What made the June 2013 flood in Germany an exceptional event? A hydro-meteorological evaluation

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General remarks:
This manuscript is a nice example of (in the words of the authors) “Forensic disaster analysis” (FDA). This kind of studies are needed in order to understand gaps in the knowledge concerning the triggering and management of extreme (flood) events.
The manuscript uses a solid base of data and nicely combines established evaluation techniques. In the introduction I miss some paragraphs on the methods adopted (See below). The methods adopted are presented and adopted in a straight-forward manner, no sensitivities are assessed. This should be improved, because I have much the impression of reading a cook-book, which is here adopted for assessing the severity of a “random” event. The “hydraulic load” is in my opinion also an aspect that needs to me more highlighted in the introduction (novel to me).
I found that the referencing adequate, but in my opinion some useful paper have been not considered (see minor comments and reference list). Most of the references I missed stem from NHESS, a journal which could also have been an adequate recipient for this manuscript.

Issues to be addressed (Page(s) – Line(s)):

Introduction: I completely miss some paragraphs on previous applications of the adopted methodologies (API, Wetness-Index, EVS and so on). I would expect that you introduce them and clarify how novel is the application you realize here (e.g. the specific combination of the approaches).

8131-4-13: In the section methods you explain the different measures you use in the assessment. One central question is the selection of the event start date, which varies within the stream network. Now, from an HESS manuscript I expect somewhat less straight-forward application of the methods. I would like you to consider to introduce some basic analysis of sensitivities. I really like your Figure 12 and it would be nice to have in there some error-bars (both for API and the wetness index). What if you use API20 instead of API30? What if you do not start the API estimation the day prior to the 3days maximum, but two days prior to the 5 days maximum. These examples should bring you to “experiment” with your methodology and finally tell us that for these kind of analyses API30 and starting API the day before the 3 days precipitation maximum are a solid way to proceed in these kind of analyses. Without such contribution is like reading a technical report on the event. You write on Page 8132 that *“We have performed this analysis for maximum precipitation total of 3 to 7 days duration”*. These analyses should be shown and the sensitivities should be propagated until “Figure 12”. You can also vary the “decay” within the API equation (you use 0.9).

8133-6: Why 5 year RP? Again I would be interested in the sensitivity of the methodology you use in this “Forensic Disaster Analysis” and I am not very interested in reading a cook-book.

Minor comments:

8127-5-11 : When speaking about flood losses you might cite the papers of Hilker et al. (2009) and Barredo (2009)

8128-6-15: Here you might find also some interesting discussion in Alfieri et al. (2014)

8129-6: You consider a relative long period and this might allow you using the “block maxima” approach. Why you select POT?

8130-8: Am I the only one wishing an illustration of “low central Europe (TM)” and “trough central Europe (TRM)” ? Add TRM and TM in Figure 1.

8135-5: GEV computations generally allows estimating uncertainty ranges (which in case of RP of 5 years might result very narrow). But again, it would be another piece that can be added for quantifying the sensitivity of this methodology.

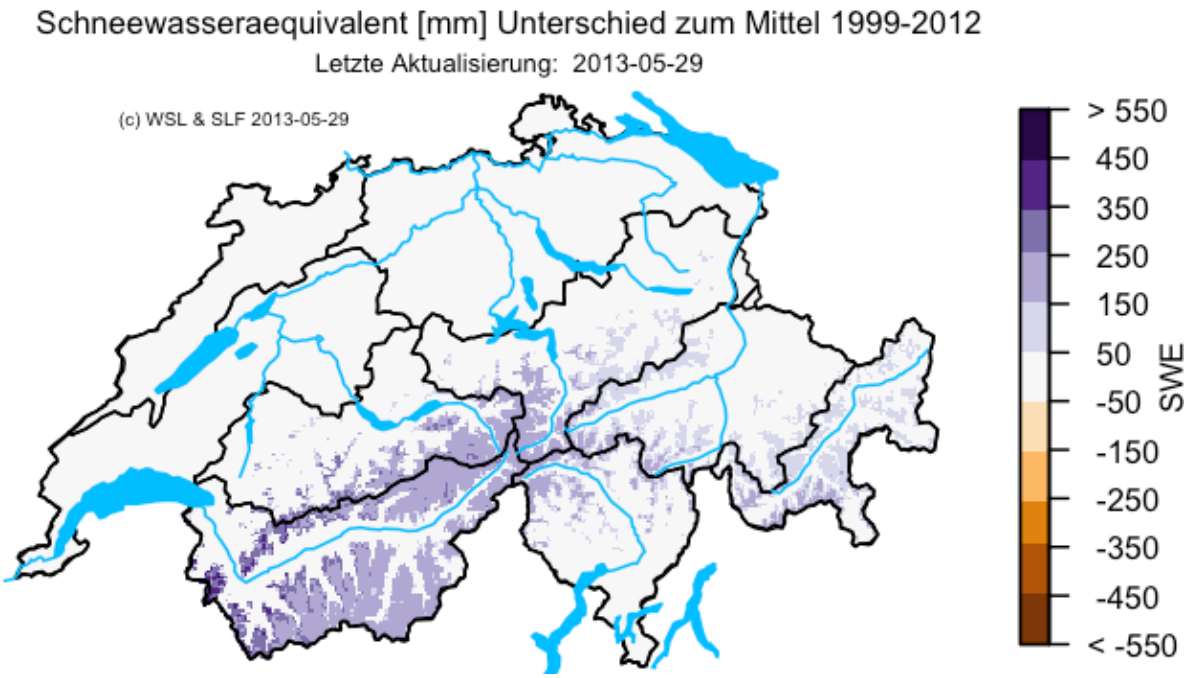
8136-8137: You make large use of regional geographic terminology. Thank you very much for Figure A1.

8138-15-20: Is there any literature on LCL, or is it assumed that HESS readers are familiar with this?

8139-10: The propagation of this statistical uncertainty up to Figure 12 is what I want to see.

8141-23: I really like this “Hydraulic load” approach.

8142-15-20: It should be possible to access a snow-depth measurement in order to confirm this statement. Here below an assessment of snow-resources anomalies in Switzerland on May 29 2013. Source T. Jonas, SLF (see also Jörg-Hess et al.., 2014 and Zappa et al., 2014). A slight positive anomaly can be seen in the highest areas.



8144-23: Very interesting section, just add some sensitivity to this as proposed before.

8145-19: No new line needed.

Figure 12: Caption: “Upper right corner”, I guess.

Final considerations:
Summarizing I found the reading of this event report quite agreeable and I could recommend it for minor revisions … in NHESS. For the HESS target audience I think that more methodological novelty is needed.

Best regards

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Birmensdorf, 22.08.2014

References:

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Jörg-Hess S, Fundel F, Jonas T, and Zappa M. Homogenisation of a gridded snow water equivalent climatology for Alpine terrain: methodology and applications, The Cryosphere, 8, 471-485, doi:10.5194/tc-8-471-2014, 2014.

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