

## **A Characterisation of Dolomitization in Triassic Dolomites of Ticino, Switzerland, Using $\delta^{26}\text{Mg}$ and Clumped Isotopes**

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Magnesium isotope compositions ( $\delta^{26}\text{Mg}$ ) from suitable seawater-derived archives have recently found use as a tracer of Earth surface processes, such as weathering and hydrothermal activity. Dolomite,  $\text{CaMg}(\text{CO}_3)_2$ , is a major host of Mg sourced primarily from seawater, and the isotope fractionation factor for incorporation of Mg into dolomite is generally known. Therefore, dolomite is a good potential archive of seawater  $\delta^{26}\text{Mg}$  values. However, many additional factors were suggested to control the deviation of the  $\delta^{26}\text{Mg}$  value of dolomites from the contemporaneous seawater signature, particularly if dolomitization occurs in a partially enclosed system (e.g., in pore water of marine sediments). We present  $\delta^{26}\text{Mg}$  values taken from South Alpine Triassic dolostones separated by a range of scales from millimetre to metre to assess the variation within single samples (earliest versus later void-filling dolomite), across whole tidal cyclic units, between such cyclic units, and between formations separated by 20 Myr. Dolomitization history is characterised using optical and cathodoluminescence (CL) microscopy and electron microprobe element mapping, and temperature of dolomitization is constrained using clumped isotope thermometry. CL reveals complex zoning in later void-filling dolomites and element mapping reveals the pattern of changing major element chemistry of dolomitizing fluids during their formation. Our results enable us to estimate the suitability of these and other similar dolomite deposits as archives of seawater  $\delta^{26}\text{Mg}$ .