# Topology of the European Network of Earth Observation Networks and the need for an European Network of Networks – ENEON

Joan Masó, Ivette Serral (ivette@creaf.uab.cat), Ian McCallum (IIASA), Palma Blonda (CNR), Hans-Peter Plag (TIWAH)

ENEON is the European Network of Earth Observation Networks, funded by the European Union under the H2020 ConnectinGEO project] mainly including non-space networks to better coordinate them, with the aim of providing better observations for resolving interdisciplinary problems, to improve the European in-situ participation in GEO and in support of the implementation and monitoring of the UN Sustainable Development Goals.

**ENEON** intends to increase the connection between the existing EO networks and the Science & Technology (**S&T**) communities involved in defining the United Nations **Sustainable Development Goals** (SDG), as well as the S&T communities engaged in the assessments, forecasting, and projecting of future developments. ENEON is the instrument that will bring together European networks involved in research and innovation relevant to GEOSS, with a particular focus on the **in-situ** segment. ENEON also addresses emerging European networks and sensor development projects to provide future provisions which may not yet be part of **GEOSS** or **Copernicus** Services.

***Open to contributors and users from***: European thematic in-situ networks and Communities or Practice, Copernicus in-situ segment, representatives of the SME's the private sector, European and national funding agencies and other European stakeholders of non-space Earth observations.

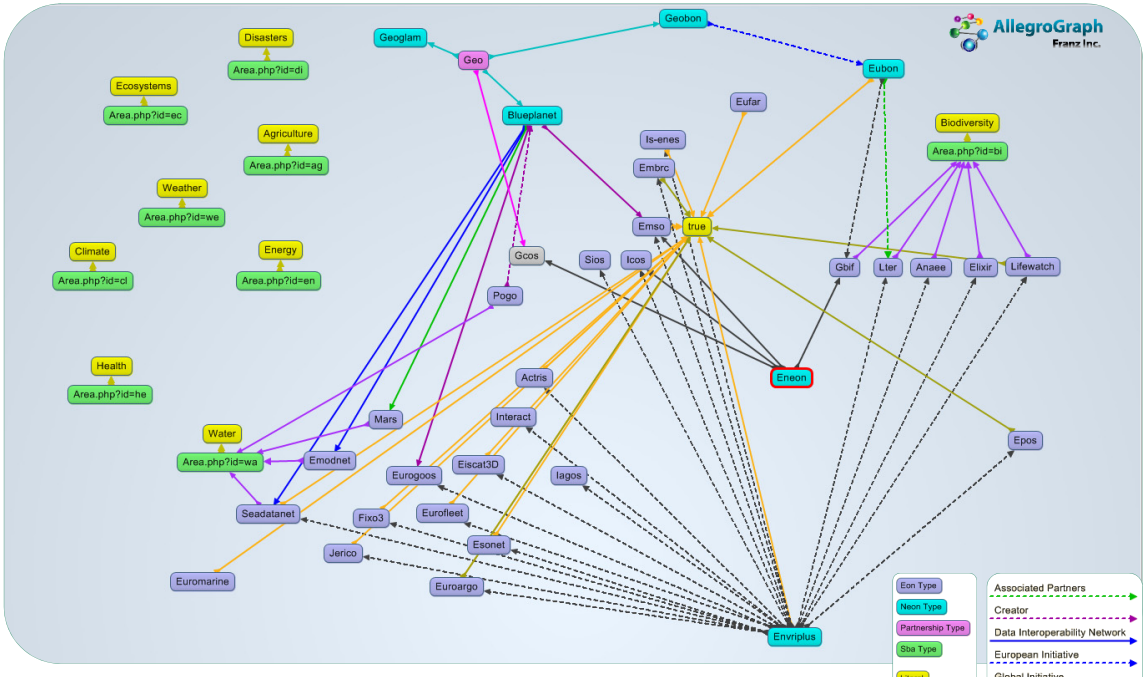
**Become a member!** http://www.eneon.net

This poster presents the complex panorama of Earth Observations Networks in Europe. The list of networks is classified by **discipline**, **variables**, **geospatial scope**, etc.

We also capture the **membership** and **relations** with other networks and umbrella organizations like GEO.

*Help ConnectinGEO to make known EO gaps within your network domain:* www.connectingeo.net/gaps

The on-going result is a graph of multiple relations between networks that can not be clearly expressed as a flat list




*Technically the networks can be represented as nodes with relations between. This is a living diagram that has not been previously produced. This graph of networks will be integrated in the semantic web using linked data technologies. Technically the networks are represented as nodes and the connections between them as lines relating the nodes. We have chosen **RDF** as a language and an **AllegroGraph 3.3** as a **triple store** that is visualized in several ways using for example Gruff 5.7.*

ConnectinGEO final aim is to identify gaps in the EO Networks and justify the need for a more structured coordination between them.

| Gap ID | Gap type | Theme | EV | Gap description | Thread | Traceability | Purpose | Date | Review | Remedy | Feasibility | Impact | Cost | Priority | Recommendation | Filled | Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 001 | 1.1 | Climate | ECV: Temperature (Atmosphere upper-air) | The scarce of microclimatic data (air temperature) from the beneath of trees. | 2 | Pieter De Frenne and Kris Verheyen "Weather stations lack forest data" | Find out how temperatures are changing beneath the trees | 2016/01/15 | | | | | | | | 1 | |
| 002 | 2.3 | Climate | ECV: Aerosols (aerosol mass, size distribution (or at least mass at 3 fraction sizes: 1, 2.5 and 10 micron), speciation and chemical composition, Aerosol Optical Depth (AOD) at multiple wavelengths, AAOD, water content, ratio of mass to AOD | Daily monitoring of inorganic compounds in precipitation | 2 | EMET PROGRESS IN ACTIVITIES IN 2009-2019 AND FUTURE WORK. Level 1 | Monitoring of inorganic compounds in precipitation (SO4, NO3, NH4, H+ (pH), Na+, K+, Ca2+, Mg2+, Cl- | | | | | | | | | | |
| 003 | 2.3 | Climate | ECV: Aerosols (aerosol mass, size distribution (or at least mass at 3 fraction sizes: 1, 2.5 and 10 micron), speciation and chemical composition, Aerosol Optical Depth (AOD) at multiple wavelengths, AAOD, water content, ratio of mass to AOD | Daily/weekly monitoring of heavy metals in precipitation | 2 | EMET PROGRESS IN ACTIVITIES IN 2009-2019 AND FUTURE WORK. Level 1 | Monitoring of heavy metals in precipitation As, Cd, Ni, Cd, Pb, Cu, Zn | | | | | | | | | | |
| 004 | 2.3 | Climate | ECV: Aerosols (aerosol mass, size distribution (or at least mass at 3 fraction sizes: 1, 2.5 and 10 micron), speciation and chemical composition, Aerosol Optical Depth (AOD) at multiple wavelengths, AAOD, water content, ratio of mass to AOD | Daily monitoring of Inorganic compuns in air | 2 | EMET PROGRESS IN ACTIVITIES IN 2009-2019 AND FUTURE WORK. Level 1 | Daily monitoring of inorganic compounds in air. SO2, SO4, NO3, HNO3, NH4,NH3, HCl,NA+, K+, Ca2+, Mg2+ | | | | | | | | | | |
| 005 | 2.3 | Climate | ECV: Aerosols (aerosol mass, size distribution (or at least mass at 3 fraction sizes: 1, 2.5 and 10 micron), speciation and chemical composition, Aerosol Optical Depth (AOD) at multiple wavelengths, AAOD, water content, ratio of mass to AOD | Daily/hourly monitoring of NO2 in air | 2 | EMET PROGRESS IN ACTIVITIES IN 2009-2019 AND FUTURE WORK. Level 1 | Hourly/daily monitoring of NO2 | | | | | | | | | | |
| 006 | 2.3 | Climate | ECV: Reactive Gases, Trace gases (incl GHG), Ozone Precursors (Total ozone, profile ozone, surface ozone, NO, NO2 (surface, column, profile), PAN, HNO3, NH3, CO, VOC (isoprene, terpenes, alcohols, aldehydes, ketones, alkanes, alkenes, alkynes, aromatics | Monthly monitoring of gas particle ratios of N-species | 2 | EMET PROGRESS IN ACTIVITIES IN 2009-2019 AND FUTURE WORK. Level 1 | Monthly monitoring of NH3, NH4, HCl, HNO3, NO3 (in combination with filtre pack sampling) | | | | | | | | | | |

- Several in-situ EO networks in Europe working in different domains and from different sources
- Several schemas and programs: ERIC, ENFRI, etc
- Lack of coordination among them
- Risk of overlapping or missing important pieces