

NHESS-2024-371

Reply document to referee comments 1 (RC1) – Second review

Reconstructing hail days in Switzerland with statistical models (1959–2022)

Lena Wilhelm, Cornelia Schwierz, Katharina Schröer, Mateusz Taszarek, and Olivia Martius

The authors thank the reviewer for reviewing the manuscript again. The suggested changes are all applied to the revised manuscript, and we addressed all comments in the following document. The comments of the reviewer are shown in black and our replies in blue. Removed parts are ~~crossed-out~~ and new additions are in *italic*. All line numbers refer to the originally submitted manuscript.

Second Review of “Reconstructing hail days in Switzerland with statistical models (1959–2022)”

The authors have addressed most of my comments. I thank them for their diligence.

The most critical issue that remains is the choice of using outdated convective indices in their model. If I understand their argument, this is what they are arguing.

- Others use these outdated indices, so it is alright if we do.
- Because we are doing statistics, it is alright if use outdated technologies.
- The authors say that they agree with Doswell and Schultz (2006), but do not cite their arguments in their revised manuscript.

I don't see the point of furthering this argument. We must agree to disagree.

Thank you for your feedback. To clarify, our rationale for using these indices was not based on their use by others. While we acknowledge they may be considered outdated for certain forecasting purposes, we wanted to demonstrate that they can still be useful for other problems, such as long-term hail day reconstructions. We believe the combination of both traditional and modern indices remains valid for our specific study goals and have discussed this.

We agree to disagree on this point.

Other issues:

Line 105: No capitals and put a space in “echo top”. The authors did not address my previous comment on this topic (#16).

We excuse this oversight on our part and have made the necessary adjustments to “echo top”.

Lines 108, 126: In their response, the authors said that they could not reword “temporal resolution”. They could use the phrase “time intervals”. The authors could replace “5 min and daily temporal resolution” with “5 min and daily data”. There are a number of ways to addressed this issue. Fix elsewhere in the manuscript.

We agree and have changed line 108 to:

"POH data is currently available from 2002 to 2024 in 5-minute and daily ~~temporal resolution~~ *time intervals* on a 1 km × 1 km Cartesian grid."

Line 126 is changed to:

"In this work, *data from 1959 to 2022 at hourly and 6-hourly intervals was used, including data on model levels (137 levels from 1000 hPa to 1 hPa, 0.5° × 0.5° grid spacing), pressure levels (17 levels, 0.5° × 0.5° grid spacing), and surface data (0.25° × 0.25° grid spacing) in hourly and 6-hourly resolution was used from 1959 to 2022.*"

Line 141: Change the longer em dash (—) to an en dash (–). *Adjusted.*

Line 344: Put a space between “m s⁻¹”; otherwise it is per millisecond. (Apologies, I cannot use a superscript in this text editor.). [Adjusted throughout the text.](#)

Line 353: Change to “atypical”. [Adjusted.](#)

Lines 359–360: “A lower freezing level suggests a greater potential for hail formation”: No. Lower freezing level suggests a greater potential for the survival of hail after it is formed. Revise.

[Lines 359-360 changed to: “A lower freezing level suggests a greater potential for the survival of hail after it is formed due to a longer residence time of hail embryos in the hail growth zone and less melting of hailstones before they reach the surface.”](#)

Figure 8 caption: “thenorth” needs to be revised. [Adjusted.](#)

Line 403: “(Figure 9)” is outside the sentence. [Adjusted.](#)

Lines 413, 419: “Mann–Kendall” requires an en dash, not a hyphen. Fix throughout and for other similar compound phrases. [Adjusted throughout the text.](#)

Line 430: Change “it’s” to “its”. [Adjusted.](#)