

Interactive comment on “Coupling scenarios of urban growth and flood hazard along the Emilia-Romagna coast (Italy)” by I. Sekovski et al.

Anonymous Referee #3

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Coupling scenarios of urban growth and flood hazard along the Emilia-Romagna coast (Italy) I. Sekovski, C. Armadori, L. Calabrese, F. Mancini, F. Stecchi, and L. Perini

General comments This is a good, well-written and interesting paper that is appropriate for this NHESS Special Issue. It describes modelling of changes in coastal flood risk and hazard, with emphasis upon population growth scenarios. The case study is a highly populated region of the Adriatic coast. The authors aim to provide insights into historical growth, scenarios for future growth – and also produce coastal flood extent & hazard maps. I have some fairly minor suggestions & queries.

Specific comments & technical corrections/queries

Some suggested adjustments. In the Abstract: From: “The extent of coastline urban-
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ization reduces their resilience to flooding, especially in” To: “The extent of a coastline’s urbanization reduces its resilience to flooding, especially in” From: “is compact-like” To: “progresses compactly” From: “can be useful for identify” To: “can be useful to identify” or “can be useful for the identification of” From: “Although projecting future is often” To: “Although projecting the future is often”

P2153, line 26: you write: “High degree of coastal urbanization also caused the flattening of dunes for construction purposes, therefore nowadays dunes are present only in 28% of the 130 km of coastline” – I suggest changing this to: “A high degree of urbanization has meant that as of XXXX [insert year of the source of your statistic from Armadori et al 2012], dunes are present along only 28% of the 130 km of coastline”.

P2154: You switch between metres and cm –perhaps for consistency use one or the other. “Storm surge levels are significant.” – This statement isn’t informative – I’d suggest removing it & just explaining in the subsequent narrative exactly what you mean by significant; where it is stated: “Even low return period surges (e.g. a 1-in-10 year event) can reach elevations close to 1 m above MSL (Masina and Ciavola, 2011).” Is the ‘1 m above MSL’ the storm-induced elevation of the water level (caused purely by the low pressure and wind stress), or is this an extreme water surface elevation (with some surge + tide) above a datum (i.e. MSL)?

P2161: “Run-up levels, land sub-sidence and scenarios of sea level rise were not included into the computation” – I appreciate a fast method is desirable, and you acknowledge that run-up can be critical for estimating flooded areas, and also that part of your focus here is upon a fast, practical method. However these variables could be (briefly) addressed separately/more systematically with regard for the implications upon your results; or with more specifics about how they would be integrated into future application of your modelling approach. Do you think that the hazard assessment (or forcing) component of this paper is secondary to (and primarily allows you to demonstrate an example application of) your analysis of the receptor dynamics using SLEUTH?

In the discussion & conclusions you make the point that yours is a fast and simple method for estimating future flood hazards. If it is not feasible here to explain the specific sensitivities (of a more detailed hazard assessment component, e.g. values for wave run-up, morphological change, sea level rise etc.) can you provide any more insight to some of the practicalities of your model (e.g. run times, set-up time etc.), especially as you indicate this approach could be adopted by a wide range of users / decision-makers?

P2162: “Resulting hazard maps were more realistic in some areas, if compared to historical storms”. – do you mean that in locations where you were able to calibrate or validate, the results were likely to be more certain?

P2170 line 3-4: “We believe that planners and decision makers should be strongly encouraged to take into account models and scenarios.” – see above comments. A bit more information on what models and scenarios (or types of these) you are specifically referring to would enhance this statement.

More of a generic view / some context as to how your methodology is similar or differs to other research (case studies & methods applied elsewhere), would be beneficial, and strengthen a review of your research’s strengths, and recommendations for future work. For example this Special Issue includes a paper which assesses the population vs sea level in the context of coastal flood hazard: “Stevens et al. . . Estimating the long-term historic evolution of exposure to flooding of coastal populations, doi:10.5194/nhess-15-1215-2015, 2015.”

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