

Integrating surface and subsurface information – towards the development of a geomorphologic information system

Jan-Christoph Otto¹, Marc-Oliver² Löwner, Lothar Schrott¹

¹: Department of Geography and Geology, University of Salzburg, Austria

²: Department of Geodesy and Photogrammetrie, Technische Universität Braunschweig

Citation Notes:

This Abstract was accepted for the 7th International Conference on Geomorphology (ANZIAG), 06. - 11.07.2009, Melbourne, Australia as

Otto, J., Löwner, M.-O. & Schrott, L. (2009): Integrating surface and subsurface information - towards the development of a geomorphologic information system.

Spatio-temporal changes at the earth surface are often related to subsurface structures and conditions. Landform evolution not only depends on surface process, but also is conditioned by the distribution of subsurface material. Geomorphic maps display the spatial distribution of process, material and landform data based on field data and/or remote sensing imagery. High resolution surface data (e.g. LIDAR, HRSC, Ikonos, Quickbird) are easily available today and enable an automated detection of geomorphic landforms and landform patterns. Due to recent developments in geophysical equipment and analysis software, high resolution subsurface data became a common tool in geomorphology. But, an integrated management of these different data types is still missing. Traditionally, geomorphological information is represented in 2D by means of geomorphological maps or single borehole data. An integration of the subsurface implies the extension into the third dimension which is of great importance in dynamic environments, such as unstable slopes, floodplains or glacier forefields.

We will present thoughts and ideas on the design and potential of an integrative geomorphologic information system (GeomorphIS). Focus will be set on the different information types provided and their relationships and connections. These interrelations influence the system state at various scales and produce various types of feedback and emergent behaviour. A challenge for the data base design will be the integration of different types of information and the creation of new analysis tool that deliver information on process-form-material relationships.

The geomorphological information system is providing a platform for holistic information on landform distribution, surface and subsurface properties, conditions and changes. It will enhance the understanding of process-form-material linkages that is necessary for the prediction of landform reactions to environmental change and human impact. The application of this geomorphological information system will also improve process modelling as well as hazard and risk management.