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Climate of the Past Discussions

Interactive comment on "Seemingly divergent sea surface temperature proxy records in the central Mediterranean during the last deglacial" *by* M.-A. Sicre et al.

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The paper "Seemingly divergent Sea Surface Temperature proxy records in the central Mediterranean during the last deglacial" by Sicre et al presents new multi-proxy SST (faunal SST for spring and fall, and alkenones) from two cores in northern and southern central Mediterranean Sea covering the last 25 ka. They observe shifts in the alkenonederived SST relative to faunal spring and fall SSTs, from which the raw SST values jump from being the warmest (e.g. during the LGM and Heinrich events) to the coldest (e.g. during the B/A in both cores and the early Holocene in the Adriatic Sea).

They interpret these mismatches in terms of differing alkenone-producing algae sensitivities to different seasons over the extreme variability of climate impacting southern Europe during that time window.

Overall, it is a fairly well-written, straightforward paper presenting nice data. Many reasons can be invoked to explain the observed SST features along with likely hydrological shifts that might have triggered ecological adaptation of coccolithophorids, and the invoked likely reasons to explain it all make sense to me. I suggest the paper be accepted after minor revisions.

I am first wondering whether choosing the Ternois calibration, which is known to slightly deviate from the global, open-ocean ones such as the Conte calibration, would change the observed differences among SST proxies. The residual (measured minus estimated) SSTs using the Conte calibration suggest a $\sim$1°C SST residual (probably varying between 0 and 2°C) for core top samples collected in the Mediterranean Sea (Figure 3a in Conte). I do not think the interpretation would be altered, as we're dealing here with large temperature shifts, but I think the authors might clarify such kind of aspect, and advertise here and there when the differences in estimated SSTs from different proxies the authors look at should be interpreted with caution.

ANSWER: As shown in Figure 2a from Conte et al. 2006 that plots the "North Atlantic data" used in the global compilation, the Mediterranean samples shown as blue triangles and do not show any deviation as compared to other basin samples which is also seen on Figure 3a. Ouliers are indicated as black crosses and none of them are from the Mediterranean Sea.

In the same vein, uncertainties associated with faunal SST estimates should at least be admitted. I find curious sometimes that the authors nicely deal with uncertainties associated with alkenone-based SSTs and seem to use April/May and October/November foram-based SSTs as true (unbiased) SST proxies for those particular months. As the reference database is based on core-top, which does not account for monthly-weighted

foram fluxes, I would expect some shifts in the seasonal foram fluxes as well. Instead, the spring and fall SSTs seem to be used as golden SST proxies on which the interpretation of changing seasonality of alkenones is anchored.

ANSWER It is true that foraminifera transfert function establishes relationships between assemblages and spring and fall temperatures. In absence of foraminifera fluxes we can thus rely on dissimilarity coefficient and uncertainties provided by MAT.

To be the devil's advocate, one might have used the alkenones as reflecting the spring and fall SSTs as stated in the beginning of the discussion, and turn the paper toward discussing why the April- May and October-November faunal SSTs don't fit to alkenones, to comment on biases associated with the modern analogue technique through discussing the likely shifts in the foraminiferal ecological niches along with climate changes. Some short discussion on what kind of uncertainties can affect assemblages in the Mediterranean would hence be welcome.

ANSWER Alkenone SSTs calculated from Conte et al (2006) provide production T (at the time of cell growing). There is no assumption on the growth season. In the NW Mediterranean Sea, sediment traps data have shown that alkenone fluxes today today in spring and fall but this is independent work from the calibration - Furthermore, weight fluxes SSTs for each sediment time interval over a year have show good agreement with modern sediments in this area.

I like the discussion of the last paragraph that compares the southern core to the Tunisian speleothem. But from the figure 3 I also find interesting the plot of both alkenone records put together (green panels). In the end, the southern core is warmer than the northern from the glacial period to sometime around _15 ka (except perhaps for a short period around 18 ka), and then is found colder than the northern core over the last 15 ka. Can the authors add some short discussion on that observation?

ANSWER The two green records were mislabeled - this is corrected in the new version.

Two other minor remarks: 1/ Please refer a little more to the figures while describing the results and discussion 2/Please consider putting d18O of bulloides on a panel next to the SSTs, the blue colours are multiple records interfere and make it hard to visualize the time series

ANSWER Color for 18O of bulloides has been changed to dark to avoid confusion with A-M foram SSTs.

Interactive comment on Clim. Past Discuss., 9, 683, 2013.