Exploring Weather Trends
Project#1

In this project, I will analyze local and global temperature data and compare the temperature trends in Beirut city in Lebanon country (I think this is the closest city to where I live) to overall global temperature trends.

Contents

1.the outline

A. to extract the data from the database, I have written these two queries in the workspace:

This query for extract the global data:

```
SELECT*
FROM global_data
```

The result is 266 rows with the year and average global temperature for each year.

This query for extract the local data:

```
SELECT year,avg_temp
FROM city_data
WHERE city='Beirut'
```

The result is 223 rows with the year and average temperature for each year in Beirut city

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B.I have opened up the CSV files in Google spreadsheets, it is most comfortable.

I have plot the 20 years moving average rather than the yearly averages in order to smooth out the lines.

In the spreadsheet , there are eleven columns:

1.column A : years

2.column B : avg_temp_global: for the yearly global temperature

3.column C: 20-years MA global: for the 20 years moving average global temperature.

4.column D:avg_temp_local: for the yearly local temperature for Beirut city

*Note :the first cell having data is D43 because the data of Beirut city start in 1791rather than the globe that having data from 1750

5.column E: 20-years MA local: for the 20 years moving average local temperature.

6.column F : avg_temp_Abudhabi: for the yearly Abu-Dhabi temperature

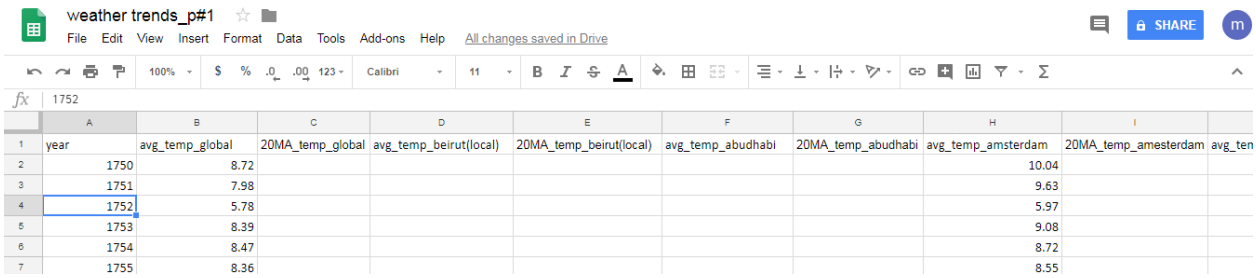
7.column G: 20-years MA Abu-Dhabi: for the 20 years moving average Abu-Dhabi temperature.

8.column H : avg_temp_Amsterdam: for the yearly Amsterdam temperature

9.column I: 20-years MA Amsterdam: for the 20 years moving average Amsterdam temperature.

10.column J : avg_temp_Chicago: for the yearly Chicago temperature

11.column K: 20-years MA Chicago: for the 20 years moving average Chicago temperature.

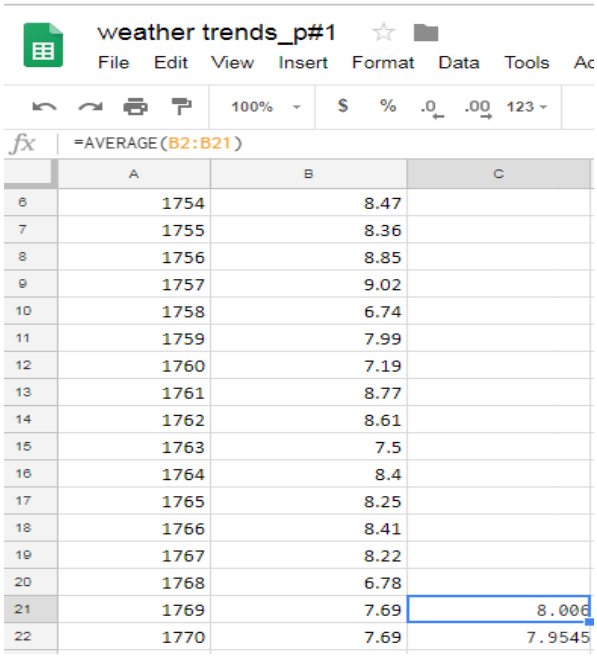


	A	B	C	D	E	F	G	H	I
1	year	avg_temp_global	20MA_temp_global	avg_temp_beirut(local)	20MA_temp_beirut(local)	avg_temp_abudhabi	20MA_temp_abudhabi	avg_temp_amsterdam	20MA_temp_amesterdam
2	1750	8.72						10.04	
3	1751	7.98						9.63	
4	1752	5.78						5.97	
5	1753	8.39						9.08	
6	1754	8.47						8.72	
7	1755	8.36						8.55	

C. Calculating the 20 years Moving Average :

In the column C(MA global temp) , the first cell having data is C21 cell and has this equation

=average(B2:B21)

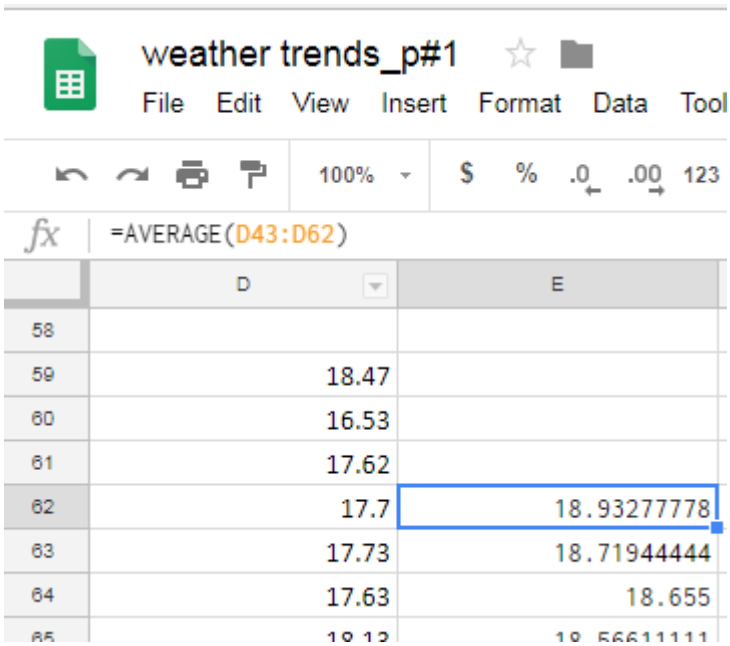


	A	B	C
6	1754	8.47	
7	1755	8.36	
8	1756	8.85	
9	1757	9.02	
10	1758	6.74	
11	1759	7.99	
12	1760	7.19	
13	1761	8.77	
14	1762	8.61	
15	1763	7.5	
16	1764	8.4	
17	1765	8.25	
18	1766	8.41	
19	1767	8.22	
20	1768	6.78	
21	1769	7.69	8.006
22	1770	7.69	7.9545

`Then I have` clicked and dragged the formula down to the next cells.

In the column E(MA local temp), the first cell having data is E62 and has this equation:

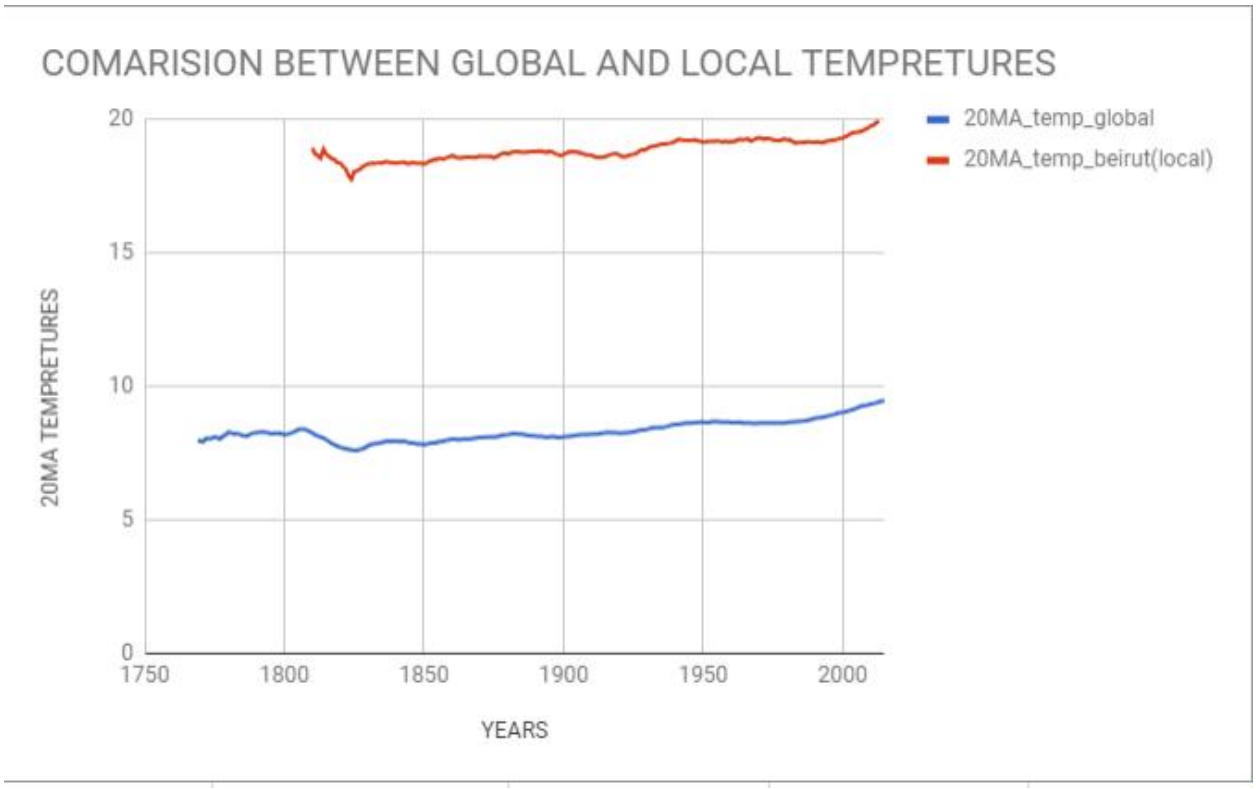
=average(D43:D62)



	D	E
58		
59	18.47	
60	16.53	
61	17.62	
62	17.7	18.93277778
63	17.73	18.71944444
64	17.63	18.655

Then I have clicked and dragged the formula down to the next cells.
Calculating moving average is the same for all of the other cities in the sheet.

The line chart



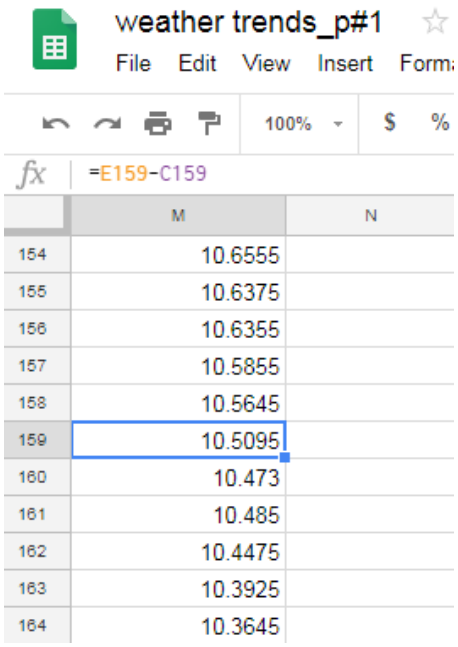
Observations:

- 1. My city is hotter on average compared to the global average temperature ,and the difference has been consistent over time.

- 2. from the line chart we notice that the difference is nearly 10 over time, so I can estimate the average temperature in my city based on the average global temperature by adding 10 to the average global temperature.

  For example : if the avg global temp=8 then the avg temp in my city is nearly 8+10 or 18

  I have created another column to calculate the difference between the MA global temperature and MA local temperature



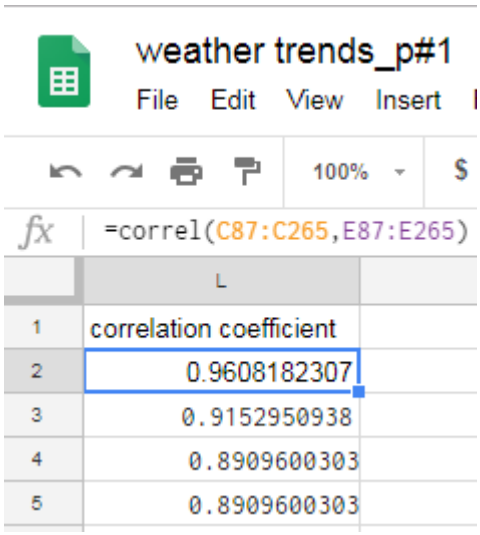
	M	N
154	10.6555	
155	10.6375	
156	10.6355	
157	10.5855	
158	10.5645	
159	10.5095	
160	10.473	
161	10.485	
162	10.4475	
163	10.3925	
164	10.3645	

- 3.the correlation coefficient which is used to determine the strength of the relationship between two datasets is near to one when I am calculating it between the moving average global temperature and moving average temperature for the local city and the other cities .

  I have used this equation in the Google spreadsheets:

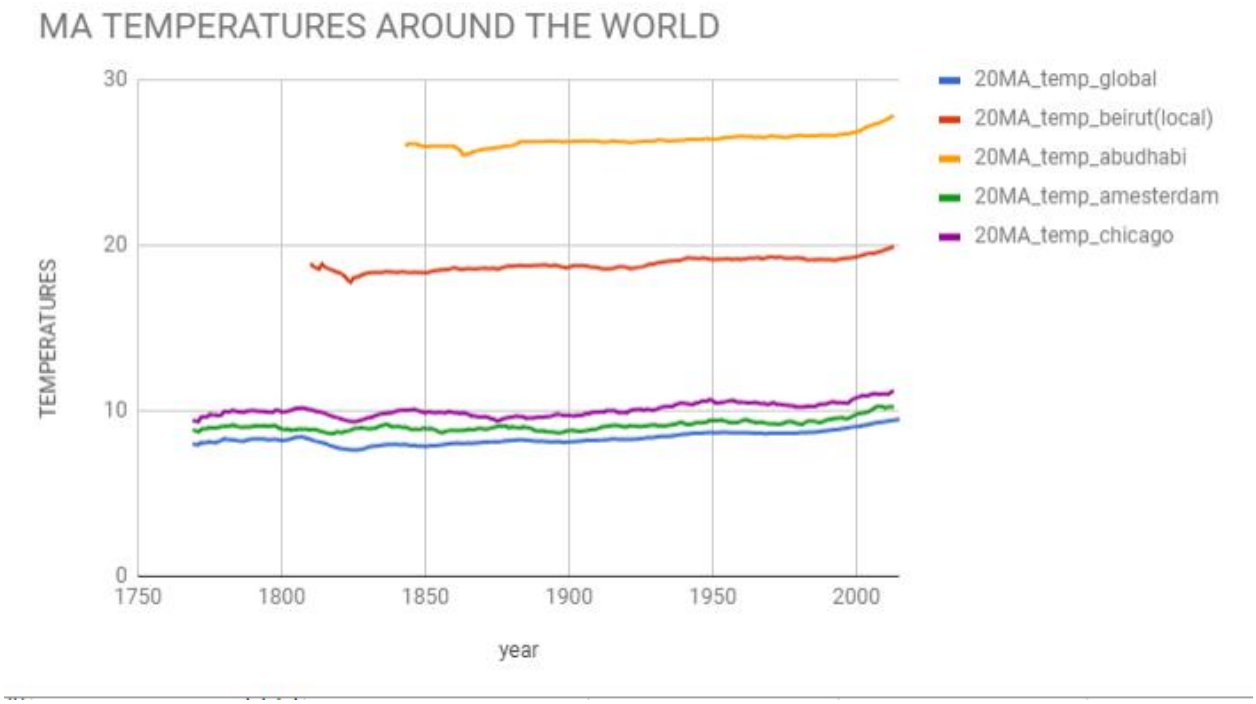
  `=correl(C87:C265,E87:E265)`

  `The result equals to` 0.9608182307



Which means that the relationship is linear, and that means when the average global temperature is increasing, the average local temperature is increasing too.

4. I have added other cities from around the globe to my visualization and this is the line chart :



From this line chart we notice that the difference between every city and the world in the temperatures has been consistent over time. So the world is getting hotter, and the weather trends have been consistent over the last few hundred years.

sources:

http://www.statisticshowto.com/probability-and-statistics/correlation-coefficient-formula/

prepared by Manar Jawarneh