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Earth Observation Foundation Models: Multimodal Learning, Agentic Intelligence, and Trustworthiness

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Earth Observation foundation models are rapidly transforming geospatial intelligence by enabling scalable, transferable, and multimodal learning across diverse sensors, regions, and application settings. Built on large heterogeneous archives and modern AI techniques, these models support unified representation learning for optical, SAR, hyperspectral, LiDAR/DEM, thermal, weather, and tabular data, opening new opportunities for land-cover analysis, hazard monitoring, environmental assessment, and decision support.

This special issue aims to highlight recent advances in multimodal EO foundation models, agentic geospatial systems capable of autonomous planning and tool use, and trustworthy AI methods that improve uncertainty awareness, robustness, fairness, and interpretability. It also seeks contributions that strengthen benchmarking, evaluation protocols, and practical adoption in high-impact EO applications.

The topics of interest include (but are not limited to)

- **Scalable EO foundation model architectures and pretraining strategies, including masked, contrastive, diffusion-based, spatio-temporal, and graph-based approaches.**
- **Multimodal representation learning across optical, SAR, hyperspectral, LiDAR/DEM, thermal, weather, text, and socio-economic or tabular data.**
- **Agentic geospatial intelligence, including autonomous planning, tool use, multi-step reasoning, multi-agent collaboration, and human-in-the-loop EO systems.**
- **Temporal modeling for EO time series, including change detection, anomaly detection, dynamic Earth monitoring, and event analysis.**
- **Efficient adaptation methods such as LoRA, adapters, prompting, distillation, few-shot and zero-shot transfer, active learning, and domain adaptation.**
- **Trustworthy EO foundation models, including uncertainty quantification, calibration, robustness to distribution shifts, bias and fairness analysis, explainability, hallucination mitigation, and safety.**
- **Benchmarks and evaluation protocols for cross-region, cross-sensor, and extreme-event applications such as floods, wildfires, landslides, and droughts.**

The following schedule is proposed:

June 8, 2026	White paper submission deadline
June 15, 2026	Invitation notification
August 15, 2026	Full paper submission deadline
September 30, 2026	Review notification
November 15, 2026	Revised manuscript due
December 15, 2026	Final acceptance notification
January 15, 2027	Final manuscript due
April 2027	Publication date