

The Google Earth Engine Explorer: Training Classifiers, Supervised Classification and Error Assessment

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OBJECTIVES:

- Learn to add raster and vector data from the catalog in Google Earth Engine (GEE) Explorer
- Learn to train a classifier
- Learn to download and share results

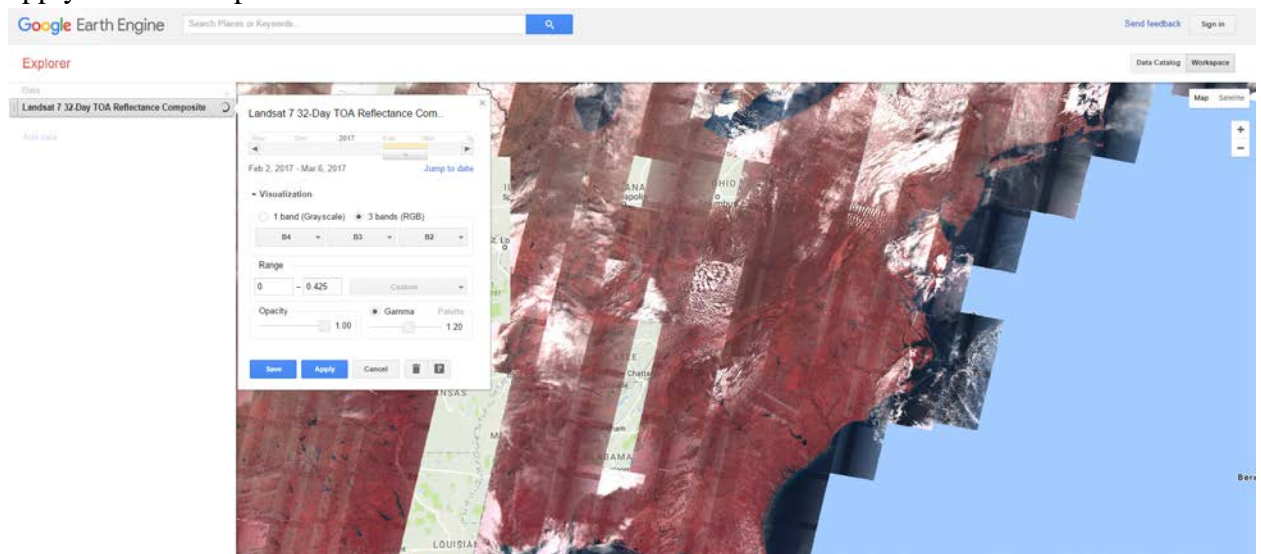
INTRODUCTION:

The GEE Explorer is a simple web interface to the Earth Engine application program interface (API). Anyone can visualize data provided in the public data catalog whereas the code editor is a web-based integrated development environment (IDE) for the GEE JavaScript API. Code editor requires a 'trusted tester' access in which the user has to login into their Gmail account. The GEE Explorer allows anyone to view its features; however, signed in GEE users can also import data, run simple analyses, save and export the results.

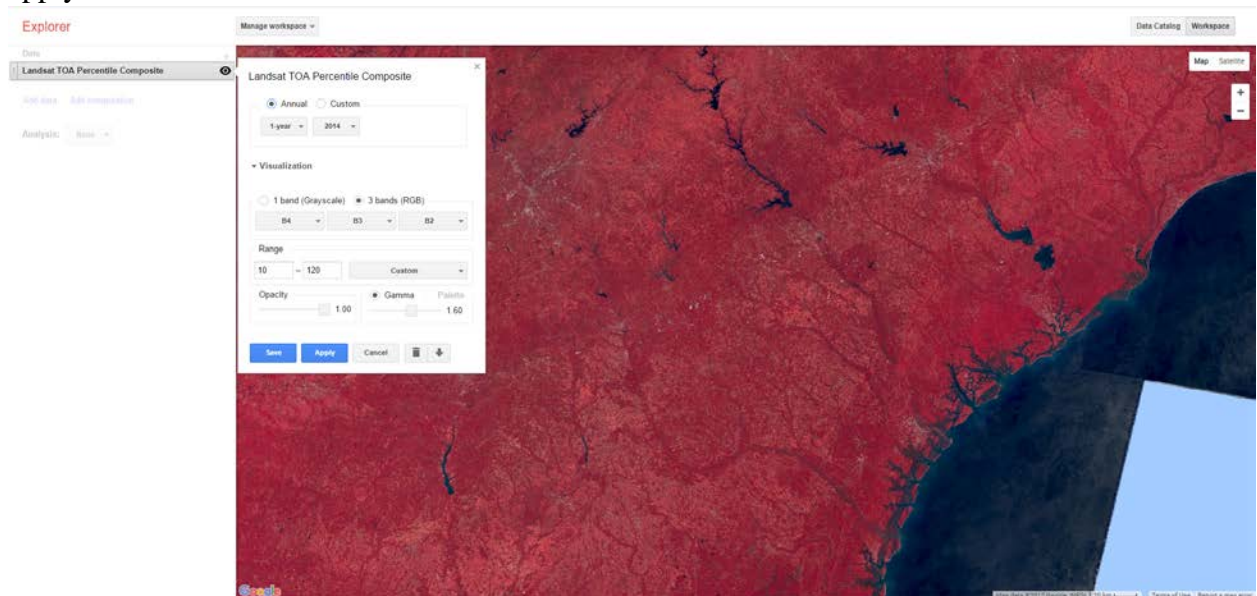
PROCEDURE:

In order to access GEE Explorer, enter the web address: www.explorer.earthengine.google.com

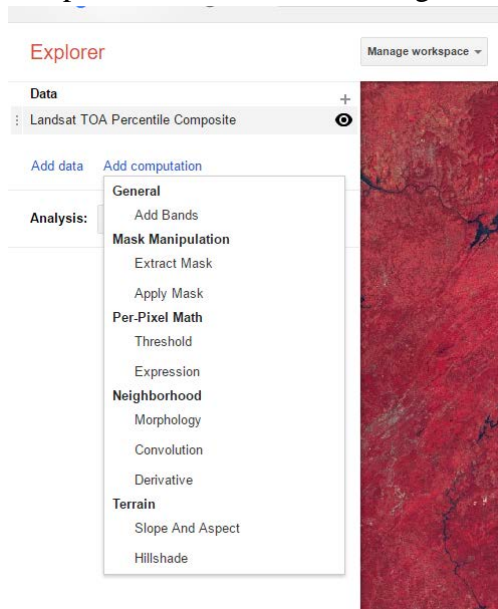
1. Go to the data catalog, click on 32-day under popular tags, and add the Landsat 7 32-Day Reflectance Composite to the workspace.
2. Notice that Explorer gives you the opportunity to view past data as well as the most recent. Click on the most recent date, change the band combination to false color, and apply. Zoom to a portion of the United States of America.



3. In order to perform any analysis beyond just viewing data, you need to sign in to your Google account.
4. Notice there is a clear workspace again because you are not given access to save work without an account. Click in the search bar and select the featured raster named “ Landsat TOA Percentile Composite”.
5. Change the band combination to view the tiles in false color, change the time frame to custom, select the dates May 2016- September 2016 (to show leaf-on imagery), and click apply.

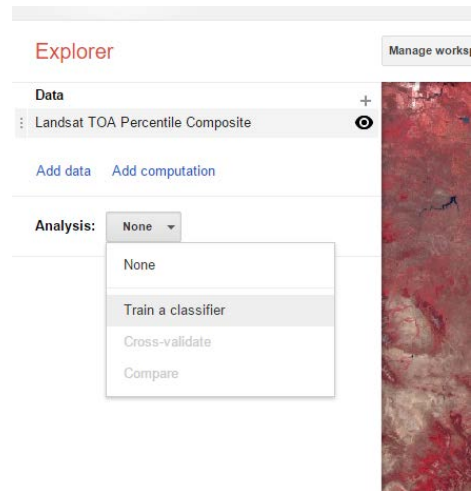


6. See that there is now an option underneath the data which allows you to add a computation to this dataset along with adding more data.

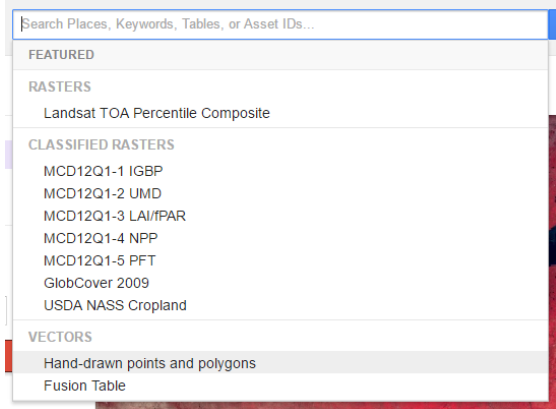


7. For the purpose of this exercise, there is no direct need for a computation. Go back and click the drop-down box under ‘Analysis’. Note that there is the option to ‘Train a Classifier’. This is how you will perform a supervised classification. Note that you have

many different classification algorithm's available and for this exercise use the first classifier 'Fast Naïve Bayes'; Before you begin the process of classification you must create the appropriate classes to train.



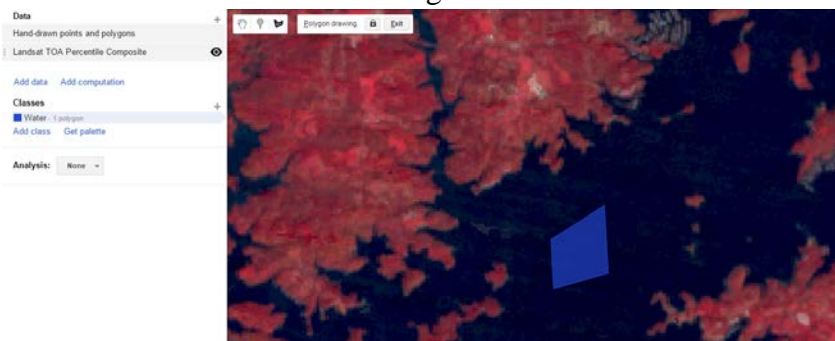
8. In the search bar, select 'Hand-drawn points and polygons' from the vector featured data.



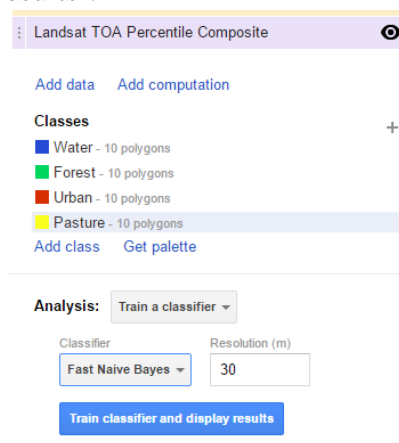
9. Click 'Add class'. For the purposes of this tutorial four classes will be created: **water, urban, pasture, and forest**. You can rename the class by clicking on the label and also change the colors of the classes to distinguish between them.
10. Zoom to Lake Sidney Lanier in Georgia and notice that the water is a dark blue/black color.
11. Create a polygon to get a training sample by clicking the polygon icon in the top left-hand corner of the screen.



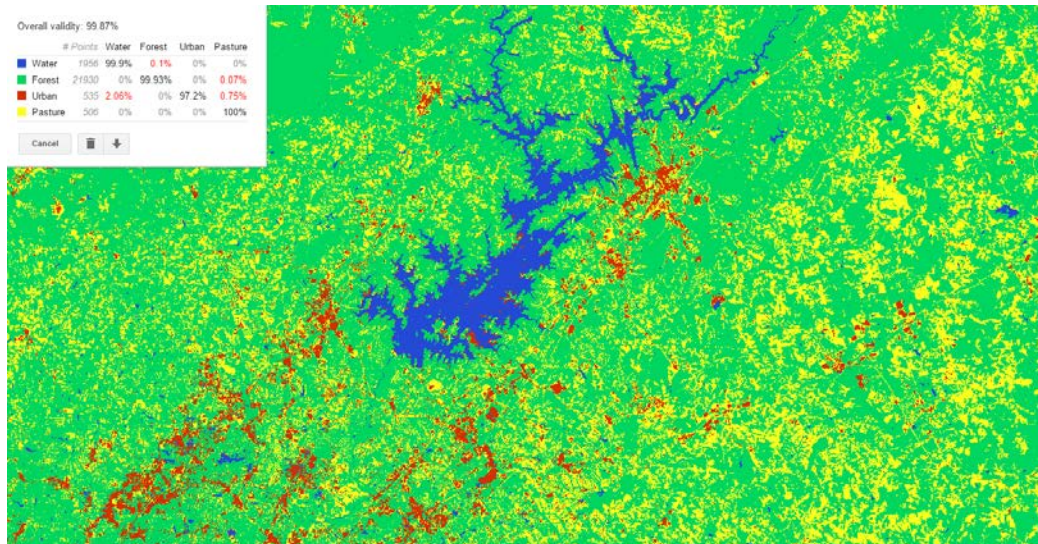
12. Begin drawing a polygon that ONLY includes what is visible as water in the area. Note that the completion of the polygon is recorded under classes. Continue drawing polygons of water bodies in the surrounding area until there are at least ten polygons for the class.



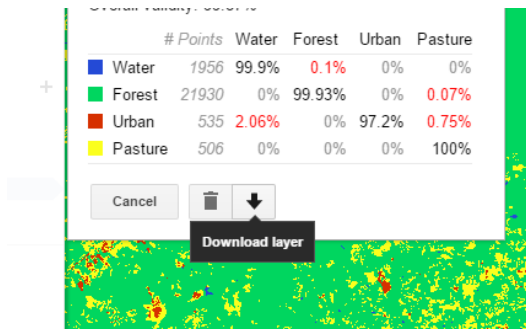
13. Repeat the process for the three other classes. Recall what the classes look like in false color in order to collect the sample points efficiently.
14. When you are finished, click 'Train a classifier' under Analysis.
15. Leave 'Classifier' and 'Resolution' at default and click 'Train Classifier and display results'.



16. View the output classified image as well as the results. It contains the overall validity percentage as well as a break-down of each class with the number of points.



17. GEE Explorer gives you the option to download the results as well. You can download the current extent of the screen or define a specific area by drawing a polygon or point. You can also define which format the data is desired to be downloaded as, the projection, and the resolution.



18. Choose the desired specifications then click download.

Region: Viewport ▼

Format: GeoTIFF (Raw) ▼

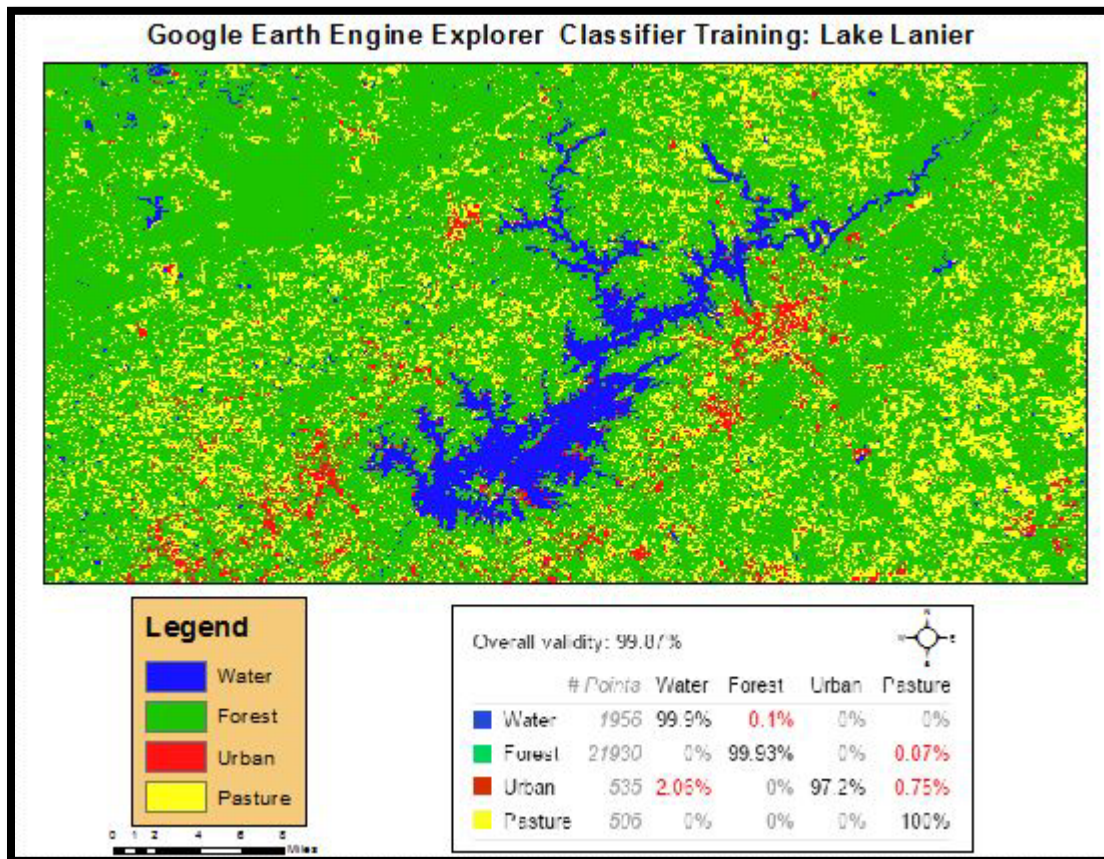
Bands: classification ▼

Projection: Native (EPSG:4326) ▼

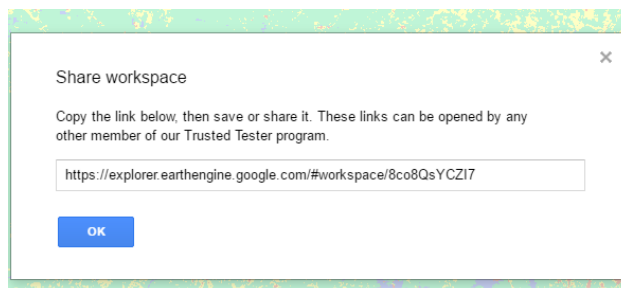
Resolution (m): 30

Download

19. The results will need to be unzipped in the desired folder after download.
20. Pull up the downloaded image in ArcMap and make a map composition.



21. Save your workspace by clicking in the top left-hand corner. Also you can share your workspace via copy and pasting the link assigned to you.



22. Repeat the above exercise by using some of the other available Classifiers and compare results by visual inspection on ArcMap. You can pull up the reference basemap imagery

on ArcMap to help you ascertain which classifier did a better job in classifying the landcover. Write a report analyzing your results.



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