fine-grained sediments and heavier Si is enriched in coarse-grained sediments. Another similarity between the two isotope systems is that in bed sands δ^{30}Si remains relatively stable whilst in suspended sediments δ^{30}Si decreases with grain size. The enrichment of the light Si isotopes in fine-grained sediments could be due to (1) the presence of biological material; (2) the higher contribution of soil material; (3) the higher contribution of "recycled" material (fine sedimentary rocks), carrying a light Si isotope signature from previous weathering episodes. We suggest that the last hypothesis of recycled material is the most viable candidate to explain the manifestation of Si fractionation in large river sediments.

[1] Dellinger et al., (2014) *EPSL*, **401**, pp 359-372.

[2] Savage et al., (2013) *GCA*, **109**, pp 384-399.