



The PhilEO Geospatial Foundation Model Suite

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Foundation Models (FMs) are the latest big advancement in AI that build upon Deep Learning. They have the ability to analyse large volumes of unlabeled Earth Observation (EO) data by learning at scale, identifying complex patterns and trends that may be difficult or even impossible to detect through traditional methods. These models can then be used as a base to create powerful applications that automatically identify, classify, and analyse features in EO data, unlocking the full potential of AI in EO like never before, providing a paradigm shift in the field.

The field of geospatial FMs is blooming with milestones such as Seasonal Contrast (SeCo) [1] or Prithvi [2]. We present the PhilEO Suite: a dataset (the PhilEO Globe), a series of models (the PhilEO Pillars), and an evaluation testbed (the PhilEO Bench).

In particular, the PhilEO Bench [3] is a novel framework to evaluate the performances of the numerous EO FM propositions on a unified set of downstream tasks. Indeed, there is the need now to assess them with respect to their expected qualities in terms of generalisation, universality, label efficiency, and easiness to derive specialised models. The PhilEO Bench comprises a fair testbed bringing independence to external factors and a novel 400GB global, stratified Sentinel-2 dataset containing labels for the three downstream tasks of building density estimation, road segmentation, and land cover classification.

References

- [1] Oscar Manas, et al., "Seasonal Contrast: Unsupervised pre-training from uncured remote sensing data," in Proc. ICCV, 2021.
- [2] Johannes Jakubik, Sujit Roy, et al., "Foundation Models for Generalist Geospatial Artificial Intelligence," arxiv:2310.18660, 2023.
- [3] Casper Fibaek, Luke Camilleri, Andreas Luyts, Nikolaos Dionelis, and Bertrand Le Saux, "PhilEO Bench: Evaluating Geo-Spatial Foundation Models," arXiv:2401.04464, 2024.

