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MONUGEO - Modern numerical methods for high-fidelity simulation of geohazards

Geohazards, such as rock avalanches, landslides and debris flows, are commonly recoganized as the slow-to-rapid gravitationally-driven processes that typically occur in mountain regions, such as Alps in Europe, Himalaya in Asia, Rocky in North Americas and Snowy in Australia, possessing potential hazards societies. With the advancement of computer science, numerical simulations of geohazards have become crucial in the modern geomechanics and geotechnical engineering. The fragmentation of current research into local national projects often falls short in comprehensive understanding of the evolution mechanisms. This gap results in a grey area in modern numerical methods for high-fidelity simulations, limiting accessibility for both scientific researchers and engineering practitioners. MONUGEO brings together the complementary expertise of our consortium members to develop a better understanding of triggering initiation, run-out and deposition (and/or interaction with protective obstacles) processes, and in turn to produce the ground-breaking numerical tools for the high-fidelity predictions. Our international and interdisciplinary consortium will also prefer to an integrated research approach, involving laboratory experiments, scaled centrifuge physics modelling tests, and region-scale application with geological survey. This integrated methodology will serve to validate our developed computing paradigms and numerical toolbox, and to apply them to realistic scenario.

Coordinator: Universitaet Fuer Bodenkultur Wien

Beneficiary: Università degli Studi di Padova

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Department: Department of Mathematics

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