

Quantitative Analysis of Seismicity before Large Taiwanese Earthquakes Using G-R Law

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Since the seismicity was identified as one example of natural nonlinear systems of which the distribution of frequency and earthquake magnitude follows a power law called “Gutenberg-Richter (G-R) law”, the parameters of power law, i.e. the b - and the a -value, have been widely used in many researches about seismic hazards, earthquake forecasting model and many other topics. The plausibility of power-law model, or the applicability of parameter correspondingly, is crucial in these researches and is mainly verified by the statistical error σ of b -value in past, however, the effectiveness of σ remains doubtful. In this research, we used “ p -value”, which was derived from an approach developed by Clauset et al. (2009), to deal with the problems mentioned above and had verified its effectiveness as a reliable plausibility index of the power-law model. Furthermore, we also verified the effectiveness of the K-S statistics as a goodness-of-fit test in estimating another crucial parameter, cut-off magnitude, which must be determined before estimating the parameters of power-law model.

Keywords: G-R law, Kolmogorov-Smirnov statistic, K-S test