Udacity Weather Trends Project

Temperatures Trends - Washington, DC vs. Global

Introduction.

We explore weather trends in localized temperatures (city of Washington, DC) against global mean temperature from 1750 to 2013. All temperatures are measured in degrees Celsius.  
We use moving averages to better observe trends.  
The project uses SQL and Python (Pandas and Matplotlib).

Data Collection.

All data was provided by Udacity. To extract a clean data set, we join the global\_data and city\_data tables on year with parameters to select for location and drop null values:

SELECT gd.year AS "year",

gd.avg\_temp AS "global\_temp",

cd.avg\_temp AS "wash\_temp"

FROM global\_data AS gd

JOIN city\_data AS cd

ON cd.year = gd.year

WHERE cd.city = 'Washington' AND cd.avg\_temp IS NOT Null AND gd.avg\_temp IS NOT NULL

Moving Averages – Pandas

The data is imported from csv into a data frame with the pandas.read\_csv() method.

We then use the rolling() method to create a column with rolling averages from the temperatures like:

df['wash\_moving'] = df['wash\_temp'].rolling(window=20, min\_periods=1)

Figure 1 shows the utility of moving averages. We can observe the general trend easier from the averaged curves.

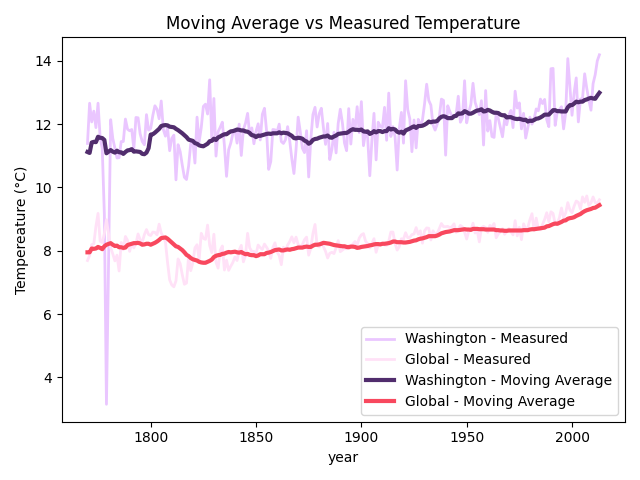


Figure 1 – Moving averages reduce noise and the highlight the general trend in the data..

City and Global temperatures

We plot moving averages for city and global and the area between them.

Highlight

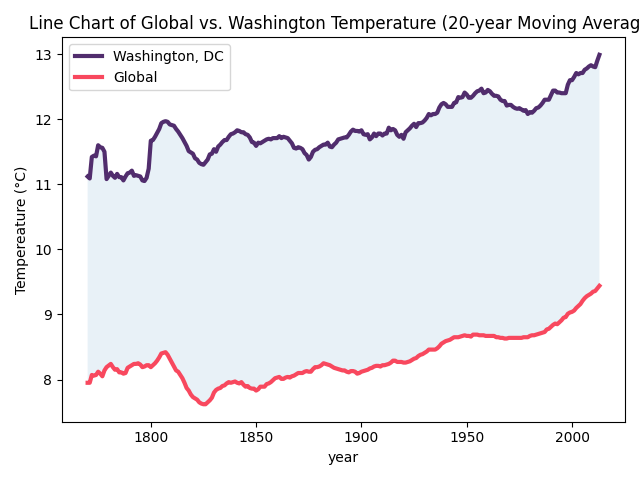


Figure 2- Temperature Trends

Conclusions

From this analysis we conclude the following:

1. Moving averages provide a valuable tool when analyzing trends in data rather than localized details.
2. We can conclusively assert that the provided data shows temperatures are rising at a city and global level.
3. The rate of increase (the slope of the curves) increased drastically in the second half of the 20th century.
4. For the city of Washington, DC, temperature changes closely resemble changes at the global level. The area between the graphs remains somewhat constant.
5. We should further study other cities temperature trends as compared to global temperatures, particularly as in correlation between latitude or longitude, continent, etc.