

Explore Weather Trends

Outline

1. Data Acquisition
 - a. Data was used from Udacity
 - b. Data was extracted from a database using SQL
 - i. First the closest city was searched for by using the following SQL:

```
SELECT *
FROM city_list
WHERE country='United States'
ORDER BY city
```
 - ii. Miami was the closest city
 - iii. From there the temperatures of Miami were extracted:

```
SELECT *
FROM city_data
WHERE city='Miami'
ORDER BY year
```
 - iv. Then the global temperatures were extracted:

```
SELECT *
FROM global_data
ORDER BY year
```
2. Data reduction
 - a. Data reduction took place in excel.
 - b. Several years in Miami had no data so the years were removed.
 - c. The Global data had temperature data up to 2015 while Miami only had data up to 2013 so 2014 and 2015 data for the Global data was removed.
 - d. The final range of data was from 1781-2013.
3. Calculations
 - a. The moving average was calculated by the decade using Excels AVERAGE function. The first ten years (1781-1790) was averaged. Then the next ten years (1791-1800) was averaged. This continued for both data sets until 2013 was reached.
4. Data Visualization
 - a. The matplotlib package in python was utilized for data visualization.
5. Data Analysis
 - a. The first most notable feature in the graph is the dip in temperature from 1811-1821. The sudden change is indicative that something must have happened in the world as both graphs exhibit the feature. (A quick search shows that 1816 was known as the "Year without a Summer" and could be a possible relation to a dip in the graph.)
 - b. There is a gradual rise in the global temperature over the graph as well as in Miami. However, the rise in temperature in Miami is not as great as the global rise.
 - c. The line graph of Miami has more small peaks and troughs than the line graph of the global temperatures. This could be because the temperature of the global graph is averaged over the whole world and results in a smoother graph.

- d. There is a sudden peak from 1951-1961 in the Miami graph that is not displayed in the global graph. It is interesting that there appears to be an isolated temperature hike.

```
In [2]: import matplotlib.pyplot as plt
import numpy as np
import pandas as pd
#To plot an interactive plot change "inline" to "qt"
%matplotlib inline #qt
```

UsageError: unrecognized arguments: #qt

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The purpose of this notebook is to visualize Udacity weather data for Miami and the world. It is recommended to view the plot as an interactive plot rather than inline.

```
In [3]: #importing the data
global_dat = pd.read_csv(r'C:\Users\jmcas\Downloads\Global_Data.csv',header=1)
miami_dat = pd.read_csv(r'C:\Users\jmcas\Downloads\Miami_Data.csv',header=1)
```

```
In [4]: #The global data displayed
global_dat
```

Out[4]:

	year	avg_temp	moving_average
0	1781	8.10	NaN
1	1782	7.90	NaN
2	1783	7.68	NaN
3	1784	7.86	NaN
4	1785	7.36	NaN
...
228	2009	9.51	9.493
229	2010	9.70	9.543
230	2011	9.52	9.554
231	2012	9.51	9.548
232	2013	9.61	9.556

233 rows × 3 columns

```
In [5]: #The miami data displayed  
miami_dat
```

Out[5]:

	year	avg_temp	moving_average
0	1781	23.39	NaN
1	1782	23.45	NaN
2	1783	22.44	NaN
3	1784	22.57	NaN
4	1785	22.24	NaN
...
228	2009	23.90	23.821
229	2010	22.75	23.746
230	2011	24.23	23.799
231	2012	23.92	23.780
232	2013	24.44	23.824

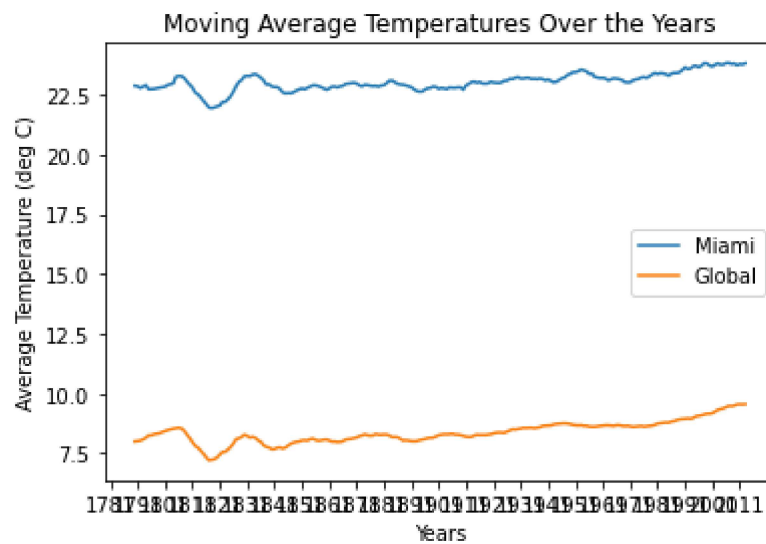
233 rows × 3 columns

```
In [6]: #creating a list of xticks for the graph  
x = []  
i=0  
while i < 233:  
    x.append(i)  
    i+=10
```

```
In [7]: #creating a list of xticks for the graph  
xtick = miami_dat['year'][x]
```

```
In [8]: #plotting the data
plt.plot(miami_dat['year'],miami_dat['moving_average'],label='Miami')
plt.plot(global_dat['year'],global_dat['moving_average'],label='Global')
plt.title('Moving Average Temperatures Over the Years')
plt.xlabel('Years')
plt.ylabel('Average Temperature (deg C)')
plt.xticks(xtick)
plt.legend()
```

Out[8]: <matplotlib.legend.Legend at 0x2a5bd5869d0>



In []:

Moving Average Temperatures Over the Years

