Project #1

Exploring Weather Trends

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12-1-2020

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Datasets Used

Evaluation Rubric

Criteria	Meets Specifications
Student is able to extract data from a database using SQL.	• The SQL query used to extract the data is included. • The query runs without error and pulls the intended data.
Student is able to manipulate data in a spreadsheet or similar tool.	Moving averages are calculated to be used in the line chart.
Student is able to create a clear data visualization.	• A line chart is included in the submission. • The chart and its axes have titles, and there's a clear legend (if applicable).
Student is able to interpret a data visualization.	• The student includes four observations about their provided data visualization. • The four observations are accurate.

Suggestions to Make Your Project Stand Out!

Think about other ways to compare and find insights from this data beyond interpreting the chart. Hear are a few ideas:

- What's the correlation coefficient?
- Can you estimate the average temperature in your city based on the average global temperature?
- Multiple cities - Add your favorite cities from around the globe to your visualization. What do you learn about them?

Data Gathering Outline/Sampling Method

I sampled 251 rows (years) of data each from the city_data and global_data tables for years 1763 to 2013 for my local city of Virginia Beach, Virginia. I also sampled data for the cities of Qingdao, China (1841 to 2013) and Moscow, Russia (1750 to 2013) and compared them to corresponding global temperature ranges. The moving average for all data sets was calculated based on five year intervals in the data via the AVERAGE() function in Microsoft Excel.

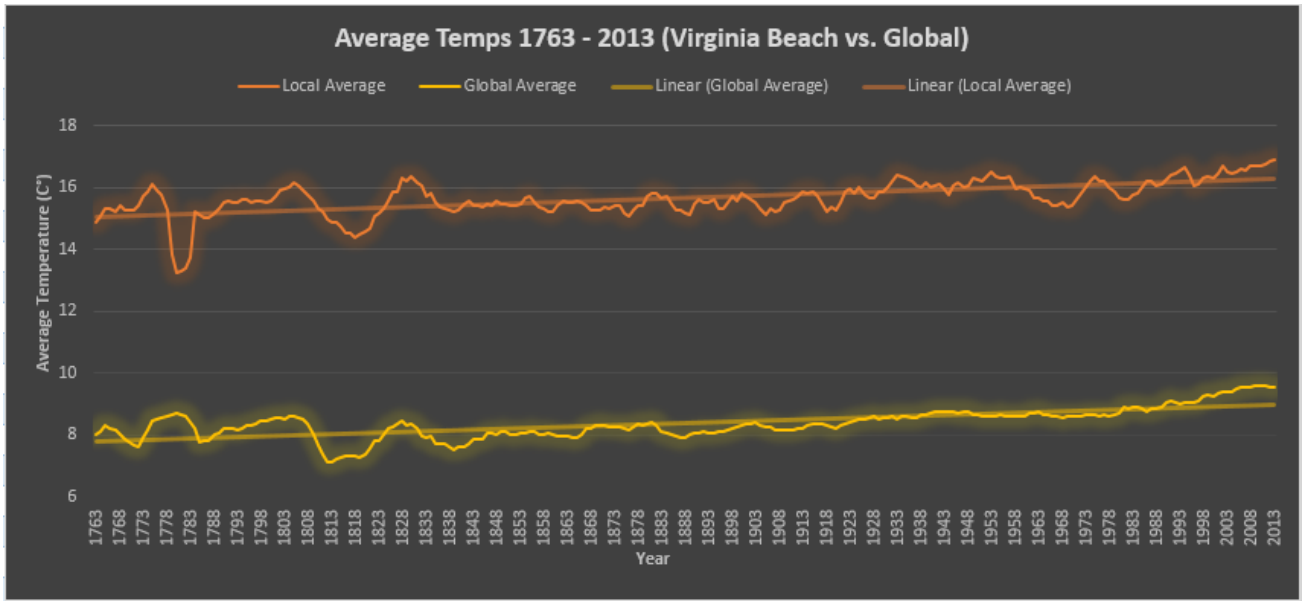
SQL Queries used to pull data:

SELECT * FROM city_data; - Pull all data from the city_data table within the database.

SELECT * FROM global_data; - Pull all data from the global_data table within the database.

Queries were run one at a time, as running them together caused the workspace to ignore the first one.

Charts and Observations



Questions

1. **Is your city hotter or cooler on average compared to the global average? Has the difference been consistent over time?**

   The local temperatures in Virginia Beach are consistently higher on average when compared to the global temperatures over the 250 year period in question. This is likely due to the fact that the global average has to take multiple climate types into account, including those that are overall cooler than Virginia Beach's humid subtropical one.

2. **How do the changes in the local city's temperatures over time compare to the changes in the global average?**

   Both local and global temperatures generally rose and fell around the same times, with the exception of one very noticeable period. As seen in the above chart, from 1776 to 1780 the local average dropped every year, while the global average increased.

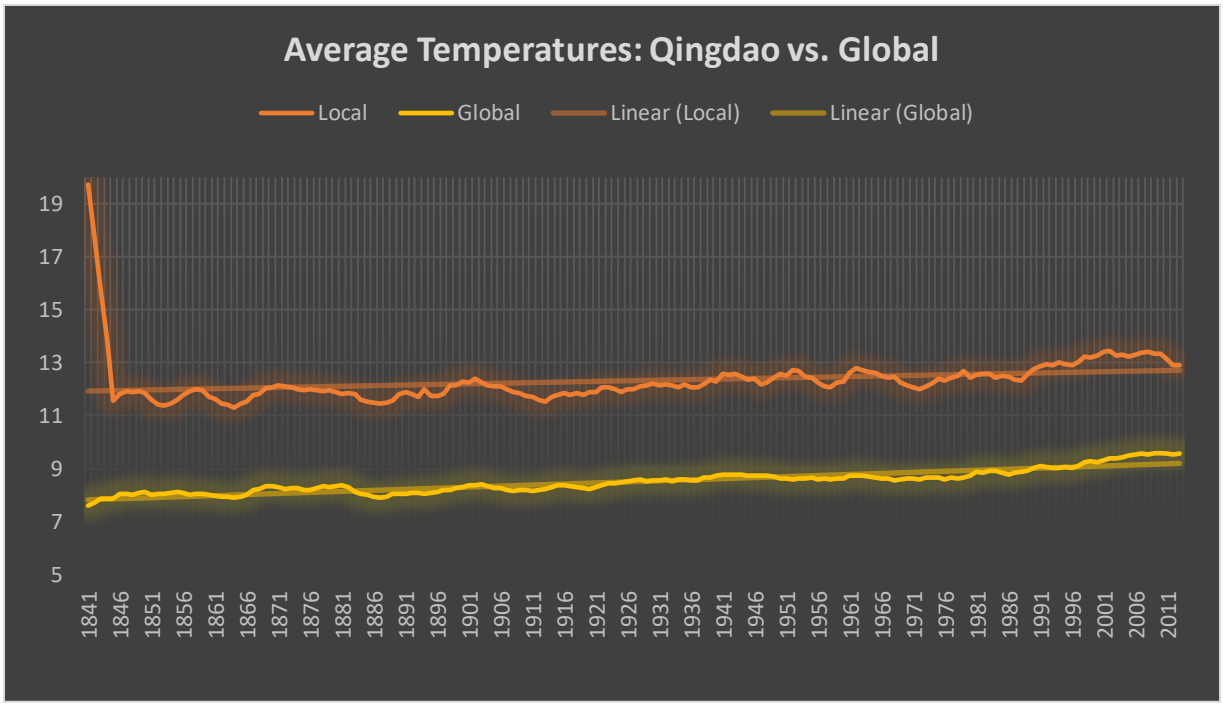
3. **What does the overall trend look like? Is the world getting hotter or cooler? Has the trend been consistent over the last few hundred years?**

   As the local and global trend lines within the chart depict, both local and global average temps have been trending slightly upward over the period in question. This shows that the world has been getting hotter over the last 250 years.

4. What is the correlation coefficient of the dataset?

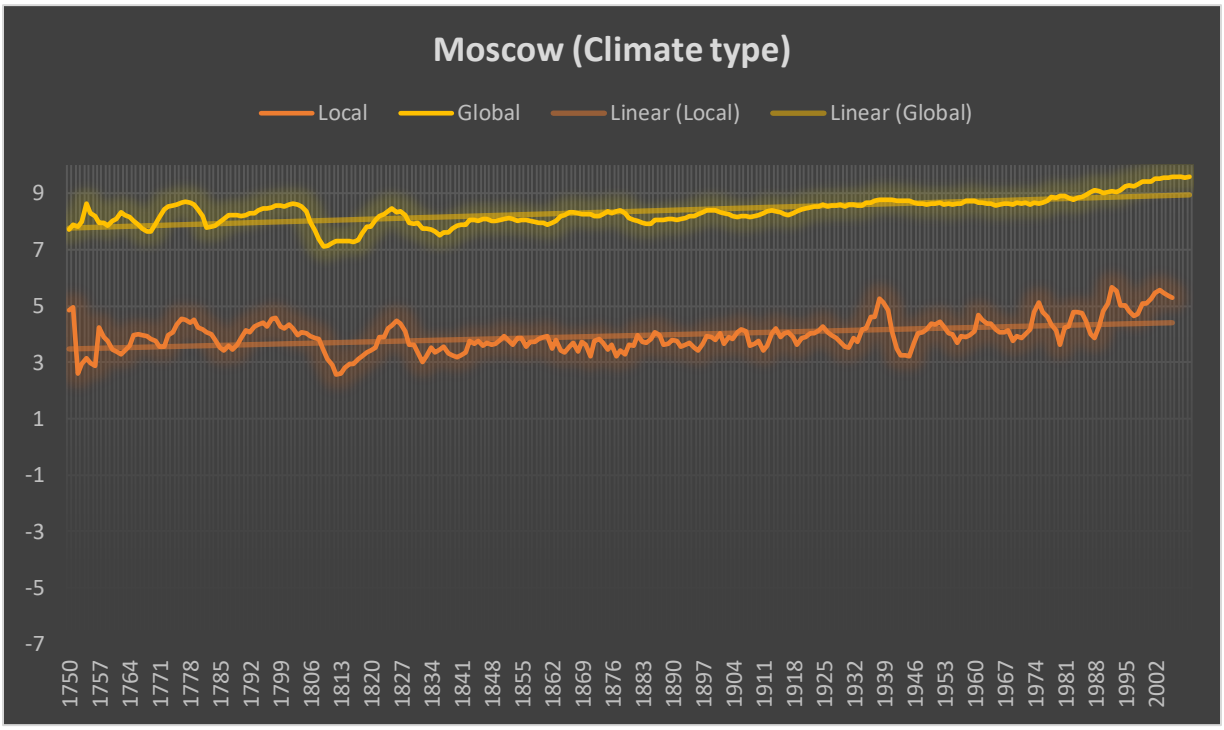
As seen in the table above, **0.65721** was the calculated correlation coefficient. When compared to the valid coefficient range (-1.0 to 1.0), this number indicates a positive statistical correlation between the average local and global temperatures of moderate strength. In other words, when the average global temperature increases in any given year, the local average temperature will do the same - and vice versa.

5a. In a city with the same climate type as Virginia Beach (humid subtropical), will a difference in geographical location yield a different type of correlation?



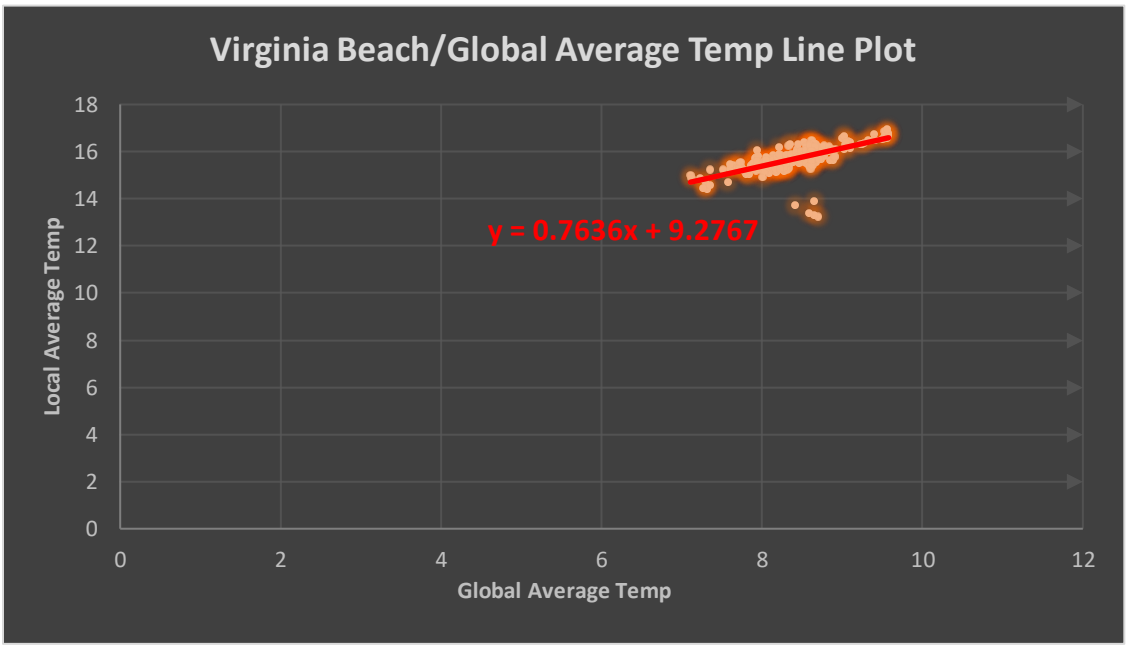
One such city would be Qingdao, located in China's northeastern Shandong province. As seen in the chart above, the linear trend lines again indicate a slight positive correlation between Qingdao's averages and the global averages.

5b. What about a city with a different climate type?



Even Moscow, Russia – with a cooler climate type of humid continental – still has a positive correlation with global averages, although it has lower average temperatures than most of the world.

6. Can the average temperature in the local city be estimated based on the average global temperature?



According to the linear regression scatterplot above for the dataset in question, the equation **y = 0.7636x + 9.2767** can best be used to estimate the correlation between the global and local temperatures, where 'Y' is the local (Virginia Beach) average temperature and 'X' is the global average temperature.

Summary

The observations and findings presented above indicate a rise in average global temperatures. This global increase is causing individual cities around the globe to experienced increased averages as well. Neither geographical location nor local climate type change the upward trend in temperature. Overall, these findings indicate that the Earth as a whole is getting warmer.

Additional statistical information

The MAX(), MIN(), AVERAGE(), MEDIAN(), and CORREL() excel functions were used on the dataset to calculate the Max value, Min value, Mean value, Median value and correlation coefficient respectively.

	Local Moving Average Stats	Global Moving Average Stats
Max Value	16.93	9.58
Min Value	13.235	7.108
Mean Value	15.66361	8.36451
Median Value	15.578	8.334
Total Increase in Average (Max - Min)	3.695	2.472
Correlation Coefficient	0.65721	

Dataset used for Virginia Beach

Year	Local avg_temp (Celsius)	Local 5 year moving average	Global avg_temp (Celsius)	Global 5 year moving average
1763	13.62	14.908	7.5	8.012
1764	16.02	15.076	8.4	8.094
1765	15.39	15.35	8.25	8.306
1766	16.17	15.35	8.41	8.234
1767	14.99	15.238	8.22	8.156
1768	14.63	15.44	6.78	8.012
1769	15.3	15.296	7.69	7.87
1770	15.19	15.256	7.69	7.758
1771	16.29	15.28	7.85	7.646
1772	15.84	15.45	8.19	7.64
1773	16.12	15.748	8.22	7.928
1774	15.83	15.854	8.77	8.144
1775	16.41	16.098	9.18	8.442
1776	15.52	15.944	8.3	8.532
1777	15.03	15.782	8.26	8.546
1778	13.63	15.284	8.54	8.61
1779	8.76	13.87	8.98	8.652
1780		13.235	9.43	8.702
1781	15.85	13.3175	8.1	8.662
1782	15.31	13.3875	7.9	8.59
1783	15.01	13.7325	7.68	8.418
1784	14.79	15.24	7.86	8.194
1785	14.73	15.138	7.36	7.78
1786	15.25	15.018	8.26	7.812
1787	15.26	15.008	8.03	7.838

1788	15.91	15.188	8.45	7.992
1789	15.61	15.352	8.33	8.086
1790	15.54	15.514	7.98	8.21
1791	15.63	15.59	8.23	8.204
1792	15.05	15.548	8.09	8.216
1793	15.92	15.55	8.23	8.172
1794	15.95	15.618	8.53	8.212
1795	15.5	15.61	8.35	8.286
1796	15.25	15.534	8.27	8.294
1797	15.22	15.568	8.51	8.378
1798	16.06	15.596	8.67	8.466
1799	15.62	15.53	8.51	8.462
1800	15.65	15.56	8.48	8.488
1801	16.04	15.718	8.59	8.552
1802	16.32	15.938	8.58	8.566
1803	16.18	15.962	8.5	8.532
1804	15.95	16.028	8.84	8.598
1805	16.4	16.178	8.56	8.614
1806	15.61	16.092	8.43	8.582
1807	15.4	15.908	8.28	8.522
1808	15.57	15.786	7.63	8.348
1809	14.82	15.56	7.08	7.996
1810	15.16	15.312	6.92	7.668
1811	15.28	15.246	6.86	7.354
1812	14.06	14.978	7.05	7.108
1813	15.07	14.878	7.74	7.13
1814	14.81	14.876	7.59	7.232
1815	14.51	14.746	7.24	7.296

1816	14.16	14.522	6.94	7.312
1817	14.07	14.524	6.98	7.298
1818	14.5	14.41	7.83	7.316
1819	15.09	14.466	7.37	7.272
1820	15.12	14.588	7.62	7.348
1821	14.66	14.688	8.09	7.578
1822	15.99	15.072	8.19	7.82
1823	15.11	15.194	7.72	7.798
1824	15.81	15.338	8.55	8.034
1825	16.25	15.564	8.39	8.188
1826	16.1	15.852	8.36	8.242
1827	16.02	15.858	8.81	8.366
1828	17.38	16.312	8.17	8.456
1829	15.4	16.23	7.94	8.334
1830	16.85	16.35	8.52	8.36
1831	15.13	16.156	7.64	8.216
1832	15.51	16.054	7.45	7.944
1833	15.62	15.702	8.01	7.912
1834	15.97	15.816	8.15	7.954
1835	15.36	15.518	7.39	7.728
1836	14.42	15.376	7.7	7.74
1837	15.2	15.314	7.38	7.726
1838	15.5	15.29	7.51	7.626
1839	15.59	15.214	7.63	7.522
1840	15.74	15.29	7.8	7.604
1841	15.27	15.46	7.69	7.602
1842	15.68	15.556	8.02	7.73
1843	14.88	15.432	8.17	7.862

1844	15.46	15.406	7.65	7.866
1845	15.59	15.376	7.85	7.876
1846	15.84	15.49	8.55	8.048
1847	15.45	15.444	8.09	8.062
1848	15.53	15.574	7.98	8.024
1849	15.07	15.496	7.98	8.09
1850	15.48	15.474	7.9	8.1
1851	15.62	15.43	8.18	8.026
1852	15.38	15.416	8.1	8.028
1853	15.9	15.49	8.04	8.04
1854	15.97	15.67	8.21	8.086
1855	15.66	15.706	8.11	8.128
1856	14.61	15.504	8	8.092
1857	14.83	15.394	7.76	8.024
1858	15.46	15.306	8.1	8.036
1859	15.55	15.222	8.25	8.044
1860	15.61	15.212	7.96	8.014
1861	15.7	15.43	7.85	7.984
1862	15.46	15.556	7.56	7.944
1863	15.41	15.546	8.11	7.946
1864	15.44	15.524	7.98	7.892
1865	15.88	15.578	8.18	7.936
1866	15.46	15.53	8.29	8.024
1867	14.95	15.428	8.44	8.2
1868	14.61	15.268	8.25	8.228
1869	15.43	15.266	8.43	8.318
1870	15.93	15.276	8.2	8.322
1871	15.85	15.354	8.12	8.288

1872	14.76	15.316	8.19	8.238
1873	15.06	15.406	8.35	8.258
1874	15.51	15.422	8.43	8.258
1875	14.75	15.186	7.86	8.19
1876	15.4	15.096	8.08	8.182
1877	15.65	15.274	8.54	8.252
1878	15.88	15.438	8.83	8.348
1879	15.48	15.432	8.17	8.296
1880	16.17	15.716	8.12	8.348
1881	15.94	15.824	8.27	8.386
1882	15.53	15.8	8.13	8.304
1883	15.33	15.69	7.98	8.134
1884	15.76	15.746	7.77	8.054
1885	14.88	15.488	7.92	8.014
1886	14.88	15.276	7.95	7.95
1887	15.46	15.262	7.91	7.906
1888	15.04	15.204	8.09	7.928
1889	15.5	15.152	8.32	8.038
1890	16.42	15.46	7.97	8.048
1891	15.64	15.612	8.02	8.062
1892	14.92	15.504	8.07	8.094
1893	15.06	15.508	8.06	8.088
1894	16.12	15.632	8.16	8.056
1895	14.98	15.344	8.15	8.092
1896	15.67	15.35	8.21	8.13
1897	15.77	15.52	8.29	8.174
1898	15.96	15.7	8.18	8.198
1899	15.45	15.566	8.4	8.246

1900	16.26	15.822	8.5	8.316
1901	15.06	15.7	8.54	8.382
1902	15.5	15.646	8.3	8.384
1903	15.45	15.544	8.22	8.392
1904	14.39	15.332	8.09	8.33
1905	15.26	15.132	8.23	8.276
1906	15.98	15.316	8.38	8.244
1907	15.03	15.222	7.95	8.174
1908	15.85	15.302	8.19	8.168
1909	15.57	15.538	8.18	8.186
1910	15.42	15.57	8.22	8.184
1911	16.26	15.626	8.18	8.144
1912	15.63	15.746	8.17	8.188
1913	16.51	15.878	8.3	8.21
1914	15.31	15.826	8.59	8.292
1915	15.56	15.854	8.59	8.366
1916	15.55	15.712	8.23	8.376
1917	14.38	15.462	8.02	8.346
1918	15.45	15.25	8.13	8.312
1919	15.92	15.372	8.38	8.27
1920	15.12	15.284	8.36	8.224
1921	16.81	15.536	8.57	8.292
1922	16.16	15.892	8.41	8.37
1923	15.79	15.96	8.42	8.428
1924	15.13	15.802	8.51	8.454
1925	16.13	16.004	8.53	8.488
1926	15.54	15.75	8.73	8.52
1927	15.85	15.688	8.52	8.542

1928	15.7	15.67	8.63	8.584
1929	16.12	15.868	8.24	8.53
1930	16.07	15.856	8.63	8.55
1931	16.4	16.028	8.72	8.548
1932	16.69	16.196	8.71	8.586
1933	16.87	16.43	8.34	8.528
1934	15.91	16.388	8.63	8.606
1935	15.71	16.316	8.52	8.584
1936	15.88	16.212	8.55	8.55
1937	15.94	16.062	8.7	8.548
1938	16.55	15.998	8.86	8.652
1939	16.74	16.164	8.76	8.678
1940	14.96	16.014	8.76	8.726
1941	16.05	16.048	8.77	8.77
1942	16.23	16.106	8.73	8.776
1943	15.84	15.964	8.76	8.756
1944	15.88	15.792	8.85	8.774
1945	16.31	16.062	8.58	8.738
1946	16.48	16.148	8.68	8.72
1947	15.63	16.028	8.8	8.734
1948	16.06	16.072	8.75	8.732
1949	17.06	16.308	8.59	8.68
1950	16.06	16.258	8.37	8.638
1951	16.17	16.196	8.63	8.628
1952	16.39	16.348	8.64	8.596
1953	16.84	16.504	8.87	8.62
1954	16.27	16.346	8.56	8.614
1955	15.91	16.316	8.63	8.666

1956	16.22	16.326	8.28	8.596
1957	16.51	16.35	8.73	8.614
1958	14.99	15.98	8.77	8.594
1959	16.54	16.034	8.73	8.628
1960	15.6	15.972	8.58	8.618
1961	15.86	15.9	8.8	8.722
1962	15.38	15.674	8.75	8.726
1963	14.95	15.666	8.86	8.744
1964	15.98	15.554	8.41	8.68
1965	15.62	15.558	8.53	8.67
1966	15.28	15.442	8.6	8.63
1967	15.2	15.406	8.7	8.62
1968	15.56	15.528	8.52	8.552
1969	15.35	15.402	8.6	8.59
1970	15.84	15.446	8.7	8.624
1971	16.26	15.642	8.6	8.624
1972	16.09	15.82	8.5	8.584
1973	16.5	16.008	8.95	8.67
1974	16.45	16.228	8.47	8.644
1975	16.56	16.372	8.74	8.652
1976	15.55	16.23	8.35	8.602
1977	16.06	16.224	8.85	8.672
1978	15.41	16.006	8.69	8.62
1979	15.74	15.864	8.73	8.672
1980	15.72	15.696	8.98	8.72
1981	15.32	15.65	9.17	8.884
1982	15.94	15.626	8.64	8.842
1983	16.06	15.756	9.03	8.91

1984	16.04	15.816	8.69	8.902
1985	16.63	15.998	8.66	8.838
1986	16.5	16.234	8.83	8.77
1987	15.8	16.206	8.99	8.84
1988	15.45	16.084	9.2	8.874
1989	16.14	16.104	8.92	8.92
1990	17.49	16.276	9.23	9.034
1991	17.22	16.42	9.18	9.104
1992	15.93	16.446	8.84	9.074
1993	16.12	16.58	8.87	9.008
1994	16.58	16.668	9.04	9.032
1995	16.17	16.404	9.35	9.056
1996	15.61	16.082	9.04	9.028
1997	16.09	16.114	9.2	9.1
1998	17.2	16.33	9.52	9.23
1999	16.7	16.354	9.29	9.28
2000	15.97	16.314	9.2	9.25
2001	16.47	16.486	9.41	9.324
2002	17.25	16.718	9.57	9.398
2003	16.2	16.518	9.53	9.4
2004	16.48	16.474	9.32	9.406
2005	16.28	16.536	9.7	9.506
2006	16.91	16.624	9.53	9.53
2007	16.95	16.564	9.73	9.562
2008	16.93	16.71	9.43	9.542
2009	16.47	16.708	9.51	9.58
2010	16.3	16.712	9.7	9.58
2011	17.22	16.774	9.52	9.578

2012	17.37	16.858	9.51	9.534
2013	17.29	16.93	9.61	9.57

Dataset used for Qingdao

Year	Local avg_temp (Celsius)	Local 5 year moving average	Global avg_temp (Celsius)	Global 5 year moving average
1841	10.87	19.72	7.69	7.602
1842	11.65	17.62	8.02	7.73
1843	11.8	15.78	8.17	7.862
1844	11.72	13.808	7.65	7.866
1845	11.76	11.56	7.85	7.876
1846	12.15	11.816	8.55	8.048
1847	12.16	11.918	8.09	8.062
1848	11.7	11.898	7.98	8.024
1849	11.83	11.92	7.98	8.09
1850	11.34	11.836	7.9	8.1
1851	10.99	11.604	8.18	8.026
1852	11.2	11.412	8.1	8.028
1853	11.56	11.384	8.04	8.04
1854	12.08	11.434	8.21	8.086
1855	12.21	11.608	8.11	8.128
1856	11.81	11.772	8	8.092
1857	11.89	11.91	7.76	8.024
1858	11.9	11.978	8.1	8.036
1859	11.98	11.958	8.25	8.044
1860	10.99	11.714	7.96	8.014
1861	11.32	11.616	7.85	7.984
1862	10.98	11.434	7.56	7.944
1863	11.89	11.432	8.11	7.946
1864	11.31	11.298	7.98	7.892
1865	11.77	11.454	8.18	7.936

1866	11.74	11.538	8.29	8.024
1867	12.2	11.782	8.44	8.2
1868	12.03	11.81	8.25	8.228
1869	12.37	12.022	8.43	8.318
1870	11.98	12.064	8.2	8.322
1871	12.18	12.152	8.12	8.288
1872	12	12.112	8.19	8.238
1873	11.78	12.062	8.35	8.258
1874	12	11.988	8.43	8.258
1875	11.92	11.976	7.86	8.19
1876	12.26	11.992	8.08	8.182
1877	11.75	11.942	8.54	8.252
1878	11.75	11.936	8.83	8.348
1879	12.14	11.964	8.17	8.296
1880	11.59	11.898	8.12	8.348
1881	11.8	11.806	8.27	8.386
1882	11.93	11.842	8.13	8.304
1883	11.67	11.826	7.98	8.134
1884	11.04	11.606	7.77	8.054
1885	11.27	11.542	7.92	8.014
1886	11.59	11.5	7.95	7.95
1887	11.77	11.468	7.91	7.906
1888	11.81	11.496	8.09	7.928
1889	11.34	11.556	8.32	8.038
1890	12.56	11.814	7.97	8.048
1891	11.97	11.89	8.02	8.062
1892	11.45	11.826	8.07	8.094
1893	11.24	11.712	8.06	8.088

1894	12.74	11.992	8.16	8.056
1895	11.38	11.756	8.15	8.092
1896	11.83	11.728	8.21	8.13
1897	11.84	11.806	8.29	8.174
1898	12.93	12.144	8.18	8.198
1899	12.74	12.144	8.4	8.246
1900	12	12.268	8.5	8.316
1901	11.68	12.238	8.54	8.382
1902	12.55	12.38	8.3	8.384
1903	12.28	12.25	8.22	8.392
1904	12.11	12.124	8.09	8.33
1905	11.93	12.11	8.23	8.276
1906	11.62	12.098	8.38	8.244
1907	12.02	11.992	7.95	8.174
1908	11.77	11.89	8.19	8.168
1909	11.85	11.838	8.18	8.186
1910	11.4	11.732	8.22	8.184
1911	11.45	11.698	8.18	8.144
1912	11.57	11.608	8.17	8.188
1913	11.41	11.536	8.3	8.21
1914	12.68	11.702	8.59	8.292
1915	11.81	11.784	8.59	8.366
1916	11.83	11.86	8.23	8.376
1917	11.13	11.772	8.02	8.346
1918	11.79	11.848	8.13	8.312
1919	12.26	11.764	8.38	8.27
1920	12.46	11.894	8.36	8.224
1921	11.71	11.87	8.57	8.292

1922	12.21	12.086	8.41	8.37
1923	11.67	12.062	8.42	8.428
1924	12.01	12.012	8.51	8.454
1925	11.9	11.9	8.53	8.488
1926	12.11	11.98	8.73	8.52
1927	12.3	11.998	8.52	8.542
1928	12.16	12.096	8.63	8.584
1929	12.22	12.138	8.24	8.53
1930	12.29	12.216	8.63	8.55
1931	11.75	12.144	8.72	8.548
1932	12.44	12.172	8.71	8.586
1933	11.94	12.128	8.34	8.528
1934	11.91	12.066	8.63	8.606
1935	12.83	12.174	8.52	8.584
1936	11.23	12.07	8.55	8.55
1937	12.43	12.068	8.7	8.548
1938	12.48	12.176	8.86	8.652
1939	12.77	12.348	8.76	8.678
1940	12.43	12.268	8.76	8.726
1941	12.77	12.576	8.77	8.77
1942	12.32	12.554	8.73	8.776
1943	12.55	12.568	8.76	8.756
1944	12.22	12.458	8.85	8.774
1945	11.95	12.362	8.58	8.738
1946	12.95	12.398	8.68	8.72
1947	11.29	12.192	8.8	8.734
1948	12.79	12.24	8.75	8.732
1949	13.14	12.424	8.59	8.68

1950	12.79	12.592	8.37	8.638
1951	12.53	12.508	8.63	8.628
1952	12.27	12.704	8.64	8.596
1953	12.74	12.694	8.87	8.62
1954	12.06	12.478	8.56	8.614
1955	12.57	12.434	8.63	8.666
1956	11.56	12.24	8.28	8.596
1957	11.68	12.122	8.73	8.614
1958	12.43	12.06	8.77	8.594
1959	13	12.248	8.73	8.628
1960	12.7	12.274	8.58	8.618
1961	13.26	12.614	8.8	8.722
1962	12.57	12.792	8.75	8.726
1963	12.13	12.732	8.86	8.744
1964	12.62	12.656	8.41	8.68
1965	12.55	12.626	8.53	8.67
1966	12.59	12.492	8.6	8.63
1967	12.33	12.444	8.7	8.62
1968	12.33	12.484	8.52	8.552
1969	11.43	12.246	8.6	8.59
1970	12.06	12.148	8.7	8.624
1971	12.25	12.08	8.6	8.624
1972	11.99	12.012	8.5	8.584
1973	12.72	12.09	8.95	8.67
1974	12.07	12.218	8.47	8.644
1975	12.99	12.404	8.74	8.652
1976	11.85	12.324	8.35	8.602
1977	12.59	12.444	8.85	8.672

1978	13.07	12.514	8.69	8.62
1979	12.84	12.668	8.73	8.672
1980	11.76	12.422	8.98	8.72
1981	12.35	12.522	9.17	8.884
1982	12.94	12.592	8.64	8.842
1983	12.96	12.57	9.03	8.91
1984	12.13	12.428	8.69	8.902
1985	12.1	12.496	8.66	8.838
1986	12.18	12.462	8.83	8.77
1987	12.44	12.362	8.99	8.84
1988	12.73	12.316	9.2	8.874
1989	13.21	12.532	8.92	8.92
1990	13.26	12.764	9.23	9.034
1991	12.71	12.87	9.18	9.104
1992	12.82	12.946	8.84	9.074
1993	12.54	12.908	8.87	9.008
1994	13.69	13.004	9.04	9.032
1995	12.92	12.936	9.35	9.056
1996	12.54	12.902	9.04	9.028
1997	13.34	13.006	9.2	9.1
1998	13.69	13.236	9.52	9.23
1999	13.54	13.206	9.29	9.28
2000	13.16	13.254	9.2	9.25
2001	13.26	13.398	9.41	9.324
2002	13.52	13.434	9.57	9.398
2003	12.89	13.274	9.53	9.4
2004	13.66	13.298	9.32	9.406
2005	12.87	13.24	9.7	9.506

2006	13.58	13.304	9.53	9.53
2007	13.88	13.376	9.73	9.562
2008	13.08	13.414	9.43	9.542
2009	13.31	13.344	9.51	9.58
2010	12.75	13.32	9.7	9.58
2011	12.66	13.136	9.52	9.578
2012	12.7	12.9	9.51	9.534
2013	13.01	12.886	9.61	9.57

Dataset used for Moscow

Year	Local avg_temp (Celsius)	Local 5 year moving average	Global avg_temp (Celsius)	Global 5 year moving average
1750	4.84	4.84	#REF!	8.618
1751	5.07	4.955	#REF!	8.288
1752	-2.08	2.61	#REF!	8.192
1753	3.87	2.925	7.7175	7.958
1754	4.07	3.154	7.868	7.942
1755	3.99	2.984	7.796	7.86
1756	4.51	2.872	7.97	8.012
1757	4.66	4.22	8.618	8.094
1758	2.22	3.89	8.288	8.306
1759	3.45	3.766	8.192	8.234
1760	2.41	3.45	7.958	8.156
1761	4.14	3.376	7.942	8.012
1762	4.1	3.264	7.86	7.87
1763	2.91	3.402	8.012	7.758
1764	4.35	3.582	8.094	7.646
1765	4.3	3.96	8.306	7.64
1766	4.23	3.978	8.234	7.928
1767	4.05	3.968	8.156	8.144
1768	2.72	3.93	8.012	8.442
1769	3.85	3.83	7.87	8.532
1770	3.97	3.764	7.758	8.546
1771	3.23	3.564	7.646	8.61
1772	3.93	3.54	7.64	8.652
1773	4.79	3.954	7.928	8.702
1774	4.47	4.078	8.144	8.662

1775	5.29	4.342	8.442	8.59
1776	4.16	4.528	8.532	8.418
1777	3.78	4.498	8.546	8.194
1778	4.26	4.392	8.61	7.78
1779	4.99	4.496	8.652	7.812
1780	3.9	4.218	8.702	7.838
1781	3.92	4.17	8.662	7.992
1782	3.33	4.08	8.59	8.086
1783	3.89	4.006	8.418	8.21
1784	3.85	3.778	8.194	8.204
1785	2.65	3.528	7.78	8.216
1786	3.38	3.42	7.812	8.172
1787	4.14	3.582	7.838	8.212
1788	3.31	3.466	7.992	8.286
1789	4.6	3.616	8.086	8.294
1790	3.78	3.842	8.21	8.378
1791	4.8	4.126	8.204	8.466
1792	3.85	4.068	8.216	8.462
1793	4.32	4.27	8.172	8.488
1794	4.99	4.348	8.212	8.552
1795	4.05	4.402	8.286	8.566
1796	4.11	4.264	8.294	8.532
1797	5.19	4.532	8.378	8.598
1798	4.59	4.586	8.466	8.614
1799	3.35	4.258	8.462	8.582
1800	3.8	4.208	8.488	8.522
1801	4.74	4.334	8.552	8.348
1802	4.48	4.192	8.566	7.996

1803	3.35	3.944	8.532	7.668
1804	3.92	4.058	8.598	7.354
1805	3.65	4.028	8.614	7.108
1806	4.18	3.916	8.582	7.13
1807	4.15	3.85	8.522	7.232
1808	3.21	3.822	8.348	7.296
1809	1.9	3.418	7.996	7.312
1810	2.09	3.106	7.668	7.298
1811	3.21	2.912	7.354	7.316
1812	2.4	2.562	7.108	7.272
1813	3.45	2.61	7.13	7.348
1814	2.79	2.788	7.232	7.578
1815	2.82	2.934	7.296	7.82
1816	3.23	2.938	7.312	7.798
1817	3.17	3.092	7.298	8.034
1818	4.11	3.224	7.316	8.188
1819	3.39	3.344	7.272	8.242
1820	3.12	3.404	7.348	8.366
1821	3.88	3.534	7.578	8.456
1822	5.01	3.902	7.82	8.334
1823	3.99	3.878	7.798	8.36
1824	4.98	4.196	8.034	8.216
1825	3.6	4.292	8.188	7.944
1826	4.84	4.484	8.242	7.912
1827	4.37	4.356	8.366	7.954
1828	2.78	4.114	8.456	7.728
1829	2.45	3.608	8.334	7.74
1830	3.64	3.616	8.36	7.726

1831	3.5	3.348	8.216	7.626
1832	2.62	2.998	7.944	7.522
1833	3.93	3.228	7.912	7.604
1834	3.86	3.51	7.954	7.602
1835	2.89	3.36	7.728	7.73
1836	4.03	3.466	7.74	7.862
1837	2.97	3.536	7.726	7.866
1838	2.85	3.32	7.626	7.876
1839	3.49	3.246	7.522	8.048
1840	2.46	3.16	7.604	8.062
1841	4.46	3.246	7.602	8.024
1842	3.51	3.354	7.73	8.09
1843	4.81	3.746	7.862	8.1
1844	3	3.648	7.866	8.026
1845	2.93	3.742	7.876	8.028
1846	3.76	3.602	8.048	8.04
1847	4.02	3.704	8.062	8.086
1848	4.44	3.63	8.024	8.128
1849	3.18	3.666	8.09	8.092
1850	3.53	3.786	8.1	8.024
1851	4.52	3.938	8.026	8.036
1852	3.05	3.744	8.028	8.044
1853	3.87	3.63	8.04	8.014
1854	4.36	3.866	8.086	7.984
1855	3.44	3.848	8.128	7.944
1856	3.08	3.56	8.092	7.946
1857	3.81	3.712	8.024	7.892
1858	3.88	3.714	8.036	7.936

1859	4.99	3.84	8.044	8.024
1860	3.66	3.884	8.014	8.2
1861	3.25	3.918	7.984	8.228
1862	1.58	3.472	7.944	8.318
1863	5.41	3.778	7.946	8.322
1864	3.21	3.422	7.892	8.288
1865	3.27	3.344	7.936	8.238
1866	4.31	3.556	8.024	8.258
1867	2.29	3.698	8.2	8.258
1868	3.78	3.372	8.228	8.19
1869	5.04	3.738	8.318	8.182
1870	2.67	3.618	8.322	8.252
1871	2.25	3.206	8.288	8.348
1872	5.08	3.764	8.238	8.296
1873	4.13	3.834	8.258	8.348
1874	4.36	3.698	8.258	8.386
1875	1.5	3.464	8.19	8.304
1876	3.02	3.618	8.182	8.134
1877	3.13	3.228	8.252	8.054
1878	5.13	3.428	8.348	8.014
1879	3.56	3.268	8.296	7.95
1880	3.24	3.616	8.348	7.906
1881	2.84	3.58	8.386	7.928
1882	4.96	3.946	8.304	8.038
1883	4.03	3.726	8.134	8.048
1884	3.34	3.682	8.054	8.062
1885	4	3.834	8.014	8.094
1886	3.99	4.064	7.95	8.088

1887	4.43	3.958	7.906	8.056
1888	2.26	3.604	7.928	8.092
1889	3.57	3.65	8.038	8.13
1890	4.63	3.776	8.048	8.174
1891	3.97	3.772	8.062	8.198
1892	3.31	3.548	8.094	8.246
1893	2.6	3.616	8.088	8.316
1894	4.01	3.704	8.056	8.382
1895	3.66	3.51	8.092	8.384
1896	3.44	3.404	8.13	8.392
1897	4.49	3.64	8.174	8.33
1898	4.04	3.928	8.198	8.276
1899	3.76	3.878	8.246	8.244
1900	3.27	3.8	8.316	8.174
1901	4.57	4.026	8.382	8.168
1902	2.67	3.662	8.384	8.186
1903	5.24	3.902	8.392	8.184
1904	3.31	3.812	8.33	8.144
1905	4.54	4.066	8.276	8.188
1906	5.06	4.164	8.244	8.21
1907	2.39	4.108	8.174	8.292
1908	2.56	3.572	8.168	8.366
1909	3.76	3.662	8.186	8.376
1910	5.03	3.76	8.184	8.346
1911	3.39	3.426	8.144	8.312
1912	3.14	3.576	8.188	8.27
1913	4.82	4.028	8.21	8.224
1914	4.57	4.19	8.292	8.292

1915	3.52	3.888	8.366	8.37
1916	4.07	4.024	8.376	8.428
1917	3.28	4.052	8.346	8.454
1918	4.05	3.898	8.312	8.488
1919	3.19	3.622	8.27	8.52
1920	4.64	3.846	8.224	8.542
1921	4.33	3.898	8.292	8.584
1922	4.01	4.044	8.37	8.53
1923	3.94	4.022	8.428	8.55
1924	3.67	4.118	8.454	8.548
1925	5.39	4.268	8.488	8.586
1926	3.37	4.076	8.52	8.528
1927	3.5	3.974	8.542	8.606
1928	3.3	3.846	8.584	8.584
1929	3.01	3.714	8.53	8.55
1930	4.55	3.546	8.55	8.548
1931	3.28	3.528	8.548	8.652
1932	5.1	3.848	8.586	8.678
1933	2.72	3.732	8.528	8.726
1934	5.26	4.182	8.606	8.77
1935	4.56	4.184	8.584	8.776
1936	5.36	4.6	8.55	8.756
1937	5.16	4.612	8.548	8.774
1938	5.92	5.252	8.652	8.738
1939	4.63	5.126	8.678	8.72
1940	3.16	4.846	8.726	8.734
1941	1.67	4.108	8.77	8.732
1942	2.09	3.494	8.776	8.68

1943	4.63	3.236	8.756	8.638
1944	4.76	3.262	8.774	8.628
1945	2.94	3.218	8.738	8.596
1946	4.09	3.702	8.72	8.62
1947	3.77	4.038	8.734	8.614
1948	4.78	4.068	8.732	8.666
1949	5.27	4.17	8.68	8.596
1950	3.93	4.368	8.638	8.614
1951	3.99	4.348	8.628	8.594
1952	4.21	4.436	8.596	8.628
1953	4	4.28	8.62	8.618
1954	4.04	4.034	8.614	8.722
1955	3.71	3.99	8.666	8.726
1956	2.45	3.682	8.596	8.744
1957	5.38	3.916	8.614	8.68
1958	3.89	3.894	8.594	8.67
1959	4.3	3.946	8.628	8.63
1960	4.5	4.104	8.618	8.62
1961	5.28	4.67	8.722	8.552
1962	4.54	4.502	8.726	8.59
1963	3.17	4.358	8.744	8.624
1964	4.42	4.382	8.68	8.624
1965	3.35	4.152	8.67	8.584
1966	4.81	4.058	8.63	8.67
1967	4.55	4.06	8.62	8.644
1968	3.58	4.142	8.552	8.652
1969	2.47	3.752	8.59	8.602
1970	4.27	3.936	8.624	8.672

1971	4.37	3.848	8.624	8.62
1972	5.27	3.992	8.584	8.672
1973	4.48	4.172	8.67	8.72
1974	5.45	4.768	8.644	8.884
1975	6.01	5.116	8.652	8.842
1976	2.65	4.772	8.602	8.91
1977	4.43	4.604	8.672	8.902
1978	3.21	4.35	8.62	8.838
1979	4.37	4.134	8.672	8.77
1980	3.41	3.614	8.72	8.84
1981	5.67	4.218	8.884	8.874
1982	4.75	4.282	8.842	8.92
1983	5.65	4.77	8.91	9.034
1984	4.42	4.78	8.902	9.104
1985	3.3	4.758	8.838	9.074
1986	4.19	4.462	8.77	9.008
1987	2.49	4.01	8.84	9.032
1988	4.89	3.858	8.874	9.056
1989	6.63	4.3	8.92	9.028
1990	5.81	4.802	9.034	9.1
1991	5.62	5.088	9.104	9.23
1992	5.36	5.662	9.074	9.28
1993	4.15	5.514	9.008	9.25
1994	4.13	5.014	9.032	9.324
1995	5.88	5.028	9.056	9.398
1996	4.55	4.814	9.028	9.4
1997	4.56	4.654	9.1	9.406
1998	4.47	4.718	9.23	9.506

1999	5.94	5.08	9.28	9.53
2000	5.96	5.096	9.25	9.562
2001	5.32	5.25	9.324	9.542
2002	5.63	5.464	9.398	9.58
2003	4.99	5.568	9.4	9.58
2004	5.32	5.444	9.406	9.578
2005	5.54	5.36	9.506	9.534
2006	4.91	5.278	9.53	9.57
2007	6.43	5.438	9.562	
2008	6.76	5.792	9.542	
2009	5.69	5.866	9.58	
2010	5.91	5.94	9.58	
2011	6.01	6.16	9.578	
2012	5.2	5.914	9.534	
2013	6.8	5.922	9.57	