

## ***Interactive comment on “A catalog of high-impact windstorms in Switzerland since 1859” by P. Stucki et al.***

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### Main points

1. and 2. Thank you for the careful and detailed comments. We appreciate your confidence in our work.

3. and 4. Yes, 'hazardous' in this context means the most damaging of the windstorms classified as extreme and severe. We now explain it explicitly with the terms 'extreme' and 'severe'. We have put effort into clarifying the terminology in general. For instance, scientific and technical terms from a range of disciplines (atmospheric science, insurance, forestry, etc.) are used in this paper. Some of these terms are specific to the German language or even to Switzerland only. Finding a correct and comprehensive

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terminology and wording is challenging at times. Therefore, we appreciate your suggestions, which we gladly adopt for the most part; e.g., 'total losses' become 'total financial losses', 'movables' become 'movable property'.

5. This is a good point. It had been cut in the course of revisions, but is now reintroduced in 3.2.4.

6. Obviously, we have not been able to communicate the importance of this paragraph from our perspective. In fact, this section is quite crucial for us in a range of aspects. We see the co-variation between the wind data (i.e., the hazard) and the damage information (i.e., the impact) as a corroboration of our results. However, it is not self-evident that temporal variations of windstorm activity can as well be found in the damages from these windstorms due to issues regarding coverage and concatenation of sources or normalization. Our statements are therefore quite conservative at the cost of being perceived as rather vague.

Nevertheless, trends in windstorm activity over Switzerland / Europe have repeatedly been postulated for and have been discussed controversially (e.g., Schiesser et al., 1997a; Wang et al., 2011, see Introduction). Here, we can show once more that decadal-scale variations overrule long-term trends by far.

Of course, the catalog may be of use without this climatological context. In the first place, however, it is intended to give a basis for further climatological and atmospheric science studies. The damage-based approach was precisely chosen because high-resolution wind data are not available. For instance, the windstorm catalog and the found storminess variations might help establishing an extrapolation of storminess over Switzerland into a future climate.

For these reasons, we opt for revising the paragraph, giving an additional Figure (6c) and adding a reference for the Poisson point process.

Specific Points

1. The message should have been that the potential impacts of such events were unanticipated / unforeseen by the (Swiss) society, authorities and economy. Evidently, the meaning of the term 'unanticipated' is not clear without further explanations. It is therefore replaced by 'unprecedented' for conciseness of the abstract.
2. The reference to Compo et al. (2011) is given on page 3824, line 14.
3. 'Total financial losses' is introduced for clarification. See also main point 3 regarding this and many more of your suggestions that are adopted in the following.
4. 'Movables' is replaced by 'movable property' here and in Table 1.
5. According to information from Munich Re NatCatSERVICE, 'tempests' can be replaced by 'convective storms'.
6. The sentence now reads 'used for validation of the obtained results (see Sect. 5).'
7. 'Larger' is replaced by 'major'.
8. This is a typo; 'field means' is correct.
9. Unfortunately, we could not find a concise definition for the term 'intensity' in the field of natural hazards. The term 'intensity' seems to be widely used in a rather informal way and in the sense of 'strong' or 'with great damage'. Closer to physical reasoning, 'intensity' means 'amount of force per unit'. Then, the 'magnitude' of the damage from a natural event would be a function of 'intensity' and 'duration'. Our historical damages are virtually all described with respect to the informal meaning of intensity. No report explicitly describes a specific influence of 'duration' on the damage patterns (e.g., from cladding or fatigue loads), but implicitly, the effects of the storm 'duration' are included in the descriptions of the storm 'intensity' (i.e., 'magnitude'). However, such specifications would be rather lengthy and are not relevant for understanding the method. Therefore, the text in parenthesis is removed.
10. The normalization ratio is introduced.

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11. This is rephrased to 'from a reduction of >35 % to an increase of >250 %'.
12. An explanation is added: 'a solid measure for piled wood'.
13. This procedure was applied to little data, and a detailed explanation would put too much weight on it compared to more relevant procedures. A compromise between conciseness and clarity is maybe found in that interim results are given and calculation is referenced.
14. 'Such as bark-beetle attacks' is added as an example.
15. 'Exemplarily' is removed.
16. The sentence is completed as follows: '(i.e., the probability distributions are approximately identical, see Coles, 2001)'. Note that we also added 'independent and identically distributed values' on page 3837, line 7.
17. 'Exceedance values' is the correct term.
18. The return periods are with regard to accrued losses, number of affected buildings, and volume of windfall timber (see first sentence of Section 3.2.7). Only damage information from Switzerland was considered.
19. This sentence was intended to explain the subjective threshold choice of 30 years, but the phrasing is admittedly confusing. We rephrased such that we can give a reference for the used term.
20. The sentence is slightly rephrased and completed.
21. This is a description of the first results, i.e., before validation. However, the sentence could be misleadingly interpreted as being contradictory to our final findings. Therefore, it is discarded here.
22. 'Well' is replaced by 'very'.
23. The link to your online database is added in the text. In the Supplement, the 'multi-

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ple storms in 4 days' are marked for a different reason. Our declustering required one storm-free day between two windstorm events (see Sect. 3.2.5 and the Supplement). The yellow mark is intended to transparently communicate that there are a few windstorm events in the catalog that are close to clustering as we define it. For conciseness, we would like not to additionally mark the validation sources.

24. and 25. The paragraph is slightly revised and further explanations are given for more clarity.

26. and 27. We added that nine out of the top ten events are the same and defined 'most hazardous' by use of the classification terms. Note that page 3845 line 11 and page 3847 line 22 have been adapted accordingly.

28. This is a correct objection. Consequently, the sentence is slightly rephrased. Note that accordingly, page 3847, line 22 is also slightly changed to 'all extreme and virtually all severe winter storms'.

29. Hopefully, the answer is given on page 3846, lines 6 to 8.

30. This is indeed an inconsistency. USB is replaced by OBS in the Supplement, and the abbreviation OBS is now explained in the Supplement as well.

31. 'Largest' is certainly wrong here, but 'extreme' is reserved for the classes. It is substituted by 'the most extraordinary high-wind days'.

32. This is an elegant suggestion.

33. See the reply to main point 6. Some reasoning is introduced in the paragraph.

34. We would like to leave the parenthesis as is. It adds the purposes, e.g., that extreme value analysis was applied to windfall timber.

35. 'Particularly' is discarded.

36. We would like to restrain from going too much into details here, which could over-

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load the table. Typesetting and layout of this table was already rather complicated for NHES and a few changes had to be made. Moreover, the rather vague terms and attributes listed here are often seen in indexing / historical climatology due to the lack of exact information. In Sect. 3.1, we explain the concept referring to its scientific background, our sources and adaptations, we give key words for each class, and we give a short example. In addition, three examples are provided in the Supplement, where readers can re-enact how the conceptual guideline was applied in concrete cases. We added the sources below Table 2 again so that interested readers can find answers to questions such as in your review. Nevertheless, we appreciate your suggestions and have modified some text for a bit more clarity. a) The regional extent is adopted from a visual guideline in BAFU (2008): This reference should be added here. In addition, an approximate number of affected Cantons are given. b) Yes. Stables used to be built much less solidly than residential houses. The guidelines are adapted from several sources indicated below the table. c) This is another example of a vague indication. It gives a guideline for how to weight the term 'numerous' or equivalent terms found in descriptions. Therefore, we cannot give an exact number. d) It is not necessarily a total breakdown, but the devastation of entire forests, like from Lothar. 'Devastated' is added. e) 'Equivalent' is spelled out. f) Ranges instead of thresholds are given. g) This refers to Usbeck et al. (2010) as indicated below the table.

37. For the reasons given in 36, we would like to leave the text without modifications.

38. The labels are added as suggested. We are not sure about the first question. If you ask whether the thresholds are subjectively chosen, we can refer to Sect. 3.2.7. The date labels are related to the specific points.

39. The y-axis is complemented with 'Return level (weighted means)' for clarification.

40. This needs indeed some clarification. The term 'adjusted' is replaced by 'normalized' to keep consistency with the introduced terminology, the tick labels on the x-axis are modified as suggested, and 'Swiss forests' is indicated. In our database, both 7

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and 8 November 1962 are mentioned; see the Supplement.

Further changes to the manuscript

Page 3833, Line 1. 'large' instead of 'dramatic'

Page 3843, Section 5.2.1. 'range' replaces 'spread', as the latter could be misunderstood as 'standard deviation'. 'extraordinary wind speeds' is replaced by 'extreme wind speeds' to be consistent with 'resulted in extreme values at' further below. We also added 'for the 1919 case' in the reference.

Page 3846, Line 3. We added 'The same declustering as for CAT-DAM was applied'.

Please also note the supplement to this comment:

<http://www.nat-hazards-earth-syst-sci-discuss.net/2/C1877/2014/nhessd-2-C1877-2014-supplement.pdf>

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