

COAL-FO Beta Release Progress Report

Bryce Egley, Kenny Thompson

Project Overview-Group Intro

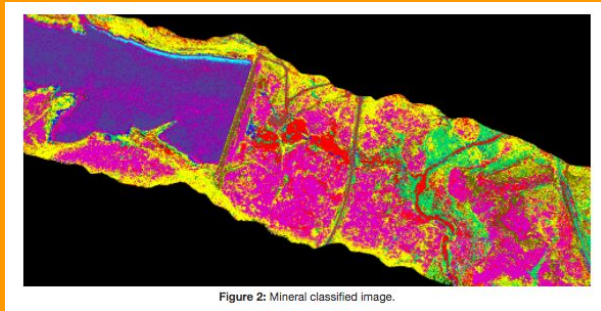
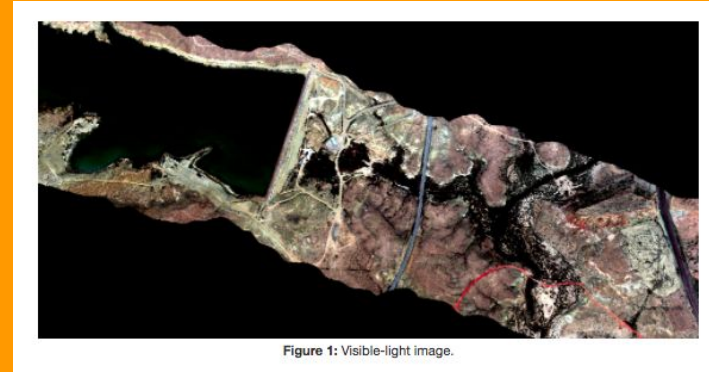
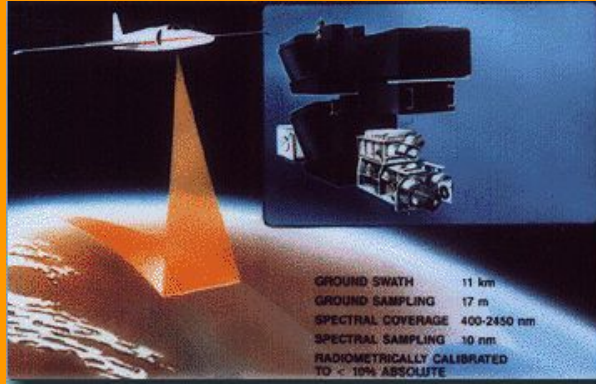


Figure 2: Mineral classified image.

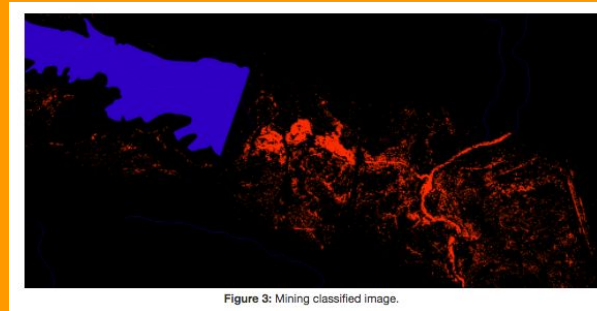


Figure 3: Mining classified image.

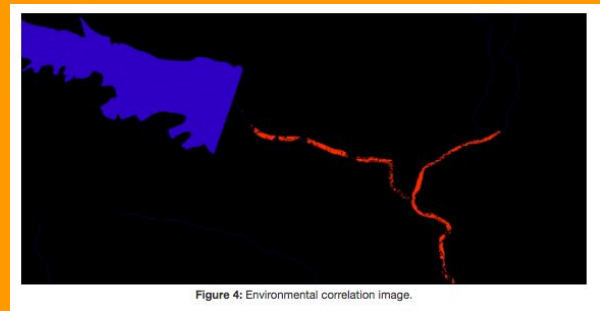


Figure 4: Environmental correlation image.

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

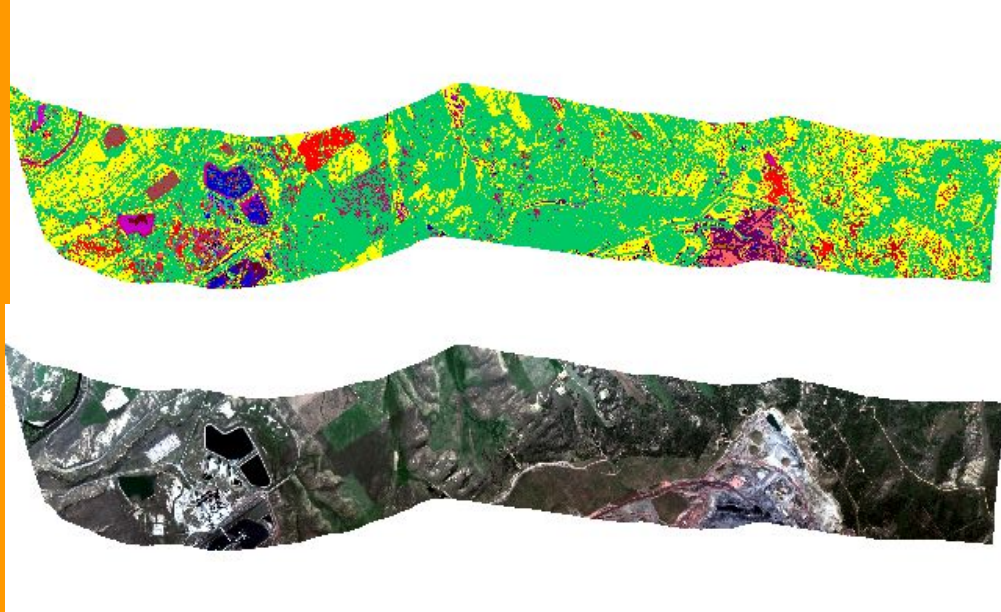
All of this is reflected on GitHub and my weekly OneNotes

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

Getting More Data

Bakersfield, CA

Site Name: COAL 2

Size 6 GB



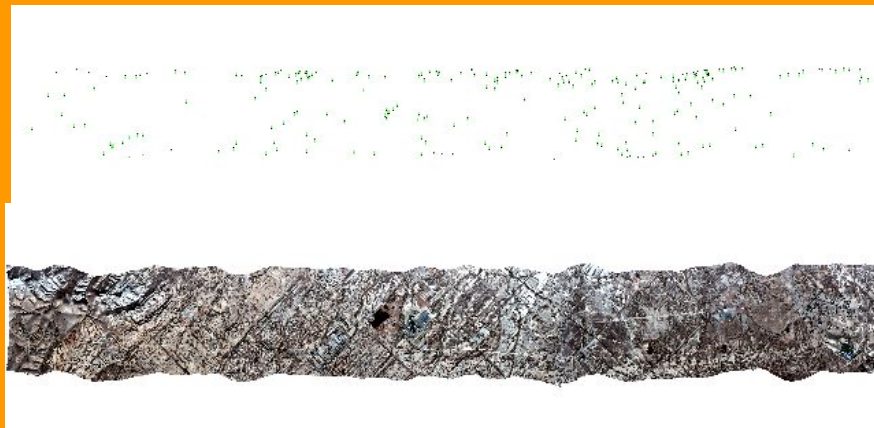
East of San Francisco, CA

Site Name: Delta 57 Zone 2 and Sulphur Mine

Size: 22.4 GB

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

Presenter: Bryce Egley

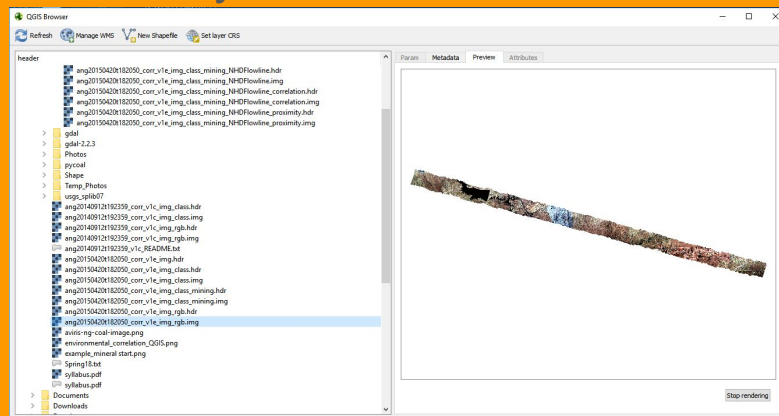
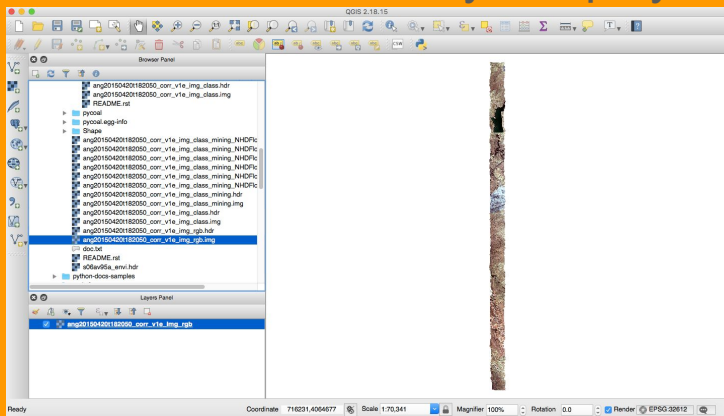


Fixing GDAL installation instruction

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

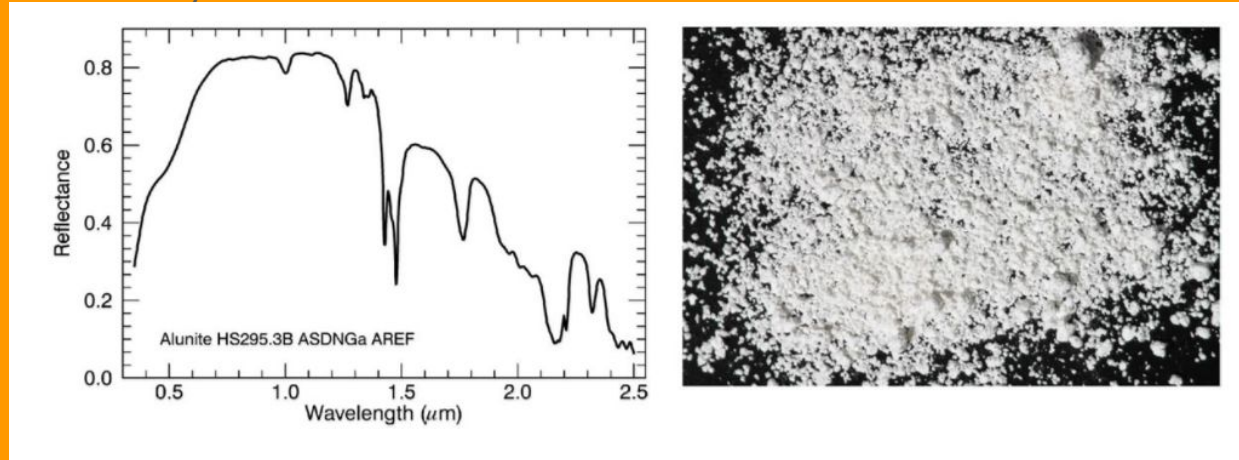
It appears that GDAL fixed the rotation bug.

However Mac QGIS always displays images vertically. Windows QGIS correct



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



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>

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>

Kenny Thompson

- Past: COAL-SDS/AWS
- Current improvements
- Working display of current functionality
- Future

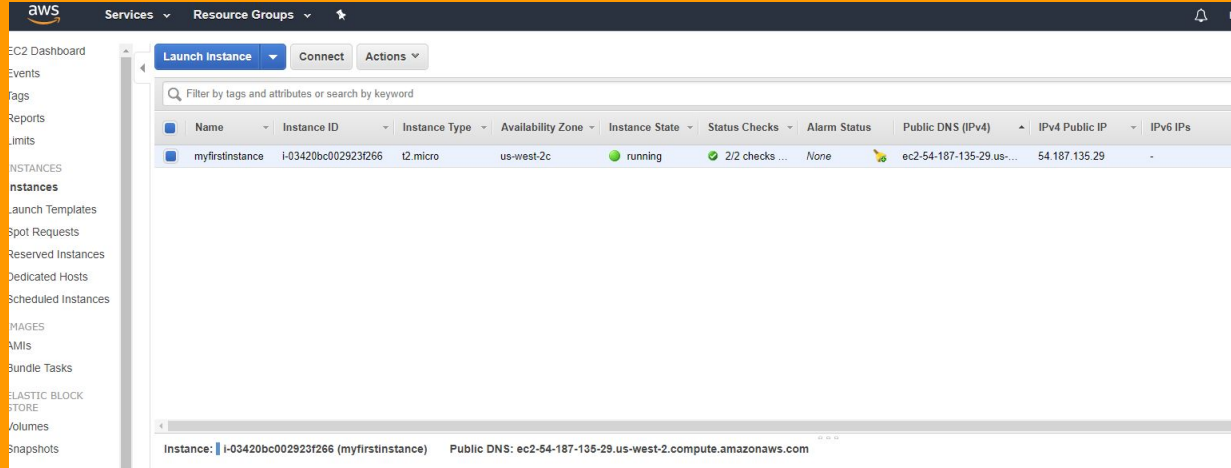
Coal-SDS

- 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 till 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 comparable results to XSEDE
- Currently only staged on AWS

Current AWS Instance running File Manager

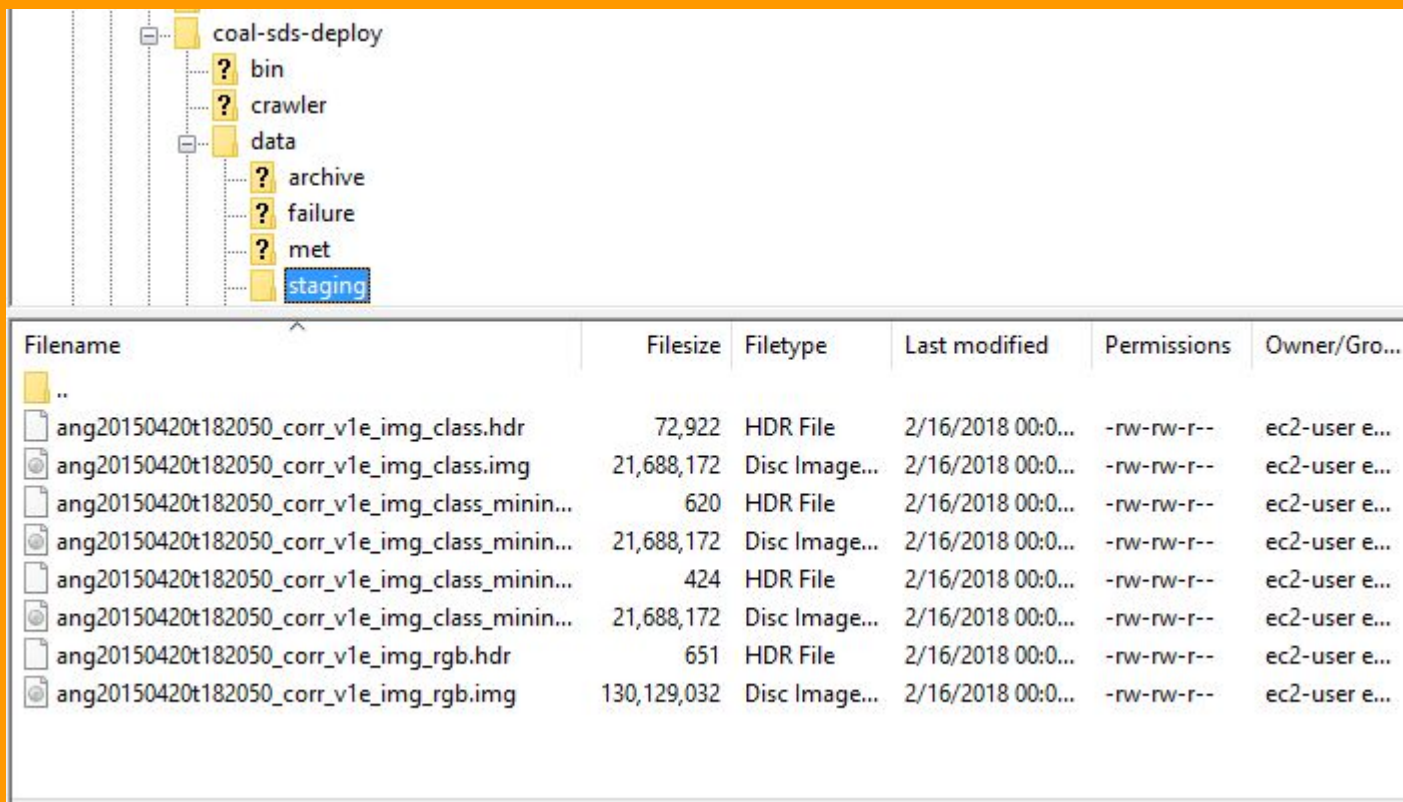


The screenshot displays the AWS Management Console interface for the EC2 service. The top navigation bar includes the AWS logo, 'Services', and 'Resource Groups'. The left sidebar lists various EC2-related options such as 'EC2 Dashboard', 'Events', 'Tags', 'Reports', 'Limits', 'INSTANCES', 'Launch Templates', 'Spot Requests', 'Reserved Instances', 'Dedicated Hosts', 'Scheduled Instances', 'IMAGES', 'AMIs', 'Bundle Tasks', 'ELASTIC BLOCK STORE', 'Volumes', and 'Snapshots'. The main content area features a 'Launch Instance' button, a 'Connect' button, and an 'Actions' dropdown. Below these is a search bar and a table of EC2 instances. The table has columns for Name, Instance ID, Instance Type, Availability Zone, Instance State, Status Checks, Alarm Status, Public DNS (IPv4), IPv4 Public IP, and IPv6 IPs. A single instance, 'myfirstinstance', is listed with ID 'i-03420bc002923f266', type 't2.micro', in the 'us-west-2c' availability zone, and is in a 'running' state. The status checks show '2/2 checks ...' and the alarm status is 'None'. The public DNS is 'ec2-54-187-135-29 us-...' and the IPv4 public IP is '54.187.135.29'. At the bottom, a status bar indicates the instance ID and public DNS: 'Instance: i-03420bc002923f266 (myfirstinstance) Public DNS: ec2-54-187-135-29.us-west-2.compute.amazonaws.com'.

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6 IPs
myfirstinstance	i-03420bc002923f266	t2.micro	us-west-2c	running	2/2 checks ...	None	ec2-54-187-135-29 us-...	54.187.135.29	-

Instance: i-03420bc002923f266 (myfirstinstance) Public DNS: ec2-54-187-135-29.us-west-2.compute.amazonaws.com

Current File Manager Staging



The screenshot shows a file manager interface. On the left, a directory tree is visible under the path 'coal-sds-deploy'. The tree includes subdirectories: 'bin', 'crawler', 'data', 'archive', 'failure', 'met', and 'staging'. The 'staging' directory is currently selected and highlighted in blue. On the right, a table displays the contents of the 'staging' directory. The table has six columns: 'Filename', 'Filesize', 'Filetype', 'Last modified', 'Permissions', and 'Owner/Gro...'. It lists eight files, including HDR files and Disc Images, all with permissions of -rw-rw-r-- and owned by ec2-user.

Filename	Filesize	Filetype	Last modified	Permissions	Owner/Gro...
..					
ang20150420t182050_corr_v1e_img_class.hdr	72,922	HDR File	2/16/2018 00:0...	-rw-rw-r--	ec2-user e...
ang20150420t182050_corr_v1e_img_class.img	21,688,172	Disc Image...	2/16/2018 00:0...	-rw-rw-r--	ec2-user e...
ang20150420t182050_corr_v1e_img_class_minin...	620	HDR File	2/16/2018 00:0...	-rw-rw-r--	ec2-user e...
ang20150420t182050_corr_v1e_img_class_minin...	21,688,172	Disc Image...	2/16/2018 00:0...	-rw-rw-r--	ec2-user e...
ang20150420t182050_corr_v1e_img_class_minin...	424	HDR File	2/16/2018 00:0...	-rw-rw-r--	ec2-user e...
ang20150420t182050_corr_v1e_img_class_minin...	21,688,172	Disc Image...	2/16/2018 00:0...	-rw-rw-r--	ec2-user e...
ang20150420t182050_corr_v1e_img_rgb.hdr	651	HDR File	2/16/2018 00:0...	-rw-rw-r--	ec2-user e...
ang20150420t182050_corr_v1e_img_rgb.img	130,129,032	Disc Image...	2/16/2018 00:0...	-rw-rw-r--	ec2-user e...

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