**Becoming an Independent Data Scientist – Assignment 4**

**Applied Plotting, Charting and Data Representation in Python**

**University of Michigan / Coursera**

# Region and Domain

Whitmore Lake, Michigan

Marquette, Michigan

# Research Question

How do the precipitation amount and recorded snowfall vary between these two locations in Michigan? While both cities are in Michigan, the visualization attempts to show the dramatic difference in weather between the two locations. Michigan is divided into two peninsulas, lower peninsula, and the upper peninsula. Many people acknowledge the difference in culture that exists between the lower peninsula and the upper peninsula, this project also displays difference in precipitation amounts.

# Links

**National Centers for Environmental Information – data set query tool**

<https://www.ncdc.noaa.gov/cdo-web/results>

**Whitmore Lake Weather Dataset**

<https://www.ncei.noaa.gov/orders/cdo/2997899.csv>

**Round Rock TX Weather Dataset**

<https://www.ncei.noaa.gov/orders/cdo/2997895.csv>

**Documentation for the Dataset**

<https://www.ncei.noaa.gov/pub/data/cdo/documentation/GHCND_documentation.pdf>

# Data Visualization

Chart, line chart

Description automatically generated

Graphic shows that precipitation in Marquette is generally higher than Whitmore Lake.

Chart, line chart

Description automatically generated

Graphic shows that snowfall level is dramatically higher in Marquette than Whitmore Lake. While this is typically acknowledged by most people living in the State of Michigan. It is interesting to graphically represent it and view the dramatic difference. The graphic does show that 2015 produced some interesting observations with Whitmore Lake receiving more total snowfall than Marquette.

# Discussion / Conclusion

I chose this analysis because I have family living in Marquette and I live in Southeast Michigan (lower peninsula). I do travel to Marquette often and I note the difference in weather. Sometimes within a single day. Many times, I tell my family and friends in Marquette that it feels like I am traveling to a different state when I visit.

The graphics do show that indeed Marquette, MI does receive more precipitation than Whitmore Lake, MI. Much of this precipitation is in the form of snowfall. Firsthand, I have experienced the differences in snowfall amounts. I chose to represent this graphically and display the dramatic differences between these two locations. Both are in the State of Michigan however the graphics might lead people to believe these locations are different areas of the country. The snowfall graphic does show an anomaly happening in 2015, in which Whitmore Lake did receive more snowfall than Marquette.

Data sets for this analysis were taken from National Centers for Environmental Information. Selection was based on the primary zip code for each location. Each dataset was loaded into a Pandas data frame and indexing was set on the date field. This provided a straightforward way to select and group the data on a yearly basis. The statistical mean was calculated for each year and the data was adjusted to for measurement in inches on the graphic.

The graphic employs a simple format using line graphs. I felt this was the best approach to highlighting the differences. I did choose to include a grid on the graphic. I believe the grid does allow the observer to quickly compare the difference for each year. While some may believe the grid is unnecessary and produces an undesirable “data-ink ratio” , per Alberto Cairo. I believe in this analysis it aids the viewer to complete a quick and simple analysis. I also chose to keep the frame on the graphics, because it helps focus the viewer and would make it more suitable for inclusion in paper or web page.

**Truthfulness** - data for the analysis was provided by the National Centers for Environmental Information. Very little transformation of the data was performed. Indexes were set on date fields and precipitation amounts were adjusted from hundredths of an inch to inches.

**Beauty – the graphics and simple and convey one overall message of comparison between the two locations.**

**Functionality** – simple line graphs with single legend to quickly show the answer to the research question.

**Insightfulness – the graphic support the research question and reinforce weather difference of two locations based in the same state, however they are separated by a significant distance in latitude. The graphic does depict some additional information on anomaly year when Whitmore Lake did receive more total snowfall than Marquette.**