

We thank Mathias Raschke for his comments on our manuscript.

I am very interested in any kind of quantification of aggregated natural catastrophes (natcat) losses from such as you present, as I am employed in (re)insurance industry for natcat modelling and research and publish as freelancer in this field. Unfortunately, I realize many gaps and shortfalls in and questions regarding your draft about event losses from windstorms (in parts of Europe):

- Why is the renaming (storm severity index [SSI] to meteorological loss index [LI]) not mentioned in the abstract?
Answer: We did not rename the method, but used the official definition/naming by Pinto et al. (2012) – a well-established method. LI was introduced to differentiate between a formulation using population density as a proxy for the insurance values (LI) and another one without, thus representing the purely meteorological effect (MI).
- As far as I know, the original purpose of the SSI was not to estimate loss, but to formulate a size measure (for spatial extent (RMS 2024)). The SSI is also used to quantify spatial correlation (Bonazzi et al. 2012). What means a “metrics to quantify windstorm-related losses”? An event loss can be recorded or estimated. Why so you change this focus?
Answer: The original papers to formulate the SSI approach were Palutikof & Skellern (1991) and Klawa & Ulbrich (2003). In our study, we follow the approach from Klawa & Ulbrich (2003) and Pinto et al. (2012) focusing on the aggregated loss. Even the above-mentioned study by Bonazzi et al. (2012) states that “The SSI is a hazard-based index which correlates closely to aggregated damages due to storms.” They use it “for its relevance to the re/insurance industry.” Therefore, in our opinion, we did not change the focus of SSI.
- The natcat models in (re)insurance industry (such as the applied Aon’s IF Euro WS model) are less explained in the draft in contrast to your reference Mitchell-Wallace et al. (2017). Alternative models and vendors are not even mentioned. The Natcat model with thousands of stochastic events estimates event losses for a defined exposure and (high) return period.
Answer: We will provide a more detailed description (roughly 10 pages) of the Aon IF windstorm model, which will be included in the Supplementary. Please also refer to the main reviewers’ comments.
- What sense does it make to compare two model results on event losses when data for (insured) event losses and corresponding exposure (provided by the Perils AG, mentioned in your draft) are available? There is also information about market penetration (proportion of insured exposure to insurable exposure).
Answer: Our study is the first to compare a full insurance windstorm model (which is not available publicly) to a simplified meteorological loss index. For proprietary reasons, our analyses are restricted to country-scale and normalized losses for the Aon model output. Nevertheless, we will include a detailed case study for recent storm Sabine (February 2020) in the updated manuscript, in which we compare LI and the Aon model output, and add aggregated market losses from the PERILS data as a reference.
- Why is my model (Raschke 2022) not even mentioned? The agreement between estimated and observed event damage (windstorm Germany) is significantly better in my results (plot) than in yours.
Answer: Thanks for making us aware of this study; we will include a reference to it in revised manuscript.

- The loss/damage function applied should be discussed. The power parameter of 3 might be unrealistic. The wind speed does not cause damage, but rather it creates a damage generating wind pressure/load (at the buildings) that is proportional to the squared wind speed (details see Raschke 2022).

Answer: The LI method used in our study is well established. Based on the original approach developed for station data from Klawe & Ulbrich (2003), it was further developed by Pinto et al. (2012), and several formulations (also with other exponents) were tested. The same was done in other studies such as Prahel et al. (2015). All these studies agree that the performance of the different indices depends on the underlying event set. For some storm events, formulations with higher exponents seem to better suit to realistically estimate windstorm losses, while for other events, the cubic relationship provides results that are more realistic. In this sense, and based in our experience, no formulation clearly outperforms the others. Since our study is the first to compare a full insurance windstorm model (which is not available publicly) to a simplified meteorological loss index, we focus on a straightforward comparison of the two methods. Therefore, in our opinion, the objective should not be to experiment with the LI formulation. Nevertheless, we will provide a more detailed discussion of the impact of the LI setup on the results in the revised manuscript.

- Correlation measures has been formulated for random variables. The maximum event loss per year or the annual sum of such losses are random variables (drawn once per year). However, event losses don't be random variables but point events of a stochastic process. Therefore, you can't just apply a correlation measure to it.

Answer: We are sorry, but we cannot follow the reasoning here.

Besides, the results are not perfectly presented (e.g., Figure 8, colour scale for correlation measure form blue [-0.9] to red [0.9] although only positive correlations are mapped).

Answer: We will improve the presentation of results in the revised manuscript.

References

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