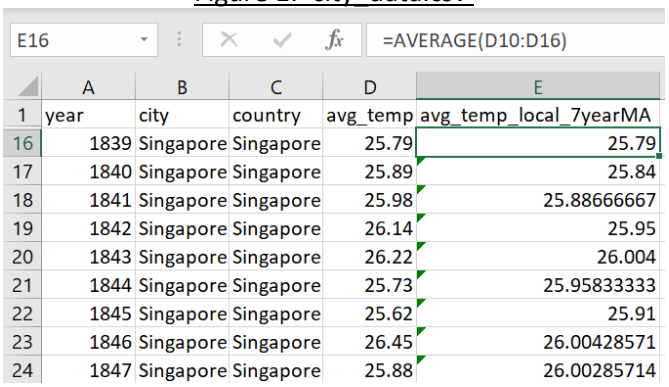
Explore Weather Trends: Using Microsoft Excel

Step 1: Extract the data from the database using the following SQL commands:

Data Required	Command	Result
City Data	SELECT * FROM city_data WHERE city = 'Singapore';	Exported data to 'city_data.csv'.
City List	SELECT * FROM city_list WHERE city = 'Singapore';	Exported data to 'city_list.csv'.
Global Data	SELECT * FROM global_data;	Exported data to 'global_data.csv'.

Step 2: Open 'city_data.csv' using Microsoft Excel. Calculate 7-year moving average temperatures and insert the results in a new column 'avg_temp_local_7yearMA'. In addition, due to missing data, I will only use the temperature data from year 1839 to 2013.

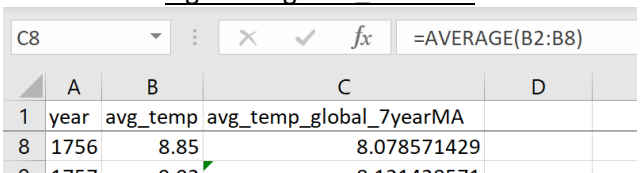
Figure 1: 'city_data.csv'



	A	B	C	D	E
1	year	city	country	avg_temp	avg_temp_local_7yearMA
16	1839	Singapore	Singapore	25.79	25.79
17	1840	Singapore	Singapore	25.89	25.84
18	1841	Singapore	Singapore	25.98	25.88666667
19	1842	Singapore	Singapore	26.14	25.95
20	1843	Singapore	Singapore	26.22	26.004
21	1844	Singapore	Singapore	25.73	25.95833333
22	1845	Singapore	Singapore	25.62	25.91
23	1846	Singapore	Singapore	26.45	26.00428571
24	1847	Singapore	Singapore	25.88	26.00285714

Step 3: Open 'global_data.csv' using Microsoft Excel. Calculate 7-year moving average temperatures and insert the results in a new column 'avg_temp_local_7yearMA'.

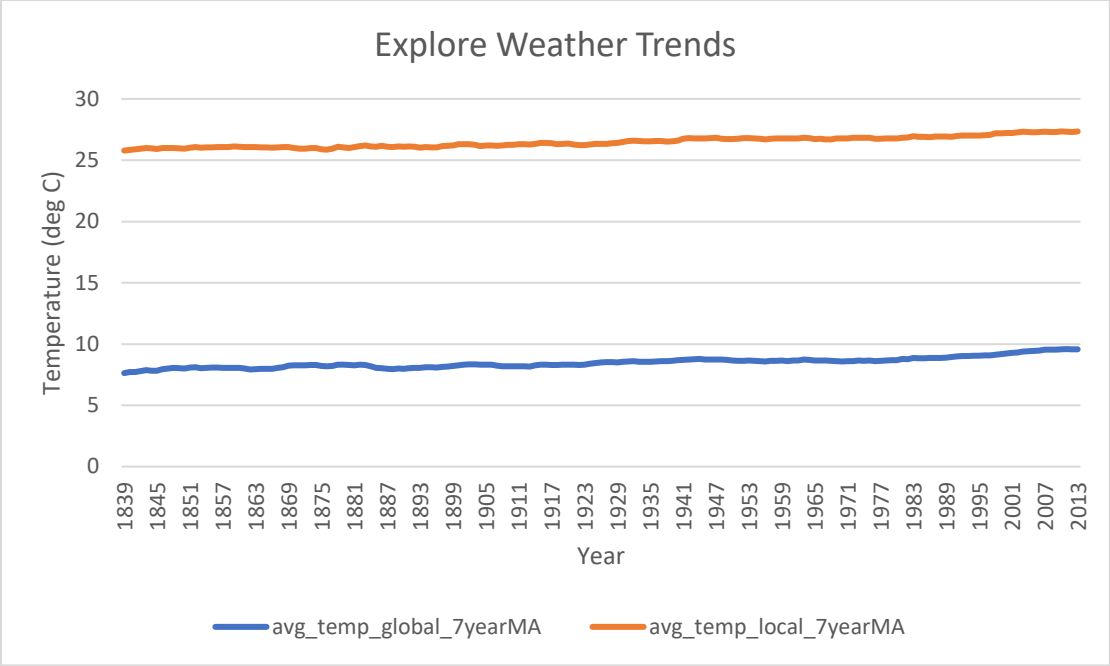
Figure 2: 'global_data.csv'



	A	B	C	D
1	year	avg_temp	avg_temp_global_7yearMA	
8	1756	8.85	8.078571429	
9	1757	9.02	8.121428571	
10	1758	6.74	7.944285714	
11	1759	7.99	8.26	
12	1760	7.19	8.088571429	
13	1761	8.77	8.131428571	
14	1762	8.61	8.167142857	
15	1763	7.5	7.974285714	
16	1764	8.4	7.885714286	

Step 4: Plot 'avg_temp_local_7yearMA' and 'avg_temp_global_7yearMA' against time.

Figure 3: Explore Weather Trends



Step 5: Four observations about the visualization

- **a.** From the slope of the graphs, it can be seen that there is a general increase in the local (Singapore) and global temperatures over time from 1839 to 2013.
- **b.** This steady increase in temperature from 1839 to 2013 is estimated to be about 3 to 5 deg C for both local and global temperatures.
- **c.** The delta between local (Singapore) and global temperatures is estimated to be about 15 deg C.
- **d.** The delta mentioned in Point c is roughly constant (i.e. 15 deg C throughout) from 1839 to 2013.

Additional Observations: Correlation Coefficient

The correlation coefficient is 0.955683.

Figure 4: Correlation Coeffcient

I2 =CORREL(C2:C176,H2:H176)

	A	B	C	D	E	F	G	H	I
1	year	avg_temp	avg_temp_global_7	year	city	country	avg_temp	avg_temp_local_7yearMA	
2	1839	7.63	7.63	1839	Singapore	Singapore	25.79	25.79	0.955683
3	1840	7.8	7.715	1840	Singapore	Singapore	25.89	25.84	
4	1841	7.69	7.706666667	1841	Singapore	Singapore	25.98	25.88666667	
5	1842	8.02	7.785	1842	Singapore	Singapore	26.14	25.95	