Project : Exploring Weather Trends

Project Prep : SQL and Moving Averages

Summary :
In this project, you will analyze local and global temperature data and compare the temperature trends where you will live to overall global temperature trends.

Instructions :
Your goal will be to create a visualization and prepare a write up describing the similarities and differences between global temperature trends and temperature trends in the closest big city to where you live.

PART A : Extracting The Data

Tools : SQL on Udacity's SQL Workspace
Action : Extract data from the temperatures database, then download the results to a CSV file

Step 1 - found the closest big city to where I live; that is Nairobi, Kenya :

```
SELECT * FROM city_list
WHERE country = 'Kenya' and city = 'Nairobi';
```

Step 2 - extracted local City Temperature Data and exported the data to a CSV file :

```
SELECT year,  avg_temp
FROM city_data
WHERE country = 'Kenya' and city = 'Nairobi' ;
```

Step 3 - extracted Global Temperature Data and exported the data to a CSV file :

```
SELECT *
FROM global_data ;
```

PART B : Open up the CSV Files
Tool : Google sheets

PART C : Create a Line Chart

Tool : Google sheets
Action : Create a Line Chart that compares your city's temperatures with the global temperatures.

Step 1 : Calculate the Moving average on both Local and Global Temperature
Tool : Google sheets

Calculated a 11-year Moving Average on both Local and Global Temperature.

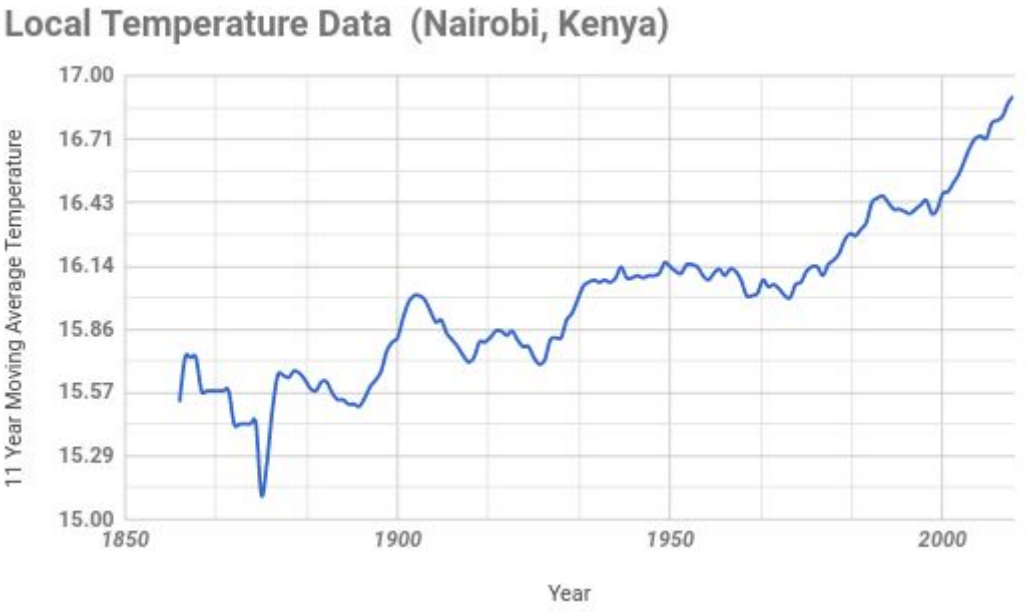
Moving Average was calculated by creating a new column to store the Moving Average on the 11th year on the exported data ,that is year 1760 on global data and 1860 on city data, used AVERAGE() function to calculate average temperatures for the first 11 years on record; then replicated the process until the end of the dataset(s) . Finally I rounded up the 11-year Moving Average to 2 decimal places on both Local and Global Data - so as to have similar format on the plot data.

The reason for using an 11-year Moving Average was that between the years 1850 to 1874 , City Temperature Data on Nairobi, Kenya had multiple occurrences on missing data; the largest period spanning 10 years that is between 1865 to 1874 (so as to prevent division by zero while calculating the moving averages - I chose to use an 11 year Moving Average).

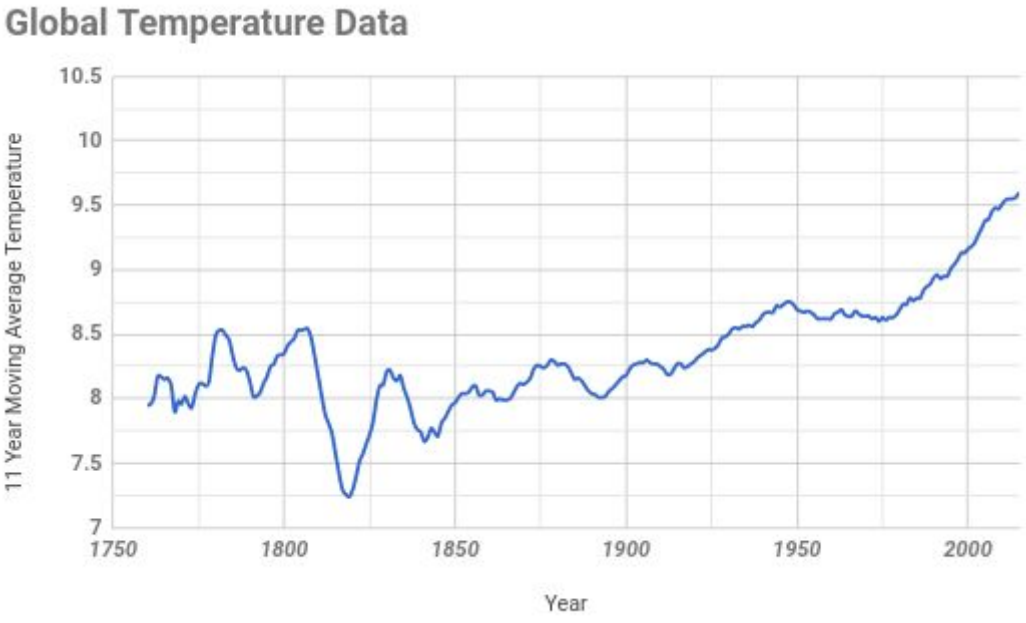
Step 2: Create a Line Chart
Tool : Google sheets
Action : Plot moving average rather than the yearly averages in order to smooth out the lines and making trends more observable the line

By selecting year and the moving average columns ; clicked on the chart button to plot Local and Global Temperature Trends

Plotted Local (Nairobi, Kenya) Temperature Data on a line chart below :



Plotted Global Temperature Data on a line chart below :



PART D : Make Observations

Please note that all values quoted below are from the calculated 11-year Moving Averages.

Observation 1

On average Nairobi, Kenya is hotter compared to the global average. The trend has been consistent over last few hundred years with lows of 15.11 (1875) and highs of 16.91 (2013) on local temperatures - in comparison to global lows of 7.24 (1819) and highs of 9.6 (2015).

Observation 2

Within the last hundred years there has been a trend of temperatures rising steadily both globally and locally - The trend has been consistent in both cases with the global temperatures rising by 1.37 points , from 1900 (8.18 points) to 2013 (9.55 points) and local temperatures rising by 1.09 points, from 1900 (15.82 points) to 2013 (16.91 points).

Observation 3

Globally the coldest time period on record was between the years 1814 to 1825 (with lows of 7.24 points recorded in 1819) ; while locally the coldest time period on record was between the years 1871 to 1877 (with lows of 15.11 points recorded in 1875) - However it was noted that both locally and globally - after the above periods the temperatures recorded were consistently rising.

Observation 4

Temperatures were noted to fluctuate over a period both locally and globally before they both experienced consistent increase in temperatures. Globally the period was between 1834 to 1914 - temperatures fluctuated recording lows of 7.71 (1845) and highs of 8.3 (1878) while locally the period was between 1904 to 1936 - temperatures fluctuated recording lows of 15.22 (1927) and highs of 16.01 (1904).