

PROJECT TYPE: EXPLORE WEATHER TRENDS

NAME: AMOS MOSES OMOFAIYE

EMAIL: mosesomofaye@yahoo.com

PROCEDURE AND OUTPUT

SQL USED TO EXTRACT DATA

1. Before extraction, I first previewed all data in each table using the following SQL:

```
SELECT *
```

```
FROM city_list
```

```
LIMIT 20;
```

```
SELECT *
```

```
FROM city_data
```

```
LIMIT 20;
```

```
SELECT *
```

```
FROM global_data
```

```
LIMIT 20;
```

2. Because I live in Northern Nigeria very close to Abuja, I extracted Abuja data using the following SQL:

```
SELECT *
```

```
FROM city_data
```

```
WHERE city = 'Abuja';
```

3. Then I extracted global data using:

```
SELECT *
```

```
FROM global_data;
```

4. And because I want to compare Nigeria with neighbouring cities, I extracted data for Accra and Abidjan too.

```
SELECT *
```

```

FROM city_data
WHERE city = 'Accra';
SELECT *
FROM city_data
WHERE city = 'Abidjan';

```

PREPARING DATA FOR LINE CHART

5. I took some time out to read on the choice of moving averages for temperature data and I decided to settle on moving average of 30 years and 5 years to be plotted in different charts. Thereafter I created an excel sheet to house all the data that I will use in creating the line chart. This file I titled *tempdata.xlsx*. And then I calculated the moving averages using 30 and 5 years respectively for global and city average temperature data.
6. Because the data for Abuja started from 1856, I used global data starting from 1856 also so as to have equal data points.
7. Abuja has no data for 1863-1872 and 2014-2015. But I am certain that temperature is not zero(0) in those years, therefore I substituted the average data for the years before them for those years. In general, as a result, I have 160 data points to compare for both variables.
8. Using a moving average of 30 years (this is due to climate definition), I end up having 130 equal data sets for both variables. I made sure that I left all data points to four decimal places. This dataset was then used to draw the line chart below.

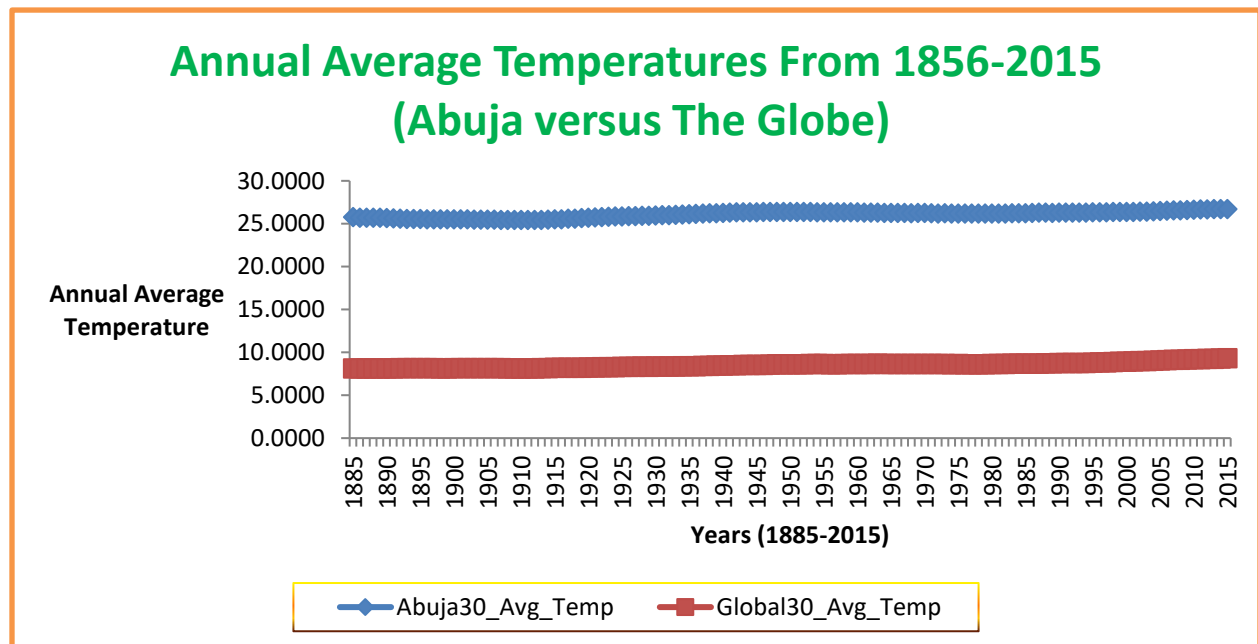


Figure 1: Abuja versus Global Annual Temperature using 30 years Moving Average

From these data, the correlation coefficient is **0.920454**.

The regression line of Global against Abuja is $y = 0.008x + 25.51$ with $R^2 = 0.782$

THE USED LINE CHARTS BASED ON 5 YEARS MOVING AVERAGES

9. Because the trend in the 30 years moving average is difficult to see, I decided to use 5 years moving average. And the chart below is the result of plotting 5 years moving averages for both Abuja and Global Annual Temperature.

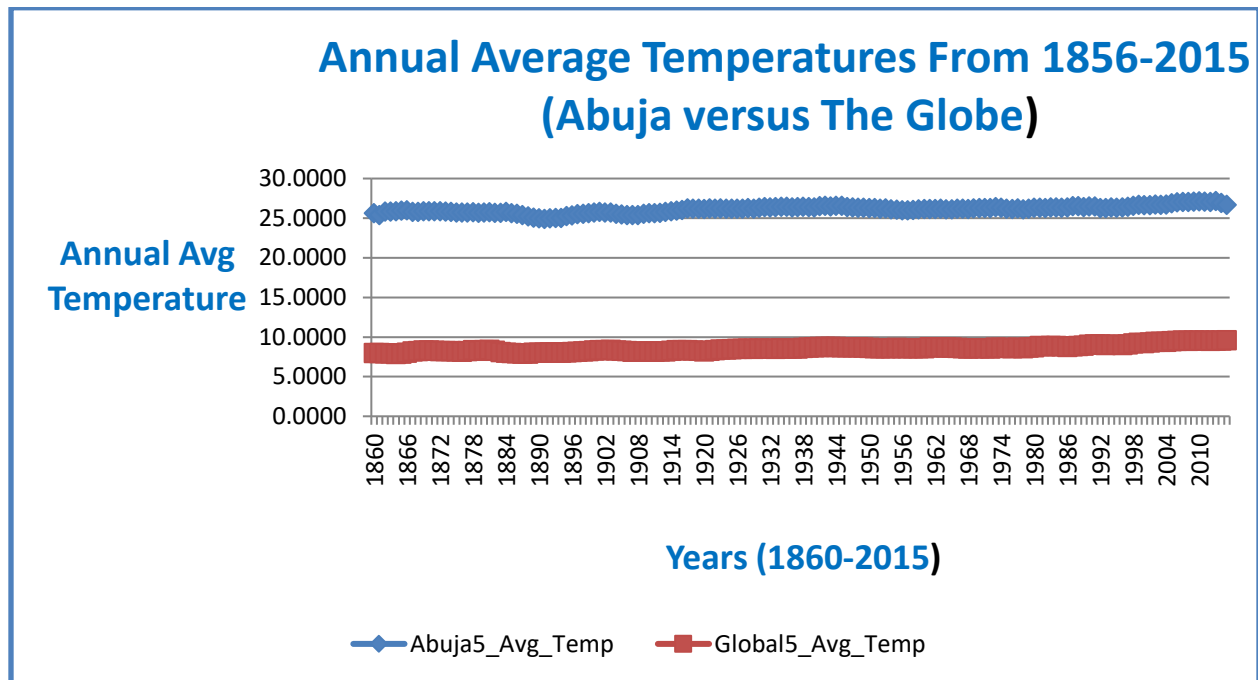


Figure 2: Abuja versus Global Annual Temperature using 5 years Moving Average

In this dataset the correlation coefficient is **0.875996** and the regression line is $y = 0.008x + 25.47$ with $R^2 = 0.639$

10. Next, I calculated 5 years moving averages for both Accra and Abidjan in order to be able to compare temperature trends among them and Abuja.
11. Finally, I plotted the line chart using excel, as usual.

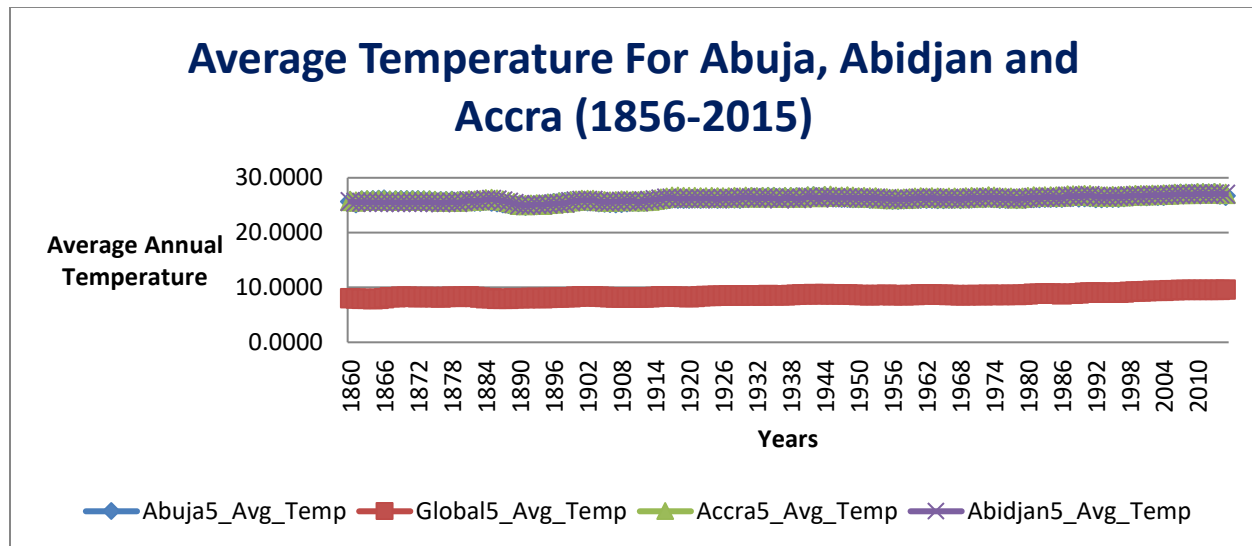


Figure 3: Abuja, Abidjan, and Accra versus Global Annual Temperature using 5 years Moving Average

In this dataset the correlation coefficients are:

0.968161 0.935134 0.982931

For Abuja-Accra, Abuja-Abidjan, and Accra-Abidjan respectively.

12. Finally, my observations are as listed below:

1. Abuja is on the average hotter than the global average. This is understandable because Abuja is in the tropical region of the world.
2. The difference has been consistent overtime. It is normal that a tropical city like Abuja should be hotter than the global average consistently.
3. Abuja's temperature trend greatly mimics global temperature trend. According to the graph, between 1890 and 1896 the city's temperature dropped and so is the world temperature. Between 1932 and 1950, the city's temperature greatly increased and so does the world temperature. The only difference is that the global temperature does not rise as much.
4. From 1986 to 2013, Abuja's temperature kept increasing. The global temperature also kept increasing. Although the graph shows a slight dip in 2014 and 2015, this does not accurately mirror reality because the data for the two years were derived from the average of 2012 and 2013 because they were originally not available. To understand this better, the global graph should be studied. It does not show any dip in increase from 1986 to 2015 and the data used were the accurate (original) one.
5. To show the relationship between Abuja's temperature and global temperature, the correlation coefficient was calculated and this gave a strong correlation of **0.8759**.
6. The overall trend shows that the world is getting hotter. This has been greatly consistently since 1986.
7. These observations are also true for Accra and Abidjan.