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Climate of the Past Discussions

Interactive comment on "Leaf wax *n*-alkane distributions record ecological changes during the Younger Dryas at Trzechowskie paleolake (Northern Poland) without temporal delay" *by* Bernhard Aichner et al.

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General Comments: Overall, I think the manuscript is an important contribution to the fields of organic geochemistry and paleoenvironmental reconstruction. The conclusions regarding the risks associated with using oversimplified alkane-based metrics to reconstruct vegetation and the lack of a delay between the alkane and pollen proxies are important to the broader discipline. The issue of 'pre-aging' of waxes is particularly troublesome in lacustrine settings and I think it deserves more attention in the discussion as it is currently limited to just a couple of paragraphs. I recommend adding

references to this section including: - Gierga, M., Hajdas, I., van Raden, U.J., Gilli, A.,Wacker, L., Sturm, M., Bernasconi, S.M., Smittenberg, R.H.: Long-stored soil carbon released by prehistoric land use: evidence from compound-specific radiocarbon analysis on Soppensee lake sediments. Quat. Sci. Rev. 144, 123-131, 2016. - Lane, C.S., Horn, S.P., Taylor, Z.P., Kerr, M.: Correlation of bulk sedimentary and compound-specific d13C values indicates minimal pre-aging of n-alkanes in a small tropical watershed. Quat. Sci. Rev. 145, 238-242, 2016. - Uchikawa, J., Popp, B.N., Schoonmaker, J.E., Zu, L.: Direct application of compound-specific radiocarbon analysis of leaf waxes to establish lacustrine sediment chronology. J. Paleolimn 39, 43-60, 2008

RE.: we enhanced the focus to potential pre-aging by adding another sub-section to 5.1. where these issues are discussed. Additional to the three suggested references we also added Kusch et al., 2010 and Eglinton et al., 1997.

The document would generally benefit from improved conciseness and clarity, this includes the abstract that is much too long for such a short paper. It is my opinion that the study is worthy of publication in Climate of the Past, but considerable effort will be required to improve the conciseness of the presentation and to focus the paper more effectively on the most significant conclusions (lack of diagnostic capability based on widely-applied chain-length metrics and rapid response of alkane proxies to vegetation change). Too much of the manuscript focuses on paleoenvironmental/paleoclimate interpretations that have already been made based on pollen-based interpretations in prior studies when the truly novel aspects of this manuscript seem to be the rapid response of the alkane record to change relative to other studies that highlight 'pre-aging'.

RE.: we agree that the coeval response of of n-alkane based proxies compared to pollen is – beside source evaluation of leaf wax compounds – the most important aspect of the manuscript. Our discussion about this finding is in our view sufficient and has been further enhanced by adding another subchapter about potential lag-times to section 5.1.. We also consider that the new organic geochemical data provide an

integrative proxy data set, which deserve a separate discussion in a paleoecological context – especially for the YD-termination and early Holocene which was not yet discussed in detail through the palynological data. We think that two pages for this chapter 5.3 is not too extensive (compared to almost six pages for the above mentioned issues).

General editing that should be applied to the entirety of the text: 1. The use of conjunctive adverbs (however, thus, nevertheless, etc.) are excessive throughout the text. The paper would be much more concise if sentences were restructured to omit the conjunctive adverbs altogether. 2. The authors are flipping between active and passive voice throughout the document. (Lots of examples, but see lines 28-30 on page 7 for one example: switch from 'have been reconstructed' to 'our observations'. 3. Throughout, commas should be placed before 'which' and 'but'. 4. Compound-specific needs to be hyphenated when used as an adjective. 5. The word 'this' is used too frequently in sentence strings where it is often difficult to decipher what precisely 'this' is referring to (e.g. page 2, line 28; 6. Shouldn't results and methods be in the past tense? 7. Throughout, need to be careful when designating species vs. genera. For example, page 9 Betula spp. would be a genus, not a species.

RE.: we thank the reviewer for suggestion to improve writing of the manuscript. For revision we shortened the abstract and changed passages throughout the whole text with taking special attention to the general suggestions #1-7 listed above.

Specific comments:

1. Page 5, line 9: grammar 'hexane as solvent'

RE.: this was corrected

2. Page 5, line 20: Delta V Plus should be spaced

RE.: this was corrected

3. Page 5, line 26: should this be a permille sign?

RE.: yes, it should be permille. This was corrected

4. Page 7, line 10: should be 'concentrations'

RE.: this was corrected

5. Page 7, line 14: great example of a sentence that could be much more concise: : :Source allocation of n-alkane homologues can also be derived from the carbon isotope composition.

RE.: this was corrected

6. Page 7, line 26: semicolon should be period.

RE.: this was corrected

7. Page 8, line 6-7: low concentrations of aquatic macrophyte pollen specifically? Needs to be specified.

RE.: yes, this refers to aquatic pollen. This was inserted.

8. Page 8, line 7: remove 'also'

RE.: this was corrected

9. Page 8, line 17: just say 'are likely of terrestrial origin'.

RE.: this sentence was shortened

10. Page 8, line 25: remove 'mainly'

RE.: this was corrected

11. Page 9, line 5: no need for a colon here.

RE.: this was corrected

12. Page 9, line 13: recommend different word choice for 'mainly expanding'

RE.: this was changed

13. Page 9, lines 14-16: no need for ‘in the: : :’ openings to both sentences

RE.: this was corrected

14. Page 10, line 16: need to specify what exactly is being correlated; also change from ‘each other’ to ‘one another’.

RE.: this was changed to “. . . concentrations of n-alkane homologues strongly correlate with one other”

15. Page 10, no need to capitalize ‘Mid-chain’

RE.: this was corrected

16. Page 11, line 20: specify which data: : :avoid ‘as discussed’.

RE.: this was changed to “ Similar to pollen vs. n-alkane concentrations, autocorrelations need to be considered when interpreting n-alkane based proxies”

17. Page 12, line 3: awkward phrasing ‘has been discussed to be probably equivalent’

RE.: this sentence was altered

Figure 2: I am not sure that overlaying all of the homologues in the bottom panel is effective: : :there are too many lines making it difficult to decipher the trends of any one individual homologue in the plot.

RE.: despite there is some overlay within the YD, we think the plot can be deciphered

Figures 4 and 5: latin names need to be italicized.

RE.: this was corrected

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