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Anonymous during peer-review: Yes No
Anonymous in acknowledgements of published article: Yes No

Recommendation to the editor

1) Scientific significance

Does the manuscript represent a substantial contribution to scientific progress within the scope of this journal (substantial new concepts, ideas, methods, or data)?

Excellent Good Fair Poor

2) Scientific quality

Are the scientific approach and applied methods valid? Are the results discussed in an appropriate and balanced way (consideration of related work, including appropriate references)?

Excellent Good Fair Poor

3) Presentation quality

Are the scientific results and conclusions presented in a clear, concise, and well structured way (number and quality of figures/tables, appropriate use of English language)?

Excellent Good Fair Poor

For final publication, the manuscript should be

accepted as is

accepted subject to **technical corrections**

accepted subject to **minor revisions**

reconsidered after **major revisions**

I am willing to review the revised paper.

I am **not** willing to review the revised paper.

rejected

Suggestions for revision or reasons for rejection (will be published if the paper is accepted for final publication)

This is a very interesting and challenging research topic that has the potential to open up new avenues for the accurate reconstruction of past vegetation and biomass patterns globally. By using an extensive dataset from standardised pollen trapping experiments around Europe, the manuscript attempts to provide thresholds for the local presence of a number of key tree species in the vegetation history of the region. By focussing on pollen accumulation rates, the authors provide the first continental-scale dataset that is relevant to reconstructing past changes in biomass, tree migration rates, palaeo-population dynamics and so on. The results could even be used to help anticipate the effect of climate change on pollen production in the future, which could have implications for allergy sufferers in the region, forest health and conservation. The manuscript includes some very involved and novel graphical presentations

in R and much relevant literature.

Unfortunately the manuscript is not yet ready for publication, in my opinion. The shortcomings are detailed below and are all quite easy to solve with some moderate revision of the text, particularly the Introduction and Methods, which currently lack coherent links to the study aims. I really hope the authors will make the effort to modify their manuscript, as this work is certainly novel and has great potential to be a turning point in palaeoecological and biogeographical research.

Major comments:

There is a surprising number of grammatical mistakes given the authors involved. Some of these mistakes are identified in detailed comments, below, but thorough proof reading would be helpful before resubmission.

The manuscript was read by native speaker.

The Introduction would benefit from tighter structuring and should emphasise the broader context for the research (i.e. beyond palynology - see suggestions in the first paragraph above). Perhaps breaking it into subsections, each dealing with one of the aims, would make the text more focussed, e.g. Relationships between PARs, climate and vegetation cover; The importance of long-distance transported pollen; Applicability of PARs to palaeovegetation reconstruction. At the moment, the Introduction seems to be largely directed at Aim 1, whereas Aims 2 and 3 are not adequately introduced. This leaves the reader wondering why certain methods of analysis were chosen later in the paper. The current text could be shortened in places without loss of information. Taphonomic processes that affect lake sediment pollen should be introduced in the section relating to fossil PARs, not at the end of the Discussion (Section 4.4), as these are critical to interpretation.

The first paragraphs were rewritten to emphasize the importance of this study and the three questions were separated into paragraphs introducing them as suggested.

In the Methods, it would also be good to split sections 2.3 and 2.4 into 3 sections dealing with each of the 3 aims. -> Done

Section 2.4 mentions selecting fossil sites within each trapping region, but were any criteria used to make the selection? Were records filtered according to taxonomic resolution or the number of radiocarbon dates? As PARs are highly dependent on accurate chronologies, some mention of chronological control should be made in this section.

We added constraints for the selection of sites. However, taxonomic resolution is not a criterium here as we only investigated abundant taxa that are usually identified by all investigators.

Table 1 should include the number of dates contributing to each site's chronology. Section 2.4 describes a statistical clustering technique that is poorly explained. Please give some more details to explain how the method works and why it is the most appropriate option for addressing Aim 3.

We changed the text to emphasize the purpose for using a one-dimensional clustering metode here. The method is widely used, referenced and details of how it works can be easily found elsewhere.

A number of new methods are introduced in the Results and Discussion sections (see below) – these should first appear in the Methods.

All methods are described in the method section, some are mentioned again in the result section to remind the reader how the values were derived.

In Results, the “3% wide bin” approach requires more explanation and justification. It seems to be an arbitrary solution to finding a trend in the data, rather than based on any objective criteria.

The 3% wide bin was found exploring the data; it was not an a priori condition. We indicated this in the result section.

Please try to avoid this perception by making it clearer how and why this approach was taken. It would be best to add this to the Methods, rather than introducing new data treatments (i.e. the binning approach and regression analysis) here in Results.

In the result section on LDT we changed “regression analysis” for “fitting a linear relationship”. This is also and was present in the method section; we only repeat it here to explain the values. We agree in general that the methods should be clearly stated in their section. However, it is sometimes easier to add detailed information on the data treatment with the description of the results.

The authors claim that a threshold of 30 grains/cm²/yr indicates long-distance transport (LDT), but Fig. 4 shows that only *Picea* and *Quercus* had LDT components below the error bars for traps within the species’ geographic ranges. This is important to note because researchers could apply the threshold and mistakenly reach the conclusion that it denotes the absence of the species (a key question in island biogeography and post-glacial tree migration). This makes Fig. 5 potentially misleading. Maybe a better approach is to consider different thresholds for each species – the PAR threshold of 30 grains/cm²/yr might be appropriate for *Fagus*, but not for other taxa (Fig. 4b). The authors should also explain why 200 km is an appropriate distance when much better results are obtained at greater distances. The choice of 200 km is now motivated in the method section. A note on *Fagus* was added to the result section as well as a general note of warning. A note of warning was also added to the discussion.

Section 3.4 includes a t-test for differences between fossil and trap PARs, but it is unclear why this was done and which aim it addresses.

The motivation was added to the method section and the text in the result section was revised to

Section 3.5 includes detailed descriptions of 8 different taxa. These are very long and include too much interpretation for a Results section. Consider removing these or reducing the descriptions in the manuscript to a single sentence per taxon and put the longer interpretations (existing text) in the supplement. The ad hoc exclusion of *Betula* data from Turkey and Georgia seems difficult to justify (see specific comments) and requires some explanation in the text.

Ok, we moved this description to the supplementary, extracted the most important information per species into a one sentence and created new Section 3.5. We wanted to express in the first sentence of the *Betula* section, that other species than *B. pendula* and *B. pubescens* grow in Georgia and Turkey. Traps from both areas were included. Rephrased.

The Discussion seems to say that taphonomic processes can be disregarded in comparing trap and fossil pollen.

The sentence in the beginning of the discussion states that modern and fossil values are comparable “in spite of different taphonomic processes”, meaning that pollen collection in

the trap is markedly different from the accumulation in traps. The reference to Lisitsyna et al. (2011) comparing pollen accumulation in traps to lake was added.

It is hard to see how this can be claimed without a full explanation of those processes. The authors link pollen production to primary productivity gradients (latitude), yet do not consider how these gradients might have changed during the Holocene due to millennial-scale climatic variations.

We only compare the modern pollen trap data to the latitudinal gradient, not the fossil. Where we search for analogous fossil values to the PAR in the traps we do interpret these links with a changing Holocene climate.

This makes the comparison between fossil and trap data quite complex and these complexities should be assessed in the Discussion.

We mention Corylus and Pinus each as an example of taxa which is more abundant in past one in the present due to climatic variations.

The section about long-distance transport could also consider how elevation might affect trap results – a trap placed in Fagus forest will presumably catch more pollen than a trap on a treeless mountaintop, even though both traps are within Fagus's geographic range.

Elevation has little influence on the deposition of long distance transported pollen when considering PAR. There is a large influence when looking at percentages, but the amount of pollen coming from 200 km or beyond landing on the mountain top is similar to what should arrive in the valley.

We added two sentences in the Discussion. Even though, the present dataset contains several altitudinal transects, linear model between altitude and PAR does not have much sense, since variability between them are clearly larger. Good topic for next analysis by linear mixed models.

The use of a Gaussian Plume dispersal model is mentioned for the first time in the Discussion, but should be introduced in Methods.

We introduced this in Methods, added sentences in Results and improved sentences in the Discussion.

Section 4.3 has lots of potential to explain the importance of linking modern and fossil PARs, but gets very detailed very quickly, making it difficult to see the overall picture.

Please try to broaden the scope here and use the site-specific details to support your argument. Help the reader understand why it's important that no modern analogues for early-Holocene Corylus PARs exist in Europe, for example.

The text has been rephrased to explain the importance of the examples.

The limitations and problems section (4.4) is well thought through and contributes substantially to the paper's scientific value. However, it leaves the reader perplexed as to what are the strongest points of the analysis. Which results/outcomes of the paper can we regard as being the most robust?

All the results and insights are useful. The LDT limit is probably the most robust single number. For the rest, you indicated above that uncertainties should be stated. Well here they are.

Specific line-by-line comments:

Page 2, line 1: Consider putting a comma after "modern" and replacing "diagrams" with "assemblages and the reconstruction of past vegetation communities in space and time" to expand the scope of the paper from a purely palynological one.

done

2: Replace "Such" with "Modern" [to avoid confusion]

done

4: “European latitudes” sounds strange as the same latitudes are found in N America and E Asia. Consider “Europe” instead

done

7: Replace “are still collecting” with “still collect”

done

9: “Comparisons... show comparable values” sounds strange – consider “similar values”

done

10: Replace “fossils” with “fossil”; this sentence is hard to understand – are the fossil sites located further south and downhill compared to the trap sites, or vice versa? What is meant by “similar high values” in this context. Please rephrase more simply

Rephrased to “Comparisons for temperate taxa often demonstrate that similar trap values are found further south or downhill.”

11: The sentence “While modern... do not occur” is unclear. Do you mean that, for some taxa, PARs in the past were much higher than those recorded in the traps?

rephrased

12: Replace “PAR’s” with “PARs” and “publically” with “publicly”

replaced

13: Replace “serves improving” with “serves to improve” or simply “aids”

replaced

19: I suggest adding a statement before the opening sentence that highlights the relevance of pollen analysis. This would provide a broader context for the paper and might attract non-palynological readers!

Sentence added.

21: Comma after “tree-line”

done

22: “procuring” should be “producing”

Changed according to major comment.

Page 3, line 1: place commas around the phrase “or... period of time”; also note that “is better” should be “are better” to agree with rates

done

3: It would be useful to point out what makes this paper so groundbreaking, as the sentence seems lost without such elaboration

“afforestation” replaced by “spread of trees”

8: Inconsistent use of “PAR” vs “PARs” (cf. line 6, this page); change “sediments” to “sediment”

Corrected to PAR.

14: Comma needed after citation

done

16: Ditto

done

18: Replace “numerable” with “numerous”

done

19: Replace “comparably” with “comparatively”

deleted

21: “were based” should be “was based” to agree with construction.

done

26: “of the previous, as well as the year of flowering” – it is unclear whether this means the previous topic (tree biomass) or the previous year. Consider “of the year of flowering and previous year”

done

27: The question posed here does not arise from the previous statements. You state that pollen deposition rates represent absolute tree abundance, but then say that interannual PAR variations are determined by weather, so it is unclear why climate (which is different to weather) or site conditions (whatever that means) would raise questions. Please rephrase this to help readers follow your arguments

Sentences changed to “However, the absolute pollen deposition must be averaged from several years,...”

28: The sentence “Comparing... suggest...” would make more sense with “A comparison of... suggesting”; this sentence might be better placed before the question above to provide context

This was changed and moved.

30: What is the basis for interpreting the PAR:weather relationship as reflecting primary productivity of the tree? Isn't flowering (and pollen production) specific to the phenology of each species and may have many different weather triggers according to each species? See Autio and Hicks 2003 <https://doi.org/10.1080/00173130310017409>. Your primary productivity theory cannot explain masting or trees that flower in response to stress. Please rephrase this sentence and the following one and include some references in support of your claims. What's the basis of the CO2 argument?

Whole paragraph rewritten, reference added.

32: Delete “Already” [awkward] or replace with “As early as the 1940s”

done

34: Place a comma either side of “however”

done

35: Do you mean “then” rather than “than”?

done

How is the climatic interpretation here different to what Davis and Deevey proposed?

Sentence changed: “could also be due to a change in these parameters and not only due to tree abundance”

Page 4, line 1: The “initial question” has not been introduced previously. Please elaborate on this and explain to the reader why it is important to determine the long-distance component more accurately, including references (e.g. Markgraf 1980, Grana 19, 127-146). It's a very important question for island palaeoecology, where the presence or absence of pollen can often be used to decide if a species is native or exotic (e.g. <http://doi.org/10.1111/j.1365-2699.2008.02012.x>, and <http://doi.org/10.1126/science.1163454>). Splitting the long-distance aspect off into a standalone paragraph might be a good idea.

The “initial question” was introduced by Hesselman 1919, cited here as a second study. New paragraph produced.

7: Delete “as references helping” [unnecessary]

done

8: Comma needed after “Finland”

done

9: Change “applied” to “applied to”

done

16: Add comma after citation

done

20: Ditto

done

32: This aim seems fine, but the preceding introduction adds a lot more variables, such as site condition, CO₂ fertilization, weather of the flowering season etc. Perhaps you could explain why only climate and forest cover are retained in the aims?

Because they were not studied, the weather was. We hope this decision is clear from paragraph 1.2.

Page 5, line 3: The 3rd aim does not seem to arise so easily from the introduction. Could you perhaps provide some more context in the introduction to tell readers why this aim is important and necessary?

This is introduced by subsection "Modern analogies"

8: Replace "the" with "their" or simply delete; I suggest putting the names of the trap regions in this section in capital letters, e.g. "North Boreal" instead of "north boreal" to make them stand out more

done, capitalized in whole text

Page 6, line 21: Comma after "overview"

done

29: Replace "In consequence" with "Consequently,"; replace "might overgrow or cover" [future tense] with "might have overgrown or covered" [past tense]

done

Page 7, line 5: Provide a citation to Tauber's paper where these components are described.

Tauber 1967 provided

29: Add a comma after "PAR"

done

32: "in the pollen type described above" – perhaps "in each of the pollen types listed above" would be clearer

done

34: "these taxa" – do you mean the taxa not suitable for comparison, or the taxa that were suitable? Unclear. It is also unclear how the pollen traps were placed at exactly 200 km from the edge of the plant distribution limits. Do you mean >200 km? Or within 200 km?

Yes, this was unclear: suitable replaced with possible, and rephrased to: "Linear regression between this distance and the decadic logarithm of PAR was used to explore thresholds of long-distance transport (hereafter also as "LDT") at 200 km from their mapped distribution limits."

Page 8, line 2: Maybe "target taxa" instead of "taxa considered"

done

4: Why was log₁₀ PAR used instead of PAR? Justify

We expect a logarithmic decline of PAR away from the source and added this observation: "Initial observations showed that PAR dropped rapidly away from the distribution of the parent tree and did not decline at the same rate at larger distances. We therefor compared distance to the decadic logarithm of PAR, applying linear regression to explore thresholds of long-distance transport (hereafter also as "LDT")."

8: Replace "Per" with "For"

done

10: Add comma after "comparison"

done

12: “logged PAR” – do you mean “log-transformed PAR”? It is unclear how this sentence compares traps and fossil data – it seems to only deal with trap data – please expand.

Expanded and changed substantially by your major comments. Log-transformed and log-normal in whole text.

15: “at level” – replace with “at the level”.

done

The description of the methods here is wordy but does not really convey why one-dimensional clustering was the most appropriate method and what statistical criteria were used to form the clusters. More detail about the method would be useful.

Sentence “This method splits the univariate data in the way that the total of within-cluster sums of squares is always minimum.” added

“The classes produced were used to facilitate the comparison between trap and fossil data and to match the trap values with analogous situations in the past. The aim of this comparison was to find traps with similarly high values for individual taxa that compared to the highest average fossil PAR” – these sentences are quite wordy and seem to be saying “These classes helped us compare trap and fossil data and to link high trap PARs with high fossil PARs of the past”.

Changed.

Please explain why only high values were considered meaningful for comparison.

“We dealt only with the highest class in each fossil sequence, because maximum abundance of several our target taxa was used as a stratigraphic marker of the Holocene period.”

19: The grammar of this sentence needs attention

done

23: supplementary material?

deleted

27: How does a “mean trap assemblage” differ from a “trap location”?

“Considering the trap record with 3 years” we excluded some traps. Here we inform about the number of traps in the database and then the number of traps in the analysis.

28-30: These sentences describing climate and elevation might be more appropriate for the Study Area section (2.1)

Yes and no, we understand it as a result of our data extraction from the climatic dataset. The range of elevations was obtained after the compilation of all traps in the database, thus we hope it can stay in results as well.

Page 9, line 2: Comma after “environments”

done

3: Comma after “type”

done

6: Explain briefly what makes these differences noticeable

Changed to: “Dominance of oak and hornbeam at Temperate/Mediterranean sites in the lowland and pine and birch at Arctic/Alpine and North Boreal sites show similar stability in the Holocene perspective. Vegetation history at the rest of the fossil sites show more dynamic development”

10: Delete “Nevertheless”; hyphenate “log-transformed”;

done

the text here refers to “total PAR” but the figure referred to (Fig. 2) only displays “tree PAR” – please indicate where the total PAR data can be found

referred to tree PAR

12: How much variance did elevation explain on its own? This information is missing from Table S4

Relationship of the elevation and tree/total PAR in such a large dataset would need to be tested by mixed models, which would allow to separate different transects in Alps, Georgia, Pieria, Šumava, Krkonoše... Nice idea, but it would be too much for this paper. Simple linear model show that elevation itself explains less than 5%..

Page 10, Fig. 2: This is a very comprehensive figure! However, the absence of data for the Georgian sites should be explained somewhere in the text. Vegetation data were collected for the Georgian pollen traps in Filipova-Marinova et al. 2010

(<https://doi.org/10.1007/s00334-010-0257-z>).

Thank you, unluckily our data source does not cover Georgia and vegetation data do not contain general forest cover. Fig. 2 in Filipova-Marinova et al 2010 contains only some tree species.

Page 11, line 1: “affect” rather than “effect”. It’s unclear what relationship is meant here – clarify. Also, consider “tree species” to replace the potentially confusing wording “different trees”.

done

4: Comma after “grasses”. Why were grasses included here and not in the previous analysis? This is not mentioned in the Methods and should be explained somewhere.

We added to Methods: “...explain the variance in average pollen accumulation of total and tree PAR”

5: Hyphenate “log-transformed”

done

8: Replace “pattern, the” with “pattern, so the”

done

9: Replace “are” with “is” to agree with “distribution”; same problem in next line

done

15: What is meant by the “3% wide bins”? This seems to be a methodological decision that needs further explanation. How was the 3% value determined? Why not use a more ‘usual’ value like the lower quartile? What is the regression model referred to here? The sentence here is very difficult to understand and should be rewritten more clearly.

Changed to “Exploring the data showed that a 3 %..”

18: Is “PAR” singular or plural in this sentence? Perhaps using PAR for singular and PARs for plural would avoid confusion?

Singular grammar corrected

19: What is meant by “distribution limit” – the geographic distribution or distribution of points on the plot?

changed to: limit of geographic distribution

21: Comma after “taxa”.

done-

Regression analysis should be mentioned in the Methods rather than Results.

It was at page 8 line 4. / we keep it there.

In this section, it would be useful to mention which taxa show a significant difference between LDT pollen and local pollen (within the species’ range).

Yes, this comment is very important, thank you. It led us to reconsider the analysis for Fig 4. All regressions were significant, but we realized that we ignored values within the distribution area. Now, they are included. (All regressions are significant, of course). LDT is

higher and more correct.

26: Delete “here”

deleted

29-33: Where are these results presented?

added reference to Fig 5 again.

Page 12, line 1: Replace “Minimal” with “Minimum”

done

2: Commas after “Cyperaceae” and “particular”. Please provide a supplementary figure that shows the distributions being described in this paragraph, or consider omitting this information about frequency distributions as its relevance is unclear.

Distributions are in Figure 5 in paired histograms.

3: It’s hard to understand what is meant by “fossil PARs show a local maximum in the frequency of low values, which does not occur in the traps”, especially since there is no associated figure.

Pointing out “local maxima” was deleted.

5: Commas after “types” and “these”. It is unclear why this analysis was done or what the “pairs” are comprised of – please explain.

“pairs of trap and fossil data”

6: Comma after “comparison”

done

Page 13, line 3: Comma after “PAR”

done

5: What are “maximum averages”? Do you mean average maxima? Hyphenate “site-by-site”

Changed to highest class of fossil PAR

7: Why are results for all these 8 taxa included, while others are in supplementary material? How were the 8 taxa chosen and are they all important? Also replace “description” with “descriptions”.

We followed your suggestion from major comments and we present all taxa in the main paper by one sentence. and in detail in the supplementary.

8: Missing word – “supplementary material” or use “supplement”

done

12: Delete “the” before “different”

done

15: Comma after “populations”

done

17: Comma after “Sumava”

done

Page 15, line 4: Explain why the Georgian and Turkish traps were excluded (this information is in the responses to reviewers, but not in the text). It’s hard to understand why these countries were excluded because of the presence of other species of *Betula*, when the same approach was not taken to *Pinus*, *Fraxinus*, *Fagus*, *Carpinus*, *Quercus* – all of which have different species in the Caucasus and Anatolia. The map, Fig. 6, clearly shows *Betula pendula*’s range overlapping with the Georgian trap locations.

We wanted to express in the first sentence of the *Betula* section, that other species than *B. pendula* and *B. pubescens* grow in Georgia and Turkey. Traps from both areas were included. Rephrased: Some other *Betula* species can appear around traps in the Caucasus and Turkey.

Page 16, line 4: There are at 6 species of *Corylus* in the Caucasus and *C. colurna* occurs in both Georgia and Turkey, so perhaps add “...and other species” here.

done

5: What do you mean by “as discussed in the main text”?

deleted

8: Replace “small” with “low”

done

Page 17, line 7: Italics for *Picea abies*

done

Page 19, line 10: Add “The” before “highest”. Change “Balkan” to “Balkans”

done

12: “seem too high” – this is interpretation and misplaced in the Results section

deleted

Page 20, line 4: Lagodekhi misspelled

done

5: Semicolon after “Georgia”

done

6: The highest...

done

Page 21, line 4: This is the first time taphonomy is mentioned in the paper, which seems a significant oversight.

According to the major comment mentioned in the Introduction.

7: Add comma after “locations”

done

11: “On the regional scale PAR” – replace with “On a regional scale, PAR”

done

13: If latitude influences primary productivity (and thereby pollen production), then surely elevation has a similar effect?

Yes, we added sentences on the end of section 4.2.

15-16: This seems to be saying the same thing as lines 8-11. Or do you mean average PAR, or regional PAR here?

Yes

Page 22, line 2: How do the PARs for local vs long-distance presence from that study compare to the thresholds in this paper?

Sentence added: “Our general threshold 80 grains cm⁻² y⁻¹ is slightly lower than their range for Pinus and Betula in arctic-apline zone 100-200 grains cm⁻² y⁻¹.”

8: Replace “larger” with “higher”

done

– and explain how the fall speed influences pollen thresholds.

Reference to Table S6 added.

It’s hard to tell whether the data support the authors’ claims about thresholds here as the *Fagus* results (Fig. 4) do not cover the same distance range as the *Corylus* results. Consider revising this statement.

Statement revised.

18-20: Remind the reader in a few words why fossil data from these areas were considered unreliable.

Reliable fossil PAR record is produced in a stable sedimentation environment. We found only fuzzy record and we do not have detailed knowledge of the sedimentation processes as mentioned on the end of the first paragraph of 4.4.,

21: Split “for the”

rewritten

22: Is PAR plural here?

rewritten

24: Comma after “percentages”

done

Page 23, line 2: Please provide a source for the statement that nitrogen increases pollen production in other tree species independently of changes in forest composition.

We added Pers-Kamczyc et al 2020.

Please provide details of the CO₂ experiment – were the levels of CO₂ comparable to the current climate, i.e. is the recent increase in atmospheric CO₂ sufficient to explain the recent increase in pine pollen in the Brandenburg forests?

They fumigated with 200 microlitres per liter which corresponds to 200 ppm more than the environment. This difference is twofold higher than the rise of CO₂ from 1900 (100 ppm). CO₂ itself can not explain that, you have to take into an account the growing volume, nitrogen enrichment from fertilization and possible interactions.

12: Make “percentage” plural

done

23: Comma after “sites”

done

Page 24, line 1: “in boreal region result above” – seems to be a word missing here
swapped with “are”

3: This section (4.4) has many sentences starting with “Nevertheless, Although, Also, Despite” – this stream of contradictions makes the argument seem disjointed.

done

6: What are some examples of these modern processes? This statement assumes that these are common knowledge.

“such as pollen from trapped insects”

8: Replace “stringer” with “stronger”

done

13: How the “best available” sites were chosen should be elaborated in the Methods

added

15: Comma after “available”

done

20: Replace “high” with “large”

done

25: In this context it might be worth referring to Tauber’s experiments with roofed and unroofed traps, where the roofed traps would have presumably avoided any direct pollen fall.

I think that it is quite clear, that when leaves fall on the opening, that less or no pollen is coming.

28: Comma after “dataset”

done

29: Replace “is” with “are”

done

Page 25, line 7: Double check Conclusions once other changes have been made (also Abstract)

Sentence to abstract added.

7: One instance of “that” needs to be deleted

done

S1 and S2 – the axes are labelled as % while the data seem to be proportions

Corrected

S3 Carpinus – caption is missing (a).

We cannot find any missing caption for (a)-

For part (d), the maximum for site “Sum” is not highlighted (intermediate values highlighted instead)

Yes, Carpinus at Suminko is listed in Table S3, where you can find all cases, where the second highest class of fossil PAR was used for the link with modern analogues.

S3 Fraxinus – “demining tree” perhaps should be “demanding tree”

Changed