



Citation and Attribution Guidelines for Geo-INQUIRE and How to Cite Data Properly

Kirsten Elger (GFZ)

16th Geo-INQUIRE online Seminar "Giving credit to data by citation - lessons learnt over a decade and future directions"



Geo-INQUIRE is funded by the European Union. Views and opinions expressed are however those of the authors only and do not necessarily reflect those of the European Union or the European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.

Outline

- DOIs, DOI metadata and data citations
- What do I have to keep in mind when I am using published data from others (e.g., earthquake catalogues derived from data from seismic networks) – what needs to be cited and where?
- DOI Registration agencies: Role and Services
- DOI citation formatter: What can I do if I only know the DOI string?
- How to attribute funding and support by Geo-INQUIRE in your research (paper, data and software publications) – introduction to the guidelines



What makes DOIs different to other persistent identifiers?

Digital object identifier (DOI) are globally unique **persistent identifier** uniquely pointing to publications, data, software, samples, ...

Standardised metadata is required for DOI registration (e.g. DataCite Schema) (metadata for citation and data discovery)

Metadata must be **machine actionable** (XML, JSON format; metadata exchange)

Data publications with DOIs are fully citable in scholarly literature (and required by journals)



How do I cite a dataset in an article and vice versa?

Research Article

(<https://doi.org/10.5194/hess-21-3167-2017>)

Hydrology and Earth System Sciences

An interactive open-access journal of the European Geosciences Union

[EGU.eu](#) | [EGU Publications](#) | [EGU Highlight Articles](#) | [Contact](#) | [Imprint](#) | [Data protection](#)

Landscape-scale water balance monitoring with an iGrav superconducting gravimeter in a field enclosure

Andreas Güntner^{1,4}, Marvin Reich¹, Michal Mikolaj¹, Benjamin Creutzfeldt², Stephan Schroeder¹, and Hartmut Wziontek^{1,3}

„Data availability: [...] Güntner et al. (2017) provided the data of iGrav006, both raw 1 s gravity records and [...] Wziontek et al. (2017) provided the raw gravity data of the two superconducting gravimeters [...] in Wettzell.”

References

Güntner, A., Reich, M., Mikolaj, M., Creutzfeldt, B., Schroeder, S., Thoss, H., Klügel, T., and Wziontek, H.: Superconducting gravimeter data of iGrav006 and auxiliary hydro-meteorological data from Wettzell – Supplement to: Landscape-scale water balance monitoring with an iGrav superconducting gravimeter in a field enclosure, <https://doi.org/10.5880/igets.we.gfz.l1.001.2017>.

Wziontek, H., Wolf, P., Nowak, I., Richter, B., Rülke, A., and Wilmes, H.: Superconducting gravimeter data from Wettzell – Level I, <https://doi.org/10.5880/igets.we.l1.001.2017>.

Data Publication

(<https://doi.org/10.5880/igets.we.l1.001>)

The screenshot shows the GFZ Data Services interface for the dataset 'Superconducting Gravimeter Data from Wettzell - Level 1'. The page includes a 'Dataset' section with a 'Data download via ftp (registration and FTP client required)' link and a 'License: CC BY 4.0' notice. There is an 'Abstract' section with a 'Copy citation to clipboard' button. A 'Dataset Description' section provides detailed information about the Geodetic Observatory Wettzell, its location, and the instruments used. A 'Related Work' section lists the article 'Landscape-scale water balance monitoring with an iGrav superconducting gravimeter in a field enclosure' by Güntner et al. (2017) with its DOI and journal information.

link to article

link to data



More specifically

Good scientific practice and legal requirement of the licence: cite all sources!!

Example: Data publication of seismic energy magnitude catalogue with data from 180+ seismic networks as input data (Bindi et al., 2024)



Dataset Global energy magnitude catalog 2011-2023 with event selection driven by Mw Geofon Released

Cite as:
Bindi, Dino; Zaccarelli, Riccardo; Strollo, Angelo; Di Giacomo, Domenico; Heinloo, Andres; Evans, Peter; Cotton, Fabrice; Tilmann, Frederik (2024): Global energy magnitude catalog 2011-2023 with event selection driven by Mw Geofon. V. 1.1. GFZ Data Services. <https://doi.org/10.5880/GFZ.2.6.2023.010>

Files download data and description License: CC BY 4.0

Dataset Description Supplement to

Abstract
This archive disseminated through the GFZ-Data Service includes both results and information associated to Bindi et al. (2023). In particular, the archive includes a seismic catalogue reporting energy magnitude M_e estimated from vertical P-waves recorded at teleseismic distances in the range $20^\circ \leq D \leq 95^\circ$, following Di Giacomo et al (2008, 2010). The catalogue is built considering 6349 earth-quakes included in the GEOFON (Quinteros et al., 2021) catalogue with moment magnitude M_w larger than 5 and occurring after 2011. Tools used to compute the energy magnitude are free available. In particular, we used stream2segment (Zaccarelli, 2018) to download data from IRIS (<https://ds.iris.edu/ds/>) and EIDA (Strollo et al., 2021) repositories, and me-compute (Zaccarelli, 2023) to process waveforms and compute M_e . The methodology applied to me-compute is also implemented as add-on for SeisComp (GFZ and Gempa, 2020) in order to allow the real time computation of M_e (<https://github.com/SeisComp/scsmert>).

Additional Information
Version History:
19 February 2024: release of first version
28 March 2024: release of v.1.1
Addition of the complete list of references for the seismic networks analysed with me-compute as described in Bindi et al. (2024, ESSD). The list is provided as additional txt file in the data download section and all references were added to the XML metadata.

GFZ DATA SERVICES
GEOSCIENCES DATA PUBLISHER

Dataset Global energy magnitude catalog 2011-2023 with event selection driven by Mw Geofon Released

Cite as:
Bindi, Dino; Zaccarelli, Riccardo; Strollo, Angelo; Di Giacomo, Domenico; Heinloo, Andres; Evans, Peter; Cotton, Fabrice; Tilmann, Frederik (2024): Global energy magnitude catalog 2011-2023 with event selection driven by Mw Geofon. V. 1.1. GFZ Data Services. <https://doi.org/10.5880/GFZ.2.6.2023.010>

Files download data and description License: CC BY 4.0

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Funders
European Research Executive Agency: Geo-INOURE (10105518)
Geo-INOURE

Keywords
Seismic catalog, seismic catalog, geological process > seismic activity > earthquake
GCOM Science Keywords
EARTH SCIENCE > SOLID EARTH > TECTONICS > EARTHQUAKES

More Metadata
Datacite download and
DOI:10.5880 download and
schema download

Zaccarelli, R. (2018). Stream2segment: a tool to download, process and visualize event-based seismic waveform data (Version 2.2.3) [Computer software]. GFZ Data Services. <https://doi.org/10.5880/GFZ.2.6.2018.003>

Zaccarelli, R. (2023). me-compute: a Python software to download events and data from FDSN web services and compute their energy magnitude (M_e). GFZ Data Services. <https://doi.org/10.5880/GFZ.2.6.2023.008>

Derived from
Abhijeet Ghosh, (2014). *Albanian Array of Arrays* [Data set]. International Federation of Digital Seismograph Networks. https://doi.org/10.7914/IS/NSC_2014

Alan Alexander, (2014). *Caribbean-Mexico Andes Experiment* [Data set]. International Federation of Digital Seismograph Networks. https://doi.org/10.7914/IS/NSC_2014

Alaska Earthquake Center, U. O. A. F. (1987). *Alaska Regional Network*. International Federation of Digital Seismograph Networks. https://doi.org/10.7914/IS/NSC_1987

Alaska Volcano Observatory/USGS. (1988). *Alaska Volcano Observatory* [Data set]. International Federation of Digital Seismograph Networks. https://doi.org/10.7914/IS/NSC_1988

Albuquerque Seismological Laboratory (ASL)/USGS. (1980). *Albuquerque Seismological Laboratory*. International Federation of Digital Seismograph Networks. https://doi.org/10.7914/IS/NSC_1980

Albuquerque Seismological Laboratory (ASL)/USGS. (1988). *Global Seismograph Network (GON - IRIS)/USGS*. International Federation of Digital Seismograph Networks. https://doi.org/10.7914/IS/NSC_1988

Albuquerque Seismological Laboratory (ASL)/USGS. (1990). *United States National Seismic Network*. International Federation of Digital Seismograph Networks. https://doi.org/10.7914/IS/NSC_1990

← isDerivedFrom

Citations of all input data



Data citation in research articles

The citation of 100+ references to seismic network DOIs or other data sources remains challenging in research papers. However: **the first publication of a data product MUST cite all sources** (good scientific practice, licence!)

Success stories (thanks Helle!)

1. An article with **numerous networks with short citations** in the Data Section, and **citations included in reference list**

Marignier et al. (2024, GJI), <https://doi.org/10.1093/gji/ggae070>

2. An article citing **many seismic networks, with short citations in tabular form** (Table 1), and **citations included in reference list**

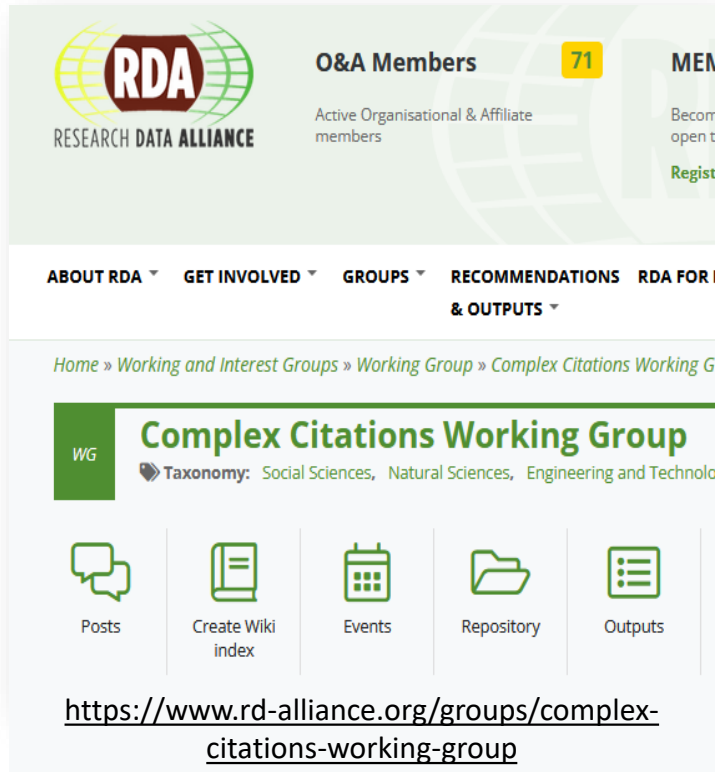
Pedersen et al. (2024, GJI), <https://doi.org/10.1093/gji/ggac388>

3. An article in a **high impact journal with 184 citations**

Svennevig et al. (2024, Science), <https://doi.org/10.1126/science.adm9247>



Recent Activity within the Research Data Alliance



The screenshot shows the Research Data Alliance (RDA) website. At the top left is the RDA logo with the text "RESEARCH DATA ALLIANCE". To the right, it says "O&A Members 71" and "Active Organisational & Affiliate members". Below this is a navigation menu with items: "ABOUT RDA", "GET INVOLVED", "GROUPS", "RECOMMENDATIONS", and "RDA FOR I & OUTPUTS". The main content area shows a breadcrumb trail: "Home » Working and Interest Groups » Working Group » Complex Citations Working Group". Below this is a green header for the "Complex Citations Working Group" with a "WG" icon and a "Taxonomy" section listing "Social Sciences, Natural Sciences, Engineering and Technol". At the bottom of the page, there are five icons representing different activities: "Posts", "Create Wiki index", "Events", "Repository", and "Outputs". The URL <https://www.rd-alliance.org/groups/complex-citations-working-group> is displayed at the bottom of the screenshot.

RDA Complex Citation Working Group (2023+): Citing 100+ objects in an article

1. Create a „container“ (Complex Citation Object) that includes, e.g., DOIs of 200 seismic networks used in an article
2. Cite the „container“ in the article
3. Develop a workflow for journals to „unpack“ the „container“ and include all individual citations in the DOI metadata

The role and services of DOI registration agencies

- DOIs must be centrally registered to guarantee their uniqueness
- DOI Registration Agencies, like DataCite and Crossref offer DOI registration services
- Uniqueness is granted via DOI Prefixes (e.g., 10.5880/ for GFZ Data Services, 10.5194/ for Copernicus Publications)
- Crossref members are mostly Publishers
- Datacite was originally funded to provide DOIs for research data and “grey” literature, today DOIs also for software, physical samples, instruments, etc.
- Both Agencies provide additional services (metadata catalogue)



SERVICES



Create DOIs

DOI registration via form or API



Enable Discovery

Catalogue of all DataCite DOIs (data, code, samples, instruments, texts)

Promote Reuse

Promote reuse with flexible, state-of-the-art tools and technology

DOI citation formatter, content negotiation, automated ORCID updates, ...

Metadata Schema

(v. 4.6)

Metadata Working Group

**Connecting Research,
Advancing Knowledge**



1,741

Member Organizations



69

Member Countries



114,775,888

DOIs Registered to Date

Metadata search and download via DataCite Commons

DataCite Commons

10.5880/GFZ.LKUT.2025.002

Support Sign In

Works People Organizations Repositories

2 Works

OpenBuildingMap

Laurens J. N. Oostwegel, Danijel Schorlemmer, Lars Lingner & Tara Evaz Zadeh

Dataset published 2025 in GFZ Data Services

This data publication provides the OpenBuildingMap dataset, organized per zoom-level 6 Quadkey. The dataset provides information about the occupancy and height of individual buildings. The main purpose of this data collection is risk assessment for natural hazards, however it can be used by anyone in need of a building exposure dataset. Buildings play a critical role in understanding human settlement patterns and are essential for applications such as crisis management, urban planning, energy efficiency, and multi-hazard risk assessment. To address the need for comprehensive and accessible global building data, we introduce a dataset containing 2.7 billion building footprints, enriched with structured attributes such as occupancy type and height information classified using the GEM Building Taxonomy. This dataset is derived from the integration of the AI-derived Open Buildings and the Global

Creators & Contributors

- Oostwegel, Laurens J. N. 2
- Gu??guen, Philippe 1
- Schorlemmer, Danijel 1
- Lingner, Lars 1
- Evaz Zadeh, Tara 1

Publication Year

- 2025 2

(1) Search for a DOI

<https://commons.datacite.org/>



Metadata download via DataCite Commons

(2) Open the metadata set



Support

Sign In

Works

People

Organizations

Repositories

OpenBuildingMap

<https://doi.org/10.5880/gfz.lkut.2025.002>

Download

Full Metadata

DataCite XML

DataCite JSON

Schema.org JSON-LD

Citation Metadata

Citeproc JSON

BibTeX

RIS

(3) Metadata download in different formats

Download Metadata

Add to Record

Sign in to add work to your record.

room-level 6 Quadkey. The buildings. The main purpose of used by anyone in need of a man settlement patterns and

are essential for applications such as crisis management, urban planning, energy efficiency, and multi-hazard risk assessment. To address the need for comprehensive and accessible global building data, we

<https://commons.datacite.org/>



DataCite Metadata XML example for

<https://doi.org/10.5880/GFZ.LKUT.2025.002> - as provided by the repository

creators/ authors

```
<resource xsi:schemaLocation="http://
<identifier identifierType="DOI">10
-<creators>
  <creator>
    <creatorName nameType="Personal"
    <givenName>Laurens J. N.</givenName>
    <familyName>Oostwegel</familyName>
    <nameIdentifier
  <affiliation>
    GFZ Helmholtz (
  </affiliation>
  </creator>
  <creator>
    <creatorName name
    <givenName>Danij
    <familyName>Scho
    <nameIdentifier
```

licence

```
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1025.002</identifier>
-<rightsList>
  <rights rightsURI="">Open Data Commons Open Database License (ODbL)</rights>
</rightsList>
```

related references: Citations!

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  <relatedIdentifier relatedIdentifierType="DOI" relationType="References">10.13117/GEM.EXP-MOD.TR2013.02</relatedIdentifier>
  <relatedIdentifier relatedIdentifierType="URL" relationType="IsDerivedFrom">https://www.openstreetmap.org</relatedIdentifier>
  <relatedIdentifier relatedIdentifierType="URL" relationType="IsDocumentedBy">https://git.gfz-potsdam.de/globaldynamicexposure
  <relatedIdentifier
  <relatedIdentifier relatedIdentifierType="DOI" relationType="References">10.1007/BF00288933</relatedIdentifier>
  <relatedIdentifier relatedIdentifierType="URL" relationType="IsDerivedFrom">
    globalMLBuildingFootprints
  <relatedIdentifier relatedIdentifierType="URL" relationType="IsSourceOf">https://www.openbuildingmap.org</relatedIdentifier>
```

funding Information: Geo-INQUIRE!

```
<fundingReferences>
  <fundingReference>
    <funderName>European Commission</funderName>
    <funderIdentifier funderIdentifierType="Crossref Funder ID">
    <awardNumber>101058518</awardNumber>
    <awardTitle>Geo-INQUIRE</awardTitle>
  </fundingReference>
```

DataCite metadata can also be queried via an API → automated processing

How can I find the citation for a DOI?

<https://citation.doi.org> DOI citation formatter of the International DOI Foundation that provides DOI citations for objects registered by 8 DOI registration agencies



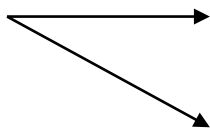
DOI CITATION FORMATTER

1. Enter DOI



Type or paste a known DOI. For example
10.1145/2783446.2783605

2. Select citation style and language



copernicus-publications
Select style: Begin typing (e.g. Chicago or IEEE.) or use the drop down menu.

Select language: Begin typing (e.g. en-GB for English, Great Britain) or use the drop down menu.

3. Click Submit



Result:

Oostwegel, L. J. N., Schorlemmer, D., Lingner, L., and Evaz Zadeh, T.: OpenBuildingMap, <https://doi.org/10.5880/GFZ.LKUT.2025.002>, 2025.





Guidelines for the attribution of research results derived with funding or sponsoring of the Geo-INQUIRE project

A. Strollo, K. Elger and project management team
validated by WP7, O. Lange, J. Quinteros and colleagues



Purpose and outline of the document

EU Requirements: All publications, data, models and codes funded under the EU's Open Science Policy must be openly accessible without any barriers, to enable the early and open sharing of research.

The document provides guidelines and examples for the

- acknowledgement of the funding agency and the project (in all text, data, model and code publications)
- correct attribution of Geo-INQUIRE funding in DataCite metadata
- correct provision of the licence for data and code in the DataCite metadata



Acknowledgement of the funding agency and the project

All Geo-INQUIRE- publications (text, data, code, etc.) that have used funds of the project must acknowledge the project and the funding agency by adding

...funded by the EU through Horizon Europe Grant 101058518 (Geo-INQUIRE)

and if there is space, depending on the type of publication, the disclaimer as well:

Geo-INQUIRE is funded by the European Union. Views and opinions expressed are however those of the authors only and do not necessarily reflect those of the European Union or the European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.

- In text publications, the quotation (and disclaimer) must be added in the “Acknowledgements” section.
- For data and software publications, this quotation should also be added to the “description” field of the DOI Metadata. In addition, the Geo-INQUIRE funding must be added to the funding information field (see below)



Attribution for data, software, services developed within Geo-INQUIRE, Deliverables, Technical Notes...

All products should be published with DOI in trusted repositories. Domain-specific repositories with data curation services are recommended.

Differentiation between products where **Geo-INQUIRE is the main funder** and those where **Geo-INQUIRE only supported/ sponsored the research**

List of metadata properties and values + XML Examples

- Funding Reference:
 - Funder Name: **European Commission**
 - (a) Funder Identifier: <https://doi.org/10.13039/501100000780>
(for [Crossref](https://crossref.org/) Funder ID)
 - (b) Funder Identifier: <https://ror.org/00k4n6c32> (for ROR ID)
 - (a) Funder identifier Type: [Crossref](https://crossref.org/) Funder ID:
 - (b) Funder Identifier Type **ROR**:
 - Award Number: **101058518**
 - Award URI: <https://doi.org/10.3030/101058518>
 - Award Title: **Geo-INQUIRE**

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  <fundingReference>
    <funderName>European Commission</funderName>
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    <awardNumber>101058518</awardNumber>
    <awardTitle>Geo-INQUIRE</awardTitle>
  </fundingReference>
</fundingReferences>
```



Geo-INQUIRE is the main funder then use the funding reference (example deliverable

<https://commons.datacite.org/doi.org/10.48440/m3hj-e896>)

```
<rightsList>
  <rights rightsURI="https://creativecommons.org/licenses/by/4.0/legalcode">Creative Commons Attribution 4.0 International</rights>
</rightsList>
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    <awardNumber>101058518</awardNumber>
    <awardTitle>Geo-INQUIRE</awardTitle>
  </fundingReference>
</fundingReferences>
```

Geo-INQUIRE is only supporting/sponsoring use the contributor type = sponsor (example dataset only enhanced in Geo-INQUIRE <https://commons.datacite.org/doi.org/10.5880/gfz.2.2.2023.001>)

```
<contributors>
  <contributor contributorType="Sponsor">
    <contributorName>Geo-INQUIRE</contributorName>
    <nameIdentifier nameIdentifierScheme="DOI">10.3030/101058518</nameIdentifier>
  </contributor>
```



The end



- The final guidelines will be published with a DOI and made available to all
- Thank you for your attention!
- Questions?
- Contact: Kirsten Elger (kelger@gfz.de)

Geo-INQUIRE is funded by the European Union. Views and opinions expressed are however those of the authors only and do not necessarily reflect those of the European Union or the European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.

