

WEBINAR

# Observing our planet through data: Destination Earth

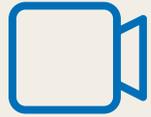
**data.**  
**europa**  
academy

13 February 2026

10:00 – 11:30 CET



# Rules of the game



The webinar will be recorded and published on the data.europa academy



For questions, please use the ClickMeeting chat



Please reserve 3 min after the webinar to help us improve by filling in our feedback form



# Today's speakers



**Carlijn de Smet**  
European Data Portal,  
Publications Office of the EU



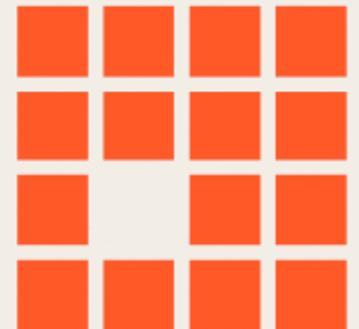
**Thore Fechner**  
Lead of the Open Data  
and Copernicus team  
at con terra



**Daniel Draghicescu**  
Policy Officer at the  
European Commission

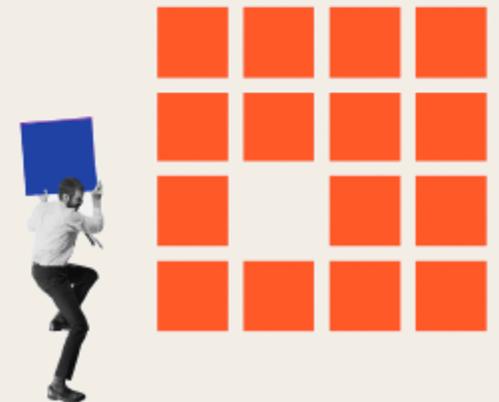


**Michael Schick**  
Principal Engineer for  
the Digital Solution and  
SAF division EUMETSAT



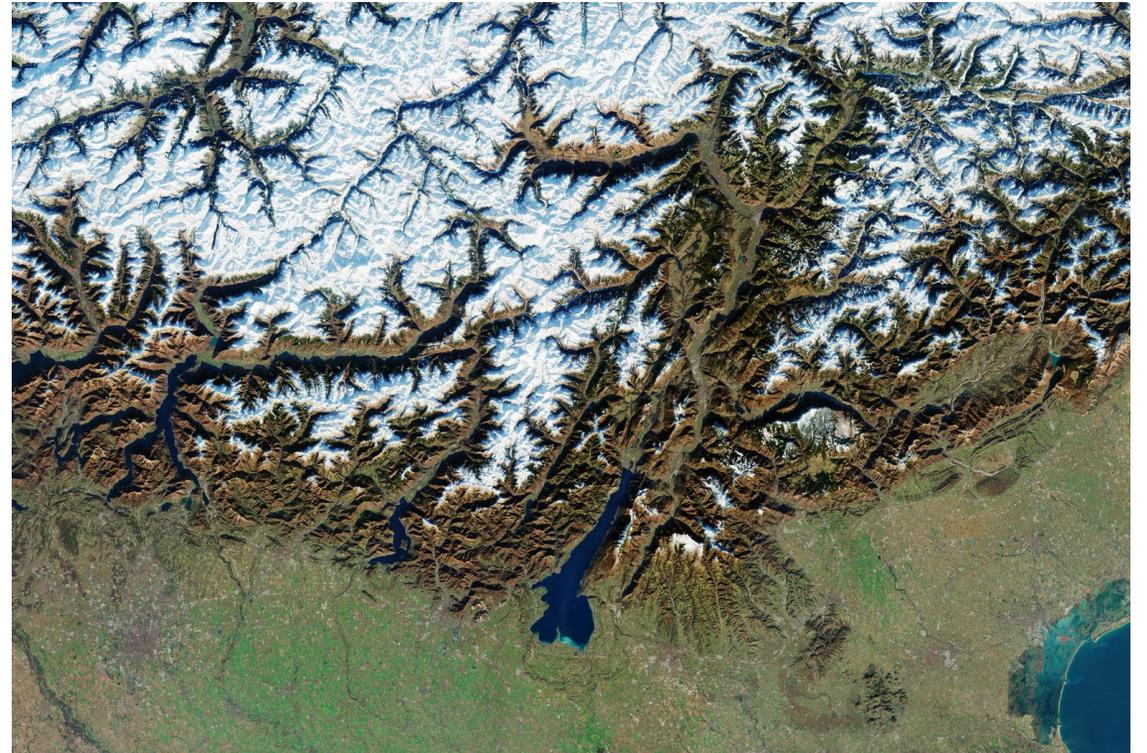
# Indicative agenda

10.00 – 10.05	Opening and introduction – <i>Carlijn de Smet</i>
10.05 – 10.20	Introduction to Earth Observation – <i>Thore Fechner</i>
10:20 – 10:45	The policy and strategic context of Destination Earth – <i>Daniel Draghicescu</i>
10:45 – 11:10	The platform, data lake, and digital twins – <i>Michael Schick</i>
11:10 – 11:30	Q&A session and closing remarks – <i>Carlijn de Smet</i>



# What is Earth Observation (EO)?

- Earth Observation means collecting information about Earth without direct contact, mainly using satellites, aircraft, and ground sensors.
- EO data helps us understand what is happening on the planet — now and over time.



©ESA: Earth from Space - Olympic View

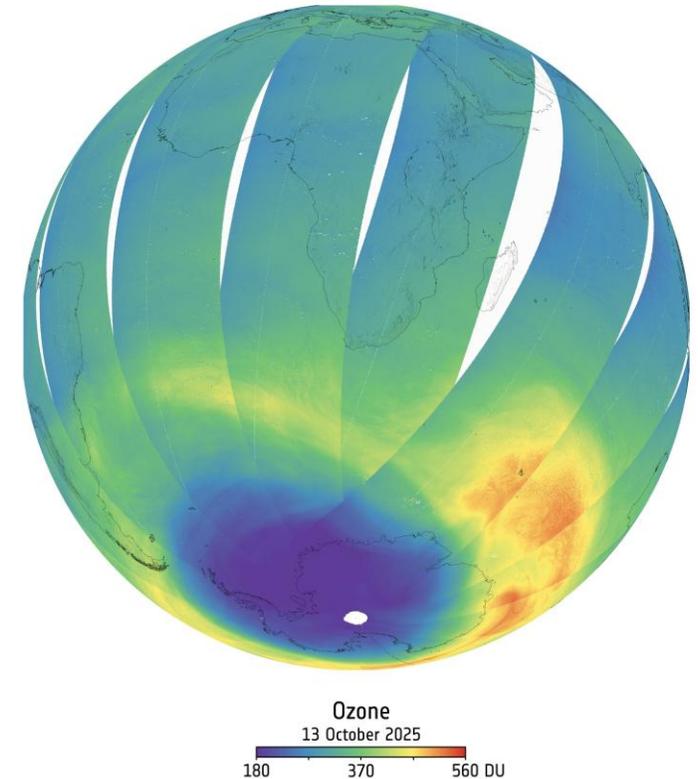
[https://www.esa.int/ESA\\_Multimedia/Images/2026/02/Earth\\_from\\_Space\\_Olympic\\_view](https://www.esa.int/ESA_Multimedia/Images/2026/02/Earth_from_Space_Olympic_view)

# What is EO data?

- EO data is data about land, oceans, atmosphere, and human activity, collected repeatedly and consistently.
- Examples
  - Satellite images
  - Temperature and air-quality measurements
  - Land use and vegetation maps
  - Sea-level and ice-cover data
- Why EO data is special
  - Global coverage
  - Long-term time series
  - Comparable across countries

# How EO Data Is Collected

- **Main sources**
  - **Satellites** (e.g. Copernicus Sentinel missions)
  - **Aerial platforms** (drones, aircraft)
  - **Ground stations** (weather stations, sensors)
- Satellites don't just take “photos” — they measure **radiation, temperature, moisture, movement**, and more.



# Earth Observation data in the European Data Portal

- The European Data Portal includes metadata harvested from other catalogues
- The harvested catalogues often include EO data



Home > Datasets > Global river flood hazard maps

**Dataset** Global river flood hazard maps

Joint Research Centre

API Cite Metadata Embed RSS

The global river flood hazard maps are a gridded data set representing inundation along the river network, for seven different flood return periods (from 1-in-10-years to 1-in-500-years). The input river flow data for the new maps are produced by means of the open-source hydrological model LISFLOOD, while inundation simulations are performed with the hydrodynamic model LISFLOOD-FP. The extent comprises the entire world with the exception of Greenland and Antarctica and small islands with river basins smaller than 500km<sup>2</sup>. Cell values indicate water depth (in m). The maps can be used to assess the exposure of population and economic assets to river floods, and to perform flood risk assessments. The dataset is created as part of the Copernicus Emergency Management Service. NOTE: this dataset is not an official flood hazard map (for details and limitations please refer to related publications).

Quality >

Similar datasets >

Created: 14 March 2024

Creator: Joint Research Centre

Landing Page: <https://emergency.copernicus.eu/>

Languages: English

This dataset is not available in your language yet. Translations are ongoing.

Show More >

Distributions (1)

Title	Format	Updated	Actions
Global river flood hazard maps	TIFF	-	Access

[https://data.europa.eu/data/datasets/jrc-floods-floodmapgl\\_rp50y-tif?locale=en](https://data.europa.eu/data/datasets/jrc-floods-floodmapgl_rp50y-tif?locale=en)

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Datasets found (915) API request Relevance

EU institutions Dataset

### IASI Carbon Monoxide Profiles FORLI-CO Climate Data Record Release 1 - Metop-A and -B

The IASI Carbon Monoxide (CO) Climate Data Record (CDR) has been produced using the FORLI algorithm using the IASI Level 1C as input. It was processed using IASI instruments onboard Metop-A and Metop-B polar orbiting satellites and covers the period from 200...

EUMETSAT Product Navigator

EU institutions Dataset

### SI-1 Fundamental Data Record Release 1 - Meteor - Polar

Release 1 of Fundamental Data Record (FDR) of measurements taken by the Spectrometer/Interferometer (SI)-1, developed by the Academy of Sciences of the German Democratic Republic, which flew on polar orbiting satellites Meteor-28 (also known as Meteor-P...

EUMETSAT Product Navigator <https://data.europa.eu/data/catalogues/pn?locale=en>

# From Raw Data to Information

## EO data lifecycle

1. Data collected by sensors
2. Processed and corrected
3. Combined with other data
4. Turned into maps, indicators, dashboards

# What EO Data Is Used For

- **Environmental & climate**

- Climate change monitoring
- Deforestation and biodiversity
- Air and water quality

- **Urban & societal**

- Urban growth and land use
- Traffic and mobility
- Disaster risk and emergency response

- **Policy relevance**

- EO provides **objective, comparable evidence** across regions and time.

# Examples for use of EO data

# Forestry - calamity response

- EO data is used across the whole response cycle of calamities (storms, floods, droughts, fires, pests):
  - 1. Early warning and preparedness (before calamity)
  - 2. Rapid impact assessment (during / immediately after)
  - 3. Damage quantification and prioritisation
  - 4. Operational response and logistics
  - 5. Monitoring recovery and secondary effects (months to years)
  - 6. Reporting, funding, and policy support

# Forestry - waldinfo.nrw

Navigation icons: back, forward, refresh, home, search, star, share, settings, menu

URL: [waldinfo.nrw.de/waldinfo2/?lang=de](http://waldinfo.nrw.de/waldinfo2/?lang=de)

Suche nach Adressen, Orten, Koordinaten, Flurstücken, Kartenebenen, ...

Hilfe | Informationen | offline-App

Ministerium für Landwirtschaft und Verbraucherschutz des Landes Nordrhein-Westfalen



**waldinfo.nrw**

Alle Kartenebenen | Wechseln zu Themenkarten

- Wald
  - Flächennutzung (ALKIS)
  - Landbedeckung (Cop4ALL)
  - Waldbedeckung (ATKIS)
  - Baumartenklassifikation (Sentinel 2)
  - Vegetations- und Gebäudehöhen (nDOM)
  - Waldanteil
- Waldökologie
- Waldfunktion
- Waldbewirtschaftung
- Waldnaturschutz
- Freizeitnutzung
- Waldschäden und Gefahrenabwehr
  - Stand Verbisssgutachten
  - Forstliche Rettungspunkte
  - Kalamitätskarte Nadelwald
  - Kalamitätskarte Nadelwald 2018-2025
  - Wiedurforschbedflächen Friederike

Ausgewählte Kartenebenen

- Kalamitätskarte Nadelwald 2018-2025
- Baumartenklassifikation (Sentinel 2)

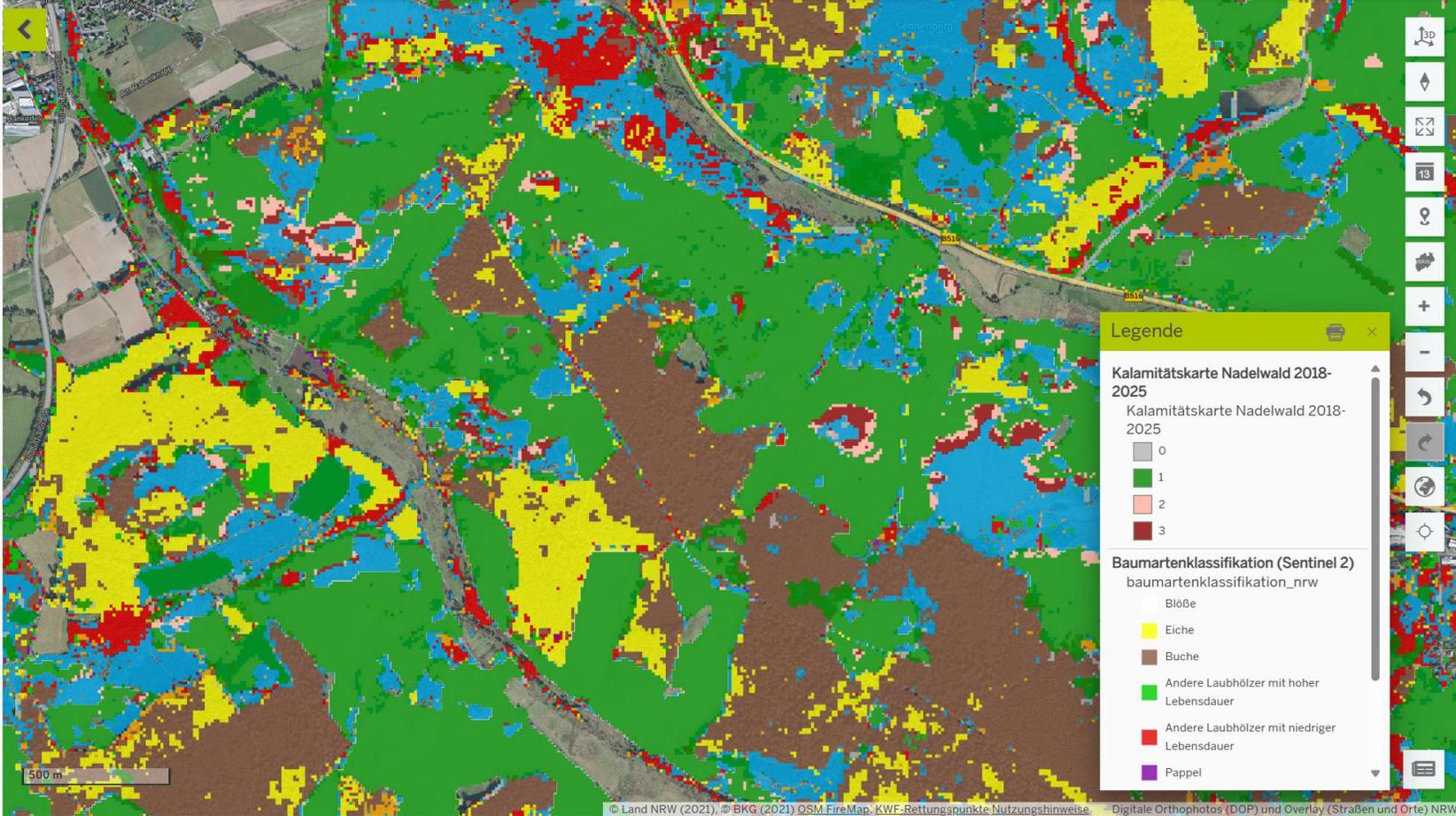
Interaktive Waldbau-Werkzeuge

- Unterstützungssystem Wiederbewaldung
- Vergleich Baumarten - Standorteignung

Basis-Werkzeuge

Erweiterte Werkzeuge

Hintergrundkarte | Luftbild + Overlay | **Legende**



**Legende**

**Kalamitätskarte Nadelwald 2018-2025**

- 0
- 1
- 2
- 3

**Baumartenklassifikation (Sentinel 2)**  
baumartenklassifikation\_nrw

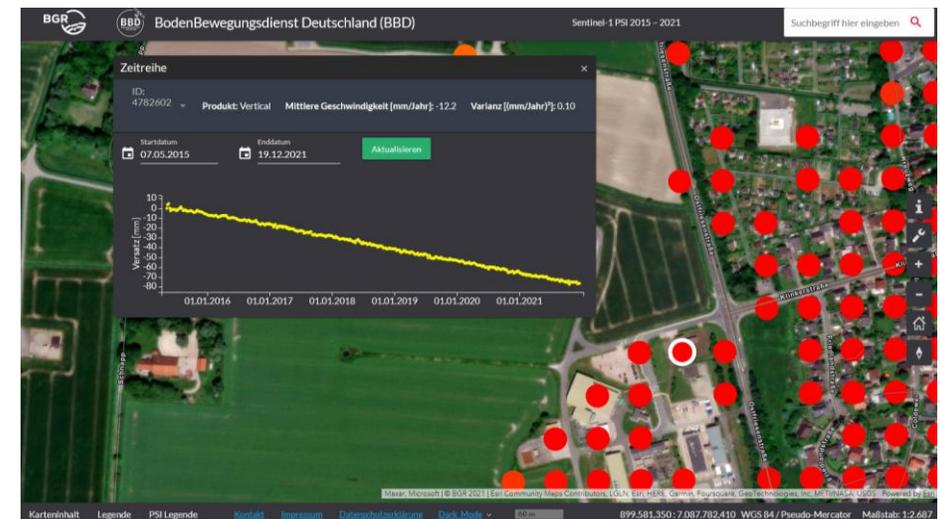
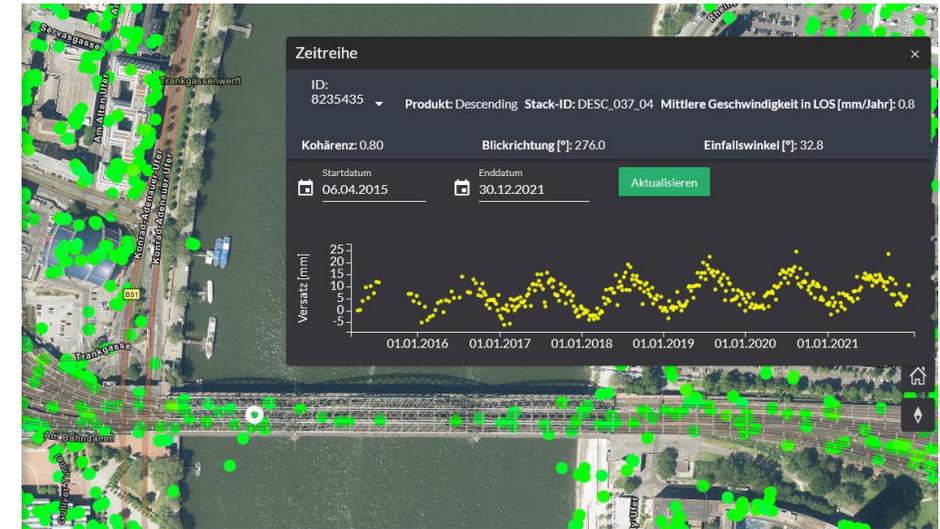
- Blöße
- Eiche
- Buche
- Andere Laubhölzer mit hoher Lebensdauer
- Andere Laubhölzer mit niedriger Lebensdauer
- Pappel

© Land NRW (2021), © BKG (2021) OSM, FireMap, KWF-Rettungspunkte, Nutzungshinweise | Digitale Orthophotos (DOP) und Overlay (Straßen und Orte) NRW

464.478,091 : 5.701.180,478 ETRS89 / UTM Zone 32N 1: 12.151

# Monitoring ground motion

- „Bodenbewegungsdienst“ Germany
- Provides information on ground movements in the millimetre range
- Annual update of database (2015 – 2021, 2025 is being included now)
- Basis: Sentinel-1 data (radar interferometry)
- Visualisation, analyses, download
- Use cases, e.g.:
  - (Critical) infrastructure: planning, monitoring, maintenance, etc.
  - Risk assessment: insurance, disaster control, (post-)mining/open-cast mining, etc.
  - Private/commercial use: identification of anthropogenic influences (new construction areas, renovation activities, etc.)





# Destination Earth

EU flagship initiative



## Observing the Earth through data: Destination Earth

13 February 2026  
data.europa academy webinar

**EUROPEAN COMMISSION**

**DG CNECT**

Unit C.1 – High Performance Computing and Applications

# Destination Earth

A Flagship Initiative of the European Union to Create A Highly Accurate Digital Twin of the Earth

Monitor, simulate and predict natural phenomena and the impact of human activity on Earth



Assist in designing accurate adaptation strategies and climate change related mitigation measures



Accelerate the EU's green and digital transition



Leverage existing and new data sources and EU's advanced digital and computing infrastructure



Create and test "what if" scenarios and to integrate impact sector applications for more sustainable development



Support decision-making at various levels (e.g. EU, national, regional, local)



Make complex simulation systems more accessible to a large range of users and applications



Scale up existing models and boost the exploitation of AI-based ones



# Destination Earth (DestinE) Implementation



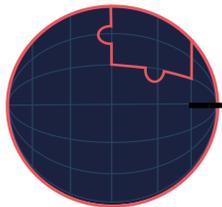
Funded under the Digital Europe Programme

≈500 MEUR



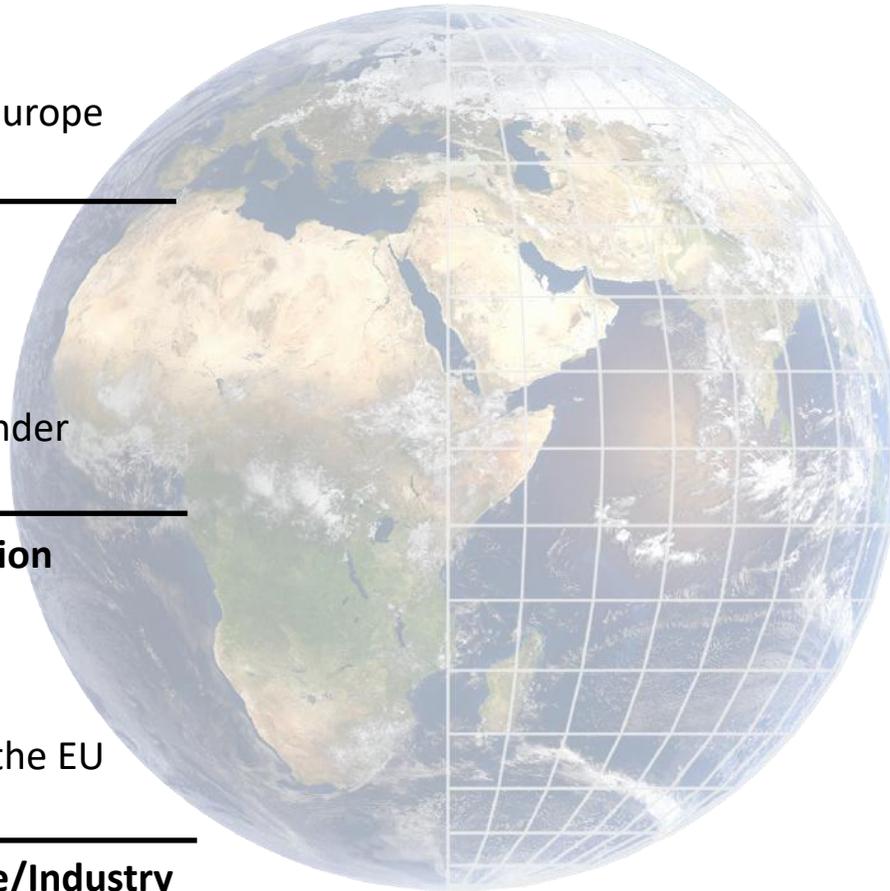
Important R&I activities under Horizon Europe

to support DestinE evolution



Significant Involvement of the EU industry

**27 Countries**      **60 Private/Industry**  
**116 Organisations**      **24 SMEs**



## LEAD BY



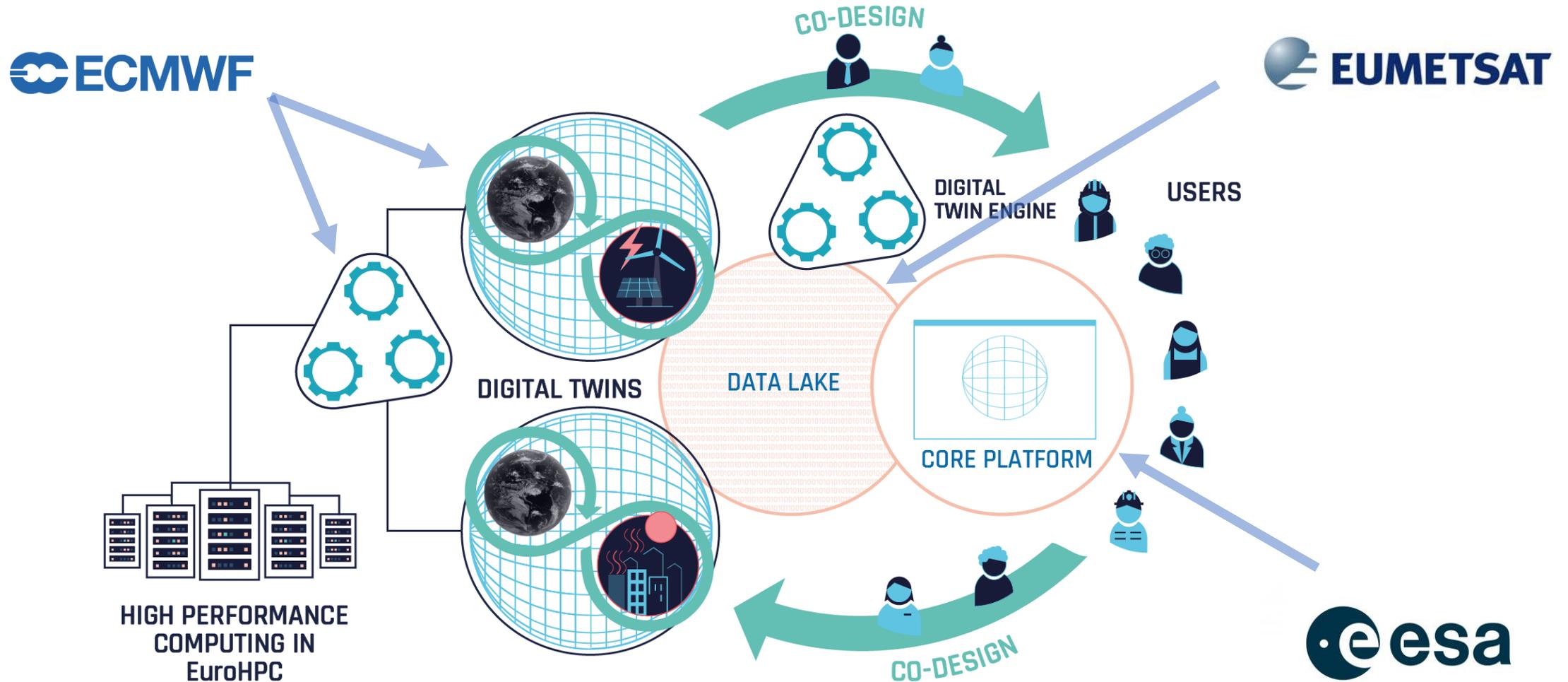
in coordination with Member States and Associated Countries

## IMPLEMENTED BY

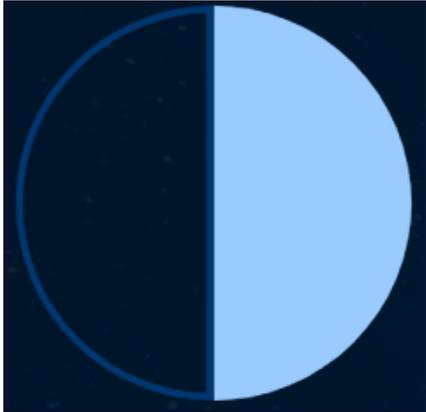


# Destination Earth

# Destination Earth Overview

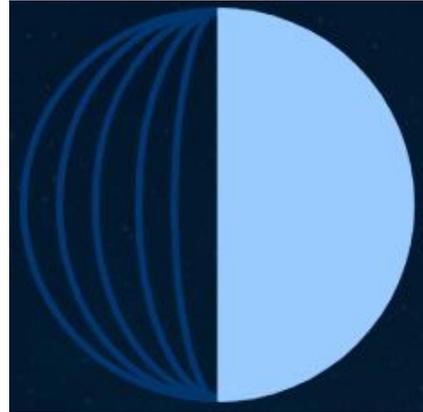


# Implementation Roadmap



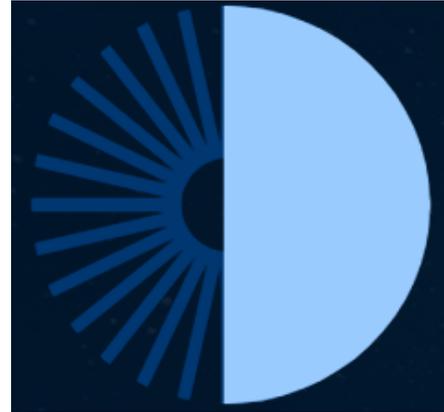
## IMPLEMENTATION KICK-OFF 2022

Start of implementation,  
after signing of the  
Contribution  
Agreements in 2021.



## DEVELOPMENT PHASE 1 2023-mid 2024

Development of the  
main components and  
deployment to  
EuroHPC.



## SYSTEM LAUNCH 10 June 2024

1st versions of all  
components are ready.  
Opening of  
core platform &  
two digital twins.



## ENHANCEMENT PHASE 2 until mid-2026

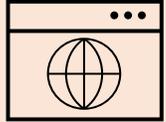
Further enhancement of  
the system, integration  
of additional digital  
twins, development of  
applications  
and services.



## TRANSITION TO LONG- TERM OPERATIONS post 2028

Completion of the  
digital twin of Earth  
system and full  
operationalisation of  
the system.

# Key features at this stage



## Core Service Platform

33 services

Data access services, for DestinE DTs data and multiple other data sources,

Data processing services, for users to exploit and manipulate the data,

Visualization services

Streamline collaboration



## Data Lake

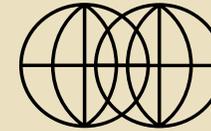
Geographically distributed near-data processing

Access to data portfolio, including federated datasets

Storage of Digital Twins Data

Edge services (including IaaS, PaaS)

AI capabilities



Extremes DT

**Digital Twins**

Climate DT

Regular production at **4.4 km**

On demand zoom-in at **500-750m**

Clear benefits at local scale demonstrated

Multi-decadal projections at high-resolution up to **2040-2050**

First ever prototype projections at **5km across Earth-system**

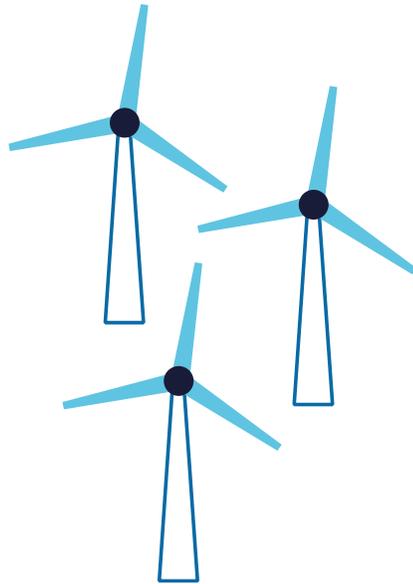
Streaming Earth-system information to selected impact models included in the DT workflow

# DestinE first two high priority Digital Twins

## Simulate scenarios and tailor information

### To optimise the use of renewable energies

*How will an approaching storm affect the renewable energy production in my wind park, and how does it affect others ?*



### To explore possible future scenarios

*How do heatwaves look like in a +2° or +4° warmer world and how should I adapt my city?*



## EXTREMES DT : A MAGNIFYING GLASS ON EXTREME WEATHER EVENTS

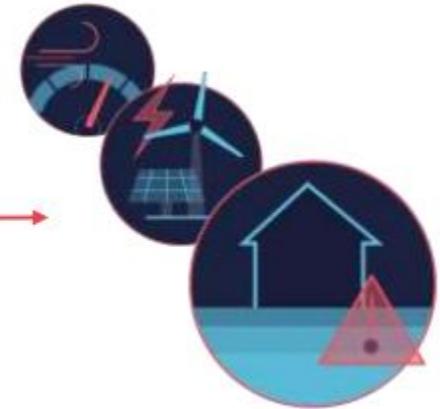


**Global** and **daily** simulations of extreme weather  
**4 days** ahead at **4.4km**

DETECTION/  
TRIGGERING



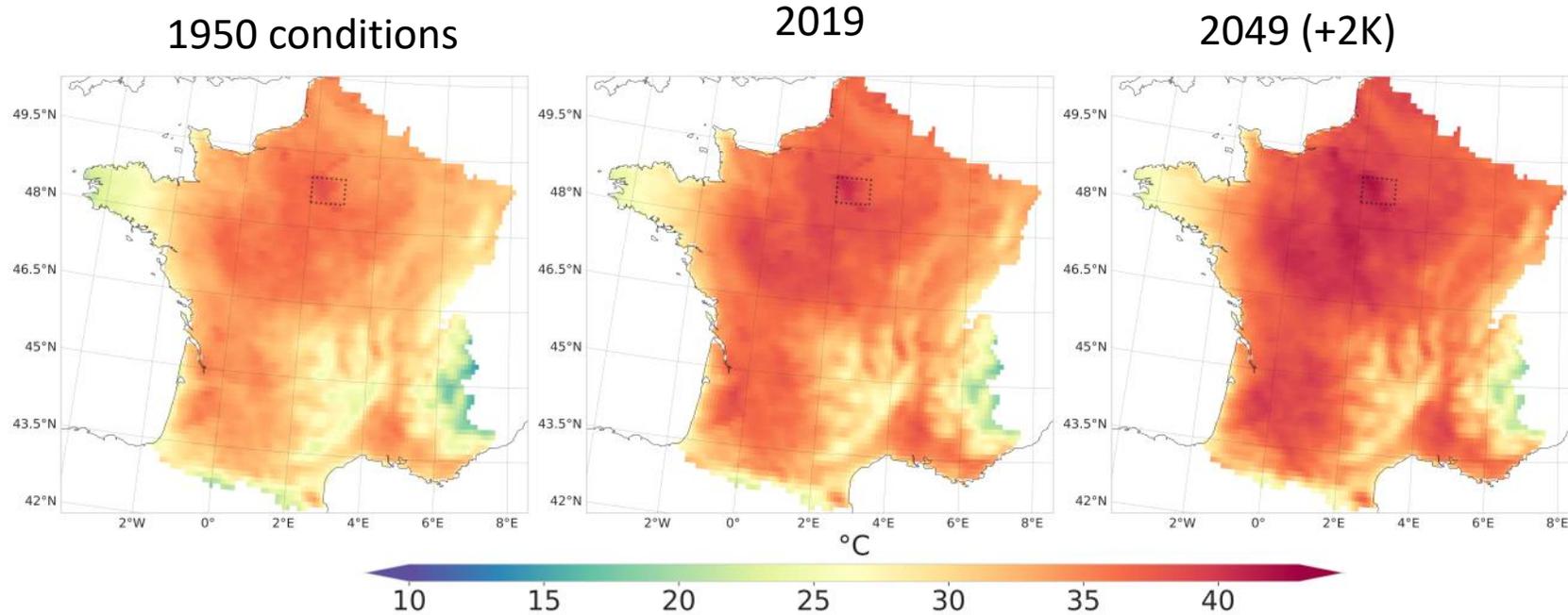
**On-Demand** regional simulations  
**2 days** ahead at **750m to 500m**



Impact-sector models:  
user-relevant information for societal impacts

# Climate DT: Producing storylines of extreme events

“What-if” the 2019 heatwave occurred in 1950 or 2049 ?



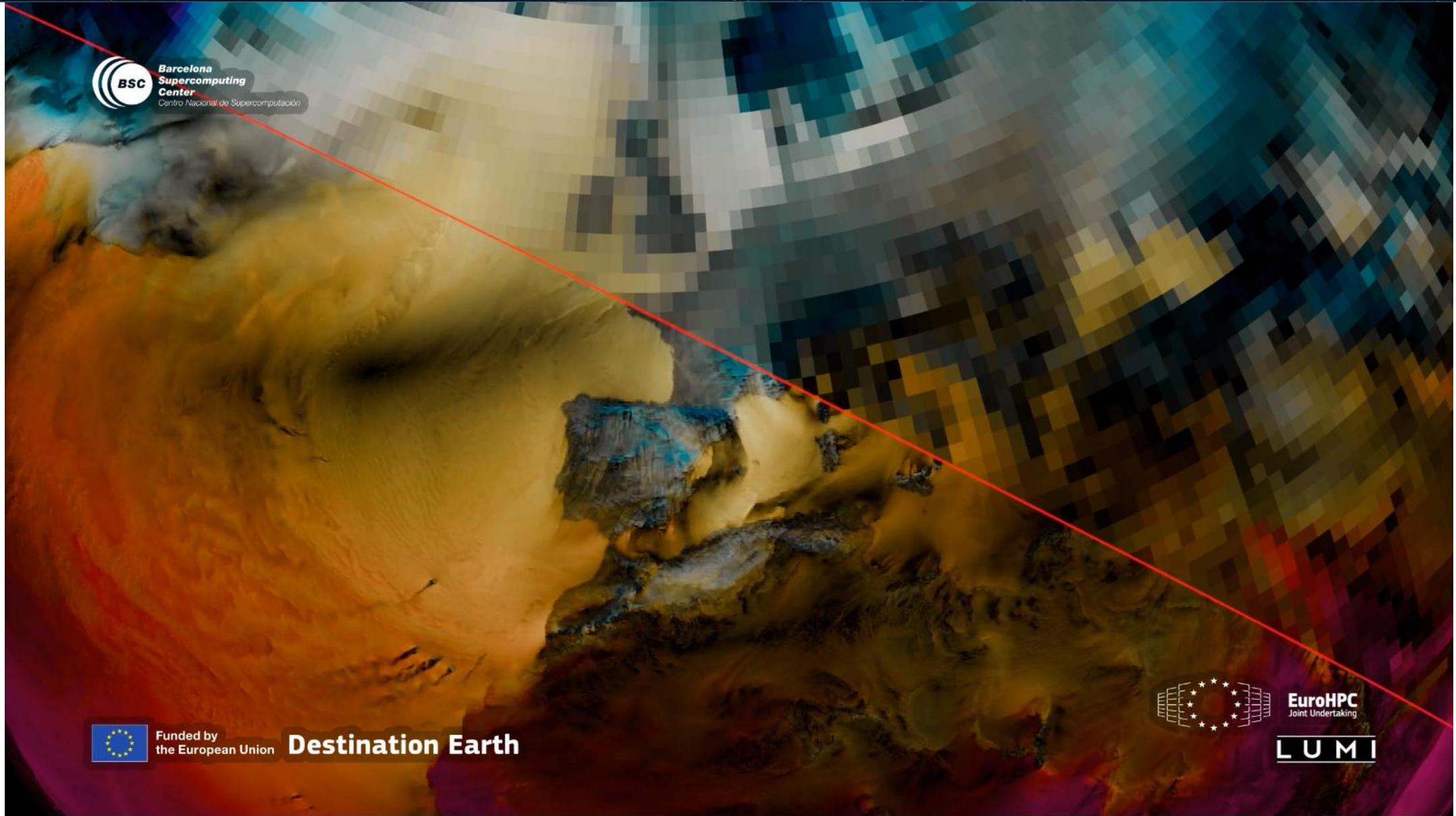
d) Maximum 2m-temperature (Paris)

2049	29.5	28.8	28.2	27.9	27.7	27.7	29.0	31.0	33.4	35.9	38.1	39.9	41.0	41.8	42.1	41.8	41.8	40.4	38.9	36.9	34.8	33.5	31.9	30.6
2019	30.1	29.2	28.5	28.0	27.4	27.1	28.1	29.9	32.4	35.0	37.2	38.8	39.8	40.5	40.8	40.9	40.5	39.4	38.8	37.3	35.5	34.1	32.8	31.5
1950	27.1	26.4	25.7	25.2	24.5	24.3	25.3	27.3	29.6	31.9	34.2	35.9	37.2	37.9	38.2	38.3	37.1	37.0	36.7	35.4	33.1	31.4	30.1	29.1
	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00

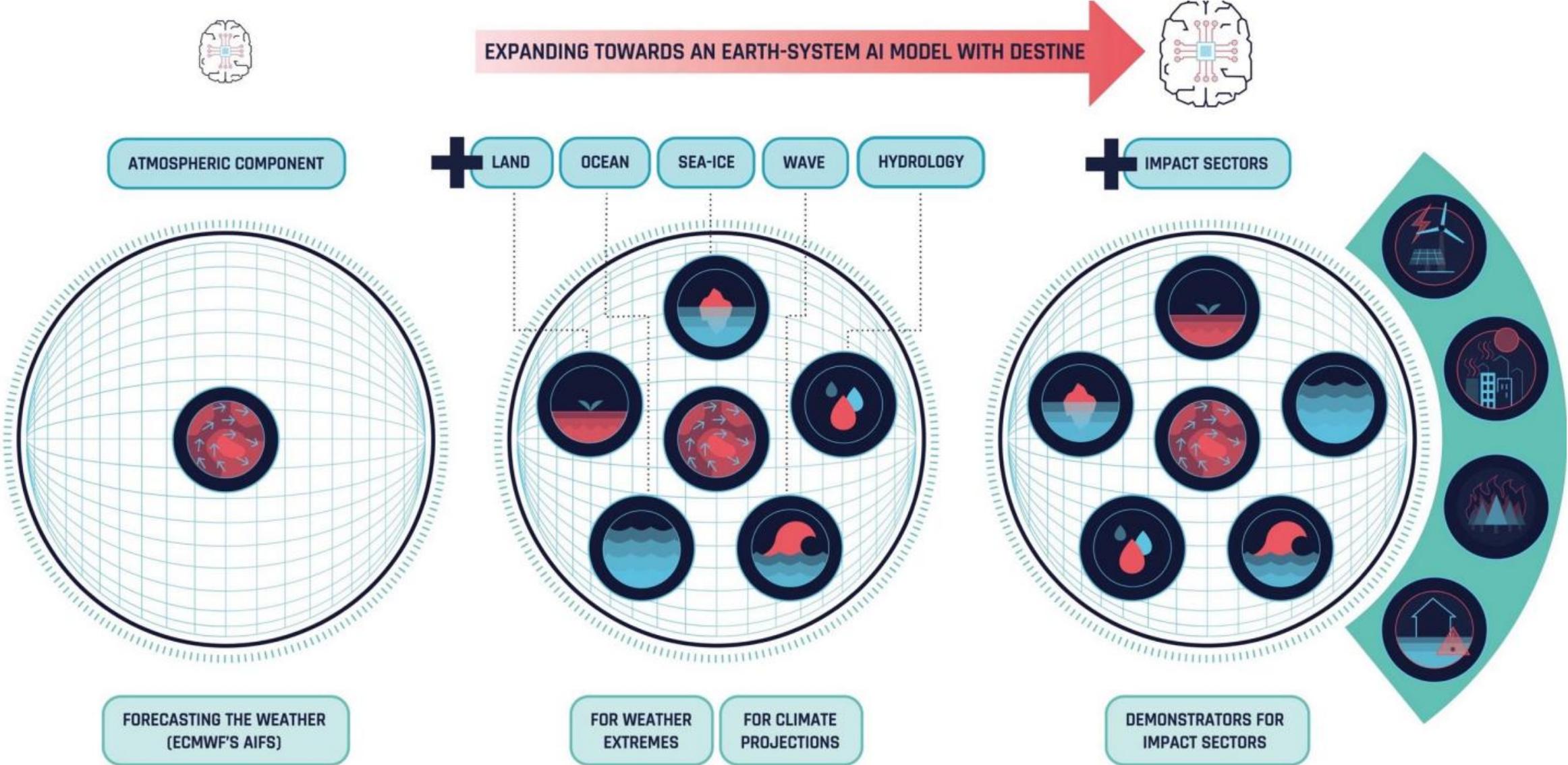
Maximum 2m temperature (Paris)

IFS-FESOM  
with large-scale  
nudged towards  
ERA5 (2018-2023)

# DestinE game-changing resolution



# AI in DestinE: Towards an AI Earth-system model





## Identity and Access Management defined via DestinE



### **Climate Change Adaptation Digital Twin (Climate Adaptation DT)**

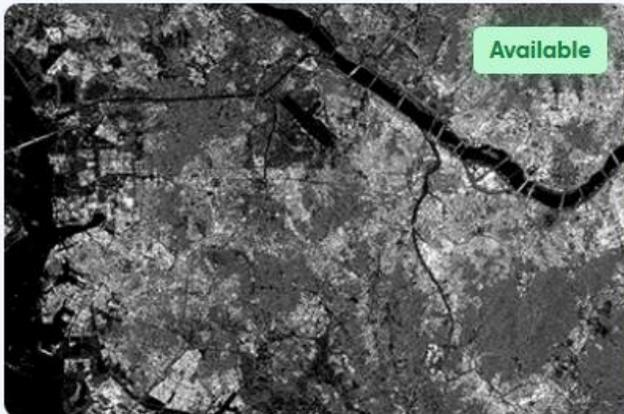
Atmosphere   Meteorology   Soil   Earth   Sea Ice   Decision Making   Climate Change   Sn

The Climate Change Adaptation Digital Twin provides global climate projections and sector-specific information over multiple decades at high resolution via a unified framework combining advanced Earth system models, impact assessments, and observations.

### **Weather-Induced Extremes Digital Twin (Extremes DT)**

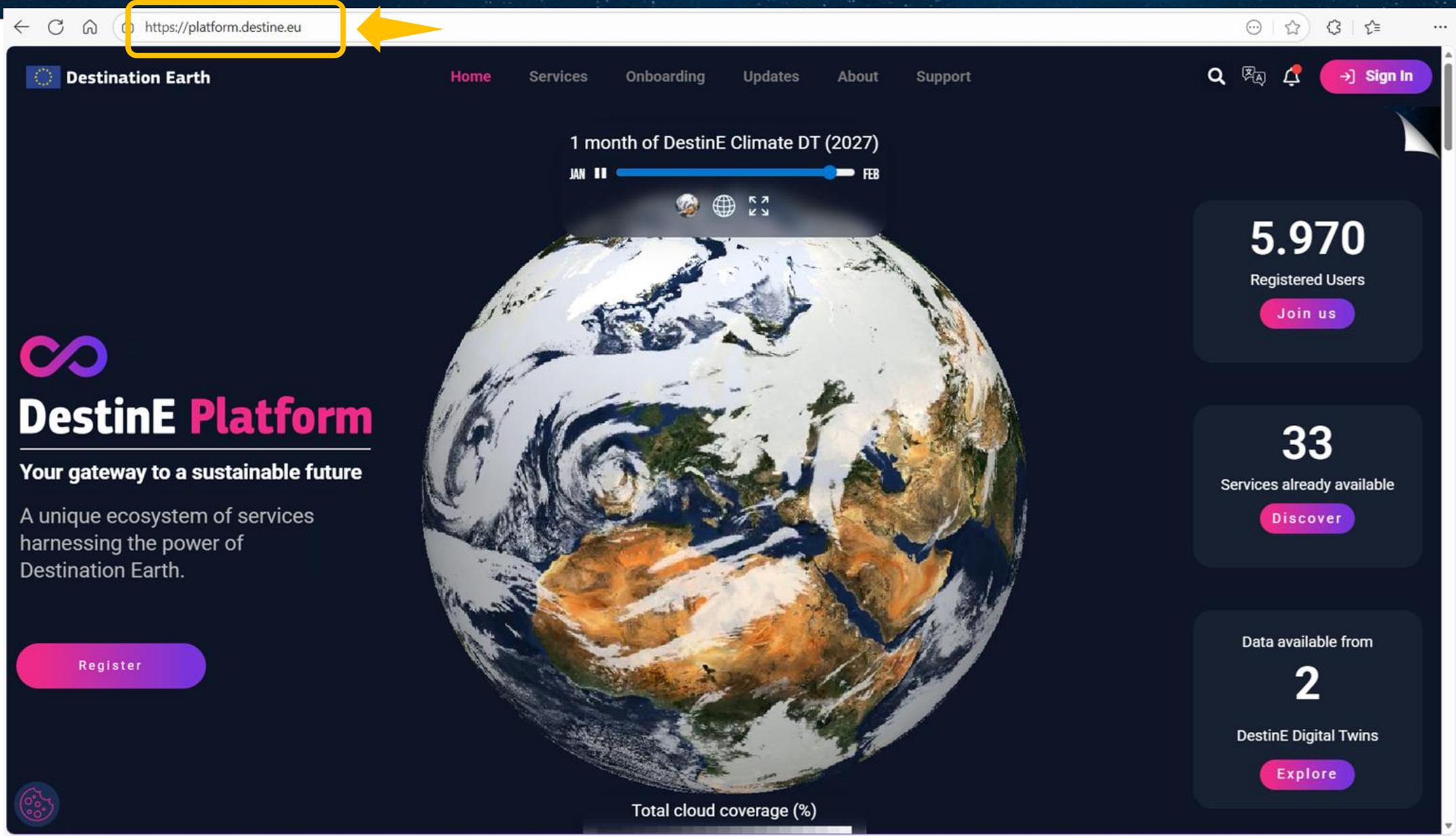
Atmosphere   Meteorology   Soil   Earth   Weather Forecasting   Sea Ice   Decision Making

The Weather-Induced Extremes Digital Twin (Extremes DT) is a digital twin that simulates extreme weather events and their impacts at km-scale resolutions using combined Earth-system models, impact-sector models, and observations across a global and regional scale.

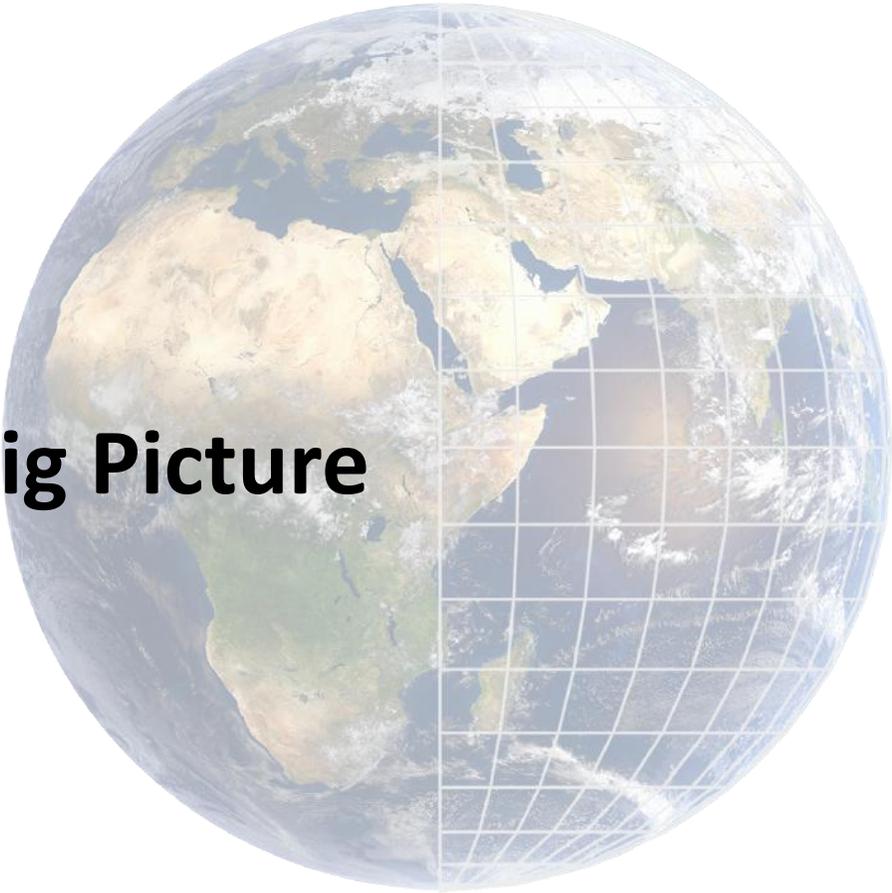


### **200+ federated data sets, for e.g. Copernicus EO data**

# How to Access DestinE



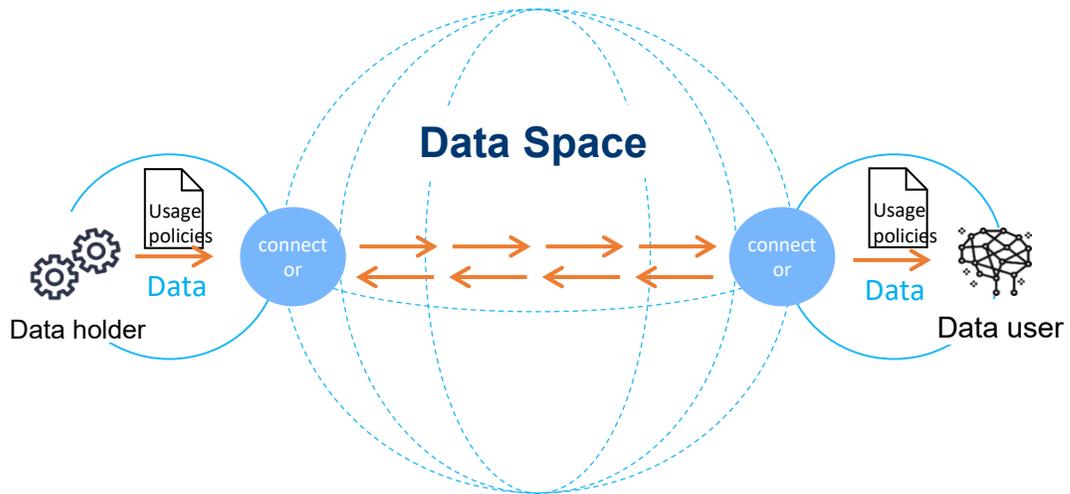
The screenshot shows the DestinE Platform website in a browser. The address bar contains the URL <https://platform.destine.eu>, which is highlighted with a yellow box and a yellow arrow. The website header includes the "Destination Earth" logo and navigation links for Home, Services, Onboarding, Updates, About, and Support. A search icon, a chat icon, a notification bell, and a "Sign In" button are also present. The main content area features a large image of Earth with a "1 month of DestinE Climate DT (2027)" slider set to "JAN" and "FEB". Below the image is a "Total cloud coverage (%)" label. On the left, the "DestinE Platform" logo is displayed with the tagline "Your gateway to a sustainable future" and a "Register" button. On the right, three statistics are shown: "5.970 Registered Users" with a "Join us" button, "33 Services already available" with a "Discover" button, and "Data available from 2 DestinE Digital Twins" with an "Explore" button.



**Towards the Big Picture**

**Destination Earth**

# Common European Data Spaces

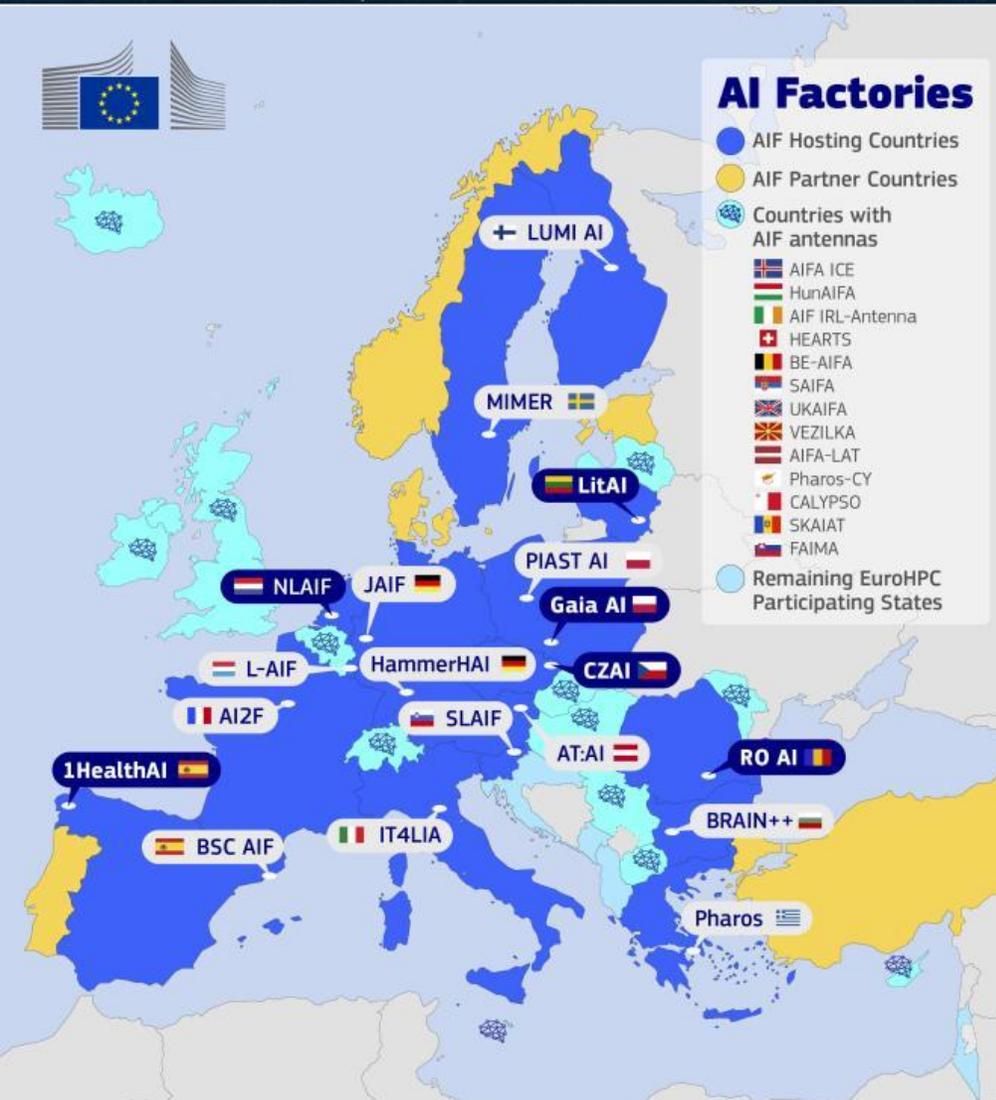


A **Common European Data Space** is a secure and trustworthy environment where data is shared in a peer-to-peer manner:

- a **technical infrastructure** that allows the transfer of or access to data
- a **governance framework** defining data sharing and usage policies.

The aim is to establish “Common European Data Spaces” as a leading brand, positioning Europe as a global leader in data usage and governance

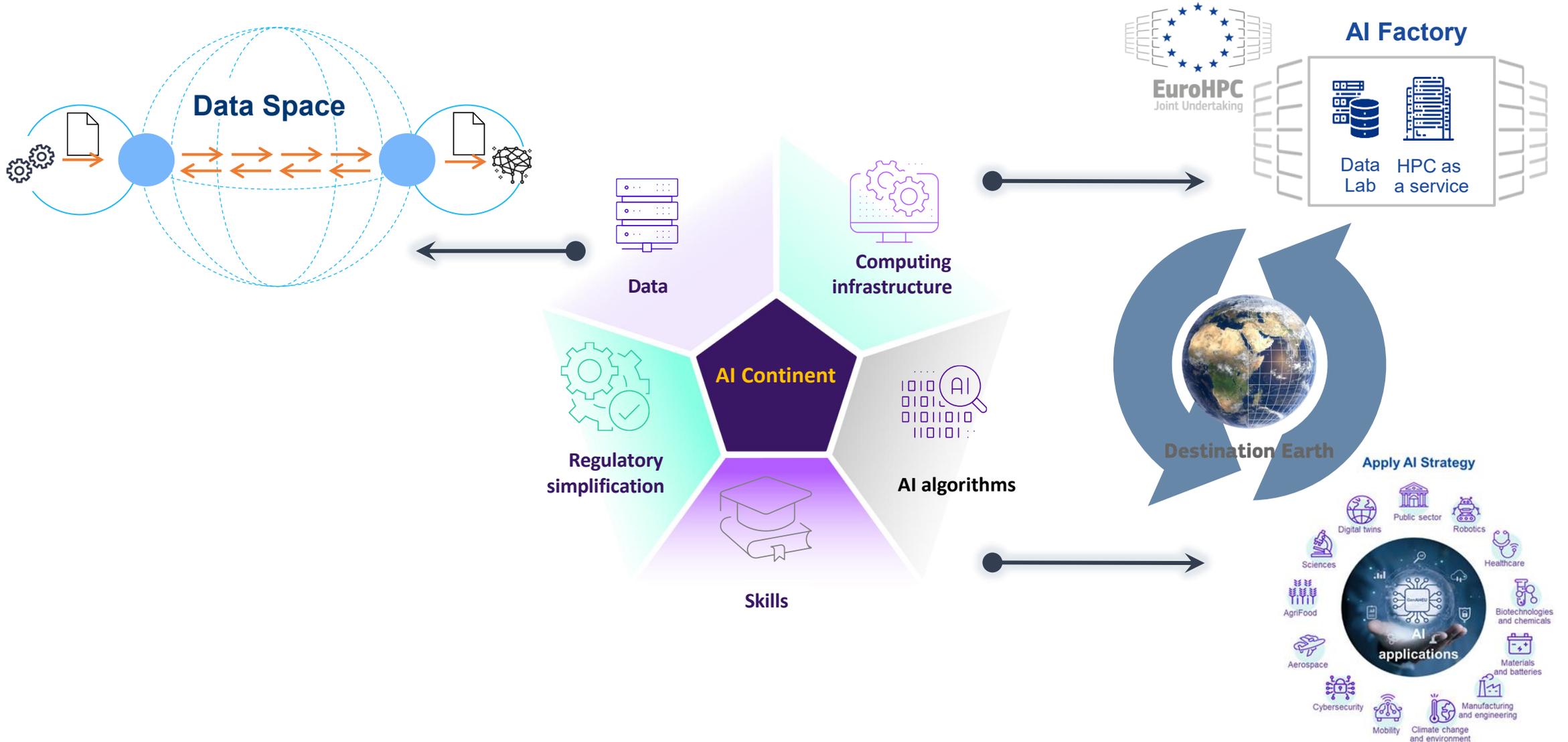
# EuroHPC JU, AI Factories, AI Gigafactories



AI Factories leverage the supercomputing capacity of the EuroHPC Joint Undertaking to develop trustworthy cutting-edge AI models.

- AI Factories are dynamic **ecosystems** that **foster innovation, collaboration, and development** in the field of **artificial intelligence**.
- They bring together computing power, data, and talent to create cutting-edge **AI models and applications**.
- They foster **collaboration across Europe**, linking supercomputing centres, universities, small and medium sized enterprises (SMEs), industry, and financial actors.
- AI Factories serve as **hubs driving advancements in AI applications** across various sectors such as health, manufacturing, climate, finance, space, and more.

# The Big Picture





# Thank you!

<https://destination-earth.eu/>  
<https://platform.destine.eu/>  
<https://digital-strategy.ec.europa.eu/en/policies/destination-earth>

CNECT-DESTINE@ec.europa.eu

# Under the Hood: Core Platform, Data Lake, and Digital Twins

ESA – Inés Sanz Morère  
EUMETSAT - Michael Schick  
ECMWF – Nils Wedi

Webinar - Observing our planet through data: Destination Earth  
13<sup>th</sup> of February 2026



# DestinE: A European ENDEAVOUR



hybrid physical modelling and AI  
on weather & climate timescales

Multiple models

CO-DESIGN



300+  
scientists,  
analysts and  
HPC experts  
enrolled!

DIGITAL  
TWIN ENGINE

DIGITAL TWINS

DATA LAKE

DIGITAL  
TWIN ENGINE

USERS

CORE PLATFORM

27 Countries  
116 Organizations

60 Private/Industry  
24 SMEs

LUMI

Leonardo

MN5

Meluxina



HIGH PERFORMANCE  
COMPUTING IN  
EuroHPC

Jupiter

CO-DESIGN





## DestinE - Digital Twin's (ECMWF)....



# DIGITAL TWINS FOR EXPLORING PLAUSIBLE WHAT-IF SCENARIOS

## WEATHER-INDUCED EXTREMES DIGITAL TWIN

A few days ahead



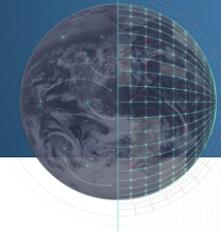
*What specific adaption measure can limit the consequences of recent and future events?*

## CLIMATE CHANGE ADAPTATION DIGITAL TWIN

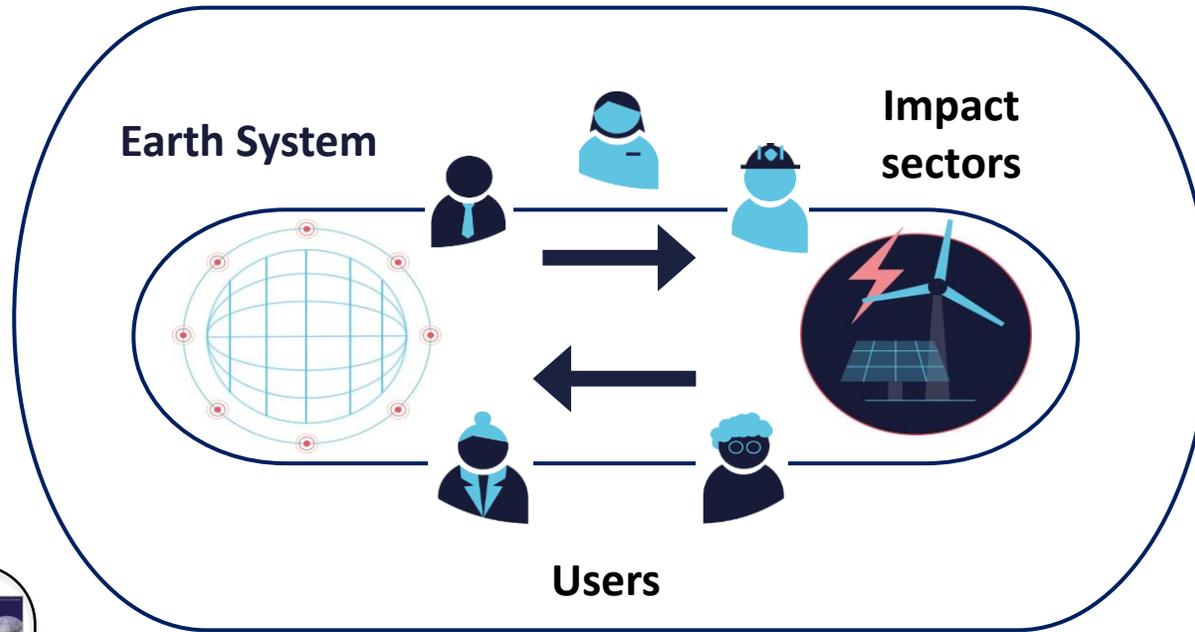
Multi-decadal timescales



*How will different scenarios change droughts and heatwaves?  
How will this impact European food production?*



# DIGITAL TWIN TECHNOLOGY



 Journal of the European Meteorological Society  
Volume 3, December 2025, 100015

**Implementing digital twin technology of the earth system in Destination Earth**

Nils Wedi<sup>a</sup>, Irina Sandu<sup>a</sup>, Peter Bauer<sup>b,1</sup>, Mario Acosta<sup>c</sup>, Rune Carbuhn Andersen<sup>d</sup>, Ulf Andrae<sup>e</sup>, Ludovic Auger<sup>f</sup>, Gianpaolo Balsamo<sup>b</sup>, Vasileios Baousis<sup>b</sup>, Victoria Bennett<sup>a</sup>, Andrew Bennett<sup>b</sup>, Carlo Buontempo<sup>a</sup>, Pierre-Antoine Bretonnière<sup>c</sup>, René Capell<sup>g</sup>, Miguel Castrillo<sup>c</sup>, Matthew Chantry<sup>b</sup>, Matthieu Chevallier<sup>b</sup>, Ricardo Correa<sup>b</sup>, Paolo Davini<sup>h</sup>, Leif Denby<sup>d</sup>, Florian Pappenberger<sup>b</sup>

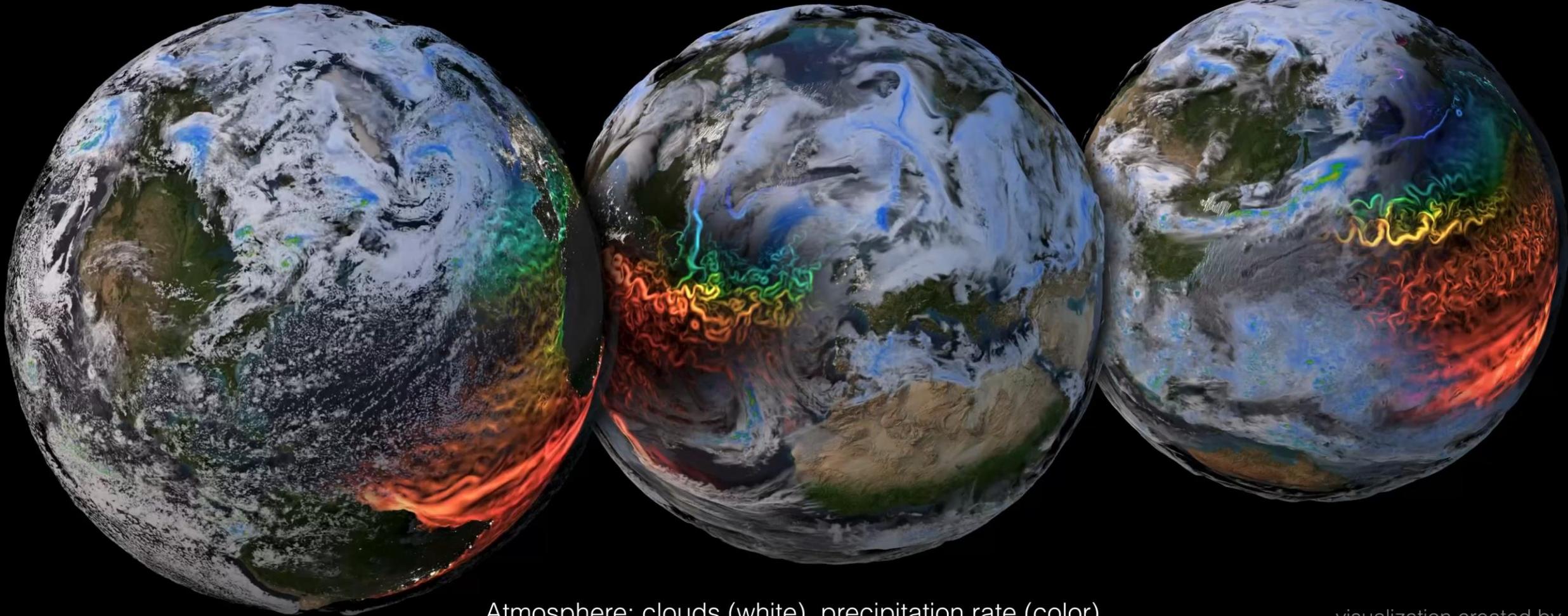
<https://doi.org/10.1016/j.jemets.2025.100015>

- ✓ Enhanced flexibility, bespoke simulations and output
- ✓ On-demand production, frequent updates, increased spatial and temporal resolution
- ✓ Integration of sectoral models in the DTs workflow
- ✓ An innovative and thriving AI-enabled digital ecosystem
- ➔ Ease of interactive access and use of state-of-the-art information on *weather in a changing climate*

**ICON**  
Aug 2039

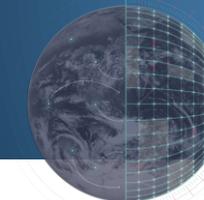
**IFS-FESOM**  
Jan 2039

**IFS-NEMO**  
Aug 2038



Atmosphere: clouds (white), precipitation rate (color)  
Ocean: temperature (color), current speed (brightness)

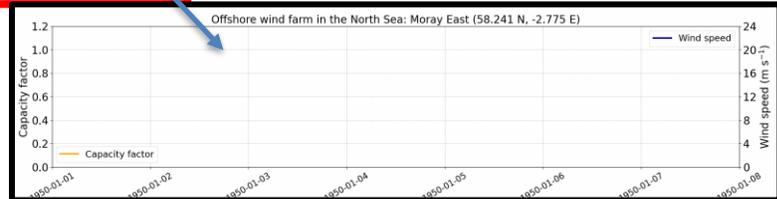
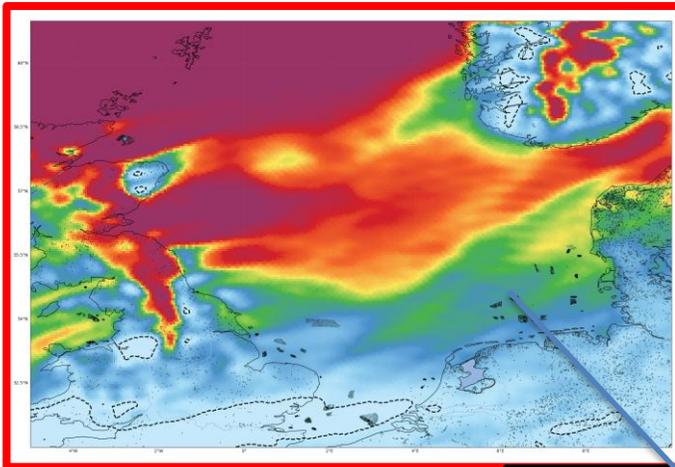
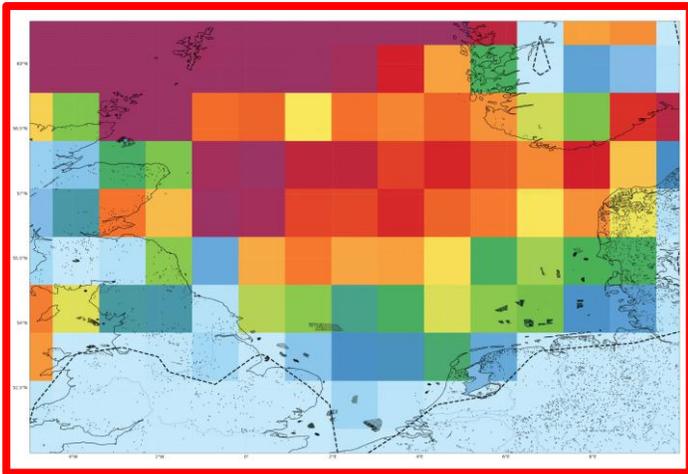
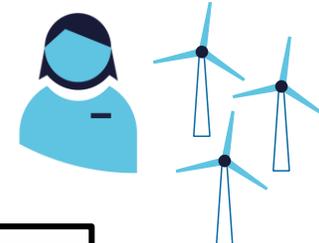
visualization created by  
Andreas Müller (ECMWF)



# CLIMATE DT: GLOBALLY CONSISTENT CLIMATE INFORMATION AT KM-SCALE

*To allow industry, including SMEs, to make well informed business decisions*

*How to optimize a portfolio of windfarms to maximize energy yield ?*



**Current state-of-the-art:**

- Low temporal resolution: 3 or 6-hourly data.
- Low spatial resolution: regional downscaling needed
- No information at hub height
- Large data extraction required

**Climate DT:**

- Global 1-hourly data.
- 5km resolution, globally
- 100 m wind speed
- Customized information is produced and streamed for any global locations



# EXTREME DT

## An end-to-end framework for producing bespoke extremes information & exploring “what-if” scenarios

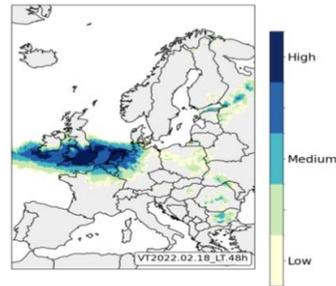
### Global simulations



#### IFS-NEMO

- Run daily
- 4 days
- 4.4 km

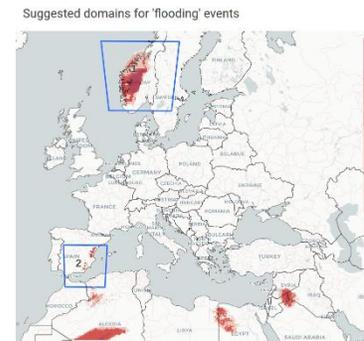
### Detection/Configuration



#### IFS ensemble (9km)

- Detection of extremes
- Wind, precipitation, CAPE, surge...

### Regional simulations



#### ALARO, AROME, HARMONIE-AROME

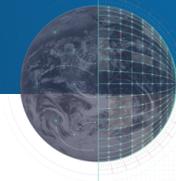
- Run in near-real-time for hundreds of cases
- Flexible domain
- 2 days
- 750-500m

### Impact sector models



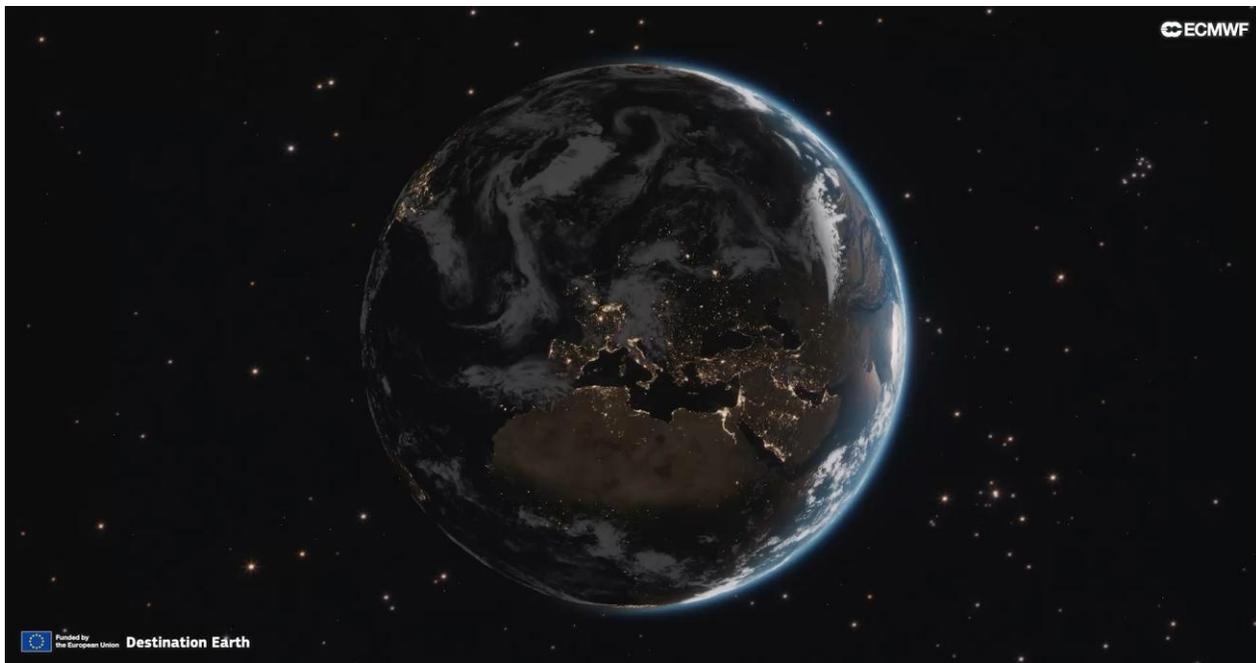
- Floods, renewable energy, air quality, storm surge, thermal comfort, fire
- User-relevant information





# EXTREMES DT: REGULAR SIMULATIONS

Daily global simulations, 4.4 km, 4days

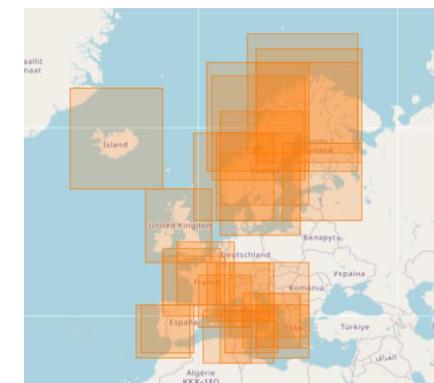
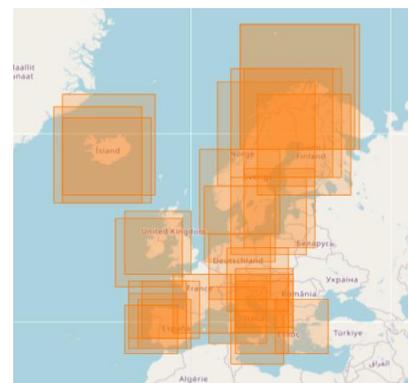


Regional simulations, 500m, 2 days  
Oct 2024 -- Feb 2025

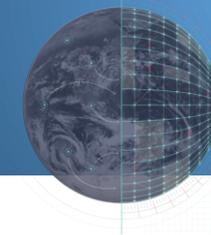


high wind events  
in Jan/Feb 2025

high precip events  
in Jan/Feb 2025

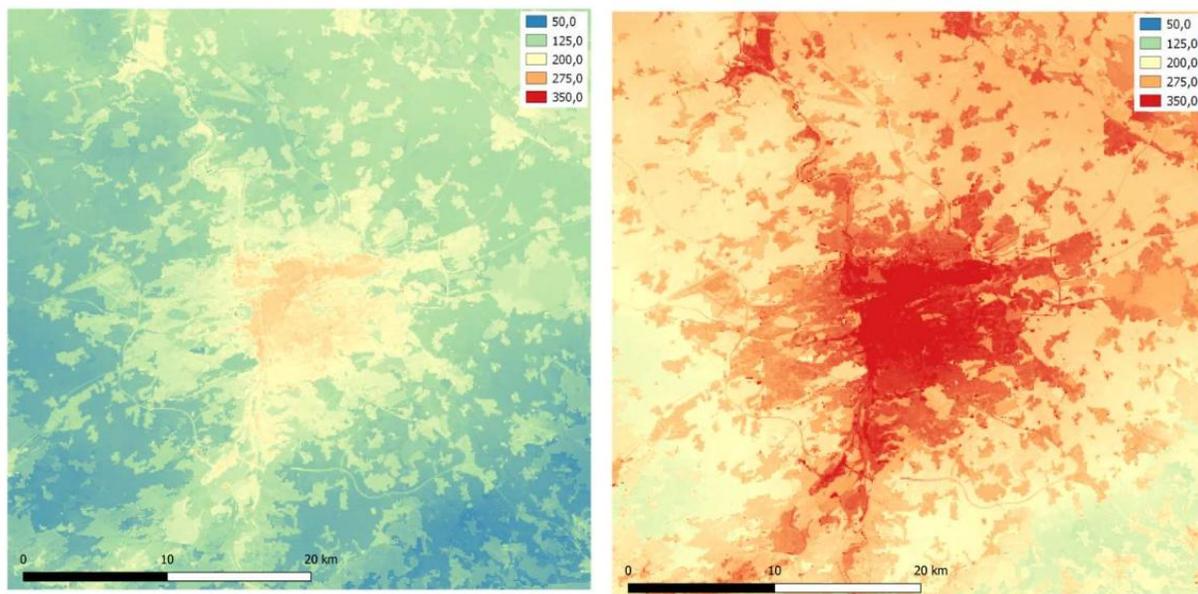


Indicators and data feeds for risk assessment, forecasting, and emergency response



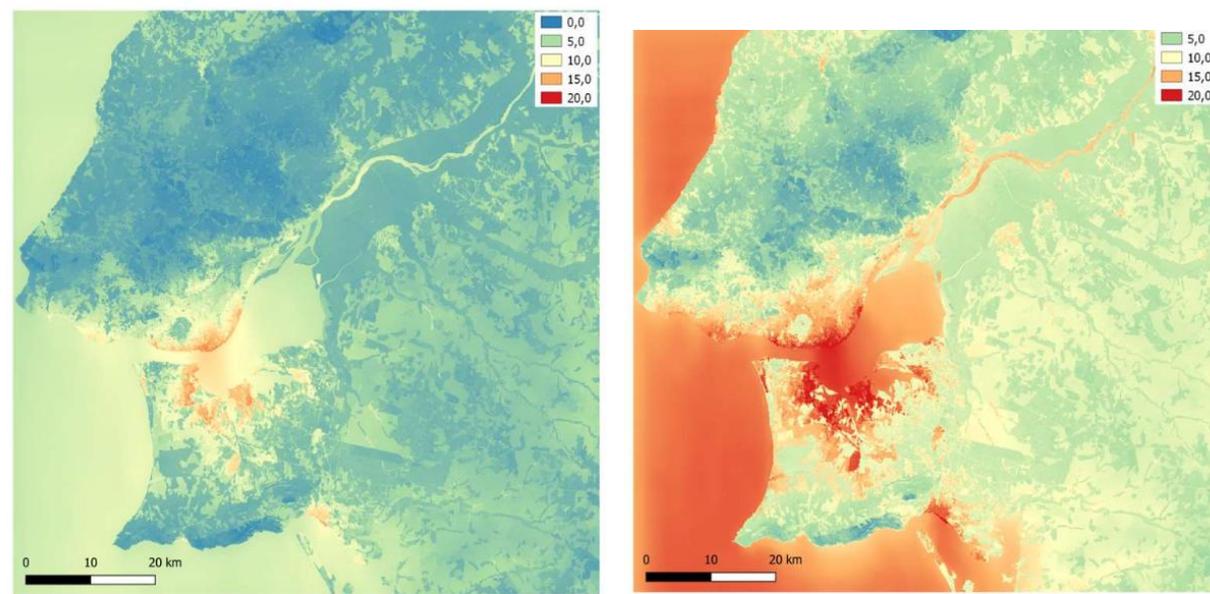
# PHASE 3 ADD ADAPTATION SUPPORT WITH DECAMETRE-SCALE

*Heat-related excess mortality for Prague*



*ERA5 2011-2020 reference    Climate DT scenario 2031 - 2040*

*Number of tropical nights for Lisbon*



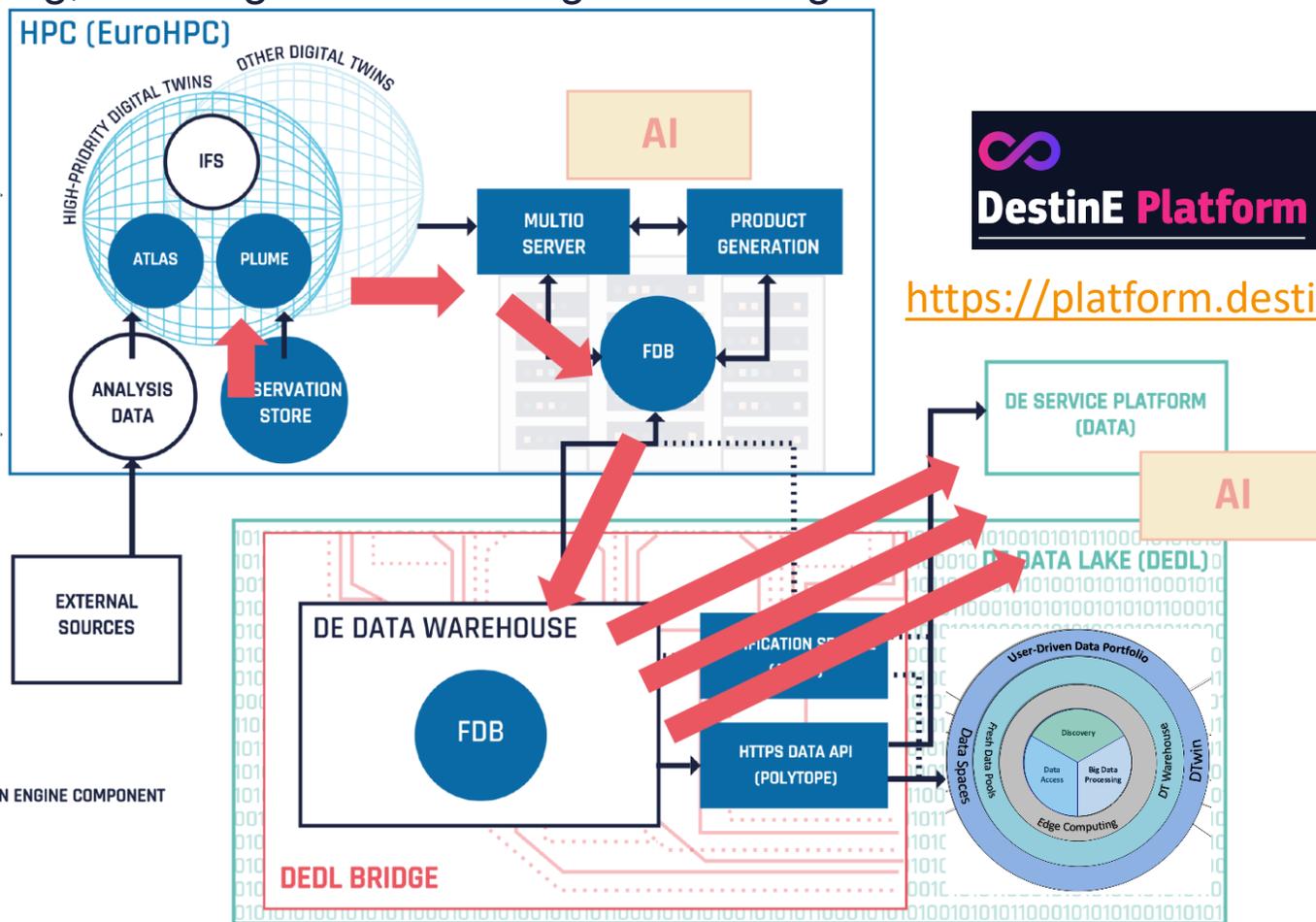
*ERA5 2011-2020 reference    Climate DT scenario 2031 - 2040*



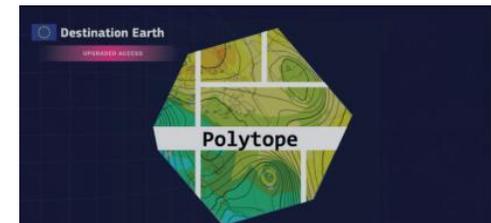
# DIGITAL TWIN ENGINE: AI-ENABLED SOFTWARE INFRASTRUCTURE

To operate complex Earth-system and impact-sector workflows on EuroHPC, and provide software solutions and services for accessing, handling and interacting with the digital twins and their data

Python frameworks are used across accelerated physical modelling, ML/AI frameworks, geographically distributed (cloud) data access, processing and visualisation



<https://platform.destine.eu/>



WMO WIS2.0 compatible data access

<https://pygeoapi.io/>

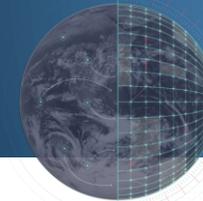
<https://polytope-client.readthedocs.io/en/latest/>



Funded by the European Union

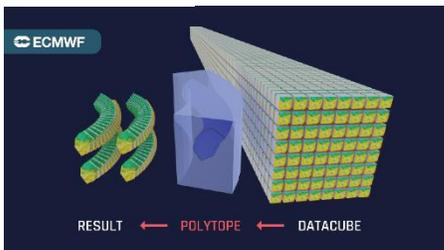
Destination Earth

implemented by



# INTEROPERABLE SEMANTIC DATA ACCESS

STAC extensions and catalogue;  
OGC/FAIR/INSPIRE compliant  
interfaces, AI-ready datasets,  
data coalesce functions,  
hierarchical access



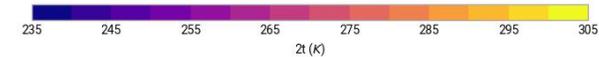
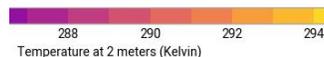
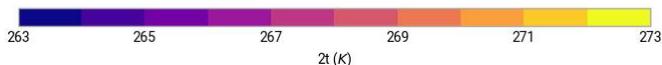
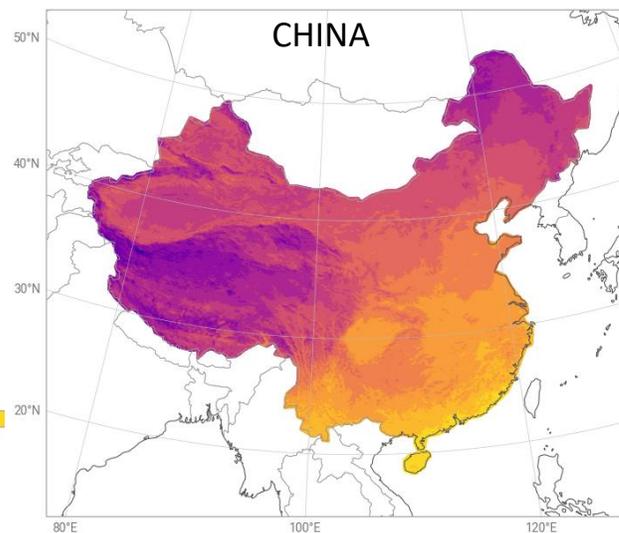
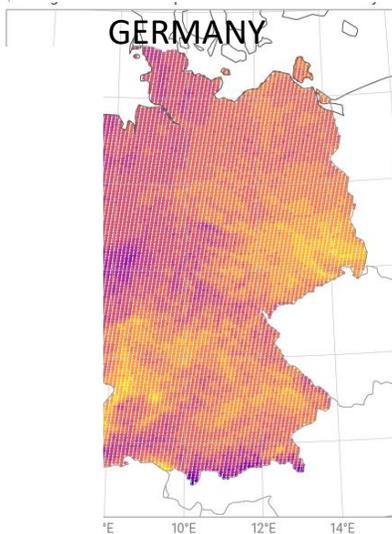
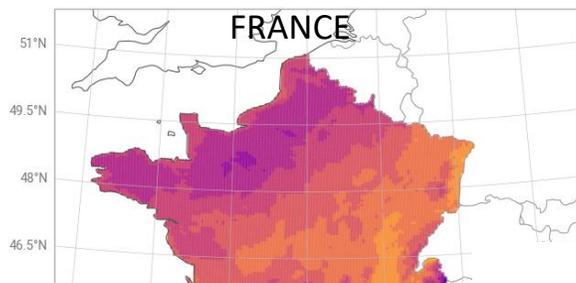
## Polytope - service

```

countries = ["Finland"] # List of countries
shapes = earthkit.geo.cartography.country_polygons(countries, resolution=50e7)

request = {
  "dataset": "climate-dt",
  "class": "d1",
  "activity": "ScenarioMIP",
  "experiment": "SSP3-7.0",
  "realization": "1",
  "generation": "1",
  "model": "ifs-nemo",
  "resolution": "high",
  "stream": "clte",
  "type": "fc",
  "date": "20260120",
  "time": "0000",
  "levtype": "sfc",
  "expver": "0001",
  "param": "165/167",
  "feature": {
    "type": "polygon",
    "shape": shapes,
  },
}

```



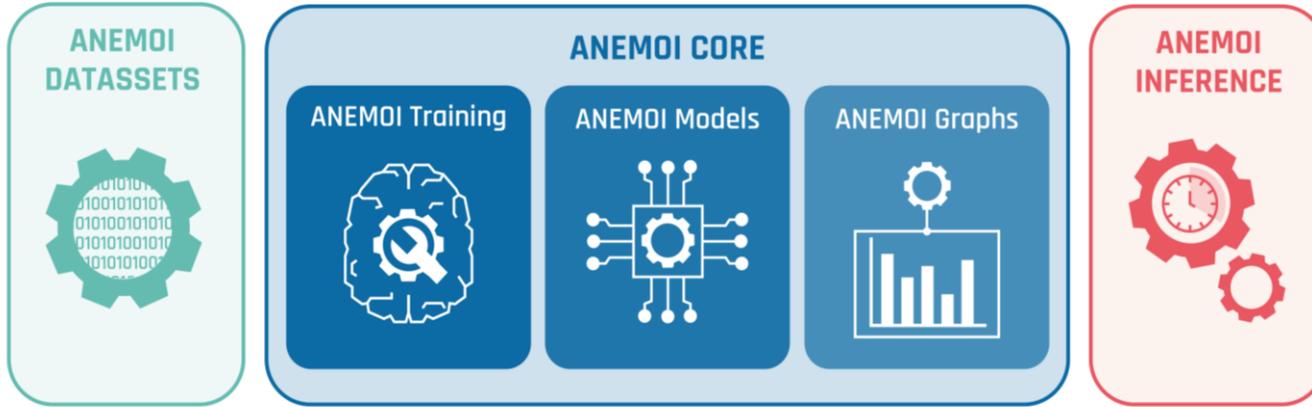
Examples:



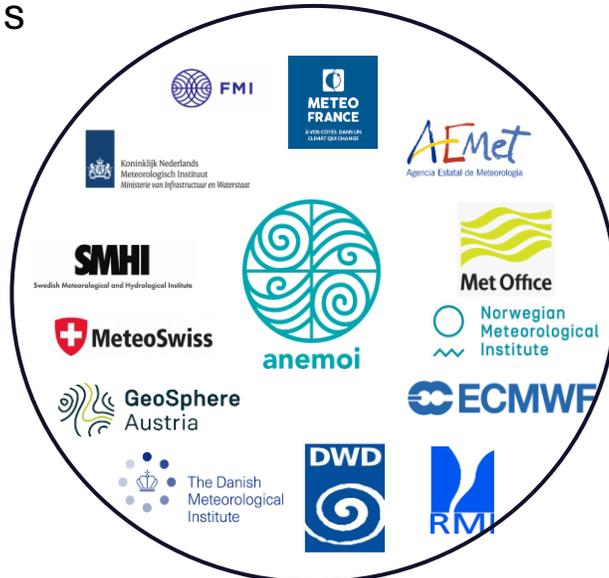
<https://github.com/destination-earth-digital-twins/polytope-examples>

# ANEMOI: foundation for DestinE AI models & AI factories

Anemoi : an end-to-end open-source framework for AI weather and climate applications



AI-ready data collections



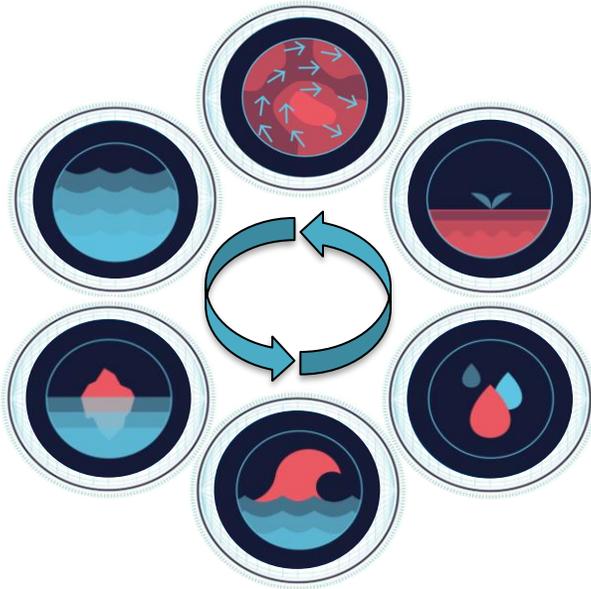
+ JUPITER in 2026 !



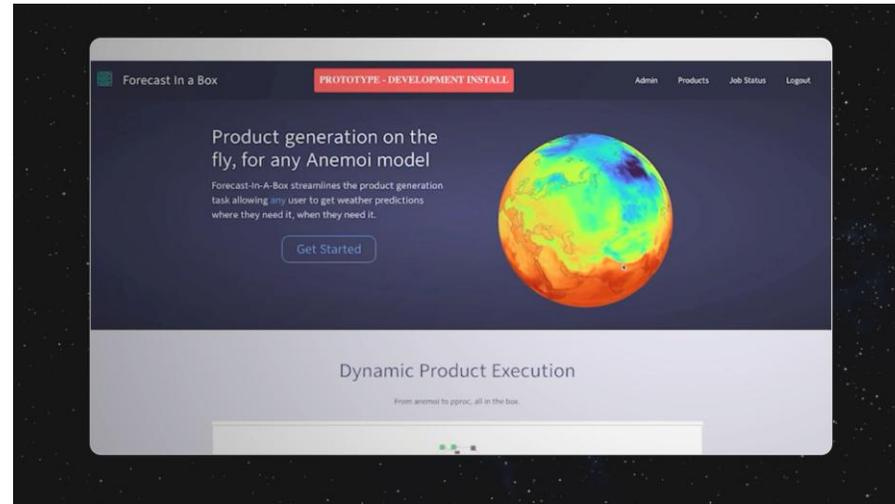


# AI OUTLOOK

## Towards an AI - ESM

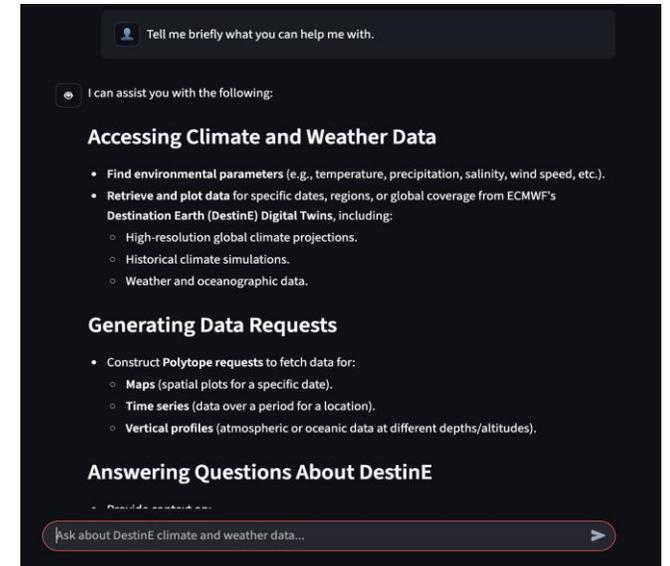


## Forecast-in-a-box



Portable-ai-forecasting-workflows-within-the-destine-digital-twin-engine

## Chatbot: Digital Twin assistant

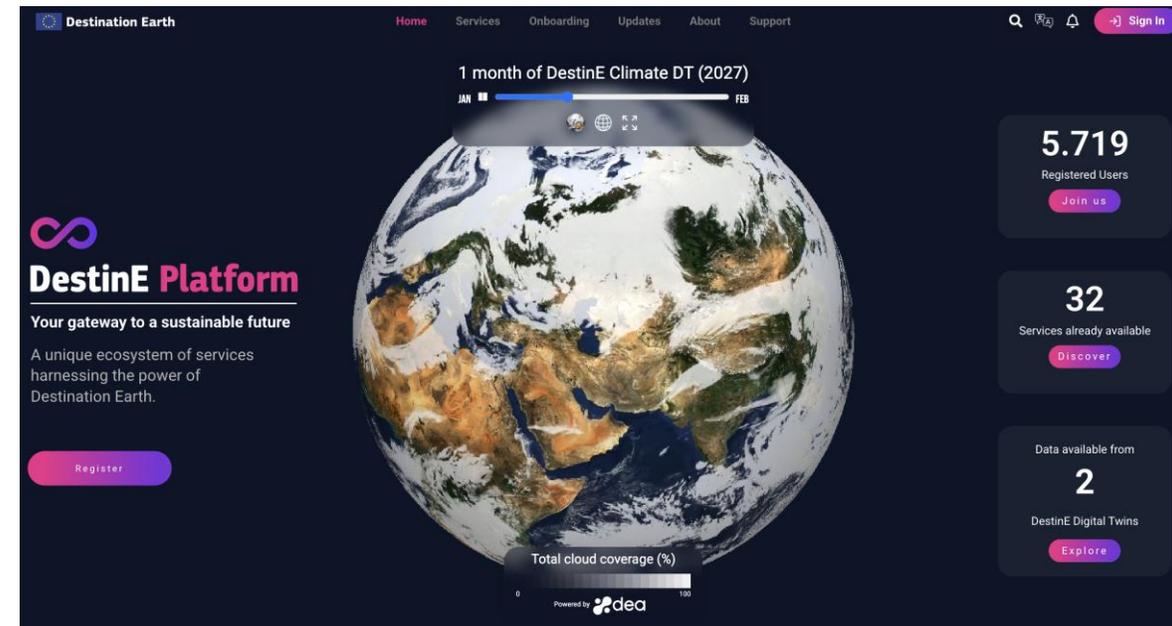




## The DestinE Core Platform (ESA)....

The DestinE Platform represents a **flexible ecosystem of services** allowing to discover DestinE DTs data, exploit them locally, and create services on top. It is designed such that it:

- Can host **thousands of users** from a wide variety of backgrounds,
- Operates on a **European sovereign cloud solution** (OVHCloud is the first European Cloud provider present world-wide),
- Enables **climate critical services** by making DestinE Digital Twins and other data **easily accessible**,
- Supports **new operational and scalable usages for European services**, and
- Stimulates industrial innovation and collaboration, **fostering the growth of European Industry**.



<https://platform.destine.eu/>  
<https://destination-earth.eu/destine-community/>

The DestinE Platform acts as the **access point to DestinE System** by providing access to all DestinE users to a variety of services supporting the exploitation of:

<https://platform.destine.eu/destine-data-portfolio/>

	<b>Data Cache Management</b> The Data Cache Management Service (DCMS) is a local storage on the DestinE Platform for frequently used data, flexible to be adapted to user needs. It contains a subset of DestinE Digital Twins data in ZARR format and lat-long projection.	<a href="#">Go To Service</a>
	<b>DestinEStreamer</b> The DestinE Streamer service provides optimized data access through advanced compression and access techniques. Among others, it provides access to DestinE Digital Twins data retrieved from the DCMS.	<a href="#">Go To Service</a>
	<b>EDEN</b> The EDEN service is a service providing access to a variety of datasets. It includes a direct interface to the HAD service to access native DestinE Digital Twins data.	<a href="#">Go To Service</a>
	<b>HDA</b> The Harmonised Data Access (HDA) is a service offering a STAC API allowing users to browse through the wide variety of data made available in the DestinE Data Portfolio, including the native DestinE Digital Twins data.	<a href="#">Go To Service</a>
	<b>Polytope</b> The Polytope service is a service providing access to the full data portfolio of native DestinE Digital Twins data. These native data are shared in healpix projection and in the form of hypercubes.	<a href="#">Go To Service</a>
	<b>SesamEO</b> The SesameEO service is a service providing a direct interface to different data access services making heterogeneous data easily accessible. It includes sources such as the HDA, to retrieve native DestinE Digital Twins data, the local Cache A of DestinE Platform, as well as Copernicus or Eurostat.	<a href="#">Go To Service</a>

- the DestinE Digital Twins\* data, generated by ECMWF and stored in EUMETSAT's Data Bridges, and
- the data from the federated data sources interfacing EUMETSAT's Data Lake.

\*the DestinE Digital Twins data are only accessible by upgraded access users approved by DG-CNECT.

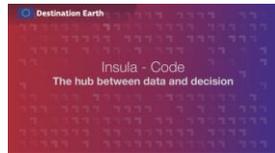
This variety of services addresses the needs of a diverse audience, proposing different interfaces, formats, or data projections.

Currently 32 services are in operations, those include:

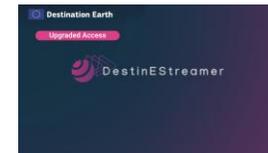
- Data **access** services, for DestinE DTs data and more



- Data **processing** services, for users to exploit and manipulate the data,



- **Visualization** services based on storytelling approach, for users to communicate the results of their activities.



All services are scalable and designed to adapt resources consumption to demand. These services are **open and free** and can be used for the ESA DTCs projects.

The current service offer also includes services addressing the **needs of end users**, and many more are gradually being added in the service registry:



The outcome of the ESA DTCs projects might be an **operational service** to be listed in the DestinE web portal, ensuring a broad access to it.



## Best Practices

**Objective:** Ensure the best solutions for Data Management Services (access, processing, visualization, etc.)

**Context:** on a phase-basis, organised by Serco within the DestinE Platform contract

**Funding:** Long-term ESA commitment

*Note: stable Platform Management Services ensure a continuation of the basic capabilities during time*

## Open Calls

**Objective:** Enlarge the catalogue in European strategic areas with end-user services

**Context:** on a regular basis, organised by Atos withing the AAS (Advanced Applications & Services) contract

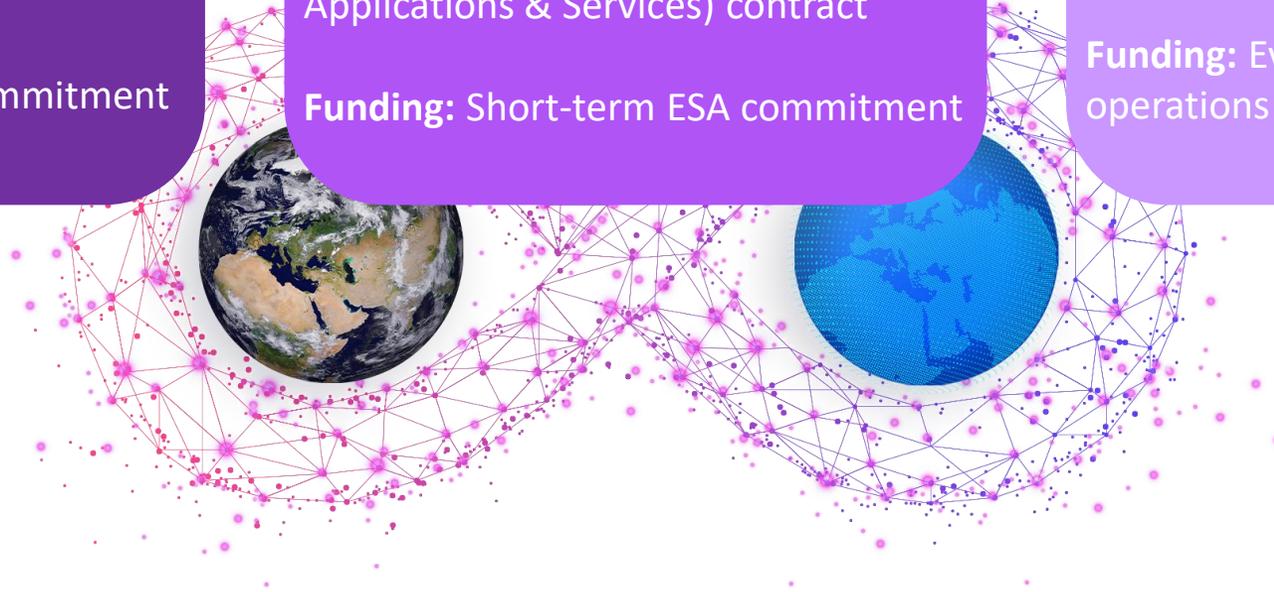
**Funding:** Short-term ESA commitment

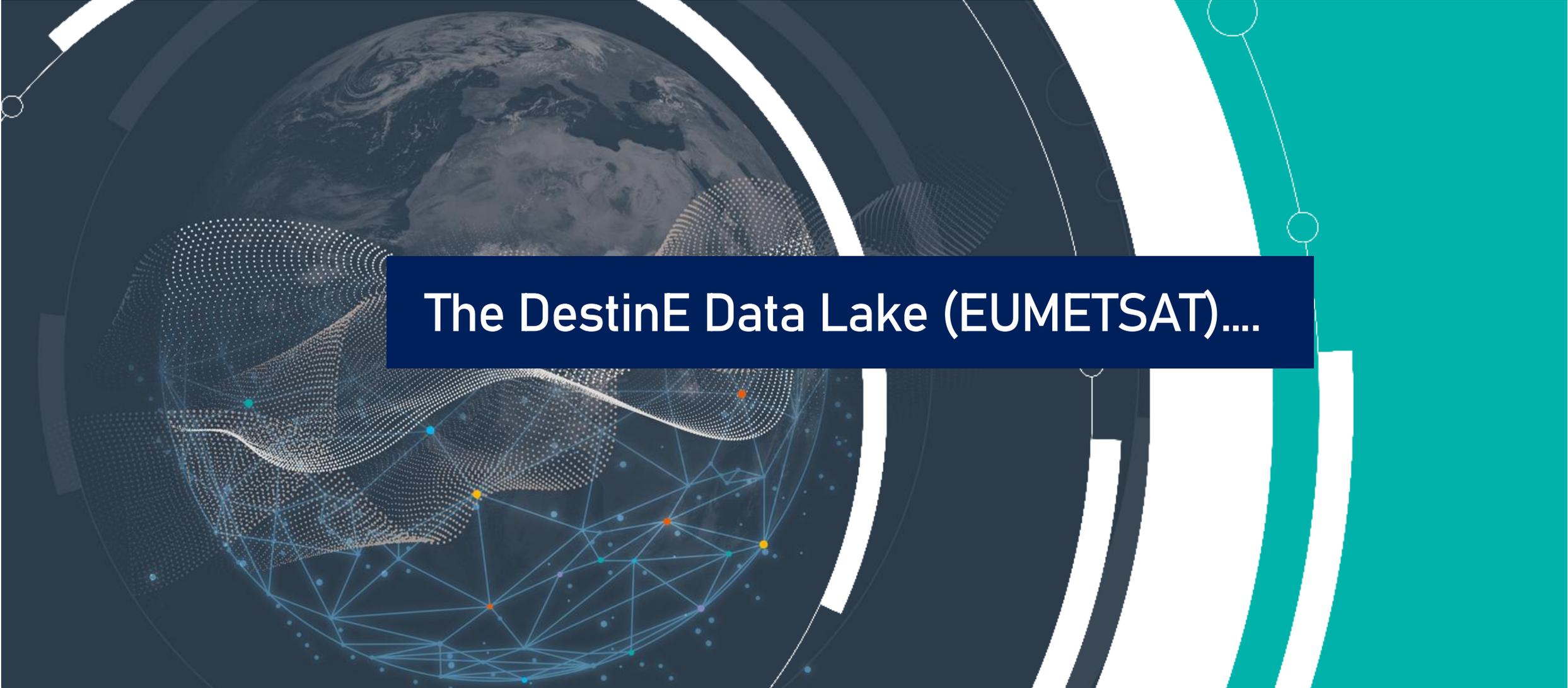
## Onboarding

**Objective:** Enhance the platform catalogue with end-user services addressing DestinE objectives

**Context:** open to the public through the platform

**Funding:** Evidences of sustainable operations are requested

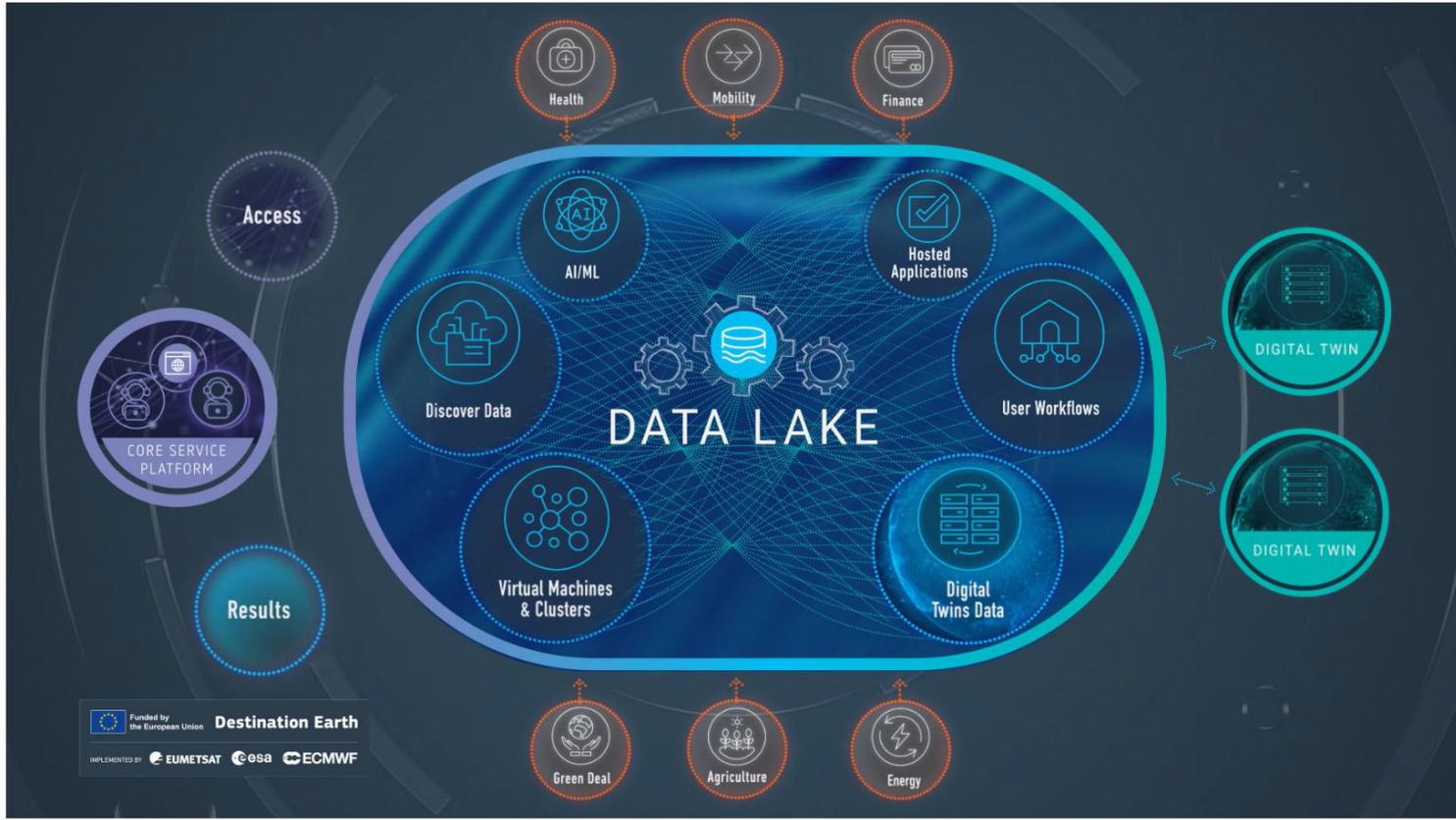




## The DestinE Data Lake (EUMETSAT)....



# DestinE Data Lake in a nutshell



## Data Lake essential pillars

### Distributed infrastructure

- Implementing near-data processing
- Data Bridges close to EuroHPC sites that host the ECMWF Digital Twins and big data providers such as EUMETSAT
- Storage of DestinE data

### Discovery & Data Access

- Harmonisation of data access (HDA) to simplify data discovery & access
- External federated data spaces
- Digital Twin data (ECMWF):
- DestinE User generated data

### Big Data Processing Services and Tools

- Processing near data including distributed computing & workflows tools and services (i.e. ISLET)
- Supports & enables AI/ML applications

This block contains logos for various services and the data portfolio. On the left are logos for ISLET, HOOK, and STACK. In the center is the "Destination Earth Data Portfolio" which includes a circular diagram showing "DestinE Digital Twin Data", "User Generated Data", and "User-Driven Workflows".



# Data Lake distributed infrastructure



LUMI  
HPC



June 2023

Dec 2024



EUMETSAT  
Data Center

Leonardo  
HPC



January 2024

September 2022



CloudFerro  
Data Center

Mare Nostrum  
HPC



March 2025

## Totals

Storage (PB):	120
vCPUs:	42680
GPUs:	76
Datasets:	+200





# DestinE Data Portfolio

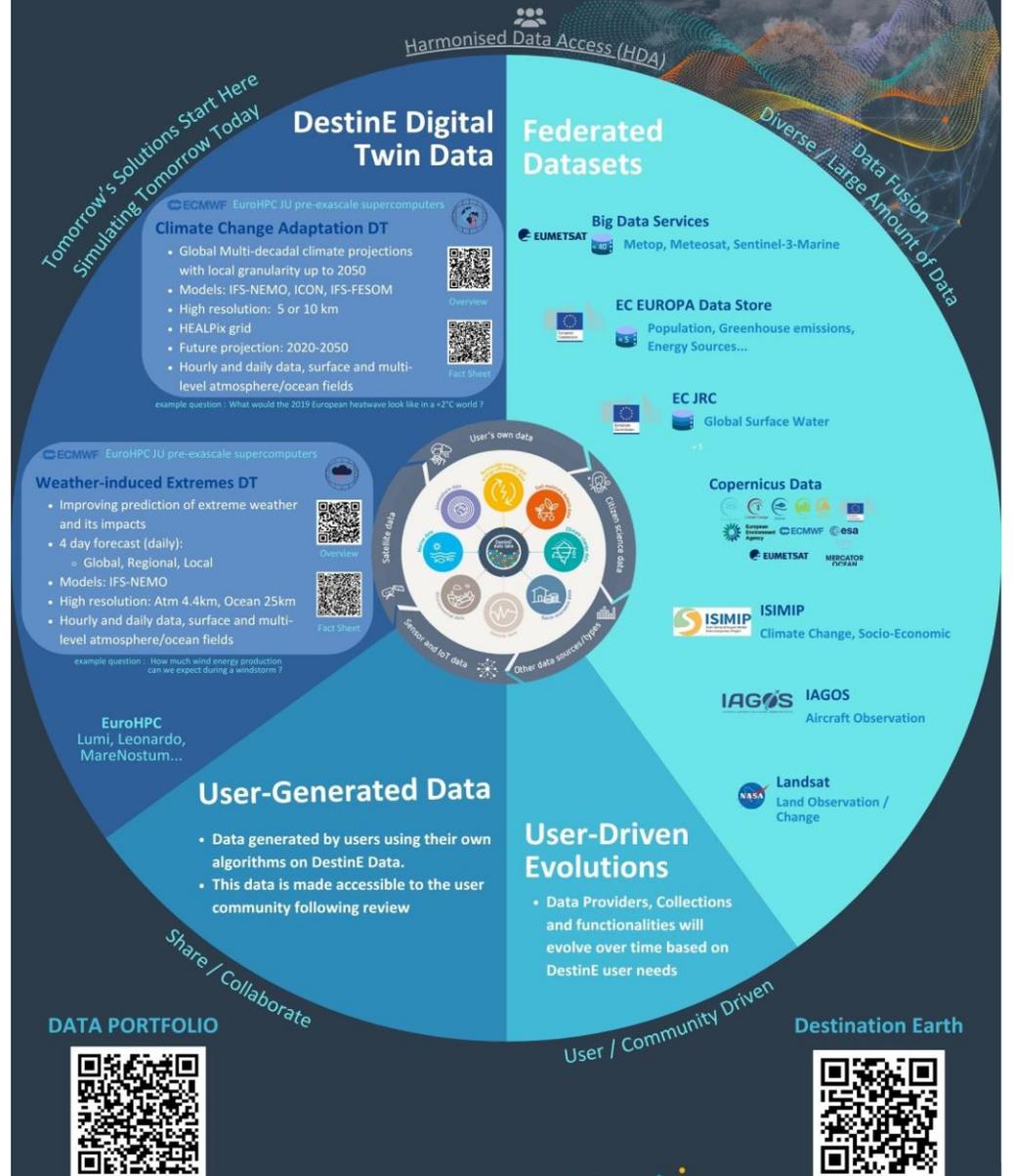
DestinE Data Lake offers access to a wide variety of data

- Digital Twin Data
- Federated datasets from various data spaces, also beyond traditional Earth Observation
- User generated data
- User-driven datasets, based on DestinE user needs

The data portfolio can be accessed using harmonized data access solution (HDA) that abstracts away the heterogeneity and complexity of the underlying data sources. HDA one option amongst other data access services

<https://data.destination-earth.eu/data-portfolio>

# Destination Earth Data Portfolio





# DestinE Data Portfolio and HDA

## Destination Earth Data Portfolio

Harmonised Data Access (HDA)

Tomorrow's Solutions Start Here  
Simulating Tomorrow Today

**DestinE Digital Twin Data**

Climate Change Adaptation DT

- Global Multi-decadal climate projections with local granularity up to 2050
- Models: IFS-NEMO, ICON, IFS-FESOM
- High resolution: 5 or 10 km
- HEALPix grid
- Future projection: 2020-2050
- Hourly and daily data, surface and multi-level atmosphere/ocean fields

Weather-induced Extremes DT

- Improving prediction of extreme weather and its impacts
- 4 day forecast (daily):
  - Global, Regional, Local
- Models: IFS-NEMO
- High resolution: Atm 4.4km, Ocean 25km
- Hourly and daily data, surface and multi-level atmosphere/ocean fields

EuroHPC  
Lumi, Leonardo, MareNostum...

**User-Generated Data**

- Data generated by users using their own algorithms on DestinE Data.
- This data is made accessible to the user community following review

**Federated Datasets**

Big Data Services

- Metop, Meteosat, Sentinel-3-Marine

EC EUROPA Data Store

- Population, Greenhouse emissions, Energy Sources...

EC JRC

- Global Surface Water

Copernicus Data

- ISIMIP: Climate Change, Socio-Economic
- IAGOS: Aircraft Observation
- Landsat: Land Observation / Change

Other data sources: Sentinel data, User's own data, User-generated data, Other data sources

Share / Collaborate

User / Community Driven

DATA PORTFOLIO

Funded by the European Union  
Destination Earth  
IMPLEMENTED BY EUMETSAT

DestinE service to all users  
According to Data policy

Destination Earth

HARMONISED DATA ACCESS

1 Credential

1 Harmonised API

STAC

~200 datasets

+ 15 different providers



<https://github.com/destination-earth/DestinE-DataLake-Lab>



# DestinE Data lake services – Key Features

HDA



Harmonised Data Access: seamless access to

- DestinE Data – DT Outputs & User Generated Data for DestinE
- Federated Data

as per defined & evolving “[DestinE Data Portfolio](#)”.  
API => Spatio Temporal Asset Catalog (STAC)

Usage on request



STACK: SaaS suite which enables near data processing  
JupyterHub, Dask/ Dask Gateway and Data Cube (coming soon)



ISLET Compute: (IaaS/PaaS) enables near data processing by allowing users to manage and deploy virtualised workloads



ISLET Storage: S3 Object Storage to store user’s data and processing results

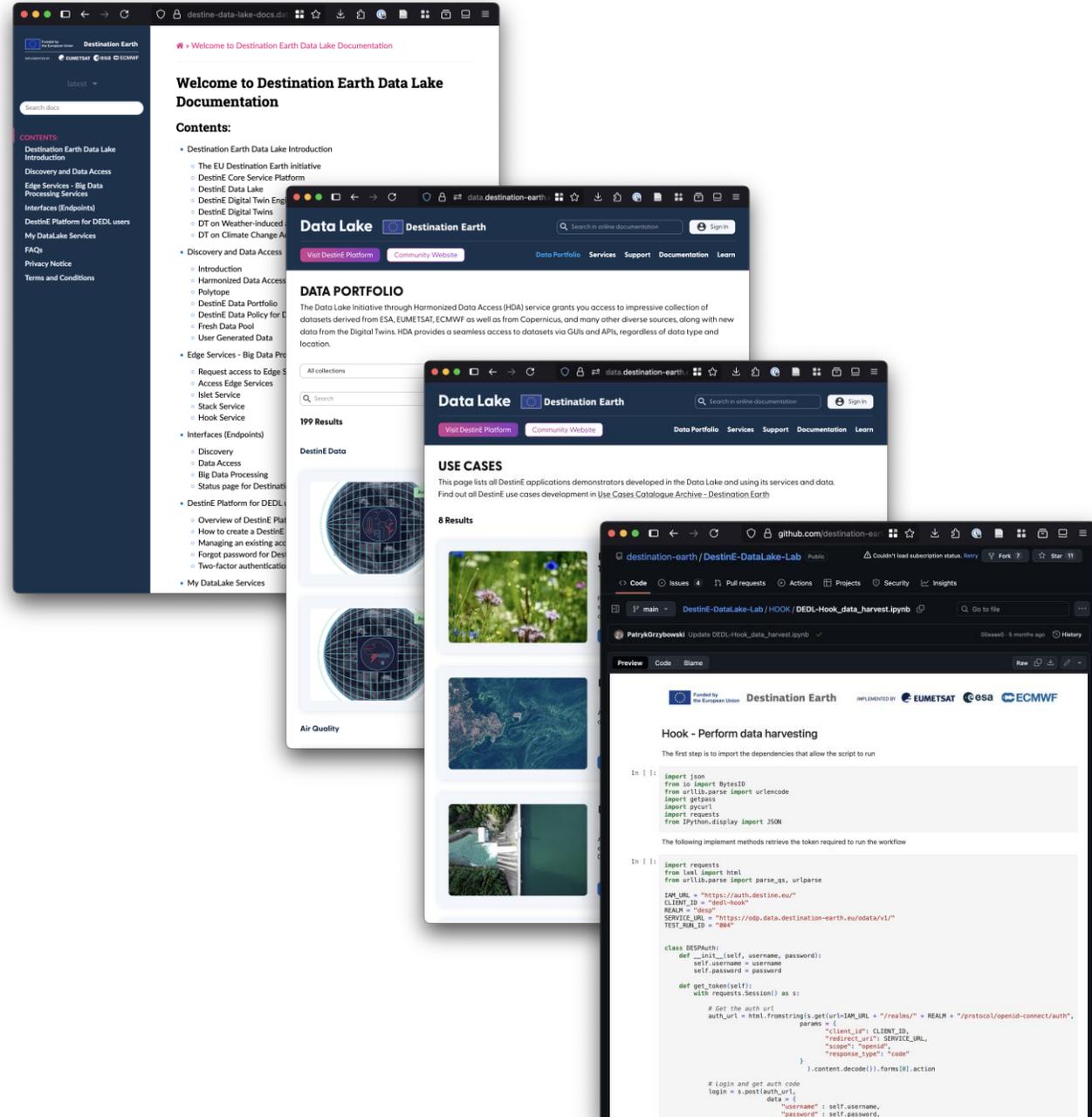


HOOK: allows to execute high level pre-defined or own workflows  
Data harvest: to harvest data from a federated data provider a priori of planned data processing or analysis task

Q1/2 2026

The Assistant exploits the following sources:

- Destination Earth Data Lake Documentation (<https://destine-data-lake-docs.data.destination-earth.eu/en/latest>)
- Data Portfolio (HDA Collections) (<https://data.destination-earth.eu/data-portfolio>)
- Destination Earth Use Cases Catalogue (<https://destination-earth.eu/use-cases/>)
- Destination Earth Data Lake Laboratory on GitHub (<https://github.com/destination-earth/DestinE-DataLake-Lab>)

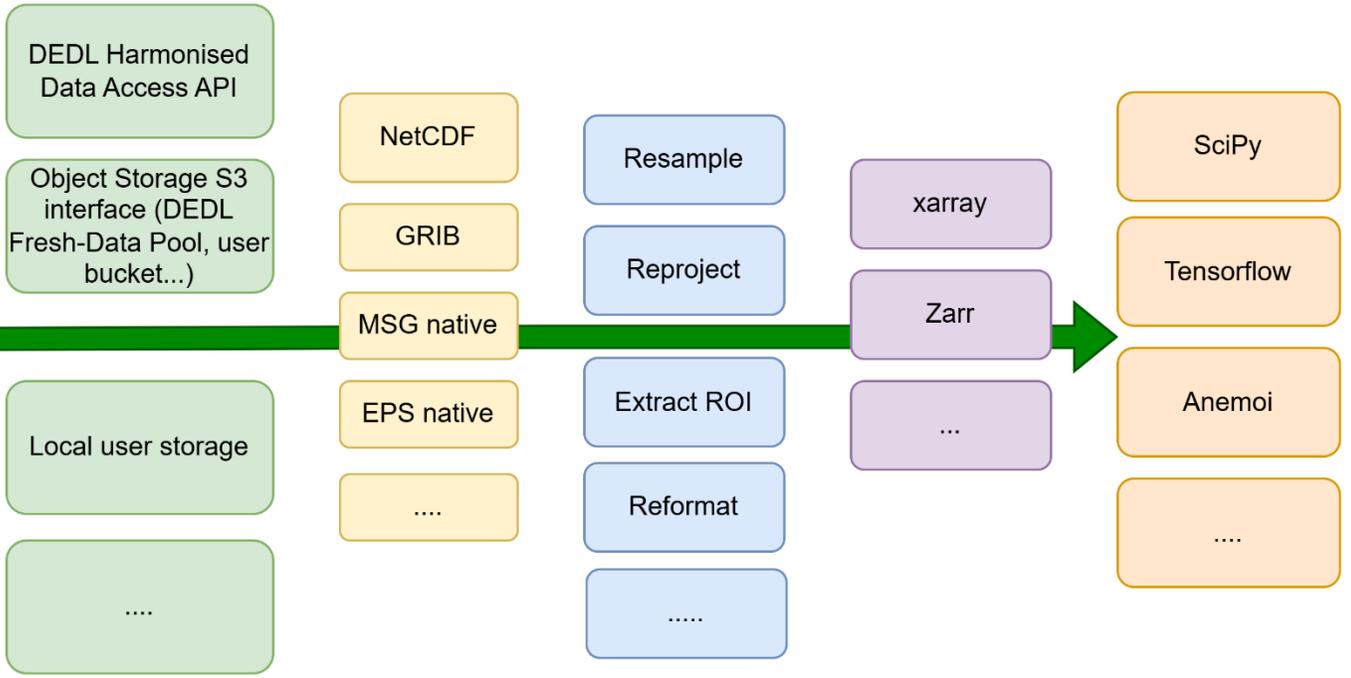
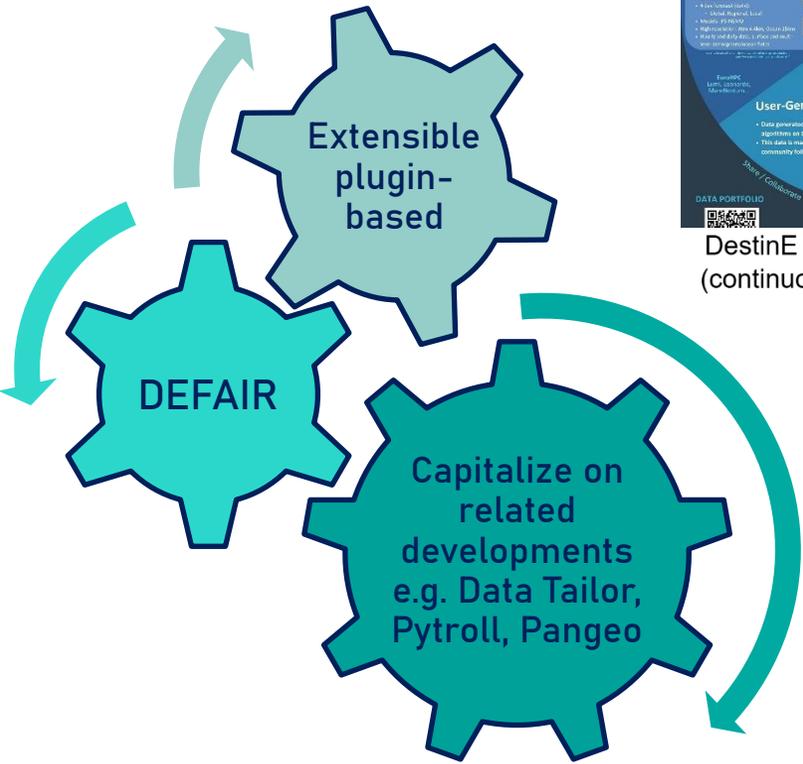


Q3 2026

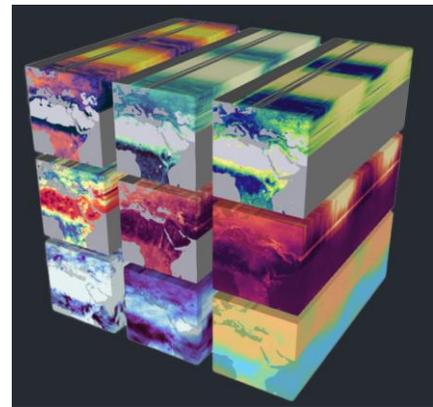
Target => Satellite Data  
Initially – MSG, MTG, EPS more to come



DestinE Data Portfolio (continuously evolving)



- Dataset versioning
- Data Lineage
- Metadata propagation
- Flexible and Modular

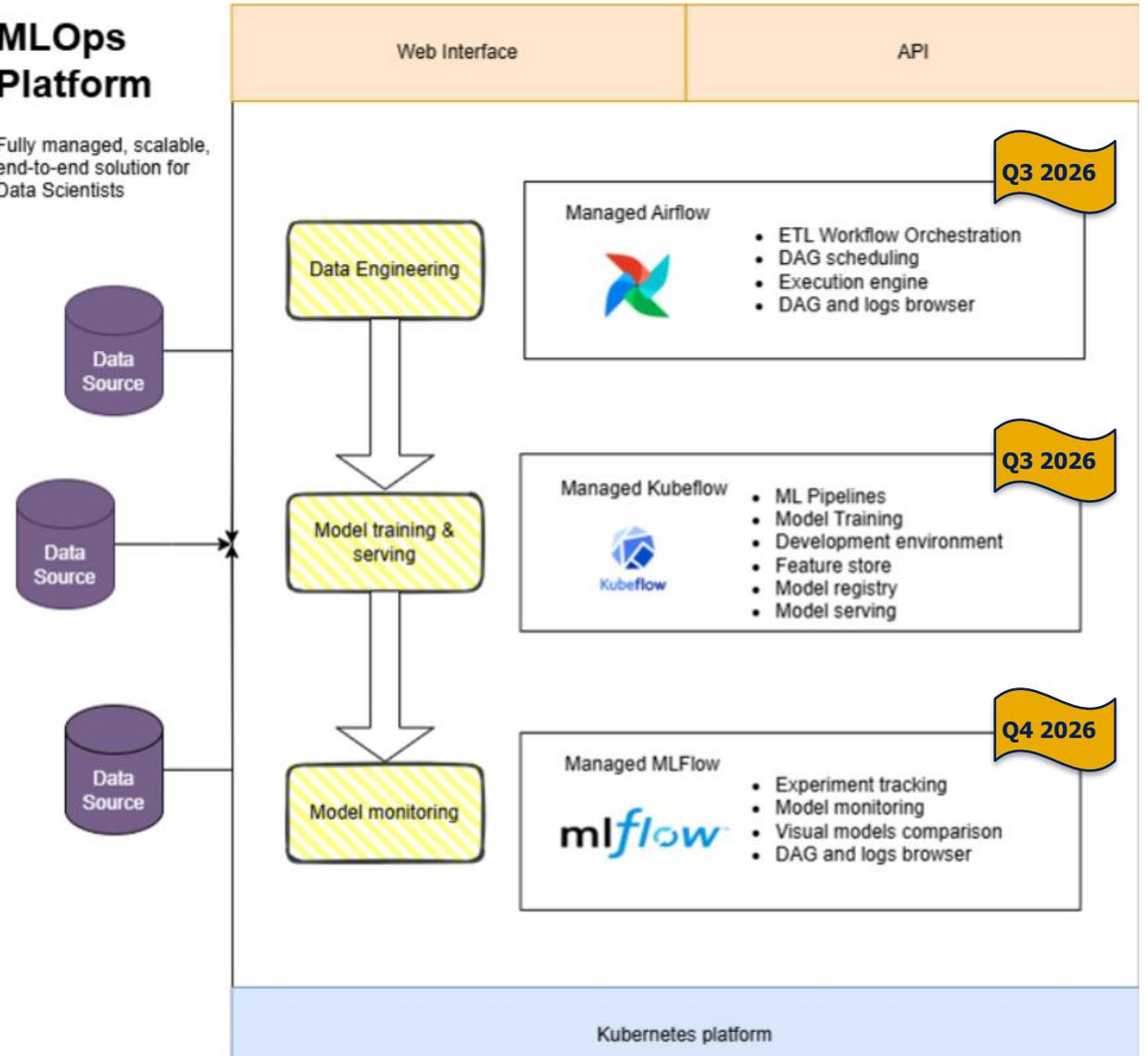


© Environmental Data Science and Remote Sensing group, Leipzig University

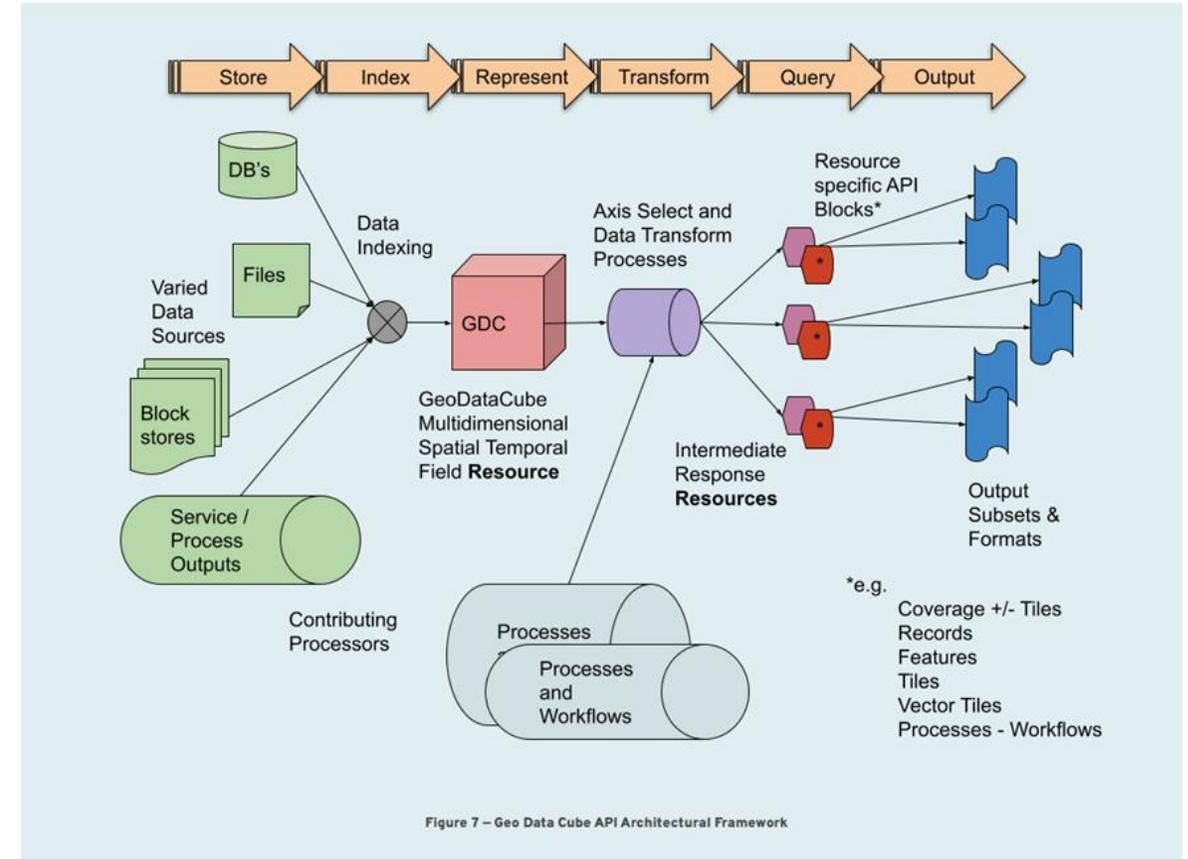
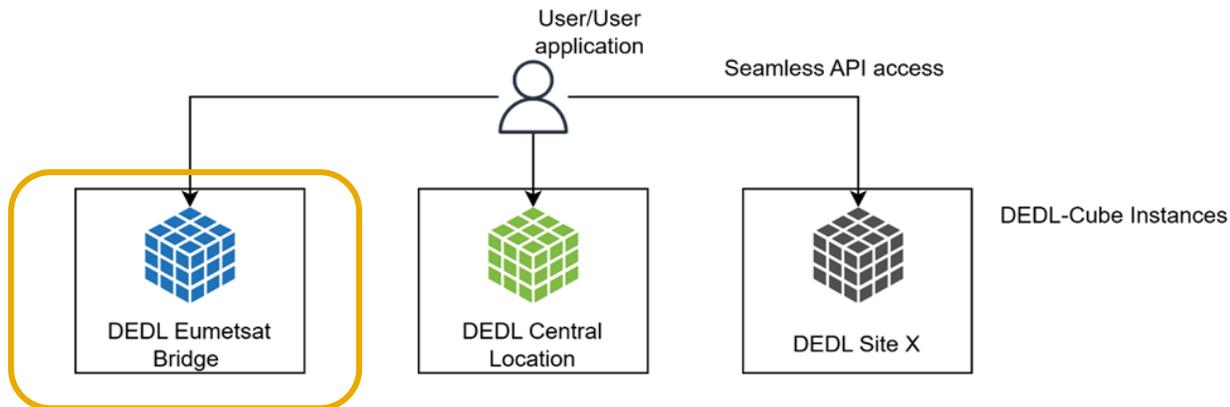
- End-to-end ML lifecycle:
  - Covers data ingestion, preprocessing, training, deployment, and monitoring
- Core components:
  - Airflow for workflow orchestration, MLflow for experiment tracking & model registry, Kubeflow for scalable ML pipelines and serving
- Modular & flexible:
  - Services can be used independently or combined
- Cloud-native & managed:
  - Secure, scalable, and user-friendly environment

## MLOps Platform

Fully managed, scalable, end-to-end solution for Data Scientists



- Design multi-site concept & instantiate service on DEDL EUMETSAT Bridge
- Initial Target Satellite Data
- Implement data access & processing API according to OGC GeoDataCube SWG recommendations
- Support AI/ML applications (e.g. via streaming API)



Conceptual OGC GeoDataCube API Architectural View (OGC Testbed-17)

# Q&A session



**Carlijn de Smet**  
European Data Portal,  
Publications Office of the EU



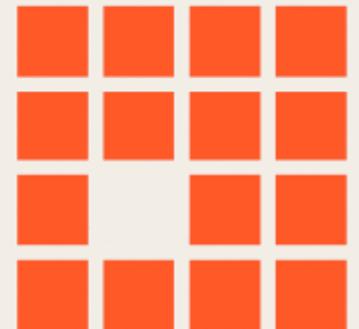
**Thore Fechner**  
Lead of the Open Data  
and Copernicus team  
at con terra



**Daniel Draghicescu**  
Policy Officer at the  
European Commission



**Michael Schick**  
Principal Engineer for  
the Digital Solution and  
SAF division EUMETSAT



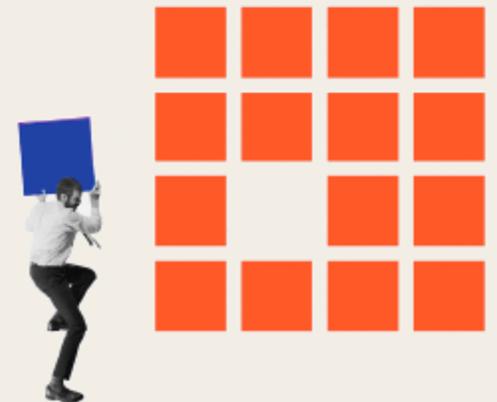
# Register for our upcoming webinar!

**WEBINAR**

**Open Data Maturity  
in Europe 2025:  
progress, best  
practices, and key  
insights**

**data.  
europa  
academy**

27 February 2026  
10.00 – 11.30 CET



# Continue the discussion after the webinar!

## Observing our planet through data: Destination Earth

Submitted by [Hannah KROKER](#) on Tue, 27/01/2026 - 10:11

Topic: [Academy webinars](#)

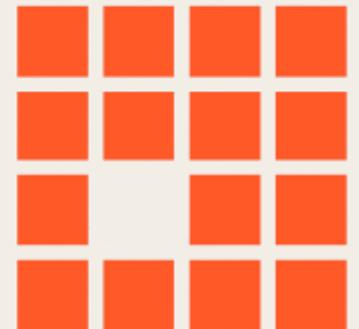
**Did you enjoy our webinar on Earth observation data?** If you have any remaining questions or want to share your own thoughts on the topic, **leave a comment below!**

With the help of Earth observation data, we can **monitor and predict various ecological and human-induced phenomena** on our planet. To understand how this works in practice, our webinar focused on the **Destination Earth** project, featuring Daniel Draghicescu (DG CNECT), Antje Kügeler (con terra), and Michael Schick (EUMETSAT) as guests.

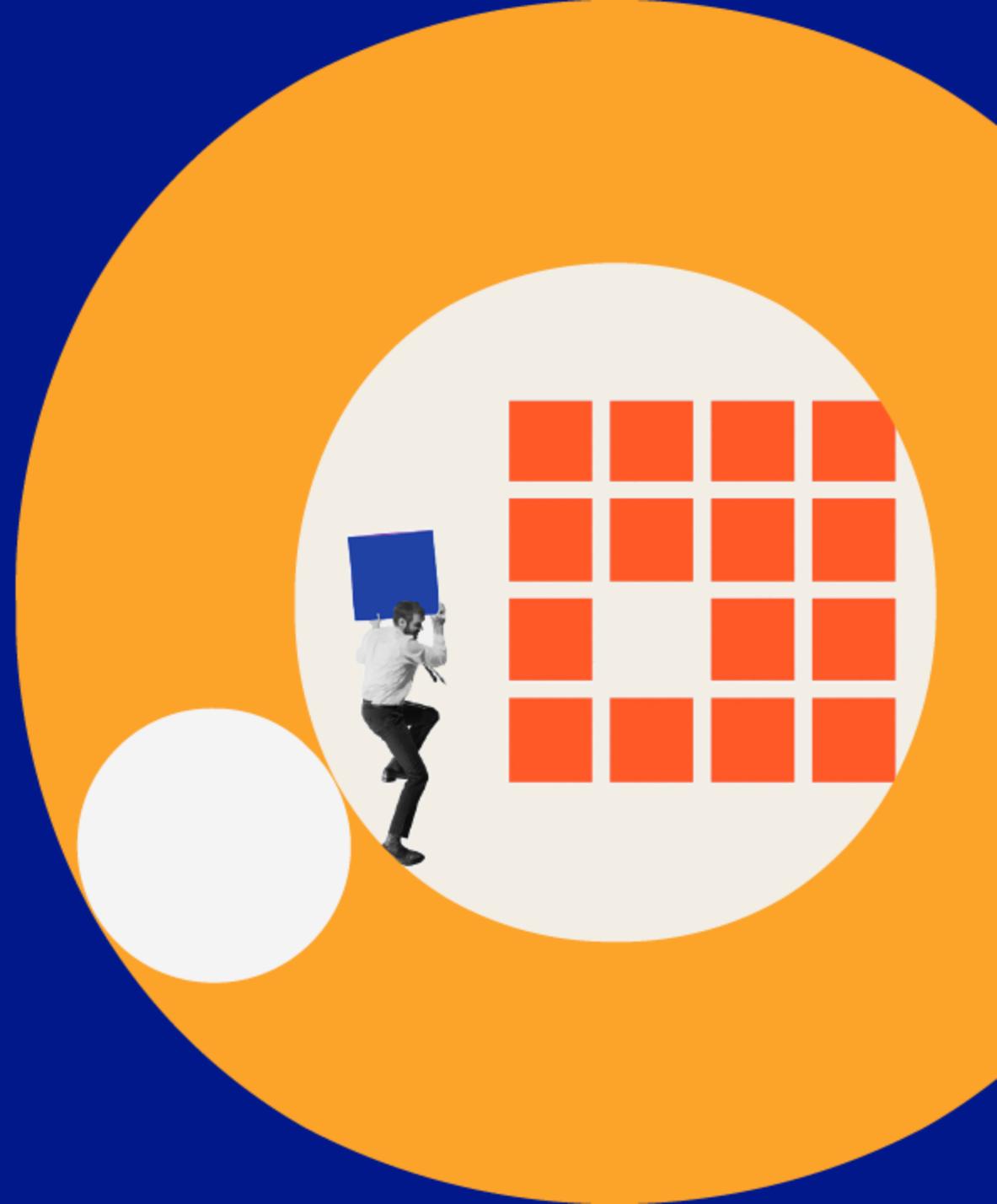
Have you used Earth observation data in your work or research before? Where do you think the Destination Earth initiative could be especially helpful?

**Share your ideas and questions below!**

*Login using your EU login account to share your thoughts in the comment section down below.*



# Your opinion is important to us!



# Thank you

