



## Geo-factor Inference Modelling with Empirical Susceptibility Weights Approach for GIS-based Seismic Hazard Mapping of Thiruvananthapuram City

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### Abstract

Appropriate assessment of various site parameters influencing the spatial distribution of seismic hazard was investigated to critically identify the susceptible spots in the study area, Thiruvananthapuram city, a low to moderately active seismic zone in southern Peninsular India (PI). The Geo-Factor Inference (GFI) model developed in this study, evaluates respective contribution level of local geo-factors to estimate the Peak Ground Acceleration (PGA), representing regional seismic hazard. Considering the complexity and limitations in the widely accepted Analytic Hierarchy Process (AHP), mostly used in seismic studies, a simplified Empirical Susceptibility Weights Approach (ESWA) was proposed to assess the attribute weights for GFI model. The ESWA weights were mathematically calibrated by Rank-Order Centroid (ROC) tool and subsequently, compared with AHP weights to deduce variations in scale ranges. ESWA values from GFI were finally assigned to respective geo-factor thematic layers for weighted over-lay analysis in Geographical Information Systems (GIS) platform. The solution from GFI model, integrated with GIS-approach provides distinctive distribution of susceptibility levels ranging from very low to high in the seismic hazard mapping of the city.

**Keywords:** Seismic hazard, Geo-factor inference (GFI), Empirical susceptibility weights approach (ESWA), Rank-order centroid (ROC), AHP