

Interactive comment on “Bacteriohopanepolyols record stratification, nitrogen fixation and other biogeochemical perturbations in Holocene sediments of the Central Baltic Sea” by M. Blumenberg et al.

Anonymous Referee #2

Received and published: 5 March 2013

This study investigates distributions of bacteriohopanepolyols as well as organic chemical properties and other lipid biomarkers for terrestrial and marine plants in Holocene sediments of the Baltic Sea. Distribution of BHPs seems to well reflect variation of organic composition, hence Baltic Sea's history. As a general question, however, are there any contributions from modern bacterial activities into the BHP pool in the sediments? Some BHPs analyzed in this study are possessed by living bacteria. The drastic increase of BHP concentration after the Littorina transgression can be explained by modern bacterial activities because of enriched carbon substrates in the sediment.

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Furthermore, a significant contribution of cyanobacterial source into sedimentary organic matter after the Littorina transgression is a major premise for the discussion in this manuscript. Some more evidences for cyanobacterial contribution need to be shown in the manuscript using previous studies. If these information are included, the discussion will be much more persuasive. I have some other comments. I think it should be publishable after revision.

Comments: Introduction: It would be better if you add an explanation about the utility of BHPs as paleoenvironmental proxies.

P4, line 1: Some more evidences for cyanobacterial contribution should be added here as described above.

Section 3.1: Show accuracy and precision for EA and EA-IRMS analyses.

Section 3.2: As reviewer #1 mentioned, microwave extraction is not a common method for lipid (hopanoid) extraction from sediments. Recovery and effect of microwave extraction on original BHP structure should be examined for quantitative analysis of BHPs.

P8, line 12-14: Is it possible that concentration of dinosterol show in absolute value, not in relative value? Correlation between conc. of dinosterol and TOC looks very well in Fig. 4. So, I am interested in how large is the concentration relative to those of BHPs.

P12, line 24-P13, line 5: This conclusion conflicts with the premise of cyanobacterial origin of organic matter in this field.

P14, line 8-10: I could not understand why possibility of SRB origin for 35-aminobacteriohopanetetrol and -triol can be turned down. Please clarify this issue.

P14, line 26: Hopanoid input and low N/P ratio cannot be linked directly due to lack of evidence for low N/P ratio at the Littorina Sea stage although it is an understandable scenario. Rewriting is required for this part.

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