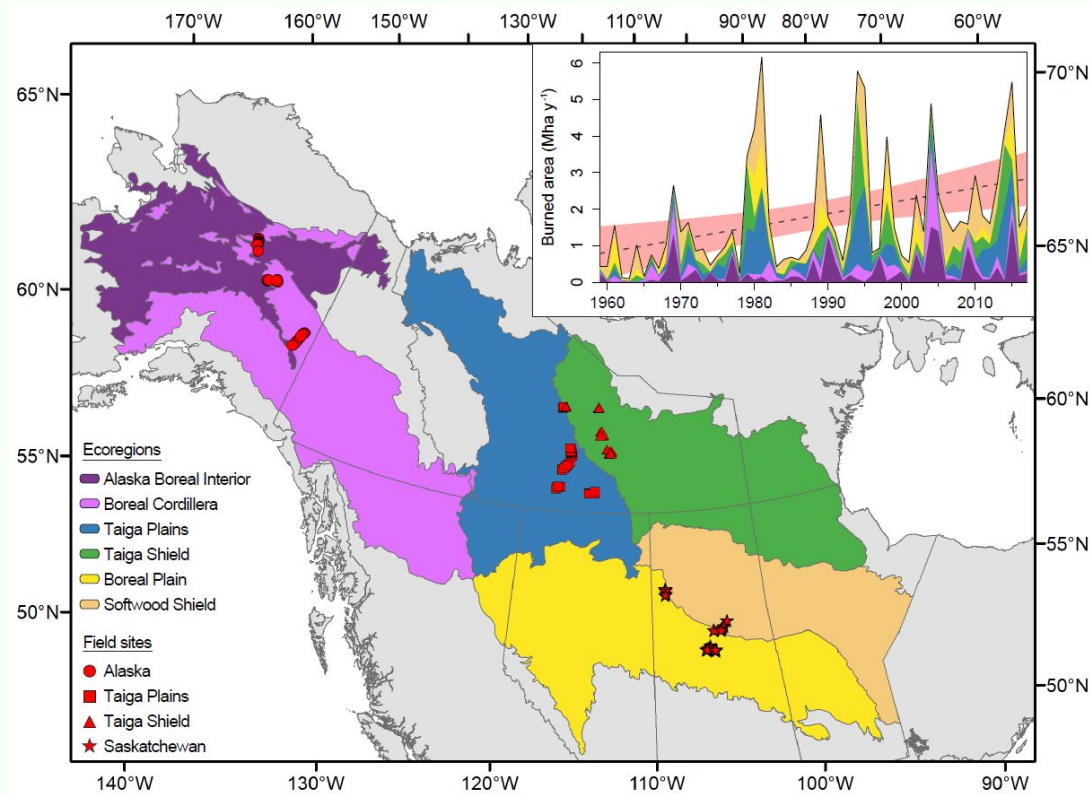


Analysis of Basal Density and Basal Area to influence Wildfire Burn Depth

Sarang Pujari

Forest Site Data: NASA's The Arctic-Boreal Vulnerability Experiment (ABoVE) is a NASA Terrestrial Ecology Program

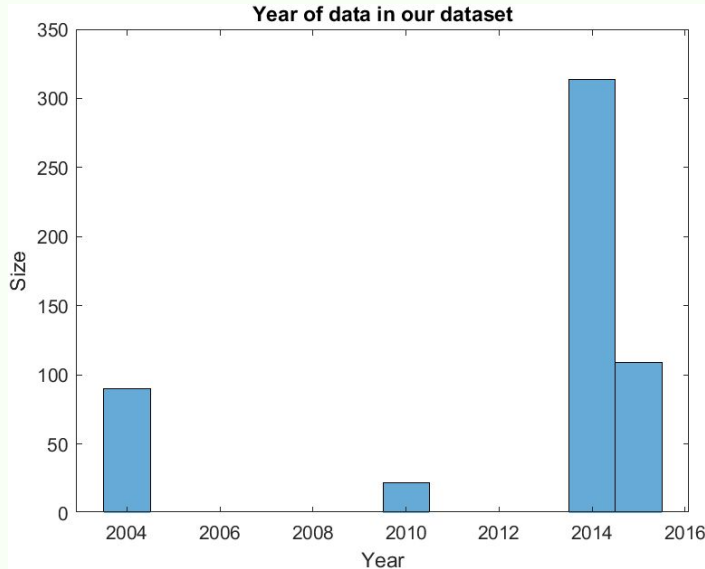


Current Dataset

Stand Basal Density: Estimated density of pre-fire stems per m² for the pre-fire stand. All trees and saplings that were alive at the time fires are included

Stand Basal Area: Total measured basal area (cm²) of **pre-fire tree species** expressed on a per m² basis. Basal area was calculated from stem diameter at breast height (area of each tree= $\pi(\text{dbh}/2)^2$)

Burn Depth: Depth of Burn





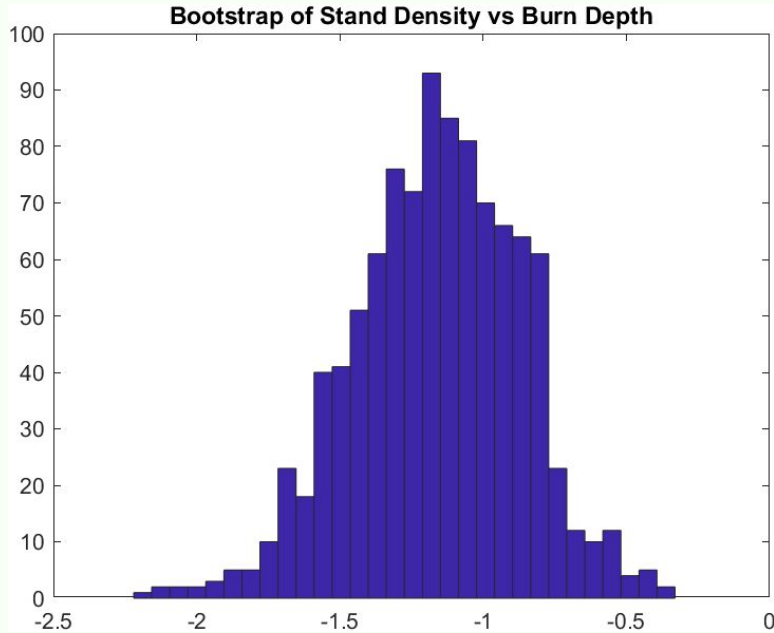
Hypothesis

There will be a positive correlation between Basal Density, Basal Area and Burn Depth

Example: A larger basal density will correlate to a larger burn depth

Purpose of study: Analyze how changes in basal density and area influence burn depth

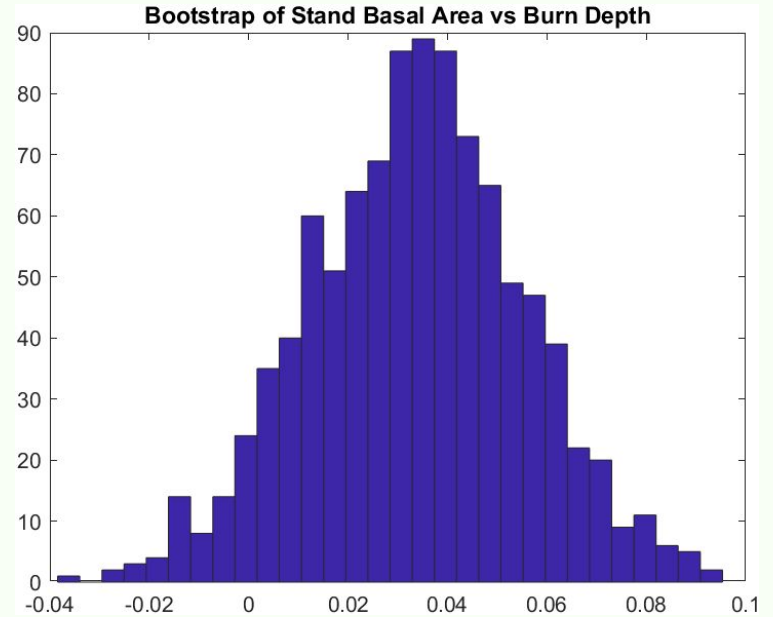
Bootstrap Correlation



95% CI: [-0.60, 12.05]

.05% CI: [-1.76, 10.80]

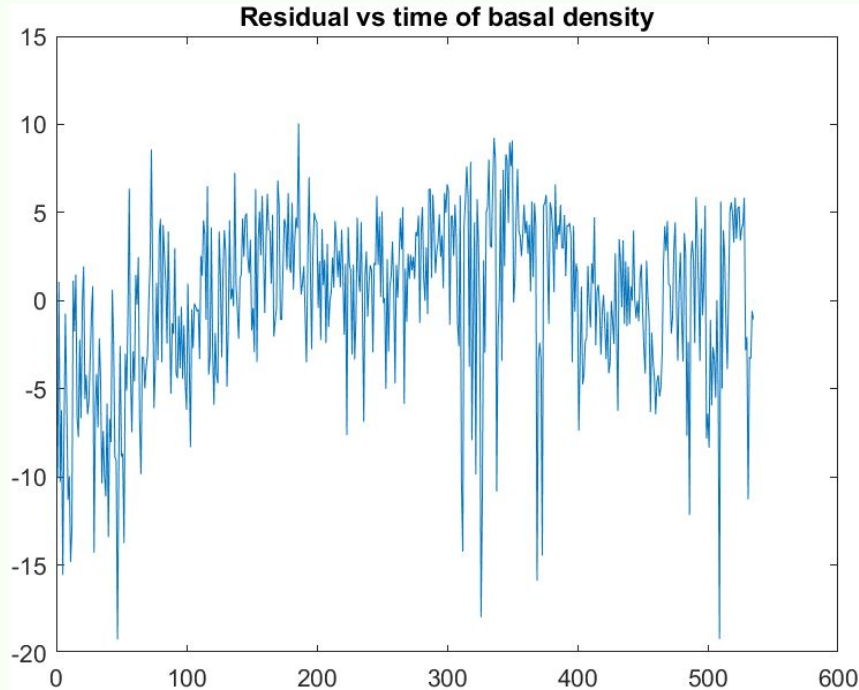
Has no noticeable trend because of
negative value in range



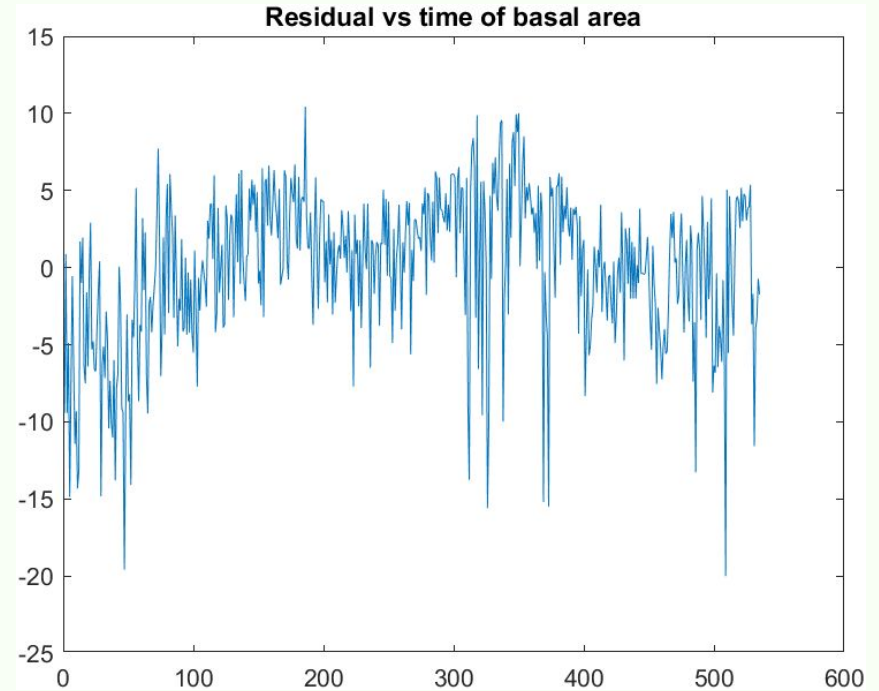
95% CI: [0.073, 10.75]

.05% CI: [-0.01, 9.51]

Least Squares Regression Residual



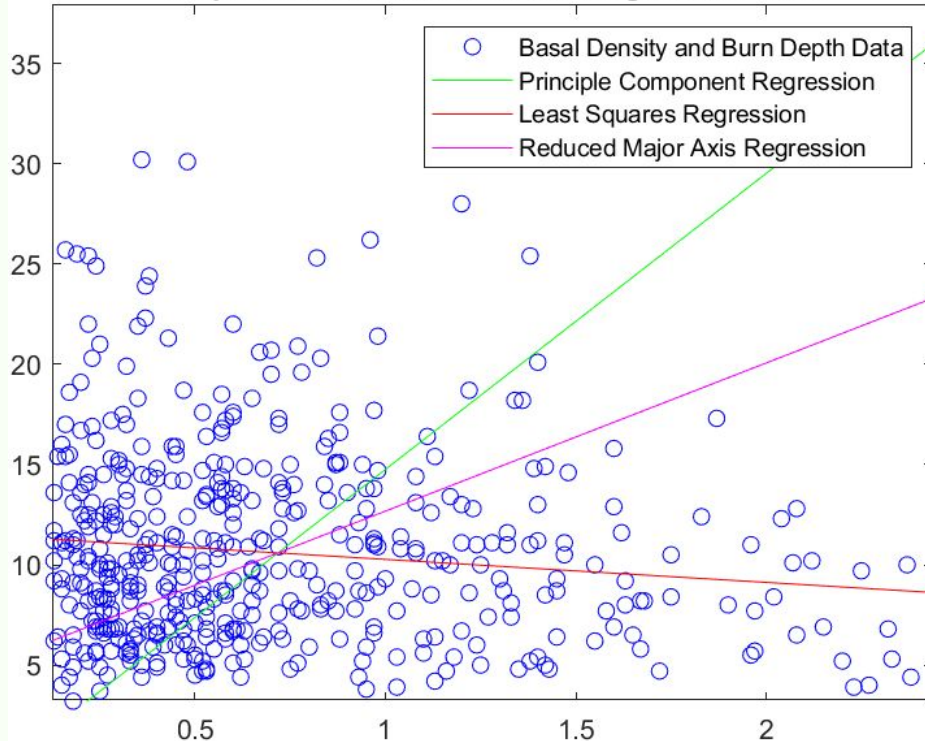
Normal Distribution since $274.24 < 588.88$ (Cannot reject the null hypothesis)



Normal Distribution since $210.43 < 588.88$ (Cannot reject the null hypothesis)

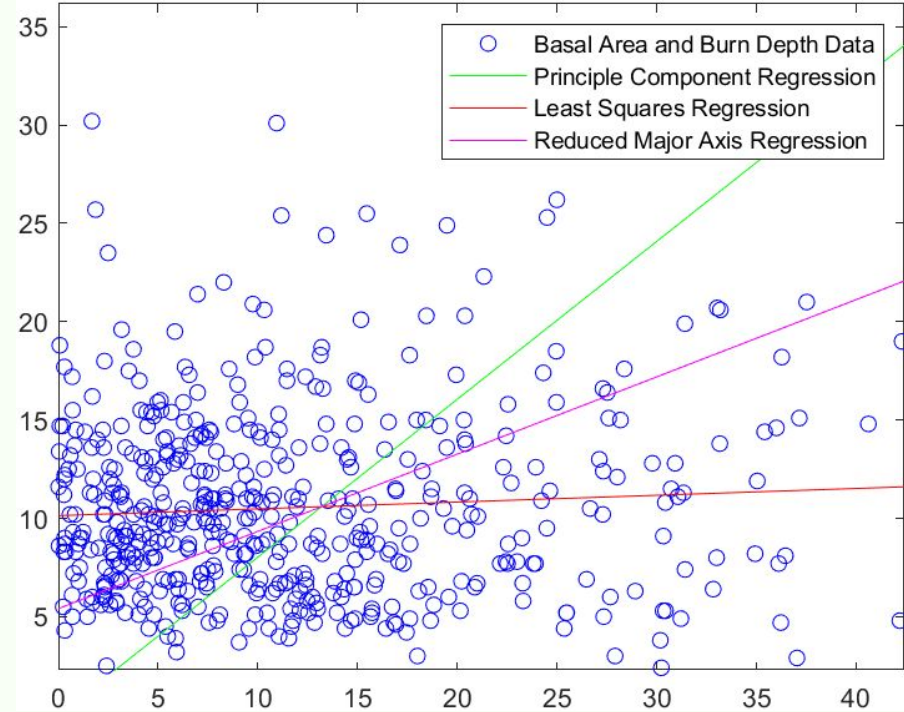
Various Regression Models

Graph of different and various regression lines

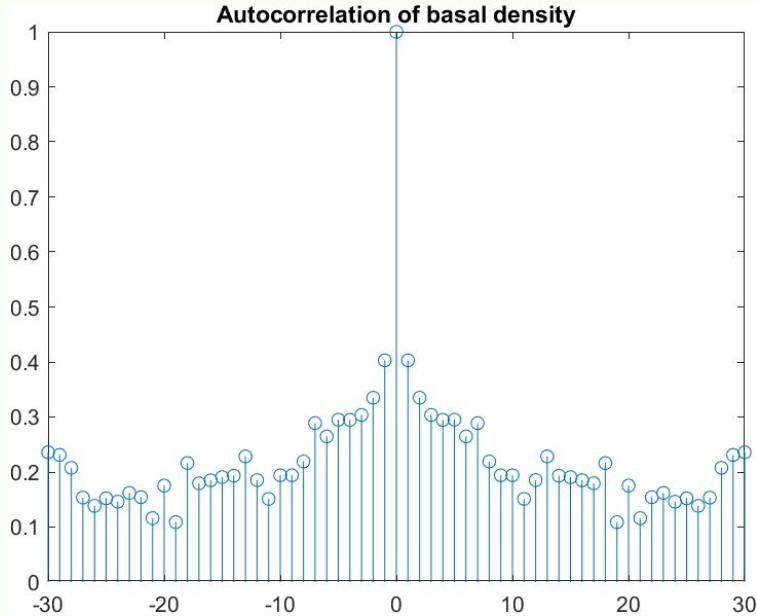


Interesting to see a negative slope for Least Squares Regression Line

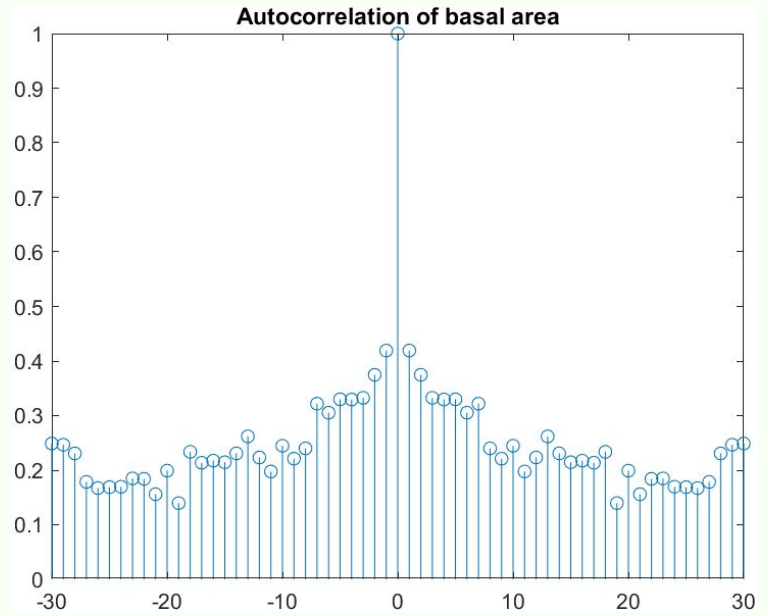
Graph of different and various regression lines



Autocorrelation



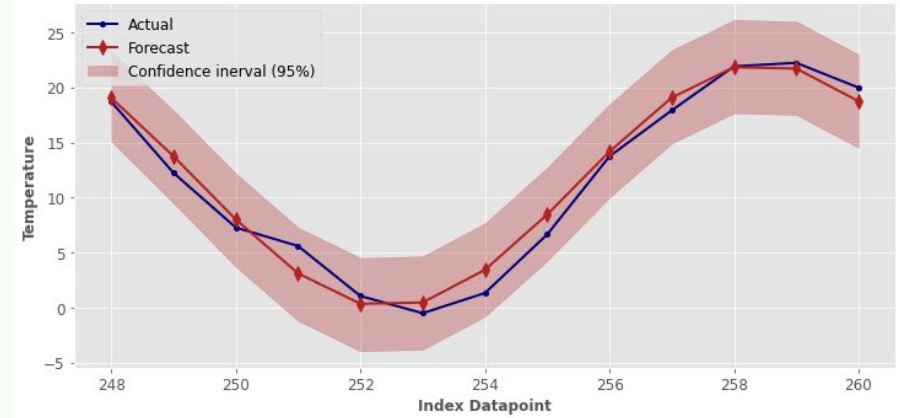
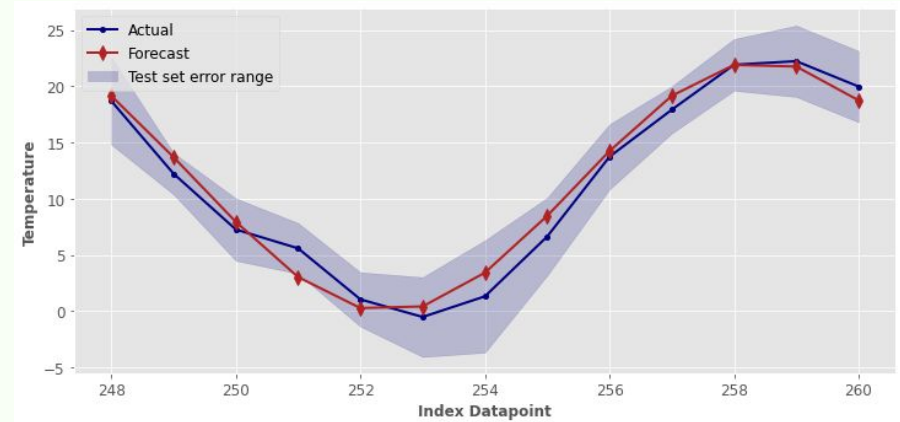
Symmetric from mean, which leads to possibility that it is normally distributed



Symmetric from mean, which leads to possibility that it is normally distributed

Future Steps for final report

- ❖ Experimenting with Neural Networks in Python
- ❖ Need to conduct further data analysis (Periodogram, AD Fuller Test, Coherence Estimate via Welch, Time Series Analysis learned in class etc.) to reach final conclusions
- ❖ Considering processing data a different way to conduct Machine Learning time series analysis: Auto Regressive Integrative Moving Average model (ARIMA)



THANKS!

Any Questions?

