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Seismotectonic Characteristics of the Northern Sector of the Banda Arc Based on Spatiotemporal Analysis of *b*-Values and Focal Mechanisms

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ABSTRAK

Seismotektonik di Sektor Utara Busur Banda sangat aktif dan destruktif, yang ditunjukkan oleh sejarah gempa bumi sejak tahun 1674 hingga gempa Laut Banda tahun 2023. Untuk memberikan gambaran risiko kegempaan di wilayah tersebut, dilakukan studi dengan tujuan mengevaluasi dinamika seismotektonik secara spasial-temporal. Kebaruan studi ini terletak pada analisis stratifikasi vertikal nilai-*b* dan parameter mekanisme fokal dengan menggunakan katalog gempa bumi hingga Maret 2026. Evaluasi seismotektonik dilakukan dengan menganalisis nilai-*b* secara temporal pada periode pengamatan 26 tahun dengan menggunakan metode *Maximum Likelihood Estimation* (MLE). Analisis nilai-b secara spasial dilakukan pada segmen Seram dan segmen Buru serta stratifikasi vertikal pada lapisan dangkal (0-35 km) dan lapisan dalam (35-100 km). Hasil studi menunjukkan bahwa lapisan dangkal bertindak sebagai zona utama penumpukan stres ($b < 1.0$), sedangkan lapisan dalam berada pada fase relaksasi ($b > 1.4$). Analisis mekanisme fokal mengonfirmasi bahwa akumulasi stres pada zona dangkal disebabkan oleh gaya tekanan berarah Timur-Laut Barat-Daya yang dilepaskan secara periodik melalui kombinasi sesar naik dan sesar geser lokal. Segmen Buru diidentifikasi berada pada kerentanan tektonik kritis akibat penurunan nilai-*b* secara konsisten hingga 0.87 tanpa ada fase relaksasi yang cukup. Implikasi penelitian ini berupa peningkatan pengawasan seismik secara berkala dan penguatan program mitigasi bencana secara struktural maupun nonstruktural di wilayah Maluku Tengah, khususnya di Pulau Buru.

ABSTRACT

The seismotectonic activity in the Northern Sector of the Banda Arc is highly active and destructive, as evidenced by historical earthquakes dating back to 1674, including the 2023 Banda Sea earthquake. This study aims to evaluate seismotectonic dynamics both spatially and temporally, providing an overview of seismic risk in the region. The novelty of this study lies in the vertical stratification analysis of *b*-values and focal mechanism parameters utilizing an earthquake catalog updated through March 2026. The seismotectonic evaluation was conducted by analyzing the temporal *b*-values over a 26-year observation period using the Maximum Likelihood Estimation (MLE) method. Spatial b-value analysis was performed on the Seram and Buru segments, along with vertical stratification in the shallow (0-35 km) and deep (35-100 km) layers. The study results indicate that the shallow layer acts as the primary zone of stress accumulation ($b < 1.0$), whereas the deep layer is in a relaxation phase ($b > 1.4$). Focal mechanism analysis confirms that stress accumulation in the shallow zone is driven by a Northeast–Southwest compressive force, which is released periodically through a combination of local thrust and strike-slip faulting. The Buru segment is identified as being under critical tectonic vulnerability due to a consistent decrease in b-values to 0.87 without a significant relaxation phase. The implications of this research include increased periodic seismic monitoring and strengthening of both structural and non-structural disaster mitigation programs in the Central Maluku region, particularly in Buru Island.

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1. INTRODUCTION

The eastern Indonesian region, namely Maluku, possesses a highly complex tectonic setting (Anugrah et al., 2025; Patria & Hall, 2017, 2018). Maluku is situated precisely at the intersection of three global plates, the Indo-Australian, Eurasian, and Philippine Sea plates, and is subjected to tectonic pressure from the Pacific plate (Daniarsyad et al., 2021; Meilano et al., 2021; Prasetio et al., 2021; Rohadi et al., 2021). The activity of these plates, particularly the westward pressure of the Pacific plate against the Maluku region (Banda Arc), is a major factor in the tectonic evolution in the Northern Sector of the Banda Arc, as illustrated in Figure 1 (Baskara et al., 2023; Raharjo et al., 2025). This interaction induces oblique collision and the formation of fold belts and thrusts that define the geodynamic characteristics of the central Maluku region, which encompasses the area from Buru Island to Seram Island (Hall et al., 2017; Patria & Hall, 2018). Seismotectonics in this area, particularly driven by activity of the Northern Sector of the Banda Arc, is highly active and destructive (Anugrah et al., 2025; Baskara et al., 2023). Tangible examples include the historical records of the 1629 Earthquake-Tsunami, the 1674 Ambon Earthquake-Tsunami, the 1708 Earthquake (Ambon, Haruku, & Buru), the 1899 Tehoru (Seram) Earthquake, the 1965 North Buru Earthquake, the Buru Island Earthquakes (2004 & 2006), the 2019 Ambon Earthquake, and most recently, the 2023 Banda Sea Earthquake (Anugrah et al., 2025; Baskara et al., 2023; Murjaya et al., 2021; Setiawan et al., 2023). These earthquakes ranged in magnitude from Mw 6.5 to Mw 8.8 and claimed many lives (Anugrah et al., 2025; Meilano et al., 2021). Several studies indicate that the megathrust earthquake potential in the Seram Trench is the primary cause of these events (Anugrah et al., 2025). In addition, various studies consistently associate these destructive earthquakes with activity in the Northern Sector of the Banda Arc (Baskara et al., 2023; Hall et al., 2017; Meilano et al., 2021; Patria & Hall, 2017; Rahmadani et al., 2022). Hall et al. (2017) and Patria & Hall (2017) noted that although the Seram Trough is aseismic (exhibiting minimal earthquake activity within the trench), it is a major factor in the active faults in the Northern Sector of the Banda Arc, which is responsible for the high seismic activity on the mainland of Seram Island (Hall et al., 2017; Patria & Hall, 2017). A study by Baskara et al. (2023) explicitly categorizes the earthquakes of 1674, 1708, 1899, and 1965 as a series of major destructive earthquakes in the North Banda Arc (Baskara et al., 2023). Rahmadani et al. (2022) also identified that the Northern Sector of the Banda Arc exhibits a very high strain accumulation rate (greater than 100 nanostrain/year), with the Seram Trench structure and the Seram Strike Slip Fault serving as the primary sources of seismic hazard (Rahmadani et al., 2022).

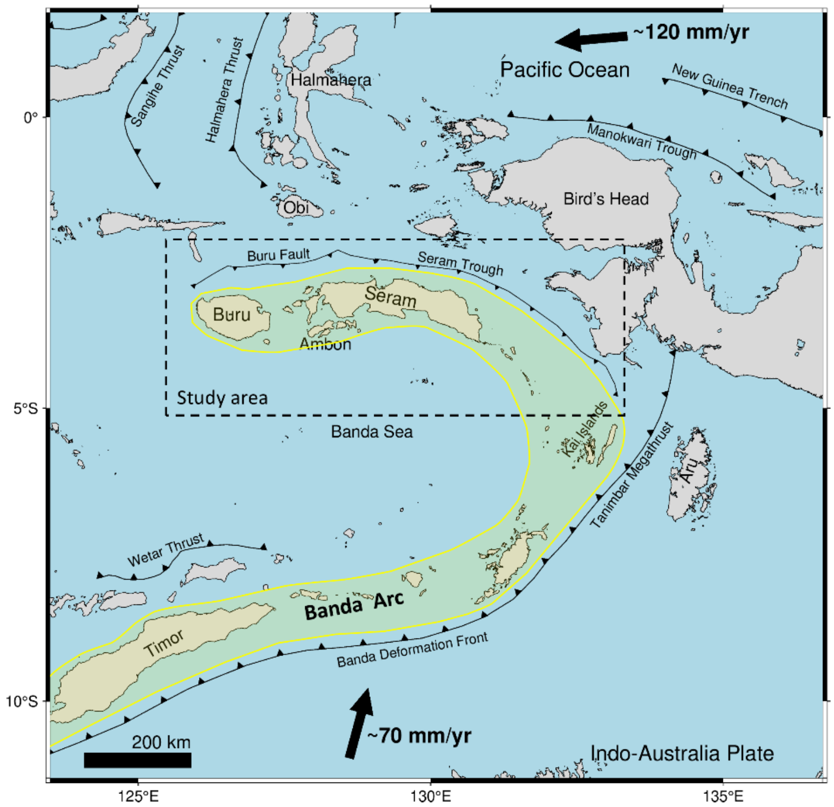


Figure 1. Tectonic plate study area

In evaluating seismic hazard potential, one indicator is characterized by a low *b*-value (less than 1) (Khalqillah & Umar, 2023; Rahayu R & Madrinovella, 2024). The *b*-value reflects the ratio between the frequency of small-magnitude earthquakes and large-magnitude earthquakes (Chang et al., 2025). Mechanically, the *b*-value signifies the degree of subsurface rock brittleness as well as the level of structural heterogeneity (Rahayu R & Madrinovella, 2024; Wiyono et al., 2024). The degree of rock brittleness indicates the rock's capacity to withstand applied stress (pressure). Rocks with high brittleness or those subjected to substantial stress tend to fracture more easily and generate earthquakes. A low *b*-value indicates a high level of stress accumulation (Rahayu R & Madrinovella, 2024). This implies that the rock is in the final stage of sustaining the energy load or at the threshold of reaching its elastic strength, making it highly susceptible to the sudden release of a large amount of energy (Khalqillah & Umar, 2023; Rahayu R & Madrinovella, 2024). Under this condition, the accumulated energy will be released through a large-magnitude earthquake with a relatively low frequency of small-magnitude earthquakes (Rahayu R & Madrinovella, 2024). Conversely, a high *b*-value indicates low stress accumulation, where energy is released more frequently through small-magnitude earthquakes (Khalqillah & Umar, 2023; Rahayu R & Madrinovella, 2024). A temporal decline in the *b*-value signifies a high stress accumulation, which can serve as an indicator of the potential for a large-magnitude earthquake (Chang et al., 2025; Ito & Kaneko, 2023; Khalqillah & Umar, 2023; Li et al., 2021; Rahayu R & Madrinovella, 2024). In a study by Khalqilla & Umar (2023), it was concluded that major earthquakes, such as those in Sumatra, are generally preceded by a significant drop in the b-value (approximately 6 months prior), indicating a high potential for further major shocks (Khalqillah & Umar, 2023). The region surrounding the Northern Sector of the Banda Arc (Buru–Seram) was depicted as a critical stress area (Baskara et al., 2023). This is driven by an exceptionally high strain accumulation rate resulting from pressure exerted from Papua (the Pacific plate) (Baskara et al., 2023; Meilano et al., 2021; Rahmadani et al., 2022). Consequently, rocks beneath the mainland of Seram and Ambon continuously store substantial stress (Baskara et al., 2023; Meilano et al., 2021).

Spatiotemporal b-value analysis provides better seismic risk management when coupled with the geological context of focal mechanisms, which reflect actual structural activity (Baskara et al., 2023; Chang et al., 2025). Although numerous seismic studies have been conducted in the Maluku region, most remain focused on post-earthquake analyses localized within specific areas (Baskara et al., 2023; Meilano et al., 2021; Rohadi et al., 2021). For instance, seismic studies identifying complex faulting, strain accumulation, and focal mechanisms have been conducted by Baskara et al. (2023), Meilano et al. (2021), and Rohadi et al. (2021), yet those remain localized within the Ambon and Seram regions. Analysis of seismic activity from the Buru Strike-Slip Fault to the Seram Trough will provide a continuous overview of deformation along the Northern Sector of the Banda Arc, which is known to have an exceptionally high strain accumulation rate (Anugrah et al., 2025; Hall et al., 2017; Rahmadani et al., 2022). A recent study in the Buru–Seram area conducted by Saputra et al. (2025) provides a foundation regarding stress analysis and fault instability (Saputra et al., 2025). However, the active tectonic conditions and activity in the Northern Sector of the Banda Arc necessitate further observation. This study was conducted by updating the earthquake catalog through March 2026 and analyzing depth-dependent b-values to differentiate stress accumulation within the shallow crust from that in the subduction zone. This study not only maps b-value variations as indicators of rock stress accumulation, but also correlate them with focal mechanisms to understand relative stress release processes across major and minor fault networks. Therefore, this study aims to evaluate the spatiotemporal seismotectonic dynamics in the Northern Sector of the Banda Arc to provide an overview of seismic risk in the Central Maluku region.

2. METHODS

The Data in this study uses the USGS (United States Geological Survey) earthquake catalog, covering the period from 2000 to 2026, with a maximum depth filter of 100 km. The magnitude scales obtained from the catalog consist of local magnitude (M_L), body-wave magnitude (M_b), and moment magnitude (M_w). All magnitude scales were subsequently converted into the M_w scale based on the following empirical conversion formulas for the M_b scale (Wattimanela & Setiawan, 2025) and the M_L scale (Prasetio et al., 2021):

$$M_w = 1.0107M_b + 0.0801$$
$$M_w = 0.91M_L + 0.36$$

Earthquake distribution mapping was conducted to observe the dispersion pattern, and the analysis was subsequently divided into two segments: Seram and Buru. Within both segments, b-value calculations were then performed using the Maximum Likelihood Estimation (MLE) method developed by Aki (1965) (Ito & Kaneko, 2023). This approach was used because it estimates b-values more stably and unbiasedly than the least-squares method (Chang et al., 2025). Mathematically, the b-value is calculated as follows:

$$b = \frac{\log_{10} e}{\bar{M}_w - (M_c - \Delta M/2)}$$

Where M_c represents the magnitude of completeness (the threshold of the observational data), Mw is the average magnitude of all observed data with magnitudes greater than M_c, and $\Delta M = 0.1$ is the magnitude interval. To measure the level of uncertainty for the b-value generated in each calculation, the formulation from Shi and Bolt (1982) (Ito & Kaneko, 2023) was adopted as follows:

$$\sigma_b = 2.30b^2 \sqrt{\frac{\sum_{i=1}^{n}(M_i - \bar{M}_w)^2}{n(n-1)}}$$

Where M_i represents the magnitude of each event, and n is the total number of analyzed earthquakes.

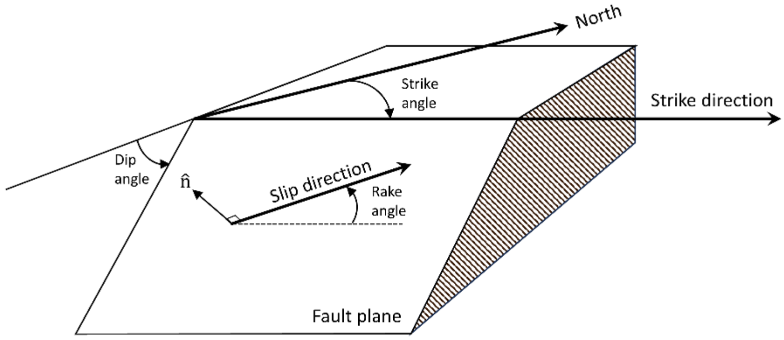


Figure 2. Fault Geometry

The b-value analysis was conducted not only temporally for each observation period and spatially for the Seram and Buru segments, but also vertically by depth to determine rock stress. Furthermore, to evaluate parameters within the study area, a focal mechanism analysis was conducted. This analysis was performed to understand the fault plane orientation and the types of tectonic forces contributing to energy release (earthquakes). The geometric characteristics of the focal mechanism were determined based on three primary fault plane parameters: strike, dip, and rake/slip. The physical definitions and relationships of these three parameters are illustrated in Figure 2. Focal mechanism data in this study were obtained from the USGS and G-CMT (Global Centroid Moment Tensor) catalogs for earthquake events exceeding the magnitude of completeness (M≥Mc).

3. RESULTS AND DISCUSSION

3.1 Central Maluku Seismicity

The earthquake distribution in the Seram segment exhibits significantly higher activity (1,252 earthquakes) than the Buru segment (329 earthquakes). The seismic activity indicates that the rate of stress or energy release in the Seram segment was much more active during the observation period. In the Buru segment, earthquakes were distributed from the fault line to the south of Buru Island. On the other hand, earthquakes in the Seram segment showed no activity along the Seram

Trench line. This demonstrates that the Seram trench is aseismic, as previously described by Patria & Hall (2017). This difference in seismic activity suggests that the Buru Strike Fault and the Seram Trench possess different tectonic mechanisms. To illustrate the stress levels within each fault, b-value analysis of the Northern Sector of the Banda Arc was divided into the Buru and Seram segments using segmentation boundaries, as shown in Figure 3.

The cross-section results for both segments show a similar fault dip direction, which trends toward the south or southwest. The dip direction confirms the main thrust from the Bird's Head region of Papua trends southwestward. Although the dip directions in both segments are similar, they have different tectonic structures, as illustrated by their seismic activity patterns (Figure 3). In the Seram segment, the dip forms a thrust fault system that folds rocks upward (Patria & Hall, 2017). In the Buru segment, this dip constitutes part of a normal fault that forms a seafloor depression (Hall et al., 2017). The AA’s cross-section results in the Buru sector show a relatively uniform hypocenter distribution without a clear southward dip. This indicates that, despite being located within the same arc, seismic activity in the Buru segment is likely influenced by local fault complexities that differ from the subduction system in the Seram segment. To examine this spatial heterogeneity, separate b-value analyses were conducted for each segment (based on the segment boundary in Figure 3).

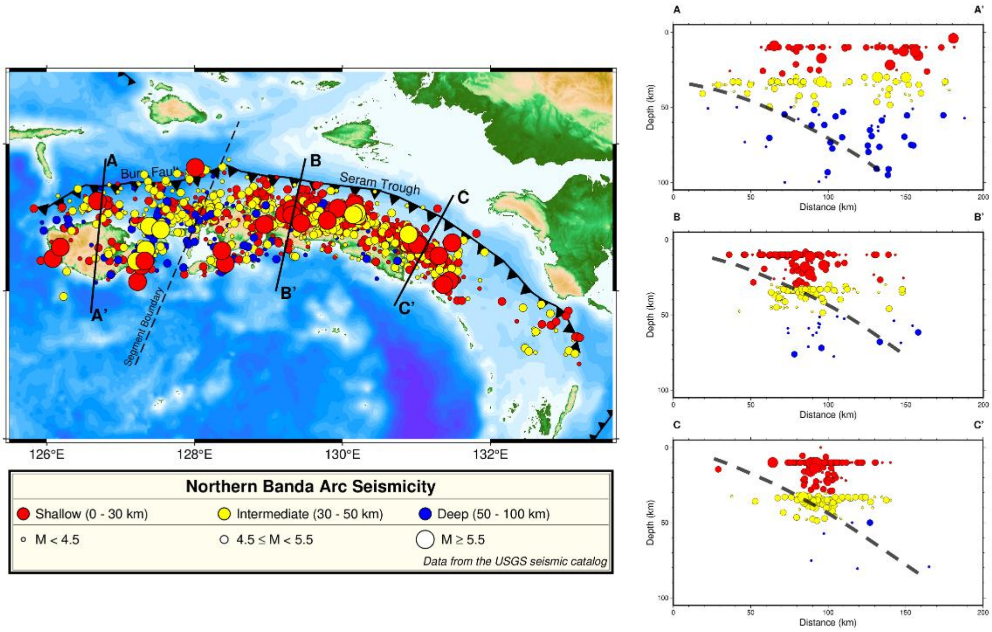


Figure 3. Seismicity map of the Seram region from 2000 to 2025.

3.2 *b*-Value of the Seram and Buru Segments

The b-value analysis was conducted by dividing the Northern Sector of the Banda Arc into the Buru and Seram segments. The *b*-values were calculated based on 100 earthquake events with a magnitude completeness (Mc) of Mw 4.4. These calculations were ordered by earthquake occurrence time and shifted by a window gap of 10 earthquake events for the Buru segment and 20 for the Seram segment. The results of the b-value calculations for both segments are visualized graphically (Figure 4). In the Seram segment, the b-values fluctuated. Between 2005 and 2007, the *b*-value decreased significantly to below 1.0 (the unitary value). During this period, stress buildup occurred, triggering major earthquakes such as the 2006 Tehoru earthquake (Patria et al., 2021; Souisa & Sapulete, 2021), which was a massive energy release with a magnitude of 7.4 Mw. Following the Tehoru earthquake, the increase in the b-value indicated a stress relaxation phase from 2007 to 2010. The dominance of small-magnitude aftershocks statistically influenced the increase in the b-value during this period (Chang et al., 2025). This condition indicates the release of residual energy in the tectonic system of the Seram segment. After the relaxation phase, the b-value again exhibited a decreased trend from 2018 to 2020. This decreasing pattern is a clear precursor indicator before the occurrence of a highly destructive major earthquake, namely the Kairatu earthquake (6.5 Mw) in September 2019 (Patria et al., 2021; Simanjuntak & Ansari, 2024). This downward trend indicates a rock-hardening process that diminished the frequency of small-magnitude earthquakes (Rahayu R & Madrinovella, 2024; Wiyono et al., 2024). Meanwhile, energy within the rock continued to accumulate until the maximum threshold, resulting in a massive release of energy (Rahayu R & Madrinovella, 2024). In the final observation period (2021-2026), the b-value of the Seram segment shows a consistent decrease pattern. Despite seismic activity in Tehoru 2021 (approximately 6.0 Mw) and shallow earthquakes in the South Seram subduction system in 2026, the b-values do not indicate a relaxation or increase phase. This information indicates that these seismic activities were insufficient to release all accumulated stress within the Seram segment. This implies that the Seram segment is currently in a phase of high-stress maturation or a critical condition that requires vigilance for a larger energy release in the future.

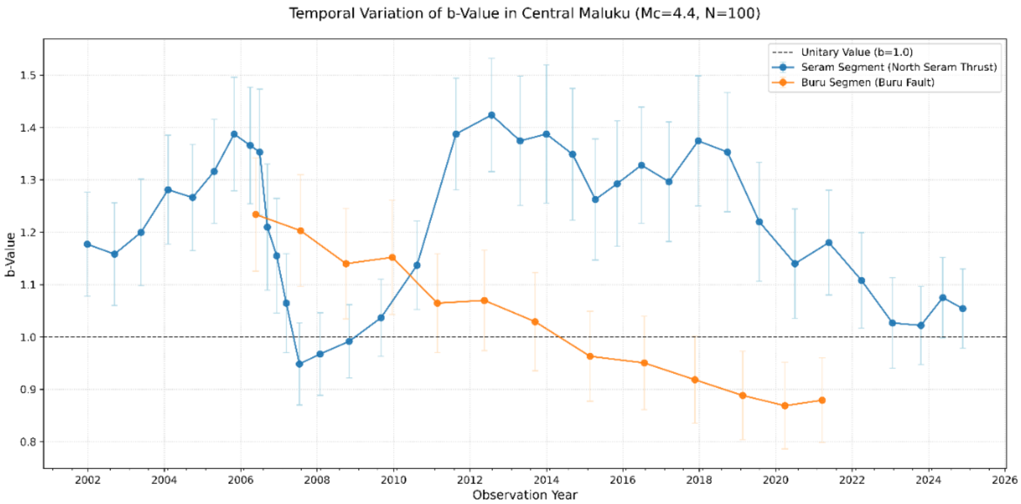


Figure 4. Temporal variation of b-value ($M_c = 4.4,\ N = 100$)

In the Buru segment, the b-value exhibits a consistent downward trend throughout the observation period, as shown in Figure 4. Beginning in 2006, the b-value in the Buru segment continued to decline without experiencing relaxation (an increase in b-value) until reaching its lowest value in the range of 0.87 during the final observation period. Based on data from the earthquake catalog and ESDM (Ministry of Energy and Mineral Resources), the mainland area of Buru Island and the Buru Strike-Slip Fault have not recorded any earthquakes with magnitudes larger than 6.5 Mw or destructive earthquakes (Murjaya et al., 2021; Patria et al., 2021; Yudhicara et al., 2023). This condition indicates that strong and continuous stress locking is occurring within the Buru segment. Statistically, a b-value below 1.0 over a highly extended duration (as observed in the 2014 to 2026 period of the Buru segment in Figure 4) depicts a region heading toward a rock saturation point. This condition will increase the probability of a large-magnitude earthquake occurring in the future.

3.3 Vertical Stratification of b-Values

Vertical stratification analysis, as shown in Figure 5, separates the rock stress mechanisms into shallow (0-35 km) and deep (35-100 km) layers. The b-value calculation results reveal a trend in the shallow layer that is consistently lower in both the Seram and Buru segments. These low values indicate that the shallow layers are undergoing a rock-hardening process that could rupture at any time, triggering a major earthquake (Khalqillah & Umar, 2023; Setiawan et al., 2023). This is demonstrated by historical earthquakes occurring at shallow depths, such as the 2006 Tehoru earthquake (Souisa & Sapulete, 2021). The high b-value (>1.4) in the deep layer indicates more ductile rocks, meaning that any applied stress will be released in the small-magnitude earthquakes (Rahayu R & Madrinovella, 2024; Wiyono et al., 2024). This condition explains why the risk of large-magnitude earthquakes is higher at depths of less than 50 km. The stratification results for the Buru segment show a consistent downward pattern in the b-value, remaining below unitary-value (<1.0). This reaffirms that the Buru segment is currently undergoing high stress locking, thereby increasing the hazard risk of a large-scale earthquake.

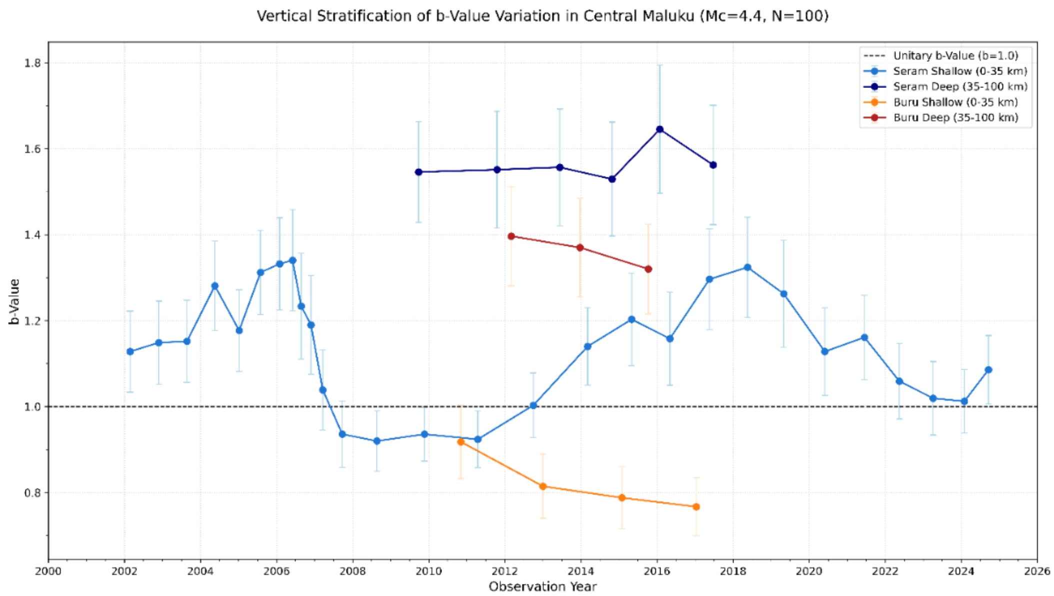


Figure 5. Vertical stratification of b-value variation ($M_c = 4.4, N = 100$)

The Seram segment trend, as shown in Figure 5, shows a pattern of increasing b-values in the deep layers, but decreasing in the shallow layers, and vice versa. This condition explains vertical stress transfer, whereby an earthquake in the deep layers can transfer stress to the shallow layers, or vice versa (Baskara et al., 2023; Souisa & Sapulete, 2021). This phenomenon reflects the subduction mechanism occurring in the Seram segment (Patria & Hall, 2018). The higher b-values in the deep layers indicate internal deformation that releases small-magnitude earthquakes, while rocks in the shallow layers remain locked. The vertical stratification results indicate that earthquake risk in the northern Banda Arc is not evenly distributed vertically. Low b-values are more concentrated at depths of 0-30 km, suggesting that mitigation efforts and risk mapping should focus on potential areas.

3.4 Focal Mechanism of the Northern Banda Arc

The shallow-layer focal mechanisms were analyzed based on earthquake source parameters, as shown in Figure 6 and Table 1. Based on geographic location, fault orientations are grouped into five clusters (A–E). Clusters A and B represent the dynamics of the Buru segment, while clusters C, D, and E represent the dynamics of the Seram segment. In general, the focal mechanisms in the northern sector of the Banda Arc are dominated by thrust faults with slip planes dipping south to southwest (as seen in the dip values in Table 1).

Seismic activity in the Buru segment is dominated by thrust faults (such as the 2018 and 2023 events in cluster A) with relatively steep dips, ranging from 26 to 56°. These characteristics are also reflected in the earthquake mechanisms in cluster B, which occur at deeper depths of 24.9-32.6 km. Based on nodal plane orientations, cluster B indicates the interaction of rigid rocks with low elasticity that continuously undergo stress accumulation (Khalqillah & Umar, 2023; Rahayu R & Madrinovella, 2024). This phenomenon aligns with the b-value in the Buru segment (Buru shallow in Figure 5), which continues to decrease, indicating a relaxation phase. The absence of strike-slip faulting mechanisms in energy release indicates that the fault system of the Buru segment tends to store accumulated stress for an extended period (Anugrah et al., 2025; Rahmadani et al., 2022). This reaffirms the potential risk of large-scale rock rupture (earthquakes) in the future.

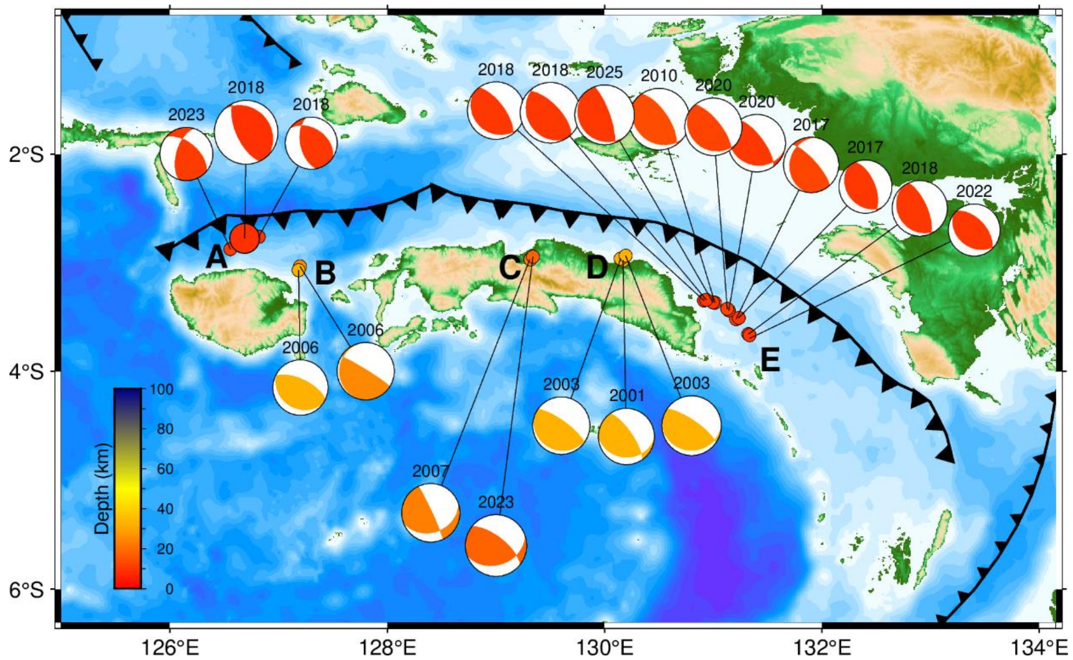
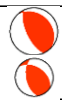
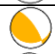


Figure 6. Spatial distribution of earthquake focal mechanisms.

Tabel 1. Earthquake Source Parameters for the Study Area

Cluster	Time Events	Magnitude (Mw)	Depth (km)	Nodal Plane ($strike/dip/rake$)	Fault Types
A	2018-02-26	6.0	9.0	315°/26°/72°	 Thrust Fault
	2018-02-27	4.9	10.0	304°/44°/55°	

	2023-09-28	5.0	11.0	310°/56°/38°		
B	2006-06-22	5.4	24.9	180°/09°/148°		Thrust Fault
	2006-06-24	5.2	32.6	122°/25°/96°		
C	2007-08-30	5.5	23.3	71°/33°/07°		Left-lateral Strike-slip
	2021-11-04	5.8	18.0	72°/37°/40°		Thrust Fault
D	2001-12-05	5.3	33.0	92°/27°/40°		Thrust Fault
	2003-05-21	5.4	33.0	110°/15°/75°		
	2003-06-06	5.6	33.0	90°/18°/57°		
E	2010-11-26	5.8	14.0	128°/24°/74°		Thrust Fault
	2017-05-05	5.0	10.0	141°/30°/76°		
	2017-06-18	5.2	12.8	189°/23°/139°		
	2018-03-08	5.4	10.0	129°/23°/77°		
	2018-03-08	5.7	10.0	149°/24°/102°		
	2018-04-17	5.2	10.0	143°/21°/78°		
	2020-07-30	5.4	10.0	103°/24°/52°		
	2020-11-02	5.4	12.2	123°/20°/73°		
	2022-05-31	4.9	10.0	128°/35°/83°		
	2025-04-20	5.6	10.0	133°/15°/64°		

The Seram segment mechanisms, as displayed in Figure 6 and detailed in Table 1, show a fault stress pattern consistent with the arc geometry and the subduction system of the Seram Trench (Patria & Hall, 2018). Cluster C demonstrates a variety of mechanisms that provide information about the local tectonic complexity of the segment. The presence of a left-lateral strike-slip fault in 2007 (depth of 23.3 km), subsequently followed by a thrust fault in 2021 (depth of 18.0 km), represents this scenario. This indicates that seismotectonics in the Seram segment are not dominated solely by the implications of the Seram Trench, but also by local fault activity, as presented by Daniarsyad (2021) in his study (Daniarsyad et al., 2021). Clusters D and E show strong homogeneity of mechanisms dominated by thrust faults. Cluster E, located in the eastern segment of Seram, exhibits earthquake activity at very shallow depths (10.0–14.0 km) with relatively gentle dip angles (20°–30°). The nodal plane orientation in cluster E shows a pattern consistent with the structural path of the Seram Trench geometry. This strongly confirms that the decline of the *b*-value in the shallow layer of the Seram segment is an implication of thrust fault activity driven by compression from the Bird's Head microplate of Papua (Patria et al., 2021; Rahmadani et al., 2022).

4. CONCLUSIONS

Spatiotemporal analysis of *b*-values and focal mechanism parameters in the Northern Sector of the Banda Arc reveals vertically contrasting seismotectonic dynamics. The shallow layer (0–35 km) serves as the primary zone of stress accumulation (*b*-value < 1.0) due to the rigid and inelastic nature of the rocks. In contrast, the deep layer (35–100 km) is in a more stable relaxation phase (*b*-value > 1.4) due to increased rock plasticity. Focal mechanism analysis confirms that stress accumulation in the shallow zone is triggered by a Northeast–Southwest compressive force resulting from the movement of the Bird's Head microplate of Papua. In the Seram segment, this stress is periodically released through a combination of thrust faults and local strike-slip faults, causing dynamic b-value fluctuations after major earthquakes. Meanwhile, the Buru segment is in a critical condition with a consistent decrease in *b*-value to ~0.87 without relaxation, indicating a high probability of a large-magnitude energy release in the future. The results of this study provide recommendations for enhanced periodic seismic monitoring and strengthening both structural and non-structural disaster mitigation programs in Central Maluku, particularly Buru Island.

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