



EXPLORE WEATHER TRENDS

Project 1

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1. Data Extraction:

SQL was used to extract the weather data.

First query was used to confirm data is present for London, UK.

Query: *"select * from city_list where country = 'United Kingdom';"*

Sample result:

Output 5 results Download CSV	
city	country
Belfast	United Kingdom
Birmingham	United Kingdom
Cardiff	United Kingdom
Edinburgh	United Kingdom
London	United Kingdom

Figure 1: Query 1

Second query to extract city level data: “select * from city_data where city = 'London' and country = 'United Kingdom';”

Sample result:

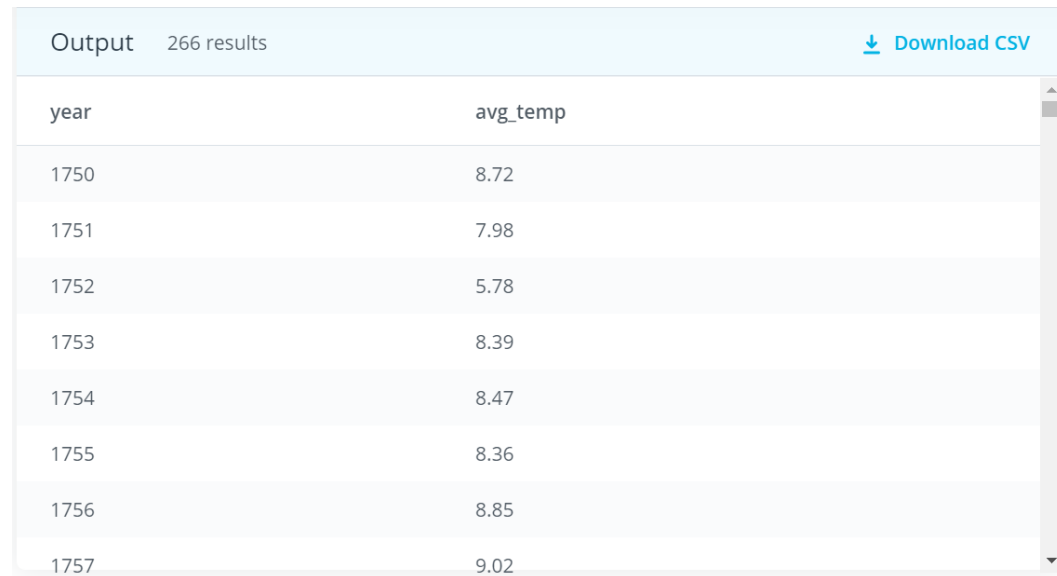
Output 271 results Download CSV			
year	city	country	avg_temp
1743	London	United Kingdom	7.54
1744	London	United Kingdom	10.34
1745	London	United Kingdom	4.13
1746	London	United Kingdom	
1747	London	United Kingdom	
1748	London	United Kingdom	
1749	London	United Kingdom	
1750	London	United Kingdom	10.25

Figure 2: Query 2

Finally, a third query was used to extract global weather data.

Query: *"select * from global_data;"*

Sample result:



Output 266 results		Download CSV
year	avg_temp	
1750	8.72	
1751	7.98	
1752	5.78	
1753	8.39	
1754	8.47	
1755	8.36	
1756	8.85	
1757	9.02	

Figure 3: Query 3

Extracted data was saved in a CSV file that's going to be used in the second step.

2. Data Preparation:

In the next two steps, Microsoft Excel was used to prepare and visualize the data.

When first observing the data, it was noticed that the data for London average temperature was available from 1743 till 2013. While global data was recorded from 1750 to 2015. This difference in data availability needed to be adjusted to have consistent data sets for comparison.

The first change was to remove the records for the years 1743-1749 from London data and remove two records from global data to have a consistent data set of temperature averages from 1750 to 2013 for London versus globally. The average temperature was also adjusted to the nearest 2 decimal places.

After that, the 6-year moving average was calculated for both data sets. This was done using Excel by calculating the average starting year 1755 (6th row) and dragging the same formula through all the remaining rows to continue the calculation for the rest of the data set.

Below is a screenshot that demonstrates the first few columns of the data sets.

London					Global		
year	city	country	avg_temp	6-year moving average	year	avg_temp	6-year moving average
1750	London	United Kin	10.25		1750	8.72	
1751	London	United Kin	9.99		1751	7.98	
1752	London	United Kin	6.54		1752	5.78	
1753	London	United Kin	9.42		1753	8.39	
1754	London	United Kin	9.2		1754	8.47	
1755	London	United Kin	8.95	9.06	1755	8.36	7.95
1756	London	United Kin	9.42	8.92	1756	8.85	7.97
1757	London	United Kin	9.34	8.81	1757	9.02	8.15
1758	London	United Kin	8.85	9.20	1758	6.74	8.31
1759	London	United Kin	9.8	9.26	1759	7.99	8.24
1760	London	United Kin	9.26	9.27	1760	7.19	8.03
1761	London	United Kin	9.69	9.39	1761	8.77	8.09
1762	London	United Kin	8.99	9.32	1762	8.61	8.05
1763	London	United Kin	8.75	9.22	1763	7.5	7.80
1764	London	United Kin	9.14	9.27	1764	8.4	8.08
1765	London	United Kin	8.95	9.13	1765	8.25	8.12
1766	London	United Kin	9.07	9.10	1766	8.41	8.32
1767	London	United Kin	8.98	8.98	1767	8.22	8.23

Figure 4: Moving Averages

Finally, 2 data sets were combined into one data set to prepare for data visualization step. The data set included the following columns:

- 1- Year
- 2- Average temperature
- 3- 6-year moving average

3. Data Visualization:

Excel was also used in this step to create a line chart and visualize moving average of London versus global temperatures starting 1755 throughout 2013.

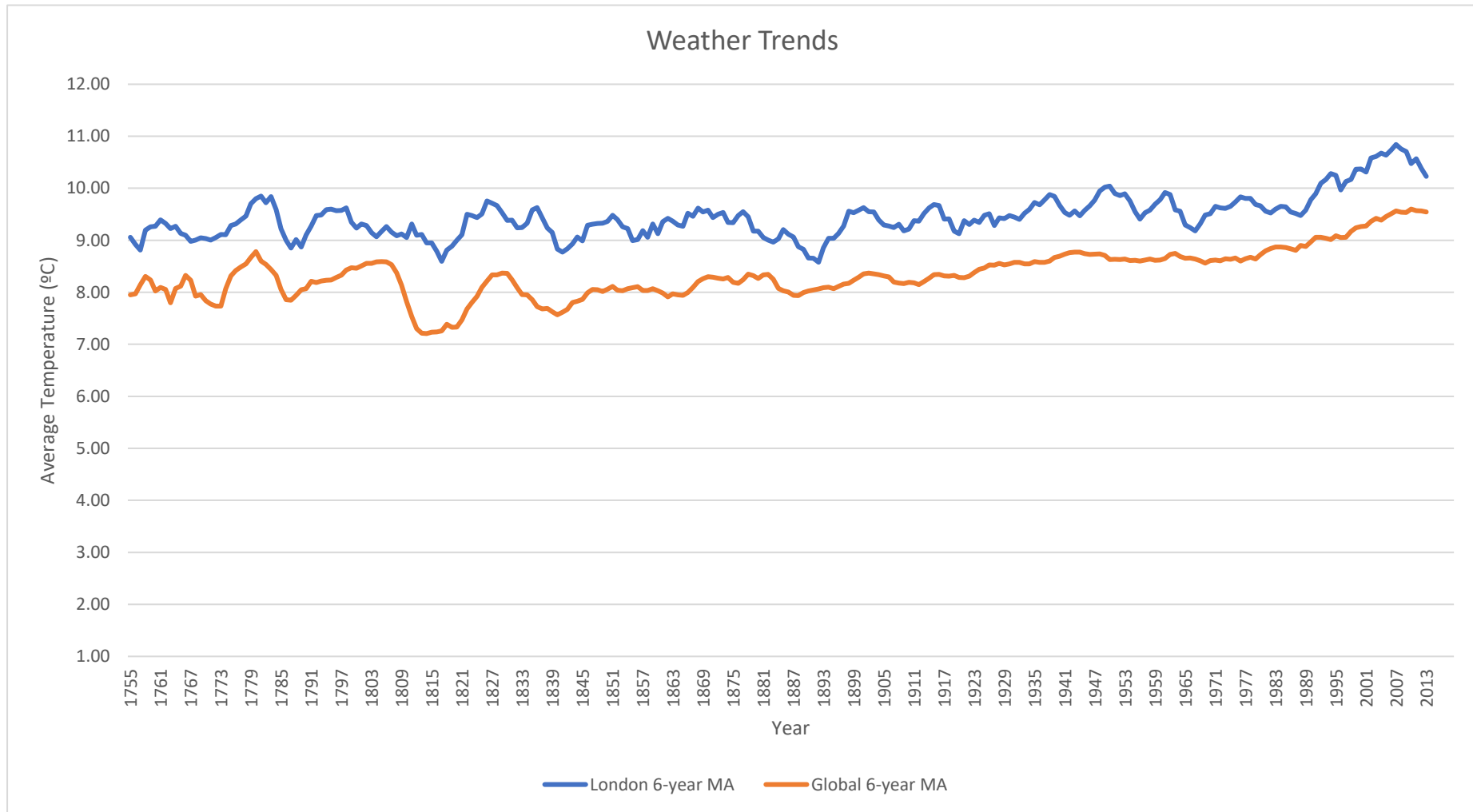


Figure 5: Weather Trends Line Graph

The following observations were made based on the graph:

- 1- London weather seems to be generally hotter compared to global weather
- 2- The average temperature in London reached its highest in 2008 reaching 10.75
- 3- The lowest global temperature of 7.21 was recorded in 1813 and 1814
- 4- The global temperature was fluctuating between high and low until 1888, after that it seems to be in a stable yet slow increase reaching 9.55 in 2013
- 5- The changes in the temperatures in London are fluctuating which shows an unstable trend
- 6- The overall trend is that the world is getting hotter over the years

The lines on the graph also show a positive relationship between the global average temperature and London average temperature. The value of correlation coefficient calculated = 0.819125.

In the below graph, the moving average of Cairo was added. It shows that temperature in Cairo, Egypt is significantly higher than global average. The trend of the weather in Egypt seems stable with an unusual drop in the year 1823.

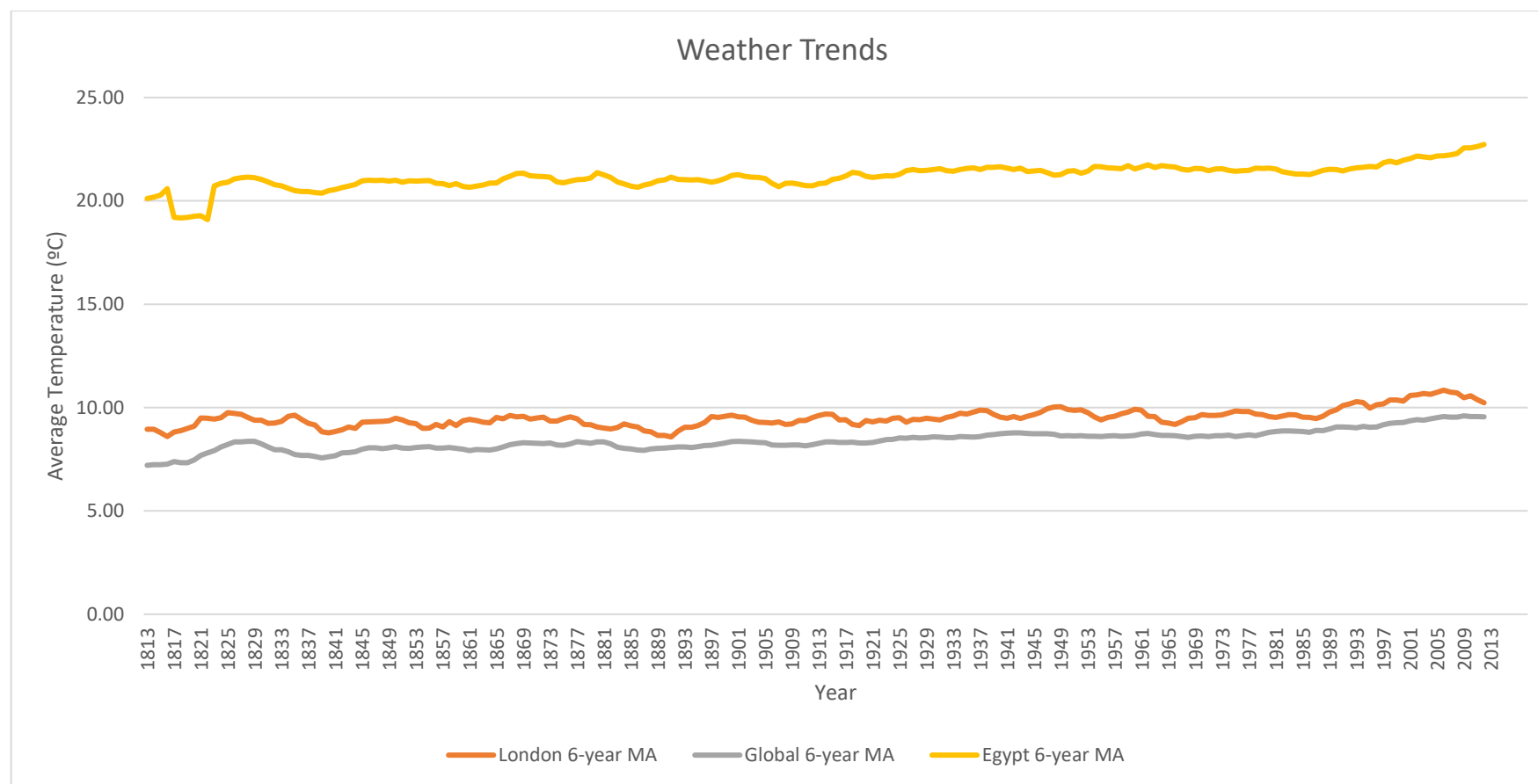


Figure 6: Global, London and Egypt