

Interactive comment on “Precipitation of dolomite from seawater on a Carnian coastal plain (Dolomites, northern Italy): evidence from carbonate petrography and Sr-isotopes” by Maximilian Rieder et al.

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I reviewed this manuscript previously for another journal, and while I recommended publication with minor corrections, the editor’s decision was ‘Reject with Referral Offer’. After closely examining the present and previous manuscript line by line, I conclude there are no substantive changes to the original manuscript other than: 1) the rearrangement of some material in the introduction section, 2) the deletion or modification of some sentences that did not provide additional insight, 3) the replacement of the word “humid” for “wet”, and 4) the addition of a final paragraph just before the conclu-

sions section. As such, my previous review appears relevant so it is posted below.

"This manuscript describes a petrographic and geochemical investigation of dolomitic rocks collected from the Travenanzes formation in northeastern Italy, and dolomite samples collected from the Weser and Arnstadt formations (Germanic Keuper unit), the Coorong Lagoon (Australia) and Deep Springs Lake, CA. Thin sections were prepared from hand samples for petrographic and SEM analysis, and bulk samples and mineral separates were processed for elemental and isotopic (C, O, Sr) analysis. The goal of the study was to '...gain better insight into the conditions and processes of dolomite formation'. Based on the data collected, the investigators propose that the dolomites of the Travenanzes formation were deposited in ephemeral lakes in an extended alluvial plain or dryland river system that was episodically inundated by seawater, and they conclude there is no known modern analogue to this depositional environment.

This manuscript was very well written and it was a pleasure to read. In fact, there were very few places where improvements could be suggested. The summary information provided in the introduction was appropriate and insightful, and the methodology and analytical procedures were explained in a straightforward way. The investigators presented convincing petrographic and geochemical evidence that supports their interpretation for the depositional environment of the Travenanzes dolomites. The Sr isotope data are remarkably consistent with Triassic seawater throughout the length of the section and they only show hints of a continental signature with the most aggressive leaching procedures. The stable O-isotope data are consistent with a marine signature and the C-isotopes demonstrate the incorporation of oxidized organic matter in texturally distinct samples. Overall, the data appear to be straightforward and easy to interpret.

The sequential extraction work (e.g., Table 6) for the Sr-isotope work could be presented better so the reader can understand why various procedures and reagents (e.g., NaCl, AcOH, HCl) were being used. The TIC/TOC results could be integrated in more substantial ways, e.g., perhaps TOC could be related to the development of

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dolomite nodules during microbial sulfate reduction."

Several aspects of the present manuscript, that were identified in my previous review, still remain: 1) a general lack of engagement with the bulk elemental data (i.e., Table 5), 2) although 39 samples were collected in this study, it appears only a handful of these are presented in the manuscript for analysis, and 3) the manuscript does not substantially engage the potential for microbial origins although the subject is broached in general ways.

Nevertheless, and as stated in my previous review, ". . . my overall impression is that this manuscript provides a plausible interpretation for the origin of Travenanzes dolomites. This contribution provides an incremental step, albeit a small one, in our general understanding of dolomite formation and more specifically dolomite formation along the Tethyan margin and I feel it is acceptable for publication. . .", although slight modifications are warranted that can be supervised by the associate editor.

Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2019-34>, 2019.

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