

# Angling for data: making biodiversity metadata more FAIR

/ Joakim Philipson (Stockholm University Library)

@TDWG 2017, Ottawa, Oct. 3



# Go Fish!

- (Swedish, verb:) "meta" = 'to angle'
- FAIR **meta**data will give all a larger lake to fish from, and a greater diversity of fish!



# Implementing the FAIR Principles?

## Box 2 | The FAIR Guiding Principles

### To be Findable:

- F1. (meta)data are assigned a globally unique and persistent identifier
- F2. data are described with rich metadata (defined by R1 below)
- F3. metadata clearly and explicitly include the identifier of the data it describes
- F4. (meta)data are registered or indexed in a searchable resource

### To be Accessible:

- A1. (meta)data are retrievable by their identifier using a standardized communications protocol
  - A1.1 the protocol is open, free, and universally implementable
  - A1.2 the protocol allows for an authentication and authorization procedure, where necessary
- A2. metadata are accessible, even when the data are no longer available

### To be Interoperable:

- I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.
- I2. (meta)data use vocabularies that follow FAIR principles
- I3. (meta)data include qualified references to other (meta)data

### To be Reusable:

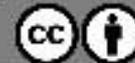
- R1. meta(data) are richly described with a plurality of accurate and relevant attributes
  - R1.1. (meta)data are released with a clear and accessible data usage license
  - R1.2. (meta)data are associated with detailed provenance
  - R1.3. (meta)data meet domain-relevant community standards

15 Criteria

Data Archiving and Networked Services

DANS

See: <http://datafairport.org/fair-principles-living-document-menu> and  
<https://www.force11.org/group/fairgroup/fairprinciples>



[FAIR-principles](#) (*Findable, Accessible, Interoperable, Re-usable*)

[FAIR metrics tool](#) from DANS (<https://goo.gl/749dmf> OSFair ws, 2017-09-08)



Stockholm  
University

# What is FAIR? Explication attempts

FAIR = **Findable, Accessible, Interoperable, and Re-usable** metadata and identifiers:

- 1. To be **Findable** any Data Object should be uniquely and persistently identifiable
  - 1.1. The same Data Object should be re-findable at any point in time, thus Data Objects should be persistent, with emphasis on their metadata
  - 1.2. **A Data Object should minimally contain basic *machine actionable* metadata that allows it to be *distinguished from other Data Objects***
  - 1.3. **Identifiers** for any concept used in Data Objects should therefore be **Unique** and **Persistent**
- 2. Data is **Accessible** in that it can be always obtained by machines and humans
- 3. Data Objects can be **Interoperable** only if:
  - 3.1. (Meta) data is ***machine-actionable*** ... **Metadata being machine readable is a *conditio sine qua non* for FAIRness.**
  - 3.3 (Meta) data within the Data Object should thus be both *syntactically parseable* and *semantically machine-accessible*
- 4. For Data Objects to be **Re-usable** additional criteria are:
  - 4.1 Data Objects should be compliant with principles 1-3
  - 4.2 (Meta) data should be sufficiently well-described and rich that it can be automatically (or with minimal human effort) ***linked or integrated, like-with-like***, with other data sources

# What has FAIR *metadata* to do with data quality?

## Findable & Accessible

-> *potentially more eyeballs to scrutinize data, detect errors*



Wellcome Images [\[CC BY 4.0\]](#),  
via Wikimedia Commons



Photo: Dave Meier Stocksnap.io CC0 1.0

<- **Interoperable**

<- **Re-usable**

-> *more testing by different users*

Laura Russell (GBIF VertNet 2011): <https://vimeo.com/album/1904479/video/40447148>

# Wish list!

1. **Findable** – e.g. by schema.org markup of html-records (cf. Uniprot)
2. *Citation* (in several formats if applicable), easy to copy.
3. Good searchability options (indexing and filtering)
4. **Accessible** – “can be always obtained by machines and humans” -> a clear policy and/or demonstrated ability to always keep metadata records in the database, even for datasets that have for some reason been withdrawn.
5. Resolvable *Permanent* globally unique *Identifiers* - **PIDs** of standard formats (doi, hdl, ...) – widely *used* -distributed (also making them more **Findable** or ‘*googlable*’)
6. **Interoperable** - “(Meta)data is **machine-actionable**” ... -> a *metadata file in XML or JSON* for download (or harvesting via API or OAI-PMH) should be part of each dataset or package.
7. Preferably using *non-proprietary, sustainable fileformats*
8. **Re-usable** - “(Meta)data ... automatically (or with minimal human effort) *linked* or *integrated, like-with-like*, with other data sources” -> Provide **export of metadata** to other formats (DC, DataCite, DDI, DIF, DWC, EML, RDF?) AND **compliance** with exportformat standards provided (**validation**, keeping promises)
9. **File overview and structure** (relations between files), with explicit statements of fileformats, file sizes, and possibly checksums included in metadata.
10. **Standardized licenses** (CC-BY et al., selection from drop-down menu)

# Wish list!

1. **Findable** – e.g. by *schema.org* markup of html-records (cf. Uniprot) -> a wider lake to fish from! (or, bigger chance to be caught):  
*google it:* [fish egg lectin](#)

From view-source:<http://www.uniprot.org/uniprot/P68512> of db entry:

```
<main class="uniprot"
property="schema:about" resource="http://purl.uniprot.org/uniprot/P68512"
typeof="schema:CreativeWork" id="content"><section id="page-header">
<h2 class="page-title" property="schema:alternateName">UniProtKB - P68512 <span
property="schema:alternateName">(FEL_CYPCA)</span></h2>
```

...

```
<div id="content-protein" class="entry-overview-content">
<h1 property="schema:name">Fish-egg lectin</h1>
</div>
```

...

```
<a
href="http://dx.doi.org/10.1042/BJ20030413"
>Biochem. J. 376:433-440(2003)</a> [<a
property="schema:sameAs"
href="https://www.ncbi.nlm.nih.gov/pubmed/12956625"
>PubMed</a>] [<a property="schema:sameAs"
href="http://europepmc.org/abstract/MED/12956625"
```

# Wish list!

## 2. Findable – Citation(s), in several formats if applicable), easy to copy.

Examples from [wikimedia](#) v:

Zenodo: ->

### Bibliographic details for File:Sampling coral microbiome (27146437650).jpg

- Page name: File:Sampling coral microbiome (27146437650).jpg
- Author: Wikimedia Commons contributors
- Publisher: *Wikimedia Commons, the free media repository.*
- Date of last revision: 5 August 2016 01:10 UTC
- Date retrieved: 11 June 2017 12:54 UTC
- Permanent URL: [https://commons.wikimedia.org/w/index.php?title=File:Sampling\\_coral\\_microbiome\\_\(27146437650\).jpg&oldid=203149246](https://commons.wikimedia.org/w/index.php?title=File:Sampling_coral_microbiome_(27146437650).jpg&oldid=203149246)
- Page Version ID: 203149246

### Citation styles for File:Sampling coral microbiome (27146437650).jpg

#### APA style

File:Sampling coral microbiome (27146437650).jpg. (2016, August 5). *Wikimedia Commons, the free media repository*. Retrieved 12:54, June 11, 2017 from [https://commons.wikimedia.org/w/index.php?title=File:Sampling\\_coral\\_microbiome\\_\(27146437650\).jpg&oldid=203149246](https://commons.wikimedia.org/w/index.php?title=File:Sampling_coral_microbiome_(27146437650).jpg&oldid=203149246).

#### MLA style

"File:Sampling coral microbiome (27146437650).jpg." *Wikimedia Commons, the free media repository*. 5 Aug 2016, 01:10 UTC. 11 Jun 2017, 12:54 <[https://commons.wikimedia.org/w/index.php?title=File:Sampling\\_coral\\_microbiome\\_\(27146437650\).jpg&oldid=203149246](https://commons.wikimedia.org/w/index.php?title=File:Sampling_coral_microbiome_(27146437650).jpg&oldid=203149246)>.

#### MHRA style

Wikimedia Commons contributors. "File:Sampling coral microbiome (27146437650).jpg". *Wikimedia Commons, the free media repository*. 5 August 2016, 01:10 UTC. <[https://commons.wikimedia.org/w/index.php?title=File:Sampling\\_coral\\_microbiome\\_\(27146437650\).jpg&oldid=203149246](https://commons.wikimedia.org/w/index.php?title=File:Sampling_coral_microbiome_(27146437650).jpg&oldid=203149246)> [accessed 11 June 2017]

1

FILTER APPLIED 18 SEPTEMBER 2017

**Citation:** GBIF Occurrence Download doi:10.15468/dl.muveie accessed via GBIF.org on 18 Sep 2017

**File:** 5 MB Darwin Core Archive For how long will GBIF store this data?

**Involved Datasets:** 137

Scientific name

Gadus morhua linnaeus, 1758

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Cite as

Carozza, David A, Bianchi, Daniele, & Galbraith, Eric D. (2017). Metabolic impacts of climate change on marine fish communities and fisheries - Dataset and figure plot script [Data set]. Zenodo. <http://doi.org/10.5281/zenodo.495487>

Start typing a citation style...

3 Biotech

3D-Printed Materials and Systems

3D Printing in Medicine

3D Research

4OR

AAPG Bulletin

AAPS Open

AAPS PharmSciTech

But no citation help for single records or search results:

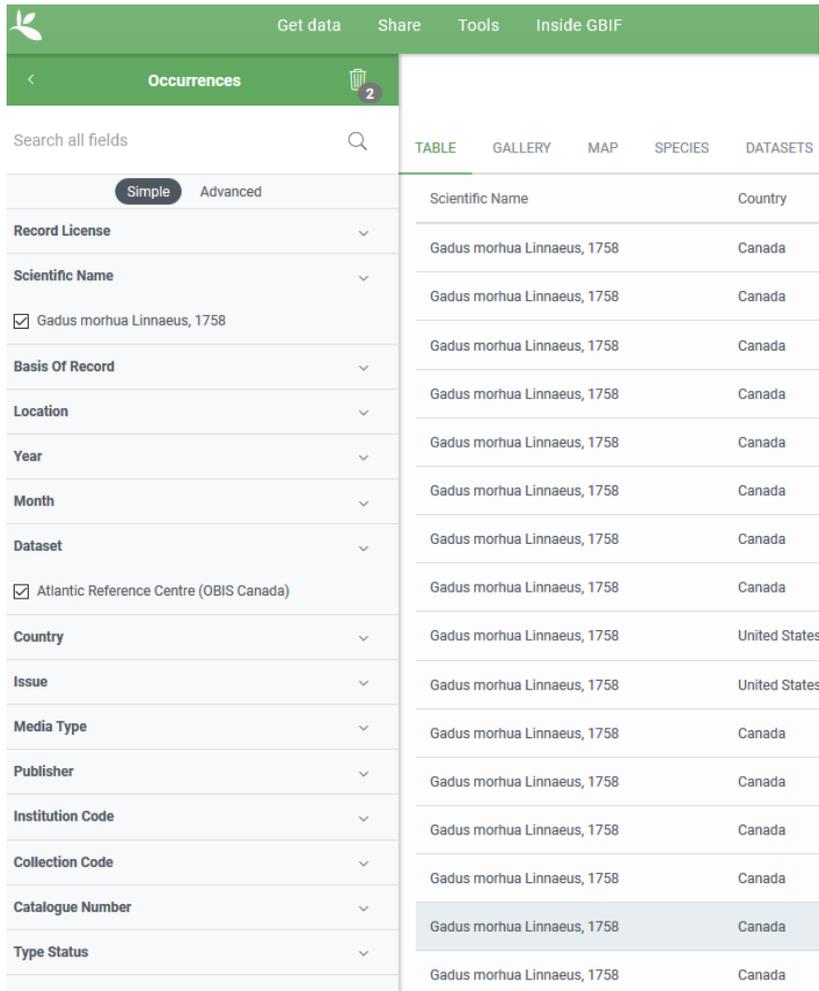
<https://www.gbif.org/occurrence/17469157> – Atlantic Reference Centre, 2005-07-11

<https://records.nbnatlas.org/occurrences/search?q=lsid:NBNSYS0000175392> - login req.

# Wish list!

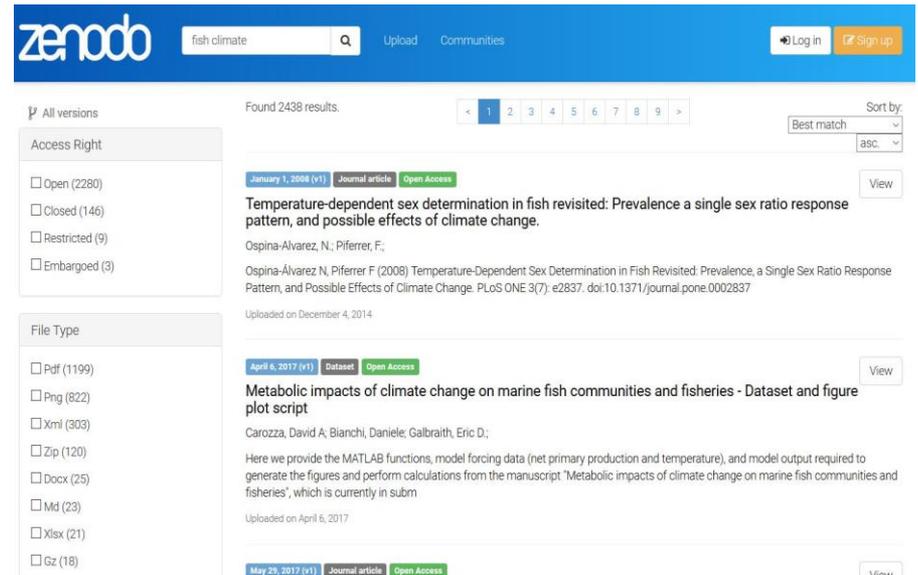
## 3. Findable – good searchability in database (with clear filtering options)

Example: <https://zenodo.org/search?page=1&size=20&q=fish%20climate>



The screenshot shows the GBIF Occurrences search results for *Gadus morhua*. The interface includes a search bar, a filter sidebar on the left, and a main results table. The filter sidebar has sections for 'Simple' and 'Advanced' filters, with 'Simple' selected. The 'Advanced' filters include Record License, Scientific Name (checked for *Gadus morhua* Linnaeus, 1758), Basis Of Record, Location, Year, Month, Dataset (checked for Atlantic Reference Centre (OBIS Canada)), Country, Issue, Media Type, Publisher, Institution Code, Collection Code, Catalogue Number, and Type Status. The main table has columns for Scientific Name and Country, and lists 20 occurrences of *Gadus morhua* from Canada and the United States.

TABLE	GALLERY	MAP	SPECIES	DATASETS
Scientific Name			Country	
Gadus morhua Linnaeus, 1758			Canada	
Gadus morhua Linnaeus, 1758			Canada	
Gadus morhua Linnaeus, 1758			Canada	
Gadus morhua Linnaeus, 1758			Canada	
Gadus morhua Linnaeus, 1758			Canada	
Gadus morhua Linnaeus, 1758			Canada	
Gadus morhua Linnaeus, 1758			Canada	
Gadus morhua Linnaeus, 1758			Canada	
Gadus morhua Linnaeus, 1758			Canada	
Gadus morhua Linnaeus, 1758			Canada	
Gadus morhua Linnaeus, 1758			United States	
Gadus morhua Linnaeus, 1758			United States	
Gadus morhua Linnaeus, 1758			Canada	
Gadus morhua Linnaeus, 1758			Canada	
Gadus morhua Linnaeus, 1758			Canada	
Gadus morhua Linnaeus, 1758			Canada	
Gadus morhua Linnaeus, 1758			Canada	
Gadus morhua Linnaeus, 1758			Canada	
Gadus morhua Linnaeus, 1758			Canada	



The screenshot shows the Zenodo search results for 'fish climate'. The interface includes a search bar, a filter sidebar on the left, and a main results table. The filter sidebar has sections for 'All versions', 'Access Right', and 'File Type'. The 'Access Right' section includes checkboxes for Open (2280), Closed (146), Restricted (9), and Embargoed (3). The 'File Type' section includes checkboxes for Pdf (1199), Png (822), Xml (303), Zip (120), Docx (25), Md (23), Xlsx (21), and Gz (18). The main table lists search results with columns for date, file type, and title. The first result is 'Temperature-dependent sex determination in fish revisited: Prevalence a single sex ratio response pattern, and possible effects of climate change.' by Ospina-Alvarez, N.; Piferrer, F. The second result is 'Metabolic impacts of climate change on marine fish communities and fisheries - Dataset and figure plot script' by Carozza, David A.; Bianchi, Daniele; Galbraith, Eric D. The third result is 'Metabolic impacts of climate change on marine fish communities and fisheries' by Carozza, David A.; Bianchi, Daniele; Galbraith, Eric D.

<- GBIF very good at this! Example:

[https://www.gbif.org/occurrence/search?taxon\\_key=8084280](https://www.gbif.org/occurrence/search?taxon_key=8084280)

Fishbase fine-grained search-form, complex post-search-filtering:

<http://fishbase.org/search.php>

Search Genus+Species: *Gadus morhua* ->

<http://fishbase.org/summary/Gadus-morhua.html> ->

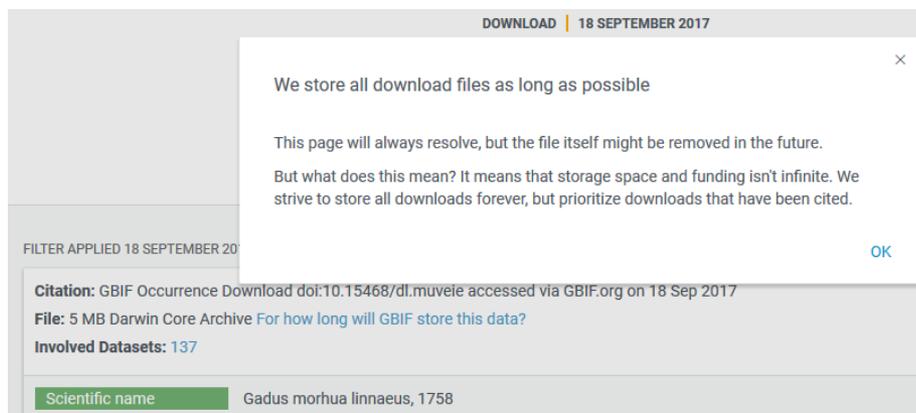
# Wish list!

**4. Accessible** ... data "can be always obtained by machines and humans" -> *a clear policy and/or demonstrated ability to always keep metadata records in the database, even for datasets that have for some reason been withdrawn.*

Few research data repositories live up to this yet. A recent study from TU Delft (<https://doi.org/10.5281/zenodo.321423>) showed only 1 of 37 repositories that complies:

"...To be compliant requires a clear policy statement (or various examples of data this has actually happened to) indicating that metadata is still available even if the data is removed. ... only 3% of repositories are compliant (i.e. only one repository from the sample!)."

**GBIF has something of such a declaration for downloads, promising permanent resolution of page, but does it mean that actual metadata will be preserved?**



The screenshot shows a GBIF download interface. At the top, it says "DOWNLOAD | 18 SEPTEMBER 2017". A modal dialog box is open with the following text: "We store all download files as long as possible", "This page will always resolve, but the file itself might be removed in the future.", and "But what does this mean? It means that storage space and funding isn't infinite. We strive to store all downloads forever, but prioritize downloads that have been cited." Below the dialog, there is a "FILTER APPLIED 18 SEPTEMBER 20" and a "Citation: GBIF Occurrence Download doi:10.15468/dl.muveite accessed via GBIF.org on 18 Sep 2017". Other details include "File: 5 MB Darwin Core Archive For how long will GBIF store this data?" and "Involved Datasets: 137". At the bottom, a green button labeled "Scientific name" is next to the text "Gadus morhua linnaeus, 1758".

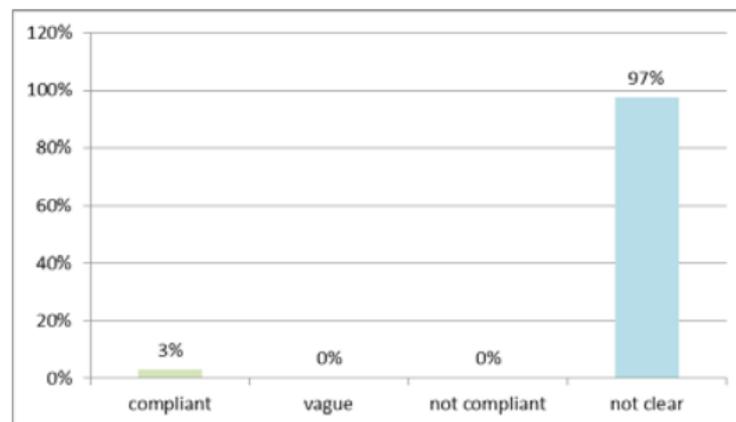


Figure 4: Compliance Rate for A4 metadata are accessible, even when the data are no longer available.

# Wish list!

**5. Accessible** – Resolvable Permanent unique *Identifiers* - *PIDs* of standard formats (doi, hdl, ...)

Examples: <https://zenodo.org/record/495487> = <https://doi.org/10.5281/zenodo.495487>



GBIF *occurrence search*

download:DOI

[10.15468/dl.muveie](https://doi.org/10.15468/dl.muveie) –

‘googlable’ as ["10.15468/dl.muveie"](https://doi.org/10.15468/dl.muveie)

NBNAtlas occurrence search:

[Googling:](#)

[Isid:NBNSYS0000175392](#) –

‘googlable’ and unique

But often no PIDs for single records or at least not clear what if anything could be used as a PID – record no.? apparent UUID as part of URL? etc.; not ‘googlable’.

Metabolic impacts of climate change on marine fish communities and fisheries - Dataset and figure plot script

Carozza, David A; Bianchi, Daniele; Galbraith, Eric D.

Here we provide the MATLAB functions, model forcing data (net primary production and temperature), and model output required to generate the figures and perform calculations from the manuscript 'Metabolic impacts of climate change on marine fish communities and fisheries', which is currently in submission as a research article. The figures plot script (plot\_figures\_climate\_fish\_deconstruction.m) is written in MATLAB version R2012a.

OpenAIRE

Publication date:

April 6, 2017

DOI:

[DOI 10.5281/zenodo.495487](https://doi.org/10.5281/zenodo.495487)

Keyword(s):

Global climate change Metabolic impacts  
Temperature and net primary production change  
Global bioenergetically-constrained fisheries model  
Marine communities Fisheries

License (for files):

[Creative Commons Attribution 4.0](#)

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Figshare: [doi:10.6084/m9.figshare.4234886.v4](https://doi.org/10.6084/m9.figshare.4234886.v4)

Harvard Dataverse: [hdl:1902.1/19629](https://dataverse.harvard.edu/hdl:1902.1/19629), V3

<https://records.nbnatlas.org/occurrences/62be3121-cf9d-4283-ba7d-c53120fcca4>

<https://www.gbif.org/species/8084280>

<https://www.gbif.org/occurrence/17469157>



Stockholm University

# Wish list!

**6. Interoperable** - "(Meta)data is *machine-actionable* ... Metadata being machine readable is a *conditio sine qua non* for FAIRness" -> a *metadataset* in XML or JSON for download (and / or harvesting via API or OAI-PMH) should be part of each dataset or package.

Example: <https://www.ncdc.noaa.gov/paleo-search/study/15974>



Formerly the National Climatic Data Center (NCDC)... [more about NCEI](#) »

SEARCH RESULTS (9 STUDIES) ■ CLIMATE RECONSTRUCTIONS ONLY (1 STUDY)

- NOAA Caspian Sea-Level Changes During the Last Millennium (Naderi Beni, A.)
- NOAA Global Lake-Level Variations from 18,000 to 0 Years Ago: A Paleoclimatic Analysis (Street-Perrott, F.A.)
- NOAA LAKE STATUS RECORDS FROM EUROPE: DATA BASE DOCUMENTATION (Yu, G.)
- NOAA LAKE STATUS RECORDS FROM THE FORMER SOVIET UNION AND MONGOLIA: DOCUMENTATION OF THE SECOND

## Caspian Sea-Level Changes During the Last Millennium

### Originator:

Naderi Beni, A.; Lahijani, H.; Mousavi Harami, R.; Arpe, K.; Leroy, S.A.G.; Marriner, N.; Berberian, M.; Andrieu-Ponel, V.; Djarnali, M.; Mahboubi, A.; Reimer, P.J.

### Citation Information:

Naderi Beni, A., H. Lahijani, R. Mousavi Harami, K. Arpe, S.A.G. Leroy, N. Marriner, M. Berberian, V. Andrieu-Ponel, M. Djarnali, A. Mahboubi, and P.J. Reimer. 2013. Caspian sea-level changes during the last millennium: historical and geological evidence from the south Caspian Sea. *Climate of the Past*, 9, 1645-1665. doi: 10.5194/cp-9-1645-2013

### NOAA Study Page:

<https://www.ncdc.noaa.gov/paleo/study/15974>

### JSON Metadata:

<https://www.ncdc.noaa.gov/paleo-search/study/search.json?xmlid=13739>

### DIF Metadata:

<http://www1.ncdc.noaa.gov/pub/data/metadata/published/paleo/dif/xml/noaa-lakelevel-15974.xml>

### Download Data:

Data File	Caspian Sea Level
-----------	-------------------



GBIF and biodiversity db providers do provide machine actionable (meta)data as DwCa, EML or CSV for download + tools for validation:

DATASET STATS ACTIVITY DOWNLOAD

GBIF annotated archive **recommended**

This dataset comprises GBIF annotated metadata EML

[Darwin Core Archive/EML validator](#)



# Wish list!

**7. Interoperable** – Preferably using *non-proprietary, sustainable fileformats*: e.g.: .csv instead of .xls

**GBIF and biodiversity db providers seem to be good at this ...**

Resources for format control:

Sustainability of Digital Formats / Library of Congress:

<https://www.loc.gov/preservation/digital/formats/intro/intro.shtml>

PRONOM formatregister / National Archives, UK:

<http://www.nationalarchives.gov.uk/PRONOM/Format/proFormatSearch.aspx?status=new>

# Wish list!

**8.(1) Re-usable** - "(Meta)data ... automatically (or with minimal human effort) *linked or integrated, like-with-like*, with other data sources" ->

Provide **export of metadata** to other formats – directly or via APIs, OAI-PMH (DC, DataCite, DDI, DWC, EML, RDF ...)

Examples: <https://zenodo.org/record/495487> ->

GBIF and biodiversity db providers –  
no standard md export generally provided,  
except for domainspecific formats (ABCD, DWC,  
EML)? What about DataCite (DMK)?

GBIF species record – no export formats?

<https://www.gbif.org/species/8084280>

- more comprehensive than JSON via API:

<http://api.gbif.org/v1/species/8084280>

NBNatlas *species* records provided also as JSON  
and link-search to GBIF, EoL, BHL, PESI, ARKive:

<https://species.nbnatlas.org/species/NBNSYS000017539>



<http://www.catalogueoflife.org/col/search/all/key/Gadus+morhua> – export CSV

**Publication date:**  
April 6, 2017

**DOI:**  
DOI 10.5281/zenodo.495487

**Keyword(s):**

- Global climate change
- Metabolic impacts
- Temperature and net primary production change
- Global bioenergetically-constrained fisheries model
- Marine communities
- Fisheries

**License (for files):**  
[Creative Commons Attribution 4.0](#)

**Share**

**Cite as**

Carozza, David A, Bianchi, Daniele, & Galbraith, Eric D. (2017). Metabolic impacts of climate change on marine fish communities and fisheries - Dataset and figure plot script [Data set]. Zenodo. <http://doi.org/10.5281/zenodo.495487>

Start typing a citation style...

**Export**

[BibTeX](#) [CSL](#) [DataCite](#) [Dublin Core](#) [JSON](#)  
[MARCXML](#) [Mendeley](#)



# Wish list!

**8.(2) Re-usable** - Compliance with metadata standards offered (= **validates** OK for default metadata format of the db and export formats, incl. APIs / OAI-PMH); "keeping promises". Example: **Zenodo**

<https://zenodo.org/oai2d?verb=ListRecords&metadataPrefix=datacite3&from=2017-04-04&until=2017-04-08> – missing namespace declarations for xsi and datacite; forbidden html-tags within elements, **does not validate**

**GBIF and biodiversity db providers – not always given that metadata files comply even with “domestic formats” (DWC, EML)?**

Example: *GBIF Occurrence Download 10.15468/dl.muveie*

0008504-170826194755519.zip/  
*metadata.xml*

**does not validate** against *eml.xsd*

Archive Browser

- 0008504-170826194755519.zip
  - dataset
    - citations.txt
    - meta.xml
    - metadata.xml
    - multimedia.txt
    - occurrence.txt
    - rights.txt
    - verbatim.txt

metadata.xml

```
<?xml version="1.0" encoding="utf-8"?>
<eml:eml xmlns:eml="eml://ecoinformatics.org/eml-2.1.1" xmlns:xsi:schemaLocation="eml://ecoinformatics.org/eml-2.1.1 http://gbif.org" packageId="10.15468/dl.muveie" system="http://gbif.org" xml:lang="en">
  <dataset>
    <alternateIdentifier>0008504-170826194755519</alternateIdentifier>
    <title>GBIF Occurrence Download 10.15468/dl.muveie</title>
    <creator>
      <individualName>
        <surName>GBIF Download Service</surName>
      </individualName>
      <electronicMailAddress>support@gbif.org</electronicMailAddress>
    </creator>
    <metadataProvider>
      <individualName>
        <surName>GBIF Download Service</surName>
      </individualName>
      <electronicMailAddress>support@gbif.org</electronicMailAddress>
    </metadataProvider>
    <associatedParty>
      <individualName>
        <givenName>Casey</givenName>
        <surName>Dillman</surName>
      </individualName>
    </associatedParty>
  </dataset>
</eml:eml>
```

In content of element <associatedParty>: The content model does not allow element <address>

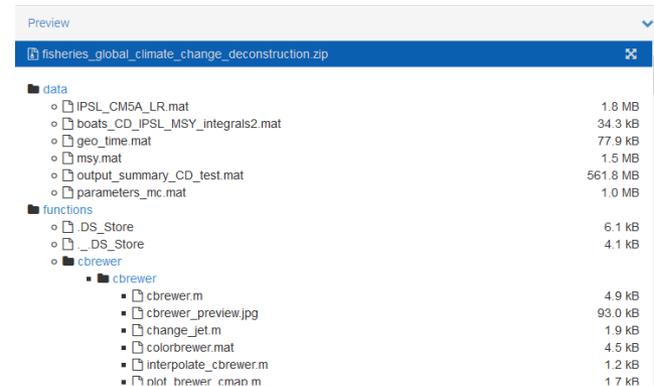
Text Grid Author

# Wish list!

**9. Re-usable** - *File overview and structure* (relations between files), with explicit statements of fileformats, file sizes, and possibly checksums included in metadata.

**Zenodo:** preview and structure in html-page, but not "machine actionable";  
not in metadata export formats(?)

GBIF and biodiversity db providers:  
file structure incl. fileformats, filesize  
largely only through download (of zip-  
packages), sometimes requiring login  
(e.g. NBNatlas)

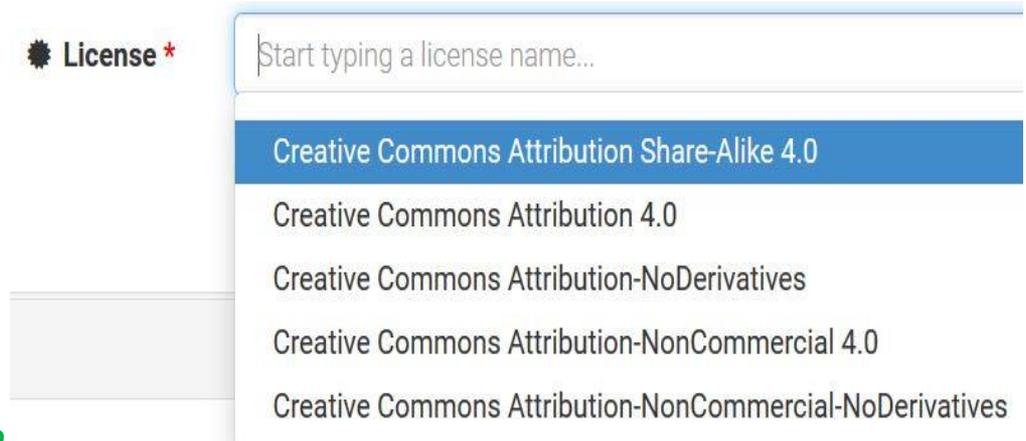


Folder/File	Size
data	
IPSL_CM5A_LR.mat	1.8 MB
boats_CD_IPSL_MSY_integrals2.mat	34.3 kB
geo_time.mat	77.9 kB
msy.mat	1.5 MB
output_summary_CD_test.mat	561.8 MB
parameters_mc.mat	1.0 MB
functions	
_DS_Store	6.1 kB
__DS_Store	4.1 kB
cbrewer	
cbrewer	
cbrewer.m	4.9 kB
cbrewer_preview.jpg	93.0 kB
change_jet.m	1.9 kB
colorbrewer.mat	4.5 kB
interpolate_cbrewer.m	1.2 kB
plot_brewer_cman.m	1.7 kB

# Wish list!

**10. Re-usable** - Standardized Licenses (URIs), drop-down menu at upload

Example: Zenodo ->



*Unaware how licensing works  
at upload to GBIF and  
biodiversity db providers?*

*Filtering option on License type  
in occurrence searches in GBIF and NBNatlas!*

**Record License**

- CC0 1.0
- CC BY 4.0
- CC BY-NC 4.0
- Unspecified
- Unsupported

**▼ Attribution**

**Licence**

- CC-BY-NC (618)
- CC-BY (441)
- OGL (247)

# Thank you!

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