Natural Hazards and Earth System Sciences
European Geosciences Union

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Preface

Landslides and debris flows: analysis, monitoring, modeling and hazard assessment

Since its first appearance, *Natural Hazards and Earth System Sciences* publishes special issues containing papers presented during European Geophysical Union meetings and European Geosciences Union (EGU) meetings. Taking the opportunity of the 1^{st} EGU General Assembly held in Nice, France, from April 25 to April 30, 2004, we chose to merge five sessions in one special volume dedicated to *Landslides and debris flows: analysis, monitoring, modeling and hazard assessment*. The 16 papers presented in this volume are issued from sessions NH3.01: Documentation and monitoring of landslides and debris flows for mathematical modeling and design of mitigation measures; NH3.02: Rainfall induced landslides and debris flows; NH3.06: Slope instabilities: from dating, triggering and evolution modeling to hazard assessment; NH3.07: Terrain analysis using DTM and landslides and NH3.08: Modeling landslides as part of erosive processes.

This merging underlines the necessity to view slopes as systems, that have to be studied in several different ways to obtain the most accurate image of nature. Landslides have to be first characterized by their morphometry. The subject is discussed in 8 papers dedicated to case studies and/or digital elevation model (DEM) analysis. 6 papers are dedicated to either numerical or analogous modeling of slope movements, at instability, local, scale or at a regional scale. Stability aspects, as well as triggering rainfall, are considered. One paper is dedicated to rainfall-induced landslides related to climate and another is dedicated to landslide monitoring.

By its variety, this set of articles covers many of the problems related to landslide hazard assessment. From morphological characterization to monitoring, landslide analysis must pass through several stages, which are illustrated here. Modeling, as well as analysis of triggering factors, must be considered for the understanding of slope processes. New techniques such as Laser DEM acquisition, monitoring facilities, computer modeling and analogous modeling make it possible to improve greatly all those analyses. The spatio-temporal aspect of landslide evolution is particularly addressed in this volume. We think that the present issue is a very good overview of the present state of the art in landslide hazard assessment.

The new policy of *NHESS* is to publish special issues first on the website, thus permitting a rapid distribution of the manuscripts without waiting for all papers to be published in a hard copy of the special volume. This is at the origin of a particularity of this special issue: the page numbers are not consecutive. Please find below the table of contents ordered according to the criteria previously presented:

Case studies and/or digital elevation model (DEM) analysis

Modeling of slope movement

Brückl, E. and Parotidis, M.: Prediction of slope instabilities due to deep-seated gravitational creep, 5, 155–172, 2005.

Baron, I., Agliardi, F., Ambrosi, C., and Crosta, G. B.: Numerical analysis of deep-seated mass movements in the Magura Nappe; Flysch Belt of the Western Carpathians (Czech Republic), 5, 367–374, 2005.

Bathurst, J. C., Moretti, G., El-Hames, A., Moaven-Hashemi, A., and Burton, A.: Scenario modeling of basin-scale, shallow landslide sediment yield, Valsassina, Italian Southern Alps, 5, 189–202, 2005.

Bachmann, D., Bouissou, S., and Chemenda, A.: Influence of weathering and pre-existing large scale fractures on gravitational slope failure: insights from 3-D physical modeling, 4, 711–717, 2004.

Arattano, M., and Franzi, L.: Analysis of different water-sediment flow processes in a mountain torrent, 4, 783–791, 2004.

Lin, M.-L., Wang, K.-L., and Huang, J.-J.: Debris flow run off simulation and verification – case study of Chen-You-Lan Watershed, Taiwan, 5, 439–445, 2005.

Rainfall-induced landslides

Zêzere, J. L., Trigo, R. M., and Trigo, I. F.: Shallow and deep landslides induced by rainfall in the Lisbon region (Portugal): assessment of relationships with the North Atlantic Oscillation, 5, 331–344, 2005.

Monitoring of landslides

Arattano, M. and Marchi, L.: Measurements of debris flow velocity through cross-correlation of instrumentation data, 5, 137–142, 2005.

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