

What are the key factors that determine the extent of tsunami inundation? – investigations using ANUGA

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It is often assumed that it is only the height (or amplitude) of a tsunami that determines the extent of inundation, but there are many other variables that could be important: notably the wave-period, the shape of the waveform, and the number of consecutive waves. The aim of this project is to try and tease-out which of these factors are the most important and which are secondary. An important reason for doing this is to improve estimates of tsunami risk, for which propagation and inundation are often modelled separately.

In this work we have used real topography, bathymetry, and roughness data to generate a realistic site model, but use synthetic boundary conditions (representing tsunami which may not be realistic for the chosen site) so that the extent of inundation can be studied for a variety of different incoming wave shapes.

Ultimately we would like to apply this technique to a variety of different examples of coastal terrain, as it is plausible that different factors are important in different terrain types. For our first example we have used data from the Christchurch area, which is relatively flat and uniform, with coastal sand-dunes and a tidal estuary.

We will demonstrate how our model has been constructed, how the boundary conditions have been applied, and present our initial results. We will also present comparisons with empirically-derived inundation models applied to the same location.