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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Tsunami hazard warning and risk prediction based on inaccurate earthquake source parameters" *by* K. Goda and K. Abilova

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Overall statement:

The paper is an interesting and very well-researched attempt to look at the variability in tsunami loss models for Japan, as well as to gaining an insight into the evacuation and safety aspects of tsunami warning times via magnitude determination. The paper is well-written with only a few minor typos and will make an interesting addition to the journal. Reasonable assumptions are made for Box-Cox, Hurst, fault plane, slip etc. in line with the author's previous papers. The novelty of the paper, as the authors point out, is that the uncertain tsunami scenarios are not specific for source models, which

makes for a more probabilistic quantification of results than other methods.

Clarifications:

MDR ratio from 3.8 billion for 80000 buildings = $50000 USD - seems reasonable. 1 USD = 100JPY seems reasonable as an exchange rate given the cost of replacement is borne over a few years and that the exchange rate has gone from 75 to 125ish. Perhaps this could be explained as otherwise readers may expect the 2011 USD-JPY exchange rate. Arbitrary damage ratios seem fine as the key output of the paper is the variability in losses and not the absolute loss numbers.

"correct" estimates of Mw - 10 mins after - page 7489, Line 18 - availability of the Mw value as reported by USGS of Mw8.8 was 20 mins after. At 15 mins, the range in agencies was 7.5-8.0 (not inc. JMA) According to the JMA, the magnitude estimate of this quake was initially 7.9, then revised to 8.4, 8.8, 8.9, back to 8.8, and finally set at 9.0. The data released by the USGS was 8.8, but revised to 8.9 the same day. On March 14, it was finally set at 9.0. http://eost.u-strasbg.fr/wphase/events/tohoku_oki_2011/ gives a good overview. or here - http://tsunamisociety.org/314AnnunziatoEtAl.pdf Please review this statement.

Manning's value for inundation:- this value would likely have quite a large influence on final results in terms of attenuation of waves inland:- why was a value of 0.02 used for agricultural, and 0.04 for low density residential etc.? Miyagi Prefectural Govt. is mentioned, but a reference is required and a comment as to variability may be useful.

"In the database, seven discrete damage levels are defined: no damage, 10 minor damage, moderate damage, major damage, complete damage, collapse, and washaway" seems misplaced in 2.4 and would recommend be moved to 2.5.

Assumption that all residential are wood structures is OK again given the paper's goal and the details of the portfolio should not be dwelled upon.

Figure adjustments:

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Fig 1: wonderful overview. 10^6 US$ are in which year? - for the text. Fig 2: great Fig 3: nice overview - shows smaller fault area, higher mean slip of Tohoku well Fig 4: interesting mean slip is higher for Mw8.6 than Mw8.8, but max. slip less. Fig 5: projection of figure a? not WGS-84; UTM? so would be good to have this on the diagram. A bar graph of the relative ratio of RC, steel, wood and masonry loss would be a worthy addition to the analysis as opposed to the Fig 6. The log-prob plots are ok, but do not show a lot of the variability associated with the various functions as the plots in Fig 7, and Fig 9, are aggregated results based on the number of buildings. The Mw8.0-8.8 values become lost in Fig. 6. and in Fig. 7 are log scale absolute values. Fig 9: bottom 2 require projection Fig 10: good Fig 11, 12: good but require projection?

Minor errors/typos: Page 7489 - 230,000+ Page 7490, L18 - A building portfolio consisting of about 86000 buildings in Miyagi — (about 86000) needs to refer to something or bring it out of the brackets Page 7497 - two additional constraints Page 7500 - The buildings are all concentrated within/on/in the Sendai coastal plain. Page 7505, L9 - but also not but only

There were a few typos in the original when reading through but in the 2nd read-through I didn't pick them up again. Please check within the word document.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 7487, 2015.