Udacity Data Analyst Nanodegree Program

Project: Explore Weather Trends

Submission

Reinhold Mauch, Mercedes-Benz AG

10.03.2021

Task:

- Extract temperature data from given SQL database
  - Global average temperature by year
  - Average temperature of closest city by year
- Create a line chart using the data
  - Smooth out the volatility using the moving average
- Make observations about similarities/differences based on the line chart

Approach:

Step 1 – Extract the Data

Tools: SQL Editor within Udacity Workspace

SQL Statements:

At first I'd like to get all the columns in the city_list table.

This is why I use the following SQL statement assuming it might be a MySQL database.

```
Select COLUMN_NAME from INFORMATION_SCHEMA.COLUMNS Where TABLE_NAME = 'city_list'
```

Based on the result my next SQL statement is

```
Select Distinct Country From city_list Order By Country
```

As "Germany" is in the list I assume that my nearest city is within Germany

```
Select city From city_list Where country = 'Germany'
```

This returns "Munich" among others. This is my nearest city for the project task.

Now I want to know what is inside the "city_data" table using following SQL-Statement:

```
Select COLUMN_NAME from INFORMATION_SCHEMA.COLUMNS Where TABLE_NAME = 'city_data'
```

This returns year, city, country, avg_temp

I decide to put all the information together within one SQL-Statement and export the result to CSV:

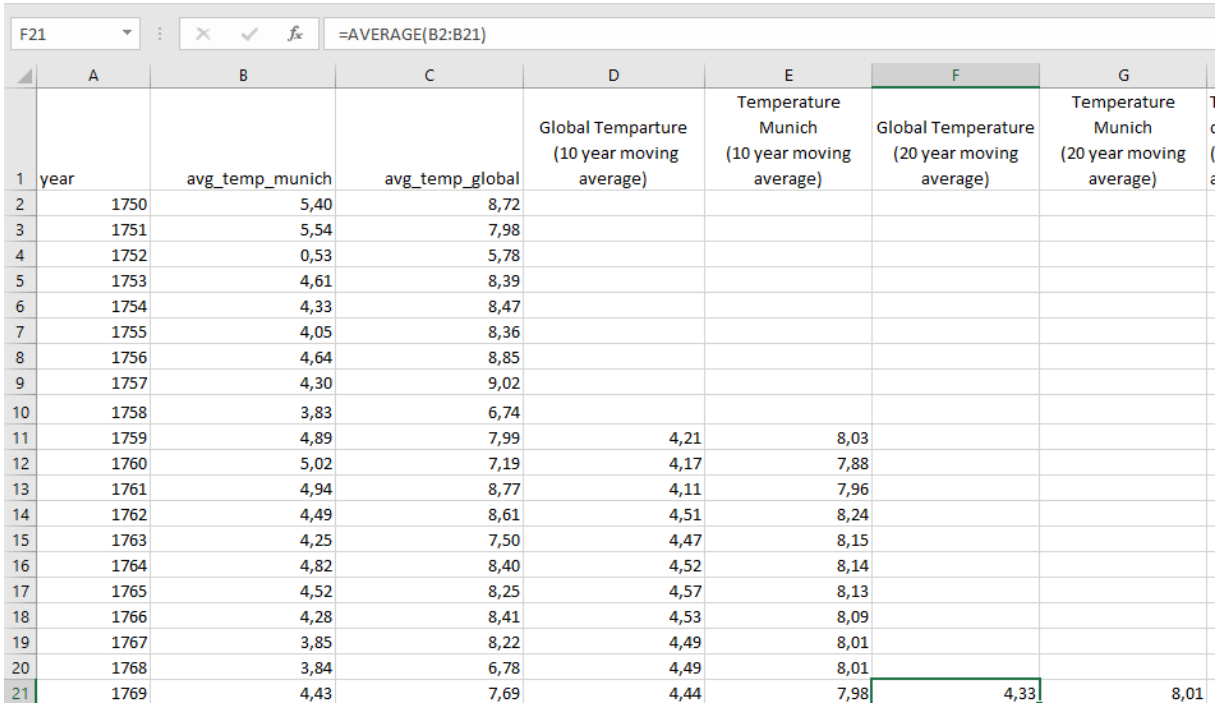
```
Select city_data.year, global_data.year, city_data.avg_temp as avg_temp_Munich,
global_data.avg_temp as avg_temp_Global

FROM (Select * FROM city_data Where city = 'Munich') as city_data

INNER JOIN global_data

ON city_data.year = global_data.year

Order by global_data.year
```

Step 2: Calculate the moving average of the temperature data

Tools: Excel

To calculate the moving average I use the AVERAGE formula from the example in the lesson.

My decision is to use a 10-year moving average for both values and later decide to add a 20-year moving average to smooth out the volatility.



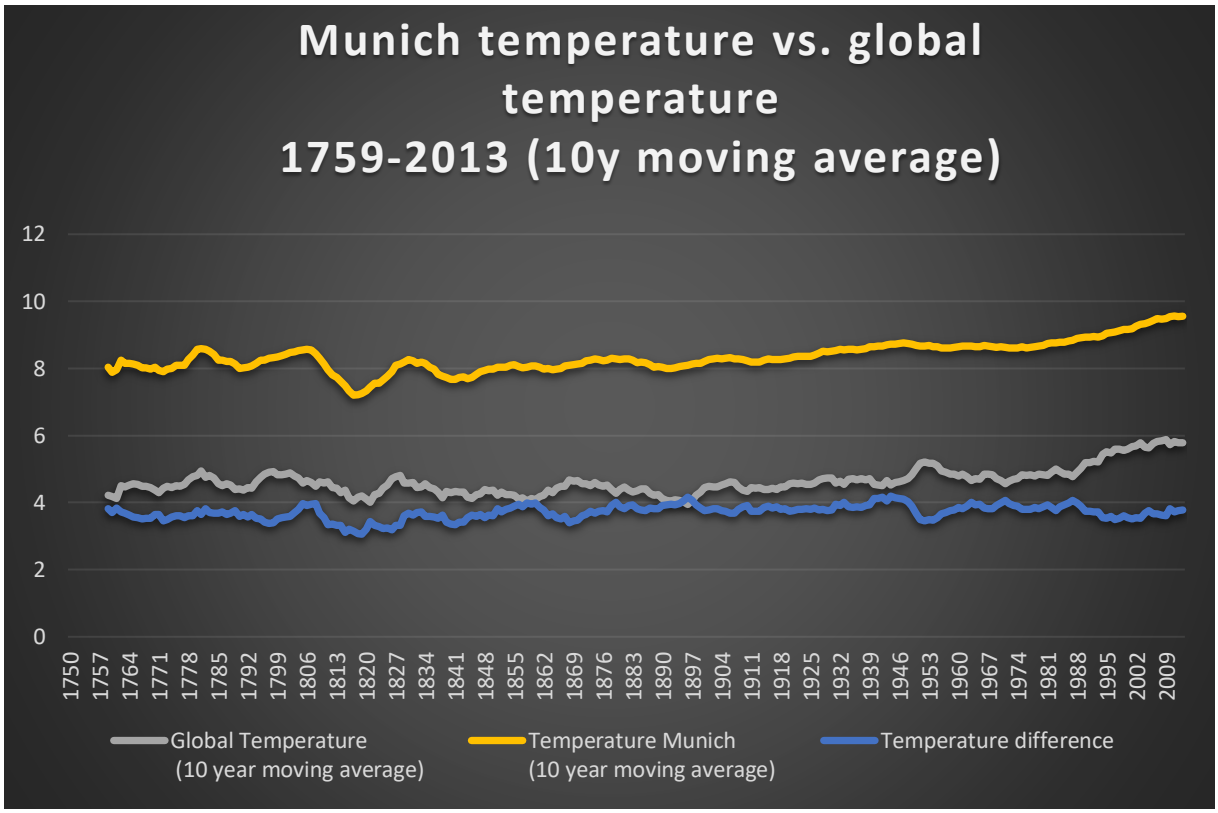
F21 =AVERAGE(B2:B21)

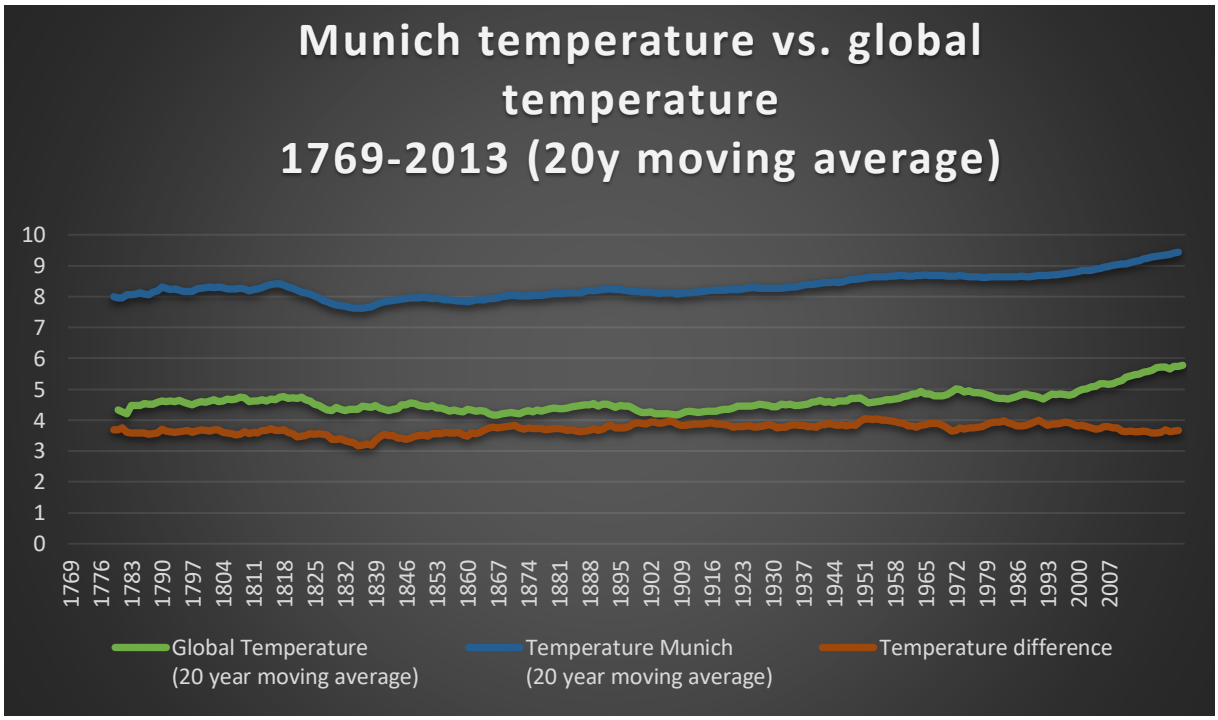
	A	B	C	D	E	F	G
1	year	avg_temp_munich	avg_temp_global	Global Temparture (10 year moving average)	Temperature Munich (10 year moving average)	Global Temperature (20 year moving average)	Temperature Munich (20 year moving average)
2	1750	5,40	8,72				
3	1751	5,54	7,98				
4	1752	0,53	5,78				
5	1753	4,61	8,39				
6	1754	4,33	8,47				
7	1755	4,05	8,36				
8	1756	4,64	8,85				
9	1757	4,30	9,02				
10	1758	3,83	6,74				
11	1759	4,89	7,99	4,21	8,03		
12	1760	5,02	7,19	4,17	7,88		
13	1761	4,94	8,77	4,11	7,96		
14	1762	4,49	8,61	4,51	8,24		
15	1763	4,25	7,50	4,47	8,15		
16	1764	4,82	8,40	4,52	8,14		
17	1765	4,52	8,25	4,57	8,13		
18	1766	4,28	8,41	4,53	8,09		
19	1767	3,85	8,22	4,49	8,01		
20	1768	3,84	6,78	4,49	8,01		
21	1769	4,43	7,69	4,44	7,98	4,33	8,01

Step 3: Create a line chart comparing Munich's average temperatures to global average temperatures

Tools: Excel

I decide to create the line chart to compare the temperature values using Excel. To better visualize the information I add a curve displaying the temperature difference. I do this twice for 10-year moving average and 20-year moving average.





Step 4: Make observing about the data

1.) According to the given data, Munich's temperature is on average three to four degrees above global temperature.

2.) In the end of the 18th century, the temperature difference between Munich and global temperature was around 3.5 degrees. We can see a dip in the early 19th century were the temperature difference was closer to three degrees moving up to around 4 degrees in the

late 19th century and staying there for around 100 years. Since the end of the last century, the temperature difference tends to decrease slightly.

3.) Looking at the overall trend the world is getting hotter. It has not been like this until the beginning of the last century. The upward momentum significantly intensified during the end of the last century.
4.) Looking at the curves the average global temperature is on average more volatile than Munich's average temperature.
5.) There is a negative correlation between temperature increase and temperature difference