

Weather Clim. Dynam. Discuss., referee comment RC2  
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## **Comment on wcd-2021-53**

Anonymous Referee #2

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Referee comment on "A characterisation of Alpine mesocyclone occurrence" by Monika Feldmann et al., Weather Clim. Dynam. Discuss.,  
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Review

Manuscript Number: wcd-2021-53

Title: A Characterisation of Alpine Mesoscale Mesocyclone Occurrence

Recommendation: Major revisions required.

General comments:

Overall, the manuscript is of interest to the science community and within the scope of Weather and Climate Dynamics. The scientific approach is mainly good. However, the results are not discussed thoroughly and more relevant references are needed. The presentation is mainly good. The figure captions are often too short and not precise; important information that is needed to understand and interpret the analysis is "hidden" in the rather long appendix.

Specific comments:

- The discussion of the influence of the radar quality index on the derived spatial distribution of (mesocyclonic) storms is not very clear. E.g. What does a quality index of 0.5 mean? Should the results in this area be considered correct? Or underestimated?
  
- Meteorological expectations, derived distributions, limits of the radar network as well as assumed correlations between mesocyclones and hail are often mixed or used to support findings or assumptions in a rather ambiguous way.
  
- In the discussion it says "The accompanying relative quality index map helps interpret, where the mesocyclone detection is impeded by the physical limitations of the radar network." However, this information is not thoroughly used in the presentation and discussion of the results.

- The discussion of the “synoptic weather situation” is rather short. This could be elaborated. Also, it should be clearly stated which sentences are hypotheses and which are based on analyses (references).

Technical corrections:

L. 62: Including these place names in a map would help those readers not familiar with the study domain.

L. 88: 1 Apr to 31 Oct

L. 123: distance from the radar.

Fig. 1 Caption: Is this the quality index only for mesocyclone detection or for all radar derived products?

L. 151: Typically, negative velocities indicate a component of the wind towards the radar and positive values indicate a component away from the radar. Please clarify.

Fig. 3 Caption: Individual mesocyclone detections (there could be detections in successive radar scans – thus multiple detections per storm) or mesocyclone storm tracks per km<sup>2</sup>? Wording should be clear and consistent throughout the manuscript.

Fig. 5 Caption: Spatial distribution of detected mesocyclones classified by the synoptic flow. The colours denote the prevailing wind at .... level. The percentages given in the box ....

All maps: Could you use latitude / longitude instead of “swiss x-/y-coordinates”?

L. 224-225: Please explain.

L. 239: How are storm area and track length defined?

L. 245: The influence of the low number of cases on the results should be discussed.

L. 255: What is the influence of the radar data quality on the mesocyclone detections at high altitudes and its intensity estimation?

Fig. 7: Use a boxplot instead. Also provide the number of cases per selected altitude bin.