BSADRI

Black Sea and Danube Regional Initiative Applications (BSADRI)

Priority Application Domain B:
Sustainable Natural Resource Management in Agriculture and Forestry

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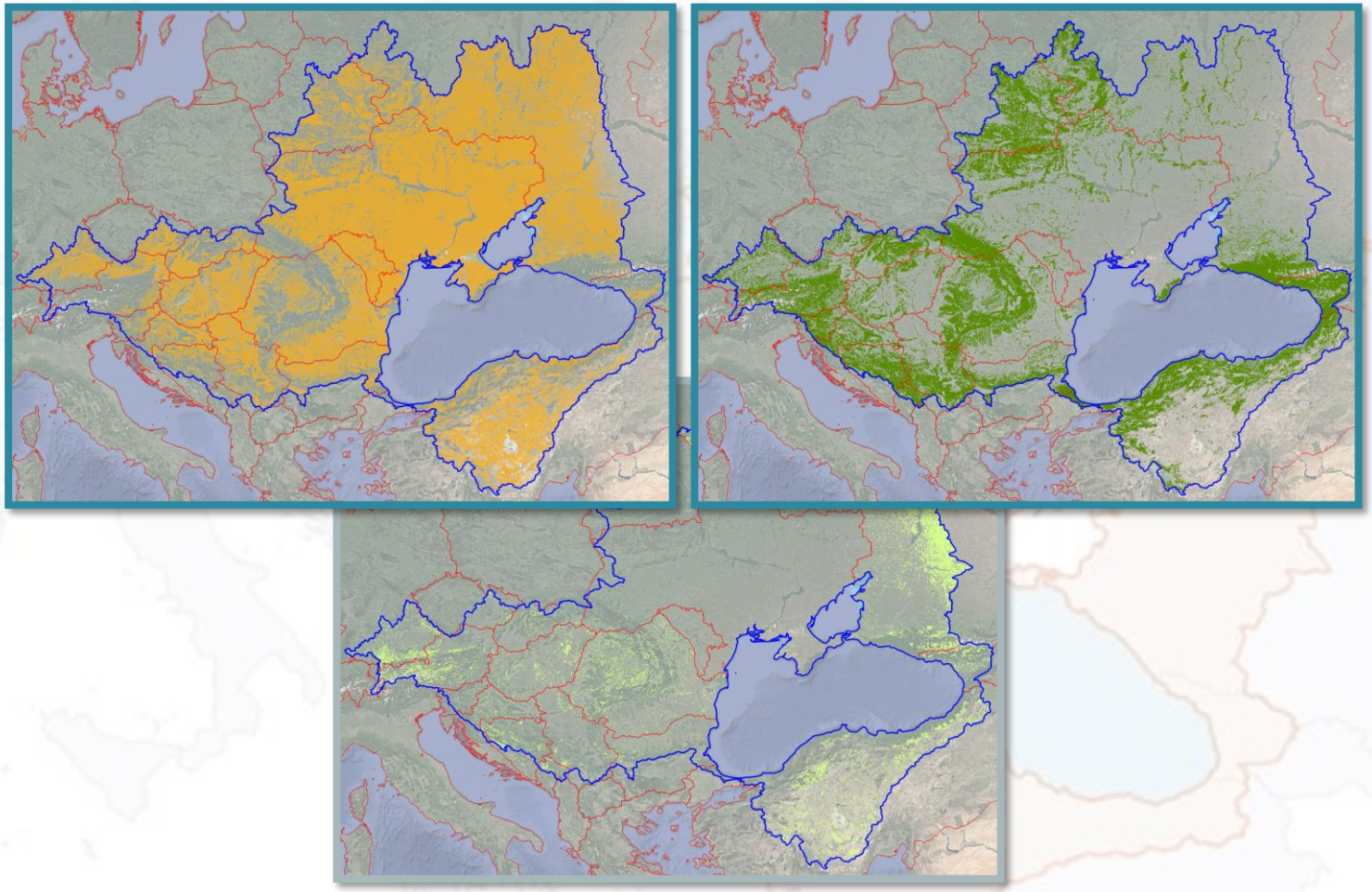
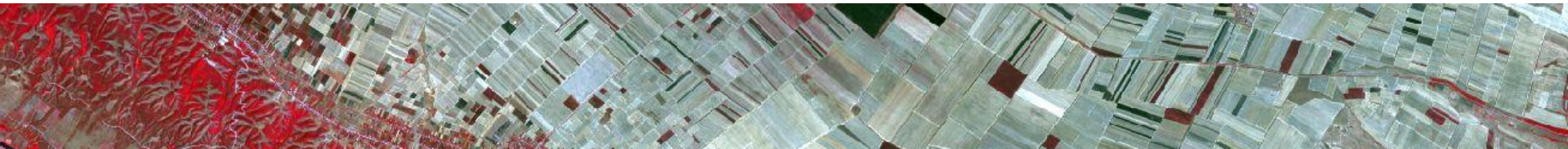


ESA regional initiatives – Black Sea region

- Activity is part of the EO (Earth Observation) Exploitation Platforms element of ESA's Earth Observation Envelope Programme (EOEP-5,) aiming among others to establish regional information services in selected geographic regions in Europe and neighbouring countries (Alps, Baltic, …& Black Sea…
- There are three common objectives for all regional initiatives such as:
    - Demonstrate the benefit and utility of EO-derived information to support regional monitoring priorities, and enhance the capabilities to cooperatively address these priorities
    - Achieve measurable progress in embedding EO-derived information into the strategies and cooperation actions within the regions, and
    - Utilise state of the art processing and analysis capabilities within the region and demonstrate added value of using an open, non-monolithic and federated network of platforms, fuelled with European EO assets.



BSADRI - objectives

Precursors & Experience

- Thematic Exploitation Platforms
- Application projects *(EO4SEE /EO4EP)*
- EO based services
  (Sen4CAP, Sen2Agri, DROMAS, Forest Inspector)

Objectives

- Data tools for EO processing
- Services and applications
- Respond to user needs

Requirements & Expectations

- Use of Cloud infrastructure
- BigData processing
- Link-up to already ongoing developments
- Regional approach to information collection and delivery
- Integrate non-EO data

Context & Regional users

Regional events

Constanta and Sofia Workshops (2016/18)

Service providers

EU perspective

CAP, EU Directives

Users

- Authorities
- Research institutes,
- Non-governmental organisations
- International institutions & programs

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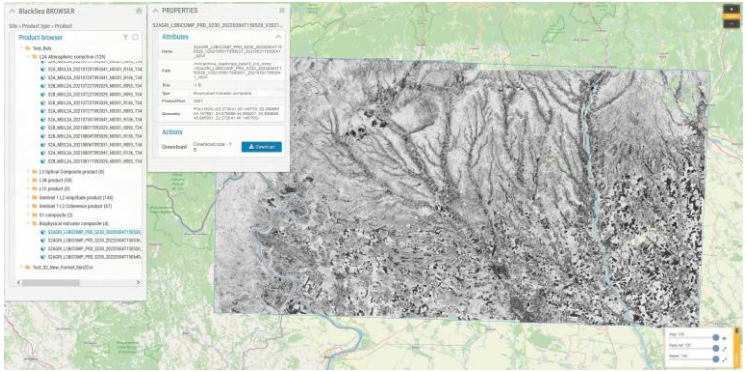
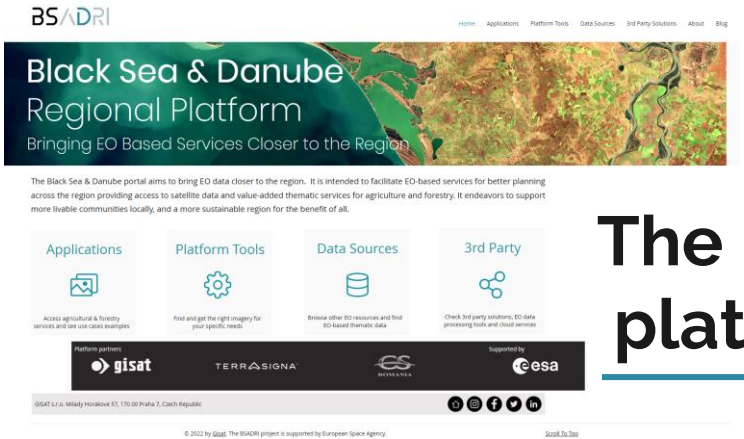
- ESA regional initiatives
- Infrastructure support (NOR)
- Project office

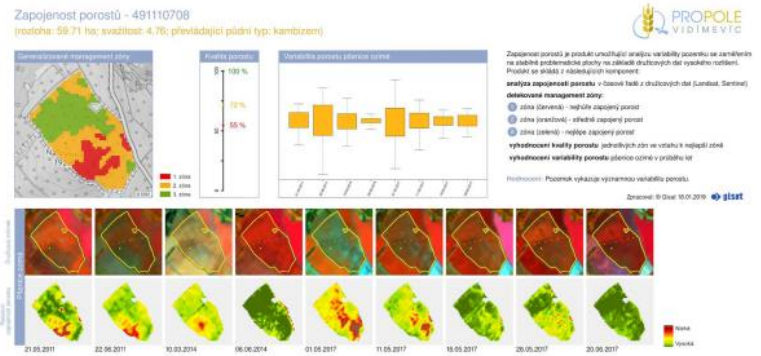
Tools & Services



The Black Sea platform



Use case demonstrations



Black Sea – platform

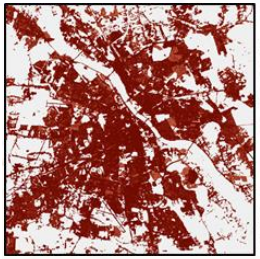
Black Sea – Data & 3rd Party solutions

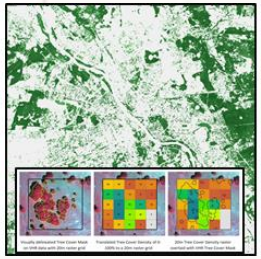
01 | Global Copernicus Land Monitoring
02 | Pan-European Copernicus (Land Monitoring)
03 | High resolution Layers

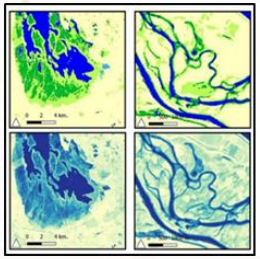
04 | Copernicus Climate Change, Atmosphere…

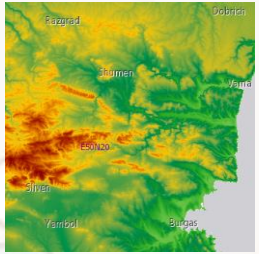
05 | TEP'S - Food, Forestry
06 | Sen4Stat, World Cereal, Sen4CAP
07 | Data and Information Access Services (DIAS)

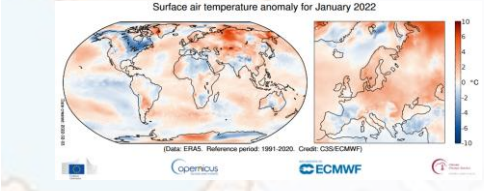
08 | ESA SCiHub, AWS
09 | Sentinel Hub, Land Viewer, Google Earth Engine











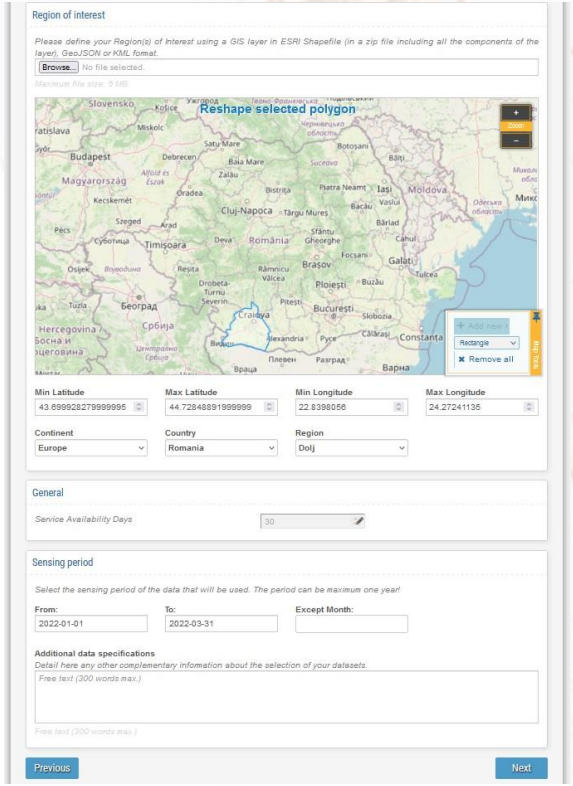
Cereal

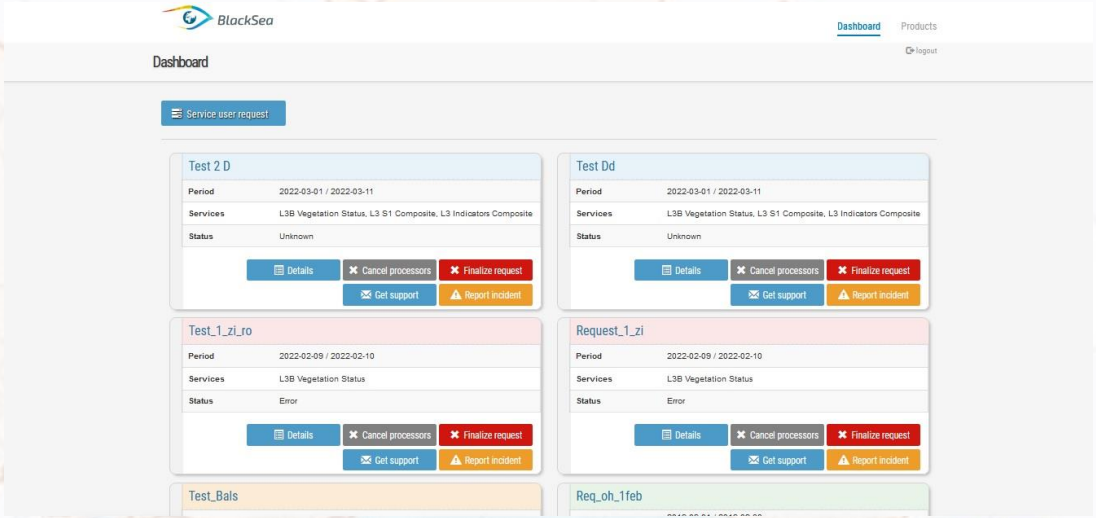
sentinelhub
member of Euro Data Cube

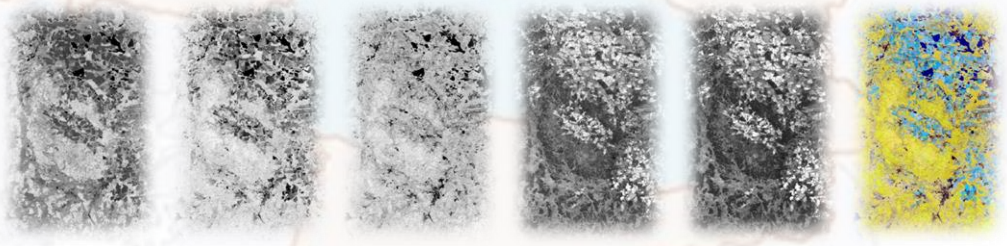
EURO DATA CUBE

food security
tep

Black Sea – platform tools







NDVImin NDVI med NDVI max NDVI rng NDVIstd NDVIfc

Black Sea – CreoDIAS via NoR

- Large scale demonstration implemented – use of cloud infrastructure inevitable
- Long time-series processed – direct access to Sentinel archives makes it feasible
- High computation requirements – automation, distributed computing and server clustering
- Production tools deployed on the cloud – open-source based, cloud agnostic (docker)
- Innovative EO data processing workflows – AI method, Analysis Ready Data, Big Data

Conclusion:

Cloud computational infrastructures combined with scalable analytical platform capabilities represent a modern viable solution for operational EO data processing and analysis

Applications

Precision farming

2

CAP Support

3

Forest management

4

Land Inventory

1

Georgia

01

Long Term Land Use and Land Inventory

- Aims to facilitate land use classification from HR data
- Primary data source S2 and Landsat
- Allows accounting of balance between temporal horizons (5 year)

Institutional reform

2005

...Data gap on agricultural and arable land...

2010

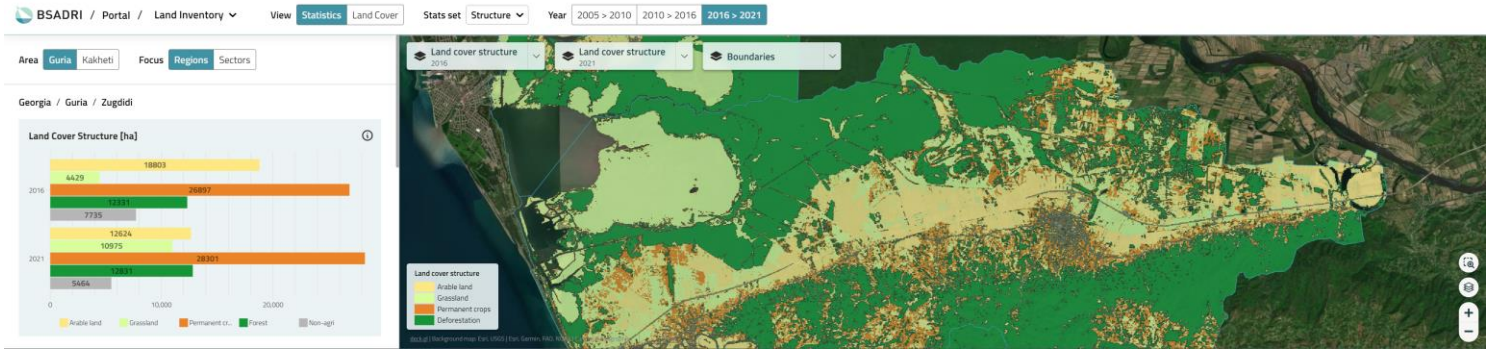
2015

2021

Service extension

20XX

BSADRI regional initiative



Precision Farming

02

- Demonstrate operational agricultural services supporting variable farming management

Products:
Historical time-series analysis of crop spatial and temporal variability, monitoring crop growth in the current season

- **Support to soil sampling optimization**
- **Variable sowing and fertilization**
- **Pest and disease control**
- **Smart irrigation**

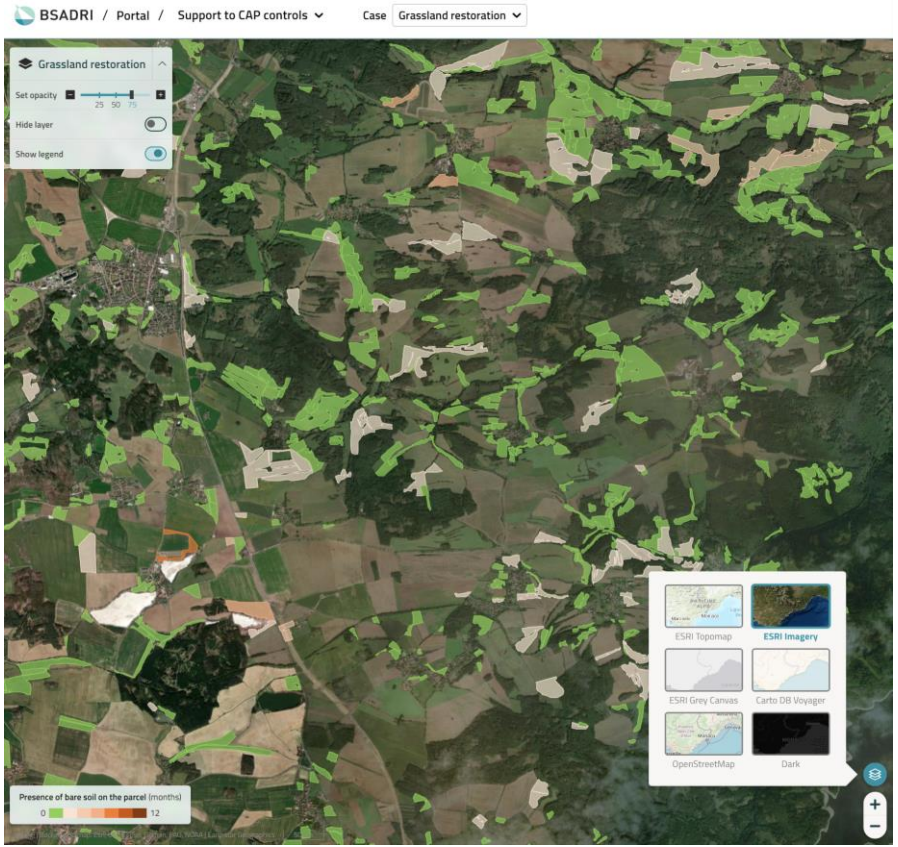
CAP support

03

- Demonstrate how EO data can be applied to support the compliance checks of CAP subsidy applications

Products:
Monitoring of grassland ploughing, monitoring of crop growing season dynamics to assess the impacts of agricultural drought

- **Implementation of Checks by monitoring**
- **Reducing costs and burden (by automation and limited field visits), increasing fairness (by avoiding sampling)**



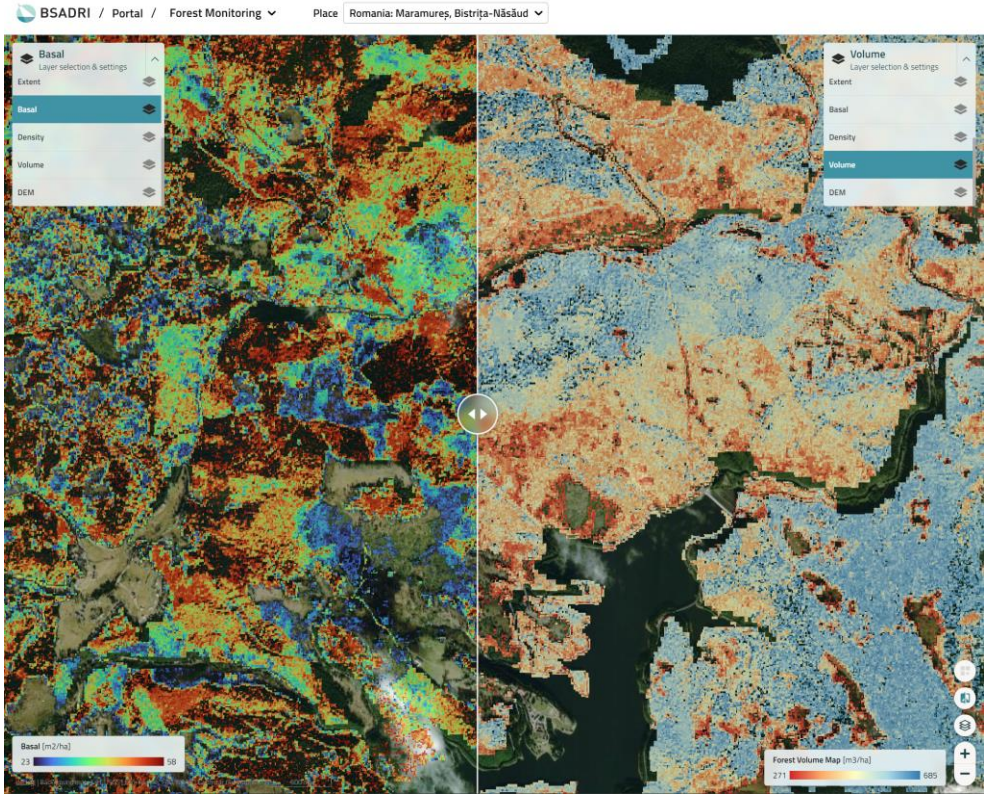
Forest management

04

- Forest inventory and management from remote sensing Sentinel 2 products for the Carpathian region in Romania

Products:
footprint map, density map, basal area map, volume map

- **Forest inventories**
- **Monitoring** the effect of disturbances
- **Forest operations planning**



Synthesis & Conclusions

01 | **Common data basis** – free and open - **Sentinel 1,2** & Landsat

02 | Mostly based on operationally available **open source tools**

03 | **Data & Services** at one place

04 | **Scalability**

05 | **Applications** - real operational use cases

05 | **Outlook** – portal perspective, additional services, relation to other regional platforms

E3.03.1 Black Sea and Danube Regional Applications and Science

BSADRI

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