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# Project 1: Explore Weather Trends

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## Outline:

- For this project I used SQL queries, Excel and the Add in “Analytics Toolpak” and the regular built-in chart tool
  - I used two SQL queries to extract the necessary data from the database
    - o I extracted the global trends from global\_data
    - o I extracted the city data from Munich, because it is the biggest city close to my current location
    - o Then I opened the data in Excel and adjusted the view to separate the columns using the delimiter comma
  - I calculated the moving average using the Analytics Toolpak
  - My key considerations during the visualisation were making sure that I used the same time period (1750-2013; as the offered data differed a little), making sure the formatting was right to guarantee a correct use of the tool, combining the two lines in one chart for comparison, as well as playing with different intervals to see which best illustrate the trends
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## Findings:

- First, I extracted the global weather data with the SQL query:  
`Select * from global_data`
- Then I accessed the city data and specifically filtered out the local data for Munich, Germany:  
`Select * from city_data`  
`WHERE City = 'Munich'`
- Then I downloaded both data sets as CSV files

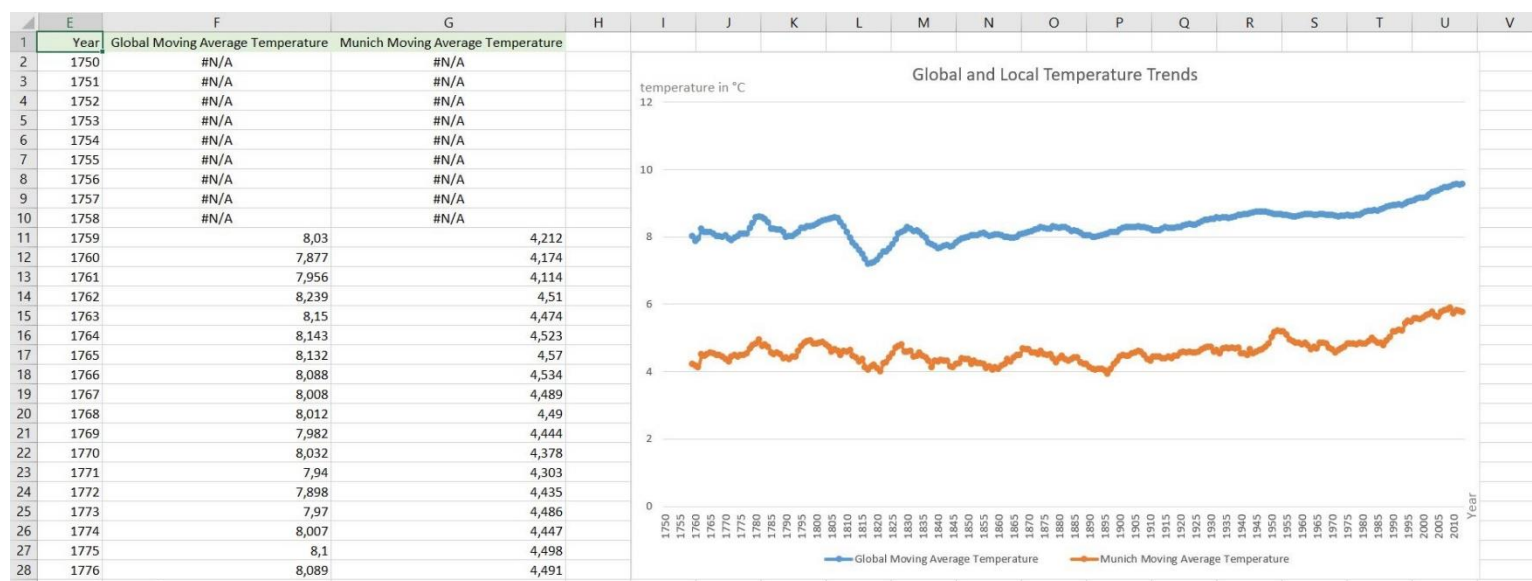
## Formatting challenges:

- 1. Approach: When opening the CSV file through the “from Text/CSV” option in Excel, to transform the data into manageable columns separated by comma as a delimiter, the temperatures would be turned into numbers without dot separation
- 2. Approach: In order to separate the columns while still displaying the temperatures correctly, I used this regex command to transform all commas into semi-colons:  
`sed -i 's/,;/g' *.csv`
  - however, this resulted in the temperature values being automatically turned into dates/months by Excel
- 3. Approach: To stop Excel from automatically transforming the temperature values into dates/months, I used Notepad++ to put an apostrophe (') in front of the temperature column and then reopened through the “from Text/CSV” option in Excel
  - the columns are displayed correctly and the temperature as well
  - I then replaced all apostrophes directly in Excel with spaces and the dots with commas so that the temperature data would be recognised as numerical data
- Then I merged the global and local data into one Excel file
- I calculated the moving average for global temperatures and temperatures in Munich, Germany using the Analytics Toolpak with an interval of 10, because it showed the smoothest line
- Then I selected the two rows (moving average) and combined them in a line chart using the Excel built-in chart function

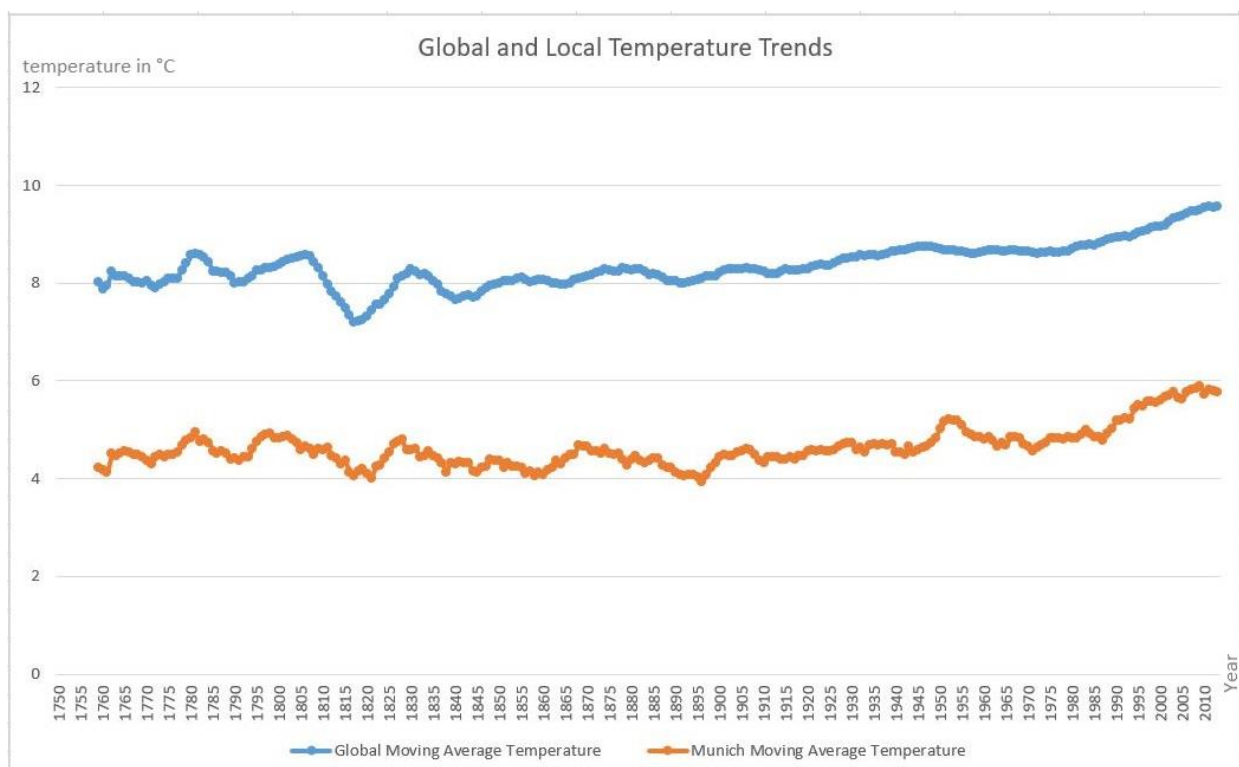
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## Plotting the chart:

- In order to plot a line chart easily, the two columns containing the moving average data need to be next to each other, but not directly next to the original average temperature data
  - however, the average temperature data must not be deleted from the worksheet, as this disrupts the moving average function and leads to an error in the moving average column
- I used the Excel built-in function to plot a line chart with markers
- In order to display the years in the horizontal axis, I left the title cell "Year" empty during the plotting process, which makes Excel recognise that this column is not part of the numerical data
- Afterwards I put the title back in the column



- Below you can see a bigger screenshot of the line chart:



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Observations based on the findings:

- On average, my city is cooler than the global average
- The difference has been quite consistent over time: the lows and the highs align, though there has been one hike in the local average in the beginning of the last quarter
- The overall trend shows that temperatures are increasing both, globally and locally
- There have always been lows and highs, but overall the temperature is increasing, especially in the last quarter

Please contact me in case of questions.

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