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Biogeosciences Discussions

Interactive comment on "Mercury concentrations and pools in four Sierra Nevada forest sites, and relationships to organic carbon and nitrogen" *by* D. Obrist et al.

D. Obrist et al.

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We greatly appreciate the positive feedbacks of two anonymous referees to our manuscript. We specifically appreciate the careful reading of both reviewers who pointed out a series of spelling errors, and we apologize for this carelessness. We agree with the comments and have implemented all minor revisions as suggested by both reviewers. Please find below a detailed response to the comments.

Anonymous Referee 1

This paper is original and includes new information about the mercury pools and concentrations in four Sierra Nevada site ecosystems. The authors have presented detailed information about different Hg concentrations in numerous ecosystem compart-

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ments, C and N relationships, and a discussion about the effects of forest fires. Thus, the article is of interest to a wider readership. The authors have discussed the results in great detail. They have compared their results extensively with the existing literature. The methods for sample analysis are valid and used in this kind of research. The paper is well written and structured, and language is fluent. Some spelling mistakes still exist in the MS and careful check is recommended.

Response: We have carefully checked for spelling mistakes and corrected them in the text.

I have listed my own correction remarks below after other comments. The paper is suitable for the journal Biogeosciences with minor revisions.

Minor comments and concerns: p. 1782, line 22: Explain Oi, Oe and Oa when you mention the abbreviations for the first time. At the moment, they are first explained in page 1787. Are the explanations needed in Fig. 1 and 2?

Response: We added definitions to page 1782, line 22. We prefer to keep the explanations in figure 1 and 2 so the figures can be understood by readers that do not read the full text.

p. 1792, line 15: reference?

Response: We added a reference to line 16.

Fig. 1: The error bars do not show in post-fire near Truckee site. Are the error bars deviations of replicate samples? This should be stated in the text.

Response: Error bars show mean and standard errors of replicate plots (i.e., 4 and 3 replicate plots as describe in the text). We added this to the text in the first sentence in Results and Discussion Section.

Fig. 3 and 4: There are two error bars that do not fit the picture. Please, specify the error amount in the Fig. or in the text.

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Response: The error bars referred to are in Fig. 4 and 5. However, we think both error bars and right y-axis are clearly marked to show the full extent of the error bars (i.e., reaching 149 t/ha and 223 t/ha in figure 4 and 5, repectively).

Corrections needed: p.1778, line 18: 92

Response: Corrected

p. 1781, line 6: fata

Response: Corrected to fate

p. 1784, line 27: undcomposed

Response: Corrected

p. 1786, line 1: Revise the chapter numbering.

Response: Chapter numbering is done by Biogeosciences, we have asked editors to correct chapter numbering.

p. 1786, line 28: to

Response: Corrected

p. 1787, line 11: then

Response: Corrected

p.1792, line 25: Truckeem

Response: Corrected

p. 1796, line 8: buring

Response: Corrected

Fig. 2: The gray-filled symbols are hard to distinguish from white symbols. The gray-filled symbols should be replaced by e.g. triangles.

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Response: Corrected, we colored the different symbols for clarification.

Anonymous Referee 2

This paper reports and interprets measurements of Hg concentrations in soil and litter in four Sierra Nevada forest sites. The study also includes estimates of Carbon and Nitrogen and demonstrates stochiometric relationships between Hg and C/N pools on local and ecosystem scales. I feel that the authors have put together a solid piece of work here, which Biogeosciences should accept for publication. I see no major technical or analytical flaws in their measurements or presentation and their interpretation of data seems sound, even where speculative. They have put their results in appropriate context by citing many key studies related to their work and their data support the conclusions of some previous studies of Hg variation in soil and litter layers. The comparison of Hg/C relationships at various soil and litter horizons is probably more detailed than any study to date, and the inverse relationship of Hg and C among various horizons, as well as the strong and consistent Hg:N relationship across sites are particularly interesting. It seems that experimental and long-term studies will be needed to assess (if possible) the fate of Hg stored in soil in terms of the balance between deposition, loss to solution, and re-emission. I have only a few minor comments. I did not participate in the technical review for BGD, but the paper could use a careful readover by the authors and/or editorial staff for grammatical/typographical errors (for example, misspelling of Truckee, p.1792 line 25; unnecessary to; on p.1786, line 28).

Response: All grammatical/typographical errors were corrected and additional typos were corrected

p.1782, section 2.2 8211; should indicate here the size of the replicate plots and how far apart they were. Some previous studies of Hg in soil and litter have indicated significant variation among plots that are fairly close together (e.g., 10-15 m) largely due to variation in Hg content in the organic layer.

Response: We specified plot size (0.04 ha and 0.1ha) and distance between plots (50

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to 100 m)

Also, the samples were taken in October and November. Can the authors address how this might bias or impact their interpretations, or do they expect little seasonal variation in factors which could influence litter and soil Hg, Carbon and Nitrogen (ie, deposition, throughfall rate, variation in precipitation type or frequency, radiation and temperature)?

Response: We selected to collect samples in fall to include litter at the end of the vegetation period. We now mention that stocks may change slightly during the season, but that these changes are considered small as stocks are very large compared to annual fluxes (page 1785, line 25).

p.1786 Results and discussion should probably be a new section (section 3) rather than a continuation of section 2 (materials and methods).

Response: Chapter numbering is done by Biogeosciences, we have asked editors to correct chapter numbering.

p.1786, line 24 8211; it is interesting that bole wood concentrations, while of course small compared to other above-ground compartments, are smaller than those reported previously for the same Truckee site. Any speculation for the difference 8211; did the studies collect and analyze samples using the same techniques?

Response: Yes, we followed very similar protocols for sample analysis as the previous study (i.e., combustion analysis). We already mention a possible explanation for the differences (i.e., possible inclusion of bark).

Interactive comment on Biogeosciences Discuss., 6, 1777, 2009.