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Climate of the Past Discussions

Interactive comment on "Holocene hydrography evolution in the Alboran Sea: a multi-record and multiproxy comparison" *by* Albert Català et al.

Albert Català et al.

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We thank to Referee #2 for the useful comments and suggestions. Below we detail our replay point by point.

RC#3: I also recommend checking the English by a native speaker English has been improved by a native speaker.

RC#3: As other Referee, I also doubt about to be published in the Special Issue about the "4.2 ka event" due to no major discussion is centered on that time period.

This is already argued to the RC#2

RC#3: My general comments are mainly concerning the absence of discussion be-

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tween cores ALB-2 and ODP976 since they are located in the same site (western Alboran) at different points: - There is a notable difference on _18O profiles between both cores (lines 232-235) for the whole time period, and specially during the YD-Holocene transition, whereas using Mg/Ca ratio on same species (i.e. G. bulloides) from the different cores, it is generally obtained a good correlation. It would be also good to add the error bars. - For the deglaciaton-YD there is notable differences on Mg/Ca ratio derived-SSTs.

We want to stress, as it is already mentioned in the text and figure caption, that both ALB-2 and ODP976 δ18O records are plotted in Fig.2 with independent y-axis and the absolute values are totally comparable. We do not see such a notable difference between the two records as the reviewer mentions. Referee stress on the YD differences but fig.2 includes the age control of all the considered records indicating their error bars. It can be observed in that figure that the chronological constrain of ODP976 for the YD period it is very poor, and the structure there could have an error of several centuries, according to that, these discrepancies could be moved to fit in a good agreement with those of core ALB-2. We do not think that the aim of the manuscript is to go in the detailed discussion of minor structures, even more since the YD is not the main target of the manuscript. Regarding the Mg/Ca records it also has to be taken in account that the resolution of ODP976 in that part of the record (YD) is extremely low. That record had significant contamination problems and several of the samples were removed after a contamination check as is described in the original manuscript. Taking in consideration all these issues we consider that the comparison needs to concentrate in the main patterns and not in the little details.

RC#3: Major differences are observed in SSTs-derived from alkenones and Mg/Ca ratio. They are finally explained as different seasonal and depth habitat differences, suggesting that Mg/Ca-SST reflects spring season. However, if you compared SST values from the most superficial samples, Mg/Ca-SST are much lower (more than 2_C) than Uk'37-SST. Present-day SST differences between annual spring and autumn temper-

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atures are less than 1_C, so Mg/Ca-SST might also reflect a deeper depth habitat of G. bulloides.

This is a good observation that we noticed was not treated in detail in the original version of the manuscript. The new submitted version includes an analysis and discussion of current temperature and δ18O distribution along the year and water depth. This is included in a new figure (Fig. 4a and b) and discussed in Section 4.2 (lines 293-324). It illustrates that the proxy differences in absolute SST estimations are coherent with the habitat preference in both season and water depth for the different proxy carriers.

RC#3: In general, there is not addressed the influence of hydrodynamic of the Alboran gyres on the different proxies derived SST.

The manuscript focuses in the discussion of the ALB2 Mg/Ca SST record. The multi record comparison is used to argue the regional consistency in the main patterns and document the commune response to the deglacial changes. Resolution of the records is very different and in some cases the chronology no very robust, for that reason we did not wanted to address the manuscript into little difference between the records that could be attributed to the gyres or other regional hydro graphic structures. Nevertheless, we recognise that there is the potential there for further studies.

RC#3: I also miss any further hypothesis about the effect of salinity changes on the different proxies, since Mg/Ca ratio is susceptible to be affected.

It has been incorporate a brief discussion on this in section 3.3 (211-220). We argue in there that the here discussed Mg/Ca ratios do not have a significant salinity overprint.

RC#3: Concerning the meaning of the UP10 proxy, if it is related to major paleocurrents during cold periods, there is not an increase at 4.2 kyr and later on there is a peak at ca. 3.5 kyr and 2.5 kyr that are not punctuated by a strong cooling signal.

The UP10 shows an increase in relation to the 4.2 event, but as the text acknowledges (lines 433-436) it is not one of the major ones within the Holocene. We agree with the

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reviewer that any increase in the UP10 occurs during the 3.5 and 2.5 cooling events and for that reason it is not commented in the text. We never argue that every cold event in Alboran has to have the exactly same pattern.

RC#3: Detailed comments

These detailed comments have been changed or added.

RC#3: Finally, I recommend rewriting and shortening accordingly the conclusions.

The conclusions have been shortened.

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Figure 4

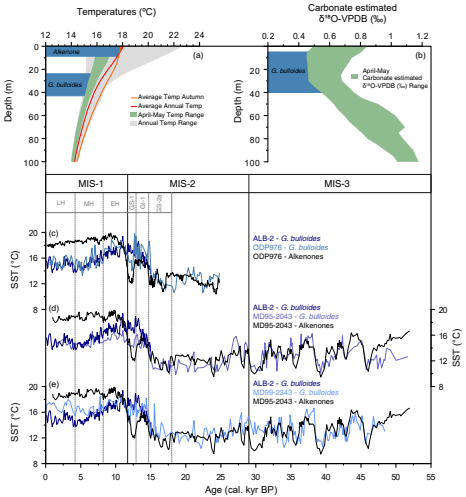

Fig. 1. Figure4

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