



A GIS-based seismic vulnerability assessment in Gyeongju, South Korea using AHP

Jihye Han (1), Soyoung Park (), Seongheon Kim (), Sanghun Son (), Seonghyeok Lee (), and Jinsoo Kim ()

(1) Pukyong National University, Spatial Information Engineering, Korea, Republic Of (jhhan931025@gmail.com), (2) Pukyong National University, BK21 Plus Project of the Graduate School of Earth Environmental Hazards System, Busan, Republic of Korea(yac100@pknu.ac.kr)

Seismic vulnerability is inherently a multicriteria decision making problem which treats sustainable development. The assignment of various levels of vulnerability to each urban block can be considered as a multicriteria decision making consisting expert's viewpoints to weight the criteria. Assessing vulnerability areas could have an important role in conducting relief operations. The objective of the study is to evaluate the seismic vulnerability in Gyeongju city based on the analytic hierarchy process (AHP) and geographical information system (GIS). Geotechnical, physical, social, structural, and systemic components were used as major factors, moving towards a more comprehensive assessment of vulnerability. The AHP method was applied to assess the priority rank and weight of criteria (layers) and alternatives (classes) of each criterion via pairwise comparison in all levels. Finally, the seismic vulnerability map was produced by overlay all factors using ArcGIS software. The seismic vulnerability map was classified into four zones as high, medium, low, and safe. The results indicated that 6% of Gyeongju, regarding seismic vulnerability, was highly vulnerable, while 34% was safe. The AHP and GIS has been successfully implemented for production of the seismic vulnerability map. In addition, the seismic vulnerability map produced in this study can be become a significant tool for confronting crises resulting from future earthquake incidences.