

Review of PhD thesis “Environmental gradients during Late Glacial in Central Europe” by Mgr. Libor Petr

Mgr. Jan Roleček, Ph.D.

Department of Botany and Zoology, Masaryk University & Department of Vegetation Ecology, Institute of Botany, Academy of Sciences of the Czech Republic, Brno, Czech Republic

General comments and evaluation

Mgr. Libor Petr presents a PhD thesis focused on the reconstruction of natural environment and vegetation at different sites of Central Europe since the Last Glacial Maximum (LGM). This is a very relevant focus, as LGM is an important milestone in the development of our nature and we still do not know much about the climate and environmental conditions of the period between LGM and the beginning of the Holocene.

The thesis consists of eleven pages of Introduction, six separate papers and four pages of Conclusions. The Introduction provides an overview of Quaternary climatic and environmental development, with an emphasis on the period between the LGM and Middle Holocene. Three and a half pages are devoted to Late Glacial period, which is not much considering it is the focal period of the thesis. However, the Introduction shows good orientation of the author in the discipline and contains almost no factual errors, as far as I can judge. Unfortunately, I cannot say it provides a good introduction to the topic, because it is rather difficult to read. Its language is rather poor, the style unbalanced and it contains very many typing errors (e.g. *Cottynus cotigria* instead of *Cotinus coggygria*, *Janovská – Jankovská*, *Kripell – Krippel*, *Magyary – Magyar* etc.). Logic of some paragraphs and even sentences is unclear. Common scientific terminology is not often followed (e.g. *indeciduous* for *evergreen*, *wood* for *woody species*), is used inconsistently (e.g. *alluvium*, *floodplain* and *river bottom* used in the same meaning) or even in a misleading way („The *subsistence strategy* of the Central European inhabitants, i. e. introduction of agriculture, use of pottery, occurred around 7 500 BP”). The author cites many recent papers from his field, but in some places he surprisingly refers to somewhat obsolete sources; this pertains particularly to some climatological and chronological passages (e.g. 21 years old book does not seem to be the best source for dating of Pleistocene-Holocene transition).

Because the Introduction is rather descriptive, I expected some fundamental discussion in the Conclusions chapter. Interestingly, formulation of the aims of the thesis in the Conclusions somewhat differs from that in the Introduction (focus on regions that have traditionally been neglected by palynological research is emphasized). However, this and other ideas are repeated repeatedly, which makes the Conclusions somewhat difficult to read. On the last two pages of his thesis, the author opens many disputable issues and demonstrates his ability and willingness to discuss, to adopt an attitude, even a nonconformist one. This part gives several opportunities for questions, which I will use soon. Still, I miss here a more elaborated attempt to link author's opinions and particularly his new findings about the Late Glacial period with what is already known. The author restricts himself to statements that available evidence is fragmentary, accurate dating is necessary and that we still miss detailed palaeoclimatic record for this period from the Czech Republic. While these statements may be true, they seem rather trivial and do not provide the reader with what he expects from the thesis most: improved understanding of the Late Glacial discourse. Therefore, I had to go through the separate papers included in the thesis and tried to find the expected answers there.

Two of the papers are published or accepted for publication in international scientific journals, three other are submitted for evaluation and one of them is an unpublished manuscript. During my evaluation, I have not paid much attention to last two papers that relate to the environment of the Late Glacial period only marginally or not at all.

Paper 1 (Šúr – a former Lateglacial and Holocene lake at the westernmost margin of the Carpathians) submitted to Preslia

This is a potentially very valuable first author paper, synthesising information on past environmental conditions from several different proxies: geochemistry, pollen, plant macroremains and diatoms. Also the position of the study site on the boundary between Carpathians and Pannonian Basin makes the study interesting. However, during reading I struggled with similar problems as in the Introduction and Conclusions of the thesis: poor language, complicated style and many typing errors. My factual question will be read later (also for the other papers).

Paper 2 (High vegetation and environmental diversity during the Late Glacial on the example of lowlands in the Czech Republic) – an unpublished manuscript

Finally a nice synthesis of Late Glacial in the Czech Republic! Good language, smooth style, few typing errors, good discussion. What a difference compared to paper 1, yet also a first author paper!

Paper 3 (Late-glacial and Holocene environmental history of an oxbow wetland in the Polabí lowland (Elbe River, Czech Republic); a context dependent interpretation of a multi-proxy analysis) in press in Folia Geobotanica

This paper provides a well-elaborated multi-proxy analysis and multi-perspective synthesis and discussion about environmental history of one site in Bohemia. I liked general concept of the paper very much, particularly the plurality of views. Although the paper is full of results (graphs and tables), it still remains clear and smooth. There are some language issues, but not too many.

Paper 4 (A continuous record of deglaciation and postglacial environmental change in the Bohemian Forest, Czech Republic: the history of a central-European upland in the last 17,500 years) submitted to Quaternary Science Review

This study provides interesting results of a multi-proxy analysis, though according to my feeling not much ecological, the less so botanical. Results of palaeobotanical analysis are interpreted more as a (complementary) source of palaeoenvironmental information, than as a source of information on the development of vegetation. Still it is useful and as a nice example of interdisciplinary co-operation should be followed. Well written paper, with rather few language issues.

Conclusions

The qualities of the thesis are unbalanced. The Introduction, Conclusions and the first paper are below a common standard of international scientific work. By contrast, papers 2, 3 and 4 clearly show the abilities of the author to participate in a scientific team or even to lead the

research. The results have generally high scientific value, particularly thanks to the multi-proxy approach promoted by the author, whose contributions are at the same time substantial and positive. As a whole, the thesis is a significant contribution to the knowledge of natural environment and vegetation of Central Europe since the Last Glacial Maximum (LGM). According to my opinion, the thesis fulfils the requirements for a PhD thesis and I bring to the commission the recommendation that Mgr. Libor Petr proceeds to further stages of the dissertation evaluation process.

Náměšť nad Oslavou, 14 September 2013



Mgr. Jan Roleček, Ph.D.

Questions and comments

Paper 1

The interpretation of the age of the analyzed sediments is not fully convincing. Radiocarbon dating of the oldest palynologically interpreted layers is missing. Please, summarize your arguments for Late Glacial age and against Early Holocene age. (Remark: labels of main pollen zones (S1–S3) are switched in the text and in the table, which may be confusing for the reader).

I do not understand the following argument and conclusion: *Even though it was a Mesolithic settlement, a dominating human influence on the landscape (by forest burning, for example) cannot be assumed. This means that the landscape was covered with an open-canopy forest, locally even of a steppe character, see the high proportion of Artemisia pollen in the Šúr profile.* Do not you think a mosaic of closed forests and dry steppe could give a similar signal? Do you think the Mesolithic people were not able to shape the landscape by fire? Are there other possible drivers of vegetation structure?

The break of the last glacial/Holocene periods manifests in the profile as a rapid drop in the amount of Pinus pollen. At the same time, there is an expansion of woody species of the Quercetum mixtum community such as Quercus, Corylus, Ulmus and Fraxinus. Could it alternatively be Preboreal/Boreal transition?

Paper 2

Question: what do you mean with *high vegetation* in the title?

Paper 3

The interpretation within the frame no. 3 (meander infilling as a result of random processes) is rather general. More specific comments would make it more relevant.

It is concluded that *processes which do not fit the general interpretational frame of global or local changes are emphasized. These processes could occur by chance as a result of the*

heterogeneity of the alluvium environment. Until I understand, the paper rather says that whole analyzed sequence may be interpreted out of the traditional interpretational frames. I find this difference important – please state your position clearly.

Paper 4

Is the paper accepted now?

You write: *Roughly 10.5 kyr cal BP was the time when the last significant change in the development of the natural environment of the Bohemian Forest took effect.* What about forest spread to higher altitudes (rise of the treeline) that took place later? Generally, it seems to me that in the whole thesis, vegetation-driven changes of the environment are not sufficiently appreciated. Even though the climate is stable, natural environment may change a lot due to successional and secular changes of vegetation cover. Please state your position clearly.

Thesis conclusions

You write: *Discussions have hitherto revolved around the existence of primary non-forested land and a dark forest. This is trivial in light of published findings because such a contrast almost did not occur.* This is a strong and rather unclear statement. Please explain it clearly.

That there is a gradual transition between forests and non-forested land has been known for a long time. This fact got, however, obscured by emphasis on the two opposing extremes, that is, non-forested land and a dense forest. Please explain why you find the traditional approach inferior.

I avoided an interpretation involving a hypothesis concerning the fashionable topic of northern glacial refugia of woody plants. Why fashionable? Is there any difference between fashionable and modern/topical in your understanding?