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A multi-isotope approach towards dolomite research

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Calcium is a major cation in dolomite but one that is at present underexplored. Many natural dolomites are calcian dolomites at distinct degrees and Ca isotopes may hint on their origin and formation. Here, we report on a combined $\delta^{44/42}$Ca, δ^{26}Mg, δ^{13}C, and δ^{18}O study of three groups of dolomites: (i) marine evaporative (sabkha), (ii) altered marine ("mixing zone"), and (iii) non-marine evaporative dolomites (lacustrine/palustrine). Significant correlations are found between the four isotope systems and the dolomite ordering degree, with characteristic patterns for each dolomite group. Data shown here suggest that the combination of the four isotope proxies, and particularly so the $\delta^{44/42}$Ca values of dolomite, is a promising tool to improve our understanding on the formation and alteration pathways of dolomite minerals and dolostone rocks.