

# Ground acceleration distribution modeling for Istanbul using Geographic Information Systems

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## Abstract

In this study, apart from the predefined scenario-based studies, peak ground acceleration (PGA) values resulted for Istanbul by any earthquake defined by its magnitude and coordinates are modeled using ArcGIS software and ArcToolbox modules. Geological data is in digitized format and is derived from 1:25000 scaled geological maps of Istanbul. Fault data is taken from the Marmara fault map prepared by National Oil & Natural Gas Company of Turkey (TPAO) in 1999. The user inputs the coordinates of the epicenter, the magnitude of the earthquake to be simulated, the depth of the epicenter and the folders that the distribution maps are to be saved. Two formulae derived from the ground measurements from Northwestern Turkey were used for calculation of the peak ground acceleration values: a formula derived by Özbey et al.(2004) and another derived by Gülkan and Kalkan (2002). The developed model prepares two distribution maps for each attenuation relation. Additionally a third is derived by taking the maximum of the two by carrying out a cell-based analysis. The model also confirms the statement made in the regarding article that the second formula underestimates the PGA values in close ranges. The model is intended to be used in a loss estimation program to be developed in the future.

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