Data Extraction

- SQL queries to extract the data from the tables.
    - Select *
      FROM city_list; (to extract list of cities)
    - Select year, avg_tmp
      FROM city_data
      WHERE city='San Francisco'
      ORDER BY year; *(to extract average yearly temperatures for particular city)*
    - Select *
      FROM global_data
      WHERE year IN (select year from city_data where city='San Francisco')
      ORDER BY year; (*where clause to select only those years for global temperatures for which city temperature exist*)
- Order by clause used so that the order of the year remains same for both city and world.
- Output of queries downloaded in CSV format and saved in excel format.

Moving Average Calculation

- Calculated average of 10 years using excel function on first 10 rows **Average(A1:A10)** and then dragged the columns down.
- Created a separate column for Moving Average temperatures.
- Placed city and world Moving average temperatures global in a separate excel sheet along with years to plot a line graph.

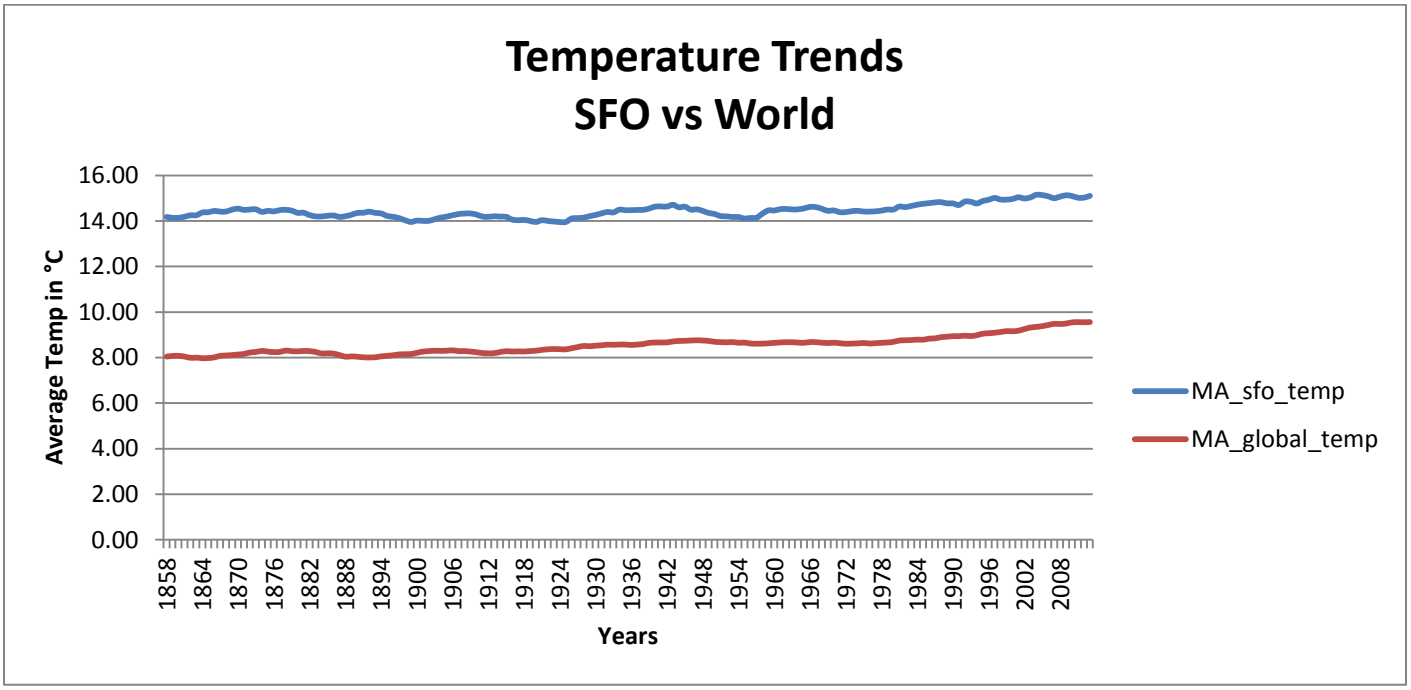
Key Considerations

- Calculated difference between yearly average temperatures for each year and placed in a separate sheet.
- Global average temperatures are less than city average temperatures in all records.

Line Chart

MA_city_temp : 10 year Moving Average temperatures for city SFO

MA_global_temp : 10 year Moving Average temperatures for world



Data Sample *for chart above (Moving average for city and world for 10 years)*

Year	MA_sfo_temp	MA_global_temp
1858	14.18	8.04
1859	14.14	8.07
1860	14.14	8.07

1861	14.19	8.04
1862	14.25	7.98
1863	14.25	7.99
1864	14.37	7.97
1865	14.38	7.98
1866	14.44	8.00
1867	14.41	8.07
1868	14.41	8.09
1869	14.50	8.11
1870	14.54	8.13
1871	14.48	8.16
1872	14.50	8.22
1873	14.51	8.24
1874	14.40	8.29
1875	14.44	8.26
1876	14.42	8.24
1877	14.48	8.25
1878	14.49	8.30
1879	14.45	8.28
1880	14.35	8.27
1881	14.36	8.28
1882	14.25	8.28
1883	14.20	8.24
1884	14.20	8.18
1885	14.23	8.18
1886	14.24	8.17
1887	14.18	8.11
1888	14.21	8.03
1889	14.27	8.05
1890	14.35	8.03
1891	14.36	8.01
1892	14.41	8.00
1893	14.35	8.01
1894	14.33	8.05
1895	14.22	8.07
1896	14.18	8.10
1897	14.13	8.13
1898	14.03	8.14
1899	13.96	8.15
1900	14.01	8.20
1901	14.00	8.26

Observation

- San Francisco is hotter than world throughout.
- The yearly average difference between sfo and world ranges between 4.86 - 7.20.
- For San Francisco moving average, year 1858 – 1960 city is cooler, 1961 onwards city becomes hotter and temperatures keep rising.
- For world moving average, year 1858 – 1900 world is cooler, 1901 onwards global temperatures becomes hot and keep rising.
- City is cooler for longer period of around 102 years before it starts getting hot as compared to world which is cooler for only about 50 years.
- The temperature difference looks almost consistent, except at few points
    - like Moving Average temp difference for year 1956&1957 is 0.17>0.01 *(a big change)* the previous MA temp difference for 1955&1956.
    - And again 1959&1960 MA temperature 0.03<0.13 *(big drop)* MA temp difference for 1960&1961.
    - Again 0.05<0.13>0.02 a big change at point 2000&2001, 2001&2002, 2002&2003 MA temp differences respectively.