

# ***Interactive comment on “Spatial variability and potential maximum intensity of winter storms over Europe” by Michael A. Walz and Gregor C. Leckebusch***

## **Anonymous Referee #2**

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The study uses operational ECMWF seasonal ensemble forecast data to investigate the most intense extratropical cyclones by means of extreme value statistics. The impact of the cyclones is evaluated by using the windstorm index SSI and different regions within Europe are considered. The paper addresses a relevant topic that meets the interests of NHESS. Using this large data set of a state-of-the-art NWP model is an innovative approach and the method applied is appropriate.

From my view the manuscript needs a major revision in terms of carefulness: (1) The study uses regions (SC, CE) that are not shown nor described in terms of position and size (section 3, p.4). Additionally, the choice of the regions is not motivated. (2) In

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section 4.2, p.9 one figure is referenced that is not in the paper. (3) Sections 1, 2, 4.1, 4.2 and 5 must be divided into paragraphs to make them readable.

Other comments: (4) Sentence 2 of the abstract should be deleted because it does not express what you have done in the study. (5) p.1, line 15, 16: From my understanding, "somewhere" and "about" sound a bit too sloppy to describe amounts of losses and casualties. There should be a more exact reference. (6) p. 3, line 8: I find "years" confusing in this context. (7) p. 3, line 9, 10: What do you mean by "observational" reanalysis data? (8) section 2: What times/time resolution of the data set have you used? (9) Fig. 1: What is the unit and the depicted level of the wind speed? (10) Fig. 1: Here, you could show the circles for all regions. (11) p.4, line 1: As above, replace "years" by seasons. (12) p. 6, line 21: In the beginning of the main section: What are the "other two regions" here? (13) Fig. 2,3: The red circle is hardly visible, can you draw it on top of the trajectories? (14) p. 9, lines 5ff: The heights of the bar figures 4,9 and 10 are barely comparable among the panels. A number on top of each bar could help, or a finer resolution of the horizontal lines. In addition, there is the unit missing for the return period. (15) p.9: Same as above: The long text needs some paragraphs. (16) p.9, lines 26ff: How are celerity and duration defined, how are they used to construct Fig. 5? (17) p.9, lines 34ff: This can not be understood without the figure. (18) p.9, line 32-34: This statement is related to which region? (19) p. 10, line 1ff, Fig. 6,7: How exactly are the composites constructed, which times of the windstorm are used? (20) Same, more scientific: What do you want to address with the composites? Your argumentation goes in two different directions: Do they represent the cyclone related to the windstorm or the steering flow responsible for the trajectories? For the steering flow the 700hPa geopotential is a more appropriate field. Still, the composites show a climatological picture. Are the windstorms of smaller scale embedded somewhere in the Icelandic low? Then, it would be interesting to show them as a disturbance field or high frequency field where the climatological low pressure system is subtracted. If there are multiple time steps for each cyclone/windstorm you could consider to use only one each, e.g. the most intense or the one when entering the region. Please revise this

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paragraph. (21) p. 10, line 26: Delete the "a". (22) p. 10, lines 29 till p.11, line 5: This section is too long. What about drawing a marker at the beginning of the windstorm identification above each trajectory? (23) p. 11, table 2: Is there a physical reason why the Germany/Benelux region should be affected by a potentially deeper cyclone than the British Isles (which are closer to the Icelandic low)? This is also in contrast to the results in Fig. 9. (24) section 4.2 and Fig. 10: Wouldn't it be more meaningful to show the statistics of the wind speed instead of cyclone curvature? (25) p. 12, line 11: Again, you do not have 1500 "years" of data. (26) p.13, lines 3-5: How is that meant? (27) p.13, line 3 16,17: What do you mean: "cyclones ... are ... lower"?

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