



## **Re-evaluation of temperature of replacement dolomitization in the Triassic Latemar platform with clumped isotope thermometry**

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The Triassic Latemar platform shows different types of dolomitization styles including features such as dolomitized zones around basaltic dykes and patchy reddish or greyish dolomitization features in the central part of the platform. The processes leading to this partial dolomitization are still debated. Different geochemical tools were applied to determine the formation temperature of the patchy dolomite phases, thereby microthermometry on fluid inclusions and clumped isotope thermometry revealed significantly different temperature ranges (100 to 200 °C vs. 40 to 80 °C, from Wilson et al., 1990 and Ferry et al., 2011, respectively). We re-evaluated the origin of these patchy dolomites at Latemar using a new dolomite-specific clumped isotope temperature calibration based on dolomites synthesized in the laboratory at different temperatures. We directly compare the clumped isotope temperatures of patchy dolomites from Latemar with those obtained on the same samples by fluid inclusion microthermometry. With the new dolomite specific clumped isotope temperature calibration it is possible to determine more precisely the dolomite formation temperature and the oxygen isotope composition of the fluid source. Both are critical parameters for better constraining the origin of different dolomite fabrics on the Earth's surface and in ancient sediments.

E.N. Wilson, L.A. Hardie and O.M. Phillips, 1990. Dolomitization front geometry, fluid flow patterns, and the origin of massive dolomite: the Triassic Latemar buildup, northern Italy. *American Journal of Science* 290, 741-796.

J.M. Ferry, B.H. Passey, C. Vasconcelos and J.M. Eiler, 2011. Formation of dolomite at 40-80 °C in the Latemar carbonate buildup, Dolomites, Italy, from clumped isotope thermometry. *Geology* 39, 571-574.