

# Weather Trend Report

## Summary

The report provides a brief analysis of weather trends for London, UK and global average, using annual data from about 1750 till about 2015.

## Data and tools

Data was provided by Udacity and extraced using SQL queries detailed below:

```
SELECT *
FROM city_data
WHERE
    city = 'London'
    AND country = 'United Kingdom';
```

and

```
SELECT *
FROM global_data;
```

The tools used were: Jupyter Notebook, SQL, Python and Python libraries.

## Load data

From CSV files, where SQL query results were saved.

In [11]:

```
city_temp = pd.read_csv('london_uk_weather_yearly.csv')
city_temp.head(10)
```

Out[11]:

	year	city	country	avg_temp
0	1743	London	United Kingdom	7.54
1	1744	London	United Kingdom	10.34
2	1745	London	United Kingdom	4.13
3	1746	London	United Kingdom	NaN
4	1747	London	United Kingdom	NaN
5	1748	London	United Kingdom	NaN
6	1749	London	United Kingdom	NaN
7	1750	London	United Kingdom	10.25
8	1751	London	United Kingdom	9.99
9	1752	London	United Kingdom	6.54

In [14]:

```
global_temp = pd.read_csv('global_weather_yearly.csv')
global_temp.head(10)
```

Out[14]:

	year	avg_temp
0	1750	8.72
1	1751	7.98
2	1752	5.78
3	1753	8.39
4	1754	8.47
5	1755	8.36
6	1756	8.85
7	1757	9.02
8	1758	6.74
9	1759	7.99

*#merge data into one table*

```
temp = pd.merge(city_temp, global_temp, on=['year'], how='outer')
temp.head(10)
```

In [5]:

*#clean table*

```
temp.rename(columns={'avg_temp_x': 'london_temperature_yearly', 'avg_temp_y': 'global_temperature_yearly'}, inplace=True)
temp.drop(columns=['city', 'country'], axis = 1, inplace=True)
temp.head(10)
```

Out[5]:

	year	london_temperature_yearly	global_temperature_yearly
0	1743	7.54	NaN
1	1744	10.34	NaN
2	1745	4.13	NaN
3	1746	NaN	NaN
4	1747	NaN	NaN
5	1748	NaN	NaN
6	1749	NaN	NaN
7	1750	10.25	8.72
8	1751	9.99	7.98
9	1752	6.54	5.78

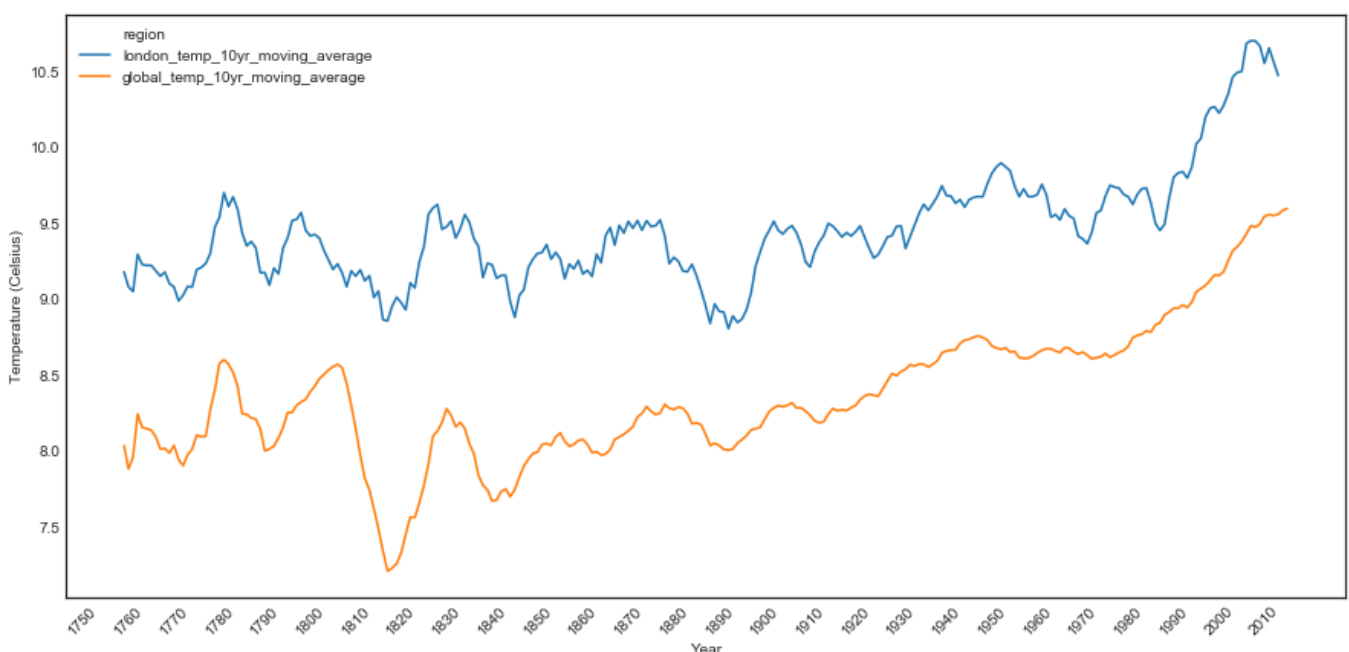
## Calculate moving averages

In [6]:

```
#Calculate 10yr moving average
temp['london_temp_10yr_moving_average'] = temp['london_temperature_yearly'].rolling(10)
.mean()
temp['global_temp_10yr_moving_average'] = temp['global_temperature_yearly'].rolling(10)
.mean()
```

## Line chart

Line chart with local and global temperature trends.



## Observations

All observations refer to the 10year moving averages of annual temperatures of London (UK) and global average.

- 1) Globally and in London, the average annual temperatures started rising visibly since 1970 (last 50 years), and a mild upward trend may have been observed from about 1900-1920
- 2) Globally and in London, from about 1750 till 1900, the average annual temperatures have reverted to average (without any visible upward or downward trend), though there have been significant variations in this period
- 3) around 1815 it was particularly cold globally (London was only minorly below average for that century), which corresponds to Napoleonic war period, and Napoleon's armies freezing in Russia
- 4) London is consistently warmer than global average, though the spread differs through the years
- 5) In the last 10 years, London's annual temperature moving average has turned downwards, while the continuous rise is observed in global moving average