Geophysical Research Abstracts,
Vol. 11, EGU2009-7931-1, 2009
EGU General Assembly 2009


# Collapse hazards in gypsum and importance of susceptibility mapping: an example from Sivas basin (Turkey)

I. Yilmaz

Cumhuriyet University, Department of Geological Engineering, 58140 Sivas – TURKEY (iyilmaz@cumhuriyet.edu.tr; tel: +90 346 219 1010, fax: +90 346 219 1171)

As a foundation material, gypsum differs from other rocks in that voids may be found at almost any depth within the rock mass. Collapse structures in gypsum terrains are the most serious geological hazards because they can damage engineering structures, settlement areas, natural lakes, and allow infiltration of contaminant into the groundwater. Collapse and subsidence may occur in the course of time or suddenly and catastrophically. Presentation of engineering geological data in the form of a hazard map is a useful tool in urban planning. In order to avoid the problems related to the subsurface and thus save property and money, detailed geoscientific data should be collected and used in urban development plans.

Interpretation of future collapse occurrence requires an understanding of conditions and processes controlling collapse event. In order to predict collapse, it is necessary to assume that collapse occurrence is determined by collapse related factors, and that future collapses will occur under the same conditions as past collapses. On this basis, the relationship between areas where a collapse has occurred and collapse related factors can be distinguished from the relationship between areas without past collapses and collapse related factors. The evidence of collapse structures such as dolines and sinkholes is the most important factor in the prediction of future collapses.

In this study, a method is presented for mapping of collapse susceptibility in gypsum terrain in Sivas basin (Turkey) using Geographical Information System (GIS) and statistical method (Conditional Probability). Attributes and descriptions in the content of karst inventory preparation were first prepared by polygons corresponding to boundaries of karst structure. Data base of direct or indirect collapse-related factors such as; surface karst density, slope gradient and and aspect, topographical elevation, drainage system, structural lineaments and discontinuities, land-use by means of settlements and roads, stream power index (SPI) and topographical wetness index were then obtained. Both of the inventory and collapse-related factors were then inserted to GIS environ in a GIS software and collapse hazard map was produced by using statistical model of Conditional Probability. Higher quality of the map by means of its performance was obtained and map was considered as satisfactory. The results of this study indicated that the statistical models can be used as a simple tool in the assessment of collapse susceptibility in karst terrains.

Keywords: Gypsum; karst; collapse; GIS; susceptibility map; conditional probability.