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Comment

## ***Interactive comment on “The XWS open access catalogue of extreme European windstorms from 1979–2012” by J. F. Roberts et al.***

**J. F. Roberts et al.**

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Thank you for your comments. Responses to each comment are detailed below:

Major comments:

1. The wind footprints are generated by initialising from reconfigured ERA-Interim at 18Z and then run for 30 model hours, driven at the boundaries during that time from boundary data from ERA-Interim (see page 2016, line 15, starting "To drive the 0.22 deg MetUM..."). This is actually more constrained than regional climate model (RCM) type configurations suggested by the reviewer, which are typically only driven at the boundaries. (We note that spectrally nudged RCMs are more constrained, but a hind-cast performed in this way is not yet available to us.) Just to note that the entire ERA-

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Interim dataset has been downscaled this way (1979–2012 at the time of writing the paper), not just the storms.

Apologies for the confusion. To make this clearer in the text, we will add to line 19 on page 2016: "..and a 30 h forecast is performed, driven at the boundaries by ERA-Interim", and on line 22: "...new higher resolution data set is created for the ERA-Interim period 1979–2012."

It is worth noting that all forecasts and model products will contain biases. Subsequently criticisms can be raised about any method using forecast or climate models. It is therefore of great importance that model results are properly evaluated, and if deemed necessary, recalibrated. These aspects are undertaken in later sections of the paper.

2. a) As stated above, the whole ERA-Interim dataset was downscaled, and as stated on line 18 on page 2017, "Footprints were created for each of the 5730 storms identified by the tracking algorithm". It is true that many of these 5730 events are not severe. As for the domain - as stated on line 21, page 2015, "The algorithm identified 5730 storms over the 33 yr period in European domain defined as 15W to 25E in longitude, 35N to 70N in latitude".

b) As mentioned above, we had the whole 33 year dataset. As stated on line 11 of page 2021, the 98th percentile was calculated using October – March only ("..where  $u_{98,i}$  is the 98reference period (October–March, 1979–2012) at grid point i.").

3. Please see the reply to Joaquim Pinto's post.

Minor comments: 1. As this is not a track intercomparison paper we felt it was inappropriate to go into the details in the paper, but to answer your questions:

The application of the adaptive constraints for the tracking are described in Hodges (1999) which control the maximum displacement in a time step and the track smoothness which is measured over three consecutive time steps (Hodges, 1994). The con-

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straints where changed from what is typically used for 6 hourly data to values more suitable for the 3 hourly data and to ensure the capture of very fast moving systems. These were set for the displacement distance as:

```
0.0  360.0  -90.0  -20.0  5.0
0.0  360.0  -20.0   20.0  2.0
0.0  360.0   20.0   90.0  5.0
```

which means that the maximum displacement in the -20 to 20 degree latitude band is 2 degrees (geodesic distance) and in the 20 to 90 degree latitude band of 5 degrees. If a storm moves from one band to the second then the average is taken as the constraint. For the track smoothness constraint the settings are:

```
0.5  1.5   3.5   5.0
1.0  0.4   0.1  0.05
```

so for an average displacement over three time steps of 0-0.5 degrees (geodesic) the track smoothness is 1.0 which means a very relaxed constraint on the motion for very slow moving storms, for average displacements between 0.5 and 1.5 degrees (geodesic) the constraint decreases linearly from 1.0 to 0.4 and the functionality is similar for the the larger displacements, see Hodges (1999) for details of how this is implemented in the algorithm.

2. As stated on lines 21-24 on page 2020, the indices  $S_f$  and  $S_{f98}$  are calculated from the footprints, not the 925hPa windspeed from the track. On line 1 on page 2021 it also states that  $u_i$  is the maximum gust at grid point  $i$  in the footprint. However, to re-emphasise this, on line 23 of page 2020, after "...and Scandinavian land." we can add "Note that for SSIs calculated from the footprint only, the maximum gust at 10m is used rather than the 925hPa windspeed."

3. Different thresholds were used because they serve different purposes: for severity indices we chose the 25m/s threshold as this is widely assumed to be a damage threshold, which is what the severity indices are trying to measure. For the recalibration, however, a threshold is chosen to be "extreme" but still give a reliable statistical model. This is stated on line 23 on page 2029.

4. Yes, the list of events was given to us as being important from a European-wide perspective, and it is almost certain that by looking at individual regions the ranking would be different. It is possible that the Klawe and Ulbrich index (Sf98) could perform better when looking at severe storms over specific regions, and also that storm area (N) could be less important. To mention this in the paper, to line 15 on page 2019, after "...if considering insured loss only", we can add "over the whole European domain.", and in the Conclusions at the end of the 2nd paragraph (line 14, page 2030): "It is worth noting that for specific regions or countries the performance of each index could be quite different; for example Sf98 may perform better due to using local thresholds, and perhaps storm area (N) may be less important."

The insured losses can be included in Table 1 (they are listed here: <http://www.europeanwindstorms.org/cgi-bin/storms/storms.cgi>). We did not include them originally because they were not available for all the storms and hence were not actually used in the analysis.

We are aware of the limitations of our analysis, in particular that the choice of index is very sensitive to the list of severe storms, which is likely to be biased or incomplete. Better access to loss data would have improved the study, but we could only use what was available to us at the time. We have tried to be clear about this (see page 2030, lines 14–17).

5. Table 1 is in alphabetical order. The insurance experts are from Willis Re (in the acknowledgements section), but this can be added to the caption. The losses were insured rather than economic, which can also be added to the caption.

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 2011, 2014.

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