

**med 2018**

11–12 December 2018 | ESA–ESRIN | Frascati (Rome), Italy



ESA

# **GEO-CRADLE Initiative: Coordination and Integration of EO Activities Accelerating the Development of Links with Copernicus & GEO/GEOSS**

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<http://geocradle.eu>

# Why sustained EO activities at regional level are important?

The continuous provision of **useful, 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 the relevant **EU Directives**.



# The GEO-CRADLE contribution

**GEO-CRADLE** is a Coordination & Support Action; integrates state-of-the-art EO activities in the regions of **North Africa, Middle East, Balkans** (NAMEBA) and **Black Sea**; develops links with Copernicus and GEO, and GEO related flagship initiatives as EuroGEOSS & AfriGEOSS.



**GEO-CRADLE** brings together **key players** representing the **entire EO value chain** (researchers, public/private sectors, SMEs, decision makers), and promotes the **uptake and exploitation of innovative EO activities in the diversified territory of NAMEBA+BS** through:

- ✓ **Capacity building**
- ✓ **Awareness raising of stakeholders**
- ✓ **Establishing cooperation between countries**
- ✓ **Promoting open data sharing principles**
- ✓ **Ensuring interoperability of platforms**

<http://geocradle.eu>



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

# The GEO-CRADLE links



**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/>

25 partners

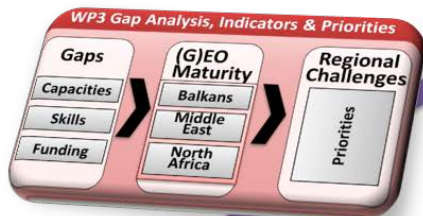
20 countries

3 continents around the Mediterranean Sea

IN SUPPORT TO	LINKED TO GEO SOCIETAL BENEFIT AREA	LINKED TO COPERNICUS THEMATIC AREA	LINKED TO UN SUSTAINABLE DEVELOPMENT GOAL (SDG)	PROJECT TYPE
 <input checked="" type="checkbox"/>	 DISASTERS <input checked="" type="checkbox"/>  ENERGY <input checked="" type="checkbox"/>  FOOD SECURITY <input checked="" type="checkbox"/>  PUBLIC HEALTH <input checked="" type="checkbox"/>  WATER MANAGEMENT <input checked="" type="checkbox"/>	 ATMOSPHERE <input checked="" type="checkbox"/>  MARINE <input checked="" type="checkbox"/>  LAND <input checked="" type="checkbox"/>  CLIMATE <input checked="" type="checkbox"/>  EMERGENCY <input checked="" type="checkbox"/>  SECURITY <input checked="" type="checkbox"/>	 ZERO HUNGER <input checked="" type="checkbox"/>  AFFORDABLE ENERGY <input checked="" type="checkbox"/>  CLIMATE CHANGE <input checked="" type="checkbox"/>  LIFE ON LAND <input checked="" type="checkbox"/>  SUSTAINABLE CITIES <input checked="" type="checkbox"/>	COORDINATION ACTION <input checked="" type="checkbox"/>  RESEARCH & INNOVATION <input type="checkbox"/>  INNOVATION ACTION <input type="checkbox"/>
 <input checked="" type="checkbox"/>				

# The GEO-CRADLE overview

11 countries analysed with the “maturity indicators” methodology



Capacity building

Regional cooperation

16 regional workshops

Networking Platform with >270 stakeholders from 29 countries



Network of Stakeholders

Regional Data Hub assisting the harmonised access to >25,000,000 datasets of geo-spatial information



Pilots



4 pilots / feasibility studies in support of 11 UN SDGs showcasing the delivery of innovative EO services by integrating existing regional capacities

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

A **continuation** and **extension** of the work of **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



Black Sea

### Thematic extension



Disasters Management & Water Resources Management

### Operational Maturity



Operationalisation of services to the engaged users

# GEO-CRADLE Initiative: Activities

1. **Promote the coordination of EO activities at regional level**
2. Assess the maturity of EO activities at national level
3. Foster the progressive operationalisation of EO-based services
4. Promote the effective implementation of data sharing principles

Sustained operation of the GEO-CRADLE networking platform



Organisation of more regional workshops

Exploitation of new tools for stakeholder engagement



FPA

Relays

Academies

Interface with key initiatives



# GEO-CRADLE Initiative: Activities

1. Promote the coordination of EO activities at regional level
2. **Assess the maturity of EO activities at national level**
3. Foster the progressive operationalisation of EO-based services
4. Promote the effective implementation of data sharing principles

Further implementation, test and improvement of the “maturity indicators” methodology in the current 11 countries

Geographic extension to new countries with the support of EuroGEOSS and AfriGEOSS

Establishment of a mechanism for periodic update

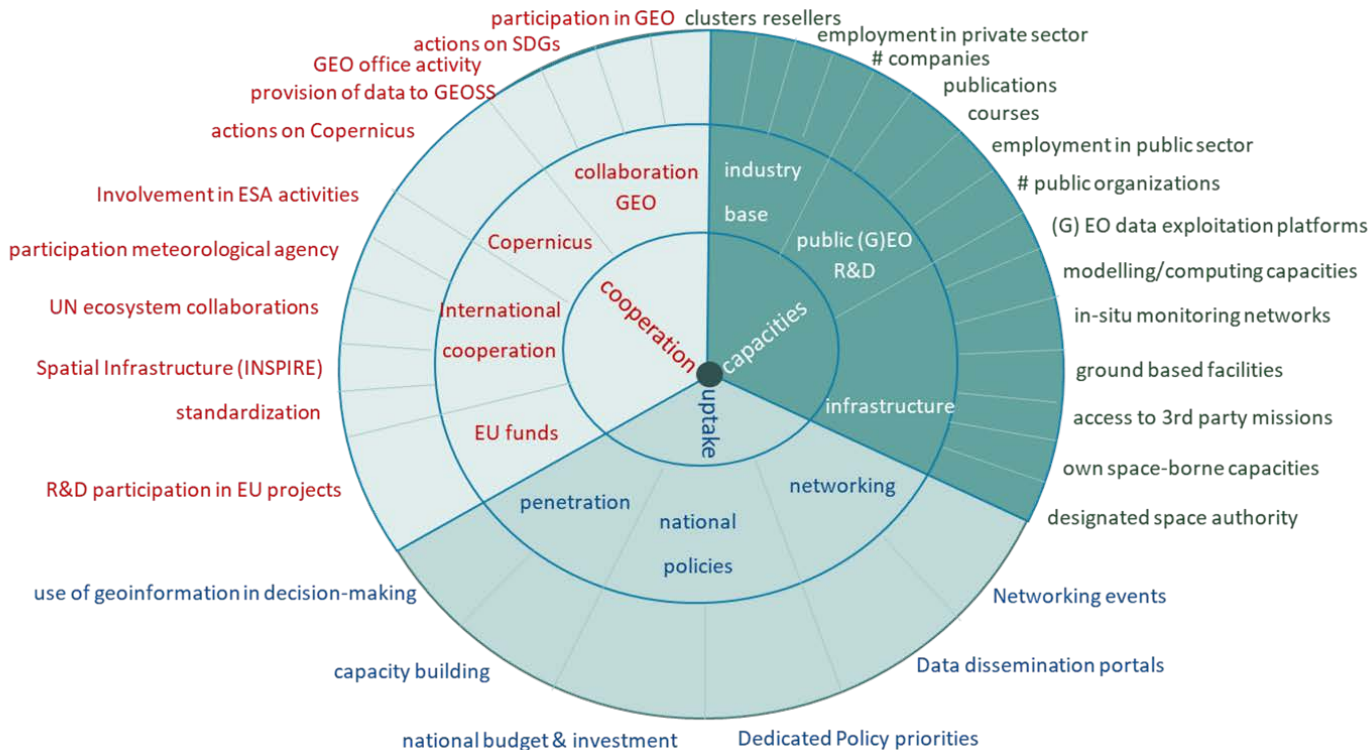


	Maturity Indicators (level c)	RANGED	ROUNDED
Albania	1,28	h	h
Bulgaria	1,84	h	h
Cyprus	1,47	h	h
Egypt	1,44	h	h
FYROM	1,13	h	h
Greece	3,50	h	h
Israel	3,03	h	h
Romania	2,84	h	h
Serbia	2,03	h	h
Tunisia	1,78	h	h
Turkey	2,88	h	h

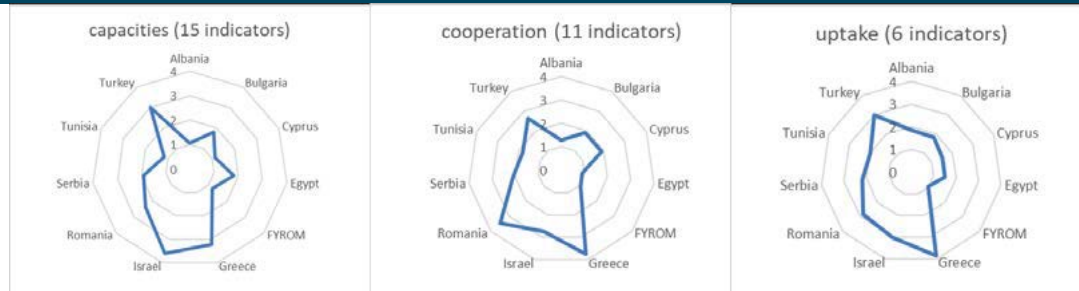




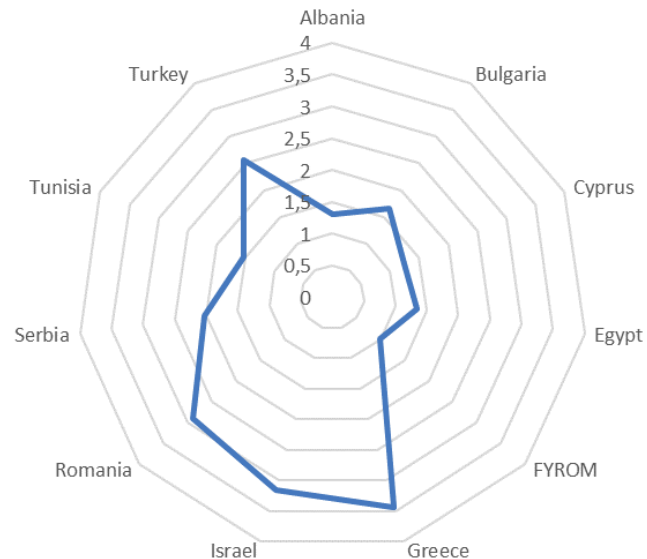
# GEO-CRADLE Initiative: The Maturity Criteria



# GEO-CRADLE Initiative: The Maturity Results



The overall maturity score for countries surveyed by the GEO-CRADLE project in the Balkans, Middle East and North Africa



# GEO-CRADLE Initiative: Activities

1. Promote the coordination of EO activities at regional level
2. Assess the maturity of EO activities at national level
- 3. Foster the progressive operationalisation of EO-based services**
4. Promote the effective implementation of data sharing principles

Exploitation of the results of the 4 GEO-CRADLE pilots

Link to the 3 GEO priorities (CC, DRR and SDGs) and the national needs for achievement of SDGs

Further involvement of the private sector

GEO-CRADLE Thematic Areas in support of the UN SDGs



			
<b>Adaptation to Climate Change (ACC)</b> 13 CLIMATE ACTION 3 GOOD HEALTH AND WELL-BEING 11 SUSTAINABLE CITIES AND COMMUNITIES 15 LIFE ON LAND	<b>Improved Food Security – Water Extremes Management (IFS-WEM)</b> 2 ZERO HUNGER 12 RESPONSIBLE CONSUMPTION AND PRODUCTION	<b>Access to Raw Materials (ARM)</b> 1 NO POVERTY 2 ZERO HUNGER	<b>Access to Solar Energy (SENSE)</b> 7 AFFORDABLE AND CLEAN ENERGY 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Pilots applicable & adaptable to all countries



End users & stakeholders engagement

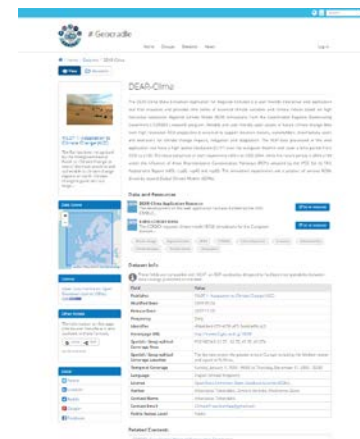
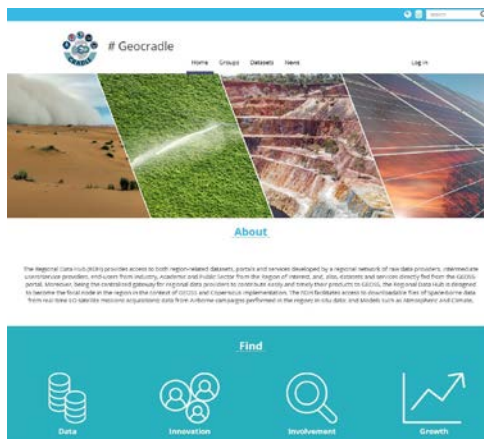
# GEO-CRADLE Initiative: Activities

1. Promote the coordination of EO activities at regional level
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3. Foster the progressive operationalisation of EO-based services
4. **Promote the effective implementation of data sharing principles**

Sustained operation of the GEO-CRADLE Regional Data Hub

Further registration of key national and regional datasets to the GEOSS Platform

Synergies with other initiatives and projects



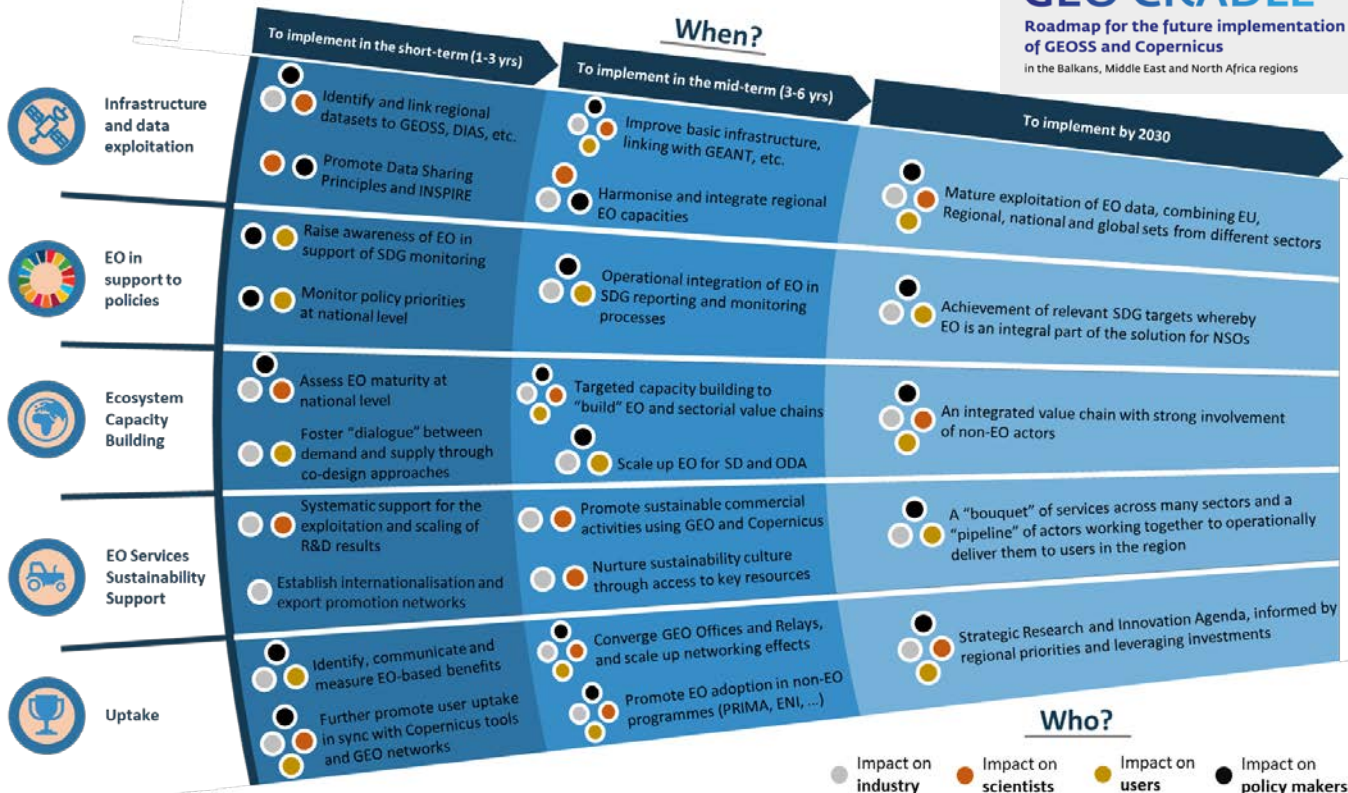
# GEO-CRADLE Initiative: The Roadmap - Action Plan

## GEO-CRADLE

Roadmap for the future implementation of GEOS and Copernicus

in the Balkans, Middle East and North Africa regions

What?



# GEO-CRADLE Initiative: The Roadmap - Action Plan

*Action 1: Identify and link regional datasets to GEOSS **Platform**, DIAS and data gateways*

*Action 2: Promote Data Sharing Principles and INSPIRE*

*Action 3: Improve **basic infrastructure**, linking with GEANT, etc*

*Action 4: Harmonise and integrate regional EO capacities*

*Action 5: Raise awareness of **EO in support of SDG monitoring***

*Action 6: Monitor **policy priorities** at national level*

*Action 7: Foster operational integration of EO in SDG reporting and monitoring processes*

*Action 8: Assess **EO maturity** at national level*

*Action 9: Foster “dialogue” between demand and supply through co-design approaches*

*Action 10: Carry out targeted capacity building to “build” **EO and sectorial value chains***

*Action 11: Scale up EO for Sustainable Development and ODA*

*Action 12: Provide systematic support for the exploitation and scaling of R&D results*

*Action 13: Establish internationalisation and **export promotion networks***

*Action 14: Promote sustainable commercial activities using GEO and Copernicus*

*Action 15: Nurture sustainability culture through access to key resources*

*Action 16: Identify, **communicate and measure EO-based benefits***

*Action 17: Further promote user uptake in sync with Copernicus tools and GEO networks*

*Action 18: **Converge GEO Offices and Relays**, and scale up networking effects*

*Action 19: Promote **EO adoption in non-EO programmes** (PRIMA, ENI, ...)*

*Action 20: Develop and implement a Strategic Research and Innovation Agenda, informed by regional priorities and leveraging investments*

# GEO-CRADLE Initiative: The DRR Aspect

**GEO-CRADLE is/will be linked to DRR domain through :**

- (a) already developed thematic services and
- (b) on-going projects/initiatives led by the coordinator and the partners strongly linked with DRR.

**Examples of thematic areas and relevant achievements :**

**• Indicative services**

1. Adaptation to Climate Change; Climate Projections of essential climate parameters for NAMEBA
2. Resilience of Agriculture production and Food against extreme disaster and climate related events (e.g. Droughts and Floods)
3. Soil status, Soil moisture, Water balance, Water scarcity
4. Energy balance – Solar Energy Exploitation for PVs, Agro-food production, Hospitals

**• Web based prototype services** have been developed and made available to the daily practice of end-users, showcasing the benefit from engaging the EO communities and EO means towards building resilient societies and meaningful DRR

**• A number of 106 Stakeholders from all sectors (Institutional 35 + Research & Academic 47 + Commercial 24)** has been engaged so far in the network of GEO-CRADLE, directly or indirectly linked to DRR.

One of the priorities in GEO-CRADLE initiative would be to **further expand the network of the involved entities and the collection/assessment of DRR requirements in the regions**, as well as the prioritisation of **common/regional challenges with respect to DRR**

# GEO-CRADLE Initiative: The DRR Aspect

## Institutional

**ALBANIA:** National Food Authority, Risk Management and Inspections Coordination

[www.aku.gov.al](http://www.aku.gov.al)

## Research & Academic

**GREECE:** BEYOND Center of Excellence for EO-based Monitoring of Disasters, NOA

[www.beyond-eocenter.eu](http://www.beyond-eocenter.eu)

## Commercial

**BULGARIA:** RISK – SPACE – TRANSFER Technology Transfer Office

[www.rst-tto.com](http://www.rst-tto.com)

The screenshot shows the AKU website interface. At the top, there is a logo for 'AKU AUTORITETI KOMBETAR I UJSHIMIT' and a search bar with the text 'Vendosni tekstin' and a 'KËRKO' button. Below the search bar is a 'Menu' button. The main content area features a large image of a vegetable market stall with various colorful produce. Below the image is a navigation bar with 'LEXO MË SHUMË' and a 'AKU NË QARQE' section with the text 'adresat e AKU në qarqe'. There is also a 'LIÇENCIMI I OBU procedurat' section and a 'ÇERTIFIKATA Modellet veterinare' section. The footer features the 'efsa' logo.

The screenshot shows the BEYOND website interface. At the top, there is a logo for 'BEYOND' and a navigation menu with 'HOME', 'ABOUT US', 'THEMATIC AREAS', 'WEB SERVICES', 'PROJECTS', 'INFRASTRUCTURE', 'NEWS/EVENTS'. Below the navigation is a map of Europe with several colored markers. Below the map is a search bar with 'Select Country', 'Select Disaster Type', and 'Select Search Criteria'. There are also buttons for 'Our Team', 'Outreach', 'Newsletters', and 'Training'. Below the search bar is a section titled 'BEYOND THEMATIC AREAS' with icons and text for 'Agriculture', 'Disasters', 'Climate', 'Energy', 'Coordination-Research', and 'Procurement-Innovation'. To the right is a section titled 'WEB SERVICES' with icons for 'Fire', 'Flood', 'Drought', 'Earthquake', 'Tsunami', 'Wildfire', 'Aviation', 'Maritime', 'Space', 'Agriculture', 'Energy', 'Disasters', 'Climate', 'Coordination-Research', and 'Procurement-Innovation'.

The screenshot shows the RST website interface. At the top, there is a logo for 'RST RISK-SPACE-TRANSFER Technology Transfer Office' and a logo for 'TAKT IRI'. Below the logo is a navigation menu with 'HOME', 'ORGANIZATION', 'COMPETENCES', 'PROJECTS', 'NEWS', 'INFORMATION', 'CONTACTS'. Below the navigation is a section titled 'Technology transfer office - a place for business and science to meet'. Below this section is a diagram showing the flow of information between 'BAS', 'TTO', 'AERO-SPACE TRANSFER SOLUTIONS', 'Government sector', 'Private sector', and 'Public sector'. Below the diagram is a section titled 'Presenting the technology transfer in the country we are giving a clear view that science has always been and will always be a main factor in the production and innovations. Technology transfer is a modern perspective for development of innovations and their implementation in business and society.' Below this section is a section titled 'The Aero - space technology transfer office for crisis management and disaster resilience is aiming to create long term partnership between scientific and business organizations for achieving their common goals. The partnership between other technology transfer offices is giving the opportunity for organizing and participating in common initiatives. That's why our office has always been the partner they always wanted.' Below this section is a section titled 'Working both with institutions and scientific organizations the Technology transfer office has become a main engine of innovative ideas and development of perspectives for a better and modern society.' Below the text are three boxes: 'MISSION to be strengthening the', 'AIMS Creating, developing and', and 'COMPETENCES Research and analysis'.

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# GEO-CRADLE Initiative: The DRR Aspect

So far, the **geographic distribution of the 106 engaged stakeholders** is as follows:

**BALKANS: 63**                      Albania 9 + Bulgaria 8 + Croatia 1 + FYROM 3 + Greece 19 + Kosovo\* 2  
+ Montenegro 3 + Romania 5 + Serbia 11 + Slovenia 2

**MIDDLE EAST: 25**                Cyprus 4 + Israel 6 + Jordan 3 + Turkey 12

**NORTH AFRICA: 18**              Egypt 6 + Morocco 3 + Tunisia 9

• **The capacities** owned by the engaged countries in terms of **monitoring tool and networks, data and portals** cover all the following fields:

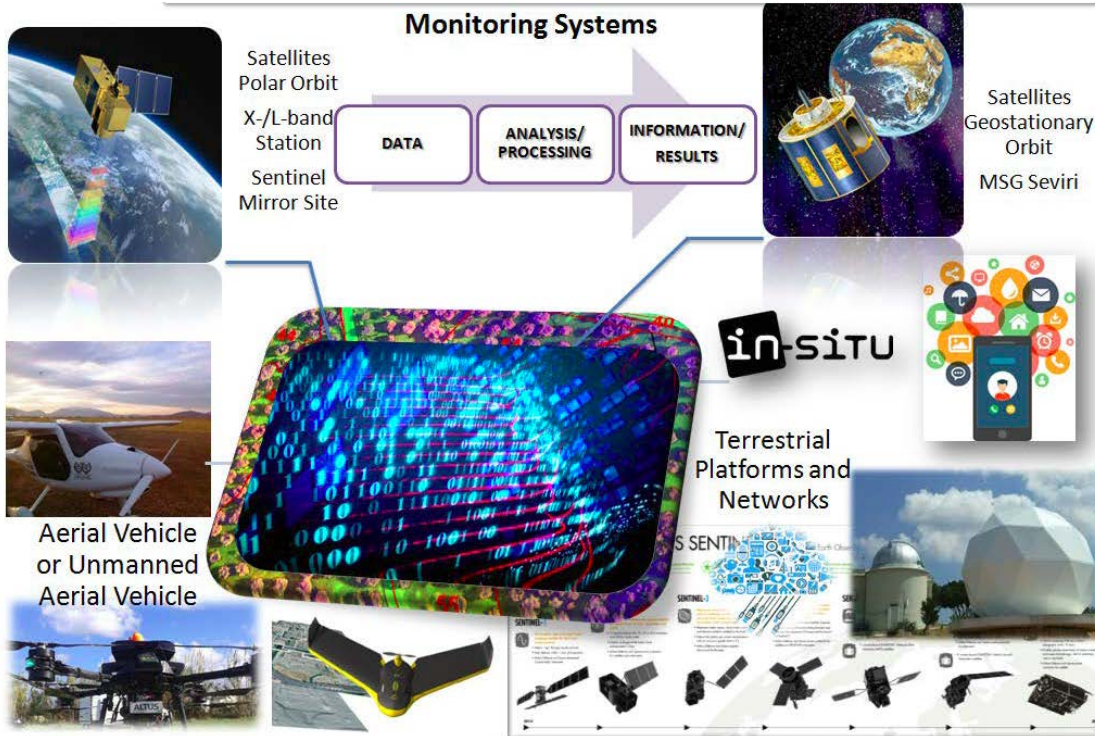
- **Space-borne capacities 12** (BA: 6, ME: 5, NA: 1)
- **Ground-based/In-situ monitoring networks/facilities 38** (BA: 21, ME: 11, NA: 6)
- **Modelling and computing processing capacities 36** (BA: 21, ME: 9, NA: 6)

• **The GEO-CRADLE Regional Data Hub** that facilitates the transparent and interoperable access to hundreds of thousands of cleaned geo-spatial datasets referring to socio-economic and geographic information (linking to GEOSS, INSPIRE, local geo-portals) **will be further expanded with respect to DRR priorities**

*\* This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence.*

# GEO-CRADLE Initiative: The DRR Aspect – GEO-CRADLE vs EMS

- The **GEO-CRADLE** is strongly engaged (through the BEYOND EO Center for Disasters <http://beyond-eocenter.eu/> coordinated by the NOAA) in **DRR**:

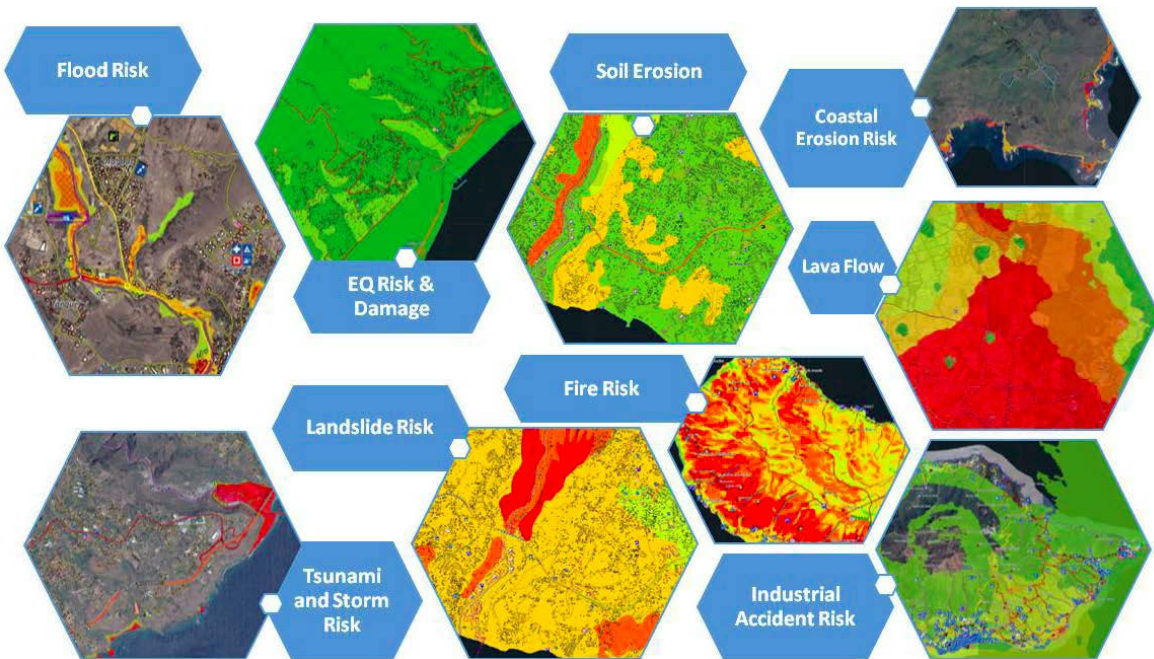


# GEO-CRADLE Initiative: The DRR Aspect – GEO-CRADLE vs EMS

- **The GEO-CRADLE** is strongly engaged (through the BEYOND EO Center for Disasters <http://beyond-eocenter.eu/> coordinated by the NOA) in **DRR**:
  - **BEYOND** is actively involved in the Copernicus EMS Risk & Recovery Pillar as service provider, delivering only in the last two years **Preparedness, Vulnerability and Risk Assessment and Recovery Services**, and **Mitigation Planning** to > 20 Civil Protection Authorities worldwide for a vast portfolio of events and types of disasters
  - Also **Rapid Damage Assessment services over Greece and neighbouring countries** (e.g. fires/floods – 2007/2009/2018 Attica fires in Greece, Balkans and EQs/landslides globally)



## Actively involved in the Copernicus EMS Risk & Recovery - Examples



Thousands of **Vulnerability, Hazard, Damage Assessment Maps and Reference (Assets) Maps** have been delivered in the scale of 1:5000 – 1:10000

A vast portfolio of disasters: **fires, floods, draughts, water scarcity, landslides, earthquakes, volcanic eruption, tsunami, epidemics, industrial accidents, storms/typhoons, etc.**

# GEO-CRADLE Initiative: The DRR Aspect – GEO-CRADLE vs EFFIS

- **The GEO-CRADLE** is strongly engaged (through the BEYOND EO Center for Disasters <http://beyond-eocenter.eu/> coordinated by the NOAA) in **Early Warning**:
- **BEYOND delivers the Copernicus EFFIS services over the NAMEBA and entire Europe.**

## ECOSYSTEM OF EO SYSTEMS & SERVICES

- **Early detection, Monitoring, Decision Making Support, and Management of Forest Fires and Burned Areas in Real Time and Post Fire – Best Service Challenge Service Copernicus Masters 2014**
- **The European Forest Fires Information System - EFFIS**



06/12/2018

<https://sentinels.space.noa.gr/>

The FireHub System



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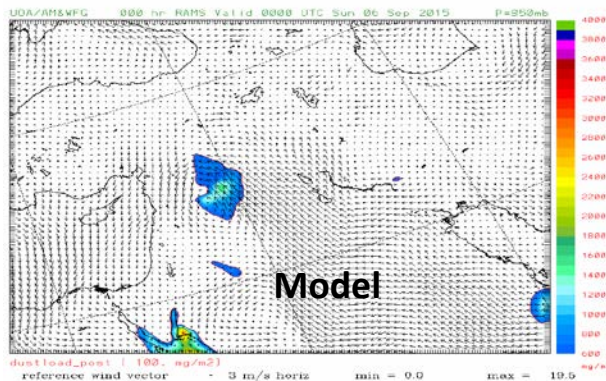
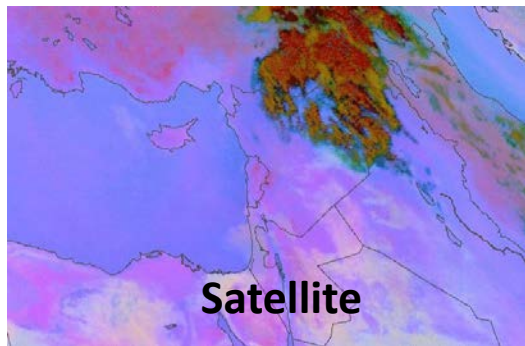


## A record-breaking Middle East haboob 6-13 September 2015

Climate Change ?  
War Aftermath?



Severe convective downdrafts over East Turkey and North Iran resulted in mobilization of dust over Middle East and East Mediterranean.



Mamouri, R.-E., Ansmann, A., Nisantzi, A., Solomos, S., Kallos, G., and Hadjimitsis, D. G.: Extreme dust storm over the eastern Mediterranean in September 2015: satellite, lidar, and surface observations in the Cyprus region, *Atmos. Chem. Phys.*, 16, 13711–13724, doi:10.5194/acp-16-13711-2016, 2016.

# SMURBS: SMart URBan Solutions for disasters – GEO-CRADLE vs ERAPLANET

Flood events are the world's most frequent natural disasters affecting a large number of people and assets.

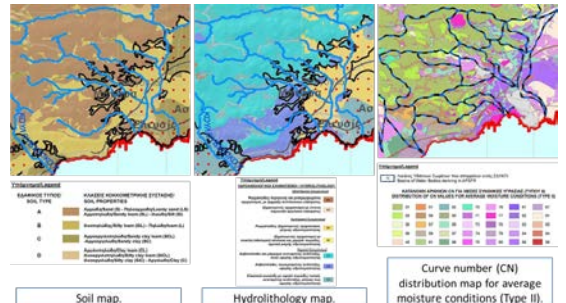
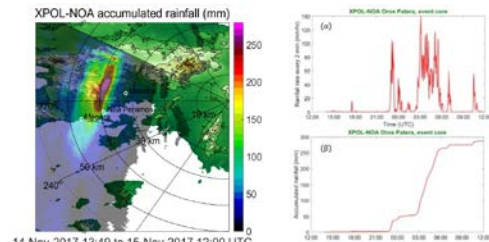
During the past 30 years, flooding killed more than 200.000 people and affected more than 2,8 billion others worldwide.



*Lethal flood (24 casualties) on 15/11/2017 in Mandra, Attica region, Greece*



Flood monitoring using remote sensing (satellite & airborne), in-situ data, modelling, and **crowdsourcing**



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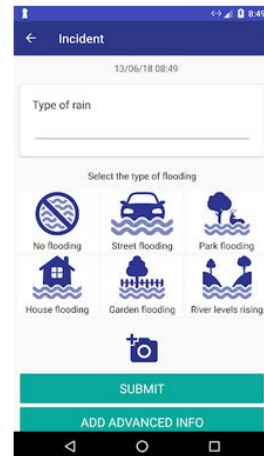
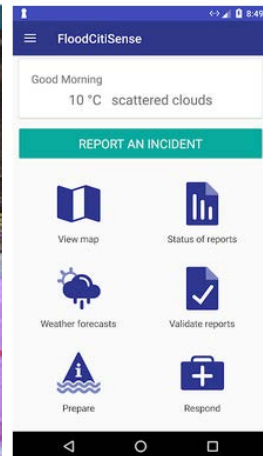
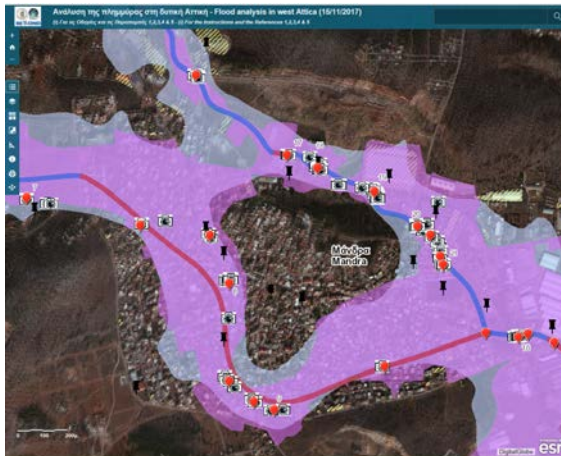
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# GEO-CRADLE Initiative: The DRR Aspect – GEO-CRADLE vs NEXTGEOSS

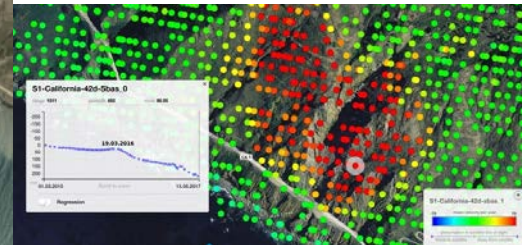
Landslides represent one of the natural events that occur most frequently worldwide after hydro-meteorological events.

In 2017, 453 landslides were recorded worldwide causing 4,164 deaths (D. Petley, April 2018)



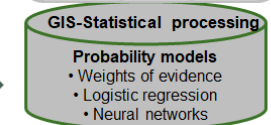
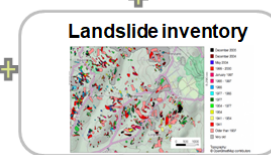
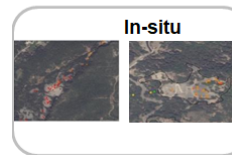
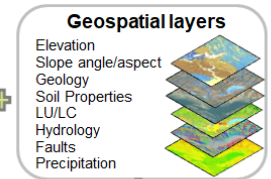
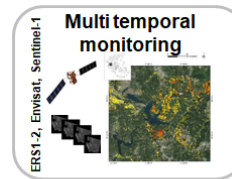
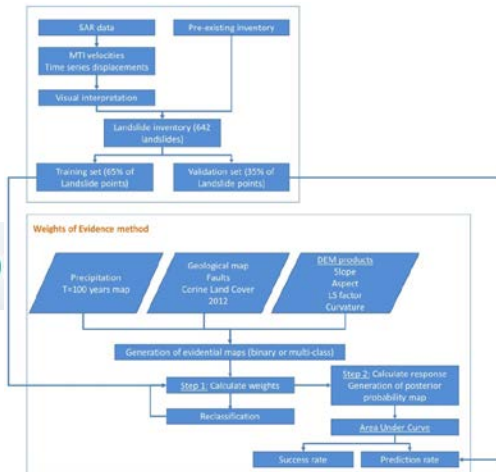
California, USA

Use of Sentinel-1 & Small Baseline Subset interferometry (SBAS) technique



Landslide using remote sensing (satellite & airborne), in-situ data, modelling, and open platform allowing multitemporal analysis of EO data

**BEYOND**  
Center of Excellence for EO-based monitoring of Natural Disasters



**NEXTGEOSS**  
Contributing to the Vision of BEO

- **The GEO-CRADLE is strongly engaged in the EUROGEOSS Initiative for DRR:**
  - In the **EuroGEOSS initiative** we have been mandated to coordinate the **Disasters Action Group** bringing together the **EU Research and SME and co-designer communities** (sectors: Energy, Facilities, Transport, Tourism, Agriculture, Insurance) **along three axes of resilience:**
    - (a) Business Resilience,
    - (b) Ecosystem and Citizen Resilience,
    - (c) Agro-food Resilience.
  - Key partners who are actively involved and coordinated in this framework are: **ECMWF, CNR, FMI, ARMINES / MINES, EU-SatCen, Médecins Sans Frontières, Greek Ministry of Health, Egyptian Ministry of Electricity and Renewable Energy, Moroccan Royal Centre for Remote Sensing, Multi-hazards Functional Centre - Regional Environmental Protection Agency of Calabria/Italy.**



# SCENT: Smart Toolbox for Engaging Citizens into a People-Centric Observation Web

**BEOND**  
Centre of Excellence for EO-based monitoring of Natural Disasters

FloodHUB



scent



## Kifisos, Attica, Greece

### Legend

Hydrographic Network

Meteorological Stations

Drills Research

### Altitude

High 1400



Low 0

### Orientation



### Scale

0 1 2 4 6 8  
Kilometers



The hydrographic network has been drastically altered due to distinct land-use and **68% of the basin is occupied by urban expanses** – host to 4 million citizens. The **city's rapid development** occurred without an appropriate plan for drainage works: Parts of the drainage network were shrunk and converted into streets whilst critical river cross sections were diminished. When **floods** occur they have a **significant impact on infrastructure**, especially at the downstream part, including Piraeus port, a major transportation hub that is served by railway network and major roads.

During the **large scale citizen campaign with field visits**, citizens took **on-site images** from the pilot site, enriching the existing dataset. A larger group of citizens participates in the **online gaming apps** for annotating already available images.

**scent**

## Attica Pilot Campaign

Become a Citizen Scientist and join us at our SCENT Campaign in Attica, Greece, 15-18 November, and help test the new SCENT Explore and SCENT Measure apps.

Register now: <http://bit.ly/2ndAthensPiloteng1>

[www.scent-project.eu](http://www.scent-project.eu)  
[hello@scent-project.eu](mailto:hello@scent-project.eu)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101019718

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- **The GEO-CRADLE** is strongly engaged (through the BEYOND EO Center for Disasters <http://beyond-eocenter.eu/> coordinated by the NOA) in **ESA and UN-SPIDER DRR programs**:
  - The **ESA's EO4SD Climate Resilience Action** to address DRR and Preparedness/Mitigation needs of the
    - (a) **World Bank (WB)**
    - (b) **Asian Development Bank (ADB)**
    - (c) **Inter-American Development Bank (IADB)**
  - Undertake capacity building in the regions of:
    - (i) **Sahel, South Asia, Africa, Monrovia (Liberia) and Afghanistan** for WB
    - (ii) **Philippines, China and Mongolia** for ADB
    - (iii) **Peru (Amazon rainforest), Nicaragua, Trinidad** for IADB.
  - **Act as regional Support Office of UN-SPIDER in the NAMEBA region**, with the responsibility to assist **the transfer of know-how, capacity building and training** of the competent authorities.

## GEO-CRADLE Initiative: The DRR Aspect

- **Seed funding is secured for continuing the activities through Copernicus FPA and EuroGEOSS** so as to coordinate and support the actions as a GEO Initiative.
- In regards to **DRR and Humanitarian Aid**, the focus would be:
  - Towards **capacity building and training** in support to EU priorities in the regions and any challenges towards establishing links with the stakeholders
  - Organisation of dedicated/targeted **DRR regional workshops**
  - **Collection of needs and regional challenges**
  - **Enriching the network by engaging new countries**
  - **Facilitating the collection and harvesting of datasets and portals** in the regions
  - **Raise awareness** of the countries and key local actors on the **DRR mechanisms and exploit the funding opportunities** and instruments for the support of the EU and Regional/policies and IFIs investments
  - **Support (coordinate) the partnership of key local actors** towards addressing common DRR problems in the region (as already done in GEO-CRADLE for the four thematic priorities).
  - **Support the launch of a showcase study which is a common priority for a region in relation to DRR** (e.g. a trans-boundary flooding/drought problem linked to citizen/agro-food/business resilience).

thank you!



<http://geocradle.eu>

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