

ABSTRACT

This study aims to analyze seismicity characteristics based on the *a*-value, *b*-value, and Magnitude of Completeness (*Mc*), as well as their spatial and temporal variations in Central Papua Province during the period 2000–2025 using the maximum likelihood method. The maximum likelihood method was selected because it is capable of producing more accurate and stable estimations of seismicity parameters in *b*-value calculations. The data used in this study were obtained from the ISC catalog and the BMKG repository. The data were processed through magnitude conversion to *M_w*, declustering using the Reasenberg method, and Frequency-Magnitude Distribution (FMD) curve analysis using ZMAP 6.0 through MATLAB. The results showed a *b*-value of 0.879, an *a*-value of 6.57, and an *Mc* value of 3.8 *M_w*. Spatially, the Nabire region has low *b*-value ranges of approximately 0.85–0.95, which are associated with high stress accumulation, whereas the Mimika region has higher *b*-value ranges of approximately 1.0–1.3, indicating dominant energy release in the form of small earthquakes. Temporal analysis indicates that the *Mc* values range from 3.8–4.2 *M_w*, while the *b*-value fluctuates between 0.85–1.3, reflecting the dynamic changes in tectonic stress conditions within the study area.

Kata Kunci : *a*-value, *b*-value, maximum likelihood, seismicity, Central Papua Province