Natural Hazards
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Sciences
Discussions

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Interactive comment on "Kalman-filter based stochastic-multiobjective network optimization and maximal-distance Latin hypercube sampling for uncertain inundation evacuation planning" *by* Tsang-Jung Chang et al.

Anonymous Referee #2

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GENERAL COMMENT

This manuscript introduces new concepts to develop the evacuation scenarios considering the uncertainty of inundation evacuation planning. For inundation evacuation under uncertainty, a Kalman-filter based stochastic-multiobjective network optimization model is implemented. Moreover, a maximal-distance Latin hypercube sampling method is used to simulate uncertain scenarios of flooding. A case study in Muzha, Taiwan is then used to apply the new frameworks of evacuation scenarios. The results of implementing these new methods are then discussed.

Although the manuscripts have presented new frameworks to improve the quality of evacuation scenarios under uncertainty, in general, several points need to be improved: (1) The flow of writing is not well presented. Some parts need to be connected with a proper story. The writing seems to be inconsistent considering the flow of the story; (2) The main concept of evacuation used in this study has not been addressed in the text; (3) the contribution/novelty of this concept compared to the existing methodologies has not been discussed clearly. Subsequently, further revisions need to be carried out.

SPECIFIC COMMENT

ABSTRACT: line 12: channel friction resistance uncertainty ==> "uncertainty" can be deleted since you already used UNCERTAIN INUNDATION FACTORS

Line 15: THE new measurement?

The story flow of sentences in the last sentence of abstract (line 19-21) is not well connected.

INTRODUCTION

In my opinion, the problem in the second paragraph (starting from line 33) must be moved in the first paragraph. Therefore, the story will be something like this: general problem, specific evacuation problem, issues in the existing evacuation methodologies developed in the current literature, then addressed why your frameworks are necessary.

Line 48: MANY RELATED STUDIES HAVE DISCUSSED EVACUATION TRANSPORTATION SYSTEM PROBLEMs ==> What is the problem? need to discussed clearly so the contributions of this study can be well presented.

LINE55: WHAT are the two stage of programming models? you then explained in Line 63-64 but the sentences in line55 seem to be unfinished.

METHODOLOGY

First, what type of evacuation that you present in this manuscript? is this self-evacuation process where the people are decided by themselves where they want to evacuate? or is there any pre-existing road/plan that has been developed before? Is there any announcement from the authorities for the evacuation?

Second, in principle, the evacuation time is calculated by summing initial reaction time (IRT) and evacuation time (ET). Three components are further considered to calculate the initial reaction time (IRT) including institutional decision time (DT), institutional notification time (NT), and reaction time of the community (RT). Do you consider this concept or everything has been included in the multiobjective optimization introduced in this study?. If it has been included, please state it clearly.

RESULTS AND DISCUSSION

In my opinion, the manuscript needs to discuss the comparison between the results from your study and the other existing frameworks that have been validated and used for another study/region. In this section, the results from this study have not been validated with the other methodologies/data.

Line 180: why 200-m is the radius of potential overflow? please clarify

Line 184: why the simulation is only 425 times?

Lines 185: Why only three probability scenarios presented in this section? are there only three cases? please clarify. Why are these three probs chosen?

Line 188: How to define the people live on higher floors? do you have all the building data in this areas? please explain it clearly.

Line 198: HOT ZONE changes to CRITICAL zone?

Line 208-209: the sentences are not clear. Suggest to re-write.

The comments for Figs 8-9 need to elaborate on the concept of calculating the evacuation time.

CONCLUSIONS

First and second sentences (line 239-240) is not necessery. Suggest to change or delete it.

The limitations of this study also need to be explained clearly in this section. Only future studies are presented but it can be connected with the limitations of this study.