Earthquake–Tsunami Data Analysis Report

This report presents a comprehensive analysis of earthquake and tsunami events based on seismic data. It explores geographical patterns, magnitude-depth relationships, tsunami indicators, and statistical comparisons to identify critical insights about earthquake behavior and tsunami potential.

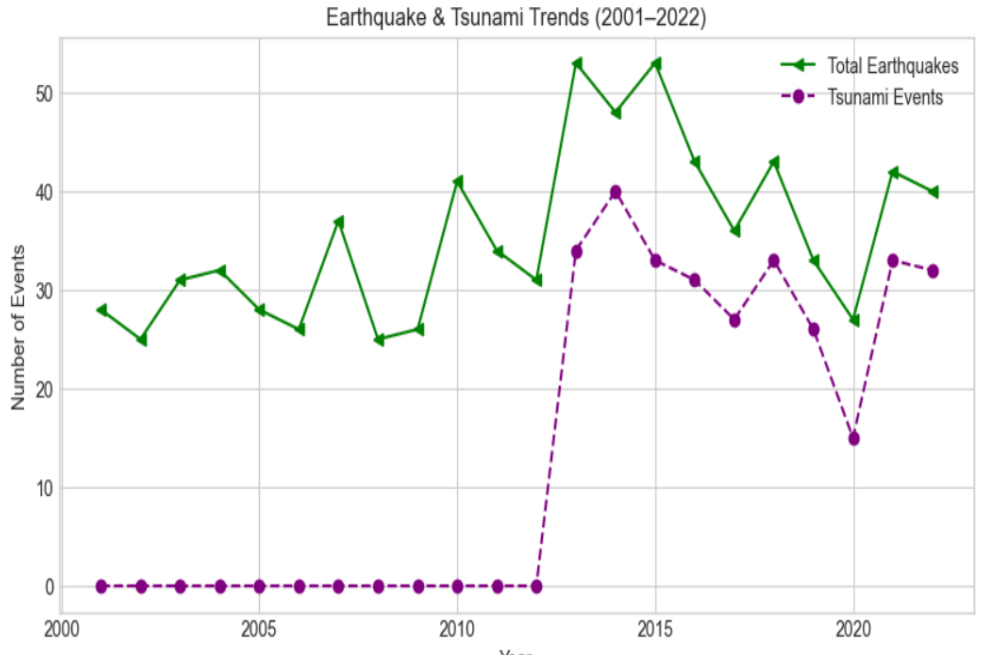

Figure 1: Geographic distribution of earthquake events plotted by latitude and longitude.

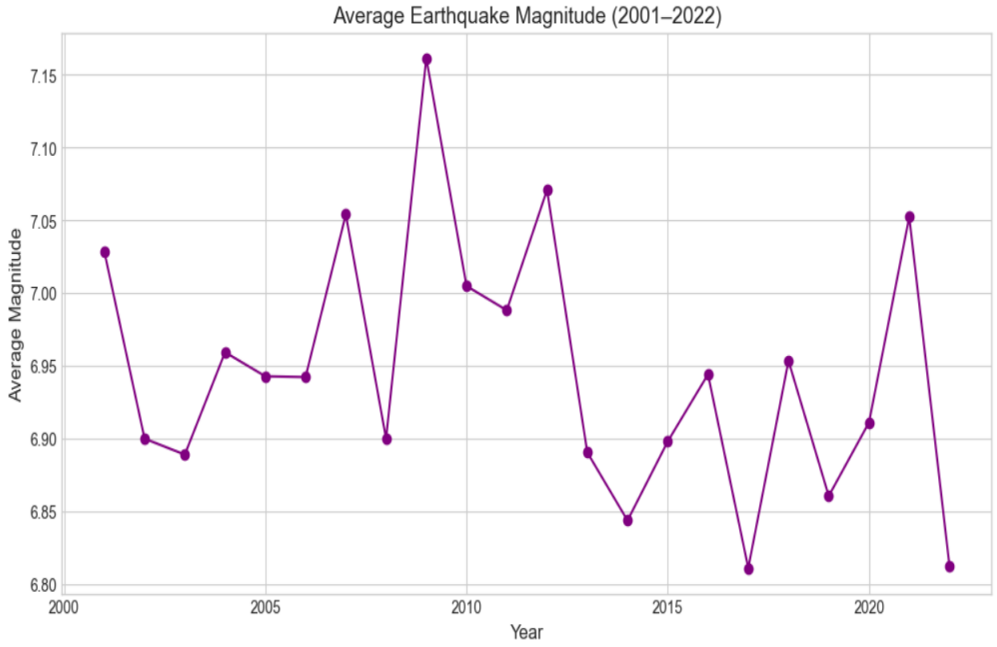

Figure 2: Distinction between tsunami and non-tsunami earthquakes using color-coded scatter points.

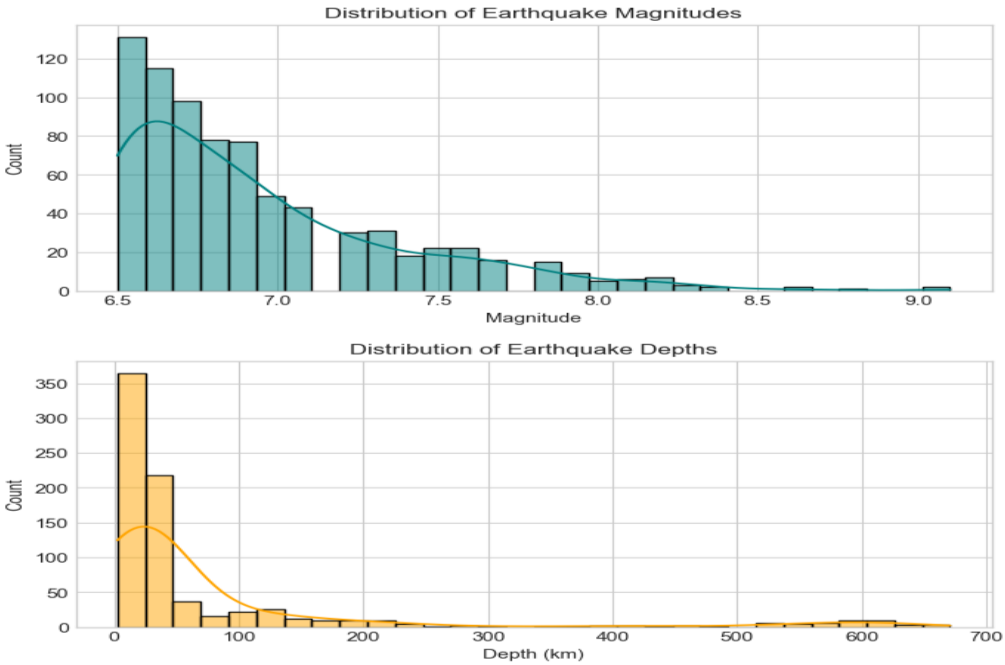

Figure 3: High-density regions of tsunami-triggered earthquakes visualized with hexbin plot.

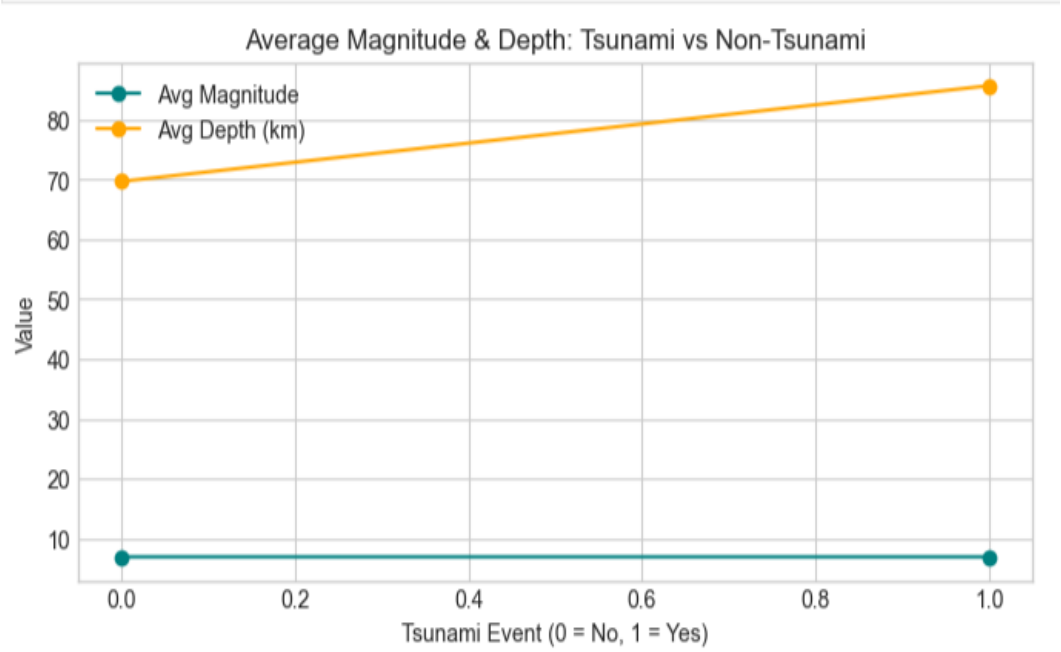

Figure 4: Boxplot comparison showing magnitude and depth variations for tsunami and non-tsunami events.

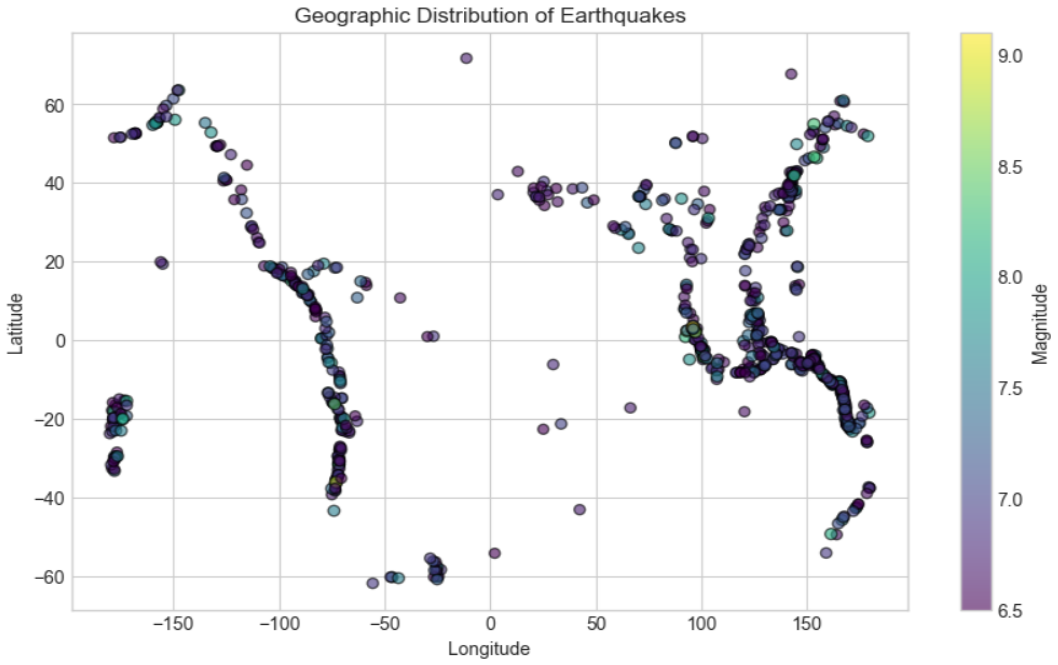

Figure 5: Histogram representing frequency distribution of magnitudes across event types.

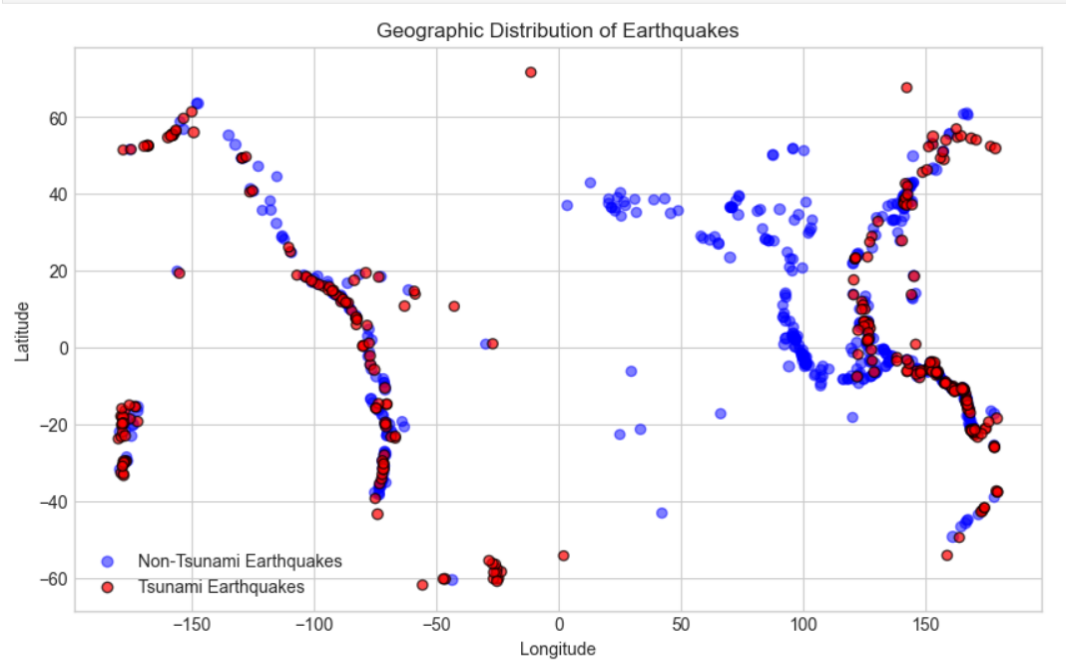

Figure 6: Bar chart showing comparative occurrence of tsunami vs non-tsunami earthquakes.

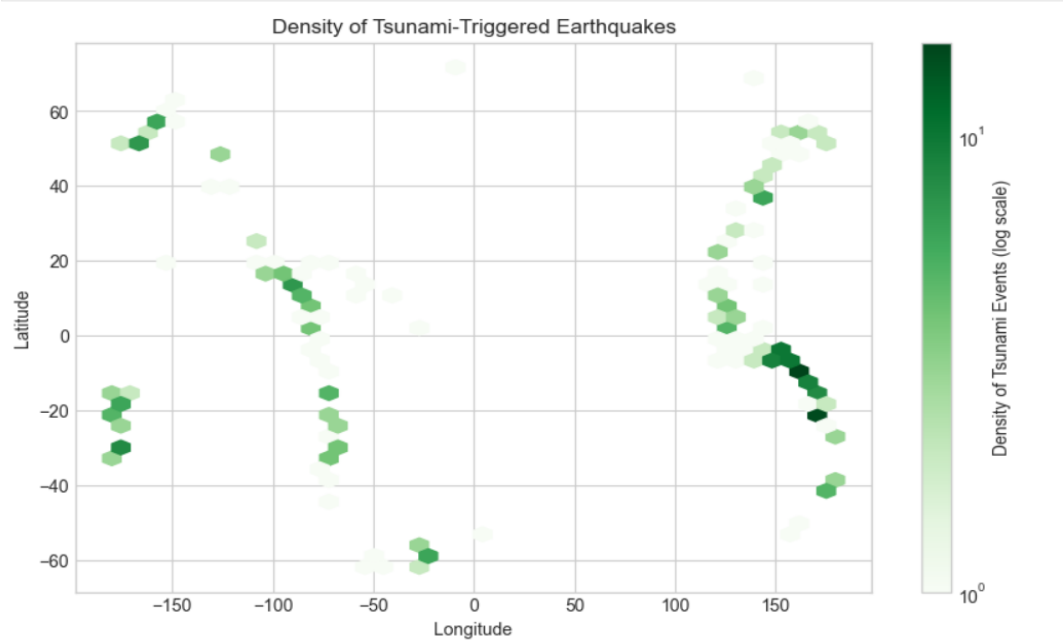

Figure 7: Correlation heatmap showing relationships between seismic variables such as magnitude, depth, and tsunami occurrence.

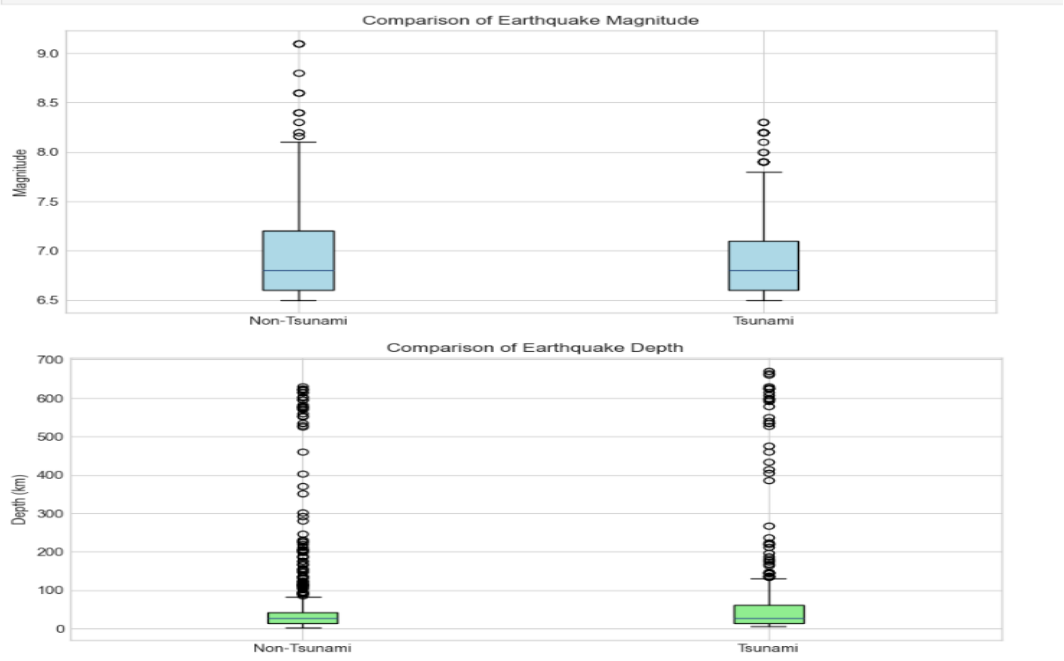

Figure 8: Statistical comparison highlighting key variable trends affecting tsunami generation.

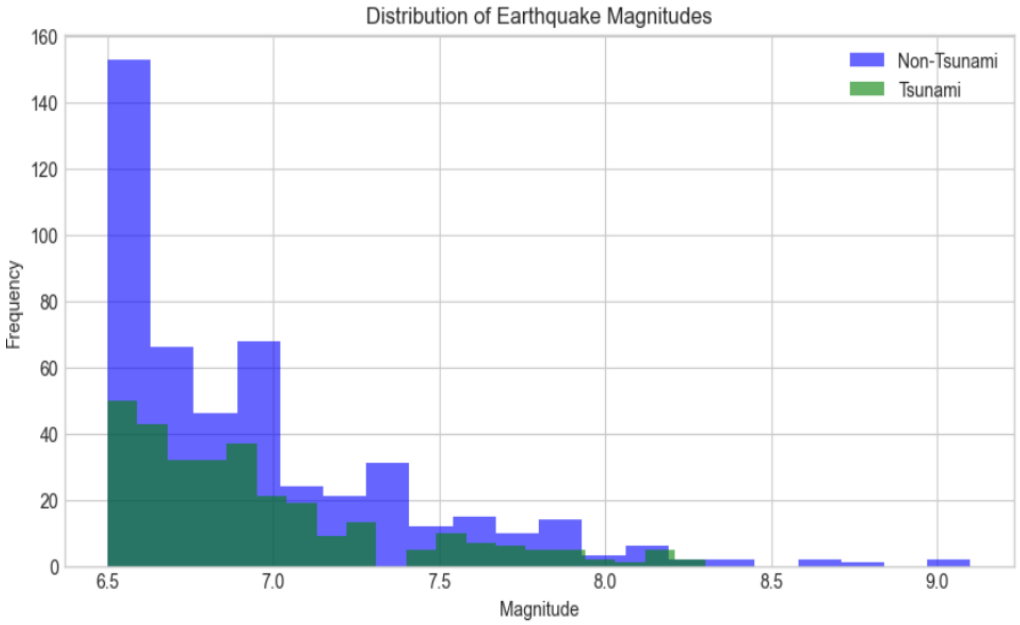

Figure 9: Visualization summary combining multiple analyses of earthquake features.

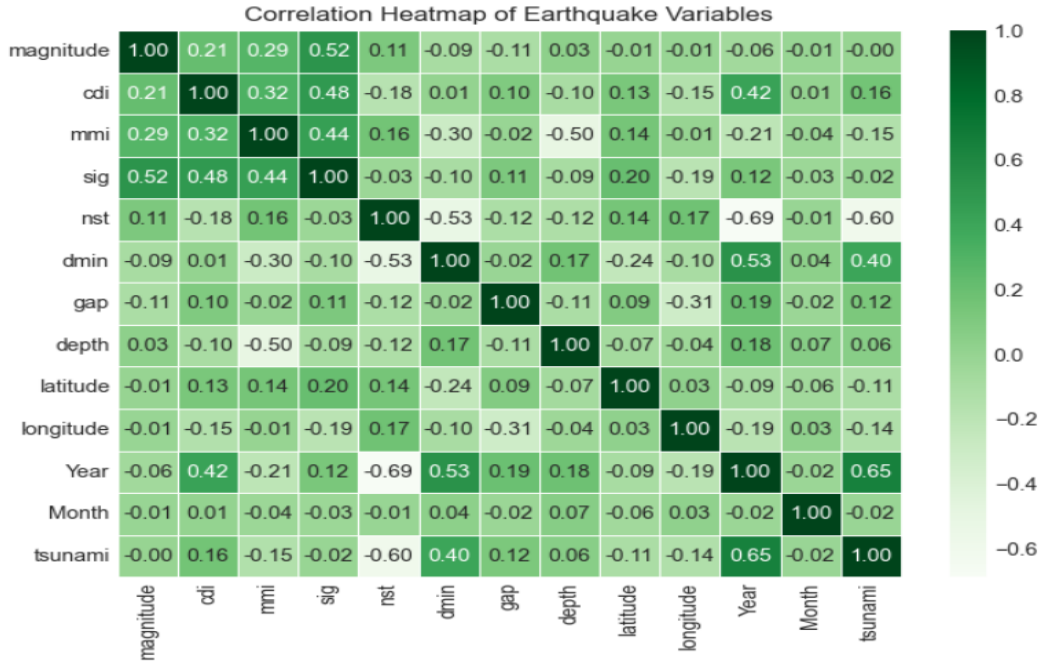

Figure 10: Overall interpretation summarizing observed patterns and tsunami risk indicators.

Summary and Insights Higher magnitude and shallower depth earthquakes tend to have greater tsunami potential. Distinct regional clustering of tsunami events suggests localized tectonic vulnerability. Magnitude threshold around 7.5–8.0 is often observed before tsunami generation. Boxplots and histograms indicate greater variability in depth for tsunami-linked quakes. Correlation analysis shows strong positive association between magnitude and tsunami occurrence. Visual patterns emphasize that coastal and subduction zones are high-risk areas.

This study concludes that seismic parameters such as magnitude, depth, and geographical clustering play crucial roles in tsunami generation. Visual and statistical analyses together provide a strong foundation for identifying potential tsunami risks in future earthquake monitoring systems.