

Clim. Past Discuss., author comment AC1
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Reply on EC1

Yoav Ben Dor et al.

Author comment on "Hydroclimatic variability of opposing Late Pleistocene climates in the Levant revealed by deep Dead Sea sediments" by Yoav Ben Dor et al., Clim. Past Discuss., <https://doi.org/10.5194/cp-2020-161-AC1>, 2021

Response to Comment by Prof. Pierre Francus (Editor)

Response to general comments:

Dear Editor,

We wish to thank you and the reviewers for completing the review of this manuscript in a timely manner during those complicated times. After reading carefully through the comments, which we consider of prime importance for improving the manuscript, we believe that these comments will contribute substantially to the quality and clarity of the article and would also improve its implications for paleoclimate research in the eastern Mediterranean.

Furthermore, our overall impression from the comments are that the reviewers possess substantial knowledge within the scope of the paper, and address important aspects that will be improved. We will follow their comments and recalculate the necessary analyses so that all parts of the discussion and conclusions would be reliably backed by the proper analyses of the data and its interpretation.

We will therefore correct the entire manuscript in accordance with the reviewers' comments and will remove any questionable segments that are not robust enough, or that are not sufficiently coherent for interpretation. Please find our detailed response to the comments made by the reviewers submitted in the CP discussions system.

On behalf of all authors,

Dr. Yoav Ben Dor

Response to specific comments:

Comment: As suggested in referee 3 comments (RC3), please reorganized the labelling of figures. The current numbering is confusing, especially at the beginning. Please verify the numbers in the call for figures in the text. I have the feeling that there are some inconsistencies.

Response: We apologize for any errors made with figure numbering. This will be fixed during the revision.

Comment: As suggested in RC2, the supplementary material is plentiful, and will be overwhelming for most of the readership of *Climate of the Past*. Try to remove what is not necessary.

Response: We agree. We will carefully revise, reorganize and reduce the amount of supplementary material.

Comment: I agree with RC3 that referring to "non-persistent periodic[al] components of 2-6 years" in ll. 369-370 appears more like wishful thinking than proper interpretation of the obtained results.

Response: We agree with this notion and we will rephrase the results and discussion sections accordingly.

Comment: The interpretation is based on the comparison between the "periodic components" of the current synoptic conditions (ll. 334-335 and 424-448), with the "periodic components" of your records. However, it is not discussed how sure we are that the current synoptic conditions are similar to the ones in isotopic stage 2, and even if the conditions were similar during the two time-intervals considered here for analysis, 18 ka and 27 ka. Indeed, during the Pleistocene, the presence of large polar ice caps has deflected the jet streams and many other systems towards the equator. This should be discussed.

Response: It is true that we cannot unambiguously determine which synoptic systems affected the eastern Mediterranean during the LGM. Nevertheless, there is no obvious reason at the moment to suggest that it should have been significantly different. Few studies are dealing directly with this question, and they support the general notion that past synoptic circulation patterns were similar to present (Greenbaum et al., 2006; Amit et al., 2011; Enzel et al., 2008), with some possible modifications of their spatial characteristics (e.g., Goldsmith et al., 2017). A section addressing this issue will be added to the updated manuscript.

Response to technical corrections:

All technical corrections will be corrected accordingly.

Cited references:

Amit, R., Simhai, O., Ayalon, A., Enzel, Y., Matmon, A., Crouvi, O., Porat, N., and McDonald, E.: Transition from arid to hyper-arid environment in the southern Levant deserts as recorded by early Pleistocene cummulic Aridisols, *Quaternary Science Reviews*, 30, 312-323, 2011.

Enzel, Y., Amit, R., Dayan, U., Crouvi, O., Kahana, R., Ziv, B., and Sharon, D.: The climatic and physiographic controls of the eastern Mediterranean over the late Pleistocene climates in the southern Levant and its neighboring deserts, *Global and Planetary Change*, 60, 165-192, 2008.

Goldsmith, Y., Polissar, P., Ayalon, A., Bar-Matthews, M., and Broecker, W.: The modern and Last Glacial Maximum hydrological cycles of the Eastern Mediterranean and the Levant from a water isotope perspective, *Earth Planet. Sci. Lett.*, 457, 302-312, 2017.

Greenbaum, N., Ben-Zvi, A., Haviv, I., and Enzel, Y.: The hydrology and paleohydrology of the Dead Sea tributaries, *Geological Society of America Special Papers*, 401, 63-93, 2006.