



GEO-CRADLE - μία πλατφόρμα συλλογής δεδομένων Παρατήρησης της Γης, στις περιοχές των Βαλκανίων, της Βορείου Αφρικής και της Μέσης Ανατολής

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

National Observatory of Athens
GREECE

*The final BEYOND workshop, 17 May 2016
Athens, Electra Palace*



FP7-Regpot-2012-23-1



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”.



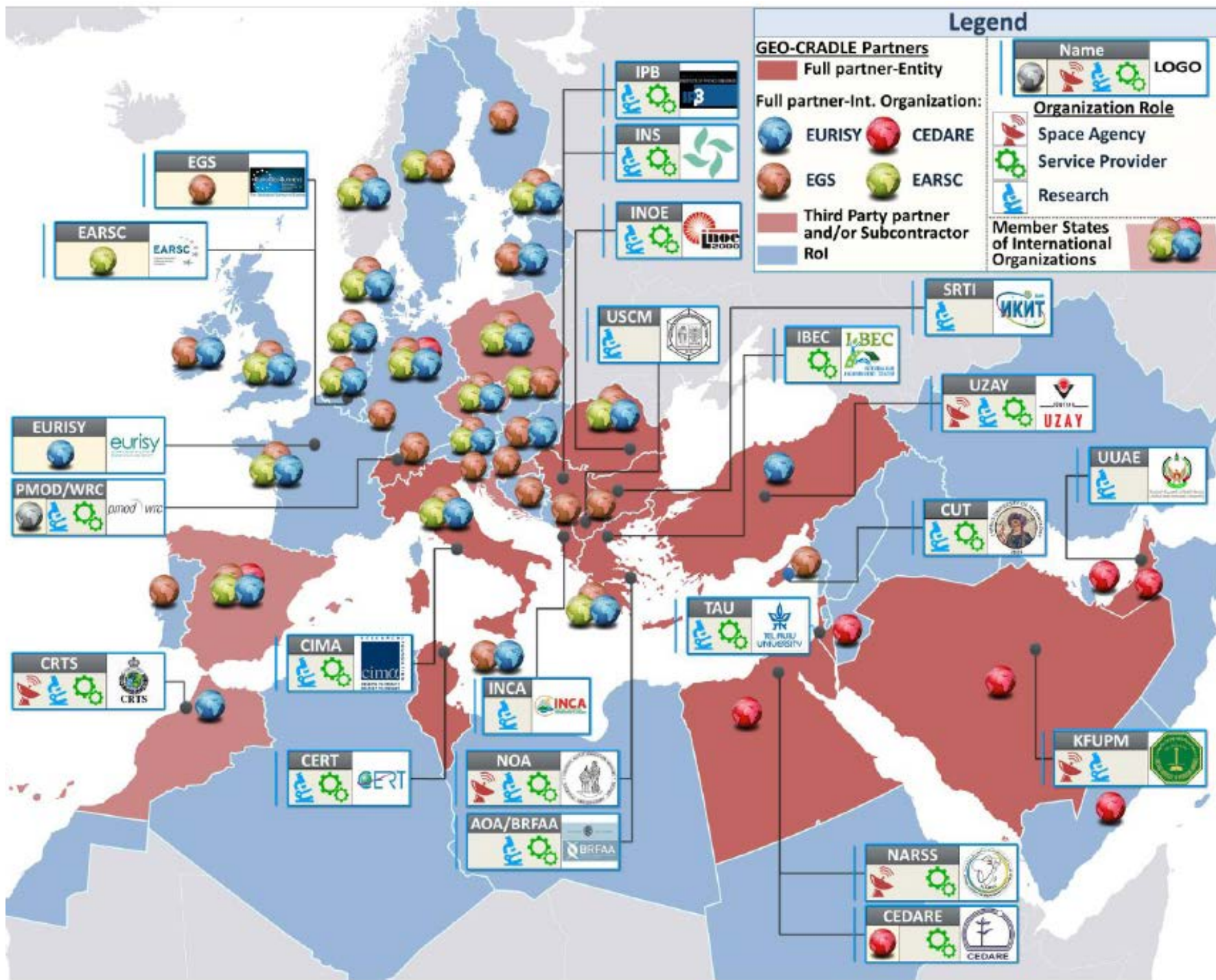
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ID	Participant Organisation Name	Country	Logo
1	National Observatory of Athens (NOA) - Coordinator	Greece	
2	Interbalkan Environment Center (IBEC)	Greece	
3	Center for Environment and development for the Arab Region and Europe (CEDARE)	Egypt	
4	Research 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	



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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	EuroGeoSurveys (EGS)	EU	
19	University of UAE (UAAE)*	UAE	
20	King Fahd University of Petroleum and Minerals (KFUPM)*	Saudi Arabia	
21	World Radiation Center (PMOD/WRC)*	Switzerland	
22	National Authority for Remote Sensing & Space Sciences (NARSS) (subcontractor to CEDARE)**	Egypt	
23	Royal Centre for Remote Sensing (CRTS) (subcontractor "in-kind" to EURISY)**	Morocco	

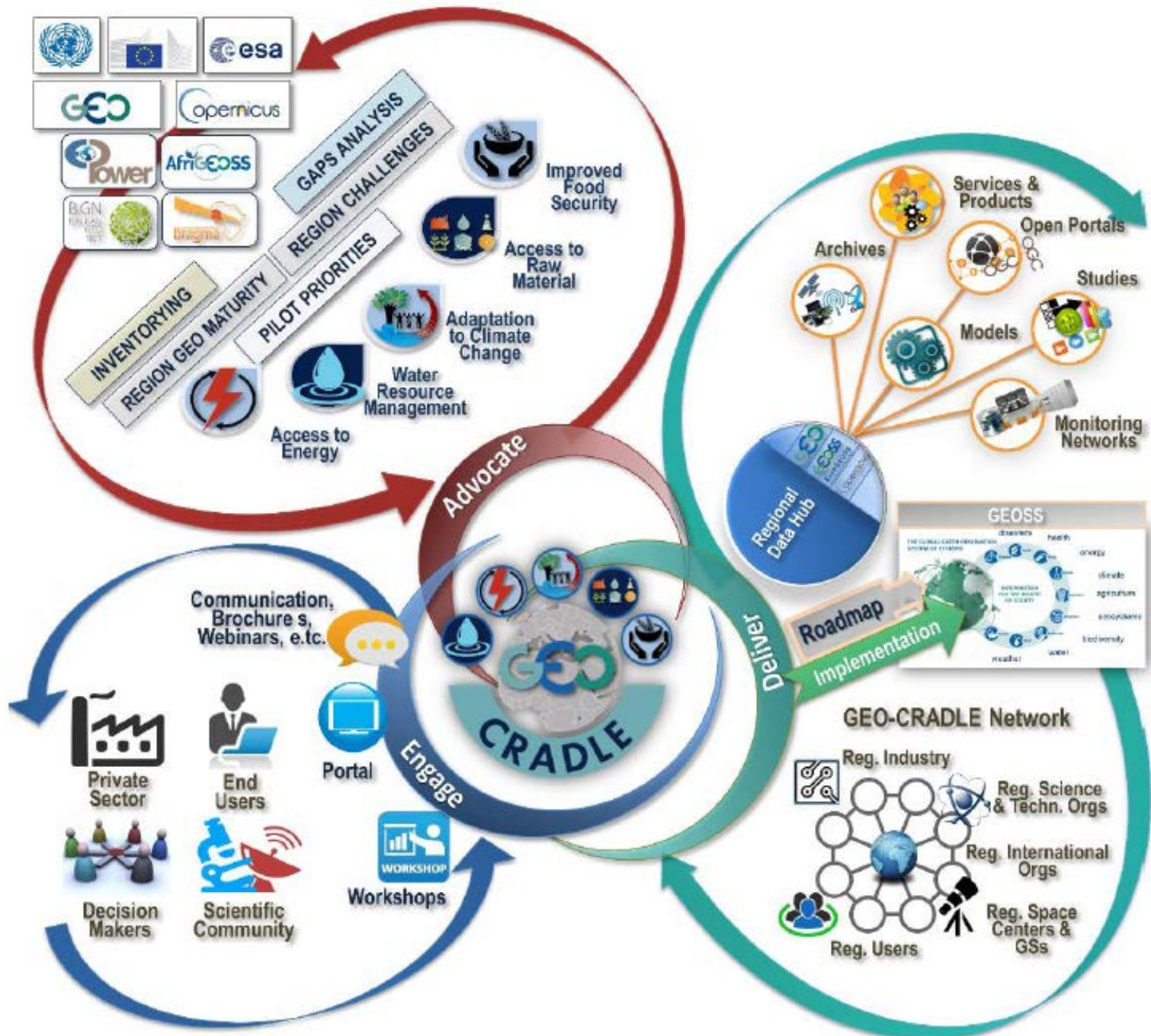




GEO-CRADLE

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



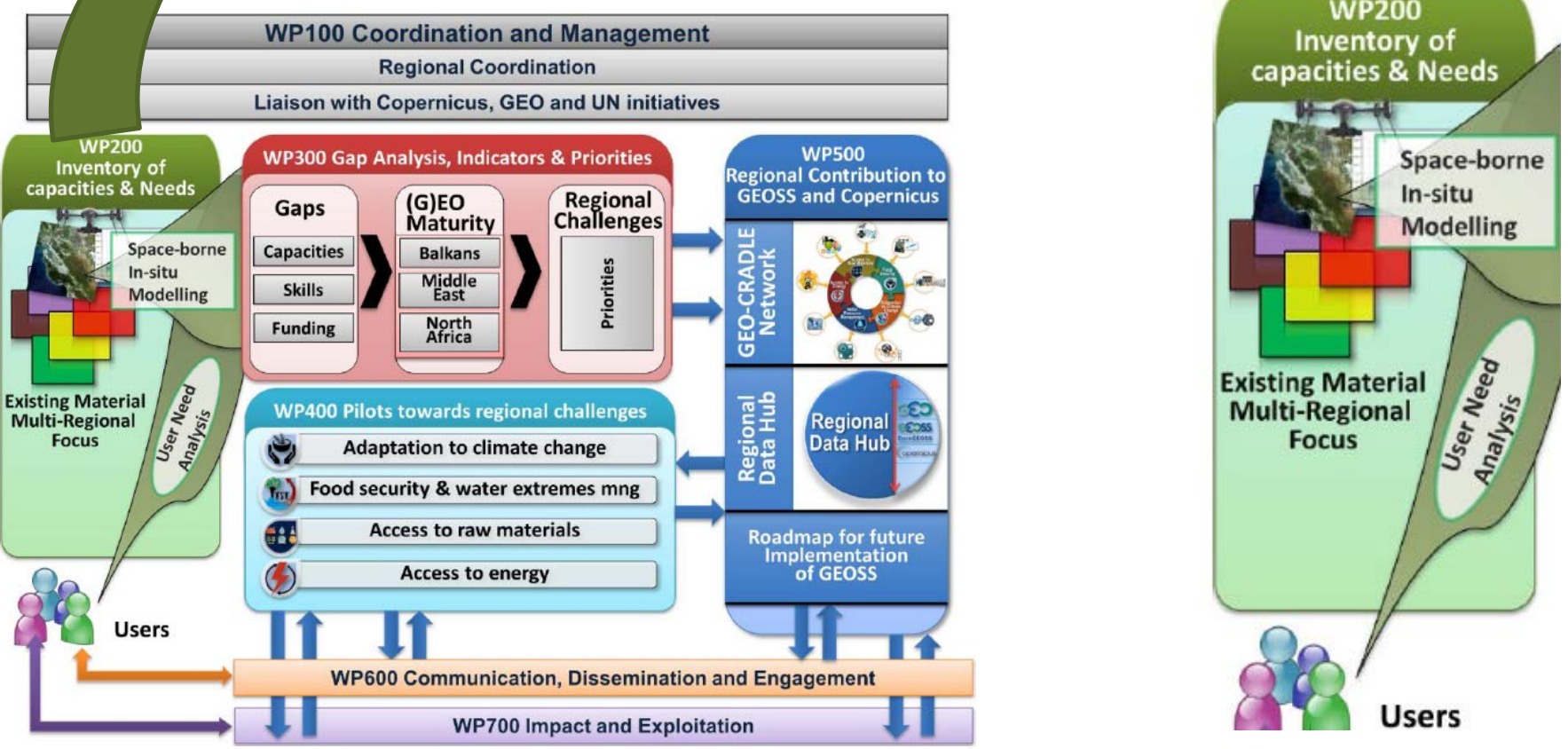


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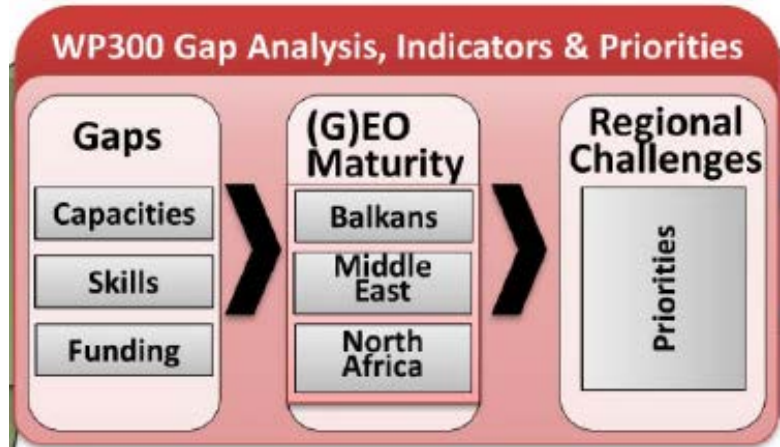
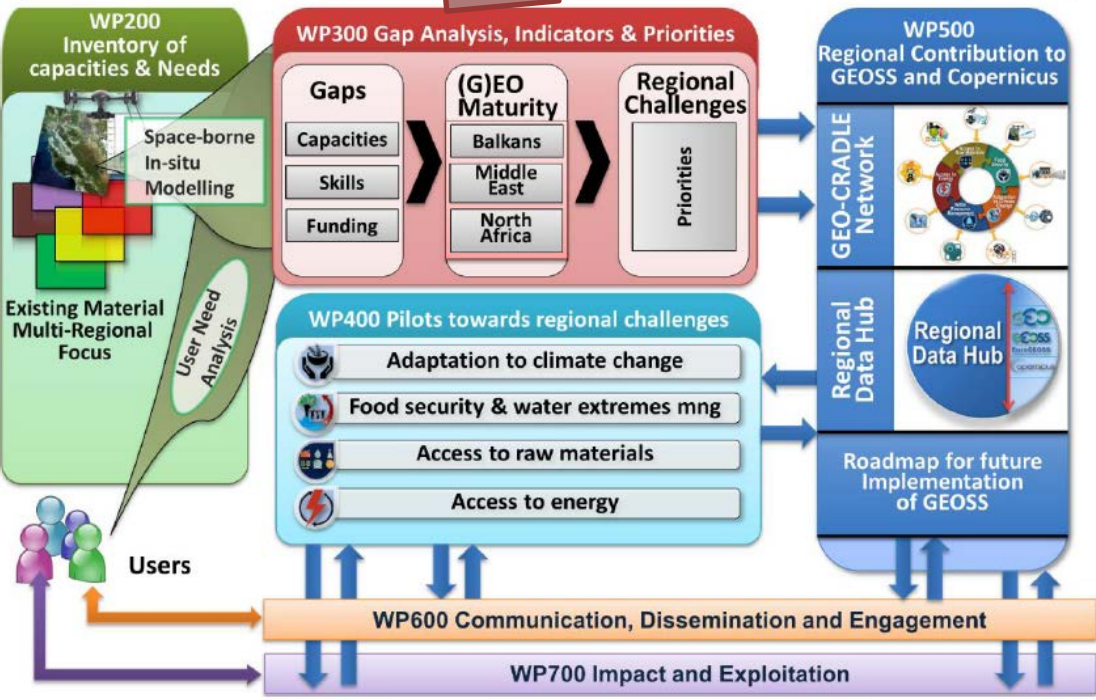
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GEO-CRADLE



WP100 Coordination and Management
Regional Coordination
Liaison with Commission GEO and UN initiatives



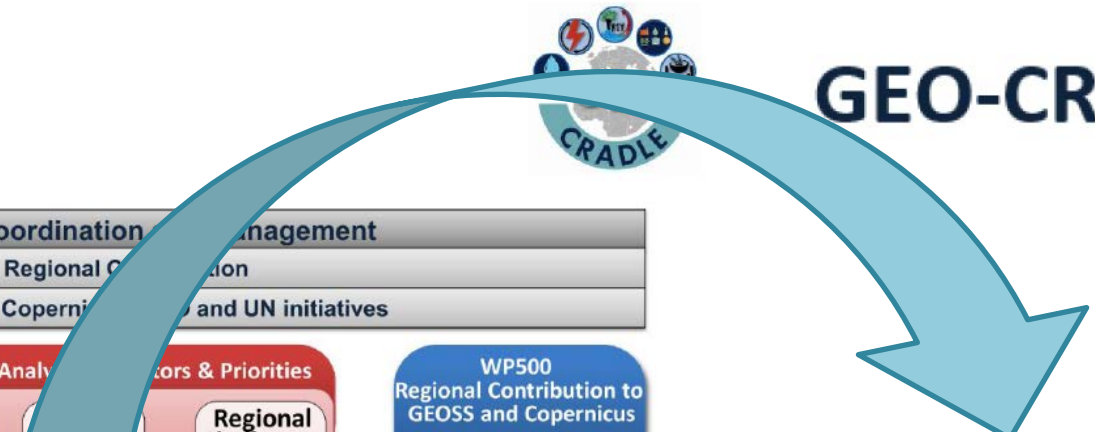


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GEO-CRADLE



WP100 Coordination and Management
 Regional Coordination
 Liaison with Copernicus and UN initiatives

WP200 Inventory of capacities & Needs
 Space-borne
 In-situ
 Modelling
 Existing Material
 Multi-Regional
 Focus
 User Need
 Analysis

WP300 Gap Analysis of Capacities & Priorities

Gaps	Regional Challenges
Capacities	Priorities
Skills	
Funding	

WP500 Regional Contribution to GEOSS and Copernicus

GEO-CRADLE Network

Regional Data Hub

Regional Data Hub

Roadmap for future Implementation of GEOSS

WP400 Pilots towards regional challenges

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

WP400 Pilots towards regional challenges

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



WP600 Communication, Dissemination and Engagement

WP700 Impact and Exploitation





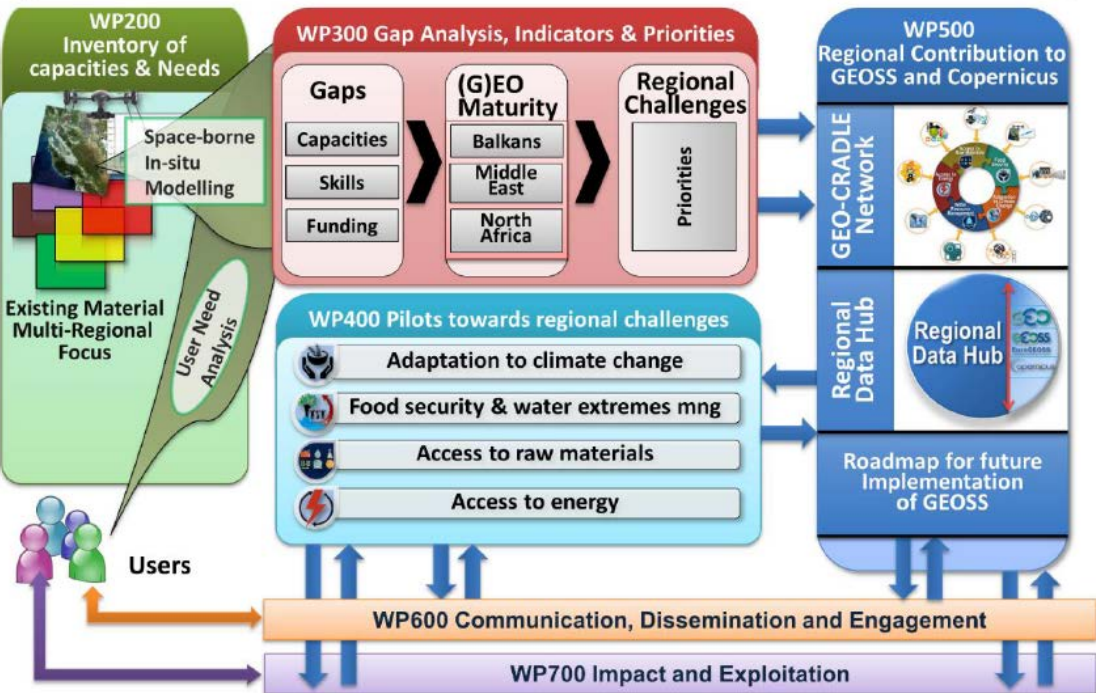
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GEO-CRADLE

WP100 Coordination and Management
 Regional Coordination
 Liaison with Copernicus, GEO and UN initiatives



WP500 Regional Contribution to GEOSS and Copernicus

GEO-CRADLE Network

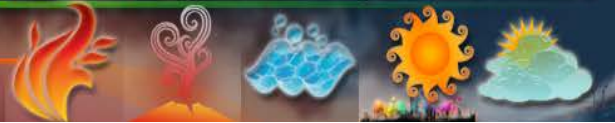
Regional Data Hub

Roadmap for future Implementation of GEOSS

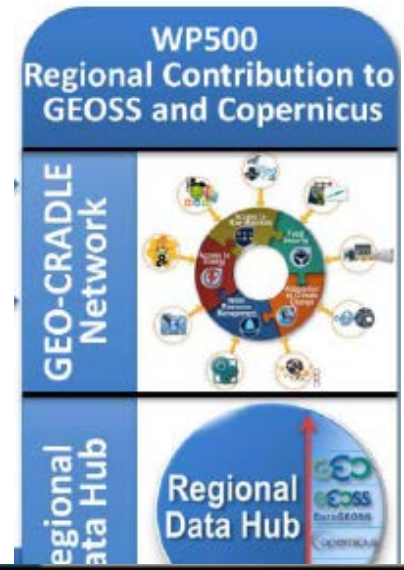


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GEO-CRADLE



Roadmap for future Implementation of GEOSS

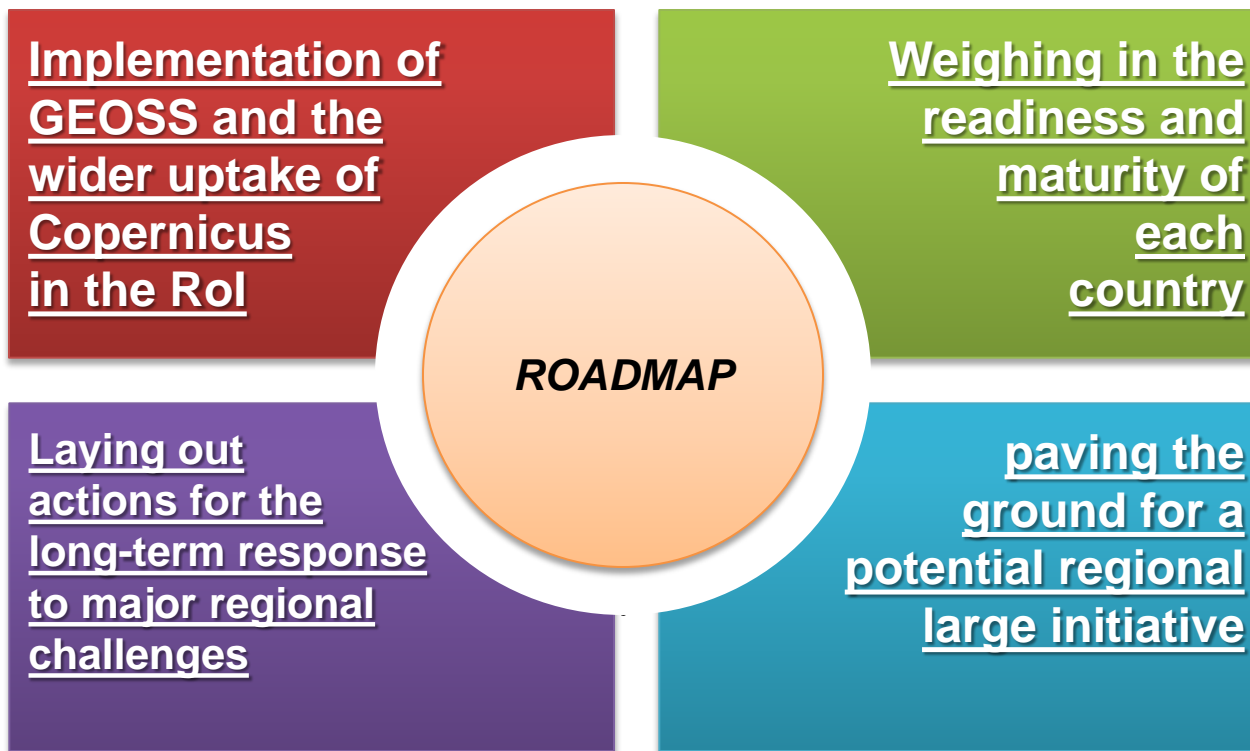


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Main Scope



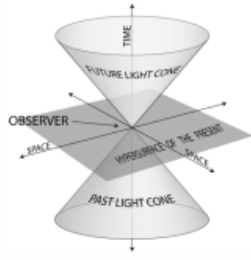


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What is our future?



Flagship

GEO-CRADLE



Initiative

Community Activity



May 2016



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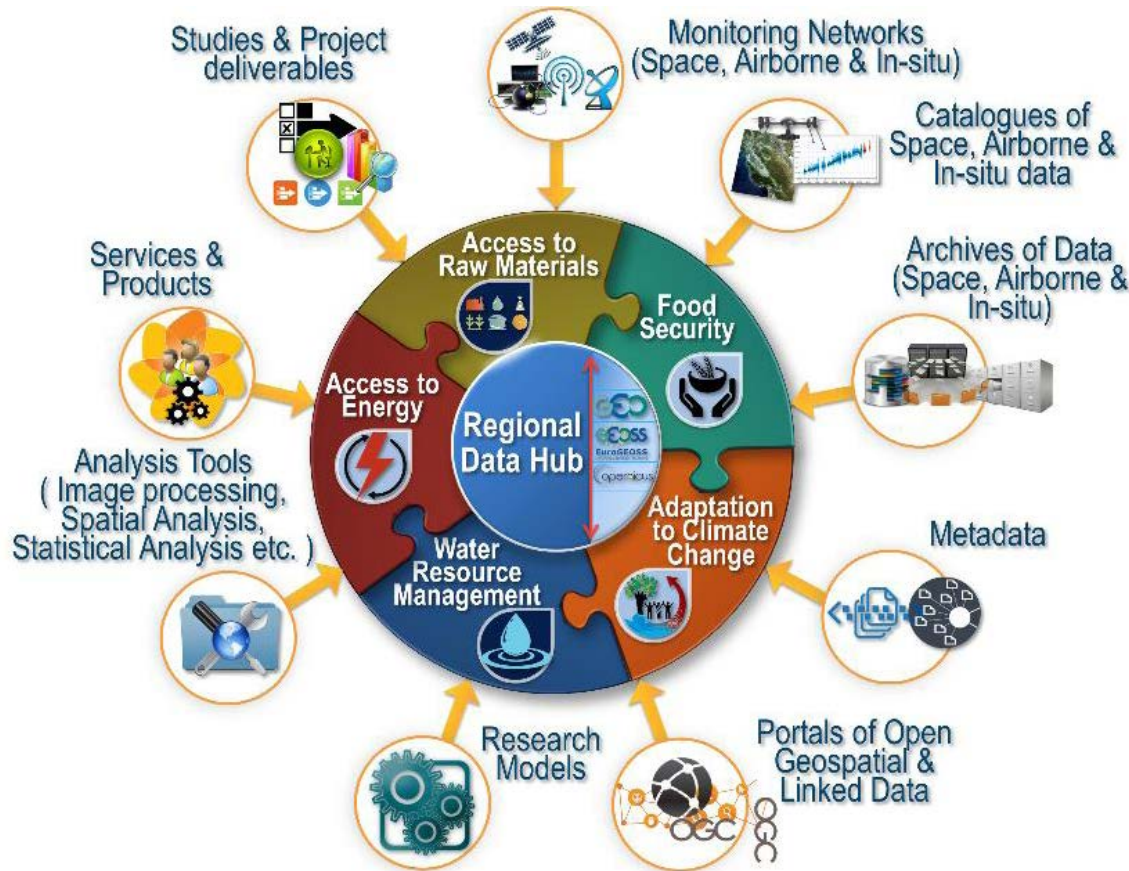


GEO-CRADLE

Introduction: The GEOSS Portal is the main entry point to Earth Observation data from all over the world. Links the world-wide community of practice in nine **Societal Benefit Areas** providing the necessary tools for searching and/or registering data.

Vision: The Regional Data Hub (RDH) aspires to become a concrete contribution of GEO-CRADLE to the implementation of GEOSS and Copernicus in the RoI.

- ✓ Strengthen the Portal capabilities.
- ✓ Alleviate its shortcomings.



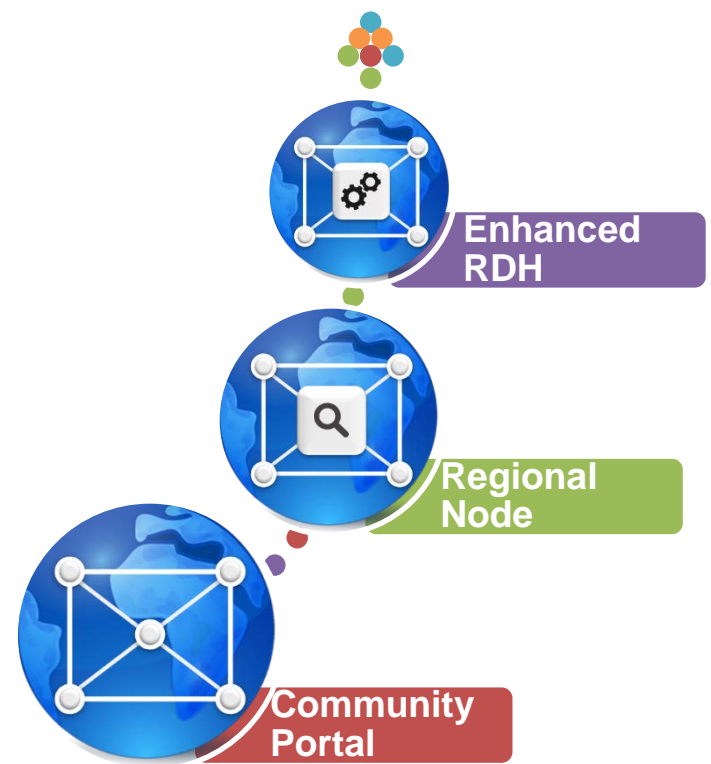
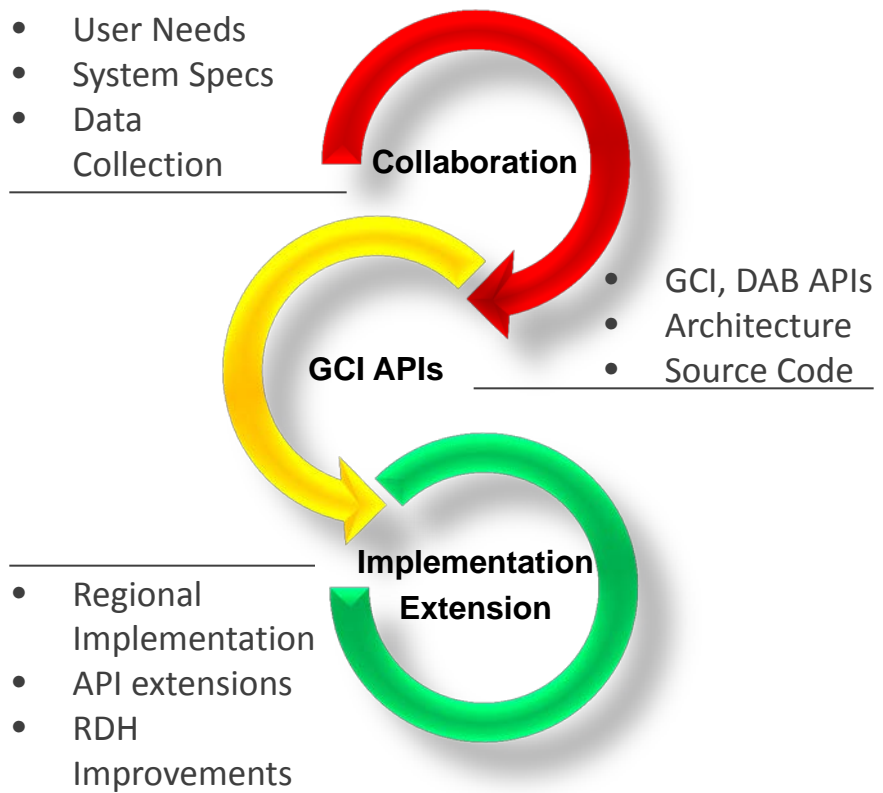


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Approach





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User Friendly Interface

- Based on up-to-date Human Computer Interaction and User Experience principles.
- Based on state of the art Web frameworks: Angular JS, Lavarel PHP, etc.
- Model View Controller (MVC) architecture for the separation of the Graphical User Interface (GUI) from the underlying logic.

Federation

- Homogenization of the integrated data / metadata (e.g. NetCDF, HDF for the space-borne data).
- Standardized access interfaces based on well established protocols (e.g. OGC WFS).
 - Standardized metadata cataloguing, storing and dissemination (e.g. INSPIRE Implementing rules, GML format).

*One-stop-shop for
RoI specific
data/information/
knowledge access
for EO players,
service providers,
and end users.*

Fine-Grained Organization

- Better organization of data, metadata, services and products.
- Cleaner navigation between:
 - Metadata catalogues,
 - Data storages,
 - Product services,
 - OGC services such WMS, WFS, etc.

Enhanced Functionality

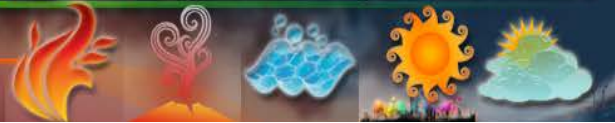
- Systematic verification / validation of each dataset availability (e.g. heuristic mechanisms deciding a resource's availability).
- Free-text search functionality using state-of the art APIs such as OpenSearch.
- An advanced filtering mechanism enabling the user to pose flexible and complex queries.





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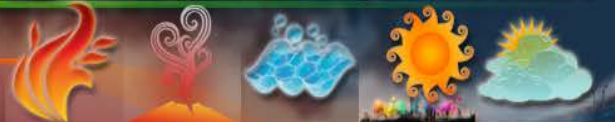
- Collection, homogenisation, archiving and integration of ground-, air- and space-based EO data, accessible through the GEO-CRADLE Regional Data Hub
- Provision of timely and accurate services related to atmospheric hazard forecasting and climate projections (e.g. desert dust, fire smoke, volcanic ash, 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.





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- **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.





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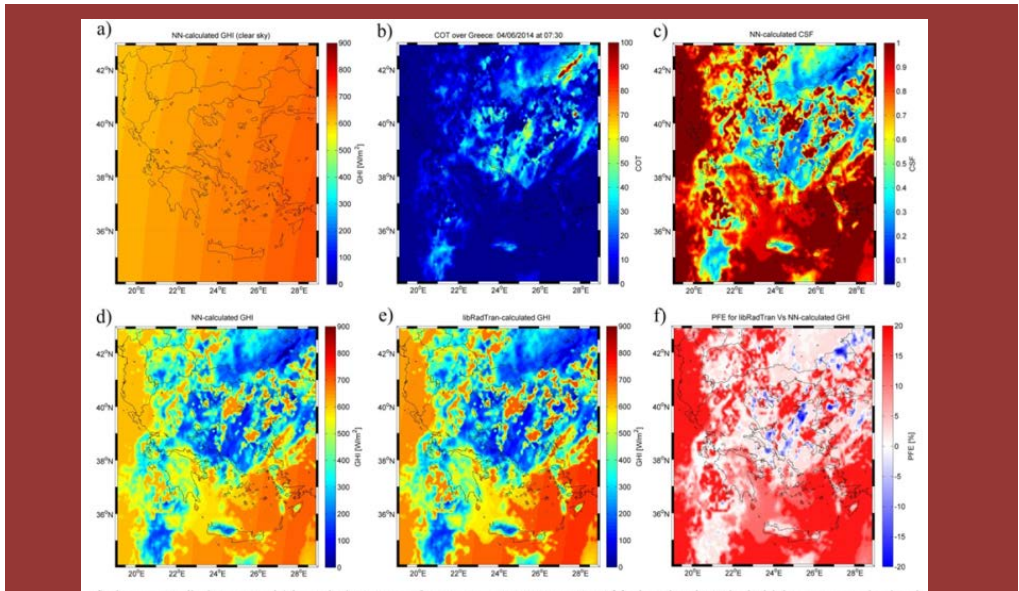
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- **Solar Energy Nowcasting SystEm (SENSE) pilot:** provision of an operational, satellite-driven, real time system for solar energy now-cast.
- **Satellite missions:** MODIS Aqua & Terra, CALIPSO, MSG3-SEVIRI, EarthCARE, Sentinel-3/4/5p
- **In-situ 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



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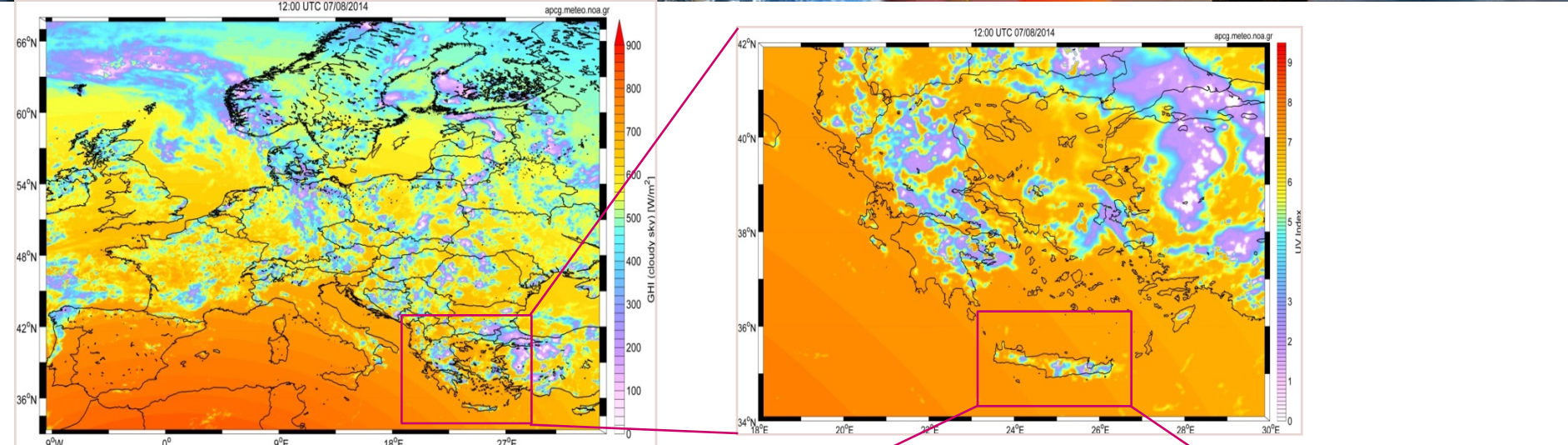


a) The spectrally-integrated 'clear sky' GHI map for Greece at 07:30am UGT. **b)** The Cloud Optical Thickness map obtained from MSG3. **c)** The Clear Sky Factor map. **d)** The spectrally-integrated GHI map generated by the cloudy sky NN. **e)** The spectrally-integrated GHI map generated by libRadTran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

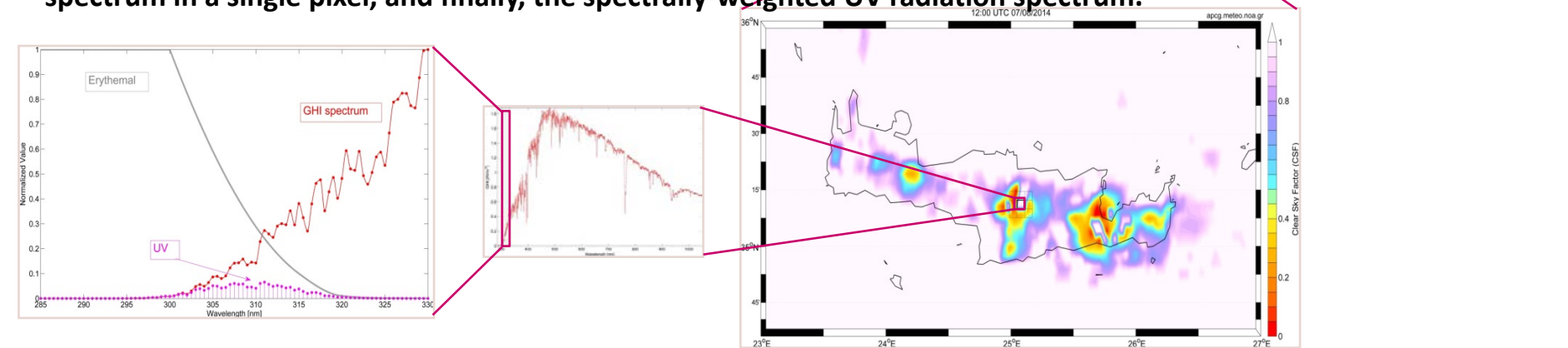


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Clockwise: the GHI for Europe, the UV index for Greece, the clear sky factor on the island of Crete, the insolation spectrum in a single pixel, and finally, the spectrally-weighted UV radiation spectrum.





thank you!





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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

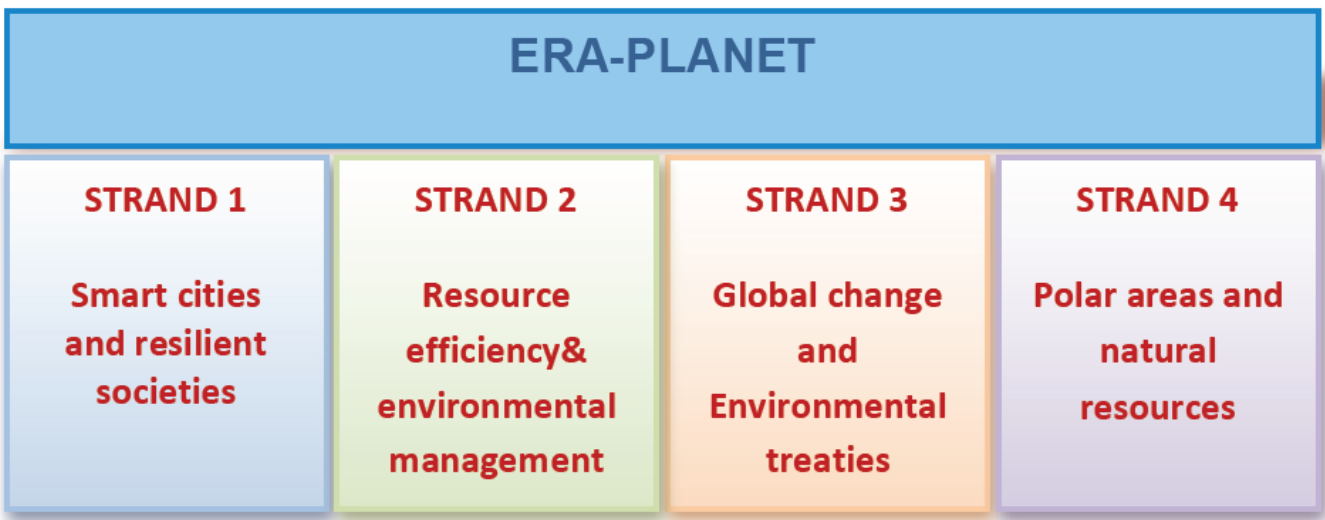


Figure 2 – ERA-PLANET Strands



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)



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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	FUNDAOAO PARA A CIENCIA 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