Hydrol. Earth Syst. Sci. Discuss., 11, C5317–C5318, 2014
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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Little evidence for super Clausius–Clapeyron scaling of intense rainstorm properties with air temperature" *by* P. Molnar et al.

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Received and published: 26 November 2014

The referee presented two suggestions to improve the paper. In the revision we have recomputed all our results with rainfall data at a 10-min resolution, and the new results will in our opinion take into account both suggestions of the referee in the following ways.

1. The first suggestion was to try to provide an explanation why the scaling presented in our work was not visible in previous studies. The answer is to a large degree in our method of using independent event statistics as opposed to all rainfall intervals, and perhaps more importantly to the fact that we do not search for a break in rainfall intensity-temperature slope at an arbitrary temperature. In fact in our data, with stations

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at different altitudes with very different temperature ranges, finding such a breakpoint is rather futile and certainly not robust. We think it is not our place to re-compute previous studies with our methodology, but we will make clear in the revision where the main differences lie and the impact they have. The referee may find the answers to the key questions also in our response to the comment of Loriaux in this Discussion.

2. The second suggestion was to use the quantile regression method (Wasko and Sharma, 2014) to estimate the scaling rates in addition to temperature binning, so that estimation uncertainty can be better understood. We agree with this comment and have estimated the scaling slopes with both methods. In the revised manuscript we present the quantile regression method applied to the set of all events and individually to the subsets of events with and without lightning. This is equivalent to using covariate regression. We do not compare the estimation uncertainty of the scaling rates at each station and for each method, but we illustrate the variability in the estimates between the stations by both methods. Altogether the statistics of the estimated scaling rates do not change significantly with the estimation method, however the quantile regression method certainly is more attractive because it does not require the arbitrary binning of data into temperature classes.

The revised manuscript will consider and expand on both suggestions.

References

Wasko, C. and Sharma, A.: Quantile regression for investigating scaling of extreme precipitation with temperature, Water Resour. Res., 50, 3608-3614, 2014.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 8923, 2014.