

Interactive comment on “Climate variability and long-term expansion of peat lands in Arctic Norway during the late Pliocene (ODP Site 642, Norwegian Sea)” by S. Panitz et al.

S. Panitz et al.

sina.panitz@northumbria.ac.uk

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We are grateful for additional comments from Ian Bailey and have taken the following actions:

1) It seems that the highest fidelity age-depth relationships used in this study are based on an unpublished benthic d18O record not shown in any of their figures. I admit that I would rather see them plot these benthic d18O data since it appears that much of the useful information gained from the regional to global correlations discussed rely on the validity of the benthic d18O-based aspects of their age model. It is also frustrating (albeit highly interesting) that they allude to a potential hiatus in their stratigraphy span-

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ning part of MIS M2 but present no data to support this possibility (by the way, the 'lack of IRD' argument is circular and I suggest it is removed). I appreciate that in practice it is not so simple to show these $\delta^{18}\text{O}$ data because Risebrobakken et al. (2015) (where it appears these data will be presented?) is in review elsewhere. I'm not familiar with CP's policy on this front. At the least, I agree with the referee comment published on the 22nd January that their pollen data need to be plotted alongside the LR04 stack (and in all data figures where the data are presented in the age domain). A figure with the benthic $\delta^{18}\text{O}$ record from Hole 642B in comparison with the LR04 stack will be added (reviewer #2, R1).

R1: The 'lack of IRD' argument will be removed.

The LR04 record will be added to Figure 6 (reviewer #1, R11).

2) The same referee states that "In contrast with previous low resolution studies, they show for the first time that Piacenzian warmth was not as stable as previously thought but punctuated by cooler episodes." It seems that their data do indeed illustrate rather nicely the dynamic nature of climate change in Arctic Norway during their study interval. However, I do not agree with the reviewer that this study illustrates for the first time that the climate of the Piacenzian is highly dynamic. Perhaps I misunderstand the reviewer. Nevertheless, Lawrence et al. (2009) have already shown, for example, that SST variability at ODP Site 982 in the subpolar northeast North Atlantic was highly variable (and 'Late-Pleistocene-like') between 4-3 Ma on the same sort of timescales highlighted by Panitz et al. This fact has been a clear motivation for the proposed PRISM-P4 time slice. I'm not even sure Panitz et al. are even claiming to have a first here on this front since their study is a nice first for the nature of climate variability centred on Norway at this time, rather than during the Piacenzian per se. Perhaps this point needs to be made clearer in their conclusions. I do not think for one moment that this fact diminishes the worth of Panitz et al's contribution, but I do suggest that they cite Lawrence et al. (2009) and compare their findings to that important piece of work. Lawrence, K. T., T. D. Herbert, C. M. Brown, M. E. Raymo, and A. M. Haywood (2009),

High-amplitude variations in North Atlantic sea surface temperature during the early Pliocene warm period, *Paleoceanography*, 24, PA2218, doi:10.1029/2008PA001669.

R2: It was indeed not our intention to claim to have a first on the “Pliocene high resolution front”. In order to avoid a misunderstanding we reworded the respective sentence (p. 5781, line 20-22). We also included the high resolution marine cores described in Lawrence et al. (2009) and Naafs et al. (2010) in our discussion.

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