

## Second Review of WCD-2021-25

**Title:** Multi-day hail clusters and isolated hail days in Switzerland – large-scale flow conditions and precursors

**Authors:** H el ene Barras, Olivia Martius, Luca Nisi, Katharina Schroeer, Alessandro Hering, and Urs Germann

**Recommendation:** Minor revision

I very much appreciate the significant effort that the authors have invested to address all the comments made by the three reviewers. Such efforts show the desire to arrive at a stronger publication, and the manuscript at hand is no exception. I have a few broader considerations that the authors might to address beyond their initial response, and I consider these as minor overall.

The response to the wind shear query of my first review mentioned that a subset of the hailstorms captured in the hail cases for this study were from supercells. On conceptual grounds these storms require deep layer shear which may or may not be captured adequately on the 0.5  ERA-5 dataset in the vicinity of substantial terrain (which would not be captured adequately on 0.5  grid). I see a risk of a proportion of the readership might gain a similar impression, which can preemptively be addressed somewhat more that it has to date. I recommend the following considerations for inclusion.

[1] Hail of golf ball size or larger is most likely due to storms that are organized due to deep layer shear interaction (what proportion of the hail reports in the insurance dataset are in that category?)

[2] Can anything be said about the deep layer performance of ERA-5 around significant orography (I am not asking for this step, but has anyone ever plotted observed or km-scale modelled deep layer shear against ERA-X deep layer shear?)

The restate the above thoughts once more has they summarize the main gap in demonstrating that ERA-5 can be meaningfully applied to flows around the Alps in the lower troposphere.

Among the very minor tidy-up considerations are:

- Clustering hail days: I can see that the amount of detail required to explain the approach can be seen to detract from the paper's main messages. On the other hand, a study should provide the minimum amount of information that allows

a (rather keen) scientist to reproduce the results. Maybe the best compromise is an Appendix with the clustering details, or a reference to an external source? The allocation of two 5-day clusters to 12-19 day periods of clustered days seems to follow the principle of maximum 5-day period separation. This principle can lead to the 5-day periods extending beyond the actual hail days by 1 day. Is there a simple way of showing that integrating such non-hail days into the analysis is not going to majorly alter the results? I suspect this may be hard to show, and I do not consider it an essential inclusion.