

EXPLORE WEATHER TRENDS

This project aims to analyze the global average temperature behavior over the past 250 years and compare it to the closest big city I live in, Munich. To complete the analysis, the following steps were taken:

- Data extraction
- Data processing and moving average calculation in Google Sheets
- Line chart generation
- Graph analysis and findings description

Data Extraction

The data required for the analysis was extracted from the Udacity's SQL workspace, according to the SQL queries shown bellow. Two tables from the database were consulted: `global_data` and `city_data`. The `global_data` table was consulted to obtain the information regarding the global temperatures, and the `city_data` has specific information about big cities in the world, like Munich. Both tables were saved as CSV files.

```
SELECT * FROM global_data
```

```
SELECT * FROM city_data  
WHERE city = 'Munich'
```

Data processing and moving average calculation

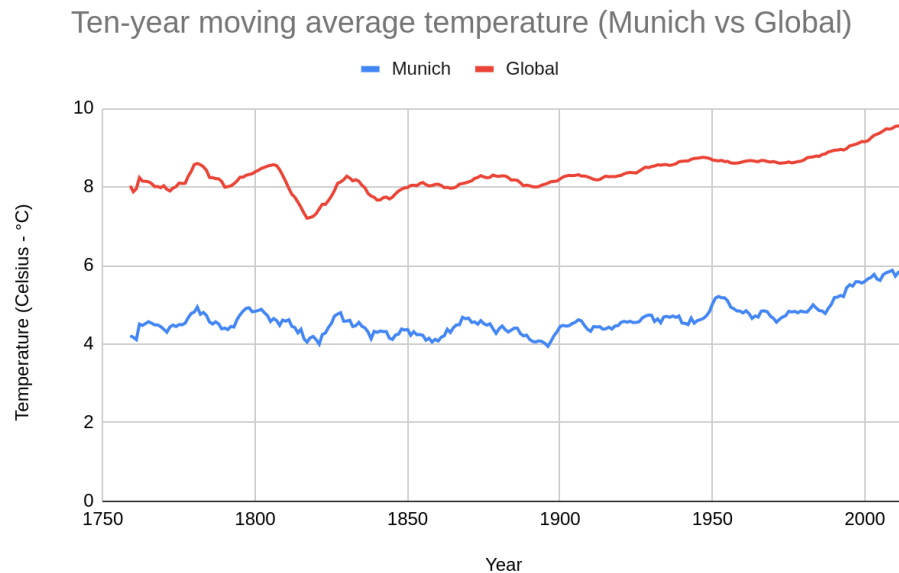
The CSV files were loaded in Google Sheets and processed before generating graphs. Due to the purpose of making a comparison between global data and specific data about Munich, both files were joined into a single table. Then, only the years present in both tables were kept, in the same way that missing data were disregarded.

Finally, the moving averages - Munich and global - were calculated. A time period of ten years was considered, so that every row from the tenth is the result of the average of the previous 10. The described processing can be observed in the following image.

=AVERAGE(B9:B18)							
A	B	C	D	E	F	G	H
year_munich	avg_temp_munich	year_global	avg_temp_global	same_year	year	ma_munich_10y	ma_global_10y
1750	5.4	1750	8.72	TRUE	1750		
1751	5.54	1751	7.98	TRUE	1751		
1752	0.53	1752	5.78	TRUE	1752		
1753	4.61	1753	8.39	TRUE	1753		
1754	4.33	1754	8.47	TRUE	1754		
1755	4.05	1755	8.36	TRUE	1755		
1756	4.64	1756	8.85	TRUE	1756		
1757	4.3	1757	9.02	TRUE	1757		
1758	3.83	1758	6.74	TRUE	1758		
1759	4.89	1759	7.99	TRUE	1759	4.212	8.03
1760	5.02	1760	7.19	TRUE	1760	4.174	7.877
1761	4.94	1761	8.77	TRUE	1761	4.114	7.956
1762	4.49	1762	8.61	TRUE	1762	4.51	8.239
1763	4.25	1763	7.5	TRUE	1763	4.474	8.15

Line chart generation

To generate the line chart, the columns regarding the year and the moving averages were selected. The title, legend, and axis description have been adjusted to better describe the information.



Data analysis

There are some key observations from the analyzed data:

- It can be seen from the graph that the global temperature is hotter than the temperature in Munich.
- Over the last 270 years, it is noted that the average temperature has increased by about 1.5 °C, both in Munich and the world.
- The difference between the average temperature in the world and in Munich has remained consistent, around 3.5 degrees.
- Before 1900 some highs and lows can be observed and in general there is not a great deal of variability in the average temperature, especially in Munich.
- It is also possible to notice that there has been a steady increase in the average temperature since 1900.