

Interactive comment on “Characterising the relationship between weather extremes in Europe and synoptic circulation features” by S. Pfahl

Anonymous Referee #1

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General comment:

The article investigates the role of cyclones and blocking conditions on windstorms, cold and warm temperature extremes as well as precipitation extremes in Europe. This topic is in the scope of the NHESS journal. The applied method is very convincing in its straightforwardness. The results confirm existing studies and reveal new aspects. The article is well written.

In my opinion, there is, however, one very important point missing in the study which should be addressed before the manuscript is finally accepted: The study sets out to identify conditions leading to extreme events. The author finds that specific cyclone and blocking locations favour the development of such extremes. It is suggested that

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the method can be applied to models of different climates to assess extreme weather events. In order to do so it has to be checked if the relevant cyclone and blocking anomalies are only a necessary or also a sufficient requirement for the development of the extremes. The study forgets to check in how far moderate weather events are linked to the same anomaly patterns and if it is really possible to assess (changes in) extremes by analysing (changes in) the blocking and cyclone patterns. I assume that especially in the case of precipitation the conditional frequency anomaly patterns for extreme and moderate events will be very similar. In my opinion, it is important that this aspect is looked at and discussed. Regardless of the outcome of this check, the paper is interesting and should be published when such a discussion has been added.

Specific comments:

Section 3.2 In how far do the results depend on the applied cyclone tracking algorithm, which identifies only closed cyclones? It may be that only the steering cyclones are captured. I assume that in a lot of cases there will be an open cyclone closer to the target region. Please look at some individual cases and comment on this.

P1881-1882 Is blocking on its own sufficient to cause a windstorm or is the presence of a cyclone also required?

Technical:

Figures: It is difficult to distinguish the yellow and turquoise shades in the conditional cyclone frequency anomaly plots.

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