# Data Visualization of Weather trends

Comparing the temperature trends of Rio de Janeiro with global trends

## Overview of the steps taken

At first, the data of global and local temperatures were extracted using SQL queries. After that, I calculated the moving average in Excel with the function AVERAGE. Then, I generated a line chart with the results in Excel. This visualization allows us to easily recognize the correlations of both weather trends providing us with the tools to analyze the data and draw conclusions. Indeed, the final step takes this into account and presents four observations of the resulted chart.

## 1. Extraction of data

With the following SQL query, I determined which Brazilian cities are contained in the data.

```
SELECT *
FROM city_list
WHERE country IN (‘Brazil’)
```

After that, I could define Rio de Janeiro as the city I would use in this exploratory analysis. In order to extract the city and global data, I used the query below:

```
SELECT g.year, g.avg_temp global_temp, c.city, c.avg_temp city_temp
FROM global_data g
JOIN city_data c
ON c.year = g.year
WHERE g.year >= 1851 AND g.year <= 2013 AND c.city = ‘Rio De Janeiro’
```

To take the temperatures at global and local levels, I used a JOIN considering the year as a link between both tables. Besides, as the data available for Rio de Janeiro were missing for years before 1851 and after 2013, I decided to use a year range where both temperatures could be compared.

As soon as I checked if the data were correct, I downloaded the resulting tables into a CSV file.The table contains four columns (year, global average temperatures, city name and city average temperatures).

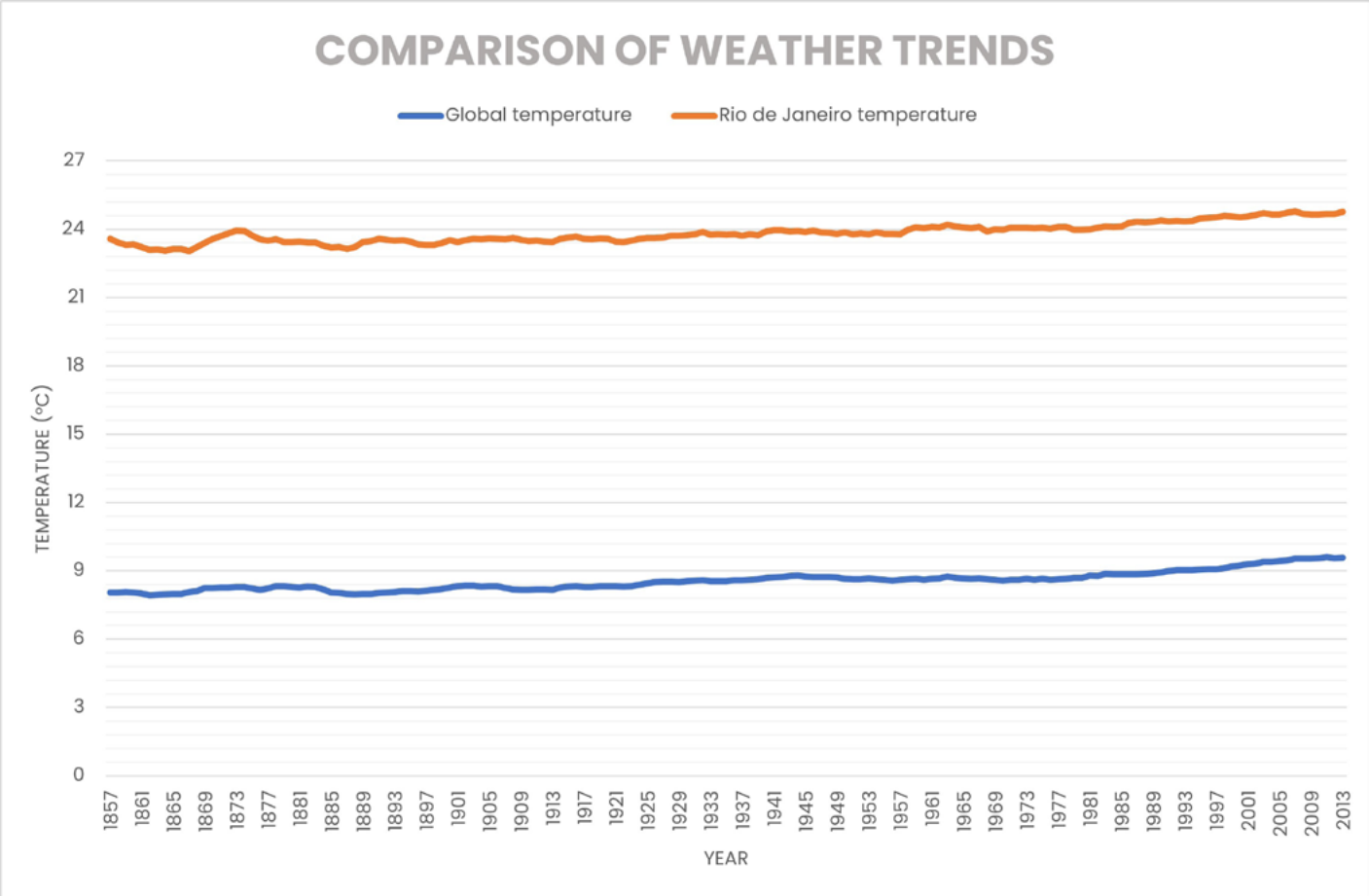
## 2. Calculating the moving average

To better visualize the temperature trends, a calculation of a 7-year moving average for both data (global and local temperatures) was necessary. Therefore, after opening up the CSV file, I applied the function AVERAGE in Excel, taking the first seven rows of temperatures as arguments. Following this, to get the complete moving average, this function was replicated in the remaining rows.

| year | global_temp | Global temperature |
|---|---|---|
| 1851 | 8.18 | |
| 1852 | 8.1 | |
| 1853 | 8.04 | |
| 1854 | 8.21 | |
| 1855 | 8.11 | |
| 1856 | 8 | |
| 1857 | 7.76 | =AVERAGE(B2:B8) |

## 3. Line Chart Visualization

After calculating the moving average, I created a line chart using the resulted values in Excel. The chart is presented below.



# 4. Observations

Representing the data in a line chart helps us to recognize some patterns. Here I draw some conclusions brought by the analysis of this data.

**1.** In the line chart, you may notice that the average temperatures for Rio de Janeiro are higher than those on a global level. Over time the city temperatures had a variation ranging from 22.37°C to 25.19°C while the global ones varied from 7.56°C to 9.73°C. Besides, the temperatures have been keeping a consistent difference over the years.

**2.** During the 1860s, the world and city of Rio de Janeiro became warmer. It's noticeable, however, that locally the curve presents a steeper increase. Along with the 1870s, both curves reached a peak. Following this, it happened a decrease in the temperatures in the 1880s.

**3.** From the 1940s to the 1980s, temperatures passed through a relatively stable period in both levels. The ones registered in Rio de Janeiro were around 24°C. While globally, they were about 8.7°C.

**4.** In the 1980s, both weather trends experienced an accelerated increase in temperatures. This pattern is present till the end of the curves following through the 1990s and the 2000s.