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Interactive comment on “The impact of uncertain precipitation data on insurance loss estimates using a Flood Catastrophe Model” by C. C. Sampson et al.

Anonymous Referee #2

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The authors present a well written and documented study on the uncertainty caused by different rainfall data sets, hydrological model parameterization and rainfall distribution sampling on flood damages, resp. loss ratios in a flood risk assessment (“CAT model” in insurance industry terms). The flood risk assessment is performed by a complete model chain starting with the forcing rainfall and ending in an estimation of insured loss. While the first components and their uncertainty were subject in other studies (to different extends), the last link of the model chain is usually not covered in scientific publications, at least in the hydrological commune. The model selection was aptly justified (important because there are many alternative options possible), and the

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methods are in most cases comprehensively explained. As the title suggests, the presented results provide interesting insights into the uncertainty and thus usefulness of different rainfall data sets for flood risk assessments, at least for catchments of comparable sizes. Moreover, the uncertainty in losses caused by sampling the event base and by the parameterization of the hydrological model is also quantified. So overall the manuscript is surely adequate for publication in HESS, both from a content and technical point of view. I have little to criticize or comment, but the authors should comment on the following aspects in order to polish the manuscript for final publication even more:

1. There are some studies published considering at least the major parts of the model chain including uncertainty presented here, if not the whole. In these studies the vulnerability model, resp. the flood damage assessment was typically the component causing the largest uncertainties, at least to the same extent as the forcing of the model chain. Often river discharges were used instead of rainfall, i.e. the hydrological model was skipped, but the results are comparable. Examples are given in the annotated pdf. I recommend that the uncertainty of the damage models/vulnerability is reflected in the discussion/conclusion when the overall uncertainty of risk assessments is discussed.
2. The uncertainty of the final loss ratios shown in figure 5 is zero for probabilities of exceedance up to probabilities of 0.006, resp. 166 years return interval. Given that the analysis is based on rainfall records of 7 years only, this is a very surprising view for anyone into the subject. Of course, this is explained by the fact that the uncertainty of the financial model is shown only, and that the uncertainty caused by the different rainfall data sets is shown in different panels. But it also indicates that one uncertainty source is not considered in the study: the parametric uncertainty of the stochastic model (fit of the Generalized Pareto distribution to the tails). Given the short time series this epistemic uncertainty is likely very large. This aspect is indirectly touched by the analysis of the uncertainty caused by different record lengths, but it is not explicitly covered in the study. I recommend that the authors comment on this, because even

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if the recorded rainfall would map the real spatially distributed rainfall exactly, large uncertainties would be associated to a synthetic 1000 year rainfall time series and particularly to the extremes due to the limited record length, resp. the fitting of the statistical model.

3. Can the authors comment on the suitability of the re-analysis and satellite products for risk assessments on a larger scale, where the scales of data and catchment match better than in the presented analysis? This should be interesting for readers dealing with larger scale risk assessment, including the insurance sector.

Besides these points I made some comments of mainly technical nature in the attached annotated pdf.

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/11/C198/2014/hessd-11-C198-2014-supplement.pdf>

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