A study on the effect of the ground acceleration of the ground acceleration on landslide susceptibility maps

Ozgur Das (1), Harun Sonmez (2), Candan Gokceoglu (3), and Hakan Nefeslioglu (4)

(1) General Directorate of the Bank Provinces (hasanozgurdas@yahoo.com), (2) Hacettepe University, Geological Engineering, Ankara, Turkey (haruns@hacettepe.edu.tr), (3) Hacettepe University, Geological Engineering, Ankara, Turkey (cgokce@hacettepe.edu.tr), (4) General Directorate of Mineral Res & Explorat, Dept Geol Res, TR-06520 Ankara, Turkey

Particularly in the last decade, landslide susceptibility and hazard maps have been used for urban planning and site selection of infrastructures. However, the use of seismic activity in susceptibility analysis is still open to discussion. For the reason, the purpose of the study is to investigate the effect of the seismic activity on the landslide susceptibility. For the purpose of the study, a series of stability analysis based on circular failure and infinite slope model were performed. By employing the relation of the ratio of decrease in stability based on slope and acceleration, the landslide susceptibility map for two scenario earthquakes (Ms = 5.5 and Ms = 7.5) was produced for a seismically active and landslide-prone area (Kelkit Valley, NE Turkey). The landslide susceptibility of the study area is mainly controlled by lithological properties. When making a comparison between the landslide susceptibility map at static condition and the landslide susceptibility maps including seismic effects, a considerable decrease in the number of grid cells of low susceptibility classes for the landslide susceptibility maps including seismic effects was observed, and the number of grid cells of high susceptibility classes was increased. Additionally, landslide hazard maps were produced by using the occurrence probabilities of two scenario earthquakes in time intervals such as 10, 50, 75 and 100 years. The hazard maps are becoming closer to the susceptibility map during earthquake, when time intervals increase.