

Review of the PhD thesis of MSc. Jiří Mašek

The PhD thesis under review by Jiří Mašek, entitled "*Response of tree rings and NDVI of Central-European conifers to extreme climatic events*", is conceived as a set of four research papers, which are preceded by a theoretical introductory part and concluded with summary conclusions. The topic is highly actual, especially in view of the ongoing climate change. The author has thus demonstrated his ability to keep up with current scientific trends.

The structure of the introductory part of the thesis is very well conceived in terms of content and introduces and presents well the studied issues. The state of the art section presented is highly expert and has a logical continuity of the different parts. The author has also demonstrated in this part a very good orientation in the studied issues, which is evidenced by the number of cited sources. At the end of the introductory part, the objectives are clearly defined and outlined. The justification of the need to address the set objectives is appropriately presented by the author during the preceding parts of the text.

I have only very minor comments on the content of the introductory part. For example, in the chapter that introduces topographic conditions that may modify the sensitivity of trees to extreme climatic events, the author dominates the description of elevation. Other topographic parameters are only listed. I would have expected a more detailed presentation of these, including their theoretical influence on tree sensitivity to climate. The only technical remark I have is on slope gradient: it is not the main parameter that controls the occurrence of landslides or debris flows (the geological structure, the thickness of the weathering mantle, etc. are also key). But I agree that the influence of these parameters on the results of the overall tree sensitivity strongly depends on the scale studied.

Furthermore, some of the information in the introduction is repeated in several places. In particular, information regarding the change in limiting factors for tree growth with change in elevation. However, given that this is also one of the main findings of the thesis, this is understandable. The author appropriately and convincingly justifies the choice of the NDVI parameter for his research, but it is not entirely clear from the introduction whether or how tree-ring widths and remote sensing data were combined/compared with each other.

The enclosed studies, which form the core of the thesis, have been published in top scientific journals and there is no doubt about their quality, even taking into account the demanding peer-review procedures already carried out. It is not clear from the text what is the status of the latest study submitted for publication in the *International Journal of Biometeorology*. I have only a minor criticism of the introduction and presentation of the individual studies in the introductory section. I

would have welcomed an overall summary of the basic findings and the overall contribution of each of the included studies. At the same time, a better introduction and presentation of the individual studies would have been helpful.

Considering the focus of the individual studies and the quality of the results obtained, it can be clearly stated that the proposed objectives of the thesis have been fully met.

The author has used modern methods and procedures to develop the thesis, but their description could have been more detailed in the introductory part, which would have improved the quality of this separate part. On the other hand, I understand that individual specific methodological procedures are always presented in the individual studies, which would lead to repetition of the same information. From a formal point of view, the work is of an excellent standard, and is supplemented by appropriate graphical figures.

Questions and suggestions for discussion:

- In the introduction, the author only mentions that the trees were "cored". Could he give the general rules he used for sampling the trees?
- In sub-chapter 7.1.2 he writes that in Šumava and Kokořínsko he sampled outside stands affected by disturbance. Which disturbances were involved?
- Trees in general show age-dependent sensitivity to external factors (including climate), which may be reflected in changes in the frequency of occurrence of pointer years. How to deal with this problem in addition to detrending?
- In the case of tree rings, the author worked mainly with their widths. Does the author see the point of using other tree-ring parameters (e.g., ratio of early wood and late wood or changes in anatomical parameters)? Would these analyses be applicable, or what results would he expect?

Final evaluation

Overall, it can be said that the work presented is of a high professional standard. The author has demonstrated a deep knowledge not only of the researched issues, but also the ability to professionally process and interpret a considerable amount of data. The thesis gives a superior professional and formal impression. Overall, I recommend the thesis for defence at the Faculty of Science, Charles University in Prague, and after successful defence I propose to award Mgr. Jiří Mašek the degree of Ph.D.

Ostrava, 13. 3. 2024

prof. RNDr. Karel Šilhán, Ph.D.

