ECCO Data Access

Outline
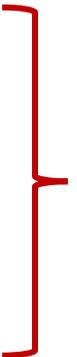
Have your laptops ready with an OSS JupyterHub (https://sealevel.oss.eis.smce.nasa.gov) launched so you can follow along!

- Overview of ways to access ECCO data

- The *ecco_access* Python library

- Get *ecco_access* on your Python path*

- Tutorial examples to access ECCO data*

- Try your own example!*

How can you access ECCO data/output? Overview

How can you access ECCO output?

- On NASA's Pleiades supercomputer (if you have an account)

- Through the ECCO Data Portal hosted by NASA Advanced Supercomputing (https://data.nas.nasa.gov/ecco)

Ultra high-res ECCO simulations only available here

- ECCO Drive (https://ecco.jpl.nasa.gov/drive)

- AWS Cloud S3 bucket (ecco_model_granules)

- Through PO.DAAC (currently version 4 release 4 only)
  - Includes access in-cloud from S3 bucket

ECCO Drive (legacy access) vs. PO.DAAC

ECCO Drive - https://ecco.jpl.nasa.gov/drive

- Many versions of ECCO available

- Not as complete a selection of variables for version 4 release 4 (esp. daily)

PO.DAAC (NASA Earthdata) - https://search.earthdata.nasa.gov

- Only version 4 release 4/4b available currently

- More fields available with daily resolution, snapshots, etc.
  - Enables 3-D budget closures for volume, heat/temperature, salt/salinity/freshwater at daily as well as monthly time resolution

ECCO Drive (legacy access) vs. PO.DAAC

ECCO Drive - https://ecco.jpl.nasa.gov/drive

- Files are organized in a hierarchy of directories
  - By temporal resolution, variable, and year (for v4r4)
- Typically use *wget* or similar to download
- No spatial subsetting prior to download

PO.DAAC (NASA Earthdata) - https://search.earthdata.nasa.gov

- Files are organized by datasets
  - Composed of granules for individual times
- Can select granules via web interface or use Earthdata API
- Opendap enables spatial & variable subsetting prior to download
- **Python-based access library (*ecco_access*)**

The *ecco_access* Python library

From your OSS home directory, use the left panel to navigate to the following tutorial:
ecco-2024/book/tutorials/ECCO_data_access/ECCO_access_intro.ipynb. Double-click to open it.

- In the past two years we have developed Python modules for accessing ECCO output hosted on PO.DAAC – either by direct download (*ecco_download.py*) or in-cloud access (*ecco_s3_retrieve.py*)

- These modules have been combined under the new *ecco_access* Python library, which will (hopefully) soon become a Python package
  - It can be imported into your Python code like a package: `import ecco_access as ea`

- *ecco_access* includes:
  - Support for a variety of Internet-based and AWS Cloud-based access methods (modes)
  - Query ECCO variable names and descriptions to find the dataset(s) you need
  - A Python interface to download subsets of ECCO granules (powered by Opendap)

Exercises

Use *ecco_access* to open in your Python workspace (as *xarray* Datasets), without downloading:

- Monthly salinity fields during the time period of the SPURS-1 campaign (2012-2013) near the subtropical Atlantic salinity maximum (25 N 38 W)

- Daily surface wind stress during the life span of Hurricane Katrina (August 23-31, 2005)

Hints: You can use grid = 'latlon', mode = 's3_open_fsspec', and jsons_root_dir=join('efs_ecco','mzz-jsons')