Udacity

Data Analyst Nanodegree

Explore Weather Trends

Project 1

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Submitted by:

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Overview :

Analyze the average temperature trends between the nearest city and the global.
As I'm from Saudi Arabia and I live in Jeddah city. The nearest city for me in the database is Mecca. The nearest city for me in the database is Mecca.
So, I start comparing the average temperature in Mecca and global from the year 1861, because before this year there is missing data for average temperature in Mecca, so all the analysis in this project starts from 1861 and end in the year 2013.
In this project, in all charts, Mecca data will represent by the color blue while global data will represent by the orange color.

The steps of solution and analysis:

Step One : Extract the data from the database by using SQL.

1- To find out which Saudi cities are included in the database.

```
SELECT *
FROM city_list
WHERE country LIKE 'Saudi%'
```

2- As I found Mecca is the nearest city for Jeddah, the next step is to extract Mecca's data and download CSV

```
SELECT *
FROM city_data
WHERE city LIKE 'Mecca'
```

3- Extract data for the global and download CSV

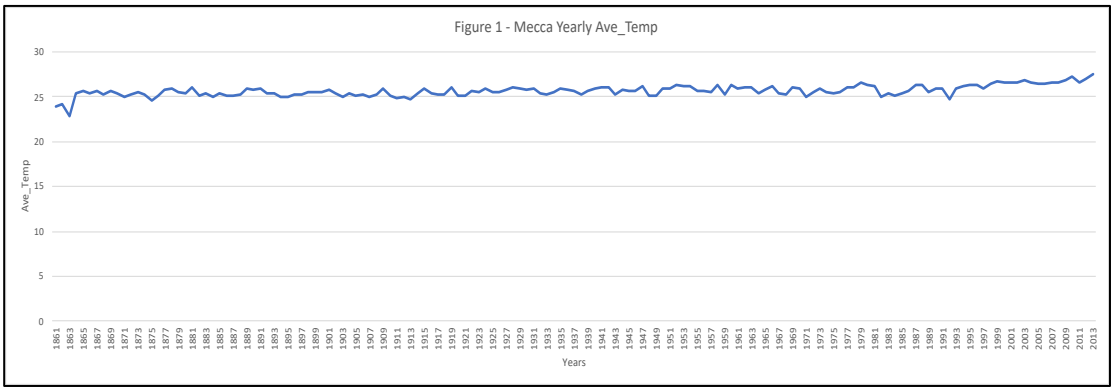
```
SELECT *
FROM global  data
```

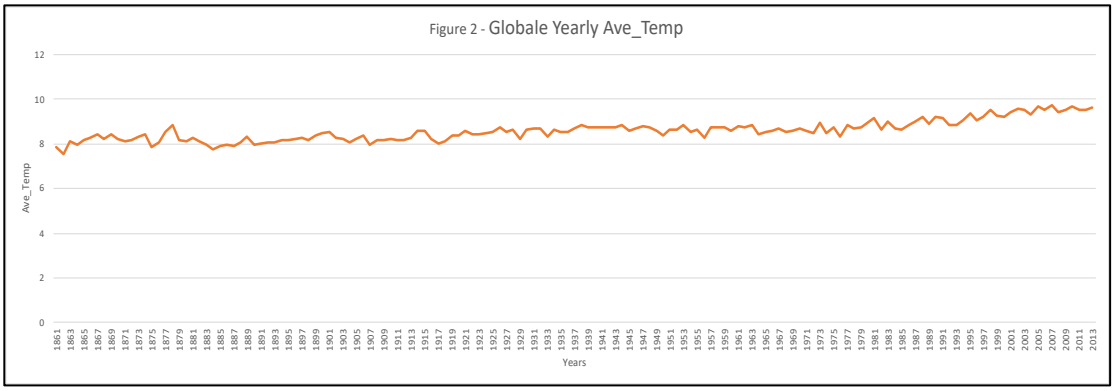
Step Two: Using Excel & Observations

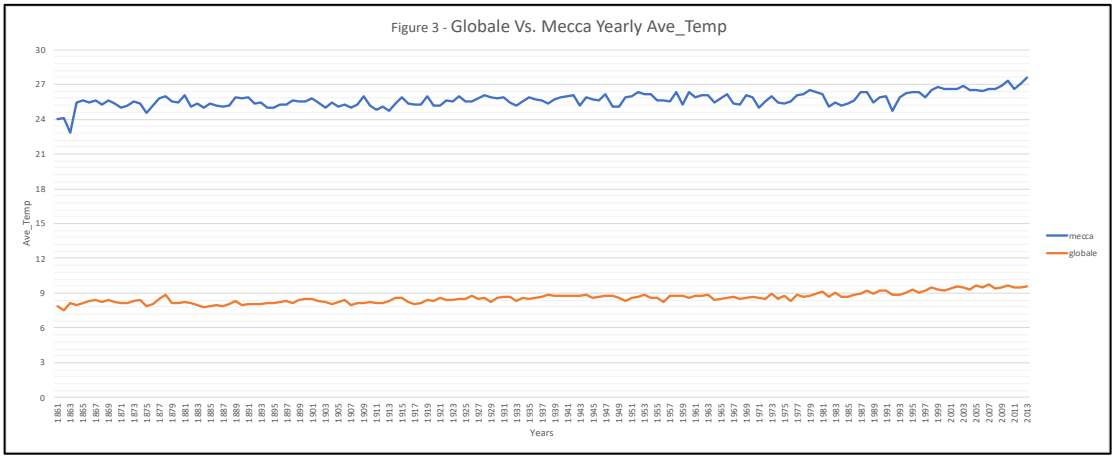
Combine these two tables in one table by using Excel (vlookup function), Under each section, there are some observations related to the figures or tables in the section.

Section One :

In this section, there is a linear plot for average temperature in Mecca and global as seen in figures 1 and 2. In figure 3, the average temperature for both Mecca and global.







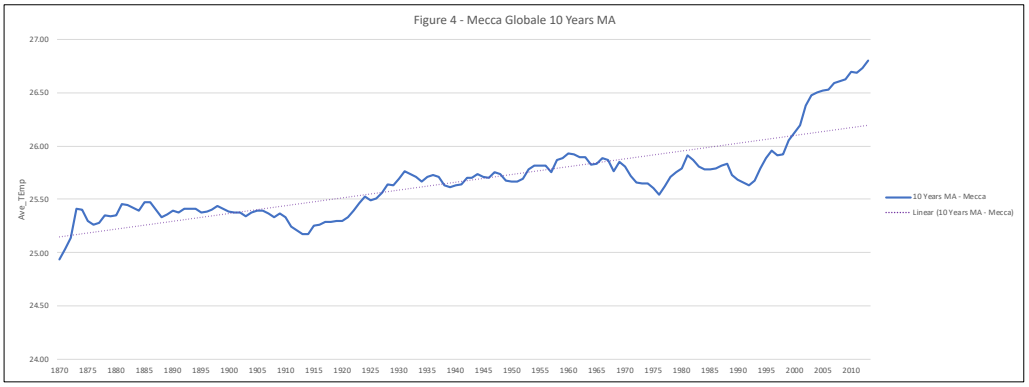
As is has shown there is a large gap between the averages temperature, Mecca temperature considers more than three times hotter than global temperature.

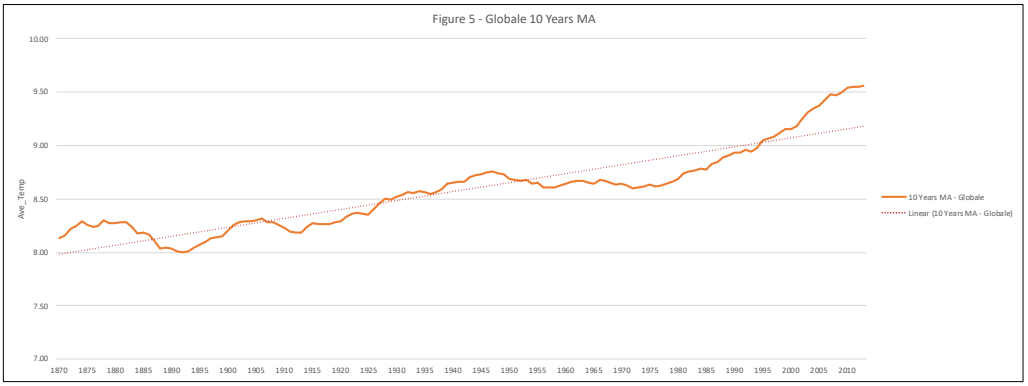
As we see there is a similarity in both average temperature in Mecca and global, both average temperatures go slightly high over the years.

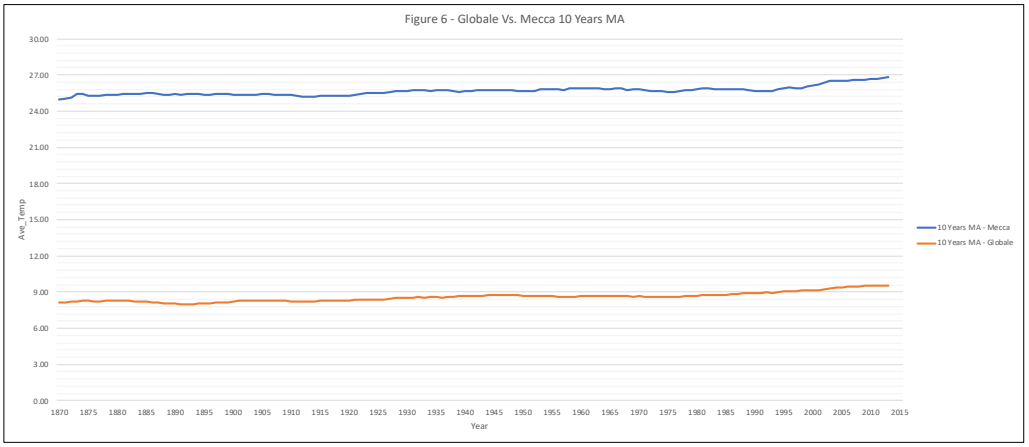
Section Two:

In section two, in figures 4,5 shows the moving average for 10 years for each of the average temperatures for Mecca and global and the trendline. The reason to choose 10 years for the moving average because the 10 years represent one decade.

The gap between trendline and the actual average temperatures, Mecca has a larger gap than global. Which mean the average temperatures in Mecca goes up more than expected and faster than global average temperatures. In figure 6, comparing between the moving averages.







Mecca's moving average starts at 24,94 in 1870 and rising to reach 26,80 in 2013, the change is about 2.15 degrees. While the global moving average in 1870 was 8.13 and reach to 9.56 in 2013, the change is equal to 1.43 degrees.

This means Mecca moving average is more fluctuating and it rises over the years more than the average global temperature.

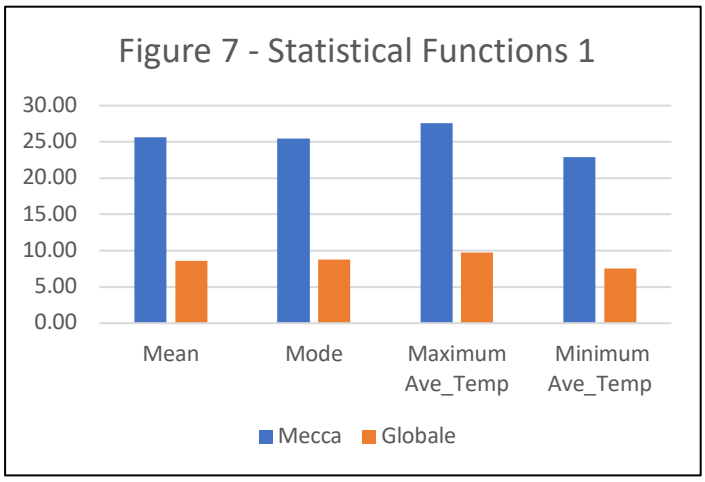
Section Three:

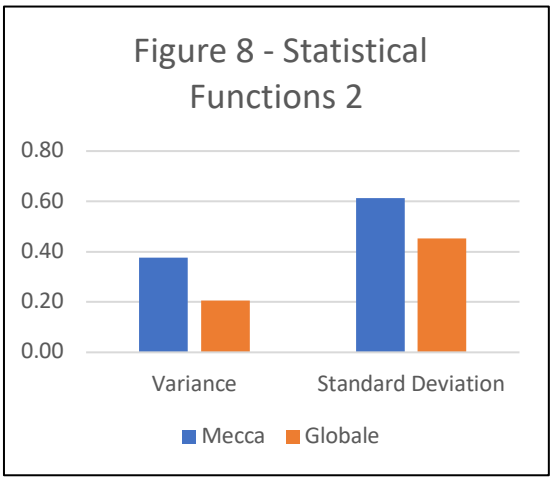
There are some statistical functions to see the difference and similarity for average temperatures for Mecca and global in following tables and charts:

Statistical Functions	Mecca	Globale
Mean	25.68	8.59
Mode	25.42	8.73
Maximum Ave_Temp	27.57	9.73
Minimum Ave_Temp	22.87	7.56
Variance	0.38	0.21
Standard Deviation	0.61	0.45
Correlation Coefficient	0.75	

Place	Maximum Ave_Temp	Year
Mecca	27.57	2013
Gloable	9.73	2007

Place	Minimun Ave_Temp	Year
Mecca	22.87	1863
Gloable	7.56	1862





The mean of the average temperature for Mecca is more than the global average temperature. Besides, the standard deviation and variance of Mecca data are higher than the global data. That means the data for average temperatures in Mecca is more dispersion than the global average temperatures. In 1862, the global average temperature registered the lowest degree at 7.56. While Mecca registered its lowest degree in 1863 at 22.87.

In 2007, the global average temperature registered the highest degree at 9.73. while Mecca registered the highest average temperature in 2013 at 27.57.

from this, we can say that Mecca's average temperature affected by the change in the global average temperature. Also, the Correlation Coefficient between global average temperature and Mecca is 0.75, which means there is a positive strong relationship, as the global average temperature increases, Mecca's average temperature will also increase and vice versa.

Section Four:

By using forecast trendline, the forecasting for the next 10 years is the average temperature for both Mecca and the global will be almost the same as it was in the last decade as it shown in Figures 9 and 10.