

Interactive comment on “Late Pliocene and early Pleistocene environments of the north-eastern Russian Arctic inferred from the Lake El’gygytgyn pollen record” by A. A. Andreev et al.

Anonymous Referee #1

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Review of the paper cp-2013-112: “Late Pliocene and Early Pleistocene environments of the north-eastern Russian Arctic inferred from the Lake El’gygytgyn pollen record” by A.A. Andreev et al.

This paper, focussed on the vegetation changes in Russia during the Pliocene and early Pleistocene, presents highly reliable data on the Lake El’gygytgyn that surely need to be published. In fact, authors show here an impressive long pollen record (750 samples) that represents without doubt an exceptional source of information for the scientific community. Topics of the paper enter well in general themes of Climate of the past.

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This paper is very interesting although amendments need to be done before publication:

- In the introduction, I rather wanted to find a more detailed presentation of the context. It has been done for the spatial context but not really for what is interesting to do in the region on the studied period proposed comparing to what has been already done in other part of the world. The quick summary proposed in the introduction about what has been done on the cores will be consistent for a special paragraph that may be useful for the discussion at the end of the paper. In fact, at the end of the introduction, we have the feeling that we have to read all what has been done previously on the lake before beginning to read the paper. What is called multiproxy in the paper? I have only seen a large palynological (pollen and non-pollen palynomorphs) results that compare pollen, algae, spore and fungi. When I had finished reading the introduction, I imagined that the paper will compare vegetation with data from sedimentology, lake level and so on. ... A rapid look on the figures shows that it is not the case. Why? Probably other data are available on this core and may be useful for the interpretations.

- Another remark concerns the chronological framework of the studied series. I understand that the proposed paper correspond to one of a collection of papers on the same site (it is largely written in the introduction and after). However, the paper must be readable alone without searching after all the other papers written on the cores. We definitively need a paragraph on the chronology to understand how the series have been dated and how the age model has been constructed. A figure that replaces the core in the known chronology of the studied period with the proxy that have help to construct the age model will be very helpful and especially in front of the record of Lieseckí and Raymo for example.

In fact, authors do not mentioned the geological periods by reference to the classic geological time scale in the text and in the figure.

- Part 2: The method is well- explained. Nevertheless, I would like to have a recall

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about the composition of the biomes that will be used in the paper. Probably it will be also helpful to non palynologists not to only refer to the paper of Tarasov et al.

- Part 3:

o Description of the pollen record is too long in my opinion. In parallel, the diagrams are difficult to read as they are very little especially concerning the labelling of the pollen zones (PZ). Reader has to enlarge the diagram with an important magnification to be able to read them.

o Description pollen zone by pollen zone results in a boring part in the paper: five pages and half even if it remains interesting for the specialist. Is it possible to synthesize this part? To make it more attractive I propose to place the complete pollen data in additional files and to present a simplified pollen diagram by gathering the taxa (main and sporadic ones) in groups that eventually mimics the following biomes presented after. This will feature the changes that occurred in the record. It will be helpful if authors show in the same figure a comparison with the reference climate curve such as Lisiecki and Raymo one with the classic chronology (here, Pliocene – Pliozan, Pleistocene – Gelasian).

o Fig. 5 is particularly difficult to read. Perhaps, authors may circle the taxa that allow defining the main vegetation groups that drive the changes and the position of the different pollen zones as indicated in the text. This figure will then appear clearer to the reader. Explanations are in the short paragraph 3.2 and the three sentences at the end of this paragraph are not demonstrated by what has been written before. I do not see exactly the aim of that.

- Interpretation and discussion:

o This part has been cut in several paragraphs that do not represent any geological basis. Is this cutting corresponded to anything in the sedimentology??? It will support the interpretations if the figures show the magnetic chronology and if the geological

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stages are mentioned in front of the data.

o Here again the text must be synthesized as for the descriptive part. The reader runs to read that and that's a pity because these impressive data are here embedded. Lot of questions are opened when regarding this pollen record.

o Probably it would have been better to extract only the main trends and changes in vegetation and compare with the general pattern of climate cyclicity : first the predominance of 19-21 kyrs cycles prior to ~2,58 Ma and then the occurrence of the 41 kyrs cycles after ~2,58 Ma. In lake El'gygytyn, is there different pattern prior and after ~2,58 Ma that points to the Pliocene/Pleistocene boundary? There are few episodes of cold steppe developments just around this date. Does it correspond to that transition?

o Is it possible in this record to detect the different cyclicities and to define a pattern for the response of the arctic vegetation to these climate oscillations? If the cycles are really recorded, can we see repetitive successions signing these cycles as it has been evidenced in other regions?

o Do the authors try to place their record in front of the climate record of Lisiecki and Raymo? Some of the isotope stages are cited. Why the authors do not present the figure with the comparison. ...

o When I have a rapid look to the pollen diagram, I see a regular alternation of the taxa - conifers peaks versus Betula ones for example - that may correspond to cyclic features. This may be shown in a simplified diagram or through the biomes representation.

In conclusion, this paper present data of great importance that deserves publication after the proposed amendments. I recommend publication after revisions.

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