

This file was created from data gathered from USGS data posted on their online site found at <https://earthquake.usgs.gov/earthquakes/feed/> . The data was collected for all earthquakes and was collected on Mar. 7, 2020 at 1:16 PM.

The data was received as a csv file and transferred via a python script into the following figures and analysis. The data has NA portions within it which are removed in the analysis.

The data was transformed from comma separated into a 2D framework using `pandas.readtable` rather than `genfromtxt()`. This was due to the fact that different data types were present in the original data file. As such, `genfromtxt()` could not parse the data and `pandas.readtable` was used in its place. This transformation was preferable as the data was in usable column row format which could be taken advantage of later in the analysis.

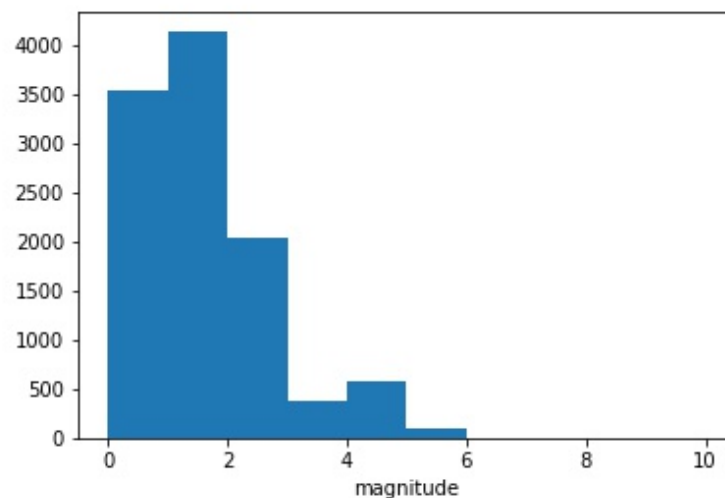


Figure 1: Histogram of earthquake magnitude.

The bin size of the histogram drastically affects the resolution of the plot and how the data is visualized. This plot shows the data set to be left skewed however if finer bin sizing is allowed then the plot can show a slight double peak that is left biased. For this plot a range of 0 – 10 is not necessary as there are no data points beyond 7.

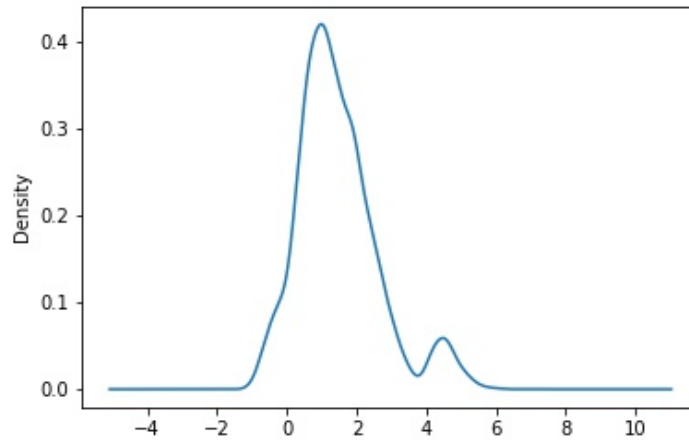


Figure 2: KDE of magnitude

This plot uses Scott's rule to determine the bin width of the plot. Scott's rule can be summarized as  $n^{-(1/(d+4))}$  where  $n$  is the number of data points and  $d$  is the number of dimensions. It uses Gaussian kernels.

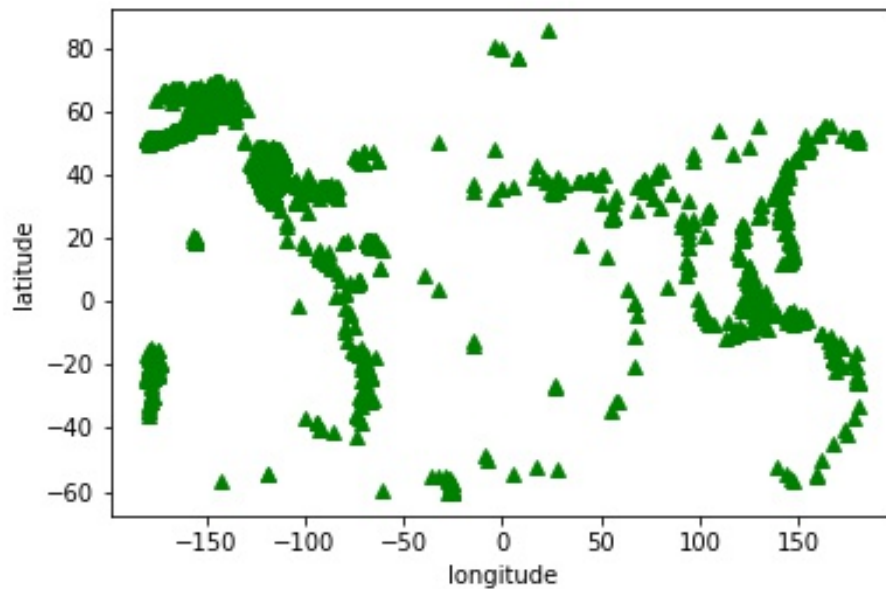


Figure 3: latitude vs longitude of earthquake location.

With the points shown above the rough geographical layout of the earth can be seen especially along large fault lines such as in California. There are surprisingly few points in the Pacific or Atlantic however this is most likely due to earthquakes in those locations going unnoticed.

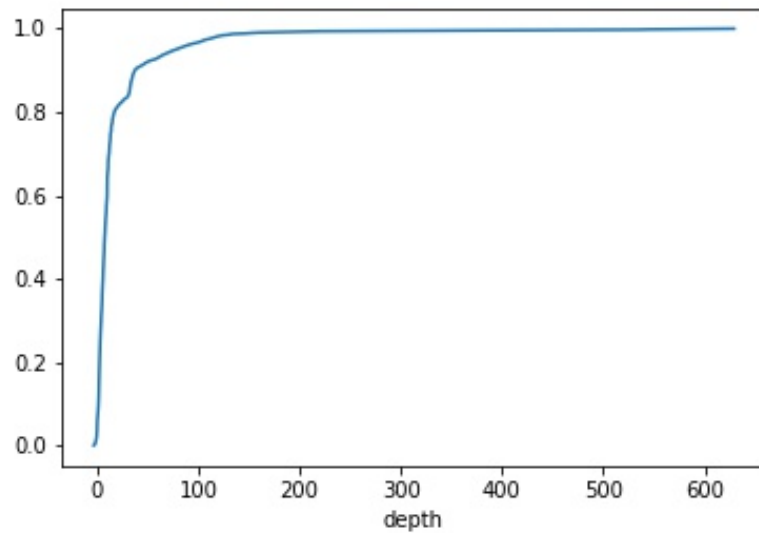


Figure 4: Normalized cumulative distribution plot of earthquake depths

This plot shows that the strong majority of earthquakes occur at a depth of less than 100 feet with extremely few earthquakes occurring at greater depths.

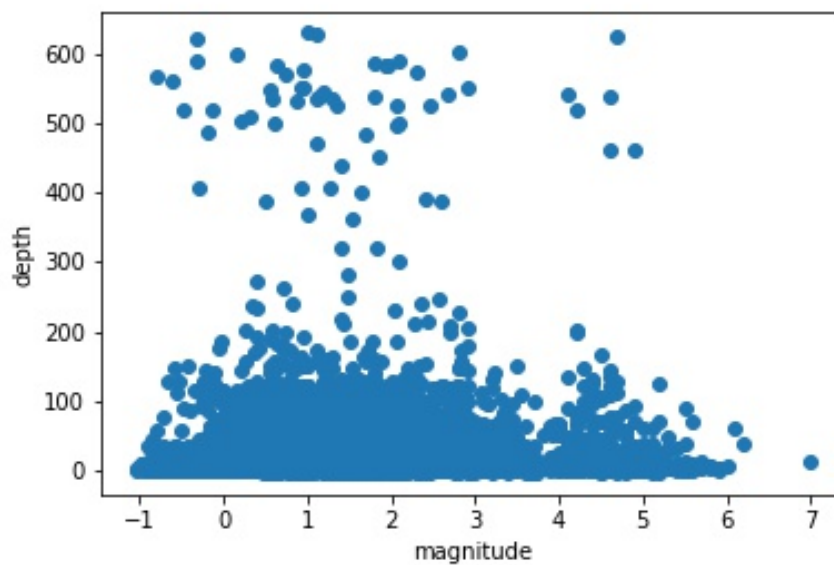


Figure 5: Earthquake depth vs magnitude

From the data shown above, it can be stated that the majority of earthquakes occur at a more shallow depth while fewer occur at deeper depths.

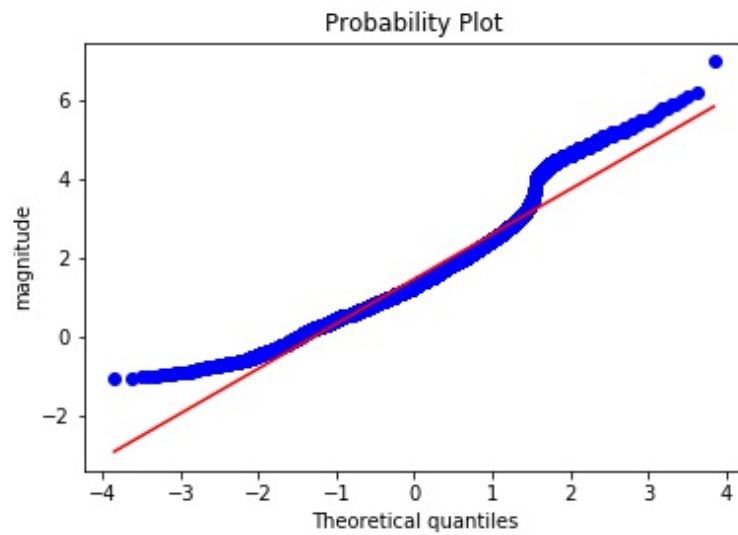


Figure 6: Q-Q plot of earthquake magnitude

This plot assumes normalcy of the data. Based on the image and the fact that the data does not deviate largely from the shape of a line then it can be stated that the data does comply with that distribution.