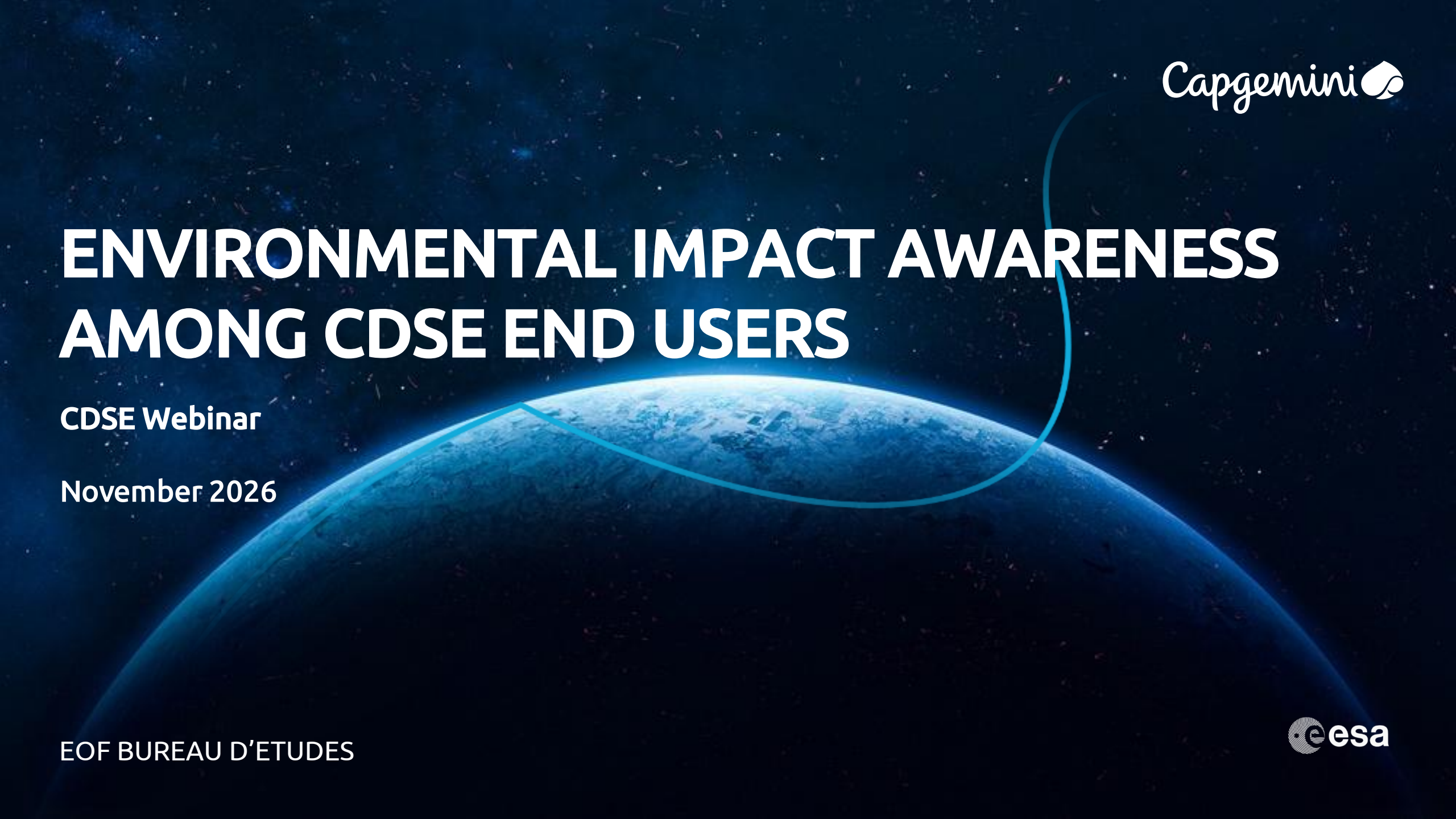


ENVIRONMENTAL IMPACT AWARENESS AMONG CDSE END USERS

CDSE Webinar

November 2026

EOF BUREAU D’ETUDES

Before we start,



This session is recorded

The replay will be available on the CDSE Documentation.



Mic and camera off

Sound clear for everyone & less video streaming.



Questions are welcome

Keep them for the live Q&A (15 min) at the end of the session.

Today is about getting the most value from Copernicus data, while using digital resources more efficiently.

Today’s journey

45mn
Presentation

15mn
Q&A

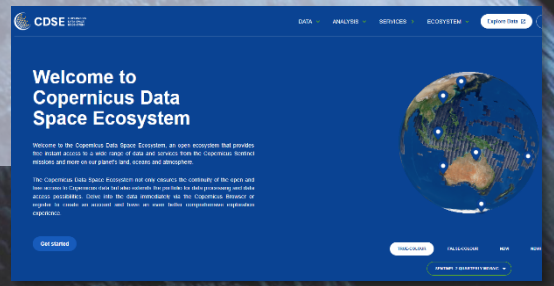
#	Topic
1	**Introduction** Welcome & Round table
2	**Context & Objectives** Why does CDSE environmental impact matter
3	**Understand key insights** Where environmental impacts occur & what the study revealed
4	**Act & explore** Best practices you can apply today & live CDSE walkthrough
5	**What's next for CDSE?** Initiatives & roadmap
6	**Live Q&A**

Company Confidential © Capgemini 2026. All rights reserved.


Capgemini
1. INTRODUCTION
CDSE Webinar 2026
esa

INTRODUCTION

Welcome to
the CDSE User Webinar



Teams involved in the study

ESA	**Berenice GUEDEL** Head of Copernicus GS Services Section	**Ines SANZ MORERE** Earth Observation Data Processor Engineer
	Razvan COSAC Technical Officer CDSE	
Capgemini	**Caroline VATEAU** Sustainable IT Director	**Patrick BURGER** Sustainable IT Officer for Bureau d'études
	Riana RASOLDIER Sustainable IT Sr. Manager	**Sandyla MANICOM** Sustainable IT Manager
		Charlotte GARREL Sustainable IT Consultant

Webinar Speaker & Guests

Capgemini



Riana RASOLDIER
Sustainable IT Sr. Manager

ESA



Razvan COSAC
Technical Officer CDSE

CDSE Consortium



Andras ZLINSZKY
Sinergise

2. WHY DOES ENVIRONMENTAL IMPACT MATTER?

CDSE Webinar 2026

From satellites to usable insights

COPERNICUS SENTINELS

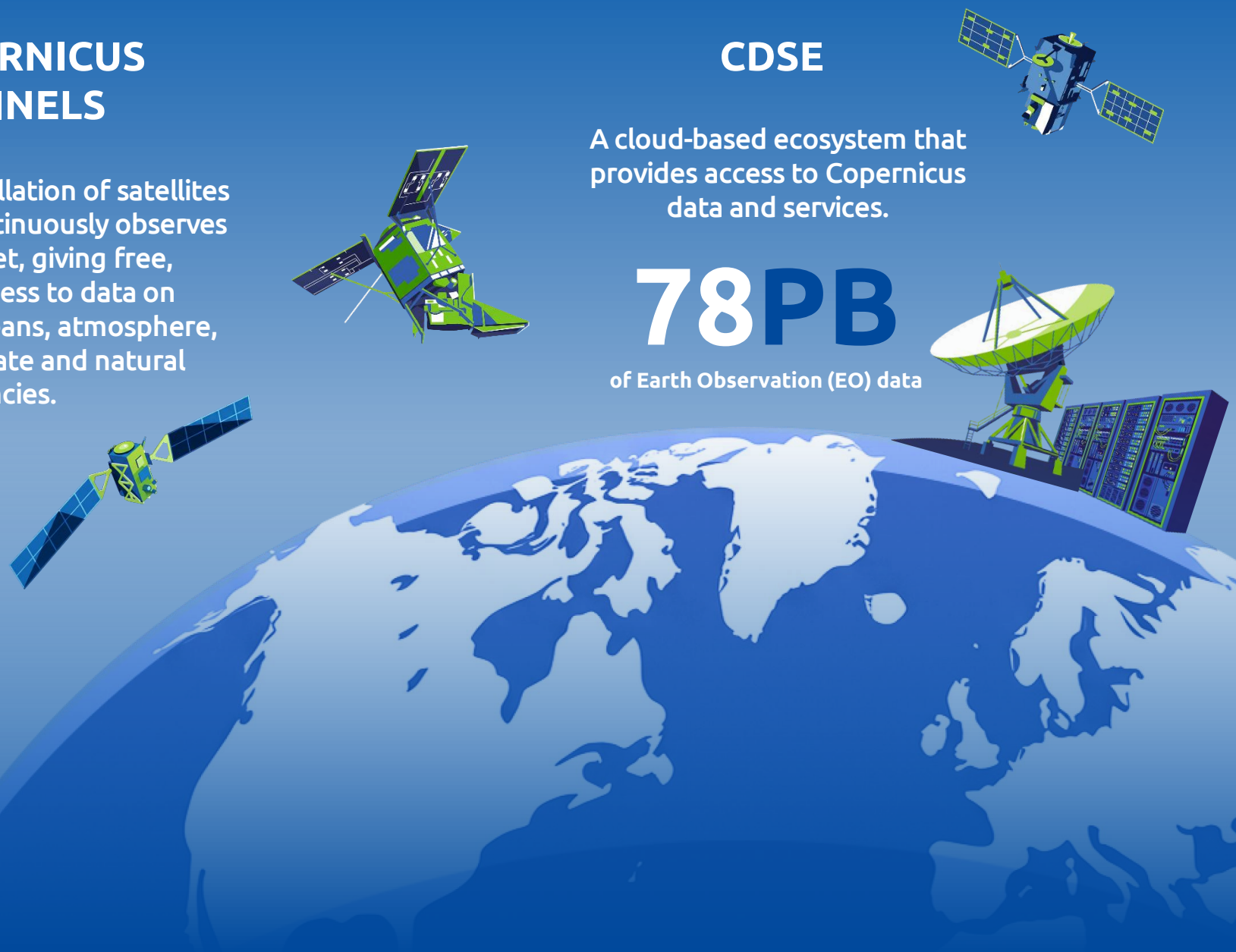
A constellation of satellites that continuously observes the planet, giving free, open access to data on land, oceans, atmosphere, and climate and natural emergencies.

CDSE

A cloud-based ecosystem that provides access to Copernicus data and services.

78PB

of Earth Observation (EO) data



USERS

3.7M

Copernicus Browser visits in 2024

825K

Total number of CDSE registered users since the start of operations

Understanding the impact of data use

AI and data growth increase computing and storage needs, making their **environmental impact** increasingly important to understand.



Digital sector

3.4%

of GHG emissions[1]



Data centers

x2

electricity use by 2030[2]

ESA has addressed

2024	**CGS infrastructure & operations** *ESA assesses the environmental footprint of the Copernicus Ground Segment (CGS) infrastructure.*
2025	**CDSE end-users** *ESA studies how CDSE end-users' actual data-use habits shape their environmental footprint.*
2026 Today	**Awareness & action** *ESA develops a set of initiatives to raise awareness around the impact of data use.*

Sources: (1) GreenIT.fr, 2025 (2023 data); (2) IEA, Energy and AI, 2025 (Base Case, 2024-2030)

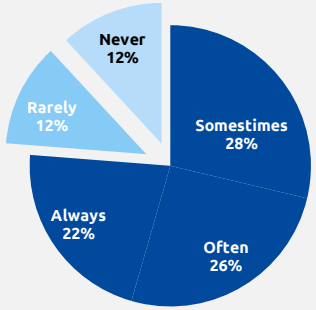
Before we dive into the results...

We asked 1,896 CDSE users

- How **familiar** users are with sustainable data practices ?
- Whether these practices are already **applied** in everyday EO workflows ?
- What prevents users from **adopting** more sustainable approaches ?
- What **support** users expect from CDSE ?

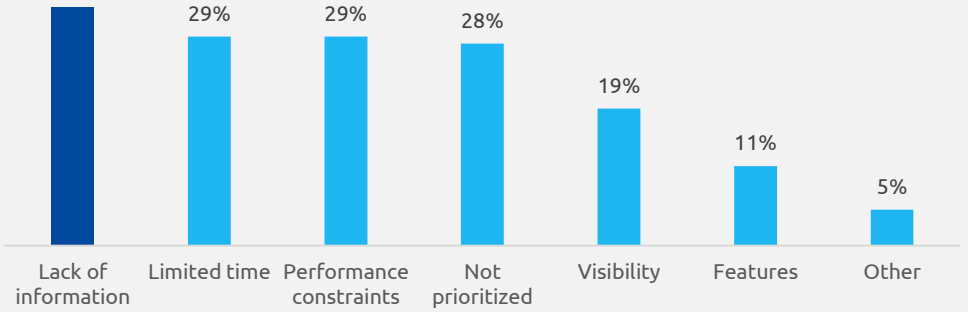


What we learned*

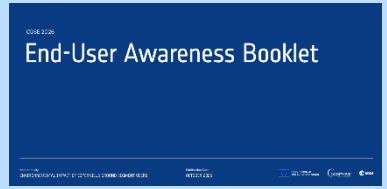


77% of users say they sometimes, often or always **optimize their workflows to reduce resource usage**

33% identify a **lack of information** and **guidance** as the main obstacle to more sustainable practices



66% would like **practical guidance** and **best practices directly from CDSE**



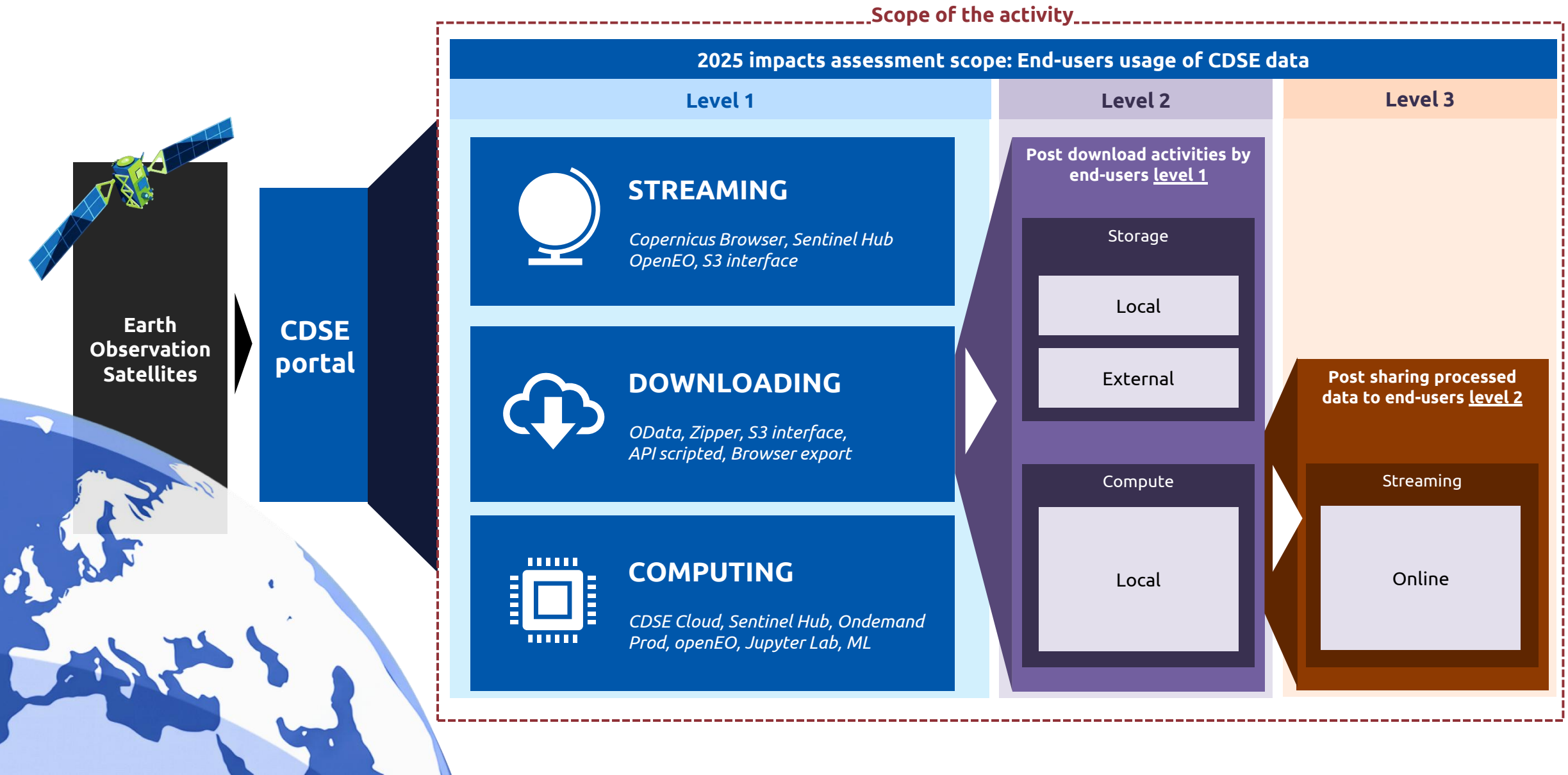
Users are willing to act but they need practical guidance, tools and visibility to make informed choices.

**Survey period: June-July 2026, 1,896 participants*

3. KEY FINDINGS FROM THE CDSE END-USER IMPACT STUDY

CDSE Webinar 2026

Activity scope for end-users' impact analysis



Approach calculation and insights

CALCULATION METHODOLOGY BASED ON LIFE CYCLE ASSESSMENT (LCA)

Assessment of the environment impact across a 1-year period

Data-use footprint

Infrastructure, network & user devices

=



ANNUAL EMBODIED EMISSIONS

emissions from extraction of raw material and manufacturing of equipment

+



ANNUAL OPERATIONAL EMISSIONS

emissions from data use in one year

Result presented by

Geographical scope

All **CDSE portal end-users** located in **6 continents**



User scope



Research & education



Public authority



Personal interest



Intl. organization



SME



Non-SME



Charities & NGOs

INSIGHTS

Limits of the study

- Results are based on surveys, interviews & 2025 report
- **Uncertainty increases from Level 1 to Level 3**, but results remain robust **(±22-30% range)** enough to identify trends and key hotspots.

2025 CDSE end-users' environmental impact

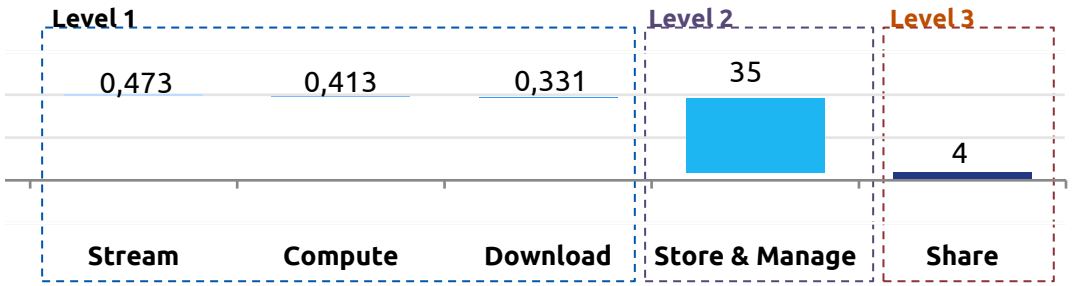
40k $tCO2_{eq}$

Estimated annual footprint associated with CDSE data usage

Water	Primary Energy	Abiotic Resources
30M m³ eq	1.3 bn MJ	400 kg Sb eq

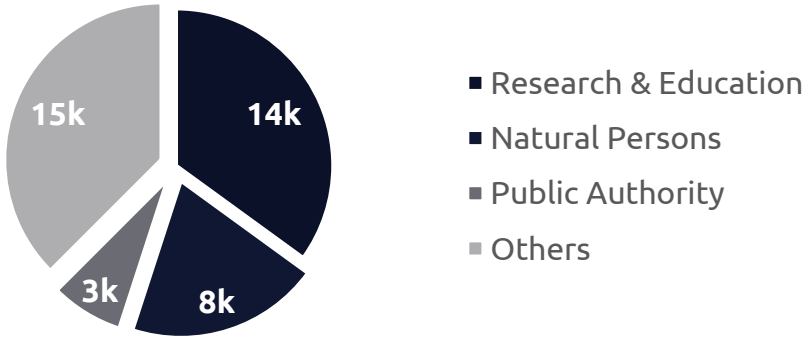
87% of impacts occur after data download

($ktCO2_{eq}$)



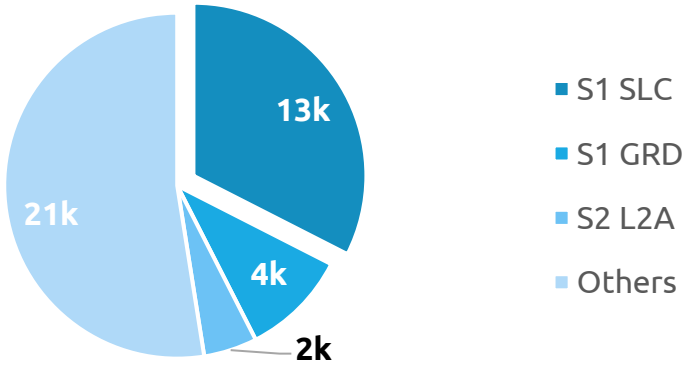
35% of impacts are associated with Research & Education users due to the adoption scale

($tCO2_{eq}$)



Nearly 50% of all impacts are linked to just three datasets

($tCO2_{eq}$)



KEY TAKEAWAYS

- User behaviour is the main driver of impacts
- Storage is the largest environmental hotspot
- Sharing data multiplies impacts across the value chain
- Sustainable practices matter at scale

4. CDSE USAGES BEST PRACTICES TO REDUCE YOUR IMPACT TODAY

CDSE Webinar 2026



Copernicus Data Space Ecosystem (CDSE)

More than a data portal: a complete ecosystem for **accessing**, **exploring** and **processing** Earth Observation data

HOW USERS ACCESS CDSE

Download

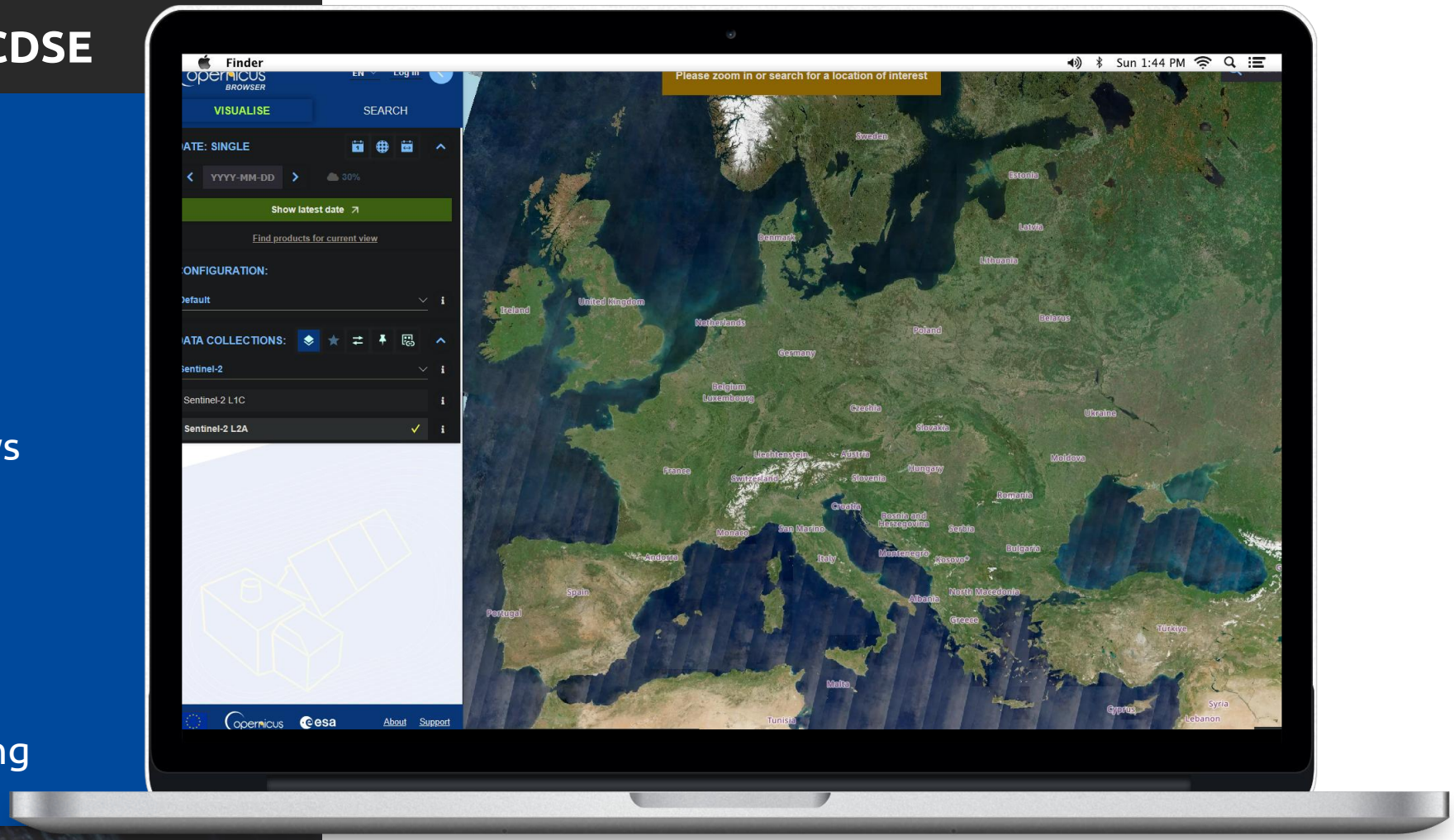
- OData
- S3 Access

Visualise & Explore

- Copernicus Browser
- Quicklooks & previews

Process

- Sentinel Hub
- openEO
- JupyterLab
- On-demand processing



Sustainable CDSE workflows in practice

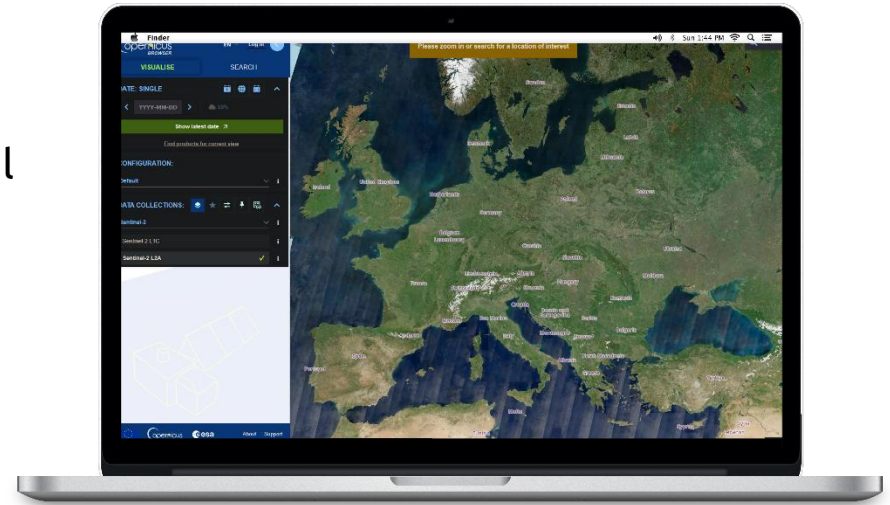
How can I reduce my impact while getting the most from CDSE?

During the next 25 minutes

We will discover **CDSE capabilities** & **best practices** & impact per **usage typologies** :

1. **Filter or focus before you act**
2. **Download only if necessary**
3. **Handle the result, not the whole dataset**

Then we will showcase a practical walkthrough



1. FILTER OR FOCUS BEFORE YOU ACT

What does CDSE offer?

- Copernicus Browser
- Sentinel Hub visualization
- Fast exploration tools *(S3 Interface, Open EO…)*

STREAMING ENVIRONMENTAL COSTS

473 tCO2 eq
GHG EMISSIONS

4 kg SB eq
ABIOTIC RESOURCES

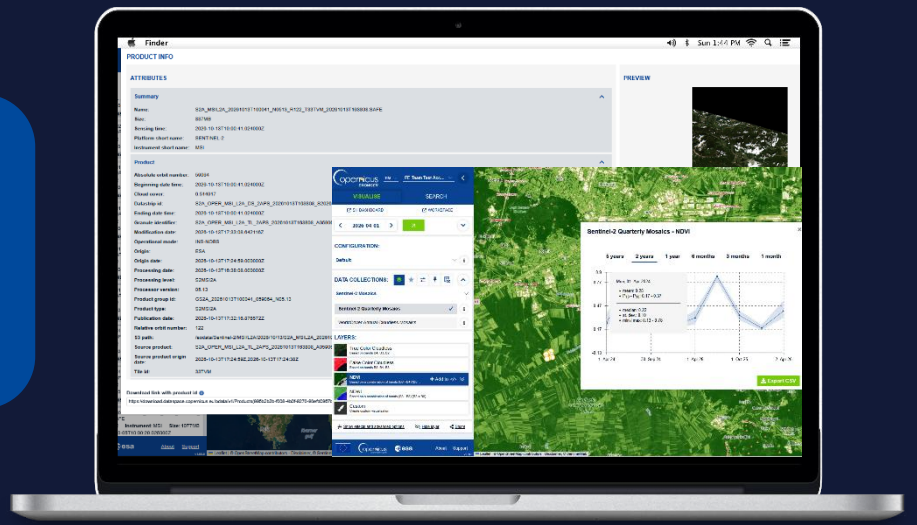
234K m^3 eq
WATER

814K kWh/year
ELECTRICITY

Top best practices

What do I really need?	1	Check metadata and preview before downloading and streaming
	2	Narrow before you pull data
How do I prepare it?	3	Filter and mask before you compute
	4	Use analysis-ready data whenever possible

For NDVI analysis, filtering Sentinel-2 imagery by study area, cloud cover, date, preview, and required bands (B04/B08) before access can reduce download volume by up to 90%.



2. DOWNLOAD ONLY IF NECESSARY

What does CDSE offer?

- AOI clipping
- Time filtering
- Product filtering

Top best practices

Can I avoid the download?	1	Stream before you download
	2	Process where the data lives
	3	Check before you duplicate
If I do download, how do I keep it light?	4	Use a single source of truth
	5	Download derived products instead of raw data

DOWNLOADING ENVIRONMENTAL COSTS

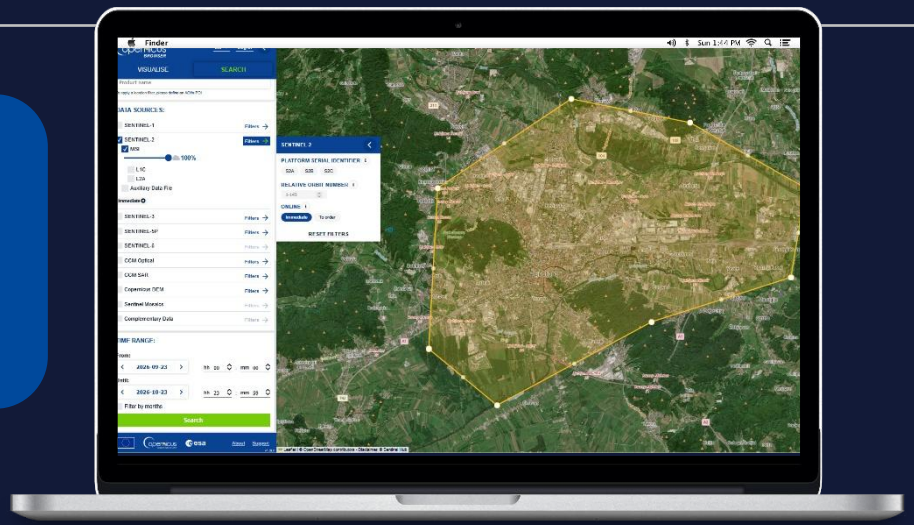
39K tCO2 eq
GHG EMISSIONS

394 kg SB eq
ABIOTIC RESOURCES

30,1M m^3 eq
WATER

62M kWh/year
ELECTRICITY

A regional authority can assess flood risk by processing Sentinel imagery in CDSE and downloading only the final map, avoiding large local archive downloads.



3. HANDLE THE RESULT, NOT THE WHOLE DATASET

Key usage metrics

+205K users
download and store data

+86K TB of stored
data over 1 year

COMPUTING ENVIRONMENTAL COSTS

412 tCO2 eq
GHG EMISSIONS

4 kg SB eq
ABIOTIC RESOURCES

190,1K m^3 eq
WATER

722K KWh/year
ELECTRICITY

Top best practices

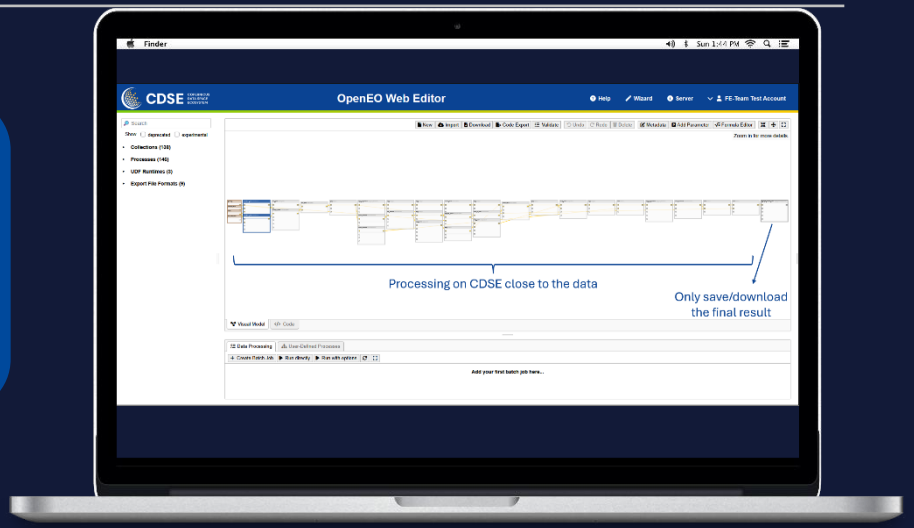
What do I keep?

1. Keep the outputs, drop the raw data
2. Archive what's inactive and set a retention period

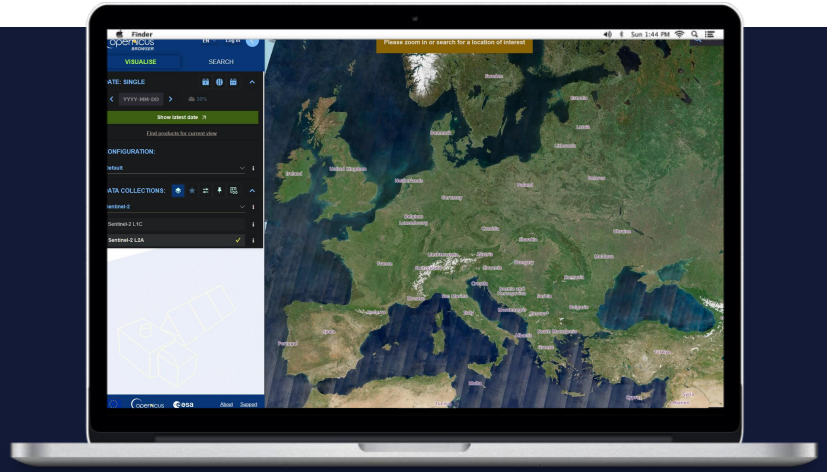
What do I share, and how?

3. Share only what your audience needs
4. Share your process along with your output
5. Share references instead of copies

Rather than retain raw Sentinel data, share crop-yield indicators, forecasts and methods, and archive completed-season results.



CDSE WALKTHROUGH



TUTORIALS

From Browser to Jupyter: video tutorial
youtube.com/watch?v=QVla6BT4eeA

From Browser to Jupyter: notebook
github.com/…/from_browser_to_jupyter.ipynb

CDSE JupyterLab tutorial notebook
jupyterhub.dataspace.copernicus.eu

Introduction to Sentinel Hub APIs: notebook
github.com/…/introduction_to_SH_APIs.ipynb

Sentinel Hub API advanced statistical visualisation: notebook
github.com/…/Statistical_API_advanced_visualisations.ipynb

WEB TOOLS

Data workspace
workspace.dataspace.copernicus.eu/workspace/my-products

Browser: Sentinel-2 cloud-free view of Ireland
link.dataspace.copernicus.eu/zcfd

Browser: Sentinel-2 Scene Classification Layer, Ireland
link.dataspace.copernicus.eu/o3n6

CUSTOM SCRIPTS

Kernel NDVI custom scripts
custom-scripts.sentinel-hub.com/…/sentinel-2/kndvi

Kernel NDVI script for analytical data export
tinyurl.com/kndviexportirl

DOCUMENTATION

STAC API documentation
documentation.dataspace.copernicus.eu/APIs/STAC.html

Sentinel Hub QGIS plugin guide
dataspace.copernicus.eu/news/2023-9-29-integrate-…

5. WHAT'S NEXT FOR CDSE?

CDSE Webinar 2026

What's next for the awareness journey ?

From insights...

...to action



New awareness contents & channel will be published on CDSE website

- **Awareness Booklet**
- **CDSE Environmental impact Documentation**
- **CDSE Forum Discussions**

By the end 2026

Keep an eye on your inbox & CDSE portal for upcoming news


Capgemini
LIVE Q&A
CDSE Webinar 2026
esa

THANK YOU !