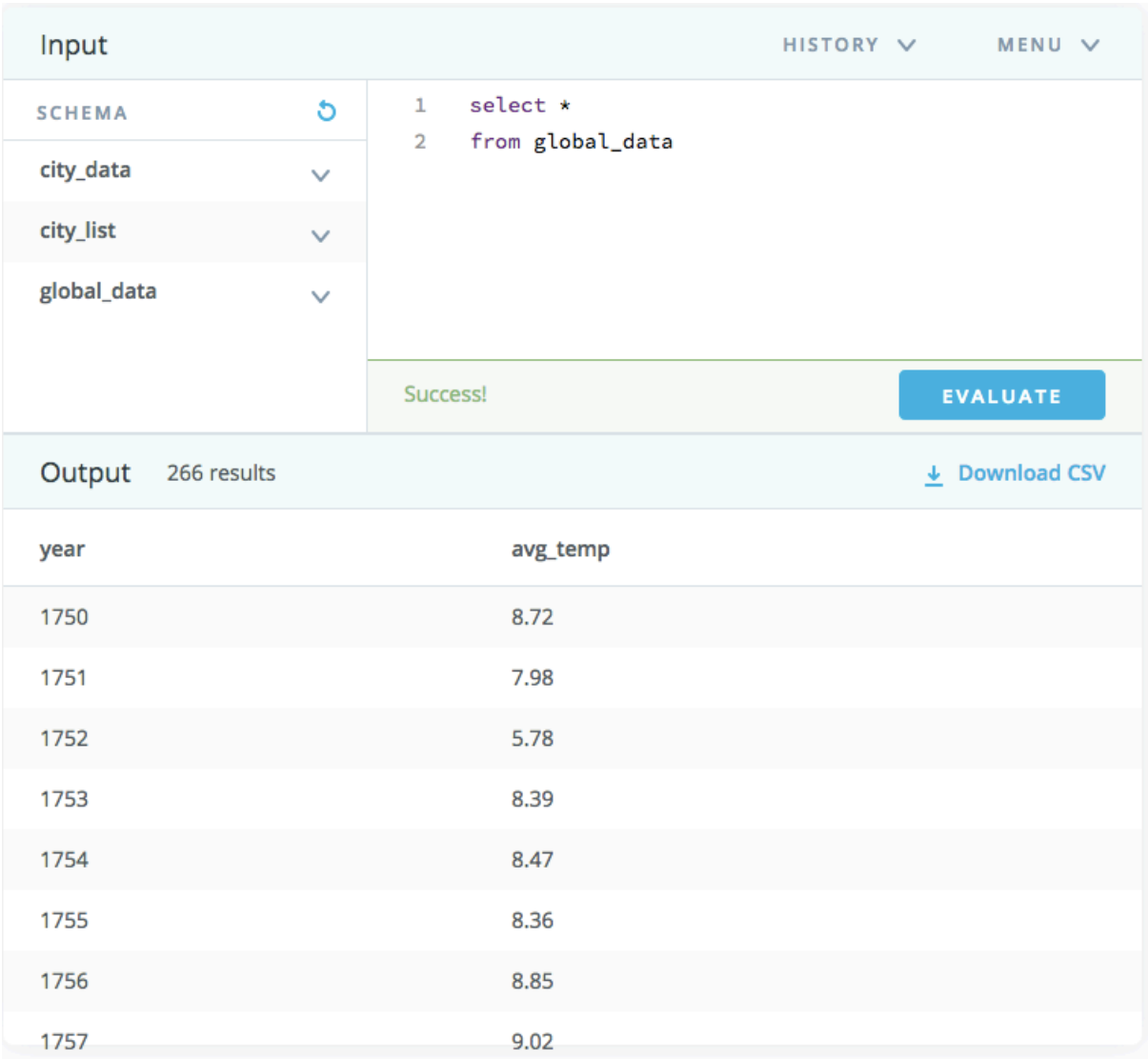
Explore Weather Trends

The first project aiming to extract, manipulate and using weather data, comparing the global temperature with the big nearest city one. For this reason I choose Milan, Italy.
So I started it using Udacity SQL addon, typing the right query to extract and download the interested data (Global and Milan too):



Input HISTORY MENU

SCHEMA

city_data

city_list

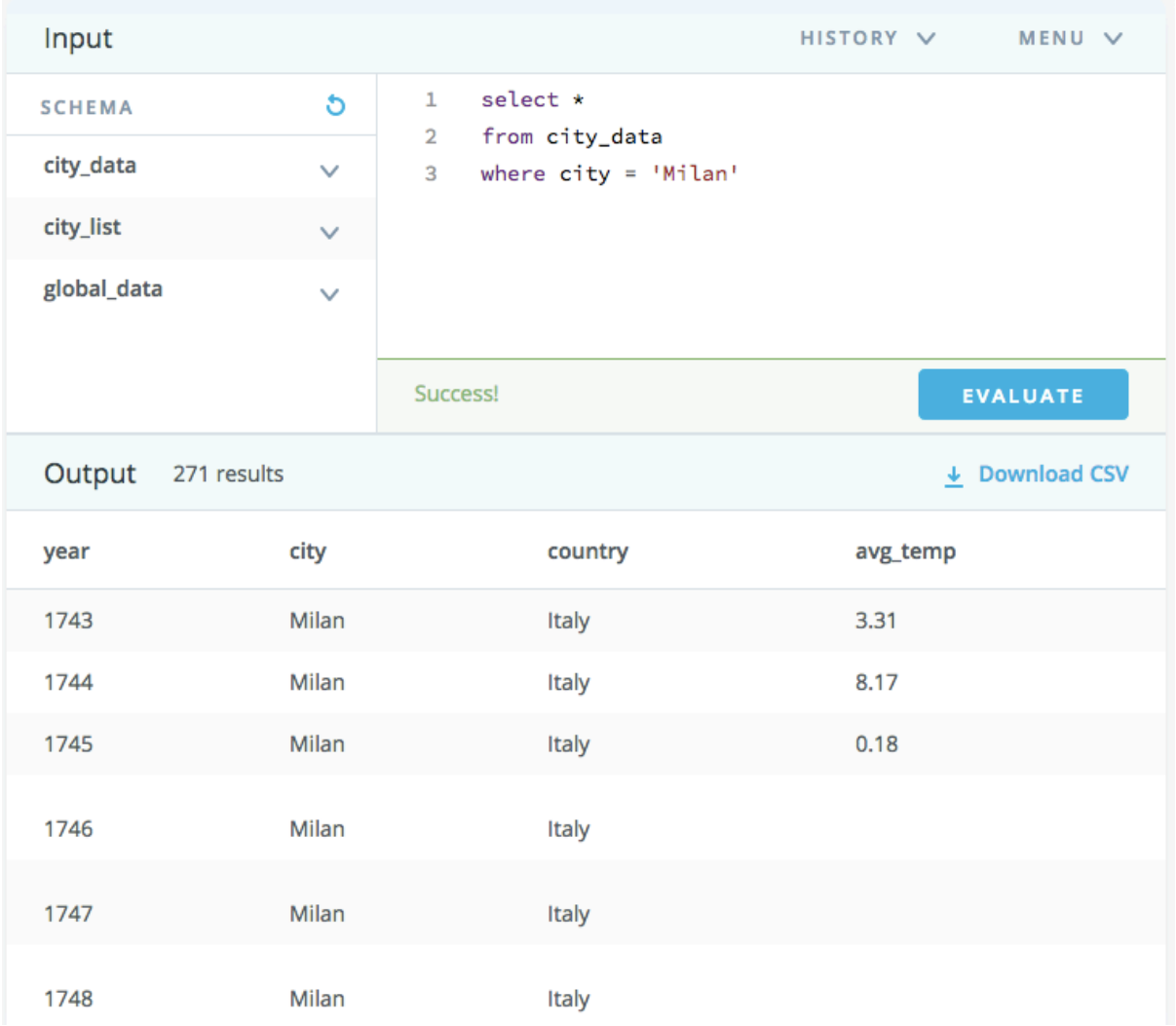
global_data

```
1  select *
2  from global_data
```

Success! EVALUATE

Output 266 results Download CSV

year	avg_temp
1750	8.72
1751	7.98
1752	5.78
1753	8.39
1754	8.47
1755	8.36
1756	8.85
1757	9.02



Downloaded the necessary data I manipulated it using Microsoft Excel, creating firstly a table composed by 4 main columns (Global temperature, Milan temperature, Global average temperature, Milan average temperature) and then plotting 2 different line charts: 1st comparing the overall and 2nd the average temperatures. To fill averages columns in I needed to structure the AVERAGE formula: $\frac{1}{n} * \sum_{i=1}^{n} x_i$ where n indicate the terms number and x is our variable.

Set it up I could create the table below:

GLOBAL		MILAN		GLOBAL AVARAGE TEMP	MILAN AVARAGE TEMP
year	temp	year	temp		
1750	8.72	1750	7.51	\	\
1751	7.98	1751	7.77	8.35	7.64
1752	5.78	1752	2.65	6.88	5.21
1753	8.39	1753	6.83	7.085	4.74
1754	8.47	1754	6.53	8.43	6.68
1755	8.36	1755	6.27	8.415	6.4
1756	8.85	1756	6.61	8.605	6.44
1757	9.02	1757	6.3	8.935	6.455
1758	6.74	1758	5.97	7.88	6.135
1759	7.99	1759	7.14	7.365	6.555
1760	7.19	1760	7.15	7.59	7.145
1761	8.77	1761	6.99	7.98	7.07
1762	8.61	1762	6.69	8.69	6.84
1763	7.5	1763	6.48	8.055	6.585
1764	8.4	1764	6.93	7.95	6.705
1765	8.25	1765	6.73	8.325	6.83
1766	8.41	1766	6.54	8.33	6.635
1767	8.22	1767	6.15	8.315	6.345
1768	6.78	1768	6.23	7.5	6.19
1769	7.69	1769	6.67	7.235	6.45
1770	7.69	1770	6.56	7.69	6.615
1771	7.85	1771	6.79	7.77	6.675
1772	8.19	1772	8.13	8.02	7.46
1773	8.22	1773	6.65	8.205	7.39
1774	8.77	1774	6.57	8.495	6.61
1775	9.18	1775	7.18	8.975	6.875
1776	8.3	1776	6.62	8.74	6.9
1777	8.26	1777	6.33	8.28	6.475
1778	8.54	1778	7.16	8.4	6.745
1779	8.98	1779	7.55	8.76	7.355
1780	9.43	1780	7.09	9.205	7.32
1781	8.1	1781	7.57	8.765	7.33
1782	7.9	1782	6.11	8	6.84
1783	7.68	1783	7.27	7.79	6.69
1784	7.86	1784	6.26	7.77	6.765
1785	7.36	1785	6.26	7.61	6.26

1786	8.26	1786	6.34	7.81	6.3
1787	8.03	1787	7.05	8.145	6.695
1788	8.45	1788	7.24	8.24	7.145
1789	8.33	1789	6.28	8.39	6.76
1790	7.98	1790	7.15	8.155	6.715
1791	8.23	1791	7.3	8.105	7.225
1792	8.09	1792	6.91	8.16	7.105
1793	8.23	1793	7.08	8.16	6.995
1794	8.53	1794	7.57	8.38	7.325
1795	8.35	1795	6.53	8.44	7.05
1796	8.27	1796	6.79	8.31	6.66
1797	8.51	1797	7.18	8.39	6.985
1798	8.67	1798	6.88	8.59	7.03
1799	8.51	1799	5.65	8.59	6.265
1800	8.48	1800	7.17	8.495	6.41
1801	8.59	1801	7.21	8.535	7.19
1802	8.58	1802	7.53	8.585	7.37
1803	8.5	1803	6.62	8.54	7.075
1804	8.84	1804	7.08	8.67	6.85
1805	8.56	1805	5.5	8.7	6.29
1806	8.43	1806	7.2	8.495	6.35
1807	8.28	1807	6.95	8.355	7.075
1808	7.63	1808	5.57	7.955	6.26
1809	7.08	1809	6.36	7.355	5.965
1810	6.92	1810	6.59	7	6.475
1811	6.86	1811	7.59	6.89	7.09
1812	7.05	1812	5.42	6.955	6.505
1813	7.74	1813	6.27	7.395	5.845
1814	7.59	1814	5.57	7.665	5.92
1815	7.24	1815	6.45	7.415	6.01
1816	6.94	1816	5.2	7.09	5.825
1817	6.98	1817	6.51	6.96	5.855
1818	7.83	1818	6.95	7.405	6.73
1819	7.37	1819	7	7.6	6.975
1820	7.62	1820	6.36	7.495	6.68
1821	8.09	1821	6.65	7.855	6.505
1822	8.19	1822	8.01	8.14	7.33
1823	7.72	1823	6.31	7.955	7.16
1824	8.55	1824	6.97	8.135	6.64
1825	8.39	1825	7.28	8.47	7.125
1826	8.36	1826	6.78	8.375	7.03
1827	8.81	1827	6.54	8.585	6.66

1828	8.17	1828	7.43	8.49	6.985
1829	7.94	1829	5.44	8.055	6.435
1830	8.52	1830	6.39	8.23	5.915
1831	7.64	1831	6.83	8.08	6.61
1832	7.45	1832	6.51	7.545	6.67
1833	8.01	1833	6.77	7.73	6.64
1834	8.15	1834	7.59	8.08	7.18
1835	7.39	1835	6.18	7.77	6.885
1836	7.7	1836	6.15	7.545	6.165
1837	7.38	1837	5.81	7.54	5.98
1838	7.51	1838	5.72	7.445	5.765
1839	7.63	1839	6.85	7.57	6.285
1840	7.8	1840	6.19	7.715	6.52
1841	7.69	1841	6.87	7.745	6.53
1842	8.02	1842	6.19	7.855	6.53
1843	8.17	1843	6.44	8.095	6.315
1844	7.65	1844	6.38	7.91	6.41
1845	7.85	1845	6.19	7.75	6.285
1846	8.55	1846	7.46	8.2	6.825
1847	8.09	1847	6.24	8.32	6.85
1848	7.98	1848	6.46	8.035	6.35
1849	7.98	1849	6.77	7.98	6.615
1850	7.9	1850	5.88	7.94	6.325
1851	8.18	1851	5.85	8.04	5.865
1852	8.1	1852	6.81	8.14	6.33
1853	8.04	1853	5.79	8.07	6.3
1854	8.21	1854	6.36	8.125	6.075
1855	8.11	1855	5.68	8.16	6.02
1856	8	1856	6.52	8.055	6.1
1857	7.76	1857	6.53	7.88	6.525
1858	8.1	1858	5.78	7.93	6.155
1859	8.25	1859	7	8.175	6.39
1860	7.96	1860	5.38	8.105	6.19
1861	7.85	1861	6.81	7.905	6.095
1862	7.56	1862	7.28	7.705	7.045
1863	8.11	1863	7.32	7.835	7.3
1864	7.98	1864	5.99	8.045	6.655
1865	8.18	1865	6.99	8.08	6.49
1866	8.29	1866	7.05	8.235	7.02
1867	8.44	1867	6.8	8.365	6.925
1868	8.25	1868	7.21	8.345	7.005
1869	8.43	1869	6.61	8.34	6.91

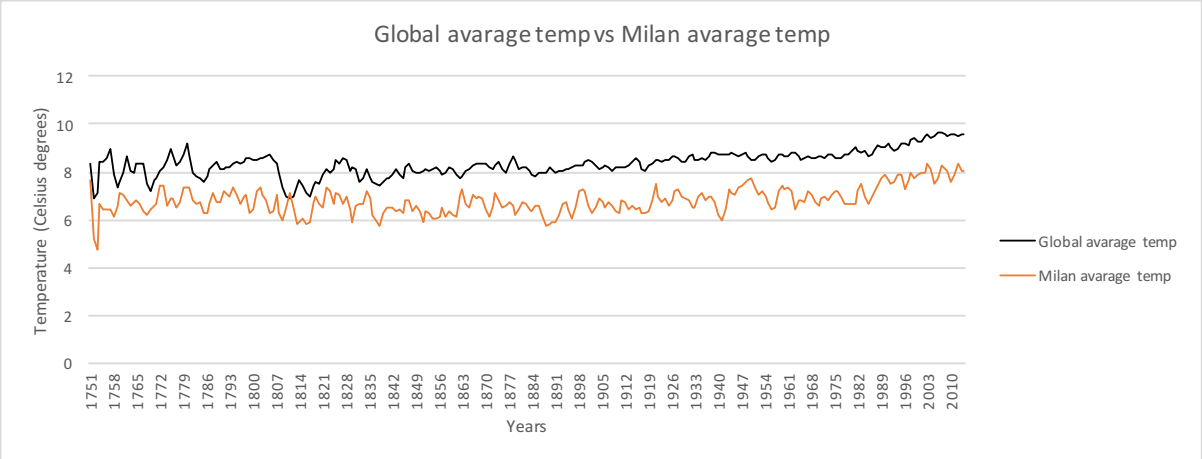
1870	8.2	1870	6.19	8.315	6.4
1871	8.12	1871	5.98	8.16	6.085
1872	8.19	1872	7.14	8.155	6.56
1873	8.35	1873	7.13	8.27	7.135
1874	8.43	1874	6.52	8.39	6.825
1875	7.86	1875	6.45	8.145	6.485
1876	8.08	1876	6.65	7.97	6.55
1877	8.54	1877	6.79	8.31	6.72
1878	8.83	1878	6.42	8.685	6.605
1879	8.17	1879	5.91	8.5	6.165
1880	8.12	1880	6.97	8.145	6.44
1881	8.27	1881	6.47	8.195	6.72
1882	8.13	1882	6.78	8.2	6.625
1883	7.98	1883	6.05	8.055	6.415
1884	7.77	1884	6.59	7.875	6.32
1885	7.92	1885	6.56	7.845	6.575
1886	7.95	1886	6.55	7.935	6.555
1887	7.91	1887	5.64	7.93	6.095
1888	8.09	1888	5.79	8	5.715
1889	8.32	1889	5.81	8.205	5.8
1890	7.97	1890	5.92	8.145	5.865
1891	8.02	1891	5.92	7.995	5.92
1892	8.07	1892	6.5	8.045	6.21
1893	8.06	1893	6.82	8.065	6.66
1894	8.16	1894	6.69	8.11	6.755
1895	8.15	1895	6.19	8.155	6.44
1896	8.21	1896	5.97	8.18	6.08
1897	8.29	1897	7.04	8.25	6.505
1898	8.18	1898	7.36	8.235	7.2
1899	8.4	1899	7.24	8.29	7.3
1900	8.5	1900	7.13	8.45	7.185
1901	8.54	1901	6.04	8.52	6.585
1902	8.3	1902	6.52	8.42	6.28
1903	8.22	1903	6.55	8.26	6.535
1904	8.09	1904	7.27	8.155	6.91
1905	8.23	1905	6.27	8.16	6.77
1906	8.38	1906	6.72	8.305	6.495
1907	7.95	1907	6.68	8.165	6.7
1908	8.19	1908	6.52	8.07	6.6
1909	8.18	1909	6.12	8.185	6.32
1910	8.22	1910	6.42	8.2	6.27
1911	8.18	1911	7.28	8.2	6.85

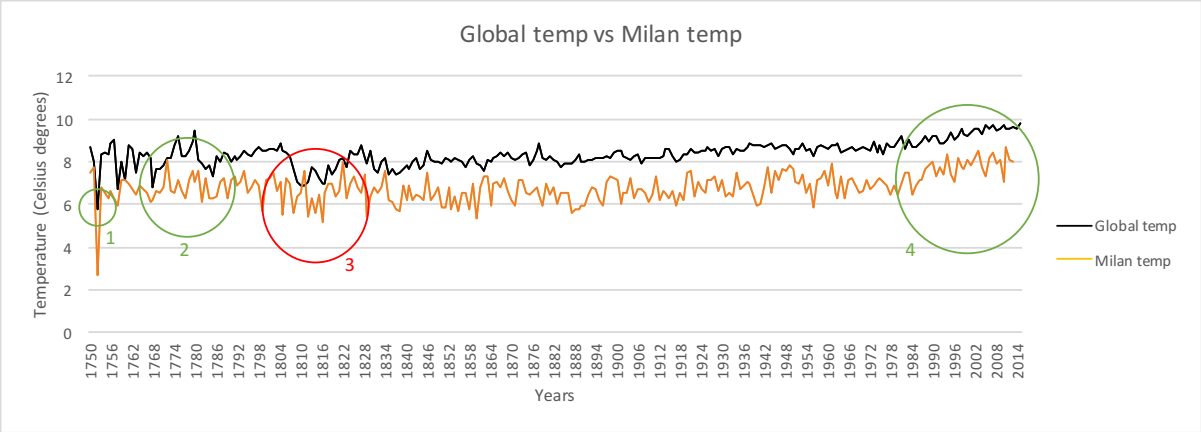
1912	8.17	1912	6.22	8.175	6.75
1913	8.3	1913	6.67	8.235	6.445
1914	8.59	1914	6.55	8.445	6.61
1915	8.59	1915	6.3	8.59	6.425
1916	8.23	1916	6.64	8.41	6.47
1917	8.02	1917	5.97	8.125	6.305
1918	8.13	1918	6.58	8.075	6.275
1919	8.38	1919	6.2	8.255	6.39
1920	8.36	1920	7.46	8.37	6.83
1921	8.57	1921	7.61	8.465	7.535
1922	8.41	1922	6.38	8.49	6.995
1923	8.42	1923	7.1	8.415	6.74
1924	8.51	1924	6.69	8.465	6.895
1925	8.53	1925	6.51	8.52	6.6
1926	8.73	1926	7.18	8.63	6.845
1927	8.52	1927	7.18	8.625	7.18
1928	8.63	1928	7.32	8.575	7.25
1929	8.24	1929	6.61	8.435	6.965
1930	8.63	1930	7.17	8.435	6.89
1931	8.72	1931	6.39	8.675	6.78
1932	8.71	1932	6.58	8.715	6.485
1933	8.34	1933	6.4	8.525	6.49
1934	8.63	1934	7.47	8.485	6.935
1935	8.52	1935	6.71	8.575	7.09
1936	8.55	1936	6.92	8.535	6.815
1937	8.7	1937	7.07	8.625	6.995
1938	8.86	1938	6.94	8.78	7.005
1939	8.76	1939	6.5	8.81	6.72
1940	8.76	1940	5.95	8.76	6.225
1941	8.77	1941	6.01	8.765	5.98
1942	8.73	1942	6.84	8.75	6.425
1943	8.76	1943	7.77	8.745	7.305
1944	8.85	1944	6.54	8.805	7.155
1945	8.58	1945	7.55	8.715	7.045
1946	8.68	1946	7.18	8.63	7.365
1947	8.8	1947	7.68	8.74	7.43
1948	8.75	1948	7.55	8.775	7.615
1949	8.59	1949	7.83	8.67	7.69
1950	8.37	1950	7.63	8.48	7.73
1951	8.63	1951	7.1	8.5	7.365
1952	8.64	1952	6.94	8.635	7.02
1953	8.87	1953	7.41	8.755	7.175

1954	8.56	1954	6.52	8.715	6.965
1955	8.63	1955	6.99	8.595	6.755
1956	8.28	1956	5.88	8.455	6.435
1957	8.73	1957	7.14	8.505	6.51
1958	8.77	1958	7.21	8.75	7.175
1959	8.73	1959	7.61	8.75	7.41
1960	8.58	1960	6.87	8.655	7.24
1961	8.8	1961	7.9	8.69	7.385
1962	8.75	1962	6.57	8.775	7.235
1963	8.86	1963	6.27	8.805	6.42
1964	8.41	1964	7.31	8.635	6.79
1965	8.53	1965	6.32	8.47	6.815
1966	8.6	1966	7.18	8.565	6.75
1967	8.7	1967	7.26	8.65	7.22
1968	8.52	1968	6.89	8.61	7.075
1969	8.6	1969	6.55	8.56	6.72
1970	8.7	1970	6.63	8.65	6.59
1971	8.6	1971	7.15	8.65	6.89
1972	8.5	1972	6.73	8.55	6.94
1973	8.95	1973	6.91	8.725	6.82
1974	8.47	1974	7.14	8.71	7.025
1975	8.74	1975	7.26	8.605	7.2
1976	8.35	1976	7.08	8.545	7.17
1977	8.85	1977	6.85	8.6	6.965
1978	8.69	1978	6.43	8.77	6.64
1979	8.73	1979	6.87	8.71	6.65
1980	8.98	1980	6.43	8.855	6.65
1981	9.17	1981	6.95	9.075	6.69
1982	8.64	1982	7.49	8.905	7.22
1983	9.03	1983	7.49	8.835	7.49
1984	8.69	1984	6.49	8.86	6.99
1985	8.66	1985	6.87	8.675	6.68
1986	8.83	1986	7.12	8.745	6.995
1987	8.99	1987	7.19	8.91	7.155
1988	9.2	1988	7.65	9.095	7.42
1989	8.92	1989	7.86	9.06	7.755
1990	9.23	1990	7.97	9.075	7.915
1991	9.18	1991	7.28	9.205	7.625
1992	8.84	1992	7.76	9.01	7.52
1993	8.87	1993	7.43	8.855	7.595
1994	9.04	1994	8.39	8.955	7.91
1995	9.35	1995	7.43	9.195	7.91

1996	9.04	1996	7.06	9.195	7.245
1997	9.2	1997	8.18	9.12	7.62
1998	9.52	1998	7.77	9.36	7.975
1999	9.29	1999	7.64	9.405	7.705
2000	9.2	2000	8.13	9.245	7.885
2001	9.41	2001	7.83	9.305	7.98
2002	9.57	2002	8.15	9.49	7.99
2003	9.53	2003	8.55	9.55	8.35
2004	9.32	2004	7.74	9.425	8.145
2005	9.7	2005	7.33	9.51	7.535
2006	9.53	2006	8.15	9.615	7.74
2007	9.73	2007	8.4	9.63	8.275
2008	9.43	2008	7.91	9.58	8.155
2009	9.51	2009	8.11	9.47	8.01
2010	9.7	2010	7.05	9.605	7.58
2011	9.52	2011	8.68	9.61	7.865
2012	9.51	2012	8.05	9.515	8.365
2013	9.61	2013	8.04	9.56	8.045
2014	9.57	2014		9.59	8.04

Using all necessary data, I could use the Excel plotting add-on to draw and view the trends, average and overall. My keys considerations were about similarities and differences involved during the trend chart, analysing so up and down trend.





Using the overall chart, I could detect some similarities and differences, selecting 4 of them:

1) Between 1750 and 1756 we can describe an abrupt temperature decline which involved both our charts, Global and Milan one;
2) Another similarity is located between 1768 and 1780 we observe a rush temperature increment followed by both variables: even if Global one settles an higher level, we could look at the same temp rise of Milan too;
3) During 1804-1820 we can notice an opposite temperature trend between the variables and particularly on 1810 where Global was decreasing too much and instead the Milan was increasing its level, reaching almost the its maximum record;
4) At last I identified a strictly and continuous temperatures upper trend which involved both our variables, indicating the possibility to get hotter than past.

Finally, I can write general considerations about the temperatures trends. First thing I would like to underline is that Milan temperature is cooler than Global one and not just during last few years, but we could analyse it keeping in consideration the whole study period. Both trend definitely have followed the same cycle and what can I suppose looking the chart is the continuous temperature increment which taking the world to get warmer, also because of greenhouse effect and global warming.