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Climate of the Past Discussions

Interactive comment on "Calcareous nannofossil assemblages from the Central Mediterranean Sea over the last four centuries: the impact of the little ice age" *by* A. Incarbona et al.

Anonymous Referee #2

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Calcareous nannofossil assemblages from the Central Mediterranean Sea over the last four centuries: the impact of the little ice age Incarbona et al Clim. Past. Discuss.

The reviewed paper is an interesting contribution in Paleoceanography using Calacareous nannofossils (mainly Coccolithophores) for reconstruction of environmental conditions in Central Mediterranean, for a short time interval, historically well documented and of general interest. This goal fits perfectly in the aim of this publication. Most of the data including here are novel, linked to an important research line in the region for the Pleistocene. Although results are clearly showed, I consider that at this time the discussion and interpretation need to be revised in order to improve the paper.

Following I am including some comments that hope helps to the authors.

As general comment, I consider (in agreement with the title and most of the text) that this study should focus in the LIA (as I'll comment more recent time are not enough documented and justified –even with the proposed sampling)

1) Introduction Is very general. It is fine explain what's CN/Coccolithophores, but after the authors must explain what's the goal of this study: Complete the 963 record in order to demonstrate the referred cyclicity? Just focus in LIA and recent times? A clear proposal of objectives is required. Some "classic" references in relationship with this kind of studies must be included (e.g. Beaufort paleoproductivity papers).

2) Material and Methods It is necessary to include authors justifying the expressed error (Dennison and Hay. . .., Peterson. . .. Concerning CN groups, I consider it is quite confusing, especially the UPZ group and miscellaneous gr. It is necessary to clarify the ecological meaning of these groups and how to use it. The Placoliths gr. Is also a UPZ group. I recommend include more information here about that and use it in the Discussion in this sense (or well include comments about if necessary). In this sense Figs. 9-11 will be useful and easy to understand. Also, Figs 5, 6, 7 and 8 are not necessary because are not used/discussed in the text. On the other hand try to avoid references to spp. that are not identified (e.g some LPZ spp)

Oxygen isotope analysis is included only in a core and the justification of this data is not so clear for my. For example, they presented a comparison with other standard isotope standard record (Fig. 14), but not with they data. They data ad 18O are only compared with the reworking material, and the record is just above LIA. I can't see any sense on that.

2) Dating This is a crucial part that needs to be explained better. According with the data the dating is 210Pb based in all sites, but only 137Cs analyses were performed in C90-1M. It is not clear for me that the recent sediments remain in the other sites. For this "historical" records, I consider that recent radioisotope analyses must be included

in the Box-core record. This is not necessary if the study focus only in LIA, because in this case resolution could be fine for this objective. So, if these data are not available, it is important to demonstrate that all the record exists: some of the conclusions, in general terms, are very precise. If not, all conclusions relative to the last century must be reconsidered. What about bioturbation in these sites?

3) Results This section needs to be improved. Most of the results are included in the Discussion section. A clear separation between Discussion and Results must be considered. A Results section must include all the information concerning the proposed proxies, trying to avoid conclusion/comparisons.

4) Discussion Considering a general Methodological aspect, the authors should express/discuss their data considering an hypothesis (non clear in the objectives), after they can discuss about according with their data. In the Discussion chapter sometimes the conclusion (or the assumption) is adopted before. (Section 6.2). They must interpret they data first! After discuss the feasibility/agreement with other.

Some of the text is mainly Results! Consider the possibility to separate it. On the other hand will be important to justify in the regional context the role of Coccolithophores and the productivity signal. Most of the data are based in "direct-productivity" indicators. In the record of Paleoproductivity the authors just compare sites in general, mixing time slices. I consider that an analysis in this sense needs consider same time (present day), and after it is possible to extend it to the rest of the record. Here, this section is very confusing, also due to some of the sites /cores are different record, and as I noted, time resolution in the upper part need to be clarified. They referred the "possibility" to use the Incarbona et al. (2008) equation to reconstruct paleoproductivity, why they didn't include these data? If this function works will be the best proxy, comparable with all the present day included.

Section 6.2 is very confusing, LIA and recent data are considered at the same time. Also references to NAO are very rough and need to be included in a precise context.

Most of the conclusions are not supported. This section need to be rewritten and ordered focusing in LIA. Some of the other aspects included here, must be included in a more general section (6.1?) Taking into account that the LIA is not recorded in all sites, a generalization is quite dangerous. This must be clearly explained in the text, considering separately intervals for analysis. Section 6.3 The 18O record in the sense proposed need to be explained better. The conclusion they obtained is consequent (and expected!). These results need a more precise discussion in terms of high-resolution record (as defended); also, if they can support same precision in the other sites, will be important a correlation between sites (not only in general terms as shown). Some references, e.g AHP an so need to be improved and justified. I think this is not the goal of this study, and most of these considerations must be avoided at this time. I can't see the sense to include some data from ODP 963!

5) Conclusions Some of the conclusions from the interval after LIA need first confirm if the age-model is correct. Need to be reconsidered after revision of Discussion, some of that are not supported.

Some of the figures (5 to 8) are not necessary (superfluous; see comments) Fig 1. Need labeled sites (including ODP) Fig. 4 Not enough explained in the text (how to use it) Fig 13 is fine, to justify the tool but other proxies (or comments) need to be included(commented Fig. 14 Is not enough explained in the text. The correlation (or absence of correlation) is needed. Fig . 15 Is not necessary! Fig 16 Need more explanation in the text, and show the relationship with other sections (not only one).

In general, II consider this study needs a substantial modification to be accepted for publication. A more clear definition of objectives as well as the interpretation (and justification) of the proxies to be used is crucial. Definition of the CN groups and the meaning, or, in case, functions included in the text but no used.

Interactive comment on Clim. Past Discuss., 6, 817, 2010.