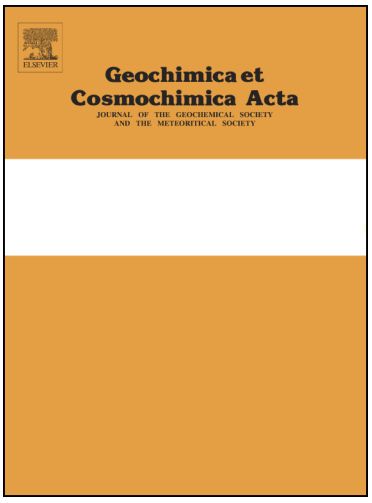

Mg isotope response to dolomitization in hinterland-attached carbonate platforms: Outlook of δ ^{26}Mg as a tracer of basin restriction and seawater Mg/Ca ratio

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Mg isotope response to dolomitization in hinterland-attached carbonate platforms: Outlook of δ^{26}Mg as a tracer of basin restriction and seawater Mg/Ca ratio

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Abstract

Magnesium isotopes in early diagenetic dolomite have been proposed as a potential tracer for seawater chemistry and global Mg cycles. However, the applicability of Mg isotopes of early diagenetic dolomite in studies of ancient seawater requires a detailed understanding of the behavior of Mg isotopes during dolomitization in a variety of geological settings. Hinterland attached carbonate platform is an important sink of seawater Mg through dolomitization, and basin restriction is a common feature in hinterland attached carbonate platforms, yet its effects on Mg isotope systematics in carbonates have not been well documented.

The upper Albian Hevyon Formation in southern Israel was deposited in a typical hinterland attached carbonate platform setting and provides an ideal case for investigating the Mg isotope behavior during dolomitization in environments of frequent basin restrictions. The abundance of dolomite increases up-section in the Hevyon Formation and correlates with the appearance of microbial deposits and disappearance of metazoans, reflecting water level fluctuations in multiple exposure and recharging events. In conjunction with sedimentary facies analysis, multiple geochemical proxies (Ni/Co, V/Cr, Ce/Ce*, and δ^{13}C) indicate the development of anoxic conditions. These two lines of evidence, together with textural indicators and $^{87}Sr/^{86}Sr$ ratios, suggest dolomitization was microbial and penecontemporaneous in a shallow low circulation water body. δ^{26}Mg of dolomite increases from -