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GET GEOSPATIAL ENABLING TECHNOLOGIES
making location matter

Operational use of open satellite data for marine water quality monitoring

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About GET

Geo ICT — GeoInformatics

Open DATA — Open Data

GeoBI Business Inteligence — Business Intelligence

Environment — Environment

We give value to Geospatial Information

Objective

The purpose of this project was to develop an **operational platform** for **marine water quality monitoring** using **near real time satellite** data.

The platform utilizes **free** and **open** satellite data available from different data sources like **COPERNICUS**, the European Earth Observation Initiative, or **NASA**, from different satellites (TERRA, AQUA, GOES, METOP, MSG, NPP) and instruments (MODIS, VIIRS, AVHRR, AATSR, AMSR-E, TMI).

Developed for the IPA **Greece-Albania** Cross-Border Programme: "SA.I.MO.N.: SAtelllte Near Real Time MOnitoring Network of the eutrophication risk for the marine waters over the Greek-Albanian crossborder area"

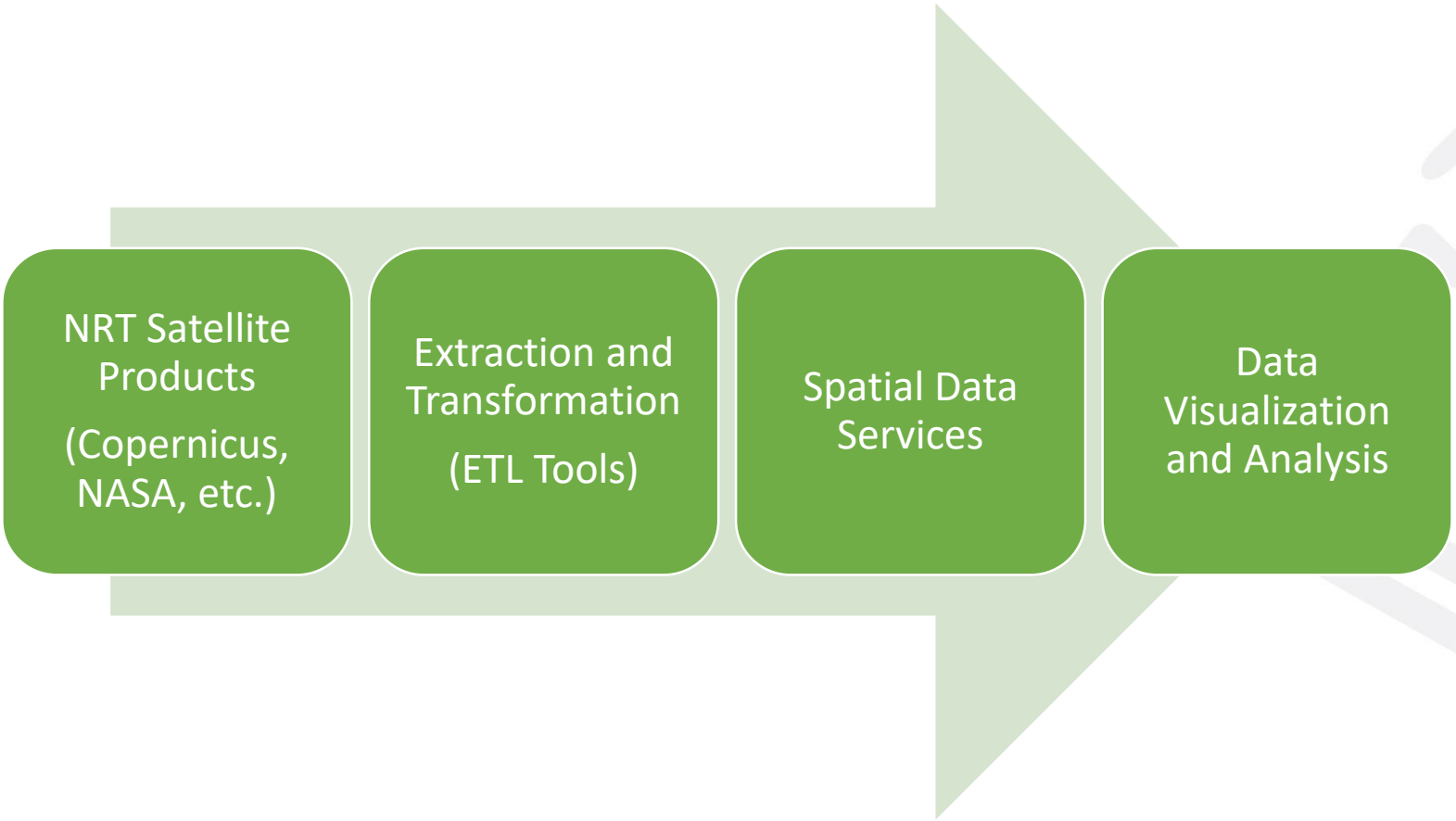
Study Area

Ionian Sea

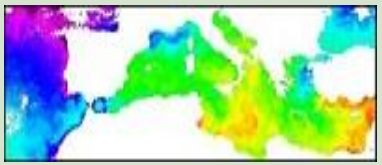
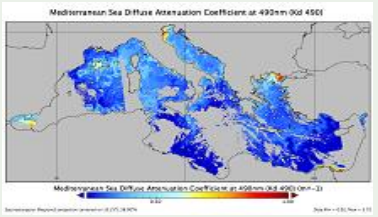
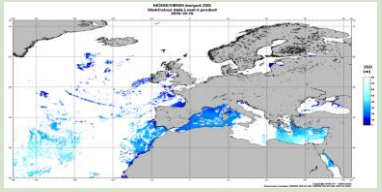
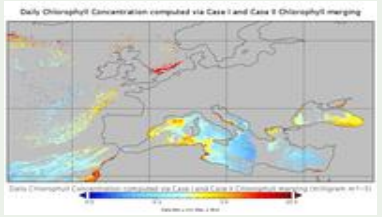
Can be extended to:

Mediterranean and Black Sea

Methods


NRT Satellite Products
(Copernicus, NASA, etc.)
Extraction and Transformation
(ETL Tools)
Spatial Data Services
Data Visualization and Analysis

Datasets

Parameter	Source	Satellite Sensor	Coverage
SST	Copernicus, NASA JPL	AVHRR, SEVIRI, MODIS, AATSR, AMSR-E, TMI	
kd490	Copernicus	MODIS, VIIRS	
ZSD	ESA	MODIS, VIIRS	
Chlorophyll	Copernicus	MODIS, VIIRS	
Data sources:	esa European Space Agency	NASA	opernicus Europe's eyes on Earth

The Copernicus Open Data Service

- Access to **OPEN Earth Observation** Data including:
  - Satellite images and products
  - Model data
  - In-situ measurements
- With 6 different **themes** it provides information on:
  - Land
  - **Marine**
  - Atmosphere
  - Emergency Management
  - Climate Change
  - Security
- Services: FTP, WMS, Sub-setting

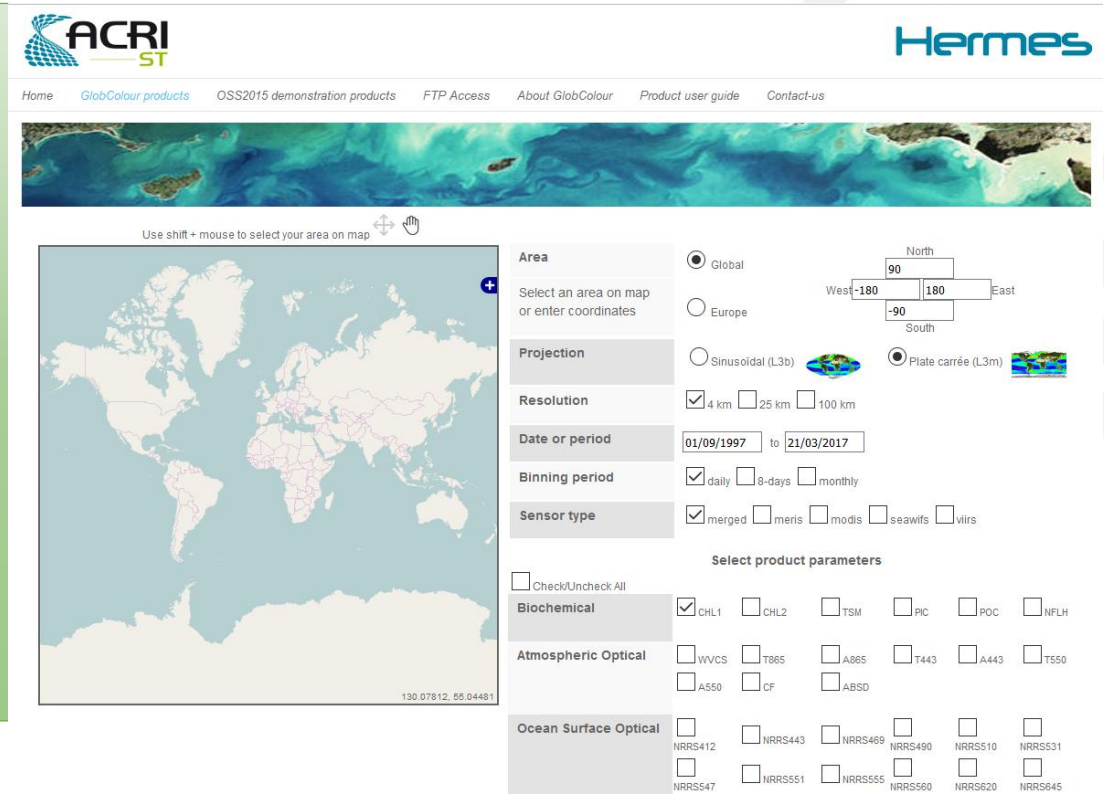
Marine Environment Monitoring Service

Marine Products Catalogue

GLOBCOLOUR

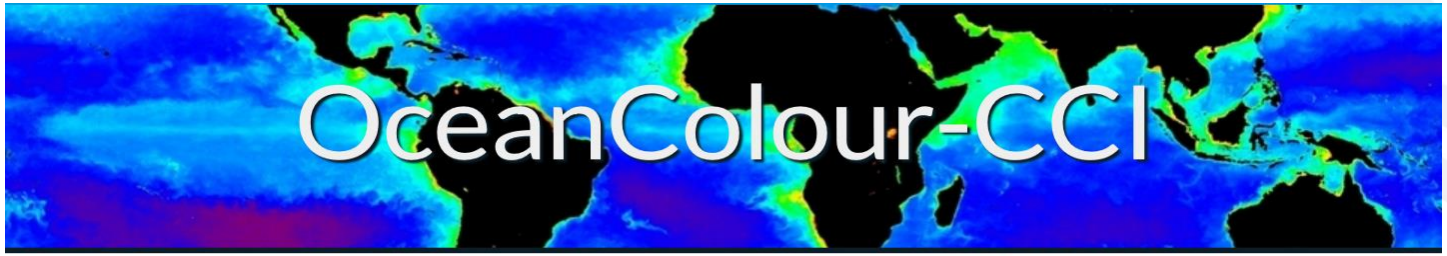
- **GlobColour** program began in 2005 as an **ESA** program **Data User Element** (DUE) in order to provide continuous monitoring of sea (as **level 3**, gridded data).
- In the program were involved both **ESA** and **NASA**.
- Since 2008, the GlobColour program serves more than 600 users worldwide providing **real-time and archive** data.
- Data is available from the portal: http://hermes.acri.fr

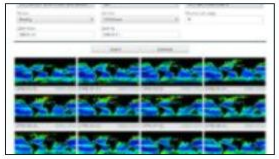
- Many parameters: **Biochemical, atmospheric, surface, seabed**
- **Global** coverage with **4km** resolution and for **European** regions with **1km** resolution
- **Daily, weekly and monthly** products
- **Merged** satellite products



OceanColor Web

- **OceanColor Web** is the Earth Observation repository of the marine environment of **NASA**. The web portal can be found at: http://oceancolor.gsfc.nasa.gov
- The portal provides **archive** and **near real-time** data from various missions (MODIS TERRA, MODIS AQUA, VIIRS SNPP, SEaWiFS, CZCS, MERIS, OCTS) and for various analysis and processing levels (L1, L2, L3, L4).





Composite Browser

Access a range of products composited in different periods. Data can be searched by time ranges, periods, products & wavelengths. Version one datasets available now.

OPeNDAP

A freely available framework that simplifies all aspects of scientific data networking, making local data available to remote locations regardless of storage format.

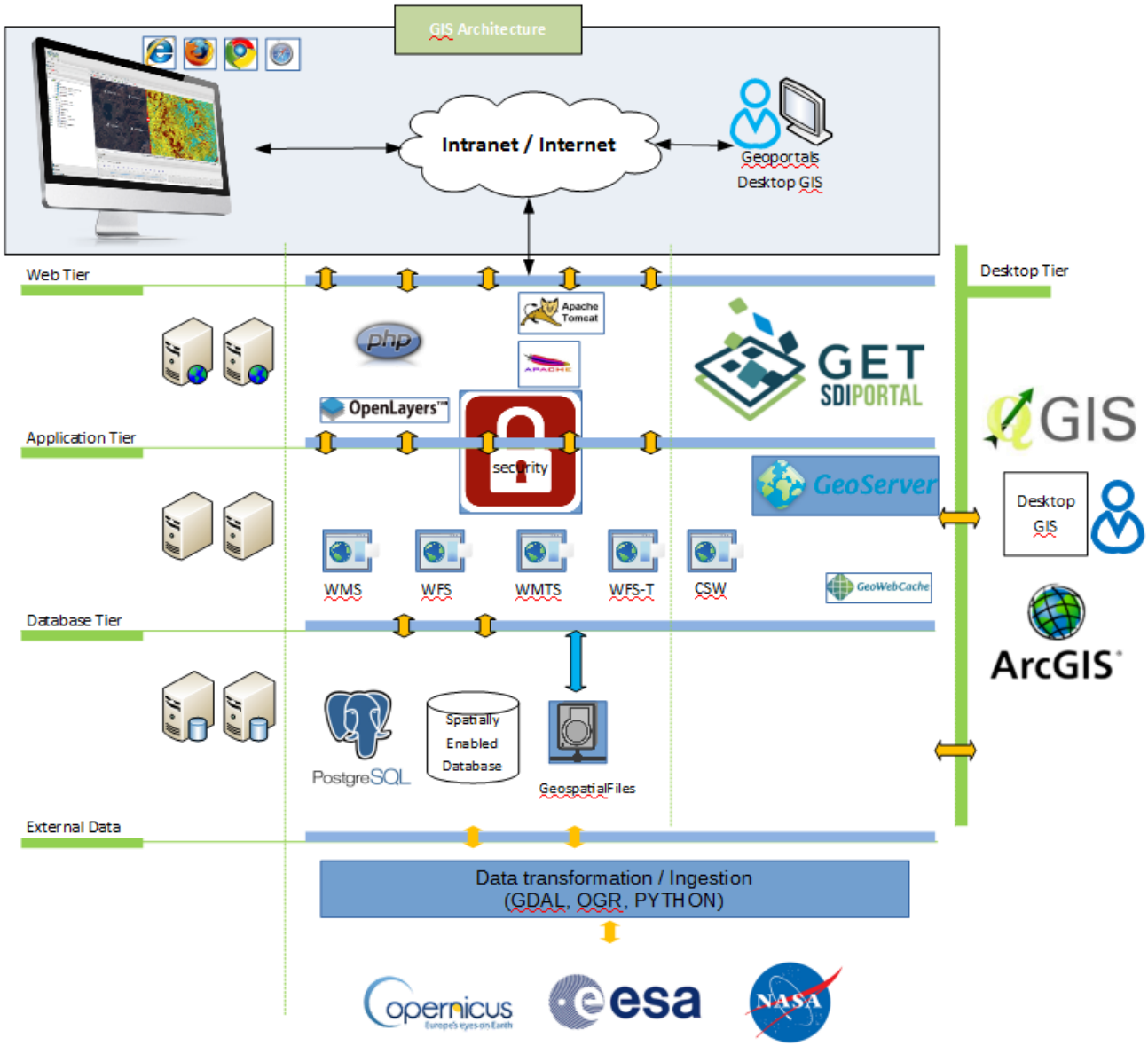
Web GIS Portal

View, manipulate & analyse data. Version one datasets available now.

FTP

Download large sets of data easily. Version one datasets available now.

The platform: Architecture



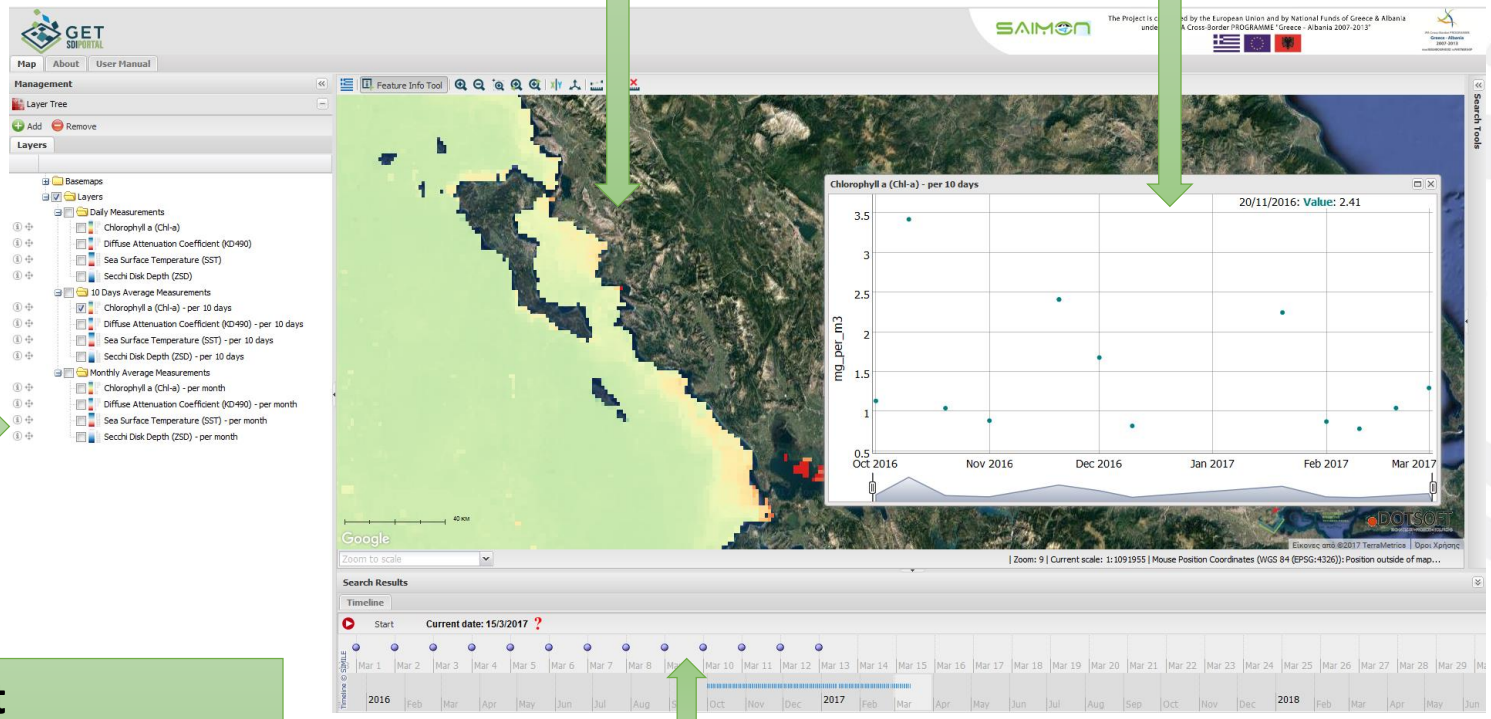
The platform: Functionalities

- Web Map interface for data visualization and analysis (based on the **GET SDI PORTAL**)
- Access to data using standard **OGC web services**: WMS, WCS
- **Satellite** products available as map overlays (daily, 10 days, monthly averages)
- Ability to add data from **external data sources** using OGC services
- Raster datasets are styled using **SLD**
- Time enabled **rasters**
- Time series chart using point info tool

User Interface

Interactive Map

Time series chart



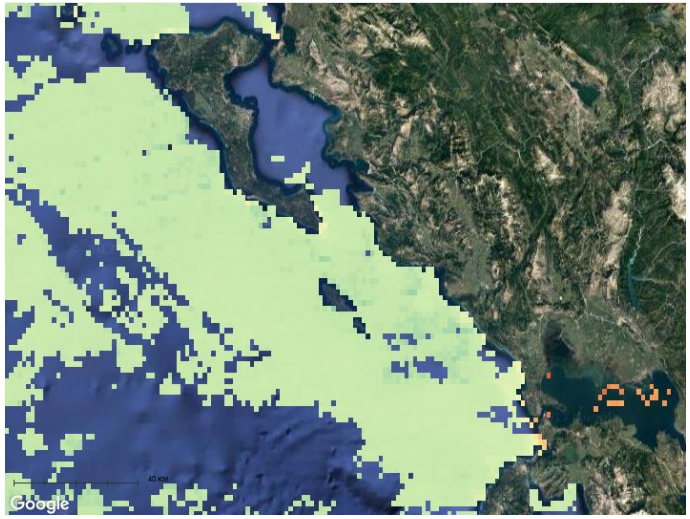
Layer List

- Base Maps
- Overlays
- Layer actions
- Add external data

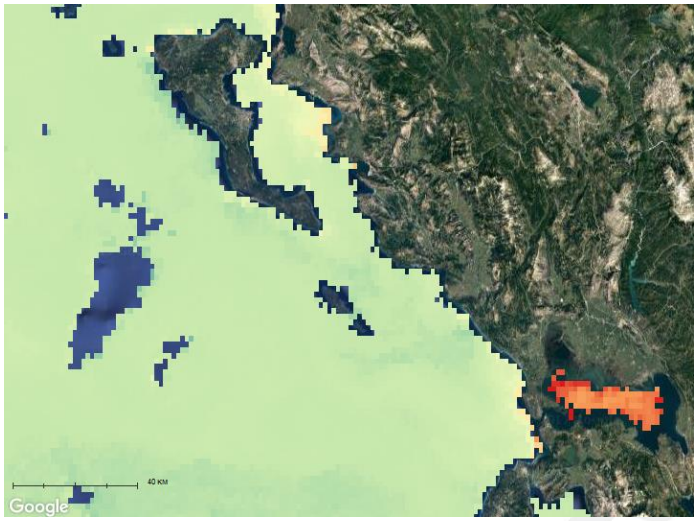
Time

- Selection of date
- Data animation

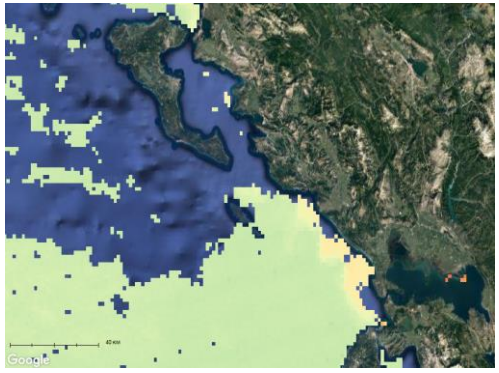
Results

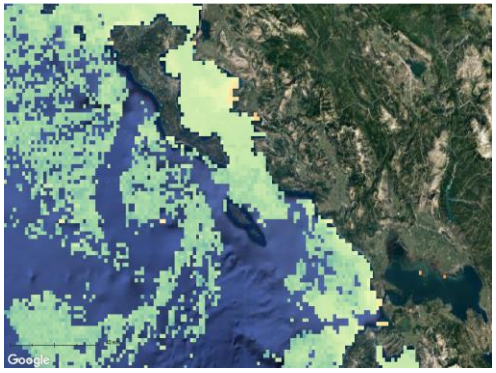


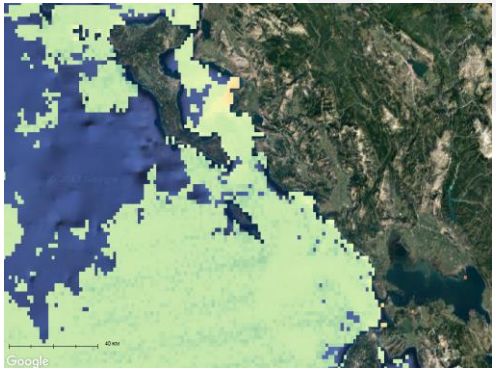
Chlorophyll-a (VIIRS)



Chlorophyll-a (MODIS)

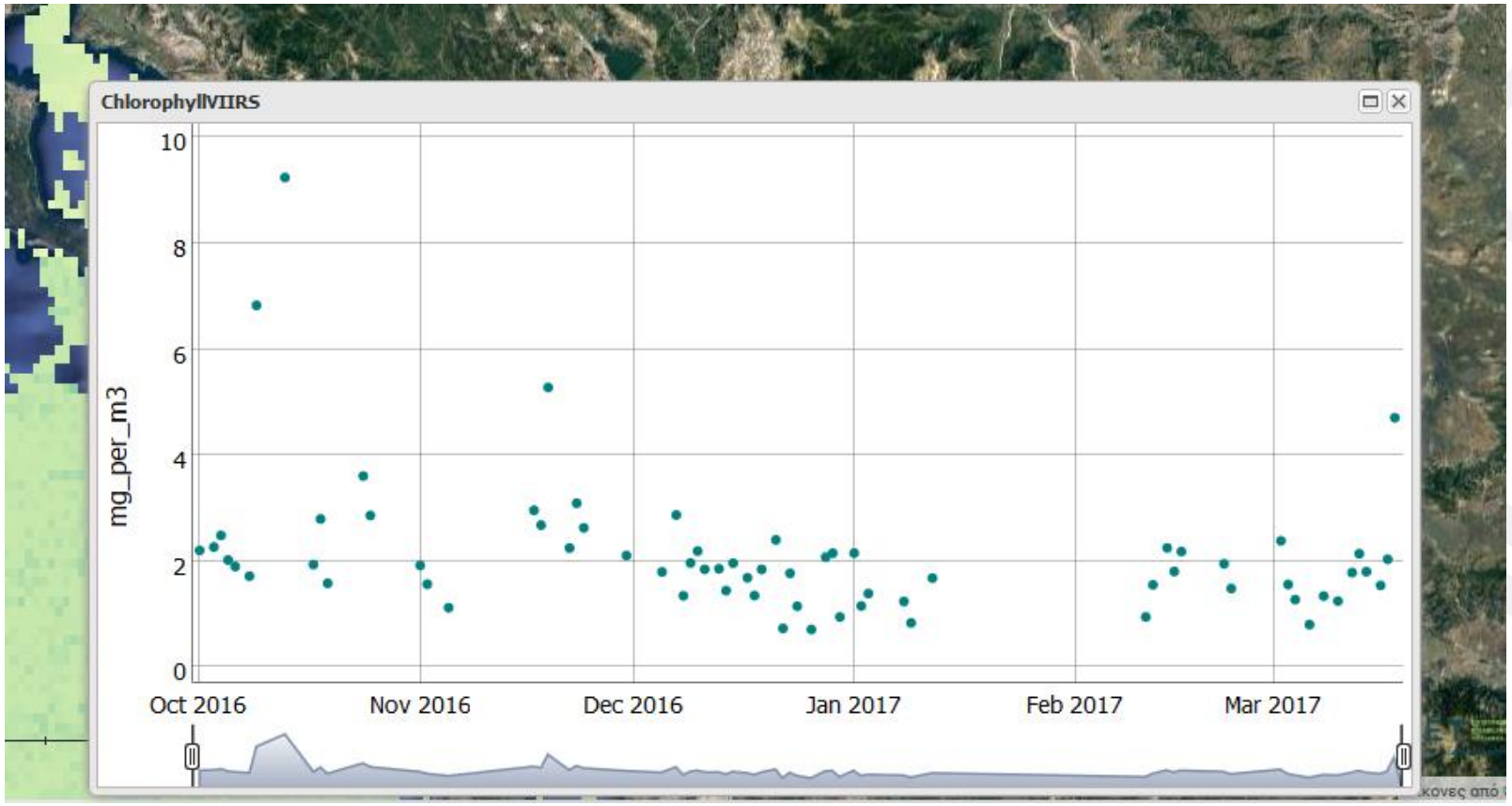






Chlorophyll-a concentration during different days

Results


ChlorophyllVIIRS
mg_per_m3
10
8
6
4
2
0
Oct 2016
Nov 2016
Dec 2016
Jan 2017
Feb 2017
Mar 2017

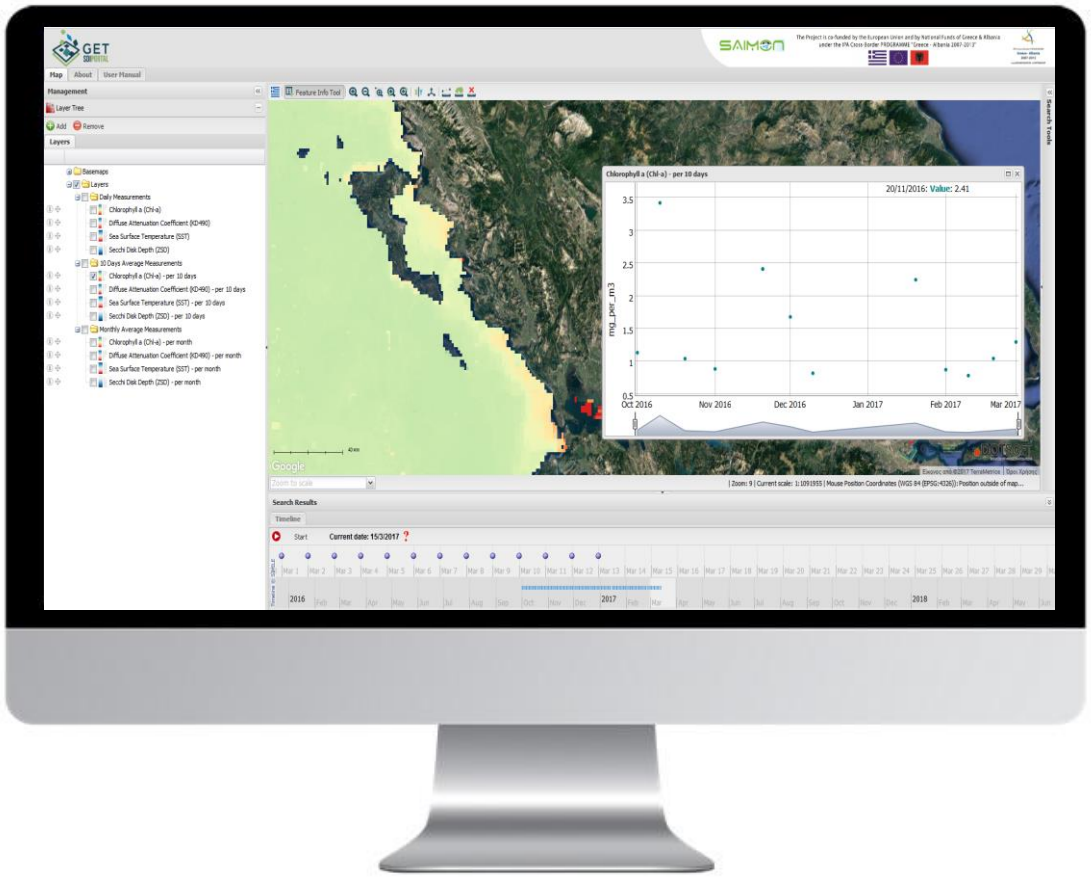
Next Steps

- Provide additional parameters (sea physics, biogeochemistry, in-situ measurements)
- Provide access to **forecast** data
- Increase **spatial resolution** using **Sentinel** data products
- Integration with **Sentinel HUB** service
- Develop **alert** mechanism for areas that observed values exceed limits
- Provide additional spatial **analysis** tools like cross section or additional services like WCPS
- Extend area of service. **Cloud** platform installation.

SINERGISE

SENTINEL Hub

LIVE DEMO



http://saimon.getopendata.gr/

Thank you!

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