# Simulation of Tsunami and Flash Floods

## S. G. Roberts[1] and O. M. Nielsen[2]

**Abstract:** Impacts to the built environment from hazards such tsunami or flash floods are critical in understanding the economic and social effects on our communities. In order to simulate the behaviour of water flow from such hazards within the built environment, Geoscience Australia and the Australian National University are developing a software modelling tool for hydrodynamic simulations.

The tool is based on a finite-volume method for solving the Shallow Water Wave equation. The study area is represented by a large number of triangular cells, and water depths and horizontal momentum are tracked over time by solving the governing equation within each cell using a central scheme for computing fluxes. An important capability of the software is that it can model the process of wetting and drying as water enters and leaves an area. This means that it is suitable for simulating water flow onto a beach or dry land and around structures such as buildings. It is also capable of resolving hydraulic jumps well due to the ability of the finite-volume method to handle discontinuities.

This talk will describe the mathematical and numerical models used, the architecture of tool and the results of a series of validation studies, in particular the comparison with experiment of a tsunami run-up onto a complex three-dimensional beach.

[1] Department of Mathematics
Australian National University
Canberra, ACT, 0200, Australia
*stephen.roberts@anu.edu.au*

[3] Risk Assessment Methods Project Geospatial and Earth Monitoring Division
Geoscience Australia
Symonston, ACT, 2609, Australia
*Ole.Nielsen@ga.gov.au*