Solid Earth Discuss.,
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Solid Earth Discussions

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. Hendry, Thank you for the very constructive comments. They not only helped us to improve the quality of the manuscript but also our knowledge of dolomitizataion process. 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 preliminary findings. 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 study area, 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. 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. The manuscript will be reviewed by a native speaker after receiving the second reviewers' comments. 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-AC1-supplement.zip

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

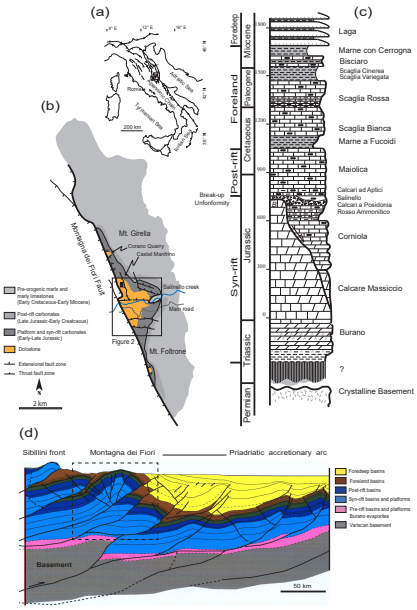

Fig. 1

Fig. 1.

C3

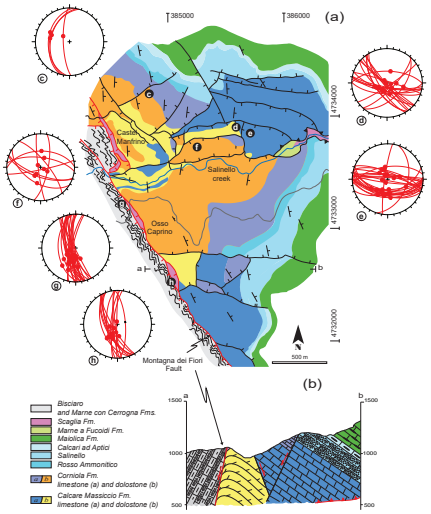

Fig. 2

Fig. 2.

C4

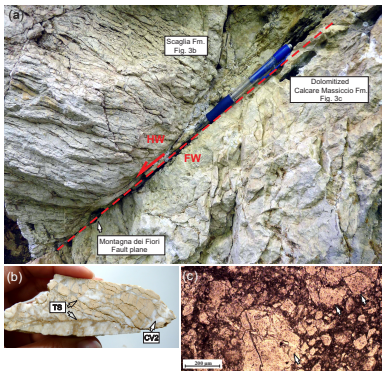

Fig. 3

45

Fig. 3.

C5

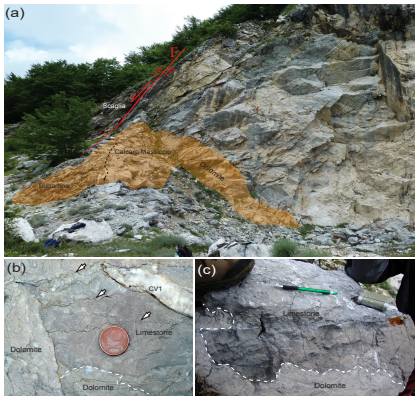

Fig. 4

46

Fig. 4.

C6

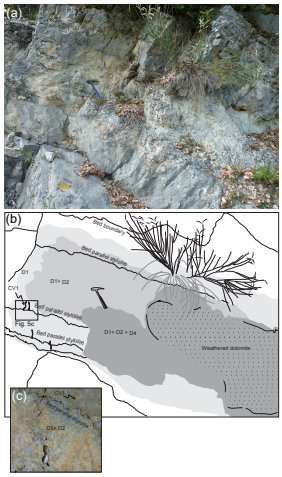

Fig. 5

Fig. 5.

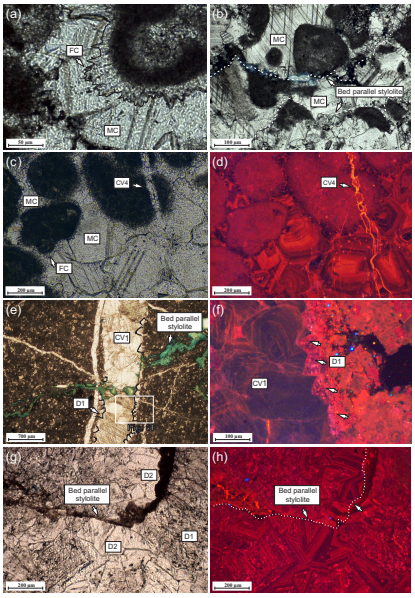

Fig. 6

Fig. 6.

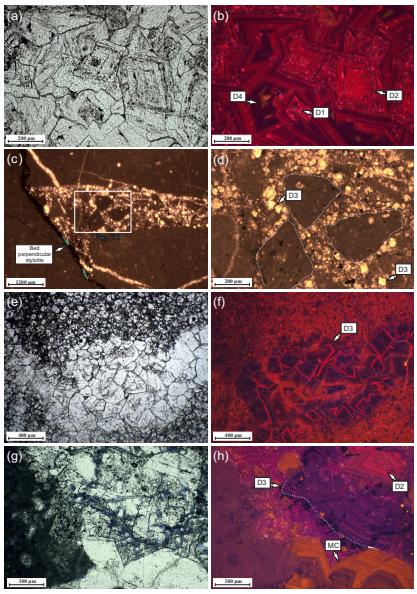

Fig. 7

Fig. 7.

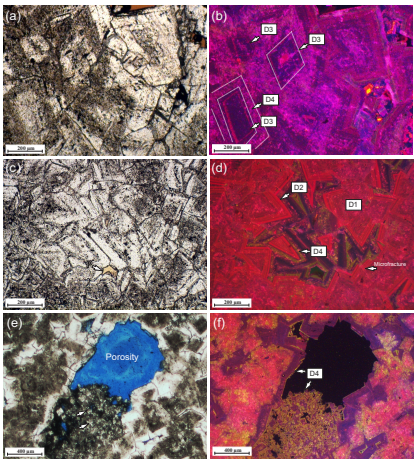

Fig. 8

Fig. 8.

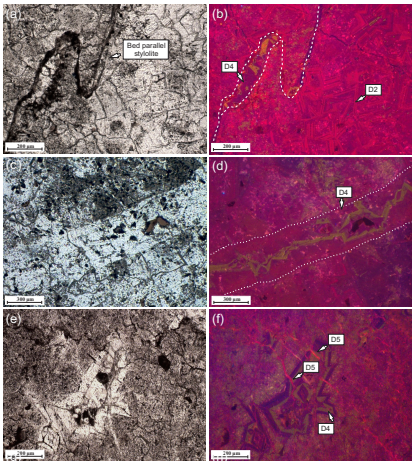

Fig. 9

Fig. 9.

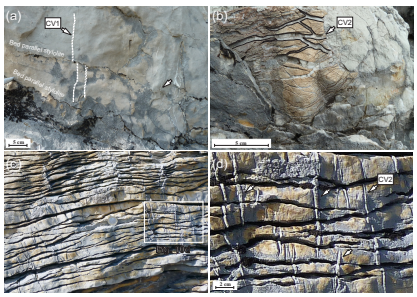

Fig. 10

Fig. 10.

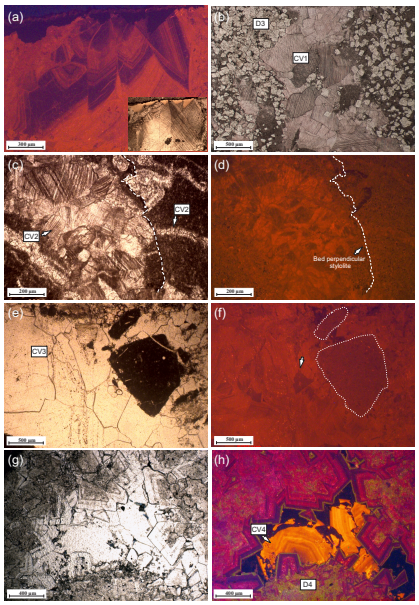

Fig. 11

Fig. 11.

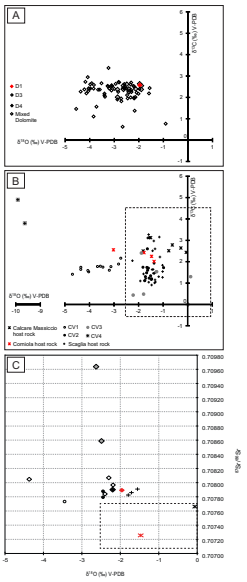

Fig. 12

Fig. 12.

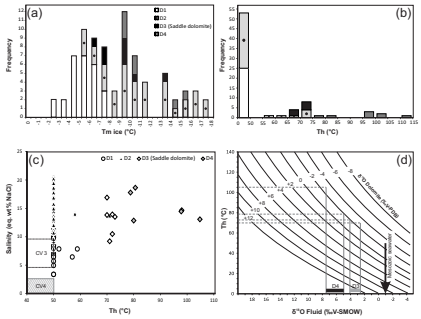

Fig. 13

55

Fig. 13.

C15

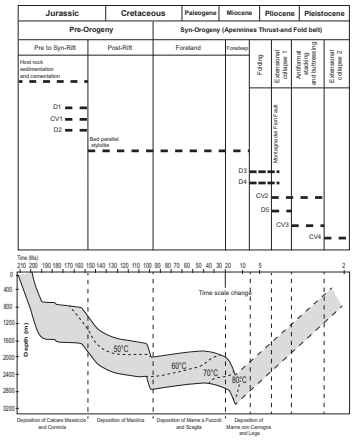

Fig. 14

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Fig. 14.

C16

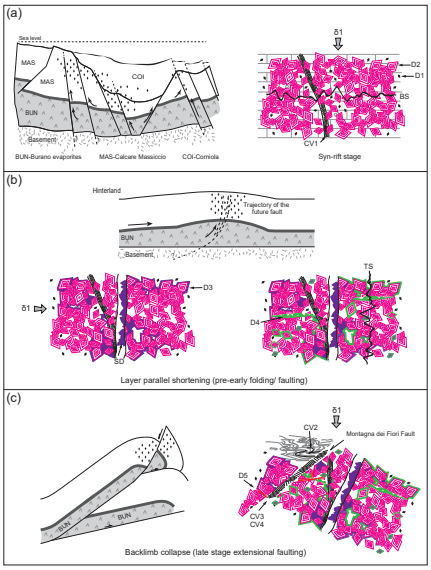
(a)
Sea level
MAS
MAS
COI
BUN
Basement
BUN-Burano evaporites
MAS-Calcare Massiccio
COI-Corniola
δ1
D2
D1
BS
CV1
Syn-rift stage
(b)
Hinterland
Trajectory of the future fault
BUN
Basement
D3
δ1
SD
TS
D4
Layer parallel shortening (pre-early folding/ faulting)
(c)
δ1
CV2
Montagna dei Fiori Fault
D5
CV3
CV4
BUN
BUN
Backlimb collapse (late stage extensional faulting)

Fig. 15

Fig. 15.