

GEO Knowledge Hub

Introduction and concepts

Presentation by

GEO Knowledge Hub team

Supported by

GEO Data and Knowledge Working Group



June 23, 2025

Open Earth Observation **data** and **knowledge** are **crucial** in addressing **global** socio-environmental **challenges**



Climate change

Source: Washingtonpost.com



Natural disasters

Source: bbc.com



Agriculture monitoring

Source: ESA multimedia gallery



GEO is all about **Open Data** and **Open Knowledge**

GEO is a global partnership involving 116 governments and over 162 organizations from academia, business, United Nations and civil society.

GEO brings together Earth Observation providers and users to promote **free, open and equitable access** to EO data and Earth Intelligence solutions.

By sharing this wealth of information and research, we ensure that **decisions made for Earth's future are based on the best available knowledge.**

Openness as a Principle, **Progress** as a Goal

2005

Birth of GEO



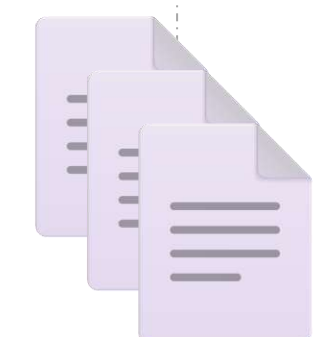
2012

Data sharing
principles



2021

Open Knowledge
statement



Activities grounded in **solid** principles

GEO Data Sharing principles



23rd Programme Board Meeting – 21-22 June 2022

PB-23.12

Revised GEO Data Sharing and Data Management Principles

This document is submitted by the Secretariat to the Programme Board for decision.

1 INTRODUCTION

In 2015, the GEO Data Management Principles Task Force was tasked with defining a common set GEO Data Management Principles¹. These principles address the need for discovery, accessibility, usability, preservation, and curation of data and related resources that are shared. Such resources also should be shared as open data in accordance with the GEO Data Sharing Principles². The GEO Data Management Principles complement the FAIR Principles and TRUST Principles, which also are being adopted across research communities. The GEO Data Management Principles can be applied to the entire data management lifecycle,

Open Knowledge Statement



21st Programme Board Meeting – 28-30 September 2021

PB-21.17

GEO Statement on Open Knowledge

This document is submitted by the Secretariat to the Programme Board for decision.

1 INTRODUCTION

This document presents a revision of the GEO Statement on Open Science (see Annex A) that was presented to the Programme Board at its 19th meeting in January 2021. Based on consultations with the GEO community, the Secretariat proposes that the statement be reformulated to focus on “Open Knowledge”. This concept, while inclusive of Open Science, is considered to be more closely aligned with the GEO Mission and Vision, which aim to support decision making and not only or primarily science.

The **D**ata and **K**nowledge **W**orking **G**roup (DK-WG) is convened to **work** with the GEO community and with external stakeholders to address **data policy, data sharing** and **data governance issues** impacting the use of space-based and in-situ EO as well as open knowledge practices

Subgroup: In-situ data



Fairification tool



G-reqs

GEO In Situ Data Strategy

GEO In Situ Data Strategy

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Subgroup: Data Sharing and Data management principles



Self-assessment tool



Dialogue Series

GEO Data Management Principles

GEO Data Management Principles

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Subgroup: Law and Policy



Survey on Data License



Engagement with GWP

Data License Guidance

Data Licensing Guidance

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The DK-WG co-organize the Open Data and Open Knowledge (**ODOK**) workshop

ODOK 2023 (Switzerland)



ODOK 2024 (China)



ODOK 2025 (Italy)



Data and Knowledge working group resources and tools

GEO Data Management Principles

GEO Data Management Principles

1 INTRODUCTION

In 2015, the GEO Data Management Principles Task Force was tasked with defining a common set of GEO Data Management Principles. These principles address the need for discovery, accessibility, usability, preservation, and curation of data and related resources that are shared. Such resources also should be shared as open data in accordance with the GEO Data Sharing Principles. The GEO Data Management Principles complement the FAIR Principles and TRUST Principles, which also are being adopted across research communities. The GEO Data Management Principles can be applied to the entire data management lifecycle, while the FAIR principles (Wilkinson M.D. et al.) focus primarily on aspects of metadata, including persistent identifiers, curation and preservation of data principles, the GEO Data Management Principles can be applied to services that and related products. The Data Information (DRI) and other recommendations for them.

The GEO Data Branding website generate a GEO label that reflects pages (<https://www.geoportal.org/implementation-of-the-DMPs-as-data>). At this stage, the GEO has provided against the DMPs. Guidance for implementing the section of the guidelines. The following are the key elements:

- Title and Category of Data
- Explanation of the DMP

Editor: Data Sharing and Data Working group

Implementation guidelines

Data License Guidance

Data Licensing Guidance
Law and Policy Subgroup of the GEO Data Working Group

This document submitted by the Data Working Group was approved in the 25th Programme Board meeting

1 INTRODUCTION

The Programme Board directed the Data Working Group (DWG) to prepare guidelines regarding open data licensing (Action PB-34.05). This document responds to that action, providing data licensing guidance for GEO members and Participating Organizations and GEO Work Programme Activities, consistent with the GEO Data Sharing Principles and other existing GEO policy. This living document was developed by the Law and Policy Subgroup (LP-SG) and approved by the Data Working Group.

2 BACKGROUND

Data users need to understand their legal rights and obligations when using data. The Earth observation (EO) community has often used phrases such as "full and open" to convey this information. With expanded use of EO data, however, this phrase no longer provides sufficient legal certainty. This uncertainty discourages the use of EO data.

Additionally, some GEO members and the private EO community use custom, lengthy "End User License Agreements" (EULAs) to describe allowable use. Accepting EULAs requires legal review, and EULAs often include substantive restrictions on use (such as restricting to non-commercial use). Frequently these custom EULAs include terms that national governments are unwilling to accept (such as being subject to foreign law, and indemnification requirements), requiring lengthy negotiation of those terms. Small and medium-size enterprises are at a further disadvantage, lacking the clout to request that data providers negotiate EULA terms and requiring investment in legal counsel to understand the implications of accepting those terms. Furthermore, the lack of uniformity in definitions, treatment of value-added products, and other important terms causes uncertainty and could create legal risks for users.

This issue has been well known and explored for at least a decade, both within GEO and in other international groups. In 2011, for example, the GEO Legal Interoperability Sub-Group of the Data Sharing Task Force first developed a White Paper for the GEO-VII Plenary that recommended that "GEO Members and Participating Organizations should consider adopting one of the following

1 / 5

GEO In Situ Data Strategy

GEO In Situ Data Strategy

Draft Table of Content¹

[This strategy itself should be a rather short document (less than ten pages?), easy to read for non-experts, providing a clear and concise framework and guidance. Supporting documents (or annexes) may be prepared and referenced as needed (e.g., the Data Sharing Principles)]

Purpose and Context

Purpose

- Scope, rationale, and justification. Remember to add references to the role of EO in-situ data in GEO related documents and strategies providing a solid basis for a strategy: GEOSS Strategic Plan to 2025, Ministerial Declaration (s), at least Mexico and Canberra, and In Situ Concept note (early 2020). We may underline the opportunity for GEO to take an empty space (unlike for satellite imagery where we have CEO57) (Do we need to consider the timeframe of GEO's mandate?).
- We need to define what we mean by "in-situ data"? (We need to be open and pragmatic).

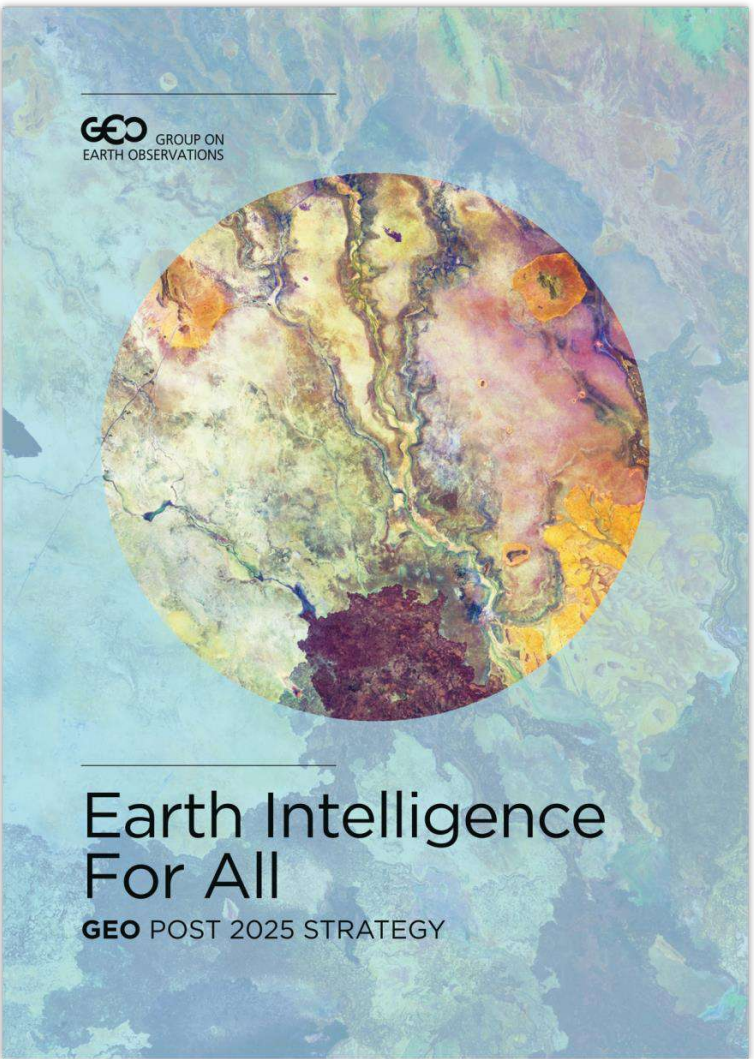
Context

References we can use: In-Situ Concept v0, GEO XIII-2-Inf-01(Rev1) APPENDIX 4: In-Situ Observations: Coordination Needs and Benefits). ... We can decide to do a SWOT analysis (see the GEO Engagement Strategy) – not a bad idea even if we may ultimately decide to add this as an annex rather than in the strategy.

- State of play, the in-situ data landscape, main challenges (this section should not be too long, we could describe key characteristics (heterogeneity, lack of coordination, geographical variations, data access ...) rather than the individual elements);
- Building on GEO's successes (Lessons Learnt, what are the current in situ data landscape elements in GEO described via GEO governance (Canberra Declaration, ExCoM focus, GEOSEC priority, Data WG ...) and project initiatives. Exemplify use and importance of in-situ data – from a GEO perspective. Examples of the use and importance of in-situ data in GEO initiatives (e.g., GEOGLAM, GEO Mountains, TWIGA-TAHMO, GEO Aqua Watch, and others?);
- What organisational, policy, and governance landscape should GEO fit into? Where can GEO make a difference? Key (international) partners and organisations (e.g., Research infrastructures, WMO, NOAA, FAO, ...).

Examples of Key Challenges:

¹ Partly based on the GEO Engagement Strategy



Towards



Supports

GEO GROUP ON
EARTH OBSERVATIONS
GEO Work Programme Activities



Self-assessment tool



Fairification tool



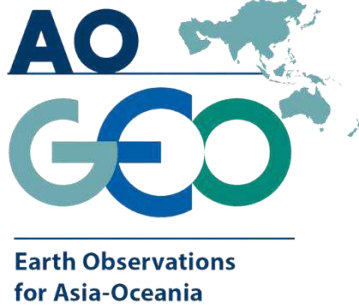
Dialogue Series



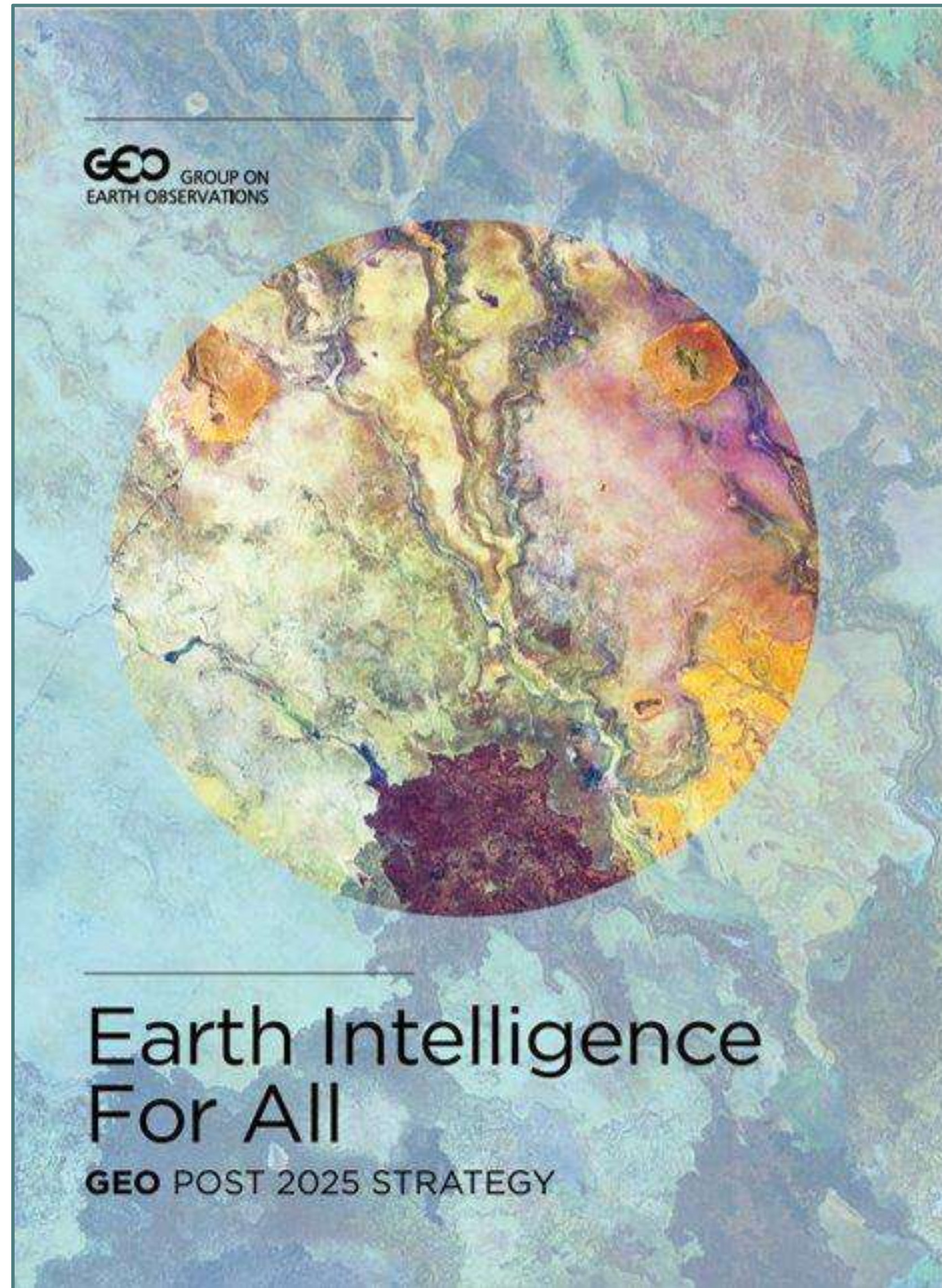
G-reqs



GEO Knowledge Hub



Evolving: The GEO Post 2025 Strategy



“There is a clear need for a global partnership where data providers and users from all communities work together, leading to better coordination, greater inclusion, reduced duplication, and faster action”

“Building on the achievements of the past 10 years, GEO reaffirms its commitment to full and open access to Earth observation data, knowledge, products and services. GEO also reaffirms its commitment to promote data and knowledge sharing and the co-development of services that empower users to make sound environmental decisions, enable economic opportunities and promote good governance”

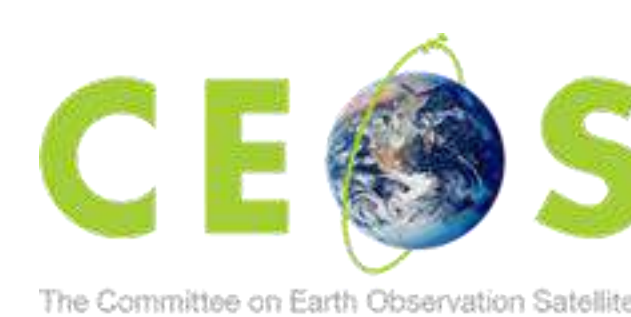
Knowledge

Papers

Analysis

Data

Videos



Digital Earth
AFRICA



Ameri
GEO
Earth Observations
for the Americas



Afri
GEO
Earth Observations
for Africa



AO
GEO
Earth Observations
for Asia-Oceania



Digital library



Climate change



Deforestation



Drought



Wildfires



Flood



Food security

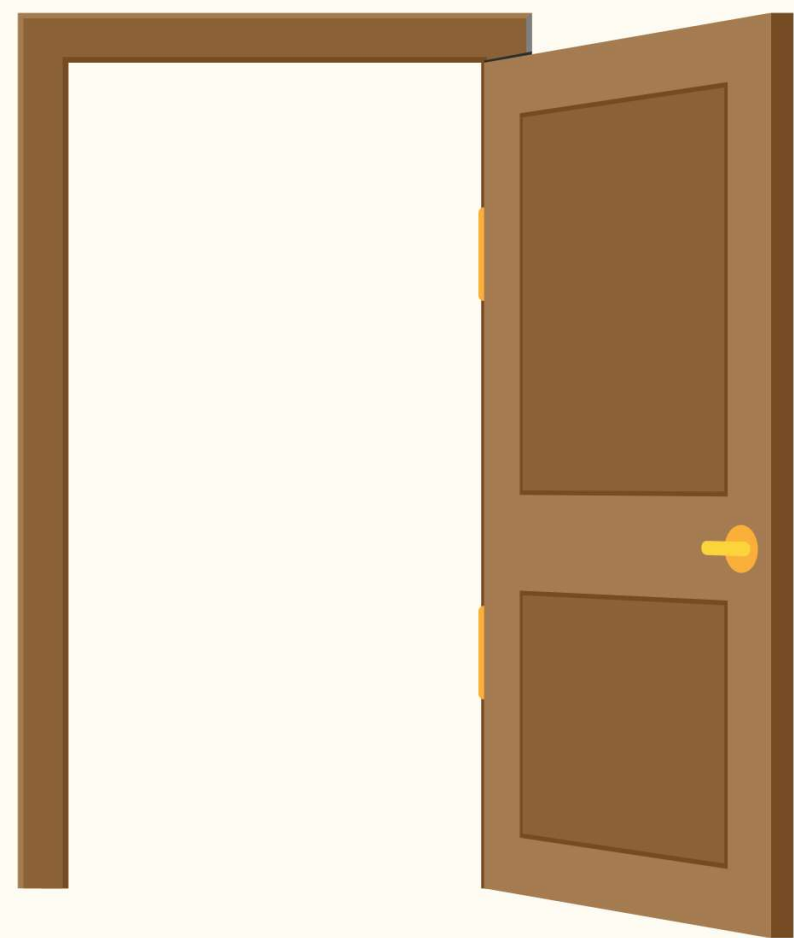


GEO Knowledge Hub

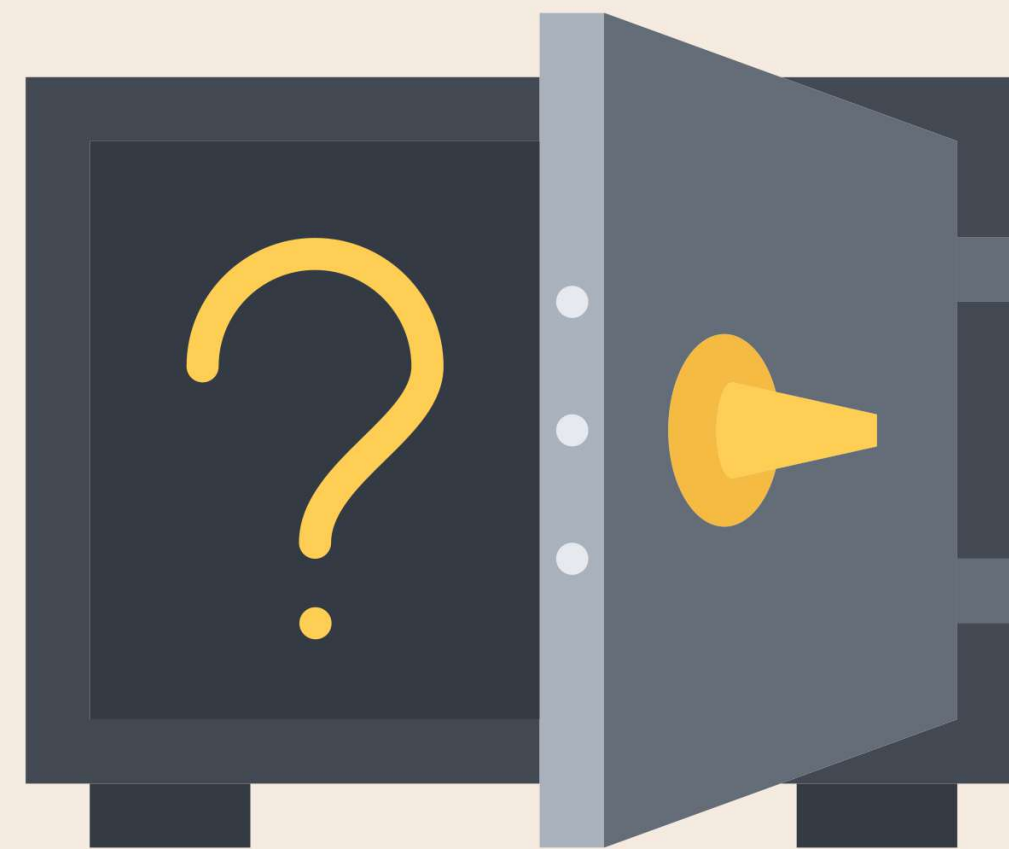
GEO Knowledge Hub

The **GEO Knowledge Hub** is a central cloud-based digital library created to **preserve**, **disseminate**, and **support** the reuse of EO Applications developed by the **GEO Community**

Open



Preserve



Use



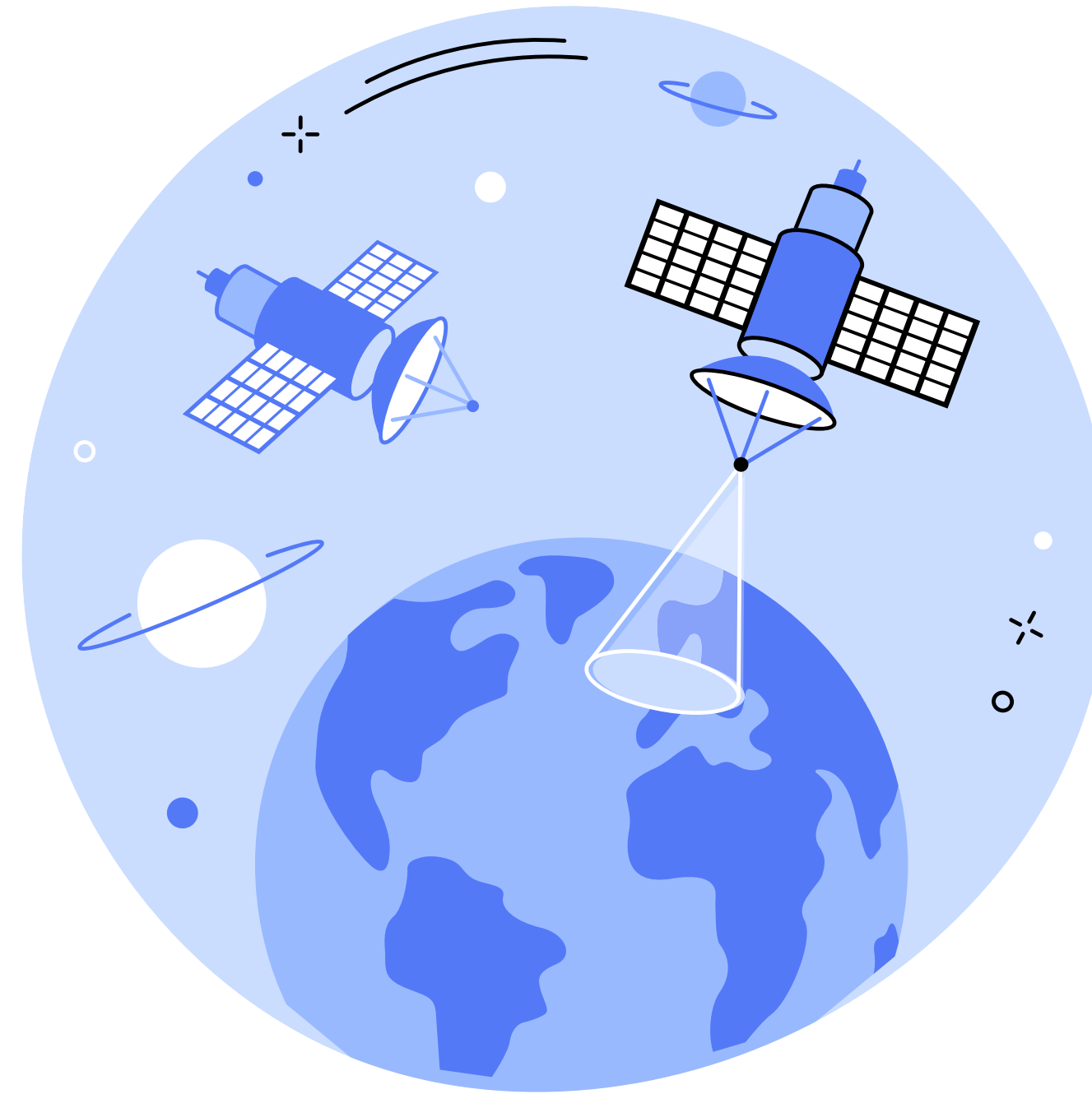
Open resources = Collaborations

Open resources = Accelerate impact

Lack of open resources leads to the creation of silos

Making EO Applications

EO Application

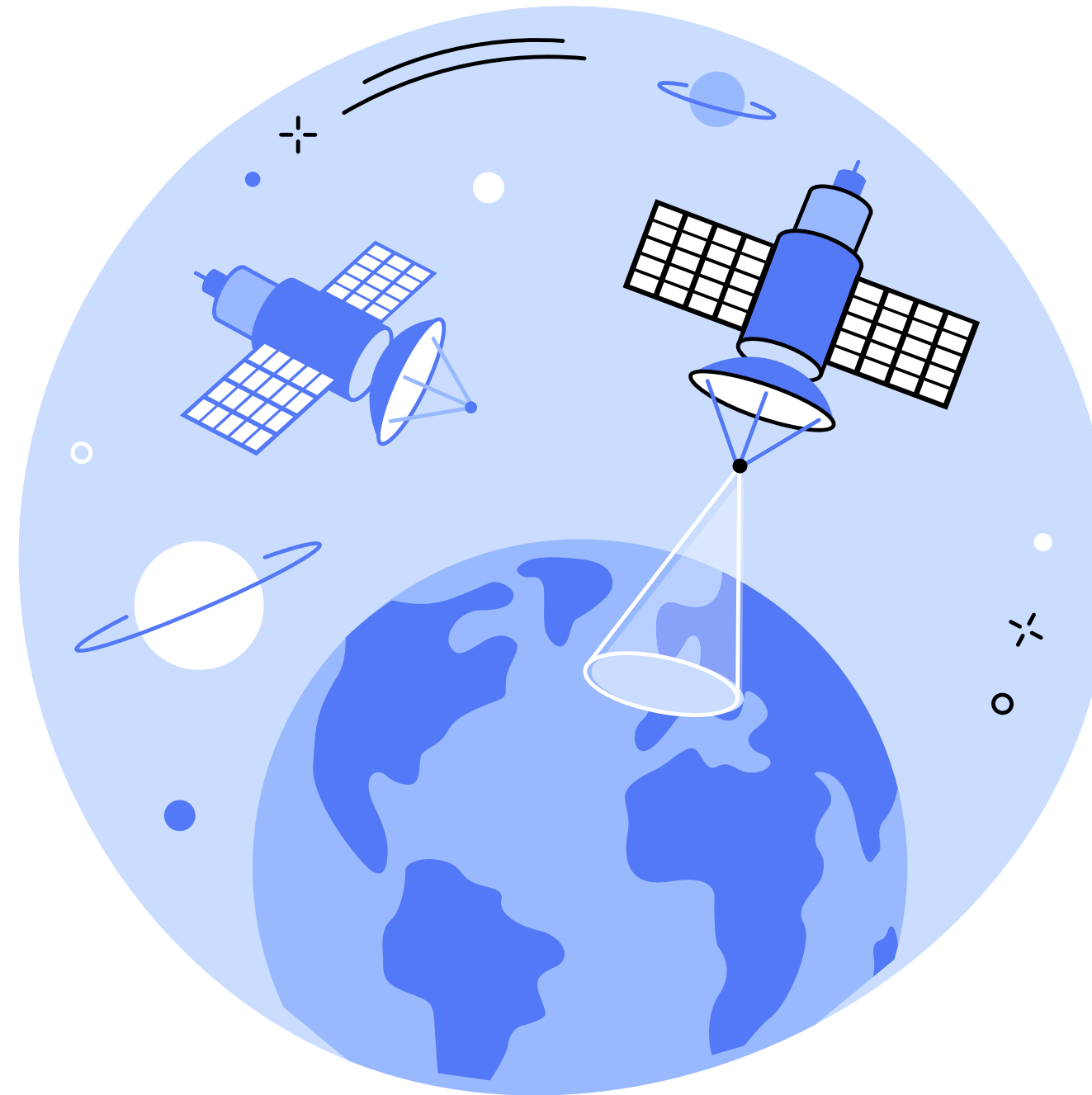


Making EO Applications



Satellite imagery

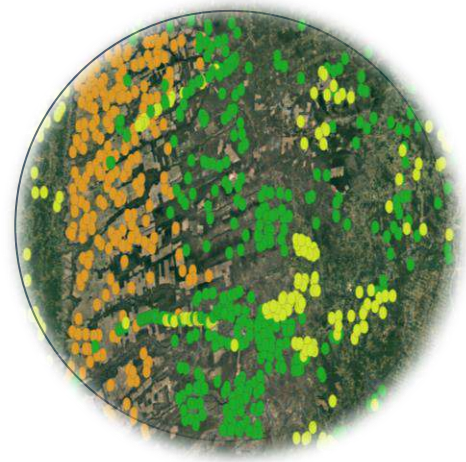
EO Application



Making EO Applications

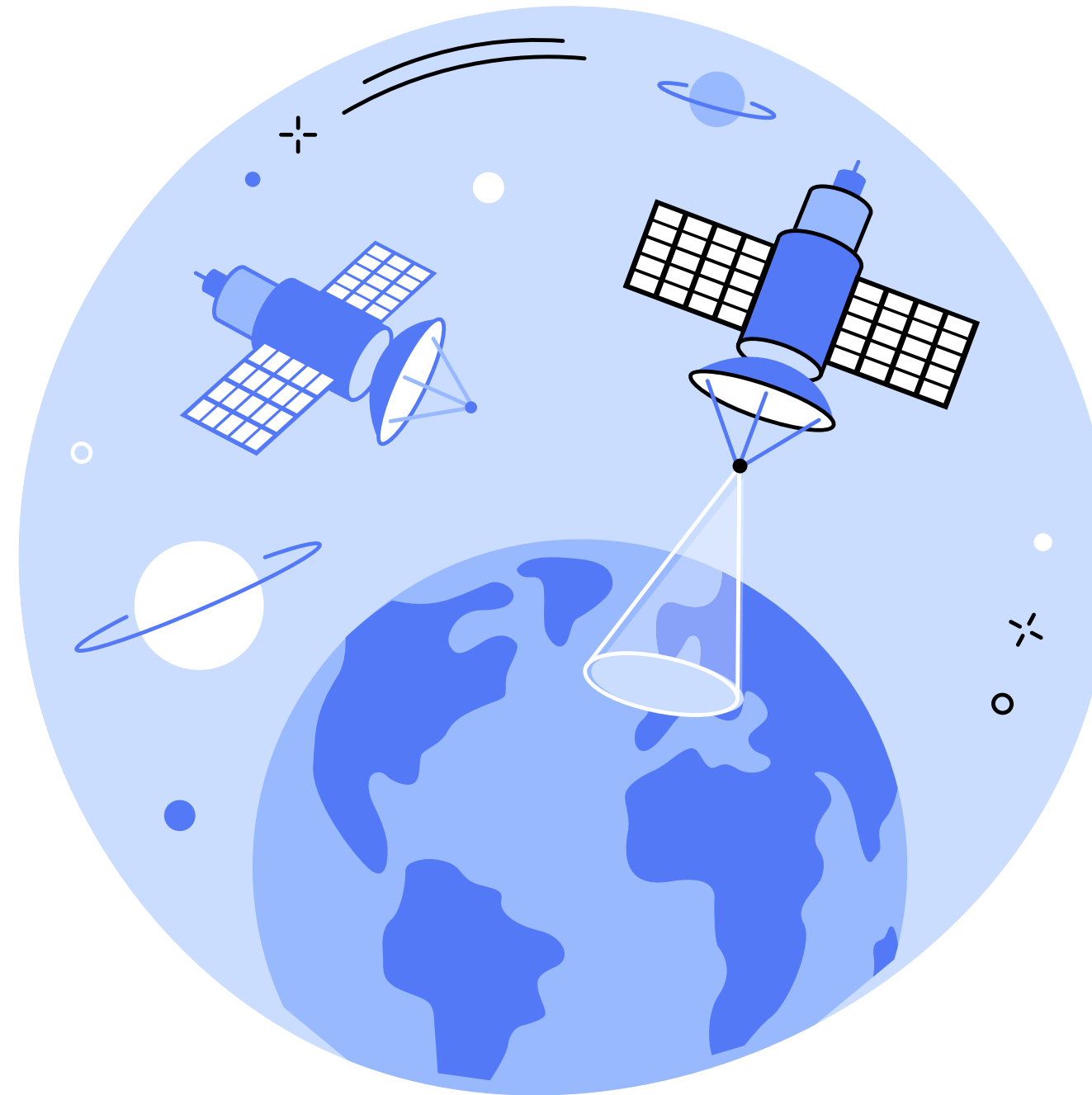


Satellite imagery



In-situ data

EO Application



Making EO Applications



Satellite imagery

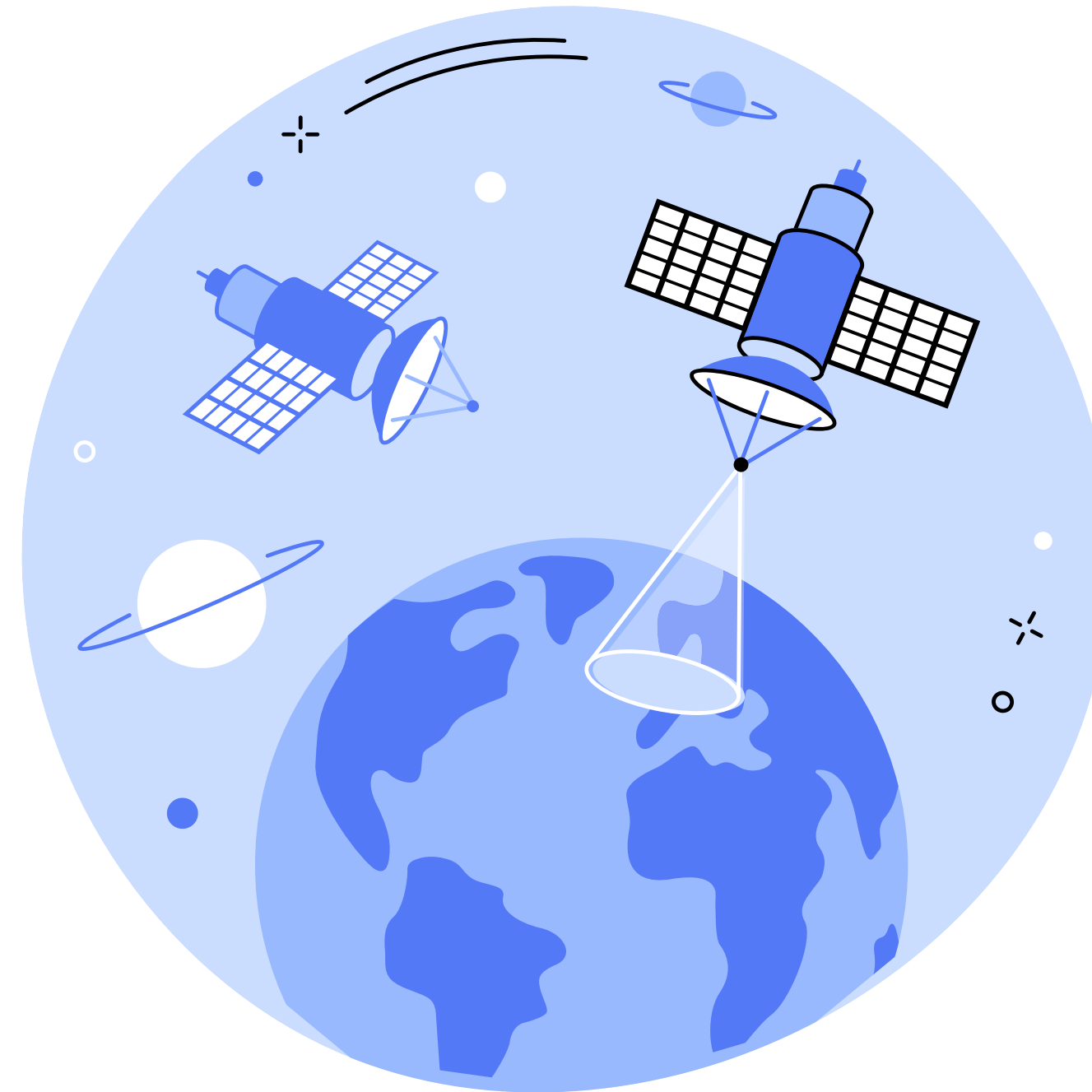


In-situ data



Processing scripts

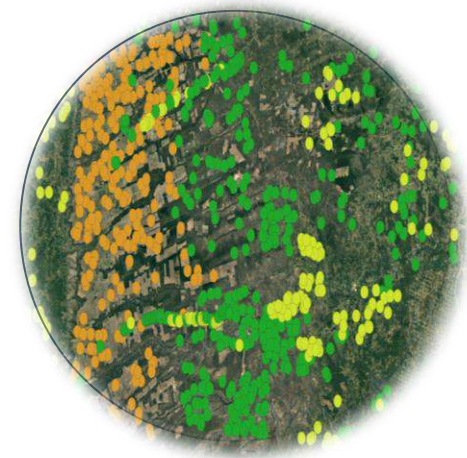
EO Application



Making EO Applications



Satellite imagery

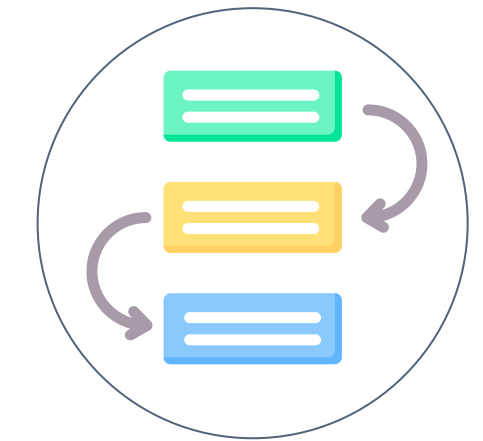
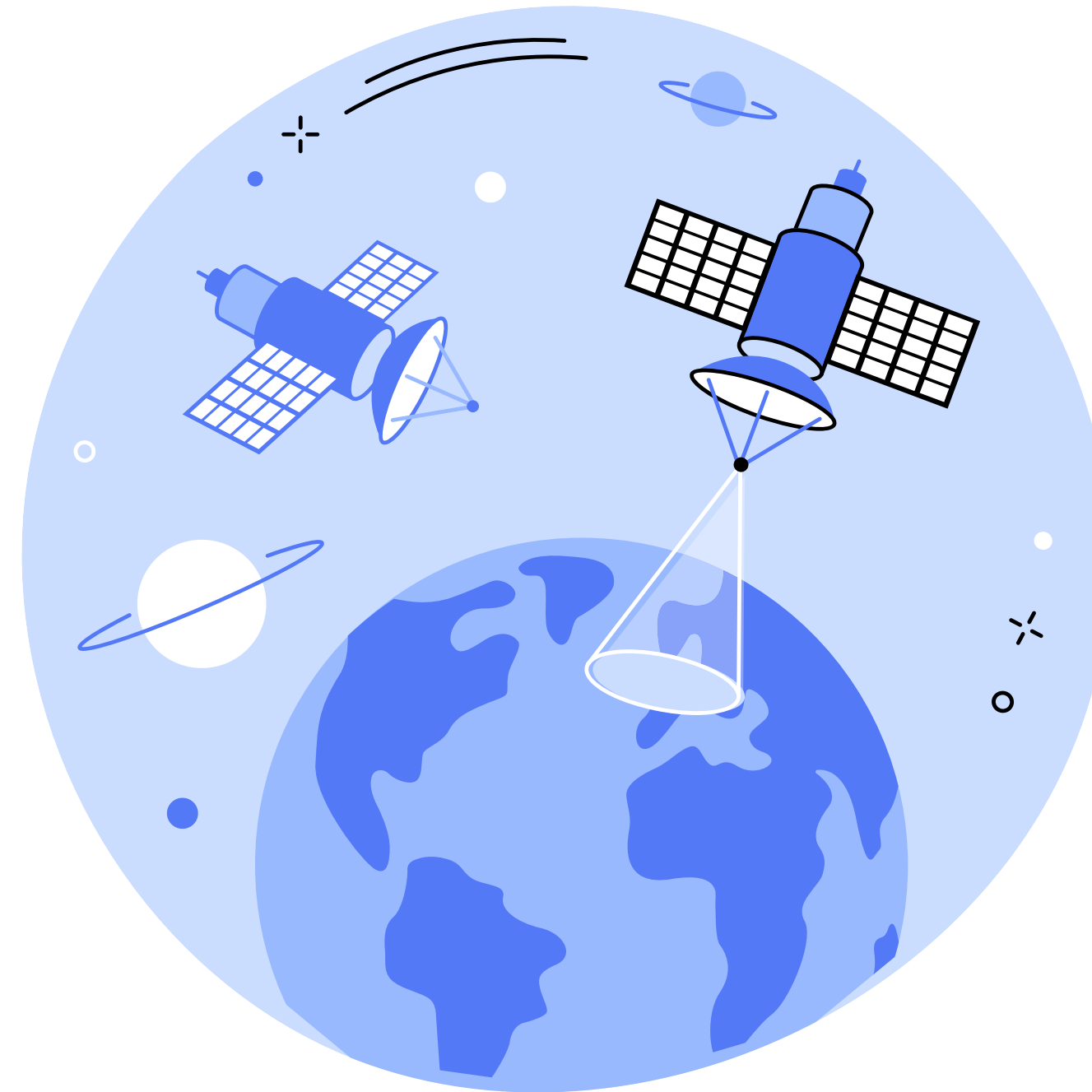


In-situ data

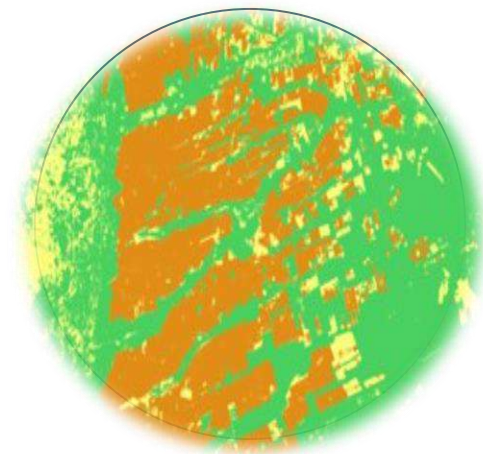


Processing scripts

EO Application



Workflow



Data results

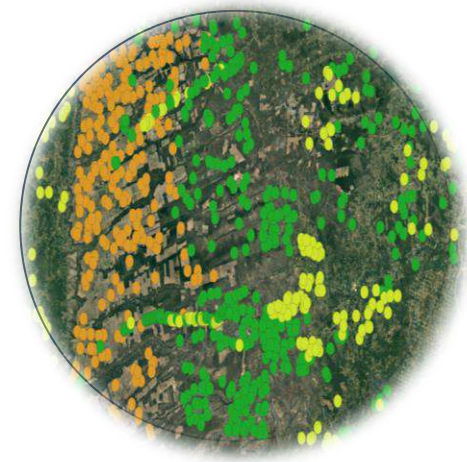


Articles & notes

Sharing EO Applications



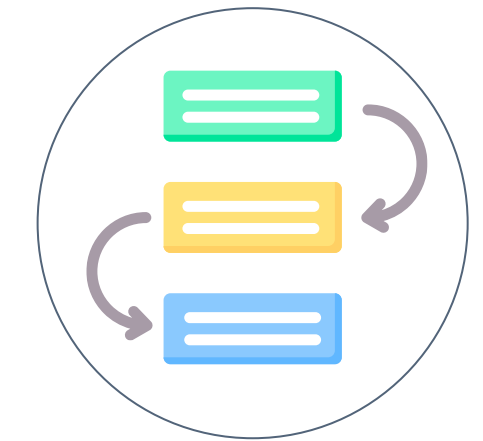
Satellite imagery



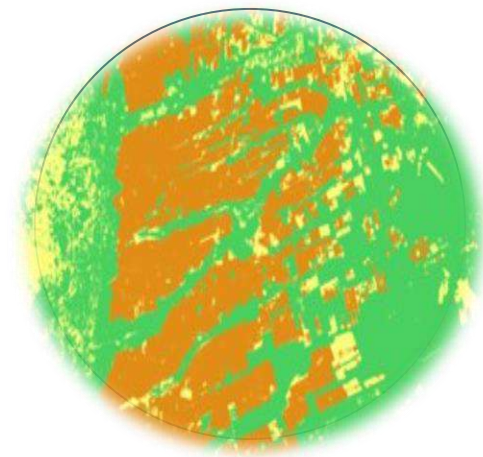
In-situ data



Processing scripts



Workflow



Data results

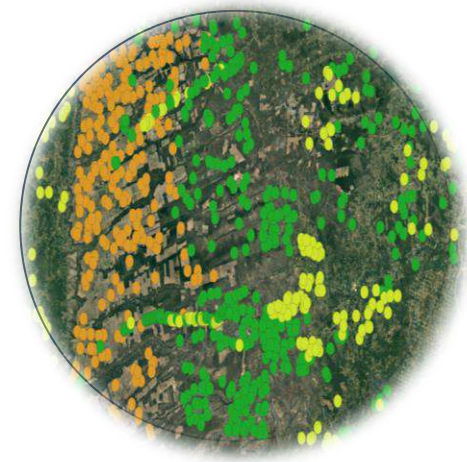


Articles & notes

Sharing EO Applications



Satellite imagery



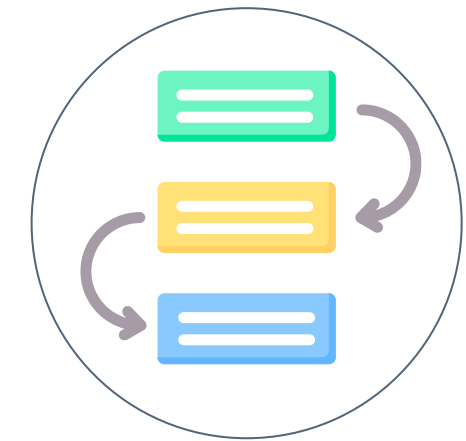
In-situ data



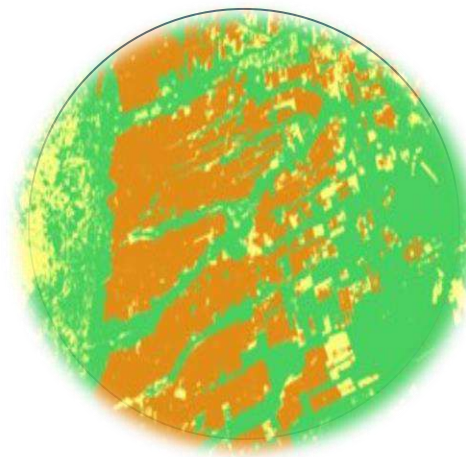
Processing scripts

Metadata

(title, description, license, and others)



Workflow



Data results



Articles & notes

Sharing EO Applications



Satellite imagery



In-situ data



Processing scripts

Metadata

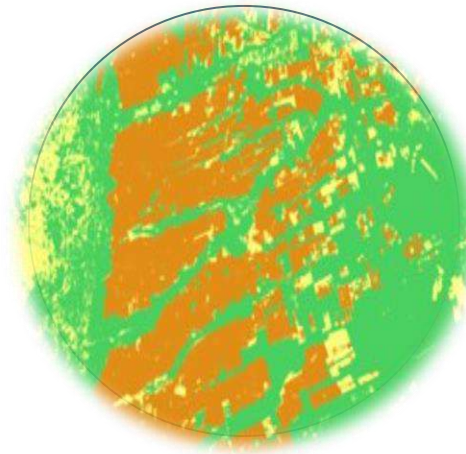
(title, description, license, and others)

Files

(Resource file itself or auxiliary ones)



Workflow



Data results



Articles & notes

Sharing EO Applications



Satellite imagery



In-situ data



Processing scripts

Metadata

(title, description, license, and others)

Files

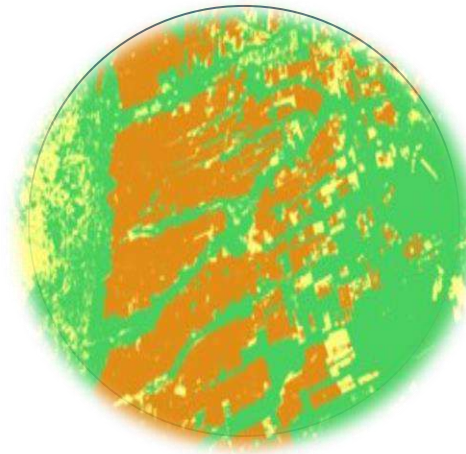
(Resource file itself or auxiliary ones)

Auxiliary resources

(Documentation, articles, and others)



Workflow



Data results



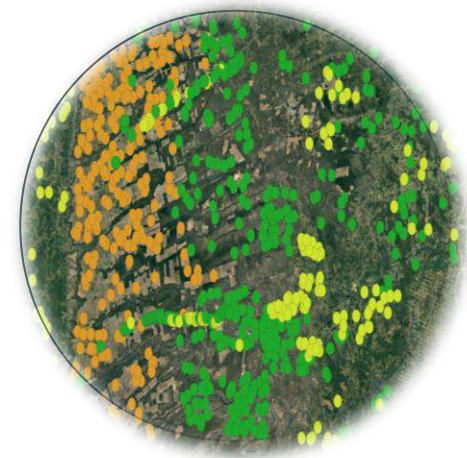
Articles & notes

Sharing EO Applications



Satellite imagery

Platform A



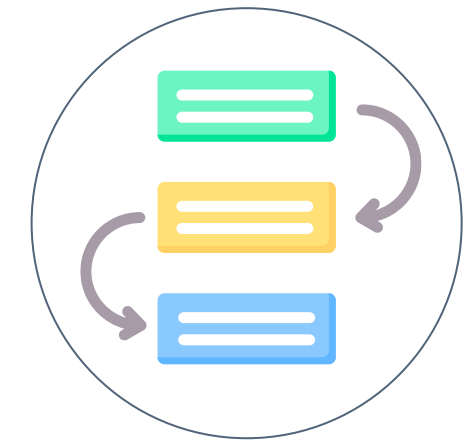
In-situ data

Platform B

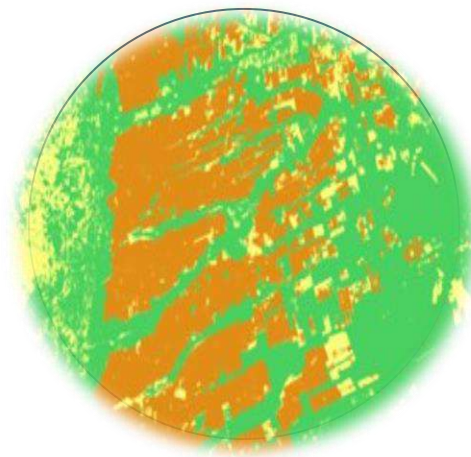


Processing scripts

Platform C



Workflow



Data results

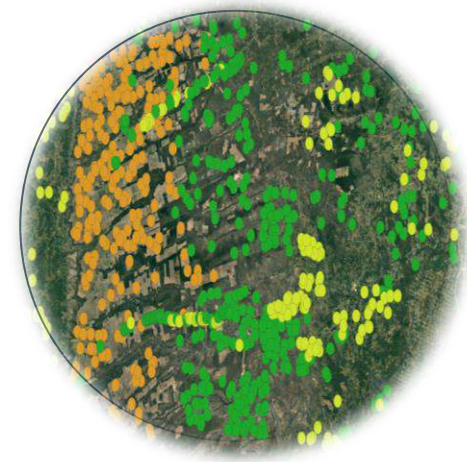


Articles & notes

Sharing EO Applications



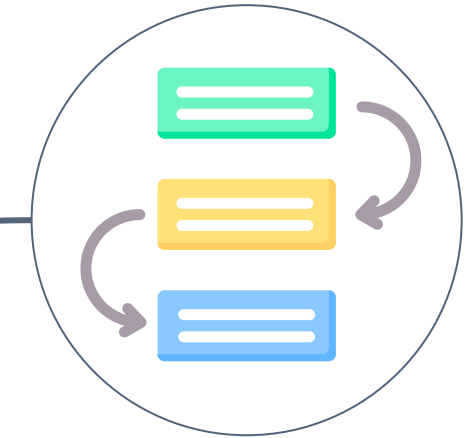
Satellite imagery



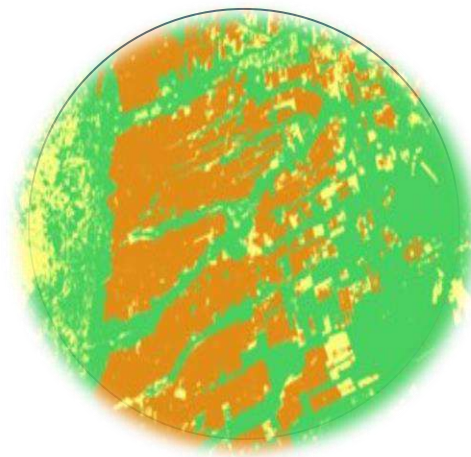
In-situ data



Processing scripts



Workflow



Data results



Articles & notes



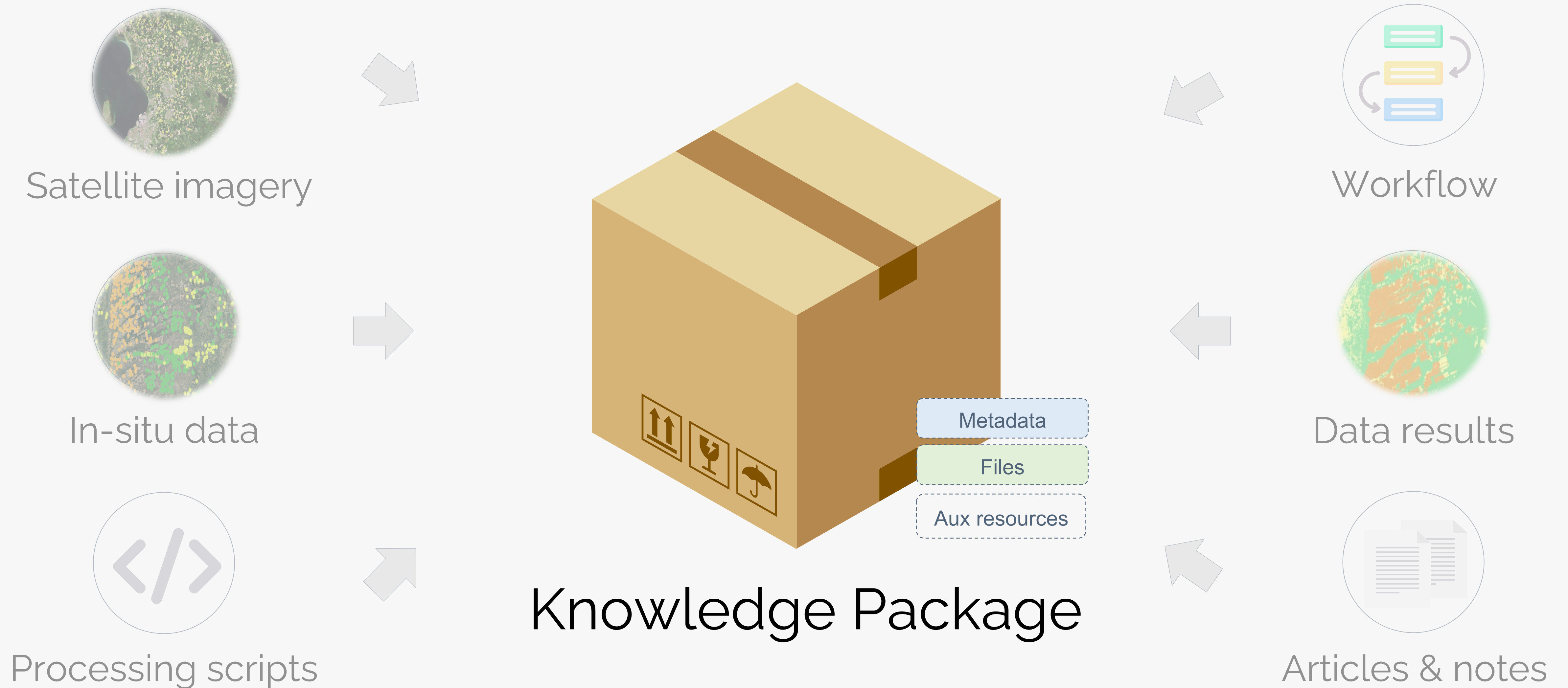
Knowledge Package and resources



Knowledge Package and resources



Knowledge Package and resources



Knowledge Package and resources

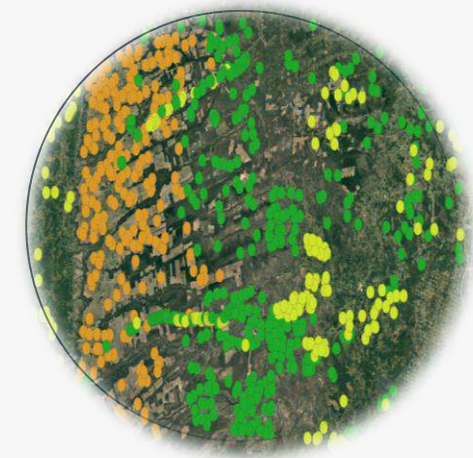


Satellite imagery

Metadata

Files

Aux resources



In-situ data

Metadata

Files

Aux resources



Processing scripts

Metadata

Files

Aux resources

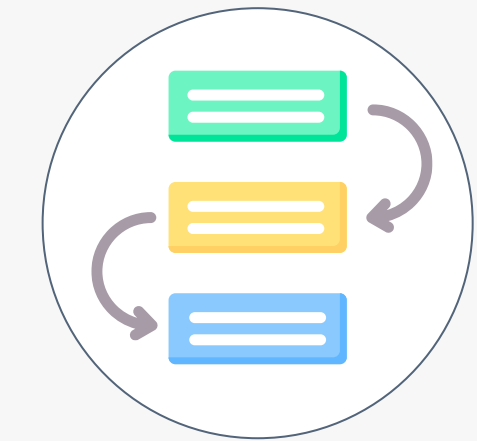


Knowledge Package

Metadata

Files

Aux resources

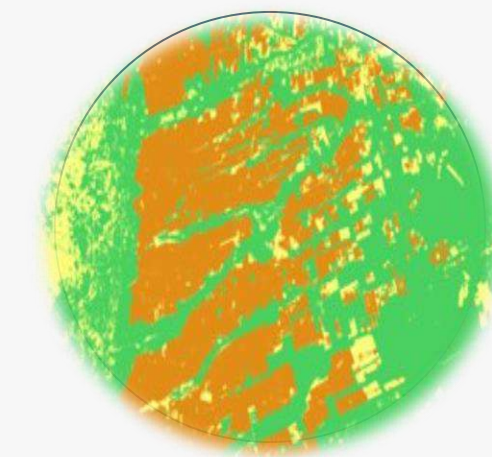


Workflow

Metadata

Files

Aux resources



Data results

Metadata

Files

Aux resources

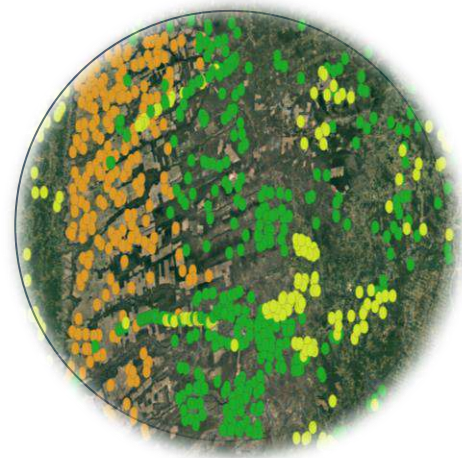


Articles & notes

Knowledge Package and resources



Satellite imagery



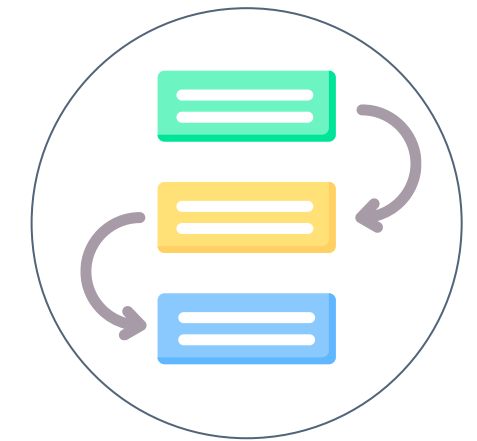
In-situ data



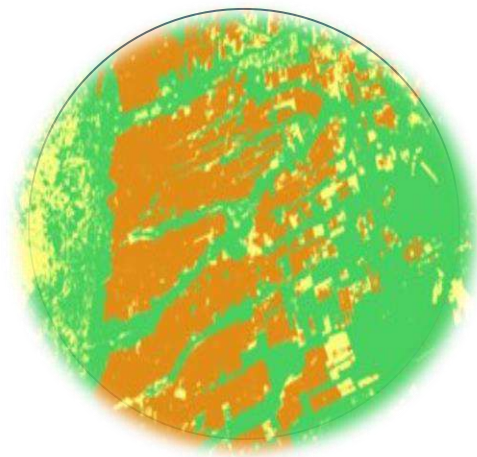
Processing scripts



Knowledge Package



Workflow



Data results



Articles & notes

Support the GEO community towards Open Data and Open Knowledge



Meet the community!





EO4SENDAI
Monitoring

GWIS

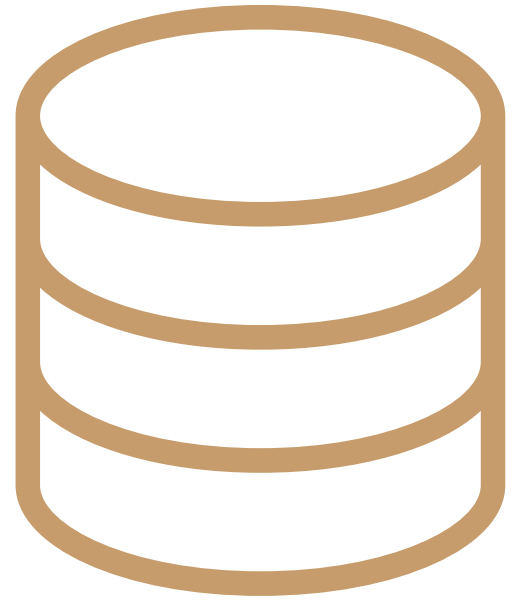
GEO ECO



GEOMIN

GEO Value





Preserve



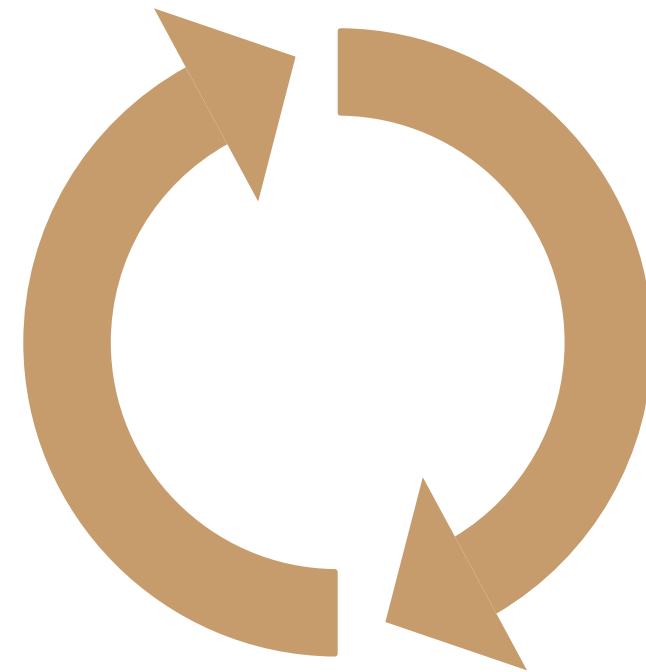
Visibility



Impact



Meet users

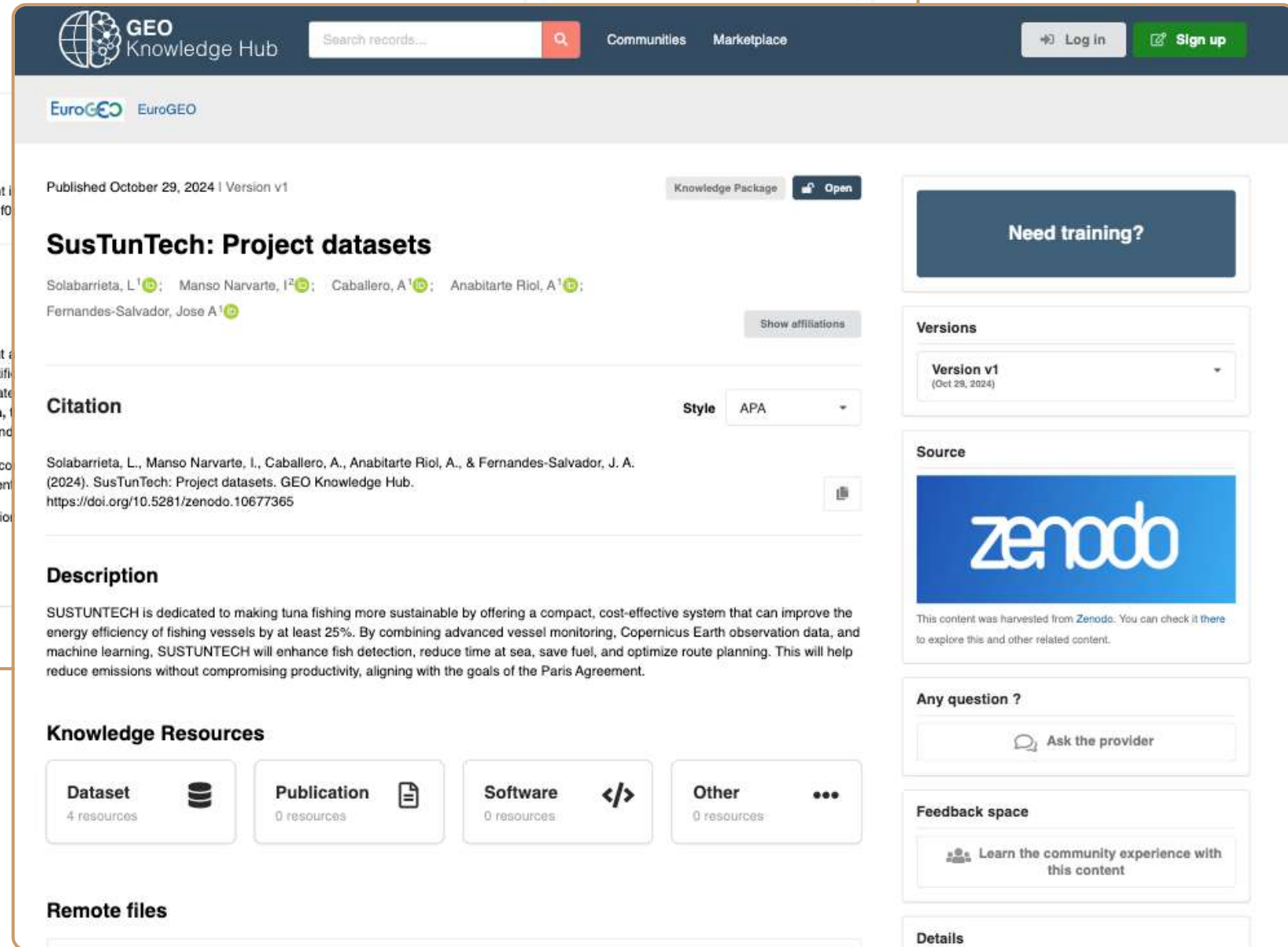
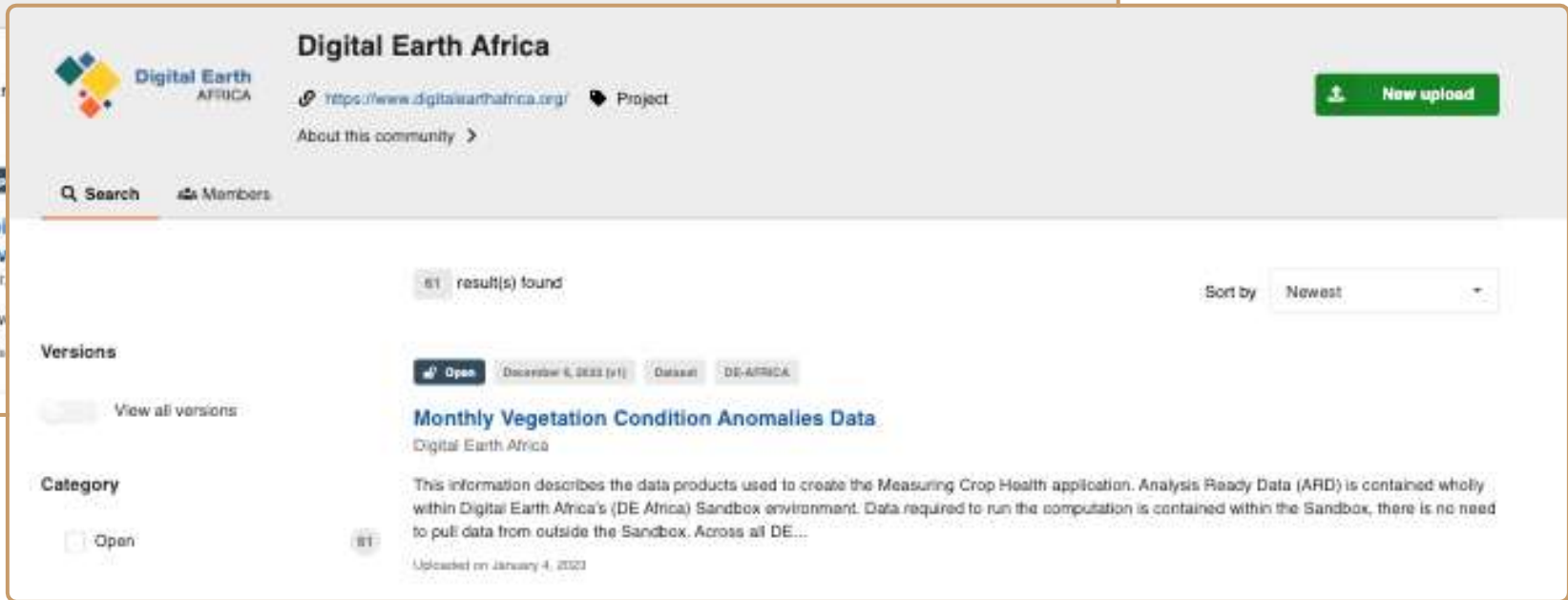
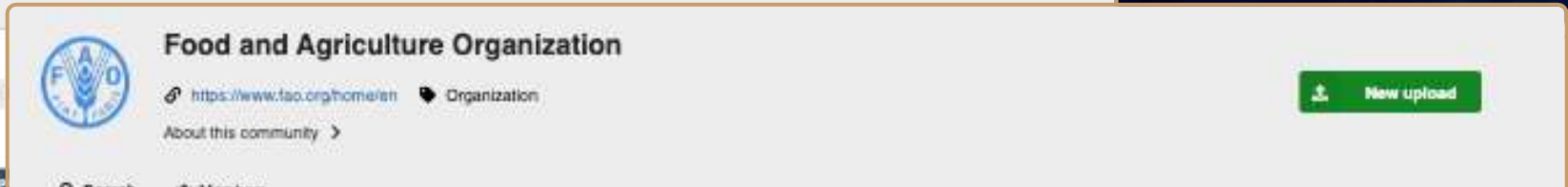
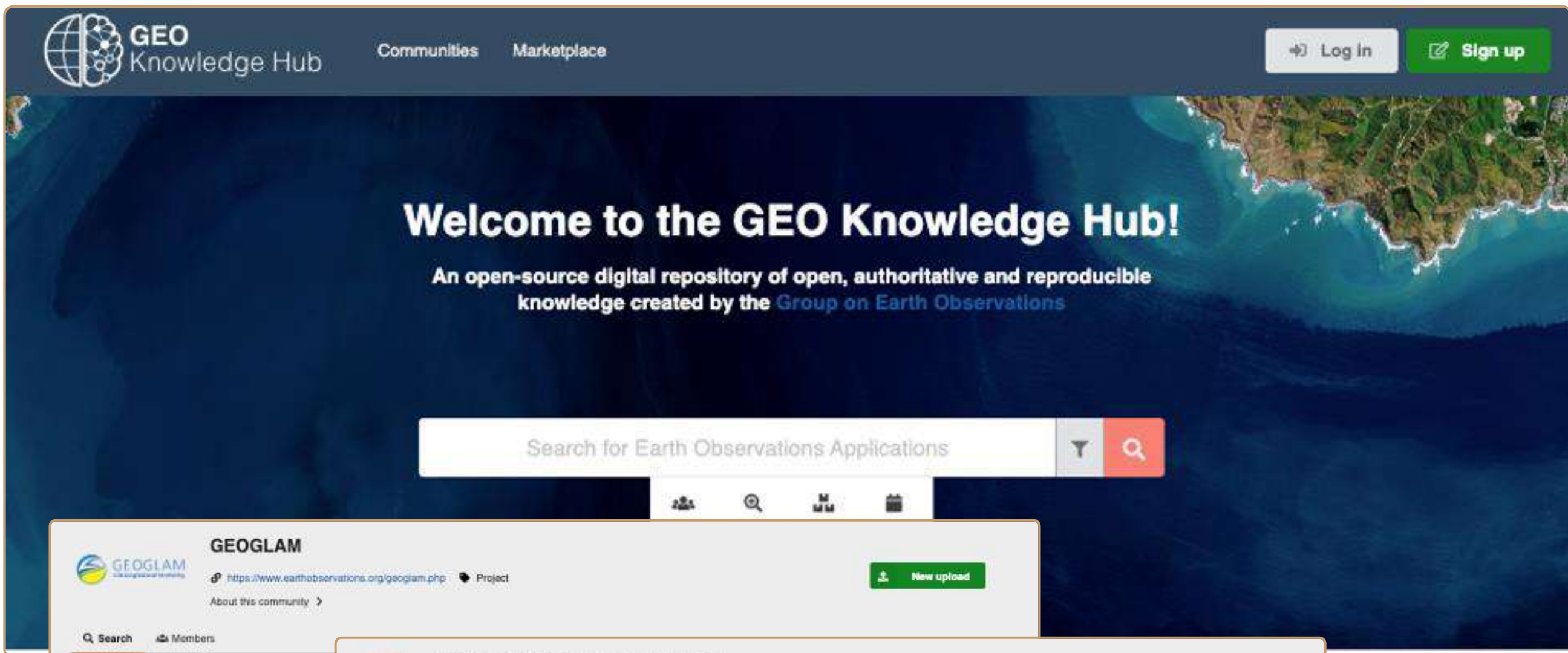


Reuse



Global and trusted

The GEO Knowledge Hub

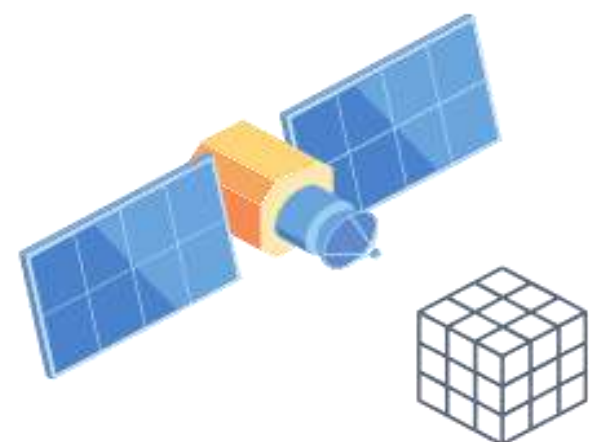


gkhub.earthobservations.org

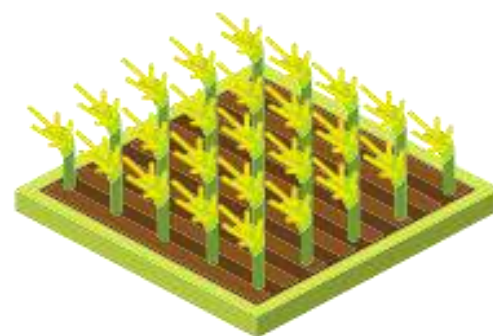
Which EO resources are made available through the GEO Infrastructure?



Data and resources



Satellite data
and datacube



In situ



Services



Tools



EO Derived

Applications



Knowledge





GEO Infrastructure

What problem are you trying to solve ?



Why

Agriculture & Food Security

Water & Land Sustainability

Ecosystems-
Biodiversity & Carbon
Management

Weather & Disaster
Resilience

Climate, Energy &
Urbanization

One Health

Who

Developer
GIS specialist

What's your profile ?

Non-technical



Where

When

Location and time

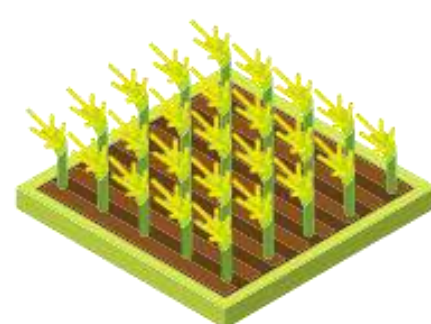


What

Data and resources



Satellite data
and datacube



In situ



Services



Tools



EO Derived

Applications



Knowledge



- **WHY:** What is the problem you are trying to solve
- **WHO:** What is your profile, technical or nontechnical
- **WHERE:** Where is the area of interest

- **WHEN:** Timeframe of the EO Resources required
- **WHAT:** Which resources are you looking for

What is the added value of the revised GEO Infrastructure ?

EO resources will be organized by **Focus Areas** and by curated “**Scenarios-Services**” thus guiding the end users to **discover, access, use, and re-use** available **EO Resources** to provide solutions **to a specific socio-environmental problem**, having access to the **full landscape of EO efforts for domain-specific aspects**.



The **success** of the new **GEO Infrastructure** is contingent upon the **long-term, sustainable contributions of the global community**, with **all components governed by open licenses** and inclusive participation from all regions. (GEO Infrastructure earmarked)

Since 2021, the GEO Knowledge Hub is **serving** the GEO Community as the **central repository** to **share** and **preserve Open EO Data** and **Open EO Knowledge**



GEO Knowledge Hub



Open

Centralize

Preserve

Curate

Engage

Think **global**, act **local**



Global



Local



National GEO Knowledge Hub



Contextualize



Issues

Communities

Activities

The National GEO Knowledge Hub is a **new space** within the GKH where **National GEOs** can share **local, specialized, and issue-focused** Open Data and Open Knowledge

National GKH

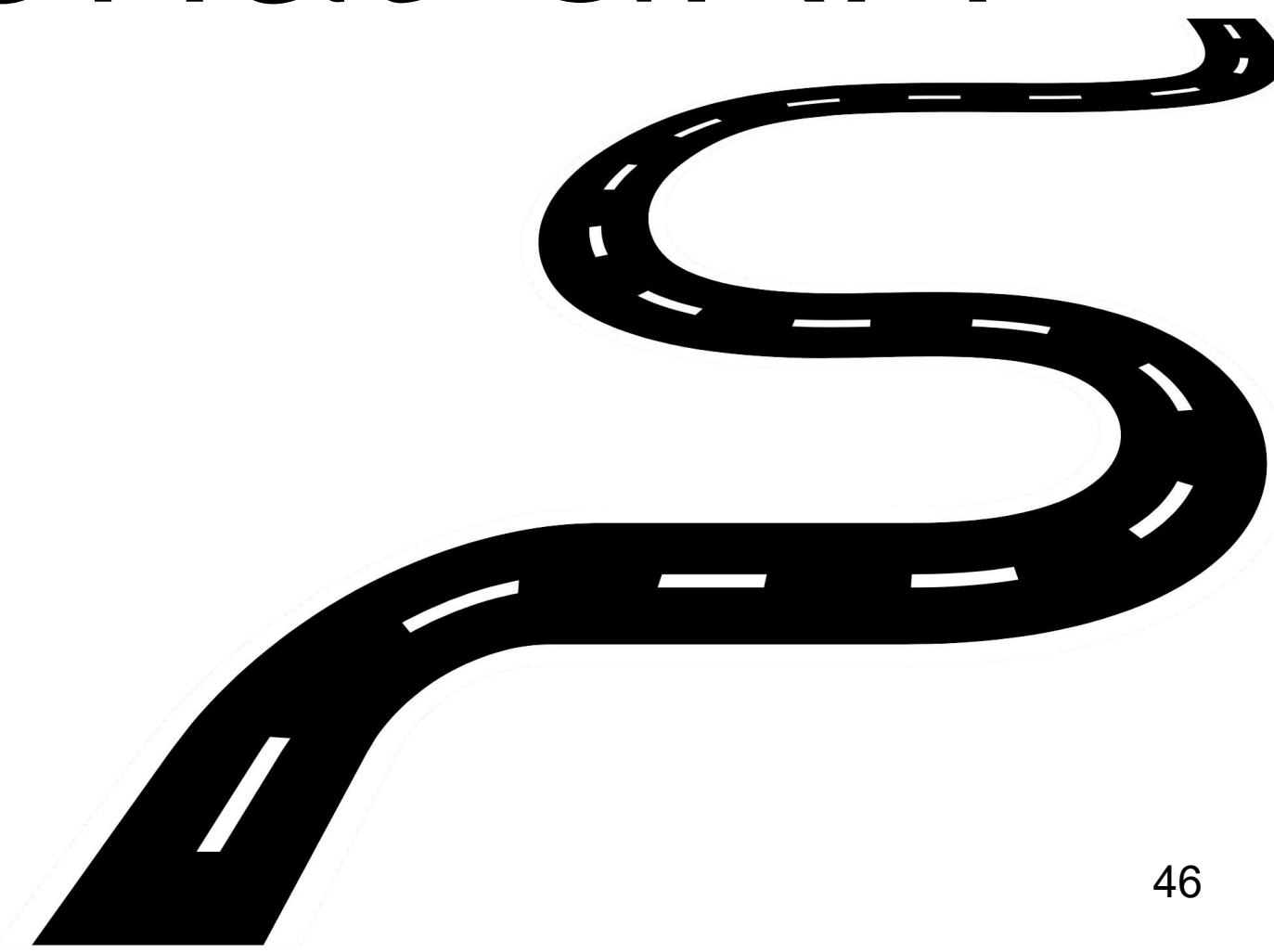
National GEOs can have their own space

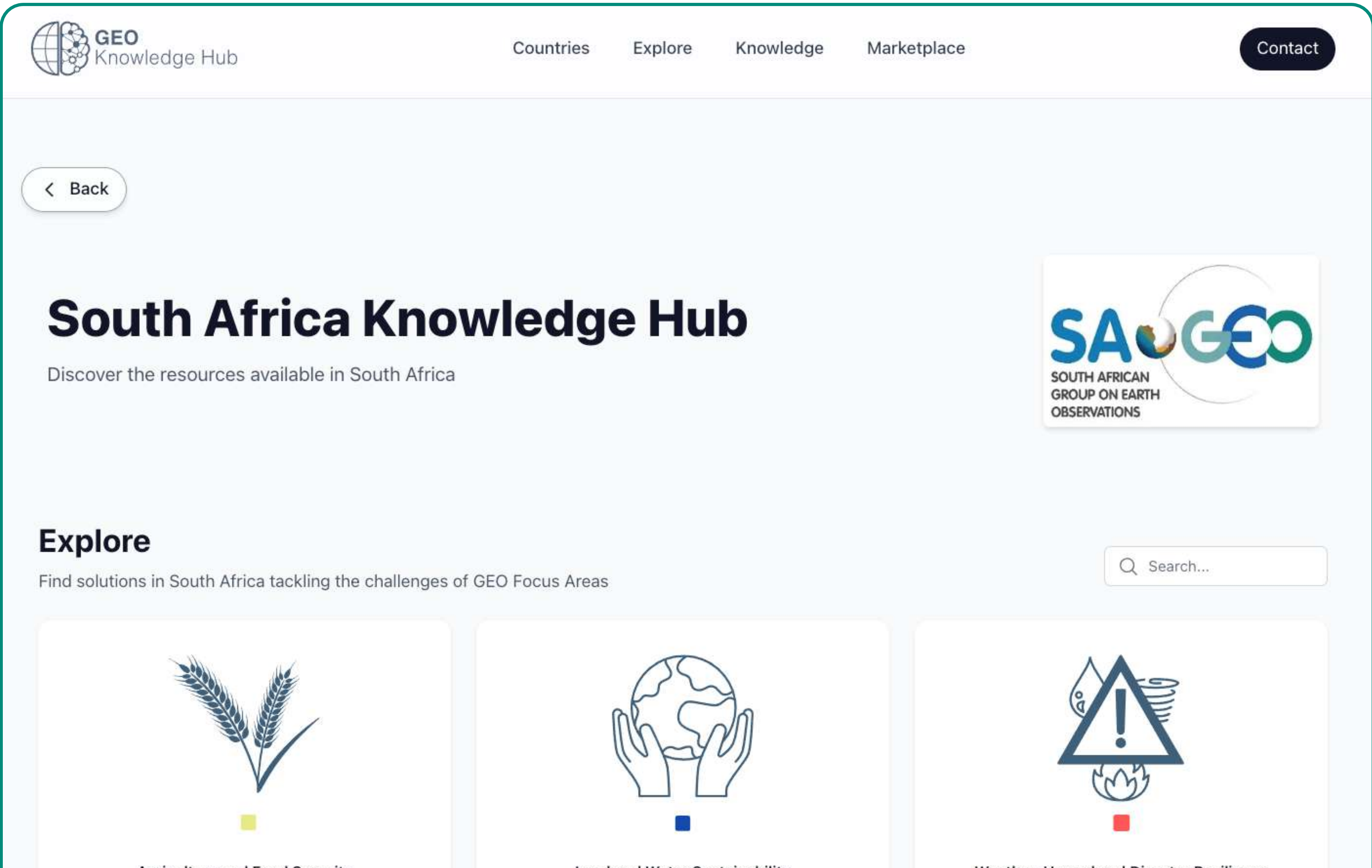
Based on the content available in the GKH

Content and page specialized for each case
(e.g., contact point, research projects, capacity building activities)

South Africa

Pioneering the way to National GKH





gkhub.earthobservations.org/national/countries/south-africa

Help us to help you! Thank you!

Group on Earth Observations

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Case postale 2300
CH-1211 Geneva, Switzerland
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