METADATA

1. Data Source

This data is downloaded from USGS earthquake hazards website. The data is stored in 'csv' format in file named 'all_month.csv'. This snapshot of dynamic earthquake data was captured on 26th February 2020 at 09:04 UTC

The Data Columns are as follows:

- time
- latitude
- longitude
- depth
- mag
- magType
- nst
- gap
- dmin
- rms
- net
- id
- updated
- place
- type
- locationSource
- magSource
- horizontalError
- depthError
- magError
- magNst
- status

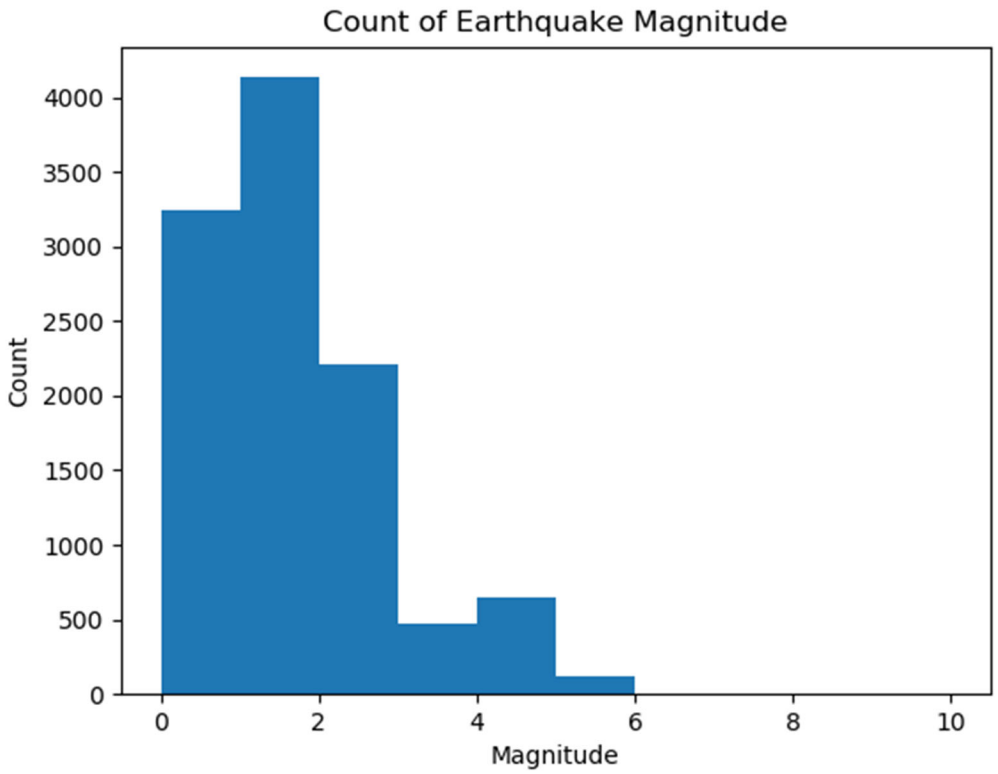
More details can be found at: https://earthquake.usgs.gov/earthquakes/feed/v1.0/csv.php

2. Data Analysis

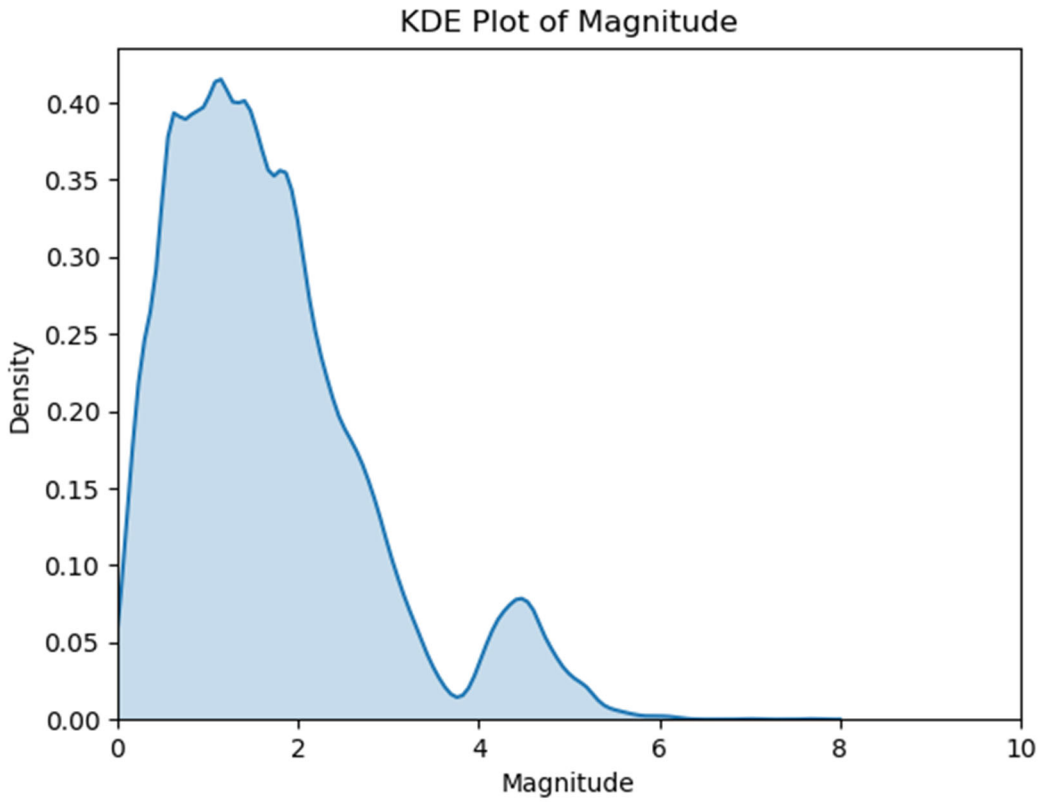
Python script (program_07.py) is used to process the data. Graphical Analysis is performed with the following methods:

- Histogram of Earthquake Magnitude with bin width of 1 and bins from 0 to 10
- KDE plot of Earthquake Magnitude with Gaussian kernel width=0.1
- Earthquake coordinates on a map
- Normalized Cumulative Density Function of Earthquake Hypocenter
- Scatter plot of Magnitude and Depth
- QQ-plot of Earthquake Magnitude

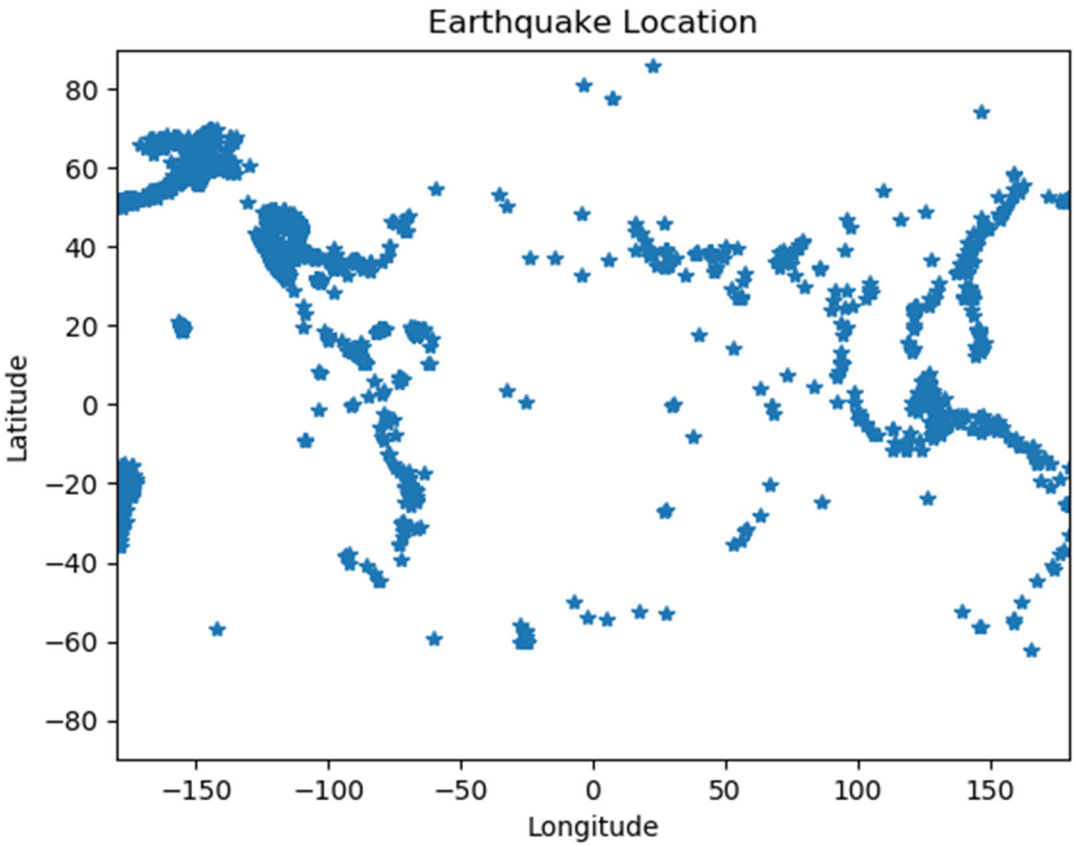
3. Analysis Results



Graph 1: Histogram of Earthquake Magnitude with bin width of 1 and bins from 0 to 10. Distribution of data is highly dependent on both number of bins and size of each bin. More accurate form of representing data is with a greater number of bins and smaller bin width. Though such accuracy might not be required in all cases. This graph shows that lower magnitude earthquakes are more likely.



Graph 2: KDE plot of Earthquake Magnitude with Gaussian kernel width=0.1 Compared to the histogram, KDE better represents the magnitude of earthquakes relative to each other with higher granularity. Higher the density, more likely the earthquake to occur.



Graph 3: Earthquake coordinates on a map. They are more likely to occur in Ring of Fire Left and Right quarter of the plot. We can clearly see how closely it relates to fig 1. Longitudes run horizontally hence they are on x-axis while latitudes run vertical so they are on y-axis

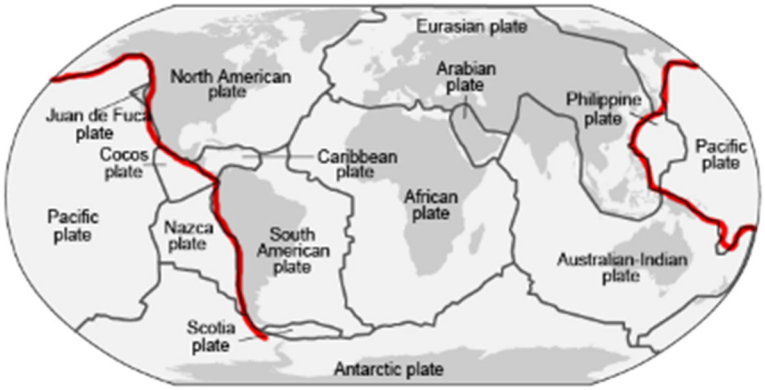
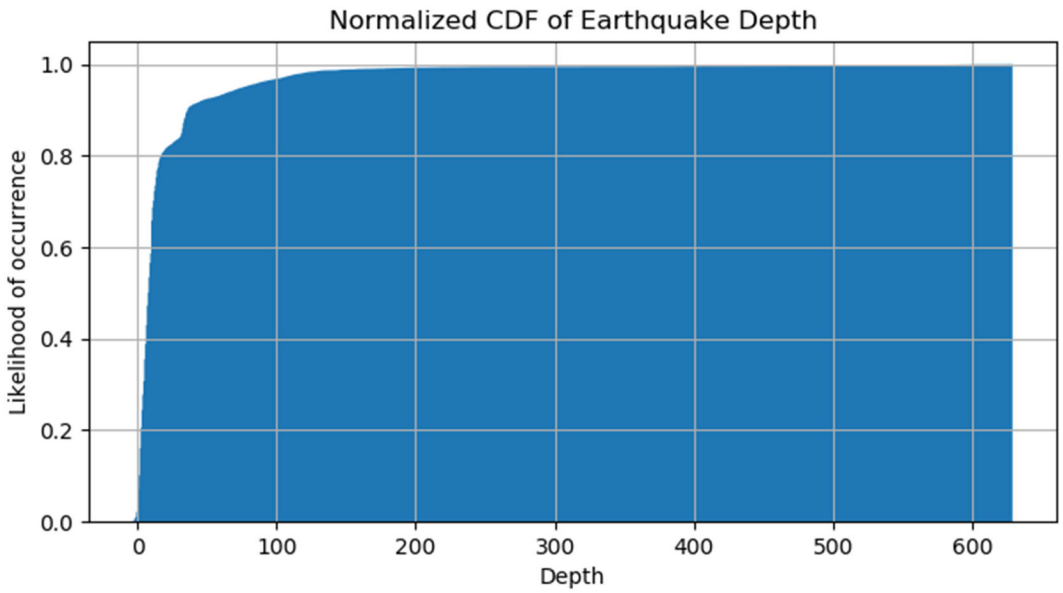
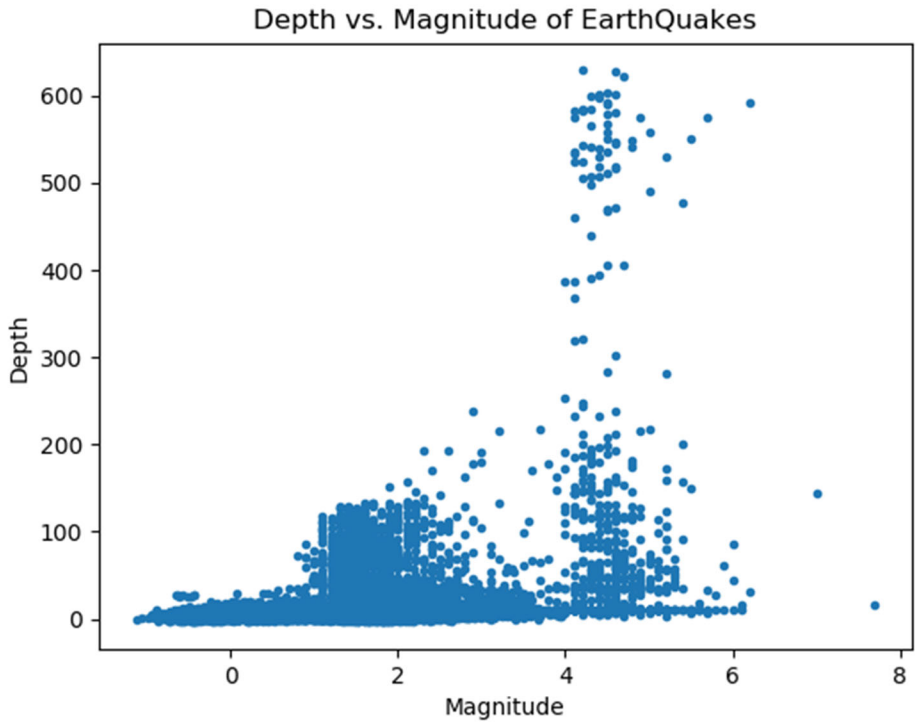


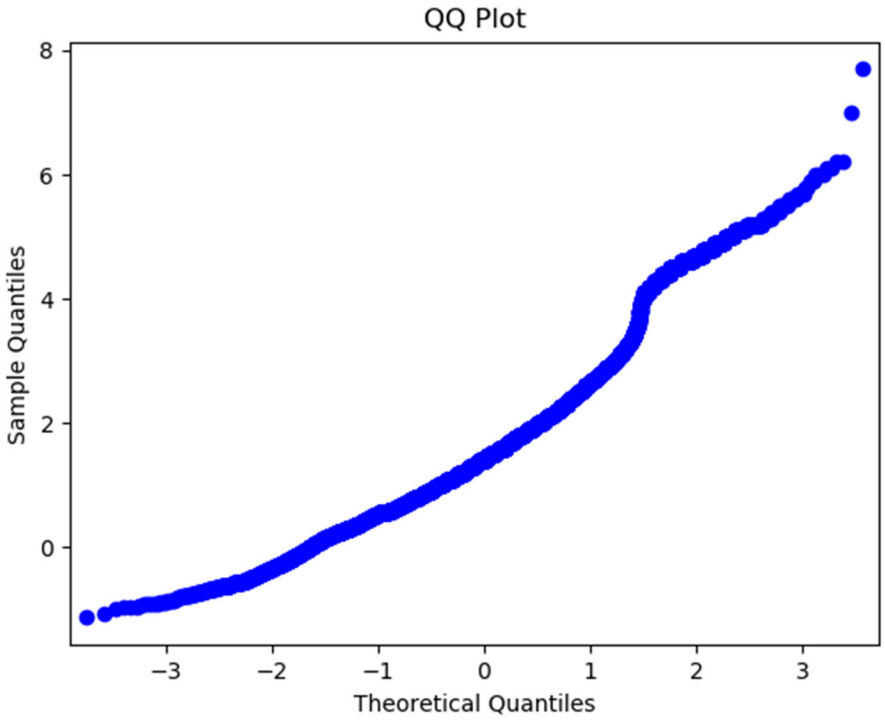
Figure 1: Ring of Fire



Graph 4: Normalized Cumulative Density Function of Earthquake Hypocenter. The graph shows that most earthquakes originate from a depth of 200



Graph 5: Scatter plot of Magnitude and Depth. Less intensity earthquakes originate from depths of around 200 while higher intensity earthquakes can occur from depths of 600



Graph 6: QQ-plot of Earthquake Magnitude. QQ plot helps us check the assumption of normality of data. For our case, based on the QQ plot, data passes the normality test