

Interactive comment on “Tsunami risk assessment for multiple buildings by considering spatial correlation of wave height using copulas” by Yo Fukutani et al.

Anonymous Referee #2

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General comments

The paper by Fukutani et al. deals with simultaneous assessment of tsunami risk to two buildings located at a distance from each other, using spatial correlation of tsunami wave heights. The study shows that the copula modeling is useful in evaluating the tsunami risk for a portfolio of buildings. My comments are listed below.

The paper presents a good overview of specific methods used in the study, and a complete review of related literature. I cannot comment on the accuracy of the copula modeling since this is outside of my area of expertise, but the tsunami modeling methodology is solid. Results are presented in a clear way. The concept of the re-

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sponse surface makes the probabilistic tsunami hazard assessment more efficient.

My major concern with this study is the assumption of the uniform slip on the rupture. This is never the case in a real earthquake, and it was shown in many tsunami studies that tsunami wave heights and runup values in the near field are highly sensitive to the slip distribution in the rupture area. Both towns, Oiso and Miura, are located in the near field with respect to the simulated tsunami sources (the ten Regions), and in some cases even within the rupture area of the earthquake. In my experience, the sensitivity of tsunami heights and runup values to the slip distribution is higher than that to the slip amount and depth of the fault (given that the fault depth was varied by small amounts). If the goal of the paper was to demonstrate only the proof of concept of using response surface and copulas, this needs to be stated clearly in the abstract.

Specific comments 1. It is not clear from the abstract that the considered buildings from the same portfolio are located far away from each other. It would be nice to define “portfolio of buildings” for readers who are not familiar with the civil engineering terminology. 2. A figure that shows the geographical region described in the study, including the Sagami trough, should be included. This figure can be referenced at the beginning of Section 3. 3. It is not clear why each earthquake source needs to be represented by thousands of subfaults if the slip on the rupture is uniform. 4. Technical corrections - Page 1, line 20: this sentence is not grammatically correct. - Page 2, line 27: refer to Figure 2 for locations. - Page 5, line 9: needs to be “affect” - Page 5, line 10: reference the new figure that shows the study area - Page 6, line 33: it is probably “all possible uncertainties” - Page 9, line 6: it is probably “agencies”

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