

# Advances in Python for Community Multiscale Air Quality Analyses: A planet in the Cloud?

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*The views expressed in this presentation are those of the authors and do not necessarily represent the views or policies of the U.S. Environmental Protection Agency*

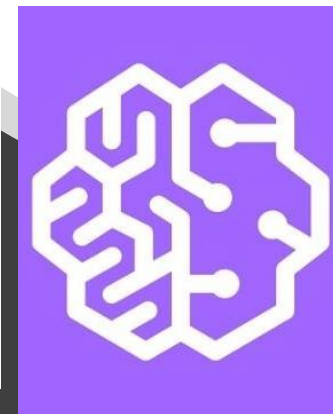
# The CMAS community needs Jupyter Lab

- Jupyter Lab is a notebook with web-based file browser and terminals
  - Docs, code, results, and images
  - Reusable with a minimum effort
  - R, Python, Bash, even C
- Easy install windows, linux, mac
  - Use a python installer
  - run ``pip install --user jupyterlab``
  - ``jupyter lab`` or ``jupyter.exe lab`` to get a web-based platform
- Jupyter Notebooks are a great way to share analysis systems.



Jupyter give anyone access to cloud computing services.

- Available all kinds of places
  - Google Colab (integrated GitHub)
  - Amazon SageMaker
  - Azure (recently dropped easy access)
  - Add it to any system (see last slide)
- The interface is the same in the cloud as on your machine...



# Jupyter in the cloud means instant access to huge data resources!

Bring the creativity and POWER!

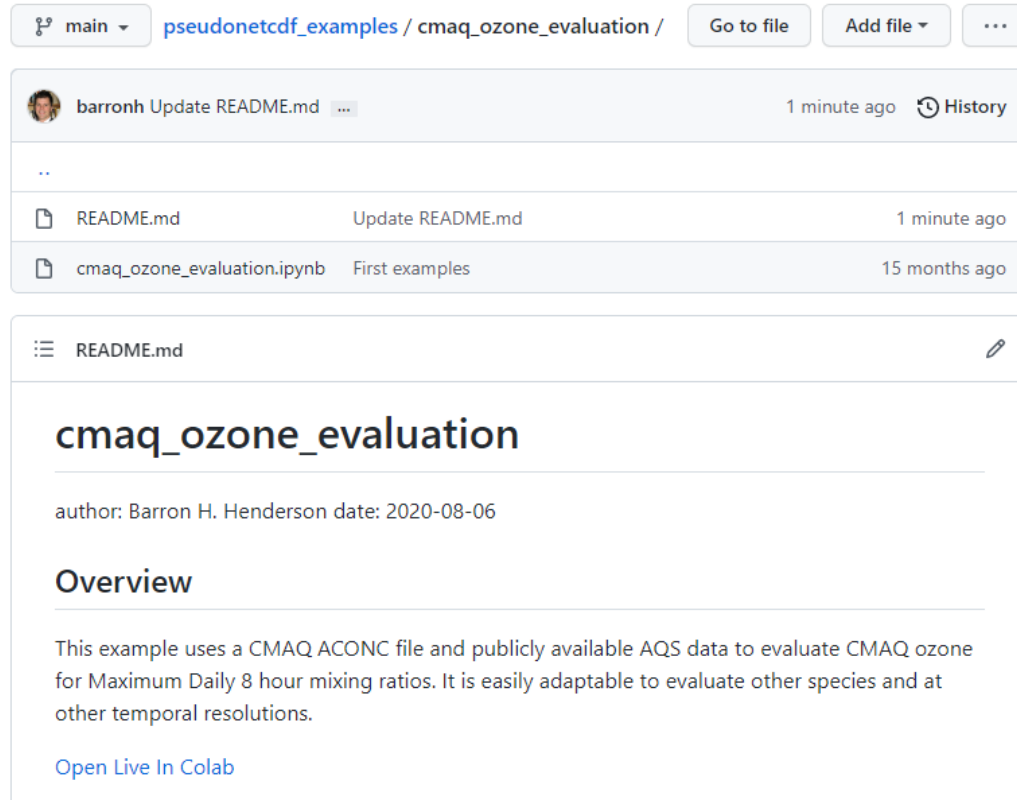
- <https://registry.opendata.aws/>
  - NOAA already has GOES
  - NASA already has OMI L3 data
  - GEOS-Chem emissions and meteorology
- <https://cloud.google.com/solutions/datasets>
  - NOAA: Rapid Refresh (RAP) Forecasts, monthly climate data (nclimgrid), GFS, HRRR, etc
  - USGS Landsat
  - EPA observations
- Much more to come!



# How can I get started?

If you want to get started with geostationary satellite data and python but aren't sure how, try plotting GOES-16 AOD or TEMPO Synthetic NO2 data.

These are primers, and not targeted toward specific applications.



main ▾ pseudonetcdf\_examples / cmaq\_ozone\_evaluation / Go to file Add file ▾ ...

barronh Update README.md ... 1 minute ago History

File	Update	Time
README.md	Update README.md	1 minute ago
cmaq_ozone_evaluation.ipynb	First examples	15 months ago

README.md

## cmaq\_ozone\_evaluation

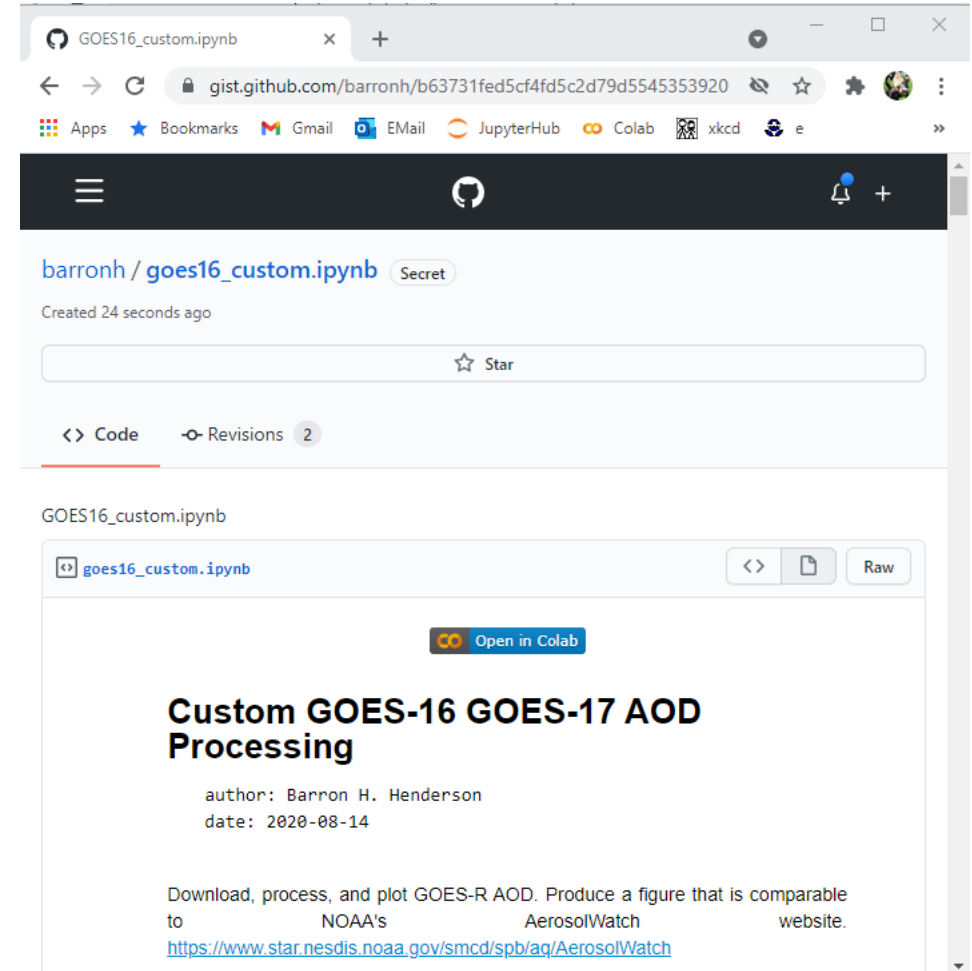
author: Barron H. Henderson date: 2020-08-06

### Overview

This example uses a CMAQ ACONC file and publicly available AQS data to evaluate CMAQ ozone for Maximum Daily 8 hour mixing ratios. It is easily adaptable to evaluate other species and at other temporal resolutions.

[Open Live In Colab](#)

[https://github.com/barronh/pseudonetcdf\\_examples](https://github.com/barronh/pseudonetcdf_examples)



GOES16\_custom.ipynb

gist.github.com/barronh/b63731fed5cf4fd5c2d79d5545353920

barronh / goes16\_custom.ipynb Secret

Created 24 seconds ago

Star

<> Code Revisions 2

GOES16\_custom.ipynb

goes16\_custom.ipynb

Open in Colab

## Custom GOES-16 GOES-17 AOD Processing

author: Barron H. Henderson  
date: 2020-08-14

Download, process, and plot GOES-R AOD. Produce a figure that is comparable to NOAA's AerosolWatch website.  
<https://www.star.nesdis.noaa.gov/smcd/spb/aq/AerosolWatch>

<https://gist.github.com/barronh/b63731fed5cf4fd5c2d79d5545353920>

# What could it look like?

- A repository of fully functional runnable code.
- Oriented toward solving our types of problems.
- Right now, the CMAS Forum Python Channel allows us to link to these sorts of things
  - [cmascenter.org](https://forum.cmascenter.org/c/python/) -> Help -> CMAS Forum -> Category Python
  - <https://forum.cmascenter.org/c/python/>

