

EXPLORE WEATHER TRENDS- ABUJA (LOCAL) VS GLOBAL TEMPERATURE

INTRODUCTION

In this project, I analysed data on average temperature in Abuja and globally between 1856 and 2013. This project was completed as part of the [Data Analyst Nanodegree](#) with **Udacity**. The **goal** of this analysis is “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.”

Data: The temperature database containing the data is located on [Udacity](#). There are three tables in the database:

1. `city_list` - This contains a list of cities and countries in the database
2. `city_data` - This contains the average temperatures for each city by year (°C)
3. `global_data` - This contains the average global temperatures by year (°C)

ANALYSIS TOOLS:

SQL and **Microsoft Excel** was used for this analysis



MY APPROACH

This analysis was done systematically using 5-step approach as shown in the figure 1 below

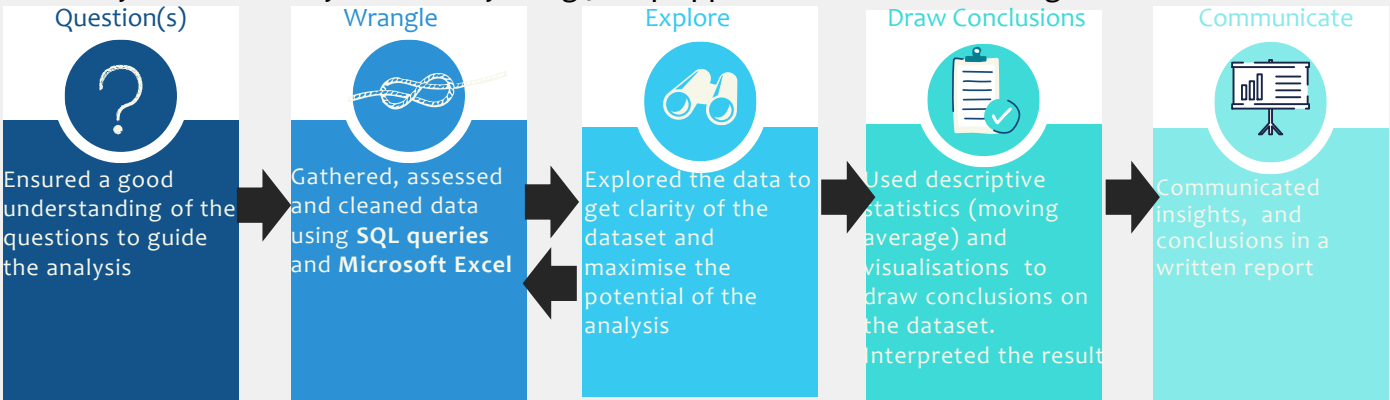


Figure 1: 5-step analysis process designed by Scholastica Olanrewaju on Canva

1. Questions

This analysis set out to answer the following questions.

1. Is Abuja hotter or cooler on average compared to the global average? Has the difference been consistent over time?
2. How do the changes in Abuja’s temperatures over time compare to the changes in the global average?
3. What does the overall trend look like? Is the world getting hotter or cooler? Has the trend been consistent over the last few hundred years?

2. Wrangle

The temperature database was queried using SQL queries to check for the local city -Abuja in the database (figure 2), understand the dataset (figure 3) and extract data figure 4). Then the result consisting of 158 records was downloaded in CSV.

```
1 SELECT DISTINCT city
2 FROM city_list
3 ORDER BY city
```

Figure 2: Assessing City

```
1 SELECT *
2 FROM city_data
3 LIMIT 5
```

Figure 3: Understand the dataset

Input

SCHEMA

city_data

city_list

global_data

1

SELECT cd.*, gd.year AS global_year, gd.avg_temp AS global_temp

2

FROM city_data AS cd

3

JOIN global_data AS gd

4

ON cd.year = gd.year

5

WHERE cd.city = 'Abuja'

Success!

EVALUATE

Output

158 results

Download CSV

year	city	country	avg_temp	global_year	global_temp
1856	Abuja	Nigeria	26.93	1856	8.00
1857	Abuja	Nigeria	24.67	1857	7.76

Figure 4: Extracting the data

In [spreadsheet \(Microsoft Excel\)](#), the following was checked or done to **clean the data**.

- i. Checked ‘year’ for duplicates. There was no duplicate
- ii. Checked all columns for missing data. 10 rows had missing average temperature for Abuja (1863 to 1872). Deletion was used to [handle the missing data](#). Given that this represents less than 6% of the observations, it was deleted.
- iii. ‘global_year’ column was deleted as it is the same with ‘year’ column.
- iv. Adjusted ‘avg_temp’ and ‘global_temp’ to 2 decimal places

3. Explore

- Plotted 2 histogram to explore the distribution of Abuja and global temperature
- Added 2 columns ('abuja_moving_avg' and 'global_moving_avg') to the data table to calculate the 10-year moving average for Abuja and Global temperature respectively using Excel's average function. Moving average will smooth out the lines and make the trends easier to observe.
- A line graph was used to visualize the trend in average temperature (a continuous variable) and compare Abuja to global temperature.
- Made a scatter-plot between temperature in Abuja and global temperature to assess the correlation.
- Correlation coefficient was calculated using Excel's CORREL. This was calculated to be **0.76**.
$$=CORREL([avg_temp],[global_temp])$$

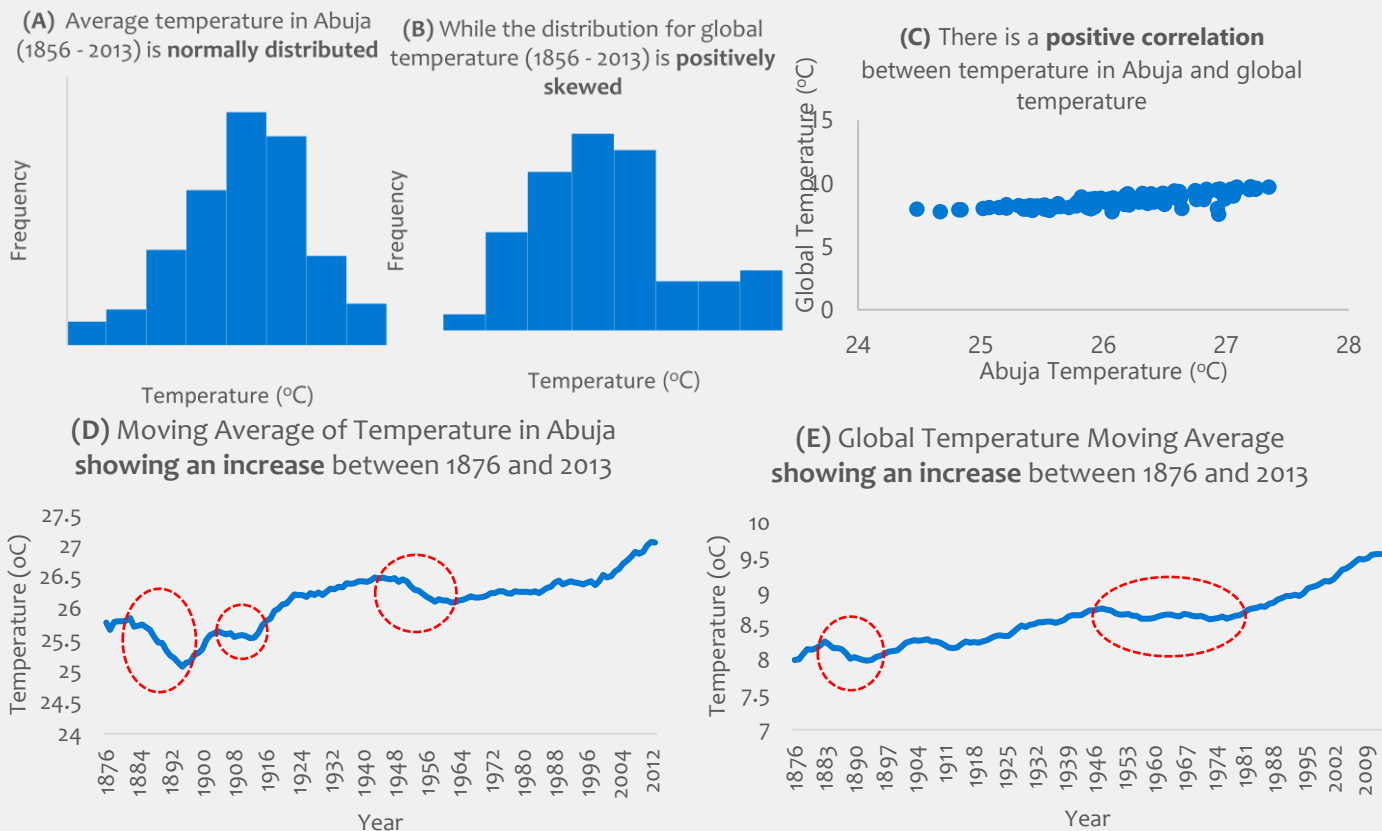


Figure 5: Histogram of average temperature in Abuja (A), Histogram of global temperature (B), scatter plot of global temperature vs average temperature in Abuja (C), Line graph of moving average for temperature IN Abuja (D) and global temperature (E)

4. Draw Conclusions

From the descriptive analysis and visualisation of the data, the following conclusions was drawn in response to the questions.

- While temperature in **Abuja is normally distributed**, the **global temperature is positively skewed** (Figure 5a and 5b).
- The scatter-plot (Figure 5c) and correlation coefficient of **0.76** indicates a **positive correlation** implying that as global temperature is increasing, the temperature in Abuja is also increasing. Note that this does not imply causation.
- On average, **Abuja is consistently hotter than the global temperature**. Abuja's temperature was an average of 26.1 (range: 24- 26) °C while the global temperature average was 8.6 (range: 7-9) °C within the period of review.
- Overall and within the period of review (1876 to 2013), the temperature in both Abuja and the Globe showed an **upward trend**. That is, Abuja and the globe is getting hotter. However, there were years within the period when the temperature showed a decline between **1886 -1895** and the period between **1955-1958**.

This analysis showed that while the temperature in Abuja is higher than the global temperature, the temperature in Abuja and the globe are positively correlated and increased within the period of review.

It is recommended that more research should be done on the period 1886-1895 and 1955-1958 when the temperature declined as there might be lessons from history in it to guide relevant stakeholders to stop global warming.

5. Communicate

Insights, visualisations, and conclusion of the analysis to explore weather trends was shared in this written report