EGUsphere, referee comment RC1
https://doi.org/10.5194/egusphere-2022-829-RC1, 2022

Referee Comment on egusphere-2022-829

Anonymous Referee #1

Referee comment on "A climate-conditioned catastrophe risk model for UK flooding" by Paul D. Bates et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-829-RC1, 2022

This paper summarizes the impressive work done by Paul Bates and colleagues in flood risk modelling. While the details are left to other more technical papers, this work concentrates on the big picture and answers to the call for peer-reviewable flood risk assessments (in the UK but I would say also elsewhere). Because of this, I believe that the paper fits is appropriate for NHESS. I only have a couple of minor suggestions (and some more detailed comments below):

- Despite the title and abstract focus on climate scenarios, in the paper, a lot of emphasis is given to the transparency and consistency of the hazard and risk maps obtained through this modelling chain as opposed to the "opaque" official maps. The climate change analysis, instead, is not fully developed. The assessment of uncertainty with an envelope of climate models (and for different emission scenarios) would be a standard requirement (and the estimation of additional uncertainties of the hydrologic and hydraulic models would be even better). My suggestion would be to rephrase title and abstract to reflect the weight given in the paper to the product transparency (which has the appealing side effect of allowing coherent change analyses, for which this paper shows an example).

- The paper is a manifest for the consistent flood risk modelling at the national scale. It is a step toward the construction of the digital twin (of UK in this case). Is there any room for local knowledge in this game? I would expect, and the Authors acknowledge it, that locally tailored models may be more accurate than the national one. This is partly due to the calibration with local data but also to the better specification of boundary conditions, including hot-spots, that is possible because of local knowledge. Is there a way to incorporate local knowledge in a "consistent" large scale modelling effort maintaining its consistency? It would be nice to have a couple of lines discussing this point in the concluding section.

Detailed comments:

Line 88: Bloeschl et al. (2019, https://doi.org/10.1038/s41586-019-1495-6) show a significant increase of river flood magnitudes over the UK, specially the northern part,which is one of the clearest hotspots in Europe for that matter.

Line 212: under the RCP8.5 scenario only? Are therefore the different worming levels correspondent to different future times?

Line 216: uncertainty in hydrological modelling is accounted for. How? What are the regionalised "results"? How regionalised?

Line 220: for how many years are the stochastically generated events simulated over the UK? How many events per year are generated on average? (PS. at page 16 I see it is 10000 years)

Table 1: it would be very informative to also stratify the results by river flooding, pluvial flooding, and coastal flooding.

Line 267: labelled 2, in "red"?

Table 2: for "ABI" and "This paper" one could report also other statistics for the annual damages (not only the mean but, for example, the 25% and 75% quantiles, or more) which would show whether the distribution of "observed" annual damages is captured by the model, and that "This paper" is much more informative than NaFRA and CCRA3.

Line 479: for past changes, see e.g., Bertola et al. (2020, https://doi.org/10.5194/hess-24-1805-2020).