

Weather Clim. Dynam. Discuss., referee comment RC2
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Comment on wcd-2021-44

Anonymous Referee #2

Referee comment on "Characteristics of extratropical cyclones and precursors to windstorms in northern Europe" by Terhi K. Laurila et al., Weather Clim. Dynam. Discuss., <https://doi.org/10.5194/wcd-2021-44-RC2>, 2021

This paper investigates extratropical cyclones over Northern Europe, which are typically less studied in the literature, but have big impacts on the region. The cyclones are split into two groups – those that are classed as windstorms (i.e. having strong winds within the region) and those that are non-windstorms. The authors analyse the seasonality of these storms, their structure, lifecycle, and correlations with precursor fields (using ensemble sensitivity analysis). An interesting result is that the minimum MSLP of the windstorms are more strongly correlated with precursor fields than the maximum 10-m wind gusts. However, the strong link between the minimum MSLP and the wind gusts gives extra potential predictability.

The paper is very well written and enjoyable to read, with some minor grammatical issues (detailed below).

My two main criticisms are:

- The way in which the "windstorms" are selected gives (as the authors mention) mostly the extratropical cyclones that occur over the sea, due to decreased friction. It would be valuable to know whether storms that have the biggest impacts (i.e. the strongest winds over land) have the same precursors. This would certainly be more relevant when considering how these features might change in the future. However, if the authors feel that this is outside the scope of the paper, a stronger justification of the selection of the storms would be good.
- The ensemble sensitivity analysis is based on correlations between fields, and does not necessarily imply causation. Many of the phrases "leads to" or "causes" (e.g. line 185), should be changed to reflect this.

Minor comments

- Line 15: "than" -> "as".
- Line 30: "and" -> "with".
- Line 44: "to" -> "of".
- Line 61: "of" -> "for".
- Lines 51-66: The inclusion of some references would be useful here.
- Lines 79-80: This gives the impression that this study will also consider climate change. Perhaps it could be made clearer that this is a possibility for future study.
- Introduction: For some of the introduction, the terms "extratropical cyclones" and "windstorms" seem to be interchangeable until line 81. Then the difference is not made clear before the research questions. I suggest including a brief definition of extratropical cyclones versus windstorms.
- Line 90: "How the spatial..." -> "How does the spatial...".
- Line 111: Many other studies using TRACK use a truncation of T42 before identifying extratropical cyclones. Is this because you are using MSLP rather than vorticity? It would be useful to mention this difference.
- Line 116: "with a 6..." -> "within a 6...".
- Line 128: "differ from..." -> "go from...".
- Line 138: "which" -> "whose".
- Figure 2: I'm not sure you need both the left and right panels. Perhaps on the left panels you could just add a dashed line to indicate the mean.
- Line 251: "less" -> "fewer".
- Lines 313, 317, 379 and others: The use of the term "offset times" is confused in places. Line 317, for example, I would refer to the time of minimum MSLP as the "central" time (or similar). Then the offset is the difference from that central time.
- Line 335 and throughout: "similar than" should be "similar to" everywhere it appears.
- Line 347: Why not just say "minimum MSLP" instead of "maximum intensity in terms of MSLP"?
- Line 360: I think the sentence could end after "cold season".
- Line 408: Perhaps the first sentence could be turned around. E.g. "The 10-m wind gusts are weakly sensitive to the 300-hPa PV".