

PROJECT SPECIFICATION

Explore Weather Trends

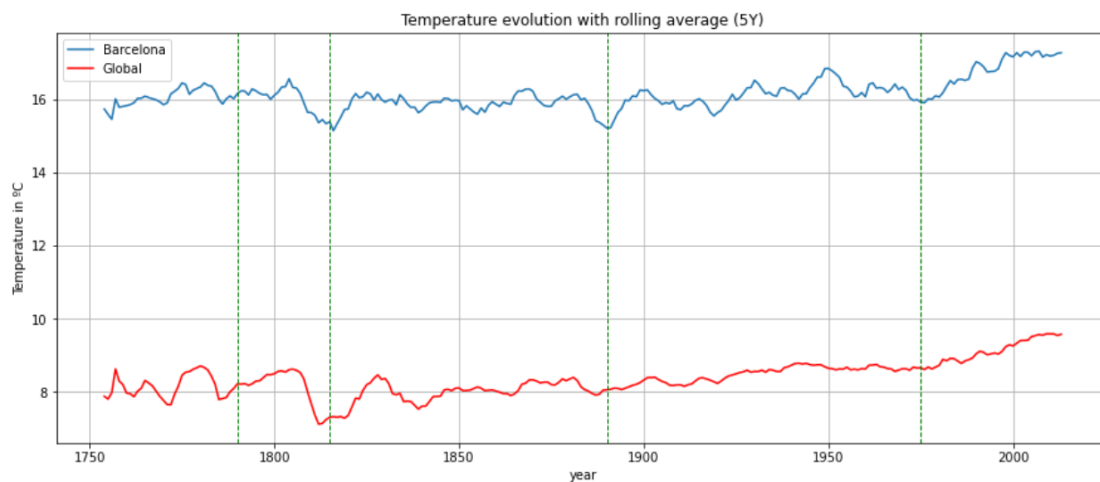
1. SQL Query

```
SELECT city_data.year, city_data.avg_temp as city_temp, global_data.avg_temp as
global_temp
FROM city_data
JOIN global_data
ON city_data.year = global_data.year
WHERE city_data.city = 'Barcelona' AND city_data.country = 'Spain'
AND NOT city_data.avg_temp is NULL
```

2. Analysis and graph done with Python on Jupyter notebooks. Moving averages calculated as:

```
temp['city_ma5'] = temp['city_temp'].rolling(5).mean()
temp['global_ma5'] = temp['global_temp'].rolling(5).mean()
```

3. Graph



4. Observations:

- It is clear that Barcelona, Spain is hotter than the average global temperatures. The average temp. difference between Barcelona and global temp. is 7,78 °C. Having a consistent max/min difference of [8,5 – 7,15] °C throughout the years.
- The green dashed vertical lines on the graph show that the trends are simultaneously followed on both sides, showing the changes earlier on the avg. global temperature due to the gathering of temperatures of all around the world and thus having a bigger sample.
- There is an upward temperature trend. For Barcelona the temperature has risen 1,544 °C and in avg. global temperatures 1,702 °C.
- Analyzing the correlation to measure the strength of the linear relationship between the two variables (City - global temperatures) we can observe a correlation coefficient of 0.693804 and when calculated with 5-year rolling average it is 0.845151. This positive strong correlation close to 1 means that both variables will react similarly to increases and decreases. The rest of the correlations shown below can be dismissed as they do not have any meaning for this analysis.

```
[34]: temp.corr()
```

```
[34]:
```

	city_temp	global_temp	city_ma5	global_ma5	ma_diff
city_temp	1.000000	0.693804	0.761725	0.627080	0.107639
global_temp	0.693804	1.000000	0.749217	0.849099	-0.326547
city_ma5	0.761725	0.749217	1.000000	0.845151	0.100520
global_ma5	0.627080	0.849099	0.845151	1.000000	-0.446866
ma_diff	0.107639	-0.326547	0.100520	-0.446866	1.000000