**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 #1

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General comments

The paper "Calcareous nannofossil assemblages from the Central Mediterranean Sea over the last four centuries: the impact of the little ice age" by Incarbona and co-authors presents a new nannofossil dataset from the Mediterranean Sea. Three short sediment cores off the southern coast of Sicily are compared with a core located in Salerno Bay, Tyrrhenian Sea. The cores reach back to the upper part of the Litte Ice Age interval (1620 at most). The presented data is of good quality and makes a new and important contribution to nannofossil studies in the Mediterranean Sea. The palaeoclimatological interpretation of the data is based on abundance ratios of different coccolithophore

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Interactive Discussion

Discussion Paper

species that are characteristic for different habitats in the water column. The abundance of the deep dwelling species Florisphaera profunda in relation to the dominant small placoliths (including Emiliania huxleyi and Gephyrocapsa species) is used as an indicator for productivity changes. Productivity patterns are different between the studied sites, which is explained by different oceanographical settings and/or the shallow water depth of some sites, which therefore are not recording the deep dwelling species in the same way as deeper sites. Herein lies a possible error in the interpretation of the data (see below).

In general, I am missing more focus in the paper. It seems to handle more than only the impacts of the little ice age as is stated in the title. In combination with the language which causes some reading problems to me, it is sometimes not easy to follow the authors thoughts. I think that the paper could largely benefit from a thorough language check by a native speaker, and from making it shorter and more concise. I have made some suggestion for this below.

Specific comments

Abstract I suggest to take out the exact core positions here. At this point, it is too much information.

2. Material and Methods The last paragraph on the productivity data could be shortened, as it repeats information available from the data source. I suggest just to state from where the data is obtained and refer to the publications where the exact methodology is explained.

3. Chronology I suggest to shorten this section. As the chronology data is available from other studies, it should be sufficient to use the time scales provided there without repeating how the age model was calculated. This would save some space. Also, figures 2 and 3 could be taken out.

4.1 Oceanographic circulation The production of Levantine Intermediate Water (LIW)

is explained in detail. However, the currents are not marked in Figure 1.

4.3 Atmospheric pattern Why is the Mediterranean Oscillation index mentioned when it is not explained in more detail? Local rainfall might be of interest for the story, so it might be worth to check if this index could have an influence on the data.

6.1 Palaeoproductivity considerations In the first paragraph you state that the standard error on your groups is demonstrating stable environmental conditions. The error seems to be relatively high, so why would that show stable conditions?

On page 830, lines 4-11, the different abundances of F. profunda between the Tyrrhenain Sea and the Strait of Sicily are taken as proof for different productivities between the regions. However, in the paragraph directly above, the lower abundance of F. profunda in the Tyrrhenian core is attributed to the shallower sampling depth. If this is true, F. profunda can not be used for productivity estimates in the Tyrrhenian Sea core.

In general, the interpretation of the F. profunda data is probably lacking one important aspect. A decrease in F. profunda is interpreted as an increase in productivity. However, the intermediate water masses in the Mediterranean Sea are nutrient enriched compared to the upper water levels. Could it also be possible, that an increase in F. profunda would show nutrient enrichment only in the deeper photic zone? As an example, F. profunda abundances can increase during Mediterranean sapropel formation (e.g. Giunta et al. 2003), a time interval that is characterized by increased productivity.

Figures

Figure 1: LIW could be included

Figures 2-3: These figures could be eliminated (see above).

Figures 9-12: I suggest to have these figures not divided by station, but by group. In this way it would be possible to compare the different groups between the stations directly. In the way it is presented now, it is too similar to figures 5-8.

Figure 13: Perhaps the difference between the regions is not because of the productivity, but because of the water depth (see above).

Figure 17: The images should be bigger, it is difficult to see what they show.

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