

OUTLINE - Data Acquisition Process:

SQL was used to obtain data from the provided database. The commands used where:

```
SELECT *  
FROM city_data  
WHERE country = 'Germany' and city = 'Munich'
```

To extract annual avg. temperature data for Munich city

```
SELECT *  
FROM global_data
```

To extract Global annual average temperature data.

The acquired data was exported as `.csv` file from the embedded SQL workspace.

Moving averages were calculated in Google spreadsheet manually similar to method showcased in the lesson. To visualize the trends properly a **line chart** was used selecting the proper data fields to be included in the plot. Care was taken to include appropriate chart and axis titles for the generated plots.

Observations from Data results:

- In general, Munich is much cooler than the global average. The highest annual avg. temperature in Munich recorded has been 6.56°C (in year 2011) and the lowest annual avg. temperature in Munich recorded was -2.15°C (in year 1745). The highest global annual avg. temperature recorded was 9.83°C (in year 2015) and the lowest was 5.78°C (in year 1752).
- The year on year temperature increase for both the global data and Munich data however cannot be said to be consistent at first glance. There are many occasions where the avg. temperature drops in some years and increases erratically compared to previous years.
- On the contrary, the **Moving Averages** data shows that the avg. temp is seeing an increasing trend since 1944 for Munich. The moving averages for the global avg. temperature has also been *similarly* increasing to new heights after the year 1950
- The overall trend suggests that the world is definitely getting hotter every year and this trend has *largely* been consistent in the last 100 years.
- The value of (Pearson Correlation Coefficient) **R** is 0.4093 for data in Chart 1 (Munich avg_temp data). Although technically a positive correlation, the relationship between the variables (Years vs. Avg. Annual Temperature) is weak for Munich (i.e. the nearer the value is to zero, the weaker the relationship). So we cannot concretely conclude that there is a linear correlation between increasing average temperatures every year. The value of (Pearson Correlation Coefficient) **R** is 0.6228 (for Chart 3 - Global Avg_Temp Data). Thus for the global data we can conclude that there is a strong linear positive correlation for increasing average annual temperatures every year.

Line Chart - Plots

Chart 1 - Average Annual Temperature (Munich)

Average Annual Temperature - Munich

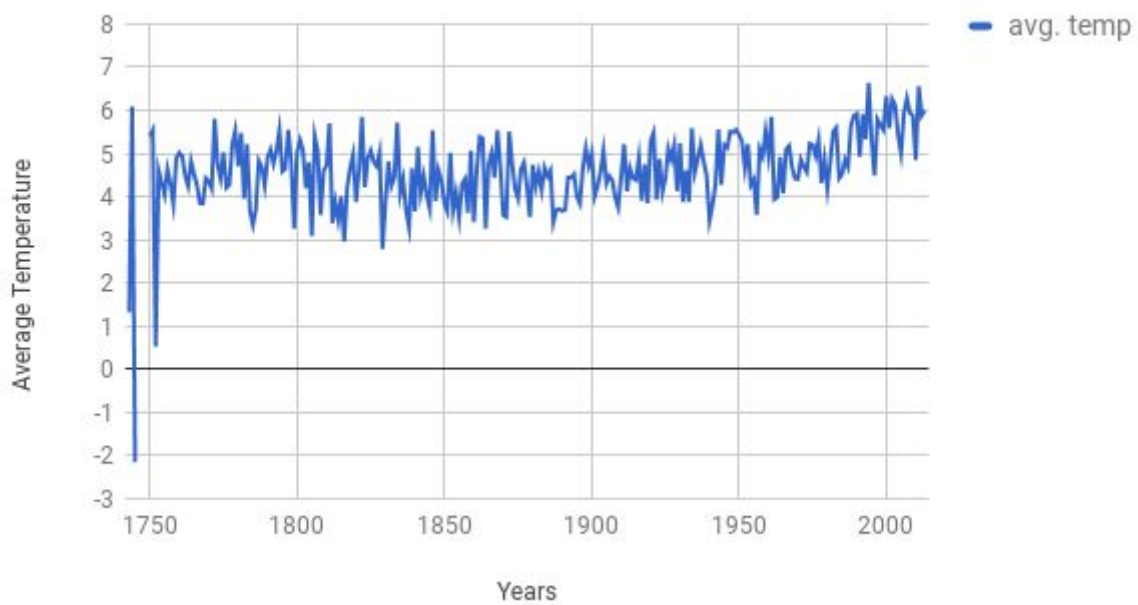


Chart 2 - Moving Averages (Munich)

7 year Moving Averages - Annual Temp (Munich)



Chart 3 - Global Average Annual Temperature data:

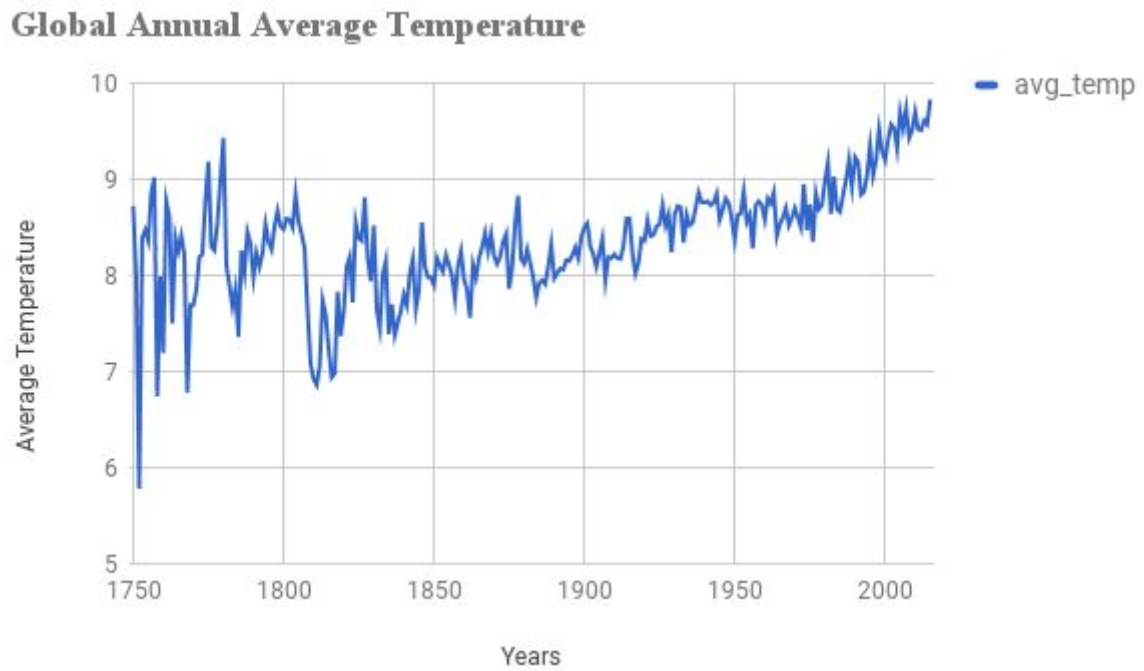


Chart 4 - Moving Averages (7 year) - Global Average Annual Temperature

