



# NFDI4Earth

## **Intro to NFDI - The National Research Data Infrastructure**

1<sup>st</sup> NFDI4Earth Plenary 2022 – June 9<sup>th</sup>-10<sup>th</sup>

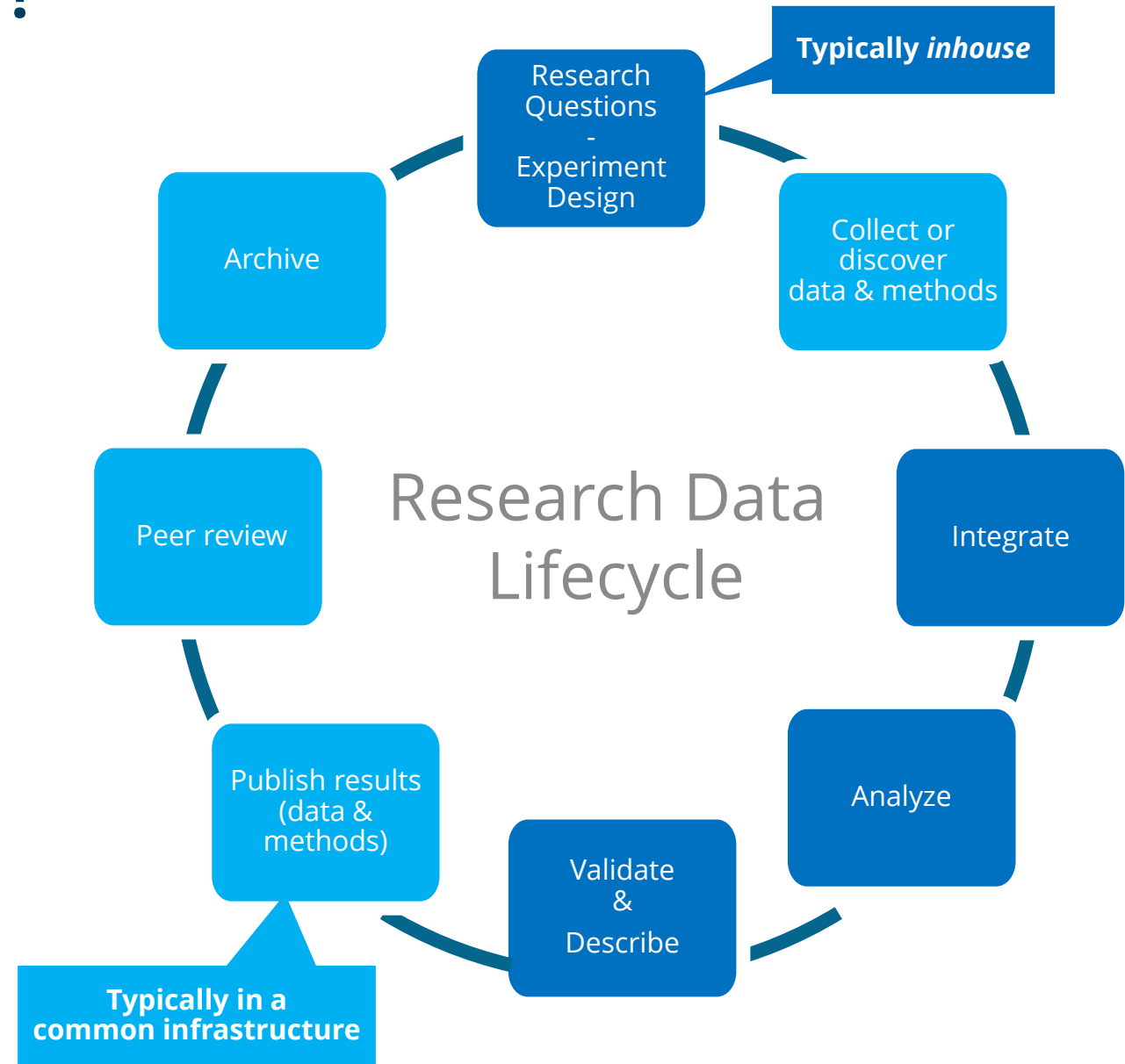
Lars Bernard

# Research Data Management ?!

Take on idealized research process:

- Includes all aspects of acquiring, evaluating, analyzing, sharing, and publishing research data *and* research methods/software
- Research data is the foundation, intermediate, and final product of research

***Overarching Goal:  
Exchange and reproducibility of  
research results***



# Research Data Management

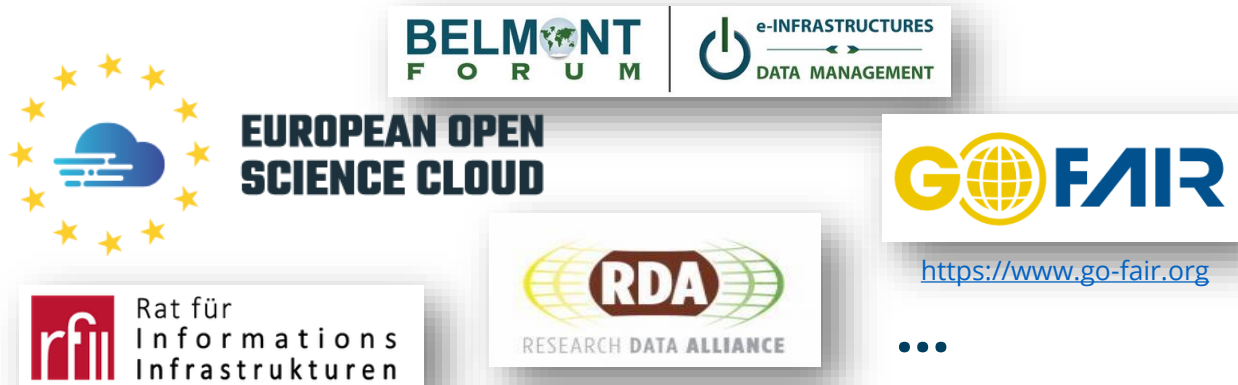
## Tools



## Repositories



## Initiatives

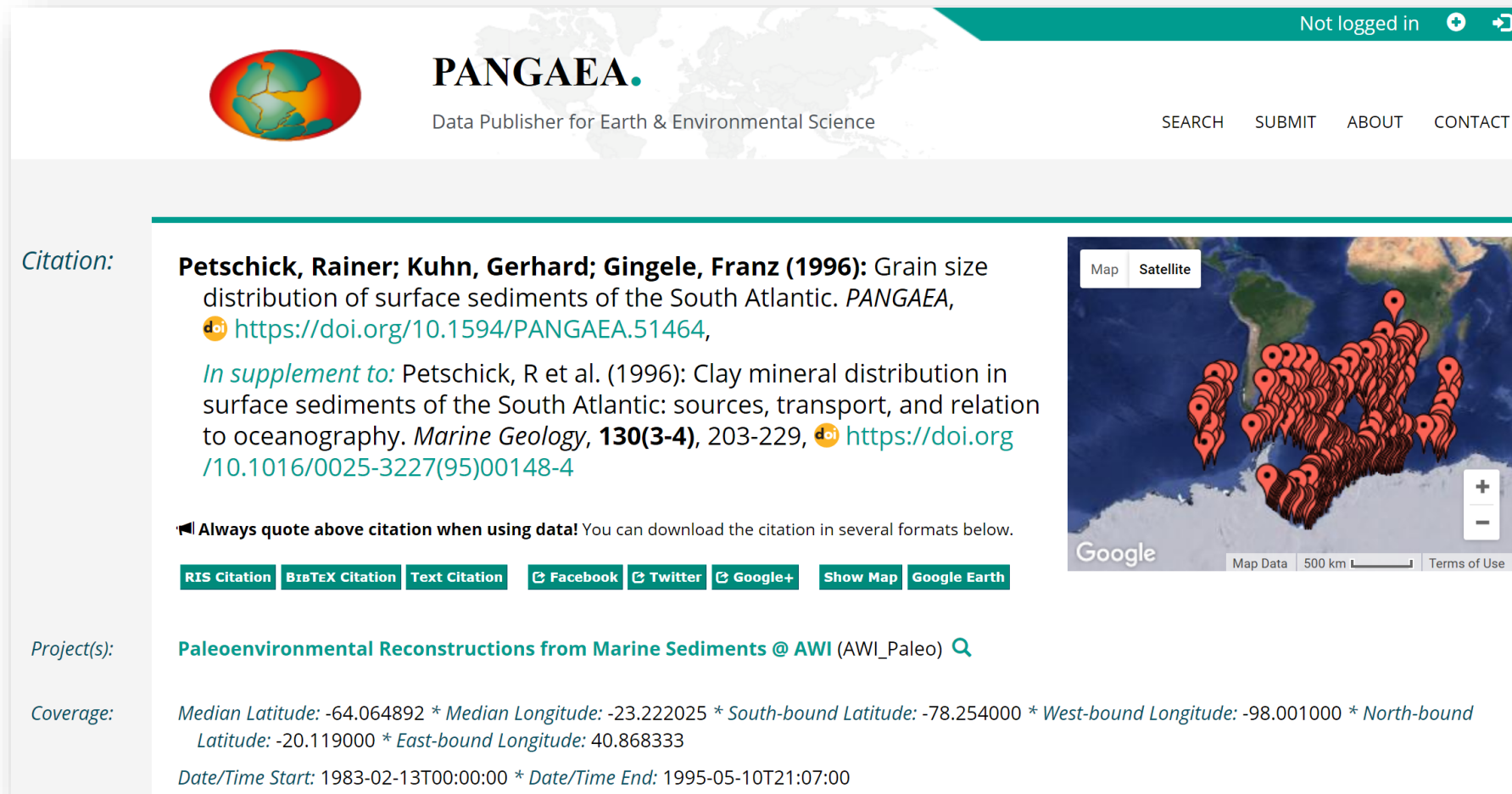


## Standards & Best Practices



# Research Data Management

- Where do we stand typically/ideally...



**PANGAEA.**  
Data Publisher for Earth & Environmental Science

Not logged in

SEARCH SUBMIT ABOUT CONTACT

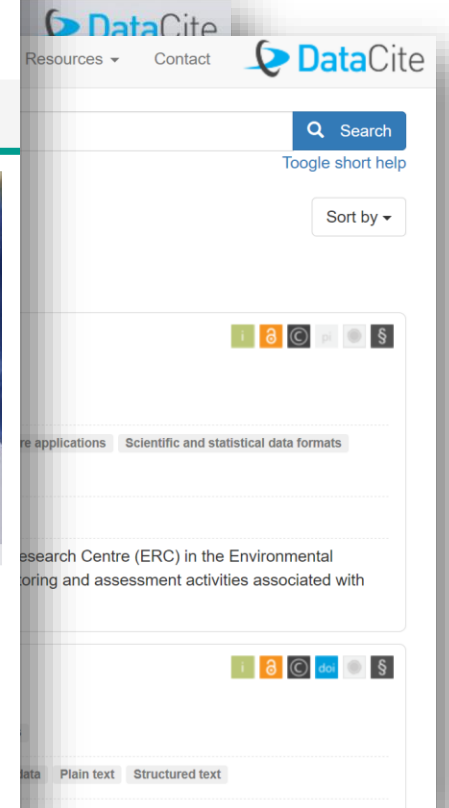
*Citation:* **Petschick, Rainer; Kuhn, Gerhard; Gingele, Franz (1996):** Grain size distribution of surface sediments of the South Atlantic. *PANGAEA*, doi <https://doi.org/10.1594/PANGAEA.51464>,  
*In supplement to:* Petschick, R et al. (1996): Clay mineral distribution in surface sediments of the South Atlantic: sources, transport, and relation to oceanography. *Marine Geology*, **130(3-4)**, 203-229, doi [https://doi.org/10.1016/0025-3227\(95\)00148-4](https://doi.org/10.1016/0025-3227(95)00148-4)

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

*Project(s):* **Paleoenvironmental Reconstructions from Marine Sediments @ AWI** (AWI\_Paleo) 🔍

*Coverage:* Median Latitude: -64.064892 \* Median Longitude: -23.222025 \* South-bound Latitude: -78.254000 \* West-bound Longitude: -98.001000 \* North-bound Latitude: -20.119000 \* East-bound Longitude: 40.868333  
Date/Time Start: 1983-02-13T00:00:00 \* Date/Time End: 1995-05-10T21:07:00



DataCite

Resources Contact

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Scientific and statistical data formats

research Centre (ERC) in the Environmental  
monitoring and assessment activities associated with

Plain text Structured text

# Research Data Management - Challenges

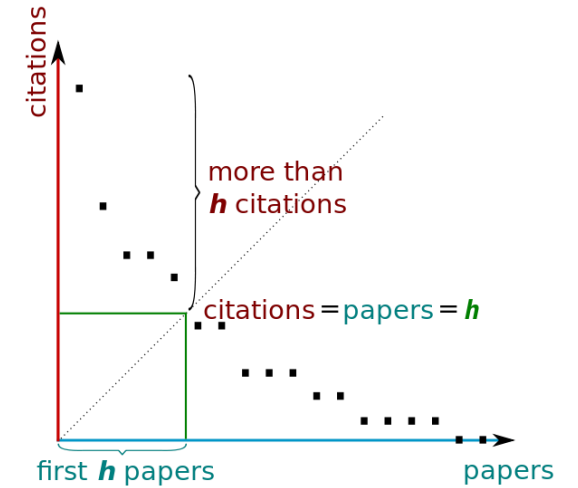


“If we build it, they will come”

Nelson, B. Data sharing: Empty archives. *Nature* **461**, 160–163 (2009). <https://doi.org/10.1038/461160a>

# Research Data Management – Challenges

- User driven !
- Support to researchers !
- Research data management as part of curricula !
- Reputation mechanisms !
  - It's still the paper that counts, not the data/software publication
- Sovereignty and sustainability
- Curation and quality assurance
- Balancing data protection and access
- Long-term archiving for software and data



<https://en.wikipedia.org/wiki/H-index>



Cases of Cholera Victims in London (John Snow 1854)

# Towards the National Research Data Infrastructure

## RfII recommended to establish a National Research Data Infrastructure (2016\*):



<http://www.rfii.de/>

- Novel to implement the FAIR principles  
(Findable, Accessible, Interoperable, and Re-usable).
- **Sustainable** (not only project solutions !)
- Step-by-step - **taking into account the different digital cultures** within disciplines
- Internationally integrated
- Driven by **scientific users and consortia of users and providers**

\* RfII (2016): *Enhancing Research Data Management: Performance through Diversity.*

# Towards the National Research Data Infrastructure

„...systematize scientific data holdings with a national research data infrastructure and ensure sustainable access...“

*Coalition Agreement, March 2018*

<https://www.bundesregierung.de/Content/DE/StatischeSeiten/Breg/koalitionsvertrag-inhaltsverzeichnis.html>

„...We want to further develop the National Research Data Infrastructure...“

*Coalition Agreement, March 2021*

<https://www.bundesregierung.de/breg-de/service/gesetzesvorhaben/koalitionsvertrag-2021-1990800>



*picture alliance / dpa*



# Towards the National Research Data Infrastructure

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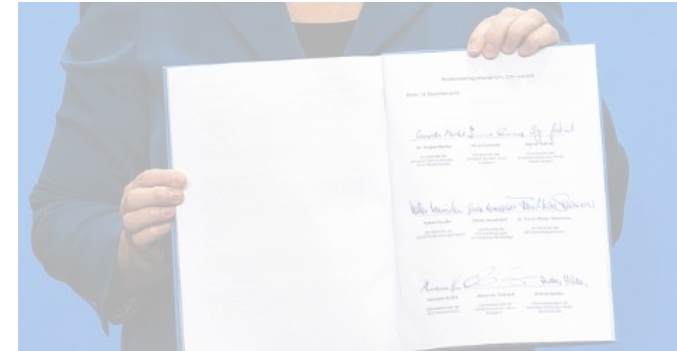
Coalition Agreement, March 2018

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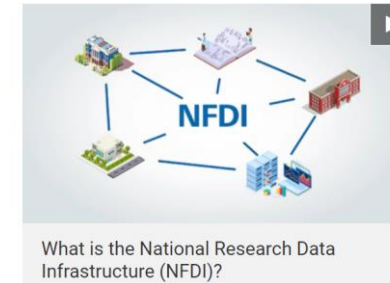
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picture alliance / dpa

## The federal-state program to create the NFDI (11/2018)

- Funding over 10 years with € 90 million p.a.
- Funding of up to 30 consortia in 3 rounds of calls –  
**Managed by the German Science Foundation (DFG)**
- Foundation of the **NFDI Association** (NFDI e.V.)  
and the **NFDI Directorate** in Karlsruhe (10/2020)



<https://dfg.de/nfdi>

**nfdi**  
<https://www.nfdi.de/>

# NFDI Consortia – after 2 from 3 calls

## 1<sup>st</sup> Round 2020

|   |                                   |  |                      |
|---|-----------------------------------|--|----------------------|
| 1 | <a href="#">DataPLANT</a>         | DataPLANT - Data in Plant research   | Biology              |
| 2 | <a href="#">GHGA</a>              | GHGA - German Human Genome Archive   | Medicine             |
| 3 | <a href="#">KonsortSWD</a>        | KonsortSWD - Consortium for the Social, Behavioural, Educational, and Economic Sciences  | Social Sciences      |
| 4 | <a href="#">NFDI4BioDiversity</a> | NFDI4BioDiversität - Biodiversity, Ecology & Environmental Data                          | Biology              |
| 5 | <a href="#">NFDI4Cat</a>          | NFDI4Cat - NFDI for Catalysis-Related Sciences   | Chemistry            |
| 6 | <a href="#">NFDI4Chem</a>         | NFDI4Chem - Chemistry Consortium in the NFDI   | Chemistry            |
| 7 | <a href="#">NFDI4Culture</a>      | NFDI4Culture - Consortium for research data on material and immaterial cultural heritage | Humanities           |
| 8 | <a href="#">NFDI4Health</a>       | NFDI4Health - National Research Data Infrastructure for Personal Health Data             | Medicine             |
| 9 | <a href="#">NFDI4Ing</a>          | NFDI4Ing - National Research Data Infrastructure for Engineering Sciences                | Engineering Sciences |

## 2<sup>nd</sup> Round 2021

|    |                                   |  |                                   |
|----|-----------------------------------|--|-----------------------------------|
| 1  | <a href="#">BERD@NFDI</a>         | NFDI for Business, Economic and Related Data   | Social and Behavioural Sciences   |
| 2  | <a href="#">DAPHNE4NFDI</a>       | DAta from PHoton and Neutron Experiments for NFDI  | Physics                           |
| 3  | <a href="#">FAIRmat</a>           | FAIR Data Infrastructure for Condensed-Matter Physics and the Chemical Physics of Solids | Physics                           |
| 4  | <a href="#">MaRDI</a>             | Mathematical Research Data Initiative  | Mathematics                       |
| 5  | <a href="#">NFDI4DataScience</a>  | NFDI for Data Science and Artificial Intelligence  | Computer Science                  |
| 6  | <a href="#">NFDI4Earth</a>        | NFDI Consortium Earth System Sciences  | Geosciences                       |
| 7  | <a href="#">NFDI4Microbiota</a> - | National Research Data Infrastructure for Microbiota Research                            | Life Sciences                     |
| 8  | <a href="#">NFDI-MatWerk</a>      | National Research Data Infrastructure for Materials Science & Engineering                | Materials Science and Engineering |
| 9  | <a href="#">PUNCH4NFDI</a>        | Particles, Universe, NuClei and Hadrons for the NFDI                                     | Physics                           |
| 10 | <a href="#">Text+</a>             | Language and Text Based Research Data Infrastructure                                     | Humanities                        |

# Snapshots from the NFDI Landscape



|                              |                            |
|------------------------------|----------------------------|
| <br>Electronic Lab Notebooks | <br>Chemistry Repositories |
| <br>Data Management Plans    | <br>Knowledge Base         |
| <br>Terminology Service      | <br>Helpdesk               |

<https://www.nfdi4chem.de>



**Hello, I'm BETTY**

I'm an engineer and self-taught programmer that develops research software. Very often, this software represents a computational model for the simulation of an engineering application. While I'm very keen on guaranteeing the reproducibility of my computational results, I can't dedicate too much time to achieve this.

<https://nfdi4ing.de/>

**Services**

KonsortSWD  
Consortium for the Social, Behavioural, Educational and Economic Sciences

|  |   |
|--|---|
| <b>Supporting research data centres</b><br>Creating benchmark processes and quality standards to support RDCs in implementing FAIR principles for sustainable and trustworthy data access. | <b>RDM project grants</b><br>RDM project grants support researchers in preparing and making available relevant new data collections for secondary use in accordance with the FAIR principles. |
| <b>Persistent identifiers for variables</b><br>Making the content of any datasets referenceable and findable.  | <b>Making data more findable</b><br>Best practices for enhancing the visibility of research data in metasearch engines such as Google & Co.   |

<https://www.konsortswd.de>



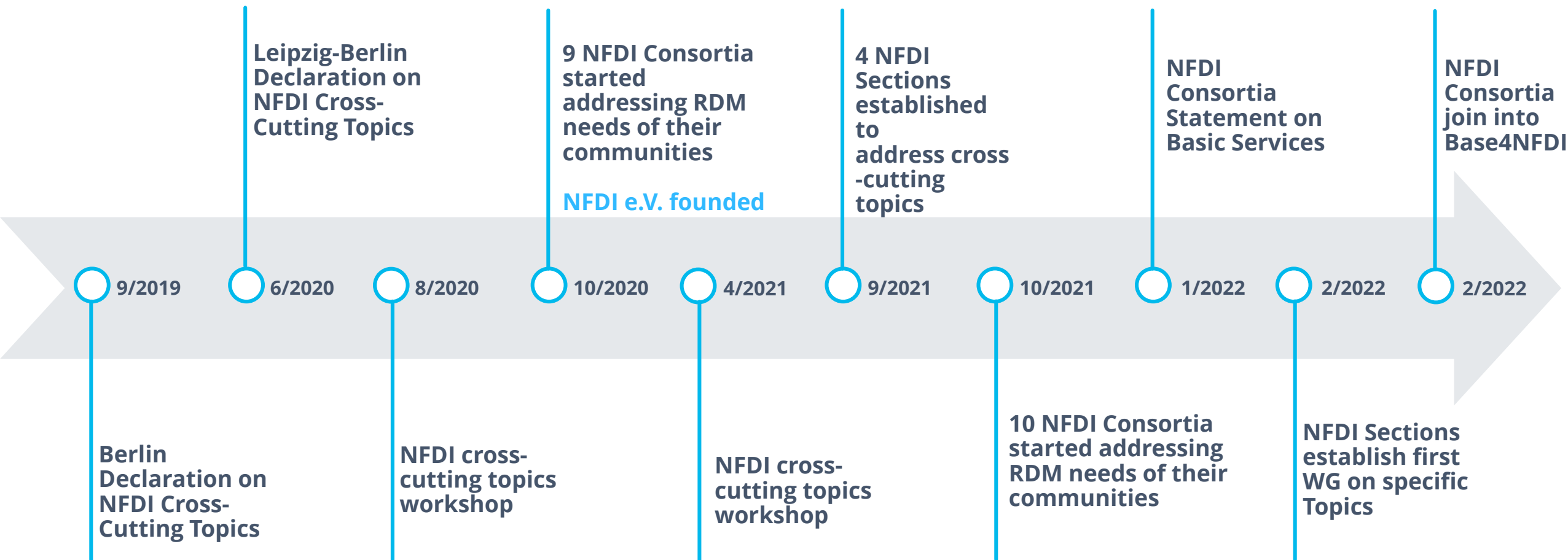
|   |  |   |
|---|--|---|
| <b>Research data management</b><br>Search data repositories, submit own data and create data management plans according to community standards. | <b>Data visualisation and analysis</b><br>Online environment for georeferenced data and the creation of biodiversity maps. | <b>Data standards and more – our specialist information</b> |
|---|--|---|

**Use Case Projects**

Developing solutions collaboratively: Our use cases are representative for resources and needs in the biodiversity community and help us to develop a sustainable, user-oriented data infrastructure.

<https://www.nfdi4biodiversity.org>

# Cooperation of NFDI Consortia – joining into *one* NFDI...



***Thank You !***



<https://www.nfdi4earth.de/>