



Preliminary results of the experimental study on the amplification of tectonic tsunami coastal wave heights due to landslides

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There are several types of tsunamis originating from different sources. Among them are landslide- and earthquake-generated waves which could be the most hazardous. Some tsunamis generated by earthquakes are associated with landslides which can amplify the coastal wave heights of the tsunamis. These tsunamis are called tsunamis with dual sources, i.e. earthquakes and landslides. This project studies the interaction between landslide and earthquake-generated waves to understand how the velocity of landslide movement, the period of the earthquake-generated waves and the slope angle of the failure plane can influence on wave amplitudes over time. This study is conducted through physical modelling. Practical experiments are carried out in the wave flume at the Brunel University London in a 10m long, 0.3m wide and 0.47m deep flume. Tsunami amplitudes were recorded using wave gauges. In total 31 experiments were conducted among which several of them were performed twice to obtain the required accuracy. The procedures of the experiments have been video recorded and photographed. The results of this study indicate that the overall tsunami amplitude changes due to the considered parameters. Based on the results, tsunami peak amplitude varied in different experiments due to the effects of wave periods, water depths and landslide parameters. Furthermore, the results of this study showed that the highest tsunami amplitude for dual waves (combined earthquake and landslide sources) was 74.4 mm in experiment 23, while the lowest amplitude was 36.5 mm in experiment 24. The highest percentage of amplitude increase was 60% (in experiment 15) compared to the single earthquake source. The analysis demonstrates that the velocity of landslide could be the most important factor in generating a wave with high amplitude. It is planned in this project to conduct further experiments in the future to study various aspects of dual-source tsunamis.