

Hydrodynamic inundation modelling

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Project summary

Impacts to the built environment from natural hazards such as riverine flooding, storm surges or tsunamis 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 (called ANUGA) for hydrodynamic simulations.

The software implements the finite-volume method for solving the Shallow Water Wave equation. An advantage of this method is that the study area can be represented by an unstructured mesh with variable resolution to suit the particular problem. ANUGA uses a triangular mesh and solves the governing equations within each cell to determine the water depth and horizontal momentum over time. 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.

ANUGA is currently being applied in a number of projects where impacts from tsunami events on coastal communities are simulated. ANUGA calculates the maximum water depth for the study area which is then provided as a map for use by emergency managers. Predicting the impact from a tsunami is not only important for effective warnings and disaster management, it is also integral to the quantification of risk to infrastructure, buildings and communities. Projects include Tsunami Impact Modelling for WA (with Fire and Emergency Services Authority) and support to the Australian Tsunami Warning System.

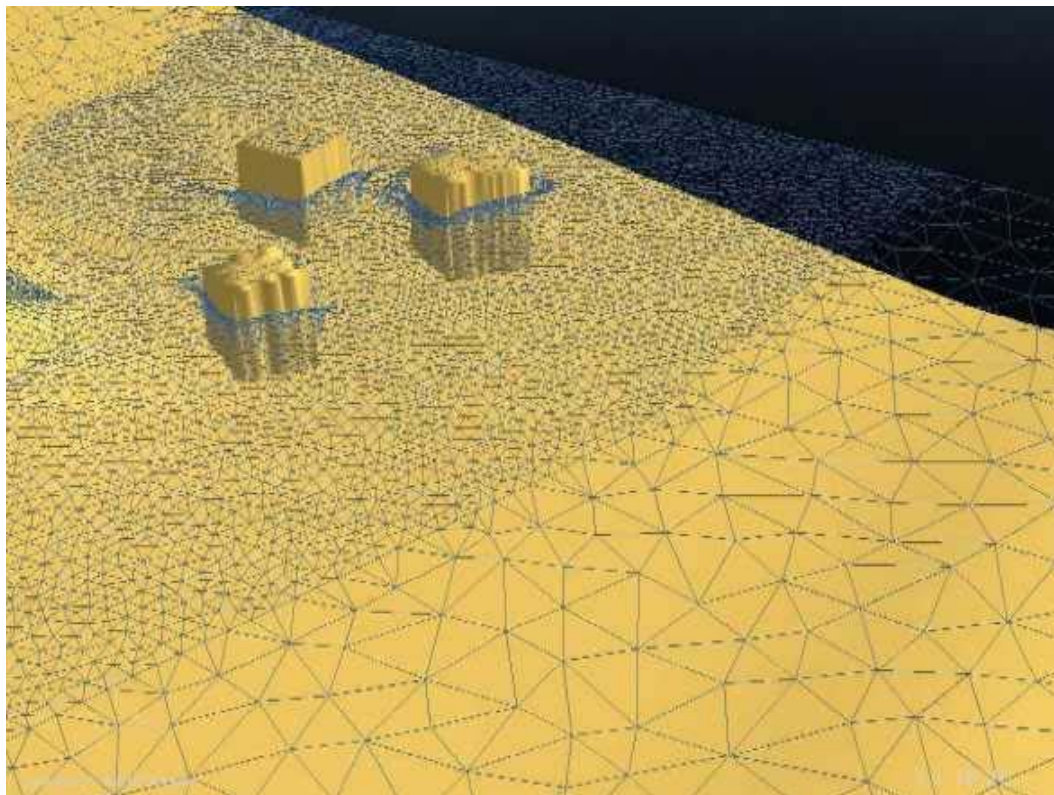
[Link to Model Download Centre](#)

ANUGA is a software implementation of a hydrodynamic model which is specifically designed to model wetting and drying processes. ANUGA is a joint development project between Geoscience Australia (GA) and the Australian National University (ANU).

Inundation modelling scenes



A scene from the ANUGA Inundation Model.



A scene showing the creation of the ANUGA Inundation Model.



A scene from the Tsunami Inundation Model.

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Papers

Nielsen, O., J. Sexton, D. Gray, N. Bartzis, S. Roberts and J. Schneider (2005), [Hydrodynamic Modelling of Coastal Inundation](#), *Poster presented at 100th Anniversary Earthquake Conference Commemorating the 1906 San Francisco Earthquake*, April 2006 [PDF_6125K]

Nielsen, O., S. Roberts, D. Gray, A. McPherson and A. Hitchman (2005), [Hydrodynamic Modelling of Coastal Inundation](#), *Proceedings of ModSIM 2005* [PDF_541K]

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Sexton, J. (2006), "Geoscience Australia's impact modelling protecting Australia", *AusGEO News*, 81