



# The contribution of Italy to GEO and future actions

Nicola Pirrone

*GEO Principal of Italy*





# EUROGEO WORKSHOP 2023



## Ministries:



Ministero dell'Ambiente e  
della Sicurezza Energetica



Ministero dell'Università  
e della Ricerca

- ✓ CNR
- ✓ INGV
- ✓ ISPRA
- ✓ ASI
- ✓ CMCC
- ✓ Universities (i.e. Torino, PoliMi, Cagliari, Pisa,...)

- E-GEOS
- Planetek
- FBK Bruno Kessler Foundation
- LATITUDO 40
- LINKS Foundation
- MEEEO
- SERCO



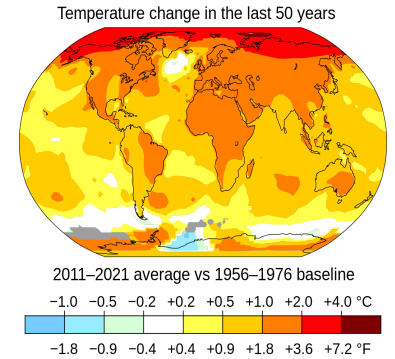
**BOLZANO 2-4 OCTOBER 2023**



## Triple Planetary Crisis (UN)

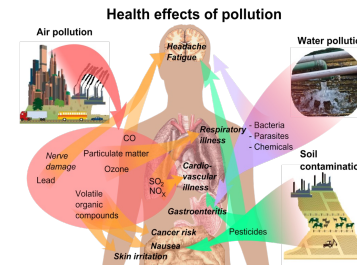
- Climate change
- Pollution
- Biodiversity loss

PC



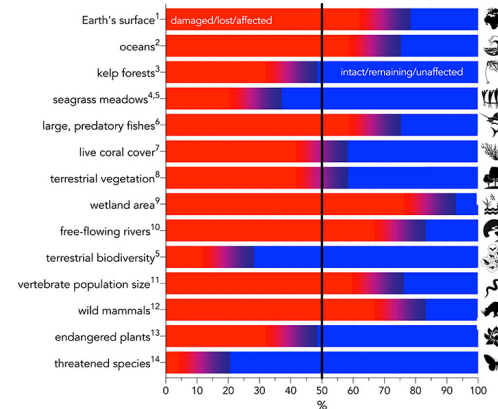
(after NASA's Scientific Visualization Studio, CC BY 4.0)

Main health effects on humans from some common types of pollution



(after Haggström, 2014, PD)

Major biodiversity-related environmental-change categories expressed as a percentage of human-driven change (in red) relative to baseline (blue)



(after Bradshaw et al., 2021, CC BY 4.0)



## Four Engagement Priorities (GEO)

- United Nations 2030 Agenda for SD
- Paris Agreement on climate change
- Sendai Framework for Disaster Risk Reduction
- Resilient Cities and Human Settlements



COP21-CMP11  
PARIS 2015  
UN CLIMATE CHANGE CONFERENCE



UN World Conference on  
Disaster Risk Reduction  
2015 Sendai Japan



Make cities and  
human settlements  
inclusive, safe,  
resilient and  
sustainable





## GEO activities




- HLWG
- ExCom
- PB
- DWG
- GIDTT

# EUROGEO WORKSHOP 2023



## EU projects: ended

 Funded by the European Union  
Financé par l'Union Européenne  
Financiado pela União Europeia



4



Earth Server

ERA-PLANET

The European network for observing our changing planet

EuroGEO Showcases: Applications Powered by Europe



GEOVIQUA



BIO\_SOS



EGIDA PROJECT



FAIR-EASE

Building Interoperable Earth Science & Environmental Services



EGIDA PROJECT

ConnectinGEO



COHECO  
MONITORAGGIO / RICERCA / AMBIENTE



uncert|web



Blue-Cloud2026

A federated European FAIR and Open Research Ecosystem for oceans, seas, coastal and inland waters



EuroGEOSS  
A EUROPEAN APPROACH TO GEOSS




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## EU projects: on-going

 Funded by the European Union  
Financé par l'Union Européenne  
Financiado pela União Europeia



NewLife4Drylands  
LIFE20 PRE/IT/000007

NBFC  
NATIONAL BIODIVERSITY FUTURE CENTRE



GREAT  
Green Deal Data Space



trigger



# EUROGEO WORKSHOP 2023



EP	CC	SD	DRR	RC
PC	CC	BL	POL	



## Italy coordinates the GEO-Geohazard Supersites and Natural Laboratories initiative (GEO-GSNL), established in 2010.

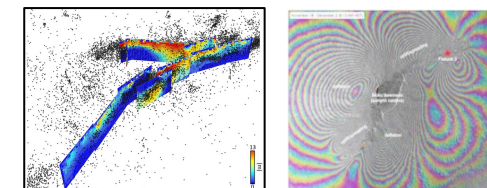
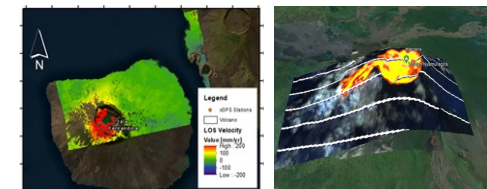
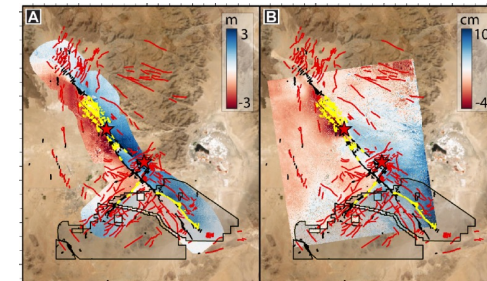
GEO-GSNL is a **global network of 14 seismic and volcanic Supersites**, where a large community of scientists works to generate state of the art scientific products **to support decision making in Disaster Risk Management**.



**Stefano Salvi**

Using an **Open Science** approach, the network provides access to satellite imagery (4000+ images per year), in situ geophysical data and technological resources, promoting sharing of scientific knowledge, capacity development, and innovation in DRM.

The main partners of GEO-GSNL are the **CEOS space agencies** and the local **geohazard monitoring institutes**.



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# EUROGEO WORKSHOP 2023



Nicola Pirrone  
Sergio Cinnirella



Browse & select anthropogenic emission data by Country and Industrial Sector (A)

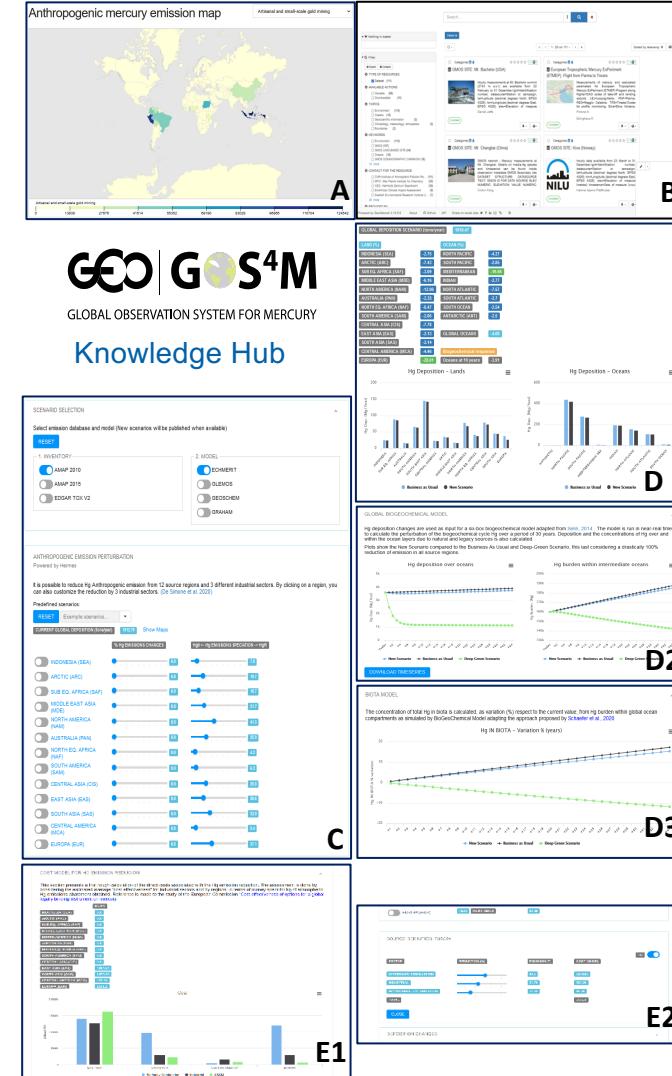
Browse and download dataset on Hg concentration in air, water and biota as well ancillary parameters (B)

Evaluate changes in deposition patterns & trends over land and oceans (D1), long-term trends of Hg concentrations in oceans (D2) and marine biota (D3) by interacting with a dashboard (C)

Evaluate cost-effective strategies, including investment costs, aiming to achieve a given risk mitigation target (E1-2)



gos4m.org/kh





EP	CC	SD	DRR	RC
PC	CC	BL	PO	



## PanAfGeo Phase-2 (2021-2024)

Pan-African Support to the EuroGeoSurveys - Organization of African Geological Surveys (EGS-OAGS) Partnership



**Giuseppe  
Delmonaco**

Organization of **30 trainings** (desk+field) in **18 host African countries** addressed to **750 young African geologists** from African Geological Surveys on subjects such as:

- **Governance of mineral resources**
- **Sustainable exploitation of non-energy mineral resources**
- **Prevention and mitigation of natural and man-made disasters**
- **Development of local mining private sector**



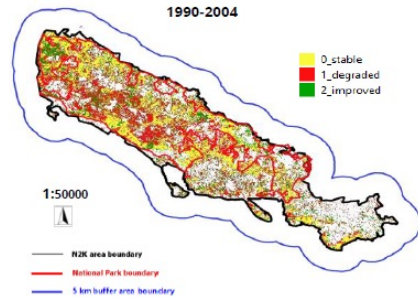


# EUROGEO WORKSHOP 2023

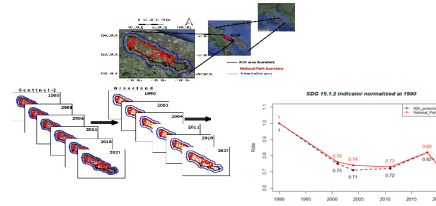


EP CC SD DRR RC  
 PC CC BL PO  
 15 LIFE ON LAND

## SDG 15.3.1: "Proportion of land that is degraded over total land area"



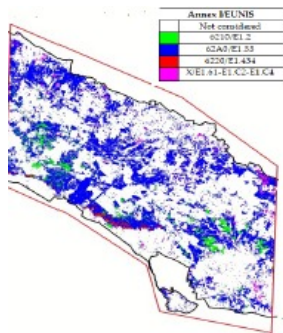
## SDG 15.1.2: "Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type"



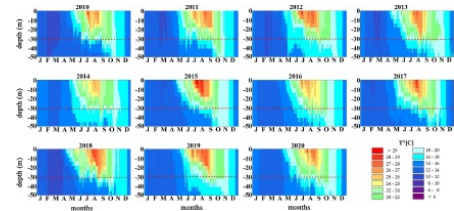
Patrizia Adamo



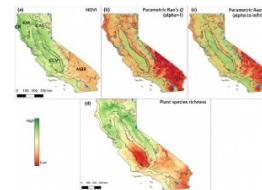
## Habitat Mapping



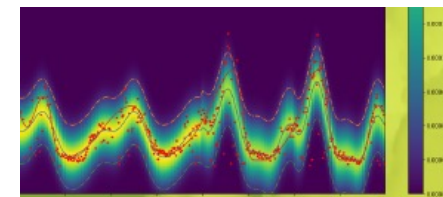
## Global warming effects on vegetation



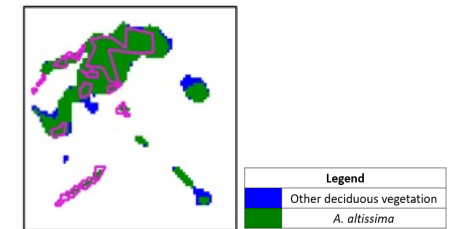
## Ecosystem Heterogeneity measures



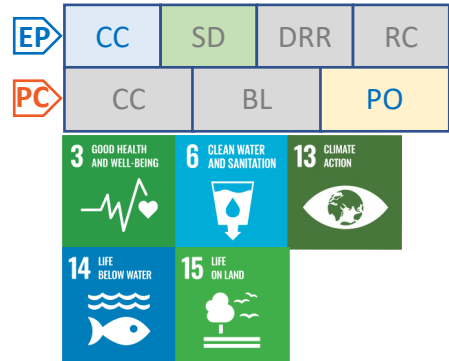
## Ecosystems Phenology & Primary Productivity



## Invasive Species Mapping



# EUROGEO WORKSHOP 2023

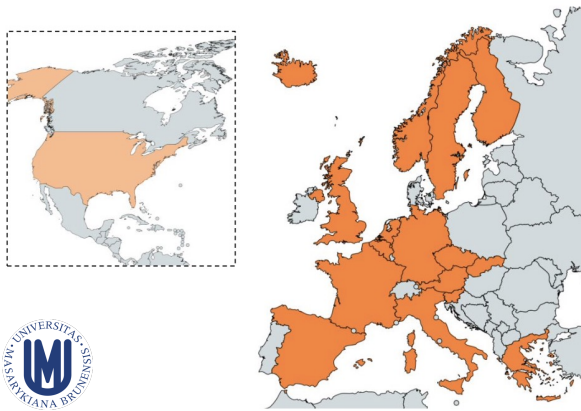


[www.eirene-ri.eu](http://www.eirene-ri.eu)

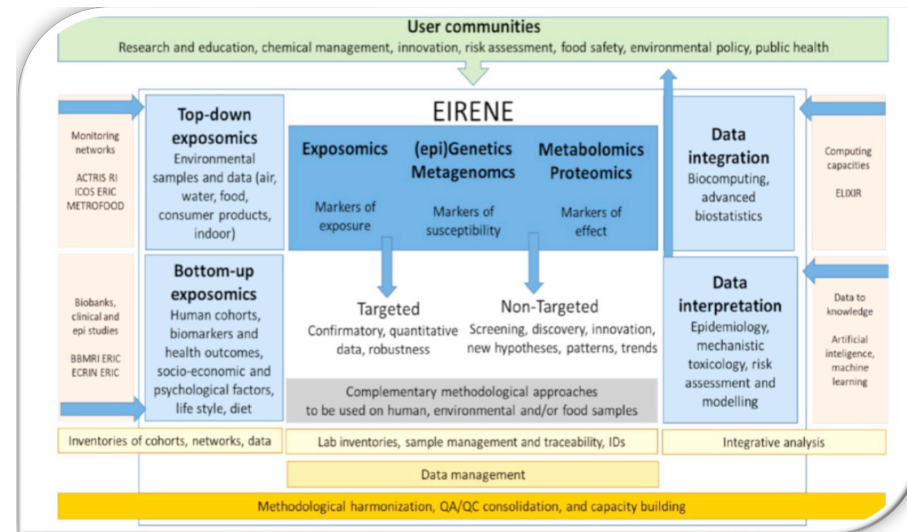
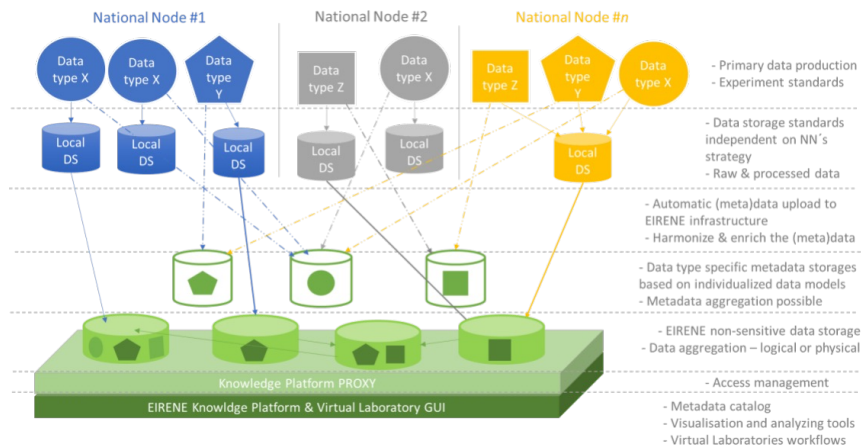
## Research Infrastructure for Environmental Exposure assessment in Europe



Nicola Pirrone



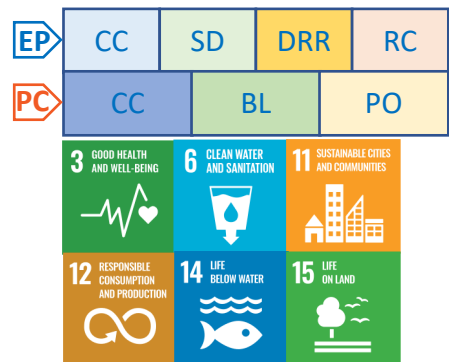
17 national hubs, 50+ individual partners



EIRENE\_IT node: **CNR – ISS – ASI**

BOLZANO 2-4 OCTOBER 2023





**Green Deal Data Space Foundation and its  
Community of Practice**



**GDDS vision in the support of endorsement process**

GREAT is tasked to establish the Green Deal Data Space (GDDS) foundation & Community of Practice

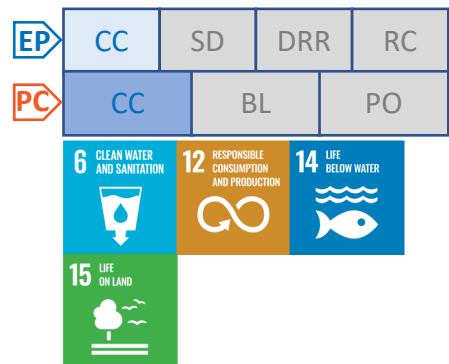
**The design of the GDDS framework** is driven by the requirements of use cases that address the following **3 Green Deal actions**: 2030 Biodiversity strategy, Zero-pollution Action Plan & Climate Change Adaptation Strategy.

*More details*

**Tuesday 3 October 2023**

14.45 – 15.45 | **Building the Green Deal Data Space in a way that contributes to GEO**





**Delivery of the "GEOSS Vision" document** under discussion with EC DG-RTD and EC-JRC, and for future discussion in EuroGEO and GEO (GIDTT)



**Development of demos of Earth Intelligence generation with the GEOSS Platform** and its enhancements for data/models sharing and reuse

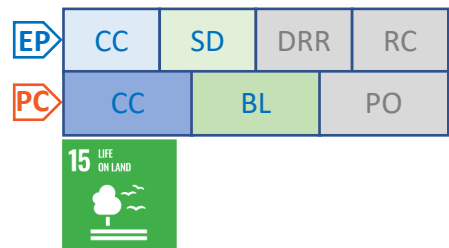


**H2020 I-CHANGE** (Individual Change of HAbits Needed for Green European transition)



**HORIZON TRIGGER** (SoluTions foR mltiGatinG climate-induced hEalth tReaths)





Carmela Marangi

## SPREAD AND CONTROL OF INVASIVE ALIEN SPECIES

### ACTIVITY:

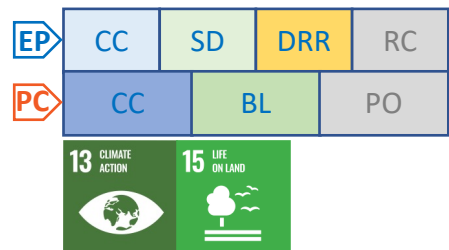
- **Predictive models** for the spread and control of invasive alien species.
- Spread and control of *Ailanthus altissima* in Alta Murgia National Park.
- Mathematical models in virtual environments.
- **COINS workflow** (*Ailanthus Altissima* validation case of the **International Joint Initiative of LifeWatch ERIC** on invasive species).
- **Integration of data** from multiple EO sources

## CARBON CYCLING AND RESTORATION

### ACTIVITY:

- **Assessment of Soil Organic Carbon trends** in Alta Murgia and Margurski National Parks.
- **Response of SOC change Index** to environmental changes; sensitivity analysis.
- **Modeling of wetland ecosystems** in multiple change scenarios, conservation/restoration models, development of a conceptual framework to translate knowledge and tools into policies.
- **Upscaling and integration** for the assessment of the status and restoration potential of wetlands in Europe.
- Models for **climate change mitigation in wetlands**.

# EUROGEO WORKSHOP 2023



Antonello Provenzale

## CRITICAL ZONE DYNAMICS

### ACTIVITY:

- **Measurement and modelling of carbon and water fluxes** in natural ecosystems (mountains, Arctic, wetlands).
- **Response of ecosystem-driven carbon and water fluxes** to climate and land use changes.
- **Assessment of regional climate** and local microclimate changes in high-mountain areas.
- **Modeling of the wetland carbon cycle** in multiple change scenarios.
- **Use of ground data** to calibrate and validate RS-based models and upscaling of carbon flux estimates.

## WILDFIRES AND DROUGHTS

### ACTIVITY:

- **Modelling droughts** occurrence and impacts in Mediterranean areas.
- **Modelling of burned area** as a function of environmental and climatic drivers.
- **Interaction between vegetation biodiversity and wildfire dynamics.**
- **Future projections** of expected burned areas for different climate and land cover conditions.

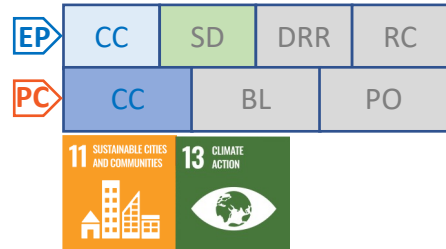




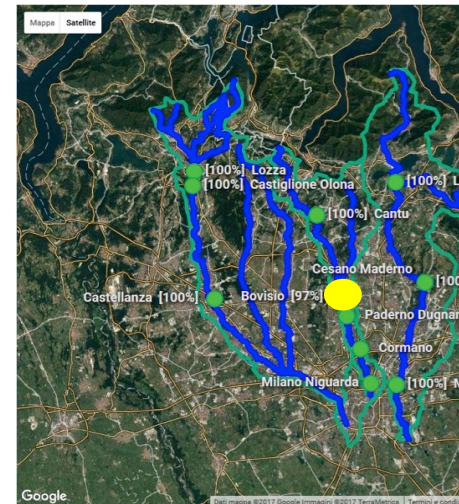
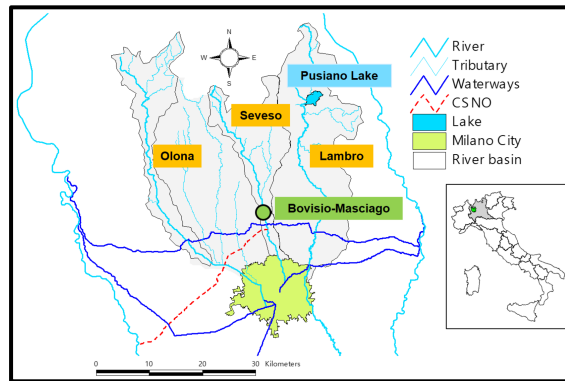
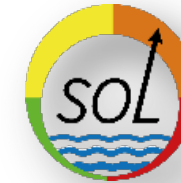
## SOL FloWS: Seveso Olona Lambro Food Warning System Real time Flood Hydrograph Forecast and Observation



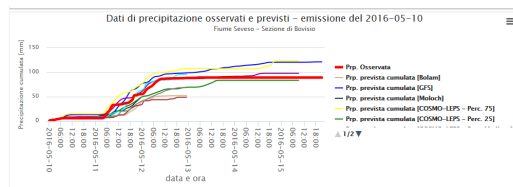
Marco Mancini



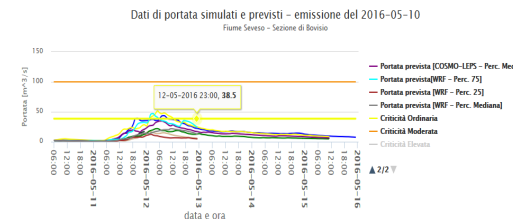
<https://www.sol.polimi.it/>



Stazione	Oggi	Domani	Doppodomani
Lozza	🏠	🏠	🏠
Castellanza	🏠	🏠	🏠
Cantu	🏠	🏠	🏠
Paderno Dugnano	🏠	🏠	🏠
Peregallo	🏠	🏠	🏠
Milano via Feltrè	🏠	🏠	🏠
Bovisio	🏠	🏠	🏠
Lambrugo	🏠	🏠	🏠
Castiglione Olona	🏠	🏠	🏠



**Multi-model meteorological forecasts: precipitation**



**Hydrograph forecasts & discharge thresholds**





*Project proposal under negotiation*

## **EuroGEOSec - Establishing the EuroGEO Secretariat to Support the EuroGEO Initiative**



**Nicola Pirrone  
Sergio Cinnirella**

*More details*

**Wednesday 4 October 2023**  
9.00 – 10.45 | **Shaping EuroGEO**  
**Coordinator: Thierry Rankin**



**Nicola Pirrone**  
co-Chair of AgData



It will support the transition to sustainable agriculture while strengthening policy monitoring and evaluation by harnessing the potential offered by various data technologies used in combination with Earth observation, environmental and agricultural reference datasets, precision farming machinery and other data sources.

National coordination with support of  
MUR and MASAF



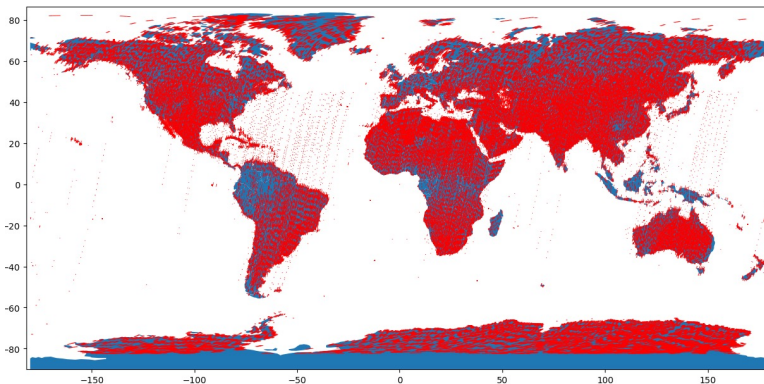


## PRISMA Satellite

**PRISMA data catalog through GEOSS (Daily update).**

PRISMA acquisition feasibility tool online and toolbox available soon.

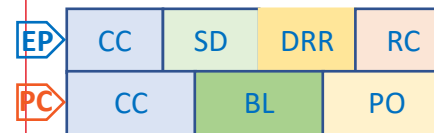
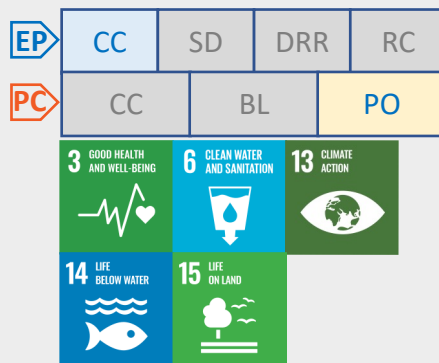
ARCHIVE 247k @06.06.2023



<https://prisma.asi.it>

[prisma\\_missionmanagement@asi.it](mailto:prisma_missionmanagement@asi.it)

Kicked-off a prototype project (**APEMAIA**) to assess population risk exposure at urban level, in the Southern Italian area, under a ASI-CNR/IIA Agreement. Planned extension to the other areas. Expected results also to support evaluation of SDG Indicators



Giovanni Rum

## Space for Climate Observatory - SCO



SCO is a GEO Participating Organization

- ASI signatory and early Supporter
- ASI Member of the SCO Programme Board

<https://www.spaceclimateobservatory.org/>



## Private sector





## Sustainability – Supporting Agenda 2030 SDGs and EU Green Deal



**Fabio Volpe**

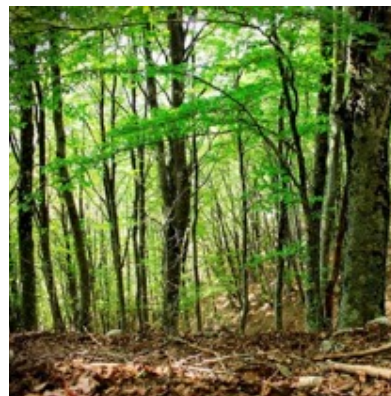
### Agriculture Sustainability



#### Agriculture support services

Monitoring productive and sustainable agriculture, supporting farmers in the optimal management of their plots, and institution in the production control

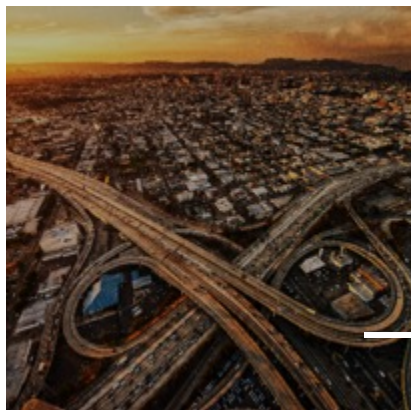
### Environment Sustainability



#### Thematic mapping services

Support to land environmental quality maintenance, monitoring of land degradation and of forestry environment  
Monitoring of coastal environment evolution, water pollution, support to illegal fishing detection

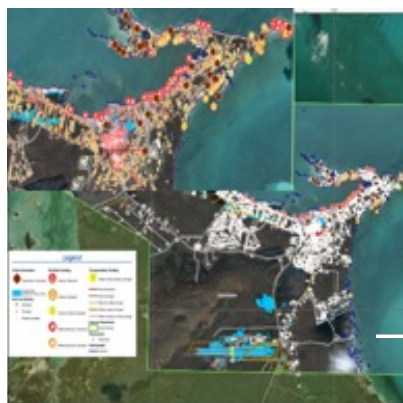
### Resilience and Risk Reduction



#### Land and infrastructures monitoring services

Monitoring buildings, infrastructures, terrain for analysis, modeling and early detection of anomalous behavior and conditions that can affect resilience and safety

### Emergency Response



#### Emergency mapping services

Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction  
Support disasters management and post disasters activities



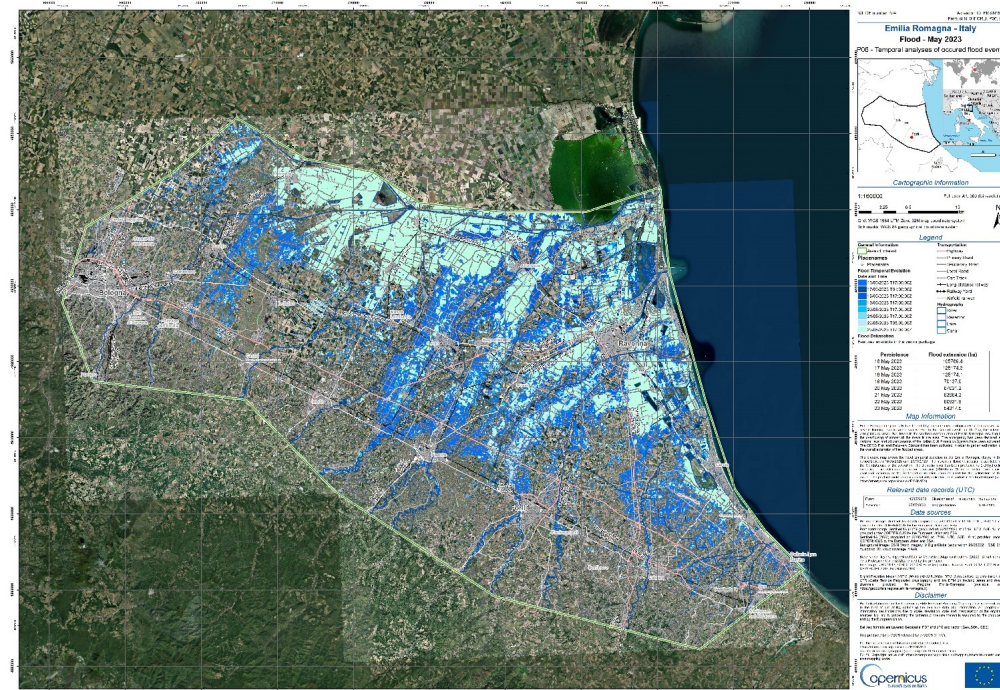




**Fabio Volpe**

## Managing Emergency for climate change extreme weather events

- **e-geos** is Prime Contractor of Copernicus EMS, providing timely geospatial information for supporting emergency situations after severe weather events due to climate change



**24/7**   
OPERATIONAL

**ALL**   
MULTIMISSIION  
SENSORS

**40+**   
EXPERIENCED  
OPERATORS

**5000+**  
MAPS PRODUCED  
IN 8 YEARS



**700**  
ACTIVATIONS OF THE e-  
GEOS EMERGENCY  
MANAGEMENT SERVICE

**40+**  
COUNTRIES



**BOLZANO 2-4 OCTOBER 2023**



	CC	SD	DRR	RC
	CC	BL	PO	

Emergency Management Service - Mapping

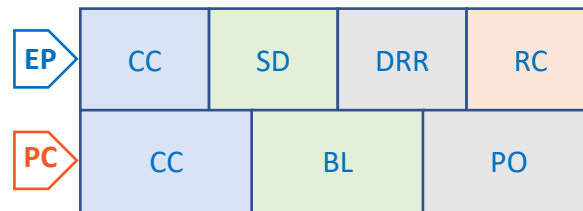
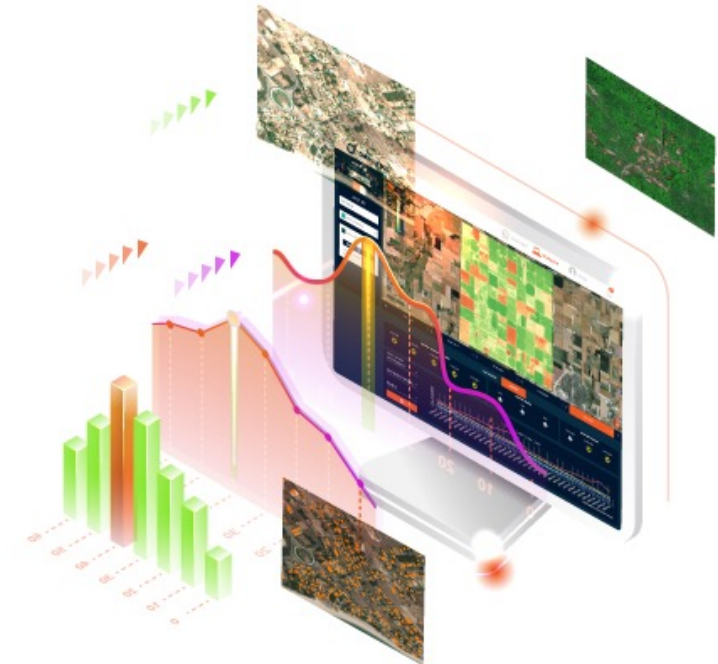


**Empowering cities to embrace sustainability and take ESG (Environmental, Social and Governance) decisions.**

**All-in-one Urban Data Analytics Platform** powered by satellite imagery and artificial Intelligence tools.

*To help cities plan their way to carbon neutrality (zero carbon 2030) through proprietary algorithm that estimates the amount of CO2 that urban green infrastructure is able to capture.*

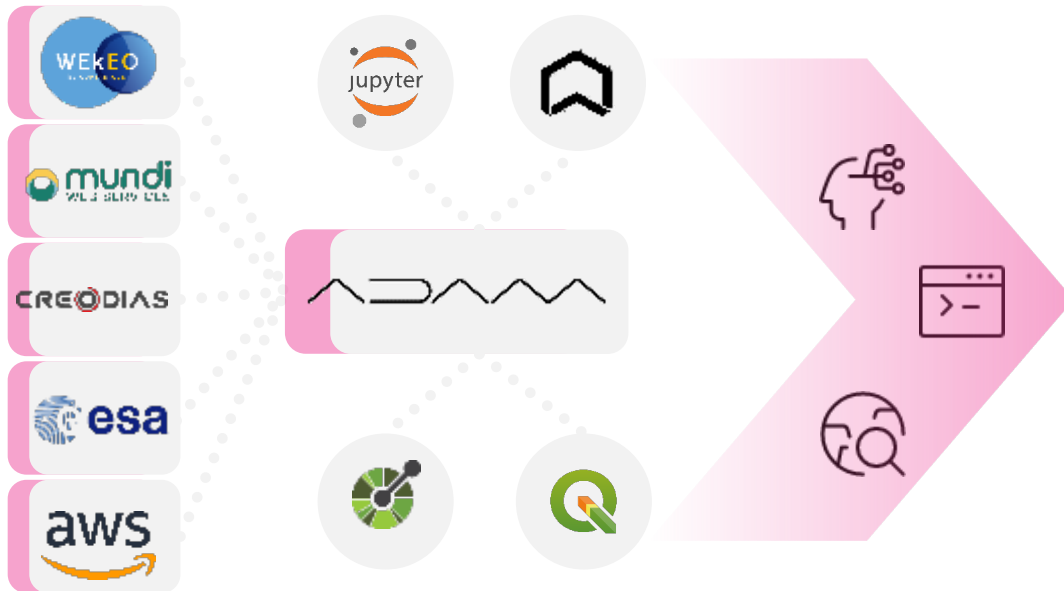
*Our model enables urban planners to learn from the past, monitor the present and shape the future.*



# EUROGEO WORKSHOP 2023

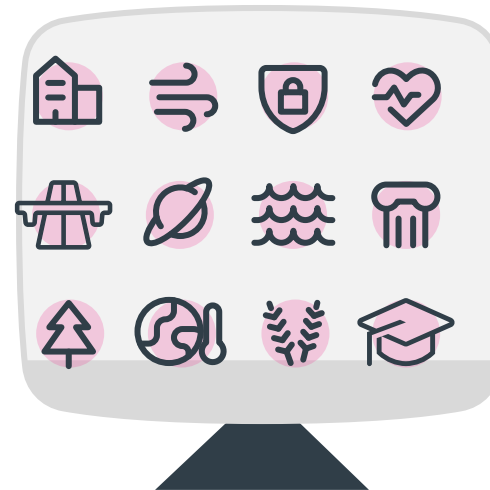


## GEO DATA BROKERING



- Discovery
- Catalogue
- Interoperability
- Access
- Standardization
- Visualization

## THEMATIC DOMAINS



- Air Quality
- Cultural Heritage
- Climate Risk
- Super Resolution
- Training
- Dissemination







Marco  
Folegani

### **GEO DATA BROKERING**

**RELIANCE FAIR** research in ESOC  
(<https://www.reliance-project.eu/>)

**DTE Hydrology**  
(<https://explorer.dte-hydro.adamplatform.eu/>)

**e-shape pilot FRIEND Flood data access**  
(<https://e-shape.eu/>)  
(<https://friend.adamplatform.eu/>)

**EO4EU EO and Climate data access**  
(<https://eo4eu.eu/>)

**NEANIAS Novel EOSC Services**  
(<https://www.neanias.eu/>)

### **THEMATIC DOMAINS**

**SDGs-EYES Sustainable Development Goals**  
(<https://sdgs-eyes.eu/>)

**ILIAD – Digital Twin Ocean**  
(<https://www.ocean-twin.eu/>)

**RESCUEME – Cultural Heritage**  
(<https://resilientculturallandscapes.eu/>)

**SHELTER Cultural Heritage**  
(<https://shelter-project.com/about/>)

**ESA GDA Global Development Assistance**  
(<https://gda.esa.int/>)

**AI4Copernicus pilot SR4C3 Climate Crisis**  
(<https://ai4copernicus-project.eu/>)  
(<https://ai4copernicus-project.eu/sr4c3-super-resolution-for-climate-crisis-context/>)



## Rheticus® Marine

- **User:** National and Regional Governmental Institutions in charge of environmental monitoring and reporting
- **Initiative:** Copernicus Marine Environment Monitoring Service (CMEMS) and EMODnet
- **Service Provider:** CMEMS and EMODnet

**Target 13.1:** EO services based on Identifying, monitoring and preparing for climate related hazards

**Target 14.1:** EO services based on Integrating data & monitoring for marine pollution. Indicator 14.1.1: Coastal marine pollution



## Rheticus® Safeland

- **User:** Regional to local authorities, Environmental protection agencies, Civil engineering companies
- **Challenge/Needs:** Land instability represents a serious source of danger for citizens safety, infrastructure safeguarding and environmental protection. Prioritize areas based on the level of concern to better manage inspection and investments for stability works represents a huge need
- **Initiative:** Internal Development

**Target 1.5:** EO services focus on: Build resilience of vulnerable populations contributing to management of disaster risk reduction. Indicator 1.5.2: Disaster Damage

**Target 9.1:** EO services based on Inform on infrastructures development & planning.

**Target 11.5:** EO services based on Mapping of vulnerable disaster areas & early warning systems



References links

<https://marine.copernicus.eu/services/use-cases/rheticus-marine-support-eu-marine-strategy>

<https://www.rheticus.eu/rheticus-services/marine/>



## Rheticus® Network Alert

- **User:** Water and Wastewater Utilities
- **Challenge/Needs:** improving inspection planning & efficiency of water and sewerage networks, by enabling predictive analysis to prevent structural failures.
- **Initiative:** Internal Development
- **Results:** multi-utilities improved stressed pipeline detection and inspection efficiency of about 40%
- **Service Provider:** Planetek Italia's Rheticus platform

**Target 6.4:** EO services based on Water user efficiency. Indicator 6.4.1: Water user efficiency & 6.4.2: Water stress

**Target 9.1:** EO services based on Inform on infrastructures development & planning.

planetek  
italia

Giovanni  
Sylos Labini



## Rheticus® Aquaculture

- **User:** Fish & Shellfish farms
- **Challenge/Needs:** threats caused by climate change and worsening of environmental conditions may cause variations on quantity and quality of nutrients, or on sea temperature eventually affecting productivity, mussels' quality or sanitary conditions.
- **Initiative:** several mussel farming sites monitored as agreed with Associazione Mediterranea Acquacoltori.
- **Service Provider:** Planetek Italia's Rheticus service

**Target 2.3:** EO services focus on Management of farming

**Target 6.4:** EO services based on Water user efficiency. Indicator 6.4.1: Water user efficiency & 6.4.2: Water stress







## GEO ITALY (2025-2035)

- ✓ **Consolidate GEO Italy Governance** by involving all interested parties.
- ✓ **Actively contribute to build EuroGEO Secretariat** by enhancing NCMs in the context of the GEO post-25 strategy's guiding principles.
- ✓ **Contribute to increase the engagement of the private sector** in GEO.
- ✓ **Expectations: reinforce the European capacity** to strength EO value chain that through a co-design approach should ensure EO products and services fit-for-purposes to improve the policy-making process - **increased social benefits and equity** are expected - **all this should be the core of the Earth Intelligence.**



***Thank you***