



CDSE COPERNICUS
DATA SPACE
ECOSYSTEM

CDSE AI Capabilities

AI and EO: From Innovation to Services

March 9, 2026, Brussels

Dennis Clarijs, VITO



dataspace.copernicus.eu



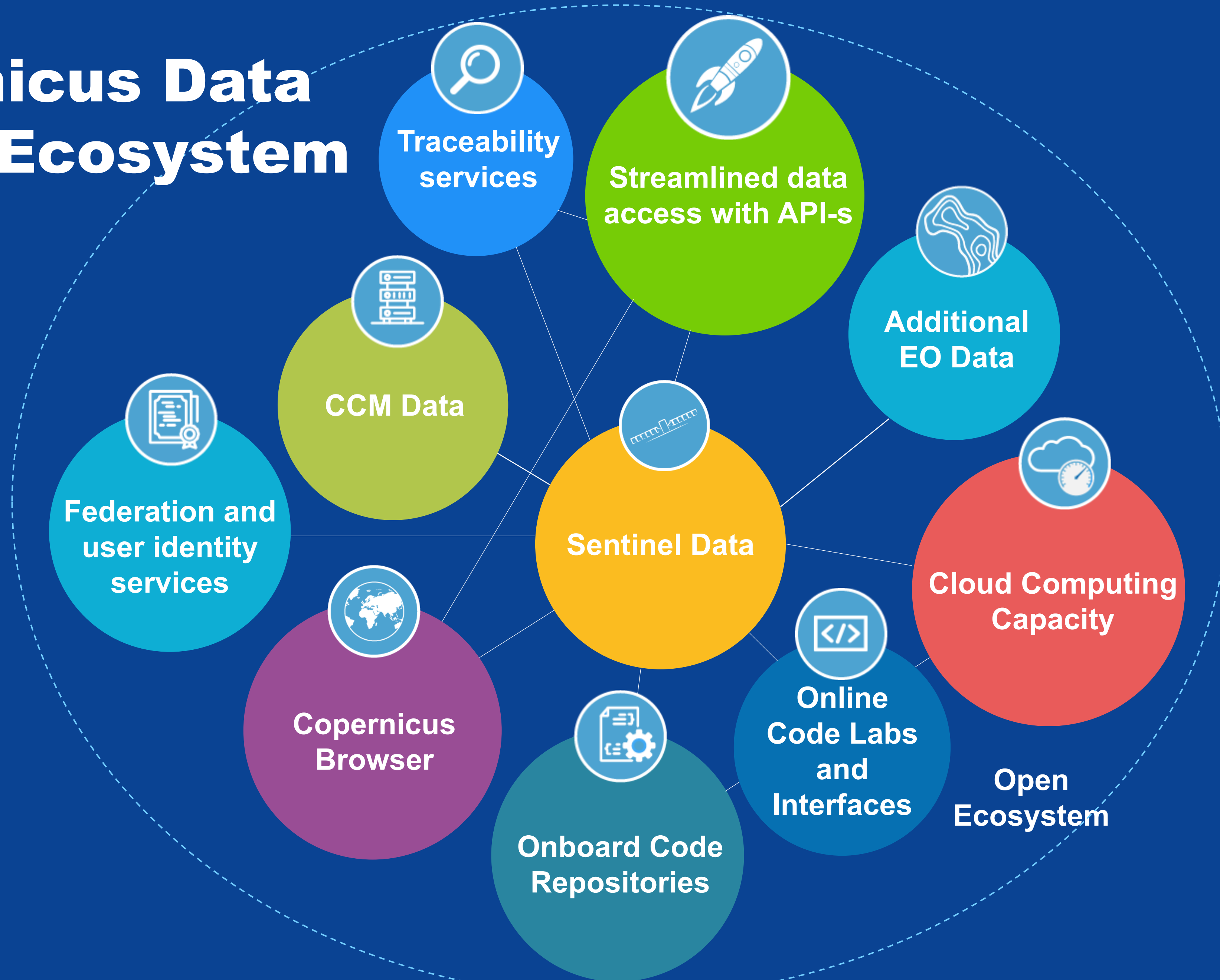
Copernicus

Largest data space for the largest EO programme

- The **authoritative source** for full and up-to-date archives of Sentinel user data, digitally traced
- **Immediately available, free and open data**
 - Currently 85 PB and more than 100 PB by 2028
- Governed by a Service Level Agreement, ensuring continuity and trust (up to **December 2028** with optional extension until **December 2032**)
- **Open ecosystem** of advanced services



Copernicus Data Space Ecosystem



AI-ready ecosystem

Continuous innovation and evolution fostering the development of a European EO AI Ecosystem

openEO Agent for lowering onboarding barrier and algorithm plaza

Open and free capacity with potential commercial extension

ML-ready processing API's openEO, Sentinel-Hub for feature engineering, model training and inference

The authoritative source for full and up-to-date access to Sentinel data, CCM data and GEO-AI datasets and federated back-ends

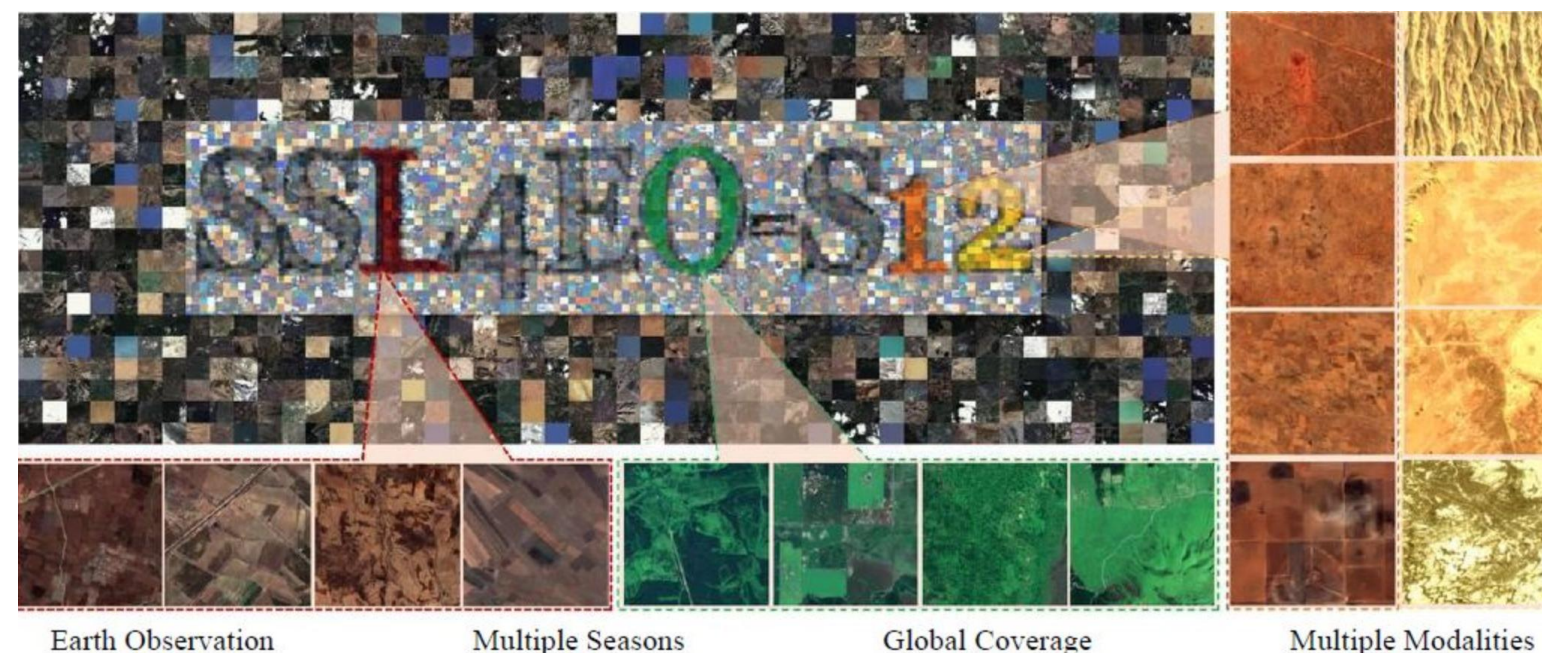
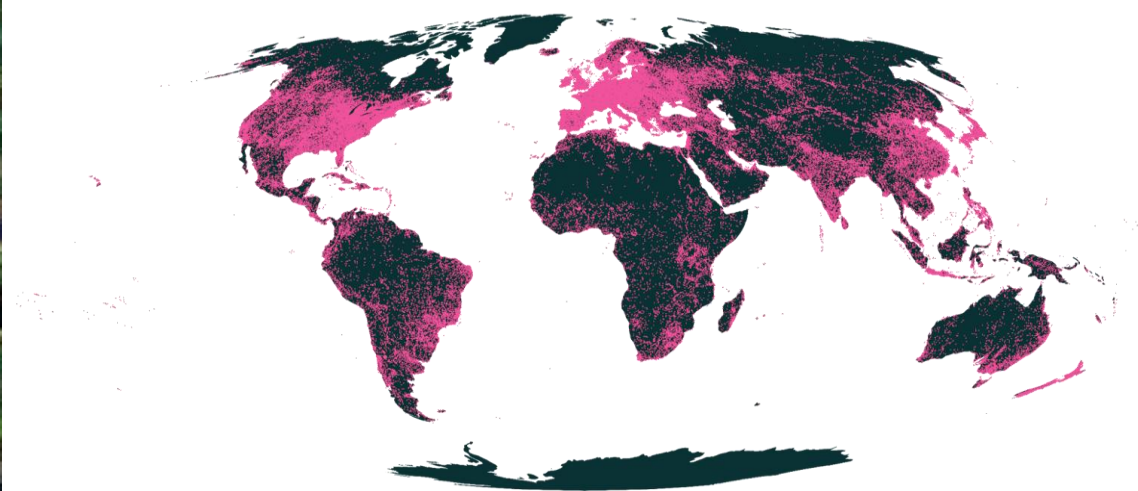
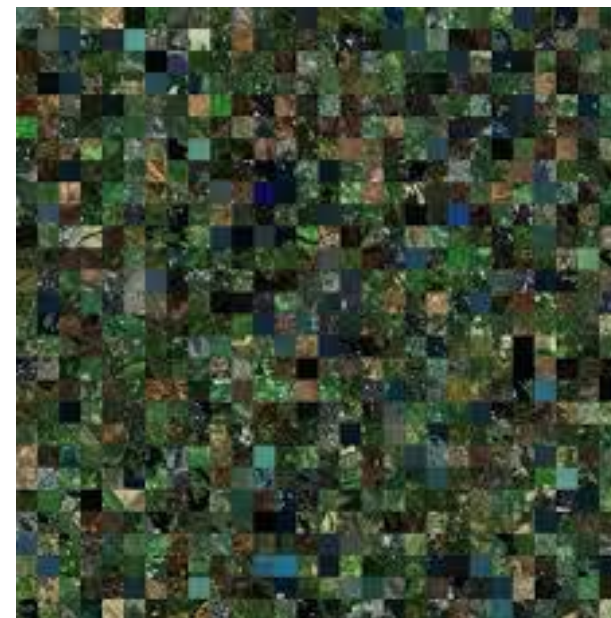
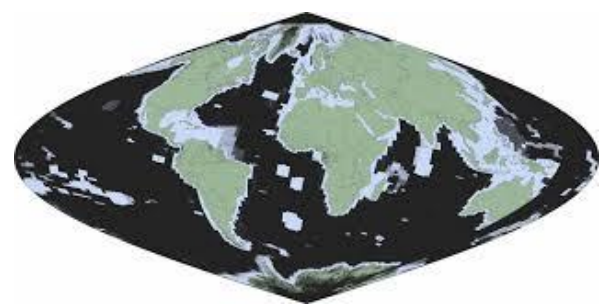
Sovereign, secure, scalable, redundant infrastructure ecosystem, CPU/GPU access

GEO AI Datasets ecosystem

Making geoAI datasets available within CDSE/CREODIAS significantly lowers the barrier to AI development by enabling faster access, easier testing, and tight integration with Copernicus data.

Datasets:

- MajorTOM
- SSL4EO-S12
- OlmoEarth
- MMEarth
- BigEarthNet-S1/S2
- EuroSAT MS/RGB
- CloudSEN12
- SatlasPretrain
- TerraMesh



Earth Observation

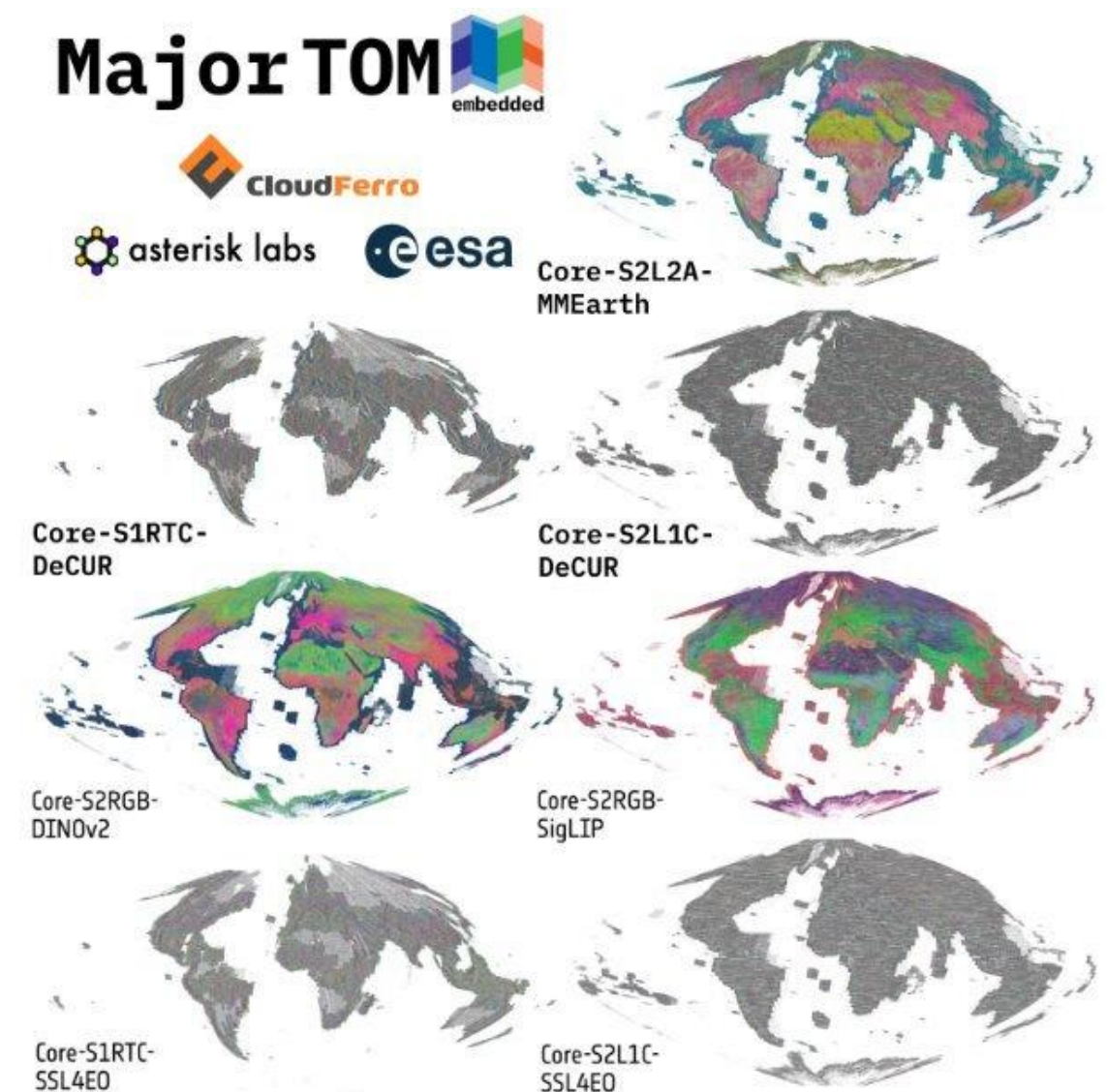
Multiple Seasons

Global Coverage

Multiple Modalities

Embeddings datasets at CDSE - optimized for fast inference, vector search and scalable downstream geoAI applications.

MajorTOM embeddings: SSL4EO, MMEarth, SigLIP, DINOv2, DeCUR, (CORSA)



Additional embedding datasets coming soon...

Example notebook tutorial available

File Edit View Run Kernel Tabs Settings Help

Launcher cdse_embeddings_CF.ipynb

Markdown

Computing similarity between images

Finding the most similar patches in clusters

Steps

1. Storing indices, cosine similarity, and location/grid cell info for pairs in the same cluster
2. Selecting the pairs with highest similarity per cluster
3. Listing the top pairs

```
[9]: cluster_pairs = defaultdict(list)
N = len(df_embeddings)
# Iterate over all pairs of images
for i in range(N):
    for j in range(i + 1, N):
        lat_i, lon_i = (
            df_embeddings.iloc[i]["centre_lat"],
            df_embeddings.iloc[i]["centre_lon"],
        )
        lat_j, lon_j = (
            df_embeddings.iloc[j]["centre_lat"],
            df_embeddings.iloc[j]["centre_lon"],
        )

        if lat_i == lat_j and lon_i == lon_j:
            continue

        cluster_i = df_embeddings.iloc[i]["cluster"]
        cluster_j = df_embeddings.iloc[j]["cluster"]

        if cluster_i != cluster_j:
            continue
```

Cluster 1

lat=41.93943 lon=2.83389

lat=41.92046 lon=2.85939

lat=41.92043 lon=2.83394

Cluster 2

lat=41.95329 lon=2.88881

lat=41.95327 lon=2.86335

lat=41.92049 lon=2.88483

Cluster 0

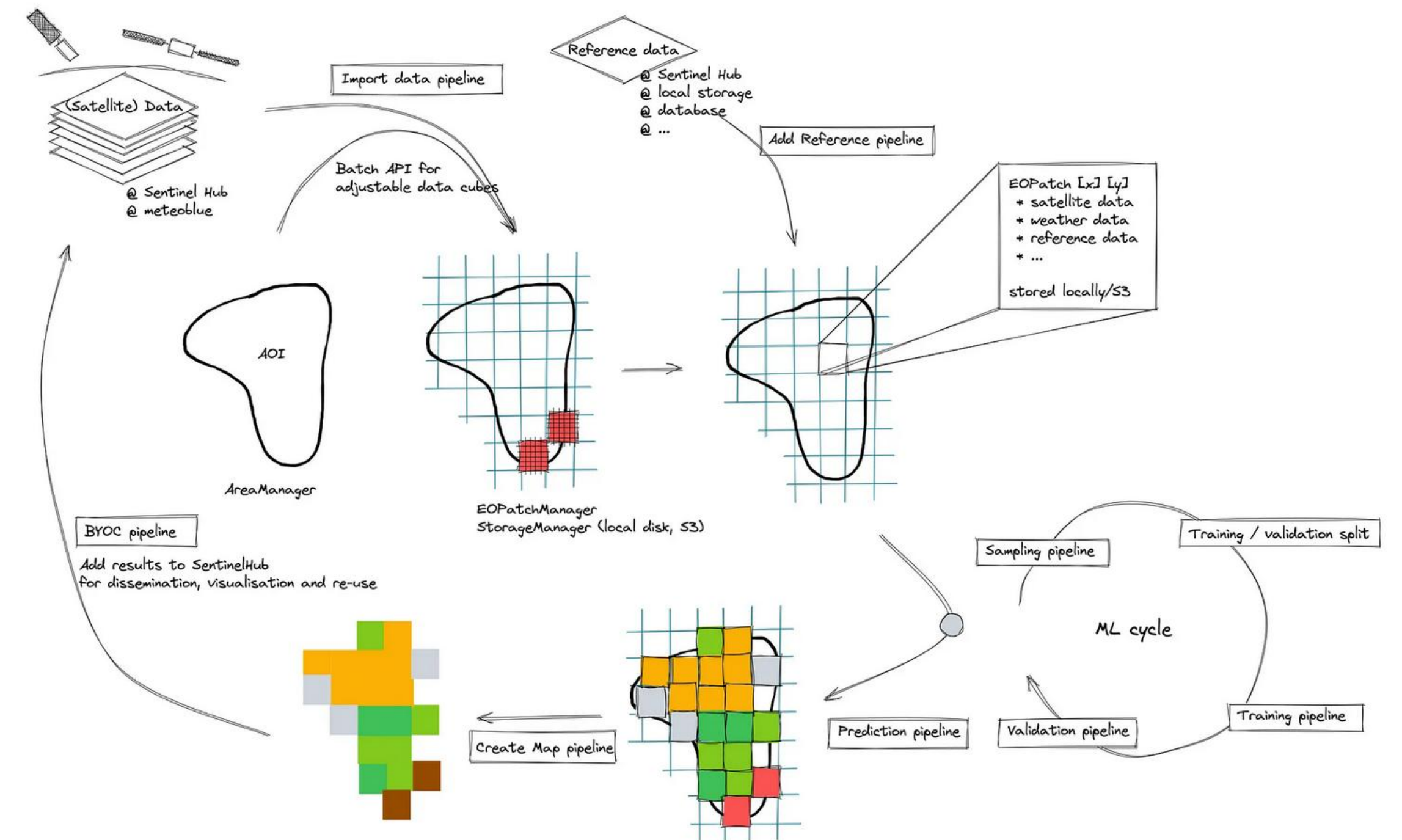
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lat=42.01021 lon=2.81227

lat=41.95315 lon=2.78698

AI and CDSE powering Common Agriculture Policy

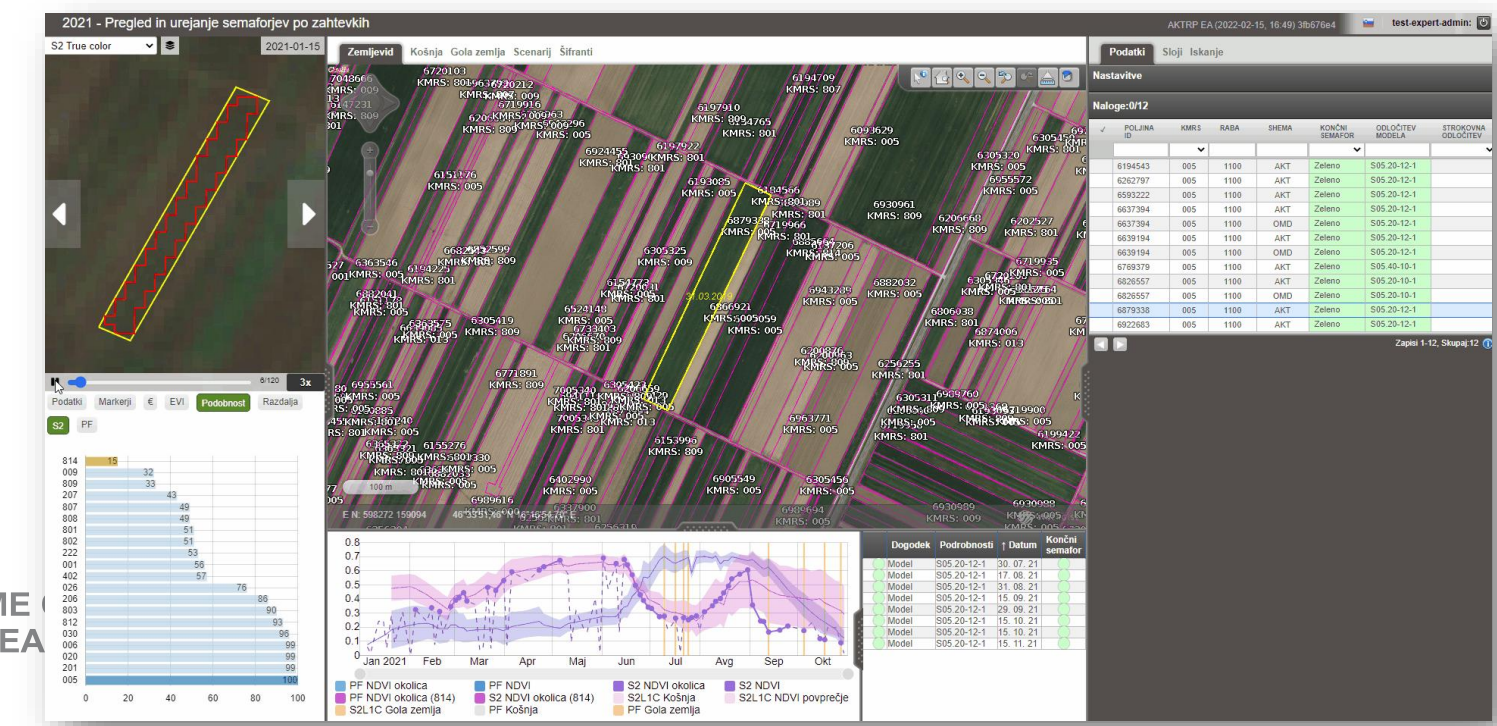
- **Signals - Feature engineering**
 - openEO, Process API, Statistical API/Batch Processing API, Batch Statistical API
 - CARD BS, CARD4L, CARD DOH6/12, MAJA, FORCE
- **Markers - Model training and inference**
 - Jupyter Lab, OpenEO
 - IaaS, Managed Kubernetes
- **Analysis and dissemination of results**
 - Copernicus Browser
 - IaaS, S3
 - OGC APIs
- **Next steps**
 - Integration of embeddings in the process



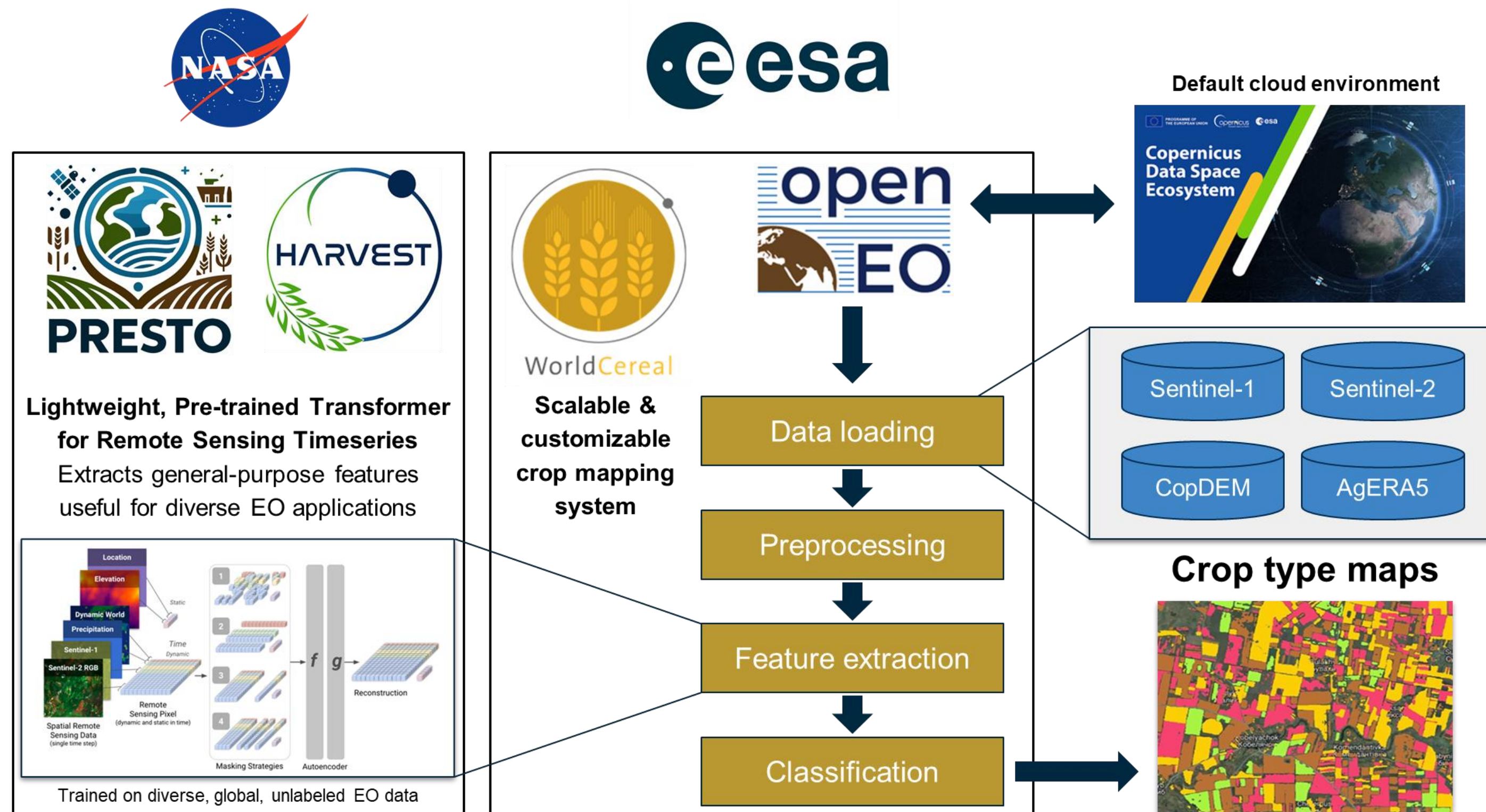
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PROGRAMME THE EUROPEA



ESA World Cereal Project → EO Plaza



Prototype

ESA worldcereal global crop type detector

A crop type detection algorithm for global use

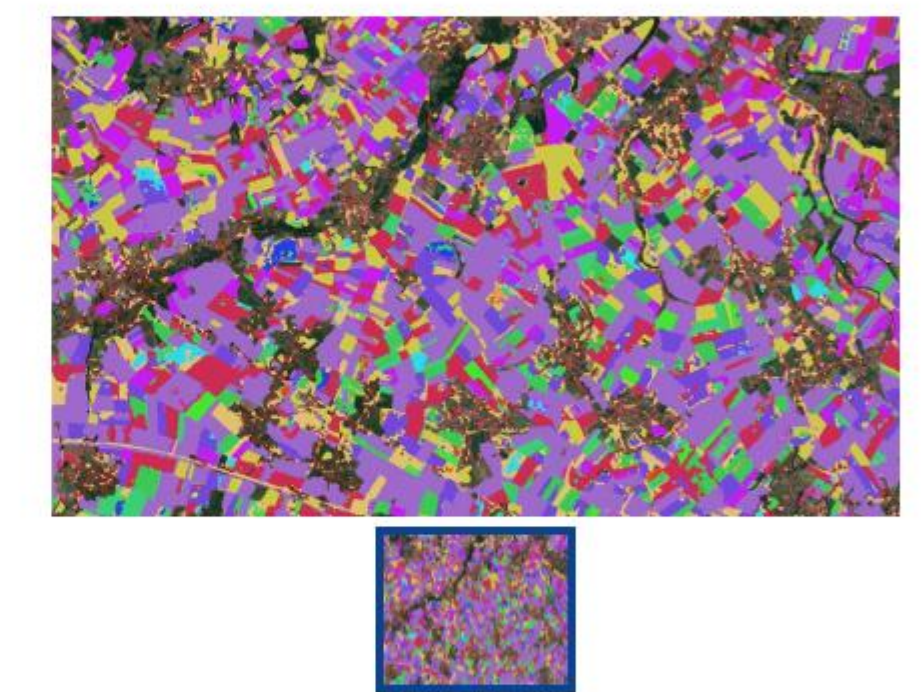
sentinel-1 sentinel-2 ESA WorldCereal ESA

[GET STARTED](#)

Provided by:
WorldCereal

Service links:
[Website URL](#)

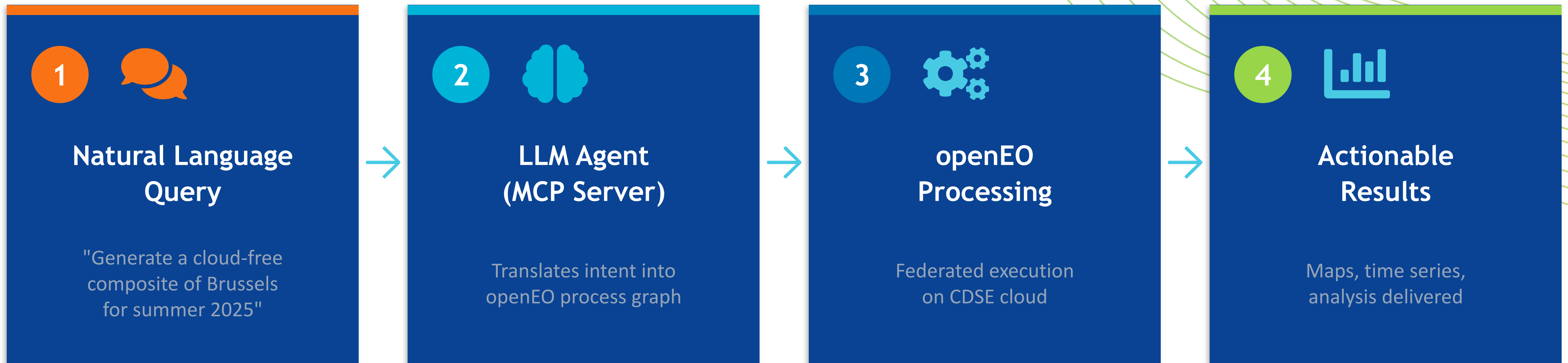
Navigate to:
[Overview](#)
[Usage example](#)
[Parameters](#)
[Results](#)
[References](#)



Overview

The ESA WorldCereal Crop Type Detector combines Sentinel-1 (SAR) and Sentinel-2 (optical) time series with meteorological inputs and in-situ observations to produce local to global 10 m crop-type maps, processed at scale via openEO within the Copernicus Data Space Ecosystem. It generates pixel-level embeddings using the Nasa Harvest' "Presto"

openEO AI agent (Upcoming)



Open Standard

Federated

Low threshold

Built on openEO API — not locked into any proprietary ecosystem

Processes execute across multiple backends, wherever the data resides, linked to user account

Lowering the bar for custom code processing and conversion, free tier



eo_agent



Hi, Victor Verhaert!



Type your message...

Hide Tool Calls

Send

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PROGRAMME OF
THE EUROPEAN UNION

