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Climate of the Past Discussions

Interactive comment on "Reinforcing the North Atlantic backbone: revision and extension of the composite splice at ODP Site 982" *by* Anna Joy Drury et al.

Anonymous Referee #2

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The subject of the ms is a revision of the shipboard splice of ODP Site 982 and some of its direct implications. Site 982 represents one of the most important sites, if not the most important one, to study paleoclimate change for the interval between 8 and 5 Ma in the critical North Atlantic. The interval notably covers the entire Messinian stage and its salinity crisis. Although the title may sound boring for some, this paper is critically important as it highlights the current tendency to revise shipboard splices, using high-resolution land-based core scanning data that are more suitable for splicing than the initial shipboard generated data. This tendency has major consequences for the paleoclimate and -oceanographic and IODP drilling community for instance regarding sample party and strategy, astronomical age models, etc. As such the paper should

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serve as an eye opener for the community. However, it also shows the time consuming work that is behind the revision of such a shipboard splice, work that does not always seem to be valued. But, in this case, the implications of the revised splice discussed in the ms already make it perfectly clear why such a revision of the shipboard splice should become standard in the procedures of deep-sea drilling legs dedicated especially to paleoclimatic and -oceanographic studies.

The ms itself is clearly written and easy to follow. I only have one major issue as well as some minor ones. The major issue deals with the presentation of the tuning used to establish the astronomical age model. Following an initial age model based on calcareous plankton events, a minimal tuning is presented with approximately one tie-point per 100-kyr. This strategy is used to avoid incorporation of the amplitude modulation of precession by eccentricity in the tuned time series. In the first place, it might be added that the ages of the bio-events represent astronomically calibrated ages, which will facilitate tuning if these ages are (near) correct. The selected tie-points are shown in green in Figure 5 together with additional tie-points (in red) that were subsequently added to generate a next higher resolution astronomical age model. However, it is not made clear how and why the tie-points were selected and this should be made clear in the ms. In other words, what were the criteria and the approach used to select the tie-points for the tuning. The strategy of avoiding the amplitude modulation of precession to enter the tuned time series may suggest that the expression of the short eccentricity cycle itself might have played a central role in the selection of the tieÂň-points every ∼100-kyr. However, the expression of the short eccentricity itself is only present in part of the studied interval and thus seems not to have been used in the procedure, at least not over the entire interval. In addition, a minimal tuning might not be necessary as the modulation effect can be avoided by applying appropriate (wide) filters. Finally, it should be realized that the availability of astronomical ages for the bio-events as well as previously published age models may have played an important role in constraining the initial tuning and selecting the tiepoints.

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Minor issues.

1) Some data are not fully shown in the figures in the Supplementary Information as they fall somehow outside the range of plotted values;

2) Add minor ticks on some of the x-axis in the Supplementary Figures, especially figure 3;

3) It might be preferable to use an offset between the isotope records in Figures 8A-B, and;

4) Make sure that there is a space between the genus and species name, also when the first one is abbreviated (i.e. in 2.4).

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