Hydrology and Earth System Sciences Discussions

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2
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Comment on hess-2022-362

Anonymous Referee #2

Referee comment on "Development of an integrated socio-hydrological modeling framework for assessing the impacts of shelter location arrangement and human behaviors on flood evacuation processes" by Erhu Du et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2022-362-RC2, 2022

Summary: the authors evaluate tradeoffs between behavioral heterogeneity in departure time, which route they choose and where evacuation centers are location on traffic congestion and time to evacuate the affected population using a coupled model of flood inundation and traffic routing.

Comments: The paper is very interesting and well organized. Following are few of my comments that the authors may want to consider before resubmitting their manuscript:

- at places authors may want to check for languange

- there is reference to sociohydrology - perhaps the authors can spend some space on why it is sociohydrology (e.g. because of bidirectional feedbacks between agents decisions and travel times). Also more references, placing this study in the landscape of other sociohydrological studies would be helpful.

- It remains a semi-empirical study. The authors may want to discuss what next steps should be taken to make it more realistic in terms of mapping household behaviour. For example using household surveys on psychological factors that may influence such behavior. Can then behavior of others influences the psychology of those who have not yet started to evacuate (e.g. "others are evacuating with urgency so I better hurry"). This may be a more concious feedback than the traveltime congestion feedback due to heterogeniety in time of departure)

- Table 1 is secondary not primary data. Primary data is self measured, e.g. trhough field

campaigns

- How are the travel time results affected when shelter locations are designed to be located close to denser parts of the population than when they are randomly assigned in space? Here, perhaps simulations with more number of shelters and where they are designed to be located are needed to conclude that marginal gains reduce as number of shelters are increased.

- Are system wide shortest routes calculated for each of households that have yet to decide to evacuate at each time step of the simulation? This is not clear and perhaps affects the interpretation of the results regarding the superiority of centrally planned routes. What if households are just given live updates on congestion and then let them decide on their own vs a route that is centrally planned before the flood hits. Centrally planned routes may still be better if they are repeatedly calculated at each time step of simulation where central planners also have information on congestion on various routes and it would be interesting to see how this fares compared to agents deciding on their own route but with live information on congestions. Perhaps the authors may want to provide result on this so the two cases can be fairly evaluated (self organization for evaucation vs centrally planned one - which one is better?)