

Making Data FAIR for the World Data Service for Paleoclimatology (WDS-Paleo)

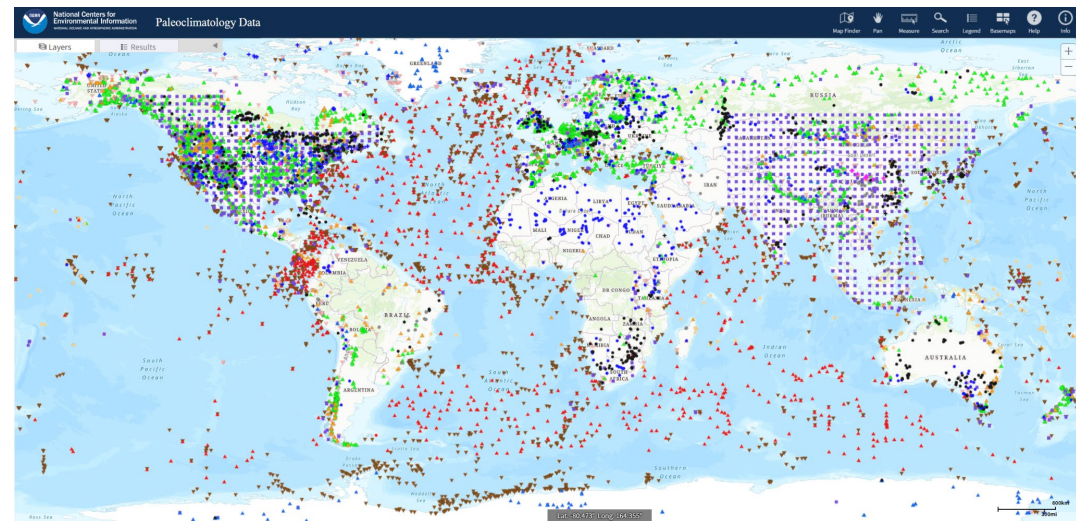
National Centers for
Environmental Information (NCEI)

September 19, 2024

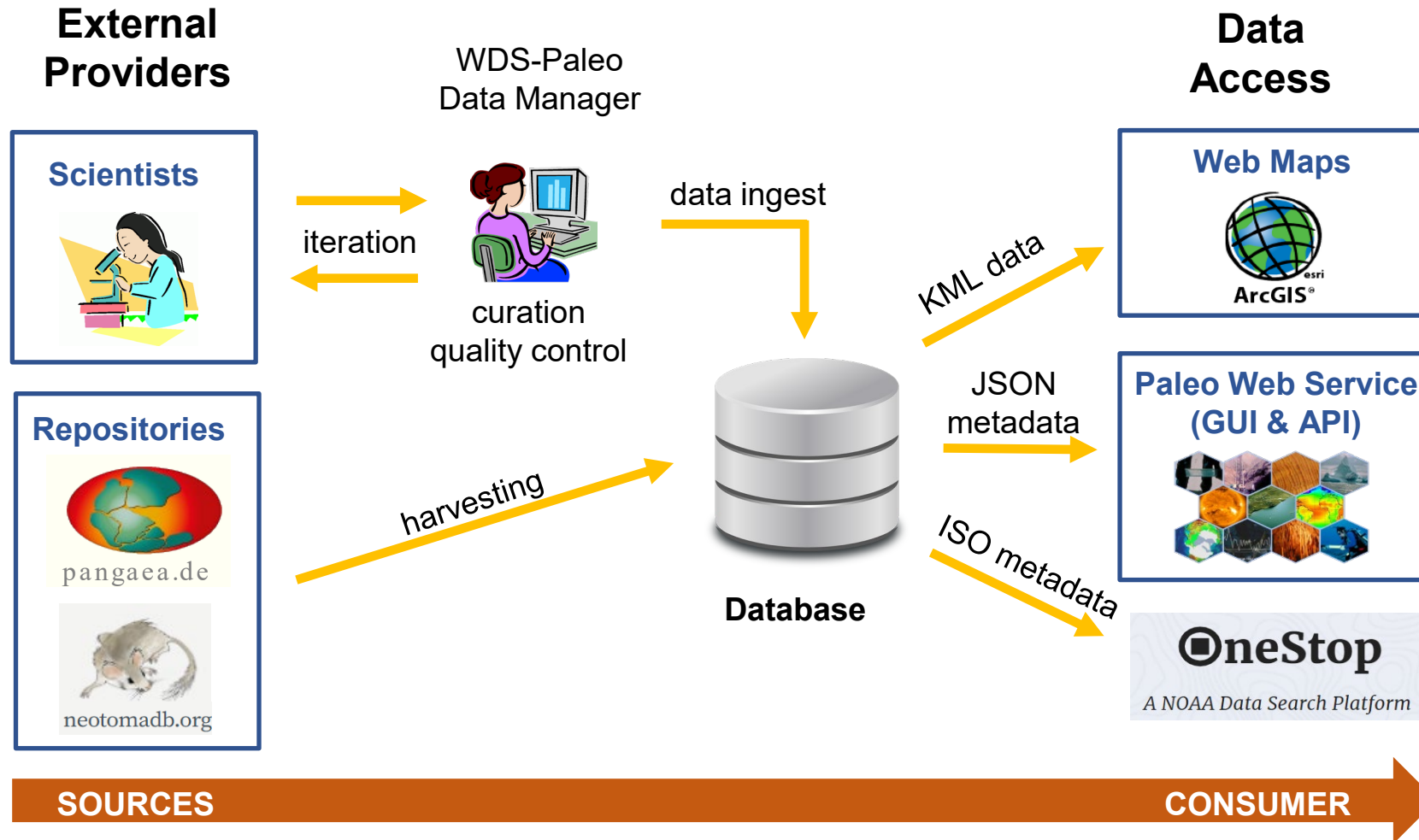
Carrie Morrill, Director of the WDS-Paleo

World Data Service for Paleoclimatology

- over 13,000 data sets
- nearly 8,500 contributors
- 18 data types (see right)
- Two specialized collections:
International Tree Ring Data Bank (ITRDB) and International Multiproxy Paleofire Database (IMPD)
- CoreTrustSeal certified
- Member of World Data System



Overview of Metadata and Data Flows



Examples of Data Usage

Scientific Research

FOREST ECOLOGY
Drought sensitivity in mesic forests heightens their vulnerability to climate change

To quantify trees' sensitivity to weather fluctuations, we drew upon two large databases of annual tree-ring measurements: the International Tree Ring Data Bank (ITRDB) ...

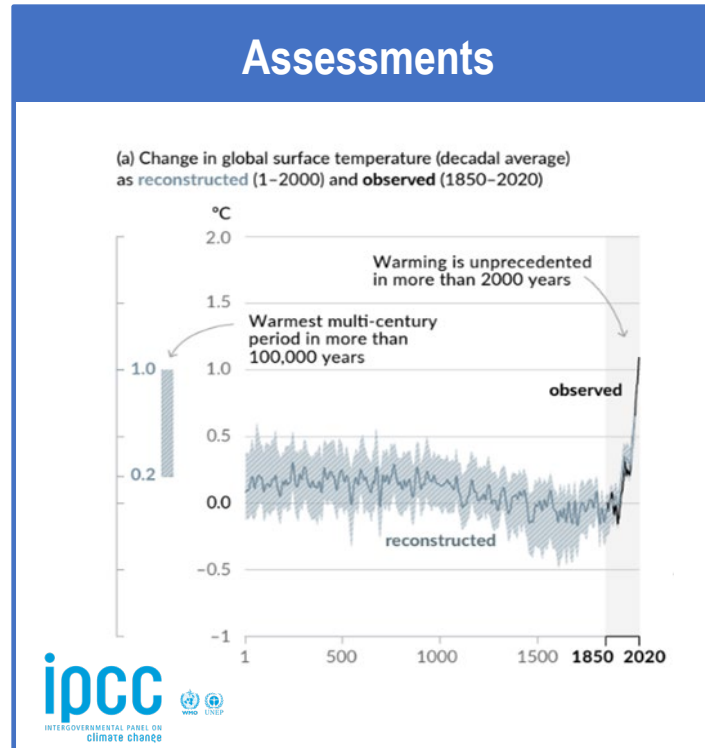
Heilmayr *et al.*, *Science* **382**, 1171-1177 (2023) 8 December 2023

Media/Public

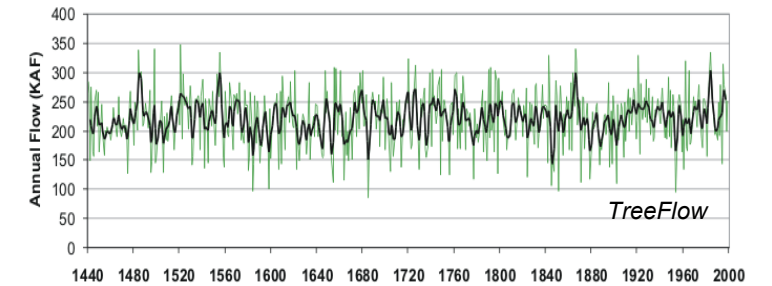
Carbon dioxide levels at 800,000-year high
 Carbon dioxide measurements taken at varying intervals from an Antarctic ice core:

SOURCE World Data Center for Paleoclimatology, Boulder, and NOAA Paleoclimatology Program USA TODAY

Assessments



Resource Management and Planning



DENVER WATER



Delivering water and power[®]



CALIFORNIA DEPARTMENT OF WATER RESOURCES

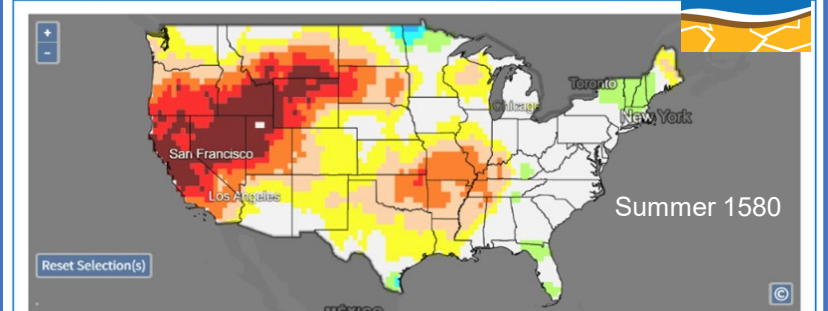


U.S. Drought Monitor (2000 - Present)

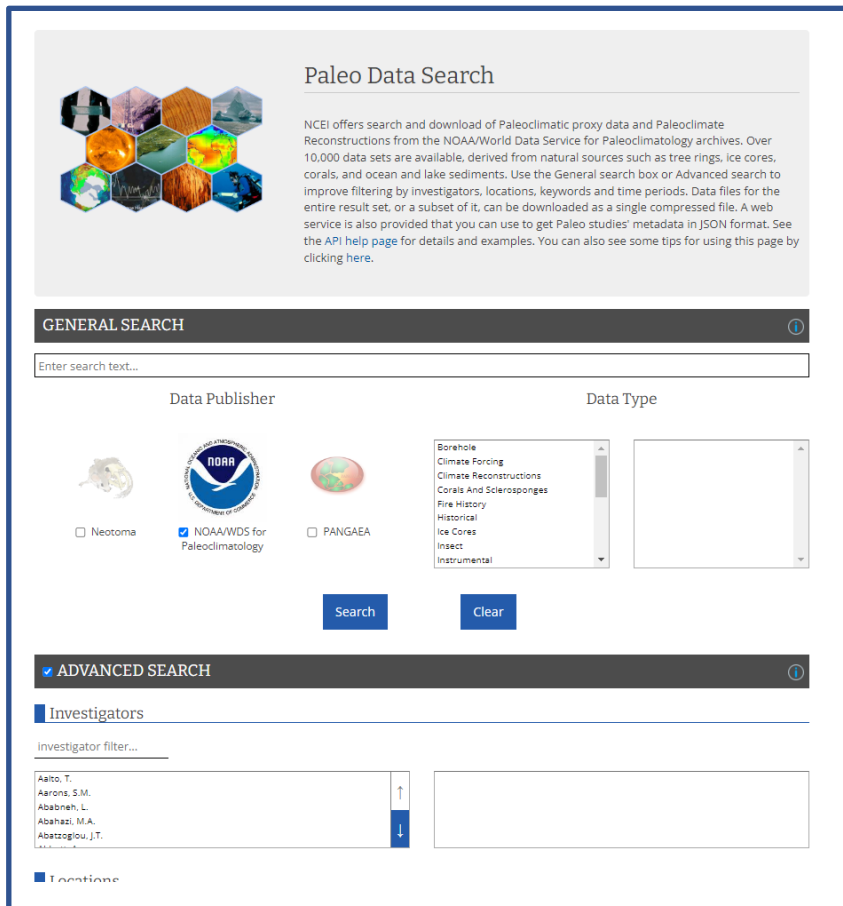
9-Month SPI (1895 - Present)

Paleoclimate Data (0 - 2017)

NIDIS

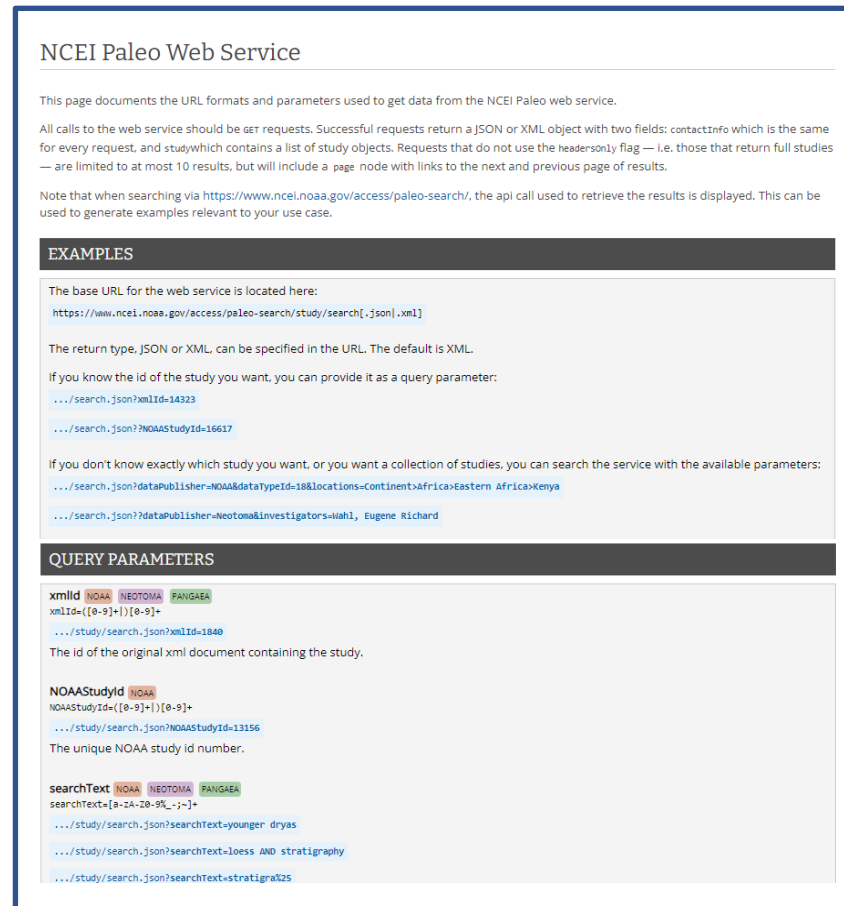


FAIR Example: GUI and API



The screenshot shows the 'Paleo Data Search' interface. At the top, there's a header with the title and a brief description of the service. Below this is a 'GENERAL SEARCH' section with a search input field and filters for 'Data Publisher' (Neotoma, NOAA/WDS for Paleoclimatology, PANGAEA) and 'Data Type' (Borehole, Climate Forcing, etc.). A 'Search' button is present. Below that is an 'ADVANCED SEARCH' section with an 'Investigators' filter and a list of names like Aalto, T., and Aaronson, S.M.

<https://www.ncei.noaa.gov/access/paleo-search/>



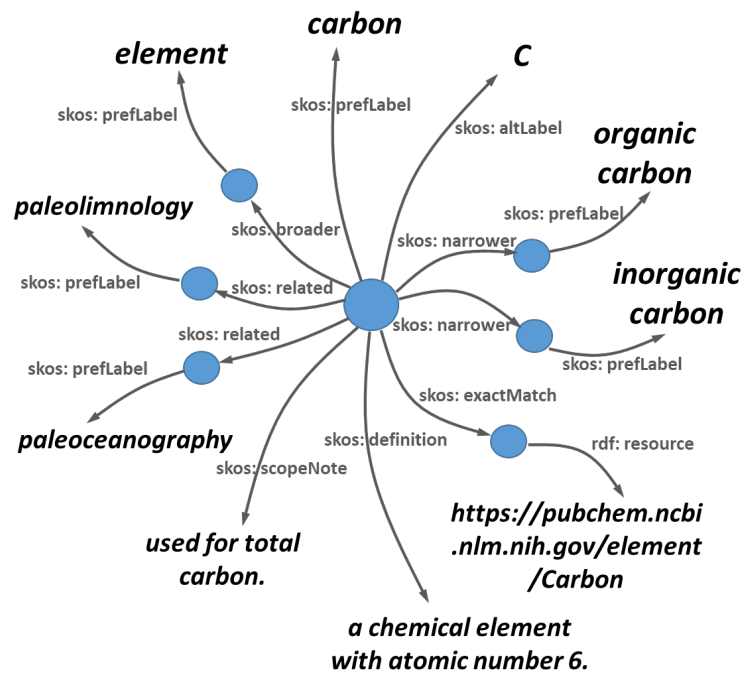
The screenshot shows the 'NCEI Paleo Web Service' documentation page. It includes an 'EXAMPLES' section with various URL examples for searching by study ID, NOAA study ID, and specific parameters like publisher and location. It also has a 'QUERY PARAMETERS' section listing parameters like 'xmlId', 'NOAAStudyId', and 'searchText' with their respective value ranges and examples.

<https://www.ncei.noaa.gov/access/paleo-search/api>



FAIR Example: PaST Thesaurus

- Standardizes terminology for measured or inferred variables
- Allows searching by variable name
- Facilitates data aggregation



PaST Thesaurus Navigator

Use this page to navigate the Paleoenvironmental Standard Terms (PaST) thesaurus and discover information about terms such as definitions, relations, and vocabulary hierarchies.

search for terms by name...
 preferred terms only

carbon
a chemical element with atomic number 6.

ROOT > what > chemical composition > element or single-element molecule > carbon

Non Preferred Terms
C

Broader Terms
element or single-element molecule

More Specific Terms
inorganic carbon
organic carbon

Related Terms
fire history
ice cores
loess and paleosol
paleoceanography
paleoclimatic modeling
paleolimnology

SKOS
<https://www.ncei.noaa.gov/access/paleo-search/skos/past-thesaurus.rdf>

Find Studies Show Hierarchy

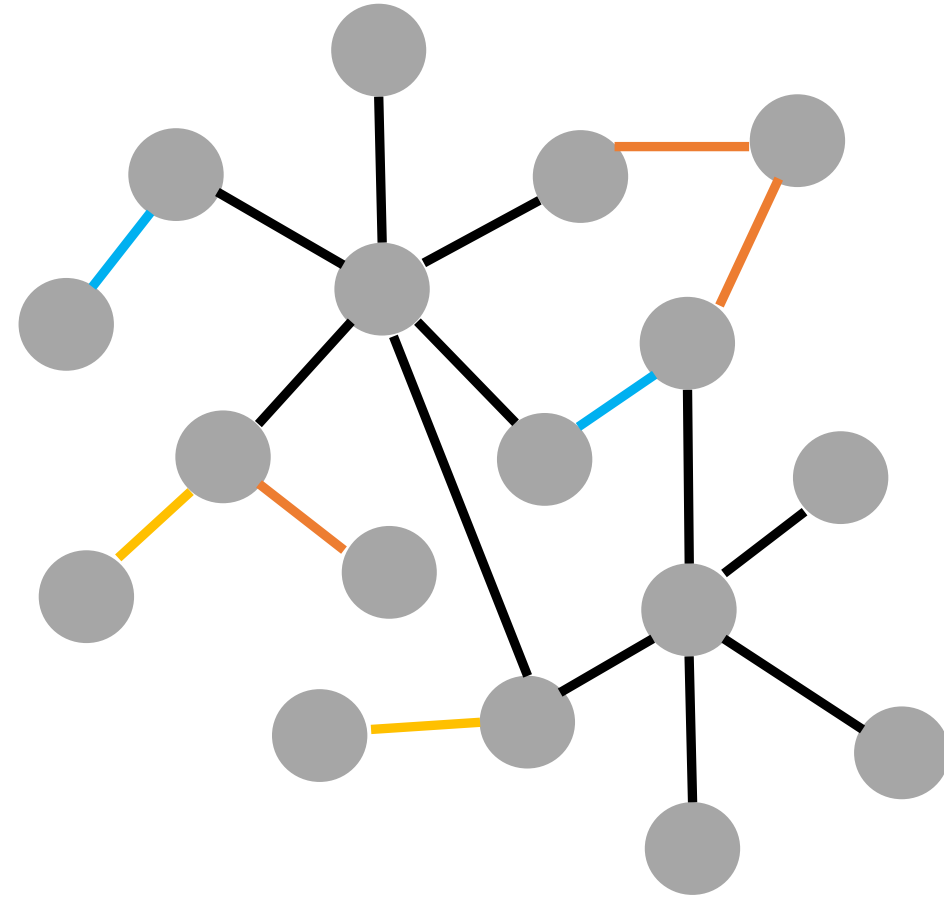
<https://www.ncei.noaa.gov/access/paleo-search/cvterms>

Morrill et al. 2021 *Paleoceanography and Paleoclimatology*
<https://doi.org/10.1029/2020PA004193>

Future Directions: Tracking Data Linkage

Goal is to disambiguate datasets that have been:

- Updated and recontributed by original data generator
- Simultaneously contributed to multiple repositories
- Intentionally mirrored by repositories
- Compiled in a data product and recontributed

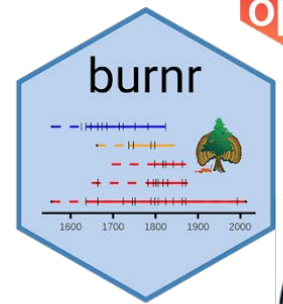
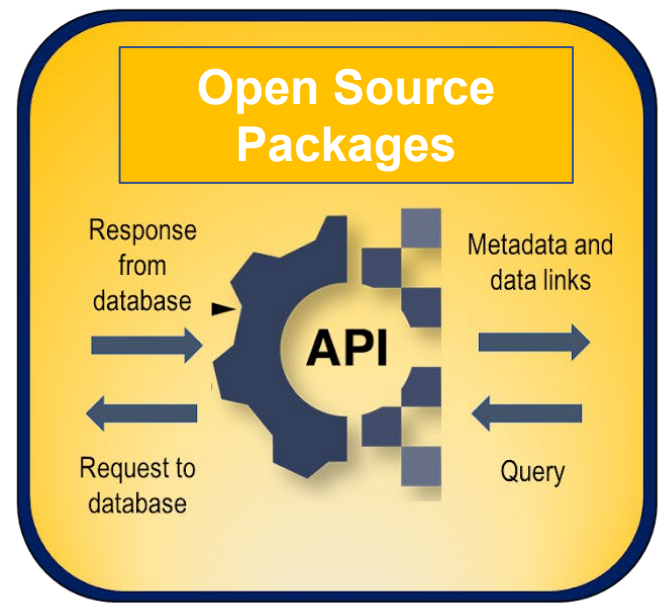


Future Directions: Improving Interoperability

Datasets



Community-Developed Software



Thoughts about FAIR

- Our emphasis has been largely on findability, there is still much more work to be done for other aspects of FAIR.
- Documenting our processes and workflows has been very helpful, especially in identifying possible improvements to become more FAIR.

