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A block-based landslide model using smooth surface reconstructions

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The present work is combining the block-based landslide-model developed by Tinti and Bertolucci (2000) with different smooth surface reconstruction methods. This enables us to directly solve the underlying ODE-system, that is describing the blocks motion, numerically.
The numerical model is based on the idea that the sliding mass can be discretized by a certain number of quadrilateral blocks of finite volume, where the movement of the single blocks is described using a Lagrangian approach. Within this approach, the underlying equations of motion require for each time-step the computation of the acceleration of each of the blocks from their position on the sliding surface, where information on its curvature is needed in order to compute the centripetal component.
To come up to this, different methods were used to interpolate smooth, two times differentiable, surface reconstructions from a given number of points that are describing the real sliding surface.
The numerical solution of the model in time is obtained using higher-order explicit and implicit time-integration methods
The results of the simulations are evaluated especially with respect to the arrival times and final velocities of the sliding mass and therefore a possible tsunamigenic impact.