# Introduction

# Background

Discuss permafrost, Ground Ice, and Thermokarst to provide background on science being looked at.

Discuss Alaska Thermokarst model to provide context for purpose of work

Discuss random forests, their theoretical background, advantages, and applications

# Permafrost

# The Active Layer

# Ground Ice

# Thermokarst

# Alaska Thermokarst Model

# Random Forests

# Decision Trees

# Bagging

# Applications

# Data

Discuss study area and raster data characteristics

Summarized where data comes from, what’s been done to it, and why it was chosen.

# Study Area and Period

# Air Temperature

# Precipitation

# Location

# Elevation, Slope, and Aspect

# Summary of Features

Mostly a table summarizing how data is used as features

# Methods

# The Original Model

Will show how does the original model work

# Software

Info on tools used

# Finding Baseline Hyperparameters

Discussed how baseline hyperparameters were found.

# Comparing Models

Discuss which metrics are used to determine model strength.

# Scenarios for Sensitivity Analysis

Discussion of planned sensitivity analysis Parameters. Table show planned scenarios.

Table 5: Scenarios for Sensitivity Analysis

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Change** |
| OM as Feature | feature change | Add Original Model (training labels) as input feature |
| Random Data as Feature | feature change | Add a blob of random data as an as input feature |
| Remove Lat/Long | feature change | Remove latitude and longitude from input features |
| Remove top | feature change | Remove features that are indicated as most important |
| Remove bottom | feature change | Remove features that are indicated as least important |
| Vary max\_depth | Hyperparameter  change | Vary max\_depth around the value in BRF |
| Vary max\_leaf\_nodes | Hyperparameter  change | Vary max\_leaf\_nodes around the value in BRF |
| TBD |  |  |

# Results

Provide stats and information on models and how they compare to original model and each other

# The Baseline Random Forest

# Feature changes

# Hyperparameter changes

# A Final Model

Which model discussed gives best results

# Discussion

What do results mean?

# Future Work

How can the process be used/improved

# Conclusion

# References