GEO 542: Introduction to Remote Sensing – Fall 2026

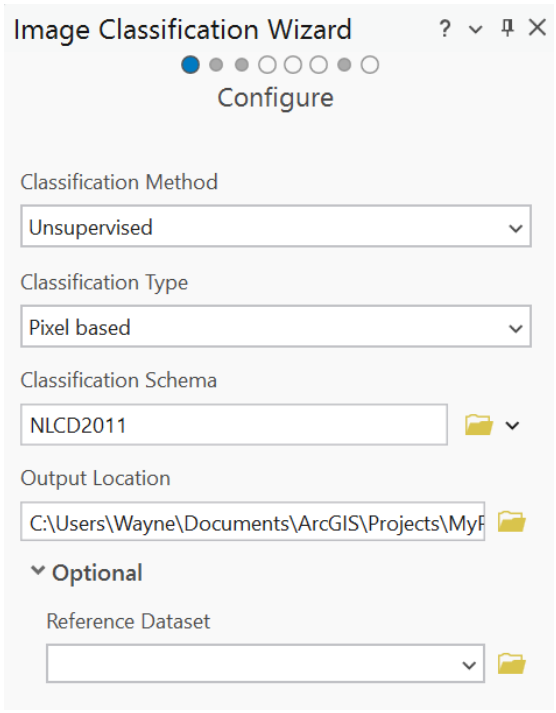
Lab2: Image Classification

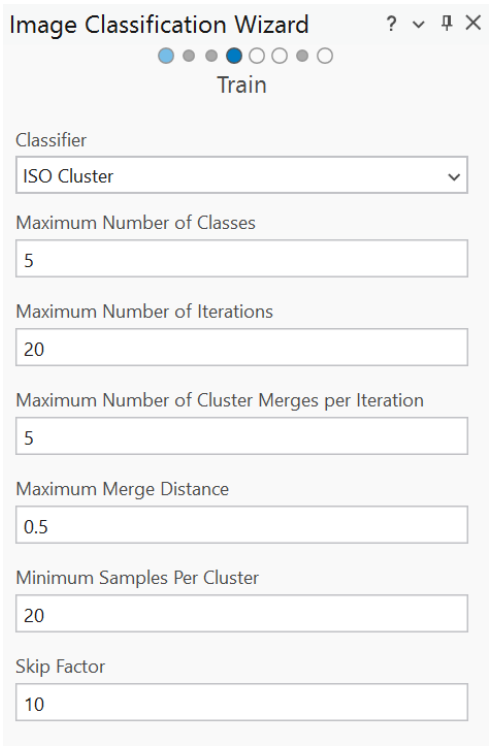
Due: written portion (worth 20% of your total course grade) Nov. 24, 2026 by 9:00pm via D2L
in-class presentation (worth 10% of your total course grade) **5 minutes per student - random order on** Dec. 1 (in the lecture and lab periods). **If you are not present when your name is called, you will receive a grade of zero (0) for the presentation portion of the lab. If your Powerpoint presentation is not submitted via D2L by 9:00pm on November 30 (further details below), you will receive a grade of zero (0) for the presentation portion of the lab.**

Image classification for a variety of applications is one of the main reasons that remotely sensed data are collected. In this lab, you will perform **"unsupervised" classification** procedures on two 2000 x 2000 pixel subset images for areas **outside** North America. For your classifications, you will **use two different** Sentinel 2A/B images obtained from the Copernicus Data Space Ecosystem (https://dataspace.copernicus.eu/). The image files will be used for land cover classification. Details on Sentinel 2A and 2B images are also available from the Copernicus Data Space Ecosystem website.

In order to complete the classifications, you will need to follow these steps:

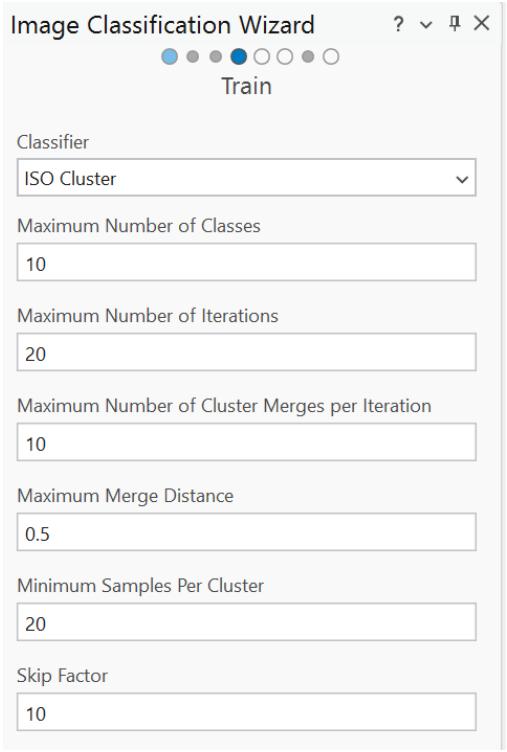
1) Download the imagery for the areas of your choice (outside North America). No duplication of areas is permitted so the choice of areas will be on a "first come/first served" basis. Your instructor will maintain a list of the areas chosen (**with image ID's**) and you must have your choice approved (via email) by November 3 by the end of the lab period (9:00pm) or you will receive a 10% total course grade reduction. The images must be Level-1C (the standard format that is available). You require the **Sentinel-2 L1C Tile in JPEG2000 (.jp2)** format. You will be utilizing the 10m spatial resolution bands (2,3,4,8). You can extract these using "**Composite Bands**" in ArcGIS Pro. The metadata are located in the file manifest.safe.
2) Subset a 2000 x 2000 pixel portion from each of your images that you would like to work with. No clouds or "No Data" areas are permitted. Use "**Clip Raster**" for this task.
3) Run an unsupervised classification with Iso Cluster Unsupervised Classification tool using the parameters below:





You will be classifying each of the images into five (5) "logical" classes.

4) Run a second unsupervised classification with the alternative parameters such as those below:



Start with 10 as the **Maximum Number of Classes**. This may separate the classes sufficiently so that classes that are the same (but spectrally different due to other factors) can be combined together. You may need to increase this number to achieve sufficient class distinction.

You will need to use "**Assign Classes**" to combine such classes into that belong together. You can do this based on visual inspection and/or using ancillary data.

The tool "**Assign Classes**" will be examined during the lab period in the next class.

Deliverables:

1) Two maps (created in ArcGIS Pro) showing your analysis areas subset in "natural colour" (two maps). The maps must be submitted as .pdf files.
2) Maps (created in ArcGIS Pro) of your initial **Maximum Number of Classes = 5** unsupervised classification images for each area including a legend showing what colour represents each class for each analysis area (two maps). The maps must be submitted as a .pdf files.
3) Maps (created in ArcGIS Pro) of your **Maximum Number of Classes = 10 (or more)** unsupervised "**Assign Classes"** classification images for each area including a legend showing what colour represents each class for each analysis area (two maps). The maps must be submitted as a .pdf files.
4) An explanation of why you chose the five (5) classes that you did for each image (not longer than one page, double spaced, 12-point Times (New Roman) font, with 1" margins all around). Consult the USGS Landcover Classification System as necessary. The document must be submitted as a .docx file.
5) An explanation of whether your classifications are "accurate" (not longer than one page, double spaced, 12-point Times (New Roman) font, with 1" margins all around). The document must be submitted as a .docx file.

6) Your Powerpoint presentation will be **5 minutes in length** and will answer the questions above as well as provide an explanation of where your analysis area was located. You can also include other information you deem relevant. All presentations must be submitted via D2L by 9:00pm on November 30. The file will be your named yourlastname.pptx. Email your instructor if you have questions.

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