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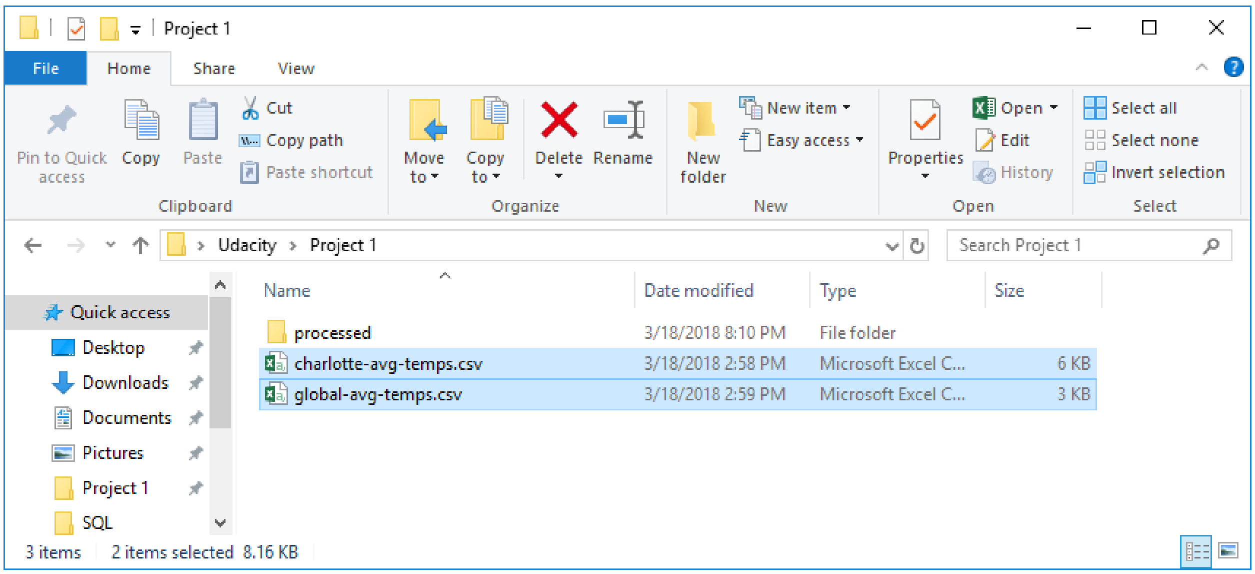
Udacity Data Analyst Nanodegree Term 1: Project 1 – Basic Weather Analysis

I used the following two queries to select the data I wanted:

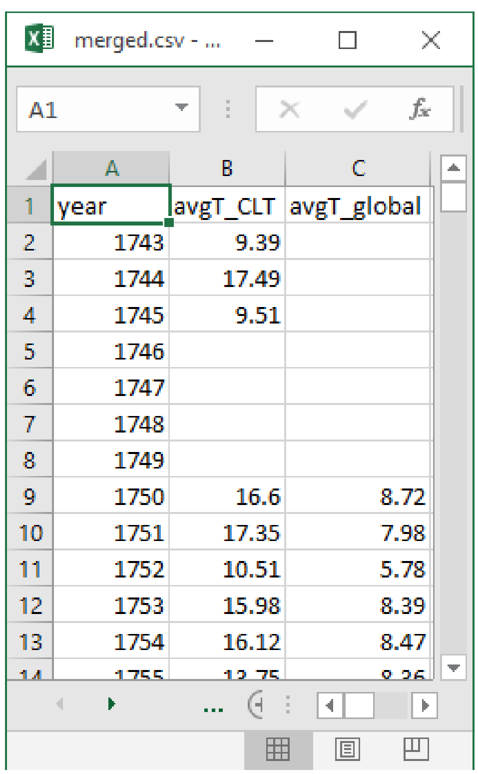
```
SELECT city, year, avg_temp
FROM city_data
WHERE city LIKE 'Charlotte'
ORDER BY year;

SELECT *
FROM global_data
ORDER BY year;
```

…then I exported them separately to two .csv files:



Afterwards, I decided to merge the two datasets to my liking into one file and modified row 1 labels to distinct values:



	A	B	C
1	year	avgT_CLT	avgT_global
2	1743	9.39	
3	1744	17.49	
4	1745	9.51	
5	1746		
6	1747		
7	1748		
8	1749		
9	1750	16.6	8.72
10	1751	17.35	7.98
11	1752	10.51	5.78
12	1753	15.98	8.39
13	1754	16.12	8.47

With the necessary data all in one set and after lining up the extra data with the dates, I decided to compute 10-year and 50-year moving averages of the Charlotte and Global average temps.

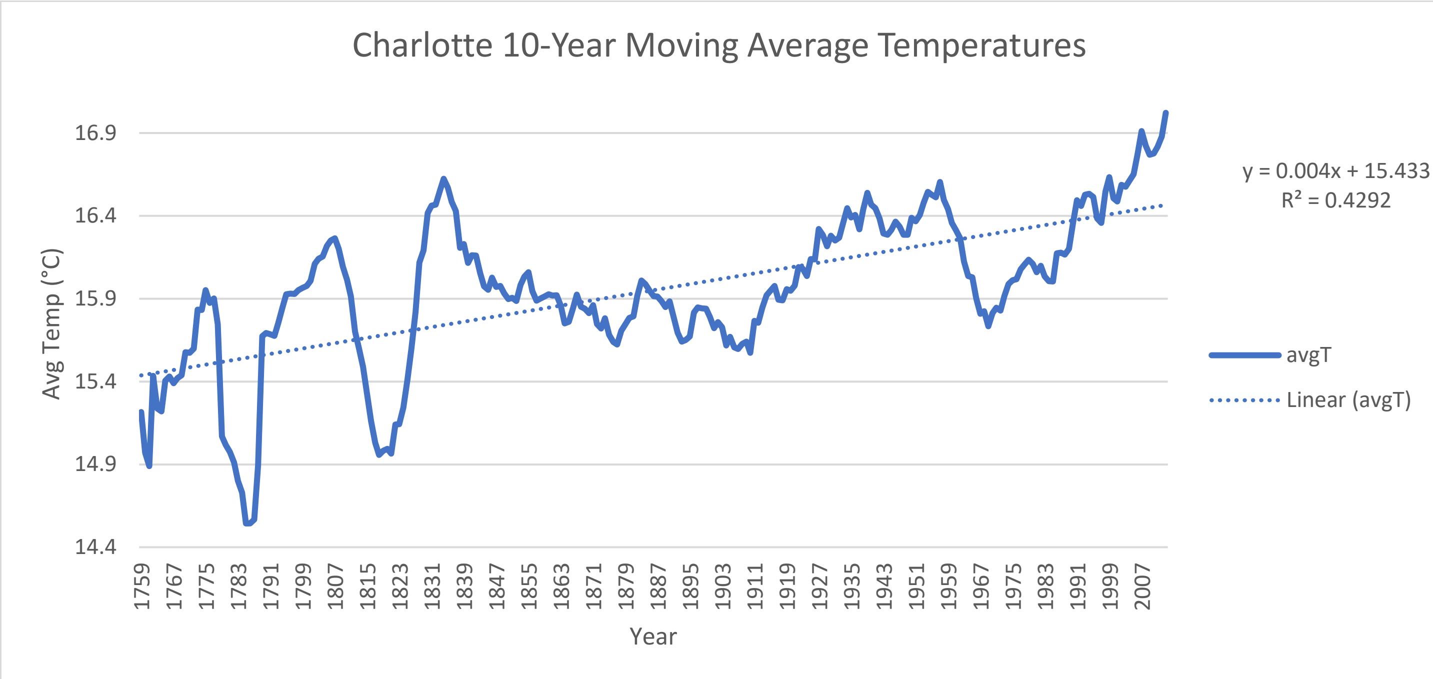
/*I forgot about a particular quirk with .csv files is that they can't save graphs so I lost them all and had to redo them after closing excel for a while. */

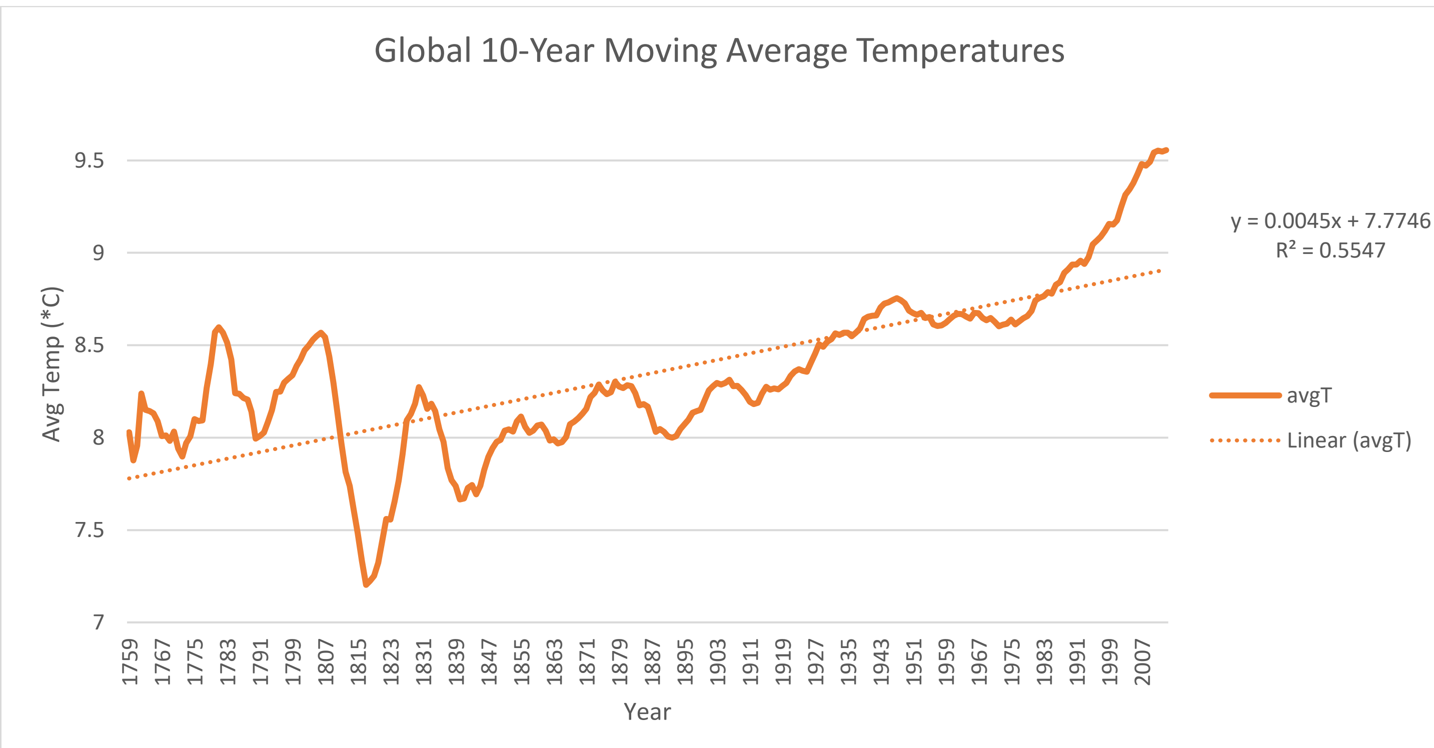
Chart 7

	A	B	C	D	E	F	G	H
1	year	avgT_CLT	10-mavg_CLT	50-mavg_CLT	avgT_global	10-mavg_global	50-mavg_global	
2	1743	9.39						
3	1744	17.49						
4	1745	9.51						
5	1746							
6	1747							
7	1748							
8	1749							
9	1750	16.6			8.72			
10	1751	17.35			7.98			
11	1752	10.51			5.78			
12	1753	15.98			8.39			
13	1754	16.12			8.47			
14	1755	13.75			8.36			
15	1756	16.17			8.85			
16	1757	15.64			9.02			
17	1758	14.52			6.74			
18	1759	15.52	15.216		7.99	8.03		
19	1760	14.15	14.971		7.19	7.877		
20	1761	16.54	14.89		8.77	7.956		
21	1762	15.95	15.434		8.61	8.239		
22	1763	14.01	15.237		7.5	8.15		
23	1764	15.95	15.22		8.4	8.143		
24	1765	15.6	15.405		8.25	8.132		
25	1766	16.43	15.431		8.41	8.088		
26	1767	15.23	15.39		8.22	8.008		
27	1768	14.83	15.421		6.78	8.012		
28	1769	15.69	15.438		7.69	7.982		
29	1770	15.55	15.578		7.69	8.032		
30	1771	16.49	15.573		7.85	7.94		
31	1772	16.2	15.598		8.19	7.898		
32	1773	16.36	15.833		8.22	7.97		
33	1774	15.94	15.832		8.77	8.007		
34	1775	16.8	15.952		9.18	8.1		
35	1776	15.66	15.875		8.3	8.089		
36	1777	15.49	15.901		8.26	8.093		
37	1778	13.27	15.745		8.54	8.269		
38	1779	8.94	15.07		8.98	8.398		

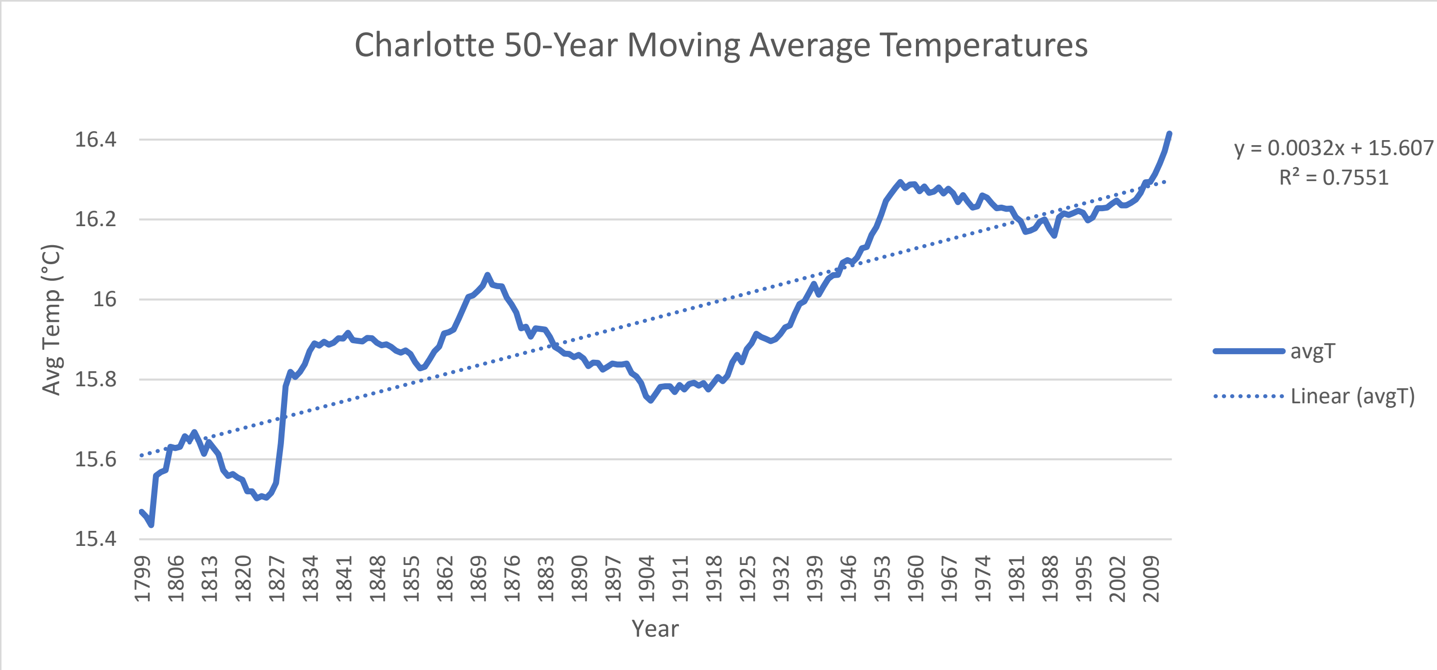
merged | Sheet1

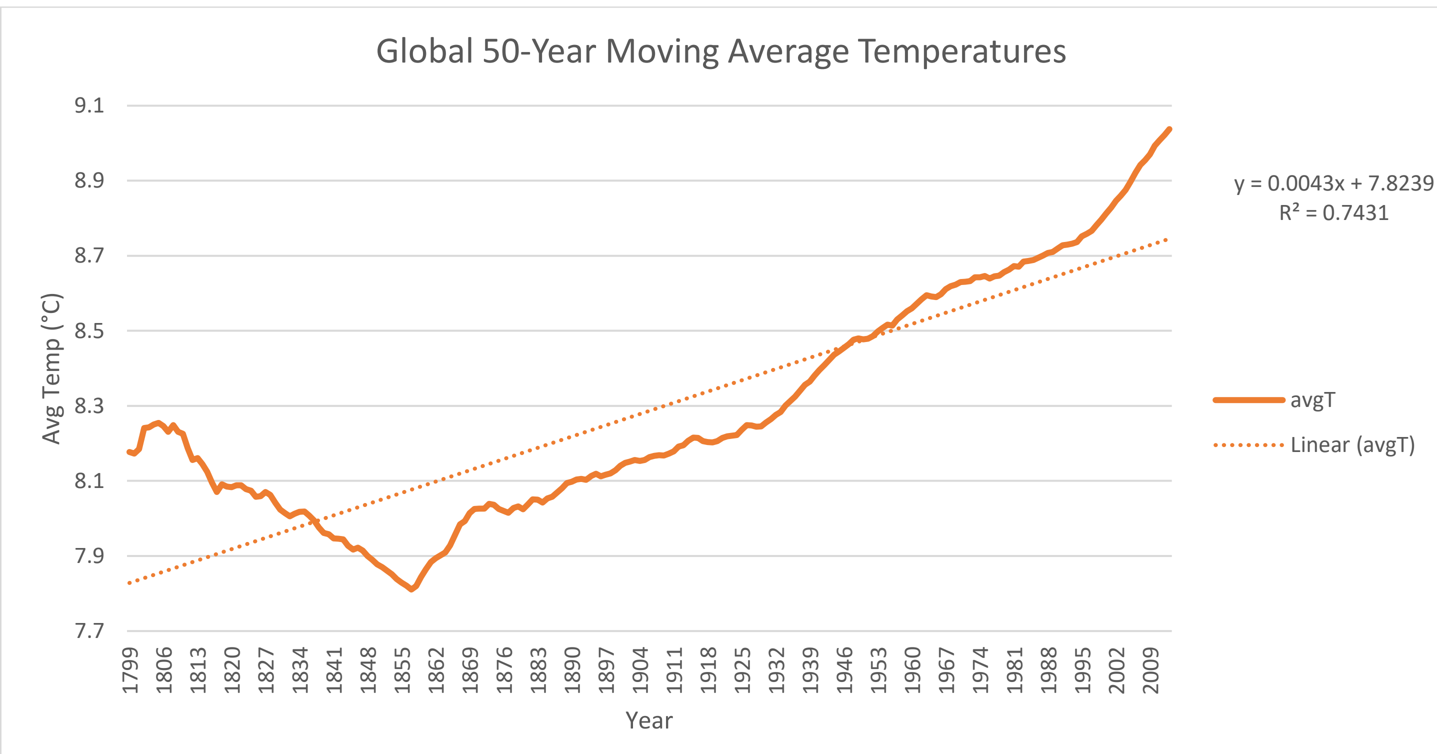
Once that was done, I added separate graphs for the necessary moving average:



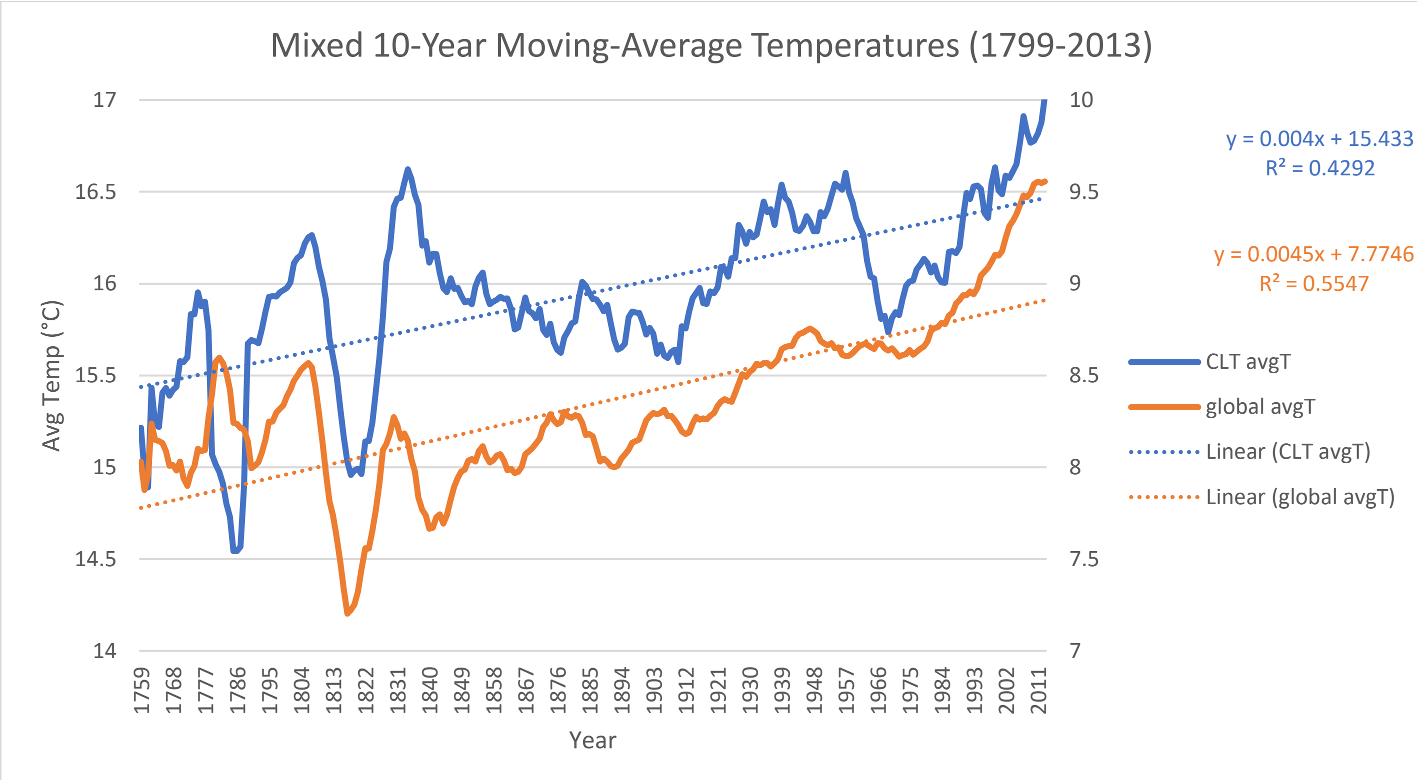


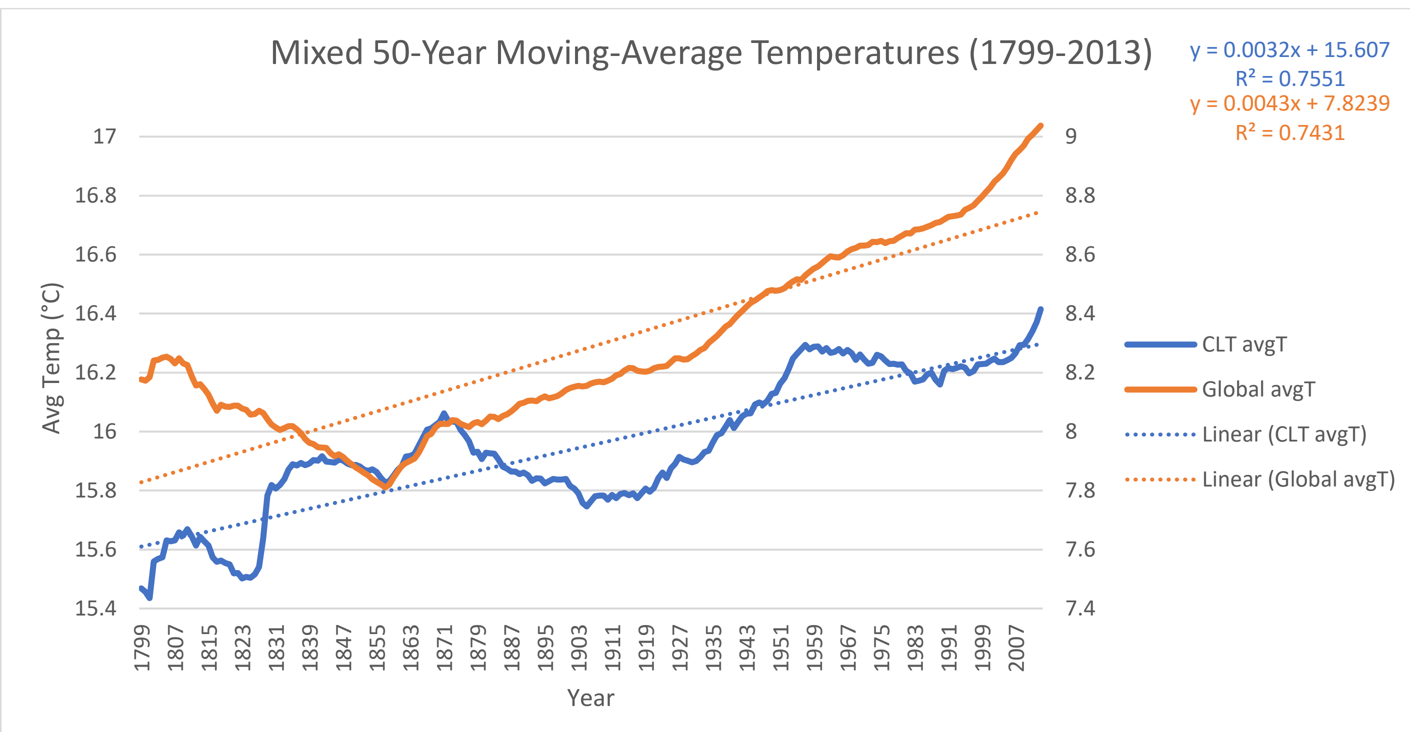
Bored, I decided to see what a 50-year moving average would look like:



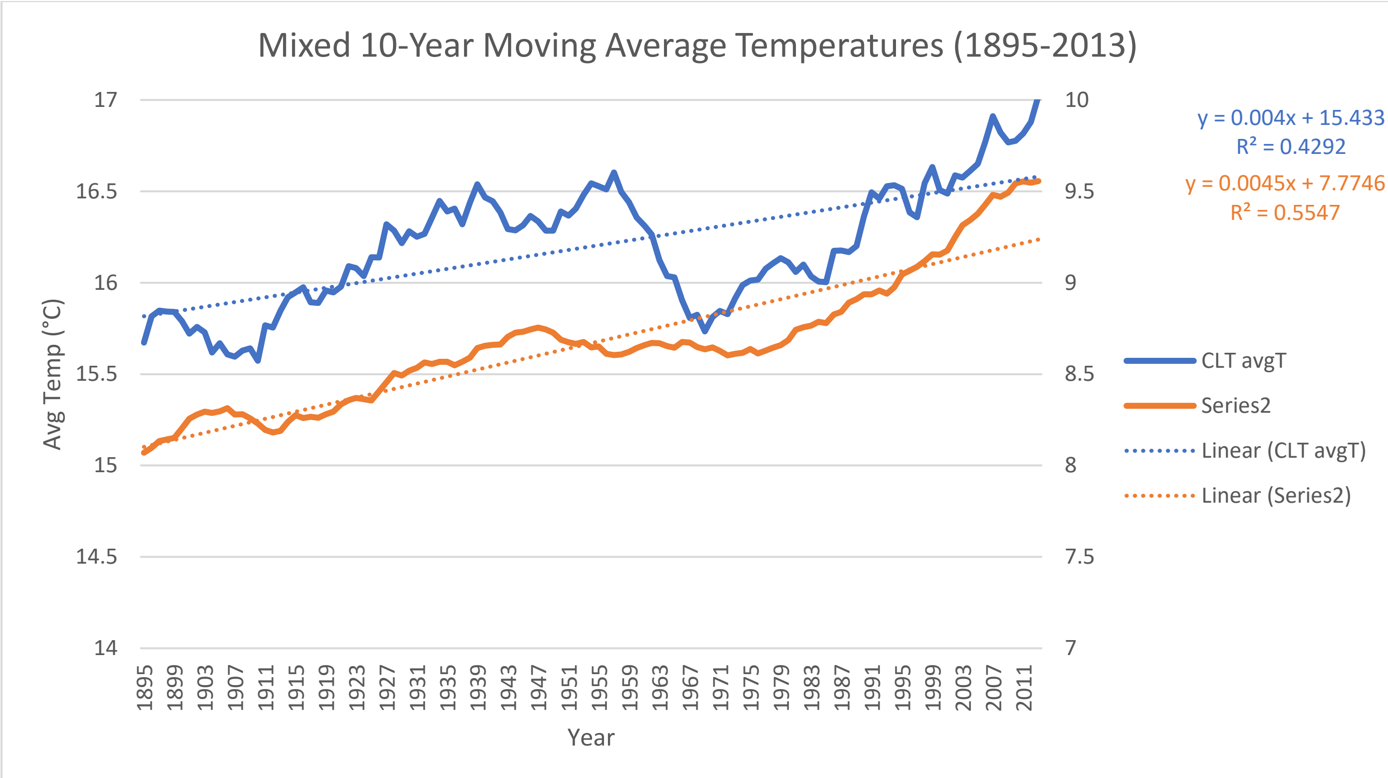


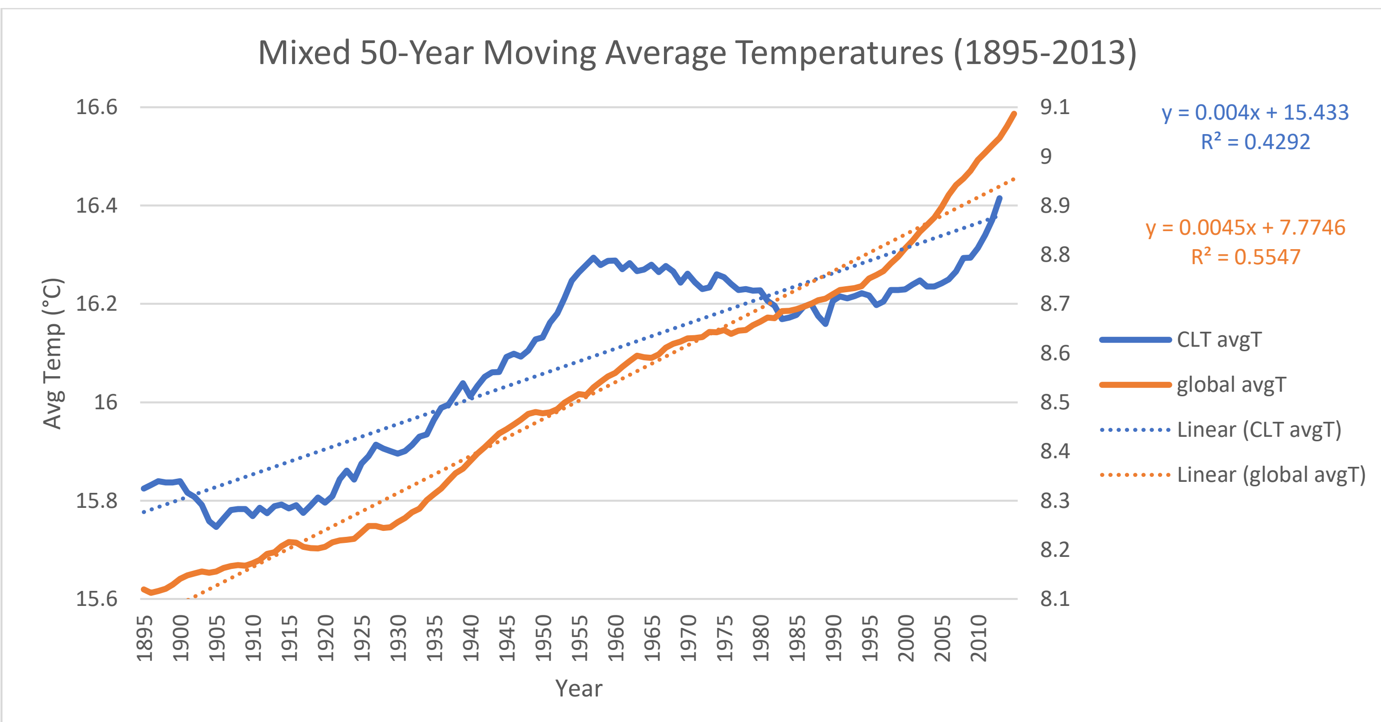
Then I combined data to make one graph making sure the intervals on the primary and secondary y-axis were spaced to the same data range difference (3°C):





I was a little bit worried about the accuracy of the data provided in prior to 1895 so I made a couple more graphs looking at what moving averages from what I would consider to be a more reliable range:





The early record is incomplete and appears to be unreliable.

1. According to the data, we are clearly trending towards a warmer Charlotte and a warmer Earth.
2. One of the dips in average temperature (starting around 1809 or 1810) is, perhaps, the result of a major volcanic eruption. This can happen if an eruption is powerful enough to inject the stratosphere with enough sulfur-based areosols that it kind of “shades” the Earth as the ash-matter spreads and eventually falls (think of it as a thin, opaque film on the surface of a body of water in relative to how the film affects the passage of light – some light gets through, but some is reflected back out), causing a global cool-off for a few years. Because of the turbulent nature of the stratosphere, it can take a while for ash-particulates to fall from there (up to a few weeks!). Then again, it could also be caused by certain atmospheric triggers (the thinking here is similar to the phrase “stars aligning”) paired with some oceanic teleconnection that activated a bunch of feedback loops that significantly increased Earth’s albedo for a spell, causing the major cooling sesh.
3. Charlotte, in an average sense, is generally a Celsius degree (or two away) from being almost twice as warm as the global moving average.
4. The slope of the global moving-average trendline is steeper than Charlotte’s in each graph I made. This suggests that over the long-term, Charlotte is warming at a slower pace relative to the Earth.
5. However, towards the end of the graph (from about 2009 onwards) the acceleration of Charlotte’s moving-average temperature appears to outpace the acceleration of the global moving-average. This suggests that Charlotte, as far as the near-term is concerned, is currently warming faster than the Earth.

Unfortunately, our records don’t extend very far into the past. If I recall correctly, there was once the prospect that we were headed towards another ice age, but we appear to be “skipping” it. How severe the consequences of an ice-free Arctic (which could actually happen within a decade if everything goes “wrong”) will dictate the ensuing global catastrophe that will beset the human population. Despite rightly being classified as a greenhouse gas, I’m holding off hope for the moderating influence water vapor has on temperature, but the sheer amount of methane to be released from melting permafrost combined with the loss of a significant portion of Earth’s albedo (hopefully more cloud-cover will make up for it) looks really, really bad.