

# Index Tool

An easy way to create and visualize satellite indices



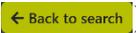
Prepared by:

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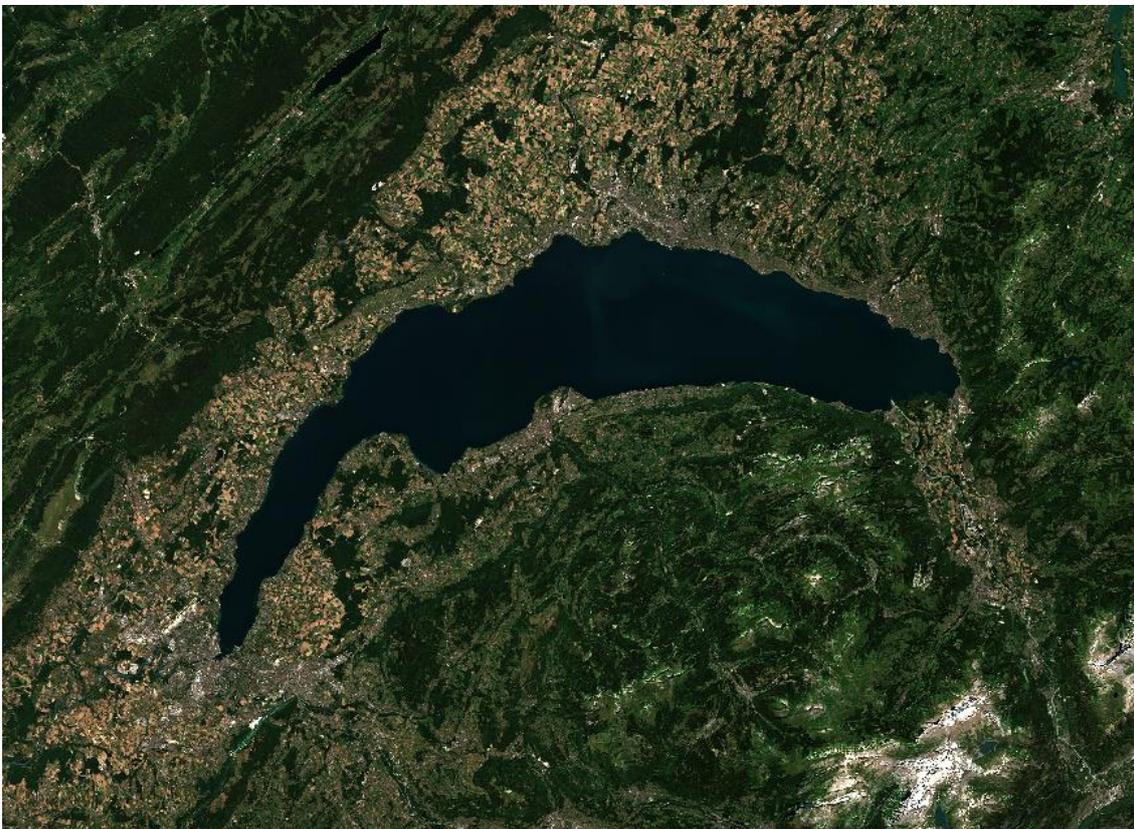
Cvetkova ulica 29, 1000 Ljubljana

18.08.2020, Ljubljana

# 1 Search for Data

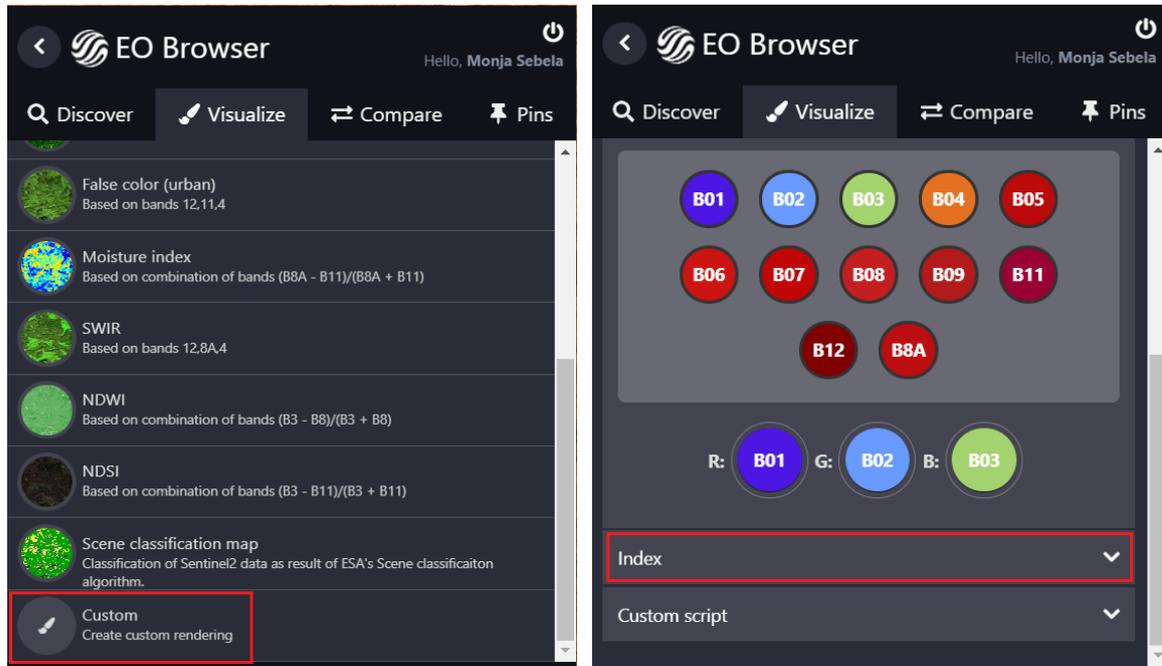
- To start, open **EO Browser**.
- Next, move the map to the area you want to investigate, by panning the window or by entering a location in the Search Box ( ). You can change the zoom level of the map using your mouse wheel or by using . To get nice results in the later steps, it's helpful if you select an area that has some water bodies.
- Next, search for data in the discover tab. You can leave the default settings and simply hit search.
- The search results open. In case you are not happy with the results, you can go back to search (  ) and modify the time range or set a maximal cloud coverage under the advanced search options.
- Once you are happy with the search results, you can select one by clicking on visualize (  ) or by clicking on a tile on the map.
- For more information on how to use the EO Browser, consult the **user guide**.

In this tutorial, we are going to be working with Lake Geneva, Switzerland. To open the area in EO Browser, click on the image below.



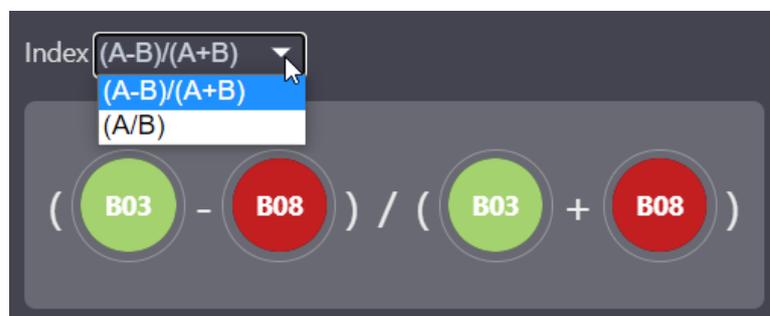
## 2 Create and Visualize an Index

To create an index, you have to select the custom option at the bottom of the sidebar (left image) and then open the index tab (right image).

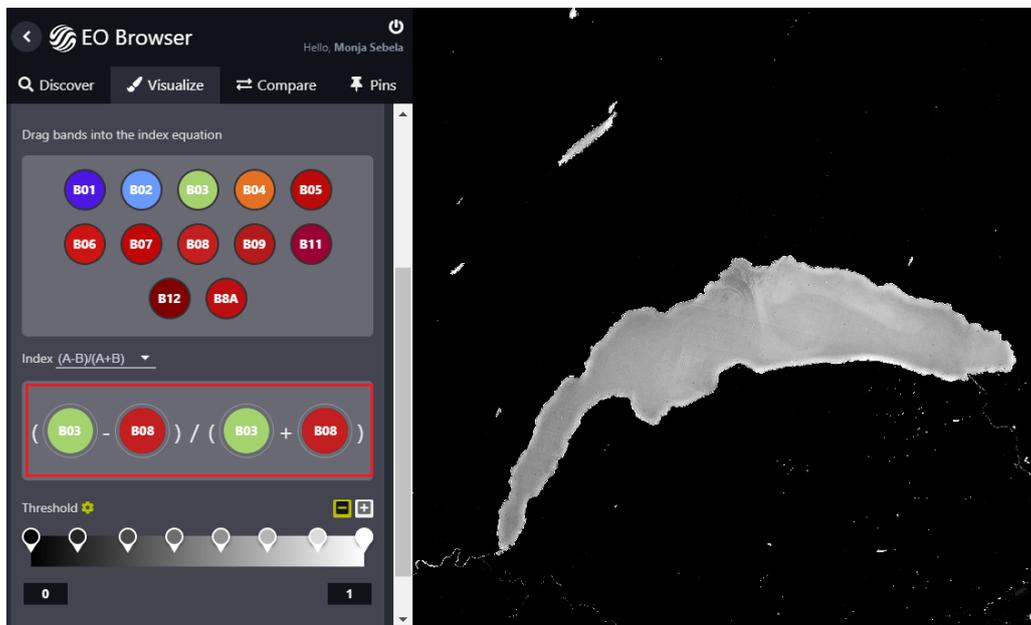


*Tip: You can find the index tab between the composite tab and the custom script tab. If you are curious what the other two tabs are about, check out our [custom script tutorial](#).*

At the moment there are two commonly used equations available. One for a simple band ratio (A/B) and one for a normalized difference index (A-B)/(A+B). We will use the latter. It is already preselected so you don't need to change anything here. In case you would like to switch the equation, you can do so by clicking on the equation and a dropdown menu will appear.



In this tutorial, we will use an index called **Normalized Difference Water Index (NDWI)**, which is useful for mapping water bodies. The NDWI uses the green band 3 (B03) for A and the near-infrared band 8 (B08) for B. Use drag and drop to place both bands into the corresponding position in the index equation  $(B03 - B08) / (B03 + B08)$  so your equation looks like the one on the image.



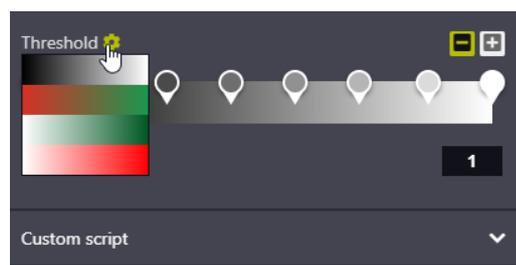
As the default color palette of the index tool is grayscale, and the default value range 0 – 1, the result should be a black and white NDWI index with values between 0 and 1. NDWI index values range from -1 to 1, so feel free to change the min./max values by entering a new number.

However, in this tutorial, we are mapping water bodies and as pixels with NDWI values higher than 0.5 can be classified as water bodies, the default range of 0 – 1 is sufficient.

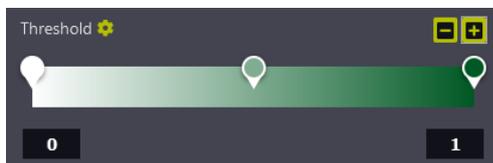
If you're working with other indices, you might want to modify the range of values to suit your index and your needs. Check out other indices in our [custom scripts' repository](#).

### 3 Fine Tune Your Visualization

In the next steps, we will modify the visualization to get a better distinction between water bodies and non-water bodies. Because we want to display water bodies in green, we want to change the color ramp to display colors from white to green. To change the color palette, click on the gear next to *Threshold*, and then select the 3<sup>rd</sup> color ramp (white to green).



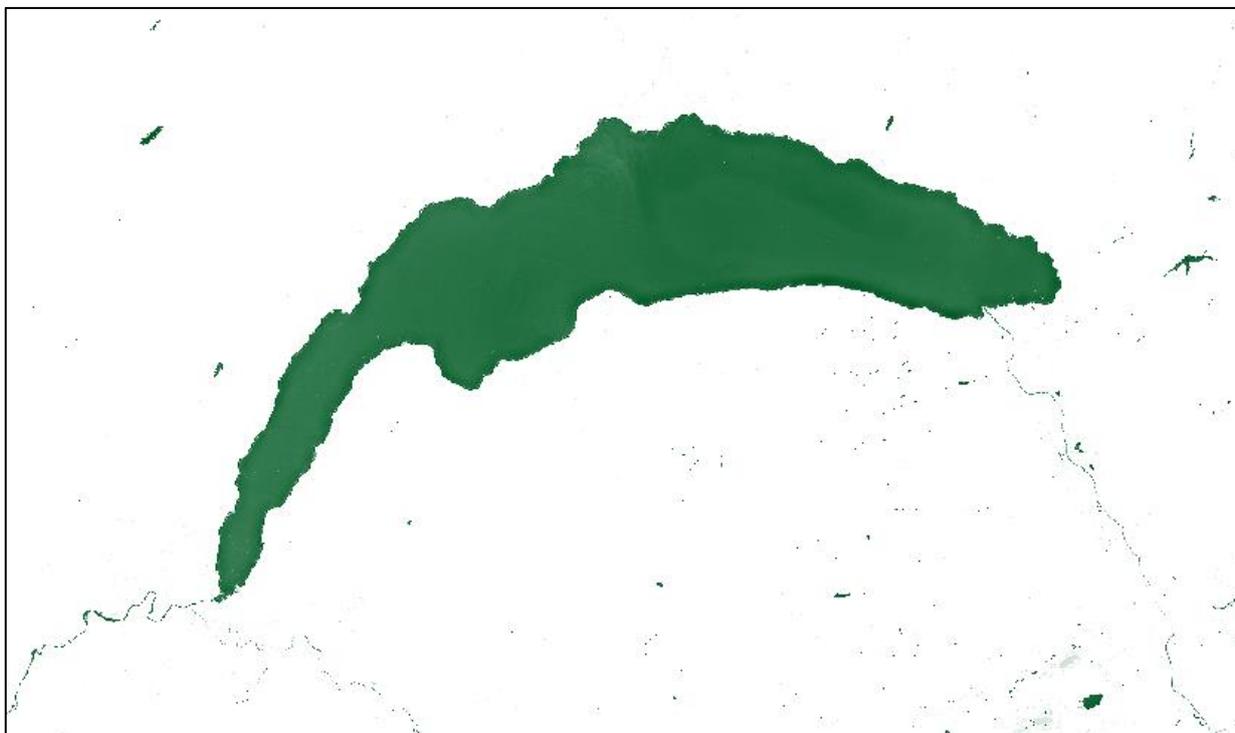
By default, the color ramp comes with 8 color pickers that can be used to modify specific sections of the color ramp. As we only want to distinguish between water bodies and non-water bodies, we can remove most of the color pickers using the minus (-) until there are only three (Min, Max, 0.5).



To give all the pixels with values between 0.5 and 1 a nice green color, we move the 0.5 color picker to the right side.



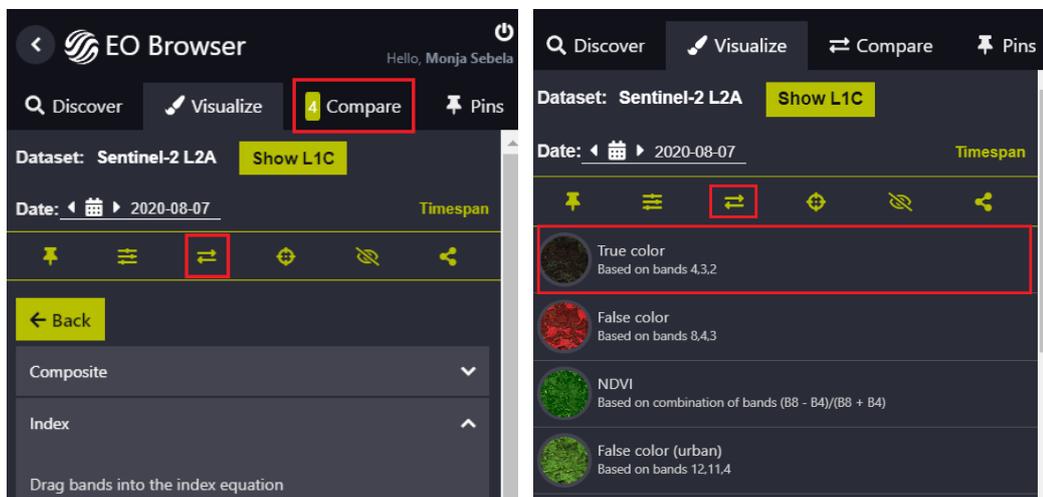
Your result should be a visualization, where water bodies are displayed in dark green and non-water bodies in white.



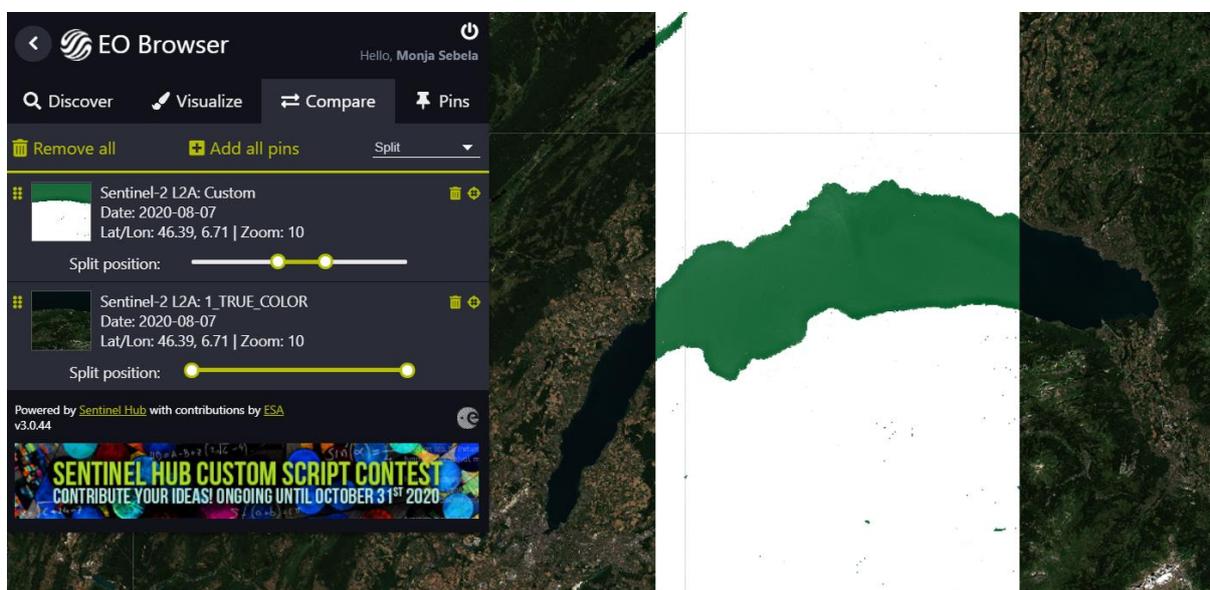
## 4 Verify your Results using the compare Functionality

To verify the result, we will use the compare functionality and compare our result with a true color image of the same location. To do so we have to add both visualizations to the compare panel.

- Add the just created visualization to compare by clicking on the two arrows  in the row above the **Back** button  (left image below).
- To add the true color visualization to the compare panel, click on back , then select the **True color** visualization, and finally again on the two arrows  (right image below). As you do so, you will see the count of the added visualizations appear next to the **Compare** tab at the top.



- Switch to the **Compare** tab and drag the true color image below the custom image by using the move icon .
- Use the slider next to the **Split position** text of the custom visualization layer, to reveal the true color visualization below.



You can also use the custom visualization as a transparent overlay. To use opacity, switch from **Split** to **Opacity** at the top right, and then set the opacity of your custom visualization to something between 0.3 and 0.5. This should give you enough transparency to see the true color visualization in the background, but still see the water bodies in green overlaid, as you can see on the image below.



The index tool makes it easy to explore satellite indices without the need for scripting. If you would like more control, however, you can always modify the index you created by clicking on the **Custom Script** option, where you can edit the color palette and do just about anything you'd like. To make your images more appealing, you can also edit them right in EO Browser, where you can control gamma, gain, and the amount of red, green, and blue hues in your images.

