

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

### **Anonymous Referee #3**

Received and published: 7 March 2019

“Holocene hydrography evolution in the Alboran Sea: a multi-record and multiproxy comparison” by Albert Català et al.

The authors present a dual-temperature proxy comparison using new Mg/Ca ratio from *G. bulloides* and previously published alkenones during the last deglaciation and Holocene in the Alboran Sea (westernmost Mediterranean). Discrepancies between SST proxies are explained and appropriate literature is presented in the text. The paleoclimate and paleoceanographic description with the different water masses currents in the westernmost Mediterranean is explained with detail envisaging different hypotheses to explain the discrepancies. I find the manuscript acceptable and suitable for publication, although I have some general comments apart from minor revisions that should be addressed in the revised version. As other Referee, I also doubt about to be

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published in the Special Issue about the “4.2 ka event” due to no major discussion is centered on that time period. Indeed, it is much more focused on the last deglaciation (Fig. 4). I also recommend checking the English by a native speaker before, and the reference format and reference list.

General comments: My general comments are mainly concerning the absence of discussion between cores ALB-2 and ODP976 since they are located in the same site (western Alboran) at different points: - There is a notable difference on  $\delta^{18}\text{O}$  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 deglaciation-YD there is notable differences on Mg/Ca ratio derived-SSTs. - 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  $2^\circ\text{C}$ ) than Uk'37-SST. Present-day SST differences between annual, spring and autumn temperatures are less than  $1^\circ\text{C}$ , so Mg/Ca-SST might also reflect a deeper depth habitat of *G. bulloides*.

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

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.

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.

Finally, I recommend rewriting and shortening accordingly the conclusions.

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Detailed comments:

Line 23: add records after Mg/Ca-SST

Lines 24-25: rewrite as “alkenone-SST reconstructions from other marine records recovered from the same region spanning the last deglaciation and Holocene periods. Result comparisons show in all cases a high degree of coherence between. . . “

Line 47: add “worldwide distributed” Holocene climate records

Line 52: Debret et al.,

Line 53: add Moreno et al., 2012; Nieto-Moreno et al., 2011

Line 68: Rodrigo-Gámiz et al., 2011; Ausin et al., 2015

Line 72: our proxies? It might say, the climate proxies

Line 72: SST must be introduced, as well as  $\delta^{18}\text{O}_{\text{sw}}$

Lines 74-76: This paragraph might be rewritten

Lines 78-81: I would say “ is compared with other three Mg/Ca ratio on *G. bulloides* derived-SST records from the western Mediterranean, i.e. two new records () and other record previously. . . “

Line 83: based on

Line 83: UK'37

Line 84: Rodrigo-Gámiz et al., 2014

Line 87: Mg/Ca-SST allow us to discuss

Line 88: North Atlantic Ocean variability or circulation?

Lines 124-125: Add information about sampling space and which samples has been analyzed.

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Line 147: 215-355 or 250-355  $\mu\text{m}$ ?

Line 196: the inferred SST

Line 296: annual average temperatures

Line 304: preferential depth habitat

Line 310: spring, autumn and annual average

Line 312: depth habitat differences between

Line 320: Based on these observations

Line 354: to change its depth habitat or blooming season?

Lines 373, 374, 376: North Atlantic

Line 381: associated with

Line 397: (WMDW)

Line 402: Alboran Sea that occurred after 7.7 kyr BP, according with

Line 427: Late Holocene

Line 432: defined on base

Figure 5: add  $\delta^{18}\text{O}_{\text{sw}}$  in the caption and figure.

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Interactive comment on Clim. Past Discuss., <https://doi.org/10.5194/cp-2018-163>, 2018.

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