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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "A probabilistic tsunami hazard assessment for Indonesia" *by* N. Horspool et al.

Anonymous Referee #2

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General Comments

This paper addresses a relevant and important issue, by describing a first national scale Probabilistic Tsunami Hazard Assessment (PTHA) for Indonesia. The paper presents state-of-the-art methods for making such an assessment, and after some relatively minor changes I think it will be suitable for publication in NHESS.

A PTHA such as presented here is a complicated project containing many important details. To describe all these details would require much more space than a typical paper, so to some extent a paper such as this represents a summary of the project rather than a complete description. This does place some limits on how deeply a reviewer can assess the work presented. Below I will explain some areas where I think

more detail should be included, while recognising that a complete description of all parts of the work is not practical.

Specific Comments

A key component of this work is the quantification and application of the Aleatory Uncertainties (Section 2.4.2). This work is of much interest to researchers in the field, but unfortunately the reference given for the derivation of the uncertainties (Thio, 2012) does not appear to be a public document (at least, I was not able to access it). If the document is public, please could the authors provide a link to it? If it is not public, the Editor may need to decide whether it is OK to use as a reference? If the authors are able to make this public, or to include the derivation of these quantities in an appendix, I suggest this would be a useful public service.

A concern, that I could not address from the information given, is whether sigma_m, sigma_d and sigma_s are truly independent? In particular, could it be that sigma_m (the modelling uncertainty) already captures some of the uncertainty in dip and slip distribution? This would be the case if the models used to estimate sigma_m did not have perfectly accurate information on the dip and slip distribution of the modelled events.

Another area of concern, is the treatment of 'tsunami earthquakes', particularly along the coast of Java. The 1994 and 2006 java tsunamis appear to have been caused by earthquakes that bear many of the characteristics of 'tsunami earthquakes' i.e. slow rupture on the shallow plate interface, limited felt shaking, a large tsunami relative to the magnitude. Presumably the authors are not treating these events any differently, i.e. they are considered to be just a part of the standard distribution of earthquakes? It is not clear to me how 'tsunami earthquakes' should best be handled in a PTHA, but I would like to ask the authors to clearly state their assumptions on this matter.

The logic tree treatment of epistemic uncertainties is initially well described, but does not feature in the section on probabilistic calculations or results (section 2.6 onwards).

NHESSD

2, C1662–C1664, 2014

To my way of thinking, each logic tree branch produces it's own synthetic catalogue and subsequent hazard curve. And the (weighted) distribution of the hazard curves can then be used to produce a combined hazard curve with an associated uncertainty distribution.

It is not clear how the authors are doing this, it seems like they are producing a single synthetic catalogue combining results from all of the logic tree branches. How then should the final hazard curve be interpreted? Is this the mean hazard curve? Or the median? What information is available on the uncertainty in the hazard curves (and hazard maps)? I would like to see these questions addressed.

A Minor point

'... greens functions ...', should probably be written as '... Green's functions ...'?

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 3423, 2014.