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## ***Interactive comment on “Seasonal lake surface water temperature trends reflected by heterocyst glycolipid based molecular thermometers” by T. Bauersachs et al.***

### **Anonymous Referee #2**

Received and published: 10 February 2015

Bauersachs and coworkers report on the distributions of cyanobacterial heterocyst glycolipids (HG) in water column particulate matter and surface sediments from Lake Schreventeich with the intent of evaluating how HG distributions might relate to surface water temperature, pH, and oxygen content. Variations in HG abundances and compositional changes, as indicated by proposed HG-indices, were observed to occur seasonally and were best correlated with temperature. Similarities between HG compositions in the water column, especially at the time of maximum productivity, and in surface sediments are taken as suggesting the HG indices might provide a means of reconstructing past lake water temperatures from the sediment record.

Overall the manuscript is well written and the data presented do indeed indicate the

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potential of HG-indices as water-temperature predictors. Several suggestions for the authors follow:

Fig 3 – the dashed line in the figure showing the HG abundances needs to be made more visible. Also, it would help if the HG abundances were included in Supplemental Table 12 along with the fractional abundances for individual HG.

P 760, top of section 4.1 – to say that the HG were “first detected in mid-August” is a bit misleading since there are no data indicating that samples before this time were analysed and that in fact HG were not detected then. This statement could be clarified.

Fig. 3 – please note in the caption (to remind the reader who might have forgotten) that the results or the surface sediment are for 2 sediments from different locations.

P 766 and in section 4.4 on geochemical implications– the authors could add a bit more on what they may think about the HG preservation in sediments, beyond the fact that they are found in old sediments since the potential of the HG index-temperature reconstructions assumes there are no selective degradation/preservation issues.

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**BGD**

12, C137–C138, 2015

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