

## **Interactive comment on “A methodology to conduct wind damage field surveys for high impact weather events from convective origin” by Oriol Rodríguez et al.**

### **Reply to Anonymous Referee #3**

We thank Anonymous Referee #3 for reviewing our manuscript “A methodology to conduct wind damage field surveys for high impact weather events from convective origin”. We believe that the comments provided help to reconsider the structure of the text and improve the clarity of some aspects of the manuscript, particularly to explicitly mention that our study is focused on meteorological aspects which may complement other general features of general post-disaster damage surveys. We provide an item-by-item reply below:

As authors state in the introduction, the objective of the paper is “to propose a methodology to conduct wind-field damage assessments of convective-driven events in a systematic way, to contribute to the creation and maintenance of homogeneous databases”. Accordingly, the authors present first the methodology they propose, followed by its critical analysis and by two real implementations.

(1) The objective of the paper, as stated in the introduction (note that in the conclusions the objective changes in “to provide guidelines for gathering pictures and locations of damage on manmade structures and on vegetation, using smartphones or photo cameras with geolocation capability”), is in the scope of the journal and is also related to a very important weakness of natural hazards research and practice, being the lack of standardised data on past hazardous events. Still, the paper suffers from many criticalities, which prevent its publication in the present form. In the following, such criticalities are explained in detail while I did not supply specific comments, at this stage of the review.

Reply: thanks for this comment. As it is explained, the main objective of the paper presented on the introduction is “to propose a methodology to conduct wind-field damage assessments of convective-driven events in a systematic way, to contribute to the creation and maintenance of homogeneous databases”. We will rewrite this on conclusions to “provide a systematic and easily-reproducible methodology to carry out strong-convective wind event damage surveys, mainly based on gathering geolocated information about damaged man-made structures and vegetation, with the final aim of representing the damage scenario to study the event from a meteorological point of view”.

#### **Main criticalities**

(2) Methodology. I really appreciate all the anecdotal experience put in the paper by authors. Still, the methodology lacks of a clear logical structure; for example, some of the tasks included in the section 2.1 “survey planning” (e.g. gathering information and pictures on damage location on the media and social networks) are also included in the preliminary considerations discussed in the section methodology.

Reply: according to this and the next comment, and also to Referee #1, we will improve the structure merging “Survey planning” and “previous considerations” sections into

a new one titled “preliminary considerations”, to strength the chronological order of the tasks to carry out to apply the proposed methodology.

(3) Likewise, the section called “previous considerations” seems more related to preliminary considerations. With respect to this point, I think that a flowchart of the methodology, showing its steps in a logical order could support both possible users and readers.

Reply: thanks for the recommendation respect to adding a flowchart. We propose to present it in Section 2 (Methodology), as an overview of the proposed methodology. Following, we attached the flowchart proposal.

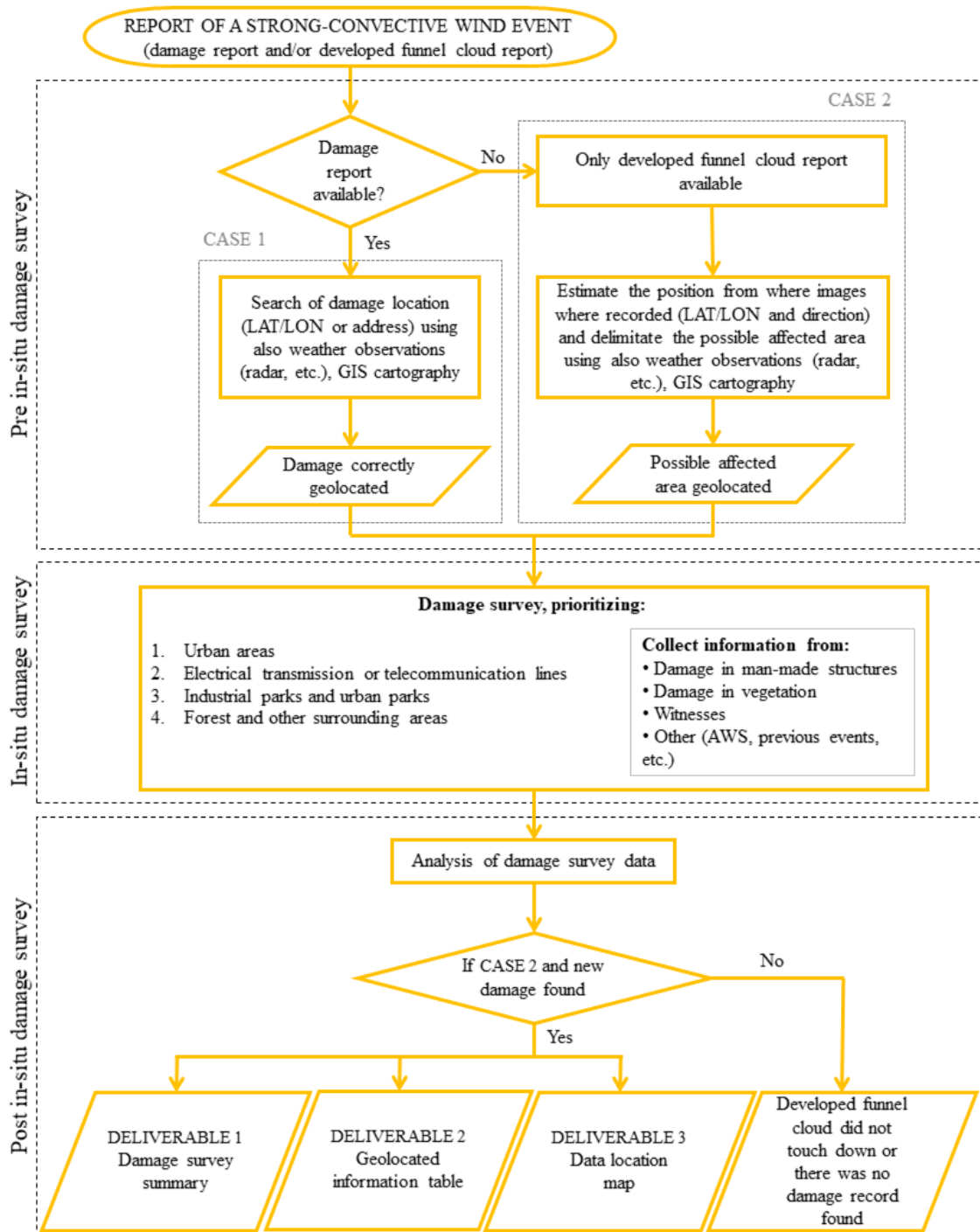


Figure 1. Flow diagram of the structure and application of the proposed methodology to carry out strong-convective wind damage assessment.

(4) Moreover, the proposed methodology is not a systematic or a standardised one: only some indications of which could be the different aspects to be surveyed are provided (see e.g. section 2.2.2) without a systematic and standardised procedure for their survey and collection (e.g. by means of pre-defined questions in a form). The only “step” that, in some way, is standardised is the witness enquiries (section 2.2.4), for which predefined questions are provided. The lack of standardisation is a big limit towards the objective of creating homogenous databases, given that the parameters/aspects to be surveyed, the way they must be surveyed/measured, and the possible values assumed by each of them is a subjective choice of the surveyor.

Reply: Thanks for your comment. We agree that the methodology can be better explained. To clarify and standardize the methodology, we propose to list explicitly which data is required for every damage location. For man-made structures are:

- Latitude
- Longitude
- Damage Indicator – DI (*omit it in case of damaged element not contained in damage rating scales*)
- Degree of Damage – DoD (*omit it in case of damaged element not contained in damage rating scales*)
- Draggd distance and direction (in case of object displaced with a known origin) – *distance between the origin and the final position of the object measured with a measuring tape and direction of the movement measured from the initial position of the object with a compass (minimum resolution of 5 degrees)*
- Previous weakness (lack of anchors, weak structure, oxide)

And for damaged vegetation:

- Latitude
- Longitude
- Damage Indicator - DI
- Degree of Damage - DoD
- Fall direction (in case of uprooted tree) – *measured with a compass (minimum resolution of 5 degrees)*
- Trunk diameter (in case of snapped tree) – *perimeter measured with a measuring tape*
- Previous weakness (moist soil, rocky subsoil, lack of extended roots, old tree)

According to [De Groeve et al. \(2014\)](#) we will propose some changes in final deliverables to standardize them including elements from Table 2 of the above mentioned study, showed in pages 34 and 35.

We will also attach the final deliverables of a case study to show explicitly how collected data is organized and presented.

(5) Objective of the survey. The objective of the survey is not really clear. Is it reproducing the damage scenario? Is it identifying the kind of event for insurance purposes?

Reply: the objective of the survey is reproducing the damage scenario to study the event from a meteorological point of view. With the gathered data: (1) the type of strong-convective wind phenomenon is identified, (2) the damage swath is characterized (it is determined the length and the width of the track) and (3) the intensity of the phenomenon is also estimated. In the particular case of Spain, as it is mentioned in the paper, the reinsurance public company also needs to know which kind of phenomenon caused damage, but the main interest of carrying out field works characterize events to build up a robust database about this kind of natural hazard. We will add this information in the introduction to clarify it.

(6) Given the effort requires by on-field surveys, I think that the multi-usability of collected data should be pursued (see references below). For example, what about the amount of damage data collected? Are they used only to characterise the hazard? This arises also the question of whether the products (deliverables) identified in the paper are suitable for multi-purposes uses of data Case studies.

Reply: all the collected data is used to characterise strong-convective winds (i.e. phenomenon type, intensity, damage path length and width) with the main aim of building up a robust and homogeneous database of this kind of meteorological phenomena. Moreover, as it is mentioned in [De Groeve \*et al.\* \(2013\)](#) and in [De Groeve \*et al.\* \(2014\)](#), data gathered in a field work is also useful to further analyse the exposition and vulnerability of damaged man-made structures, and it is also possible to study the impact of strong convective wind phenomena in an area. In addition, all this information can also be used to enhance or compliment wind intensity rating scales (as presented in [Mahieu and Wesolek, 2016](#)), even to create a new one as it is proposed in [Groenemeijer \*et al.\* \(2018\)](#). These comments will be included in the corrected manuscript.

(7) Case studies do not supply examples of how to implement the methodology but simply describe the events and the scenarios resulting from the survey. I think this is due to the lack of standardised tools for the implementation of the methodology previously commented.

Reply: the main objective of analysing these two case studies was to explain in practical cases which handicaps we found and to show the final deliverables, similarly as it is done usually in meteorological case studies. Attending to Referee #2, we will attach the three deliverables from a case study as supplementary material. Thus, it will be shown explicitly how all the data gathered during a strong-convective wind damage survey carried out following the proposed methodology is organized and presented in a practical way.

## References

[De Groeve T., Poljansek K. & Ehrlich D. Recording disasters losses: recommendation for a European approach. JRC Scientific and Policy Report \[online\]. 2013. Available at: \[http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/29296/1/lbna261\\\_11enn.pdf\]\(http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/29296/1/lbna261\_11enn.pdf\).](#)

De Groeve T., Poljansek K., Ehrlich D. & Corbane C. Current status and best practices for disaster loss data recording in EU Member States. JRC Scientific and Policy Report [online]. 2014. Available at: <http://publications.jrc.ec.europa.eu/repository/bitstream/JRC92290/lbna26879enn.pdf>