

Mg isotope geochemistry of glacial streams in Svalbard, Norway

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It has been known that various biogeochemical processes control dissolved magnesium isotope compositions in rivers. In the glacial streams, it is important to investigate how and to what extent Mg isotope fractionation may occur during chemical weathering. We collected water samples at three different glacial streams in July 2015 along downstream transects between glacial margin and the fjord. On an average molar basis, major ion abundances in all streams are characterized by the highest Ca (61%) and HCO₃ (77%) abundances, regardless of bedrock type. Mg isotope compositions ($\delta^{26}\text{Mg}$) in streams range from -0.85‰ to -1.75‰, of which three streams in northeastern area display lower $\delta^{26}\text{Mg}$ values than one in southwestern area. Although the former drains silicates, dissolved $\delta^{26}\text{Mg}$ values display an average value of -1.30‰, indicating the dissolution of easily weatherable minerals such as carbonates. However, the latter draining silicates displays relative higher $\delta^{26}\text{Mg}$ values ranging from -0.85‰ to -0.27‰, indicating that congruent weathering and/or clay formation controls $\delta^{26}\text{Mg}$ values.