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Discussions

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Interactive comment on "A radar-based regional extreme rainfall analysis to derive the thresholds for a novel automatic alert system in Switzerland" *by* L. Panziera et al.

Anonymous Referee #1

Received and published: 25 April 2016

General comments

This paper presents the use of weather radar data for regional extreme rainfall analysis together with a relevant application for automatic heavy precipitation alerts. The authors not only clearly explain methodology and describe the data employed, but they also show how they addressed issues that otherwise might have introduced biases in their calculations, as for example the presence of residual ground clutter. The presentation is clear and the text completed with an interesting case study which illustrates how the proposed system is complementary to thunderstorm nowcasting in case of low convective, but heavy precipitation events. Finally, the study not only touches at topics that are particularly relevant for operational weather services, as the production

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[Discussion paper]

of warnings for severe weather, but it also introduces practical methods for exploiting the potential of increasingly growing weather radar archives.

Specific comments

p. 8, line 13: The use of monthly block maxima for the regional extreme analysis is certainly appropriate and has the advantage of introducing a robust temporal independence of the extremes. However, given the seasonal variation of the precipitation, just taking one value per month might lead to the exclusion of some of the extremes: the second peak in August may be larger than the highest value in May. The issue is of some importance considering the short duration of the dataset (10 years). Often a peaks-over-threshold approach is proposed to overcome the limitation. Have you considered this approach for your application?

p. 9, lines 4-20: You are not only assuming that the GEV parameters are spatially constant within each warning region, but also that they are stationary throughout the warm/cold season. The assumption is justified by the need to compensate for the limited number of years in the record, but in my opinion it might be appropriate to mention it more explicitly in the text. There are also examples of studies trying to explicitly account for seasonality (e.g. Rust et al., 2009).

Technical corrections

Figure 8: If alert thresholds are defined per region and correspond to given return periods, why is the colorbar on Figure 8 showing both alert levels and rainfall thresholds? As I understand it, two regions at the same alert level (and therefore experiencing precipitation events with similar return periods) may get very different 1-hour rainfall totals (as shown in Figure 6).

References

Rust, H. W., Douglas Maraun, and T. J. Osborn. "Modelling seasonality in extreme precipitation." The European Physical Journal Special Topics 174.1 (2009): 99-111.