

Interactive comment on “Changing seasonality of moderate and extreme precipitation events in the Alps” by Stefan Brönnimann et al.

Stefan Brönnimann et al.

stefan.broennimann@giub.unibe.ch

Received and published: 7 June 2018

"1) The study analyses precipitation and temperature averages over a fairly large area with diverse geographical features. They clearly explain why they do so and I'm fine with it. However, when looking at 1-day precipitation extremes, there are likely to be quite some differences between those at station scale (that the reader might intuitively think of, when reading this study) and those averaged over 17000 square kms. I'm quite sure that we are not talking about the local convective systems that move slowly and therefore often bring extreme precipitation amounts locally, while neighboring stations are not affected. What kind of meteorological situations are we talking about? Probably frontal systems that move over the entire region? Could you please discuss this, to give the study the right framing? E.g. a typical example of an area-wide rx1day event

C1

opposed to a typical station-scale rx1day event would be very instructive. This is not mandatory, but at least a few sentences on the differences between station scale and area-average should be added."

The reviewer is right that at single stations, Rx1day may occur during highly convective situations. For Rx1day over the catchment studied, a combination of a frontal systems with prefrontal convective precipitation is often responsible. We will add some text to the paper and will add a figure to the supplementary material showing meteorological fields for the three strongest events in the observations. In the main text we will give references to the most extreme events studied and will add a table summarizing the ten largest Rx1day in the catchment. Thanks for the comment.

"2) One of your major interpretations of the results is, that thermodynamic constraints are not the dominating constraints for moderate extremes, but for rarer extremes (10 year's rx1day) thermodynamic constraints dominate. This would mean: The hotter, the more rain, right? If this is the case, why has the annual cycle of rare extremes a notch during the hottest phase of the year? (Figure 3, bottom left panel). Isn't that a contradiction? Please comment on that."

The reviewer is right that a notch is not expected. What we see here is just a tiny notch, much smaller than for Rx1day, and this is the main point here. We will add a comment on that to the revised manuscript.

"3) Editorial:

Line 66: '(2) changes in the seasonal cycle of temperature on Rx1day events'. Something is missing here. Maybe 'the effect of' in the beginning?"

We will add 'the effect of'.

"Line 81: 'In this study we focus on experiments with regional or global models.' regional AND global models?"

This will be changed.

C2

"Line 141: '(iv) Finally...' This sentence hard to comprehend. After looking at the results, it becomes clear what you mean, but please consider rephrasing this sentence for better comprehensibility."

The sentence will be rephrased.

"Fig S2: In the figure caption, there is a 'Top:' too much."

This will be changed.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2018-55>, 2018.

C3