

Interactive comment on “Late Glacial to Holocene environments in the present-day coldest region of the Northern Hemisphere inferred from a pollen record of Lake Billyakh, Verkhoyansk Mts, NE Siberia” by S. Müller et al.

S. Müller et al.

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We acknowledge the positive review of Referee #1 regarding our submitted manuscript. All suggested changes are constructive and will be addressed in the revised version of the manuscript. Below we placed our reply to the questions raised by Referee #1.

General comments 1.stronger integration of already published data from the region - we tried to keep the manuscript short but informative because of the size limitation for the manuscript

2.results from other sites are not illustrated - now they are, see Table 3 in the new

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version of the manuscript

3.no use of coldest region in Eurasia in the discussion - the whole paper is dealing with this special place of the coldest region of the northern hemisphere

4.further analysis and interpretation of the data - see general comment 1

5.text file of the appendix - data are also available in the PANGAEA database

Specific comments Page: 1240, Line: 11-14: It would be nice to get some more information on why this area is important and compare the density of available sites to that of other regions. -more data and extensive descriptions will be available in the following paper describing the longest core from Lake Billyakh; another reason for shortness is the restriction if sites for this paper

Page: 1242, Line: 9-11 and elsewhere: Usually cores are described from bottom to the top - also the numbering of zones should be carried out in this way and I do not see the benefit of doing it the other way around. The explanation given for the reversed numbering of the pollen zones on Page 1243 is not really convincing me as a statistical method is used for the decision of the zone boundary which may differ between cores from the same lake. - We are aware that the dating of the pollen zones from the bottom to the top can be frequently seen. But especially in this case we do not completely agree with this practice, which makes it difficult to continue the pollen description further in depth/time without renumbering the whole profile if we are analysing another core from the same lake. The downward numbering is rather common in geology, e.g. all MIS zones are numbered in this way.

Page: 1242, Line: 21: Adding a single tablet of Lycopodium spores to 1.5 g sediment will result in low precision in the estimation of pollen concentration. Moreover, using weight instead of volume hampers the calculation of pollen accumulation rates. Concentrations given later in the text and appendix are expressed per volume but it is not stated how the sample weight was converted to sample volume. Furthermore, the

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count of exotic Lycopodium spores is not provided in the appendix and thus further use of that data hampered. - Adding a single Lyco-tablet to 1.5g sediment is a standart technique. - We changed concentrations to pollen/g in the text and appendix. - We added the Lyco-tabs counts in the appendix.

Page: 1243, Line: 9-10: How was it possible to see that the contribution of re-deposited pollen was unimportant? - Only in a few samples redeposited pollen were found and moreover redeposited pollen concentration was very low. Thus we concluded that its contribution to the pollen spectra was rather unimportant.

Page: 1244, Line: 15 and following: No information is given on the material that was used for dating (e.g. macrofossils or bulk sediment) and where the samples were dated - also the lab numbers in the table seem to be project internal numbers rather than the code assigned by the radiocarbon dating lab. - We added the questioned information in the text (4.1) and in Table 2.

Page: 1244, Line: 22: I would argue that the date with the depth of 304 cm is an outlier. When this date would be removed a much better fit would certainly be obtained. It may also be useful to try polynomials with more than 3 terms. - We cant see the reason for this argument. The date for this depth fits very well in our model and is in line with our interpretation.

Page: 1247, Line: 5: I find the headings confusing as the Younger Dryas and the Allerød are part of the Late Glacial. Moreover, based on the age control it is questionable if the period assigned to the Allerød really corresponds to this time period. It may be better to find other headings and argue in the text that this period may correspond to the Allerød or Bølling/Allerød warming. - accepted and changed

Page: 1248, Line: 21 and following: This sounds interesting but I am not sure I understand the argument. What does it have to do with the data from Lake Billyakh? - This sentence comprise the comparison of our data with the results from other sites which the reviewer asked to do (see general comments 1 and 4).

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Page: 1249, Line: 5-10: A substantial warming at the Late Glacial/Holocene boundary is what we would expect to find and not worth emphasizing unless it is meant to say that in some of the records temperatures rose quickly to values higher than today? - The warming at the Late Glacial/Holocene transition is a feature which we are not emphasizing but stating from the results (incl. certain events) in our record.

Page: 1250, Line: 5-11: There is only one sample with a considerable amount of Abies pollen while no Abies pollen was found in most other samples. This looks a bit suspicious and I wonder if the authors have an explanation for this pattern. I would be careful basing an interpretation on one sample only. - There were 3 samples in the two PAZ recorded with higher amounts of Abies pollen. We just stated this as a regional sign, which we dont want to miss.

Technical corrections Page: 139, Line: 24-27: Sentence would benefit from restructuring. -we assume page 1239 was ment: accepted and corrected Page: 1240, Line: 3: delete "s" from vegetations - accepted and corrected Page: 1241, Line: 13: Confusion of word or number order. - accepted and corrected Page: 1242, Line: 3: It would be good to add a reference to the coring system. - more information about the coring system is available at <http://www.uwitec.at/html/frame.html> Page: 1244, Line: 8: A threshold value may prove to be useful but I am not sure if it can be verified. - accepted and corrected Page: 1244, Line: 25: The bottom of the core was not dated but the date was obtained through extrapolation and an age can thus only be suggested. - accepted and corrected Page: 1245, Line: 14: As mentioned before it should be stated how concentration by mass was converted to concentration by volume and the results should be rounded to at least the nearest 100, as otherwise an accuracy is suggested which is not present. - We already answered this above; accepted and corrected Page: 1247, Line: 12-13: "pollen taxa" rather than "taxa pollen" and "percentages" may be deleted. - accepted and corrected Page: 1248, Line: 10: It may be better to say that temperatures were high enough to sustain the survival of boreal trees. They did not go "extinct", at least not globally. - accepted and corrected Page: 1248, Line: 12:

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The biome scores are produced from pollen data and thus have to show the same as the original data otherwise something may be wrong. - accepted and corrected Page: 1248, Line: 19: Probably "interglacial" is meant rather than "interstadial". - accepted and corrected

On behalf of the co-authors Stefanie Müller

Interactive comment on Clim. Past Discuss., 4, 1237, 2008.

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4, S742–S746, 2009

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