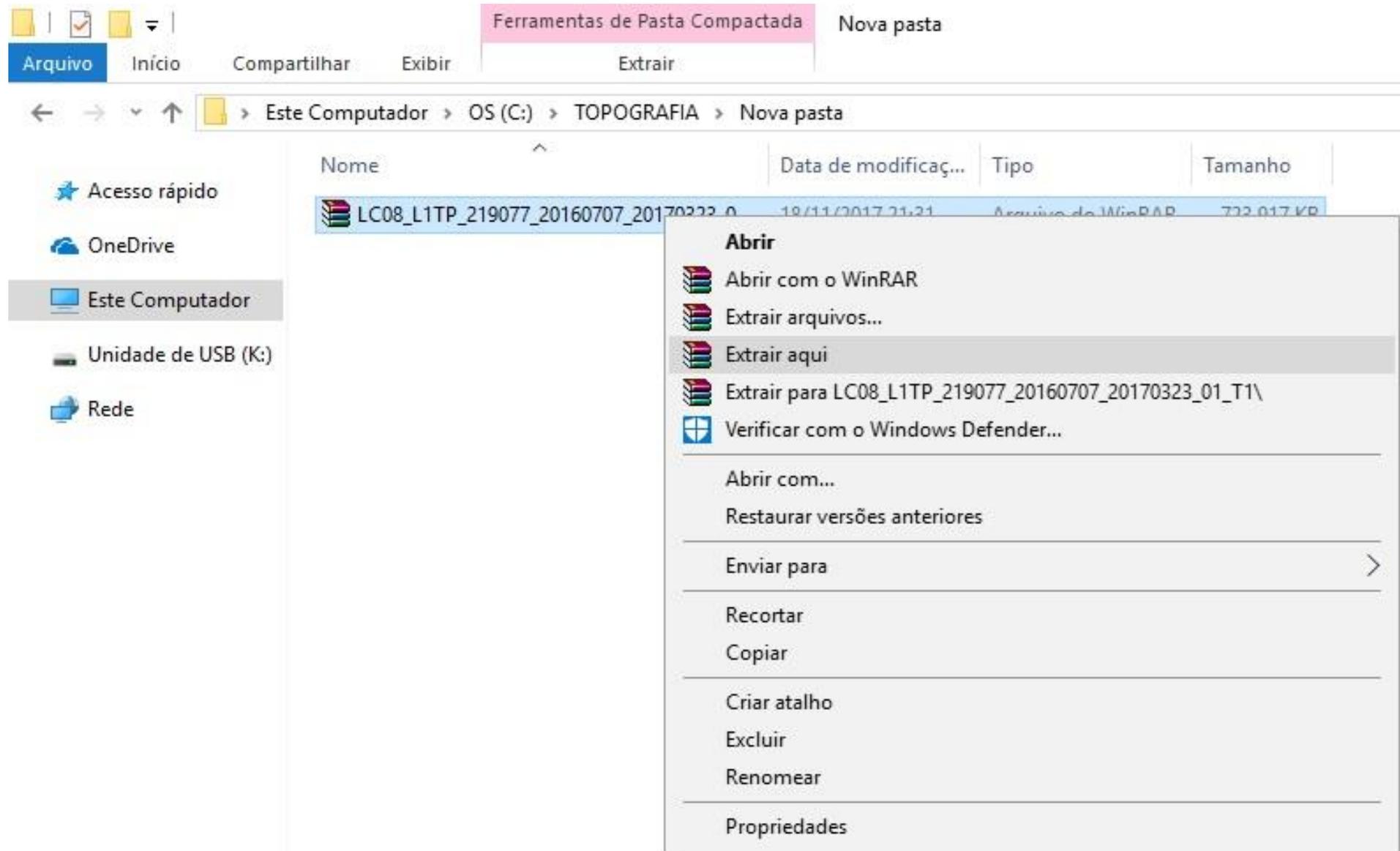


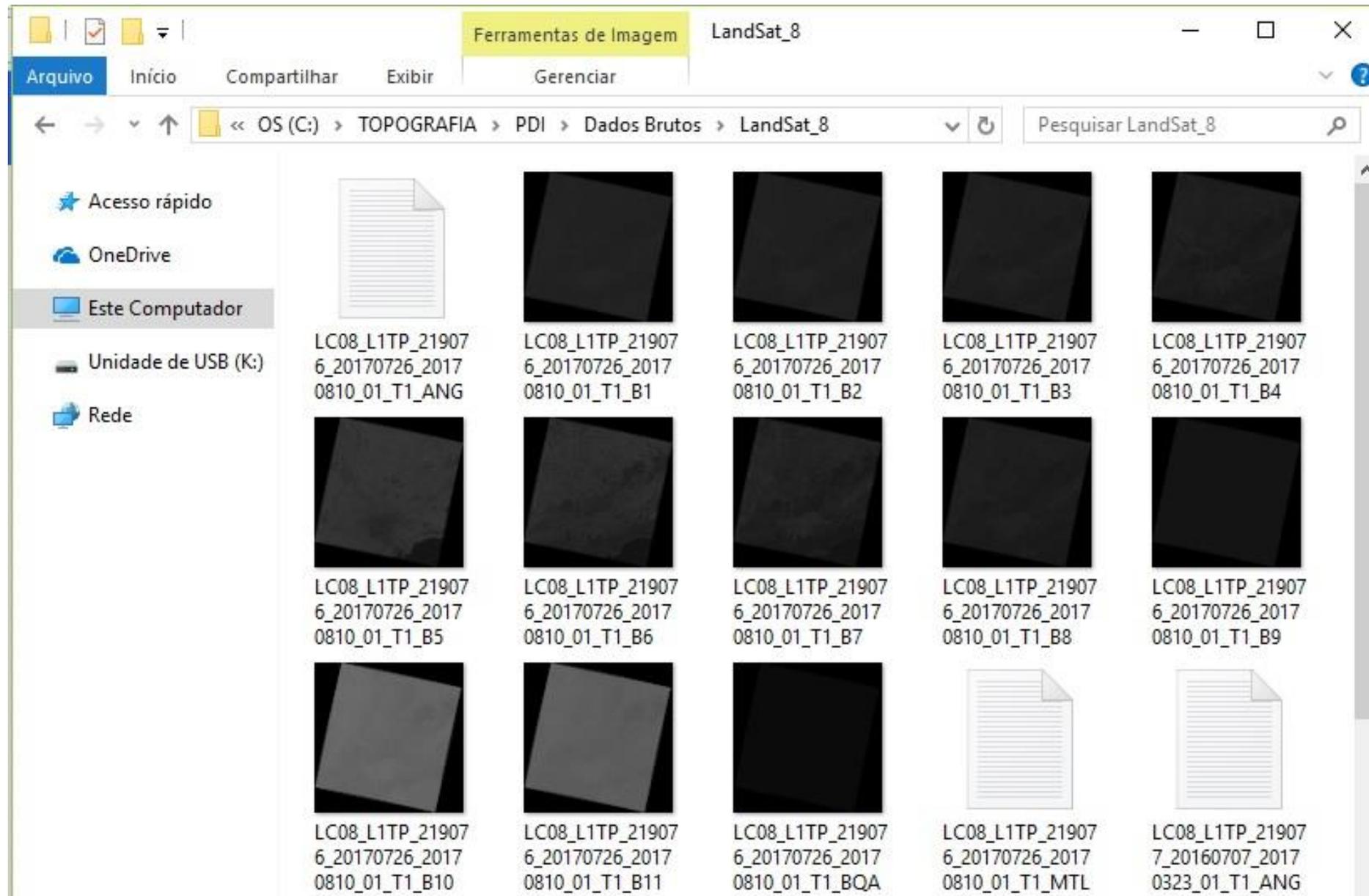
Processamento e Classificação Digital de Imagens de Satélites

**Exercício prático em QGIS com o uso de imagens
Landsat 8 (OLI/TIRS) para o Município de São Paulo**

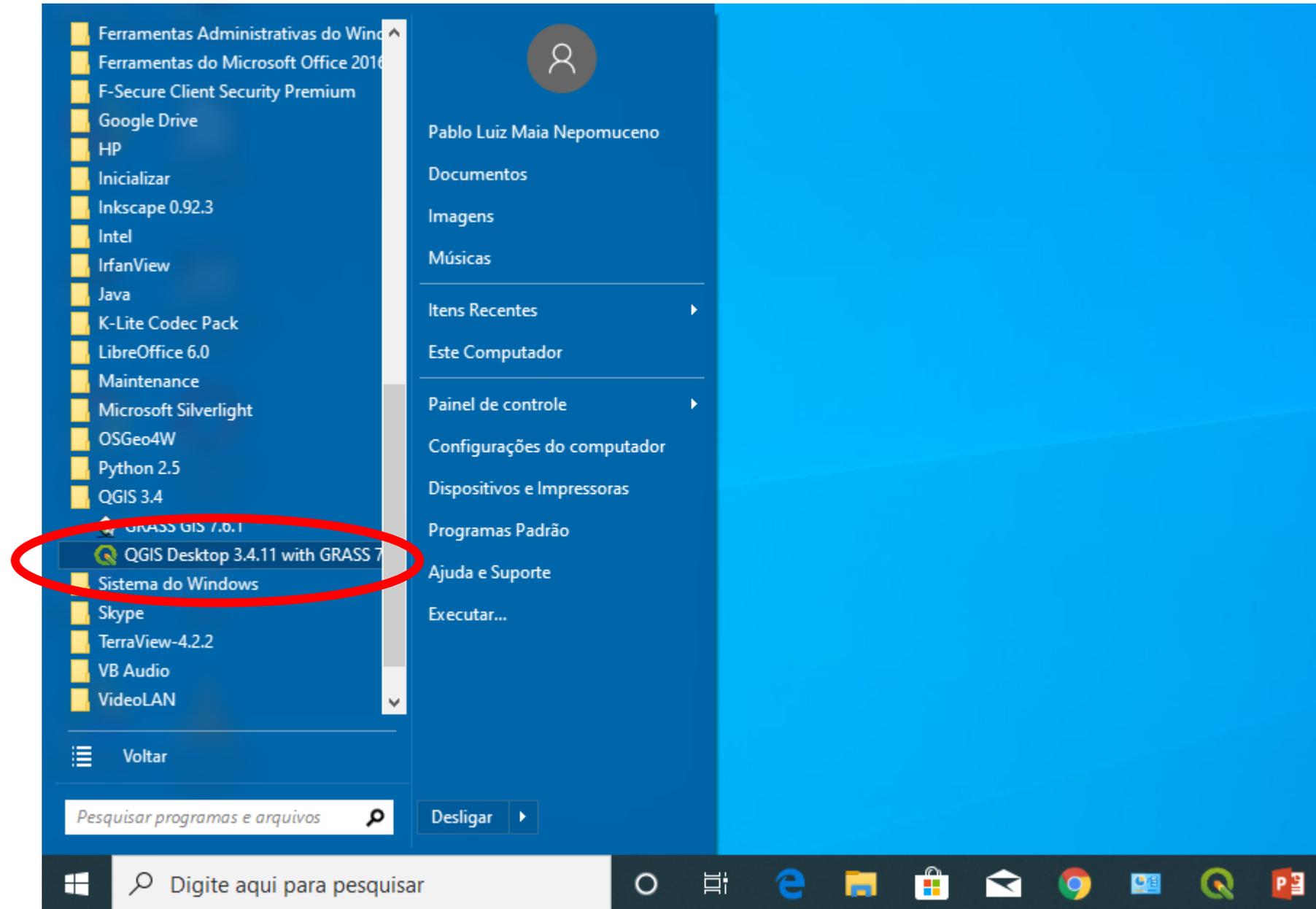
Extrair arquivos baixados usando winzip ou winrar



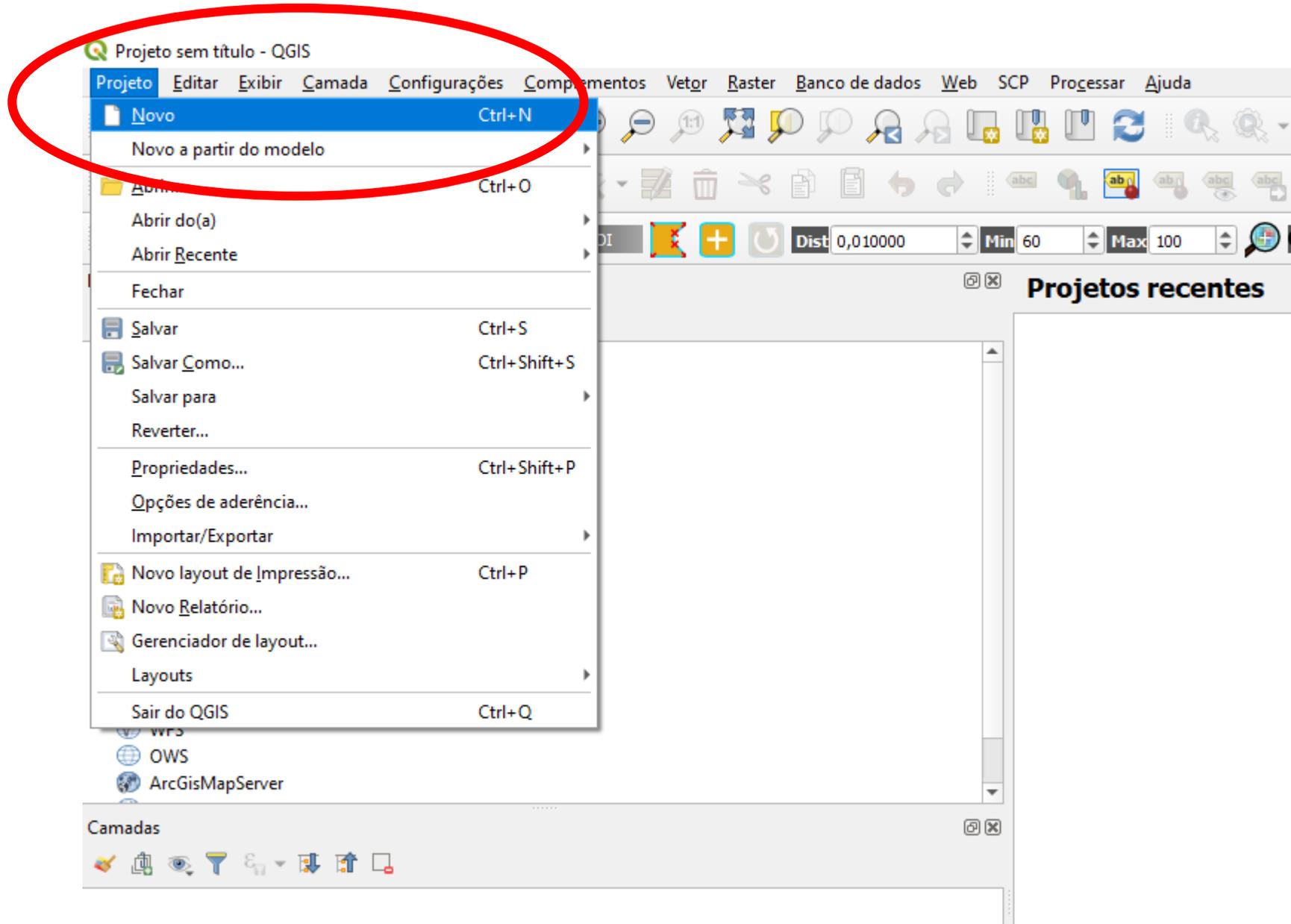
Exemplo de Pasta com Arquivos após a extração



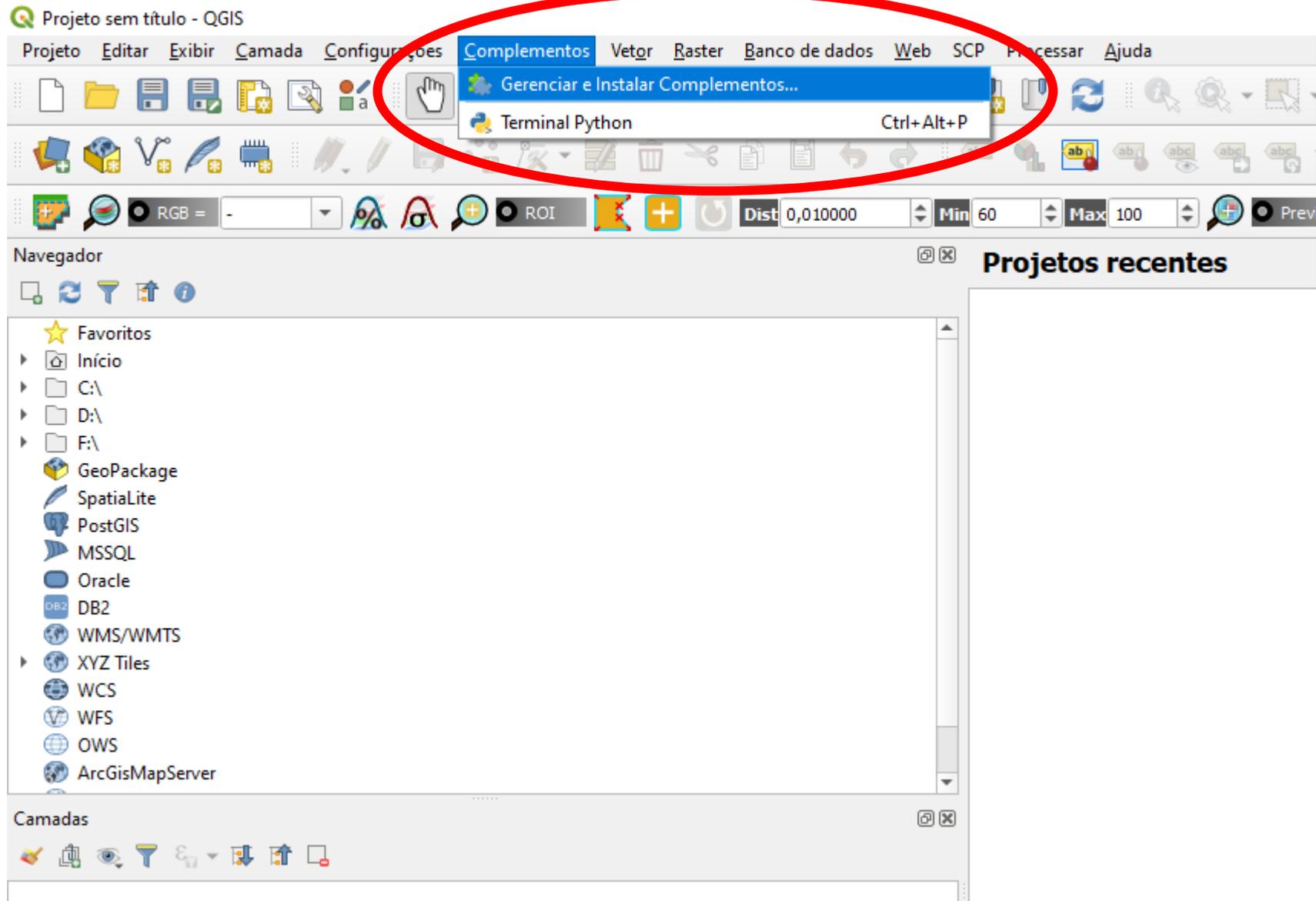
Abrir QGIS Desktop



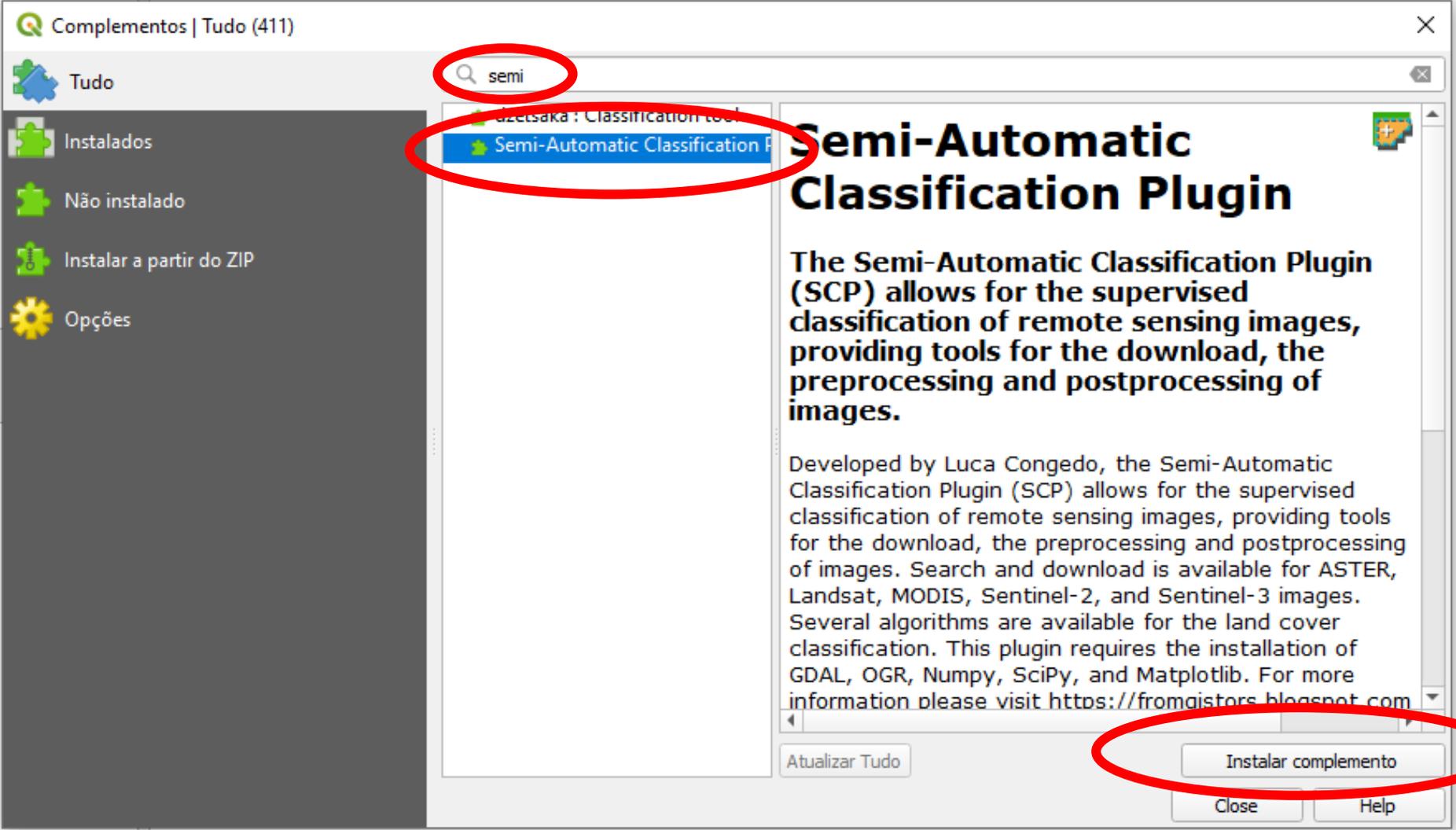
Iniciar Novo Projeto



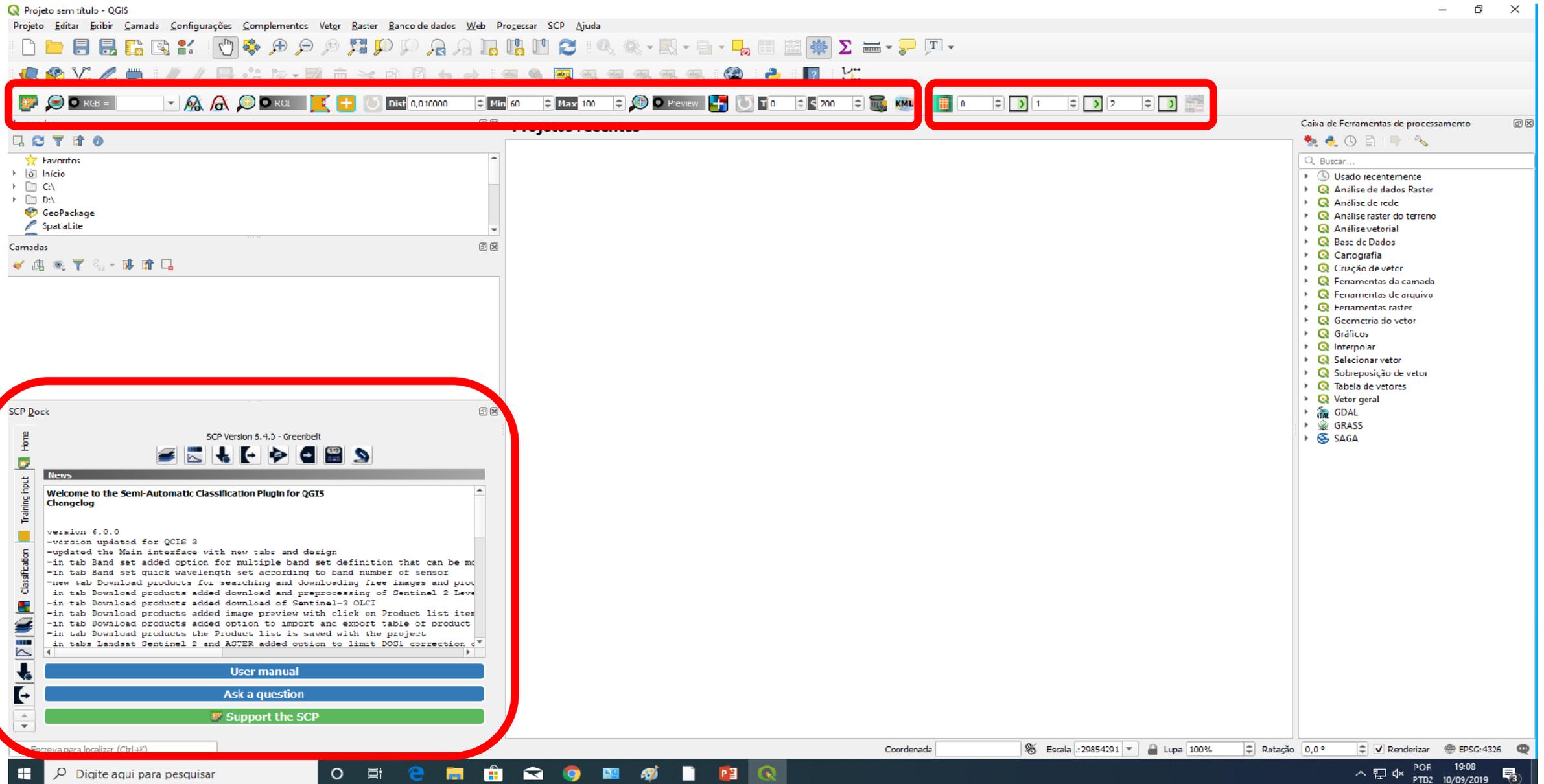
Abrir Gerenciador de Complementos



No menu lateral “Tudo” procurar por “Semi” e instalar o “Semi-Automatic Classification



Ferramentas do Semi-Automatic Classification



Atalho de Gerenciador de Camadas

The image shows the QGIS SCP interface with the 'Painéis' (Panels) dock on the right. The 'Gerenciar camadas' (Manage layers) panel is highlighted with a red box. The interface includes a menu bar, a toolbar, and a dock area with various panels like 'News', 'SCP Dock', and 'Painéis'.

Projeto sem título - QGIS

Arquivo Editar Exibir Camada Configurações Complementos Vetor Raster Banco de dados Web SCP Processar Ajuda

RGB = - ROI Dist 0,010000 Min 60 Max 100 Preview T 0 S 200 KML 0

Dock

SCP Version 6.4.0 - Greenbelt

News

Plugin

- # New release: Semi-Automatic OS v. 6 [Read more](#)
- # Tutorial: Cloud Masking, Image Mosaic, and Land Cover Change Location [Read more](#)

Services

- # Landsat download: OK
- # ASTER, and MODIS download: OK
- # Sentinel-2 download: OK

[User manual of SCP](#)

[Tutorials about SCP](#)

[SCP group in Facebook](#)

[Support SCP](#)

User manual

Ask a question

Support the SCP

Painéis

- Caixa de Ferramentas de processamento Painel
- Camadas Painel
- Desfazer/Refazer Painel
- Digitalização Avançada Painel
- Escala da quadrícula Painel
- Estatísticas Painel
- Estilização de camadas Painel
- Favoritos Espaciais Painel
- Informação do GPS Painel
- Navegador (2) Painel
- Navegador Painel
- Ordem de camada Painel
- Registro de mensagens Painel
- SCP_Dock Painel
- Visão geral Painel
- Visualizador de resultados Painel

Barra de Ferramentas

- Ajuda
- Atributos
- Barra de Ferramentas do Gerenciador de Fonte de Dados
- Barra de ferramentas do Projeto
- Base de dados
- Complementos
- Digitalização Avançada
- Digitalizar
- Ferramentas de aderência
- Ferramentas de digitalização
- Ferramentas de medição
- Ferramentas de navegação
- Raster
- Rótulo
- SCP Edit Toolbar
- SCP Working Toolbar
- Vetor

Ferramentas de processamento

Usado recentemente

- análise de dados Raster
- análise de rede
- análise raster do terreno
- análise vetorial
- base de Dados
- cartografia
- criação de vetor
- ferramentas da camada
- ferramentas de arquivo
- ferramentas raster
- geometria do vetor
- gráficos
- interpolador
- selecionar vetor
- superposição de vetor
- tabela de vetores
- vetor geral
- DAL
- RASS
- AGA

Adicionando as imagens

The image shows the QGIS interface with the 'Camada' menu open. The 'Raster...' option is highlighted with a red circle. The interface includes a menu bar, a toolbar, a Navigator panel, a Layers panel, and an SCP Dock.

Projeto sem título - QGIS

Projeto | Editar | Exibir | **Camada** | Configurações | Complementos | Vetor | Raster | Banco de dados | Web | Processar | SCP | Ajuda

Gerenciador de fonte de dados (Ctrl+L)

- Criar nova camada
- Adicionar camada**
 - Raster...** (Ctrl+Shift+R)
 - Vetorial... (Ctrl+Shift+V)
 - A partir de um texto delimitado...
 - PostGIS... (Ctrl+Shift+D)
 - Spatialite... (Ctrl+Shift+L)
 - MSSQL Spatial... (Ctrl+Shift+M)
 - espacial DB2... (Ctrl+Shift+2)
 - Oracle Spatial... (Ctrl+Shift+O)
 - Adicionar/Editar camada virtual
 - WMS/WMTS... (Ctrl+Shift+W)
 - ArcGIS MapServer...
 - WCS...
 - WFS...
 - ArcGIS FeatureServer...
- Incorporar camadas e grupos...
- Adicionar a partir de arquivo de definição de camada...

Copiar Estilo

Colar Estilo

Copiar camada

Colar camada/grupo

Abrir tabela de atributos (F6)

Alternar edição

Salvar edições na camada

Edições atuais

Salvar como...

Salvar como arquivo de definição de camada...

Remover camada/grupo (Ctrl+D)

Duplicar camada(s)

Definir a escala de visibilidade da(s) camada(s)

Definir SRC da(s) Camada(s)

Definir o SRC do projeto a partir da camada

Camada Propriedades...

Filtrar... (Ctrl+F)

Rotular

Mostrar na visão geral

Mostrar tudo na visão geral

Ocultar tudo da visão geral

SCP Dock

Home

News

Selecionando as imagens – todas as TIF menos a BQA

The image shows the QGIS interface with two dialog boxes open. The top dialog is 'Gerenciador de Fonte de Dados | Raster' and the bottom dialog is 'Abrir conjunto(s) de dados raster GDAL suportados'.

Gerenciador de Fonte de Dados | Raster

Tipo de fonte: Arquivo Protocolo: HTTP(s), nível, etc.

Fonte: Conjunto(s) de dados raster "IF" "C:\Pablo\Aula_PDI\LANDSAT_8\LC08_L1TP_219076_20170726_20170810_01_T1_BQA.TIF"

Abrir conjunto(s) de dados raster GDAL suportados

Este Computador > OS (C:) > Pablo > Aula_PDI > LANDSAT_8

Nome Data Tipo Tamanho Marcas

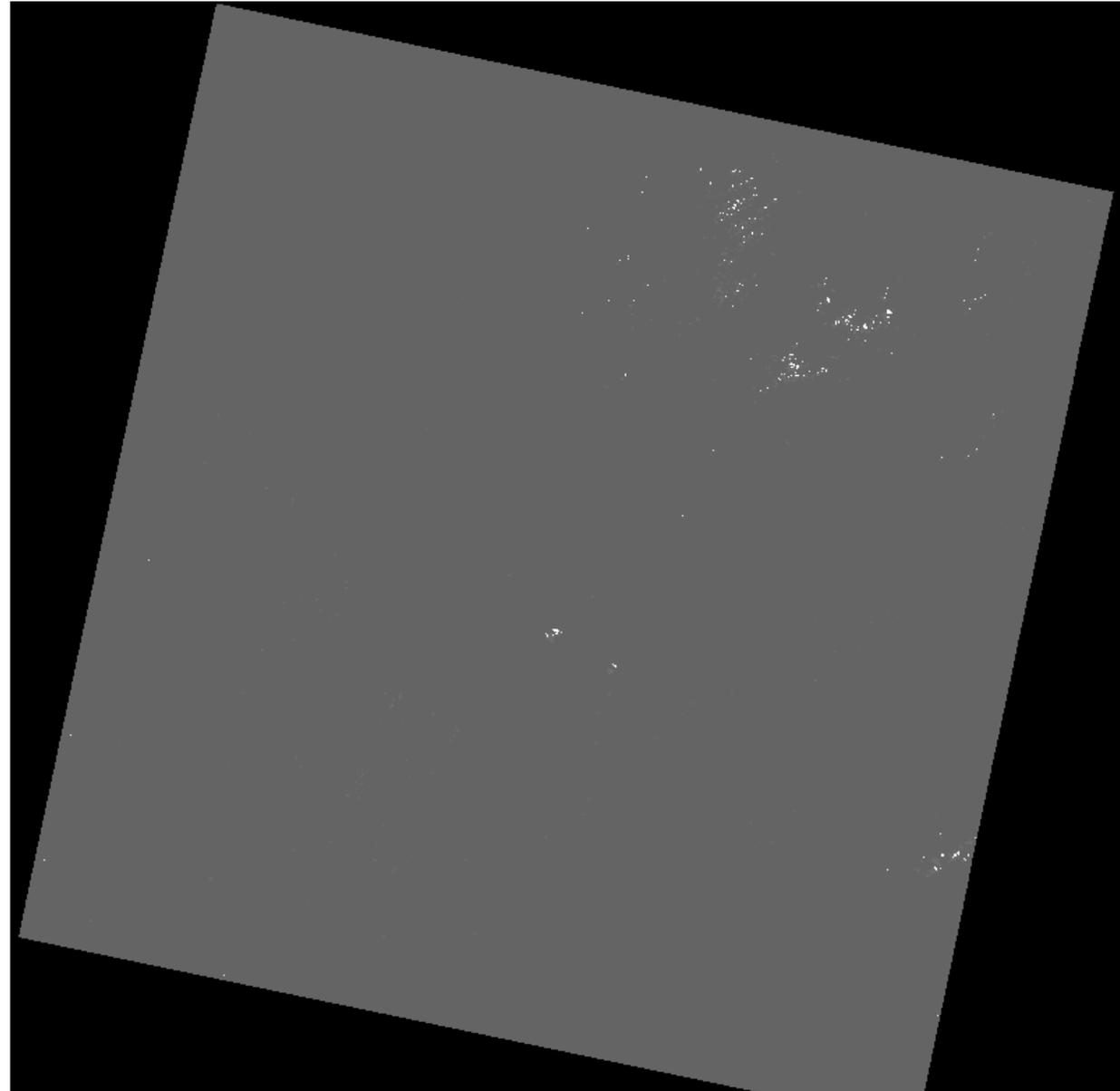
LC08_L1TP_219076_20170726_20170810_01_T1_B1	10/08/2017 08:06	Arquivo TIF	114.986 KB	
LC08_L1TP_219076_20170726_20170810_01_T1_B2	10/08/2017 08:06	Arquivo TIF	114.986 KB	
LC08_L1TP_219076_20170726_20170810_01_T1_B3	10/08/2017 08:06	Arquivo TIF	114.986 KB	
LC08_L1TP_219076_20170726_20170810_01_T1_B4	10/08/2017 08:06	Arquivo TIF	114.986 KB	
LC08_L1TP_219076_20170726_20170810_01_T1_B5	10/08/2017 08:06	Arquivo TIF	114.986 KB	
LC08_L1TP_219076_20170726_20170810_01_T1_B6	10/08/2017 08:06	Arquivo TIF	114.986 KB	
LC08_L1TP_219076_20170726_20170810_01_T1_B7	10/08/2017 08:06	Arquivo TIF	114.986 KB	
LC08_L1TP_219076_20170726_20170810_01_T1_B8	10/08/2017 08:06	Arquivo TIF	459.763 KB	
LC08_L1TP_219076_20170726_20170810_01_T1_B9	10/08/2017 08:06	Arquivo TIF	114.986 KB	
LC08_L1TP_219076_20170726_20170810_01_T1_B10	10/08/2017 08:06	Arquivo TIF	114.986 KB	
LC08_L1TP_219076_20170726_20170810_01_T1_B11	10/08/2017 08:06	Arquivo TIF	114.986 KB	
LC08_L1TP_219076_20170726_20170810_01_T1_BQA	10/08/2017 08:06	Arquivo TIF	114.986 KB	
LC08_L1TP_219076_20170726_20170810_01_T1_ANG	10/08/2017 08:05	Documento de Te...	115 KB	
LC08_L1TP_219076_20170726_20170810_01_T1_MTL	10/08/2017 08:06	Documento de Te...	9 KB	
LC08_L1TP_219076_20170726_20170810_01_T1_B2.TIF...	18/11/2017 23:05	Documento XML	4 KB	

Nome: "LC08_L1TP_219076_20170726_20170810_01_T1_BQA" "LC08_L1TP_219076_20170726_20170810_01_T1_B"

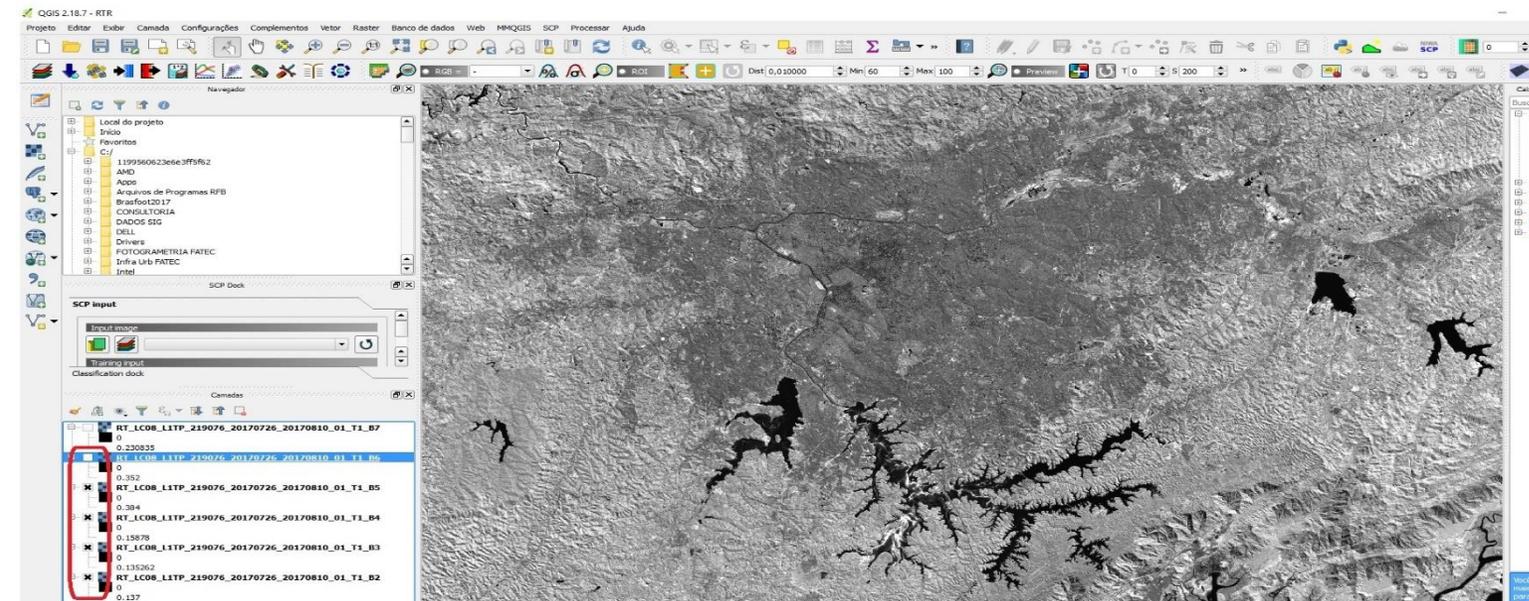
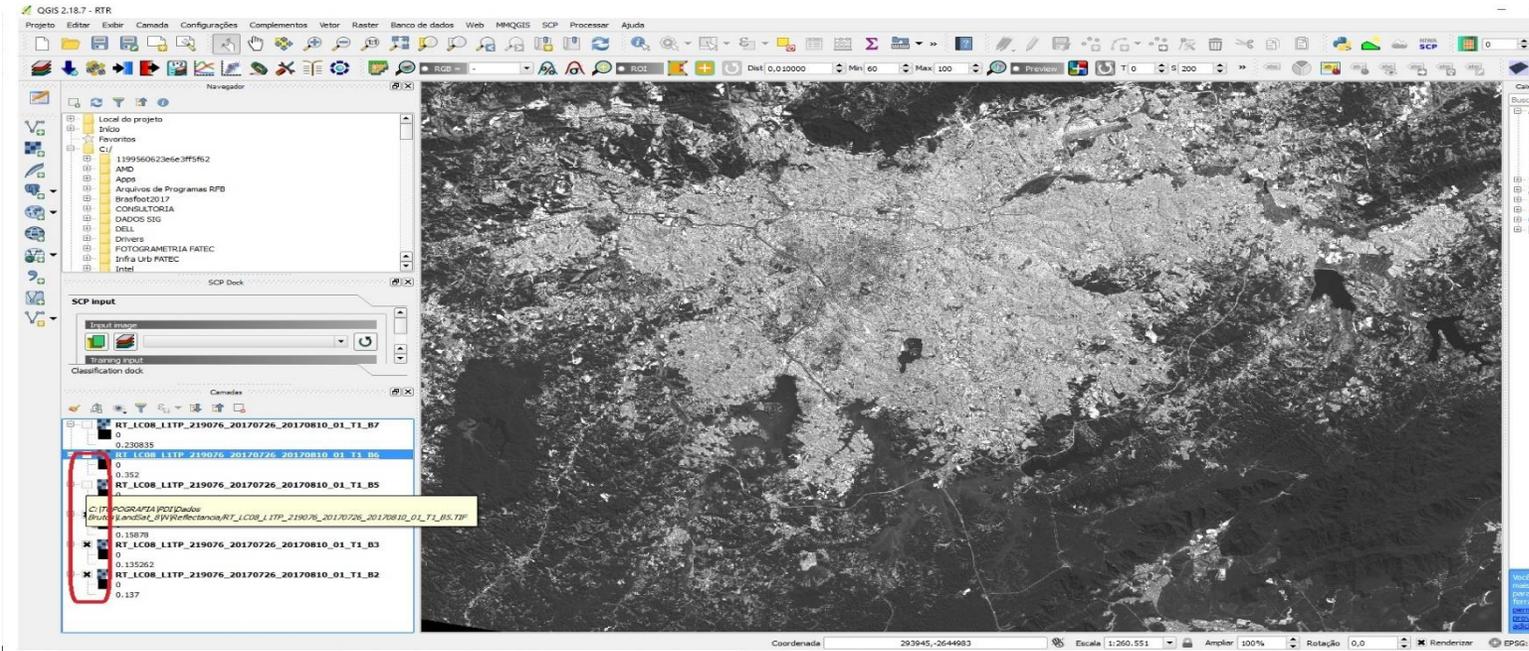
Todos arquivos

Abrir Cancelar

Visualizando as imagens – todas as TIF



Habilitar e desabilitar bandas para verificar diferenças espectrais entre elas



Correção atmosférica – selecionando as bandas (2 a 7)

The screenshot displays the 'Semi-Automatic Classification Plugin' interface. The left sidebar contains a menu with the following items: Band set, Basic tools, Download products, Preprocessing, Band processing, Postprocessing (highlighted with a red '2'), Band calc, Batch, Settings, About, User manual, and Online help (highlighted with a red '4').

The main window shows the 'Landsat' tab with the following settings:

- Directory containing Landsat bands: C:/Pablo/Aula_PDI/LANDSAT_8 (highlighted with a red '1' and a yellow folder icon)
- Select MTL file: C:/Pablo/Aula_PDI/LANDSAT_8/LC08_L1TP_219076_20170726_... (highlighted with a red '1' and a green folder icon)
- Brightness temperature in Ci
- Apply DOS1 atmospheric cor... only to blue and green band (highlighted with a red '3' and a red oval)
- Use NoData value: 0 (highlighted with a red '3' and a red oval)
- Perform pansharpening (Landsat 7 or 8)
- Create Band set and use Band set tools
- Add bands in a new Band set

The 'Metadata' section shows: Satellite: DSAT_8, Date (YYYY-MM-DD): 7-07-26, Sun elevation: 3140602, Earth sun distance: 156179.

The 'Band' table is highlighted with a red '5' and a red box. It lists 11 bands with their corresponding file names and the 'RADIANCE_MUL' column. The first three rows (1-3) are highlighted with a red box. The last two rows (10-11) are also highlighted with a red box.

	Band	RADIANCE_MUL
1	LC08_L1TP_219076_20170726_20170810_01_T1_B1.TIF	
2	LC08_L1TP_219076_20170726_20170810_01_T1_B10.TIF	
3	LC08_L1TP_219076_20170726_20170810_01_T1_B11.TIF	
4	LC08_L1TP_219076_20170726_20170810_01_T1_B2.TIF	
5	LC08_L1TP_219076_20170726_20170810_01_T1_B3.TIF	
6	LC08_L1TP_219076_20170726_20170810_01_T1_B4.TIF	
7	LC08_L1TP_219076_20170726_20170810_01_T1_B5.TIF	
8	LC08_L1TP_219076_20170726_20170810_01_T1_B6.TIF	
9	LC08_L1TP_219076_20170726_20170810_01_T1_B7.TIF	
10	LC08_L1TP_219076_20170726_20170810_01_T1_B8.TIF	
11	LC08_L1TP_219076_20170726_20170810_01_T1_B9.TIF	

At the bottom right, there is a 'RUN' button (highlighted with a red '7' and a red box) and a 'Support the SCP' button (highlighted with a red '5').

Indicar “Reflectancia” como pasta de saída

The image displays the QGIS 2.18.7-RTR interface with the Semi-Automatic Classification Plugin (SCP) active. A file selection dialog titled "Select a MTL file" is open, showing the path "OS (C:) > TOPOGRAFIA > PDI > Dados Brutos > LandSat_8 > N". The dialog shows a folder named "Reflectancia" selected, along with two files: "LC08_L1TP_21907_6_20170726_2017_0810_01_T1_ANG" and "LC08_L1TP_21907_6_20170726_2017_0810_01_T1_MTL". The "Nome:" field is empty, and the file type is set to "MTL file *.bt (*.bt)".

The SCP input panel shows the following fields:

- Input image: [Image icon]
- Training input: [Image icon]
- SCP news: [Text area]

The bottom status bar shows the following information:

- Coordenada: 321622, -2652250
- Escala: 1:326.119
- Ampliar: 100%
- Rotação: 0,0
- Renderizar
- EPSG:32623

A blue tooltip in the bottom right corner reads: "Você pode adicionar mais algoritmos para a caixa de ferramentas, [permitem que os provedores adicionais.](#) [close]"

Entendendo as BANDAS da LandSat 8

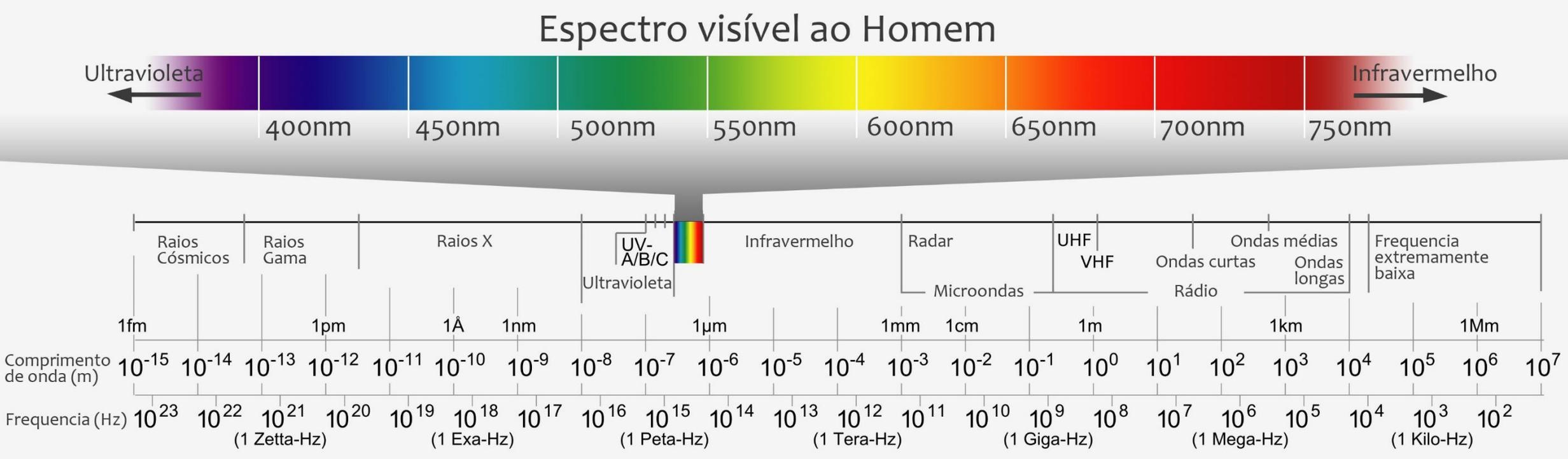
Tabela 3. Características das imagens do OLI e TIRS do satélite Landsat 8.

Banda	Sensor	Faixa espectral (μm)	Significado	Resolução Espacial (m x m)
Banda 1	-	0,43-0,45	Aerossol, costeira*	30
Banda 2	-	0,45- 0,51	Azul	30
Banda 3	-	0,53-0,59	Verde	30
Banda 4	-	0,64-0,67	Vermelho	30
Banda 5	OLI	0,85-0,88	IV Próximo	30
Banda 6	-	1,57-1,65	SWIR 1	30
Banda 7	-	2,11-2,29	SWIR 2	30
Banda 8	-	0,50-0,68	Pancromático	15
Banda 9	-	1,36-1,38	Cirrus**	30
Banda 10	TIRS	10,60-11,19	-	100
Banda 11	-	11,50-12,51	-	100

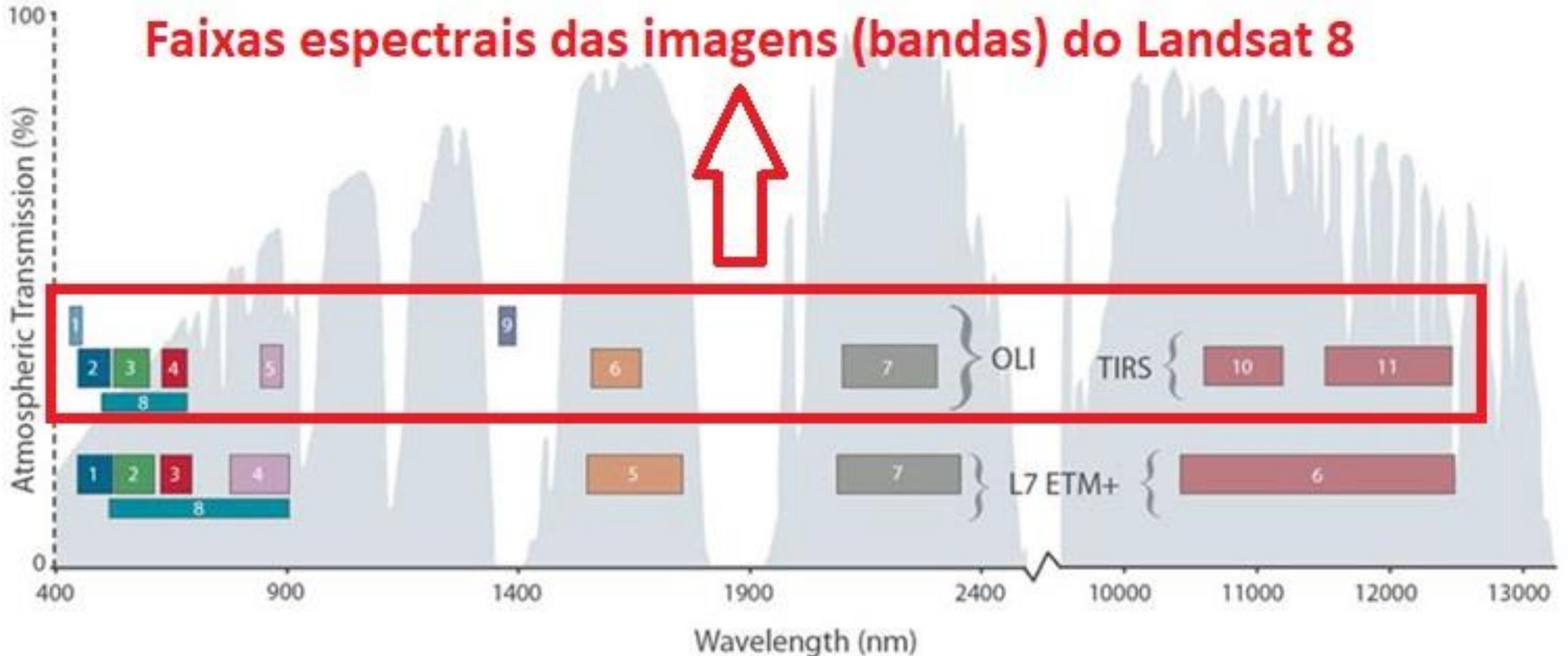
* utilizada para estudo de aerossol e ambiente costeiro; ** estudar as nuvens cirrus.

Fonte: USGS (2012a; 2012b).

Espectro Eletromagnético



Entendendo as BANDAS da LandSat 8



Bandpass wavelengths for Landsat 8 OLI and TIRS sensor, compared to Landsat 7 ETM+ sensor

Note: atmospheric transmission values for this graphic were calculated using MODTRAN for a summertime mid-latitude hazy atmosphere (circa 5 km visibility).

Percebendo Mudanças no range de valores e nos contrastes em relação a imagem original

QGIS 2.18.7 - RTR

Projeto Editar Exibir Camada Configurações Complementos Vetor Raster Banco de dados Web MMQGIS SCP Processar Ajuda

Navegador

- Local do projeto
- Início
- Favoritos
- C:/
- 1199560623e6e3ff5f62
- AMD
- Apps
- Arquivos de Programas RFB
- Brasfoot2017
- CONSULTORIA
- DADOS SIG
- DELL
- Drivers
- FOTOGRAMETRIA FATEC
- Infra Urb FATEC
- Intel

SCP Dock

SCP input

Input image

Training input

Classification dock

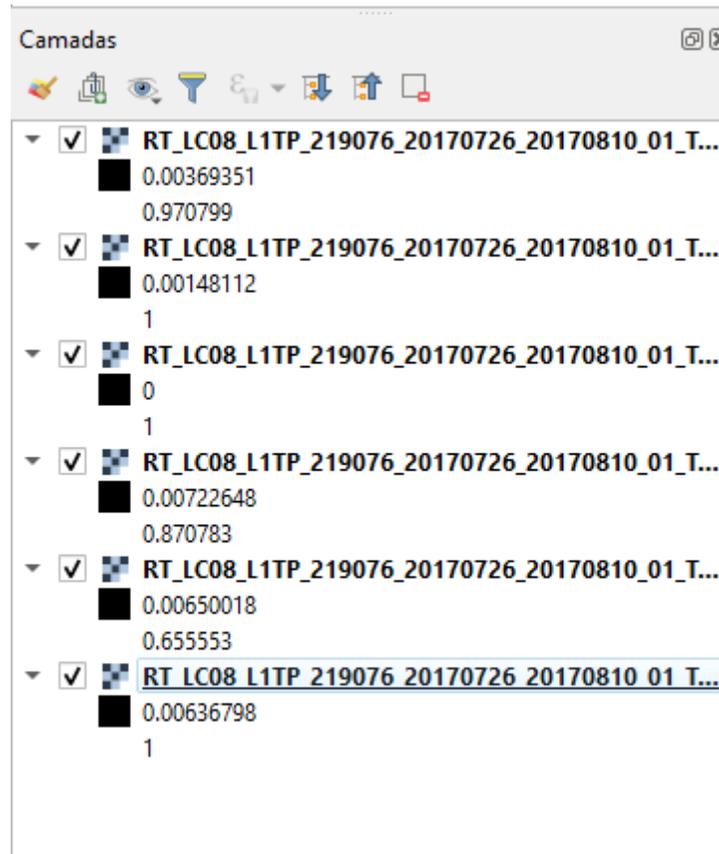
Camadas

- RT_IC08_L1TP_219076_20170726_20170810_01_T1_B7
- 0
- 0.230835
- RT_IC08_L1TP_219076_20170726_20170810_01_T1_B5
- 0
- 16604
- RT_IC08_L1TP_219076_20170726_20170810_01_T1_B6
- 0
- 0.352
- RT_IC08_L1TP_219076_20170726_20170810_01_T1_B5
- 0
- 0.384
- RT_IC08_L1TP_219076_20170726_20170810_01_T1_B4
- 0
- 0.15878
- RT_IC08_L1TP_219076_20170726_20170810_01_T1_B3
- 0
- 0.135262
- RT_IC08_L1TP_219076_20170726_20170810_01_T1_B2
- 0
- 0.137

Coordenada 327518,-2625267 Escala 1:260.551 Ampliar 100% Rotação 0,0 Renderizar EPSG:32623

Você pode adicionar mais algoritmos para a caixa de ferramentas: [permem que os provedores adicionais.](#) [close]

Remover as bandas originais (sem conversão para reflectância) e deixar só as “corrigidas”, com denominação inicial “RT” de reflectância



Acessar propriedades da imagem

The image shows the QGIS desktop application interface. The title bar reads '*Projeto sem titulo - QGIS'. The menu bar includes 'Projeto', 'Editar', 'Exibir', 'Camada', 'Configurações', 'Complementos', 'Vetor', 'Raster', 'Banco de dados', 'Web', 'SCP', 'Processar', and 'Ajuda'. The toolbar contains various icons for navigation and processing. The 'Camadas' (Layers) panel on the left shows a list of layers, with the top layer 'RT LC08 L1TP 219076 20170726 20170810 01' selected and circled in red. A context menu is open over this layer, listing actions such as 'Aproximar para camada', 'Mostrar na visão geral', 'Copiar camada', 'Renomear Camada', 'Aproximar para 100%', 'Estender Usando a Extensão Atual', 'Duplicar Camada', 'Remover Camada...', 'Configurar escala de visibilidade da camada', 'Configurar SRC', 'Exportar', and 'Estilos...'. The 'Propriedades...' option at the bottom of the menu is also circled in red. The 'SCP Dock' panel at the bottom left shows 'SCP Version 6.4.0' and a 'News' section with links for 'New release: Semi-Automatic OS v. 6', 'Tutorial: Cloud Masking, Image Mosaic, and Lan...', and 'Services' including 'Landsat download: OK', 'ASTER, and MODIS download: OK', and 'Sentinel-2 download: OK'. A large, dark, textured satellite image is displayed on the right side of the screen.

Manipulando histograma

Propriedades da camada - RT_LC08_L1TP_219076_20170726_20170810_01_T1_B6 | Histograma

Informação
Fonte
Simbologia
Transparência
Histograma
Renderização
Pirâmides
Metadata
Legenda
QGIS Server

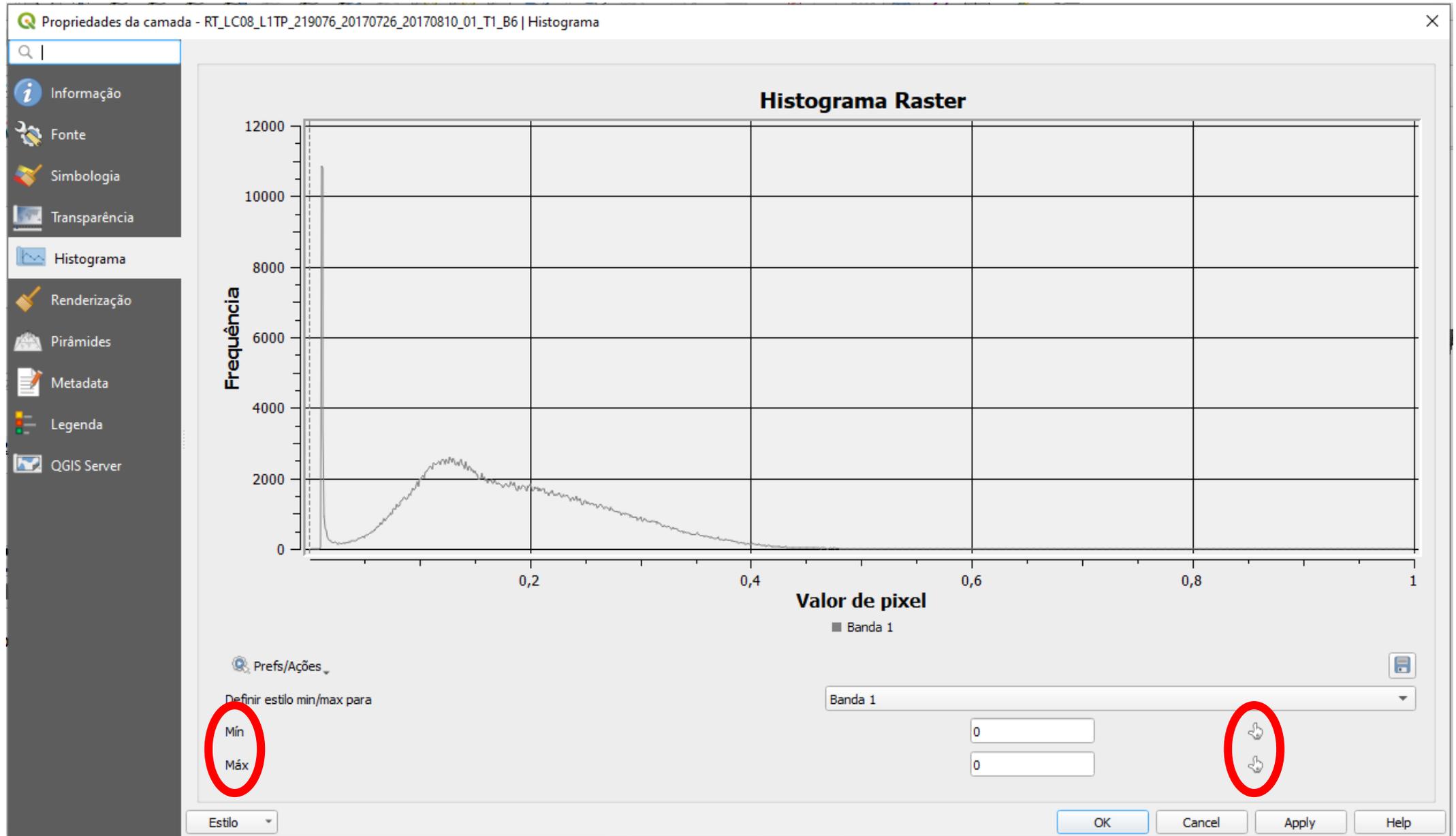
Estilo

Calcular Histograma

OK Cancel Apply Help

The image shows the QGIS Histogram dialog box. The left sidebar contains a list of property categories: Informação, Fonte, Simbologia, Transparência, **Histograma** (highlighted with a red circle), Renderização, Pirâmides, Metadata, Legenda, and QGIS Server. The main area is a large empty plot with a vertical axis from 0 to 1000 and a horizontal axis from 0 to 1000. At the bottom center, the 'Calcular Histograma' button is circled in red. At the bottom right, there are buttons for 'OK', 'Cancel', 'Apply', and 'Help'. A dropdown menu labeled 'Estilo' is located at the bottom left of the plot area.

Manipulando histograma



Criando um conjunto de imagens

Semi-Automatic Classification Plugin

Band set

Basic tools

Download products

Preprocessing

Band processing

Postprocessing

Band calc

Batch

Settings

About

User manual

Online help

Support the SCP

Multiband image list

Single band list

- RT_LC08_L1TP_219076_20170726_20170810_01_T1_B3
- RT_LC08_L1TP_219076_20170726_20170810_01_T1_B4
- RT_LC08_L1TP_219076_20170726_20170810_01_T1_B5
- RT_LC08_L1TP_219076_20170726_20170810_01_T1_B6
- RT_LC08_L1TP_219076_20170726_20170810_01_T1_B7

Band set definition

Band set 1

	Band name	Center wavelength	Multiplicative Factor	Additive Factor	
1	RT_LC08_L1TP_219076_20170726_20170810_01_T1_B2	1.0	1	0	ba
2	RT_LC08_L1TP_219076_20170726_20170810_01_T1_B3	2.0	1	0	ba
3	RT_LC08_L1TP_219076_20170726_20170810_01_T1_B4	3.0	1	0	ba
4	RT_LC08_L1TP_219076_20170726_20170810_01_T1_B5	4.0	1	0	ba
5	RT_LC08_L1TP_219076_20170726_20170810_01_T1_B6	5.0	1	0	ba
6	RT_LC08_L1TP_219076_20170726_20170810_01_T1_B7	6.0	1	0	ba

Quick wavelength settings

Wavelength unit: band number

Band set tools

Create virtual raster of band set Create raster of band set (stack bands) Build band overviews Band calc expressions

RUN

Indicar “Reflectancia” como pasta de saída

The image displays the QGIS 2.18.7-RTR interface with the Semi-Automatic Classification Plugin (SCP) active. A file selection dialog titled "Select a MTL file" is open, showing the path "OS (C:) > TOPOGRAFIA > PDI > Dados Brutos > LandSat_8 > N". The dialog shows a folder named "Reflectancia" selected, along with two files: "LC08_L1TP_21907_6_20170726_2017_0810_01_T1_ANG" and "LC08_L1TP_21907_6_20170726_2017_0810_01_T1_MTL". The "Nome:" field is empty, and the file type is set to "MTL file *.bt (*.bt)".

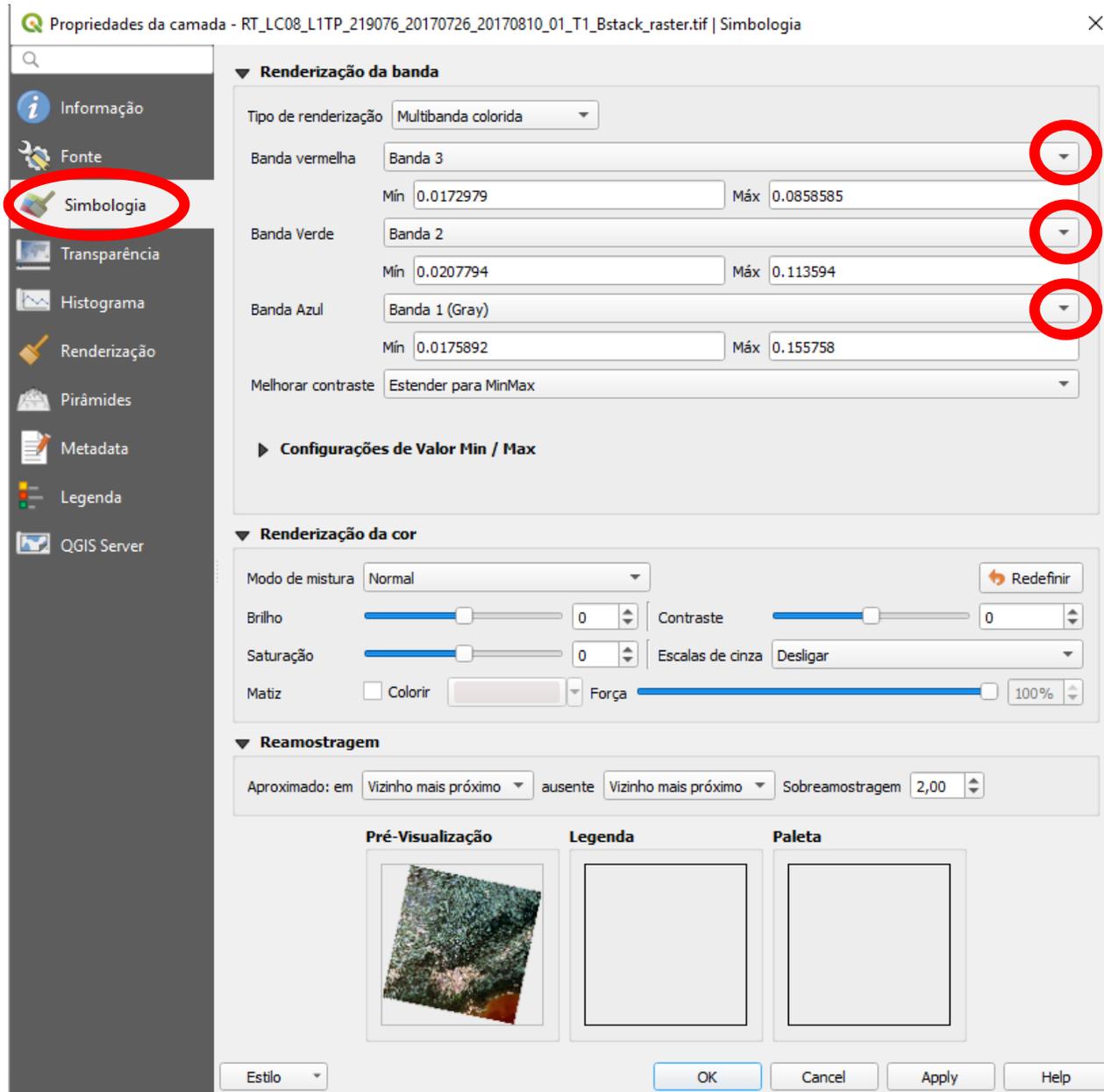
The SCP input panel on the left shows the "Input image" and "Training input" sections. The "Input image" section has a green icon and a red icon. The "Training input" section has a green icon and a yellow icon. The "SCP news" section is empty. The "Classification dock" is also empty.

The Windows taskbar at the bottom shows the system clock at 15:56 on 20/11/2017. The taskbar also shows the Start button, a search bar, and several application icons.

Acessar propriedades da imagem criada

The image shows the QGIS desktop application interface. The main window title is '*Projeto sem titulo - QGIS'. The menu bar includes 'Projeto', 'Editar', 'Exibir', 'Camada', 'Configurações', 'Complementos', 'Vetor', 'Raster', 'Banco de dados', 'Web', 'SCP', 'Processar', and 'Ajuda'. The toolbar contains various icons for navigation and processing. The 'Camadas' (Layers) panel on the left shows a list of layers. The top layer, 'RT_LC08_L1TP_219076_20170726_20170810_01', is selected and highlighted with a red circle. A context menu is open over this layer, with the 'Propriedades...' option at the bottom highlighted by another red circle. The main map area displays a satellite image of a forested area. The 'SCP Dock' at the bottom left shows the 'SCP Version 6.4.0' interface with a 'News' section containing links for plugin releases and services.

Fazendo composições coloridas



Composições sugeridas:

R - 3, G - 2, B - 1 (cores naturais)

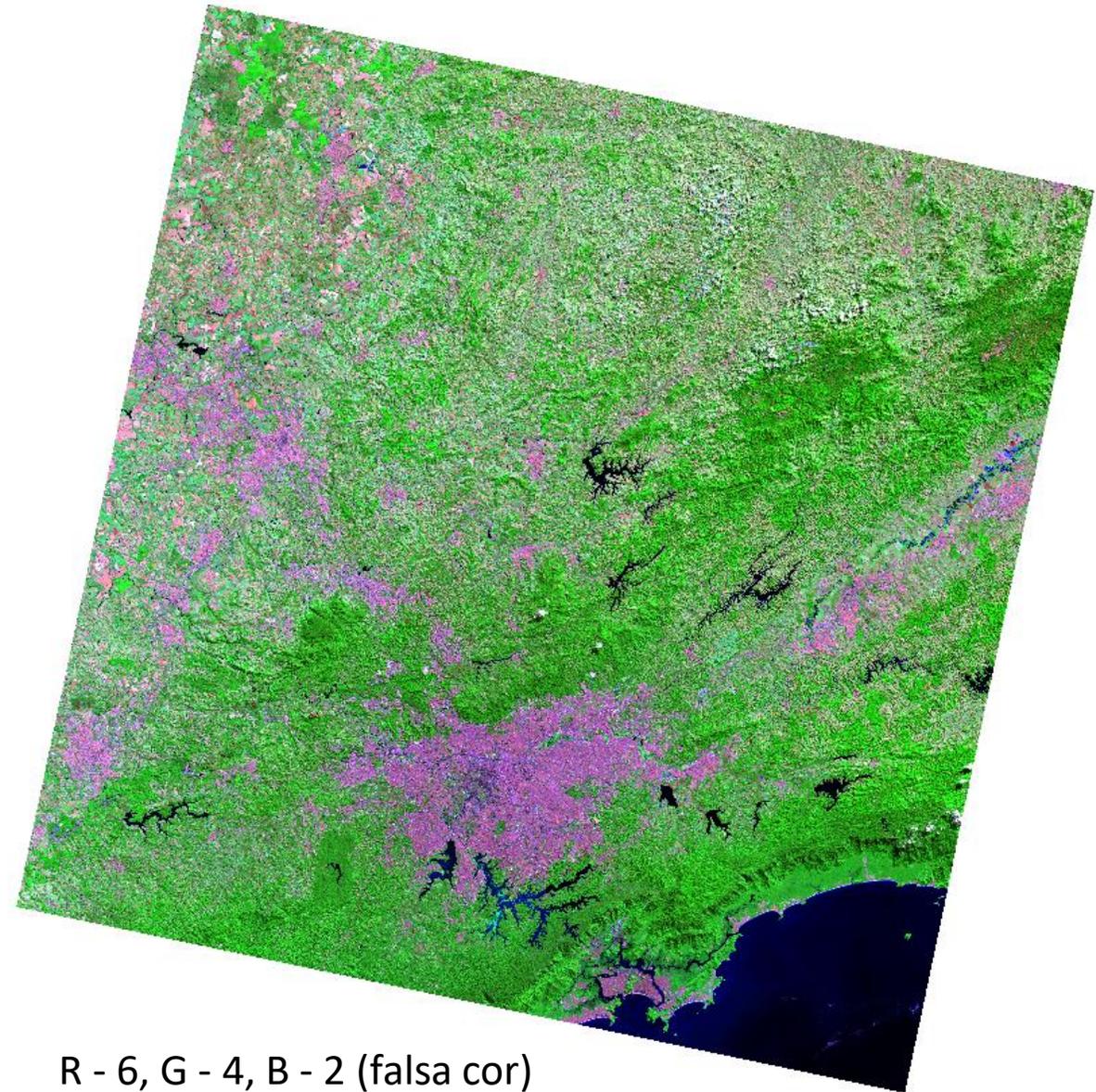
R - 6, G - 4, B - 2 (falsa cor)

Testar outras composições

Resultados das composições propostas

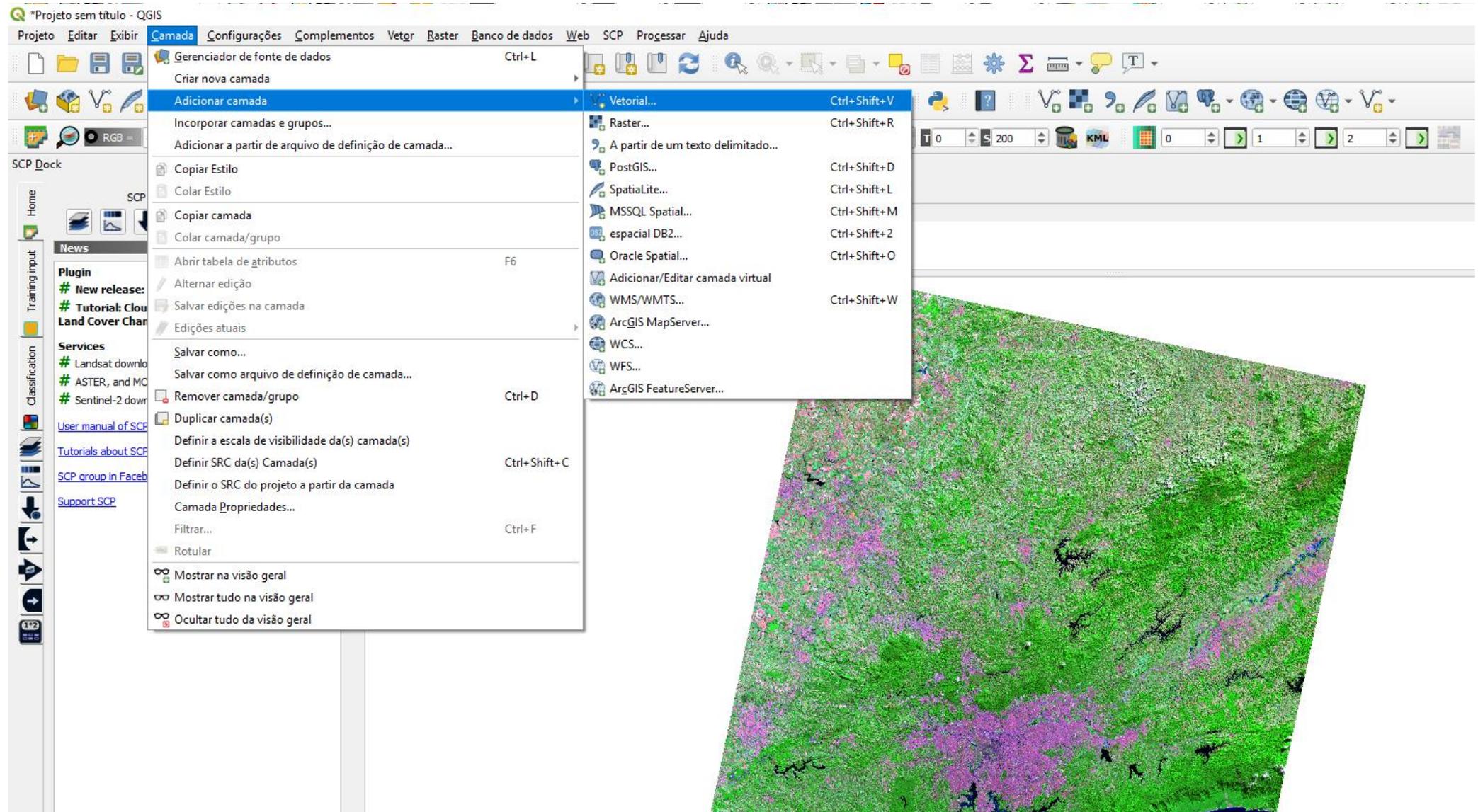


R - 3, G - 2, B - 1 (cores naturais)

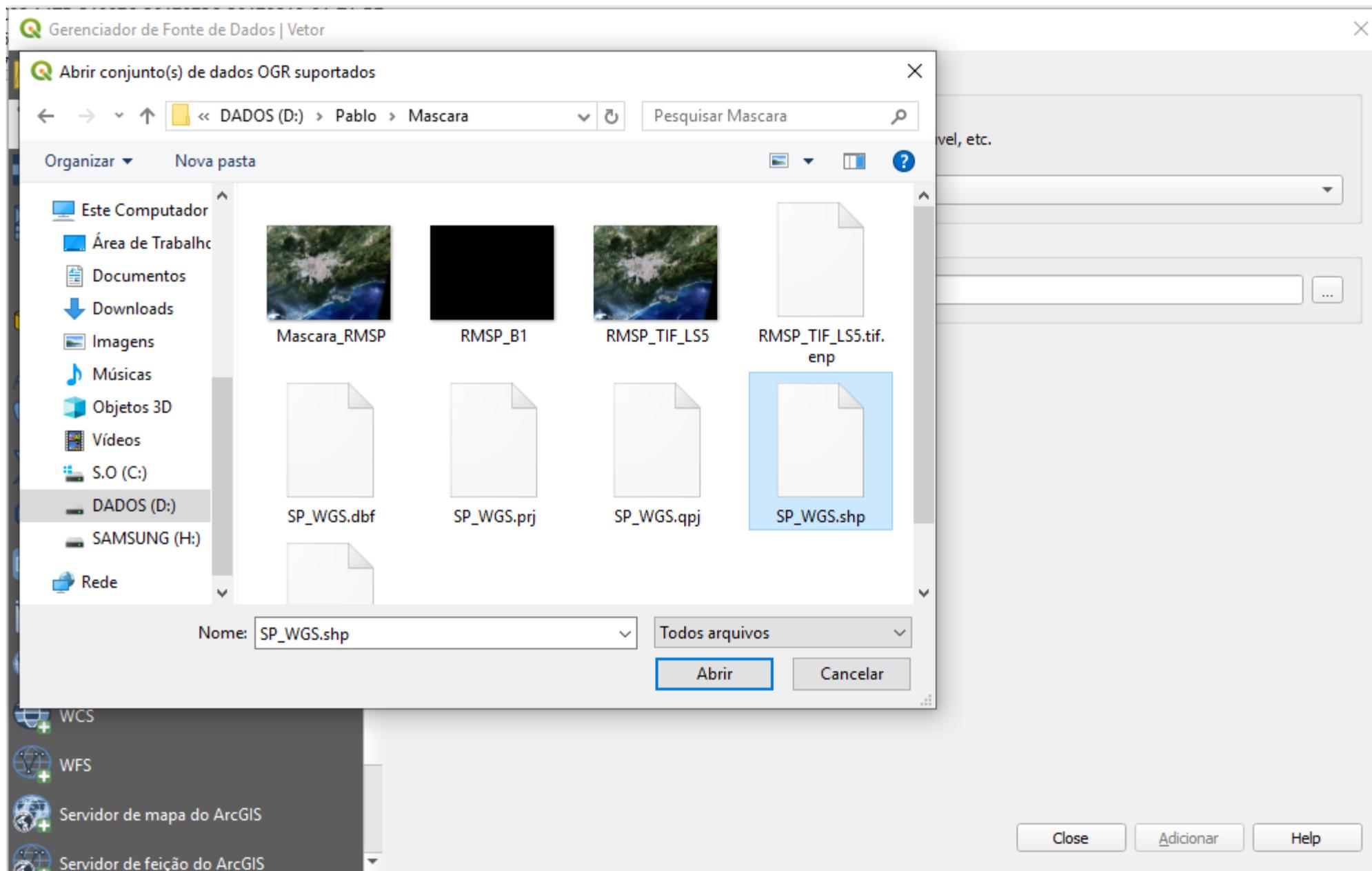


R - 6, G - 4, B - 2 (falsa cor)

Importando limite do Município de São Paulo (máscara vetorial)



Selecionar apenas a extensão “shp”



Ativar o “Preprocessing” e configurar o recorte das bandas

The screenshot displays the Semi-Automatic Classification Plugin (SCP) interface. The left sidebar contains a menu with the following items: Band set, Basic tools, Download products, **Preprocessing** (circled in red), Band processing, Postprocessing, Band calc, Batch, Settings, About, User manual, and Online help. The main workspace shows the 'Clip multiple raster' tool selected in the top toolbar (circled in red). The tool's configuration panel includes the following settings:

- Clip band set:** Select input band set: 1; NoData value: 0; Output name prefix: clip.
- Clip coordinates:** UL X, Y, LR X, Y fields; a 'Show' button with a '+' icon; and a refresh button (circled in red).
- Use vector for clipping (circled in red); a dropdown menu set to 'SP_WGS' (circled in red); and a 'Use vector field for output name' dropdown.
- Use temporary ROI for clipping.

At the bottom right, there is a 'RUN' button with a circular arrow icon.

Criando conjunto de bandas (Band set)

The screenshot displays the QGIS interface with the Semi-Automatic Classification Plugin (SCP) window open. A red circle highlights the 'Band set' icon in the top toolbar, with a red arrow pointing to the plugin window. The plugin window shows the 'Band set' tab with a table for defining bands.

Band name	Center wavelength	Multiplicative Factor	Additive Factor

Below the table, there are options for 'Quick wavelength settings' and 'Wavelength unit' (set to 'band number'). At the bottom, there are checkboxes for 'Create virtual raster of band set', 'Create raster of band set (stack bands)', 'Build band overviews', and 'Band calc expressions', along with a 'RUN' button.

The background shows the QGIS main interface with the 'Camadas' panel on the left and the 'Caixa de Ferramentas de processamento' on the right. The SCP Dock at the bottom left contains a 'News' section with a 'Welcome to the Semi-Automatic Classification Plugin for QGIS Changelog' and a 'Support the SCP' button.

Criar um novo conjunto de bandas somente com as recortadas

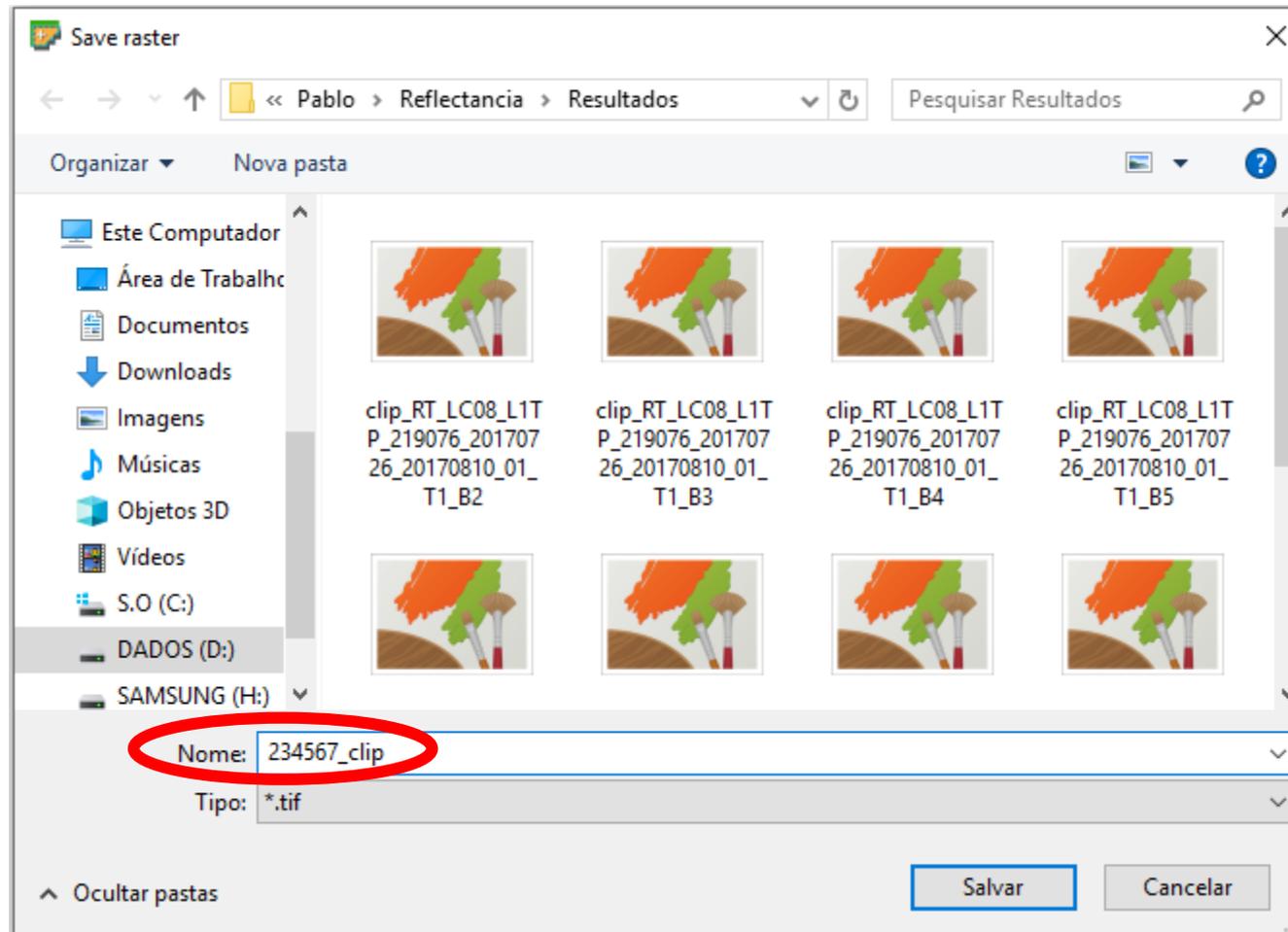
The screenshot displays the Semi-Automatic Classification Plugin (SCP) interface. On the left is a navigation menu with options: Band set, Basic tools, Download products, Preprocessing, Band processing, Postprocessing, Band calc, Batch, Settings, About, User manual, and Online help. The main workspace is divided into several sections:

- Multiband image list:** A dropdown menu and a refresh icon.
- Single band list:** A list of bands with a vertical scrollbar. The first band is circled in red with a '1' and a refresh icon. The second band is circled in red with a '2' and a plus sign icon. A large red arrow points from the plus sign icon to the 'Create raster of band set (stack bands)' checkbox.
- Band set definition:** A tab labeled 'Band set 1' containing a table of band parameters.

	Band name	Center wavelength	Multiplicative Factor	Additive Factor	
1	clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B2	1.0	1	0	ba
2	clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B3	2.0	1	0	ba
3	clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B4	3.0	1	0	ba
4	clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B5	4.0	1	0	ba
5	clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B6	5.0	1	0	ba
6	clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B7	6.0	1	0	ba

Below the table is a 'Quick wavelength settings' dropdown and a 'Wavelength unit' dropdown set to 'band number'. At the bottom, the 'Band set tools' section contains three checkboxes: 'Create virtual raster of band set' (unchecked), 'Create raster of band set (stack bands)' (checked and circled in red), and 'Build band overviews' (unchecked). A 'RUN' button is located at the bottom right.

Criando um conjunto de imagens “empilhadas”



Alterar novamente a composição RGB das bandas para R-6, G-4, B-2



Gerando índice de vegetação do Município - NDVI

Semi-Automatic Classification Plugin

Band list

	Variable	Band name
1	raster1	clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B2
2	raster2	clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B3
3	raster3	clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B4
4	raster4	clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B5
5	raster5	clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B6

Expression

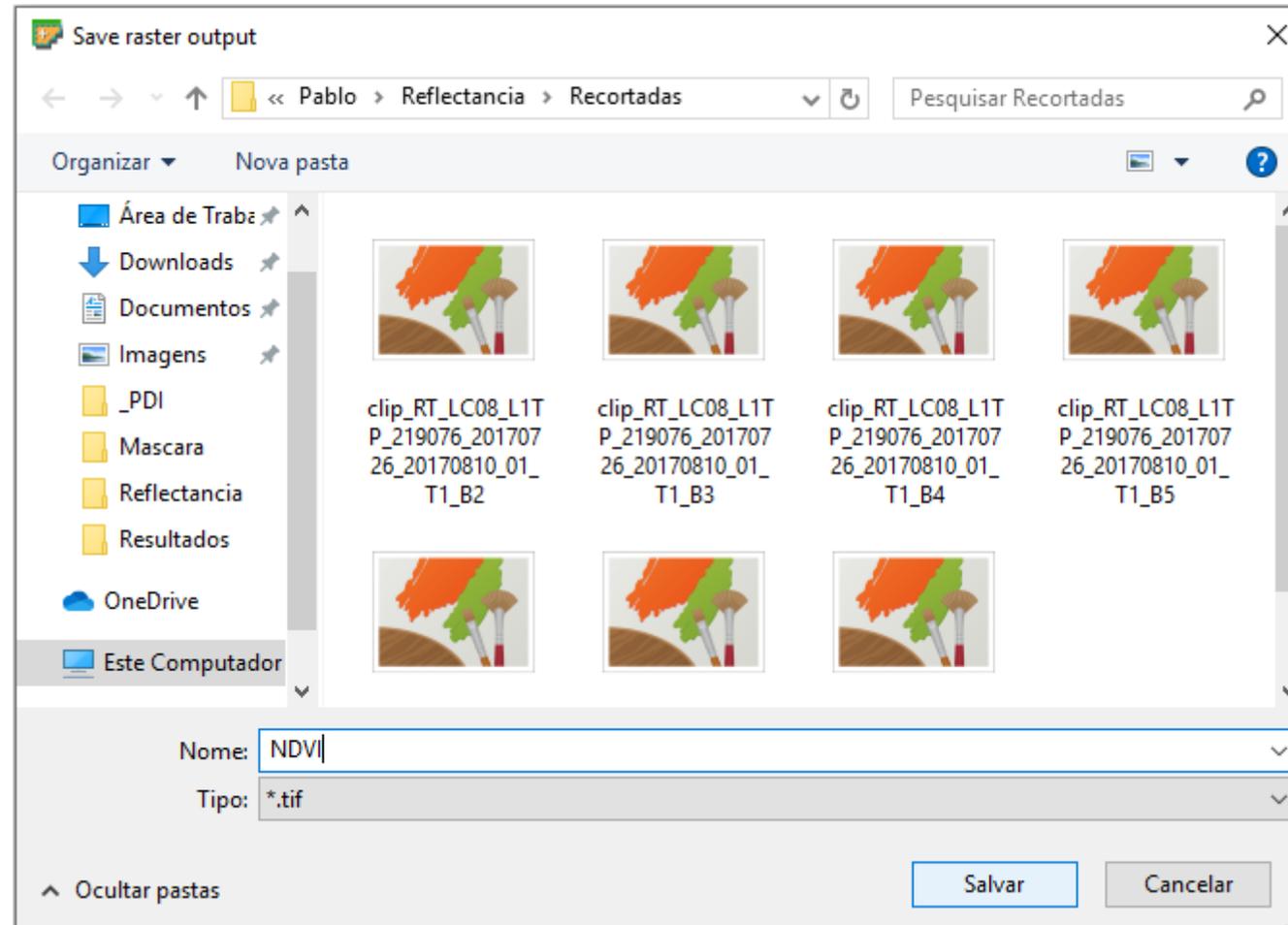
```
("clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B5" - "clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B4") / ("clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B5" + "clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B4")
```

Output raster

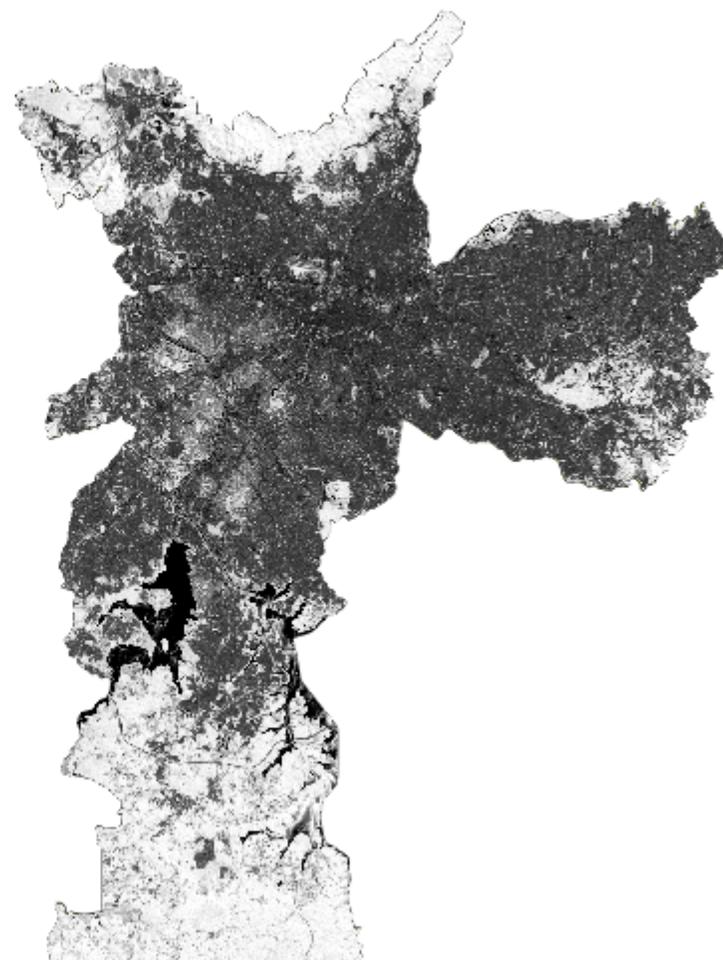
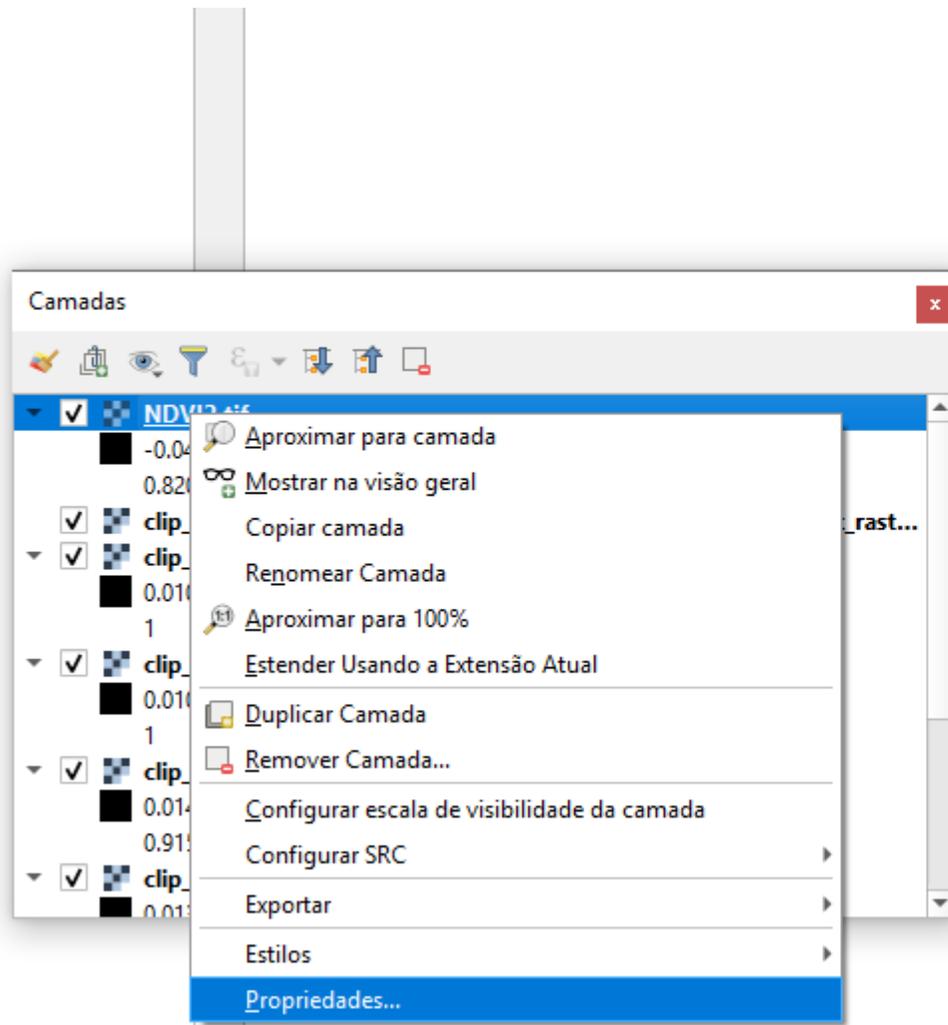
Set NoData value

Extent: Intersection Same as "Map extent" Align **RUN**

Nome de saída do arquivo: “NDVI”



Classificando NDVI em classes de cores



Classificando NDVI em classes de cores

Propriedades da camada - NDVI2.tif | Simbologia

Renderização da banda

Tipo de renderização: Banda simples falsa-cor

Banda: Banda 1 (Gray)

Mín: -0.629863 Máx: 0.877455

Configurações de Valor Min / Max

Interpolar: Linear

Gradiente de cores: [Green to Dark Green Gradient]

Unidade do sufixo do rótulo:

Valor	Cor	Rótulo
-0.62986326...	[Light Green]	-0.629863262176514
-0.25303377...	[Medium-Light Green]	-0.253033772110939
0.123795717...	[Medium Green]	0.123795717954636
0.500625208...	[Dark Green]	0.50062520802021
0.877454698...	[Dark Green]	0.877454698085785

Modo: Contínuo Classes: 5

Classifica [+] [-] [↺] [↻] [📁] [📄]

Recortar fora do intervalo de valores

Renderização da cor

Modo de mistura: Normal [Redefinir]

Brilho: 0 Contraste: 0

Saturação: 0 Escalas de cinza: Desligar

Matiz: [Color] Força: 100%

Estilo [OK] [Cancel] [Apply] [Help]

Gerando imagem de temperatura em graus célsius a partir da banda termal (banda-10)

The screenshot displays the 'Semi-Automatic Classification Plugin' window. The 'Preprocessing' tab is selected in the left sidebar. The main panel shows the 'Landsat conversion to TOA reflectance and brightness temperature' tool. The 'Landsat' button is highlighted. The 'Directory containing Landsat bands' is set to 'D:/Pablo/LANDSAT_8' and the 'Select MTL file' is 'D:/Pablo/LANDSAT_8/LC08_L1TP_219076_20170726_20170810_01_T1_MTL.txt'. The 'Brightness temperature in Celsius' checkbox is checked. The 'Use NoData value' is set to 0. The 'Metadata' section shows 'Satellite: LANDSAT_8', 'Date (YYYY-MM-DD): 2017-07-26', 'Sun elevation: 37.28140602', and 'Earth sun distance: 1.0156179'. A table below shows the processing parameters for band 10:

Band	RADIANCE_MULT	RADIANCE_ADD	REFLECTANCE_M
1 LC08_L1TP_219076_20170726_20170810_01_T1_B10.TIF	3.3420E-04	0.10000	

The 'RUN' button is highlighted at the bottom right.

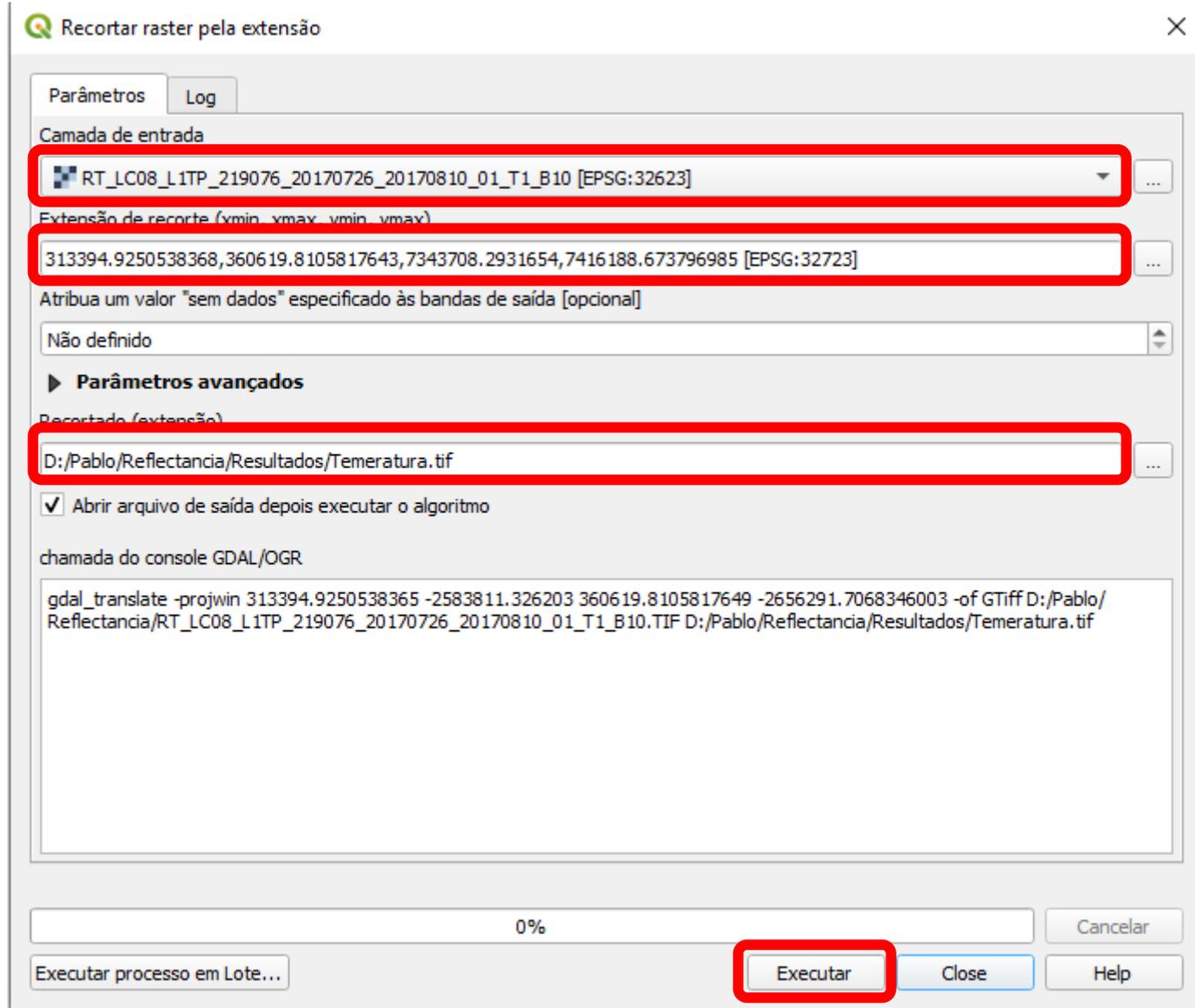
Recortando imagem de temperatura em graus celcius

The image shows the QGIS software interface. The 'Raster' menu is open, and the option 'Recortar raster pela máscara...' is selected. The 'Camadas' (Layers) panel on the left shows a list of layers, with 'Recortado (mascara)' selected. The map area displays a green heatmap representing temperature data over a geographical region.

Camadas (Layers):

- NDVI2.tif
 - 0.629863262176514
 - 0.253033772110939
 - 0.123795717954636
 - 0.50062520802021
 - 0.877454698085785
- Recortado (mascara)**
- clip_RT_LC08_L1TP_219076_20170726_20170810_...
- RT_LC08_L1TP_219076_20170726_20170810_01_T...
 - 10.1289
 - 34.4396
- clip_RT_LC08_L1TP_219076_20170726_20170810_...
- clip_RT_LC08_L1TP_219076_20170726_20170810_...
 - 0.0107924
 - 1
- clip_RT_LC08_L1TP_219076_20170726_20170810_...
 - 0.0103632
 - 1
- clip_RT_LC08_L1TP_219076_20170726_20170810_...
 - 0.0144574
 - 0.915491
- clip_RT_LC08_L1TP_219076_20170726_20170810_...
 - 0.0130707
 - 0.836741
- clip_RT_LC08_L1TP_219076_20170726_20170810_...
 - 0.0145894
 - 0.733639
- clip_RT_LC08_L1TP_219076_20170726_20170810_...
 - 0.0187829
 - 0.640321
- SP_WGS

Recortando imagem de temperatura em graus celcius



Classificando em classes de cores a imagem de temperatura em graus celcius

Propriedades da camada - Recortado (mascara) | Simbologia

Renderização da banda

Tipo de renderização: Banda simples falsa-cor

Banda: Banda 1 (Gray)

Min: 15.742 Máx: 27.2817

Configurações de Valor Min / Max

Interpolar: Linear

Gradiente de cores: [Color gradient bar]

Unidade do sufixo do rótulo: [Empty field]

Valor	Cor	Rótulo
15.74203491...	[Blue square]	15.7420349121094
18.62694549...	[Green square]	18.6269454956055
21.51185607...	[Yellow square]	21.5118560791016
24.39676666...	[Orange square]	24.3967666625977
27.28167724...	[Red square]	27.2816772460938

Modo: Contínuo Classes: 5

Classifica [Add] [Remove] [Refresh] [Folder] [Save]

Recortar fora do intervalo de valores

Renderização da cor

Modo de mistura: Normal [Redefinir]

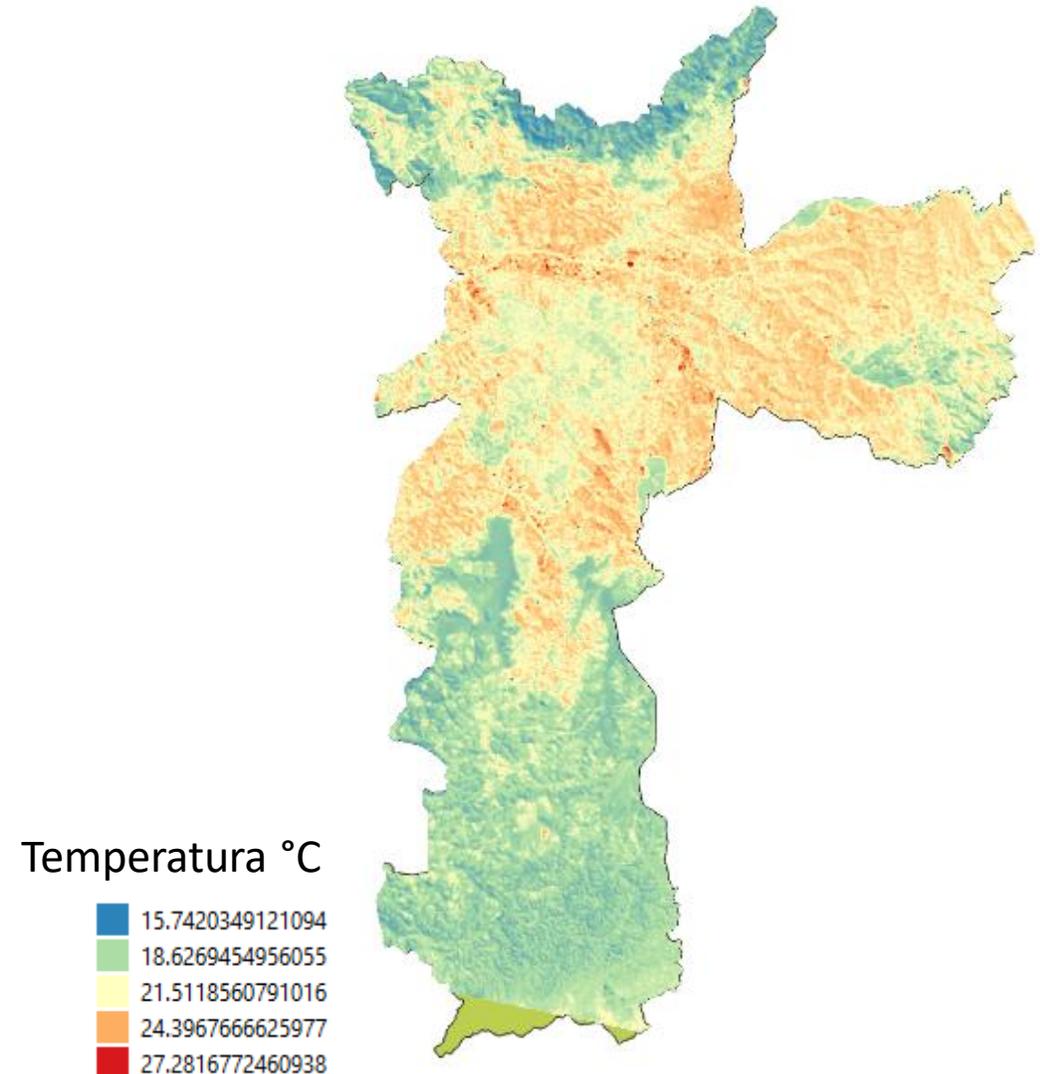
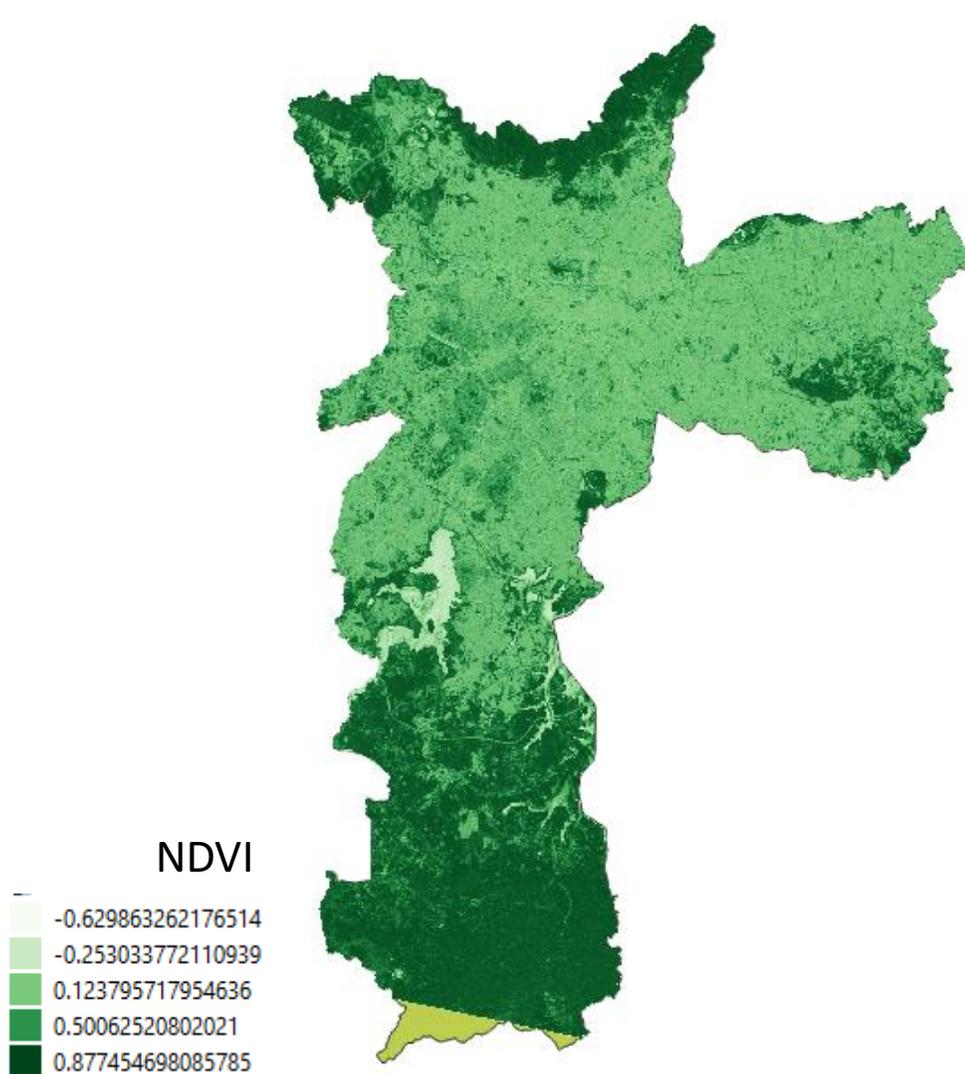
Brilho: [Slider] 0 Contraste: [Slider] 0

Saturação: [Slider] 0 Escalas de cinza: Desligar

Matiz: Colorir [Slider] Força: [Slider] 100%

Estilo [Dropdown] [OK] [Cancel] [Apply] [Help]

Comparar resultados da relação entre a distribuição da vegetação e da variação da temperatura de superfície no Município



Verificar se no “Band set 1” só temos as imagens “clip_RT” relativas as bandas 2, 3, 4, 5, 6 e 7

Semi-Automatic Classification Plugin

Band set

Basic tools

Download products

Preprocessing

Band processing

Postprocessing

Band calc

Batch

Settings

About

User manual

Online help

Support the SCP

Multiband image list

Single band list

- clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B3
- clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B4
- clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B5
- clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B6
- clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B7

Band set definition

Band set 1 X

	Band name	Center wavelength	Multiplicative Factor	Additive Factor	
1	clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B2	1.0	1	0	ba
2	clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B3	2.0	1	0	ba
3	clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B4	3.0	1	0	ba
4	clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B5	4.0	1	0	ba
5	clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B6	5.0	1	0	ba
6	clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B7	6.0	1	0	ba

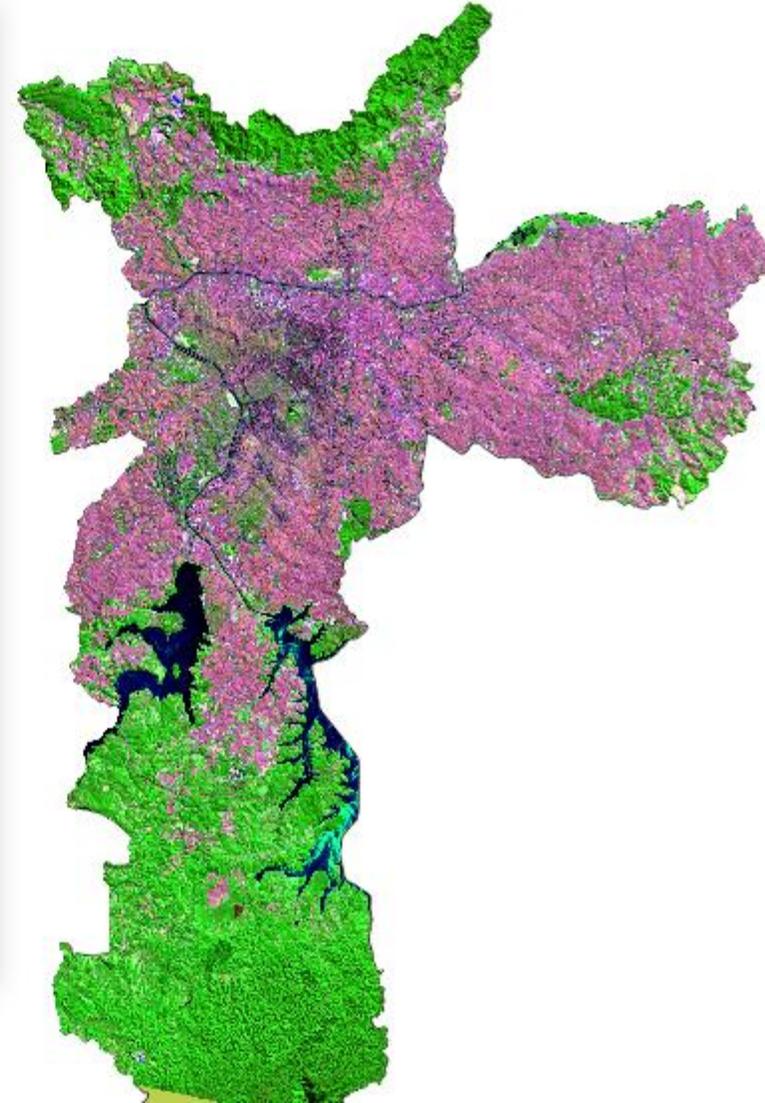
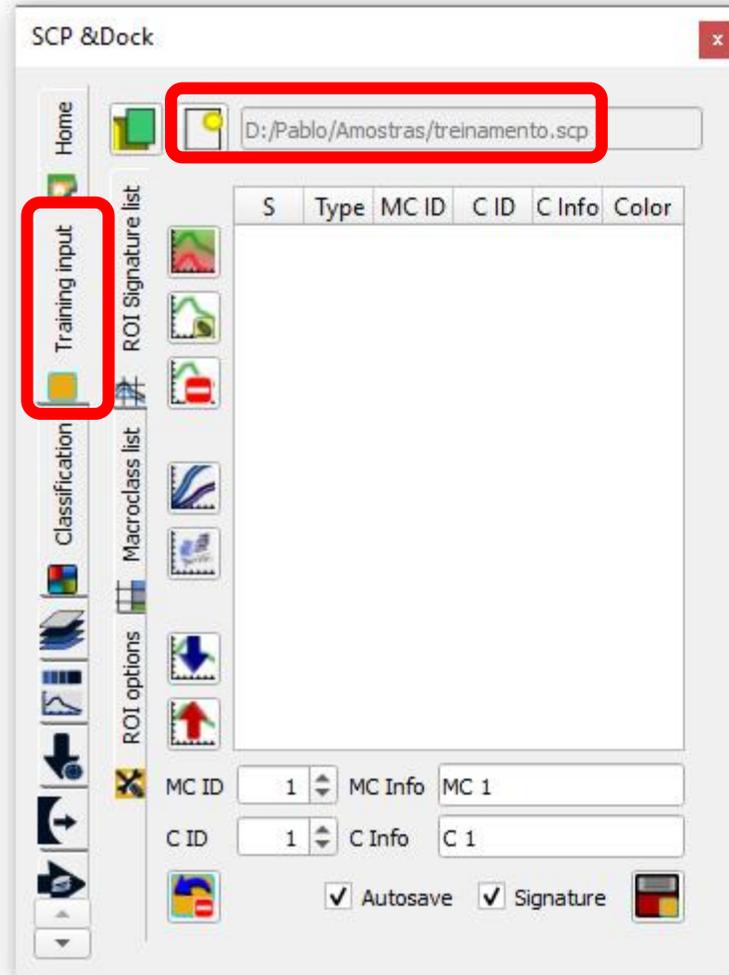
Quick wavelength settings Wavelength unit

Band set tools

Create virtual raster of band set Create raster of band set (stack bands) Build band overviews Band calc expressions

RUN

Em “SCP &DOC” vamos à aba “Training input” e criamos um arquivo de amostras de treinamento numa nova pasta



Coletando Amostras para Classificação

The screenshot displays the QGIS interface for a project titled '*Projeto sem título - QGIS'. The main window shows a satellite image of a forest with a red ROI (Region of Interest) box. The 'SCP Dock' is open, showing the 'ROI Signature list' table and the 'Macroclass list'.

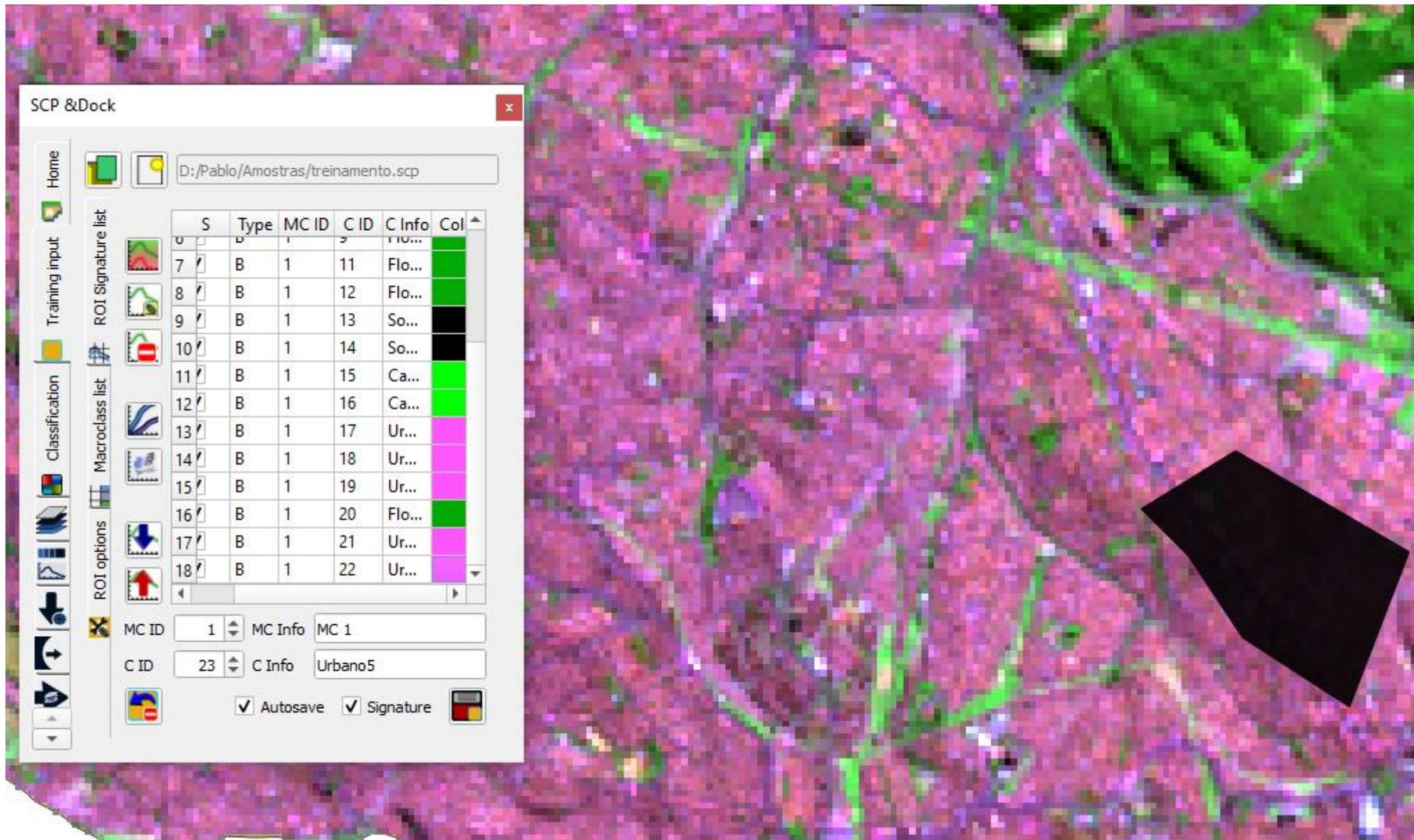
S	Type	MC ID	C ID	Inf	Colo
1	✓	B	1	3	Flo...

Below the table, the 'MC ID' is set to 1, 'MC Info' to MC 1, 'C ID' to 4, and 'C Info' to Floresta 1. The 'Autosave' and 'Signature' checkboxes are checked. A color selection icon is also visible.

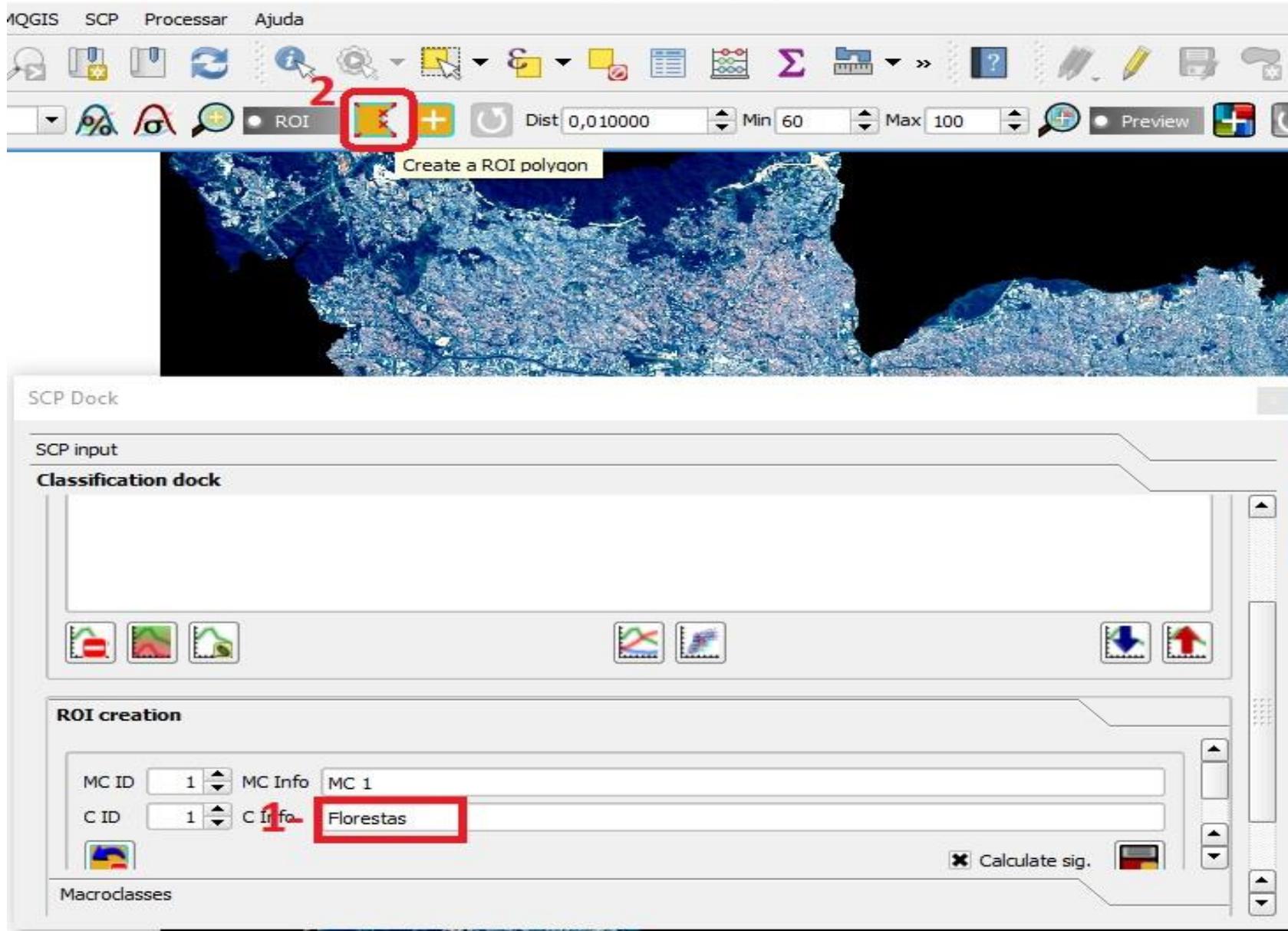
The 'Camadas' panel at the bottom shows the following layers:

- class 234567
- 234567_clip.tif
- clip_RT_LC08_L1TP_219076_20170726_2017081...
- 0.0107924
- 1
- clip_RT_LC08_L1TP_219076_20170726_2017081...
- 0.0103632
- 1

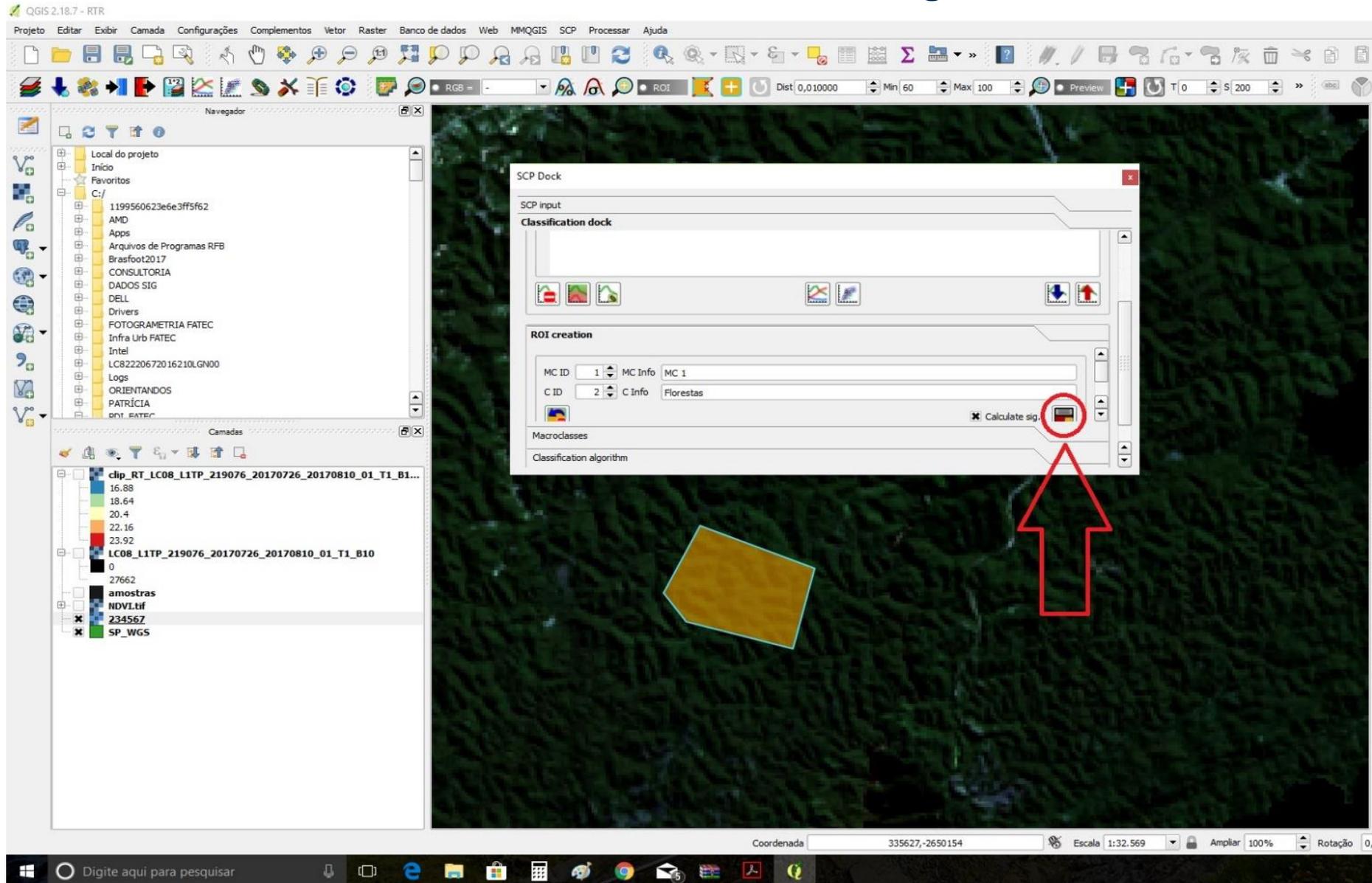
Coletar ao menos 5 amostras para cada uma das classes (Água, Floresta, Campo, Urbano e Sombra)



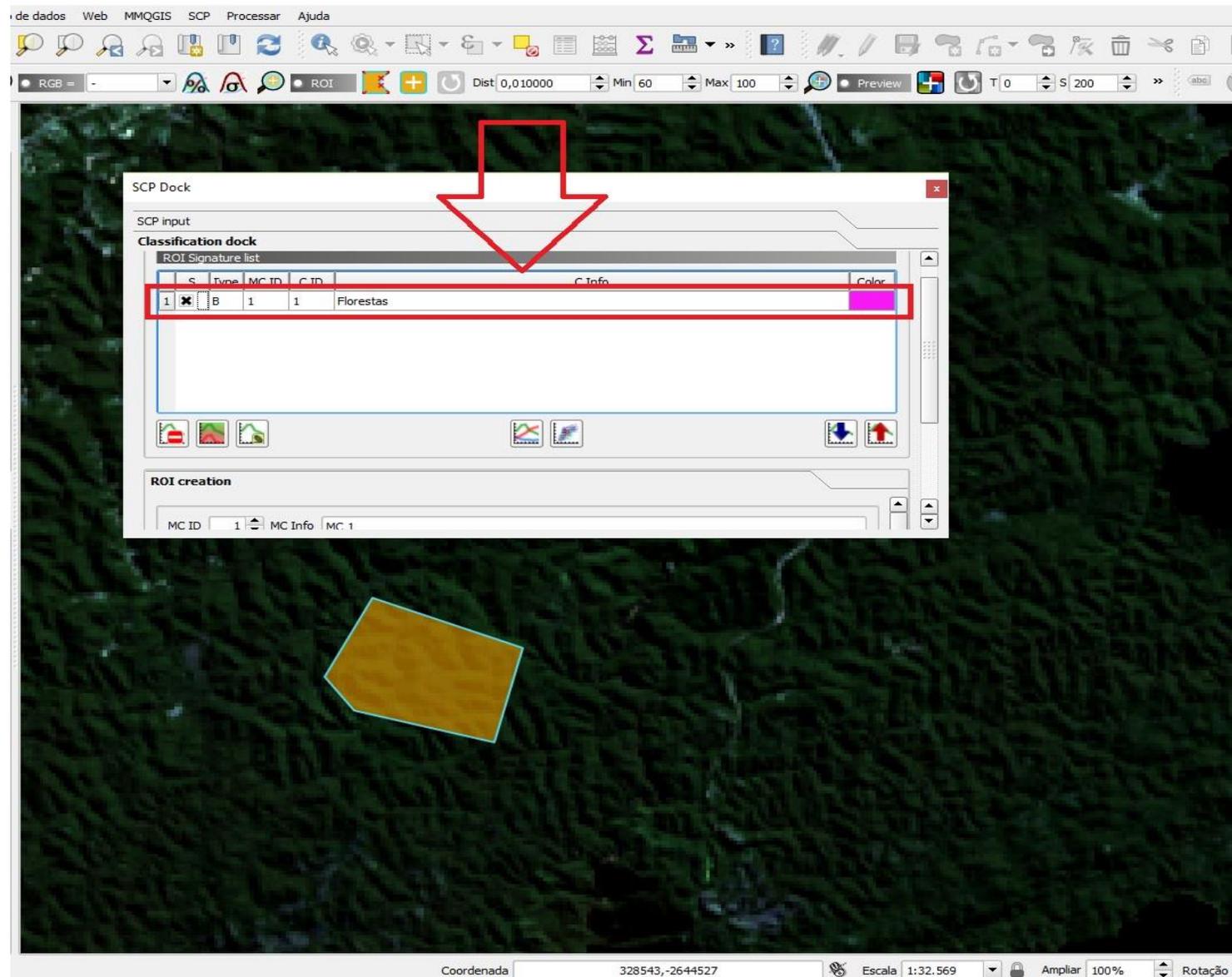
Digitar nome “Florestas” em “C Info” (1) e clicar no ícone de “Create a ROI polygon” (2)



Dar um zoom até uma área de Floresta e fazer um polígono usando o botão esquerdo do mouse para inserir os vértices e usar o botão direito para fechar o polígono - Depois clicar no ícone de salvar a amostra conforme ilustrado na figura.



Automaticamente já se cria uma linha correspondente ao polígono salvo (amostra de Floresta) dentro do “Classification dock”



Fazer pelo menos quatro amostras diferentes para cada categoria de uso e cobertura do solo identificado na imagem

The screenshot displays the QGIS 2.18.7 interface. The main window shows a satellite image of a forested area. A brown polygon is drawn on the image, representing a Region of Interest (ROI). The SCP Dock dialog box is open, showing the 'Classification dock' and 'ROI creation' sections.

SCP Dock

SCP input

Classification dock

S	Type	MC ID	C ID	C Info	Color
1	B	1	1	Florestas	
2	B	1	2	Florestas	

ROI creation

MC ID: 1 MC Info: MC 1
C ID: 3 C Info: Florestas

Calculate sig.

Coordenada: 332378,-2633251 Escala: 1:16.284 Ampliar: 100% Rotação: 0,0

Amostras para Água

The screenshot displays the QGIS 2.18.7 interface with the SCP Dock and ROI creation tool open over a satellite image. The SCP Dock is configured with the following data:

SCP Input						
Classification dock						
4	X	B	1	4	Florestas	Green
5	X	B	1	5	Urbano	Light Green
6	X	B	1	6	Urbano	Light Blue
7	X	B	1	7	Urbano	Light Blue
8	X	B	1	8	Urbano	Light Blue

The ROI creation tool is configured with the following parameters:

- MC ID: 1, MC Info: MC 1
- C ID: 9, C Info: Agua
- Calculate sig. checkbox: checked

The ROI creation tool also includes sections for Macroclasses, Classification algorithm, and Classification output.

The main map area shows a satellite image with a yellow diamond-shaped ROI (Region of Interest) overlaid on a dark area, likely representing water. The interface includes a Project Panel on the left, a Layers Panel at the bottom left, and a Status Bar at the bottom right showing coordinates (318810, -2608606), scale (1:65.138), and zoom level (100%).

Amostras para Áreas Urbanas

QGIS 2.18.7 - RTR

Projeto Editar Exibir Camada Configurações Complementos Vetor Raster Banco de dados Web MMQGIS SCP Processar Ajuda

Dist 0,010000 Min 60 Max 100 Preview T 0 S 200

Navegador

- Local do projeto
- Início
- Favoritos
- C:/
- 1199560623e6e3ff5f62
- AMD
- Apps
- Arquivos de Programas RFB
- Brasfoot2017
- CONSULTORIA
- DADOS SIG
- DELL
- Drivers
- FOTOGRAMETRIA FATEC
- Infra Urb FATEC
- Intel
- LC82220672016210LGN00
- Logs
- ORIENTANDOS
- PATRICIA
- PDI_FATEC

Camadas

- clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B1...
- 16.88
- 18.64
- 20.4
- 22.16
- 23.92
- LC08_L1TP_219076_20170726_20170810_01_T1_B10
- 0
- 27662
- amostras
- NDVI.tif
- 234567
- SP_WGS

SCP Dock

SCP input

Classification dock

S	Type	MC ID	C ID	C Info	Color
1	B	1	1	Florestas	Purple
2	B	1	2	Florestas	Pink
3	B	1	3	Florestas	Light Green
4	B	1	4	Florestas	Green
5	B	1	5	Urbano	Yellow

ROI creation

MC ID 1 MC Info MC 1

C ID 6 C Info Urbano

Calculate sig.

Coordenada 330797,-2603935 Escala 1:32.569 Ampliar 100% Rotação 0,1

Amostras para Campos

The screenshot displays the QGIS 2.18.7 interface with the SCP Dock dialog box open. The background is a satellite image of a forest with a yellow ROI polygon. The SCP Dock dialog is titled "SCP Dock" and contains the following sections:

- SCP input**
- Classification dock**: A table with 4 rows and 5 columns. The first column contains values 9, 10, 11, and 12. The second column has a checked checkbox and the letter 'B'. The third column has the value '1'. The fourth column has values 9, 10, 11, and 12. The fifth column has the text 'Agua'. To the right of the table is a vertical color bar with four colored segments: pink, blue, orange, and green.
- ROI creation**: Fields for MC ID (1), MC Info (MC 1), C ID (18), and C Info (Campo). There is a checked checkbox for "Calculate sig." and a color selection icon.
- Macroclasses**: A section with a label and a dropdown menu.
- Classification algorithm**: A section with a label and a dropdown menu.
- Classification output**: A section with a label and a dropdown menu.

The QGIS interface also shows a Project Navigator on the left with a tree view of folders and files, and a Layers panel at the bottom left showing a legend for the current layer with values 16.88, 18.64, 20.4, 22.16, 23.92, 0, 27662, and labels for "amostras", "NDVI.tif", "234567", and "SP_WGS". The status bar at the bottom indicates coordinates (322511, -2644407), scale (1:32.569), zoom (100%), and rotation (0,0).

Amostras para solos expostos

The screenshot displays the QGIS 2.18.7 interface with the SCP Dock dialog box open. The dialog is used for creating a Region of Interest (ROI) for soil classification. It features a classification table and fields for ROI creation.

SCP Dock

SCP input

Classification dock

3	<input checked="" type="checkbox"/>	B	1	3	Florestas
4	<input checked="" type="checkbox"/>	B	1	4	Florestas
5	<input checked="" type="checkbox"/>	B	1	5	Urbano
6	<input checked="" type="checkbox"/>	B	1	6	Urbano

ROI creation

MC ID: 1 MC Info: MC 1
C ID: 20 C Info: Solo Exposto

Calculate sig.

Save temporary ROI to training input

Camadas

- clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1_B1...
- LC08_L1TP_219076_20170726_20170810_01_T1_B10
- amostras
 - NDVI.tif
 - 234567
 - SP_WGS

Coordenada: 338636,-2590467 Escala: 1:16.284 Ampliar: 100% Rotação: 0,0

Padronizar as cores das amostras para cada tipo de categoria com duplo clique sobre as caixas de cores uma a uma, conforme ilustrado na figura

SCP Dock

SCP input

Classification dock

ROI Signature list

	S	Type	MC ID	C ID	C Info	Color
3	✘	B	1	3	Florestas	Green
4	✘	B	1	4	Florestas	Green
5	✘	B	1	5	Urbano	Pink
6	✘	B	1	6	Urbano	Pink
7	✘	B	1	7	Urbano	Pink
8	✘	B	1	8	Urbano	Pink

ROI creation

MC ID: 1 MC Info: MC 1

C ID: 23 C Info: Solo Exposto

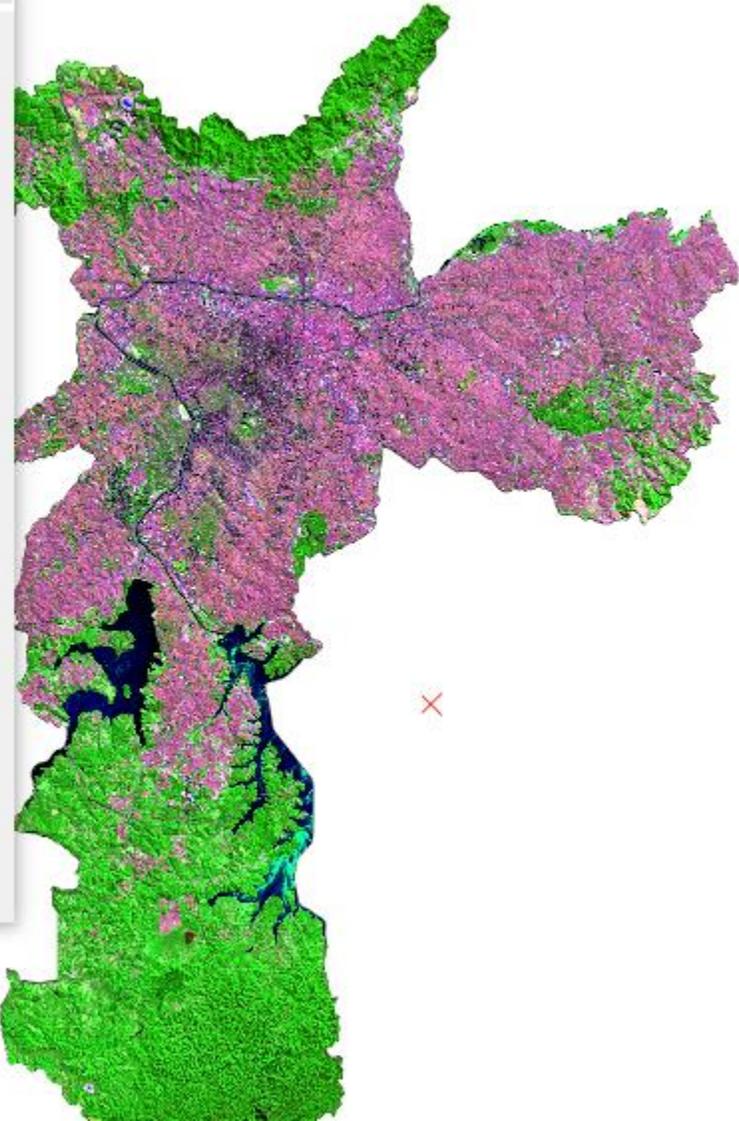
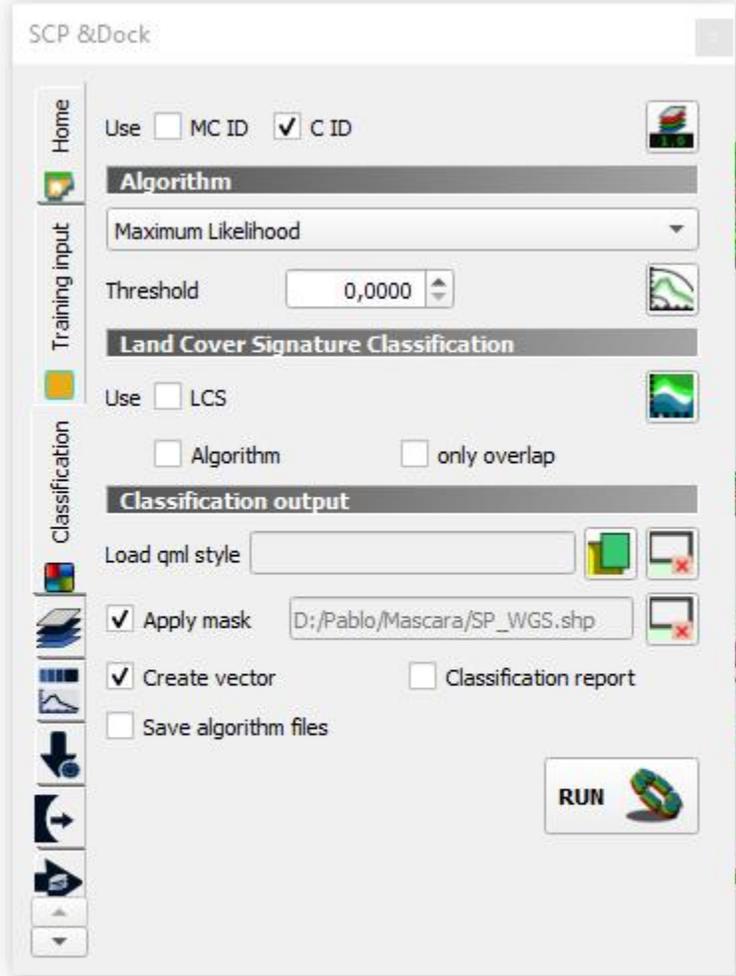
Calculate sig.

2 Macroadclasses

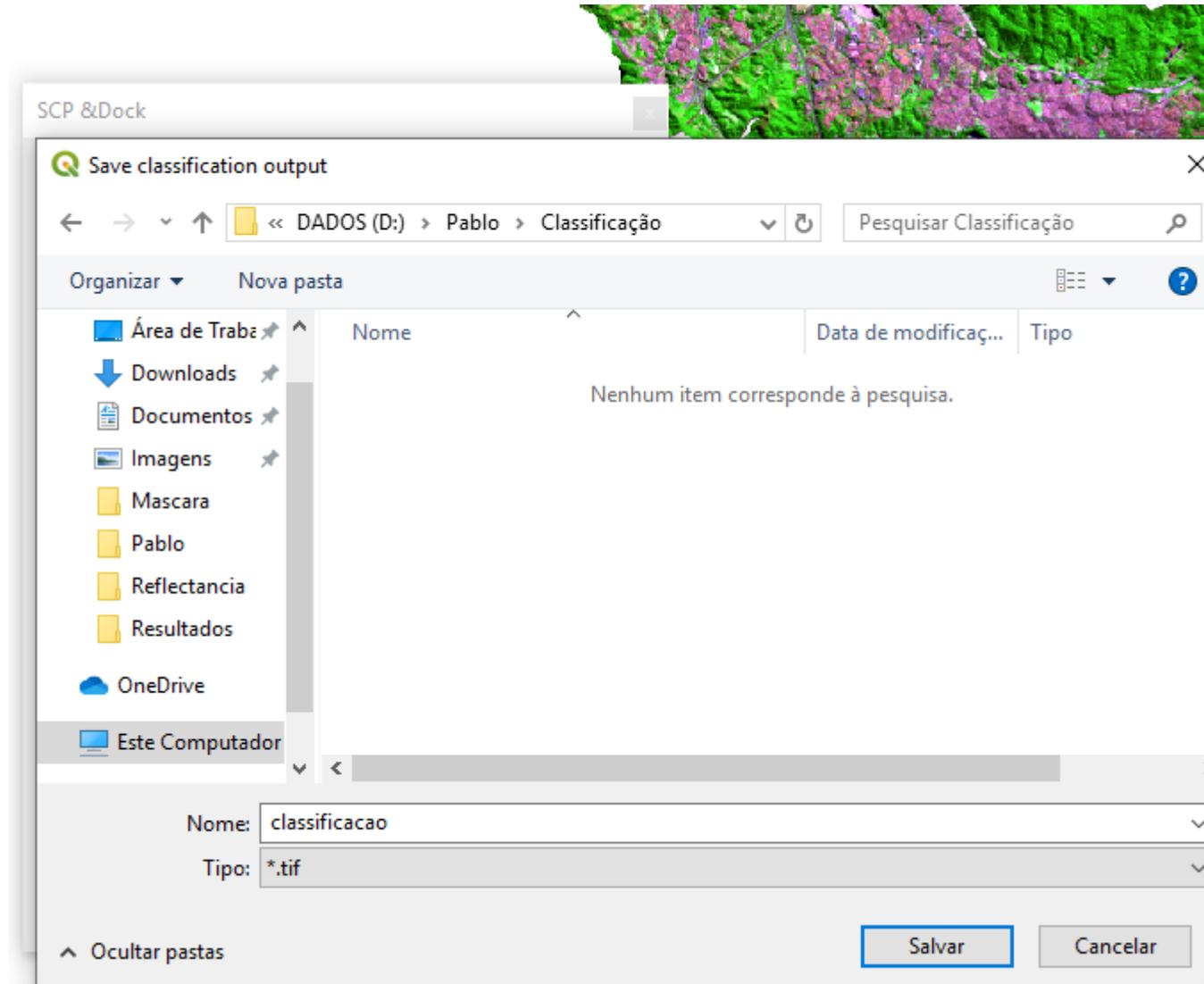
Classification algorithm

Classification output

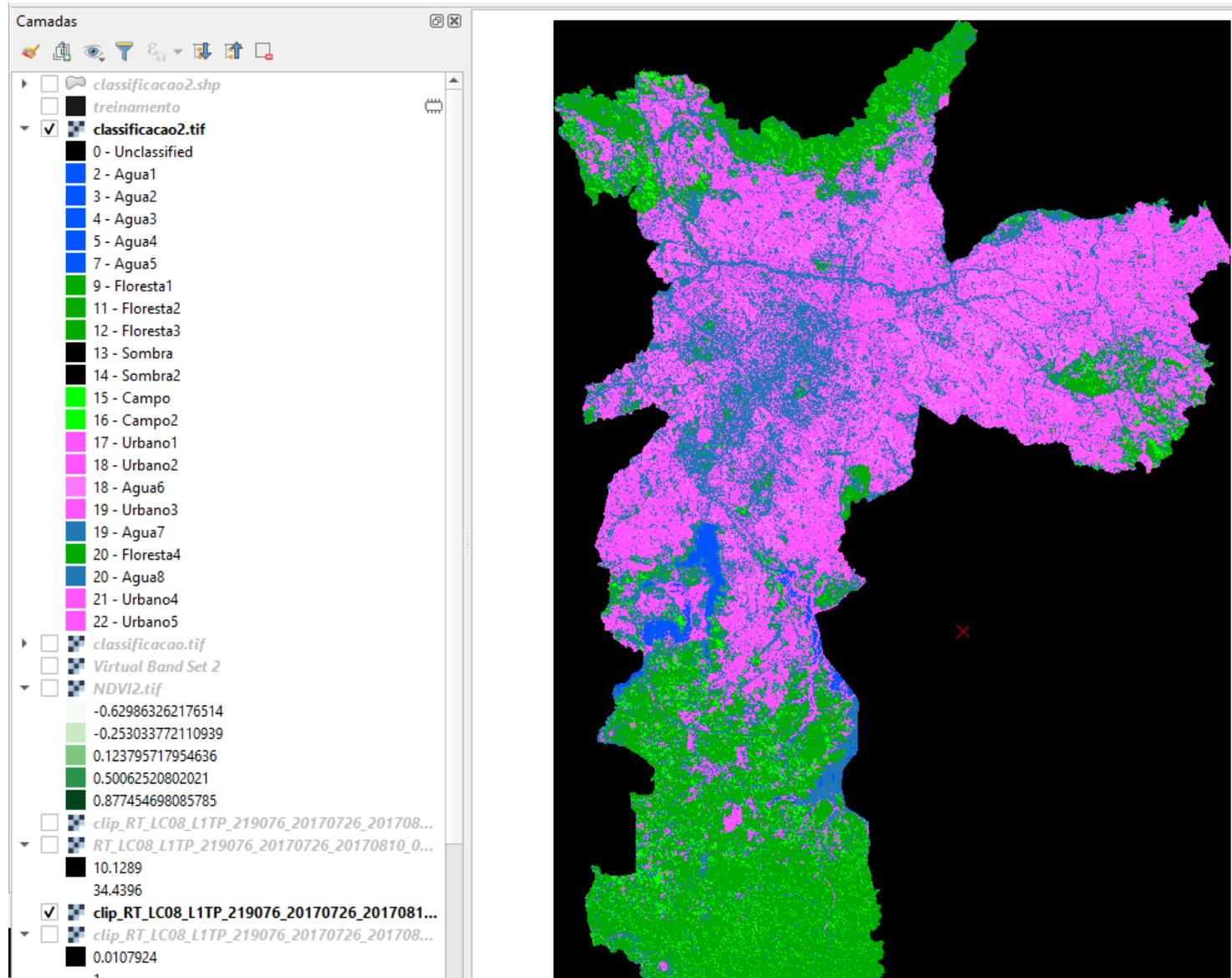
Coletadas as amostras vamos à aba “Classification”, selecionamos a Algoritmo, habilitamos as opções “Apply mask” e “Create vector” e rodamos a classificação em “run”



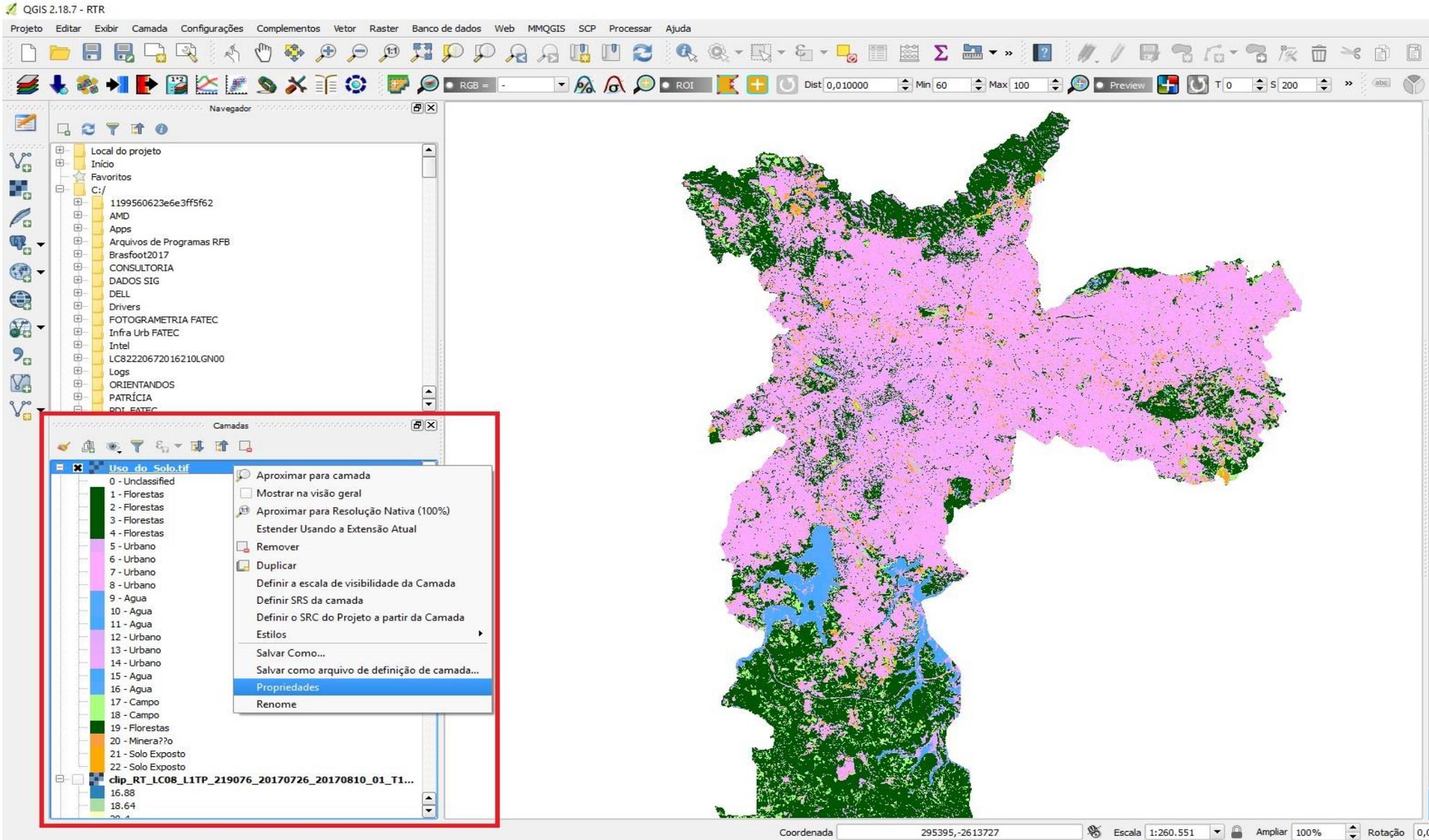
Atribuimos um nome e local de saída do arquivo referente a classificação



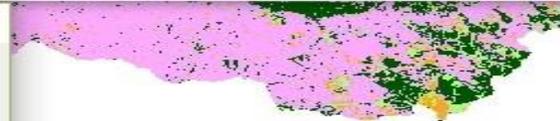
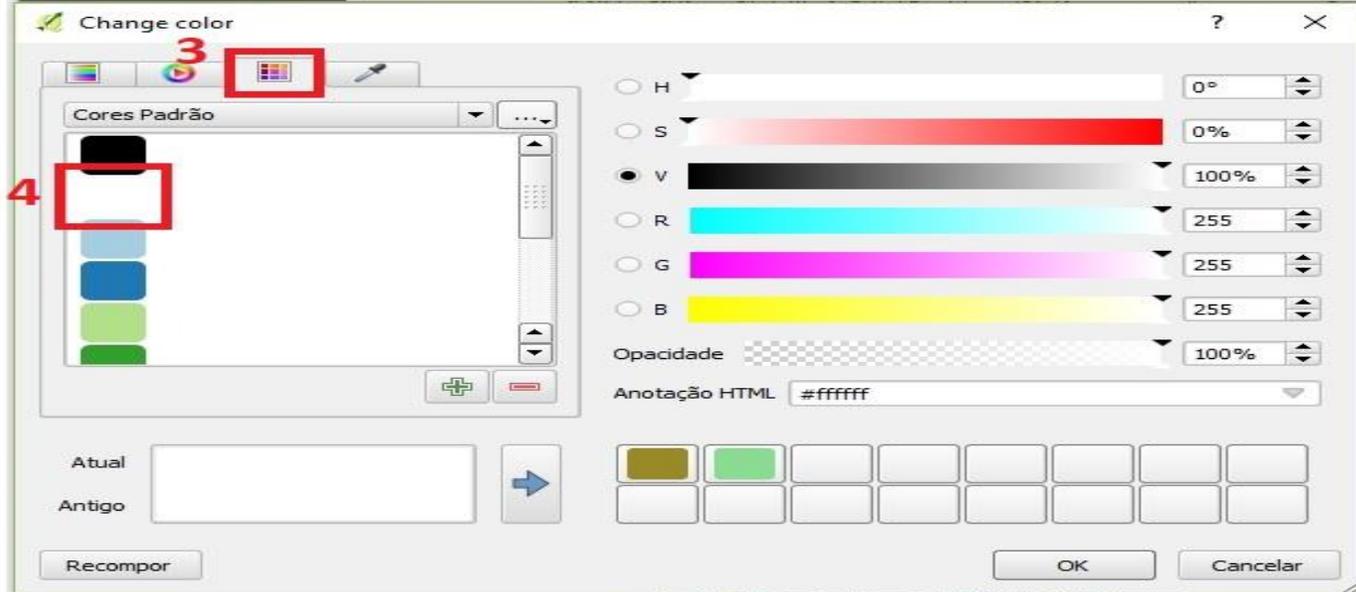
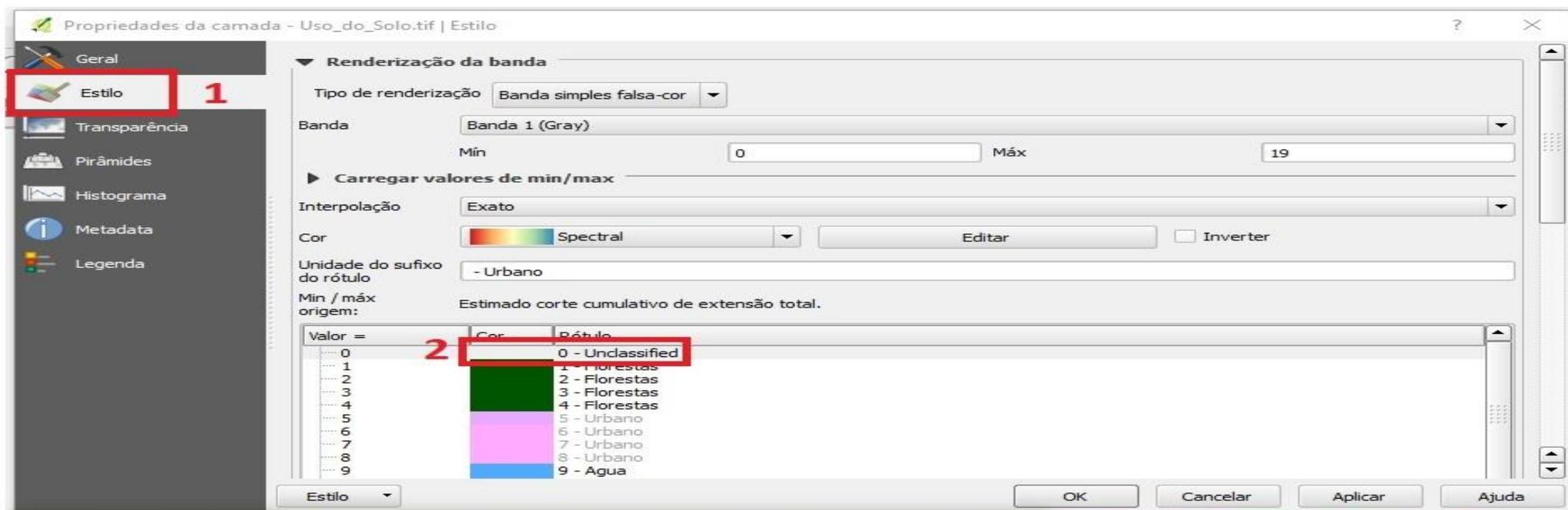
Após rezar (rs), temos a nossa classificação de uso e cobertura do solo!!!



Para alterar cor de fundo (geralmente escura) clicamos com o botão direito sobre o nome do arquivo em “Camadas” e depois em “Propriedades”



Em “Estilo” (1) pode se alterar a cor da área não classificada em preto dando um duplo clique na cor correspondente a ele (2) e em seguida selecionando a opção Padrão (3) e a cor branca (4)



Salvar Projeto final com o nome "Uso do Solo"!!!

The screenshot shows the QGIS 2.18.7 interface. The 'Projeto' menu is open, and the 'Salvar como...' option is highlighted with a red box. The map displays a land use classification with various colors representing different categories. The legend on the left lists the following categories:

- 12 - Urbano
- 13 - Urbano
- 14 - Urbano
- 15 - Agua
- 16 - Agua
- 17 - Campo
- 18 - Campo
- 19 - Florestas
- 20 - Minera??o
- 21 - Solo Exposto
- 22 - Solo Exposto

The legend also shows several other layers, including 'clip_RT_LC08_L1TP_219076_20170726_20170810_01_T1...', 'LC08_L1TP_219076_20170726_20170810_01_T1_B10', and 'amostras'. The 'Uso do Solo' layer is checked and highlighted in blue.

The status bar at the bottom shows the coordinates '309313, -2598389' and the scale 'Escala 1:250'.