Geophysical Research Abstracts,
Vol. 11, EGU2009-12108, 2009
EGU General Assembly 2009

Simulation of mud- and debris flows with a 2D model

G. Volk (1), J. Hübl (2), M. Brauner (1), and H. Teufelsbauer (2)

(1) GeoExpert Research and Planning GmbH, 1150 Wien, Austria (gerhard.volk@geoexpert.at), (2) Department of Civil Engineering and Natural Hazards, University of Natural Resources and Apllied Life Sciences-Vienna, 1190 Wien, Austria (johannes.huebl@boku.ac.at)

In recent years, spatially distributed avalanche simulation models were successfully applied in the practical use in Austria. Snow avalanches are a very dynamic process, which, due to the high kinetic energy, is little affected by small changes of the terrain. In practice, digital terrain data with a point density of 0.04 points per m^2 proved adequate for snow avalanche simulation calculations.
Compared to avalanches mudflows are flowing usually slower. Accordingly, the terrain plays a much larger role. Also, very heterogeneous processes can take place in close vicinity affecting the behaviour of the debris flow heavily. The increasingly widespread availability of terrain data that is collected by laser scanners, with point densities of up to 10 points / m^2 now also offer a data base, where the use of spatially distributed simulation models for mudflows and debris flows appears to be useful.
Building on the experiences in the creation of an avalanche simulation model, a model for the calculation of mudflows/debris flows was developed. In this model, the rheological approach of O'Brien was realized. The big challenge for the implementation of the model was the requirement that the model could benefit from the high density terrain data and would deliver stable results with practical useful computing speeds. For the numerical solution a forward oriented finite difference scheme with shifting calculation grids was chosen. The code was implemented fully parallelized so that the use of multi-core processors leads to significant speed increases.
In 2 test areas in Austria first calculations were carried out and delivered satisfactory results.