

Interactive comment on “Defining and Analyzing the Frequency and Severity of Flood Events to Improve Risk Management from a Reinsurance Standpoint” by Elliott P. Morrill and Joseph F. Becker

Anonymous Referee #1

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This study applies a data driven approach to capture and aggregate multiple occurrences of flooding at various locations into independent events in attempts to solve the issues of inconsistent event definitions within the (re)insurance industry. The manuscript is well written and the results are valuable and interesting. Although the logic of this work is presently smoothly, the scientific novelty should be somehow emphasized in the manuscript. Some figures are repeated (see the comments below). Besides, I think the following major concerns of the work should be addressed before it gets published.

C1

Lines 167 - 168, 8/6 digit HUC were chosen as they were felt to best represent how flood waves would impact a basin. So this is not a rigorous scientific conclusion and no other reference supports this?

Lines 201 - 204, and 208 - 209, if the method "was made to ensure that the threshold was not impacted by drastic variations within the annual maximum during a short period of time", then why "Sites with less than 5 years of data had their respective Q2 calculated from the annual maxima obtained through their daily discharge time series"? Isn't the methodology here contradictory to its purpose?

Lines 246 - 247, "the impacted area was defined as the number of sites within the desired HUC". This is questionable since the sites are not spatially uniformly distributed across all HUCs. But I see on lines 249 - 250, "severity was calculated by taking the sum of all scaled discharges and dividing by the total number of sites within the basin", which is fine.

Lines 266 - 267, authors said the frequencies within basins defined by the HUC6 are higher than frequencies defined by the HUC8. I think this is simply due to that the average area of each HUC6 is much larger than that of HUC8. Thus each HUC6 basin could contain several HUC8 basins (in the area) and generally has more flood events comparing to HUC8. But interestingly, authors found that "for each HUC, there was no interaction between the size of the catchment and the number of events" (lines 274 - 275). I hope the author could explain this obvious observation and the contradictory result.

Lines 280 - 281, "there does not appear to be a population bias throughout the study"? Please prove it, otherwise, do not make this conclusion.

Lines 285 - 292, Figures 12 and 13 are well explained by the numbers mentioned in this paragraph, but I think it would be more interesting to compare the shape of the corresponding CDF curves and it will be clear to see the difference of each duration within different HUCs.

C2

Lines 303 - 304, "the duration of the events represent the observations at each site so based on our definition we can see long event durations". What does this sentence mean? What definition is it?

Line 367, can't find 071200 on Figure 5.

Figures

Figure 4 left panel, Figure 9, Figure 16, and Figure 18 left panel are all the same. Figure 4 right panel is the same as Figure 11.

Can't recognize the numbers on Figure 5.

Figures 12 and 13 can be combined as one figure.

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