

WP4 - Blue-Cloud Virtual Labs for demonstrating cross- domain web-based open science

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eosc

Blue-Cloud2026



The Global Fisheries Atlas VLab.

A FAIR-compliant entry point for end users to discover, access and understand the state of stocks and fisheries worldwide.

IRD, FORTH & CNR (with FIRMS partnership)

Julien Barde



Funded by
the European Union

Can you tell me :

- **if I can still eat tuna ?**
- **if this stock is sustainable / overexploited?**
- **what are the sustainable fisheries for this species ?**

=> Need to provide and update resources describing Fisheries activities
(data, information, knowledge..but also methods and tools) in different ways
(general public, scientists, data managers..)



Facilitate the yearly update of key products:

- e.g. products endorsed by FIRMS (FAO, RFMOs + research bodies)
 - Global Records of Stocks and Fisheries (GRSF) knowledge base
 - Global Tuna Atlas datasets
- tackle challenges of a yearly update:
 - governance issue: data providers should comply with standards
 - run FAIRification process for heterogeneous datasets
 - open science: **ensuring the reproducibility of the work is not an option !**
 - e.g. Tuna Atlas was only executed on a PC few years ago: hardly reproducible (not versioned / PC dependant)
 - what if the guy in charge leaves / retires ?
- FAIR data management:
 - discovery and long term access with DOIs
 - interoperability by implementing widely used standards
 - rich usage metadata (including provenance)

“Global Fisheries Atlas” VLab **main outcomes:**

- **methods and tools** for the FAIR management of (a) stocks and fisheries data, and (b) fisheries spatial (gridded) data.
- **end products** for various users:
 - harmonized **knowledge base**: semantic integration of heterogeneous datasets:
 - unified view of heterogeneous data collections
 - links and connections with various knowledge bases and thesauri
 - complex query answering (i.e. that can be achieved by combining data from different collections)
 - harmonized **datasets**: standardization by complying with OGC, CWP, DwC formats and access protocols,
 - generic **apps**: map viewers, dashboards..
- **Fisheries data => biological EOV** (e.g. biodiversity beyond EEZ..)

FAIRification of stocks and fisheries resources (data, information, knowledge, code..):

- **Findable** with discovery metadata for efficient retrieval
- **Accessible** with different formats & protocols (e.g. resource catalogues, APIs, SPARQL endpoint etc.)
- **Interoperable** by complying with standards (e.g. OGC + semantic Web technologies and universal identifiers interlinked with other relevant public data sources: URIs of FishBase, GBIF, etc.)
- **Reusable + Reproducible**: rich metadata + DOIs



Deluge + Chaos in many domains



Source: [armyupress](#)

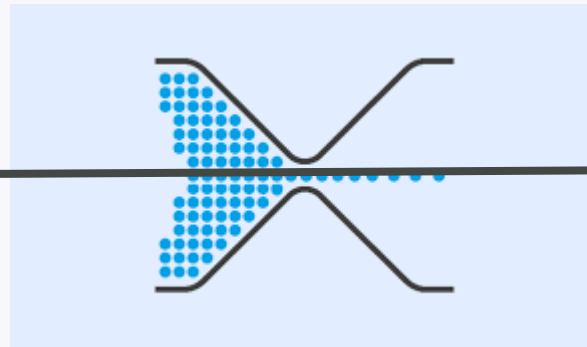


Data deluge + Data chaos

- heterogeneous
- lack of standards
- data managers overloaded
- “good will” vs policy enforcement

Data Bottleneck = FAIRification

- clean the mess
- standardization

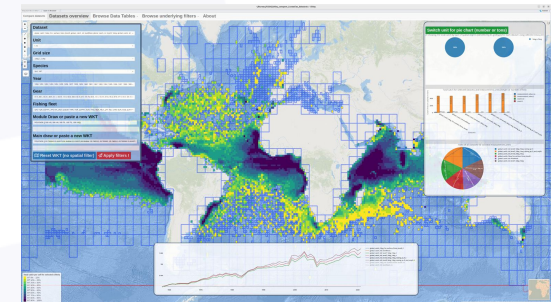
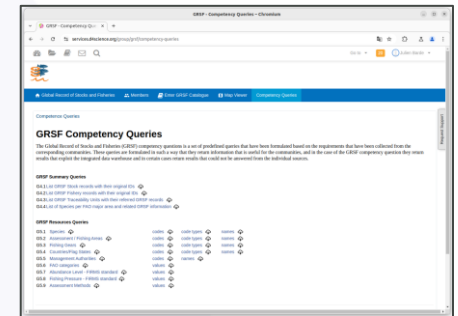
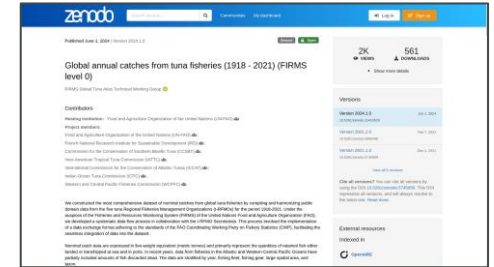


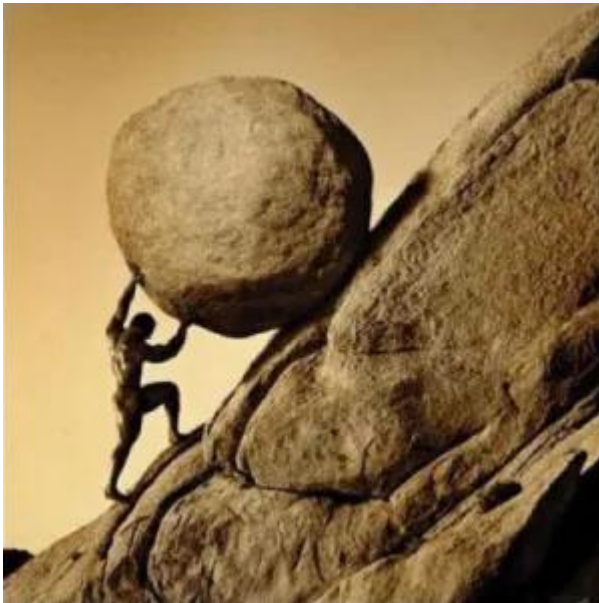
end products

Knowledge
e.g. GRSF

Data
e.g. GTA

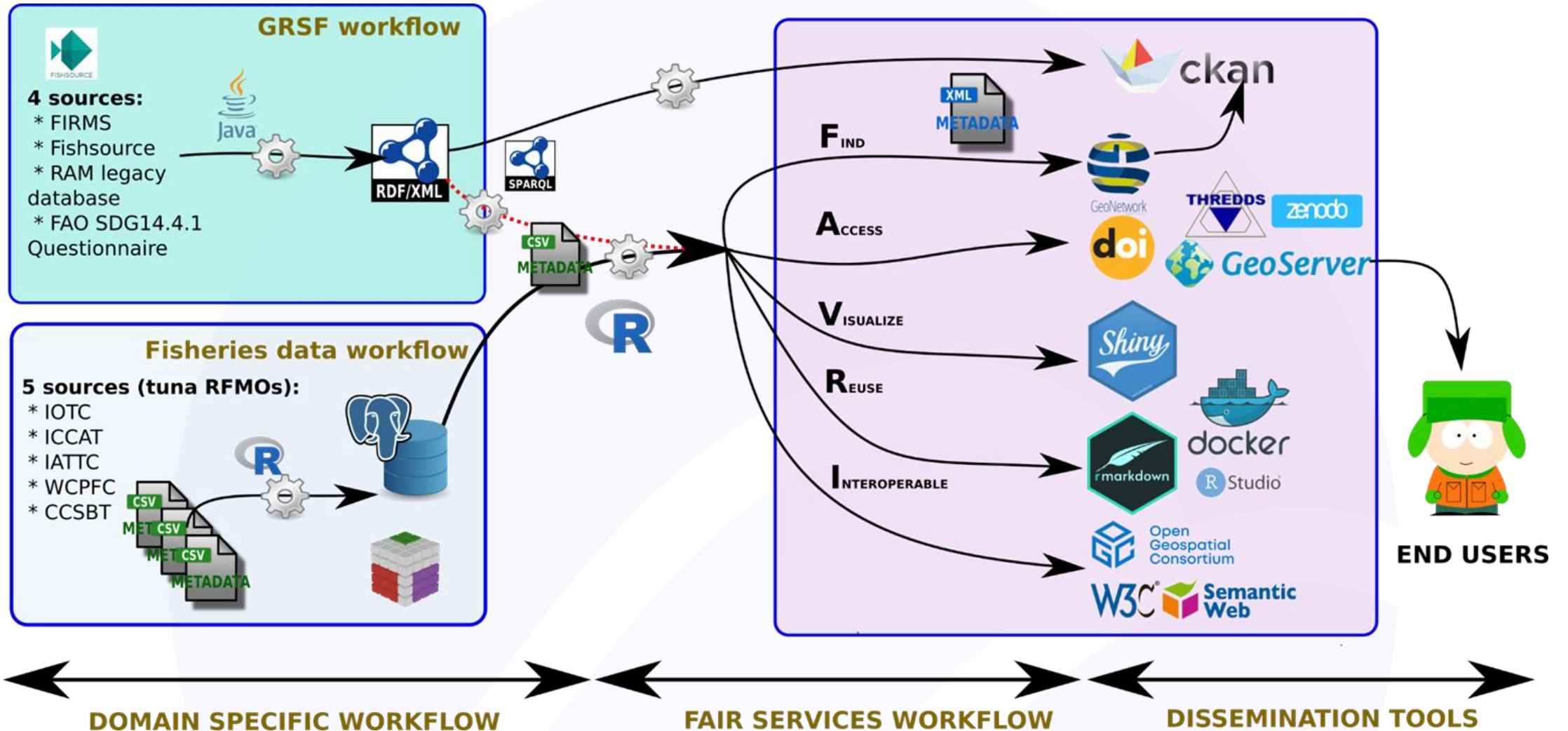
Apps





**How does it feel to
create an exhaustive
Global Fisheries Atlas ?**





GRSF impact to the scientific community

- Enhanced data discovery and access, by providing better indexing and annotation of datasets.
- Improved interdisciplinary collaboration, by exploiting standardized vocabularies and ontologies used for semantically integrating datasets making data understandable across disciplines
- Increased data longevity and utility, since well structured and enriched integrated datasets can be re-used without extensive reprocessing

Global (Tuna) Fisheries Atlas VLab provides:

- FAIRified datasets for the **5 tuna RFMOs** (for a total of 20) as a proof of concept:
 - relevant standards for our domain (**OGC** standards as a basis):
 - **CWP** gridded data: catch, effort, conversion factors
 - higher resolution: Darwin Core format (**DwC**) for biodiversity extended for fisheries,
 - **DOI** assigned to both data and code with virtual environments snapshots: reproducible and transparent
- we can not FAIRify all fisheries data but we **share a VLab with a generic workflow** which can foster data generation & FAIRification
- **generic apps** to generate atlases once data are FAIR: e.g. Map viewers / dashboards

- The latest version of GRSF (refreshed on September 2024) consists of:
 - > 36,000 records
 - Three types of records: Stocks, Fisheries, Traceability Units
 - From 4 distinct data sources
 - > 500 thousand timeseries
 - > 1,400 marine species

Explore knowledge

Records Search

Insert keywords here



[See All Records](#)

[See All Tags](#)

GRSF Catalogue statistics

36.1k records **5** organisations **23** groups **6** types

Browse by Organisations



Global Record of Stocks and Fisheries (GRSF) (25929)



FishSource (6628)



RAM Legacy Stock Assessment Database (1512)



Fisheries and Resources Monitoring System (FIRMS) (1259)



FAO SDG 14.4.1 Questionnaire (778)

[See All Organisations](#)

Home / Organisations / Global Record of Stocks ... / **Scombridae - Maldives**

Scombridae - Maldives

Followers
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Organisation

Global Record of Stocks and Fisheries (GRSF)

There is no description for this organisation

License
Creative Commons Attribution Share-Alike 4.0
[OPEN DATA](#)

[Record](#) [Groups](#)

Scombridae - Maldives PRIVATE

Short Name: Little tuna - Maldives
GRSF Semantic Identifier: asfis:MAX+eez:MDV
Record URL: https://data.d4science.org/ctlg/GRSF_Admin/a75c7b67-166d-3af0-b318-ce5a35ce0255

[Citation](#)

Map Preview

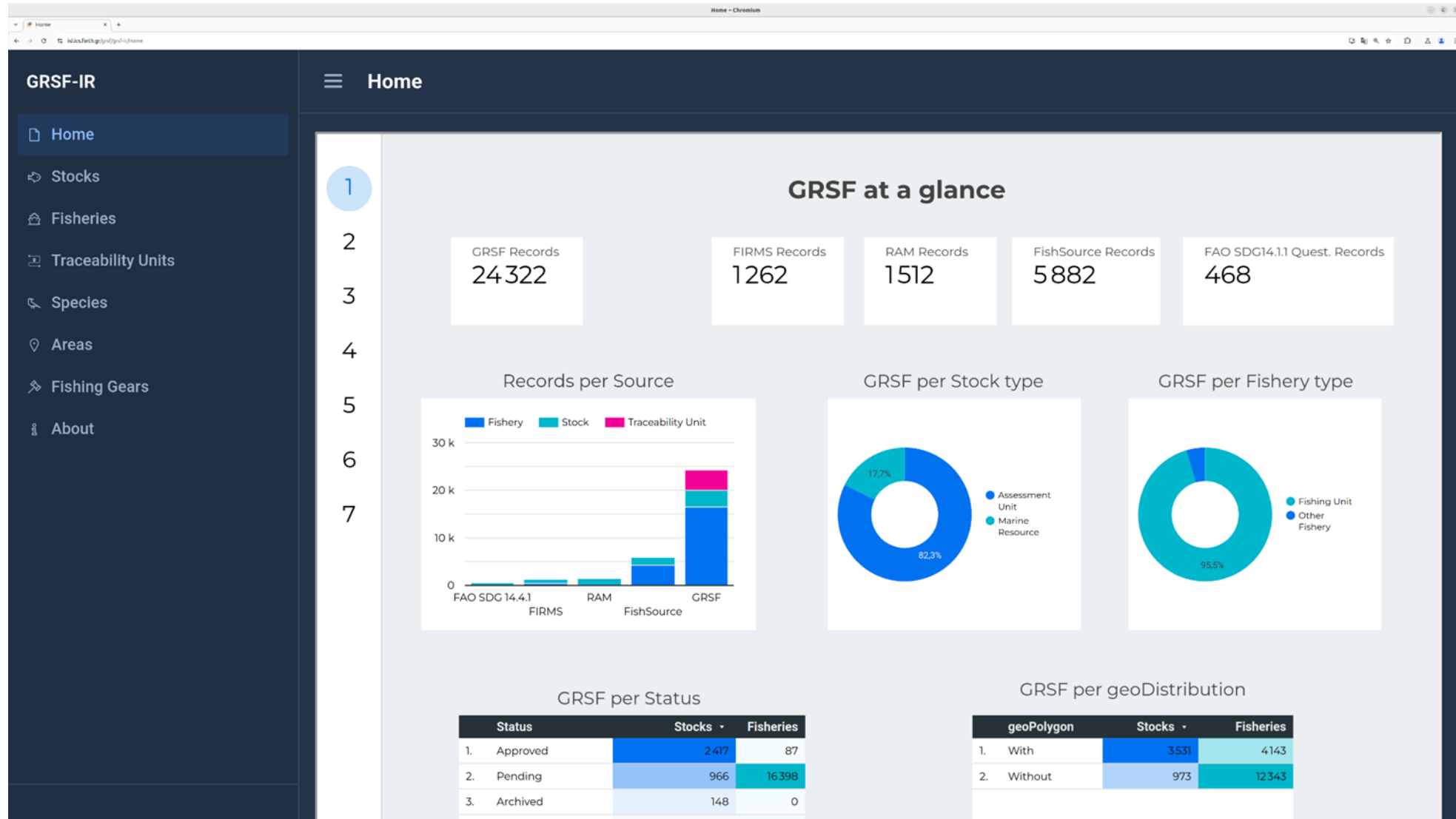
Tags

Assessment Unit Code 51 System fao Name Indian Ocean Western

Code 57 System fao Name Indian Ocean Eastern

Code MAX Classification System ASFIS Scientific Name Scombridae

Code MDV System eez Name Maldives National not connected without similar records



Yearly updates of time series have been assigned new version DOIs



zenodo Search records... Communities My dashboard Log in Sign up

Published June 1, 2024 | Version 2024.1.0 Dataset Open

Global annual catches from tuna fisheries (1918 - 2021) (FIRMS level 0)

FIRMS Global Tuna Atlas Technical Working Group

Contributors

Hosting institution: Food and Agriculture Organization of the United Nations (UN-FAO)

Project members:

- Food and Agriculture Organization of the United Nations (UN-FAO)
- French National Research Institute for Sustainable Development (IRD)
- Commission for the Conservation of Southern Bluefin Tuna (CCSBT)
- Inter-American Tropical Tuna Commission (IATTC)
- International Commission for the Conservation of Atlantic Tunas (ICCAT)
- Indian Ocean Tuna Commission (IOTC)
- Western and Central Pacific Fisheries Commission (WCPFC)

We constructed the most comprehensive dataset of nominal catches from global tuna fisheries by compiling and harmonizing public domain data from the five tuna Regional Fisheries Management Organizations (t-RFMOs) for the period 1918-2021. Under the auspices of the Fisheries and Resources Monitoring System (FIRMS) of the United Nations Food and Agriculture Organization (FAO), we developed a systematic data flow process in collaboration with the t-RFMO Secretariats. This process involved the implementation of a data exchange format adhering to the standards of the FAO Coordinating Working Party on Fishery Statistics (CWP), facilitating the seamless integration of data into the dataset.

Nominal catch data are expressed in live-weight equivalent (metric tonnes) and primarily represent the quantities of retained fish either landed or transhipped at sea and in ports. In recent years, data from fisheries in the Atlantic and Western-Central Pacific Oceans have partially included amounts of fish discarded dead. The data are stratified by year, fishing fleet, fishing gear, large spatial area, and taxon.

2K VIEWS **561 DOWNLOADS**

Show more details

Versions

Version	Date
Version 2024.1.0 10.5281/zenodo.11410529	Jun 1, 2024
Version 2021.2.0 10.5281/zenodo.5999286	Feb 7, 2022
Version 2021.1.0 10.5281/zenodo.5745959	Dec 1, 2021

View all 3 versions

Cite all versions? You can cite all versions using the DOI [10.5281/zenodo.5745959](https://doi.org/10.5281/zenodo.5745959) represents all versions, and will always represent the latest one. [Read more.](#)

View all 3 versions

External resources

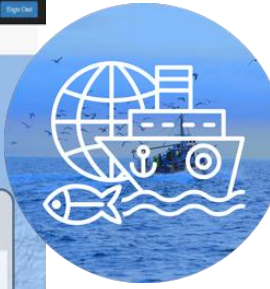
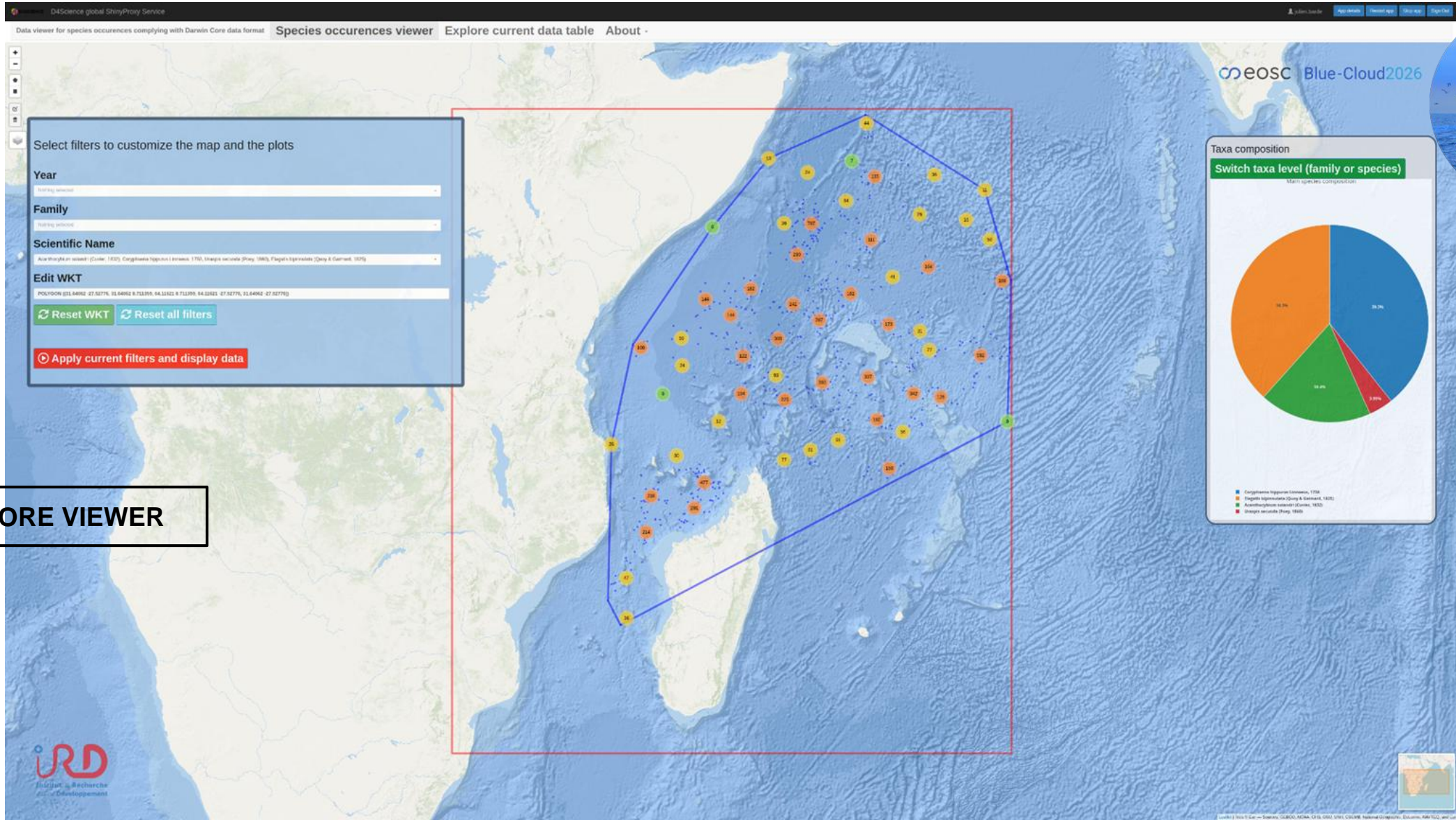
Indexed in

OpenAIRE

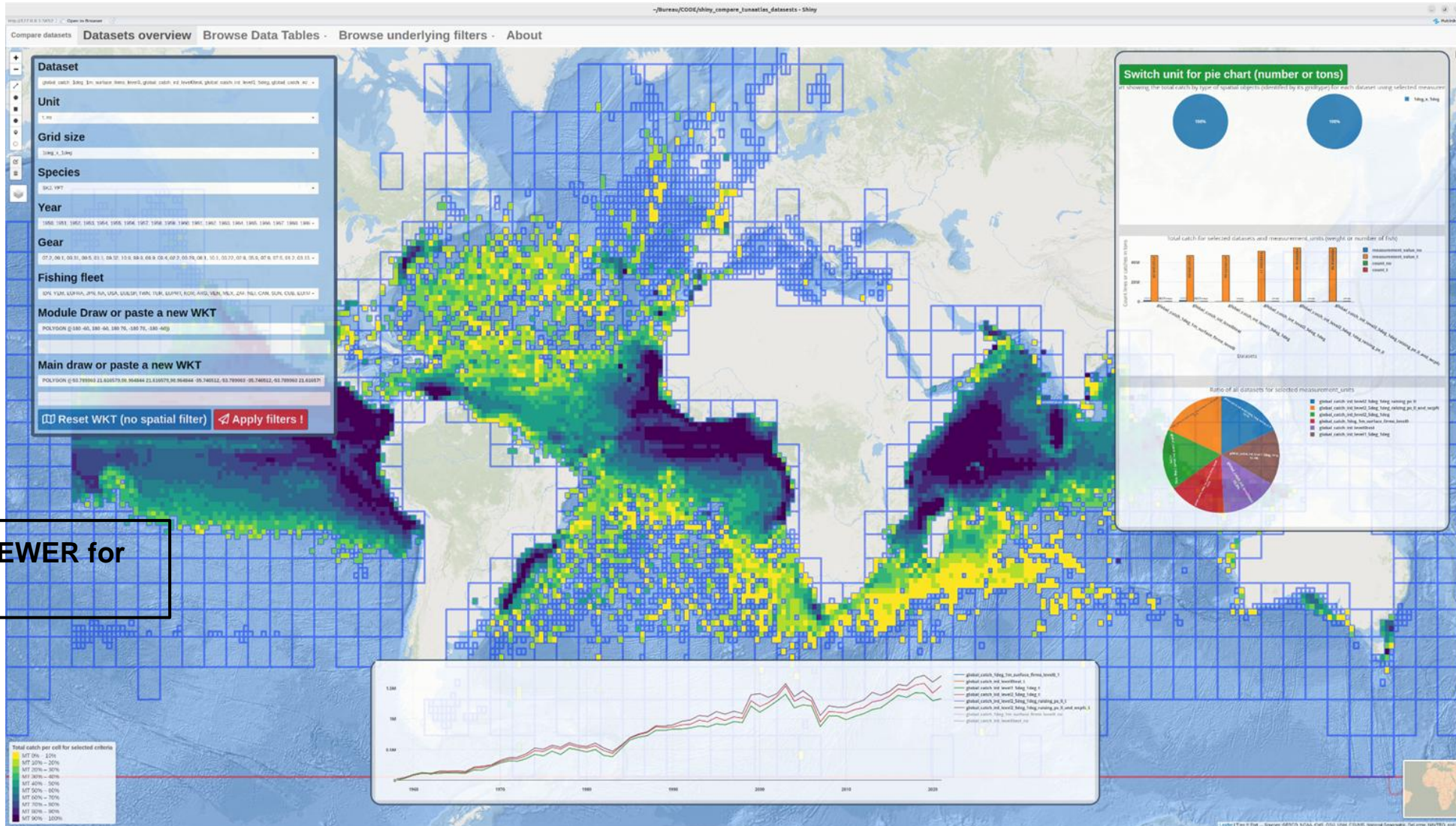


DOIs assigned :

- data : new version DOIs
- code
 - workflow code
 - shiny apps code



DARWIN CORE VIEWER



CWP format VIEWER for quality control

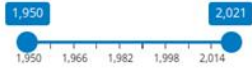


Tuna Atlas: Interactive Indicator General overview **Other dimensions** CSV-based Filtering Dataset table exploring Choosing dataset and gridtype More about How to use this Global Tuna Atlas shiny app ?

source_authority **species** Gear gear_type measurement_unit fishing_mode fishing_fleet species_name species_group gridtype

Submit

Choose a period



Discrete selection of year

Select source authority

ICCAT IOTC WCPFC
CCSBT IATTC

Select All source authority

Select species

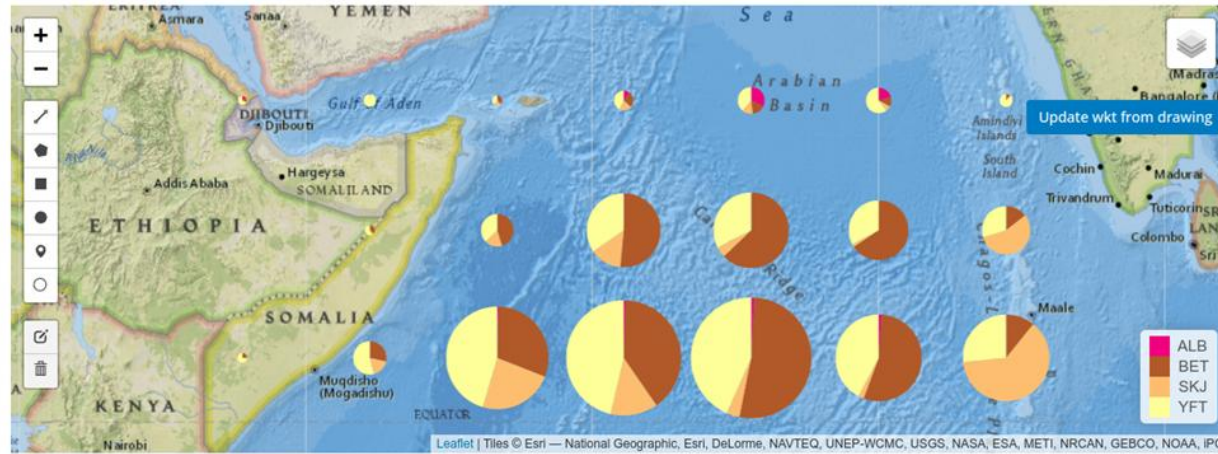
ALB BET SKJ YFT
SBF

Select All Species

Select Major Tunas

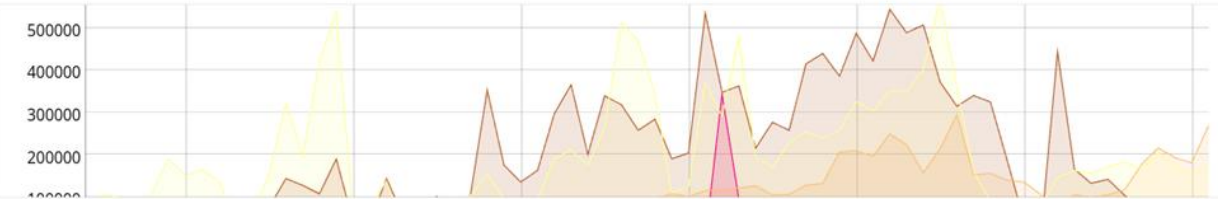
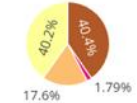
Select Gear

Purse seines
Seine nets nei
Drift gillnets



Distribution for species

BET
YFT
SKJ
ALB



CWP format VIEWER

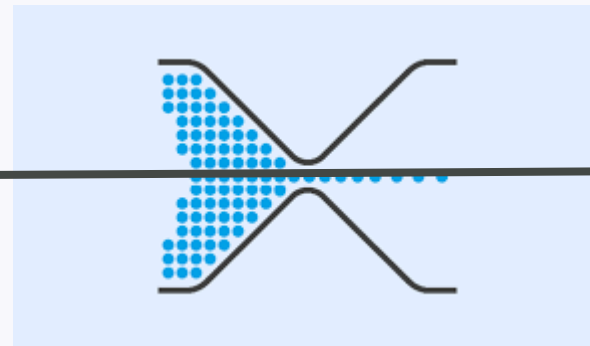


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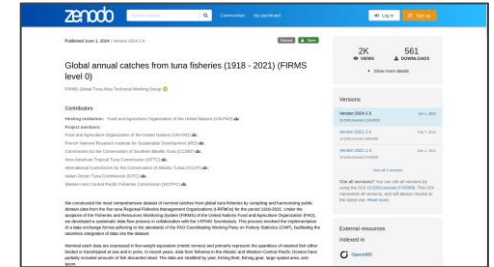
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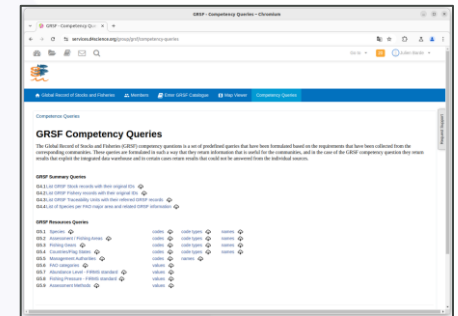


end products

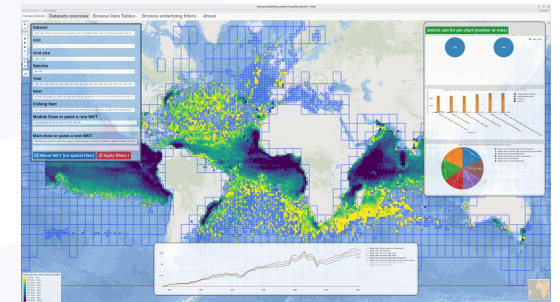
End products:
Data
e.g. GTA



Knowledge
e.g. GRSF



Apps



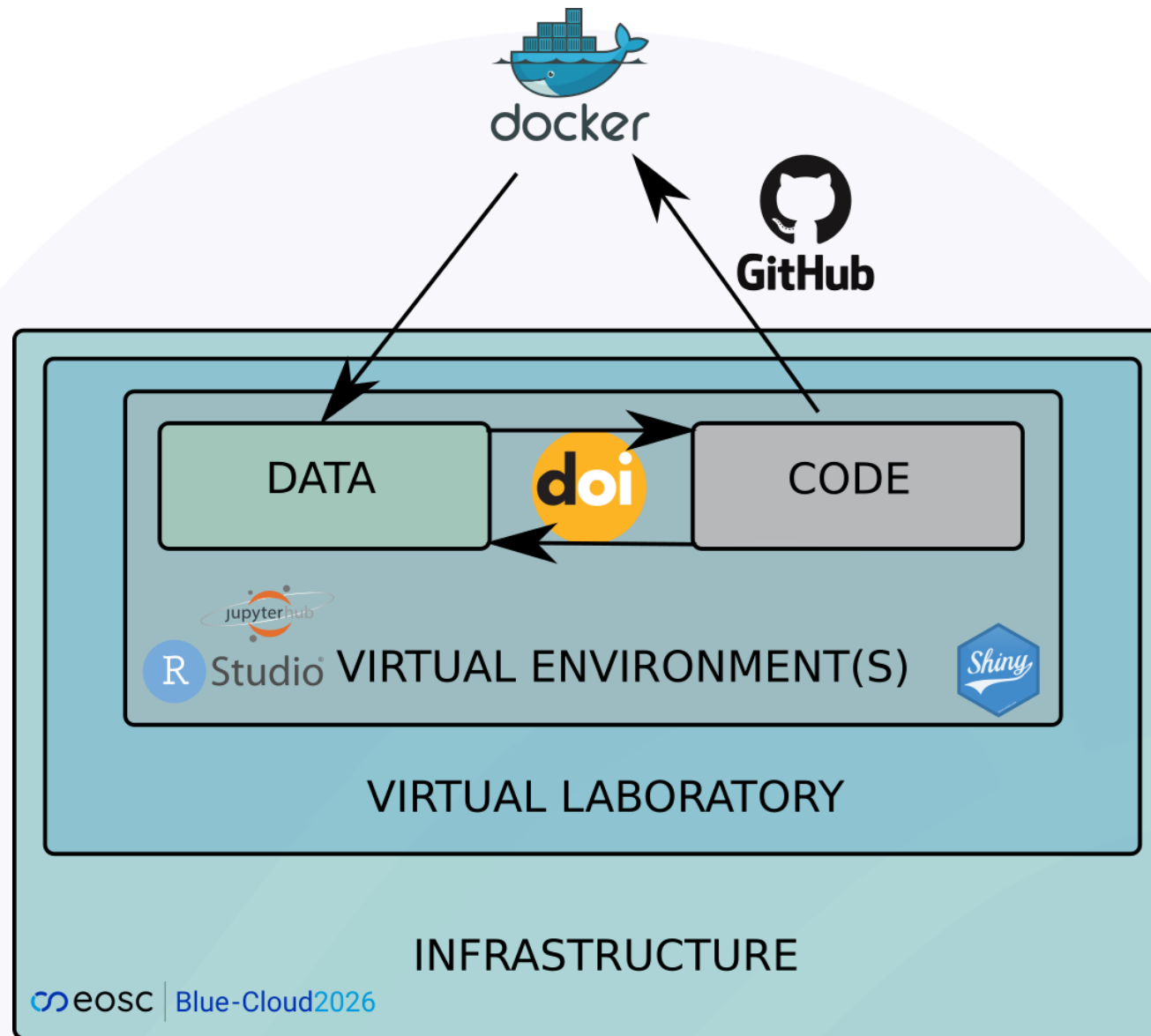
End products for end users: e.g.
Global Fisheries Atlas from data to knowledge

Blue-Cloud 2026 scientific cloud provides a key framework:

- **data bottleneck:** technical feasibility of Fisheries knowledge and data FAIRification (open products, methods and tools)
- **end products** expected in a Global Fisheries Atlas are easily generated once data FAIRified
- **(data chaos)** still remains and can't be fixed by a single project:
 - getting FAIRified data from providers is a governance issue:
 - “good will” vs policy enforcement? Eg EU directives (INSPIRE, Water framework..)
 - FAIRification should be managed by data providers : nobody can clean everything
 - making standards mandatory is not sufficient, collaborative tools are needed to support governance..

Blue-Cloud 2026 scientific cloud proves technical issues can be tackled:

- by **providing services** which don't exist in most of national research organizations (e.g. RStudio and ShinyProxy servers)
- by **acquiring skills** required to implement open science and FAIR data management best practices:
 - slower (at start only) but better science
 - hiring or training young scientists
 - needed whatever the infrastructure => ensures the interoperability of products with other infrastructures including HPC



Collaborative work: working groups or e.g. workshops with 30 attendees

As usual, for each single PC

- install git
- install Rstudio
- clone git repos
- **same R versions on all PCs**
- open R project
- restore renv / download R package versions
- pray, start working, loose your day, works with X % only

With a VLab

- log in
- open RStudio project
- start working
- reproduce
- customize...

Blue-Cloud 2026 VLabs provide expected pillars for Open Science and FAIRification to better manage the products (data, methods, tools):

- ensures long term **access**
 - assigning and combining DOIs of data and code into containers,
 - foster interoperability by complying with standards
- ensures **reproducibility / customization** of the work by newcomers
 - provides self-sufficient environment to develop, generate, reuse and host Fisheries FAIR data products: data, knowledge, apps..
 - works for any Fisheries data => Global Fisheries Atlas
- **interoperability** : fisheries data can feed OOS with E(biological)OV : e.g. better connection with GBIF / EMODNET.. (from Zenodo)

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