

Interactive comment on “Paleobotanical proxies for early Eocene climates and ecosystems in northern North America from mid to high latitudes” by Christopher K. West et al.

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GENERAL COMMENTS

This is a well-written and well-structured paper reporting important additional evidence about the latitudinal temperature gradient that poses a real problem in palaeomodeling. An important reason to study the Eocene is its high levels of atmospheric carbon dioxide. Please mention this aspect in the beginning of the Introduction.

The scientific methods are mostly outlined well. However, some details that are found in the referenced literature should be added. I think that the more general readership

C1

of CP would need a little bit more explanation about the data. I assume that the data include only macro fossils, i.e. leaves, but this is nowhere explicitly stated. This is necessary because the BA-analysis is based on NLR-analysis, which is normally used with pollen data. If the BA-analysis is based on pollen data too, that fact should be mentioned and discussed as the taphonomy of pollen data differs strongly from that of fossil leaves. It also would be helpful to mention which taxa are dominant/important in the assemblages of the sites described.

It is not clear if the new work in this study concerns the statistical analysis only, or that also new botanical analysis has been carried out. If new botanical analysis has been carried out, the method section has to be complemented.

I suggest to change the sequence of section 2.3. Please, explain the physiognomic and bioclimatic analysis first and then the combination of ensemble climate analysis.

Please leave out the decimals of the temperature and precipitation estimates as they are obviously not significant.

In the discussion, I miss an important point, which has been already discussed by the first author in an earlier paper (West et al. 2015) but should not be forgotten. The photic regime of the poles (more diffuse summer light than at lower latitudes) might result in bigger leaves and, therefore, precipitation estimates might have been overestimated.

The tables and Fig. 1 could include more information. Please, indicate in the caption of Fig.1 and also in Table 2 the categories ‘Mid-latitude Upland’ etc. as used in the paper. Please, give a more precise age indication in Table 1 and also give an indication of the ages of the data summarized in Table 3.

SPECIFIC COMMENTS

Lines 110-112: needs a reference; please give an estimate of polar displacement.

Line 227: Physg3brcAZ is not mentioned in Yang, but mentioned in Jacques et al. 2011.

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Line 228: GRIDMet3brcAZ: Yang mentions GRIDMetGlobal378_HiRes. Is that the same dataset?

Line 305: 3.1.2 (instead of 3.2.2)

Line 433: please, mention the kind of fossil evidence.

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