

## ***Interactive comment on “Is average chain length of plant lipids a potential proxy for vegetation, environment and climate changes?” by M. Wang et al.***

### **Anonymous Referee #3**

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Organic geochemical proxies based on lipid patterns (e.g. lipid ratios, ACL, . . .) in sedimentary archives are frequently used to infer past ecological changes. It is therefore important to understand the influencing factors on leaf wax fingerprints of the sources of those compounds which are mainly higher aquatic and terrestrial plants for long-chain n-alkanes and n-alkanoic acids. Each new data set of lipid-fingerprints from plants has the potential to improve this understanding, which makes this manuscript -reporting ACL-data derived from different plant types at two different locations- relevant for the organic geochemical community. Unfortunately the manuscript has some weakness in distilling the relevant information out of a principally interesting data set and putting this in context to previous works. Further it mixes apples with oranges

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while comparing ACLs of alkanes to those of fatty acids. This makes it difficult for me to suggest acceptance of this manuscript in its present form. However, if the authors manage to restructure their work and specifically succeed in improving to put their data in context to previous studies, than 'Biogeosciences' would be an appropriate journal to reach the interested target audience for this study.

General comment:

The - simplified - assumption that grasses produce longer chain lengths than trees was -for good reasons- mainly made for n-alkanes, resulting in occasionally applied proxy ratios such as  $(nC_{27}+nC_{29})/nC_{31}$ . In contrast, long-chain fatty acids seem to be far less (semi-)source specific. Hence, the fatty acid data set from Blood Pond is a little bit out of context in this manuscript, specifically if considering the compiled data from the literature which, with one exception, only refer to n-alkanes. If the authors want to keep their Blood Pond data within the manuscript, they should split it into an n-alkane and n-alkanoic acid part for both the new and the literature data.

Minor comments:

p. 5479 / l. 8: not totally true; there are a number of studies evaluating n-alkane patterns of plants as the compilation of data in this manuscript shows

p. 5479 / l. 13: “However single types of plants. . .”: there is something wrong with this sentence.

p. 5481 / l. 21: “Because not all. . .”: There is grammatically something wrong with this sentence. I suggest rephrasing.

Table 3: I suggest using bold letters for significant t-test results

Figure 2: I suggest putting the plant types of the second panel (Blood Pond) in a logical order (and similar order than panel A).