ConnectinGEO

Workshop
on Gap Analysis and Prioritization

Providing Earth Observation Support to the Monitoring and Implementation of the Sustainable Development Goals: Gaps and Priorities

The ConnectinGEO project
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ENEON

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IIASA. Schlossplatz 1 - A-2361 Laxenburg, Austria

GEO

Introduction

- 2 year H2020 funded project (641538). Now in the last months (ending by January 2017).
- Coordinate and Support Action (CSA)
- 15 partners
- A contribution of the EC to GEOSS
- Main objectives
  - Perform a gap analysis in EO data, mainly in-situ
  - Propose priorities for addressing this gaps
  - Manage an European Network of Earth Observation (ENEON)
  - Link gaps to EV and SDG

Main results - EV review and analysis

EVs are variables that have a high impact and should have priority in designing, deploying and maintaining observation systems and making data and products available

- Coming from a Workshop in Bari, June 2015 and reported in the public *D2.3: Proposal of EVs for selected themes*
- 147 EVs reviewed
- Some of the EVs are not a single variable, but a cluster of several ones
- The community that has defined the highest number of EVs is currently the Climate one, lead by the Global Climate Observing System (GCOS)
- Most of the ECVs are relevant to the other GEO SBAs or themes
- Other communities already working on a mature set of EVs are Weather (lead by WMO/GAW) and Ocean, lead by the Global Ocean Observing System (GOOS)
- EV discussion and related work is growing fast in Biodiversity and Water. Energy community follows.
- Agriculture, Disasters, Ecosystems, Health, and Urban Development, are still in the initial stage

- Conclusions
  - Many SBA can rely on a number of EVs already available in other areas
  - Better to concentrate efforts on those variables that are cross-cutting different domains and check if the requirements are the same

GEO New SBA (+ Climate)	Themes (according to the Bari's Workshop)	EV name	Domain and/or system component	Status of EV discussion (initial, medium, advanced)	Relevant communities, conventions, others initiatives	Other relevant GEO SBAs
Biodiversity and Ecosystem Sustainability	**Biodiversity**			Advanced	GEOBON, CBD, Ramsar Convention	
		Genetic composition (Co-ancestry, Allelic diversity, Population genetic differentiation, Breed and variety div.)				
		Species populations (Species distribution, Population abundance, Population structure by age/size class)				

Fragment of the summary table available in the deliverable

Main results - SDG review and analysis

- UN approved 17 SDGs articulated in 169 targets and 240 indicators to measure progress towards these targets
- How many indicators can be measured using Geospatial information and which subset can be measured with EO using EV?
  - 231 of the 240 indicators can be calculated with socio-economic data,
  - only 30 can be extracted with the combination of socio-economic data and Earth observation (in-situ, airborne or remote sensing),
  - only 9 indicators by Earth observation alone,
  - …, but Earth observation can be used to understand global processes that can help to retrieve other indicators.
- In ConnectinGEO, an effort has been done to link SDG with EV → available in the D2.3 Proposal of EVs for selected themes

Example

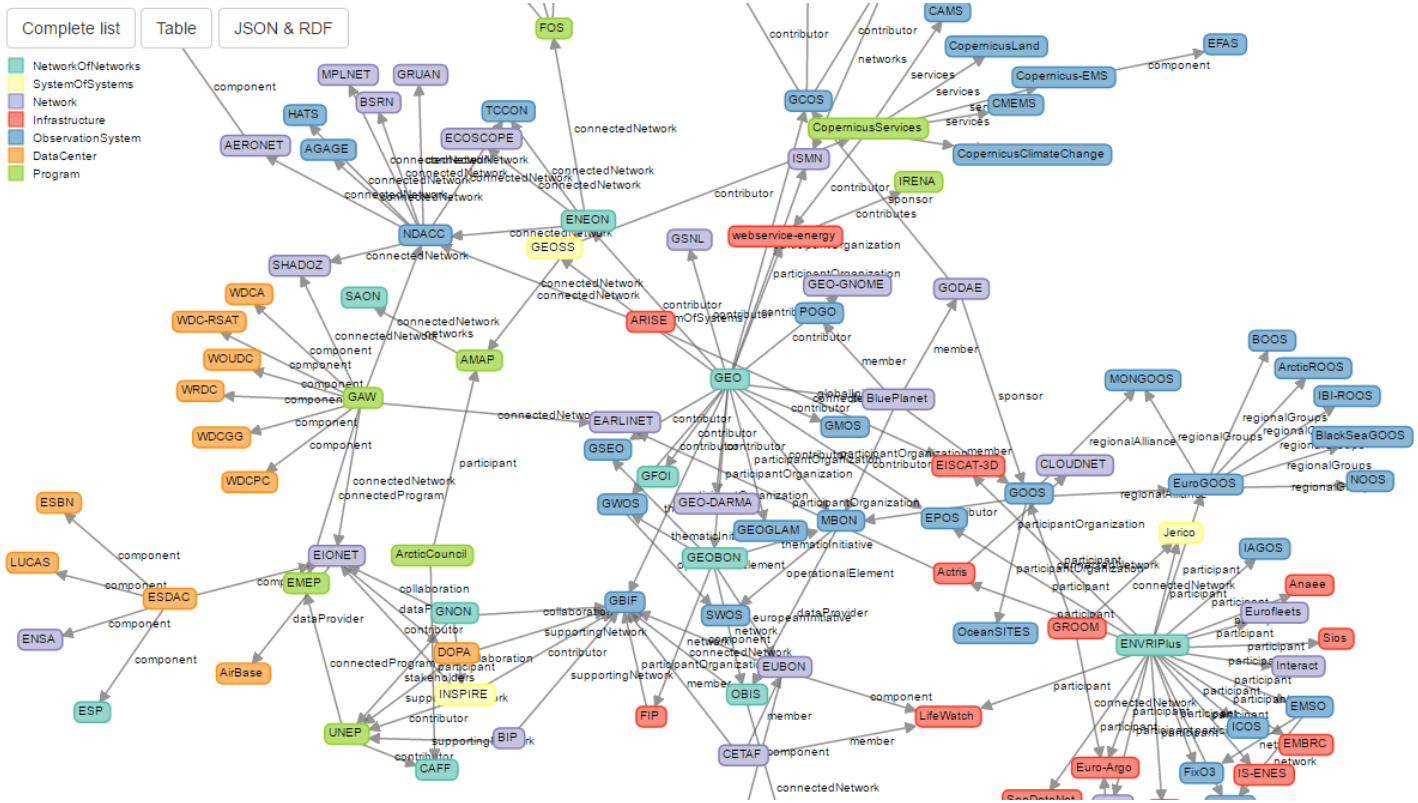
- **Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development**
  - Target 14.1: By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from landbased activities, including marine debris and nutrient pollution
    - *Indicator 14.1.1 Index of Coastal Eutrophication (ICEP) and Floating Plastic debris Density*
      - *Related proposed EV: Ocean colour | Ocean acidity | Species populations (Species distribution, Population abundance, Population structure by age/size class) | Community composition (Taxonomic diversity, Species interactions) | Ecosystem structure (Habitat structure, Ecosys. extent and fragmentation, Ecosys. composition by functional type)*
  - Target 14.3: Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels
    - *Indicator 14.3.1 Average marine acidity (pH) measured at agreed suite of representative sampling stations*
      - *Related proposed EV: Ocean acidity*
  - Target 14.4: By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at l
    - *Indicator 14.4.1 Proportion of fish stocks within biologically sustainable levels*
      - *Related proposed EV: Species populations (Species distribution, Population abundance, Population structure by age/size class)*

Organizing the European Contribution to GEOSS

- Instruments:
  - European data hub - NextGEOSS
  - ERA-Planet
  - **European Network of Earth Observation Networks**
- Via:
  - Participation in GD-06
    - Report provided on the status of in-situ observations
  - ENEON workshops
  - ENEON website
  - ENEON activities
    - E.g. Mapping the Networks
    - SOS Web service for the networks linking data to GEOSS

Main results – Map of the EO networks

- A dynamic graph of the existent EO networks in Europe in JSON-LD format - http://www.eneon.net/graph
- Anyone can contribute! User feedback system integrated to enhance this first draft version



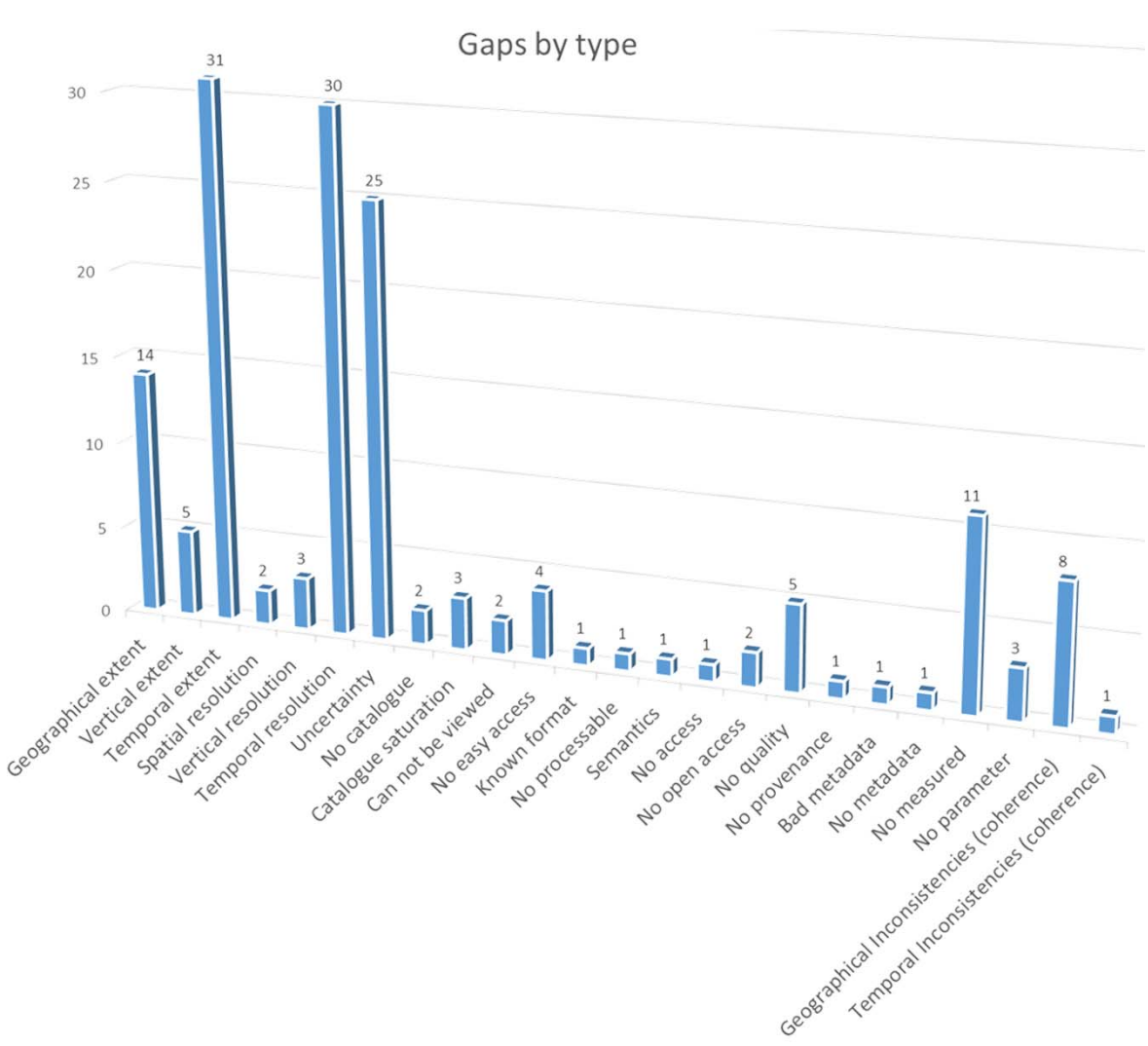
Main results – EO gaps analysis

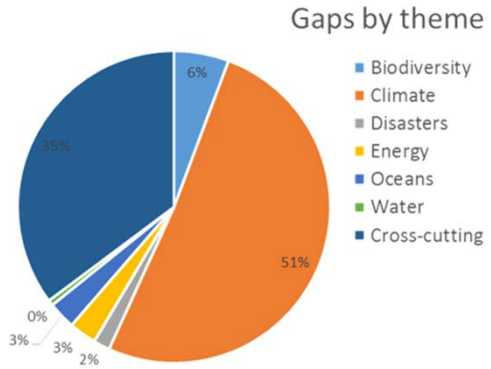
- 176 gaps identified coming from the ConnectinGEO methodology
- Collected in a collaborative table were anyone can contribute:
  http://twiki.connectingeo.net/foswiki/bin/view/ConnectinGEOIntranet/GapAnalysisTable

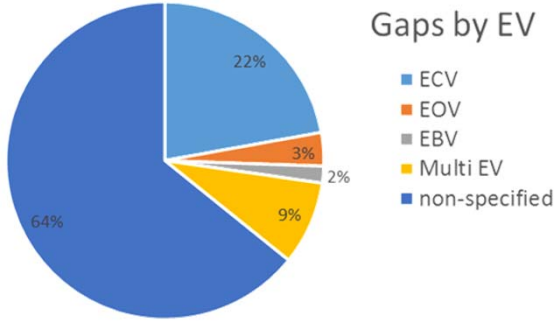
Add	View	Gap ID	Gap type	Theme	EV	Gap description	Thread	RS/In-Situ
Add FeedBk	View FeedBk	001	1.1	Climate	ECV: Temperature (Atmosphere upper-air)	The scarce of microclimatic data (air temperature) from the beneath of trees.	3	
Add FeedBk	View FeedBk	002	2.3	Climate	ECV:Aerosols (aerosol mass, size distribution (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, vertical distribution of extinction).	Daily monitoring of inorganic compounds in precipitation	2	
Add FeedBk	View FeedBk	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, vertical distribution of extinction).	Daily/weekly monitoring of heavy metals in precipitation	2	
Add FeedBk	View FeedBk	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, vertical distribution of extinction).	Daily monitoring of Inorganic compuns in air	2	
Add FeedBk	View FeedBk	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	Daily/hourly monitoring of NO2 in air	2	

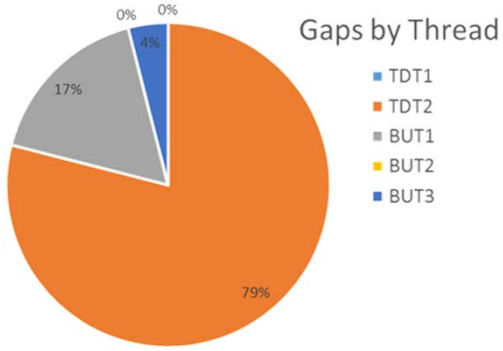
- User feedback system integrated for a given gap

- Some preliminary statistics extracted from the gaps



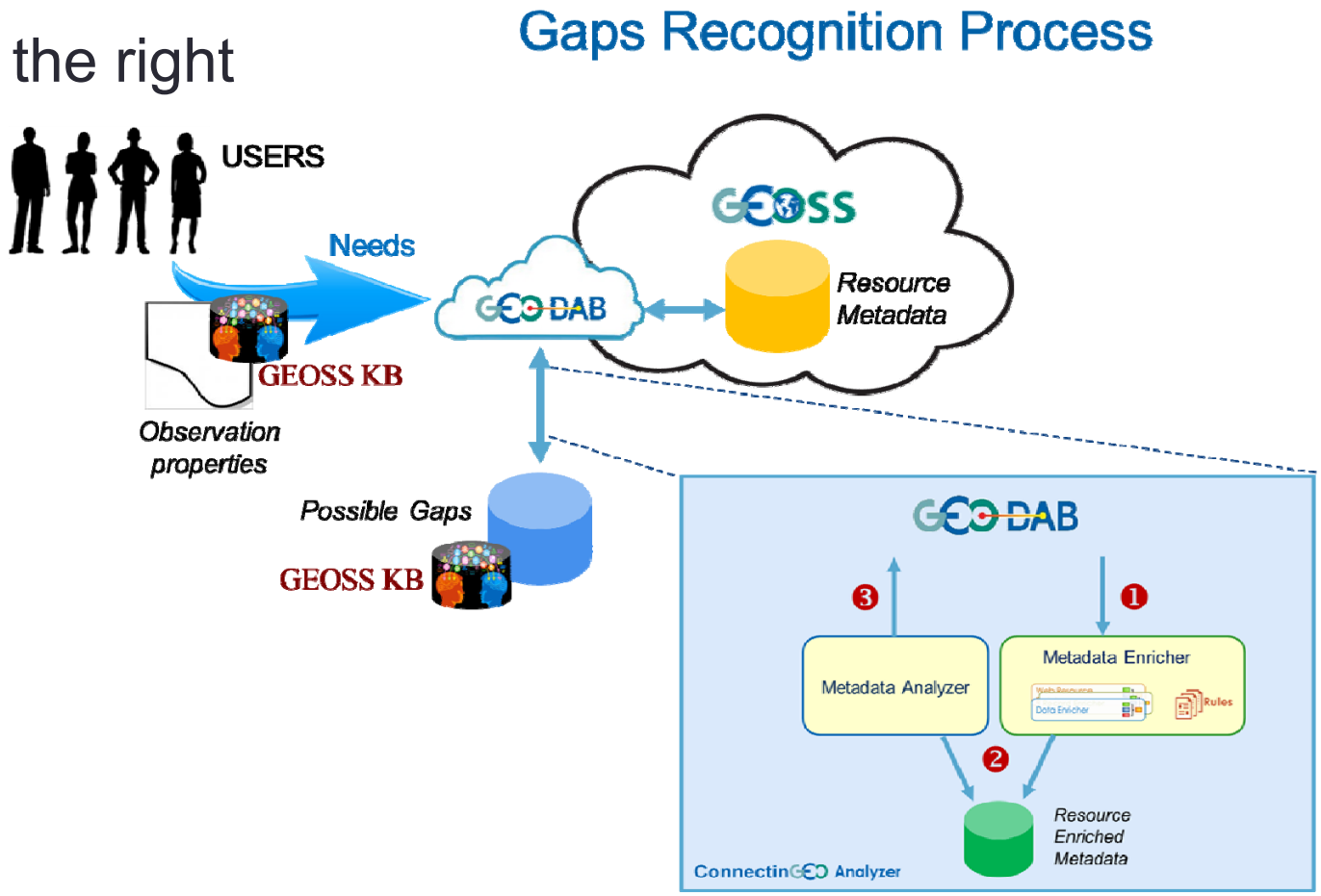






Other results – gaps inventory

- Linked to the GEO DAB and the GEOSS KB
- Metadata enrichers and data filters
- Formulating the right questions to assess the gaps



Other results – A WebGIS Client providing access to in-situ measurements:

- Based on the 52N SWE (Sensor Web Enablement) solution following OGC SOS (Sensor Observation Service) standard and GEOSS recommendation on interoperability
- http://insitu.webservice-energy.org/jsClient-0.2.0/#map

- visualization of sensor locations
- visualization of measurements as time series
- display of sensor metadata
- computation and statistical representation of time series
- download data

Challenges

- Sustainability and engagement in the ENEON
  - Analyzing alternatives including social network or merging with other initiatives (ERA-Planet, NextGEOSS, ENVRI+…)
- Keep the network mapping updated
- Activate Bottom-Up Thread 2 and 3 to collect their gaps
- Apply the gap analysis methodology regularly
- Setting the right priorities for the current gaps

- Scientific Special Issue on Environmental and socio-economic methodologies and solutions towards integrated Essential Variable definition and generation