
A hand is shown holding a glowing blue wireframe globe. The globe is composed of many interconnected lines forming a mesh. The hand is positioned over a laptop screen, which is partially visible in the background. The overall scene is set against a dark, blurred background.

OPEN DATA & OPEN KNOWLEDGE Workshop

Session 8: GEO Infrastructure and Closing

A hand is shown holding a glowing blue wireframe globe, which is superimposed over a laptop screen. The background is a blurred image of a person's arm and hand reaching towards the laptop. The text is overlaid on the left side of the image.

OPEN DATA & OPEN KNOWLEDGE Workshop

Reporting from Session 1

Current situation in few points (technology, political, communities)

More satellite data than ever, more Data Cubes initiatives becoming operational.

Full archives available in private and public platforms, mostly using standards (STAC).

Strong and growing regional to international partnerships.

Still low accessibility for medium to high resolution imagery.

Benefits encountered

- Timeseries allow to monitor changes with way more accuracy for official reporting of SDGs if **users are able to use all the data that is available.**
- Analysis Ready Data efforts have lowered the barrier to use satellite imagery, **allowing more time for data analytics**
- Many platforms hosted by agencies allowing to **explore and analyse the data.**
- Data Cubes and Digital Earths implementation allow to **reach users beyond the “traditional” EO community.**

Challenges encountered

- Measuring the benefit of all data available.
- Making sure relevant users can access it.
- Filling the gap of common tools (interoperability).
- Strengthening capacity development efforts on how to use all data that is available.

Concrete actions identified by the GEO Community

- Empower local stakeholders to generate their own local products derived from EO.
- Enhance visibility of satellite data providers of different regions, resolutions and purpose, for the GWP activities.
- Increase capacity building.
- Enhance knowledge sharing on Data Cubes (how to build, how to use, how to collaborate).

Actions for GEO Infrastructure

- Increase computing power access to the communities in need. **Follow the FAO SEPAL example.**
- Integrate more data types in the Data Cubes (ground, statistics, etc...)
- Implement STAC and OGC standards,
- Zero download model !



OPEN DATA & OPEN KNOWLEDGE Workshop

Reporting from Session 2

Report Session 2: Towards Open Knowledge

- *Actual situation In few points (Technological challenges; Political dimensions; community aspect) e.g. International perspective, Regional challenges, National examples*
- The world is becoming more complex and less stable
 - => competition between needs to exchange and geo-political situation.
- Success of some initiatives is linked to funding
- Importance of trust across people (meeting in person is important) and institutions

Report Session 2: Towards Open Knowledge

- *Benefits encountered*
 - Community, collaboration
- *Challenges encountered*
 - Still issues with data use and interpretation. There is often a poor understanding of data from the user side (what information do they carry, how to use them? how to cite?, origin of the data, etc.)
 - Important to select the capacities we want to develop and that they link to the high level goals.
 - Curation of capacity development.

Report Session 2: Towards Open Knowledge

- *Concrete actions identified / to be envisaged by the GEO community (e.g. GEO Work Programme Activities; Data Working Group; GIDTT) to move the Open Data and Open Knowledge in a concrete way*
 - **Focus on Human Factor: Engage** and strengthen the community further increasing diversity and building a long-term strategy to engage with people
 - Building capacity is key for open science, open software, open knowledge development and engagement
 - Consultation is very important across different stakeholder groups
 - **Clarify value propositions** so smaller players see benefits from open models It is Important to see how sharing can increase value
 - Demonstrate success stories enhancing benefits from open data policies
 - Identify who are the end users in the value chain (app developers, urban planners, farmers...)

Report Session 2: Towards Open Knowledge

- *Actions to be considered for GEO Infrastructure*
 - It is time to really engage with knowledge packages' end-users.
 - Awareness needs to be increased in young generation of researchers. access to universities to advocate open software / EO data use / GKH
 - Importance of web analytics for reporting about users and use to encourage sharing
 - We need to find champions across users of our products to promote GEO value

Report Session 2: Towards Open Knowledge

- *Any other Important aspect*
 - Material needs to be professionally prepared: easy to ingest.
 - The language barrier should not be underestimated.
 - Importance to have tools in-place to help convert algorithm to actual service, streamlining from development to operations
 - Keep on advocating the move from provider centric approach to user centric to data provision.
 - Important to assess socio-economic impact of shared resource (ZENODO assesses billion swiss francs...).

GEO Dialogue Series 2023


Open Education, Open Evaluation

6 July 2023, 16:00-17:30 CEST

Register: https://www.earthobservations.org/geo_blog_obs.php?id=592

Organized by the GEO Data Working Group

*Supported by EEA, EC via InCASE and ILIAD projects
Communication supported by Space Tech*



OPEN DATA & OPEN KNOWLEDGE Workshop

Reporting from Session 3

Session 3 (part 1): Open In-situ data and EVs

- *Strengthening of GEO strategy with respect to in-situ data over a number of years – established in-situ as a priority topic for GEO*
- *In-situ landscape highly **heterogeneous***
- *Availability of in-situ data challenging due to both **cultural and technical issues** e.g. adoption of open science practices not fully embraced; proprietary data formats*
- *Data Sharing needs to be the default **"If you love your data, then set it free!!"***
- *Open In-situ data essential for:*
 - **validation** of satellite-based observations
 - **direct assessment of human impact** on individual ecosystems/habitats
 - **real-time monitoring**
 - **delivering higher precision data**, including training data necessary for AI

Session3 (part 1): Open In-situ data and EVs

- *Open data*
 - Funding agencies and other agencies **mandating open FAIR data** – fosters wider adoption of open data practices
 - Challenge is **legacy data**, especially analogue that cannot be accessed and shared
 - Investment (financial/intellectual) in **data** acquisition makes it an **asset** to be protected –need to demonstrate the potential future benefits of wider sharing of data/knowledge/information
 - **Requirements gathering** for in-situ data across GWP activities can be optimised using a **systematic approach** e.g. GReqs tool (<https://g-reqs.grumets.cat/>)
- **GEO should foster wider adoption of open data, knowledge and information, especially within the GEO community**
- **GEO Knowledge Hub can be a primary resource for practical implementation of open science/open knowledge/open information practices**

Session 3 (part 1): Open In-situ data and EVs

- **Essential variables:** *identified as a key for integration and interoperability (with and across domains)*
 - some GWP activities have experience of developing EVs over many years e.g. GCOSS
 - EVs are critical for providing input to **evidence-based policy making**
- Requirement for domain/ thematic level EVs
 - *aim to **reduce heterogeneity***
 - ***break down barriers/siloes** and **support cross domain collaboration** – important as multidisciplinary research is increasingly necessary to address fundamental global challenges*
 - *Supports data and knowledge sharing*
- Challenges encountered

Session3 (part 1): Open in-situ data and EVs

- *Many GWP activities have identified need for EVs*
- *Requirements for EVs potentially common across different selected domains*
- *Coordinated cross-domain dialogue on EVs will reduce duplication of effort and ensure convergence*

GEO uniquely position to facilitate discussions across different domains/thematic communities on requirements for EVs.

Session 3 (part 2) - gaps and challenges

- **Key messages** from in situ data providers and intermediaries:
 - **User needs and quality** needs to be focus
 - **Collaborate** with the relevant stakeholders on a continuous basis
 - Provide **acknowledgement** and **visibility** of in situ data providers
 - Use **common standards, vocabularies and protocols** – but sometimes cannot be forced, use **brokering approaches** (DAB)
 - There is still **limited data availability** in some regions/topics (crop mapping)
 - In many other cases, there is data but either it is not known or they are in **inadequate format, quality or access protocols**

Session 3 (part 2) - gaps and challenges

- **How to go further in GEO?**
 - Bottom-up actions need to be complemented by top-down messages by **GEO members** to promote more open data policies
 - **Standards** need to be advocated for the creation of more accurate products, as well as describing their **uncertainties**
 - The collection of user requirements is essential – **G-reqs** could be used for the GEO community to express their in situ data needs
 - **Regional and National GEOs** can be the right fora to connect local and regional users and stakeholders/data providers
 - **GEO** should communicate more the value of open in situ data, to promote the sustainability of in situ infrastructures and networks

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OPEN DATA & OPEN KNOWLEDGE Workshop

Reporting from Session 4

Summary of Presentations – Part 1

- **ITC - CAPACITY DEVELOPMENT AND OPEN DATA /OPEN KNOWLEDGE**
- How to move the geo community to adopt open data and open knowledge?
- How to bring knowledge to a wider community for greater impact through the geo knowledge hub ?
 - New skills (manage large amounts of data, new technologies, legal, integrity, ethics issues)
 - Change of attitude - from “protected data by default” to “open data by default”, respecting legal, and other constraints
 - A holistic approach - Individual, organizational and institutional capacity development; national, regional, youth; policies, infrastructure, legal, technical, career guidelines, funding, networking and collaboration
- **GEO-LDN - National coordination through Capacity Development**
- Theory of Change for GEO-LDN developed to guide the design of the services
- Capacity development being conducted through Post Graduate Program, Online Seminars and Dialog Forum, CAN, Help desks, LDN Toolbox
- All data open, open source tools
- Partnership and collaborations with existing institutions (UENR, RCMRD, GPSDD)

Summary of Presentations – Part 1

- **UNOOSA - UN-SPIDER and GEO Knowledge Hub - leveraging Open applications in delivering training in countries**
 - Leveraging Open applications in delivering training in countries
 - UNSPIDER mandate – ensure that all countries have access to and develop the capacity to use all types of space-based information (EO,GNSS, SatComms) to support the full disaster management cycle.
 - Regional Support Offices based at regional institutions
 - Training on NSDI (Sri Lanka), TAM on space regulations, UNSPIDER knowledge portal
- **National Coordination Mechanisms for National GEOs**
- Structure of framework for coordination and collaboration among stakeholders to deliver on specific priorities (National steering committees, task teams, inter-ministerial committees, emergency teams, National GEOs)

Summary of Presentations – Part 2

National GEOs

- **USGEO**

- Community - private sector, non-profits, and academia
- Foster improved Earth system data management and interoperability
- Identify high-priority user needs for Earth observations data
- Goals: Support & Balance the Portfolio of Earth Obs., Engage the Earth Observations Enterprise, Improve the Impact of Earth Obs.
- Working Groups & Task Teams (Data Management Working Group, Satellite Needs Working Group)
- 2023: A Year of Open Science - A multi-agency (15) initiative across the US Federal Government
- NASA's Transform to Open Science (TOPS) - certification (provide researchers with core open science skills)

- **SAGEO**

Legislation - Spatial data Infrastructure, DLAARD

Policies - National Space Policy (DTIC), Draft national data Policy (DTPS)

Strategies - South African Earth Observation Strategy (SAEOS) & National Space Science & Technology Strategy (DSI)

Implementation - Institutions, processes & infrastructure

International Data Sharing and GEO principles – FAIR, TRUST

SAGEO Open Data Facilitation Mechanisms - SA-GEO Communities of Practice (CoP) Engagements (Data Governance CoP, Earth Observations Infrastructure CoP, Best practise guidelines (under development), Open data policy recommendations)

Open data examples: South African Earth Observation Strategy (under development), Marine Information Management Systems (MIMS), Bio Energy Atlas, National Climate Change Response

Database, South African Risk and Vulnerability Atlas (SARVA), Digital Earth South Africa, National Oceans and Coastal Management Systems (OCIMS)

Summary of Presentations – Part 2

National GEOs

- **Ghana**

- Approval of National Space Policy for Ghana
- Establishment of Ghana Space Agency
- Ghana Space to provide Satellite data to all MMDA's
- Purpose of National GEO:
 - Strengthen partnerships
 - Addressing our needs
 - Accessibility of EO data and tools, and services
 - Developing tailor made solutions
 - Develop proposals to obtain fund from within and outside the country
 - Building capacity of national institutions to effective deliver on their mandate
 - Partnership and collaboration with other national GEOs / GEO secretarial
- National GEO Document for Ghana – define purpose, coordination mechanisms, activities, expected impacts, capacity development strategy, partnership and outreach strategy

- **Kenya**

- Kenya Space Agency – mandate to Promote, Coordinate and Regulate space related activities
- Purpose of National GEO for Kenya:
 - Standardization of Processes and Systems
 - Collaboration and Knowledge Sharing
 - Policy and Governance Support
 - Public Engagement and Sensitization
 - Capacity Building and Technology Transfer
- Geospatial communities of Practice
 - Agriculture (Crops, Livestock & Fisheries) and Food Security
 - Natural Resources Management
 - Data Governance & Infrastructure
 - Human Settlement and Spatial Planning
 - Health systems
 - Climate Action and Disaster Risk Reduction

Benefits/ Challenges of National GEOs

- Benefits encountered
 - Avoid duplication of efforts
 - Fit-for-purpose data and services
 - Promote co-development and ownership
 - Leverage existing capacities
 - Maximize return on investments
- Challenges encountered
 - Conflicting institutional mandates
 - Institutional Vs government's political mandate
 - Low or no political goodwill
 - Low awareness on value of data sharing
 - Poor infrastructure
 - Inadequate resources to address identified priorities


- Concrete actions identified/to be envisaged by the GEO community (e.g. GEO Work Programme Activities; Data Working Group; GIDTT) to move the Open Data and Open Knowledge in a concrete way
 - GEO WP involvement at national level
 - Improved Coordination with other communities
 - Resources for GEO activities at regional and national level
 - Joint activities – MoUs, ...
 - Increase awareness – workshops and other forums
 - Support by Government – role of GEO principles in enabling operations of National GEOs
 - Alignment of policies with National GEO's objectives

Actions to be considered for Data and Infrastructure

- Support for innovation – data, cloud access, software, open and reproducible tools, resources, forums
- Open data coordination – at all levels
- Re-usable apps and data
- Common accessible repositories for in-situ data
- Needs assessments at national level – thematic, or other
- Capacity building at National GEO level

Measures of Impact for successful National GEOs

- Aspirations and motivation within GEO community
- An engaging community – more collaborations
- Political goodwill improved
- Value for propositions – valuable activities with positive outcomes and impacts (increased and effective capacity, increase in resources for EO activities, reduced losses, etc.)
- Increased and improved data sharing - more open platforms and infrastructure



OPEN DATA & OPEN KNOWLEDGE Workshop

Reporting from Session 5

Status of Data Licensing in GEO


- Little data shared within GEO is licensed with a standard data license, but instead is unlicensed or subject to a custom license.
- The GEO Programme Board approved GEO Data Licensing Guidance developed by the Law & Policy Subgroup earlier this year, but there has not been significant adoption.
- The ODOK Open Data Licensing session was focused on the GEO Data Licensing Guidance, featuring insights from data providers and users across government, industry, and international sectors and sought the audience's input on challenges to and benefits of adoption of the Guidance, as well as needed tools, resources, and trainings.

Session Discussion

- Data licensing is a critical component of open data. This importance is only increasing.
- There is significant benefit to using existing standard, machine-readable, open data licenses. No license=data are unusable, and custom licenses create significant complications and delay.
- Legal interoperability is just as important as technical and other forms of interoperability.
- Simple guidance is required for implementation.
- No concerns were raised with the content of the GEO Data Licensing Guidance, and several data providers are already using or actively working towards using its recommended licenses.
- We must continually advocate for this issue within GEO and in our communities.

Potential Concrete Actions

- Work with GEO initiatives towards applying a recommended license to their data and products.
- Ensure GEO platforms that host data or information require providers to include a license.
- Consider developing metrics to track adoption of data licensing guidance.
- Seek the support of the regional GEOs in promoting adoption of data licensing guidance.
- Explore some action related to data licensing at the GEO Ministerial.
- Develop simple data licensing implementation instructions.
- Effectively and repeatedly communicate the benefit of open data licensing, success stories, and the importance of licensing for users and open knowledge.

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OPEN DATA & OPEN KNOWLEDGE Workshop

Reporting from Session 6

We heard from GEO Work Programme Activities




Open Data and Open Knowledge is a journey and we as GEO Community we are all together to accelerate impact to solve our Planet Socio Environmental challenges

What is needed to enhance users uptake of the GEO Applications

- Capacity building and involvement of National GEOs
- Assess capacity needs in each country
- Focus on Open Knowledge and Youth
- Assess what tools will be relevant in the individual country
- Keep applications updated in the GEO Knowledge Hub
- Interact with people you want to use the applications to be more impactful
- Take time to invest in the follow-up in current solution before moving to the next thing
- Provide the youth with education on open data open knowledge – work on mindset long term
- Influence UN with definitions based on GEO experience
- Advocate the importance of Earth observations in global policy making (IPCC etc) via GEO members and PO (national level, regional, global).

Actions

- Best practices – examples from concrete cases that have succeeded, made good decisions
- Engage with Users to learn from their experience and Build circular economy of knowledge sharing
- Welcome of the DOI Minting to ensure long term preservation

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OPEN DATA & OPEN KNOWLEDGE Workshop

Reporting from Session 7

Session 7

- **How commercial sector is supporting Open Knowledge/ Very High resolution imagery and GEO Community needs**
- The private sector has leveraged Earth observations capabilities to develop products and services to support the use of these data, platforms and algorithms for open science and open knowledge.
- These international private, non-profit and commercial entities offer insights into the evolution of business models that leverage Earth observations to promote and serve the EO community and the public.

Session 7

Benefits

- *Support can be provided for the open scientific method, establishing repositories in an open and transparent way, which can contribute to health issues, such as those observed during COVID-19.*
- *Commercial platforms offer opportunities for organizations to provide new or improved services to their customers. GEO compute and storage capabilities provide an opportunity for the private sector and cloud companies to become involved at low or no cost, as well as online training, to enable geo collaborators to become successful in using EO data on the cloud.*

Challenges

- *Open data licenses are not always respected; simplicity in data*

Session 7 Action to Considered for GEO Infrastructure

- Provide community support to identify and respect appropriate licenses and related services for open access and use of EO data.
- Provide support for the open scientific method and data management throughout the data lifecycle and for leveraging the private sector and cloud-based services to establish and improve repositories in an open and transparent way.