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

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National Centers for Environmental Information (NCEI)

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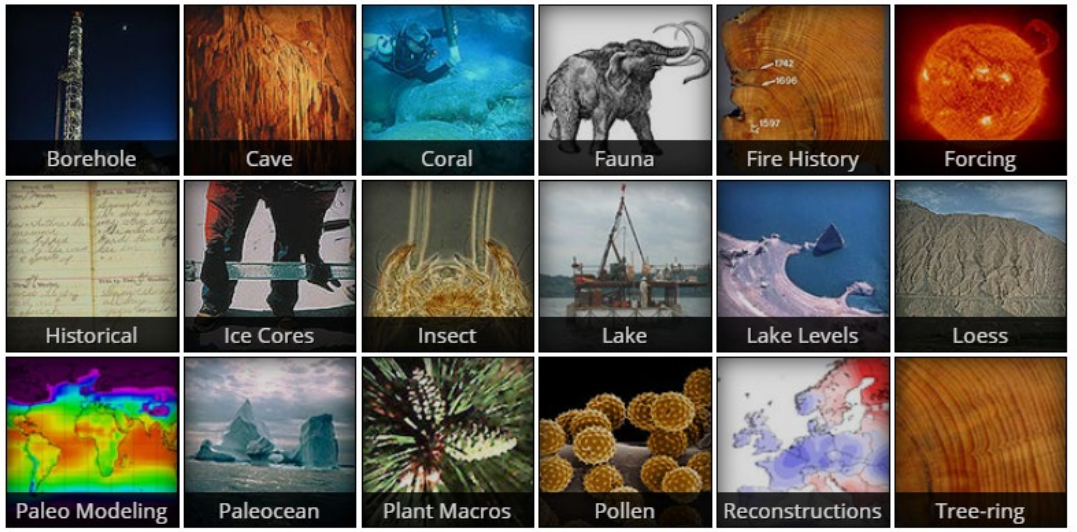
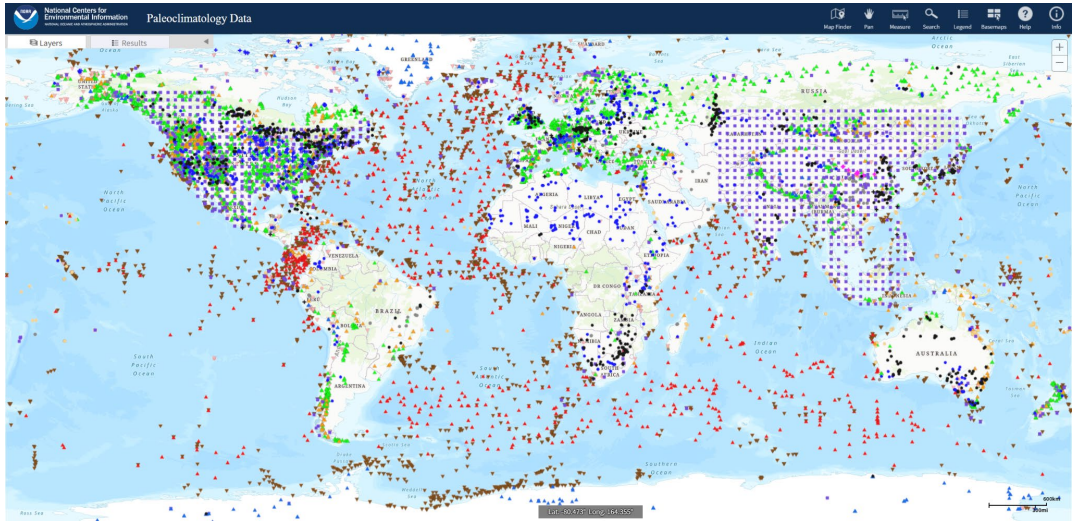
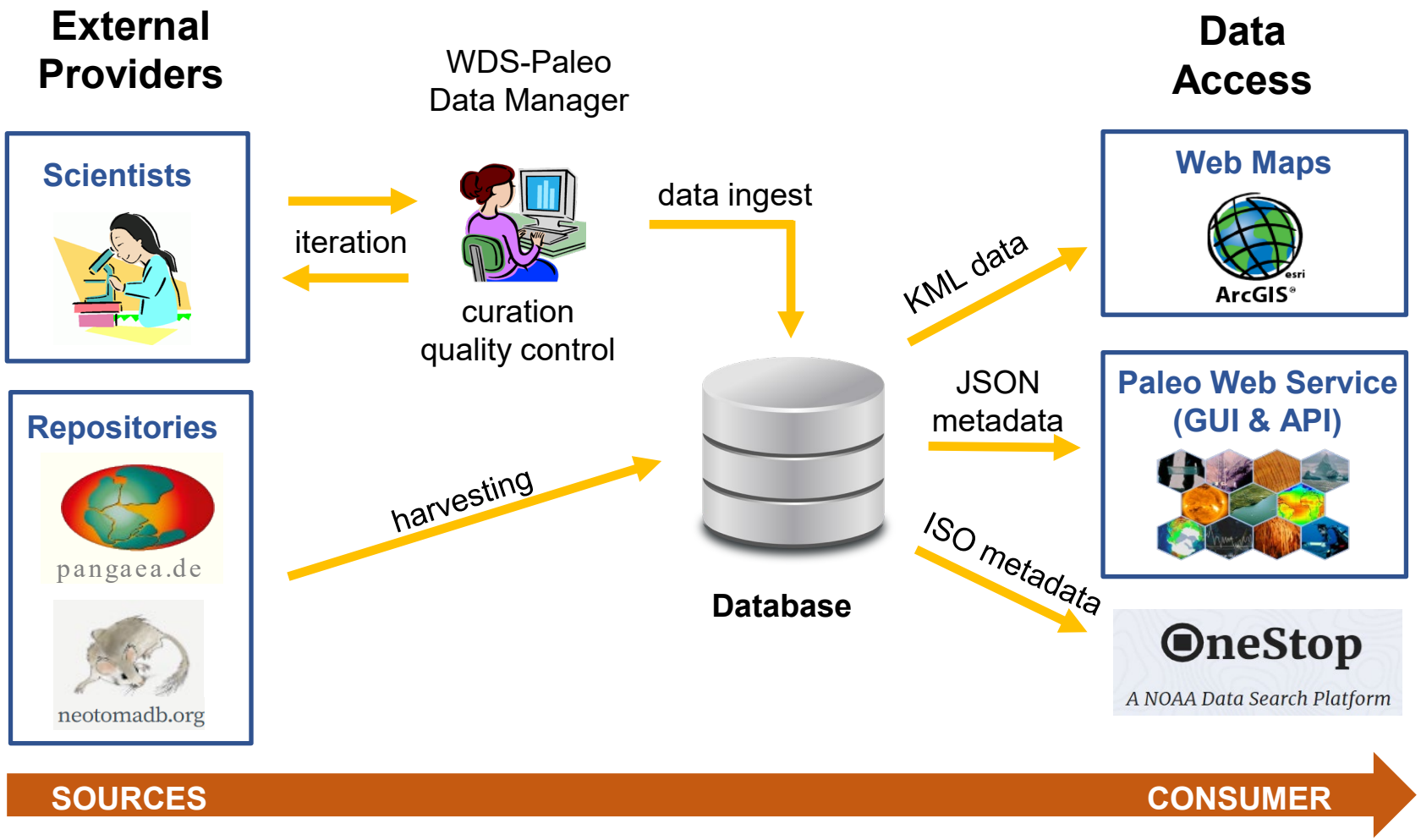
World Data Service for Paleoclimatology

- 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



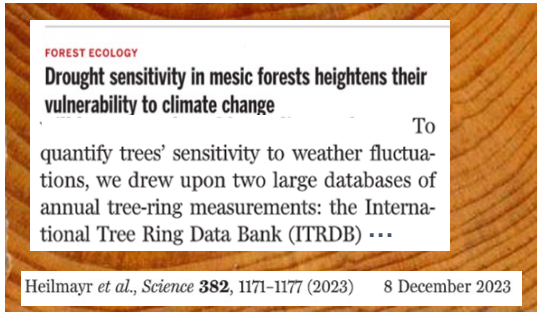


Overview of Metadata and Data Flows



Examples of Data Usage

Scientific Research

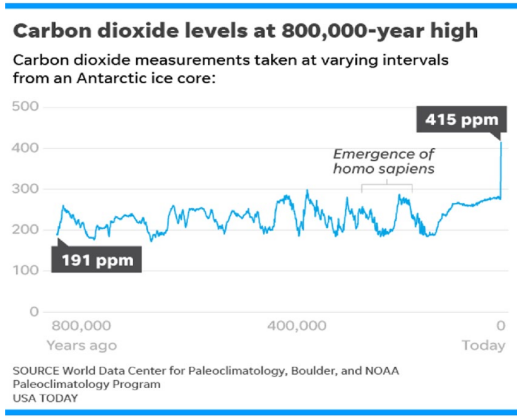

FOREST ECOLOGY

Drought sensitivity in mesic forests heightens their vulnerability to climate change

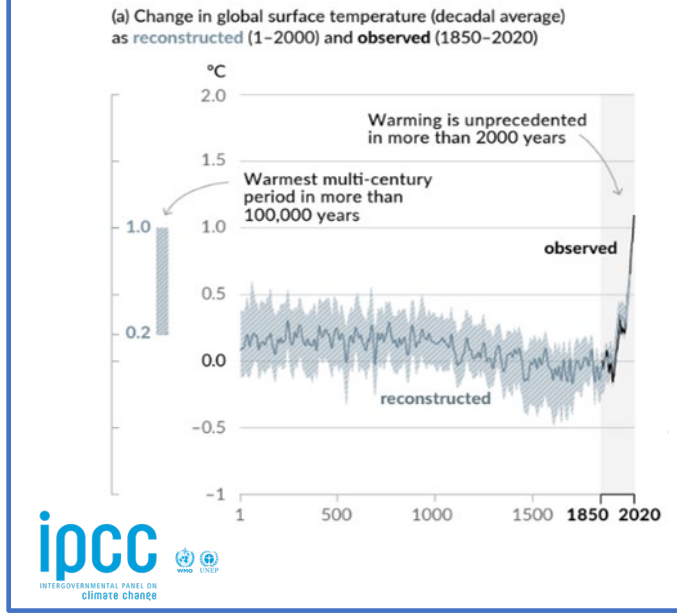
To quantify trees' sensitivity to weather fluctuations, we drew upon two large databases of annual tree-ring measurements: the International Tree Ring Data Bank (ITRDB) ···

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

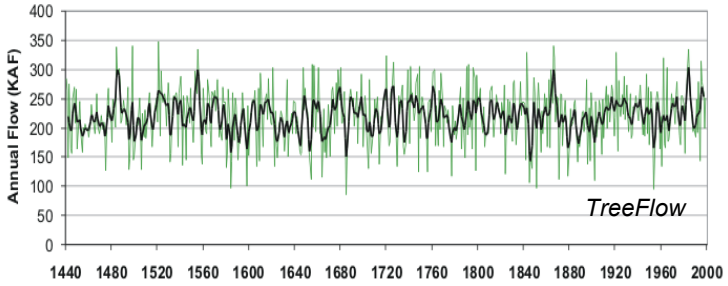
Media/Public



Assessments



Resource Management and Planning



DENVER WATER

SRP

CALIFORNIA DEPARTMENT OF WATER RESOURCES

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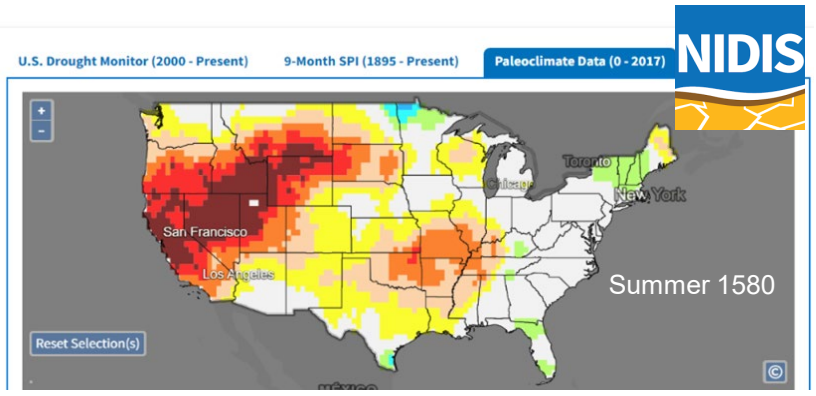
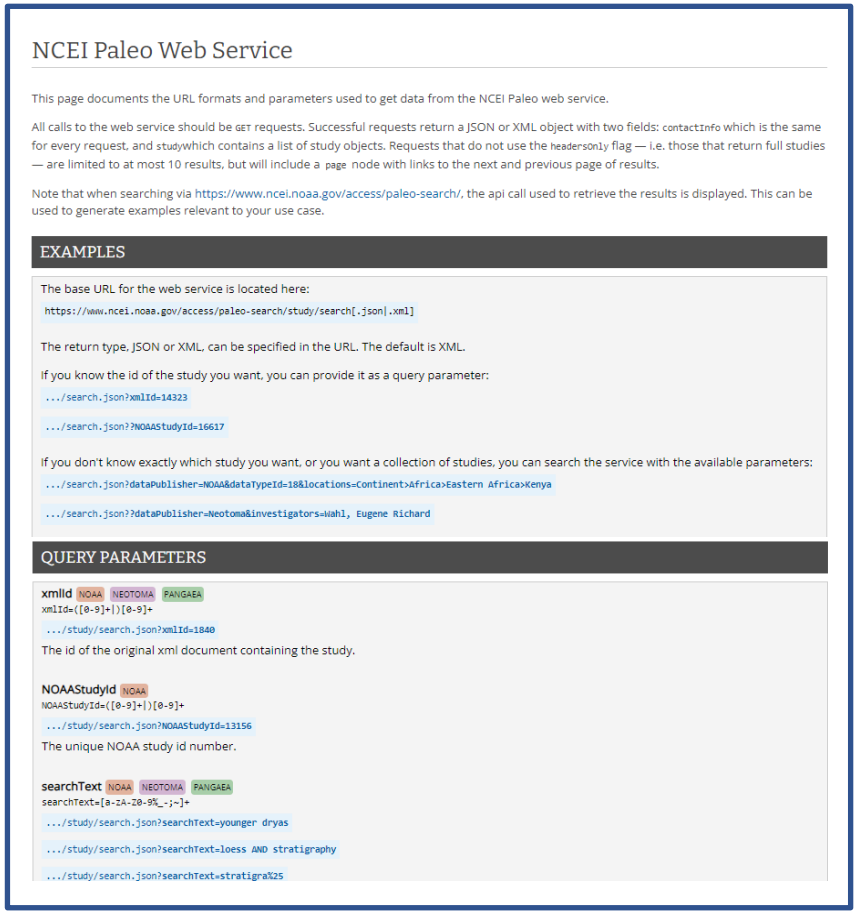


FAIR Example: GUI and API

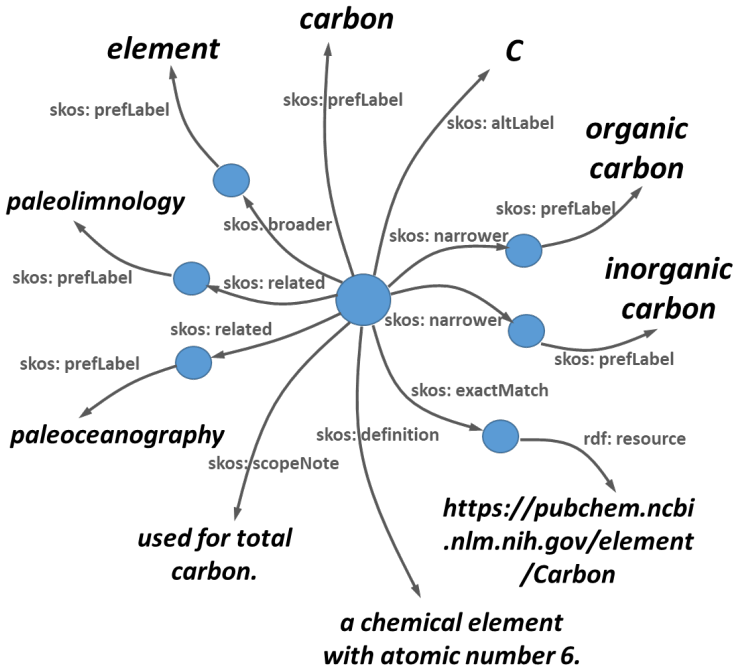
https://www.ncei.noaa.gov/access/paleo-search/

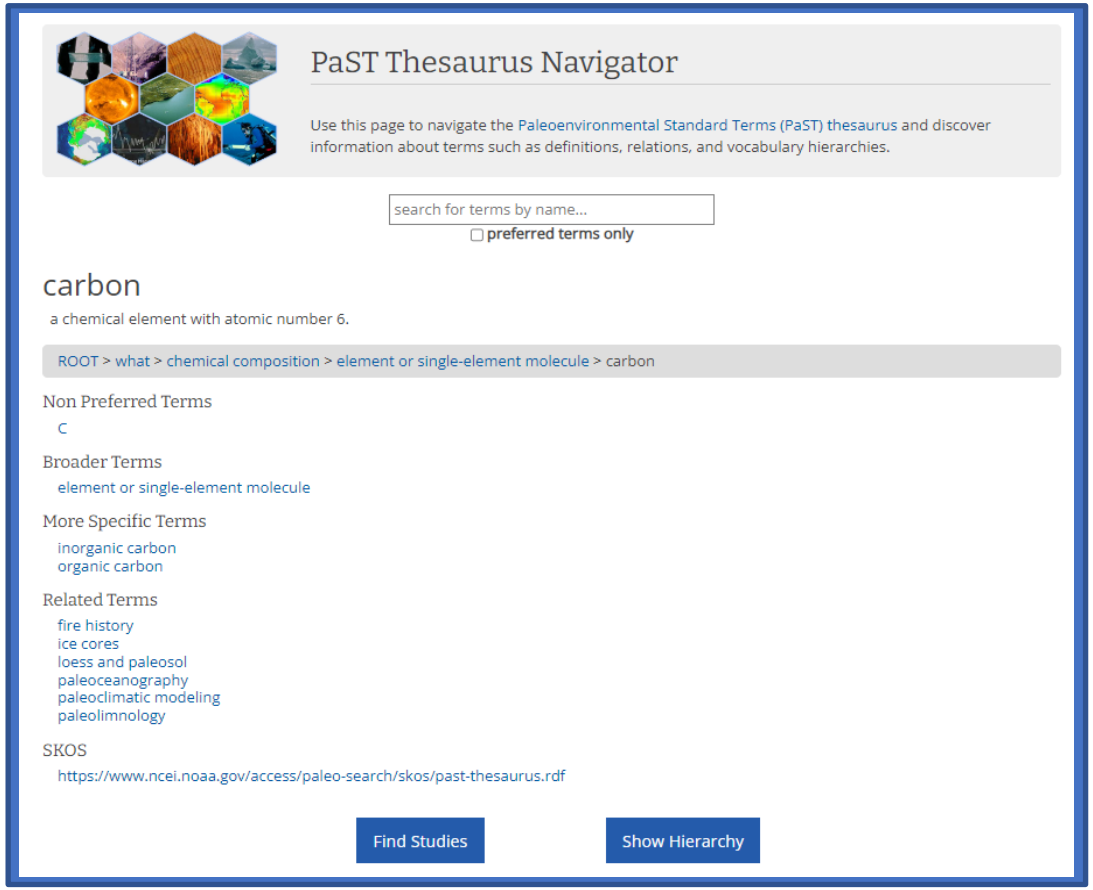


https://www.ncei.noaa.gov/access/paleo-search/api

FAIR Example: PaST Thesaurus

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





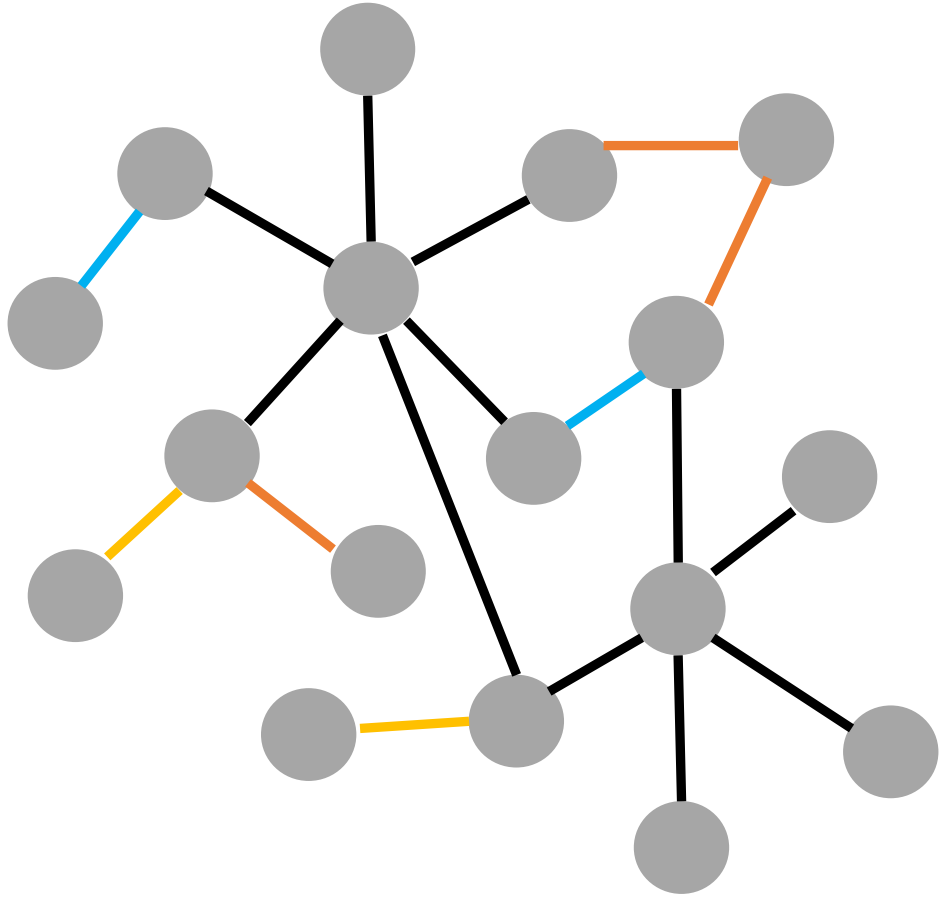
https://www.ncei.noaa.gov/access/paleo-search/cvterms

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

Future Directions: Tracking Data Linkage

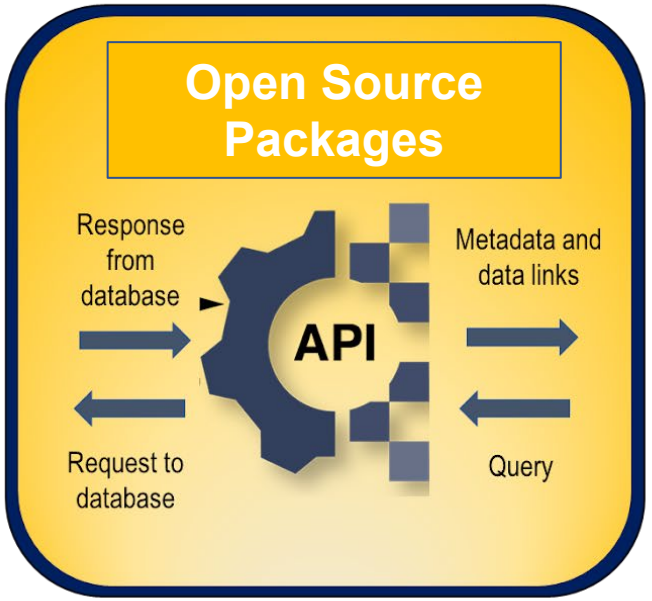
Goal is to disambiguate datasets that have been:

- 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**



geoChronR

openDendro

burnr

PYLEOCLIM

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.