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comment

Interactive comment on "Validation of lake surface state in the HIRLAM NWP model against in-situ measurements in Finland" *by* Laura Rontu et al.

Anonymous Referee #1

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General comments:

The paper presents results of HIRLAM (v7.4) model integrated to Flake model, lake surface state validation against in-situ observations of lake water temperature and ice cover during the period of 2012-2018 in Finland. In general, the paper structure is good and it is mainly written well. Same validation results against these in-situ observations have not been published earlier, eventhough some earlier papers have dealt with lake temperature and ice cover observation use in the HIRLAM. However, the noticed bug related to ice cover modelling is rather fundamental in physical way, and dominating the results, and makes me consider revising results with proper snowfall calculations on ice. It seems that in the future the HIRLAM model is no longer used and will be substituted with a new model. In that aspect, erroneous calculation could be docu-

mented in this article. The figures and tables could be improved and should be made more visual and reader-friendly; I will provide some specific comments on them. Especially figures and tables should run better in line with the text. Now, some figures are mentioned many pages before that they appear.

Specific comments:

1. Introduction, first paragraph (page 1, lines 16-19): Please provide some references.

2. You have used observations data for the year 2018 eventhough it is current year, usually provisional data. Is the in-situ data used in the analysis quality controlled? When the in-situ data was uploaded? And until which date the year 2018 data are used?

3. Page 3, Figure 1. I would like to have it more visual-friendly. Is there certain meaning with arrow line thickness, if not then harmonize.

4. Page 5, line 16. Please make reference to SYKE network, which year status it is? (There are 34 sites in the network in year 2018 according to the SYKE database)

5. Chapter 3.2.2. Freezing and melting dates. Article Korhonen (2006) has introduced terms for freezing and break-up in English, please use those. See: Korhonen, J. 2006. Long-term changes in lake ice cover in Finland. Nordic Hydrology 37(4-5): 347–363.

6. Please state little bit more why these lakes were chosen. Were they only ones large enough to HIRLAM grid or were there other criteria?

7. I suggest combining figures 3 & 4 to same gridded figure with four graphs. Remove from temperature scale dots after the kelvin numbers. In figure caption open up meaning of fc an fob, an.

8. Chapter 4.2. is little bit hard to read/understand. Try to rewrite it more clear.

9. Page 10: Text paragraph, it is not clear what are different percentage categories.

10. Table 2: What are the units in this table?

11. I suggest combining Figures 5 and 6 to same figure (a and b)

12. Page 12, last paragraph: make more clear in the text if you are talking about HIRLAM (analysed/forecast) or observed freezing and melting days.

13. Chapter 4.3. Make a reference to where lake area/depth records are taken. GLDB perhaps?

14. Figures 7-10 could be combined to one gridded figure (a, b, c, d) Remove dots after Kelvin scale numbers.

15. Figure 11. & 12. Add variable name and Unit in Y-scale. Just one legend could be below graphs since they are all same. For codes 28 and 29 use verbal definitions, please. It seems data until early 2018 is used?

16. Figure 13. Add variable name and Unit in the Y-scale. In headings, use only lake name and years: Lappajärvi 2012-2013, Kilpisjärvi 2012-2013, Simpelejärvi 2012-2013.

Technical/typo corrections:

1) Abstract: line 3 "integrated to HIRLAM" -> integrated into HIRLAM

2) Use wording "in-situ" or "in situ" through whole text. Now there are both versions in the text.

3) I would use "lake ice freezing and "lake ice melting" instead of lake freezing and melting (all text) (e.g. page 2, line 21)

4) Page 2, line 31: I would consider revising wording "became available"

5) Page 4, line 31: I would consider revising wording "basic material"

6) Figure 2. Page 6: Please note that abbreviation LID has not been introduced in the text before.

7) Chapter 3.2.2 "codes 27-30" should not be used in the text or figures, use instead verbal definitions. Codes are so called database codes and not normally used as definitions. They are irrelevant as code numbers.

8) Please check through the text that LWT and LSWT are used coherently. Page 13, line 1: LWST -> LSWT, Page 18, line 13 SYKE LSWT?

9) Chapter 3.2.3 Ice thickness and snow depth on lakes

10) Page 7, line 8: typo Simpelejärvi

11) Chapter 3.3.1. Lake surface water temperature (LSWT)

12) Page 8, line 2: Use verbal definition instead of category 29. Same in line 3 for category 28.

13) Page 8, line 9: SYKE LWT observations

14) Page 8, line 21: typo known

15) Page 15, line 9: 125 Wm-2 (superscript)

16) Page 15, line 19: 2012-2018

17) Page 18, line 1: wrong -> incorrect/erroneous

18) Page 18, line 17: ice thickness and snow depth

19) References: Please check that all references are formatted same way. For example, if many initial letters using space between or not in consistent way. I noticed some typos:

Page 24,1. Potes, M. -> Potes, M.

Page 24, line 22. Gandin, L. missing :

Page 25, line 5. Remove ++ after Hydrology Research.

Page 25, line 11. co authors -> write all names

Page 25, line 33 et al > write all names

Page 25, line 33. Yang, Y., coauthors -> write all names and put the year in the end

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