

## عنوان مقاله:

Bayesian and Frequentist Approaches for the Estimation of the Maximum Expected Earthquake Magnitude in Iran

## محل انتشار:

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## خلاصه مقاله:

The maximum earthquake magnitude plays a crucial role in different aspects of seismic hazard and risk assessments. Previous work by Salamat et al. [1] shows the divergence of the confidence interval of the maximum possible earthquake magnitude  $M(\max)$  for high levels of confidence  $1-\alpha$ , in different seismotectonic zones of Iran. For this,  $M(\max)$  is replaced by the maximum expected earthquake magnitude  $\mu_t$  that is calculated for different predefined future time intervals  $T_f$ . In this work, the frequentist and Bayesian approaches are applied to calculate the upper bound of the confidence interval of  $\mu_t$ . The frequentist confidence intervals are calculated for the level of confidence  $1-\alpha=95\%$  and  $99\%$ , and future time intervals  $T_f=30,50$  years. In the Bayesian approach, the posterior distributions of the maximum expected earthquake magnitude are calculated for  $T_f=30,50$  years and  $90\%$  confidence level. The stationary Poisson process in time and Gutenberg Richter relation are assumed as a statistical model for the magnitude distribution. In order to estimate  $\mu_t$  in each seismotectonic zone, three different scenarios of  $M_{\max}=8.5, 9.0, 9.5$  are assumed. In order to find the influence of the declustering, all calculations are applied for both original and declustered catalogs. The results show, as long as the length of the time interval is short or moderate, different values of  $M_{\max}$  have a minor effect on the estimation of the maximum expected earthquake magnitude  $\mu_t$ .

## کلمات کلیدی:

Maximum Magnitude, Frequentist approach, Bayesian approach

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