Comparison between Moving Average Temperatures 30-year in Rome and Globally between 1779 and 2013

Preliminary operations

The database from which all the data for this comparison has been extracted consists of three tables: **city_list** (a list of all the cities and respective countries in the database), **city_data**(data about every single city, including a column with the average temperature for every year) and **global_data** (year and respective global average temperature).

I first searched for the available cities in my country, Italy, with the following query:

```
SELECT *
FROM city_list
WHERE country='Italy'
```

The resulting cities listed were Rome and Milan.

I decided to pull out data for the city of **Rome**, the nearest city to my location, with the following query:

```
SELECT year, avg_temp
FROM city_data
WHERE city='Rome'
```

I then obtained data about the average temperature for every year globally with the this query:

```
SELECT *
FROM global_data
```

I extracted a csv file for both the two last queries and inserted the data in a **Google Sheet.**

Data extracted for the global temperatures range from year 1750 to year 2015, while data available for Rome range from 1743 to 2013, but data between year 1746 and 1749 are missing for this city, I therefore decided to compare only data present in both dataset, between year 1750 and year 2013, calculating the moving average 30-year for both dataset: the resulting calculation range between year **1779** (the first year for which it is possible to calculate the a 30-year average) and **2013**.

I used Google Sheet to calculate the moving average temperature for Rome and global temperature. I inserted the following formulas in the Google Sheet:

Rome:

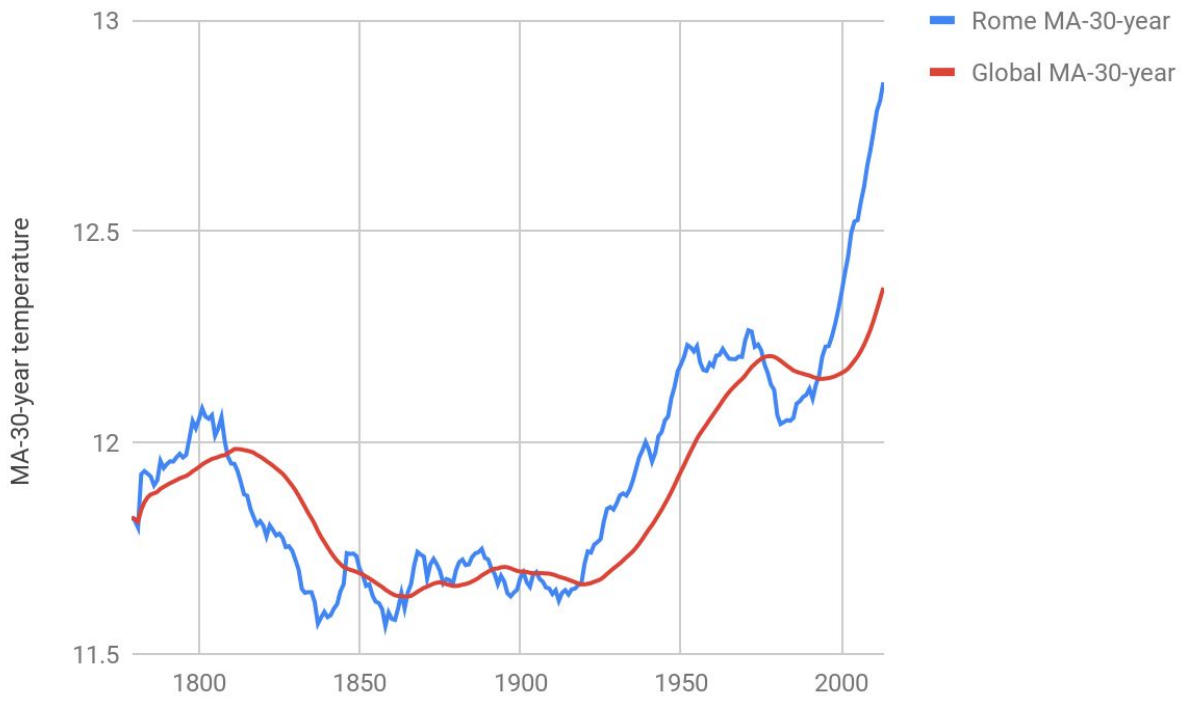
A	B	C	D	E
1772	13.32			
1773	11.87			
1774	11.97			
1775	12.36			
1776	11.59			
1777	11.5			
1778	12.43		Rome MA-30-year	Global MA-30-ye
1779	12.57	177	=AVERAGE(B9:B38)	11.82333333
1780	12.31	1780	11.816	11.81966667
1781	12.49	1781	11.79933333	11.81288889
1782	11.46	1782	11.92533333	11.841

Global:

1778	12.43		Rome MA-30-year	Global MA-30-year
1779	12.57	1779	11.8233333	=AVERAGE(D9:D38)
1780	12.31	1780	11.816	11.81966667
1781	12.49	1781	11.79933333	11.81288889
1782	11.46	1782	11.92533333	11.841
1783	12.18	1783	11.93266667	11.85933333
1784	11.61	1784	11.92666667	11.87055556

The formulas calculate the mean of temperature of 30 cells. I then copied these formulas in all the remaining cells until the cell corresponding to year 2013.
The resulting Moving Average Temperatures have been then be plotted against the year, obtaining the graph in the next page.

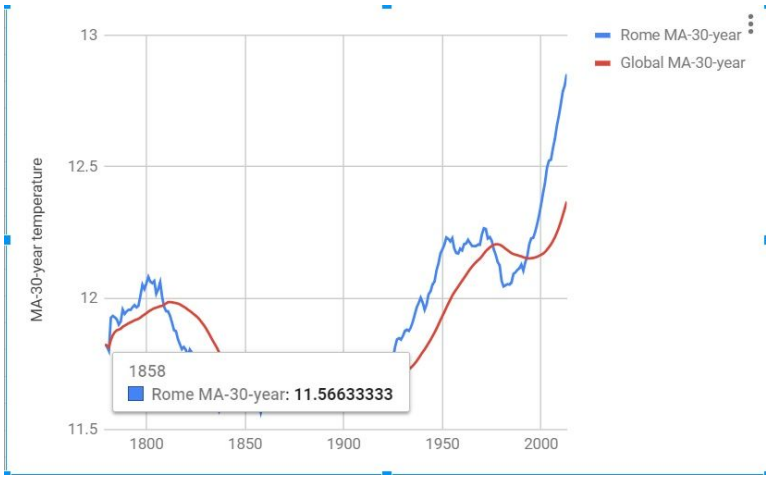
The following graph shows the moving average temperatures for Rome and globally between year 1779 and 2013

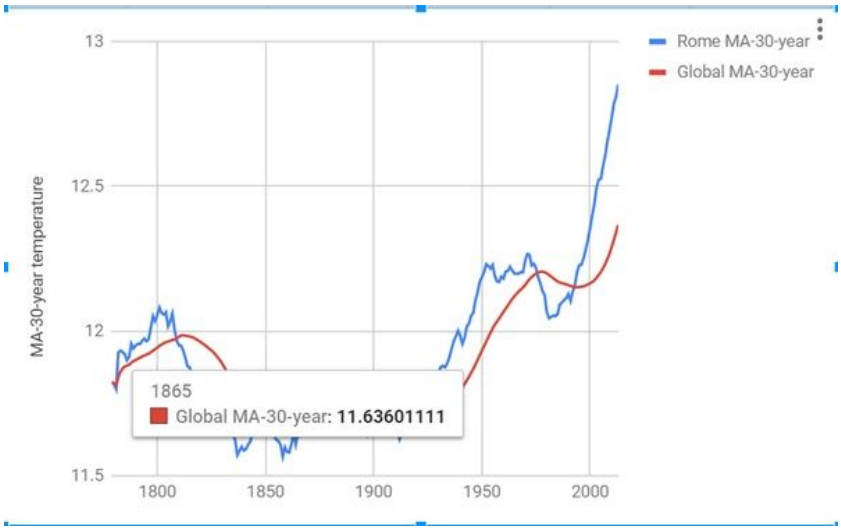


Observations

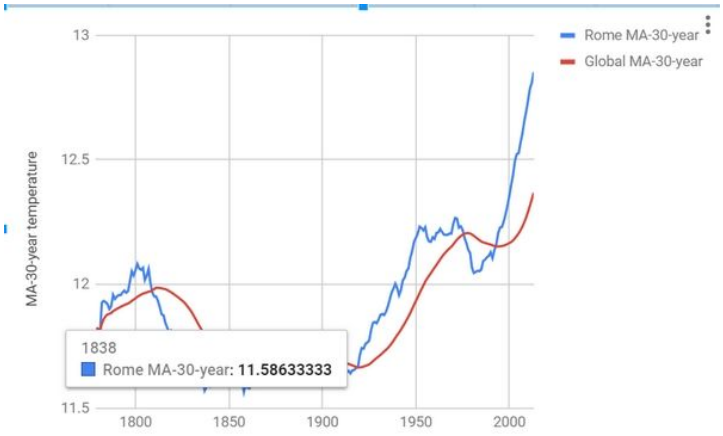
Note: temperatures used in the observations are rounded to 2 decimal places respect to the ones in the graph

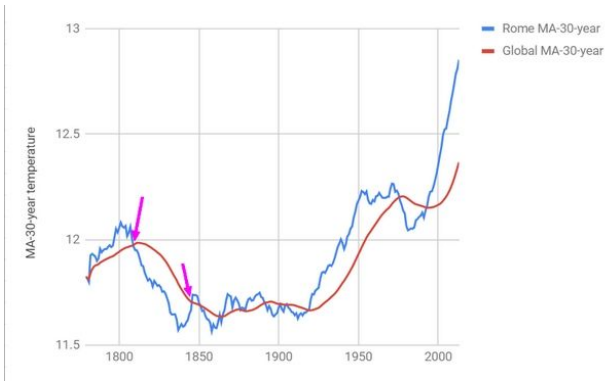
1) For both dataset the lowest MA-30-year temperature has been in the 19th century: in particular globally the lowest MA-temperature has been in 1865 (11.64) and for Rome in 1858 (11.57)



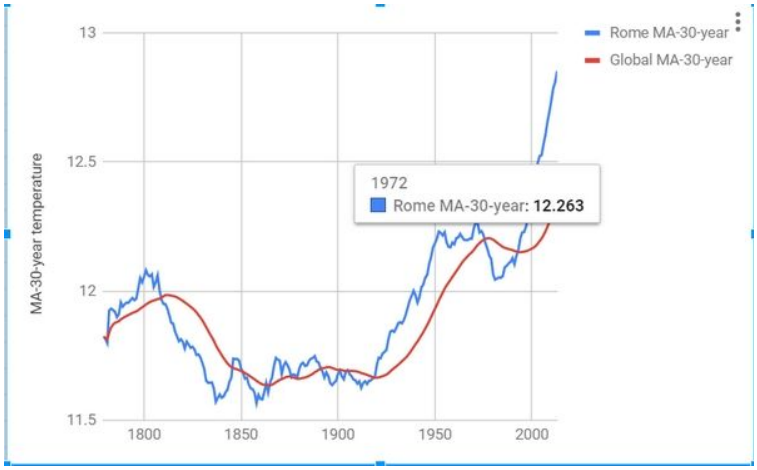


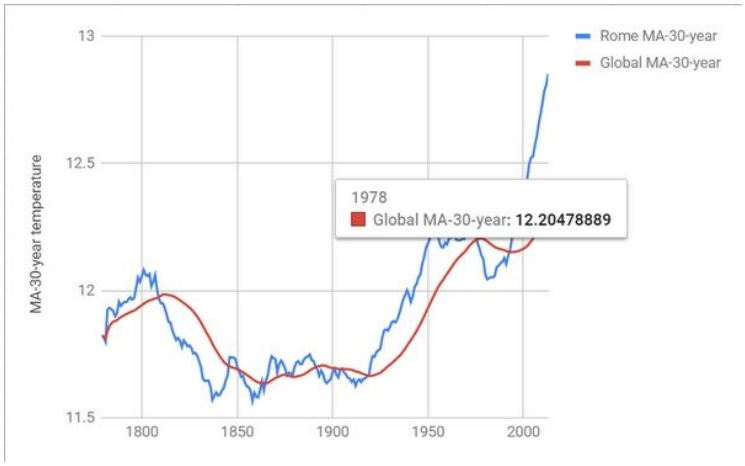
2) Most of the time global temperature has been lower than Rome temperature, considering the MA-30-year: the longest consecutive period in which instead the global temperature has been higher than Rome temperature is between the year 1812 and 1848, period during which Rome recorded its second lowest temperature in recent history in 1838 (11.59)

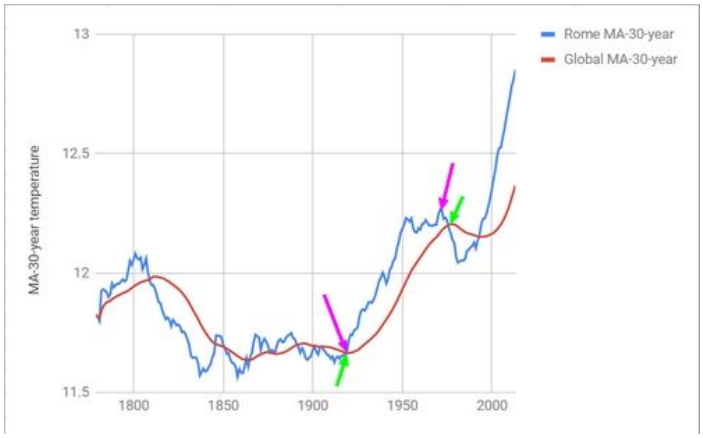




3) Starting from around 1920, for both dataset there is a progressive increase in temperature, higher for Rome than globally, which peaked in 1972 for Rome (12.26) and in 1978 globally (12.20) before lowering again.







4) The last year considered in this analysis, 2013, corresponds to the highest value of MA-30-year temperature for both dataset: 12.85 for Rome and 12.37 globally. Furthermore temperatures starting from around year 2006 (green arrows in the third graph below) register the highest values for both dataset compared to the rest of the years considered.