GOFC-GOLD
Global Observation of Forest and Land Cover Dynamics

NASA LCLUC
Land-Cover / Land-Use Change Program

Greek participation in MedRIN

Mediterranean Regional Information Network (MedRIN), 20th March 2019

Ioannis Manakos, Stavros Stagakis, George Zalidis, Chariton Kalaitzidis, **Ioannis Gitas**

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Information, repositories, capacity building

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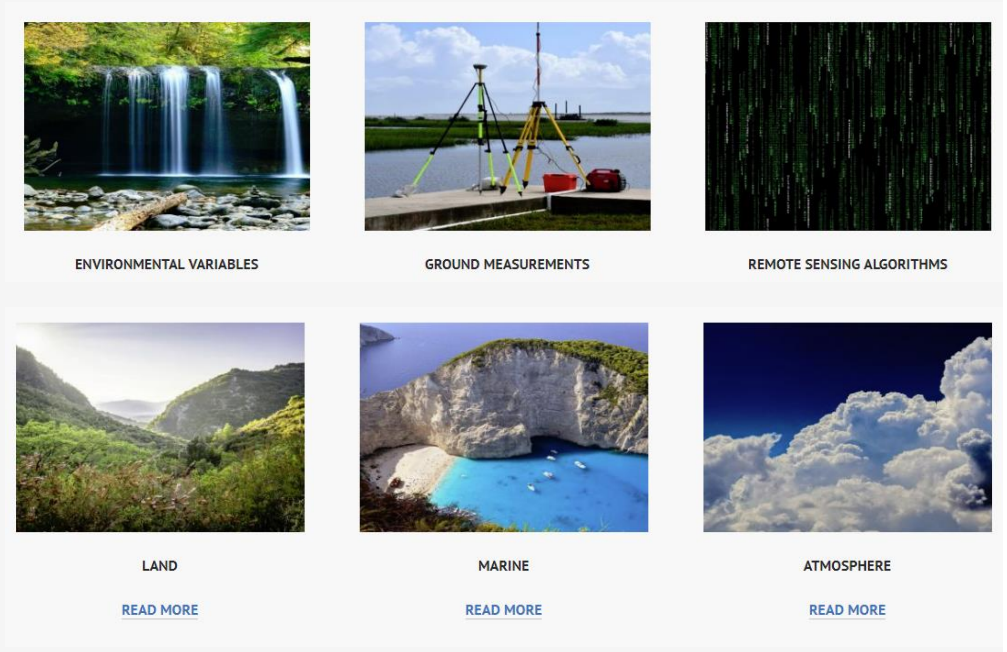
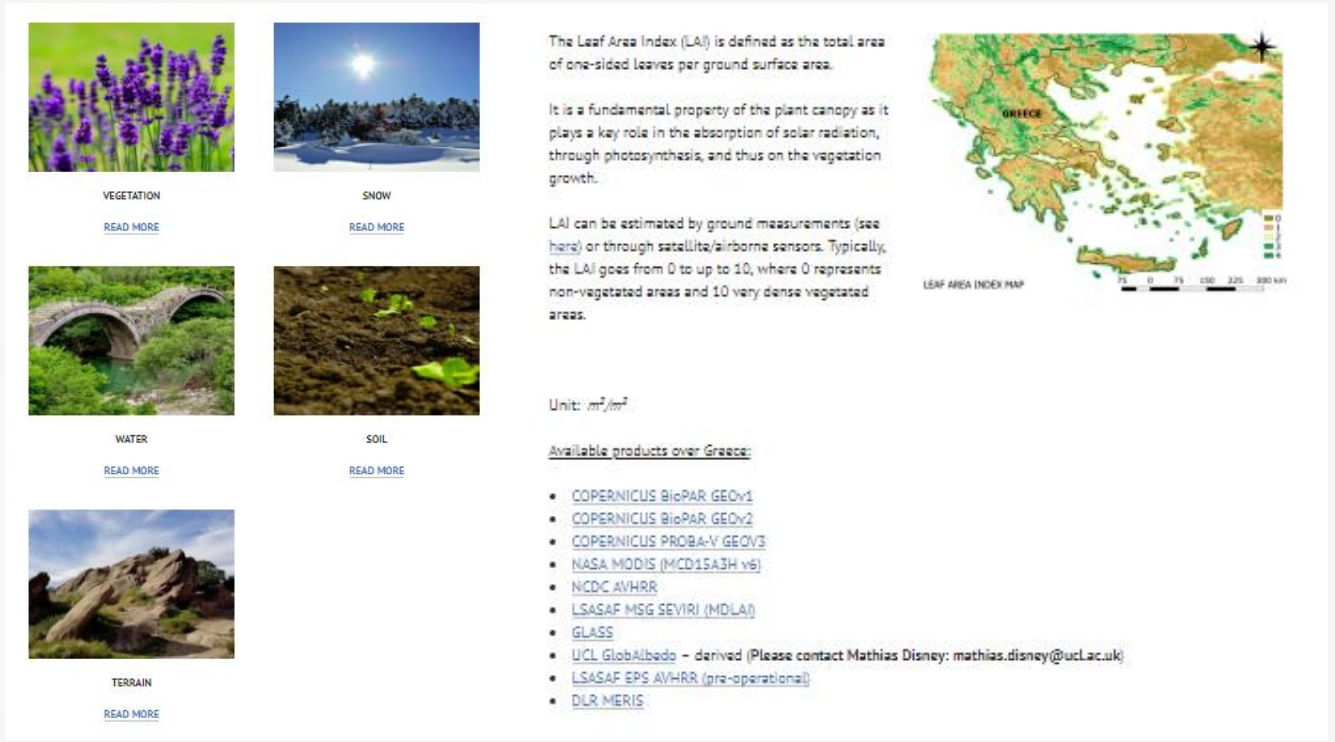
NASA LCLUC Land-Cover / Land-Use Change Program

- **Case A (information, repositories, capacity building)**: background information about land, marine, and air environmental variables, and the ways these may be estimated by EO products, including existing repositories, may be provided online to the users with examples from the Eastern Mediterranean, as done in the site greece.livingearth.online.





Mediterranean Regional Information Network (MedRIN)

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Online services

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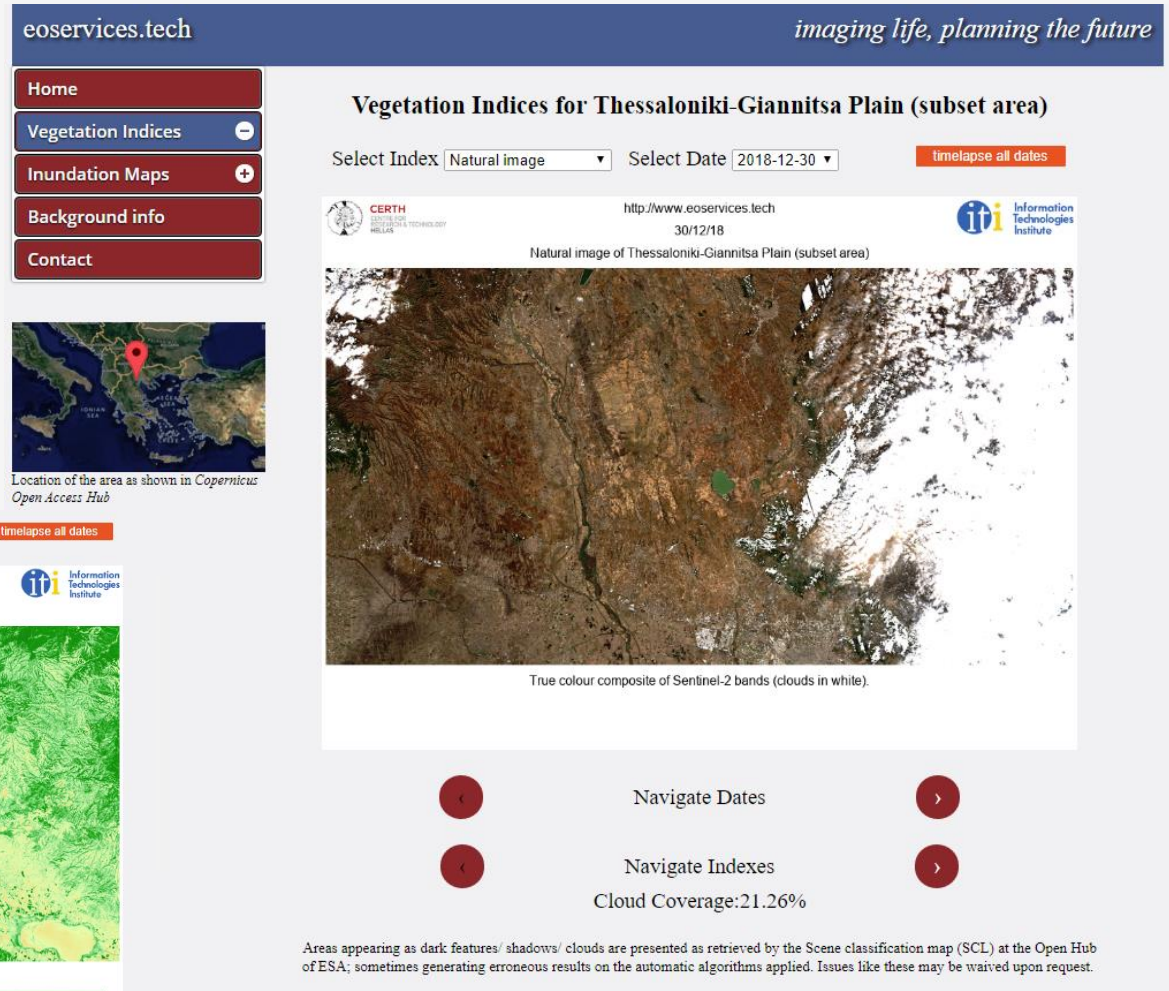
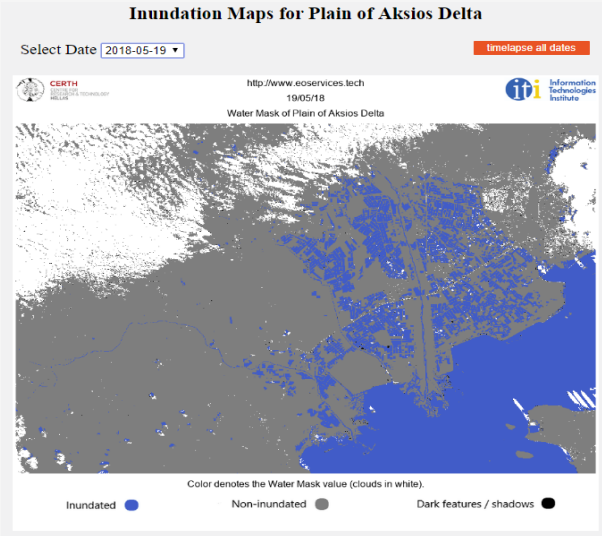
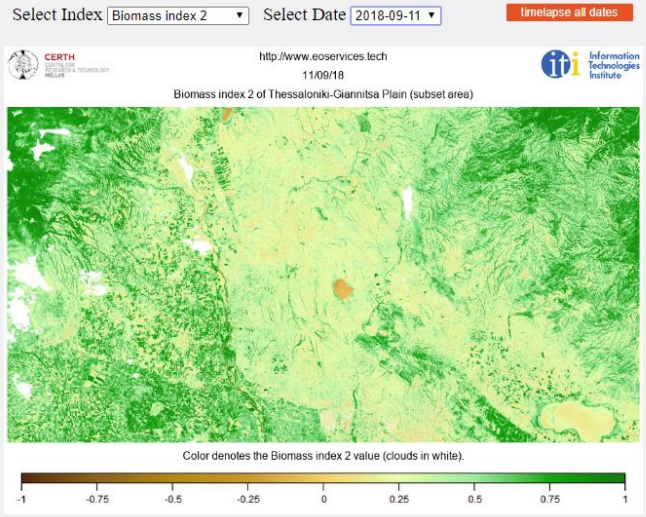
- **Case B (online service examples)**: online free offer of raw images and processed thematic layers for selected hot spot subset areas across the Mediterranean, as examples of our colleagues' capacity to offer EO services, like in the example of the site of eoservices.tech of ITI.gr







Mediterranean Regional Information Network (MedRIN)

Surface temperature monitoring

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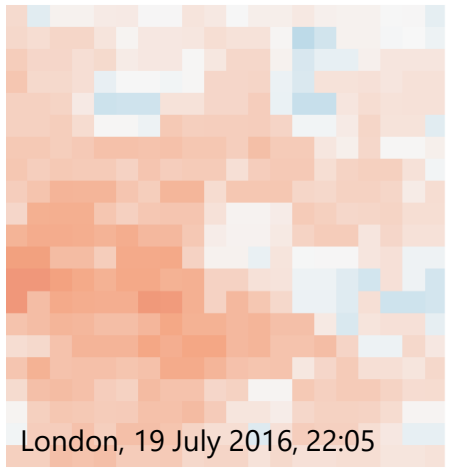
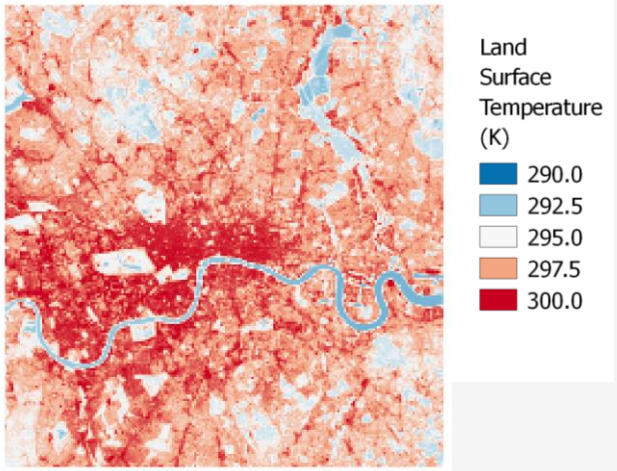
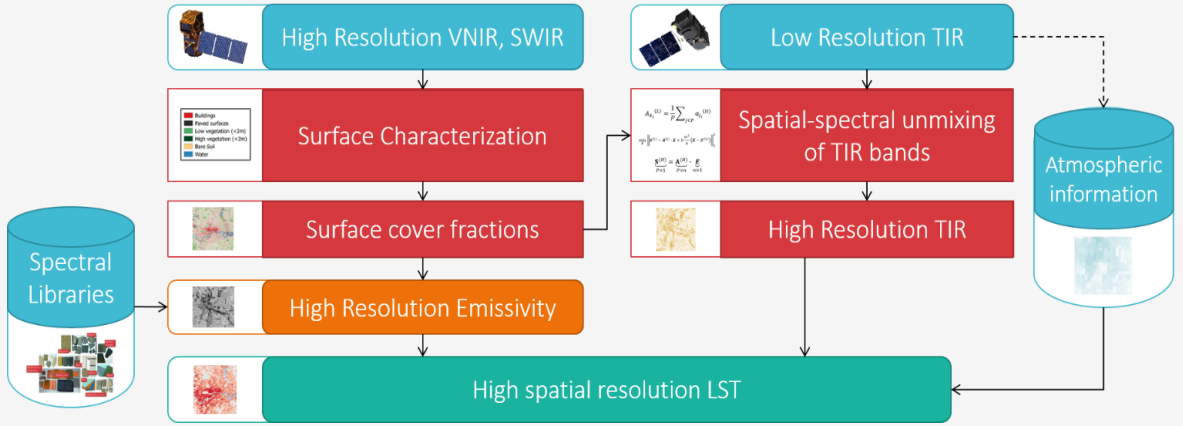
Downscaling Methodology

MODIS: 1 km



Downscaled: 100 m





Mitraka, et al. 2015

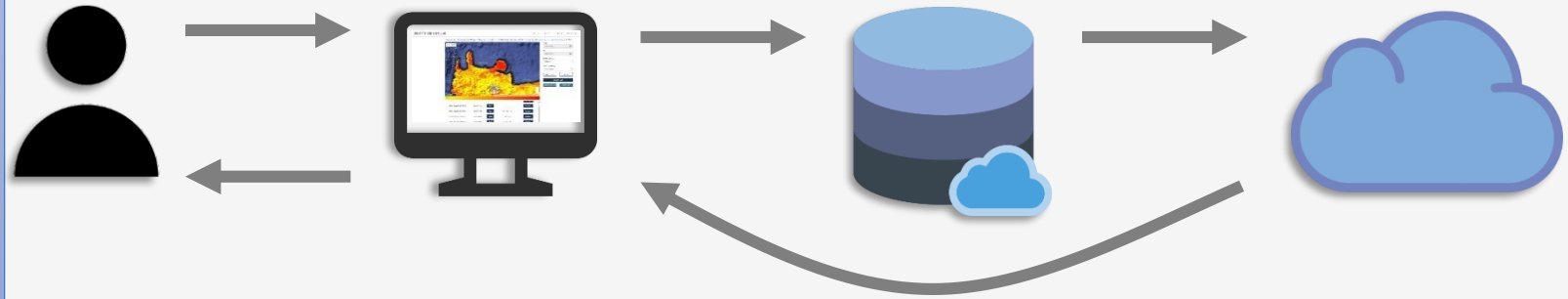
Global LST tool

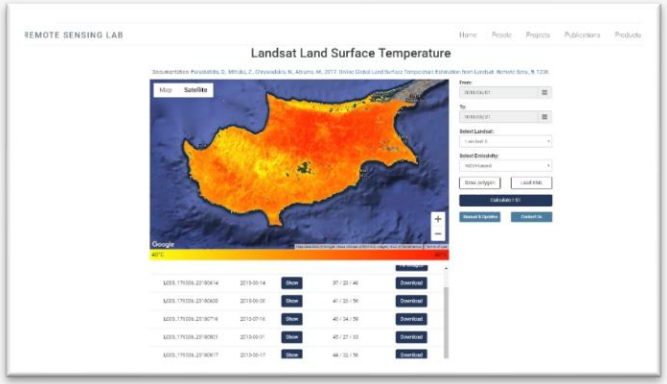
User

http://rslab.gr/downloads_LandsatLST.html

Google cloud database

Google cloud computing





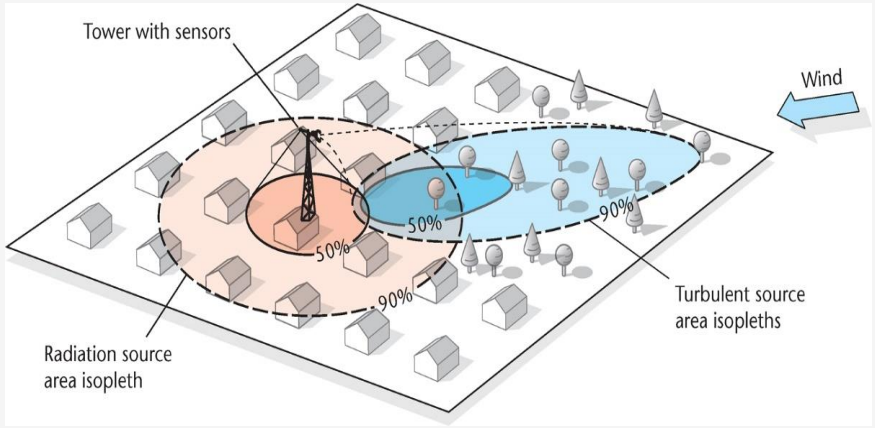
REMOTE SENSING LAB
www.rslab.gr

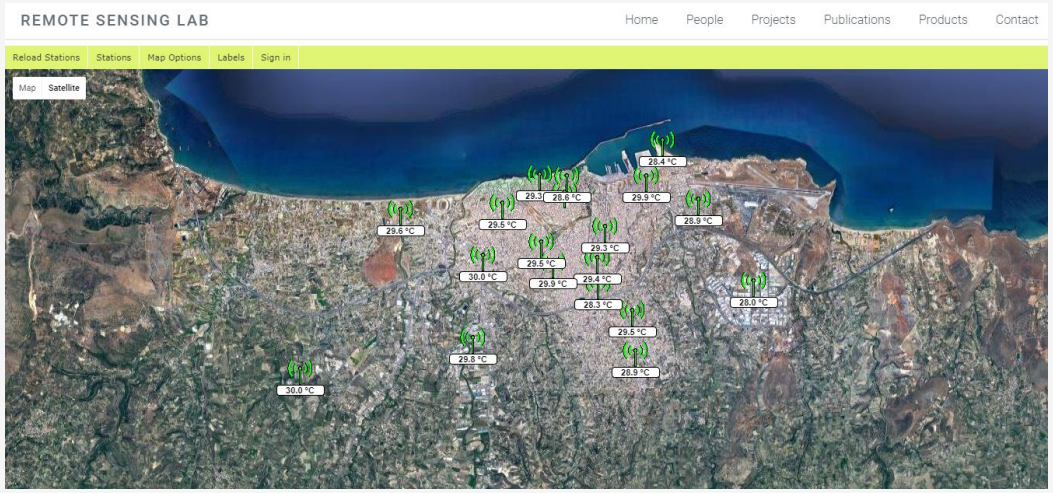
Parastatidis, et al. 2017. Online Global Land Surface Temperature Estimation from Landsat.

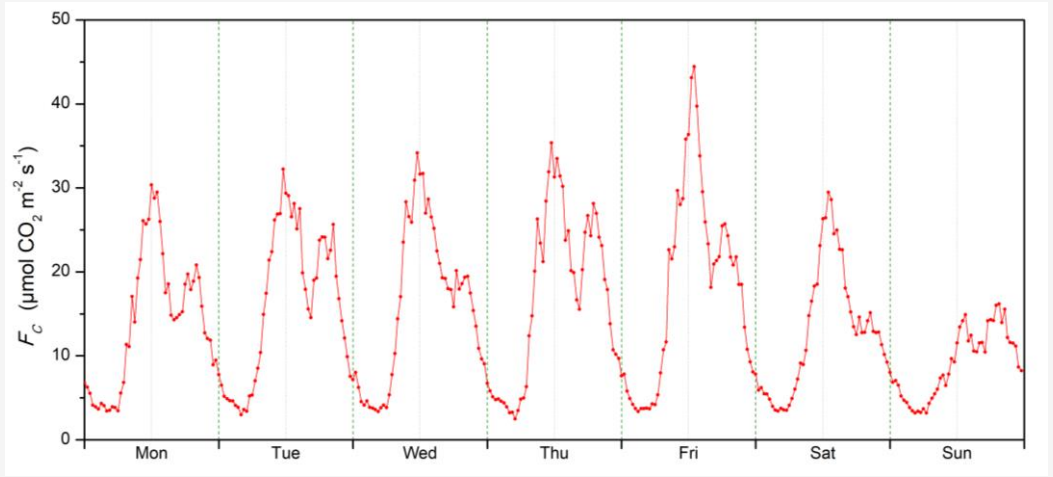
Mediterranean Regional Information Network (MedRIN)

Long-term in-situ measurements in Heraklion

- ✓ **Eddy Covariance** (2016 – today)
  - Sensible heat flux (Q_H)
  - Latent heat flux (Q_E)
  - Net all-wave radiation (Q*)
  - Carbon dioxide flux (F_{CO2})
- ✓ **Wireless Sensors Network** (2015 – today)
  - 15 on-line real-time intra-urban meteorological measurements







Stagakis, et al. 2019. Eddy Covariance measurements and source partitioning of CO2 emissions in an urban environment: Application for Heraklion, Greece.

REMOTE SENSING LAB www.rslab.gr

Mediterranean Regional Information Network (MedRIN)

Inland water quality monitoring

Input Data

1

- **Sentinel-2 & Landsat-8** images of the region retrieved from EarthExplorer, spanning a period of 8 months
- For the same period, **telemetry data** [Chl-α, pH, EC] retrieved from i-BEC's own DataHub

Data Processing

2

- L1 images processed into L2 water products using AcoLite
- L2 water products ingested into the DataCube
- Water quality indices extracted using both **published equations**, and locally calibrated models

Comparison with Reference Framework

3

- National & EU target values for good ambient water quality
- SDG five core parameters [DO, EC, N, P, pH] + chemical [Chl-α, turbidity]
- Compare derived results with target values and **classify the inland water body** on a temporal basis

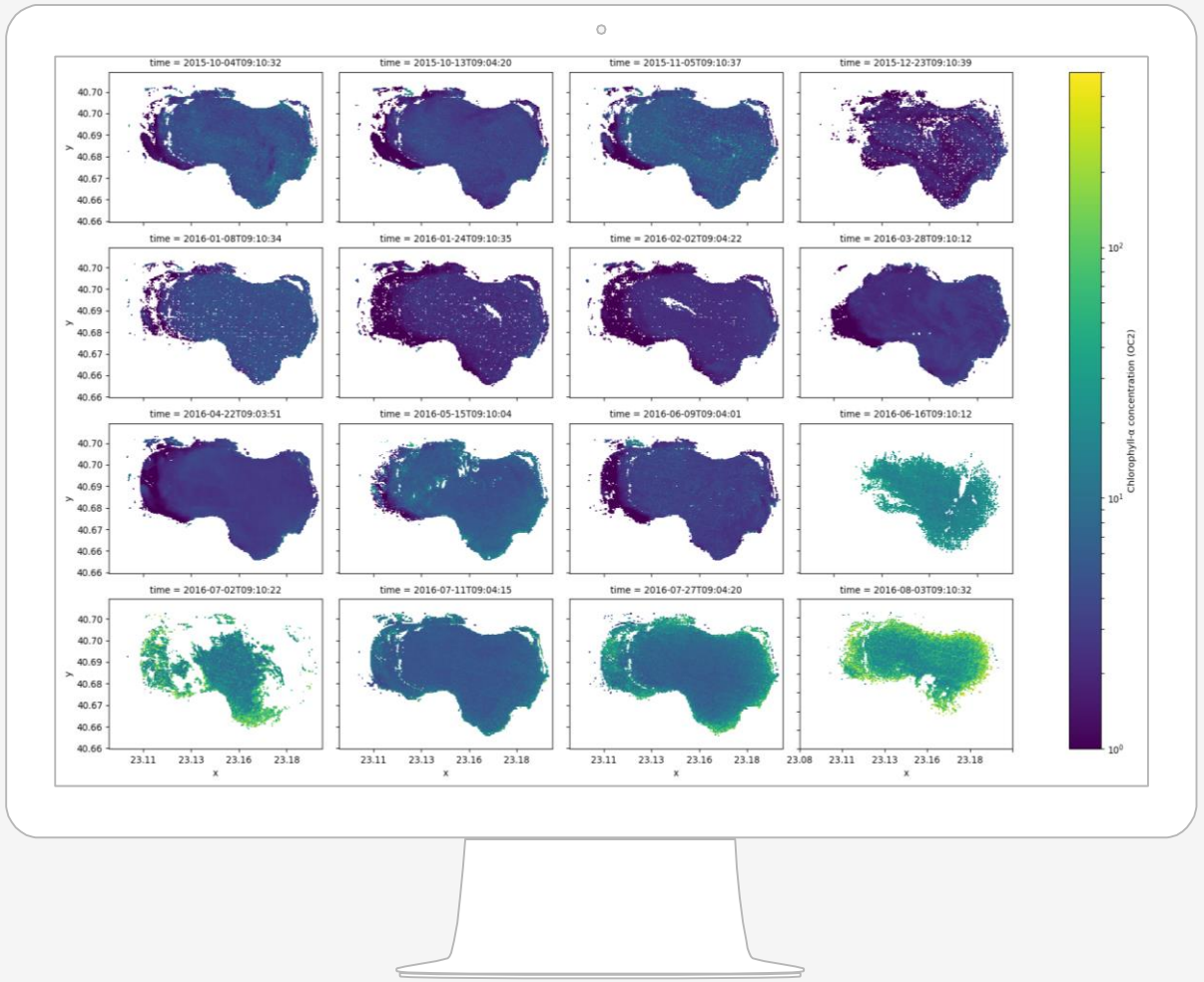
Dissemination

4

- Deliver the selected water quality parameters in terms of spatiotemporally derived products
- Deliver to the **Greek Decentralized Administrations**
- [competent authorities for water regulations]

Mediterranean Regional Information Network (MedRIN)

Inland water quality monitoring

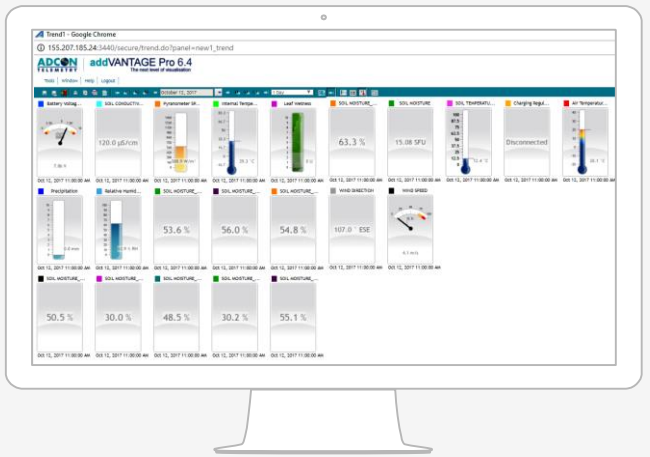


Source: Monitoring Inland Water Quality based on Earth Observation Data towards reporting of the SDG Indicator 6.3.2 Ambient Water Quality, i-BEC 2017

Time-series of chl-α in lake Koronia [Oct 2015 – August 2016] showcasing the development of an algal bloom; result obtained from DataCube and Lansdat-8 imagery

Date	DO	pH	EC [μS/cm]	Temperature [°C]	chl-α
10/04/2015	7.54	8.3	2053.6	20.3	440,711
10/13/2015	6.44	8.3	2248	19.5	324,890
12/23/2015	6.3	8.3	3349.6	6.7	175,378
01/08/2016	7.37	8.3	3378.8	6.3	401,866
01/24/2016	8.69	8.4	3383.6	3.6	206,539
02/02/2016	7.41	8.2	3355.3	7.1	224,979
03/28/2016	8.751	8.8	3158.5	12.4	244,421
04/22/2016	7.49	8.5	3256.8	19.8	287,496

Telemetry data can be used to backtrack in time and view the recorded values from the sensors for a given time period

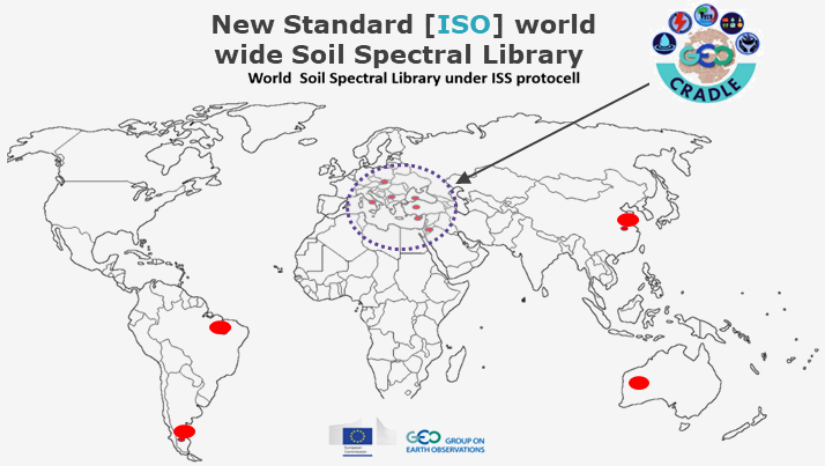


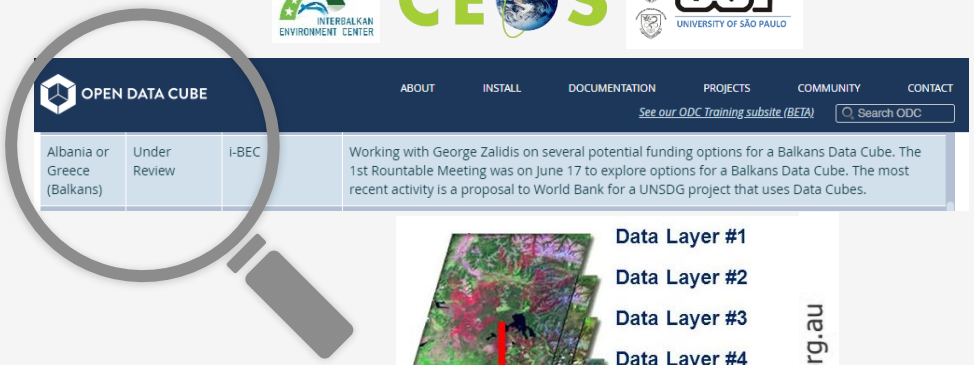
Mediterranean Regional Information Network (MedRIN)

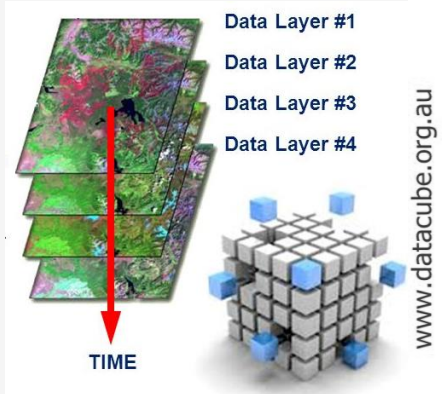
Soil monitoring

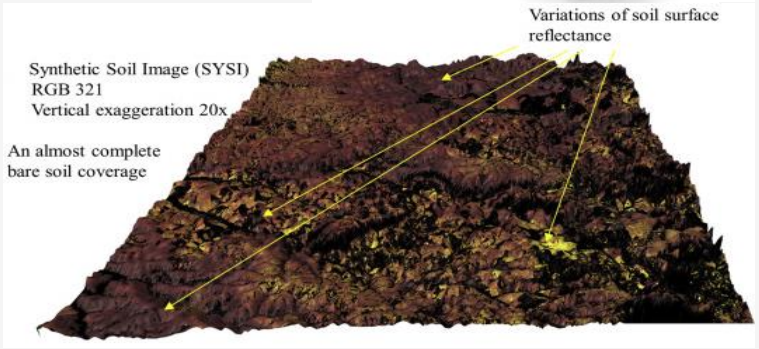
GEO-CRADLE SSL
The Vehicle of Soil Data Interoperability

- Establish a SSL [~2000] for the **North Africa, Middle East and Balkans** [well recognized infrastructure gaps]
- GEO-CRADLE has established the **first ISO - SSL data base** for the Mediterranean to be a "lighthouse" for the World SSL
- Standard Protocol facilitates the **integration of untapped national in situ soil data** [Brazil, China, Australia etc.]
- The first **soil data base within the GEOSS sharing regulation** and having the capability to be expanded in all over the world









Mediterranean Regional Information Network (MedRIN)

Agricultural technologies

TOOLS


Smart insect control traps


Crop Disease models


Aerial imaging with hyperspectral cameras for the measurement of vegetation indices

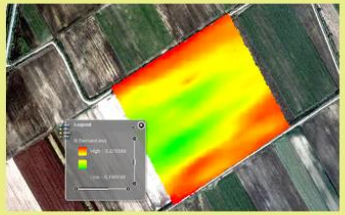

High precision 7-day microclimate prognosis

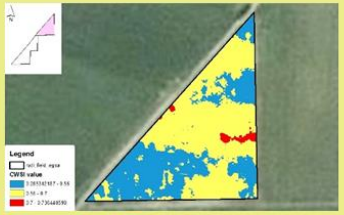

Measurement of climatic and soil parameters


Automated irrigation system

SERVICES

Spatio-temporal application for plant protection products


Spatial application of fertilization


Optimization of irrigation application

GOAL

Reduction of inputs, reduction of carbon footprint & increase of competitiveness of products (reduced agriculture input products)

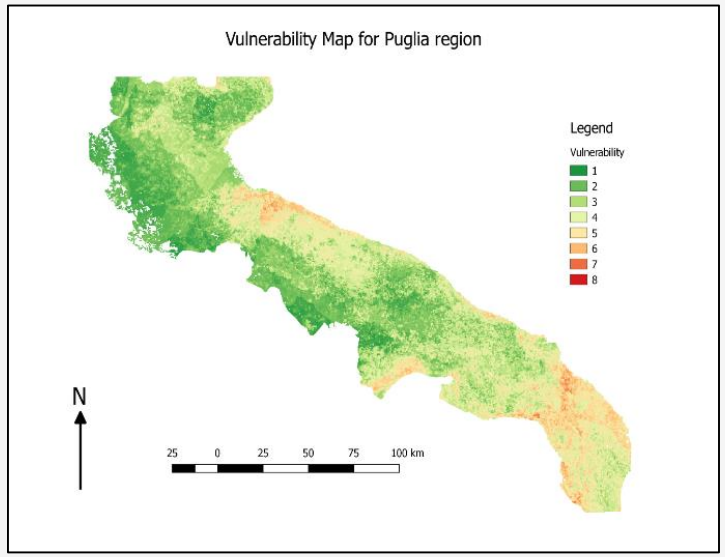
LESS 20%
PLANT PROTECTION PRODUCTS

LESS UP TO 30%
FERTILIZERS

LESS UP TO 70%
IRRIGATION WATER

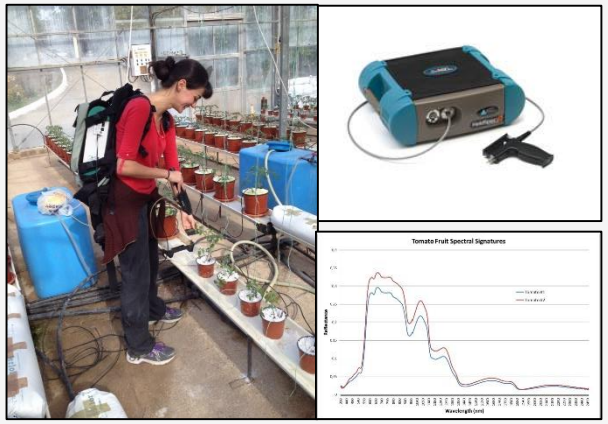
Mediterranean Regional Information Network (MedRIN)

Monitoring of agricultural crops

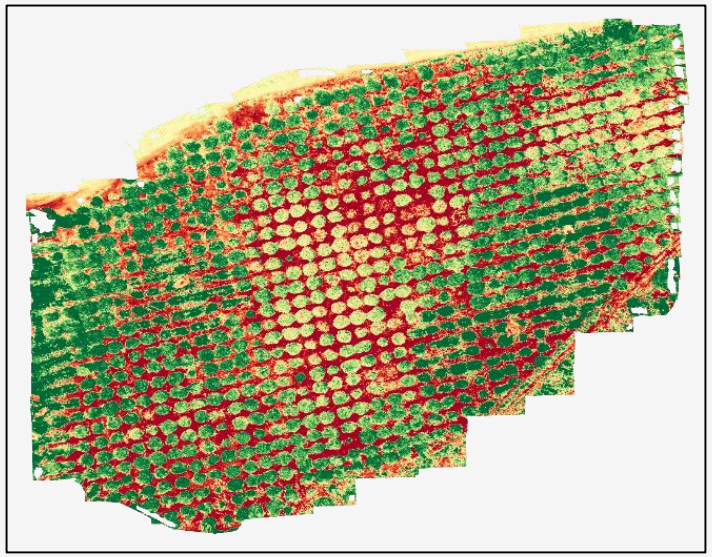


Xylella fastidiosa olive tree infection threat, Puglia, Italy

Agriculture



Monitoring stress effects on plants through spectroscopy

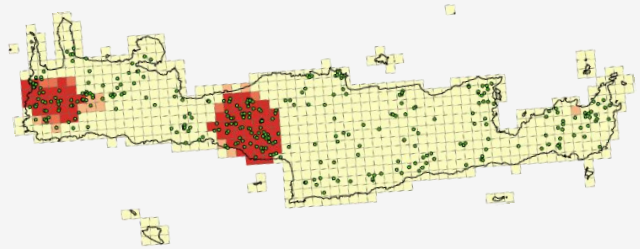


Assessing orange grove health

Mediterranean Regional Information Network (MedRIN)

Forest Fires

Forest Fire Processes and Mapping



Forest fires hotspots in Crete
1984-2017

Fire progression simulation in wind tunnel

MSc Geoinformation in Environmental Management

- Main applicants from the South and East Mediterranean and the Balkan region.
- Training in a range of Remote Sensing topics and methods, as well as modules on Mediterranean environmental issues.
- Course delivery by specialized invited lecturers from European universities and institutes.

Mediterranean Regional Information Network (MedRIN)

National Observatory of Forests (NOF)

Establishment and pilot operation of the National Observatory of Forests (NOF)

- Main activities of NOF:
  - Creation of a digital repository of all forest management plans of Greece searchable through the internet.
  - Development of an internet-based service that ensures accessibility to the developed forest information geodatabase.
  - Set up a demonstration case to be used as the base for the Greek contribution to international initiatives such as GEOSS, FISE, etc.

Mediterranean Regional Information Network (MedRIN)

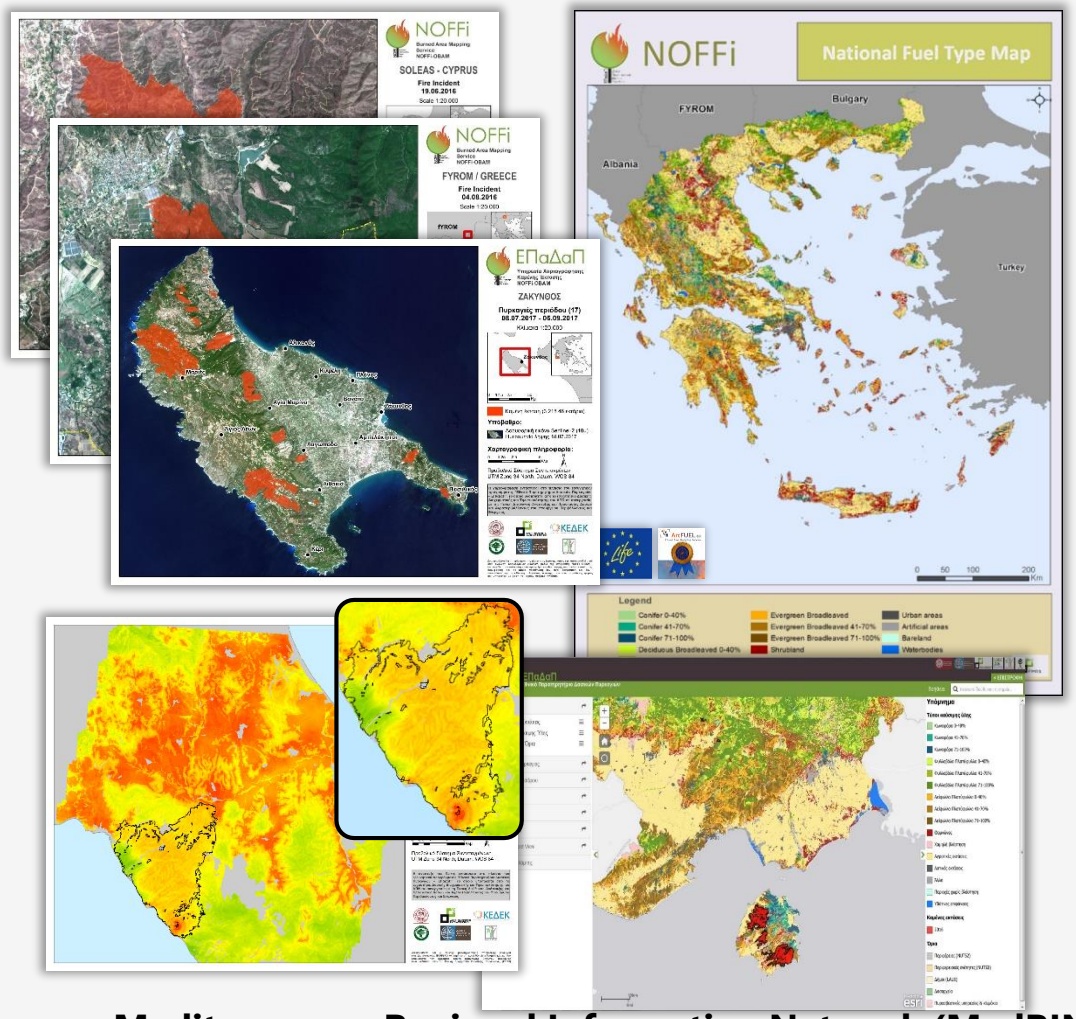
National Observatory of Forest Fires (NOFFi)

NOFFi National Observatory of Forest Fires

Establishment of an observatory of forest fires in Greece to support the National Forest Service

❖ Services that were developed under NOFFi:

- A fuel type mapping service
- A burned area mapping service
- A midterm forest fire danger index
- A Web-based GIS platform and a burned area viewing service in collaboration with iBEC
- A network of partners at the local Forest Service departments as well in Cyprus and the Balkan countries



Mediterranean Regional Information Network (MedRIN)

National Observatory of Forest Fires (NOFFi)

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Network Members

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Thank you for your attention!

- Contact: Ioannis Gitas, igitas@for.auth.gr

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