

# ***Interactive comment on “Extreme lowering of deglacial seawater radiocarbon content is recorded by both epifaunal and infaunal benthic foraminifera” by Patrick A. Rafter et al.***

**Patrick A. Rafter et al.**

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We thank Dr. Marchitto for this thoughtful and useful review. We have adjusted the manuscript in response to every comment, either by modifying text and figures or adding a new figure (as suggested). Below is a summary of the comments and adjustments made to the manuscript:

1: Place greater emphasis on novelty of the wood-based age model relative to other age models (e.g., planktic foram 14C).

We adjusted the title of the manuscript (as suggested) to, “Extreme lowering of

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deglacial seawater radiocarbon recorded by both epifaunal and infaunal benthic foraminifera in a wood-dated sediment core”. We also added new text examining the usefulness and application of the wood-based age model. Also, we compared the usefulness of our wood  $^{14}\text{C}$  ages relative to work published after our manuscript was submitted to *Climate of the Past* (Zhao and Keigwin, 2018). We also added all the accepted and rejected wood  $^{14}\text{C}$  ages to an available figure (see attached).

## 2. Macrofauna consumption is not clear.

We added text and a new figure (now “Figure 6”; see attached) to better explain the apparent macrofaunal disturbance we observed in our sediment core.

## 3. Elaborate on the stratigraphic correlation of the two sediment cores based on color.

Photos of the sediment cores were not as useful as some unpublished XRF measurements we had, so we decided to use the ratio of Ca measured on our sediment cores (using XRF and normalized to terrestrial contribution by dividing by Al) to illustrate the rapid change in sedimentary composition at both sites. This new data is meant to be used as an estimate for the abundance of calcium carbonate microfossils, which sharply decrease (just as color darkens) during the early Holocene. Even better, we were able to add this new data to an existing figure (see attached).

## 4. Accounting for bioturbation and its impact on benthic foram $^{14}\text{C}$ .

Old and new text in the first paragraph of the Discussion section explicitly states that bioturbation cannot explain the extreme deglacial lowering of these (and likely other) benthic foraminifera  $\Delta^{14}\text{C}$ . We did not elaborate on the “off-maxima” foraminifera abundance  $^{14}\text{C}$  values, as suggested, because this work is beyond the scope of the study in hand, but is the subject of a future manuscript. We also softened text that described the  $\Delta^{14}\text{C}$  record as lacking the “W” shape of earlier work.

## 5. Comments on interspecies $^{14}\text{C}$ age offsets.

We clarified some text that was confusing, making sure to state that while the inter-

species  $\delta^{14}\text{C}$  age differences were not significantly offset on average, the standard deviation between these (on and off the foram abundance maxima) is large. We also made large changes to Figure 3 (see attached Figure 3C) to enable the reader to see the interspecies differences in both  $\delta^{14}\text{C}$  age and  $\Delta^{14}\text{C}$ .

6. Details about diagenesis.

We added new text and removed old text, as suggested. Good comments.

7. Additional discussion of buffering / appropriate referencing for this discussion.

We complied with all requests.

Line-by-line comments.

We complied with all requests or adjusted text in ways to match the request in all but one instance. This instance was the suggestion that we discuss the locations of the records showing and not showing the extreme lowering of  $\Delta^{14}\text{C}$  during the deglaciation. We feel this is beyond the scope of the current manuscript.

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Interactive comment on Clim. Past Discuss., <https://doi.org/10.5194/cp-2018-75>, 2018.

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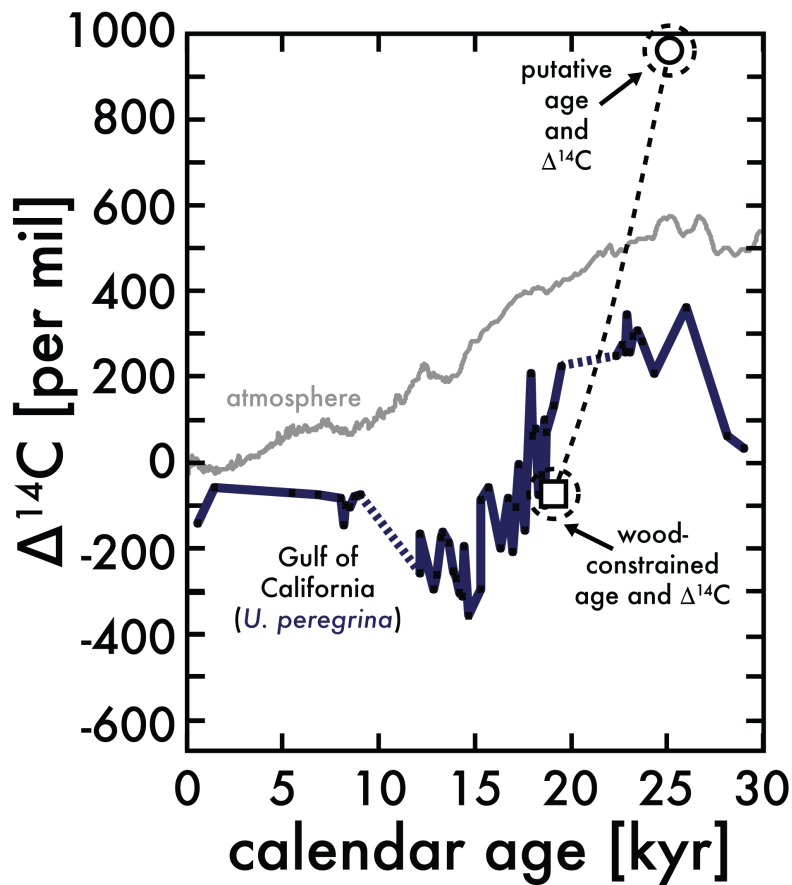
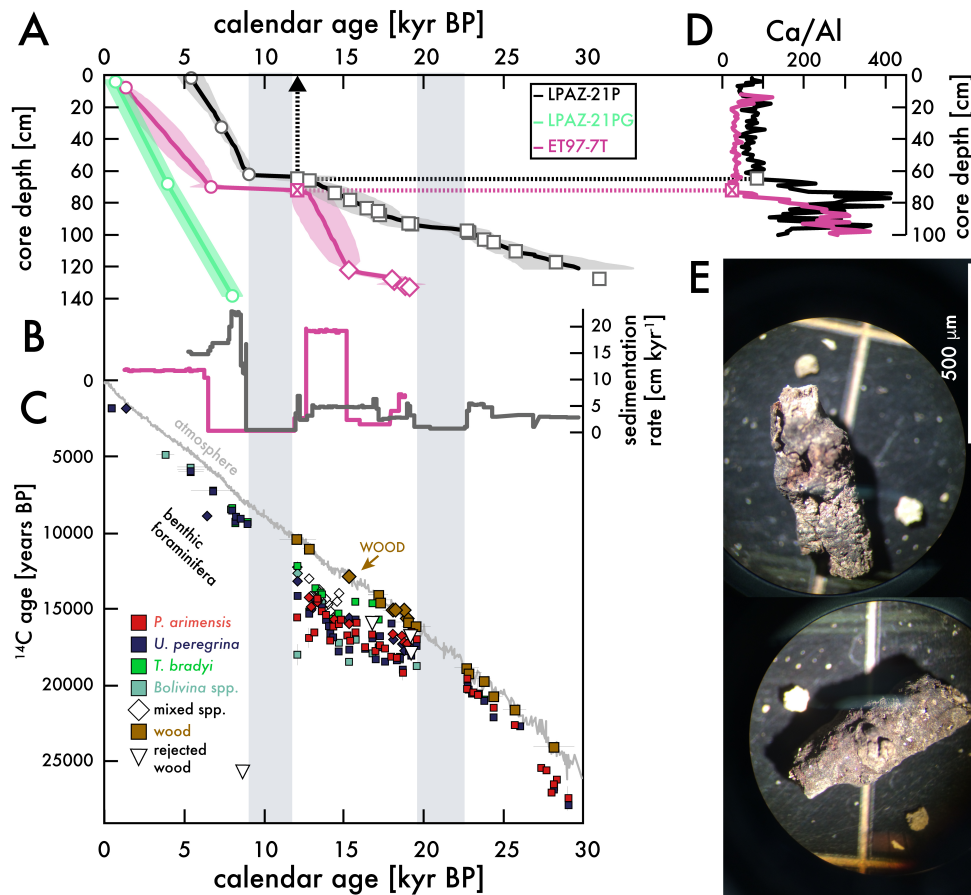


Fig. 1. New "Figure 6": the macrofaunal disturbance

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**Fig. 2.** New Figure 3, with color-coded species <sup>14</sup>C and D14C