Generation and propagation of the tsunami from the potential Åknes rock slide

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A major unstable rock volume has been detected in the mountain side, Åkneset, in the narrow fjord, Sunnylvsfjorden, Western Norway. If large parts of the unstable masses are released at the same time, the slide will generate a destructive tsunami, which may be devastating to several settlements along the fjord. Assumed complex deformation, high speeds, large volumes, and steep fronts make the modelling of the tsunami generation a challenging task involving splash, turbulence, and strong non-linearities.

The simulations of the rock slide and the tsunami are based on different slide scenarios and various numerical models. Our work attempts to model the generation and propagation of the tsunami by applying (1) numerical rock slide models, (2) numerical wave models, and (3) laboratory experiments. In addition to results of practical interest, the laboratory experiments also provide increased physical understanding as well as valuable input to and validation of the numerical models. For the numerical simulations of the subsequent tsunami propagation we apply the so-called Boussinesq wave equations covering both dispersion and non-linearity. Non-linear models for simulation of wave run-up are also discussed

The results are presented as one- and two-dimensional sensitivity analyses of the parameters for configuration and dynamics of the slide, as well as of the different mathematical wave models.