MODELING TSUNAMI GENERATION, PROPAGATION, AND RUNUP IN THE NEW ZEALAND REGION

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ABSTRACT

In a geophysical sense, New Zealand sits in a precarious position astride the boundary between the Pacific and Australian Plates. A wide range of tsunamigenic sources are present, including fault ruptures, submarine landslides, seabed movements due to volcanic activity, and perhaps the odd bolide impact among other mechanisms. A semi-implicit, unstructured grid, finite element hydrodynamic model was developed in order to assess the effects of these events. The model solves the depth-averaged RANS equations and retains dynamic (non-hydrostatic) pressure for a proper description of dispersive waves. The model includes a dynamic model for submarine landslides to account for the time-dependent generation of surface waves. The numerical discretization provides a straightforward method to simulate runup and inundation.

The model was used to simulate a number of tsunami generated by different sources on and adjacent to the New Zealand continental shelf. Some results have been used for hazard assessment and others have been used in conjunction with historical and paleotsunami data to evaluate the importance of different source locations and mechanisms. This work is ongoing.