Geophysical Research Abstracts, Vol. 8, 02040, 2006
SRef-ID: 1607-7962/gra/EGU06-A-02040

Towards landslide runout prediction using the dynamic model DAN3D

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Runout analysis is an important component of landslide hazard and risk assessment, and dynamic modelling has become a powerful tool for this purpose. A versatile new dynamic model, DAN3D, has been developed at the University of British Columbia. An extension of the existing model DAN, the new model is capable of simulating rapid landslide motion across complex 3D terrain without requiring the input of a predefined path direction or width. Similar to DAN, it can account for internal strength of the landslide as well as volume and rheology changes due to entrainment of material in the path, capabilities that are essential for simulating real landslides. An efficient, meshless, Lagrangian numerical method, based on Smoothed Particle Hydrodynamics, permits large displacements and deformations that are typical of extremely rapid landslides. The model has been used extensively to back-analyze a wide variety of real events, and useful patterns are beginning to emerge. Similar events have been successfully simulated using the same rheology and very similar rheological parameters, suggesting that first-order runout prediction is possible. Some examples will be presented in this talk. A major objective of this research is the creation of a database of calibrated input parameters, sorted by landslide type, which can be used to determine an appropriate rheology and range of parameters to use for prediction.