

Interactive comment on “X-ray fluorescence mapping of mercury on suspended mineral particles and diatoms in a contaminated freshwater system” by B. Gu et al.

Anonymous Referee #3

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General overview: This paper describes the location of mercury in suspended particles in stream water downstream of an industrial contaminant source. The Hg is located primarily on the surfaces of diatoms and adsorbed to organic matter particles, and is particularly associated with iron, manganese, sulphur and zinc. The authors speculate that this is explained by sorption of Hg onto Fe- and Mn-oxyhydroxide minerals, and some coating of these complexes to diatom surfaces. Additional FTIR spectra provide evidence for carboxylic acid and phenolic functional groups, along with polysaccharides, which are likely to be interacting as bridges between the Hg(II) particles and the metal oxides. The novelty of this study is in the high resolution mapping of Hg along with other elements to provide evidence for an important mechanism that removes Hg

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from stream water. This case study is well written and provides a useful discussion of the geochemistry of Hg transport in stream water. Can the authors apply their findings beyond this local watershed? How many streams and lakes are polluted with Hg at the level measured in the EFPC study area? Will biological processes be important in the sorption processes, or is this an abiotic phenomenon? Detailed comments: In Figure 3, the details of parts a and b should be indicated in the caption. Are both images made from spiked diatoms? One parenthetical line describes this figure but it needs more explanation (p. 7528, L 29). The image b looks like it has much more Hg sorbed onto it than image a. Annotating the images would be a good idea to improve interpretability, especially with reference to analyses in Table 1, in addition to more explanation in the caption.. In Fig. 4, do the parts a, b and c have anything to do with one another? The caption could use a bit more detail explaining what the images are of.

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