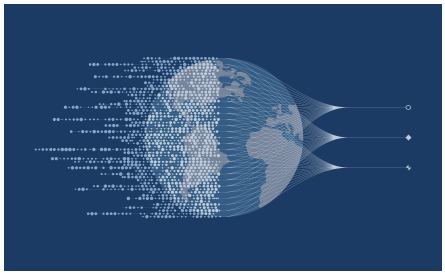

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Analysis of the Gutenberg-Richter Law Using CTBTO SEB Data for the Americas Region

Thursday 11 September 2025 11:00 (1 hour)

This study evaluates seismic activity in the Americas region over the past five years using data from the Seismic Event Bulletin (SEB) of the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO). By applying the Gutenberg-Richter law, key seismic parameters (a and b) are calculated to estimate recurrence intervals and maximum expected magnitudes for localized subregions. Using magnitude intervals of 0.5, the analysis refines the characterization of seismic activity. Statistical regression is employed to determine a and b values, enabling projections of maximum magnitudes and their probable occurrence times. Results reveal significant variations in a and b across tectonically diverse subregions, highlighting the heterogeneous nature of seismic activity in the Americas. This research demonstrates the effectiveness of the CTBTO SEB dataset for high-resolution seismic analysis and underscores its potential for enhancing regional seismic hazard assessments. The findings provide a fresh perspective on risk management and urban planning strategies in earthquake-prone areas, offering critical insights for disaster preparedness and resilience.

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