Hydrology and
Earth System
Sciences

Open Access

Discussions

Interactive
Comment

Interactive comment on "Precipitation variability within an urban monitoring network in terms of microcanonical cascade generators" *by* P. Licznar et al.

P. Licznar et al.

pawel.licznar@pwr.wroc.pl

Received and published: 30 July 2014

Reply to Reviewer#1 comments We would like to thank you for precise analysis of our manuscript. We believe that this will give us the possibility to prepare a much better version of revised manuscript. Below we also present our short replies to the general comments.

General comment no. 1: - Clarify more precisely the added value with regards Licznar et al 2011 a and b

In our study, in contrast to Licznar et al. (2011 a and b), we do not focus on the

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

development of microcanonical cascades and we do not compare how microcanonical cascades perform versus canonical cascades. We investigate the variability of cascade generator within gauged sites of an urban precipitation network. In the specific, we address two issues. First, if the only one microcanonical cascade generator is valid for the whole city? Second, how long should be the high-resolution time series to derive the microcanonical cascade model parameters? We believe these questions are crucial for the practical use of microcanonical 1-D cascades as it is declared in numerous studies to be downscaling daily total rainfall data for urban hydrology needs. In revised version of the manuscript, we will make clear the aims of this study.

General comment no. 2: - With regards to cluster analysis, it not straightforward what "non-obvious" information it brings. Authors should clarify the purpose of this study and why this methodology was tested on the various rain gauges of this rather small area.

The idea is to analyze the variability of precipitation within gauged sites of an urban precipitation network comparing the relative BDCs histograms. For this comparison we have considered the cluster analysis because it allows for objective comparison of patterns i.e. shapes of BDCs histograms leading to the identification of similar, as well as different, histograms. The purpose of this analysis for a group of gauges deployed on rather small area of a city was to answer to the question if data from single gauge are representative for urban hydrology modelling and if one single microcanonical cascade generator is representative for all the city. Our results show that in general most of gauges display very close patterns of BDCs histograms with exception of gauges R15 and R25. For these two gauges, and some timescales, BDCs histograms seem to be more diverse than even histograms obtained for gauges located in other cities. Of special practical importance is the case of gauge R15, which is the airport gauge. Note that time series originating from airport gauges are used for urban hydrology needs in central Europe on daily basis.

General comment no. 3: - Results should be discussed much more in-depth with some physical interpretation rather than simply stating output of statistical analysis.

Thanks for this comment. We agree with you. We would like to support the more in-depth discussion of our results with their physical interpretation; however actually, we are not able to do it fully based on only available data from gauging network. We regret not having access to some alternative meteorological data on the high resolution of our gages to support existence of local turbulence conditions difference among suburban gauges of R15 and R25 and all other inner city gauges.

General comment no. 4: - Why some spatial (some elements are in Rupp et al, 2012) or even spatio-temporal downscaling has not been tested with this data set.

Thanks for this comment. Here, we are not interested in exploring spatial or spatio-temporal properties of Warsaw rain field, e.g. by means of 2-D or 3-D cascade models. In our opinion, analyzed dataset from 25 gauges is not sufficient to allow for developing truly spatio-temporal rainfall model, but we believe that it might be possible in the future by coupling rainfall and radar data. Results of comparisons of C-band radar data with Warsaw gauges time series were recently published by Jakubiak et al. (2014).

General comment no. 5: Some methodological aspects should be justified, especially the overlapping methods, statistical significance of the differences in cluster analysis...

Many thanks for this comment. In revised version of manuscript, we would try to justify more profoundly the above-mentioned statistical aspects.

Specific comment: "micro-canonical cascades are mentioned, but I think that other types (such as macro-canonical ones) should be mentioned, and you should justify the use of one type rather than the other ones."

In this study, we focus attention on microcanonical cascades as we would like to use a simple BDCs framework for rainfall variability from gauge to gauge. We do not believe that in this study there is space for a comparison of the performances of different types of cascades, but for surely in a future work. We would like to point out that we consider this issue of interest, also because, as working in progress, we are calculating universal

cascade parameters for all 25 gauges.

References mentioned not supported in original manuscript:

1) B. Jakubiak, P. Licznar, S. P. Malinowski: Rainfall estimates from radar vs. raingauge measurements. Warsaw case study. Environment Protection Engineering 2014, vol. 40(2), ss. 162-170.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 5251, 2014.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper