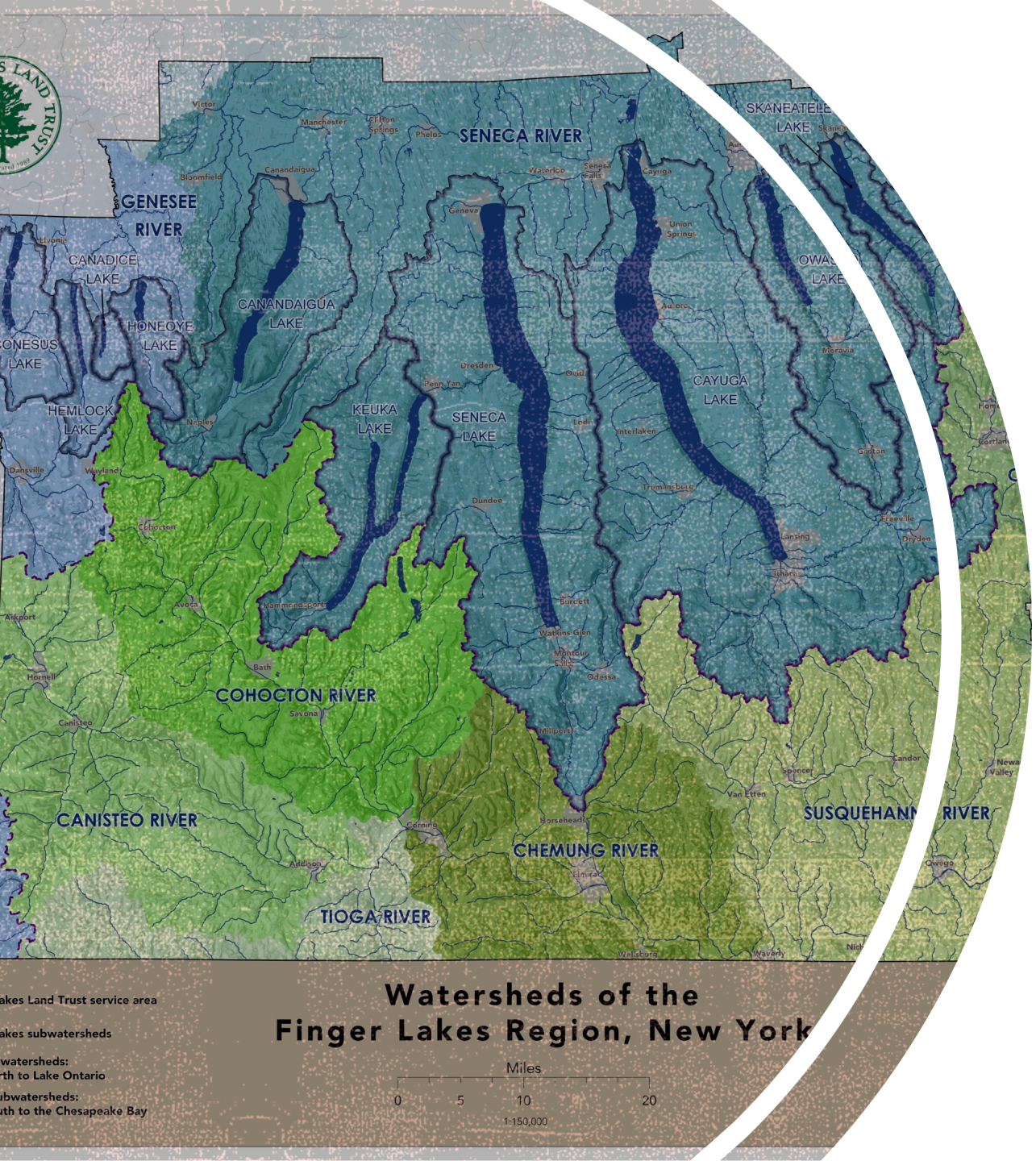


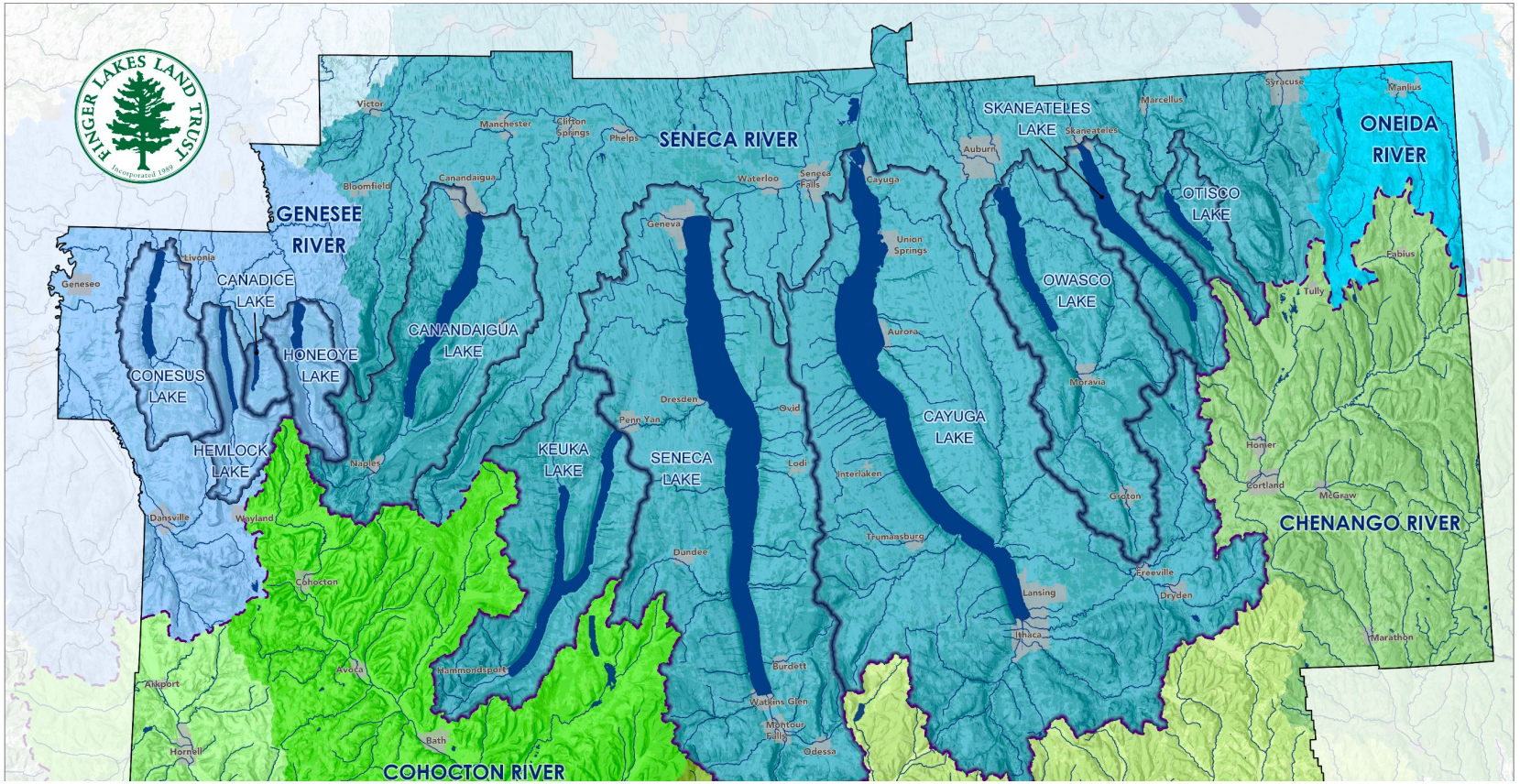
AN ISOTOPIC SNAPSHOT OF THE FINGER LAKES: IMPLICATIONS AND A PATH FORWARD

Hunter Jamison (htj5)

ABOUT ME

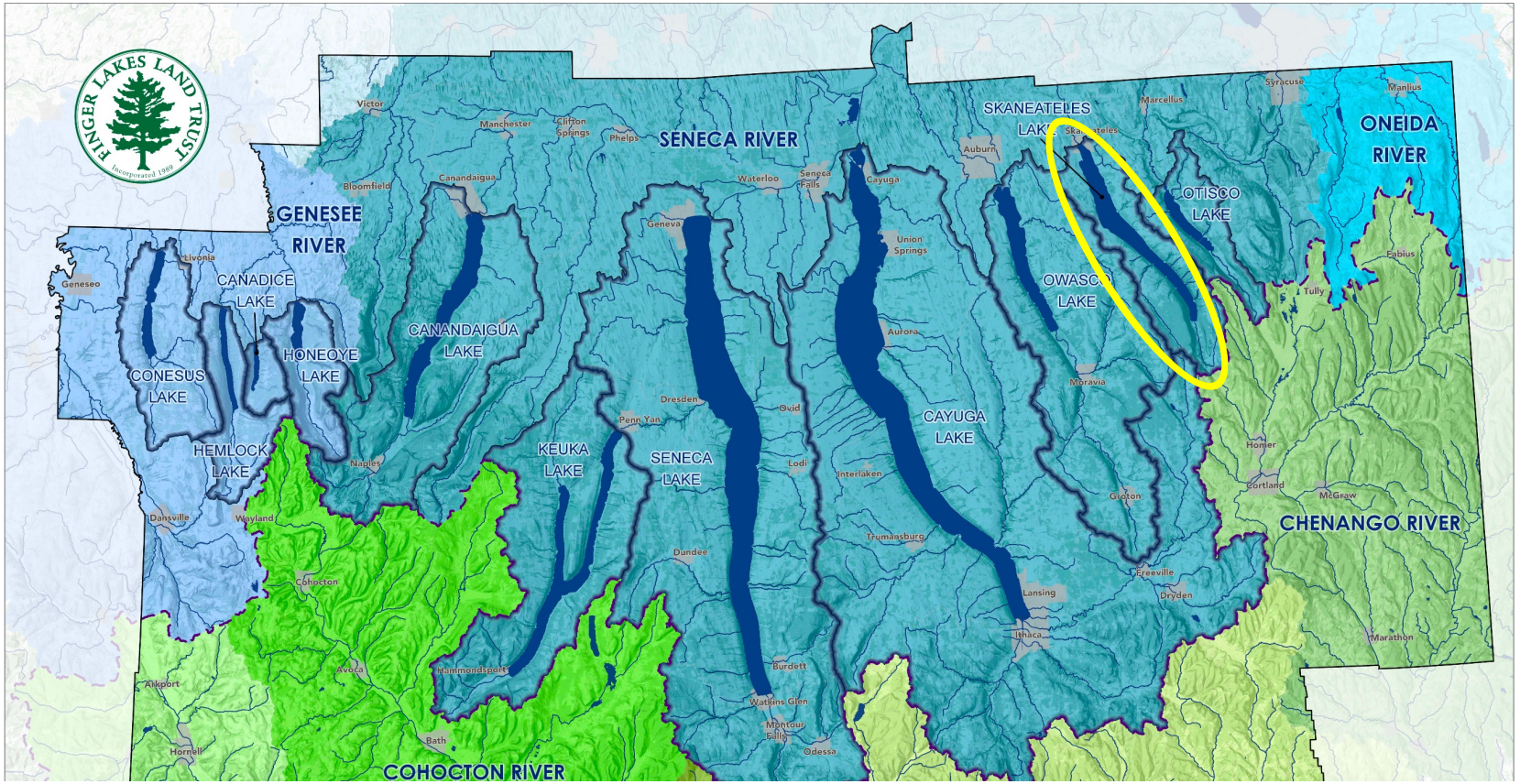
- 1st Year PhD Student in Earth and Atmospheric Sciences (EAS)
- Use hydrogen and oxygen stable isotopes to see how pools of water change over time, and the drivers of such changes
- Previously worked at Eel River Critical Zone Observatory, looking at variability of hydrogen and oxygen stable isotopes radially around trees

MOTIVATION: WHY THE FINGER LAKES?



Finger Lakes Land Trust

MOTIVATION: WHY THE FINGER LAKES?



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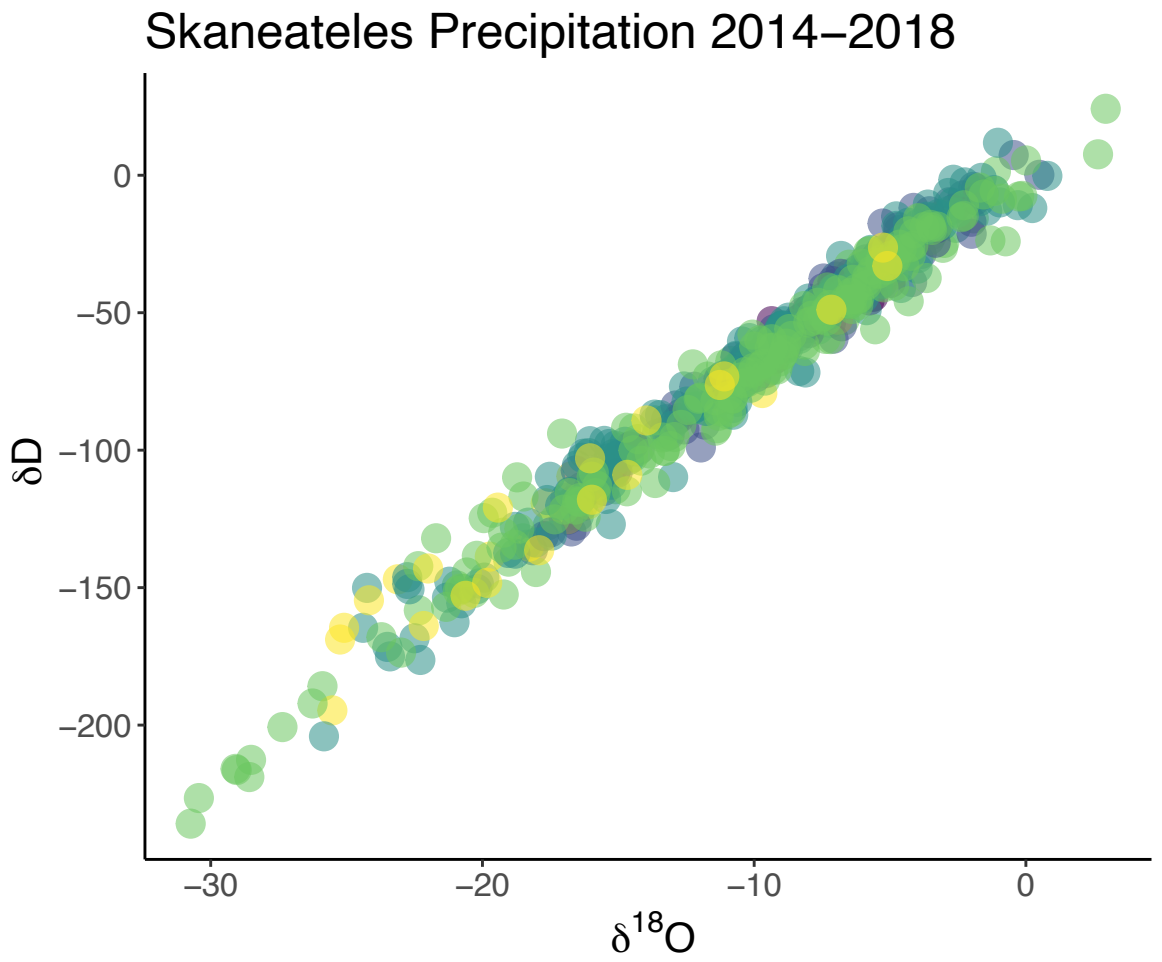
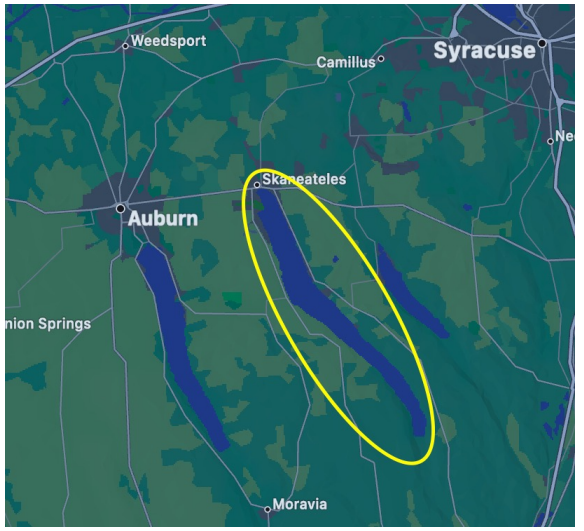
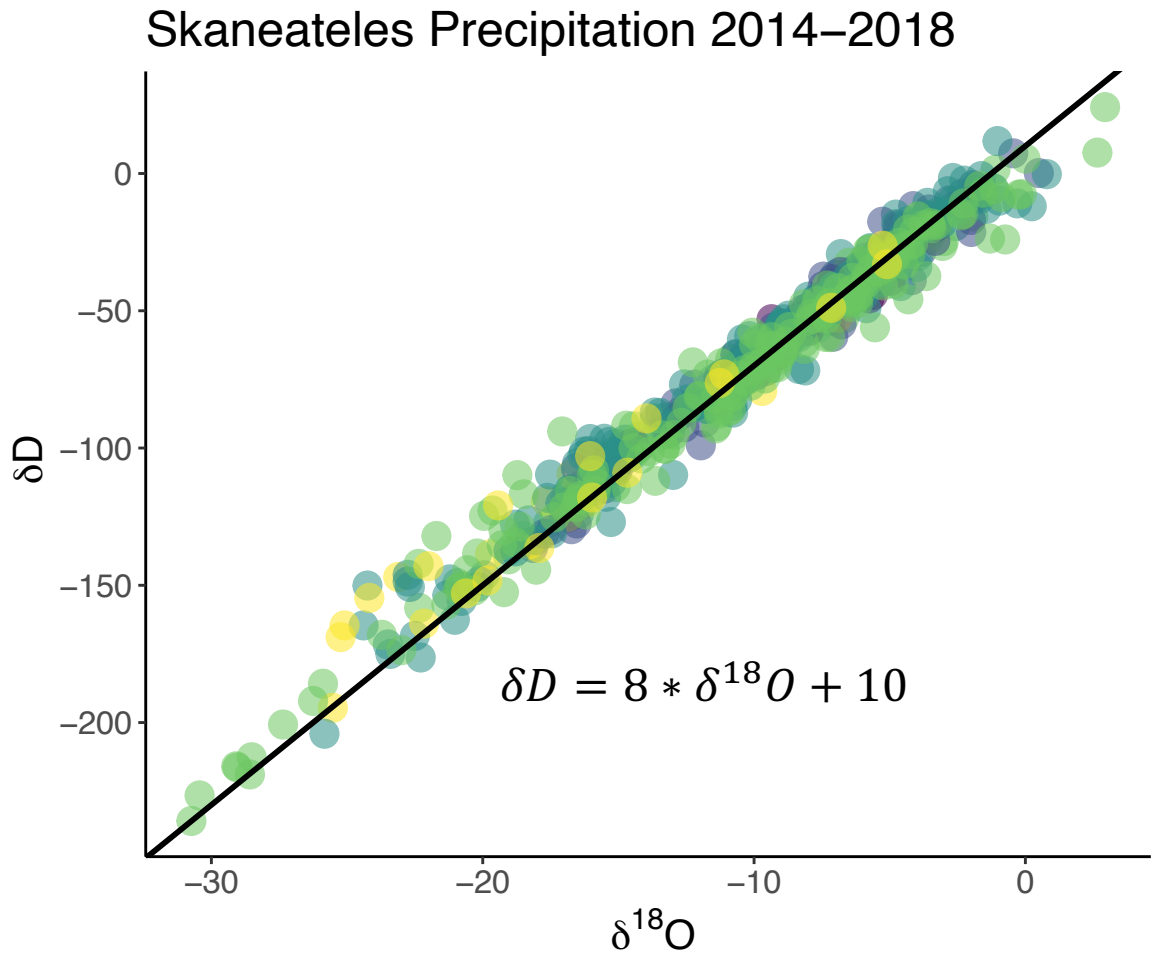
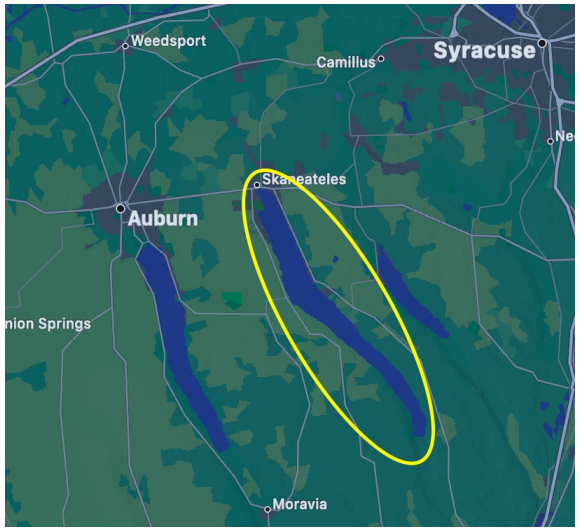




Corcoran, Thomas, and Boutt 2019

INTRODUCTION





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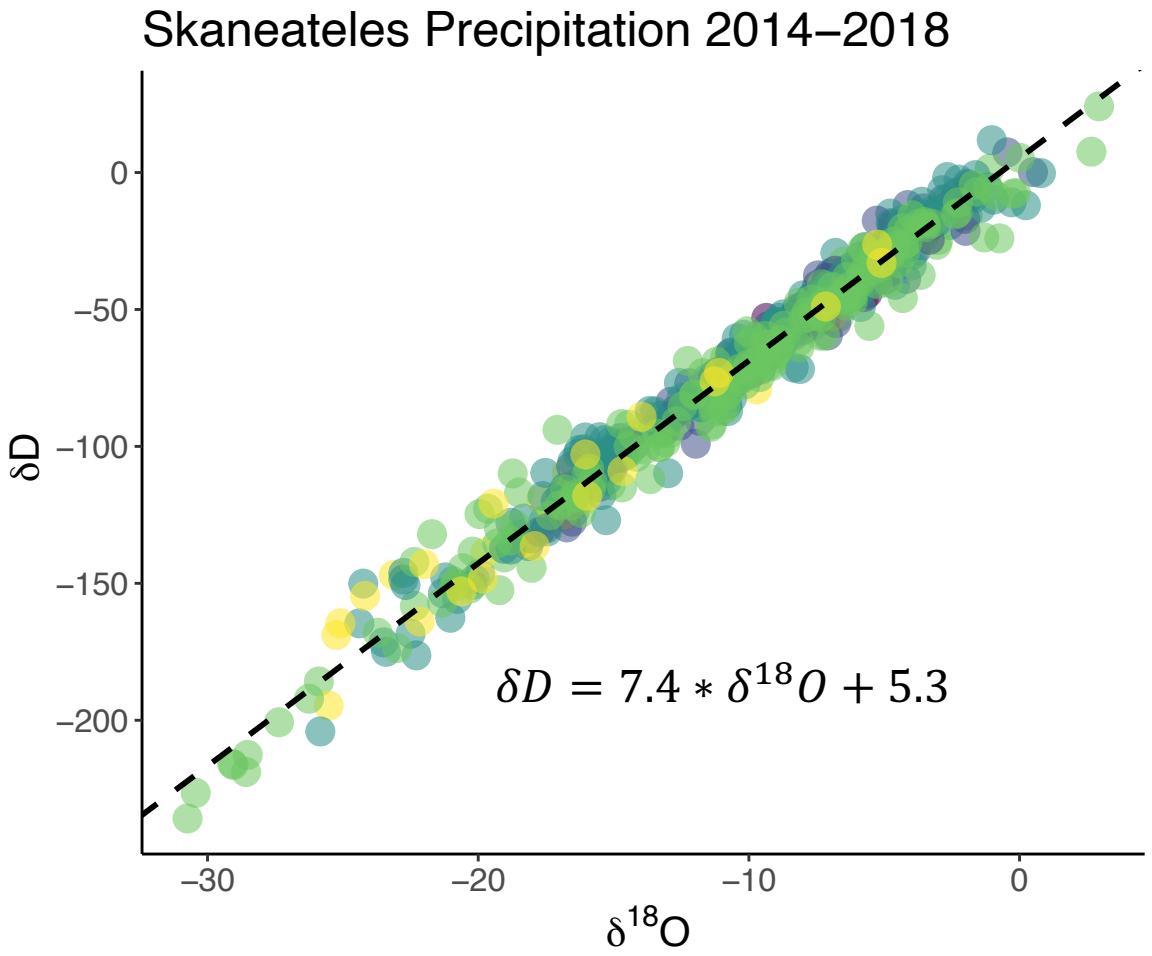

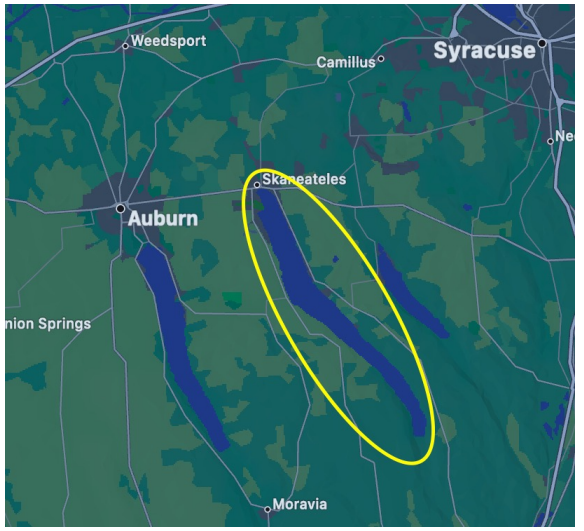

Corcoran, Thomas, and Boutt 2019

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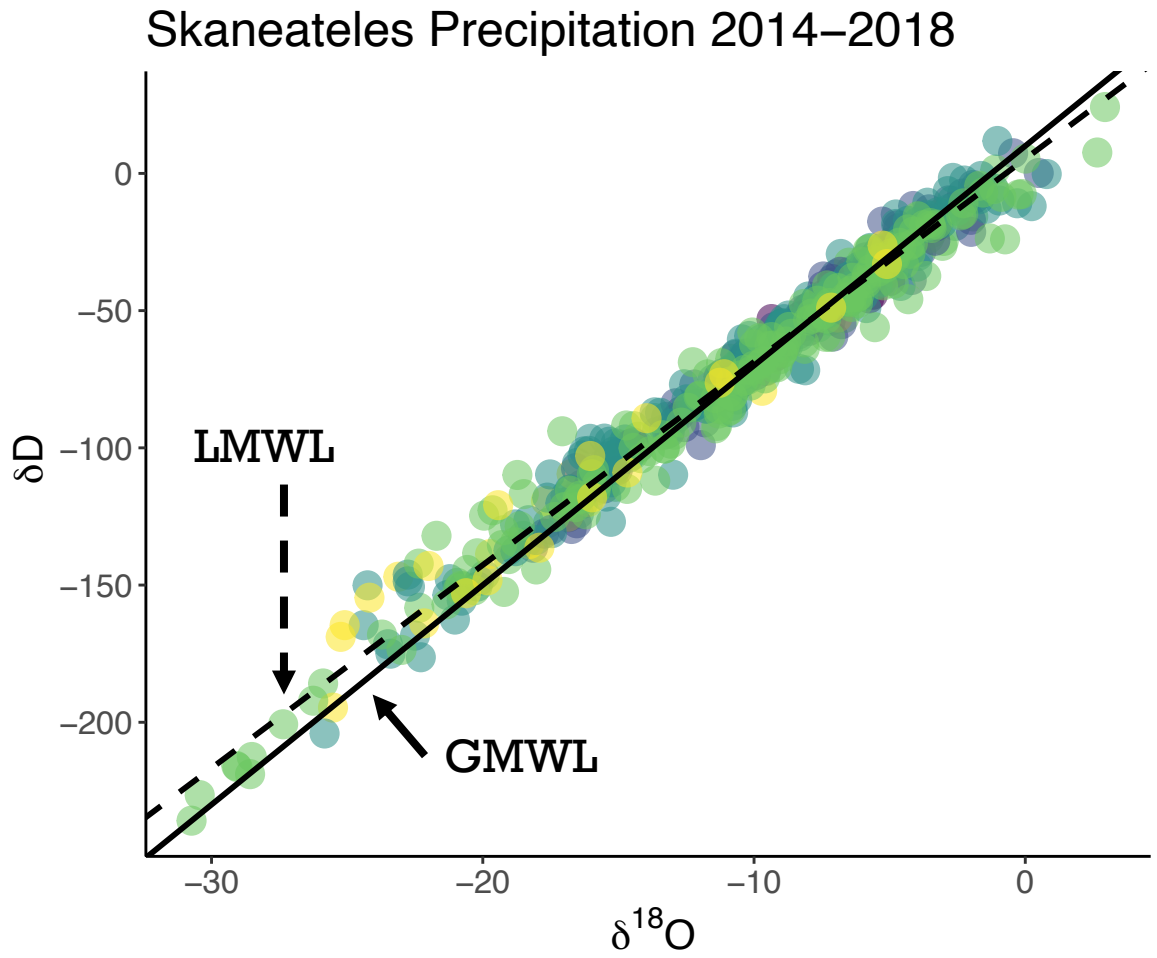

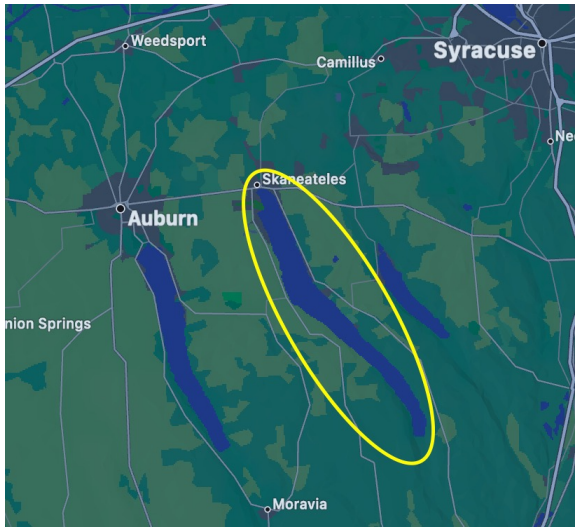

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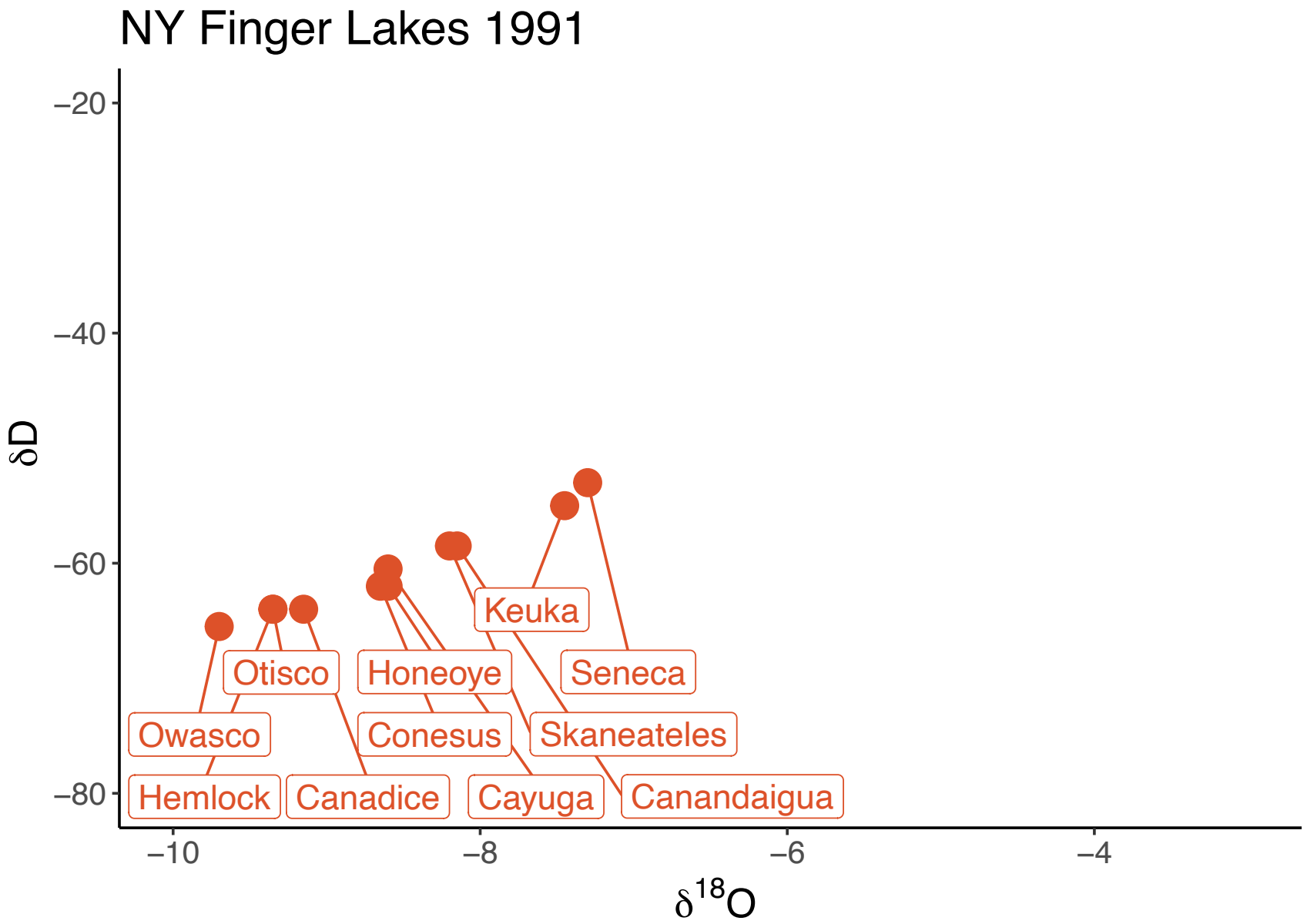
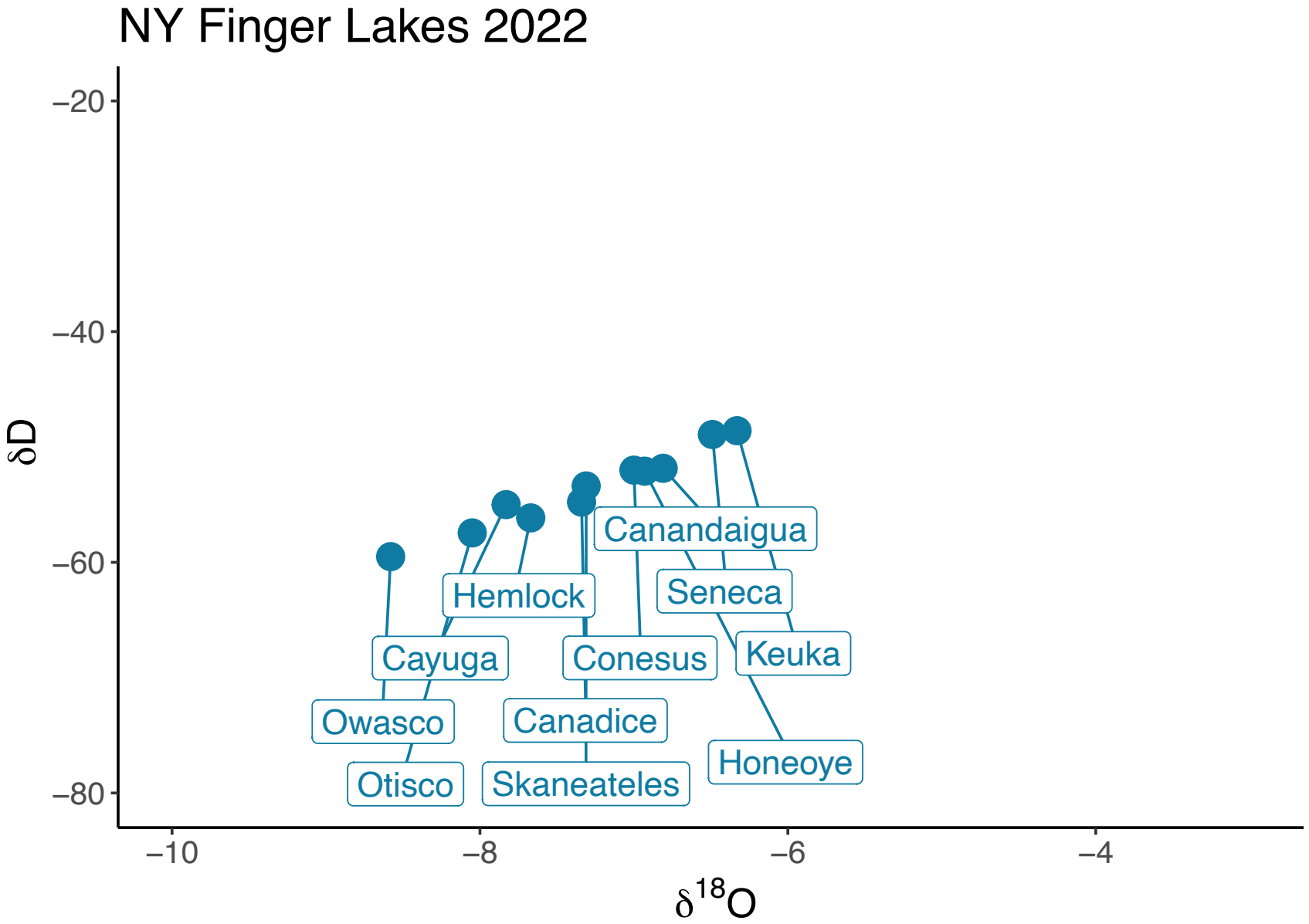
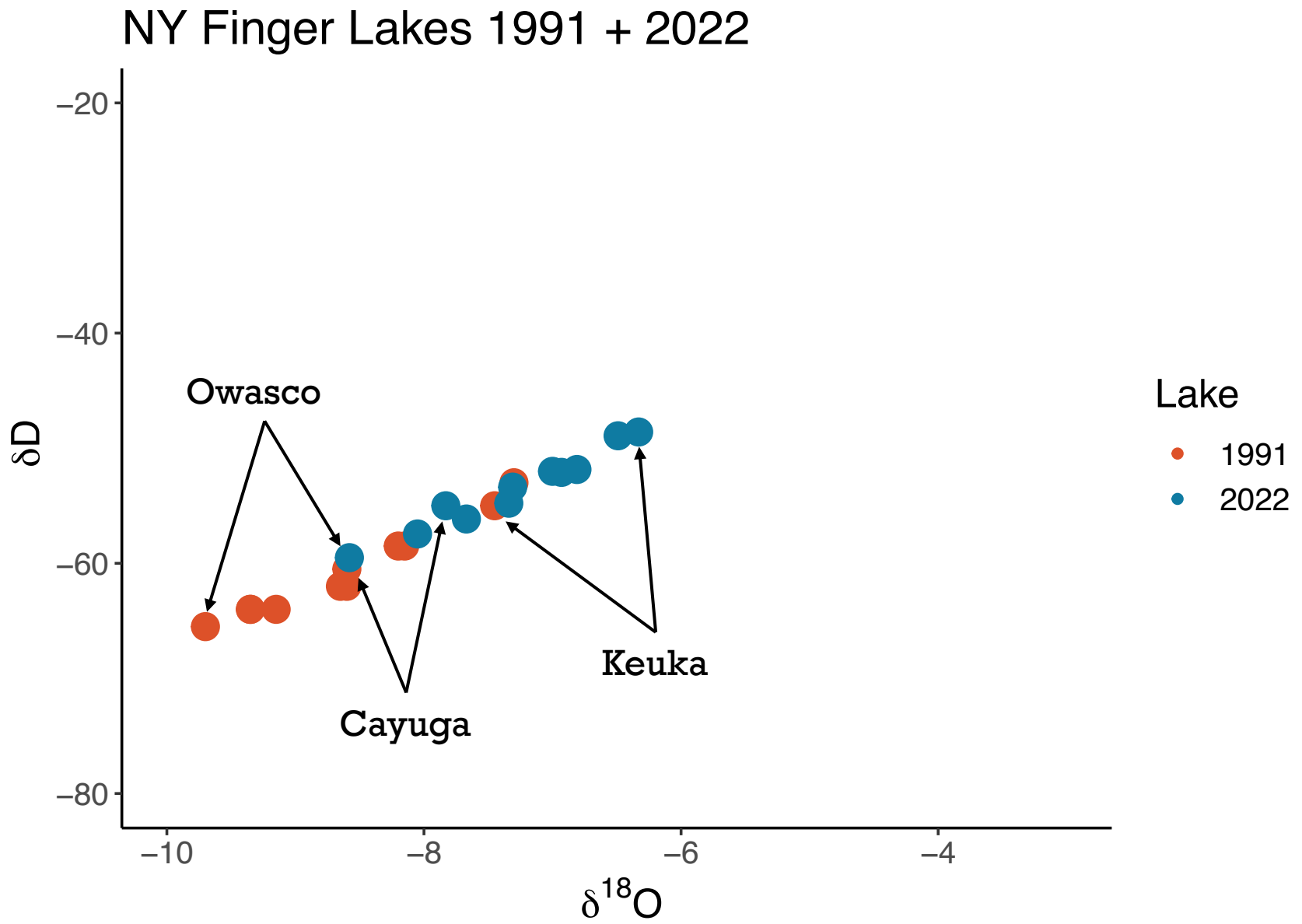
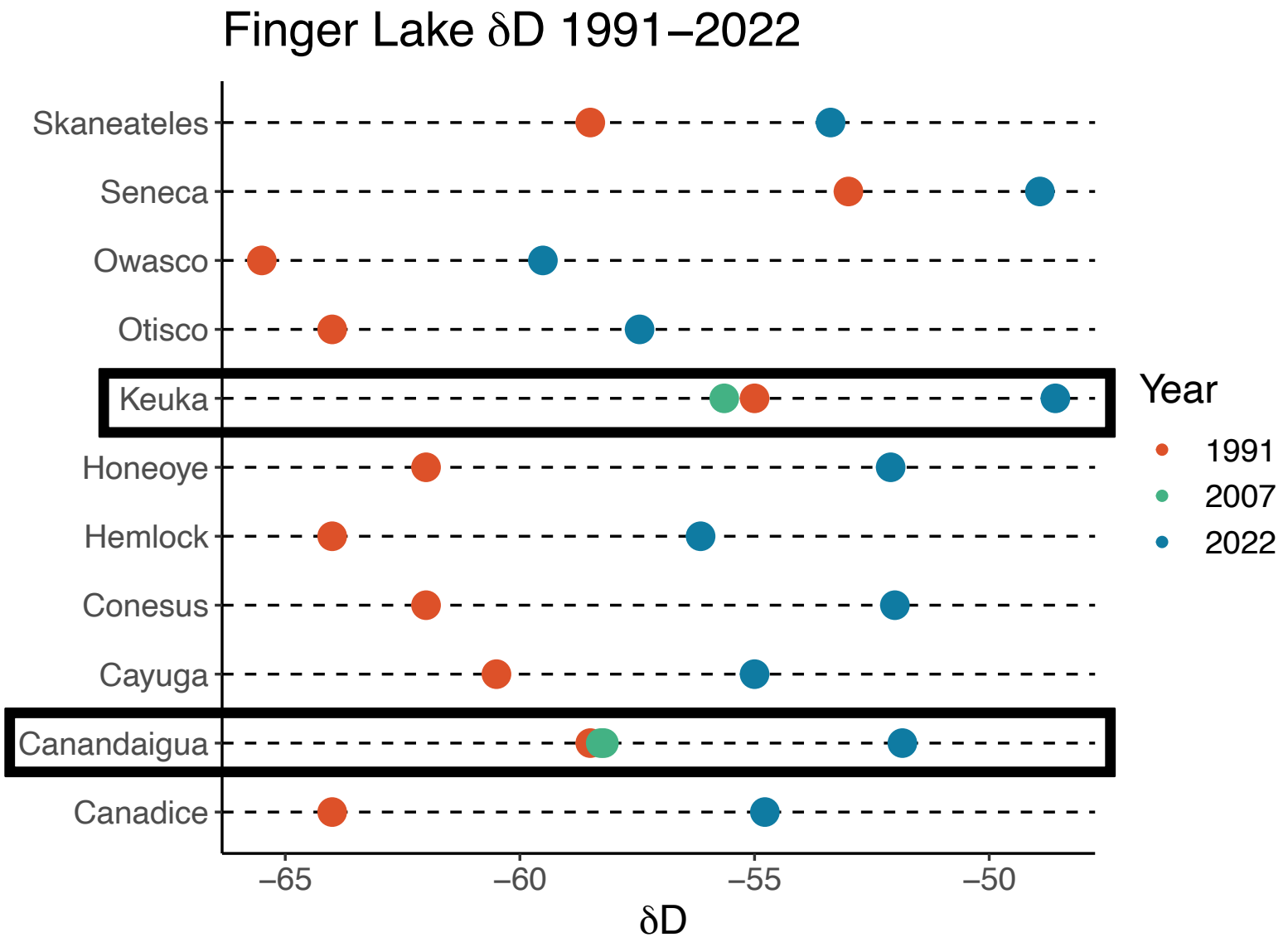


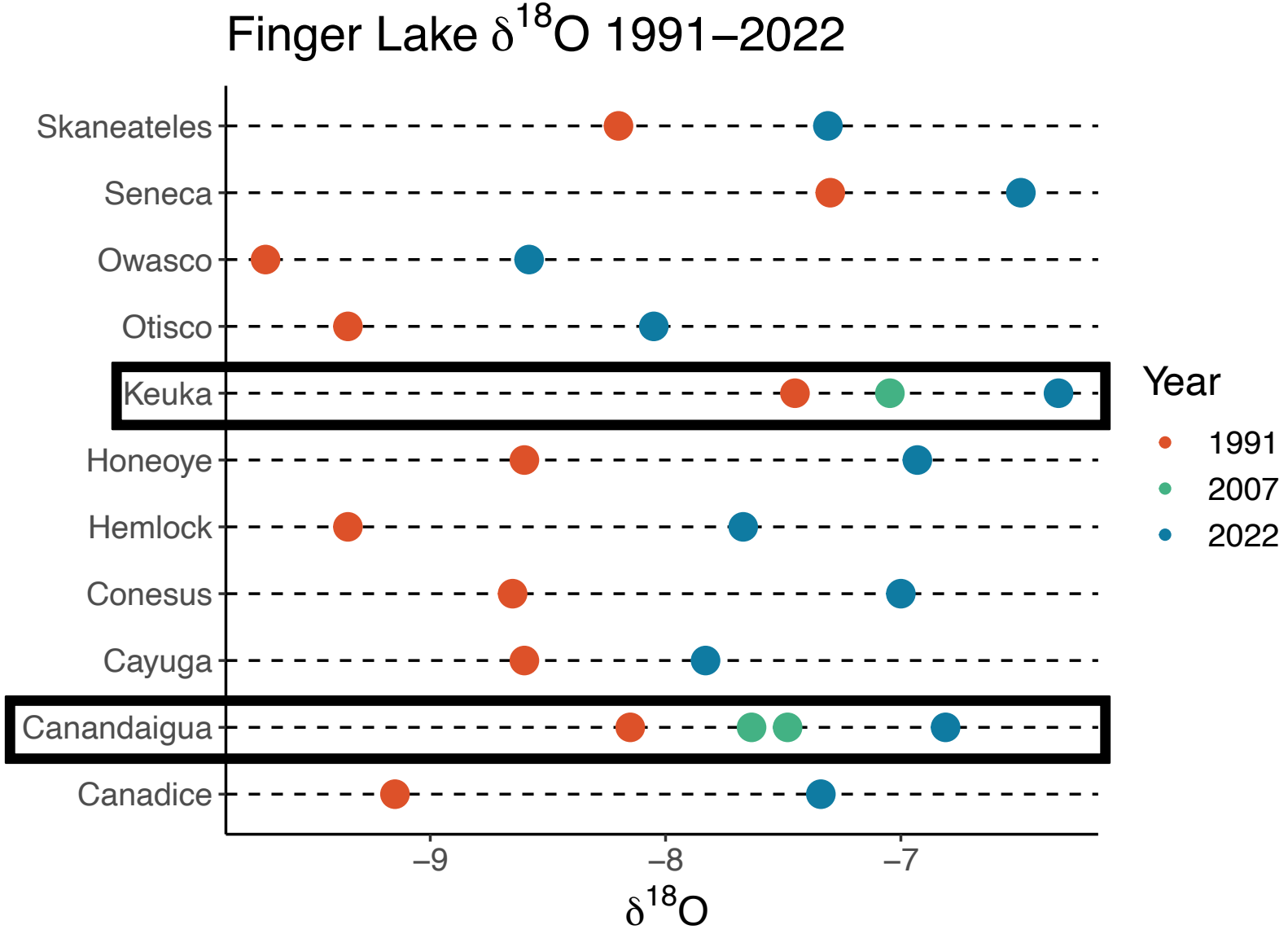
Michel and Kraemer 1995


NY Finger Lakes 2022
−20
−40
−60
−80
δD
−10
−8
−6
−4
δ18O
Canandaigua
Hemlock
Seneca
Cayuga
Conesus
Keuka
Owasco
Canadice
Honeoye
Otisco
Skaneateles

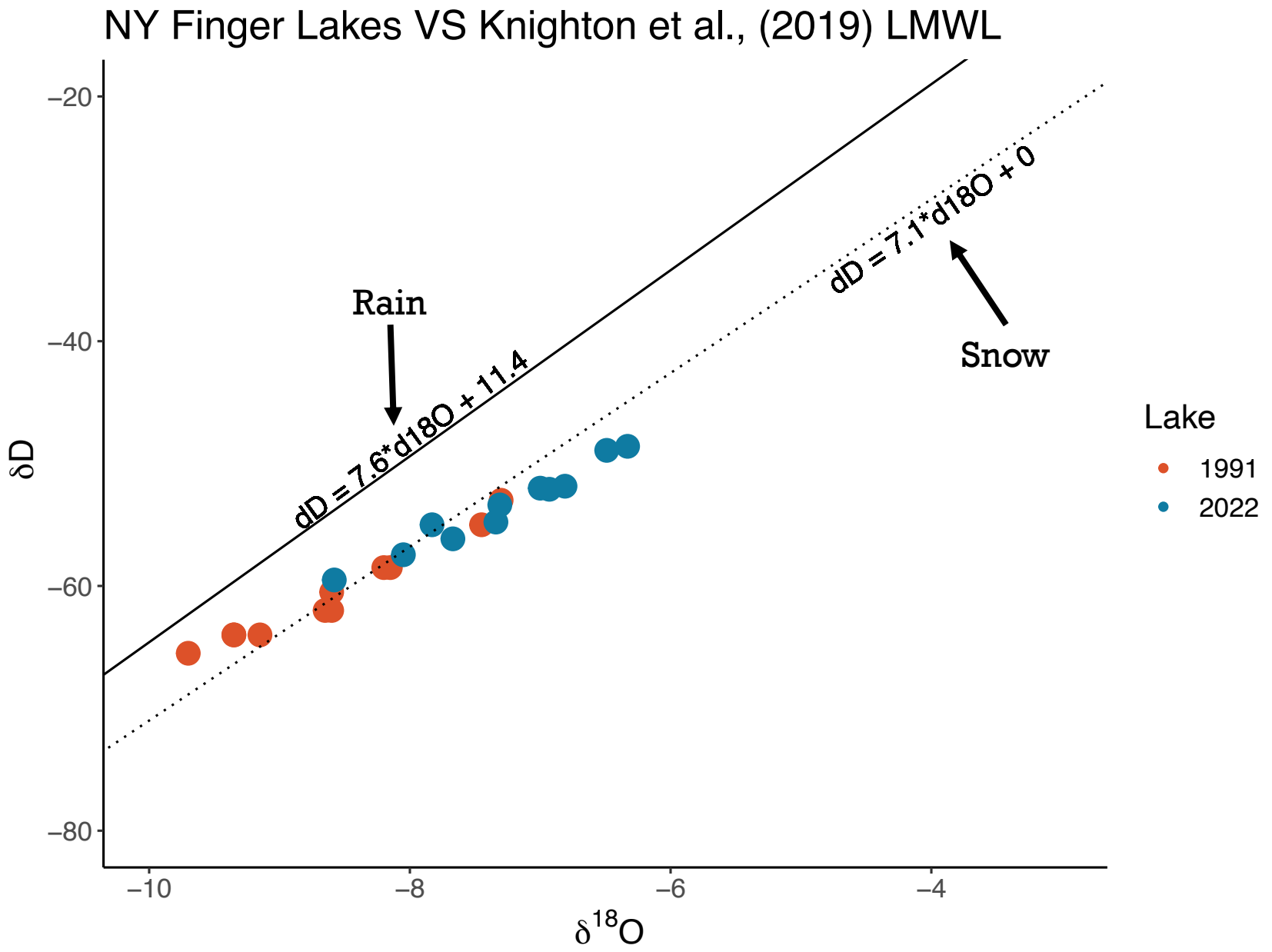

NY Finger Lakes 1991 + 2022
−20
−40
−60
−80
δD
−10
−8
−6
−4
δ18O
Owasco
Cayuga
Keuka
Lake
1991
2022



Brooks et al., (2014)



Brooks et al., (2014)


NY Finger Lakes VS Knighton et al., (2019) LMWL
−20
−40
−60
−80
δD
−10
−8
−6
−4
δ18O
Rain
dD = 7.6*d18O + 11.4
dD = 7.1*d18O + 0
Snow
Lake
1991
2022

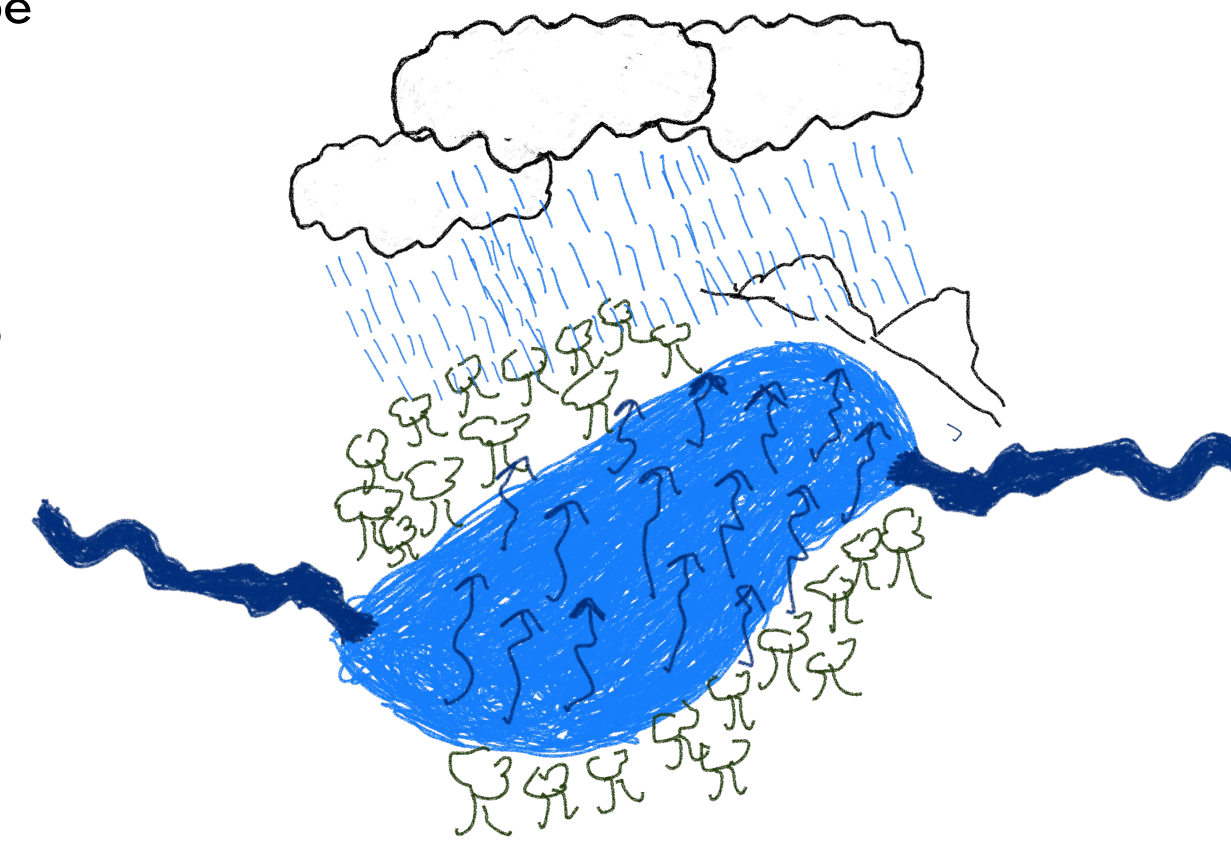
RECAP

- Finger Lakes are more enriched in ∂D and $\partial^{18}O$ in 2022 compared to 1991
  - ∂D doesn't perfectly match trend (2007)
  - $\partial^{18}O$ does show continued enrichment
  - Oxygen stable isotope may be preserving long time signal
- Enrichment in oxygen stable isotope could be a signal of warming in the Finger Lake region
- Lakes match snow meteoric water line better
  - Changes in snowfall composition (or sourcing) could be one cause

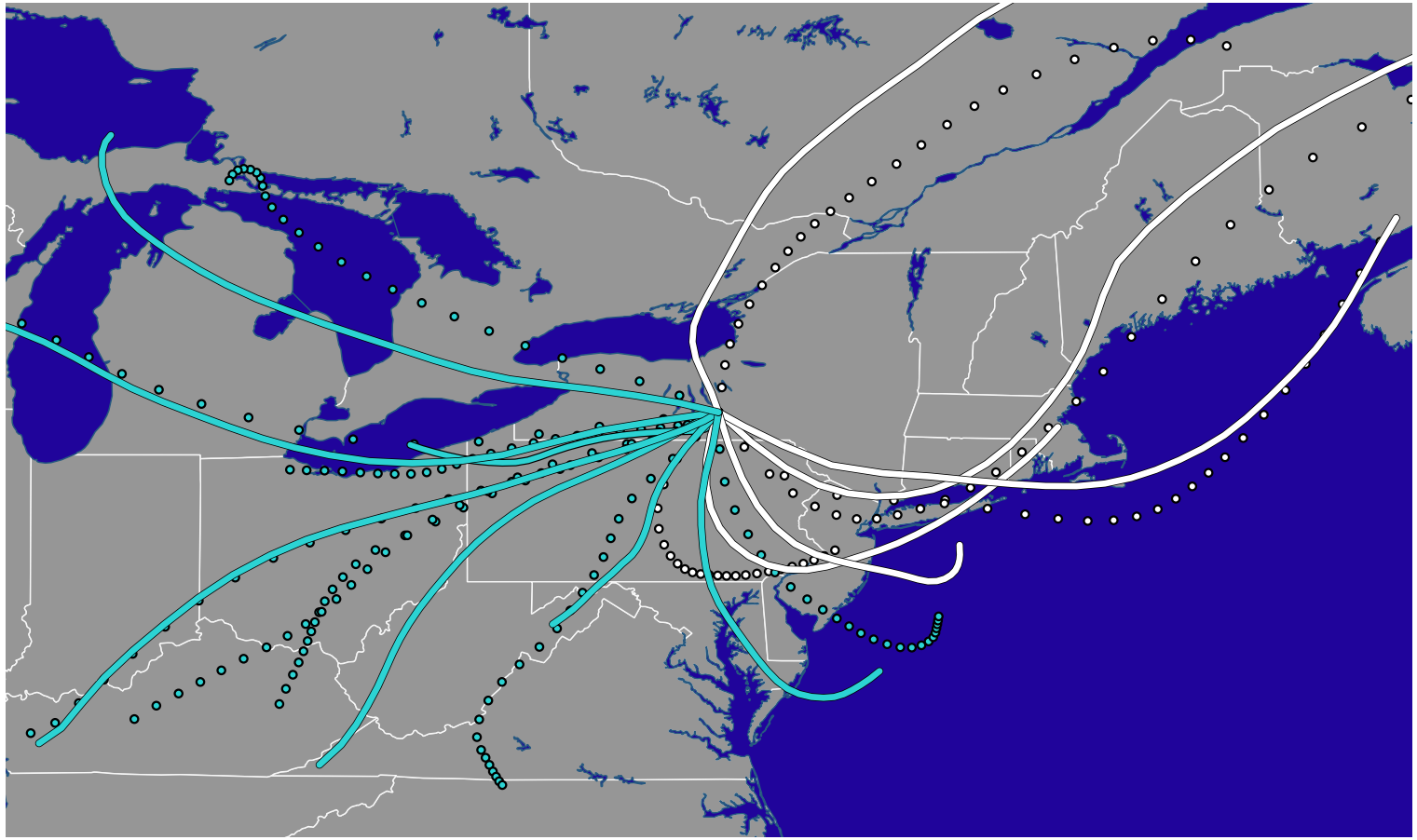
PATH FORWARD: DISENTANGLING SIGNALS

There are a couple different forces that could be driving the observed signal. In order to parse each out we will have to look at:

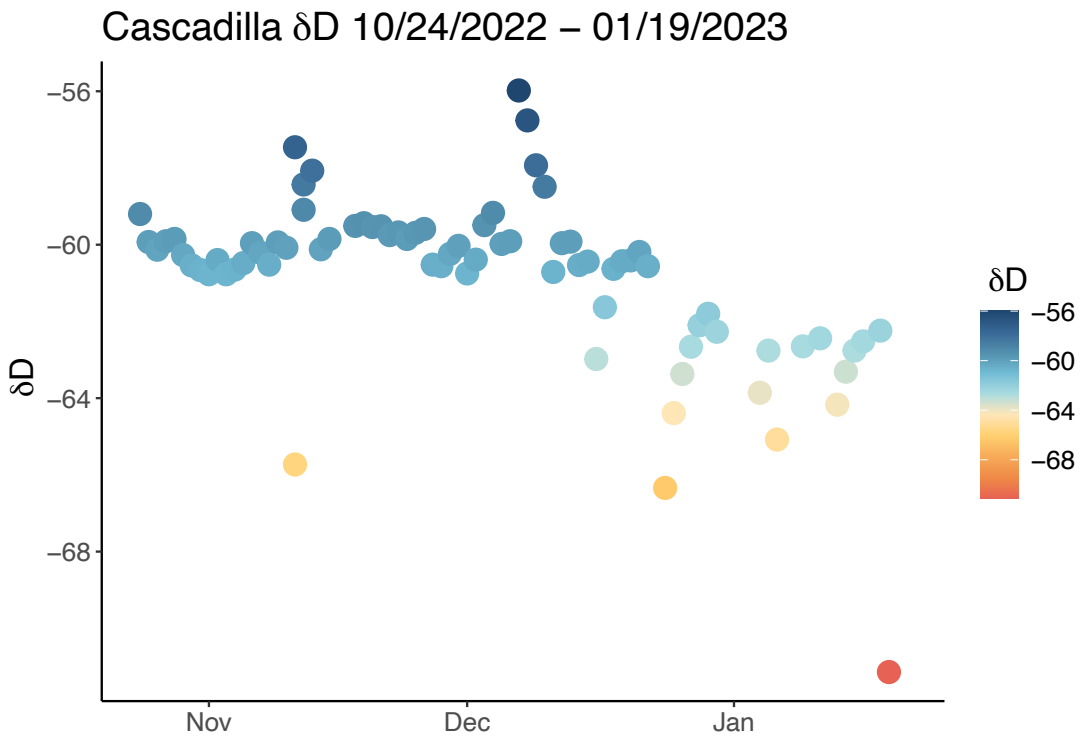
1. Precipitation
    1. Where are the bulk of the storm events coming from?
    2. Which is contributing more water long term?
2. Tributaries
    1. How do they respond to precipitation?
    2. Are there clear shifts in isotopic composition through seasons? years?
3. Lake driven effect?
    1. Increased evaporation?

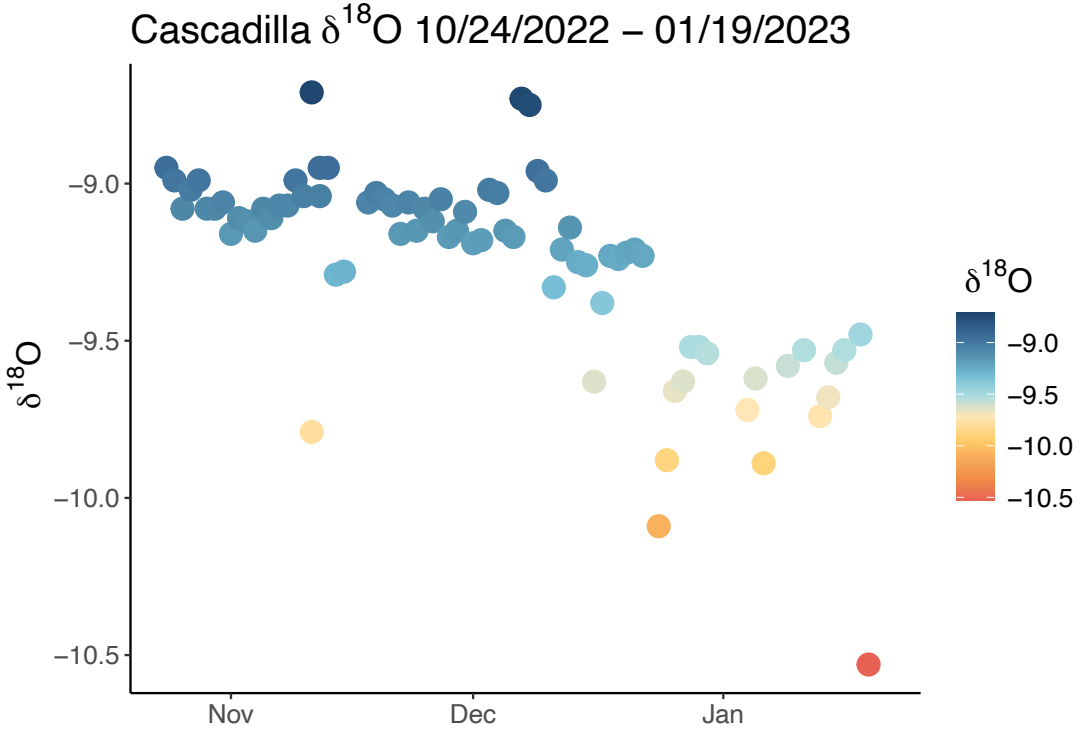


PRECIPITATION

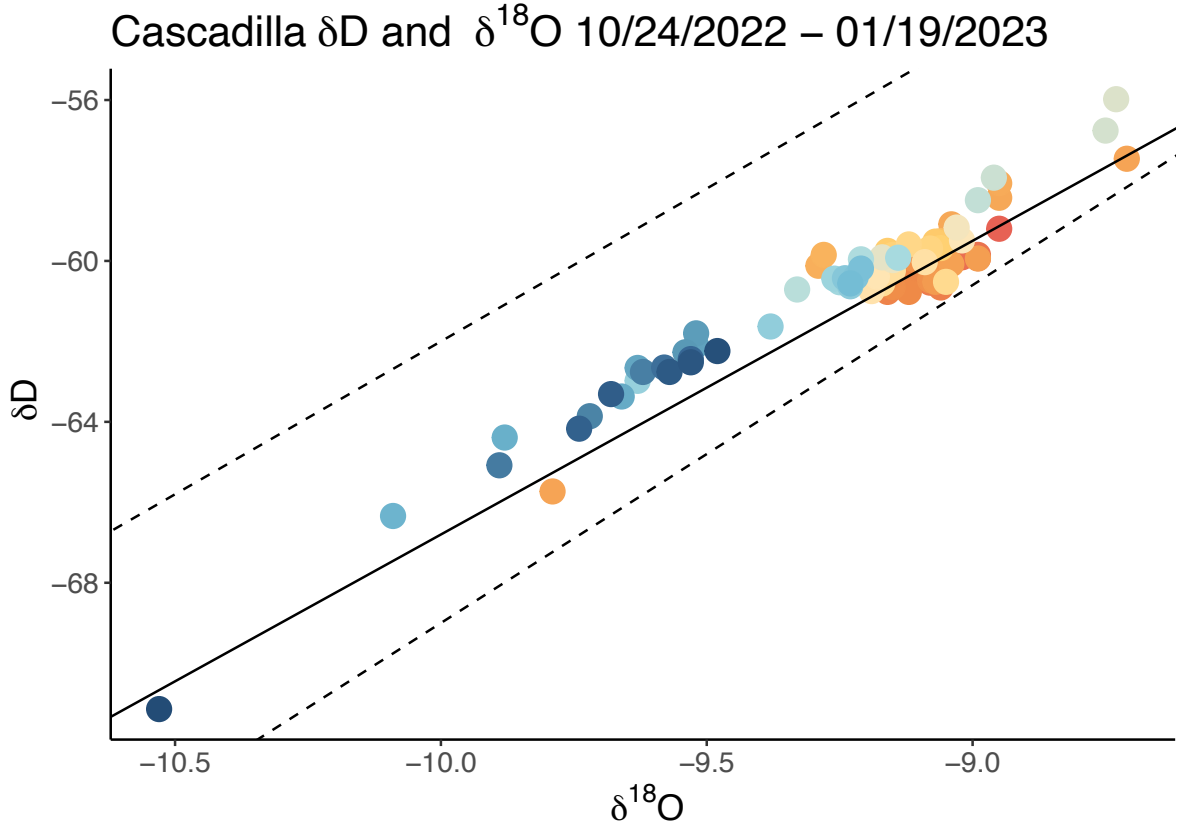


GROUND WATER





GROUND WATER



ACKNOWLEDGMENTS

- Thank you, Thomas Butler for letting me borrow the wet deposition collector!
- Thank you, Nicole, George, and Jiawei, for your help in collecting samples!
- Thank you, 'Pico de Gallo' the Picarro for running all the samples

CITATIONS

1. Corcoran, Megan C., Elizabeth K. Thomas, and David F. Boutt. 2019. 'Event-Based Precipitation Isotopes in the Laurentian Great Lakes Region Reveal Spatiotemporal Patterns in Moisture Recycling'. *Journal of Geophysical Research: Atmospheres* 124 (10): 5463–78. https://doi.org/10.1029/2018JD029545.
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3. Michel, Robert L., and Thomas F. Kraemer. 1995. 'Use of Isotopic Data to Estimate Water Residence Times of the Finger Lakes, New York'. *Journal of Hydrology* 164 (1–4): 1–18. https://doi.org/10.1016/0022-1694(94)02586-Z.
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5. Finger Lakes Land Trust
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