Getting started with the Google Earth Engine python API

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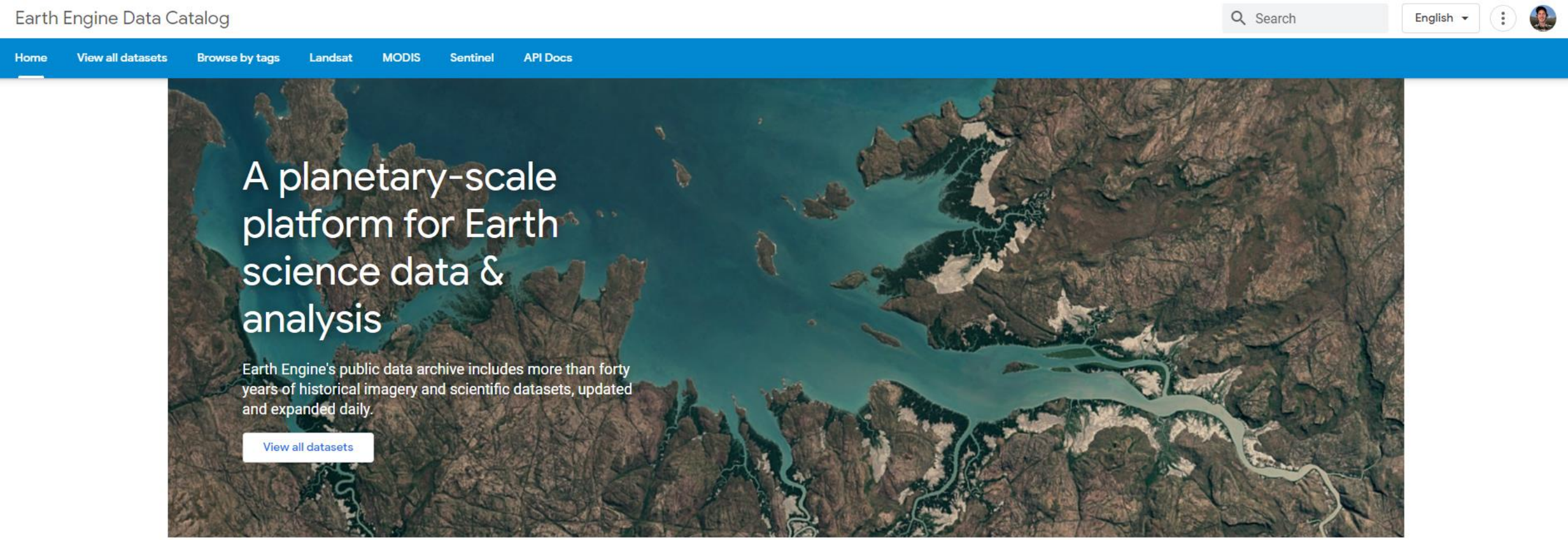
Overview

- GEE overview
  - Registering a GEE account
  - Data Catalog
  - Differences between JavaScript and python APIs
- Installation
  - Anaconda
  - GEE python API in new Anaconda environment
  - Other python libraries (geemap, etc.)
- Examples using JupyterLab
- Links to learning resources and code examples

Registering a GEE account

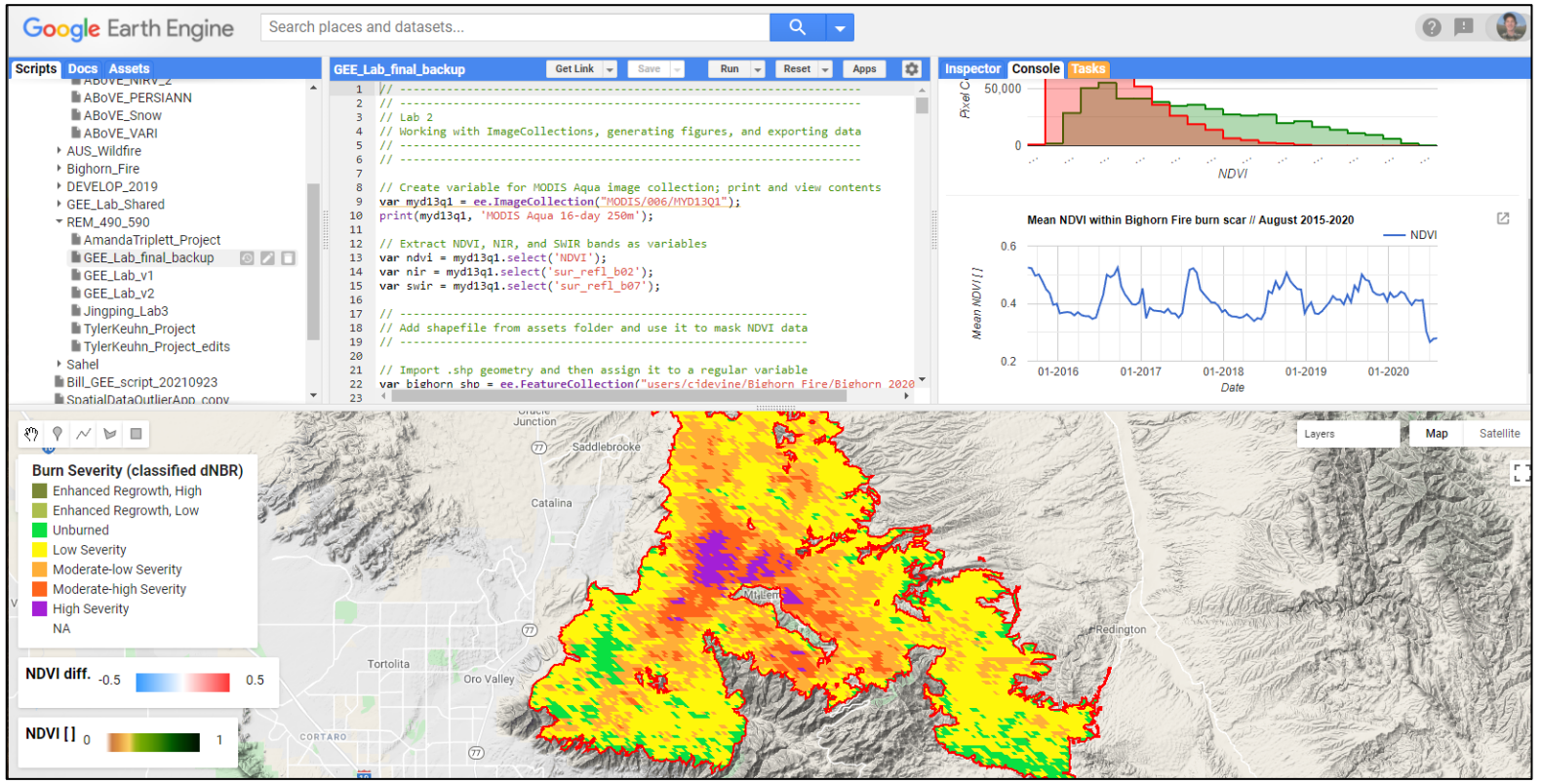
- Requires gmail address
- Figure it out here: https://earthengine.google.com/

GEE Data Catalog (ctrl-click image to visit page)



JavaScript vs. python APIs

JavaScript



Pros:

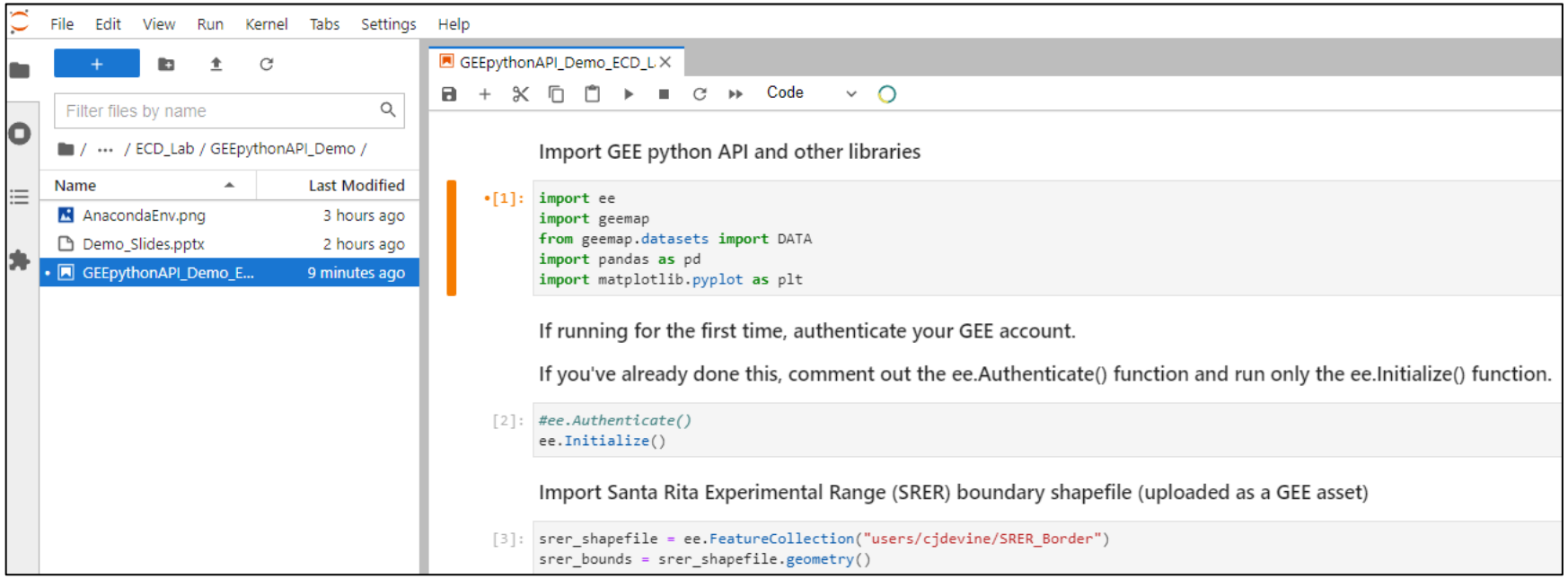
- Easy to access and share EO and model output datasets through simple web interface
- Customize UX/UI, publish web-based applications
- Embed applications in websites
- No downloads required whatsoever

Cons:

- JavaScript syntax
- Difficult to automate certain data processing tasks
- Plotting/visualization options limited in certain ways

JavaScript vs. python APIs

python



Pros:

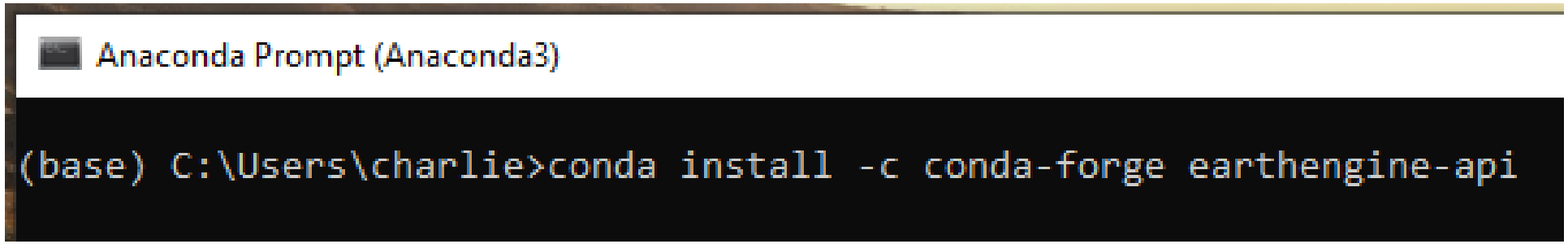
- Familiar syntax
- Integrates GEE data with commonly used python libraries (numpy, matplotlib, etc.), existing workflows
- Easier to combine GEE with locally stored datasets
- Easier to automate workflows
- Develop code using preferred IDEs and text editors, better options for customizing development workspace
- More compatible with machine learning than JavaScript API

Cons:

- Can be a pain to set up
- Fewer UX/UI options
- Not as easy to share interactively
- Package dependencies/versioning issues

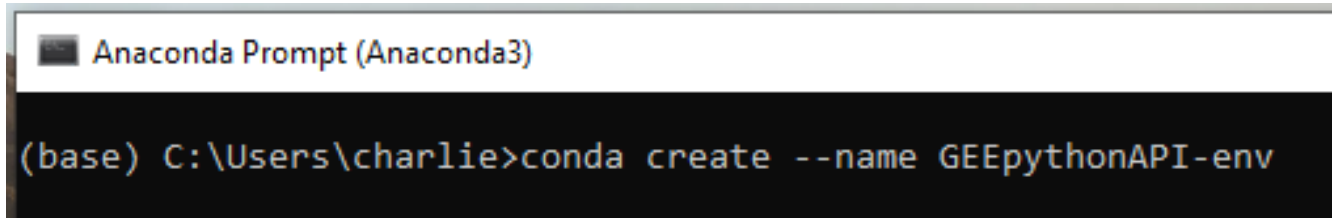
Installing Anaconda and python libraries

1. Install Anaconda (link here)
2. Install GEE python API (resource page)
   I. Open Anaconda Prompt (similar to command line window)
   II. Type the following command to install using conda-forge:

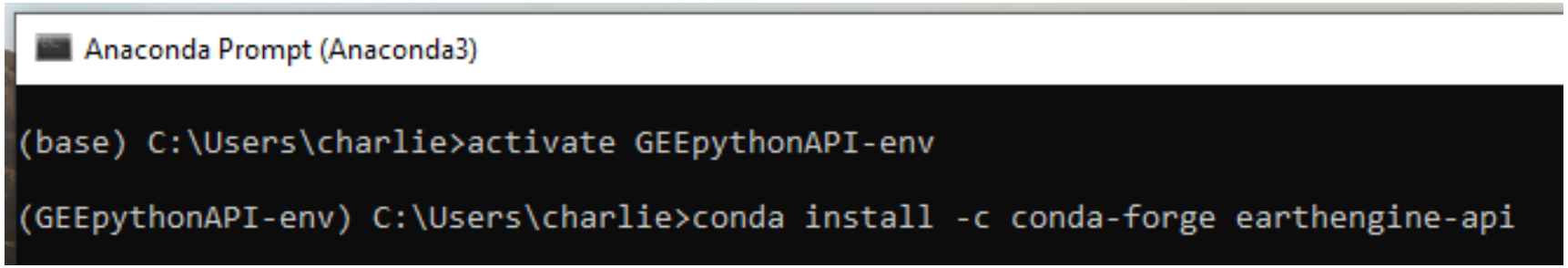


Installing Anaconda and python libraries

3. If installation stalls for a long time (“Solving environment: /”), try creating a new Anaconda environment and installing the GEE python API there
   - Create new environment (GEEpythonAPI-env used as name here, but you can use whatever name you prefer):



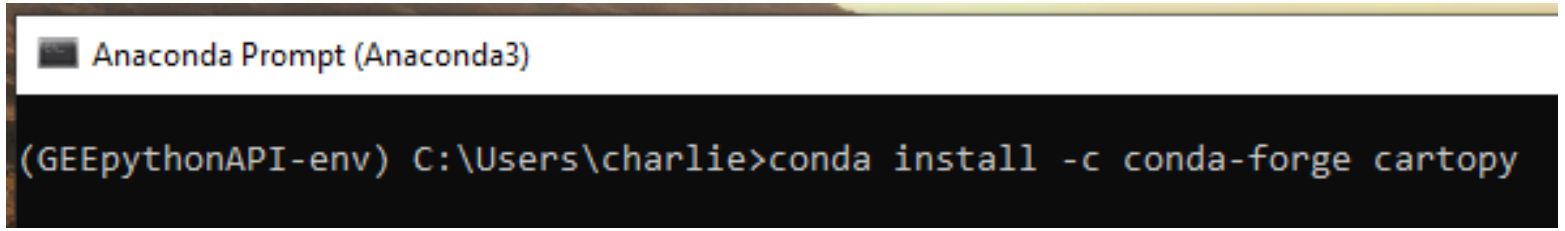
   - Activate the environment (activate GEEpythonAPI-env) and install GEE:



Other python libraries

- geemap
  - Interactive mapping/visualization

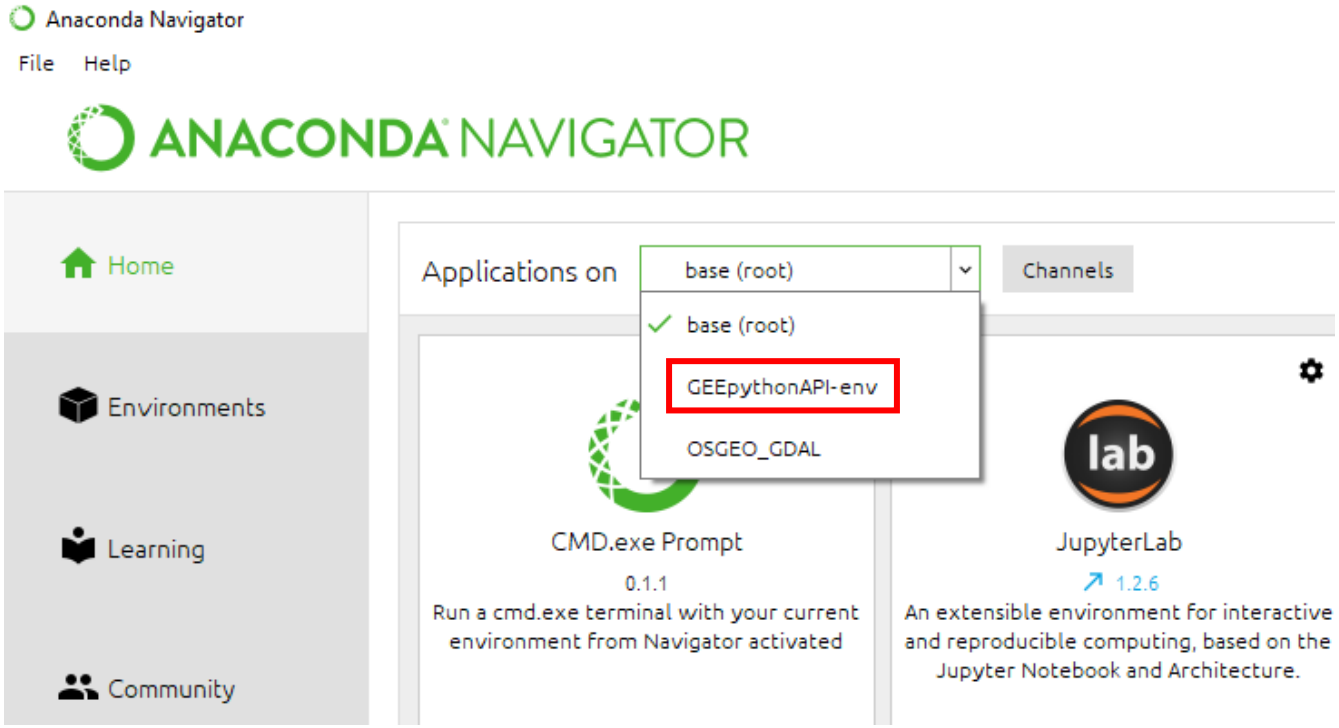
- cartopy
  - Spatial plotting tools



Also install pandas and matplotlib the same way

GEE in JupyterLab

1. Open Anaconda Navigator
2. If GEE python API was installed in a new environment that you created in the previous step, select it from the drop-down next to where it says “Applications on…”



3. Once installed, click “Launch” to open the JupyterLab application in a browser window

GEE in JupyterLab

- See my Github repository for demo code and data files

Links / Resources

- Google Developers page for GEE python intro
- Google Developers single-page GEE python API reference
- geemap documentation
- cartoee documentation
- AwesomeGEE python API resources
- GeoPython2021 workshop materials
- Quisheng Wu (U. Tenn.)
  - Blog: https://giswqs.medium.com/
  - Github: https://github.com/giswqs
- Noel Gorelick (Google)
  - Blog: https://gorelick.medium.com/