

Review Bak et al. 2025 preprint “20th century ecological disasters in central European monoculture pine plantations led to critical transitions in peatlands”

This study investigates how different disturbance events affected the forest structure and a peat bog (including its hydrological and biochemical properties) over the past 2000 years, and aims to recognize and standardize patterns that could be applied to other sites. Even though the discussion deviates quite far into describing the full details of the insect outbreak and the forest fire, which are not really necessary to understand the magnitude of these events, the manuscript is overall decent. Figure 7 is inspiring and a nice conclusion of the manuscript.

I am a bit skeptical that no attempt was made to explain the strong fluctuations in the vegetation composition, according to the PCA, and I do not agree with the conclusion that the PCA shows that the rapid change already started after 1775 AD.

Abstract: I found the abstract not informative enough. Which palaeoecological proxies? How long was the record that you studied? The outbreak of what?

Introduction: Please check the language again, if all statements are in written language and not spoken language, and if no articles are missing (I think some are). I think it would be worth to consider to move some sentences around to give the introduction a better, logical structure from beginning to end.

Line 39: I would replace the word ‘precious’ with a less personal adjective.

Line 42: Maybe “simplified linkages” can be explained in the text so that the reader doesn’t have to open the referred article; it is not clear to me what these simplified linkages are.

Line 45 – 51 break up the flow of the introduction, which I think should move from “negative impacts” to “recognize how these impacts work and used to work”; the description of the forest structure in Poland could maybe be moved.

Line 73: also here I think it would be suitable to mention what kind of insect it was. Bark beetle?

Line 76: please replace ‘dramatic’ with ‘extreme’

Line 76 -78: This seems insufficiently explained. Did all three studies mentioned in line 75 use the same sediment core? Did they search for evidence but it was not found in the core, thus suggesting that evidence did not preserve?

Line 78 – 79: about small peatlands, seems out of place here. The text makes sense without referring to the size of peatlands here.

Methods:

Most of the methodology reads fine and is logical to me, but this being the first manuscript that I’m reading that studies Nd isotopes I did not get enough information about why and how it is used. Sometimes briefly referring to literature is not enough. It probably would suffice to borrow a few sentences from the publication by Marcisz et al (2023b).

Line 146: replace 'are' with 'were'.

Line 148: It makes sense that these two radiocarbon dates were rejected from the model, but I don't understand the explanation in the text.

Line 182: Perhaps you could keep the same terminology here as for the previous part about the plant macrofossils.

Results:

Figure 2 looks very nice, but Figure 3 and Figure 4 could perhaps be a bit summarized and simplified (further). This is only an aesthetic opinion, though.

My biggest comment on the results is on the statistical analysis. I am quite skeptical about how a line was fitted through the data points (Fig 5), as the PCA values seem quite stable between 1775 – 1920. Have you already tried to plot the rate of change?

In the caption of Fig 3 it should be mentioned that DWT is calculated from the testate amoeba. And perhaps it should be mentioned again that the two largest recorded calamities are included again, like in Fig 2.

The second line in Fig 3, marking between zone 2 and zone 3, should be replaced with a thin one. It actually confused me.

Line 348: microscopic charcoal already starts to increase halfway the phase, it appears.

Line 362: It is already clear from Fig 3 that you did not reconstruct DWT up until zone 4.

Line 367: this is not a result but rather a point of discussion, or conclusion.

Line 413 – 414: this is about zone 4 and not zone 5.

My suggestion is to move Table 2 to the supplementary materials, since values are already displayed in Fig 2.

Discussion

I'm missing a discussion about why the fluctuating values in the PCA don't appear to reflect any significant environmental changes. So what caused these fluctuations? Is the pattern unique for this record or was it found in other studies as well?

L 488: I'm sure the fitting of the complete function was statistically significant, but the portion 1775 – 1900 seems to be deviating from the data points.

L 500 – 501: those are quite lot of references just to mention that this is the first record that captures a much longer history of the Notec Forest.

L 502 – 505: This sentence was quite confusing to me. Do you mean to say, that the analysis of your record allow for the reconstruction of not only the forest but also the peatland itself, and how it reacted to forestry practices?

L 512: I think you meant replaced, rather than misplaced

L 530 – 532: You only investigated the last 2000 year of the forest.

L547 – 550: See my previous comments on Fig 5 and L 488.

L633: Have you tried to isolate butterfly wing scales (Girona, 2018)?

L690: what are stable ecosystem links, exactly?

L703: are these bark beetle outbreaks? And this was not evident in your record?

L725: It could also have played a role that Mialy is situated next to a railroad and your study site was surrounded by trees.

L756: How is slow tree growth affecting forest fires?