

Real Aperture Radar Interferometry – Practical Application of a Monitoring System in Western Norway

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ABSTRACT:

Infrastructure in Norway is threatened by various natural hazards ranging from flooding to snow avalanches. Along the vital transport road E16 in Western Norway, rockfall is a common event, resulting in closed roads and large financial losses due to longer travel times, reopening of roads and road damages. For Norway, the costs related to natural hazard events along the main transport corridors is estimated to at least 100 million NOK yearly, where delayed travel times amount to at least 70% of the total sum. The Norwegian Natural Hazards fund paid over 250 million NOK to damaged roads, houses and land in 2013, of which 6.1 % were used to cover damages from different types of slides and avalanches.

Since 2007, monitoring displacement with ground-based interferometric radar has been increasing. The ground-based interferometric radar yields accurate information about displacement. Due to its non-changing image geometry and high correlation from acquisition to acquisition, long-term campaigns and/or constant monitoring enables a precise measurement of surface displacement velocities. The real aperture interferometric radar from Gamma (GPRI) has monitored glacier displacements successfully, as well as landslides and unstable rockfaces. The critical baseline for the instrument is at 16 km, enabling monitoring of areas at high risk for large, sudden events from a safe distance.

Using a GPRI, NGI is monitoring areas at risk for rockfall at six locations along the E16. The goal is to detect any unstable areas in the rockfaces and monitor changes in displacement rates. The monitoring will continue twice per year until spring 2017. The acquired time series will show any seasonal variations and/or displacements in the areas investigated. Here, the results from the first two campaigns are presented and discussed.

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