

The authors examined stable oxygen and carbon isotopes of tree-ring cellulose at subannual to annual scale resolution for the study on paleo-climate of the early Eocene “hothouse”. The materials they used, the well-preserved mummified wood buried within a subarctic kimberlite diamond mine, are quite unique and thus this kind of paleoclimatic study may open a new window to look back into the earth’s history. The data of this manuscript is quite valuable and results are highly interesting to those studying the paleo-environment. However, there are some aspects to be clarified before it can be accepted to publish in BG.

Majors:

1. I would say that the parts “1. Introduction” and “2. Methods” in the manuscript are comparatively quite clear and well-organized. The part “3. Results and discussion”, however, would terrify the readers. The authors should tease apart major points and re-organize this large block into fractions with sub-titles as they did in the parts “1. Introduction” and “2. Methods”. This way it would be easier for readers to grasp the major points and their reasoning as well.
2. Please give more details about the mummified wood and the tree rings the authors examined. Just one piece of wood? Or wood of many trees? The wood samples they examined were of one tree species or not? How did the authors select tree rings for their study? If tree rings were from different trees? Did different tree species respond the same way to the changing climatic factors?
3. Page 16280 Lines 15-24: logically it is not clear why PC1 corresponds with $\Sigma_{Z\text{-score}}$ and PC2 with $\Delta_{Z\text{-score}}$.
4. Page 16281 Line 4 and Line 14 and ...: As the R values are quite small (below 0.5), this kind of relation can be termed as significant?
5. Page 16282 Line 13: This passage is really confusing. Was the stomatal conductance an important factor or not?

Minors:

Page 16276 Line 26: delete one “delignification”

Page 16278 Line 16: define in the text what is “ $\epsilon_{\text{biochem}}$ ” in the equation (3)

Page 16278 Line22: define “MAT” when it first appears in the text

Page 16281 Line 16: $\delta^{18}\text{C}$? Please change.

Page 16285 Line 15: define “ g_s ”