

The manuscript is suitable in terms of topic for publication in *Climate of the Past*, and might be of interest to the scientific community interested in the Mediterranean paleoceanography and climate. Nevertheless, I think that it would need additional work prior to publication. My major comments bear mostly on interpretation/discussion and are reproduced below. Also, I address some minor issues that could help to improve the manuscript.

The authors describe in relatively detail the study area and mention some of the currents, water masses, Mistral and Tramontana winds, and geographical locations in the Western Mediterranean in section 2.1. These should be included in Figure 1, at least those that are essential for the discussion (e.g. Gulf of Lions).

I find the paper is well organized and has an easy-to-follow structure. However, I suggest to combine the “oceanographic setting” with the introduction or to create a specific section for it between “introduction” and “material and methods”. Similarly, I think P. 3196, lines 4-13 would fit better in the introduction section.

The authors assume that the reader must know many of the processes occurring in the Western Mediterranean basin. I believe slightly more detailed explanation of some statements would make the paper easier to follow, especially by those not familiar with the study area. An example:

-P. 3190, lines 8-10 mention the influence of LIW in deep water formation processes. This explanation is very brief and might be insufficient for a general reader to understand the subsequent discussion. The authors should explain how these contents of “heat and salt” are in comparison with those of the upper water masses and in which way these properties of LIW influence deep water formation in the Gulf of Lions.

In addition, some references are needed for some of the statements written on the text:

-P. 3189, line 1: “Because of strong ocean/atmospheric interactions in the Mediterranean region” (citation).

- P. 3194, line 20: “...the 8200 yr BP” (citation).

-P. 3195, line 25: “...in the Eastern Mediterranean was much reduced or shutdown...” (citation).

-P. 3197, line 5-6: “Under such conditions storminess is enhanced in the Mediterranean” (citation).

-P. 3194: SST trends would be easier to see if the authors marked them with arrows in the graph. Some trends are clear (e.g. core M40/4-SL78), but other records lack such trend (e.g. core MD 90-917, M25/4-KL11, GeoB 7702-3-TEX₈₆). If “trends” were calculated as the difference among the SST values at the lower and upper extremes of the period 7,000-1,000 yr, a positive (i.e. cold) or a negative (i.e. warm) result will be always obtained. But this does not imply the presence of a cooling or warming “trend” over this period, only that SST was colder or warmer at 1,000 yr in comparison with SST at 7,000 yr. The authors should revise this part, and in any case explain in the text how these trends are calculated.

I agree with the authors that there are differences among the SST patterns of the eastern and western basins. This is a current feature inherent to the Mediterranean Sea where these two basins, despite of being connected, represent very different environments. I feel the discussion of this part is more a description than an interpretation of the compared data. It should be discussed, for example, when these patterns became different between basins and to discuss why if possible.

P. 3195, line 19: please explain in the text what M events are when you talk about M8.

Page 3195, lines 25-28: I am not convinced by the following author’s reasoning “...we speculate that lower amounts of LIW formation during the AHP could have decreased advection of salt in

the Gulf of Lions thereby contributing to weaken convection..." "...and caused a reduction of the thermohaline circulation in the Mediterranean Sea during this time period", because the UP10 by Frigola et al. (2007) does show the clearest reinforcement of deep water convection during this period over the Holocene. The authors should explain the mismatch between SST and deep water convection during M8 by a different mechanism that includes what both proxies show: warmer SST and stronger deep water convection at that time.

P. 3196, line 17-19: please mark these lowest values with arrows in the graph to help the reader.

P. 3196-3197: "Comparison of TERR-alkane and floodactivity in the N-Alps with NAO (Fig. 4d) indicates that high values occur during positive NAO". The NAO index shows several oscillations, mostly to a positive-NAO mode. However, almost all the negative-NAO periods also occur within those of higher values of TERR-alkanes (Fig. 4). I do not see this correspondence between TERR-alkanes and any of the two phases of NAO because periods of higher TERR-alkanes agrees with both negative and positive modes of NAO. Therefore, I do not believe any cause-effect relationship among them can be concluded (lines 22-24). On the contrary, correspondence between intense flood of the S-Alps and negative-NAO is more clear and certainly interesting. Line 9: please check the number of the figure.

The authors should check spelling. Some examples:

-P. 3189, line 16 (material), P. 3190, line15 (is), P. 3193, line 21 (*bulloides*), P. 3193, line 22 (Castañeda)

Minor issues:

P. 3188, line 15: significance of "NAO"

P. 3190, lines 7: ...the "cooling and evaporation" of...(surface waters?). Also, I don't think "spread to the bottom floor" is the proper term in oceanographic terms. I would suggest the use of "sink".

P. 3191, line 5: the MARINE13 calibration set includes the global reservoir effect, but the authors should add this on the text, and clarify that ΔR is the local reservoir effect.

P. 3191, line 20: please mention how many samples were used for the analyses and/or the obtained temporal resolution.

-P. 3192, line 11 onwards: please refer, if any, according to which stratigraphic terminology you name the "Early" and "Late" Holocene (e.g. (Walker et al., 2012) or specify the time spans. This should be also added to the graphs.

P. 3192, line 19: figures should be explained in order. The authors name figure 2c in the text before figure 2b. Please change the order in the text or in the graph.

P. 3192, line 23: "during the second half of the Holocene". This description is ambiguous since it depends on how the reader looks at the graph. Please clarify the time span you are referring to.

P. 3195, line 1: please use "temperature" instead of T

P. 3195, line 11: it would be helpful if the authors plot in Fig. 2b age control points used by Frigola et al. (2007).

Reference:

Walker MJC, Berkelhammer M, Björck S, Cwynar LC, Fisher DA, Long AJ, Lowe JJ, Newnham RM, Rasmussen SO and Weiss H: Formal subdivision of the Holocene Series/Epoch: a Discussion Paper by a Working Group of INTIMATE (Integration of ice-core, marine and terrestrial records) and the Subcommission on Quaternary Stratigraphy (International Commission on Stratigraphy), *Journal of Quaternary Science*, 27, 649-659, 2012.