Geophysical Research Abstracts
Vol. 21, EGU2019-17541, 2019
EGU General Assembly 2019

The AlpSense-Project: Alpine remote sensing of climate-induced natural hazards

Michael Krautblatter (1), Christoph Mayer (2), Ulrich Münzer (3), Florian Siegert (4), Uwe Stilla (5), Thomas Wunderlich (6), Sabine Kraushaar (7), Markus Keuschnig (8), Johannes Leinauer (1), Benedikt Friedrich (1), Benjamin Jacobs (1), Riccardo Scandroglio (1), Maximilian Wittmann (1), Adrian Emmert (5), Ludwig Hoegner (5), Lukas Raffl (6), Christoph Reith (6), Larissa Van der Laan (2), Doris Hermle (3,4), Regina Pläsken (1,8)

(1) Technical University of Munich, Chair of Landslide Research, München, Germany (m.krautblatter@tum.de), (2) Bayerische Akademie der Wissenschaften, Erdmessung und Glaziologie, München, Germany, (3) Ludwig-Maximilians-Universität Munich, Department for Earth and Environmental Sciences, Geology, München, Germany, (4) 3D RealityMaps GmbH, Baierbrunn, Germany, (5) Technical University of Munich, Chair of Geodesy, Department of Civil Geo and Environmental Engineering, München, Germany, (6) Technical University of Munich, Chair of Photogrammetry and Remote Sensing, Department of Civil Geo and Environmental Engineering, München, Germany, (7) University of Vienna, Department of Geography and Regional Research, Wien, Austria, (8) GEORESEARCH Forschungsgesellschaft mbH, Wals, Austria

Alpine hazards are a significant threat to alpine communities, infrastructure and economies. The development of coping and protection capabilities is a key challenge for alpine societies in the near future. As the costs for maintenance and reinstallation of protective structures exceeds the financial capacities even of rich countries, clever early warning and anticipation strategies are agreed to be the key strategy for the near future.
In 2018 AlpSense operated as a benchmark study to systematically explore the capacity of space-borne, air-borne and terrestrial high-resolution observation and monitoring. For this we have chosen three representative test sites in the critical 2000-3000+ m a.s.l. range, where the effects of climate change are most evident and cause frequent landslides, permafrost and glacier-degradation related hazards in the vicinity of dense tourist infrastructure. The Wetterstein Mountains/ Zugspitze (GER/AUT), the Hohe Tauern Range/ Kitzsteinhorn (AUT) and the Ötztal/ Vernagtferner with Schnalstal (AUT/IT) test sites all undergo a massive environmental change, cause frequent natural hazards, have well-established and relatively dense tourist infrastructure and provide unique long-term observation and monitoring histories often dating back to the 19th century. In addition, extensive work has been done at the verification site Hochvogel (GER/AUT), where a high-magnitude rock slope failure is currently in its preparation.
AlpSense operates in three groups: (1) Pro- und periglacial dynamics and slope instability, (2) glacier development and glacier dynamics and (3) multiscale remote sensing and 3D visualisation. The cooperation of these groups serves (i) to identify hotspots of natural hazards, (ii) to classify, understand and for a few high-risk sites model glacial and slope instability processes, (iii) to perform high-resolution near-real time observation and anticipation for immediately preparing natural hazards and (iv) to provide near real-time visualisation and communication with important stakeholders.

In 2018 we used a unique innovative combination of measuring techniques as there are optical, radar and infrared sensor technologies, operating space-borne, air-borne and terrestrial, as well as novel geophysical (electrical and seismical), geochemical (ice isotope signatures), glaciological (3D ablation) and geodetical (infrared coregistration) applications. Here we present the key ideas and strategies of the AlpSense-Project and results of the first operating year.