

Evaluation of difference in tsunami response , among tsunami source models

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After the 2011 Tohoku-Oki earthquake (hereafter 3.11 earthquake) evaluating based on tsunami simulation approach becomes very important role for promoting tsunami disaster prevention measures against mega-thrust earthquakes. In considering tsunami disaster prevention measures based on the knowledge from tsunami simulation, it is important for us to carefully examine what kind of tsunami source model we use. In the current scheme of tsunami simulation, there exist several ways to set the tsunami-genic source model, such as (1) rather simplified model assuming an average slip for an entire fault zone, (2) static model assuming inhomogeneous slip distribution over finite fault zone, (3) another inhomogeneous slip model further assuming the effect of rupture propagation, and so on. Since each tsunami source model has each own feature, a fair amount of difference in tsunami behavior can be possibly expected.

Thus, in this report, we do tsunami simulation analysis using several tsunami source models and evaluate how different tsunami response could be in the tsunami runup process, among tsunami source models. Specifically in the present analysis, we do tsunami simulation of 3.11 earthquake around Soma Port in Fukushima Prefecture in Japan by using several tsunami source models ([1],[2], etc), and evaluate relative differences in things such as tsunami wave height, wave pressure, and so on. For evaluating tsunami wave pressure, we assume the method of Tanimoto et al.(1984)[4], which has been used in the past research of tsunami simulation of 3.11 earthquake around Soma Port [3]. As the result, we observed a fair amount of relative differences in maximum wave height and wave pressure for incoming tsunami onto inland region.

Basically, phenomena of tsunami runup are very complex and in this study we ended up evaluating the relative differences of things like wave pressure, based on the shallow water theory. For more details of tsunami runup, evaluation has to be done by three-dimensional method of tsunami simulation.

References

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