

Project 1 - Explore Weather Trends

Pulling the data - Using SQL and Udacity:

/*This project we will be trending my local Kansas City weather data compared to global trends by year. Per project specs, we first need to do a lookup in the city_list table to locate a city nearest me. Then pull the data from the city_data table for the located city and order by year. Finally, we will pull all city_data from the global_data table and order by year.*/

/*Start by searching the city_list to find the city nearest me*/

```
SELECT *  
FROM city_list  
where country LIKE '%nited%' AND country LIKE '%tates'  
order by country, city;  
/*The closest city near me is 'Kansas City'*/
```

/*Use 'Kansas City' for pulling the city_data. Make sure to keep and eye on punctuation by using wildcards.*/

```
SELECT *  
FROM city_data  
where (city LIKE '%ansas%' AND city LIKE '%ity') AND (year BETWEEN 1781 AND 2013)  
order by year;
```

/*Pull all data from global_data order by year.*/

```
SELECT *  
FROM global_data  
WHERE year BETWEEN 1781 AND 2013  
order by year;
```

While reviewing the data, I noticed that the years between the two data sets were uneven. The Kansas City data started at an earlier date, and had missing data in the early years, where the global data had more years of data. I matched the years with good data so that both data sets were equal. I ended up using data for the years between 1781 and 2013. Once the data was downloaded into two separate .csv files, I analyzed the data and figured out which fields I needed to keep. I decided that the only fields I needed was the Year, Kansas City Average Temp, and the Global Average Temp. I copied the data and merged them into the columns below.

Calculating the moving average:

First, I created a five year and a ten moving average column for Kansas City data and for the Global data. I formatted all the cells except for the year column, to Number and having a 2 digit decimal place.

5 Year Moving Average:

I created 2 columns; one for Kansas City 5 Year Moving Average (kansas_city_5_yr_ma), and one for Global 5 Year Moving Average (global_5_yr_ma). For the Kansas City 5 year moving average, I started on the corresponding row for the year 1785 using the function =AVERAGE(B15:B19), then dragged the calculation down to last row of data. I completed the same steps for the Global 5 year moving average using the global_avg_temp data (=AVERAGE(E15:E19)).

10 Year Moving Average:

I created 2 columns; one for Kansas City 10 Year Moving Average (kansas_city_10_yr_ma), and one for Global 10 Year Moving Average (global_10_yr_ma). For the Kansas City 10 year moving average, I started on the corresponding row for the year 1790 using the function =AVERAGE(B15:B24), then dragged the calculation down to last row of data. I completed the same steps for the Global 5 year moving average using the global_avg_temp data (=AVERAGE(E15:E24)).

Considerations for visualizations:

I chose using both a 5 year and 10 year visualization for a specific reason. While the 10 year visualization shows a smoother flow of the similarities/differences of weather temperature between Kansas City and globally as well as the steady increase in temperatures as time goes by, I want to used the 5 year visualization to show just how dramatic the temperature fluctuations Kansas City has to the global temperatures.

The Data Set:

local_year	kansas_city_avg_temp	kansas_city_5_yr_ma	kansas_city_10_yr_ma	global_avg_temp	global_5_yr_ma	global_10_yr_ma
1781	11.83			8.1		
1782	11.41			7.9		
1783	11.21			7.68		
1784	11.32			7.86		
1785	11	11.35		7.36	7.78	
1786	11.57	11.30		8.26	7.81	
1787	11.62	11.34		8.03	7.84	
1788	11.99	11.50		8.45	7.99	
1789	11.78	11.59		8.33	8.09	
1790	11.65	11.72	11.54	7.98	8.21	8.00
1791	11.94	11.80	11.55	8.23	8.20	8.01
1792	11.49	11.77	11.56	8.09	8.22	8.03
1793	11.82	11.74	11.62	8.23	8.17	8.08
1794	11.99	11.78	11.69	8.53	8.21	8.15
1795	4.18	10.28	11.00	8.35	8.29	8.25
1796	11.75	10.25	11.02	8.27	8.29	8.25
1797	11.57	10.26	11.02	8.51	8.38	8.30
1798	12.21	10.34	11.04	8.67	8.47	8.32
1799	11.98	10.34	11.06	8.51	8.46	8.34
1800	11.85	11.87	11.08	8.48	8.49	8.39
1801	12.17	11.96	11.10	8.59	8.55	8.42
1802	12.32	12.11	11.18	8.58	8.57	8.47
1803	12.14	12.09	11.22	8.5	8.53	8.50
1804	12.21	12.14	11.24	8.84	8.60	8.53
1805	12.2	12.21	12.04	8.56	8.61	8.55
1806	11.9	12.15	12.06	8.43	8.58	8.57
1807	11.68	12.03	12.07	8.28	8.52	8.54
1808	11.45	11.89	11.99	7.63	8.35	8.44
1809	10.61	11.57	11.85	7.08	8.00	8.30
1810	10.65	11.26	11.73	6.92	7.67	8.14
1811	10.83	11.04	11.60	6.86	7.35	7.97
1812	10.19	10.75	11.39	7.05	7.11	7.82
1813	11.39	10.73	11.31	7.74	7.13	7.74
1814	11.24	10.86	11.21	7.59	7.23	7.61
1815	10.66	10.86	11.06	7.24	7.30	7.48
1816	10.09	10.71	10.88	6.94	7.31	7.33
1817	10.39	10.75	10.75	6.98	7.30	7.20
1818	11.33	10.74	10.74	7.83	7.32	7.22
1819	10.8	10.65	10.76	7.37	7.27	7.25
1820	10.58	10.64	10.75	7.62	7.35	7.32
1821	10.93	10.81	10.76	8.09	7.58	7.45
1822	11.61	11.05	10.90	8.19	7.82	7.56
1823	11.2	11.02	10.88	7.72	7.80	7.56
1824	11.39	11.14	10.90	8.55	8.03	7.65
1825	12.52	11.53	11.08	8.39	8.19	7.77
1826	11.69	11.68	11.24	8.36	8.24	7.91
1827	12.4	11.84	11.45	8.81	8.37	8.09
1828	12.36	12.07	11.55	8.17	8.46	8.13
1829	11.8	12.15	11.65	7.94	8.33	8.18
1830	12.88	12.23	11.88	8.52	8.36	8.27
1831	10.68	12.02	11.85	7.64	8.22	8.23
1832	11.95	11.93	11.89	7.45	7.94	8.16
1833	12.49	11.96	12.02	8.01	7.91	8.18

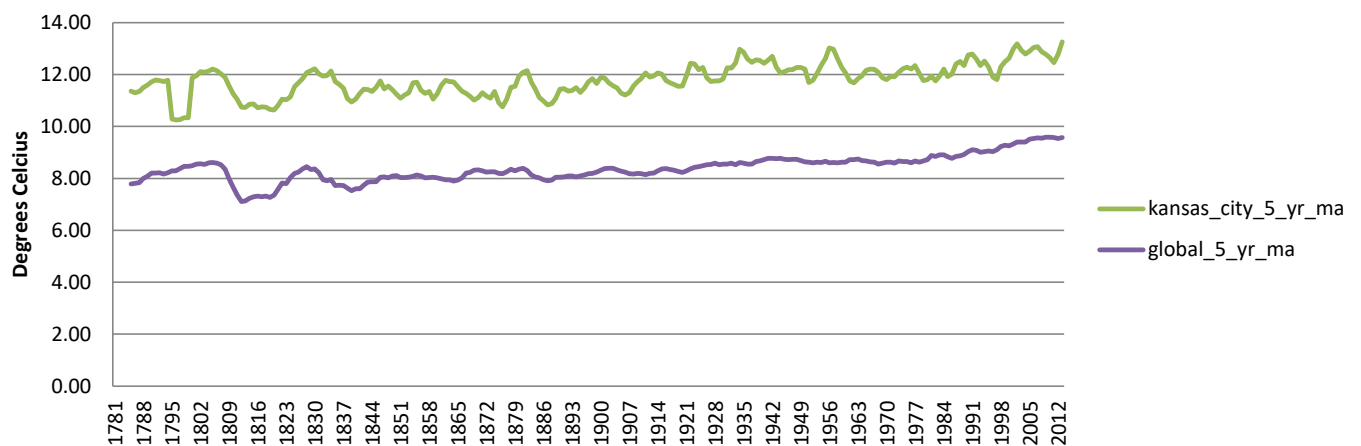
1834	12.67	12.13	12.14	8.15	7.95	8.14
1835	10.86	11.73	11.98	7.39	7.73	8.04
1836	10.11	11.62	11.82	7.7	7.74	7.98
1837	11.22	11.47	11.70	7.38	7.73	7.84
1838	10.5	11.07	11.52	7.51	7.63	7.77
1839	12	10.94	11.54	7.63	7.52	7.74
1840	11.41	11.05	11.39	7.8	7.60	7.67
1841	11.27	11.28	11.45	7.69	7.60	7.67
1842	11.98	11.43	11.45	8.02	7.73	7.73
1843	10.46	11.42	11.25	8.17	7.86	7.74
1844	11.63	11.35	11.14	7.65	7.87	7.69
1845	12.17	11.50	11.28	7.85	7.88	7.74
1846	12.55	11.76	11.52	8.55	8.05	7.83
1847	10.43	11.45	11.44	8.09	8.06	7.90
1848	11	11.56	11.49	7.98	8.02	7.94
1849	10.91	11.41	11.38	7.98	8.09	7.98
1850	11.28	11.23	11.37	7.9	8.10	7.99
1851	11.8	11.08	11.42	8.18	8.03	8.04
1852	11.1	11.22	11.33	8.1	8.03	8.05
1853	11.38	11.29	11.43	8.04	8.04	8.03
1854	12.83	11.68	11.55	8.21	8.09	8.09
1855	11.43	11.71	11.47	8.11	8.13	8.11
1856	10.23	11.39	11.24	8	8.09	8.06
1857	10.48	11.27	11.24	7.76	8.02	8.03
1858	11.79	11.35	11.32	8.1	8.04	8.04
1859	11.34	11.05	11.37	8.25	8.04	8.07
1860	12.49	11.27	11.49	7.96	8.01	8.07
1861	11.9	11.60	11.50	7.85	7.98	8.04
1862	11.37	11.78	11.52	7.56	7.94	7.98
1863	11.58	11.74	11.54	8.11	7.95	7.99
1864	11.22	11.71	11.38	7.98	7.89	7.97
1865	11.59	11.53	11.40	8.18	7.94	7.98
1866	11.03	11.36	11.48	8.29	8.02	8.00
1867	10.97	11.28	11.53	8.44	8.20	8.07
1868	11	11.16	11.45	8.25	8.23	8.09
1869	10.51	11.02	11.37	8.43	8.32	8.11
1870	12.03	11.11	11.32	8.2	8.32	8.13
1871	11.96	11.29	11.33	8.12	8.29	8.16
1872	10.39	11.18	11.23	8.19	8.24	8.22
1873	10.54	11.09	11.12	8.35	8.26	8.24
1874	11.81	11.35	11.18	8.43	8.26	8.29
1875	9.91	10.92	11.02	7.86	8.19	8.26
1876	11.12	10.75	11.02	8.08	8.18	8.24
1877	11.9	11.06	11.12	8.54	8.25	8.25
1878	12.78	11.50	11.30	8.83	8.35	8.30
1879	12.04	11.55	11.45	8.17	8.30	8.28
1880	11.83	11.93	11.43	8.12	8.35	8.27
1881	11.87	12.08	11.42	8.27	8.39	8.28
1882	12.22	12.15	11.60	8.13	8.30	8.28
1883	10.55	11.70	11.60	7.98	8.13	8.24
1884	10.75	11.44	11.50	7.77	8.05	8.18
1885	10.16	11.11	11.52	7.92	8.01	8.18
1886	11.22	10.98	11.53	7.95	7.95	8.17
1887	11.47	10.83	11.49	7.91	7.91	8.11
1888	10.81	10.88	11.29	8.09	7.93	8.03

1889	11.71	11.07	11.26	8.32	8.04	8.05
1890	11.93	11.43	11.27	7.97	8.05	8.03
1891	11.4	11.46	11.22	8.02	8.06	8.01
1892	10.97	11.36	11.10	8.07	8.09	8.00
1893	10.93	11.39	11.14	8.06	8.09	8.01
1894	12.26	11.50	11.29	8.16	8.06	8.05
1895	10.97	11.31	11.37	8.15	8.09	8.07
1896	12.31	11.49	11.48	8.21	8.13	8.10
1897	12.11	11.72	11.54	8.29	8.17	8.13
1898	11.55	11.84	11.61	8.18	8.20	8.14
1899	11.32	11.65	11.58	8.4	8.25	8.15
1900	12.18	11.89	11.60	8.5	8.32	8.20
1901	12.14	11.86	11.67	8.54	8.38	8.26
1902	11.2	11.68	11.70	8.3	8.38	8.28
1903	11.03	11.57	11.71	8.22	8.39	8.30
1904	10.87	11.48	11.57	8.09	8.33	8.29
1905	11.19	11.29	11.59	8.23	8.28	8.30
1906	11.78	11.21	11.54	8.38	8.24	8.31
1907	11.62	11.30	11.49	7.95	8.17	8.28
1908	12.33	11.56	11.57	8.19	8.17	8.28
1909	11.71	11.73	11.61	8.18	8.19	8.26
1910	11.85	11.86	11.57	8.22	8.18	8.23
1911	12.82	12.07	11.64	8.18	8.14	8.19
1912	10.8	11.90	11.60	8.17	8.19	8.18
1913	12.61	11.96	11.76	8.3	8.21	8.19
1914	12.25	12.07	11.90	8.59	8.29	8.24
1915	11.56	12.01	11.93	8.59	8.37	8.28
1916	11.6	11.76	11.92	8.23	8.38	8.26
1917	10.41	11.69	11.79	8.02	8.35	8.27
1918	12.3	11.62	11.79	8.13	8.31	8.26
1919	11.88	11.55	11.81	8.38	8.27	8.28
1920	11.58	11.55	11.78	8.36	8.22	8.30
1921	13.68	11.97	11.87	8.57	8.29	8.33
1922	12.75	12.44	12.06	8.41	8.37	8.36
1923	12.12	12.40	12.01	8.42	8.43	8.37
1924	10.77	12.18	11.87	8.51	8.45	8.36
1925	12.07	12.28	11.92	8.53	8.49	8.36
1926	11.67	11.88	11.92	8.73	8.52	8.41
1927	12.04	11.73	12.09	8.52	8.54	8.46
1928	12.21	11.75	12.08	8.63	8.58	8.51
1929	10.8	11.76	11.97	8.24	8.53	8.49
1930	12.43	11.83	12.05	8.63	8.55	8.52
1931	13.82	12.26	12.07	8.72	8.55	8.53
1932	11.99	12.25	11.99	8.71	8.59	8.56
1933	13.16	12.44	12.10	8.34	8.53	8.56
1934	13.49	12.98	12.37	8.63	8.61	8.57
1935	11.85	12.86	12.35	8.52	8.58	8.57
1936	12.47	12.59	12.43	8.55	8.55	8.55
1937	11.36	12.47	12.36	8.7	8.55	8.57
1938	13.67	12.57	12.50	8.86	8.65	8.59
1939	13.35	12.54	12.76	8.76	8.68	8.64
1940	11.29	12.43	12.65	8.76	8.73	8.66
1941	13.14	12.56	12.58	8.77	8.77	8.66
1942	12.08	12.71	12.59	8.73	8.78	8.66
1943	11.64	12.30	12.43	8.76	8.76	8.70

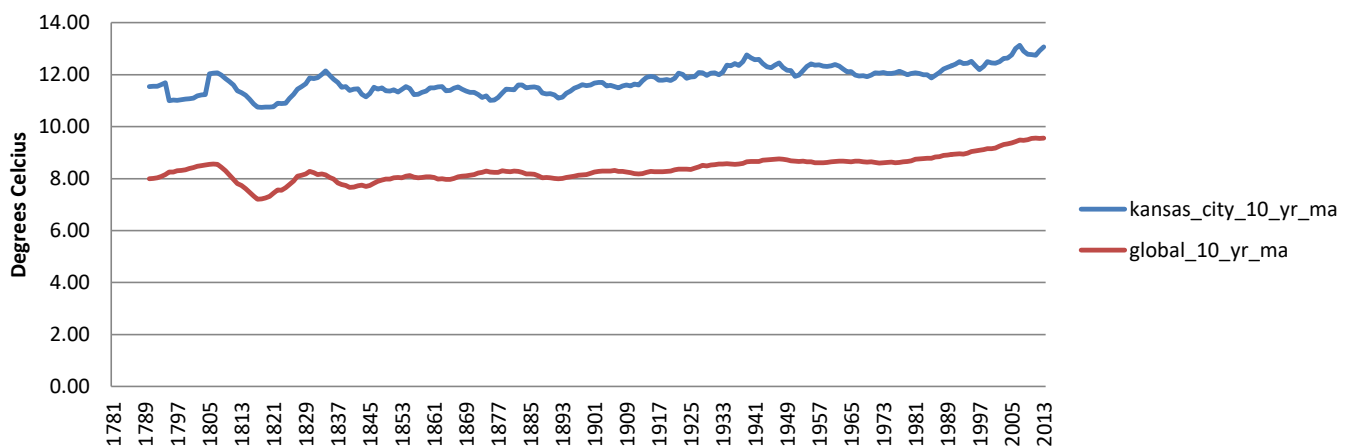
1944	12.15	12.06	12.30	8.85	8.77	8.73
1945	11.53	12.11	12.27	8.58	8.74	8.73
1946	13.52	12.18	12.37	8.68	8.72	8.75
1947	12.11	12.19	12.45	8.8	8.73	8.76
1948	12.03	12.27	12.28	8.75	8.73	8.74
1949	12.19	12.28	12.17	8.59	8.68	8.73
1950	11.2	12.21	12.16	8.37	8.64	8.69
1951	10.96	11.70	11.94	8.63	8.63	8.67
1952	12.5	11.78	11.98	8.64	8.60	8.67
1953	13.41	12.05	12.16	8.87	8.62	8.68
1954	13.74	12.36	12.32	8.56	8.61	8.65
1955	12.46	12.61	12.41	8.63	8.67	8.65
1956	13.04	13.03	12.36	8.28	8.60	8.61
1957	12.21	12.97	12.37	8.73	8.61	8.61
1958	11.56	12.60	12.33	8.77	8.59	8.61
1959	12.07	12.27	12.32	8.73	8.63	8.62
1960	11.46	12.07	12.34	8.58	8.62	8.64
1961	11.48	11.76	12.39	8.8	8.72	8.66
1962	11.85	11.68	12.33	8.75	8.73	8.67
1963	12.37	11.85	12.22	8.86	8.74	8.67
1964	12.62	11.96	12.11	8.41	8.68	8.65
1965	12.49	12.16	12.12	8.53	8.67	8.64
1966	11.74	12.21	11.99	8.6	8.63	8.68
1967	11.8	12.20	11.94	8.7	8.62	8.67
1968	11.77	12.08	11.97	8.52	8.55	8.65
1969	11.6	11.88	11.92	8.6	8.59	8.64
1970	12.11	11.80	11.98	8.7	8.62	8.65
1971	12.37	11.93	12.07	8.6	8.62	8.63
1972	11.73	11.92	12.06	8.5	8.58	8.60
1973	12.62	12.09	12.09	8.95	8.67	8.61
1974	12.27	12.22	12.05	8.47	8.64	8.62
1975	12.43	12.28	12.04	8.74	8.65	8.64
1976	11.98	12.21	12.07	8.35	8.60	8.61
1977	12.41	12.34	12.13	8.85	8.67	8.63
1978	11.14	12.05	12.07	8.69	8.62	8.65
1979	10.89	11.77	12.00	8.73	8.67	8.66
1980	12.62	11.81	12.05	8.98	8.72	8.69
1981	12.62	11.94	12.07	9.17	8.88	8.74
1982	11.48	11.75	12.05	8.64	8.84	8.76
1983	12.09	11.94	11.99	9.03	8.91	8.77
1984	12.26	12.21	11.99	8.69	8.90	8.79
1985	11.21	11.93	11.87	8.66	8.84	8.78
1986	13.04	12.02	11.98	8.83	8.77	8.83
1987	13.45	12.41	12.08	8.99	8.84	8.84
1988	12.57	12.51	12.22	9.2	8.87	8.89
1989	11.46	12.35	12.28	8.92	8.92	8.91
1990	13.26	12.76	12.34	9.23	9.03	8.94
1991	13.22	12.79	12.40	9.18	9.10	8.94
1992	12.43	12.59	12.50	8.84	9.07	8.96
1993	11.34	12.34	12.42	8.87	9.01	8.94
1994	12.37	12.52	12.44	9.04	9.03	8.98
1995	12.04	12.28	12.52	9.35	9.06	9.05
1996	11.33	11.90	12.35	9.04	9.03	9.07
1997	11.96	11.81	12.20	9.2	9.10	9.09
1998	13.81	12.30	12.32	9.52	9.23	9.12

1999	13.32	12.49	12.51	9.29	9.28	9.16
2000	12.73	12.63	12.46	9.2	9.25	9.15
2001	13.09	12.98	12.44	9.41	9.32	9.18
2002	13	13.19	12.50	9.57	9.40	9.25
2003	12.56	12.94	12.62	9.53	9.40	9.32
2004	12.56	12.79	12.64	9.32	9.41	9.34
2005	13.27	12.90	12.76	9.7	9.51	9.38
2006	13.77	13.03	13.01	9.53	9.53	9.43
2007	13.18	13.07	13.13	9.73	9.56	9.48
2008	11.61	12.88	12.91	9.43	9.54	9.47
2009	12.03	12.77	12.78	9.51	9.58	9.49
2010	12.68	12.65	12.78	9.7	9.58	9.54
2011	12.79	12.46	12.75	9.52	9.58	9.55
2012	14.79	12.78	12.92	9.51	9.53	9.55
2013	13.99	13.26	13.07	9.61	9.57	9.56

5 Year Moving Average Weather Trends (Celcius)



10 Year Moving Average Weather Trends (Celcius)



Trend observations:

Kansas City, United States stays an average of 4 degrees celcius higher than the global average year over year. Similarly, the weather over the years are getting consistantly hotter with an average change of 2 degrees celcius from 1781 to 2013. If this trend continues, by the year 2237, the average temperatures in Kansas City will be around 15.00 degrees celcius and the global average temperature will be around 11.5 degree celcius. Another interesting observastion is that Kansas City has considerably dramatic temperature swings on a 5 year basis. In the 1812 time period, the earth experienced a considerable drop in temperature that lasted about 7 years. The difference on the notable cold shifts is that Kansas City had a sizable cold weather pattern 1795 to 1803 where the global temperatures did not experience this.