Exploring Weather Trends
Project 1

Analysis Of Local And Global Temperature Data

Tinatin Verdzeuli
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Overview

This Project describes similarities and differences between global temperature averages and temperature trends in Tbilisi, Georgia.

Outline

Project consists of following steps :

- Extraction of data from a database using a SQL query.
- Calculation of a moving average in a spreadsheet.
- Creation of a line chart in a spreadsheet.
- Least four observations, about the similarities and/or differences in the trends.

Tooles

- SQL - For data extraction

    SQL commands to find city, select and join tables:

    > SELECT * FROM city_list WHERE country LIKE ‘Georgia’

    > SELECT global_data.year, global_data.avg_temp as globavg, city_data.avg_temp as cityavg

    FROM global_data

    JOIN city_data

    ON global_data.year=city_data.year

    WHERE city='Tbilisi'

- Excel - Plotting Line Charts and calculating Moving Average

    Moving Average was calculated using formula “=AVERAGE(An:An+x) “

    Where x = 3 and x = 10

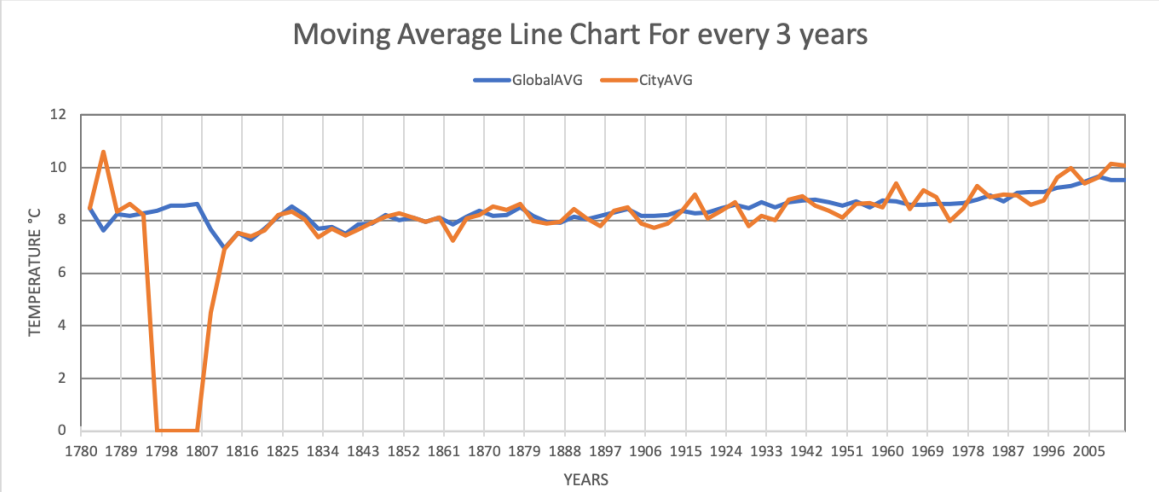
    Below is a part of Excel file for demonstration porpoises.

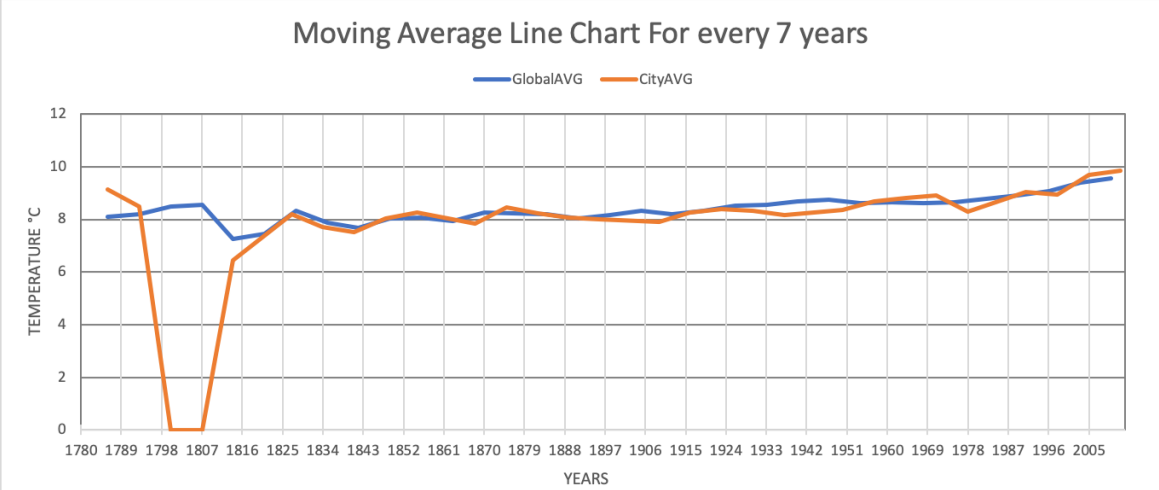
Charts

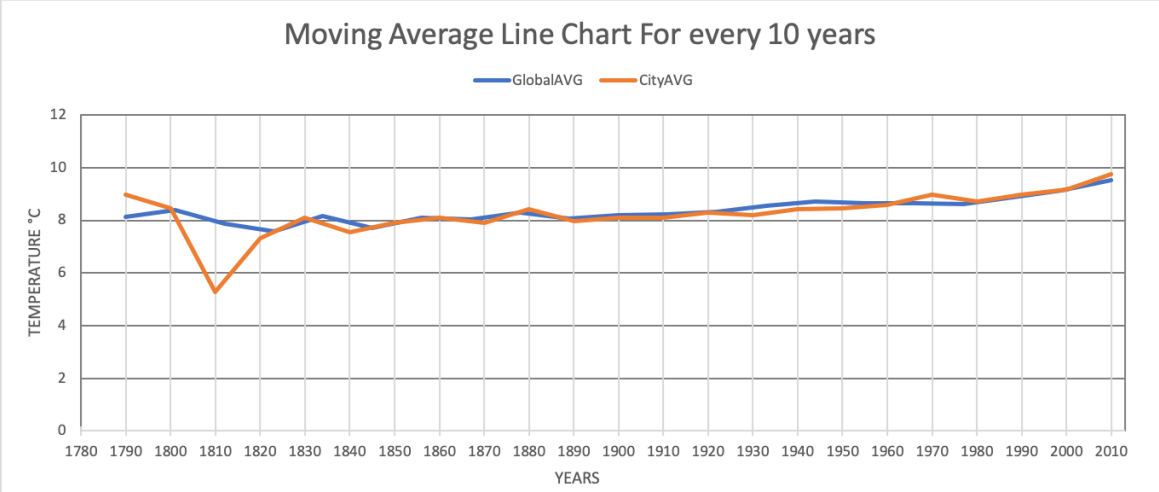
	A	B	C	D	E	F	G	H
1	year	globavg	cityavg	MovGobAvg10	MovCityAvg10	MovGobAvg3	MovCityAvg3	
2	1780	9,43	9,17					
3	1781	8,1	8,31					
4	1782	7,9	7,91			=AVERAGE(B2:B4)		
5	1783	7,68	9,27					
6	1784	7,86						
7	1785	7,36	11,96			7,633333333	10,615	
8	1786	8,26	8,21					
9	1787	8,03						
10	1788	8,45	8,47			8,246666667	8,34	
11	1789	8,33	8,56					
12	1790	7,98		8,125454545	8,9825			
13	1791	8,23	8,7			8,18	8,63	
14	1792	8,09	8,22					
15	1793	8,23						
16	1794	8,53				8,283333333	8,22	
17	1795	8,35						
18	1796	8,27						
19	1797	8,51				8,376666667	#DIV/0!	
20	1798	8,67						
21	1799	8,51						
22	1800	8,48			8,46	8,553333333	#DIV/0!	
23	1801	8,59		8,405454545				
24	1802	8,58						
25	1803	8,5				8,556666667	#DIV/0!	
26	1804	8,84						
27	1805	8,56						
28	1806	8,43				8,61	#DIV/0!	
29	1807	8,28						
30	1808	7,63	2,27					
31	1809	7,08	6,75			7,663333333	4,51	
32	1810	6,92	6,83		5,283333333			
33	1811	6,86	6,9					
34	1812	7,05	7,02	7,884545455		6,943333333	6,916666667	
35	1813	7,74	7,56					
36	1814	7,59	7,79					
37	1815	7,24	7,18			7,523333333	7,51	
38	1816	6,94	6,95					
39	1817	6,98	7,12					
40	1818	7,83	8,14			7,25	7,403333333	
41	1819	7,37	7,43					

I have plotted global and local graphs together to better demonstrate differences and similarities between the two.

First, Second and third graphs show moving average with windows 3, 7, 10.







Observations

1. Global average temperature changes between 7.5°C - 9.5°C during 230 years. Showing a (in larger picture) trend of very slow gradual increase over the years 1780 - 2010 of nearly 2°C.
2. Average Tbilisi temperature is very similar to global average. Which has mostly been consistent over time (Especially from year 1820 till 2010).
3. Tbilisi average temperature trend, Just like trend for global average, also shows gradual increase over long period of time.
4. Both averages show consistent type of periodicity, where after temperature increase phase, comes a decrease phase: having peak minimums and maximums in every period. Showing that in smaller periods (~ 10 years) temperature stays nearly consistent.
5. According to above observation [4] and an average temperature graph, we can expect an average temperature decrease soon after 2010 (first a bit of increase possibly, and once it reaches maximum peak, it will start to decrease), for global world and Tbilisi.
6. Having in mind the first observation [1], and larger time lapse, we can also expect a gradual and slow increase of temperature after 2010. For example in every 100 years by ~ +1°C. This shows a trend of temperature rising globally. However, this is only a guess, based on small time period, and I don't have nearly enough information from this data, to make any accurate conclusion.