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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Impact of snow deposition on major and trace element concentrations and fluxes in surface waters of Western Siberian Lowland" *by* Vladimir P. Shevchenko et al.

Anonymous Referee #2

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General suggestions:

There is very limited knowledge of chemical and particulate composition of snow and water in Western Siberia currently. This manuscript shows a complete dataset of chemical element contents on the snow through sampling of substantial latitudinal transect in this region. The authors addressed the latitudinal effect, particle mineralogical impact and contribution separation of river input and atmospheric deposition to the lake. The topic and scope of this paper is a good fit for the journal. However, the current version of the manuscript confronted the following issues in my opinion, so that I suggest the

manuscript be major revised.

Specific suggestions:

Page 1, Line 15-31, The Abstract section need a clear objective (at the beginning) as well as significance (at the end). Result descriptions should summarily focus on the objectives.

Significant editing is required to improve the grammar, syntax and English expression throughout the paper. See comments on page 2 for examples:

Page 2, Line 39, "exhibits a number of properties"

Page 2, Line 46, "the chemistry of winter atmosphere" could be changed to "the air chemistry in winter"?

Page 2, Line 48, "atmospheric transfer" changed to "atmospheric transport"?

Page 2, Line 76; Page 3, Line, 89: do not often use the words like "unprecedentedly", "exceptionally", etc.

Page 3, Line 105: "we chose to sample. . ."

Page 3, Line 110: "All sampling points were located more than 500 m far from the winter road."

Page 4, Line 134: as "trace elements" was defined as TE, it should be consistent to use TE through the manuscript. Please check it. In addition, need to define REEs at Line 136.

Page 5 Line 171: ". . .performed, taking into account of . . ."

Page 5 Line 173: ". . .calculated from hydrological parameters."

Page 5 Line 178-180: this is a bad sentence, "The most recent complete hydrological data of small and medium size rivers in permafrost-affected area of WSL (Novikov et al., 2009) were used together with RHS database to calculate the spring flood fluxes

of individual rivers and snow water stock for three latitudinal zones. . .."

The second paragraph of the Introduction (Line 51-65) includes a lot of information and previous literature review. This could be improved by re-organizing or combining some of the previous reports in different regions. Line 51: "numerous studies ....western Siberia", probably in contradiction to the text on Line 61: "the trace ... Siberian snow remains at the beginning of exploration."

Results: the database was not clearly and continuously expressed. Too many small figures and supplement information. Readers have to obtain the data information here and there. Although it is difficult to think out a reasonable method to improve the description of big database, the authors still need to consider it.

Page 6, Line 209-213: the PCA results seems inexplicable. Fe and Pb were attributed to lithogenic stable group; however, Ba and Si to highly mobile group. In the lithogenic group, Ti was not observed. If the mobile elements were used as indicator of marine aerosols, the element, Na should be also taken into account.

Page 8, Line 299-306: The introduction of EF calculation should be moved to the Method section. The authors should give some reasons to choose Al to be reference element, rather than Si or Ti in this study. Is there a good relation between Al and other trace elements? In addition, it is interesting to see that the EFs of Pb, Cu and Sb are larger than 100, and those of Sb, Zn and Cd larger than 1000, which clearly show serious anthropogenic pollution. However, in the introduction, the authors said that the region experiences lower anthropogenic disturbance, with fewer people and less industry. So, how to explain the high EFs? Probably it is a result of using average Earth Crust as the background?

Discussion: The authors pointed out three objectives: latitudinal effect, mineralogical impact and different sources of metal input to lakes. So, the discussions should be related to these key issues. The current version of this section should be shorten, as some of text repeated the Results content.

Conclusions: This section should be compressed. It is not necessary to repeat too much details of data results.

Quality/resolution could be improved for all figures. Figures 6, 7 and 8 could be merged together.

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