

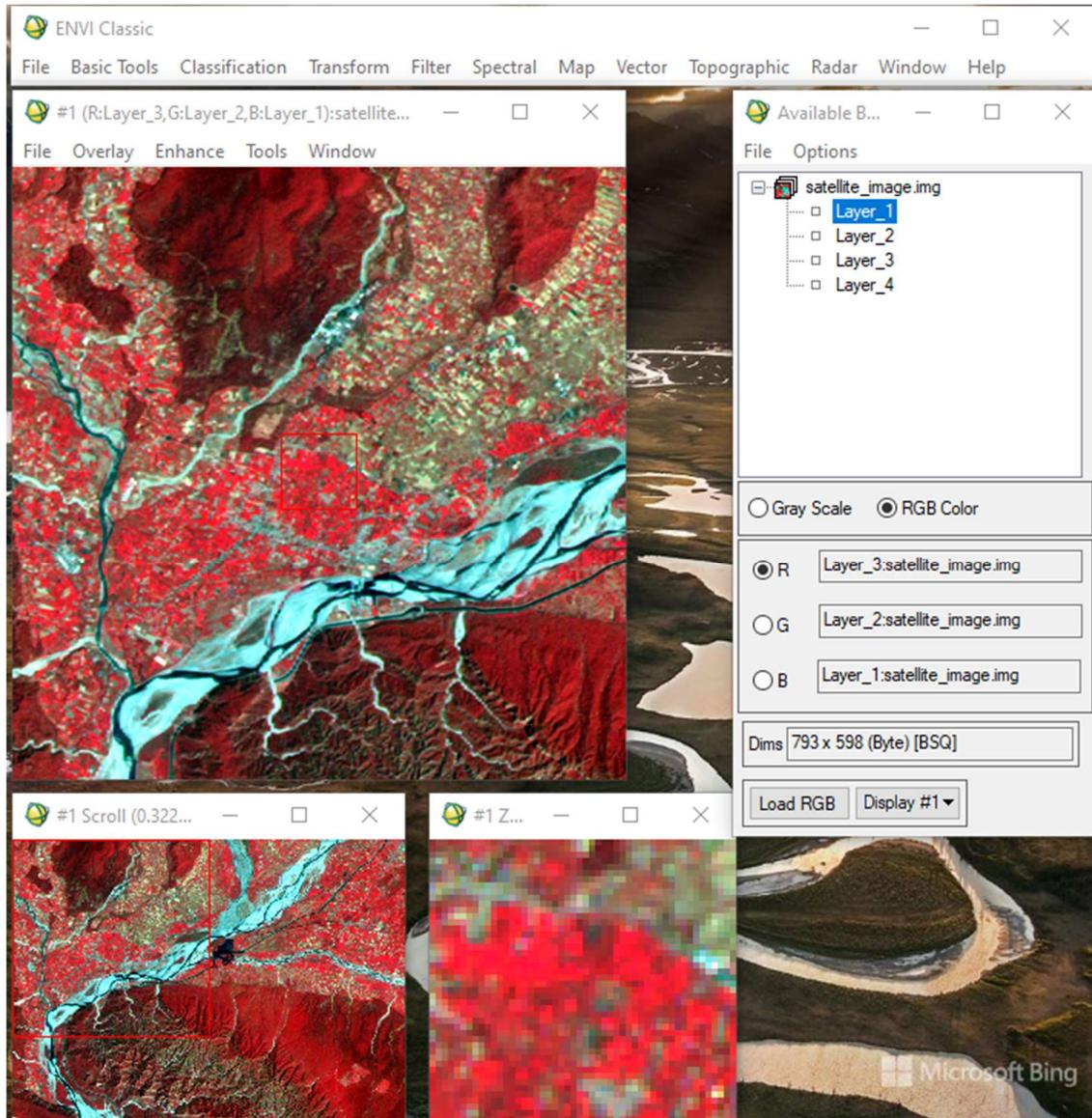
SRIMAYA MOHAPATRA ,244104010

**LAB 7 ASSIGNMENT**

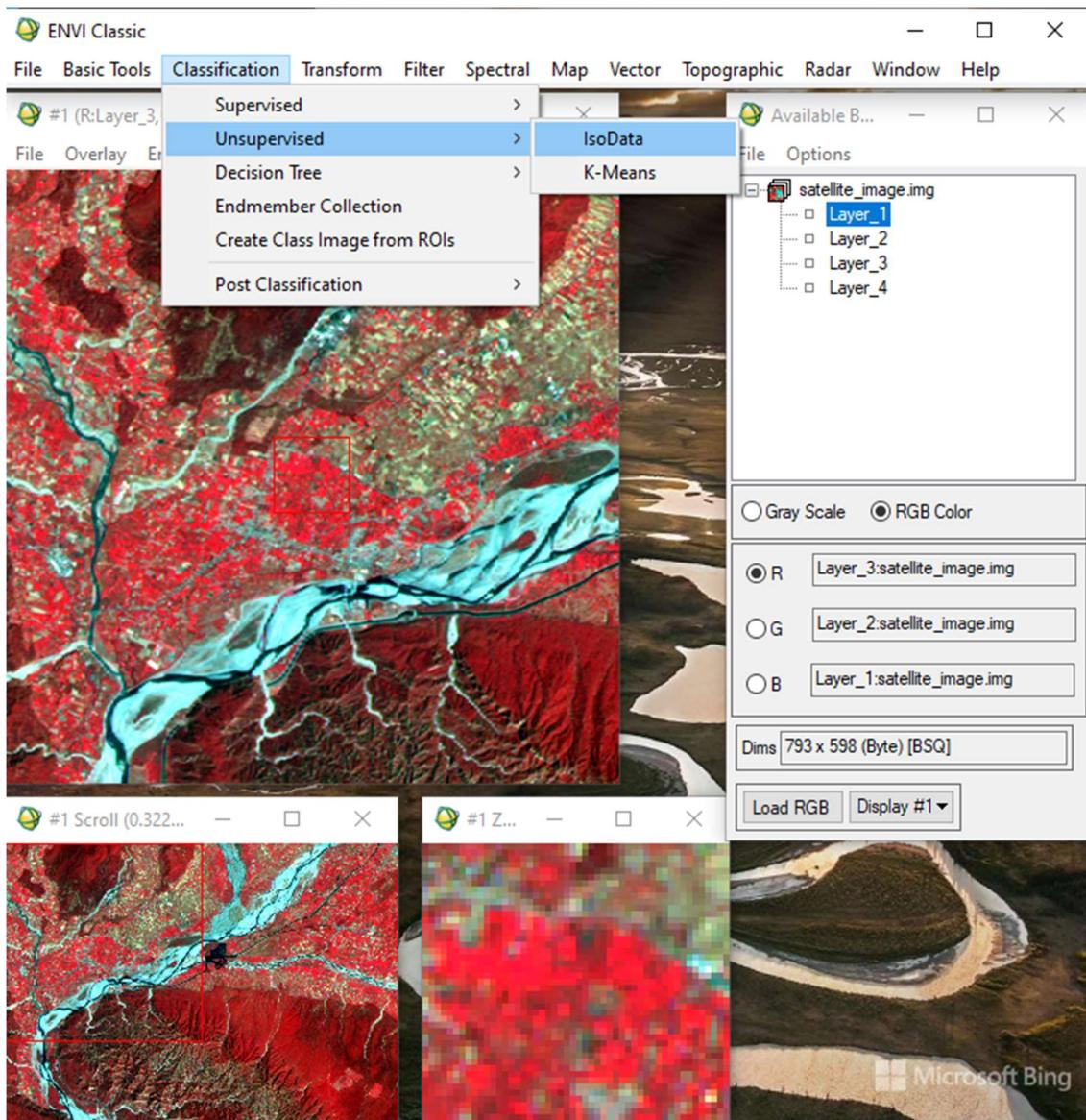
**CE 593 ADVANCED REMOTE SENSING**

**CLASSIFICATION OF REMOTE SENSING IMAGE**

**SATELITE IMAGE**



## ISODATA ALGORITHM

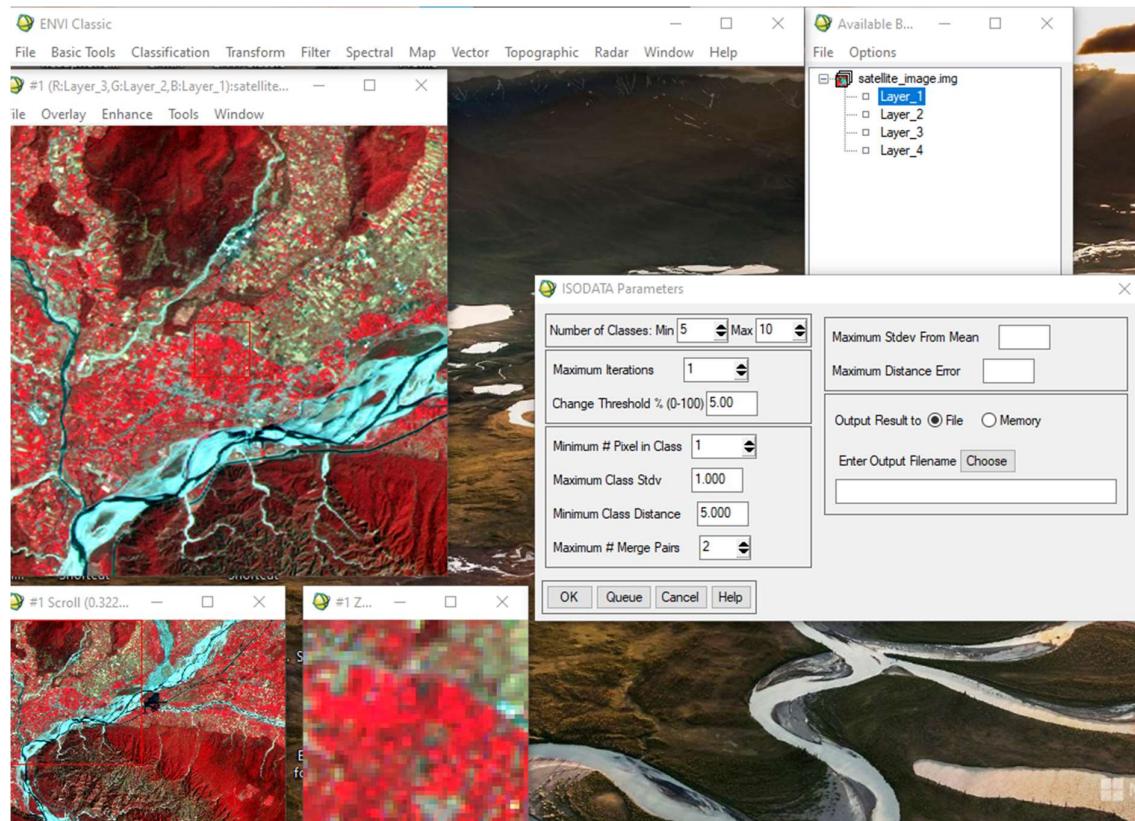
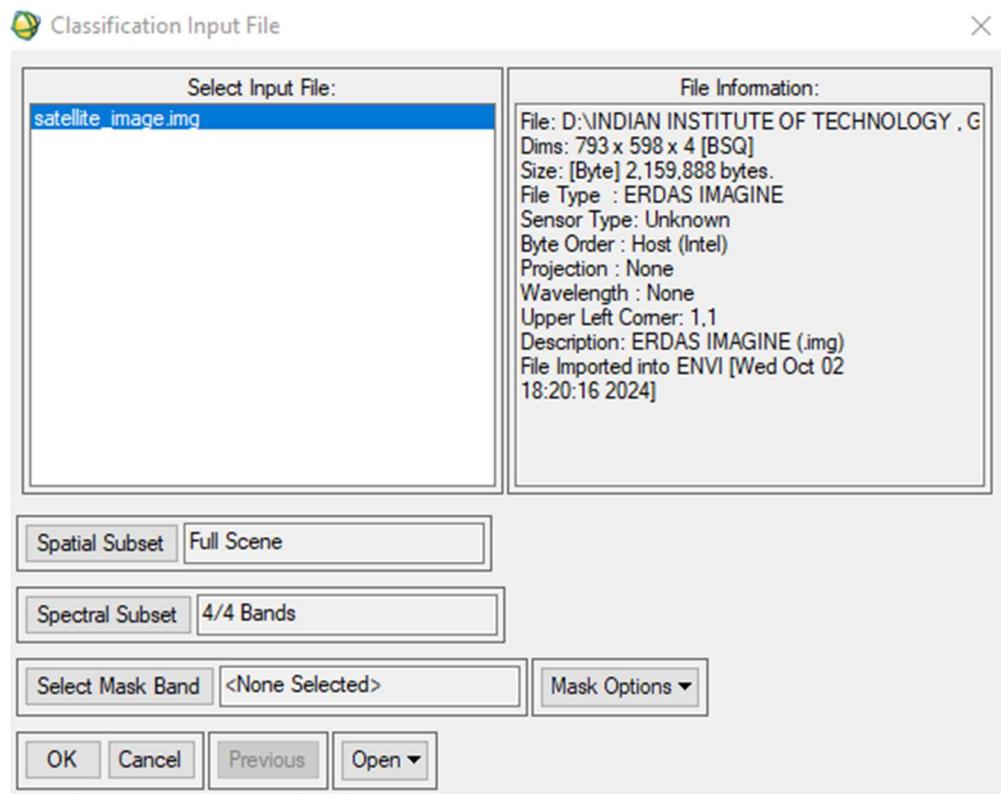


### Isodata

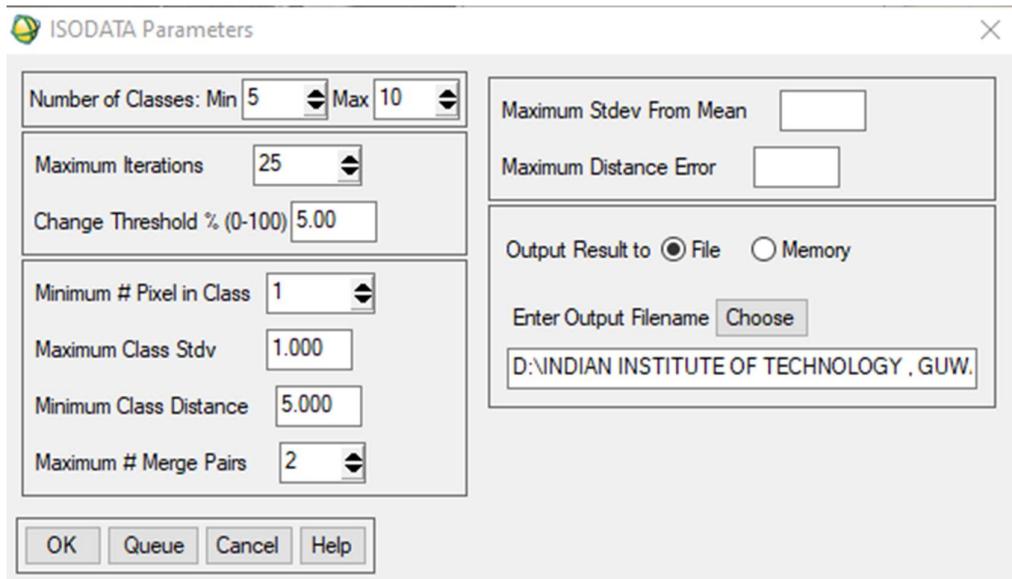
Isodata algorithm is a common modification of the K -means algorithm and includes merging of clusters, if their separation is below a threshold, splitting of single clusters into two clusters, if it becomes too large

Number of clusters is undefined in ISODATA.

## Classification of the Satellite Data



## Parameter settings for ISODATA



- **Number of Classes: Min 5, Max 10**

It mainly sets the range for the number of clusters or groups the algorithm will attempt to find in the data.

It starts with at least 5 classes and make it up to 10.

- **Maximum Iterations: 25**

The algorithm iterates the clusters a certain number of times to show the results.

It will stop once it reaches 25 iterations

**Minimum Iterations Often Set to 20 or More:**

1. Convergence: More iterations allow the algorithm to converge to a stable solution.

2. Accuracy: Increased iterations improve the estimation of various combinations of classes properly.

- **Change Threshold % (0-100): 5.00**

The **5%** Change Threshold means that if less than 5% of the data points (pixels in an image) change their cluster between iterations.

The algorithm will stop when it assumes that the clustering has mostly stabilized.

- **Minimum of Pixels in Class: 1**

Sets the minimum number of pixels or points that a class must have to be considered valid. Classes with fewer pixels than this threshold may be merged with other classes.

- **Maximum Class Std Dev: 1.000**

The standard deviation of pixel values within a class should not exceed this threshold. If a class has a standard deviation greater than this, it may be split into multiple classes.

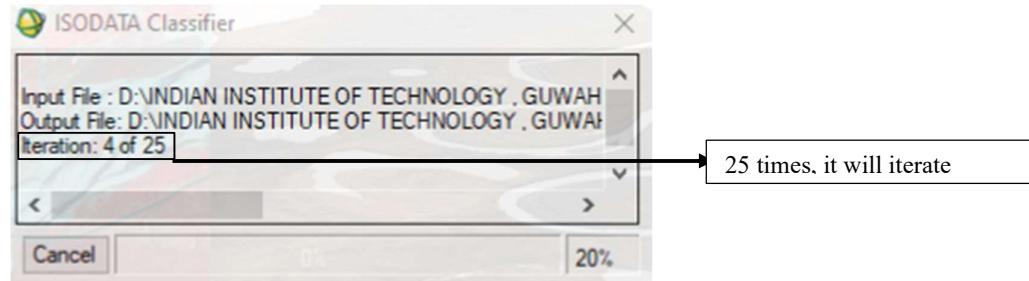
- **Minimum Class Distance: 5.000**

This is the minimum distance between class means. If two classes are closer than this distance, they can be merged.

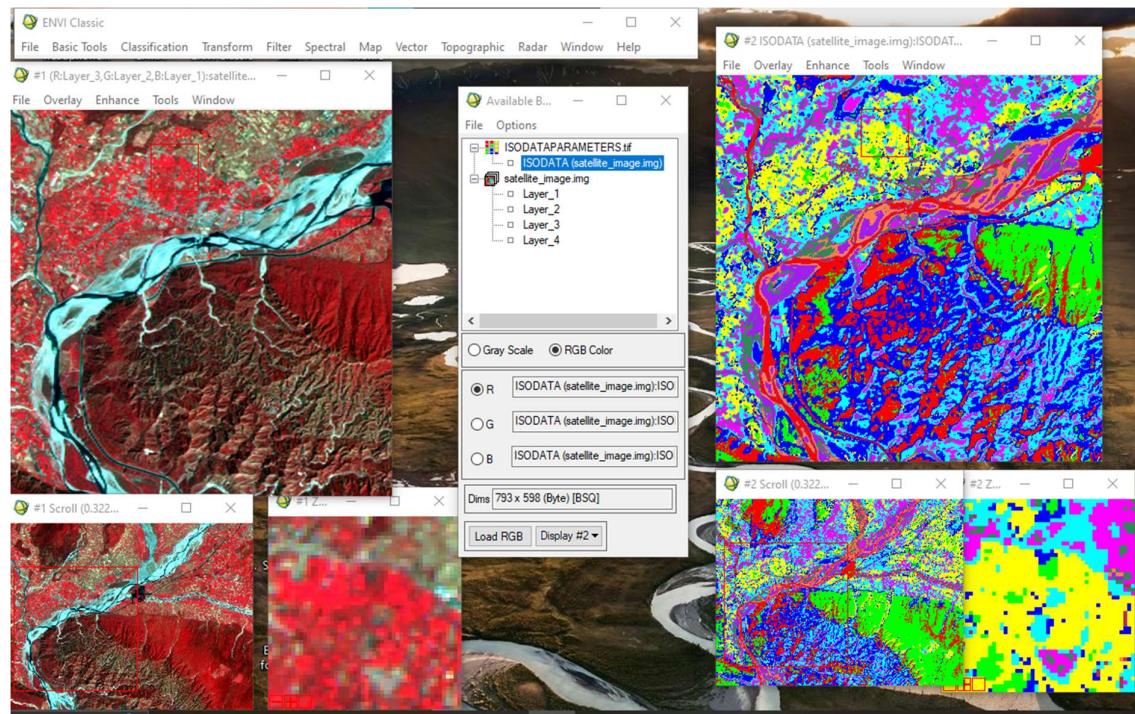
- **Maximum of Merge Pairs: 2**

The algorithm will mainly merge no more than two pairs of clusters per iteration if their distance is smaller than the "Minimum Class Distance".

### Iteration Process



### ISODATA Classified Image

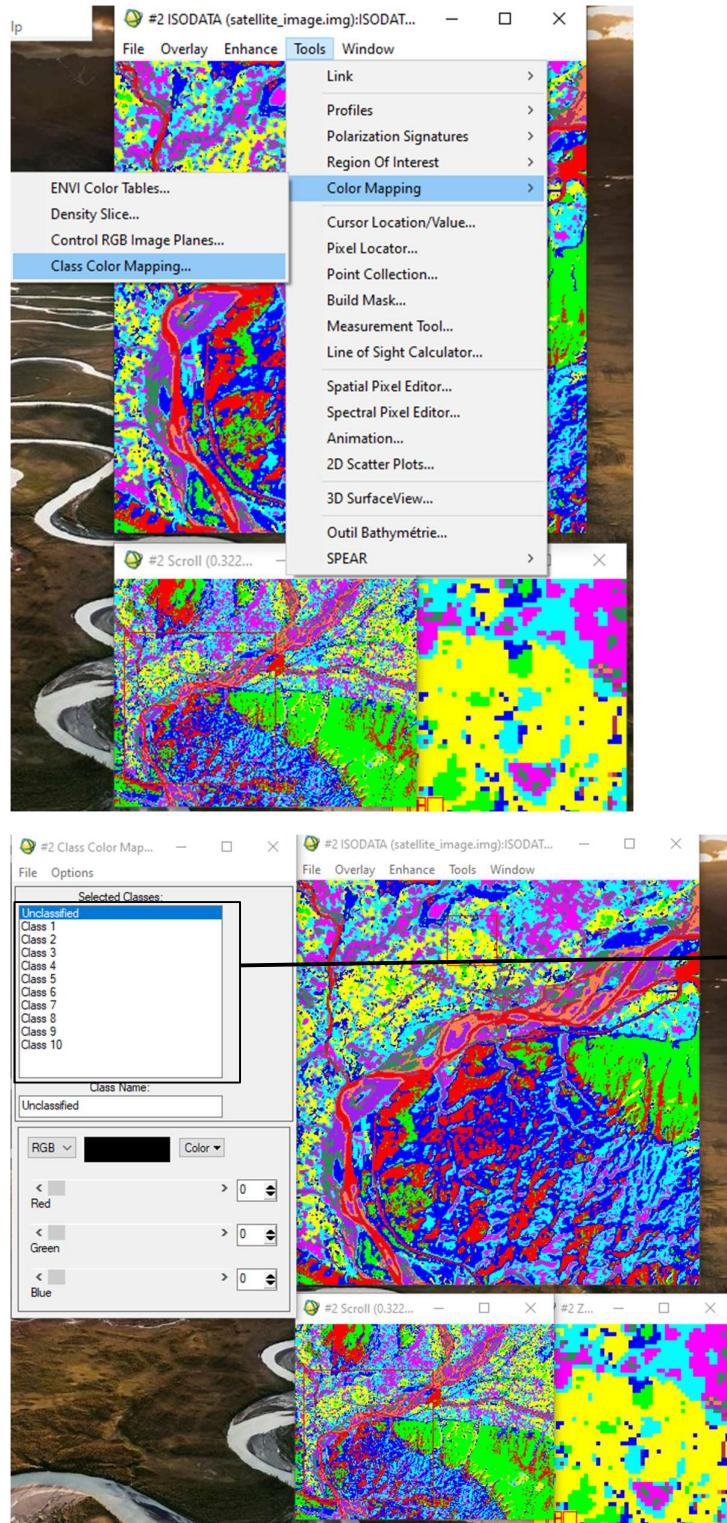


**A classified image is generated**

**ISODATA clustering-** Each colour represents a different class, or cluster, derived from the unsupervised classification.

Different colours to show different land cover types or features that were identified in the clustering process.

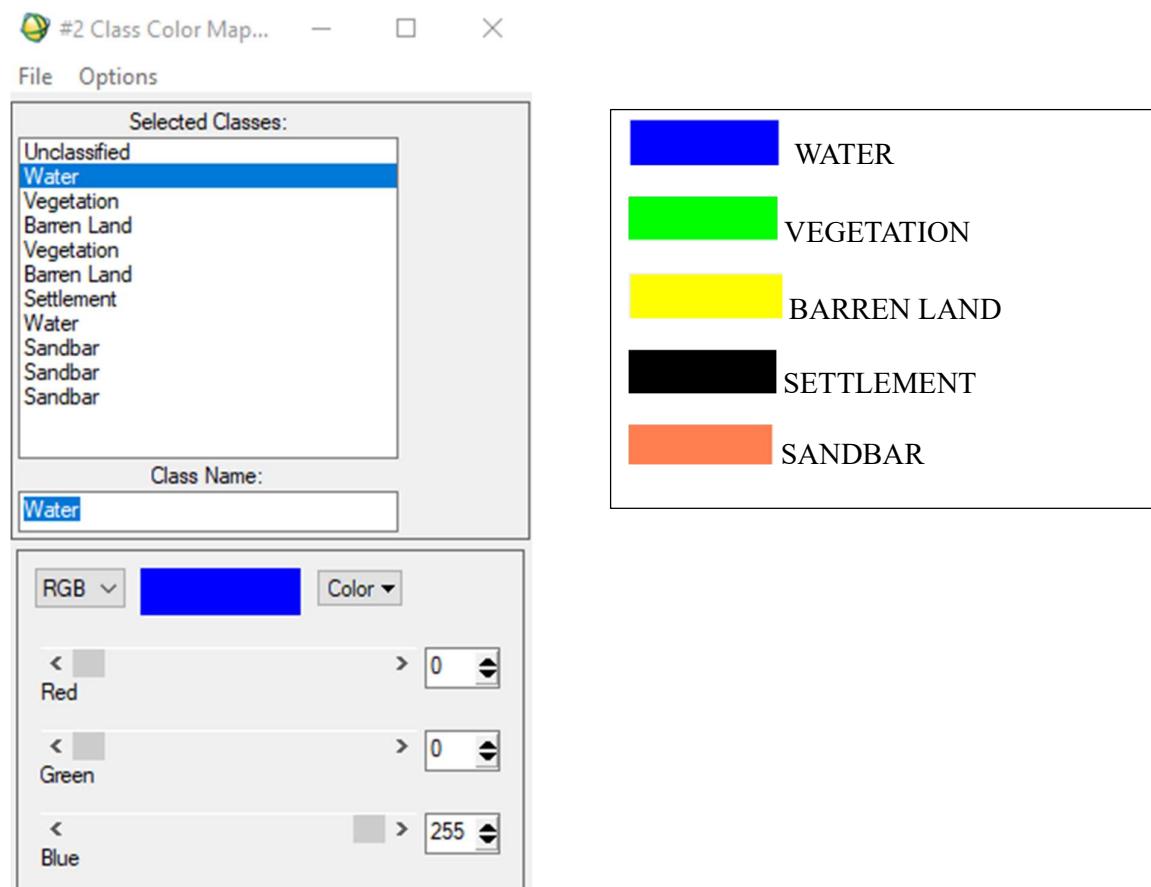
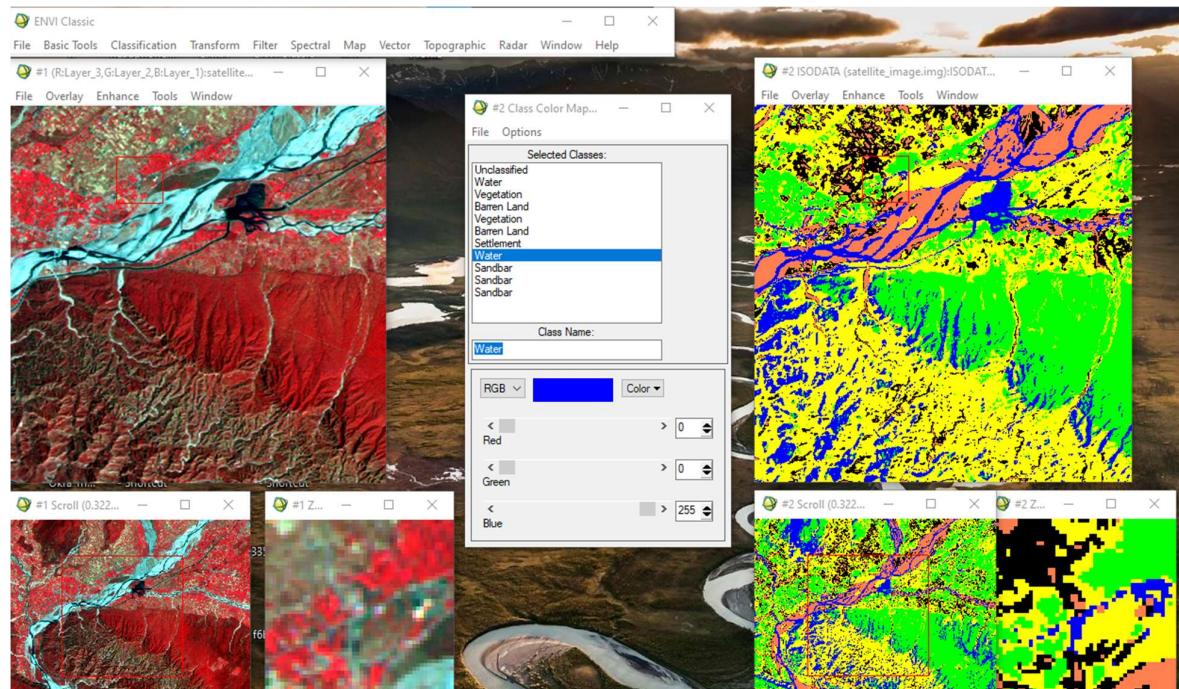
## Class Color Mapping



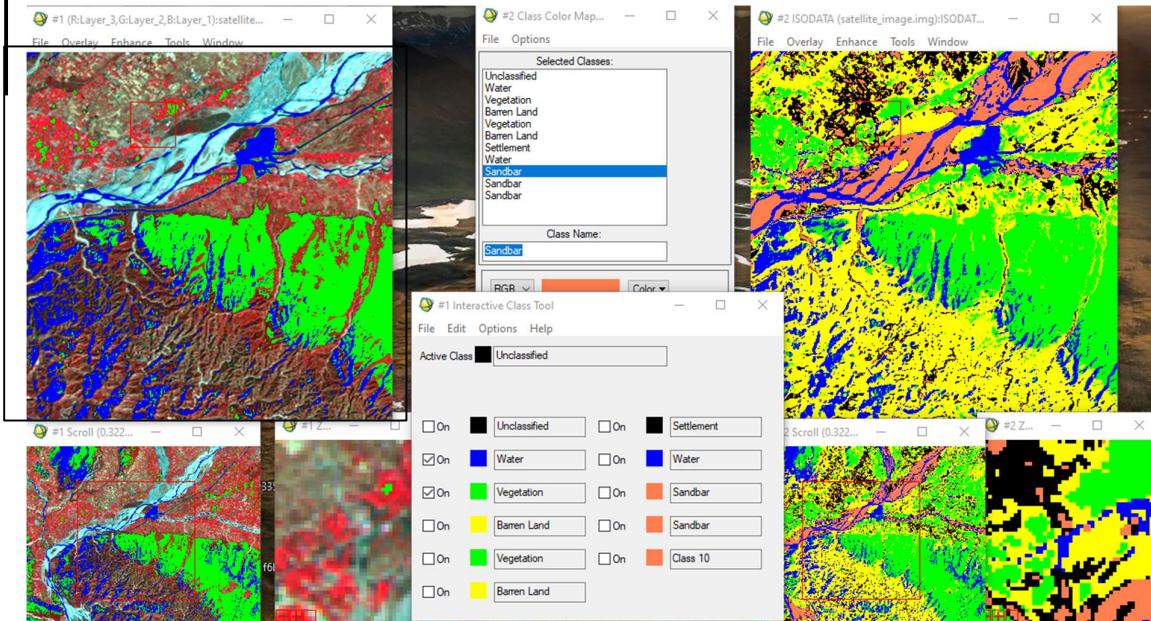
Different classes represent different land covers

Class Colour Mapping in ISODATA (classification in remote sensing) refers to how each class or land cover type is represented by a specific colour in the classified image.

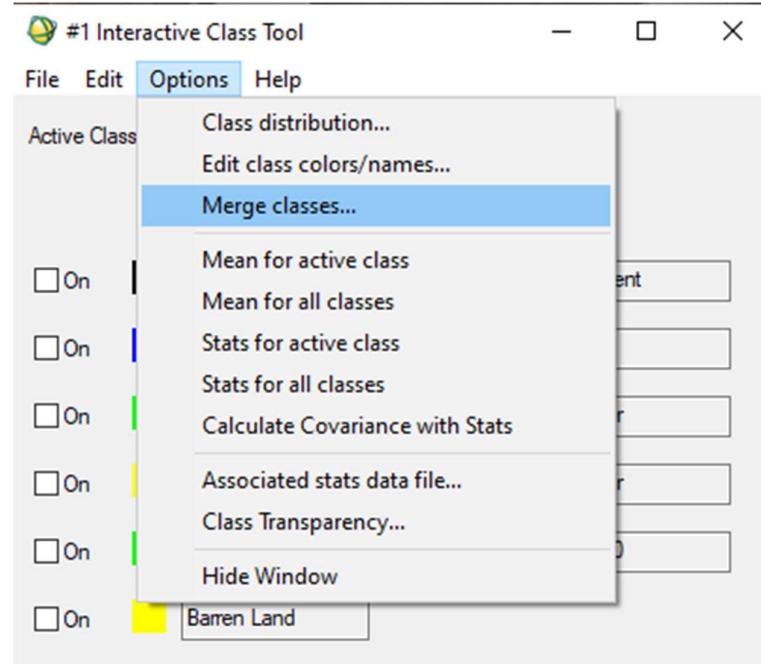
These colours help to differentiate between various clusters or classes, making it easier to understand the results.

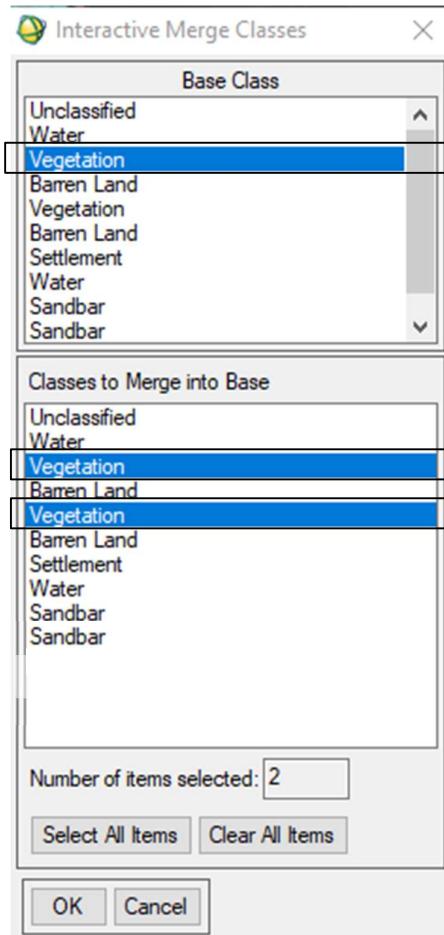


### Isodata Classification -IsoData parameters in satellite image

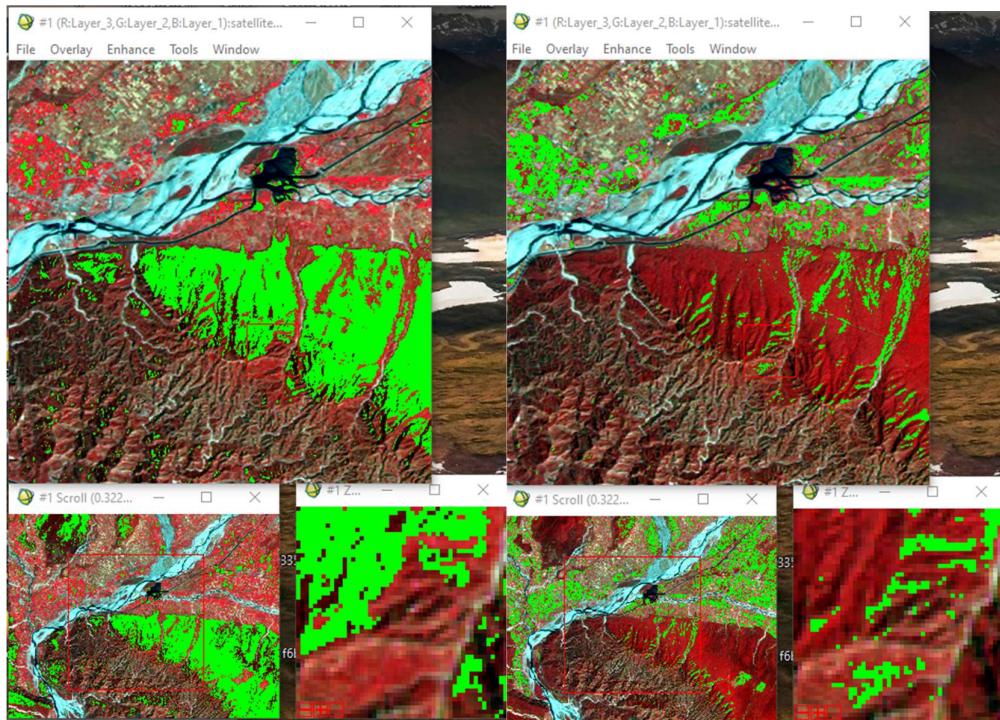


### Merge Classes

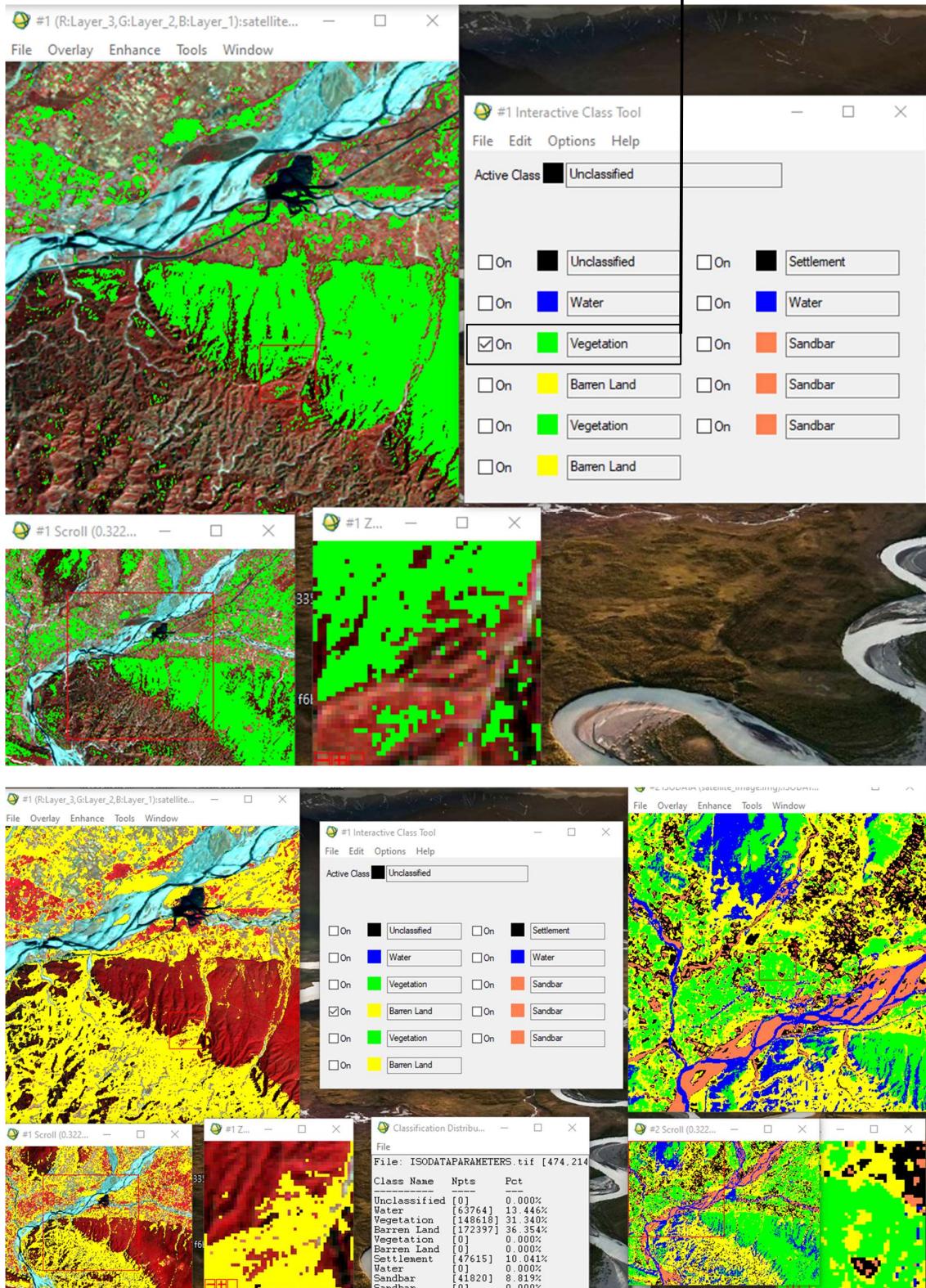




Merging two classes in one class



### Vegetation merged in one class



Classification Distribu... — ×

File: ISODATAPARAMETERS.tif [474,214]

Class Name	Npts	Pct
Unclassified	[0]	0.000%
Water	[63764]	13.446%
Vegetation	[148618]	31.340%
Barren Land	[172397]	36.354%
Vegetation	[0]	0.000%
Barren Land	[0]	0.000%
Settlement	[47615]	10.041%
Water	[0]	0.000%
Sandbar	[41820]	8.819%
Sandbar	[0]	0.000%
Sandbar	[0]	0.000%

**Unclassified Pixels:** None of the pixels are unclassified (0.000%).

**Maximum Classes:** The maximum classes in this image are "Barren Land" (36.354%) and "Vegetation" (31.340%).