

Drexel University
College of Computing and Informatics

INFO 250 Information Visualizations

Individual Project 1B

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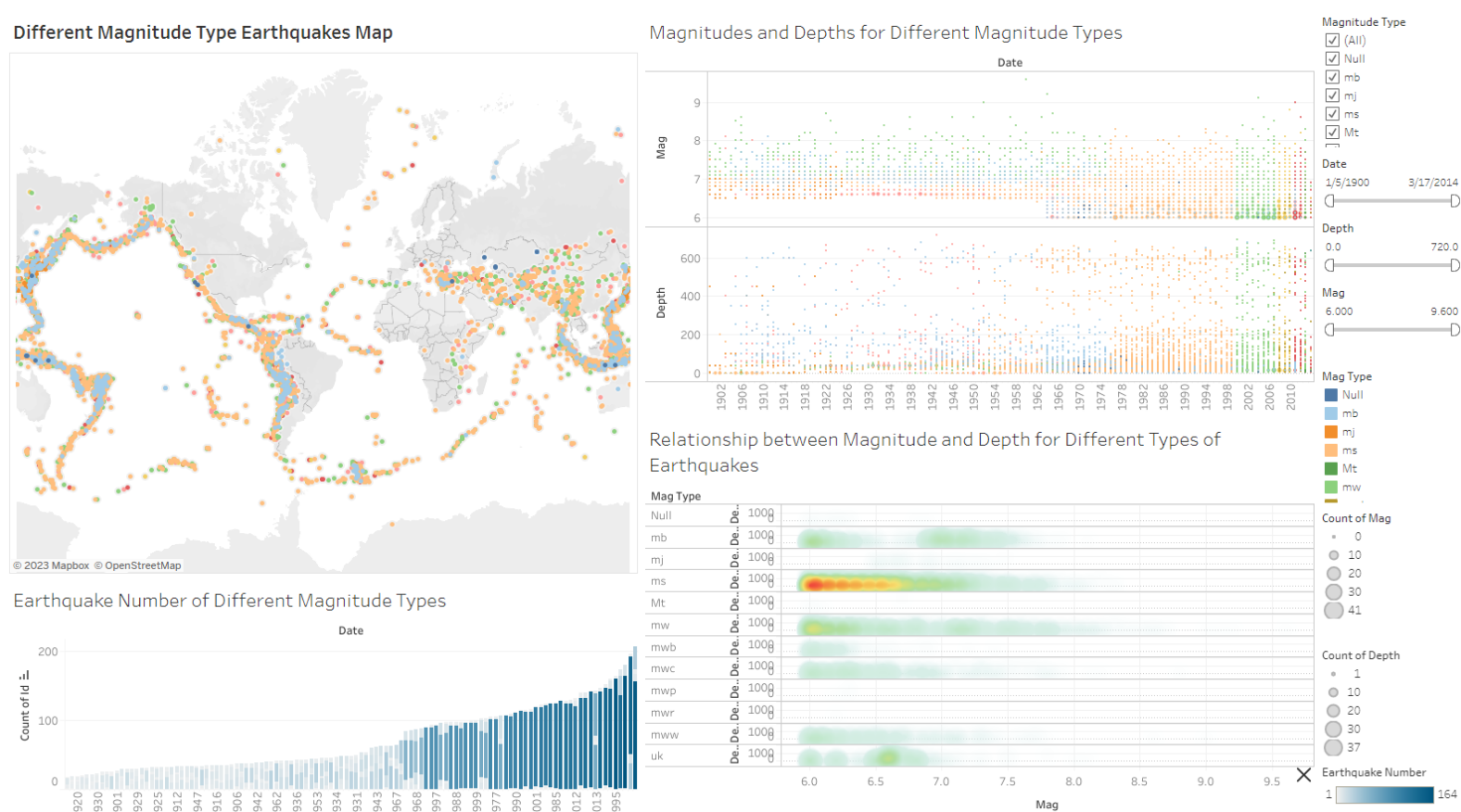
1. Earthquake Visualization Overview

1.1 Overview of the Dashboard

The dashboard consists of four different parts of visualization, they can work separately or together around the title of this dashboard “The Study of Different Earthquake Magnitude Types”. The four parts are:

- Different Magnitude Type Earthquakes Map
- Earthquake Number of Different Magnitude Types
- Magnitudes and Depths for Different Magnitude Types
- Relationship between Magnitude and Depth for Different Types of Earthquakes

1.2 Screenshot and Tableau Public Link

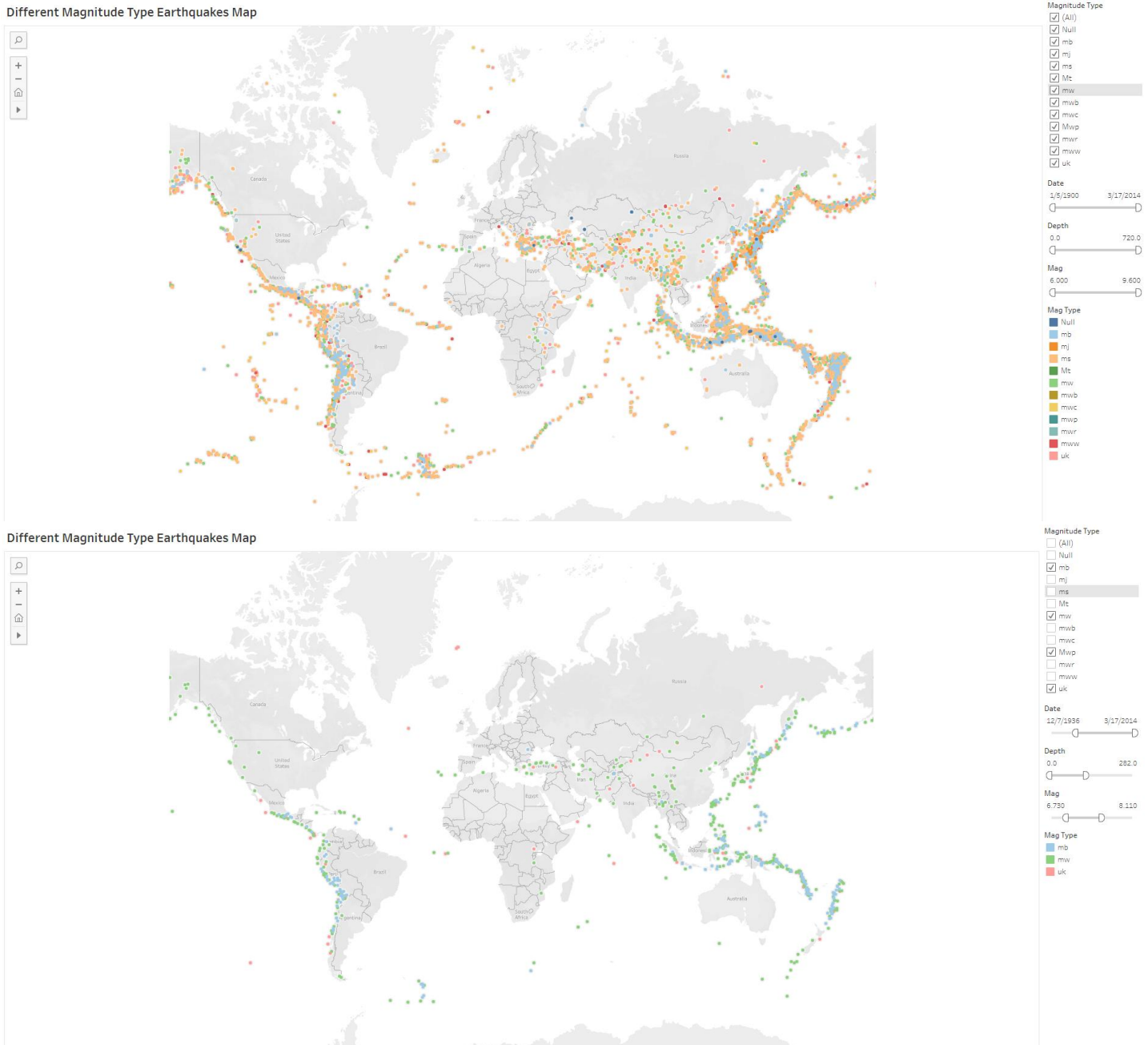


2. Associated User Tasks

2.1 Different Magnitude Type Earthquakes Map

This visualization is the main part of the dashboard. It illustrates every earthquake in the data set as a single point, colored by different types of magnitudes, and demonstrates them on a world map diagram according to its latitude and longitude. The filter bar on the right includes the selection of magnitude type, date, depth and magnitude.

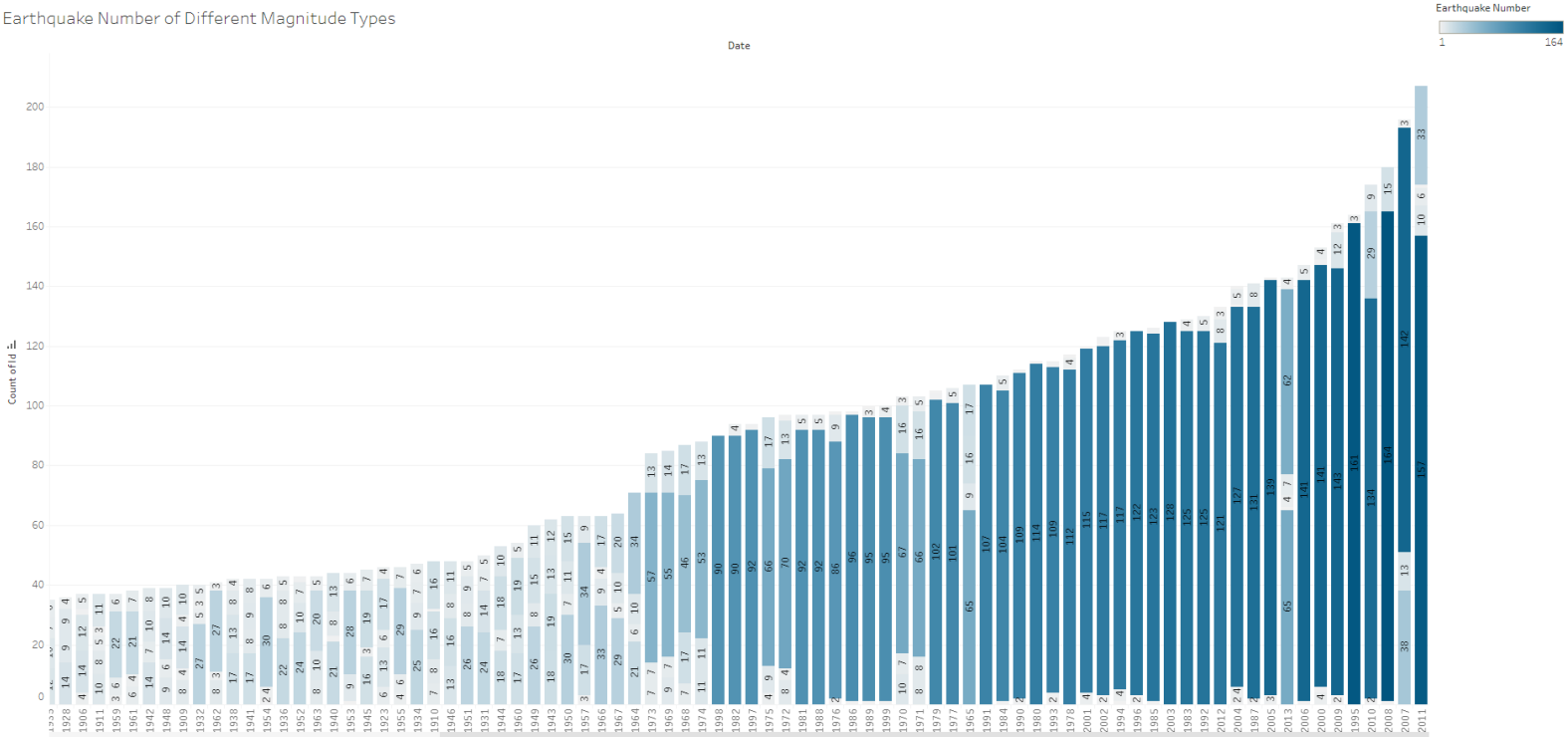
In terms of Shneiderman's type by task taxonomy, this visualization enables users to have an **overview** of all the data points in the dataset, and also allows users to **zoom in** using the toolbar on the left. Users can also use the right-side **filter** bar to select specific types of magnitude types, also with the slide-adjustable filters to select a timespan, depth and magnitude range. By hovering the mouse on the corresponding data point, the chart can exhibit **details-on-demand** information about the data user chose, including id, latitude, longitude magnitude type, depth and magnitude.



2.2 Earthquake Number of Different Magnitude Types

This visualization is the auxiliary diagram of the map diagram. It illustrates the number of earthquakes in selected years using a bar chart. The color of the bar chart from light to dark indicates the frequency of certain magnitude types in a given year.

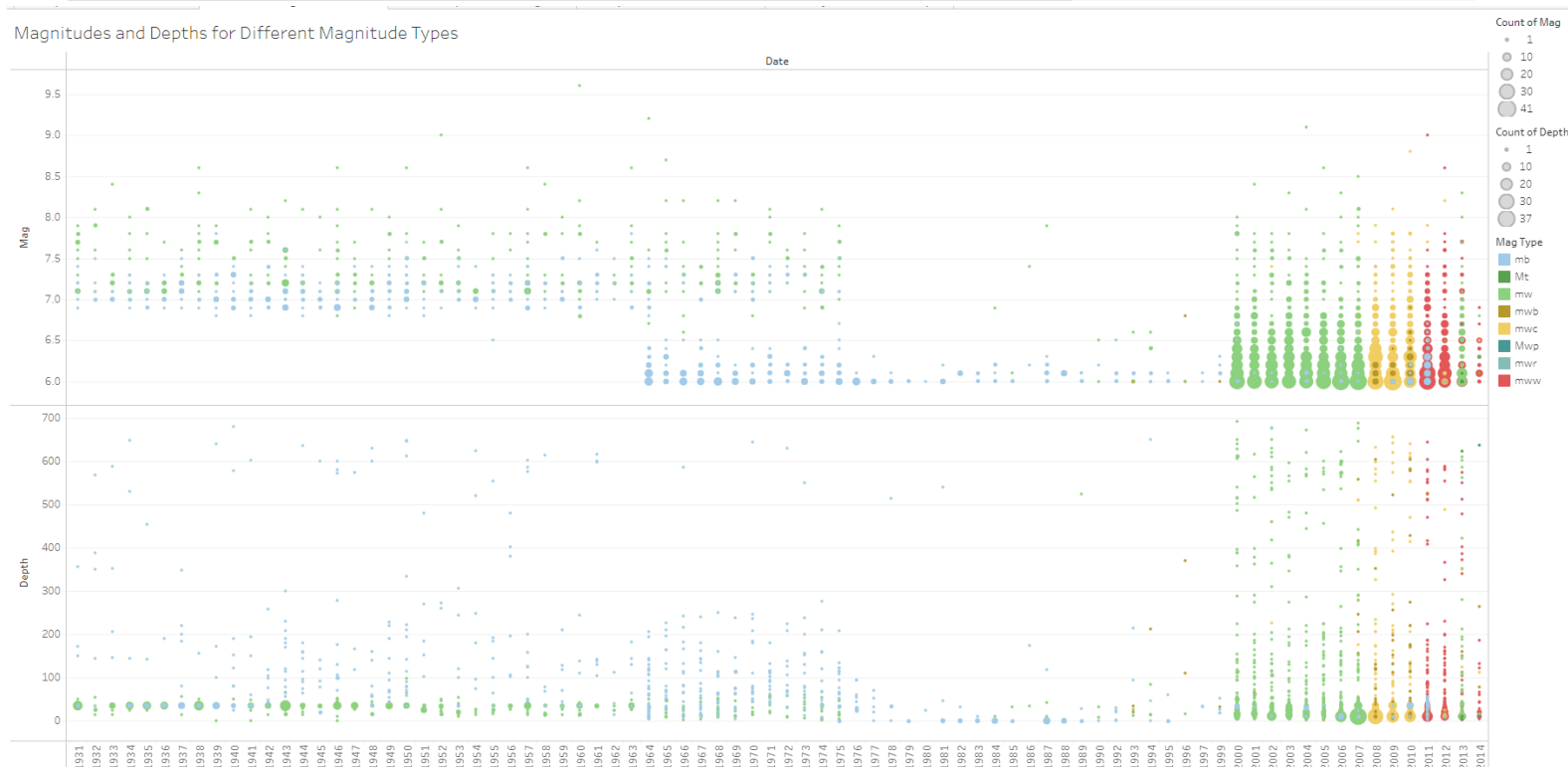
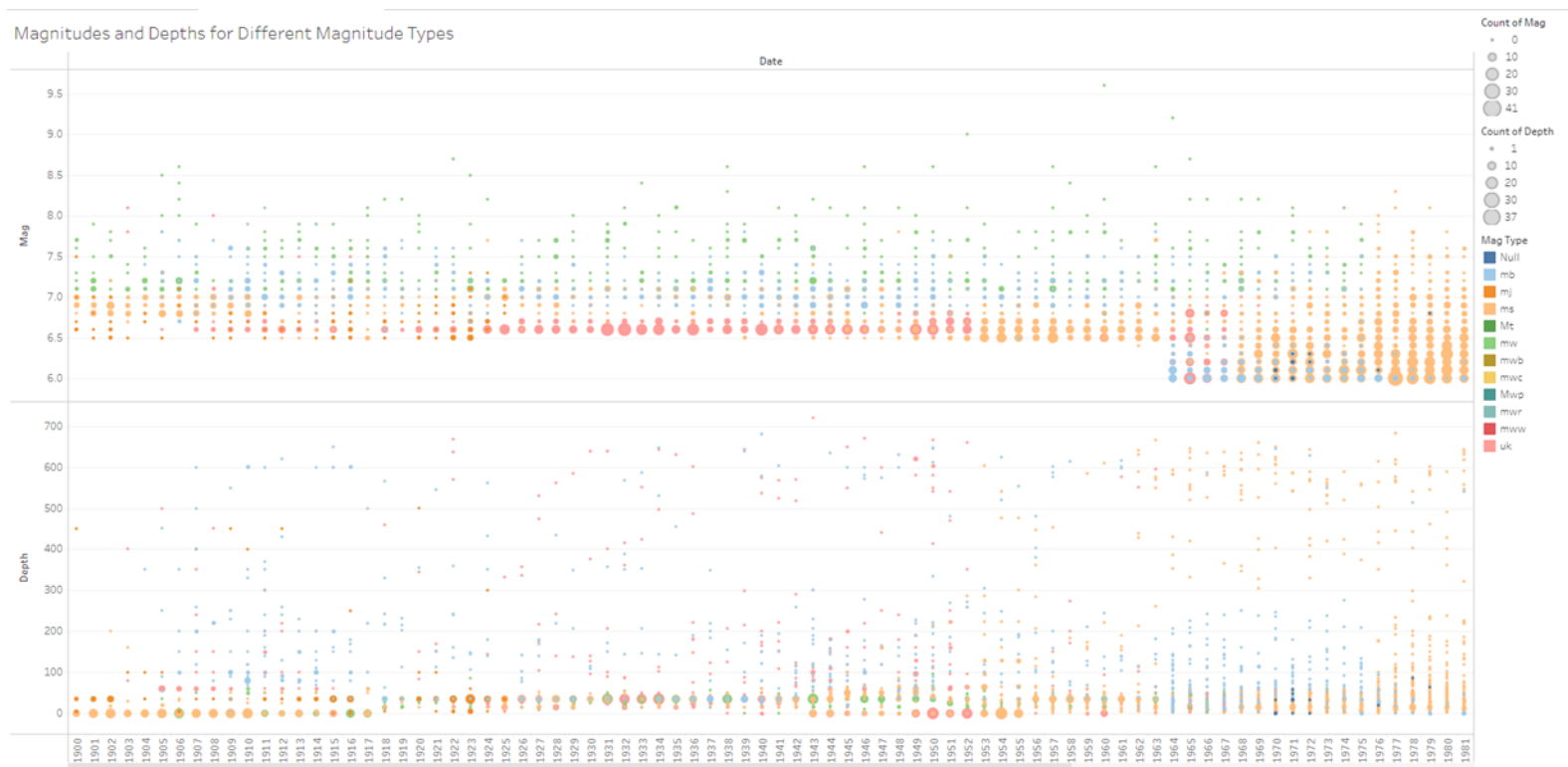
In terms of Shneiderman’s type by task taxonomy, this visualization also enables users to have an **overview** of all the data in the dataset. The bar chart can **filter** the trend of number changes and the corresponding magnitude types in different timespans. By hovering the mouse on the corresponding bar, the chart can exhibit **details-on-demand** information about the magnitude type and its frequency.



2.3 Magnitudes and Depths for Different Magnitude Types

This visualization is aimed at showing detailed information about magnitude and depth for different magnitude types. Each color represents a corresponding magnitude type and the size for each data point represents the related frequency.

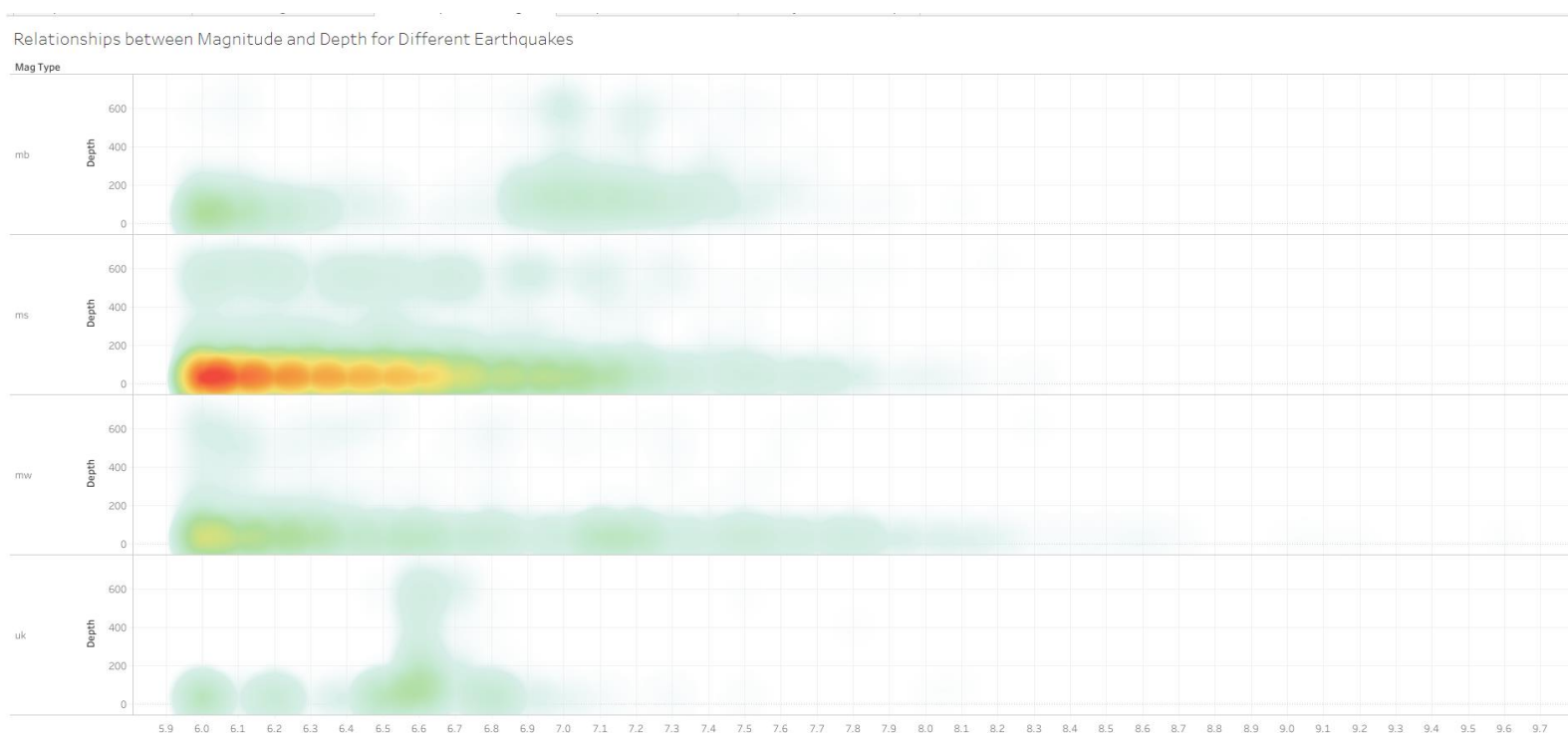
In terms of Shneiderman's type by task taxonomy, this visualization allows users to have an **overview** of the entire collection and can also **filter** out uninteresting items. Users can also select an item or group and get the details about different magnitude types' of depth and magnitude values. This diagram combined both attributes of earthquakes which enables users to **relate** different earthquake types and discover patterns.



2.4 Relationships between Magnitude and Depth for Different Earthquakes

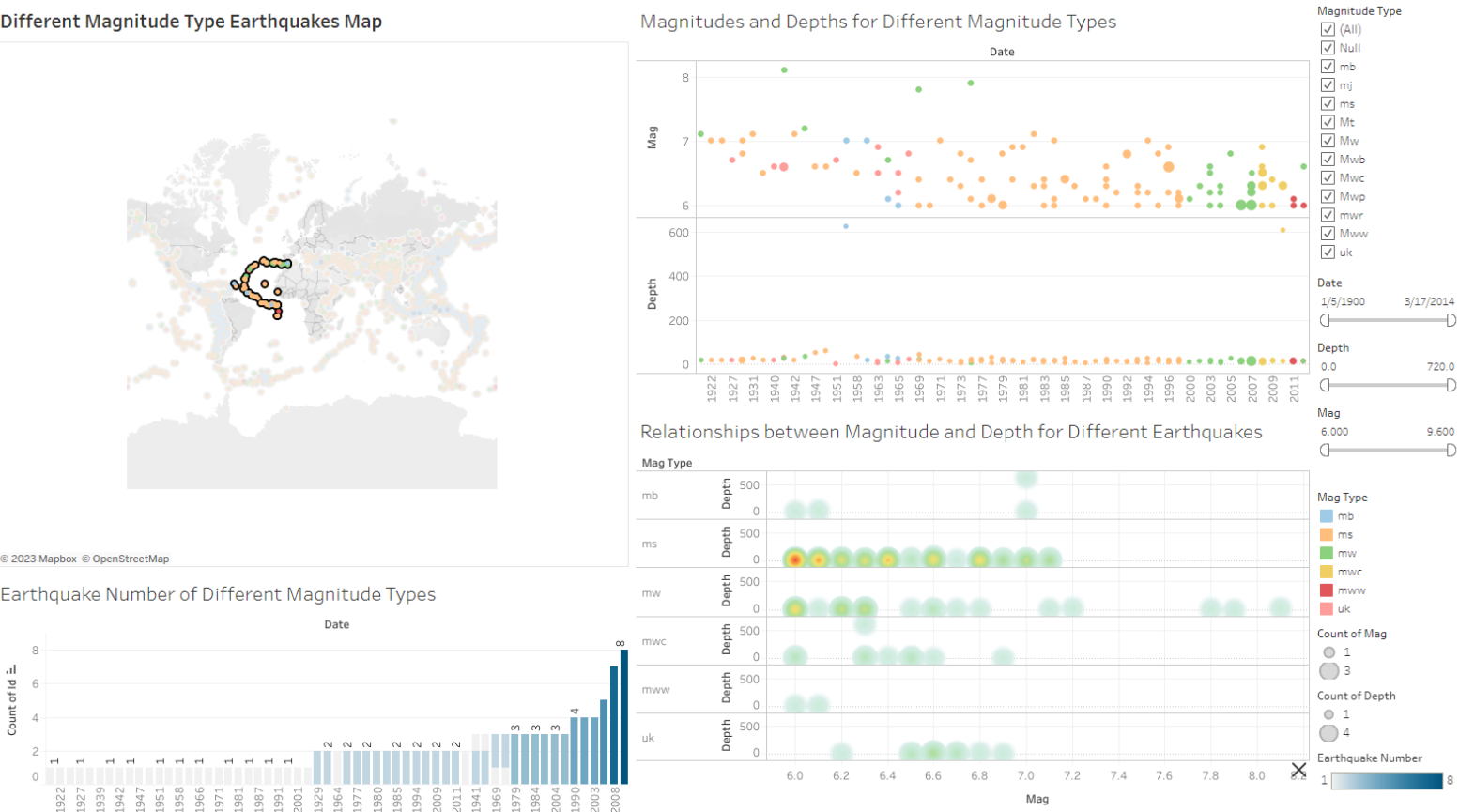
This visualization shows the relationship between magnitude and depth using a density diagram. The diagram also separates into different earthquake types to illustrate different patterns.

In terms of Shneiderman's type by task taxonomy, this visualization supports an **overview** of the whole data collection. By selecting different data using the toolbar, users can **filter** out their interesting items, and conduct **detail-on-demand** operations. This diagram also easy for users to observe the **relationships** and patterns between the magnitude and depth of different earthquakes.



2.5 Brief Conclusion to the Whole Dashboard

This dashboard used an interactive way for users to overview, zoom, filter and details-on-demand the information in a simple, efficient way. The four visualizations are connected together to make the relationships more clear. Users can select the data they want on the toolbar or any of the four visualizations and the whole dashboard will demonstrate the selected information correspondingly. Users can also trace back their operations of the dashboard to obtain their history operations including progressive refinement.



3. Visualization Proposals

1. Adding functions to perform the extraction task

Allowing users to extract data can be crucial for facilitating their manipulations, particularly if users need to share or preserve the chosen data. The data and dashboard can be used for a far wider range of purposes by allowing for more flexible extraction functions, such as displaying discoveries or enhancing other applications.

2. Allow advanced filtering

Although this dashboard combines the magnitude type, date, and depth with user interaction to offer some content of sophisticated filtering, it is very inflexible for users to execute more complex data filtering requirements. As a result, the visualization process can be made more efficient by using additional filtering functions, such as the dynamic queries technique.