Mass Movement Hazard Assessment in Zacatecas State, Mexico

Luis D. Barajas Nigoche and Juan P. Moreno Ruiz

Servicio Geológico Mexicano, Boulevard Felipe Ángeles, Km 93.50-4,
Col. Venta Prieta, Pachuca, Hidalgo, México

ABSTRACT

Mass movement processes (MMP) in Zacatecas State, Mexico (ZAC), affects some main cities as well as federal, state and municipal roads. The major MMP processes are rock falls, slab slides, and also isolated debris flow. Based on the analysis of field data and basic and thematic information throughout a geographic information system (GIS), it was found that from the total area of state (75,341.29 km^2), 6.6% is in high hazard, 6.9% in medium hazard, and 10.4% in low hazard classification. Furthermore, within the 10,171.28 km of total linear road structure available, 33.99 km of federal highway, 38.30 km of trunk roads, and 217.04 km of gravel are classified into high hazard for MMP. Among the state´s major cities that have some degree of danger for MMP are included Zacatecas, Guadalupe, Sombrerete, Río Grande, and Concepción del Oro. However, the highest concentration of MMP was identified in the southern and western regions of the state, associated with the geological and geomorphological conditions prevailing. In this regard, it should be noted that there are variations of elevation in the valley over the plateau of about 1000 m. This condition largely determines the soil erosion velocity and weathering of geological units associated with the climatic conditions in the areas. The field survey was conducted by specific MMP tables.

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