Earthquake Data Analysis Report

This report presents a detailed analysis of earthquake data from 2001 to 2022, focusing on the comparison between tsunami and non-tsunami events. The analysis includes time-based trends, magnitude-depth relationships, and statistical comparisons.

1. Time-Based Analysis:

- Earthquake frequency fluctuates yearly.
- Tsunami events occur less frequently but follow similar peaks as total earthquakes.
- Activity has slightly increased after 2010, possibly due to improved detection.

2. Magnitude and Depth Analysis:

- Most earthquakes have magnitudes between 6.5 and 7.5.
- Shallow earthquakes (less than 100 km) are more frequent and likely to cause damage.
- Tsunami-generating earthquakes are generally strong (magnitude 7.0 or higher) and shallow.

3. Geographic Distribution:

- Earthquakes are concentrated along the Pacific Ring of Fire.
- Tsunami events cluster around Indonesia, Japan, and South America.

4. Statistical & Comparative Analysis:

- Tsunami earthquakes show higher magnitude and significance but lower depth.
- Non-tsunami earthquakes occur across wider depth ranges.
- Significance (sig) scores are higher for tsunami-related quakes, reflecting their greater impact.

5. Key Insights:

- Shallow, high-magnitude quakes near coastal regions are most likely to cause tsunamis.
- Deep-focus quakes, though strong, do not disturb the seafloor enough to generate tsunamis.
- The correlation between shallow depth, large magnitude, and tsunami generation is evident.

This analysis confirms fundamental geophysical principles and provides a statistical overview useful for seismic hazard assessment.