Paper nhess-2019-214 "Multi-coverage Optimal Location Model for Emergency Medical Services (EMS) facilities under various disaster scenarios: A case study of urban fluvial floods in the Minhang District of Shanghai, China"

Comments

This study proposes a methodology for location of emergency medical services (ems) facilities under various disaster scenarios. In the introduction section, some background information and relevant literature are presented. The methodology is discussed afterwards. A case study is performed for emergency evacuation as a result of floods in the Minhang District of Shanghai, China. Overall, I think the study investigates an interesting subject and fits well with the scope of the journal. However, there are quite a few areas that have to be improved in the paper. Below please find more specific comments:

*Page 1 line 14: I suggest replacing "add valuable minutes to travel times" to "may significantly increase the total travel time".
*Page 1 line 22: Since EMS is defined as "Emergency medical services" in the abstract, I suggest using "Emergency medical services" in the keywords as well instead of just "Emergency medical service".
*Pages 1: The authors start the introduction section with a discussion regarding the importance of emergency services. I suggest including a broader discussion, highlighting potential consequences of disasters, importance of emergency evacuation and disaster preparedness, and the need for developing the methodologies that can improve both emergency services and emergency evacuation. In the discussion, I recommend acknowledging some relevant studies, including the following:

- Wilmot, C. and Mei, B., 2004. Comparison of alternative trip generation models for hurricane evacuation. Natural Hazards review 5 (4), 170-178.
- Dulebenets, M. A., Abioye, O. F., Ozguven, E. E., Moses, R., Boot, W. R., & Sando, T. 2019. Development of statistical models for improving efficiency of emergency evacuation in areas with vulnerable population. Reliability Engineering & System Safety, 182, 233-249.
- Xu, Z., Yang, X., Zhao, X., and Li, L., 2012. Differences in driving characteristics between normal and emergency situations and model of car-following behavior. Journal of Transportation Engineering 138, 1303-1313.
- Cheng, G., Wilmot, C., and Baker, E., 2013. Development of a time-dependent disaggregate hurricane evacuation destination choice model. Natural Hazards Review 14, 163-174.
- Dulebenets, M. A., Pasha, J., Abioye, O. F., Kavoosi, M., Ozguven, E. E., Moses, R., Boot, W. R., & Sando, T. 2019. Exact and heuristic solution algorithms for efficient emergency evacuation in areas with vulnerable populations. International Journal of Disaster Risk Reduction, 101114.
- Sadri, A., Ukkusuri, S., Murray-Tuite, P., and Gladwin, H., 2014. How to evacuate: model for understanding the routing strategies during hurricane evacuation. Journal of Transportation Engineering 140, 61-69.

*Page 3: Towards the end of the introduction section, please briefly discuss the structure of the manuscript (what would be described in the next sections of the manuscript).
*Page 3: It would be good to have a Figure in section 2.1, illustrating the problem of interest. This will help the readers visualizing the problem at hand.
*Pages 4-5: There are some issues with the control of indexes in the mathematical model. For example, in constraint set (2) you have y_j but you are summing over i, which is incorrect. The summation should be over index j. In constraint set (4) indexes "i,j" are not controlled. I assume you are trying to enforce the following condition: $t_{ij} \leq T \; \forall i \in I, j \in J$. Again, please check the entire model and make sure that all the issues associated with the control of indexes are fixed.
*Pages 7-8: Did you develop Figures 1 and 2 yourself? If not, please provide a relevant reference.
*Page 15: The conclusion section should be strengthened. The authors should clearly highlight limitations of this study and how they will be addressed in future research.