Exploring Weather Trends – Data Analysis Nanodegree Project 1

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1. The objective of this project was to create a visualisation and a write up describing the similarities and differences between global temperature trends and temperature trends where I live.
2. I extracted the temperature data for London, UK, using the SQL query below.

```
SELECT *

FROM city_data

WHERE city = 'London'

AND country = 'United Kingdom'

Order by year;
```

3. I included the country clause in the query in order to exclude results from London, Canada.
4. I downloaded the 271 rows of results, consisting of year, city, country and average temperature to a .csv file.
5. Next, I extracted the global temperature data using the query below.

```
SELECT *

FROM global_data

Order by year;
```

6. I downloaded the 266 rows of results, consisting of year and average temperature, to a .csv file.
7. I then calculated a 7 year moving average for London and global temperatures within Excel, in order to smooth out the data and make it easier to observe the long term trends. The moving average was calculated using the following function AVERAGE(B1:B8) and then copied down.
8. I amalgamated the moving average data into a single spreadsheet using the VLOOKUP() function and then created a Line Chart (Chart 1).
9. In order to improve the visualisation, I made the following changes to the chart format:
    a. Y axis data labelling to start at 5 rather than 0 and increment in single units.
    b. X axis data labelling to increment in units of 10.
    c. Added gridlines.
    d. Added labels and title.

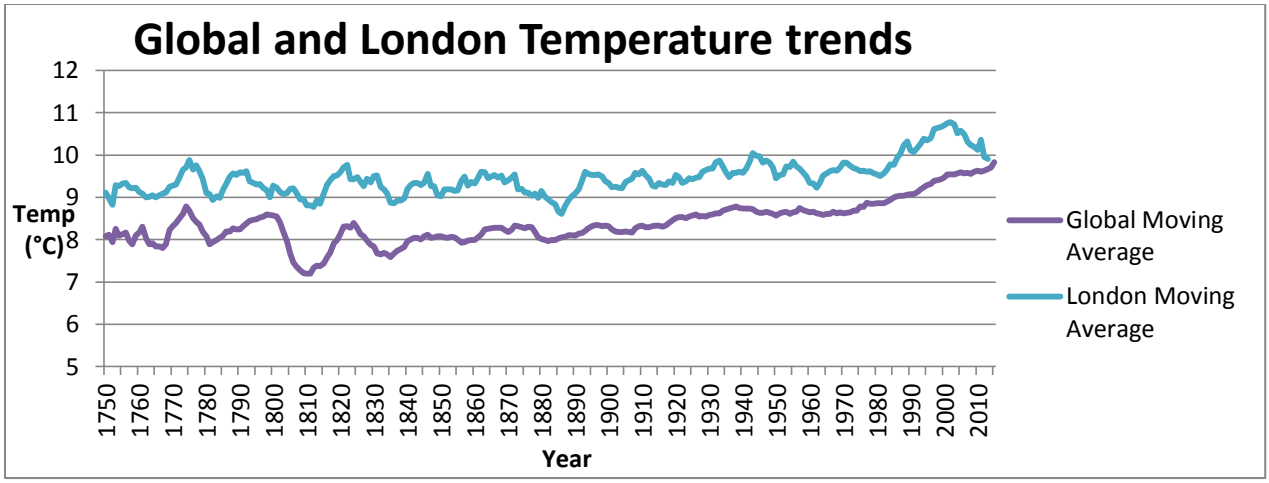

Chart 1: Line Chart showing global and London Temperature trends

10. I have made the following observations from analysing the chart:
    a. The temperature in London is higher than global temperatures.
    b. The difference has been generally consistent over time.
    c. Until the mid-20th century the London temperature fluctuations generally followed global fluctuations, for example, a drop in the average temperature at the start of the 19th century and a rise at the end of the 18th century. However, since the mid-20th century, the global average temperature has risen more smoothly than the London average as the London average has continued to fluctuate.
    d. In the 21st century, the London average temperature is closer to the global average temperature as the global average has continued to rise while the London average has dropped. However, London data is only available to 2013, whereas global is available to 2015 but the indication is that London average temperatures are falling.
    e. If the trends continue as observed in the graph, the average London temperature will be below the average global temperature in a few years.

11. As an extension to the project, I decided to analyse the similarities and differences between temperature trends for each of the provinces in the UK (England, Northern Ireland, Scotland and Wales) and compare them with the global trends.
12. I extracted the data and calculated the averages using the same method as described earlier for London, using data for Cardiff, Edinburgh and Belfast. I then created a Line graph showing the 5 sets of data (Chart 2).

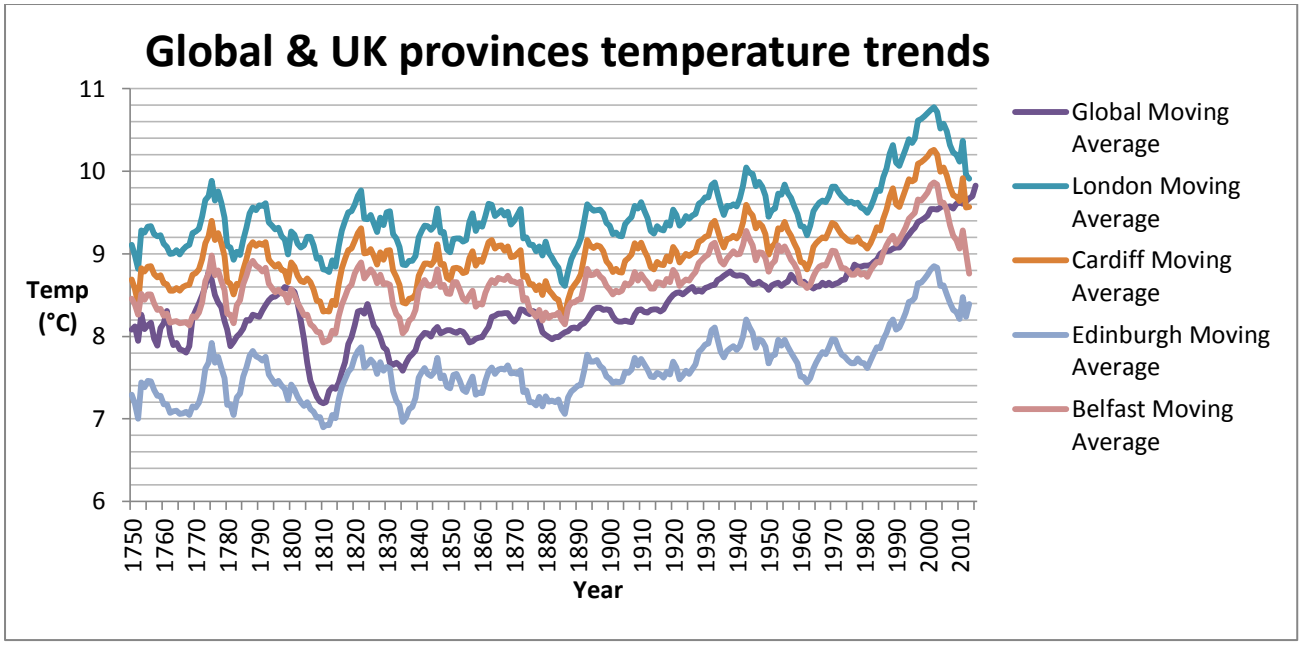

Chart 2: Line Chart showing global and UK province temperature trends.

13. I have made the following observations from analysing the chart:
    a. London average temperatures are higher than those of Cardiff, Edinburgh and Scotland, as is expected.
    b. London and Cardiff average temperatures are higher than average global temperatures; Belfast average temperatures are generally higher than average global temperatures but Edinburgh average temperatures are lower.
    c. The differences between the provinces have been generally consistent over time.
    d. All UK temperatures have followed a similar pattern over time with similar fluctuations and the differences have been consistent.
    e. If temperature trends continue in the pattern we can observe since the start of the 21st century, in a few years all UK temperatures could be below the average global temperature.