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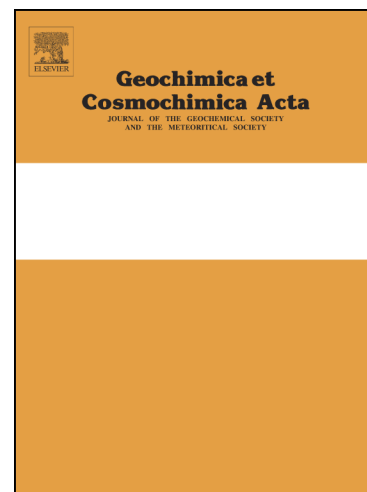
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The radiogenic and stable Sr isotope geochemistry of basalt weathering in Iceland: Role of hydrothermal calcite and implications for long-term climate regulation

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Abstract

Several studies have examined the geochemistry of Icelandic rivers to quantify the relationship between basalt weathering and long-term climate regulation. Recent research has suggested that the chemical weathering of hydrothermal and metamorphic calcite contributes significant quantities of HCO_3^- to the Icelandic riverine flux (Jacobson et al., 2015). Because the HCO_3^- derives from volcanic CO_2 that was sequestered in mineral form prior to atmospheric injection, the strength of the basalt weathering feedback occurring in Iceland may be lower than previously realized. To test these hypotheses, we analyzed the radiogenic and stable Sr isotope composition ($^{87}\text{Sr}/^{86}\text{Sr}$ and $\delta^{88/86}\text{Sr}$) of the same suite of water, rock, and mineral samples as examined in Jacobson et al. (2015), and we developed a simple model of the long-term C cycle that considers the transformation of volcanic CO_2 to HCO_3^- during subsurface silicate weathering, which is a precursor to hydrothermal calcite formation.

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