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Climate of the Past Discussions

Interactive comment on "Hydroclimatic variability in the Levant during the early last glacial ($\sim$ 117–75 ka) derived from micro-facies analyses of deep Dead Sea sediments" *by* I. Neugebauer et al.

Anonymous Referee #1

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Neugebauer et al. present a new paleoclimate record from the Dead Sea aiming at elucidating the hydroclimatic variability in the Levant (Eastern Mediterranean) during the youngest interval of the last interglacial, i.e., MIS 5d-a ($\sim$117-75 ka). In particular, they reconstruct the Dead Sea lake level variability employing sedimentological and geochemical methods (including microfacies, grain size, μ-XRF and XRD analyses) on ICDP core 5017-1 to better understand the mechanisms controlling moisture supply to the Levant. They conclude that the Dead Sea has experienced considerable lake level changes at the end of the last interglacial but not a complete desiccation. In addition, they suggest that the position of the Atlantic-Mediterranean storm track over and off the Eastern Mediterranean is the main cause for these lake level fluctuations.

These conclusions challenge the hypotheses of Torstein et al. (2015) who suggested that (1) the Dead Sea almost completely dried out during the end of the last interglacial and (2) water of monsoonal origin may have contributed to the increased lake levels during the early last glacial. In the first case, the authors present compelling sedimentological evidence that the appearance of a 35-cm-thick well-sorted gravel layer at ∼110-108 ka BP was not an in-situ beach deposit, but instead a major mass-waste deposit with the fine-grained sediments being washed out during the drilling process, thus excluding a major drawdown of the lake. In the second case, the authors show that the Dead Sea lake level highstands occurred during warm interstadials, as reflected in Greenland ice cores and terrestrial and marine records from the circum-Mediterranean region. This suggests a possible teleconnection between the Levant and North Atlantic climates, perhaps via large-scale atmospheric circulation shifts related to the expansion of ice-sheets in the Northern Hemisphere.

This is an interesting, overall very well written and scientifically sound manuscript that clearly merits publication in Climate of the Past. I would like to underscore the authors' decision to contribute to the heated debate on the potential desiccation of the Dead Sea during the last interglacial [see also a very recently published comment on Torstein et al. (2015) by Katz and Starinsky (2015)] via Climate of the Past, which is a journal that fosters public scientific discussion prior to the final publication of papers. I recommend the publication of this manuscript after minor modifications.

Minor suggestions / technical comments:

1.Page 3641/Lines 16-19: It would be good for the non-expert readership to provide some additional information on how the geochemistry of the brine and the geomentry of the basin do not allow a complete drying of the Dead Sea.

2. Page 3644/ Line 25: You may also see Rohling et al. (2015) for a recent review on the sapropel formation in the Mediterranean Sea (including sapropels S3 and S4).

3. Please check the Fig. 2 call outs. I think they should be 'Fig. 2d' and 'Fig. 2e' in

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page 3633/ line 26 and page 3633/line 3, respectively.

4. Please spell out MIS and XRF when they first appear in the text; add XRD after '. . .diffraction' in page 3632/line 11

References:

Katz, A., Starinsky, A., 2015. No drawdown and no hyperaridity in the ancient Dead Sea (Comments to Torfsteins's et al., (2015) paper, EPSL 412, 235-244). Earth and Planetary Science Letters 427, 303-305.

Rohling, E.J., Marino, G., Grant, K.M., 2015. Mediterranean climate and oceanography, and the periodic development of anoxic events (sapropels). Earth-Science Reviews 143, 62-97.

Torfstein A., Goldstein, S.L., Kushnir, Y., Enzel, Y., Haug, G., Stein, M., 2015. Dead Sea drawdown and monsoonal impacts in the Levant during the last interglacial. Earth and Planetary Science Letters 412, 235-244.

Interactive comment on Clim. Past Discuss., 11, 3625, 2015.