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Comment on nhess-2020-414

Anonymous Referee #1

Referee comment on "Cost–benefit analysis of coastal flood defence measures in the North Adriatic Sea" by Mattia Amadio et al., Nat. Hazards Earth Syst. Sci. Discuss.,
<https://doi.org/10.5194/nhess-2020-414-RC1>, 2021

Cost-benefit analysis of coastal flood defence measures in the North Adriatic Sea

by Amadio et al. – submitted to NHESS

Overall evaluation:

The manuscript reports the results of a study about the effect of planned and hypothetical seaside renovation projects against the historical baseline in two North-Italian towns, Rimini and Cesenatico. Authors simulate coastal flood scenarios for different return periods, by considering changing climate conditions, i.e., extreme sea level for current conditions (2020) and future conditions (2050 and 2100). Based on the results of the hydrodynamic simulations, expected annual damages on residential buildings are calculated and a cost-benefit analysis is performed, showing increasing benefits of the investigated projects over time, due to increased probability of intense flooding in the next future.

The context is in line with the scope of the Journal and the aim of the manuscript is interesting and useful for all scientist (and not only), who works on flood risk and cost-benefit analyses for defending projects. The manuscript is clear, well written and structured. Figures and graphs are of high impact and useful to understand the entire work.

I surely consider the manuscript suitable for publication, although I think it needs be even more improved by means of some minor revisions, that I'm reporting hereafter.

Minor comments:

General: I would clearly specify that Authors are referring to residential (or mixed) buildings only. It is only sometimes mentioned, while the scope of the manuscript appears to be a general cost-benefit analysis that includes other sectors too (infrastructures, industrial and commercial buildings, population, heritage and natural sites) and maybe also indirect damages. I would at least specify it in the introduction and remember it in the conclusions. Consider also to mention it also in the titles of paragraphs 3.7 and 4.2 and in the graphs' titles.

Introduction: I suggest adding a paragraph about the situation in Italy, in order to introduce and justify the study area

Ch. 2 and Sec. 3.1: I would add some references, although the reader can find most of them in the flowing sections, but at a first read, they seem to be missing (e.g., about subsidence in the Padan plain at P2 L78-79 and VLM rates at P3 L102).

P3 L85-86: it is not clear to me how the sea level events' increasing is related to the socio-economic development of the coast. Please clarify.

P3 L93: please provide some examples (years?) of coastal storms resulting in flooding of buildings and activities in the study area.

P8 L245-247: I think the verb is missing, please correct.

P8 L249: what about infrastructures and natural sites (mentioned on P3 L240)?

P8 L 259-261: the statement about the validation of the depth-damage function on Italian empirical data is a repetition.

P9 L279: please provide a reference or a justification to the 6 M€.

P9 L 292: "costs" instead of "cots".

Figures 8-9 (left): I would suggest plotting the defended scenarios too, so that the reader can immediately see the differences and be introduced to the right histograms.

P14 L388: is the velocity as output needed? It is not used in the analysis...

Appendix A is never cited in the text. Please correct.