

Weather Clim. Dynam. Discuss., referee comment RC1
<https://doi.org/10.5194/wcd-2021-25-RC1>, 2021
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Comment on wcd-2021-25

Pieter Groenemeijer (Referee)

Referee comment on "Multi-day hail clusters and isolated hail days in Switzerland – large-scale flow conditions and precursors" by H el ene Barras et al., Weather Clim. Dynam. Discuss., <https://doi.org/10.5194/wcd-2021-25-RC1>, 2021

General comments:

The authors present a clear analysis of the differences between the synoptic-scale conditions associated with clustered and isolated hail events in Switzerland, both north and south of the Alps, and discuss the differences between those conditions. The steps in their analysis are described clearly and the figures illustrating the analysis are of high quality. In my opinion, the only point that could be improved a little is to elaborate a bit on why contrasting isolated from clustered events is so important. Overall, the paper is of high quality and I recommend it for publication with only minor revisions.

Specific comments:

Lines 30-34:

"For insurance companies, an important question is whether hail events can be considered as independent or not. "

I suggest explaining this a bit more precisely. What do insurance companies mean by independent, and why is this important to them? Besides this point, are there other reasons why clustered events are interesting? Is the hail usually larger or more widespread during those events?

Line 35 onward:

I suggest also citing this relevant publication, in which the synoptic-scale weather pattern and relation to storms is discussed as well:
van Delden, A., 2001. The synoptic setting of thunderstorms in western Europe. Atmospheric Research, 56(1-4), pp.89-110.

Line 86:

"We extracted ERA-5 variables at a 6-hourly temporal resolution and a spatial resolution of 0.5°."

Please indicate as well which vertical resolution you used, so that readers will be able to confirm it was sufficient for calculating Ertel PV.

Figure 2:

It is not clear to me how there can be events between the first and last day of clustered events, i.e. dots, which are not groups of 2 or 3 days and therefore seem "isolated", that are not classified as such. In other words, why are single dots that are not encircled to indicate an isolated event in the figure? This probably has a very simple answer :-)

Line 345:

"In contrast, at the beginning and end of the hail season, the air masses are not as unstable to begin with and therefore need stronger triggers to produce hailstorms."

I don't think triggers need to be stronger to initiate storms when instability is lower. The difficulty here is in the definition of "trigger", which has not been defined in the manuscript. Maybe it is good to be more specific about what you mean by trigger. I consider a trigger to be an area of meso-gamma-scale (2 - 20 km) upward motion sufficiently strong to lift parcels to their level of free convection, which usually also needs to have sufficient longevity and spatial coherence to create a storm. The factors inhibiting initiation despite mesoscale lift are in particular 1) convective inhibition and 2) dry air entraining into the updrafts, not so much the amount of instability as expressed by CAPE. It can be that by trigger, you refer to lift over a much larger scale and for a longer duration, so that it modifies the environment significantly and creates CAPE?

Technical comments:

Affiliation: "Climate Change Reserach". Correct to "Reserach"

Line 18: Duplicate word "Moreover"

Line 200: Remove the excess word "than".

