Geophysical Research Abstracts
Vol. 15, EGU2013-10189, 2013
EGU General Assembly 2013

Infrared thermography sensing for mapping open fractures in deep-seated rockslides and unstable cliffs

Ivo Baroň (1,2), David Bečkovský (2), and Lumír Míča (2)

(1) Geological Survey of Austria, Dept. of Geophysics, Vienna, Austria (ivobaron@seznam.cz), (2) Inst. of Building Structures, Faculty of Civil Engineering, Brno University of Technology, Brno, Czech Republic

The contribution presents in detail the new approach of infrared thermography (IRT) mapping open cracks, tension fractures and pseudo-karst caves within rock slope instabilities presented by Baroň et al. (2012). The method consists in high-resolution ground-based and airborne IRT sensing and it is restricted to cold seasons. Its utility is demonstrated through case studies from the Flysch Belt of the Outer West Carpathians (rockslides at Kopce Hill, Mt. Kněhyně, Křížový Hill, Smrdutá Hill, Pustevny Rockslide and Záryje Rockslide in E Czech Republic) and from the Northern Calcareous Alps (deep-seated gravitational slope deformations in Gschliefgraben / Mt. Traunstein in Austria). The approach is based on a contrast between temperatures deep within the rock, which at a depth of several meters represent local mean annual values, and winter-time temperatures of the ground surface. In winter, warmer, buoyant air from depth rises to the ground surface through open cracks and joints, and the temperature contrast can be detected by IRT. For temperature sensing, we used a Flir B360 thermal camera. Our test survey was conducted in February and December 2012, in order to achieve the best contrast between temperatures around open tension cracks and the adjacent ground surfaces. IRT results conclusively revealed the presence of open cracks, loosened rock zones, and pseudo-karst caves over a distance sometimes greater than 1 km. The IRT approach proved to be useful for rapidly assessing the distribution of open cracks and tension fractures, which is key information required for assessing rockfall and rockslide hazard.

Baroň I., Bečkovský D. & Míča L. (2012): Application of infrared thermography for mapping open fractures in deep-seated rockslides and unstable cliffs. – Landslides, Springer Verlag. On-line First. DOI 10.1007/s10346-012-0367-z