

EOSC 410/510 Final Project Proposal

Research Question: Identifying cloud streets over Polar coastlines using edge detection and image classification.

Data: The images will be downloaded from MODIS imagery (Aqua) using [Worldview](#) and [LAADS DAAC](#). The observations and variables will both just be attributes of the image itself, observations being the number of images in the dataset. The variable we are trying to study will be whether or not each of our observations contain the presence of cloud streets.

Methods:

We will first collect images of cloud streets from MODIS data. This might be a smaller dataset to begin with. We want to manually “pre-process” these images by aligning them so that the direction of the cloud streets is consistent in each image. For simpler processing times, we will also then split higher resolution images into smaller parts (for example a 3 by 3 grid). This way we could have more training images we can use for classification later. An approximate workflow then is as follows:

- Convert images to greyscale
- Gaussian blur on the image
- Taper
- Filter
- Carry out sobel edge detection
- Carry out PCA on the output clusters after edge detection
- Cluster the PCs
- Classify clusters/images by labelling the edge detected test set with areas of cloud, land etc
- Use SOM to detect patterns of cloud streets vs no clouds detected