**SQL Queries & Analysis**

**1. Annual Earthquake Count**

*Query*: How many earthquakes occur annually, and what trends can be observed over the years?

SELECT EXTRACT(year FROM Datetime) AS yr, COUNT(ID) AS quake\_count

FROM `earthquake.earthquakes`

GROUP BY yr

ORDER BY yr;

**2. Year with Highest Number of Significant Earthquakes**

*Query*: Which year experienced the highest number of significant earthquakes (magnitude greater than 7)?

SELECT EXTRACT(year FROM Datetime) AS yr, COUNT(ID) AS major\_quake\_count

FROM `earthquake.earthquakes`

WHERE Magnitude > 7

GROUP BY yr

ORDER BY major\_quake\_count DESC

LIMIT 1;

**3. Maximum and Average Magnitude per Year**

*Query*: What are the maximum and average magnitudes of earthquakes recorded annually?

SELECT EXTRACT(year FROM Datetime) AS year, MAX(Magnitude) AS Max\_magnitude,

ROUND(AVG(Magnitude), 2) AS average

FROM `earthquake.earthquakes`

GROUP BY year

ORDER BY year;

**4. Monthly Earthquake Distribution**

*Query*: How are earthquakes distributed across different months, and which month experiences the most activity?

SELECT EXTRACT(month FROM Datetime) AS month, COUNT(ID) AS count\_quake

FROM `earthquake.earthquakes`

GROUP BY month

ORDER BY month;

**5. Earthquake Frequency by Day of the Week**

*Query*: Which day of the week has the highest frequency of earthquakes?

SELECT EXTRACT(DAYOFWEEK FROM Datetime) AS DAYOFWEEK, COUNT(ID) AS count\_quakes

FROM `earthquake.earthquakes`

GROUP BY DAYOFWEEK

ORDER BY count\_quakes DESC;

**6. Earthquake Frequency by Hour of the Day**

*Query*: During which hours of the day do earthquakes mostly occur?

SELECT EXTRACT(HOUR FROM Datetime) AS hour, COUNT(ID) AS quake\_count

FROM `earthquake.earthquakes`

GROUP BY hour

ORDER BY quake\_count DESC;

**7. Earthquake Frequency by Month and Year**

*Query*: How does the frequency of earthquakes vary across different months of each year?

SELECT FORMAT\_DATE('%Y-%m', Datetime) AS monthwiseyear, COUNT(ID) AS quake\_count

FROM `earthquake.earthquakes`

GROUP BY monthwiseyear

ORDER BY quake\_count;

**8. Quarterly Earthquake Patterns**

*Query*: What is the quarterly pattern of earthquake activity?

SELECT EXTRACT(YEAR FROM Datetime) AS year, qtr, COUNT(ID) AS quake\_count

FROM (SELECT \*,

CASE WHEN EXTRACT(month FROM Datetime) BETWEEN 1 AND 4 THEN 1

WHEN EXTRACT(month FROM Datetime) BETWEEN 5 AND 8 THEN 2

WHEN EXTRACT(month FROM Datetime) BETWEEN 9 AND 12 THEN 3

END AS qtr

FROM `earthquake.earthquakes`) t1

GROUP BY year, qtr

ORDER BY year, qtr;

**9. Earthquakes this Month**

*Query*: How many earthquakes have occurred so far this month?

SELECT COUNT(ID) AS QUAKES

FROM `earthquake.earthquakes`

WHERE EXTRACT(year FROM Datetime) = EXTRACT(year FROM CURRENT\_DATE())

AND EXTRACT(month FROM Datetime) = EXTRACT(month FROM CURRENT\_DATE());

**10. Earthquakes in the Last 90 Days**

*Query*: How many earthquakes have been recorded in the past 90 days? What was the average depth and magnitude?

SELECT COUNT(ID) AS count\_quakes, ROUND(AVG(Depth), 2) AS avg\_depth,

ROUND(AVG(Magnitude), 2) AS avg\_magnitude

FROM `earthquake.earthquakes`

WHERE Date >= DATE\_SUB(PARSE\_DATE('%Y-%m-%d', '2016-12-31'), INTERVAL 90 DAY);

**11. Average Interval Between Significant Earthquakes**

*Query*: What is the average interval of days between significant earthquakes (magnitude 7 or higher)?

SELECT ROUND(AVG(date\_bw), 2) AS avg\_interval

FROM (SELECT Date,

DATE\_DIFF(Datetime, LAG(Datetime) OVER(ORDER BY Date), DAY) AS date\_bw

FROM `earthquake.earthquakes`

WHERE Magnitude >= 7) t1;

**12. Days Since Last Major Earthquake**

*Query*: How many days have elapsed since the most recent earthquake with a magnitude of 7 or higher?

SELECT DATE\_DIFF(PARSE\_DATE('%Y-%m-%d', '2016-12-31'), MAX(Date), DAY) AS max\_date\_since\_quake

FROM `earthquake.earthquakes`

WHERE Magnitude > 7;

**Insights:**

* Long-Term Trends: Tracking earthquake trends over time provides insights into potential future seismic events and informs disaster preparedness strategies.
* Seismic Intensity: Evaluating the intensity of seismic activity helps in risk assessment and infrastructure development.
* Patterns & Predictive Models: Identifying patterns improves the accuracy of predictive models, enhancing early warning systems.
* Current Activity: Monitoring recent seismic activity ensures up-to-date situational awareness.