

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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1) Do we expect the results to be the same if the return period was altered?

Analysis was conducted for a range of return period water levels including 1 in 1, 1 in 5, 1 in 10, 1 in 50, 1 in 100 and 1 in 1000 year levels. All of the results show the same trend for both case study areas (albeit for Hayling there is no exposure for the low return period storms): only the 1 in 200 year results were included in the paper to provide a succinct analysis.

2) Do we expect there to be many areas around the UK where the reverse trend might be found?

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It is unlikely that the reverse trend exists elsewhere as over the last 200 years population has increased across the UK, leading to increased encroachment of development and a higher population density upon floodplains. Only in low lying areas where development/population rise has remained fairly static would observed sea level rise have played a more significant role than that of population change. We would speculate that this is more likely to be the case in the future as cities such as Portsmouth reach "saturation point" in their development. The existence of exceptions could be tested by repeating the method across the whole country, and this is suggested as future work.

3) Do we believe it is possible to accurately predict the future changes in population dynamics cross the UK in order to more accurately predict exposure (and therefore risk)?

This is inherently unpredictable however it is possible to explore with scenarios and plausible futures. Agent-based approaches have been used to predict development and population change (such as developed by Fontaine (2010)*). Coupling the method presented in this paper with such approaches might develop insights on these processes, but this is a major research task. * Fontaine, C. M. (2010). Residential Agents & Land Use Change Modelling. PhD thesis. University of Edinburgh.

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