Clim. Past Discuss., 8, C2262–C2264, 2012
www.clim-past-discuss.net/8/C2262/2012/

Climate of the Past Discussions

Interactive comment on "High-latitude environmental change during MIS 8–12: biogeochemical evidence from Lake El'gygytgyn, Far East Russia" *by* R. M. D'Anjou et al.

P. A. Meyers (Referee)

pameyers@umich.edu

Received and published: 6 November 2012

General Comments

D'Anjou and colleagues present the results of their analyses of biomarker molecules extracted from samples of a sediment core from Lake El'gygytan that span 460 to 289 ka (MIS 12-8). They use these organic geochemical paleolimnologic proxies to reconstruct changes in local summer temperatures, lake productivity, and vegetation in the lake catchment over the glacial-interglacial cycles. This study is an elegant demonstration of how changes in the sources of organic matter are recorded in its molecular composition and can be applied to paleoenvironmental reconstructions. The authors

thoughtfully and candidly discuss their results, which are not surprisingly sometimes less than transparent. They arrive at reasonable and interesting conclusions about how the factors involved with global climate changes were expressed locally in this high-latitude lake system.

Specific Comments

The underlying theme of this contribution is how glacial-interglacial climate changes impacted the production and preservation of organic matter in the lake system, yet the authors provide no information about the concentration of organic carbon in the sediment samples that they have analyzed. Absent this information, mass accumulation rates of organic carbon cannot be assessed, and these values are fundamental measures of organic matter delivery and deposition in sediments. Furthermore, the dramatic variations in the multiple molecular properties that the authors have found may at least in part result from changes in the amount of total organic matter. Some comment about how organic carbon concentrations change or do not change is needed.

A less important question exists in what seems to be a mismatch between the statement in Section 3.1 that 38 samples were analyzed and the numbers of data points shown in Figures 2, 3, and 4, which are almost all less than 38. Although biomarker compositions may have been too low to measure accurately in some samples, the authors should share this information with us. A low concentration of a specific biomarker is important paleoenvironmental information. If one or two sample extracts were lost, then the number of samples that was analyzed should be corrected.

Technical Corrections

I offer a small number of stylistic and editorial corrections for the authors to consider: Page 4752, line 25 – replace "course" with "coarse"; change to read "10 ky for the 200 ky" (time intervals are usually stated as ky, whereas specific times in the past are stated as ka) Page 4754, line 4 – change to read "Splits of the polar fraction were" Page 4758, lines 8-10 – the citations on these lines remain to be added to the reference section

Interactive comment on Clim. Past Discuss., 8, 4745, 2012.