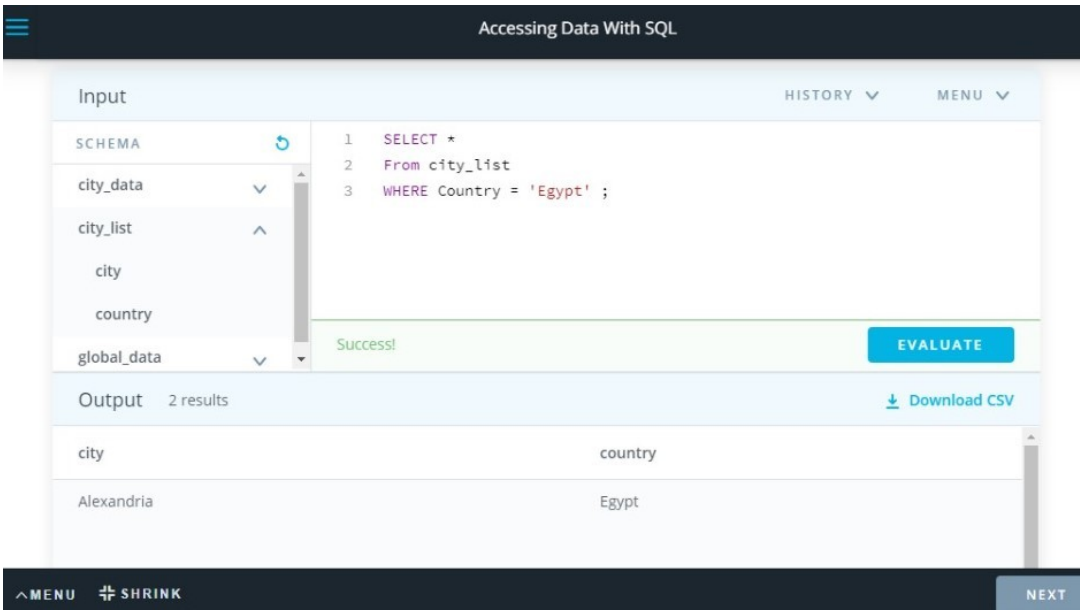
First Project – (Explore Weather Trends)

Steps:

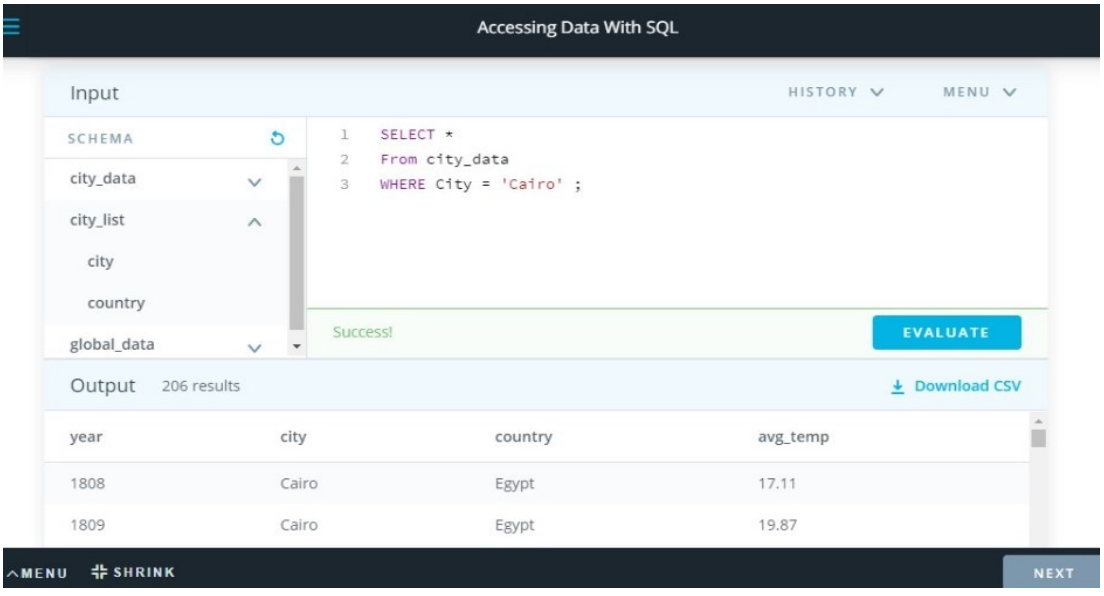
1- Extract data:

a- The closest big city to me is "Cairo" in Egypt, so I write a SQL query to search about it by:



As we see there are two cities in the results Cairo and Alexandria, Cairo is closer to me than Alex.

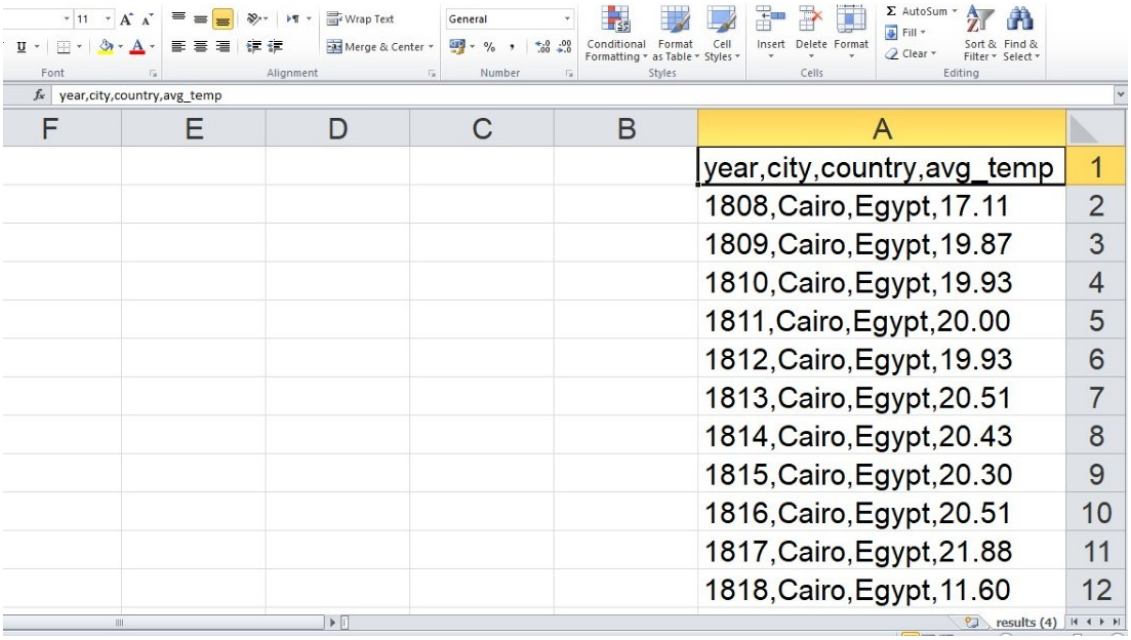
b- Then, I write a SQL query to get the data of Cairo by



As we see this is the data of Cairo, press the bottom of Download CSV.

2- Open CSV file using Excel, and Download my city data:

a- When I Open the data, there is a problem that faces me, all the data are in one column like that:

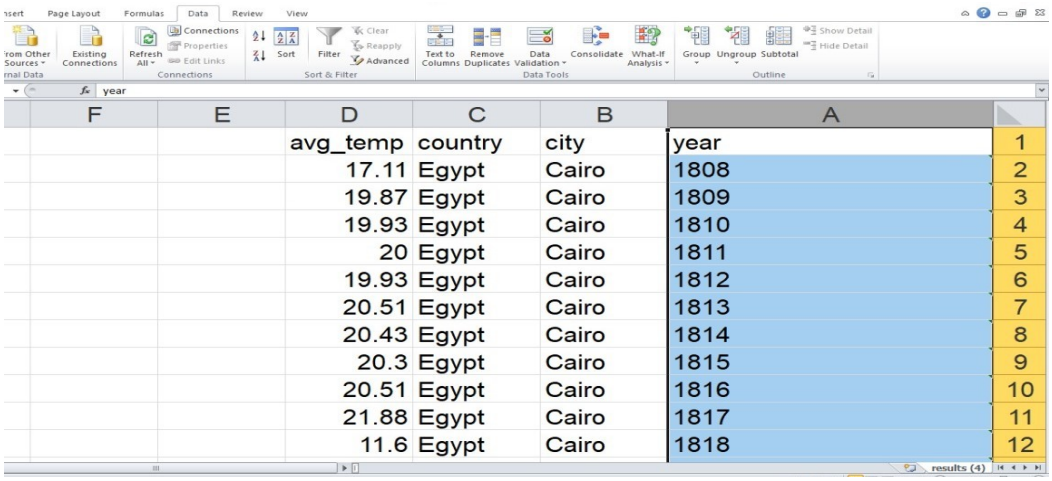


	A
1	year,city,country,avg_temp
2	1808,Cairo,Egypt,17.11
3	1809,Cairo,Egypt,19.87
4	1810,Cairo,Egypt,19.93
5	1811,Cairo,Egypt,20.00
6	1812,Cairo,Egypt,19.93
7	1813,Cairo,Egypt,20.51
8	1814,Cairo,Egypt,20.43
9	1815,Cairo,Egypt,20.30
10	1816,Cairo,Egypt,20.51
11	1817,Cairo,Egypt,21.88
12	1818,Cairo,Egypt,11.60

I Google it "comma separated values in excel" and I found the solution.

1- Highlight the column that contains your list.
2- Go to Data > Text to Columns.
3- Choose Delimited. Click Next.
4- Choose Comma. Click Next.
5- Choose General or Text, whichever you prefer.
6- Leave Destination as is, or choose another column. Click Finish.

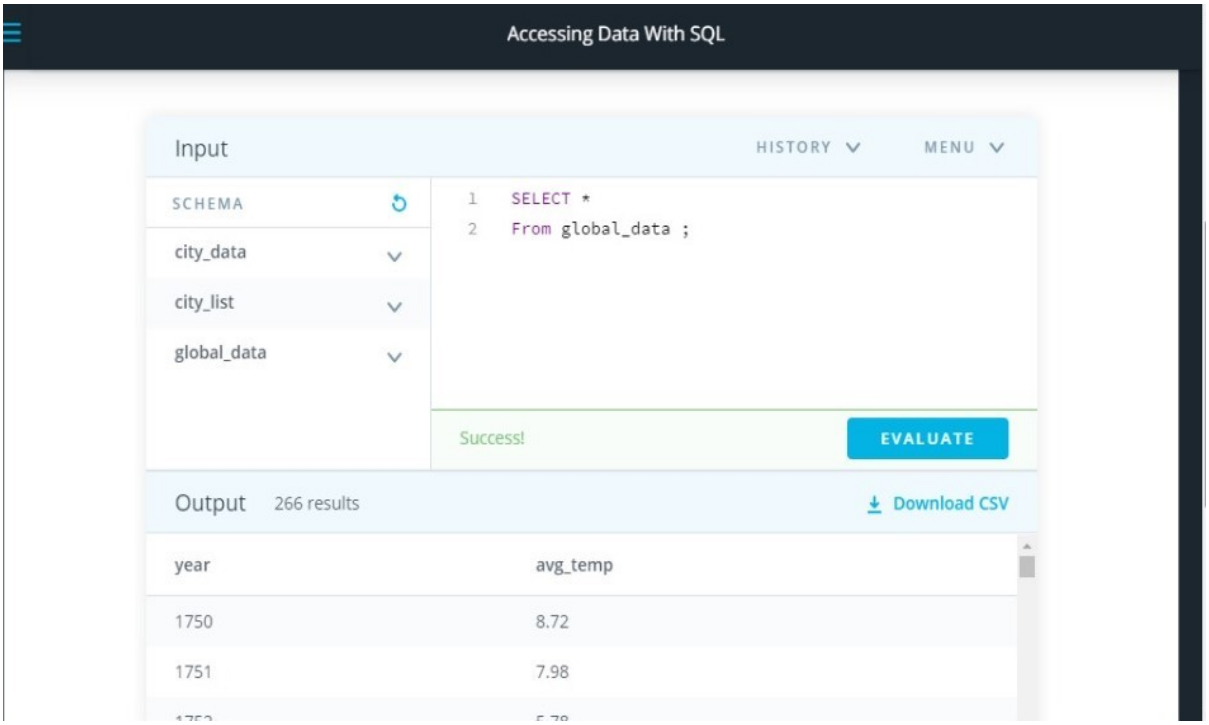
Solve:

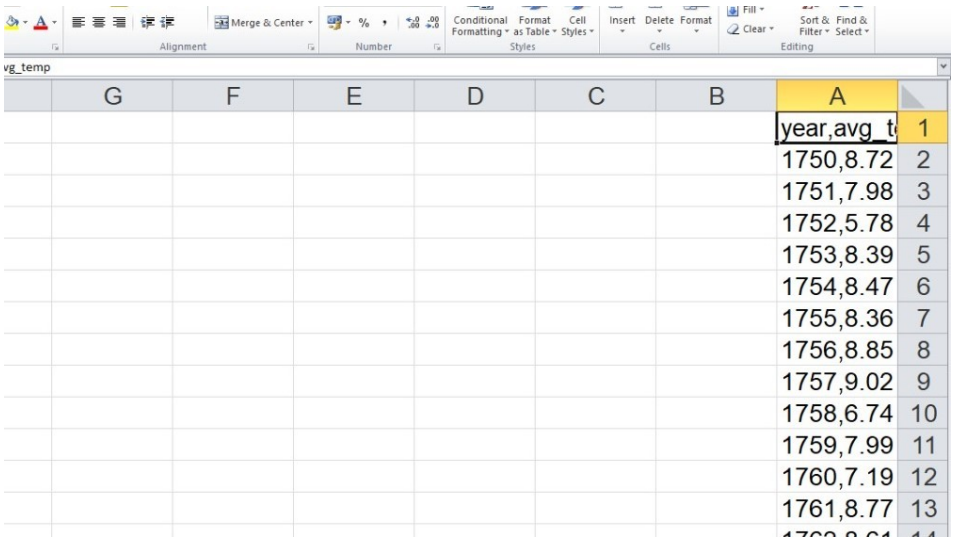


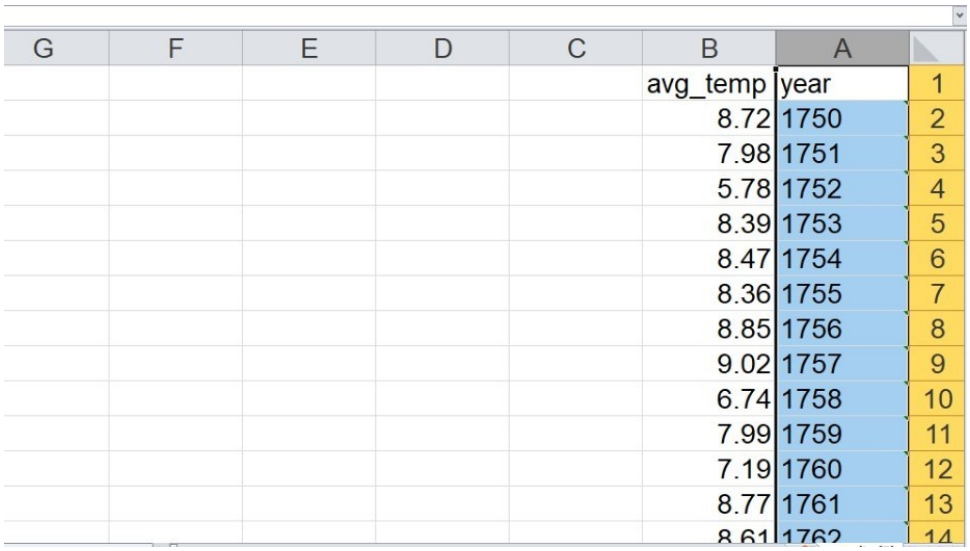
	A	B	C	D
1	year	city	country	avg_temp
2	1808	Cairo	Egypt	17.11
3	1809	Cairo	Egypt	19.87
4	1810	Cairo	Egypt	19.93
5	1811	Cairo	Egypt	20
6	1812	Cairo	Egypt	19.93
7	1813	Cairo	Egypt	20.51
8	1814	Cairo	Egypt	20.43
9	1815	Cairo	Egypt	20.3
10	1816	Cairo	Egypt	20.51
11	1817	Cairo	Egypt	21.88
12	1818	Cairo	Egypt	11.6

Now we have data of Cairo, in next steps we will download the global temperatures.

3- Write a SQL query to extract the global data, and then download it by the same previous steps:



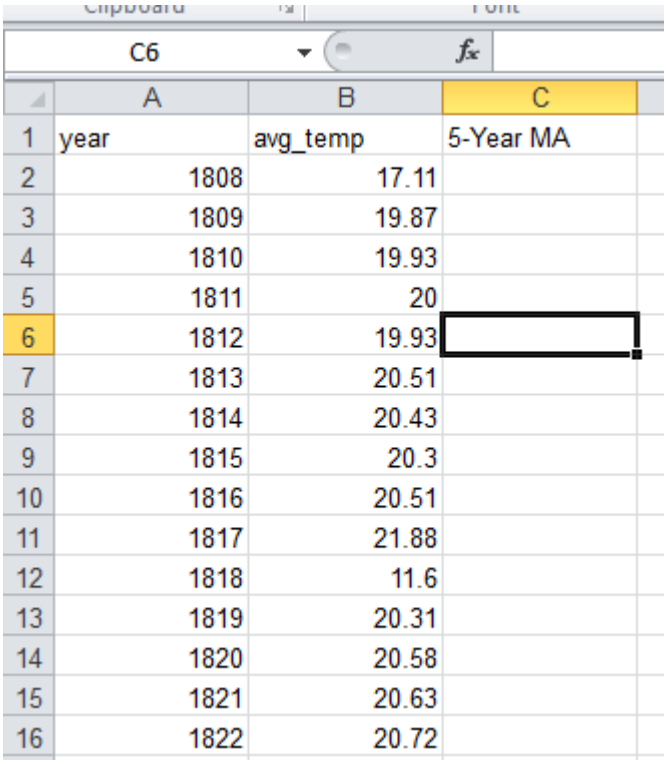




	A	B	C	D	E	F	G
1	year	avg_temp					
2	1750	8.72					
3	1751	7.98					
4	1752	5.78					
5	1753	8.39					
6	1754	8.47					
7	1755	8.36					
8	1756	8.85					
9	1757	9.02					
10	1758	6.74					
11	1759	7.99					
12	1760	7.19					
13	1761	8.77					
14	1762	8.61					

4- I calculate moving average of temperatures globally and in my city by:

a- Calculate 5-Year moving average of Cairo and Global temp, Steps as shown below:



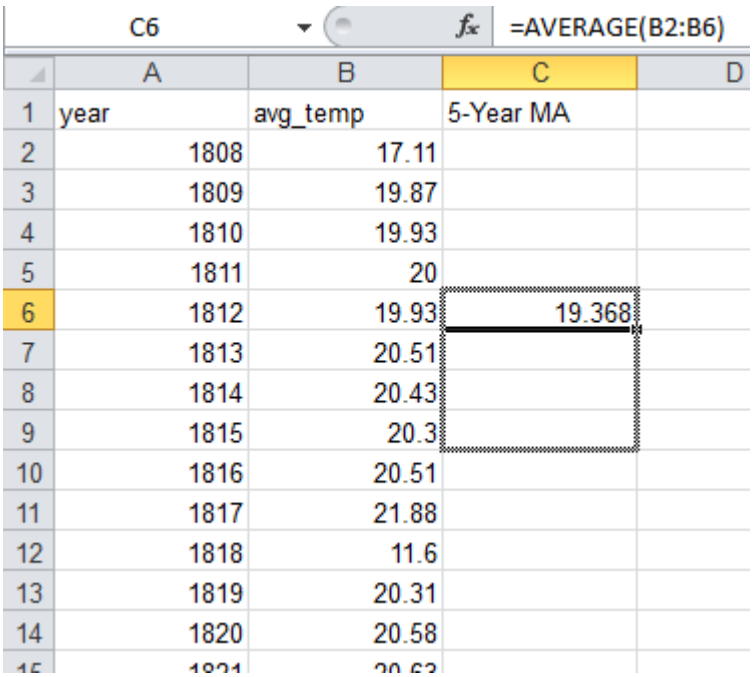
C6

	A	B	C
1	year	avg_temp	5-Year MA
2	1808	17.11	
3	1809	19.87	
4	1810	19.93	
5	1811	20	
6	1812	19.93	
7	1813	20.51	
8	1814	20.43	
9	1815	20.3	
10	1816	20.51	
11	1817	21.88	
12	1818	11.6	
13	1819	20.31	
14	1820	20.58	
15	1821	20.63	
16	1822	20.72	

1- Name a new column as "5-Year MA", then select C6 cell and write our function "=AVERAGE (B2:B6)", then press Enter.

2- Select C6 again and you can use Copy + Paste, Ctrl + D, or click and drag the formula down to the next cell. If you look at the new formula, you'll see

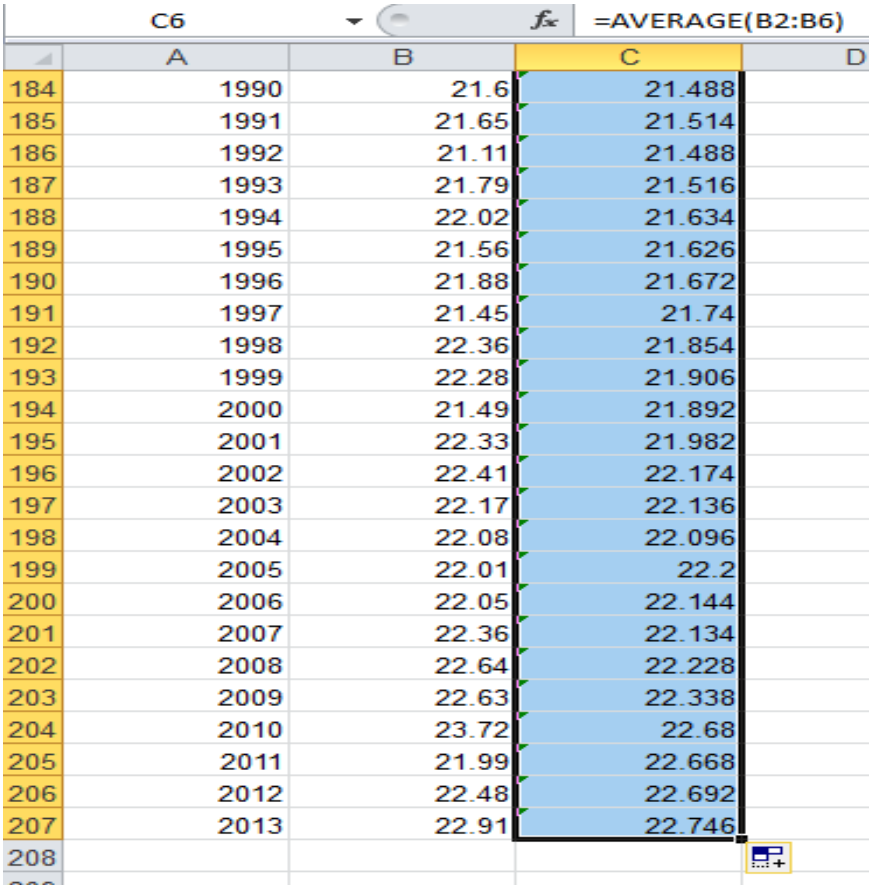
that now it calculates the average years for the second through five years.



C6 =AVERAGE(B2:B6)

	A	B	C	D
1	year	avg_temp	5-Year MA	
2	1808	17.11		
3	1809	19.87		
4	1810	19.93		
5	1811	20		
6	1812	19.93	19.368	
7	1813	20.51		
8	1814	20.43		
9	1815	20.3		
10	1816	20.51		
11	1817	21.88		
12	1818	11.6		
13	1819	20.31		
14	1820	20.58		

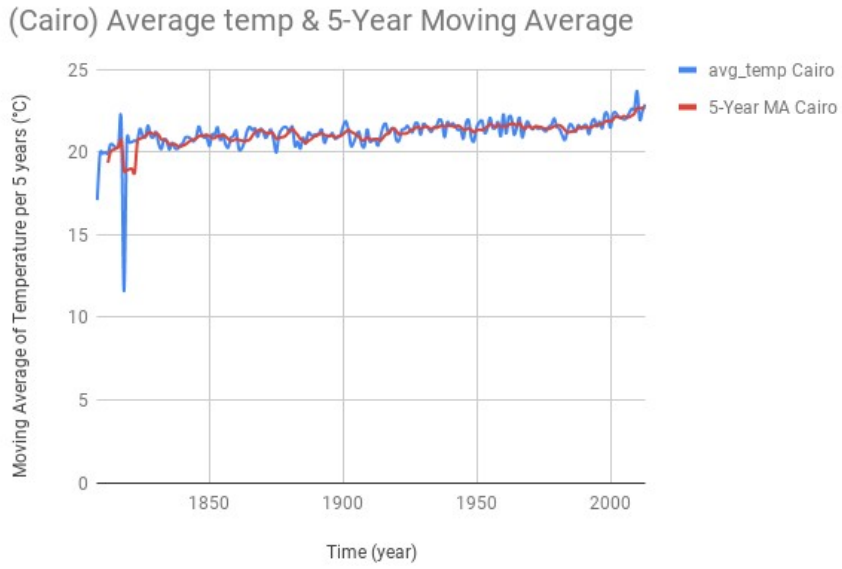
3- Then the result is



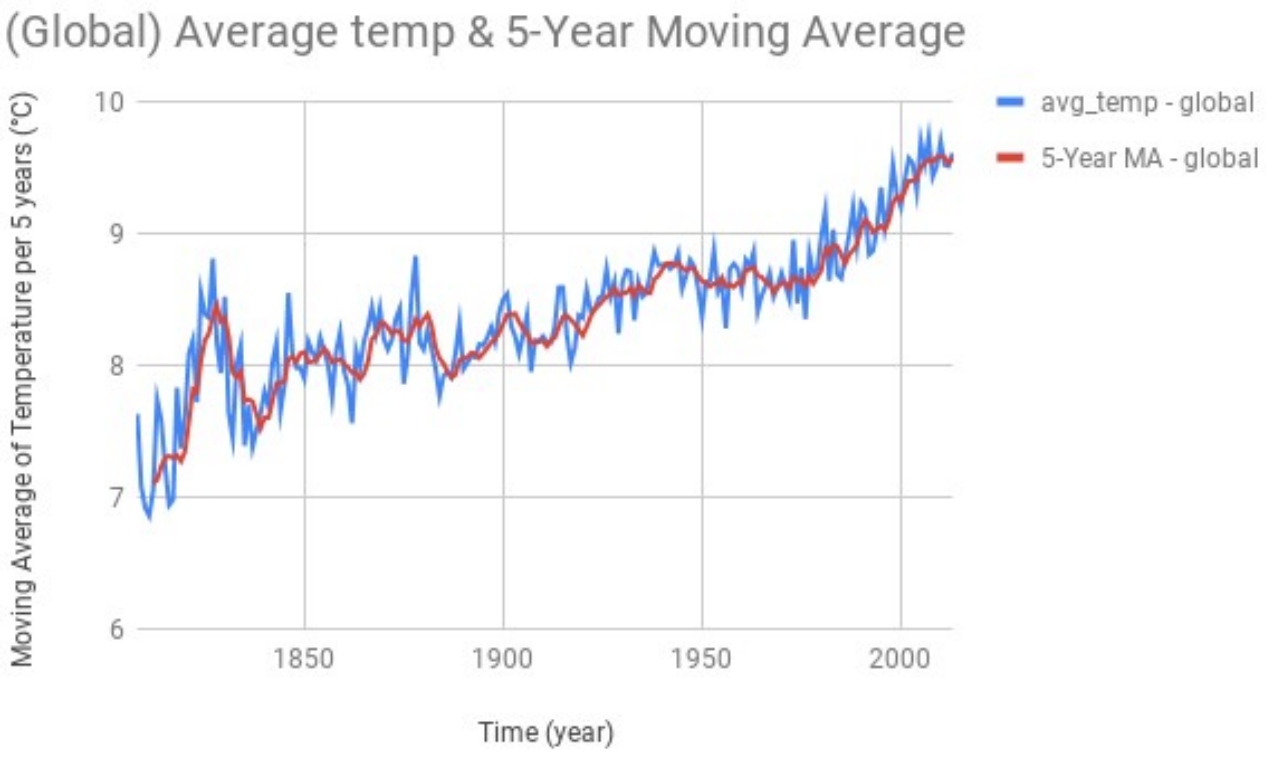
C6 =AVERAGE(B2:B6)

	A	B	C	D
184	1990	21.6	21.488	
185	1991	21.65	21.514	
186	1992	21.11	21.488	
187	1993	21.79	21.516	
188	1994	22.02	21.634	
189	1995	21.56	21.626	
190	1996	21.88	21.672	
191	1997	21.45	21.74	
192	1998	22.36	21.854	
193	1999	22.28	21.906	
194	2000	21.49	21.892	
195	2001	22.33	21.982	
196	2002	22.41	22.174	
197	2003	22.17	22.136	
198	2004	22.08	22.096	
199	2005	22.01	22.2	
200	2006	22.05	22.144	
201	2007	22.36	22.134	
202	2008	22.64	22.228	
203	2009	22.63	22.338	
204	2010	23.72	22.68	
205	2011	21.99	22.668	
206	2012	22.48	22.692	
207	2013	22.91	22.746	
208				

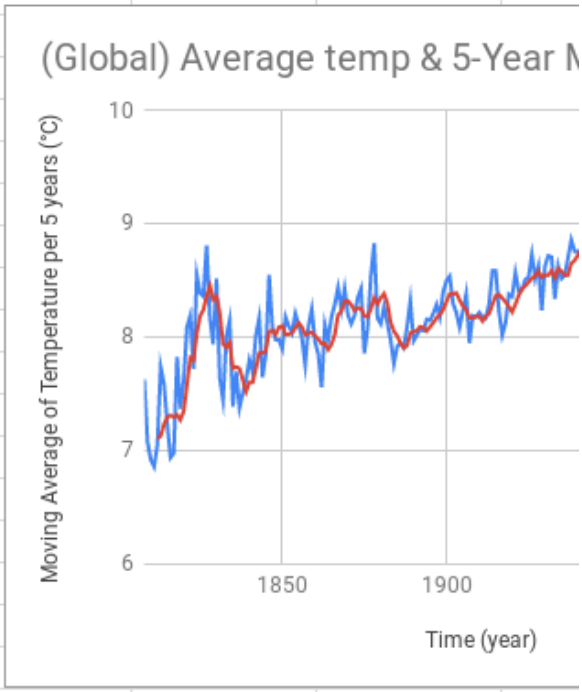
Then make a line chart for Cairo data



4- Exactly as the same previous steps calculate MA of Global Temp and the results are:



year - global	avg_temp - global	5-Year MA - global
1808	7,63	
1809	7,08	
1810	6,92	
1811	6,86	
1812	7,05	7,108
1813	7,74	7,13
1814	7,59	7,232
1815	7,24	7,296
1816	6,94	7,312
1817	6,98	7,298
1818	7,83	7,316
1819	7,37	7,272
1820	7,62	7,348
1821	8,09	7,578
1822	8,19	7,82
1823	7,72	7,798
1824	8,55	8,034



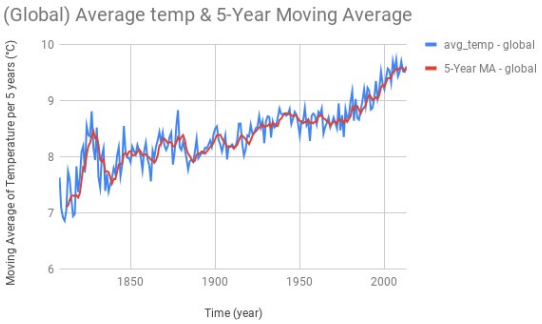
5- To compare the temp Trends in Cairo with the global temp trends:

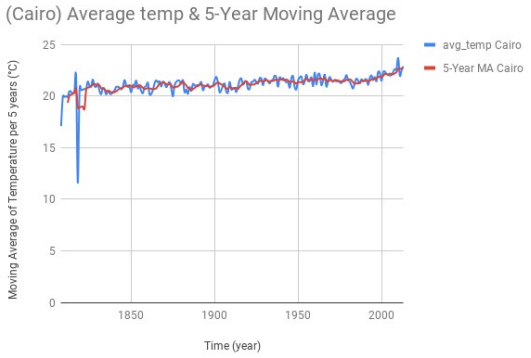
We will create visualization and write up a description of similarities and differences between Global and Cairo Trends.

Observations:

- It is noticeable that Global Trends rise overtime and that the world becomes warmer as there is an increase in temperature.
- Like global trends, my city "Cairo" is getting warmer over time like the whole world is getting warmer too, I

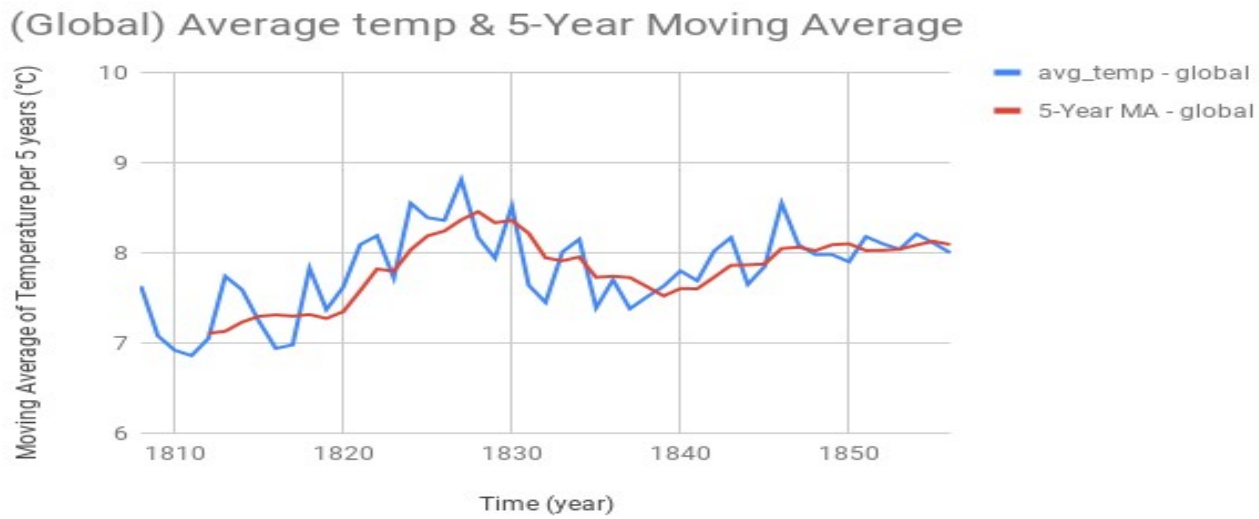
think that is because of the global warming of the planet (Geothermal Heat).





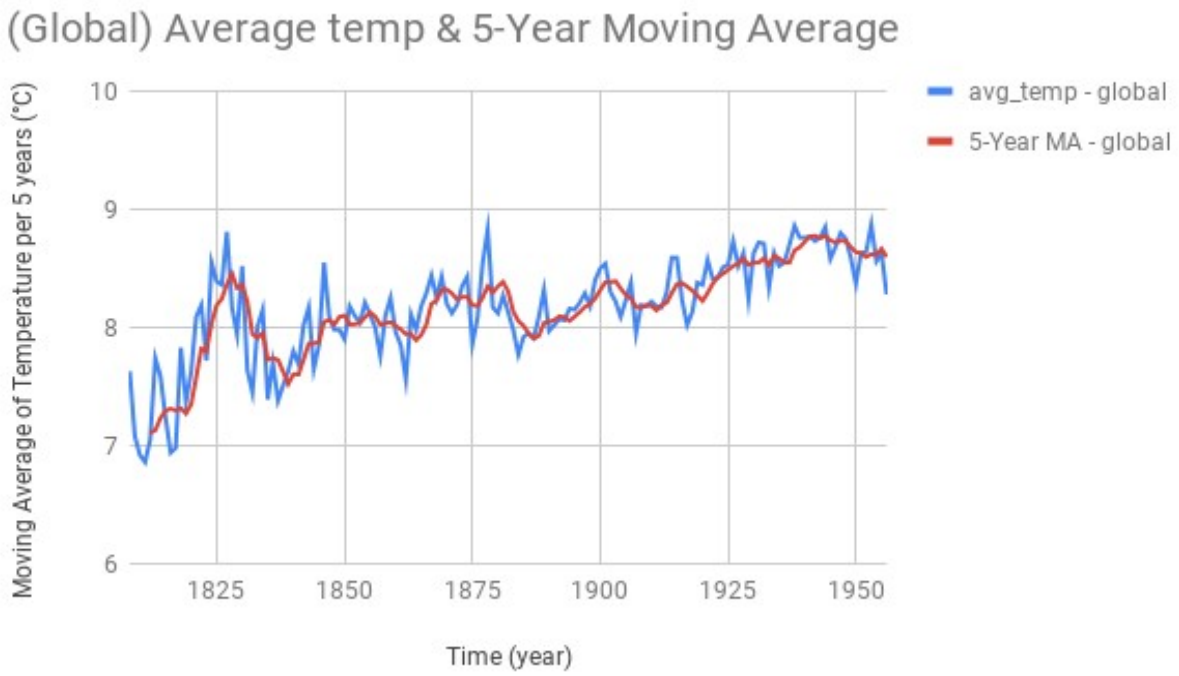
-

But if we look at the statistics of global temperatures, we find that the trend is not only going up and that it also falls and climbs again like before 1830 was the trend going up but fell before 1840.

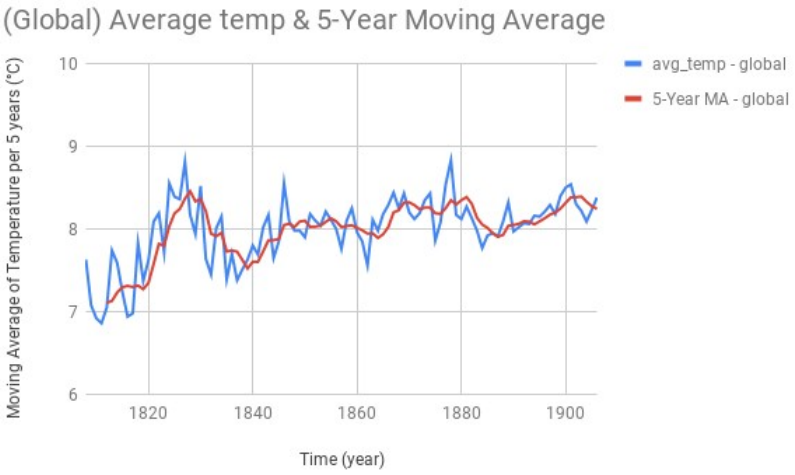


- And then we find that in the beginning of the 1900 the trend was decreasing at the beginning, but not in a

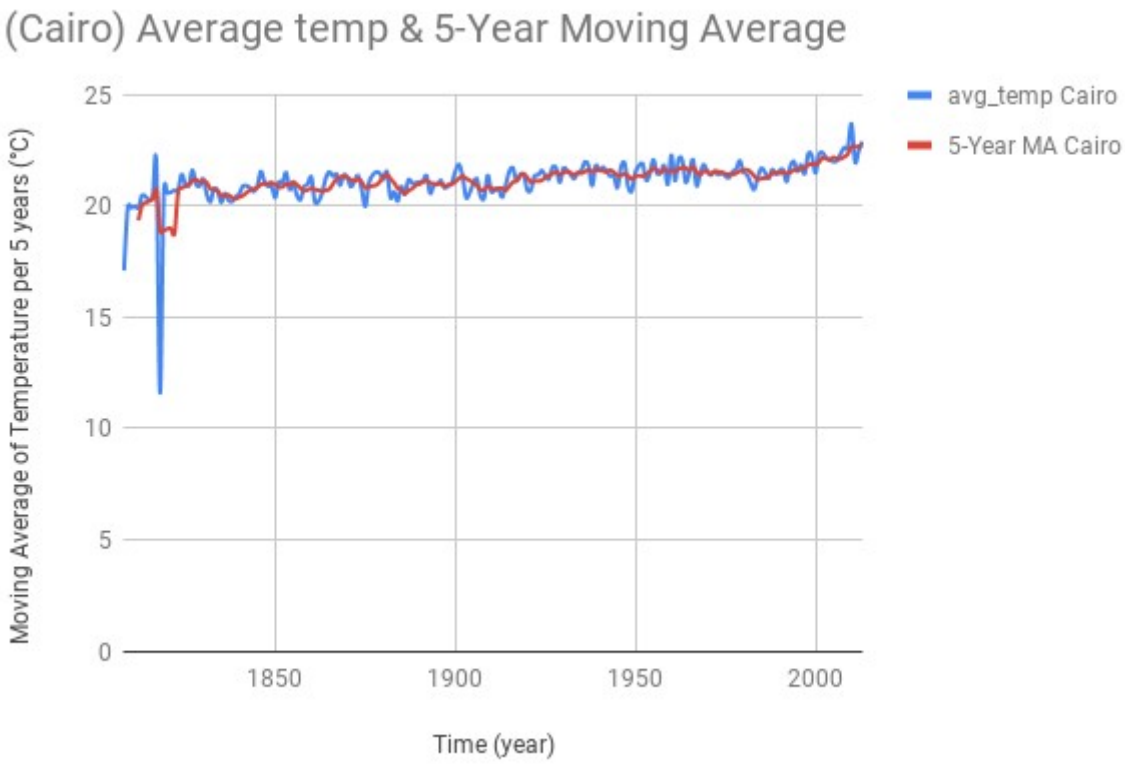
large rate and then returned to rise and continued to up till now.

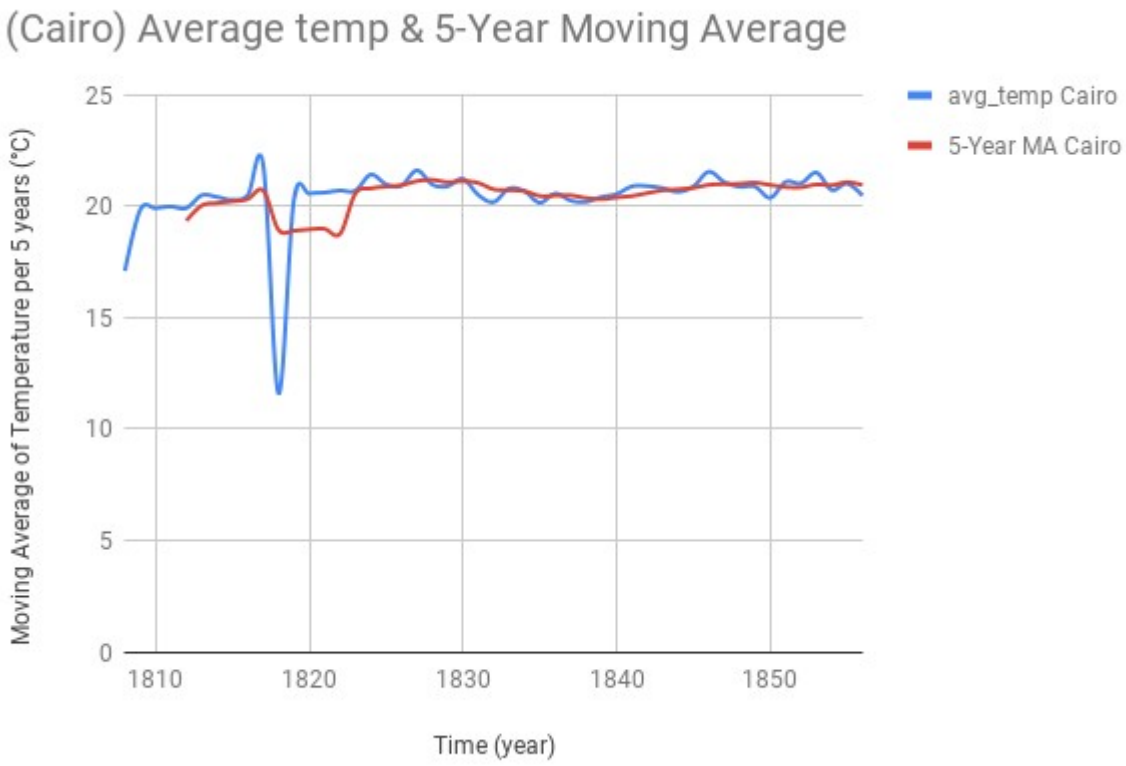


- Temperatures change constantly and quickly and even the moving average sometimes gives false signals to rise or fall as we mentioned before, we must give great importance to analyze data and use them as much as possible. As shown in the chart below, the global trend also dropped with the beginning of 1880 to the mid-term between 1880 and 1900, but it re-rose again with some curvature in the path, but overall the world it was getting hotter.



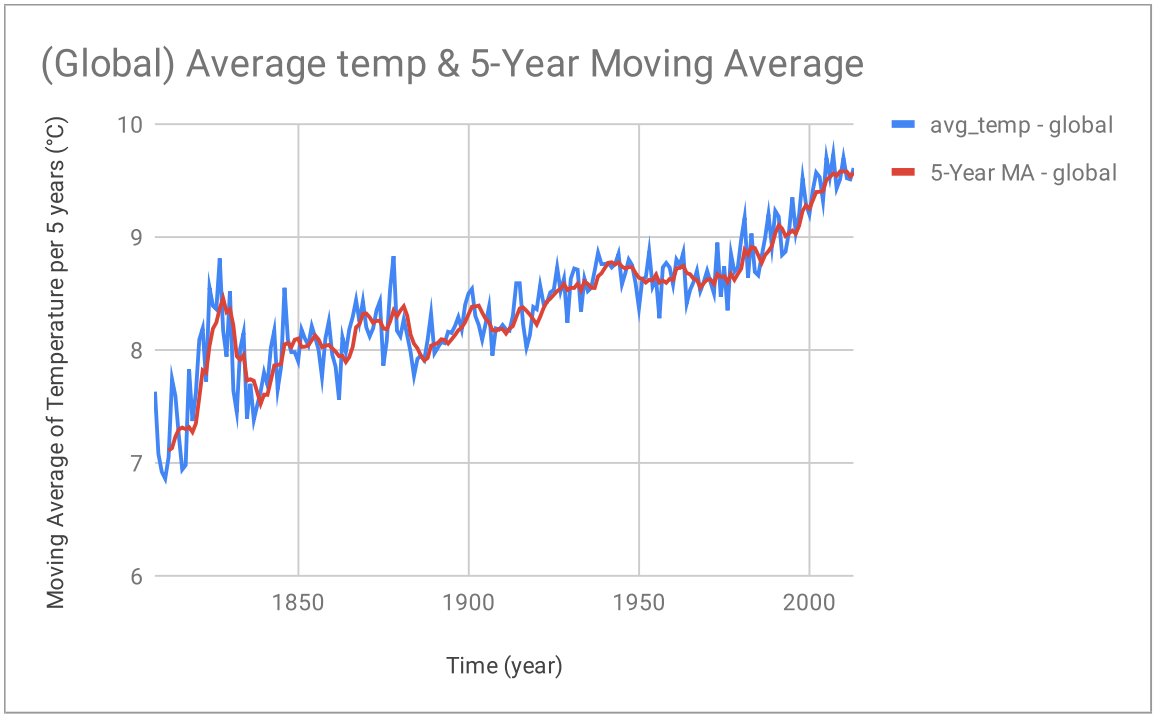
- If we look at the temperature in Cairo it is easily clear that the city is increasing in temperature and the trend is also moving in harmony, but we do not rush to analyze it until we see the values more clearly. From 1820 to 1830 the trend was unstable at the beginning of that decade, but at the end of the decade the balance returned to the trend and continued to this day.




(Cairo) Average temp & 5-Year Moving Average
Moving Average of Temperature per 5 years (°C)
25
20
15
10
5
0
1810
1820
1830
1840
1850
Time (year)
avg_temp Cairo
5-Year MA Cairo

The results:

year - global	avg_temp - global	5-Year MA - global
1808	7.63	
1809	7.08	
1810	6.92	
1811	6.86	
1812	7.05	7.108
1813	7.74	7.13
1814	7.59	7.232
1815	7.24	7.296
1816	6.94	7.312
1817	6.98	7.298
1818	7.83	7.316
1819	7.37	7.272
1820	7.62	7.348
1821	8.09	7.578
1822	8.19	7.82
1823	7.72	7.798
1824	8.55	8.034
1825	8.39	8.188
1826	8.36	8.242
1827	8.81	8.366
1828	8.17	8.456
1829	7.94	8.334
1830	8.52	8.36
1831	7.64	8.216
1832	7.45	7.944
1833	8.01	7.912
1834	8.15	7.954
1835	7.39	7.728
1836	7.7	7.74



1837	7.38	7.726
1838	7.51	7.626
1839	7.63	7.522
1840	7.8	7.604
1841	7.69	7.602
1842	8.02	7.73
1843	8.17	7.862
1844	7.65	7.866
1845	7.85	7.876
1846	8.55	8.048
1847	8.09	8.062
1848	7.98	8.024
1849	7.98	8.09
1850	7.9	8.1
1851	8.18	8.026
1852	8.1	8.028
1853	8.04	8.04
1854	8.21	8.086
1855	8.11	8.128
1856	8	8.092
1857	7.76	8.024
1858	8.1	8.036
1859	8.25	8.044
1860	7.96	8.014
1861	7.85	7.984
1862	7.56	7.944
1863	8.11	7.946
1864	7.98	7.892
1865	8.18	7.936
1866	8.29	8.024

1867	8.44	8.2
1868	8.25	8.228
1869	8.43	8.318
1870	8.2	8.322
1871	8.12	8.288
1872	8.19	8.238
1873	8.35	8.258
1874	8.43	8.258
1875	7.86	8.19
1876	8.08	8.182
1877	8.54	8.252
1878	8.83	8.348
1879	8.17	8.296
1880	8.12	8.348
1881	8.27	8.386
1882	8.13	8.304
1883	7.98	8.134
1884	7.77	8.054
1885	7.92	8.014
1886	7.95	7.95
1887	7.91	7.906
1888	8.09	7.928
1889	8.32	8.038
1890	7.97	8.048
1891	8.02	8.062
1892	8.07	8.094
1893	8.06	8.088
1894	8.16	8.056
1895	8.15	8.092
1896	8.21	8.13

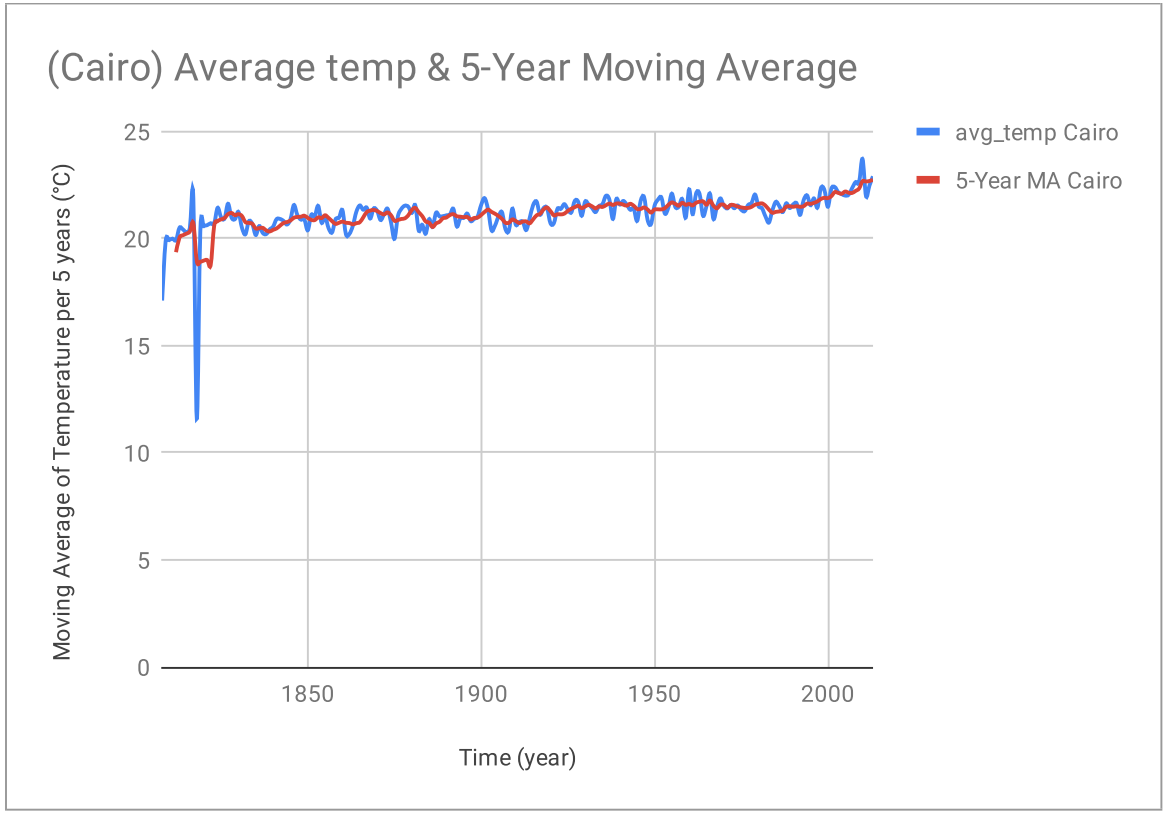
1897	8.29	8.174
1898	8.18	8.198
1899	8.4	8.246
1900	8.5	8.316
1901	8.54	8.382
1902	8.3	8.384
1903	8.22	8.392
1904	8.09	8.33
1905	8.23	8.276
1906	8.38	8.244
1907	7.95	8.174
1908	8.19	8.168
1909	8.18	8.186
1910	8.22	8.184
1911	8.18	8.144
1912	8.17	8.188
1913	8.3	8.21
1914	8.59	8.292
1915	8.59	8.366
1916	8.23	8.376
1917	8.02	8.346
1918	8.13	8.312
1919	8.38	8.27
1920	8.36	8.224
1921	8.57	8.292
1922	8.41	8.37
1923	8.42	8.428
1924	8.51	8.454
1925	8.53	8.488
1926	8.73	8.52

1927	8.52	8.542
1928	8.63	8.584
1929	8.24	8.53
1930	8.63	8.55
1931	8.72	8.548
1932	8.71	8.586
1933	8.34	8.528
1934	8.63	8.606
1935	8.52	8.584
1936	8.55	8.55
1937	8.7	8.548
1938	8.86	8.652
1939	8.76	8.678
1940	8.76	8.726
1941	8.77	8.77
1942	8.73	8.776
1943	8.76	8.756
1944	8.85	8.774
1945	8.58	8.738
1946	8.68	8.72
1947	8.8	8.734
1948	8.75	8.732
1949	8.59	8.68
1950	8.37	8.638
1951	8.63	8.628
1952	8.64	8.596
1953	8.87	8.62
1954	8.56	8.614
1955	8.63	8.666
1956	8.28	8.596

1957	8.73	8.614
1958	8.77	8.594
1959	8.73	8.628
1960	8.58	8.618
1961	8.8	8.722
1962	8.75	8.726
1963	8.86	8.744
1964	8.41	8.68
1965	8.53	8.67
1966	8.6	8.63
1967	8.7	8.62
1968	8.52	8.552
1969	8.6	8.59
1970	8.7	8.624
1971	8.6	8.624
1972	8.5	8.584
1973	8.95	8.67
1974	8.47	8.644
1975	8.74	8.652
1976	8.35	8.602
1977	8.85	8.672
1978	8.69	8.62
1979	8.73	8.672
1980	8.98	8.72
1981	9.17	8.884
1982	8.64	8.842
1983	9.03	8.91
1984	8.69	8.902
1985	8.66	8.838
1986	8.83	8.77

1987	8.99	8.84
1988	9.2	8.874
1989	8.92	8.92
1990	9.23	9.034
1991	9.18	9.104
1992	8.84	9.074
1993	8.87	9.008
1994	9.04	9.032
1995	9.35	9.056
1996	9.04	9.028
1997	9.2	9.1
1998	9.52	9.23
1999	9.29	9.28
2000	9.2	9.25
2001	9.41	9.324
2002	9.57	9.398
2003	9.53	9.4
2004	9.32	9.406
2005	9.7	9.506
2006	9.53	9.53
2007	9.73	9.562
2008	9.43	9.542
2009	9.51	9.58
2010	9.7	9.58
2011	9.52	9.578
2012	9.51	9.534
2013	9.61	9.57

year - Cairo	avg_temp Cairo	5-Year MA Cairo
1808	17.11	
1809	19.87	
1810	19.93	
1811	20	
1812	19.93	19.368
1813	20.51	20.048
1814	20.43	20.16
1815	20.3	20.234
1816	20.51	20.336
1817	21.88	20.726
1818	11.6	18.944
1819	20.31	18.92
1820	20.58	18.976
1821	20.63	19
1822	20.72	18.768
1823	20.71	20.59
1824	21.44	20.816
1825	21	20.9
1826	20.94	20.962
1827	21.63	21.144
1828	20.99	21.2
1829	20.91	21.094
1830	21.25	21.144
1831	20.52	21.06
1832	20.2	20.774
1833	20.81	20.738
1834	20.69	20.694
1835	20.17	20.478
1836	20.59	20.492



1837	20.27	20.506
1838	20.21	20.386
1839	20.43	20.334
1840	20.56	20.412
1841	20.91	20.476
1842	20.92	20.606
1843	20.83	20.73
1844	20.66	20.776
1845	20.9	20.844
1846	21.57	20.976
1847	21.1	21.012
1848	20.89	21.024
1849	20.9	21.072
1850	20.39	20.97
1851	21.11	20.878
1852	21.04	20.866
1853	21.53	20.994
1854	20.74	20.962
1855	21.04	21.092
1856	20.49	20.968
1857	20.29	20.818
1858	20.9	20.692
1859	20.98	20.74
1860	21.33	20.798
1861	20.21	20.742
1862	20.22	20.728
1863	20.6	20.668
1864	21.25	20.722
1865	21.55	20.766
1866	21.35	20.994

1867	21.45	21.24
1868	20.94	21.308
1869	21.41	21.34
1870	21.3	21.29
1871	20.87	21.194
1872	21.14	21.132
1873	21.4	21.224
1874	20.77	21.096
1875	19.99	20.834
1876	21.05	20.87
1877	21.39	20.92
1878	21.54	20.948
1879	21.49	21.092
1880	21.2	21.334
1881	21.56	21.436
1882	20.38	21.234
1883	20.65	21.056
1884	20.23	20.804
1885	20.91	20.746
1886	20.55	20.544
1887	21.21	20.71
1888	21.04	20.788
1889	21.05	20.952
1890	21.09	20.988
1891	21.13	21.104
1892	21.39	21.14
1893	20.57	21.046
1894	20.95	21.026
1895	20.97	21.002
1896	21.17	21.01

1897	20.82	20.896
1898	20.92	20.966
1899	21.04	20.984
1900	21.57	21.104
1901	21.89	21.248
1902	21.36	21.356
1903	20.39	21.25
1904	20.61	21.164
1905	21.03	21.056
1906	21.24	20.926
1907	20.45	20.744
1908	20.37	20.74
1909	21.4	20.898
1910	20.65	20.822
1911	20.78	20.73
1912	20.79	20.798
1913	20.4	20.804
1914	20.96	20.716
1915	21.57	20.9
1916	21.73	21.09
1917	21.12	21.156
1918	21.43	21.362
1919	21.43	21.456
1920	20.72	21.286
1921	20.73	21.086
1922	21.39	21.14
1923	21.39	21.132
1924	21.61	21.168
1925	21.37	21.298
1926	21.22	21.396

1927	21.76	21.47
1928	21.72	21.536
1929	21.07	21.428
1930	21.73	21.5
1931	21.6	21.576
1932	21.43	21.51
1933	21.24	21.414
1934	21.52	21.504
1935	21.61	21.48
1936	22	21.56
1937	21.82	21.638
1938	20.92	21.574
1939	21.85	21.64
1940	21.59	21.636
1941	21.76	21.588
1942	21.59	21.542
1943	21.35	21.628
1944	21.4	21.538
1945	20.83	21.386
1946	21.76	21.386
1947	21.94	21.456
1948	20.88	21.362
1949	20.68	21.218
1950	21.53	21.358
1951	21.82	21.37
1952	21.92	21.366
1953	21.17	21.424
1954	21.45	21.578
1955	22.1	21.692
1956	21.48	21.624

1957	21.49	21.538
1958	21.85	21.674
1959	20.98	21.58
1960	22.3	21.62
1961	21.14	21.552
1962	22.11	21.676
1963	22.09	21.724
1964	21.07	21.742
1965	21.52	21.586
1966	22.1	21.778
1967	20.92	21.54
1968	21.48	21.418
1969	21.88	21.58
1970	21.53	21.582
1971	21.41	21.444
1972	21.57	21.574
1973	21.42	21.562
1974	21.55	21.496
1975	21.35	21.46
1976	21.28	21.434
1977	21.57	21.434
1978	21.67	21.484
1979	22.06	21.586
1980	21.52	21.62
1981	21.42	21.648
1982	21.04	21.542
1983	20.75	21.358
1984	21.32	21.21
1985	21.72	21.25
1986	21.52	21.27

1987	21.24	21.31
1988	21.65	21.49
1989	21.43	21.512
1990	21.6	21.488
1991	21.65	21.514
1992	21.11	21.488
1993	21.79	21.516
1994	22.02	21.634
1995	21.56	21.626
1996	21.88	21.672
1997	21.45	21.74
1998	22.36	21.854
1999	22.28	21.906
2000	21.49	21.892
2001	22.33	21.982
2002	22.41	22.174
2003	22.17	22.136
2004	22.08	22.096
2005	22.01	22.2
2006	22.05	22.144
2007	22.36	22.134
2008	22.64	22.228
2009	22.63	22.338
2010	23.72	22.68
2011	21.99	22.668
2012	22.48	22.692
2013	22.91	22.746