

Methods development concerning data analysis, data management, and simulation for early warning of mass movements

Martin Breunig

Institute for Geo-Informatics and Remote Sensing
University of Osnabrueck
Barbarastr. 22b, 49076 Osnabrueck
Germany
E-Mail: mbreunig@uni-osnabrueck.de

Obviously there is a world-wide strong demand for analyzing geological events such as earth quakes, tsunami and strong rainfall combined with mass movements. The world community is invoked to provide knowledge for the development of new methods used in information systems for analysis and early warning of geological events. However, at present the analysis and information preparation are still particularly critical points of the early warning chain. The responsible decision makers are usually confronted with huge amounts of structured and unstructured data without receiving an overview of the situation from this data. Thus the question is how decision makers can be provided with a reliable and manageable amount of information to create the warning decision and for taking preventive measures. In this article objectives and requirements of appropriate methods for information analysis, management, and simulation in early warning systems are presented for mass movement scenarios. The information analysis and preparation from structured and unstructured data are investigated by statistical and linguistic methods. Services accessible from the WWW for the management of spatial and spatio-temporal data in a geo-database are presented. The simulation of landslides is executed on the basis of geotechnical, mechanically founded models. Thus a better understanding of the geological processes can be achieved. As a result techniques such as spatial data mining, linguistic methods, GIS, geo-databases, and numerical simulations are combined with each other to serve as building blocks for future analysis and early warning systems.