

Clim. Past Discuss., referee comment RC2  
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## Comment on cp-2022-50

Neil Macdonald (Referee)

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Referee comment on "Meteorological and climatological triggers of notable past and present bark beetle outbreaks in the Czech Republic" by Rudolf Brázdil et al., Clim. Past Discuss., <https://doi.org/10.5194/cp-2022-50-RC2>, 2022

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**Overall:** I enjoyed reading this paper this interesting paper that uses a range of archival and instrumental data to better understand the inter-relationship between bark beetle outbreaks and climatic parameters, with considerable impact to the economy of such outbreaks. The wealth of materials that the authors have processed is commendable, with a large volume of materials reviewed and a complex picture starts to emerge. I think that there is considerable merit within the paper, but I do have some concerns with how the paper is currently presented, these are listed below, I also provide an annotated copy to support the authors in the revision process.

My key concern is that the paper presents a very detailed understanding of human-environment-climate interactions over several hundred years, with examples recognising these complex interactions, however the conclusion states that this is a function of climate change. Such a statement I feel fails to give justice to the complexity of the different aspects you so carefully detail in the paper. Climate change may have exacerbated the impacts, but I believe you demonstrate a much complex picture of interactions throughout the paper.

I think you need to present a chronology of windstorms within the paper, these appear important throughout the record, not just the historical period. This could be presented alongside the bark beetle outbreaks to help the reader see the relationship.

### Key points that I believe should be addressed following revision:

This is a long paper with a great level of detail, whilst this is valuable and informative it does mean you need to ensure that key points are clearly detailed. I have suggested a couple of places where this could be more concise in the annotated version.

Lines 50-80, I think this needs to be more concise, it is not incorrect but not critical to the readers understanding.

155-157, I am uncomfortable with the way you are using the scPDSI, why not just present this as scPDSI-12?

470-480 I felt that you needed to explain the spatial and temporal changes in land management earlier, could you present changing extent of forestry in CR through a table or graph underneath Fig 1 or 2. I felt you also need to discuss the different forestry practices of the times, you recognise that extensive lowland forestry took place in the mid-20C but fail to then consider has the increase you attribute to climate change just been a function of these woods maturing. Also what impact does large monoculture conifer plantations have, compared to mixed conifer/deciduous?

480 Do we get different types of bark beetle, are they responsible for different outbreaks, do you need to try and distinguish between different beetle outbreaks and the different climates they preference, do we have different beetles impacting forests in the last 50 years?

545 A little more detail needed.

Discussion: You need to provide a more detailed analysis of the role of windstorms, these appear to be significant throughout the record, not just historically, this needs to be explored more fully.

Conclusions: I think the paper demonstrates a much more complex picture that cannot simply be brought down to the points presented here. Looking at the data I think you need to reflect on iii) as I do not see this clearly within the data. You provide a wealth of information in the paper detailing the complex interactions that may explain changing patterns of forestry, land use patterns, management practices, beetle outbreaks and climatology, all of which contribute. To argue recent outbreaks are a function of climate change fails to acknowledge the evidence presented in the paper, that demonstrates an emerging complex picture, of which climate change may be exacerbating the incidences, which are a function of complex human-environment interactions.

Figure 1&2: It is crucial to present the windstorm data alongside this information. You present a strong argument for windthrow damage in the earlier period, but how does this coincide with the bark beetles, without a long chronology of such information it is difficult for the reader to discern what role this has, and whether it is diminished in significance in the last 50 years.

Figure 4-6: Why not present a scPDSI-12, -18 or -24, this would be better than a cumulative monthly (scPDSI-1?) anomaly of the scPDSI for the timescales presented. It would be helpful for the reader to see the bark beetle patterns of damage alongside the climatological information, add graph below scPDSI annual/summer anomaly.

Please see annotated paper for suggested minor modifications

Prof. Neil Macdonald, University of Liverpool

Please also note the supplement to this comment:

<https://cp.copernicus.org/preprints/cp-2022-50/cp-2022-50-RC2-supplement.pdf>