



Remote environmental monitoring and data collection, 16 November 2023

Training of Experts to Assess Soils Damaged due to Hostilities

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Conflict and Environment Observatory - www.ceobs.org



For the next hour.....

1. Brief introduction to CEOBS
2. Methods for remote data collection and analysis
 - 2a. Social Media Analysis
 - 2b. Satellite image analysis
3. Q/A

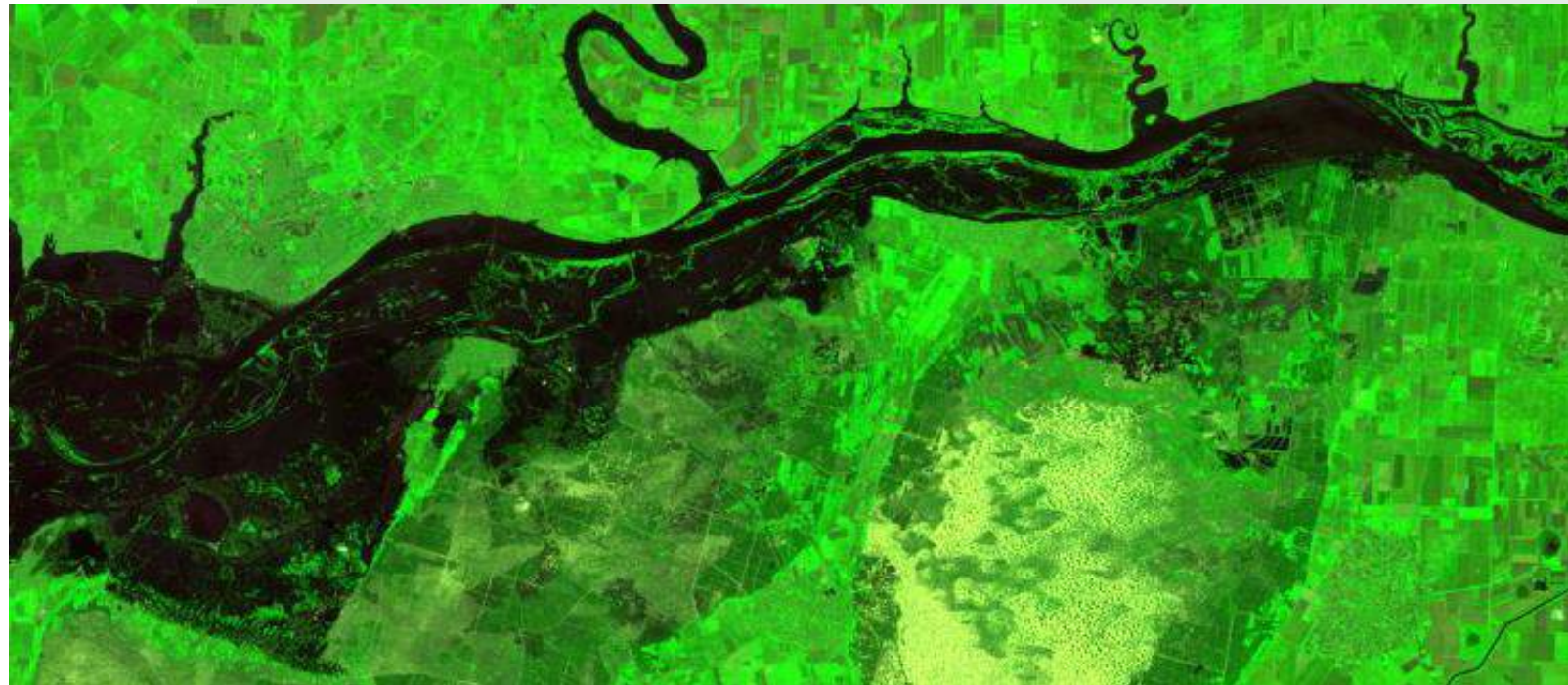




Conflict and Environment Observatory

CEOBS is a UK charity working to increase the protection of people and ecosystems from the impact of armed conflicts and military activities

www.ceobs.org, Hebden Bridge, West Yorkshire



Why do we collect environmental data?



Protection of the environment in relation to armed conflicts

Joint civil society submission to the Secretary General of the International Law Commission following First Reading
May 2021





Joint statement

Oct
7
2022

The potential role of a science-policy panel in addressing the health and ecological impact of conflict pollution and toxic war.

Joint statement on conflict pollution,

Joint statement on the potential role of a science-policy panel in addressing the health and ecological impact of conflict pollution and the toxic remnants of war.

Biological Diversity on mainstreaming biodiversity goals into mine action.

Apr
28
2023

April 2023



Mine action can promote biodiversity goals in conflict-affected areas.

Joint submission to the Convention on Biological Diversity explaining how mine action can promote biodiversity goals in fragile and conflict-affected areas.



Joint statement | Plan to address the environmental impact of war in Ukraine

Joint statement on the first anniversary of the invasion of Ukraine with recommendations for the international community aimed at mitigating harm, at preventing further environmental degradation, and at ensuring the future restoration of Ukraine's environment.



Projects in Ukraine

- Incidents database (1270)
- UNEP Ukraine project – training personnel of State Environmental Inspectorate
- NPA project ‘Protecting the environment in armed conflict in Ukraine,’
- GROMADA Erasmus+ project ‘European universities supporting legal and community capacities for Ukraine’s environmental recovery’
- OSCE report



Outside Ukraine's Borders



Energy Policy



Military spending and GHG emissions



Distraction from global environmental and climate governance



Food security



Industrial attacks in Russia

Forest fires in Russia



Top level review

- We are witnessing a **high intensity international armed conflict in a highly industrialised country**.
- We have already seen a great deal of damage to military, industrial, energy and commercial sites, and civilian infrastructure, which has the potential to harm the environment.
- Much of Ukraine's industrial and military infrastructure is located within or in close proximity to urban areas, which suffer the impacts from direct hits, and also from intense indiscriminate bombardment by Russia.
- This has created a heightened risk of serious air, water and soil pollution, and in certain places environmental emergencies associated with environmentally hazardous infrastructure.





[Credit: SES of Ukraine](#)

Foam production plant

Kyiv | 3rd March



[Credit: UkraineNow](#)

Chemical Industry

Rubhizne | 10th April



[Credit: truexanewsua](#)

Fuel Storage

Odesa | 4th April



[Credit: Planet Labs](#)

Logistics warehouses

Brovary | 22nd March



[Credit: SES of Ukraine](#)

Thermal Power Plant

Okhtyrka | 10th March



[Credit: Sentinel Hub. Contains modified Copernicus data \(2022\)](#)

Food Factory

Chernihiv | 23rd March



Foam production plant
Kyiv, Location



Chemical Industry
Rubhizne | 10th April



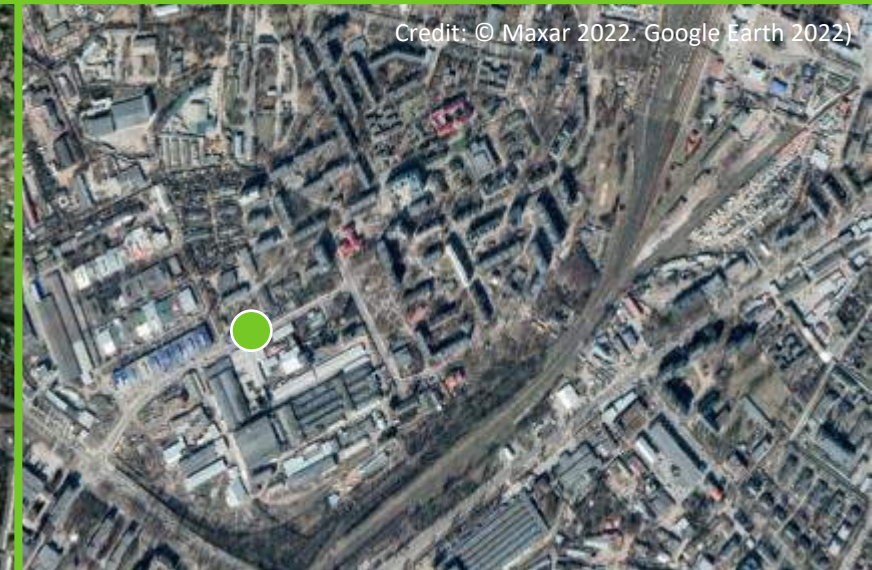
Fuel Storage
Odesa | 4th April



Logistics warehouses
Brovary | 22nd March



Thermal Power Plant
Okhtyrka | 10th March



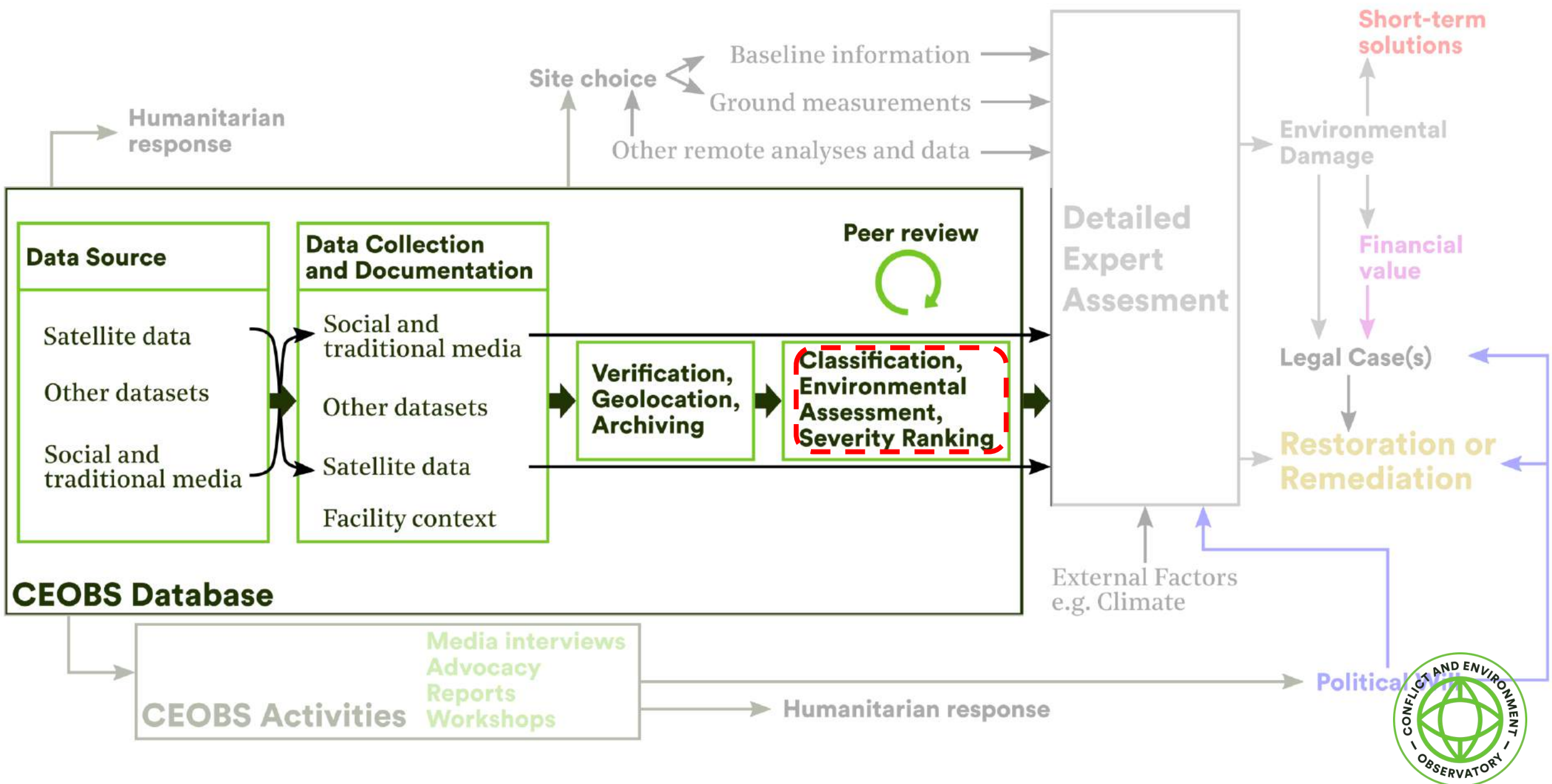
Food Factory
Chernihiv | 23rd March

STEP 1: Research the incident		STEP 2: Documentation	STEP 3: Address Religion	STEP 4: Location	STEP 5: Facility Identification				STEP 6: Impact Assessment					STEP 7: Submit for review	STEP 8: CEOS's review	STEP 9: Revisions	STEP 10: Environmental Risk						
A. Does it already exist in the database? Search by Inc		B. Not found?		C. Facility information automatically filed in the user input required				A. Damage Type		B. Air Pollution		C. Water		D. Soil		E. Other		STEP 7: Submit for review	STEP 8: CEOS's review	STEP 9: Revisions	STEP 10: Environmental Risk		
A. Search by coordinates (ignore if unknown, move onto [D]) Click to search, optional return		B. If not found, search by facility name enter search term optional return		C. If not found, search by location name enter search term optional return		Add New		Classification		i. Fire present? ii. Fire present? iii. Fire present? iv. Fire present? v. Fire present?		i. In close proximity to water? ii. In close proximity to water? iii. In close proximity to water?		i. Visible release of materials onto soil? ii. Visible release of materials onto soil? iii. Visible release of materials onto soil?		i. Suspected Military presence Abandoned facility		Refuse	Date	Analyst	Date	Analyst	High Very High
0511	get out of the study area?	Mass/Therac.com/Therac		3 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0512		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0513		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0514		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0515		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0516		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0517		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0518		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0519		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0520		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0521		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0522		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0523		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0524		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0525		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0526		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0527		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0528		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0529		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0530		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0531		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0532		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0533		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0534		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0535		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0536		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0537		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0538		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0539		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0540		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0541		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0542		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0543		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0544		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0545		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0546		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0547		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0548		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0549		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019
0550		Mass/Therac.com/Therac		19 May	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019	019

CEOBS incidents database

- Not publicly open (1270 incidents)
- Incidents peer-reviewed
- User guide, help videos, FAQ's produced
- Mostly within google suite – some external coding required



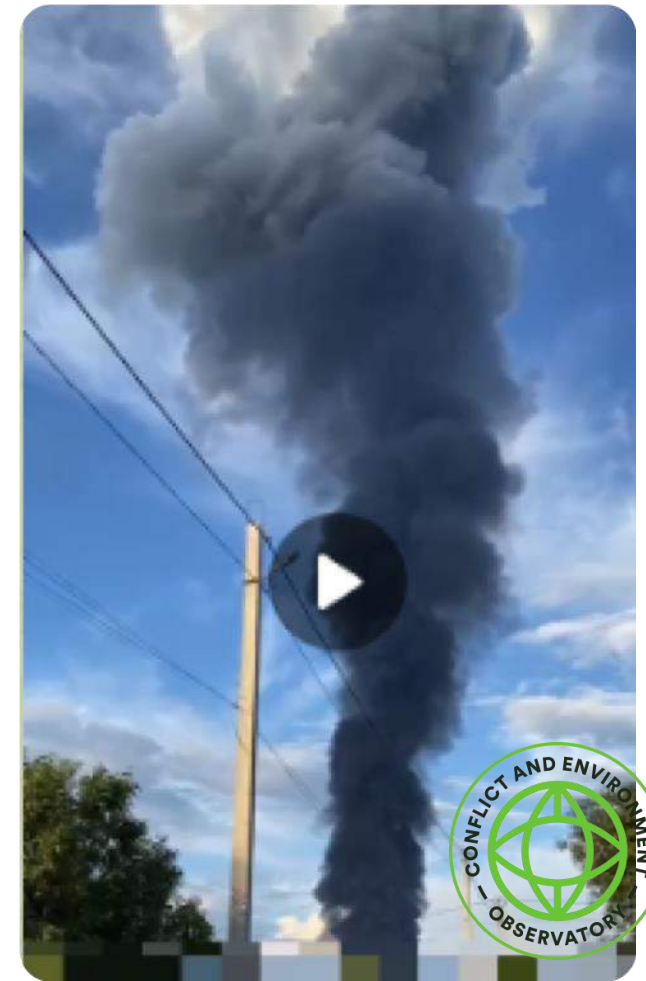


Example: Identifying damage and harm from satellite imagery

Brief Description: Fire at mini refinery over multiple days

Location: Hubynykha, Dnipropetrovsk Oblast, 48.8155, 35.2825

Date of Incident: 18 June 2022



Google maps (48.8155, 35.2825)



Social media information

- Telegram channels, Twitter aggregator accounts, Facebook, V Kontakte, LinkedIn, TikTok etc...
- From both Ukrainian and Russian sources
- National level and city or regional level channels
- Government spokespeople and departments, domestic civil society
- Twitter - (Губиниха OR Hubynukha OR Dnipro) until:2022-06-19 since:2022-07-18
- Google Image search, Google lens – Images, video

The image shows a screenshot of a Telegram channel named "ДСНС України" (State Emergency Service of Ukraine), which has 102,405 subscribers. The channel's interface is in dark mode. On the left, a list of messages is visible, including updates from various Ukrainian media outlets and government agencies like "Киев INFO", "ТРУХА", "Типичный Донецк", "Укренерго", "Одесса INFO", "Pravda Gerashch...", "ЛуганскИнформ...", "Національна...", "ТРУХА", "Енергоатом", "ТРУХА", "Ukraine NOW", "МВС України", and "ДСНС України". The main content area shows a pinned message with the text: "Нагадуємо, що у WhatsApp працює чат бот Державної служби України з надзв...". Below the pinned message are two photographs: the top one shows a large fire at night with thick black smoke rising from a building, and the bottom one shows firefighters in yellow gear working at the scene of a destroyed building. The pinned message text continues: "Оперативна інформація. Київська область 12 березня о 03:50 у с. Квітневе Броварського району внаслідок обстрілу виникла пожежа складу зберігання замороженої продукції. Попередньо жертв та постраждалих немає. Від ДСНС залучено 20 осіб та 4 од. техніки." At the bottom of the screen, there are buttons for "UPDATE TELEGRAM" and "MUTE".

Mapping, Satellite, Street View and Location-Based Information (1)

- Google Maps
- Google Earth Pro
- Yandex
- Satellites Pro
- Big maps
- Open Street Maps
- Wikimapia
- Dual Maps
- Map Carta

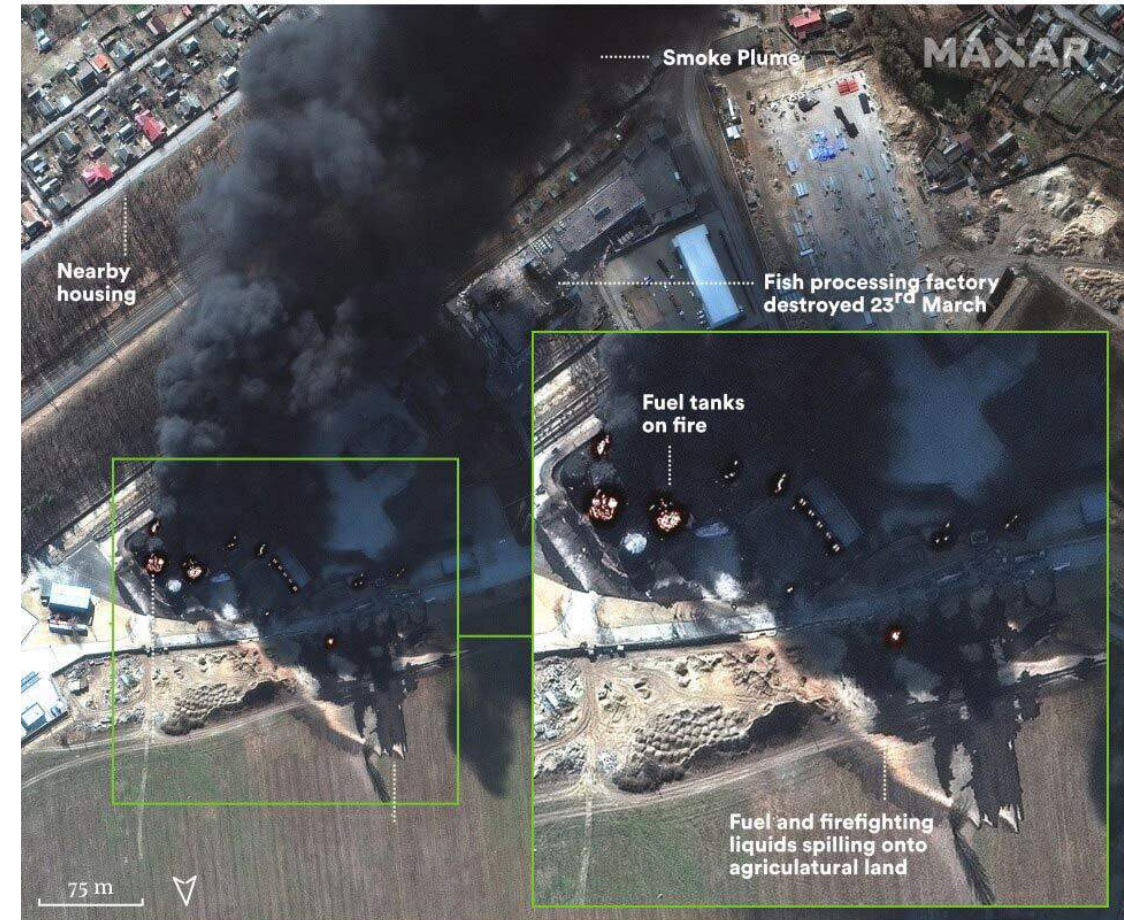


Satellite Data

- Open sources satellite imagery and data: **Sentinel-2** and **Sentinel-3**, **Landsat**, **MODIS**, **SEVIRI** – of differing resolution, frequency, and speed of availability
- Augmented by higher-resolution commercial imagery: **Planet Explorer**, **Maxar**, **Satellopic**
- Open source satellite data: **Fire hotspots (FIRMS)**, **Radar products** (Sentinel-1 e.g. for oil spills), air pollution (**Sentinel 5P**), **altimetry for water levels**
- **DamageUA** website, **Ukraine Observer**

Large fire at the oil depot in Kalynivka, near Kyiv, 24th March 2022

Visible in very high resolution satellite imagery. Imagery (C) Maxar 2022.



Graphic produced by the Conflict and Environment Observatory.





©Maxar, Google Earth
0.3 m resolution
20 April 2019



25 m

Planet Labs – After, 8 August 2022



Blackened Cropland

Biogas bags

**Large Storage
Tanks**

Debris

Earthworks

**Destroyed
Building**

Crater

**Small Storage
Tanks**

Earthworks

**Planet SkySat imagery
0.5 m resolution
8 August (50 days later)**



Sentinel-2 basic features

Sentinel-2 uses multispectral imagery with 13 bands, the combinations of which are used to better understand specific features of the imagery to explore vegetation, agriculture, geological characteristics.

Band	Resolution	Central Wavelength	Description
B1	60 m	443 nm	Ultra Blue (Coastal and Aerosol)
B2	10 m	490 nm	Blue
B3	10 m	560 nm	Green
B4	10 m	665 nm	Red
B5	20 m	705 nm	Visible and Near Infrared (VNIR)
B6	20 m	740 nm	Visible and Near Infrared (VNIR)



B7	20 m	783 nm	Visible and Near Infrared (VNIR)
B8	10 m	842 nm	Visible and Near Infrared (VNIR)
B8a	20 m	865 nm	Visible and Near Infrared (VNIR)
B9	60 m	940 nm	Short Wave Infrared (SWIR)
B10	60 m	1375 nm	Short Wave Infrared (SWIR)
B11	20 m	1610 nm	Short Wave Infrared (SWIR)
B12	20 m	2190 nm	Short Wave Infrared (SWIR)



Sentinel-2 – true color imagery

Before, 16 June 2022 – closeup of the affected area

The screenshot displays the EO Browser interface. The left sidebar shows the dataset 'Sentinel-2 L2A' and the date '2022-06-15'. The visualization options include 'True color' (selected), 'False color', 'Highlight Optimized Natural Color', 'NDVI', 'False color (urban)', and 'Moisture index'. The main map area shows a closeup of an urban area with a building and a road. The right sidebar contains various tools like 'Go to Place', 'Education', 'Layers', 'Info', 'Home', 'Share', 'Location', 'Measure', 'Download', 'Fullscreen', '3D', and 'Legend'. The bottom of the interface includes a 'Discover Copernicus Browser' banner and a footer with 'About EO Browser', 'Contact us', 'Get data', and coordinates 'Lat: 48.813210, Lng: 35.283949'.

EO Browser

ENGLISH Login

Discover Visualize Compare Pins

Dataset: Sentinel-2 L2A Show L1C

Date: 2022-06-15 Timespan

True color
Based on bands 4,3,2

False color
Based on bands 8,4,3

Highlight Optimized Natural Color
Enhanced natural color visualization

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 $(B8A - B11)/(B8A + B11)$

Free sign up for all features

Powered by Sentinel Hub with contributions by ESA
v3.48.4

Discover Copernicus Browser

About EO Browser Contact us Get data

Lat: 48.813210, Lng: 35.283949 50 m

Sentinel-2 – true color imagery

During, 20 June 2022 – closeup of the affected area

The image shows a screenshot of the EO Browser web application. The interface is dark-themed and includes the following elements:

- Top Left:** EO Browser logo, language selector (ENGLISH), and a Login button.
- Navigation:** Discover, Visualize (active), Compare, and Pins buttons.
- Dataset:** Sentinel-2 L2A, with a Show L1C button.
- Date:** 2022-06-20, with a Timespan selector.
- Visualization Options:**
 - True color (Based on bands 4,3,2) - Selected
 - False color (Based on bands 8,4,3)
 - Highlight Optimized Natural Color (Enhanced natural color visualization)
 - 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 $(B8A - B11)/(B8A + B11)$)
- Right Side:** Search bar (Go to Place), Education toggle, and various map controls (Home, Share, Location, Print, Download, Full Screen, 3D, Legend).
- Main Map:** Aerial view of an urban area with a closeup of a bright spot.
- Bottom:** Footer with "Discover Copernicus Browser" and "Powered by Sentinel Hub with contributions by ESA v3.48.4".

Sentinel-2 – true color imagery

After, 5 July 2022 – closeup of the affected area

The image shows a screenshot of the EO Browser interface displaying Sentinel-2 L2A true color imagery. The interface includes a left sidebar with navigation and visualization options, a top navigation bar, and a right sidebar with map controls. A white arrow points to a bright, charred area in the imagery, labeled "Destroyed storage tanks, charred area".

EO Browser Interface Elements:

- Top Bar:** EO Browser logo, Language (ENGLISH), Login, Go to Place search, Education toggle, and map controls (Layers, Info, Home, Share, Location, Print, Download, 3D, Full Screen).
- Left Sidebar:**
 - Discover, Visualize, Compare, Pins
 - Dataset: Sentinel-2 L2A (Show L1C)
 - Date: 2022-07-05 (Timespan)
 - Visualization Options:
 - True color (Based on bands 4,3,2)
 - False color (Based on bands 8,4,3)
 - Highlight Optimized Natural Color (Enhanced natural color visualization)
 - 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 $(B8A - B11)/(B8A + B11)$)
 - Free sign up for all features
 - Powered by Sentinel Hub with contributions by ESA
 - Discover Copernicus Browser
- Right Sidebar:** +, - (Zoom controls)
- Bottom Bar:** About EO Browser, Contact us, Get data, Lat: 48.813391, Lng: 35.284655, 50 m

Sentinel-2 – measuring the smoke plume length and potential area of pollution transfer to assess soils which may be affected by airborne pollution

The screenshot displays the EO Browser interface. The main view is a satellite image of an industrial facility with a prominent smoke plume extending to the right. The interface includes a left sidebar with the following elements:

- EO Browser logo and language selector (ENGLISH).
- Navigation tabs: Discover, Visualize, Compare, Pins.
- Dataset: Sentinel-2 L2A (with a Show L1C button).
- Date: 2022-06-20 (with a Timespan selector).
- Visualization options:
 - True color (Based on bands 4,3,2)
 - False color (Based on bands 8,4,3)
 - Highlight Optimized Natural Color (Enhanced natural color visualization)
 - 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 $(B8A - B11)/(B8A + B11)$)
- Footer: Free sign up for all features, Powered by Sentinel Hub with contributions by ESA, v3.48.4.

The top navigation bar includes a search field (Go to Place), an Education toggle, and a layer stack icon. The right sidebar contains various map tools: Home, Share, Location, Measure, Download, 3D, and Legend. The bottom status bar shows the current location (Lat: 48.80808, Lng: 35.29388) and a 300m scale bar.

Smoke plume area

EO Browser | ENGLISH | Hello, Iryna Babanina

Discover | Visualize | Compare | Pins

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

Date: 2022-06-20 | Timespan

True color (Based on bands 4,3,2)
False color (Based on bands 8,4,3)
Highlight Optimized Natural Color (Enhanced natural color visualization)
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](#) | v3.48.4

Discover Copernicus Browser

48.815349, 35.282409 | Education | 2.40 km 0.14 km²

Lat: 48.80834, Lng: 35.29012 | 300 m

About EO Browser | Contact us | Get data

Sentinel-2 – using false color combinations

- False color image based on bands B8 (visible and near infrared, 842 nm wavelength), B4 (red, 665 nm) and B3 (green, 560 nm) is meant to emphasize healthy and unhealthy vegetation.
- By using the near-infrared (B8) band, it's especially good at reflecting chlorophyll. This is why in a color infrared image, denser vegetation is red.
- Built areas appear grey or white. False colors combination also helps identify destroyed buildings - makes the shapes of the structures stand out from the vegetation-covered background.
- Water appears dark.



False colors - before, 15 June 2022

EO Browser | ENGLISH | Login

Discover | Visualize | Compare | Pins

Dataset: Sentinel-2 L2A | Show L1C

Date: 2022-06-15 | Timespan

True color
Based on bands 4,3,2

False color
Based on bands 8,4,3

Highlight Optimized Natural Color
Enhanced natural color visualization

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 $(B8A - B11)/(B8A + B11)$

Free sign up for all features

Powered by Sentinel Hub with contributions by ESA
v3.48.4

Discover Copernicus Browser

Go to Place | Education | 3D | + | -

Built area, oil reservoirs

Fire pond

About EO Browser | Contact us | Get data

Lat: 48.81009, Lng: 35.28712 | 100 m

False colors - during, 20 June 2022

EO Browser ENGLISH Login

Discover Visualize Compare Pins

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

Date: 2022-06-20 Timespan

- True color
Based on bands 4,3,2
- False color**
Based on bands 8,4,3
- Highlight Optimized Natural Color
Enhanced natural color visualization
- 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 $(B8A - B11)/(B8A + B11)$

Free sign up for all features

Powered by [Sentinel Hub](#) with contributions by [ESA](#)

Discover **Copernicus** Browser

Go to Place Education

3D

Lat: 48.80989, Lng: 35.28644 100 m

About EO Browser Contact us Get data

False colors - after, 5 July 2022

EO Browser | ENGLISH | Login

Discover | Visualize | Compare | Pins

Dataset: Sentinel-2 L2A | Show L1C

Date: 2022-07-05 | Timespan

- True color
Based on bands 4,3,2
- False color**
Based on bands 8,4,3
- Highlight Optimized Natural Color
Enhanced natural color visualization
- 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 $(B8A - B11)/(B8A + B11)$

Free sign up for all features

Powered by Sentinel Hub with contributions by ESA

Discover Copernicus Browser

Go to Place | Education | 3D

Dried out/polluted crops

Charred and burnt-out territory of the enterprise

About EO Browser | Contact us | Get data

Lat: 48.81018, Lng: 35.28776 | 100 m

Sentinel-2 – using SWIR (short-wave infrared)

- The short-wave infrared band combination uses SWIR (B12 band, 2190 nm), NIR (B8A, 865 nm), and red (B4, 665 nm).
- This composite shows vegetation in various shades of green. In general, darker shades of green indicate denser vegetation.
- Brown is indicative of bare soil and built-up areas.
- This combination also shows active fires and smoldering (thermal anomalies).



SWIR - before, 15 June 2022

The screenshot displays the EO Browser interface with a SWIR (Short-Wave Infrared) satellite image of an urban area. The interface is divided into several sections:

- Top Navigation:** Includes a search bar labeled "Go to Place", a language dropdown set to "ENGLISH", a "Login" button, and an "Education" toggle switch.
- Left Sidebar:** Contains a list of visualization options:
 - False color (Based on bands 8,4,3)
 - Highlight Optimized Natural Color (Enhanced natural color visualization)
 - 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)** - This option is currently selected and highlighted in yellow.
 - NDWI (Based on combination of bands $(B3 - B8)/(B3 + B8)$)
 - NDSI (Based on combination of bands $(B3 - B11)/(B3 + B11)$)
 - Scene classification map
- Right Sidebar:** Features utility icons for home, share, location, print, download, film, 3D, and a bar chart.
- Main View:** Shows a false-color SWIR image of an urban area, where vegetation appears bright green and urban structures are in shades of purple and blue.
- Bottom Status Bar:** Includes system icons (Wi-Fi, battery, etc.), a scale bar indicating "100 m", and footer links for "About EO Browser", "Contact us", and "Get data".

SWIR - during, 20 June 2022

EO Browser

ENGLISH Login

Discover Visualize Compare Pins

Dataset: Sentinel-2 L2A [Show L1C](#)

Date: 2022-06-20 Timespan

- True color
Based on bands 4,3,2
- False color
Based on bands 8,4,3
- Highlight Optimized Natural Color
Enhanced natural color visualization
- 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 $(B8A - B11)/(B8A + B11)$

[Free sign up](#) for all features

Powered by [Sentinel Hub](#) with contributions by [ESA](#)
v3.48.4

Discover Copernicus Browser



SWIR - after, 5 July 2022

The image shows a screenshot of the EO Browser web application. The interface includes a top navigation bar with a search bar, a language dropdown set to 'ENGLISH', and a 'Login' button. Below this is a secondary navigation bar with 'Discover', 'Visualize', 'Compare', and 'Pins' options. A left sidebar lists various visualization options, with 'SWIR' (Based on bands 12,8A,4) selected and highlighted. The main area displays a satellite image of an industrial site. Two white arrows point to specific areas: one to a dark, irregularly shaped area labeled 'Charred territory of the enterprise', and another to a lighter, more uniform area labeled 'Affected vegetation'. The right sidebar contains various tool icons, including a search icon, a location pin, a 3D view toggle, and a legend. At the bottom, there are links for 'About EO Browser', 'Contact us', and 'Get data', along with a status bar showing coordinates (Lat: 48.81005, Lng: 35.28889) and a scale of 100 m.

EO Browser

ENGLISH Login

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.

Custom
Create custom visualization

Free sign up for all features

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v3.48.4

Discover Copernicus Browser

About EO Browser Contact us Get data

Go to Place

Education

Affected vegetation

Charred territory of the enterprise

Lat: 48.81005, Lng: 35.28889 100 m

Sentinel-2 – using NDVI (Normalized Difference Vegetation Index)

- NDVI uses near-infrared (which vegetation strongly reflects) and red light (which vegetation absorbs), to quantify the amount of vegetation.
- The formula for the normalized difference vegetation index is $(B8 - B4) / (B8 + B4)$.
- High values suggest dense vegetation cover, low or negative values indicate urban and water features.
- May also be used to distinguish between built and green areas in darker images.



NDVI - before, 15 June 2022

EO Browser ENGLISH Login

Discover Visualize Compare Pins

- True color
Based on bands 4,3,2
- False color
Based on bands 8,4,3
- Highlight Optimized Natural Color
Enhanced natural color visualization
- 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 $(B3 - B8)/(B3 + B8)$

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Discover **Copernicus** Browser

Go to Place Education

3D

Lat: 48.81004, Lng: 35.28778 100 m

About EO Browser Contact us Get data

NDVI - during, 20 June 2022

EO Browser | ENGLISH | Login

Discover | Visualize | Compare | Pins

Dataset: Sentinel-2 L2A | Show L1C

Date: 2022-06-20 | Timespan

- True color
Based on bands 4,3,2
- False color
Based on bands 8,4,3
- Highlight Optimized Natural Color
Enhanced natural color visualization
- 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 $(B8A - B11)/(B8A + B11)$

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Discover Copernicus Browser

Go to Place | Education | 3D | + | -

May suggest vegetation drying-up in an area adjacent to the fire

Lat: 48.81066, Lng: 35.28808 | 100 m

About EO Browser | Contact us | Get data

NDVI - after, 5 July 2022

The screenshot displays the EO Browser interface. On the left, the navigation panel shows the dataset 'Sentinel-2 L2A' and the date '2022-07-05'. The 'Visualize' tab is active, showing a list of visualization options: True color, False color, Highlight Optimized Natural Color, NDVI (selected), False color (urban), and Moisture index. The NDVI option is described as 'Based on combination of bands (B8 - B4)/(B8 + B4)'. The main map area shows a satellite image with an NDVI overlay. A black outline highlights a specific area in the upper right, and a white arrow points to it. The text 'The same pollution pattern is visible - the damaged crops remain darker as the field ripens' is overlaid on the map. The interface includes a search bar at the top right, a 'Go to Place' button, and various utility icons on the right side. The bottom of the screen shows the 'Discover Copernicus Browser' banner and footer information including 'Powered by Sentinel Hub with contributions by ESA v3.48.4' and 'About EO Browser Contact us Get data'.

EO Browser

ENGLISH Login

Discover Visualize Compare Pins

Dataset: Sentinel-2 L2A Show L1C

Date: 2022-07-05 Timespan

True color
Based on bands 4,3,2

False color
Based on bands 8,4,3

Highlight Optimized Natural Color
Enhanced natural color visualization

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 $(B8A - B11)/(B8A + B11)$

Free sign up for all features

Powered by Sentinel Hub with contributions by ESA
v3.48.4

Discover Copernicus Browser

Go to Place

Education

The same pollution pattern is visible - the damaged crops remain darker as the field ripens

About EO Browser Contact us Get data

Lat: 48.81038, Lng: 35.28668 100 m

FIRMS – Fire Information for Resource Management System

The Fire Information for Resource Management System (FIRMS) distributes near-realtime active fire data from the Moderate Resolution Imaging Spectroradiometer (MODIS) aboard the Aqua and Terra satellites, and the Visible Infrared Imaging Radiometer Suite (VIIRS) aboard S-NPP and NOAA 20. Globally these data are available within 3 hours of satellite observation, but for the US and Canada active fire detections are available in real-time.

Fire Map:

<https://firms.modaps.eosdis.nasa.gov/map>

Fire Map mirror website:

<https://firms2.modaps.eosdis.nasa.gov/map>



FIRMS

Lat: -50.923°, Lon: 76.500°

LOCATION TOOL

Current Location Find Location Saved Locations

Search for location or enter coordinates

Allow multiple location selection

LAYERS

Orbit Tracks and Overpass Times +

Overlays -

Latitude-Longitude Lines + i

Coastlines / Borders / Roads - BASIC + i

Borders / Roads - DETAILED + i

Human Built-up And Settlement Extent + i

Protected Areas + i

European Regional PAs + i

Backgrounds -

Topographic i

BASIC MODE

TODAY 24HRS 7DAYS 24HRS From [Yesterday 00:00:00 UTC] to present

Fires / Hotspots ? -

Simple Time Based

Landsat [30m] i

VIIRS (S-NPP & NOAA-20) [375m] i

MODIS (Aqua & Terra) [1km] i

Overlays ? +

Dynamic Imagery ? -

VIIRS NOAA-20 Corrected Reflectance (true color) i

VIIRS S-NPP Corrected Reflectance (true color) i

MODIS/Aqua Corrected Reflectance (true color) i

MODIS/Terra Corrected Reflectance (true color) i

Static Backgrounds ? -

Blue Marble i

Location

Information layers

Measuring tool

2000 km
1000 mi

MEASURE LOCATION LAYERS TIMELINE CAPTURE SHARE HELP MAXIMIZE



FIRMS

Modes:

- Basic mode – daily information
- Advanced mode – updated every few hours

Layers:

- The Coastlines/Borders/Roads layer is a reference layer that displays global coastlines, country borders, first order administrative boundaries and major roads.
- Human Built-up And Settlement Extent layer is from the Global Human Built-up And Settlement Extent (HBASE) Dataset from Landsat.
- Protected Areas and European Regional Pas - these layers are from the World Database on Protected Areas (WDPA) (August 2023), the most comprehensive global database of marine and terrestrial protected areas.



Губиниха on Google Maps

Шукати на Картах Google

Ресторани Готелі Чим зайнятися Музеї Транспорт Аптеки Банкомати

Збережені
Останні
Губиниха

вулиця Вокзальна
вулиця Вокзальна

Шари

Губиниха
Дніпропетровська обл...
48.814732, 35.279895

Зображення: © CNES / Airbus, Maxar Technologies, 2023, Картографічні дані: © Google, 2023. Україна Умови використання Конфіденційність Відгук про продукт 50 м

The image is a screenshot of the Google Maps interface. At the top, there is a search bar with the text "Шукати на Картах Google" and a search icon. To the right of the search bar are several category buttons: "Ресторани" (Restaurants), "Готелі" (Hotels), "Чим зайнятися" (Things to do), "Музеї" (Museums), "Транспорт" (Transport), "Аптеки" (Pharmacies), and "Банкомати" (ATMs). On the left side, there is a vertical menu with icons for "Збережені" (Saved), "Останні" (Recent), and "Губиниха" (Gubyniha). The main area shows an aerial satellite view of an industrial or residential area. A location card is visible at the bottom center, displaying the name "Губиниха", the region "Дніпропетровська обл..." (Dnipropetrovsk region), and the coordinates "48.814732, 35.279895". The card also includes a location pin icon and a share icon. At the bottom right, there are navigation controls including a compass, zoom in (+) and zoom out (-) buttons, and a street view pegman icon. The bottom status bar contains copyright information: "Зображення: © CNES / Airbus, Maxar Technologies, 2023, Картографічні дані: © Google, 2023." followed by "Україна", "Умови використання", "Конфіденційність", "Відгук про продукт", and a scale bar for "50 м".

FIRMS data on 18 June 2022

NASA FIRMS
Fire Information for Resource Management System

Quick Search Announcements Feedback

Lat: 48.732°, Lon: 35.455°

LOCATION TOOL

Current Location Find Location Saved Locations

48.815078, 35.280048
Lat: 48.815078, Lon: 35.280048

Allow multiple location selection Clear All

Novomoskovskiy rayon, Dniprope
Gubinikha, Novomoskovskiy Rayon,
Dnipropetrovska Oblast, UKR
Lat: 48.815, Lon: 35.28

+ SAVE LOCATION

ADVANCED MODE

1hr 4hrs Today ~24hrs 7days

DAILY SUB-DAILY

Jun 18 2022 1 day

Fires / Hotspots

Simple Time Based Custom

POLAR ORBITING **RECOMMENDED**

- OLI / Landsat [30m]
- VIIRS / NOAA-20 [375m]
- VIIRS / Suomi NPP [375m]
- MODIS / Aqua [1km]
- MODIS / Terra [1km]

GEOSTATIONARY **BETA**

NRT AND STANDARD (FOR RESEARCH)

Orbit Tracks and Overpass Times

MODIS Burned Area


MEASURE LOCATION LAYERS TIMELINE CAPTURE SHARE HELP MAXIMIZE

JUNE 2022 JULY 2022 JUN 18 2022

3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 1 2

1 DAY

FIRMS data on 19 June 2022

**FIRMS**
Fire Information for Resource Management System

[Quick Search](#) [Announcements](#) [Feedback](#)

Lat: 48.720°, Lon: 35.392°

MEASURE TOOL - AREA

AREA DISTANCE PAN CLEAR UNITS
KM [km]

Total Area: 2,08 km²

1 2,08 km²

ADVANCED MODE

1hr 4hrs Today ~24hrs 7days

DAILY SUB-DAILY

Jun 19 2022 1 day

Fires / Hotspots

Simple Time Based Custom

POLAR ORBITING **RECOMMENDED**

- OLI / Landsat [30m]
- VIIRS / NOAA-20 [375m]
- VIIRS / Suomi NPP [375m]
- MODIS / Aqua [1km]
- MODIS / Terra [1km]

GEOSTATIONARY **BETA**

NRT AND STANDARD (FOR RESEARCH)

Orbit Tracks and Overpass Times

MODIS Burned Area

2 km 2 mi

MEASURE LOCATION LAYERS TIMELINE CAPTURE SHARE HELP MAXIMIZE

JUNE 2022 JULY 2022 JUN 19 2022

3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 1 2

1 DAY

FIRMS data on 20 June 2022

NASA FIRMS
Fire Information for Resource Management System

Quick Search Announcements Feedback

Lat: 48.724°, Lon: 35.430°

LOCATION TOOL

Current Location Find Location Saved Locations

48.815078, 35.280048
Lat: 48.815078, Lon: 35.280048

Allow multiple location selection Clear All

Novomoskovskiy rayon, Dnipropetrovskaya Oblast, Ukraine
Gubinikha, Novomoskovskiy Rayon, Dnipropetrovskaya Oblast, UKR
Lat: 48.815, Lon: 35.28

+ SAVE LOCATION

ADVANCED MODE

1hr 4hrs Today ~24hrs 7days

DAILY SUB-DAILY

Jun 20 2022 1 day

Fires / Hotspots

Simple Time Based Custom

POLAR ORBITING **RECOMMENDED**

- OLI / Landsat [30m]
- VIIRS / NOAA-20 [375m]
- VIIRS / Suomi NPP [375m]
- MODIS / Aqua [1km]
- MODIS / Terra [1km]

GEOSTATIONARY **BETA**

NRT AND STANDARD (FOR RESEARCH)

Orbit Tracks and Overpass Times

MEASURE LOCATION LAYERS TIMELINE CAPTURE SHARE HELP MAXIMIZE

JUNE 2022 JULY 2022

3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 1 2



Sep
1
2022

Ukraine conflict environmental briefing: Water



Oct
20
2022

Explosive weapons use and the environmental consequences: Mapping environmental incidents in Ukraine



Apr
22
2015

The Ukraine conflict's legacy of environmental damage and pollutants



Dec
22
2017

Monitoring the monitors studying the Ukraine conflict's environmental impact



May
21
2020

Exploring environmental governance in eastern Ukraine



Mar
5
2022

Environmental trends in the Ukraine conflict, 10 days in



Oct
17
2022

Ukraine conflict environmental briefing: Industry



Feb
25
2022

Ukraine invasion: rapid overview of environmental issues



May
28
2016

UNEA-2 passes most significant UN resolution on conflict and the environment since 1992



Apr
27
2020

Are abandoned mines flooding in Ukraine's Donbas region?



Jul
28
2022

Sustainable recovery? First sustain interest in Ukraine's environment



Mar
7
2022

Legal accountability for environmental destruction in Ukraine



Jul
25
2022

Ukraine conflict environmental brief: Nuclear and radiation risks



Conflict and Environment Observatory

CEOBS is a UK charity working to increase the protection of people and ecosystems from the impact of armed conflicts and military activities.

Learn more about our work:

www.ceobs.org | [@ceobs_org](https://twitter.com/ceobs_org) | facebook.com/ceobs