Characterized earthquake fault models along the Nankai Trough for probabilistic tsunami hazard assessment

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The National Research Institute for Earth Science and Disaster Resilience (NIED) began a research project on a probabilistic tsunami hazard assessment (PTHA) for Japan in 2012 (Fujiwara et al., 2013, JpGU). After years of research on the PTHA, the "Probabilistic hazard assessment of tsunamis due to large earthquakes along the Nankai trough" was published by the Headquarters for Earthquake Research Promotion (HERP) in 2020. Although the largest-class earthquakes were not included in this assessment, this was for the first time that the probability of tsunami hazard information had become openly available to the general public in Japan.A PTHA consists primarily of three components: the construction of earthquake fault models, tsunami simulations, and the analysis of hazard curves. In this study, we focus on theconstruction of 'characterized earthquake fault models' (CEFMs) based on the long-term evaluation by the HERP (2013) to cover various types of possible earthquakes along the Nankai Trough.
We divided the entire source region on the upper boundary of the subducting Philippine Sea plateinto 18 sub-regionsas HERP(2013) did, and constructed total of 3480 CEFMs as various combinations of the 18 sub-regions.
Based on the CEFMs and tsunami simulations, we conducted two types of PTHAs for next Nankai earthquake sequence. One consists of 3480 CEFMs (83 source regions, Mw7.7-9.0), including CEFMs for the largest-class earthquakes as well as CEFMs with super-large slip areas. In this type of the PYHA, 180 combination patterns of source regions and the corresponding 916,669 combination patterns of CEFMs were incorporated into the PTHA. The other PTHA consists of 2720 CEFMs (79 source regions, Mw7.7-9.1), not including CEFMs for the largest-class earthquakes and CFMs with super-large slip areas. 176 combination patterns of source regions and the corresponding 348,345 combination patterns of CEFMs were incorporated into the PTHA, which is equivalent to the PTHA published by HERP (2020). The differences between these PTHAs will be presented by Saito et al. (JpGU, this meeting) and Abe et al. (JpGU, this meeting).
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