Exploring Weather Trends

1. **Project Overview**
   This project presents the data analysis applied in UK (local country) and global averages temperatures. The conclusion consists of analysing the similarities and differences between global and local temperatures trends.

2. **Data Acquisition**
   Acessing Data with SQL commands and exporting to a csv format file:

   *select * from city_data*
   *select * from global_data*

   OR

   SELECT city_data.country,
   *   city_data.year,*
   *   city_data.avg_temp as city_temp,*
   *   global_data.avg_temp as global_temp*
   FROM city_data, global_data
   WHERE city_data.year = global_data.year
   *   AND city_data.avg_temp IS NOT NULL*
   *   AND city_data.country = 'United Kingdom'*

3. **Data Wrangling – Using Python to prepare data for analysis**
   :
   3.1.   Reading and Cleaning datasets

```
In [27]: # reading City_Data Dataset
         df1 = pd.read_csv('dataset/city_data.csv')
         df1.head()
```

Out[27]:

	year	city	country	avg_temp
0	1849	Abidjan	Côte D'Ivoire	25.58
1	1850	Abidjan	Côte D'Ivoire	25.52
2	1851	Abidjan	Côte D'Ivoire	25.67
3	1852	Abidjan	Côte D'Ivoire	NaN
4	1853	Abidjan	Côte D'Ivoire	NaN

```
In [4]:  # Replacing "" value for Nan
         df1.replace("",np.nan)
```

Out[4]:

	year	city	country	avg_temp
0	1849	Abidjan	Côte D'Ivoire	25.58
1	1850	Abidjan	Côte D'Ivoire	25.52
2	1851	Abidjan	Côte D'Ivoire	25.67
3	1852	Abidjan	Côte D'Ivoire	NaN
4	1853	Abidjan	Côte D'Ivoire	NaN
5	1854	Abidjan	Côte D'Ivoire	NaN
6	1855	Abidjan	Côte D'Ivoire	NaN
7	1856	Abidjan	Côte D'Ivoire	26.28

```
In [29]:  # Deleting Nan rows
          df1.dropna(subset = ['avg_temp'], inplace=True)
          df1
```

Out[29]:

	year	city	country	avg_temp
0	1849	Abidjan	Côte D'Ivoire	25.58
1	1850	Abidjan	Côte D'Ivoire	25.52
2	1851	Abidjan	Côte D'Ivoire	25.67
7	1856	Abidjan	Côte D'Ivoire	26.28
8	1857	Abidjan	Côte D'Ivoire	25.17
9	1858	Abidjan	Côte D'Ivoire	25.49

3.2.   Concatenating Datasets

```
In [37]:  # Concatenating datasets
          df1 = df1.append(df2, ignore_index=True)

          df1.head(5)
```

Out[37]:

	avg_temp	city	country	year
0	25.58	Abidjan	Côte D'Ivoire	1849
1	25.52	Abidjan	Côte D'Ivoire	1850
2	25.67	Abidjan	Côte D'Ivoire	1851
3	26.28	Abidjan	Côte D'Ivoire	1856
4	25.17	Abidjan	Côte D'Ivoire	1857

3.3. Filtering UK country, global rows and generating a csv file
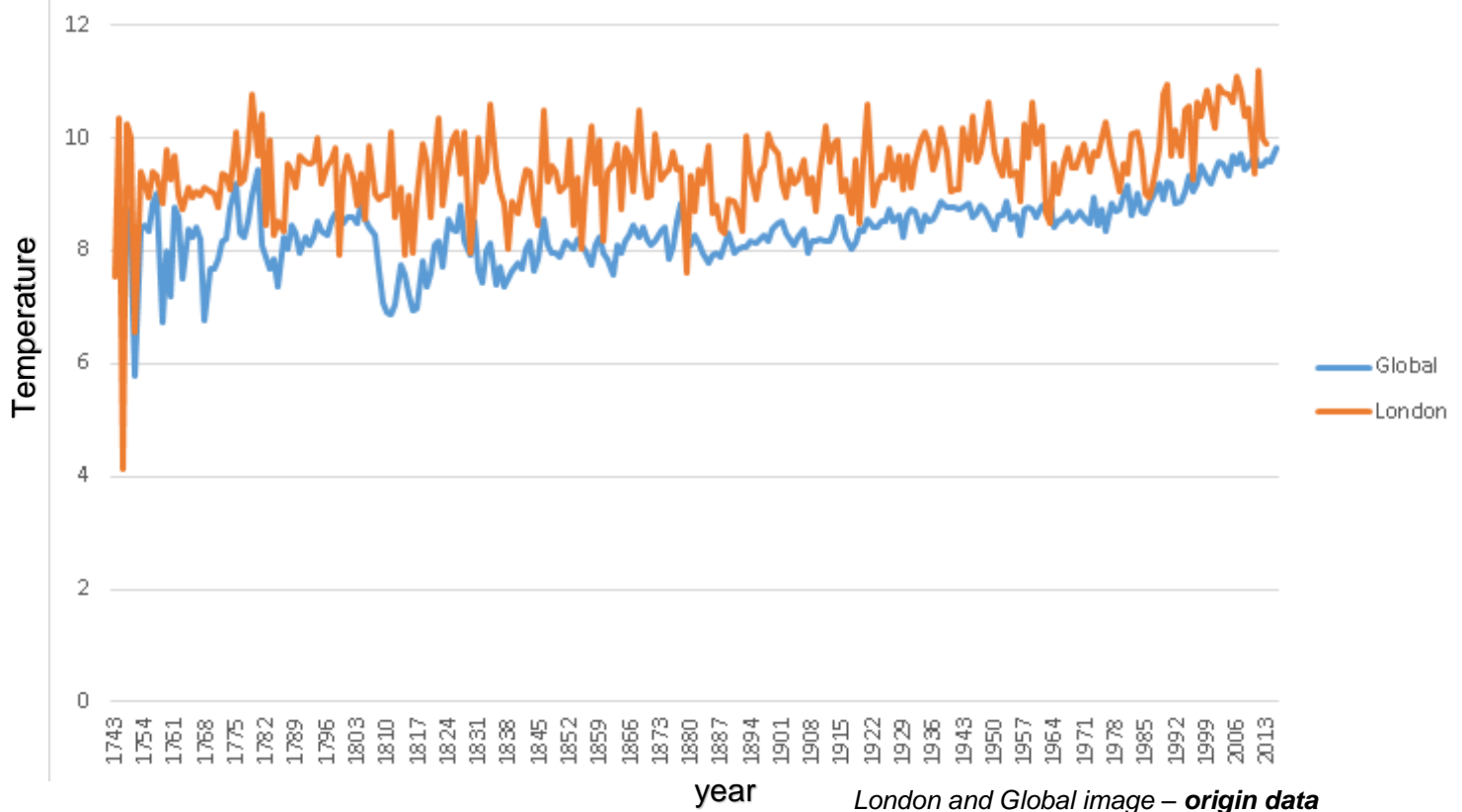
```
In [38]: dfUK = df1[(df1['country']=='United Kingdom') | (df1['country']=='Global')]
         dfUK.head(5)

Out[38]:
              avg_temp    city         country  year
        7652      8.45  Belfast  United Kingdom  1743
        7653      9.15  Belfast  United Kingdom  1744
        7654      4.51  Belfast  United Kingdom  1745
        7655      9.22  Belfast  United Kingdom  1750
        7656      8.71  Belfast  United Kingdom  1751

In [40]: dfUK.to_csv("weather_dataset.csv", index=False, header=True)
```
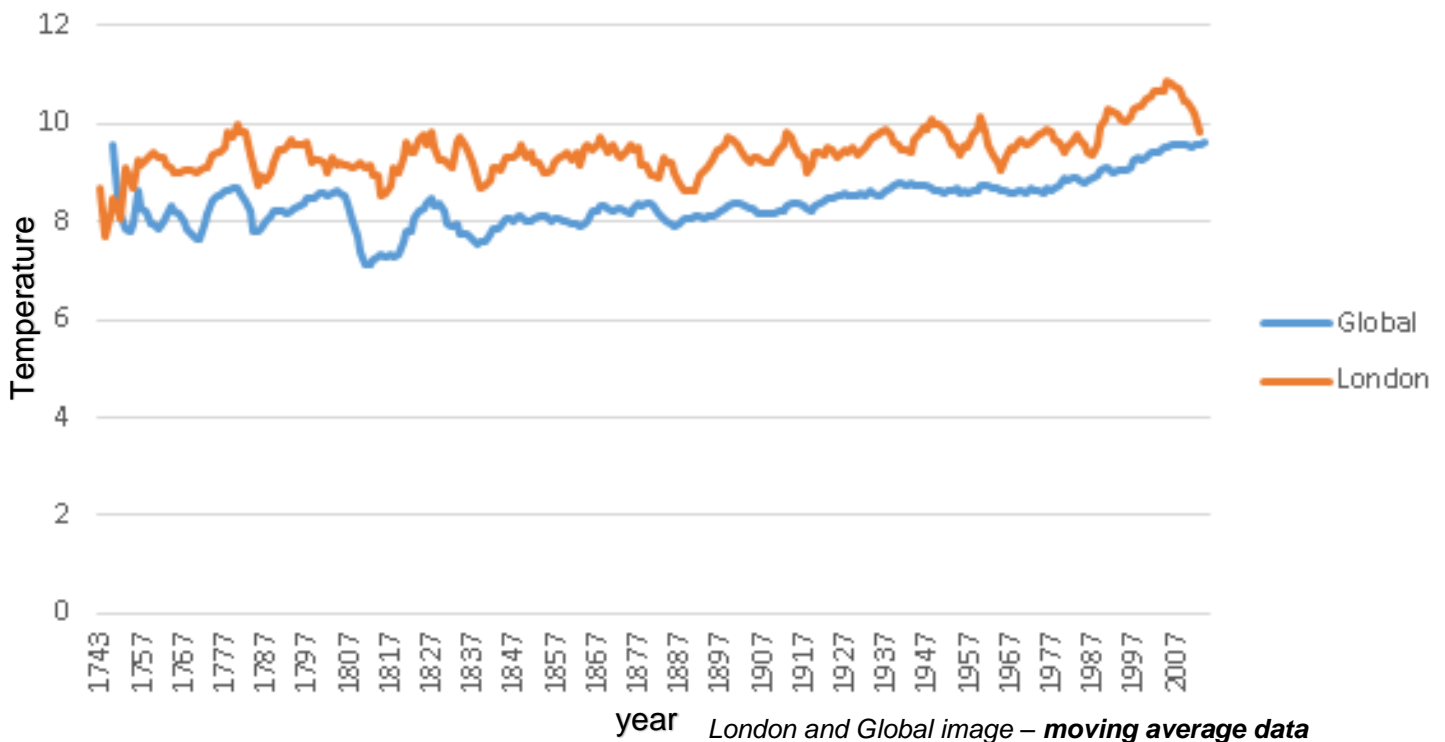
4. Exploratory Data Analysis – Using Dynamic Table on Excel

*London and Global image – **origin data***

12

10

8

Temperature

6

4

2

0

1743 1757 1767 1777 1787 1797 1807 1817 1827 1837 1847 1857 1867 1877 1887 1897 1907 1917 1927 1937 1947 1957 1967 1977 1987 1997 2007

Global

London

year *London and Global image – **moving average data***

4.1. London Analysis

4.1.1. Outliers

- Highest increase - **11.19** degree in 2011
- Lower decrease - **4.13** degree in 1745

4.1.2. Variation

- High and low temperatures is about 2 degrees difference between 1743 and 1900, changing this scenario to 1 degree after 1900.
- From about 1917 there is a gradual increase in the average temperature.

4.2. Global Analysis

4.2.1. Outliers

- Highest increase - **9.83** degree in 2015
- Lower decrease - **5.78** degree in 1752

4.2.2. Variation

- Between 1750 and 1822 an unstable scenario of averages temperatures between annual highs and lows characterized it.
- High and low temperatures is about 2 degrees difference between 1743 and 1822, changing the scenario to 0.2 degrees after 1900.
- From about 1917 there is a gradual increase in the average temperature.

4.3. Data Analysis applied in United Kingdom (biggest cities)
There is a similarity of variation between the biggest cities in the UK. Edinburgh is the city with the lowest average temperature due to its location in the north of the UK

*Biggest cities in UK – **origin data***

*Biggest cities in UK – **moving average data***
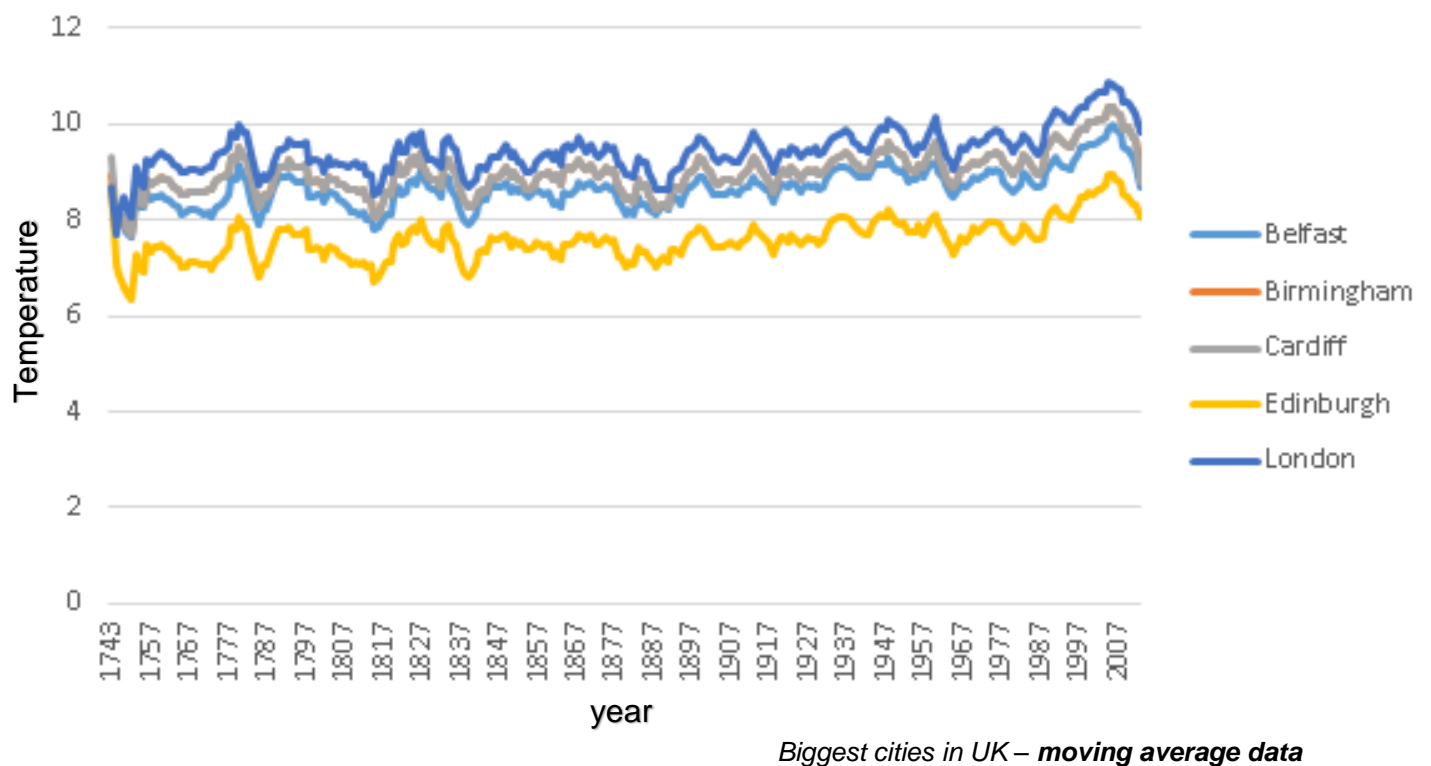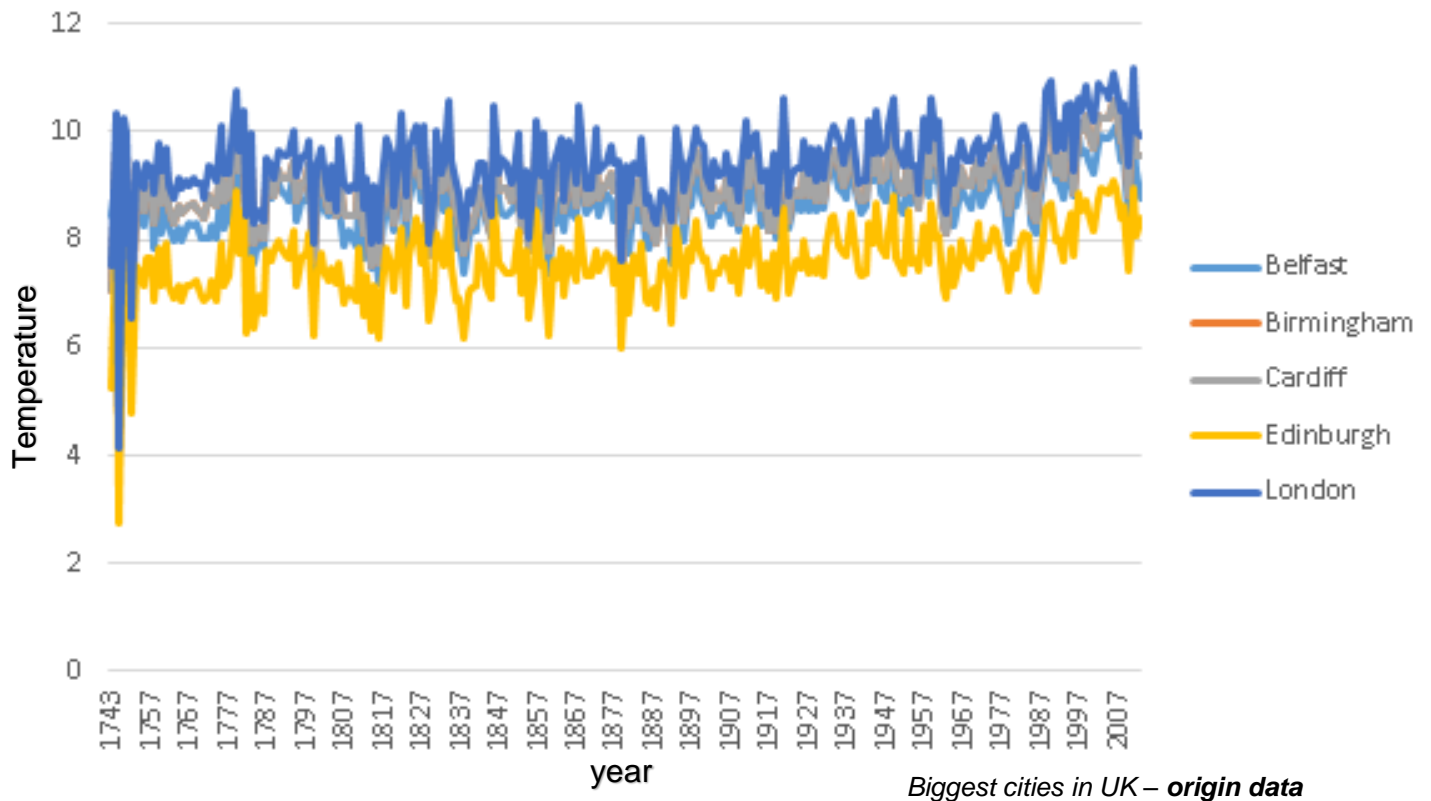
5. **Conclusion**

In general, the temperature in London is higher than the global average in more than 1 degree.

Similarity between London and Global average temperatures:

- Gradual increase in the average temperature from 1917 to 2012.

Differences between London and Global average temperatures:

- High and low variation is about 2 degrees in London between 1743 and 1900, changing this scenario to **1** degree after 1900.
- High and low variation is about 2 degrees difference between 1743 and 1822, changing the scenario to **0.2** degrees after 1900.