Earthquake Hazard Analysis using Geological Characteristics and Geographic Information System (GIS) in the Southeastern Part of Korea

Kyo-Young Song

Korea Institute of Geoscience & Mineral Resources, Daejeon, Korea. (kysong@kigam.re.kr)

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The purpose of this study is to investigate earthquake hazards using geologic characteristics and geographic information system (GIS) for assessment and mitigation of earthquake hazards. The southeastern part of Korean peninsula, especially Ulsan and Pohang cities, was chosen for construction of GIS database and analysis of earthquake hazards such as liquefaction, landslide. Two municipal areas are represented as ones of the most populous industrial cities in Korea. However, several large-scale faults such as the Yangsan fault occurred in the vicinity of those areas.

In this study, important factors closely related to earthquake hazards such as seismicity, geology, soil distribution, groundwater depth and ground slope data were compiled for spatial database using GIS, and ranked by relative susceptibility of earthquake hazards.

To classify vulnerable areas and analyze probability for susceptibility of earthquake hazards, each factor was computed and applied to established dataset for liquefaction and landslide induced from earthquake.

To present, the probability of liquefaction in the study area is calculated to about 0.012∼0.133 when g value is 0.13∼0.14 g. But if the moment magnitude increases to 7.0, the probability of liquefaction increases up to 0.802. The probability of landslide is almost null at present, but it increases rapidly when the moment magnitude reaches 5.0. The landslide is expected in all unstable slopes when the moment magnitude exceeds 6.0.

The acquired results from the study area indicate that the liquefaction and landslide induced from earthquake is closely related to the geology. Therefore, general geology such as kind of rocks and age of rocks is very important factor in analyzing earthquake hazards.