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ENEON and GD-06  
*Non-Satellite Data in GEO*

# ENEON and GD-06

## *Non-Satellite Data in GEO*

- Work Programme 2016 (V4): Foundational Task GD-06: “GEOSS Non-Space Based Earth Observations”
- Title changed to “GEOSS In-Situ Earth Observations” *with in-situ: anything not space-based*
- Main objectives:
  - Analyze current trends and develop new scenarios for in situ observations
  - Promote and coordinate in situ observation systems
  - Identify data resources needed by GEO activities
  - Compile global perspective on existing plans for new in situ observation networks
  - Promote coordination of in situ and space-based observations
- Main achievement in 2016: Report “In Situ Observations: Coordination Needs and Benefits”

## **LIST OF CONTRIBUTORS**

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Suggested Reference:

Plag, H.-P. and J. Maso (eds.), 2016. In Situ Observations: Coordination Needs and Benefits. GEO Secretariat, Geneva, Switzerland. 36 Pages.

# Report

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## **1 INTRODUCTION**

## **2 REGIONAL ACTIVITIES**

### 2.1 Europe

#### 2.1.1 Non-profit organisations and networks

#### 2.1.2 Other examples of European/EU initiatives

#### 2.1.3 Research networks and infrastructures

#### 2.1.4 Examples of cross-cutting coordination

### 2.2 Asia

#### 2.2.1 Asia-Pacific Biodiversity Observation Network (AP-BON)

#### 2.2.2 AsiaFlux

## **3 ACTIVITIES IN DOMAINS AND SOCIETAL BENEFIT AREAS**

### 3.1 Geodesy

#### 3.1.1 The Dynamic Earth

#### 3.1.2 Geodetic Observations

#### 3.1.3 Terrestrial Reference Frame

### 3.2 Climate and Atmospheric composition

### 3.3 Food security

### 3.4 Climate Change

### 3.5 Sustainable Development Goals

## **4 ISSUES REQUIRING GLOBAL COORDINATION**

### 4.1 Sustainability of Existing Measurements for Climate

### 4.2 Investigating new in situ measurements

#### 4.2.1 Improving Agricultural Monitoring

#### 4.2.2 Coordinating observing strategy for measuring global changes: from networks to flagship stations

#### 4.2.3 Facilitating access to data including ECVs

#### 4.2.4 Filling gaps in observations

#### 4.2.5 Favouring regional cooperation, including training centres

### 4.3 Emerging Techniques and new Approaches

### 4.4 Coordinating the integration of space-based and in situ observations

## **5 CONCLUSIONS AND RECOMMENDATIONS**

### 5.1 Benefits of Coordinating In Situ Earth Observations

### 5.2 Challenges of Coordinating In Situ Earth Observations

### 5.3 Recommendations to GEO

### 5.4 Recommendation to the GEO in situ working group in the next Work Programme

### 5.5 Road Map Toward Increase Coordination of In Situ Earth Observations

## **REFERENCES**

## **ACRONYMS**



## 5 CONCLUSIONS AND RECOMMENDATIONS

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- many of the grand challenges require non-satellite observation
- for full exploitation, networks require more coordination than currently available



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### 5.2 Challenges of Coordinating In Situ Earth Observations

- complex regional landscape
- fragmentation at regional and global levels
- some networks have global coordination (e.g., geodesy) but many don't
- new approaches (citizen scientists, Internet of Things, crowd-sourcing) adds new coordination needs
- integration of new data types

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## 5 CONCLUSIONS AND RECOMMENDATIONS

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- many of the grand challenges require non-scientific data
- for full exploitation, networks require more coordination

### 5.2 Challenges of Coordinating In Situ Earth Observations

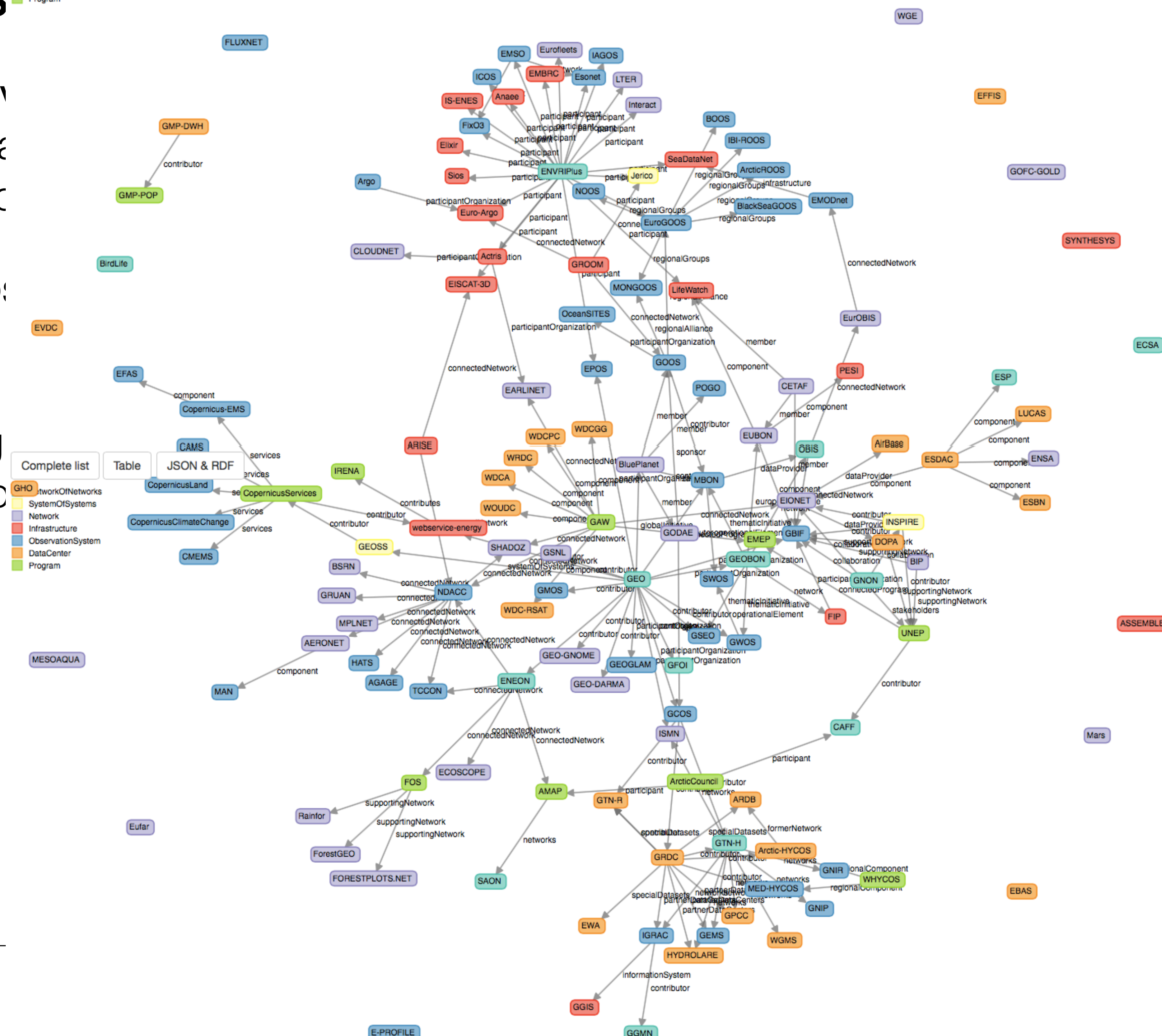
- complex regional landscape
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- some networks have global coordination (e.g. Copernicus)
- new approaches (citizen scientists, Internet of Things)
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Complete list Table JSON & RDF

- NetworkOfNetworks
- SystemOfSystems
- Network
- Infrastructure
- ObservationSystem
- DataCenter
- Program

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## 5 CONCLUSIONS AND RECOMMENDATIONS

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- for full exploitation, networks require more coordination than currently available

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### 5.3 Recommendations to GEO

The Task Team of GD-06 recommends that

- a **process to coordinate** the development of sets of **domain-specific Essential Variables** be convened by GEO and those **EVs that require in situ observation** be identified;
- the **need for regional trans-boundary and cross-domain coordination of in situ Earth observations**, including semantic harmonization, adoption of standards, processing of data to generate information products of value for societal users and the adherence to GEO data sharing and management principles, be **emphasized and covered with the needed resources in the GEO Work Programme**;
- a **comprehensive gap analysis to identify gaps in the in situ networks vis-à-vis GEO programmes'** requirements for in situ observations be convened by GEO with the goal of **providing guidance for the maintenance of existing and the development of new in situ networks**.

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### 5.4 Recommendation to the GEO in situ working group in the next Work Programme

The Task Team of GD-06 recommends that

- the **survey** of the state of in situ observations and their coordination be **further detailed and extended** to include Africa, the Americas, and Oceania and also add additional domains in Asia;
- existing and potential new **coordination models be assessed**;
- the **role of the private sector** as provider and user of in situ observations be considered;
- efforts be made to provide a **more complete picture of the risks of loss** of observational continuity and issues that reduce the sustainability of in situ networks, impact the cross-domain integration and coordination, and hamper the full exploitation of the societal benefits of these observations;
- the in situ working group take an **active role in collecting relevant in situ data requirements and a gap analysis and prioritization process** that can provide guidance to the in situ communities with respect to unmet user needs and the prioritization of existing and new networks.

## How to Help.



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Actions that GEO Members and Participating Organizations can take:

- In 2016, the Task Team developed a report on “GEO In Situ Status Report 2016”. GEO Members and Participating Organizations are **encouraged to read it and provide any suggestions and comments** in particular on the recommendations.
- However, it is necessary to work on more specific areas where gaps exist. For example, there is **no comprehensive coordination mechanism for terrestrial In Situ observation networks** at this point. **GEO could serve as a mechanism and platform to fill the gap.** GEO should work on subsidiarity principles relying upon specific international organizations whenever relevant.
- It is also necessary to **promote the integration of In Situ observations with Space based observations.** The GEO added value will be to utilize the GEO convening power and facilitate the linking, optimization, and integration of different observation networks. As above, subsidiarity principles should be applied, whenever relevant
- In Situ observation communities are rather diverse with multiple layers such as global, regional and national scales, domain specific, and research and operational operations. It is expected that **more members will join the Task team** in particular representing different networks and partially existing coordination mechanisms.
- Implementation of a **global coordination will require time and efforts.** A constant dialog with key organizations/ stakeholders involved in operating the in-situ observing system at both global and regional scales is required. A specific action may be required in some regions of the World where key players organizations are not yet well identified. In this overall coordination process, it is important to **strive for sustainable solutions, avoid duplication of efforts**, and rely upon organization established in the long-term to drive the activities.

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Subtask A: Tracking status, gaps, opportunities for in situ observations (Lead: two of the other Subtask leads)

Subtask B: Atmosphere (Lead: GCOS)

Subtask C: Ocean (Lead: GOOS)

Subtask D: Terrestrial (including freshwater, vegetation/ ecosystems, land cover/use) (Lead: unknown)

D.1 - Freshwater observations including water quality

D.2 - Vegetation and ecosystems

D.3 - Land cover and use

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Would not know where to place:

- GGOS (does atmosphere, ocean, ice sheets, solid earth, and supports everybody else)
- EPOS (integrated observations of geohazards)
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What is needed is a systems approach on regional scale, not a domain/stove-pipe approach on a global basis.



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## ENEON could:

- Contribute to the **descriptive analysis of the regional state** of in situ observations with a focus on (i) observation networks; (ii) data processing and access facilities; (iii) linkage between providers and users.
- Engage in the **analysis of coordination mechanisms** in terms of capabilities to facilitate regional cross-domain coordination and coordination across sectorial boundaries.
- Develop **new coordination approaches** for Europe and propose these to GEO.
- Convene regional conferences/workshop to **promote coordination** in the in situ communities.
- **Identify research observation networks** in Europe and at global level that should be **transitioned to an operational state** and engage the European Commission in facilitating this transition in GEO.

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## ENEON should:

- Focus on the **societal and scientific needs for more coordination**
- Carry out a “**Coordination Gap Analysis**” by identifying societal and scientific problems that benefit from coordination and would gain from more coordination and matching
- Develop **coordination and match use cases** starting at the user side and bringing in the networks as needed