

Dear reviewer,

Thank you very much for your constructive review. Your feedback was very helpful and will improve our manuscript. Our replies to your comments (*in italics*) are shown below in red.

A very well written and easy to follow Ms. I have no issues with your conclusions, which seem robust and exciting to me. In addition to the minor issues I raise below, I think the impact of your Ms would be greater if you were to incorporate into your figures the original GRAPE and spectral reflectance data used to define the shipboard splice. This way you could illustrate more clearly how what seemed like decent splicing at the time has been shown to require revision with XRF-core scanning. I don't think this finding is surprising to a stratigrapher (it's just part of how we can build on and improve high- quality shipboard work, post-cruise), but it would represent a more impactful lesson for. e.g., proxy users that do not necessarily consider splice/age-model robustness when interpreting their data.

Thank you for this suggestion, we will incorporate the original GRAPE and spectral reflectance data into one of the figures, most likely into Figure 2 or 3. We will additionally add supplementary information figures showing these records for the entire studied interval of Site 982. As the reviewer points out, in addition to providing splice revisions for Site 982, it is also our intention to illustrate to all ODP/IODP users that they should consider how robust shipboard splices are and verifying them if they wish to generate high-resolution composite records.

Minor comments:

Page 3, line 10: it's not the site's proximity to the Med Sea that makes it important for correlation to the Med, it's the site's location in the North Atlantic that makes it important for correlation to Med records.

We agree and rephrased the sentence as follows: "Considering the site's location in the North Atlantic, this isotope record is important for comparing to isotopic records from the Mediterranean basin".

Page 4, lines 4-14: presumably you generated benthic $d18O$ data from Holes A, B and C from stratigraphic gaps identified in your new splice and from portions in the existing shipboard splice (to verify no offsets in values). I think it is necessary to make that clearer in your methods text here. I know I can look at Table 3, but make it easier for the reader to understand. Saying generically that you measured 263 new data between 200 and 280 mcd is not informative enough. Having now read on I can see that the statement starting on page 5, line 4 needs folding into your methods here.

We indeed employed the strategy outlined here by the reviewer, measuring stable isotope data in the stratigraphic gaps, as well as overlapping with the original data to ensure the datasets could be integrated. We will clarify that in this section and move Line 4, Page 5 to Section 2.4.

Page 4, line 28: I would like to see the $rmcd$ splice Tables 4 and 5 in the main text. It's a hard enough job convincing people that stratigraphy is vitally important and that all subsequent results are potentially erroneous if your splice and age model is wrong. This sort of study underlies why proxy users should not blindly use published stratigraphies and having the new splice tables as supplementary tables makes stratigraphy feel like just that, supplementary.

It was definitely not our intention to display the new offsets and splice as supplementary. We included them as supplementary excel tables as opposed to print tables to make it as easy as possible for users to extract the required information from them. However, we very much

appreciate the reviewer's comment and will include a print copy of the tables, as well as excel files in the supplement/PANGAEA to facilitate easy use.

Page 5, line 9: it would be useful for you to show evidence for the existence of these strong cycles in benthic d18O and d13C and their anti-phase relationship, beyond visual inspection (show results of TSA in the depth-domain for starters?).

We provide evidence of the strong cycles in the d18O and d13C records in the time domain in the form of wavelet and spectral analysis in both Figure 6 and Figure 7. However, we will also add spectral analysis for d18O and d13C in the depth domain to Figure 7 and add a coherency wavelet analysis in the time domain to Figure 6.

Page 5, line 31: replace 'as' with 'since'.

We will replace this.

Page 6, line 18: please include the Drury et al. Site U1337 record in Figure 6. I'm pleased that you comment on the timing of your obliquity-dominated intervals and amplitude changes in benthic d18O with the identification SST cooling to near-modern values between about 7 and 5.4 Mya by Herbert et al. (2016). Really nice finding!

We did not plot the Site U1337 benthic d18O data together with the 982 d18O data in this instance, as the compilation of the benthic d18O available for this interval is the focus of an in prep manuscript and we did not wish to detract from this ongoing work.

Page 8, Line 31-32: regardless of the completeness of the AEB record, as you say, the absence of cycles in this record - otherwise present in your revised 982 splice – seems most likely be due to lack of data resolution at the former.

We agree that the absence of cycles in the record is more likely due to the lower data resolution at AEB. We will clarify this further in the text by adding that low sampling resolution, in addition to low sedimentation rates, at AEB, are most likely the cause of the remaining disagreement between AEB and Site 982.

Page 9, lines 6-14: I would fold this important statement about MIS revision into your conclusions (and abstract) and also condense your conclusions section, which could be shorter.

We will incorporate this statement into both the abstract and conclusions and make the conclusions more succinct.

Figure 4: caption needs an '(e)' inserted after 'the composite splice image for Site 982'. Also, A-E labels in the figure are capitalised, but they are lowercase in the caption. This is an issue for all figures that you may wish to rectify.

We will rectify the omission of the (e) and change the labels to upper case letters in all captions.

Figure 5: would be nice to have labels directly on the figure to aid the reader in quicker identification of minimal- and fine-tuning tie points without having to read the caption. Age scale on top x-axis is missing a label. I would label stable isotope data as 'benthic' on each y-axis label. Something to correct for all figures? I know its stated in the caption, but the first thing one looks at are the data in the figure!

The labels for the minimal and fine tuning are on the figure in the bottom right, although we agree that they are not displayed in the most prominent position. We will include them in the top left of the figure above the benthic d13C data, within the box frame of the figure itself. We will also correct the missing age label and add "benthic" to the relevant y-axes.

Figure 8: red arrows showing link between 982/926 records and zoomed in interval for the AEB record are messy since they cover the numbers on the x-axis of panel B. Please redesign. I think Figure 8 could be redesigned as follows: panel A = revised 982 with 926, panel B = original 982 stratigraphy/record, panel C = original 982 with AEB, panel D = revised 982 record with AEB. Just a suggestion.

The red arrows unfortunately shifted at some stage during the figure making process and we only noticed this following the reviewer's comment. They should go from 5.5 and 6.5 and originally did not overlap with the numbers on the x-axis. We will rectify this in the revised version, either by shifting the arrows to the correct position or by removing them entirely. Additionally, the Hodell et al., 2001 Age (Ma) caption will be added to the A x-axis, as this was also accidentally deleted.

We appreciate the reviewer's suggestion for redesigning the figure, but we prefer keeping a consistent order for "original age" on the upper panel and "revised age" on the lower panel of the A/B and C/D sets.