BIODT
biodiversitydigitaltwin

School & Hackaton

March 3rd - March 7th
Officine Cantelmo, Lecce IT

Invasive Alien Plant Species Digital Twin

Taimur Khan – Helmholtz Center for Environmental Research

Funded by
the European Union

IAS Plant Species Across Europe

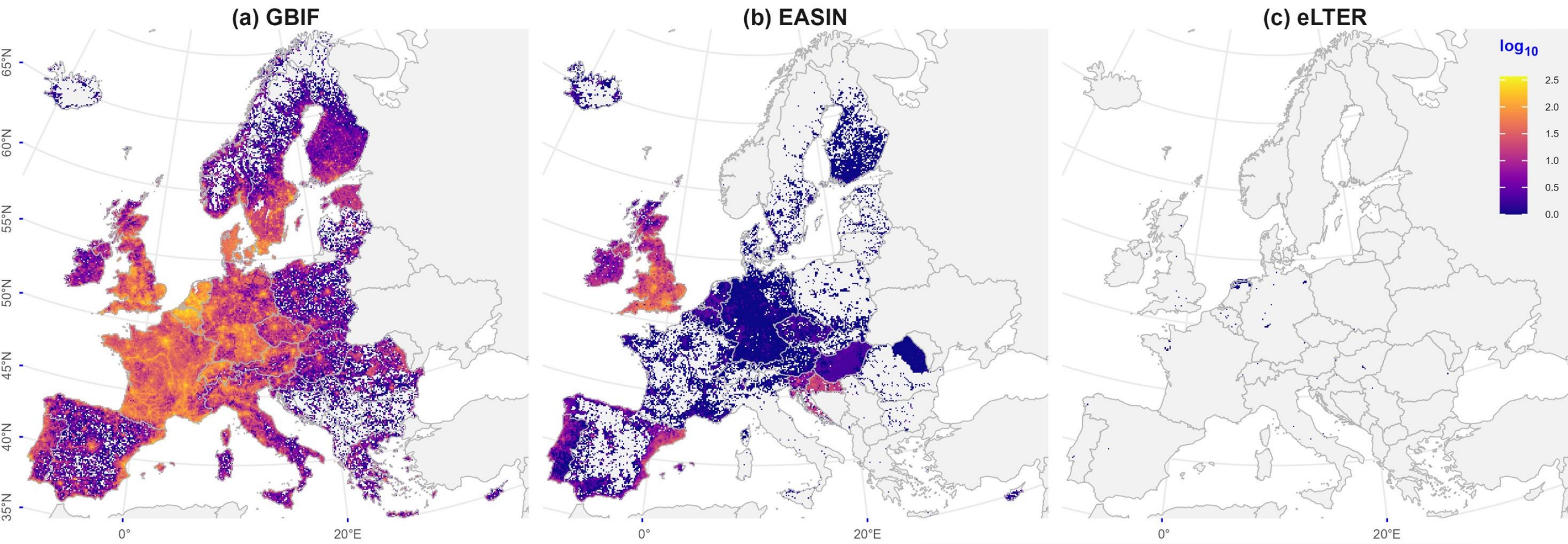
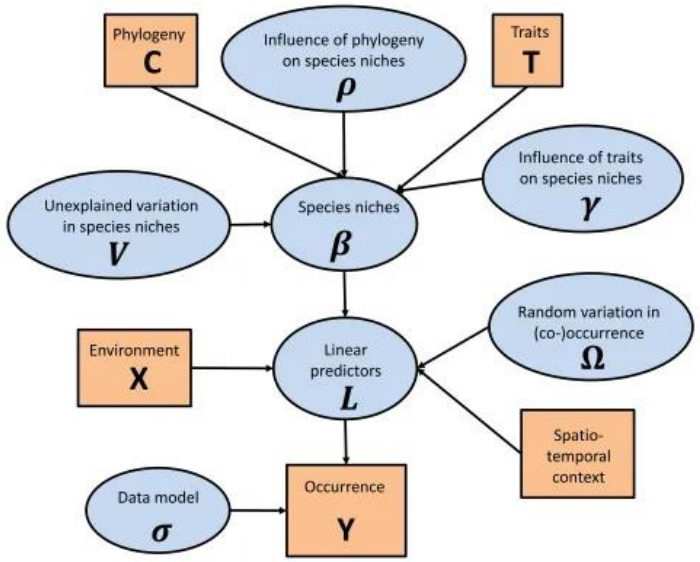
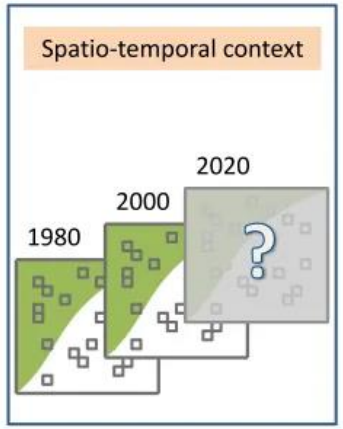
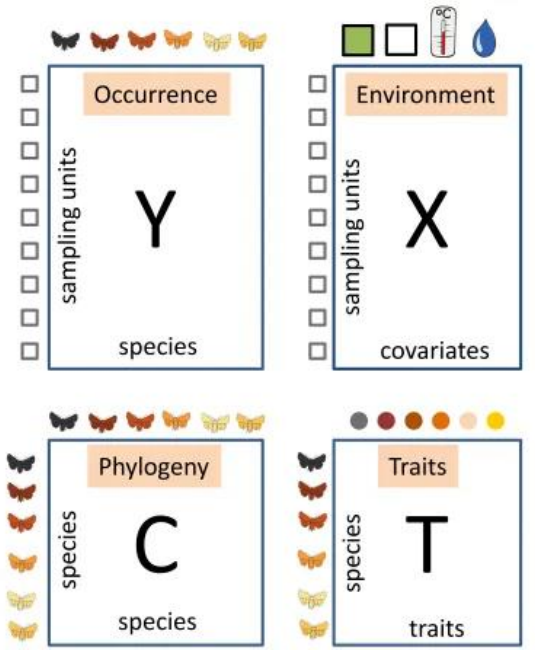


Figure 2. The $\log_{10}$-transformed number of IAS (invasive alien species) per 10 km × 10 km grid cell in the three data sources (a) GBIF, (b) EASIN and (c) eLTER (updated March 2024). Only observations made after 1980 were considered. For EASIN data, only data from data providers other than GBIF are shown. (Checklist n = 1,361; February 2024 from FloraVeg.EU) *Khan et al., 2024*.

- Predictive Digital Twin.
- State data ranging in ~ 100s of GBs.
- No direct data collection/sensor access.
- SDM = Hierarchical Modelling of Species Communities (HMSC).

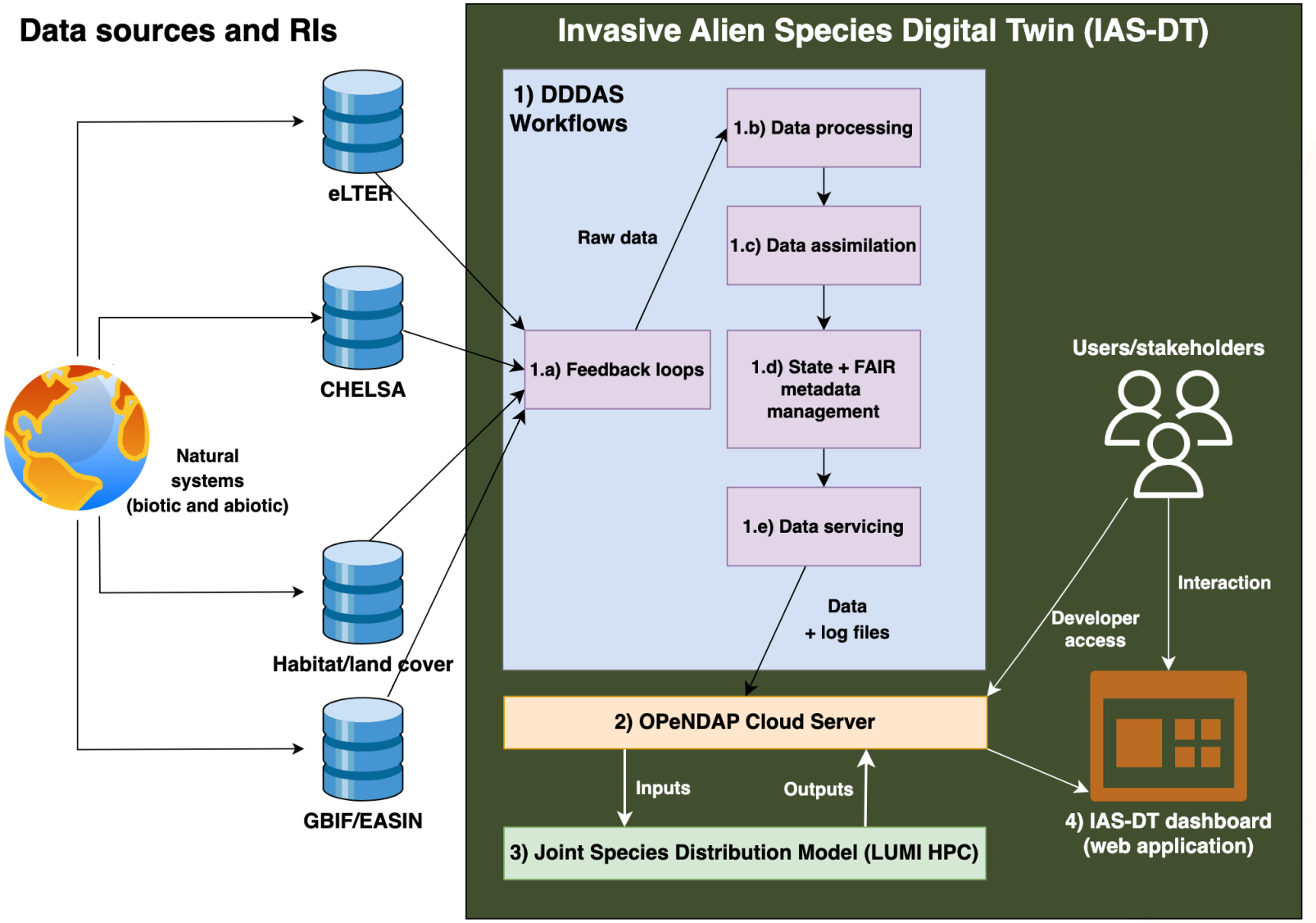


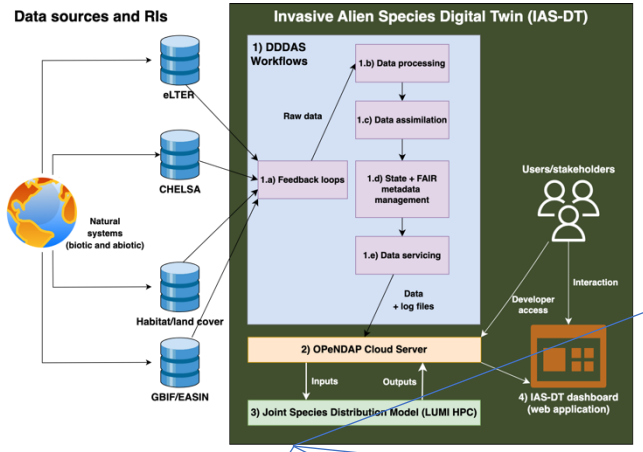




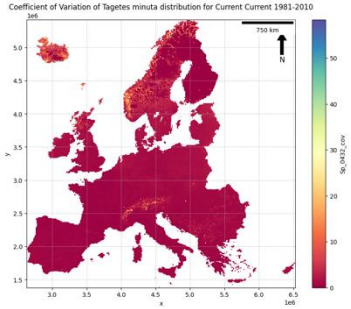
Source: Ovaskainen et al. 2017a

Architecture

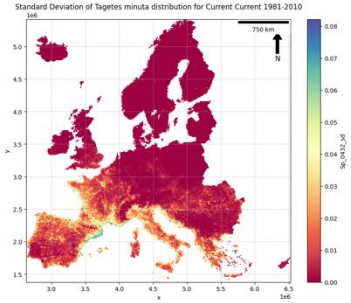




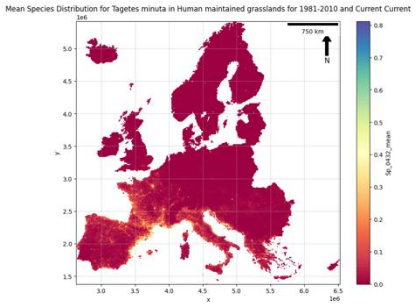
Coefficient of variation maps



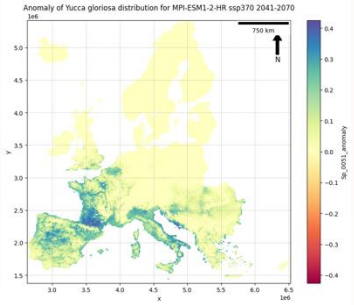
Standard deviation maps



Species richness (level of invasion) maps



Prediction anomaly, future maps – current maps



Outputs available on Rshiny or OpeNDAP server

10x10 KM grids

Invasive Alien Species Prototype Digital Twin

BIODT biodiversitydigitaltwin

Info | Data

Select parameters

Habitat:

Forests

Data Type:

- Mean
- Standard Deviation
- Uncertainty

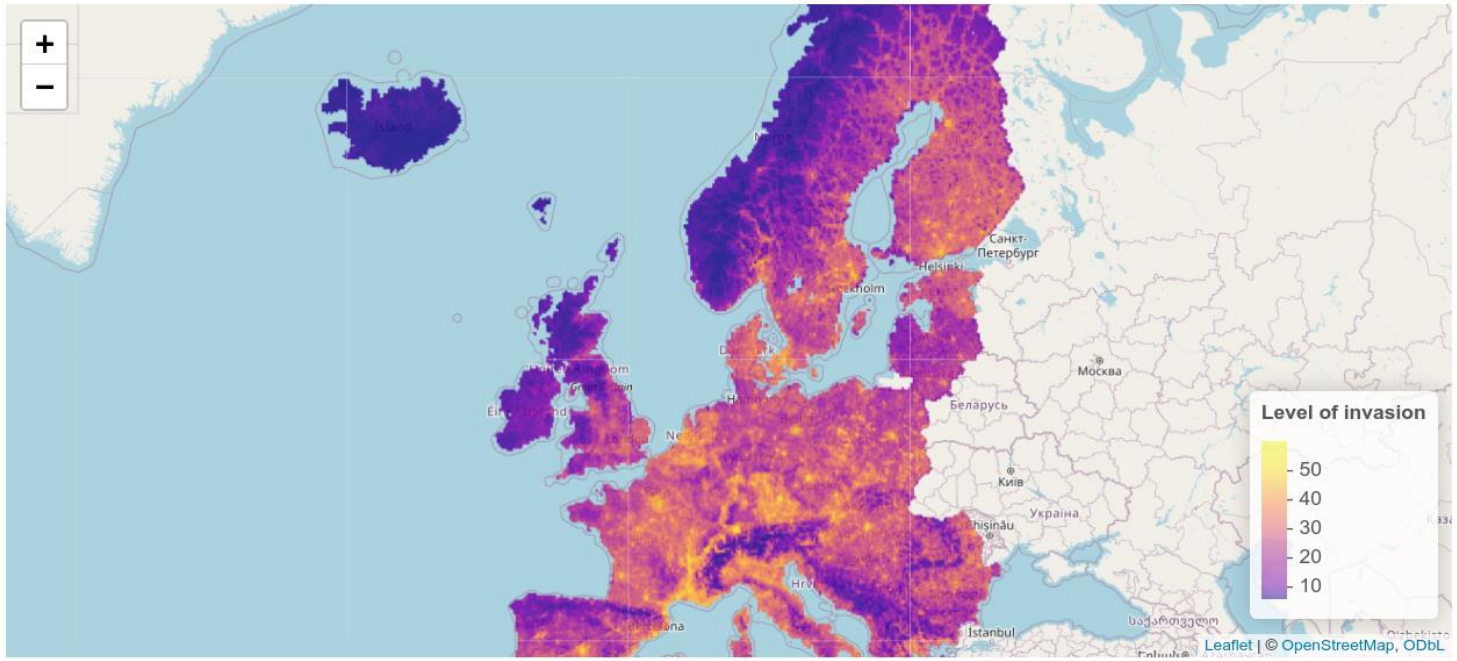
Time Frame:

- Present
- Future

Species OFF

Download TIFF File

pDT-IAS



Habitat: **Forests** | Data Type: **Mean** | Time Frame: **Present**

Time Period: **1981-2010** | Climate Model: **Current** | Climate Scenario: **Current**

Workflows available on Github

README | MIT license

Workflows for the Invasive Alien Species Digital Twin (IASDT), as part of the Horizon Europe project tiled Biodiversity Digital Twin.

> This is a collection of PyDoit workflows for data processing, data assimilation, state management, metadata management, data and HPC servicing, and job orchestration in the IASDT.

Overview Paper: DOI 10.1101/2024.07.23.604592

Code DOI: DOI 10.5281/zenodo.14756907

> **Caution**
>
> This repository is under active development and is not yet ready for public use. Please contact the author for more information.

> **Tip**
>
> The branching in this repository is named after each HPC system where the workflows are executed. For example, the `lumi` branch contains the workflows for the LUMI supercomputer, which is the main branch.

BioDT/uc-ias-workflows

http://opendap.biodt.eu

OPeNDAP Data Catalog

Home Documentation

Name	Size	Last modified	DAP Response Links
grasslands-pdt/	–	2025-02-11 16:14:02	–
ias-pdt/	–	2025-02-07 18:11:36	–
sample/	–	2024-07-15 09:26:01	–

THREDDS Catalog XML

pydap 3.5 (author: Roberto De Almeida). This is a repackaged pydap version released under the MIT license (c) 2025 by Taimur Khan.

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Funded by
the European Union