Coastal Flooding in South Dunedin

Using wave energy models to inform coastal management strategies

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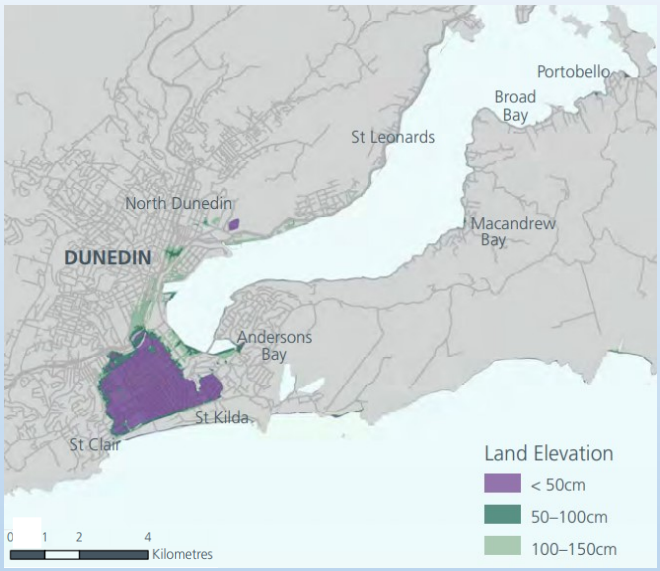
Dunedin is one of the most vulnerable cities to coastal flooding in New Zealand with more than 2,700 homes sitting within 50 cm of sea level. Combined with a high energy wave environment along Ocean Beach that batters the seawall during storm events this creates the need for coastal protection schemes that stop the erosion of what little sand is present to protect residential areas.

Wave models can be used to take information about wave climate and bathymetry and use it to solve the physical equations that govern wave velocity and energy.

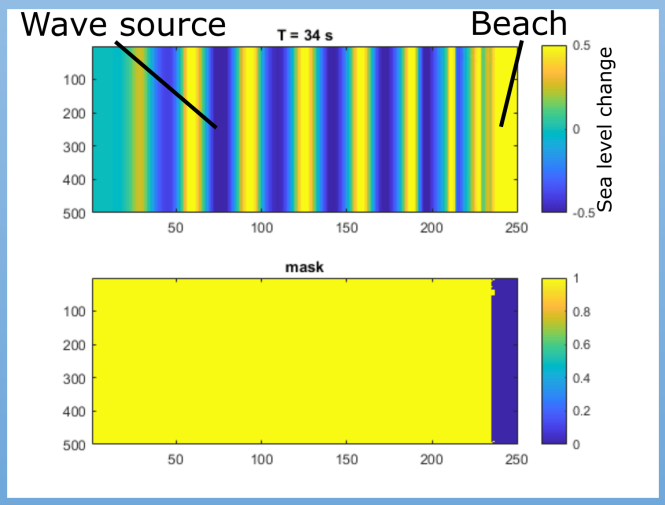
Research questions:

- What areas of the Ocean Beach coastline experience the highest wave energy during a storm event?
- Which coastal management strategies work best to reduce wave energy in the model?
- How is the model affected by potential scenarios that represent safety hazards for coastal planning; e.g. storm surges, future sea level rise, potential tsunami scenarios.



From Preparing New Zealand for rising seas: Certainty and Uncertainty, Parliamentry Commissioner for the Environment

The St Clair seawall during a storm in 2017, photo taken by Gerard O'Brien for Otago Daily Times.



An example of what the output from the current version of the model looks like. Waves are created at the 75 m mark in the x direction and then approach the shore where a decrease in depth causes the wavelength to become smaller.

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