



EGUsphere, referee comment RC1
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Comment on egusphere-2022-23

Anonymous Referee #1

Referee comment on "Integrating plant wax abundance and isotopes for paleo-vegetation and paleoclimate reconstructions: a multi-source mixing model using a Bayesian framework" by Deming Yang and Gabriel J. Bowen, EGUsphere,
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In this paper, Yang and Bowen develop a Bayesian framework to help interpret sedimentary n-alkane distributions. The authors outline the Bayesian framework and apply this in two case studies. The authors also outline areas for future development. I have little expertise in Bayesian statistics and unable to comment on the model itself. I suspect the paper will be of interest to organic geochemists. However, the paleoclimate implications are not clear. In its current form, this would be more suitable for a specialised journal (e.g., Organic Geochemistry).

I have three major suggestions:

- 1) The paper would benefit from a more thorough comparison to existing techniques (e.g., linear mixing-model approaches of Gao et al., 2011). You state that your results appear to provide alternative interpretations to the same n-alkane records – please elaborate!
- 2) It is essential to validate this approach in a sediment core with independent vegetation reconstructions. I would take a look at the African records published by Sarah Feakins (e.g., Feakins 2013 P3) - these include n-alkane chain length distributions, n-alkane carbon isotopes and the % of shrub, graminoids and tree pollen. This seems an ideal site to test your approach. However, I am sure there are dozens of other suitable sites.
- 3) The authors state that their approach could be used to assess the interpretation of associated proxies such as n-alkane $\delta^{2\text{H}}$. This would be a great tool for organic geochemists and paleoclimatologists. However, the authors did not explore this any further. The authors should demonstrate how their approach can refine the interpretation of leaf wax $\delta^{2\text{H}}$ records - if they can, this paper will be far more valuable to the paleoclimate community.

