Explore Weather Trends

Extract the data.

We are going to extracting the data from the workspace. I live in Spain near Madrid, for this reason we are going to look for the nearest city in the database.

We use SQL to make the queries.

```
select *
from city_list
where country like 'Spain'
```

Output	3 results
city	**country**
Barcelona	Spain
Madrid	Spain
Valencia	Spain

The nearest city in the database is Madrid, therefore, I will make the query to extract the data to Madrid and the global one.

```
select year,avg_temp as avg_temp_Madrid
from city_data
where city like 'Madrid'
```

```
select year,avg_temp
from global_data
```

In case of the query for Madrid, we leave out the columns city and country and rename the column avg_temp to avg_temp_Madrid to differentiate the data from the global data.

Open up the CSV and calculate the moving average.

Now we are going to open up the CSV in Google sheets and also we are going to use the same period of time both to show it in our line chart, and to calculate the moving average. This will be from 1750 to 2015 which is the time period for the global data.

	A	B	C	D	E
					=AVERAGE(B4:B8)
1	year	avg_temp_Madrid	avg_temp_global	MA Madrid	MA Global
2	1750	12,01	8,72	10,60ºC	7,49ºC
3	1751	12,71	7,98	10,82ºC	7,72ºC
4	1752	7,07	5,78	10,95ºC	7,87ºC
5	1753	11,47	8,39	10,78ºC	7,80ºC
6	1754	11,49	8,47	10,54ºC	7,97ºC
7	1755	11,17	8,36	11,39ºC	8,62ºC
8	1756	11,50	8,85	11,15ºC	8,29ºC
9	1757	11,34	9,02	11,12ºC	8,19ºC
10	1758	10,24	6,74	11,07ºC	7,96ºC
11	1759	11,35	7,99	11,08ºC	7,94ºC
12	1760	10,92	7,19	11,09ºC	7,86ºC
13	1761	11,53	8,77	11,20ºC	8,01ºC
14	1762	11,43	8,61	11,23ºC	8,09ºC
15	1763	10,79	7,50	11,34ºC	8,31ºC
16	1764	11,46	8,40	11,30ºC	8,23ºC
17	1765	11,48	8,25	11,30ºC	8,16ºC
18	1766	11,34	8,44	11,30ºC	8,04ºC

To calculate the moving average we have chosen the average temperature from two years before to two years after the year to calculate. For instance, to calculate the moving average to the year 1754, we calculate the average among 1752, 1753, **1754**, 1755, 1756.

Once we have calculated the moving average to Madrid and global data, we can create the line chart in Google sheets.

Line Chart and Observations.
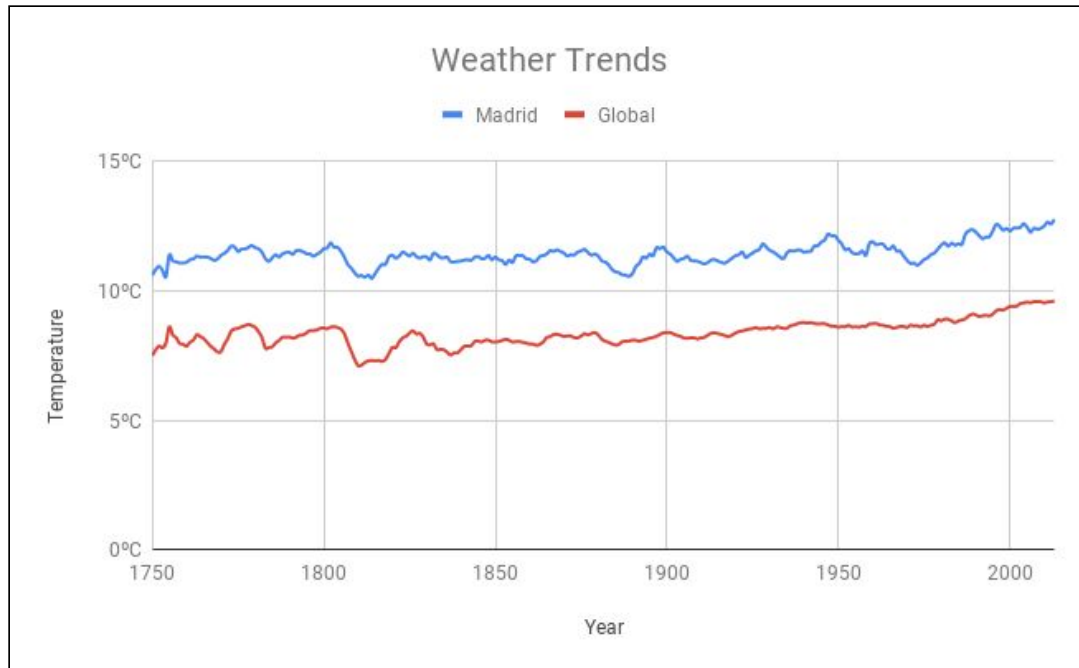
- The weather trend to Madrid and the Global have increased several grades from 1750 to ours days.
- In the beginning of 1800 we can see a decrease in the temperatures in Madrid and Global data.
- In Global data we can appreciate a smooth trend instead of Madrid, that is more variable, overall we can see it from 1950.
- In 1975, we ca see a decrease in the temperature in Madrid that does not occur in Global data.

To end up the observations we are going to see the trends of seven cities around the world, each one belongs to a different continent and hemisphere in order to find out a difference trend among them.
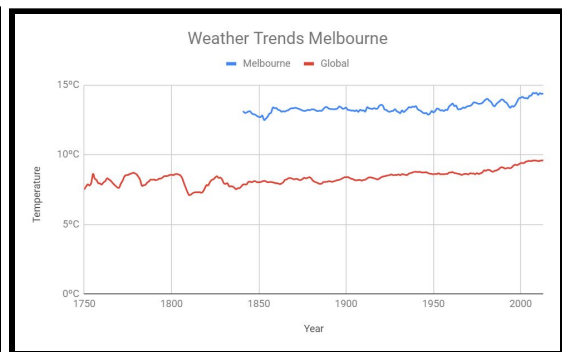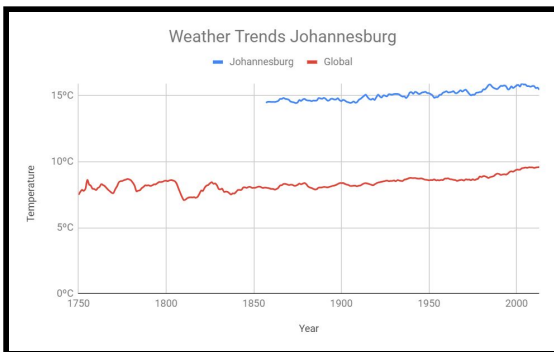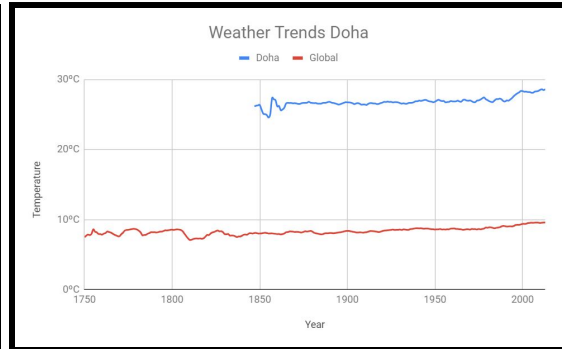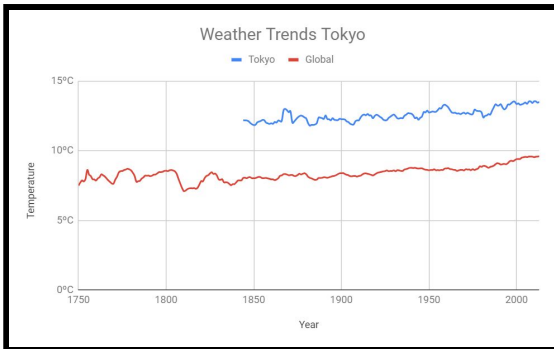
North America: New York.
South America: Caracas.
Asia: Tokyo.
Eastern Europe: Moscow
Middle East: Doha.
Oceania: Melbourne
Africa: Johannesburgo

Weather Trends Moscow

Weather Trends New York

Weather Trends Tokyo

Weather Trends Doha

Weather Trends Johannesburg

Weather Trends Melbourne

Weather Trends New Caracas
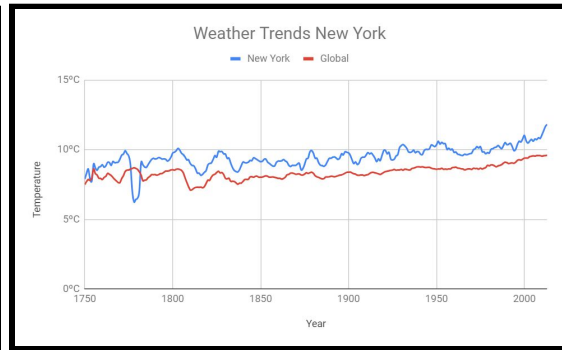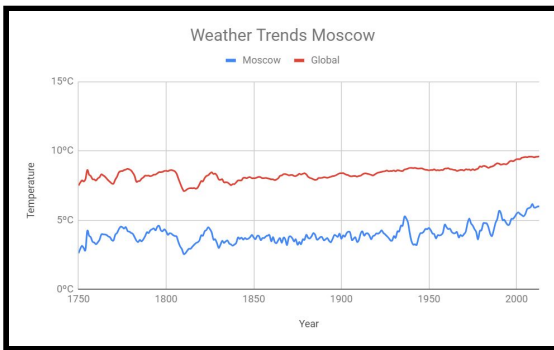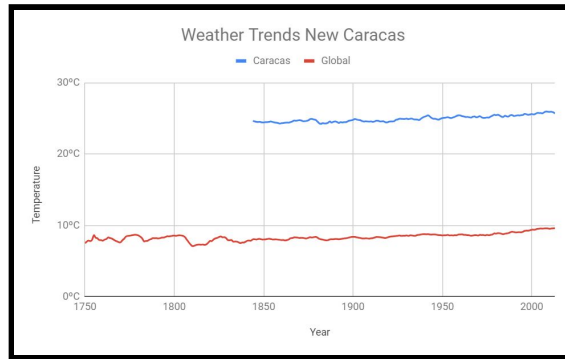
We can see with the observations of this cities that the increase in the temperature is a global phenomenon which happen in all cities around the world, although in cities like Moscow or Doha the increase in the last century is much higher than other cities like Melbourne or Madrid as we can see in the next grid.

Cities	1900	2010	Difference
Global	8,38ºC	9,53ºC	1,15ºC
Madrid	11,50ºC	12,50ºC	1,00ºC
Moscow	3,66ºC	5,91ºC	2,35ºC
Doha	26,73ºC	28,51ºC	1,78ºC
New York	9,77ºC	11,08ºC	1,31ºC
Tokyo	12,26ºC	13,54ºC	1,28ºC
Johannesburg	14,60ºC	15,74ºC	1,14ºC
Melbourne	13,37ºC	14,29ºC	0,92ºC
Caracas	24,79ºC	25,92ºC	1,13ºC

Author: Roberto Corral Ruano