

## ***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.***

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Panitz and colleagues present highly interesting high-resolution pollen-based datasets from ODP Site 642 spanning an interval critical to the Late Pliocene evolution of the northern hemisphere (3.6–3.1 Ma). With a little further iteration there is no doubt that their manuscript will represent a very nice contribution to CP. In writing this comment I do not intend to provide an ‘unofficial’ review, but rather to highlight two points that I would like to see addressed to help improve their useful contribution further.

1) It seems that the highest fidelity age–depth relationships used in this study are based on an unpublished benthic  $\delta^{18}\text{O}$  record not shown in any of their figures. I admit that

C3041

I would rather see them plot these benthic  $\delta^{18}\text{O}$  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  $\delta^{18}\text{O}$ -based aspects of their age model. It is also frustrating (albeit highly interesting) that they allude to a potential hiatus in their stratigraphy spanning 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).

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),

C3042

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

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C3043