UNIVERSITY OF SAN FRANCISCO

CS 686: Data Visualization

Earthquake Analytics

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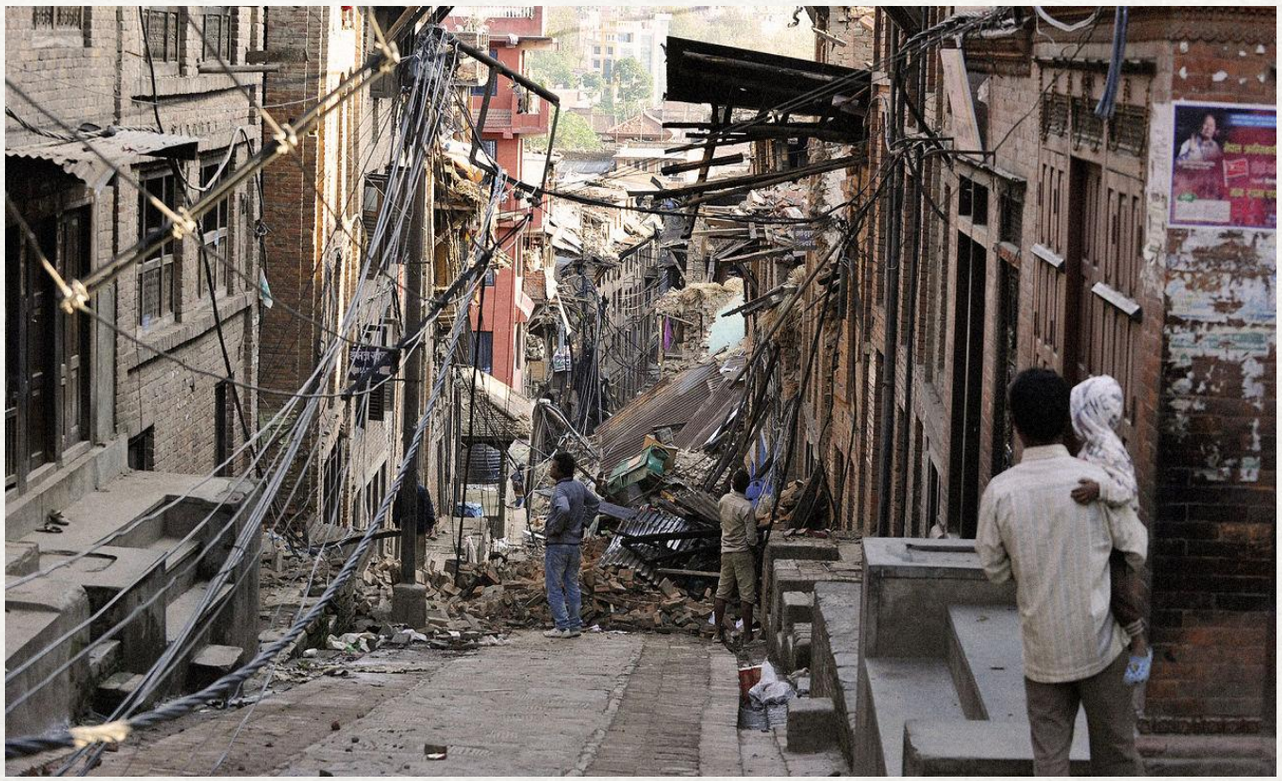
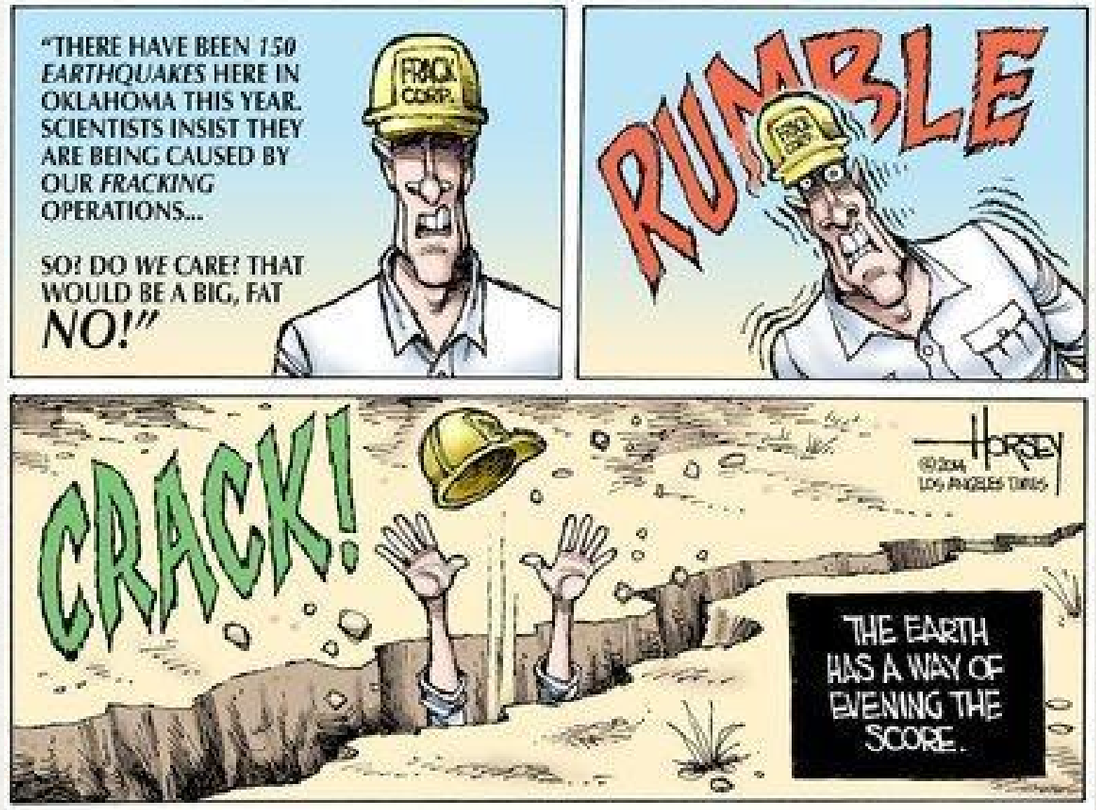
Project Link:
https://comefar.github.io/Earthquake-Analytics/EarthquakeOverview.html

Background and Motivation

- Earthquake can cause building damage, fires, tsunami. Many people lost their home, got injury, even lost their life by earthquakes.
- Relationship between human activities and earthquake happening
- Earthquake is very difficult to predict by the recently technologies.





Project Objectives

- We plan to build a Data Visualization on earthquakes to improve earthquake monitoring and help people understand earthquake easier and more efficient.

- In the same time, our visualization will show the relationship between earthquake and fracking. It will help scientists to find out the relationship between human activities and earthquake happening.

Data Processing

Data

- Earthquake data from United States Geological Survey's (USGS) Earthquake Hazards Program website. http://earthquake.usgs.gov/earthquakes/feed/v1.0/csv.php

- Fracking data, we got from fracking data org. http://frackingdata.org/fracfocus-data/

Data Processing

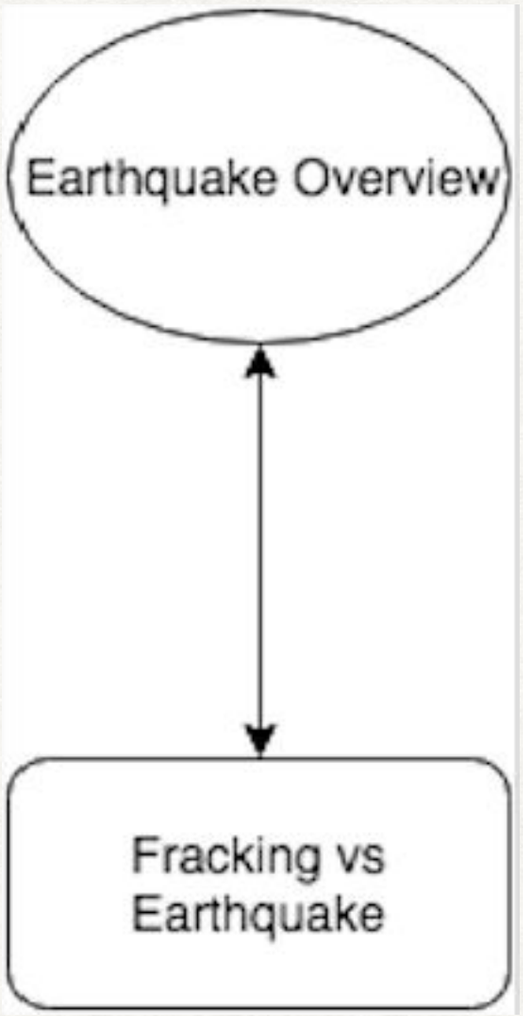
We use the more significant earthquakes happened in the a month whose magnitudes are larger than 2.5. We also use python script to cleaning and filtering data.

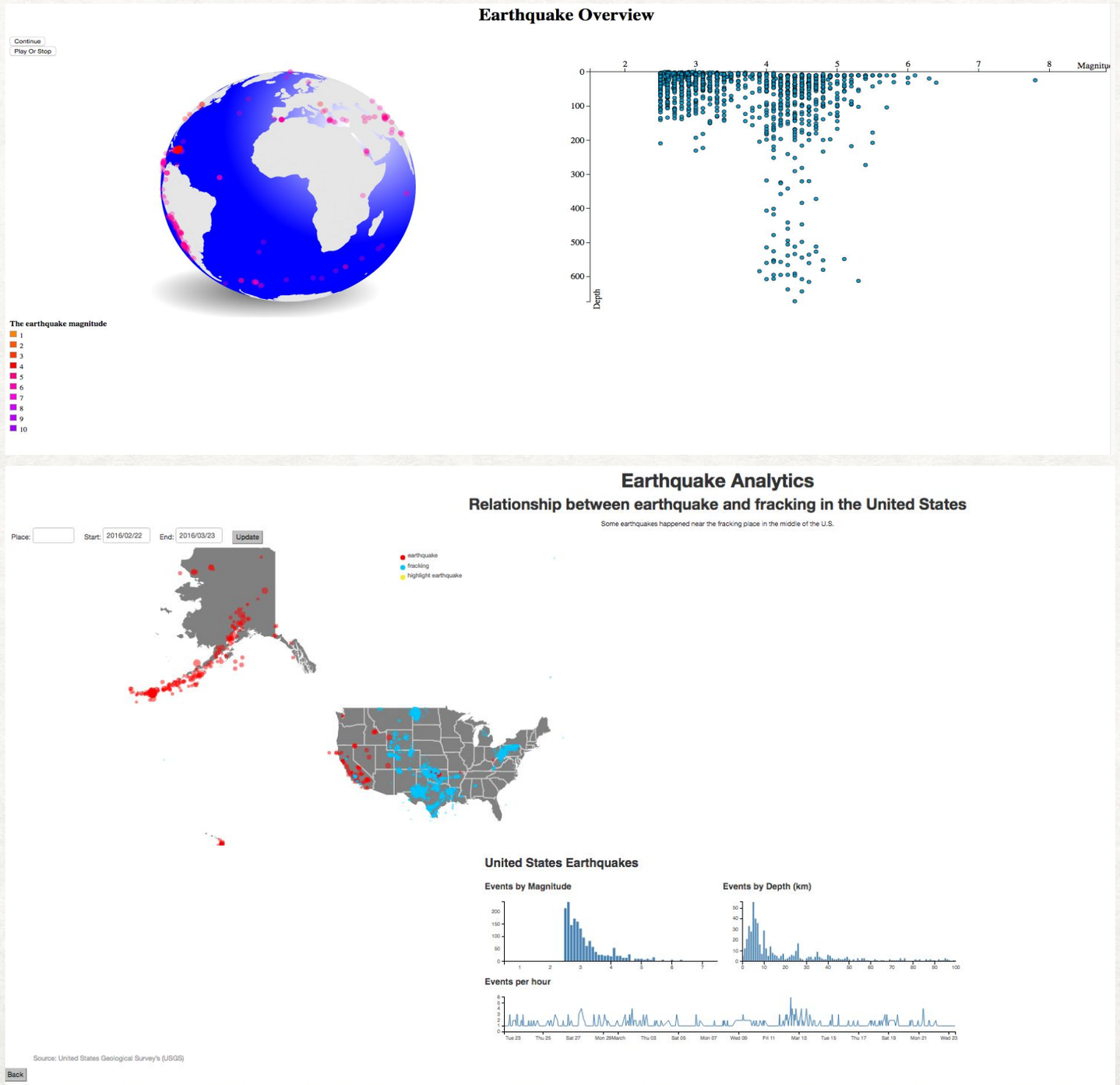
Technology

- D3.js
- Javascript
- HTML
- CSS
- Geo-visualization

Design

Overview

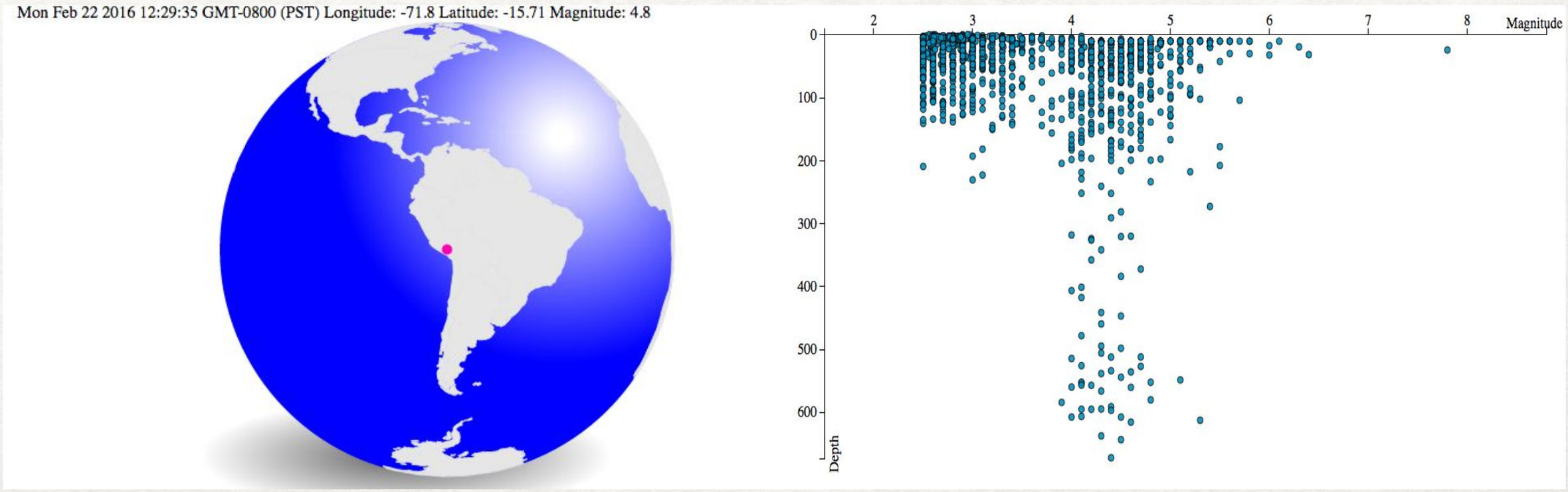




Design

Features

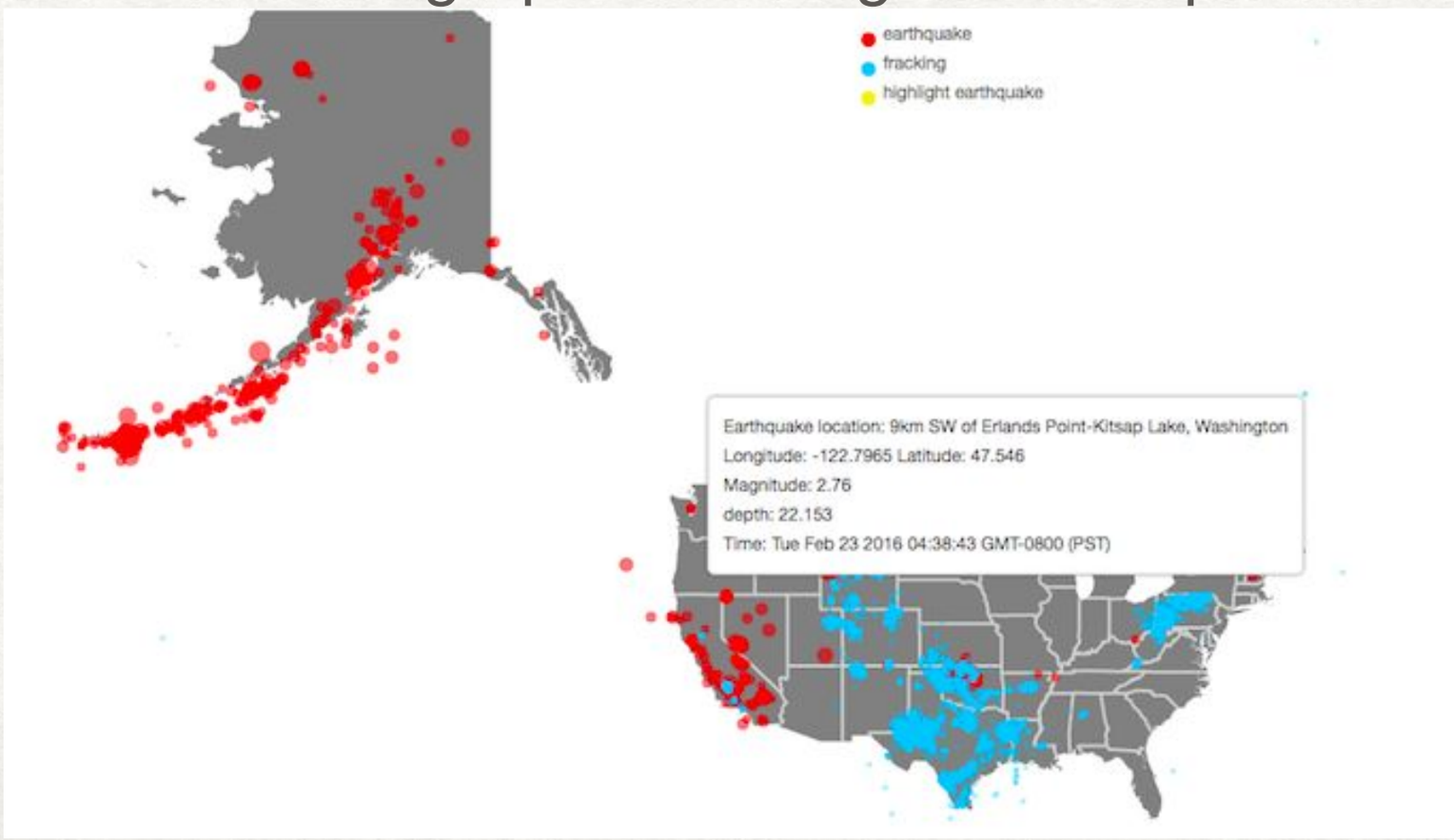
1. Build a 3D global map and plot earthquakes on the map with tooltip.
2. Draw a scatter plot to show the relationship between earthquake depth and magnitude.
3. Add rotation animation to the global map to display earthquake occurrence
4. Add animation to expand 3D map to 2D



Design

Features

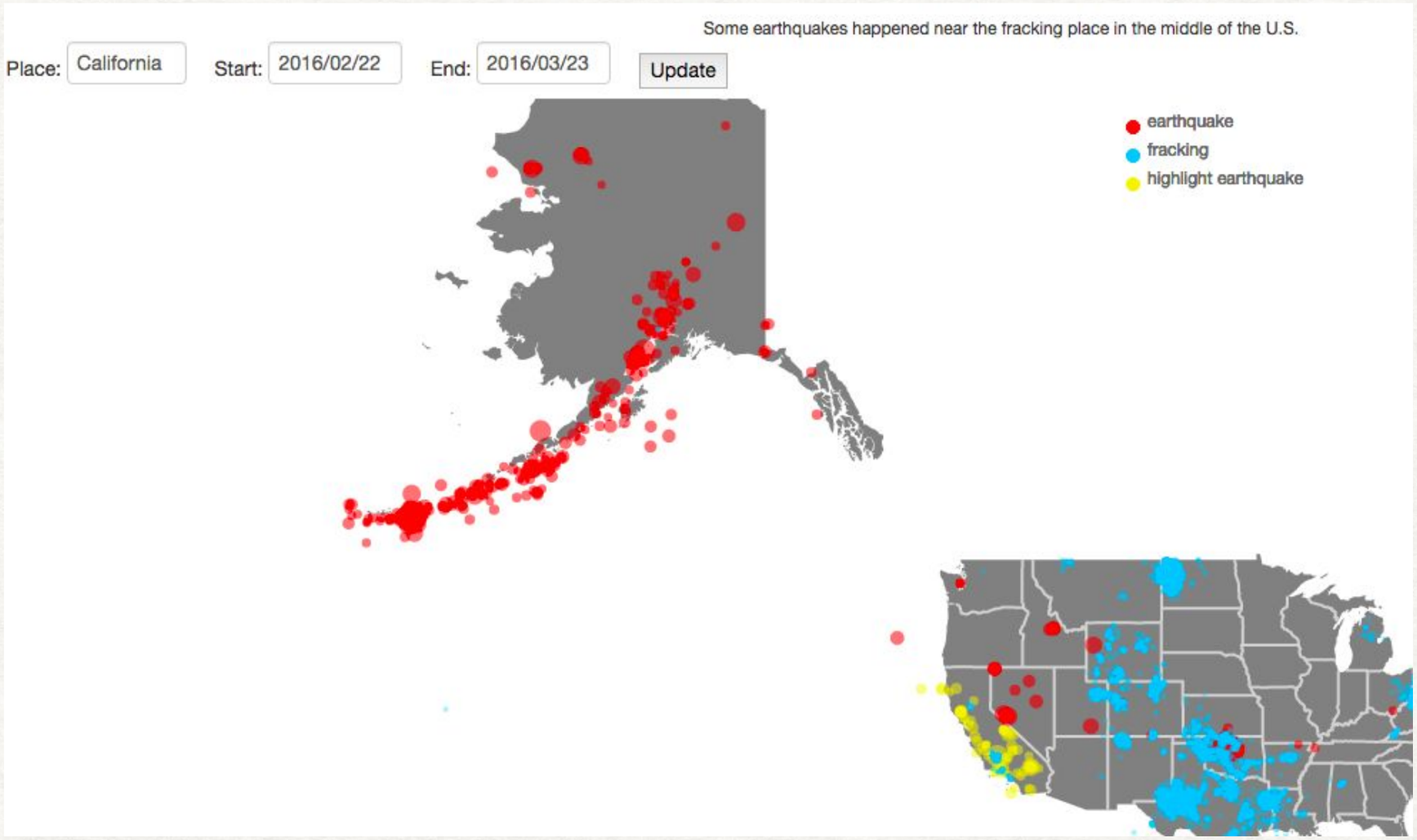
1. Geometric graph to show earthquakes happen around the United States. The earthquakes show up by the time happening.
2. We use red color represent earthquakes, and we use size of circle to represent the magnitude of an earthquake. We use blue color represent fracking. We use yellow color represent highlighting earthquake
3. Interactive Geometric graph: Zooming and tooltip.



Design

Features

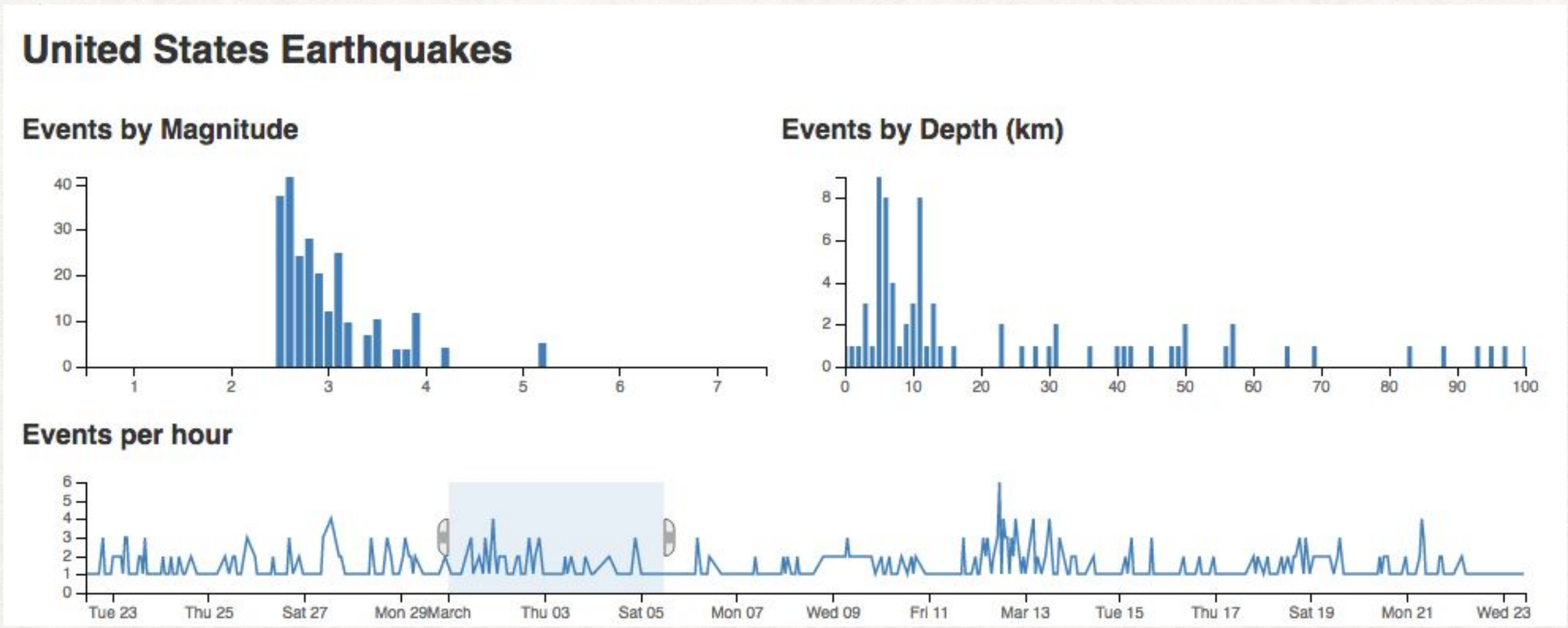
1. Searching in a Geometric graph.



Design

Features

- Use CrossFilter to show how many earthquakes happening in Bar chart and line chart. Events by Magnitude, by depth, by time



Evaluation

According to Plate tectonics theory, most earthquakes are caused by the plates movement.

From the earthquake overview we can know that earthquake happens everyday.

From the fracking location we can notice that there are some earthquakes happened in the middle of United States. However, these places are not the “movement area”.

Challenges

1. D3 documents are hard to use.
2. Rotation animation
3. Showing the relationship between fracking and earthquake
4. Improve the User Interactive: provide tooltip, filtering,highlight,zoom, crossfilter, earthquake play and map transition between 2D to 3D
5. Improve the User Friendly

Reference

1. Fracking waste and quakes, http://mrges.com/news/ESNews/scinews/files/fracking-waste-and-quakes.pdf

2. CrossFilter (http://square.github.io/crossfilter/)
3. Geography(http://www.visualcinnamon.com/portfolio/urbanization)
4. World tour(https://bl.ocks.org/mbostock/4183330)
5. Globe to Map II(http://bl.ocks.org/KoGor/7024546)

Questions