

Interactive comment on “Towards *in-situ* U–Pb dating of dolomites” by Bar Elisha et al.

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We thank Daniel Petráš for his comments on our manuscript. He pointed out an important issue regarding complex burial and diagenetic events, which will most probably result in multiple crystallization history, perplexing the interpretation of both bulk and *in-situ* analyses. The *in-situ* U–Pb dating may resolve some of the problems that arise in bulk analyses but may not work successfully to all dolomites. This is particularly true in cases of open system epigenetic dolomitization, which considerably effect uranium mobilization in the system. In our study, this behavior is reflected by a wedge plot on the Tera–Wasserburg diagram, which represents a mixture between several recrystallization events. In contrast, a closed system multi-crystallization behavior may produce a single population on a TW pots. We will include a short discussion on this issue in the revised manuscript.

C1

Indeed, a way to study the effect of open vs. closed diagenetic systems would be looking into the REE signature of each individual spot. This can be done by applying LASS (Laser Ablation Split Stream) approach, that includes simultaneous measurements of both radiometric ages and REE concentrations in each individual analysis. Unfortunately, we were unable to perform such a test in our study, but surely recommend applying this method for future studies.

Regarding the comment on localized dolomitization along faults, in which the resulted age represents the host limestone (or dolomite) or the dolomitizing fluids? As we presented in our dolomitic breccias associated with major fault plan, the age yielded by fragments of the host rock are considerably different than the age yielded by the enclosing matrix around the fragments. We demonstrated that the large breccia fragments were not affected by dolomitizing fluids and preserved ages that are much older than the matrix between grains, which correspond to the expected time of faulting. We will also expand the discussion on this point in the revised version of the manuscript.

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C2