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Using drones for rock avalanche mitigation – case study in the Galterental Valley, Switzerland

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During the collapse of an instable rock slope located in the Galterental Valley in Switzerland (coordinates (lat/lon) 46.80609, 7.19256), a hazardous rock avalanche with a volume of more than 2'500 m3 of sandstone occurred on 25 April 2016. A 300 year old building situated in proximity to the rock slope was destroyed. Fortunately, there were no casualties thanks to a telejointmeter-based online surveillance system. The instable rock slope had been monitored since 2012 when a much smaller rockfall event had occured. Prior to the event, acceleration of displacement velocities were observed along a valley-parallel chasm. Data driven analysis allowed to reliably constraint a time window for the collapse. Therefore it was possible to evacuate the house with a family of four in the month prior to the event. For mitigation purposes and evaluation of secondary processes such as landslides, volume differences were calculated using 3D-surface models based on RPAS (Remotly Piloted Aircraft Systems) imagery before and after the event. A safety blasting in the detachment zone was necessary to secure the area for further remediation works. The safety blasting was captured by a RPAS in order to evaluate further damage or necessity of emergency intervention. GEOTEST Ltd. was assigned by the local authorities for advice during the observation period, for the event analysis and the management of the safety blasting after the event.