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Large slip area in characterized Tsunami source model toward Tsunami Hazard assessment

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In previously deterministic Tsunami hazard assessment, it had been ordinary method in setting tsunami source model that it is accountable for signature of historical tsunami events. Therefore it is difficult to evaluate of tsunami risk for future events unascertained focal area or magnitude and so on. On the other hand, in probabilistic tsunami hazard assessment, it ' s necessary to be designed for all potentially tsunamigenic earthquakes considering target region in principle, in planning phase of modeling of elastic fault parameter (Toyama et al., 2014,JPGU). For our purpose, on setting for characterized tsunami source model for probabilistic tsunami hazard, it is essential to characterize tsunami source model and include the statistical variability. We focused on the " heterogeneous slip distribution " of tsunami source, and studied on how to setting area ratio of large slip.

According to the distribution of the fault plane slip obtained from the wave source inversion studies of the 2011 off the Pacific coast of Tohoku Earthquake (2011 Tohoku tsunami), the ratio of large slip area is said to have contributed significantly to the tsunami wave height, the ratio of the area is much the same.

Therefore, in this study, we analyzed the ratio of seismic moment by unit area regardless of the assumed size of the fault element to all mean of seismic moment. As a result from inversion models of 2011 Tohoku tsunami source and other magnitude of 9 level source, three stage characterized modeling is required, it was found that the model which accounts for 30% of the total area of 2 times the average slip, and 10% of the total area of 4 times the average slip is appropriate. And two stage characterized model for magnitude 8 level sources, its large slip (twice the average) region accounts for 30%. Comparing the maximum coast wave heights simulated using characterized model above with a detailed inversion fault model, we verified that the former covering the latter.

This study was conducted by a part of research project in NIED for tsunami hazard assessment for the whole of Japan.

Keywords: tsunami, probabilistic hazard assessment, characterized fault model, heterogeneous slip distribution