

## ***Interactive comment on “Variable population exposure and distributed travel speeds in least-cost tsunami evacuation modelling” by S. A. Fraser et al.***

**Anonymous Referee #2**

Received and published: 1 July 2014

Overall comments: I went through the paper and I must say that I was overwhelmed about the detail of elaboration which, on one hand, is quite appreciable; however, on the other hand, I have strong doubts about the practicability. The whole paper has probably a highly theoretical value, in the sense that some kind of sensitivity analysis is done with a huge number of parameters inside. Aim of evacuation should be to evacuate all (or a maximum of exposed people). Aim of an evacuation plan should be to reach this aim and provide with proper means and to identify potential bottlenecks.

From a practical point of view, such an evacuation plan should rather focus on worst-case scenarios taking into account those parameters that create bottlenecks: the max-

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imum of exposed people, the elderly, schools and hospitals, but also surface of the road, width of the road (not discussed in the paper). The distinction between night, weekend evacuation, the probability (40% 60% etc.) that young people run faster than expected, etc. is rather of theoretical nature instead of practical nature. There can be many possible scenarios but only one evacuation plan.

Therefore this paper has an interesting theoretical value but little practical value (at least, I cannot see it in a quick view); the paper should rather be published in a mathematical journal, I would even say.

The paper seems to have considered a huge (and sufficient) number of literatures. The graphical part seems to be quite nice; it is understood well and all figures and tables are referenced well.

The conclusions are well structured. Interestingly, in the conclusions new aspects are mentioned or introduced which could be of huge importance (see last paragraph). This left me as a reader a bit perplex, as many of these points are equally decisive for evacuation preparedness.

At the end of chapter 4, 4.5 more precisely, you introduce bicycles. So what? Does it mean to introduce another parameter, like probability of certain population groups to use a bike, or availability of bikes per cell? I mean, you can endlessly introduce new parameters into your sensitivity analysis. In my opinion better stick to evacuation on foot.

You do a very detailed analysis by introducing a variety of parameters, but then – sometimes – you step back: for example, the introduction of certain scenarios is a method to limit the range of results. Or as another example, in chapter 4.2 you discuss the omission of decision-making and preparation time: first you introduce these parameters and then you omit them. So what? As a third example, I would like to mention the mentioning of a mean ETi; again, first you do an extremely detailed analysis and then you shrink yourself to a mean value. So what?

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And finally, there are some banal expressions like in line 340: these ranges . . . variability in walking speeds. Isn't this obvious? What about those people who cannot walk at all? Or in line 468: These results show the tangible impact that is possible due to an increase in travel speeds. OK, this is obvious. If you lash on people . . . they probably run faster. Or in line 517: It has been demonstrated that a reduction in departure time can significantly reduce evacuation time and . . . . Isn't this clear from the beginning? Do we have to demonstrate this scientifically? Mathematically?

I mean, there is no objection to include as many as possible parameters in some kind of sensitivity analysis; however, the overall output can only take pick out those worst-case scenarios in order to establish a good evaluation plan. Hence for practicability reasons it does not really make sense to introduce too many parameters.

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 4163, 2014.