**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 fours 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.

1. We can notice the rapid rise in tempurature 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 tempurature. 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
2. 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 it all time high of 28 °C in 2010

1. We can notice in the chart that there are some gabs in terms of records for both Abu Dhabi and Moscow compared to global temperature:

* Abu Dhabi records starts 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.