Exploring Weather Trends

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Course: Data Analytics Bootcamp

This project is focused on Analyzing the weather trends (temperature) of the overall globe and the major city near your current location.

Steps:

Step 1: Accessing Data with SQL

The major city near me is Seattle. As per the requirement of this project, I used the following SQL queries to get fetch the data from Database.

1. First, I checked whether Seattle is present in the city_list table

    SELECT *FROM city_list WHERE city = 'Seattle' and country = 'United States';

2. Secondly, I fetched the data from regarding weather from city_data and global_data. Since it is a Comparison project, I used only the common years between global and Seattle temperatue and eliminated the rest (1828-2013).

    SELECT g.year, g.avg_temp AS Global_temperature, l.year,l.avg_temp AS Seattle_temperature
    FROM global_data AS g JOIN city_data AS l ON
    g.year = l.year and l.city = 'Seattle';

Step 2: Cleaning Data (Filling Missing Values)

I observed that for some years in **Seattle_temperature** values were missing. I filled those values with the mean value of remaining values.

Step 3: Calculating Moving average

I chose range as 11 for calculating moving average.

year	global_temperature	Seattle_temperature	Global Moving Average	Seattle Moving Average
1828	8.17	7.13		

1829	7.94	6.8		
1830	8.52	7.50136612		
1831	7.64	7.50136612		
1832	7.45	3.52		
1833	8.01	7.48		
1834	8.15	7.1		
1835	7.39	5.58		
1836	7.7	6.74		
1837	7.38	6.81		
1838	7.51	6.59	7.805454545	6.613884749
1839	7.63	7.3	7.756363636	6.629339295
1840	7.8	6.69	7.743636364	6.619339295
1841	7.69	6.81	7.668181818	6.556487829
1842	8.02	6.88	7.702727273	6.5
1843	8.17	6.55	7.768181818	6.775454545
1844	7.65	6.41	7.735454545	6.678181818
1845	7.85	6.88	7.708181818	6.658181818
1846	8.55	7.50136612	7.813636364	6.832851465
1847	8.09	8.99	7.849090909	7.03739692
1848	7.98	6.6	7.903636364	7.018306011
1849	7.98	6.68	7.946363636	7.026487829
1850	7.9	7.06	7.970909091	7.004669647
1851	8.18	7.79	8.005454545	7.104669647
1852	8.1	7.08	8.042727273	7.129215102
1853	8.04	7.61	8.044545455	7.195578738
1854	8.21	6.99	8.048181818	7.235578738
1855	8.11	7.31	8.09	7.31739692
1856	8	7.44	8.103636364	7.368306011
1857	7.76	7.91	8.031818182	7.405454545
1858	8.1	6.91	8.032727273	7.216363636
1859	8.25	6.27	8.057272727	7.186363636
1860	7.96	7.63	8.055454545	7.272727273
1861	7.85	7.18	8.050909091	7.283636364
1862	7.56	6.36	7.994545455	7.153636364
1863	8.11	7.44	7.995454545	7.186363636
1864	7.98	7.64	7.99	7.189090909
1865	8.18	7.05	7.987272727	7.194545455
1866	8.29	7.39	8.003636364	7.201818182
1867	8.44	7.12	8.043636364	7.172727273
1868	8.25	6.99	8.088181818	7.089090909
1869	8.43	8.33	8.118181818	7.218181818
1870	8.2	7.85	8.113636364	7.361818182

1871	8.12	7.97	8.128181818	7.392727273
1872	8.19	7.34	8.159090909	7.407272727
1873	8.35	7.47	8.230909091	7.508181818
1874	8.43	7.32	8.26	7.497272727
1875	7.86	6.9	8.249090909	7.43
1876	8.08	7.12	8.24	7.436363636
1877	8.54	8.14	8.262727273	7.504545455
1878	8.83	7.89	8.298181818	7.574545455
1879	8.17	6.74	8.290909091	7.551818182
1880	8.12	5.95	8.262727273	7.335454545
1881	8.27	6.86	8.269090909	7.245454545
1882	8.13	6.88	8.27	7.146363636
1883	7.98	6.97	8.250909091	7.112727273
1884	7.77	6.81	8.198181818	7.052727273
1885	7.92	8.66	8.151818182	7.174545455
1886	7.95	7.85	8.16	7.260909091
1887	7.91	6.77	8.144545455	7.229090909
1888	8.09	7.73	8.103636364	7.191818182
1889	8.32	8.08	8.057272727	7.209090909
1890	7.97	7.03	8.039090909	7.235454545
1891	8.02	7.61	8.03	7.386363636
1892	8.07	7.54	8.011818182	7.448181818
1893	8.06	6.16	8.005454545	7.382727273
1894	8.16	6.88	8.021818182	7.374545455
1895	8.15	7.26	8.056363636	7.415454545
1896	8.21	7.2	8.082727273	7.282727273
1897	8.29	7.5	8.113636364	7.250909091
1898	8.18	7.6	8.138181818	7.326363636
1899	8.4	7.08	8.166363636	7.267272727
1900	8.5	7.95	8.182727273	7.255454545
1901	8.54	7.27	8.234545455	7.277272727
1902	8.3	7.33	8.26	7.251818182
1903	8.22	6.98	8.273636364	7.200909091
1904	8.09	7.7	8.276363636	7.340909091
1905	8.23	7.59	8.282727273	7.405454545
1906	8.38	7.99	8.303636364	7.471818182
1907	7.95	7.28	8.28	7.479090909
1908	8.19	7.32	8.270909091	7.462727273
1909	8.18	6.52	8.270909091	7.364545455
1910	8.22	7.24	8.254545455	7.379090909
1911	8.18	6.73	8.225454545	7.268181818
1912	8.17	7.43	8.191818182	7.282727273

1913	8.3	6.99	8.191818182	7.251818182
1914	8.59	7.92	8.225454545	7.337272727
1915	8.59	8.13	8.270909091	7.376363636
1916	8.23	6.23	8.270909091	7.252727273
1917	8.02	7.25	8.238181818	7.185454545
1918	8.13	7.85	8.254545455	7.237272727
1919	8.38	6.94	8.271818182	7.202727273
1920	8.36	7.19	8.288181818	7.263636364
1921	8.57	7.2	8.32	7.26
1922	8.41	6.66	8.340909091	7.253636364
1923	8.42	7.82	8.363636364	7.289090909
1924	8.51	7.46	8.382727273	7.331818182
1925	8.53	8.26	8.377272727	7.362727273
1926	8.73	8.72	8.39	7.416363636
1927	8.52	7.3	8.416363636	7.513636364
1928	8.63	7.86	8.471818182	7.569090909
1929	8.24	6.96	8.481818182	7.488181818
1930	8.63	7.23	8.504545455	7.514545455
1931	8.72	8	8.537272727	7.588181818
1932	8.71	7.37	8.55	7.603636364
1933	8.34	7.06	8.543636364	7.64
1934	8.63	9.04	8.562727273	7.750909091
1935	8.52	7.33	8.563636364	7.739090909
1936	8.55	7.67	8.565454545	7.685454545
1937	8.7	7.39	8.562727273	7.564545455
1938	8.86	8.12	8.593636364	7.639090909
1939	8.76	8.25	8.605454545	7.674545455
1940	8.76	8.81	8.652727273	7.842727273
1941	8.77	8.83	8.665454545	7.988181818
1942	8.73	8.1	8.666363636	7.997272727
1943	8.76	7.51	8.670909091	8.01
1944	8.85	7.84	8.717272727	8.080909091
1945	8.58	7.57	8.712727273	7.947272727
1946	8.68	7.39	8.727272727	7.952727273
1947	8.8	8.03	8.75	7.985454545
1948	8.75	6.68	8.754545455	7.920909091
1949	8.59	7.05	8.73	7.823636364
1950	8.37	6.77	8.694545455	7.689090909
1951	8.63	7.33	8.682727273	7.554545455
1952	8.64	7.56	8.670909091	7.439090909
1953	8.87	8.11	8.683636364	7.44
1954	8.56	7.04	8.665454545	7.397272727

1955	8.63	6.09	8.645454545	7.238181818
1956	8.28	7.18	8.618181818	7.202727273
1957	8.73	7.52	8.622727273	7.214545455
1958	8.77	9.28	8.62	7.328181818
1959	8.73	7.5	8.618181818	7.402727273
1960	8.58	7.51	8.617272727	7.444545455
1961	8.8	8.12	8.656363636	7.567272727
1962	8.75	7.66	8.667272727	7.597272727
1963	8.86	7.91	8.687272727	7.629090909
1964	8.41	6.83	8.645454545	7.512727273
1965	8.53	7.91	8.642727273	7.591818182
1966	8.6	7.88	8.64	7.754545455
1967	8.7	8.38	8.678181818	7.863636364
1968	8.52	7.73	8.659090909	7.882727273
1969	8.6	7.51	8.643636364	7.721818182
1970	8.7	7.55	8.640909091	7.726363636
1971	8.6	7.1	8.642727273	7.689090909
1972	8.5	7.09	8.615454545	7.595454545
1973	8.95	7.58	8.633636364	7.588181818
1974	8.47	7.72	8.598181818	7.570909091
1975	8.74	7.09	8.628181818	7.594545455
1976	8.35	7.46	8.611818182	7.553636364
1977	8.85	7.63	8.634545455	7.530909091
1978	8.69	7.78	8.633636364	7.476363636
1979	8.73	7.88	8.652727273	7.49
1980	8.98	7.75	8.687272727	7.511818182
1981	9.17	8.23	8.73	7.573636364
1982	8.64	7.35	8.733636364	7.596363636
1983	9.03	7.94	8.781818182	7.673636364
1984	8.69	7.41	8.758181818	7.658181818
1985	8.66	6.71	8.775454545	7.566363636
1986	8.83	8.25	8.783636364	7.671818182
1987	8.99	8.67	8.841818182	7.781818182
1988	9.2	8.1	8.873636364	7.824545455
1989	8.92	7.87	8.894545455	7.832727273
1990	9.23	8.09	8.94	7.851818182
1991	9.18	8.2	8.958181818	7.892727273
1992	8.84	9.03	8.928181818	7.965454545
1993	8.87	7.68	8.949090909	7.995454545
1994	9.04	8.35	8.95	8.032727273
1995	9.35	8.62	9.01	8.142727273
1996	9.04	7.61	9.044545455	8.224545455

1997	9.2	8.41	9.078181818	8.239090909
1998	9.52	8.7	9.126363636	8.241818182
1999	9.29	7.79	9.134545455	8.213636364
2000	9.2	7.72	9.16	8.2
2001	9.41	7.9	9.176363636	8.182727273
2002	9.57	8.03	9.211818182	8.167272727
2003	9.53	8.74	9.274545455	8.140909091
2004	9.32	9.04	9.315454545	8.264545455
2005	9.7	8.57	9.375454545	8.284545455
2006	9.53	8.49	9.391818182	8.272727273
2007	9.73	8.04	9.454545455	8.311818182
2008	9.43	7.57	9.475454545	8.235454545
2009	9.51	8.02	9.474545455	8.173636364
2010	9.7	8.25	9.511818182	8.215454545
2011	9.52	7.35	9.540909091	8.181818182
2012	9.51	8.08	9.55	8.198181818
2013	9.61	9.95	9.553636364	8.372727273

Step 4: Line Chart representing Comparison Between Global vs Seattle temperature over the years.

Line Chart of Global Vs Seattle Temperature (Moving Average)
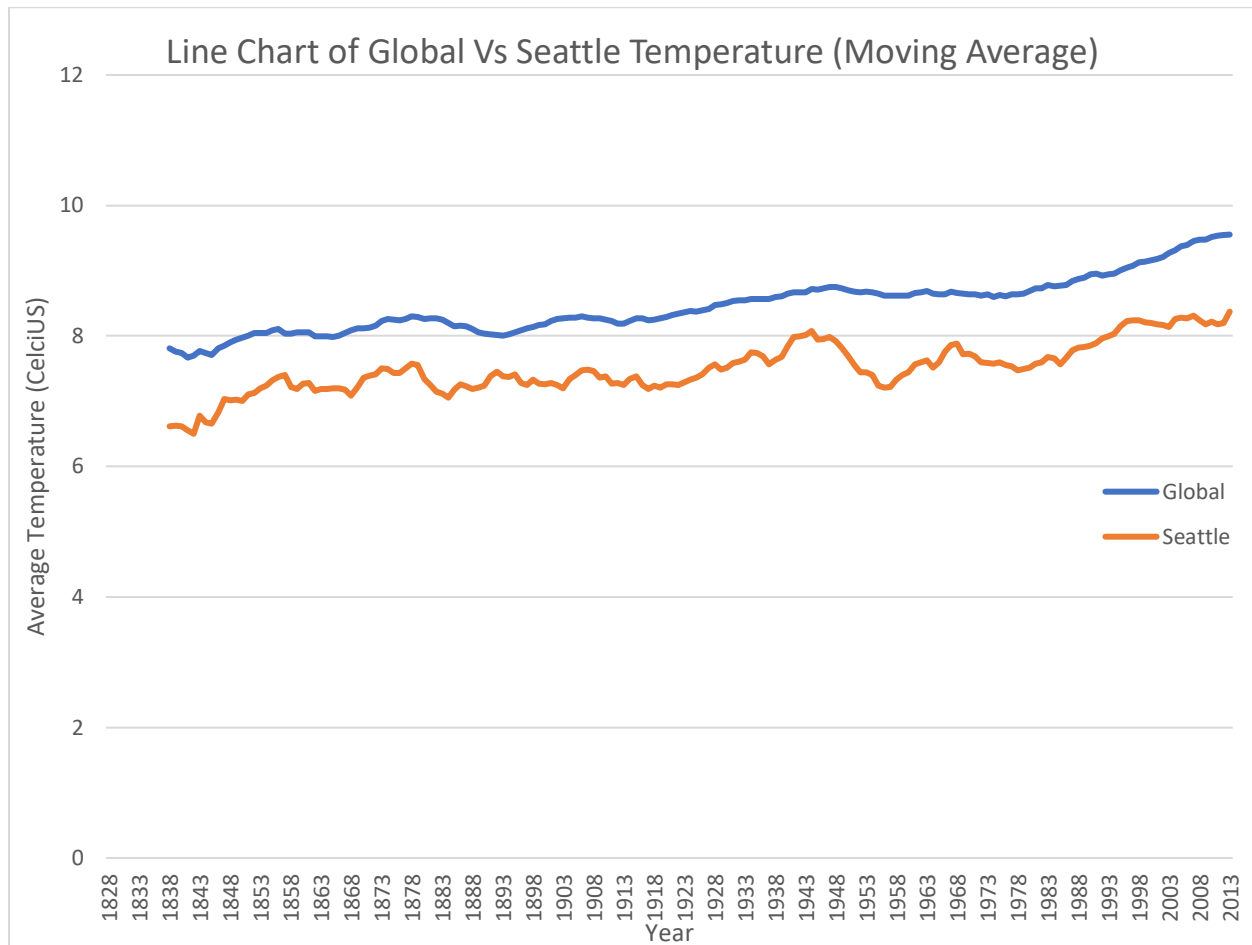
Step 5: Observations

1. Correlation Coefficient: 0.9139. Since the Coefficient value is high, we can say that global and Seattle temperature has linear relation and positive correlation.
2. In the year 1958, the Seattle temperature has suddenly decreased even if the global temperature is in the linear way. This indicates that there is sudden change in the weather to cool it down (Snow/ Rain).
3. In the year span of 1888-1898, there is decrease in the global temperature but there is an increase in the temperature of Seattle. This also indicates the sudden catastrophic change in the temperature. One of the reasons of this might be the explosion of volcano in the Mount Rainier (1894).
4. Both lines are increasing linearly. But by observing the graph, we can say that Seattle's temperature linear coefficient is lower as compared to global's temperature.