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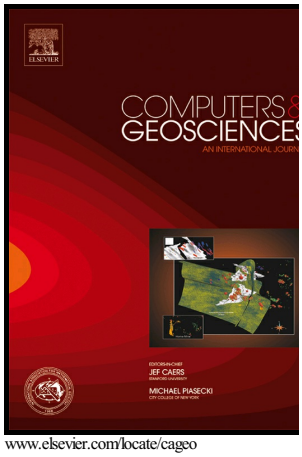

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GIS-based Site-Suitability Modeling for Seismic Stations: Case Study of the Northern Rahat Volcanic Field, Saudi Arabia

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Abstract

Spatial planners and geographers are interested in decision problems that are based on geographically defined alternatives. These alternatives are evaluated with respect to their spatial arrangement. A geographic information system-based methodology in conjunction with the multi-criteria decision analysis (MCDA) was used to evaluate alternative site suitability to identify priority sites for seismic stations setting up. Comprehensive analyses were conducted in order to identify the best location for seismic stations based on given criteria. By considering the environmental objectives and the economical feasibility, the criteria were developed in the GIS environment then individual satisfaction degrees for each alternative location are calculated using weighted overlay tool. By selecting appropriate weights, the MCDA provides effective tools for seismic station site suitability that may serve to improve the performance and capabilities of seismic networks. Several alternative comparisons were carried out to evaluate the confidence in the model and helped in the priority areas refinements.

The application of this method in Harrat Al-Madinah volcanic field, Saudi Arabia, provided a suitability map for the area. Five selective sites were proposed and found to coincide with accessible areas appropriate for seismic station installation in the

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