EXPLORE WEATHER TRENDS

7 April 2020

Udacity - Data Analyst Nanodegree

Eya Sahli

Tunis , Tunisia

Overview

In this project, I analyzed local temperature of Tunis , Tunisia , global temperature data and compared the temperature trends where I live to overall global temperature to fulfill the following goals.

Goals

- extracting data from the database .
- manipulating data .
- creating clear data visualization .
- observation and interpretation of the data visualization .

Tools

- **SQL** : to extract data from the database provided by Udacity.
- **Google sheets** : to explore , manipulate and plot the data.

Steps :

I.   Data extraction :

SQL QUERY	PURPOSE
SELECT * FROM global_data WHERE year BETWEEN '1753' AND '2013'	data extraction from the global_data table .
SELECT * FROM city_list WHERE country = 'Tunisia'	search of the cities available for my country . (the query returned Tunis as the sole city available for my country , which is the closest to my city)

SELECT * **FROM city_data** **WHERE country = 'Tunisia' AND city =** **'Tunis' AND year BETWEEN '1753' and** **'2013'**	extraction of the relevant data for my city from the city_data table .

Notes :

- the queries written above are to select data for the years that range from 1753 to 2013 , because of the missing data in the city_data table for my city , so I only worked on data where the temperature data and year are available and present in both tables (global_data and city_data).
- upon the extraction , the data was downloaded as csv files that were later imported into google sheets for manipulation .

II.   Data Manipulation :

Moving Average : in order to get an overall idea of the long-term trends and highlights in my data set , I calculated a fifteen-year moving average to smooth out short-term fluctuations and remove the "noise" . regarding my wide range of years , a moving average of 15 years seemed fitting and adequate to me .

the moving average was calculated using the average function in google sheets as shown in the following picture :

	G	H	I	J
	year	avg_temp	18,318 ✕	avg_temp
	1753	18,45	=AVERAGE(H2:H16)	8,39
	1754	18,47	18,25	8,47
	1755	18,21	18,23666667	8,36
	1756	18,67	18,23466667	8,85
	1757	18,43	18,23133333	9,02
	1758	17,25	18,308	6,74
	1759	18,36	18,37666667	7,99
	1760	17,94	18,40333333	7,19
	1761	18,62	18,47	8,77
	1762	18,56	18,44666667	8,61
	1763	17,9	18,41533333	7,5
	1764	18,62	18,46733333	8,4
	1765	18,57	18,476	8,25
	1766	18,52	18,514	8,41
	1767	18,2	18,524	8,22
	1768	17,43	18,51333333	6,78
	1769	18,27	18,57333333	7,69
	1770	18,18	18,57333333	7,69
	1771	18,62	18,56066667	7,85

III.   Data Visualization and Observations :

For the data visualization , i created a line chart based on the moving averages of both Global and Tunis temperatures from 1753 to 2013 to observe their differences and similarities .
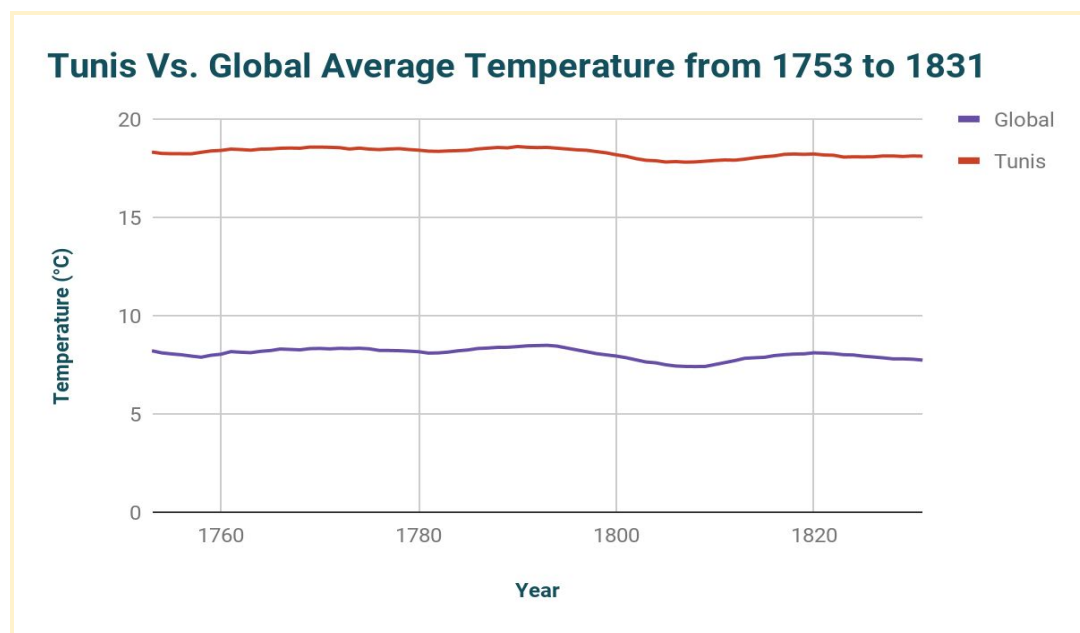
Tunis Vs. Global Average Temperature
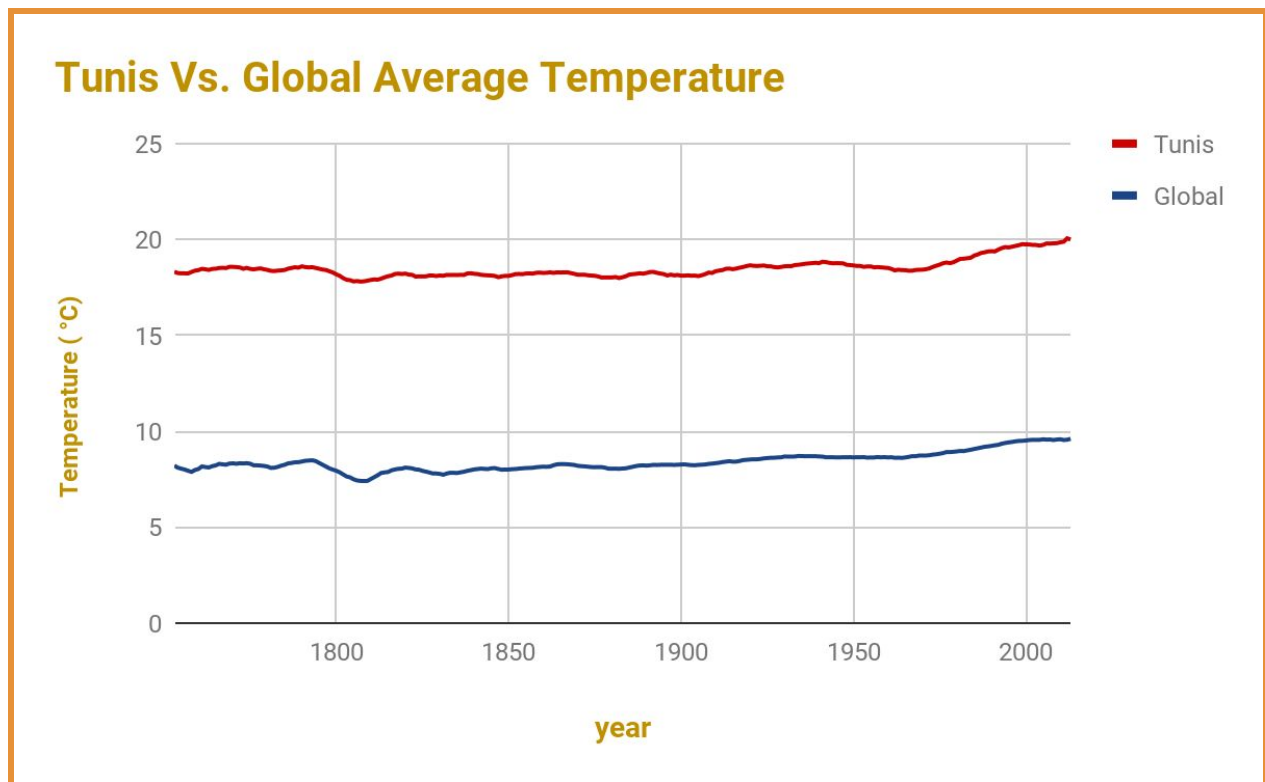
Observations :

- Global average temperature varies between 7.40 °C (1808) and 9.16 °C (2013) .
- Tunis average temperature varies between 17.806 °C (1807) and 20.06 °C (2012) .

- on average , if we compare the global and local average temperatures , Tunis seems to be hotter than global average .
- when it comes to consistency , according to the chart , Tunis has always been hotter than the global average , but the gap between the temperatures is slightly different from a year to another .
- for the change in global temperature over time compared to Tunis's , both temperatures seem to follow nearly the same ups and downs . for instance , from 1756 to 1816 , according to the following line chart , we can clearly observe the increase and decrease of temperatures , it's also worth noting that the incline and decline of temperature seems to be sharper for Tunis than the global average .

note : this line chart was made to show a portion of the line chart above in order to better observe the trends and have clearer insight .
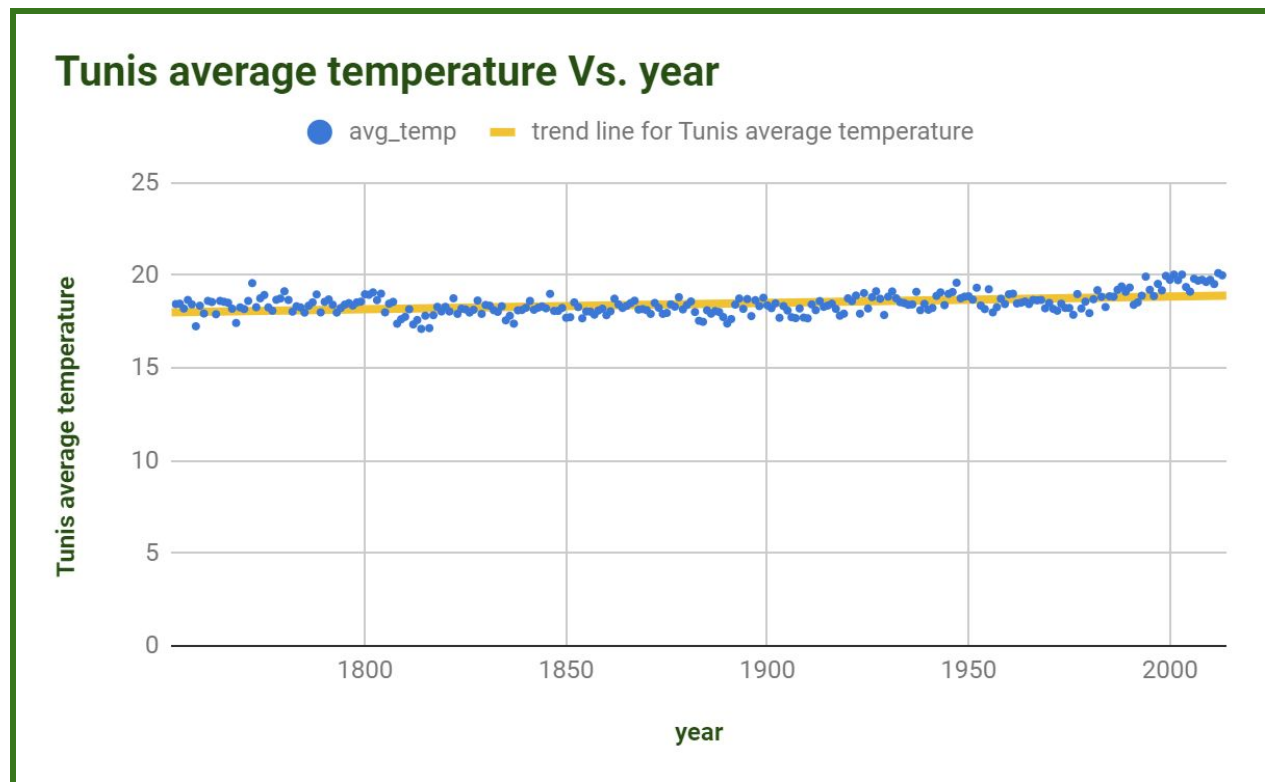

Tunis Vs. Global Average Temperature from 1753 to 1831

Correlation :

**I calculated the correlation coefficient between the years
and the average temperatures for both Global and Tunis
data and realised the following scatter plots .**
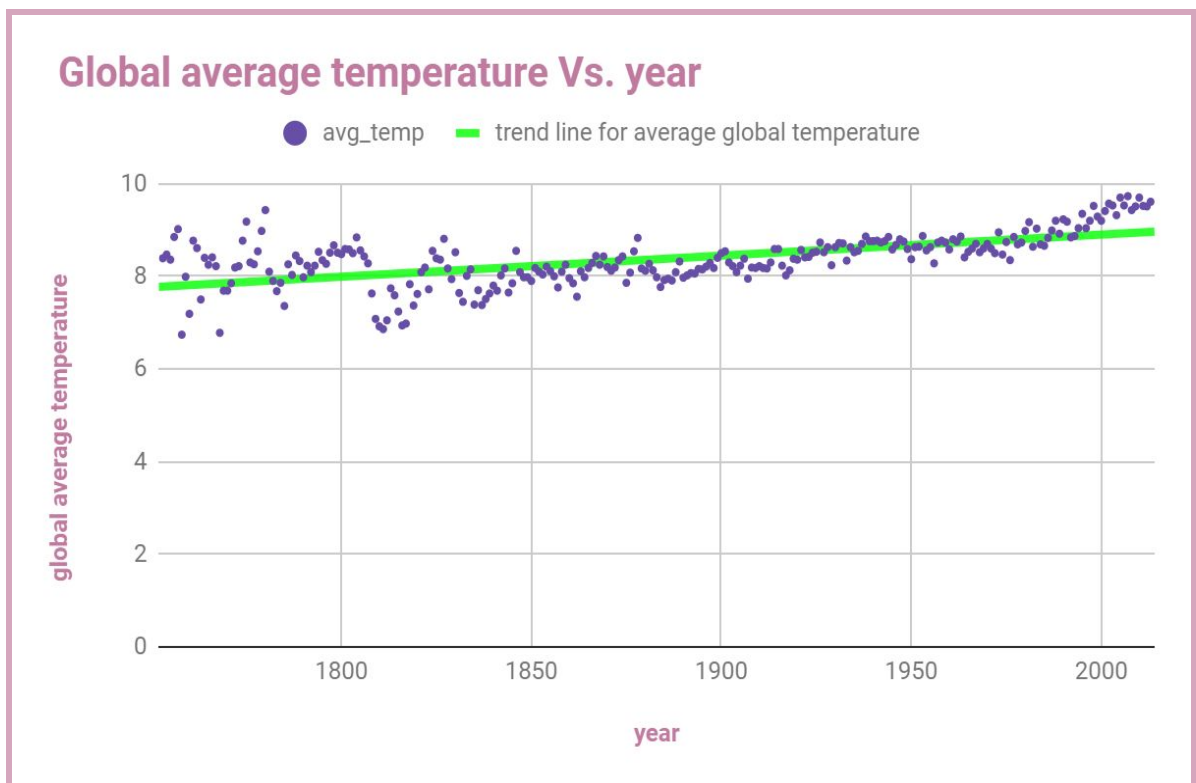
Correlation coefficient : r = `0,6179568729`

Correlation coefficient : r = 0,4597436555

- both correlation coefficients for the global and
  Tunis averages are greater than zero , this
  signifies that we have a positive correlation
  between years and temperature averages , that is to
  say , both variables move in tandem and in the same
  direction , in other words , temperatures increase
  year by year.
- the correlation coefficient between the global
  average temperature and year is greater than the
  one between Tunis average temperature and year ,
  which means that global average temperature and
  year are more correlated and hence , the global

temperature is increasing more than Tunis's over the years and the world is getting hotter.

Key considerations :

when making the visualizations , I tried to consider comparison by using different colors that are also colorblind friendly to see for myself the variation in temperature as an important component of climate change.

coloblind colors palette reference: https://davidmathlogic.com/colorblind/#%23D81B60-%231E88E5-%23FFC107-%23004D40

UDACITY