

Interactive comment on “Fault-controlled dolomitization in the Montagna dei Fiori Anticline (Central Apennines, Italy): Record of a dominantly pre-orogenic fluid migration” by Mahtab Mozafari et al.

Mahtab Mozafari et al.

mahtab_mozafari@yahoo.com

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Dear Dr. Ukar, Thank you for careful and detailed review of the manuscript. We greatly appreciate your constructive comments. They greatly helped us to improve the quality of the manuscript. We have tried our best to address your suggestions in this new version of the manuscript. Regarding the advancement of our research in comparison with the work previously presented by Ronchi et al. (2003), the current study gives much more details about the dolomite characterization and their relation to the structural evolution of the anticline on the regional and local scale. Furthermore,

the obtained geochemical and microthermometry analyses do not confirm the role of marly or shaly basinal successions in providing the Mg-rich fluids during the first event of dolomitization (i.e. syn-rift), as proposed by Ronchi et al. (2003). We have tried to be modest in criticizing the latter authors limited research since the current research was build up on their findings. Another important question about the studied dolomites was the role of Scaglia Formation in providing the Mg-rich fluids during compression, because this formation is juxtaposed with the dolostones by the Montagna dei Fiori Fault. Our results do not support this hypothesis. Moreover, we show that the dolomitization predates the observed juxtaposition. During our research, we also performed some other advance analyses such as clumped isotopes and U/Pb dating. However, the consecutive overgrowth pattern of dolomites and difficulties in isolating them to get enough and good quality samples increased the uncertainty in the results. Therefore, we decided not to include those data in the manuscript. In the Montagna dei Fiori Anticline, the structures and their relative chronology are very complicated. A comprehensive structural study on the evolution of the Montagna dei Fiori Anticline was performed parallel with the current study, and published by Storti et al. (2018) in Tectonics. The target of the current study was to focus on dolomitization, and to use the structural model proposed by Storti et al. (2018) to deduce the most likely timing for dolomitization. The distribution of dolomitization and sampled locations are way larger than the out crop photo scale. The dolomitized intervals are tens of meters mostly exposed in vertical to subvertical outcrops. To be able to show their 3D distribution properly a photogrammetry or LiDAR imaging is required. The brecciated zones are mostly clast-support with minor calcite and negligible dolomite cement. Moreover, a detailed classification of breccia is not the focus of this research and does not give relevant information regarding this dolomitization case study. This new version of the manuscript has been reviewed by a native English speaker. Best regards, Mozafari et al.

Please also note the supplement to this comment:

<https://www.solid-earth-discuss.net/se-2018-136/se-2018-136-AC4-supplement.zip>

Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2018-136>, 2019.

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