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Wednesday, November 22, 2017

Term 1 - Project: Explore Weather Trends

Summary

Analyzing city and global weather data provided by Udacity shows the global temperature has risen 1.32°C (2.37°F) from 1750-2013. Increases in temperature by city varies, as seen in the comparison of Birmingham, United States and New York, which rose 1.29°C (2.32°F) and 1.76°C (3.17°F), respectively.

Data Extraction

Udacity provided three data tables: 'city_list', 'city_data', and 'global_data'. 'City_list' included a list of cities and countries around the globe. 'City_data' included the average temperatures for each city by year (°C). 'Global_data' included the average global temperatures by year (°C).

Three cities were chosen to compare to global weather data: Birmingham, United States, New York, and Wichita.

These cities were found in the data table 'city_list' using the following SQL query:

```
SELECT *  
FROM city_list  
WHERE (country LIKE 'United States'  
       AND city LIKE 'Birmingham')  
      OR city LIKE 'New York'  
      OR city LIKE 'Wichita'  
ORDER By city
```

/* Notice the clause "country LIKE 'United States'" was not necessary for the New York and Wichita queries because within the 'city_list' database these cities are unique to the United States. Therefore, the superfluous lines of code were eliminated.*/

Now that the cities to be used were located, data on the average temperatures for each city by year (°C) were queried and downloaded from the table 'city_data' using the following SQL query:

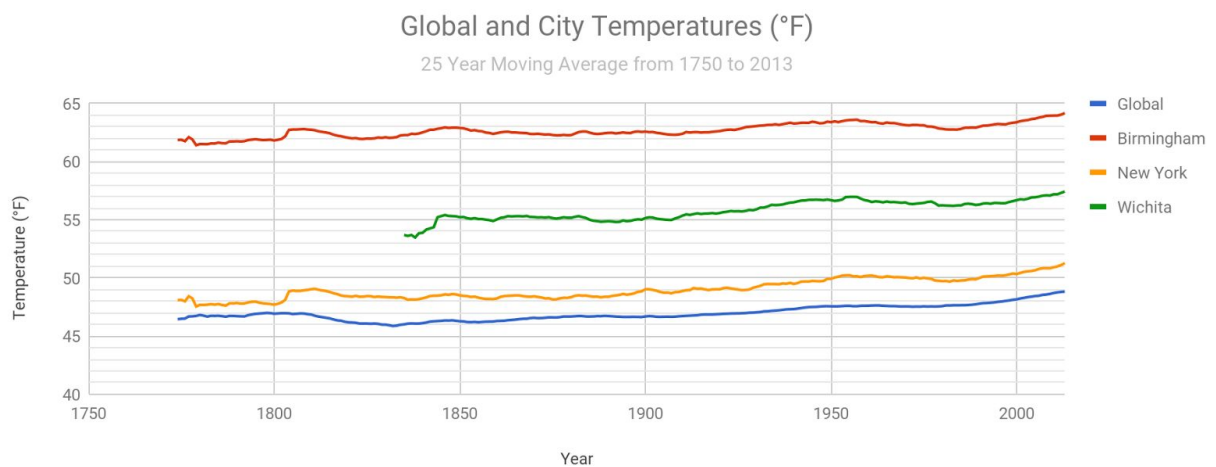
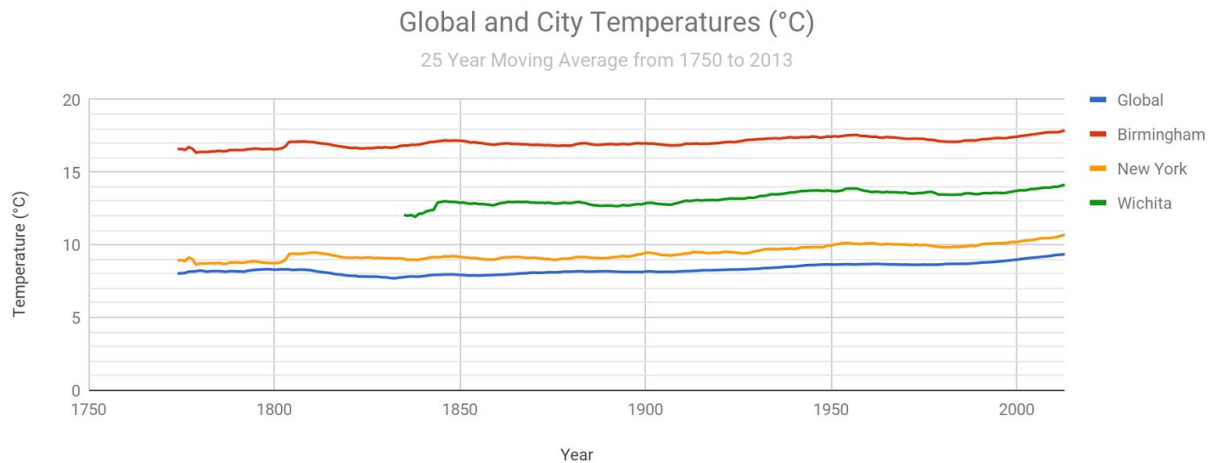
```
SELECT *  
FROM city_data  
WHERE (country LIKE 'United States'  
       AND city LIKE 'Birmingham')  
      OR city LIKE 'New York'  
      OR city LIKE 'Wichita'  
ORDER BY city, year
```

To query and download the average global temperatures by year (°C) from the table 'global_data', the following SQL query was used:

```
SELECT *  
FROM global_data  
ORDER BY year
```

Data Manipulation

The data from the tables 'city_data' and 'global_data' were manipulated to create two line charts. The first line chart, "25 Year Moving Average of Global and City Temperatures (°C)," presents the data in degrees celsius, the same unit as the extracted data. The second line chart "25 Year Moving Average of Global and City Temperatures (°F)," presents the data converted to degrees fahrenheit, as this is the unit most commonly used in the United States.



Data Analysis

As seen in the charts “25 Year Moving Average of Global and City Temperatures (°C)” and “25 Year Moving Average of Global and City Temperatures (°F),” temperatures are rising across the globe, regardless of location.

Globally, the 25 year moving average temperature increased from 8.03°C (46.46°F) to 9.35°C (48.83°F), a change of 1.32°C (2.37°F).

In Birmingham, the 25 year moving average temperature increased from 16.59°C (61.87°F) to 17.88°C (64.19°F), a change of 1.29°C (2.32°F). Compared to the global temperature, Birmingham was 8.73°C (15.71°F) higher on average, with a minimum difference of 8.15°C (14.67°F) and a maximum difference of 9.23°C (16.62°F).

In New York, the 25 year moving average temperature increased from 8.95°C (48.11°F) to 10.71°C (51.28°F), a change of 1.76°C (3.17°F). Compared to the global temperature, New York was 1.13°C (2.03°F) higher on average, with a minimum difference of 0.44°C (0.79°F) and a maximum difference of 1.46°C (2.63°F).

In Wichita, the 25 year moving average temperature increased from 12.05°C (53.7°F) to 14.13°C (57.44°F), a change of 2.08°C (3.74°F). This higher than expected change of 2.08°C (3.74°F), compared to a global change of 1.32°C (2.37°F), is most likely a result of suspiciously low and likely inaccurate readings in 1814 (8.2°C / 46.76°F), 1816 (8.78°C / 47.8°F), and 1819 (0.98°C / 33.76°F). Therefore, the Wichita data was disregarded.