Project outline

1. Extract data and calculate moving average

My first was to use a SQL query on the city_list table first to see which cities are available in the dataset. I decided to practice my newly learnt SQL skills and calculate the moving average with a window function. Since I wasn't sure which temporal granularity would be suitable I calculated several moving averages with different intervals. I implemented this for both the global data and the local data. I decided to compare the local data of the capitals of all the countries I have lived in and used one SQL query for each city. I downloaded all data as .csv and saved it locally.

The queries I used can be found here: https://github.com/zoraaroz/udacity-weather-project

2. Create a line chart

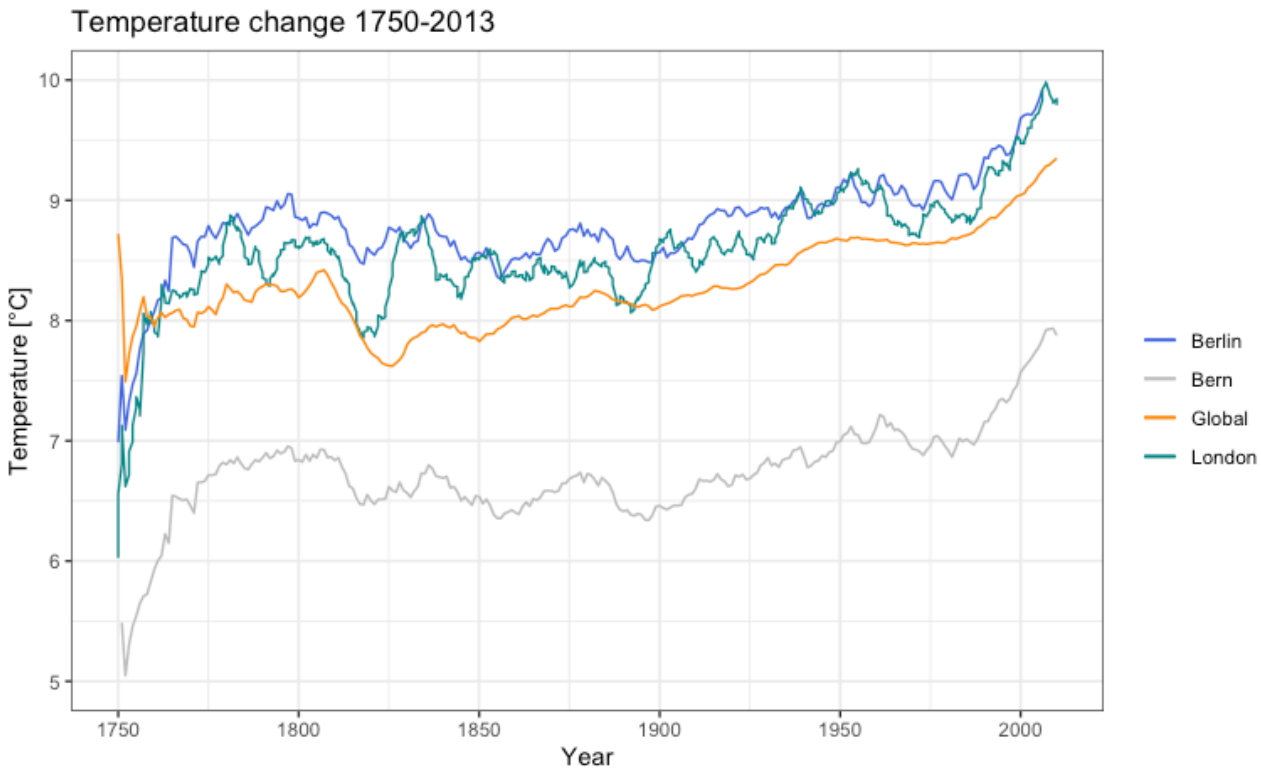
I decided to practise my rather limited R skills and used ggplot to visualise the data (the R-script can be found here: https://github.com/zoraaroz/udacity-weather-project).

I first tried out different temporal granularities for the plot and decided that a 20-year moving average was suitable. It turned out that there was data available for Berlin earlier than 1750 but this wasn't the case for the global data and the other cities. Furthermore there were missing values in the early Berlin years so I decided to only look at data starting from 1750.

To fine-tune the plot, I customised the colours (suitable for colour-blind), the legend, the title and labels as well as the axis limits.

Global vs. local temperature changes between 1750 and 2013

The plot below shows the temperature changes over time for the capitals of the countries I have lived in as well as the global temperature data.



General observations

It can be seen very clearly that the global temperature has been steadily rising since about 1830. The most dramatic increase has happened in the past 30 years, with an increase of about 0,5°C regarding the global average and up to 1°C regarding the local averages displayed above. This is very strong evidence for the global climate change.

A very clear decrease in temperature can be observed between about 1810 and 1830, which is most obvious in the global average temperature and in the London data. "Evidence suggests that the anomaly was predominantly a volcanic winter event caused by the massive 1815 eruption of Mount Tambora in April in the Dutch East Indies (known today as Indonesia)."[1]

[1] https://en.wikipedia.org/wiki/Year_Without_a_Summer

City comparison

The average temperature in Berlin and London is very similar throughout the observed time period, with a slightly lower average in London. Bern has temperatures about 2°C colder, but the time course is very similar to the Berlin data.

A noticeable anomaly can be found in the London data, where there is a clear decrease in temperature in the end of the 19th century. This was due to a cold wave in the United Kingdom in the Winter of 1894/95.[2]

[2] https://en.wikipedia.org/wiki/Winter_of_1894-95_in_the_United_Kingdom