



# Myles & Mimi and What They Tell Us

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# Overview

- 1.) What is Dendrochronology?/How Trees Record Climate
- 2.) Methods
- 3.) Data Collected/Findings
- 4.) SEM Methods and Results
- 5.) Conclusions



# Dendrochronology: What is it?

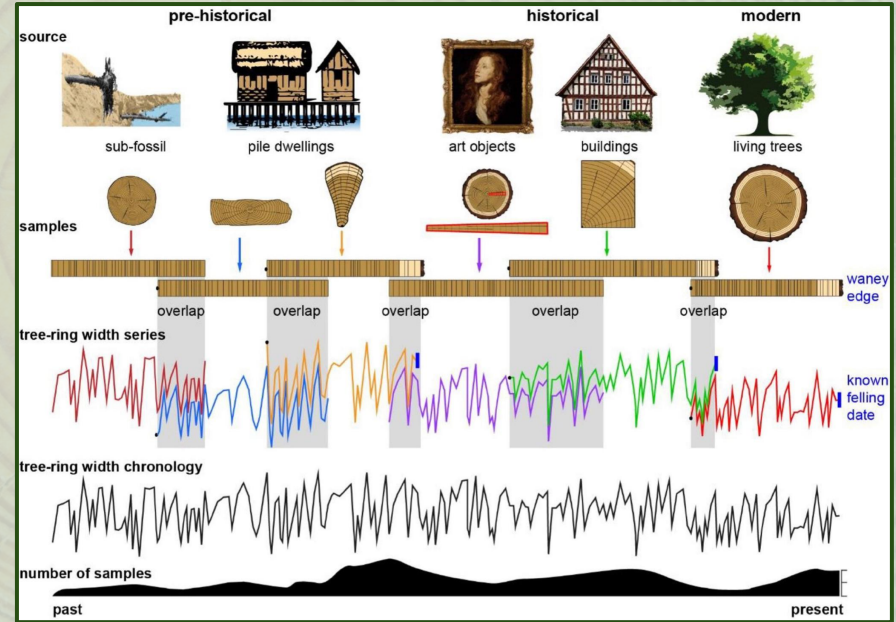
**Dendrochronology:** the study or technique of using tree rings in order to date events, climate changes, and archeological artifacts.

Methods used in dendrochronology:

- diameter at breast height (DBH)
- coring and measurement
- skeleton key plots.

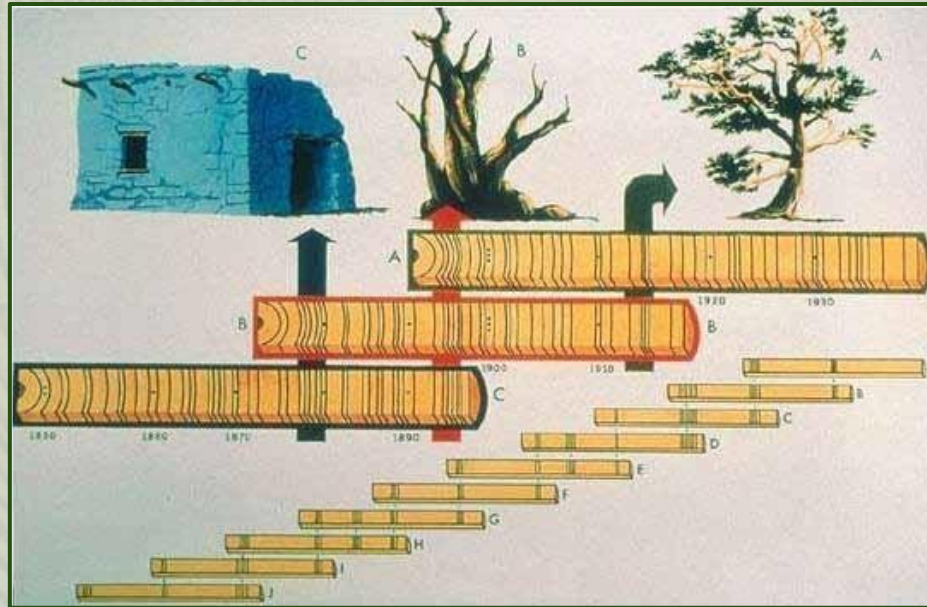
I used:

- Measurements of cross sections of trees



# How do Trees Record Climate?

- Tree rings will vary in size and color based on environmental conditions
- This data can be mapped and dated to give a timeline of climate data for that tree's area that can date back centuries.





# Meet the Trees



Myles

- Around 154 years old ('born' 1859)
- Most likely an Oak tree
- Northwestern campus Weinberg Garden



Mimi

- Around 49 years old ('born' 1964)
- A Pine tree
- Northwestern campus Weinberg Garden



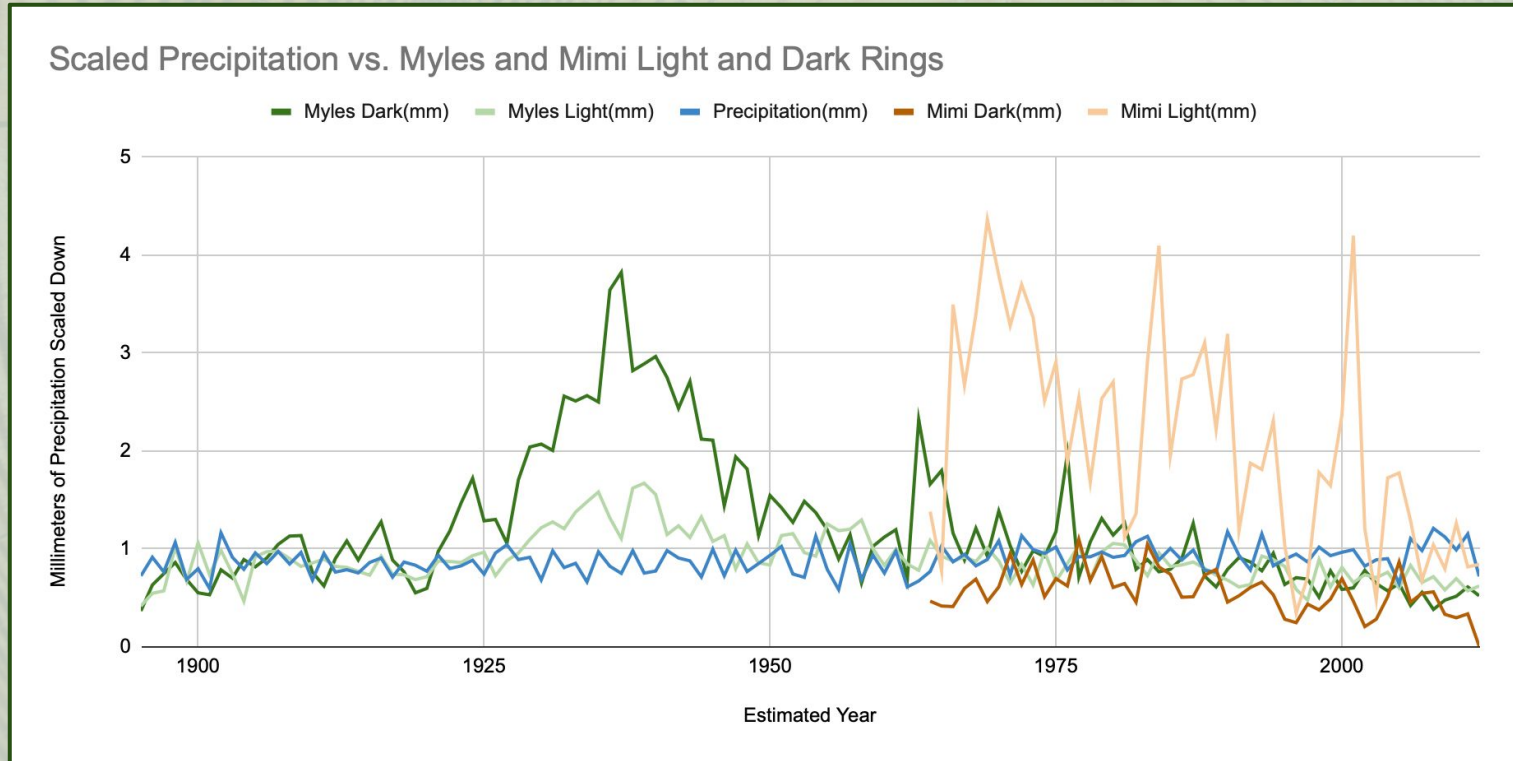
# What I did

- took measurements of two different trees(Myles & Mimi)
- compiled the different measurements into charts that show how the trees grew each year.
- compared tree ring data to precipitation data from Cook County
- Measured the dark and light rings



# Precipitation comparison

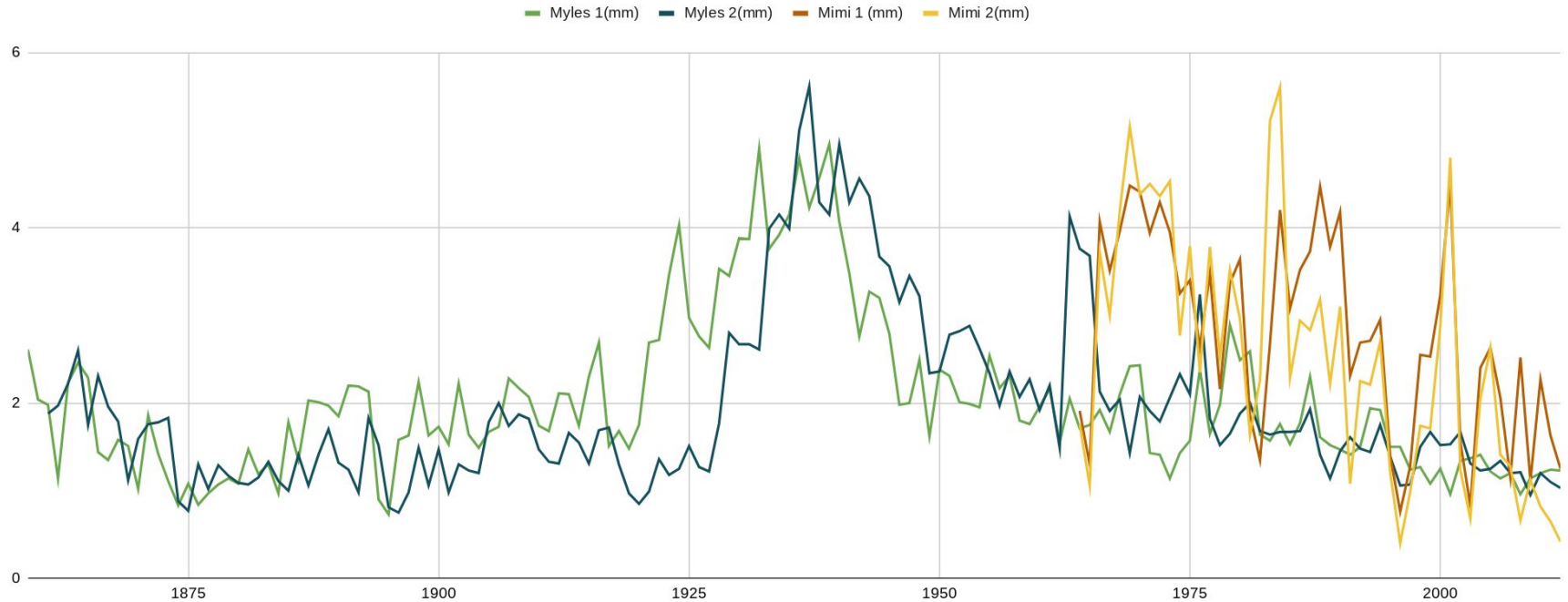
- Light and dark ring widths are correlated in tree samples
- No clear correlation between ring width and precipitation





# Measurement Transects on Each Tree

Annual Tree Ring Width Myles and Mimi





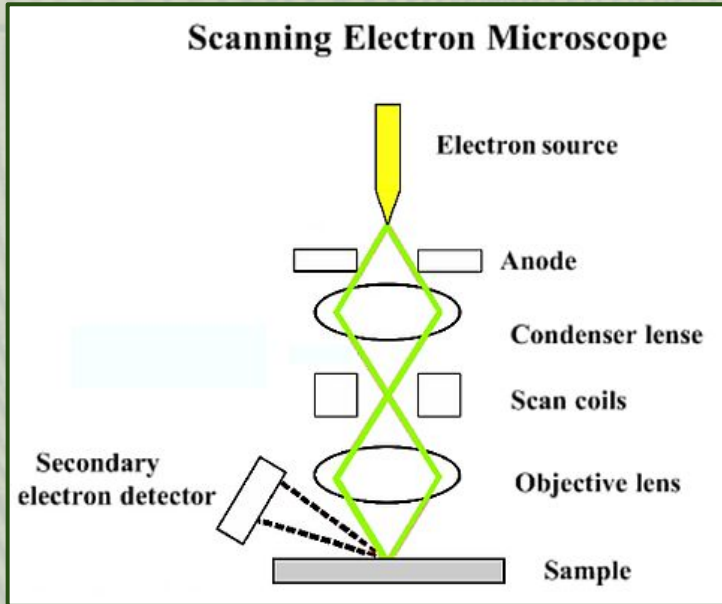
# Findings

Managed trees don't record environmental change as well as trees in harsh conditions



# What is SEM?

Scanning Electron Microscopy (SEM): sends a focused beam of electrons at a sample that can give a much clearer image than optical microscopy, especially showing depth.





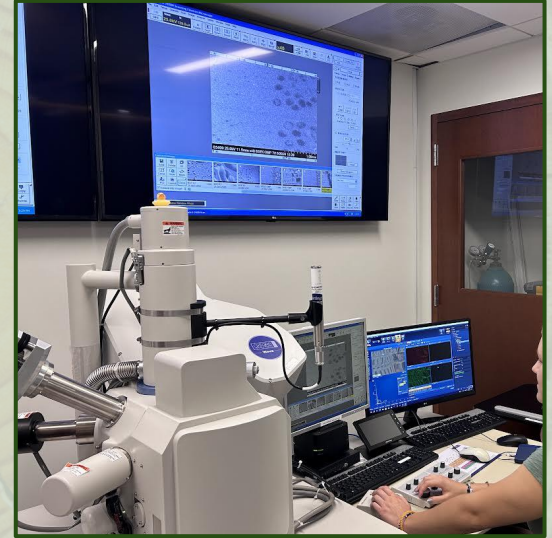
# SEM Process



First Allegra drilled small samples of the trees out so they could be mounted in resin pucks.



Second I took the pucks and sanded them down so the surface was smooth and easier to read for the SEM.

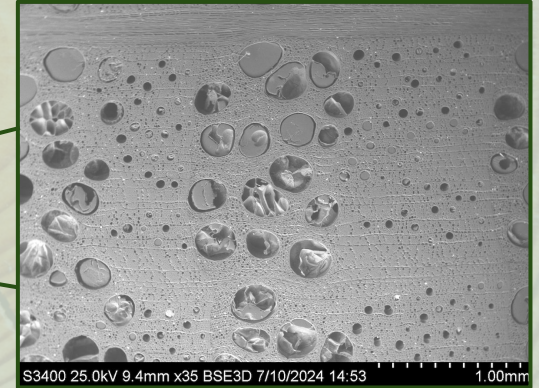
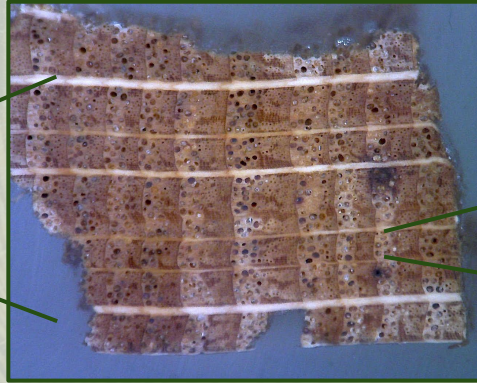


Finally I put them in the SEM and looked around to find anything interesting.



# What I Did With SEM

I chose sections of the tree to put under the microscope based on ring size as well as parts that just looked interesting.

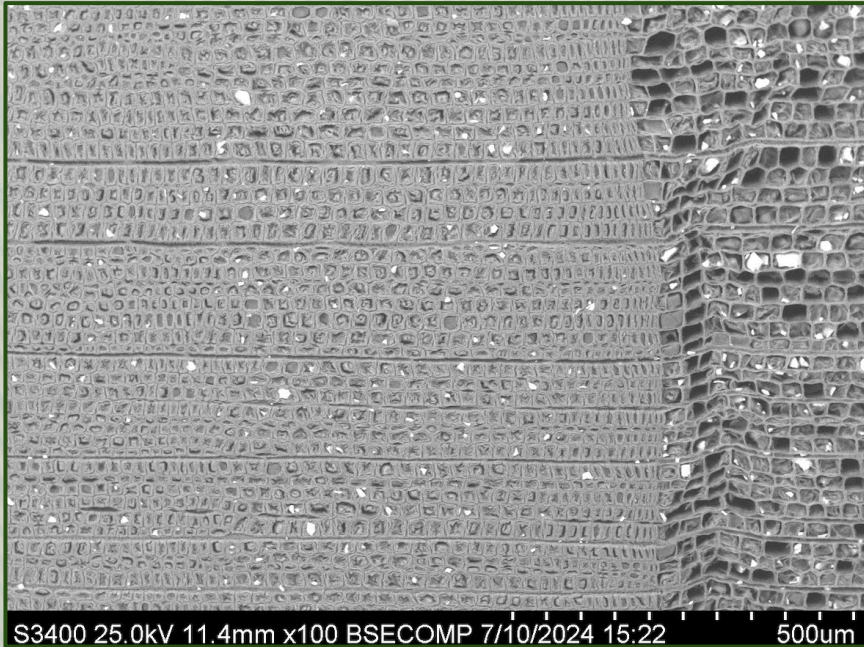




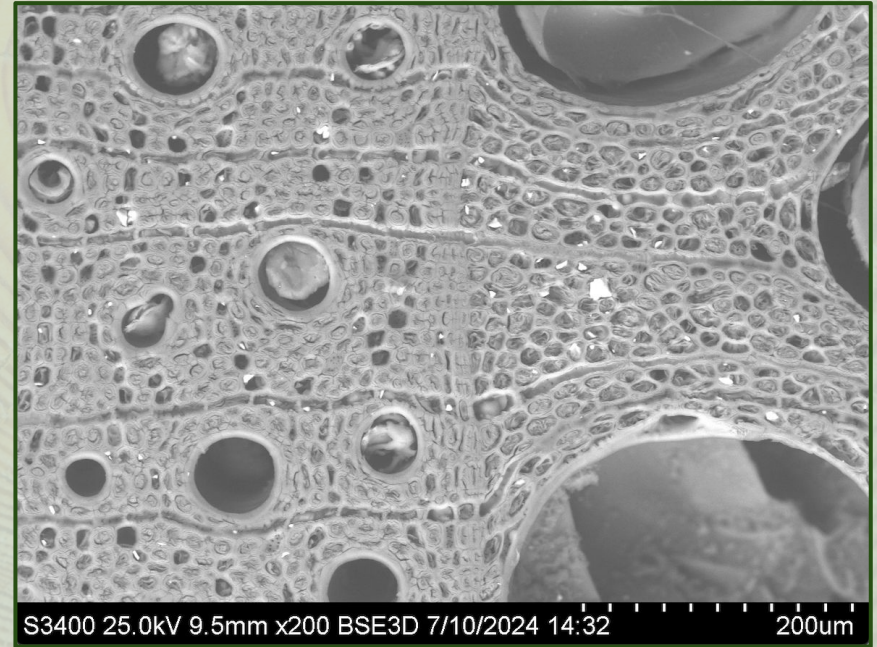
# SEM Results

There was a noticeable difference between the dark and light rings as well as a difference within the dark rings of Myles and other minute changes that aren't visible to the naked eye.

Mimi 1984-1989



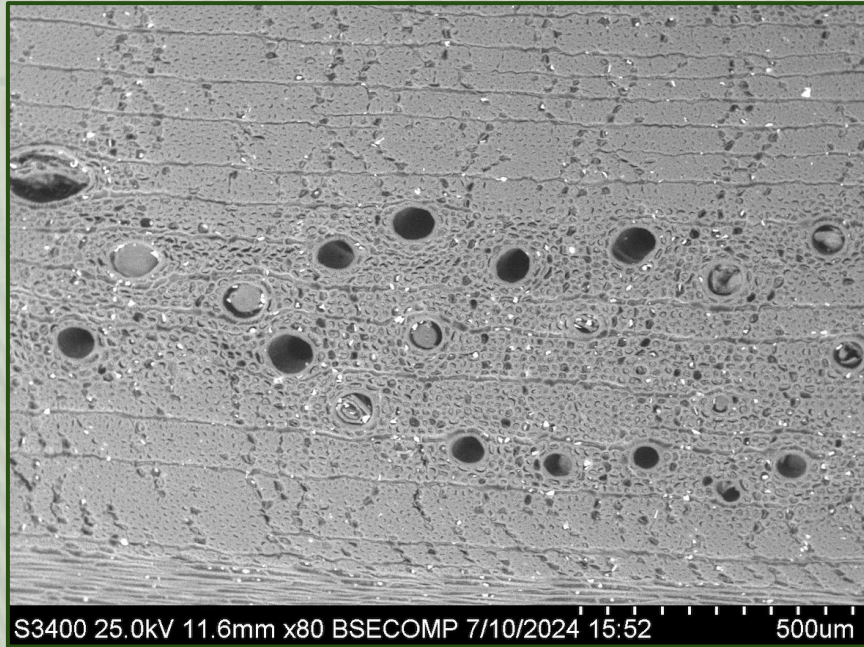
Myles 1 1969-1979



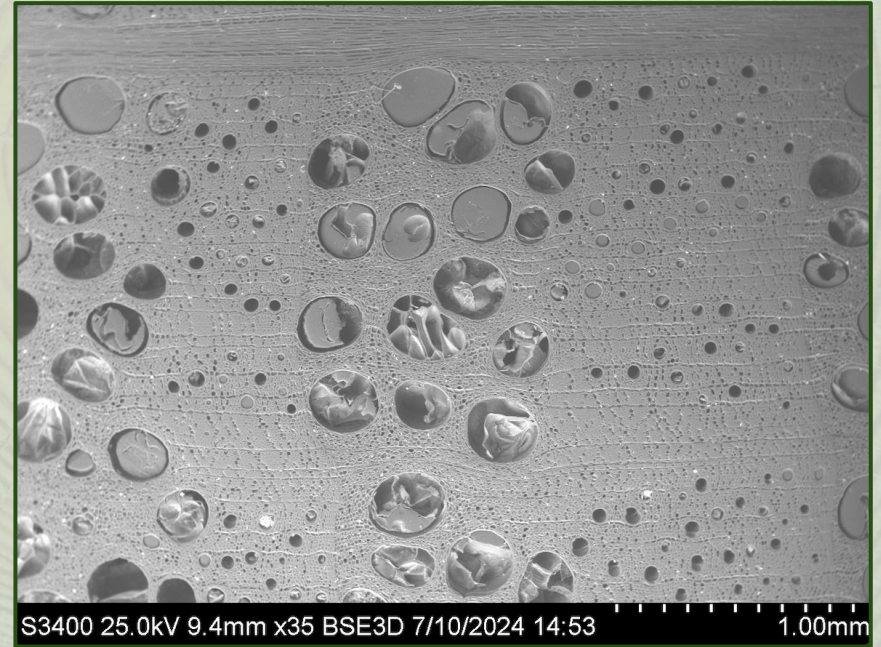


# SEM Results Continued

There was a noticeable difference between the dark and light rings as well as a difference within the dark rings of Myles and other minute changes that aren't visible to the naked eye.



Myles 2 dark ring 1934-1939

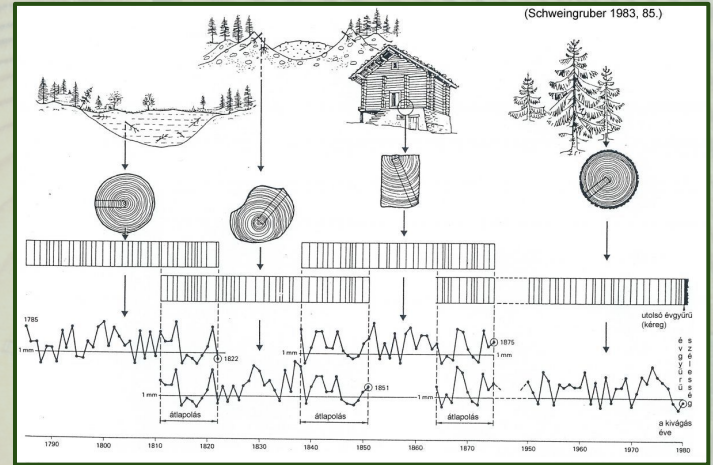


Myles 1 1969-1979



# What Others Could do Differently

- Sample more trees from different growth conditions
- Sample from harsher environments



# Summary

- Results were inconclusive
- Working with these trees showed the immense possibilities for dendrochronology
- Dendrochronology is a useful tool for studying past climate



# Acknowledgements

Thank you to:

Tirzah Abbott for all of your help with the SEM

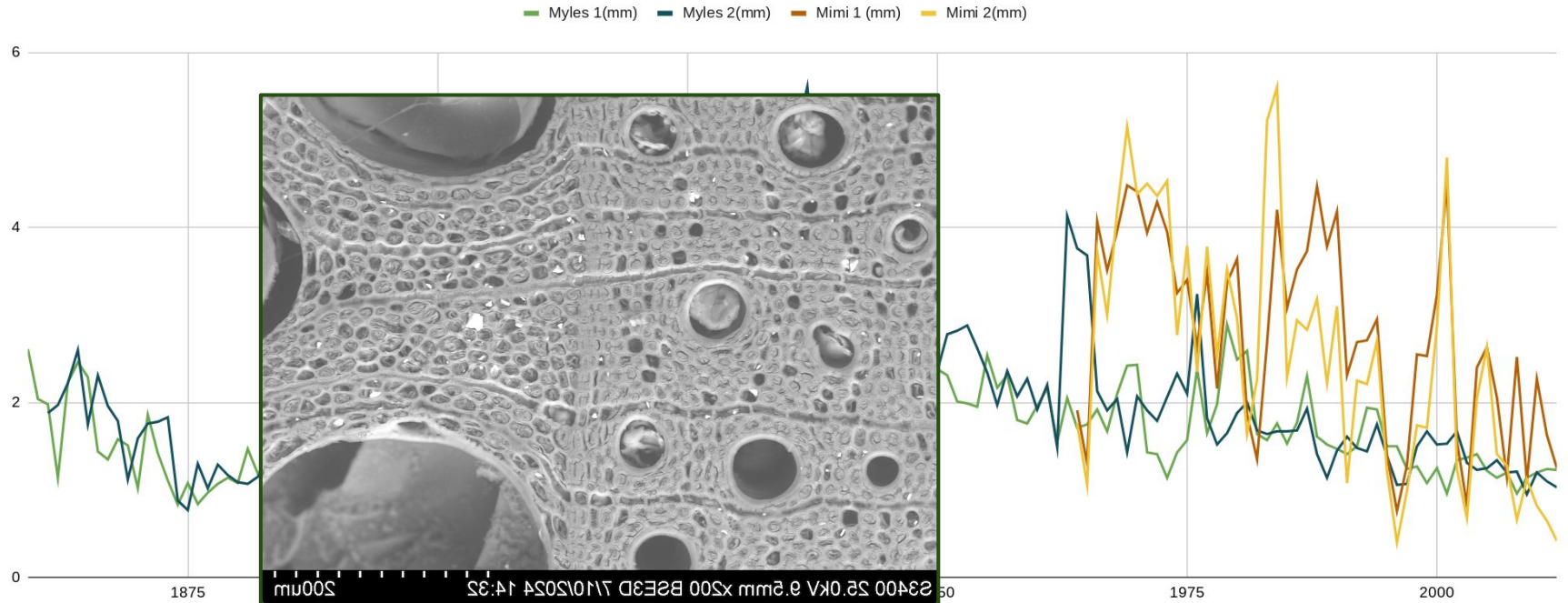
Geopaths for this amazing opportunity

Dr. Rosemary Bush for being a great leader for Geopaths and answering any questions

Allegra Tashjian for all of your work with me, and making the whole project possible.

# Measurement Transects on Each Tree

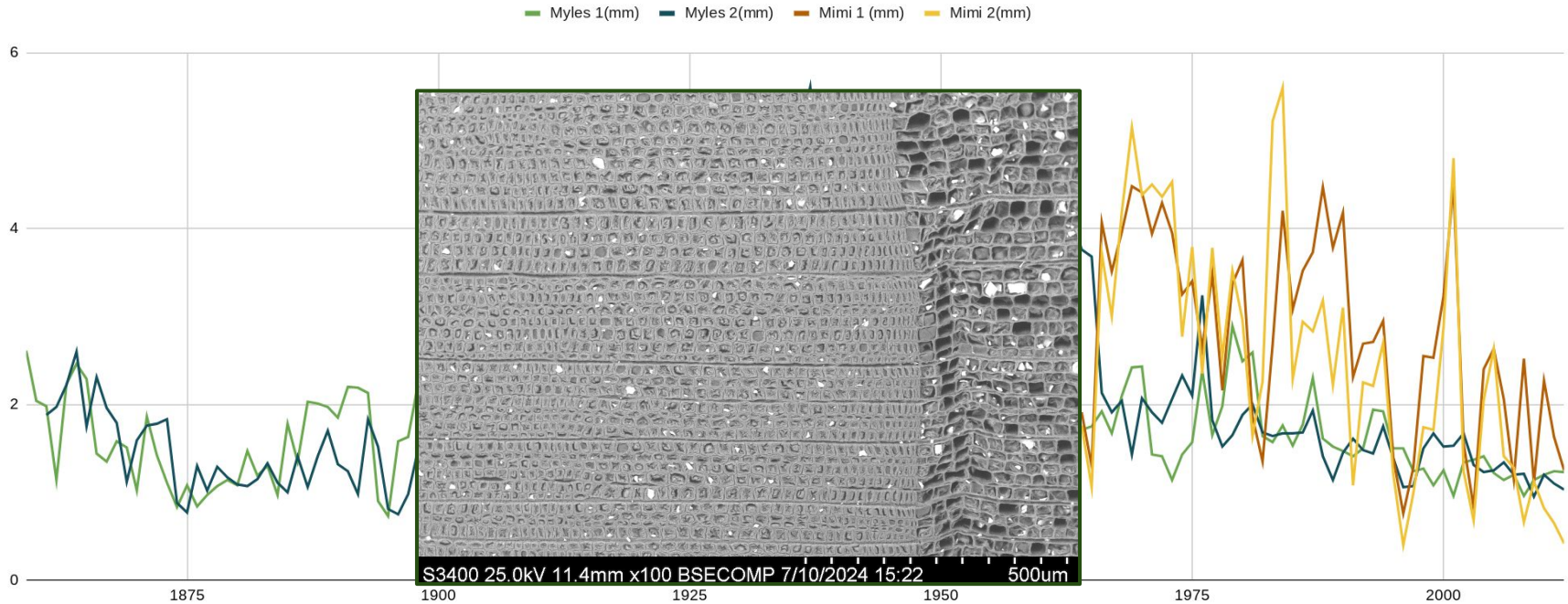
Annual Tree Ring Width Myles and Mimi





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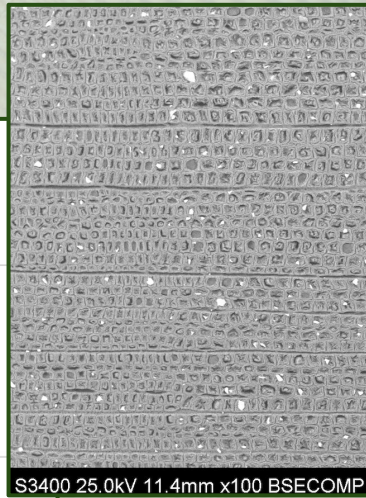
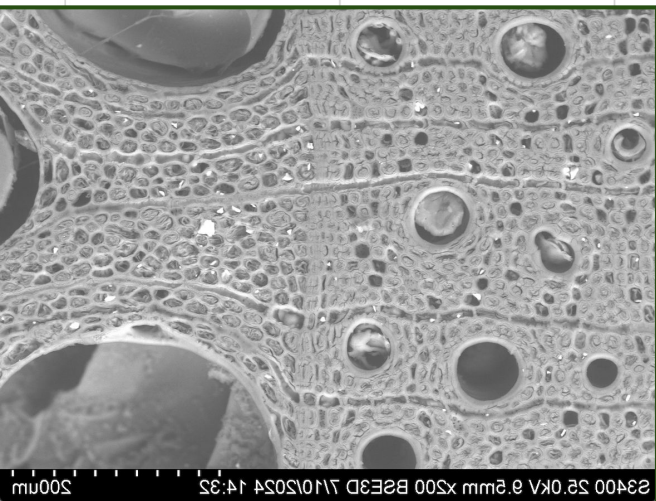
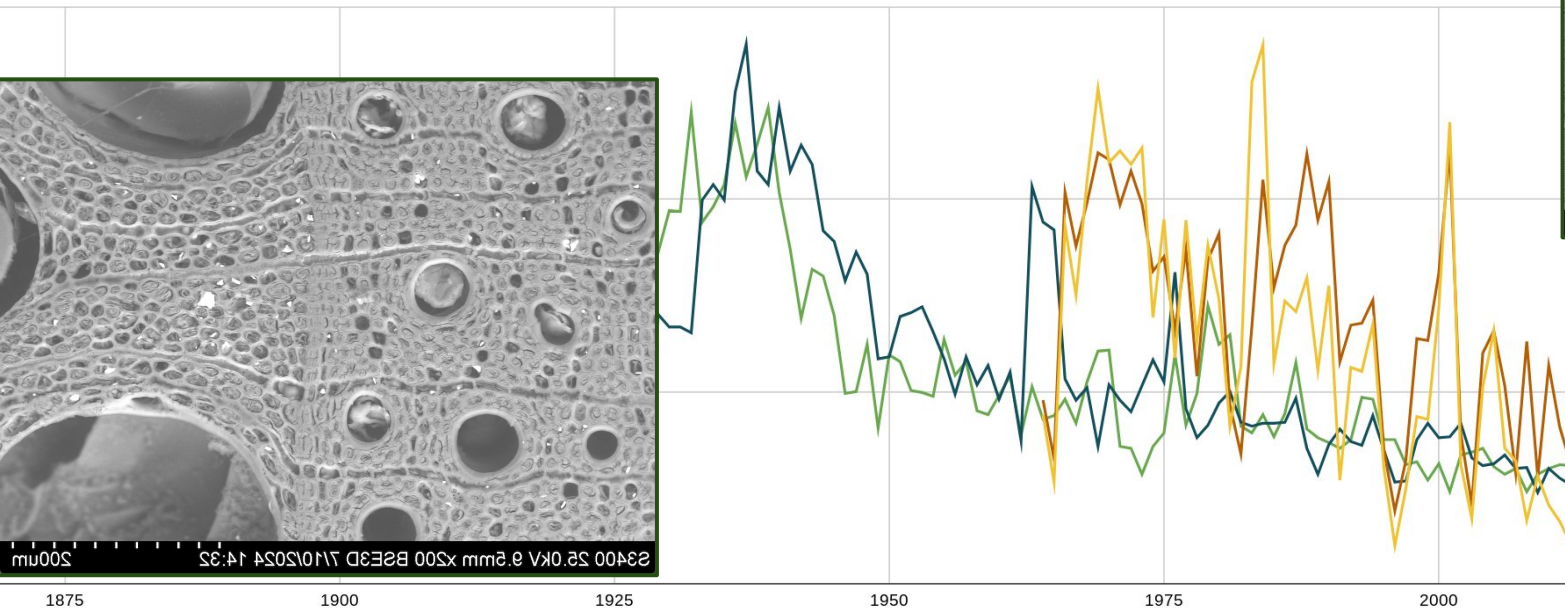
Annual Tree Ring Width Myles and Mimi



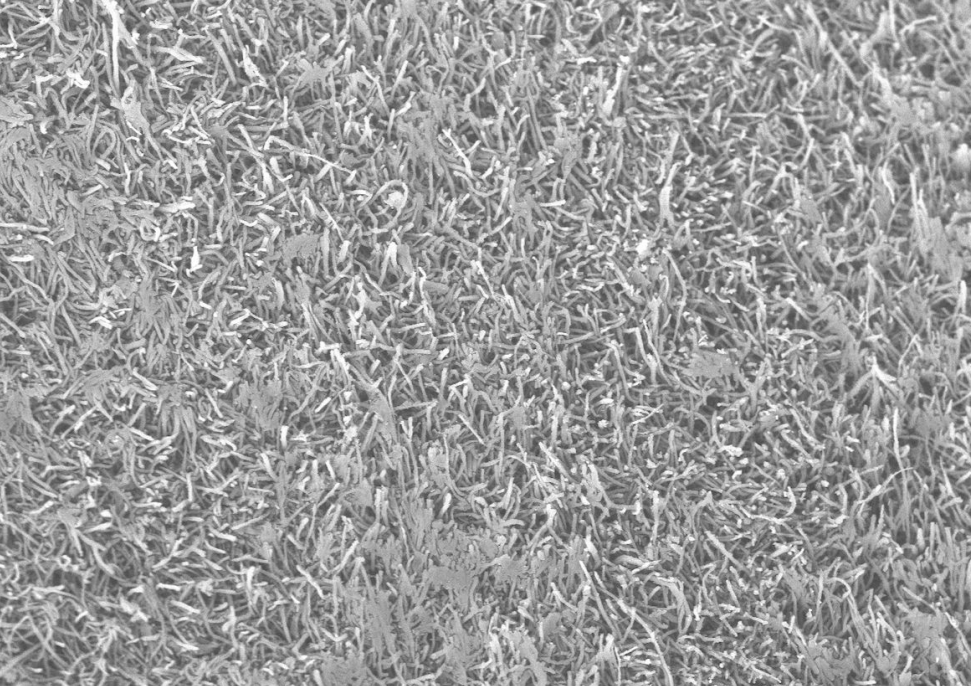
# Measurement Transects on Each Tree

Ring Width Myles and Mimi

— Myles 1(mm) — Myles 2(mm) — Mimi 1 (mm) — Mimi 2(mm)







S3400 25.0kV 11.3mm x200 BSE3D 7/10/2024 16:15 200um



S3400 25.0kV 10.4mm x300 BSE3D 7/10/2024 16:10 100um