

A carbonate Li isotope record through Earth's history

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Lithium (Li) isotopes emerge as a powerful geochemical proxy for tracking continental weathering through time. Extensive work on Li fractionation in modern systems has brought to a profound understanding of the modern Li budget as well as to a consensus that marine carbonates faithfully record seawater Li isotope signature. As such record is essential in order to track global-scale changes in weathering processes and intensity through Earth's history, we have generated Li isotope data from marine carbonates from over 40 units, ranging in age from 3.0 Ga to modern. Preliminary results provide evidence for strongly inhibited weathering-mediated clay formation prior to the Paleozoic, which we attribute to the pre-Paleozoic lack of land plants. The initial rise in the Li isotope values is observed during the Ordovician, which is followed by a subsequent drop to background values and then begins the generally increasing trend that is already well reported. These findings are open for interpretation but they still support the view that the emergence of land plants dramatically changed the process of weathering and it seems that biomass has a potentially significant role in mineral breakdown in soils. Li isotopes provide a novel perspective on weathering and the impact on the Earth system of the rise of land plants – one of the most significant transitions in Earth's history.