Data Analysis Project on Exploring Weather Trends :

Summary:

In this project, I will analyse local and global temperature data and compare them.
The temperature trends of **Hyderabad,India** will be compared to the global temperature trends.

Objective:

Visualize the data and then compare them to write down the similarities and differences between the global temperature trends and local temperature trends in Hyderabad.

Moving average of temperatures will be used locally and globally.

Steps:

1. Extraction of data:

The following query was used to retrieve the required data from database.

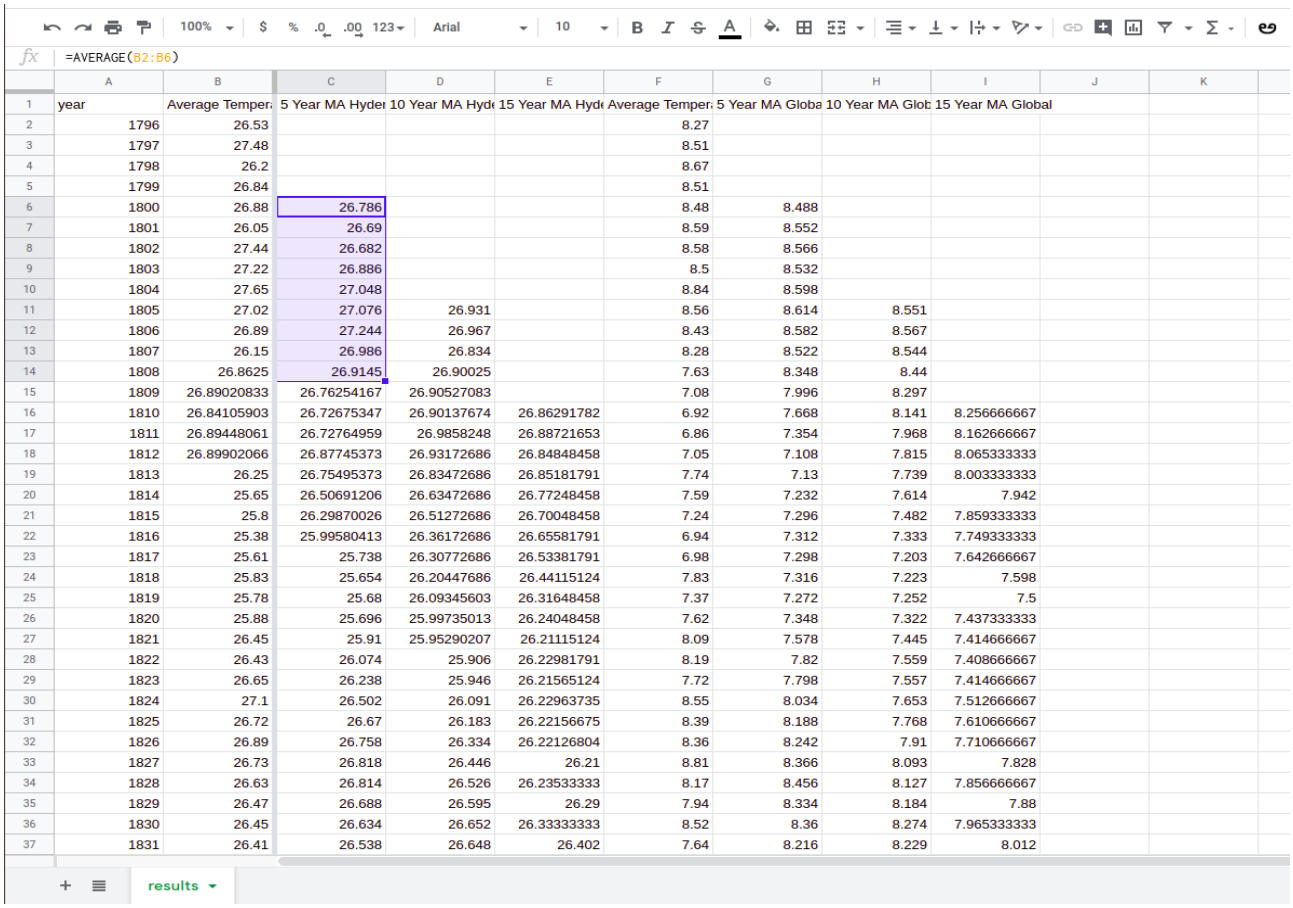
```
SELECT city.year,city.avg_temp as
avg_city_temp ,global.avg_temp as
avg_global_temp
FROM city_data as city
INNER JOIN global_data as global
on city.year = global.year
WHERE city.city='Hyderabad'
AND city.country='India';
```

- I have used this SQL query to retrieve temperature of global and city at once joined by the year.

- Results were downloaded in the results.csv file.

2. Calculation of Moving Average from CSV:

- I have used Google spreadsheet to analyse the data.
- I have calculated the moving average of intervals 5,10 and 15 years to have a better clarity of how better the temperature trends could be analyzed.
- The below snapshot shows the moving average values.
- The moving average was calculated using the formula for which the value has been highlighted.



=AVERAGE(B2:B6)

	A	B	C	D	E	F	G	H	I	J	K
1	year	Average Temper	5 Year MA Hyde	10 Year MA Hyd	15 Year MA Hyd	Average Temper	5 Year MA Globa	10 Year MA Glob	15 Year MA Global		
2	1796	26.53				8.27					
3	1797	27.48				8.51					
4	1798	26.2				8.67					
5	1799	26.84				8.51					
6	1800	26.88	26.786			8.48	8.488				
7	1801	26.05	26.69			8.59	8.552				
8	1802	27.44	26.682			8.58	8.566				
9	1803	27.22	26.886			8.5	8.532				
10	1804	27.65	27.048			8.84	8.598				
11	1805	27.02	27.076	26.931		8.56	8.614	8.551			
12	1806	26.89	27.244	26.967		8.43	8.582	8.567			
13	1807	26.15	26.986	26.834		8.28	8.522	8.544			
14	1808	26.8625	26.9145	26.90025		7.63	8.348	8.44			
15	1809	26.89020833	26.76254167	26.90527083		7.08	7.996	8.297			
16	1810	26.84105903	26.72675347	26.90137674	26.86291782	6.92	7.668	8.141	8.256666667		
17	1811	26.89448061	26.72764959	26.9858248	26.88721653	6.86	7.354	7.968	8.162666667		
18	1812	26.89902066	26.87745373	26.93172686	26.84848458	7.05	7.108	7.815	8.065333333		
19	1813	26.25	26.75495373	26.83472686	26.85181791	7.74	7.13	7.739	8.003333333		
20	1814	25.65	26.50691206	26.63472686	26.77248458	7.59	7.232	7.614	7.942		
21	1815	25.8	26.29870026	26.51272686	26.70048458	7.24	7.296	7.482	7.859333333		
22	1816	25.38	25.99580413	26.36172686	26.65581791	6.94	7.312	7.333	7.749333333		
23	1817	25.61	25.738	26.30772686	26.53381791	6.98	7.298	7.203	7.642666667		
24	1818	25.83	25.654	26.20447686	26.44115124	7.83	7.316	7.223	7.598		
25	1819	25.78	25.68	26.09345603	26.31648458	7.37	7.272	7.252	7.5		
26	1820	25.88	25.696	25.99735013	26.24048458	7.62	7.348	7.322	7.437333333		
27	1821	26.45	25.91	25.95290207	26.21115124	8.09	7.578	7.445	7.414666667		
28	1822	26.43	26.074	25.906	26.22981791	8.19	7.82	7.559	7.408666667		
29	1823	26.65	26.238	25.946	26.21565124	7.72	7.798	7.557	7.414666667		
30	1824	27.1	26.502	26.091	26.22963735	8.55	8.034	7.653	7.512666667		
31	1825	26.72	26.67	26.183	26.22156675	8.39	8.188	7.768	7.610666667		
32	1826	26.89	26.758	26.334	26.22126804	8.36	8.242	7.91	7.710666667		
33	1827	26.73	26.818	26.446	26.21	8.81	8.366	8.093	7.828		
34	1828	26.63	26.814	26.526	26.23533333	8.17	8.456	8.127	7.856666667		
35	1829	26.47	26.688	26.595	26.29	7.94	8.334	8.184	7.88		
36	1830	26.45	26.634	26.652	26.33333333	8.52	8.36	8.274	7.965333333		
37	1831	26.41	26.538	26.648	26.402	7.64	8.216	8.229	8.012		

results

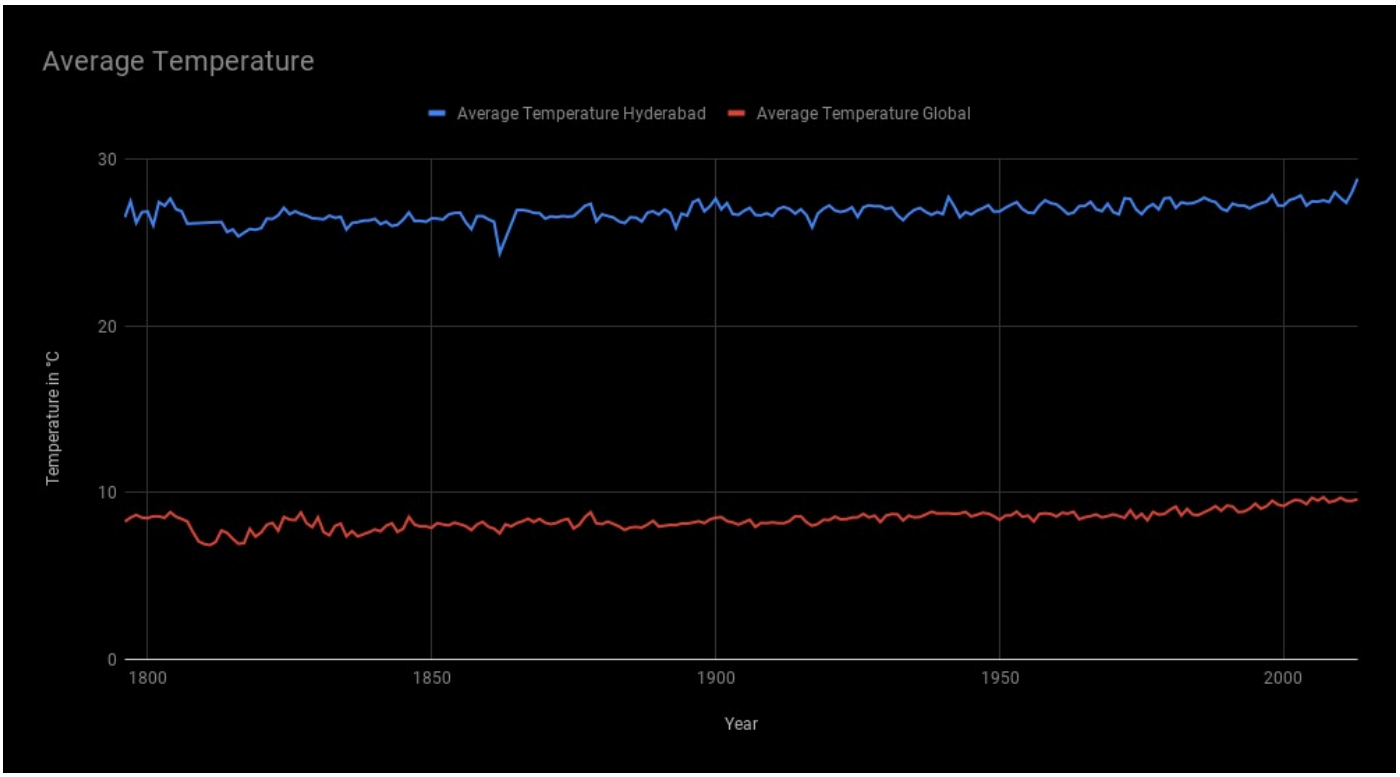
From the above snapshot, the following observations could be made:

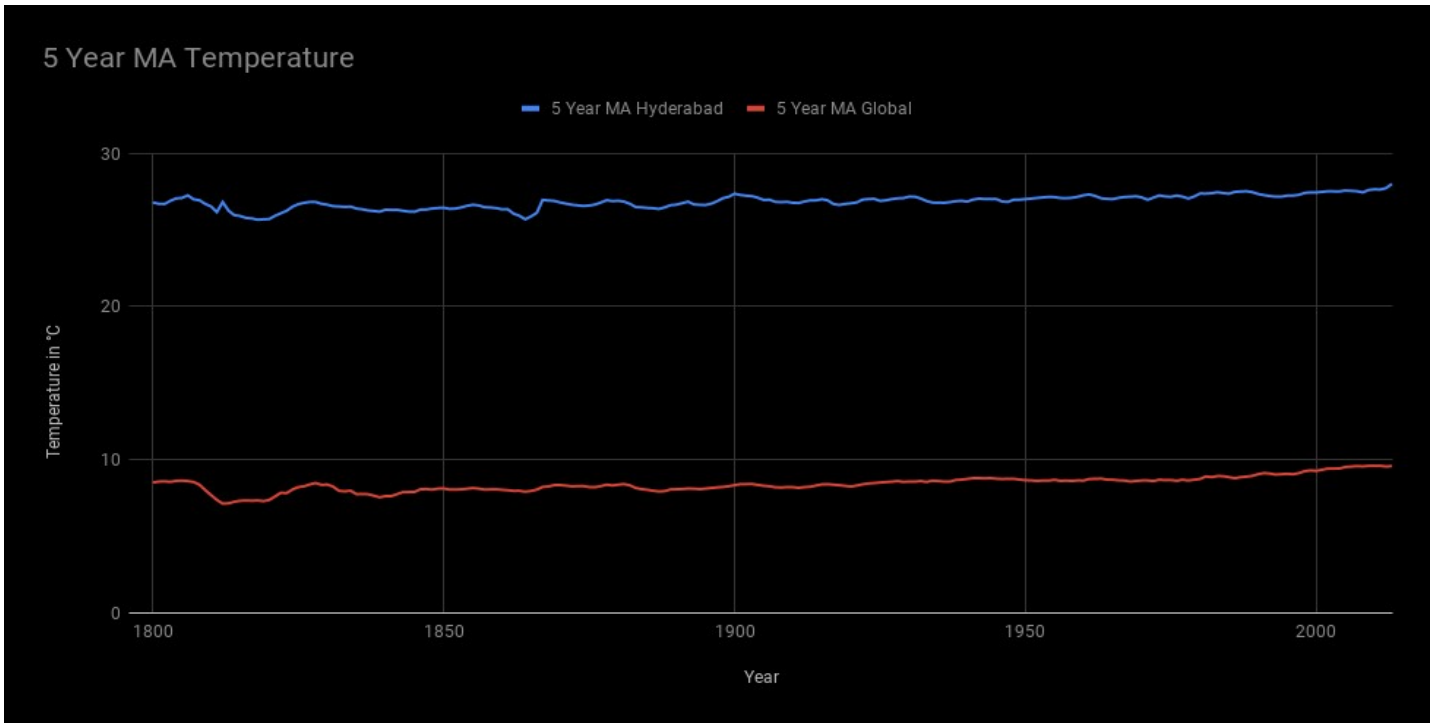
- The moving average formula for Hyderabad:
  1. 5 year MA : =AVERAGE(B2:B6)
  2. 10 year MA : =AVERAGE(B2:B11)
  3. 15 year MA : =AVERAGE(B2:B16)

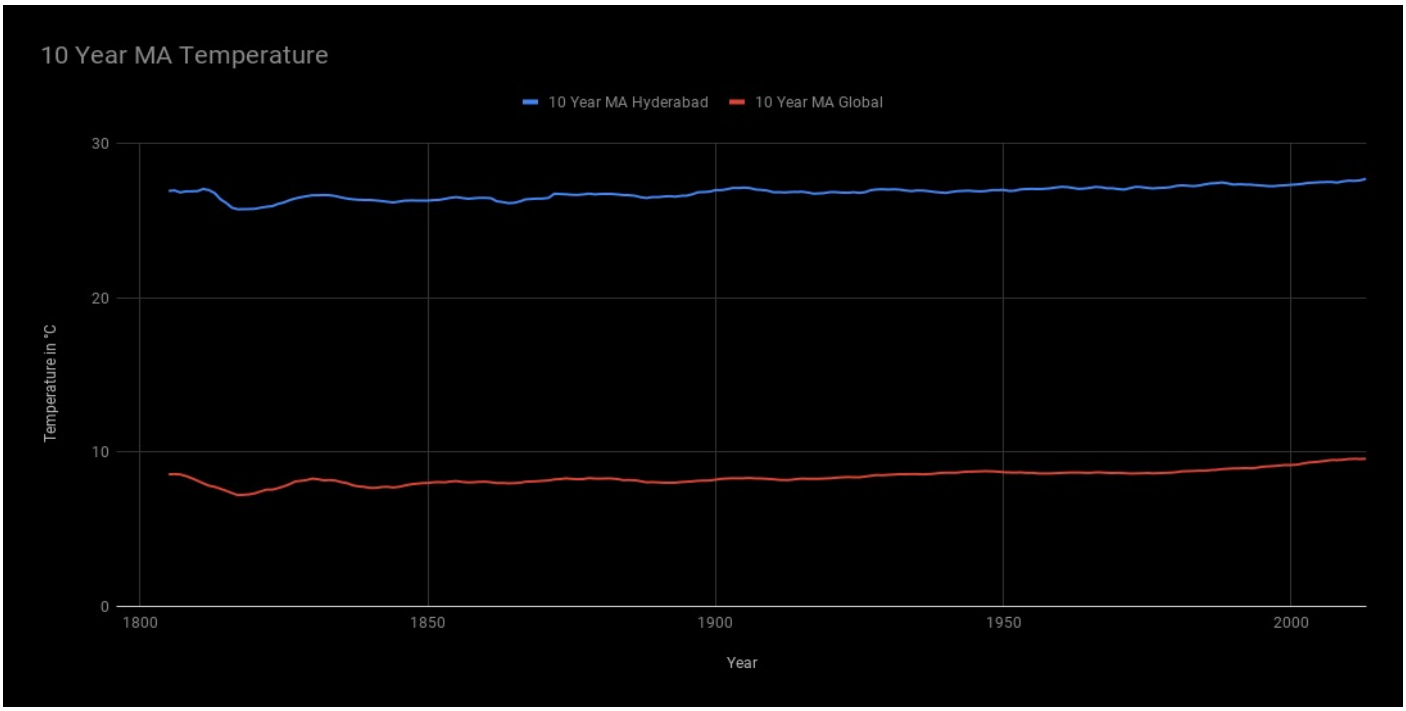
- By using this formula, by dragging all cells ,the values of all the data was filled with moving average.
- The null values were filled with average of other previous cells as the temperature seemed to have been similar when visualized.
- The similar method was followed to calculate the moving average of global temperature.

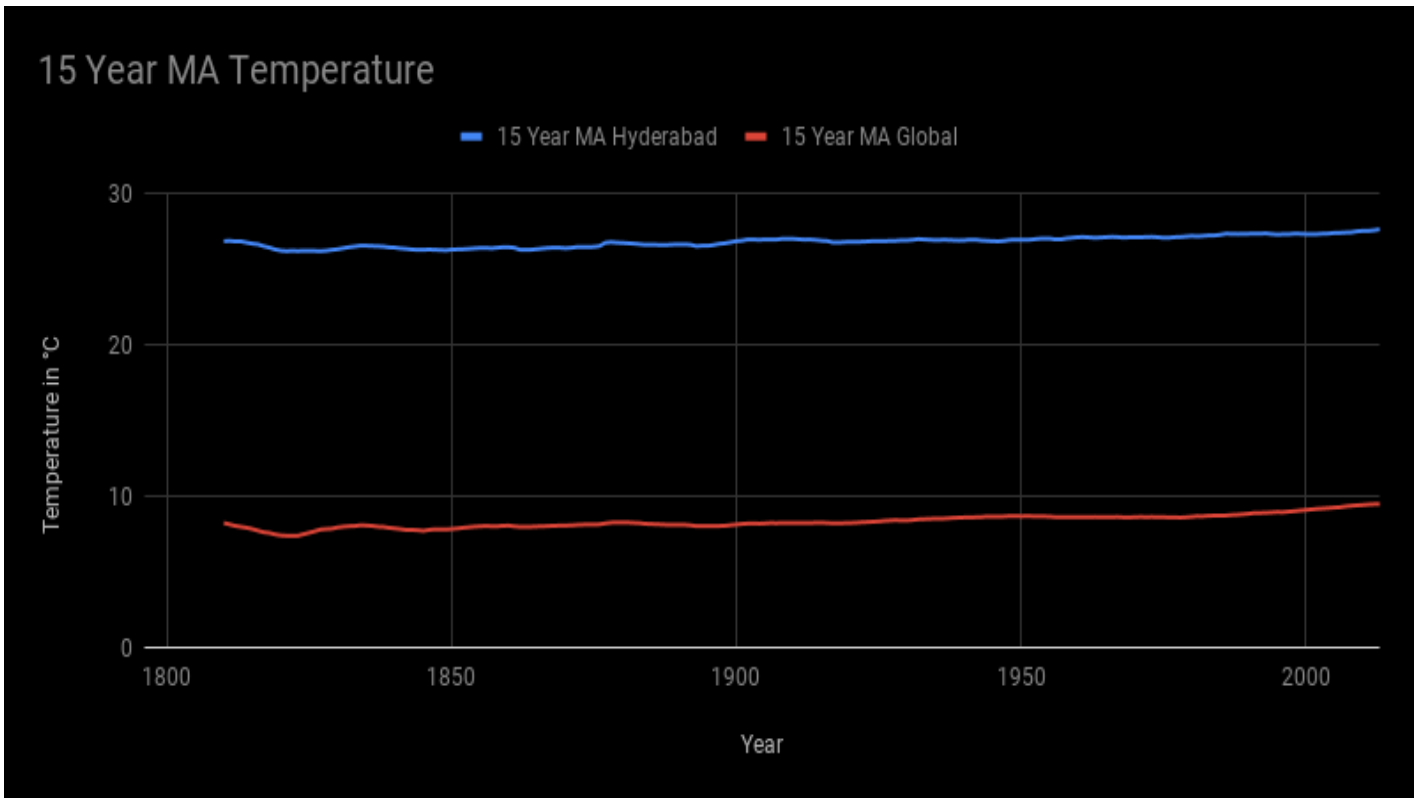
3.Data-Visualization:

- I have visualized graphs for Average temperature , moving average temperature for 5,10 and 15 years for Hyderabad and Global temperature trends.




5 Year MA Temperature
5 Year MA Hyderabad
5 Year MA Global
30
20
10
0
Temperature in °C
1800
1850
1900
1950
2000
Year


10 Year MA Temperature
10 Year MA Hyderabad
10 Year MA Global
30
20
10
0
Temperature in °C
1800
1850
1900
1950
2000
Year



- There is not much difference in the moving average for all the years and it seems like the curve tend to get smoother with increase of years in the moving average.

4. Observations:

- Global Average Temperature has increased from 8.27 degree celsius in the year 1796 to 9.57 degree celsius in the year 2013. Whereas the Temperature in Hyderabad has increased from 26.3 degree celsius in the year 1796 to 28.85 degree celsius in the year 2013.
- From the chart of moving average comparision, it can be observed that Hyderabad is way more hotter than the other countries across the globe.

- The temperature of Hyderabad over all these years have been higher than the average global temperature.
- The difference between average of both the temperatures has a huge amount of difference which is calculated to be 18.45 degree celsius.
- Global and Hyderabad’s 10-year moving average shows that there is a temperature drop from 1810 to 1821 and then they increase linearly and with quite a small difference.
- It is obvious from the charts that the world is getting hotter as years proceed.The tempearture has an increase locally as well as globally.
- The increase in the temperature is quite similar or has a shorter difference between the global and city average temperature.
- The correlation coefficient is found to be 0.77753 which determines the relationship between them.