Copernicus Land Monitoring Service - Products & data access

Land Monitoring

01/10/2024 – Copernicus Land Monitoring Workshop

Joanna Przystawska & Lorenzo Solari, EEA

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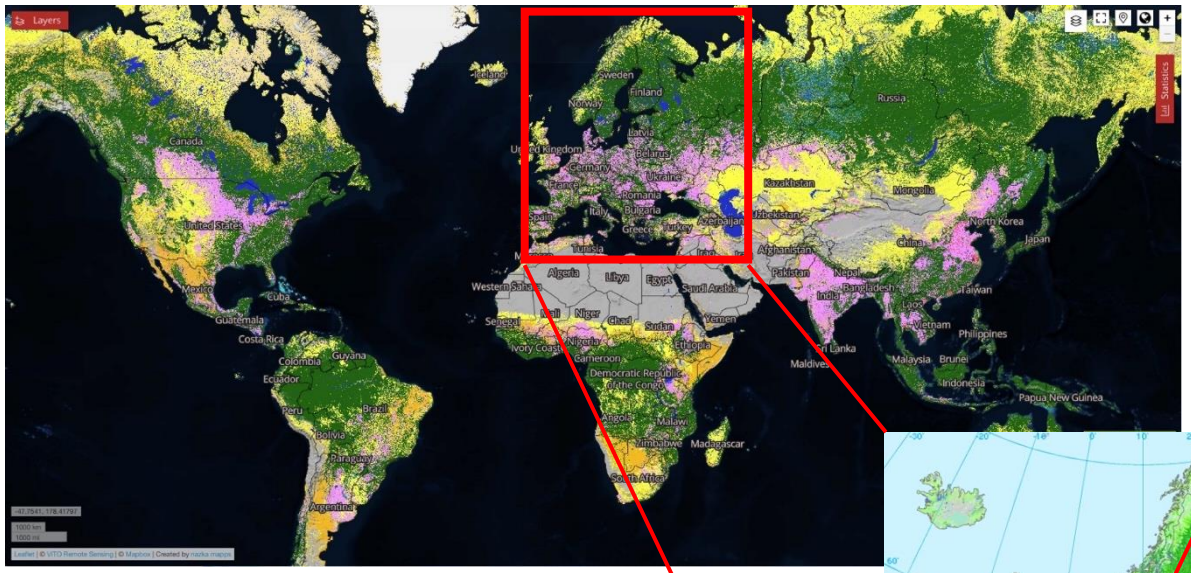
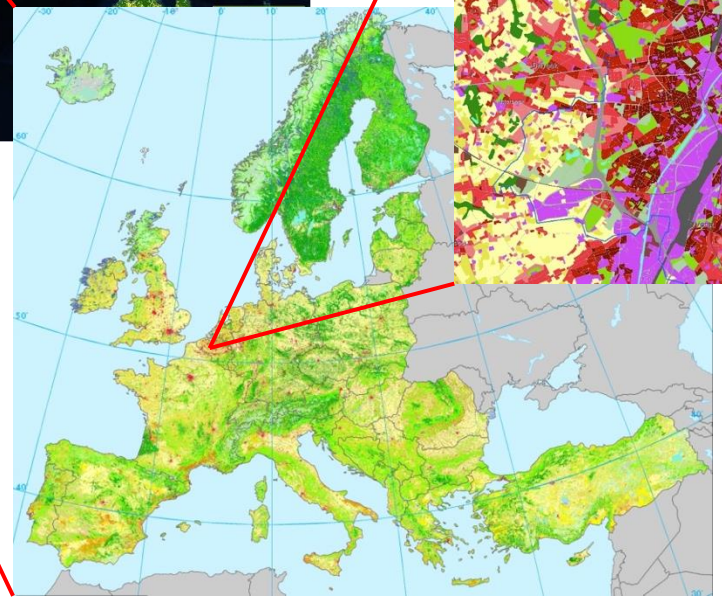
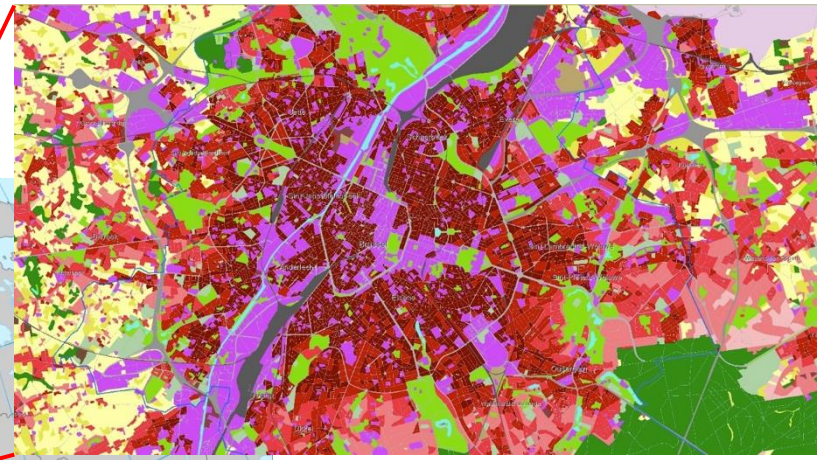
The 3 components of CLMS



CLMS global (JRC)





CLMS local component (EEA)

CLMS pan-European (EEA)

Land Monitoring

The CLMS-EU Portfolio

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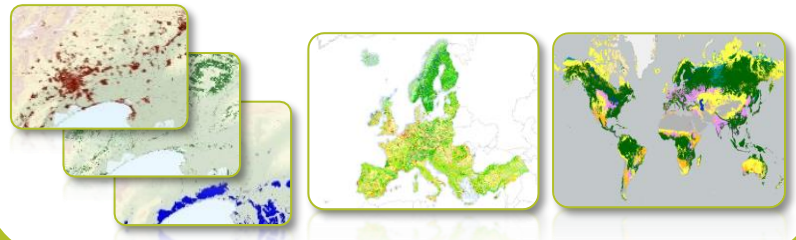
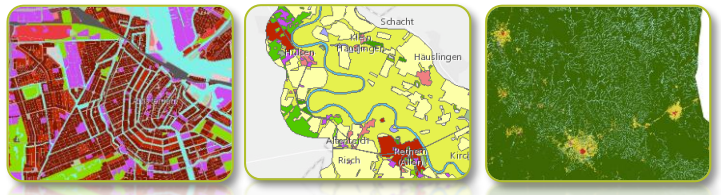
CLMS portfolio: Categories of products

Land Cover and Land Use Mapping

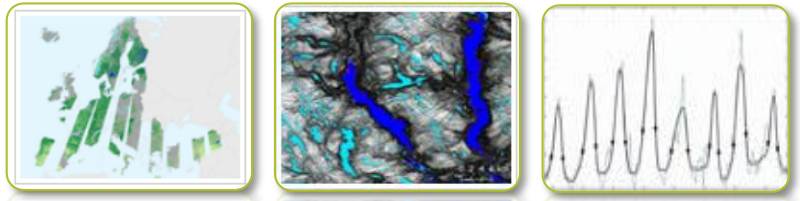


Priority Area Monitoring

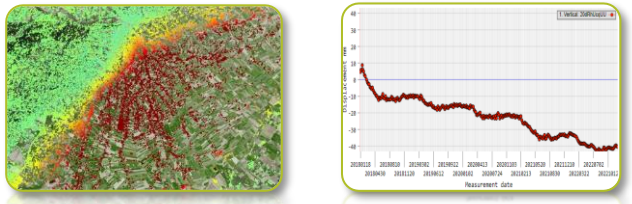


Satellite Data

Bio-geophysical Parameters



Ground Motion Monitoring



Reference and Validation Data

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Land Cover & Land Use

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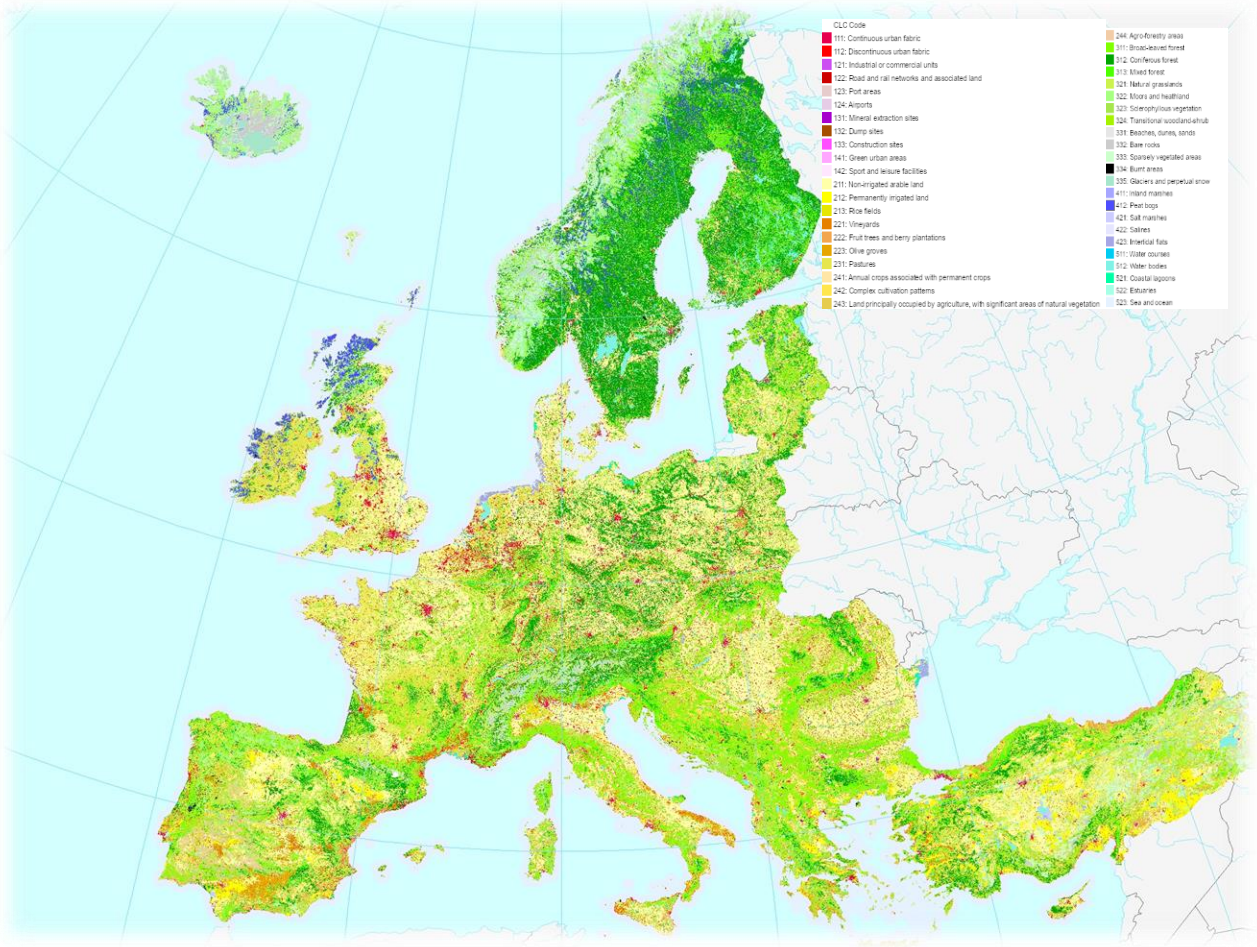
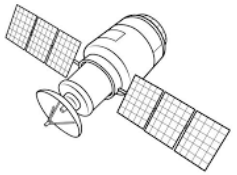
Land Cover and Land Use – Corine Land Cover

MMU
25 ha



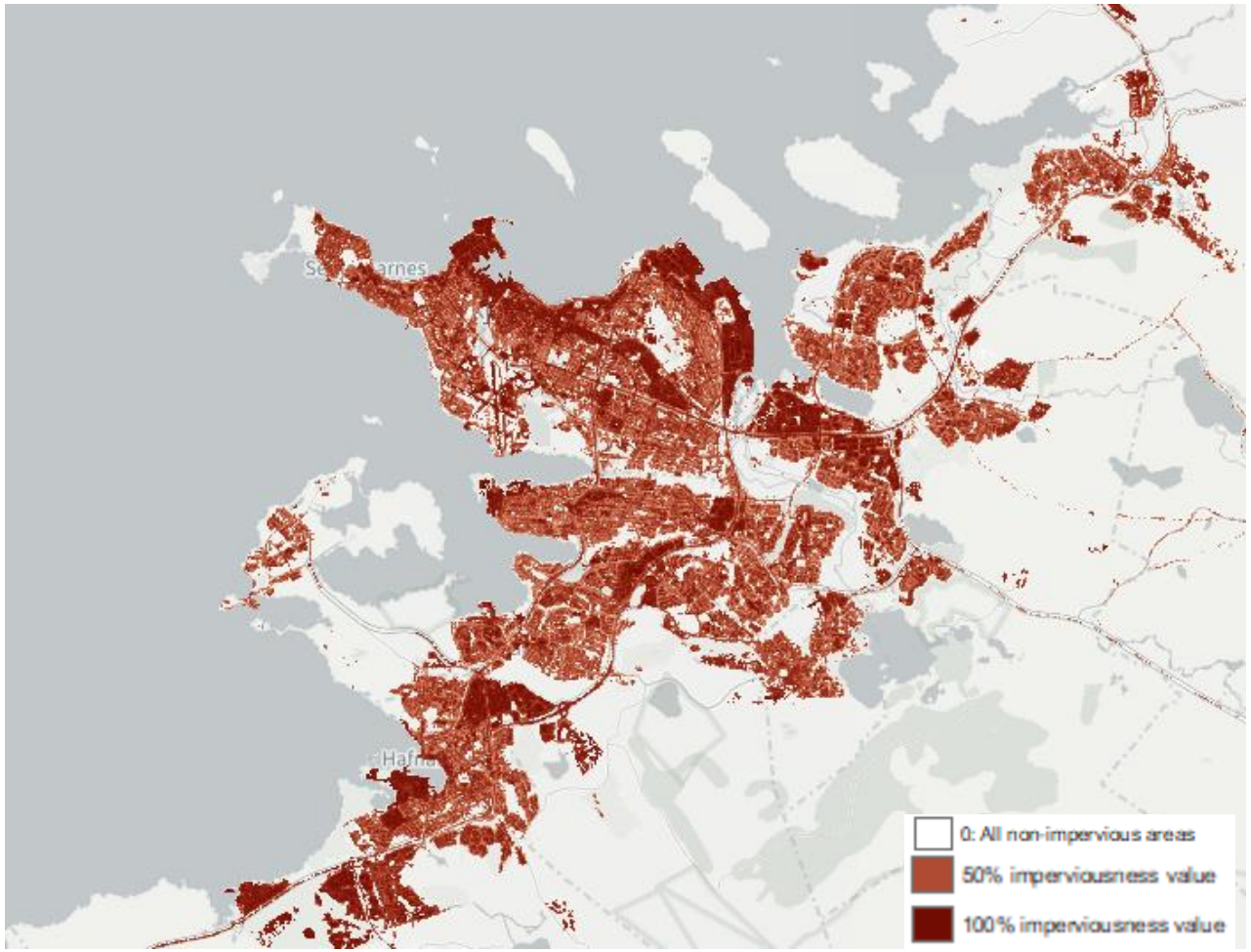


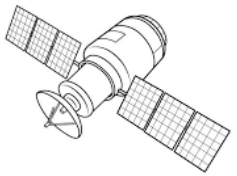
Sentinel-2 from 2018 onwards

1990
2000
2006
2012
2018
2024

Land Cover and Land Use – Imperviousness

10 m,
20 m,
100 m



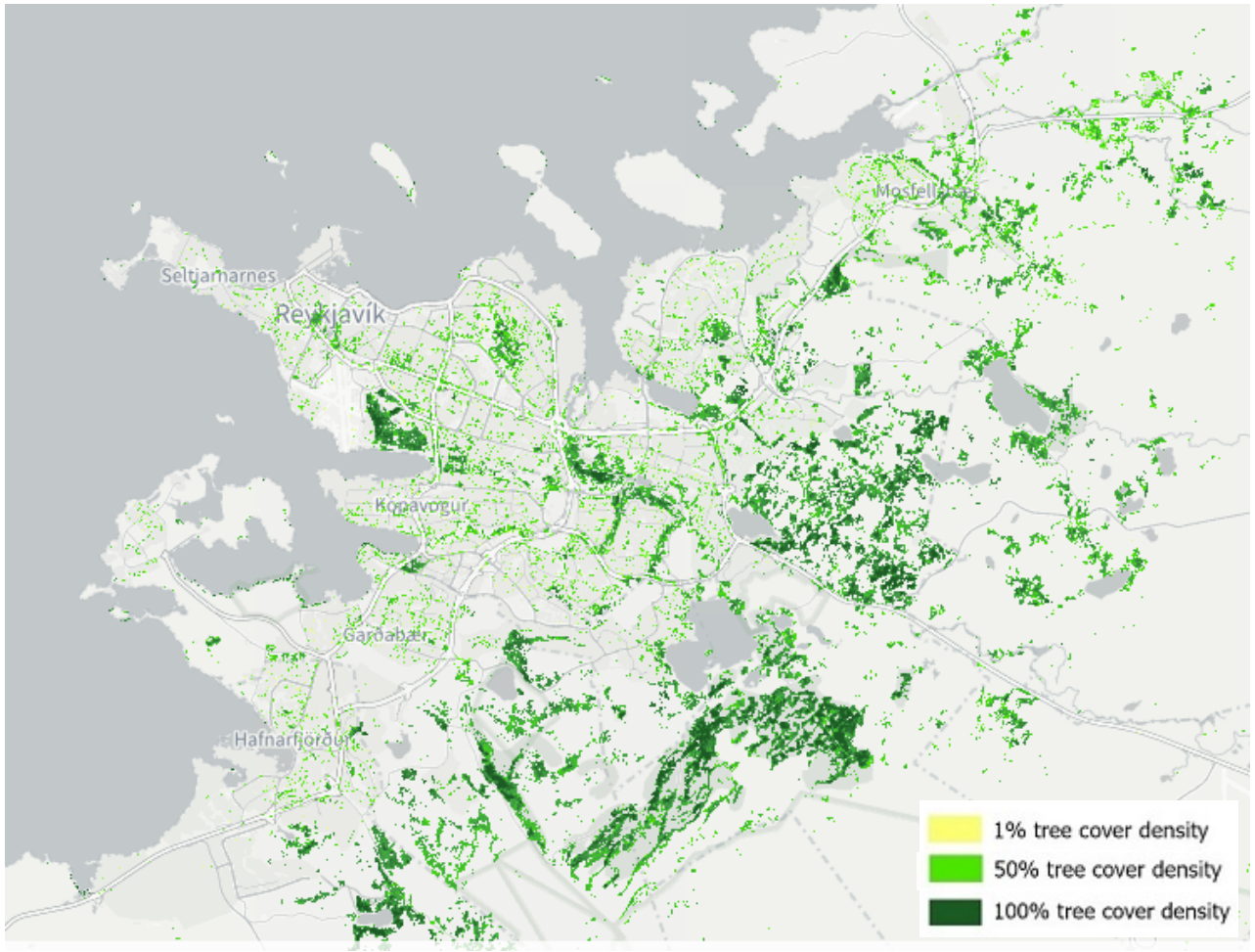


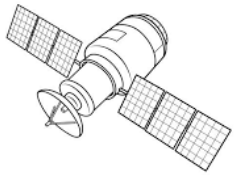
Sentinel-2
&
Sentinel-1

2006
2009
2012
2015
2018
2021

Land Cover and Land Use – Tree Cover Density

10 m,
20 m,
100 m





Sentinel-2
&
Sentinel-1

2012
2015
2018
2019
2020
2021
...

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Priority Area Monitoring

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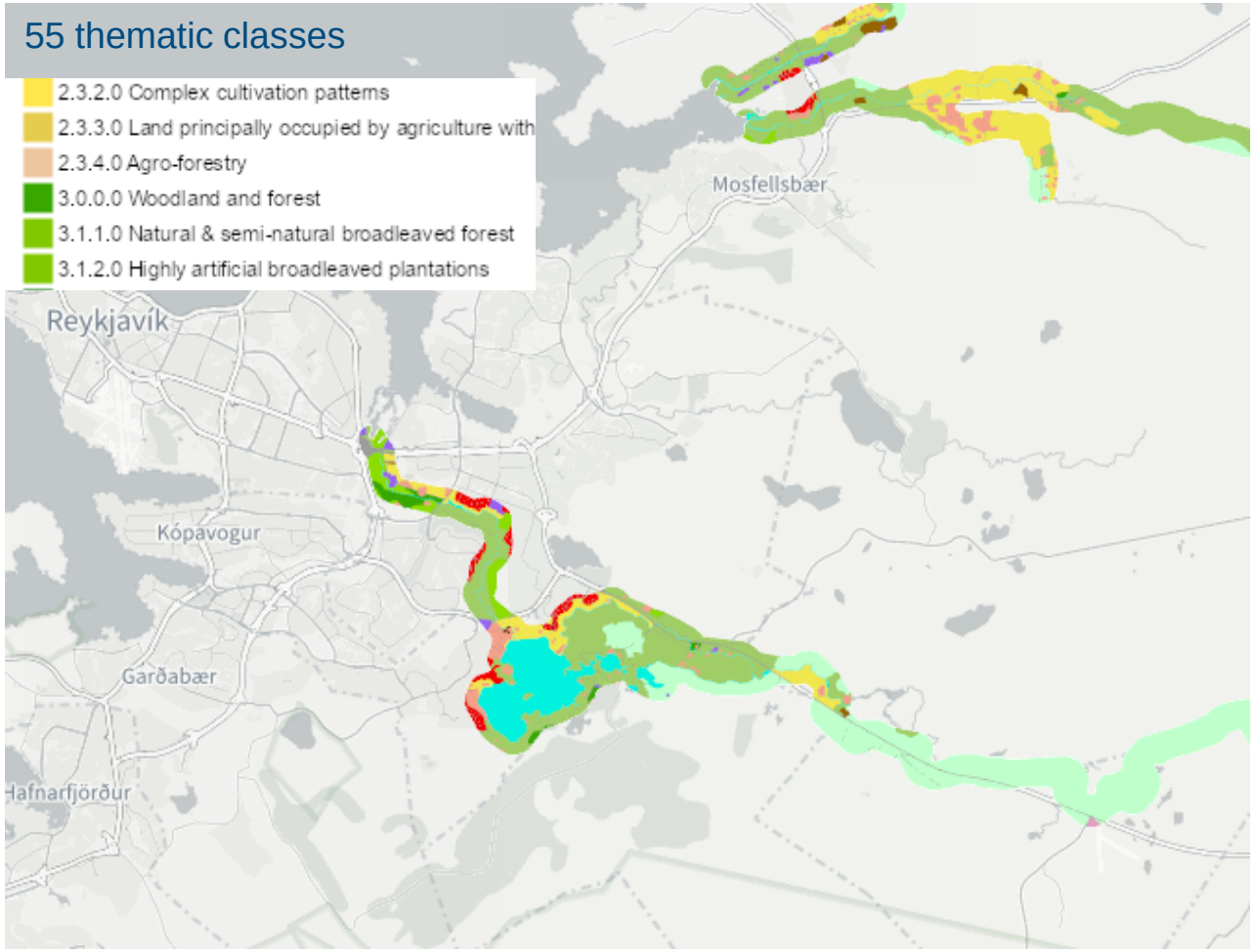
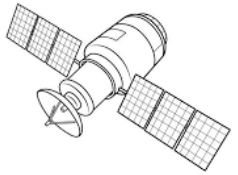
Riparian Zones

MMU
0,5 ha



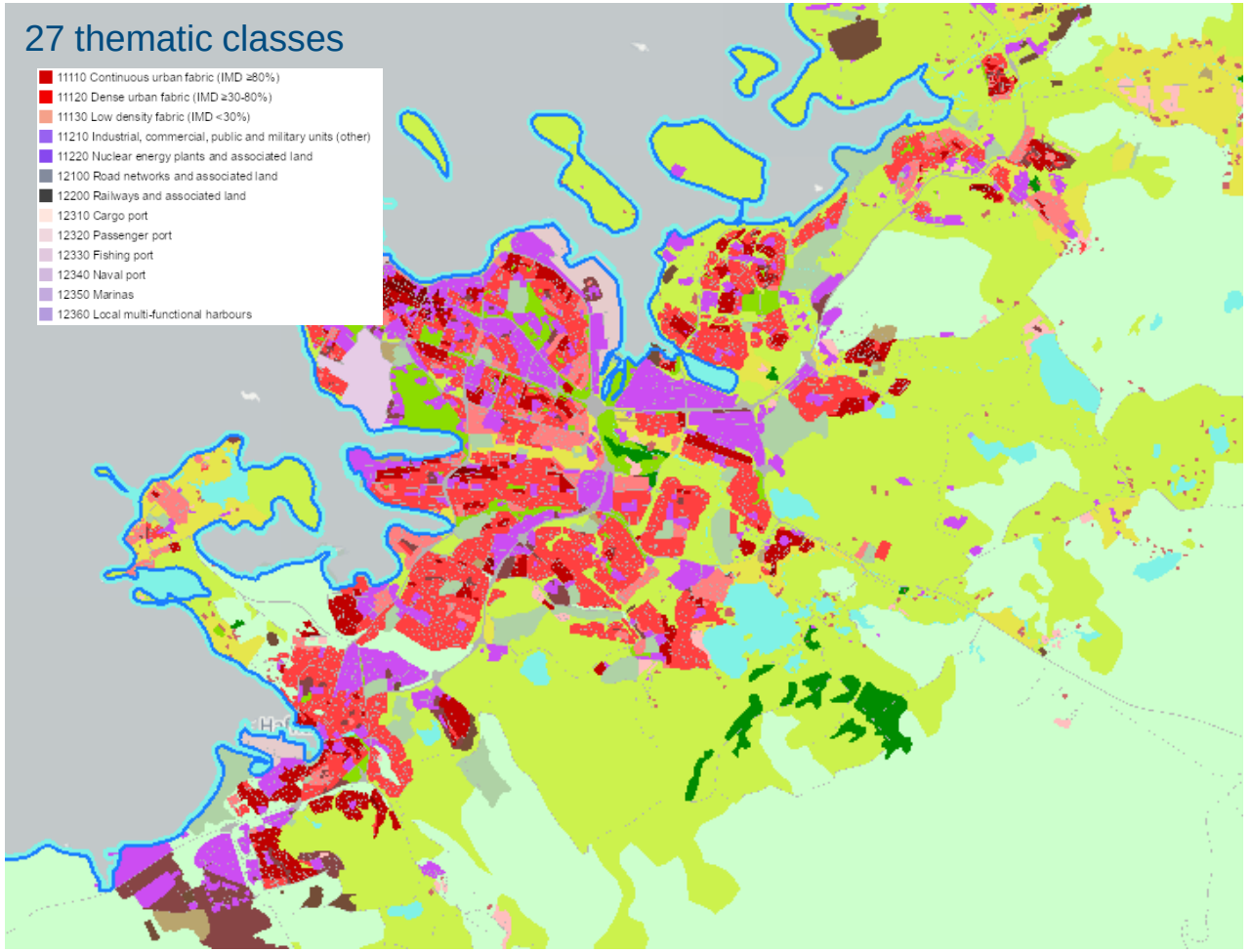


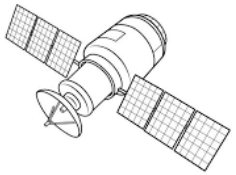
SPOT

2012
2018
2024

Urban Atlas

MMU
0,25 ha





SPOT, Formosat

2006
2012
2018
2021
2024

Land Monitoring

Bio-geophysical Parameters

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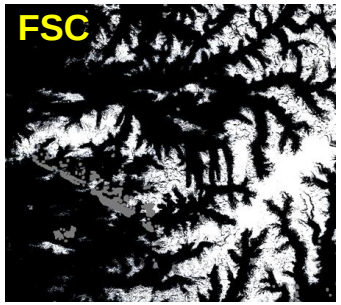
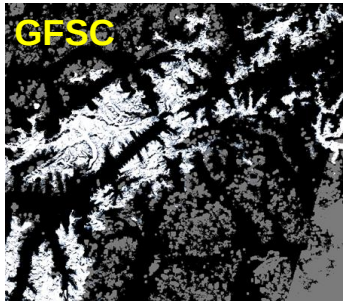
High Resolution Snow and Ice (HR-S&I) products

Fractional Snow Cover (FSC)

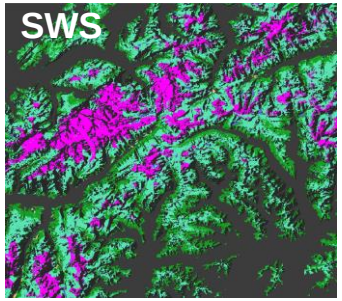


Gap-filled FSC (GFSC)

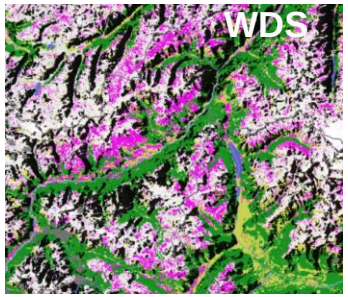


Persistent Snow Area (PSA)

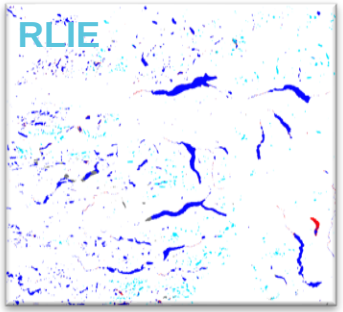
SAR Wet Snow (SWS)



Wet/Dry Snow (WDS)



River and Lake Ice Extent (RLIE)

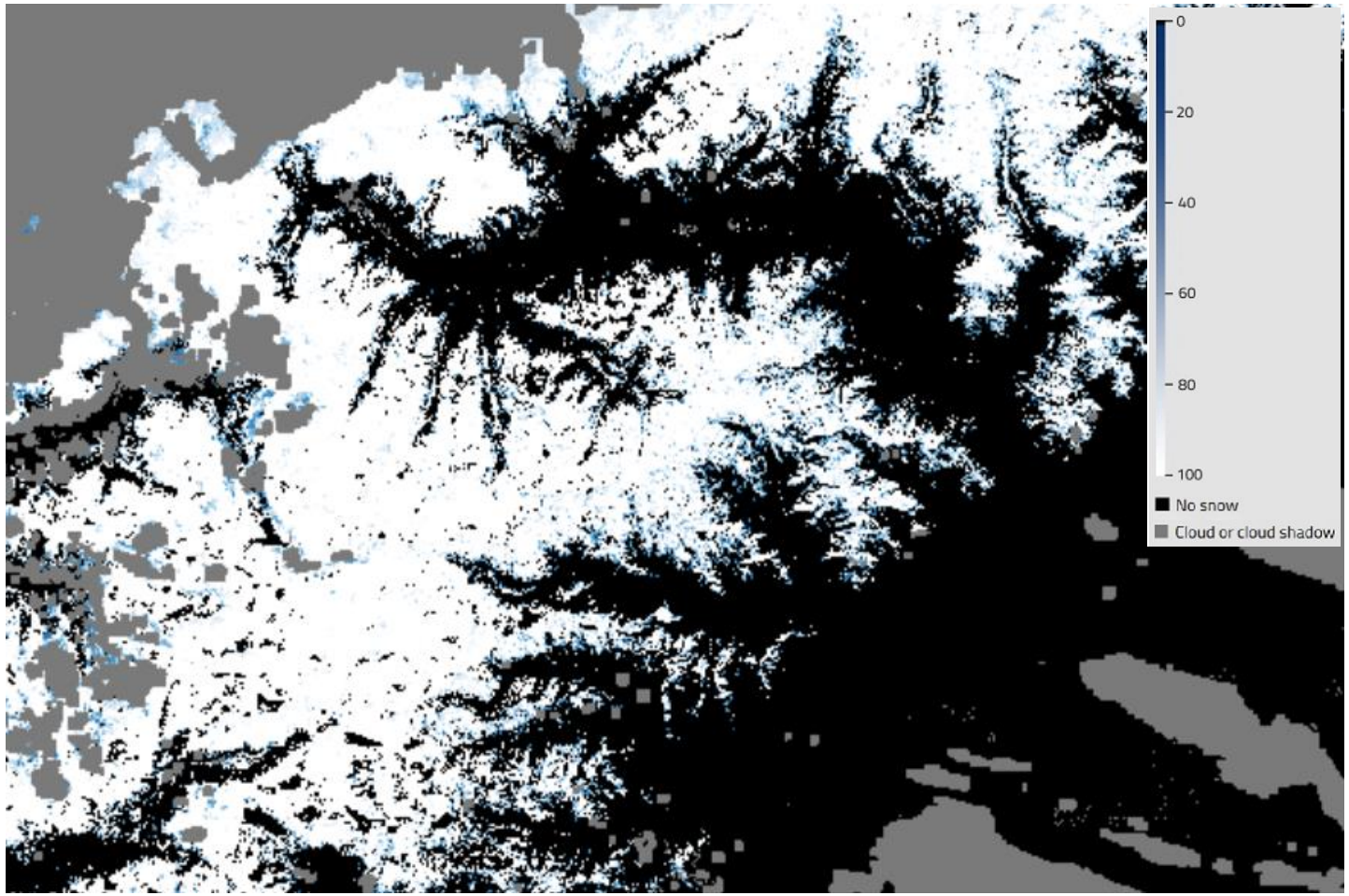


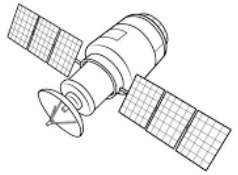
Aggregated River and Lake Ice Extent (ARLIE)

2016 — *CONTINOUS* — 2024

Snow cover – Fractional Snow Cover

20 m



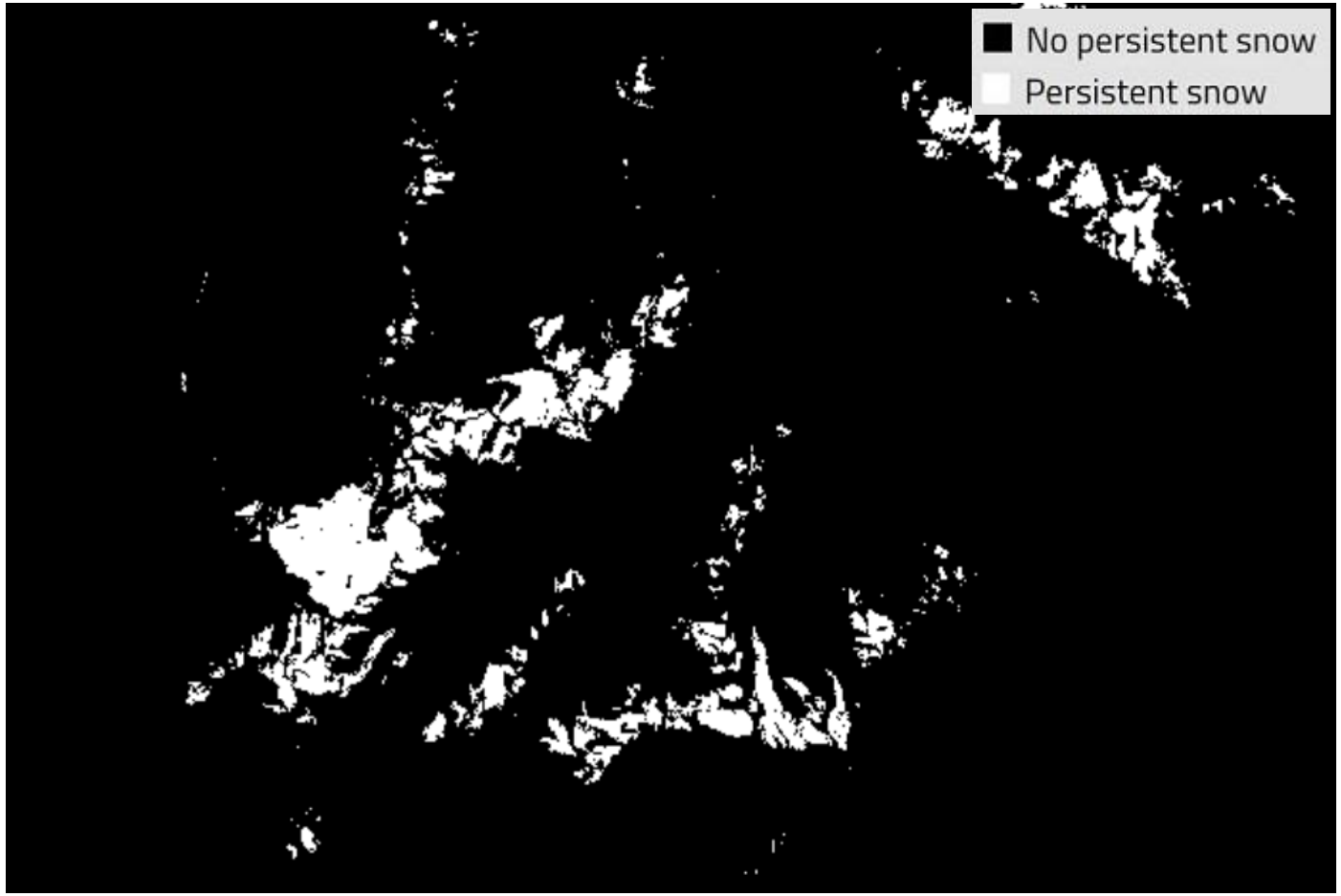


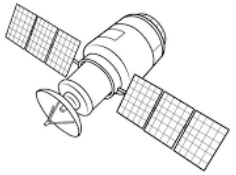
Sentinel-2

NRT (2016 – now)

Snow cover – Persistent Snow Area

20 m





Sentinel-2

Yearly
2016
2017
2018
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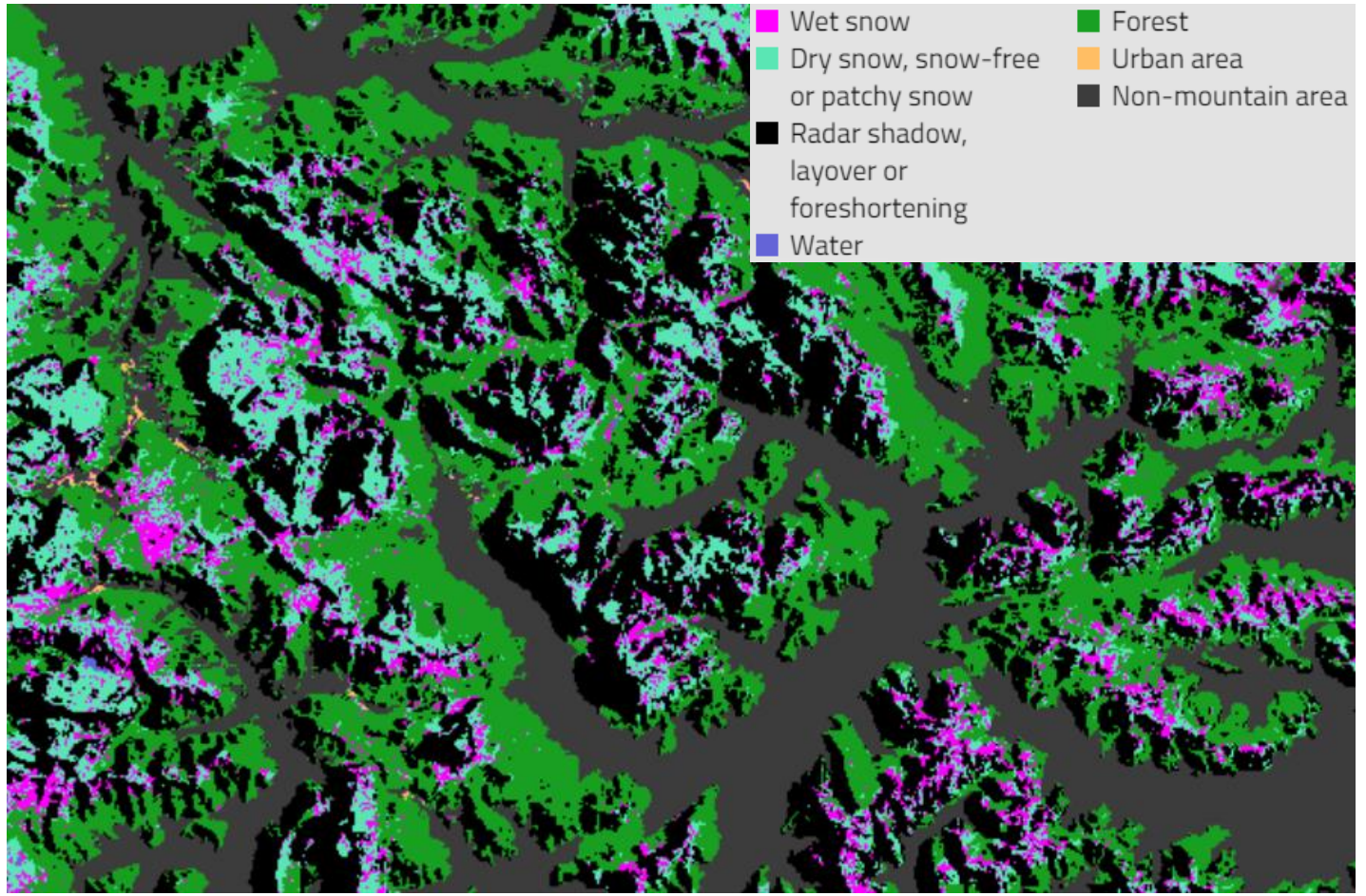
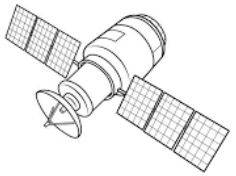
Snow state – SAR Wet Snow

60 m



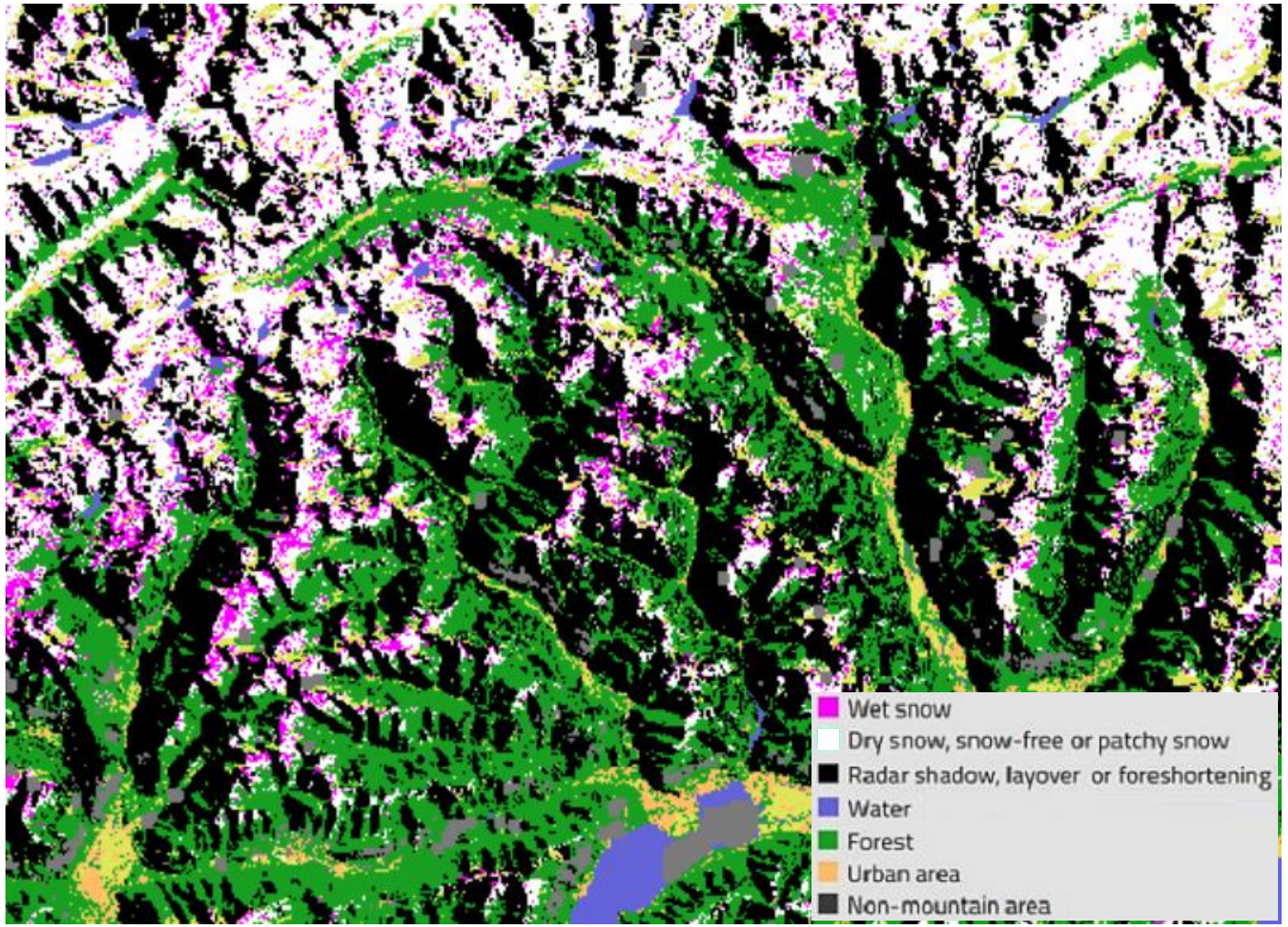


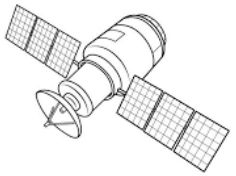
Sentinel-1 + FSC

NRT (2016 – now)

Snow state – Wet/Dry Snow

60 m



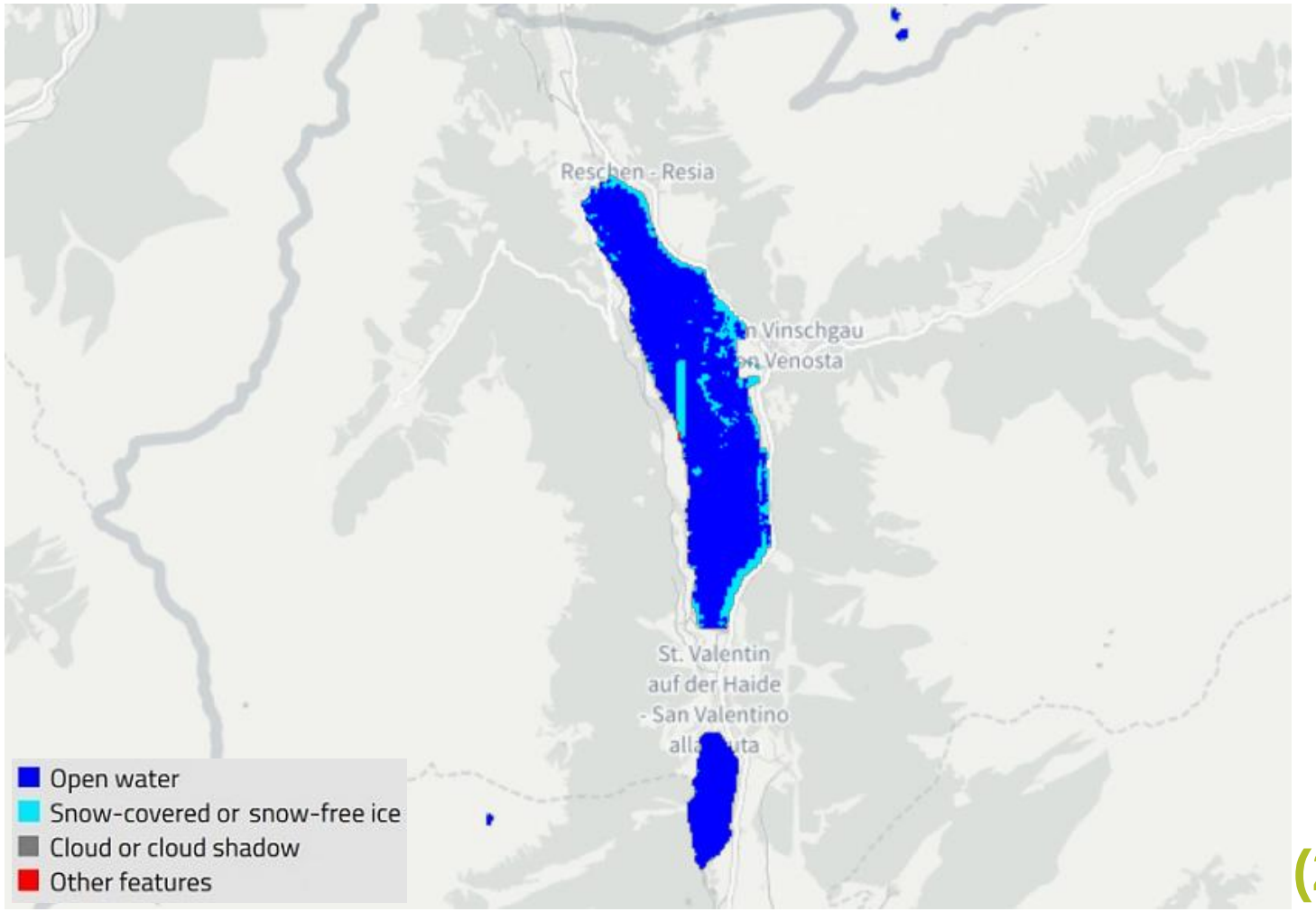


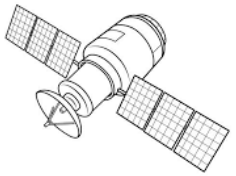
Sentinel-1

NRT (2016 – now)

Ice cover – River and Lake Ice Extent

20 m





Sentinel-1
&
Sentinel-2

NRT
(2016 – now)

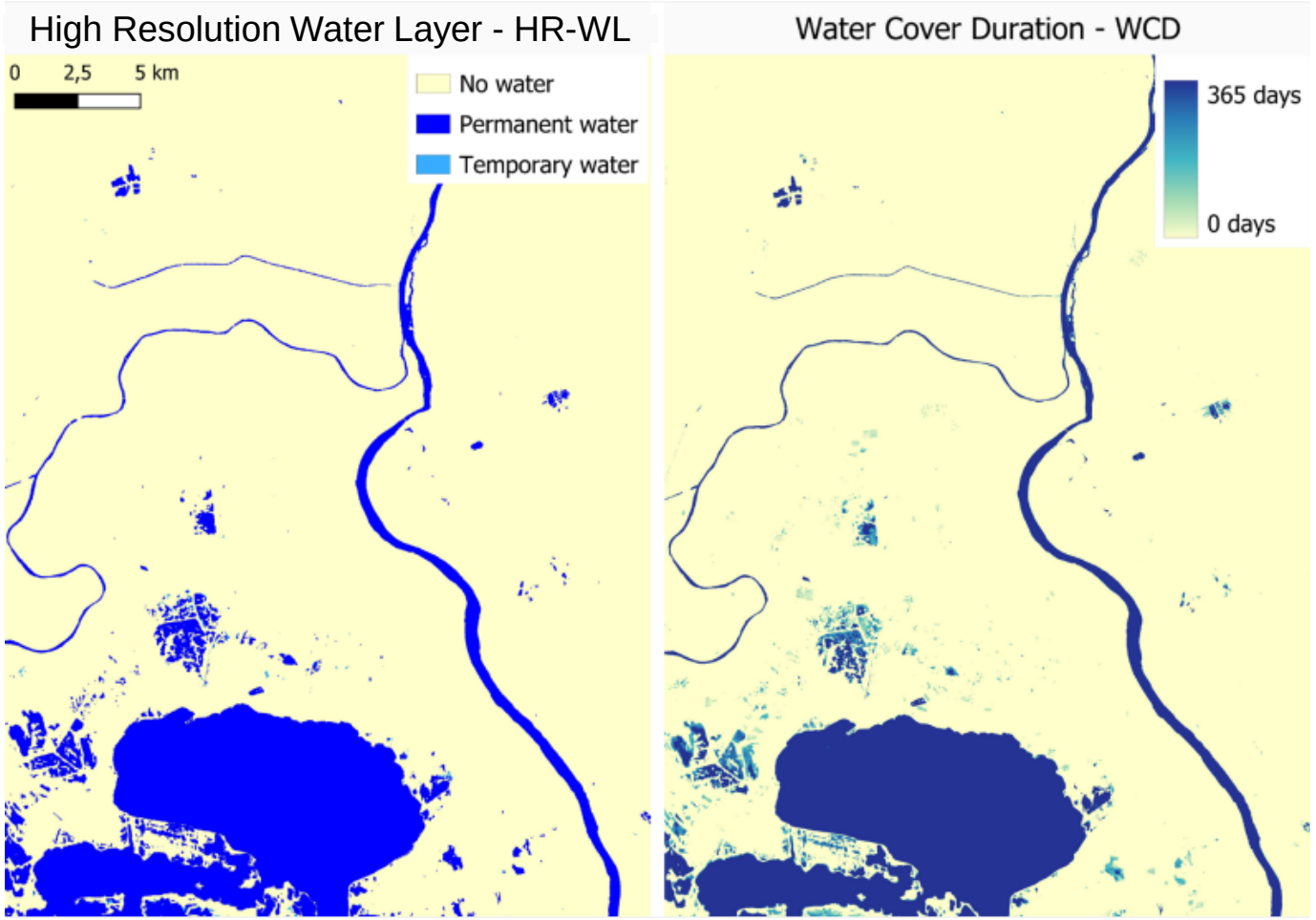
New water products in Q1 2025

- High Resolution Water Layer (HR-WL)

  Aggregated 7-year information on the characteristic of the presence of open water surfaces.

- Water Cover Duration (WCD)

  Duration of surface water occurrence as the number of days per hydrological year.



New snow phenology products in Q4 2024

- Snow Cover Duration (SCD)

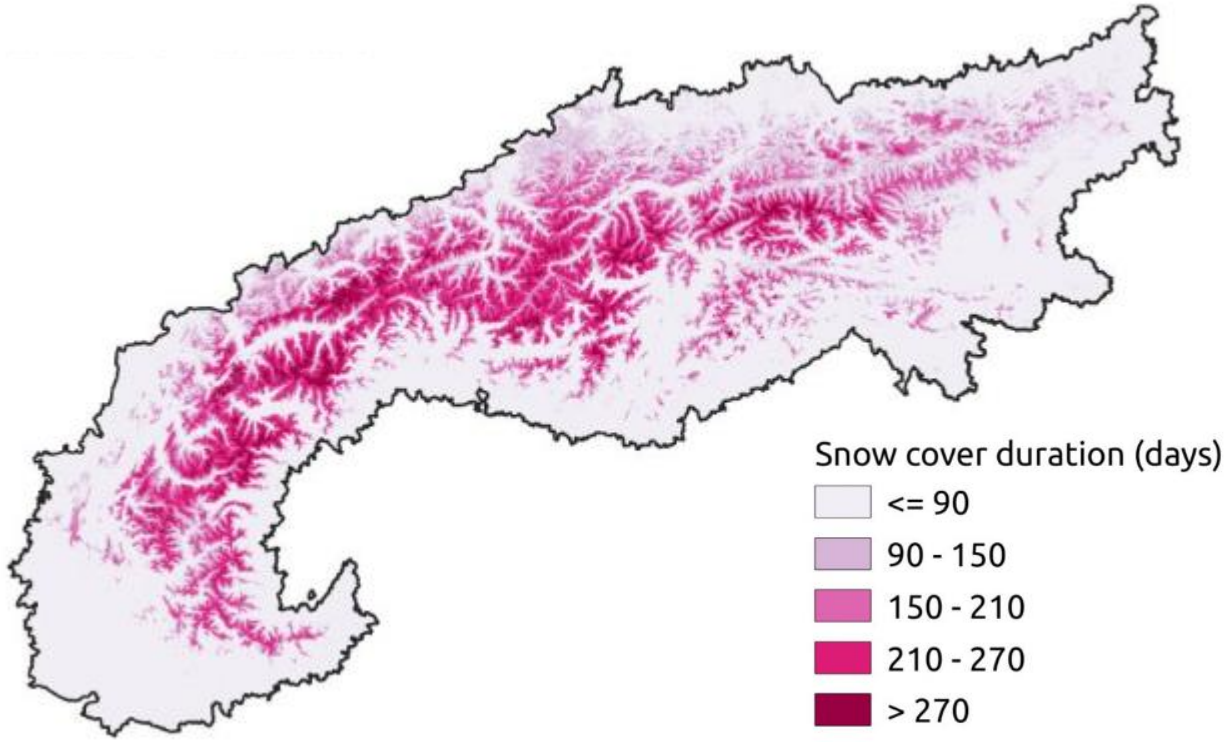
  Duration of snow cover as the number of days per hydrological year.

- Snow Cover Onset (SCO)

  Beginning of the snow season.

- Snow Cover Melt-out (SCM)

  End of the snow season.



Snow Cover Duration (SCD) in number of days per hydrological year. The Alps, 2018-2019

New ice products in Q1 2025

- Water & Ice Cover (WIC)

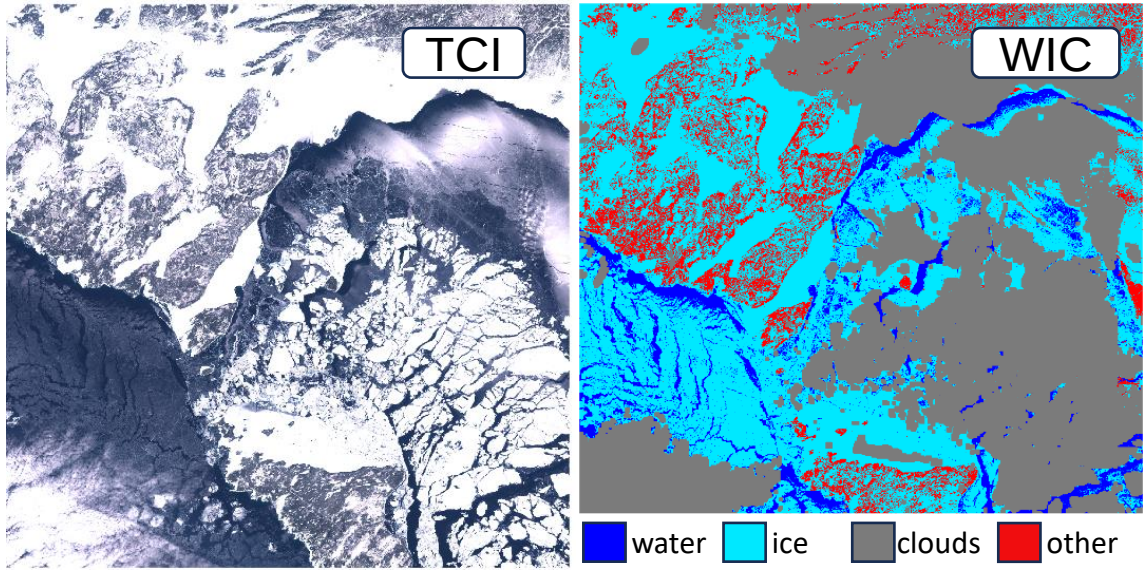
  Presence of ice over lakes and river network (based on EU-Hydro).

- Aggregated Water and Ice Cover (AWIC)

  Vector product that merges observation of the previous day (WIC) into a database.

- Ice Cover Duration (ICD)

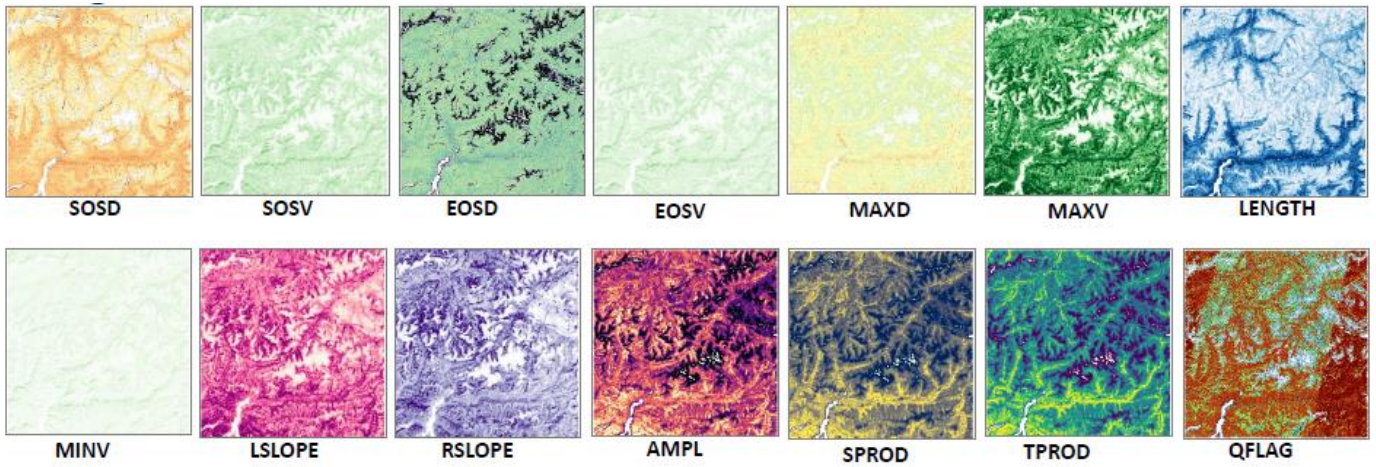
  Duration of ice cover over lakes and river network as the number of days per hydrological year.

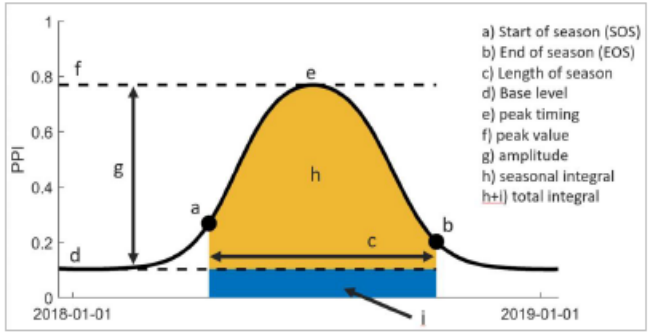


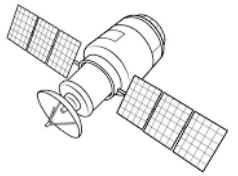
Water Ice Cover (WIC) provides information about the presence of water and ice on rivers and lakes. Georgian Bay, Canada 2020

High Resolution Vegetation Phenology and Productivity

10 m







Sentinel-2

Yearly
2017
2018
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.
.

Land Monitoring

European Ground Motion Service (EGMS)

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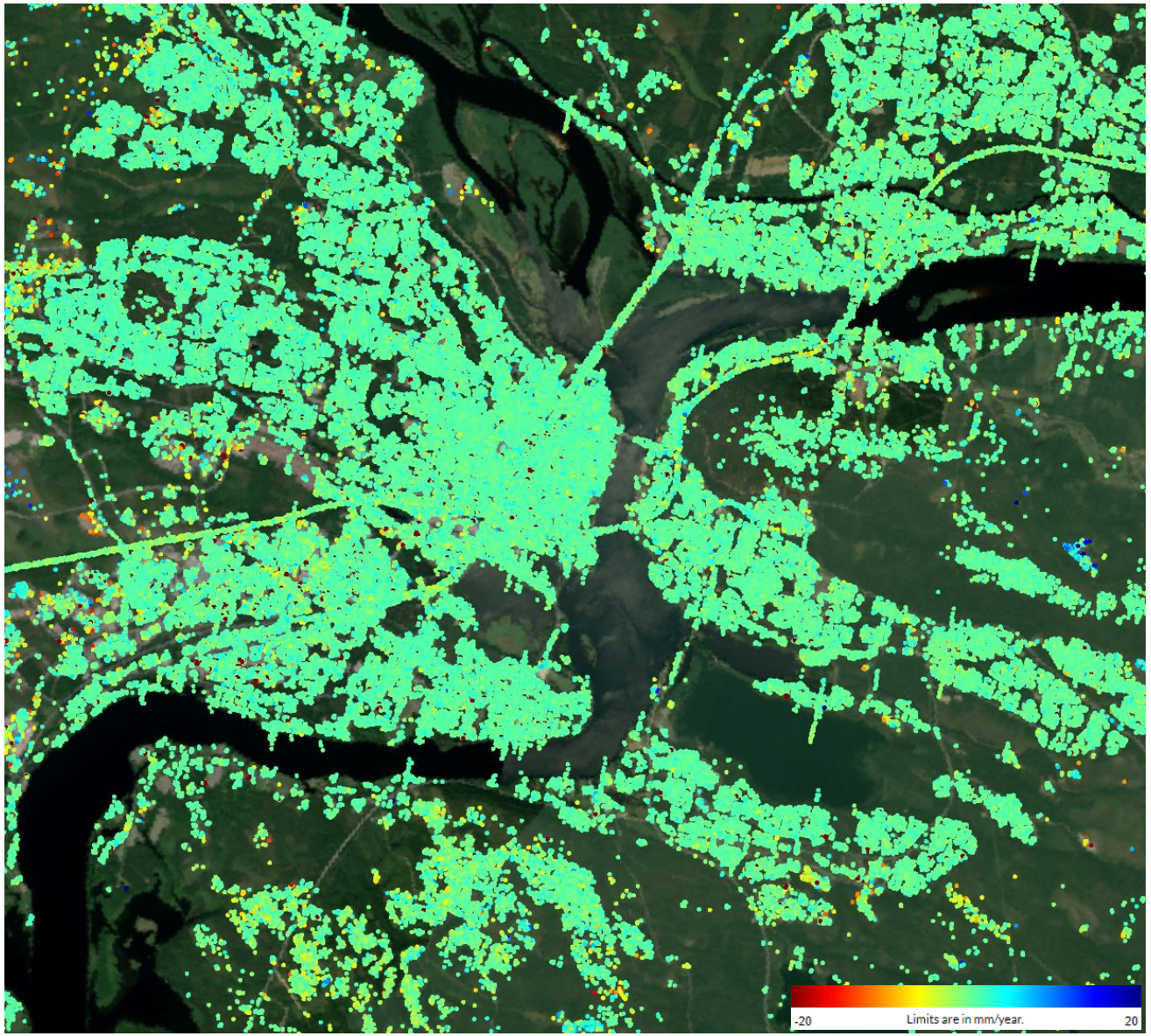
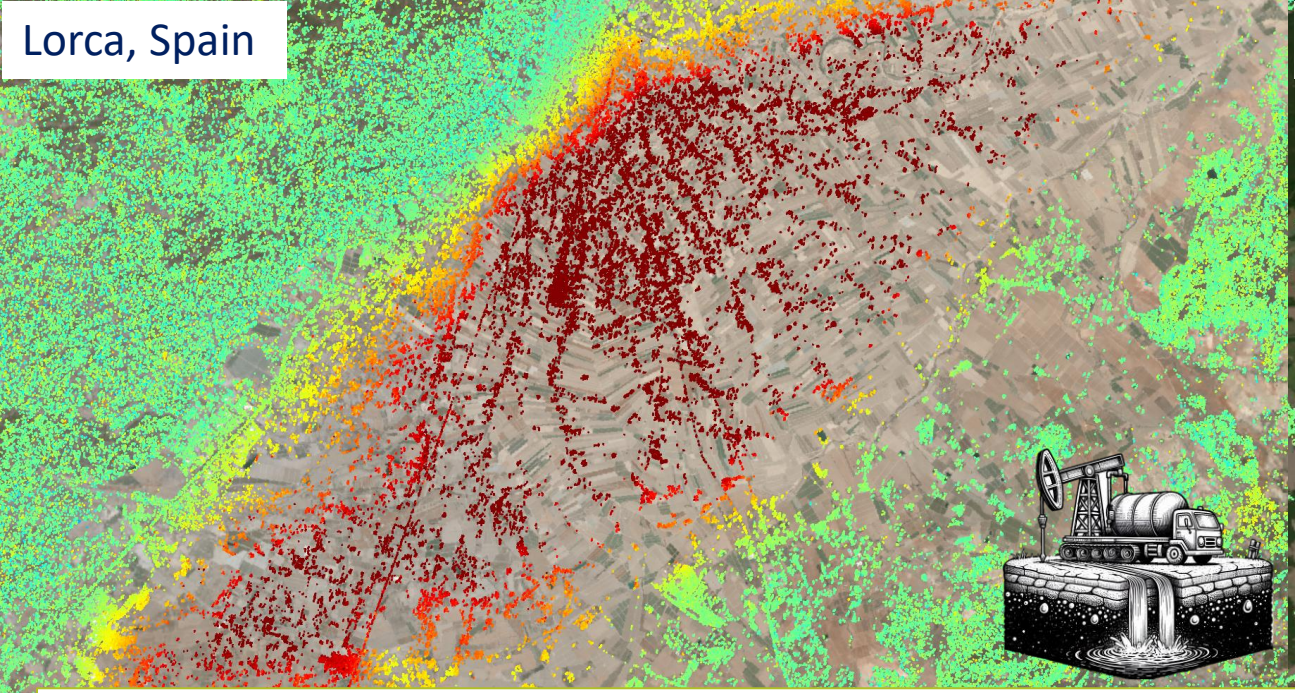
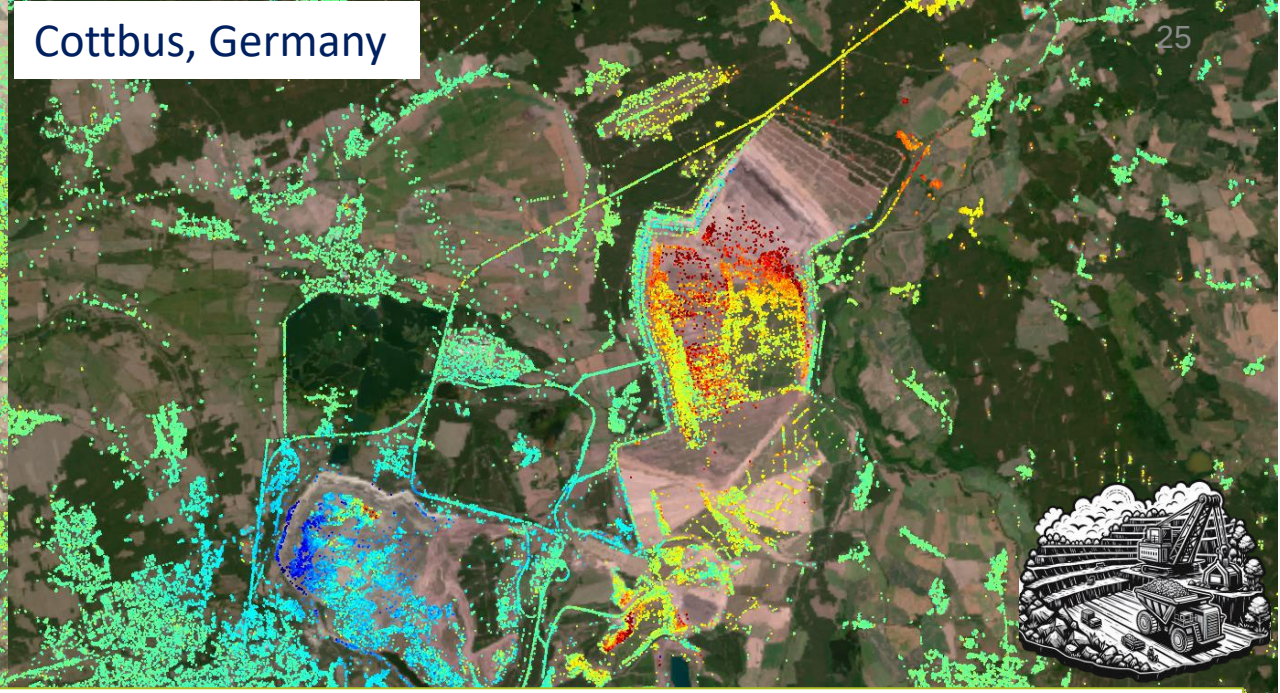
What is EGMS?

- EGMS is produced using data collected by the **Sentinel-1** radar satellite mission.
- The EGMS products provide a **high-density, continental-scale** map of ground motion.
- It is a vector product.
- Each measurement point has a value of ground motion velocity and a time series covering the last five years

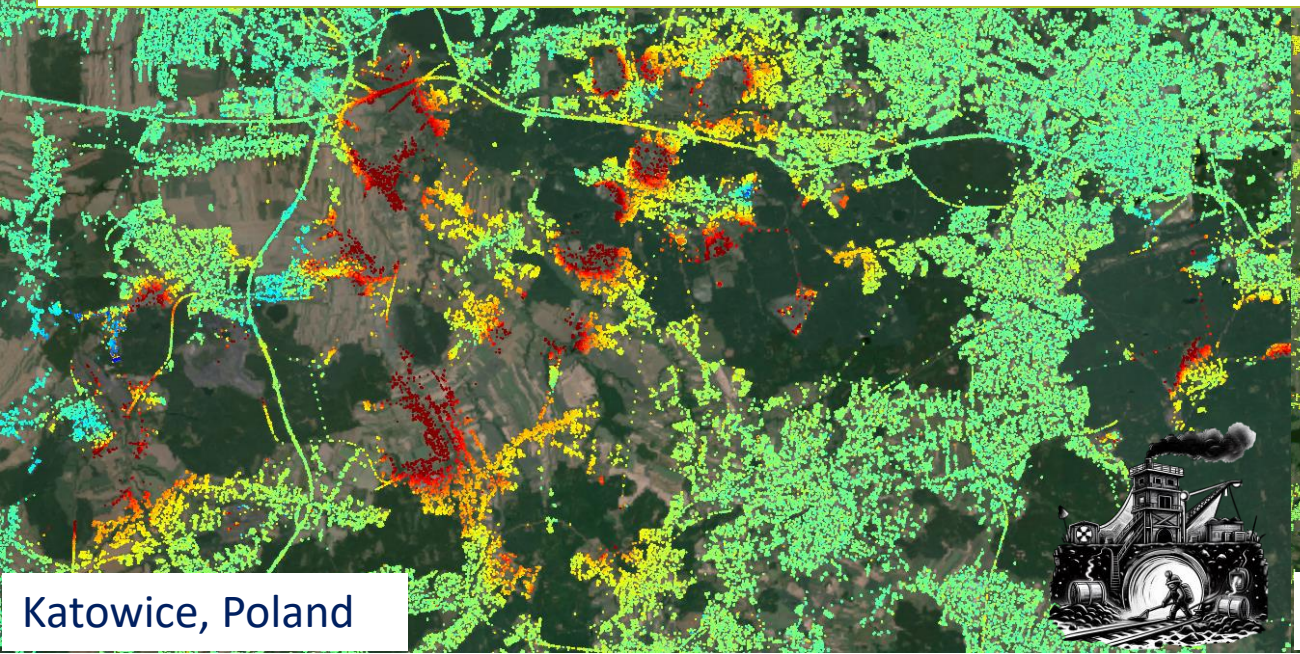


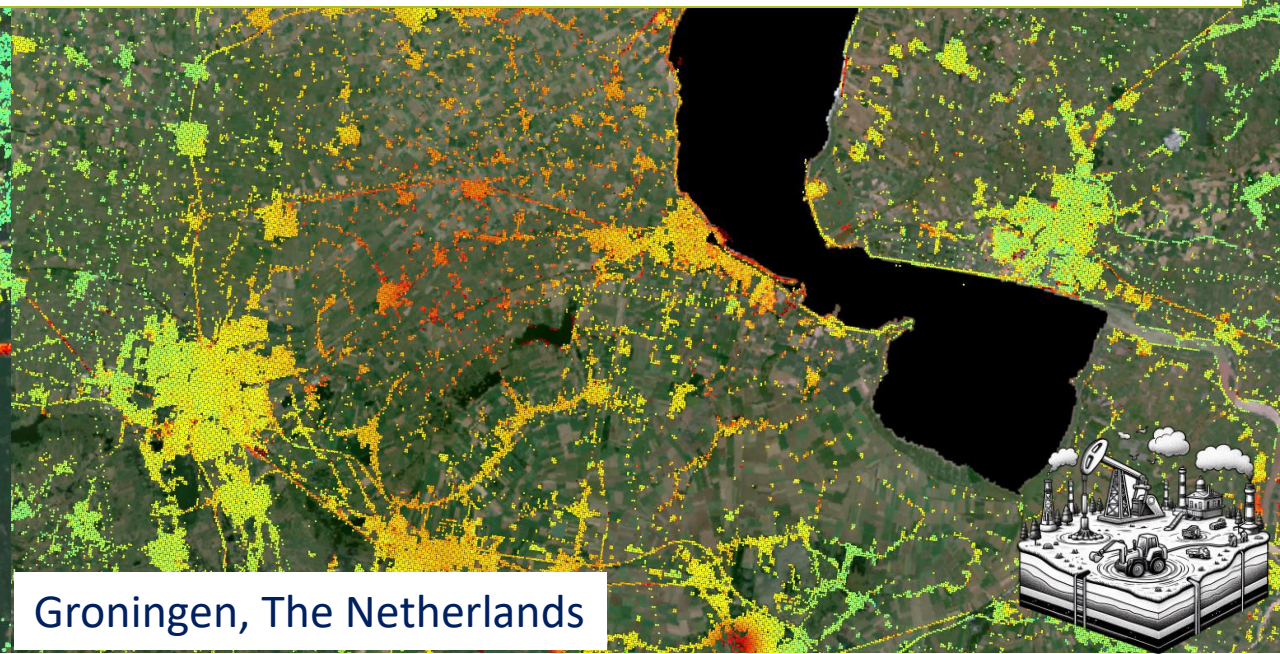
Rovaniemi, Finland



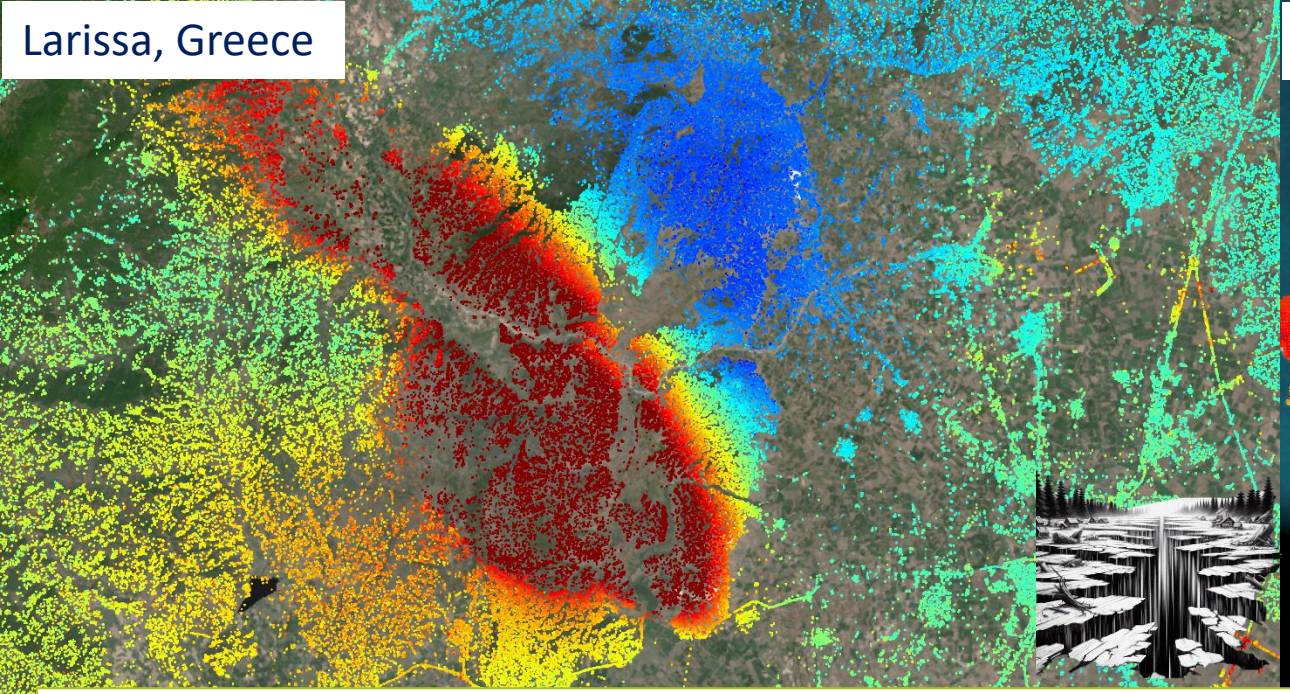


Map & monitor exploitation of natural resources

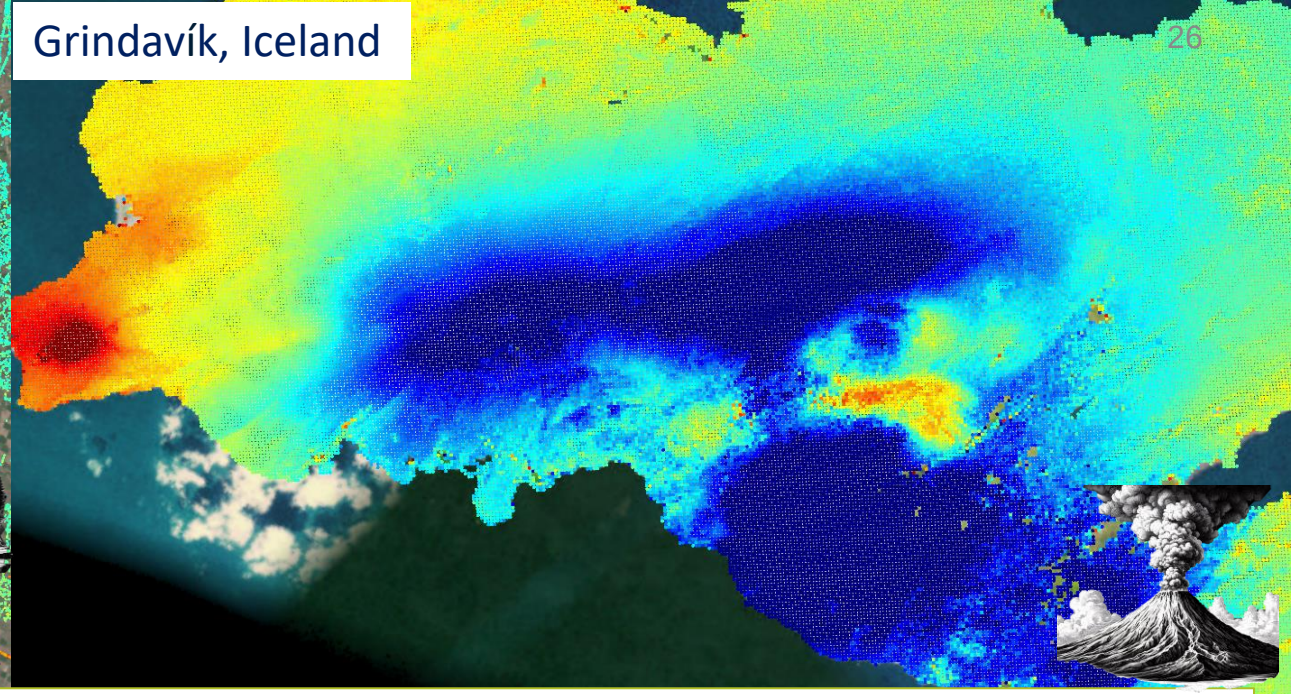




Larissa, Greece

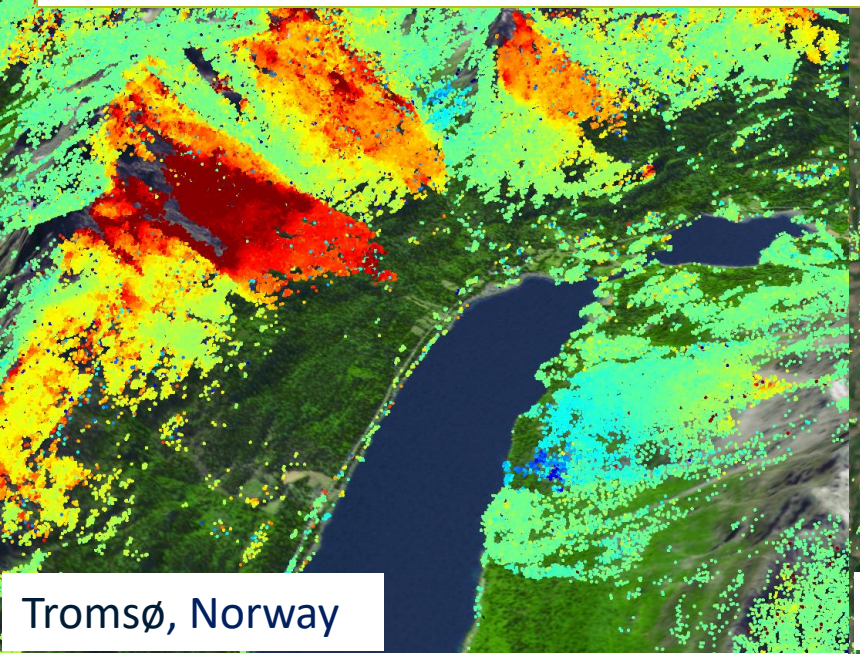


Grindavík, Iceland

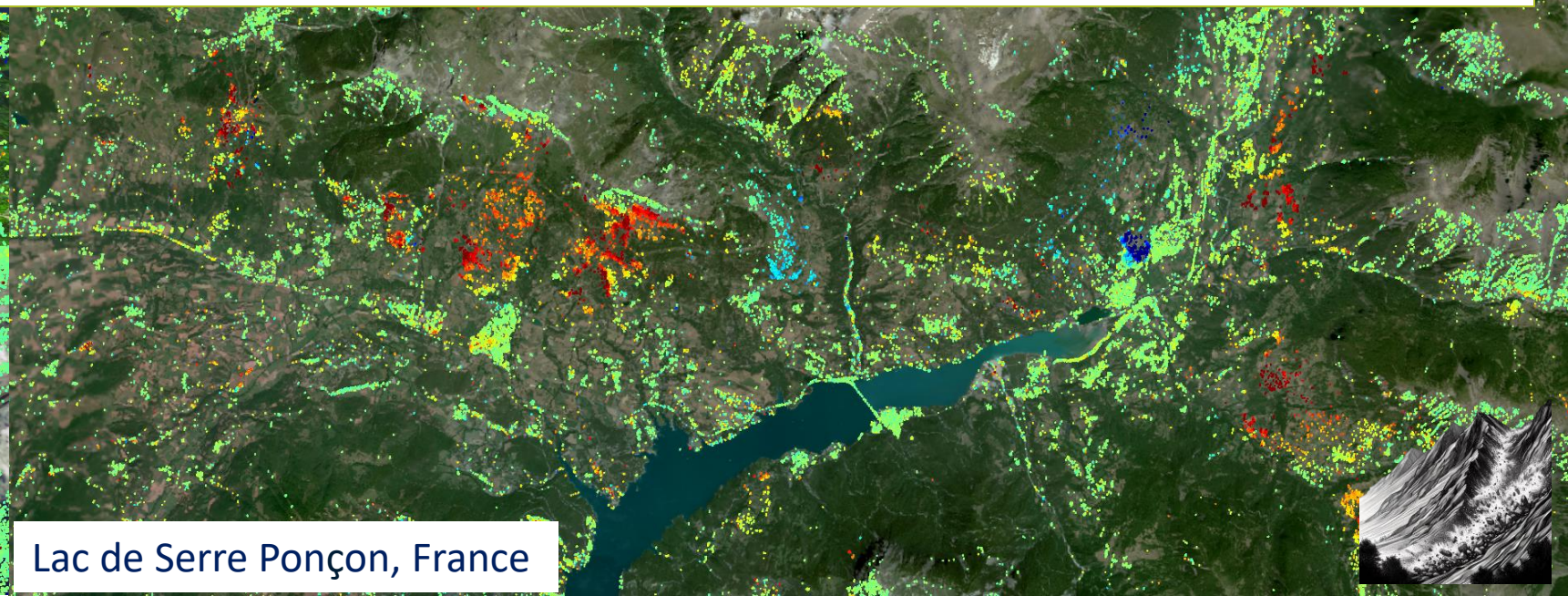


Map and monitor natural phenomena

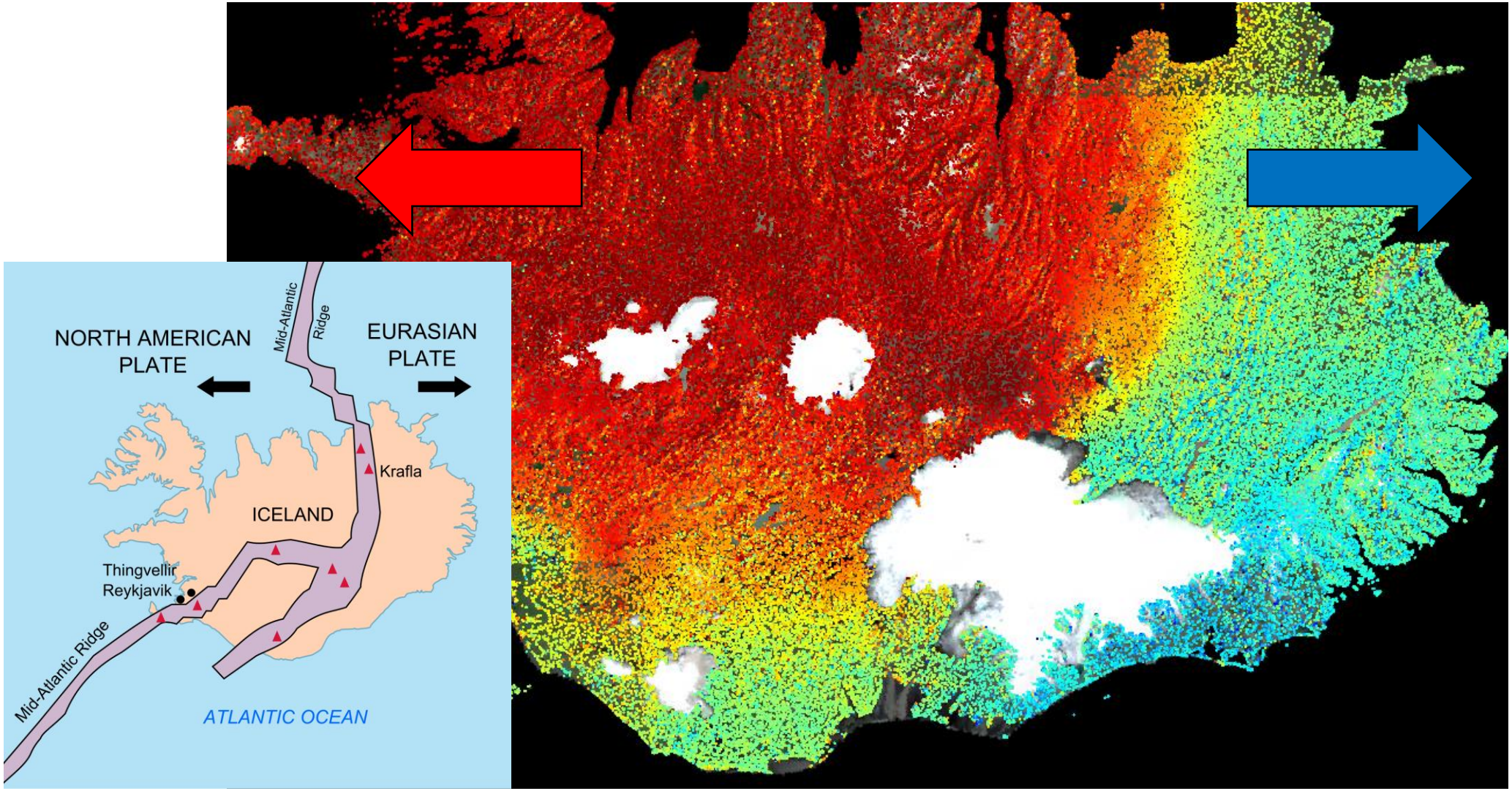
Tromsø, Norway



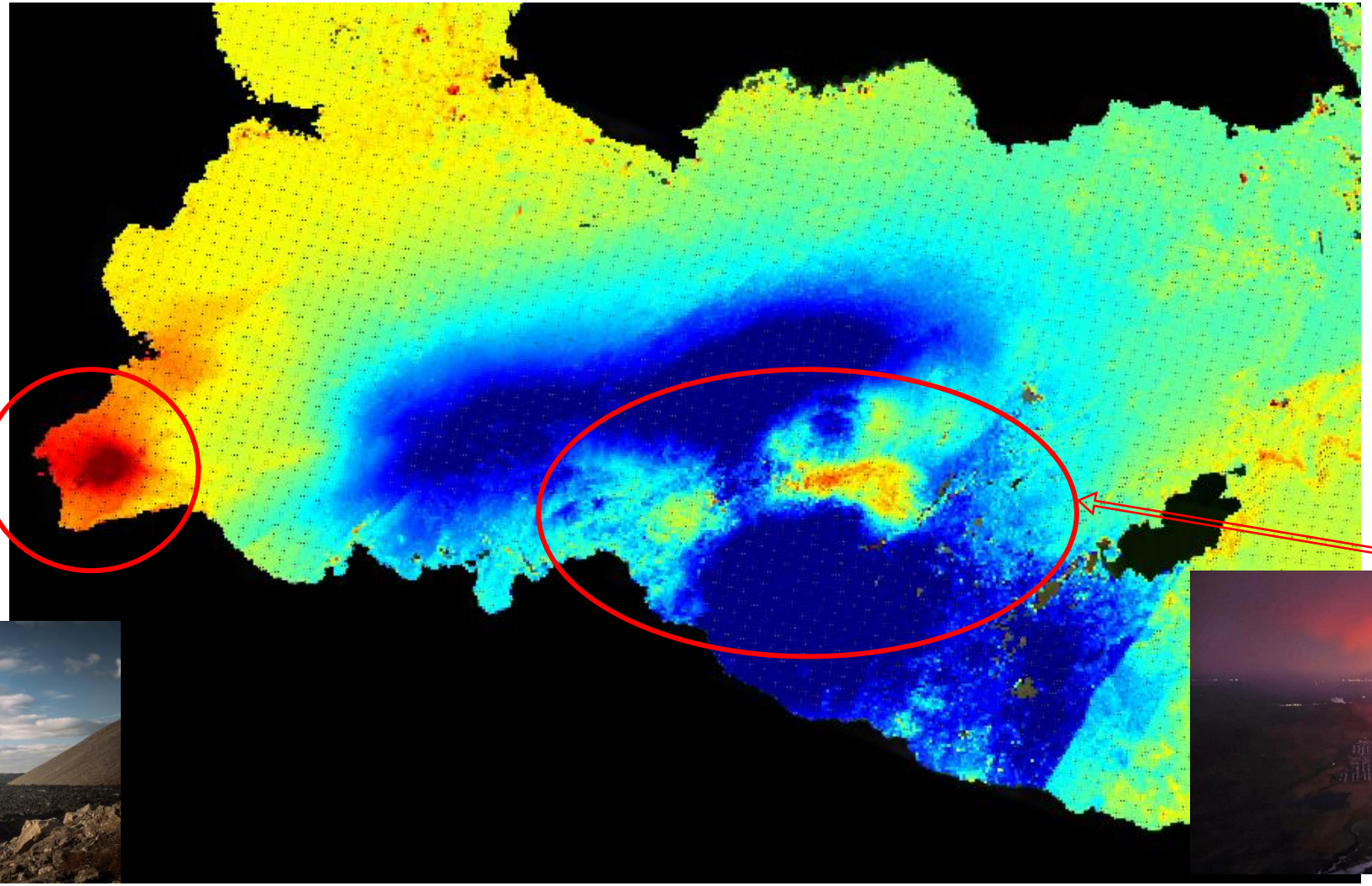
Lac de Serre Ponçon, France



Focus on Iceland

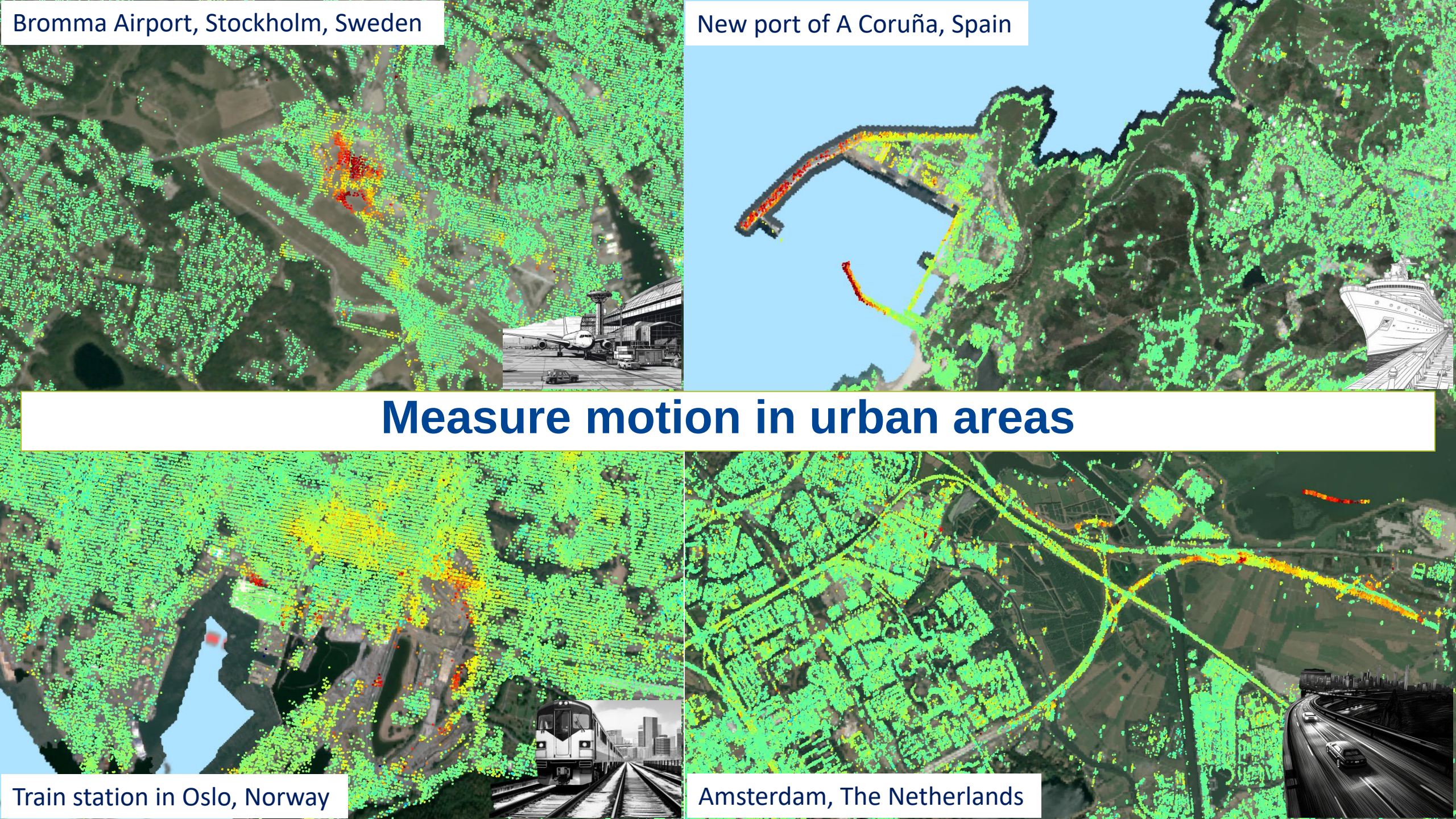


Focus on Iceland



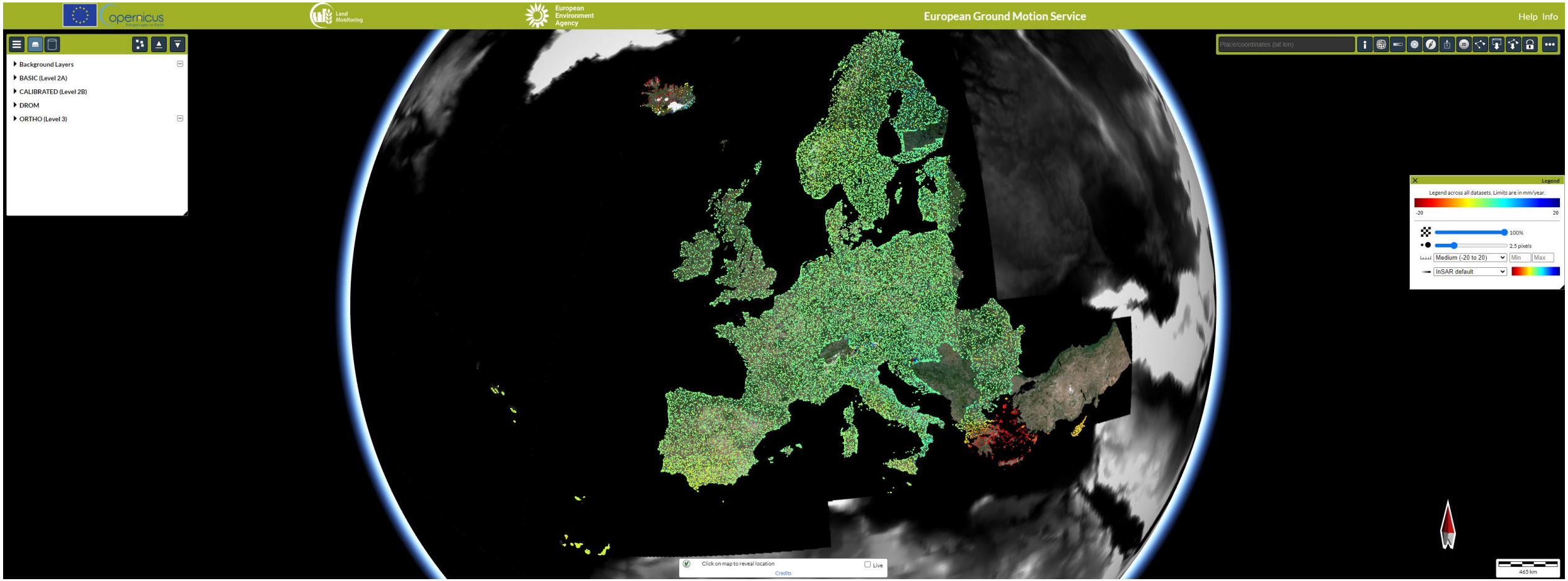
Aftermath of 2022 Fagradalsfjall eruption

Onset of 2024 Grindavik eruption



Measure motion in urban areas

EGMS Explorer



https://egms.land.copernicus.eu/

Land Monitoring

Data Access

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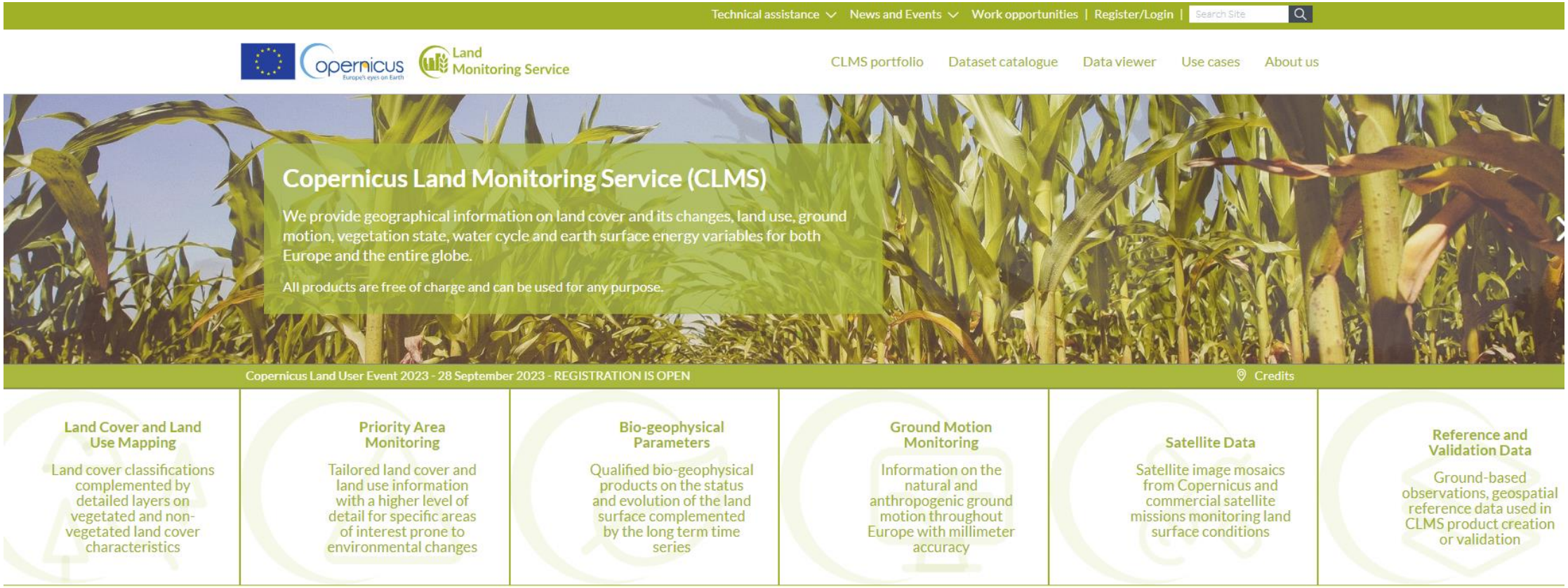
The main entry point to CLMS data



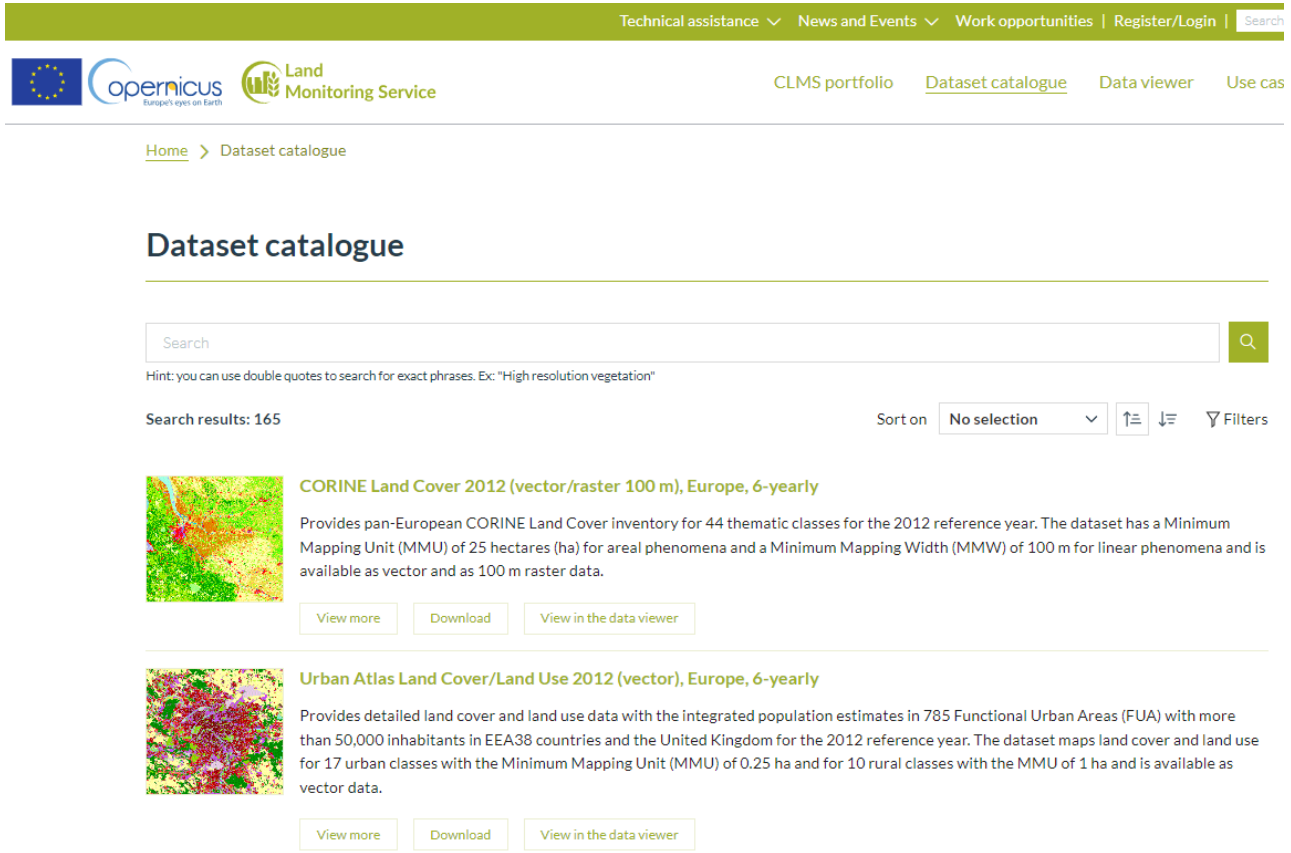
https://land.copernicus.eu/en

The central data viewer

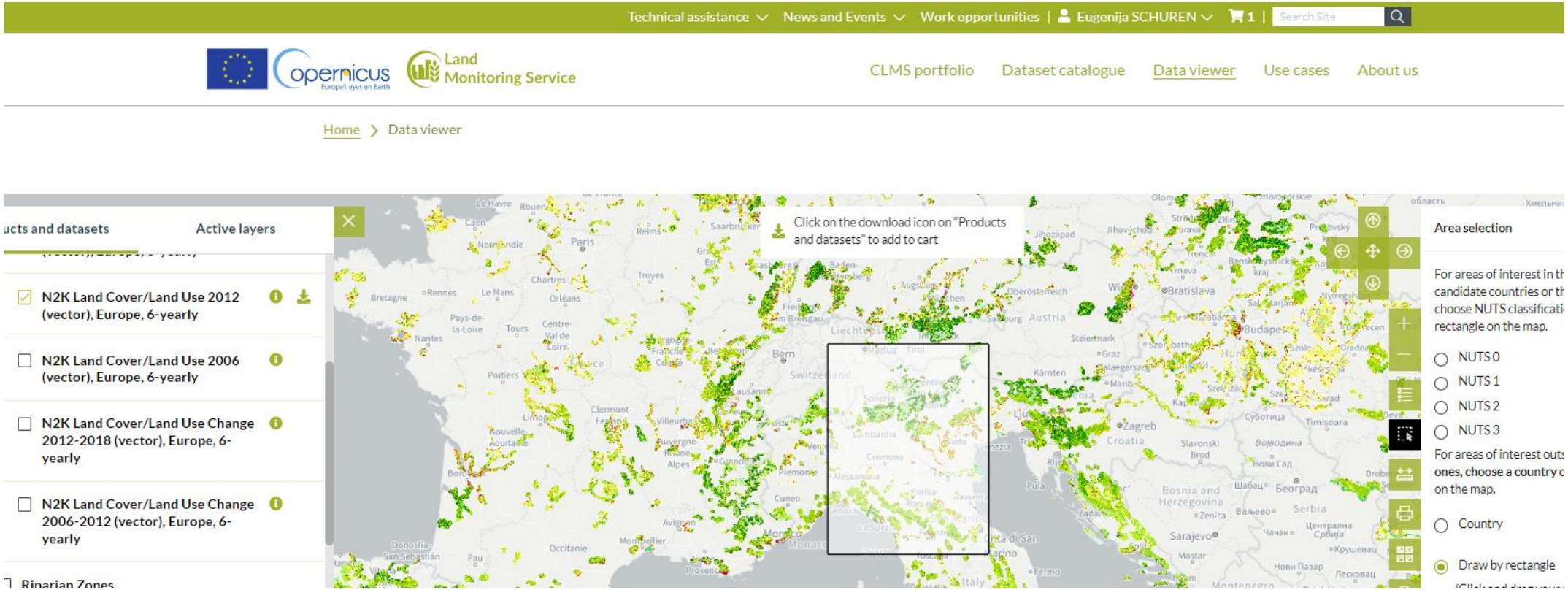
- Multiple layers in a WebGIS
- Navigation tools
- Multiple basemaps
- Pixel by pixel information
- Printing options
- Download capability – entire layer and area of interest

Data catalogue

- European (EEA) and global (JRC) data
- INSPIRE compliant
- Free text search
- Data filters:
  - Resolution
  - Format
  - INSPIRE themes
  - ….



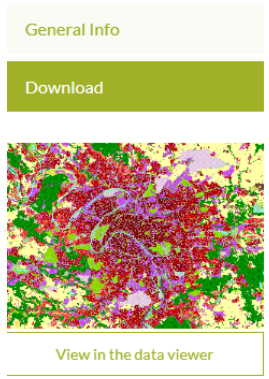
How to download the data?

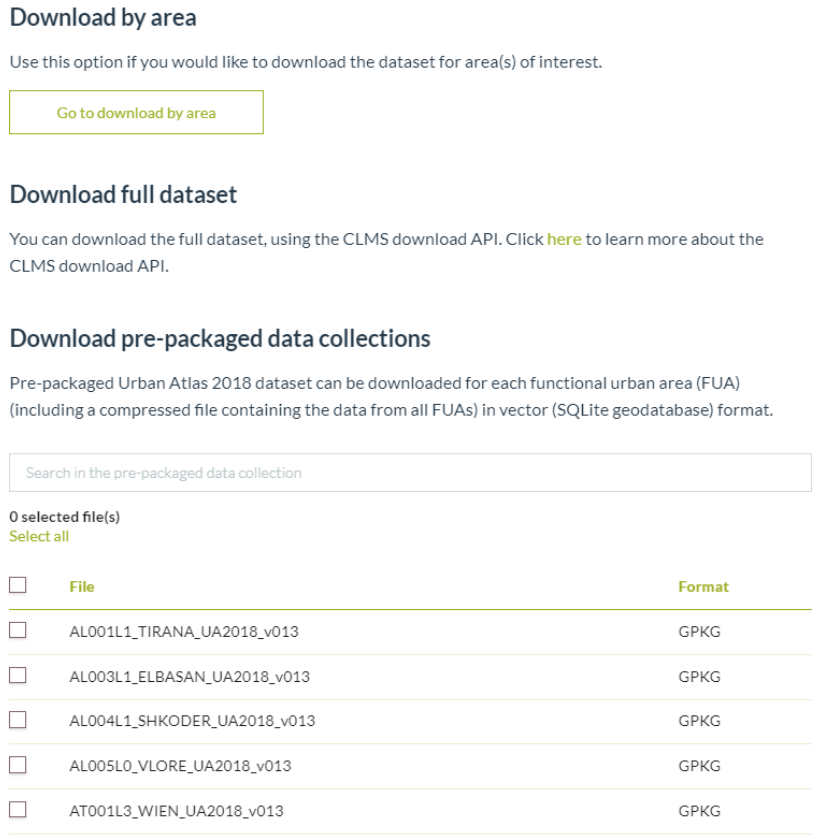


EU-Login to authenticate

How to download the data?

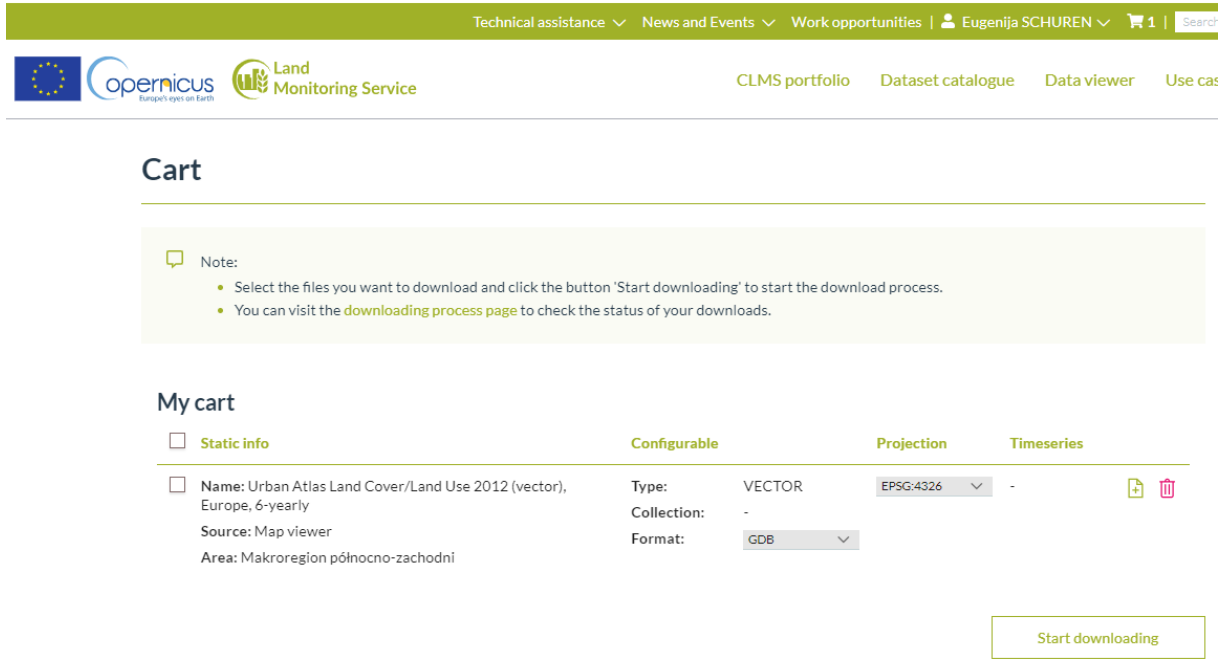
- Download by AOI:
  - NUTS (Nomenclature of Territorial Units for Statistics) classification and bounding box in Europe
  - Bounding box, country selection outside Europe
- Pre-packaged data collections
- Guidance to access the data in external platforms





How to download the data?

- Select [multiple] data to download
  - Review selected downloads:
    - Choose a different resolution, if available
    - Choose a different file format, if applicable
    - Select desired projection
    - Select time interval, if applicable
- Start download
- Monitor download request processing



… or you can use our API

https://land.copernicus.eu/en/how-to-guides/how-to-download-spatial-data/how-to-download-m2m

Where to find use cases

!!Submit a use case!!
https://land.copernicus.eu/en/use-cases/submit-use-case

Browse our use case catalogue

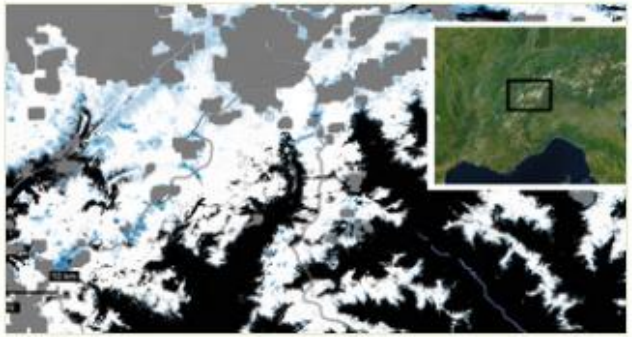
Search

Hint: you can use double quotes to search for exact phrases. Ex: "High resolution vegetation"

Search results: 24

LaRiMo - a simple and efficient GIS-based approach for large-scale morphological assessment of large European rivers

A methodology assessing large rivers' morphology (LaRiMo) based on free



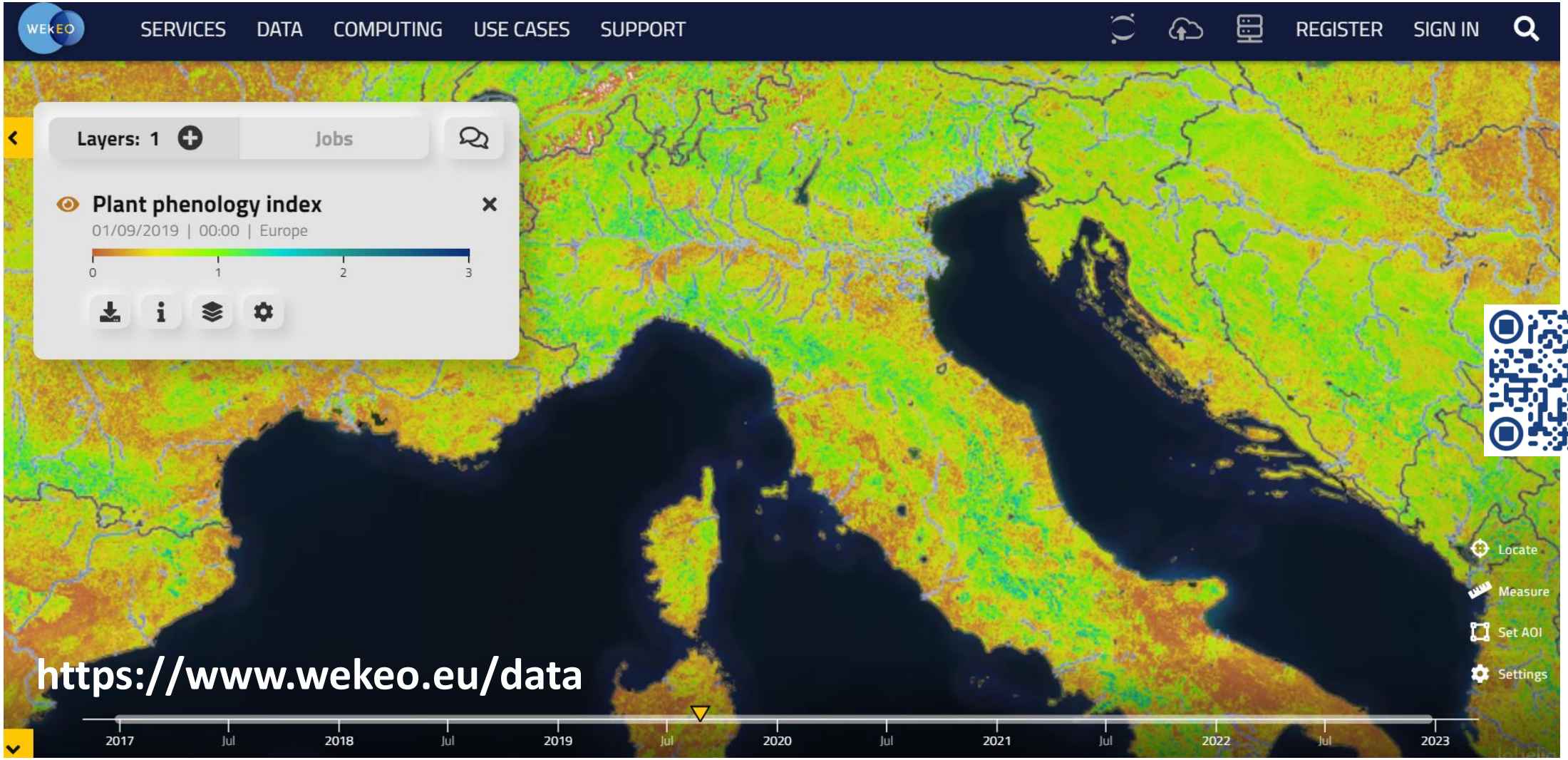
On thin ice? Understanding snowfinch behaviour with high resolution snow data

Using the Copernicus Land Monitoring Service's snow data, PhD student Carole Niffenegger was able ...

Sentinel-2 Mosaic over Finland

The Finnish Meteorological Institute is using Sentinel-2 Global Mosaic Service to produce dekad ...

Wekeo viewer



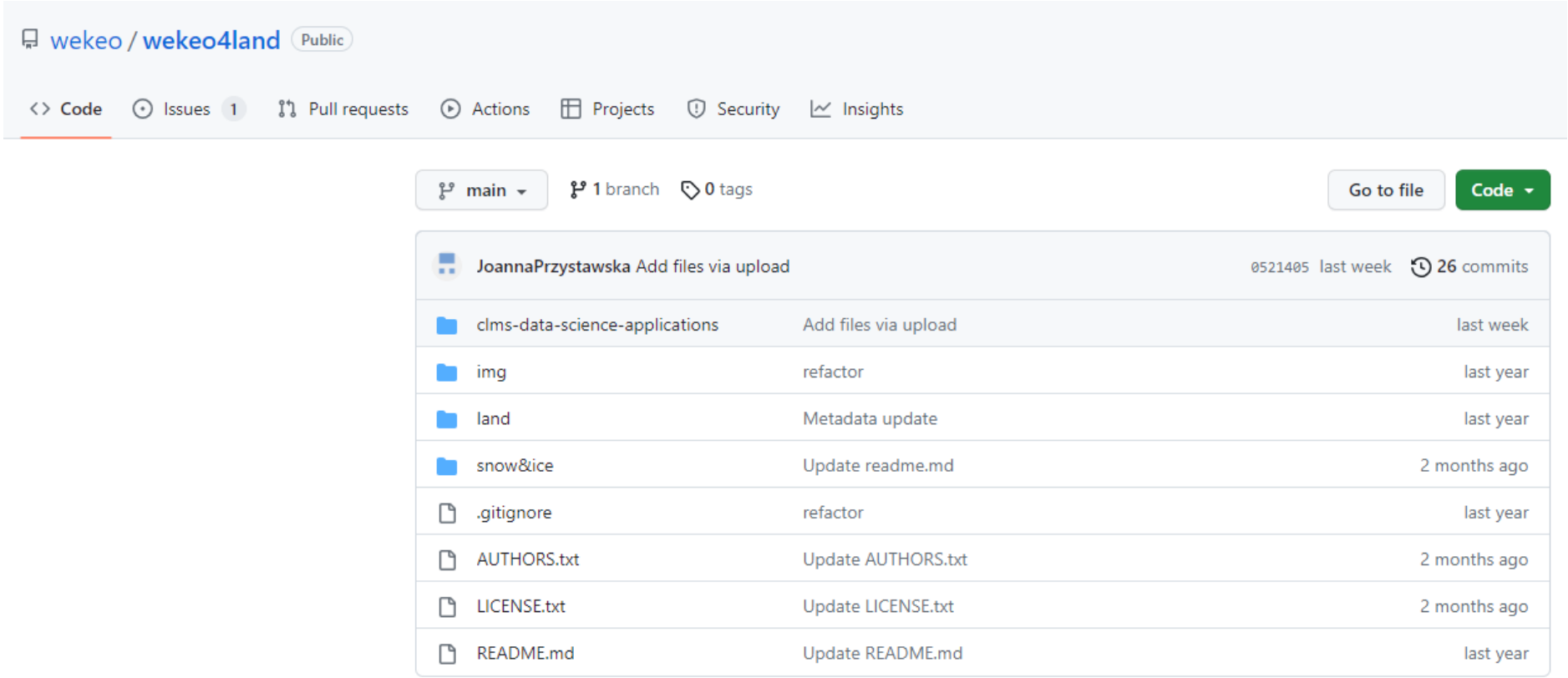
Land Monitoring

Learning Materials

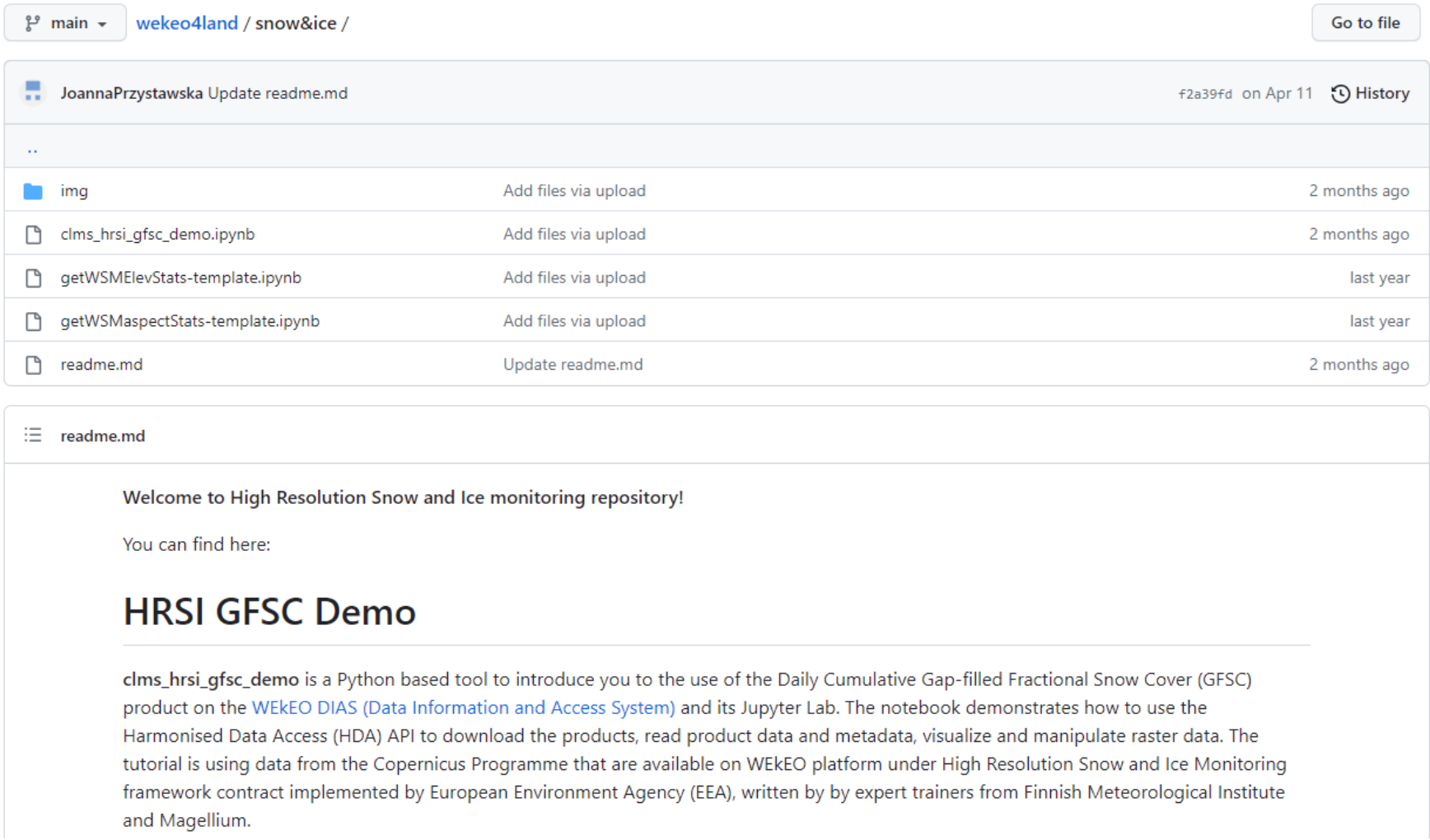
PROGRAMME OF THE EUROPEAN UNION
PROGRAMME OF THE EUROPEAN UNION
Implemented by European Environment Agency

GitHub repositories

- https://github.com/wekeo/wekeo4land
- https://github.com/eea



Wekeo4land GitHub repository



main ▾ wekeo4land / snow&ice / Go to file

JoannaPrzystawska Update readme.md f2a39fd on Apr 11 History

..		
img	Add files via upload	2 months ago
clms_hrsi_gfsc_demo.ipynb	Add files via upload	2 months ago
getWSMElevStats-template.ipynb	Add files via upload	last year
getWSMaspectStats-template.ipynb	Add files via upload	last year
readme.md	Update readme.md	2 months ago

readme.md

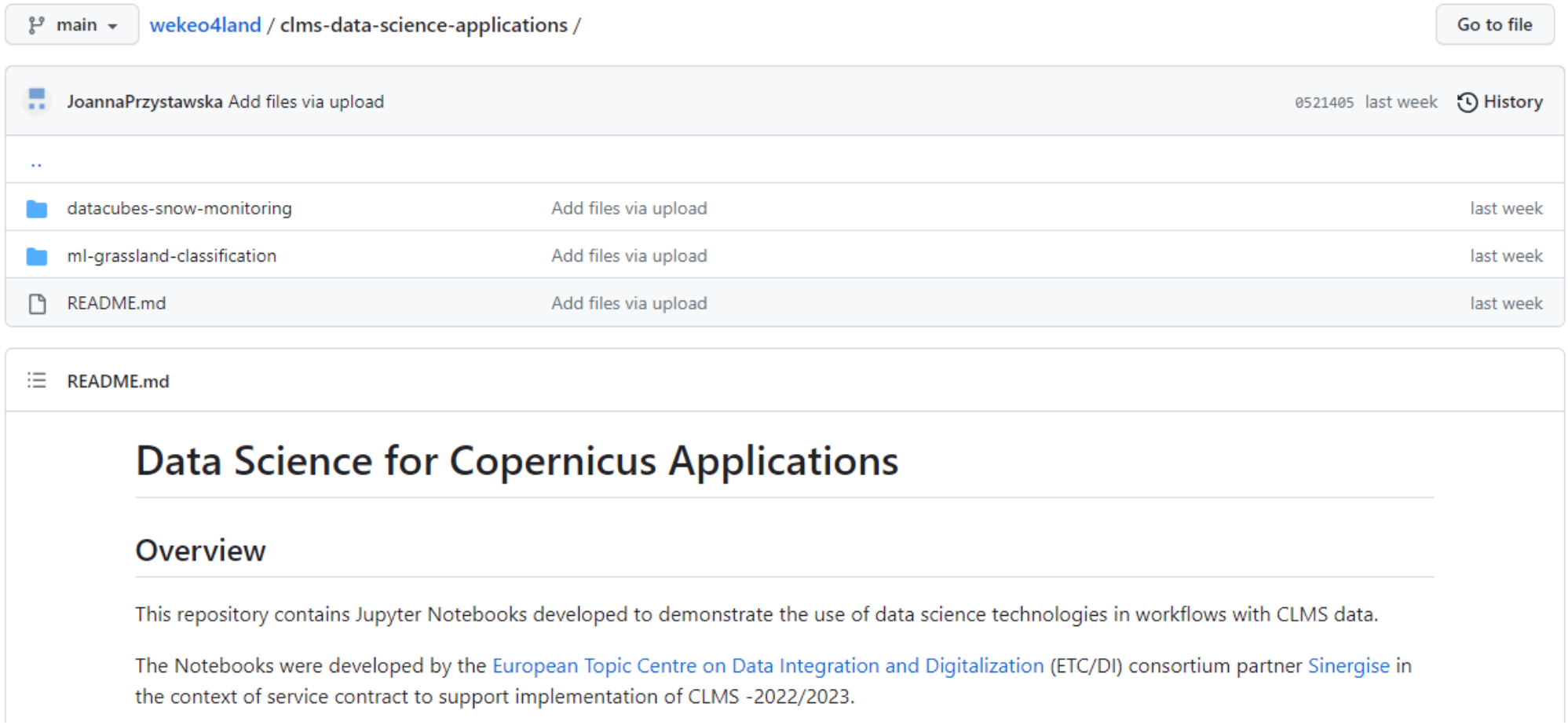
Welcome to High Resolution Snow and Ice monitoring repository!

You can find here:

HRSI GFSC Demo

clms_hrsi_gfsc_demo is a Python based tool to introduce you to the use of the Daily Cumulative Gap-filled Fractional Snow Cover (GFSC) product on the WEkEO DIAS (Data Information and Access System) and its Jupyter Lab. The notebook demonstrates how to use the Harmonised Data Access (HDA) API to download the products, read product data and metadata, visualize and manipulate raster data. The tutorial is using data from the Copernicus Programme that are available on WEkEO platform under High Resolution Snow and Ice Monitoring framework contract implemented by European Environment Agency (EEA), written by by expert trainers from Finnish Meteorological Institute and Magellium.

CLMS data science applications



main ▾ wekeo4land / clms-data-science-applications / Go to file

JoannaPrzystawska Add files via upload 0521405 last week History

..

datacubes-snow-monitoring	Add files via upload	last week
ml-grassland-classification	Add files via upload	last week
README.md	Add files via upload	last week

README.md

Data Science for Copernicus Applications

Overview

This repository contains Jupyter Notebooks developed to demonstrate the use of data science technologies in workflows with CLMS data.

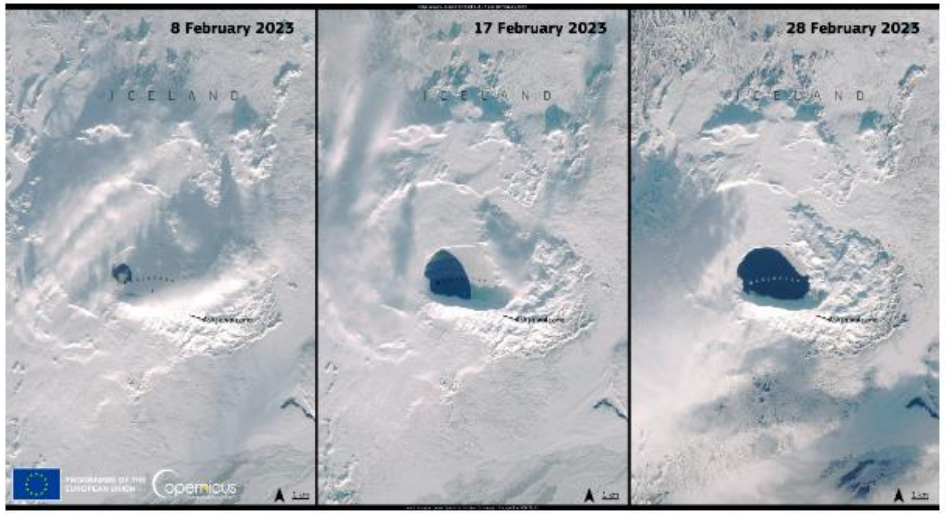
The Notebooks were developed by the European Topic Centre on Data Integration and Digitalization (ETC/DI) consortium partner Sinergise in the context of service contract to support implementation of CLMS -2022/2023.

Ice product use case

- https://github.com/eea/clms-hrsi-arlie-use-case/

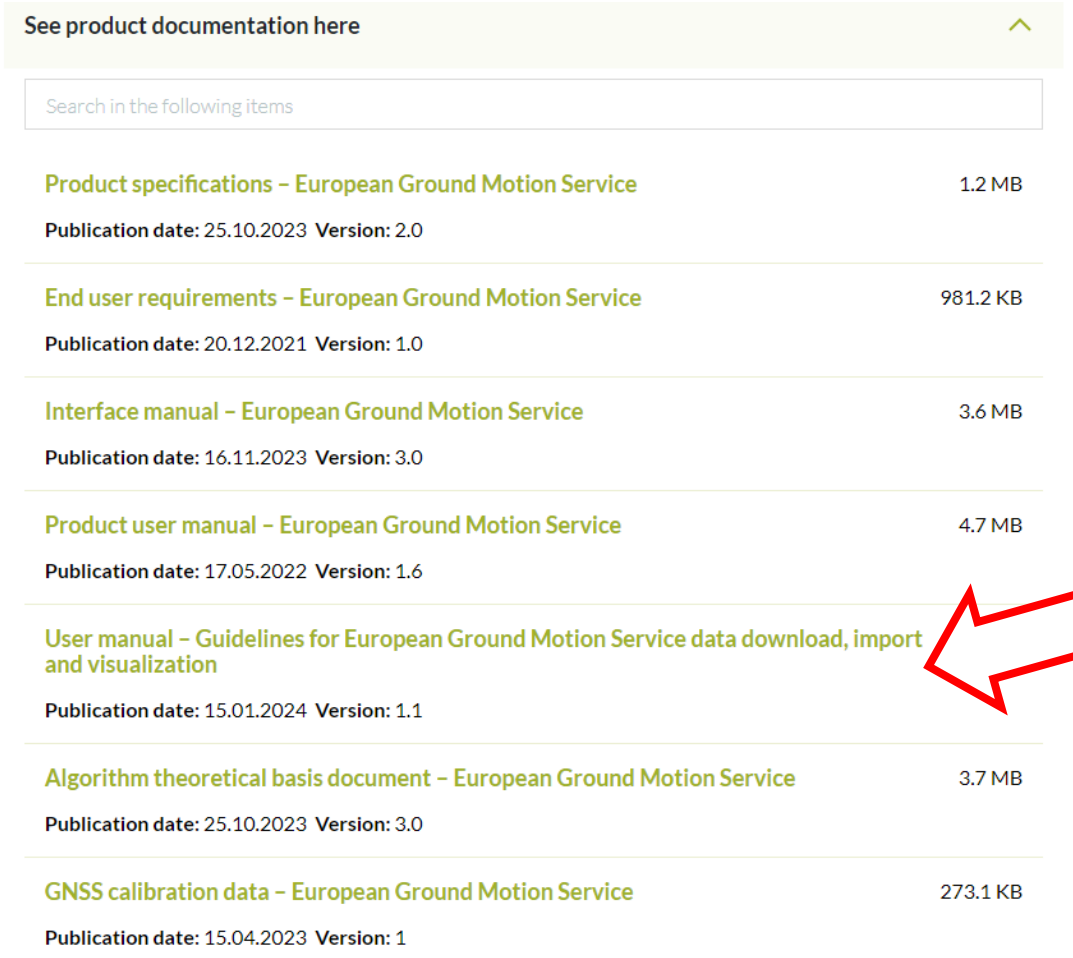
Use case 2 📊🗺️

Unexpected melting of Öskjuvatn, Iceland



This notebook demonstrates how ARLIE data can be used to study an unexpected melting event in the volcanic lake Öskjuvatn. Located in the crater of the active volcano Askja in the central highlands of Iceland, the lake usually stays frozen until June or July. Yet, in February 2023, Copernicus Sentinel-2 satellite images revealed an early melting of the lake. The actual reason behind the melting event is not fully clarified but likely due to increased geothermal activity of the Askja vulcano.

EGMS guidelines - data download & QGIS usage



https://land.copernicus.eu/en/products/european-ground-motion-service

https://land.copernicus.eu/en/technical-library/guidelines-european-ground-motion-service-product-analysis-in-qgis/@@download/file

EGMS guidelines - data download & QGIS usage

The guidelines will explain how to:

- Download the EGMS data:
  - The single data tile
  - Multiple data tile (expert users/big data users)
- Import the data in QGIS
- Modify the attribute table depending on the user needs

Land Monitoring

Thank you for your attention

Contact us @:
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lorenzo.solari@eea.europa.eu

https://land.copernicus.eu/en/contact-service-helpdesk