Geophysical Research Abstracts
Vol. 18, EGU2016-15361, 2016
EGU General Assembly 2016
© Author(s) 2016. CC Attribution 3.0 License.

Digital elevation models in 10 minute time steps – a status report on 4D monitoring of an active erosional scar

Andreas Kaiser (1), Fabian Neugirg (2), Erik Hass (3), Steffen Jose (4), Florian Haas (2), and Jürgen Schmidt (1)

(1) TU Bergakademie Freiberg, Soil and Water Conservation Unit, Freiberg, Germany (andreas.kaiser@tbt.tu-freiberg.de), (2) Catholic University Eichstätt-Ingolstadt, Department of Physical Geography, Eichstätt, Germany, (3) University of Trier, Department of Environmental Remote Sensing and Geomatics, Trier, Germany, (4) JS Elektrotechnik, Ellwangen, Germany

In erosional research a variety of processes are well understood and have been mimicked under laboratory conditions. In complex natural systems such as Alpine environments a multitude of influencing factors tend to superimpose single processes in a mixed signal which impedes a reliable interpretation. These mixed signals can already be captured by geoscientific research approaches such as sediment collectors, erosion pins or remote sensing surveys. Nevertheless, they fail to distinguish between single processes and their individual impact on slope morphology.
Throughout the last two years a highly active slope of unsorted glacial deposits in the northern Alps has been monitored by repeated terrestrial laser scans roughly every three months. Resulting high resolution digital elevation models of difference were produced to identify possible seasonal patterns. By reproducing the TLS results with a physically based erosion model (EROSION 3D) ran with in situ input data from rainfall simulations and a climate station a better understanding of individual mechanism could be achieved.
However, the already elaborate combination of soil science and close range remote sensing could not answer all questions concerning the slopes behaviour, especially not for freeze and thaw cycles and the winter period. Therefore, an array of three fully automatic synchronised cameras was setup to generate continuous 3D surface models. Among the main challenges faced for the system were the energy supply and durability, perspectives of the cameras to avoid shadowing and to guarantee sufficient overlap, a certain robustness to withstand rough alpine weather conditions, the scaling of each 3D model by tracked ground control points and the automatic data handling. First results show individual processes sculpting the slope's morphology but further work is required to improve automatic point cloud creation and change monitoring.