Exploring Weather Trends Project

In this project I will explore local and global temperature trends over a period of 260 years (1753 - 2013).

To accomplish my analysis, I was given a Database with three tables **city_data**, **city_list**, **global_data** from which I extracted the data needed for my analysis.

First I extracted (using the SQL query **SELECT * FROM global_data;**) all the data from the **global_data** table (266 rows and two columns) where the global temperature for each year from 1750 to 2015 is shown.

After that, I extracted the data for my residence city (Athens - Greece) (using the SQL query **SELECT year, avg_temp FROM city_data WHERE city = 'Athens';**), since i was interested only in the temperatures for the city of Athens. The results are 261 rows and 2 columns (temperatures from 1753 to 2013).

In each step I downloaded a csv file for the data.
Using Google sheets I imported both csv files into a sheet in order to start my analysis.

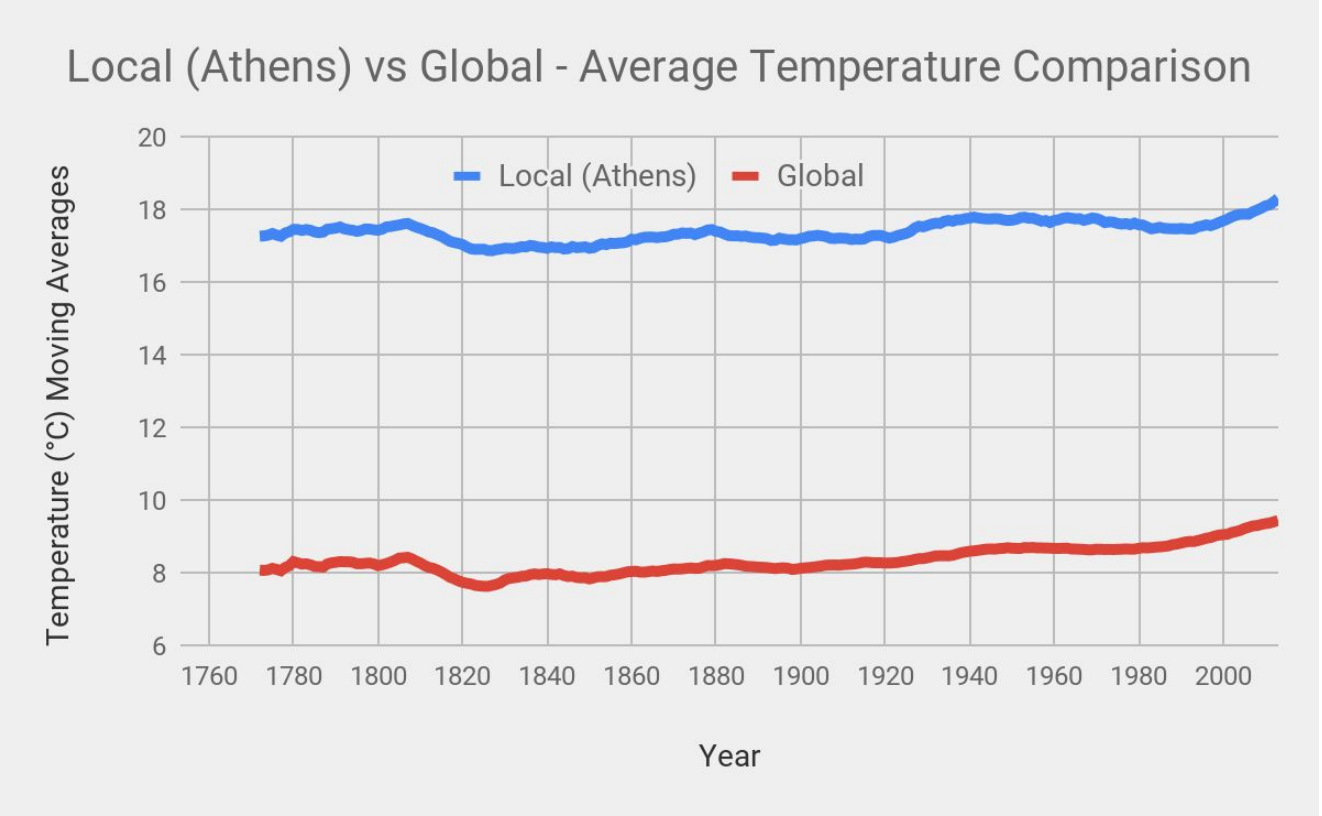
Examining the data I found that there is a lack of temperatures for certain years in local data with regard to global data namely I don't have temperature values for the years 1750, 1751, 1752, 2014, 2015. Although the missing values I don't think will cause problems with my analysis, I decided to remove the extra rows (5 in total) from the global data. Now I am left with two sets of temperature values (local and global) for the range of years 1753 - 2013.

A preliminary line chart of both local and global data showed that the fluctuations of temperatures over the years produced a graph with too many spikes for getting something valuable from it.
I decide to use the moving averages technique in order to smooth out the graph lines.

I used a 20 years period (1753 - 1772) for which I found its average and for each subsequent year after 1772 I calculated the average of the previous 20 years.

I used a 20 years period after a test of several periods (10, 15, 20, 25) years, because this seemed to have the optimum results in my graph.

Below is my final line graph that shows the comparison between local (Athens) and global temperature data over the years 1753 - 2013 and some key points that I extracted analysing the graph.



From the graph there are some interesting observations.

1. My city average temperature is more or less double the global one over the course of years.
2. Both data seem to have the same fluctuations of temperature over the years with regard to their absolute values.
3. In both cases there is a small raise in average temperature (~ 1.5 degrees in local data and ~2 degrees in global data).
4. The above results are consistent with the main trend that the global temperature is rising over the course of the year.