TITLE: Exploring Weather Trends

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CLASS: DATA ANALYST NANODEGREE PROGRAM

Table of Contents:

INTRODUCTION:

The project's primary objective was to take the global average temperature data and a local city of choice average temperature data and compare them using moving averages. Also, it was required to identify four similarities or differences with regards to the line charts produced.

Firstly, the data was extracted from the Udacity website using SQL commands for the global data, data on Portland, Oregon and, Miami, Florida. I had decided to not use my local city because I wanted to investigate the effect of global average temperature changes had on a tropical city and temperate city. The reason for this focus was to evaluate the effects on the change of global average temperature. A total of three excel spreadsheets was downloaded from the web page.

Secondly, two columns were created in each spreadsheet for a 7 year moving average and 14 year moving average respectively. The range for the years being evaluated was chosen by disregarding the a series of empty cells for the average temperature. The global average temperature range for the years was 1750 – 2015. The range for Portland was 1847- 2013 and, the range for Miami was 1781- 2013. The moving average was calculated using the excel function ('=AVERAGE()) for both the 7 year and 14 year moving average.

Finally, three line charts were created for the average temperature, 7 year moving average temperature and 14 year moving average. There was problems trying to fit three line graphs on one graph proved problematic. This was the reason you will see three charts for each dataset. A decision was made to create a line chart without points in the chart wizard in Libre Office cal software.

3

Results:

Table 1: Global Average Temperature Line Charts.

Global Average Temperature

7 Year MA Global Average Temperature
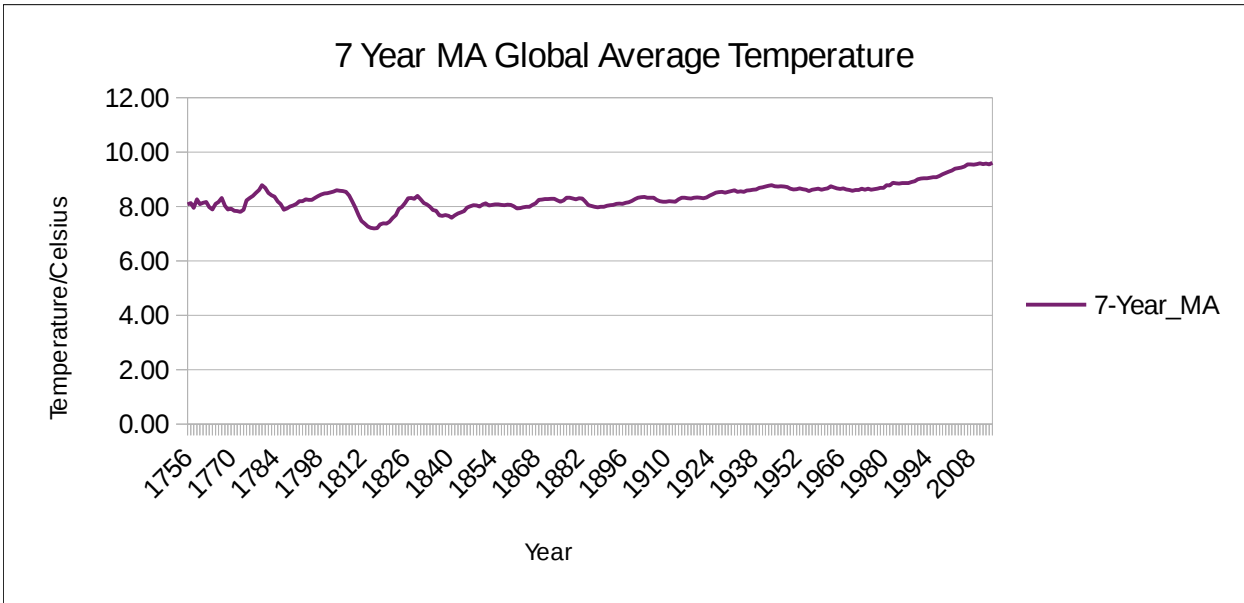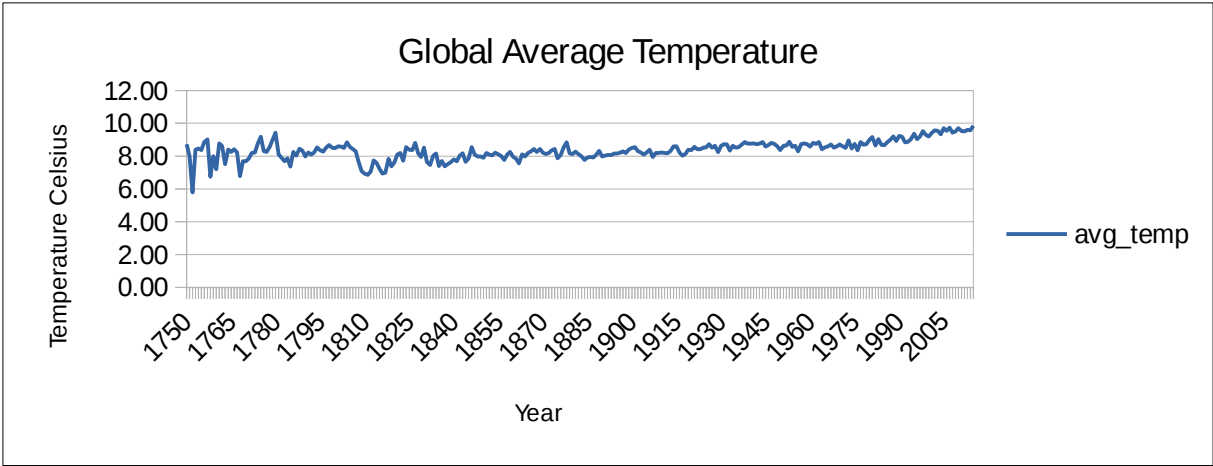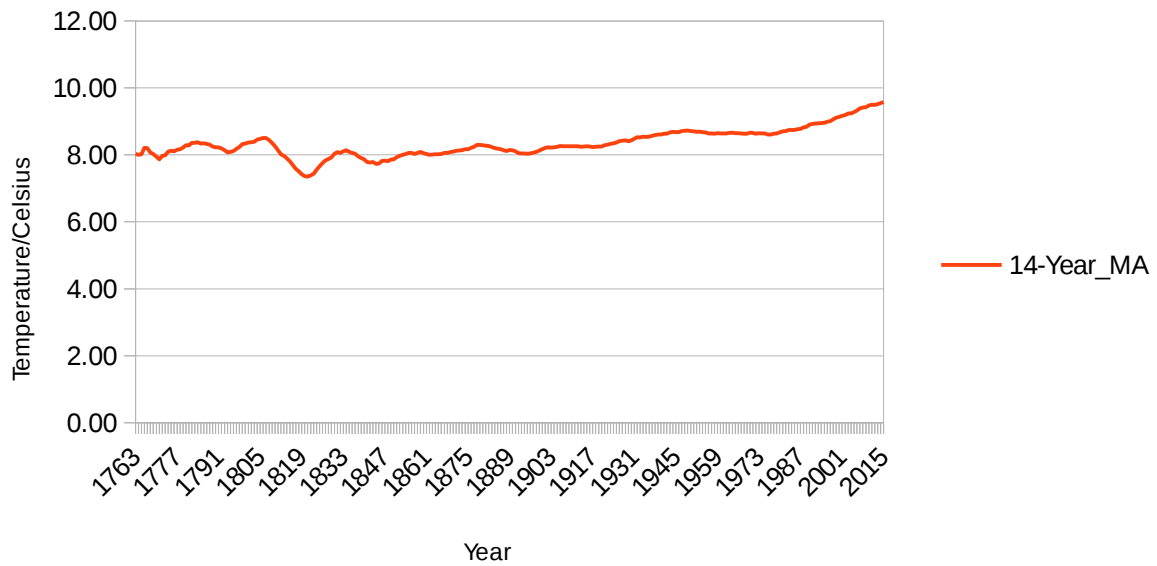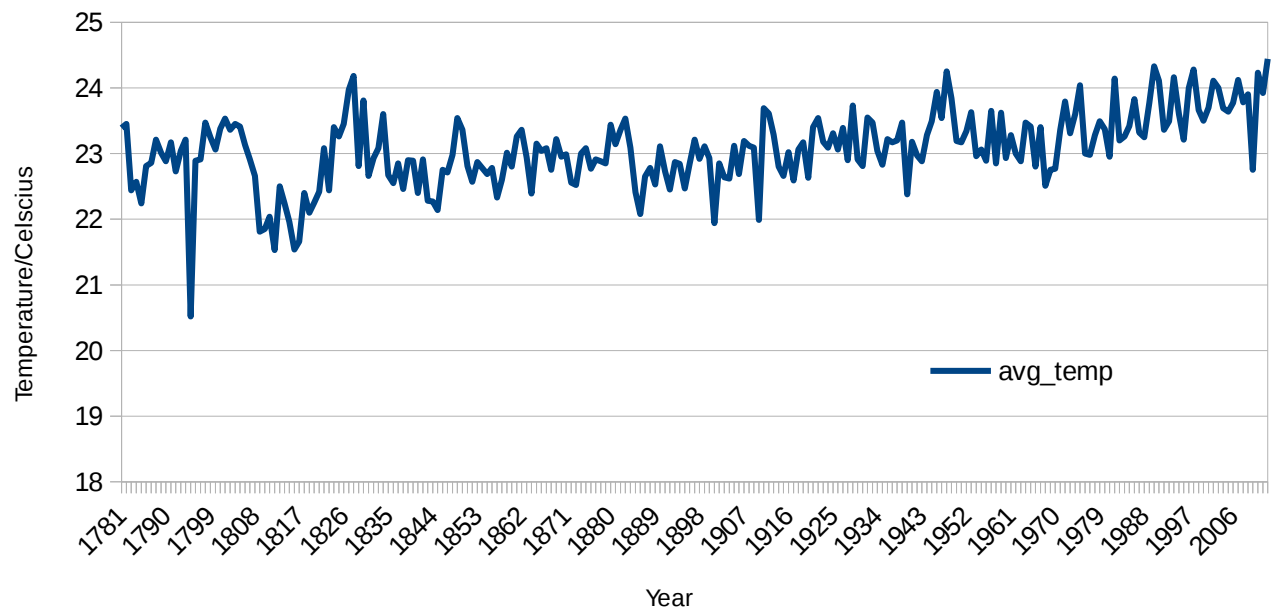
14 Year MA Global Average Temperature

Table 2: Miami Average Temperature

Miami Average Temperature

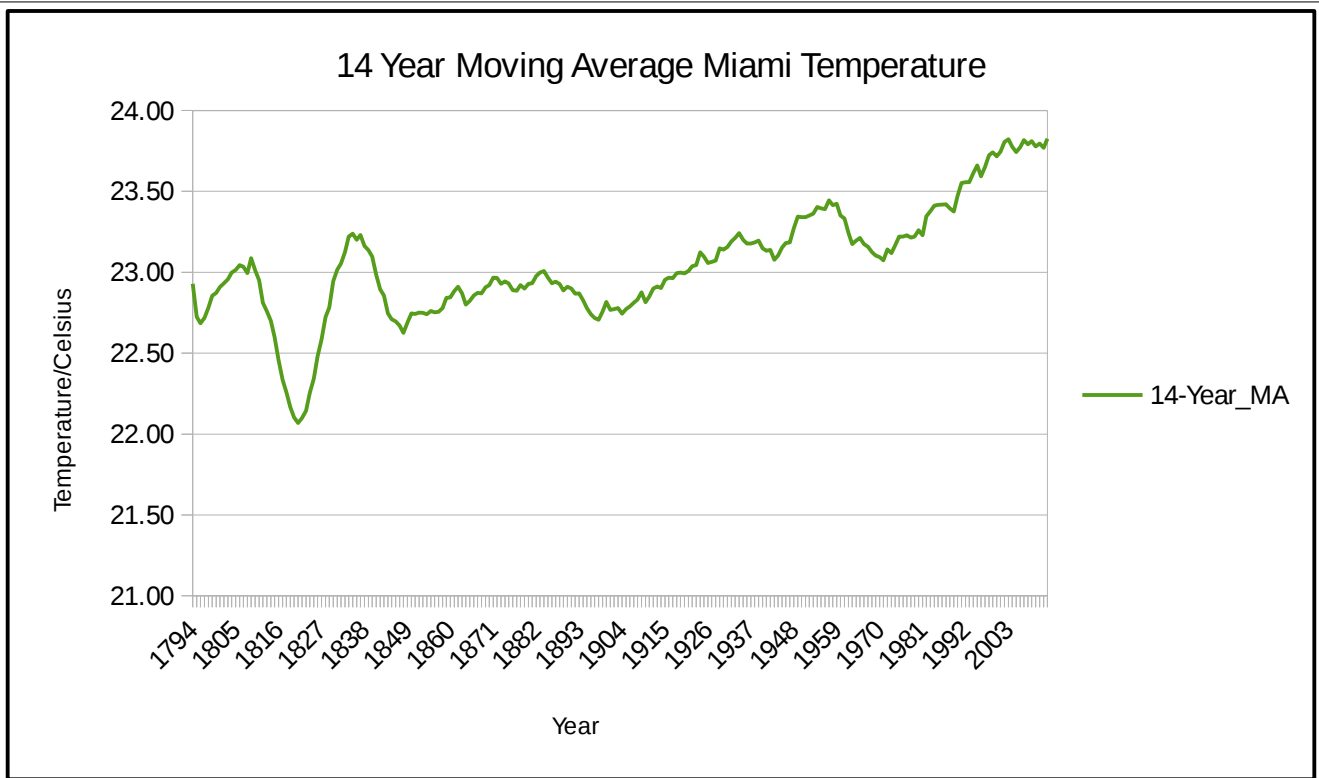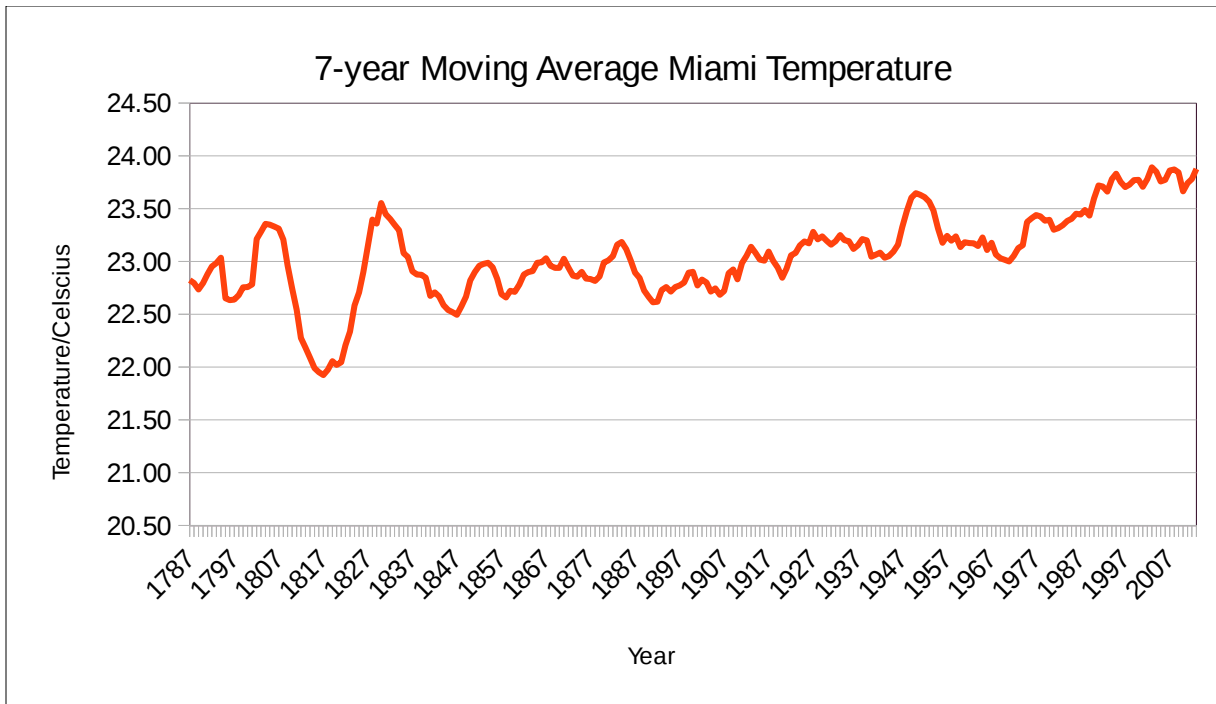7-year Moving Average Miami Temperature

14 Year Moving Average Miami Temperature

Table 3: Portland Average Temperature

Portland Average Temperature
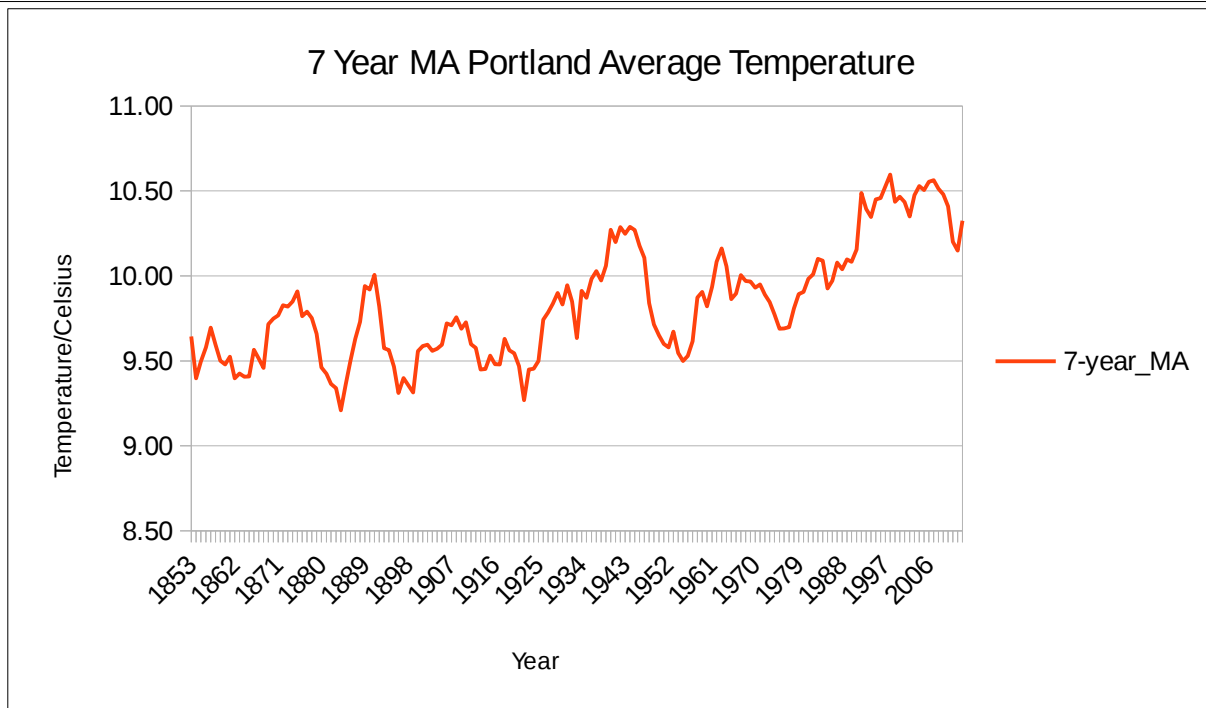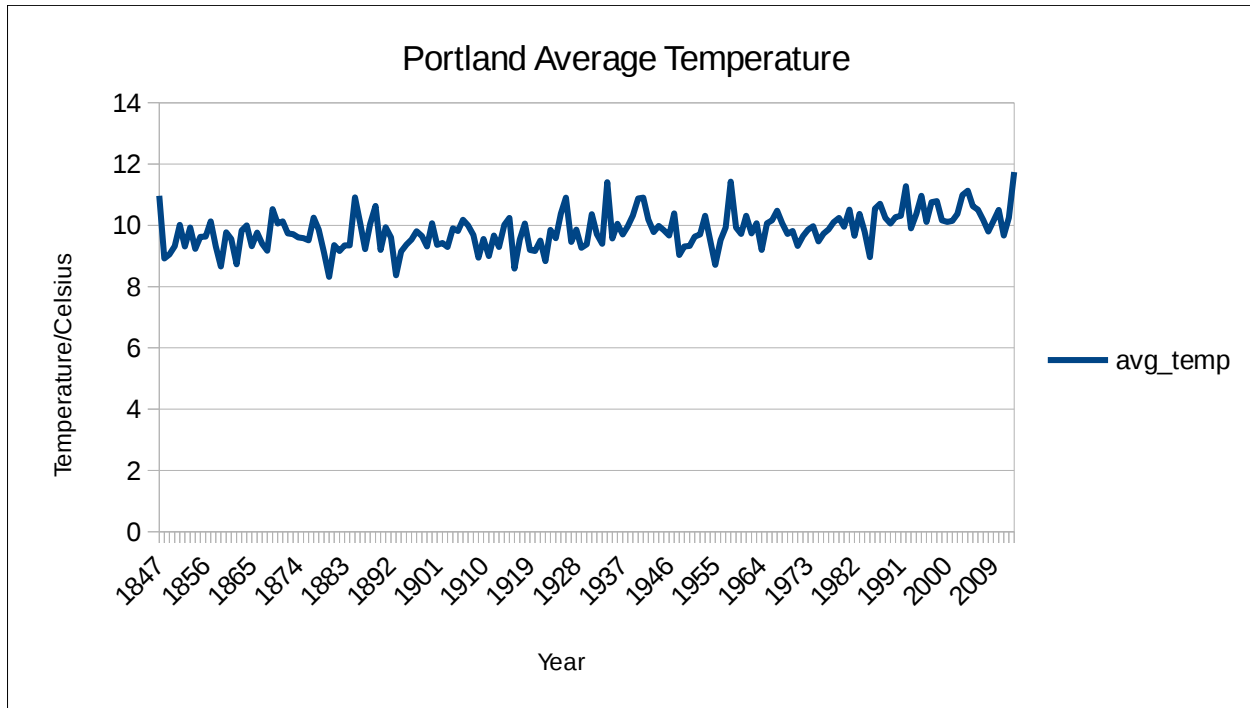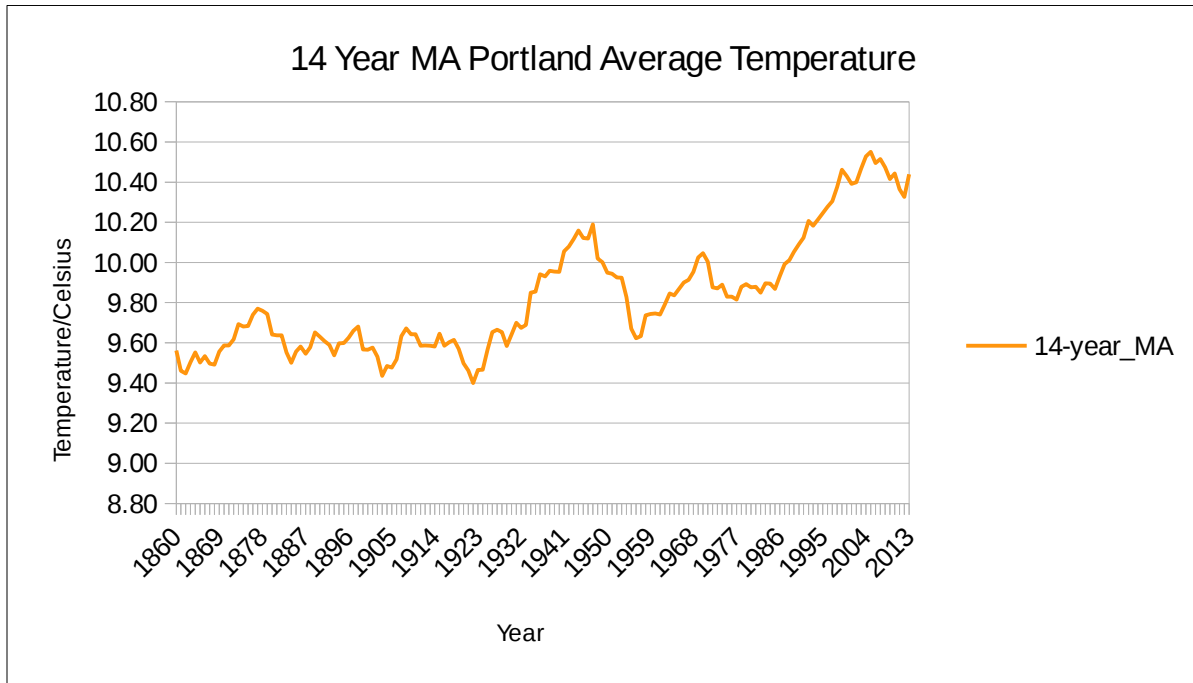

7 Year MA Portland Average Temperature

14 Year MA Portland Average Temperature

Discussion:

The use of the moving average allows the user to visual trends in very erratic data. It usually used in financial technical analysis to determine when to sell or buy stocks or commodities. The smoothing out the data removes the 'noise' within the data and allows us to see the overlying trends

Considering the global average temperature for 14 year moving average which has the a small gradient increasing from 8 ^{0}C to 9.6 ^{0}C from 1763 to 2015. This is a 0.0063 ^{0}C increase per year. Both the Miami 14 year and Portland 14 year moving average temperatures are higher than the global average. This is to be expected as the global average temperature takes data from extremes on the spectrum of earth's geographical regions. The difference has not be consistent with the Portland dataset while the Miami dataset was more consistent to the global average temperature overall trend.

The Portland temperatures are much more erratic even after 14 year moving average was applied to it. These changes are not in line with the small change as evaluated from the 14 year moving average of the global average temperature. Also, the Miami temperature changes are not in line with the global average temperatures.

Overall the trend has been increasing over time but the change is not the same across the two cities that I investigated. This may be due to Miami being consider a more tropical city while Portland is more a temperate city. The winter, spring, and fall seasons can reduce the overall temperature over the year compared to one season of summer during the year. Overall, the trend has been consistent between the two cities that the overall average temperature has been increasing over the time period investigated.

Finally, when comparing a tropical city in the United States of America and a temperate city also in the same country, the visualization of the temperature change shows that global increase in temperature does not affect these cities the same. This may be due to the difference level of urbanization of these cities and the amount of sunlight that a particular city receives throughout the year.

9

Conclusion

In conclusion, the investigation into the global average temperatures and two cities led to an inference that the temperature has been steadily increasing over the time period used in the dataset. Further investigation could be used how different levels of urbanization affect temperatures over time.

Appendix:

This is the SQL command for Portland and Miami.

```sql
SELECT year, avg_temp
FROM city_data
WHERE city = 'Portland'

SELECT year, avg_temp
FROM city_data
WHERE city = 'Miami'
```

This is the SQL command for global average temperature.

```sql
SELECT *
FROM global_data
```

Example function used in excel

```
=AVERAGE().
```