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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Comparing an insurer's perspective on building damages with modelled damages from pan-European winter windstorm event sets: a case study from Zurich, Switzerland" *by* Christoph Welker et al.

Anonymous Referee #2

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General comments

This paper compares windstorm risk estimations (such as annual average damage, exceedance frequency curves) in the canton of Zurich, Switzerland, using insurance claims data, and modelled damages with two models (GVZ and CLIMADA) using various hazard inputs ('WISC historic' and 'WISC probabilistic extension'). They find that the claims data is skewed by the extreme event Martin/Lothar, leading to a shorter return period for that storm and higher average annual damages compared to the results from the longer modelled datasets.

The paper is well written and the results are worthy of publication. My main issue is that I feel the conclusions about return periods derived from 'WISC probabilistic' may have been overstated. The authors correctly state in their discussion (L486-499), the 'WISC probabilistic' dataset does not reduce uncertainty compared to 'WISC historic' because they're based on the same data, but in some instances I think it is important to emphasise the uncertainty (I include examples in the 'specific comments' below).

Specific comments

1. Abstract L20: "Additionally, the probabilistic modelling approach allows assessing rare events, such as a 250-year return period windstorm causing CHF 75 million damages" – please emphasise the uncertainty here.

2. Section 2.2.2: I don't think it's necessary to describe 'WISC operational' and 'WISC stochastic' as they are not used. It is already mentioned in the introduction why you can't use 'WISC stochastic' (L102; perhaps you could refer to fig A1 here), and the reasons for not using 'WISC operational' could also be discussed here.

3. Section 2.2.3 L209: please could you mention here that you describe how alpha and beta are chosen later in the section?

4. Equations (1) (L209-210): I presume this transformation is applied at each grid point, so that a wind speed from a grid point i becomes the $windspeed_{original}$ at grid point j in the shifted footprint? If so, how do you account for different properties of grid points i and j – for example, they could have very different roughness and altitudes (in an extreme case i could be over open water and j could be in a sheltered area, so would have much lower expected wind speeds).

5. L215/216: The references given for the storm severity index all have different definitions. Which formula did you use here?

6. L282-287: This paragraph is a bit confusing. I guess you mean to say that MDD is calculated from the vulnerability curve of Schwierz et al, and you use this same vulnerability curve in CLIMADA?

7. L348/349: How many data points did you have above the threshold in each case? When you do the re-sampling, is the number of re-sampled points (200) equal to the number of points you used for the original fit?

8. Section 3.3: L386-391: I think you need more emphasis on the uncertainty in the return period of Lothar/Martin. Although the value from the claims is much smaller (34yrs), it's still within the 90% confidence interval from WISC historic (25yrs to $>$ 500 yrs)

9. L398: Again, I think you should mention that the 250yr RP from the claims data is within the range estimated from WISC historic.

10. L400-404: Since the 'WISC probabilistic extension' and 'WISC historic' 250yr RPs are well within the 90% confidence intervals of one another, can you really conclude anything about the difference in return periods?

11. Section 3.5 L439-440: "In total, "WISC probabilistic extension" contains 17 events which are potentially more damaging than Lothar/Martin": I assume the 17 events referred to in the text are the 17 red dots in Fig 4 with damages $>$ Martin/Lothar damage, rather than the events with P95 gusts speed $>$ P95 gust speed of Martin/Lothar, so shouldn't the grey area in Fig 4 be bounded by a horizontal line at damage $\approx$ CHF 62m, rather than the vertical line at P95 gust speed $\approx$ 133km/h?

12. L441: "A (modelled) total damage amount of more than CHF 96 million is associated with the most extreme windstorm event in "WISC probabilistic extension": In Fig 2 it looks like the highest damage storm in "WISC probabilistic extension" has a damage amount of approximately CHF 80m. Why is the maximum damage in Fig 4 higher? Aren't they the same storms?

13. Fig 4: Please could you clarify if the insured damages (blue squares and yellow diamonds) are the values from the claims dataset (after normalising), or the damage amounts estimated from the GVZ model on the historical events?

14. Fig 4: Please could you explain why there are quite a few footprints from WISC probabilistic with zero damage despite having P95 gust speeds of 107-115 km/h? Is it because they mainly hit unpopulated areas?

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