Remote Sensing and Fluxes Upscaling for Real-world Impact

Hands-on session

July 10th, 2024

What is Colab?

- Collaborative coding -> Similar to Jupyter notebook

- Supports Python and R languages

- Runs in your browser

- Access to GPU for free   https://colab.research.google.com/

Google Accounts

- **Google Drive**: We shared with you a Google folder (in Shared Drives) containing the material for the workshop.

- **Google Earth Engine**: To use Google Earth Engine you need an account to connect to. To register , start from here
  https://code.earthengine.google.com/register

If your Google Account is linked to a different email, please let us know and we will send the invitation to join the Google Drive folder.
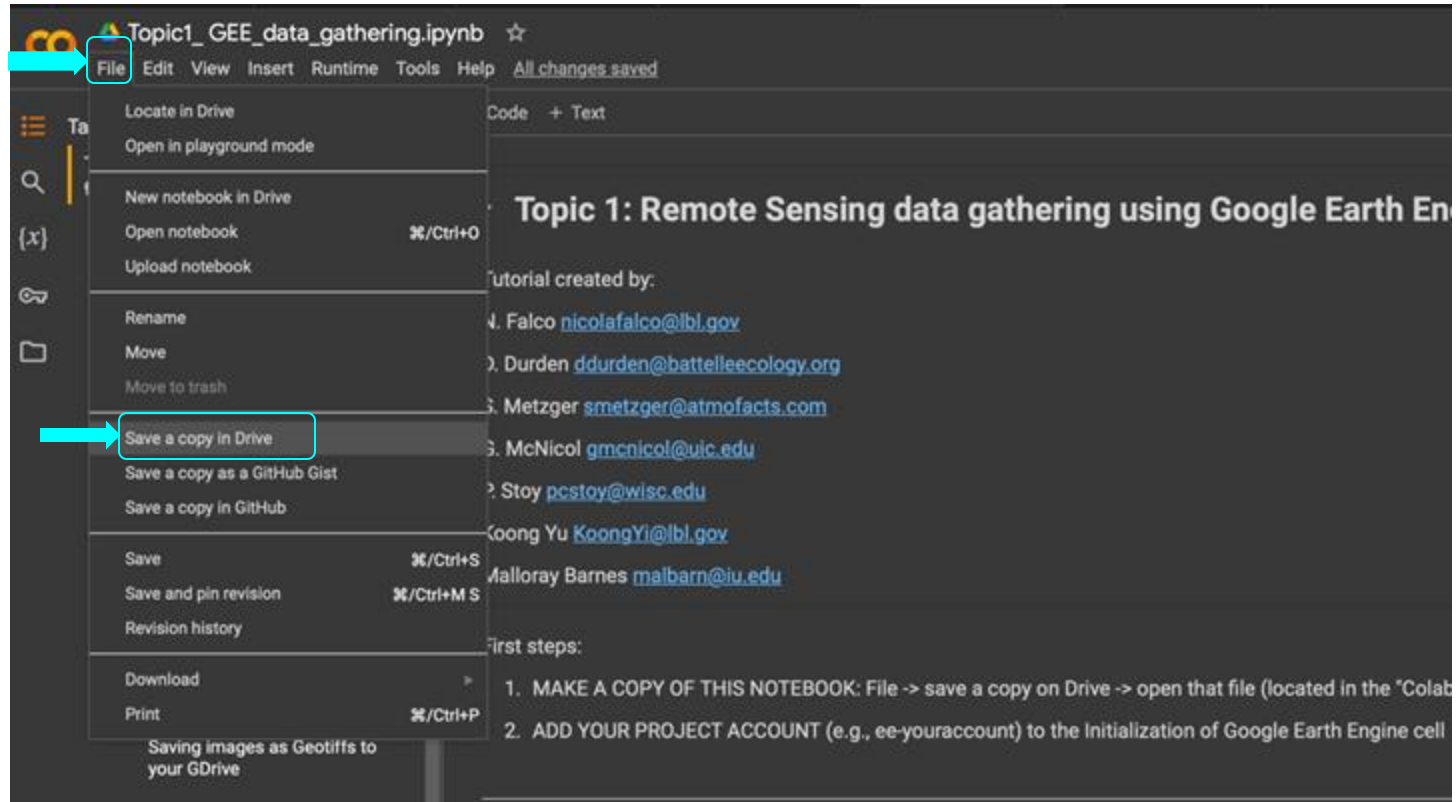
Where is the material? First steps
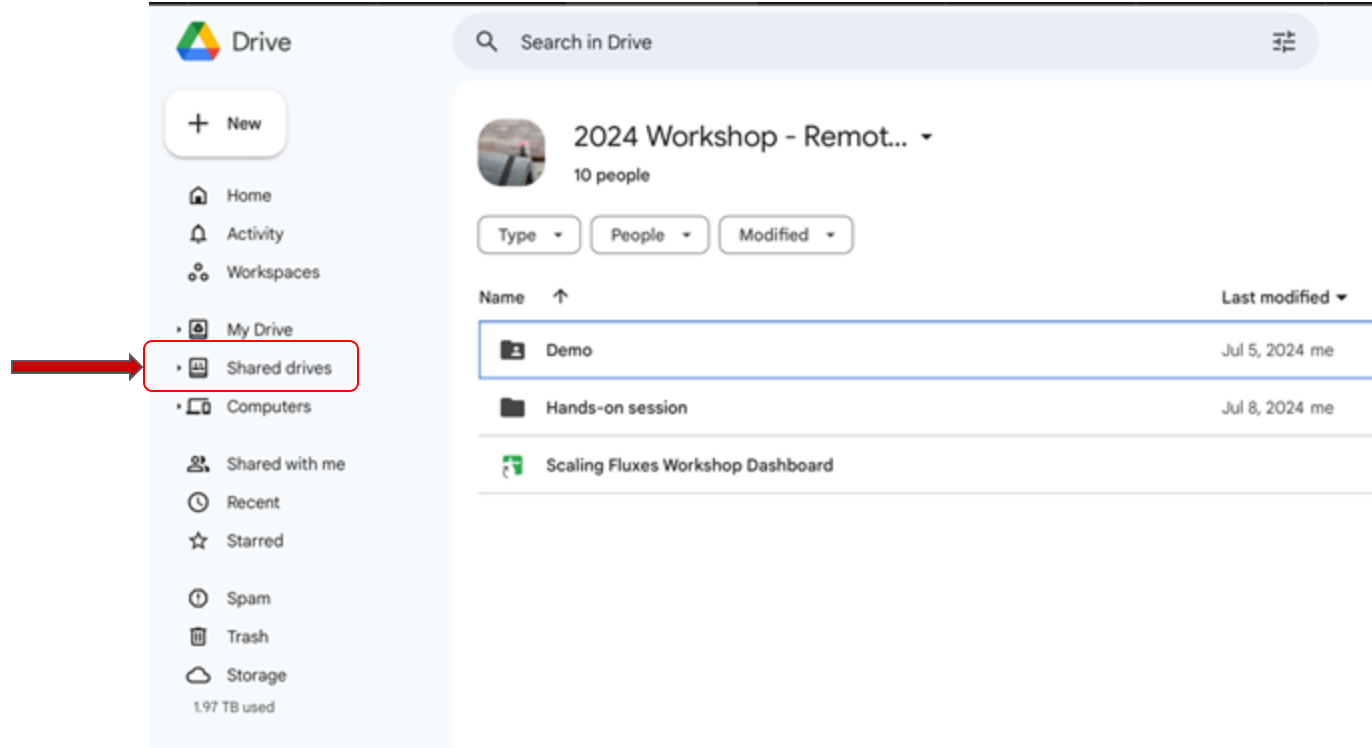
Where is the material? First steps
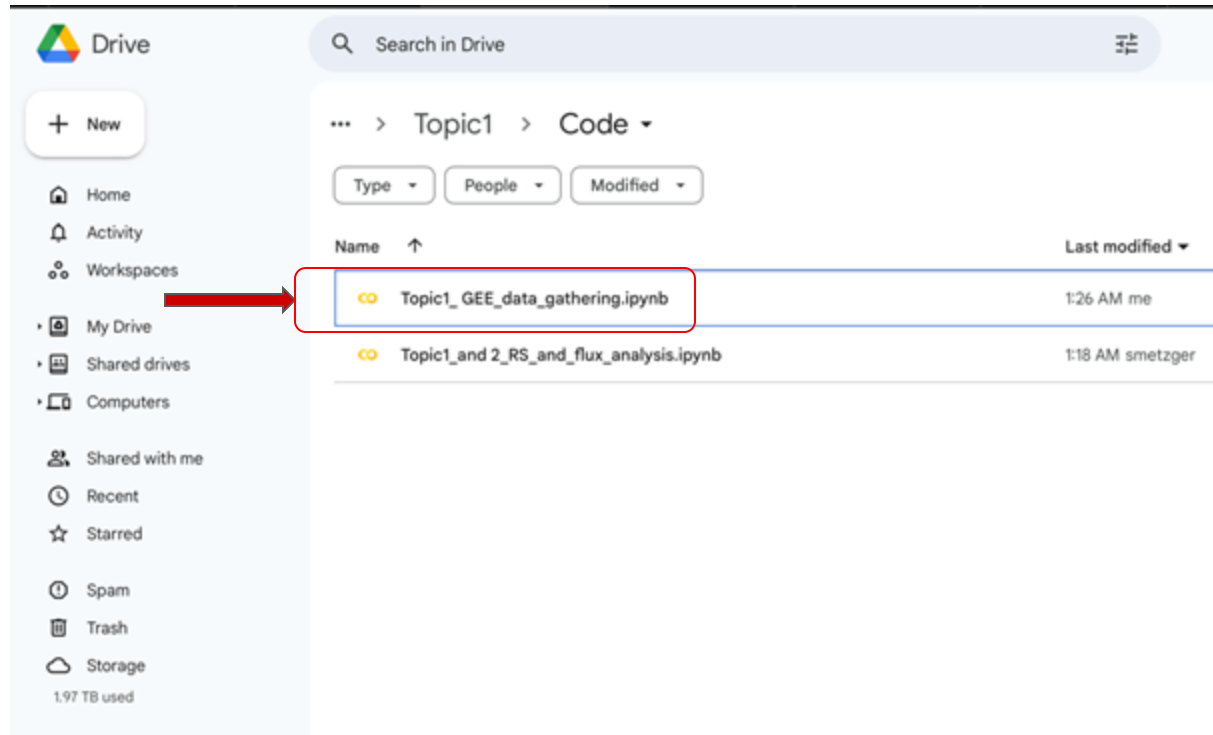
Create a copy of the colab notebook

What we will do?

TOPIC 1: From site-scale

1. We will gather RS data using Colab and GEE (python API)
2. Provide some utility codes to perform processing
   a. Vegetation indices
   b. Plot maps
   c. Extract time-series
   d. Perform quality assessment (QA)
3. Compare RS time-series with tower fluxes (NEE)
   a. RS and flux time-series aggregation
   b. Comparison between VIs and NEE (linear model)

What we will do?

TOPIC 2: over regional-scale connectivity

1. Use model derived to estimate NEE over a small region (straight shot analysis)

2. Use high-frequency flux spatialization to explore additional controls in space, time and process.

What we will do?

TOPIC 3: to continental-scale connectivity

Showcase of the Baseline Imager Live Imaging of Vegetated Ecosystems (ALIVE) workflow that we call 'ALIVEGPP

1. Use of the Advanced Baseline Imager on the Geostationary Operational Environmental Satellites - R Series (GOES-R) from pixels that contain Ameriflux and NEON, Inc. towers.
2. Use of a machine learning model to estimate GPP at the native temporal resolution of the ABI CONUS scene, every 5 minutes.
3. This lesson will teach you how to work with zarr libraries created using Arraylake by earthmover. We will use a zarr library that contains GPP estimates

Area of interest

US-xUN: NEON University of Notre Dame Environmental Research Center

Area 6 x 6 km

Tower location