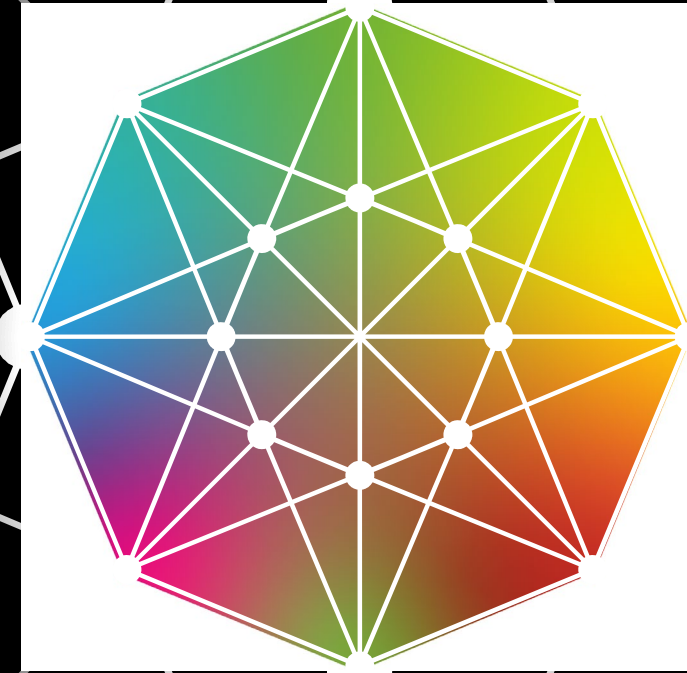


Geospatial Foundation Models in practice

8 July 2026





Andrea Manara

International
Telecommunication Union

Special Session - [AI for Geospatial Intelligence](#)



ITUKALEIDOSCOPE
GENEVA2026

AI for Good: GeoAI activities

GeoAI Discovery

Channel on GeoAI applications, highlighting its relevance to the Sustainable Development Goals.

GeoAI Challenge

Competitions aimed at providing solutions for collaboratively addressing real-world geospatial problems by applying AI and ML.



Maria Antonia Brovelli

Politecnico di Milano (UN GGIM AN
Advisory Board, ISDE Vice President,
ISPRS TC IV Vice President)



Rohini Swaminathan
Climate and Environment
Data Unit, UNICEF

GeoAI Discovery -GeoFM



Online

8 April 2026 • 14:00 - 15:00

Launch of 2026 ITU GeoAI Challenge: Reaching new heights with GeoFM embeddings

+5



Online

Badge available

30 March 2026 • 14:00 - 15:00

GeoGPT: Multimodal AI for earth data analysis and sustainable development

+3



Online

Badge available

19 March 2026 • 14:00 - 15:30

Introduction to Terratorch

+1



Online

Badge available

25 February 2026 • 14:00 - 15:30

Embedding workflows for Earth Observation tasks

+1



Online

Badge available

2 February 2026 • 14:00 - 15:30

Hands-on TESSERA: Time-series embeddings for geospatial analysis

+1



Online

Badge available

22 January 2026 • 14:00 - 15:00

Introduction to TESSERA: Time-series embeddings for geospatial analysis

+1



Online

Badge available

14 January 2026 • 14:30 - 16:30

GeoAI in Earth Engine: AlphaEarth Foundations and the Satellite Embedding dataset

+1



Online

Badge available

18 November 2025 • 14:00 - 16:00

TerraMind: Multimodal Foundation Models for Earth Observation Tasks

+2



Online

26 March 2025 • 15:00 - 17:00

GeoAI workshop: Foundation models for weather and climate

+2



Online

19 March 2025 • 15:00 - 17:00

Earth observation foundation models with Prithvi-EO-2.0 and TerraTorch

+2

AI for Good Summit 2026

📍 Room R Workshop

Leaders Gold Discovery

GeoAI for our shared future: Geospatial foundation models and generative intelligence for people and the planet

Date	Timeframe	Duration
7 July 2026	14:00 - 17:15 CEST 🌐	3h 15 minutes

<https://aiforgood.itu.int/event/geoai-for-our-shared-future-geospatial-foundation-models-and-generative-intelligence-for-people-and-the-planet/>



Geospatial Foundation Models: From Imagery to Earth Data Products

Large Language Models (LLMs)

Text → embeddings → tasks

(e.g. summarization, drafting, Q&A)

Geospatial Foundation Models (GFMs)

Imagery → embeddings → outputs



Satellite imagery

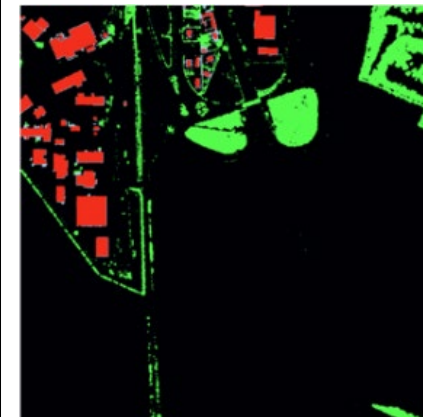


Geospatial
Foundation Model

Learns general representations



Multiple outputs



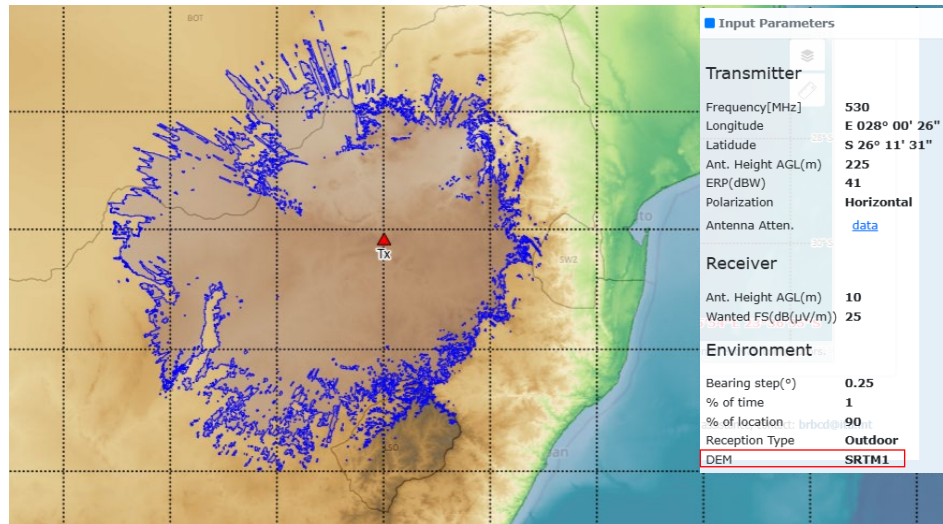
Land cover



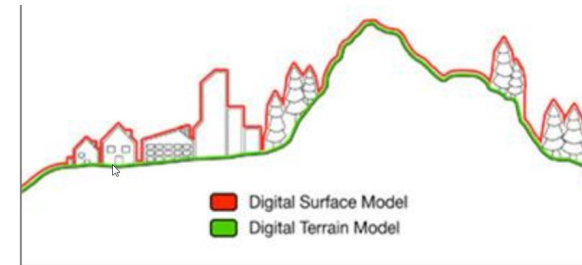
Surface height (DSM)

Improving ITU-R Propagation Prediction with Datasets Produced by Geospatial Foundation Models

Use case: coverage estimation for a DTT transmitter via ITU-R P.1812 propagation prediction method



Inputs for ITU-R propagation models



What we have today (open global dataset)

- DSM (e.g. SRTM ~30 m resolution)

What is missing

- DTM (terrain height)
 - Clutter height (DSM – DTM)
 - Surface classification (buildings / vegetation)
- Missing inputs → inaccuracies in propagation loss and field-strength prediction

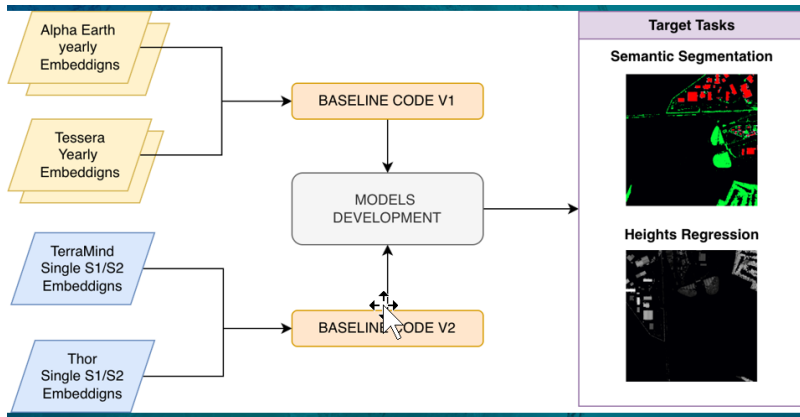
Geospatial foundation models can provide these missing inputs, enabling more accurate ITU-R propagation predictions at global scale.

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AI for Good GeoAI Challenge 2026: Reaching new heights with Geospatial Foundation Models

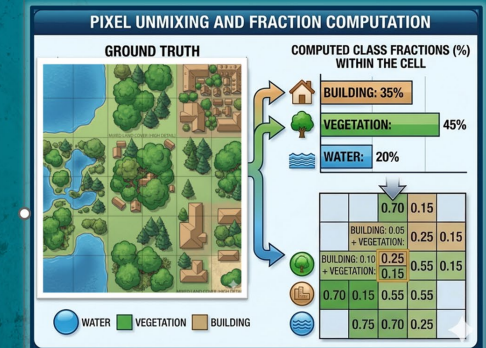


- The challenge contributes to building **large scale datasets**, including **Digital Surface Models (DSM)**, **Digital Terrain Models (DTM)**, and **land-cover classifications**.
- Central to the challenge is exploring **Geospatial Foundation Model (GFM) embeddings** (pretrained models like AlphaEarth, TerraMind, Tessera, and Thor) that can be leveraged for multi-task learning, including height estimation and land-cover segmentation.
- Participants will train and evaluate models using GFM embeddings on satellite imagery, develop methods that generalise across diverse geographic regions, and apply multi-task learning to predict terrain and land-cover features from the data.



The dataset: Training data & label structure

- The training dataset includes **2,024 data-points**, extracted from images of size **256x256 at 10 m resolution**. Labels are derived from airborne LiDAR data.
- Labels are not discrete categories. For each pixel, they represent the percentage contribution of each class within a 10x10 m cell, resulting in **four regression tasks**.
- Label data is provided as **4-band TIFF files**:
 - Band 1: percentage of **building**,
 - Band 2: percentage of **vegetation**,
 - Band 3: percentage of **water**,
 - Band 4: **relative height above ground (nDSM)**.
- The reference data is generated at 1m spatial resolution and includes **four classes**:
 1. **Background**,
 2. **Buildings**,
 3. **Trees/HighVegetation**,
 4. **Water**.



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Challenge results

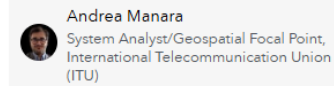


Our top performing teams



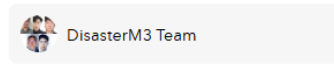
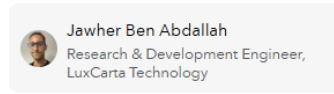
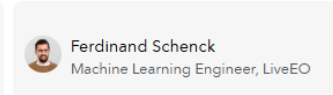
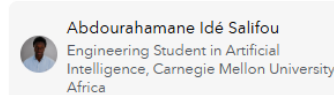
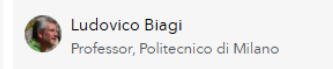
15:10 - 15:30 GeoAI challenge: Reaching new heights with GeoFM embeddings

Moderator(s):



Including live presentations or video recordings from top-5 teams

Speaker(s)



15:30 - 15:45 Coffee Break

15:45 - 15:55 GeoAI challenge: Reaching new heights with GeoFM embeddings (continued)



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Thank you!

