

Numerical simulations of tsunami generation in caldera lakes by subaqueous explosive volcanism

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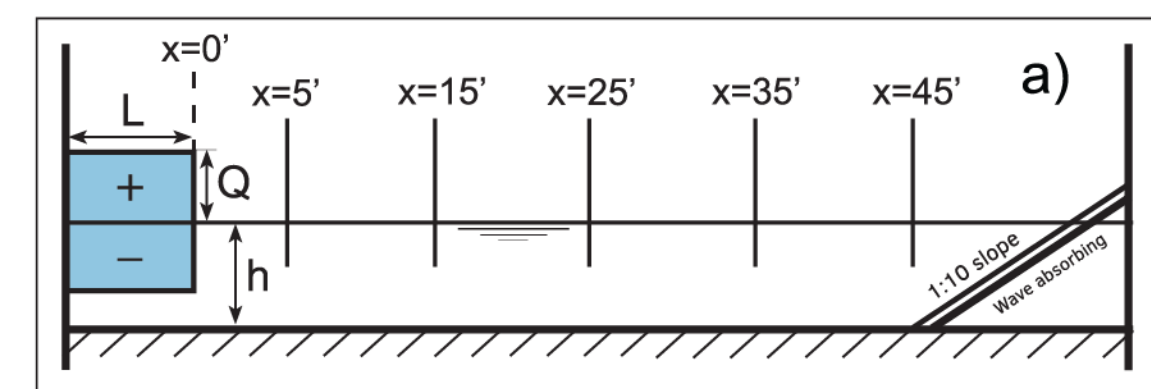
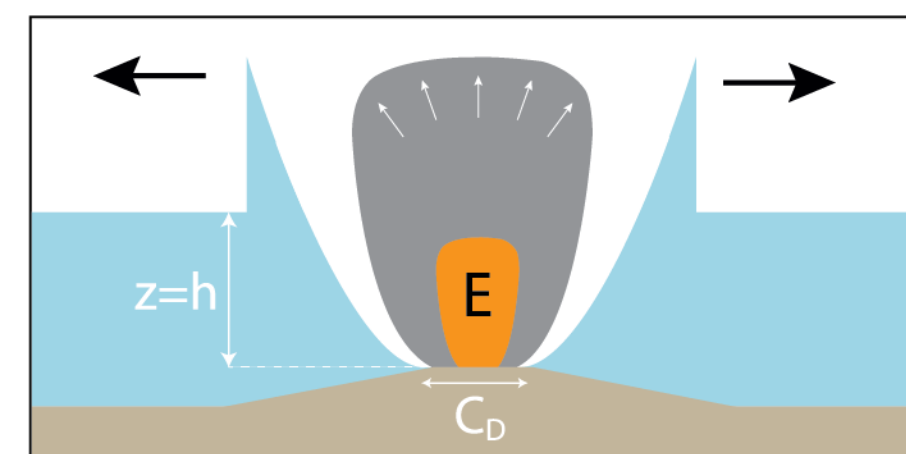
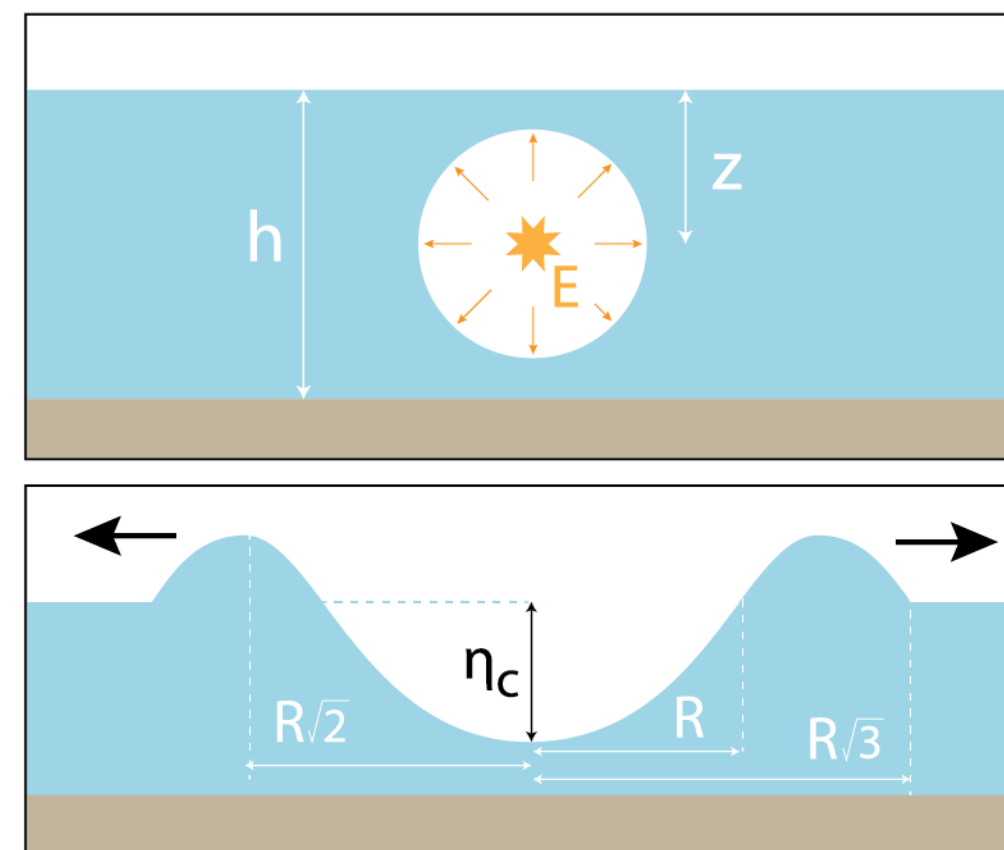
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- Volcanic eruptions can generate waves by released energy, flank collapse, PDCs etc.

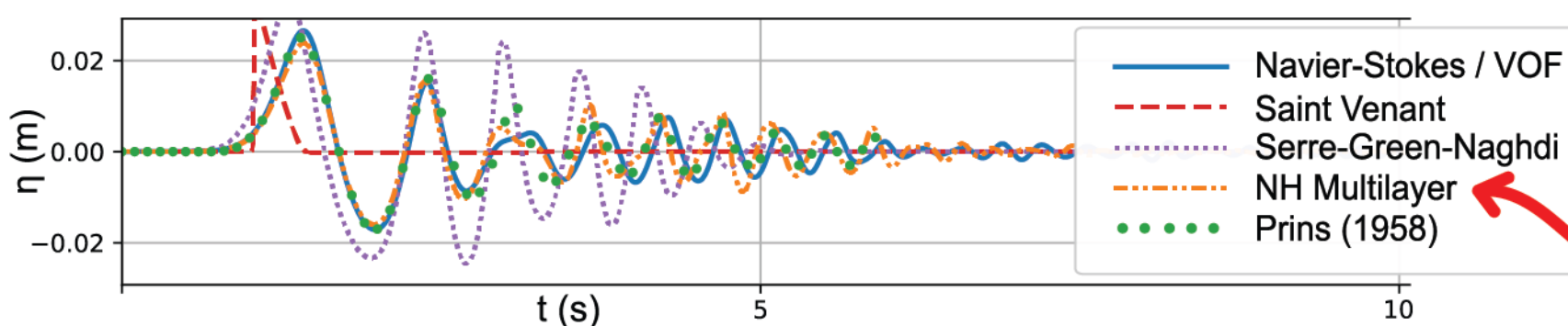
1. Intro

- Waves from explosive eruptions can be considered analogous to sub. explosions
- We test physical initialisation models from military research with recent numerical models

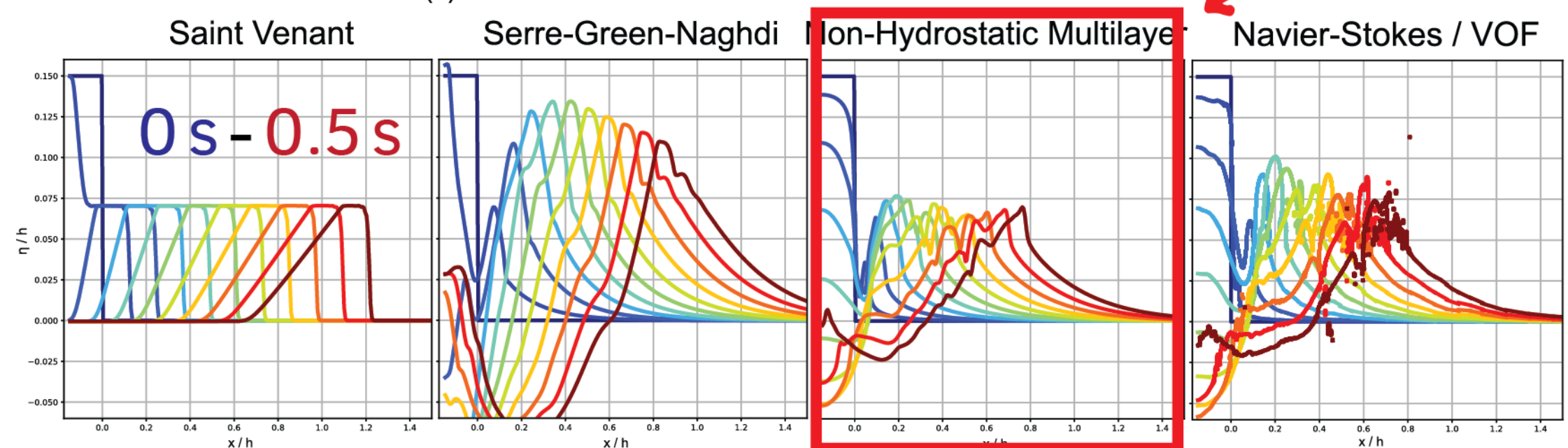


- Flume experiment releasing columns of water to generate waves

2. Lab-scale Validation

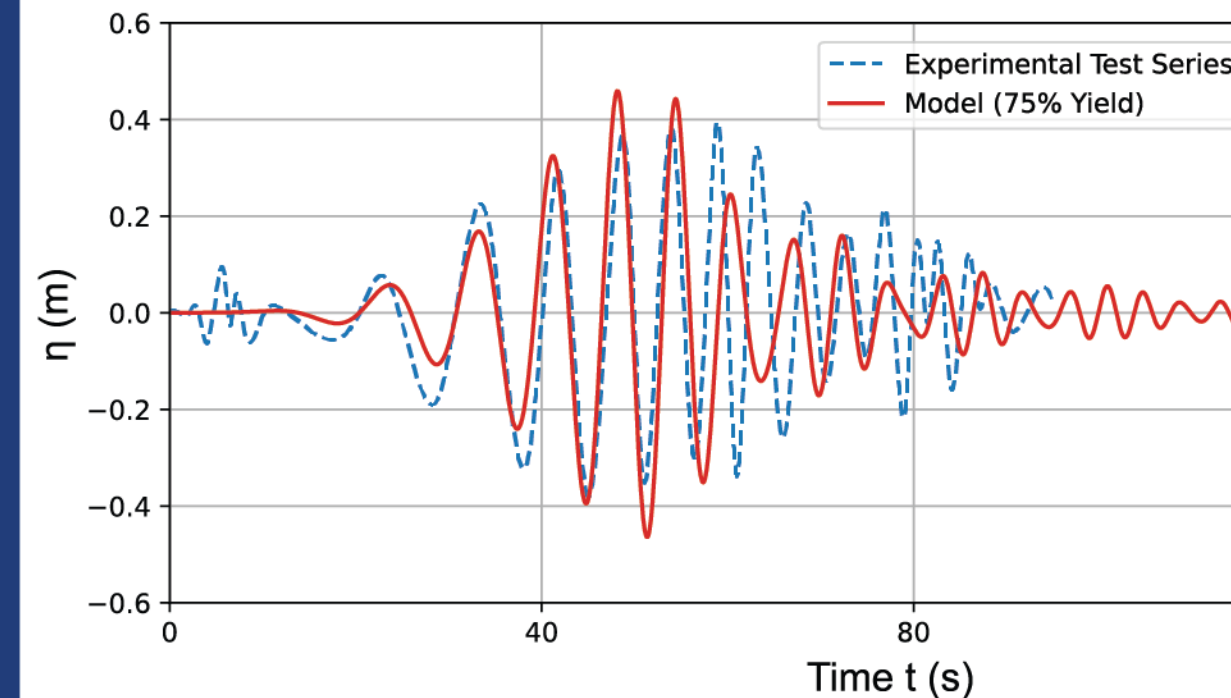


- Comparing new **non-hydrostatic multilayer** scheme against other methods and experimental data



- Captures wave generation process well in comparison with direct method
- Runtimes are similar to SWEs and Boussinesq-type.

3. Field-scale validation

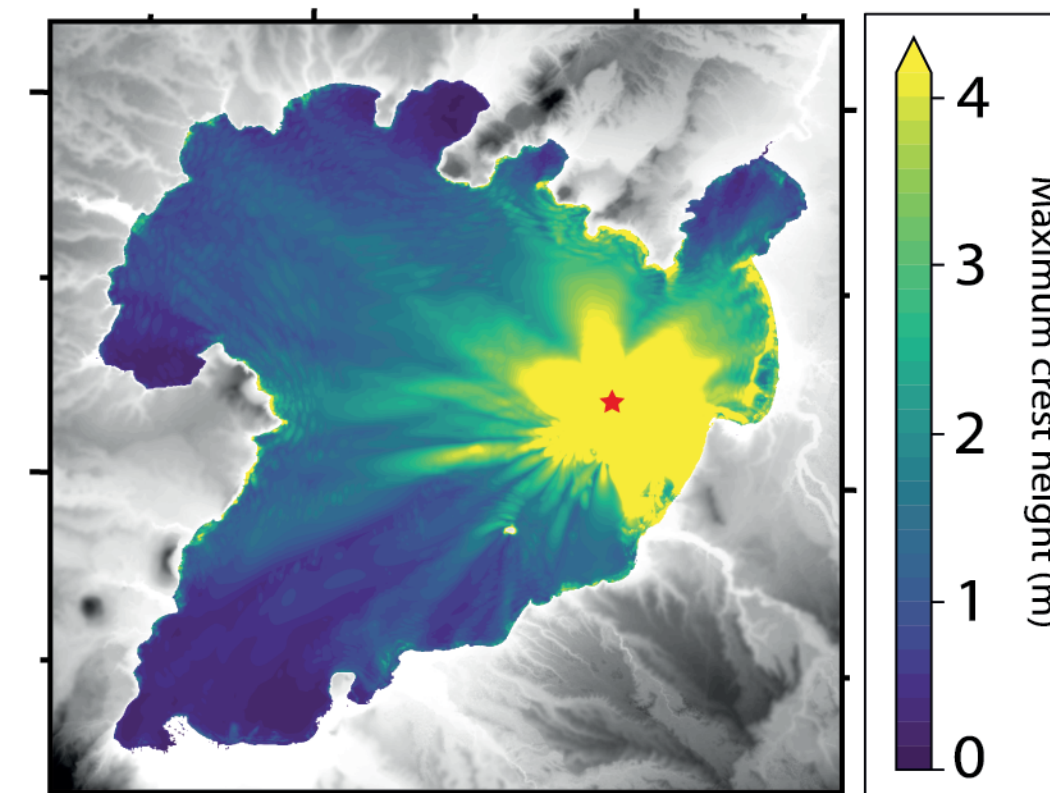


(Walter, 1966)

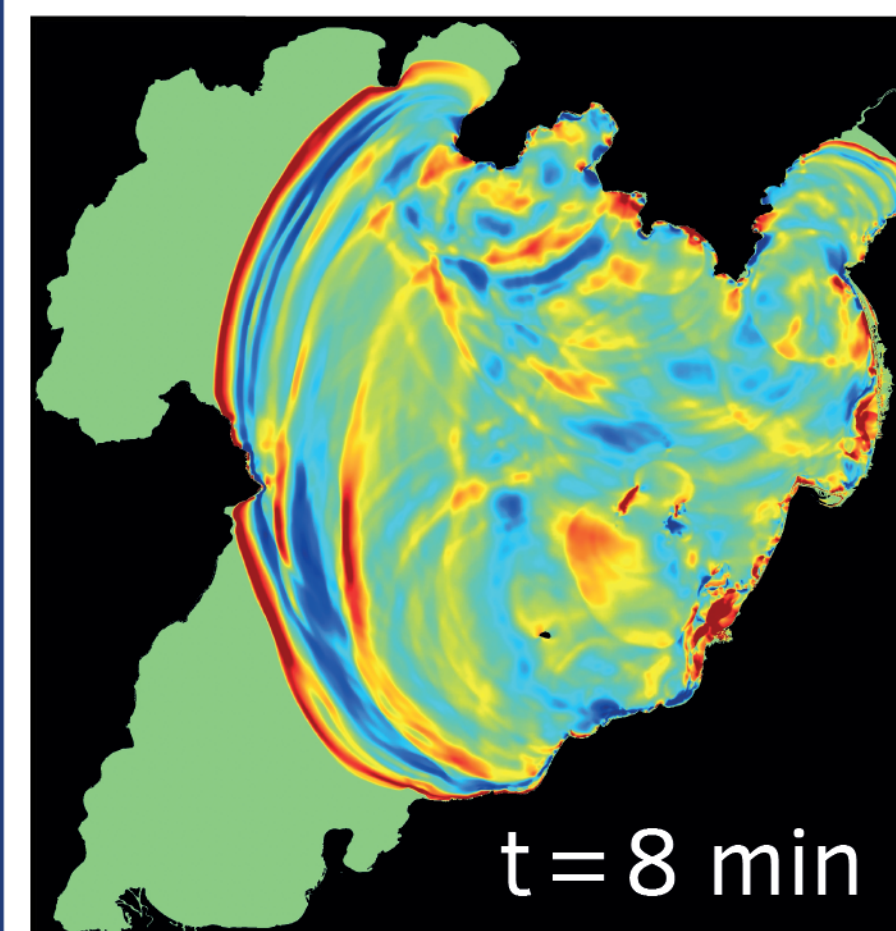
- Multilayer scheme tested against historical 9250 lb explosive test series at Mono Lake, California

4. Lake Taupō

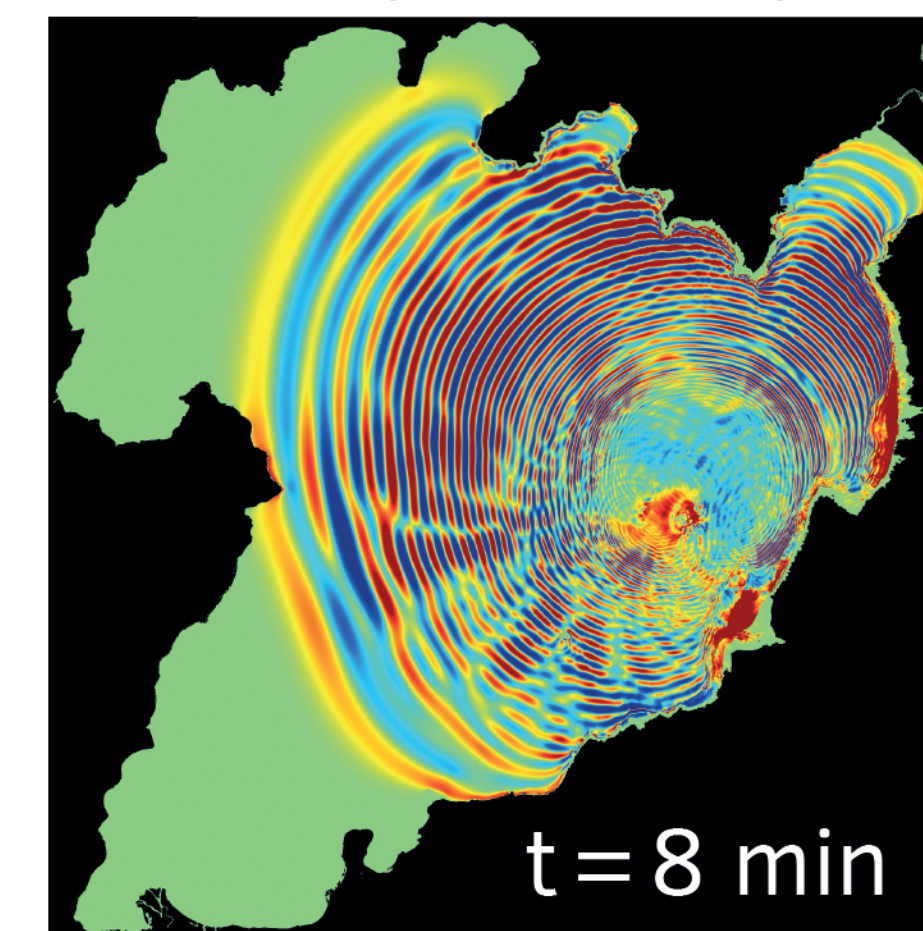
- Simulations run for small to medium size eruptions under Lake Taupō, New Zealand
- Exemplifies strong differences between models



Saint Venant



Non-Hydrostatic Multilayer



Wave height (m)

