

Ergodicity Examined by the Thirumalai–Mountain Metric for Taiwanese Seismicity

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A b s t r a c t

Ergodicity is a behavior generally limited to equilibrium states and is here defined as the equivalence of ensemble and temporal averages. In recent years, effective ergodicity is identified in simulated earthquakes generated by numerical fault models and in real seismicity of natural fault networks by using the Thirumalai–Mountain metric. Although the effective ergodicity is already reported for Taiwanese seismicity, an immediate doubt is the unrealistic gridded sizes for discretizing the seismic data. In this study, we re-examined the effective ergodicity in Taiwanese seismicity by using reasonable gridded sizes which corresponded with the location errors in the real earthquake catalogue. Initial time and magnitude cut-off were examined for the validity of ergodic behavior. We found that several subsets extracted from Taiwanese seismicity possessed effectively ergodic intervals and all terminations of these ergodic intervals temporally coincided with the occurrences of large earthquakes ($M_L < 6.5$). We thus confirm the ergodicity in the crustal seismicity by using the Thirumalai–Mountain metric.

Key-words: ergodicity, Thirumalai–Mountain metric, seismicity, Taiwan.