

LANDSLIDE HAZARD ZONATION OF THE TEHRAN METROPOLIS

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Landslide is one of the most devastating co-seismic phenomena which occur frequently in Iran. The capital, Tehran and its surrounding area is located on or near active faults. In order to determine landslide hazard in Tehran and suburb area an earthquake induced landslide model (CAMEL) along with an analytical hierarchy model (AHP) and an information value model (IV) have been used. The input layers for AHP and IV models consist of slope angel, slope aspect, ground class, Digital Elevation Model (DEM), distance to rivers, annual precipitation, land use and shake intensity. Input layers for CAMEL model consist of ground class, slope angel, slope height, ground roughness, soil moisture, vegetation coverage, distance to rivers and roads, and shake intensity.

CAMEL uses fuzzy logic and computing with words to classify landslides in 6 different groups. AHP model uses pair-wise comparison and information value model joins parametric maps with inventory map to create landslide hazard zonation map. Figures 1 and 2 show landslide hazard zonation maps using CAMEL.

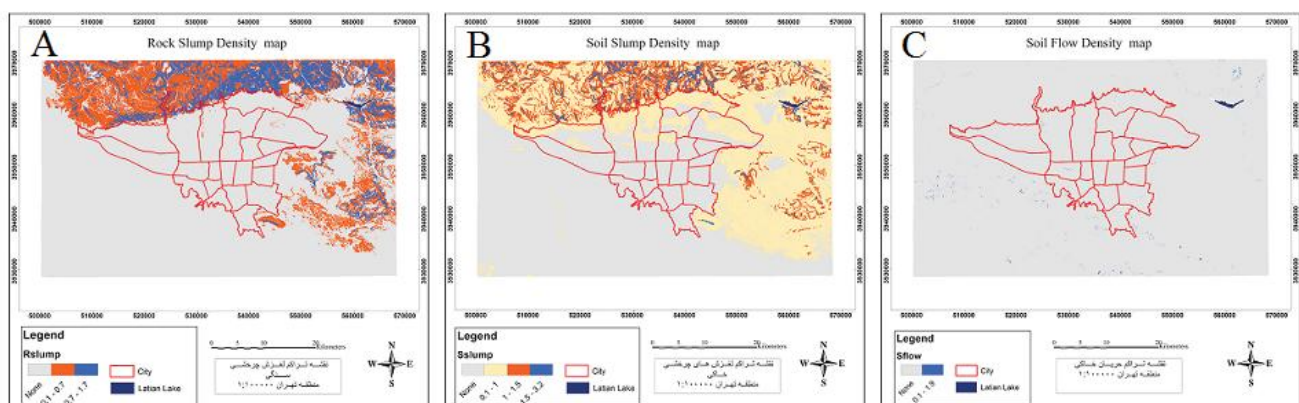


Figure 1. Landslide hazard zonation map using CAMEL. A: Rock avalanche, B: Rock fall, C: Soil fall

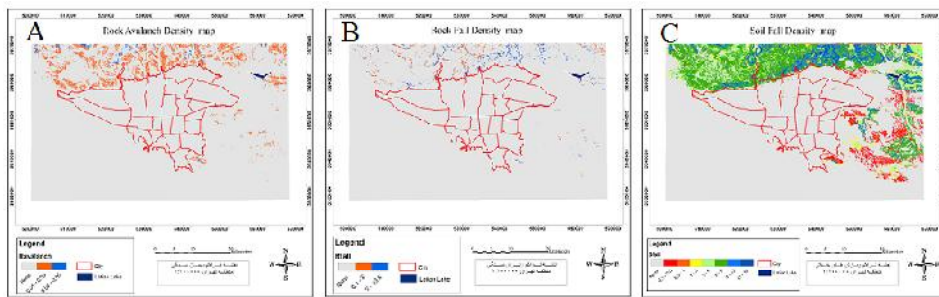


Figure 2. Landslide hazard zonation map using CAMEL. A: Rock slump, B: Soil slump, C: Soil flow

Joining the 6 different landslide hazard maps, an individual aerial landslide hazard zonation map has been created using CAMEL model (Figure-3A), (Miles and Keefer, 2007). The resultant landslide hazard zonation map using AHP model is shown in figure (3B), (Saaty, 1980) and landslide hazard zonation map created using information value model is shown in figure (3C), (Yin and Yan, 1988).

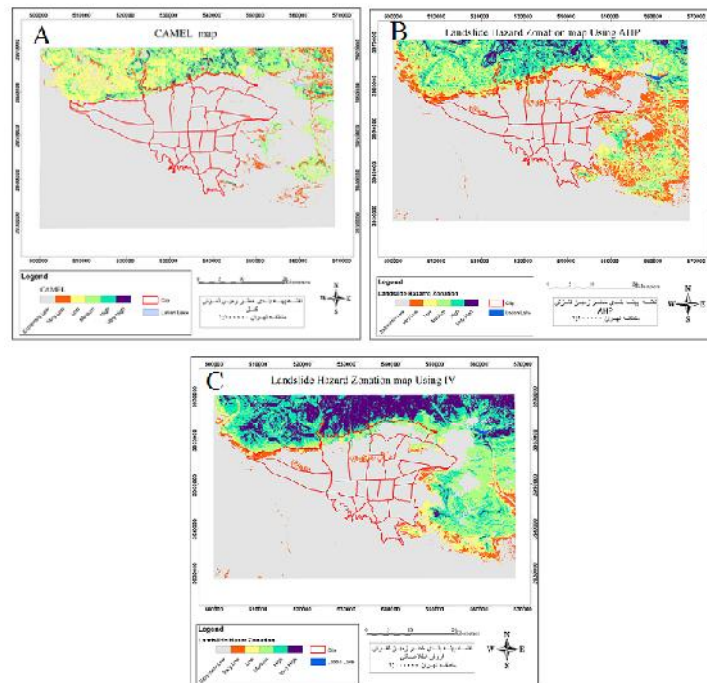


Figure 3. Landslide hazard zonation maps

Comparing the models using qualified sum index (QS), (Gee, 1992) indicate that AHP model with qualified sum of 3.41 is the most eligible model and the information value model and CAMEL with qualified sum of 3.35 and 3.15 respectively, stand after AHP model.

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