Exploring Weather Trends - Project

Local City - Ibadan

1. Tools Used;

A. SQL
B. Google sheets

A. SQL (Structured Query Language):

A Query was written in SQL Workspace provided on the Udacity classroom page to extract data from the temperatures database, then the result was downloaded into a CSV format.

This Query was used to extract data on the average temperature in Ibadan for each year from 1985 to 2013;

```
SELECT year, avg_temp
FROM city_data
WHERE country LIKE 'Nigeria' AND city like 'Ibadan'
ORDER BY year;
```

This Query was used to extract data on the Global average temperature for each year from 1750 to 2015;

```
SELECT *
FROM global_data;
```

B. Google Sheets:

The data was downloaded in a CSV format and imported into a google sheet for cleaning and preparation.

Data cleaning processes;

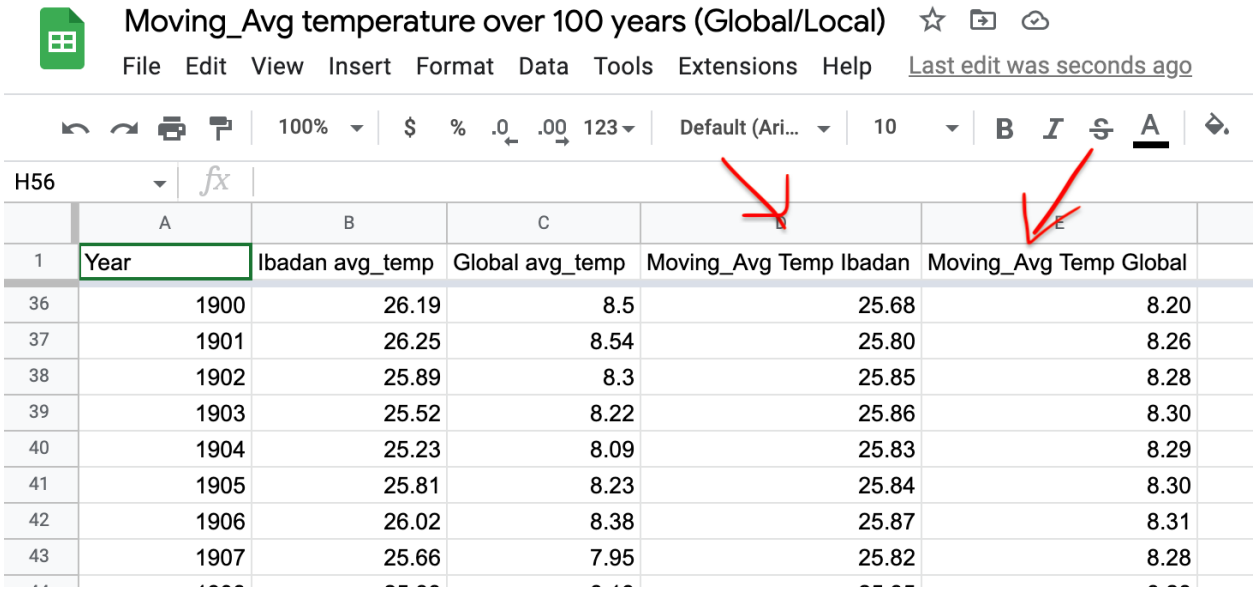
I. Null Values were removed (including corresponding years)
II. Since we are concerned about the average temperature of my city(Ibadan) over a period of hundred years (a century before the millenium), years before 1900 and after 1999 were deleted

2. How I Calculated the Moving Average;

Calculated the 10 years moving average over the course of a century from 1900 to 1999, the century before the millennium. This calculation was done both for the global average temperature within those years and the average temperature in my local city (Ibadan), using the data in the CSV file containing Avg temperature of both my local city(Ibadan) and Globally.

Calculation(in Google sheets);

A. Created two new Columns named; “Moving Avg Temp Ibadan” and “Moving Avg Temp Global” in which the moving average values for local city and Global moving averages would be stored respectively as seen in the image below.



Moving_Avg temperature over 100 years (Global/Local)

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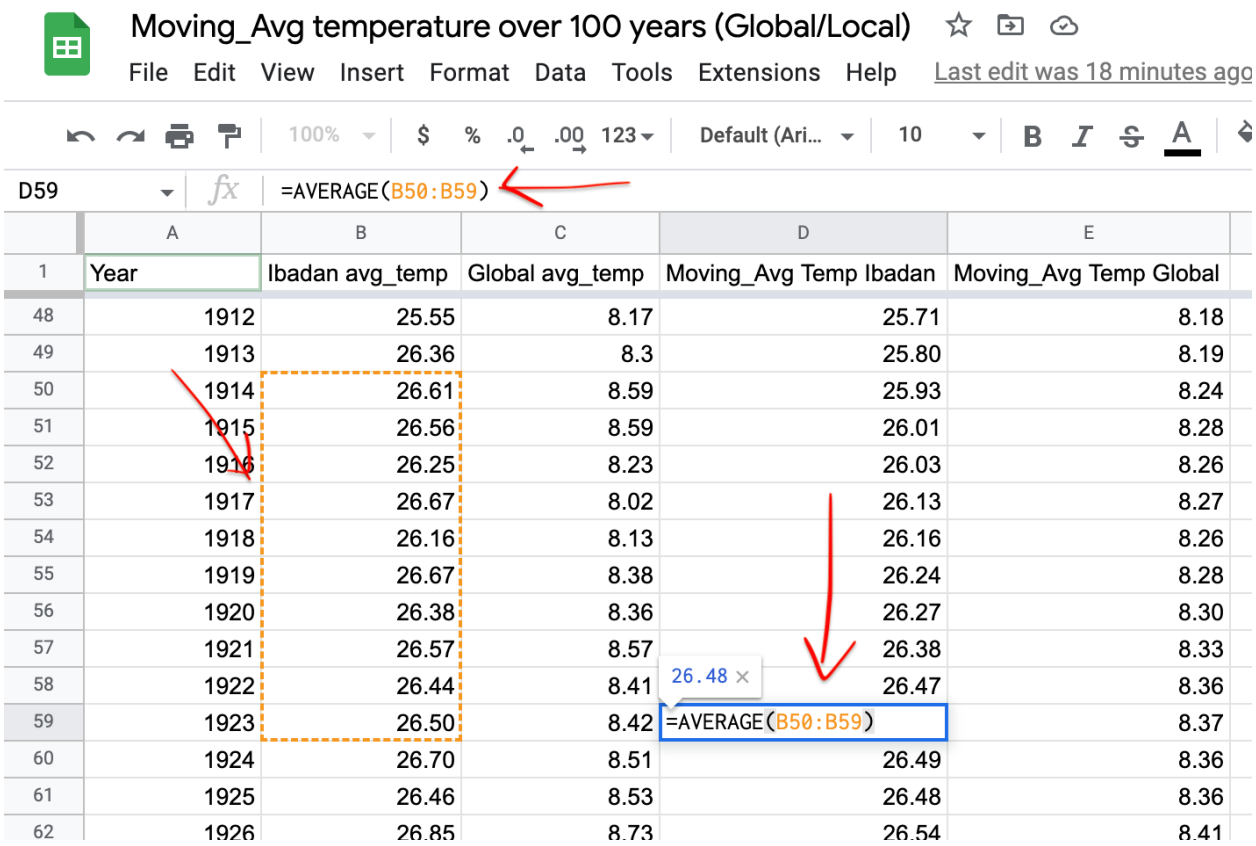
	A	B	C	D	E
1	Year	Ibadan avg_temp	Global avg_temp	Moving_Avg Temp Ibadan	Moving_Avg Temp Global
36	1900	26.19	8.5	25.68	8.20
37	1901	26.25	8.54	25.80	8.26
38	1902	25.89	8.3	25.85	8.28
39	1903	25.52	8.22	25.86	8.30
40	1904	25.23	8.09	25.83	8.29
41	1905	25.81	8.23	25.84	8.30
42	1906	26.02	8.38	25.87	8.31
43	1907	25.66	7.95	25.82	8.28

B. Using the AVERAGE() function, I divided the temperature values from the previous 9 years including the current one (10yrs total) and calculated the moving average for each year. Proceeded to calculate the field for both the local and Global moving average columns as seen in the image below;



	A	B	C	D	E
1	Year	Ibadan avg_temp	Global avg_temp	Moving_Avg Temp Ibadan	Moving_Avg Temp Global
48	1912	25.55	8.17	25.71	8.18
49	1913	26.36	8.3	25.80	8.19
50	1914	26.61	8.59	25.93	8.24
51	1915	26.56	8.59	26.01	8.28
52	1916	26.25	8.23	26.03	8.26
53	1917	26.67	8.02	26.13	8.27
54	1918	26.16	8.13	26.16	8.26
55	1919	26.67	8.38	26.24	8.28
56	1920	26.38	8.36	26.27	8.30
57	1921	26.57	8.57	26.38	8.33
58	1922	26.44	8.41	26.47	8.36
59	1923	26.50	8.42	=AVERAGE(B50:B59)	8.37
60	1924	26.70	8.51	26.49	8.36
61	1925	26.46	8.53	26.48	8.36
62	1926	26.85	8.73	26.54	8.41

C. Went ahead to plot a line chart showing the visualization of the calculated fields (the moving averages of Local and Global), and how they compare to each other.

3. Key considerations when deciding how to visualize the trends

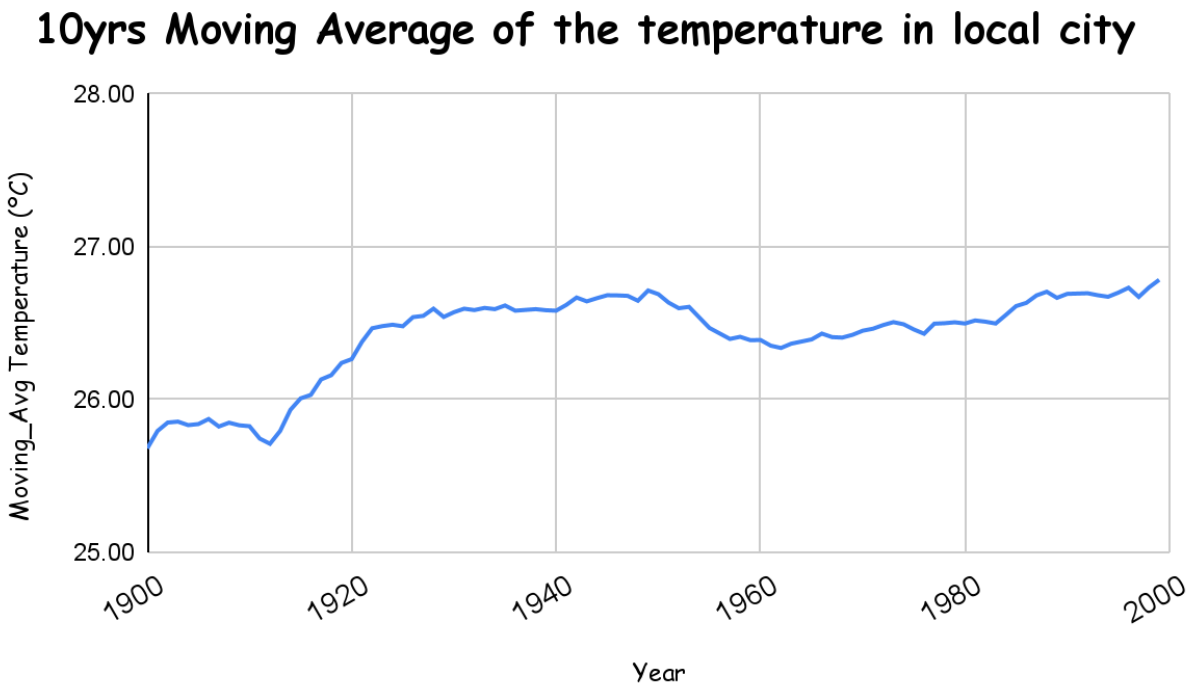
i. I considered the number of years available in each of the data (local and global), and there happened to be significantly more data available for global avg temperature *(1750-2015)* than there was for the local avg temperature *(1856-2013)*. This prompted me to calculate a 10yr moving average from 1900 to 1999, *a span of 100yrs,* and get an insight into the contrasting temperature changes that occurred between my local city(Ibadan) and globally.

ii. I also set the interval on the vertical axis to 1ºC, this ensured that the changes that occurred between the high point and low point of temperature on each of the charts were properly highlighted.

iii. I also considered using a line chart as this type of visualization focuses on detailing little changes in the trend of data than other types of visualization. Line charts are also good for time-series analysis

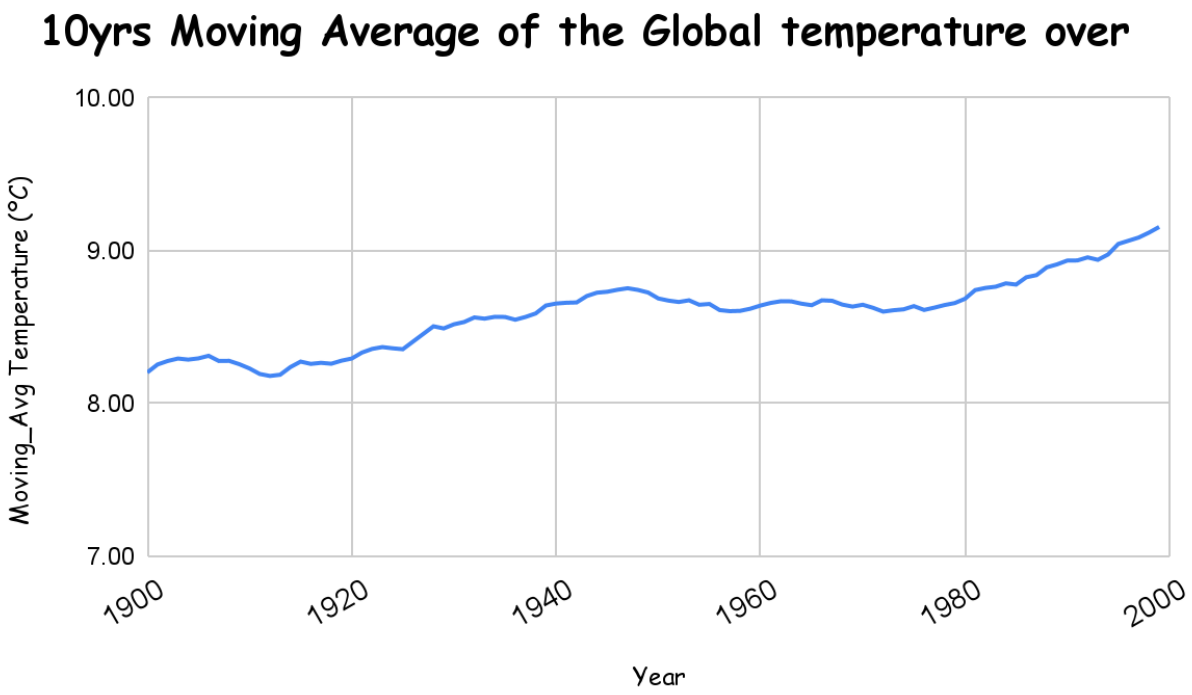
4. Line chart with local and global temperature trends

I. Local(Ibadan) Temperature Trend;



N.B I set the interval on the vertical axis to 1°C, highlighting the changes that occurred between the high point (25°C) and the low point (28°C)

II. Global Temperature Trend;



N.B I set the interval on the vertical axis to 1°C, highlighting the changes that occurred between the high point (7°C) and the low point (10°C).

5. Observations

i. The average temperature between 1900 and 1999 was significantly higher in my local city(Ibadan), standing at 26.47ºC, while the average global temperature within that same period was significantly lower at 8.64ºC.

ii. There's been a relatively consistent margin between the temperature in my local city(Ibadan) and global temperature throughout the period of 100 years. From the visualization above, we can see that in 1900 the avg temp was 25.68ºC and 8.20ºC respectively with a margin of 17.48ºC, and at the end of 100years, the avg temp was 27.23ºC and 9.56ºC respectively with a margin of 17.67ºC.

iii. Over the course of 100years the temperature rose by approximately 1ºC locally and globally.

iv. From the visualization, there was a slight decrease in temperature in 1916 followed by a noticeable jump/rise in temperature continuing into the following years and eventually plateauing from the 1940s into the 1950s.

vi. Based on the visualization, the temperature of the world is trending higher indicating that the world is getting hotter, an increase of ~1°C might not sound like a lot, but it has a huge adverse ecological impact on the world. This suggests that as humans, we must look for more sustainable means of fuel for everyday life, as fossil fuel use is one of the biggest contributors to global warming