Geophysical Research Abstracts
Vol. 16, EGU2014-15468, 2014
EGU General Assembly 2014

Analysis of material entrainment with an unmanned aerial vehicle (UAV) and simulation of the debris-flow event at the Sattelbach torrent – Austria, 2013.

Christian Scheidl (1), Klaus Schraml (1), Markus Moser (2), and Johannes Hübl (1)

(1) Institut of Mountain Risk Engineering, University of Natural Resources and Applied Life Sciences, Vienna, Vienna, Austria (christian.scheidl@boku.ac.at), (2) Austrian Service for Torrent and Avalanche Control

In summer 2013, a disastrous debris-flow destroyed several houses and infrastructure facilities on the fan of the Sattelbach catchment located in the district of St. Johann im Pongau, Salzburg (Austria). Fortunately, no damage to persons could be registered.
The debris flow was triggered by shallow landslides within the upper catchment, mobilizing in total approximately 4,000 m3 of debris. However, the volume of the debris-flow event at the fan was documented with 12,000 m3, whereas a maximum discharge of 380 m3/s was estimated near the fan apex. Witnesses reported only one big wave passing the fan area, which seems to be out of character for a typical Alpine debris-flow event showing such high discharge. For the later, one would suppose multiple smaller waves.
Due to the fact of evolving material entrainment resulted in one big wave, the debris-flow event at the Sattelbach catchment was chosen as case study to analyze mass bulking. For this reason, an unmanned aerial vehicle (UAV) was used to establish a digital terrain model (DTM) of the whole reach after the event. This terrain model was then compared to a LiDAR DTM, showing the topographical situation before the event. Based on the analyzed mass bulking along the whole reach, numerical simulations were performed using the DAN3D (Dynamic Analysis of Landslides in Three Dimensions) code. The DAN3D model allows selection between different rheologies as well as the implementation of entrainment. The study will show the applicability of UAV's in small and steep catchments and will test DAN 3D a debris-flow simulation tool with an implemented mass-bulking model.