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The Åknes/Tafjord project – Monitoring and implementation of early-warning systems

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The Åknes/Tafjord project is a large investigation, monitoring and early-warning project related to large unstable rockslopes in western Norway. The risk is due to the generation of large tsunamis when rockslides plunge into the fjords. The Åknes rockslide is a large rodckslide of 30-60 million m^3, moving with a velocity of 3-10 cm/year. The monitoring systems is based on a wide range of traditional and advanced methods (extensometers, crackmeters, tiltmeters, single lasers, GPS, total station, geophones, ground-based radar, climate station and borehole instrumentation). Major challenges are linked to the steep terrain, remote setting and problems with rockfalls and snow avalanches. Major effort has been put on to get reliable operational power and communications systems. The movement data so far demonstrates a continuous movement during the entire year, but with significant seasonal changes. During snow melt in the spring and heavy precipitation events, the movement rate can increase up to 10 times the yearly mean. This means a movement of up to 1 mm/day. Based on the historical data from the Åknes rockslide and information from historical rockslide events elsewhere, preliminary early-warning levels have been implemented. The early-warning system also includes the implementation of warning methods and the project focus on two lines: 1) Typhoons in all the villages situated in the tsunami hazard zones; and 2) Phone messages based on a continuous updated database. In addition, there is be a large effort in planning and establish evacuation routes for all the inhabitants in the tsunami hazard zones.