Reply to P.A. Meyers (Referee #2)

Johannes Hepp & Michael Zech & co-authors

Hepp and his colleagues present the elegant results of their compound-specific hydrogen and oxygen isotope analyses of 59 samples from a 87-cm interval of a sediment core from Lake Gemündener Maar in the Eifel region of Germany. The sediment in this core accumulated from the Allerød to the Boreal, and it appears to have been deposited continuously. The purpose of this study was to ascertain how dry the climate of the Younger Dryas may have been, and the isotopic compositions of the biomarker compounds were employed as paleohydrologic proxies. Two classes of biomarkers were studied – n-alkanes derived from plant waxes and sugars derived from plant hemicellulose. The hydrogen isotopic compositions of the C27 and C29 n-alkanes and the oxygen isotopic compositions of fucose, xylose, and arabinose similarly shifted to lighter values in sediment samples from the Younger Dryas around the end of the Allerød, to return to heavier values at the beginning of the Preboreal. This pattern suggests that climate in the Eifel became less moist during the Younger Dryas. The isotopic changes are consistent with changes in pollen compositions that indicate local floral changes in response to climate changes.

Use of dual compound-specific isotopic analyses in paleoclimate reconstructions as done by Hepp et al. is unusual and novel. Moreover, the authors have made very sophisticated interpretations of their data and have thoughtfully and carefully interpreted them. Unfortunately, their discussions are painfully detailed and make many sections nearly impenetrable. The manuscript is very hard to read and appreciate, and it does not have to be this way. Much of the detail is overkill – it could be trimmed or even omitted without weakening the authors' arguments and perhaps would strengthen their conclusions. Indeed, the conclusions are vague and not as clear as they should be.

I strongly suggest that the authors rewrite their very promising manuscript with the goal of cutting it by perhaps 30%. As one example, the long discussion of the source of the organic matter in the sediments is not necessary; all that is really needed is to establish that the biomarkers that have been analyzed are from vascular plants. As part of the rewriting, the English badly needs careful editing to smooth and refine it. Too many rough sections that detract from reading and appreciating the content of the text presently exist.

→ We are very grateful to P.A. Meyers (Referee #2) for his constructive and encouraging comments. We fully agree with him that the current version of our manuscript contains too many details, making it hard to read. Following his recommendation, we will readily shorten and rewrite our manuscript during revision.