

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC2
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Comment on nhess-2020-414

Anonymous Referee #2

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-RC2>, 2021

General Comments:

The paper investigates coastal flood inundation and associated risks for baseline year (2020) and future (2050 and 2100) for two North-Italian coastal areas. This was conducted by considering surge, tide and wave impacts on the coasts for the baseline year and ESLs are projected using an intermediate RCP 4.5 sea level rise scenario. The study determines the Expected Annual Damage for the mentioned coastal areas and eventually conducts a cost benefit analysis considering potential coastal defence projects.

The paper is well written, clear and very-well organized. However, there are some specific points that need to be addressed. Once these are addressed, in my opinion, the paper merits publishing, given that it is quite appropriate for the scope of the journal.

Specific Comments:

Line 52: DRR project abbreviation is not defined. Please define for the readers' convenience.

Line 68: Similarly, please define "ISTAT". If this is a reference, please include in the reference list.

Line 78: The authors suggest "... In addition to that, all the coastal profile of the Padan plain shows relatively fast subsiding rates, partially due to natural phenomena, but in large part linked to human activities." I believe this is land subsidence caused by landwater drainage. Please be more specific.

Line 85-87: The authors state that ESL events are increasing due to socio-economic development of the coast? How? The socio-economic development could only affect the "impacts" of the ESLs, not ESLs as hazard levels. Please correct this sentence.

Line150: The authors used RCP4.5 for the future projections of SLR. It would be interesting to see what happens with RCP8.5.

Line 150-152: It is stated that "We consider the intermediate emission scenario RCP 4.5 (Thomson et al. 2011), projecting an increase in MSL of 0.53 m at 2100." Is this taken

from the same reference, i.e., Thomson et al, 2011? I cannot find this in the relevant reference. Or is this calculated by the authors? If not please give the reference. Moreover, IPCC AR5 SLR projections give more local projected values of SLR. Apart from using a generic Global Mean Sea Level rise projection for the Mediterranean area, it would make more sense to account for more regional/local SLR values at specific coastal areas (as in IPCC AR5).

Line 177-179: This is a minor comment, however, is there a need for using 1 m resolution for inland topography, while using 2m resolution for the coastal area, which is more significant for an inundation model?

Line 228: The authors mention "wave setup" and "wave runup" throughout the paper inconsistently. Although interconnected, these ESL contributors are different parameters. A clear definition is needed how wave setup OR wave runup was calculated for the coastal flooding purposes.

Line 245: The population is only accounted for the year 2011? Is this dataset also used for years 2050 and 2100? Please address this more clearly.

Line 280: A reference is needed for "6M Eur per km" statement.

Line 285: Please mention the sensitivity analysis for "r" values (which is Appendix A) conducted within this paragraph.

Line 310-311: The authors state that "The north-western part and the marina are not affected by the coastal renovation project." Please specifically address this statement why and between which scenarios and years, referring to the figure 6.

Line 363: The authors found that the Benefit-Cost-Ratio is 0.82 for Rimini and claim that this is profitable. According to the definition they have given between lines 292-294, it is not, at least by the year of 2100, as it is lower than 1? Please reconsider this statement.

Technical Comments:

Line 94: "... occasions, ..." Please add comma.

Line 129: "... industrial boom." Please delete the comma.

Line 189: "Figure 3. Prototype..." Please correct with the capital letter.

Line 293: "... and the costs; ..." Please correct.

Line 359: "In figure 10 ..." Please correct.