C. Troupin*, C. Muñoz*,
M. A. Rújula*, J. G. Fernández*,
S. Watelet*, A. Barth* & J.-M. Beckers*

*GHER-University of Liège
*Balearic Islands Coastal Ocean
Observing and Forecasting System

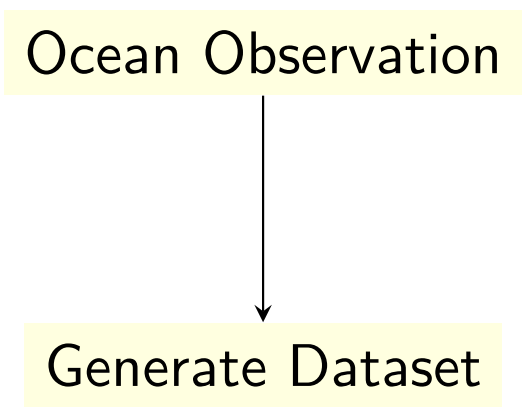
Software citation & process traceability

Persistent identifiers everywhere

Ocean Observation

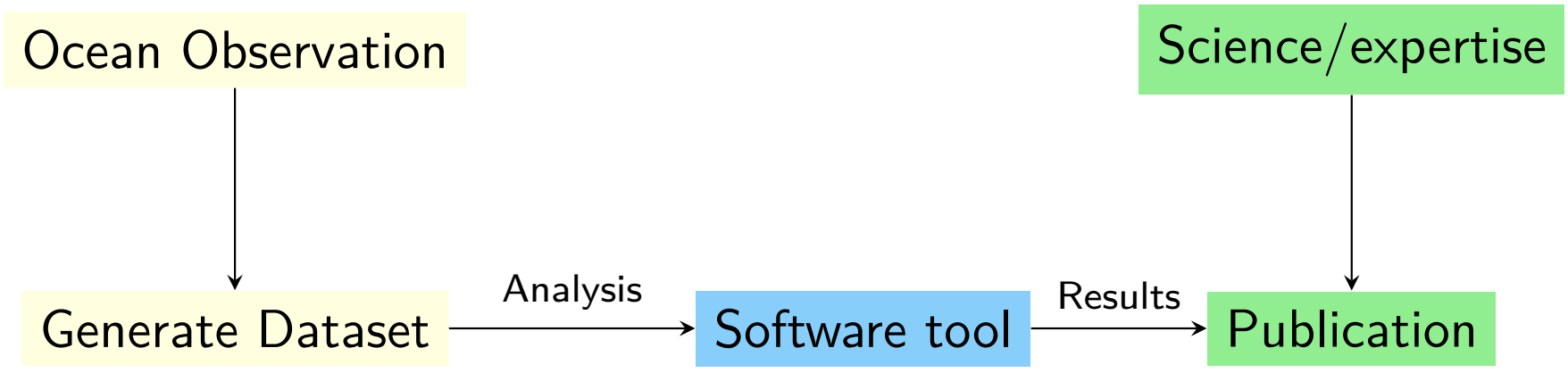
Science/expertise

Persistent identifiers everywhere

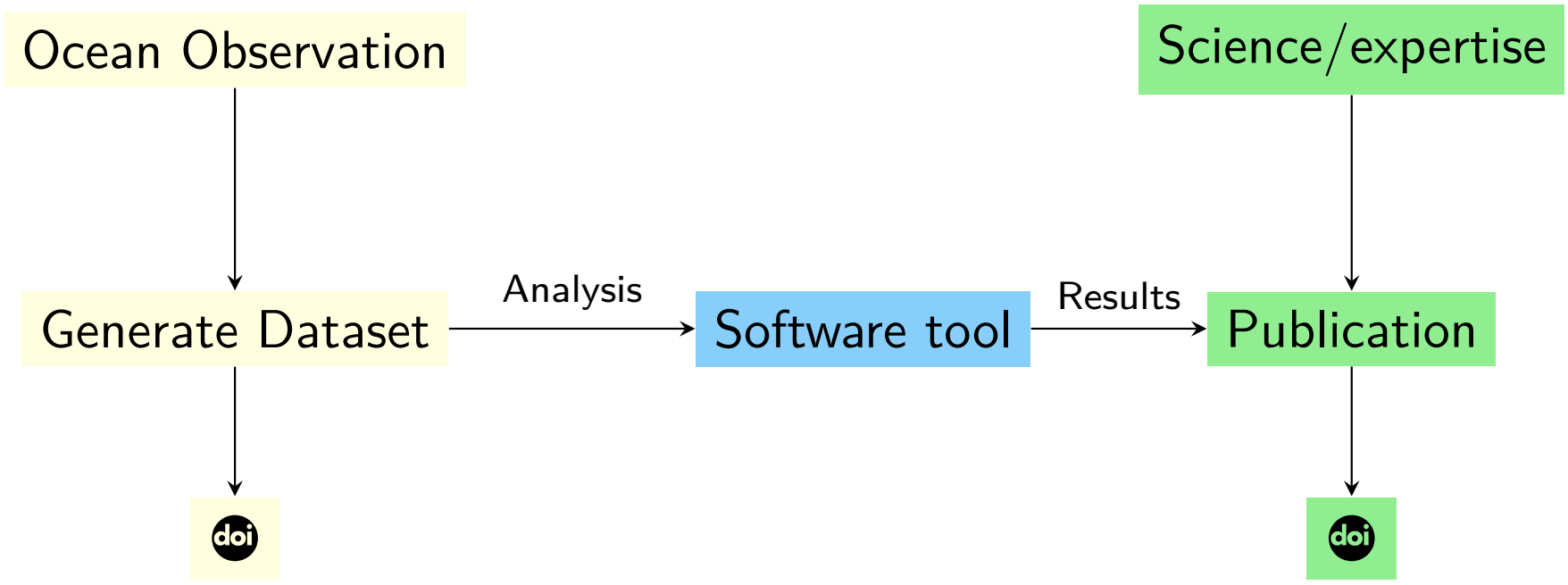


Science/expertise

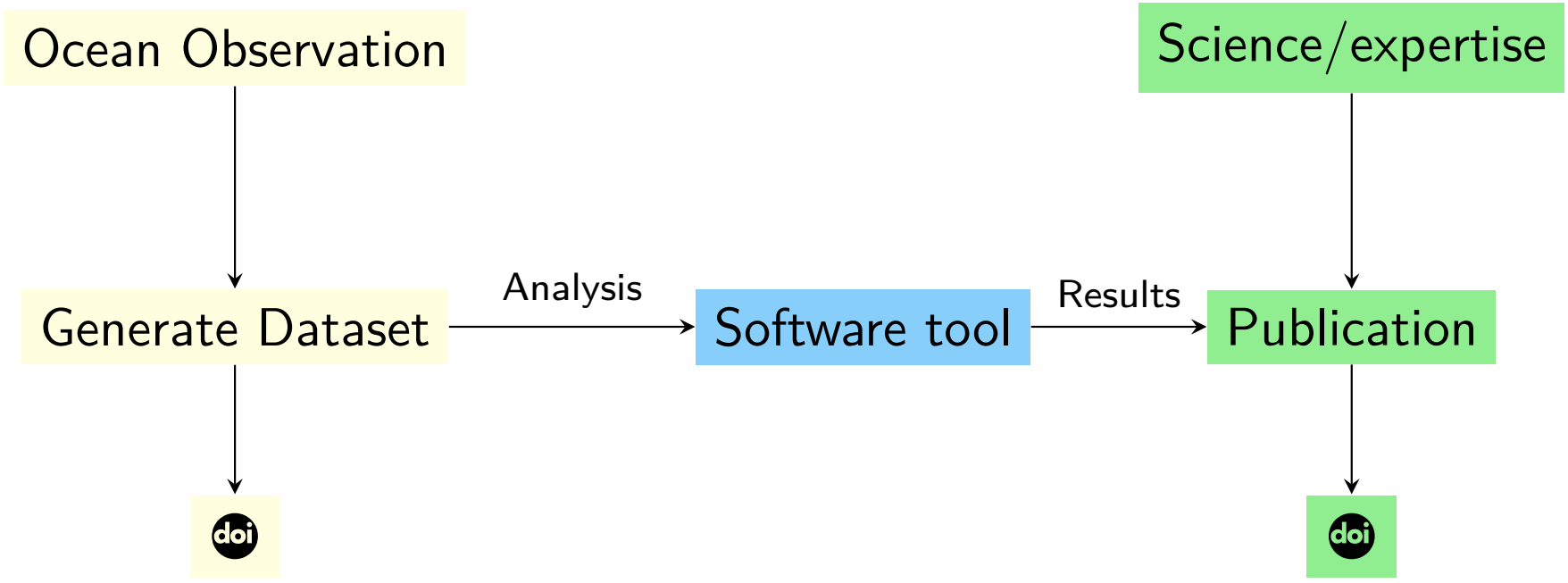
Persistent identifiers everywhere



Persistent identifiers everywhere



Persistent identifiers everywhere

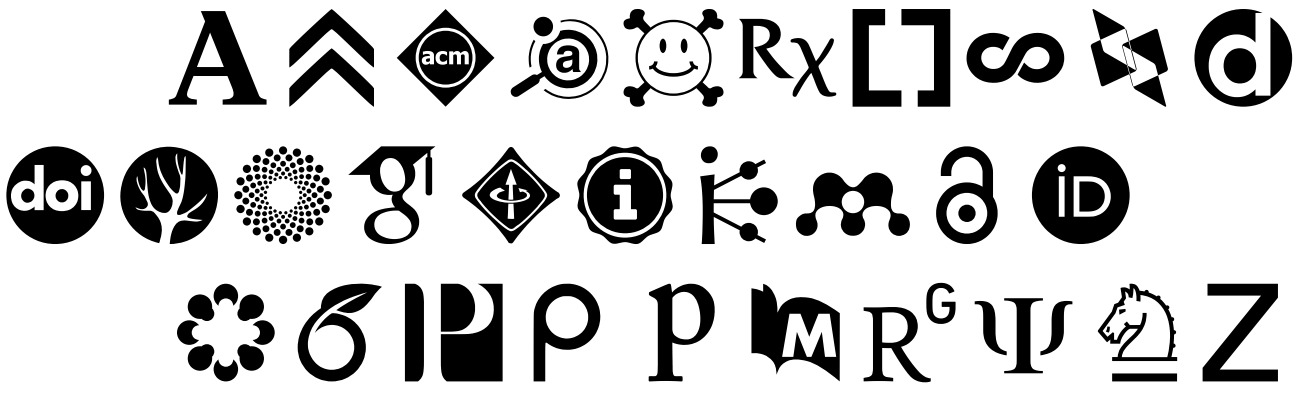


How can we ensure the readers/users can reproduce the results?

Persistent identifiers:
what about

software tools?

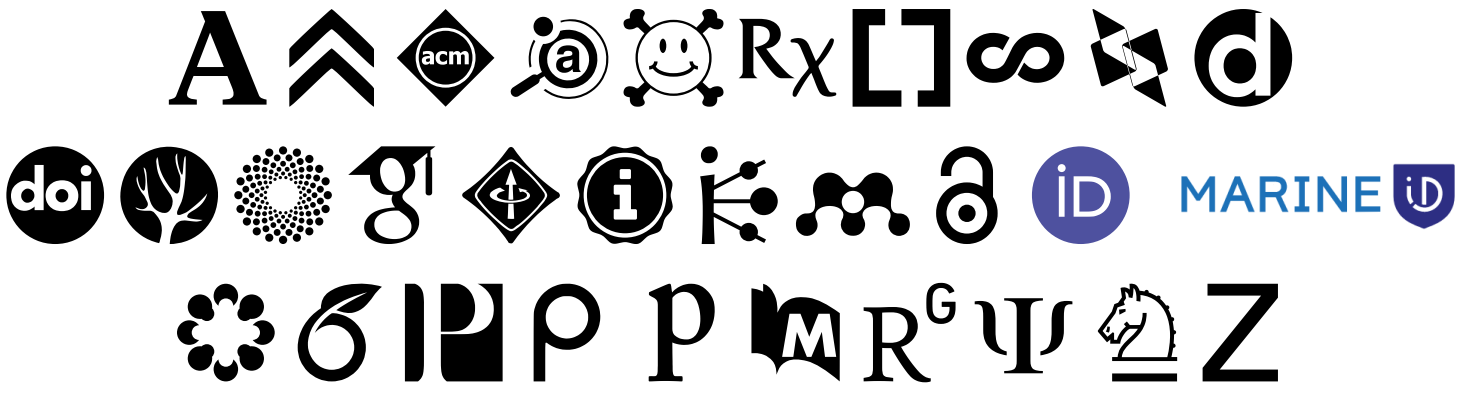
Context: who has done what, and how?



Source: Academicons

Context: who has done what, and how?

Let's work with ORCID and MarineID
(see previous ODIP workshops)

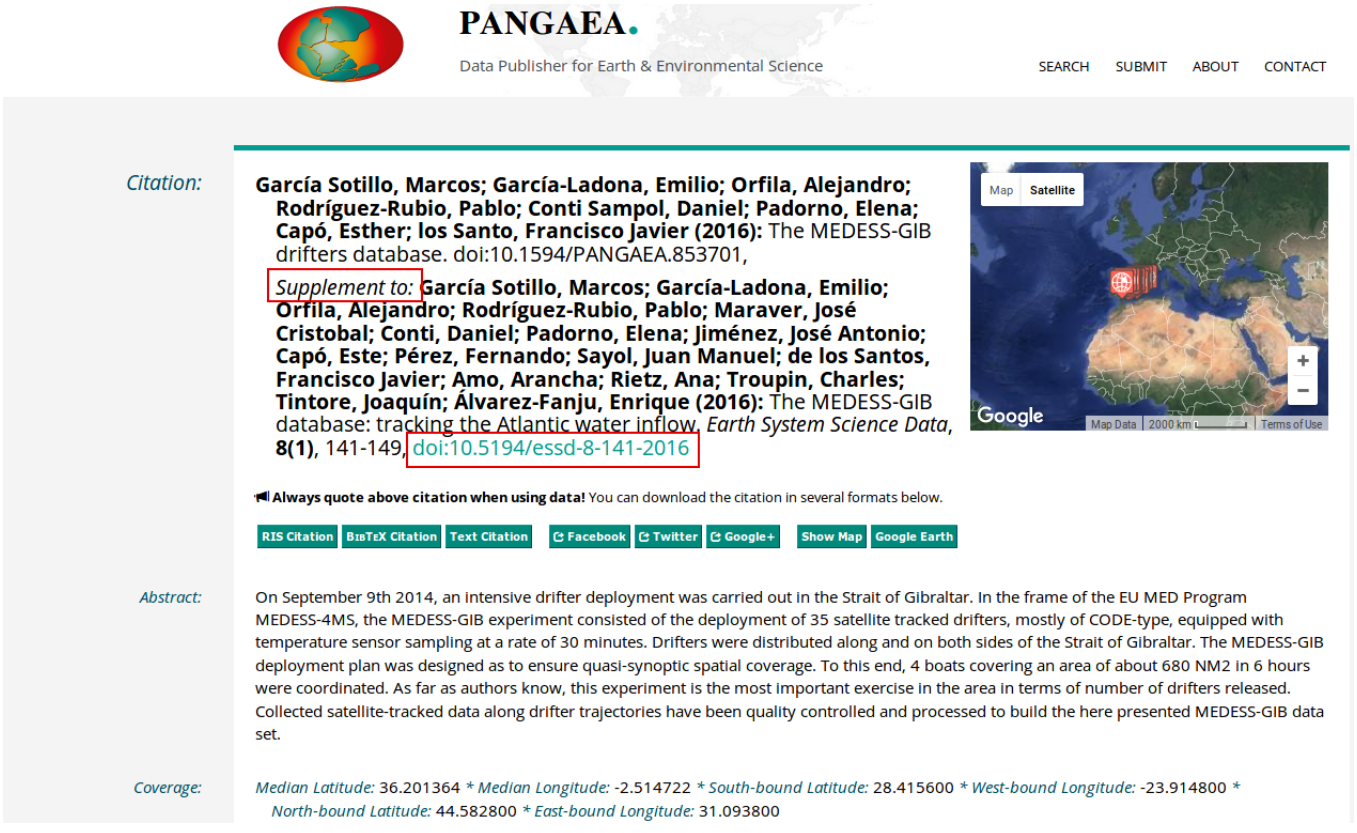


Source: Academicons

Data set identification and citation

See previous ODIP workshops + links to other initiatives

- Research Data Alliance Data Citation working group
- THOR project
- Pangaea



PANGAEA.

Data Publisher for Earth & Environmental Science

SEARCH SUBMIT ABOUT CONTACT

Citation:

García Sotillo, Marcos; García-Ladona, Emilio; Orfila, Alejandro; Rodríguez-Rubio, Pablo; Conti Sampol, Daniel; Padorno, Elena; Capó, Esther; los Santo, Francisco Javier (2016): The MEDESS-GIB drifters database. doi:10.1594/PANGAEA.853701,

Supplement to: **García Sotillo, Marcos; García-Ladona, Emilio; Orfila, Alejandro; Rodríguez-Rubio, Pablo; Maraver, José Cristobal; Conti, Daniel; Padorno, Elena; Jiménez, José Antonio; Capó, Este; Pérez, Fernando; Sayol, Juan Manuel; de los Santos, Francisco Javier; Amo, Arancha; Rietz, Ana; Troupin, Charles; Tintore, Joaquín; Álvarez-Fanju, Enrique (2016):** The MEDESS-GIB database: tracking the Atlantic water inflow, *Earth System Science Data*, **8(1)**, 141-149, doi:10.5194/essd-8-141-2016

Map Satellite

Google Map Data 2000 km Terms of Use

Always quote above citation when using data! You can download the citation in several formats below.

RIS Citation | BibTeX Citation | Text Citation | Facebook | Twitter | Google+ | Show Map | Google Earth

Abstract:

On September 9th 2014, an intensive drifter deployment was carried out in the Strait of Gibraltar. In the frame of the EU MED Program MEDESS-4MS, the MEDESS-GIB experiment consisted of the deployment of 35 satellite tracked drifters, mostly of CODE-type, equipped with temperature sensor sampling at a rate of 30 minutes. Drifters were distributed along and on both sides of the Strait of Gibraltar. The MEDESS-GIB deployment plan was designed as to ensure quasi-synoptic spatial coverage. To this end, 4 boats covering an area of about 680 NM2 in 6 hours were coordinated. As far as authors know, this experiment is the most important exercise in the area in terms of number of drifters released. Collected satellite-tracked data along drifter trajectories have been quality controlled and processed to build the here presented MEDESS-GIB data set.

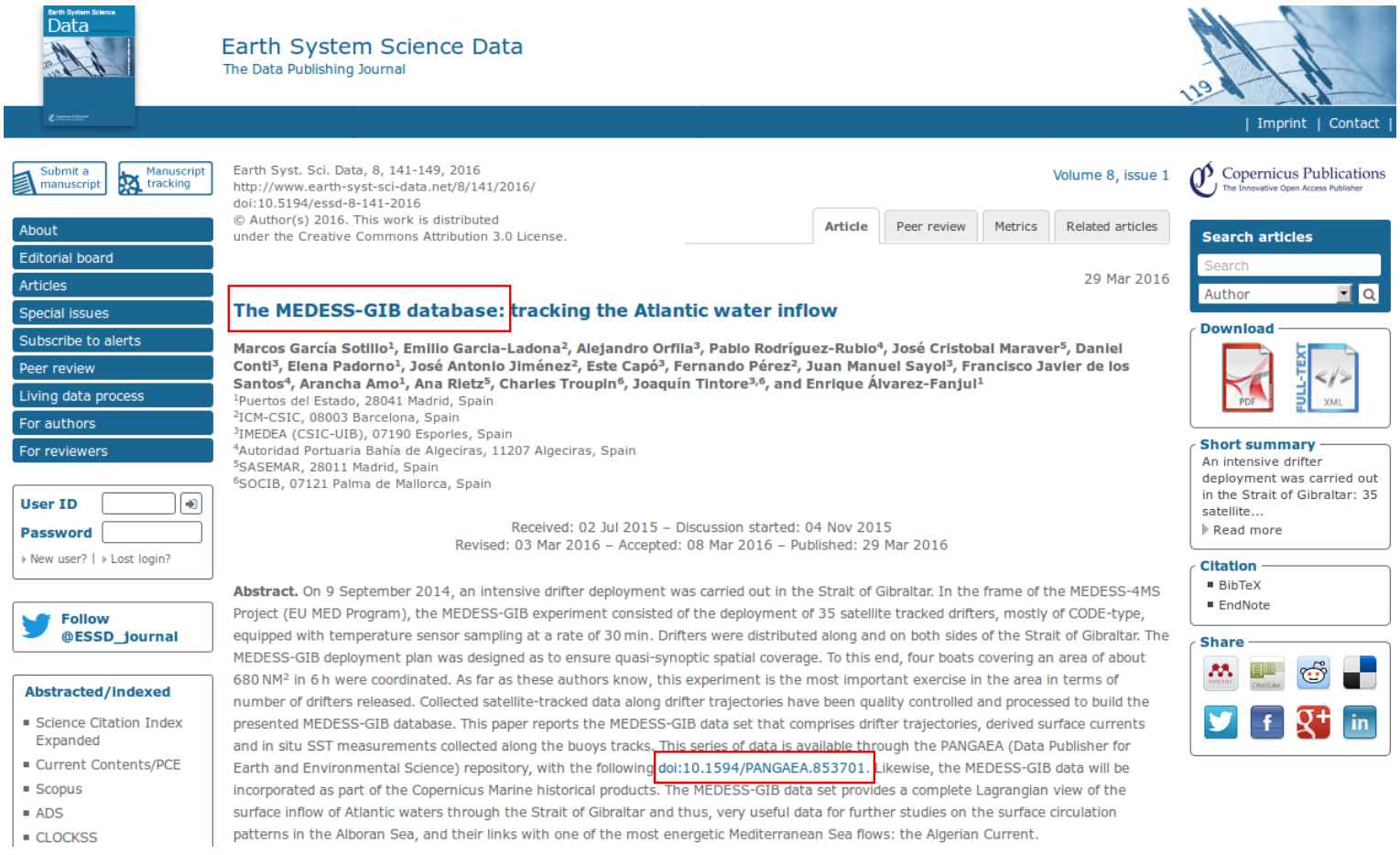
Coverage:

Median Latitude: 36.201364 * *Median Longitude:* -2.514722 * *South-bound Latitude:* 28.415600 * *West-bound Longitude:* -23.914800 * *North-bound Latitude:* 44.582800 * *East-bound Longitude:* 31.093800

Data sets in peer-reviewed journals

Earth System Science Data

- "*reuse of high-quality data of benefit to Earth system sciences*"
- 30 articles in 2017 (as of July 24th)



Earth System Science Data
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Earth Syst. Sci. Data, 8, 141-149, 2016
http://www.earth-syst-sci-data.net/8/141/2016/
doi:10.5194/essd-8-141-2016

Volume 8, issue 1

Article | Peer review | Metrics | Related articles

29 Mar 2016

The MEDESS-GIB database: tracking the Atlantic water inflow

Marcos García Sotillo[1], Emilio Garcia-Ladona[2], Alejandro Orfila[3], Pablo Rodríguez-Rubio[4], José Cristobal Maraver[5], Daniel Conti[3], Elena Padorno[1], José Antonio Jiménez[2], Este Capó[3], Fernando Pérez[2], Juan Manuel Sayol[3], Francisco Javier de los Santos[4], Arancha Amo[1], Ana Rietz[5], Charles Troupin[6], Joaquín Tintoré[3,6], and Enrique Álvarez-Fanjul[1]

[1]Puertos del Estado, 28041 Madrid, Spain
[2]ICM-CSIC, 08003 Barcelona, Spain
[3]IMEDEA (CSIC-UIB), 07190 Esporles, Spain
[4]Autoridad Portuaria Bahía de Algeciras, 11207 Algeciras, Spain
[5]SASEMAR, 28011 Madrid, Spain
[6]SOCIB, 07121 Palma de Mallorca, Spain

Received: 02 Jul 2015 – Discussion started: 04 Nov 2015
Revised: 03 Mar 2016 – Accepted: 08 Mar 2016 – Published: 29 Mar 2016

Abstract. On 9 September 2014, an intensive drifter deployment was carried out in the Strait of Gibraltar. In the frame of the MEDESS-4MS Project (EU MED Program), the MEDESS-GIB experiment consisted of the deployment of 35 satellite tracked drifters, mostly of CODE-type, equipped with temperature sensor sampling at a rate of 30 min. Drifters were distributed along and on both sides of the Strait of Gibraltar. The MEDESS-GIB deployment plan was designed as to ensure quasi-synoptic spatial coverage. To this end, four boats covering an area of about 680 NM^2 in 6 h were coordinated. As far as these authors know, this experiment is the most important exercise in the area in terms of number of drifters released. Collected satellite-tracked data along drifter trajectories have been quality controlled and processed to build the presented MEDESS-GIB database. This paper reports the MEDESS-GIB data set that comprises drifter trajectories, derived surface currents and in situ SST measurements collected along the buoys tracks. This series of data is available through the PANGAEA (Data Publisher for Earth and Environmental Science) repository, with the following doi:10.1594/PANGAEA.853701. Likewise, the MEDESS-GIB data will be incorporated as part of the Copernicus Marine historical products. The MEDESS-GIB data set provides a complete Lagrangian view of the surface inflow of Atlantic waters through the Strait of Gibraltar and thus, very useful data for further studies on the surface circulation patterns in the Alboran Sea, and their links with one of the most energetic Mediterranean Sea flows: the Algerian Current.

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Short summary
An intensive drifter deployment was carried out in the Strait of Gibraltar: 35 satellite...
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Citation
- BibTeX
- EndNote

Share

Data sets in peer-reviewed journals

Scientific Data

- "*promote wider data sharing and reuse, and to credit those that share*"
- 127 publications in 2017 as of September 4 (all disciplines)

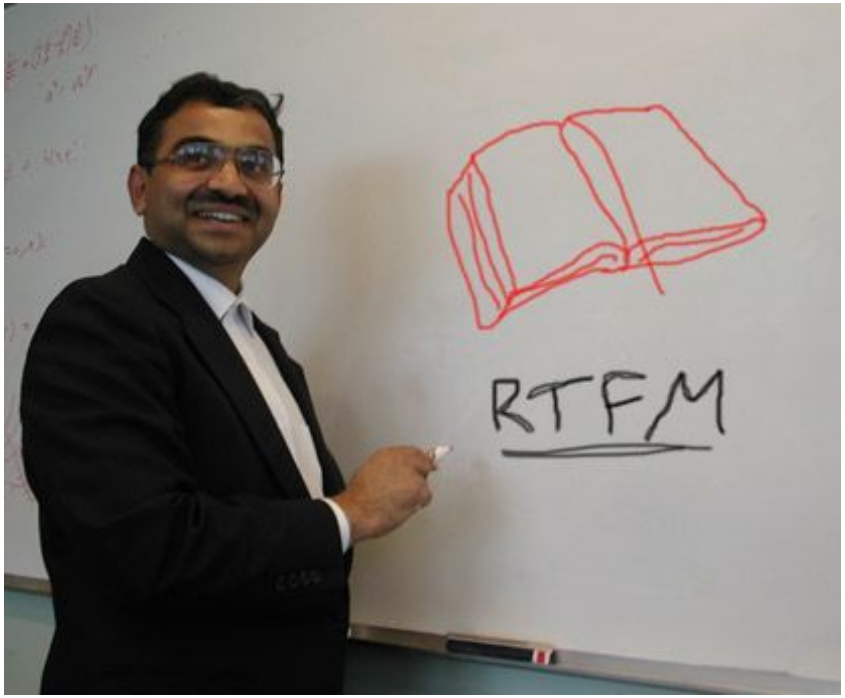
How to go from data to products?

How to go from data to products?

- Read the publication?

How to go from data to products?

- Read the publication?
- Read the manual?



How to go from data to products?

- Read the publication?
- Read the manual?
- Get and re-use code referenced in publication

8 Code and data availability

The version of FESOM2.0 used to carry out simulations reported here can be accessed from https://swrepo1.awi.de/svn/awi-fvom/ after registration. The updated versions will be available through the same link in future. For convenience, the configuration used, together with the meshes, is archived at doi:10.5281/zenodo.161319. Mesh partitioning in FESOM is based on a METIS Version 5.1.0 package developed at the Department of Computer Science & Engineering at the University of Minnesota (http://glaros.dtc.umn.edu/gkhome/views/metis). METIS and pARMS (Li et al., 2003) present separate libraries which are freely available subject to their licenses. FESOM1.4 is available at https://swrepo1.awi.de/projects/fesom/ (requires registration). The Polar Science Center Hydrographic Climatology (Steele et al., 2001) used to initialize runs of CORE-II atmospheric forcing data (Large and Yeager, 2009) is freely available online. The simulation results can be obtained from the authors on request.

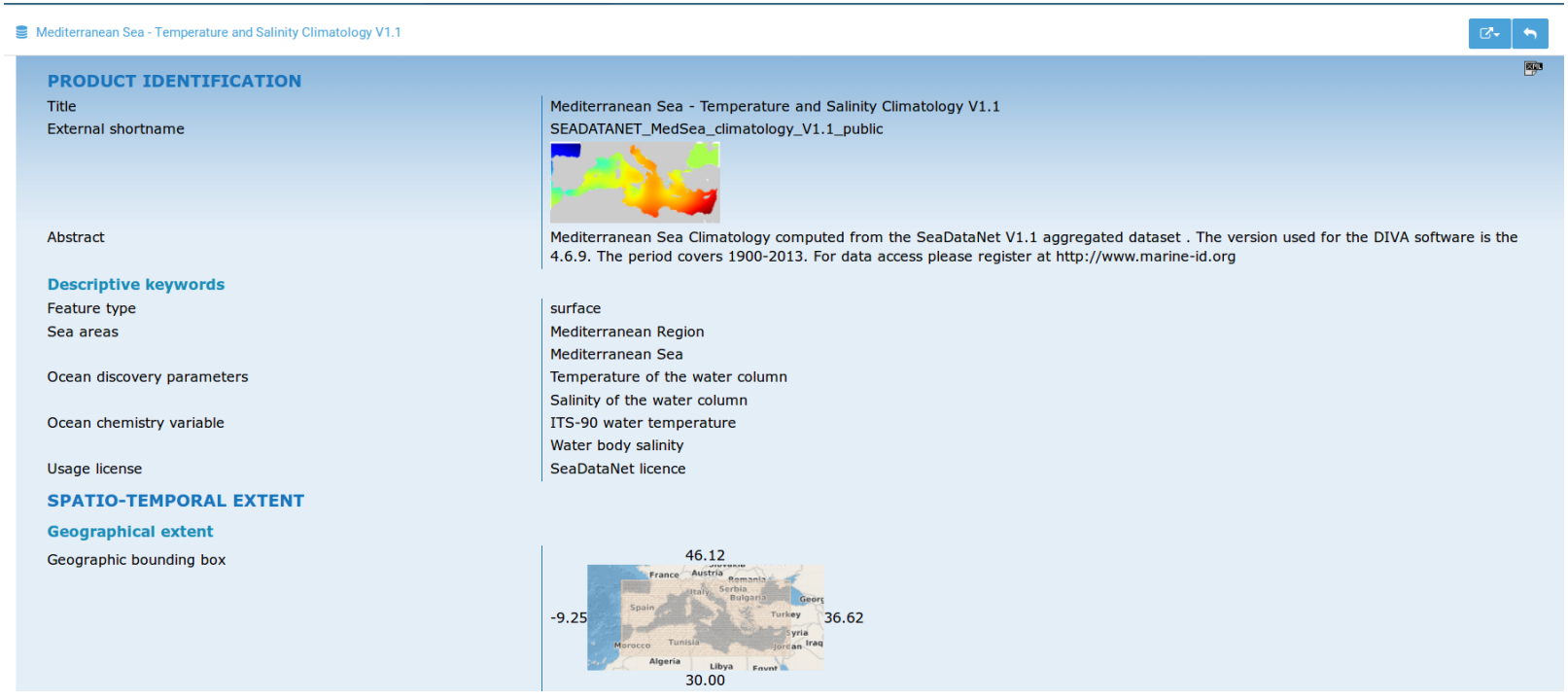
Products and results

Results:
numerical model outputs (re-analysis, forecasts)
climatologies build from in situ data
aggregated datasets

Goals:
proper citation in publications
control of different versions of the same product

Products and results

Example: SeaDataNet Product Catalog (Sextant)
Mediterranean Sea: Temperature and Salinity Climatology V1.1

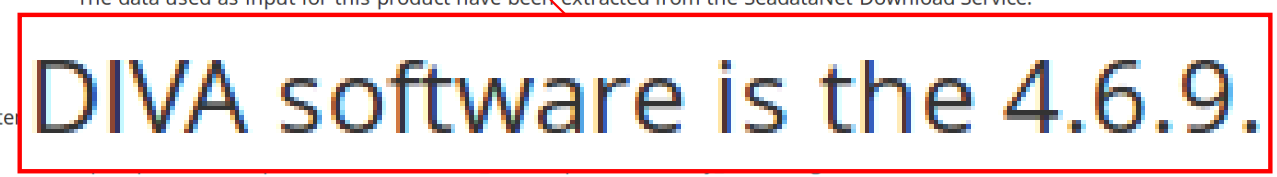


- Internal permanent shortname: 90ae7a06-8b08-4afe-83dd-ca92bc99f5c0
- DOI: 10.12770/90ae7a06-8b08-4afe-83dd-ca92bc99f5c0

Products and results

Mediterranean Sea - Temperature and Salinity Climatology V1.1

Date(s)	2015-11-30 (Creation)
Custodian(s):	IFREMER / IDM/SISMER
Originator(s):	Istituto Nazionale di Geofisica e Vulcanologia – INGV, Sede di Bologna
Credit	Seadatanet
Version	1.1
DOI	10.12770/90ae7a06-8b08-4afe-83dd-ca92bc99f5c0
Abstract	Mediterranean Sea Climatology computed from the SeaDataNet V1.1 aggregated dataset . The version used for the DIVA software is the 4.6.9. The period covers 1900-2013. For data access please register at http://www.marine-id.org
Keywords	Oceanographic geographical features, Temperature of the water column, Salinity of the water column, ITS-90 water temperature, Water body salinity, Mediterranean Region, Mediterranean Sea
Lineage	The data used as input for this product have been extracted from the SeadataNet Download Service:
Utilisation	
Temporal Exte	
Data	/SDN_2015-11_TS_Med_Sea_Climatology_v1.1.zip



Can we go further and have:

"*The version used for the DIVA software is the 4.6.9, doi: 10.5281/zenodo.836727*" ?

Software tools and methods: Journals

Geoscientific Model Development

- *"description, development, and evaluation of numerical models of the Earth system and its components"*
- *"geoscientific model descriptions, from statistical models to box models to GCMs"*
- *"Inclusion of Code and/or data availability sections is mandatory for all papers"*

Geosci. Model Dev., 7, 225-241, 2014
https://doi.org/10.5194/gmd-7-225-2014

Volume 7, issue 1

Methods for assessment of models

29 Jan 2014

divand-1.0: *n*-dimensional variational data analysis for ocean observations

A. Barth[1,*], J.-M. Beckers[1], C. Troupin[2], A. Alvera-Azcárate[1], and L. Vandenbulcke[3,4]
[1]GHER, University of Liège, Liège, Belgium
[2]IMEDEA, Esporles, Illes Balears, Spain
[3]seamod.ro/Jailoo srl, Sat Valeni, Com. Salatrucu, Jud. Arges, Romania
[4]CIIMAR, University of Porto, Porto, Portugal
[*]Invited contribution by A. Barth, recipient of the EGU Arne Richter Award for Outstanding Young Scientists 2010.

Received: 07 Jun 2013 – Discussion started: 23 Jul 2013
Revised: 18 Oct 2013 – Accepted: 12 Dec 2013 – Published: 29 Jan 2014

doi:10.5194/gmd-7-225-2014

Software tools and methods: Journals

Earth Science Informatics

- *"(...) cutting-edge, and provocative scientific work in the area of Earth Science Informatics (...)"*
- *"(...) all aspects of computer applications to the acquisition, storage, processing, interchange, and visualization of data"*
- *Sub-disciplines: Ontology, Simulation and Modeling, Information Systems Applications*

doi:10.1007/s12145-016-0266-2

Software tools and methods: Journals

Methods in Oceanography

- *"original research on new methods in all aspects of oceanographic research"*
- *"significant advances in the development of new methods for the interpretation of either existing or future data"*

Methods in Oceanography

Volume 17, December 2016, Pages 50-82

Review

Potential for an underwater glider component as part of the Global Ocean Observing System

T. Liblik [a, b], J. Karstensen [a], P. Testor [c], P. Alenius [d], D. Hayes [e], S. Ruiz [f], K.J. Heywood [g], S. Pouliquen [h], L. Mortier [c], E. Mauri [i]

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https://doi.org/10.1016/j.mio.2016.05.001 Get rights and content

doi:10.1016/j.mio.2016.05.001

💣 discontinued as of 2017

Software tools and methods: Research platforms

Definition: online infrastructures whose objective is to persistently store and archive digital artifacts relevant to research:

- articles
- data
- images
- code
- ...

Software tools and methods: Research platforms

Figshare: "improve the organization of users' research"

- file upload, collaborative spaces, DOI attribution, ...
- on the platform: figures, datasets, media (including video), papers (including pre-prints), posters, code, and filesets.

https://figshare.com/articles/CNR-ISMAR_in_situ_observations_network/4001448

Software tools and methods: Research platforms

DSpace

- has to be installed on a server manager by the search institution
- Sandbox: `http://demo.dspace.org/`

According to the Registry of Open Access Repositories (ROAR)

1759	institutions or companies as users
1374	repositories dedicated to Institutional or Departmental Research
32	repositories dedicated to Research Data
3	dedicated to Open and Linked Data

Software tools and methods: Research platforms

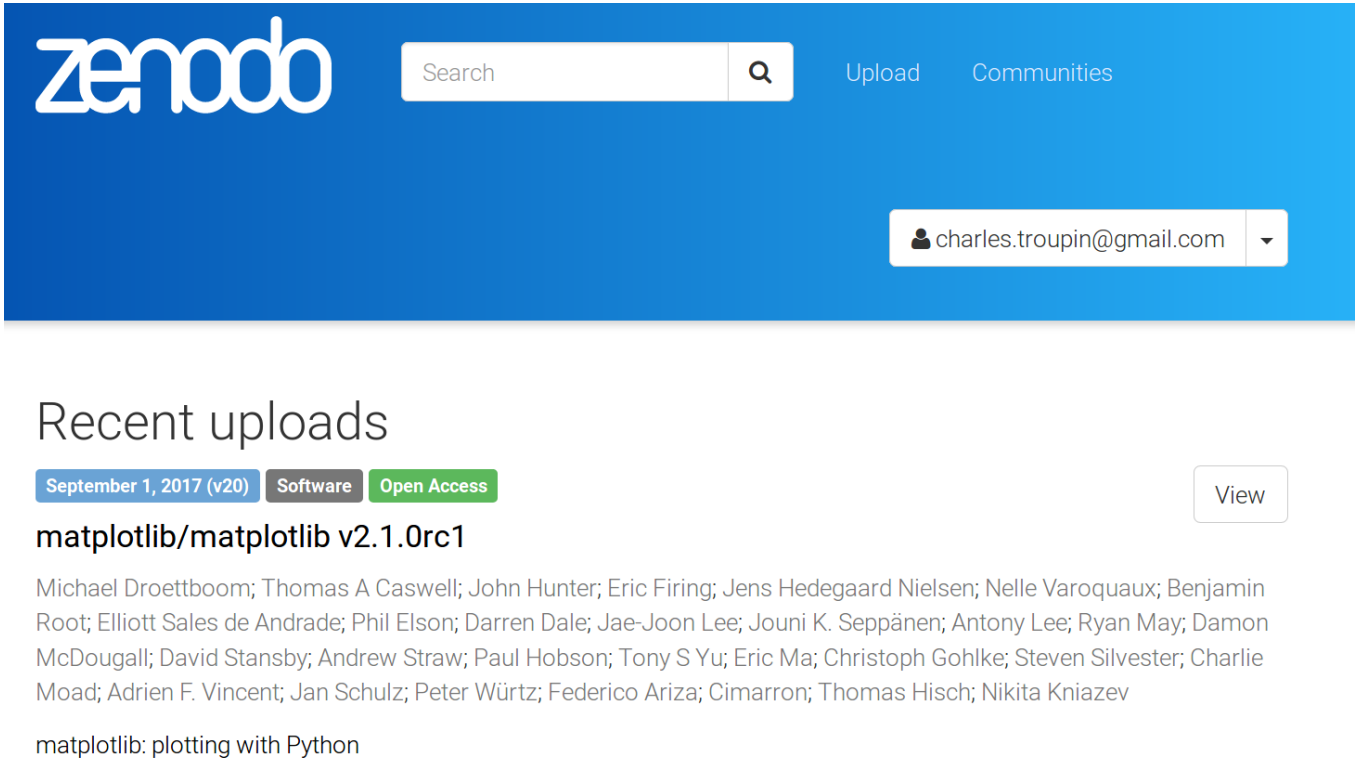
Comprehensive Knowledge Archive Network (CKAN):
can be considered as a tool for making open data websites

- streamline publishing, sharing, finding and using data
- used by numerous governments, organisations and communities around the world
- has to be installed on a server manager by the search institution

Software tools and methods: Research platforms

Zenodo: research data repository
funded by the European Commission

- ingest all research outputs and any file format
- DOIs assigned to have uniquely citable files
- integrated into reporting lines for research via OpenAIRE.



Comparison

Tool	CKAN	DSpace	Figshare	Zenodo
Open Source	Yes	Yes	No	Yes
	ckan/ckan	DSpace/DSpace	–	zenodo/zenodo
Licence	Affero GNU GPL v3.0	BSD	–	GPL-2.0
1st released	November 2011	November 2002	January 2011	May 2013
Main technology	Python	Java	–	Python
Deployment	Local	Local	Cloud	Cloud
Integration with	No	No	Yes	Yes
Integration with	Yes	Not direct	Yes	Login

Comparison

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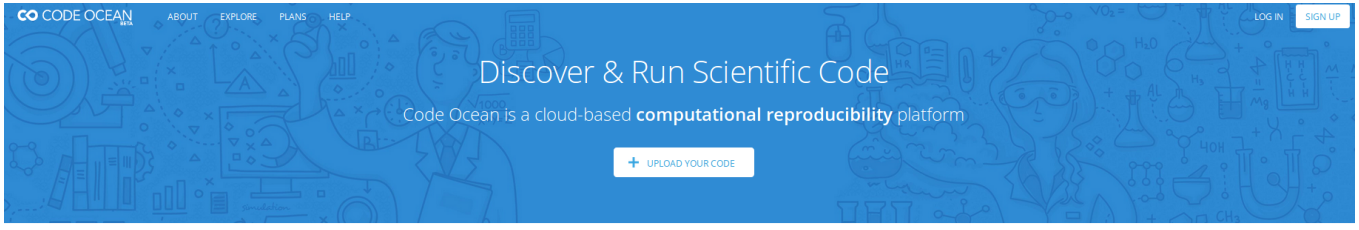
Deployment	Local	Local	Cloud	Cloud
Integration with	No	No	Yes	Yes
Integration with	Yes	Not direct	Yes	Login

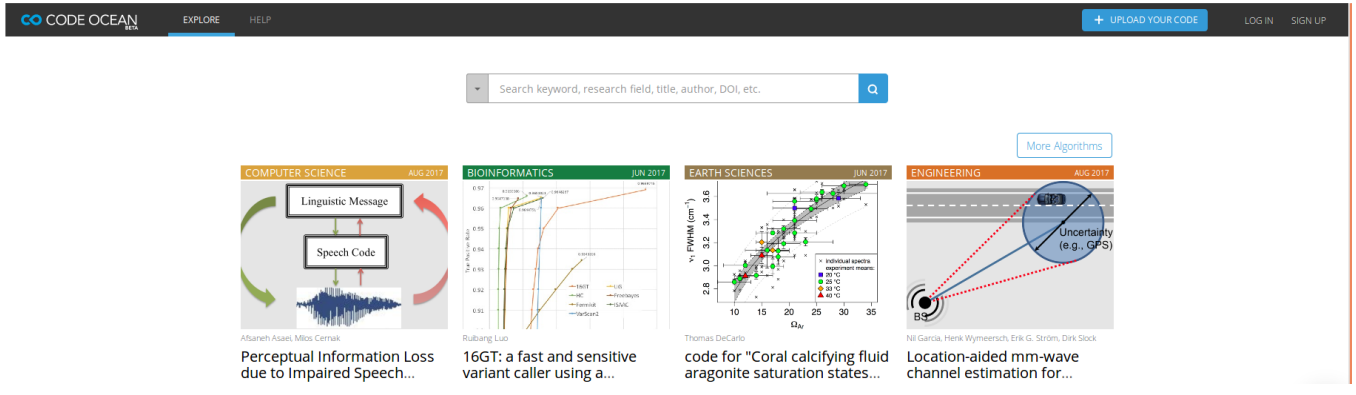
Choice for further tests: Zenodo

1. Free and open software
2. Cloud service, i.e. no installation
3. Coupling with GitHub
4. Login via ORCID

Computational reproducibility platform

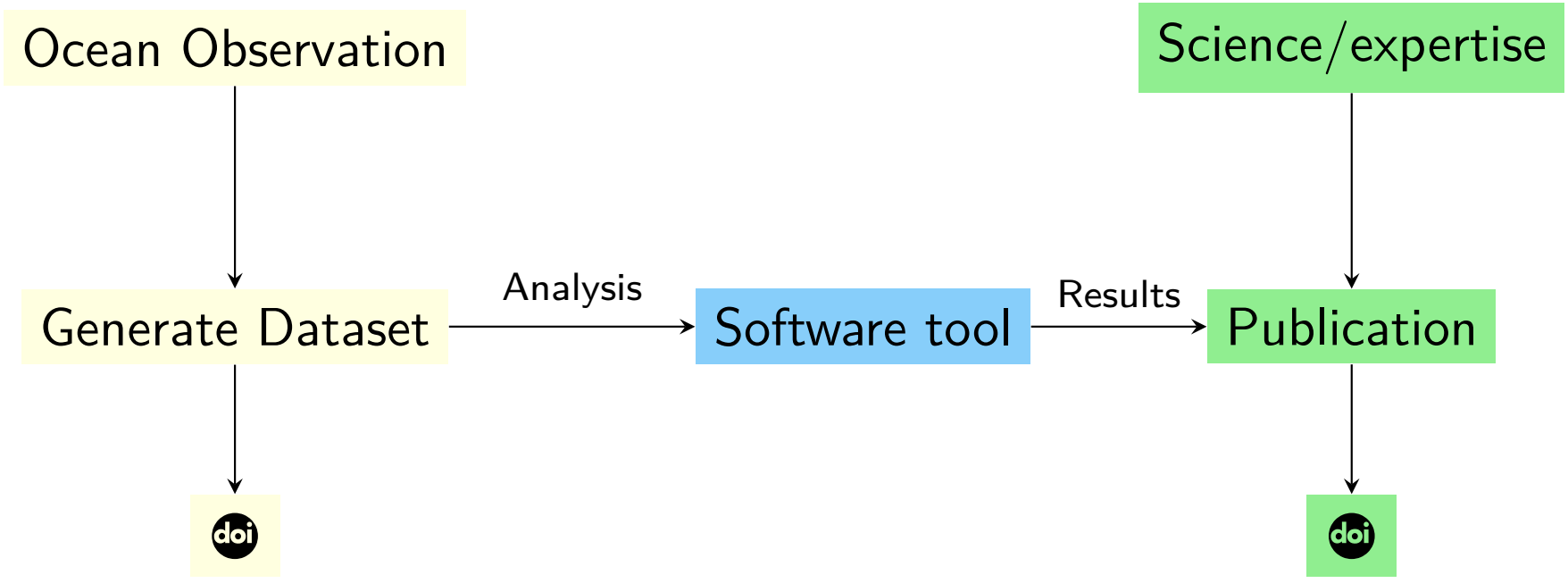
Code Ocean: easy way to share, discover and run code published in academic journals and conferences

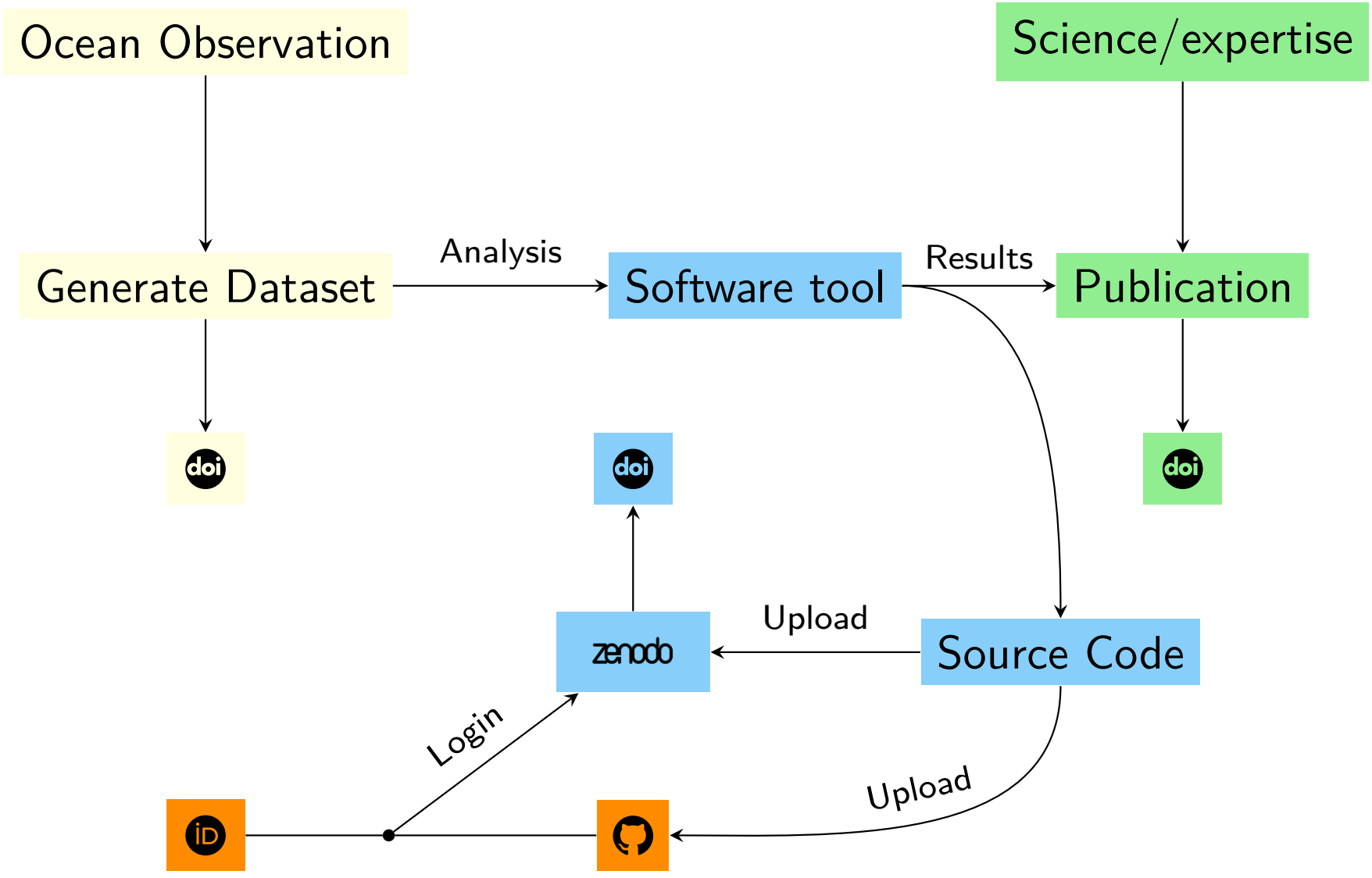




Motivations:

Reproducibility & Traceability


Ocean Observation
Science/expertise
Generate Dataset
Analysis
Software tool
Results
Publication
doi
doi


Ocean Observation
Science/expertise
Generate Dataset
Analysis
Software tool
Results
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Source Code
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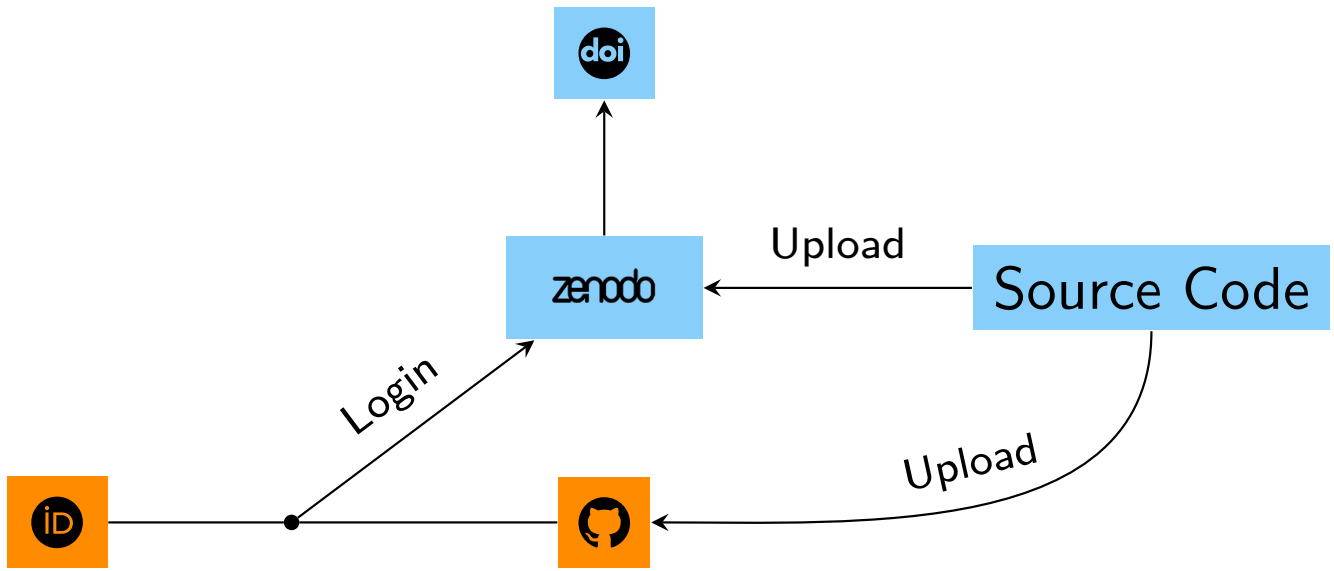
iD
Upload


doi
zenodo
Upload
Source Code
Login
iD
Upload

Goals

Reproducibility: **IF** same experiment
identical parameters
same dataset
same model
THEN same results

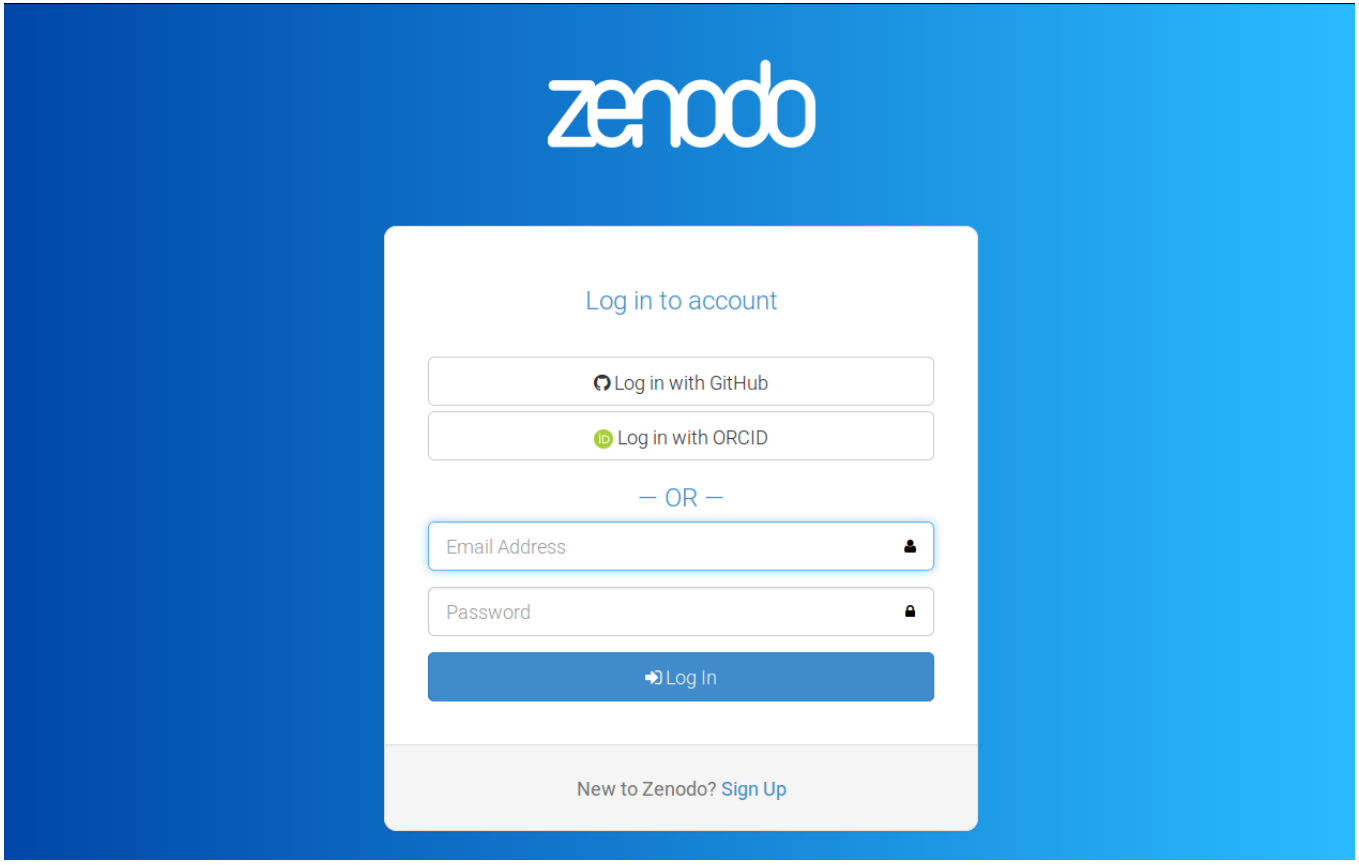
Traceability: all the elements used in the analysis/experiment:
accessible
properly described
uniquely identified

A closer look

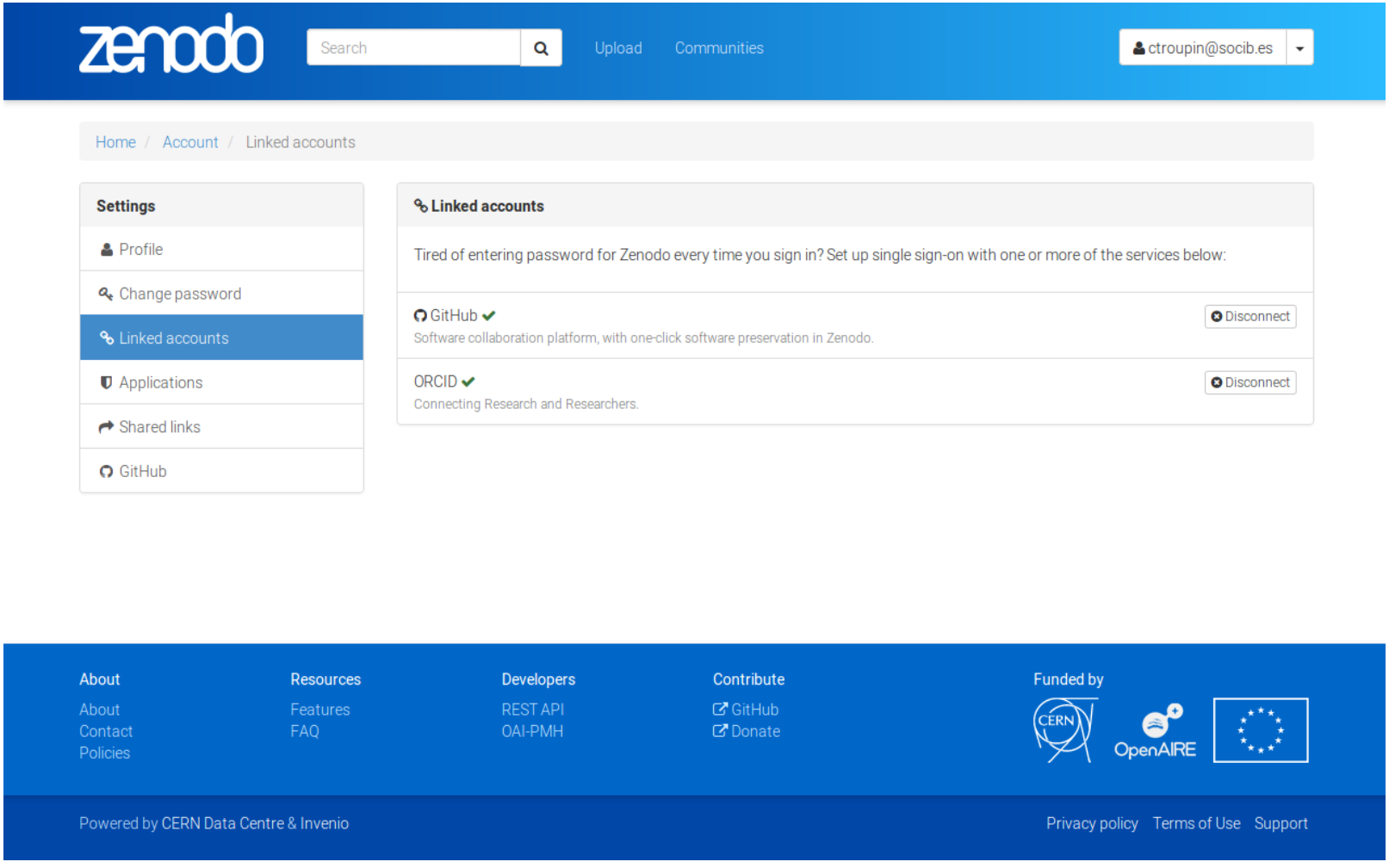
to Zenodo

Login: 3 options

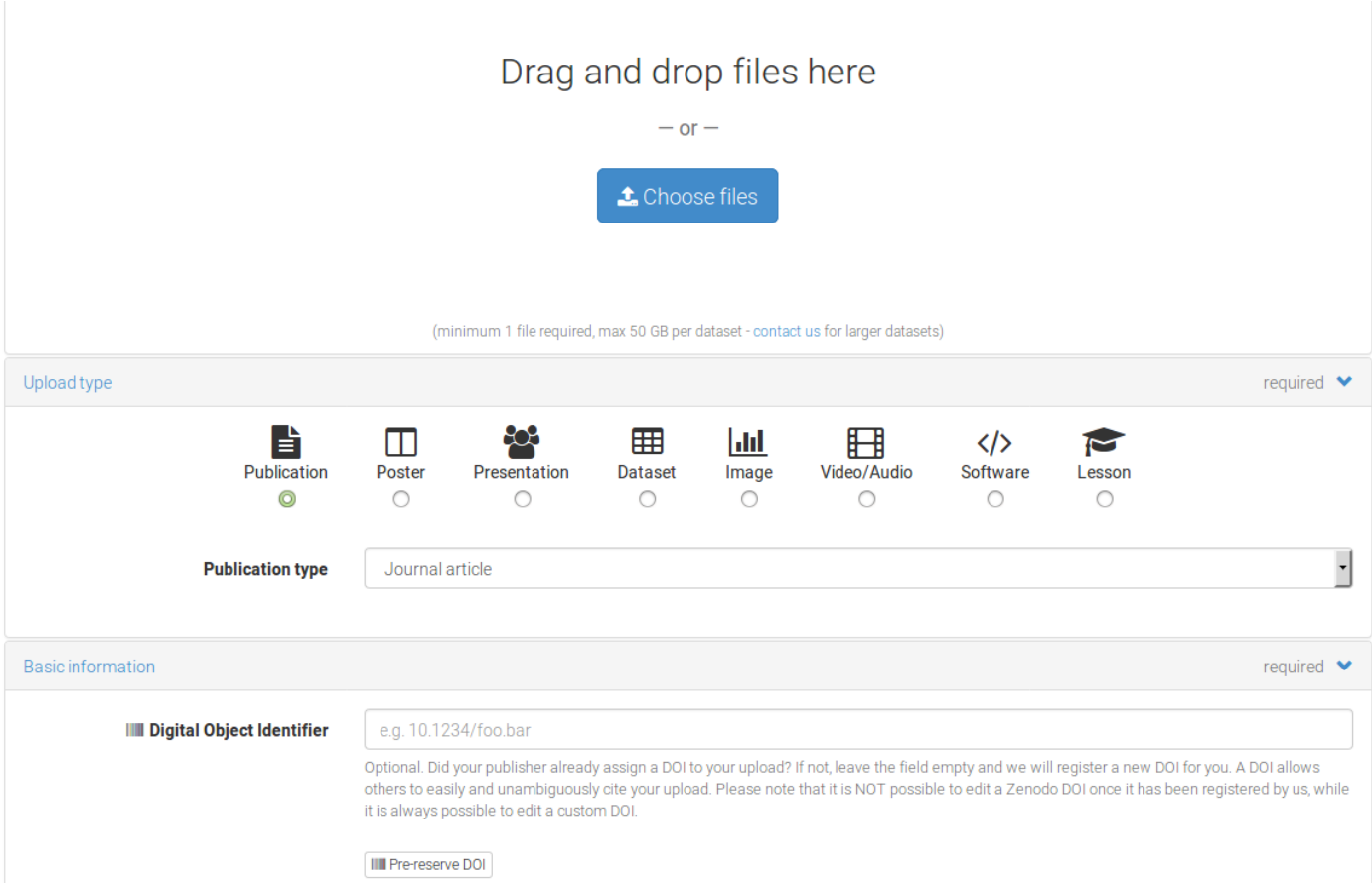
1. Use account
2. Use account
3. Create new (Sign Up)



Main page: linked accounts



Upload: you can drop anything



In particular: Software

(ok for stable code)

Upload: add metadata

Digital Object Identifier 10.5281/zenodo.836727

Optional. Did your publisher already assign a DOI to your upload? If not, leave the field empty and we will register a new DOI for you. A DOI allows others to easily and unambiguously cite your upload. Please note that it is NOT possible to edit a Zenodo DOI once it has been registered by us, while it is always possible to edit a custom DOI.

Reserve DOI ✔

Publication date * 2017-07-31

Required. Format: YYYY-MM-DD. In case your upload was already published elsewhere, please use the date of first publication.

Title * gher-ulg/DIVA: v4.7.1

Required.

Authors *

Sylvain Watelet	GHER, University of Liège
Charles Troupin	GHER, University of Liège
Jean-Marie Beckers	GHER, University of Liège
Alexander Barth	GHER, University of Liège
Mohamed Ouberdous	GHER, University of Liège

Upload: add metadata

Digital Object Identifier 10.5281/zenodo.836727

Optional. Did your publisher already assign a DOI to your upload? If not, leave the field empty and we will register a new DOI for you. A DOI allows others to easily and unambiguously cite your upload. Please note that it is NOT possible to edit a Zenodo DOI once it has been registered by us, while it is always possible to edit a custom DOI.

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Title * gher-ulg/DIVA: v4.7.1

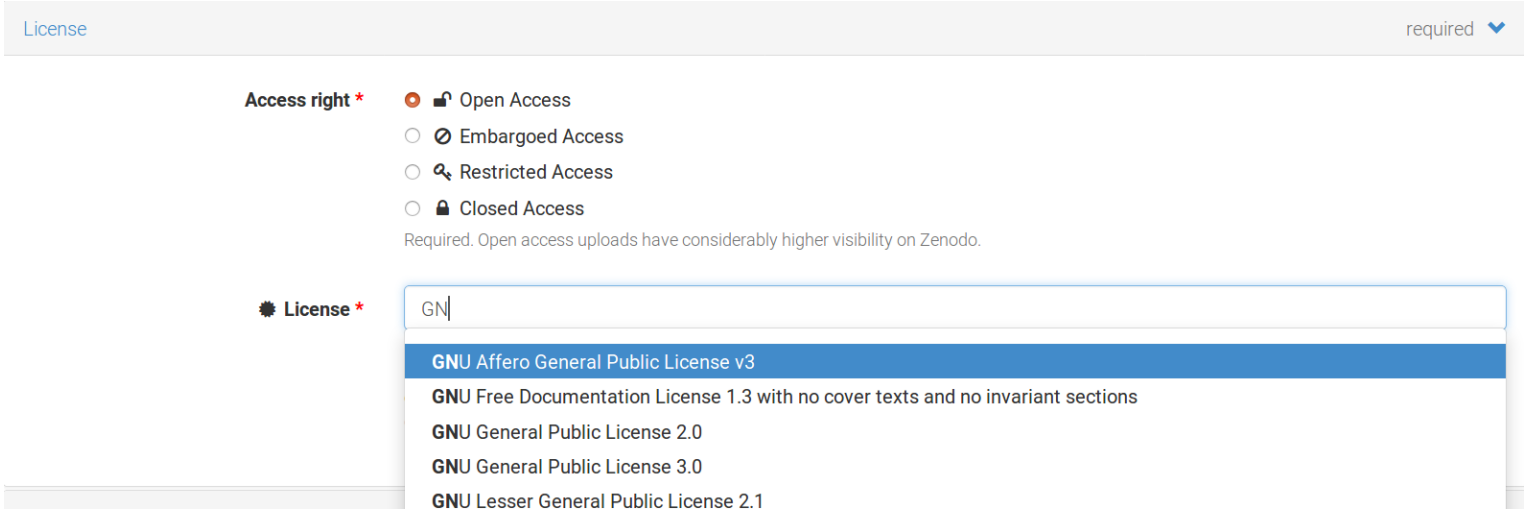
Required.

Authors *

Sylvain Watelet	GHER, University of Liège	0000-0002-0265-1021
Charles Troupin	GHER, University of Liège	ORCID (eg. 0000-0002-1825-0097)
Jean-Marie Beckers	GHER, University of Liège	ORCID (eg. 0000-0002-1825-0097)
Alexander Barth	GHER, University of Liège	ORCID (eg. 0000-0002-1825-0097)
Mohamed Ouberdous	GHER, University of Liège	ORCID (eg. 0000-0002-1825-0097)

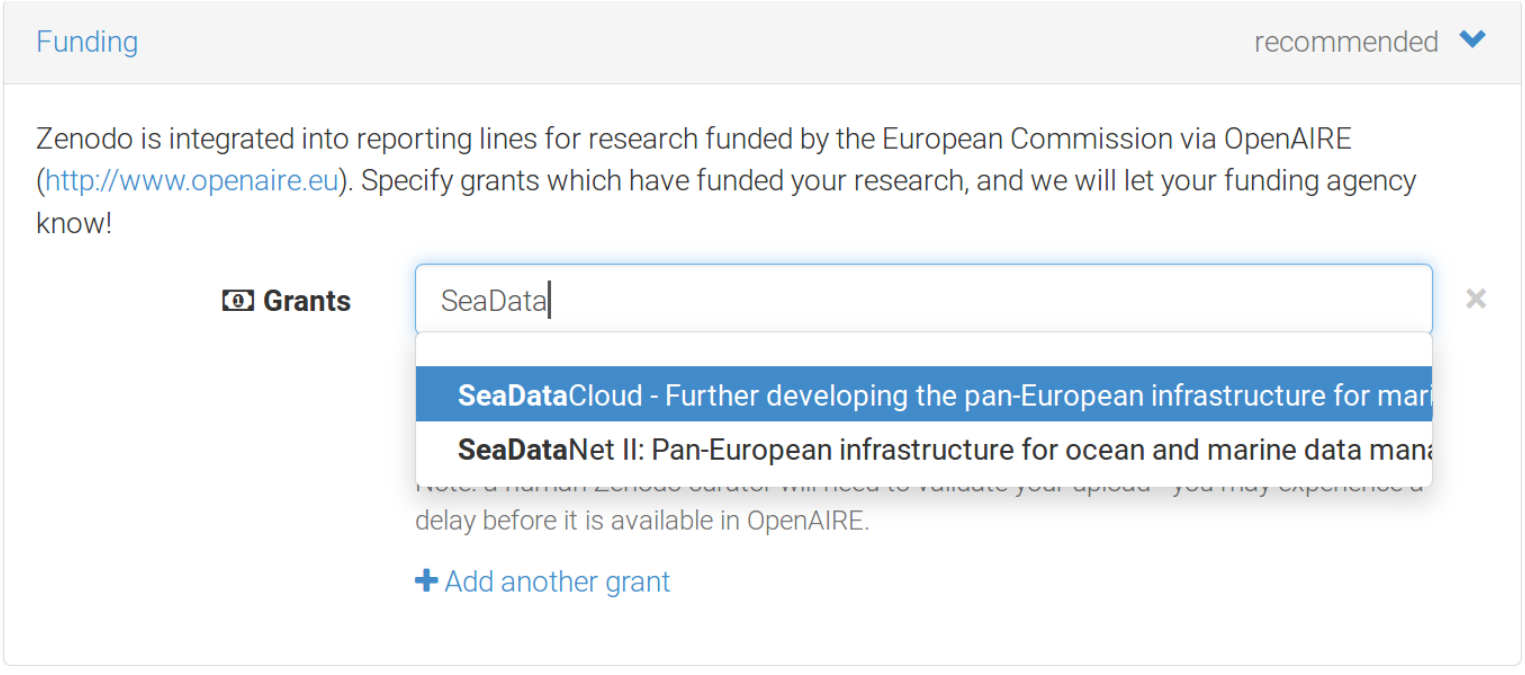
Optional.

Upload metadata: licence



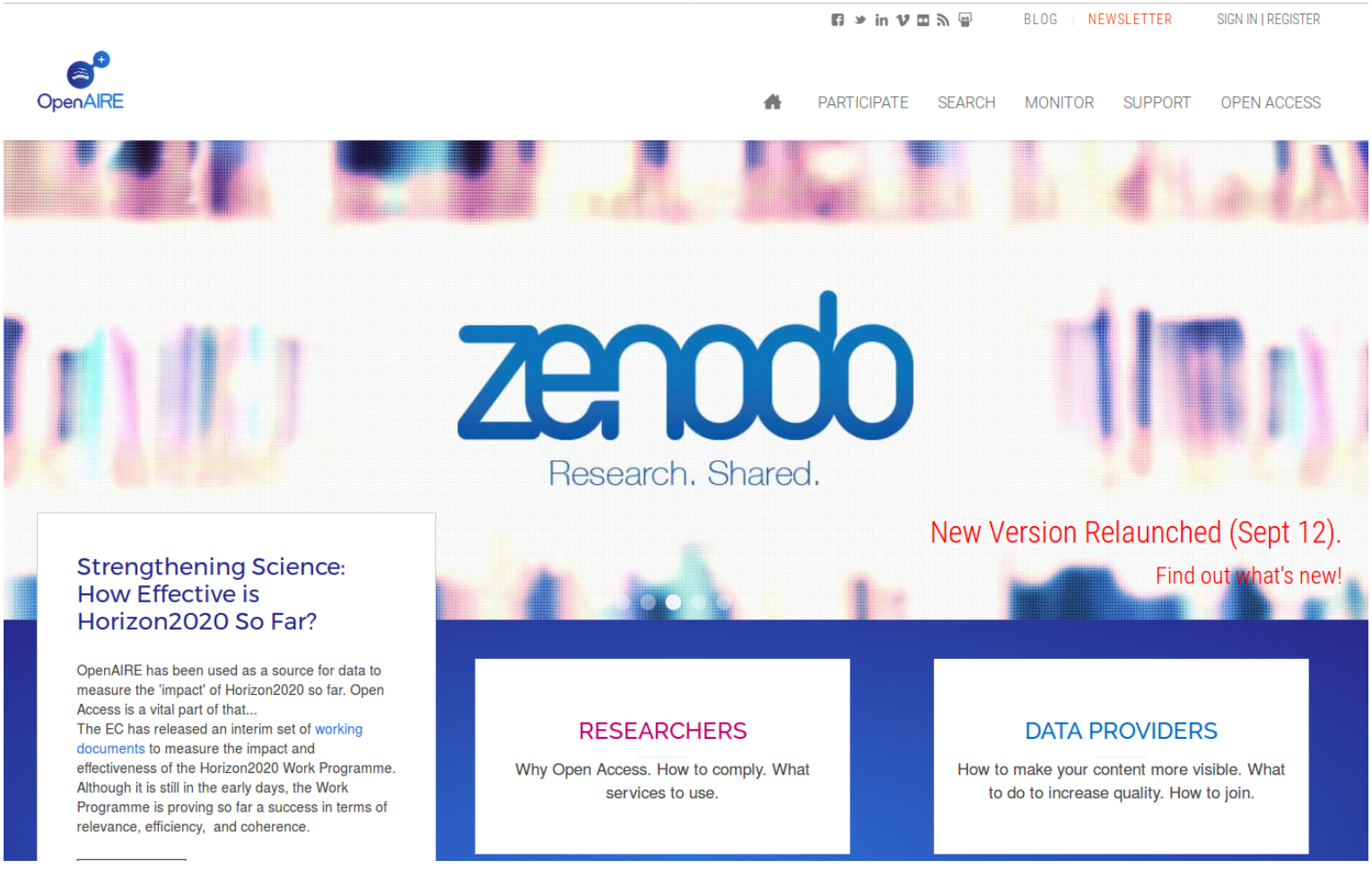
Not necessarily Open!

Upload metadata: funding!



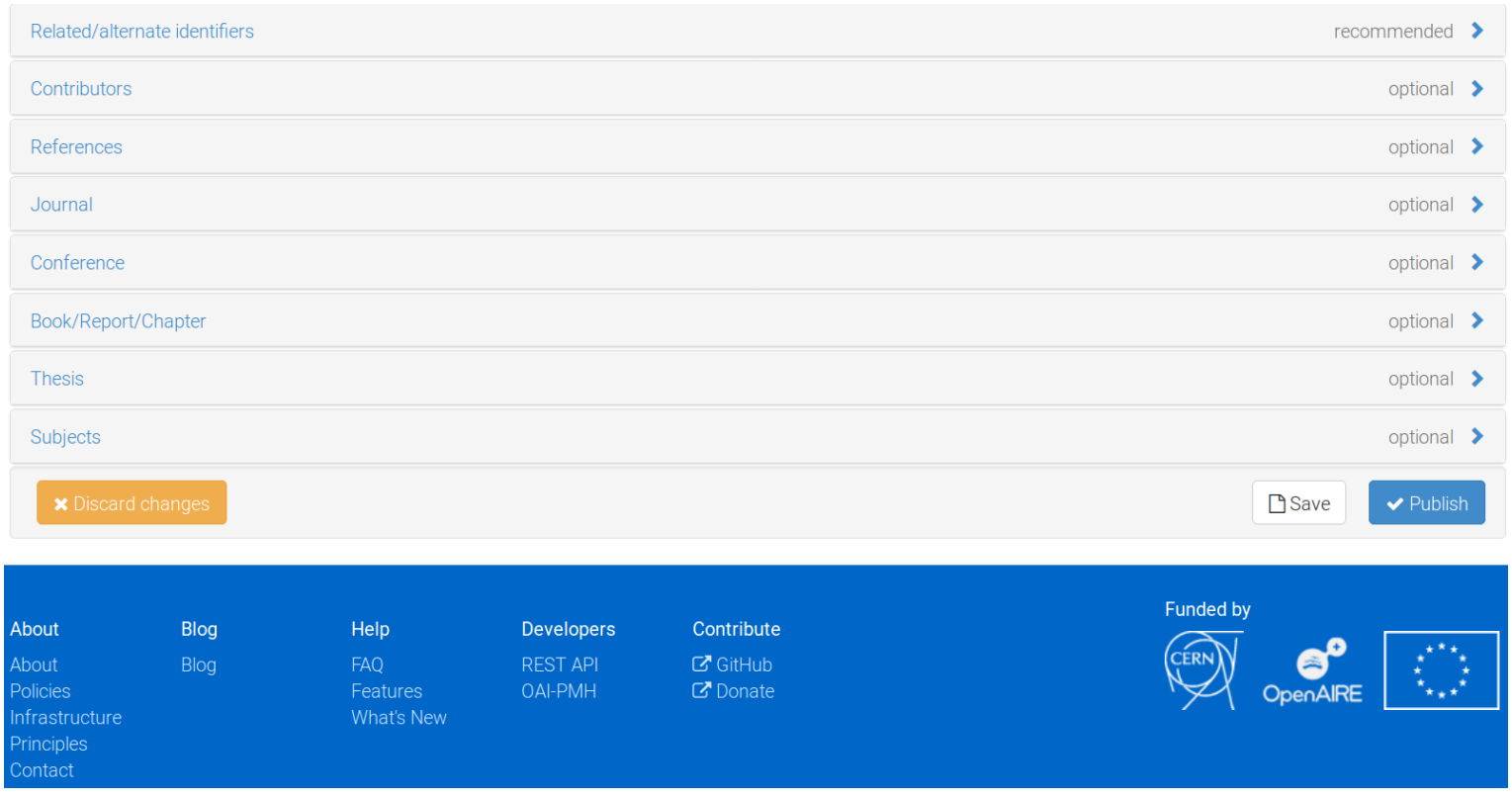
Common strategy for SeaDataCloud, ODIP, ...tools?

Upload metadata: funding!



Common strategy for SeaDataCloud, ODIP, ...tools?

Upload: finish

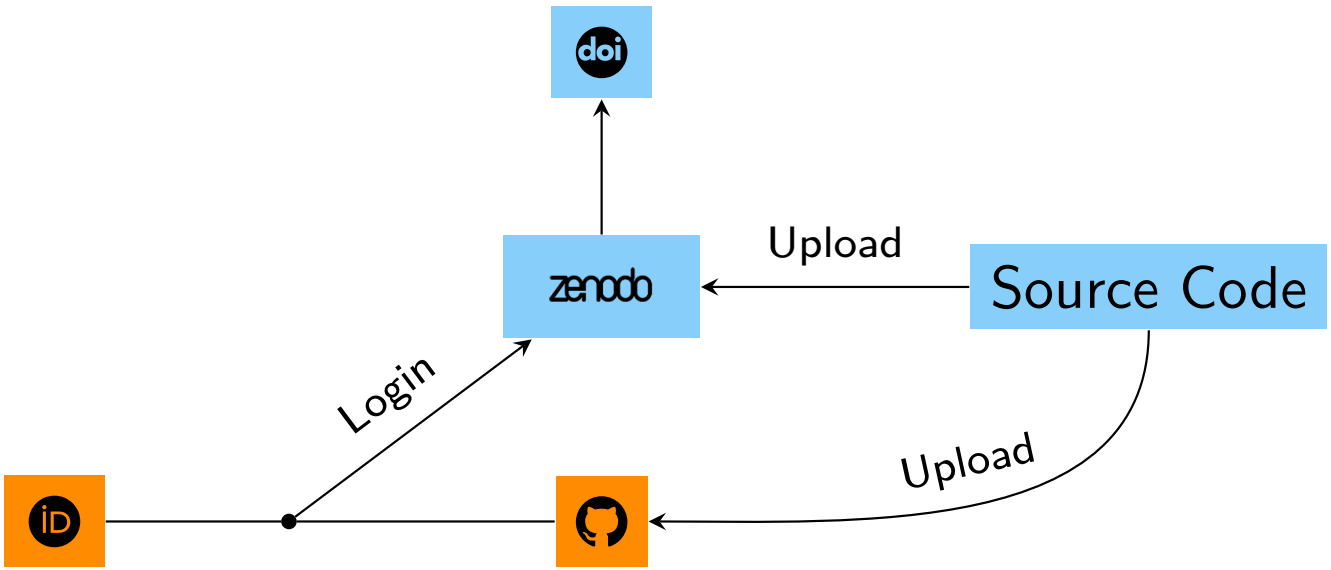


Zenodo & Github

working hand in hand

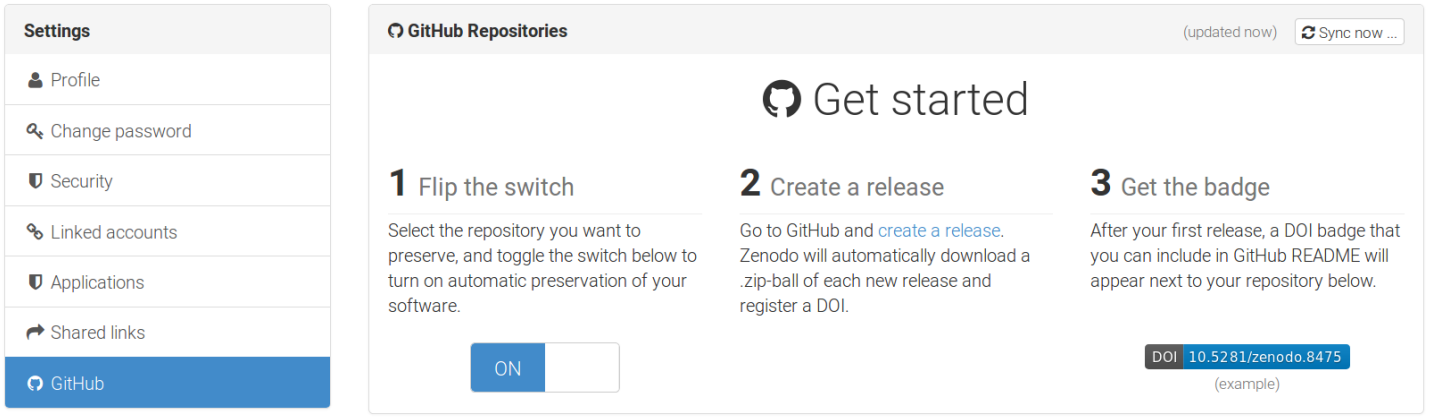
Requirements

1. or account
2. Source code



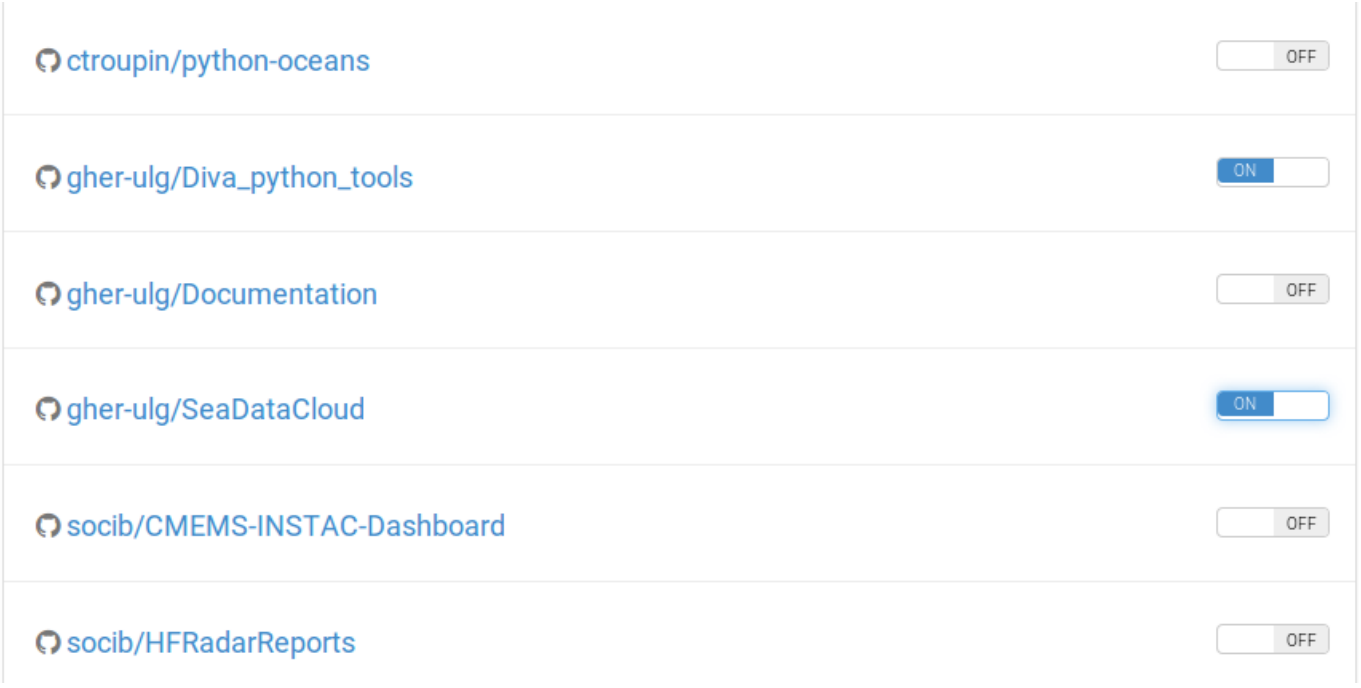
Generating doi for software releases

In Zenodo: click on the GitHub tab



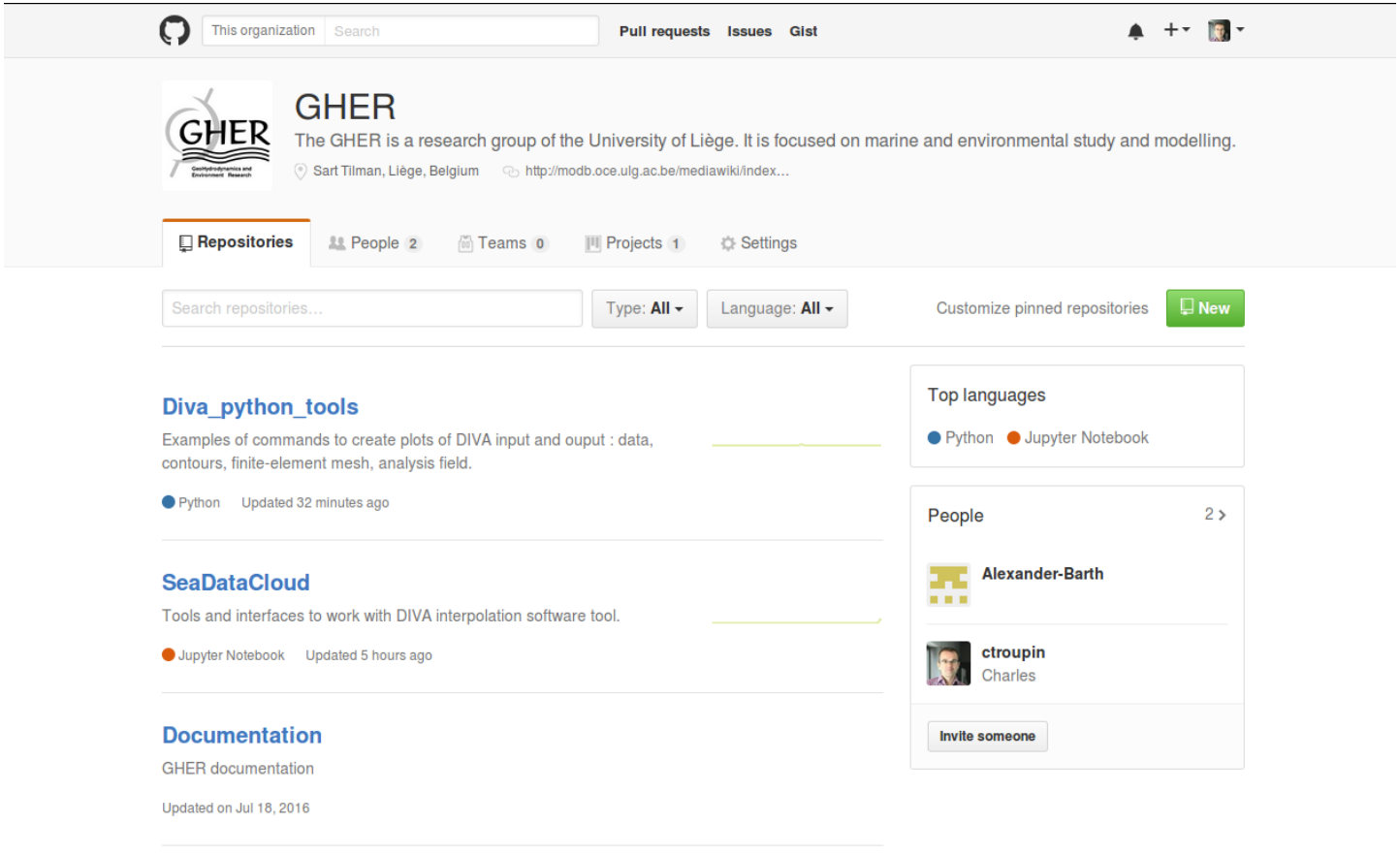
Generating doi for software releases

In Zenodo: turn on the synchronisation for the selected repositories



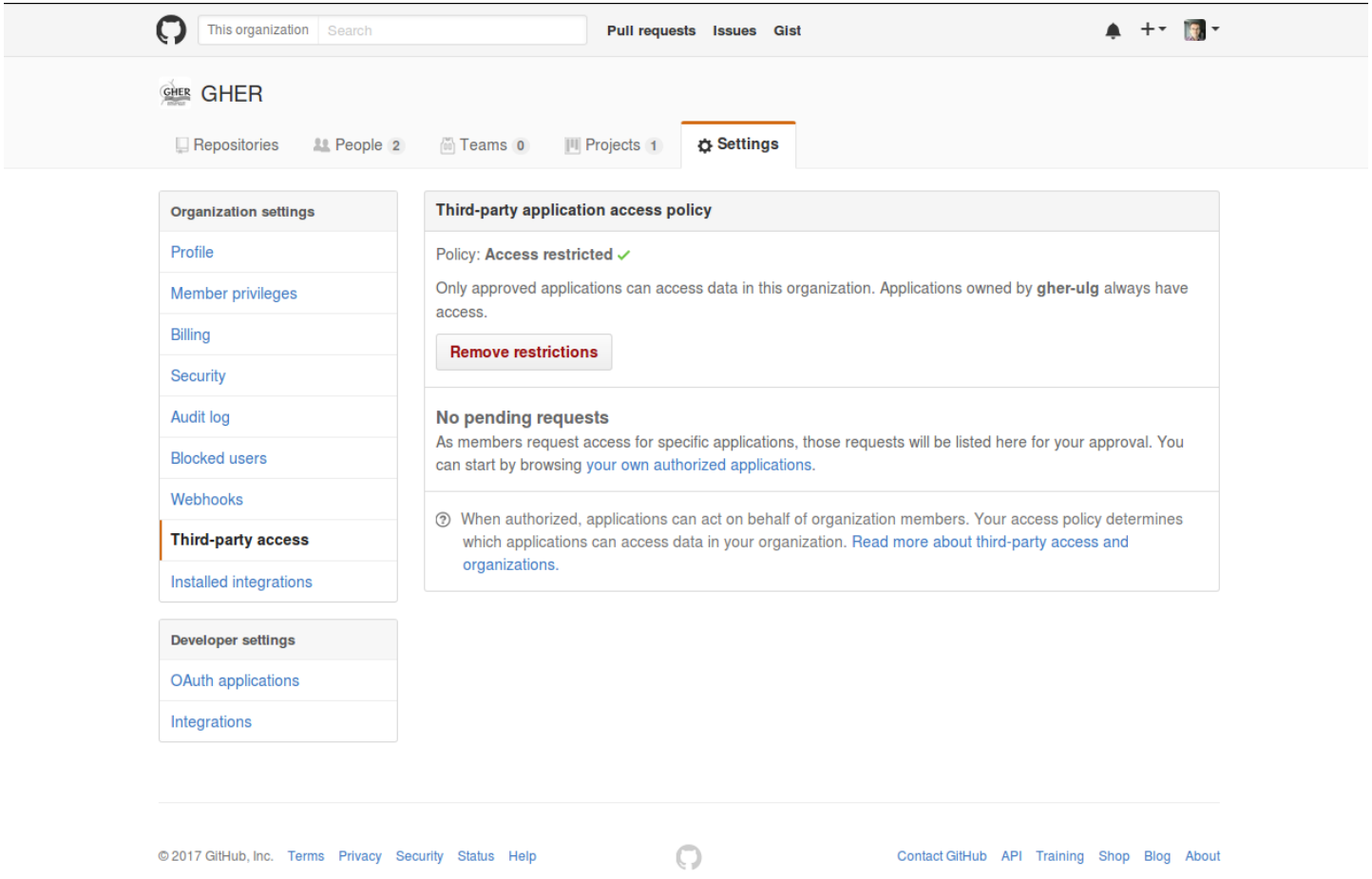
Generating doi for software releases

Go on your home page



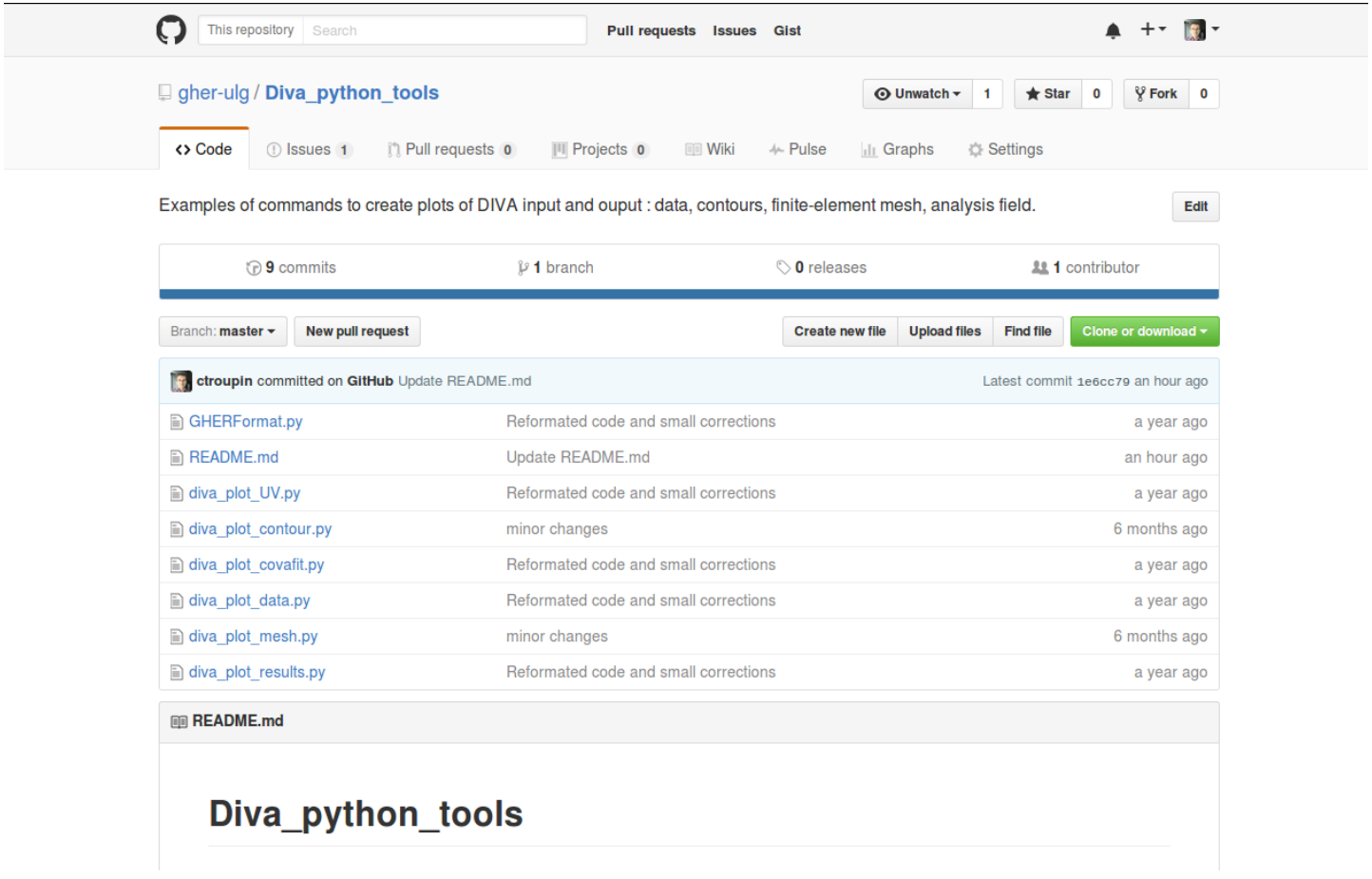
Generating doi for software releases

In settings: allow third-party access



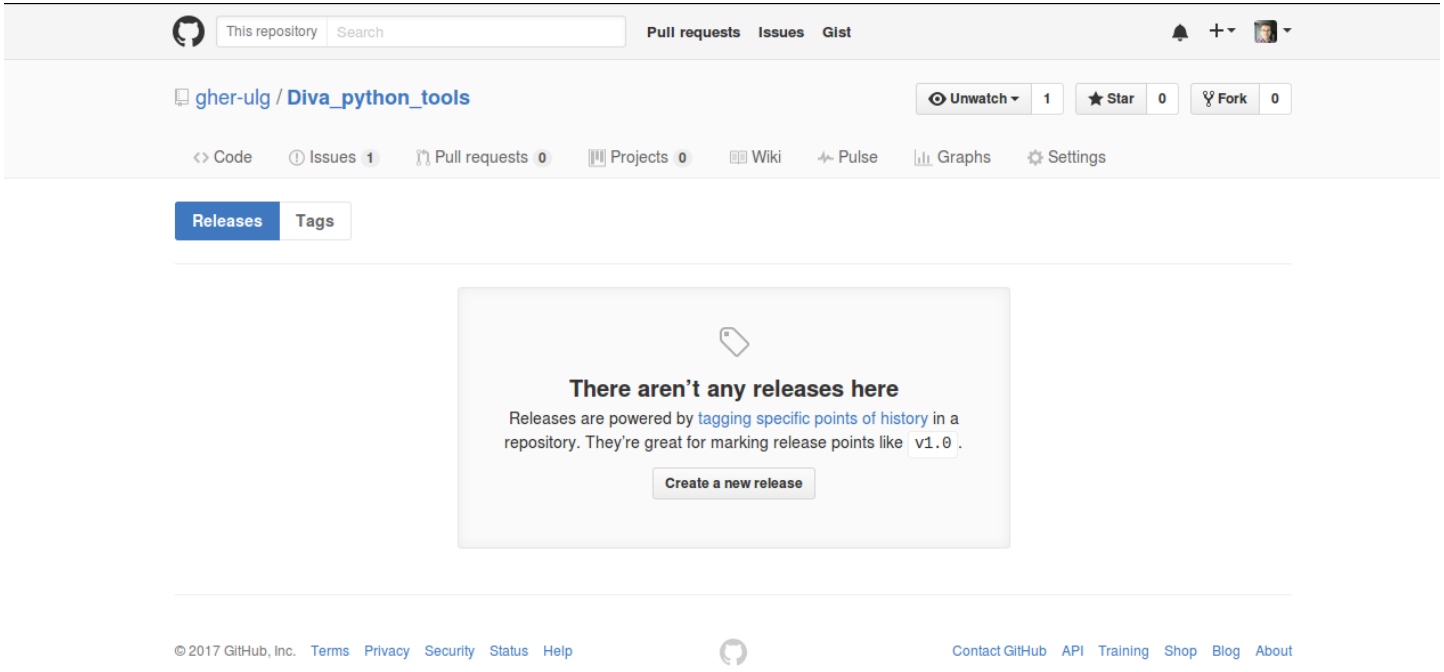
Generating doi for software releases

Open the selected project repository



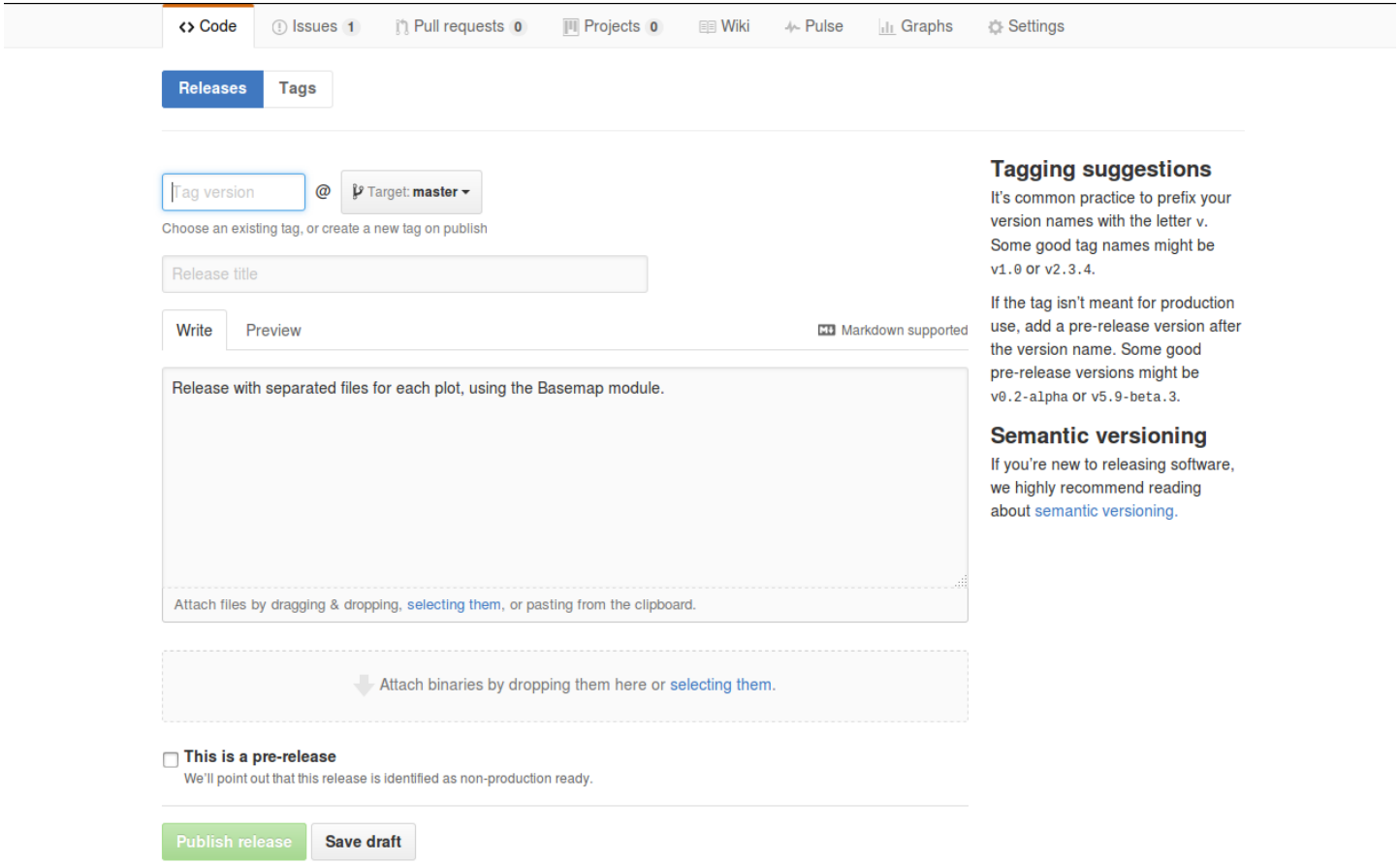
Generating doi for software releases

Click on the *Release* button



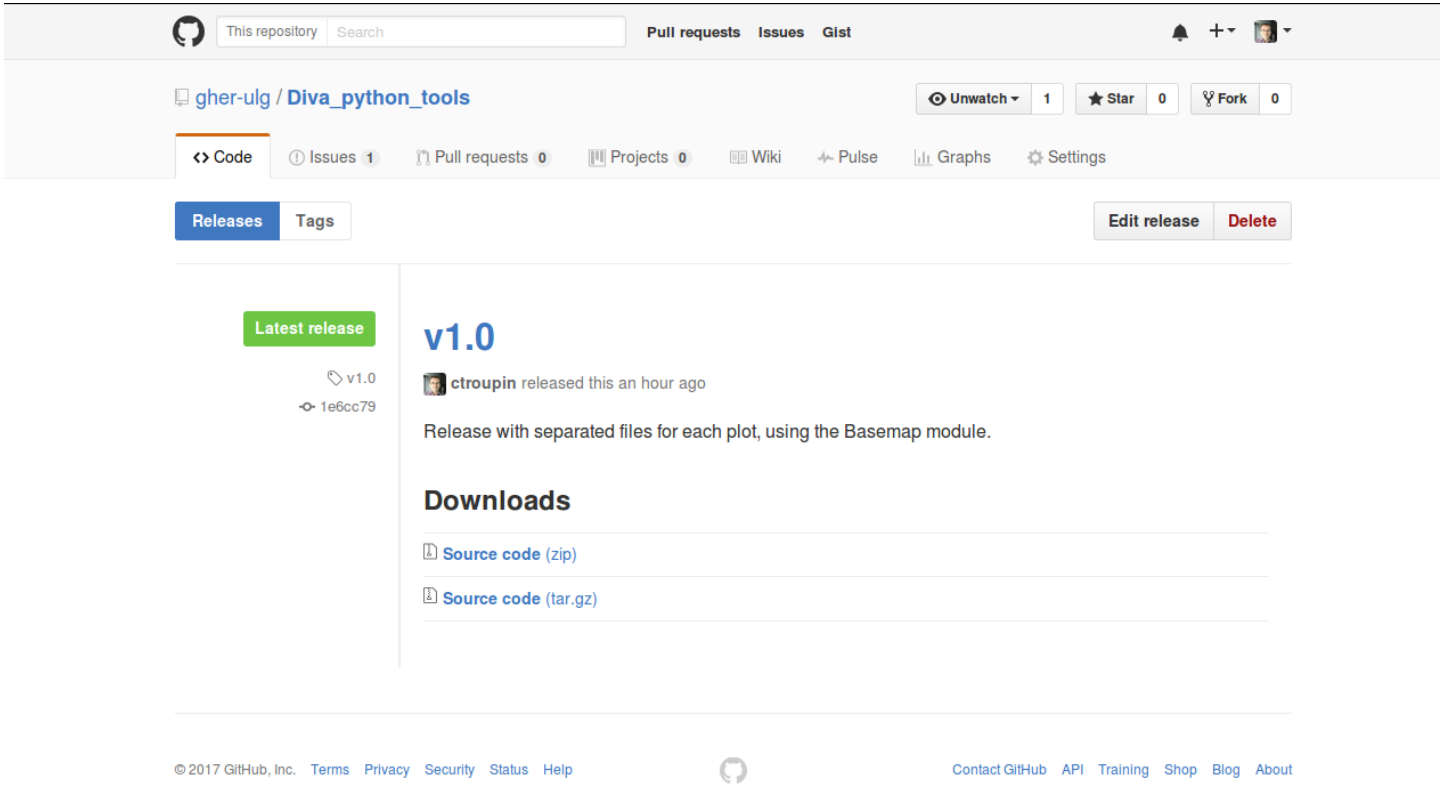
Generating doi for software releases

Fill in the information and ...



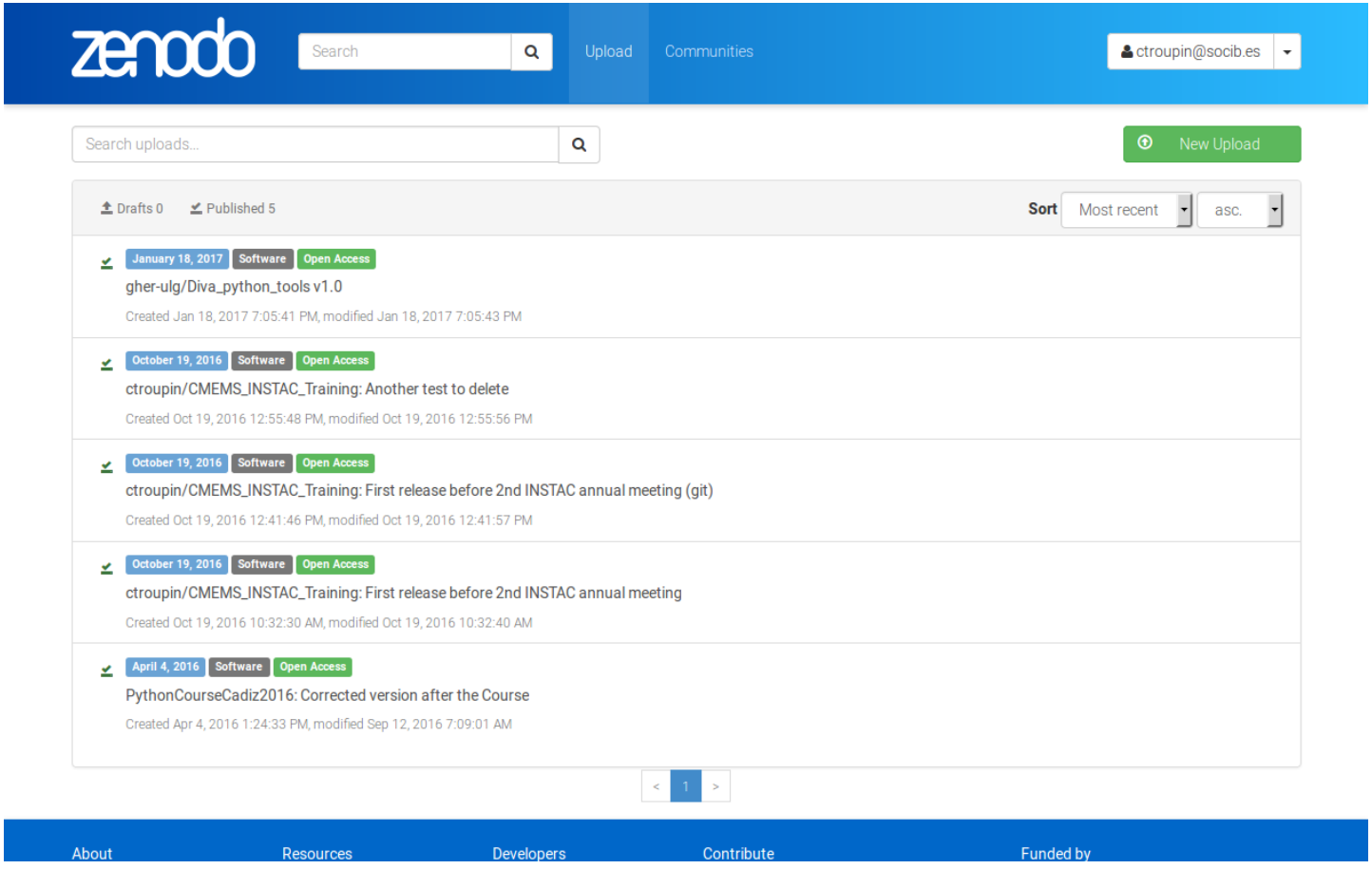
Generating doi for software releases

...make the release



Generating doi for software releases

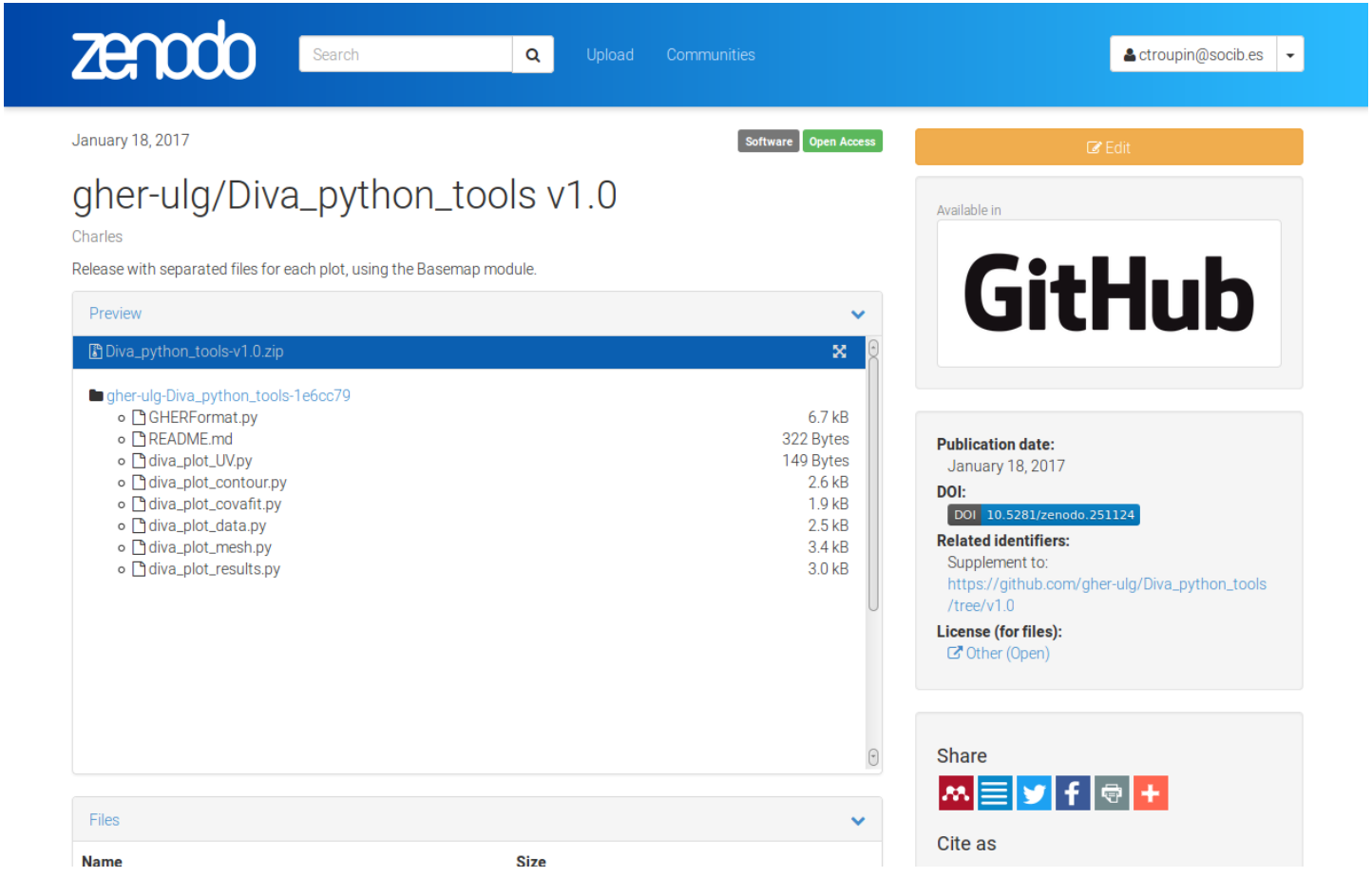
Check the project release on Zenodo and ...



Generating doi for software releases

...get the doi badge

and celebrate



Use case I

get DOI for Diva releases

Diva (simplified) development history

1990's: Variational Interpolation Method (Fortran 77)
only 2D interpolations

2006 SeaDataNet, code refactory and set of bash scripts

2007 with ODV 

2008 code in Subversion, distribution through GHER web page

2009 new modules in Fortran 90
for loops over depth and time

2012 new error calculation technique

2017 switch from to **git**, distribution via

From SVN to Git and GitHub

Easy way

1. Create a new repository with the latest release of the code
2. Lose all the history of the changes, the previous releases and developing branches

From SVN to Git and GitHub

Hard/conservative way

1. Git repository whose structure reflects that of SVN (trunk, branches, tags)
2. Use the `git-svn` bridge
3. End up with a new GitHub repos with all the history

Use-case: Diva releases

1. Switch from SVN to GitHub (conserving the history)

Resources:

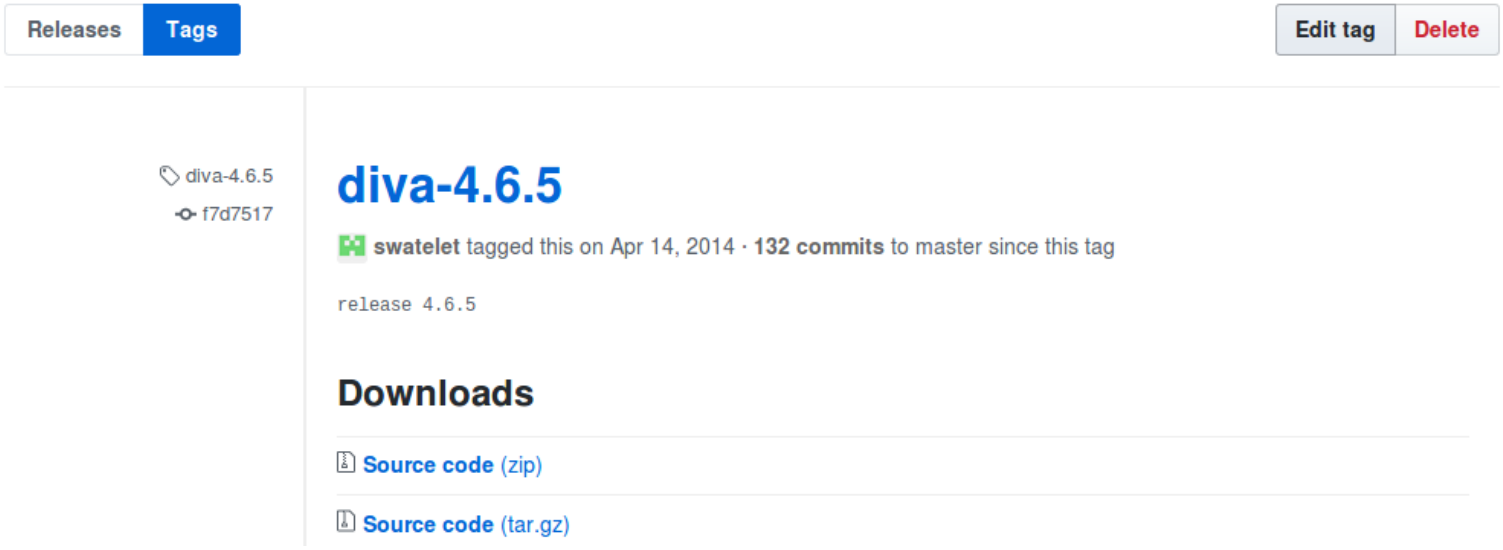
- https://git-scm.com/book/en/v2/Git-and-Other-Systems-Migrating-to-Git
- http://john.albin.net/git/convert-subversion-to-git
- https://www.atlassian.com/git/tutorials/migrating-overview

Use-case: Diva releases

1. Switch from SVN to GitHub (conserving the history)
2. Enable Diva repository on Zenodo

Use-case: Diva releases

1. Switch from SVN to GitHub (conserving the history)
2. Enable Diva repository on Zenodo
3. Edit the different *tags* on GitHub to get DOI

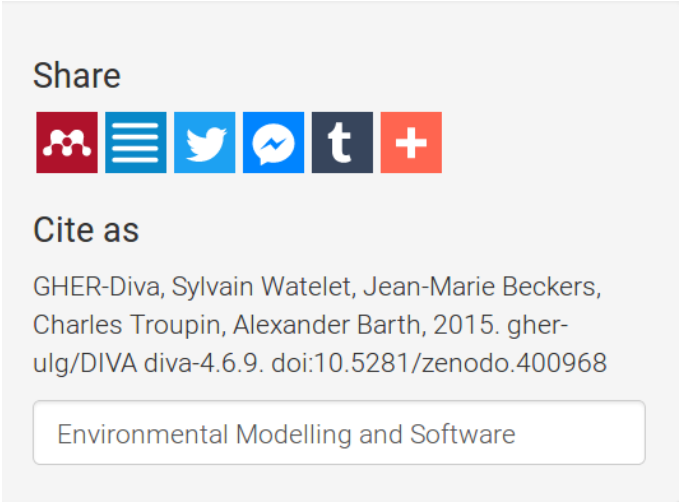


Use-case: Diva releases

1. Switch from SVN to GitHub (conserving the history)
2. Enable Diva repository on Zenodo
3. Edit the different *tags* on GitHub to get DOI
4. Now we can have
   "*The version used for the DIVA software is the 4.6.9,*
   doi: 10.5281/zenodo.400968

Use-case: Diva releases

1. Switch from SVN to GitHub (conserving the history)
2. Enable Diva repository on Zenodo
3. Edit the different *tags* on GitHub to get DOI
4. Now we can have
   "*The version used for the DIVA software is the 4.6.9,*
   doi: 10.5281/zenodo.400968
5. Bonus: "*cite as*" and social media



Use case II

SOCIB Glider toolbox

Glider toolbox (Matlab/Octave)

SOCIB Glider toolbox is a set of MATLAB/Octave scripts and functions to manage the data collected by our Glider fleet

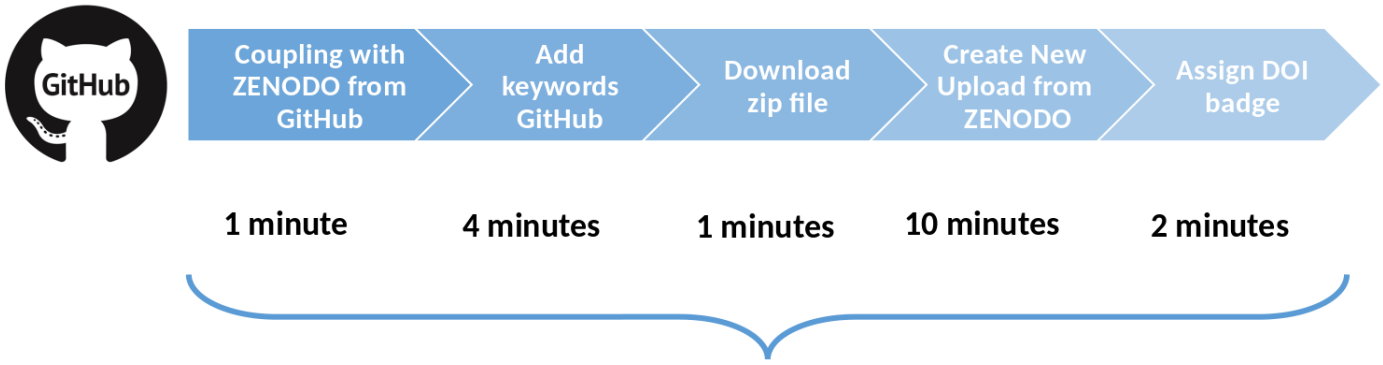
↓

NetCDF-CF compliant

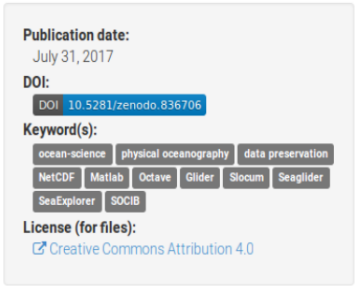
Objectives

- Publish results of our day by day work
- Track the utilization of our toolbox from research activities

User Experience



18 minutes



Conclusions on Zenodo

1. Seamless integration with GitHub, login via ORCID
2. A big step toward reproducibility
3. A mature and user-friendly tool

I don't mind your thinking slowly;
I mind your publishing faster than you think

W. Pauli