Exploring Weather Trends

Data Analysis

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Introduction

Exploring weather is a substantial matter to nearly the whole world. Having the ability for measuring and recording everyday temperature in order to observe the weather and predict How will it shape our future? it will certainly be very helpful in many aspects. Such as agriculture, Droughts and Biodiversity, along with Heat-Related Illness and Mortality, etc.

Data Extraction:

In order to extract data from the data set I used SQL query.

Input:

```
select city From city_list
where country= 'Saudi Arabia';
```

Output:

- Mecca
- Riyadh

I decide to choose Mecca city because it is the closest to my city "Madinah".

Because there was two column with the same name in different tables, I change the name respectively:

Input:

```
ALTER TABLE global_data RENAME COLUMN avg_temp to global_avg_temp;
ALTER TABLE city_data RENAME COLUMN avg_temp to city_avg_temp;
```

Then I join the two tables together in the same interval and not including NULL values.

Input:

```
select global_data.year, global_data.global_avg_temp,
city_data.city_avg_temp
from global_data join city_data
on global_data.year = city_data.year and
 city_data.city_avg_temp is not null
where city = 'Mecca';
```

Output:

A CSV file contain the city ‘Mecca’ and global data from 1843 until 2013.

Data Organization:

I used Excel to open the CSV files and apply the following operation:

- Calculate the Moving Average for both local and global temperatures with in 12 years using the Data Analysis tool.

  Moving Average helps to smooth the data and make it more obvious to observation and conclusion.

	A	B	C	D	E
1	year	global_avg_t	city_avg_tem	global_mov_	city_mov_avg
2	1843	8.17	25.16	#N/A	#N/A
3	1844	7.65	19.05	#N/A	#N/A
4	1845	7.85	22.46	#N/A	#N/A
5	1861	7.85	23.98	#N/A	#N/A
6	1862	7.56	24.13	#N/A	#N/A
7	1863	8.11	22.87	#N/A	#N/A
8	1864	7.98	25.43	#N/A	#N/A
9	1865	8.18	25.6	#N/A	#N/A
10	1866	8.29	25.42	#N/A	#N/A
11	1867	8.44	25.62	#N/A	#N/A
12	1868	8.25	25.3	#N/A	#N/A
13	1869	8.43	25.65	8.06333333	24.2225
14	1870	8.2	25.35	8.06583333	24.2383333
15	1871	8.12	24.97	8.105	24.7316667
16	1872	8.19	25.2	8.13333333	24.96
17	1873	8.35	25.57	8.175	25.0925
18	1874	8.43	25.32	8.2475	25.1916667
19	1875	7.86	24.53	8.22666667	25.33
20	1876	8.08	25.13	8.235	25.305

Figure 1.1 A screenshot of the file after modifications

Data Visualization:

Data visualization provide us with better view of the data. I used Python, Jupyter notebook.

Import the libraries:

```
import pandas as pd
import plotly.express as px
```

Loaded the data:

```
df=pandas.read_csv('/Users/wijdan_alnaif/Downloads/FResults.csv')
df.head()
```

Display the line chart for Mecca temperature:

```
figuer2 = px.line(df, x = 'year', y= ['Mecca Average','Mecca Moving Average'], title='Mecca temperature',
labels=dict(year='Years',value='Temperature'))
figuer2.show()
```

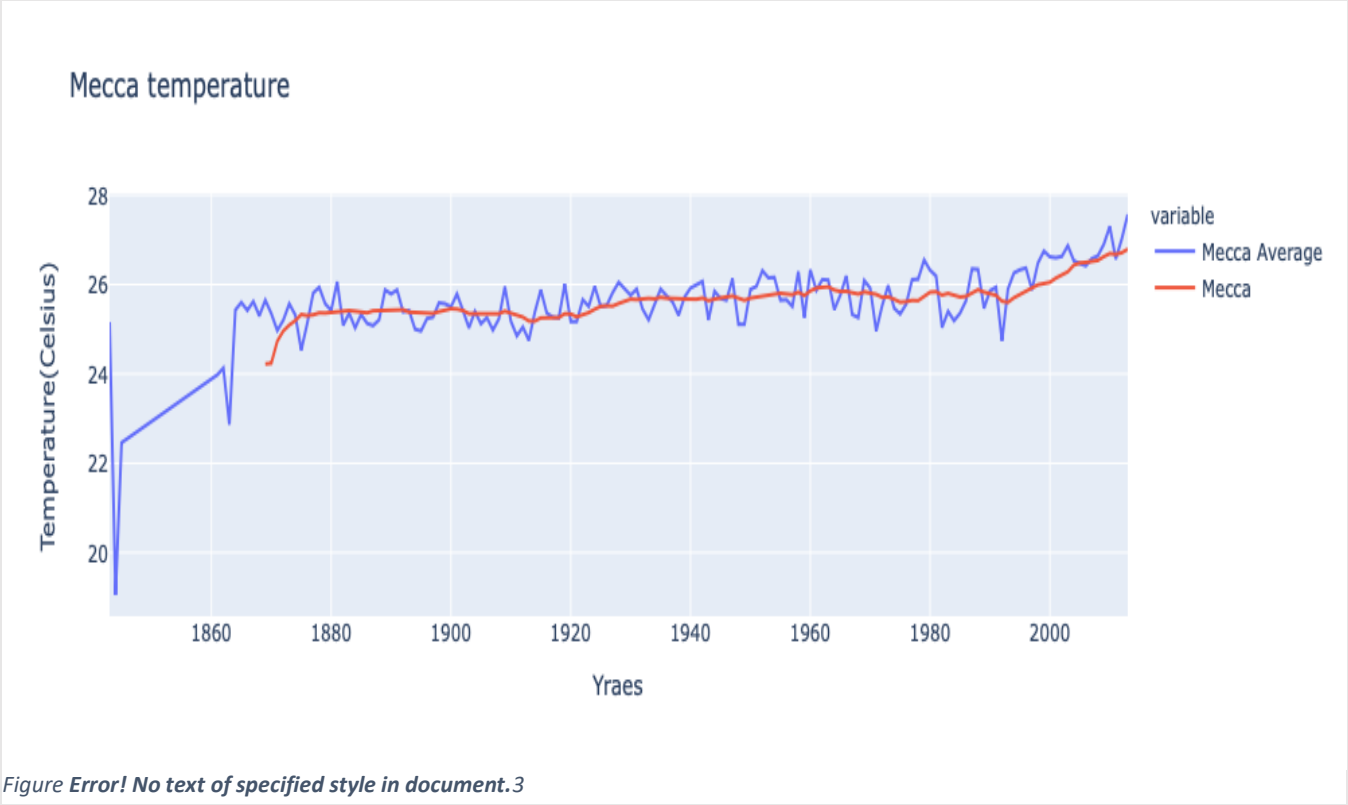

Figure ***Error! No text of specified style in document.****3*

Display the line chart for Global vs Mecca temperature:

Figuer3 = px.line(df, x = 'year', y= ['Moving Average','Mecca Moving Average'],title='Global vs Mecca Average temperature',labels=dict(M_Year='Years',value='Temperature'))

Figuer3.show()

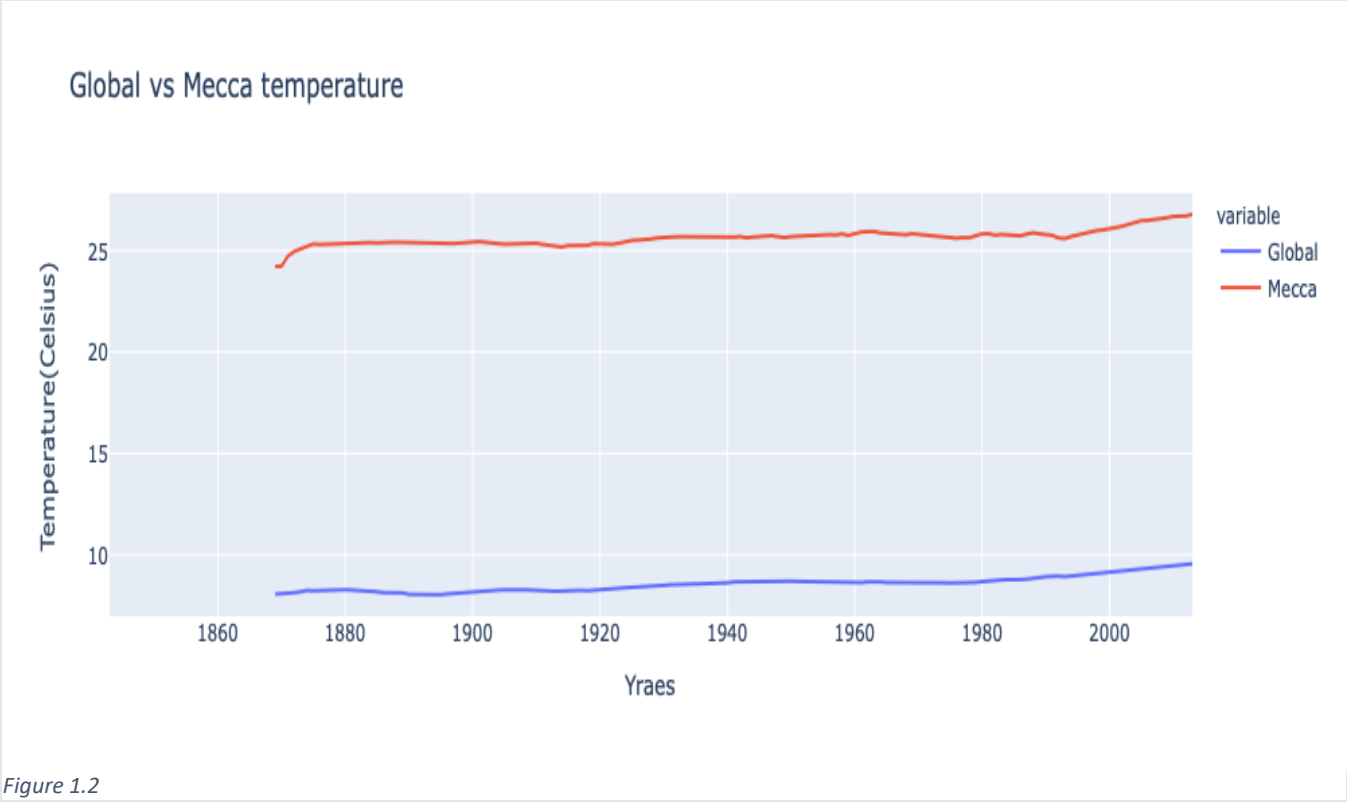

Figure 1.2

Observation:

i. The global moving average temperature chart illustrates a variety of degrees between 8 to 9.5 degrees. Figure 1.2

ii. The global average and the moving average temperature are increasing over times generally. Figure 1.2

iii. The local average temperature of Mecca is descended to approximately 25 degrees until 1994 start to increases over times to reach 26.7 degrees. Figure 1.3

iv. Mecca moving average temperature is hotter than the global moving average temperature. Figure 1.4

v. Both Mecca and global temperature increasing over recent years. Figure 1.4

vi. Since 1931 global temperature witness increasing in the temperature degree. Figure 1.2

References:

https://plotly.com/python-api-reference/generated/plotly.express.line.html

https://climate.nasa.gov/news/2865/a-degree-of-concern-why-global-temperatures-matter/