

A PROJECT ON
“Hyperspectral Image Classification”

For Database Design and Implementation subject of

M.TECH

in

Computer Science and Engineering

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(Deemed to be University under section 3 of UGC Act, 1956)

ENVI Software Installation Guide

IDL / ENVI / LiDAR Overview:

DL / ENVI / LiDAR is a powerful geospatial software that provides the basis for processing and analysing all types of imagery and data such as multispectral, hyperspectral, LiDAR, and SAR. It enables the scientists and other experts to extract information quickly, easily, and accurately from geospatial imagery for the analysis and visualization of scientific data and imagery. The tool offers an interactive environment that allows you to create powerful, photorealistic 3D visualizations and easily extract important features and products from LiDAR data. It provides user-friendly tools enabling the users to extract features from geospatial imagery based on the object's spatial, spectral, and texture characteristics and identify them as objects like vehicles, buildings, roads, coastlines, rivers, lakes, and fields. The program comes with an intuitive interface designed to be used by everyone from GIS professionals to image analysts and image scientists, regardless of prior experience with imagery.

Features of IDL / ENVI / LiDAR:

- Provides the basis for processing and analysing all types of imagery and data such as multispectral, hyperspectral, LiDAR, and SAR.
- Enables the scientists and other experts to extract information quickly, easily, and accurately from geospatial imagery for the analysis and visualization of scientific data and imagery.
- Let's you create powerful, photorealistic 3D visualizations and easily extract important features and products from LiDAR data.
- Include image analysis functionality, to create new custom image analysis capabilities based on desired results. Enables the users to transform point clouds into geographical information system (GIS) layers.
- Offers science-based strong algorithms that are accurate and reliable for extracting meaningful information.
- Ability to export the results to many popular output formats and to 3D visual databases. Creates a Digital Elevation Model (DEM).
- Automatically identifies landscape features such as buildings, trees, power poles, and power lines.
- Makes point cloud data processing quick and easy.

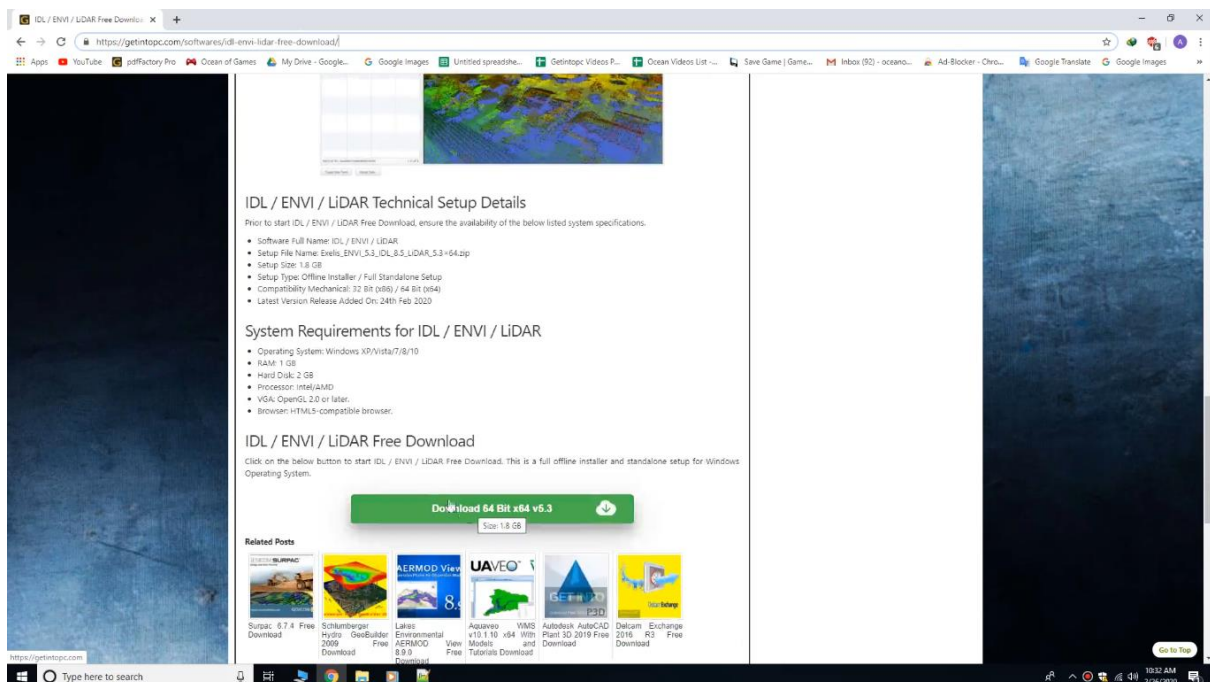
System Requirements for IDL / ENVI / LiDAR

- Operating System: Windows XP/Vista/7/8/10
- RAM: 1 GB
- Hard Disk: 2 GB
- Processor: Intel/AMD

- VGA: OpenGL 2.0 or later.
- Browser: HTML5-compatible browser.

DL / ENVI / LiDAR Free Download Link:

<https://getintopc.com/software/idl-envi-lidar-free-download/>



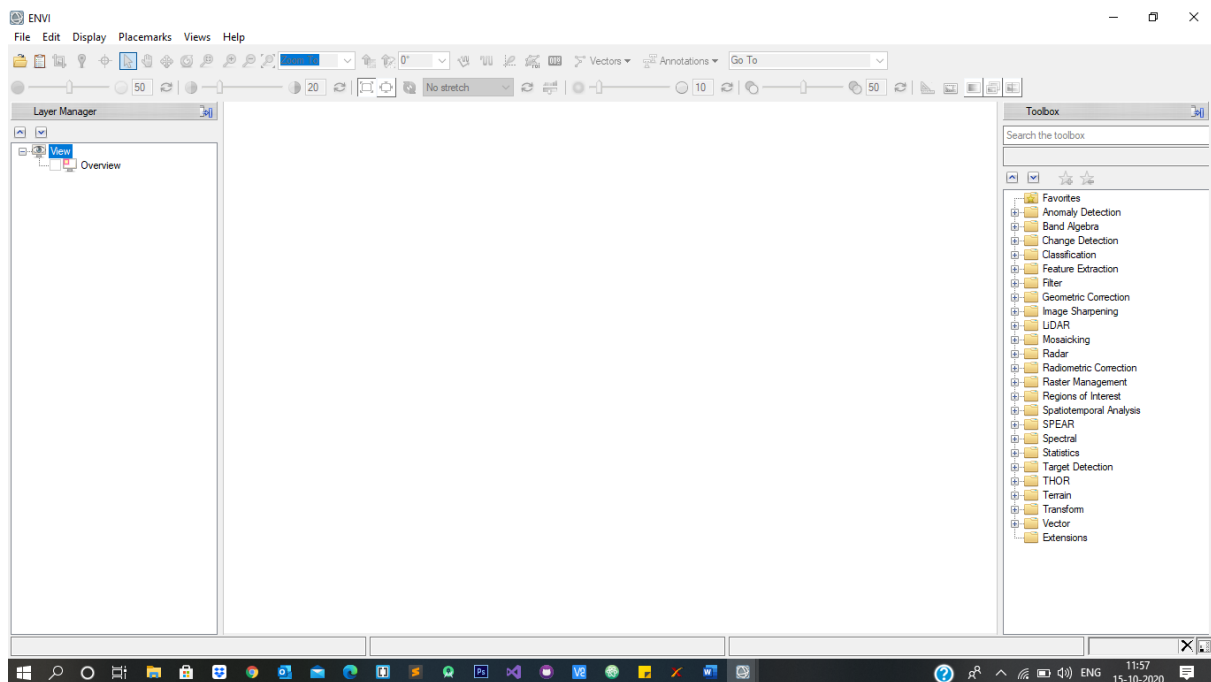
Please make sure to follow below steps:

1. Turn off your internet. Otherwise will not be activated.
2. Turn off Windows Defender Realtime Protection. In windows 10 the method is different to turn off windows defender. You can search “Defender” in Start Menu.
3. Turn off any other antivirus. Because Full version programs and crack Files are reported as False positive. Sometimes antivirus may corrupt the setup file. You can turn on after installation is finished.

After Installation of Software:

- Install app NOTE: do not license products (close dialogs when prompted)
- Copy & Replace cracked files to install dir
- Copy lic file to: C:\Program Files\Exelis\License\

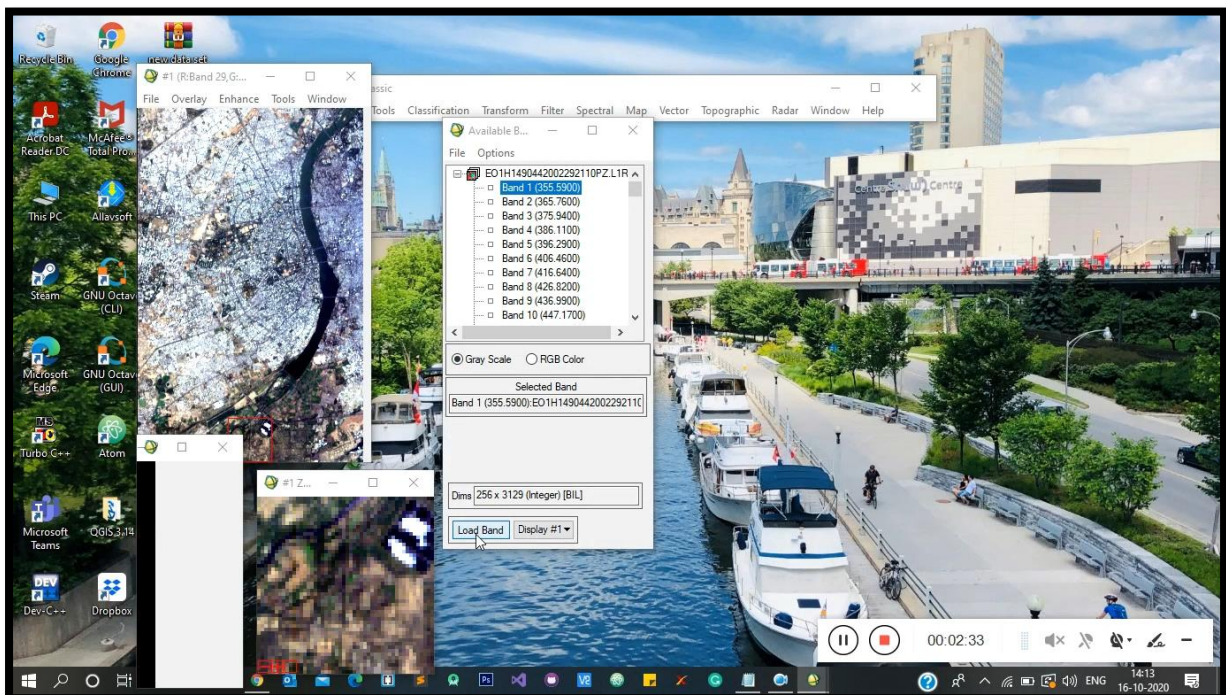
Now You can do all the Work in ENVI

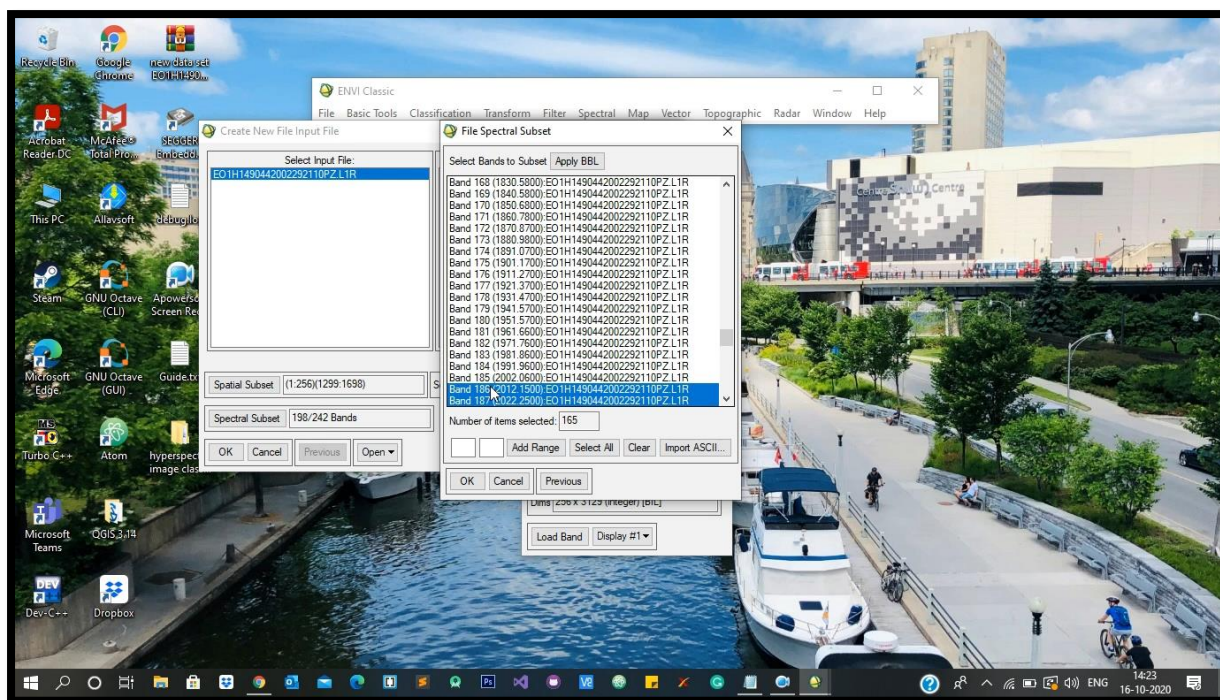


Implementation Steps

1. Bad Band Removal

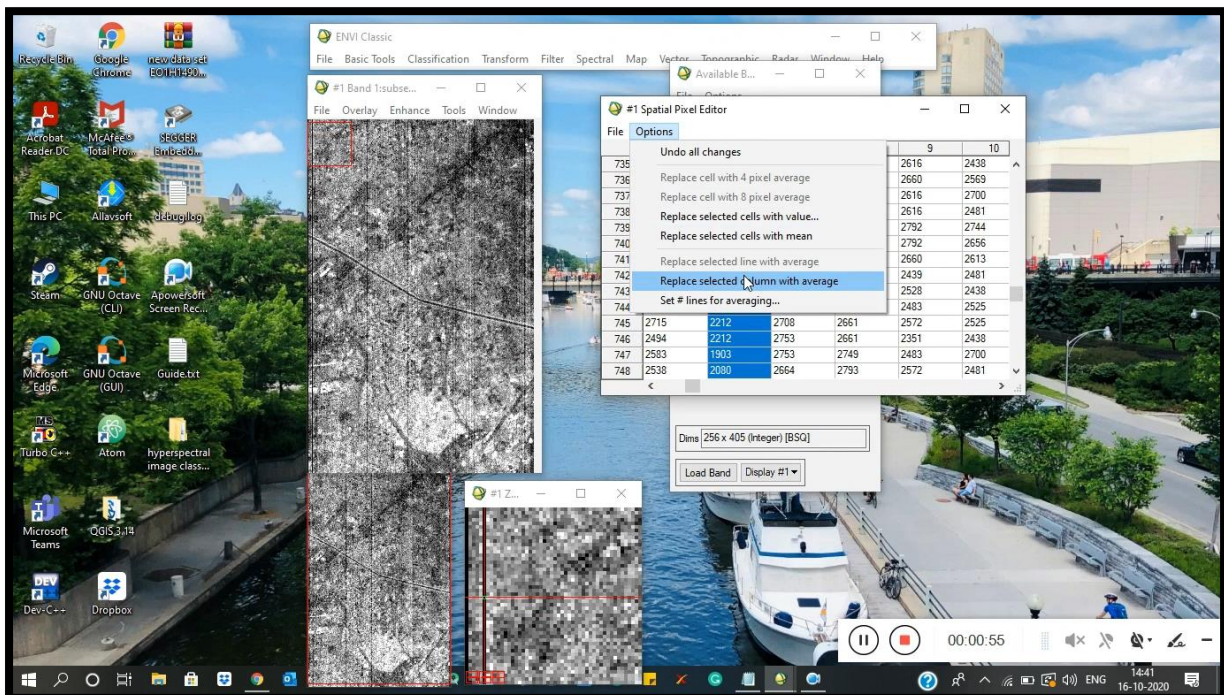
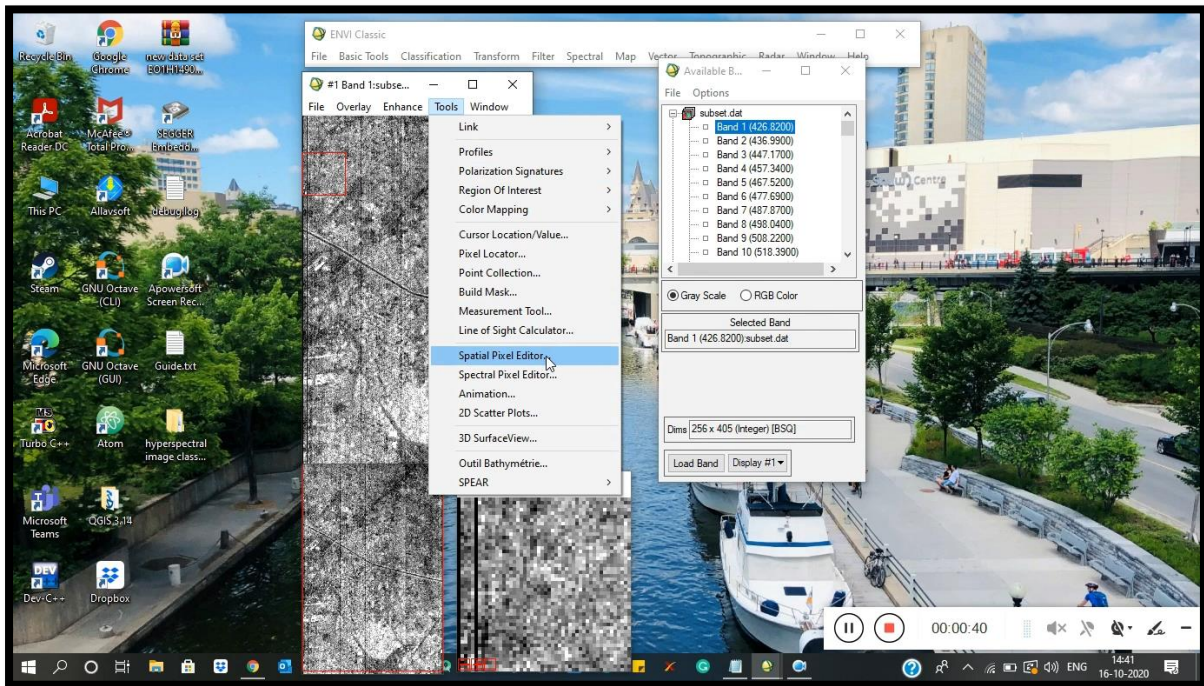
1. Open ENVI Classic
2. File -> Open External File -> EO1 -> HDF -> Select .L1R Image (We can download image from the Earthexplorer.com)
3. Check all the bands that whether it gives information or not.
4. File -> Save File -> ENVI Standard.
5. Import File -> Select .L1R Dataset.
6. Spatial Data -> Select any region that you want.
7. Spectral Subset Data -> Apply BBL(Band Band Layer).
 - a. 1-7
 - b. 58-76
 - c. 121-132
 - d. 165-187
 - e. 225-242
8. Save file (.dat) Formate.

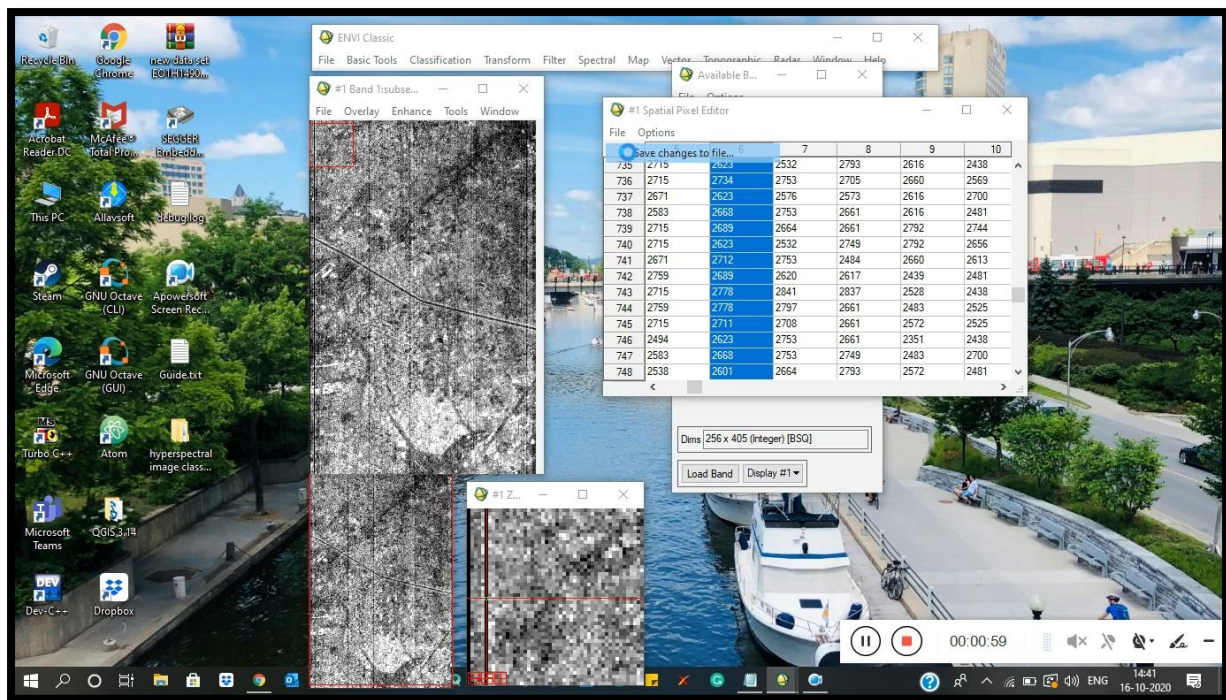




2. Remove Vertical Strip in Hyperion Image

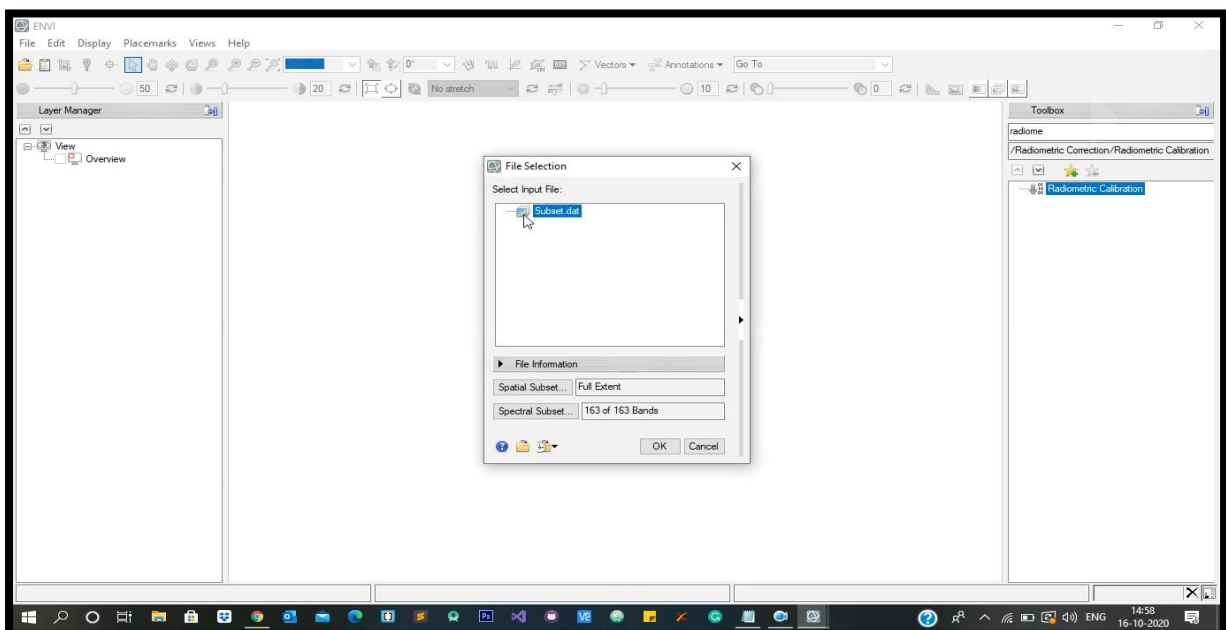
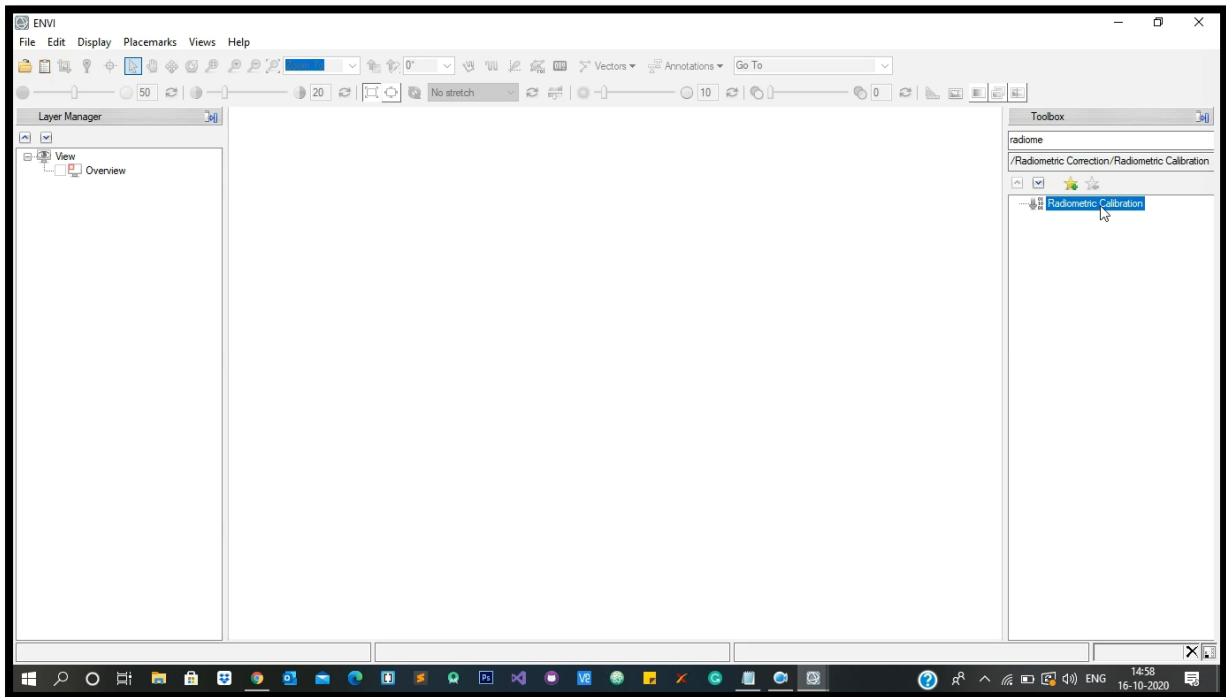
1. Select the subset dataset (After Removing Bad Bands)
2. Select Tools -> Spatial Pixel Editor
3. Select the black strip line from the zoom dialog box.
4. Select hole column -> Options -> Replace Select column with average.
5. File -> Save changes to file
6. Then, you can check for the all the 159 bands that have vertical Black Strip (Repeat until the black strip removal).

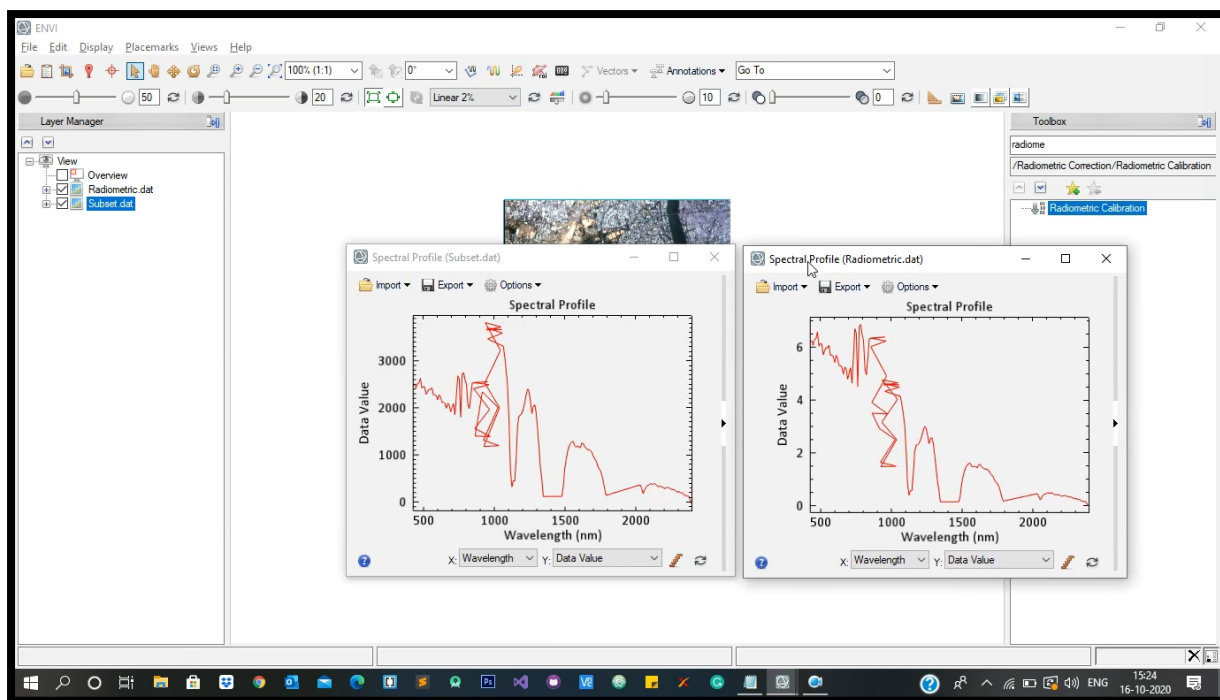




3. Radiometric Calibration

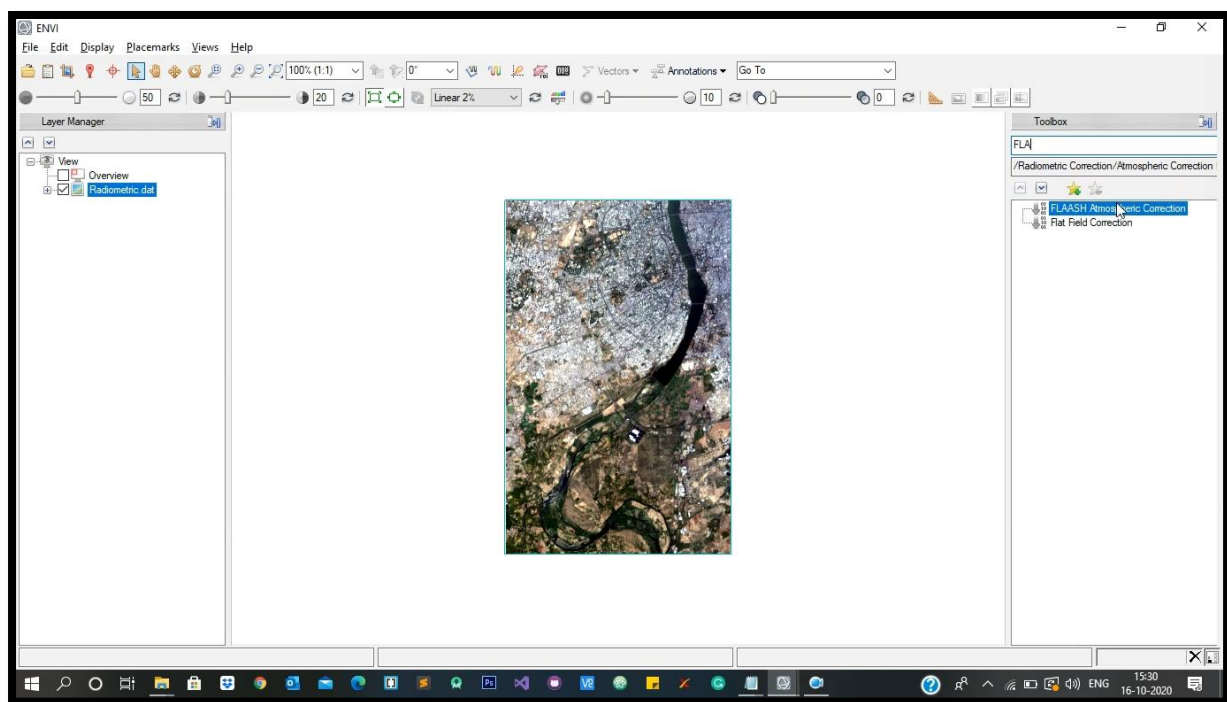
1. It is Used for the Atmospheric Correction
2. Right hand side of ENVI software type Radiometric Calibration.
3. Select -> File Selection -> Select the file (.dat) -> give Ok.
4. Pop-up Radiometric Calibration Dialog Box.
 - 4.1. Apply FLAASH Settings -> Scale Factor (0.10 nm).
 - 4.2. It will time consuming process.
 - 4.3. If the file size is too large than it will take 1 or 2 days also.

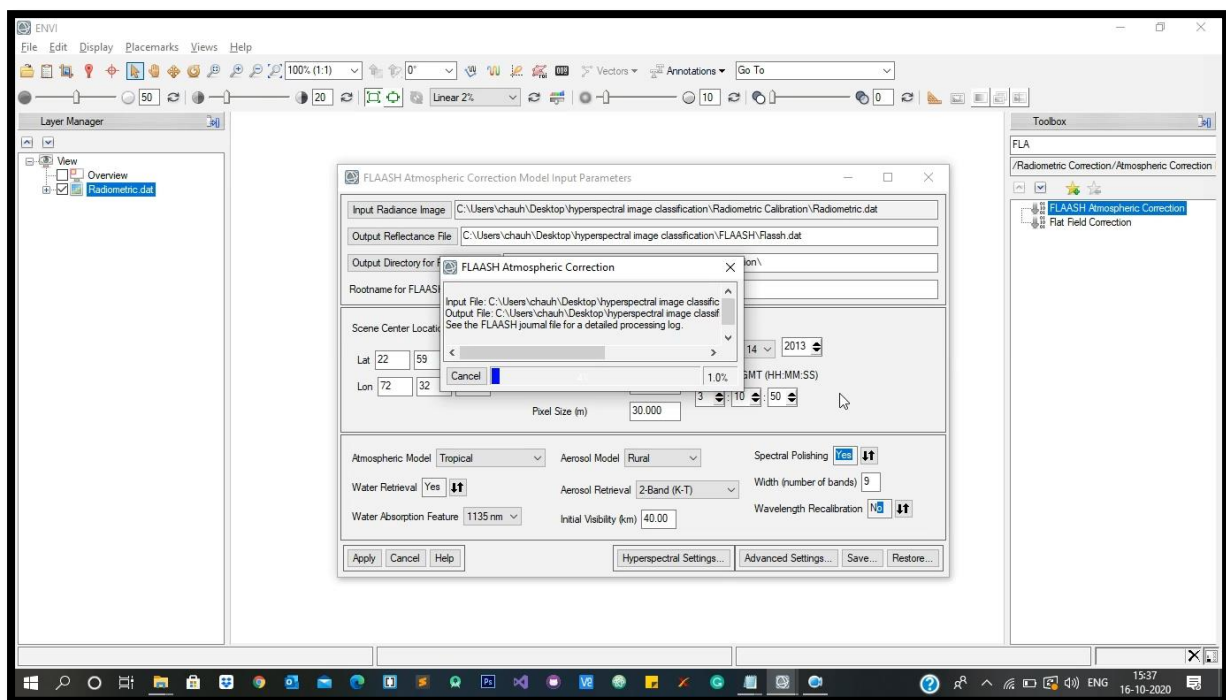
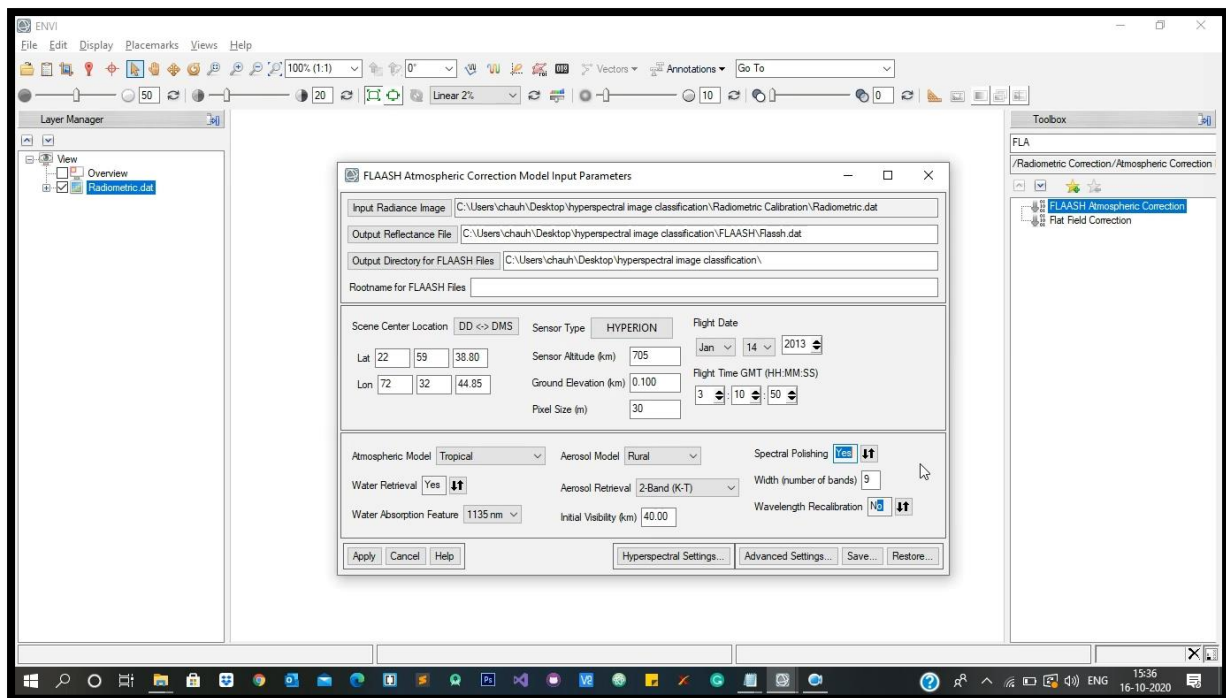




4. FLAASH Model

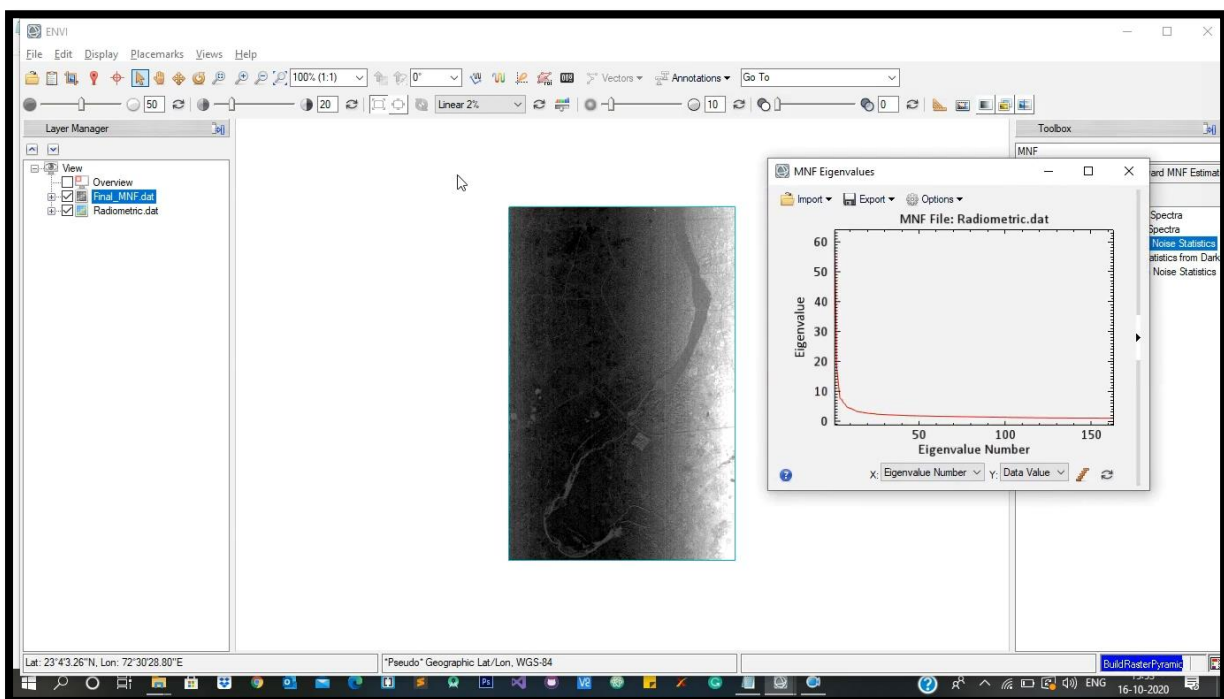
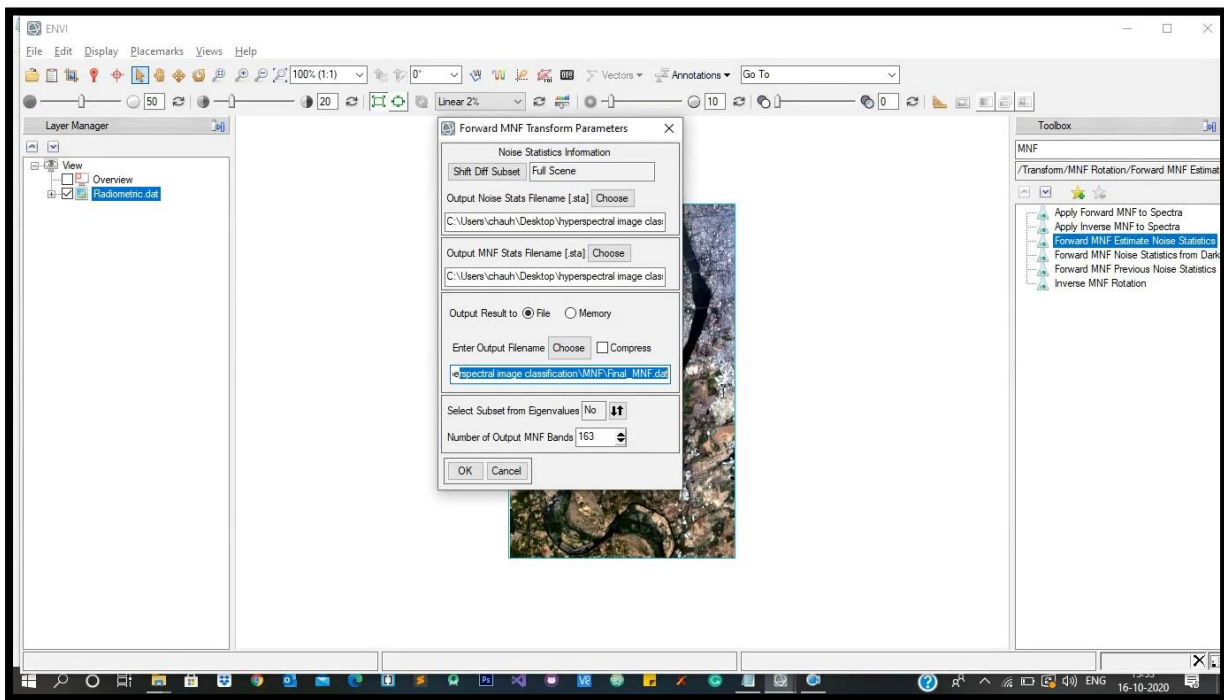
1. Open Radiometric Calibration Image.
 - a. If in metadata below of one is missing than FLAASH not apply.
 - i. FWHM
 - ii. Radiance Gains
 - b. Then select edit metadata -> import -> Select .dat dataset -> ok -> File selection -> ok.
 - c. It will open Import Metadata Items.
 - d. You can Import missing values from that.
2. Select the FLAASH Model from right.
 - a. Give input radiometric file.
 - b. Select use single scale factor of all bands.
 - c. Select output file folder.
 - d. Sensor Type -> Hyperion
 - i. Sensor Altitude (Km) -> 705
 - ii. Ground Elevation (Km) -> 0.100
 - iii. Pixel Size -> 30
 - iv. Spectral Polishing -> Yes
 - v. Water Retrieval -> Yes
 - vi. Wavelength Recalibration -> No





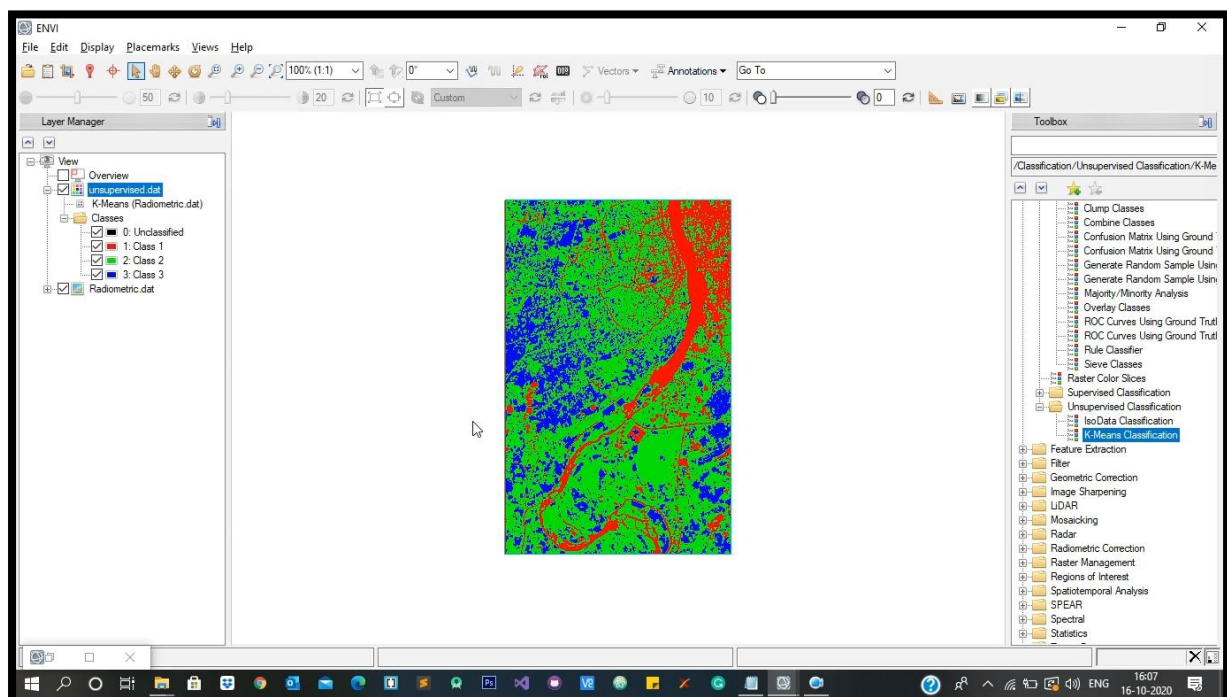
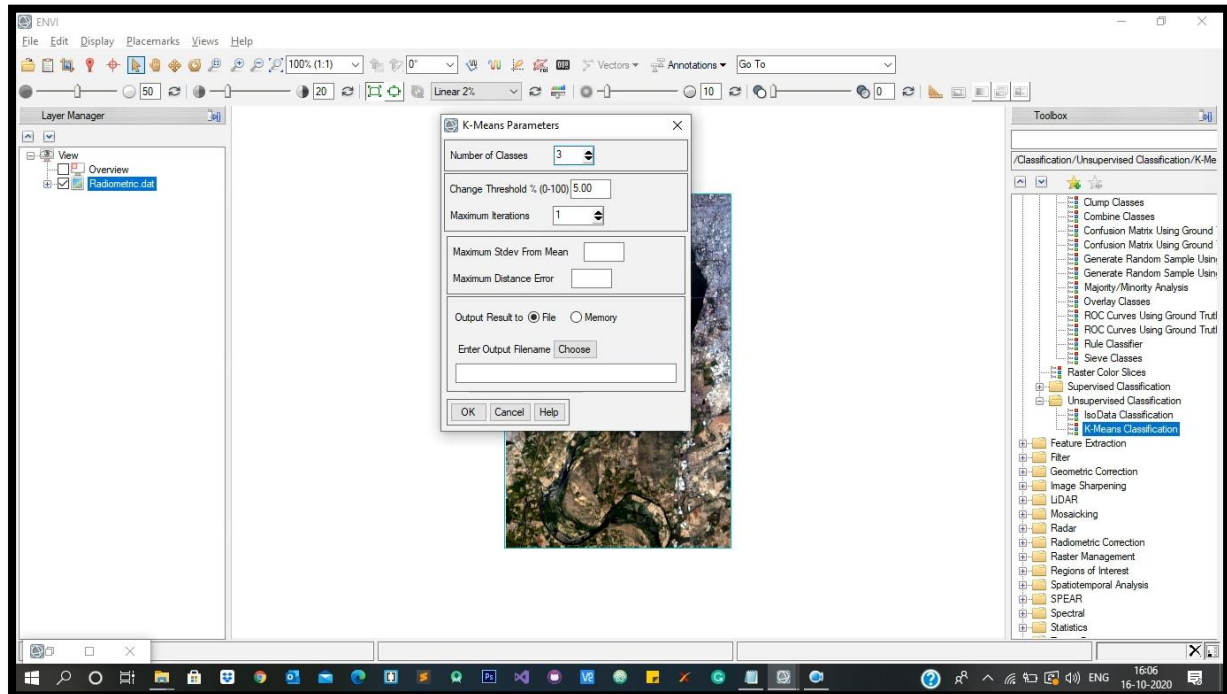
5. MNF (Minimum Noise Fraction)

1. This is Post-Processing step.
2. Select Forward MNF estimate noise static.
3. Input the Reflectance Image -> Give ok.
4. Choose folder where you want to save.
5. Top of the band Noise level is too less than the higher band value.
 - a. Top-12 band -> It shows the minimum noise level.



6. Classification

1. There are two type of classification
 - a. Supervised Classification
 - b. Unsupervised Classification



In this classification image Red is used for the River, Green is used for the Building and Blue is used for the Trees. Mostly (22,31,13) is used for the RGB according the wavelength of the image.