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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Floods and climate: emerging perspectives for flood risk assessment and management" *by* B. Merz et al.

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We thank Patrick Willems for his very supportive comments. We will incorporate his comments as follows:

We will mention the reduction of sample size when extreme value distributions are estimated for different flood generation mechanisms. Additionally, we will highlight the pressing need for more innovations in statistical extreme value approaches (e.g. as discussed in Serinaldi, F., and C. G. Kilsby, 2014, Rainfall extremes: Toward reconciliation after the battle of distributions, WRR, 50, 336-352) as well as in the development of alternative and/or complementary approaches for assessing extreme floods. The small sample of floods produced by an infrequently occurring process in a catchment in the

observed record is still some of the best information we have on what future flooding from that same process might be like in the catchment. We will emphasize the need for future approaches to be "both/and" rather than"either /or" (or one 'prevailing over' the other.)

Page 1576 – lines 19-22: We will use more concise wording.

Page 1577 – lines 2-4; Page 1577 – line 6; Comment on distinction between extreme value distribution of catchment runoff discharges and river flow discharges: We will more clearly mention that changes in the slope of the flood frequency curve can also occur as consequence of floodplain processes and that the slope may increase again when the floodplain boundaries are reached.

Page 1579 – lines 3-4 and 27-30: We agree that in some situations a straightforward quantile mapping may give better results than a weather pattern based analysis, or other more elaborate procedures. However, it cannot generally be assumed that the rainfall relevant weather patterns or their frequencies do not shift under enhanced GHG forcing. Subscale (to the GCM) local orography or land surface patterns, in combination with the relevant precipitation producing processes, may then cause deviations from the quantile mapping approach. In order to be more precise in our wording, we will modify the sentence as follows: "Under such conditions, it is not recommendable to infer future changes in flooding directly from the GCM produced rainfall at individual grid points." Further, we will point to current improvements in climate modelling: "This constraint will ease as climate models are applied at higher resolutions, for example in the work by Kendon et al. (2014) using a RCM at up to 1.5 km resolution to resolve convective rainfall in the UK." (Kendon E., Roberts N., Fowler H.J., Roberts M., Chan S.C., Senior C., 2014 "Heavier summer downpours with climate change revealed by weather forecast resolution model" Nature Climate Change in press)

We will check how the proposed papers contribute to the manuscript and add if appropriate.