

## ***Interactive comment on “The Holocene sedimentary record of cyanobacterial glycolipids in the Baltic Sea: Evaluation of their application as tracers of past nitrogen fixation” by Martina Sollai et al.***

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1) Point taken. However, the pattern is largely obscured in the narrow plot. If you increase the width of the plot you can see variations in the  $^{15}\text{N}$  data. Lower values of  $^{15}\text{N}$  can be indicative of nitrogen fixation and are considerably lower during the transition from the Ancylus Lake to establishment of the Littorina Sea, although that is not reflected in the HG plot. In addition, during periods of laminated sediments the  $^{15}\text{N}$  is ca 1 per mil lower consistent with Funkey et al. Perhaps replotting the data would be an option?

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2) I agree that all biomarkers are not created equal, but I also know that it is more powerful to use a suite of biomarkers to identify changes in biogeochemistry. Throughout most of the Funkey et al. core from the Baltic Sea pheophytin-a/Chl-a was relatively constant (except in the upper core) suggesting no large changes in diagenesis. And yes, zeaxanthin occurs in many organisms, but it is widely used as one of the biomarkers for cyanobacteria in aquatic ecosystems. For example, Bianchi et al. 2000 showed changes in zeaxanthin in laminated sequences in the Baltic in addition to changes in TC (which your paper also shows) and changes in the N:P ratio. Bianchi et al. also show a large increase in zeaxanthin/B,B-carotene ratio at the Ancylus/LS transition, which is seen in your HC data. Echinenone is highly diagnostic appearing in only cyanobacteria and sea urchins and confirms the zeaxanthin concentrations.

I am still surprised that the HG data does not show variations in cyanobacteria abundance. I saw a talk at Goldschmidt 2017 on the Baltic Sea, probably unpublished data, that confirms the Funkey et al. hypothesis. That Sollai et al. did not observe changes in HC is interesting and that it is different from Funkey et al. and Bianchi et al. is also interesting – that's science. But I think it warrants addressing in the Sollai et al. paper.

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