Exploring Weather Trends - Project 1

In this project, I tried to understand the correlations between global temperatures and local temperatures.

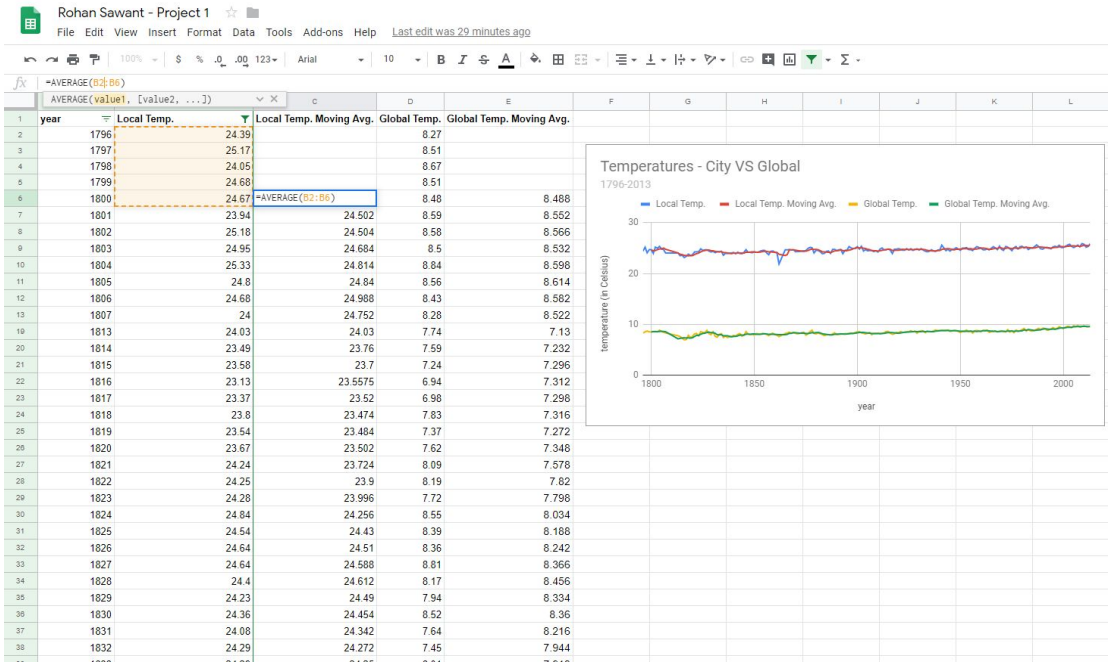
I am from Mumbai, India. So, I chose a city near me - Pune as the local to plot the chart from.

Steps

1. Extracting the Data from the database
   I used the SQL Queries to generate 2 CSV files, one with the local temperature data and one with the global temperature data.
   I used simple select statements to achieve this. A better way would have been using inner or left joins but the Udacity SQL Workbench kept crashing when I tried to do that.

   SQL Commands Used -
   SELECT year, avg_temp FROM city_data where city='Pune';
   SELECT * FROM global_data where year>=1796 and year<=2013;

2. Calculating Moving Averages
   I used Google Sheets to open the 2 CSV and then pasted them into one.
   I used the filter option to drop the rows which were empty for the local data.
   I had initially forgotten to calculate the moving averages and that made my line chart look wonky, but I fixed it as soon as I remembered to.



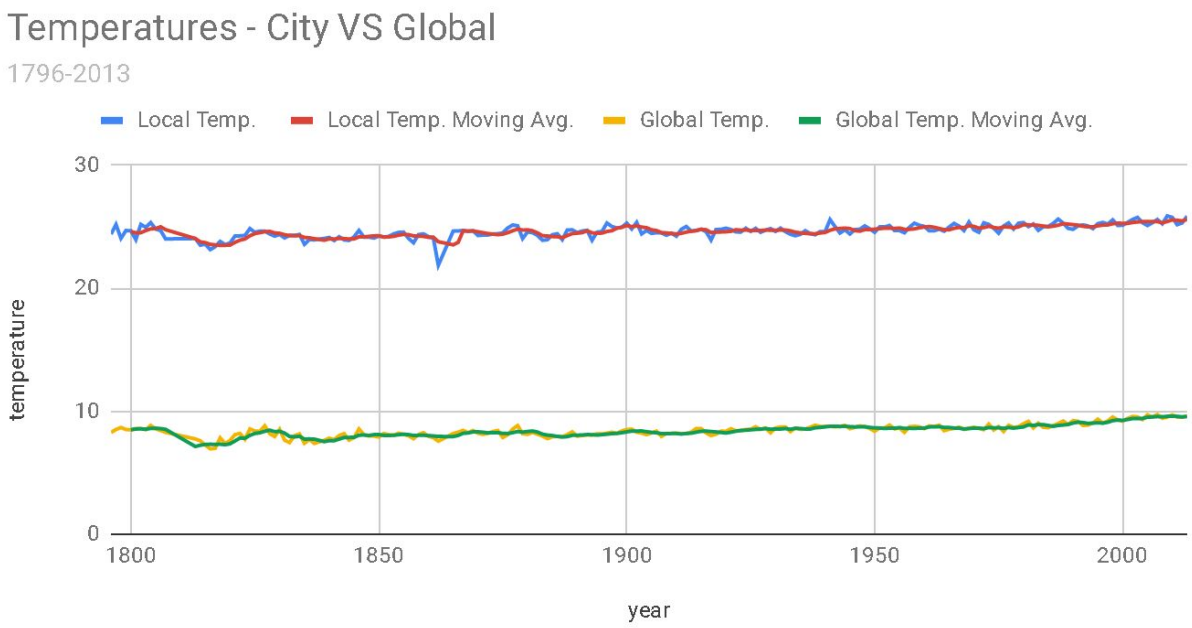
year	Local Temp.	Local Temp. Moving Avg.	Global Temp.	Global Temp. Moving Avg.
1796	24.39		8.27	
1797	25.17		8.51	
1798	24.05		8.67	
1799	24.68		8.51	
1800	24.67	=AVERAGE(B2:B6)	8.48	8.488
1801	23.94	24.502	8.59	8.552
1802	25.18	24.504	8.58	8.566
1803	24.95	24.684	8.5	8.532
1804	25.33	24.814	8.84	8.598
1805	24.8	24.84	8.56	8.614
1806	24.68	24.988	8.43	8.582
1807	24	24.752	8.28	8.522
1813	24.03	24.03	7.74	7.13
1814	23.49	23.76	7.59	7.232
1815	23.58	23.7	7.24	7.296
1816	23.13	23.5575	6.94	7.312
1817	23.37	23.52	6.98	7.298
1818	23.8	23.474	7.83	7.316
1819	23.54	23.484	7.37	7.272
1820	23.67	23.502	7.62	7.348
1821	24.24	23.724	8.09	7.578
1822	24.25	23.9	8.19	7.82
1823	24.28	23.996	7.72	7.798
1824	24.84	24.256	8.55	8.034
1825	24.54	24.43	8.39	8.188
1826	24.64	24.51	8.36	8.242
1827	24.64	24.588	8.81	8.366
1828	24.4	24.612	8.17	8.456
1829	24.23	24.49	7.94	8.334
1830	24.36	24.454	8.52	8.36
1831	24.08	24.342	7.64	8.216
1832	24.29	24.272	7.45	7.944

I decided to take 5-year moving averages. I calculated the moving averages using the following formula.

```
=AVERAGE(B2:B6)
```

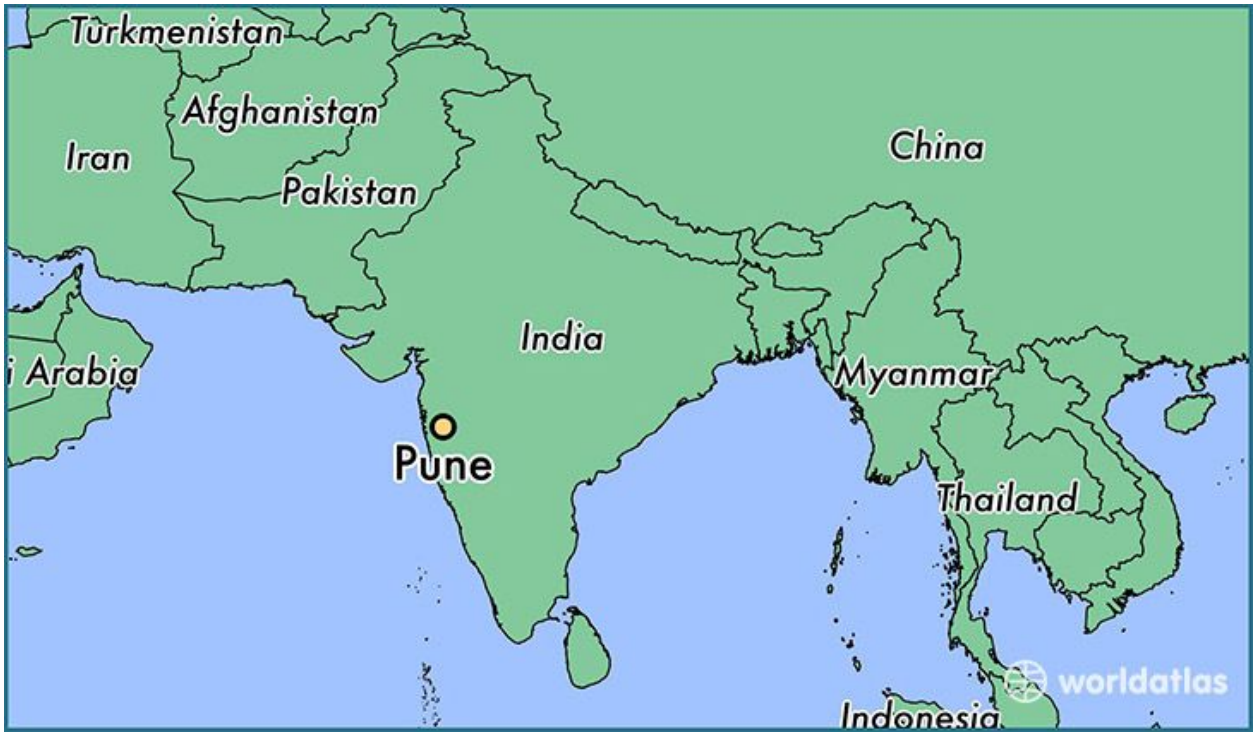
I repeated the same procedure for calculating the moving averages of the Global temperatures.

3. Drawing the Line Chart
   I then proceeded to use the Line Charts Tool to draw the line charts.
   I have plotted both the Local Temp and the Global Temperature with their respective moving averages.



4. Making Observations
   I then moved on to making some simple observations about the data.

Observations



1. Pune is hotter than the average global temperature

   Pune is close to the equator and lies on the western shore of India, this could be one of the reasons it is hotter than the average global temperature.

2. Pune V/ Average Global Temperatures

   It is easily apparent that Pune closely follows the general trend of the average global temperatures.

3. Jump in average global temperatures after the industrial revolution during the 19th century

   We can see a slight increase in the average global temperature after the Industrial Revolution, due to the increase in the burning of fossil fuels and the eventual global warming.

4. ### Pune is following the Global Temperature Trend.

   The Global Average temperate is rising and that is apparent from the Chart, with it we also see that the Local temperature in Pune is also rising. This means that Pune is following the Global temperature trend.

5. ### The World is getting hotter

   There is a visible upward trend in the average global temperatures since the last few hundred years.

Appendix

This is the table which was created as I worked on the project.

year	Local Temp.	Local Temp. Moving Avg.	Global Temp.	Global Temp. Moving Avg.
1796	24.39		8.27	
1797	25.17		8.51	
1798	24.05		8.67	
1799	24.68		8.51	
1800	24.67	24.592	8.48	8.488
1801	23.94	24.502	8.59	8.552
1802	25.18	24.504	8.58	8.566
1803	24.95	24.684	8.5	8.532
1804	25.33	24.814	8.84	8.598
1805	24.8	24.84	8.56	8.614
1806	24.68	24.988	8.43	8.582
1807	24	24.752	8.28	8.522
1813	24.03	24.03	7.74	7.13
1814	23.49	23.76	7.59	7.232
1815	23.58	23.7	7.24	7.296
1816	23.13	23.5575	6.94	7.312
1817	23.37	23.52	6.98	7.298

1818	23.8	23.474	7.83	7.316
1819	23.54	23.484	7.37	7.272
1820	23.67	23.502	7.62	7.348
1821	24.24	23.724	8.09	7.578
1822	24.25	23.9	8.19	7.82
1823	24.28	23.996	7.72	7.798
1824	24.84	24.256	8.55	8.034
1825	24.54	24.43	8.39	8.188
1826	24.64	24.51	8.36	8.242
1827	24.64	24.588	8.81	8.366
1828	24.4	24.612	8.17	8.456
1829	24.23	24.49	7.94	8.334
1830	24.36	24.454	8.52	8.36
1831	24.08	24.342	7.64	8.216
1832	24.29	24.272	7.45	7.944
1833	24.29	24.25	8.01	7.912
1834	24.36	24.276	8.15	7.954
1835	23.56	24.116	7.39	7.728
1836	23.96	24.092	7.7	7.74
1837	23.92	24.018	7.38	7.726
1838	23.99	23.958	7.51	7.626
1839	24.04	23.894	7.63	7.522
1840	24.12	24.006	7.8	7.604
1841	23.87	23.988	7.69	7.602
1842	24.18	24.04	8.02	7.73
1843	23.92	24.026	8.17	7.862
1844	23.88	23.994	7.65	7.866
1845	24.17	24.004	7.85	7.876
1846	24.69	24.168	8.55	8.048
1847	24.15	24.162	8.09	8.062
1848	24.15	24.208	7.98	8.024

1849	24.07	24.246	7.98	8.09
1850	24.23	24.258	7.9	8.1
1851	24.16	24.152	8.18	8.026
1852	24.2	24.162	8.1	8.028
1853	24.41	24.214	8.04	8.04
1854	24.53	24.306	8.21	8.086
1855	24.55	24.37	8.11	8.128
1856	24.04	24.346	8	8.092
1857	23.69	24.244	7.76	8.024
1858	24.35	24.232	8.1	8.036
1859	24.41	24.208	8.25	8.044
1860	24.19	24.136	7.96	8.014
1861	24.06	24.14	7.85	7.984
1862	21.86	23.774	7.56	7.944
1865	24.64	23.52	8.18	7.936
1866	24.65	23.71666667	8.29	8.024
1867	24.69	24.66	8.44	8.2
1868	24.61	24.6475	8.25	8.228
1869	24.66	24.65	8.43	8.318
1870	24.28	24.578	8.2	8.322
1871	24.31	24.51	8.12	8.288
1872	24.32	24.436	8.19	8.238
1873	24.4	24.394	8.35	8.258
1874	24.42	24.346	8.43	8.258
1875	24.49	24.388	7.86	8.19
1876	24.89	24.504	8.08	8.182
1877	25.13	24.666	8.54	8.252
1878	25.07	24.8	8.83	8.348
1879	24.03	24.722	8.17	8.296
1880	24.57	24.738	8.12	8.348
1881	24.51	24.662	8.27	8.386

1882	24.29	24.494	8.13	8.304
1883	23.89	24.258	7.98	8.134
1884	23.94	24.24	7.77	8.054
1885	24.34	24.194	7.92	8.014
1886	24.42	24.176	7.95	7.95
1887	23.94	24.106	7.91	7.906
1888	24.72	24.272	8.09	7.928
1889	24.74	24.432	8.32	8.038
1890	24.51	24.466	7.97	8.048
1891	24.64	24.51	8.02	8.062
1892	24.7	24.662	8.07	8.094
1893	23.89	24.496	8.06	8.088
1894	24.55	24.458	8.16	8.056
1895	24.6	24.476	8.15	8.092
1896	25.29	24.606	8.21	8.13
1897	25.01	24.668	8.29	8.174
1898	24.89	24.868	8.18	8.198
1899	24.95	24.948	8.4	8.246
1900	25.29	25.086	8.5	8.316
1901	24.81	24.99	8.54	8.382
1902	25.35	25.058	8.3	8.384
1903	24.41	24.962	8.22	8.392
1904	24.69	24.91	8.09	8.33
1905	24.45	24.742	8.23	8.276
1906	24.51	24.682	8.38	8.244
1907	24.49	24.51	7.95	8.174
1908	24.3	24.488	8.19	8.168
1909	24.47	24.444	8.18	8.186
1910	24.22	24.398	8.22	8.184
1911	24.78	24.452	8.18	8.144
1912	25.01	24.556	8.17	8.188

1913	24.64	24.624	8.3	8.21
1914	24.69	24.668	8.59	8.292
1915	24.79	24.782	8.59	8.366
1916	24.59	24.744	8.23	8.376
1917	23.91	24.524	8.02	8.346
1918	24.76	24.548	8.13	8.312
1919	24.78	24.566	8.38	8.27
1920	24.87	24.582	8.36	8.224
1921	24.77	24.618	8.57	8.292
1922	24.57	24.75	8.41	8.37
1923	24.56	24.71	8.42	8.428
1924	24.87	24.728	8.51	8.454
1925	24.61	24.676	8.53	8.488
1926	24.86	24.694	8.73	8.52
1927	24.54	24.688	8.52	8.542
1928	24.71	24.718	8.63	8.584
1929	24.84	24.712	8.24	8.53
1930	24.61	24.712	8.63	8.55
1931	24.88	24.716	8.72	8.548
1932	24.59	24.726	8.71	8.586
1933	24.38	24.66	8.34	8.528
1934	24.26	24.544	8.63	8.606
1935	24.37	24.496	8.52	8.584
1936	24.67	24.454	8.55	8.55
1937	24.43	24.422	8.7	8.548
1938	24.34	24.414	8.86	8.652
1939	24.6	24.482	8.76	8.678
1940	24.59	24.526	8.76	8.726
1941	25.57	24.706	8.77	8.77
1942	25	24.82	8.73	8.776
1943	24.48	24.848	8.76	8.756

1944	24.75	24.878	8.85	8.774
1945	24.4	24.84	8.58	8.738
1946	24.76	24.678	8.68	8.72
1947	24.79	24.636	8.8	8.734
1948	25.06	24.752	8.75	8.732
1949	24.82	24.766	8.59	8.68
1950	24.54	24.794	8.37	8.638
1951	24.98	24.838	8.63	8.628
1952	24.98	24.876	8.64	8.596
1953	25.09	24.882	8.87	8.62
1954	24.68	24.854	8.56	8.614
1955	24.68	24.882	8.63	8.666
1956	24.5	24.786	8.28	8.596
1957	24.95	24.78	8.73	8.614
1958	25.28	24.818	8.77	8.594
1959	25.11	24.904	8.73	8.628
1960	25.02	24.972	8.58	8.618
1961	24.66	25.004	8.8	8.722
1962	24.66	24.946	8.75	8.726
1963	24.8	24.85	8.86	8.744
1964	24.63	24.754	8.41	8.68
1965	24.96	24.742	8.53	8.67
1966	25.26	24.862	8.6	8.63
1967	25.05	24.94	8.7	8.62
1968	24.68	24.916	8.52	8.552
1969	25.37	25.064	8.6	8.59
1970	24.74	25.02	8.7	8.624
1971	24.54	24.876	8.6	8.624
1972	25.31	24.928	8.5	8.584
1973	25.18	25.028	8.95	8.67
1974	24.87	24.928	8.47	8.644

1975	24.47	24.874	8.74	8.652
1976	25.05	24.976	8.35	8.602
1977	25.3	24.974	8.85	8.672
1978	24.81	24.9	8.69	8.62
1979	25.28	24.982	8.73	8.672
1980	25.33	25.154	8.98	8.72
1981	25	25.144	9.17	8.884
1982	25.21	25.126	8.64	8.842
1983	24.7	25.104	9.03	8.91
1984	24.99	25.046	8.69	8.902
1985	25.02	24.984	8.66	8.838
1986	25.26	25.036	8.83	8.77
1987	25.61	25.116	8.99	8.84
1988	25.29	25.234	9.2	8.874
1989	24.86	25.208	8.92	8.92
1990	24.78	25.16	9.23	9.034
1991	25.06	25.12	9.18	9.104
1992	25.14	25.026	8.84	9.074
1993	25.06	24.98	8.87	9.008
1994	24.84	24.976	9.04	9.032
1995	25.24	25.068	9.35	9.056
1996	25.34	25.124	9.04	9.028
1997	25.21	25.138	9.2	9.1
1998	25.55	25.236	9.52	9.23
1999	25.1	25.288	9.29	9.28
2000	25.11	25.262	9.2	9.25
2001	25.34	25.262	9.41	9.324
2002	25.58	25.336	9.57	9.398
2003	25.75	25.376	9.53	9.4
2004	25.32	25.42	9.32	9.406
2005	25.09	25.416	9.7	9.506

2006	25.31	25.41	9.53	9.53
2007	25.58	25.41	9.73	9.562
2008	25.23	25.306	9.43	9.542
2009	25.87	25.416	9.51	9.58
2010	25.75	25.548	9.7	9.58
2011	25.16	25.518	9.52	9.578
2012	25.3	25.462	9.51	9.534
2013	25.85	25.586	9.61	9.57