IceNet@GalaxyClimate

Vanessa Stoeckl, University of Freiburg, Germany

Thanks to Alejandro Coca-Castro, Anne Fouilloux, Bjoern Gruening, Jean Iaquinta

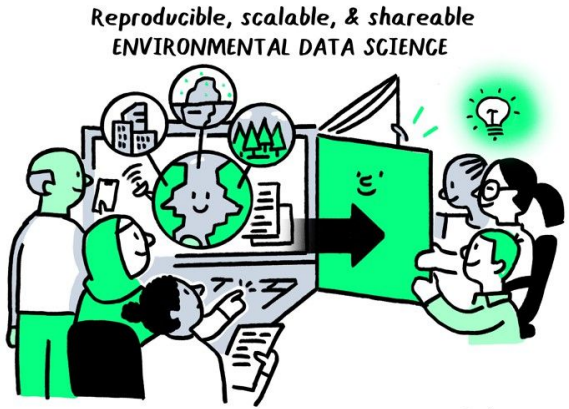
DOI: 10.5281/zenodo.7723371

Agenda

- Environmental Data Science book
- IceNet@EDS
- Galaxy Project for Climate Science
- IceNet@Galaxy

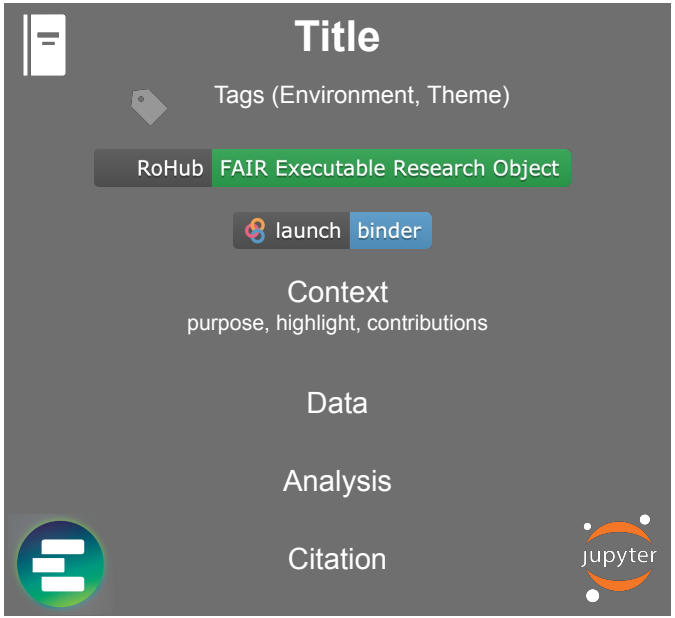
Environmental Data Science (EDS) book

A Community-driven resource for Environmental Scientists



Reliance

RoHub



www.edsbook.org

Open Science and Community of Practice with EDS book

Environmental Data Science book

A Community-driven resource for Environmental Scientists

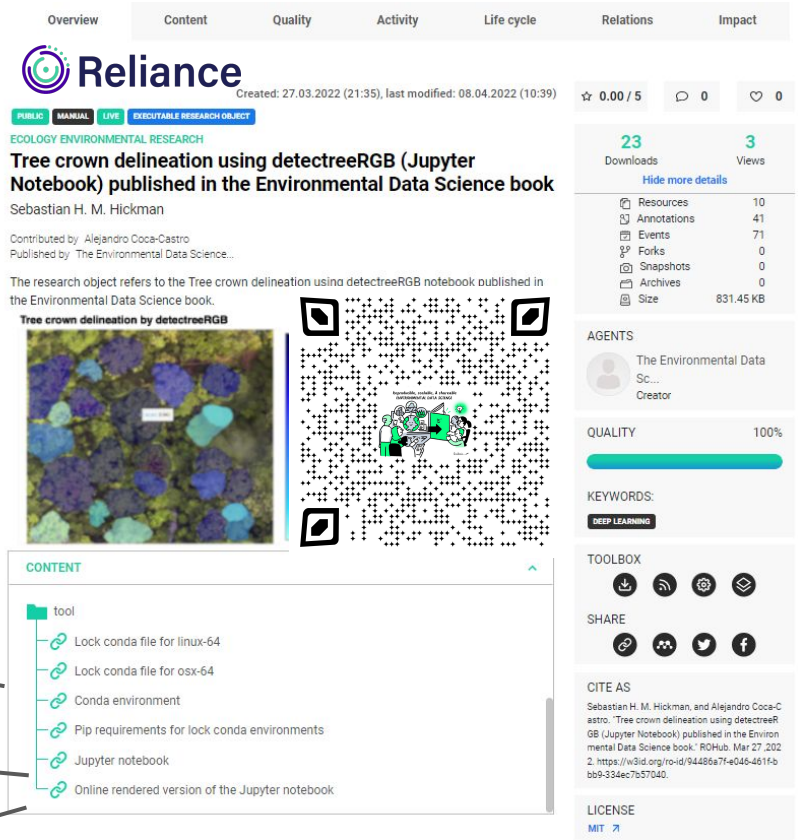
Reproducible/Reusable

binder + jupyterhub

Open-source tools

Shareable

jupyter {book}



www.edsbook.org

https://reliance.rohub.org/

IceNet - Seasonal Arctic Sea Ice Forecasting with Probabilistic Deep Learning

Alejandro Coca-Castro (The Turing Institute, UK) is an early adopter of the RELIANCE services and created a Research Object showing how to use IceNet to make seasonal sea ice forecasts.

nature communications

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Article | Open Access | Published: 26 August 2021

Seasonal Arctic sea ice forecasting with probabilistic deep learning

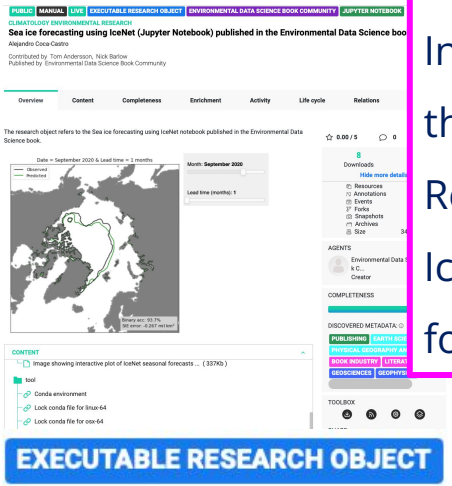
Tom R. Andersson, J. Scott Hosking, María Pérez-Ortiz, Brooks Paige, Andrew Elliott, Chris Russell, Stephen Law, Daniel C. Jones, Jeremy Wilkinson, Tony Phillips, James Byrne, Steffen Tietsche, Beena Balan Sarojini, Eduardo Blanchard-Wrigglesworth, Yevgeny Aksenov, Rod Downie & Emily Shuckburgh

Nature Communications 12, Article number: 5124 (2021) | Cite this article

18k Accesses | 25 Citations | 328 Altmetric | Metrics

Abstract

Anthropogenic warming has led to an unprecedented year-round reduction in Arctic sea ice extent. This has far-reaching consequences for indigenous and local



jupyter

Open Access paper in *Nature Communications* where IceNet, a probabilistic deep learning method, has been developed for seasonal sea ice forecasts: **data and codes are available and can be reused**.

FAIR Jupyter Notebook

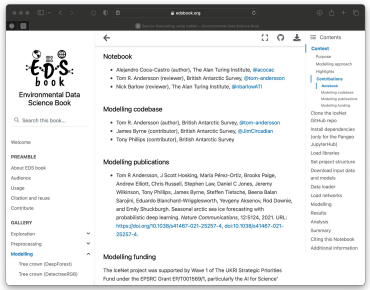
Acknowledge all contributions:
executable RO tracks all the contributions.

Reusable & Reproducible

Binder
binder
+
jupyterhub

Open-source tools

[Rendered online notebook](#)



PUBLIC MANUAL LIVE EXECUTABLE RESEARCH OBJECT ENVIRONMENTAL DATA SCIENCE BOOK COMMUNITY JUPYTER NOTEBOOK

CLIMATOLOGY ENVIRONMENTAL RESEARCH

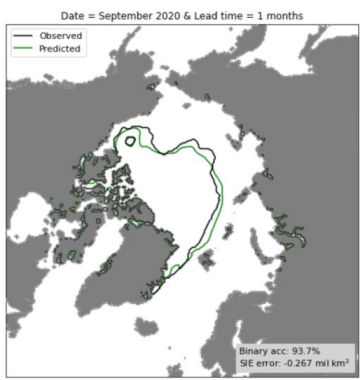
Sea ice forecasting using IceNet (Jupyter Notebook) published in the Environmental Data Science book

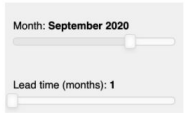
Alejandro Coca-Castro

Contributed by Tom Andersson, Nick Barlow
Published by Environmental Data Science Book Community

Overview | Content | Completeness | Enrichment | Activity | Life cycle | Relations | Impact

The research object refers to the Sea ice forecasting using IceNet notebook published in the Environmental Data Science book.





CONTENT

- Image showing interactive plot of IceNet seasonal forecasts ... (337Kb)
- tool
  - Conda environment
  - Lock conda file for linux-64
  - Lock conda file for osx-64
  - Jupyter notebook
  - Online rendered version of the Jupyter notebook

☆ 0.00 / 5 | 0 | ♡ 0

8 Downloads | 12 Views

Hide more details

Resources	10
Annotations	45
Events	87
Forks	1
Snapshots	0
Archives	0
Size	348.46 KB

AGENTS

Environmental Data Science Book C...
Creator

COMPLETENESS 84%

DISCOVERED METADATA:

PUBLISHING EARTH SCIENCES
PHYSICAL GEOGRAPHY AND ENVIRON
BOOK INDUSTRY LITERATURE LANG
GEOSCIENCES GEOPHYSICS

TOOLBOX

SHARE

CITE AS

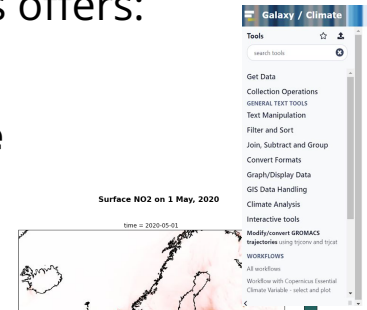
The Galaxy Project and the Galaxy Climate Workbench

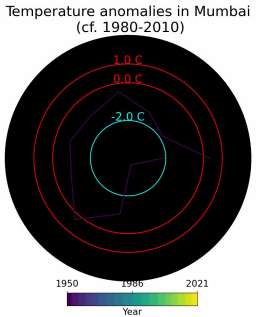
Climate Science Workbench

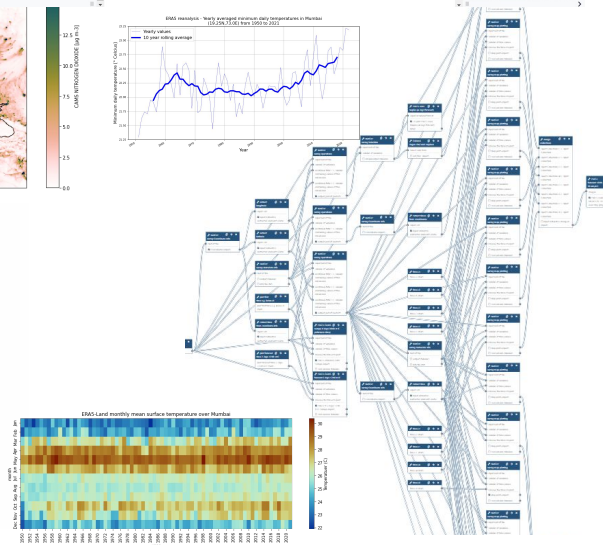
Galaxy open-source platform for FAIR data analysis offers:

- ➔ Pangeo and Climate Science jupyter notebook deployment (dask local) **available to everyone (free registration);**
- ➔ Galaxy Tools for fully **automated climate science workflows**;
- ➔ **GUI** for users with **no programming skills**;
- ➔ Self-Paced **Learning material** and organisation of online training events with the Galaxy Training Network;
- ➔ **Training Infrastructure as a Service** is a free and ready to use with private queues where only training's jobs run.

TIaaS





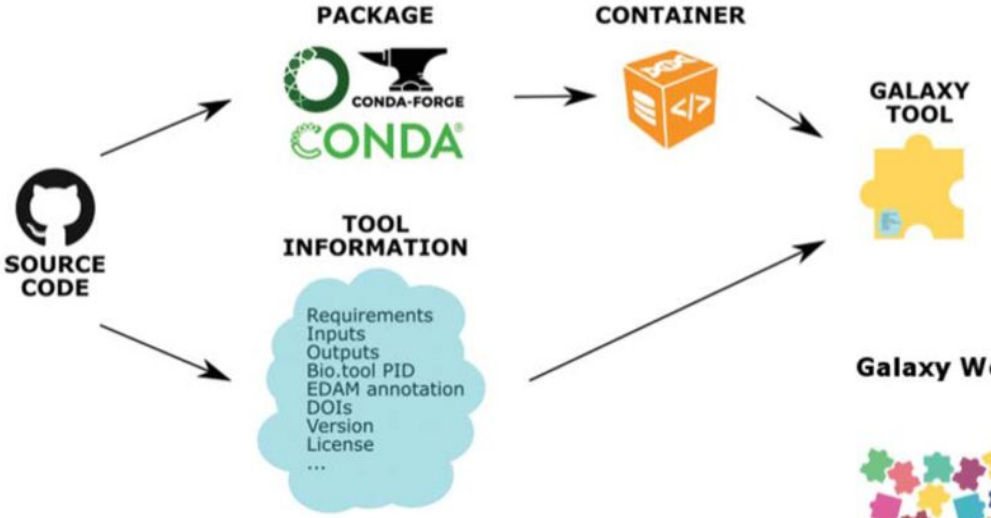


https://climate.usegalaxy.eu/

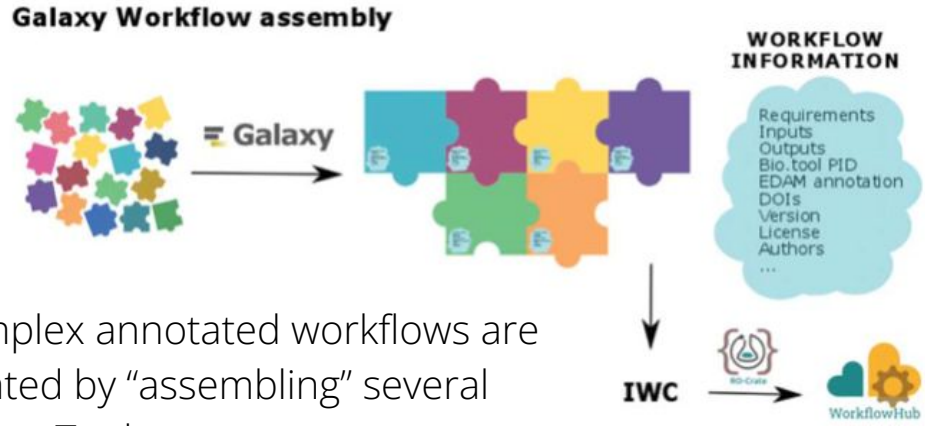
Reliance RoHub Copernicus PANGEO STAC SpatioTemporal Asset Catalog PANGEO FORGE

Accessible FAIR and Open Science

Create **FAIR** tools and workflows



For each release, a new version of the corresponding **Galaxy Tool is automatically created** and published in the Galaxy Tool Repository (Galaxy AppStore).



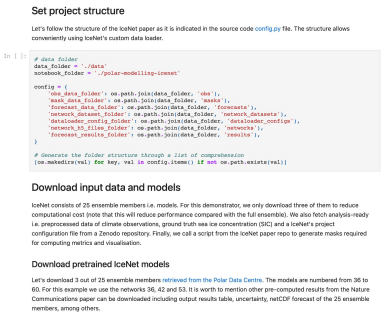
Each step is reviewed

Complex annotated workflows are created by "assembling" several Galaxy Tools.

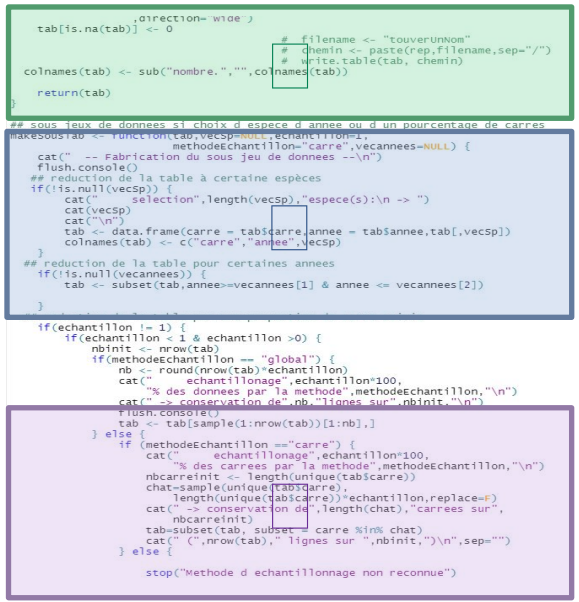
https://doi.org/10.1162/dint_a_00136

From FAIR Jupyter Notebook to Annotated Galaxy Tools & Workflows

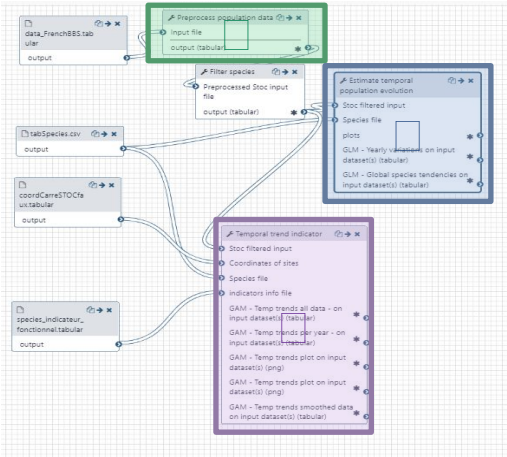
EDS book Jupyter Python/R/Julia Notebook



One Jupyter Notebook is turned into one script



Several atomic scripts from which generic and fully annotated Galaxy Tools are created

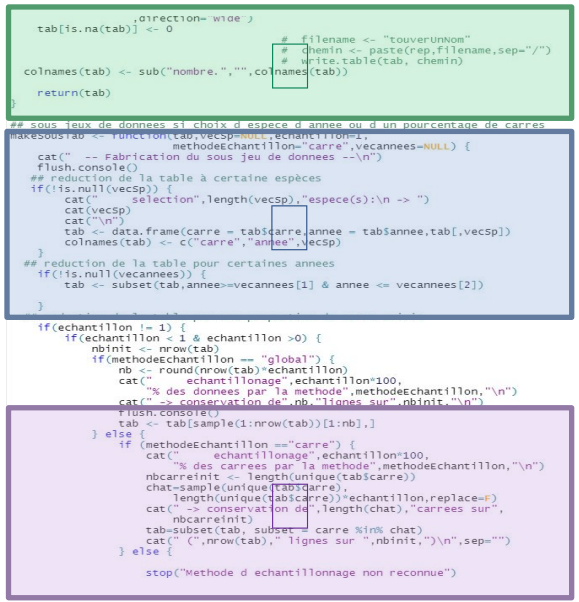


Slide adapted from Coline Royaux, Natural History Museum, France.

From FAIR Jupyter Notebook to Annotated Galaxy Tools & Workflows

EDS book Jupyter Python/R/Julia Notebook

One Jupyter Notebook is turned into one script



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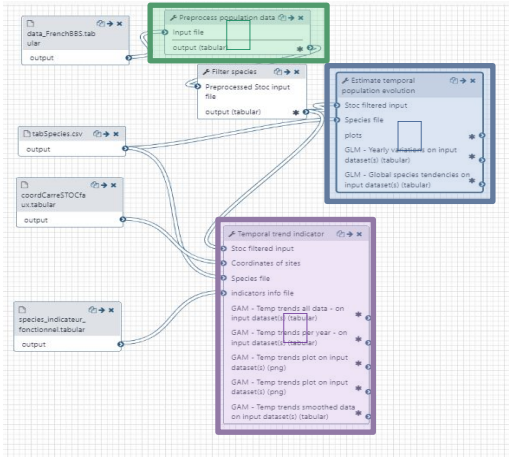
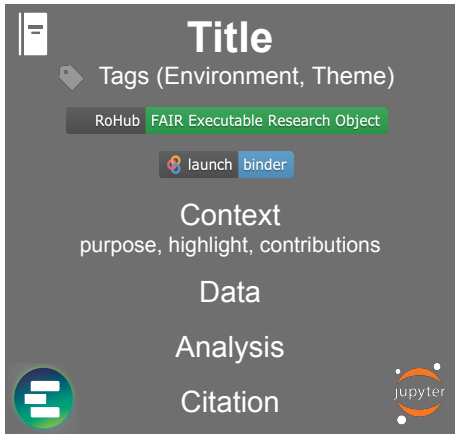


EDS book notebooks follow best practices: it makes it easier to "modularize" and create Galaxy Tools.

From FAIR jupyter notebook to annotated Galaxy Tools & workflows

IceNet Jupyter Notebook from EDS book



Galaxy workflow

Data

Pretrained IceNet models

CMIP6 input data

ERA5 input data

Analysis

Pre-processing for ERA5

Pre-processing for CMIP6

DataLoader with dataconfig

IceNet ModelLoader

Generate ensemble forecast

Aggregate results

Visualization

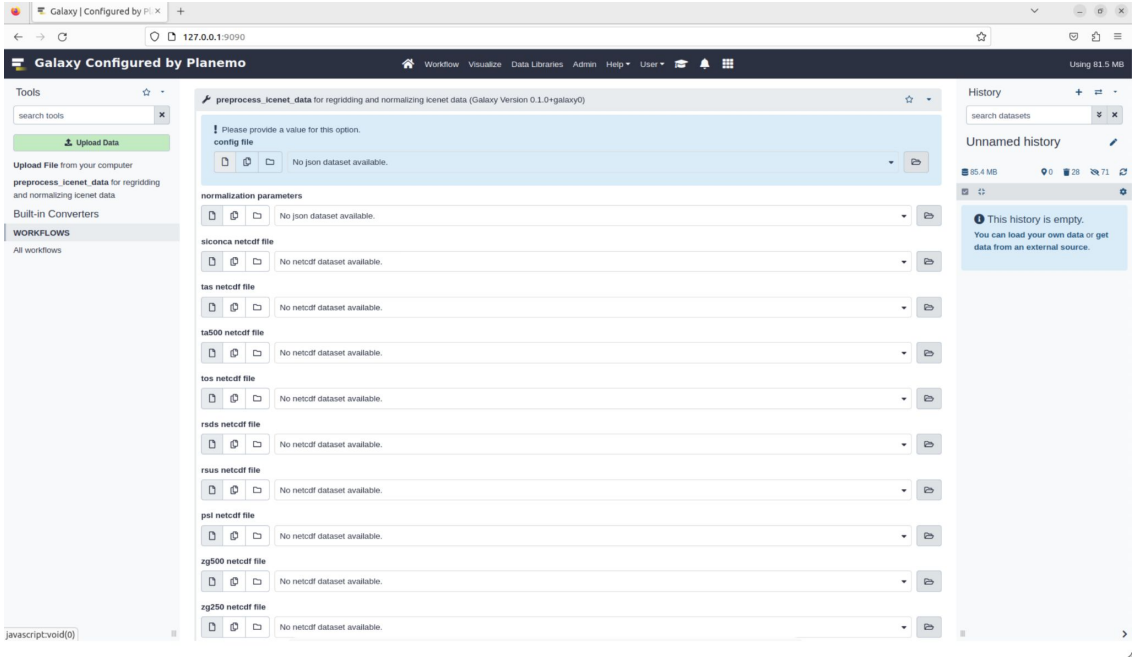
Create Interactive plot to show forecast, etc.

Copernicus Climate Data Store (C3S) Galaxy Tool; already available

Interactive dashboard & Galaxy Tools

IceNet Forecast Galaxy Tools to develop.

IceNet@Galaxy Tool



Tools can be run from the command line or from a GUI using the Galaxy web portal.

Thank you!

DOI: 10.5281/zenodo.7723371