Biogeosciences Discuss., 7, C2081–C2083, 2010
www.biogeosciences-discuss.net/7/C2081/2010/

Biogeosciences Discussions

Interactive comment on "Lipid biomarkers in Holocene and glacial sediments from ancient Lake Ohrid (Macedonia, Albania)" *by* J. Holtvoeth et al.

P. A. Meyers (Referee)

pameyers@umich.edu

Received and published: 27 July 2010

Holtvoeth and his colleagues present the results of their analysis of lipid biomarker molecules that they extracted from nine sediment samples from Lake Ohrid, Macedonia. Six of these samples originate from a sediment core from near the gently sloping southern shore of the lake; the other three come from a core near the steeply sloping northern shore. The purpose of this study was to assess the utility of the biomarker molecule compositions of sediments deposited at different times at these two different locations as paleoenvironmental proxies. The authors wisely do not attempt to reconstruct the paleolimnologic histories of the two core sites from their limited number of samples. Instead, they report the amounts and variety of n-alkanes, n-alkanols, fatty acids, sterols, hopanes, and other kinds of biomarker molecules that they identified in

the nine samples and nicely discuss their probable origins. They find that sediments deposited during late glacial, early Holocene, and near modern times indeed have different biomarker compositions that are consistent with other evidence of their paleoenvironmental differences. Furthermore, they suggest that the presence of coprostanol, which is an indicator of human and cattle feces, in early Holocene sediments may be first evidence of early human settlement in this region. The reported results are very promising for future applications of these multiple molecular proxies to reconstruct the paleolimnologic histories of this and other lakes. Because this study was designed to explore the utility of the biomarkers, the paper is largely descriptive. It is long on discussion and short on illustrations. I would like to see more of the data presented. For example, the n-alkanoic acid and n-alkanol distributions of six samples that appear in Figure 4 are effective in showing differences in samples of different age and similarities in those with similar ages. I would like to see the distributions of these compounds and also the n-alkanes for all nine samples. Furthermore, the only molecular ratio that is used is the n-alkane Paquatic ratio, whereas a variety of other chain-length ratios based on distributions of all the alkyl biomarkers that were identified can be used. I suggest that the authors calculate some of these ratios (terrigenous-aquatic ratio, carbon preference index, etc.) and present them in a new table. Two interpretive issues exist, although neither is major. First, the authors assume a fungal origin for lanosterol on line 21 of page 21 based on a strong correlation with β-amyrin. I don't follow their reasoning. Please explain. Second, the authors' interpretation that the presence of coprostanol in early Holocene sediments indicates the presence of human settlement around the lake, while exciting, needs to be tempered by the reality that non-domestic animals like deer and birds are known sources of this fecal biomarker. Finally, I have a short list of minor editorial corrections: Page 4, line 13 – correct spelling of "continuous" Page 7, line 4 – replace "is" by "are" (data are plural) Page 8, line 6 – replace "yet although" by "even though" Page 11, line 26 – insert "the" before "contribution" Page 16 line 24 – insert "which" before "determine" Page 18, line 13 – change "acid" to "acids" Page 19, line 16 – replace "today's" by "modern" Page 20, lines 17+25 –

replace “emergent” by “emersed” (look up the words; they’re different!) Page 21, line 19 – replace “well” by “good”

Interactive comment on Biogeosciences Discuss., 7, 4607, 2010.