

Interactive comment on “Distribution and behaviour of dissolved selenium in tropical peatland-draining rivers and estuaries of Malaysia” by Yan Chang et al.

Anonymous Referee #2

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In this manuscript, the authors report Se partitioning into dissolved Se(IV), Se(VI), total inorganic and organic fractions in seven rivers and their estuaries in Sarawak, Malaysia. Furthermore, they conducted a mixing experiment of river and sea water to determine the change in dissolved Se speciation. Overall, I think that the paper adds novel information to our knowledge of the Se cycle. However, it has largely a descriptive character, which could be changed by coming up with a number of hypotheses that can be tested with the data. Moreover, the original results are shown in too much detail, which obscures the general findings. I suggest to come up with figures that combine the results from several or all studied locations and move the original data to the supplementary information.

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As already indicated in my preliminary review, the paper suffers from a number (of minor) technical problems. It should be strictly structured according to the objectives, which is not the case in the introduction where the state-of-the-art concerning Objective 3 is not introduced. It is also not the case in the discussion and conclusion sections. The discussion sections includes results referring to Figs. 7 and 8, which need to be moved to the results section. Finally, the manuscript should be shortened, e.g., by moving all content that is mainly of local interest to the supplementary information.

In addition to these general remarks, I offer a number of line-by-line comments: l. 25 and l. 52: Please be clear about which organisms really need Se. I know that mammals and humans need it. At the same time plants do not need Se. I am not familiar with marine organisms. Please specify, which marine organisms need Se. I would not have expected that Se is essential for phytoplankton (because it is not for plants). This question is important and should be clearly addressed. l. 37: What do you mean by “extremely”? Add numbers. l. 47: I am not sure if the introduction of Se can generally promote productivity. This would only be possible, if Se was an essential nutrient for the considered organism. Furthermore, growth would only be promoted if Se was the limiting element, but other limitations are more likely (e.g., by P or Fe). l. 48-49: I don't understand this conclusion. I would prefer a conclusions, which is derived from your results. l. 54-67: About which organisms are you talking? This cannot be generalized! l. 57-59: Please explain this hypothesis. Its understanding is related with my above criticism, that there is no detailed explanation for which organisms Se is necessary and for which not. l. 64: Why is “organic selenide” mentioned separately? It is included in the oxidation state –II. l. 68: Does phytoplankton really need Se? l. 88: What do you mean by “various”, the previously cited studies? Perhaps better cite them again. l. 94: Do you mean that “Se speciation” was controlled? l. 97: “formation” or “generation” instead of “regeneration” l. 106: How does organic matter influence the bioavailability and fate of Se? l. 110: What do you mean by “behaviour”? l. 122: The third objective “falls from heaven”. l. 176: Why did you remove the colloids from the seawater samples? Doesn't this result in a rather artificial experiment in which some chemical transformations that

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can occur in the environment are ruled out? Please explain. Furthermore, I suggest to come up with a hypothesis, e.g., pure mixing vs. chemical transformations (which?).

l. 210: Did you check for normal distribution and transform the data if necessary?

l. 214-235: I am a bit lost here. Perhaps, this can be concentrated to the information in aggregated form that is really necessary to understand the results, thereby shortening it.

l. 223 and 231: Shouldn't the numbers of the supplementary figures be switched (according to the sequence of their reference in the manuscript)?

l. 250-268: I suggest to show the results as bar diagram with error and indication of statistically significant difference instead of the current Fig. 2, which I suggest to move to the supplementary information.

l. 349-358: I suggest to combine the results of each of your three groups into a figure for the group instead of showing all individual results.

l. 384ff: The Discussion section should be structured according to the three objectives into three parts. The objectives should be discussed as concisely as possible, i.e. the current discussion should be shortened.

l. 407-412: This belongs to the results.

l. 432-433: Why is this information important? I suggest to delete it.

l. 434-441: This is a repetition. Delete and focus on the important statement in l. 441-442.

l. 469: You can omit "as follows" and directly start with the numbered list.

l. 479: Combine 4.1 and 4.2 as joint contribution to Objective 1.

l. 541/545: Isn't the Rhone forming a delta? Or don't you talk about the French Rhone?

l. 549: Skip this heading to avoid overstructuring.

l. 562: I am confused by the simultaneous use of delta and estuary, because I think that these are two contrasting geomorphological forms, mainly driven by the strength of the tide.

l. 563-573: I would move large parts of this and the associated figure to the results section.

l. 588-589: The numbers should be subscripts.

l. 593-601: I would again move large parts of this and the associated figure to the results section.

l. 622: Will photodegradation really be important in the dark DOM-rich waters? Possibly, it is restricted to the uppermost surface-near few mm.

l. 665-678: The conclusions should fit to the objectives, i.e. there should be three main conclusions and perhaps a kind of outlook.

l. 678: See my previous comments to the role of Se for biological productivity.

Figs. 3-5 show all individual results. I suggest to aggregate these data in a way that

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clearly illustrates your main points. Figs. 7 and 8 should be included in the Results section.

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