

Interactive comment on “Re-Analysis of one of the deadliest Tornadoes in European History and its implications” by Alois M. Holzer et al.

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Received and published: 13 December 2017

We are very thankful to the work of the two reviewers. We would also like to thank Georg Pistotnik for his elaborate online comments. The reviews and comments led to fruitful discussions within the team of authors and will help to improve the paper, as we hope. Before we are going to answer the single raised points, we would like to summarize our understanding of the synopsis from reviews and comments: A) We see that a multi-disciplinary paper faces the challenge to be seen as such. Expectations that arise from a paper title and abstract in different disciplines need to be addressed. In our case the paper touches in different aspects at least meteorology, engineering, climatology, geography, social sciences and historical sciences. B) The term “reanalysis” used in the paper title in meteorology is mainly used for numerical reanalyses,

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while it has a much broader meaning in other disciplines. Our aim was to use this title in a broad, not meteorology-centric way, which was not understood by those readers, who seem to be meteorology-focused. We therefore consider resubmitting the paper with a slightly altered title: “Forensic Re-Analysis of one of the deadliest Tornadoes in European History and its implications”. Only the word “forensic” would be added, pointing towards the sub-discipline of forensic meteorology, where meteorological past events would be reconstructed with strong ties into other sciences. C) The larger-scale weather situation, the environment of the storm that spawned the tornado, was not in the focus of our work. We therefore would like to cut this aspect out of the paper and maybe report on that part in a later, separate paper. This would allow a more stringent structure and would enable us to highlight the main work that has been done in establishing a repeatable research methodology for damage assessment as well as path and magnitude reconstruction of historical tornado and local windstorm cases. D) In our detailed answers below we believe that we can either solve the raised issues or in other cases argue that they are not appropriate.

Anonymous Referee #1 Received and published: 16 September 2017 Review of “Re-Analysis of one of the deadliest Tornadoes in European History and its implications” I want to like this paper a lot and recommend publication. The analysis of the damage classification was obviously thorough, and the authors are well-intentioned by compiling these various sources into a single database for analysis. Unfortunately, the paper falls well below expectations. I found the text extremely difficult to follow. In my view, the current poor state of the manuscript shows a disregard for the volunteer time of the reviewers who are forced to try to make sense and provide detailed comments to improve a manuscript. Such revisions are the responsibility of the authors, not the reviewers. In other words, it is not up to us to clean up your mess. Sorry for being so frank, but I am not pleased with the state of this manuscript. A paper should make it clear to the reader what its goal is. That is nowhere clear. The abstract vaguely talks about “demonstrating feasibility”, but it is not clear of what. This paper needs a clear single-sentence statement: “The purpose of this paper is to. . .”. If the authors can’t

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do this, then there is little justification for this paper. Answer 1: We agree that the abstract should be more concise. Answer 2: Regarding the purpose of the paper we will add a sentence like: "The main aim of the paper is a detailed investigation of a severe windstorm case in Wiener Neustadt in 1916 using original damage information sources and current knowledge. This aim is fulfilled by answering following research questions: a) What kind of original sources can be found? b) Was the catastrophic windstorm event a tornado? c) How strong was the event on nowadays (tornado) damage rating scale? d) Is it ultimately possible to draw a coherent picture of the entire event?" All these 4 research questions are explicitly answered in section 6 of the paper. We see the value of this paper in the multidisciplinary approach. Readers with expectations towards a single-disciplinary approach might be dissatisfied for the same reason. After the text is made more clear, the paper could use a thorough proofreading by a native English speaker to make it grammatically correct. Answer 3: Regarding native English: In personal communication with one of the executive editors it became clear that NHESS does not expect English on the level of a native speaker at first hand. Moreover, the required level of English is checked before acceptance of the manuscript for discussion. This check was passed. NHESS will provide English proofreading support in the final stage before acceptance. From a practical perspective it would be a quite harsh requirement for most Europeans to ask for native English level, if there are no native speakers at hand in a given research group. At the end we are going to look into the level of English to make sure it satisfies the requirements of the journal. Finally, I will add that the paper was made even more difficult to read because the text lacked indented paragraphs or vertical spaces between paragraphs. Recommendation: Reject and resubmit after substantial revision, rewriting, and proofreading. Answer 4: We strictly followed the formatting guidelines of NHESS. In addition see A) to D) above for general statements.

Abstract: Lines 8-10: The first sentence of an abstract should be clear. This is difficult to read and understand. What are the authors trying to say? "Widen the data basis"? What does this mean? "It could be speculated": By whom? Abstracts should be one

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paragraph. Rather than saying "After presenting the methodology", the authors should describe the methods and data. "complex thunderstorm activity in the study area": This description is inadequate as a sound meteorological description of the event. "Complex" says nothing meaningful. Untypical should be atypical. "In the outlook": Outlook of what? The reader has no context for what this means. Clearer writing is needed. Rather than say "we stress the side-benefits of the given study", say explicitly what they are. A reader might not bother reading the entire article, so you should leave them with the most important results in the abstract. Answer 5: We agree that the most important results need to be added to the abstract. We also agree that the first sentence needs to be written much clearer.

On this and other topics. Introduction: The introduction is poorly organized. It's a list of thoughts put together with no coherence and no argument that it tries to advance. Line 24: "Before this study, on a regional level, and in scientific literature also on a national level, it was well known that". This content is entirely unnecessary. It is verbose, wastes readers' time, and does not encourage people to read further. Answer 6: Introduction will be reworked, including clearer statement of the main goal of the paper and more information about the previous research on historical tornado cases. First paragraph: Starts out talking about the event of 1916, but then continues to talk about the terminology. A paragraph should have one consistent topic and theme. The reader has no context for the windstorm of 1916. Develop that topic first, then discuss what the terminology means. Page 2: Lines 21-24: Why is this connected to the text before or after? This paragraph just hangs there. So what does the reader need to know about the surrounding data for the tornadoes? Why does this relate to the 1916 event? Answer 7: This part is of interest here, because there was no clear term for tornado in German language at that time, a historical language problem that might per se not be of interest for meteorologists, but it is the reason why the question needs to be answered whether the event was a tornado or not (see research questions in "Answer 2"). Presenting the local tornado climatology in a revised version will be linked to the presentation of the research on tornadoes in Europe (Groenemeijer – Kuhne and

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Antonescu et al.), after stating that these authors have used data from ESWD.

Page 3: Paragraph starting at line 6 is just one sentence. This is improper in a scientific journal article. I got frustrated in section 2 with the poor quality of the writing and lack of organization. As such, more detailed comments have not been provided. I am happy to consider providing more thorough comments ONLY AFTER SUBSTANTIAL REVISIONS FOR READABILITY HAVE BEEN PERFORMED. Answer 8: We think that the structure of the methodology section is as clear as can be in a non-trivial working process, and we cannot relieve readers from this without risking that either the methodology is misunderstood or not documented at all. To our best knowledge the steps needed for a thorough post-analysis of a historical event have never been documented, and therefore we think that this is appropriate here.

Other: 1. Why is an international Fujita scale needed? What is wrong with the existing system that a simple modification to account for other damages be added? Answer 9: There is no existing international system for non-US-standard building practices. The “existing system” (F- or EF-Scale) is often misused in a way that in case the F- or EF-Scale is used outside the US, US-specific assumptions of the F- or EF-Scale are not addressed. Please also see comments of reviewer 2.

2. What is the DI-DoD approach? Is this unique terminology and an approach used by this study? Or, has it been employed previously? More needs to be said about this. In its present state, it is just introduced and the reader is assumed to know what it means. Answer 10: There is a well-referenced introduction of the DI-DoD approach in section 2.3. The anonymous reviewer did not want to read section 2 of the manuscript, as he stated above.

3. P. 5, line 5: Specific page numbers should be provided with direct quotations. Answer 11: We will provide the exact page number of Fujita’s memoir book which we are quoting.

4. There appear to be only two new figures (Figs. 3 and 5), but each have a different

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purpose. Is the purpose of the paper to re-examine damage classifications (Fig. 3)? Or, is it to describe the meteorology (Fig. 5)? Answer 12: Fig. 3 will be shifted to the results section of the paper. Fig. 5 will be skipped, please refer to general remark C of this answer (see above).

5. I found the general meteorological description in section 3 lacking. What is its purpose? I don’t find that it is necessary to this paper. If I am wrong, then the authors need to make more clear why it is important. Again, this issue relates to the purpose of the paper, which is poorly stated, if at all. Answer 13: Thank you for this comment. Please refer to general remark D of this author’s response (see above).

6. Reference is made repeatedly to “thunderstorms”, but I don’t see any reference to cloud-to-ground lightning reported by observers. Are these really thunderstorms, or just convective storms (no lightning or thunder observed)? Answer 14: See section 3.1 of the manuscript: “In the area northwest and around Wiener Neustadt all weather stations reported thunderstorms during the afternoon and early evening hours, many of them together with gale-force wind gusts and hail.” 7. References to “modern theory” citing a single paper from 1993 is inappropriate. In fact, the whole manuscript is lacking the most relevant and recent research on convective storms and tornadogenesis. Specifically, not a single paper by Markowski has been cited. Answer 15: This will not be an issue in a revised manuscript. Please refer to general remark C of this author’s response (see above). In general, references to new papers are only useful if the research questions are related. In this historical case by far we do not have data in the necessary resolution to compare with findings by Markowski. We were only able to compare to environmental conditions and statistical studies of proximity soundings, the reason for the chosen references. But: We will expand the Introduction section with including more research that has been done on the historical tornado cases.

8. Section 5 is poorly motivated and lacks a coherent argument for the needs for these tools and approaches. Consider the types of papers written by Carles Doswell that show depth of insight and clarity in thinking about the need for European forecast

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improvements. Such clarity should be mimicked in the present paper, if the authors wish to motivate the European audience to act. Answer 16: During the project phase the authors have been in contact with Chuck Doswell several times, and we are very thankful for his advice over the past years.

9. When I get to the end of the paper, I don't see the take-home message. Answer 17: An update to the summary section will be made with regards to the improved version of the abstract and the introduction, where goals of the paper will be mentioned more explicitly.

10. Acknowledgements should be one paragraph, not separate sentences. Answer 18: This would be easy to do.

References: These two references to papers from ESSL have been omitted and should be considered to be cited in the revised manuscript. Groenemeijer, P., T. Púčík, A. M. Holzer, B. Antonescu, K. Riemann-Campe, D. M. Schultz, T. Kühne, B. Feuerstein, H. E. Brooks, C. A. Doswell, H.-J. Koppert, and R. Sausen, 2017: Severe convective storms in Europe: Ten years of research and education at the European Severe Storms Laboratory. *Bull. Amer. Meteor. Soc.*, doi: 10.1175/BAMS-D-16-0067.1. Antonescu, B., D. M. Schultz, A. Holzer, and P. Groenemeijer, 2017: The risk of tornadoes in Europe. *Bull. Amer. Meteor. Soc.*, 98, 713–728, doi: 10.1175/BAMS-D-16-0171.1. Answer: 19: Thank you for this suggestion.

Interactive comment on *Nat. Hazards Earth Syst. Sci. Discuss.*, <https://doi.org/10.5194/nhess-2017-314>, 2017.