Characterized Fault Models for Probabilistic Tsunami Hazard Assessment in the Sagami Trough

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NIED (National Research Institute for Earth Science and Disaster Prevention) has been conducting the project on the probabilistic tsunami hazard along the coastline in Japan (Fujiwara et al., 2013, JpGU). We have already constructed characterized fault models and made tsunami hazard curve using tsunami heights along the coastline estimated by tsunami simulation in the Japan Trench and Nankai Trough. In this study, we have constructed characterized fault models for probabilistic tsunami hazard assessment in the Metropolitan area.
The Philippine Sea Plate and the Pacific Plate subduct beneath the Metropolitan area. The long-term evaluation by the Headquarters for Earthquake Research Promotion (2014) categorizes the earthquakes along the plate boundary between the North America Plate and the Philippine Sea Plate as “M8-class earthquakes along the Sagami Trough”. We have modeled these earthquakes as specified fault models. The 1703 Genroku and the 1923 Taisho Kanto earthquakes are involved in this category and M8.6 earthquake with the rupture area of the whole region determined by the Headquarters for Earthquake Research Promotion is the maximum size in this study. The long-term evaluation divided the estimated source area into 5 sub-regions, and we combined these sub-regions adding 2 extra regions that correspond to the source areas of “the 1703 Genroku earthquake” and “the 1703 Genroku - the 1923 Taisho earthquake”. We constructed 126 specified fault models in the 11 regions in total. Heterogeneities in the slip amount are expressed using 3 kinds of slip area, called background slip area, large slip area and super large slip area. The large slip area has 2 times of average slip amount and 30% of total fault area, and the super large slip are has 4 times of average slip amount and 10% of total fault area. If the fault area reaches the trench, super large slip areas may be incorporated. The aspect ratio of large slip areas and super large slip area is one to two, and overlap ratio between neighboring large slip areas is approximately 50%.
Because it is quite difficult to specify the source area of M7-class earthquakes caused by the subducted plate along the Sagami trough (long-term evaluation, 2014), we have modeled these earthquakes as unspecified fault models (928 models) with large slip area in the center of the fault that are uniformly distributed in the estimated source area.
We are currently conducting tsunami simulation using the characterized fault models in the Sagami Trough for the tsunami hazard assessment. This study is conducted as a part of the research project “Research on the hazard risk assessment for natural disaster” in NIED.

Keywords: Tsunami Hazard Assessment, Characterized fault model, Sagami Trough

