Climate of the Past Discussions

Clim. Past Discuss., referee comment RC1
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Comment on cp-2022-50

Anonymous Referee #1

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-RC1, 2022

The manuscript reviews bark beetle (BB) outbreaks in Czech Republic for the last 240 years. The authors collated much data of different quality on such BB gradations and related the damage wood to meteorological extreme events. While such gradations usually followed windstorms in the 19th century, the recent and most devastating gradation was primarily related to warmer and drier weather prevailing during the last decade in the frame of climate change. Authors highlight the importance documentary databases with rich information on development of the environment and the socio-economy that foster the understanding of current forest damages.

I found the paper too long, the descriptions too detailed (though very interesting) and the conclusions too poor to be published as a concise paper. There are several ways to cope with this manuscript: to allow a long paper like this, or to improve the manuscript by reducing the information to digestible texts and figures, while putting details into the supplementary material. I propose the second treatment, by focusing on the following aspects:

Language: Much of the content can be improved an English brush-up and by more precise writing. I had much difficulties in the first half or the text and less so in the rest. Perhaps, the first part was not treated with the same care than the second part. Just my impression.

Descriptive event history on BB gradations: The information could be put in a chronologically ordered table, listing the most important triggers and forestry concepts of fighting against BB presence and also mentioning windthrow events.

Figures 7-10: Could be put into a supplementary material. Instead, one figure would do to show the length of the BB gradation (in lines) and the impact of windstorms on salvage felling. Here, the big impact of the 2018 storm Burglind could be highlighted, which

presumably strongly amplified the BB gradation.

Windstorms: It is unclear to me why the authors claim that windstorms were only important in the 19th century. Rather, by looking at figures 7–10, it appears that such storms (usually winter storms) had quite an important role as a trigger. But the information is simply missing, i.e. the exact date of the strongest winterstorms (compare e.g. Usbeck et al. 2010, Agric. For. Meteorol. 150).

Coniferous vs. deciduous tree species: I could not find information on the percentage of forests in CR that represent natural forest communities. I suspect that a high proportion of the coniferous forests are planted since perhaps 200 years. BB infestations could be seen as an interaction of non-natural forest trees, windthrow (mainly in wintertime when coniferous trees are more susceptible than deciduous trees) and warmer/dryer weather in the frame of climate change. The conclusion that "many spruce stands now appear to be located in unsuitable environmental conditions" could be highlighted and substantiated with more detail.

L28: «negative impacts» Impacts on what? On vegetation? On forests? On Nature?

L29: overpopulation: gradation?

L30: More specific here? ...caused a catastrophic Norway spruce decline with xxx ha of spruce stands affected.

L31: Again, not very precise: Huge bark-beetle infestations followed extraordinary hot-dry episodes in summertime that reduced the vitality of Norway spruce...

L32: In addition, (not „on the other hand")

L40-65: This can be reduced to few lines with the same information remaining.

L66: Here, it is better to start with "In the Czech forestry literature, ..." as this sentence now focusses on Czech republic.

L66-79: There is a long history of bark beetle impact in forest in the Czech Republic, with focal areas of investations (Sumava and others), with some exceptional years; this should

be said at the end in order to change to the central part of this study: to contextualize the most recent calamity.

L81-83: Questions 1 and 2 could be reordered: first the question is about the context of the most recent calamity, and then the question would logically be whether the changing climate has altered the regimes.

L86: "analysis and discussion"

L86: …outbreaks. Results are discussed in the context of climate change.

L87-91: can be deleted.

L93: Follow normal paper structure: Intro, Data and methods, Results, Discussion, Conclusion

L94: Section 2.1 could be reduced by putting the data into a table.

L94: According to Wiki: Czech lands, not Czech Lands

L130: spatial? if yes: grid data or station data?

L146: replace "territorial" by "spatial"

L147: replace "for their detailed study" by "for detailed analyses"

L 154: replace the beginning of the sentence by "This reference was preferred over the more recent one of 1991-2020 because..."

L155: Whatever the intention (more stable or not), the older period was also cooler and more moist.

L153-164: It is difficult to follow how significance of the anomalies were indeed defined. Some more detail may be helpful.

L180ff: Sections 4.1.1 to 4.1.4 are boring to read and lack reduction. The information could be summarized and the text could go into supplementary material

L264-247: Text can be deleted here.

L267-419: I wonder whether it wouldn't be possible to roughly quantify the bark beetle damage in the years before 1980. There is some information mentioned in the text. The text may be too detailed.

L452-454: Please clarify the sentence by putting the verb "appear" e.g. after "directions".

L573-574: That's exactly the reason for the huge bark beetle calamity: the interaction with windthrow. I bet that salvage logging after windthrow was also the highest ever in CR history. This should be discussed, too.

L600-605: This is a poor conclusion. Climate change is not the only reason why bark beetle outbreaks have increased. Rather, there is an interaction of long-term Norway spruce plantations, windthrow events and amplifying effects of warmer temperatures. I wonder to which extent CR would naturally be covered by Norway spruce and what would result as the plantation legacy of the past 200 years. To conclude would mean to promote more deciduous, stand-forming tree species to be planted in the future.

L940: A figure caption should be self-explaining. Here, a minimum of information on the calculation of the significance should be added.

L945: The period in the caption in unclear: according to the text, the data refers to four selected outbreaks in the 1980, 1990, 2000, and 2010s; this should be clarified. In addition: why are these outbreaks not addressed in detail? Are they really evenly distributed among the four decades?