

Interactive comment on “Estimating the long-term historic evolution of exposure to flooding of coastal populations” by A. J. Stevens et al.

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We agree with the reviewer that the presence of exposure (people/property to be impacted by floods) is a pre-requisite for a flood risk assessment. However, whilst it may be obvious that some degree of exposure exists and that this will be increased by sea level rise and development/population rise drivers, quantifying the number and spatial location of people in the floodplain is vital for effective flood risk management. For instance the approach for evacuating 1000 people in a dense urban environment will be different to that required for 100 people in a more dispersed rural area, perhaps with limited access routes. We also note that earlier studies such as the Foresight (2004) Future Flooding study identified that future increases in exposure (and risk) due to both

C565

climate change and socio-economic drivers was significant. Here we have established and demonstrated a method to evaluate how exposure has changed historically, which has not been quantified previously.

The uncertainty within the source terms was summarised in figure 7. This uncertainty is not of the same magnitude of the results: the same trend in exposure is present for each rate of sea level change applied. If required we can produce a supplementary graph showing all of the sources of uncertainty (i.e. from the source, pathway and receptor components) on the same graph. However with limited space this was not considered in the original paper.

The exposure for a range of different return period extreme storms (ranging from 1 in 1 year to 1 in 100 years) was considered, and the trend for each storm shows an upward trend. The reviewer is referred to our response to the first reviewer comment on 7th March where the same question was posed. Trends in a different region will vary: one of the strengths of the methodology is that it is transferable to other locations, and therefore this can be tested. This is recommended as future work. The temporal variability within the cost of a flood event is irrelevant to the analysis presented. The number of people within the floodplain was used as the metric of exposure, rather than annual average damages, avoiding this source of uncertainty.

We thank the reviewer for the comments that this work forms a good basis for future direction of study. We agree that in many ways this paper poses more questions than it answers. A key strength of the method is that it can be applied elsewhere in the UK and the world where data exists. It would be very interesting future work to look at other locations (e.g. with no/strict spatial planning policy) to see if the trends are different.

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C566