

Explore Weather Trends Project

In this project, the average temperature of Bangalore, India is compared with that of average global temperature over the years

Comparison of given global temperature against calculated global temperature:

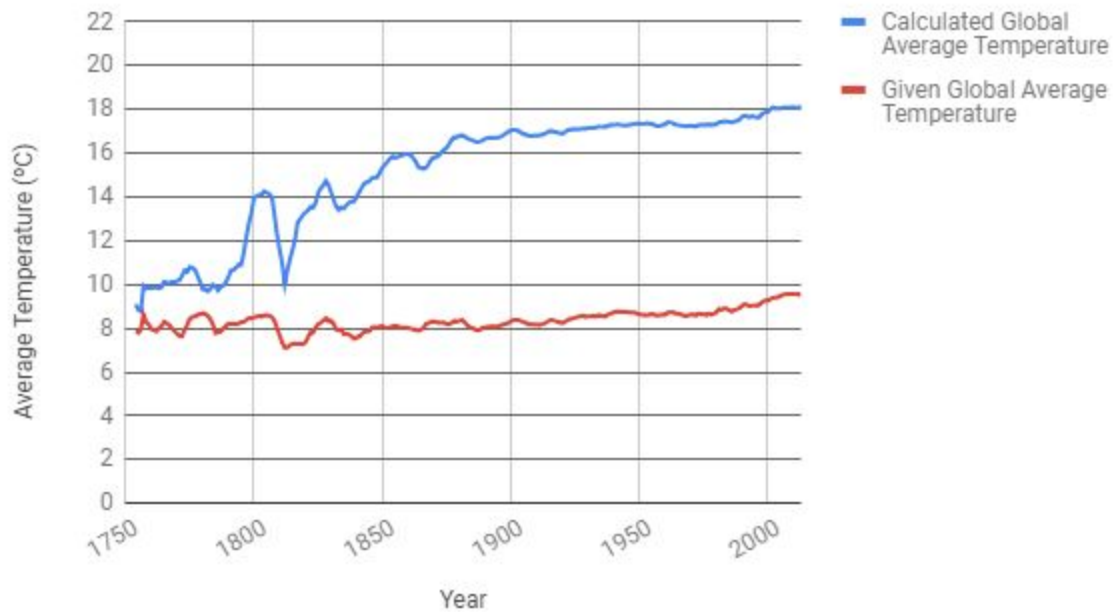
Average global temperature across years is calculated from the city_data table by taking average of avg_temp, grouped by city for each year.

```
WITH c1 AS (SELECT c.year,AVG(c.avg_temp) AS avg_city_temp
FROM city_data c
GROUP BY 1
ORDER BY 1)
```

```
SELECT c1.year,c1.avg_city_temp,
g.avg_temp AS avg_global_temp
FROM c1
JOIN global_data g
ON c1.year = g.year
```

We get the following graph when we plot the calculated global average temperature against the given global average temperature

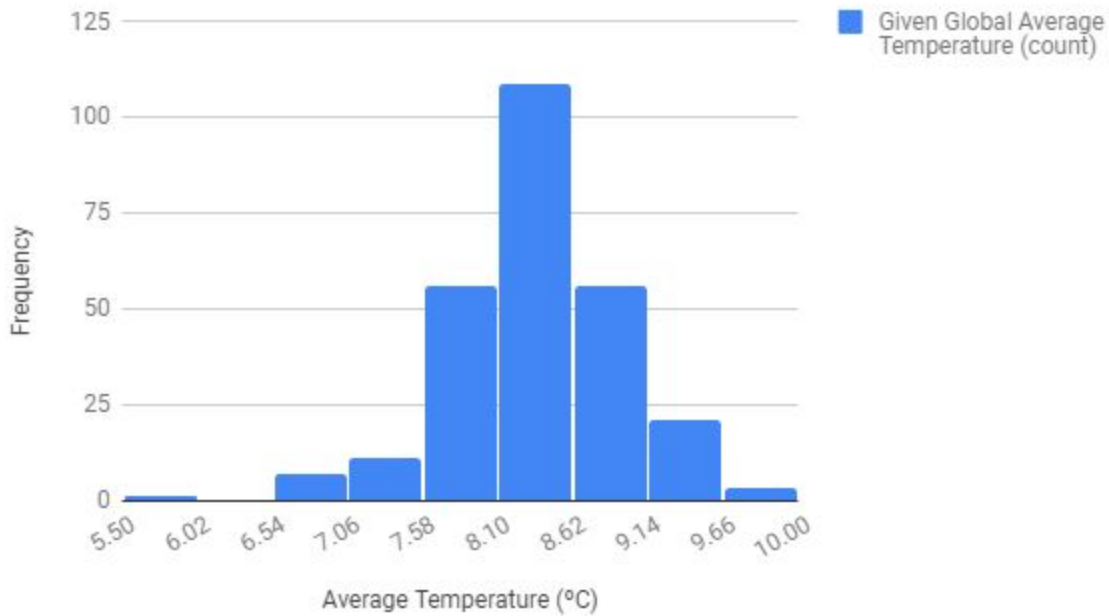
Comparison of Global Temperature Averages



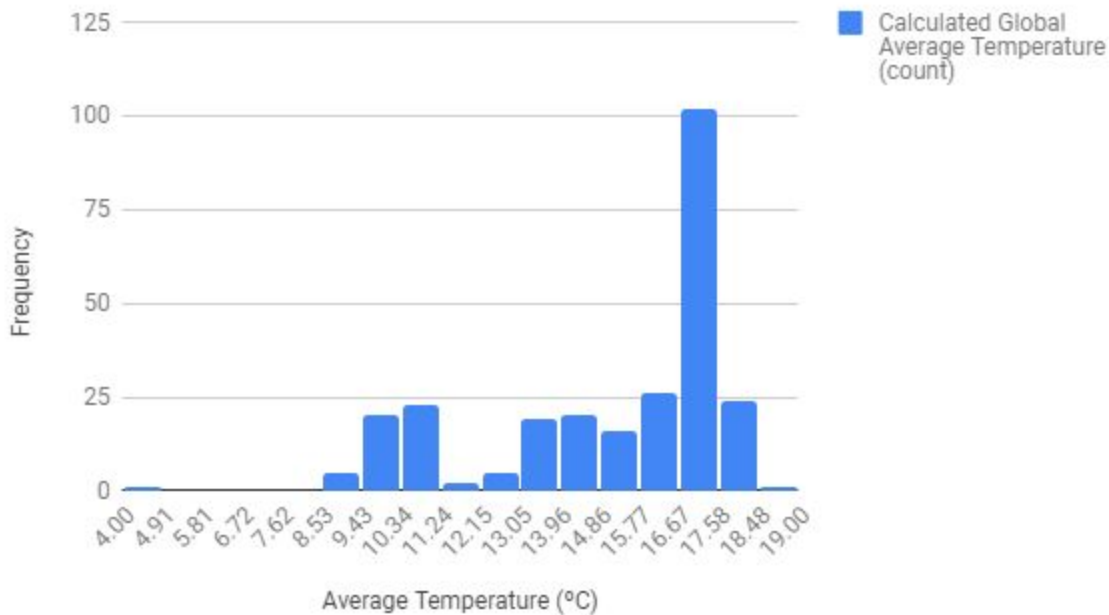
It is therefore evident that the data is not consistent across city_data and global_data tables. The calculated global temperature average is on the higher side when compared to the given global average and also the calculated average grows at a much higher rate.

When the calculated and given global averages are plotted in a histogram, it can be seen that the give global average looks like a normally distributed data with an almost bell curve shape while the calculated average is biased towards the later part of 10 - 20 degree celsius.

Global Average Temperature - Frequency



Global Average Temperature - Frequency



Comparison of average temperature of Bangalore, India with the given global temperature(From here on referred to as global temperature)

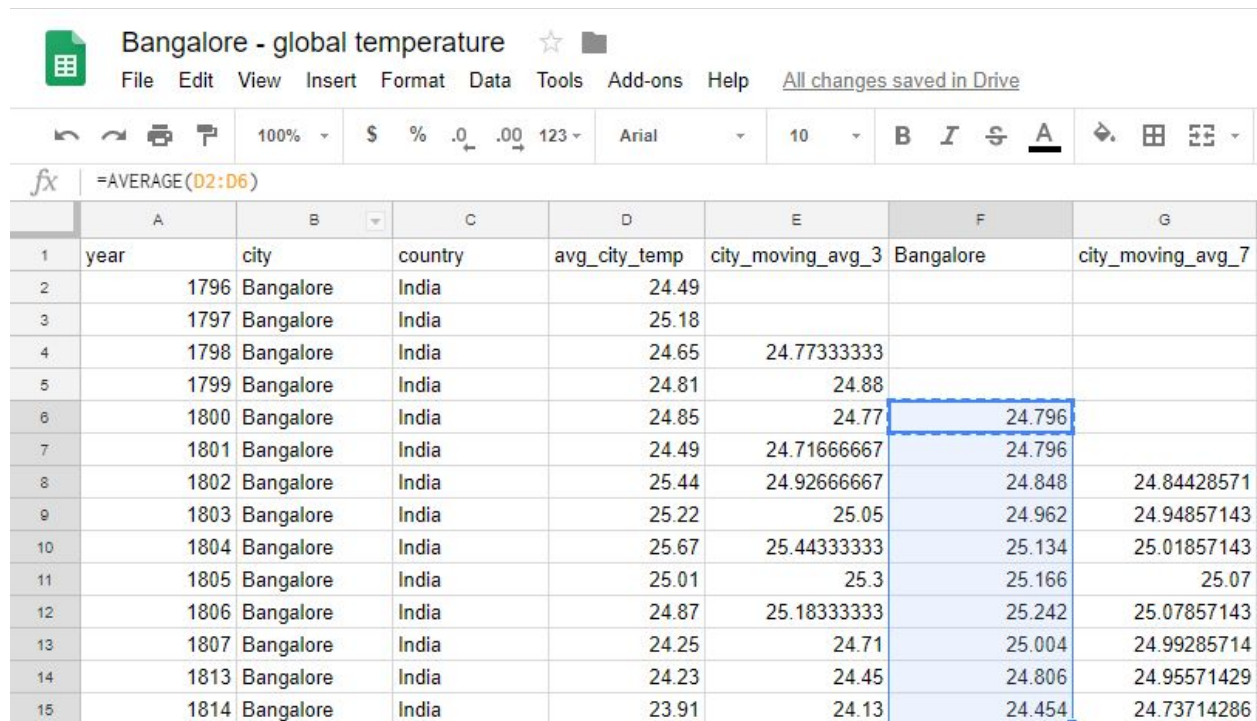
The average temperature of Bangalore and average global temperatures are extracted from the city_data and global_data tables using the following query

```
SELECT c.year,c.city,c.country,c.avg_temp AS avg_city_temp,
g.avg_temp AS avg_global_temp
FROM city_data c
JOIN global_data g
ON c.year = g.year
WHERE c.city = 'Bangalore' AND
c.avg_temp IS NOT NULL AND g.avg_temp IS NOT NULL
```

The queried data is then downloaded as a '.csv' file and is exported to a spreadsheet.

The 5 Year moving average of temperature is taken to minimize volatility in data.

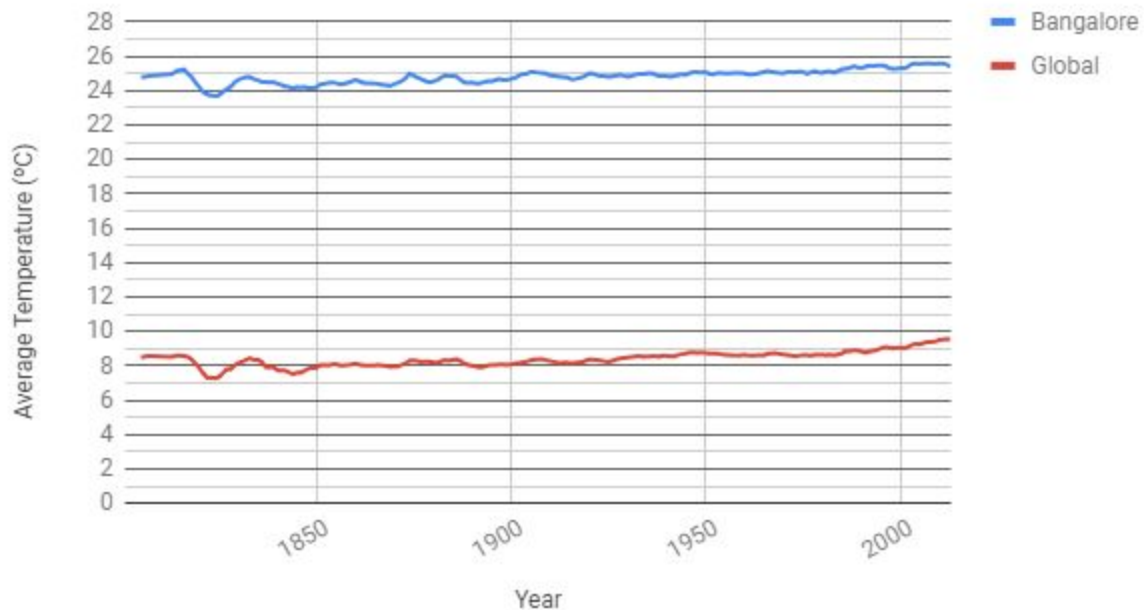
The built in function AVERAGE(cell-start:cell-end) is used to calculate average for sets of 5 years to get the 5 year moving average. The formula is then copied to all cells in the column.



	A	B	C	D	E	F	G
1	year	city	country	avg_city_temp	city_moving_avg_3	Bangalore	city_moving_avg_7
2	1796	Bangalore	India	24.49			
3	1797	Bangalore	India	25.18			
4	1798	Bangalore	India	24.65	24.77333333		
5	1799	Bangalore	India	24.81	24.88		
6	1800	Bangalore	India	24.85	24.77	24.796	
7	1801	Bangalore	India	24.49	24.71666667	24.796	
8	1802	Bangalore	India	25.44	24.92666667	24.848	24.84428571
9	1803	Bangalore	India	25.22	25.05	24.962	24.94857143
10	1804	Bangalore	India	25.67	25.44333333	25.134	25.01857143
11	1805	Bangalore	India	25.01	25.3	25.166	25.07
12	1806	Bangalore	India	24.87	25.18333333	25.242	25.07857143
13	1807	Bangalore	India	24.25	24.71	25.004	24.99285714
14	1813	Bangalore	India	24.23	24.45	24.806	24.95571429
15	1814	Bangalore	India	23.91	24.13	24.454	24.73714286

We get the following line chart when the 5 year moving averages of Temperature at Bangalore is compared to that of 5 year moving average of global temperature.

Bangalore Temperature Vs Global Temperature



We observe the following trends from the above comparison

1800-1850 : Both Global average and Bangalore average temperatures follow a similar trend of ups and downs with a similar intensity. The early half of 1800-1850 years see a huge crest and trough while the latter half see a decreasing trend of temperature.

1850-1900 : The temperature volatility is relatively lesser than that of the years 1800-1850. The average temperature of Bangalore is relatively more volatile than the global average which has very little temperature change for about 70%(approx) of the period.

1900-1950 : The temperature volatility of Bangalore is relatively lesser than that of the years 1850-1900. The early half of 1850 - 1900 is relatively more volatile than that of later half of the year range. There is a steady increase in global temperature in the later part of year range 1900-1950.

1950-2000 : There is very little temperature fluctuation in Bangalore for the first 75% of the period(approx) and the temperature starts to increase and then suddenly decreases in the later part. There is negative volatility in global temperature for the first 75% of period(approx) after which there is an increasing trend in temperature similar to that of the trend of Bangalore temperature.

>2000 : There is a sharp increase of temperature at Bangalore and little change after that while the global temperature shows a gradual increasing trend.

Both Global and Bangalore average temperatures are much more volatile in the year range of 1800-1900 than 1900-2000.

A gradual upward trend of average temperature can be found both globally and at Bangalore across years.