

## Numerical Investigation on Tsunami Suppression by Submerged Breakwater

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**Abstract :** A tsunami induced by an earthquake gives a severe disaster in coastal area. As well known, the huge earthquake in Japan 2011 induced a huge tsunami and the tsunami caused serious damage in the Tohoku and Kanto area. Although breakwaters were constructed in the coast to suppress the tsunami, these were collapsed, and it resulted in severe disasters. In order to decrease the tsunami disaster, we propose the submerged breakwaters and investigate its effect on the tsunami behavior by means of numerical simulations. In order to reproduce tsunami and capture its interface, we employed a moving particle method which is one of the Lagrangian methods. Different from ordinary breakwaters, the present breakwater is located in the under-sea. An effective installation condition is investigated by the parametric study. The results show that the submerged breakwater can decrease the wave force by the tsunami. Moreover, the combination of two submerged breakwaters can reduce the tsunami safely and effectively. Therefore, the present results give the effective condition of the installation of the under-sea breakwaters and its mechanism.

**Keywords :** coastal area, tsunami force reduction, MPS method, submerged breakwater

**Conference Title :** ICDEM 2018 : International Conference on Disaster and Emergency Management

**Conference Location :** Rome, Italy

**Conference Dates :** March 05-06, 2018