Biogeosciences Discuss., 10, C9432–C9437, 2014
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Biogeosciences Discussions
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Interactive comment on "Lena Delta hydrology and geochemistry" *by* I. Fedorova et al.

Anonymous Referee #3

Received and published: 9 April 2014

General comments

This paper builds on a solid base of data. It takes advantage of existing knowledge to make an analysis addressing current issues within hydrochemistry, carbon cycling and a changing climate through hydrology and geochemical application. In a sense validating the continuation of monitoring. It has a descriptive character but tries to advance the field through comparing temporal changes, and in my opinion has the potential of greatly exemplifying mechanisms in the whole study area through local examples. However, it contains a lot of data that is not sufficiently discussed, or discussion points that are started but not followed through, or are actually not based on the analysis of the data. My own hydrological expertise is limited, but the geochemical statements, are often not well grounded in the reported data. I suggest taking out the nutrient/element data – or move it to supplemental information. There are no conclusions drawn from these and they appear to be from only one year (?) compared to most of the other data

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that have a strong temporal depth.

I want to emphasize an effort that may be forgotten but is equally important for any scientific field – to make already existing data and knowledge available to the international arena. Both the use of monitoring data from decades back, but also the extensive use of citations from Russian scientific literature. 41 out of 77 references cited are in Russian. I believe that the combination of the Russian and the international literature can lift, reveal and authenticate/endorse the, to the large community, unavailable knowledge. I do think however this may, despite the effort also be the weaker link of the paper – and suggest additional strengthening of the paper through more international references.

The language is imprecise in many places and the structure is not well set up. I have own experience with and recognize how difficult it can be with the language barrier for the Russian scientific community, and I encourage this effort. Therefore I put some time into actual language revisions that I think interrupt the message and flow in this paper. With revisions however I believe this to be an interesting and good contribution, and I support publication in Biogeoscences after the suggested corrections below.

Specific comments

1. The paper could benefit through adding the strong temporal aspect to the title.

2. The abstract needs to include a conclusion of the scientific findings.

3. The conclusions section should be down scaled to include fewer main conclusions. Please carefully revise these and see through the manuscript that the remaining ones are supported by the data. Remove the others.

4. The words mineralization and turbidity are probably misused in several places. Please revise.

5. “Minerals and ice” is an incorrect description of ice complexes, as is “surface permafrost”. The description of “alases” is also misleading. Please revise.

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6. The manuscript needs a reference to a map for identifying the mentioned locations. Figure 1 is attempting this, but it would be useful if you could get a more high-resolution picture? Several locations that are stated in the text are missing a location reference – and should be pointed out on this figure.

7. Section 1.2, 1.3 and 1.4 are regarding existing knowledge and data, but does not report any of this particular data or introduce thoughts or views in the field of these. I suggest instead a new header 1.2 “Current state of knowledge” or something similar, and to make three sub-sections 1.2.1, 1.2.2 and 1.2.3; and at the same time to move the one sentence conclusion in current section 1.3 (starting p.20182, R26) to the abstract. This sentence should also be followed up upon in the actual results and discussion. Interesting – but it disappears after this mentioning.

8. Mid section 3.3.1 (P20199 R03-05). It is unclear how the mentioned local factors could be drivers, and actually what you mean with “control of geochemical runoff formation”. Would want to know both how this happens and to have a good example. Please develop and describe.

9. End of current section 3.3.1 (P20200 R15-19). This interesting conclusion would gain a lot by a couple of more sentences. Can you elaborate on what you mean here? Higher degradation closer to the coast - how does this associate to fine particles and nutrients?

10. Section 4.1 (P20201). Be more precise. Which parameter (sediment?) and time frame does the 35 m3s-1 increase apply to? Report the actual significance p<0.0XX of both the 35 figure and of the mentioned water discharge (P20202 R01-02).

11. Section 4.2 (P20206 R13-15). Here you say that there is a low water and little fluvial deformation between 1977 to mid 1980’s, and reference to figure 13. On fig. 13 the lowest water discharge recorded by the blue line occurs right after mid 1980’s to up around 1988-1989 when it increases sharply. This seems to be the only deviation from an otherwise steady plot. How does this correspond to the green tint background? This

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needs clarification. Please include description of how data for the green tints and the blue line associate to each other, and how you then see the stated trends accordingly.

12. Figure 8 needs clarification. Panel 1 is from 1951, panel 2 is from 2000, and panel 3 is 1951 and 2009 according to figure caption. In the text you say //The braided sandbar area increased from 1951 to 2000, but by 2009 began to increase.//. It looks on Fig. 8 as a decrease of the sandy area from panel 1 to panel 2. Is the figure caption referencing the right panels/years? There is no comparison from 2000 to 2009 made in the figure. It would be more informative if you could add a third contour for 2009 on panel 3. Perhaps add years to the actual panels for parallel construction to Fig. 7? Also – improve picture quality of panel 2?

13. Check through the text that all the figures are mentioned in appropriate places. Remove figures to supplemental that are not. Also check all figure captions to be more precise! General rule of thumb is that figure caption should stand alone as explanation for content of figure. Please check.

Technical corrections

There are plenty of places where the language could be changed for a better flow. These are the corrections that I believe alter the actual meaning or abrupt the flow in the text too much and thus should be changed before publication.

P20180 R09-10. Unclear: three periods were chosen, but for what? P20180, R19-20. Sentence vague: make clear if you mean that the conservative character was something you found, or otherwise - how you analysed it. Section 1.1. State over what interval the reported discharge data was averaged. (Unclear if data was reported 2007 by the organisation, or if it was averaged over the year 2007.) P20183 R08-10. Incomplete sentence. P20184 R03-07. Sentence structure: repetition of words. P20185 R05-06. Sentence structure: remove “we selected”. P20185 R10 //. . .discharges values. . .// and R12 remove “plotted” or “calculated”. P20186 R02-04. Wording too complicated, rephrase. P20186 R09. State which long-term period in-

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tended. P20186 R21-25. Too long, split into two sentences. Perhaps the what, and then the why. P20186 R27-P20187 R02. Sentence incomprehensible. Split into two sentences, and/or make clear what is illustrated in Fig.1 and what is presented in the database. P20193 Section 3.1 header is redundant. Remove. P20193 R16-19. Incomprehensible. Rephrase. Also, do you have a reference/figure to positive trend of sediment discharge? Otherwise remove from sentence. First paragraph of section 3.1.2 (P20194 R21-26) not a result - should be moved to methods section. P20194 R27. Sentence structure: remove "last". P20196 R11. Sentence structure: remove "and". P20196 R23-24. Unclear which 10-year period you are talking about. Clarify. Also, unclear where the Trofim-Kumaga sands are located. Mark on Fig.8 both Sardakh island and Trofim-Kumaga sands. P20197 R10 Sentence structure: add "is" to //. . .an increase and is presented. . .// P20197 R11 Sentence structure: remove "were" and "," (comma) after "2005". P20198 R22 Sentence structure: remove "below 3 and 4" and add Table 3 in the existing brackets. P20198 R25 Sentence structure: remove "correspond" P20198 R26 Incorrect tense, replace "to publish" with "published". P20199 R13-14. End sentence after "deduced". New sentence start //The main dissolved. . .// and remove either "transferred along" or "transported through". P20201 R12. State which channel the "principal channel" is. P20201 R14-17. Unclear what second part of sentence explains. Clarify. P20202 R15-18. Sentence is incomplete. Rephrase. P20202 R25, remove "a". P20203 R25-27. Sentence structure. Rephrase, or remove "the delta channels"? P20203 R29. Sentence structure. Repetition. Remove "a minor amount". P20204 R12 remove "develop". P20204 R19 replace "these" with "that". P20204 R21-23. Sentence structure: Perhaps //. . .in modern permafrost hydrology it is only mentioned that additional influx. . .//. Suggest to also end sentence after //. . .et al., 2013). // And change to //No calculations of. . .// //. . .has yet been made. //. P20206 R01. Add "was" and "," comma in //. . . Kyusyur station was noticed in Burdyikina (1951), . . .// P20206 R23-24. State what the 3rd period is. P20208 R18. Refer to which four regions you mean. Would be great if you could perhaps indicate on a map where these are? P20209 R03 remove "of". P20209 R12 replace "and" with "was". P20210 R01.

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Sentence unclear. Specify the time frame that you refer to. When? P20210 R05. Repetition. Replace second “through” with “of”. P20211 R02 remove “are”.

Interactive comment on Biogeosciences Discuss., 10, 20179, 2013.