EGU21-284
https://doi.org/10.5194/egusphere-egu21-284
EGU General Assembly 2021


# Preliminary results of numerical simulation of submarine landslide-generated waves

**Ramtin Sabeti**[1] and Mohammad Heidarzadeh[2]
[1]Brunel University London, Civil & Environmental Engineering, London, United Kingdom (ramtin.sabeti@brunel.ac.uk)
[2]Brunel University London, Civil & Environmental Engineering, London, United Kingdom
(mohammad.heidarzadeh@brunel.ac.uk)

Landslide-generated waves have been major threats to coastal areas and have led to destruction and casualties. Their importance is undisputed, most recently demonstrated by the 2018 Anak Krakatau tsunami, causing several hundred fatalities. The accurate prediction of the maximum initial amplitude of landslide waves ($\eta_{max}$) around the source region is a vital hazard indicator for coastal impact assessment. Laboratory experiments, analytical solutions and numerical modelling are three major methods to investigate the ($\eta_{max}$). However, the numerical modelling approach provides a more flexible and cost- and time-efficient tool. This research presents a numerical simulation of tsunamis due to rigid landslides with consideration of submerged conditions. In particular, this simulation focuses on studying the effect of landslide parameters on $\eta_{max}$. Results of simulations are compared with our conducted physical experiments at the Brunel University London (UK) to validate the numerical model.

We employ the fully three-dimensional computational fluid dynamics package, FLOW-3D Hydro for modelling the landslide-generated waves. This software benefit from the Volume of Fluid Method (VOF) as the numerical technique for tracking and locating the free surface. The geometry of the simulation is set up according to the wave tank of physical experiments (i.e. 0.26 m wide, 0.50 m deep and 4.0 m). In order to calibrate the simulation model based on the laboratory measurements, the friction coefficient between solid block and incline is changed to 0.41; likewise, the terminal velocity of the landslide is set to 0.87 m/s. Good agreement between the numerical solutions and the experimental results is found. Sensitivity analyses of landslide parameters (e.g. slide volume, water depth, etc.) on $\eta_{max}$ are performed. Dimensionless parameters are employed to study the sensitivity of the initial landslide waves to various landslide parameters.