Exploring Temperature Trends

The purpose of this document is to explore how temperature in London, United Kingdom has changed over time in relation to Global temperature.

Data Set and Analysis

Throughout this document the data set used to explore temperature trends contains average annual temperatures in °C over the time series 1750 - 2013. The analysis uses a 20-year moving average to explore and compare the data set. The decision to use a 20-year moving average was made as it smooths annual variation without losing the detail of significant fluctuations in temperature.

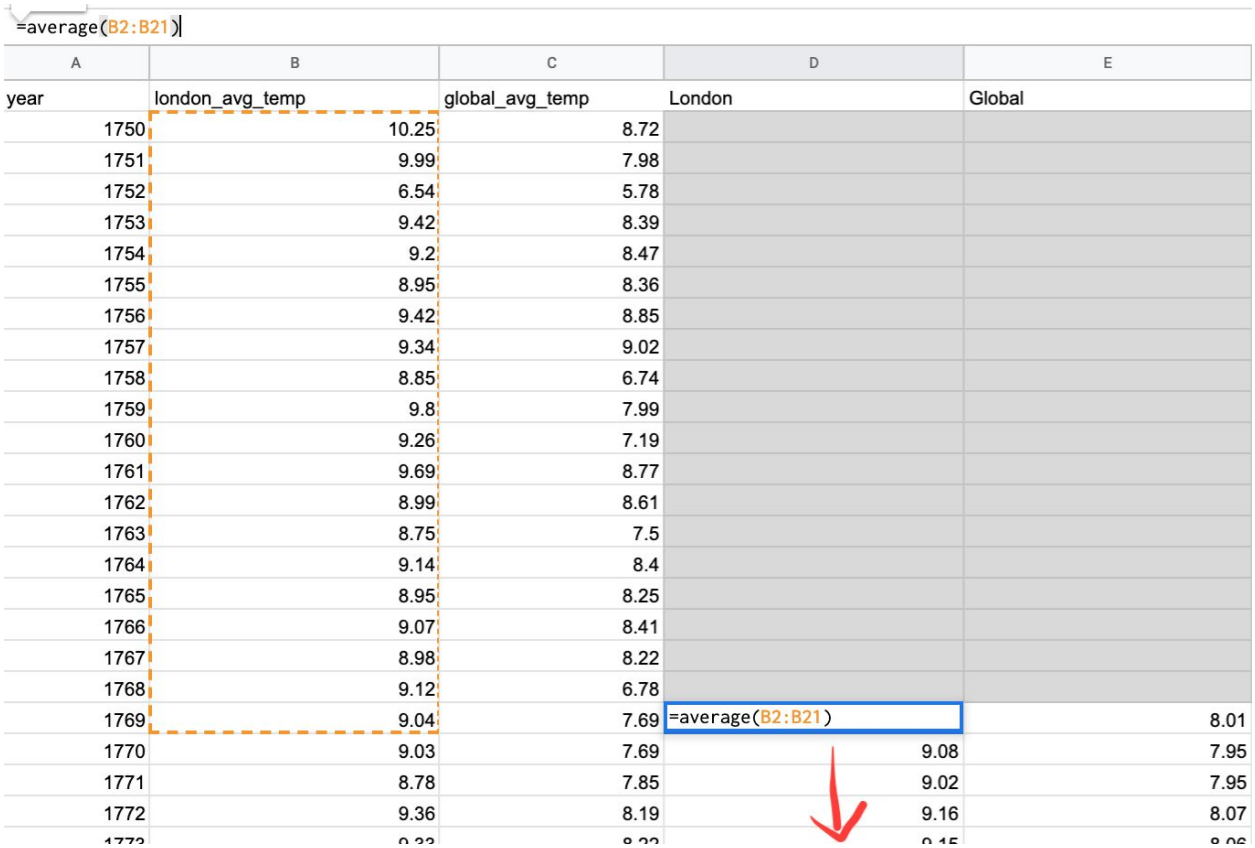
Extracting and Analysing the Data Set

The steps used to analyse the data are outlined below:

1. Data extracted from database using the following SQL query:

```
SELECT c.year, c.avg_temp as london_avg_temp, g.avg_temp as
global_avg_temp
FROM city_data c
JOIN global_data g
ON c.year = g.year
WHERE c.city = 'London' AND c.country = 'United Kingdom'
```

2. Data downloaded from Udacity IDE as csv and imported into google sheets
3. 20-year moving average calculated in google sheets using the average function (between B2:B21/C2:C21 for London/Global data set respectively) and dragged down to the bottom of the time series, as detailed in print screen below:



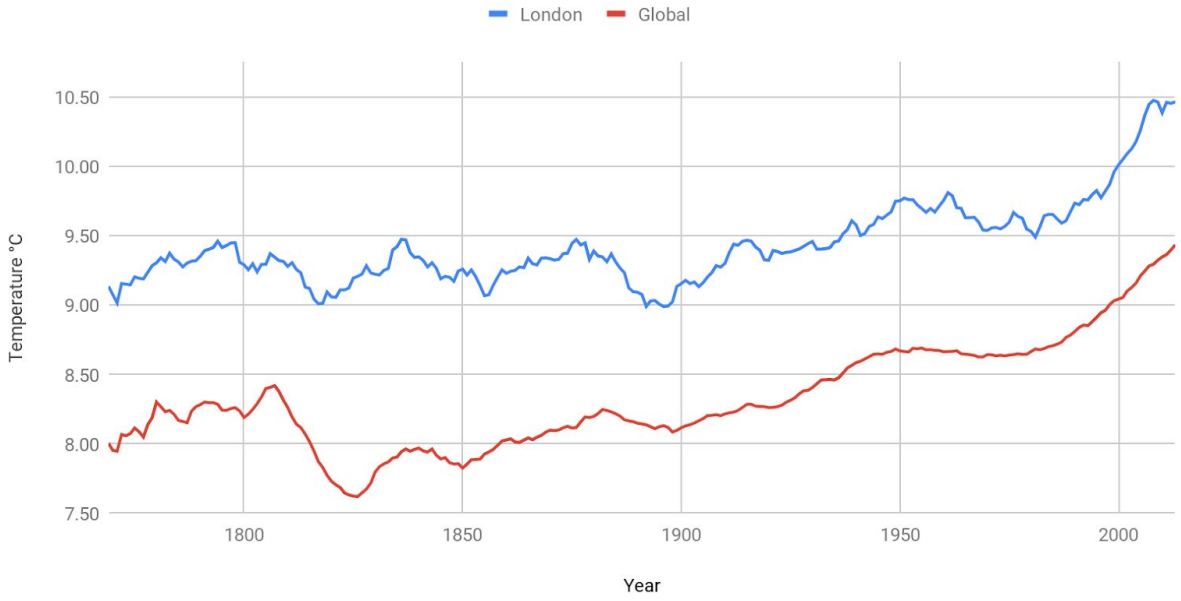
4. Mean normalization of 20-year moving average calculated data in google sheets.
5. Correlation between 20-year moving average calculated in google sheets
6. Line graphs created using google sheets graphing tool

Comparison of Global and London Temperatures

Observations from Figure 1:

- Global temperatures in 1.0°C range between 7.5°C - 8.5°C range whereas London temperatures in 0.5°C range of 9.0°C - 9.5°C over the period 1800 - 1950.
- Both Global and London temperatures have sustained above previous 150 year max from around 1950 onwards.
- Both Global and London temperatures have seen an approximate 1.0°C increase from between 1975 - 2010 (from 8.5°C to 9.5°C Globally and from 9.5°C to 10.5°C in London.)
- London vs Global temperature difference has been within a 0.8°C range over the time series (between 0.8°C and 1.6°C.) No conclusion can be made that this range is narrowing or widening.

Figure 1: London & Global Temperature°C
(20-Year Moving Average)



Observations from Figure 2:

- Figure 2 plots a mean normalised graph to provide a clearer visual indication correlation between Global and London temperatures.
- 20-year moving averages are 90% correlated (calculated using Pearson product moment correlation.)

Figure 2: London & Global Temperature°C
(Mean Normalised 20-Year Moving Average)