Project 1: Explore Weather Trends

The project intention is to explore and compare global and local weather trends. Follow the below steps.

I. Step 1: Query and save needed data to CSV file

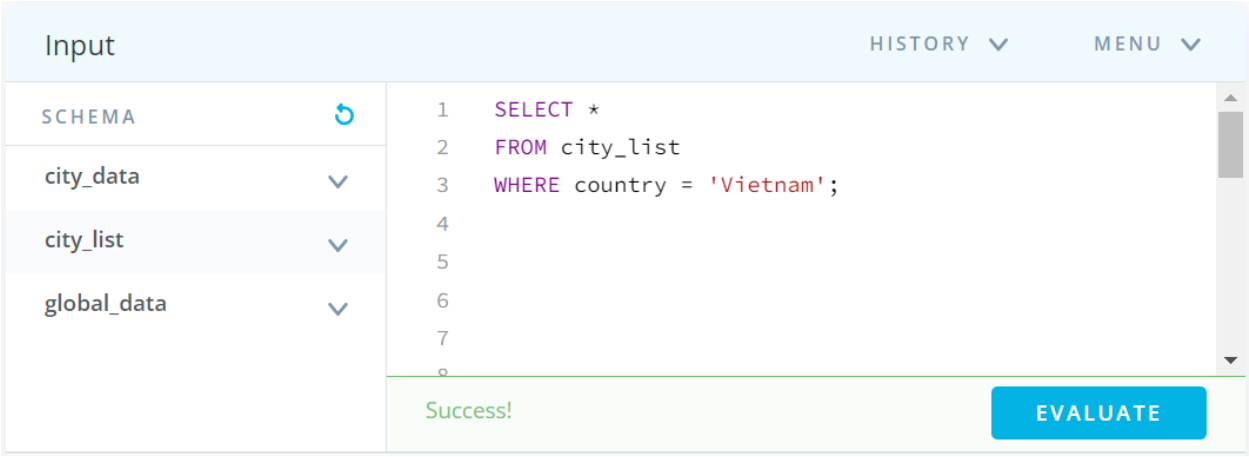
1. The Database Schema

There are three tables in the database:

- city_list - This contains a list of cities and countries in the database. Look through them in order to find the city nearest to you.
- city_data - This contains the average temperatures for each city by year (ºC).
- global_data - This contains the average global temperatures by year (ºC).

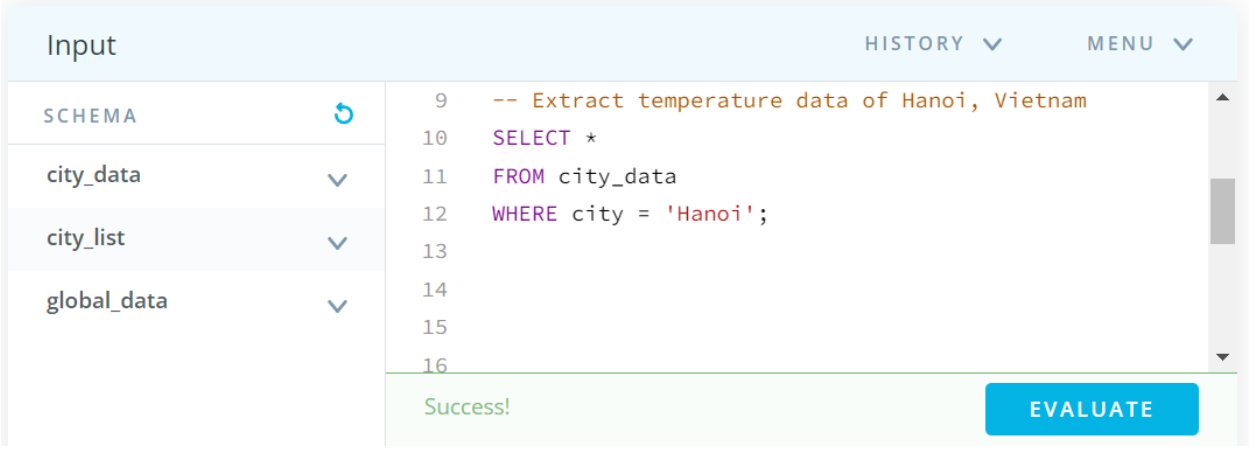
2. Process of querying and saving data

- Query all cities in Vietnam to know what is the nearest big city. Choose Hanoi as the locality.



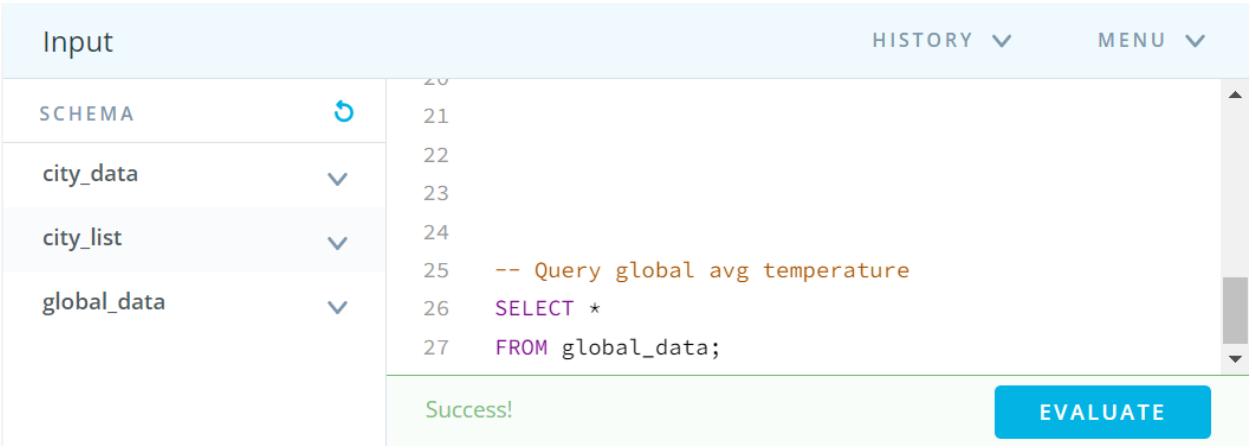
results_hanoi.csv

- Query all average temperature data in Hanoi over years.



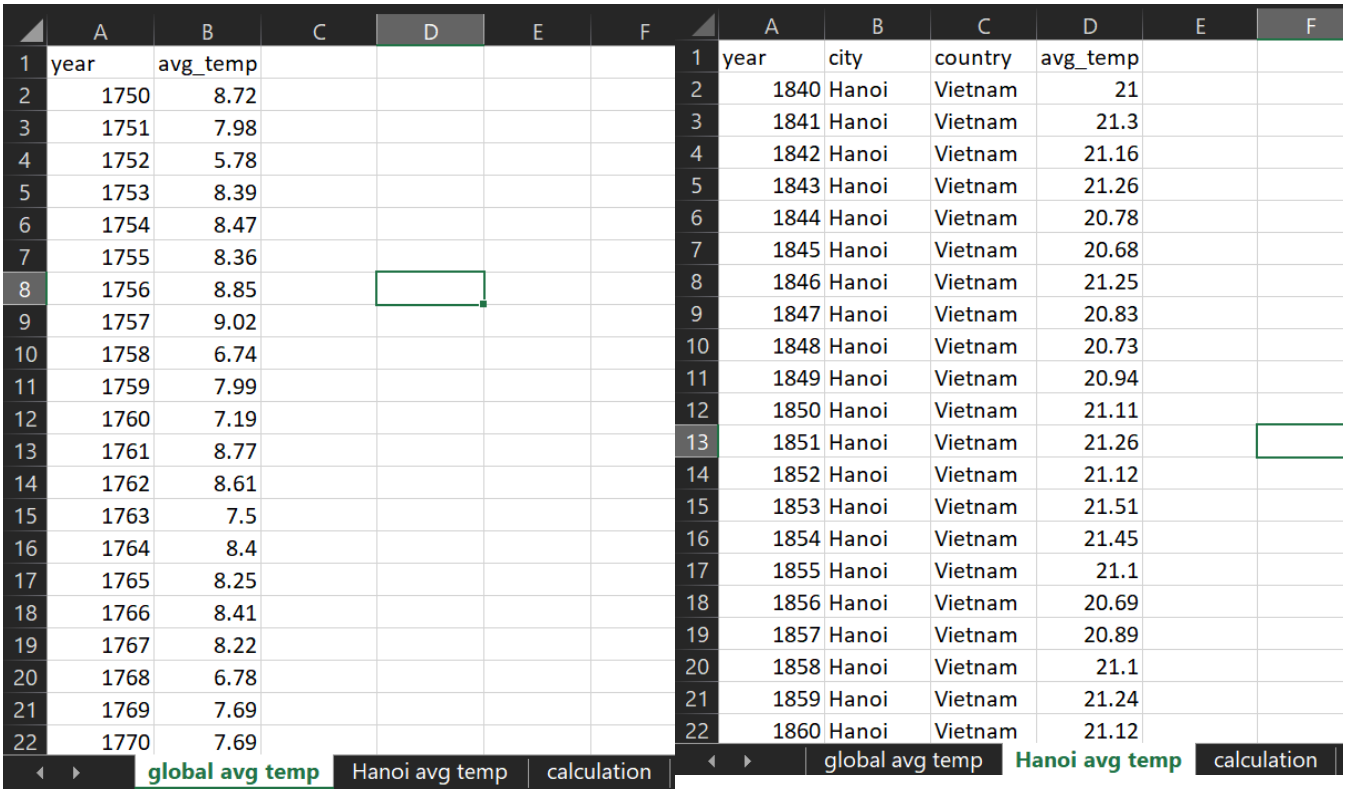
results_global.csv

- Query all global average temperature data.



II. Step 2: Calculate data

- Copy 2 above result tables into each sheet of the new file.



	A	B
1	year	avg_temp
2	1750	8.72
3	1751	7.98
4	1752	5.78
5	1753	8.39
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
22	1770	7.69

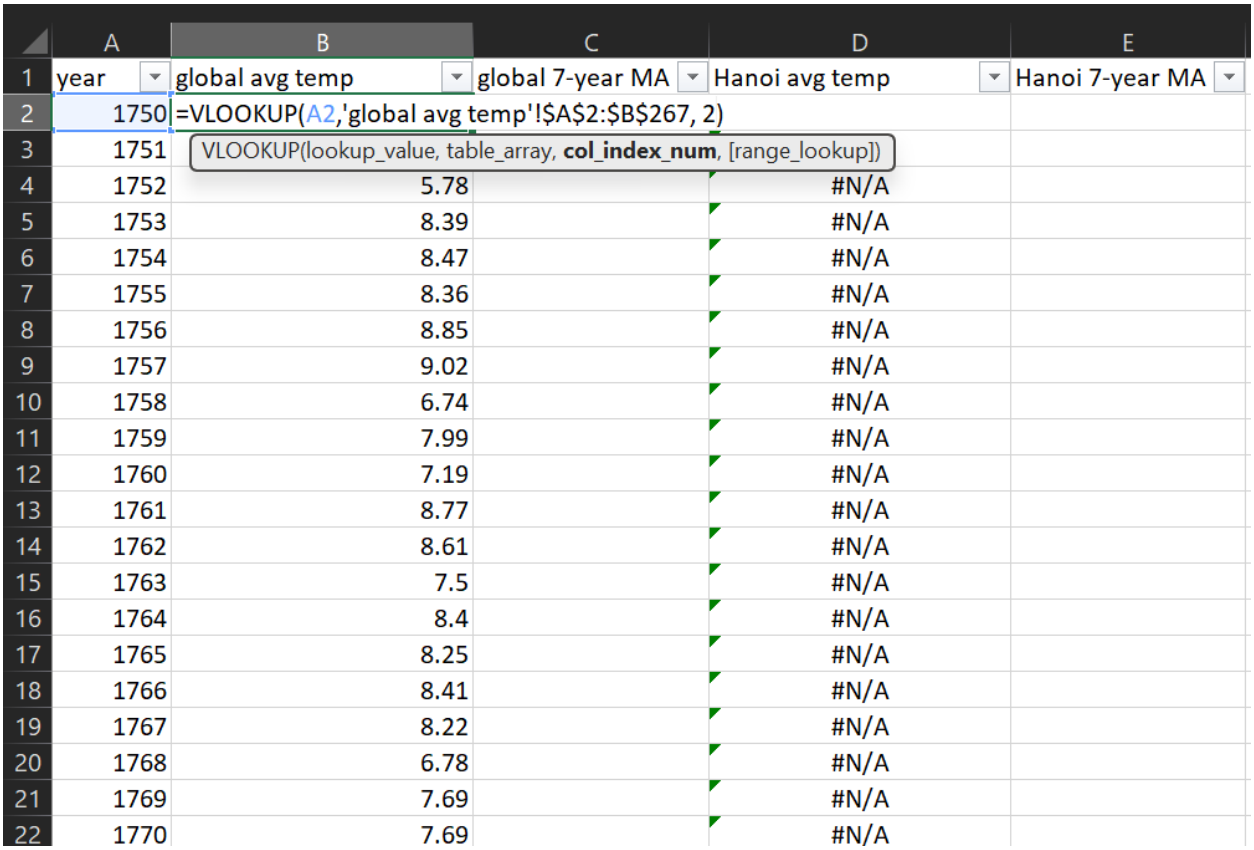
global avg temp | Hanoi avg temp | calculation

	A	B	C	D
1	year	city	country	avg_temp
2	1840	Hanoi	Vietnam	21
3	1841	Hanoi	Vietnam	21.3
4	1842	Hanoi	Vietnam	21.16
5	1843	Hanoi	Vietnam	21.26
6	1844	Hanoi	Vietnam	20.78
7	1845	Hanoi	Vietnam	20.68
8	1846	Hanoi	Vietnam	21.25
9	1847	Hanoi	Vietnam	20.83
10	1848	Hanoi	Vietnam	20.73
11	1849	Hanoi	Vietnam	20.94
12	1850	Hanoi	Vietnam	21.11
13	1851	Hanoi	Vietnam	21.26
14	1852	Hanoi	Vietnam	21.12
15	1853	Hanoi	Vietnam	21.51
16	1854	Hanoi	Vietnam	21.45
17	1855	Hanoi	Vietnam	21.1
18	1856	Hanoi	Vietnam	20.69
19	1857	Hanoi	Vietnam	20.89
20	1858	Hanoi	Vietnam	21.1
21	1859	Hanoi	Vietnam	21.24
22	1860	Hanoi	Vietnam	21.12

global avg temp | Hanoi avg temp | calculation

- Open new sheet in the same file named ‘calculation’ to retrieve and calculate the global and local 7-year moving average temperature.

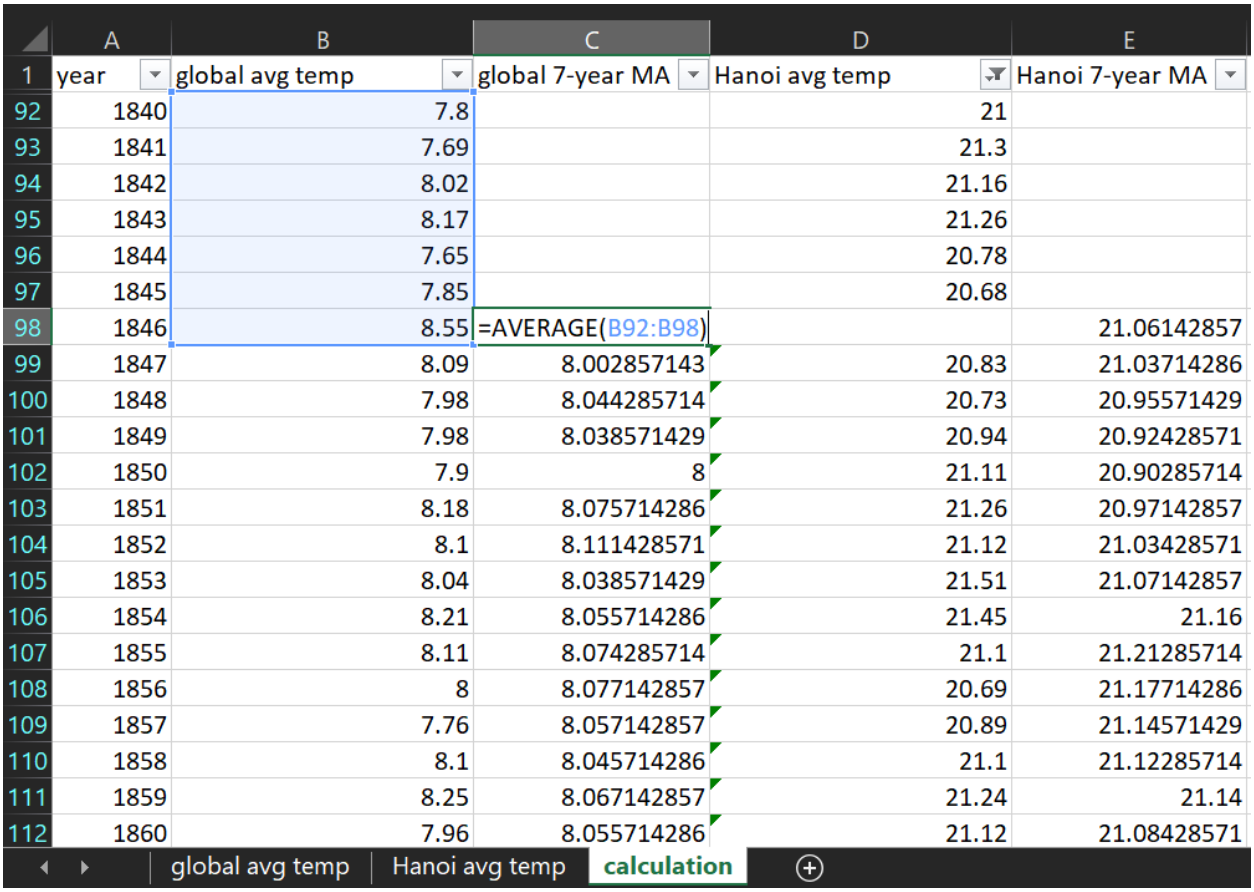
- Use VLOOKUP function to retrieve global and local average temperature data for corresponding year. The B column is global average temperature data. The D column is local average temperature data.



	A	B	C	D	E
1	year	global avg temp	global 7-year MA	Hanoi avg temp	Hanoi 7-year MA
2	1750	=VLOOKUP(A2,'global avg temp'!$A$2:$B$267, 2)			
3	1751				
4	1752	5.78		#N/A	
5	1753	8.39		#N/A	
6	1754	8.47		#N/A	
7	1755	8.36		#N/A	
8	1756	8.85		#N/A	
9	1757	9.02		#N/A	
10	1758	6.74		#N/A	
11	1759	7.99		#N/A	
12	1760	7.19		#N/A	
13	1761	8.77		#N/A	
14	1762	8.61		#N/A	
15	1763	7.5		#N/A	
16	1764	8.4		#N/A	
17	1765	8.25		#N/A	
18	1766	8.41		#N/A	
19	1767	8.22		#N/A	
20	1768	6.78		#N/A	
21	1769	7.69		#N/A	
22	1770	7.69		#N/A	

- The data just includes the local average temperature from 1840, so I decide to compare 7-year average temperature of global and local from 1840 to 2015.

- After that, use AVERAGE function to calculate 7-year moving average temperature for global and local. The C column is global 7-year average temperature data. The E column is local 7-year average temperature data.



	A	B	C	D	E
1	year	global avg temp	global 7-year MA	Hanoi avg temp	Hanoi 7-year MA
92	1840	7.8		21	
93	1841	7.69		21.3	
94	1842	8.02		21.16	
95	1843	8.17		21.26	
96	1844	7.65		20.78	
97	1845	7.85		20.68	
98	1846	8.55	=AVERAGE(B92:B98)		21.06142857
99	1847	8.09	8.002857143	20.83	21.03714286
100	1848	7.98	8.044285714	20.73	20.95571429
101	1849	7.98	8.038571429	20.94	20.92428571
102	1850	7.9	8	21.11	20.90285714
103	1851	8.18	8.075714286	21.26	20.97142857
104	1852	8.1	8.111428571	21.12	21.03428571
105	1853	8.04	8.038571429	21.51	21.07142857
106	1854	8.21	8.055714286	21.45	21.16
107	1855	8.11	8.074285714	21.1	21.21285714
108	1856	8	8.077142857	20.69	21.17714286
109	1857	7.76	8.057142857	20.89	21.14571429
110	1858	8.1	8.045714286	21.1	21.12285714
111	1859	8.25	8.067142857	21.24	21.14
112	1860	7.96	8.055714286	21.12	21.08428571

	A	B	C	D	E
1	year	global avg temp	global 7-year MA	Hanoi avg temp	Hanoi 7-year MA
92	1840	7.8		21	
93	1841	7.69		21.3	
94	1842	8.02		21.16	
95	1843	8.17		21.26	
96	1844	7.65		20.78	
97	1845	7.85		20.68	
98	1846	8.55	7.961428571	21.25	=AVERAGE(D92:D98)
99	1847	8.09	8.002857143	20.83	21.03714286
100	1848	7.98	8.044285714	20.73	20.95571429
101	1849	7.98	8.038571429	20.94	20.92428571
102	1850	7.9	8	21.11	20.90285714
103	1851	8.18	8.075714286	21.26	20.97142857
104	1852	8.1	8.111428571	21.12	21.03428571
105	1853	8.04	8.038571429	21.51	21.07142857
106	1854	8.21	8.055714286	21.45	21.16
107	1855	8.11	8.074285714	21.1	21.21285714
108	1856	8	8.077142857	20.69	21.17714286
109	1857	7.76	8.057142857	20.89	21.14571429
110	1858	8.1	8.045714286	21.1	21.12285714
111	1859	8.25	8.067142857	21.24	21.14
112	1860	7.96	8.055714286	21.12	21.08428571

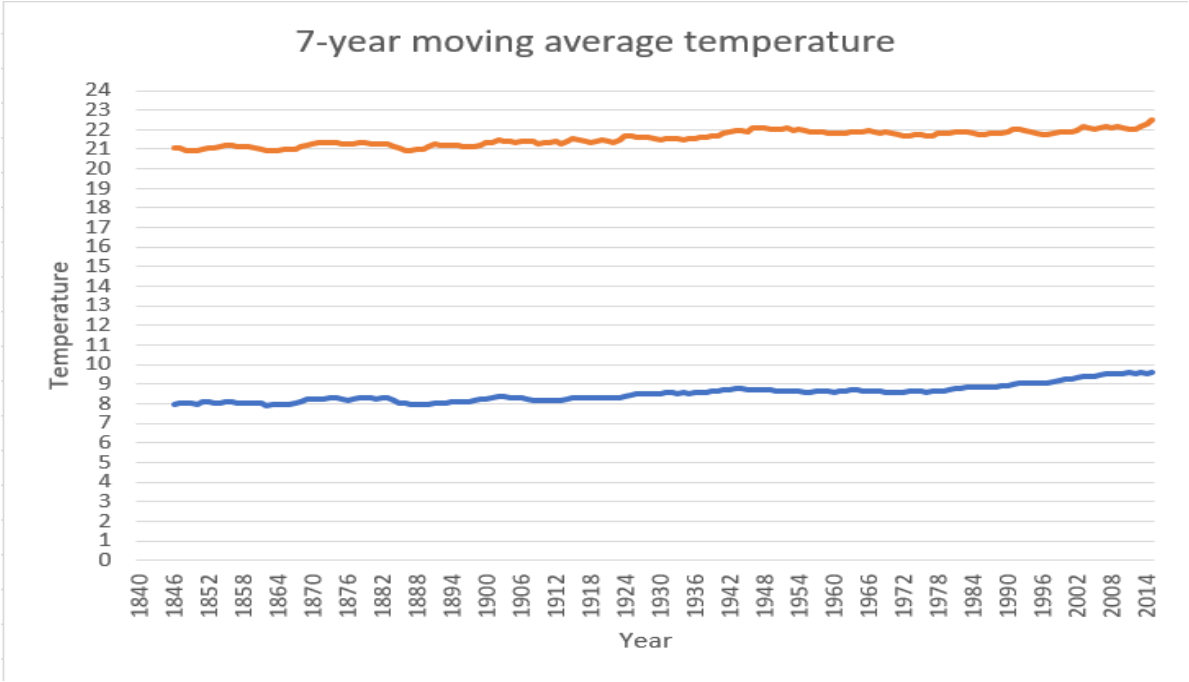
global avg temp | Hanoi avg temp | calculation

III. Step 3: Visualize data

Create a line chart to show the different global and local average temperature over years (from 1840 to 2015). Use moving averages to smooth out data and make it ealier to observe long term weather trends. And apply combine two line chart to compare global and local

prj1_results.xlsx

easily. The final file is here.



IV. Step 4: Make data observations

- Hanoi, my city is consistently hotter on average compared to the global average over time. The difference is around 13 C degree.

- Globally and locally, both have an increasing trend in average temperatures.

- The world is getting hotter, increased more than 2 C degree since 1840.

- Entering the 21st century, the average temperature increased very high. The increase in temperature from 2000 to 2015 is comparable to the increase from the mid-19th century to the end of the 20th century.