

WEATHER TRENDS

NOOBIE NANO-ANALYSIS PROVIDED BY: DON MCALLISTER

EXTRACTING THE DATA

1. EXTRACT DATA USING SQL:

```
SELECT c.year, c.avg_temp  
charlotte_avg_temp, g.avg_temp  
global_avg_temp  
FROM city_data c  
JOIN global_data g  
ON c.year = g.year  
WHERE c.country = 'United States' AND  
c.city = 'Charlotte' and c.avg_temp IS NOT  
NULL AND g.avg_temp IS NOT NULL
```

2. DOWNLOADED CSV FILE

3. OPENED UP CSV FILE USING GOOGLE SHEETS

Note:

- global_data year starts at 1750 while city_data year starts at 1743. Joining tables with the above inner join will essentially ensure we're starting at same point, optimal for comparison and determining trends.
- city_data had some null data noted so ensured only working with no null data.

Input

```
1 SELECT c.year, c  
2 FROM city_data c  
3 JOIN global_data  
4 ON c.year = g.ye  
5 WHERE c.country  
NOT NULL AND g.a
```

Success!

Output 263 results

year	charl
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1750	16.60
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MOVING AVERAGES

	A	B	C
1	year	charlotte_avg_temp	10-Year MA
2	1750	16.6	
3	1751	17.35	
4	1752	10.51	
5	1753	15.98	
6	1754	16.12	
7	1755	13.75	
8	1756	16.17	
9	1757	15.64	
10	1758	14.52	15.216 x
11	1759	15.52	=AVERAGE(B2:B11)

1. MOVING AVERAGE COLUMNS ADDED

I chose a 10-year moving average for the temperatures and made two columns: 10-Yr MA for both Charlotte temperatures and global temperatures.

2. AVERAGE()

I took the average from the temperature column for the first 10 years, and then dragged the formula down to the last year

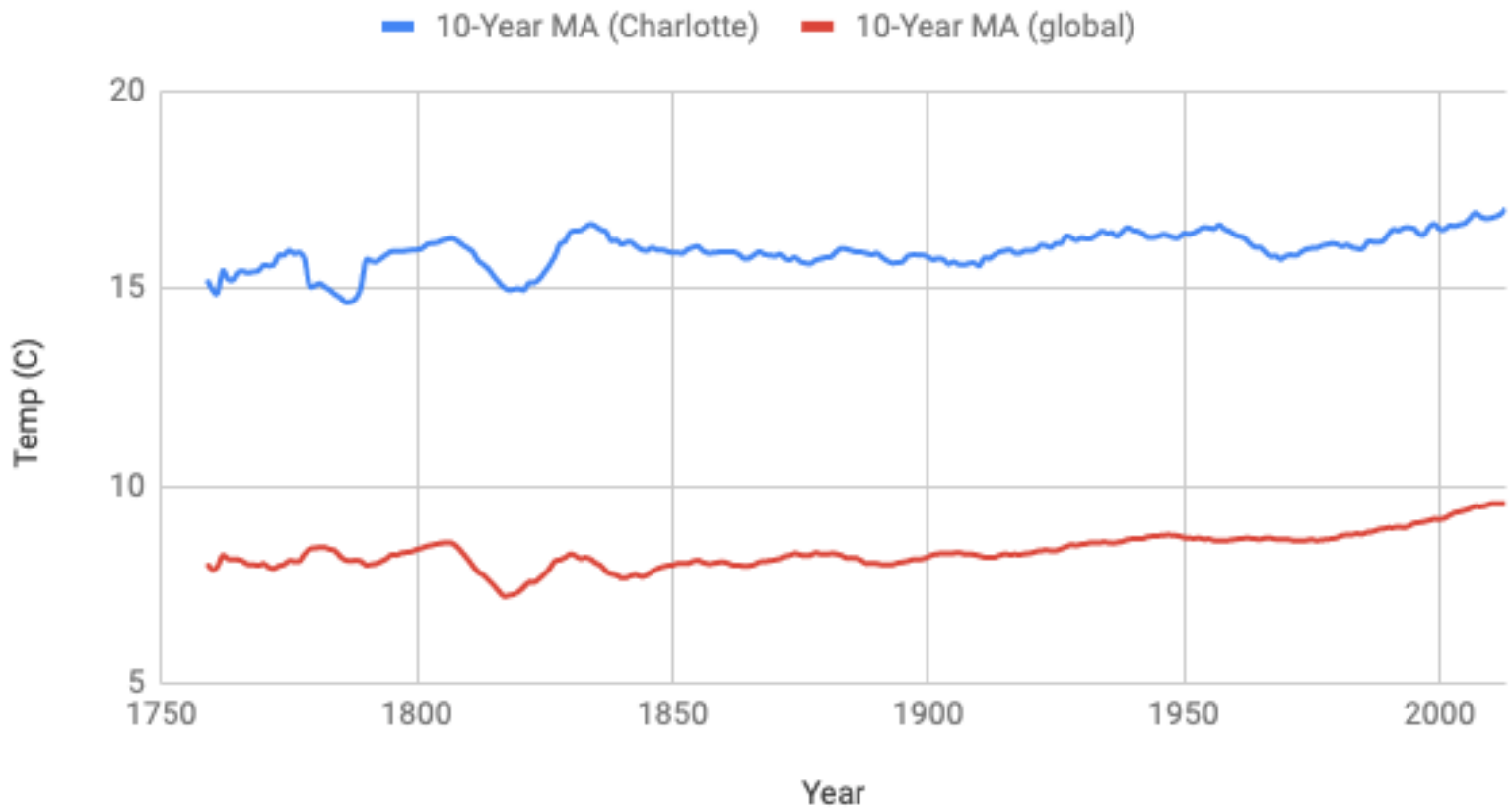
=AVERAGE(B2:B10) enter, then dragged down to last year, 1759 to 2013.

Note:

- **Moving averages are being used since we want to identify trend direction in the temperature data, and to smooth out the series somewhat.**
- **The shorter the time span used to create the average, the more sensitive it will be to temperature fluctuations. The longer the time span, the less sensitive the average will be.***

Source: <https://www.investopedia.com/terms/m/movingaverage.asp#types-of-moving-averages>

City vs Global Weather Trend



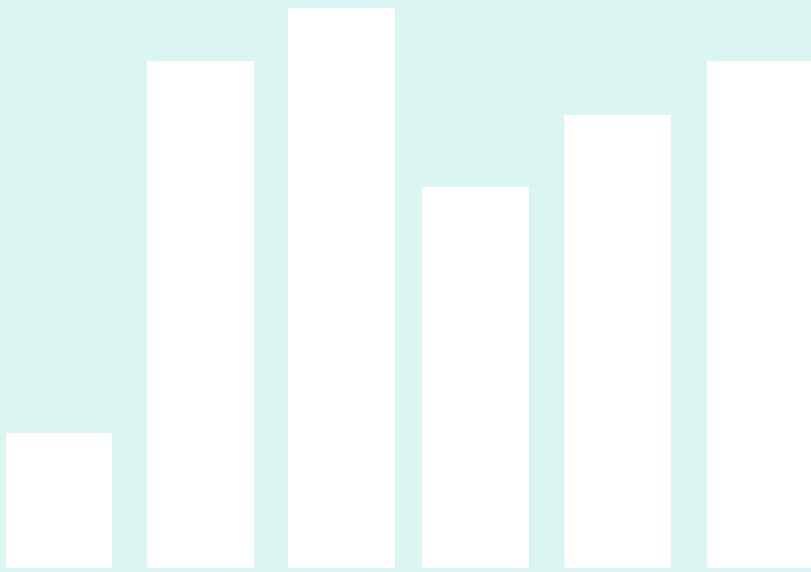
LINE CHART FROM MOVING AVERAGES

Using google sheets, I created a smooth line graph from the moving averages for both the city data and global data and overlaid them on the same graph.

We are plotting the 10-year moving averages rather than the yearly averages in order to smooth out the lines, thus making trends more observable

We are looking at 263 years worth of temperature data on the above graph, starting in the year 1750 and extending to 2013.

Charlotte table does have temperature data starting 1743, but to get a level baseline we are starting the above graph at the same year that we have overlapping data, which is 1750.



OBSERVATIONS

STATISTICAL OBSERVATIONS

CHARLOTTE

- Average temp: **15.96**, starting at 16.6 in 1750 and ending at 17.71 in 2013.
- Temp went up by **1.11** degrees during that time frame, similar to global rise.
- Median = **16.05**. For distributions without serious outliers, the median and mean will be similar.
- Variance from 1750 to 2013: **75.52%**, indicating larger temperature fluctuations vs global temp fluctuations.
- Moving average is **positively sloped**, indicating upward trend in temp overall.
- Lowest temperature recorded: 8.94 in 1779. Max temp: 18.07 in 1888. This represents a **102% swing**, larger than the global temp swing from lowest low to highest high average temp.
- There is a small divergence in trends vs global when looking at the 10-year moving average, noting a lower high between 1800-1850. global has higher high during this time frame.

GLOBAL

- Avg temps globally: **8.35**, starting at 8.72 in 1750. ending at 9.61 in 2013.
- Temps rose only **0.89** from beginning to end year.
- Median = **8.36**, representing no serious temperature outliers.
- Variance from 1750 to 2013 = **32.77%**
- Moving average is **positively sloped**, indicating upward trend overall, also noting a series of higher highs and lower lows.
- Slight **divergence** in temperatures noted, with global temperatures taking a sharper dip around 1780 - 1790.
- min temp: 5.78, max: 9.73, representing a **68% swing**. Temps appear to be more stable of the duration compared to Charlotte experiencing greater fluctuations, perhaps not surprising due to Charlotte's geographical southern local.