

## Response to Reviewer 2

The manuscript by Jacobel and co-workers provides a well-presented and well-justified study on sediment cores from the Line Island region. Using new and available stratigraphic data they provide new age model constraints for the studied cores and come up with an interpretation on how the underlying stable oxygen isotope trends along a latitudinal transect are influenced by ITCZ movement.

Overall, this is a well executed study that is easy to read and follow and it provides a nice example that age model construction is the backbone of subsequent paleoclimatic and paleoceanographic reconstructions. Based on the current version, I recommend publication of the study after some minor changes and corrections.

We sincerely appreciate the reviewer's positive assessment of the manuscript and thank them for their careful reading and suggestions.

My main comments and suggestions are (in the way they appear in the text):

1) Figure 1: for someone not familiar with the Line Island region, it would be helpful if the authors could change the inset map to one that shows a broader picture that locates the islands in the central Pacific. Furthermore, core 72PC is mentioned in the caption but it is not shown in the map. Also, the caption says "of the core sites pictured,..." while I do not see any core pictured in the inset.

In creating the figure and the inset we struggled to provide both the appropriate level of geographic context (inset) and resolution (basemap) so that the reader could see the larger context and the spatial distribution of the Line Islands cores. We settled on including the Hawaiian Islands in the inset because they are one of the few recognizable features in the central Pacific. We can modify the caption to explicitly identify this point of reference.

The small orange dots in the inset are the cores to which we refer in the text and caption. We struggled to make the dots sufficiently large as to be easily visible, while still allowing for illustration of their spatial distribution. We can experiment further with the size and color of the dots to try and make them clearer.

As mentioned in our response to Reviewer 1, we will plan to clarify our reference to 72PC.

2) Line 109: also here the cores in the inset are mentioned.

We will work to enhance the visibility/contrast of these cores.

3) Chapter 4.1: Here you mention a reversal in the 14C ages. But in Table 1 there is no reversal visible in the data. Guess these are in the supplemental information, but since this has a prominent meaning in the main text, I would suggest to add the old 14C dates also in Table 1 and label them accordingly.

Please see the response to Reviewer 1 for our detailed response to this point. We agree that the reversal and our handling of the data are worthy of further clarification and an additional reference to SI Table 1, but we prefer not to present other author's  $^{14}\text{C}$  dates in Table 1 as it would become quite unwieldy. We can clarify in ST1 which dates were used in the age model construction.

4) Lines 252-257: Is there sedimentological evidence that is supporting the deposition of a slump in this part of the core?

We have examined the MST data and core logs for 06BB (Data from NOAA: [MST logs](#)), but given the homogeneity of the foram oozes that characterize the Line Islands we suggest that it is challenging to find sedimentological evidence of a slump, especially on this scale (9 cm). We argue that the consistency of the  $^{14}\text{C}$  reversal and noisy  $\delta^{18}\text{O}$  over the 9 cm interval are strongly suggestive of a small slump.

5) Chapter 5.1.1: Also here I would recommend to add sedimentological information about the potential slumps and the reworking if there is any observation/data available that could support the statements in this chapter.

Core logs are available (from NOAA [here](#)) and suggest some graded sand intervals in 35BB consistent with the larger slumps observed for that core. The MST data do not appear to add interpretive power, likely because of the sedimentological consistency of the foram oozes. We can add this information to the MS.

6) Lines 350-370: Here the authors repeat a couple of times that there is a connection of some sort between the observed amplitude in their data and the sedimentation rates. Furthermore, in lines 366 to 367 they argue exactly the opposite compared to the text before. For me, there is no clear connection between these two things and I would like to ask the authors to revise the text to make the reasoning for their interpretation more clear to the reader. Maybe it is something very simple, but I do not get it from the text provided.

We believe we can help clarify by adding text (starting on line 347) to more clearly articulate our logic. Changes in the amplitude of a recorded signal *might* be expected to occur as a function of sedimentation rate, with lower accumulation rate sites experiencing greater bioturbation or aliasing due to sampling that might tend to lower the amplitude of the signal. Here, we are assuring the reader that we can eliminate that explanation for variations in signal amplitude with latitude, because our results show that there is no trend in accumulation rate as a function of latitude. We further illustrate that point by doing an intercomparison of two key cores. Our analysis suggests that the differences in the absolute values AND amplitudes of the signals measured at different latitudes are a function of real differences in environmental conditions, rather than preservation.

7) As a non-native speaker, there seems to be something missing in the sentence of line 374 "...the amplitude of warming the LGM to Holocene..."

Yes, this sentence should read “Previous work on a subset of the Line Islands cores suggested that the amplitude of warming from the LGM to Holocene was 1.9°C across the full latitudinal range of the Line Islands (0.22°S to 7.04°N) (Monteagudo et al., 2021).”