CEOS

Systems Engineering Office Report

David Borges, SEO

Agenda Item 1.5

WGISS-61 / WGDisasters-25

Dehradun, IN

16 March 2026

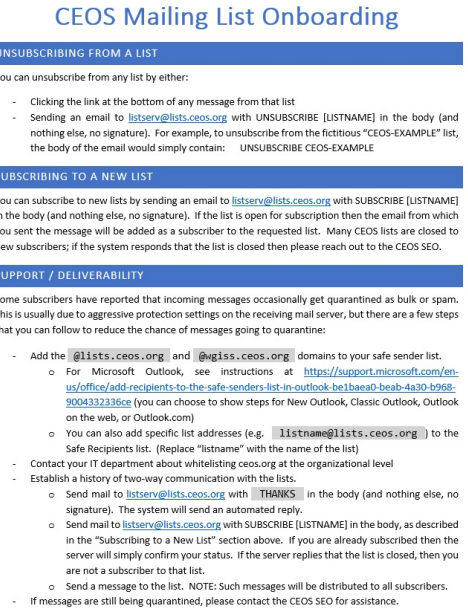
Committee on Earth Observation Satellites

SEO Updates

- Mailing Lists Status
- Digital Object Identifier (DOI) Process Paper
- CoveLib (add slides)
- CEOS Analytics Lab (CAL)
- Organizational GitHub Governance status

CEOS Mailing Lists

- Some subscribers have reported that incoming messages are being quarantined as bulk or spam. This is due to protection settings on the receiving mail system and varies by provider.
- What We've Done
  - Contacted our current mailing list provider (L-Soft) to confirm DNS and listserv configuration.
  - Worked with IT at NASA (one of the affected groups) to examine headers and quarantine rules.
  - Used diagnostic tools and automated checks to confirm mailing list configuration
- What We're Doing
  - Investigating alternative mailing list providers, including Groups.io.
    - Created a small test list and completed a deliverability test of Groups.io
    - Currently deploying an enterprise-level test of Groups.io for a complete end-to-end test.
  - Investigating alternative technologies and self-hosted solutions.
  - Created an onboarding document with steps that users can take to maximize deliverability.
- Potential Solutions
  - Groups.io seems to be a good replacement with high feature-parity to Listserv. It also will allow us to easily transition the current lists to the new provider with very little disruption.



CEOS Mailing List Onboarding

UNSUBSCRIBING FROM A LIST

You can unsubscribe from any list by either:

- Clicking the link at the bottom of any message from that list
- Sending an email to listserv@lists.ceos.org with UNSUBSCRIBE [LISTNAME] in the body (and nothing else, no signature). For example, to unsubscribe from the fictitious "CEOS-EXAMPLE" list, the body of the email would simply contain: UNSUBSCRIBE CEOS-EXAMPLE

SUBSCRIBING TO A NEW LIST

You can subscribe to new lists by sending an email to listserv@lists.ceos.org with SUBSCRIBE [LISTNAME] in the body (and nothing else, no signature). If the list is open for subscription then the email from which you sent the message will be added as a subscriber to the requested list. Many CEOS lists are closed to new subscribers; if the system responds that the list is closed then please reach out to the CEOS SEO.

SUPPORT / DELIVERABILITY

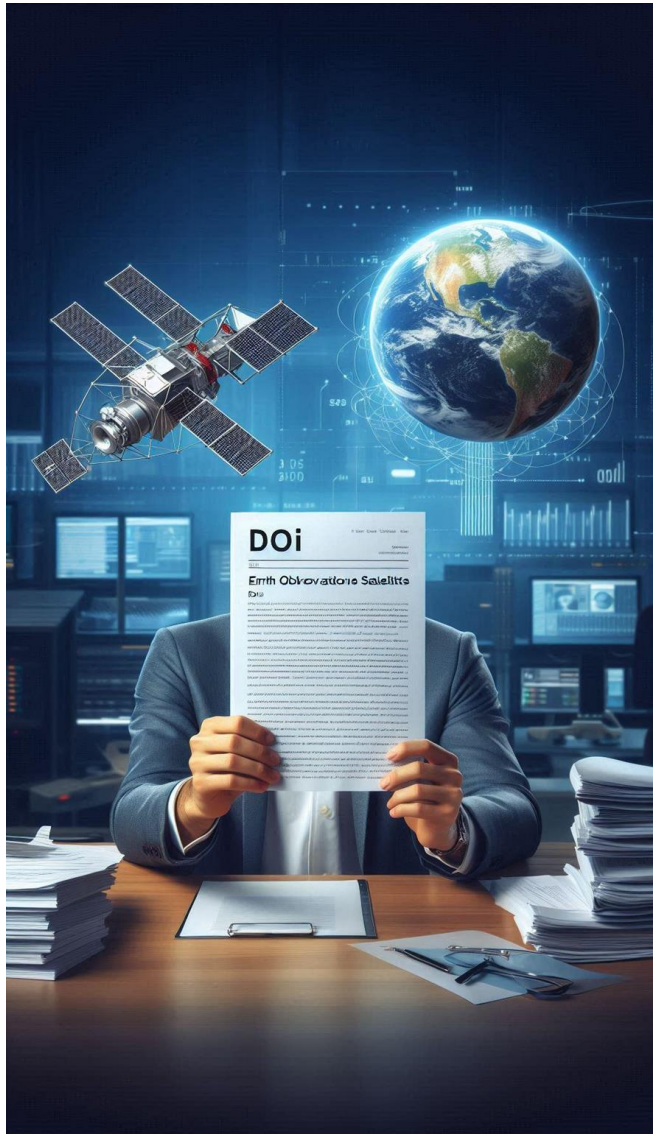
Some subscribers have reported that incoming messages occasionally get quarantined as bulk or spam. This is usually due to aggressive protection settings on the receiving mail server, but there are a few steps that you can follow to reduce the chance of messages going to quarantine:

- Add the `@lists.ceos.org` and `@wgiss.ceos.org` domains to your safe sender list.
  - For Microsoft Outlook, see instructions at https://support.microsoft.com/en-us/office/add-recipients-to-the-safe-senders-list-in-outlook-be1baea0-beab-4a30-b968-9004332336ce (you can choose to show steps for New Outlook, Classic Outlook, Outlook on the web, or Outlook.com)
  - You can also add specific list addresses (e.g. `listname@lists.ceos.org`) to the Safe Recipients list. (Replace "listname" with the name of the list)
- Contact your IT department about whitelisting ceos.org at the organizational level
- Establish a history of two-way communication with the lists.
  - Send mail to listserv@lists.ceos.org with `THANKS` in the body (and nothing else, no signature). The system will send an automated reply.
  - Send mail to listserv@lists.ceos.org with SUBSCRIBE [LISTNAME] in the body, as described in the "Subscribing to a New List" section above. If you are already subscribed then the server will simply confirm your status. If the server replies that the list is closed, then you are not a subscriber to that list.
  - Send a message to the list. NOTE: Such messages will be distributed to all subscribers.
- If messages are still being quarantined, please contact the CEOS SEO for assistance.

CEOS DOI Process Paper

- **Demand:** SEO has received many requests for a CEOS-specific Digital Object Identifier (DOI) process
- **In Development:** New *CEOS DOI Process Paper*
- **Plan:** Request endorsement at Plenary 2026

- **Value of DOI Registration**
  - **Long-term preservation** and persistent access to CEOS documentation
  - **Enhanced discoverability** through standardized metadata practices
  - **Professional credibility** and citation tracking for CEOS outputs
  - **Support for open access mission** - aligning with CEOS commitment to open Earth observation data

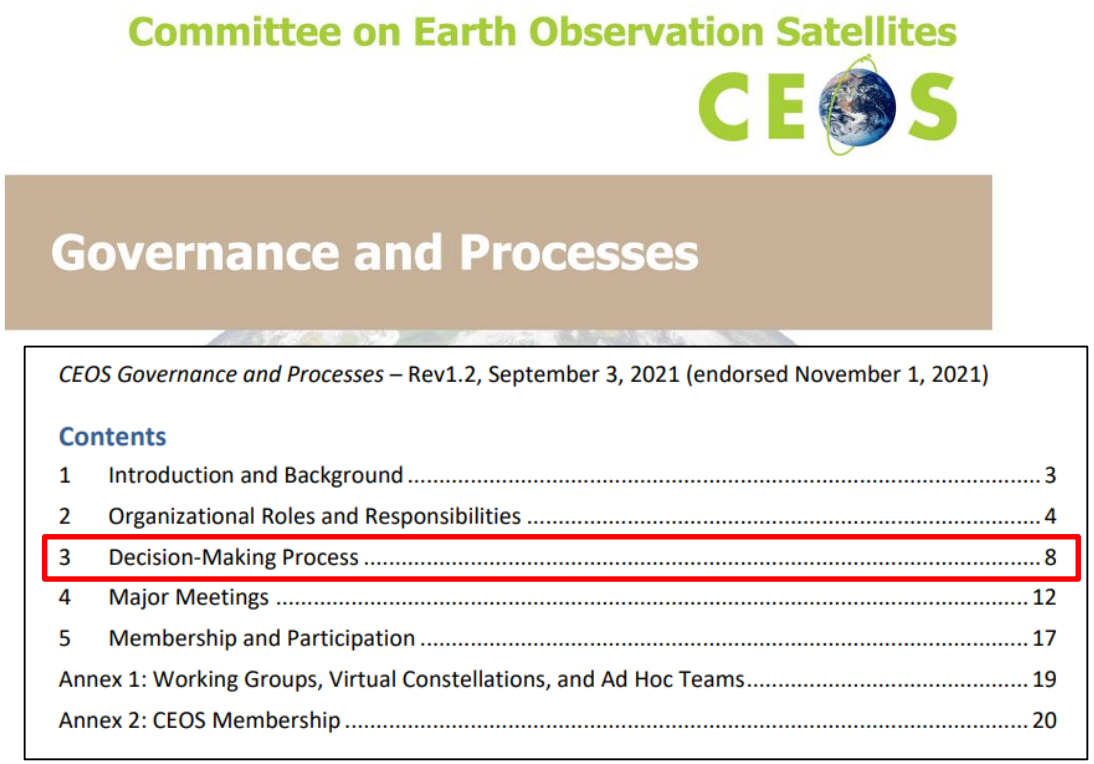


CEOS DOI Process w/ Zenodo

- **Why Zenodo is the Right Choice**
  - **Free, open-source platform** backed by CERN and OpenAIRE
  - **Built-in community features** enabling dedicated CEOS collection space
  - **Flexible content types** - supports reports, datasets, software, and presentations
  - **GitHub integration** for seamless technical documentation workflows
- **CEOS Implementation Approach**
  - **Selective application** – CEOS approval 'For Endorsement' or 'For Publication' require
  - **Standardized metadata** with mandatory CEOS keywords and affiliations
  - **Working Group oversight** - submissions require appropriate WG approval
  - **Quality standards** - professional formatting with clear Earth observation context
  - **Community coordination** through designated Implementation Lead and Technical Coordinator

CEOS Governance and Process Paper

- Alignment with ongoing discussions regarding “Clarification of CEOS Decision Types” and any version updates to the *CEOS Governance and Processes Paper*



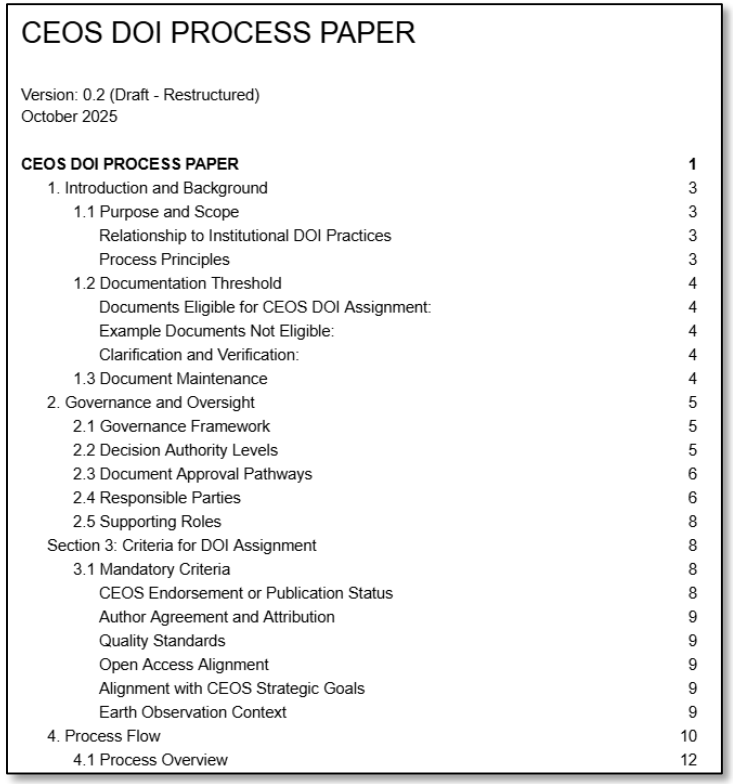
Committee on Earth Observation Satellites

CEOS

Governance and Processes

CEOS Governance and Processes – Rev1.2, September 3, 2021 (endorsed November 1, 2021)

Contents



CEOS DOI PROCESS PAPER

Version: 0.2 (Draft - Restructured)
October 2025

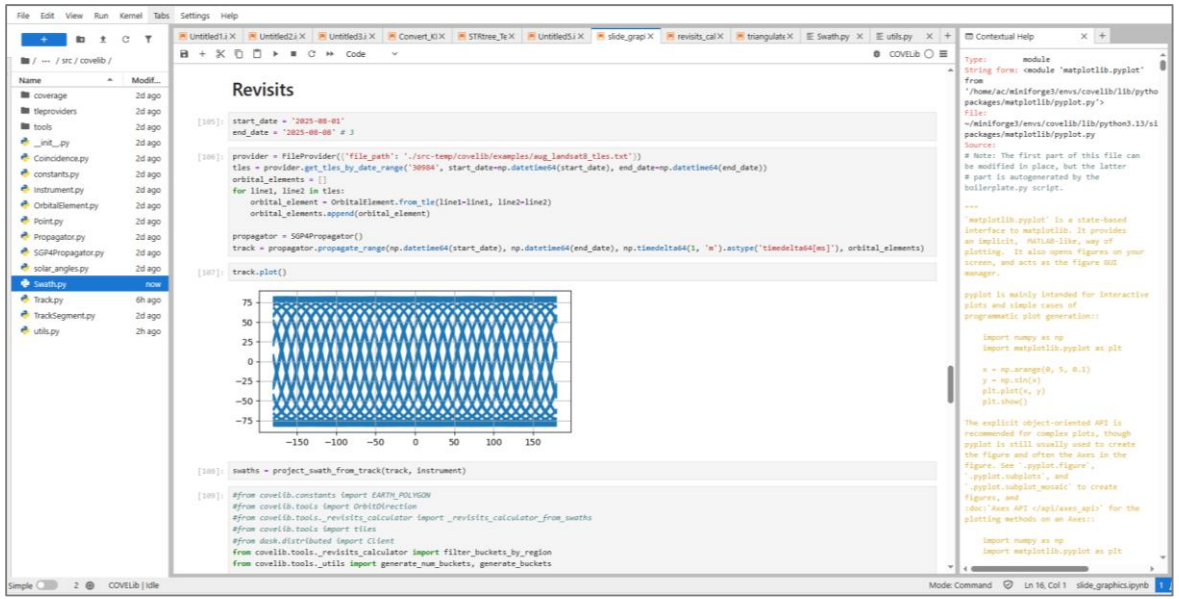
COVE vs COVELib

- What is the CEOS Virtual Environment (COVE)?

- Since 2008, the CEOS COVE suite has provided tools to help EO users calculate and visualize satellite coverage, revisits, and more.
- COVE maintains a large database of satellite acquisition metadata, TLE orbit data, and information about satellites and instruments.

- What is COVELib?

- Open-source Python library to allow users to perform many analyses locally which were previously only available through COVE.
- A set of composable tools which allows users to perform new analyses and integrate COVE functionality into existing workflows.



COVELib Tools

1. **Acquisition Forecaster** – Propagate satellite orbit and show predicted track/path/acquisitions

2. **Coverage Analyzer** – Compute number of overpasses for a given time extent and discretized region
   - COVE uses scene metadata to compute historical coverage
   - COVELib currently does this based on predicted observations

3. **Revisits Calculator** – Compute times of future overpasses for a given time extent and discretized region

4. **Coincidence Calculator** – Compute past/future times when multiple satellites observe a given region and time extents within a specified temporal proximity

5. **Utilities** – Suite of tools to help with common calculations, e.g. FOV ⇆ swath width

6. **Provider Interfaces (NEW)** – Tools to simplify the process of acquiring data and provide a common interface across multiple different sources/APIs

CEOS Analytics Lab (CAL)

- Cloud native geospatial analysis platform available to all CEOS activities that might otherwise not have group access to similar resources
- Resource to showcase the art of the possible when EO data is made cloud native and observes interoperability best practices

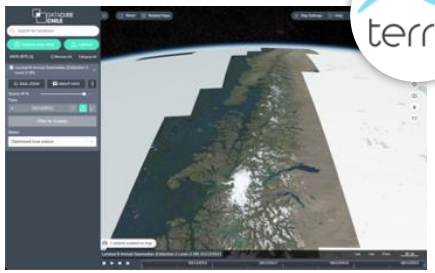
CEOS Analytics Laboratory

CEOS Analytics Laboratory

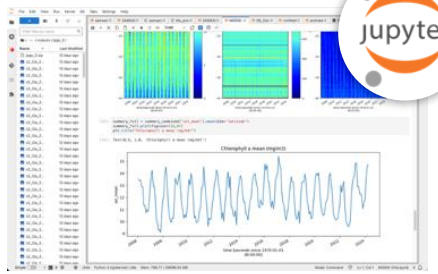
ARD & ARCO

Analysis Ready:

- Landsat 5/7/8/9
- Sentinel 1/2/3
- MODIS
- VIIRS
- ALOS
- Elevation
- Small sats
- Commercial
- ...



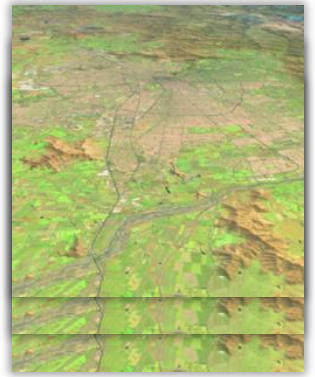
Visualisation



Exploratory analysis

Scalable workflows

from pilot or project → **to national or continental**

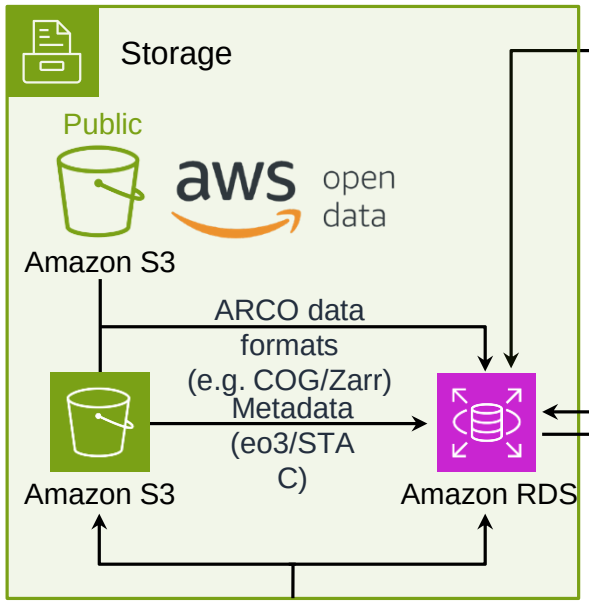


1 computer or 200
30GB RAM or
6TB
8 CPU or 1600

ARCO = Analysis Ready, Cloud Optimized

CEOS Analytics Laboratory

https://cal.ceos.org

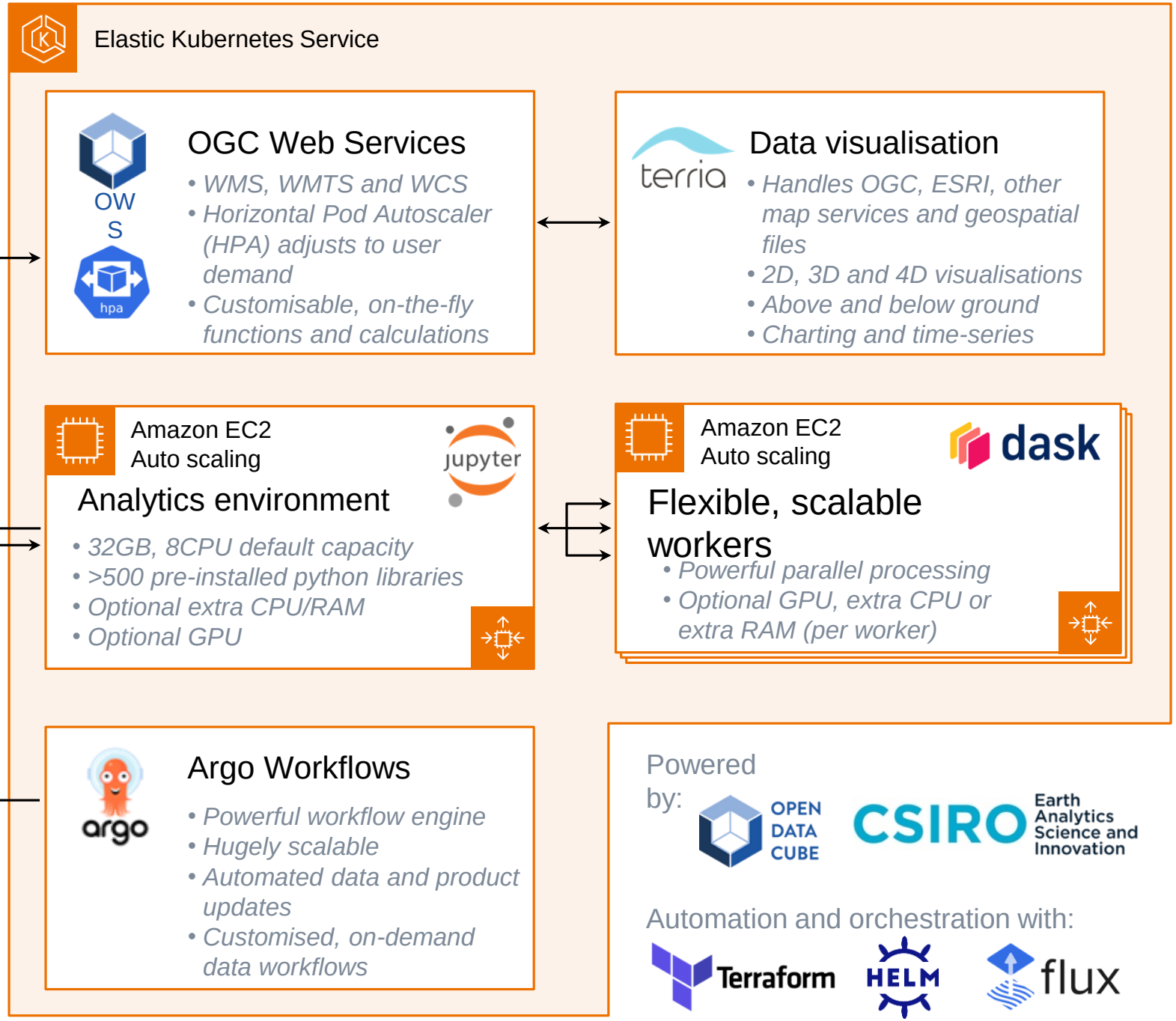


Data for visualization

Metadata queries

Metadata and data response

Data updates and new product generation (ARCO data formats and eo3 metadata)



Powered by:

OPEN DATA CUBE

CSIRO Earth Analytics Science and Innovation

Automation and orchestration with:

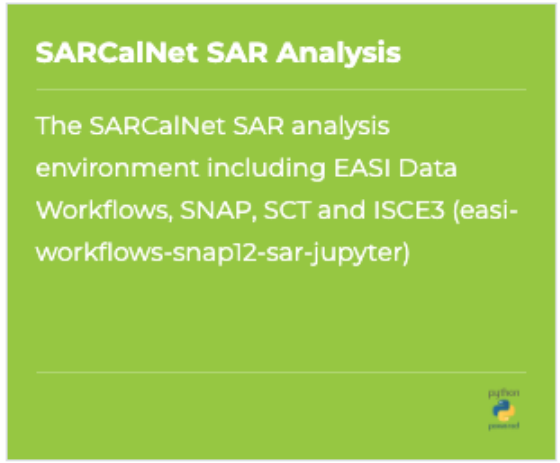
Terraform HELM flux

In addition to:

Amazon Cognito Amazon EFS Amazon DynamoDB Amazon CloudFront

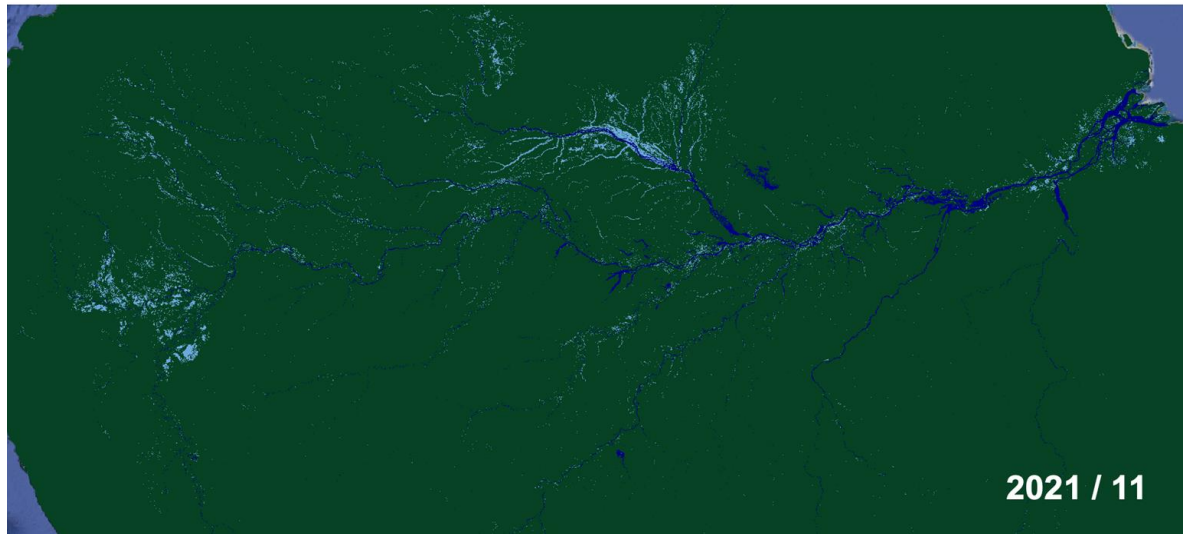
CAL Support to WGCV-SAR & SARCalNet

- New custom CAL environment for WGCV-SAR & SARCalNet users (on top of 500+ existing libraries)
- Includes a range of SAR-specific tools and libraries for processing and analysis, including:
  - SNAP (GPT, esa_snappy)
  - ISCE3
  - SAR Cal Toolbox (SCT)
  - SCT subtools
  - PolSARTools
  - PolSARPro being explored
  - Sardem
  - NISARQA
  - KARIOS
  - S1etad
  - PyroSAR
- Can be expanded on request

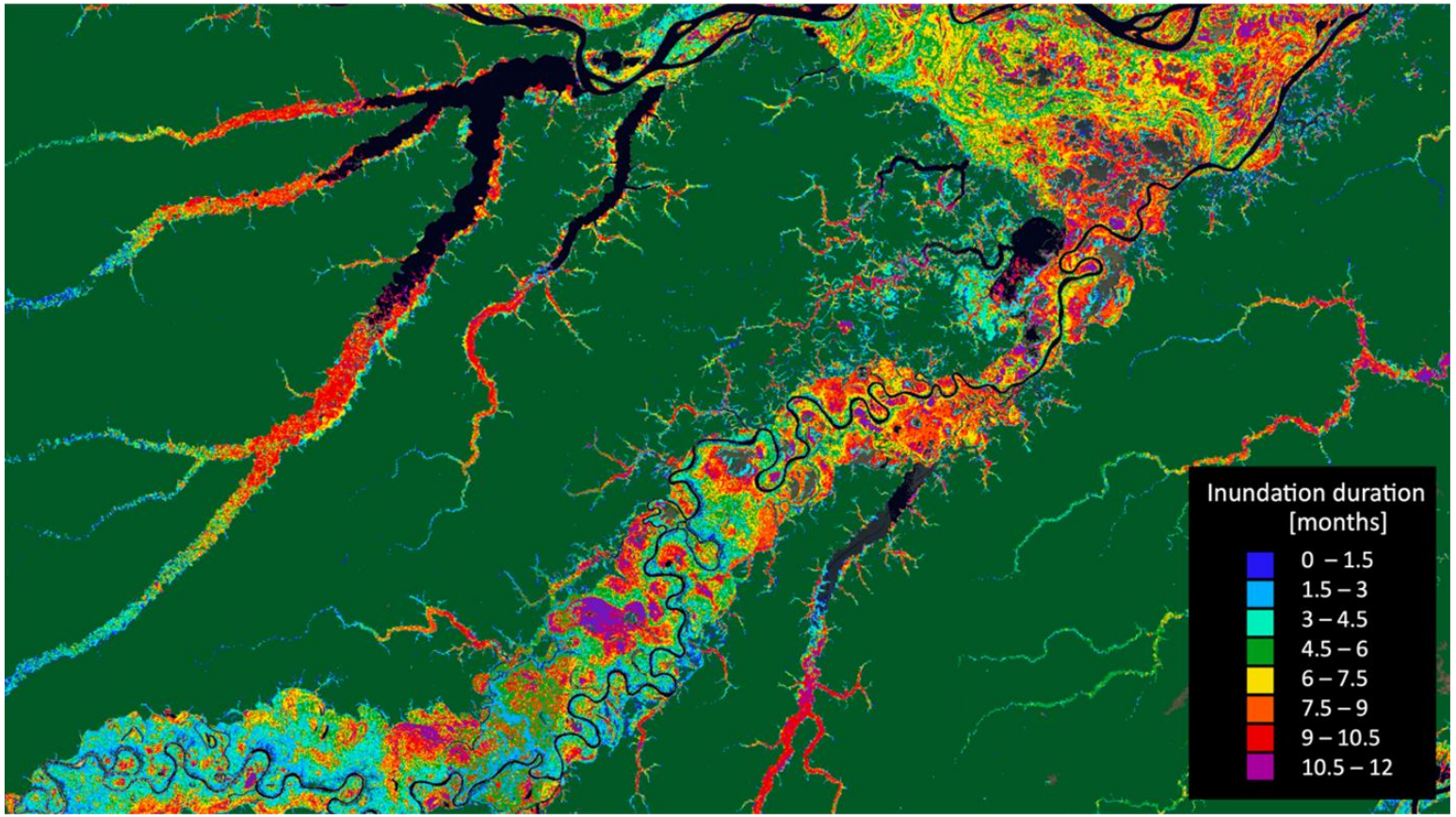


CAL Processing Case Study: ALOS-2 Forested Wetlands Inundation Mapping

- Processing intensive:
  - Amazon basin (8 Mkm^2), >10 years of data
  - Processing time using local desktop (8 CPU, 48 GB RAM): ~800 h
- Cloud-based (CAL) solution:
  - JAXA update of global archive of CEOS-ARD NRB ALOS-2 ScanSAR data on AWS (THANK YOU JAXA!)
  - CEOS Analytics Lab used to parallelise the existing workflow
  - Processing time improved **from 800+ h to less than 10 h**



CAL Processing Case Study:
ALOS-2 Forested Wetlands Inundation Mapping



← **Inundation duration map for 2022.**

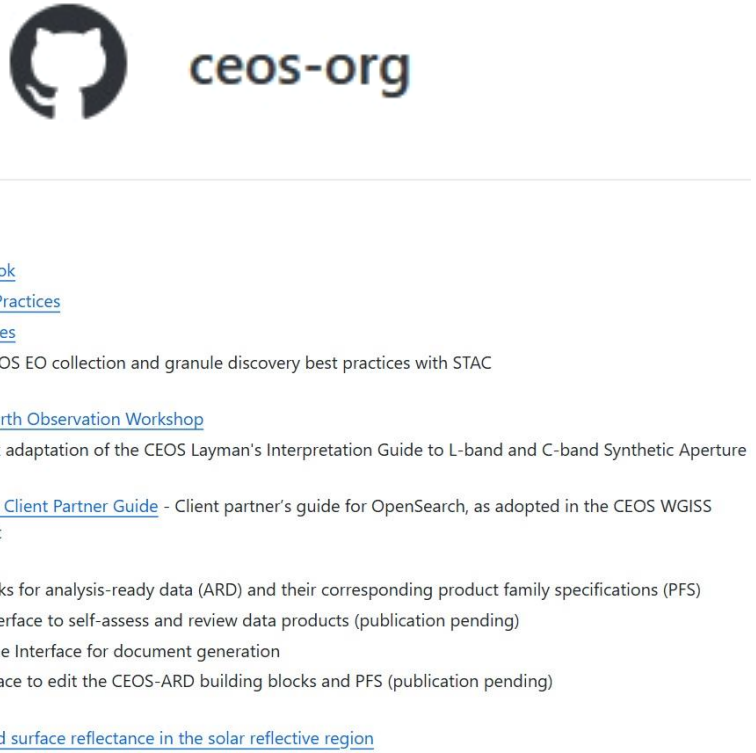
Colours indicate the number of times a pixel has been classified as “flooded” in the 2022 time-series.

CAL benefits and limitations

- Sits outside of any agency infrastructure – directly on AWS
- CEOS SEO team can help provide training and advice
- Scales up when you need it and down when you don't
- For normal use, very few limitations. For large-scale or very compute-intensive jobs, there are limits, but we can help make your code faster
- How can we help?
  - Access to CAL if available free of charge for CEOS activities
  - Tell us what your team needs: specific data, python packages, training, scale?
  - Hosting environment for Interoperability Demonstrators - under development

CEOS GitHub Organization

- Current Status
  - Organization Adoption:
    - 36 members
    - 7 outside collaborators
    - 18 repositories
    - 9 projects
    - 6 teams (Working Groups)
    - 61 followers
  - Operating under GitHub Free tier with unlimited public/private repositories
- Draft Governance framework established
  - Followed from community discussions in December 2025 with 20 participants across CEOS agencies
- Governance documentation developing on GitHub (governance repository)
- Higher-level governance summary for review at SIT-41



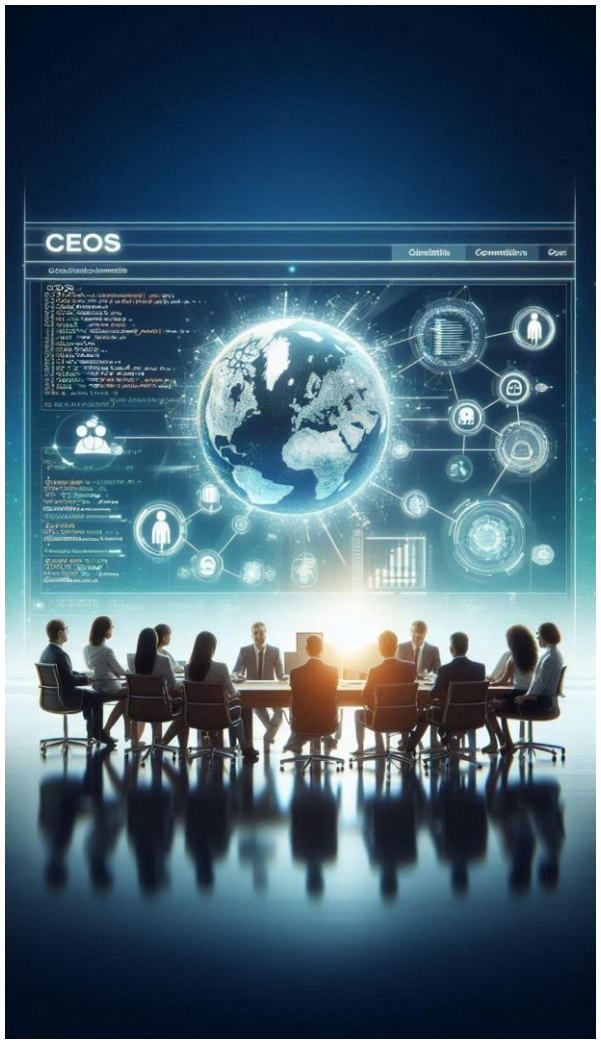
GitHub Governance Decisions

- Organizational Structure
  - Teams mirror CEOS groups (WGs, VCs) with Admin and Exec teams for administration
  - No institutional teams for now; groups nominate 1-2 points of contact (Chair by default)
  - Ownership reduced from 7 to ~3, with admin team for broader operational support
- Account and Repository Standards
  - Real names required on all GitHub accounts
  - Multi Factor Authentication enforced organization wide
  - Kebab-case naming convention for all repositories
  - Standardized files required: README, LICENSE, CONTRIBUTING, CODE_OF_CONDUCT
  - Organization-wide Code of Conduct deployed
  - Membership requirements for organization left to discretion of chairs and Admins (meeting attendance, project management, institutional teams)
- Platform Positioning
  - GitHub complements Google Docs; guidance on when each is most appropriate
  - Particularly suited to version-controlled technical content with community input
  - Remaining on the GitHub Free tier (adequate for current needs)

Licensing & Contributions

- Default Licensing
  - Apache 2.0 for software; Creative Commons Attribution 4.0 (CC-BY 4.0) for documentation
  - No objections raised and will report to CEOS leadership for comment at SIT-41
- Hybrid Contribution Framework:
  - Standard CLA approaches are difficult because CEOS has no legal personality and cannot hold IP
  - SEO recommends a three-layer hybrid framework:
    - **1.** Enhanced CONTRIBUTING.md:
      - Explicit license grant, copyright retention, and right-to-contribute certification with PR-template checkbox acknowledgment
    - **2.** Selective Developer Certificate of Origin (DCO) Sign-offs:
      - Per-commit provenance tracking applied to software repositories only; NOT required for demonstration code and documentation
    - **3.** Distributed Copyright:
      - Contributors retain ownership; contributions licensed under the project license. Optional institutional acknowledgment letters

Implementation Progress



- Completed
  - Governance repository established on GitHub
  - MFA requirement enforced for all organization members
  - Organization-wide Code of Conduct deployed
  - Ownership structure reduced to ~3 owners with admin team
  - Guidance on GitHub vs. Google Docs usage
- In Progress
  - Team structure created; population with working group members underway
  - Hybrid contribution framework under SEO review (see previous slide)
  - Publishing template for GitHub Pages in development
  - Dedicated training repository planned
  - Expand guidance and add policies to Governance

Next Steps & Community Input

- Contribution Framework
  - Hybrid DCO/contribution framework prepared for broader community review
  - IP policy may need elevation for broader review given the complexity
  - Outreach to GEO Data Working Group legal/licensing subgroup and OSGeo community
- Training and Adoption
  - Coordination with WGCapD on training materials
  - Tiered proficiency model: baseline (issue reporting, markdown), intermediate (PRs, branching), advanced (repo maintenance, Actions)
  - Creation of a sandbox repository for hands-on practice
- Governance
  - Higher-level governance summary being prepared for review at SIT-41
  - Expand repository migration guidelines for bringing existing projects under ceos-org
  - Retirement and archival policies to be established