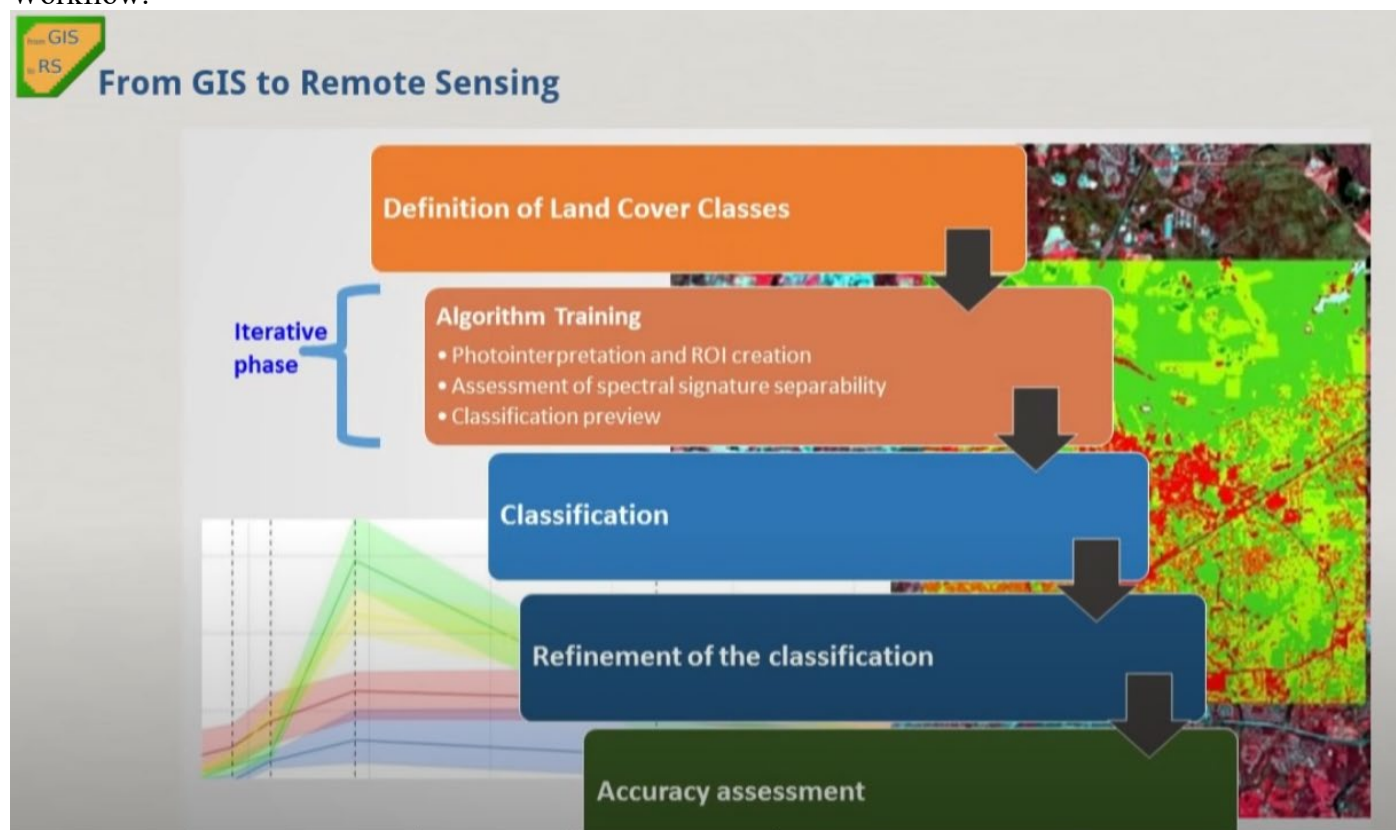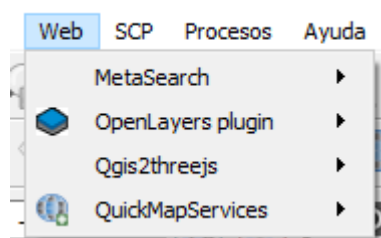# SUPERVISED CLASSIFICATION WITH QGIS AND SCP PLUGIN (SEMIAUTOMATIC CLASSIFICATION)
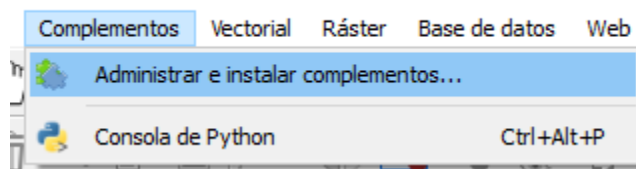
Workflow:
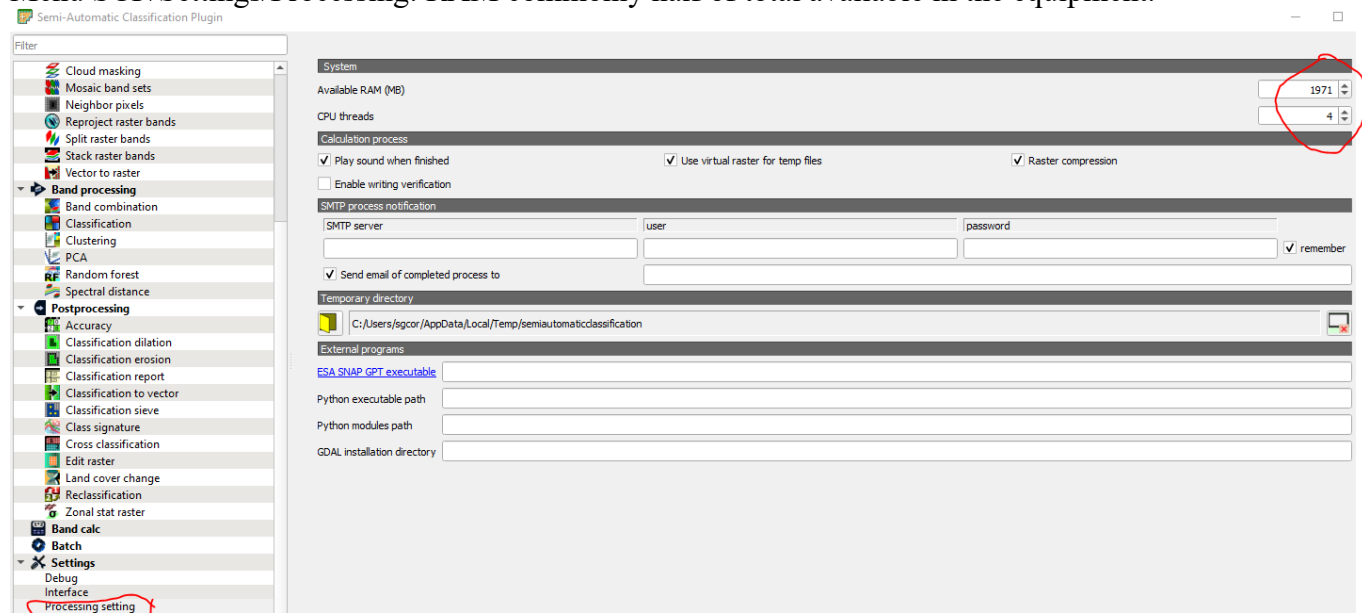

1º) Plugin installation:

-Semiautomatic Classification

Complements/Manage and install Complements

2º) Adjust memory for the plugin work if needed:

Menu SCP/Settings/Processing: RAM commonly half of total available in the equipment.


3º) Imagery donwload (optional. Use preferably the supplied scene)

The download of images may be slow and the servers may show connection problems in some cases. It is necessary to include the data for the identified entry in the download services (Copernicus, USGS EROS,...).

- To show SCP plugin if it is not visible: SCP/Show Plugin
- To show SCP panel if not visible: View/Panel/SCP Panel.

Within Login data in Donwload Products, we can enter the username and password of each server:
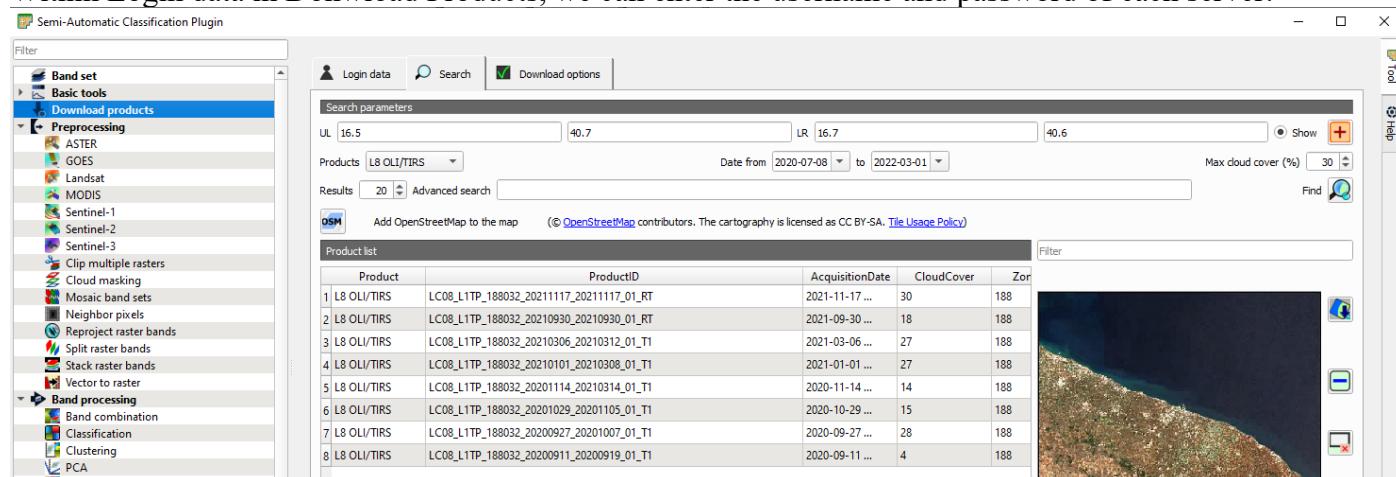

From SCP click on the left menu tab Download products. Here you can download a map of the auxiliary world to select the area you want to choose by clicking on el botón OSM (Open Street Map).

To select an area of interest click on the On the button: and on the base map mark with a rectangle the area of interest for which you are looking for satellite images. Once the rectangle has been marked (left

corner with the left mouse button and right corner with the right mouse button) the Search Area boxes will appear covered with the coordinates of the limits of that area. Choose the sensor (e.g. L8 OLI/TIRS), the maximum cloud cover if you want to limit it, as well as the date range and click on the "Find" button. The images available for download will be listed with their basic parameters..
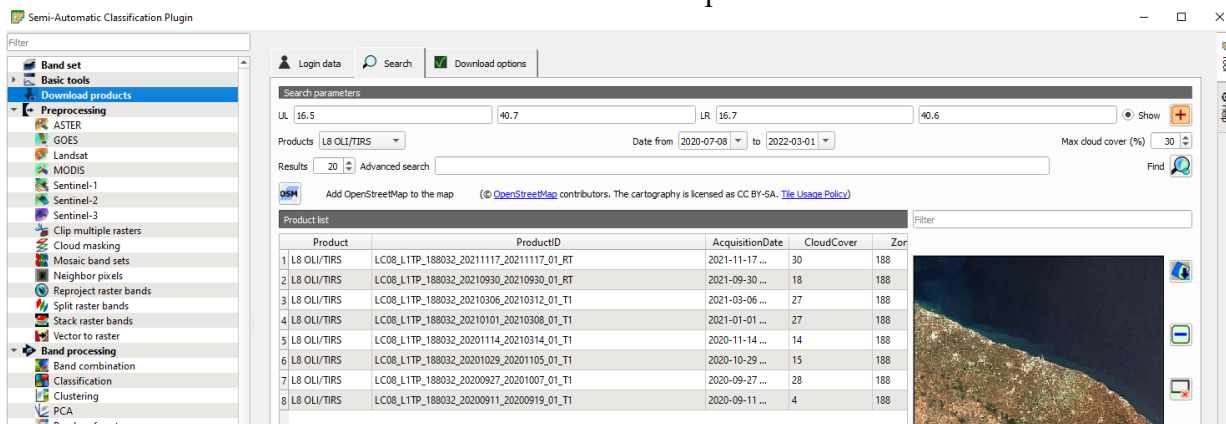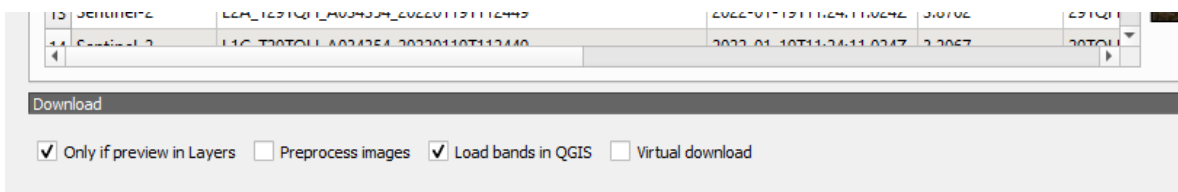

Choose the desired one by clicking on it in the list and a preview will be displayed. In the Tab control called: Download options choose the desired bands that you actually want to download. For optical remote sensing the following bands are generally not necessary: Landsat 8 (1-8-9-10-11), Sentinel2 (1-2-10). These bands can be unchecked in the download options:
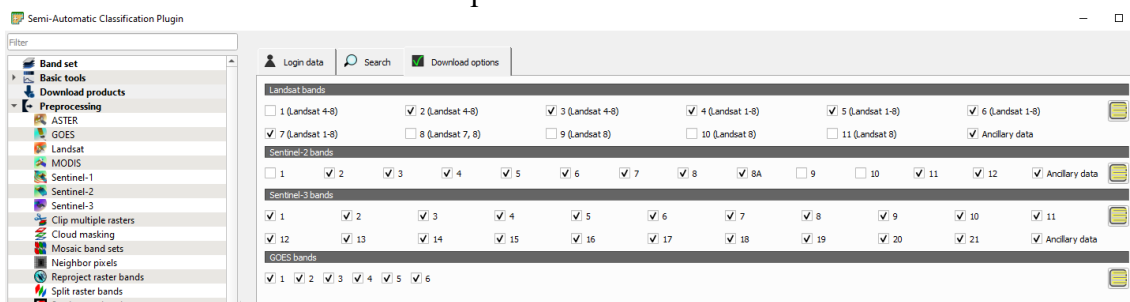
Select the scene you want to download from the list with the left mouse button and click on the button. The QGIS preview of the scene will be loaded into QGIS.
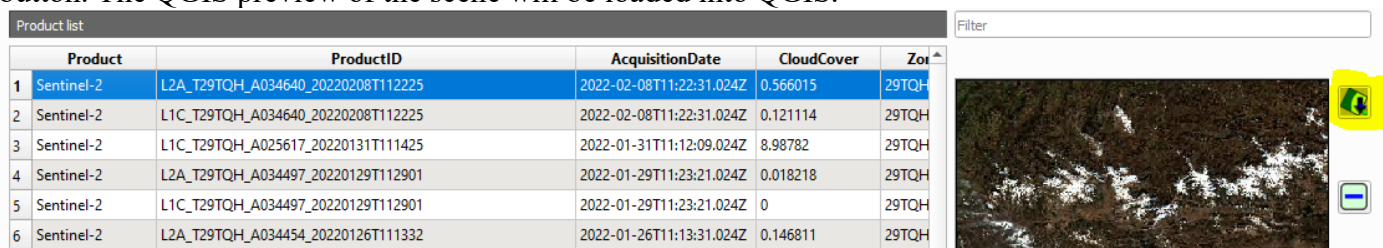
It is convenient to select the checks: "Only if preview" and "Load Strips in Qgis" and uncheck "Preprocess images" and virtual download. If you do not activate the check "Only if preview in Layers" when downloading the images, the whole list of searched scenes will be downloaded!
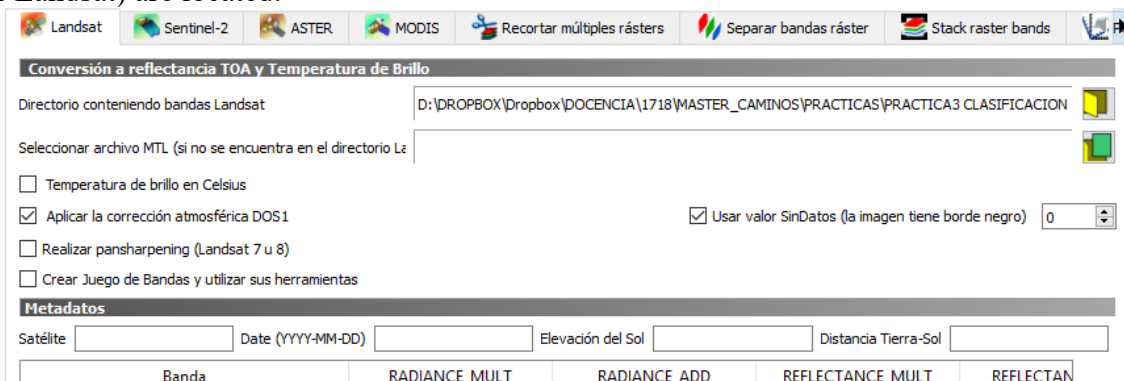

Finally, click on the "Run" button

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Naples 2023

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And we will have to provide a folder on our computer to store the image(s). The process will take some time depending on the connection.

4. Landsat imagery preprocessing

Go to Preprocessing/Landsat tab and supply the folder where the images and the metadata file (extension *.MTL for Landsat) are located.

We activate the Apply DOS1 atmospheric correction option and deactivate Create Band set and its tools. By pressing the execute button we are asked for a folder in which to store them.

The process will take a while and during this time the plugin will be "deactivated" in grey mode. You will be able to see the progress bar on the Qgis interface:

When the process is finished, a trio of warning beeps will sound in the system and the SCP plugin will be active again. In the directory chosen for the results, new bands with prefix "RT_" which stands for "Reflectance" will have been created, which are the new reflectance images created after the DOS1 correction. These images will have been loaded into the QGIS table of contents as well:

Nombre	Fecha	Tipo	Tamaño	Etiquetas
RT_LC81980312017076LGN00_B1.TIF	26/01/2018 11:31	Archivo TIF	114 835 KB	
RT_LC81980312017076LGN00_B2.TIF	26/01/2018 11:31	Archivo TIF	118 373 KB	
RT_LC81980312017076LGN00_B3.TIF	26/01/2018 11:31	Archivo TIF	123 038 KB	
RT_LC81980312017076LGN00_B4.TIF	26/01/2018 11:31	Archivo TIF	127 604 KB	
RT_LC81980312017076LGN00_B5.TIF	26/01/2018 11:32	Archivo TIF	129 186 KB	
RT_LC81980312017076LGN00_B6.TIF	26/01/2018 11:32	Archivo TIF	129 264 KB	
RT_LC81980312017076LGN00_B7.TIF	26/01/2018 11:32	Archivo TIF	128 616 KB	
RT_LC81980312017076LGN00_B8.TIF	26/01/2018 11:32	Archivo TIF	476 464 KB	
RT_LC81980312017076LGN00_B9.TIF	26/01/2018 11:33	Archivo TIF	69 301 KB	
RT_LC81980312017076LGN00_B10.TIF	26/01/2018 11:31	Archivo TIF	101 314 KB	
RT_LC81980312017076LGN00_B11.TIF	26/01/2018 11:31	Archivo TIF	100 941 KB	
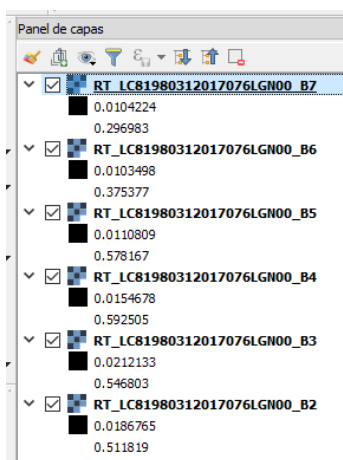
In the case of a Sentinel 2A scene, it is not necessary to mark the DOS1 correction since that product has already been atmospherically corrected.

4.1 Clip múltiple Rásters

We now choose the option Preprocessing/Clip Multiple Raster
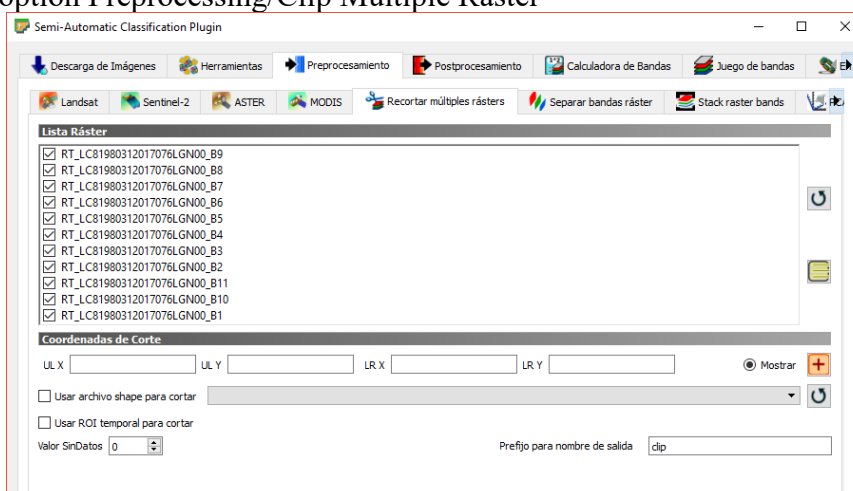
Click on the icon to load the images in the list. We select again the cutting coordinates using the

window selection with the box . When you choose to run the cutting algorithm you will have to select another folder to save them. Create a "Clipping" folder to keep them isolated. This step can also be done before the conversion into reflectance values..
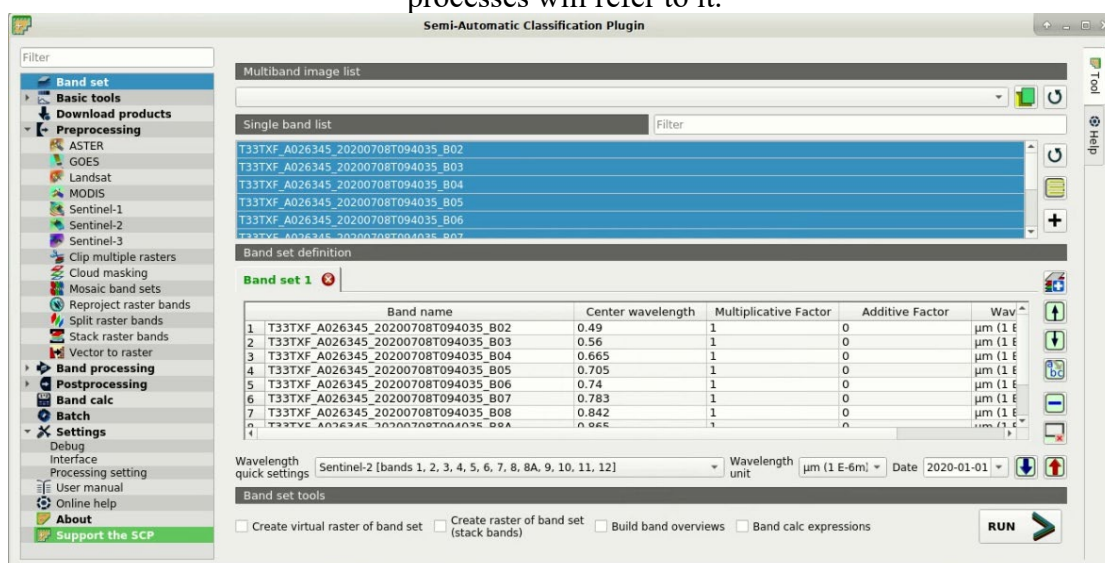
5º Classification

5.1 Creation of training areas and corresponding spectral signatures
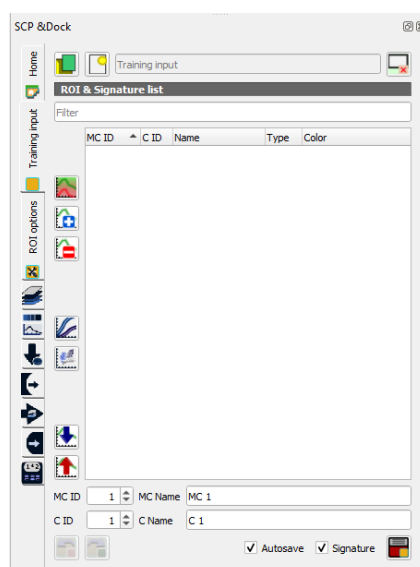
Once we have all the reflectance image clippings in QGIS, we close the rest of the previous images and create a new Bandset. The active bandset will have a green colour in its tab and the rest of the classification

processes will refer to it.

We will now work on the SCP panel which should be visible..

Now we choose the option to Create new input training. (this will internally create a *.scp file, containing the training regions and spectral signatures. A new layer will appear in QGIS named with the same name as the training region.
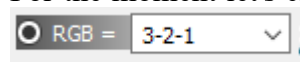

5.2 Regions of Interest (ROI)

a) We will now select the regions of interest from each class that will constitute our training sets. These regions can be selected in two ways:

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b) With the icon Create a polygonal ROI
   We create a polygon by clicking on it with the left button and finishing it with the right button. The polygon is temporary if we want to change it we can simply draw another one.

   With the ROI active pointer tool The distance and the minimum and maximum number of pixels must be set and click on an area of the image that we want to assign to that class. The selection will automatically increase from that seed point using the "growing region" algorithm.".

For the moment let's choose the natural colour band combination 3-2-1 in the RGB editable drop-down list. . We can also alternate the display with other band combinations such as 4-3-2 (false colour infrared). It should be remembered that these numbers identify the order of the layers in the Bandset (not the actual band number)
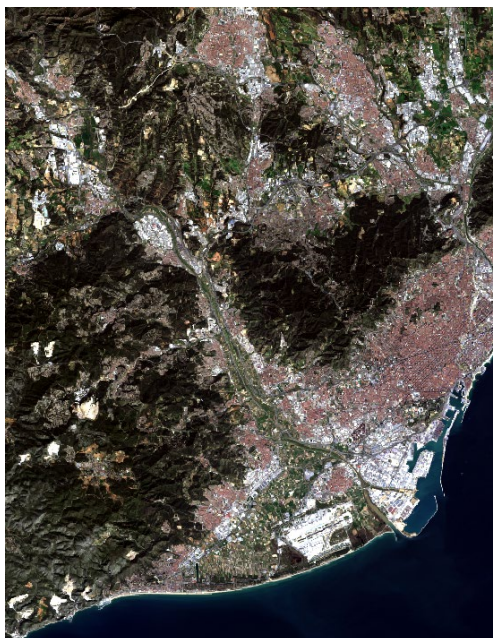
Let's mark a polygon over the sea for example and identify it in the ROI list. When we are satisfied with the marked area we can assign a name to the "Master Class Info" and the "Class Info" and a number to the MC ID and the C ID and then press leaving the spectral signature calculation active:
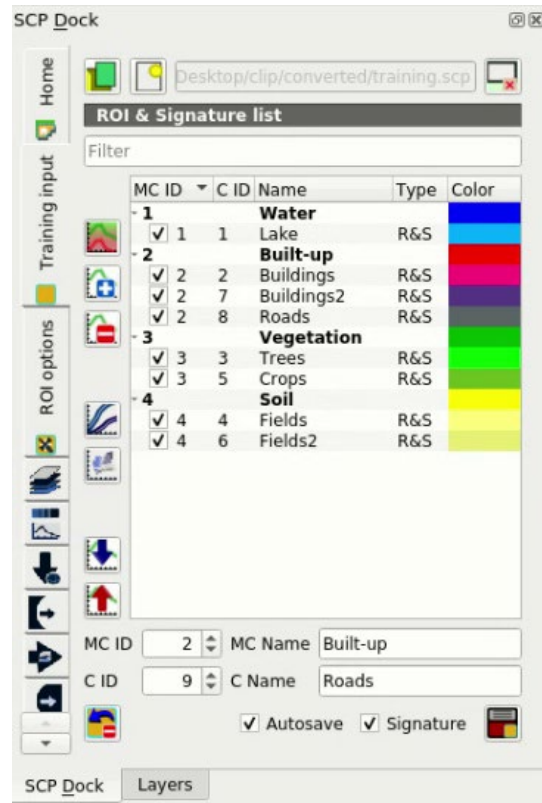
We add regions corresponding to the classes we want to obtain. In general, these regions should have as many pixels as 30x the number of bands and should be well distributed throughout the image and represent in their variability the true variability of the class. Choose between 15 and 20 regions from all the classes you wish to obtain. Several regions of the same class will have the same "MasterClass". At the end you can choose between class or MasterClass classification. It is also possible to join two regions and replace their signatures by the average between them.

5.3 Preview of the clasification

Entering Band Processing Classification, we must choose the classification algorithm in the corresponding panel and the unit of the classification (class or masterclass):
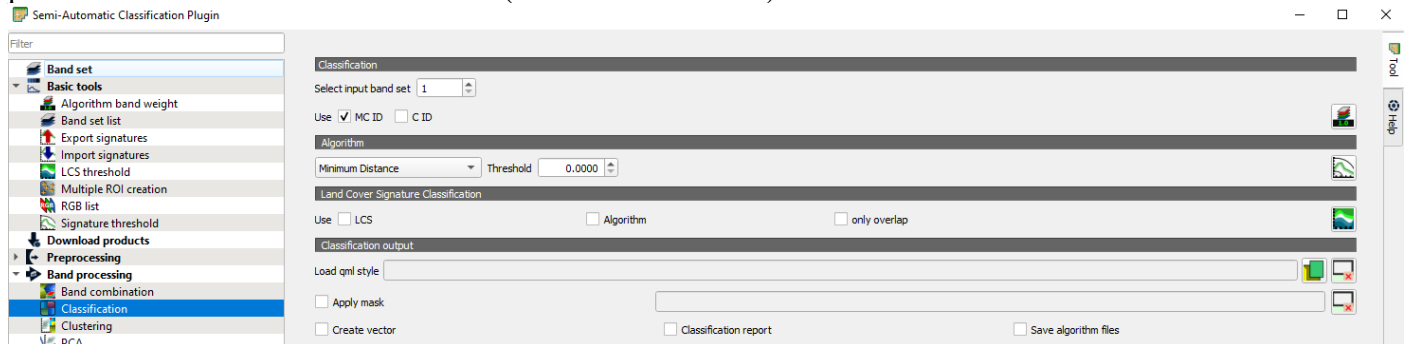

The algorithms available are Minimum Distance (not recommended), Maximum Likelihood (Bayes Classifier), Spectral Angle Mapping. If an additional threshold is selected, only those pixels that are under the threshold in each case will be classified, and if they do not meet this condition, they will remain unclassified.
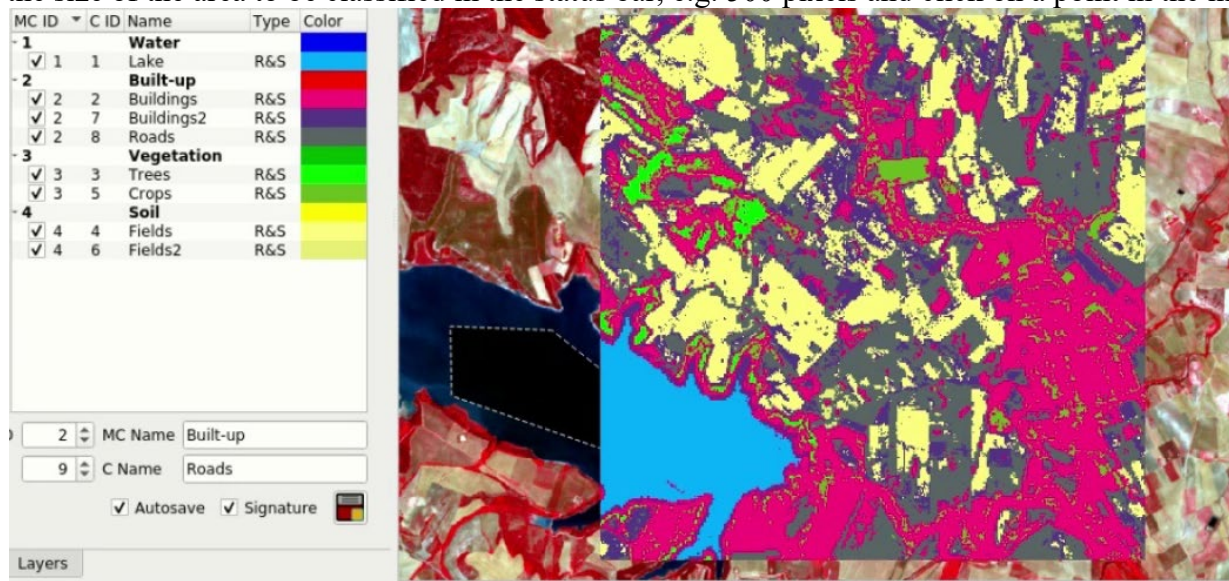
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Clasificación previa

Select the previous sorting pointer . Fijar el tamaño de la zona a clasificar en la barra de estado, por ejemplo 500 píxeles y pulsar en un punto de la imagen.
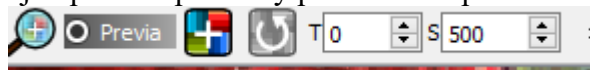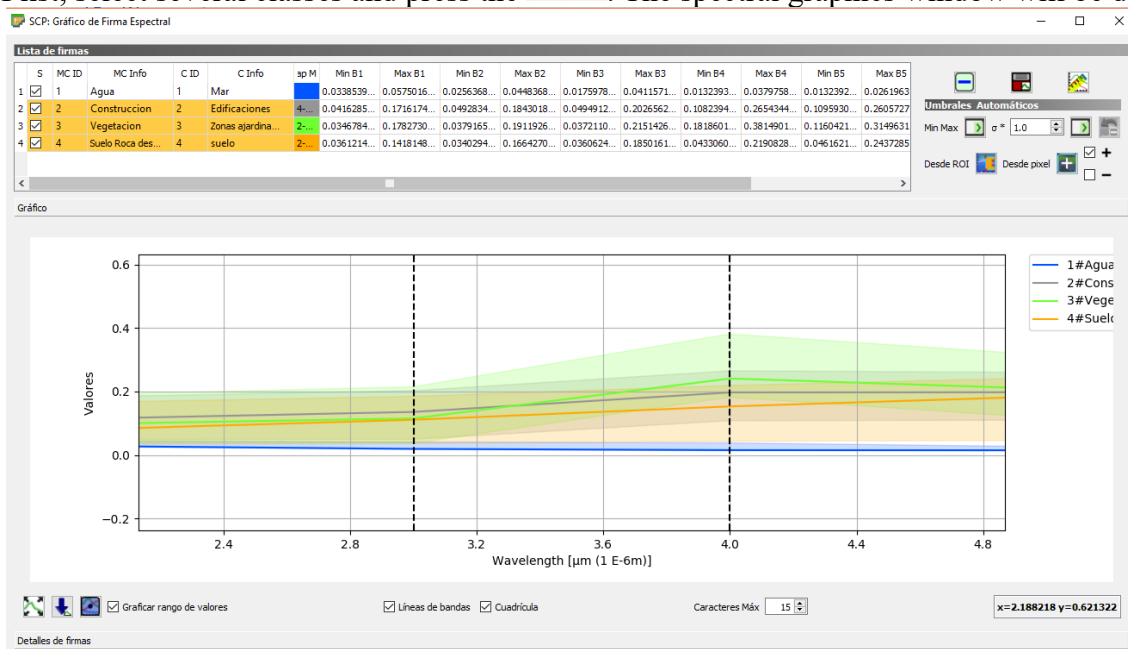

Set the size of the area to be classified in the status bar, e.g. 500 pixels and click on a point in the image.
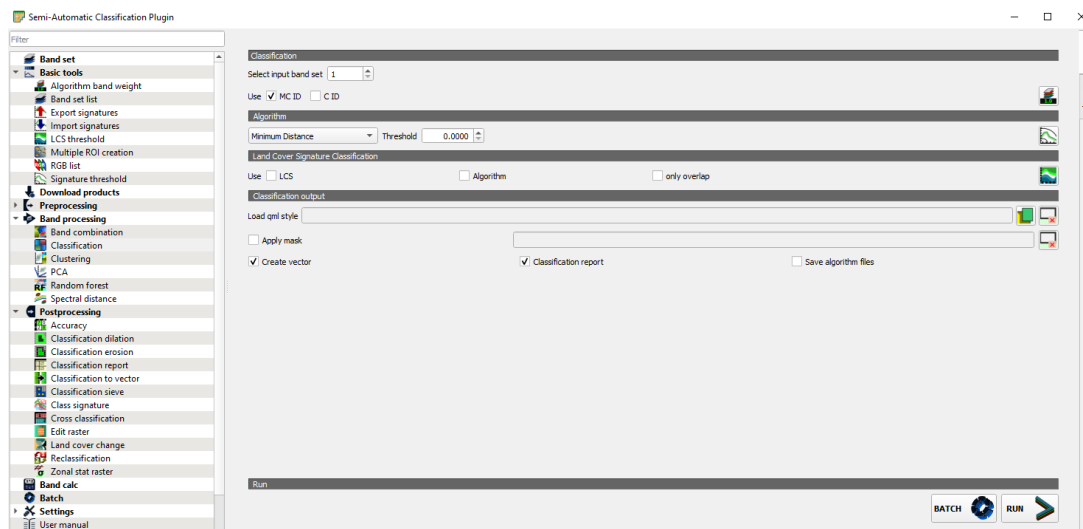

5.4 Checking spectral signatures and classification

In the ROI list, select several classes and press the . The spectral graphics window will be displayed

If we activate Create vector in addition to the raster result we will create a vector layer with the result of the classification.

To stop seeing the ROIs, deactivate the button

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If we activate Create vector in addition to the raster result we will create a vector layer with the

classification result. To stop seeing the ROIs, deactivate the button [●ROI]. The classification will be created in a TIFF and additionally a vector with the same information can be requested to be created.

5.5 Validation.

If available, it would be possible to automatically obtain a global value of the accuracy, as well as the errors of the user and the producer in each class. All this would be done by supplying a shape file with validation polygons (which cannot have intervened in the training) and which have in one of their fields the exact name of the class (or masterclass) to be checked.

To access this option it is necessary to go to PostProcessing/Accuracy and choose the appropriate classification (tiff raster) validation (Shp) files and the field in which the name of the class of each polygon is found.
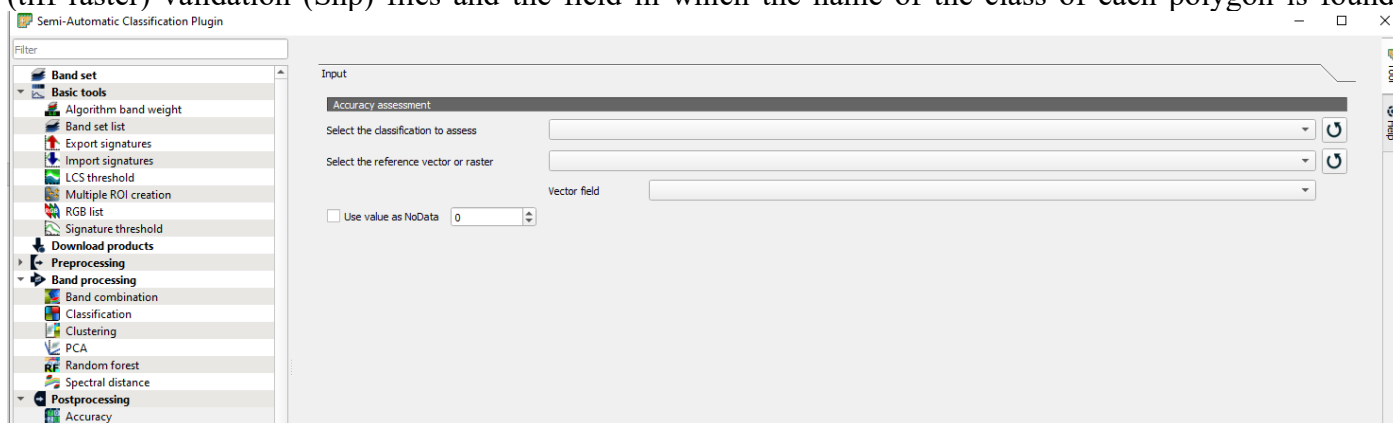
The created report is written to a *.csv file.