AI4EO:

Accelerating Earth Intelligence for All through AI-Driven Earth Observation

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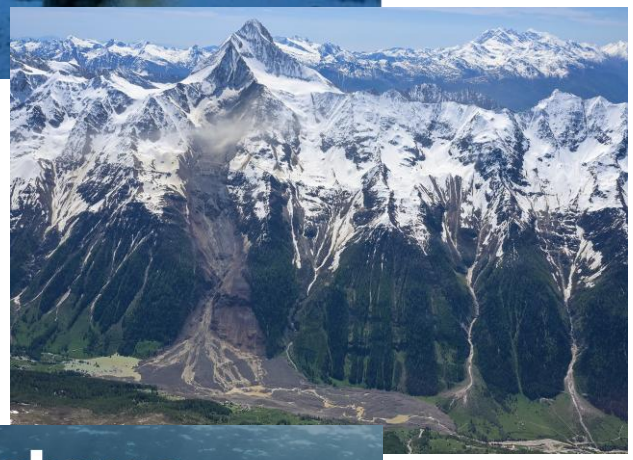
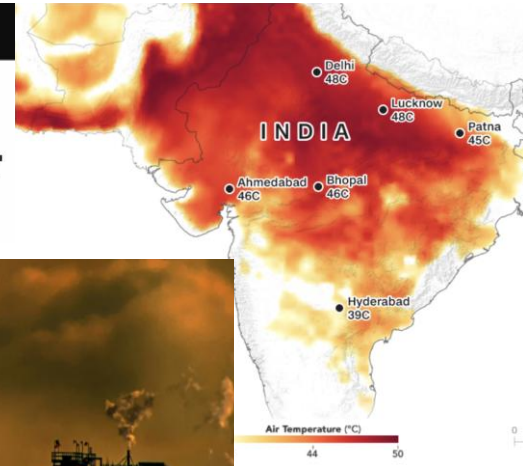
Our Planet is Facing Multiple Crises



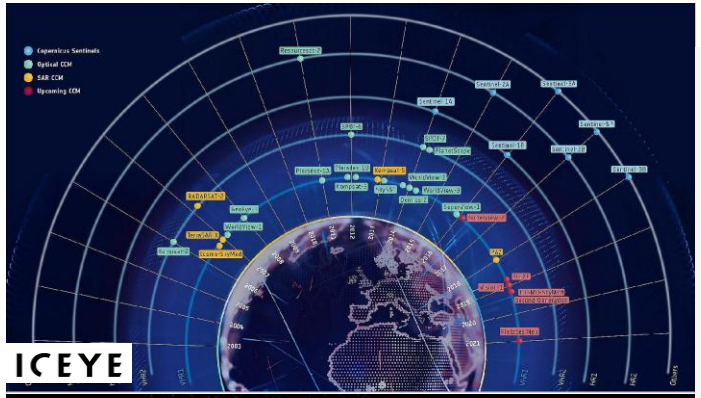
Indonesia is spending $33 billion to move its capital from a sinking city to an island where forests have been burning

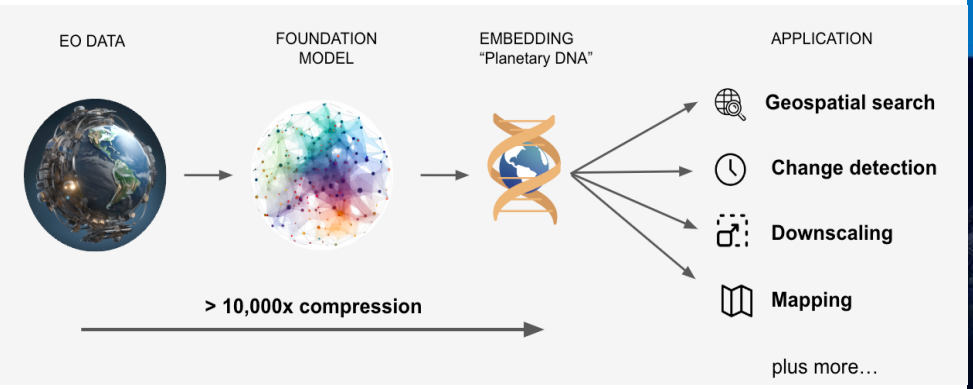
CNN World

Are parts of India becoming too hot for humans?



AI for EO Big Data: Opportunities





- Advanced deep learning models
- Automated image processing, analysis, classification, change detection, etc.
- Time series processing
- Multi-model data fusion
- Accelerate applications: air pollution, digital agriculture, biodiversity, disaster response & management, urbanization, environmental changes, and SDGs monitoring, etc.

Earth Intelligence for All

Integrate Earth observations, models, and innovative new technologies (including artificial intelligence, machine learning, digital twins, cloud computing) into the design of services that provide Earth intelligence.

Therefore, as it looks to the future, GEO will:

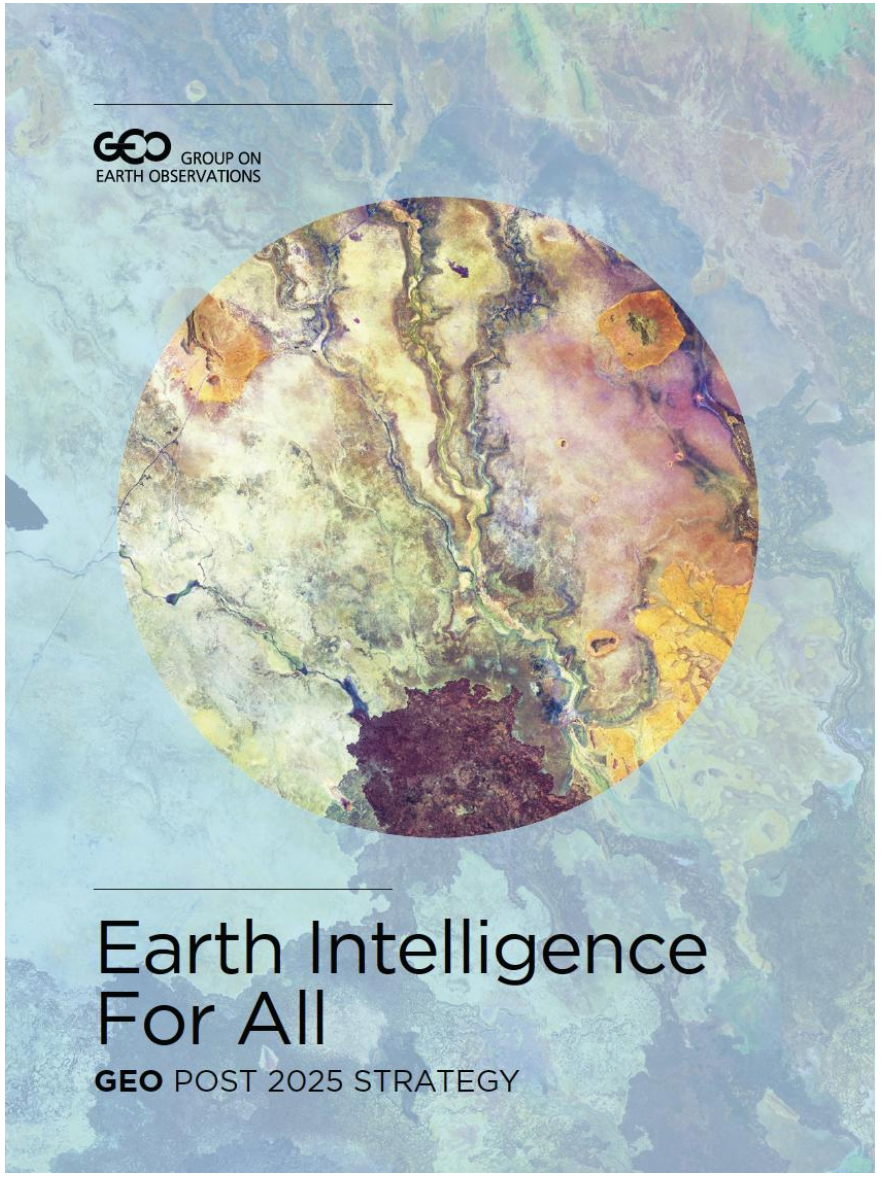
Make Earth intelligence a fundamental pillar of knowledge-based decision-making for sustainable development, building an inclusive, sustainable and resilient future for people and the planet.

Facilitate a shift from a focus on the development of services to a focus on provision of needs-based services to all, in order to bridge global knowledge and information gaps.

Co-design user-orientated services by identifying policy and decision-making needs, designing the services needed to support these needs, creating the products to enable the services, and identifying affordable and trusted Earth observation components — from across the value chain[2] — required to sustain these products.

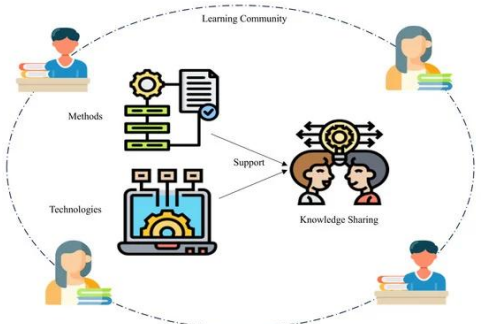
Integrate Earth observations, models, and innovative new technologies (including artificial intelligence, machine learning, digital twins, cloud computing) into the design of services that provide Earth intelligence.

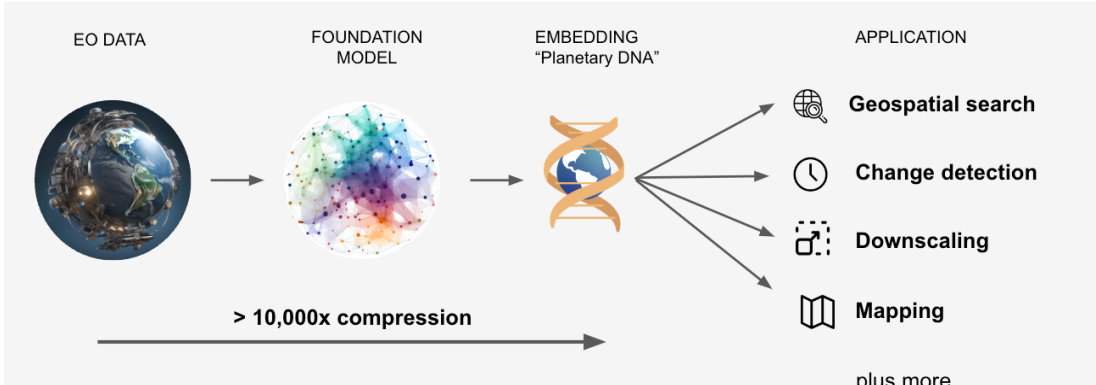
Enhance inclusivity and adaptability in the GEO community by leveraging expertise and resources from across the scientific community, indigenous peoples and local communities, private sector, civil society and international finance institutions, and by fostering open data and knowledge and building capacities.



Artificial Intelligence for Earth Observations (AI4EO)

- The **GEO AI4EO Enabler** aims to **integrate AI into Earth Intelligence** by establishing **a network of AI experts** across the GEO community. By **advancing AI applications** within the GEO Work Programme, fostering **cross-disciplinary collaboration**, and addressing **responsible use of AI in EO,** it will serve as a central hub to explore, develop, and apply **AI-driven EO solutions** that support **GEO's Post-2025 Strategy - Earth Intelligence for All**.





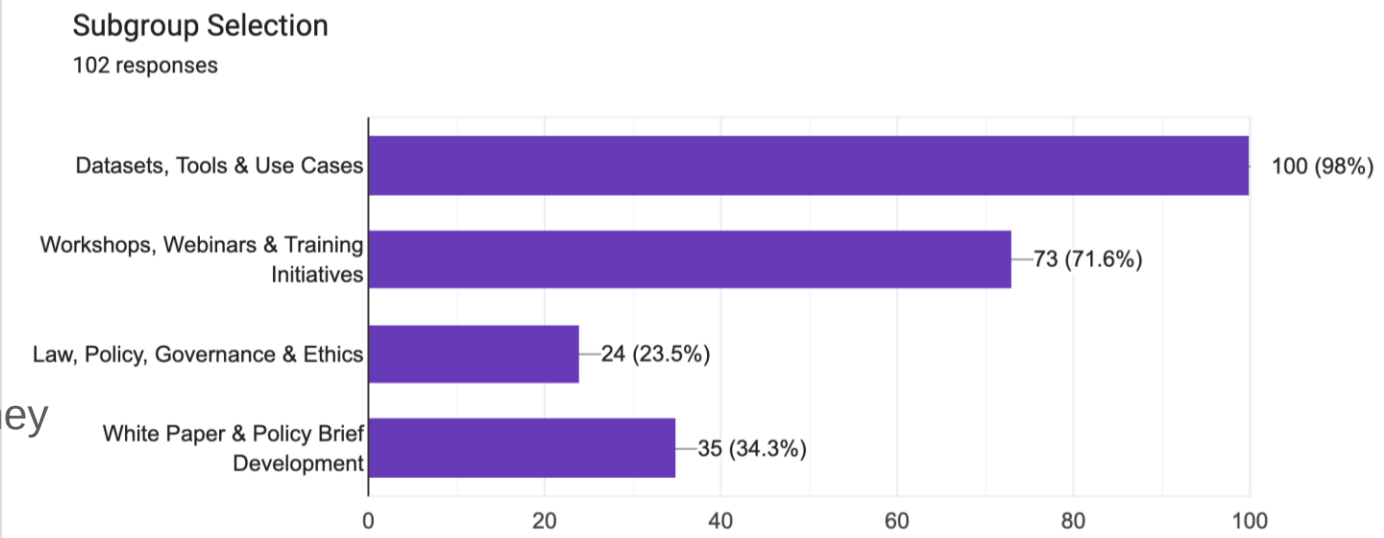
AI4EO: Specific Objectives

- Promote Cross-Disciplinary, Cross-Community Collaboration
  - AI4EO aims to connect experts in AI, data science, and EO from various GEO communities, including members of different GWP Focus Areas.
- Support Capacity Building and Knowledge Exchange
  - AI4EO will organize training sessions, webinars, and workshops to share best practices, tools, and techniques for applying AI in EO.
- Develop and Disseminate Cross-cutting AI Tools and Resources
  - AI4EO will curate and advocate for accessible, reproducible AI-driven tools and applications that can be used across various GEO initiatives. These tools - covering areas such as image classification, change detection, predictive modeling, and real-time monitoring—serve as cross-cutting assets that enhance EO capabilities and make Earth Intelligence more actionable and accessible.
- Enhance Data-Driven Decision-Making and Policy Support
  - By integrating AI insights into GEO's data ecosystem, the Convener aims to translate complex data into actionable intelligence.

AI4EO Sub-Group Formation

Subgroup Selection *

- [ ] Datasets, Tools & Use Cases
  Co-Leads: Claudio Persello, Yifang Ban
- [ ] Workshops, Webinars & Training Initiatives
  Co-Leads: Valerio Marsocci,, Andrea Nascetti
- [ ] Law, Policy, Governance & Ethics
  Co-Leads: Thorsten Jelinek, Thomas F. McInerney
- [ ] White Paper & Policy Brief Development
  Co-Leads: Pedram Ghamisi, Yifang Ban



AI4EO Work Plans

- Report on **current state of AI applications** within GEO.
- Promote **sharing of datasets and reproducible AI-driven tools** for Earth observations.
- Support development of GEO Work Programme activities that **leverage AI**.
- Organize **impactful events**, including workshops, seminars, and challenges, to facilitate **sharing of knowledge and best practices** on AI in EO applications
- Curate **training webinars** to provide AI technical and technological support to the GEO Community, especially those from developing countries.
- White paper/policy brief on **AI's future prospect for EO** within GEO context.
- Promote **responsible use of AI** and **digital sustainability**
- Liaise with other **relevant AI groups** within and beyond and leverage their outputs to the extent possible.

GEO GROUP ON EARTH OBSERVATIONS

Earth intelligence for all — GEO Symposium & ODOK Workshop — FROM VISION TO ACTION

Session 12: Earth Observation Data and AI

GLOBAL FORUM "The Earth Talks"

AI4EO:
Accelerating Earth Intelligence for All through AI and Earth Observation

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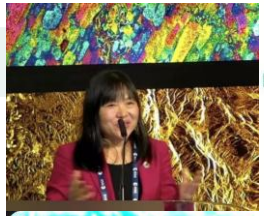

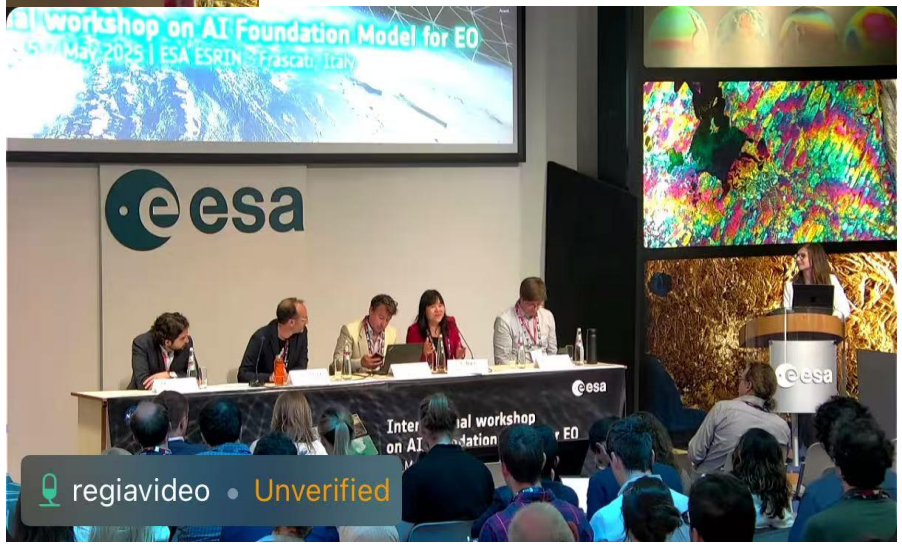

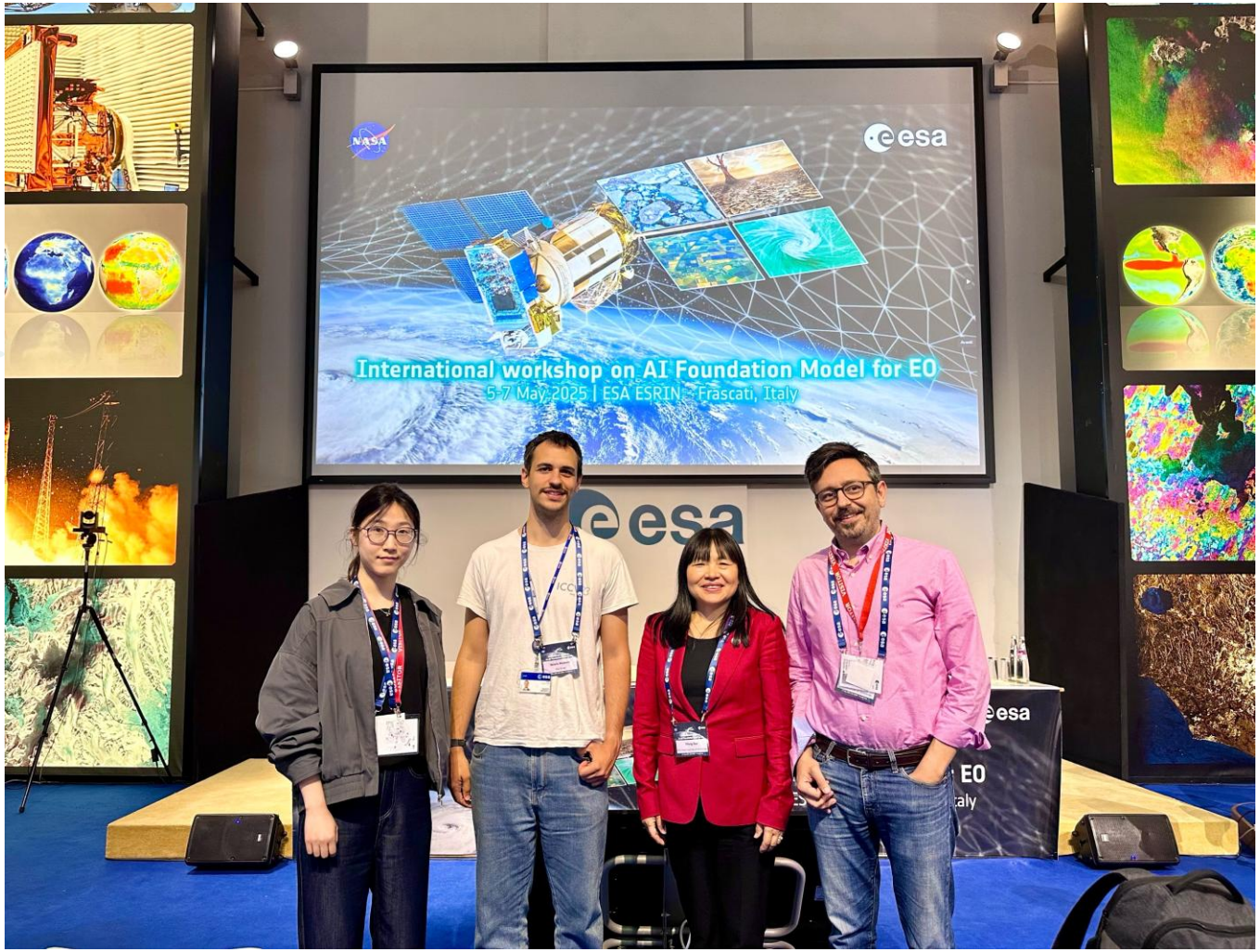

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GROUP ON EARTH OBSERVATIONS

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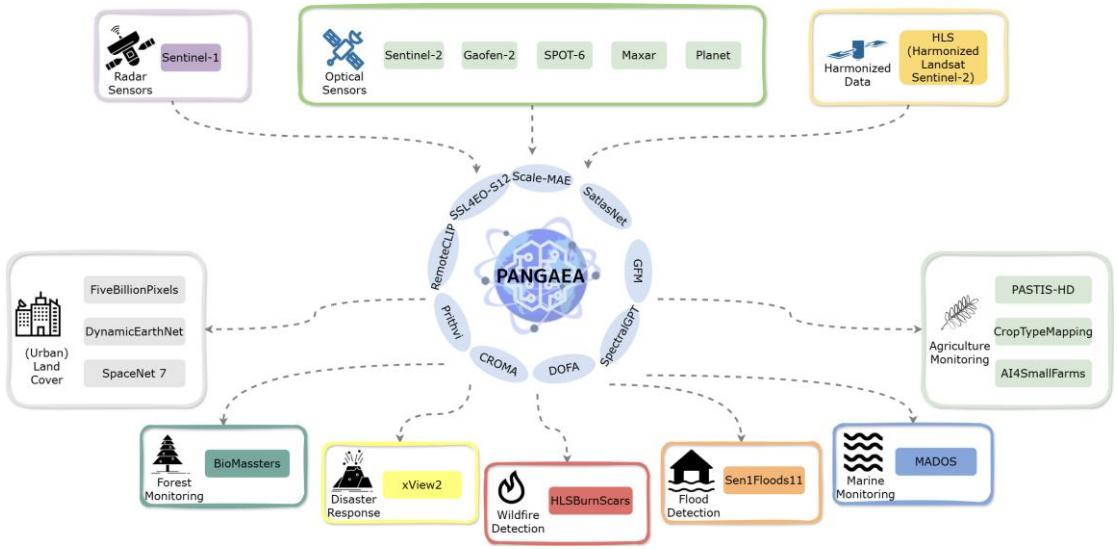
PANGAEA

A global and inclusive bench-mark for geospatial foundation models



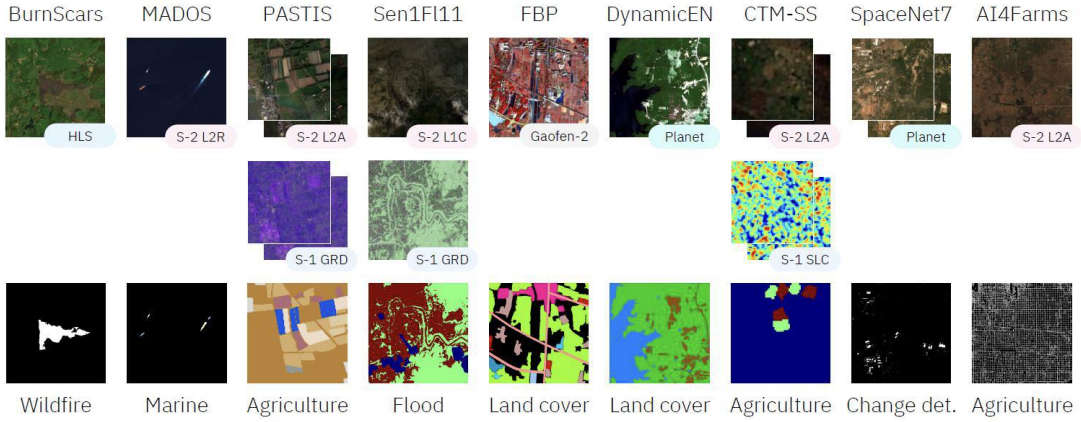
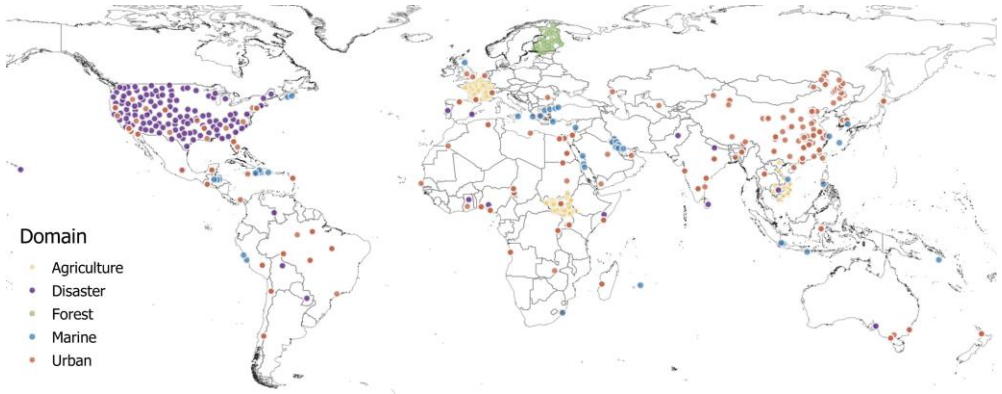


Table 3: Overview of the pretraining datasets and the number of patches used by the selected GFMs. For Prithvi, the data volume is reported.

Model	Pretraining Images	Patches/Volume
CROMA	Sentinel-1, Sentinel-2	3M
DOFA	Sentinel-1, Sentinel2, Gaofen-2, NAIP, EnMAP	8.08M
GFM-Swin	NAIP, RSD46-WHU, MLRSNet, RESISC45, PatternNet	600K
Prithvi	Harmonized Landsat Sentinel-2 (HLS)	1TB
RemoteCLIP	SEG-4, DET-10, RET-3	165K
SatlasNet	Sentinel-2, NAIP	856K
Scale-MAE	FMoW-RGB	363.6K
SpectralGPT	fMoW-S2, BigEarthNet	1.47M
SSL4EO-S12	Sentinel-1, Sentinel-2	3M

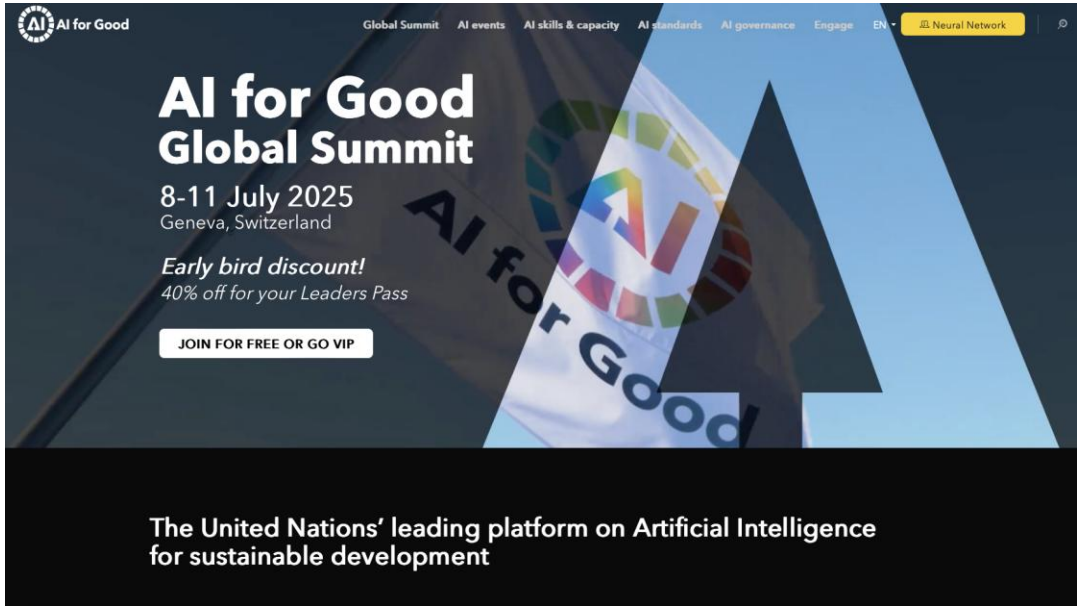
TerraMind: Large-Scale Generative Multimodality for Earth Observation

AnySat: One Earth Observation Model for Many Resolutions, Scales, and Modalities



Session 12 Earth Observation & AI

A revolution for Earth Intelligence and Information Services



Liaise with other relevant AI groups

Dr. Claudio Persello, Co-Lead, AI4EO:

Introduction to IEEE GRSS IADF TC, the IGARSS2025 Data Fusion Contests and the GeoAI for Urban Sensing Summer School.

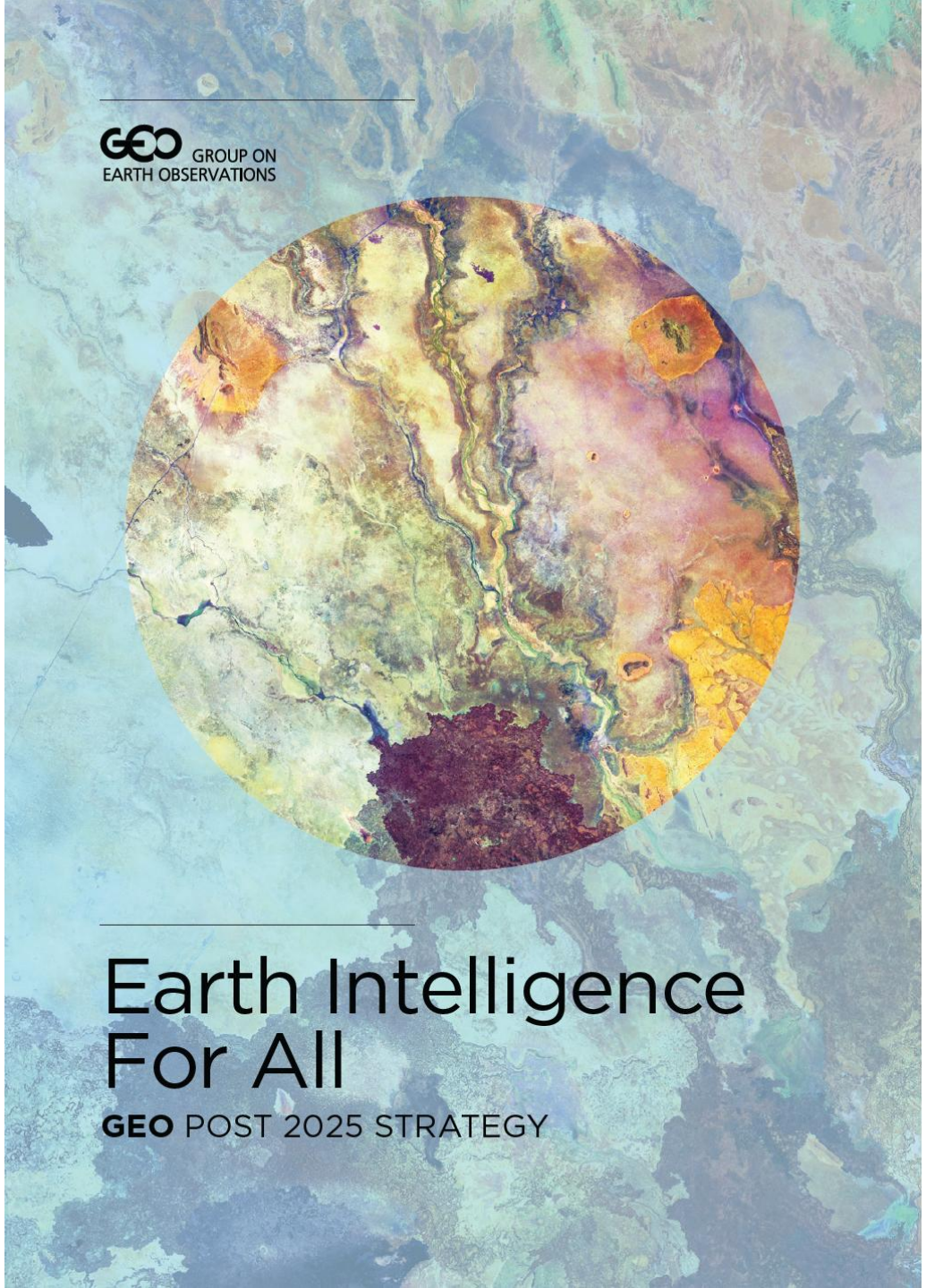
Dr. Monique Kuglitsch, Chair:

Introduction to ITU/UNEP/UNFCCC/WMO Global Initiative on Resilience to Natural Hazards through AI Solutions

GEO Data & Knowledge WG AI Policy and Legal Sub-Group

Webinar: Geospatial Data, Machine Learning, and Artificial Intelligence: Exploring Regulatory and Legal Landscapes

By Thomas McInerney



Welcome to Join GEO AI4EO

Accelerating Earth Intelligence for All through AI-Driven Earth Observation

Scan QR Code to Join GEO AI4EO

Questions? Please contact

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