



Common borders. Common solutions.

# Портали даних Copernicus Open Access Hub i Sentinel Hub

Евген Газетов, ОНУ

Октябрь, 2021



**CERTH**  
CENTRE FOR  
RESEARCH & TECHNOLOGY  
HELLAS



## Ресурси ДЗЗ

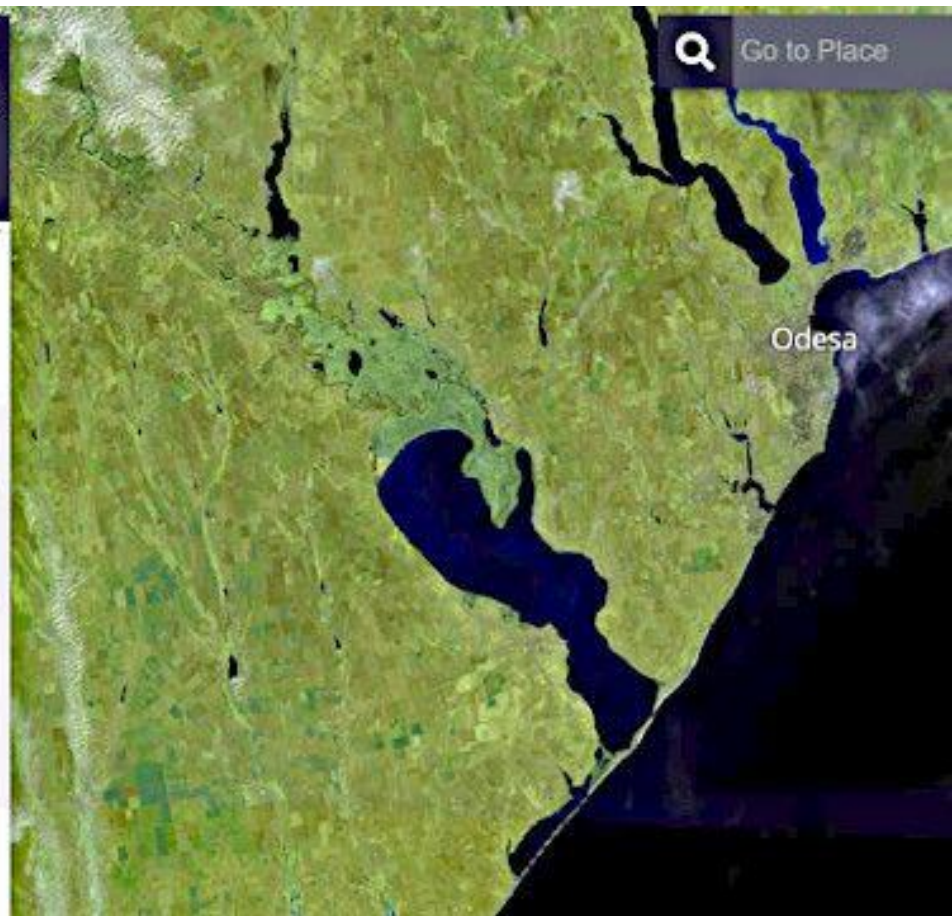
### Free open source platforms

- Copernicus Open Access Hub
- Earth System Lab
- ESA Thematic Exploitation Platforms
- Alaska Satellite Facility
- Copernicus Global Land Service
- Sentinel Data Access Service
- USGS Earth Explorer
- Sentinel Application Platform software
- Open Data Cube

# Ресурси ДЗЗ

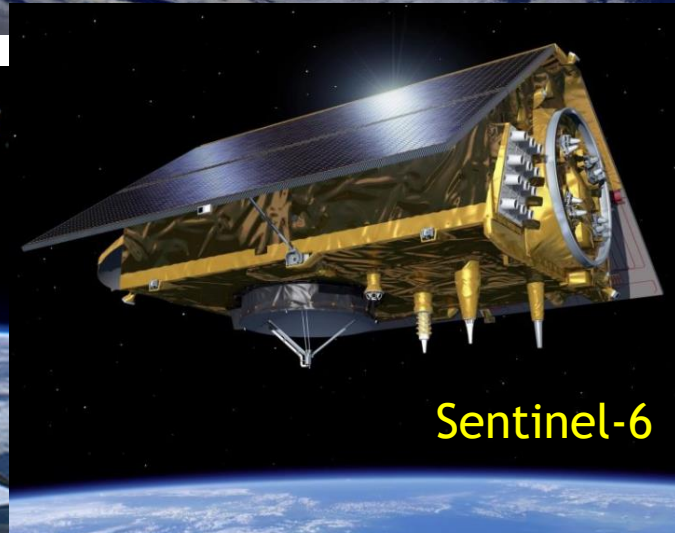
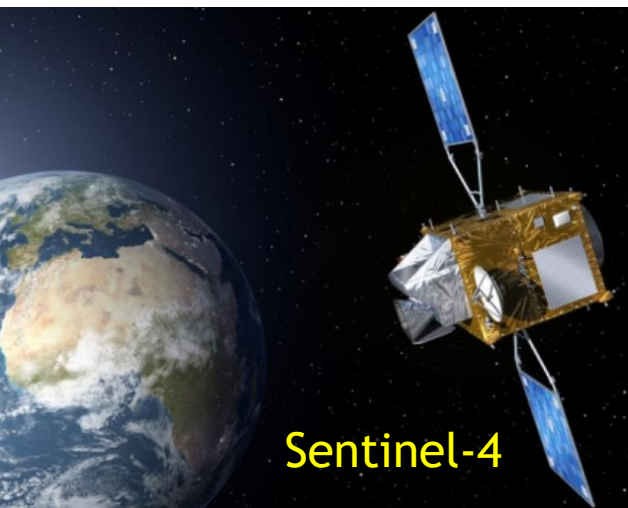
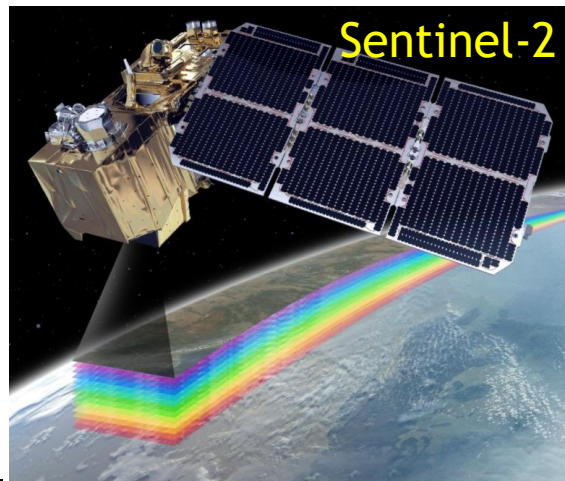
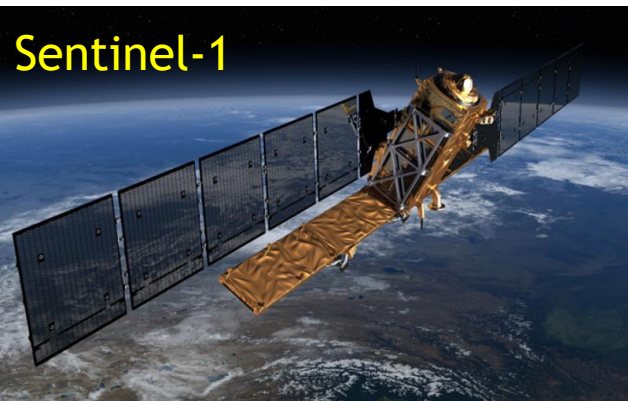
The screenshot shows the EO Browser interface. At the top, there is a search bar with the text "Go to Place" and a magnifying glass icon. Below the search bar, the user's name "Hello, Yevgen Gazyetov" is displayed. The main menu includes "Discover", "Visualize", "Compare", and "Pins". The "Visualize" menu is open, showing several options:

- Based on bands 4,3,2
- False color  
Based on bands 8,4,3
- NDVI  
Based on combination of bands  $(B8 - B4)/(B8 + B4)$
- False color (urban)  
Based on bands 12,11,4
- Moisture index  
Based on combination of bands  $(B8A - B11)/(B8A + B11)$
- SWIR  
Based on bands 12,8A,4
- NDWI  
Based on combination of bands  $(B3 - B8)/(B3 + B8)$





# Сузір'я Sentinel за програмою Copernicus





<https://scihub.copernicus.eu>

Please login to access our services...

Username

Password

**LOGIN**

Sign up

Forgot password?





The image shows a screenshot of the Copernicus Scientific Data Hub web application. The interface includes a top navigation bar with the ESA and Copernicus logos, and a search bar. The main area is a map of Europe and surrounding regions. Several blue callout boxes with arrows point to specific features: 'Advanced Search' points to the search bar; 'Full text bar' points to the search input field; 'Save Search' points to a save icon; 'Select Map Layer' points to a layer selection icon; 'Draw Region of Interest/Navigate on the Map' points to a drawing tool icon; and 'Latitude/Longitude' points to a coordinate display box at the bottom left showing '4.5264, 68.3181'. A dark overlay at the bottom shows a zoomed-in view of the map with a yellow rectangle highlighting a region in Northern Europe.

esa copernicus Copernicus Scientific Data Hub

Insert search criteria... Save Search

Advanced Search

Full text bar

Select Map Layer

Draw Region of Interest/Navigate on the Map

Copernicus Scientific Data Hub

Latitude/Longitude

4.5264, 68.3181



☰ 🛒 Insert search criteria...



» Sensing period

2021/04/22



2021/04/22



» Ingestion period



Mission: Sentinel-1

Satellite Platform

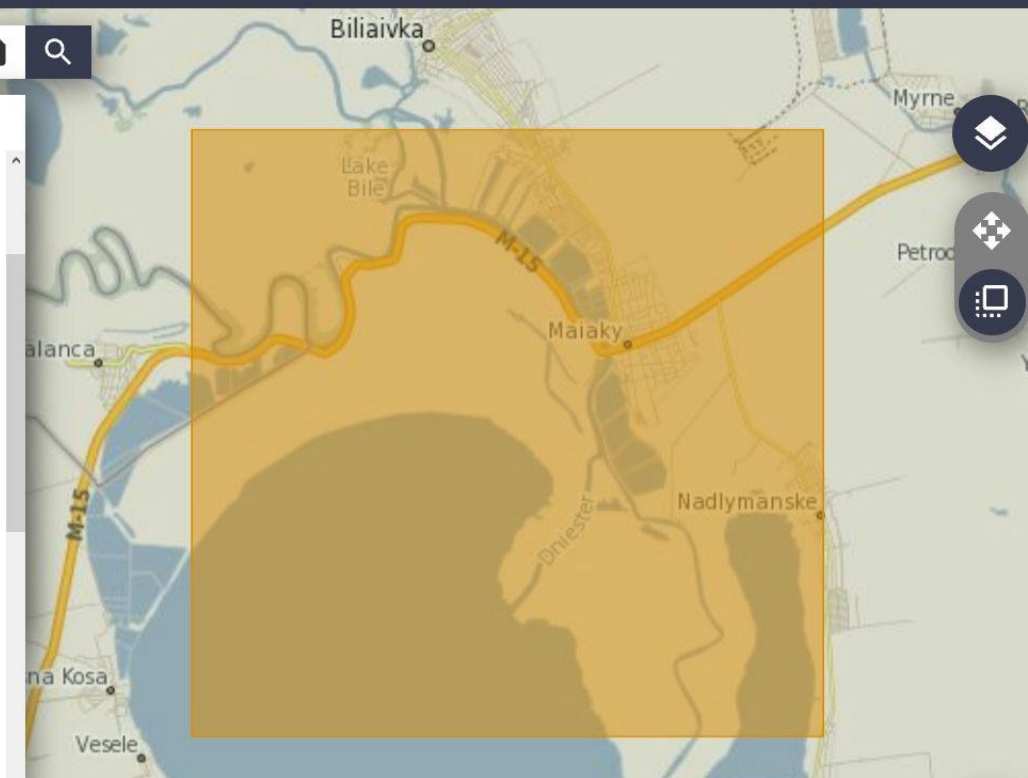
Product Type

Polarisation

Sensor Mode

Relative Orbit Number (from 1 to 175)

Mission: Sentinel-2



Insert search criteria...

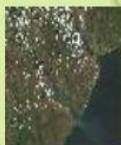


Carahasani  
Display 1 to 2 of 2 products.  
Order By: Ingestion Date ↓

1 product selected

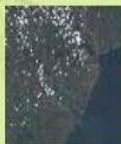
**Request Done:** ( footprint:"Intersects(POLYGON((30.122354566831092  
46.3238314084947,30.333667141085037 46.3238314084947,30.333667141085037  
46.46341891170718,30.122354566831092 46.46341891170718,30.122354566831092

S2A MSI S2A\_MSIL2A\_20210422T085551\_N0300\_R007\_T35TQM\_2021042... Offline



Download URL: [https://scihub.copernicus.eu/dhus/odata/v1/Products\('87b4bd6a-6415-420b](https://scihub.copernicus.eu/dhus/odata/v1/Products('87b4bd6a-6415-420b)  
Mission: Sentinel-2 Instrument: MSI Sensing Date: 2021-04-22T08:55:51.024Z Size: 1011.42 M

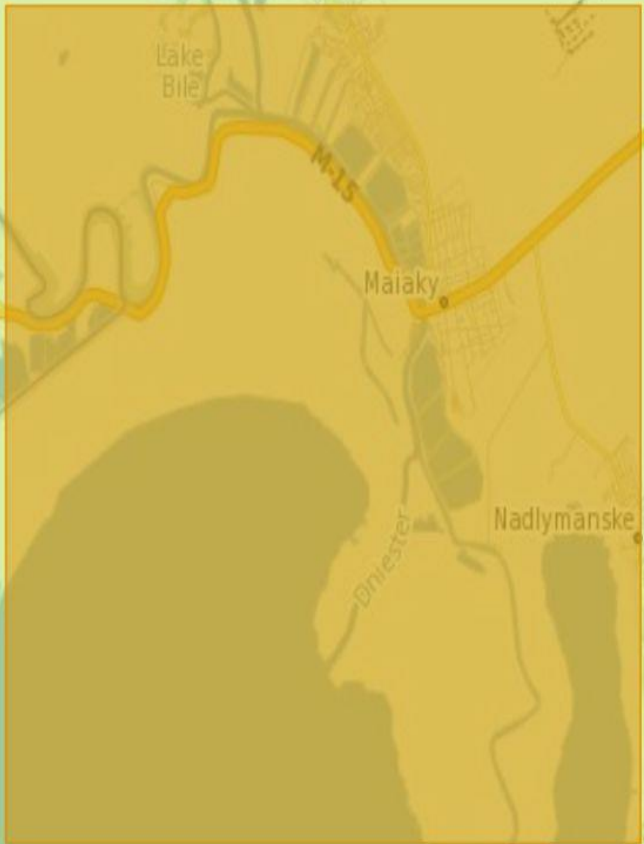
S2A MSI S2A\_MSIL1C\_20210422T085551\_N0300\_R007\_T35TQM\_2021042... Offline



Download URL: [https://scihub.copernicus.eu/dhus/odata/v1/Products\('4c780356-7f1d-47f9-8](https://scihub.copernicus.eu/dhus/odata/v1/Products('4c780356-7f1d-47f9-8)  
Mission: Sentinel-2 Instrument: MSI Sensing Date: 2021-04-22T08:55:51.024Z Size: 731.49 MB



Products per page: 25 << < page: 1 of 1 >>





Footprint



Quicklook



Attributes

Summary

Date: 2021-04-22T08:55:51.024Z

Filename: S2A\_MSIL1C\_20210422T085551\_N0300\_R007\_T35TQM\_20210422T103559.SAFE

Identifier: S2A\_MSIL1C\_20210422T085551\_N0300\_R007\_T35TQM\_20210422T103559

Instrument: MSI

Satellite: Sentinel-2

Size: 731.49 MB

Inspector

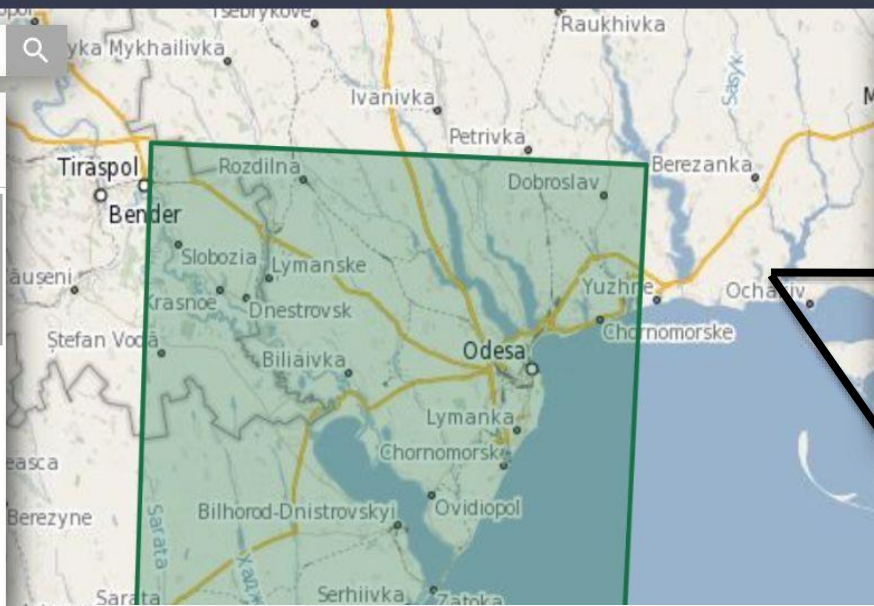


Insert search criteria...

Your cart contains 1 products.  
Display 1 to 1 of 1 products.

**S2A** **MSI** S2A\_MSIL1C\_20210422T085551\_N0300\_R007\_T35TQ... Offline

Download URL: [https://scihub.copernicus.eu/dhus/odata/v1/Products\('4c780356-...'\)](https://scihub.copernicus.eu/dhus/odata/v1/Products('4c780356-...'))  
Mission: Sentinel-2 Instrument: MSI Sensing Date: 2021-04-22T08:55:51.024Z Size: 7



**gazetov**  
gazetov@gmail.com

Allowed functions  
Q

Cart  
Saved Searches

EDIT PROFILE LOGOUT

Your cart contains 1 products.  
Display 1 to 1 of 1 products.

**S2A** **MSI** S2A\_MSIL1C\_20210422T085551\_N0300\_R007\_T35TQ... Offline

Download URL: [https://scihub.copernicus.eu/dhus/odata/v1/Products\('4c780356-...'\)](https://scihub.copernicus.eu/dhus/odata/v1/Products('4c780356-...'))  
Mission: Sentinel-2 Instrument: MSI Sensing Date: 2021-04-22T08:55:51.024Z Size: 7

Products per page: 25 << < page: 1 of 1 > >>



Insert search criteria...



Display 1 to 25 of 2713 products.

Select All

Order By: Ingestion Date ↓

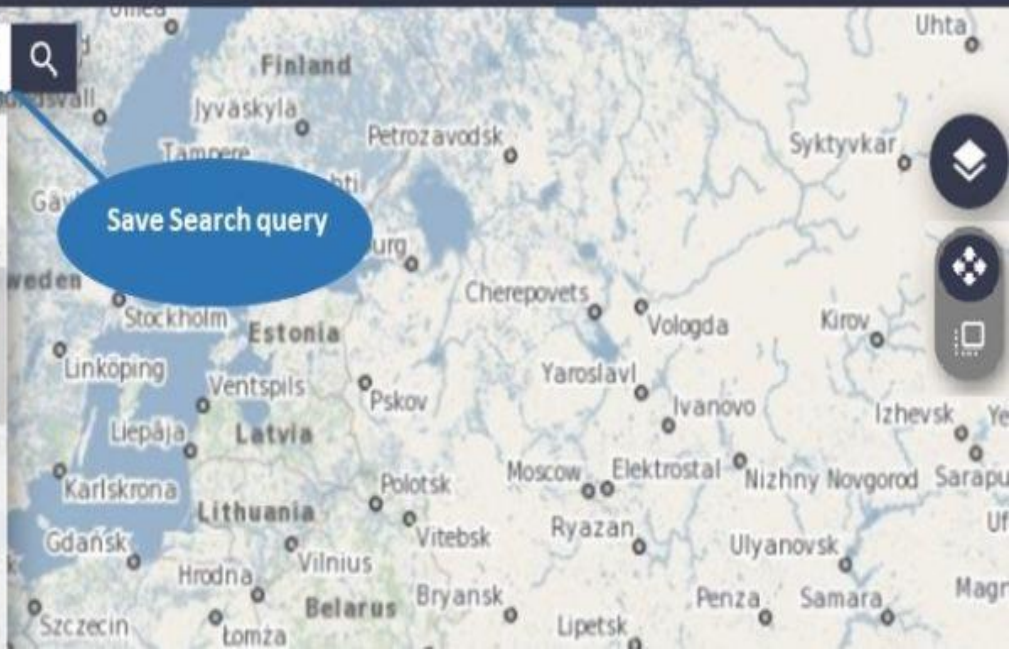
**S1B SAR-C** S1B\_EW\_SLC\_1SDH\_20170809T181952\_20170809T182059\_006866...

Download URL: <https://scihub-test.esa.int/dhus-master/odata/v1/Products/a>  
Mission: Sentinel-1 Instrument: SAR-C Sensing Date: 2017-08-09T18:19:5

**S1B SAR-C** S1B\_WV\_SLC\_1SSH\_20170402T050721\_20170402T052119\_004977...

Download URL: <https://scihub-test.esa.int/dhus-master/odata/v1/Products/e>  
Mission: Sentinel-1 Instrument: SAR-C Sensing Date: 2017-04-02T05:07:2

NO QUICKLOOK





[https://scihub.copernicus.eu/dhus/odata/v1/Products\('98922174-9a4c-4025-99a2-53bb088f50ce'\)/\\$value](https://scihub.copernicus.eu/dhus/odata/v1/Products('98922174-9a4c-4025-99a2-53bb088f50ce')/$value)



Download TCI

Footprint



Attributes

Quicklook



Inspector

Insert search criteria...

Your cart contains 49 products.  
Display 1 to 25 of 49 products.

Remove single product from Cart

Single product download

Clear Cart

Bulk Download

Products per page: 25 << < page: 1 of 2 > >>



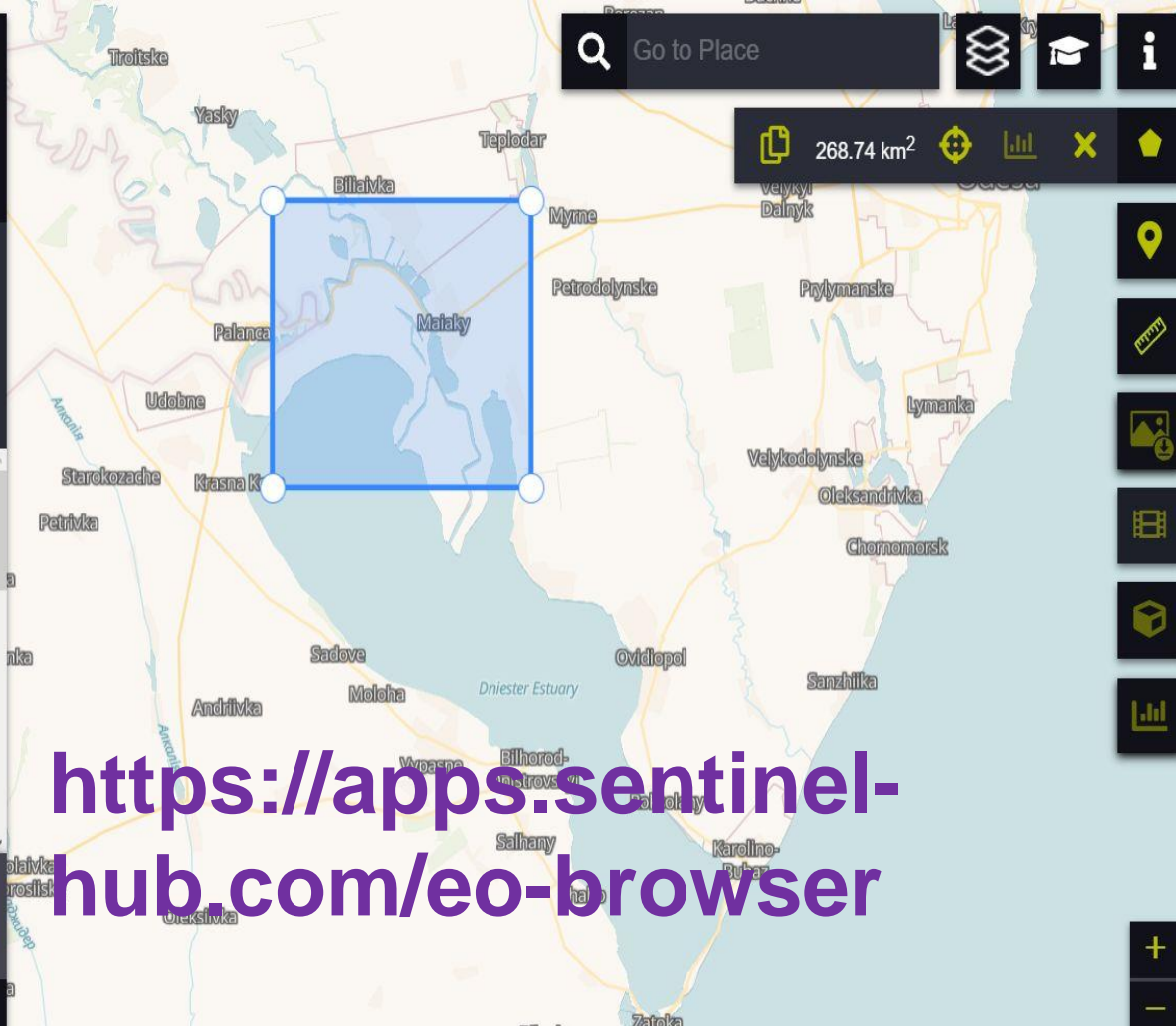
# Невеличка практична демонстрація роботи з Copernicus Open Access Hub



Data sources

- Sentinel-1 ?
- Sentinel-2 ?
  - Advanced search:
  - L1C ?
  - L2A (atmospherically corrected) ?
  - Max. cloud coverage:  100 %
- Sentinel-3 ?

Search



<https://apps.sentinel-hub.com/eo-browser>

Discover

Visualize

Compare

Pins

Dataset: Sentinel-2 L2A

Show L1C

Date: 2021-10-11

Timespan



True color

Based on bands 4,3,2



False color

Based on bands 8,4,3



NDVI

Based on combination of bands  $(B8 - B4)/(B8 + B4)$



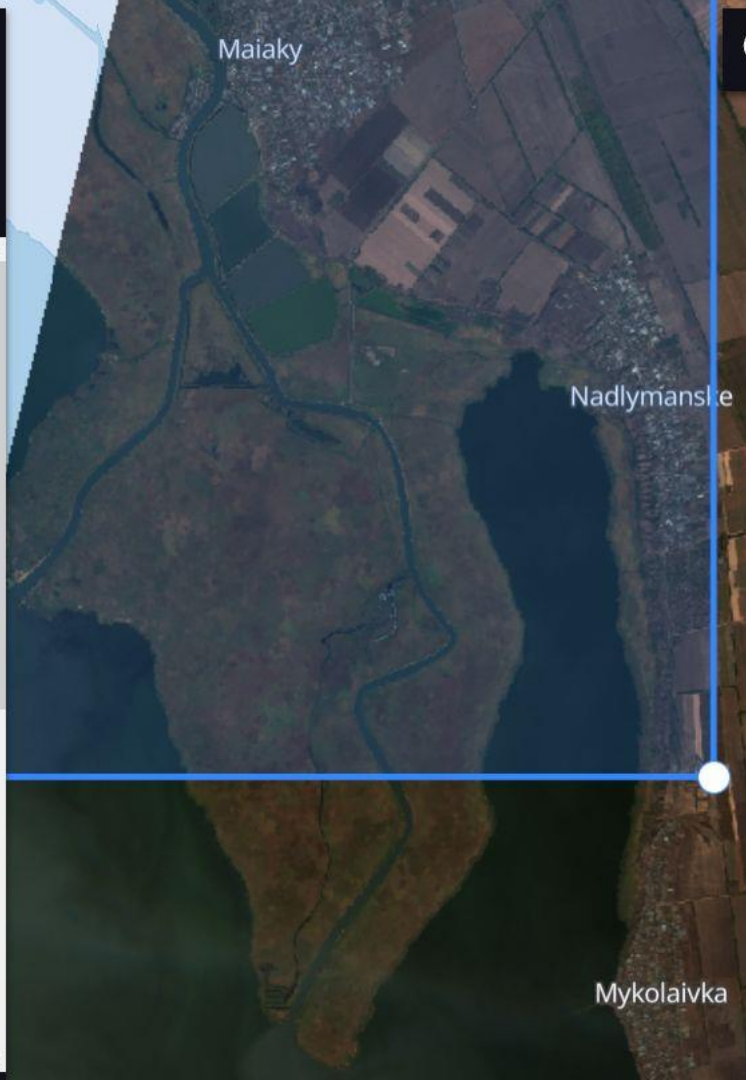
False color (urban)

Based on bands 12,11,4



Moisture index

Based on combination of bands  $(B8A - B11)/(B8A + B11)$





Discover

Visualize

Compare

Pins

Dataset: Sentinel-2 L2A

Show L1C

Date: 2021-10-11

Timespan



True color  
Based on bands 4,3,2



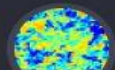
False color  
Based on bands 8,4,3



NDVI  
Based on combination of bands  $(B8 - B4)/(B8 + B4)$



False color (urban)  
Based on bands 12,11,4



Moisture index  
Based on combination of bands  $(B8A - B11)/(B8A + B11)$





Discover

Visualize

Compare

Pins



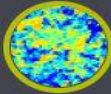
NDVI

Based on combination of bands  $(B8 - B4)/(B8 + B4)$



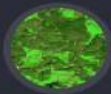
False color (urban)

Based on bands 12,11,4



Moisture index

Based on combination of bands  $(B8A - B11)/(B8A + B11)$



SWIR

Based on bands 12,8A,4



NDWI

Based on combination of bands  $(B3 - B8)/(B3 + B8)$



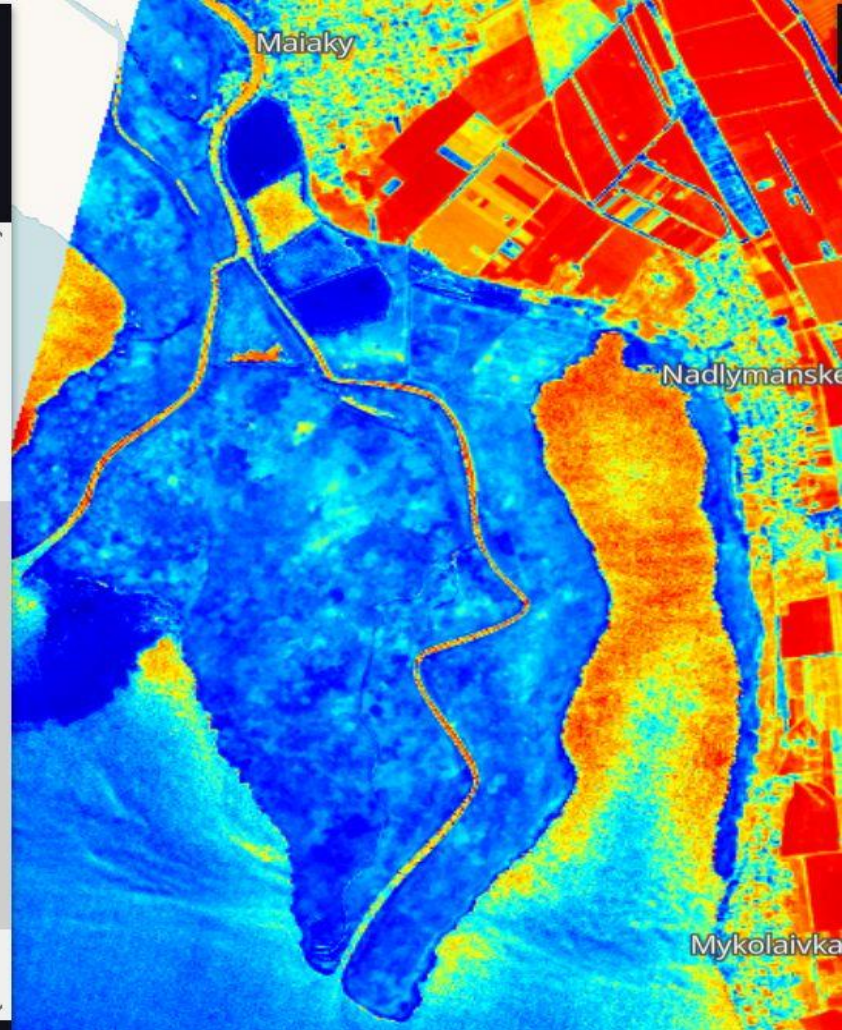
NDSI

Based on combination of bands  $(B3 - B11)/(B3 + B11)$



Scene classification map

Classification of Sentinel2 data as result of ESA's Scene classification algorithm



Discover

Visualize

Compare

Pins

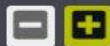
Drag bands into the index equation

Grid of satellite bands: B01, B02, B03, B04, B05, B06, B07, B08, B09, B11, B12, B8A

Index (A-B)/(A+B)

$$\left( \text{B05} - \text{B11} \right) / \left( \text{B05} + \text{B11} \right)$$

Threshold





EO Browser

ENGLISH

Hello, Yevgen Gazyetov

Discover Visualize Compare Pins

Dataset: Sentinel-2 L2A **Show L1C**

Date: 2021-10-11 **Timespan**

True color  
Based on bands 4,3,2

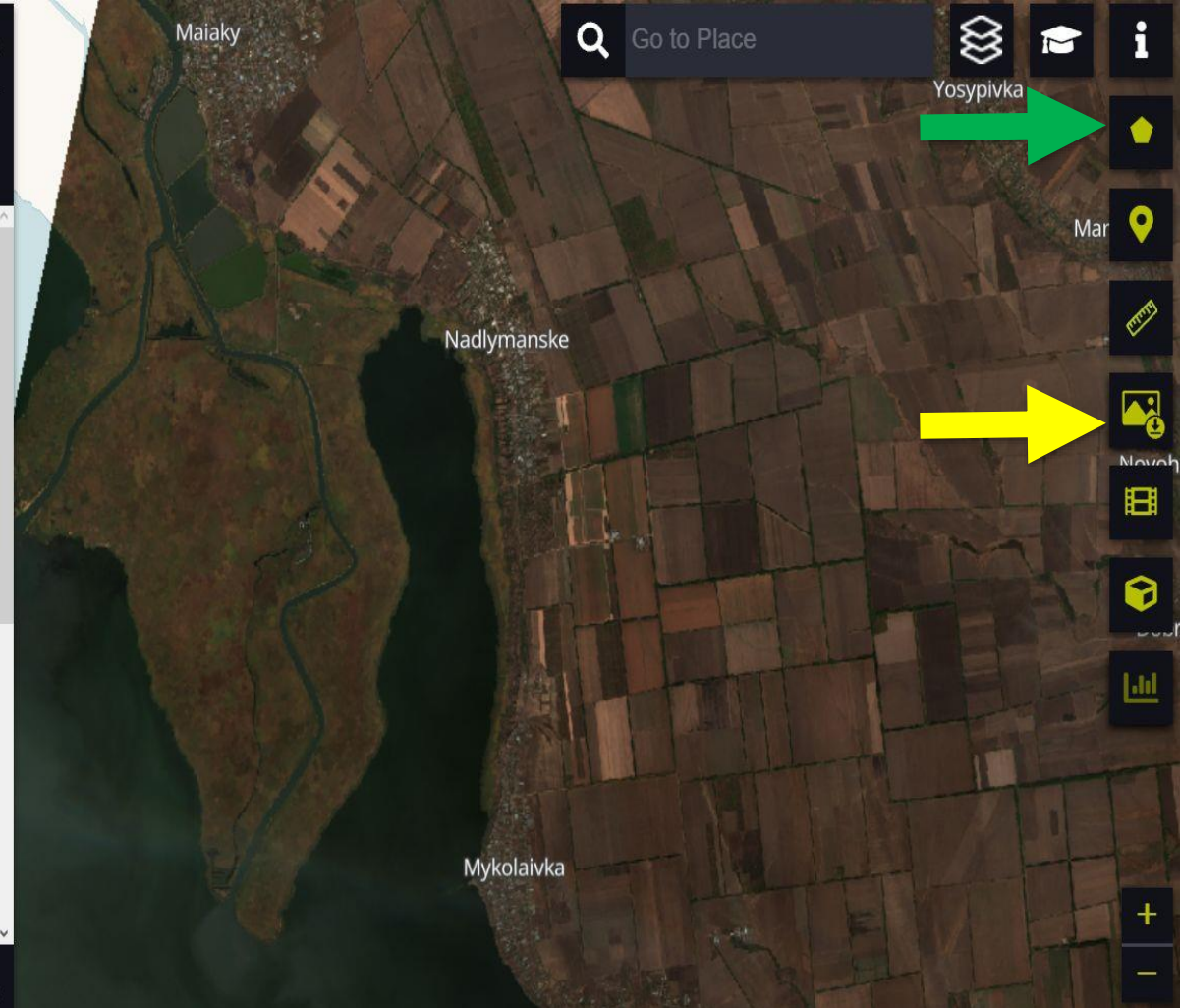
False color  
Based on bands 8,4,3

NDVI  
Based on combination of bands  $(B8 - B4)/(B8 + B4)$

False color (urban)  
Based on bands 12,11,4

Moisture index  
Based on combination of bands  $(B8A - B11)/(B8A + B11)$

Powered by Sentinel Hub with contributions by ESA



Go to Place

Yosypivka


Map icon

+


-




## Image download

Show captions 



Add map overlays 



Show legend 




Description 



Image format:

JPG (no georeference)



Image width [inches]:


33,1

Image height [inches]:

16,0

DPI:

300

 Download

EO Browser

ENGLISH

Hello, Yevgen Gazyetov

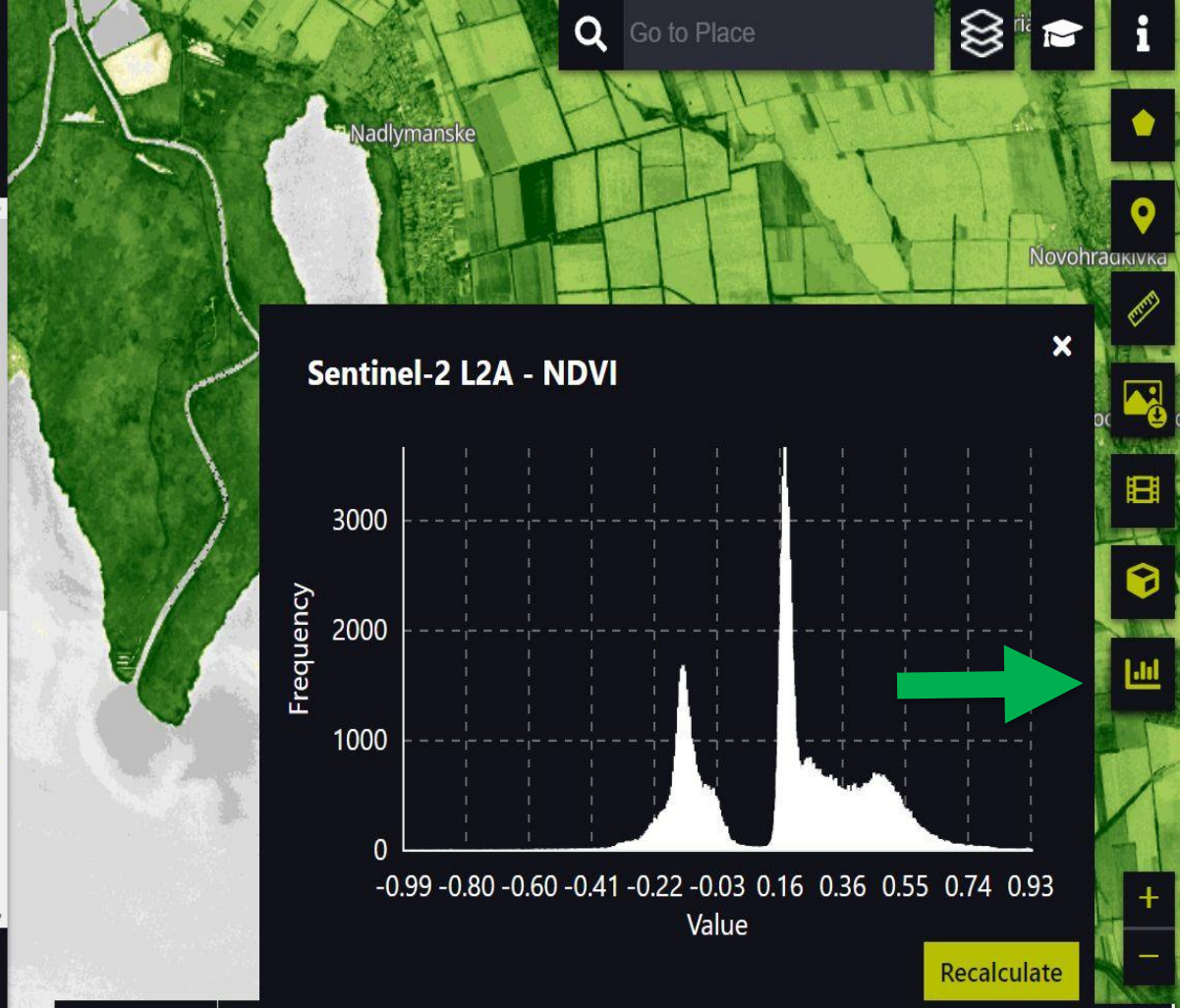
Discover Visualize Compare Pins

Dataset: Sentinel-2 L2A **Show L1C**

Date: 2021-10-11 **Timespan**

- True color  
Based on bands 4,3,2
- False color  
Based on bands 8,4,3
- NDVI**  
Based on combination of bands  $(B8 - B4)/(B8 + B4)$
- False color (urban)  
Based on bands 12,11,4
- Moisture index  
Based on combination of bands  $(B8A - B11)/(B8A + B11)$

Powered by Sentinel Hub with contributions by ESA v3.11.2



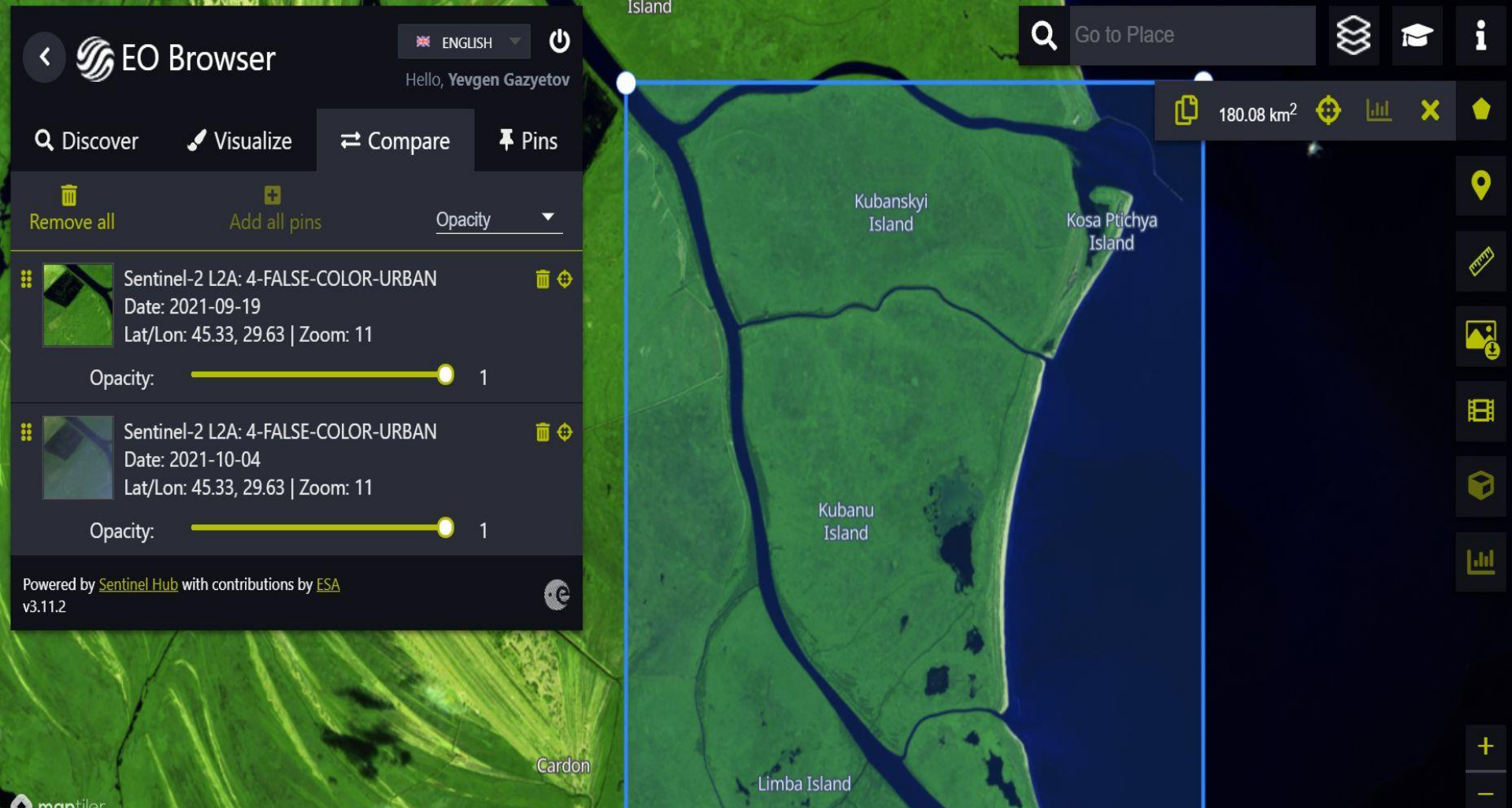
Sentinel-2 L2A: 4-FALSE-COLOR-URBAN  
 Date: 2021-09-19  
 Lat/Lon: 45.33, 29.63 | Zoom: 11

Opacity: 1

Sentinel-2 L2A: 4-FALSE-COLOR-URBAN  
 Date: 2021-10-04  
 Lat/Lon: 45.33, 29.63 | Zoom: 11

Opacity: 1

180.08 km<sup>2</sup> [Measurement icons]



Kubanskyi Island

Kosa Ptichya Island

Kubanu Island

Limba Island

Cardon



# Дякую за увагу!

Одеський національний університет  
ім. І.І. Мечникова, Регіональний центр інтегрованого моніторингу  
і екологічних досліджень,  
7, пров. Маяковського, Одеса, 65082, Україна  
Тел: +380487230120 e-mail: gazetov@gmail.com

Проект «Екологічний моніторинг в басейні Чорного моря з  
використанням продуктів програми Копернікус» (PONTOS)  
e-mail: pontos@onu.edu.ua