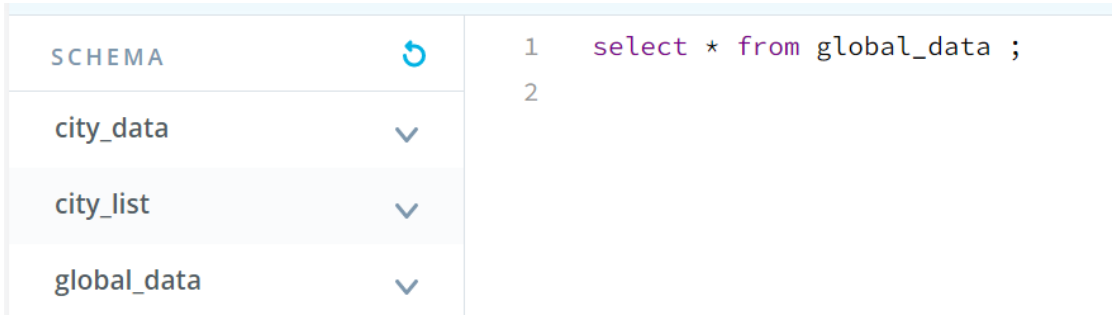
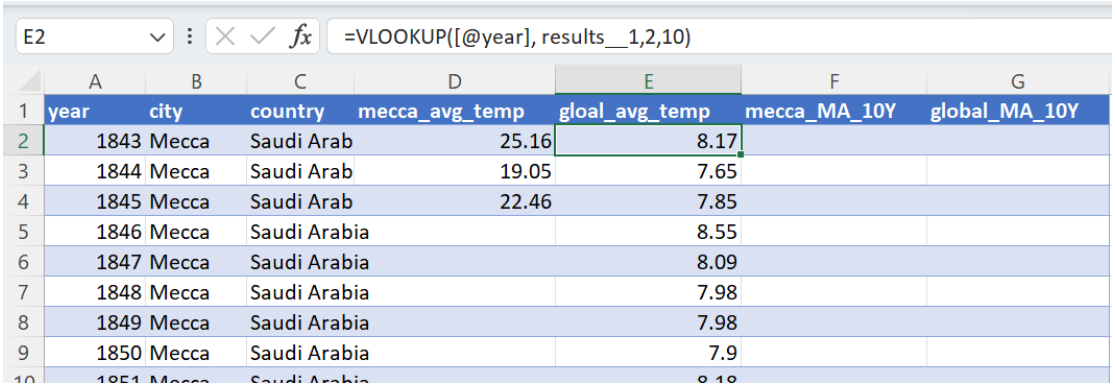
Exploring Weather Trends

Tools used:

1- to extracting Temperature data for global and my city; I used SQL query as shown in figures, and I downloaded data as CSV:



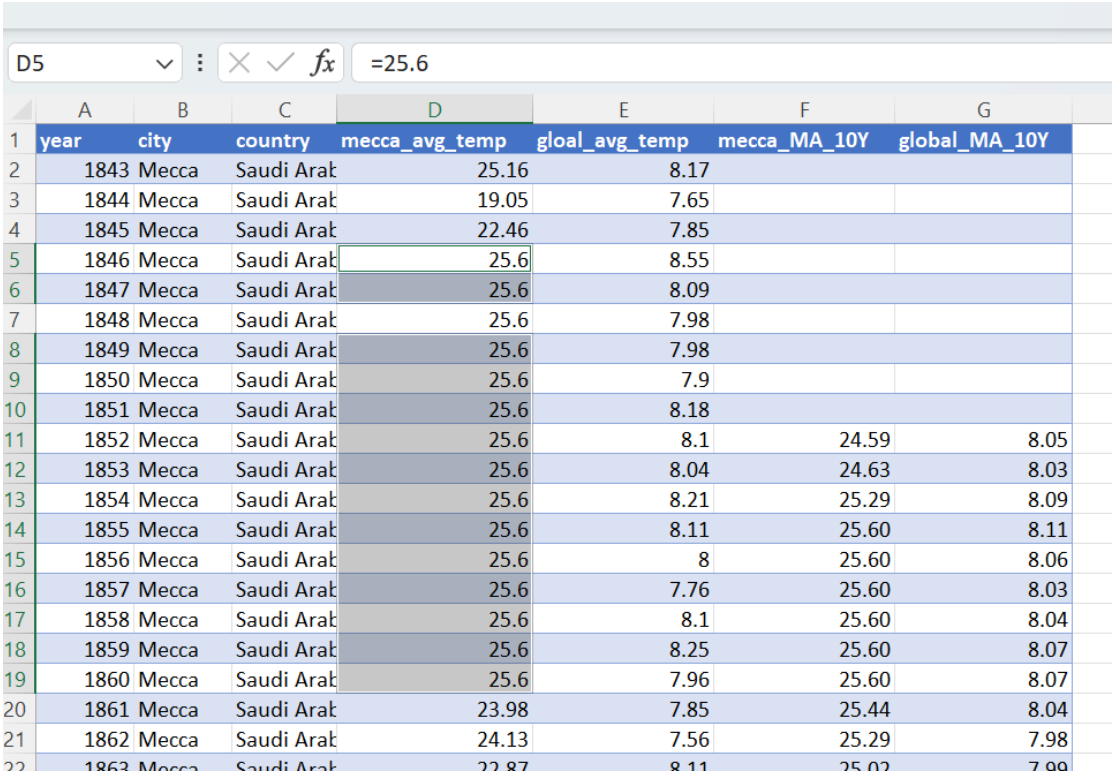
2-To join global average temperature data and Mecca data for each year, I used VLOOKUP() function as in figure:



	A	B	C	D	E	F	G
1	year	city	country	mecca_avg_temp	gloal_avg_temp	mecca_MA_10Y	global_MA_10Y
2	1843	Mecca	Saudi Arab	25.16	8.17		
3	1844	Mecca	Saudi Arab	19.05	7.65		
4	1845	Mecca	Saudi Arab	22.46	7.85		
5	1846	Mecca	Saudi Arabia		8.55		
6	1847	Mecca	Saudi Arabia		8.09		
7	1848	Mecca	Saudi Arabia		7.98		
8	1849	Mecca	Saudi Arabia		7.98		
9	1850	Mecca	Saudi Arabia		7.9		

Figure1 . VLOOKUP() function used to join Global and Mecca Temperature data

3- There are around 14 rows in Mecca Temperature are missing, so I fill the missing values by the mean of Mecca Average Temperature data as you can see in the figure:



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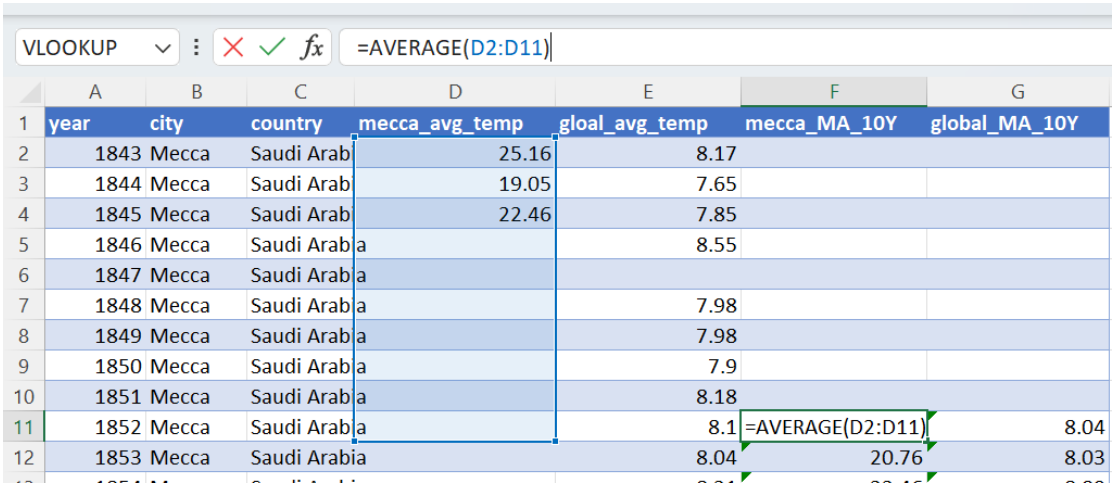
4	1845	Mecca	Saudi Arab	22.46	7.85		
5	1846	Mecca	Saudi Arab	25.6	8.55		
6	1847	Mecca	Saudi Arab	25.6	8.09		
7	1848	Mecca	Saudi Arab	25.6	7.98		
8	1849	Mecca	Saudi Arab	25.6	7.98		
9	1850	Mecca	Saudi Arab	25.6	7.9		
10	1851	Mecca	Saudi Arab	25.6	8.18		
11	1852	Mecca	Saudi Arab	25.6	8.1	24.59	8.05
12	1853	Mecca	Saudi Arab	25.6	8.04	24.63	8.03
13	1854	Mecca	Saudi Arab	25.6	8.21	25.29	8.09
14	1855	Mecca	Saudi Arab	25.6	8.11	25.60	8.11
15	1856	Mecca	Saudi Arab	25.6	8	25.60	8.06
16	1857	Mecca	Saudi Arab	25.6	7.76	25.60	8.03
17	1858	Mecca	Saudi Arab	25.6	8.1	25.60	8.04
18	1859	Mecca	Saudi Arab	25.6	8.25	25.60	8.07
19	1860	Mecca	Saudi Arab	25.6	7.96	25.60	8.07
20	1861	Mecca	Saudi Arab	23.98	7.85	25.44	8.04
21	1862	Mecca	Saudi Arab	24.13	7.56	25.29	7.98
22	1863	Mecca	Saudi Arab	22.87	8.11	25.02	7.99

Figure2 . Fill the missing values

Calculating the moving average

I decide to make Moving Average based on 10 years, so I calculate it as in figure using Average() function to Mecca temperature as well as the global temperature data, then I made a line chart on moving average Years.:



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5	1846	Mecca	Saudi Arab	a	8.55		
6	1847	Mecca	Saudi Arab	a			
7	1848	Mecca	Saudi Arab	a	7.98		
8	1849	Mecca	Saudi Arab	a	7.98		
9	1850	Mecca	Saudi Arab	a	7.9		
10	1851	Mecca	Saudi Arab	a	8.18		
11	1852	Mecca	Saudi Arab	a	8.1	=AVERAGE(D2:D11)	8.04
12	1853	Mecca	Saudi Arabia		8.04	20.76	8.03

Figure3 . Moving Average calculation

key considerations when visualize the trends

- Plot years in x-axis and Temperature in y-axis
- Use 2 different colors for global and local Temperature to better visualization the deference
- Use the moving average in line plot to clearly visualize the trend

Visualization

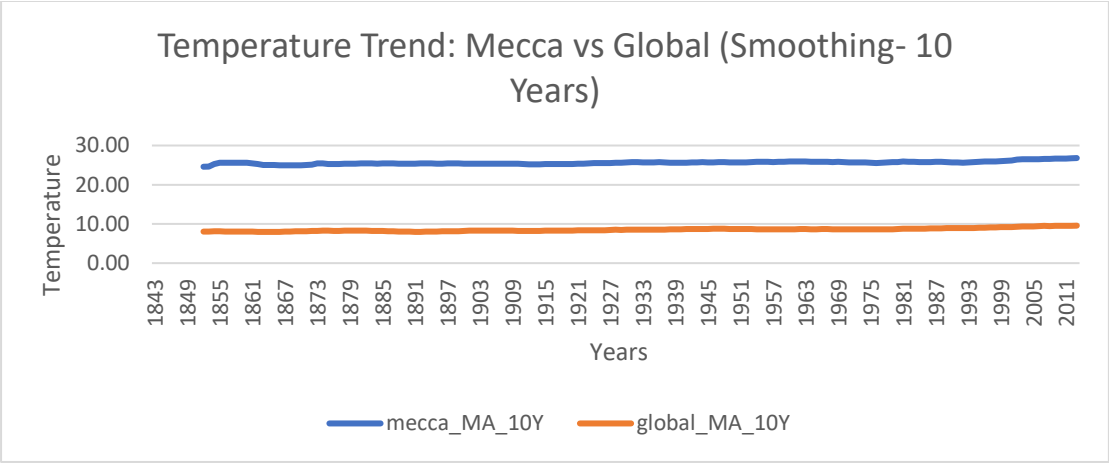

Figure 4. Mecca vs Global Temperature by moving average for 10years

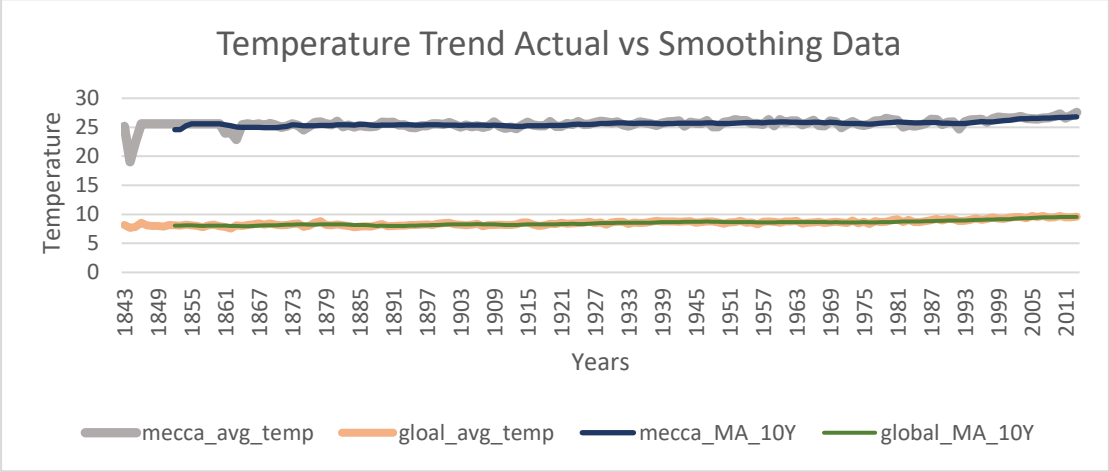

Figure 5. Actual trend vs smoothing trend

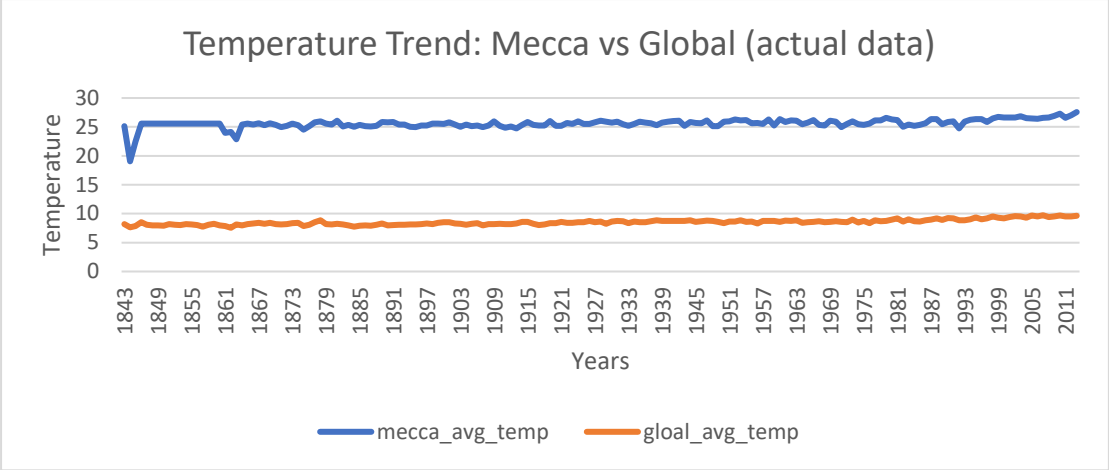

Figure 6. Mecca vs Global without moving average

Observations

- All Mecca (local) as well as global temperatures rise with increasing years
- Mecca is warmer than global temperatures
- Slow rise in temperatures in Mecca and the global
- The overall average temperature for Mecca city is 25.6C whereas Global average temperature is 8.5C from 1843 to 2013