

# Project1 – Exploring Weather Trends

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## Step1: Collecting temperature data of the world and the closest big city

### Global Data

I used the SQL query below to collect the temperature data of the world:

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

The query will return a table with two columns; **year** and **avg\_temp**, and rows are sorted by the year column (Ascending)

### City Data

First, I need to find out a list of cities in the US where temperature data is available and below is the SQL query that I used (I did not use *ORDER BY* because the returned results are already sorted by the city column):

```
SELECT *  
  
FROM city_list  
  
WHERE country = 'United States'
```

Based on the results from the query above, **Boston** is the closest big city where I currently live so I ran the SQL query below to collect the temperature data for Boston

```

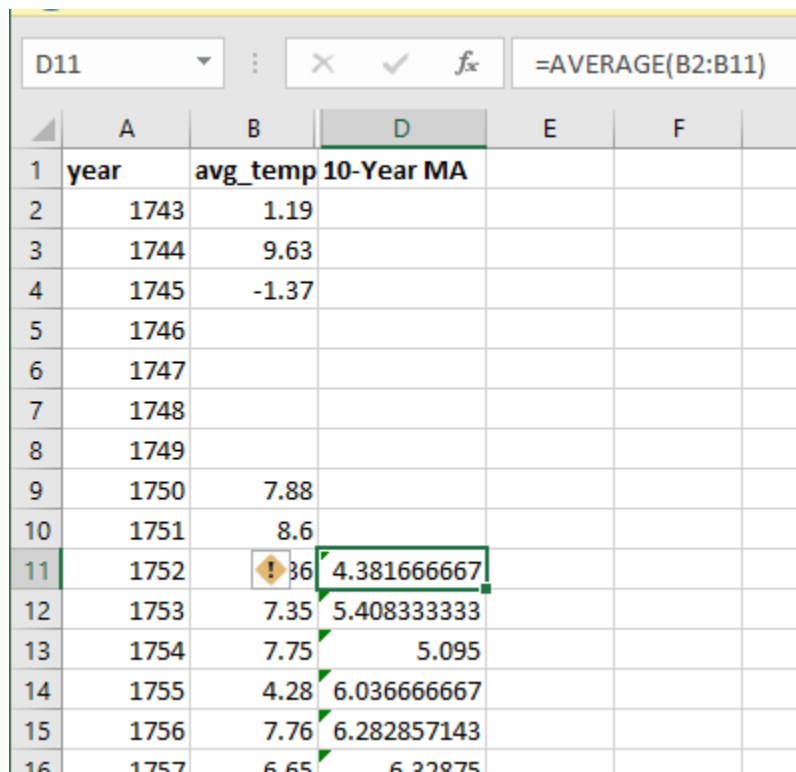
SELECT year, avg_temp
FROM city_data
WHERE city = 'Boston'
ORDER BY year

```

This query will return the temperature data for Boston where a table contains two columns; **year** and **avg\_temp**, and rows are sorted by the year column (Ascending). Note that this format matches the global temperature data which was extracted earlier to ease the next step.

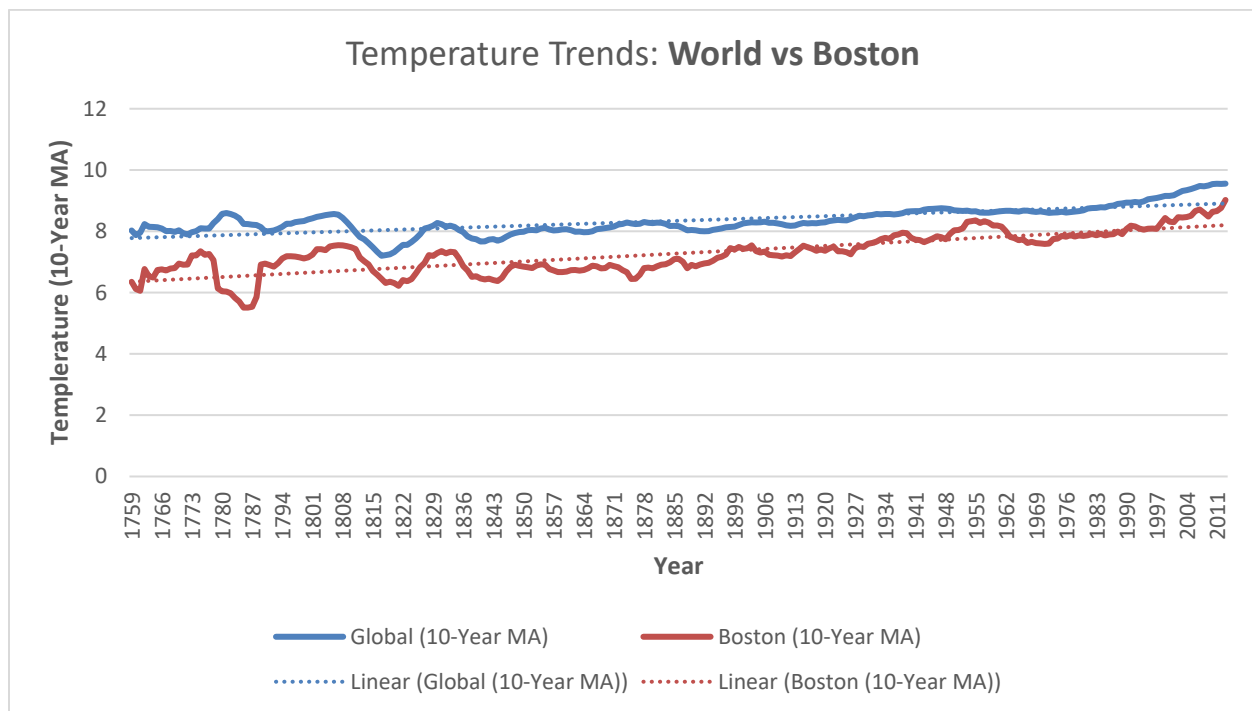
## Step2: Manipulate data and create data visualization in Excel

After exporting the SQL queries for the world and Boston to CSV, I used Excel to calculate the '**10-Year Moving Average**' data for both spreadsheets by using the 'AVERAGE' function in Excel as shown below:



	A	B	D	E	F
1	year	avg_temp	10-Year MA		
2	1743	1.19			
3	1744	9.63			
4	1745	-1.37			
5	1746				
6	1747				
7	1748				
8	1749				
9	1750	7.88			
10	1751	8.6			
11	1752	36	4.381666667		
12	1753	7.35	5.408333333		
13	1754	7.75	5.095		
14	1755	4.28	6.036666667		
15	1756	7.76	6.282857143		
16	1757	6.65	6.32875		

Below is a chart which contains line charts for the 10-Year Moving Average data for the world (**blue line**) and Boston (**red line**). Additionally, a linear trendline (using the 10-Year Moving Average data) is also added for each of them to easily see a change of temperature of the world and Boston over time.



### Step3: Observations

From the collected temperature data (1759 to 2013), Boston has always been cooler than the average temperature of the world. The chart shows that the temperature data for Boston has a similar pattern when comparing to the global data trend where the temperature data of the world and Boston was slightly dropped and then bumped up around 1810 to 1830, and the temperature continues to go up ever since. However, because of a drastic drop of the temperature data in Boston in 1778 (4.75) and 1779 (-2.31), we can see that the temperature data of Boston during 1778 to 1790 has a much larger dropped when comparing to the world because the 10-Year Moving Average data is used in this chart.

Additionally, the chart shows that the temperature of both the world and Boston has been slowly increasing over time and the trendline shows that Boston has a higher increasing rate ( $\sim 0.006$  Celsius/year) than the world (0.004 Celsius/year).

If this trend continues, the temperature of Boston will converge to the average temperature of the world in the future.