



# **Beyond *BEYOND*: Regional follow up activities**

**Dr. Evangelos Gerasopoulos**  
**Director of the Greek GEO Office**

National Observatory of Athens  
GREECE



**from the institutional ...**

**to the national ...**

**to the regional ...**

**to the European level**

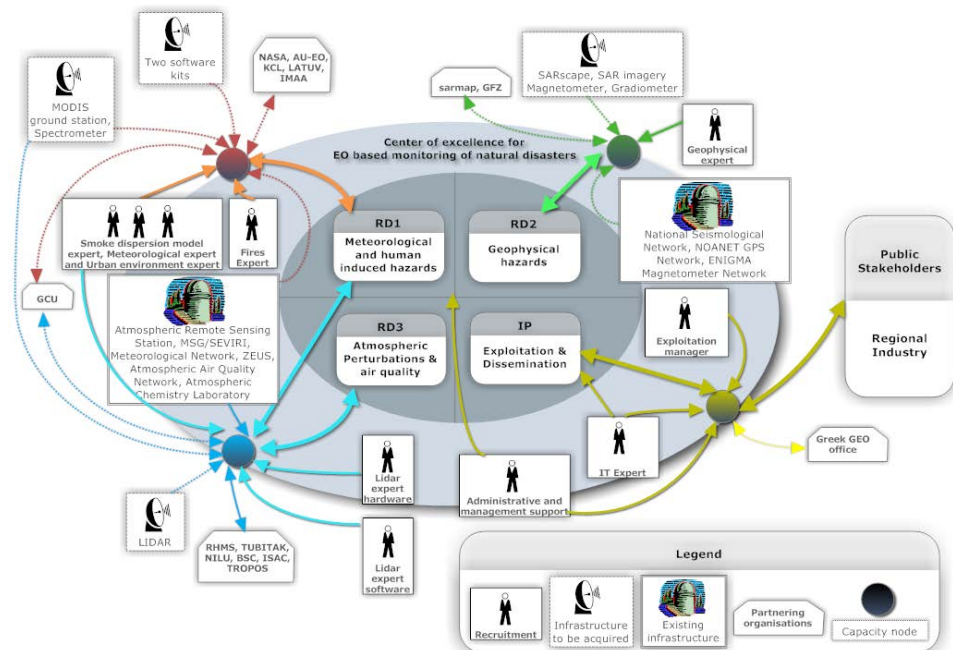


At the institutional level ...



## At the institutional level ...

**BEYOND** Building a Centre of Excellence for Earth **O**bservation based monitoring of **N**atural **D**isasters, which will situate NOA as a Provider of products and services mainly for south-eastern Europe



Future Earth Explorers ADM-Aeolus & EarthCARE

NOA - ESA Mirror Site of Collaborative Ground Segment





At the national level ...



At the national level ...

Stands for

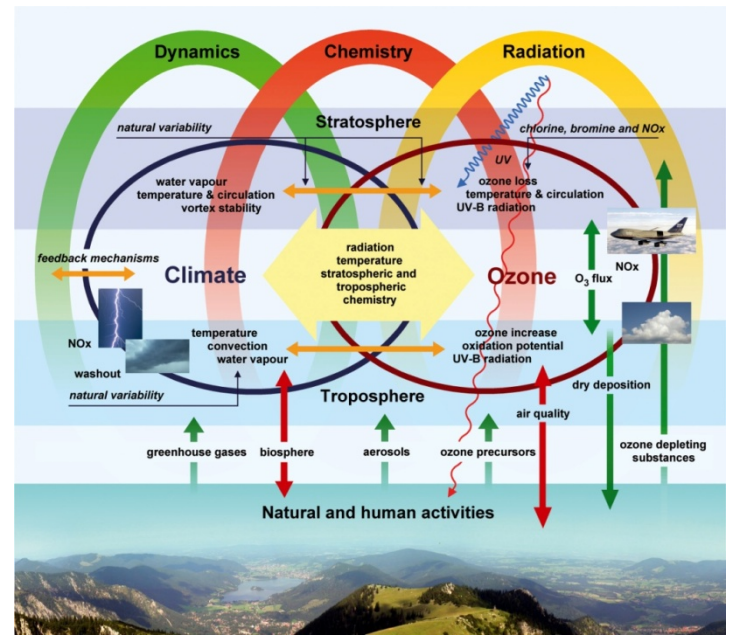
PANhellenic infrastructure for Atmospheric Composition and climate change

PANACEA

Definition

A solution or remedy for all difficulties or diseases

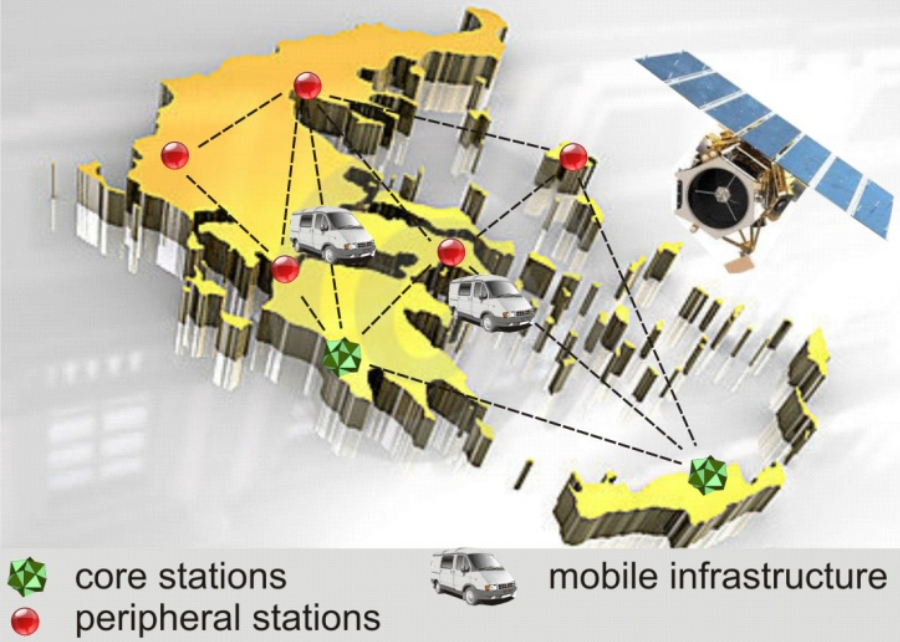
pana|cea /,panə'si:ə /





## At the national level ...

The PANACEA RI scheme



An **integrated Research Infrastructure (RI)** for specialized atmospheric observations is **presently lacking in Greece.**



PANACEA will fill this observational gap by developing a **coordinated system** for monitoring of atmospheric composition, solar radiation variations, climate change and related natural hazards in Greece.

... through **merging, enhancing, and coordinating** all existing Greek ground-based stations and networks (e.g., in-situ gas and aerosol, LIDAR and AERONET stations, RADARs and solar radiation networks), essential to achieve excellence in research and innovation.





# BEYOND

Building a Centre of Excellence for EO-based monitoring of Natural Disasters



## At the national level ...



ONE step BEYOND workshop, 15 October 2015 ESA - Frascati, Italy



FP7-Regpot-2012-23-1





# BEYOND

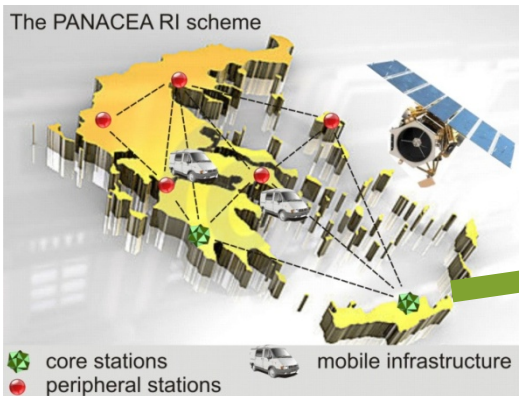
Building a Centre of Excellence for EO-based monitoring of Natural Disasters



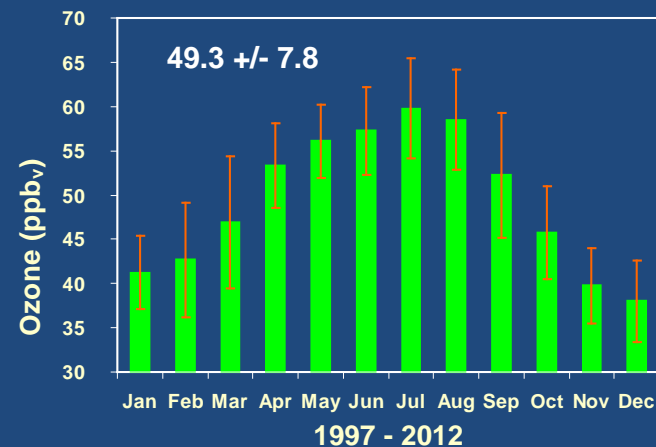
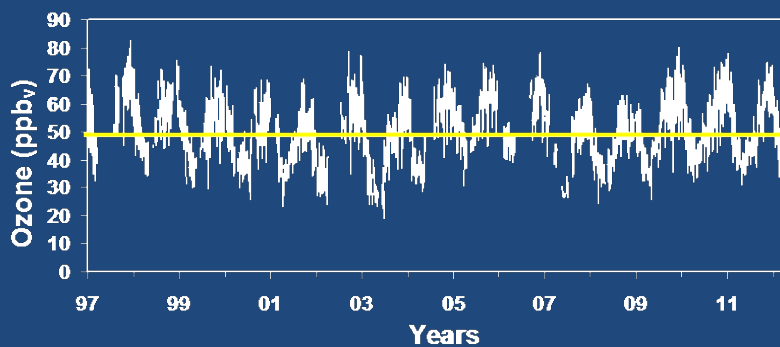
## At the national level ...



The PANACEA RI scheme



Already 20 years of operation



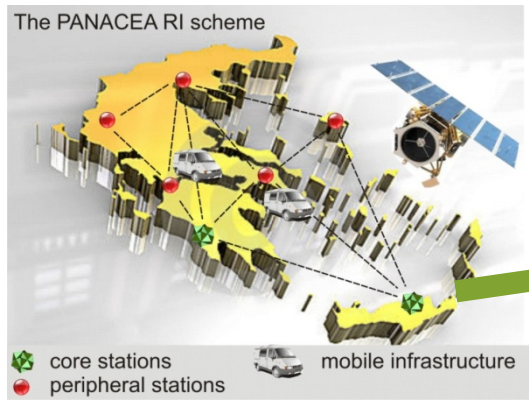


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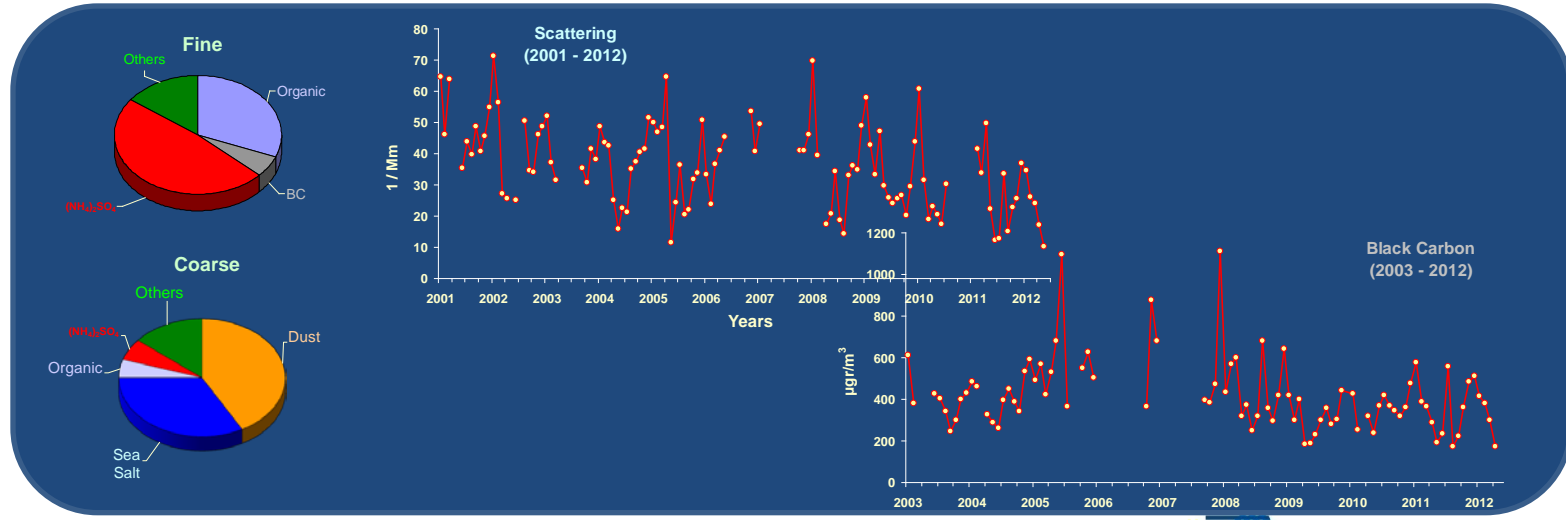
Building a Centre of Excellence for EO-based monitoring of Natural Disasters



## At the national level ...



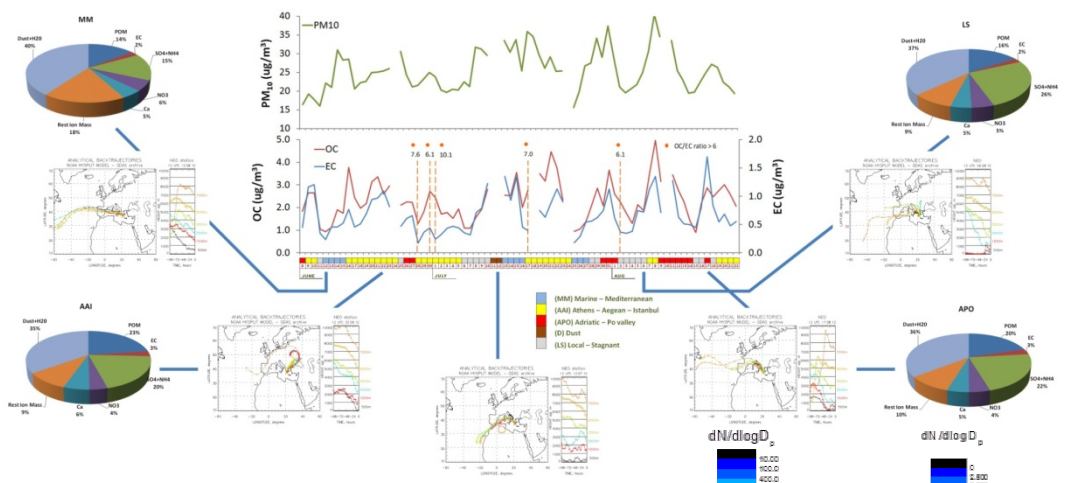
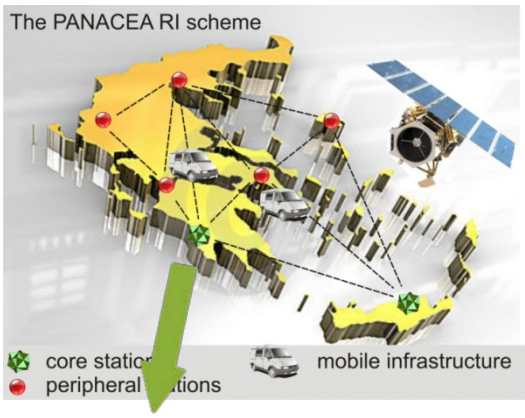
Already 20 years of operation



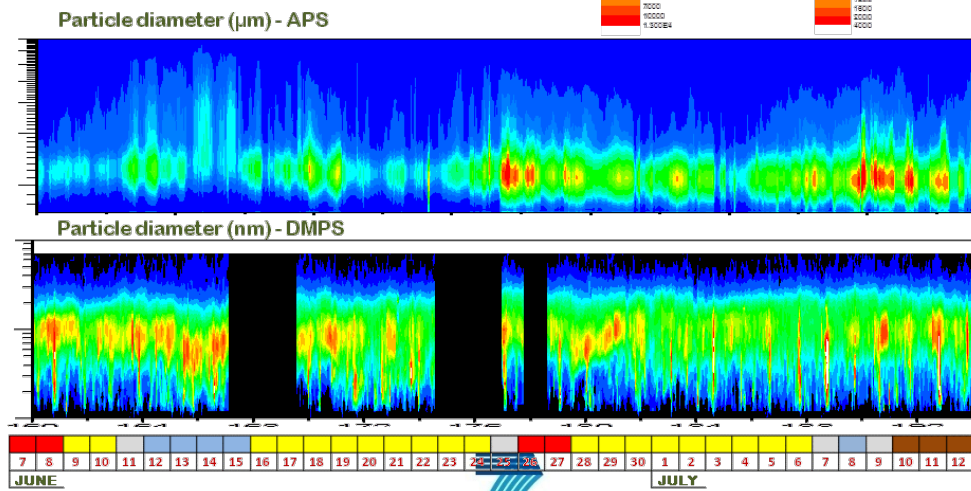




## At the national level ...



Since 2010





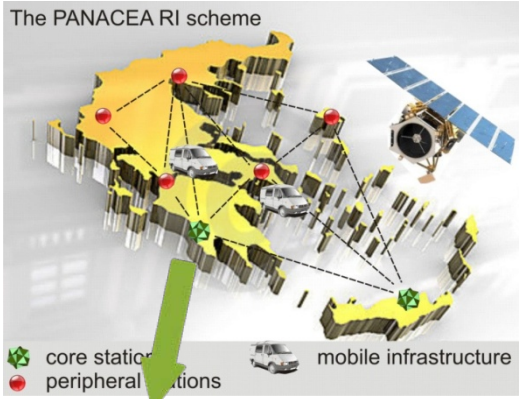


# BEYOND

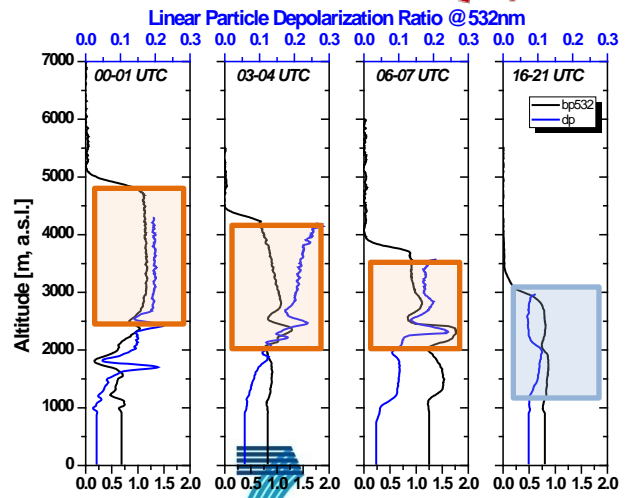
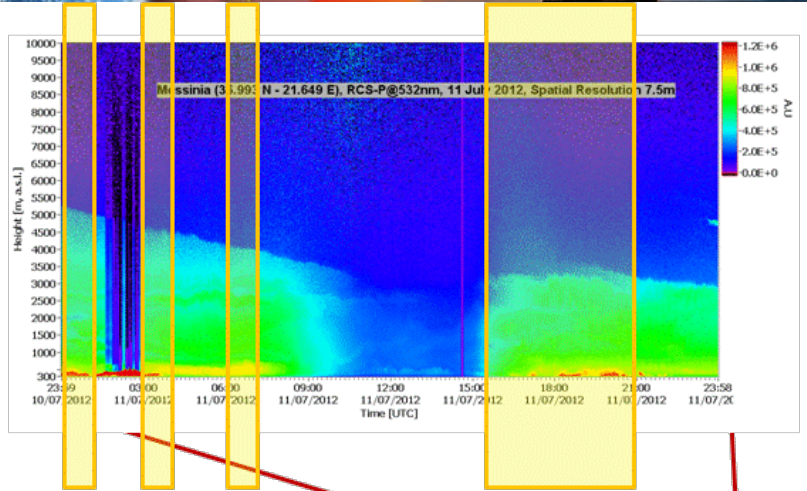
Building a Centre of Excellence for EO-based monitoring of Natural Disasters



## At the national level ...



Since 2010

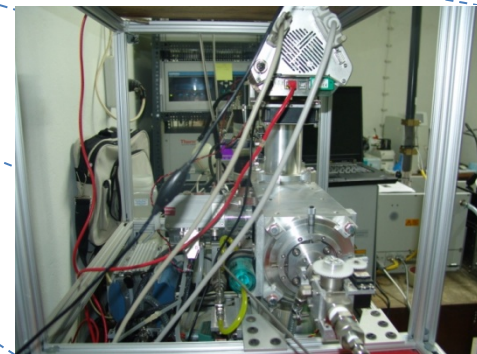
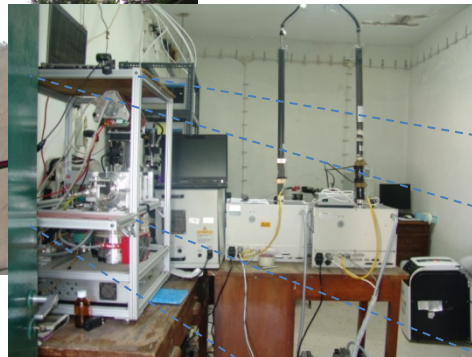


ONE step BEYOND workshop, 15 October 2015 ESA - Frascati, Italy



**At the national level ...**

Premises of the National Observatory of Athens,  
Thissio-Athens center



NOA's urban  
site in Athens



At the national level ...



**The GreeK GEO Office ... since 2007**





At the national level ...

<http://www.greekgeo.noa.gr/>



## GEO Office

*Director:* **Dr. Evangelos Gerasopoulos**

*Secretary:* **Mrs Eleni Christia**

## National Delegation

*GEO Principal:* **Prof. Christos Zerefos**

*Deputy GEO Principal:* **Prof. Kanaris Tsinganos**



At the national level ...

<http://www.greekgeo.noa.gr/>



## Vision

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### Mandate and Vision

GGO, as the focal point of GEO activities in Greece, addresses the need for a permanent coordination mechanism of GEOSS activities at the national level, at the same time building interfaces with GEO and the Greek State. Its main vision is to act as a springboard for the implementation of GEOSS in Greece and promote collaboration within the country but also with neighboring countries with proven capacity in the field.



At the national level ...

<http://www.greekgeo.noa.gr/>



ONE step BEYOND workshop, 15 October 2015 ESA - Frascati, Italy



FP7-Regpot-2012-23-1





At the national level ...

<http://www.greekgeo.noa.gr/>



2<sup>nd</sup> South-Eastern Europe GEO Workshop on  
Integrating Earth Observation Data and Services for monitoring the Environment,  
protecting the citizens and stimulating the regional economic growth  
20-21 October 2014, Athens



ONE step BEYOND workshop, 15 October 2015 ESA - Frascati, Italy



FP7-Regpot-2012-23-1



At the regional level ...



At the regional level ...



## 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**

The current proposal is addressing the H2020 Work Programme “12. Climate action, environment, resource efficiency and raw materials” and more specifically the call “SC5-18b: Integrating North African, Middle East and Balkan Earth Observation capacities in GEOSS”.





At the regional level ...



# GEO-CRADLE

ID	Participant Organisation Name	Country	Logo
1	National Observatory of Athens (NOA) - Coordinator	Greece	
2	Interbalkan Environment Center (IBEC)	Greece	
3	Center for Environment and development for the Arab Region and Europe (CEDARE)	Egypt	
4	Research and Studies Telecommunications Centre (CERT)	Tunisia	
5	Tel Aviv University (TAU)	Israel	
6	Cyprus University of Technology (CUT)	Cyprus	
7	TUBITAK UZAY Space Technologies Research Institute (UZAY)	Turkey	
8	Space research and technology institute (SRTI)	Bulgaria	
9	National Institute of R&D for Optoelectronics (INOE)	Romania	
10	University of Ss Cyril and Methodius (USCM)	FYROM	
11	Institute for Nature Conservation in Albania (INCA)	Albania	
12	Institute of Physics Belgrade (IPB)	Serbia	



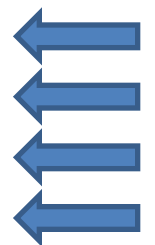


At the regional level ...



# GEO-CRADLE

ID	Participant Organisation Name	Country	Logo
13	CIMA Research Foundation (CIMA)	Italy	
14	Academy of Athens (AOA)	Greece	
15	INOSENS (INS)	Serbia	
16	European Association of Remote Sensing Companies (EARSC)	EU	
17	EURISY	EU	
18	<u>EuroGeoSurveys</u> (EGS)	EU	
19	World Radiation Center (PMOD/WRC)*	Switzerland	



\*Note: Switzerland is not requesting financial contribution from the EC



# Legend

## GEO-CRADLE Partners

Full partner-Entity

Full partner-Int. Organization:

EURISY CEDARE

EGS EARSC

Third Party partner

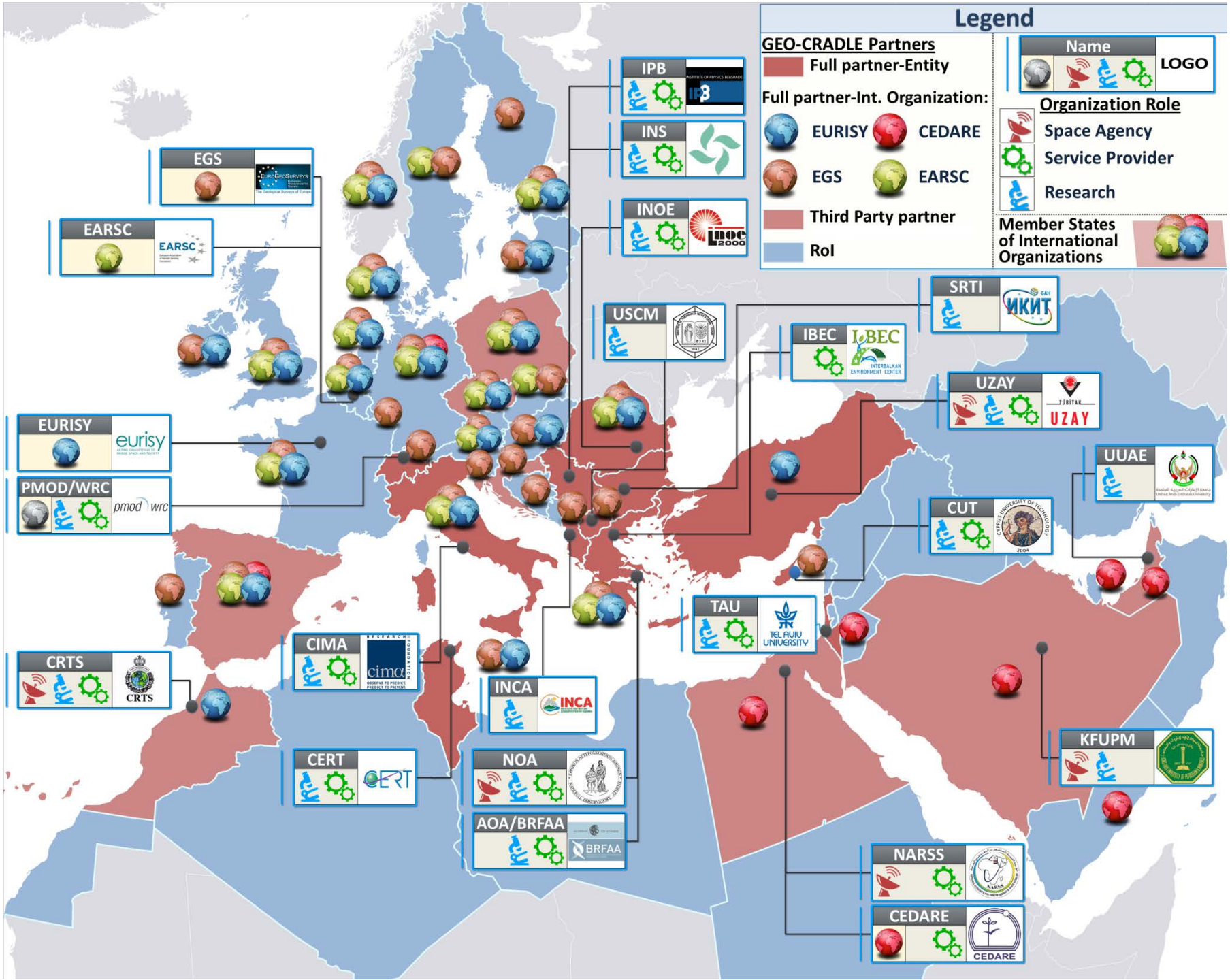
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Name	LOGO

## Organization Role

	Space Agency
	Service Provider
	Research

Member States of International Organizations



**EGS**  
EuroGeoSurveys

**EARSC**  
EARSC

**EURISY**  
eurisy

**PMOD/WRC**  
pmod wrc

**CRTS**  
CRTS

**CIMA**  
CIMA

**CERT**  
CERT

**INCA**  
INCA

**NOA**  
NOA

**AOA/BRFAA**  
BRFAA

**IPB**  
IPB

**INS**  
INS

**INOE**  
INOE

**USCM**  
USCM

**IBEC**  
IBEC

**SRTI**  
SRTI

**UZAY**  
UZAY

**UUAU**  
UUAU

**CUT**  
CUT

**TAU**  
TAU

**KFUPM**  
KFUPM

**NARSS**  
NARSS

**CEDARE**  
CEDARE





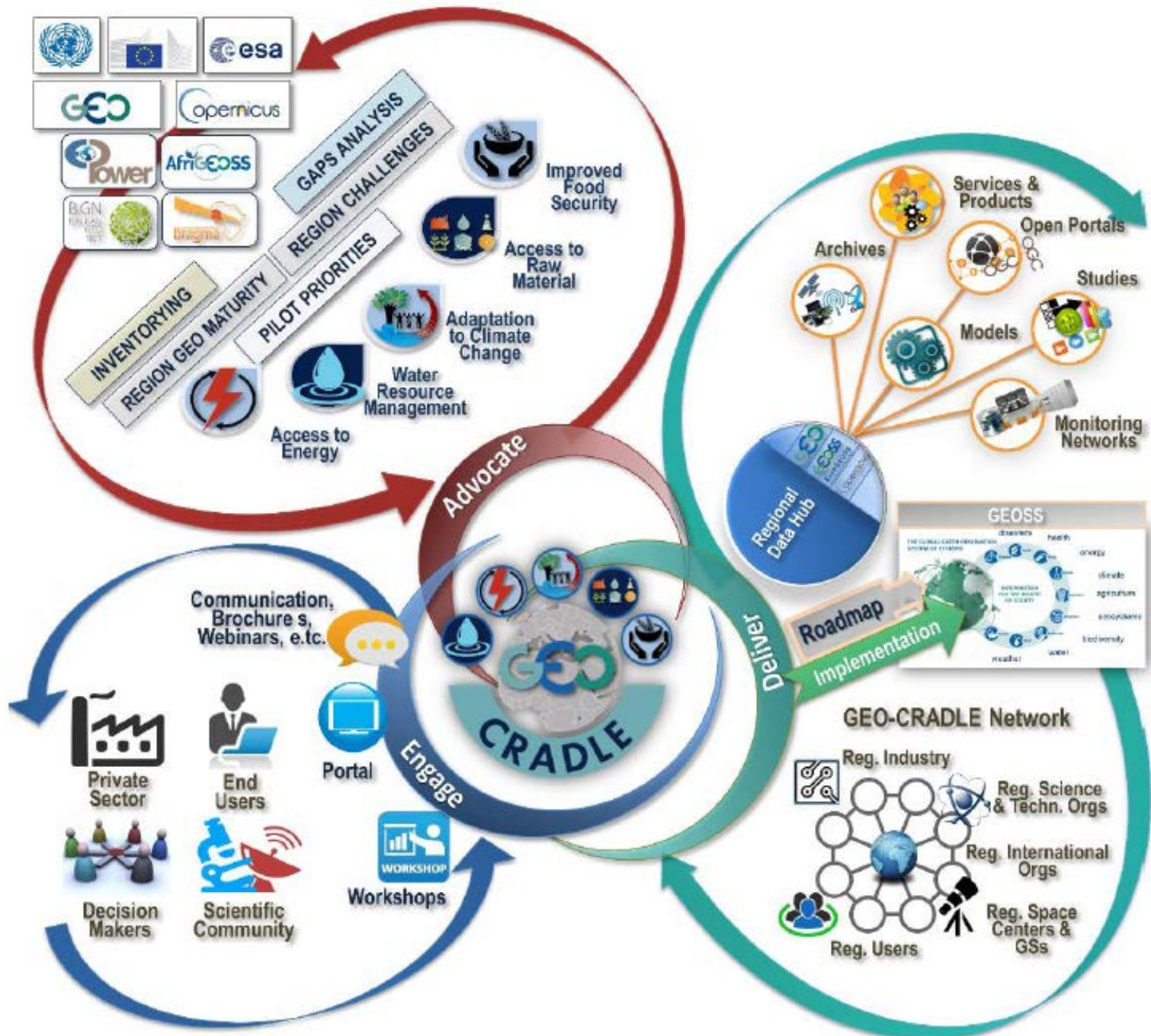
At the regional level ...



# GEO-CRADLE

The overarching objective of the GEO-CRADLE project is to create a multi-regional (Balkans, N. Africa and Middle East) coordination network, supporting the effective integration of EO capacities, providing the interface for the engagement of the complete ecosystem of EO stakeholders, promoting the uptake of EO services and data in response to regional needs and, finally, contributing to the implementation of GEOSS and Copernicus in the RoI.

# The GEO-CRADLE ecosystem







# BEYOND

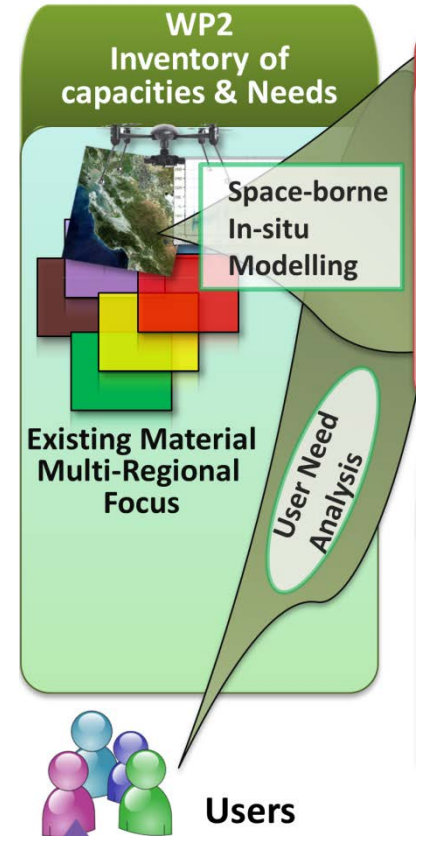
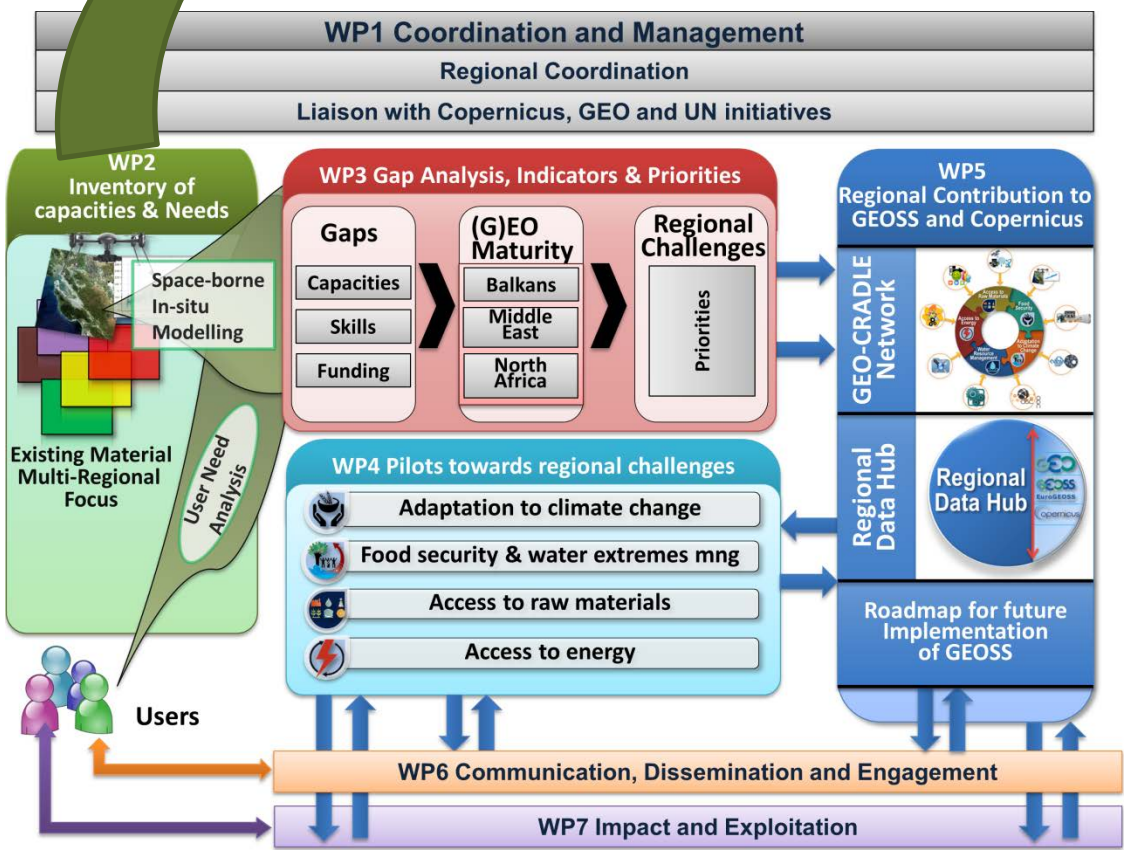
Building a Centre of Excellence for EO-based monitoring of Natural Disasters



At the regional level ...



## GEO-CRADLE







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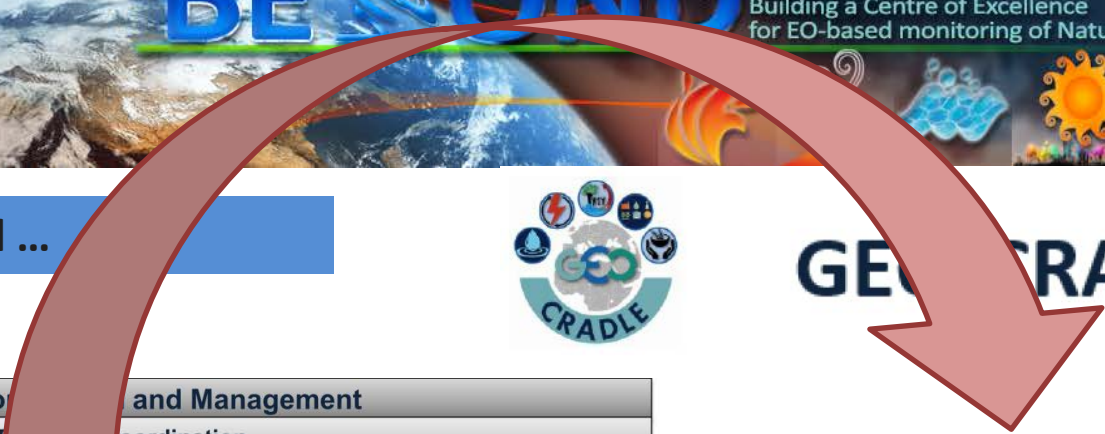
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## At the regional level ...



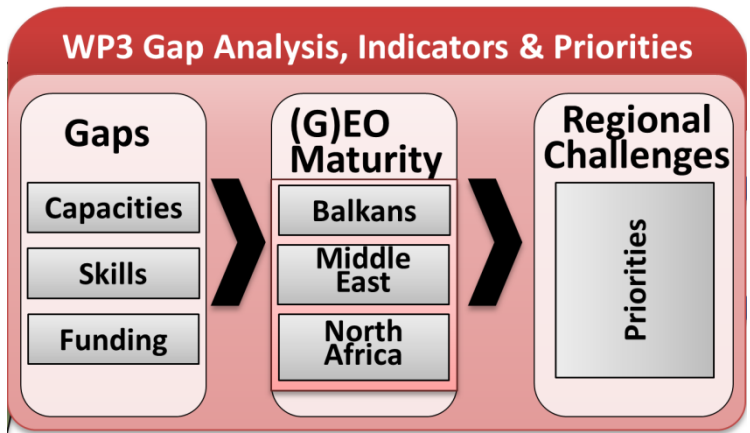
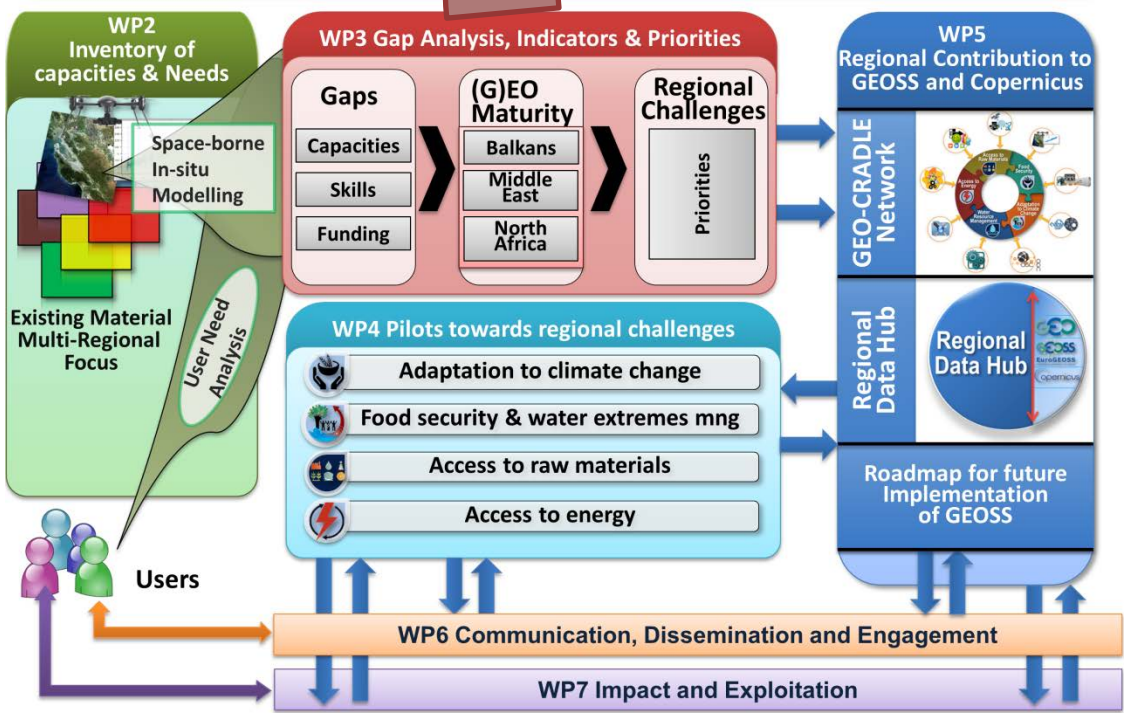
## GEO-CRADLE



**WP1 Coordination and Management**

Coordination

Liaison with ... , GEO and UN initiatives





# BEYOND

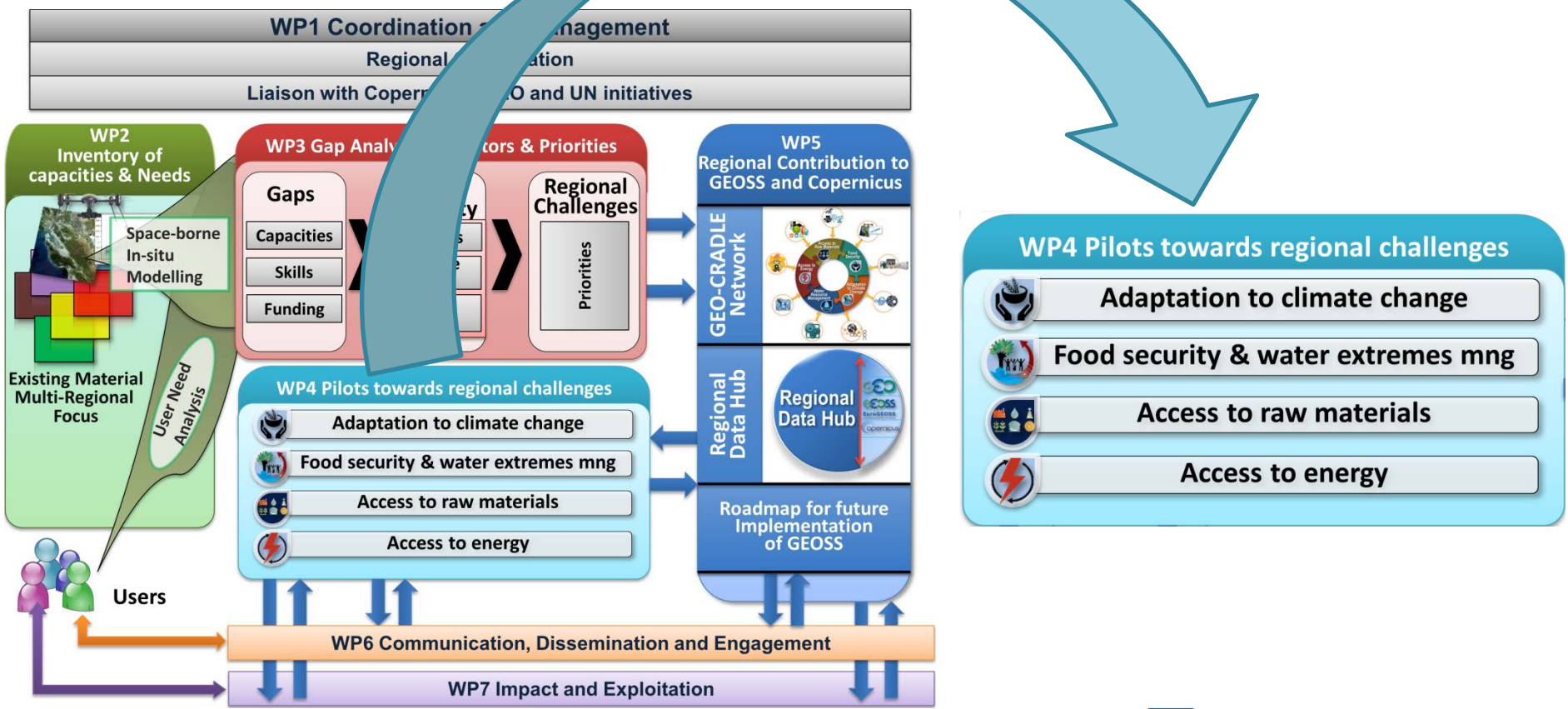
Building a Centre of Excellence for EO-based monitoring of Natural Disasters



## At the regional level ...



## GEO-CRADLE







# BEYOND

Building a Centre of Excellence for the Monitoring of Natural Disasters



## At the regional level ...



**WP1 Coordination and Management**  
 Regional Coordination  
 Liaison with Copernicus, GEO and UN initiatives

**WP2 Inventory of capacities & Needs**  
 Space-borne  
 In-situ  
 Modelling  
 Existing Material  
 Multi-Regional  
 Focus  
 User Need  
 Analysis  
 Users

**WP3 Gap Analysis, Indicators & Priorities**

<b>Gaps</b>	<b>(G)EO Maturity</b>	<b>Regional Challenges</b>
Capacities	Balkans	Priorities
Skills	Middle East	
Funding	North Africa	

**WP4 Pilots towards regional challenges**

- Adaptation to climate change
- Food security & water extremes mng
- Access to raw materials
- Access to energy

**WP5 Regional Contribution to GEOSS and Copernicus**

GEO-CRADLE Network

Regional Data Hub

Roadmap for future Implementation of GEOSS

**WP6 Communication, Dissemination and Engagement**

**WP7 Impact and Exploitation**

**WP5 Regional Contribution to GEOSS and Copernicus**

GEO-CRADLE Network

Regional Data Hub

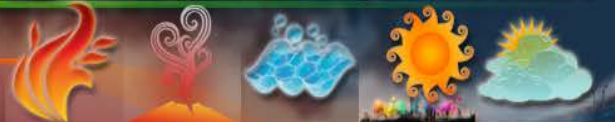
Roadmap for future Implementation of GEOSS





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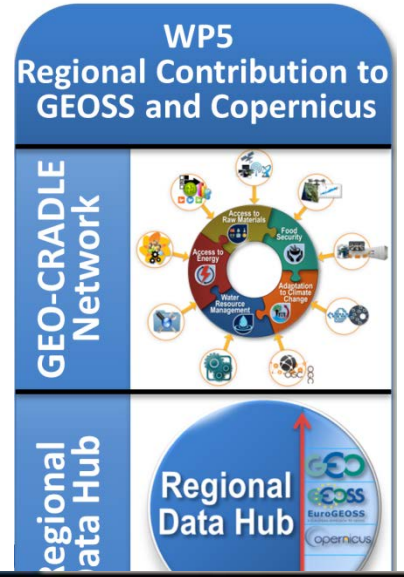
Building a Centre of Excellence for EO-based monitoring of Natural Disasters



At the regional level ...



## GEO-CRADLE



# Roadmap for future Implementation of GEOSS



# BEYOND

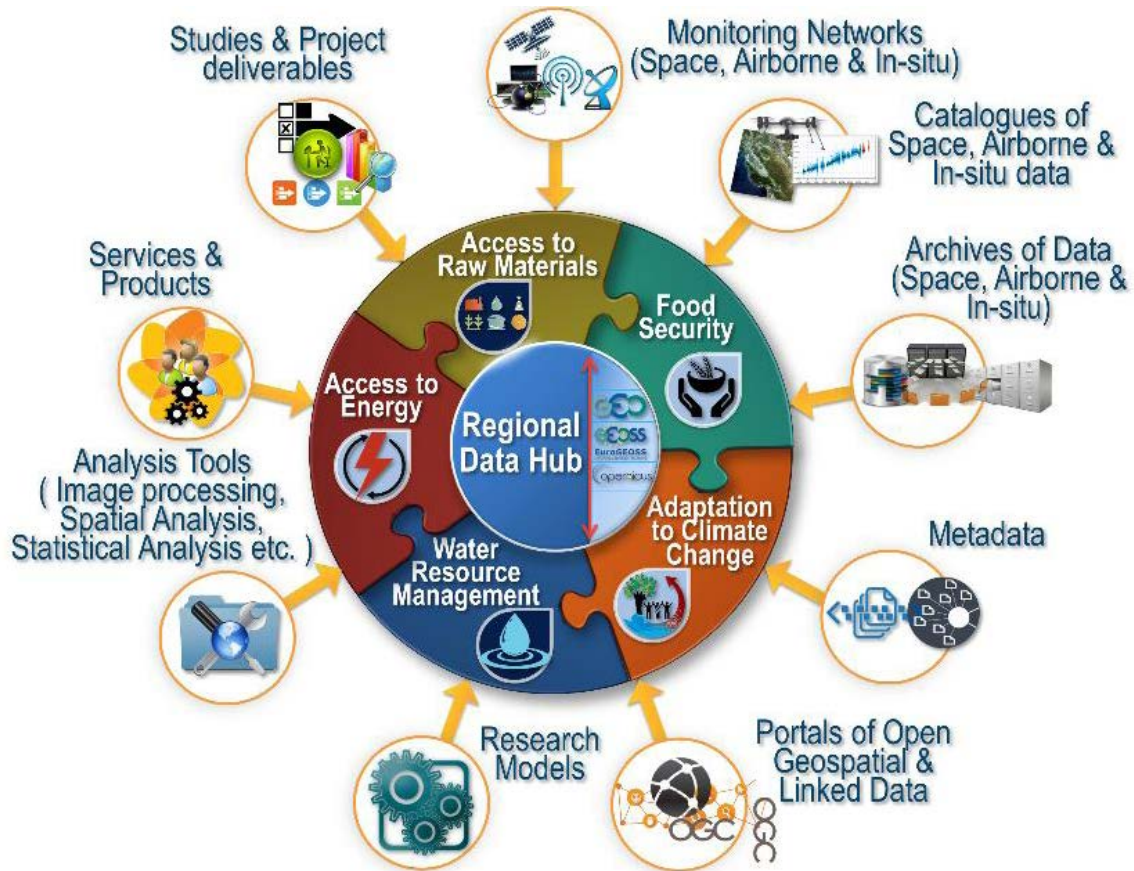
Building a Centre of Excellence for EO-based monitoring of Natural Disasters



At the regional level ...



## GEO-CRADLE

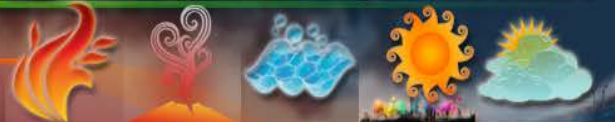






# BEYOND

Building a Centre of Excellence for EO-based monitoring of Natural Disasters



## At the regional level ...



## GEO-CRADLE



- Collection, homogenisation, archiving and integration of ground-, air- and space-based EO data, accessible through the GEO-CRADLE Regional Data Hub
- Provision of timely and accurate services related to atmospheric hazard forecasting and climate projections (e.g. desert dust, fire smoke, volcanic ash, air quality extremes, weather extremes, heat waves).
- Assessment of the regional climate change impacts based on region-optimised projections and establishment of a climate data hub, to support decision makers on mitigation and adaptation policies.

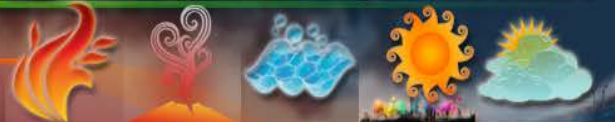






# BEYOND

Building a Centre of Excellence for EO-based monitoring of Natural Disasters



## At the regional level ...



## GEO-CRADLE



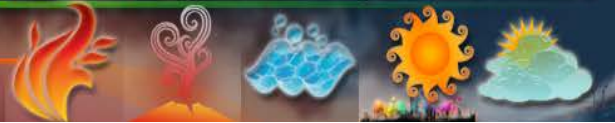
- **Space-borne:** NOAA's Sentinel Data Hub, NOAA and TUBITAK X/L band antennas for real-time EO satellite missions acquisitions, NOAA EUMETSAT DVB2 acquisition antenna
- **Airborne:** Data from airborne campaigns performed in the region (e.g. FENIX-SPECIM, CHARADMexp, ACEMED, Aegean Game)
- **In-situ:** Sensors operating in the framework of AERONET, ACTRIS, EARLINET, ICOS, GAW/WMO, ENSEMBLES, CORDEX, E-OBS, PANACEA.
- **Atmospheric and Climate Models:** MACC, WRF, NMME/DREAM, FLEXPART, HYSPLIT, RegCM4, RAMS.





# BEYOND

Building a Centre of Excellence for EO-based monitoring of Natural Disasters



## At the regional level ...



## GEO-CRADLE



- **Solar Energy Nowcasting System (SENSE) pilot:** provision of an operational, satellite-driven, real time system for solar energy now-cast.
- **Satellite missions:** MODIS Aqua & Terra, CALIPSO, MSG3-SEVIRI, EarthCARE, Sentinel-3/4/5p
- **In-situ networks and European Infrastructures:** AERONET, CloudNet, GAW, EARLINET
- **Atmospheric models:** libRadtran radiative transfer model (RTM), domestic (NOA) neural network (NN) model of the spectral irradiance from cloud and aerosol inputs, DREAM, GOCART





# BEYOND

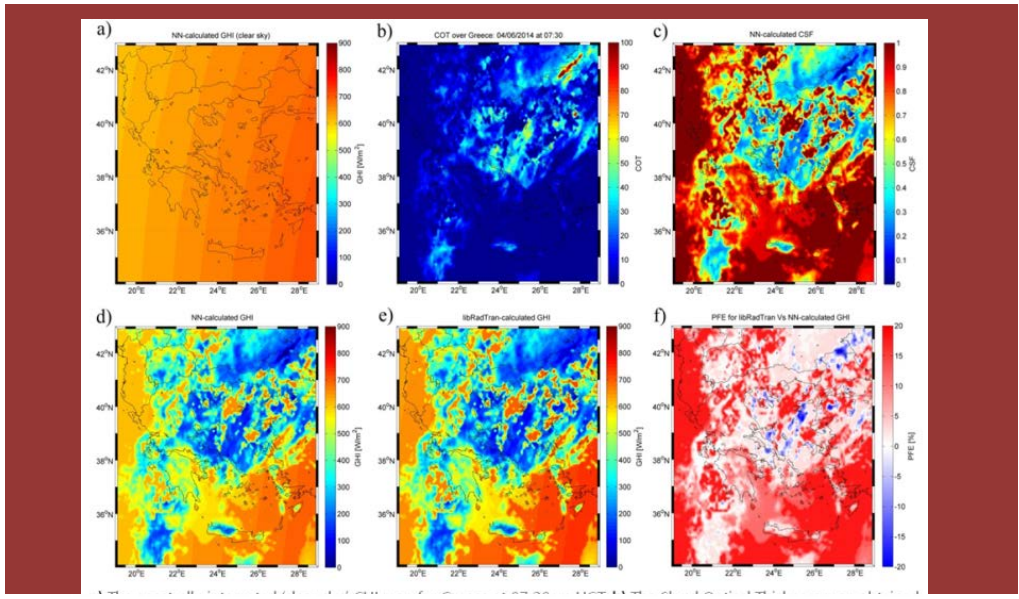
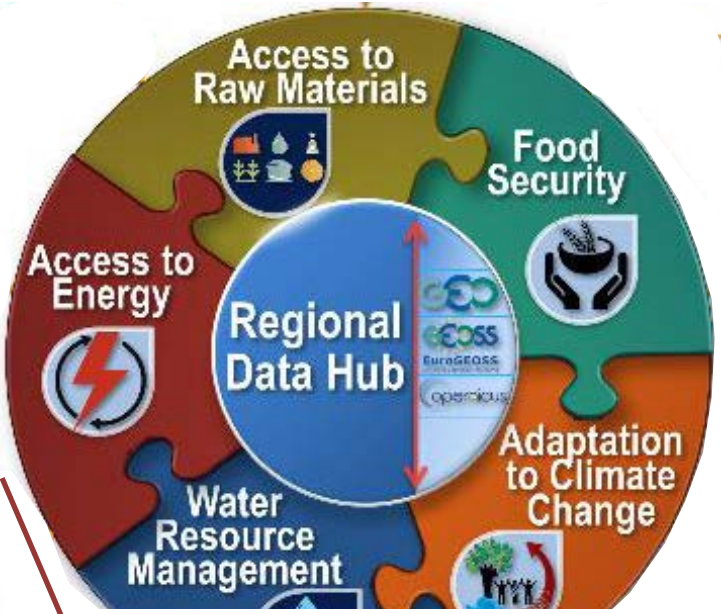
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## At the regional level ...



## GEO-CRADLE



**a)** The spectrally-integrated 'clear sky' GHI map for Greece at 07:30am UGT. **b)** The Cloud Optical Thickness map obtained from MSG3. **c)** The Clear Sky Factor map. **d)** The spectrally-integrated GHI map generated by the cloudy sky NN. **e)** The spectrally-integrated GHI map generated by libRadTran for the same inputs. **f)** The Percentage Fractional Error resulting from the difference between the spectrally-integrated GHI map generated by libRadTran and the cloudy sky NN.





At the European level ...





At the European level ...

# ERA-PLANET

## THE EUROPEAN NETWORK FOR OBSERVING OUR CHANGING PLANET

Call

**H2020-SC5-2015-one-stage**

Sub-call

**H2020-SC5-2014-2015**

Topic

**SC5-15-2015: Strengthening the European Research Area in the domain of Earth Observation**



At the European level ...

# ERA-PLANET

## THE EUROPEAN NETWORK FOR OBSERVING OUR CHANGING PLANET

The overarching goal of **ERA-PLANET** is to strengthen the European Research Area in the domain of Earth Observation in coherence with the European participation to Group on Earth Observation (GEO) and **Copernicus**.

The expected impact is to strengthen the European leadership within the forthcoming GEO 2015-2025 Work Plan. **ERA-PLANET** will reinforce the interface with user communities, whose needs the **Global Earth Observation System of Systems** (GEOSS) intends to address.





At the European level ...

# ERA-PLANET

## THE EUROPEAN NETWORK FOR OBSERVING OUR CHANGING PLANET

**ERA-PLANET** will provide **advanced decision support tools and technologies** aimed to better monitor our global environment and share the information and knowledge available in different domain of Earth Observation.

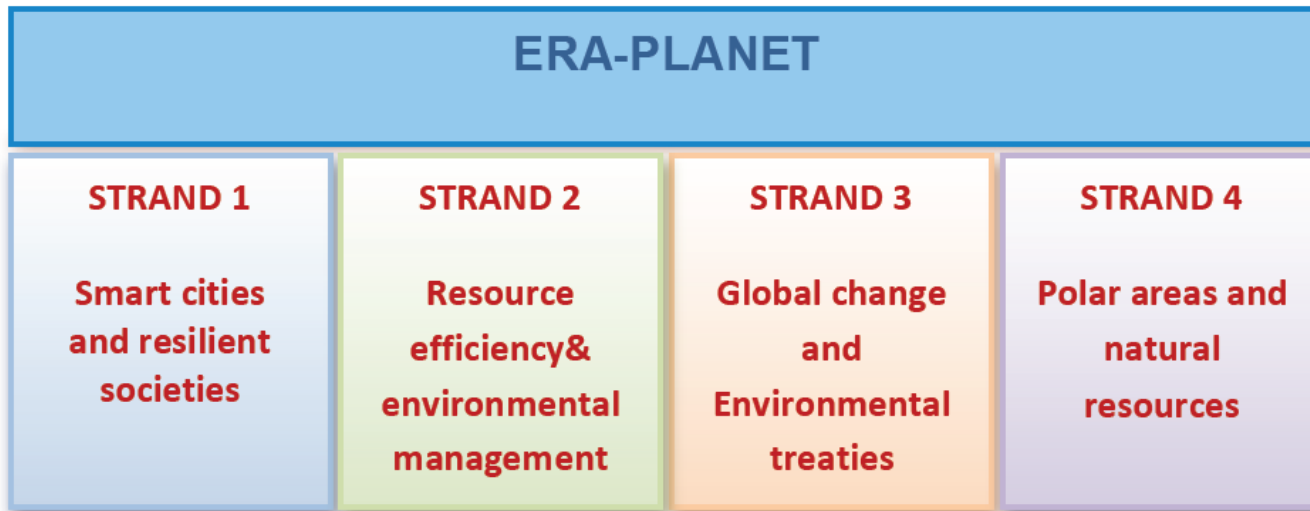
It will provide more accurate, comprehensive and authoritative information to policy and decision-makers in key societal benefit areas.



At the European level ...

# ERA-PLANET

## THE EUROPEAN NETWORK FOR OBSERVING OUR CHANGING PLANET



*Figure 2 – ERA-PLANET Strands*





At the European level ...

# ERA-PLANET

## THE EUROPEAN NETWORK FOR OBSERVING OUR CHANGING PLANET

### **Strand 1 - Smart cities and resilient societies**

*(focus on: urban growth, air quality, natural and manmade disasters, health and contaminated sites)*

### **Strand 2 - Resource efficiency and environmental management**

*(focus on: water, energy, biodiversity and food security)*

### **Strand 3 - Global change and Environmental treaties**

*(focus on: global observing systems for toxic and persistent pollutants, harmonization of monitoring systems, coupled atmosphere-ocean-terrestrial models validation, evaluation of ecosystem response to regional/global emission changes, support to policy implementation)*

### **Strand 4 - Polar areas and natural resources**

*(focus on: monitoring and assessment of ecosystems quality in Arctic and Antarctic)*



# BEYOND

Building a Centre of Excellence  
for EO-based monitoring of Natural Disasters



## At the European level ...

### List of participants

Id	Participant name	Acronym	Country – short name
1	CONSIGLIO NAZIONALE DELLE RICERCHE - DEPARTMENT OF EARTH SYSTEM SCIENCE AND ENVIRONMENTAL TECHNOLOGIES	CNR-DTA	IT
2	AARHUS UNIVERSITET	AU	DK
3	IDRYMA IATROVIOLOGIKON EREUNON AKADIMIAS ATHINON	AoA	GR
4	ASSOCIATION POUR LA RECHERCHE ET LE DEVELOPPEMENT DES METHODES ET PROCESSUS INDUSTRIELS	ARMINES	FR
5	ARISTOTELIO PANEPISTIMIO THESSALONIKIS	AUTH	GR
6	ALFRED-WEGENER-INSTITUT HELMHOLTZ- ZENTRUM FUER POLAR- UND MEERESFORSCHUNG	AWI	DE
7	CENTRO NACIONAL DE INFORMACION GEOGRAFICA	CNIG	ES
8	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	CNRS	FR
9	CENTRO DE INVESTIGACION ECOLOGICA Y APLICACIONES FORESTALES	CREAF	ES
10	CHALMERS TEKNISKA HOEGSKOLA AB	CHALMERS	SE
11	CENTRUM VYZKUMU GLOBALNI ZMENY AV CR VVI	CVGZ	CZ
12	EESTI MAAULIKOOL	EULS	EE
13	FRIEDRICH-ALEXANDER-UNIVERSITAT ERLANGEN NURNBERG	FAU	DE
14	FUNDAÇÃO PARA A CIÊNCIA E A TECNOLOGIA	FCT	PT
15	ILMATIETEEN LAITOS	FMI	FI
16	FORSCHUNGSVERBUND BERLIN E.V.	FVB	DE
17	FORSCHUNGSZENTRUM JÜLICH GMBH	FZJ	DE
18	HELMHOLTZ-ZENTRUM POTSDAM DEUTSCHES GEOFORSCHUNGSZENTRUM	GFZ	DE
19	HELMHOLTZ-ZENTRUM GEESTHACHT ZENTRUM FÜR MATERIAL- UND KÜSTENFORSCHUNG	HGZ	DE
20	INTERNATIONALES INSTITUT FUER ANGEWANDTE SYSTEM ANALYSE	IIASA	AT

## ERA-PLANET

21	ISTITUTO SUPERIORE PER LA PROTEZIONE E LA RICERCA AMBIENTALE	ISPRA	IT
22	IVL SVENSKA MILJÖINSTITUTET AB	IVL	SE
23	JOZEF STEFAN INSTITUT	JSI	SI
24	MUSEUM FÜR NATURKUNDE - LEIBNIZ-INSTITUT FÜR EVOLUTIONS- UND BIODIVERSITÄTSFORSCHUNG AN DER HUMBOLDT-UNIVERSITÄT ZU BERLIN	MfN	DE
25	MASARYKOVA UNIVERZITA - RESEARCH CENTRE FOR TOXIC COMPOUNDS IN THE ENVIRONMENT	MU	CZ
26	NATIONAL CENTER FOR SCIENTIFIC RESEARCH "DEMOKRITOS"	NCSR	GR
27	NORSK INSTITUTT FOR LUFTFORSKNING	NILU	NO
28	NATIONAL OBSERVATORY OF ATHENS	NOA	GR
29	NATIONAL UNIVERSITY OF IRELAND GALWAY	NUIG	IE
30	PAUL SCHERRER INSTITUT	PSI	CH
31	SENCKENBERG GESELLSCHAFT FÜR NATURFORSCHUNG	SGN	DE
32	SPACE RESEARCH INSTITUTE	SRI	UA
33	STOCKHOLMS UNIVERSITET	SU	SE
34	LEIBNIZ INSTITUT FUER TROPOSPHAERENFORSCHUNG e.V.	TROPOS	DE
35	HELMHOLTZ-ZENTRUM FUER UMWELTFORSCHUNG GMBH	UFZ	DE
36	HELSINGIN YLIOPISTO	UHEL	FI
37	UNIVERSITA DELLA CALABRIA	UNICAL	IT
38	UNIVERSITE DE GENEVE	UNIGE	CH
39	UNIVERSITA' DEGLI STUDI DI PADOVA	UNIPD	IT
40	THE UNIVERSITY OF NOTTINGHAM	NU	UK
41	UNIVERSITEIT UTRECHT	UU	NL

In orange WP leaders





# BEYOND

Building a Centre of Excellence for EO-based monitoring of Natural Disasters



# ERA-PLANET

## At the European level ...

### List of participants

Id	Participant name	Acronym	Country – short name
1	CONSIGLIO NAZIONALE DELLE RICERCHE - DEPARTMENT OF EARTH SYSTEM SCIENCE AND ENVIRONMENTAL TECHNOLOGIES	CNR-DTA	IT
2	AARHUS UNIVERSITET	AU	DK
3	IDRYMA IATROVIOLOGIKON EREUNON AKADIMIAS ATHINON	AoA	GR
4	ASSOCIATION POUR LA RECHERCHE ET LE DEVELOPPEMENT DES METHODES ET PROCESSUS INDUSTRIELS	ARMINES	FR
5	ARISTOTELIO PANEPISTIMIO THESSALONIKIS	AUTH	GR
6	ALFRED-WEGENER-INSTITUT HELMHOLTZ- ZENTRUM FUER POLAR- UND MEERESFORSCHUNG	AWI	DE
7	CENTRO NACIONAL DE INFORMACION GEOGRAFICA	CNIG	ES
8	CENTRE N		
9	CENTRO I		
10	CHALMER		
11	CENTRUM		
12	EESTI MA.		
13	FRIEDRICI		
14	FUNDACA		
15	ILMATIET		
16	FORSCHU		
17	FORSCHU		
18	HELMHOL		
19	HELMHOL KÜSTENF		
20	INTERNAT		

21	ISTITUTO SUPERIORE PER LA PROTEZIONE E LA RICERCA AMBIENTALE	ISPRA	IT
22	IVL SVENSKA MILJÖINSTITUTET AB	IVL	SE
23	JOZEF STEFAN INSTITUT	JSI	SI
24	MUSEUM FÜR NATURKUNDE - LEIBNIZ-INSTITUT FÜR EVOLUTIONS- UND BIODIVERSITÄTSFORSCHUNG AN DER HUMBOLDT-UNIVERSITÄT ZU BERLIN	MfN	DE
25	MASARYKOVA UNIVERZITA - RESEARCH CENTRE FOR TOXIC COMPOUNDS IN THE ENVIRONMENT	MU	CZ
26	NATIONAL CENTER FOR SCIENTIFIC RESEARCH "DEMOKRITOS"	NCSR	GR
27	NORSK INSTITUTT FOR LUFTFORSKNING	NILU	NO
28	NATIONAL OBSERVATORY OF ATHENS	NOA	GR
	NATIONAL UNIVERSITY OF IRELAND GALWAY	NUIG	IE
		PSI	CH
		SGN	DE
		SRI	UA
		SU	SE
		TROPOS	DE
		UFZ	DE
		UHEL	FI
		UNICAL	IT
		UNIGE	CH
		UNIPD	IT
		NU	UK
		UU	NL

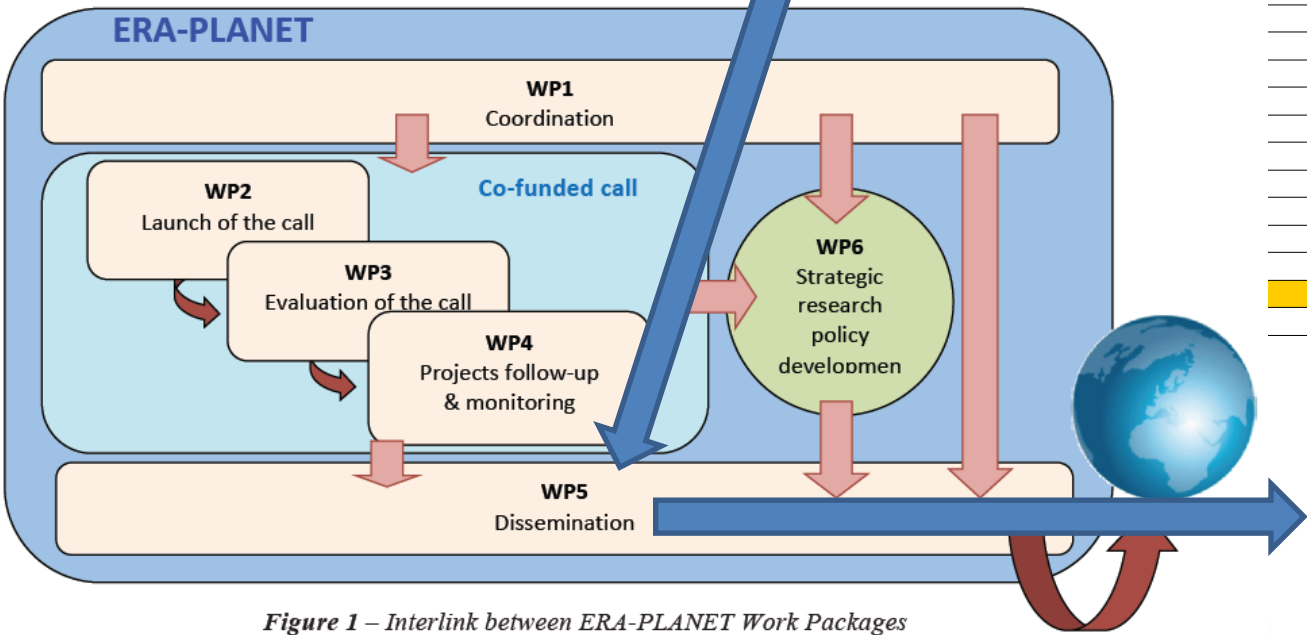


Figure 1 – Interlink between ERA-PLANET Work Packages

**NOA  
WP5 Leader**



**from the institutional ...**

**to the national ...**

**to the regional ...**

**to the European level**



**... sparked by  
sparkled through**



*thank you!*