Review of the manuscript titled "Revealing the structure of precipitation extremes: a spatio-temporal wavelet approach" by Svenja Szemkus, Sebastian Buschow, and Petra Friederichs.

The authors present a new method to analyse three-dimensional spatio-temporal precipitation characteristics by extending an existing two-dimensional method.
They apply this method to a dataset of severe precipitation in Germany and evaluate derived characteristics.

The submitted manuscript presents a reusable idea, which has the potential to change the way how precipitation fields are evaluated. However, the presentation could be made more clear to the reader. A more clear separation of theory and experiment will allow readers to adopt the proposed technique more easily. Therefore, I recommend to address some items before proceeding to publication.

Please see my general questions as questions that potential readers could have. Feel free to modify the text wherever you see fit.

Minor comments

General:

- Can the methodology be applied to the whole dataset? Is it a necessary precondition to select individual events, as you did?

- What is the purpose of finding the 50x50 km event window, when the wavelet transform is applied to the whole domain?

- Why didn't you fill the whole 128 elements in the time dimension with data, but 94 elements and filled the rest with zeroes?

- Why didn't you apply the WT continuously for 3-day and compare the evolution over, e.g., two weeks? Is the result jumpy?

- What is the benefit of the proposed method? What do the results reveal in terms of 'structure'?

Specific comments:

- L25: What is "high-quality"? Rewrite?

- L82-84: Briefly state why you choose DT-CWT over, e.g., Daubechies. Why would you choose more complex, if you find no substantial performance?

- L60-64: This is a crucial jump. First you introduce the method, then you say that there is some continuous data, and then you select 100 events. I think there is a gap to be filled. It would be helpful to articulate on what data the method can be applied to, e.g., only extreme cases, or also to a whole reanalysis?
  Are you applying the method on the whole data of 2001-2024, or 100 events?
  At this point I am confused if the selection of events is necessary? Or can I apply it on 30-years of reanalysis too? Why 100 events and not the whole dataset?
  Maybe you put details in section 2 (next comment)

- Similarly as above, L145-146: The transition from section 2 to 3 is rough.
  At the end of section 2, the reader has the method, but doesn't necessarily know on which kind of data it can be applied, etc.
  Provide details to:
  1) What are the limitations of the method?
  2) What are there requirements for the data/observations? can it be applied to satellite-derived precipitation data and station data?
  3) How long needs the timeseries to be?
  Finally, a reader would benefit from a step-by-step list of what a user needs to do to apply the method to a new dataset.

- L153: I doubt that 24 years of data are suitable for long-term climate trend analysis?!

- Title: "Revealing the structure of precipitation extremes":

  o From the description of the method I concluded that it gives characteristics not only for extremes but also the whole distribution, right?

  o Are the results characteristics of extremes or of the whole German domain during the 94 hours that went into the wavelet transform?

- L217: " the orientation along a straight line can be attributed to the movement of precipitation systems through space." Please clarify. Also, the reference is German, so please briefly describe what you mean.

- L302-305: This can be shortened and formulated more boldly, e.g. remove "only" and the sentence "Although ..." could be placed in the methods section.

- L312: " Although we initially rely on the simplified concept illustrated by Kraus (2004)" This half-sentence is confusing here. Maybe it can be (re)moved?

Typos:

- L48: "its"

- L226: "Tab. 2" You meant table 1?