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Climate of the Past Discussions

Interactive comment on "The 4.2 ka BP Event in the Mediterranean Region: an overview" *by* Monica Bini et al.

Anonymous Referee #3

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Beni et al., by far, laid out the state of the knowledge on 4.2 event in the Mediterranean region. The review is thorough and underscores most of the issues associated with 4.2 climate event and discussed the complexities caused by chronology, record expansion, and sensitivity of chosen proxies to the climate variability. One of the significance of this contribution is discussing the shortcomings of the available paleoclimate records from the region with respect to tracing abrupt climate variabilities such as 4.2 and related forcing mechanism. I found the manuscript well organized with adequate discussion and convincing conclusion. It is perfectly fit for the publication in Climate of the Past Discussion, with some minor revisions.

âĂć Page 3, Line 19: The authors stated that from paleoclimate archive they chose "the most powerful proxy" to reconstruct climate. Please elaborate more on how you eval-

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uated the efficiency of the proxies in reflecting regional climate. Although in previous paragraphs the authors clearly stated that the selection of the records as well as proxies was, to some extent, subjective but it would be great if they can provide some mathematical methods, such as using probability function, to highlight the records/proxies with highest probabilities in showing 4.2 event. They can test this on one or two records just to show the validity of their selection. the results could be presented in supplementary materials. âĂć Page 10, Line 8: The author chose paleoclimate records from Lake Zeribar and Lake Mirabad at the eastern end of their climate records. These two lakes are located in Zagros Mountains with very complex and poorly understood climate condition. Both records are lacking high resolution and optimal chronology as mentioned by the authors. It is highly recommended to replace these two records with the pollen record from Lake Maharlou in Zagros (Djamali et al, 2009) and multi-proxy record from Neor Lake, NW Iran (Sharifi et al, 2015). These records have optimal resolution with robust chronology and both clearly captured the 4.2 event. REFERENCES: Djamali et al, 2009: Vegetation history of the SE section of the Zagros Mountains during the last five millennia; a pollen record from the Maharlou Lake, Fars Province, Iran. Veget Hist Archaeobot (2009) 18:123–136, DOI 10.1007/s00334-008-0178-2. Sharifi et al., 2015: Abrupt climate variability since the last deglaciation based on a high-resolution, multi-proxy peat record from NW Iran: The hand that rocked the Cradle of Civilization? Quaternary Science Reviews, Volume 123, pp. 215-230. âĂć Page 11, Lines 31 and 33: Please include the so-called Figure 10 in the manuscript. âĂć Page 12, Lines 7-11: This is a great point and correlates well with the southward shift of the mid-latitude westerly jet (MLWJ). It might be worth considering the interplay of ITCZ and MLWJ and its effect on precipitation over the Mediterranean. Brayshaw et al. (2010) studied the changes in winter storm track over the North Atlantic and the Mediterranean during the Holocene and Nagashima et al. (2011) showed the changes in the westerly jet path during the last glacial period. The TraCE simulation conducted by Sharifi et al. (2018) revealed an equatorward shift in the position of westerly jet throughout the Holocene with an abrupt shift centered at 4.2 ka B.P. REFERENCES: Brayshaw, D.J., Hoskins,

B., Black, E., 2010. Some physical drivers of changes in the winter storm tracks over the North Atlantic and Mediterranean during the Holocene. Philos. Trans. R. Soc.A, Math. Phys. Eng. Sci.368, 5185–5223. http://dx.doi.org/10.1098/rsta.2010.0180. Nagashima, K., Tada, R., Tani, A., Sun, Y., Isozaki, Y., Toyoda, S., Hasegawa, H., 2011. Millennial-scale oscillations of the westerly jet path during the last glacial period. J. Asian Earth Sci.40, 1214–1220. http://dx.doi.org/10.1016/j.jseaes.2010.08.010. Sharifi, A.; Murphy, L. N.; Pourmand, A.; Clement, A. C.; Canuel, E. A.; Naderi Beni, A.; Lahijani, H. A. K. and Ahmady-Birgani, H., 2018:Early Holocene Greening of the Afro-Asian Dust Belt Changed Sources of Mineral Dust in West Asia. Earth and Planetary Science Letters, Volume 481, pp.30-40, DOI 10.1016/j.epsl.2017.10.001.

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