

Interactive comment on “Lithium isotopes in dolostone as a palaeo-environmental proxy – An experimental approach” by Holly L. Taylor et al.

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Dear authors,

I first would like to apologize for the delay in reaching a decision about your manuscript. Because one (several times) promised review is still missing, I decided to review your contribution, although I'm certainly not a specialist of isotope geochemistry.

Measuring the lithium isotopic signature of dolomites would allow to explore the behavior of the global geochemical cycles in the deep time, for periods where sedimentary dolomites are more abundant than aragonite or calcite. The present contribution determines the isotopic fractionation between the dolomite minerals and the fluids from which it precipitates. A cleaning procedure is also tested to get rid of the siliciclastic

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component of dolomitic formation, to avoid contamination of the signal.

The paper is well written. I can hardly comment on the technical sections of the paper, being not a specialist. The two points I would like to raise are the following:

(1) regarding the extrapolation of the present results to the natural environment. Experiments were conducted at a quite high temperature above 150°C. These high temperatures are justified by the extremely low precipitation rate of dolomite at ambient temperatures. The authors show that the isotopic fraction is a function of temperature above 150°C. A quite large extrapolation must be done to reach temperatures typical of the surficial Earth environment. There is no guarantee that the extrapolation can be approximated by a linear relationship. I think more discussions, based on published literature, are needed here.

(2) the abundance of dolomitic sediments in the distant past remains largely unexplained. Indeed, it has been shown that microbes can accelerate the dolomite precipitation rate. But it is highly probable that most of the dolomites have precipitated during diagenetic alteration of the sediments. This is mentioned on line 290 and following. This discussion should be a bit expanded. In the introduction, it is stated that the use of dolomitic materials may allow to explore periods as old as the Precambrian. Is this realistic ?

Overall, I think this contribution deserves publication in Clim Past, given that these questions are addressed.

Best regards.

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