The Fe-isotope signature in river suspended particles; an indicator of topography in the boreal landscape

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Variations in Fe concntrations and isotope signatures in the boreal landscape are driven mainly by redox dynamics. Iron-isotopes provide a tool to study the Fe cycling across the complex biogeochemical redox boundary formed between oxic and anoxic water.

The REE can be used to study a number of biogeochemical processes in the boreal landscape. Cerium is often fractionated from its trivalent REE neighbours in aquatic environments, forming an anomaly. It has been proposed that the extent of negative Ce anomaly development in ground water and stream water can be used as an indicator of topography. A linear correlation between the ∂^{56}Fe signature and the Ce-anomaly is clearly seen in the suspended particulate fraction during base flow until mid-May in the Kalix River and Råne River; Sweden. Råne River shows the same trend but the slope is different. This difference is most likely due to different topography. Råne River drainage basin is flat compared with Kalix River catchment. The trend shows that the Fe-isotopic signature becomes heavier with increasing (more negative) Ce-anomaly. We conclude that the use of stable Fe-isotopes together with REE can contribute to the understanding of internal catchment processes and dynamics in the Boreal landscape