



Sensitivity study of the Storegga Slide tsunami using retrogressive and visco-plastic rheology models

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Enormous submarine landslides having volumes up to thousands of km³ and long run-out may cause tsunamis with widespread effects. Clay-rich landslides, such as Trænadjupet and Storegga offshore Norway commonly involve retrogressive mass and momentum release mechanisms that affect the tsunami generation. As a consequence, the failure mechanisms, soil parameters, and release rate of the retrogression are of importance for the tsunami generation. Previous attempts to model the tsunami generation due to retrogressive landslides are few, and limited to idealized conditions. Here, a visco-plastic model including additional effects such as remolding, time dependent mass release, and hydrodynamic resistance, is employed for simulating the Storegga Slide. As landslide strength parameters and their evolution in time are uncertain, it is necessary to conduct a sensitivity study to shed light on the tsunamigenic processes. The induced tsunami is simulated using Geoclaw. We also compare our tsunami simulations with recent analysis conducted using a pure retrogressive model for the landslide, as well as previously published results using a block model. The availability of paleotsunami run-up data and detailed slide deposits provides a suitable background for improved understanding of the slide mechanics and tsunami generation. The research leading to these results has received funding from the Research Council of Norway under grant number 231252 (Project TsunamiLand) and the European Union's Seventh Framework Programme (FP7/2007-2013) under grant agreement 603839 (Project ASTARTE).