

Orchestrating the b3verse: Elevating Research Software through a Modular R Package Ecosystem

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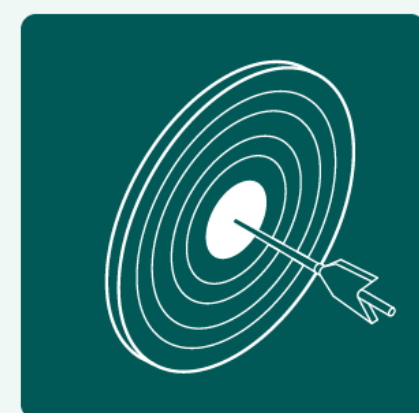
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BACKGROUND



The global biodiversity crisis requires **rapid and reliable biodiversity data** to evaluate policy



B-Cubed aims to **standardise biodiversity data into data cubes** empowering policy-makers to address biodiversity change

APPROACH & PACKAGE ECOSYSTEM

Need for a **reproducible and robust workflow**:

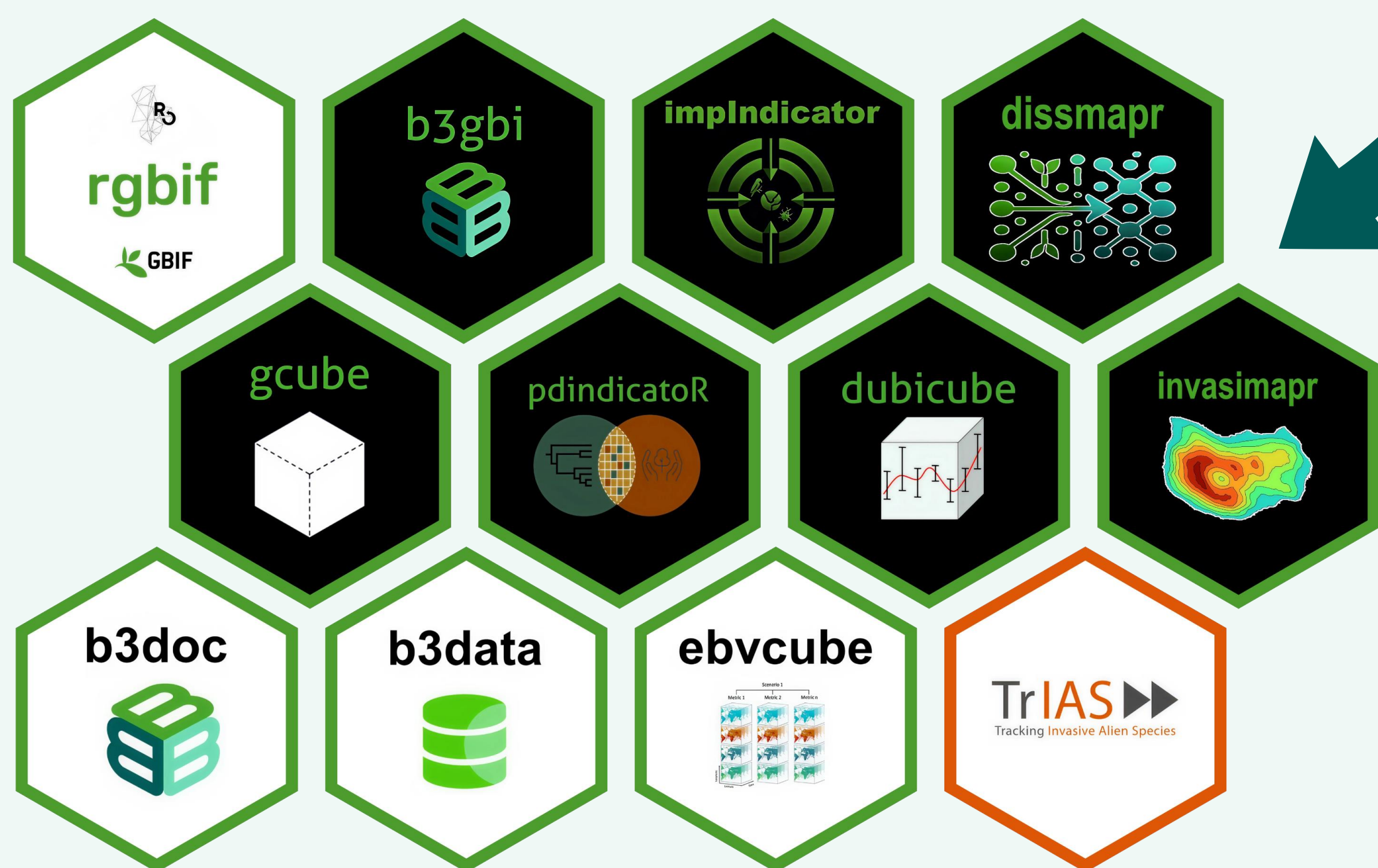
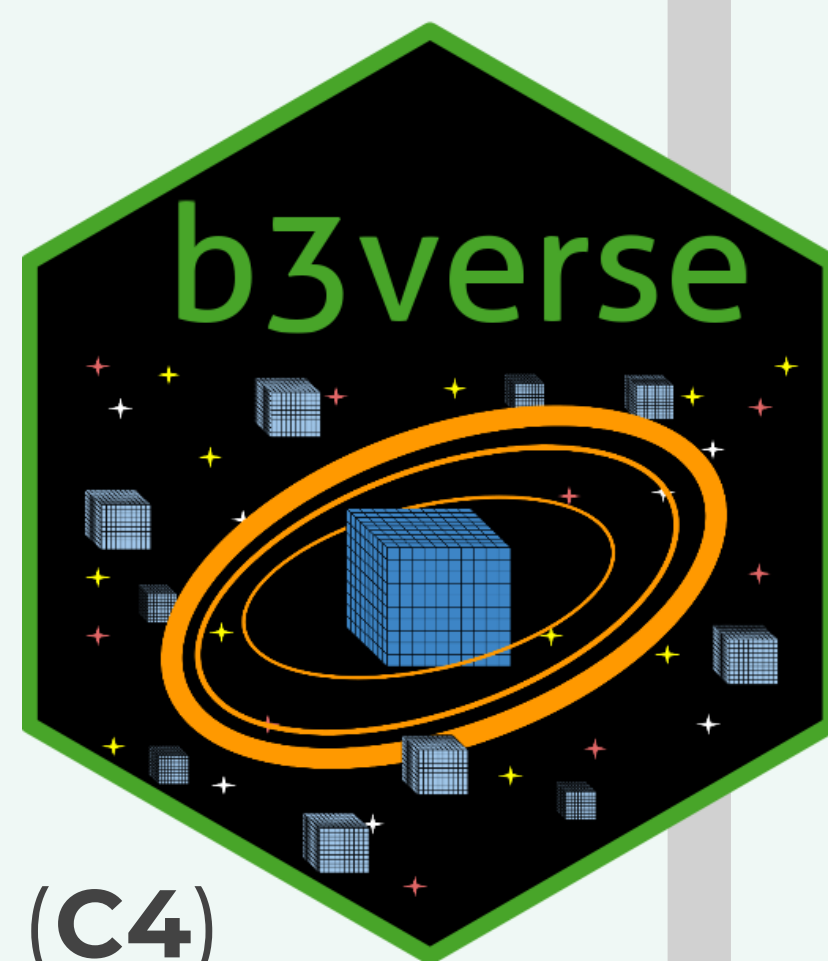
1. Generate data cubes
2. Process and explore data cubes
3. Analyse cubes (e.g., indicator calculation, statistical modelling)
4. Interpret and visualise results

Approach:

Create a group of interconnected R packages → **b3verse**

Challenges:

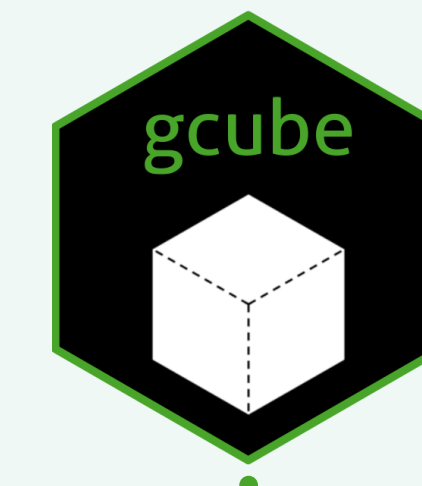
cooperation (C1), interoperability (C2), automation (C3), accessibility and outreach (C4)



THE ANALYSIS WORKFLOW

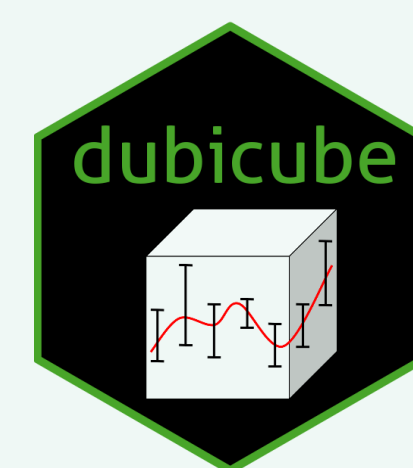
1. Data generation

Download biodiversity data cubes



Simulate cubes

2. Data processing



Data exploration and filtering

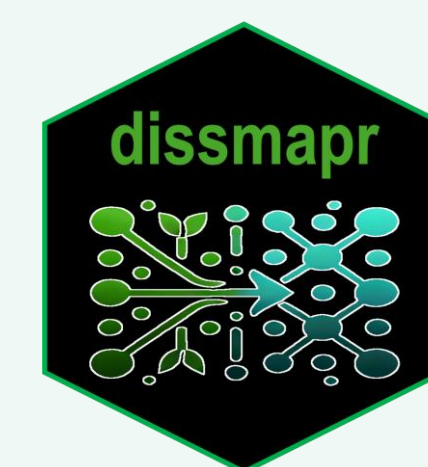


b3gbi::process_cube()

"gatekeeper" function: validates and standardises data cube input (C2)

3. Data analysis

statistical modelling



Compositional dissimilarity

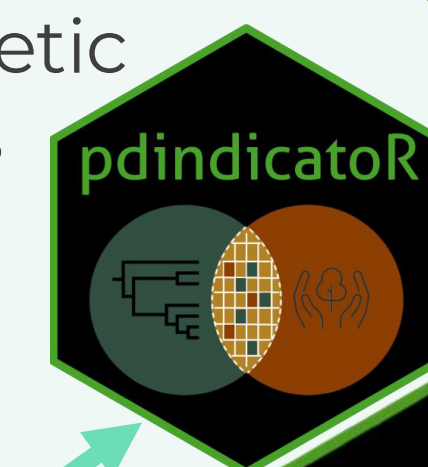


Invasion fitness

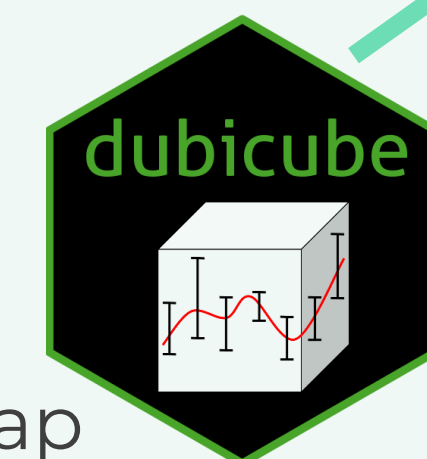
indicator calculation



Phylogenetic indicators



General indicators

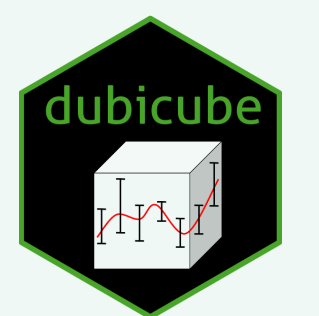
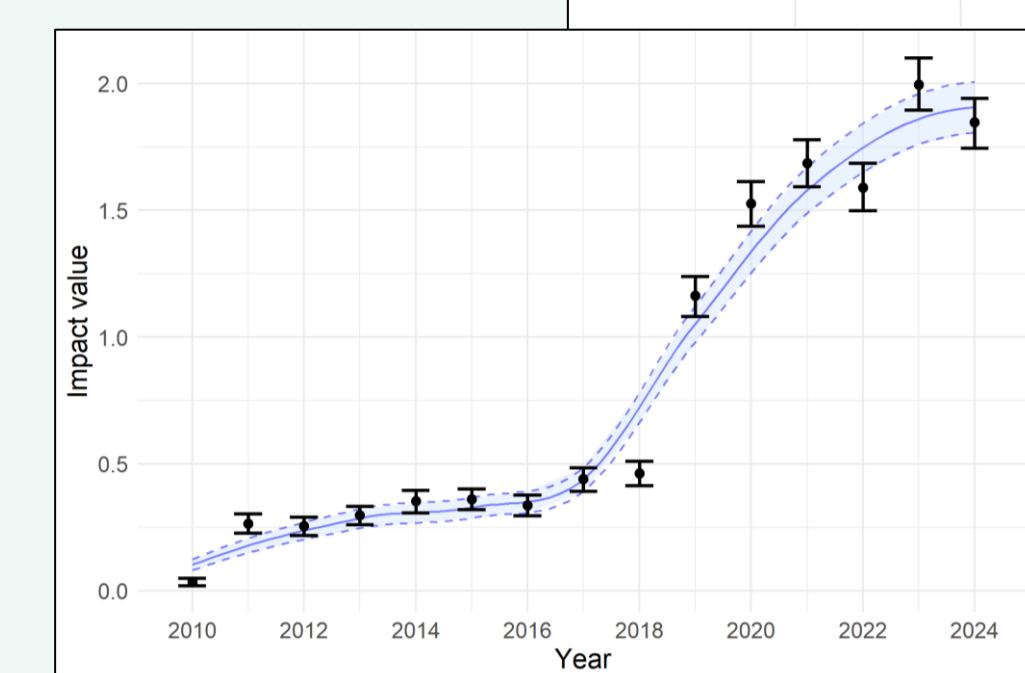
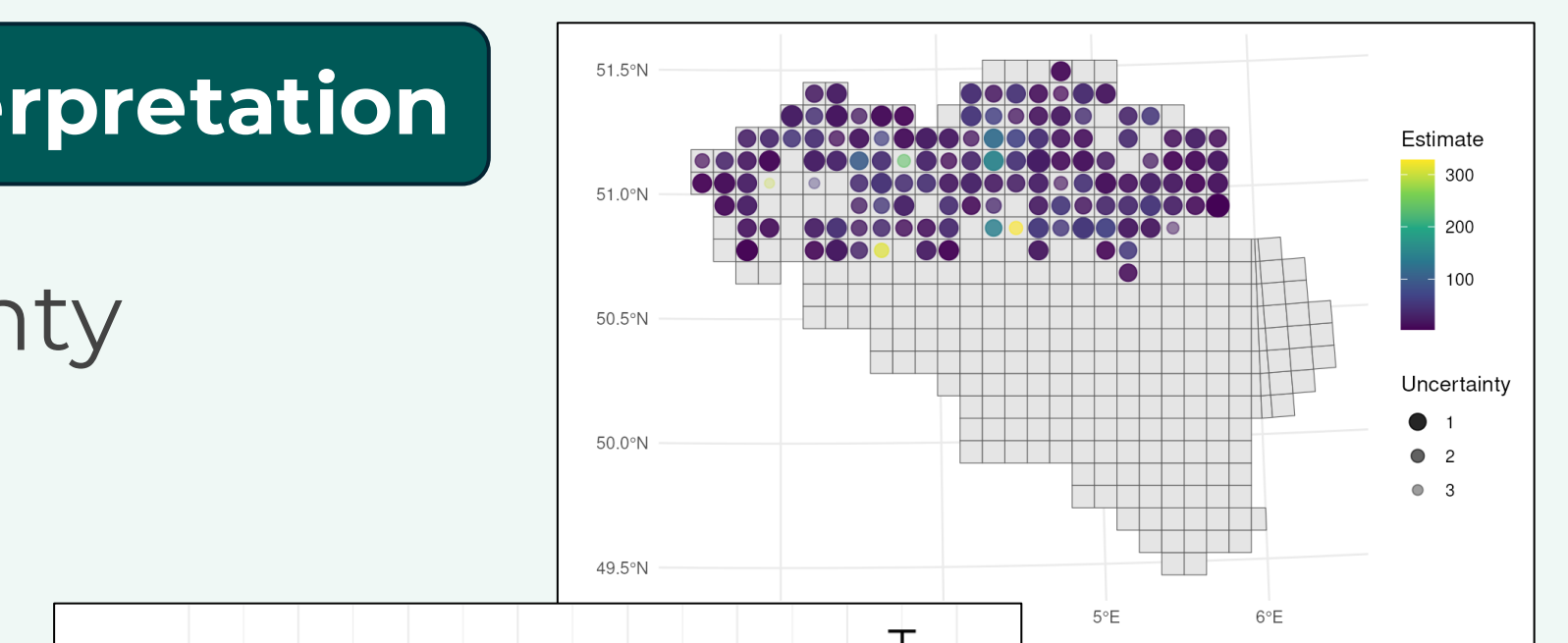
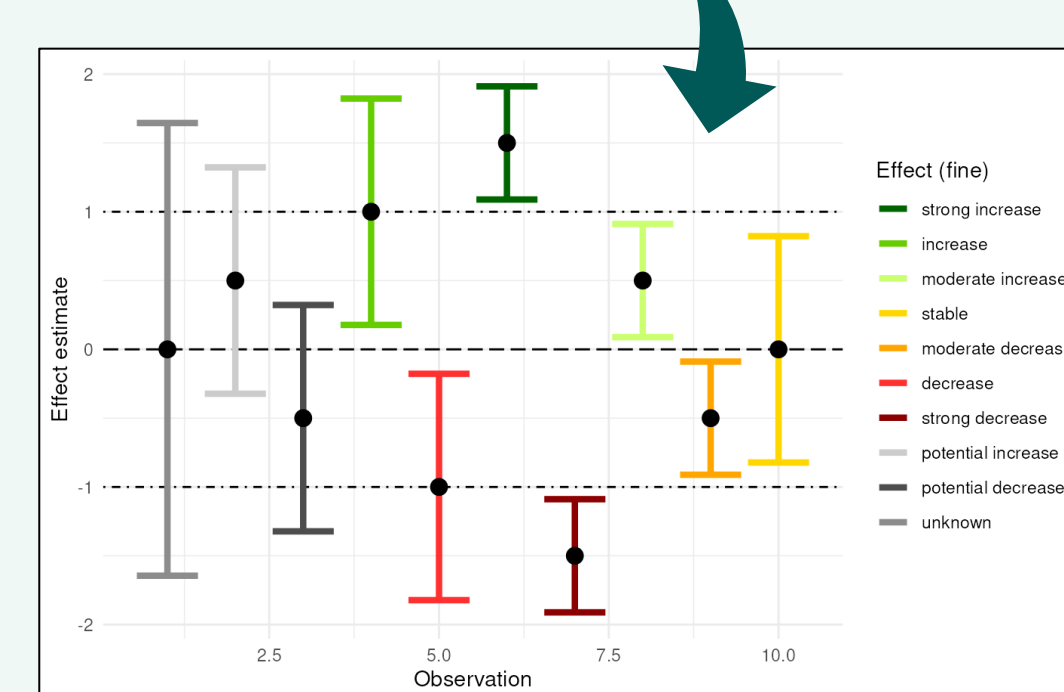


Alien impact indicators

Bootstrap interval calculation

4. Visualisation and interpretation

- Visualising uncertainty
- Effect classification



DISTRIBUTION & SUSTAINABILITY

Technical Governance

Shared Dev Guide (C1):

- R coding conventions
- doc standards

GitHub Workflow (C1, C3):

- collaboration
- automated checks

R-Verse Infrastructure

Package Repository (C4):

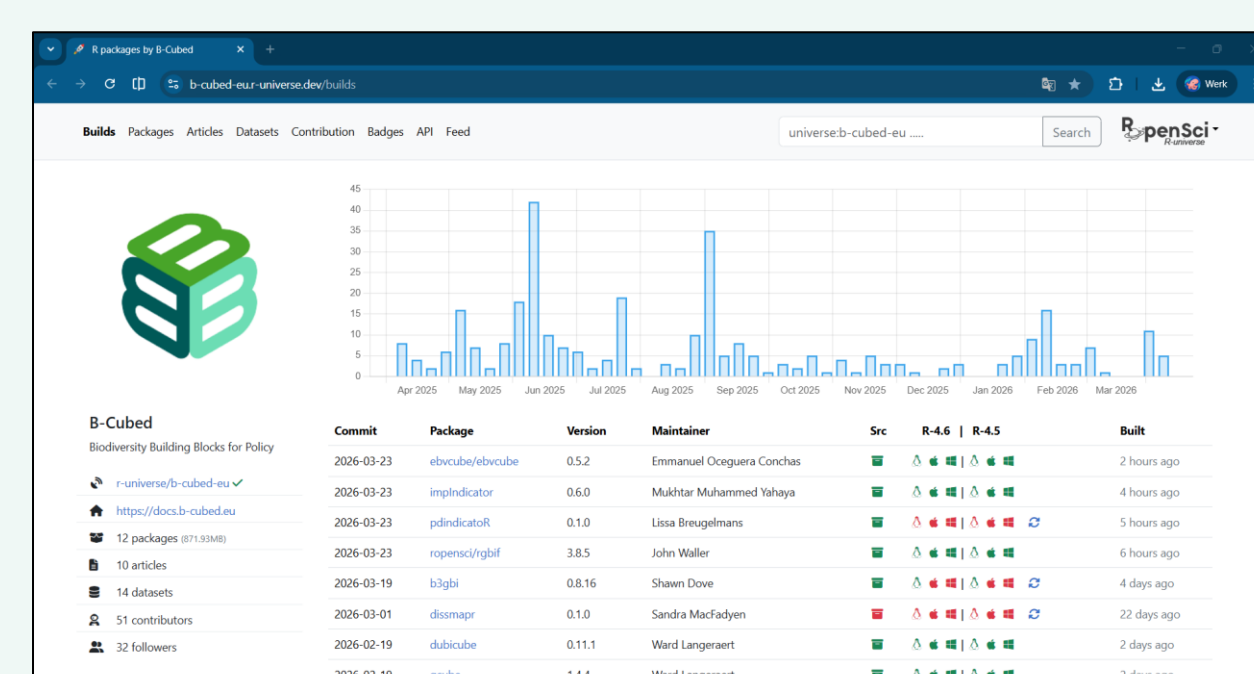
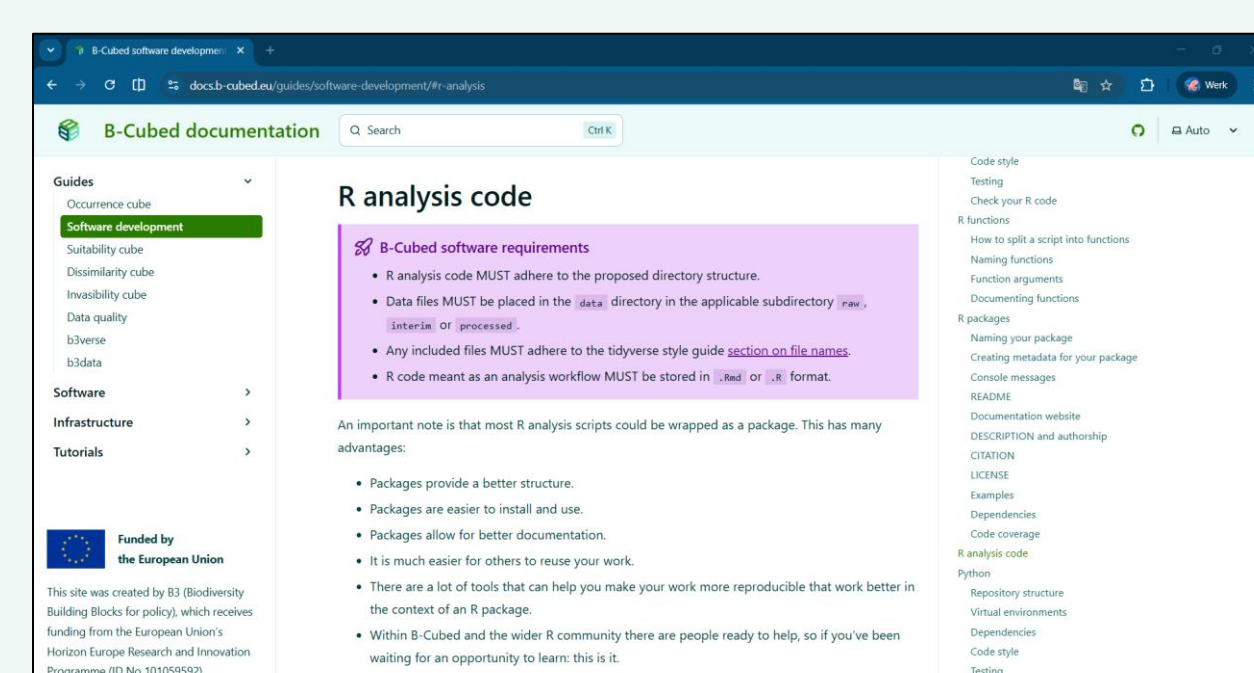
- searchable catalogue

Automated Builds (C3):

- auto-updates via GitHub

Global Access (C4):

- high visibility
- easy installation



```
install.packages(
  "gcube",
  repos = c("https://b-cubed-eu.r-universe.dev",
            "https://cloud.r-project.org")
)
```



Outreach & Data

Central Doc Website (C4):

- tutorials and tech guides

b3data Data Package (C2):

- shared Frictionless datasets

Community Engagement (C4):

- workshops
- open guidelines



```
library(frictionless) # install.packages("frictionless")

b3data_package <- read_package(
  "https://zenodo.org/records/15211029/files/datapackage.json"
)

b3data_package
#> A Data Package with 2 resources:
#> • bird_cube_belgium_mgrs10
#> • mgrs10_refgrid_belgium
#> For more information, see <https://doi.org/10.5281/zenodo.15211029>.
#> Use `unclass()` to print the Data Package as a list.

bird_cube_belgium <- read_resource(b3data_package, "bird_cube_belgium_mgrs10")
```

