

Dear editor,

We have modified the manuscript following your indications. Here we are listing the changes introduced in the manuscript to fulfill them.

Yours sincerely,

Joan O. Grimalt

Comments and changes

Thanks for uploading responses to the reviewer's comments, and for the high level of detail used in these responses. I have gone through the manuscript and the original reviews and I can appreciate how much the manuscript has improved thanks to the reviewers feedback. I think there are a few justifications and explanations presented in the responses to the reviewer's comments that could be incorporated into the manuscript and that will provide further clarification to the reader. These are detailed below.

One of the main concerns of reviewer #1 related to the resolution of the SST record, and its suitability to address millennial-scale changes. You have provided a complete response to this concern, but it would be very useful to the reader if information from this response also appeared in the main manuscript. I refer specifically to the total number of samples and the average resolution, and making the case that the record is suitable to address millennial-scale changes.

This information has been incorporated in Pg. 11 lines 5-11.

"The samples analysed in core MD03-2616, n = 576, provided an average resolution of 210 yr. The resolution in the radiocarbon age period was also 210 yr. Only in certain periods, 23.8-29.8 and 35.2-39.6, the resolution was closer to 400 yr. Fig. S2 in the Supplement shows the SST record in which the sampled and analysed levels between 5 and 70 ka are indicated. The time intervals corresponding to the Younger Dryas and the HSs are described by at least 6 measurements. The resolution of the HSs is as average comparable to other tropical cores such as those from the west Amazonia caves quoted in the study (Figs. 3E and 3F)."

Your decision on the timing of the last occurrence of *P. obliquiloculata* in the response to reviewers' comments is well justified, but this has not been incorporated into the manuscript. The reader is unlikely to review the discussion to find this information, therefore it would be more effective to add it to the methods section. I think this is what reviewer #2 intended by pointing this out, although I can appreciate this might not have come across.

This information has been added to the methods section (3.2. Age model and sedimentation rates) Pg. 8 lines 22-28 and Pg. 9 lines 1-3.

One additional pointer used (40 ka) was the last occurrence of Pulleniatina obliquiloculata (Ericson and Wollin, 1956; Kennett and Huddleston, 1972; Prell and Damuth, 1978; Vicalvi et al., 1999; Peterson et al., 2000; López-Otálvaro et al., 2009) known as biozone Y transition (Table 1). The presence of P. obliquiloculata in the ocean Atlantic sediments is diachronous. The disappearance of this species in Gulf of Mexico occurred 60 ka BP, in the Caribbean Sea 50 ka BP and in the equatorial Atlantic 35 ka BP (Prell and Damuth, 1978). In Vicalvi et al. (1999) it was indicated that the biohorizon YP.Obliq was between 40-42 ka. López-Otálvaro et al. (2009) studied the biostratigraphy in this MD03-2616 core and used 40 ka. In the Amazon fan ODP942 core the age of 40 ka was also used as biohorizon of the area (Maslin et al., 2000). In the present study, we keep the same criterion as in Lopez-Otalvaro et al (2009).

Please also incorporate your response to reviewer #1's comment on how the SST change has been calculated. The reviewer asks if this was calculated using only two adjacent samples. Your reply states that a new Figure has been added in the Supplementary material and provides additional information about how the change was calculated. However, it is unclear whether you have included an explanation of the calculation in the text.

The method of calculation of the abrupt SST changes is now defined in the heading of Table 3.

"List of the abrupt SST changes identified in the MD03-2616 core. They are defined as positive or negative increments represented by ≥ 3 samples, occurring faster than the average SST warming during the last deglaciation, $+2^{\circ}\text{C}/\text{ka}$ (3.1°C in 1,550 years in this SST record) and higher than $\pm 0.5^{\circ}\text{C}$."

The same applies for your response about the comparison of Cariaco reflectance with the SST record. Is the clarification in the response to reviewer's comments included in the manuscript?

This information is now given in Pg. 16 lines 3-6.

"Changes in Cariaco (reflectance and vegetation) are directly influenced by ITCZ shifts southward which are linked to the SST changes in Guiana. Comparison of these two proxies influenced by the same climate process provides information on the consistency of the overall interpretation of the results."

The English language has improved considerably. I would still encourage you to perform a final proof read before submitting the revised version for missed typos. We have performed this proof read and we have corrected several errors.

Additional changes annotated in the manuscript

Caption of Figure 4. Indicate the reference of the Levitus database.

This is now indicated.

Additional changes annotated in the reply to review 1

Indicate where data will be archived.

In Pangea.