

Explore Weather Trends Project

Project outline and steps

1. Data Extraction:

First I extracted all cities in the data base in the city_list table, my goal was to look for two cities, one with an average temperature that I assume is higher than global average and another with an average temperature lower than global average.

I have used the below code in SQL:

```
Select *  
      From city_list
```

The first city I chose was Abu Dhabi, and I have used the below code to extract Abu Dhabi's data from the city_data table:

```
Select *  
      From city_data  
Where city='Abu Dhabi'
```

The first city I chose was Moscow, and I have used the below code to extract Abu Dhabi's data from the city_data table:

```
Select *  
      From city_data  
Where city = 'Moscow'
```

Finally, I extracted global temperature data from the global_data table, using the below SQL code:

```
Select *  
      From global_data
```

2. Moving Average Calculation:

For this step I used Excel, I calculated 10 years moving average in the three different CSV files I exported from the database:

- Abu Dhabi average temperature
- Moscow average temperature
- Global average temperature

Then combined it all in one line chart to infer my observations.

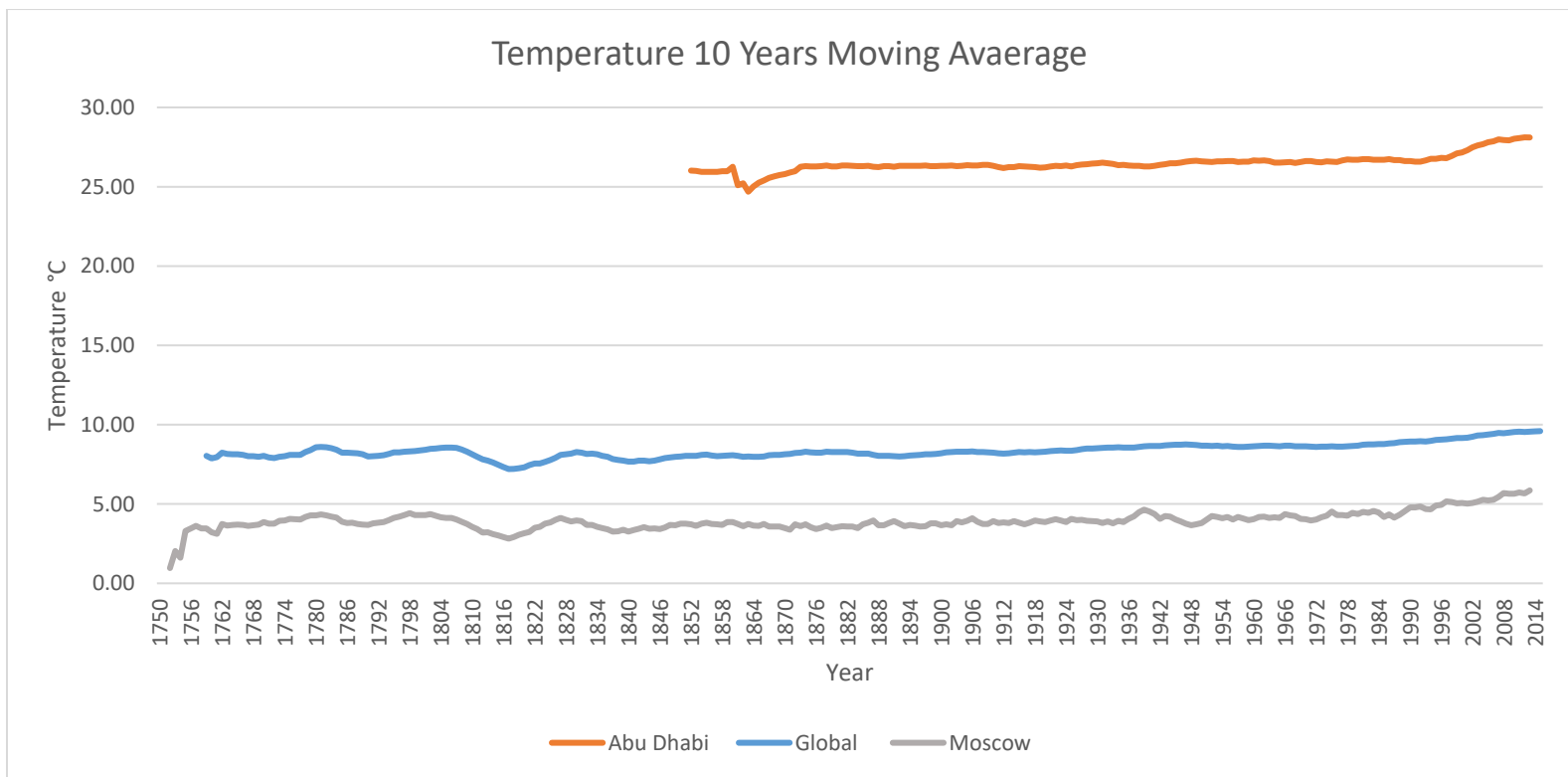
At the 10th year of each of file I used *Average* function for that year and the nine pervious values, I then dragged the function to reach the final year.

2. Data Visualization and observations:

Finally I have combined all moving averages with their respective years in one sheet, data was organized as per the below table sample:

Year	Abu Dhabi	Global	Moscow
1876	26.29	8.24	3.41
1877	26.30	8.25	3.50
1878	26.33	8.30	3.63
1879	26.29	8.28	3.48
1880	26.28	8.27	3.54
1881	26.34	8.28	3.60
1882	26.33	8.28	3.59
1883	26.32	8.24	3.58
1884	26.30	8.18	3.48
1885	26.30	8.18	3.73
1886	26.32	8.17	3.82
1887	26.27	8.11	3.95
1888	26.24	8.03	3.67
1889	26.29	8.05	3.67
1890	26.29	8.03	3.81
1891	26.26	8.01	3.92
1892	26.31	8.00	3.75

since the data is related to time and it expands over a long period of years (around 270 years), the line chart is the best tool to visualize and compare cities results to global temperature. Thus, I created a line chart that compares the three different categories:



Below is the four observations I notice in the readings:

1. The overall trend in the three categories is slightly upwards, although there are several years where the temperature decreased:
 - Abu Dhabi going from the 1950s to the 1960s
 - Moscow at the beginning of the 1800s
 - Average global temperature has also decreased at the beginning of 1800s

However the pattern of global warming can be seen unequivocally in this line chart as global temperature rise through the years.

2. We can notice the rapid rise in temperature for all three categories starting from 1940s, this can be attributed to the start of the increase of world population and industrialization that increased carbon dioxide emissions which has raised the global temperature. It can be seen that by today:
 - Average global temperature reaches an all time high around 10 °C

- Abu Dhabi average temperature reaches its peak of around 28 °C
 - Moscow also reaches its average temperature peak which is around 7 °C
3. The 10 years moving average have smoothed some extreme lows and highs in Abu Dhabi and Moscow temperature which are worth mentioning:
- Moscow average temperature was -6.13 °C in 1745
 - Abu Dhabi reached its all time high of 28 °C in 2010
4. We can notice in the chart that there are some gaps in terms of records for both Abu Dhabi and Moscow compared to global temperature:
- Abu Dhabi records start at 1843, compared to global temperature which record keeping starts at 1750. This lack of data could be attributed to Abu Dhabi's relatively being a modern city compared to other ancient cities.
 - Moscow record keeping started in 1743 which preceded the global record by 7 years.