Hydrol. Earth Syst. Sci. Discuss., 11, C5129–C5131, 2014
www.hydrol-earth-syst-sci-discuss.net/11/C5129/2014/

Hydrology and Earth System Sciences
Discussions

Interactive comment on "Stochastic modelling of spatially and temporally consistent daily precipitation time-series over complex topography" *by* D. E. Keller et al.

D. E. Keller et al.

denise.keller@meteoswiss.ch

Received and published: 17 November 2014

We would like to thank the editor for her efforts and in putting together this summary on the reviewers' main points. In the following, we respond to these in a general comment. Please also consider our replies to referee #1 and #2.

Indeed, the two reviewers assess the novelty of the study rather differently. It is true, that the precipitation generator itself is methodologically not new, but rather re-built after Wilks and others. The paper clearly states that. However, the main challenge (and the main work) of such a model is to calibrate and implement it. In a practical

application a multitude of concrete decisions and assumptions need to be made, such as the selection of time-period, the choice of non-zero precipitation distribution, the setup of calibration (each month or season separately or something else) to name a few. These practical steps, i.e. the "lessons-learnt" and the resulting consequences for the quality of the weather generator, need to be documented. It was not the purpose of this study to invent a novel stochastic modeling approach. The aim is rather to have a sufficiently simple tool ready for current climate that can be re-adjusted for future climate conditions in a subsequent study (a follow-up article is planed).

Following the reviewer comments, we realized though that the latter aspect was not emphasized enough in the abstract and the introduction. In addition, in retrospective, the title was misleading and may have caused wrong expectations. We will change the title to "Implementation of a multi-site precipitation generator to a Swiss river catchment".

We agree that we have not analysed topographical aspects in detail but the topographical analysis was implicit by using the Thur catchment with its different precipitation characteristics among the stations at different altitudes (see Figure 1 of the manuscript). These characteristics, ranging from e.g. a summer wet day frequency of 0.55 at Saentis (2502 m.a.s.l.) to a wet day frequency of 0.3 at Andelfingen (382 m.a.s.l, only about 60 km away), poses a challenge to a weather generator. To test whether a statistical tool is able to capture these different climata is one aim of our study. In the revised manuscript we spell out more clearly, which aspects of this project are novel, and what the implications of those are.

We agree with the editor, that we have missed a few important publications of space-time WGs, in particular from the hydrology-community. In the revised manuscript, we will provide citations to the following studies:

Huser, R., & Davison, A. C. (2014). Space-time modelling of extreme events. Journal of the Royal Statistical Society: Series B (Statistical Methodology), 76(2), 439–461. doi:10.1111/rssb.12035

Mezghani, A., & Hingray, B. (2009). A combined downscaling-disaggregation weather generator for stochastic generation of multisite hourly weather variables over complex terrain: Development and multi-scale validation for the Upper Rhone River basin. Journal of Hydrology, 377, 245–260. doi:10.1016/j.jhydrol.2009.08.033

Paschalis, A., Molnar, P., Fatichi, S., & Burlando, P. (2013). A stochastic model for high-resolution space-time precipitation simulation. Water Resources Research, 49(12), 8400–8417. doi:10.1002/2013WR014437

We further have to add, that it was difficult to reply to some of the allegations raised by referee #2 due to their unspecific manner. However, based on the more specific comments and the issues raised by referee #1, we hope that we could address the main critical points.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 8737, 2014.