

VARDA

Varved Sediments
Database

Constructing paleoclimate networks from annually laminated lake sediments

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**PAL
MOD**

GERMAN
CLIMATE
MODELING
INITIATIVE

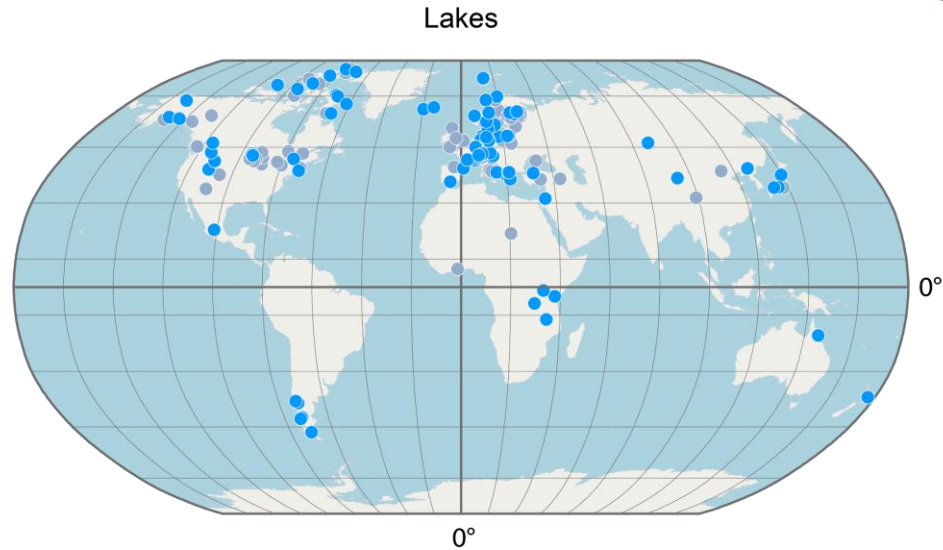


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und Forschung

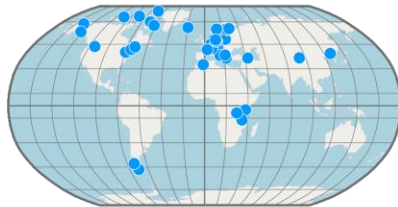


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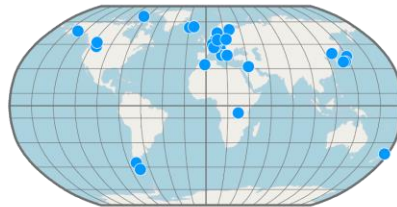
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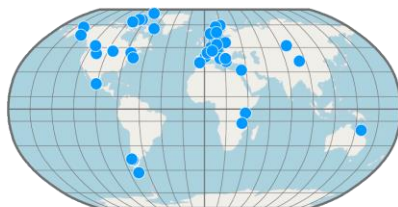
Chronology



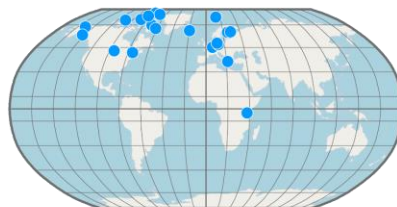
Tephra layer



Uncalibrated ^{14}C



Varve thickness



Ramisch et al., in discussion

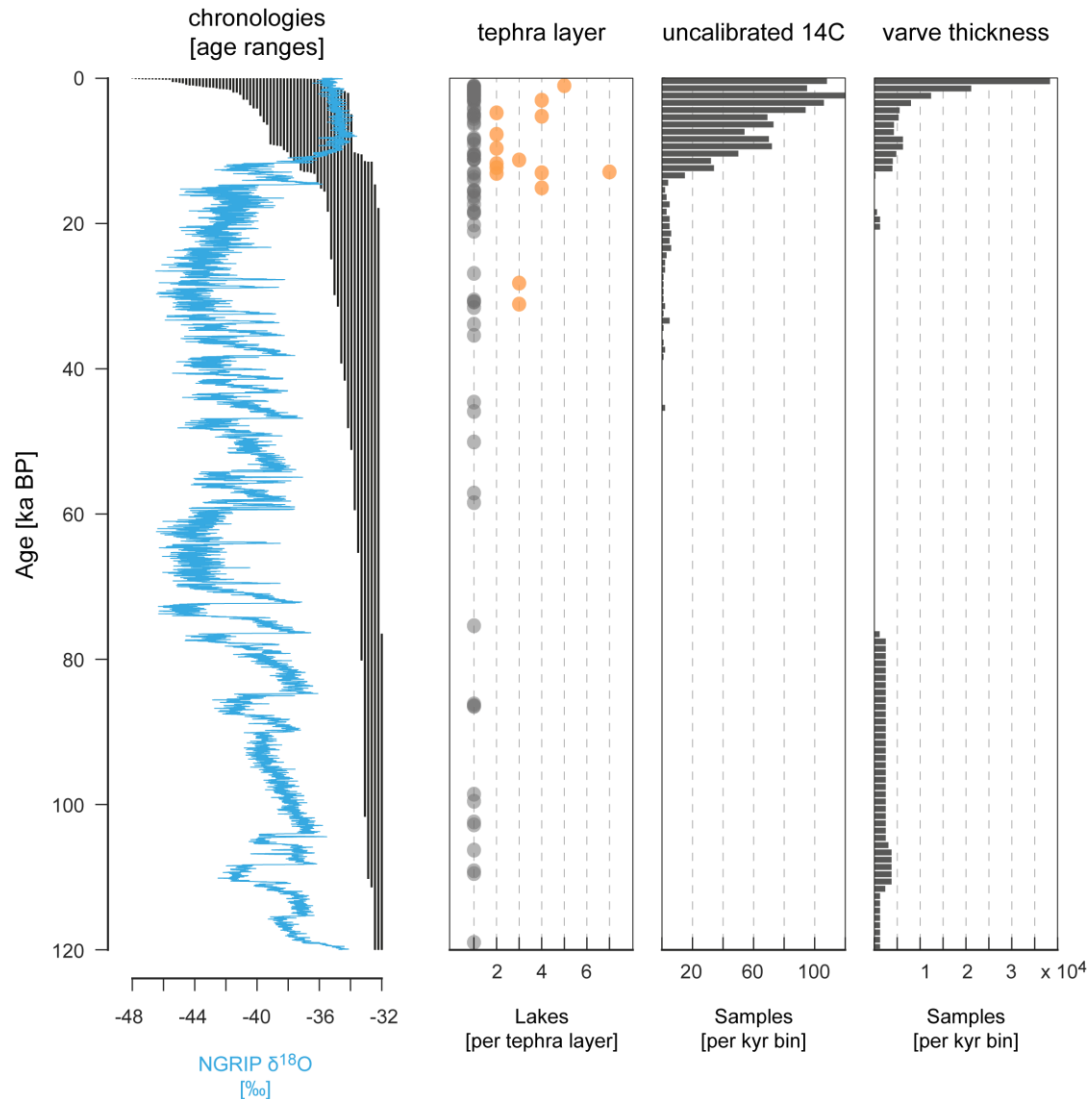
VARDA 1.0

VARDA offers standardized datasets from annually laminated lake archives. See **Ramisch et al.** (in discussion at <https://doi.org/10.5194/essd-2020-55>) for detailed information of compilation and standardization strategies

VARDA version 1.0 allows detailed comparison of published varve records, including **chronologies**, **tephra layer**, **radiocarbon measurements** and **varve thickness** records

Additional paleoclimate proxy data will be provided in forthcoming updates

Figure 1 (on the left) shows the spatial coverage of datasets in VARDA 1.0 (blue dots indicate data availability)



Ramisch et al., in discussion

Temporal coverage

VARDA 1.0 includes a total of 261 standardized datasets, with over 100,000 individual datapoints

The combined datasets span the entire last glacial cycle, with age ranges from 86 years (Lake Woserin, Germany, Czymzik et al., 2016) to 1,208,643 yrs (Lake Malawi, Tansania, Sánchez Goñi et al., 2017)

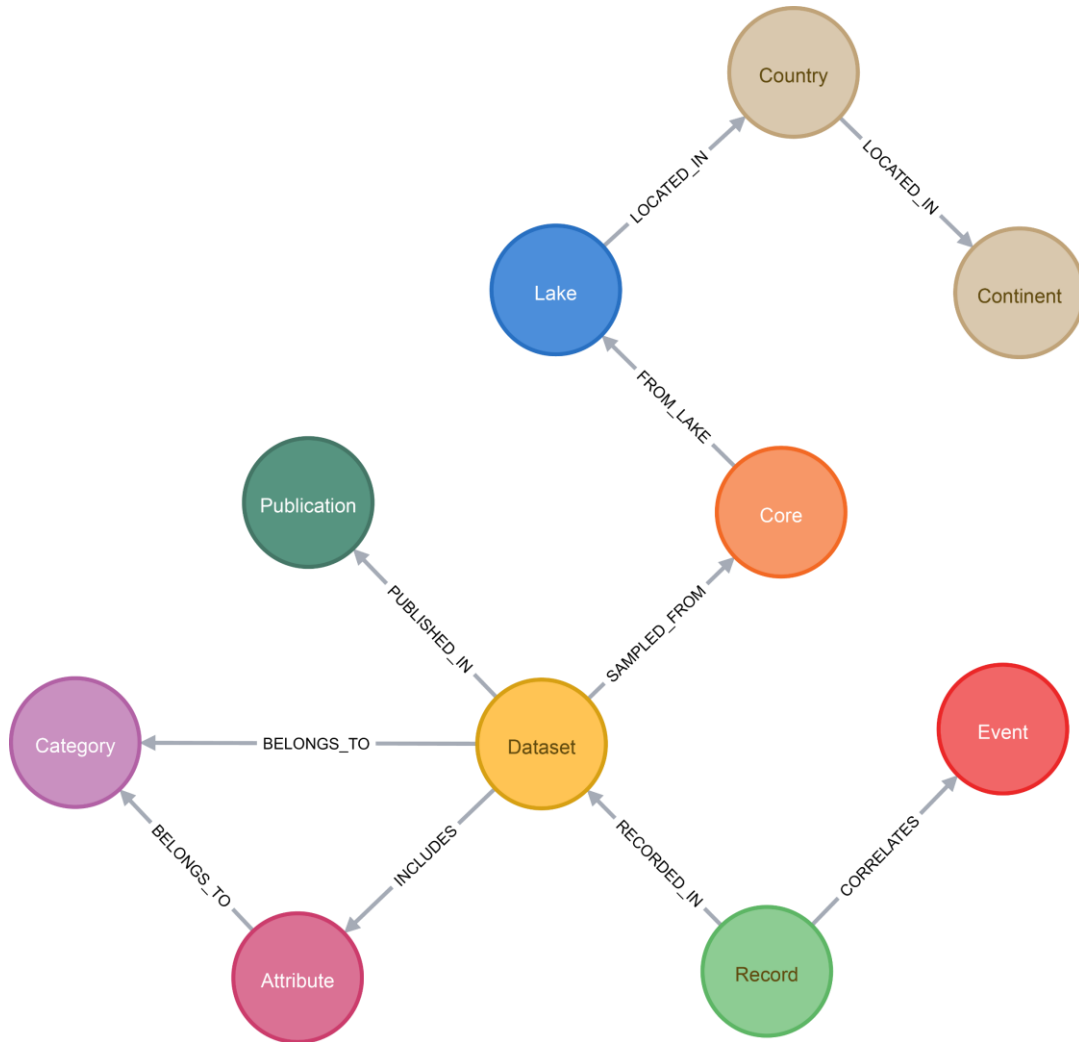
Figure 2 on the left shows the temporal coverage of datasets in VARDA 1.0 for chronologies, tephra layer, radiocarbon measurements and varve thickness records (from left to right). The NGRIP stable oxygen record (Andersen et al., 2004) with the GICC05 chronology (Vinther et al., 2006; Rasmussen et al., 2006; Andersen et al., 2006; Svensson et al., 2005) is shown as a temporal reference curve.



Property graph model

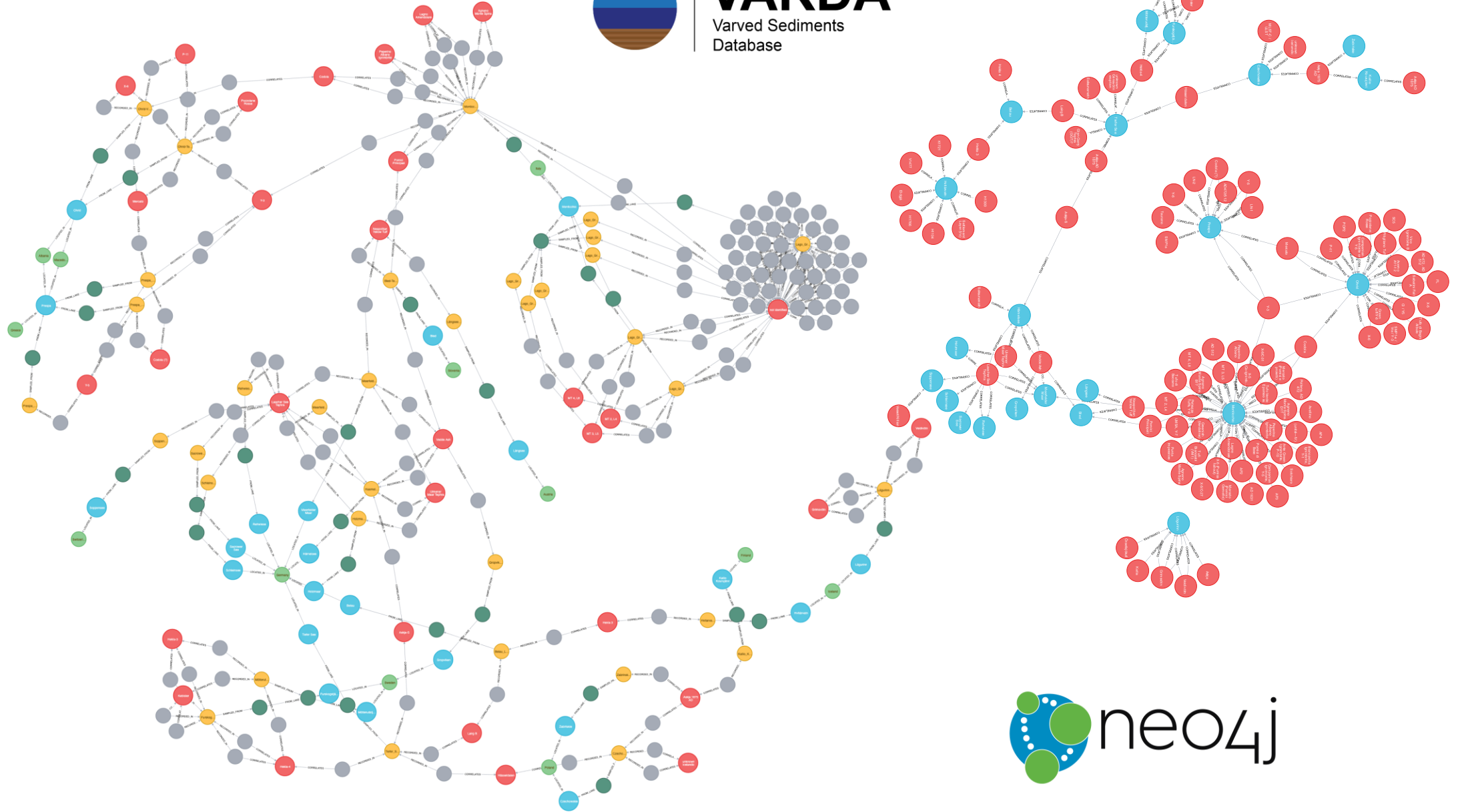
VARDA uses a connected data model (see **figure 3** on the left) that explicitly models connections (arrows) between datasets (circles) as e.g. joint tephra layers between records for synchronization

The resulting graph structure enables the generation of custom build paleoclimatic networks from individual records. **Figure 4** on the next slide shows a network of European lakes (blue dots), which are connected by common tephra layers (red dots) and associated datasets (yellow dots).



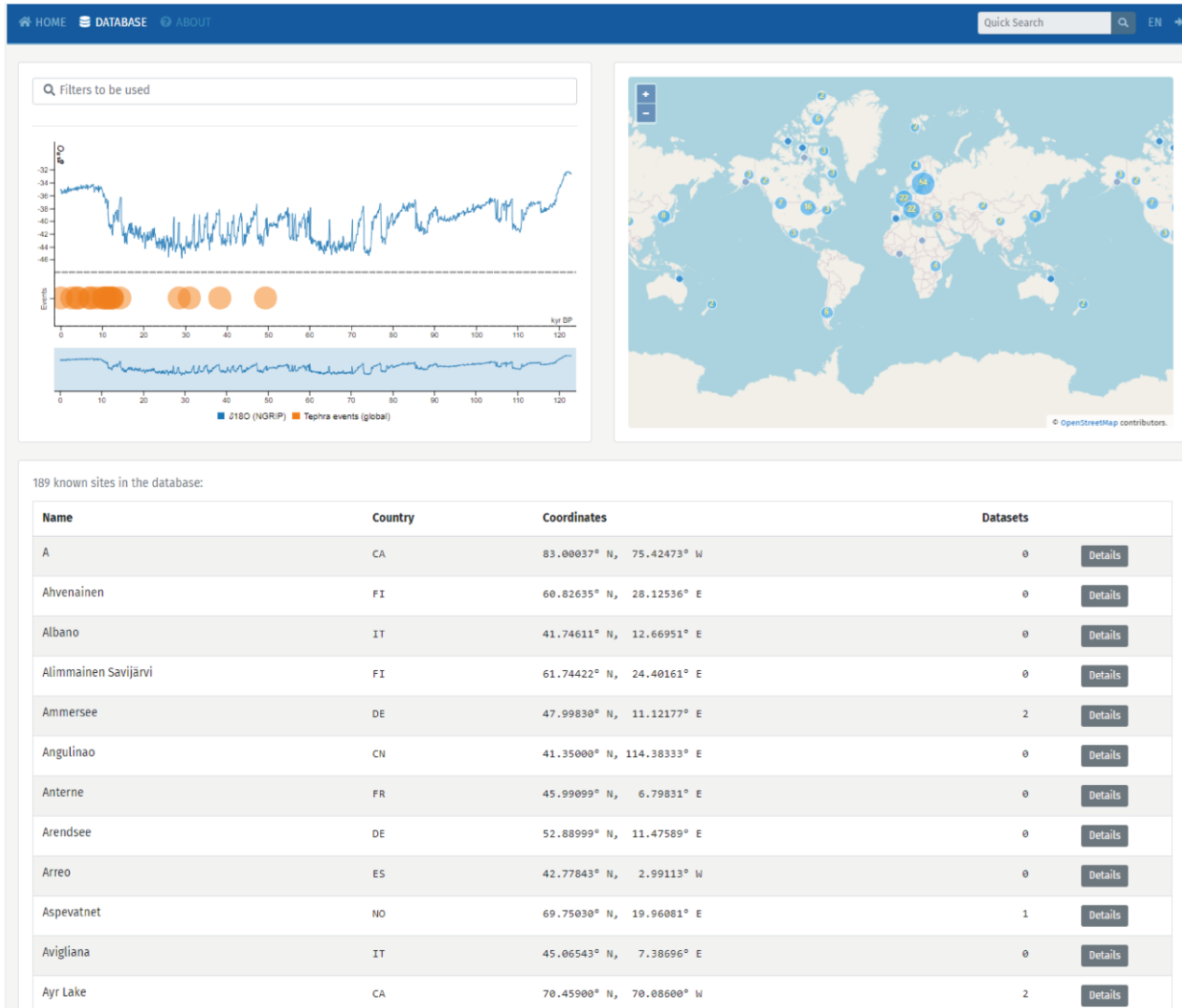


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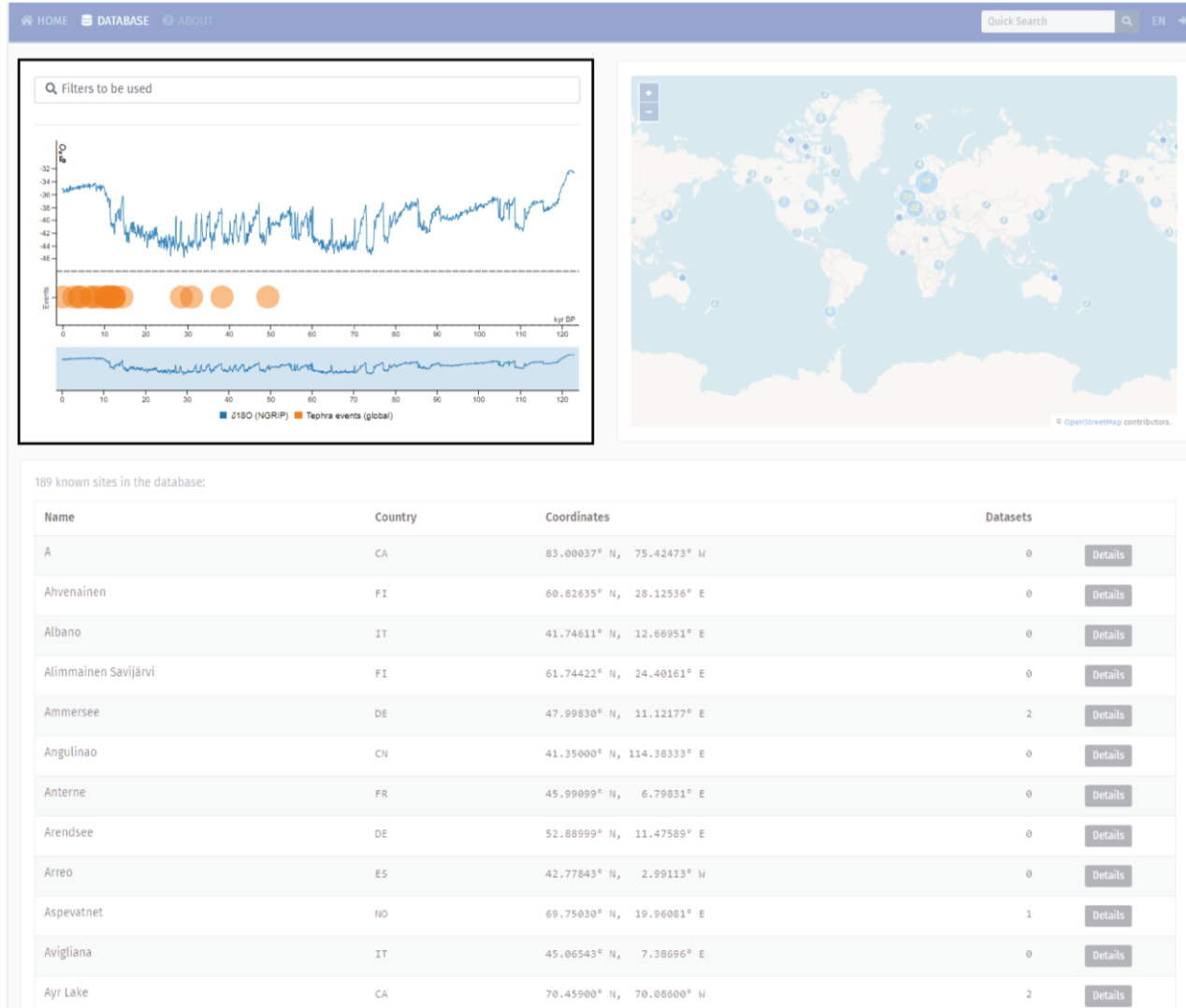
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Online access

VARDA 1.0 is freely accessible online at

<https://varve.gfz-potsdam.de>



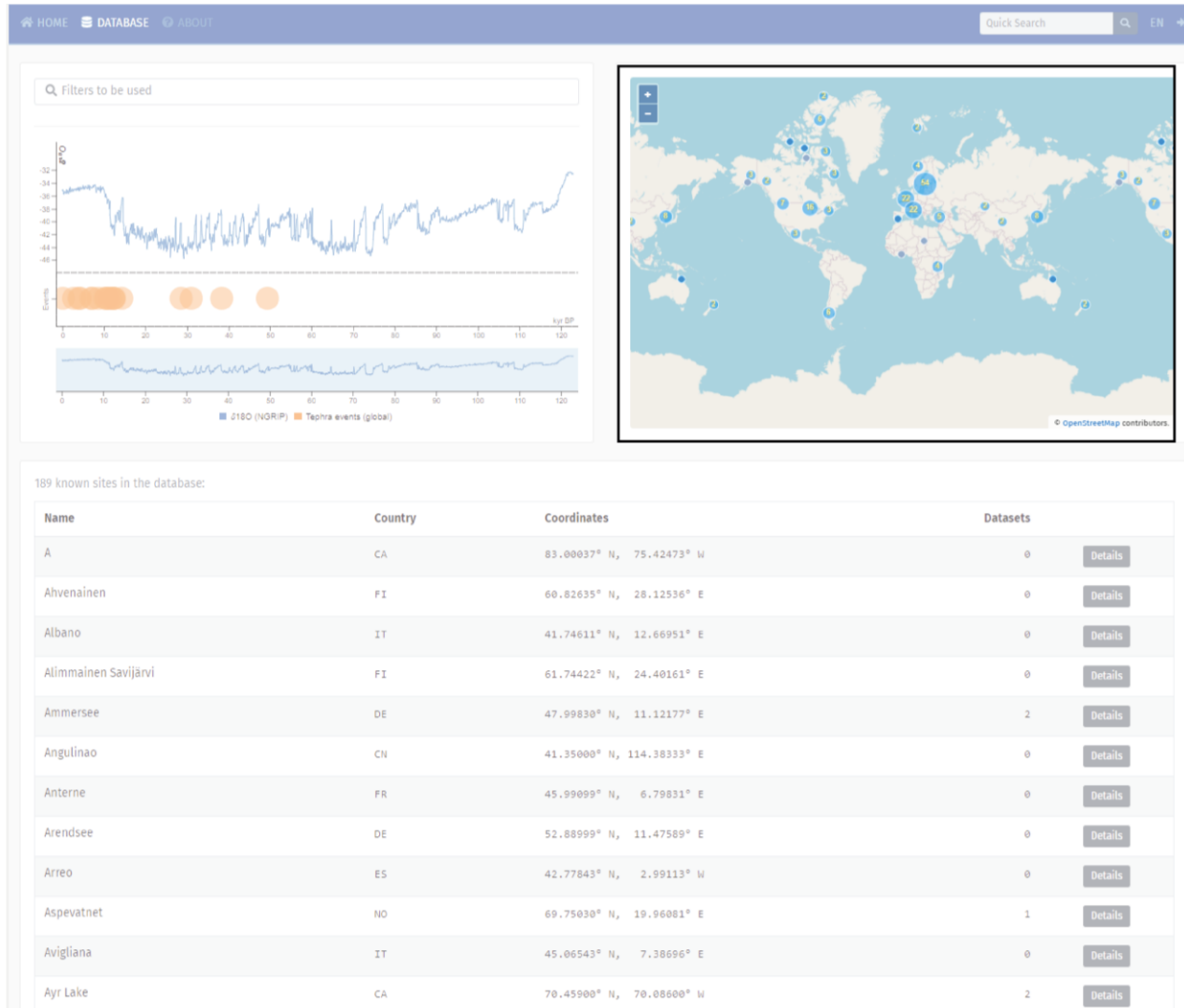
Temporal filter

Search data using a temporal filter.

(1) The iconic NGRIP curve is provided as a temporal reference. Scrolling into it will set the filter

(2) Select a tephra layer  for synchronization

(3) Adjust the temporal filter by rescaling the blue rectangle



Spatial filter

Search data using a spatial filter.

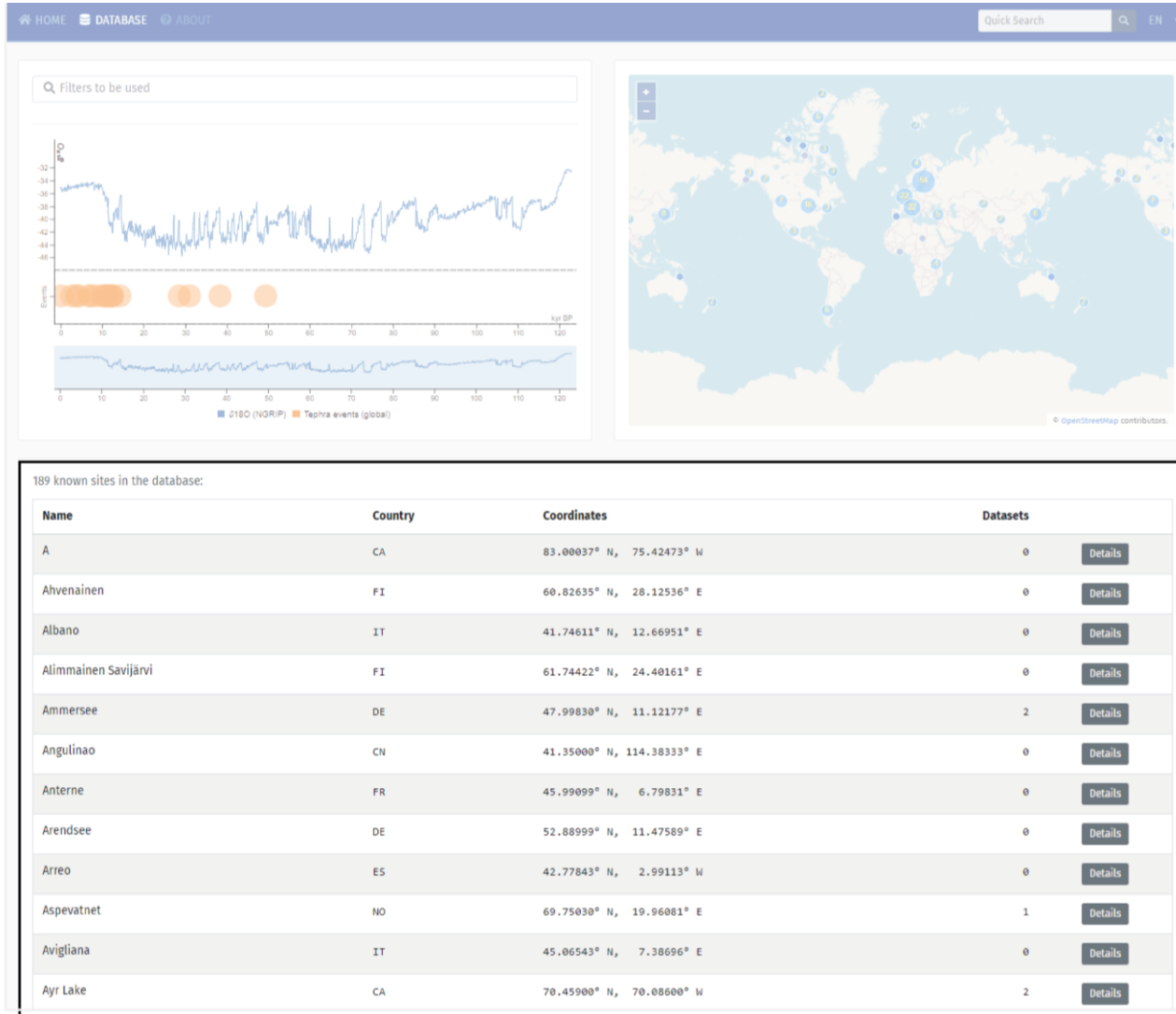
(1) Lake locations are indicated by blue dots



(2) Locations are clustered by default

14

(3) Hovering over a cluster will display individual lake locations



List of results

A list of lake records for a given search query is provided below the filters

Clicking [Details](#) gives access to all available datasets for a given lake, including a full literature and data reference. All datasets can be exported as CSV tables

The full compilation of datasets in VARDA 1.0 is also available in CSV and JSON at

<http://doi.org/10.5880/GFZ.4.3.2019.003>



<https://varve.gfz-potsdam.de>

comments and suggestions are welcome

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