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Explore Weather Trends

Udacity - Data Analyst Nanodegree

Introduction:

In this project I have analyzed the average temperature of my city 'Karachi' with Global Average Temperature around the world. I extracted the data from the database provided by Udacity. For extraction of the data I have used SQL commands and for plotting the graph and visualizing it I have used Microsoft Excel.

Tools Used:

1. **SQL:** For extracting data from the database provided.
2. **Excel:** For calculating the moving average (to smooth out data) and for visualizing, plotting the graphs between Karachi Average Temperature and Global Average Temperature.

Project Outline:

STEP 1: Extraction of Data from Udacity Database

I learnt the SQL basics from the 'Intro to Relational Database' – Udacity while completing this project and applied its concept to extract the data from the database.

- To extract the global average temperature, and year the following commands were used.

      SELECT avg_temp, year FROM global_data

- To extract the local average temperature for Karachi the following SQL commands were used.

      SELECT year, city, country, avg_temp FROM city_data WHERE city='Karachi'

After this the SQL query was used to download the CSV file.

STEP 2: Data Selection & Manipulation on Excel

After opening the data in excel file. The Moving Averages was calculated as followed:

- The Moving Average was calculated for Average Temperature of Karachi to smooth out the data and to visualize the trend easily.

- The Moving Average has been calculated for every 7th year for each single data using *=AVERAGE()* function in Excel for every 7th year.

Then a 2-D Line Chart was plotted on Excel.

- Then a 2-D Line Chart was plotted on Excel by selecting Global Avg Temp and Moving Avg Temp Karachi as Y-axis and years as X-axis. Selection of column was done using
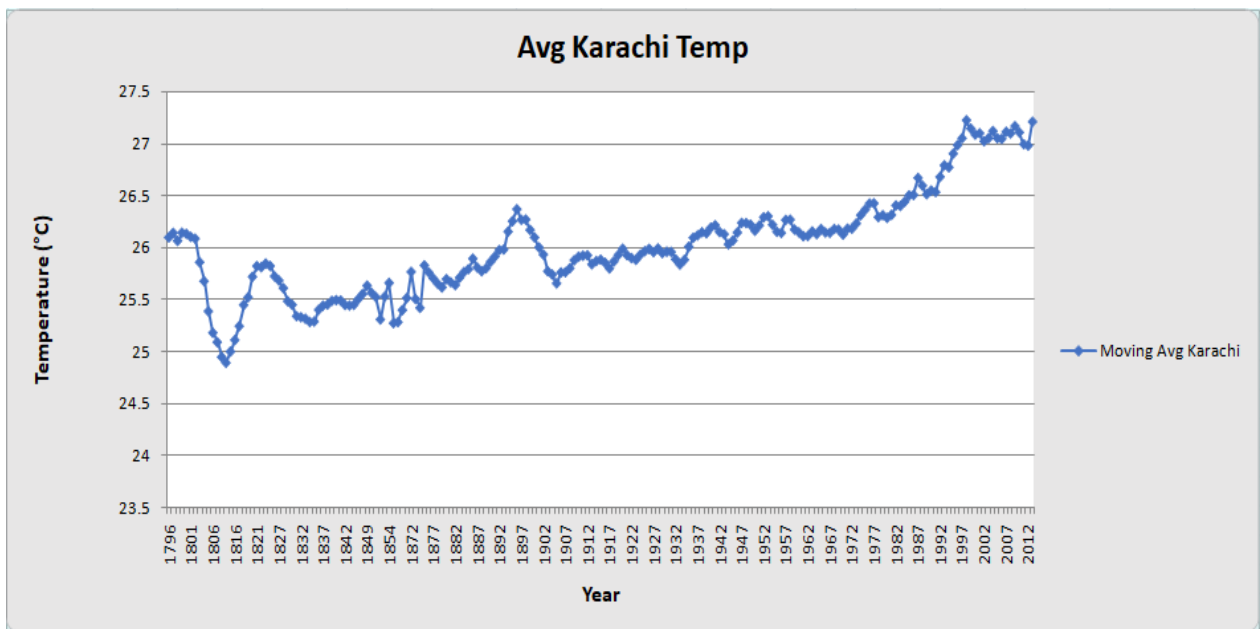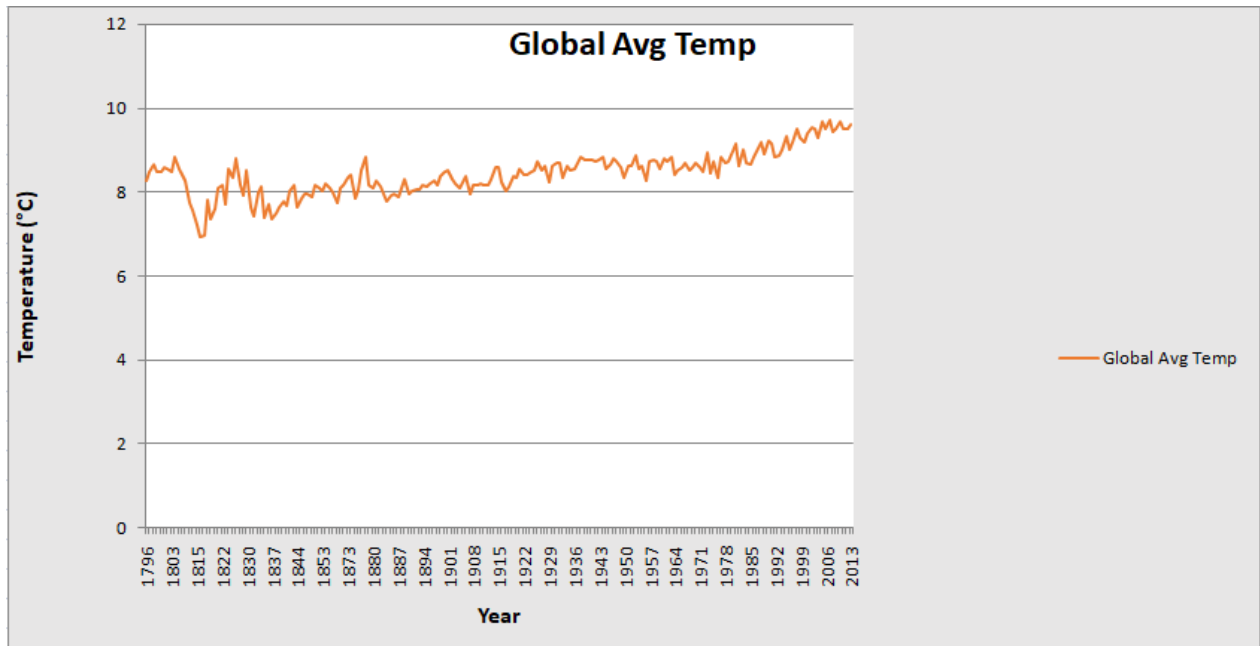
CNTRL + SHIFT + DOWN ARROW

STEP 3: Data Visualization

The first chart shows a comparison between global average and local average temperature across the following years.
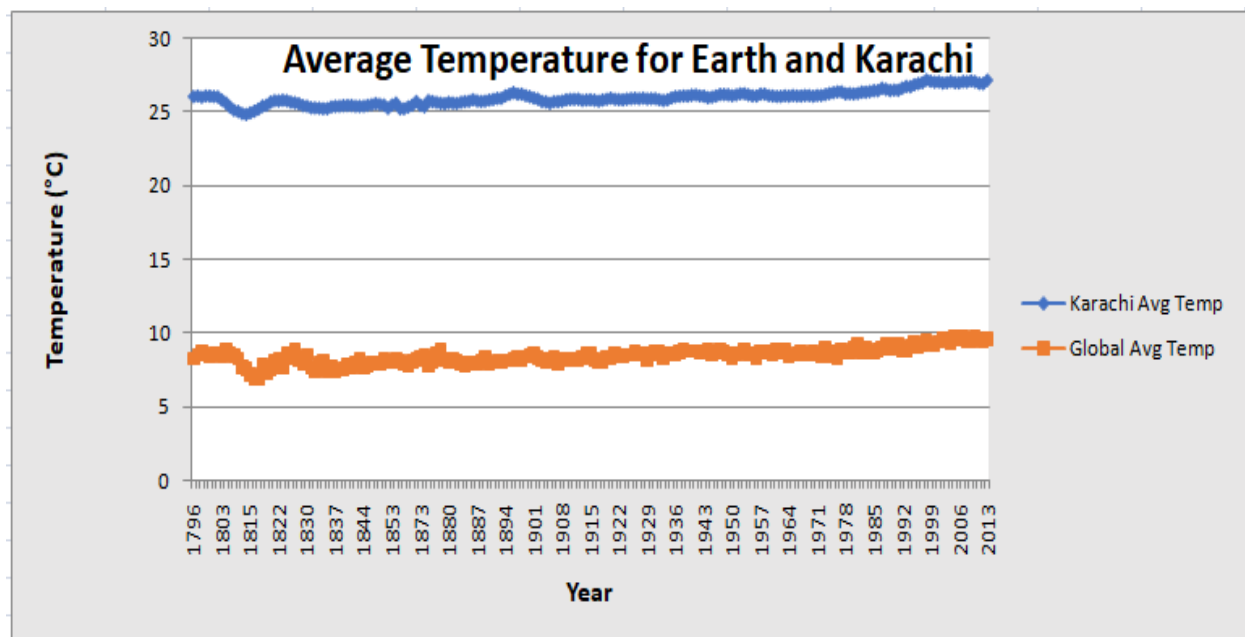
- Two other charts for Global Avg Temperature and Karachi City Avg Temperature separately for better data visualization are shown below:

Observations:

- The Average Temperature of Karachi started to raise exponentially since the start of 1800, as shown in the third graph.
- From the year 1800 to 2012, there has been an increase in overall temperature of approximately 2 to 2.5 degrees centigrade in city Karachi, whereas the Global Average temperature has raised approximately 1.5 to 2 degrees centigrade.
- The city Karachi is approximately 16 to 18 degrees Centigrade hotter as compared to the Global Average Temperature.
- The city Karachi is getting warmer and warmer each year.
- In both graphs, we can see that the average temperature is gradually increasing over the years.

Conclusion:

After visualizing the Global Average Temperature there is enough evidence to suggest that the Global Temperature is raising over the years due to climate change.