

Sentinel-2 Normalised Difference Water Index (NDWI) Service


S2NDWI

Note this service was originally developed within the ESA-sponsored Food-Security Thematic Exploitation Platform (FS-TEP) project. Further details of this project can be found here: <https://foodsecurity-tep.net/>

Service description

This service calculates a Normalised Difference Water Index (NDWI) from a Sentinel-2 L1C image, using the SNAP Sentinel Toolbox. This band ratio uses a combination of green and near infrared (NIR) bands to highlight regions of water. The exact equation is $(\text{green} - \text{NIR}) / (\text{green} + \text{NIR})$. NDWI typically ranges from -1 to +1. It can process single or multiple input images.

Selecting the service

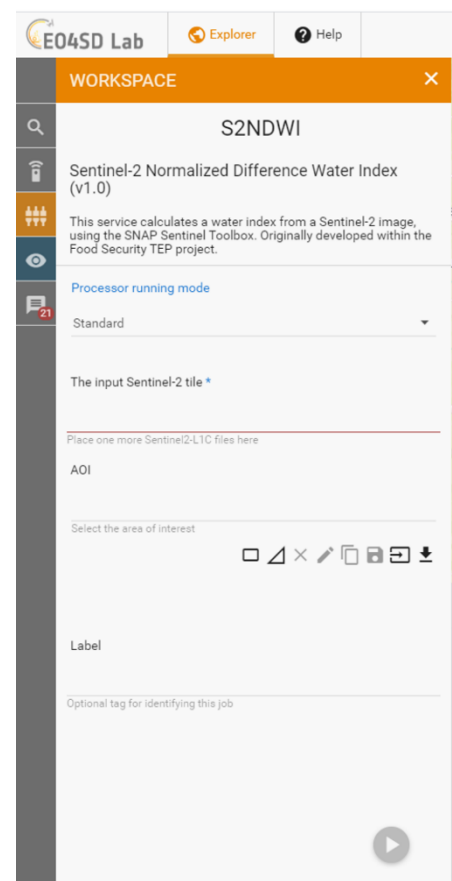
The S2NDWI service is selected by clicking on the services  icon on the left of the screen on the *Explorer pane*. This opens up the Service list, which can be filtered by service type (such as application or processor). Scroll down or type into the search interface the name of the service and after selection the *WorkSpace* panel will open.

Input data

The S2NDWI service is designed to work with Sentinel-2 L1C images

Parameters

- **Processor Running Mode:** The Processors can be run in two modes **standard** or **systematic**. Most users will just require standard processing i.e. processing of one or more products in a single processing run. For advanced users, systematic processing allows the service to be run periodically if the platform identifies input data that matches the user-defined criteria.
- **Input Sentinel-2 tiles:** this is the input Sentinel-2 L1C image(s) to be processed. Drag the input Sentinel-2 image(s) (grabbing from the horizontal lines to the left of its name) from the Results tab at the bottom of the screen to the Input data field.
- **AOI:** An OPTIONAL field to define an Area of Interest (AOI) to be used to create a geographic subset of the output image. The AOI can be drawn on the Geobrowser, extracted from a shapefile uploaded by the user or selected from a previously defined AOI. Alternatively, it can be specified in the Well-Known Text (WKT) POLYGON format. An example of a valid specification is: POLYGON((-92.906633 16.190411,-92.066559 16.188383,-92.070266 15.376645,-92.907004 15.378567,-92.906633 16.190411)).
- **Label:** An OPTIONAL field for free form tagging for later identification of this processing job.



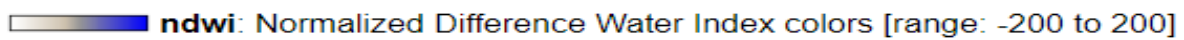
Service Execution

Once all input fields have been filled in, the service is launched by clicking the round play button at the bottom right corner of the input dialogue area.

Service Outputs

The S2NDWI service generated a greyscale NDWI GeoTIFF images from each of the input images at the 10m spatial resolution of the input images. Values within this image range from -1 (no water) to 1 (water).

Additionally, the service will generate an output RGB image on which a colour table is applied. This will aid visual interpretation of the image when its displayed on the GeoBrowser or downloaded. The colour code applied is the NDWI RGBA code as defined within the Grass GIS package (<https://grass.osgeo.org/grass78/manuals/r.colors.html>). Within this code water bodies will appear blue., as shown in the scale below.



The image below shows a scaled NDWI image, in this case over central Italy in April 2020, displayed in the GeoBrowser. In this blue indicated water bodies. This product was generated in Job ID 61 on the EO4SD Lab, user can recreate this by searching and cloning Job ID 61.



The resulting outputs GeoTIFF files can be downloaded, re-used or visualised in the GeoBrowser. Further analysis can be undertaken in one of the GUI applications, such as SNAP, Monteverdi or QGIS. Soon after desired application process (e.g. QGIS) is started, a 'Go to GUI' icon appears in the job description. The desired GUI application can then be accessed by clicking this icon, which opens the GUI in another browser tab.