Modeling the generation of shallow water waves by the gravity-driven collapse of a granular column

FAST
Fluides, Automatique et Systèmes Thermiques

Wladimir Sarlin, Cyprien Morize, Alban Sauret, Philippe Gondret

cnrs

université PARIS-SACLAY | FACULTÉ DES SCIENCES D'ORSAY

Context

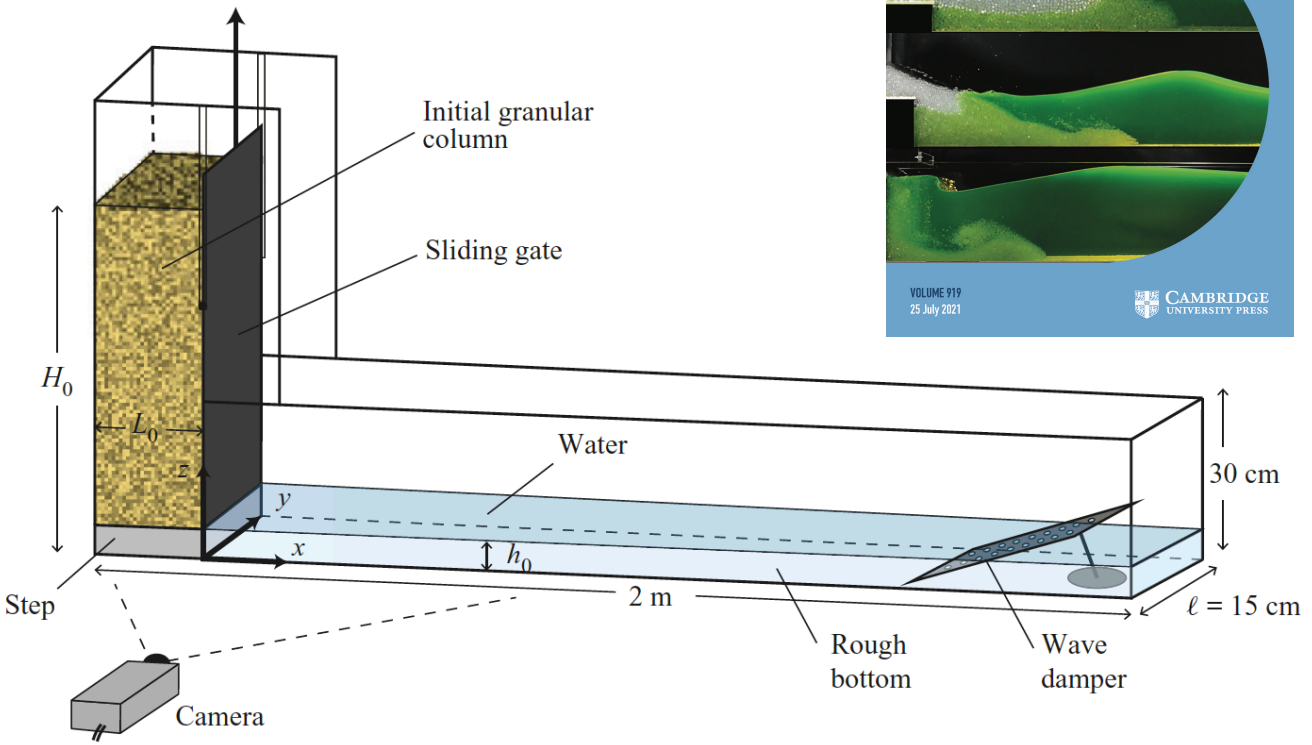
Tsunami generation by landslides, cliff or mountain collapse

Dorset Coast (England, 2021)

Anak Krakatau (Indonesia, 2018)

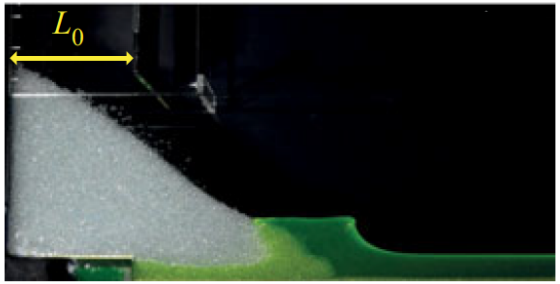
Experiments

Granular column of aspect ratio H_0/L_0
Water layer of depth h_0

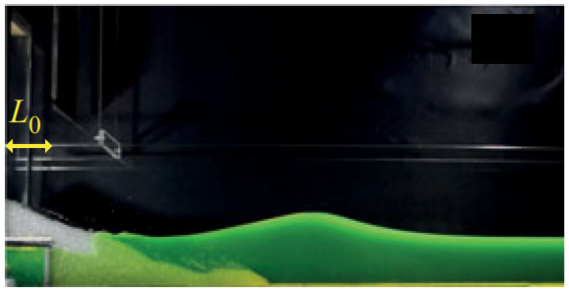


Modeling

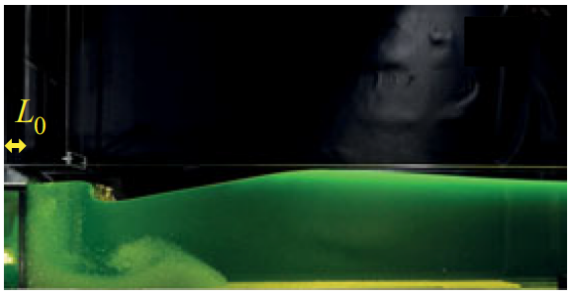
Bore waves

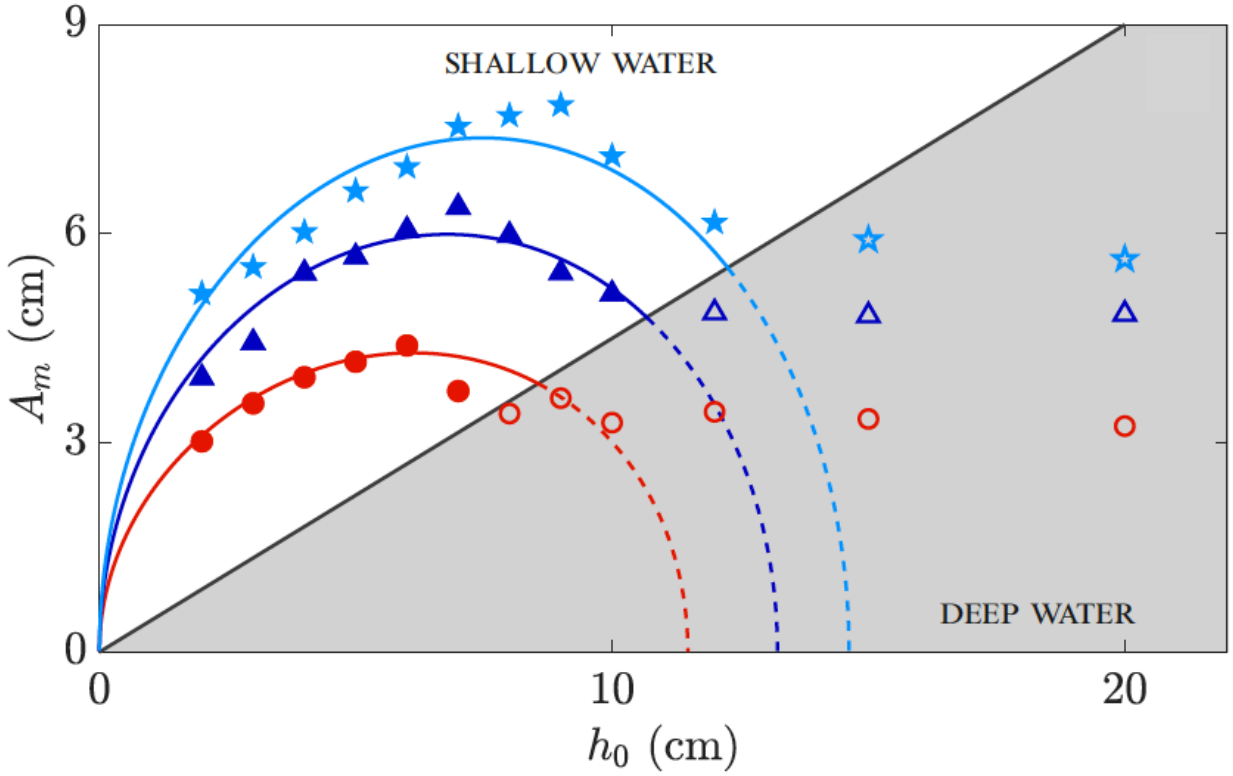


Solitary waves



Nonlinear transition waves





$$A_m \simeq 0.45\sqrt{\beta a^{m-1} H_0 h_0 - \frac{1+\beta a^m}{\alpha a^n} {h_0}^2}$$