

## The Piz Cengalo Bergsturz and subsequent debris flows

Florian Amann (1), Andrew Kos (2), Marcia Phillips (3), and Robert Kenner (3)

(1) Chair if Engineering Geology, RWTH Aachen, (2) Terransense AG, (3) WSL-Institut für Schnee- und Lawinenforschung SLF

On 27.12.2011 a rock volume of approximately 1.5 Million m<sup>3</sup> failed catastrophically from the NE face causing a rock avalanche that travelled about 1.5km down the Bondasca valley. Following the event, blue ice was observed on the vertical release scarp, leading to questions about the role of permafrost on the rock slope instability. In 2012, the ArgeAlp research project commenced focusing on geological and kinematic analysis, quantification of slope displacements using terrestrial radar interferometry and laser scanning, and analysis of ongoing rock fall activity.

Geological analysis showed that NE directed toppling was the dominant failure mechanism. Periodic measurements between 2012 and 2015 showed displacements of few cm/year. From 2015 to 2016 an increase in displacement rate was recognized with a further, major increase in rate between 2016 and 2017. The latter increase in displacement rate triggered the attention of the authorities in early August 2017. In addition to displacement measurements unambiguous warning signs were observed, characterized by a major increase in rock fall activity. The first major rock fall event occurred on the 21.08.2017 followed two days later by a catastrophic collapse with a volume of 3.15 Million m<sup>3</sup> on 23.08.2017 at 9:30. Within a relatively short time after the catastrophic failure a series of debris flow events impacted the village of Bondo leading to its evacuation.

This presentation summarizes the event history, geological investigations, displacement monitoring and provides key discussion points on potential factors that may have led to progressive failure, collapse of the Piz Cengalo NE rock slope and the mobility of the rock avalanche material.