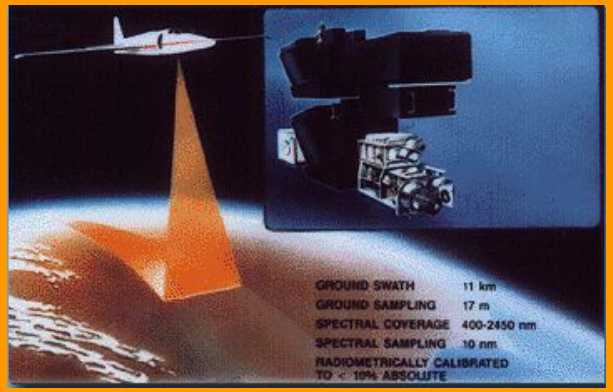
COAL-FO Beta Release Progress Report

Bryce Egley, Kenny Thompson

Project Overview-Group Intro



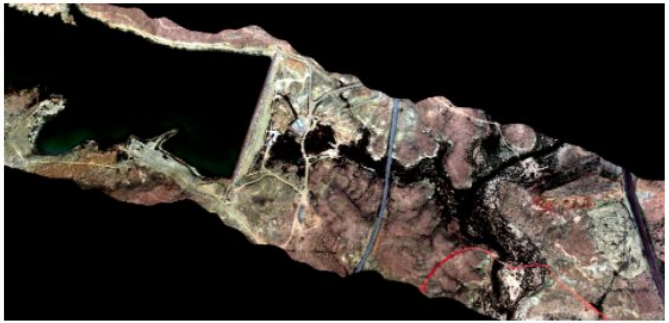


Figure 1: Visible-light image.

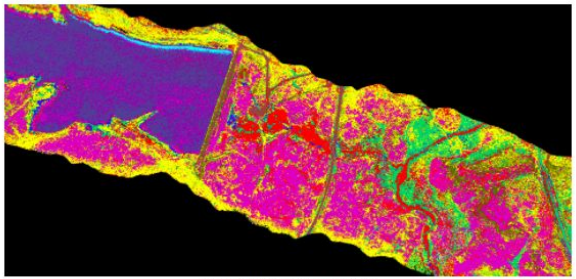


Figure 2: Mineral classified image.

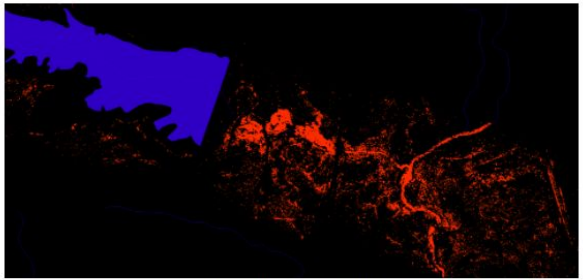


Figure 3: Mining classified image.

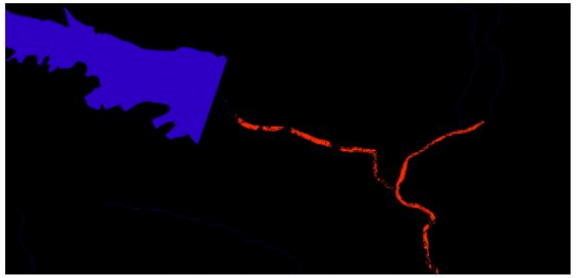


Figure 4: Environmental correlation image.

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What I have been working on

Alpha Release End of Week 6

Week 7 - Week 8 (Feb 19 - March 3)

- Getting more data and running data through pycoal

Week 8 - Week 9 (March 1 - March 7)

- Looking into GDAL rotation bug, and fixing gdal installation instructions

Week 9 - Week 11 (March 7 - March 21)

- Updating to Spectral Library Version 7
- Create convert function can also be used for ECOStress and EcoSIS spectral libraries

All of this is reflected on GitHub and my weekly OneNotes

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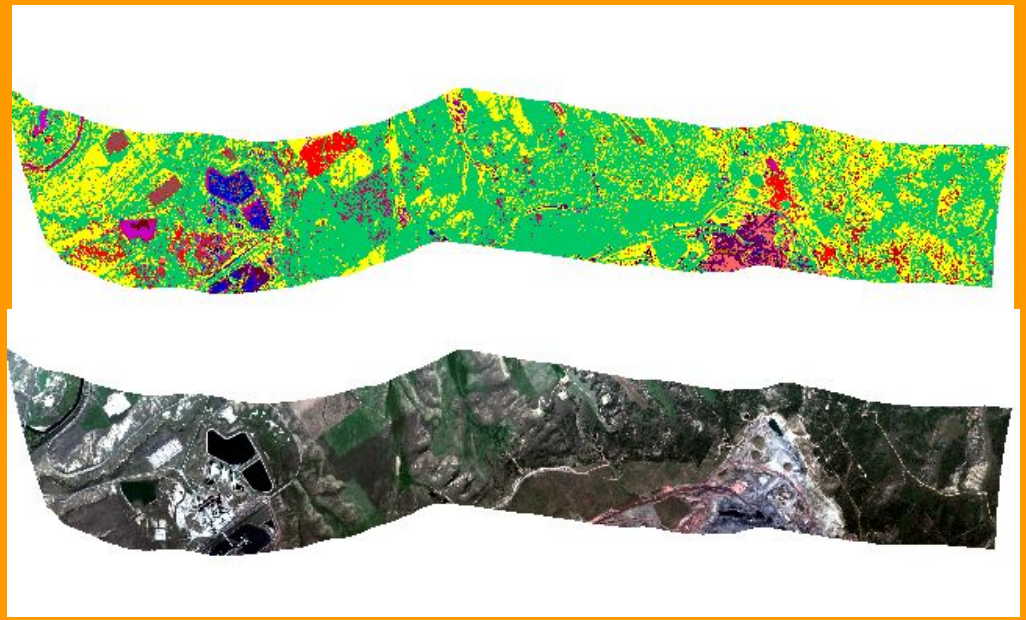
Getting More Data

North West Colorado

Site Name: Craig Power Plant

Size: 6 GB



I found several images of another Coal Mine in Colorado. Current default image for pycoal is 17.5 GB

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Getting More Data

East of San Francisco, CA

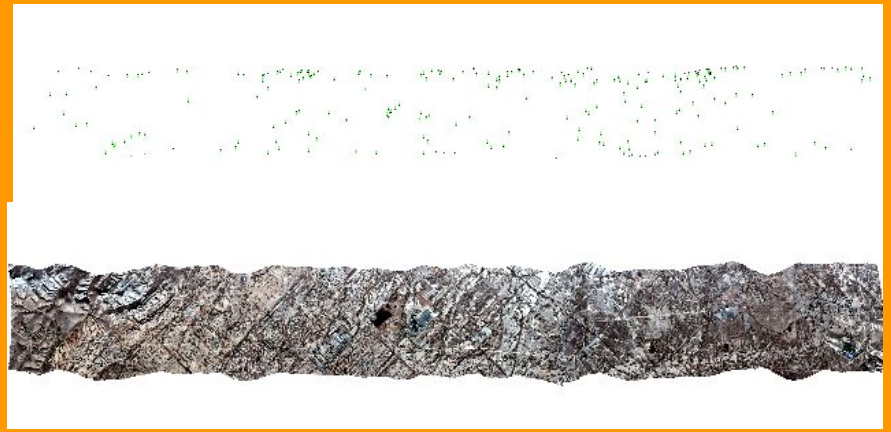
Site Name: Delta 57 Zone 2 and Sulphur Mine

Size: 22.4 GB

Bakersfield, CA

Site Name: COAL 2

Size 6 GB



I found several images of a sulphur mine in California, East of San Francisco and in Southern California

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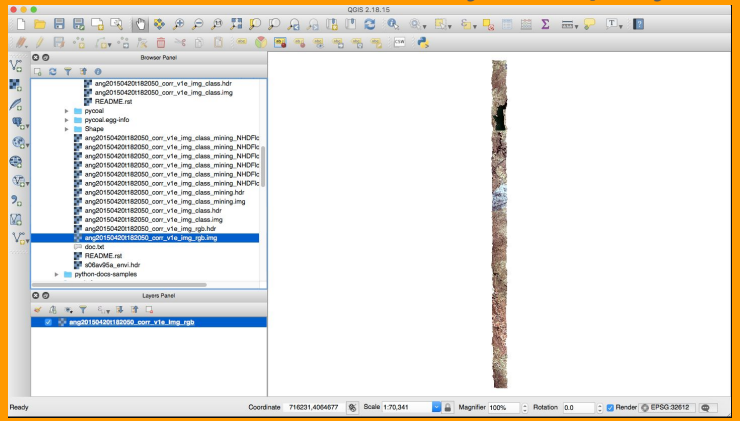
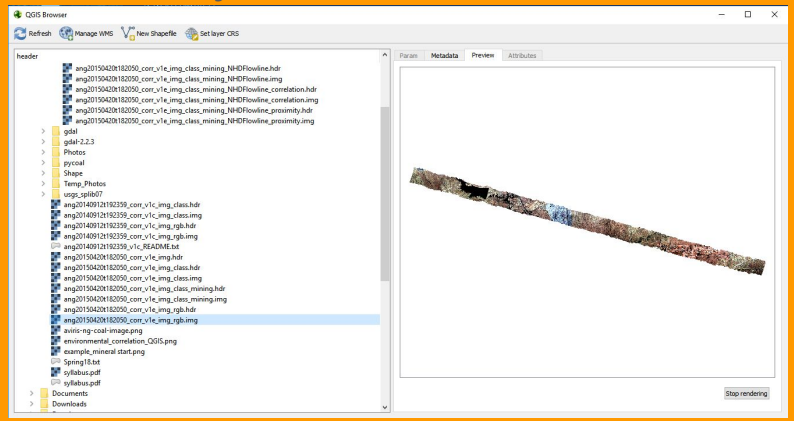
Fixing GDAL installation instruction

Upgraded GDAL installation instructions on capstone-coal.github.io. The old way used Debian which was mainly for GNU/Linux systems.

It appears that GDAL fixed the rotation bug.

However Mac QGIS always displays images vertically. Windows QGIS correct





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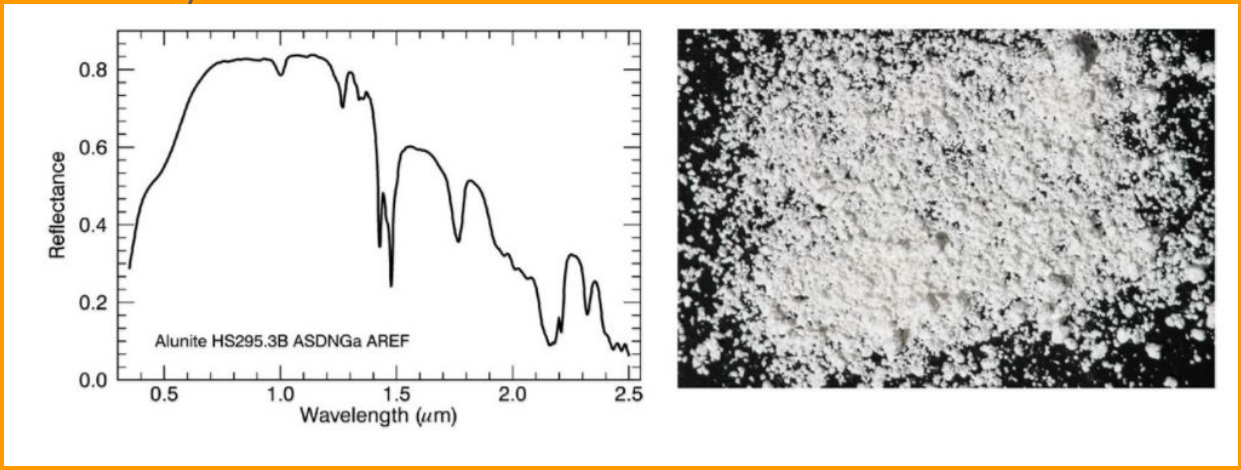
Upgrading to USGS Spectral Library Version 7

- Currently, pycoal is using USGS Spectral Library Version 6
- USGS - United States Geological Survey
- Spectra is file of wavelengths for a specific mineral after light is reflected off it
- Pycoal matches the wavelengths from the AVIRIS and AVIRIS-NG images to Spectra currently from Spectral Library Version 6



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Upgrading to USGS Spectral Library Version 7

- To use Spectral Library pycoal requires envi .sli and .hdr files. Which are quick lookups of Spectral Library.
- Spectral Library Version 4 - 6 have the envi .sli and .hdr convolved libraries here ftpext.cr.usgs.gov/pub/cr/co/denver/speclab/pub/spectral.library/splib06.library/Convolved.libraries/
- My job was to create the convolved library envi .sli and .hdr files for Spectral Version 7
- I created a convert function in mineral.py using ASTER to do this
- This convert function can easily be changed to get the ECOStress and EcoSIS Spectral Libraries. Improving our classifications which was a goal on our requirements document
- Staged products here https://drive.google.com/drive/folders/1YVhdLxvrZE3eC97OEXathLMJRgWt8haO

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My plans for the future

1) Modified convert function for Spectral Version 7 Library to work on EcoSIS and EcoStress Spectral Libraries

2) Update Coal Website to accommodate for changes to Spectral Libraries

3) Make pycoal algorithms faster so it doesn't take as long to run mineral classification

4) Crop default pycoal image or find smaller image to use as default example

More info on these issues here: https://github.com/capstone-coal/pycoal/issues

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Kenny Thompson

-Past: COAL-SDS/AWS

-Current improvements

-Working display of current functionality

-Future

Coal-SDS

-The goal for this aspect of the project is development of tools we can use to process massive amounts of data

-Most of the work up tell now has been preparing everything to start processing the data

-We finally have everything prepared to run, and have begun the process of powering through the data we want to feed into it

Amazon Web Services

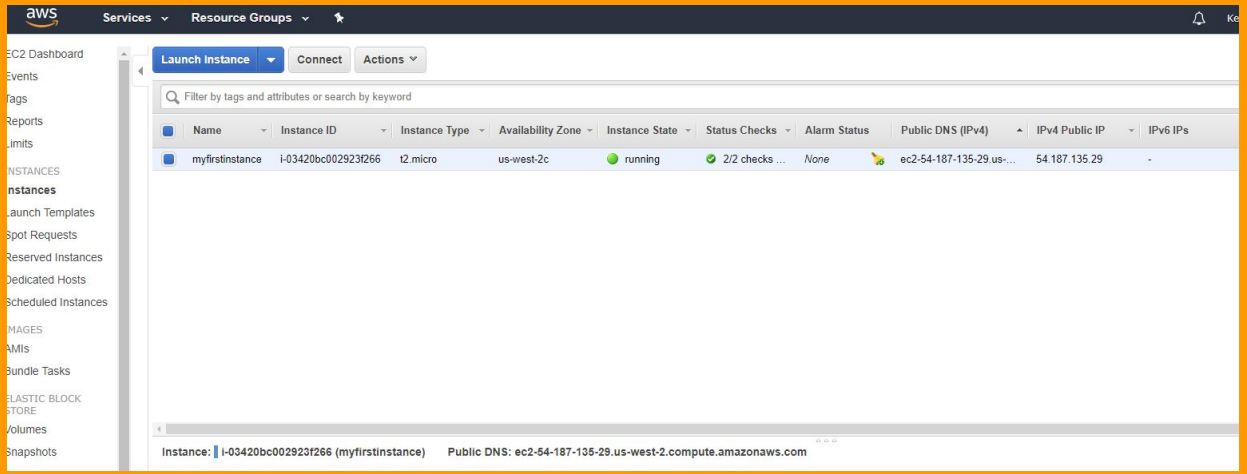
-Initially the project had a grant to use XSEDE services

-We began testing initially on AWS because of the ease of use, did not end up porting to XSEDE

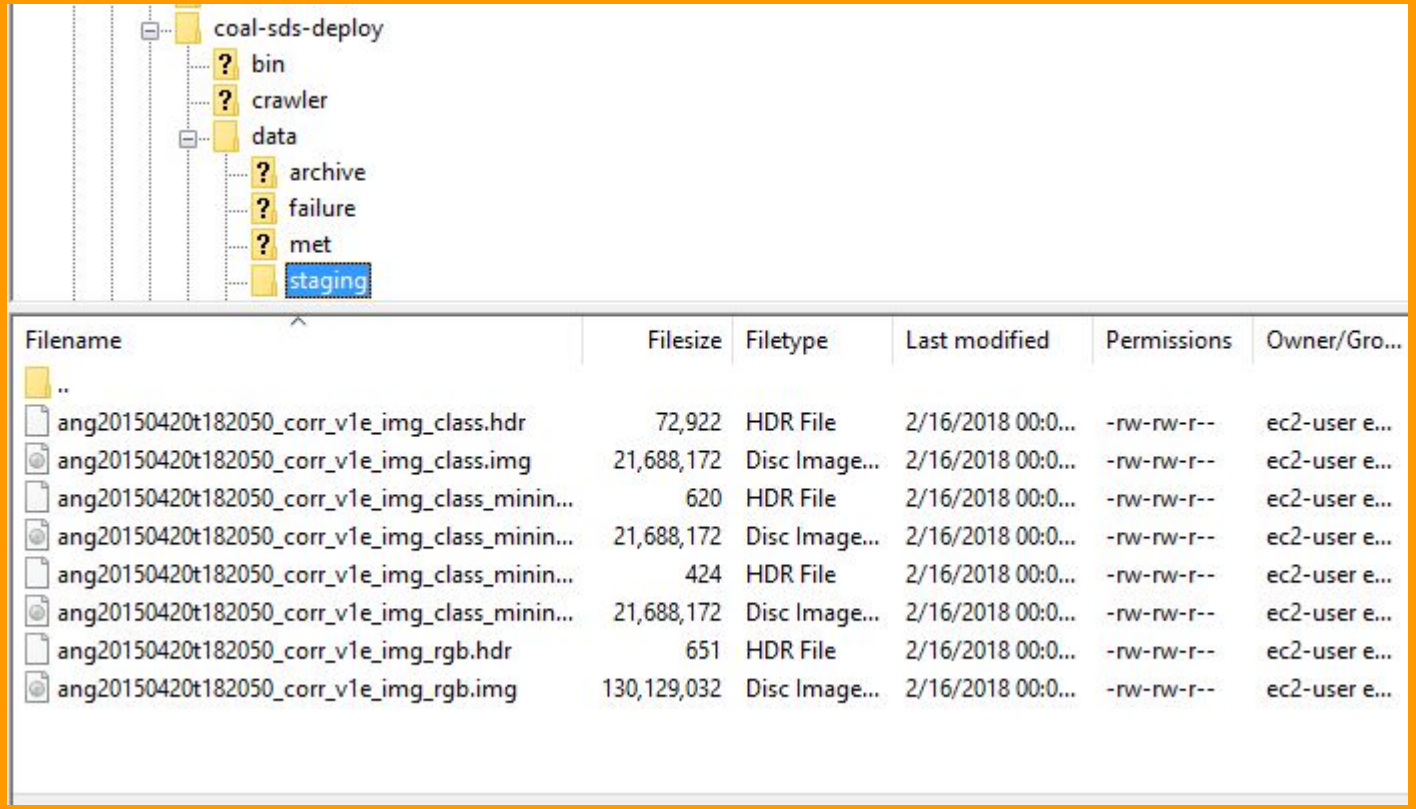
-Amazon web services does give a free student tier that has been useful in processing data, and giving us comporable results to XSEDE

-Currently only staged on AWS

Current AWS Instance running File Manager



Current File Manager Staging



Other improvements to project

-Several issues with the documentation being ported over from old project

-Collaborated on several aspects of PYCOAL

-Updated several obsolete tools to current versions

Demonstration of functionality

-The now functioning build on AWS of Apache OODT with Coal-sds integration

-The ability to stage files, and process data

Future

- Beta goal was to make improvements upon the alpha, and possibly explore porting to XSEDE
- XSEDE port ended up not happening, at least not at this time
- Possibly start importing real data soon
- Handed off COAL-SDS management to Lewis
- Future will involve improving metadata collection