TERRA: Intelligent Climate Services Platform

AI & Earth Observation for Climate Resilience

Simone Mantovani, MEEO
(on behalf of the TERRA team)

Meet the latest Horizon Europe projects for the evolution of the Copernicus Services
EU Space Days 2025 - Gdansk, May 27th 2025

The Challenge: Climate & Water Risks

- Water is essential to the global economy, with **90% of economic activities and 75% of jobs** depending on it.
- Climate change is intensifying flooding, sea level rise, and water pollution, leading to economic and environmental crises.
- These issues rank among the top five global risks and require urgent action.

The Need for Advanced Climate Monitoring

- Existing tools, such as the **Copernicus Programme**, provide valuable climate and emergency management data.
- However, **data is underutilized** by industries, policymakers, and researchers due to integration challenges.
- There is a growing demand for more intelligent, AI-driven solutions to transform raw data into actionable insights.

TERRA transforms climate data into actionable insights, bridging the gap between observation and resilience.

How TERRA Addresses This Gap

An Intelligent Platform for Integrating Climate Services that Advances Climate Resilience through AI & Earth Observation.

AI – Observation – Resilience

TERRA leverages AI, Earth Observation, and digital twins to enhance water-related risk assessment.

Forecasting – Imaging – Integration

The project develops advanced forecasting, image processing, and climate service integration for better decision-making.

Accessibility – Accuracy – Action

By making climate intelligence more accessible, accurate, and actionable, TERRA supports sustainable development and climate resilience at a global scale.

TERRA focuses on unlocking the full potential of Copernicus data by integrating Artificial Intelligence (AI), Digital Twin (DT) technology, and Big Data analytics.

terra
An Intelligent Platform for Integrating Climate Services

About TERRA

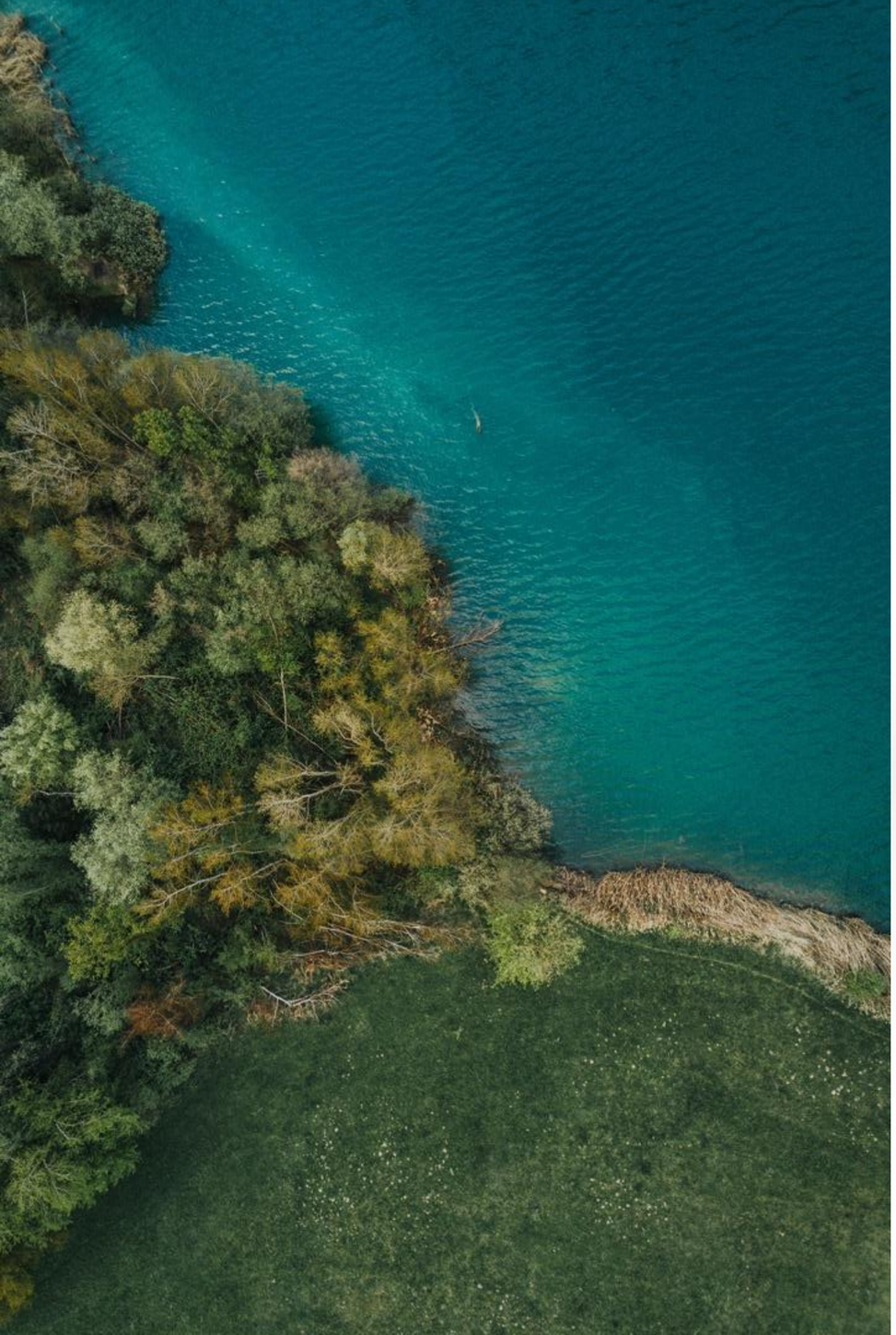
- **Project Concept:** Bridging gaps in climate services with AI and Earth Observation
- **Key Focus:** Hydrological monitoring, forecasting, and risk mitigation
- **Funded by:** European Union (HORIZON-CL4-2024-SPACE-01-35)

Project Details

- Project Name: An Intelligent Platform for Integrating Climate Services
- Topic: HORIZON-CL4-2024-SPACE-01-35
- Type of Action: HORIZON Research and Innovation Actions
- Granting Authority: European Health and Digital Executive Agency
- Project Start Date: 1 January 2025
- Project Duration: 36 months
- Grant Amount: €1,999,970.45

Our Team

- **Consortium:** 9 partners across Europe (Universities, SMEs, Research Institutions)
- All dedicated to **advancing innovation in space technologies, Earth observation,** and **environmental sustainability**
- **Countries:** Greece, Poland, UK, Cyprus, Luxemburg, Germany, Italy, France
- **Coordinator:** University of Thessaly, Greece



Objectives & Vision

TERRA envisions delivering advanced services and product chains by **integrating Copernicus services with state-of-the-art technologies**. These solutions include:

- **Coastline detection**
- **Coastline erosion prediction**
- **Flood risk assessment and mitigation**
- **Water pollution assessment**
- **Coastline modeling**

Aligned with the **SWOT mission and Group on Earth Observation (GEO) objectives**, TERRA also seeks to disseminate its outcomes **through the Global Earth Observation System of Systems (GEOSS) framework**.

Illegal Activities in Harbors

To create and utiliz
Twin framework for
monitoring coastal ch
supporting resilience
against coastal erosion a
other climate-driven
impacts.

Location: Online platform &
Port of Gdansk, Poland

Coastal Change Monitoring

To create and utilize a Digital Twin framework for monitoring coastal change, supporting resilience against coastal erosion and other climate-driven impacts.

Location: Scotland

Water Contamination Assessment

To assess and monitor water contamination in coastal regions and the broader water cycle, leveraging advanced Copernicus services and AI-based techniques.

Locatiion: Fthiotida, Greece

TERRA’s Key Innovations

Through these innovations, TERRA is transforming climate intelligence, equipping policymakers with data-driven solutions for a more resilient planet.

AI for Knowledge Extraction & Climate Forecasting

- Resilient multivariate forecasting models
- Integration of Diverse Machine Learning (ML) Approaches
- Optimized AI training for efficiency

Advanced Image Processing Techniques for Climate Services

- Small-object detection in satellite imagery
- Advanced Object Processing
- High-confidence recognition algorithms

Digital Twins and Data Augmentation for Climate Services

- Memory-Efficient Digital Twins
- Heterogeneous Data Processing
- Adaptive models for coastline & hydrology changes
- Multimodal data processing

Copernicus Service Integration and Product Provisioning

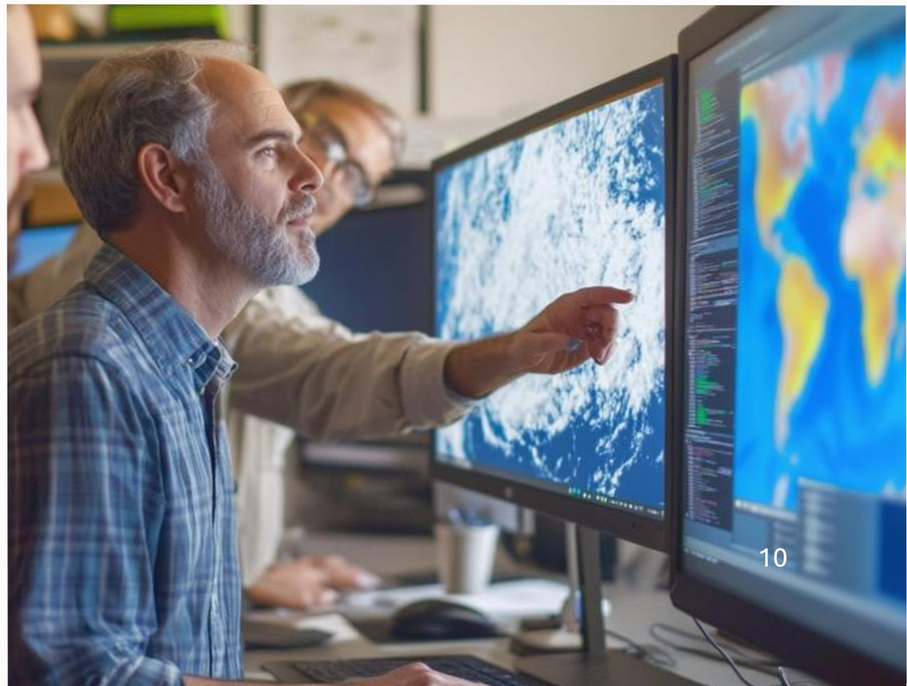
- Service Reusability
- Model Flexibility
- Multi-Source Data Integration
- High data heterogeneity management for Coastal Hydrological Observation
- Alignment with EU Green Deal & SWOT mission

TERRA’s Stakeholders

TERRA supports **stakeholders from diverse sectors** in developing, refining, and delivering meaningful solutions. Our stakeholders contribute significantly to advancements in **Earth Observation** (EO) and **environmental sustainability**.

An overview of the key groups that are part of the TERRA ecosystem:

- Application Developers
- End Users
- ICT Providers and System Integrators
- SMEs
- Government Agencies, Policymakers, and Public Authorities
- Citizens and Wider Public
- Academia, Research, and Collaborative Projects
- Open-Source Associations and Technology Clusters



Find & Join us Online

www.terra-horizon.eu

info@terra-horizon.eu

terra-horizon

horizon_terra

terra

An Intelligent Platform for Integrating Climate Services

THANK YOU!

Your Name, Organization
Date

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101189962