Sentinel2Analyzer

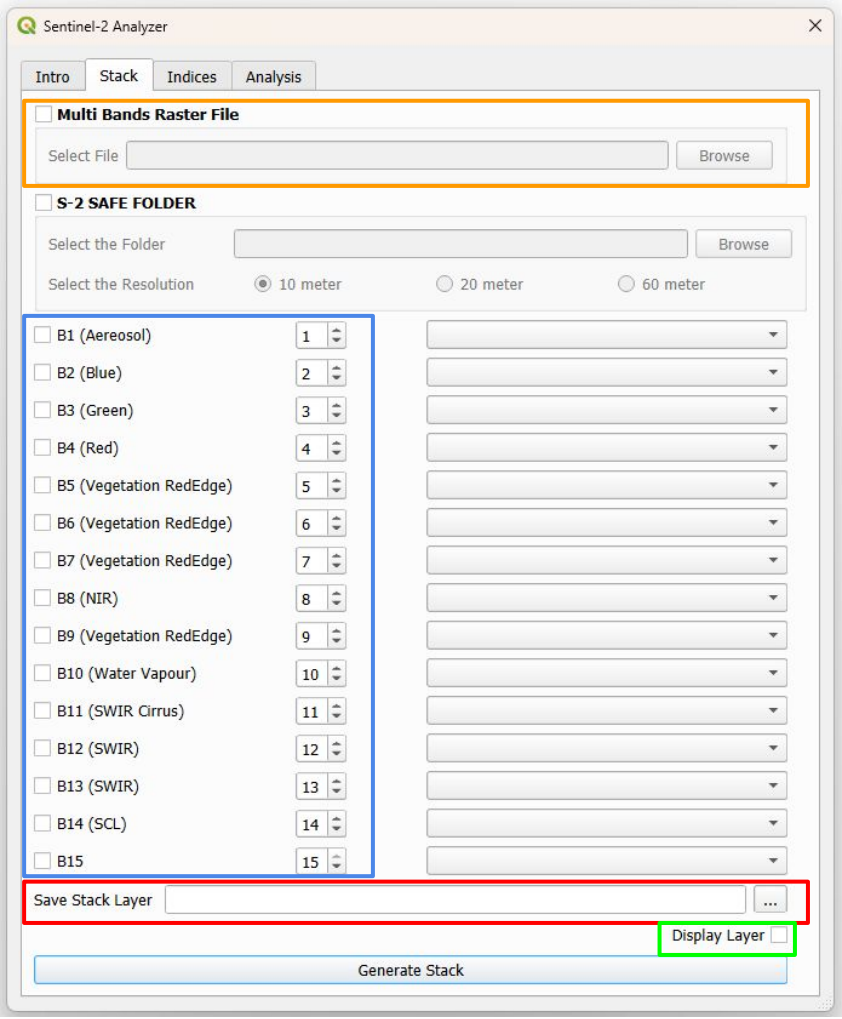
Short Guide

Introduction

Sentinel-2 Analyzer is a QGIS plugin designed to help you efficiently explore and analyze Sentinel-2 satellite imagery.

It offers an intuitive, step-by-step workflow that guides users from raw data preparation to advanced analysis — all within the QGIS environment, without requiring any coding.

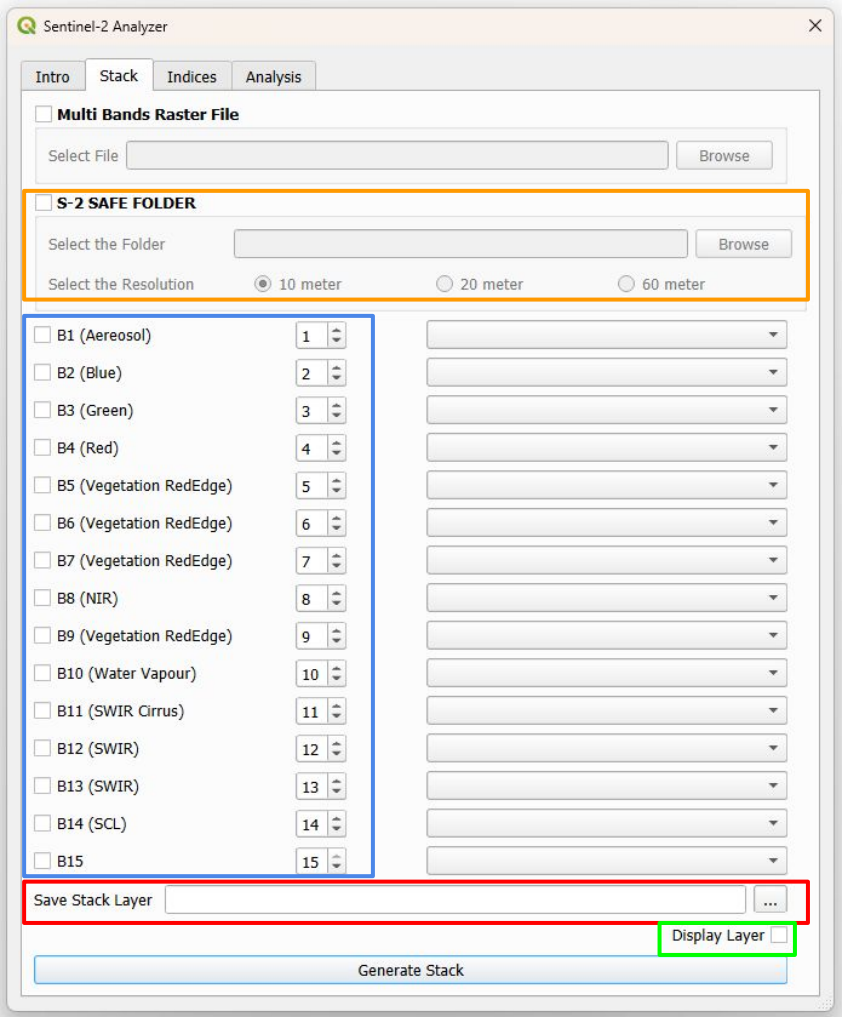
STACK TAB



STACK TAB *1/3*

- supported format for raster .tif & .jp2
- User can generate a sub-stack from a multi bands raster file:
  - Insert the input raster path (orange box)
  - Specify the band to preserve in the new stack (blue box)
  - Specify the output path of the new stack ** (red box)
  - Automatically upload new raster in QGIS Layer Panel (green box)
  - Press “Generate Stack” button

** It is necessary to specify which band to consider and the position of the band in the new file. Therefore the position of the desired band must be in a range from 1 to n (how many bands are selected) (1,2,3…,n)
User can save bands as he desires (R-G-B-NIR , B-G-R-NIR, …)

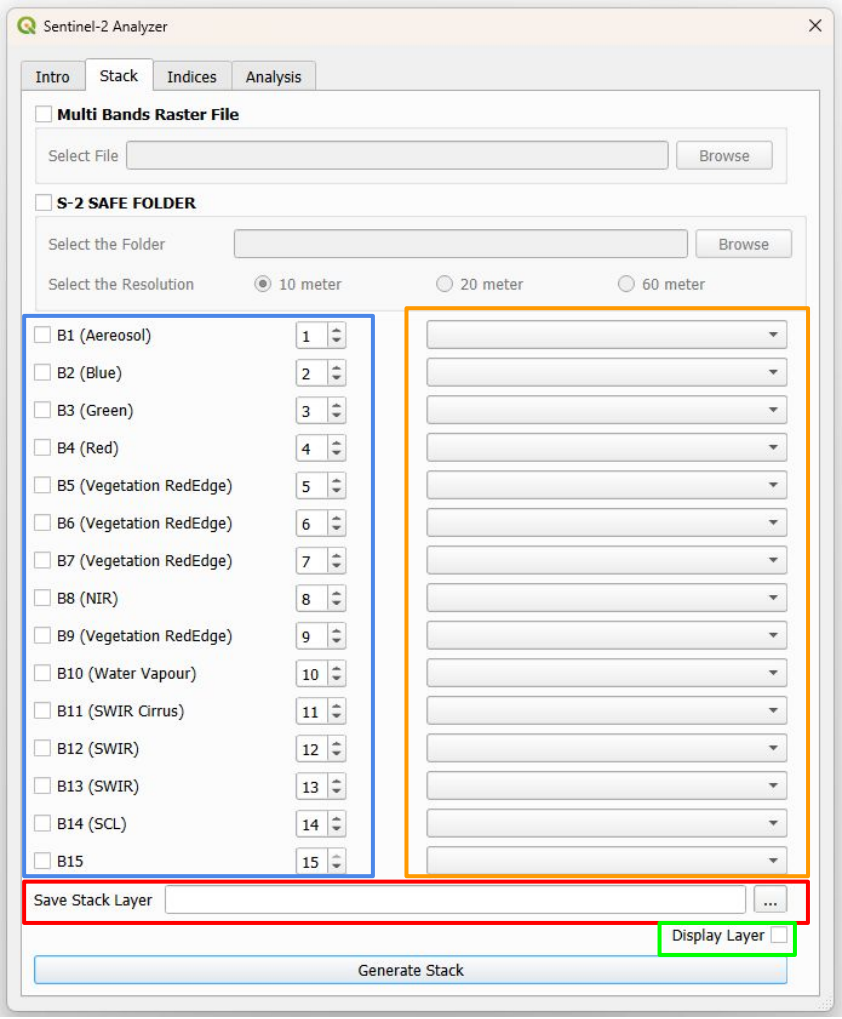


STACK TAB *2/3*

- supported format for raster .tif & .jp2
- User can generate a stack directly from SAFE folder downloaded from Copernicus EO Browser:
  - Insert the SAFE folder path (orange box)
  - Specify the desired resolution* (orange box)
  - Specify the band to have in the stack ** (blue box)
  - Specify the output path of the stack (red box)
  - Automatically upload new raster in QGIS Layer Panel (green box)
  - Press “Generate Stack” button

* Downsampling (from high to low resolution): mean of pixels
  Upsampling (from low to high resolution): Nearest Neighbour

** It is necessary to specify which band to consider and the position of the band in the new file. Therefore the position of the desired band must be in a range from 1 to n (how many bands are selected) (1,2,3…,n)
User can save bands as he desires (R-G-B-NIR , B-G-R-NIR, …)



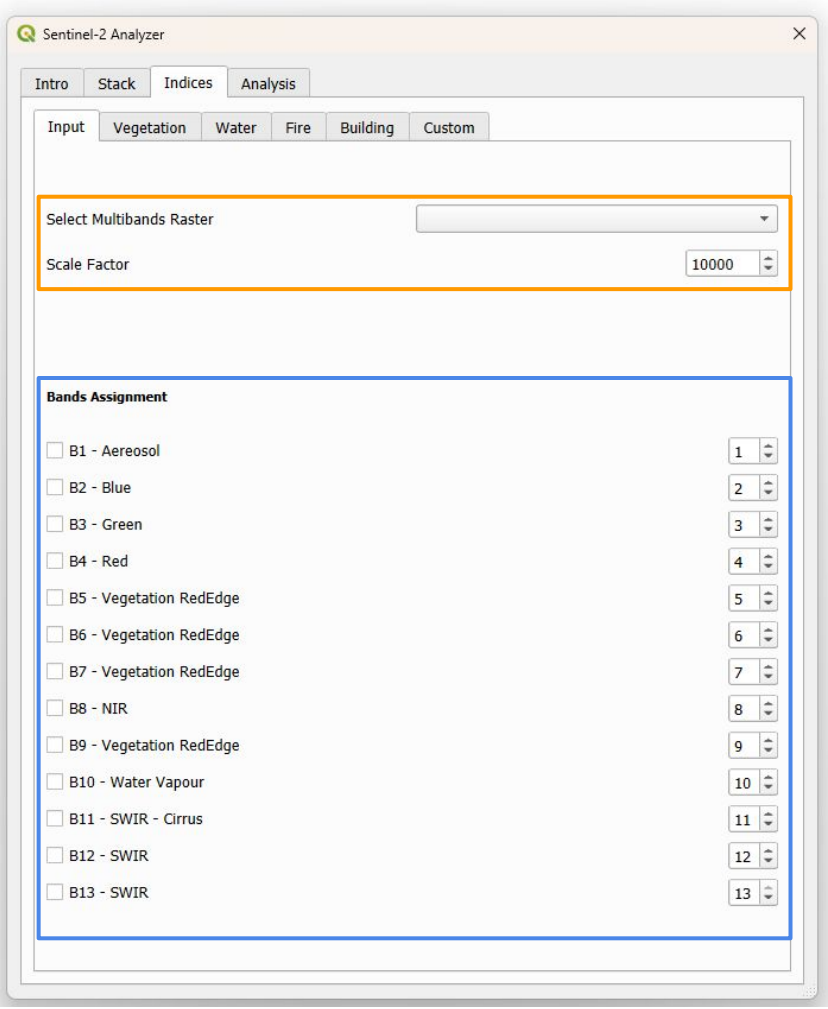
STACK TAB *3/3*

- supported format for raster .tif & .jp2
- User can generate a stack directly from single layer already upload in the QGIS Layer Panel:
  - Specify the layer according to the band* (orange box)
  - Specify the band to have in the stack ** (blue box)
  - Specify the output path of the stack (red box)
  - Automatically upload new raster in QGIS Layer Panel (green box)
  - Press “Generate Stack” button

* Layer must have the same resolution, crs, extension, …

** It is necessary to specify which band to consider and the position of the band in the new file. Therefore the position of the desired band must be in a range from 1 to n (how many bands are selected) (1,2,3…,n)
User can save bands as he desires (R-G-B-NIR , B-G-R-NIR, …)

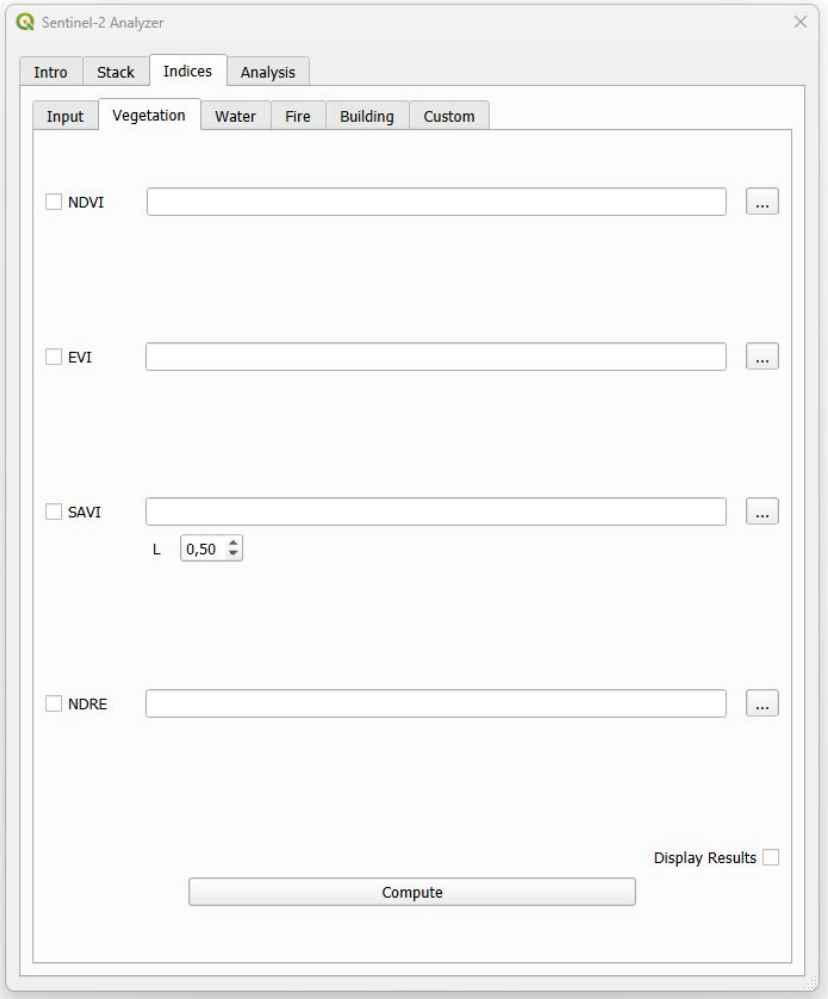
INDICES TAB



INDICES TAB: *Input*

- supported format for raster .tif & .jp2
- User has to declare the structure of the raster file before computing indices:
  - Specify the layer, already upload in the QGIS Layer Panel, to consider (orange box)
  - Specify the Scale Factor* (orange box)
  - Declare which bands are present in the considered layer and their position (blue box)

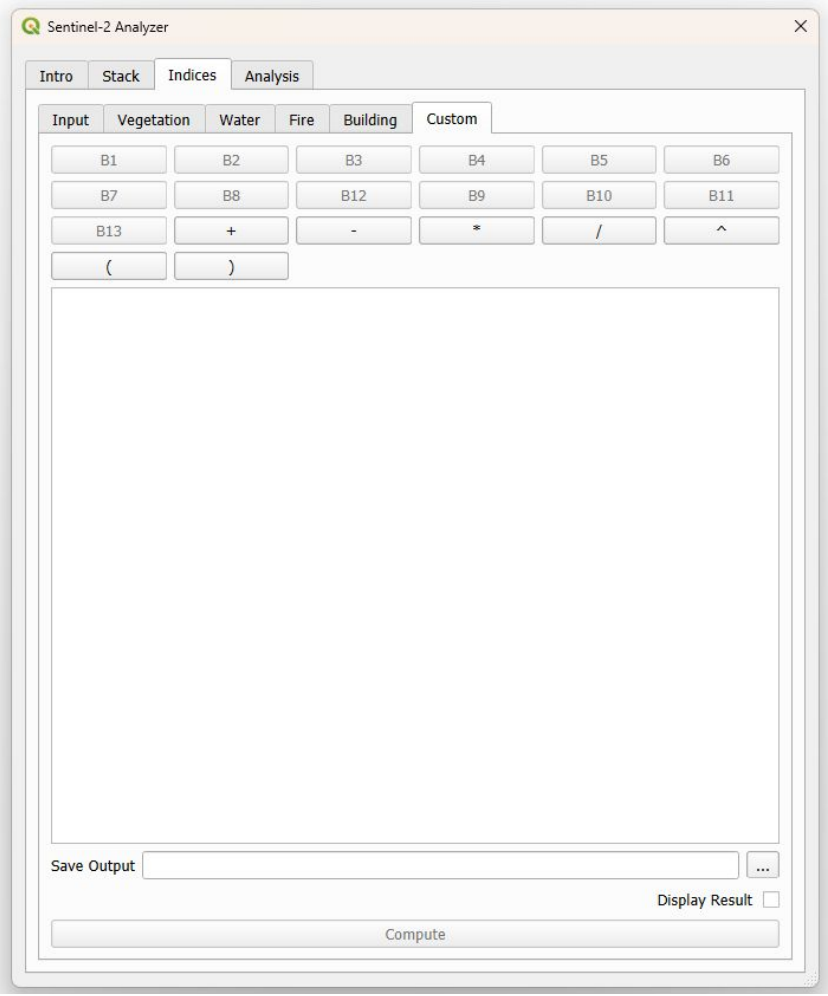
* Default for S-2 L2A images is 10000



INDICES TAB:
Vegetation/Water/Fire/Building

- supported format for raster .tif & .jp2
- User can compute some vegetation/water/fire/building indices provided by default*:
  - Specify which index wants to compute
  - Specify the output path of the raster
  - Automatically upload new raster in QGIS Layer Panel
  - Press “Compute” button

*It is mandatory to Declare the Input in the previous Tab: Indices-Input

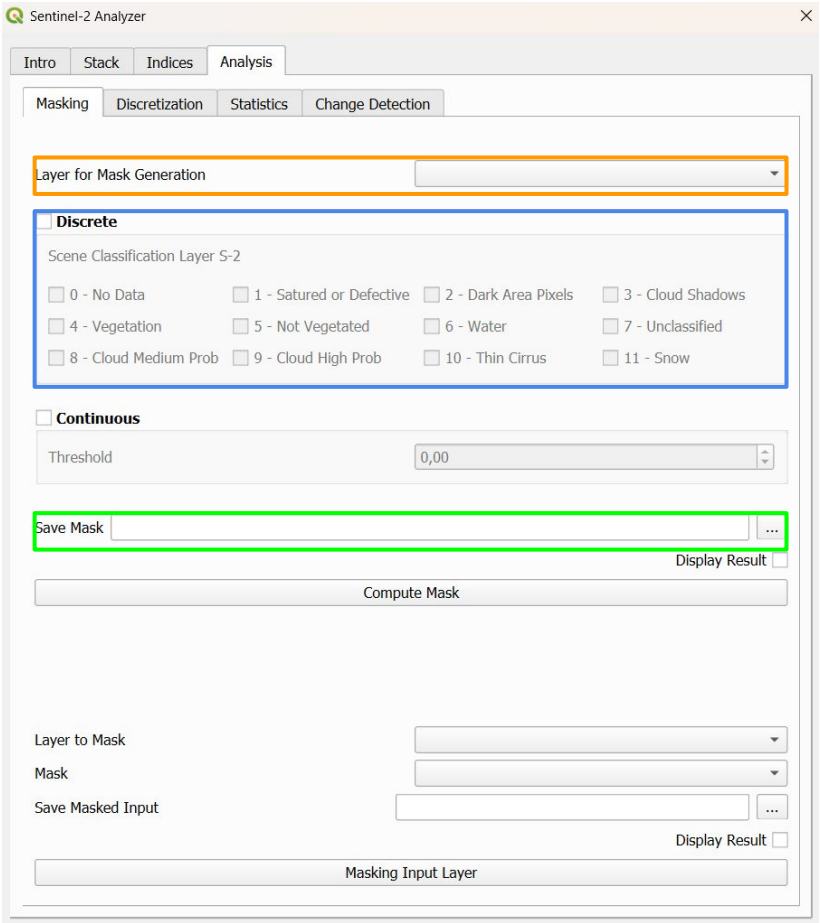


INDICES TAB: *Custom*

- supported format for raster .tif & .jp2
- User can compute custom indices, or compute some operations on the bands*:
  - Insert the operation in the window
  - Specify the output path
  - Automatically upload new raster in QGIS Layer Panel
  - Press “Compute” button

*It is mandatory to Declare the Input in the previous Tab: Indices-Input

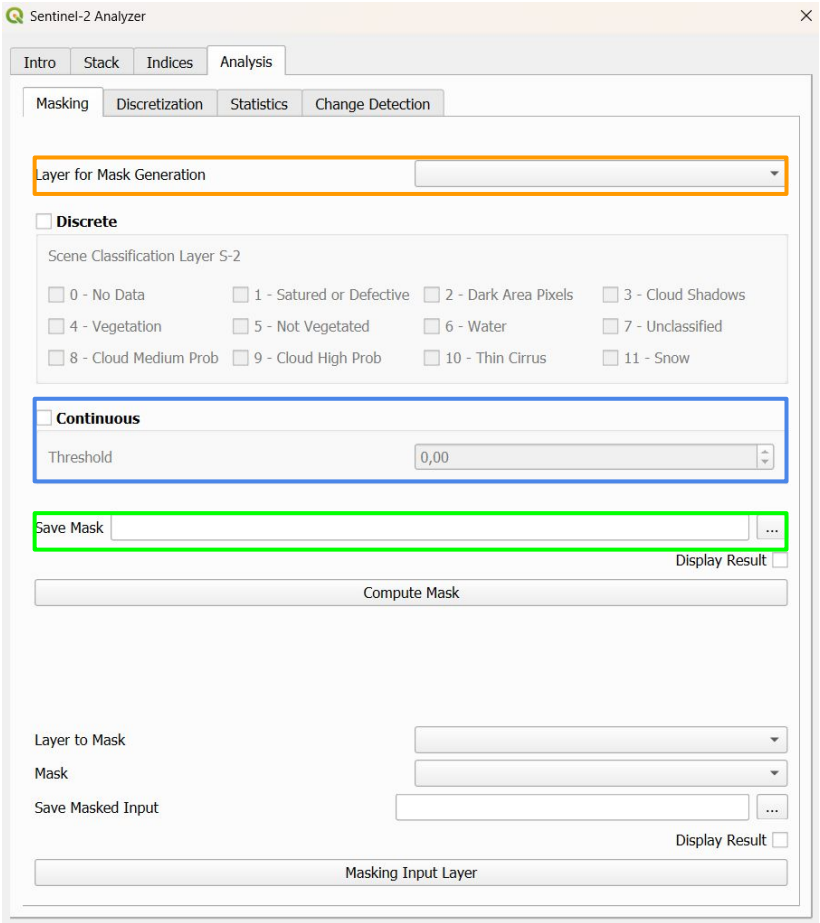
ANALYSIS TAB



INDICES ANALYSIS: *Masking 1/3*

- supported format for raster .tif & .jp2
- User can generate binary mask of a input layer*:
  - Specify the layer, already upload in the QGIS Layer Panel, to consider (orange box)
  - Specify which discrete values want to mask** (blue box)
  - Specify the output path (green box)
  - Automatically upload new raster in QGIS Layer Panel
  - Press “Compute Mask” button

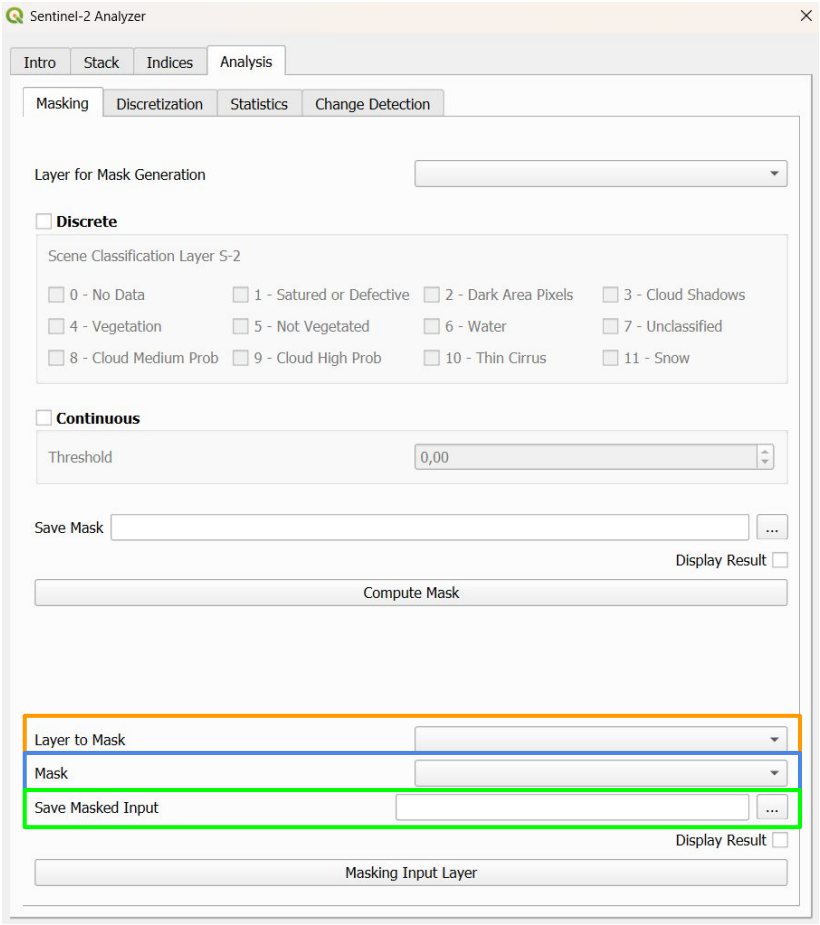
*single band layer
** discrete values proposed according to SCL product provided by Sentinel 2



INDICES ANALYSIS: *Masking 2/3*

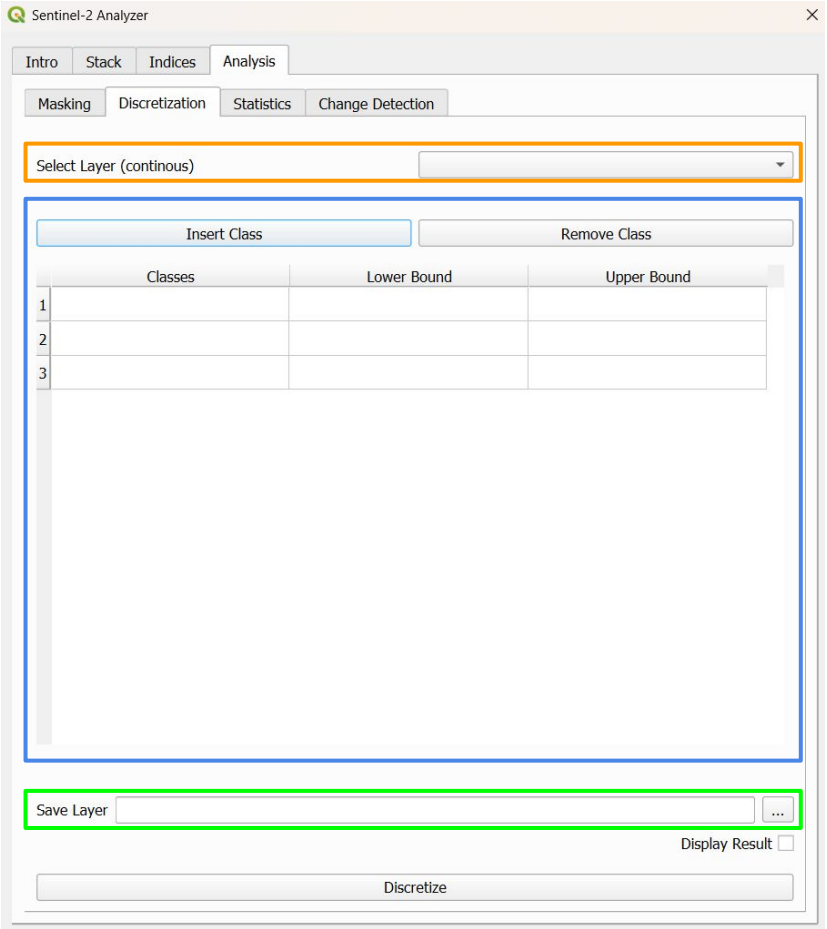
- supported format for raster .tif & .jp2
- User can generate binary mask of a input layer*:
  - Specify the layer, already upload in the QGIS Layer Panel, to consider (orange box)
  - Specify the threshold value for continuous layer (blu box)
  - Specify the output path (green box)
  - Automatically upload new raster in QGIS Layer Panel
  - Press “Compute Mask” button

*single band layer



INDICES ANALYSIS: *Masking 3/3*

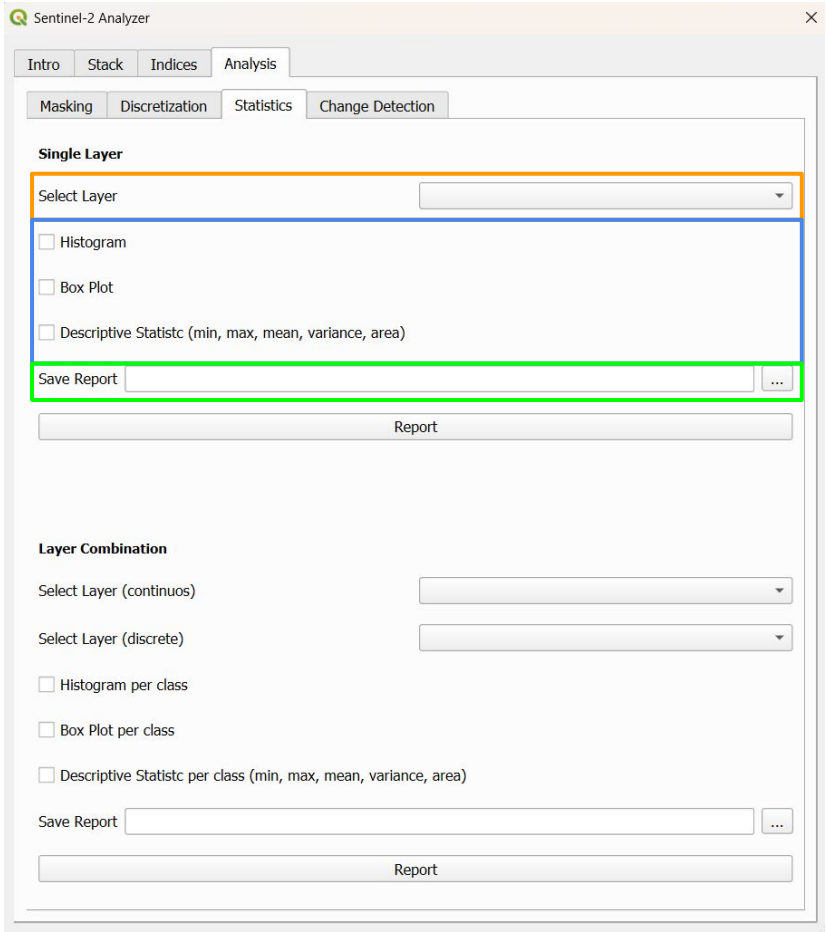
- supported format for raster .tif & .jp2
- User can apply binary mask to a input layer:
  - Specify the layer, already upload in the QGIS Layer Panel, to mask (orange box)
  - Specify the mask, already upload in the QGIS Layer Panel, to apply (blue box)
  - Specify the output path (green box)
  - Automatically upload new raster in QGIS Layer Panel
  - Press “Masking Input Layer” button



INDICES ANALYSIS: *Discretization*

- supported format for raster .tif & .jp2
- User can discretize continuous raster layer to generate discrete raster:
  - Specify the layer, already upload in the QGIS Layer Panel, to discretize (orange box)
  - Insert (delete) in the table desired classes* and the corresponding range (lower and upper bound for each class) (blue box)
  - Specify the output path (green box)
  - Automatically upload new raster in QGIS Layer Panel
  - Press “Discretize” button

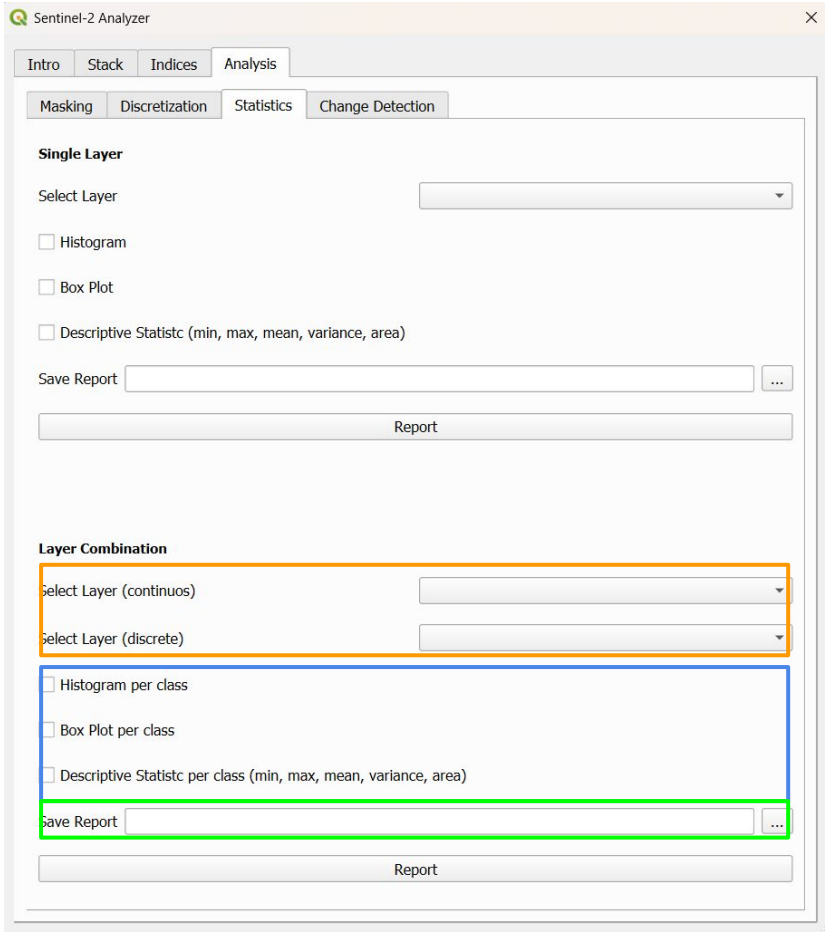
*classes must be integer values



INDICES ANALYSIS: *Statistics 1/2*

- supported format for raster .tif & .jp2
- supported format for report .pdf

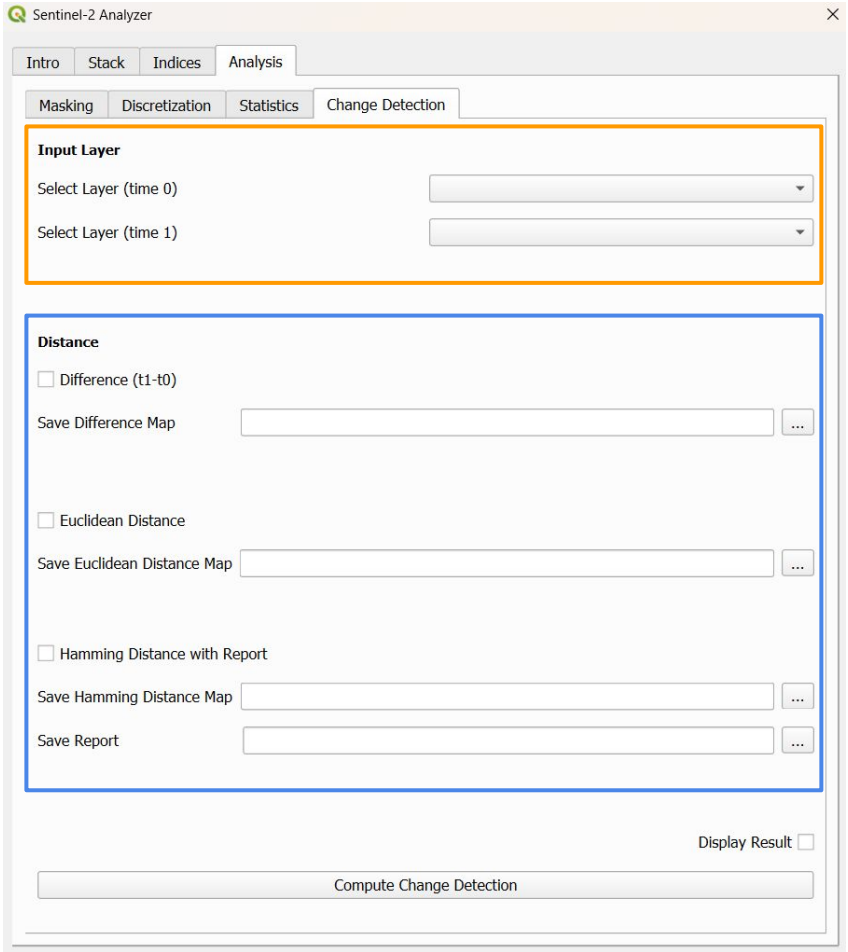
- User can generate a report related to a single input:
  - Specify the layer, already upload in the QGIS Layer Panel, on which generate a report (orange box)
  - Select which element to insert in the report (blue box)
  - Specify the report output path (green box)
  - Automatically upload new raster in QGIS Layer Panel
  - Press “Report” button



INDICES ANALYSIS: *Statistics 2/2*

- supported format for raster .tif & .jp2
- supported format for report .pdf

- User can generate a report combining to raster as input, one continuous and the other discrete:
  - Specify layers, already upload in the QGIS Layer Panel, on which generate a report (orange box)
  - Select which element to insert in the report (blue box)
  - Specify the report output path (green box)
  - Automatically upload new raster in QGIS Layer Panel
  - Press “Report” button



INDICES ANALYSIS:
Change Detection

- supported format for raster .tif & .jp2
- supported format for report .pdf

- User can compute basic change detection analysis considering two input (time 0, time 1):
  - Specify layers, already upload in the QGIS Layer Panel, on which compute the analysis (orange box)
  - Select which distance to compute and specify the related output path (blue box)
  - Automatically upload new raster in QGIS Layer Panel
  - Press “Compute Change Detection” button

NB Hamming Distance can be compute only on binary single band raster as inputs

INDICES

Vegetation:

- NDVI = *(NIR - RED) / (NIR + RED)*
- EVI = *2.5 * (NIR - RED) / (NIR + 6*RED - 7.5*BLUE + 1)*
- SAVI = *(NIR - RED) / (NIR + RED + L) * (1 + L)*
- NDRE = *(NIR - RED_EDGE) / (NIR + RED_EDGE)*

Water:

- NDWI = *(GREEN - NIR) / (GREEN + NIR)*
- MNDWI = *(GREEN - SWIR2) / (GREEN - SWIR2)*
- NDMI = *(NIR - SWIR1) / (NIR + SWIR1)*

Fire:

- NBR
- NBR2
- MIRBI

Building:

- NDBI = *(SWIR2 - NIR) / (SWIR2 + NIR)*
- NBI = *(SWIR2 * RED) / NIR*
- NBAI = *[(SWIR2 - SWIR1)/GREEN] / [(SWIR2 + SWIR1)/GREEN]*
- BAEI = *(RED + 0.3) / (GREEN + SWIR1)*