

Exploring New Information from an Old Archive: A Record of Abrupt Climate Change from Brown's Lake

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Research Question: How does Brown's Lake document a record leading up to and during the Younger Dryas?

Background

Younger Dryas

- An abrupt climate change that occurred ~12.9 - 11.7ka BP
- Drastic warm -> cold

Brown's Lake

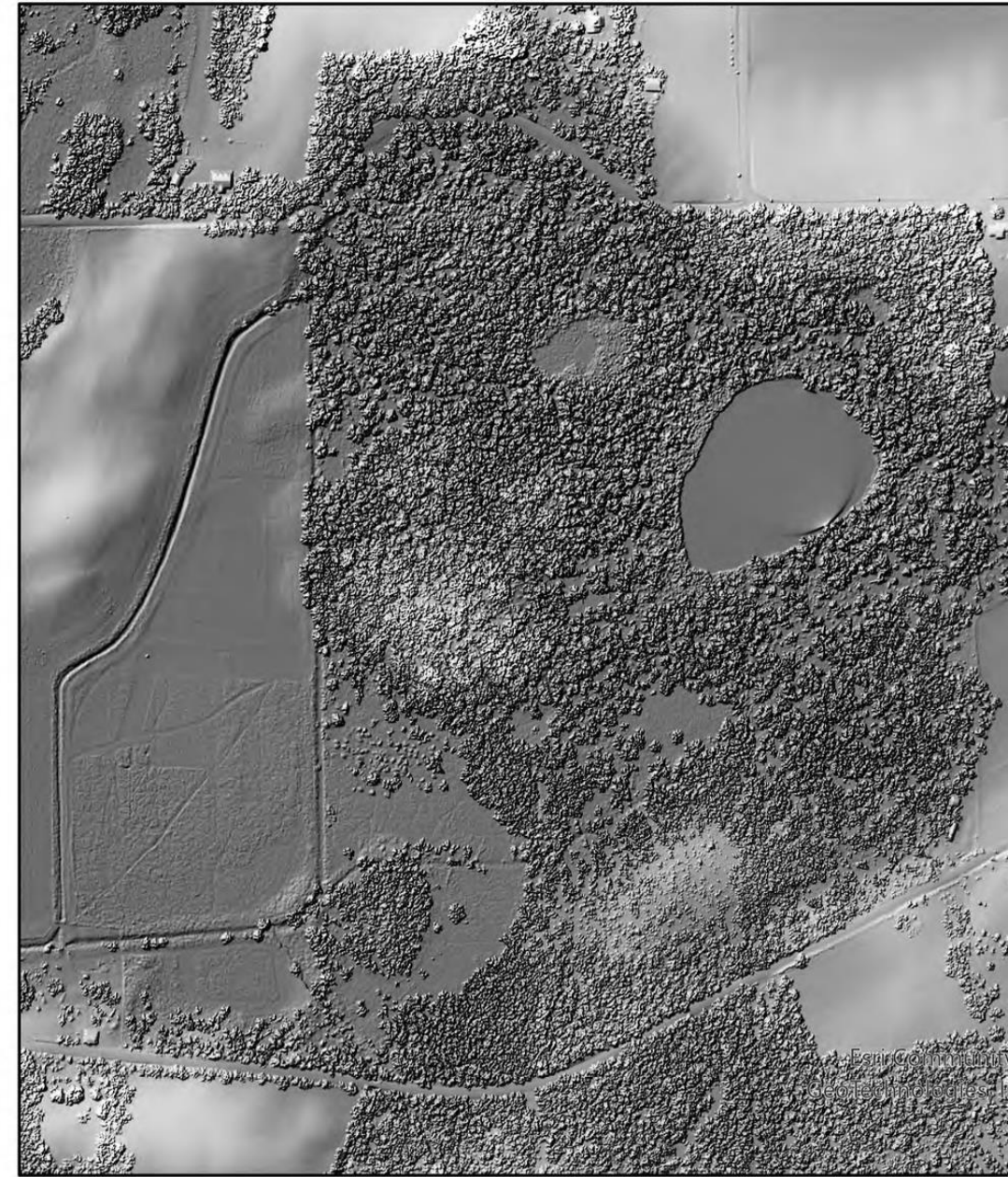
- 7-acre kettle lake ~4 km W of Shreve, OH
- Lake at least 16,000 (Shane & Anderson, 1993)

Ohio Glacial History

- Laurentide Ice Sheet Retreat ~ 14,660 +/- 60 14C yr BP (Bailey, 2003)
- Remnant of Glacial Lake Craigton

Diatoms

- Microalgae with siliceous skeletons (frustules)
- Used to monitor past and present environmental conditions



0 0.13 0.25 0.5 Miles

Photo by Alex Anikeeff

Core Photos (6-7m and 5.5-6.5m)

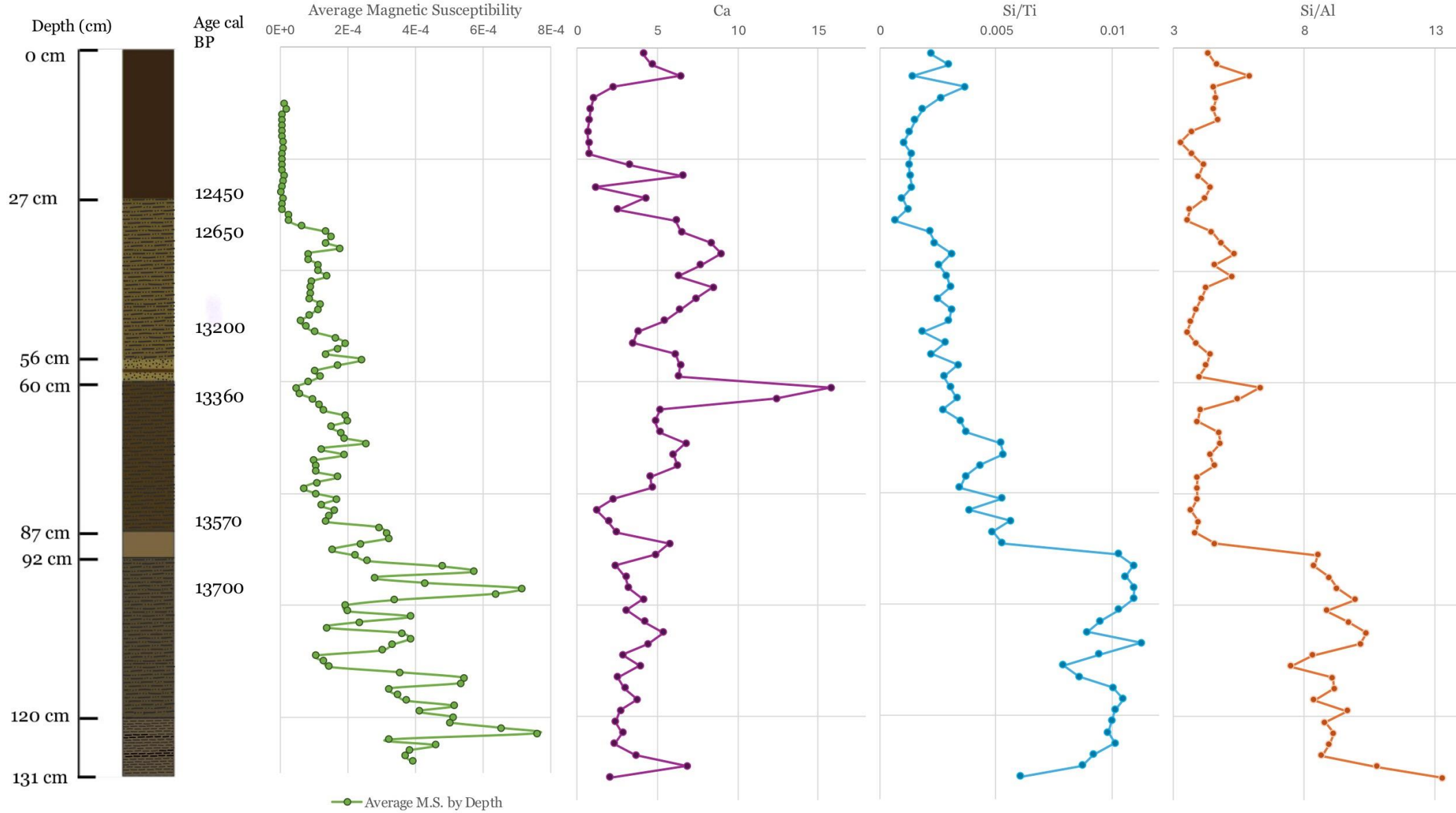
6-7 m



5.5-6.5 m

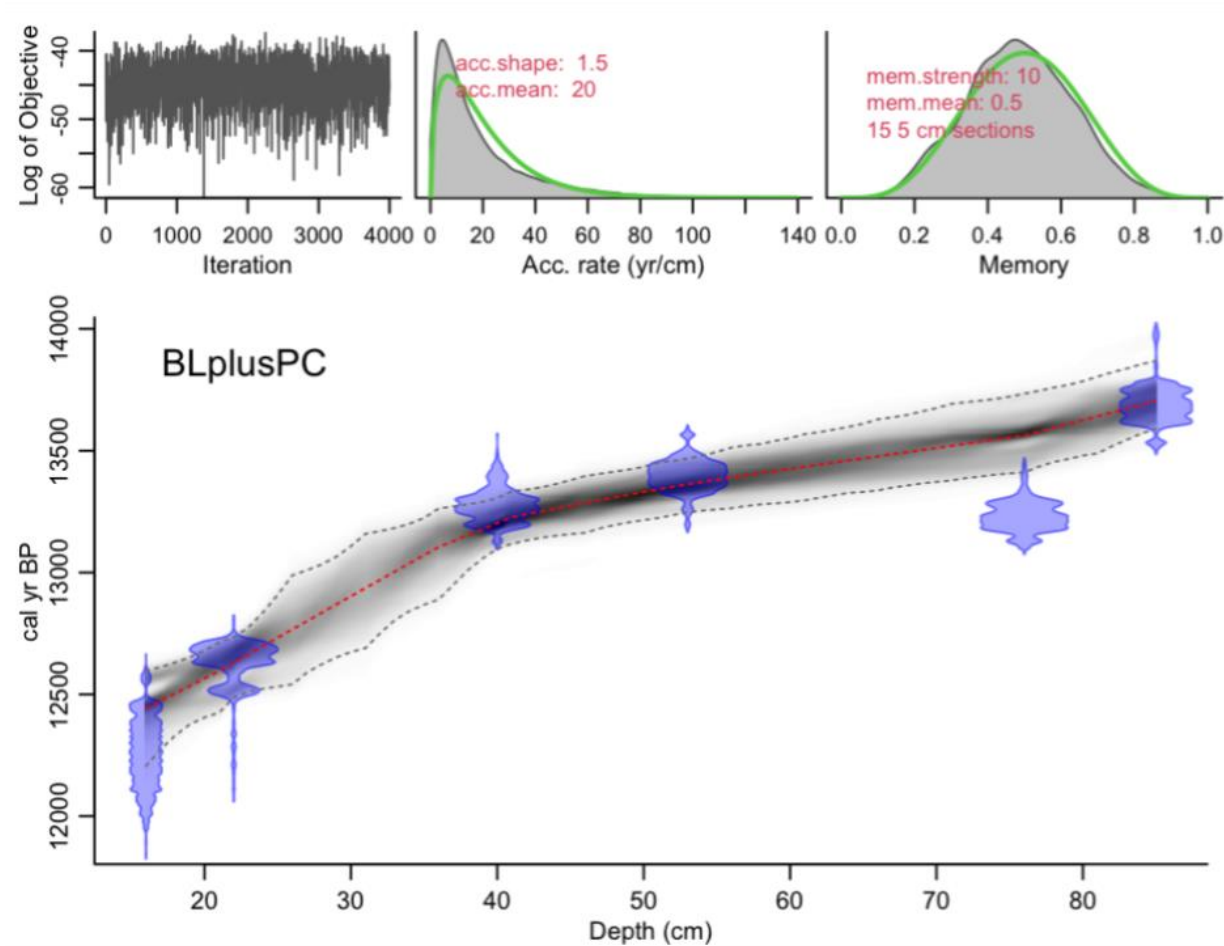


MS + pXRF Results

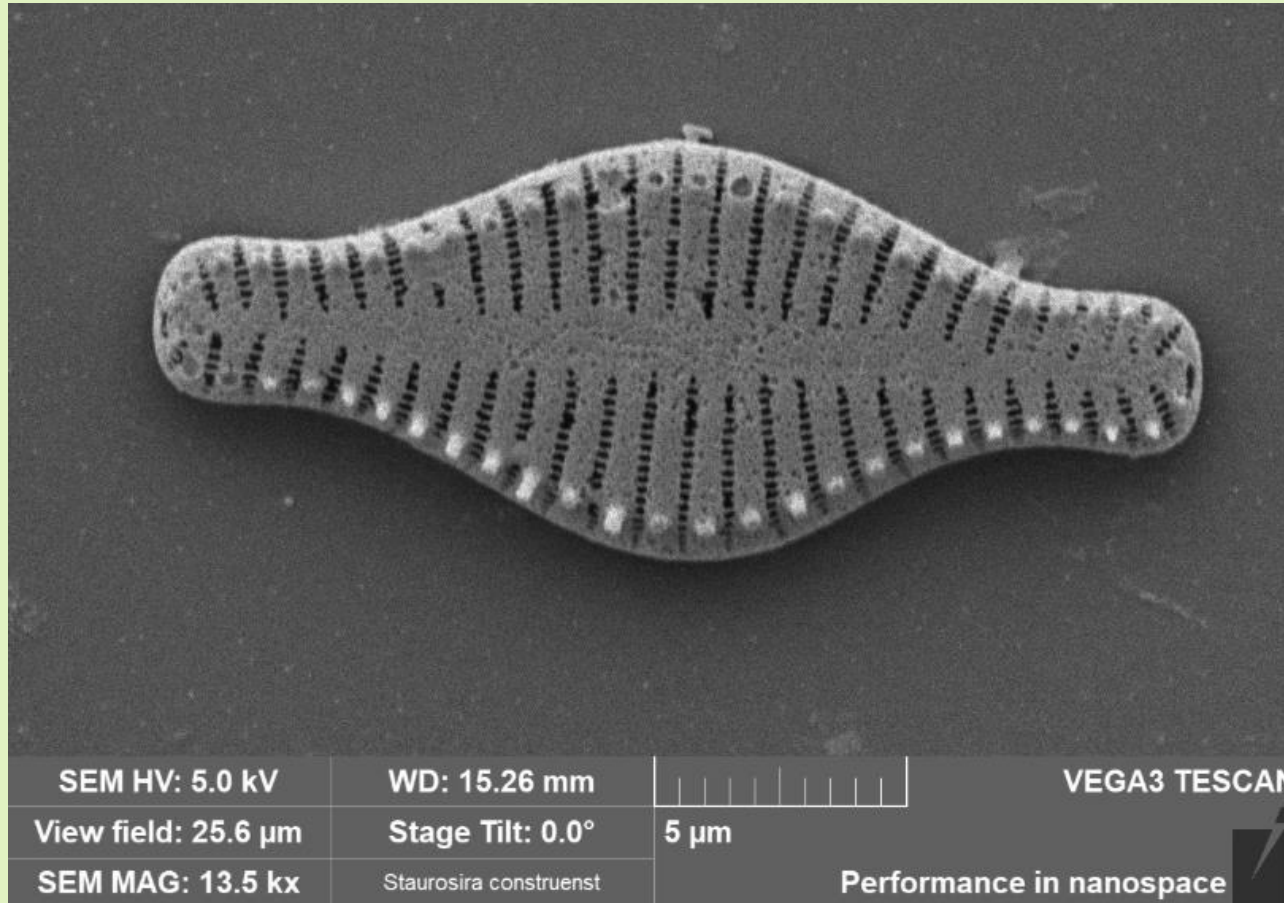


AMS Radiocarbon Dating

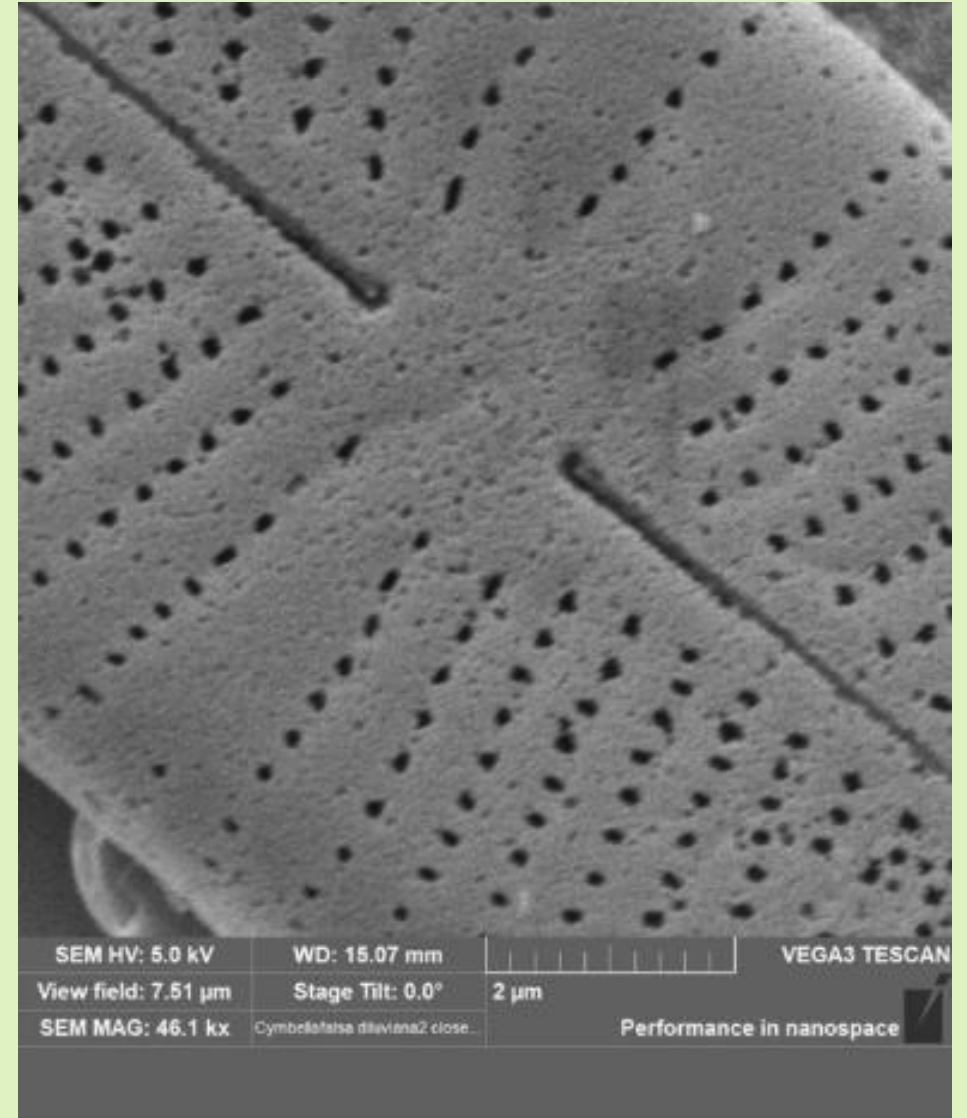
Core	Collected by	Sample Depth (cm)	Material Type	¹⁴ C Year BP (conventional age)	Calibrated age (BP)
5.5-6.5m	E. Sanford	26	Seeds	10390 ± 40	12270
5.5-6.5m	P.C. Class	32	Seeds	10630 ± 60	12660
5.5-6.5m	E. Sanford	50	Plant	11400 ± 50	13270
5.5-6.5m	P.C. Class	63	Seeds	11530 ± 50	13400
5.5-6.5m	E. Sanford	86	Plant	11340 ± 50	13230
6-7m	E. Sanford	58	Plant	11840 ± 40	13690



Diatoms!



Staurosira construens



Cymbella falsa diluviana close up

Impacts

- This research adds to the sparse Ohioan and Midwestern record of the Younger Dryas
- Understanding how Brown's Lake shows a record of the Bølling–Allerød and the start of the Younger Dryas helps add to the larger picture for how these events appear through time and space.
- **Effects:** young freshwater lake, intermittent influxes of aeolian sedimentation, a change in acidity to an alkaline environment indicated by lack of diatom preservation, and magnetic susceptibility peaks at coarser sediments and a drastic relative decrease that corresponds to a deposition of black mud.
- Provides understanding of large-scale climate change events to help improve our understanding of the Earth's climate system and to help predict future climate changes.

References

- Bailey, C., 2003, Reconstruction of the Late Glacial History of Brown's Lake Bog, Northeastern Ohio, at <https://keckgeology.org/wp-content/uploads/2024/07/bailey-2003.pdf>
- Hariri, N., Rezalou, R., and Heydari-Guran, S., 2021, Correlation of the Epipaleolithic Period in the West-Central Zagros and North Zagros with Climatic Events after the Last Glacial Maximum (LGM): *Journal of Research on Archaeometry*, v. 7, p. 205–229, at <https://doi.org/10.52547/jra.7.1.205>.
- Shane, L.C.K., and Anderson, K.H., 1993, Intensity, gradients and reversals in late glacial environmental change in east-central north America: *Quaternary Science Reviews*, v. 12, no. 5, p. 307–320, at [https://doi.org/10.1016/0277-3791\(93\)90039-O](https://doi.org/10.1016/0277-3791(93)90039-O).

Thank you!



Questions?