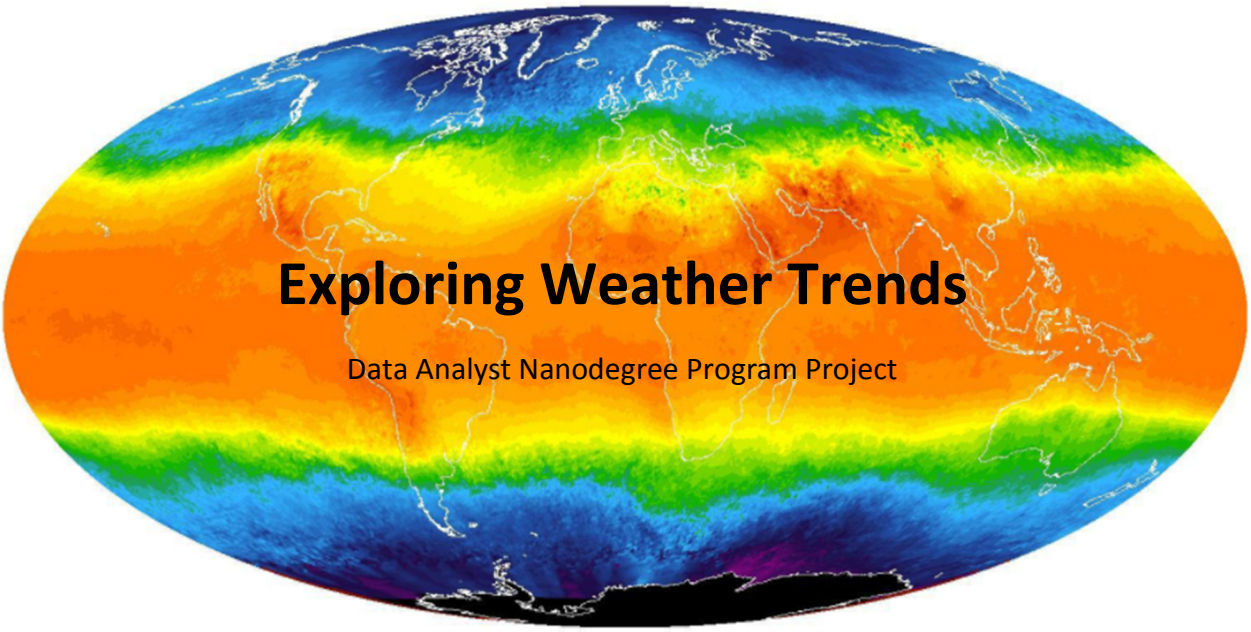

Exploring Weather Trends

Data Analyst Nanodegree Program Project

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Exploring Weather Trends

Content

1. Introduction

Goal for this project for Udacity Data Analyst Nanodegree Program is analyze and compare local (Bratislava, SVK) and global temperature data.

2. Software tools

For the project followed software tools were used:

a. Google chrome (csv file) – to obtain data from https://classroom.udacity.com/nanodegrees/nd002-ent/parts/978b95a2-2fa2-4263-a2a7-b0e0015ddb5e/modules/23fd1baf-2377-4fa8-87f1-052bd78922d6/lessons/d551938c-d004-4801-a269-4b8dd784cc3b/concepts/530f21c0-2f37-4390-aaab-3ce440e56d80 via SQL Query as a csv file;
b. MS Excel 2016 (data manipulation) – for import csv data file, for counting moving average, for plotting result;
c. MS Word (creation report) – for writing project report;
d. PDF24 creator – for producing final report in PDF format.

3. Extracting data

Based on Rubic for this project I decided to use weather data for Bratislava city.

Requested data was extracted from given database via web page by followed SQL query:

```
SELECT city_data.year, city_data.city , city_data.avg_temp as cityTemp,
        global_data.avg_temp as globalTemp
FROM city_data
FULL JOIN global_data
ON city_data.year = global_data.year
WHERE city_data.city='Bratislava'
```

and generated data set was downloaded as a csv file.

4. Processing data

CSV data file was opened and processed with MS Excel 2016.

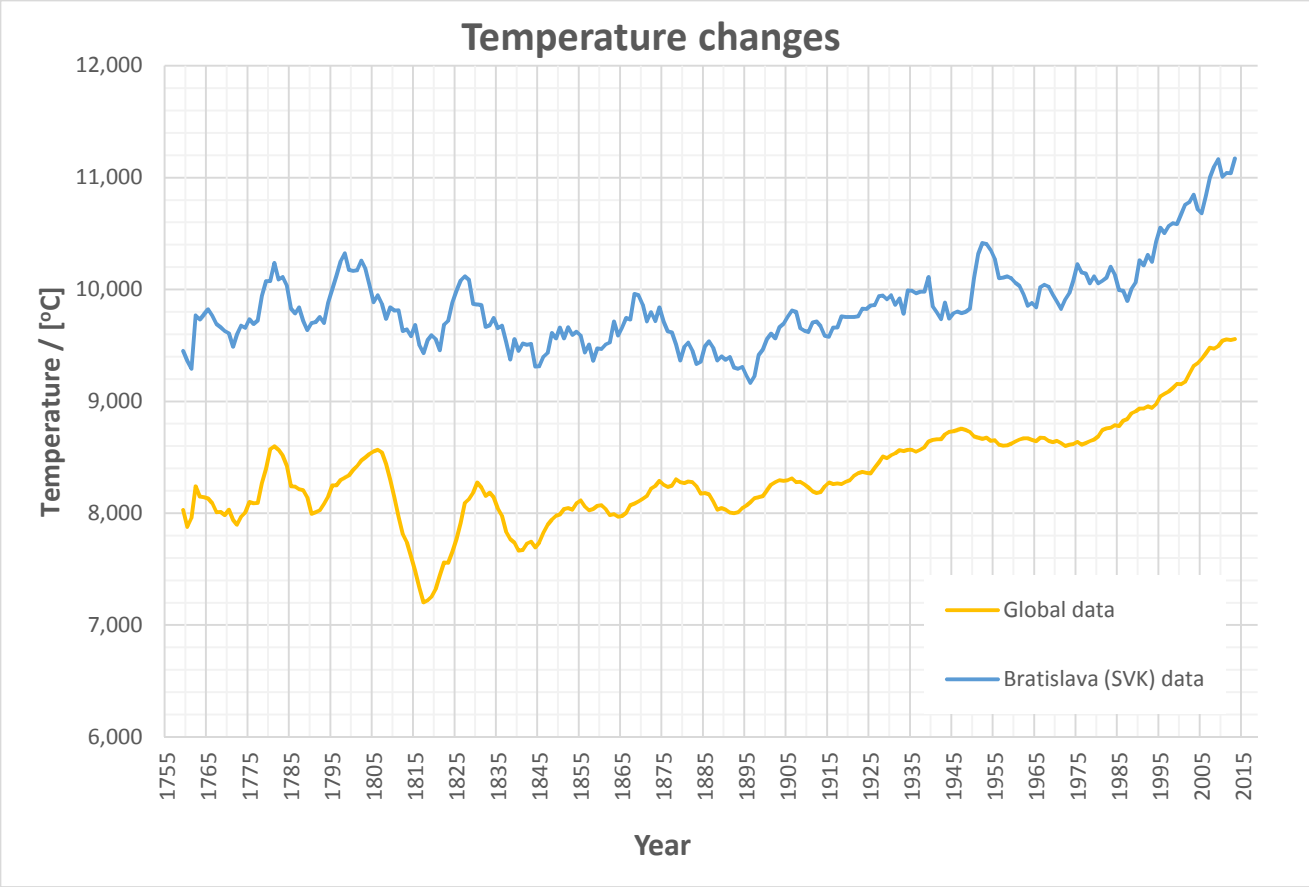
I decided to cut of data from year 1743 to year 1749 due to:

1. missing values for world weather from 1743 to 1749;
2. missing values for Bratislava weather from 1746 to 1749.

For better temperature tendency I calculated 10-year moving average[1] (Annex 1) which was used for The Line Chart for effective displaying trends. Moving average was calculated by MS Excel[2]. In a Line Chart, the vertical axis (Y-axis) is temperature, and the horizontal axis (X-axis) displays years.

Finally I calculated correlation factor[3] between moving average of Bratislava and global temperature.

5. Visualization



[1] https://en.wikipedia.org/wiki/Moving_average
[2] https://www.excel-easy.com/examples/moving-average.html
[3] https://www.accountingcoach.com/blog/what-is-the-coefficient-of-correlation
https://statisticsbyjim.com/basics/correlations/

6. Discussion

From the graph we can read few interesting facts:

1. Till aprox. 1885 temperature for Bratislava average temperature oscillating around 9,7^{o}C +/- 0,6^{o}C.
2. Same tendency is observed for global weather data, oscillation around 8,0^{o}C +/- 0,6^{o}C. For global data
3. From 1895 for Bratislava as well as for global data temperature is rising up every year. Raising average temperature in Bratislava indicates that Bratislava, in near future is going to be warmer city.
4. Same result is applicable for global weather condition. World's average temperature is rising up and generally we can say that planet is going to be warmer than is it now.
5. Another interesting observation is that from 1975 temperature rising up faster that in the previous years.
6. Correlation factor varies from +1,0 to -1,0. For this data set the correlation factor has value 0,824. This value indicates a *strong correlation* between average temperature for Bratislava and average global temperature.

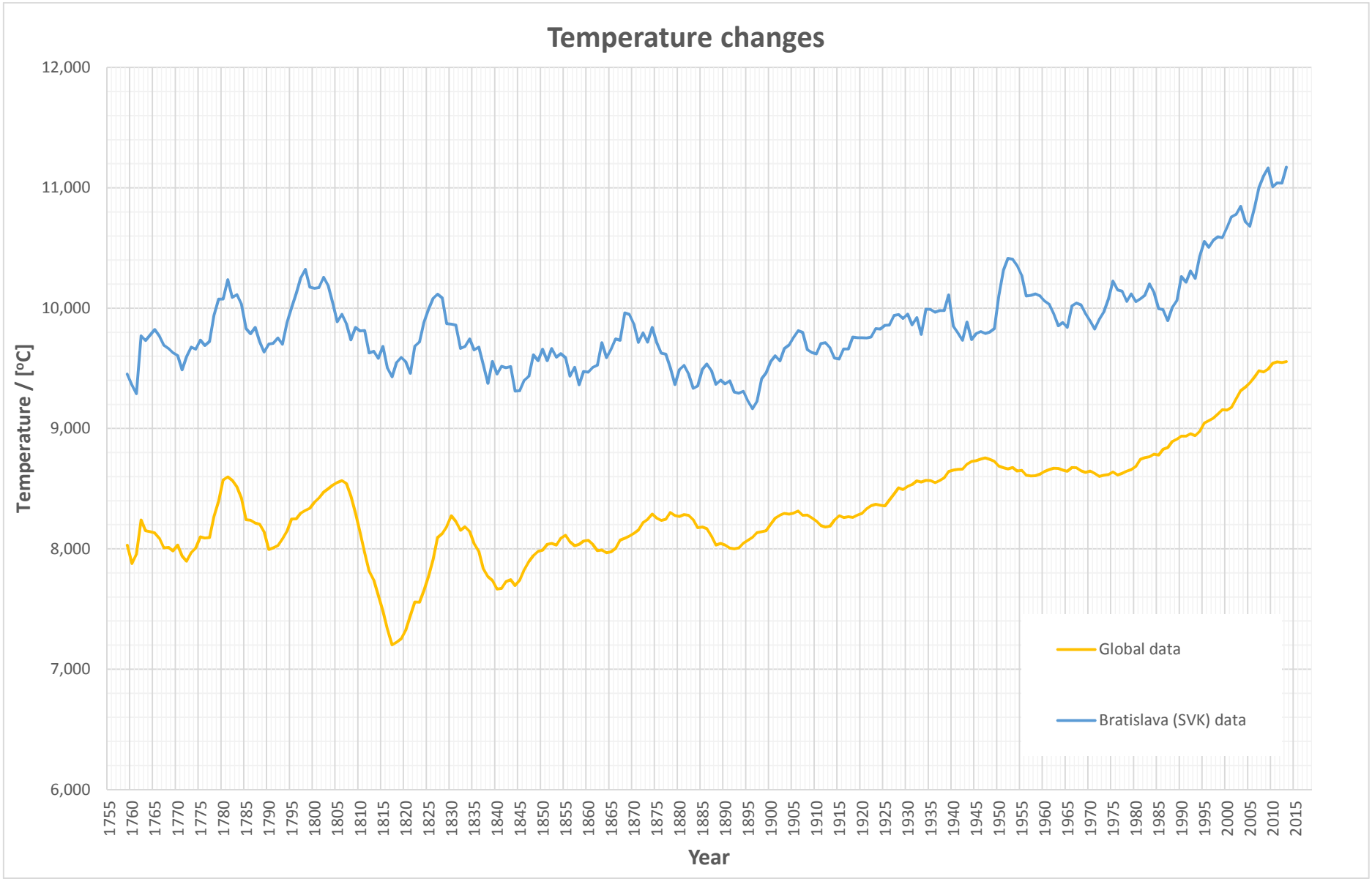
7. Conclusion

Based on provided data we can say that Bratislava is a little bit warmer city comparing to global average. From 1895 we can observe increasing trend in average temperature not only for one city but for global environment as well. One of the factor of this could be industrial revolution and increasing level of emissions. But to confirm that fact this hypothesis needs to be deeply evaluated.

Interesting fact is strong correlation factor between global and Bratislava data.

Generally, we definitely can say that temperature around the globe is permanently rising up and environment is going to be warmer in the future.

Annex 1 Full Chart line



Annex 2 Full Chart line[4]

year	citytempBA	globaltemp	cityTemp10y	globaltemp10yBA
1750	10,67	8,72	-	-
1751	10,98	7,98	-	-
1752	5,01	5,78	-	-
1753	9,78	8,39	-	-
1754	9,62	8,47	-	-
1755	9,41	8,36	-	-
1756	10,29	8,85	-	-
1757	9,94	9,02	-	-
1758	8,91	6,74	-	-
1759	9,91	7,99	8,030	9,452
1760	9,78	7,19	7,877	9,363
1761	10,25	8,77	7,956	9,290
1762	9,8	8,61	8,239	9,769
1763	9,39	7,5	8,150	9,730
1764	10,1	8,4	8,143	9,778
1765	9,85	8,25	8,132	9,822
1766	9,74	8,41	8,088	9,767
1767	9,19	8,22	8,008	9,692

	cityTemp10y	*globaltemp10yBA*
cityTemp10y	1	
globaltemp10yBA	0,824	1

[4] Annex 2 does not contain all data. It shows only first list from MS Excell.