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DEM simulations of the collapse of submerged granular columns

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The collapse of submerged granular columns in plain strain was simulated by 3D Discrete Element Method simulations with periodic boundary in the out-of-plane direction. These analyses are a first step in the attempt to simulate submarine landslides in sandy seabeds in order to investigate the consequent run-out distances.
Spherical particles from a realistic particle size distribution of a Leighton buzzard sand and a simple contact model based on linear springs, dashpots and frictional sliders were employed in the presented simulations. A rolling resistance model governed by two micromechanical parameters was added in order to indirectly account for the effect of particle non-sphericity on the angular moment equilibrium of the granular assembly. Calibration of the rolling resistance model leads to predictions of run-out distances in quantitative agreement with the available experimental data.
A comparison between the dry and the submerged cases regarding the observed run-out distances and the time of occurrence of landslide propagation were also drawn up.