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Coordinating and Integrating EO Activities in North Africa, Middle East, and Balkans. Accelerating the Development of Links with Geo/ Geoss/Copernicus and Inspire initiatives

Alexia Tsouni

National Observatory of Athens

Antwerp, 19/09/2018

http://geocradle.eu

GEO GROUP ON EARTH OBSERVATIONS

Copernicus

The **GEO-CRADLE** project has received funding from the European Union's **Horizon 2020** research and innovation programme under grant agreement No 690133

The continuous provision of **accurate and timely information** through coordinated and sustained **Earth Observation** together with INSPIRE data, Copernicus, and GCI information

is a **key enabler**

for **informed decision making**, in response to regional challenges and towards the achievement of the **UN SDGs** and the implementation of relevant **EU Directives**.

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In this direction **GEO-CRADLE** coordinates and integrates state-of-the-art EO activities in the regions of **North Africa, Middle East, and Balkans** and develops links with GEO related initiatives towards GEOSS, contributing amongst others to:

GEO-CRADLE brings together **key players** representing the **entire EO value chain** and promotes the uptake and exploitation of innovative EO activities in NAMEBA through:

- ✓ **Cooperation**
- ✓ **Awareness raising**
- ✓ **Capacity building**
- ✓ **Open data sharing principles**
- ✓ **Interoperability**

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Challenges in GEO-CRADLE

GEO-CRADLE is **the only EU GEO funded CSA** that runs over the diversified territories of North Africa, Middle East and Balkans (NAMEBA):

✔ **Identifying common needs and regional priorities**;

✔ **Fostering the regional cooperation and integration of monitoring capabilities and skills, and facilitating the networking of stakeholders**;

✔ **Defining coordination and support actions that are beneficial from societal and market wise point of view, and also realistic and in line with the domestic priorities and user needs;**

✔ **Proposing/setting up large scale regional initiatives in Earth Observation (space based and in-situ) relating to capacity building and delivery of services and innovative information in the thematic areas of the project such as:**

Adaptation to Climate Change
Improved Food Security – Water Extremes Management
Access to Raw Materials
Access to Renewable Energy Resources - Solar Energy



GEO-CRADLE Thematic Areas vs UN SDGs

SUSTAINABLE DEVELOPMENT GOALS
17 GOALS TO TRANSFORM OUR WORLD




Adaptation to Climate Change (ACC)

13 CLIMATE ACTION
3 GOOD HEALTH AND WELL-BEING
11 SUSTAINABLE CITIES AND COMMUNITIES
15 LIFE ON LAND

Improved Food Security – Water Extremes Management (IFS-WEM)

2 ZERO HUNGER
12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Access to Raw Materials (ARM)

1 NO POVERTY
2 ZERO HUNGER

Access to Solar Energy (SENSE)

7 AFFORDABLE AND CLEAN ENERGY
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

BE NL
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GEO CRADLE

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GEO_CRADLE: Coordinating and Integrating State-of-the-Art Earth Observation Activities in the Regions of North Africa, Middle East, and Balkans and Developing Links With GEO Related Initiatives Towards GEOSS
H2020-SC5-2015, GA : No 690133
2016-2019
2.910.800 EUR
http://geocradle.eu/en/

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
Copernicus √	DISASTERS	ATMOSHERE √	ZERO HUNGER √	COORDINATION ACTION √
GEO GROUP ON EARTH OBSERVATIONS √	ENERGY √	MARINE	AFFORDABLE ENERGY √	RESEARCH & INNOVATION
	FOOD SECURITY √	LAND √	CLIMATE CHANGE √	
	PUBLIC HEALTH √	CLIMATE √	LIFE ON LAND √	INNOVATION ACTION
	WATER MANAGEMENT √	EMERGENCY √	SUSTAINABLE CITIES	
		SECURITY		

- **INSPIRE and Copernicus share key requirements.**
- **A key issue is alignment to achieve interoperability.**
- **Content and geometry need to be harmonized and connected.**

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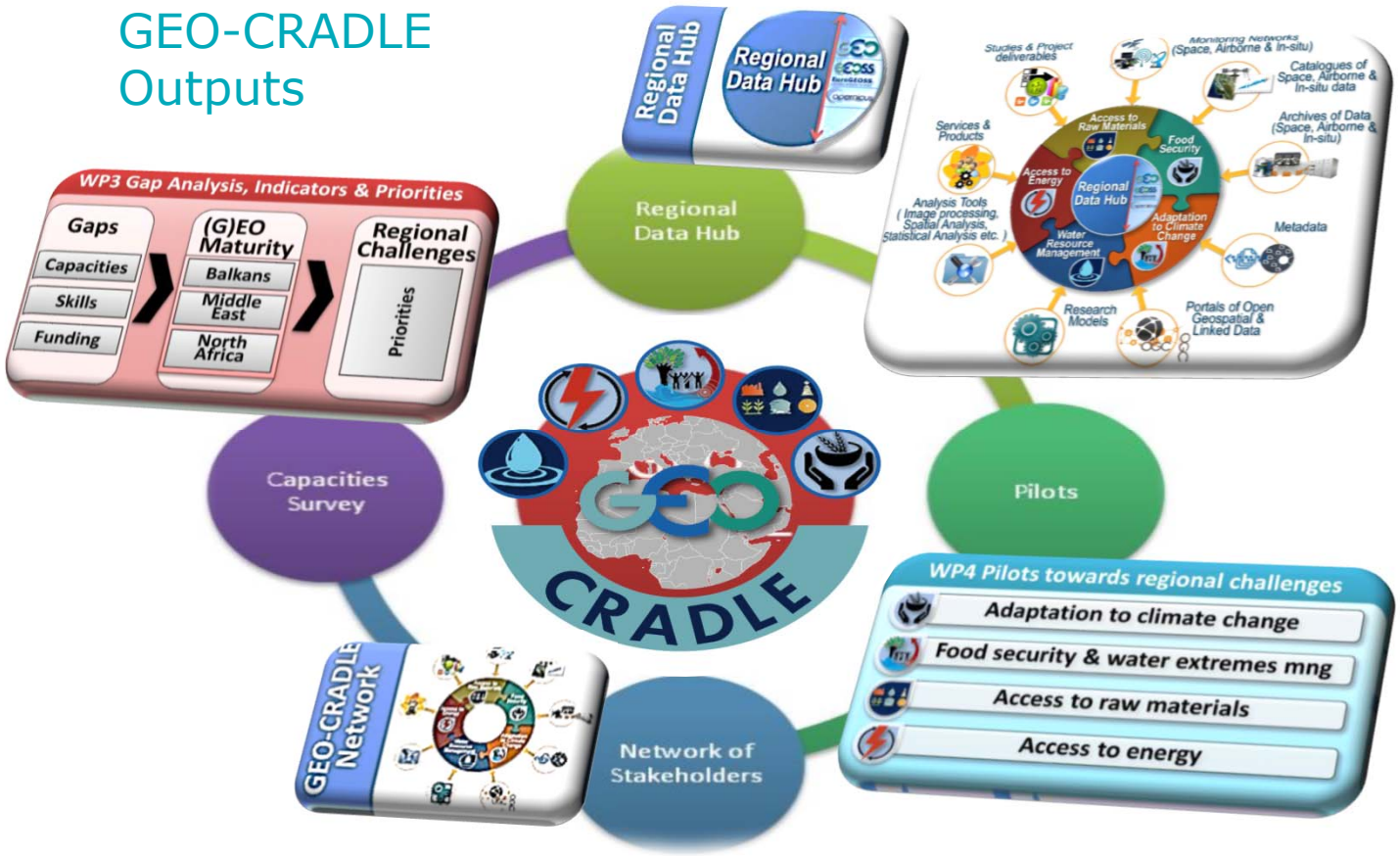
GEO-CRADLE Outputs



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GEO-CRADLE Regional Workshops

16 Regional Workshops have taken place so far in NAMEBA:

- advocating for free & open data policies in support of **GEO & INSPIRE principles**
- supporting **knowledge sharing - capacity building**
- providing participants with a unique **cross-sector networking opportunity** (e.g. an enhanced cooperation between academia and industry)
- identifying the potential **local challenges and needs** that can be addressed by Earth Observation
- enhancing **growth and innovation** in the geo-information sector
- enabling more **informed decision making**

DATE	LOCATION
27/04/2016	Cairo, Egypt
14/07/2016	Novi Sad, Serbia
26/09/2016	Tirana, Albania
17-18/10/2016	Rabat, Morocco
19/10/2016	Timimoun, Algeria
16/11/2016	Limassol, Cyprus
03/01/2017	Chişinău, Moldova
02/02/2017	Abu Dhabi, United Arab Emirates
24/03/2017	Sofia, Bulgaria
26/04/2017	Brussels, Belgium (Industrial market)
09/05/2017	Magurele, Romania
25/05/2017	Cairo, Egypt
14/09/2017	Tel Aviv, Israel
07/12/2017	Tunis, Tunisia
15-16/03/2018	Istanbul, Turkey
04-05/06/2018	Thessaloniki, Greece (3rd South-Eastern Europe GEO Workshop)

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GEO CRADLE

ΕΘΝΙΚΟΝ ΑΣΤΕΡΟΣΚΟΠΕΙΟΝ ΑΘΗΝΩΝ
NATIONAL OBSERVATORY ATHENS

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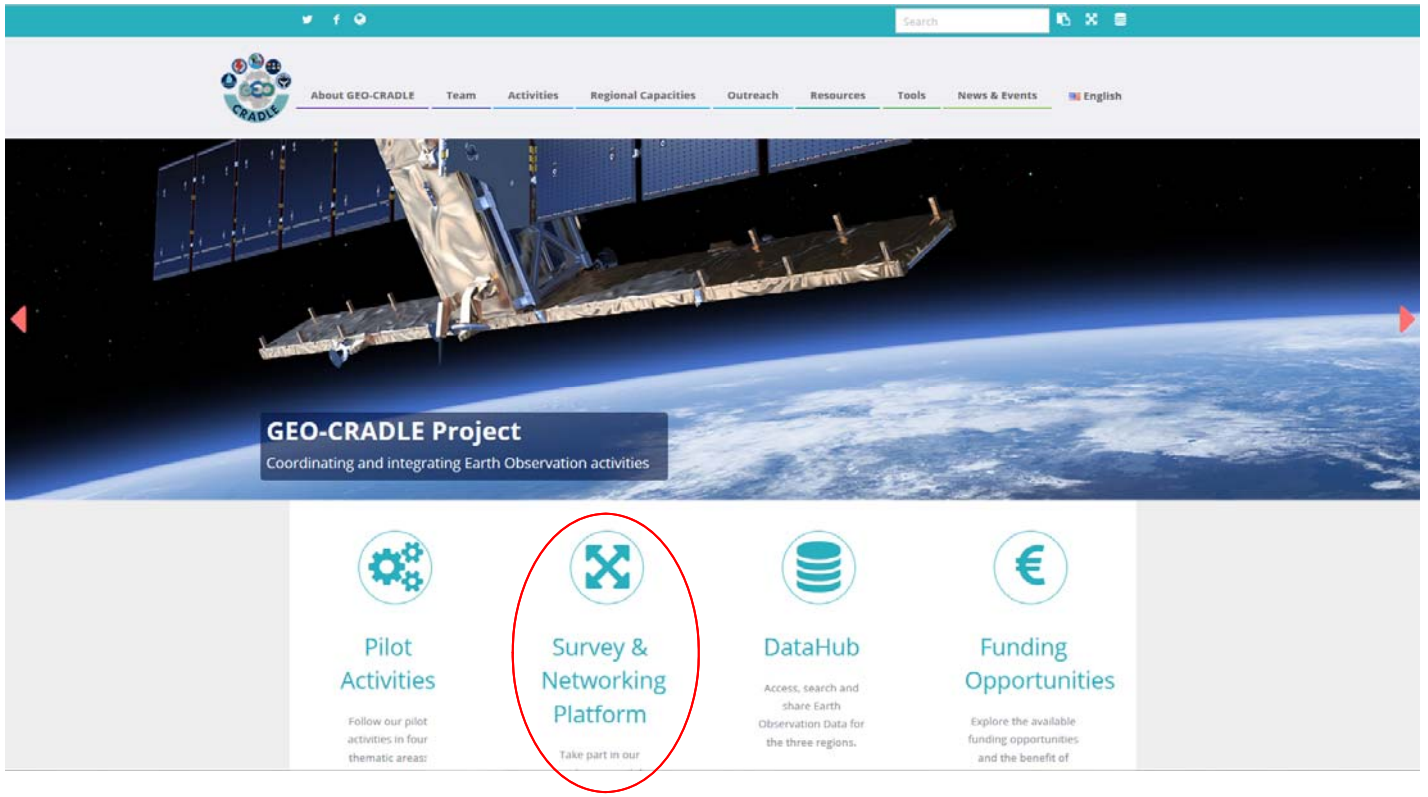
GEO-CRADLE Portal

http://geocradle.eu



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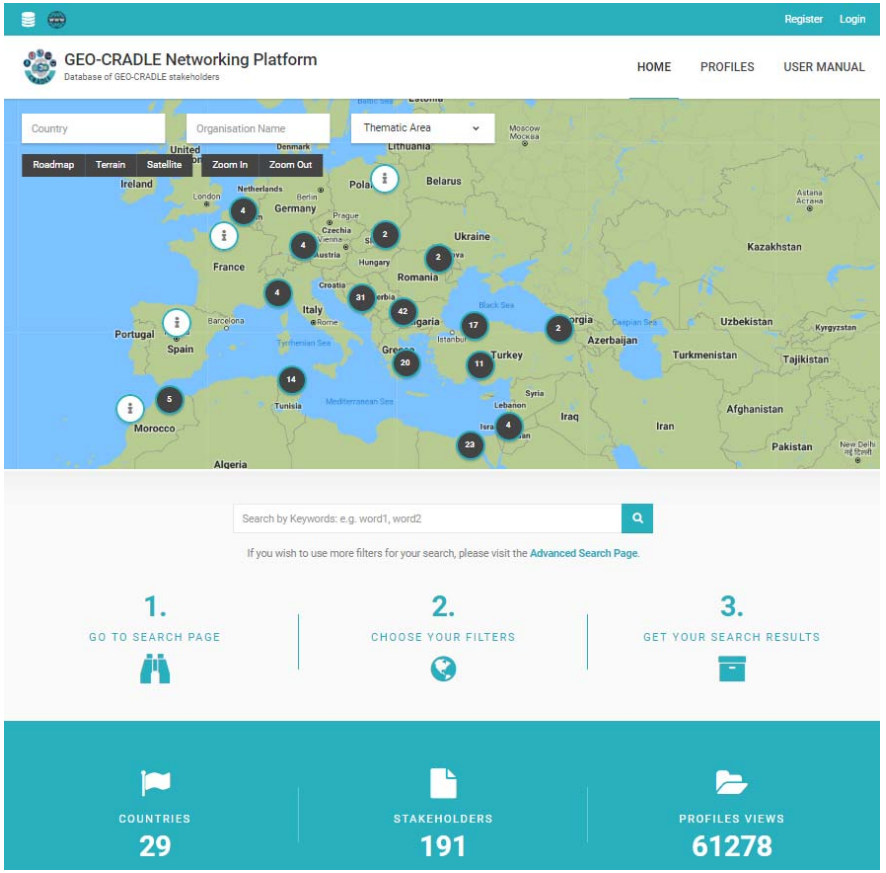
GEO-CRADLE Networking Platform

http://geocradle.eu/platform

Available for the first time in the RoI:

- inventory of regional capacities
- profiles of stakeholders
- assessment of country maturity
- potential partnerships



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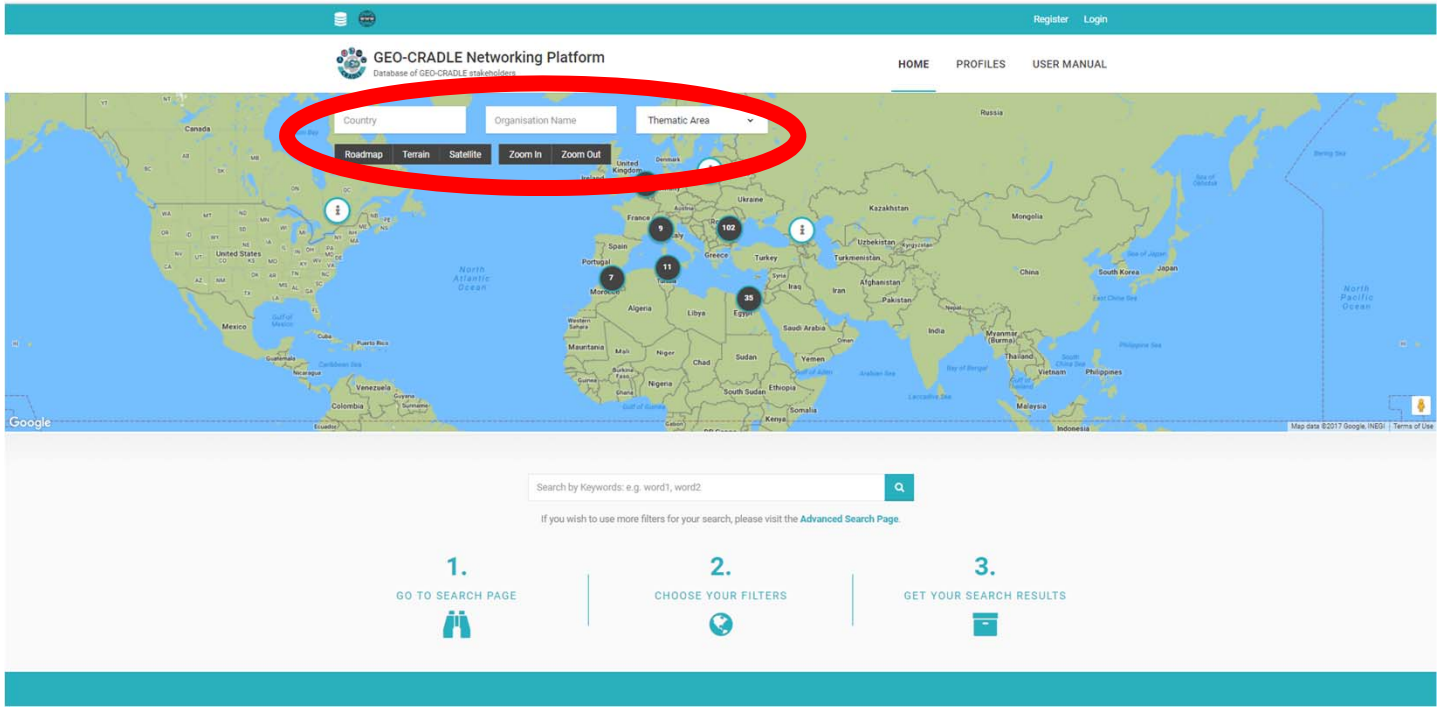
GEO-CRADLE Networking Platform

- **Software**: Wordpress.
- **Access**: Open access to all.
- **Profiles**: The profiles include exclusive and specific information collected by the GEO-CRADLE Survey.
- **Validation**: The profiles are validated by an administrator before publishing.
- **Filtering / search**: Three different mechanisms for filtering / search:
  - ✓ Map search: 3 filters to search the database & displays results on the map;
  - ✓ Keywords search: search by one or more keywords;
  - ✓ Advanced search page: 10 filters combined with "search by keywords" option.



Search option 1: Map view



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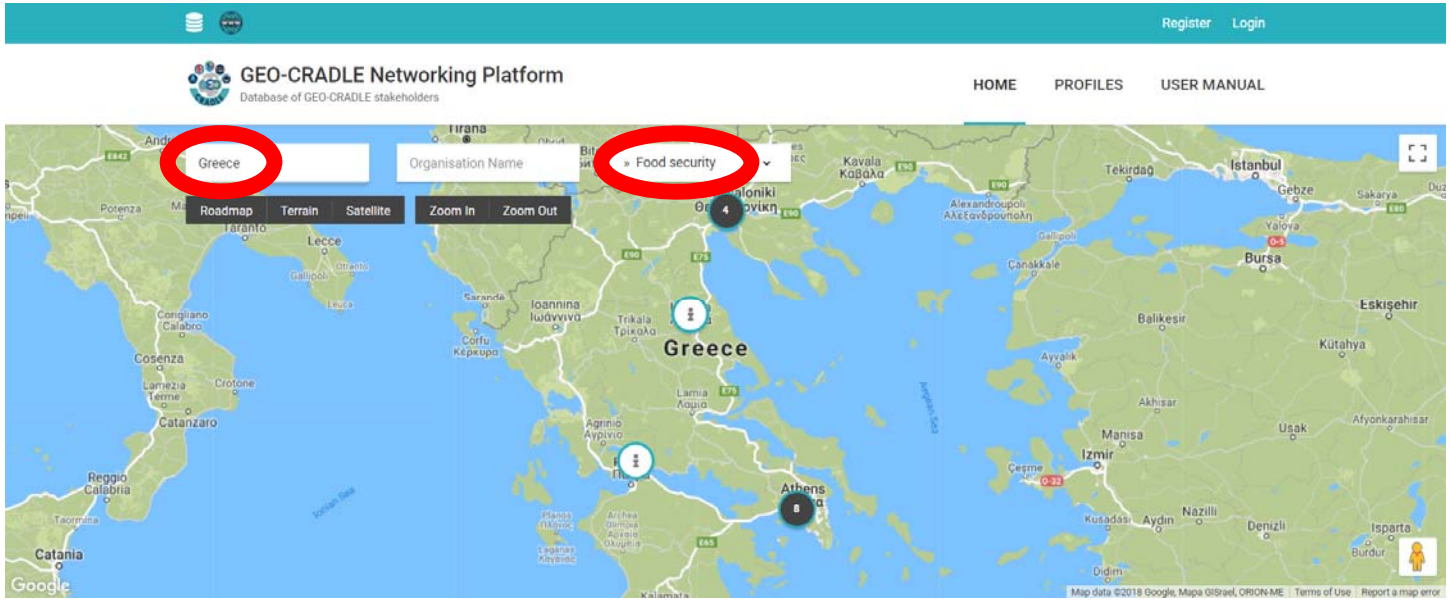
Filters:
Country: Greece
Thematic Area: Food security

Results on the map: 14



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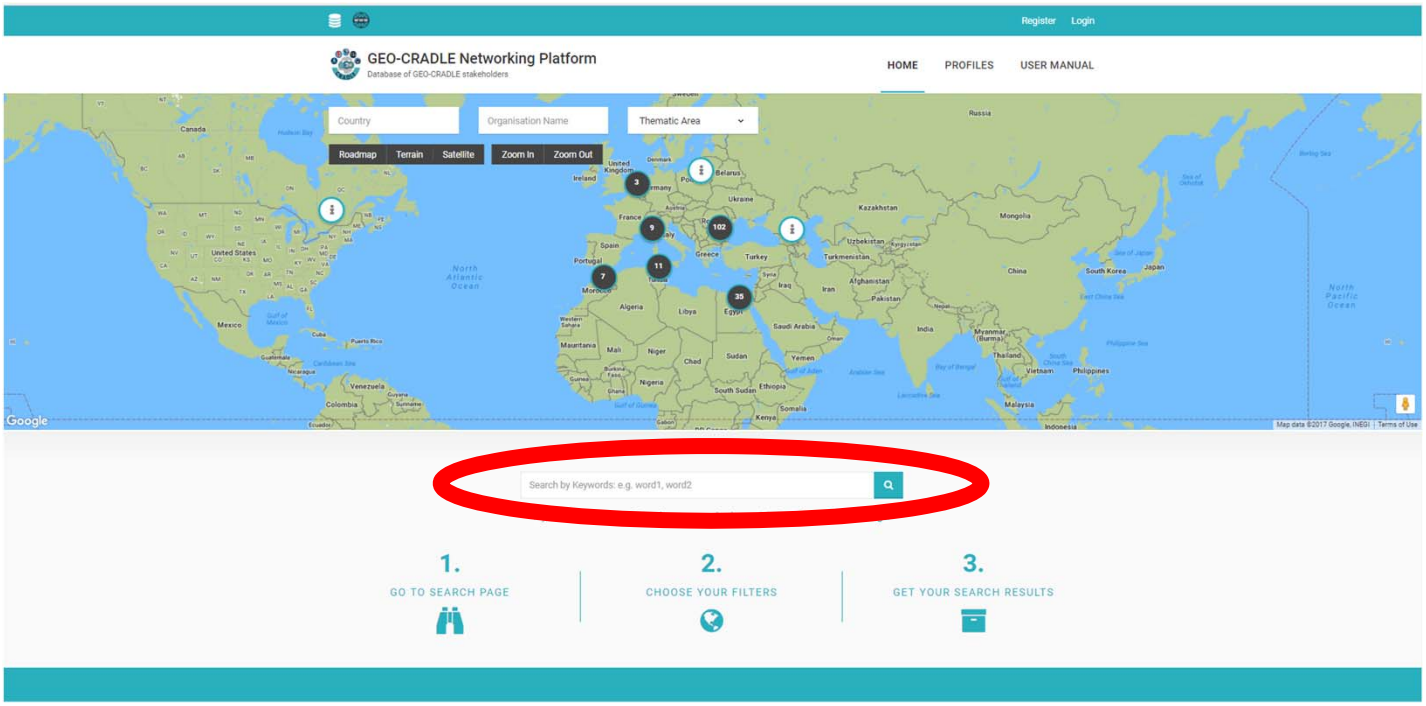
Search option 2: Search by keywords
(for quick search)



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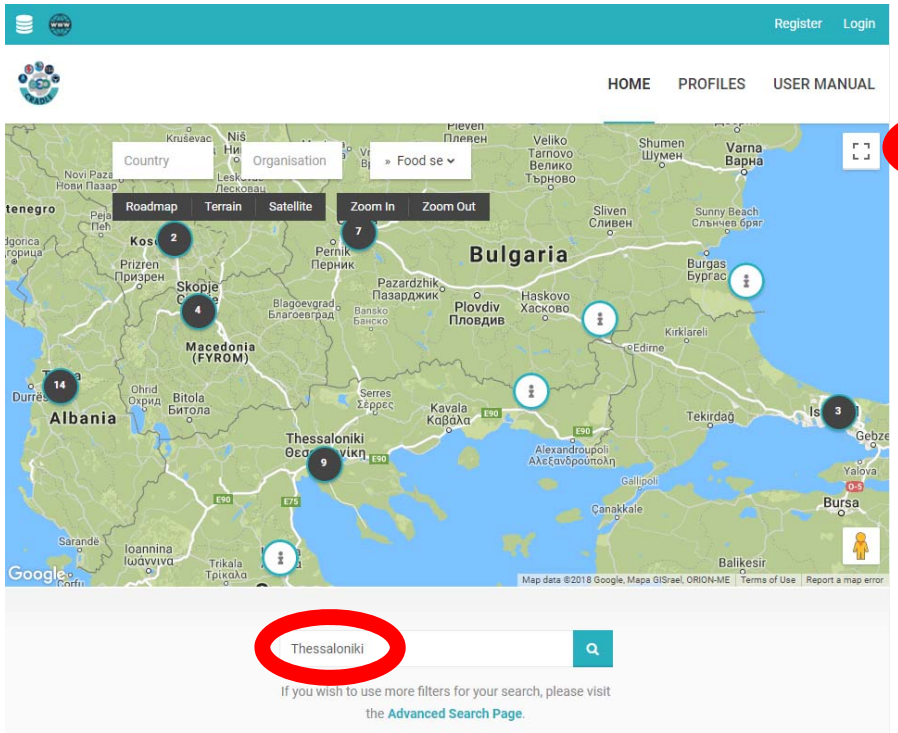
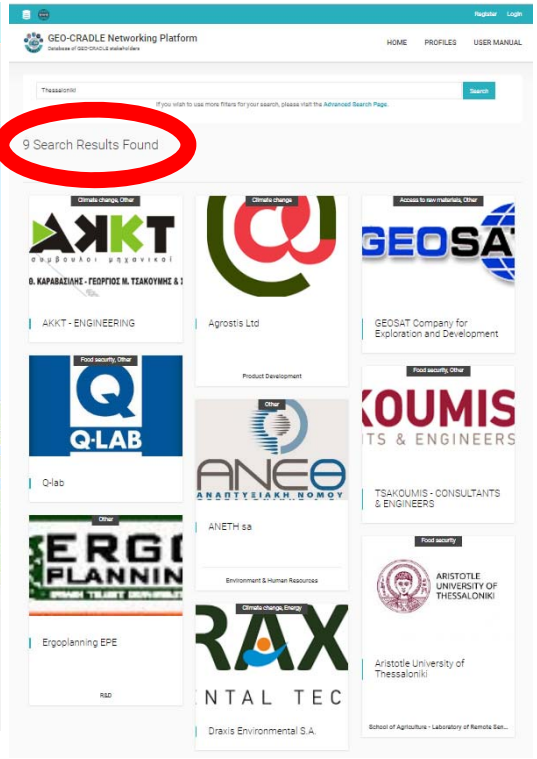
Filters:
Keywords: Thessaloniki

Results: 9





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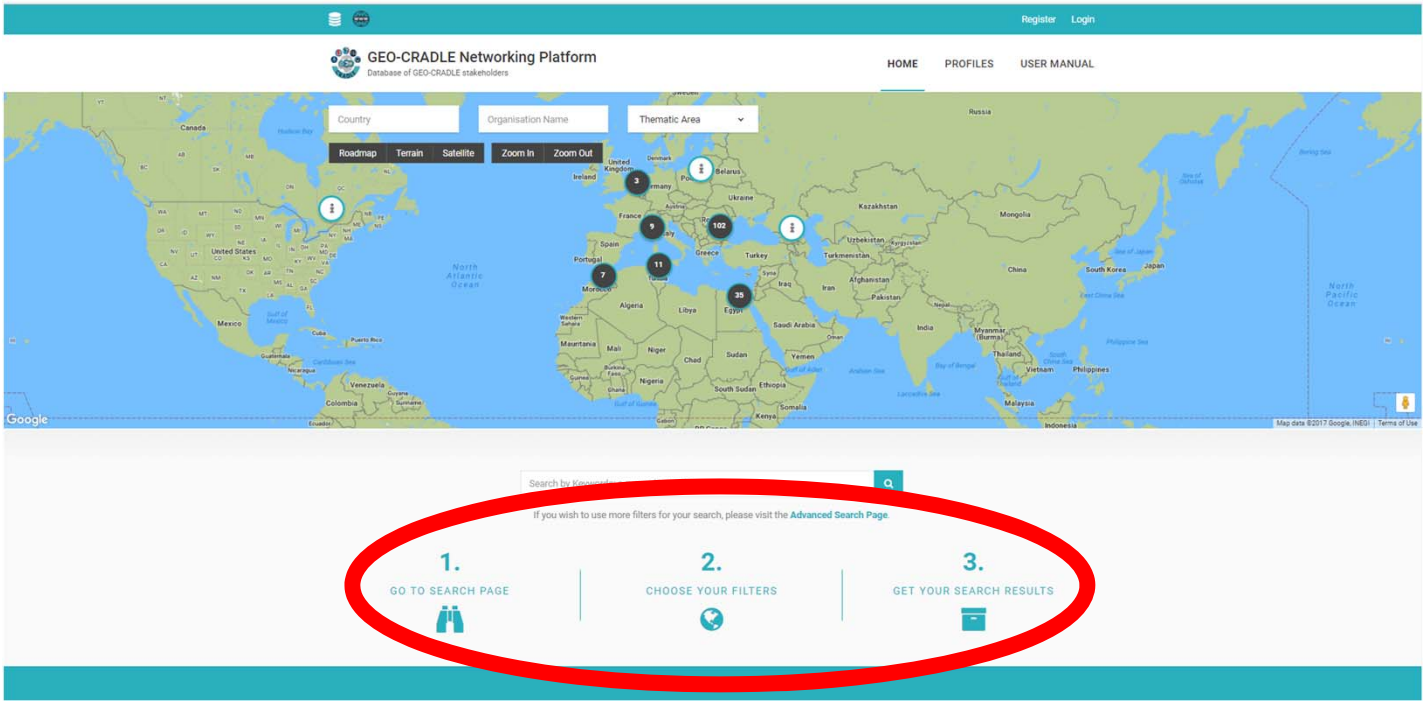
Search option 3: Advanced search page



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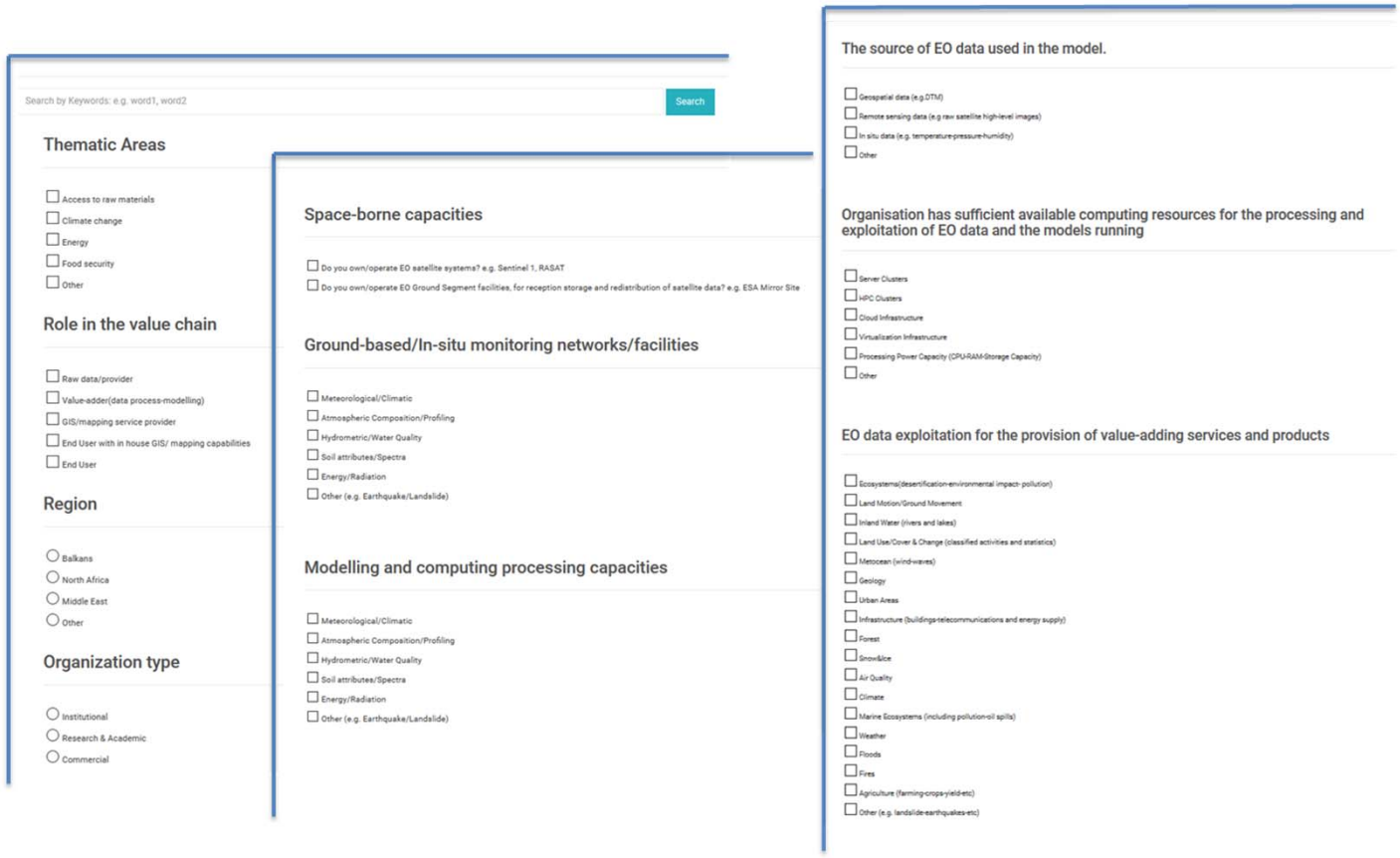

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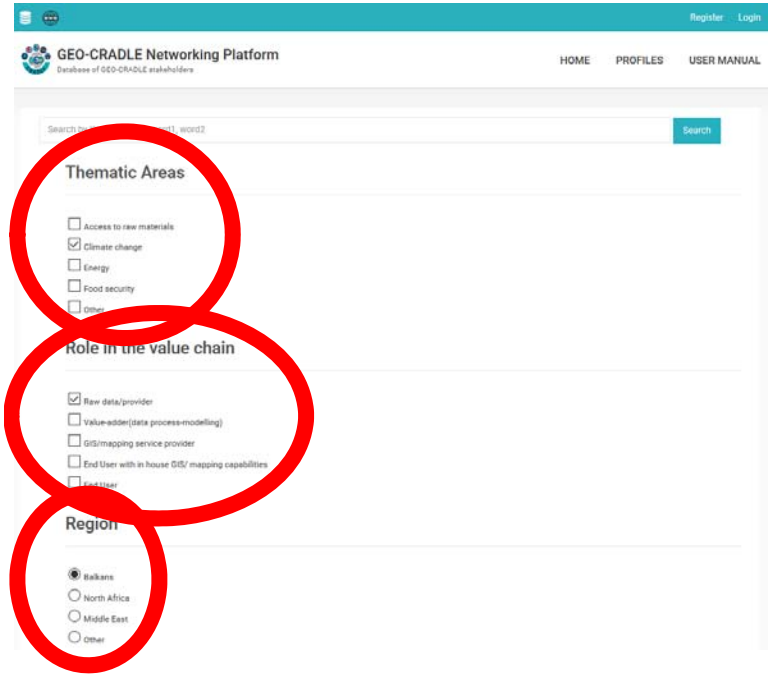
Filters:
Region: Balkans
Thematic area: Climate change
Role: Raw data/provider

Results: 27



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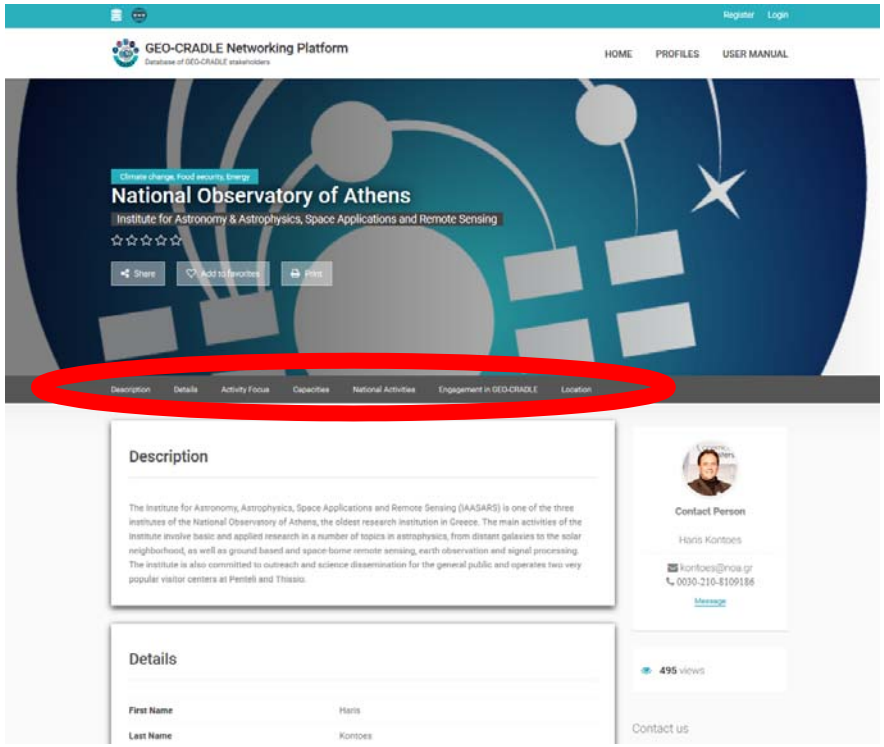
Example Profile:
National Observatory of Athens



Sections:

Description

Details

Activity Focus

Capacities

National Activities

Engagement in GEO-CRADLE

Location

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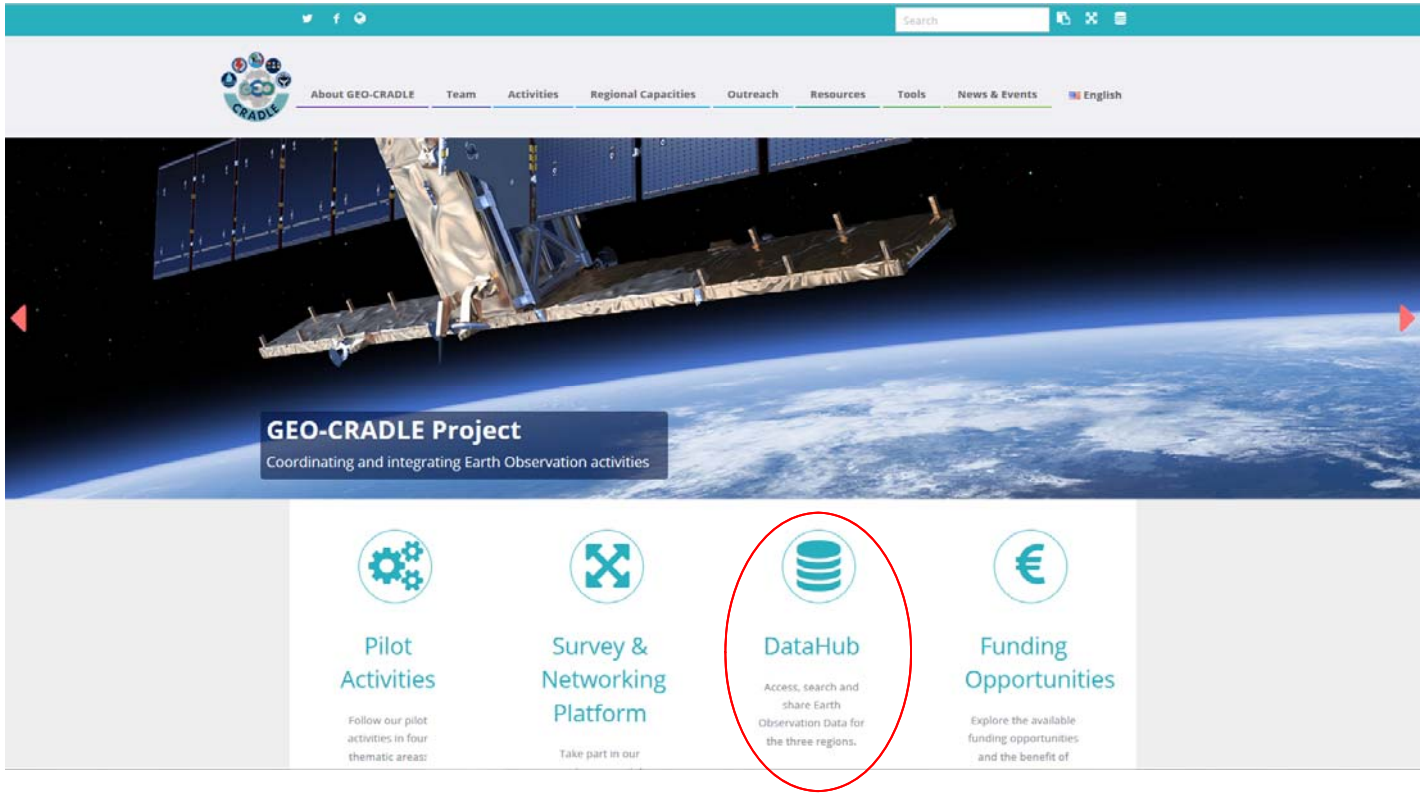
GEO-CRADLE Portal

http://geocradle.eu



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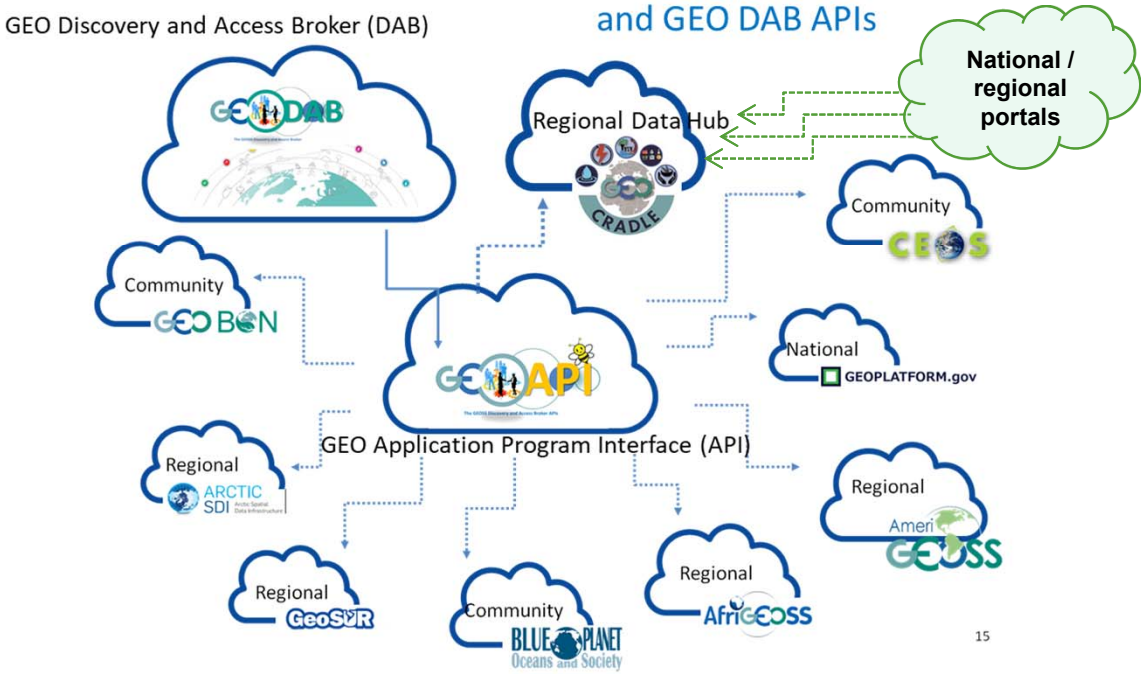
Users/GEO Portals

National, regional or thematic community portals, leveraging GEOSS Common Infrastructure (GCI) resources and GEO DAB APIs



15

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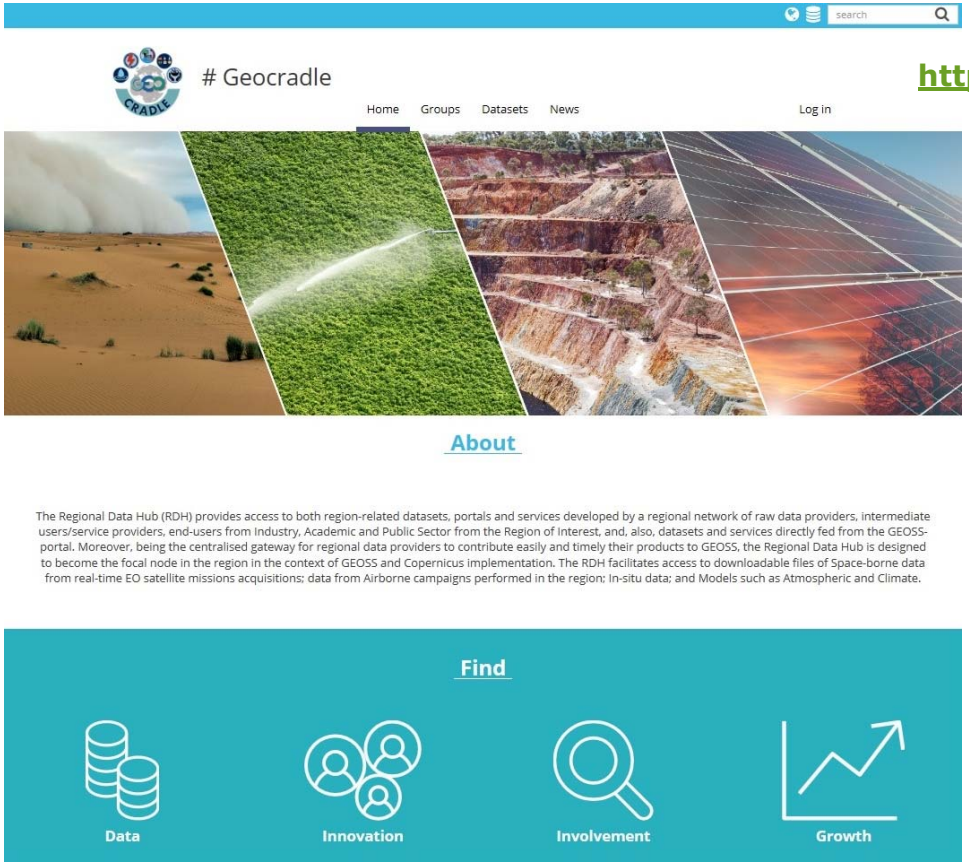

http://datahub.geocradle.eu

GEO-CRADLE Regional DataHub

Stable service and full interoperability with GCI and GEO DAB APIs, as well as connection with data available through the project pilots.

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✓ **The GEO-CRADLE RDH is designed and operates as the focal node in the region in the context of GEOSS and Copernicus implementation.**

- It is an open data web management tool / portal (developed using web technologies such as PHP, HTML5, JavaScript, CSS, etc.) that provides access to region-related datasets and services, directly fed from GCI, and at the same time being the central gateway for regional data providers to contribute easily and timely their products to GEOSS.

- It advances the current state of the art by integrating DKAN, which is a complementary implementation of CKAN (Comprehensive Knowledge Archive Network) over Drupal/PHP, with the GEO DAB APIs. DKAN CMS (Content Management System) is an open-source data management platform that treats data as content, facilitating the subsequent publication, management, and maintenance of these, no matter the administration team, its size and level of technical expertise.

✓ Several **achievements** were accomplished for the RDH to be able to provide its users the functionalities described above:

- Search in multiple sources (although by default DKAN looks up for datasets and resources in a single local database).

- Search for datasets in remote resources (integration of the GEO DAB APIs in the DKAN environment).

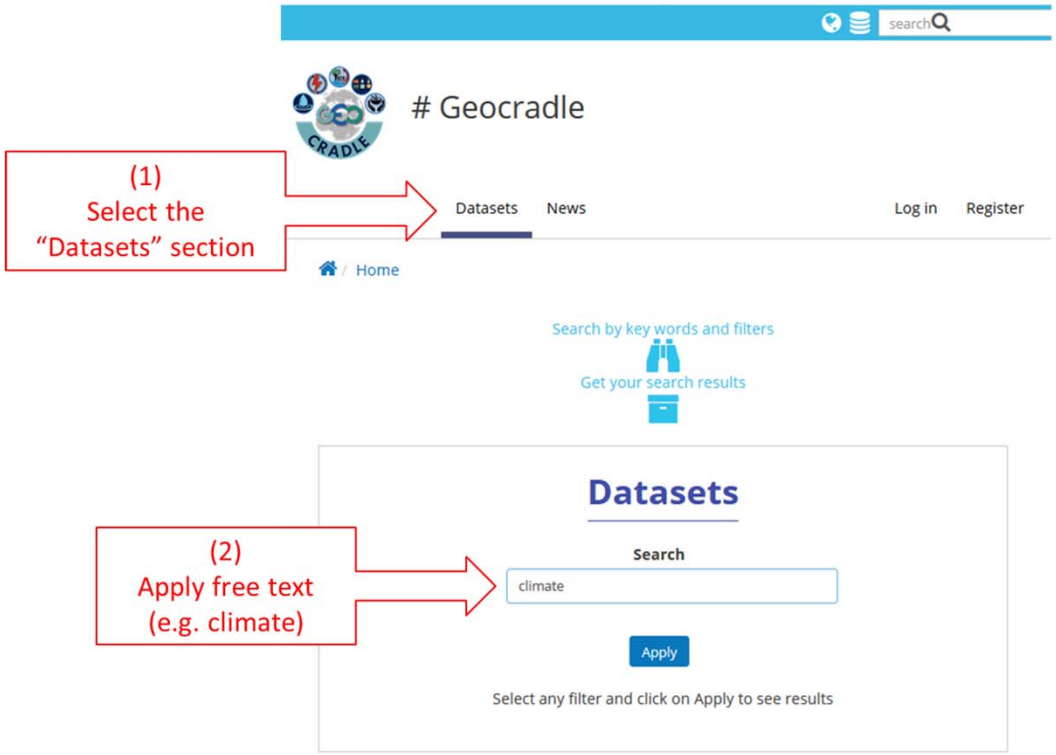
- Display the remote datasets and resources on-the-fly and with high performance (using a rendering cache mechanism which also implements an Adaptive Time-to-Live consistency mechanism to periodically check the consistency of the cached rendering structures with the original data to assure that users do not receive stale data).

- Cleaning data mechanism (cleans identical or duplicate data, discovers missing information for data, discovers URL that have changed or that are not working anymore, discards data with invalid URL schemes, etc.)

- Preview mechanism (to preview data of various formats and services, such as CSV files, Web Map Services, Zip files, etc.)

An integrated Search and Display mechanism that offers the users unified, centralized and user-friendly interface.

Search examples



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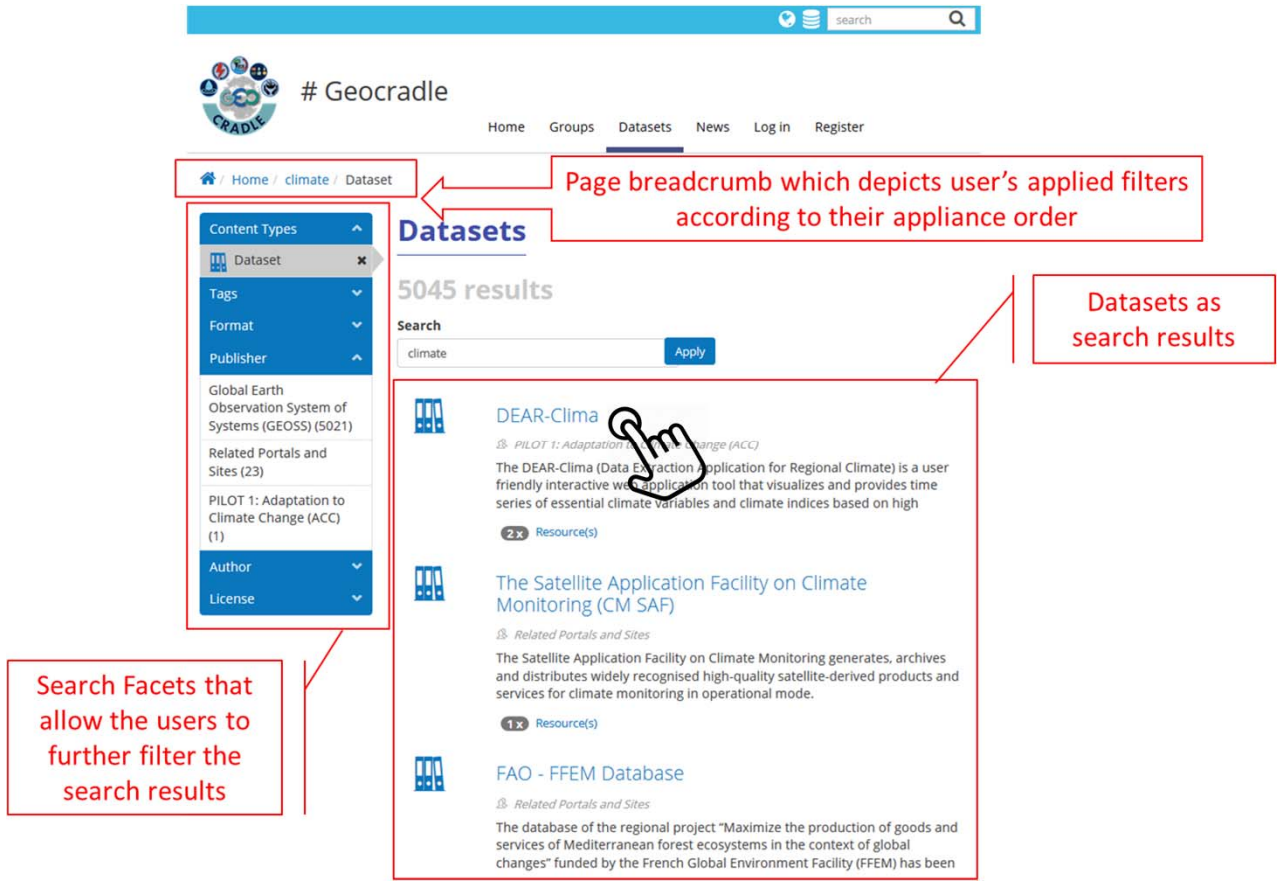

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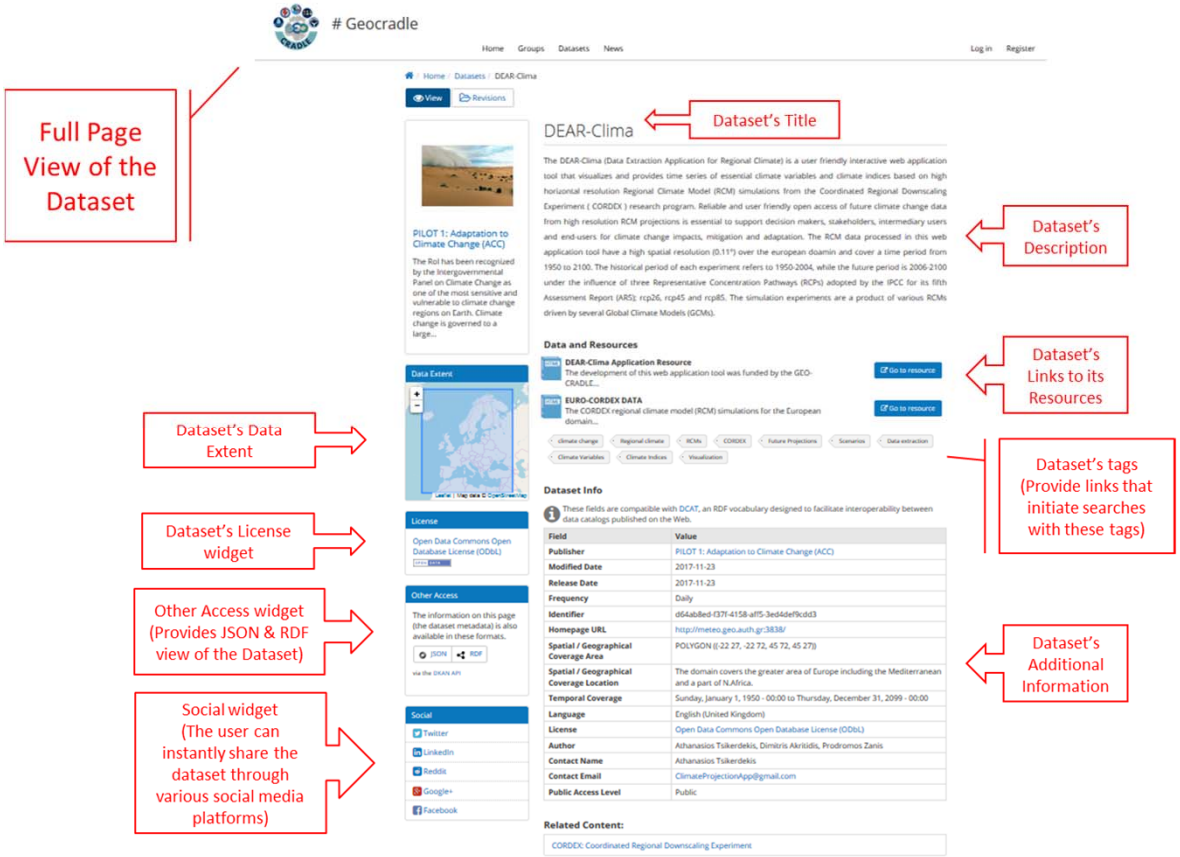

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DATA

Regions of Interest
- Balkans
- Middle East
- North Africa

Thematic Areas
- Climate Change
- Food Security & Water Extremes
- Raw Materials
- Energy

EO Data Categories
- Space borne
- Ground based
- Modelling

DATA PROVIDERS

GEO-CRADLE Survey
- 10 national portals and sites

National portals **in total**: 42

Desk Research
- 32 national portals and sites
- 12 continental and global portals and sites

GEOSS Portal
- 25.131.225 datasets

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GEO CRADLE

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Data Providers

National sites and portals in numbers

	Adaptation to Climate Change	Improved Food Security and Water Mgt	Better access to Raw Materials	Better access to Energy	Total Number of Portals per RoI (unique)
Balkans	16	17	8	3	23
Middle East	6	8	1	2	18
North Africa	0	1	0	0	1
Total Number of Portals per Thematic Area	22	26	9	5	**Total number of portals and sites: 42**

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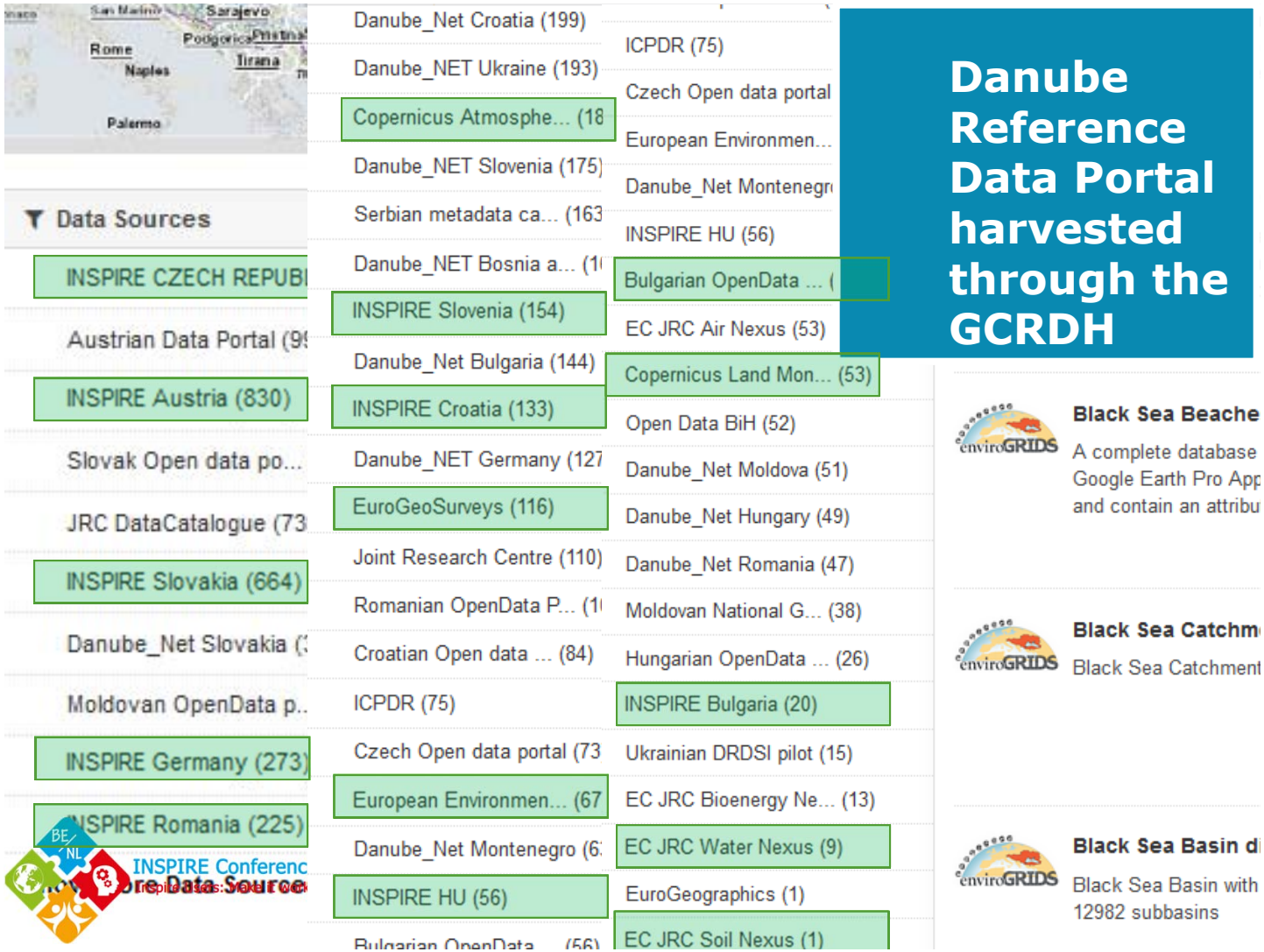
Prioritised Portals

a/a	Portals	Brokered by GEOSS
1.	Danube Reference Data and Services Infrastructure (DRDSI)	Done
2.	Eusoils	In progress
3.	Albania - GEOportal	Pending
4.	Montenegro - GEOportal	Pending
5.	Croatia - GEOportal	Pending
6.	Moldova - National geospatial data of Moldova	In progress
7.	FYROM – Soil information system	Pending
8.	Bosnia & Herzegovina - GEOportal	Pending
9.	REP of SRPSKA - GEOportal	Pending
10.	Slovenia- Portal and Forest Data Viewer	Done
11.	Cyprus - Geoportal	In progress
12.	Cyprus - Air quality	In progress
13.	United Arabic Emirates - Abu Dhabi Geospatial Portal and Map Viewer	Pending
14.	Poland - Central geological Db	Pending


Sarajevo
Rome
Naples
Tirana
Palermo
Data Sources
INSPIRE CZECH REPUBL
Austrian Data Portal (9
INSPIRE Austria (830)
Slovak Open data po...
JRC DataCatalogue (73
INSPIRE Slovakia (664)
Danube_Net Slovakia (
Moldovan OpenData p..
INSPIRE Germany (273)
INSPIRE Romania (225)
BE
NL
INSPIRE Conferenc
Danube_Net Croatia (199)
Danube_NET Ukraine (193)
Copernicus Atmosphe... (18
Danube_NET Slovenia (175)
Serbian metadata ca... (163
Danube_NET Bosnia a... (1
INSPIRE Slovenia (154)
Danube_Net Bulgaria (144)
INSPIRE Croatia (133)
Danube_NET Germany (127
EuroGeoSurveys (116)
Joint Research Centre (110)
Romanian OpenData P... (1
Croatian Open data ... (84)
ICPDR (75)
Czech Open data portal (73
European Environmen... (67
Danube_Net Montenegro (6
INSPIRE HU (56)
ICPDR (75)
Czech Open data portal
European Environmen...
Danube_Net Montenegr
INSPIRE HU (56)
Bulgarian OpenData ... (
EC JRC Air Nexus (53)
Copernicus Land Mon... (53)
Open Data BiH (52)
Danube_Net Moldova (51)
Danube_Net Hungary (49)
Danube_Net Romania (47)
Moldovan National G... (38)
Hungarian OpenData ... (26)
INSPIRE Bulgaria (20)
Ukrainian DRDSI pilot (15)
EC JRC Bioenergy Ne... (13)
EC JRC Water Nexus (9)
EuroGeographics (1)
EC JRC Soil Nexus (1)
Danube Reference Data Portal harvested through the GCRDH
enviroGRIDS
Black Sea Beache
A complete database
Google Earth Pro App
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Black Sea Catchment
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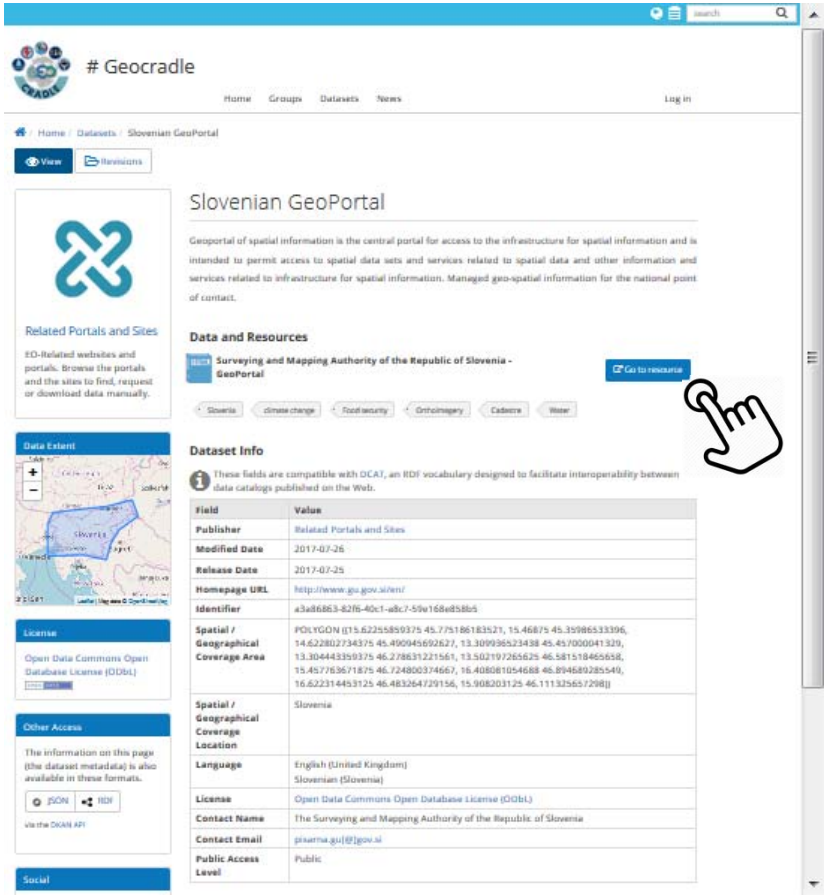
Black Sea Basin di
Black Sea Basin with
12982 subbasins

INSPIRE-compliant example



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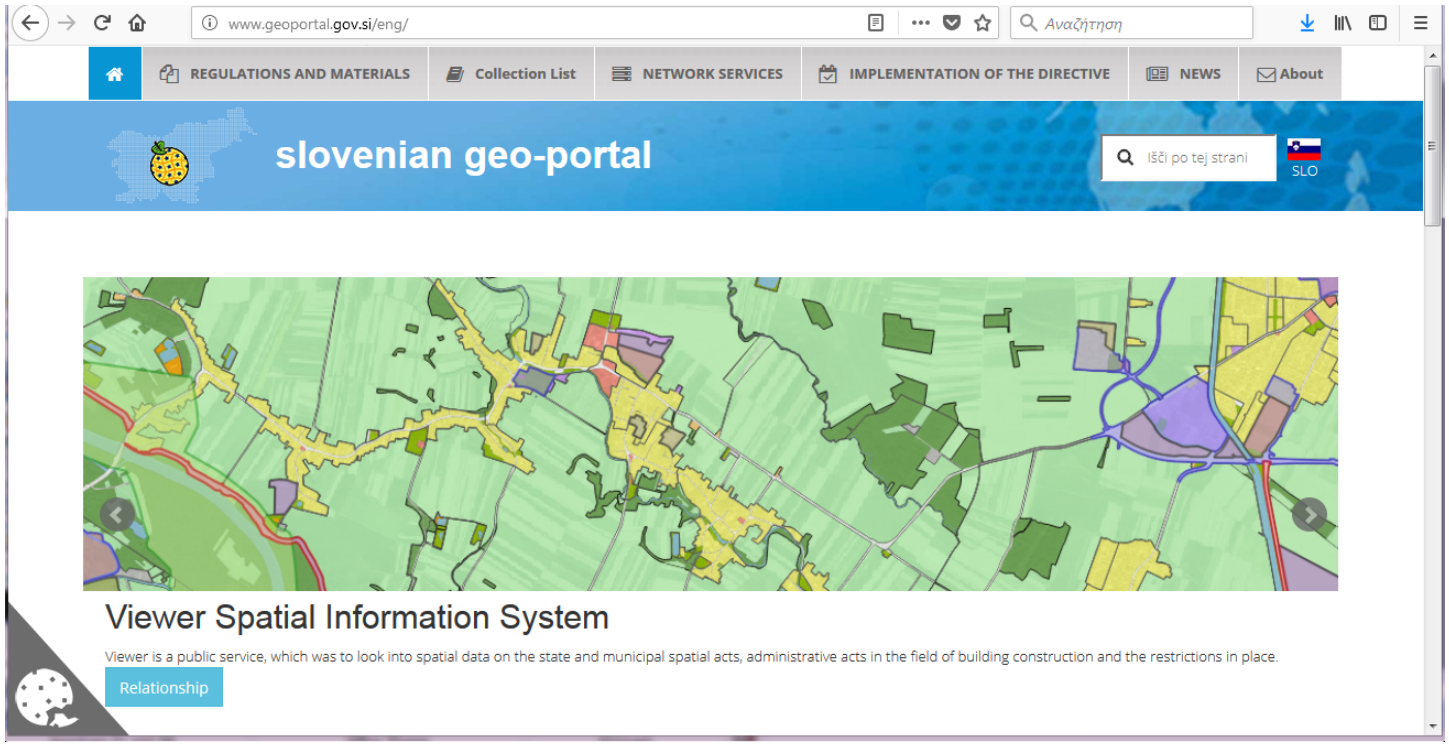

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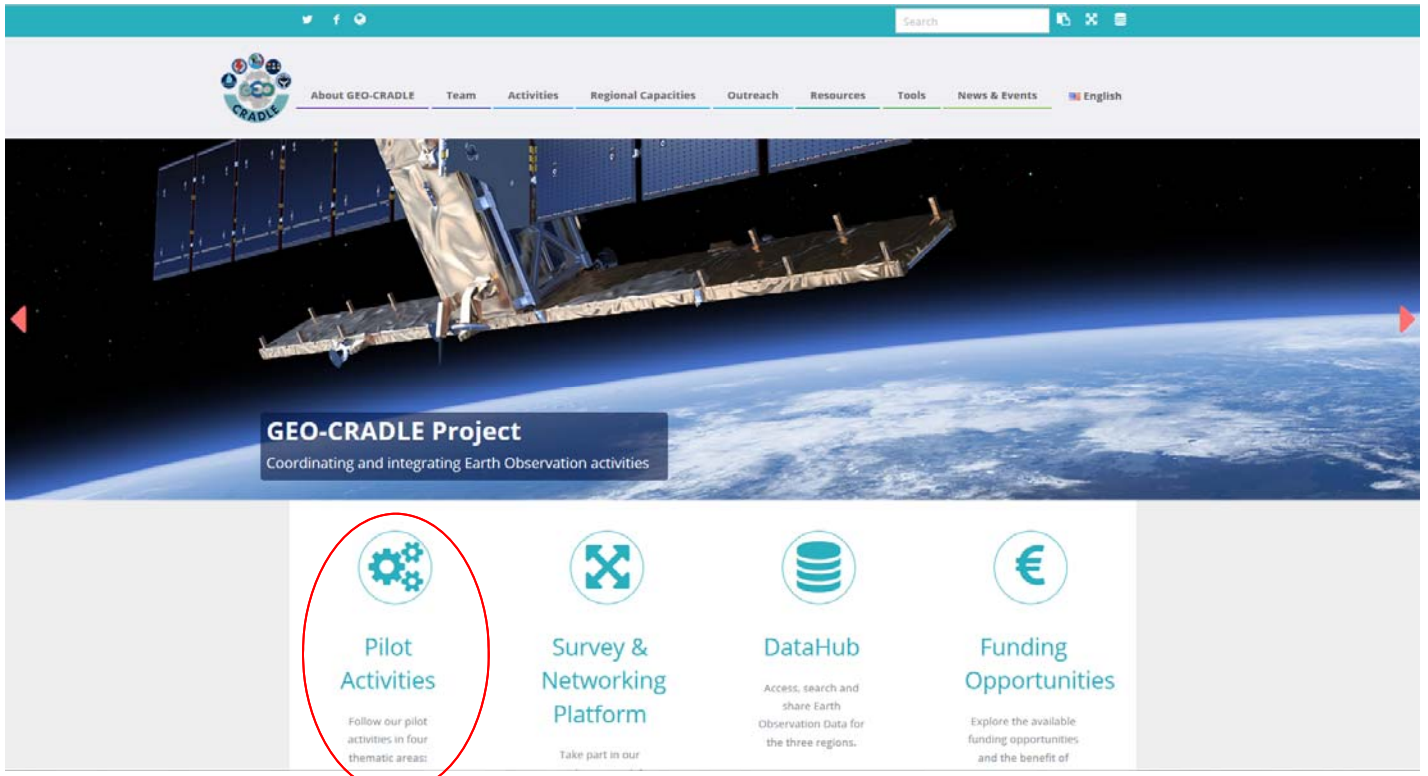
GEO-CRADLE Portal

http://geocradle.eu



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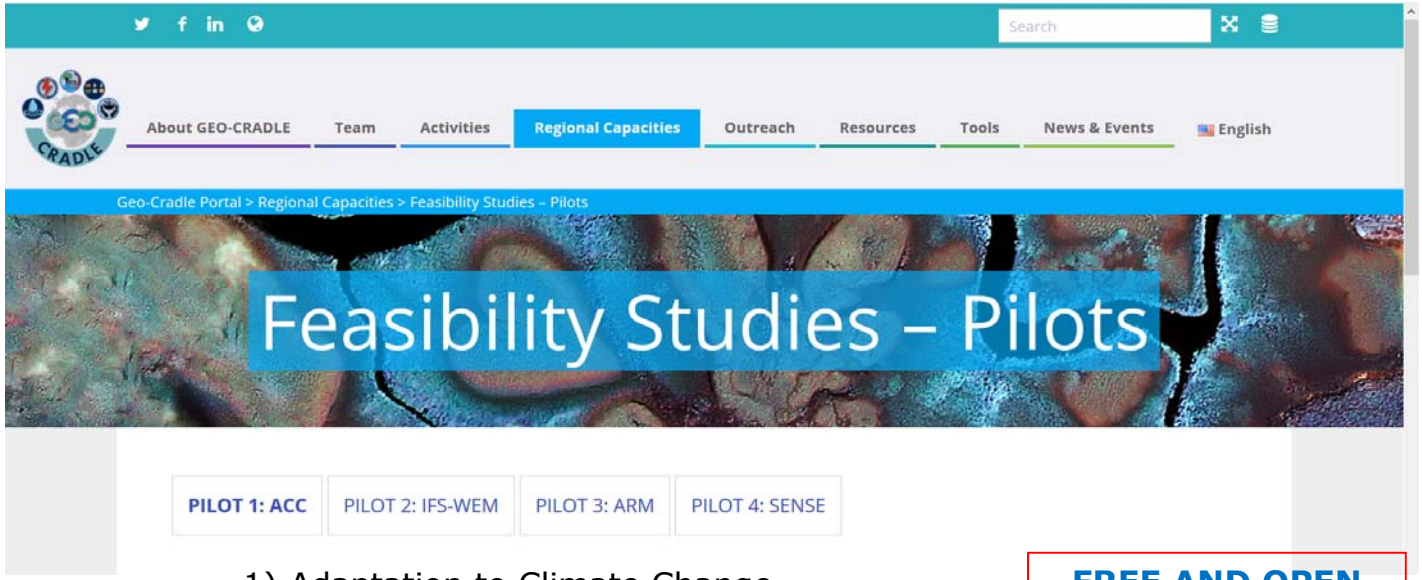
GEO-CRADLE Pilots

http://geocradle.eu/en/regional-capacities/feasibility-studies



1) Adaptation to Climate Change
2) Improved Food Security – Water Extremes Management
3) Access to Raw Materials
4) Access to Solar Energy

FREE AND OPEN ACCESS TO ALL PILOTS' DATASETS AND SERVICES

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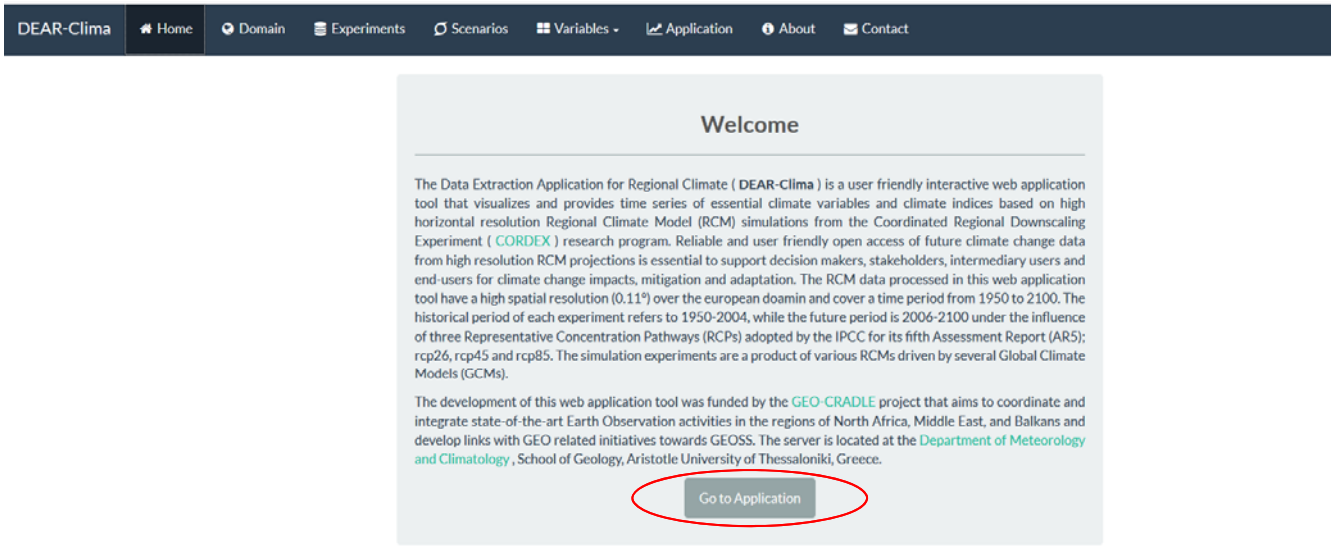
Pilot 1: Adaptation to Climate Change DEAR-Clima



http://meteo3.geo.auth.gr:3838

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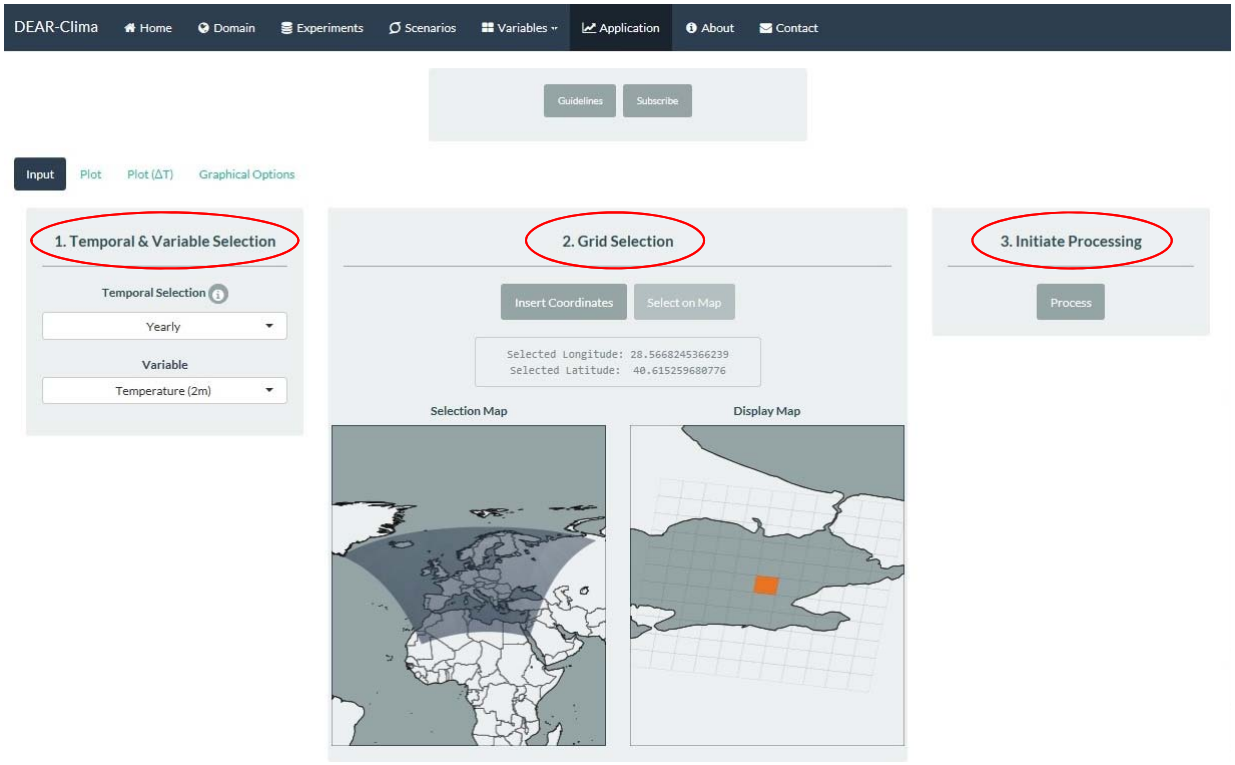
Pilot 1: Adaptation to Climate Change

DEAR-Clima



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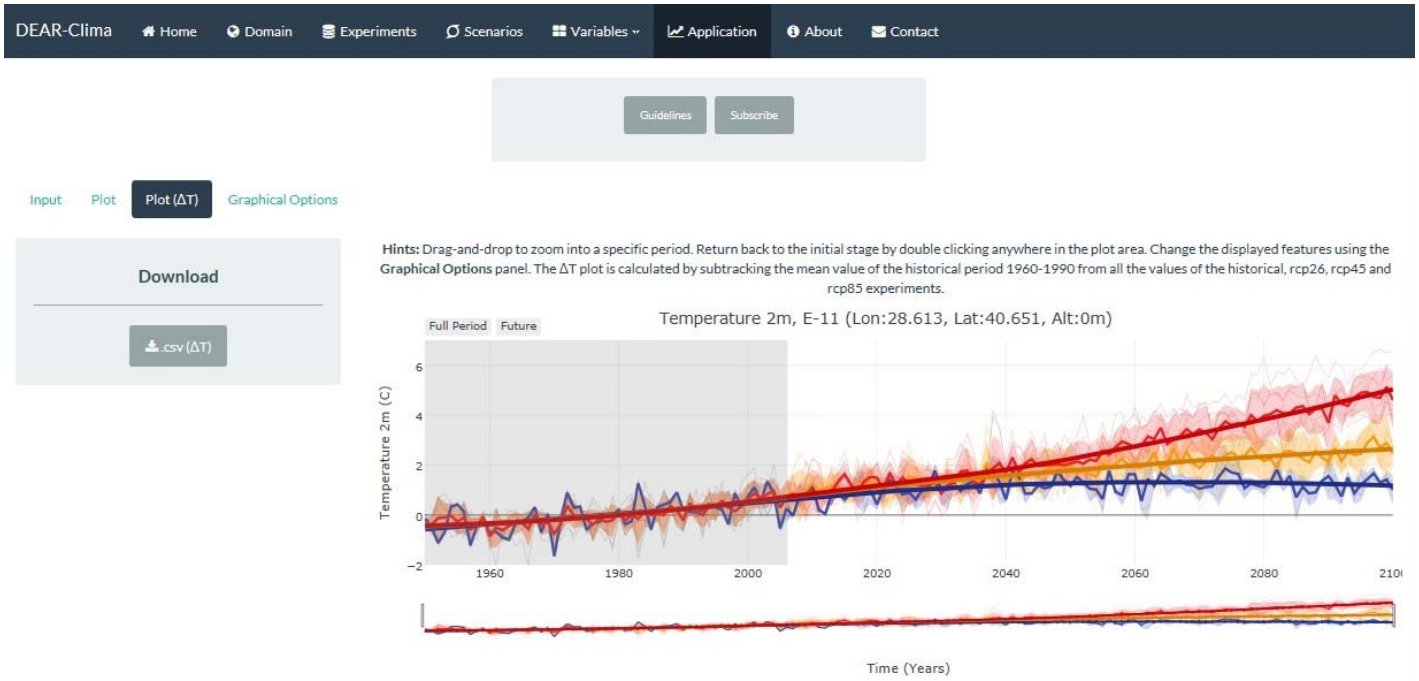
Pilot 1: Adaptation to Climate Change

DEAR-Clima



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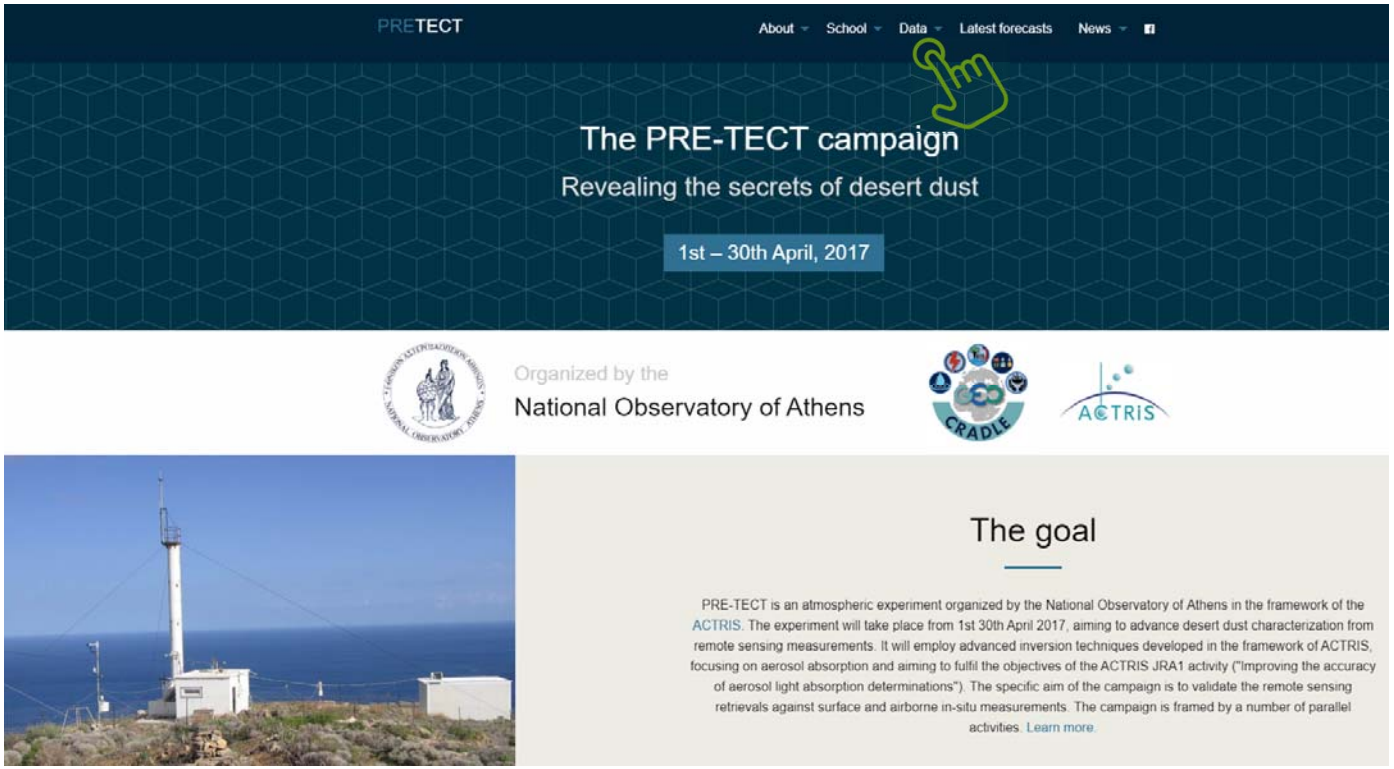
Pilot 1: Adaptation to Climate Change — Desert Dust



http://pre-tect.space.noa.gr

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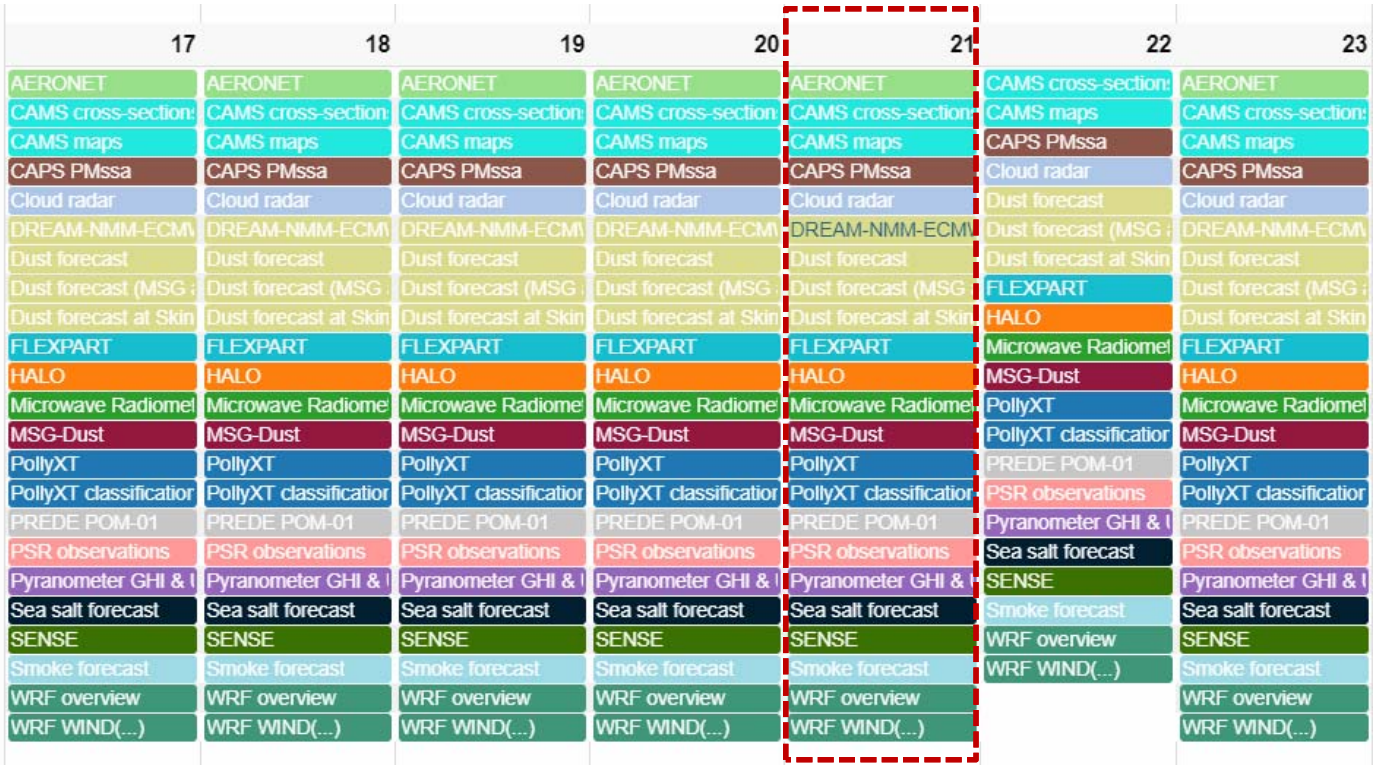
Pilot 1: Adaptation to Climate Change

Desert Dust

Select date



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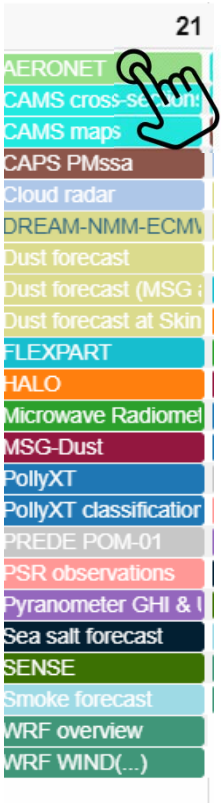
Desert Dust



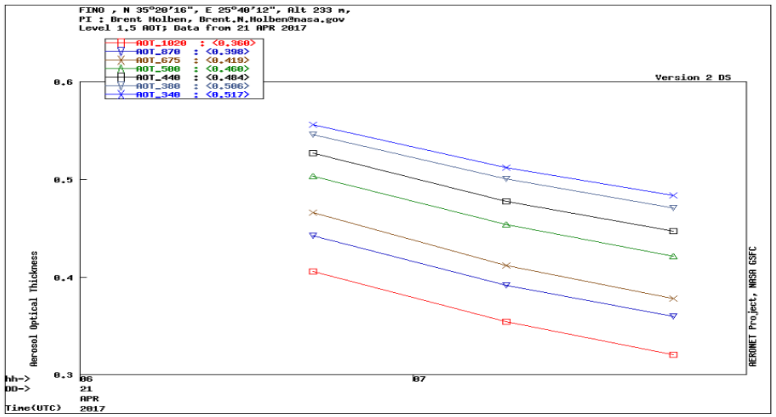
AERONET

Uploaded on 2017-04-21 17:15:28

Start time	April 21, 2017, midnight	**Duration**	1 day
Stop time	April 22, 2017, midnight	**Instrument**	CIMEL sunphotometer

← Previous Next →

Related graphs



Graph 1: Aerosol optical depth

Aerosol optical depth by AERONET sun-photometer

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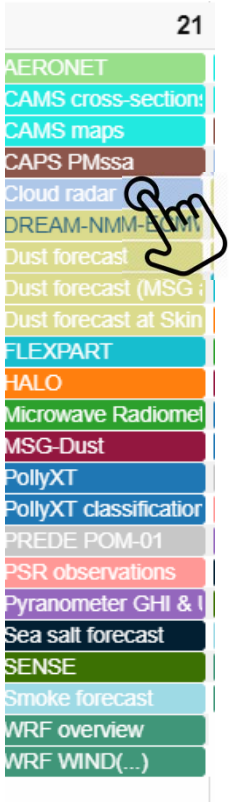
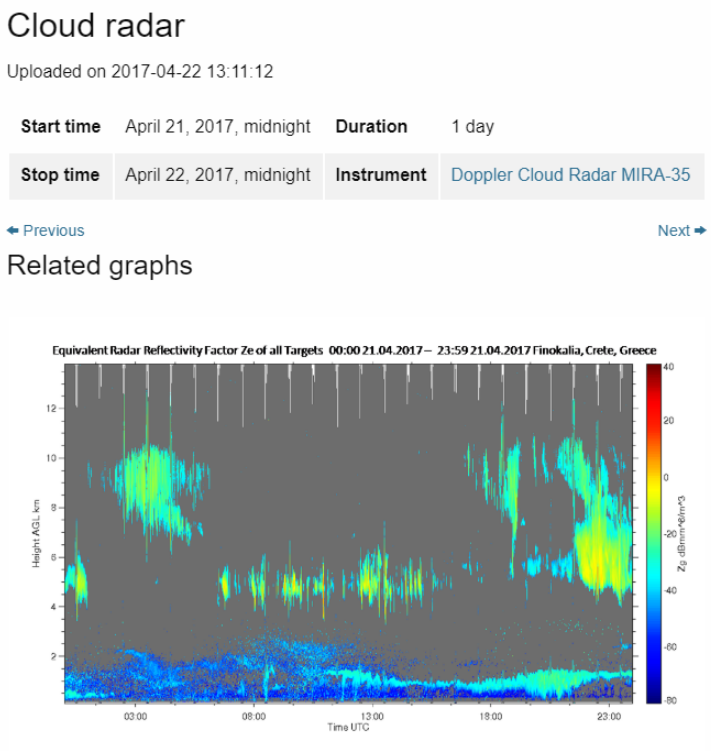
Desert Dust





Cloud and aerosol properties

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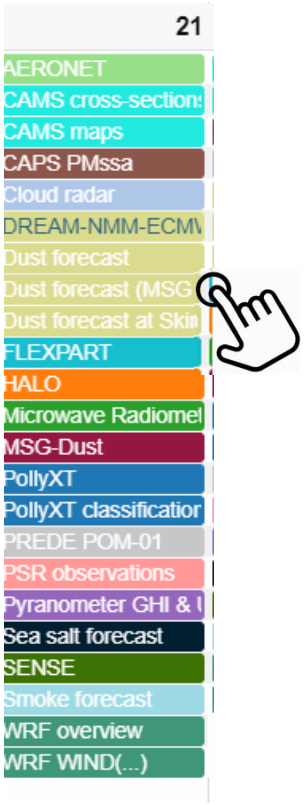
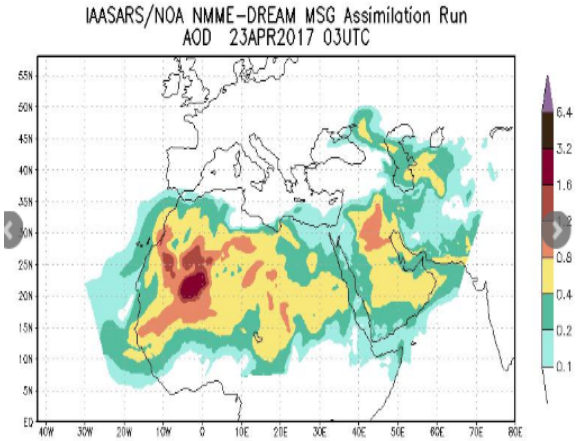
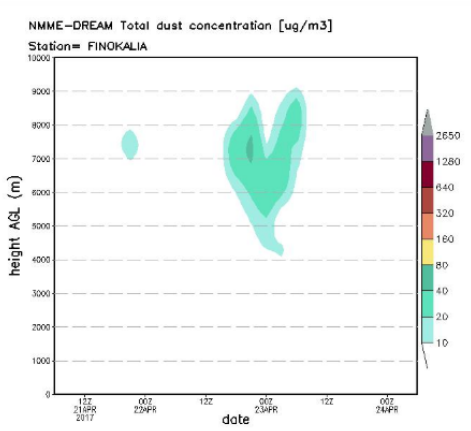
Desert Dust







Horizontal and vertical dust forecasts
with satellite assimilation

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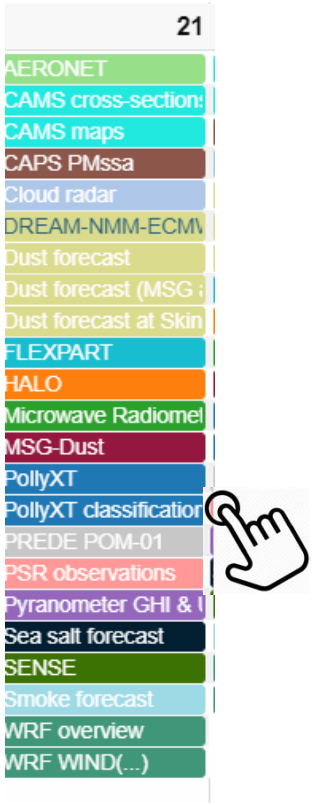
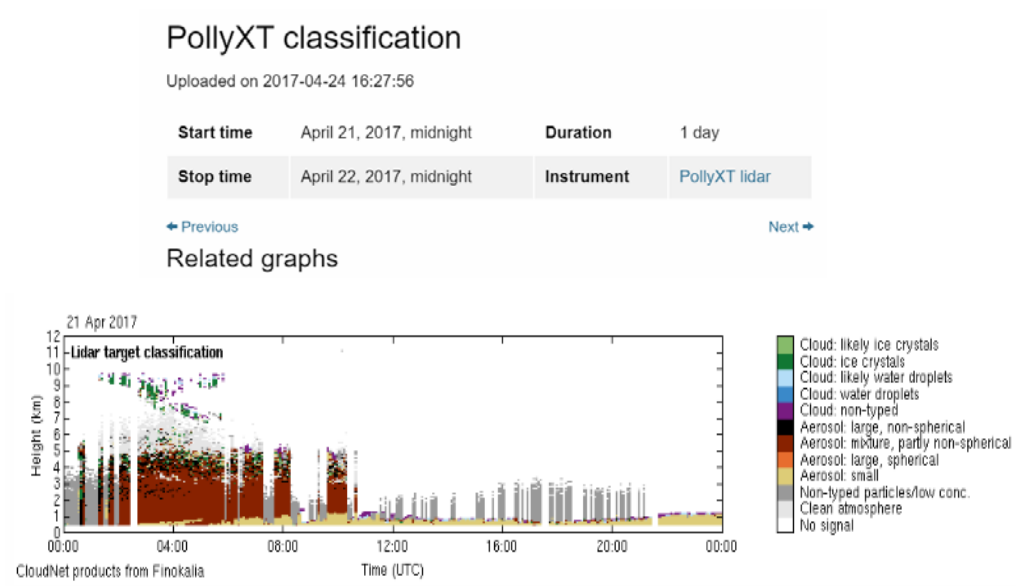
Desert Dust





Graph 1: Multiwavelength aerosol classification - 2017-04-21

Aerosol Classification by the PollyXT Lidar

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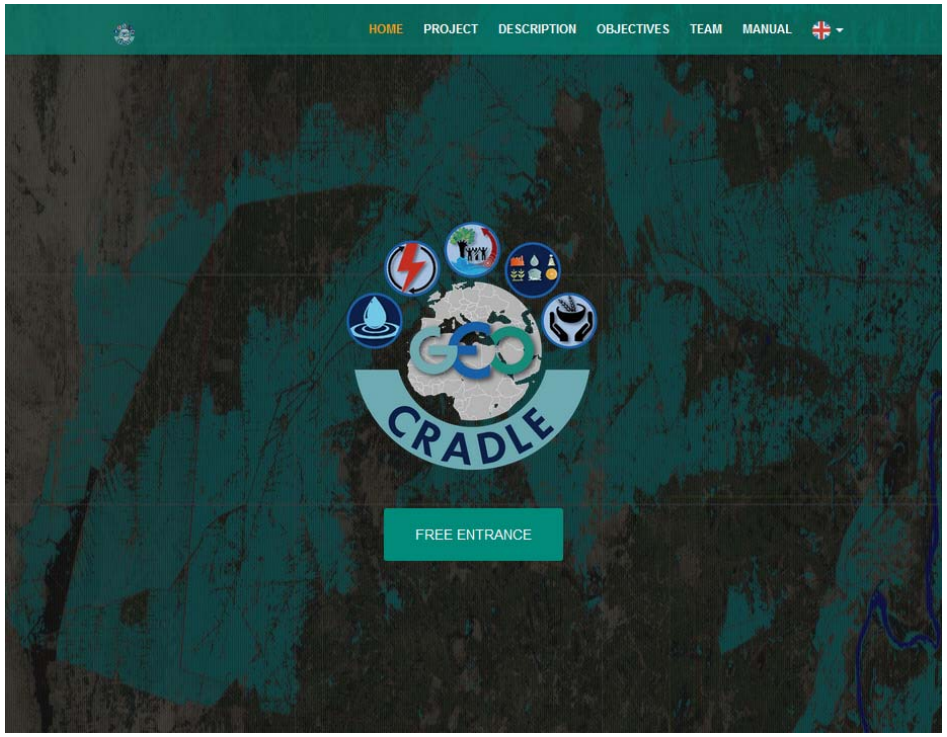

MyDewetra

Click on
FREE ENTRANCE
and hit Dewetra
on the left pane to
enter the main platform

http://geo-cradle.mydewetra.org

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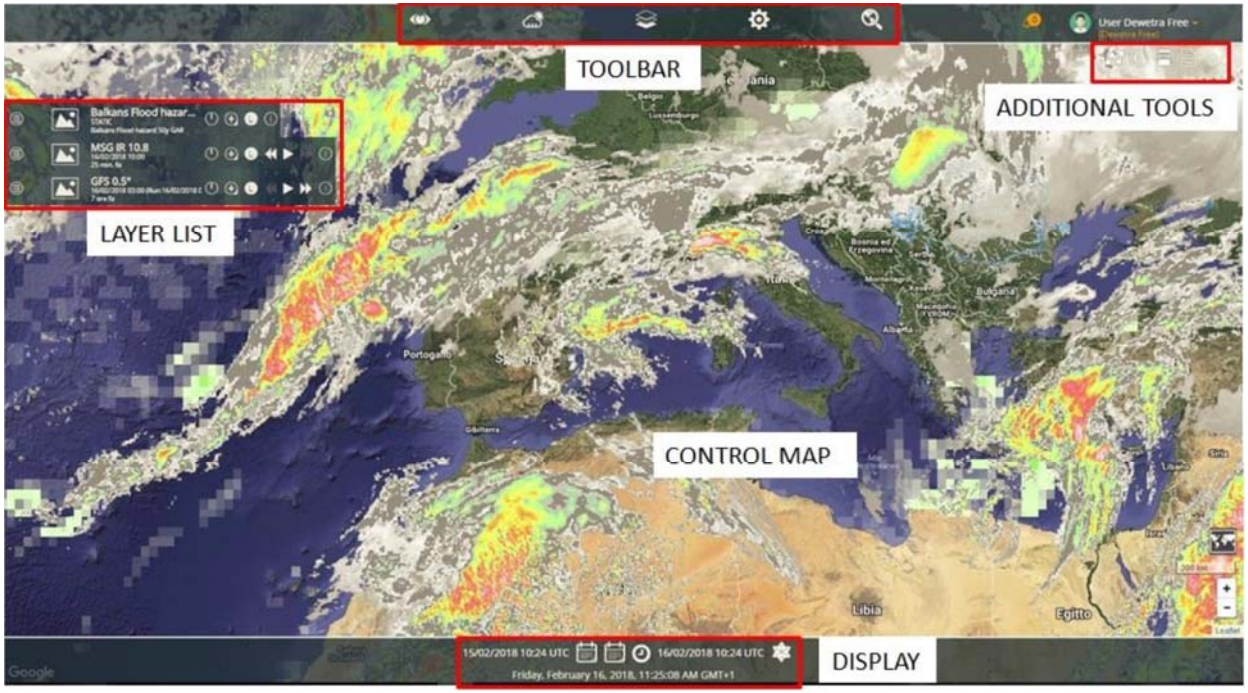
MyDewetra



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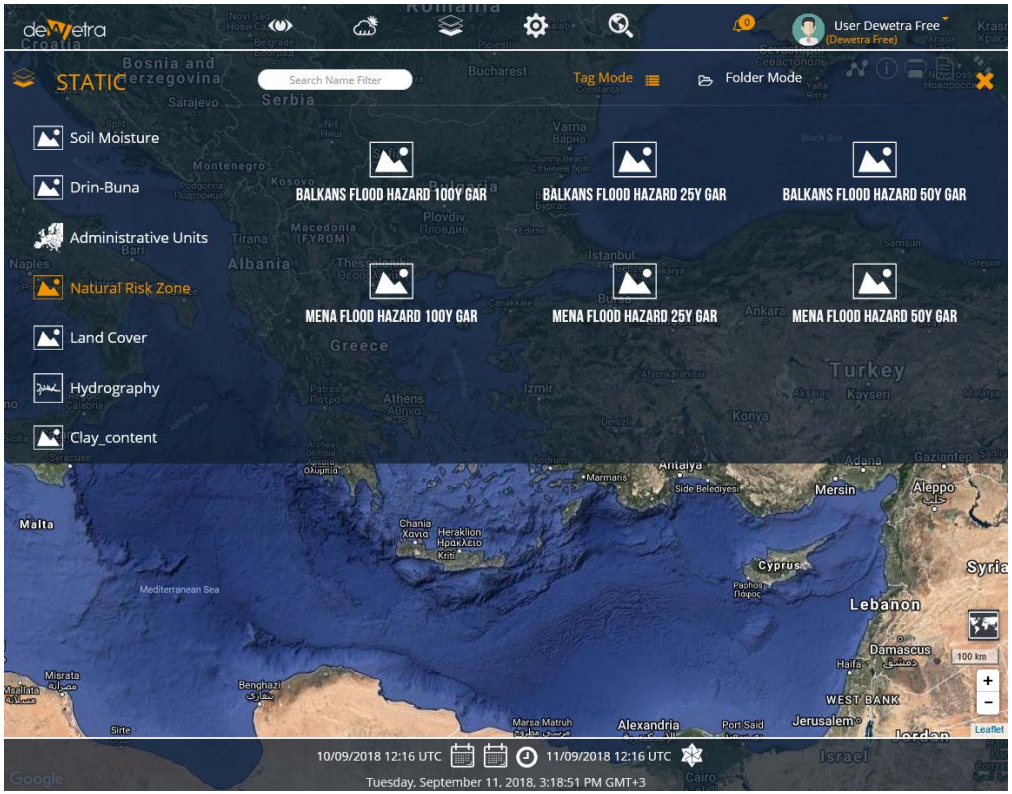

MyDewetra

STATIC Layer contains data that does not change frequently, needed to design a comprehensive risk scenario such as the exposures or the hazard maps.

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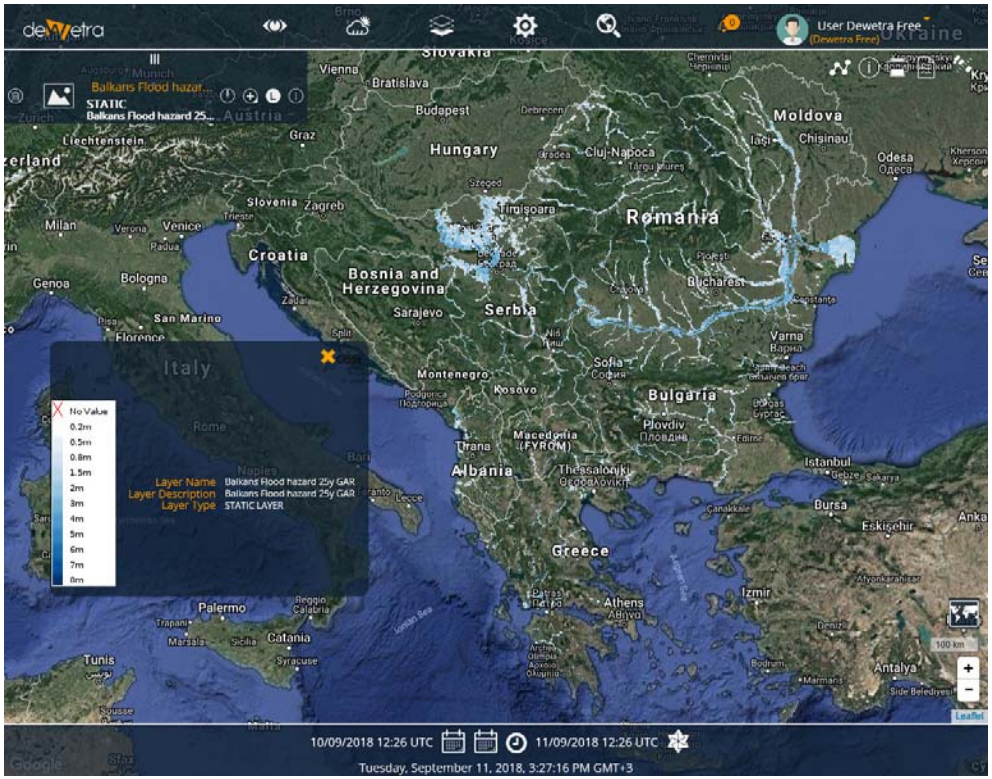

MyDewetra

Balkans –
25y Flood Hazard –
Press L to get the
legend

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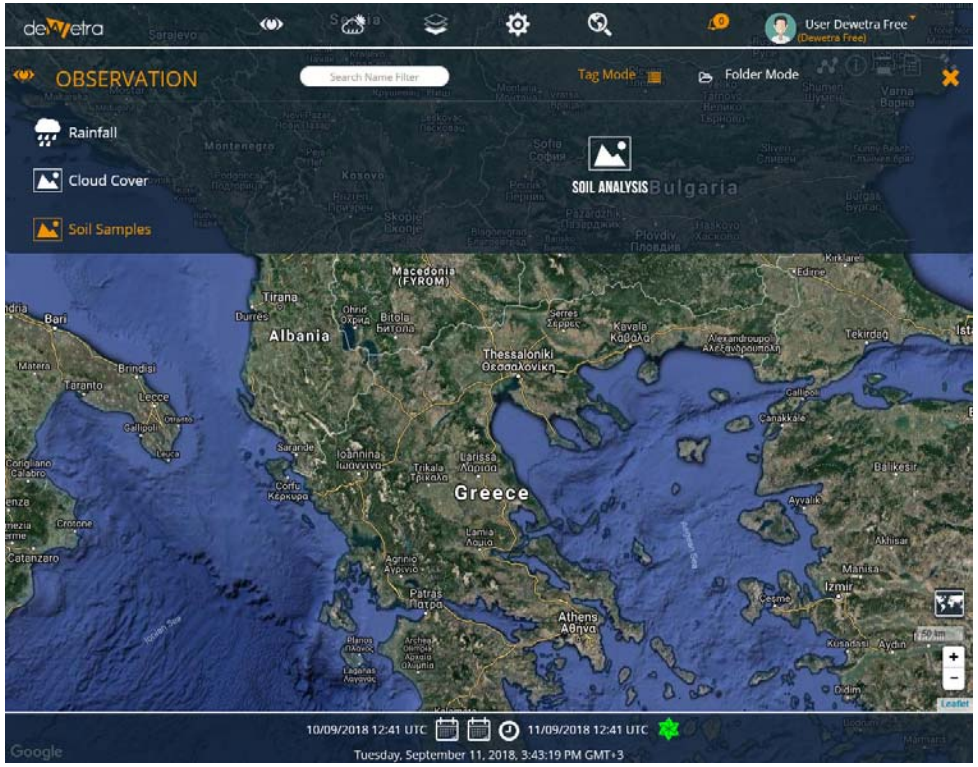

MyDewetra

OBSERVATION Layer

Soil Samples

SOIL ANALYSIS

- Click on soil analysis
- Zoom to a region containing soil samples (e.g. North Eastern Greece)

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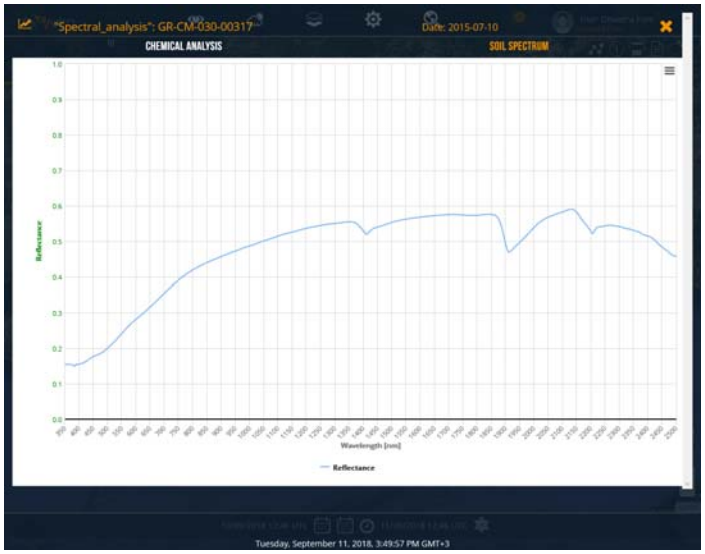
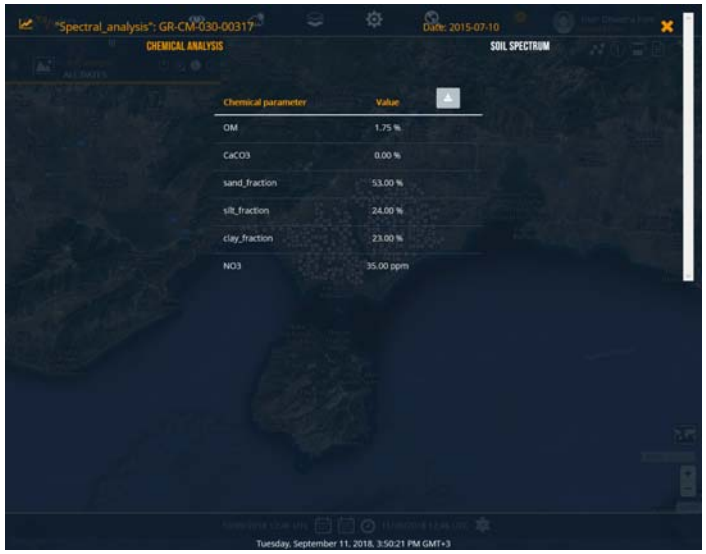
MyDewetra





- Click on a point and visualize the spectrum / chemical results (which can be downloaded)

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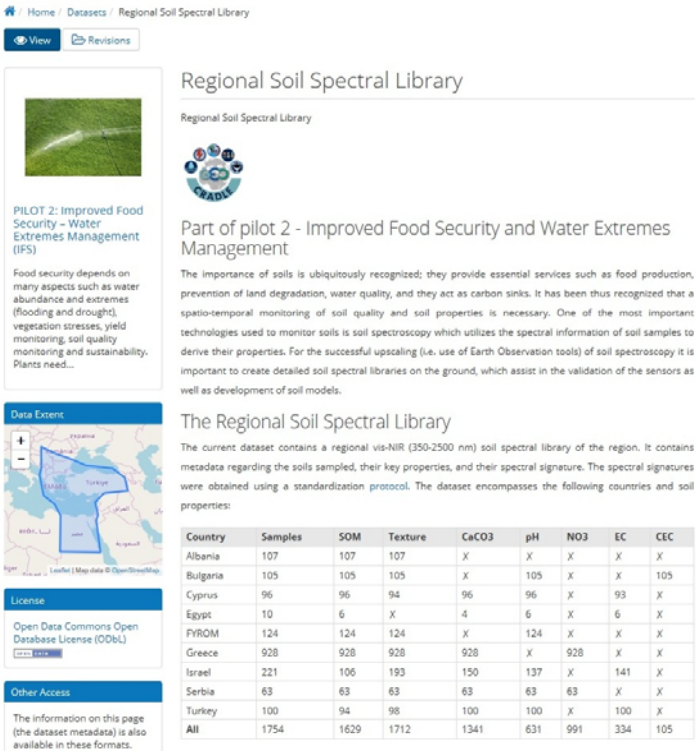
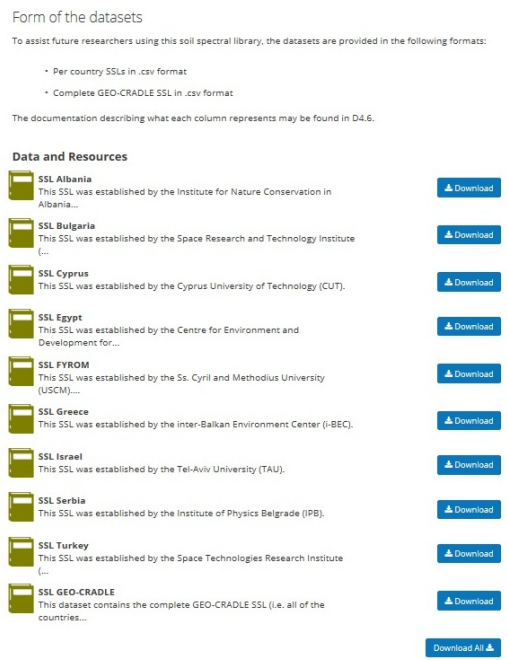
Pilot 2: Improved Food Security – Water Extremes Management

Regional Soil Spectral Library





http://datahub.geocradle.eu/dataset/regional-soil-spectral-library

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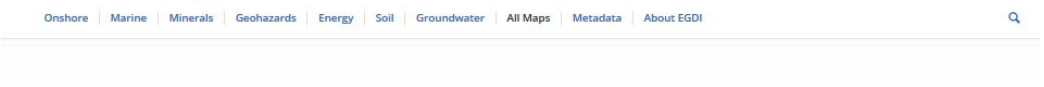
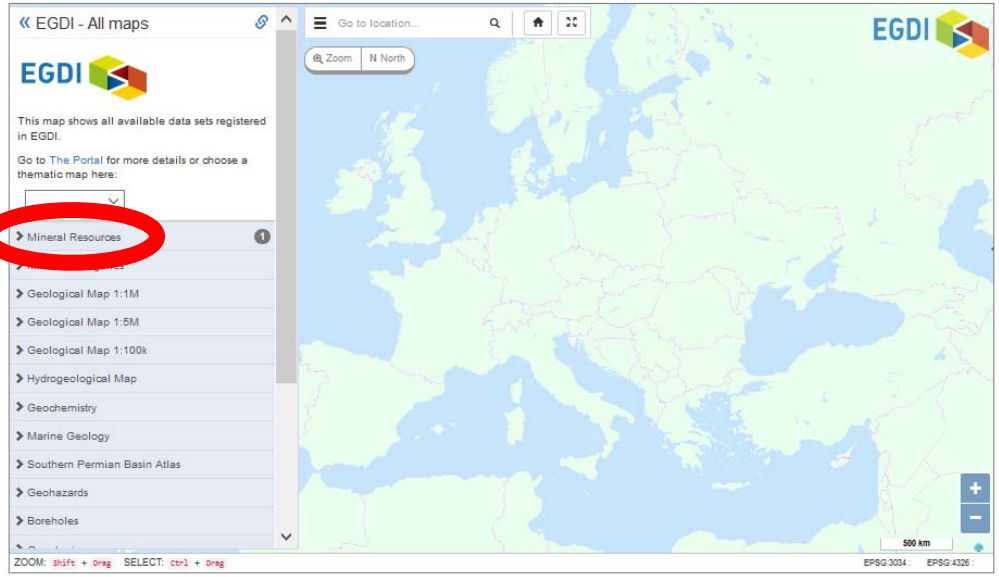
Pilot 3: Access to Raw Materials

EGDI

http://www.europe-geology.eu/map-viewer



EGDI is EuroGeoSurveys' European Geological Data Infrastructure



EUROGEOSURVEYS
European Geoscience for Society
The Geological Surveys of Europe

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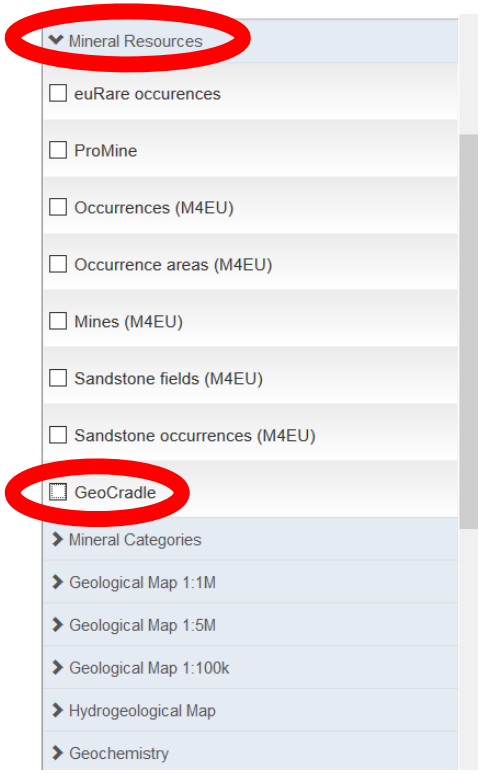
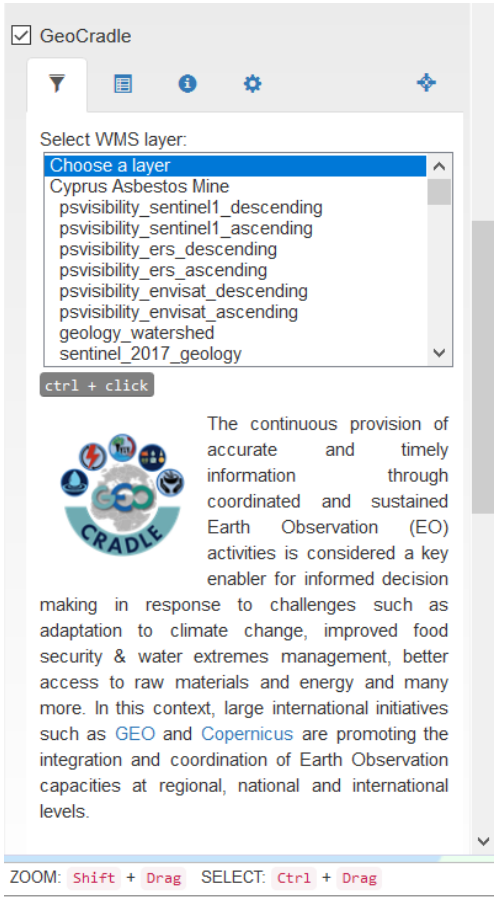
Pilot 3: Access to Raw Materials





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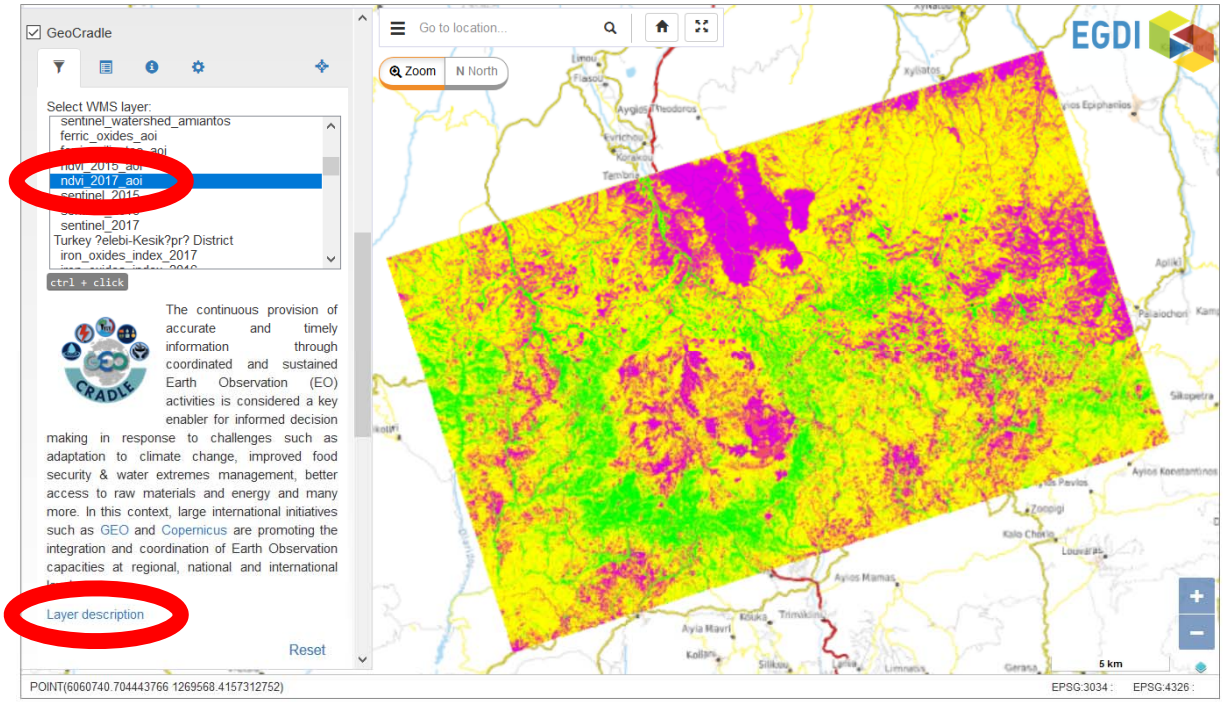
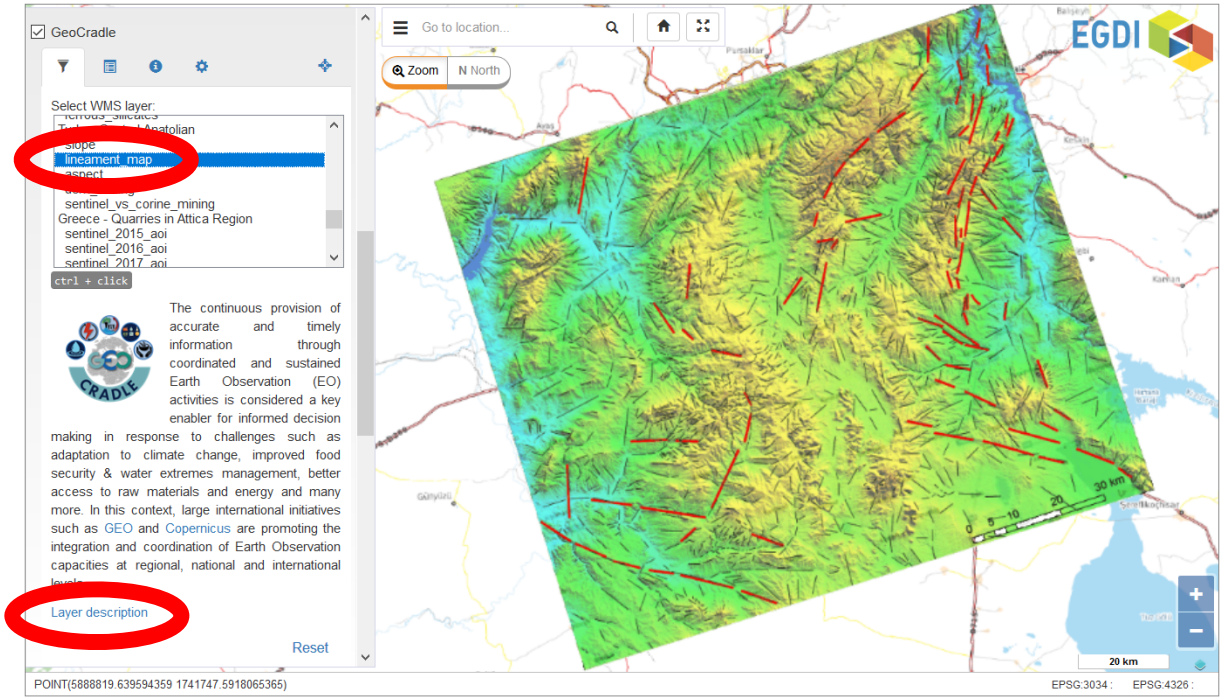


Normalized difference vegetation index (NDVI) calculated from Sentinel-2 image from 2017. The index was caluclated based on the formula: ((NIR-RED)/((NIR+RED)), where individual components correspond to the spectral band of the satellite.

Pilot 3: Access to Raw Materials



Lineament map extracted from 5 different techniques (DEM, Directional Filters, Principal Component Analysis, False Color Composite and Rationing) based on Landsat-8 image and SRTM.

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Pilot 4: Access to Solar Energy

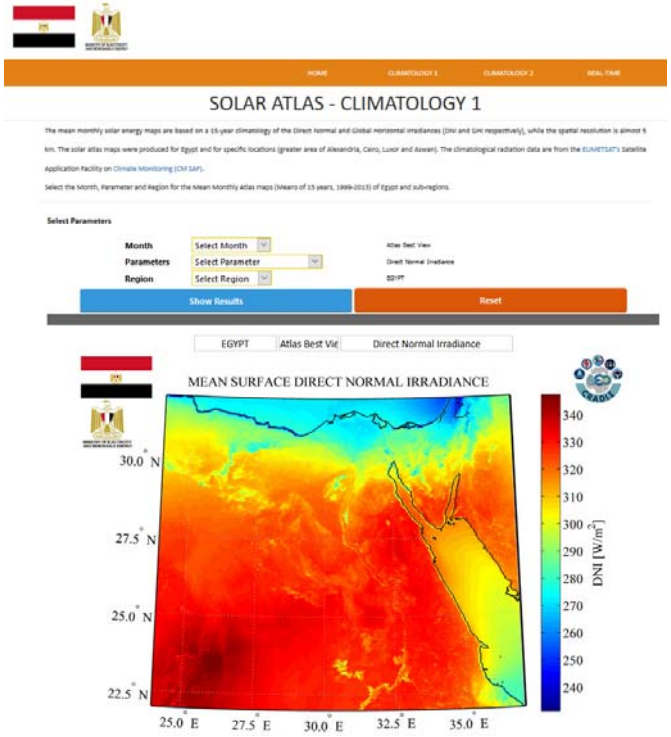
Application developed in support to the Ministry of Electricity & Renewable Energy of Egypt

Provides the solar power information in climatological basis for the Global Horizontal irradiance (GHI) and the Direct Normal irradiance (DNI)

GHI applies to PhotoVoltaic (PV) installations

DNI applies to Concentrated Solar Power (CSP) plants

Solar Atlas of Egypt



http://cedarekmp.net/solaratlas/web2

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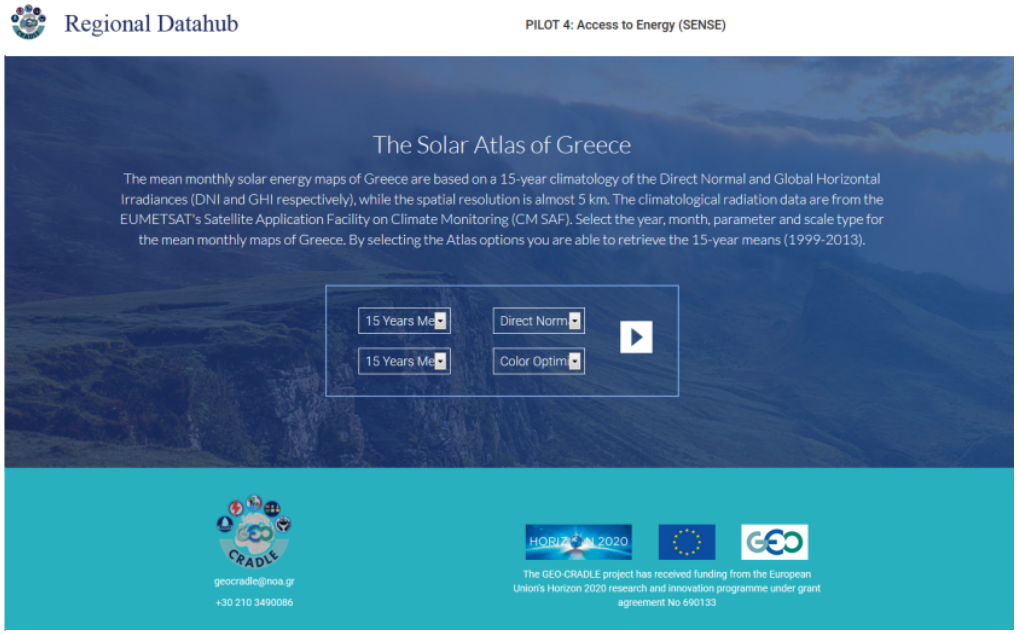
Pilot 4: Access to Solar Energy

Solar Atlas of Greece

A static applications based on an analytical database of climatological solar energy maps of Greece (GHI, DNI).

The user is able to choose additionally fixed or color optimized scale.

Such applications provided for the first time for Greece through the Geo-Cradle project and are able to provide useful information about the solar energy potential for potential solar farm installations.



http://datahub.geocradle.eu/solar

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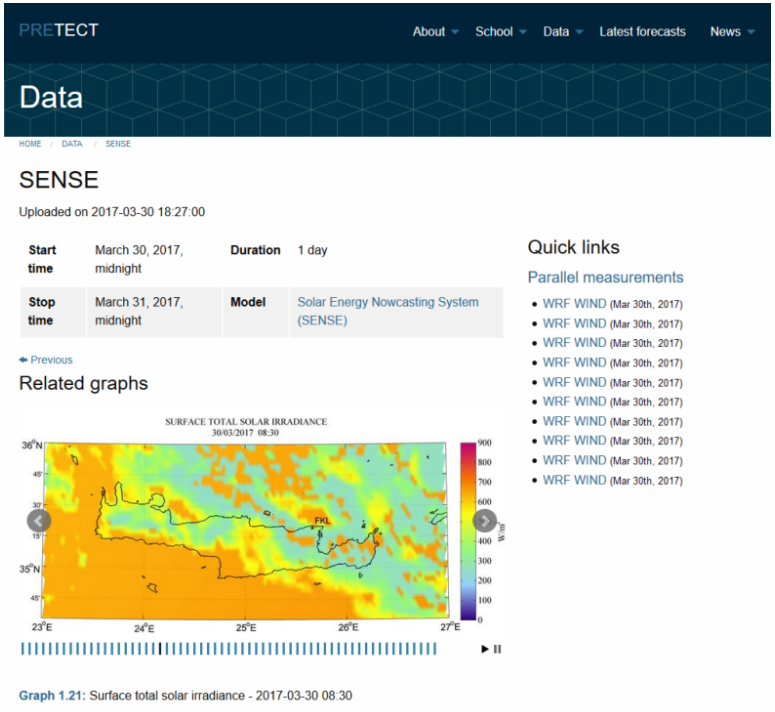
Pilot 4: Access to Solar Energy

PRETECT

The Solar Energy Nowcasting SystEm (SENSE) was applied for a scientific campaign in Crete (PRE-TECT).

Through this portal the user is able to retrieve the produced maps of Crete in high spectral, spatial and temporal resolution (1 nm, 0.05 x 0.05 degrees, 15 min).

The aerosol and cloud impacts were simulated through data input from the Copernicus Atmosphere Monitoring Service (CAMS) and the Meteosat Second Generation (MSG).



http://pre-tect.space.noa.gr/instruments/25

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Pilot 4: Access to Solar Energy PAR Atlas for Greece, Cyprus, Egypt

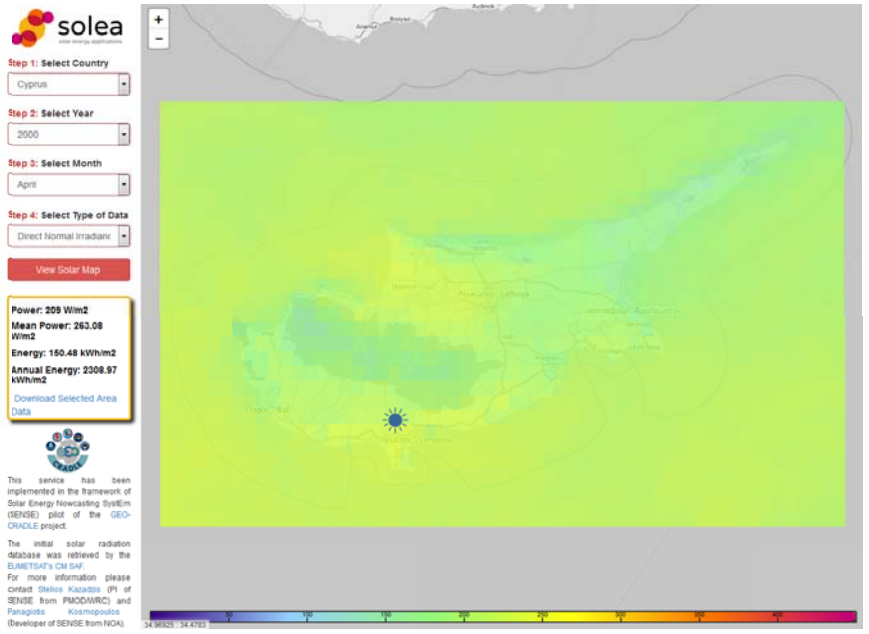
Dynamic application with background databases of solar power, energy and Photosynthetically Active Radiation (PAR) for Greece, Cyprus and Egypt.

The user is able to download the selected area data in the form of json files.

The solar power describes the "strength" of the irradiance (W/m^2).

The solar energy calculates the potential energy production by a PV or CSP system (kWh/m^2)

The PAR quantifies the energy that supports photosynthesis.



http://beyond-eocenter.eu/solarapp

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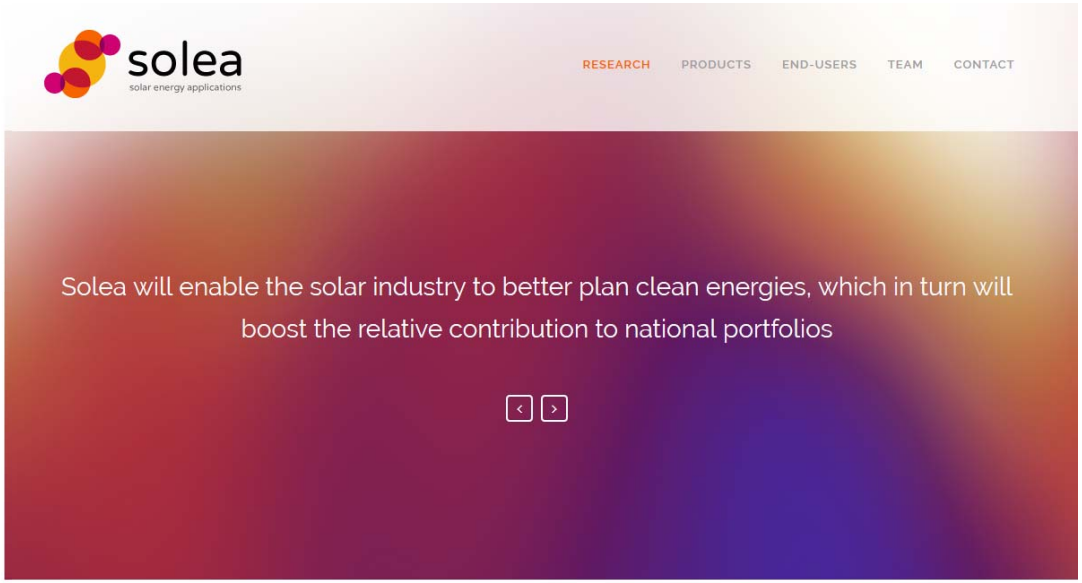
Pilot 4: Access to Solar Energy

SOLEA

All the above web applications, the technical background and much more implementations of SENSE can be found with analytical descriptions and additional information (publications, books, presentations, dissemination material) at the Solar Energy Applications (SOLEA) website.



The exploitation of EO data through GEO activities and SENSE will provide access to advanced solar energy related products, in support to large scale solar farm projects, grid operators, national and private electrical transmission and handling entities, so as to guarantee the uninterrupted energy flow and the power grid stability.

http://solea.gr

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GEO-CRADLE upgrade in GEO:
Project -> Community Activity -> Initiative

GEO Capacity Building in North Africa, Middle East, Balkans, and Black Sea

A **continuation** and **extension** of the work of the **GEO CRADLE** which will capitalise, sustain and scale-up its results, as well as key outcomes of other relevant EU flagship projects and initiatives (e.g. GEOGLAM, NextGEOSS, ERAPLANET, EuroGEOSS, AfriGEOSS, GEO-VENER, EO4SDG), in support of the **3 GEOSS priorities**, namely **CC**, **DRR** and **SDGs**.

Geographic extension

Thematic extension

Operational Maturity

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GEO CRADLE

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GEO-CRADLE network engaged in EUROGEOSS: Expressions of Intent

No	Theme	Action Group
1	Reinforcing Common Agriculture Policy	Agriculture/Food
2	Disaster Resilience Showcase under H2020 call	Disaster Resilience
3	NextGEOSS – Enhanced landslide risk assessment framework	
4	Earth Observation for Disaster-Resilient Societies	
5	Earth Observation for SOLar energy and applications	Energy
6	Earth Observation for Epidemics of Vector-borne Diseases	Climate

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thank you!

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