Exploring Weather Trends project

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Observations

For the "Exploring Weather Trends" project I used the data available in the Udacity tables for Bucharest and 3 other cities on similar latitudes as Bucharest (40-44 degrees latitude) in Europe, America, Asia, namely Belgrade, Toronto and Tashkent. I chose cities with similar latitudes as this is one of the main factors that influence climate (along with ocean currents, elevation, topography).

In order to analyse the Weather Trends

- I plotted the 10 year moving average for the temperatures of the cities I chose together with the Global 10 year moving average
- I plotted the YoY % variation of the average temperature for Bucharest and Global average temperature
- I computed the stadard deviation for each of the cities and the Global average
- I computed the minimum and maximum averages registered over time for each set, and the variation between the minimum and maximum for eaach
- I computed the correlation coefficient between the averages of each of the cities and the Global Temperature

Results & Findings
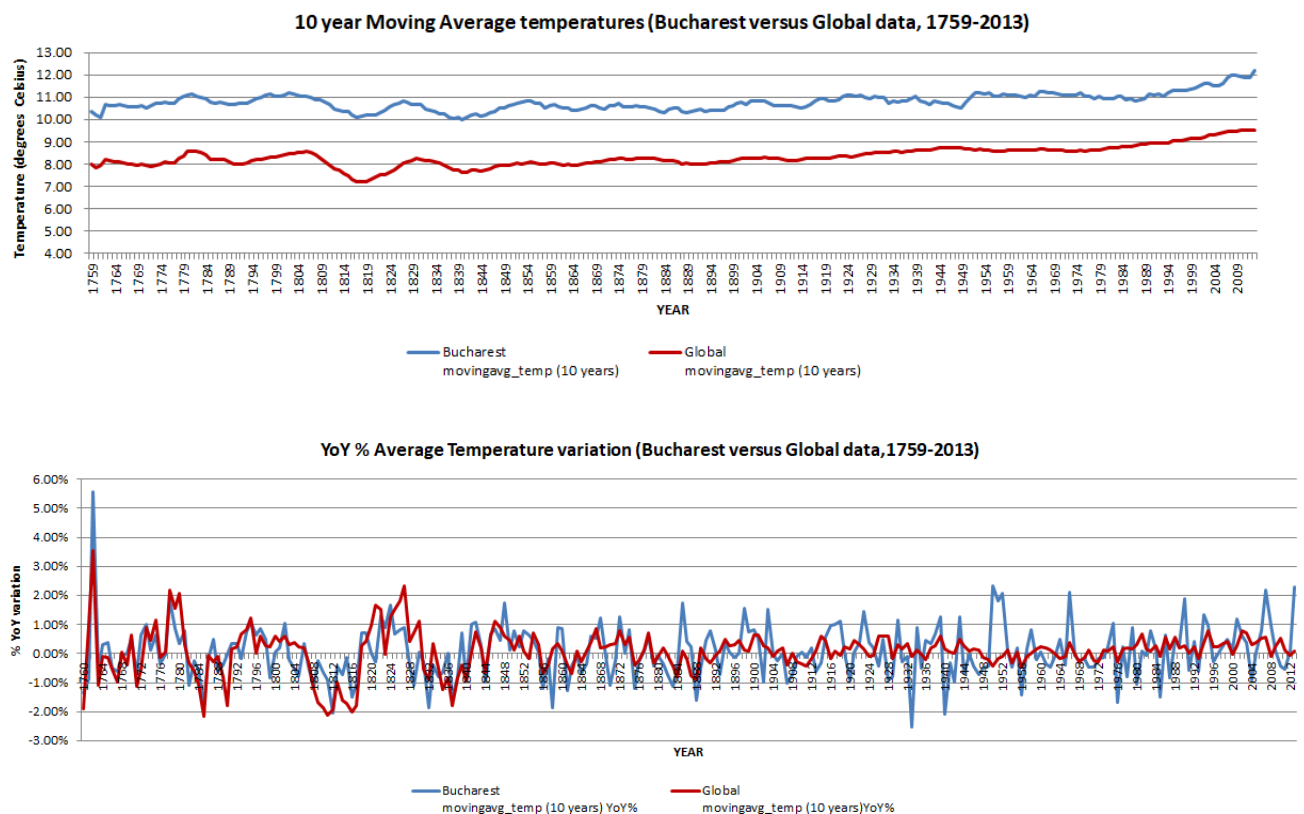
- There is an upward trend both as far as average temperature is concerned both for Bucharest and at global level. According to NASA studies[1], this increase in temperature is due, among others to fossil fuel use increase in the post-War era, but the data provided for this project is not enough to determine causality
- The variations YoY% for the average temperature register a wider range for Bucharest than for global average, as the global average contains information on the entire planet. This makes it more likely to have smoother variations

- The city with the largest standard deviation among those chosed is Toronto. This could be due, among others, to the fact that it is the only city in the group that is near water

City	Standard deviation of AVG yearly temperatures
Bucharest	0.73
Toronto	0.90
Belgrade	0.69
Tashkent	0.86
Global	0.56

- Toronto is also the city with the largest variation between the minimum and maximum average temperatures recorded in the period analysed. It also registers the lowest minimum value and the lowest maximum value.

- The variations between minimum and maximum for the other cities are similar to the variation in the global average temperature (55%/52%/62% versus 45%)

City	MIN Avg Yearly Temperature	MAX Avg Yearly Temperature	*% Difference between MIN and MAX values*
Bucharest	9.02	13.94	*55%*
Toronto	3.18	8.7	*174%*
Belgrade	8.47	12.84	*52%*
Tashkent	8.41	13.66	*62%*
Global	6.78	9.83	*45%*

- The average temperatures in the cities chosen are moderately correlated with the global average temperatures. The correlation coefficient is affected by outlier values in the registered data and does not imply causality

Correlation coefficient	Global
Bucharest	0.60
Toronto	0.69
Belgrade	0.69
Tashkent	0.72

Outline

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[1] https://earthobservatory.nasa.gov/Features/WorldOfChange/decadaltemp.php

Data sources used:	Udacity tables : city_data, global_data
Data extraction SQL commands:	SELECT * FROM global_data; SELECT * FROM city_data WHERE city IN ('Bucharest'); SELECT * FROM city_data WHERE city IN ('Toronto'); SELECT * FROM city_data WHERE city IN ('Tashkent'); SELECT * FROM city_data WHERE city IN ('Belgrade');
Presentation of data tool:	Excel
Computations:	Moving average- using Excel Average() function Correlation coefficient- using Correl () function Minimum, Maximum- using Min(), Max() functions Standard deviation- using STDEV() function