

Interactive comment on “The 4.2 ka BP event in the Central Mediterranean: New data from Corchia speleothems (Apuan Alps, central Italy)” by Ilaria Isola et al.

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We thank referee # 1 for the comments and suggestions. Following our replay point by point

“The article by Isola et al. is a nice addition to previous studies that have focused on the 4.2 ka BP event in Central Mediterranean. Past studies on Corchia Cave (mentioned by the authors) have already shown the importance of this location for past environmental reconstructions, justifying the publication of this new and important dataset. The manuscript is well written and well organized. The sections flow logically and the paper captures the reader’s attention. I do have some minor recommendations to improve an

C1

already good paper”

We are happy of the positive general comment

“No picture(s) or clear description of the cave and of the speleothem are given. The authors mention that “The cave has been described in detail elsewhere (Drysdale et al., 2004; Piccini et al., 2008; Baneschi et al., 2011) and only general information is reported here”. That is fine but I would suggest the authors add “informative” pictures of the cave and of the speleothem because, referring to other publications may reduce the impact of this article.”

This request is also similar to Referee#2. We have added a new complete figure 2, which shows geology of Mt. Corchia, cave network and a polished section of CC27.

2- A main point: statistical analyses are absent here (except in Table 2) and could have provided a good opportunity to correlate the different signals (especially in case of long-term time-series). I suggest that the authors test their correlations (see Figs 4 and 5) and maybe add information on what they suggested: “robust evidence for a regional reduction in precipitation, in spite of some differences in chronology” (see page 10). I think that the use of statistical analyses would significantly increase the impact of this good article

This is quite similar to one request of Referee#2. We have expanded this point and added a discussion on square-wave plot vs age of index of filtered anomalies of CC27 trace elements, which shows that between ca. 4.5 and 4.1 there is a statistically significant interval interpreted as drier. This approach has been done for CC27 proxies, but also for time-series discussed in the new figure 6. As now explained along the text, for these records we are intended to produce “climatic anomaly” time series irrespective of the specific meaning. From the new figure 6 is possible to observe that between ca. 4.5 and 4.2 ka there is a well expressed “negative” index of filtered anomalies, which roughly implies that this is a tendentially cold, dry and stormy period

C2

3- A last point that needs to be better discussed/tested: the age-model. Clearly, the ages at 98.3 mm (corrected age: 5.392 ± 0.2 ka), 99.3 mm (corrected age: 5266 ± 0.7 ka) and 100.4 mm (corrected age: 5323 ± 0.4 ka) are somewhat ambiguous and need to be discussed in more detail. Even if the "issue" was presented by the authors, I suggest to pay more attention to this because chronology is a key point here and must be unequivocal.

Yes, these ages comprised in 3 mm are indistinguishable within the age error. We have inserted a more sound discussion on the age model and as it has been statistically obtained.

I particularly like two points: 1- "lower mean annual temperature, reduced precipitation during winter, and cooler and wetter summer conditions appears plausible". This is a perfect way to summarize the key findings described in the paper; and 2- "These results indicate that the synoptic processes behind the 4.2 ka BP event involved changes not only in average conditions (as reported by the speleothem) but also significant changes at the seasonal scale". The last sentence summarizes what will probably be a key research avenue for most palaeo-environmentalists during the coming years. The article could be published as it stands but I strongly encourage its publication after minor revisions.

We thank referee#1 for this general conclusion

Attached the version with tracked changes

Please also note the supplement to this comment:

<https://www.clim-past-discuss.net/cp-2018-127/cp-2018-127-AC1-supplement.pdf>

Interactive comment on Clim. Past Discuss., <https://doi.org/10.5194/cp-2018-127>, 2018.