Lab 2: Google Earth Engine

This tutorial provides introduction to Google Earth Engine and introduces the basic functionalities available on Google Earth Engine. In addition to the publicly available functionality, it also gives an overview of some of the functionalities. Once you have access to the Google Earth Engine account, so the first thing to do is sign in.

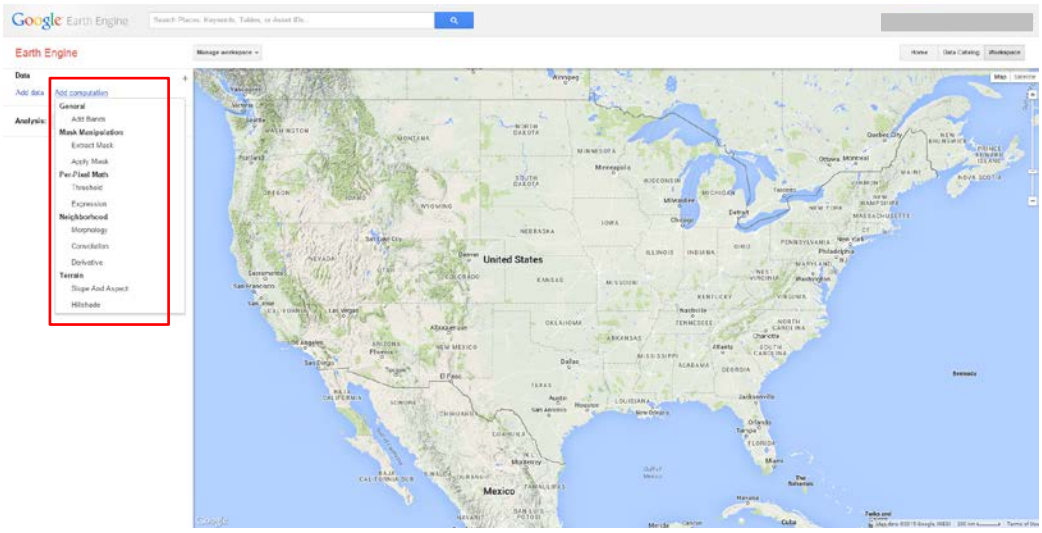
- Go to: http://earthengine.google.org
- Click on the *Sign in* link in the upper right corner of the page.
- Sign in with the Google account which you have registered with the Google Earth Engine.

Workspace Tools

Once you are signed in to Google Earth Engine, click on the *Workspace* button in the upper right. In your workspace you will see a number of new controls and features which were not present before you signed in:

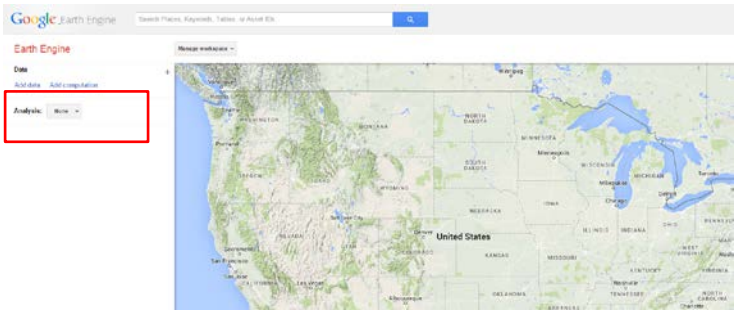
Add Computation

The *Add computation* link is now visible in the left-hand panel, next to the *Add data* link. Click on this link to see numerous computation options which can be applied to your datasets. More information on how to use these tools will be the subject of another tutorial, which will be linked here once it is ready and published.



Analysis

The *Analysis:* dropdown is now visible at the bottom of the left-hand panel. It contains options for running your own analysis on the data in Google Earth Engine. Options currently include: *Train a classifier, Cross-validate,* and *Compare*.



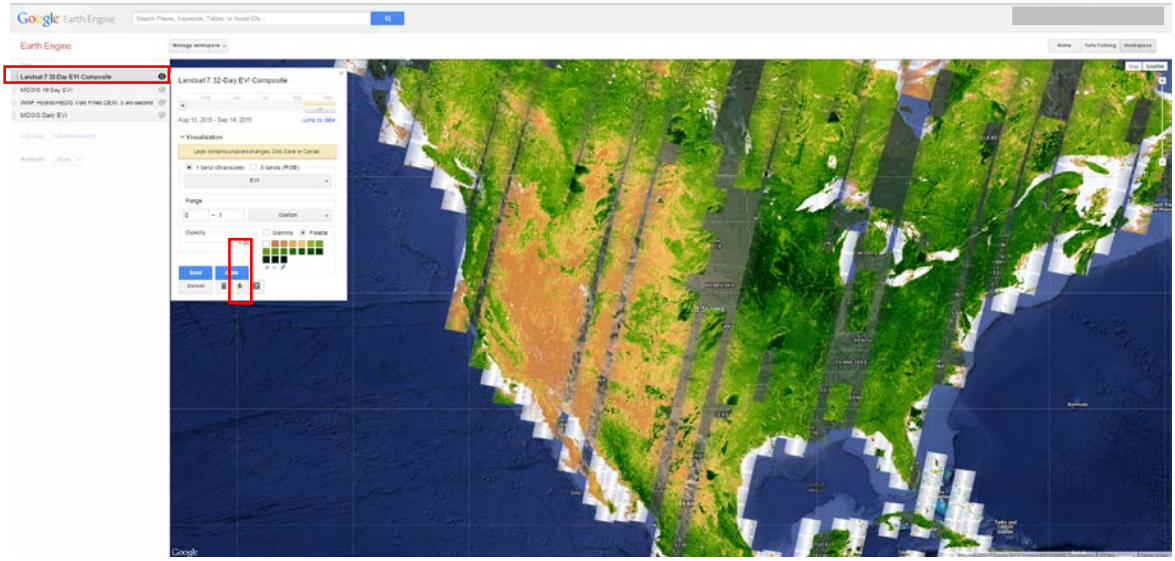
Manage Workspace

The *Manage workspace* dropdown is now visible above the map. It gives you access to a number of tools discussed below.

Data Download

When you are signed in with your Google Account, you get the option to download data layers which you have loaded in your workspace, including source data from the Google Earth Engine Data Catalog, as well as computed layers from your own analysis or classification.

- Select the data layer for which you want to download data, and click its name in the left-hand panel to open its *Layer Settings* dialog (#1 in the below).
- Click the *Download* button (downward pointing arrow) in the lower right of the dialog (#2 in the image below).

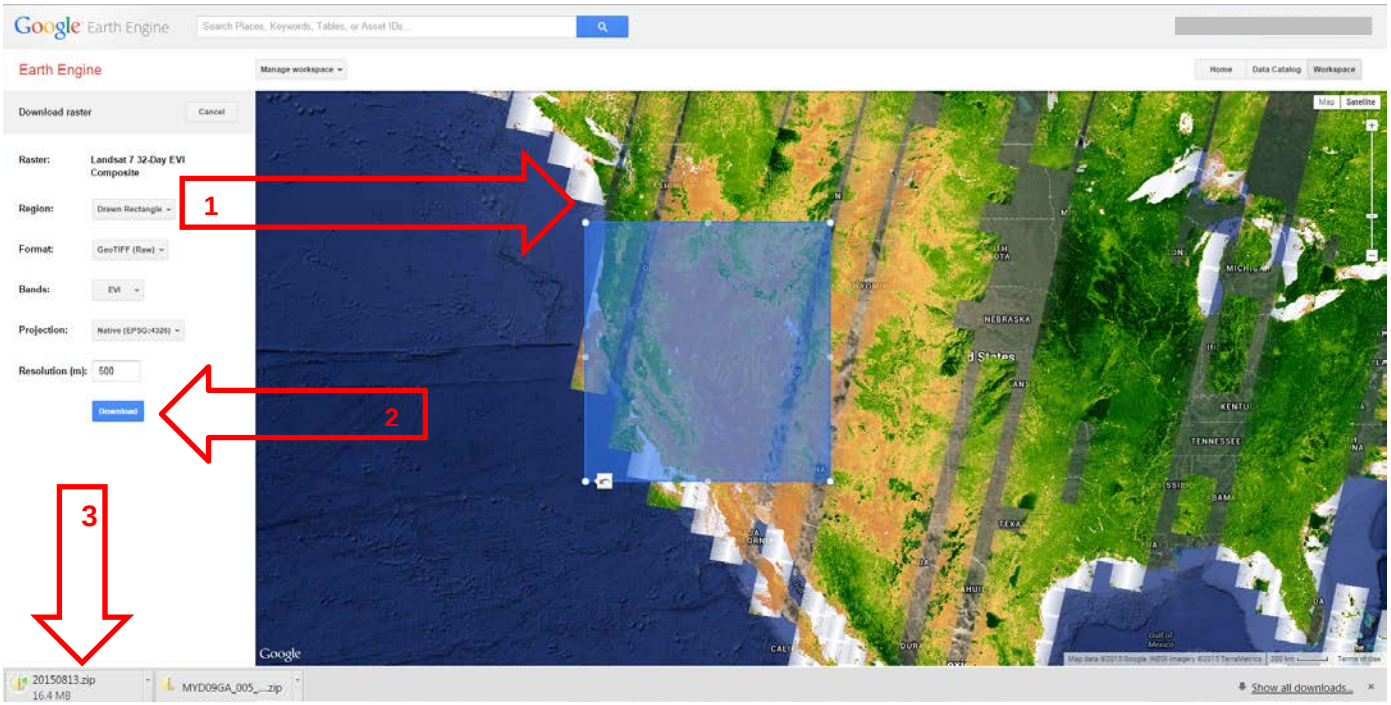


- You will see the download options appear in the left-hand panel, as shown below.

- Select which area you wish to download using the *Region:* button. For this exercise, select *Draw Rectangle*. On the map, click and drag to draw a box the size of a small state or a large city.
- Select the file format you want to download from the *Format:* dropdown. For this exercise, select *GeoTiff (Raw)*.
- Select which Bands you wish to download using the *Bands:* button. Click on the button to see the options.

For this exercise, leave the selection on *All*.

- Select the projection which you want the data to be in using the *Projection:* button. For this exercise, select *WGS84*.
- Set the resolution at which you want the data to be downloaded using the *Resolution:* box. For this exercise, leave the resolution at its default setting of *500*.
- Click the *Download* button to start the download. A zip file will be downloaded by your browser, which you can open to find the datasets which you requested.



Note: The downloaded zip file will contain one file for each of the bands requested. The data in each file will use a data type specific to the data requested. Many of these data types are not viewable by ordinary image viewers. For example, NDVI data is represented using floating point numbers, which most image readers will not understand. To view such downloaded files on your computer, you will need software which can view the relevant data type, or convert it to something simpler such as an RGB image which you can view in regular image viewers. Some software packages which can rescale images for viewing include QGIS, ENVI, ESRI/ArcGIS, and ERDAS.

Exercise

1. Download the following satellite products for Burkina Faso.
    a. MODIS 16-Day EVI (August 5 -13th, 2017)
    b. MODIS 16-Day NDVI (August 5 -13th, 2017)
    c. MODIS 16-Day NDWI (August 5 -13th, 2017)
    d. MOD11A2 LST 8 Day (August 5 -13th, 2017)
    e. GTOPO30: Global 30 arc-second Elevation

2. Based on the links below fill in the missing characteristics of each satellites:
   Landsat 8: http://landsat.usgs.gov/landsat8.php
   MODIS: https://lpdaac.usgs.gov/dataset_discovery/modis

Satellite	**Spatial resolution** What is the ground area represented by a pixel? (e.g. 15 m)	**Temporal resolution** What is the revisit period? (e.g. 10 days)	**Radiometric Resolution** What is the number of divisions of a bit depth? (e.g. 12 bit)	**Spectral resolution** How many bands does it contain? (e.g. 7 bands)
Landsat 8				
MODIS				