



## **Coping with rockslide hazard in Storfjorden, western Norway - from geology to early warning**

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Historical data and geological mapped rock avalanches in fjords have evidenced a high frequency of large events in the region. The documentation of large unstable rock-slope failures at the Åknes and Tafjord initiated a large pilot project funded by the Norwegian government in 2005. The results so far indicate a volume of the unstable slide area at Åknes of 40-70 mill. m<sup>3</sup>. The project is lead by a steering committee composed of the municipalities and the county and is divided into two groups: (1) Investigations and monitoring and (2) Preparedness and evacuation routines. The Geological Survey of Norway is leading the first group and coordinates the scientific part. Altogether, the project involves about 20 national and international scientific groups. The project initiates several research projects and development in order to be able to handle the risk. The investigations include both regional mapping in the fjord region and site-specific investigations. The aim of the regional part is to produce hazard and risk maps for the entire fjord region, mainly based on data collected by lidar and air-photos, geological field mapping (landslide inventory, structural geology and site-specific investigations) and multibeam and seismic data from the fjords. Tsunami modelling and evaluation of run-up zones is integrated in the project. The site investigations at Åknes include following data: Geological field data (morphology, structures, fractures), rock-mechanical data, geophysical data (seismic miniarrays for passive monitoring, 2D resistivity, refraction seismics, georadar), detailed laser scans (helicopter and ground based), drill cores, borehole-logging data, movement data from GPS and total station and ground-based interferometric radar. In addition there will be initiated projects on slide dynamics, tsunami modelling and laboratory experiments. The permanent monitoring so far includes 5 extensometers, 2 lasers, climate station, and pore-pressure in one of the drill holes.