PROJECT # 1 – EXPLORE WEATHER TRENDS PRESENTED BY PAULA A. MUNOZ

The purpose of this project is to analyze and compare local temperatures (**Boston**) vs Global temperatures by calculating moving averages and identifying temperature trends.

PROCEDURE

EXTRACTING THE DATA:

- Data was extracted via **SQL** queries through the provide Udacity workplace connected to internal database and exporting the results to **CSV** files.

- To obtain **local data for Boston,** I run the following SQL query:

```
SELECT *
FROM city_data
WHERE city = 'Boston';
```

- **Global data results** were extracted by running the following SQL query:

```
SELECT *
FROM global_data;
```

ANALYZING RESULTS FROM CSV FILES

- Tool utilized to open CSV files and analyze results: **EXCEL.**
- Since we were provided with yearly data for average temperatures, I decided to calculate **Ten Year Moving Averages** to smooth out the lines and better understand the temperature trends… This calculation was done for both CSV files (Boston data as well as global data).

- **Moving Average Calculation:**

  Once I had the CSV files open in EXCEL, I did the following steps:

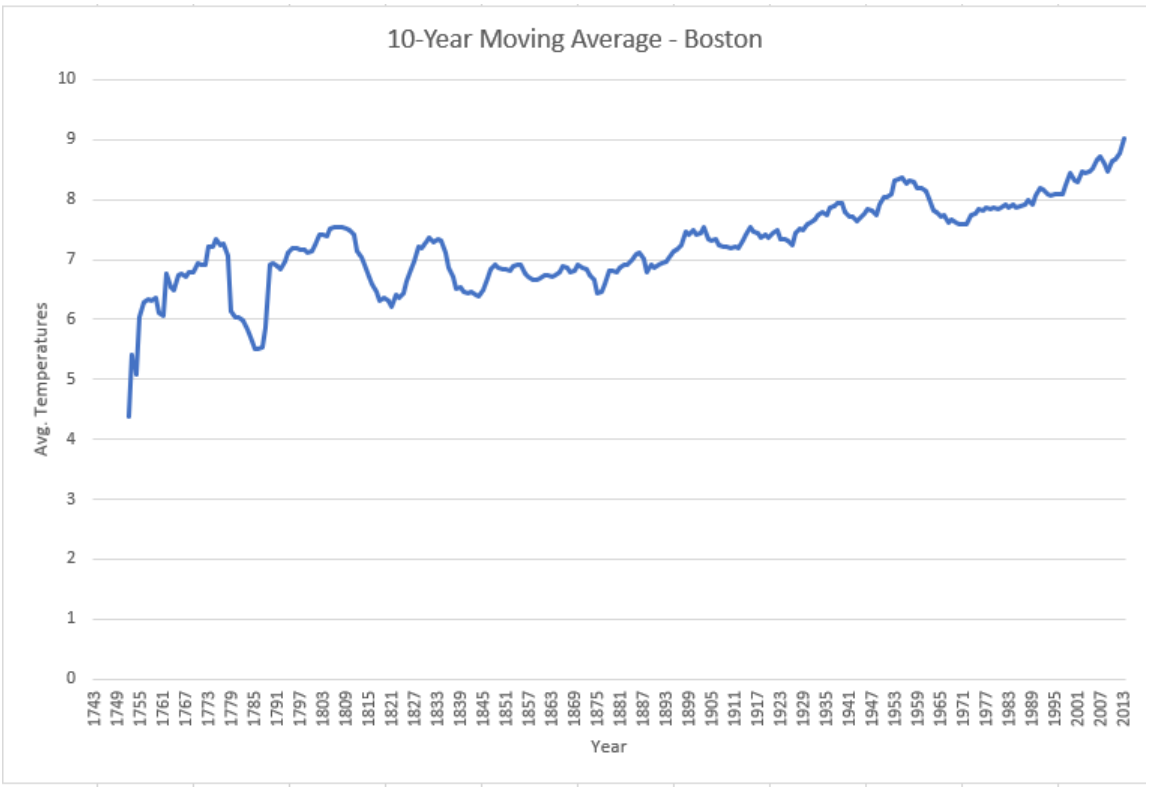
  1. Created a column called "**10-Year MA**"
  2. Went down to 10th year (row 11 since first row has the headers) and used the AVERAGE () Function to calculate the average temperatures for the first 10 years, then I dragged the formula down to the next cells to copy the formula and make the appropriate calculations.

Image below shows the process done when working with Boston results (Same process was repeated with Global results):

year	city	country	avg_temp	10-Year MA
1743	Boston	United Sta	1.19	
1744	Boston	United Sta	9.63	
1745	Boston	United Sta	-1.37	
1746	Boston	United Sta	tes	
1747	Boston	United Sta	tes	
1748	Boston	United Sta	tes	
1749	Boston	United Sta	tes	
1750	Boston	United Sta	7.88	
1751	Boston	United Sta	8.6	
1752	Boston	United Sta	0.36	=AVERAGE(D2:D11)
1753	Boston	United Sta	7.35	AVERAGE(number1, [number2], ...
1754	Boston	United Sta	7.75	5.095
1755	Boston	United Sta	4.28	6.036667
1756	Boston	United Sta	7.76	6.282857
1757	Boston	United Sta	6.65	6.32875
1758	Boston	United Sta	6.09	6.302222

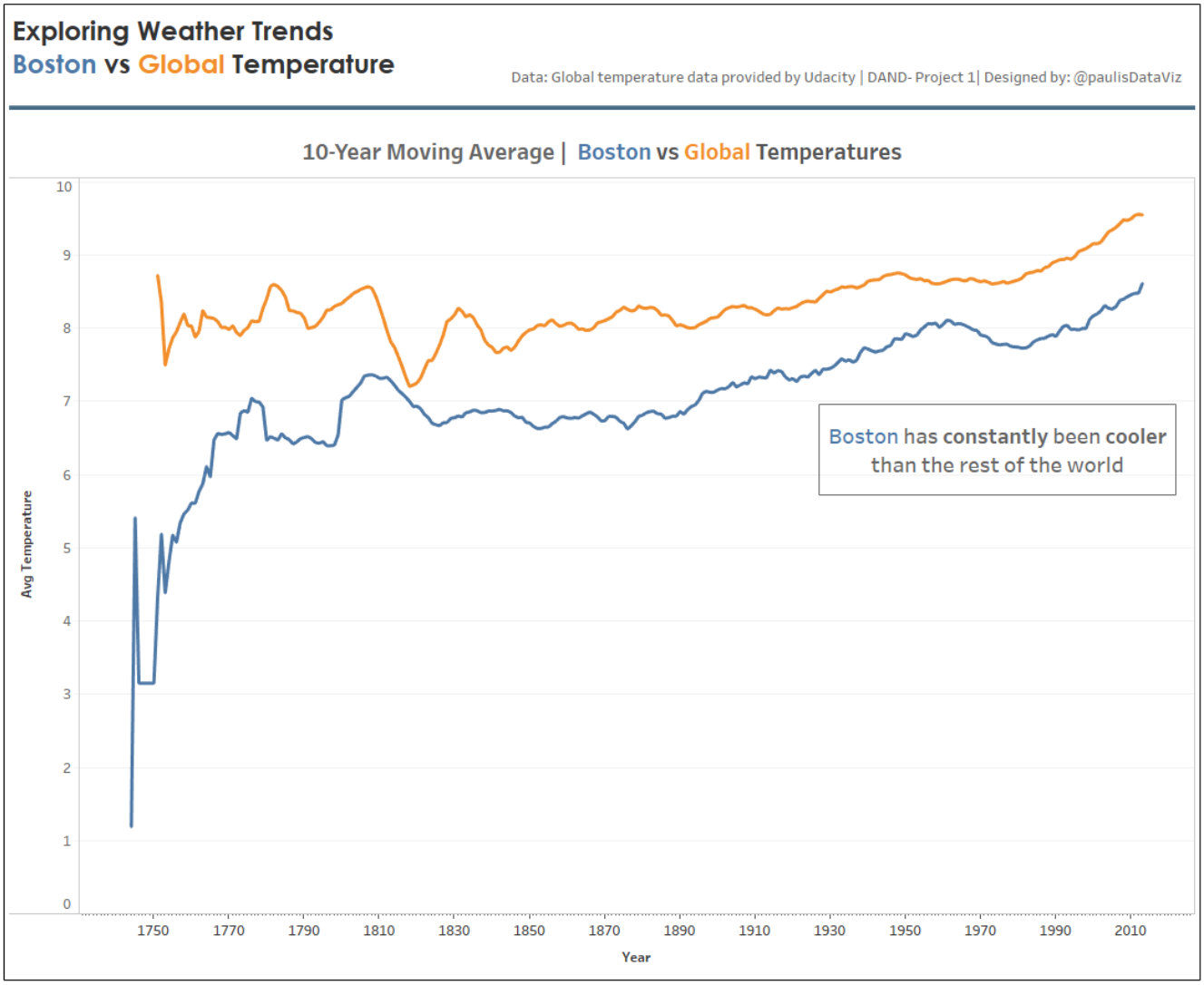
CREATING A LINE CHART

- I initially used EXCEL to create the line chart by using the moving averages calculated (Image below when testing 10 Year Moving Average for Boston)



- however, since the project requirements said we could use any tool, I decided to better use **Tableau Software** since I'm a big fan of this Tool.

- Visualization below compares the Ten-year Moving averages for Boston (Blue) and Global (Orange) Temperatures

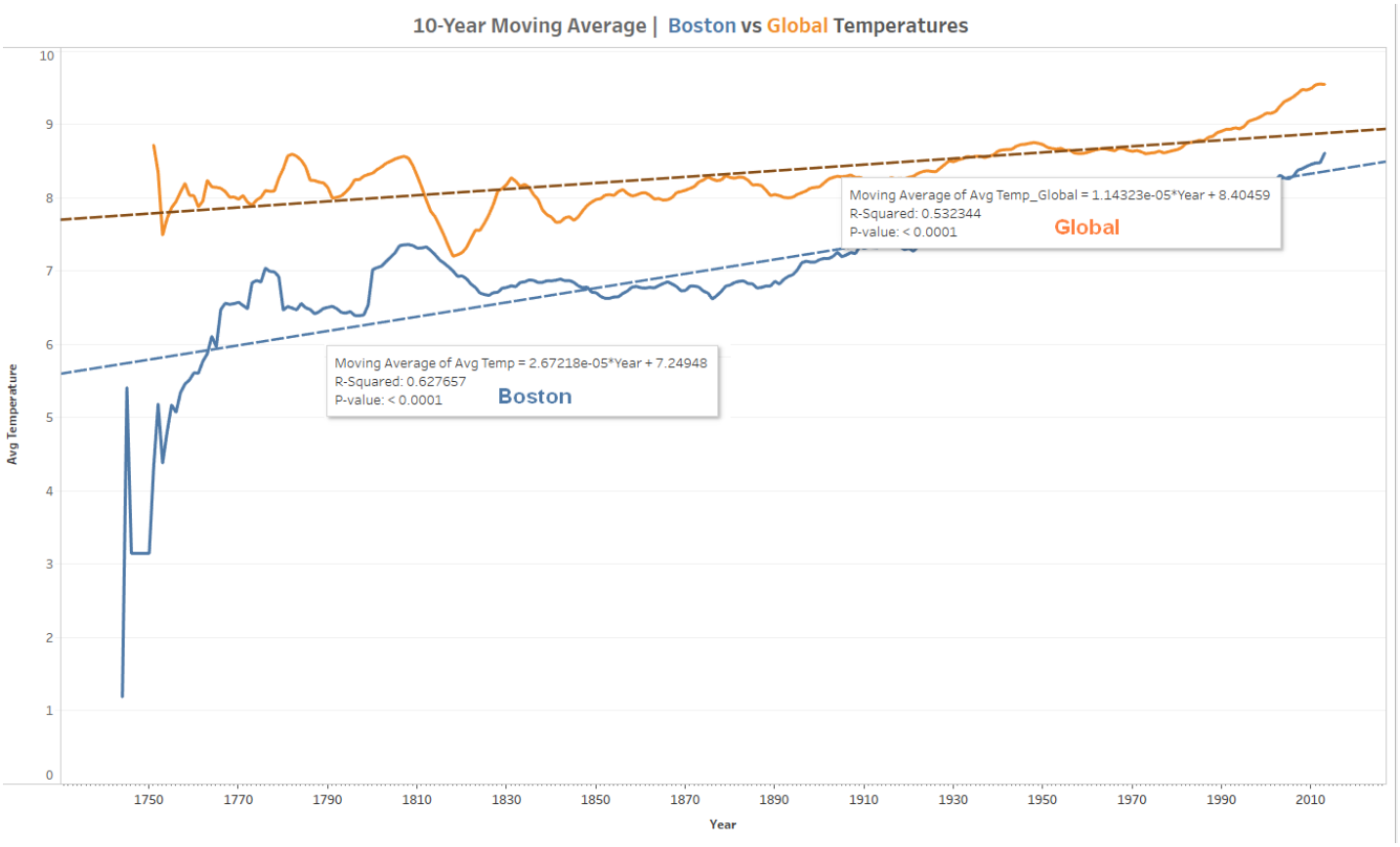


OBSERVATIONS

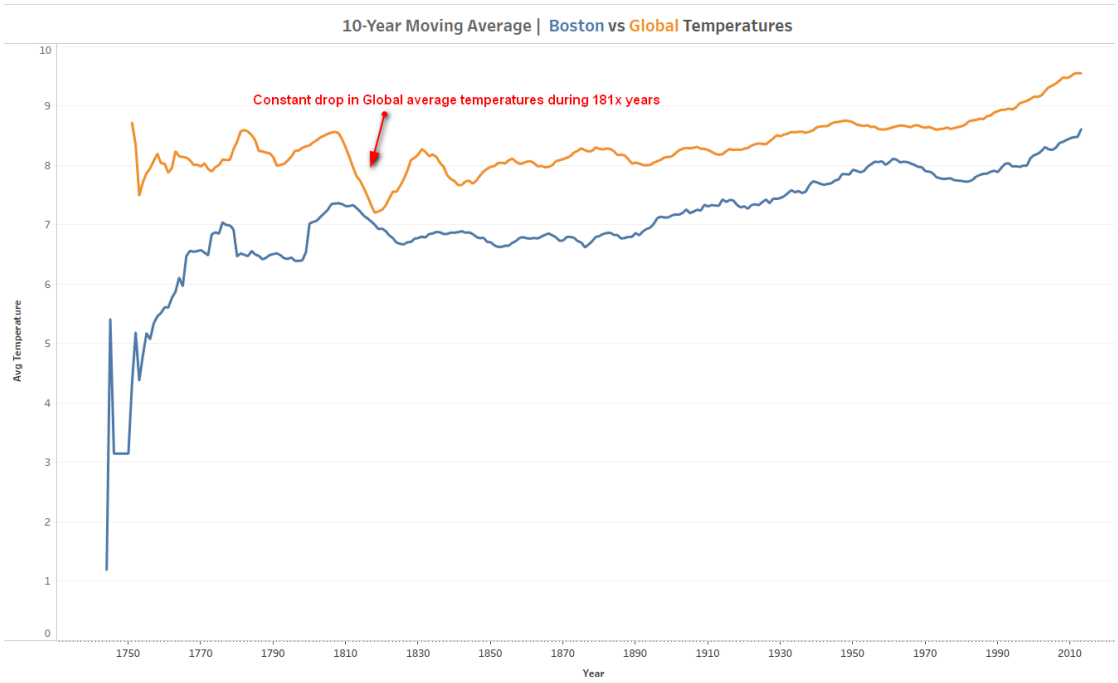
- Comparing the 10-Year moving average for Boston temperatures vs Global temperatures we can infer that Boston has consistently been cooler than the rest of the world, since we can see that corresponding line for Boston (Blue line) is always lower than the Global line (Orange line)

- Based on Moving Average temperatures (both local and global lines) we can see that in general the temperatures are increasing, which means that the world is getting hotter.

- Correlation coefficient (R Squared) for Boston data is **0.6276,** this is higher than Correlation coefficient (R Squared) for Global data which is **0.5323**



- By looking at the **Global** Moving Average temperature line**,** there is an interesting and **constant** drop in average temperatures during the **181x** years**,** the average temperature reached the lowest value of 7.203 **,** then during the **182x** years the average temperatures started to slowly increase again.



- By looking at the **Boston** moving average temperature line, we can see since **185x to 195x** the average temperatures are increasing in a somehow linear way, however starting **1962 to 1981** there was a **constant drop in average temperatures**, then in the subsequent years the average temperatures start to rise again in a linear way.