Exploring Weather Trends

1. Extracting Data Using SQL:

- Find a **closest city** from the given data:
  - List all countries and cities found in **city_list** table
  - And order them alphabetically to easily find the closest city
  - Using the following query:

```
SELECT *
FROM city_list
ORDER BY country
```

- Then, wrote the query to extract the **city level data**:

```
SELECT year, avg_temp
FROM city_data
WHERE country = 'Syria' AND city = 'Damascus'
```

- After that, wrote the query to extract the **global level data:**

```
SELECT *
FROM global_data
WHERE country = 'Syria' AND city = 'Damascus'
```

2. Analyzing the Data Using Excel:

- **Combine** the two files based on the **start and end date years:**
  - The resulted data for Damascus starts from 1808, and ends by 2013 years, while the global data starts from 1750 and ends by 2015
  - Therefore, the resulted chart is for **the common timeline between Damascus and global data (1808 - 2013)**

- And computed the **moving average temperature** for each **continuous ten years** for both data temperatures
    - e.g. The temperature for 1817 = AVERAGE (temp(1808) : temp(1817))
      The temperature for 1818 = AVERAGE (temp(1809) : temp(1818))
      …
- The following line chart draws the similarities and differences between Global and Damascus moving average temperature in the duration 1808 to 2013

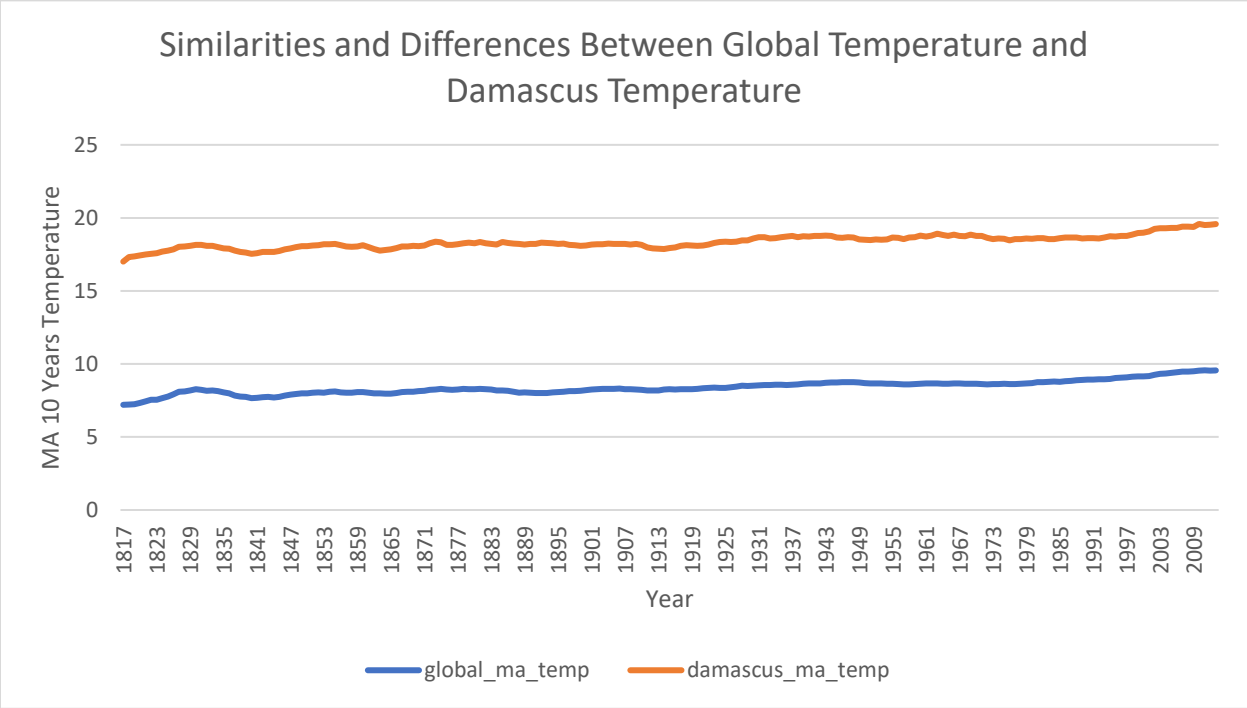

Figure 1. Simlarities and differences Between the ten years moving average of Global and Damascus temperatures in the duration 1808 – 2013.

3. Conclusions

Figure1 shows the following:

- Generally, there is a **Damascus** is **hotter** than the **world** by **10 degrees**:
    - e.g. The global MA temperature average in **1948** was **8.744**, however Damascus MA temperature was **18.649** degrees
    - And that difference remained till late times as the degrees in 2013 was **9.556** for the **world** and **19.583** for **Damascus**

- For both **Damascus** and **Global** temperatures there is **slow increment** in the temperatures
    - e.g. Considering the **global** MA temperature average in **1808** it was **7.203**, changed to **8.204** in **1900** and became **9.556** in **2013**
    - The same goes for **Damascus,** which was colder in **1808** with **17.007**, changed to **18.109** in **1900**, and became warmer in 2013 with **19.583** degrees

- It is very high **positively correlated** between the world and Damascus with more than **0.773 correlation coefficient** (computed for the real temperature)

- Based on that highly correlated data, the missing data for **Damascus can be** estimated based on the temperature of the world:
    - e.g. **2015** for the world temperature is **9.83** degrees and Damascus temperature is expected to be **19.79**
        - Computed by adding averaging of the difference between Damascus and the globe to the temperature of the globe that year

- Figure 2 shows the results of analyzing the similarities and differences between Baghdad, Damascus, and globe
    - It is clear that the average temperature for Baghdad is warmer than the Damascus by 5 degrees approximately and by 15 degrees
    - e.g. The global MA temperature average in **1948** was **8.744**, for **Damascus** it was **18.649** degrees and was **22.749** for **Baghdad**

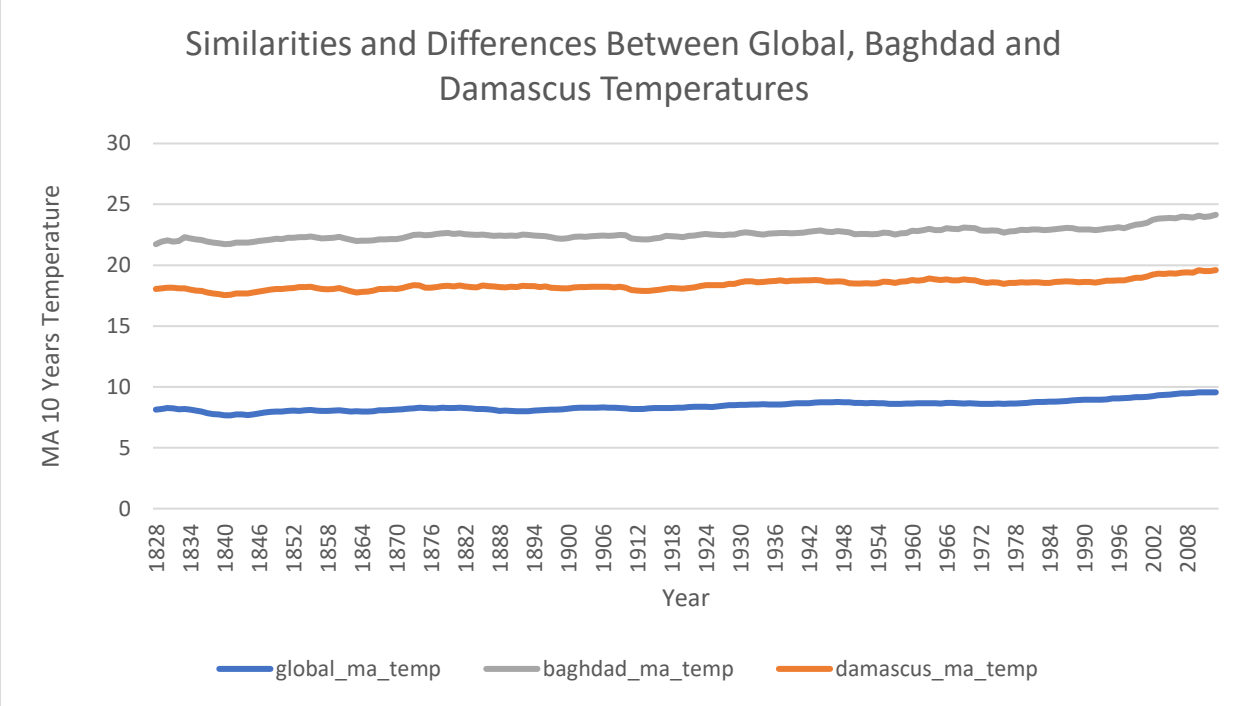

Figure 2. Simlarities and differences Between the ten years moving average of Global, Baghdad and Damascus temperatures in the duration 1819 – 2013.