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Interactive comment on “Iodine speciation and cycling in limnic systems: observations from a humic rich headwater lake (Mummelsee)” by B. S. Gilfedder et al.

Anonymous Referee #2

Received and published: 16 February 2008

This study by Gilfedder et al. focuses on iodine speciation in a German fresh water system. The authors have collected monthly water and sediment data over a year. The knowledge on iodine speciation in fresh water systems is sparse and the authors provide some interesting new and original data, especially on the organo-iodine fraction. However, on the one hand, the paper is rather descriptive and unfocused. On the other it is rather speculative and broad.

I am not a native English speaker, but it seems to me as if the paper needs linguistic editing.

I suggest the paper is accepted after major revision and that the authors are asked to

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pick a focus, elaborate more deeply on the chosen focus and consult a professional linguist.

BGD

Specific comments.

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Please provide scientific name of Norway spruce

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Study site.

Is the pH of the lake really a result of acidification and not due to the land use (i.e. Norway spruce?). It seems odd if the bedrock is acid with poor buffering capacity and the catchment is dominated by Norway spruce that the pH should be 6-7, something is odd in the description.

Please provide age of the forest and previous land-use pattern

Figure 1 is unclear. Is this the topography of the catchment or the lake bottom?

Line 23: please provide sources to the pH etc

1.1. does not say anything about the methods, please elaborate more in detail. For example: Where in the lake were the samples collected, at how many locations, with what type of equipment, how much water was collected and how were the samples stored until analysis? Oxygen 'standard techniques' please provide details of probe etc Sediment corer. Please provide details, size, origin, material

How did you certify only minimal disturbance to the core?

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Uneven referencing to sources in method. E.g. dating of sediment core

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Figure 1. Change color coding. Difficult to see difference between 0 m and rain

Why does I- chromatograph at so different times?

Results

Figure 3. The graph is too much. Compile the information somehow.

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You could plot the iodine-to-carbon ratio for the sediment column. This would help your discussion on organo-iodine

You several times say "interestingly"; but it is not obvious why the statement that follows is particularly interesting.

When discussing whether or not the organo-iodine in the sediment originates from the water column, it would help with data on iodine-to-carbon ratio in the water column and relate this to the same in the sediment core.

You claim that speciation gives a more holistic understanding of the system but you fail to explain in what sense this is true (i.e. simply put: that the whole is more than the sum of the parts)

Discussion

Are there no studies of iodination in freshwater or by freshwater organisms? If not, clarify the challenges of extrapolating from marine environments.

Line 15 You write: "It is suggested that the negative flux during November is due to major mortalities in lake biology due to the cooling of the lake water associated with the oncoming winter. The falling organic debris could then scavenge iodide from the hypolimnion."

In the light of the previously forwarded arguments that iodination is driven by biological processes, it is hard to understand why the physical movement of "falling organic debris" would render scavenging of iodide. If the iodination is driven by organisms, the scavenging should follow either the amount or the activity of the biota.

P 44. More thorough calculation on how the iodate may be explained by inflow, please

P 45, l 25 "analysing the temporal changes in organo-I is also an essential component in the understanding of the iodine cycle" Please elaborate.

P 46, line 20 You write: "in the anion chromatograms from both the spring inflow and

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the lake suggests that the iodine is bound to high molecular weight, non-ionic carbonaceous species."

In my view, this supports formation of HOI and unspecific iodination of the organic matter as the underlying process. In general, it is rather fuzzy what you mean by abiological and biological formation. I would say that exo-enzymatically driven formation of HOI, followed by abiotic iodination of organic matter is a biotic process although it encompasses an abiotic step. You do not at all discuss exo-enzymatic iodination, although it is well known that many organisms are able to produce such enzymes.

Terminology "abiological" I prefer the more widely accepted term "abiotic"

You do not really use the sediment data. I suggest you compile this information and only present what you actually use and skip the rest. The paper is overloaded as it is.

Conclusion This is not really a conclusion, it is more a summary of the results.

"Terrestrial aquatic system" is a rather odd term.

Interactive comment on Biogeosciences Discuss., 5, 25, 2008.

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