

# Project 1 - Explore Weather Trends

First, I have to extract data from the temperatures database. We have 3 tables.

In the first one “city\_list”, I can have a look on cities available. In France, there is just one city available which is Paris, where I live.

I can extract data by year for Paris in “city\_data” and for worldwide level in “global\_data”:

- for Paris, I have some temperatures available for some years from 1743 to 2013, and for every years from 1750 to 2013.
- at a global level, I have temperatures for every years only since 1750, and until 2015.
- So, for the period 1750 - 2013, I have temperature every year for both Paris and worldwide. It will be my period of analysis.

I extracted these data.

Input		HISTORY ▾	MENU ▾
SCHEMA ↻		<pre>1 SELECT 2 * 3 FROM city_data 4 WHERE city = 'Paris' 5 AND year &gt;= 1750</pre>	
city_data ▾			
city_list ▾			
global_data ▾			
		Success!	EVALUATE
Output		264 results	<a href="#">Download CSV</a>
year	city	country	avg_temp
1750	Paris	France	11.18
1751	Paris	France	11.15
1752	Paris	France	6.97

Input

SCHEMA

city\_data

city\_list

global\_data

1 SELECT

2 \*

3 FROM global\_data

Success!

EVALUATE

Output 266 results

Download CSV

year	avg_temp
1750	8.72
1751	7.98
1752	5.78

I decided to work in Google sheet, I compile these 2 extractions/tabs thanks to a Vlookup formula in one tab.

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	A	B	C	D	E
1	year	city	country	avg_temp	avg_temp_WW
2	1750	Paris	France	11.18	8.72
3	1751	Paris	France	11.15	7.98
4	1752	Paris	France	6.97	5.78
5	1753	Paris	France	10.4	8.39
6	1754	Paris	France	10.15	8.47
7	1755	Paris	France	9.84	8.36
8	1756	Paris	France	10.2	8.85
9	1757	Paris	France	10.02	9.02
10	1758	Paris	France	9.62	6.74
11	1759	Paris	France	10.66	7.99
12	1760	Paris	France	10.5	7.19
13	1761	Paris	France	10.55	8.77
14	1762	Paris	France	10.06	8.61
15	1763	Paris	France	9.88	7.5

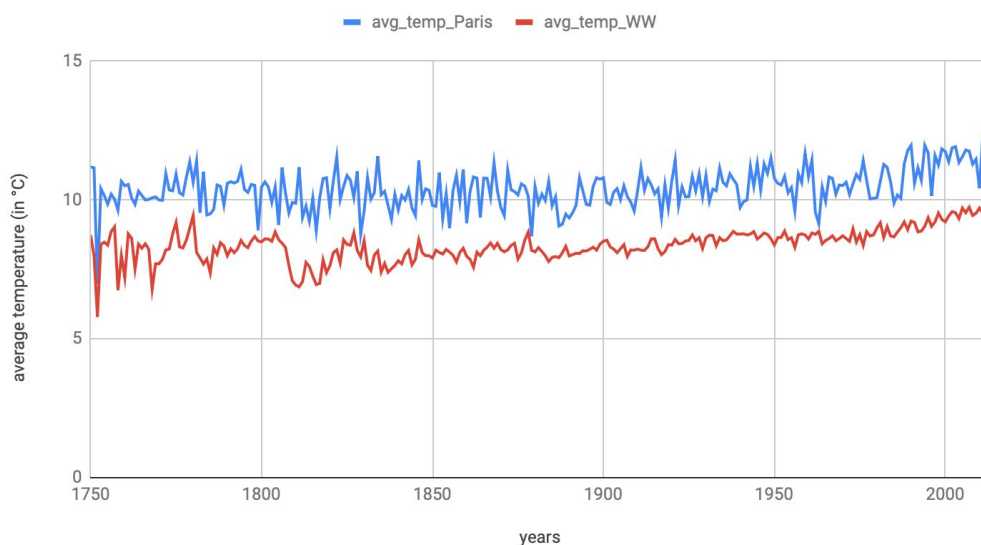
As learnt in this training, I add a moving average to smooth out data. I choose to calculate this moving average by 10 years.

=average(D2:D11)

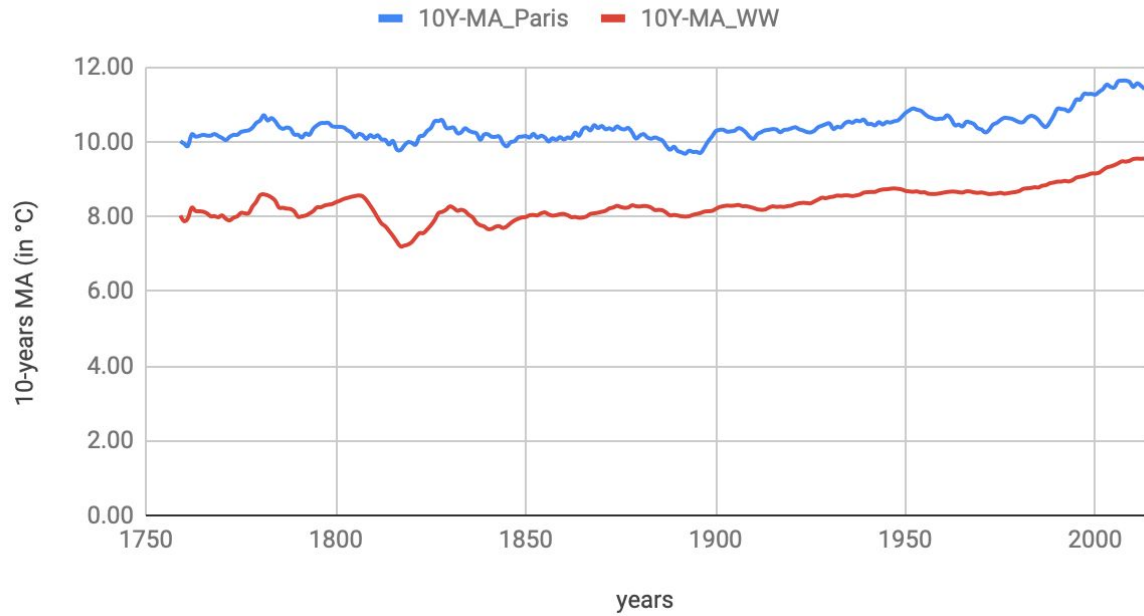
A	B	C	D	E	F	G
year	city	country	avg_temp	avg_temp_WW	10Y-MA_Paris	10Y-MA_WW
1750	Paris	France	11.18	8.72		
1751	Paris	France	11.15	7.98		
1752	Paris	France	6.97	5.78		
1753	Paris	France	10.4	8.39		
1754	Paris	France	10.15	8.47		
1755	Paris	France	9.84	8.36		
1756	Paris	France	10.2	8.85		
1757	Paris	France	10.02	9.02		
1758	Paris	France	9.62	6.74		
1759	Paris	France	10.66	7.99	10.02	8.03
1760	Paris	France	10.5	7.19	9.95	7.88
1761	Paris	France	10.55	8.77	9.89	7.96
1762	Paris	France	10.06	8.61	10.20	8.24
1763	Paris	France	9.83	7.5	10.14	8.15
1764	Paris	France	10.31	8.4	10.16	8.14
1765	Paris	France	10.15	8.05	10.10	8.10

To visualize trends, I have tried to visualize the classic data by years and also thanks to the 10-years moving average. (Note that I could also use X-years moving average, but 10-years seems to be correct to understand main trends).

average temperature of Paris and worldwide by years

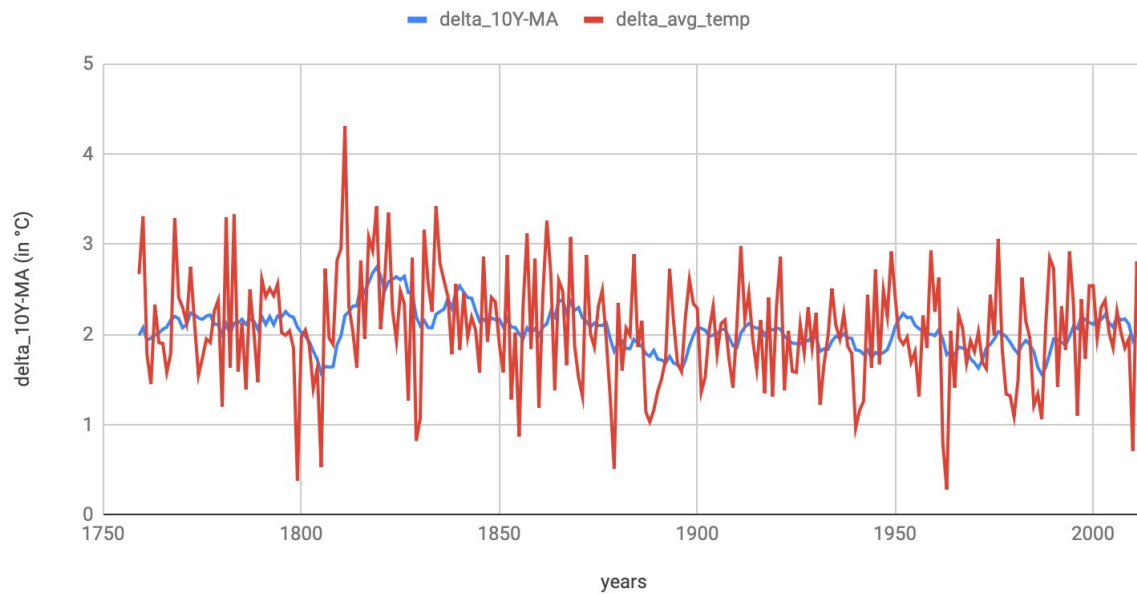


## 10-years moving average of Paris and worldwide by years



To have a better idea of the evolution comparing Paris and global temperature (WW), I have decided to visualize the delta of temperature. I have tried to visualize delta between the average and between the 10-years moving average.

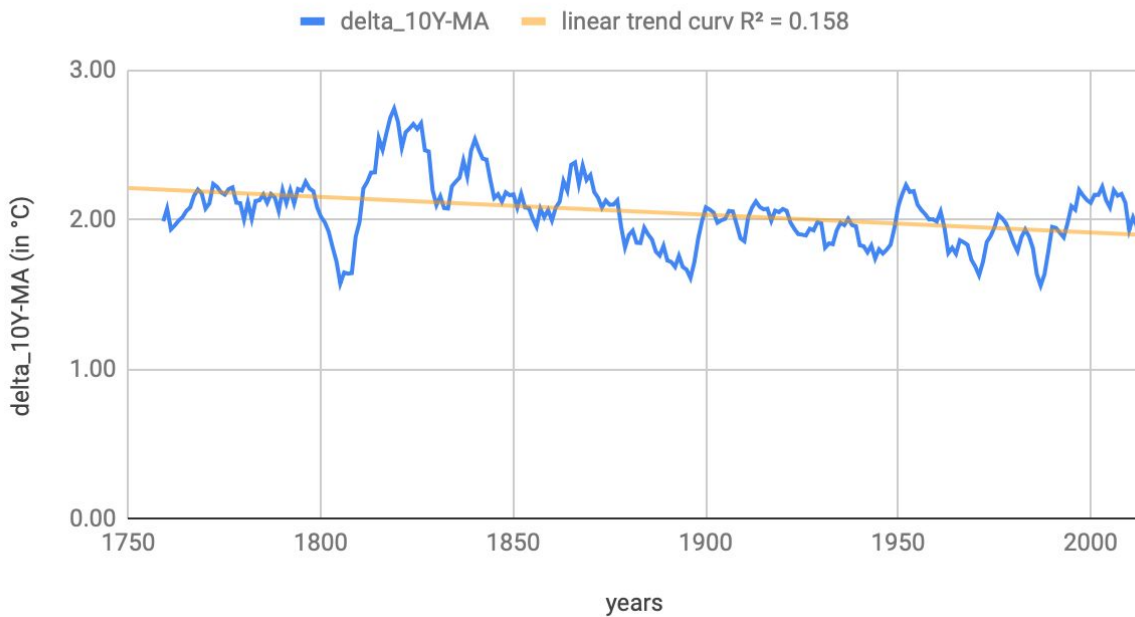
## Comparison of delta temperature of Paris vs WW thanks to average and 10-years MA



We can clearly see that the average has too many fluctuations: it is very difficult to understand trends.

So, I had to focus on 10-years moving average.

## delta\_10Y-MA



I have had a linear trend curve to understand if there is a trend through years.

I can observe:

- Paris is, on average, hotter compared to the global average.
- Looking the average temperature by years, Paris' temperature has more variations than the global temperature. Between minimum and maximum temperature in Paris, there is 5,36 degrees and for global temperature we have only 3.95 degrees of difference.
- There is some years with big differences between Paris and global temperature. For example:
  - in 1811, Paris' temperature was 11,17 degrees and it was only 6,86 degrees at a global level so almost 4,3 degrees of difference.
  - in 1863, Paris and global temperatures were very closed: 9,14 degrees in Paris vs 8,86 degrees at a global level.

- The 10-years moving average gains +1,4 degrees for Paris and +1,53 degrees at a global level. So, I can conclude that other cities' temperature increase faster than Paris'.
- The difference between Paris and global temperature is consistent over time, around 2 degrees more in Paris than at a global level. Nevertheless, there were some big variations in 1800-1850. Today, there is less variations.