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JRC CONFERENCE AND WORKSHOP REPORT

# EuroGEO Annual Workshop 2023 Proceedings

*Linking national,  
European, and global  
perspectives*

A. Kona, G. Giuliani,  
M. Di Leo, B. Tapsall.

2023

Joint  
Research  
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# Abstract

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The EuroGEO workshop held in Bolzano, Italy from October 2 to October 4, 2023, was a significant event that aimed to align European activities with the new strategy of the Group on Earth Observations (GEO) and support the coordination and interlinking of actions at national and European levels to contribute to GEO's initiatives. This report serves as a workshop proceeding report, capturing the key discussions, presentations, and outcomes of the workshop. With 350 participants from 54 countries (half in presence), the workshop covered diverse aspects of Earth observation and geospatial activities. The workshop began with an open session on national GEO activities and discussions on sustainable practices. The five EuroGEO Action Groups convened in separate plenary sessions, delving into key challenges and opportunities. The second day featured 12 parallel thematic sessions, fostering focused discussions on specific topics. The final day focused on shaping EuroGEO's role and optimizing its positioning within the Earth observation landscape. Strategic roundtable discussions and planning sessions allowed participants to reflect on progress and identify areas for improvement. Overall, the report provides a comprehensive summary of the workshop, serving as a valuable resource for understanding European activities in Earth observation and geospatial activities and fostering collaboration among stakeholders.

# Foreword

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## Opening speech J.Drake

Dear participants to the EuroGEO Workshop 2023, it is a great honour for me to join you in this opening session. Like 10 months ago at the last edition of the EuroGEO workshop in Athens, I am impressed to see that the community has once again replied positively to the invitation to meet in this beautiful region of Italy.

I am particularly thankful to our Italian colleagues from the CNR and the Eurac Research Centre to have joined their forces to make this event a reality and grateful as well to my colleagues from the European Commission's Research Executive Agency for having financed and helped putting together an exciting agenda.

Let me start first by sharing a few considerations on the why we are here and where we want to be in the coming years. In my opening speech last year, I emphasised the urgency of the crisis affecting us, and unfortunately, some would have said, as expected, we witnessed in the last months disasters which impacted lives of thousands of people, being wildfires in Greece or the recent floods in Libya.

Rather than falling into some climate-change catastrophism, let us see how at our level we should proceed, and which concrete actions can be taken. I see three driving forces for our action: a community, a framework and a range of technologies and tools.

### **EuroGEO community**

Let us start with the community. Five years ago, when we launched the EuroGEO initiative, we knew the value of establishing a strengthened European approach to leverage the impact of GEO resourcing in Europe from regional to local scale.

We wanted to build upon, network and promote further incubation and scaling-up of the most promising user-oriented services conducted at national or EU levels by the members of the European GEO Caucus.

We are however at a turning point of EuroGEO.

Did we really progress on supporting the consolidation of national GEO management structures across Europe, or on showcasing GEO benefits to European citizens, science and business?

The upcoming Coordination and Supporting Action (CSA) on the EuroGEO Secretariat represents a unique opportunity to debate on the future of EuroGEO and explore the different models that could ensure its sustainability.

While limited in terms of time and budget, I count on you and on the whole community to join forces and support this project.

Wednesday debates will certainly help identifying the priorities for action.

The European Commission is certainly not stepping back, and we are ready to support you in the coming years, and in particular in view of the remaining work programmes of Horizon Europe.

Be aware as well that in less than two weeks, we will open the call on Pre-commercial Procurement on Customisation/pre-operationalisation of prototypes end-user services in the area Climate Change Adaptation and Mitigation.

This is a non-negligible effort (we are talking EUR 19 million) in moving forward along the value chain.

There is a range of other EO related topics in 2024 throughout the Horizon Programme, that we have put together in a brochure that you can find on the registration desk<sup>1</sup>.

This summer the 5 EU Missions have been confirmed in their activities. If you have not yet looked at the opportunities that the 4 Missions serving the European Green Deal offer, I kindly invite you to have a look and come on board.

## **GEO Framework**

What makes us distinctive from other communities interested in earth observation is our common engagement in GEO. GEO as well is at a turning point of its history.

Many of you have helped imagining and putting on paper what GEO should do in the next 10 years. Time will come however to translate the overarching principles formulated in the post-2025 strategy that we are about to approve in Cape Town in a coherent implementation plan.

We all know that success of the initiative and its effective impact will depend on your active engagement. And we would appreciate getting your views on how we, as EuroGEO, can support and shape the governance and the functioning of GEO

1. <https://op.europa.eu/en/publication-detail/-/publication/b1b2b100-582b-11ee-9220-01aa75ed71a1/language-en/format-PDF>

## **GEO tools and technologies**

Let me finish by referring to the tools and technologies we need to deploy to be impactful. Debating the future of GEOSS has been a recurring issue in the history of GEO, and while we as Europeans have always been at the front line for its development, the question of its usefulness keeps coming back and contrasts with the multitude of platforms around the world.

Let us remember that we should still look at user needs and be realistic that we should not compete with large multi-million data platforms. Who are our users, what GEOSS services could be offered that the other platforms are unable or unwilling to deliver?

What makes Europe a different entity with respect to the rest of the world, and how can we organise ourselves to serve the specific needs of that community?

Those are some of the questions that I hope will be discussed in the coming days and when preparing the next phases of GEO and EuroGEO.

## **Conclusions**

Looking at the agenda, I am impressed by the incredible diversity of applications making the best use of our European EO assets. This rich landscape puts us certainly in a privileged position with respect to the design of the post-25 GEO.

I wish an excellent workshop and look forward to following your debates for the time I am still in Bolzano.

Thank you very much for your attention.

**Joanna Drake**

Deputy Director-General  
Directorate-General for Research and Innovation



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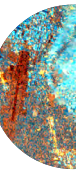
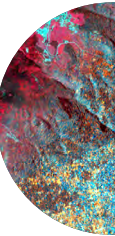
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# Executive Summary

Earth Observations (EO) is performed on a local, national, regional (European) and global level. It is based on a range of monitoring capacities including space-based, airborne, seaborne, or land-based observation systems, including in-situ data and observations coming from citizens. The European contribution to the Group on Earth Observations (EuroGEO) aims at **enhancing the coordination of EO activities and data exploitation in Europe**.

EuroGEO has developed a strategy around 3Cs: **coordination** of user driven activities to ensure a coherent European contribution to GEO; **combination** or integration of activities to reach critical mass of use; and **cooperation** beyond individual programmes and user communities in Europe

Every year, the EuroGEO community organised a workshop to **strengthen user-driven demand for EO information and knowledge** targeting four types of end-users that spans from decision makers and researchers to the private sector. This year, the EuroGEO Workshop was held in Bolzano/Bozen (Italy) from 2 to 4 October 2023, and was hosted by the EURAC Research. It brought together about 350 participants from 54 countries across the world (50% of which attending in presence).

These attendees contributed to 23 presentation sessions, 6 roundtable discussions and four surveys targeting key topics across different audiences. The participatory process aimed to position the European activities in alignment with the GEO Strategy 2025, supporting the coordination and interlinking actions at national and European level across sectors (Figure 1). More information can be found at: <https://egw2023.eurac.edu>.

## Figure 1

Satellite image of Bolzano/Bozen (Italy) venue of the EuroGEO workshop 2023.

Source: EURAC Research Institute Michele Claus, 2023 note.



This executive summary revolves around three axes: Achievements – Challenges – Way Forward. Each summarises the main outcomes of this workshop regardless of the sector.

## I. Achievements

**EuroGEO is gaining momentum** with an increased awareness and a strong interest from data producers and users to contribute. These aids building a sense of community across the continent, bringing together the different EO sectors, while advocating for alignment with EU values such as openness, fairness, and increased accessibility; among the examples:

- The **R&I component of the value chain is strong** with massive/substantial investments in EO programmes, such as the **Copernicus programme**, and infrastructures such as: Copernicus Data Space Eco- system (CDSE), European Open Science Cloud (EOSC), etc.. These infrastructures are effectively used in numerous EU-funded projects (e.g., Open Earth Monitor, EO4EU, GREAT, AD4GD, Faircube, Usage, B3) and are contributing to **build common EU data spaces for EO**.

It should be emphasised the important effort achieved by the EU to support the effective use and accessibility (through research infrastructure) of **in-situ** data that are essential for many components of the EO value chain (training and validation of AI models; validation of models based on remote sensing imagery, etc.).

- Amongst other key legacy elements, the e-shape project has built a strong and effective **co-design methodology** considering EO specificities, to connect various and heterogeneous ecosystems of data and usages, through the development of EO-based services, and support their dynamics in a long-term perspective.



**Figure 2**

Funding opportunities in Horizon Europe for 2024

Source: <https://op.europa.eu/en/publication-detail/-/publication/b1b2b100-582b-11ee-9220-01aa75ed71a1/language-en/format-PDF>

- EuroGEO supports **community networking** and partnership fostering cross-disciplinary knowledge exchange, facilitating multi- & inter-disciplinary research and application developments, promoting collaborative approaches to address regional policy needs and contribute globally.
- The involvement of national EuroGEO focal points through the **High-Level Working Group** (HLWG) ensures good coordination among the EC and Member States, strengthening the governance.
- The European community's voice is effectively represented at GEO through EuroGEO. This platform serves as an **interface** between the European community and GEO, aiming to **enhance the impact and visibility** of the European Union within the **GEO framework**.
- Finally, it should be noted that EuroGEO is **promoting EU values of Openness and FAIRness** through the Digital strategy, progressively improving standardisation of data collection and products validation, resulting in enhanced interoperability, while at the same time strengthening more open and replicable scientific practices in Europe.

## II. Challenges

Despite the comprehensive achievements reached so far by Europe in the field of EO, some challenges still persist, which relate to three major themes: Strategy; Data & Knowledge management and Sustainability of the EO Value Chain.

**Strategy:** Aligning with EU policies, establishing a governance process of EuroGEO, breaking silo barriers and continuing to **increase multi- & inter-disciplinary** approaches.

- The **role and objectives of EuroGEO should be clear** enough that contributors can easily understand the potential benefits, facilitating their engagement while at the same time building trust. In particular, it has been recognised that EuroGEO should understand the **needs & requirements** of national and regional stakeholders. Not all EU Member States (MS) were represented in the EuroGEO workshop (i.e. 22 MS out of EU27).
- EuroGEO should also **coordinate national and regional initiatives** to contribute to both EuroGEO and GEO activities (i.e. avoid duplications); and should increase the connection with the Copernicus programme to foster cooperation, both in terms of **governance and implementation**.



**Data & knowledge management:** enhancing **effective data management practices** to improve data accessibility, interoperability, and harmonisation of existing dataset collections, standardisation, licensing, and intellectual property (IPs):

- Regarding the data management practices, it has been stressed the importance of data ecosystems/data spaces approaches as a mean for **enhancing the accessibility and integration of multi-source data**, particularly for **in-situ data** which are essential to build effective data value chains. With the increasing volume of data, as well as the increasing spatial and temporal resolutions that are required, **processing is becoming an important challenge** to consider when helping users to efficiently analyse data in a cost-effective manner.
- Particular attention should be paid to **data quality metrics** (e.g., uncertainty and accuracy) that are often (partially) missing and could hinder their effective uptake both in the market and/or by decision makers. Establishing a European label of data quality could increase trust in EO-based information products.
- **Data licensing** is also an important aspect to consider as many data products are currently lacking such key information to facilitate their (re-) use in an effective and efficient manner.
- Finally, the **readiness level of products/services is often difficult to assess** and consequently, many services are considered at a low Technology Readiness Level (TRL) and cannot be used to support decision-making processes.

**Sustainability:** ensuring the **sustainability of the value chain**, to increase the market standing of R&I within Europe.

- To ensure the **sustainability of the EO value chain** and strengthen the market uptake of the European R&I, several challenges have been identified. Besides the fragmented EO landscape, it is of key importance to avoid working in silos and facilitate the exchange between academia and private sector (i.e., reduce the feeling of competition).
- EuroGEO should help to increase the visibility/branding/promotion of EU products & services. This could also help to **clarify and maximise the impacts of European contributions to GEO** activities and Work Programme.
- The current gap between research and commercial sector is originating from research entities that do **not have sufficient understanding of the targeted market**, a willingness for end clients to procure their products in the future, the commercial requirement, and the evolution of these requirements. They also **do not have accurate enough estimation of the addressable market** or targeted market and need support to design their

marketing strategy. Ideally, research entities should **move from a project vision to a product (commercial) vision**.

- Operationalisation per design and products should target customer's needs. Indeed, current research projects **rely on public funding for a short period** (usually 3-4 years) and therefore are concentrated on developing new EO-based solutions that improve their business model, resulting in an imbalance between the needs of the markets and the products/services developed.
- In addition, there are often **numerous projects that makes difficult to have a realistic understanding/access and visibility of their TRLs**; this contributes to reduce the visibility and the clarity of Europe's position on EO-based solutions.
- Finally, clarity and guidance is required on **how intellectual property (IPs) should be exploited** to ensure the effective uptake of developed EO products/services.

### III. Way forward

Various recommendations were gathered, especially during the roundtables, aiming at strengthening the EuroGEO initiative and improving the overall visibility of the EU contribution.

The first set of recommendations addresses **strategy** and aims to improve the coordination of contributions across Europe. EuroGEO is a strong and active community that should have a clear long-term vision to efficiently coordinate the diverse contributions. This coordination effort should focus on facilitating the involvement of different organizations.

- To achieve this, it is important to make the incentives for **sharing and disseminating** best practices and following EU values more prominent. By doing so, EuroGEO can increase awareness, inclusiveness, and **representativeness across Europe**.
- To enhance governance, **a clear understanding of roles and activities** within EuroGEO is recommended. This will decrease confusion and ensure effective coordination. Additionally, establishing a clear mandate between national and EU levels is crucial to prevent duplication of efforts and ensure efficient collaboration.
- **Improving communication** is another key aspect. Making EU contributions and outcomes visible to the largest extent possible will help stakeholders understand the importance and impact of EuroGEO's work. This will also contribute to increasing awareness, commitments, and empowerment of EU resources.
- EuroGEO plays a crucial role as an **umbrella coordination initiative**, effectively promoting best practices, tools, coordination, and the success of National GEOs in engaging users. This collaboration would result in mutual benefits, as **National GEOs**

can utilise the tools promoted by EuroGEO to transform solutions offered to national users into operational services. Conversely, it would also enable the sharing of new practices and insights to benefit the entire community.

- With the forthcoming establishment of the EuroGEO Secretariat, it becomes essential to **integrate best practices from national GEOs** and map potential contributions. This will prevent the oversight of relevant activities, strengthen existing cooperation, and foster further collaborations and integration of different disciplines, approaches, visions, and motivations. Additionally, it will facilitate the sharing of data, products, services, best practices, success stories, and methodologies such as co-design. By promoting networking, engagement, and the creation of synergies, EuroGEO can contribute more consistently to the European participation in the Group on Earth Observations (GEO).

The second set of recommendations addresses the **technical challenges**, in particular **data & knowledge management**.

- Improving data management is crucial for **enhancing data accessibility** and making EO data ready for analysis. This can be achieved through a wider adoption of **interoperability standard**, which enable the integration of heterogeneous data sources following federated and sovereign data sharing approaches. By embracing the **digital ecosystem** paradigm, characterised by flexible and evolvable soft architectures, fragmentation can be addressed, and multiple stakeholders can contribute to the growth of a data space through agreements and logical building blocks.
- To make sense of the vast amount of EO data efficiently and effectively, it is essential to ensure **discoverability and interoperability** of existing cloud processing infrastructures. This will enable seamless utilisation of these infrastructures and facilitate the analysis of the wealth of data available. Additionally, adopting reproducible practices tailored to policy applications is crucial for building adequate EO value chains.
- To ensure the widespread adoption of data products, services, and tools developed across Europe, **capacity building and training** activities should be considered. These activities will enhance the uptake of these resources and **empower users to leverage the full potential of EO data**.
- Improving data accessibility, interoperability, and analysis readiness, along with adopting the digital ecosystem paradigm, will **facilitate the integration of heterogeneous data sources**. Ensuring discoverability and interoperability of cloud processing infrastructures and implementing reproducible practices tailored



to policy applications are essential for **building robust EO value chains**. Lastly, capacity development and training activities play a vital role in promoting the uptake of data products, services, and tools developed across Europe.

Finally, the last set of recommendations addresses the **improvement of market uptake**.

- In order to strengthen the European EO-value chain, it is crucial to raise awareness among the private sector about EuroGEO and Copernicus and align funding instruments such as Horizon Europe with regional priorities. EuroGEO can play a key role in facilitating private-public collaborations by serving as an interface to map existing services, identify gaps, and facilitate the development of downstream services that support emerging policy priorities and address urgent societal challenges. This would ensure that EU researchers engage closely with both public and commercial sectors, work closely with end-users, and develop products/services that undergo careful assessment before reaching high Technology Readiness Levels (TRLs).
- To encourage **engagement**, EuroGEO should also focus on effectively communicating the concrete benefits for entities to contribute to its objectives and mission. Clearly defining the scope and outcomes where contributions can be recognised, acknowledged, and supported is essential.
- Taking a global perspective can help in defining a **Unique Selling Proposition** (USP) for a targeted market, highlighting the problem being addressed, and demonstrating why the research is valuable. Additionally, embedding projects into nationally funded initiatives that support EuroGEO governance can contribute to their sustainability.
- To enhance the contributions of EuroGEO, it is important to ensure that the abundance of **activity-level data, tools, and knowledge is captured** in a more centralized manner, such as through the **Geo Knowledge Hub**. EuroGEO can serve as a platform to amplify and communicate European initiatives and legal instruments related to the adoption of Open Data and Knowledge, privacy, policy, and ethics. This would provide a blueprint for **fully integrating the EO value chain**, with all stakeholder groups effectively collaborating to promote wider adoption of EO in key decision-making processes and interventions, both within Europe and in other regions.
- This contribution can be further strengthened by **continuously assessing validated outcomes**, such as products and services to address policy priorities at the European and global levels for sustainable development. Additionally, coordination actions



should be undertaken to ensure political support and long-term sustainability by engaging both public and private sector investments.

- EuroGEO plays a pivotal role in **facilitating discussions** among a diverse range of stakeholders and bridging the gap between service providers and solution seekers. It can help translate the vast amount of data into meaningful knowledge that can be delivered to stakeholders.

When considering **future developments**, it is important to recognize that **governance** is just as crucial as technology regarding data sharing. As such, it should be integrated into the design process. Additionally, promoting continuous interactions throughout the year, rather than relying solely on annual workshops, is essential. There is a need to combine societal and policy needs with research challenges, emphasising the importance of a fully integrated, multidisciplinary, and systemic approach. Furthermore, **trust** plays a fundamental role in any data sharing initiative. Both aspects of trust are crucial considerations covering a twofold dimension:

- Trust through **compliance with policies**, privacy, ethics, and data sovereignty, which is a major focus for data spaces, and
- Trust in the **transparent generation of knowledge** from open and reliable data, open science practices and reproducible algorithms, which is a major focus in GEO for open data and open knowledge.



# 1 Introduction

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## What is EuroGEO?

EuroGEO has been launched as Europe's contribution to GEO, with the aim to promote the role of Earth Observations in support of addressing global challenges with a special focus on:

- *Coordination of GEO-relevant activities*: undertaken in Europe to ensure a coherent European contribution to the GEO initiatives and priorities.
- Contribution to the GEO initiatives and priorities
- *Implementing a user-driven research and innovation agenda*: to maximise uptake and engagement of EO applications that are addressing the GEO priorities, and require further demonstration, incubation, up-scaling, or replication.
- *Supporting cooperation*: among individual European and national programmes and user communities (e.g. Copernicus, ESA, NMHIs, European observing networks and Research infrastructures, etc.).
- *Coordination with other Regional GEOs*: in particular with view to sharing data, applications and good practices globally.

EuroGEO enables Europe to position itself as global force in EO thanks to the vast knowledge gained through running the **Copernicus**.

**Copernicus** is the Earth Observation component of the European Union's space programme and is performed on a local, national and European level. It is based on a range of monitoring capacities including space-based, airborne, seaborne, or land-based observation systems, including observations coming from citizens.

EuroGEO aims to provide a coherent picture of environmental and Earth observation in Europe by combining existing Earth observation assets and initiatives.



**Figure 3**

Cloud-free Europe image from Copernicus Sentinel 3.

Source: [https://www.esa.int/ESA\\_Multimedia/Images/2018/05/Cloud-free\\_Europe\\_from\\_Sentinel-3](https://www.esa.int/ESA_Multimedia/Images/2018/05/Cloud-free_Europe_from_Sentinel-3)

## Workshop factsheet

EuroGEO brings together and coordinates activities in Europe that contribute to the initiatives of the Group on Earth Observations (GEO). GEO is at a crossroad with defining its post-25 strategy which is planned to be adopted in November 2023 at the GEO ministerial summit in Cape Town (ZA). The new strategy moves from “Earth observation” to “Earth Intelligence” and shifts the focus from services to equity to bridge the global information gaps.

This year’s EuroGEO workshop provided the opportunity to position European activities in the light of the new GEO strategy and supports the coordination and interlinking of actions at national and European level and across sectors and domains to create relevant and impactful contributions to GEO.

**Dates:** Monday 2, Thursday 3, Wednesday 4 October 2023

**Location:** Bolzano Italy at Eurac Research

**Website:** <https://egw2023.eurac.edu>

**Gallery:** <https://egw2023.eurac.edu/gallery>

**Program:** <https://egw2023.eurac.edu/program-outline>

**People:** 350 participants from 54 countries (50% in presence)

**Content:** 120+ presentations

**Thematic:** 23 sessions – 12 roundtables – 4 surveys

**Variety:** 100+ speakers

**Plural:** 70+ organisations

## Program outline

The program outline for the EuroGEO workshop held from October 2 to October 4, 2023, provided a structured agenda covering diverse aspects of Earth observation and geospatial activities. Overall, the program outline reflected a comprehensive approach, incorporating national, thematic, and strategic dimensions to address the diverse aspects of Earth observation and geospatial activities within the EuroGEO community.

The workshop commenced with an “Open session focused on national GEO activities” held on Monday afternoon. Following this, attention turned to “Ongoing developments of Earth Observation Infrastructure and Services in Italy”, with a specific emphasis on sustainability (Open session – national GEO activities). While, on Monday morning, members of the five EuroGEO Action Groups convened in separate plenary sessions, each focusing on a specific thematic area. These groups included: Agriculture Action Group; Land Cover/Land Intelligence Action Group; Biodiversity, Ecosystems, and Geodiversity Action Group; Earth Observation Data for Sustainable Practices in Viticulture; Disasters, and Health Action Group ().

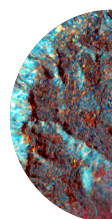
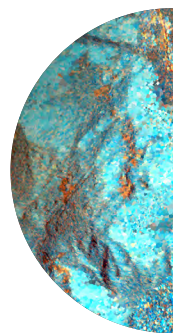
Tuesday’s program unfolded with a series of 12 parallel thematic sessions that spanned a wide range of topics, highlighting the diversity of interests within the EuroGEO community. These sessions covered areas such as Agriculture, Sustainability of Coastal Services, Urban Action Group, Digital Twin development in Europe, Scaling European Land Cover/Land Intelligence standards globally, Addressing climate-induced disasters and health challenges, Building the Green Deal Data Space, Elevating mountains in the GEO Post-2025 strategy, Renewable energies and climate, From Innovation to Market, Biodiversity, Ecosystems, and Geodiversity, and the role of EuroGEO in enhancing the availability, accessibility, and integration of in-situ Earth Observation data.

Wednesday’s agenda was dedicated to shaping EuroGEO, with a focus on optimizing its positioning and contribution to GEO. This day presumably included strategic roundtable discussions and planning sessions aimed at defining EuroGEO’s role in the broader EO landscape:

- Six roundtables were organized to gather insights from participants under the form of a World Café (i.e., facilitated discussions in small groups (<10)) and identify Achievements and Challenges of EuroGEO as well as define actions for the Way Forward to support the future EuroGEO secretariat (see Annex I).
- A plenary survey was conducted through SLIDO that consisted of three questions aimed at gathering feedback and insights from the participants. By collecting responses to these questions, the plenary survey aimed to obtain valuable input from participants, enabling a better understanding of their perspectives and preferences (see Annex II).



To conclude, JRC designed a Highlight form to collect key points from the parallel thematic session chairs and speakers regarding how their session's focus area and expertise can support the EuroGEO community at large and the Post Geo 2025 Strategy. It included 15 questions that aimed to gather insights and feedback on various aspects related to EuroGEO activities and their impact on the wider GEO community (see Annex III).



# 2 Main outcomes of the sessions

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Overall, the workshop seeks to strengthen the EuroGEO community, promote collaboration, and contribute to the development of effective strategies and tools for addressing global challenges through Earth Observation. The objectives of the workshop are as follows:

- Position EuroGEO in alignment with the new GEO strategy, ensuring that EuroGEO is well-positioned to contribute effectively to the goals and objectives of the Global Earth Observation (GEO) community.
- Identify and capitalize on synergies between national and European Union (EU) projects and initiatives, aiming to enhance collaboration and maximize the impact of Earth Observation (EO) efforts across different programs.
- Support a nexus approach to address the interconnected challenges of pollution, climate change, and biodiversity loss, recognizing the need for integrated and coordinated efforts to tackle these pressing crises.
- Foster a dialogue among scientists, policy makers, and end-users, facilitating their active involvement in the co-design process of EO-based tools, knowledge, and policies. This dialogue aims to ensure that the resulting solutions are relevant, practical, and effectively address the needs of various stakeholders.

The following reports the main outcomes of the sessions.

## 2.1 Open session – national GEO activities

The opening session of the 2023 EuroGEO workshop, held Monday afternoon marked the initiation of the event, setting the stage for what lay ahead. The workshop commenced with welcoming remarks from the hosts: EURAC, European Commission, and Italy. Guided by the theme

“Linking national, European, and global perspectives,” the session began by delving into the national context, leaving the European and Global discussions for the subsequent plenary sessions on Wednesday. Chaired by Jean Dusart (EC, DG RTD), Nicola Pirrone (Consiglio Nazionale delle Ricerche (CNR), Italy), and Evangelos Gerasopoulos (NOA, National Observatory of Athens, Greece), the session unfolded under the moderation of Jean Dusart.

The presentation lineup included welcome notes from Roland Psenner (President of EURAC Research) and Alexander Jacob (Vice Head of Institute for Earth Observation, EURAC Research), followed by insights from Joanna Drake (EC, Deputy Director-General DG RTD), Alan Belward (EC, Deputy Director-General JRC), and Dr. Roberto Formaro (Director of Programs, Italian Space Agency (ASI)).

The opening session also featured presentations on national GEO activities, with representatives from France (Frédéric Huynh - DataTerra e-Infrastructure), Germany (Jens Danzeglocke – DLR (German Aerospace center)), Greece (Evangelos Gerasopoulos – NOA), and Italy (Nicola Pirrone - CNR) providing valuable insights. The inclusion of additional activities and a Q&A session, led by Erwin Goor (EC, REA) and Alexander Jacob, offered the audience an outlook on the forthcoming days of the EuroGEO workshop, addressing logistics and fostering engagement.

Afterwards, the workshop went on with the session on “Ongoing developments of EO Infrastructure and Services in Italy: towards sustainability”. The session was structured into a series of concise presentations followed by an interactive discussion, moderated by the session Chair, Giovanni Rum (Senior Advisor – ASI).

The session primarily focused on unveiling the ongoing developments in Italy, emphasizing the establishment of a coordinated and sustainable national system to meet institutional needs and stimulate the growth of commercial services. Influenced by the national PNRR (Italian National Plan for Recovery and Resilience), Italian activities and plans were briefly presented, with a specific emphasis on efforts to complement Copernicus data and services over Italy.

The discussions delved into the roles and activities of key players, including Public Administration and Agencies, Industry, and the Scientific Community. Options for ensuring the operational continuity of the national system were presented and thoroughly discussed. Furthermore, the session explored how Europe and GEO could leverage and benefit from the developments in Italy.

The session’s layout included a welcoming segment, an overview of Italian EO Infrastructure and Services by Andrea Taramelli (ISPRA – Coordinator of the Italian Copernicus User Forum), insights into The IRIDE

Program by Guido Levrini (ESA – IRIDE Program Manager), and a discussion of ASI's operational and planned EO missions along with the Italian contribution to ESA by Francesco Longo (ASI – Head of the Earth Observation and Operations Unit). Laura Candela (ASI – Users Coordination, Downstream and Services) presented on user involvement and the approach to services development, Giovanni Sylos Labini (Planetek – EARSC Vice President) discussed the role of downstream industry, and Nicola Pirrone (CNR-IIA – GEO Principal for Italy) addressed the role of the R&D Community. The session culminated in a general discussion, providing a comprehensive overview and fostering a meaningful exchange of ideas among the participants.

#### Figure 4

Satellite image of Europe  
At Night.

Source: [https://www.esa.int/ESA\\_Multimedia/Images/2018/11/Mapping\\_the\\_night](https://www.esa.int/ESA_Multimedia/Images/2018/11/Mapping_the_night)



## 2.2 Parallel thematic sessions

During the two first days of the workshop 12 parallel thematic sessions have been organized (3 in the morning; 3 in the afternoon) covering the topics such as: Agriculture; Land Cover; Biodiversity; Disasters & Health; Urban areas; Digital Twins; Data Spaces; Mountains; Energy; In-situ data; and Commercialisation. These sessions were very insightful providing a lot of valuable inputs that ultimately significantly contributed to shaping EuroGEO and optimizing EuroGEO's positioning and contribution to GEO.



**Figure 5**

EuroGEO parallel thematic sessions.

Source: EC own elaboration.

## I. Agriculture

The session on Agriculture, held during the workshop, was dedicated to assessing the post-project sustainability and long-term impact of Earth Observation (EO) agri-projects. The focus was on evaluating completed EO agri-projects, emphasizing their successes, challenges, and lessons learned. The session aimed to identify best practices to ensure sustainability and continued relevance, with a specific focus on effective data management, stakeholder engagement, and capacity building.

In exploring strategies for long-term sustainability, the session delved into innovative funding mechanisms and partnership models to support the scaling up of EO agri-projects. The assessment also considered the role of public-private partnerships in driving innovation and long-term sustainability, examining opportunities for expanding and strengthening these collaborations.

The outcomes of the session underscored key considerations for the use of EO in agriculture. Reliable access to accurate EO data was highlighted as essential for monitoring crop health and making informed agricultural decisions. The challenges of high costs associated with deploying EO technologies tailored for agriculture, scarcity of technical expertise in interpreting EO data, and the need for seamless integration with ground data were recognized. Additionally, the session emphasized the importance of addressing data storage and processing challenges, navigating policy and regulatory complexities, and developing appropriate business models to ensure widespread adoption and long-term viability of EO in agriculture.



The awareness gap within the agricultural sector regarding the benefits of EO technologies was acknowledged, prompting discussions on the need for awareness campaigns and training initiatives. The significance of user engagement, particularly with farmers and agricultural stakeholders, was emphasized to tailor EO solutions to their specific needs and challenges. Overall, the session provided a comprehensive examination of the challenges and opportunities surrounding the use of EO in agriculture, contributing valuable insights to the broader discourse on sustainable and impactful EO applications in the agricultural sector.

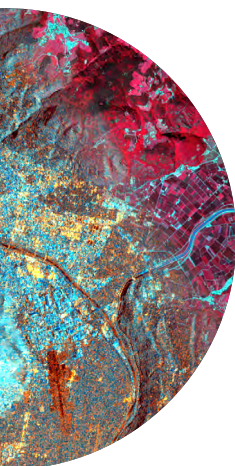
**Chairs:** Stelios Kotsopoulos. **Speakers:** Dr Dimitrios Kateris; Dr Anna Osann; Dr Juan Suarez Beltran; Mr Gregory Mygdakos; Ms Dimitra Perperidou; Dr Irini-Xanthoula Pantazi; Mr Aušrius Kučinska; Mr Stelios Kotsopoulos.

## II. Sustainability of Coastal Services

The session, held to address the sustained Coastal Services provided by the Copernicus Marine Service, aimed to comprehend the ongoing and future needs of national and private service providers in Europe and on a global scale. Attendees delved into key aspects, including providing an overview of significant European service providers, discussing their localized, national, and regional contributions, and offering guidance for an upcoming workshop. The session underscored the importance of understanding and meeting the evolving requirements for Coastal Services, emphasizing Copernicus Marine Service as a pivotal and sustainable public service supporting the development of sustainable coastal services.

The outcomes revealed a multifaceted approach to coastal management, emphasizing the co-design and co-production of the coastal component of Copernicus with national stakeholders. Member States were recognized as having a crucial role in selecting and collecting data relevant to enforcing EU policies in their respective marine waters. Additionally, the session shed light on the dual application of tools, serving both public/scientific and private sectors. To ensure sustainability, leveraging the strengths of both sectors was deemed necessary.

The e-shape project was acknowledged for providing essential co-design tools and community support, vital for the continued and sustainable commercial exploitation of Coastal Services. In terms of collaboration, the GEO Blue Planet EU Office expressed its commitment to working with EuroGEO, offering concerted support, including participation in the European Commission's transversal collaboration programs. Overall, the session contributed valuable insights, setting the stage for the continued development and enhancement of Coastal Services within the Copernicus Marine Service framework.



**Chairs:** Audrey Hasson; Muriel Lux. **Speakers:** Andrea Taramelli; Marion Sutton; Pedro Ribeiro; Ghada El Serafy.

### III. Urban Action Group

The session was designed to foster active engagement from diverse stakeholders, including academia, research, industry, and city networks within EuroGEO. It aimed to establish robust connections between EuroGEO and pivotal initiatives in the realm of urban environments, such as the EU Cities Mission, EU Climate Missions, and the IPCC's efforts to produce a special report on Cities and Climate Change.

The agenda encompassed reporting on activities post-EGW22/Athens, future planning, linking with the Resilient Cities and Human Settlements Working Group, identifying, and engaging city networks and relevant stakeholders, supporting the EU Cities Mission and Climate Mission, and contributing to the IPCC Special Report on Cities and Climate Change.

The outcomes of the session were multi-faceted. Communication strategies were emphasized, encompassing surveys, engagement plans, activation of city-level partners and users, synergies with projects, the establishment of an online portal, and the promotion of citizen science. The session highlighted the importance of translating vast amounts of data into actionable information, contributing to Earth Intelligence, and enhancing stakeholder understanding. Furthermore, the session aimed to facilitate the building of synergies in domains such as climate action plans, investment strategies, innovative city governance, and citizen engagement, involving European, national, and regional level structures, including national coordination mechanisms.

Additional outcomes included the establishment of links with the Resilient Cities and Human Settlements Working Group, support for the EU Cities Mission and Climate Mission, leveraging opportunities from European funding and private investment, and aiding JRC reporting and Ministerial Brief for GeoWeek. The session, therefore, played a crucial role in fostering collaboration, communication, and strategic alignment within the urban environment domain of EuroGEO.

**Chairs:** Nektarios Chrysoulakis, Iphigenia Keramitsoglou, Evangelos Gerasopoulos. **Speakers:** Martyn Clark; Laura Hetel; Inian Moorthy and Núria Castell; Thilo Erbertseder.

#### IV. Digital Twin development in Europe

The session focused on presenting an overview of the ongoing development and implementation of digital twins within the European research community, particularly emphasizing their relevance in the context of Earth Observation and related disciplines. The discussion spanned both infrastructure and architectural design considerations, providing insights into successful implementations and exchanging ideas on current developments. Key aspects of the session included facilitating an exchange of information on ongoing developments, harmonizing architectural designs, discussing interoperability challenges between different implementations, and exploring best practices for the implementation and operation of digital twins.

The outcomes of the session identified several challenges and opportunities in the realm of digital twins. Challenges included the imperative to break information silos, address scaling issues both from local to global and vice versa and harmonize data and processing infrastructure. Opportunities highlighted the potential to pool resources, leverage open-source solutions for sustainability, and establish common specifications and standards. The discussion also delved into the potential roles EuroGEO could assume in this domain, envisioning itself as a platform for exchange, an identifier of gaps, a link between nations, and a prioritizer for harmonizing various aspects within the digital twin landscape. Overall, the session contributed valuable insights into the current landscape, challenges, and opportunities associated with digital twins, fostering a collaborative environment for their effective utilization in Earth Observation and related research fields.

**Chairs:** Alexander Jacob, Thomas Geenen. **Speakers:** Andrea Manzi; Michael Schick; Martin Lenk; Bente Lilja Bye, Arne-Jørgen Berre.

#### V. Scaling European Land Cover/Land Intelligence standards to the world

The session aimed to bring together stakeholders in European land cover/land intelligence, with a primary focus on enhancing the sharing of European analysis-ready data and services across various EuroGEO themes and promoting global adoption. The objectives included identifying both current and future land cover/land use (LC/LU) products for collaborative integration between EuroGEO thematic groups, developing guidelines for thematic content related to Land Intelligence EO EuroGEO products, defining requirements aligned with current computing trends (Machine Learning, Artificial Intelligence, and Quantum Computing), and creating a roadmap to maintain high-quality standards of LC/Land Intelligence products while advocating for the importance of in-situ observations for

validation. The session also featured presentations on LC/LU projects that continued after the end of direct funding, serving as examples of sustainable services. Additionally, a white paper on the state of European LC/LU EO products, including Copernicus, was presented to promote collaboration between EuroGEO thematic groups and global stakeholders. The session aimed to lay the foundation for a future joint policy paper addressing current LC/LU processing technologies and the ongoing need for maintaining high-quality standards in thematic content.

The outcomes of the session were comprehensive, ranging from the establishment of standardized access to reference data ('Fiducial Reference 4 Land Cover') by developing a service collecting LC class reference data from existing networks like e\_LTER and N2K to the creation of a framework standardizing measures, methods, and sampling strategies for computing LC uncertainty and errors. Another notable outcome included the development of a service facilitating translation between LC taxonomies based on ontologies, with a focus on OWL ontologies and SKOS thesauri for machine readability and sharing through web-based catalogues and viewers.

The session addressed the critical need for EU reference data for training Machine Learning/Deep Learning/Artificial Intelligence, particularly in developing countries, and clarified the relationship between Earth Observation and different LC schemes, examining the observability of classes and the spatial-temporal context in which they are applicable. Overall, the session made significant strides in advancing collaboration, standardization, and innovation within the realm of European land cover/land intelligence.

**Chairs:** Stanisław Lewiński, Conrad Bielski. **Speakers:** Ruben Van De Kerchove; Paolo Mazzetti; Gregory Giuliani; Nataliia Kussul; Patrick Knöfel.



**Figure 6**

Satellite image city of Brussels (BE).

Source: ESA ([https://www.esa.int/ESA\\_Multimedia/Images/2022/07/Brussels\\_Belgium](https://www.esa.int/ESA_Multimedia/Images/2022/07/Brussels_Belgium))



## **VI. Addressing climate-induced disasters and health challenges: The contribution of EuroGEO and GEO-CRADLE initiatives and the way forward**

The session aimed to contribute to sustainable development by integrating Earth Observations into user-oriented and co-designed services to address climate-induced disasters and health issues. The agenda included showcasing success stories supported by EuroGEO, particularly from initiatives like e-shape and the Disasters and Health Action Groups, as well as GEO-CRADLE initiatives. The session reported on the scientific and service progress of relevant Action Groups and communities, defined concrete roadmaps for the long-term sustainability of ongoing actions and services, and promoted full and open access to EO data and science. It also focused on showcasing business models for exploiting and sustaining the generated knowledge and services to benefit cross-sector stakeholders and communities with diverse needs.

Additionally, the session aimed to design future joint actions, such as policy papers, publications, special editions in journals, workshops, webinars, and information days for applications and services, with the support of the EuroGEO Secretariat and relevant Collaborative Support Actions (CSAs) like GEO-CRADLE, Copernicus FP CUP, and GEOHEALTH. The overarching goal was to create synergies for a long-term impact on the GEO post-2025 strategy in addressing global climate-induced disasters and health crises.

The outcomes of the session highlighted the reinforcement of Technology Readiness Levels (TRL) and the operational use, scalability, and transferability of Research and Innovation Actions (RIA) and Innovation Actions (IA), along with awards recognizing their positive impact on coordination and capacity building across stakeholders and sectors. The importance of sustainable funding for well-designed and systematic capacity building actions, especially in the context of CSAs like Copernicus FP CUP and GEO-CRADLE, was underscored. EuroGEO and its Action Groups were acknowledged as key forums for enhancing exchange across value-added communities, reducing ecosystem fragmentation, and minimizing overlapping efforts.

The session emphasized the necessity of continued coordination and communication through similar workshop events, newsletters, and blogs to showcase progress and success stories. The role of the private sector in addressing the practical needs of users was highlighted, stressing the importance of moving towards the demand side to satisfy stakeholders' requirements. The session emphasized that products and services should result from a systematic and essential co-design and co-development process, with user engagement and continuous co-creation being essential for sustainability. Collaboration and integration of synergies with the



Copernicus Thematic Hubs were recognized as crucial for establishing domain knowledge and stakeholder expertise. The session concluded by highlighting the need to combine different data sources and improve data accuracy to increase the reliability and impact of services.

**Chairs:** Haris Kontoes. **Speakers:** Marco Folegani; Alexia Massacand; Marco Mancini; Frederic Bartumeus; Maria Feio; Alexia Tsouni; Julie Letertre.

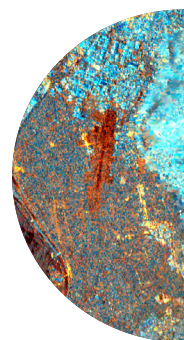
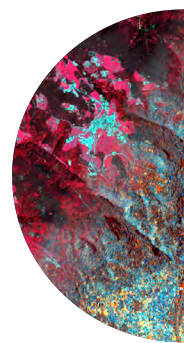
## VII. Building the Green Deal Data Space in a way that contributes to GEO

The session focused on defining how the Green Deal Data Space (GDSS) could contribute to GEO, with a multifaceted agenda. Participants sought to comprehend the Green Deal Data Space through current use cases, consolidate various perspectives into a blueprint, explore avenues for integrating the blueprint into the GEO Work Program and GEO platform, discuss ideas regarding GDSS governance, and outline future plans for its development. The session aimed to culminate in the release of a set of recommendations in a concise policy document.

The outcomes highlighted the interdisciplinary nature of the Green Deal Data Space, encompassing a wide range of areas such as hydrology, mercury, biodiversity, air quality, soil, ocean, forest, and pests. Recognizing the significance of data integration for processing, the session emphasized continuous efforts in this regard. The challenge of external stakeholders being unaware of the European community's services and data provision was acknowledged, and EuroGEO was identified as a potential supporter in defragmenting EU/national projects.

A comparison between GDSS and GEO/GEOSS underscored differences in focus, with GDSS emphasizing data sharing and trust, while GEO/GEOSS prioritizes knowledge generation (Earth Intelligence). The session recommended incorporating the open part of data spaces into GEOSS, highlighting the importance of trusted, high-quality, traceable, and well-documented datasets applicable for policy. The session reflected on the evolution of European Spatial Data Infrastructures (SDIs) over the past 20 years, emphasizing the need for adaptation in response to increased data creators, more regulations applicable to data, and the lessons learned from implementation experiences.

**Chairs:** Joan Maso; Paolo Mazzetti. **Speakers:** Peter Baumann; Kathi Schleidt; Quentin Groom; Tom Hengli; Washington Otieno, Enrico Boldrini; Nicola Pirrone; Orestis Speyer; Stathes Hadjiefthymiades.



## VIII. Elevating mountains in the implementation of the GEO Post-2025 strategy: lessons from EU-funded projects in mountain areas

The session centred on the GEO Mountains initiative, which aimed to identify, compile, and make accessible data and information related to environmental, ecological, and societal systems in mountainous regions worldwide. It sought to assess the progress made within the GEO Mountains 2020-2022 implementation plan and contributions toward closing observation gaps in mountains. Additionally, the session showcased various EU-funded projects with a mountain focus, inviting reflections on the long-term sustainability of data and information. The participants collected ideas and suggestions to contribute to a future position paper or statement by EuroGEO, encompassing relevant aspects related to mountains and aimed at supporting the implementation of the GEO Post-2025 strategy.

The outcomes highlighted the context of mountains as “natural integrators” in multiple global change processes, involving diverse disciplines and perspectives globally. Meaningful stakeholder engagement was emphasized as integral to projects’ long-term legacy and impact, fostering an iterative two-way dialogue and an inclusive process. The sustainability of data, data products, and information was identified as a key project legacy, emphasizing the importance of integrating adequate metadata, interoperable formats, established protocols/standards, documentation/DOIs, repositories, and outreach. Coordination was considered crucial, advocating for an adequately resourced networked approach to connect, exchange, and upscale the legacies of projects, exemplified by EU Coordination and Support Actions (CSAs).

**Chairs:** Carolina Adler, Elisa Palazzi. **Speakers:** James Thornton; Peter J. Zellner, Rufai O. Balogun, Thomas Iacopino, Luca Cattani, Mohammad H. Alasawedah, Michele Claus, Bartolomeo Ventura, Andrea Vianello, Bertoldi Giacomo, Alexander Jacob, Valentina D’Alonzo, Matteo Rizzari, Silvia Cocuccioni, Daniel Herrera, Valentina Miriam Cittati, Daniele Vettorato; Marta Galvagno.

## IX. Renewable energies and climate

The session aimed to showcase the utilization of Earth Observation (EO) data for renewable energies and climate applications. Progress in renewable energies applications based on EO data was presented, accompanied by examples highlighting the connections between renewable energies and climate. The session also delved into describing the current evolution of the Copernicus Energy Hub and the role of energy within

DestinE. Furthermore, it opened discussions on the evolution of the domain and the development of GEO VENER.

The outcomes highlighted the session's scope and objectives in showcasing the use of EO data for renewable energies and climate applications. It emphasized support for the EuroGEO 3C strategy—Coordinate, Combine, Cooperate—calling for improved and continuous communication through channels like newsletters and blogs, better coordination among different actors (Copernicus and Copernicus Hub, Action Group, GEO VENER initiative), and interlinks with various thematic areas.

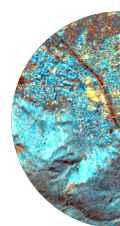
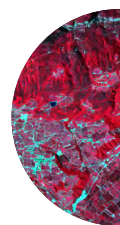
The complementary nature of tools and resources was emphasized, with EuroGEO contributing to the Cop Hub and vice versa, and GEO VENER extending its reach beyond Europe. Expectations from EuroGEO included support for funding, wearing EuroGEO colors proudly for branding, acting as an intermediary with the global GEO, assistance from DG international partnership to support European data/services outside Europe, EuroGEO serving as a network/community, and establishing links with non-European institutions as an intermediate body.

**Chairs:** Thierry Ranchin. **Speakers:** Stelios Kazadzis; Philippe Blanc; Mikko Strahlendorff; Fabio Venuti; Chiara Cagnazzo; Marion Schroedter-Homscheidt/Susanne Weyand.

## X. From Innovation to Market: Boosting the commercialization aspects of R&D results

The session aimed to shed light on the tools available to Earth Observation (EO) solution developers participating in EU-funded projects to facilitate the commercialization of their results. The objectives acknowledged initiating a dialogue with representatives of former beneficiaries of EU-funded projects and local or international institutional enablers to identify barriers. The session also focused on presenting how EO service developers navigate challenges such as market entry strategies, business planning, internationalization, scaling, etc., showcasing best practices in the field. Furthermore, it provided an overview of existing and upcoming tools designed to support the commercialization process, enhancing awareness among developers.

The outcomes of the session were centered on three pillars: 1) Barriers identification, 2) Best Practices, and 3) Awareness. Market knowledge was emphasized, urging a realistic understanding of the targeted market, including factors like willingness to pay for the service, competitors, and the potential impact of small changes in business models. The session advocated for an operational-by-design approach, encouraging a shift from a project to an operational product vision, identifying and design-



ing solutions with a global perspective. Access to user communities was highlighted, emphasizing increased interaction with targeted users, understanding their needs and challenges. The session also underlined the importance of bridging with the private sector to stimulate the exploitation of intellectual properties (IPs).

**Chairs:** Emmanuel Pajot and Francesca Piatto. **Speakers:** Stella Tkatchova (EIC Programme Manager for Space, EISMEA, EC); Donatella Ponziani (Head of ESA Commercialisation Gateway, ESA); Anilkumar Dave (Space Economy Advisor DARIWX - Partner STAR TECH VENTURES); Lefteris Mamais (Co-Founder & Director, Evenflow / e-shape); Beatriz Gómez Fariñas (Legal Procurement Consultant, CORVERS / PROTECT); Cecilia Sciarretta (Head of R&D Governance, e-GEOS); Giovanni Sylos Labini (CEO, Planetek Italia); Gaetano Volpe (CEO, LATITUDO40).

## **XI. Biodiversity, ecosystems and geodiversity - interfaces in terms of initiatives and scientific areas**

The session involved presentations and discussions on the latest developments in terms of Group on Earth Observations (GEO) and European overarching initiatives. Participants engaged in brainstorming sessions focused on key scientific interfaces, with the objectives of improving articulations between different levels of actions to face upcoming challenges and discussing the post-2025 GEO strategy within the framework of multidisciplinary visions.

The discussions explored how to connect the international, European, and national levels, emphasizing the potential contributions of EuroGEO to the Geo-post 2025 strategy and the provision of actionable knowledge. There was a particular focus on how long-term research infrastructure can contribute to sustaining biodiversity, ecosystems, and geodiversity monitoring across disciplines. The session delved into the challenges at the interface between geodiversity, ecosystems, and biodiversity, addressing the need for integration, connection, and federation of different actions and initiatives. The outcomes highlighted the importance of more contact between different research infrastructures, the need to combine societal and policy needs with research challenges, and the necessity for a fully integrated, multidisciplinary, and systemic approach encompassing both biotic and abiotic aspects and dynamics.



**Figure 7**

Image: Biodiversity, ecosystems and geodiversity.

Source: photo by Antonello Provenzale

**Chairs:** Antonello Provenzale. **Speakers:** Henrique M. Pereira; Sara Venturini; Anne Teller; Michele Bresadol, Andreas Hilpold. **Panel discussion moderated by** Gaëlle Le Bouler. **Panelists:** Sophie Justice; Alberto Basset, Zbigniew Zwolinski, Edyta Wosniak, Anna Spinosa, Ana Lillebo, Edoardo Cremonese.

## **XII. Discussing the role of EuroGEO in enhancing the availability, accessibility and integration on in-situ Earth Observation data**

The session focused on the challenges associated with accessing in-situ data, recognizing it as a limiting factor for the full exploitation of remote sensing data. It addressed the complex landscape of in-situ data providers within Europe, acknowledging issues faced by users, providers, and distributors, whether due to technical, legal, or other limitations. The overarching goal was to identify concrete actions that EuroGEO could take to enhance the availability and accessibility of in-situ data in Europe.

The outcomes underscored persistent cultural and technical barriers hindering the sharing of in-situ data. Cultural challenges included a lack of awareness, reluctance due to the absence of recognition, and institutional or national policies. Technical challenges encompassed issues related to data formats, technological solutions, and interoperability requirements.

The session explored EuroGEO's potential role in addressing these challenges, suggesting actions such as acting as an intermediary to facilitate interoperability, raising awareness about in-situ data, acknowledging data providers, gathering in-situ requirements for specific use cases, providing best practices and standards, and supporting cross-disciplinary discussions. Additionally, EuroGEO aimed to facilitate the integration of (in-situ) data from research activities and citizen science while playing a role in identifying Essential Variables.

**Chairs:** Jose Miguel Rubio Iglesias. **Speakers:** Steffen Fritz; Helen Glaves, Paolo Mazetti, Phillip Harwood, Nuria Castell, Elnaz Neinavaz.



## 2.3 Shaping EuroGEO

The session delved into the strategic orientations for EuroGEO and the prospective role of the EuroGEO secretariat. Chaired by Thierry Ranchin (ARMINES), Franz Immler, and Jean Dusart (European Commission), the session encompassed a multifaceted agenda. The objectives included the identification of success stories of EuroGEO, the exploration of potential synergies and links between EuroGEO and national GEO activities, the identification of priority topics and strategies for EuroGEO, and the provision of community feedback to shape the activities of the EuroGEO secretariat. Additionally, the session aimed to elaborate on research and innovation priorities for Horizon Europe.

The session's layout featured a flash feedback segment from the thematic session held on Tuesday, moderated by Jean Dusart, Erwin Goor, and Gaelle Le Bouler (EC REA). Thierry Ranchin (ARMINES) presented on the EuroGEO strategy, providing insights into the overarching direction. The roundtable discussions format facilitated discussions in small groups, each comprising fewer than 10 participants. Moderated by Erwin Goor and Gaelle Le Bouler, these discussions aimed at harvesting ideas and perspectives (). The session concluded with final reflections by Thierry Ranchin and the EuroGEO team, providing a comprehensive view and setting the stage for the EuroGEO Strategy.

The final reflections were a pivotal part of the EuroGEO workshop, encapsulating key insights and proposals to guide the future trajectory of EuroGEO. The session addressed several main spheres of activities aimed at optimizing the impact and contribution of EuroGEO to the Group on Earth Observations (GEO) and the broader Earth observation (EO) sector in Europe. The identified activities included the coordination of GEO-relevant initiatives, the implementation of a user-driven research and innovation agenda, and the facilitation of cooperation among European and national programs and user communities. Additionally, the session emphasized the importance of collaboration with other Regional GEOs for global data sharing, applications, and best practices.

**Figure 8**

Word Cloud showing the benefits of EuroGEO as perceived by the EuroGEO Workshop 2023.



The recommendations underscored the need for EuroGEO to evolve into a catalyst for the growth of the EO sector. This multifaceted role involved

strengthening coordination mechanisms, supporting innovation and space application development, reinforcing the EO data ecosystem within Europe, pursuing international cooperation, and contributing to the objectives of the European Green Deal through the deployment and exploitation of EO.

The concluding remarks and recommendations highlighted the imperative for EuroGEO to assume defined roles and establish a dedicated and sustainable EuroGEO Secretariat. This Secretariat would play a pivotal role in coordinating, supporting, and facilitating the implementation of EuroGEO initiatives and Action Groups. It would also contribute to the prioritization of research funding, assist in planning and executing the EuroGEO implementation plan, and play a crucial role in ensuring the initiative's long-term sustainability.

The session stressed the need for EuroGEO to collaborate with other institutional actors and initiatives, fostering a comprehensive user uptake strategy for the benefit of the entire EO value chain. In essence, the session laid out a comprehensive vision for EuroGEO's future role and the critical components required for its effective operation and impact in the EO domain.

## 2.4 Optimizing EuroGEO's Positioning and Contribution to GEO

The workshop concluded with a session, titled "Optimizing EuroGEO's Positioning and Contribution to GEO," was co-chaired by Franz Immler (EC, DG RTD). With a focus on EuroGEO's strategic alignment with the GEO, the session aimed to explore how EuroGEO could effectively contribute to and support GEO's initiatives. The scope and objectives were clearly defined, emphasizing the presentation of the new GEO post-25 strategy, insights into the GEO implementation, and an exploration of the incubators approach, with subsequent discussions on EuroGEO's potential role in supporting these endeavors.

The session unfolded with a series of presentations, starting with Mark Dowell (EC, JRC) shedding light on the "Earth Intelligence" aspect of the GEO post-25 strategy. Sara Venturini (GEO secretariat) then presented the GEO post-2025 Implementation Plan, Operating modes, and Work Programme Activities. Evangelos Gerasopoulos (NOA) followed with a presentation on GEO incubators, providing valuable insights into this innovative approach.

The session's layout also included facilitated discussions in a plenary format, allowing participants to engage in collaborative dialogue on the presented topics. This interactive segment aimed to delve deeper into understanding EuroGEO's potential contributions and optimizations aligned with the GEO post-25 strategy. The session concluded with an adjournment, leaving participants with a comprehensive overview of the strategic considerations and potential avenues for EuroGEO's impactful positioning and contributions to GEO.

# 3 Conclusions

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**EuroGEO is gaining momentum** with an increased awareness and a strong interest from data producers and users to contribute. The workshop highlighted several key points.

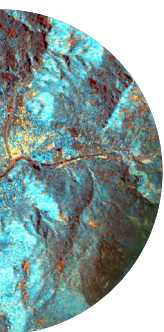
Firstly, there is a need for a dedicated and sustainable EuroGEO Secretariat to coordinate and support the implementation of EuroGEO initiatives and Action Groups. This Secretariat would play a crucial role in prioritizing research funding, planning and executing the EuroGEO implementation plan, and ensuring the long-term sustainability of the initiative.

Secondly, EuroGEO should collaborate with other institutional actors and initiatives to foster a comprehensive user uptake strategy for the entire Earth observation (EO) value chain. This collaboration would enhance the impact and contribution of EuroGEO to the Group on Earth Observations (GEO) and the broader EO sector in Europe.

Additionally, EuroGEO should focus on strengthening coordination mechanisms, supporting innovation and space application development, reinforcing the EO data ecosystem within Europe, and pursuing international cooperation. These efforts would contribute to the objectives of the European Green Deal and promote the deployment and exploitation of EO for sustainable practices.

Furthermore, EuroGEO should optimize its positioning and contribution to GEO by aligning with the new GEO post-25 strategy. This includes exploring how EuroGEO can effectively support GEO's initiatives, such as the incubators approach, and contribute to the implementation of the GEO post-2025 Implementation Plan and Work Programme Activities.

Overall, the conclusions emphasize the importance of a strategic and coordinated approach for EuroGEO to maximize its impact and ensure its long-term success in the EO domain.



# List of abbreviations and definitions

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<b>CDSE</b>	Copernicus Data Space Ecosystem
<b>DG RTD</b>	Directorate-General for Research and Innovation
<b>EARSC</b>	European Association of Remote Sensing Companies
<b>EEA</b>	European Environment Agency
<b>EO</b>	Earth Observations
<b>EOSC</b>	European Open Science Cloud
<b>ESA</b>	European Space Agency
<b>EC</b>	European Commission
<b>EU</b>	European Union
<b>GEO</b>	Group on Earth Observations
<b>GEOSS</b>	Global Earth Observations System of Systems
<b>GKH</b>	GEO Knowledge Hub
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>JRC</b>	Joint Research Centre
<b>LTER</b>	Long Term Ecological Research
<b>TRL</b>	Technology Readiness Levels
<b>USP</b>	Unique Selling Proposition

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# Annexes

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## Annex I – Roundtable discussions

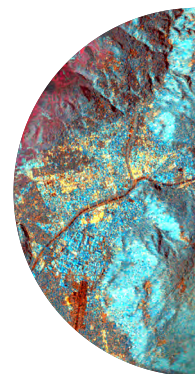
The 6 roundtables were organized to gather insights from participants under the form of a World Café (i.e., facilitated discussions in small groups (<10)) and identify Achievements and Challenges of EuroGEO as well as define actions for the Way Forward to support the future EuroGEO secretariat.

The first roundtable discussion focused on the synergies and links between EuroGEO, Copernicus, and national GEO activities. The moderators, Haris Kontoes and Alexia Tsuoni, discussed the needs and concerns of the Action Groups in receiving advice and counseling. They also explored the potential for facilitating dialogue between the Action Groups and national and regional GEO structures and initiatives, including Copernicus and other data providers.

The second roundtable discussion, moderated by Lionel Menard and Marie-Francoise Voidrot, addressed the alignment of EuroGEO with the GEO work program and global outreach. The moderators examined the level of stakeholder engagement in the ongoing and past EuroGEO Implementation Plan and explored ways to streamline stakeholder engagement for future versions of the plan. They also discussed strategies to promote and foster the adhesion of all stakeholders to create a unified EuroGEO and improve visibility and exposure for European initiatives within the GEO Work Program.

The third roundtable, moderated by Nicola Pirrone and Fabio Venuti, focused on research and innovation (R&I) priorities for EuroGEO evolution. The moderators discussed the priorities that national European funding programs should address in the coming years to support the implementation of the Green Deal and tackle the triple planetary crises.

The fourth roundtable, moderated by Nicolas Fichaux and Gaelle Le Boulter, explored the key elements of EuroGEO strategy and governance. The moderators discussed the achievements of EuroGEO and identified areas that require improvement. They also discussed different governance and



sustainability pathways for an ongoing EuroGEO Secretariat, considering options such as a purely public model, public-private partnership, or other alternatives.

The fifth roundtable, moderated by Albana Kona and Emmanuel Pajot, focused on user involvement, co-design, and private sector engagement. The moderators discussed the need for an open and transparent process to engage stakeholders in EuroGEO and expand beyond the inner circle of EuroGEO stakeholders. They explored different aspects of stakeholder engagement, including partnerships, networks, projects, industry involvement, European infrastructures, and the role of entrusted entities and European bodies.

The final roundtable, moderated by Lefteris Mamais and Brooke Tapsall/Mark Dowell, addressed the operationalization and commercialization of EuroGEO. The moderators discussed how the EuroGEO Secretariat can support the emergence of operational pipelines to address the specific needs expressed by user communities. They explored the involvement of relevant research and innovation channels, the engagement of Action Groups, outreach to industry, and the involvement of institutional actors to propose solutions.

## Annex II – Plenary surveys

The plenary survey conducted through SLIDO consisted of three questions aimed at gathering feedback and insights from the participants. By collecting responses to these questions, the plenary survey aimed to obtain valuable input from participants, enabling a better understanding of their perspectives and preferences. This information could then be used to inform future strategies and initiatives within the EuroGEO community and the broader GEO network.

The first question asked participants how the concept of “Earth Intelligence” resonated with their activities. This question aimed to understand the participants’ perspectives on the relevance and applicability of Earth Intelligence in their respective fields and how it related to their ongoing work.

The second question sought to understand what would inspire participants to engage more concretely with GEO work programme activities or GEO working groups. This question aimed to identify the factors or incentives that would encourage participants to actively participate and contribute to the work of GEO, potentially leading to increased collaboration and involvement.

The third question focused on the extent to which the incubators could accelerate the transition to post-2025. This question aimed to gather opinions and insights on the potential role and impact of incubators in

facilitating the transition to the post-2025 period, highlighting the participants' perspectives on the effectiveness of these initiatives in driving innovation and progress.

## Annex III – Session's Feedback

JRC designed a Highlight form to collect key points from the parallel thematic session chairs and speakers regarding how their session's focus area and expertise can support the EuroGEO community at large and the Post Geo 2025 Strategy. It included 15 questions that aimed to gather insights and feedback on various aspects related to EuroGEO activities and their impact on the wider GEO community.

The questions covered a range of topics including: the link between EuroGEO and national activities, the contribution of EuroGEO to the Geo-post 2025 strategy, the resonance of the term "Earth Intelligence" in their community, the value of EuroGEO activities and events, the role of EuroGEO in the context of their session's topic, key takeaways for the EuroGEO community, mentorship programs, projects or tools with potential for scaling up, major lessons learned in their field, sustainability plans, communication materials to share, and any additional comments or suggestions.

The Highlight form was structured into three sessions: A general feedback (open to all respondents & attendees), a Chairperson feedback and a Speakers and Flash talks feedback. The following report the questions asked under each session.

### **GENERAL FEEDBACK - open to all respondents & attendees**

- How does the EuroGEO link with national activities and support shaping a European GEO community?
- How do you believe EuroGeo can contribute to the Geo-post 2025 strategy? How do you see the new GEO Strategy align with your activities?
- How does the term "Earth Intelligence" resonate in your community?
- Do you believe your EuroGEO activities are a valuable contribution to the Geo Community? If so, how, why or what can be done to improve?
- Do you find events such as these, as valuable opportunities to gather experts or stakeholders in the Geo Community?
- Other comments? If there is anything else you would like to say, we would like to hear from you!

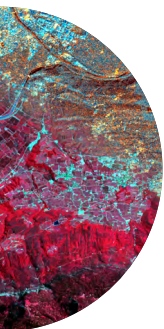
### CHAIRPERSON FEEDBACK

- How do you see the role of EuroGEO in the context of the topic covered by your session?
- What are the main key takeaways you would like to convey from the session you have participated in that are important to the wider EuroGeo Community.
- Did your session highlight any mentorship program to build GEO legacy for future generations?
- Were any projects or tools, which have potential to be scaled-up for the benefit of the EuroGEO community, presented?
- Other comments? If there is anything else you would like to say, we would like to hear from you!

### SPEAKER & FLASH-TALK FEEDBACK

- What are the three major lessons learned in your field, which can be used to support others in the Geo Community going forward.
- What is the sustainability plan of your project? Sustainability can cover many avenues of research continuity, financial sustainability, and collaboration networks etc. How do you link this to EuroGEO governance?
- About communication: Would you be willing to share any figures, pictures, and graphics from your session with the wider community (from the event or with other relevance).
- Other comments? If there is anything else you would like to say, we would like to hear from you!

The objective of the Highlight form was to gather valuable input from session chairs and speakers, which was then considered in the summary and conclusions of the EuroGEO workshop report. The purpose of collecting this feedback was to inform and shape the future direction of EuroGEO, as well as its collaboration with the wider GEO community. By incorporating the perspectives and insights of the chairs and speakers, the report aimed to provide a comprehensive overview of the key focus points and recommendations to guide the development and implementation of EuroGEO initiatives.



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