Natural Hazards and Earth System Sciences Discussions

Nat. Hazards Earth Syst. Sci. Discuss., author comment AC2
https://doi.org/10.5194/nhess-2021-161-AC2, 2021

Reply on RC1

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Author comment on "Development of damage curves for buildings near La Rochelle during storm Xynthia based on insurance claims and hydrodynamic simulations" by Manuel Andres Diaz Loaiza et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2021-161-AC2, 2021

Dear authors,

This is an interesting research on damage curves development based upon insurance damage data and hydrodynamic model results. The methods are clearly presented in the paper. The validation results of hydrodynamic models seems reasonable. The only concern of myself is the proposed standard normal distribution of damage curves because the results of all the damage curves developed in this paper is based on this hypothesis. I was wondering how to validate these damage curves? How will the insurance company utilize the damage curves for further risk analysis?

Response: Dear reviewer, thank you for your comments and your observations. I will answer them in the next paragraphs. For the concern related with the use of standard normal distribution for the damage function development we decided to use this function since it is one of the most common statistical distributions used in this scope. Nevertheless, now we decided to apply another statistical distribution in order to compare with the current results. The results will be displayed in the appendix for the newer version together with the comments of Xavier Bertin. With regard to how insurance companies can use the damages curves for future risk analysis the answer is that we are helping to determine which physical quantities (flow velocity, water depth, significant wave height etc..) generate the best correlation with damage data, and this is something insurance companies are willing to know.

Other comments:

- a thorough discussion of literature review is missing in the 'Introduction'. what is the common way of developing damage functions? what do the previous researchers have done? what are the main conclusions of their works? what is the current research gap? what is the scientific contribution of this research? please also explicitly explain the significance of this work.

Response: In the beginning we decide to be the most direct with the structure and content of the paper, since the structure is intended for people who already have experience in the topic. But based on this observation we decided to include two paragraphs on this matter. Thank you for the observation

- Line 56: ‘In’ à ‘in’

Response: yes, in the new version line 56 is changed

- Line 60: I suggest add the units of these parameters. e.g. Hsig is the significant wave height [m];

Response: we will guarantee that the correspondent units appear in the tables and in all the figures

- Line 65: Figure 23àFigure 3

Response: yes, the figure title is changed in the text of line 65

- Caption of Table 1 could be ‘Description of three scenarios of topography and bathymetry data used in the model : low resolution (a), high resolution (b), high resolution + structures (c)’.

Response: We feel the current caption is explicative enough of the content in table 1.

- I suggest zoom in the study area of Ille du Re and La Rochelle to show the water depth and Hsig. Otherwise the readers cannot get useful information from Figure 6. This figure currently didn’t convey clear information on water depth and wave height.

Response: yes, a better image with a zoom over Ille du Re and La Rochelle will be included

- Both figure 7 and Table 2 show that the damage curves for water depth and total water depth have good and very similar fitting curves for coarse (GEBCO) and fine (IGN+structure) data. It seems that damage curve is not that sensitive to the topography data for the variable of water depth. I recommend to discuss it in the section of ‘Discussion’.

Response: yes, that behaviour was initially detected although the real explanation for this is not clearly understood. Although only IGN for this variable have worst RRSE, RMSE and Pearson coefficient compared to IGN+Structures and GEBCO, these values are good in between the rest of the variables, indicating water depth and total water are good descriptive variables for the damage curves in this case study. Nonetheless, for all the variables the best goodness of fit indices are in the case of IGN+structures (better bathymetry/topography compare to GEBCO).

- I suggest reorganize the conclusion section. The paragraph of uncertainty analysis should be moved to the section of ‘Discussion'.

Response: Thank you again for your comment and all the previous, we will consider this last for the new version.