Overview

We wish to thank the four reviewers for their thorough and helpful reviews of our manuscript. They are greatly appreciated, and we are confident that we can address all concerns through revision. We begin by providing an overview of the reviewers' concerns, our responses, and planned changes to the manuscript. For each posted reviewer's comments, we post a reply with detailed responses (in blue) to each individual comment (in black).

Most of the reviewer comments can be sorted into six areas of concern:

(1) More background information about the WPWP
   - The revised manuscript will include more references and description of the climatology of the WPWP

(2) Changes to the selection of cores to be included in the stack: Some reviewers identified WPWP cores (or 14C data) that were not included in the original stack, and concern was also expressed that two cores were from the Timor Sea, which is not strictly within the WPWP.
   - Some WPWP cores mentioned by the reviewers were excluded from our stack based on their relatively short lengths (<350 kyr). However, we have added one new WPWP core to the stack as well as additional d18O data from site 806 and 14C data from KX21-2 that were overlooked in our additional compilation. Along with adding the newly found data, we decided to exclude the two Timor Sea cores. These changes in the stack's component cores have only a very small effect on the stack and do not substantially change any of our conclusions.
   - We also describe in more detail the technique used to reduce the time/depth resolution of MD97-2141, and we change its mean sampling resolution to 0.55 kyr, which is approximately the same as the next-highest record, the newly added core KX22-4.

(3) Reviewers requested more information about the stacking methods, particularly the 14C reservoir ages, using LR04 as our alignment target, specification of the new stack's uncertainty, and the shift and scale parameters.
   - Our description of the 14C reservoir ages was not sufficiently clear. The Marine20 calibration curve includes time-dependent estimates of mean reservoir ages varying from ~400-1000 yr. We chose not to apply any additional offset from the Marine20 reservoir ages (i.e., $\Delta R = 0$) and to specify an uncertainty of 200 yr (1-sigma) in the reservoir age offset. This is approximately consistent with published 14C age models for some of the cores in the stack. However, these 14C calibration choices will only affect stack ages by ~1 kyr for the 0-40 ka portion of the stack, whereas our main objective is to provide an orbital-scale alignment target for WPWP planktonic d18O.
   - The 14C age models provide one source of evidence that WPWP planktonic d18O varied nearly synchronously with the timing of change in the LR04 benthic stack across T1. Another source of evidence, which reviewers suggested we include, is comparison of planktonic d18O and benthic d18O data measured within the same core. Three of the cores included in our stack have published planktonic and benthic d18O records, and we

will include supplemental figures of these data and discuss their implications in the revised manuscript.

- The WPWP stack was constructed with relatively new stacking software, and reviewers wanted more information about how it works. The revised version of the manuscript will include more explanation of the shift and scale parameters, clarify that the amplitude of the new stack reflects the mean amplitude of its component records, and better explain how the individual data used to construct the stack affect the calculated d18O uncertainty of the stack. We will also report the standard deviation of residuals between each core and the stack.

(4) Statistical comparison of the new WPWP stack with previously published records (e.g., spectral analysis methods)

- Spectral analysis was performed by matching the (even) sample spacing of the two records being compared (e.g., 1-kyr sampling was used for spectral analysis of both the WPWP stack and the LR04 stack); however, this was not adequately described in the methods. Based on reviewer feedback, we will now use a 1-kyr sample spacing for all calculated spectra. The revision will also use the multitaper method (i.e., the pmtm function in Matlab) instead of FFT.
- The revision will also provide confidence intervals for the estimates of glacial-interglacial amplitudes for the WPWP planktonic stack and the benthic d18O stacks.

(5) More discussion of interpretation and conclusions, such as the suggested uses of the new stack and implications for better understanding WPWP climate dynamics.

- As this manuscript is intended to be a data description paper, our main goals are to document the methods used to construct the stack and provide guidance on appropriate uses of the stack. Therefore, we intentionally avoid discussion and conclusions about WPWP climate dynamics.
- However, the reviewers' feedback made clear that the manuscript needs more explanation of the appropriate use of the stack; it is primarily intended to provide a stratigraphic alignment target for WPWP planktonic d18O records. Stratigraphic alignment is most reliable when two records share nearly identical underlying signals (i.e., with differences attributable to noise). Therefore, systematic differences in the orbital-scale features between WPWP planktonic d18O and benthic stacks will degrade the accuracy of alignments. The revised manuscript will include an example comparing the alignment of a WPWP planktonic d18O record to either our new planktonic stack or to the LR04 benthic stack. This example demonstrates that differences in the orbital-scale features of planktonic versus benthic stacks can affect the accuracy of the aligned age models.

(6) Typos and other copy-editing concerns

- We apologize for the numerous errors that slipped through in our initial submission and appreciate the reviewers' patience identifying them. All identified errors have been corrected, and we will more carefully proof-read the revised manuscript before submission.