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Predominant role of geological features in landslide susceptibility. Study of the October 1999 mass movements of the Sierra Norte de Puebla (Mexico).

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Landslide susceptibility depends on various factors such as geomorphic, pedologic and geologic factors, as well as hydrologic and climatic agents. The different mass movements that occurred in October 1999 in the “Sierra Norte de Puebla” (Mexico) have been studied by means of different parameters derived from the DEM surface (primary attributes such as dipping angle, surface curvature, DEM surface roughness, etc.; and secondary attributes related to soil and moisture influence, etc.), indices issued from high resolution satellite images (i.e., vegetation density of the vegetal patterns provided by the NDVI index), field observations (characteristics and nature of the different landslide types), and exogenous information related to geologic, pedologic, geomorphologic and climatic data. All these parameters have been submitted to descriptive and multivariate statistical analysis in order to measure their relative influence. This analysis showed that the geologic features (i.e., nature and configuration of the formation, presence of tectonics events) play obviously a role in the understanding of landslide susceptibility. Measurement in a parametric modeling of the respective influence of the parameters formerly described requires studying them separately in each geological unit, as the answer used to map the unstable zones varies according to the nature of these geologic formations.