Biogeosciences Discuss., 9, C4531–C4533, 2012
www.biogeosciences-discuss.net/9/C4531/2012/

Biogeosciences Discussions

Interactive comment on "Trace metal concentrations in acidic, headwater streams in Sweden explained by chemical, climatic, and land use variations" *by* B. J. Huser et al.

B. J. Huser et al.

brian.huser@slu.se

Received and published: 5 October 2012

Thank you for the valuable comments. Our responses are listed below.

Reviewer Comment: Which factors motivated the authors to study Pb, Zn and Cr of all existing trace metals? From what I can read, there is nothing unusual (such as very high concentrations, on the contrary, Cr-concentrations are mentioned to be low) about mentioned metals in the investigated streams. I have nothing against these metals, but I guess this question rose because the answer doesn't seem obvious.

Author comment: The main motivation for this study was to determine which factors are driving the long term trends we see for some metals. For example, in Huser et al.,

2011, Pb showed decreasing trends in northern Sweden (in agreement with decreased deposition) but increasing trends were detected for many sites in southern Sweden. We can modify the text to make this more obvious to the reader.

There are more trace metals in the dataset but we decided to separate them based on how the metals are affected by the different variables studied (chem., land use, climate, etc.). We tried to maximize the information and number of metals presented while keeping the manuscript at a reasonable length for publication.

Reviewer Comment: P 1796->: I found it a bit difficult to follow the steps in the "methods"-section, and am not sure if I could reproduce the results. Of course, just following the process theoretically is different from actually trying it out.

Author comment: This was a similar issue with the other reviewers and we will add a supplementary figure describing the process in a more obvious way.

Reviewer Comment: P 1797: The investigated metals and some of the modelled variables are mentioned here. However, I felt that there should at least be a reference to table 1 if the rest of the variables aren't mentioned here.

Author comment: We will reference Table 1 in the text clarify this for the readers.

Reviewer Comment: P 1799: Filtered absorbance, using what filter? Also table 1: In some cases the authors have specified that total concentrations have been used for mentioned variable, or that samples have been filtered (using what?), whereas in others there is no information whether filtered or unfiltered concentrations have been used, which confuses the reader. Please specify.

Author comment: All of the methods behind the analyses are available online and a link is provided to the method descriptions. In this case a 0.45 umcGGN-6 Metricel (mixed cellulose ester membrane filter) was used. We felt it would add too much length to the text to go into detail about all methods but as we stated in reply to Reviewer #2, we will clarify the metals fractions better in the manuscript because these are obviously the

BGD

9, C4531–C4533, 2012

most important.

Reviewer Comment: - Have you considered calculating metal speciation using a modelling software, in case those results could at least help to understand the poor results for Cr?

Author comment: We agree that the use of modeling software might give some insights into the mobilization of some of the trace metals, especially for the redox-insensitive metals Pb and Zn. However it is known that both metals may be strongly bound to colloidal and particulate forms of iron and manganese besides being bound to organic matter. In this dataset however we do not have access to the dissolved and particulate fractions of iron or manganese. In addition, for the redox sensitive element Cr, the software also requires the oxidation state in order to predict the speciation. We estimated that the inherent uncertainty of both unknown redox state and presence of absence of colloidal iron or manganese is too large to render helpful results.

Technical comments P 1796, line 21: “that had maximum catchment size ”, “a” is missing from in between “had” and “maximum”. P 1798, line 24: “It has been successful applied ” ! successfully P 1809: Reference is made to figure 6, which does not exist. Figure 3 seems to contain the information that was referenced to.

Author comment: These have all been corrected in the manuscript. Thank you for pointing them out to us.

Interactive comment on Biogeosciences Discuss., 9, 1793, 2012.