Geology and Geochronology of Oracle, Arizona

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Acknowledgements

Clouds to the Core

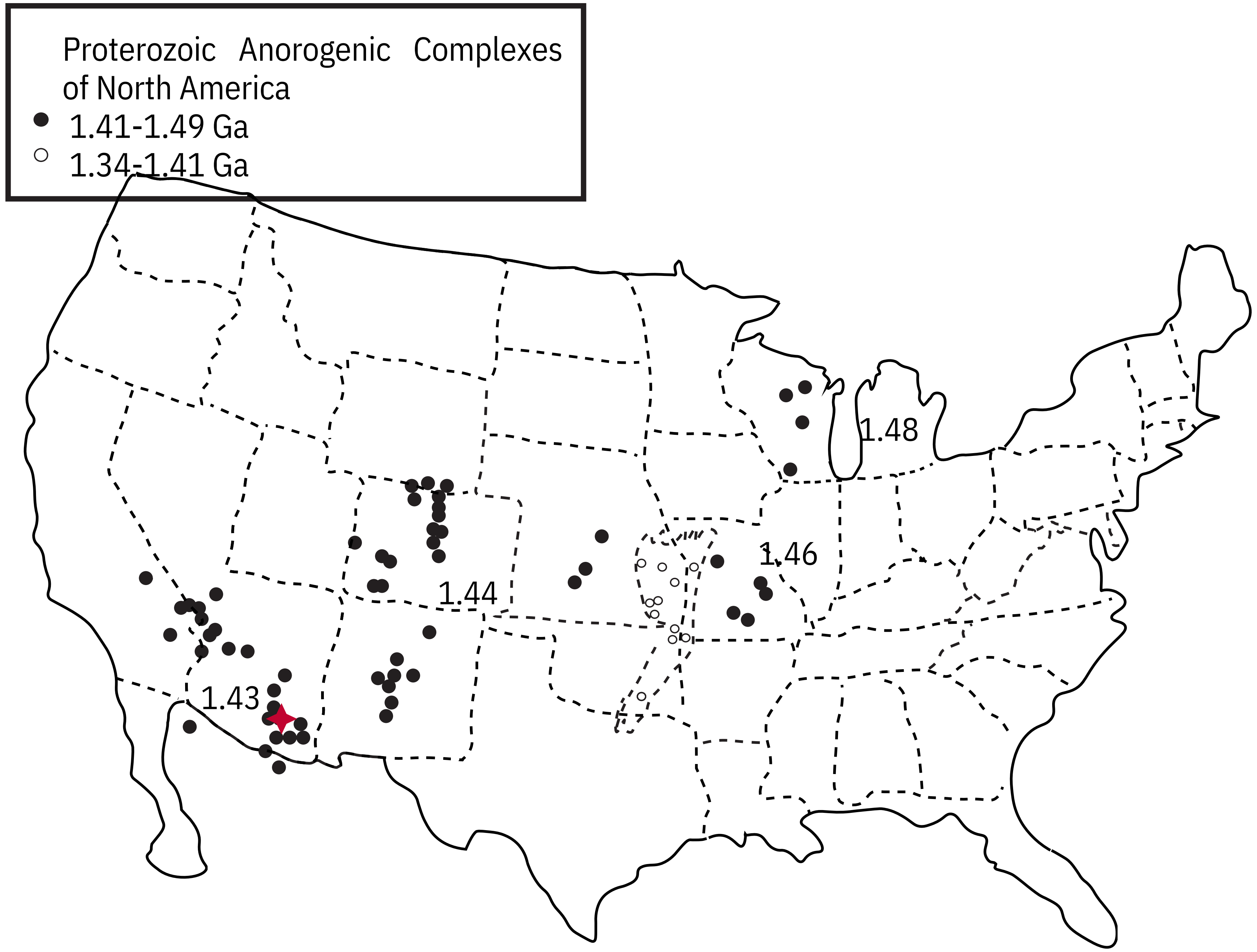
Southwest Geoscience Research Experience

ARIZONA LASERCHRON CENTER

Department of Geosciences

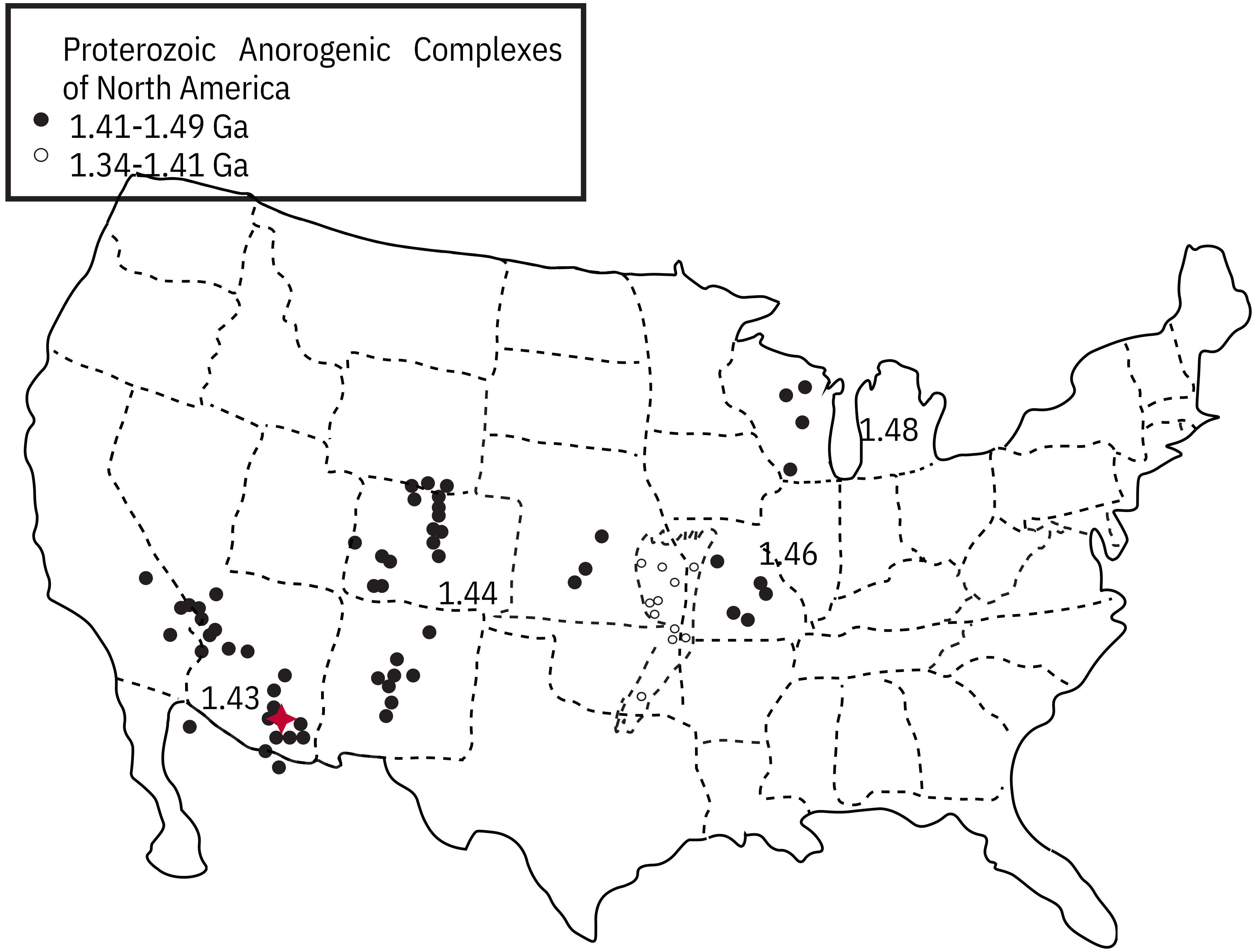
University of Arizona

A-Type Granite



The Oracle intrusion is a 1.4 Ga Anorogenic granite located in the Transcontinental belt.

Why is this Important?

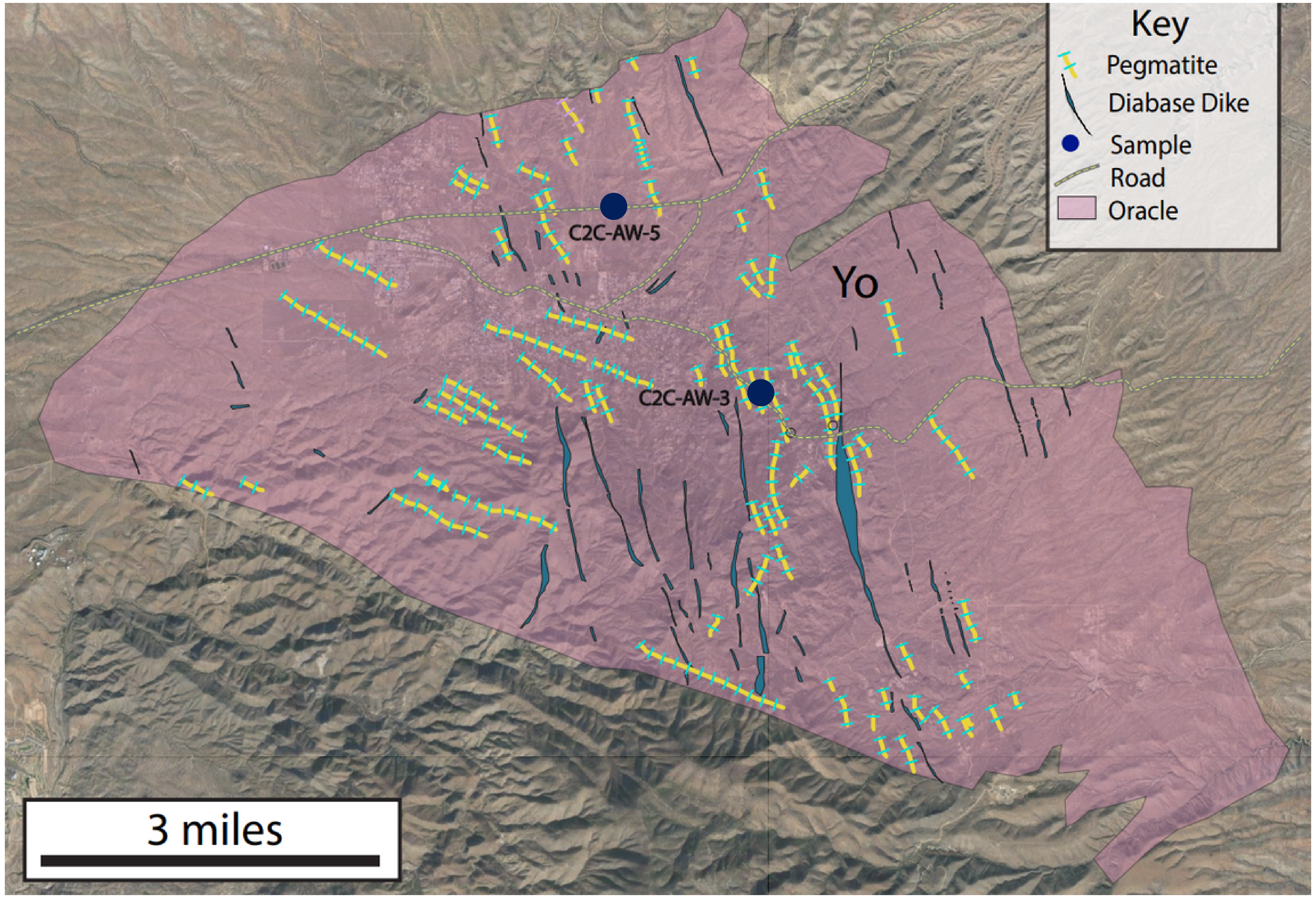


A-Type granite is fundamental to understanding crustal evolution.

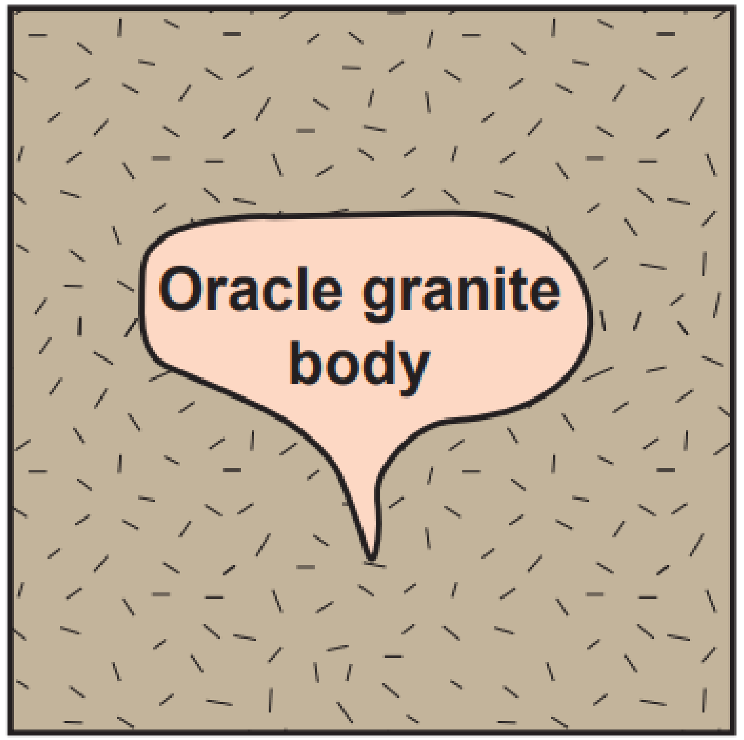
Oracle granite is the crust we live on.

It was the foundation for the later tectonic events in the Tucson area.

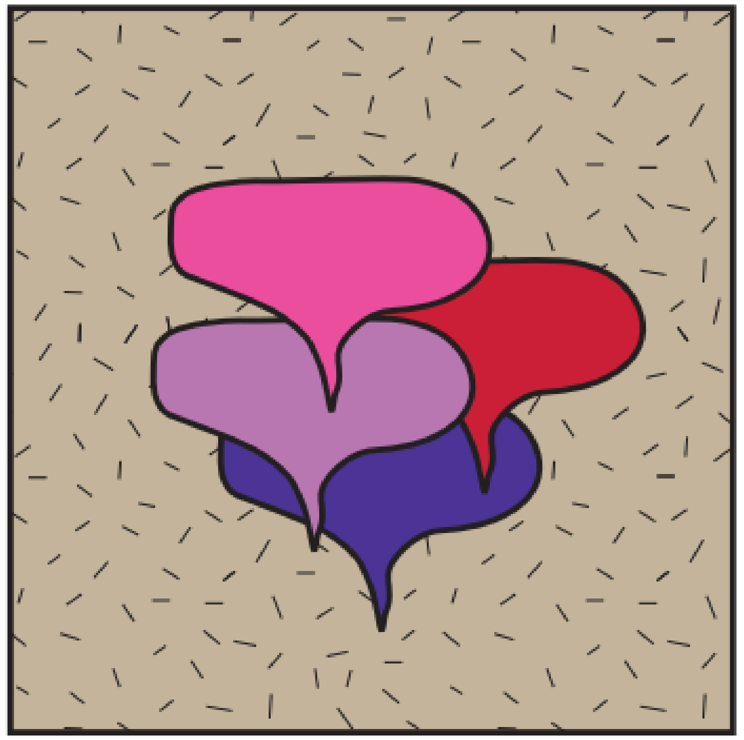
Project Hypothesis



Known: One age at 1.4 Ga



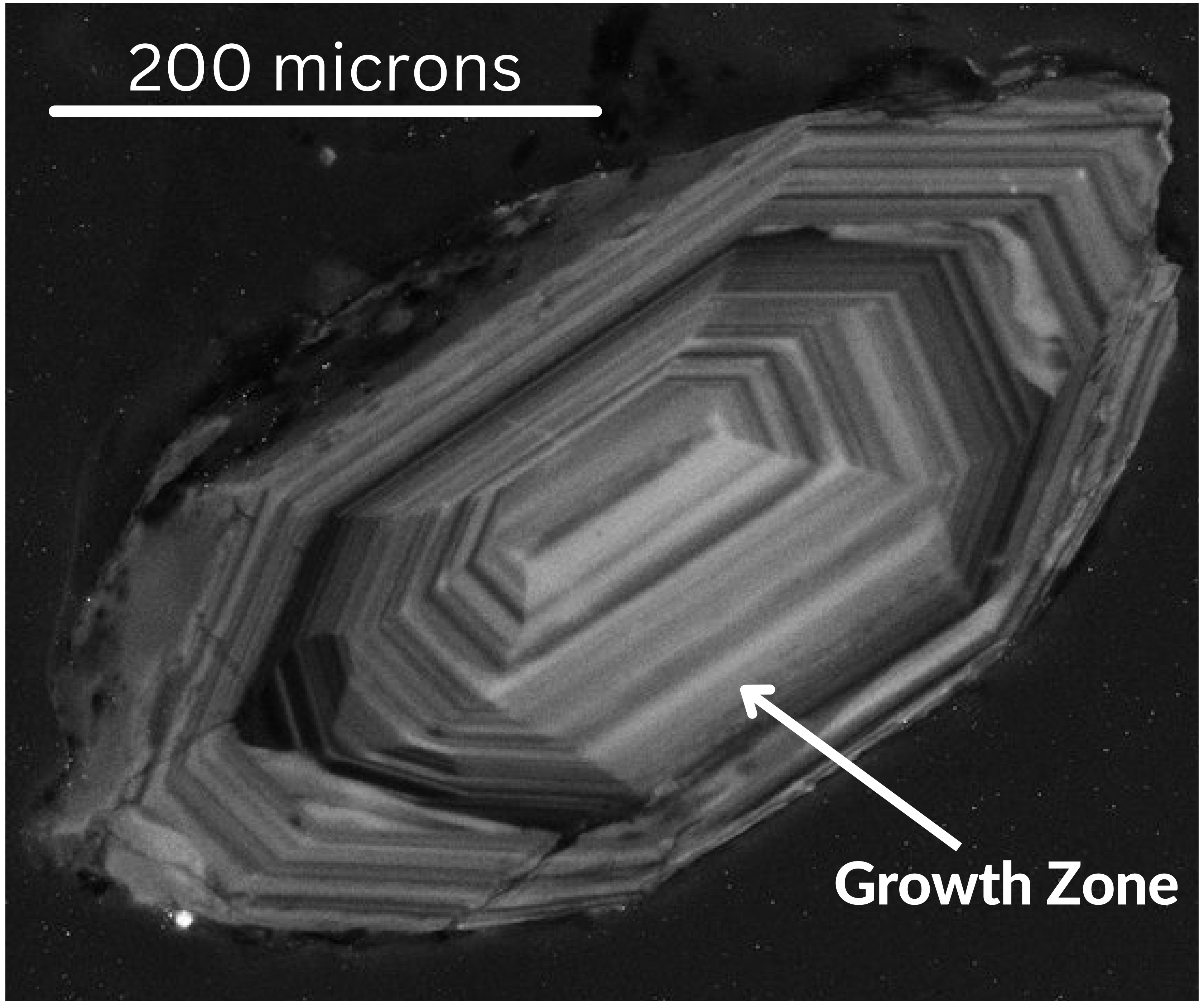
Hypothesis: Multiple magma bodies



Different outcrops may produce different ages.

Zircon

$ZrSiO_4$

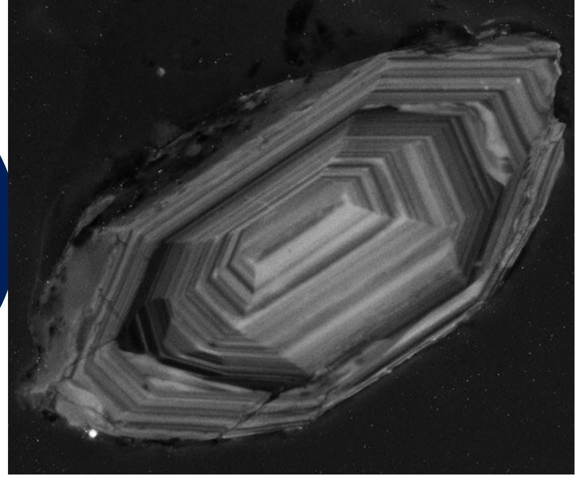


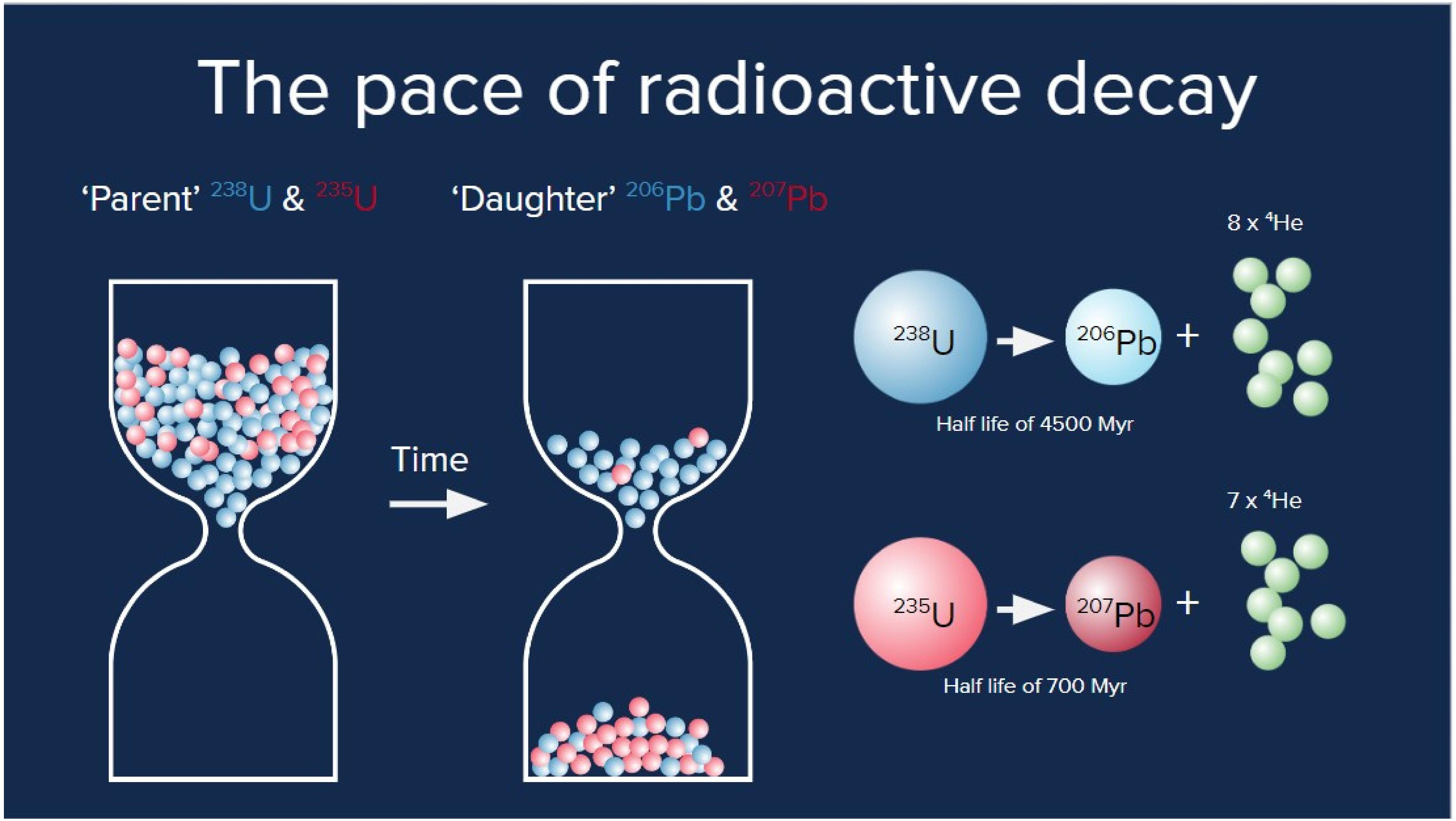
Cathodoluminescence Image (CL Image)

Over time, Zircon incorporates Uranium and it excludes Lead as it's growing from a melt.

Zircon is very resilient to alternation.

Zircon U-Pb: How it works?



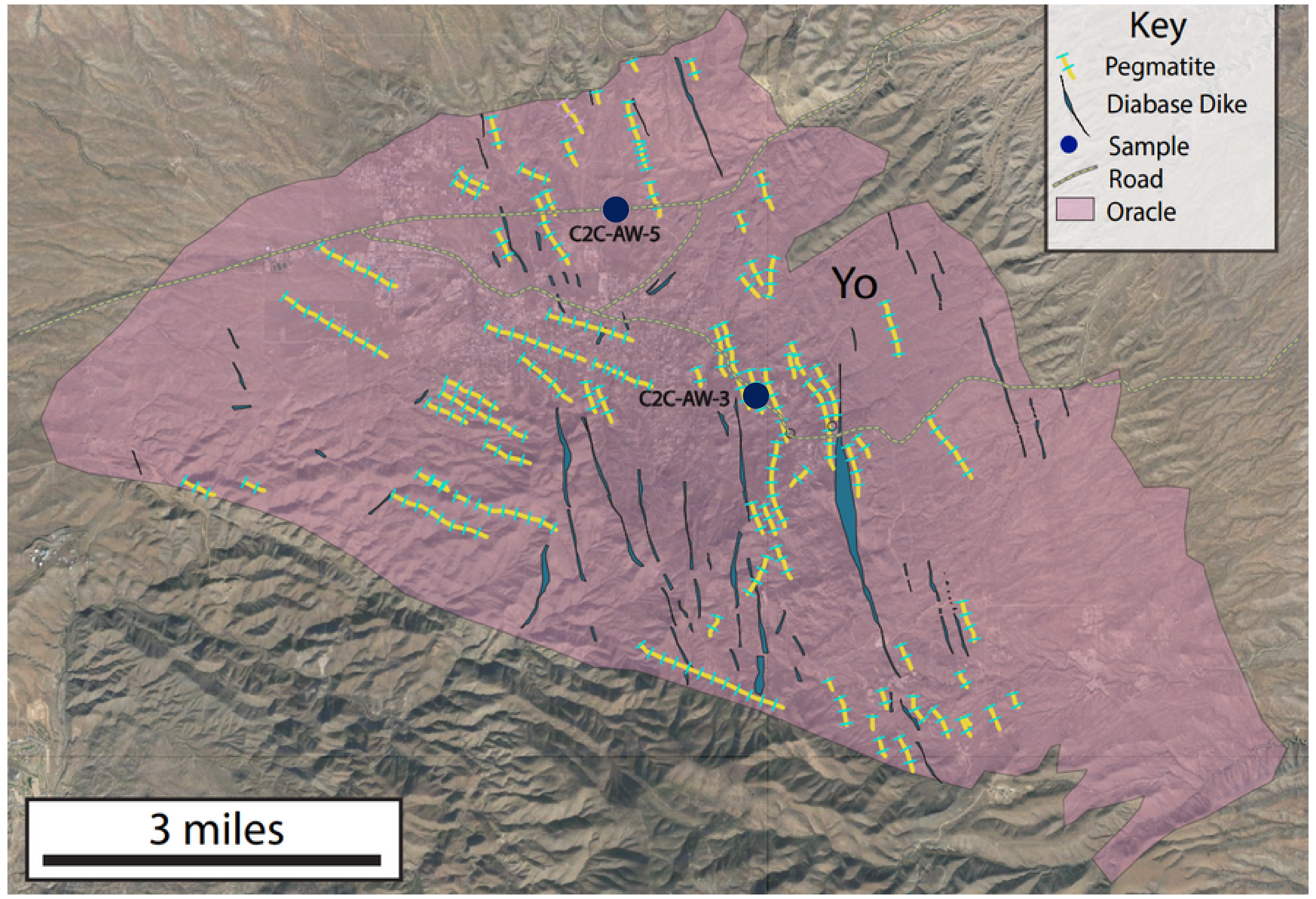


Personal Communication Mauricio

Methods Part 1: Fieldwork

Collected samples in the field from two units

Intact Oracle Sample C2C-AW-3



Crumbly Oracle Sample C2C-AW-5

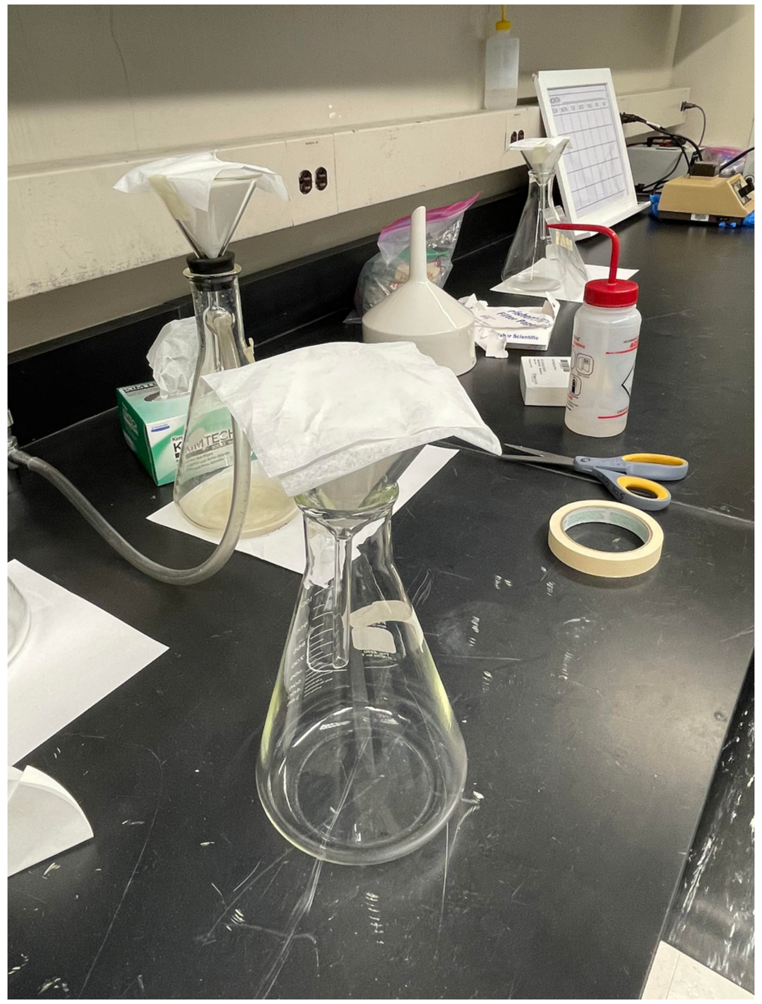
Methods Part 2: Zircon Separation

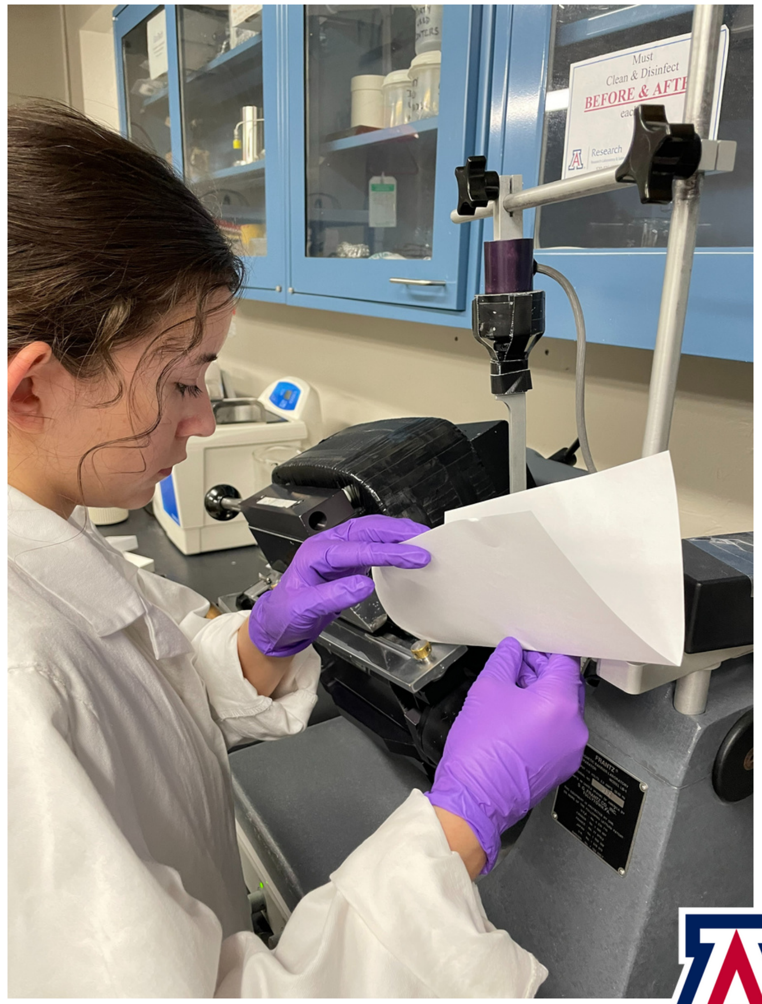
1
Crushing

2
Panning

3
Heavy Liquids

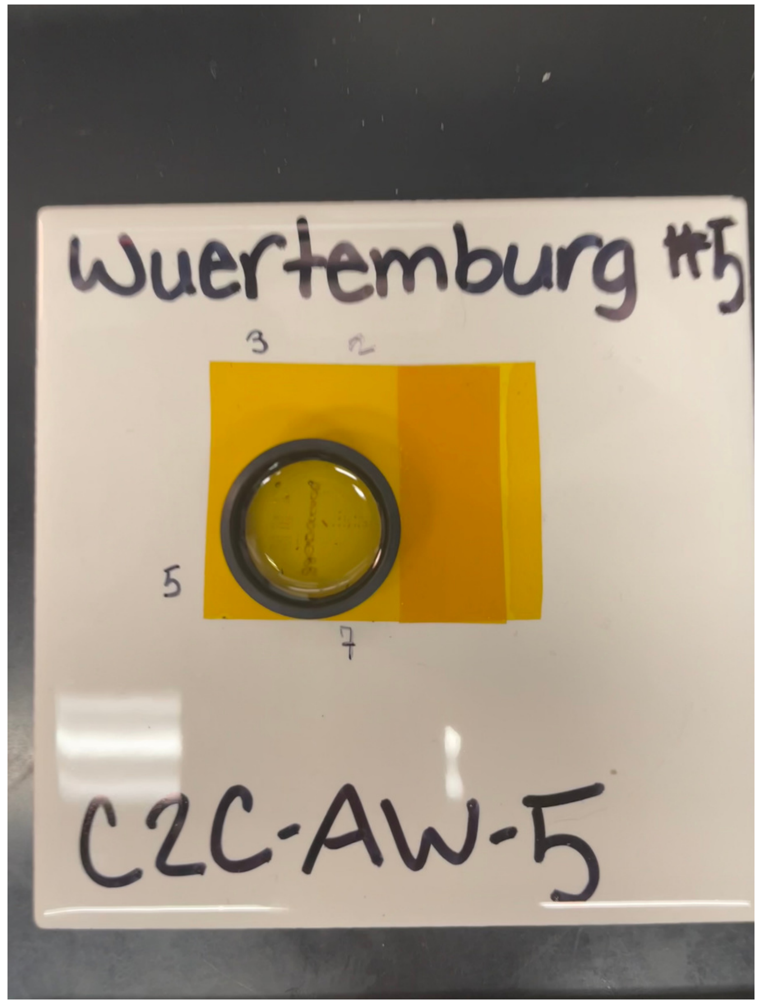
4
Frantz



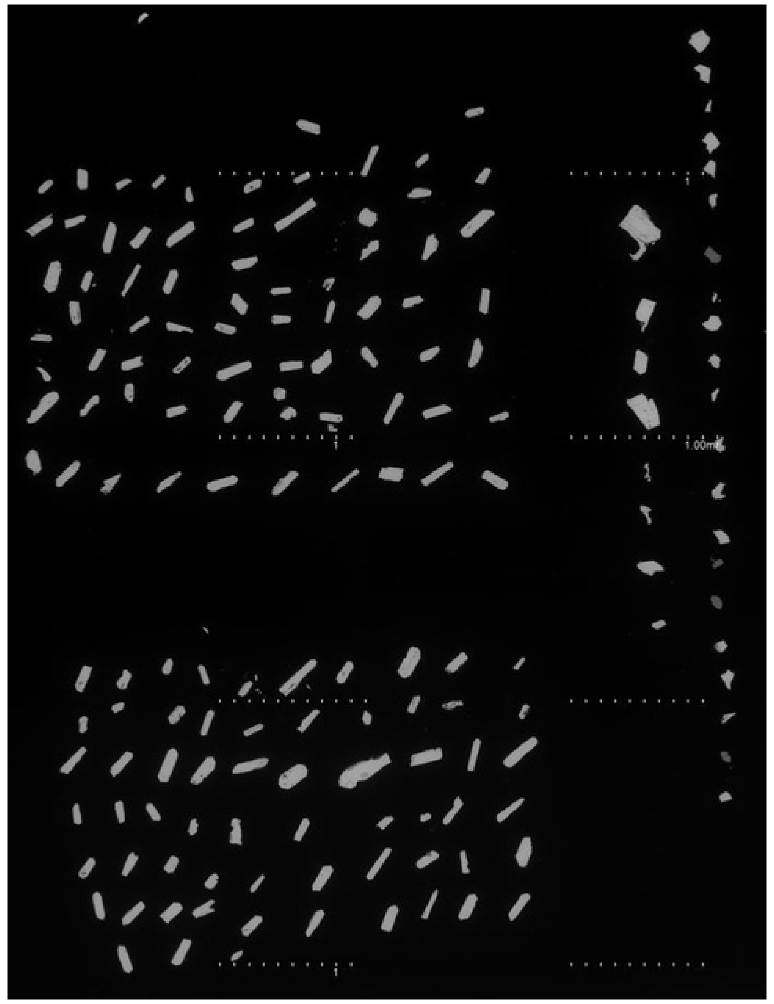


Methods Part 3: Zircon Analyses

5
Mounting

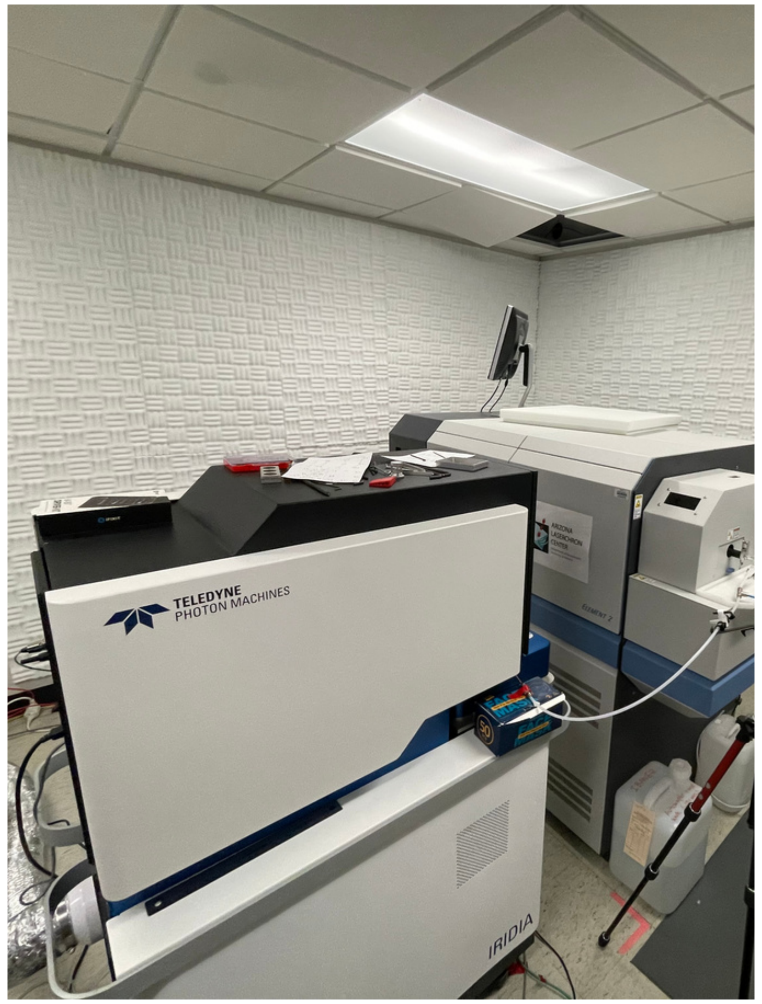


6
Polishing



7
CL and BSE Imaging

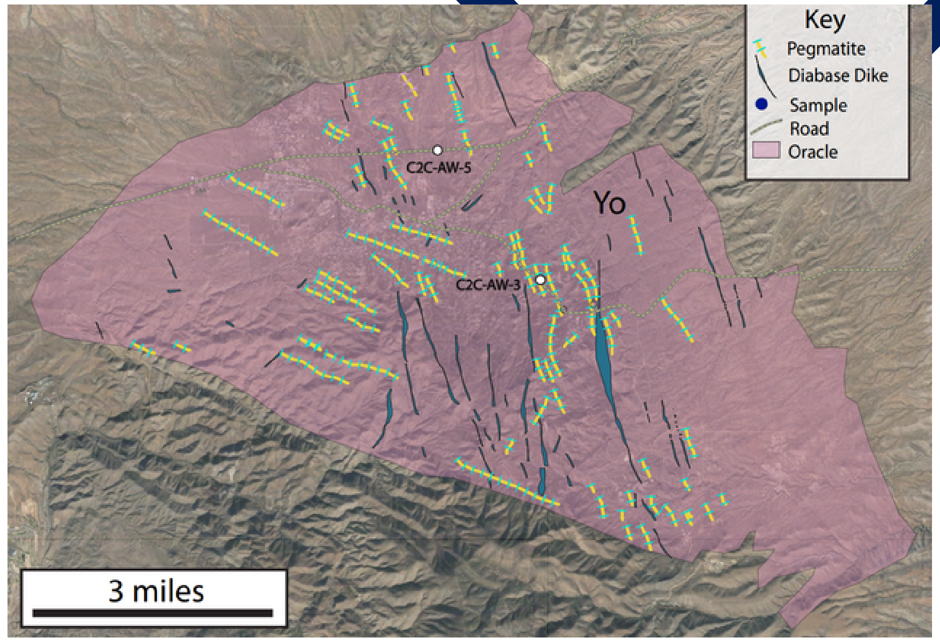
8
Mass Spectrometer

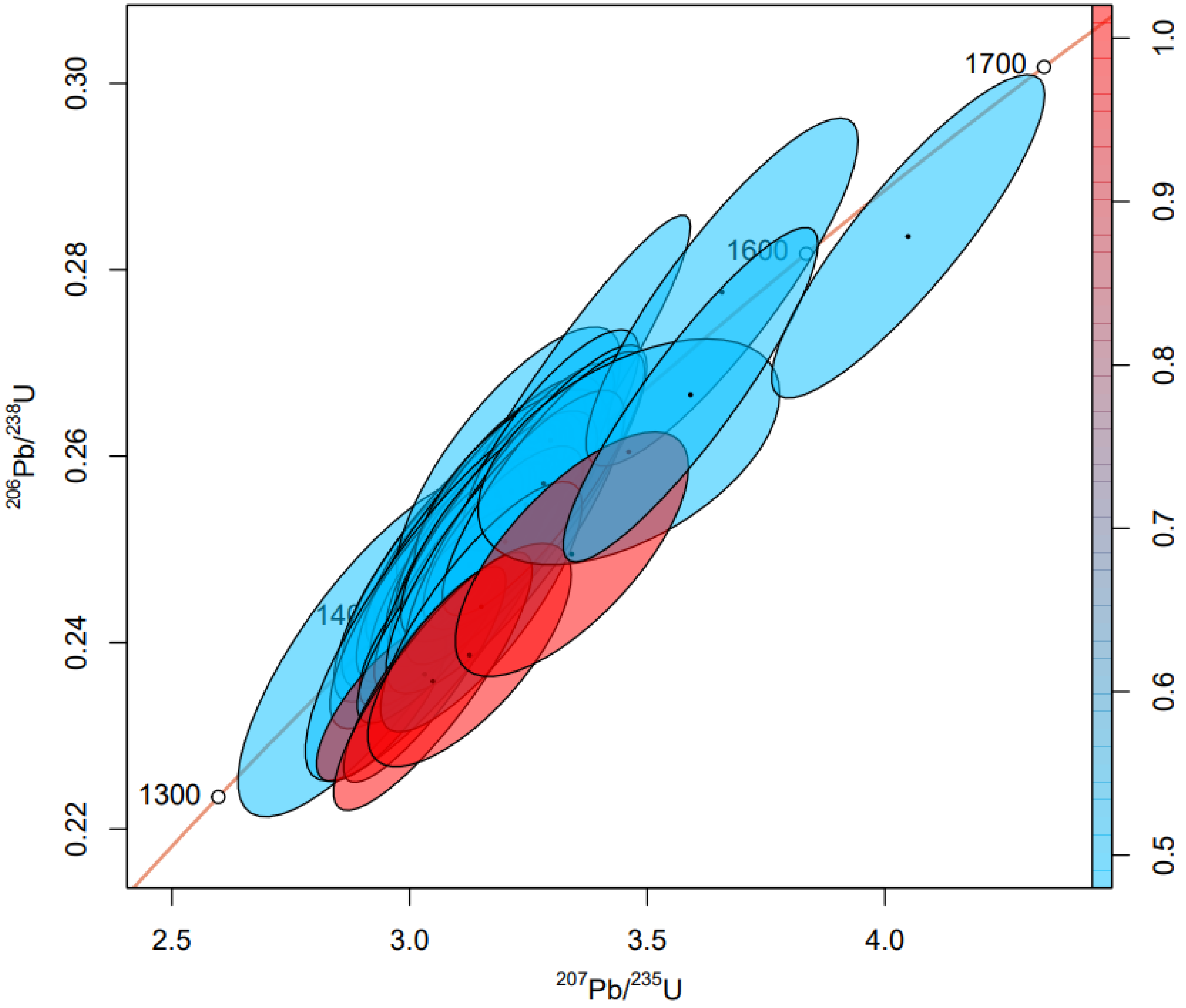


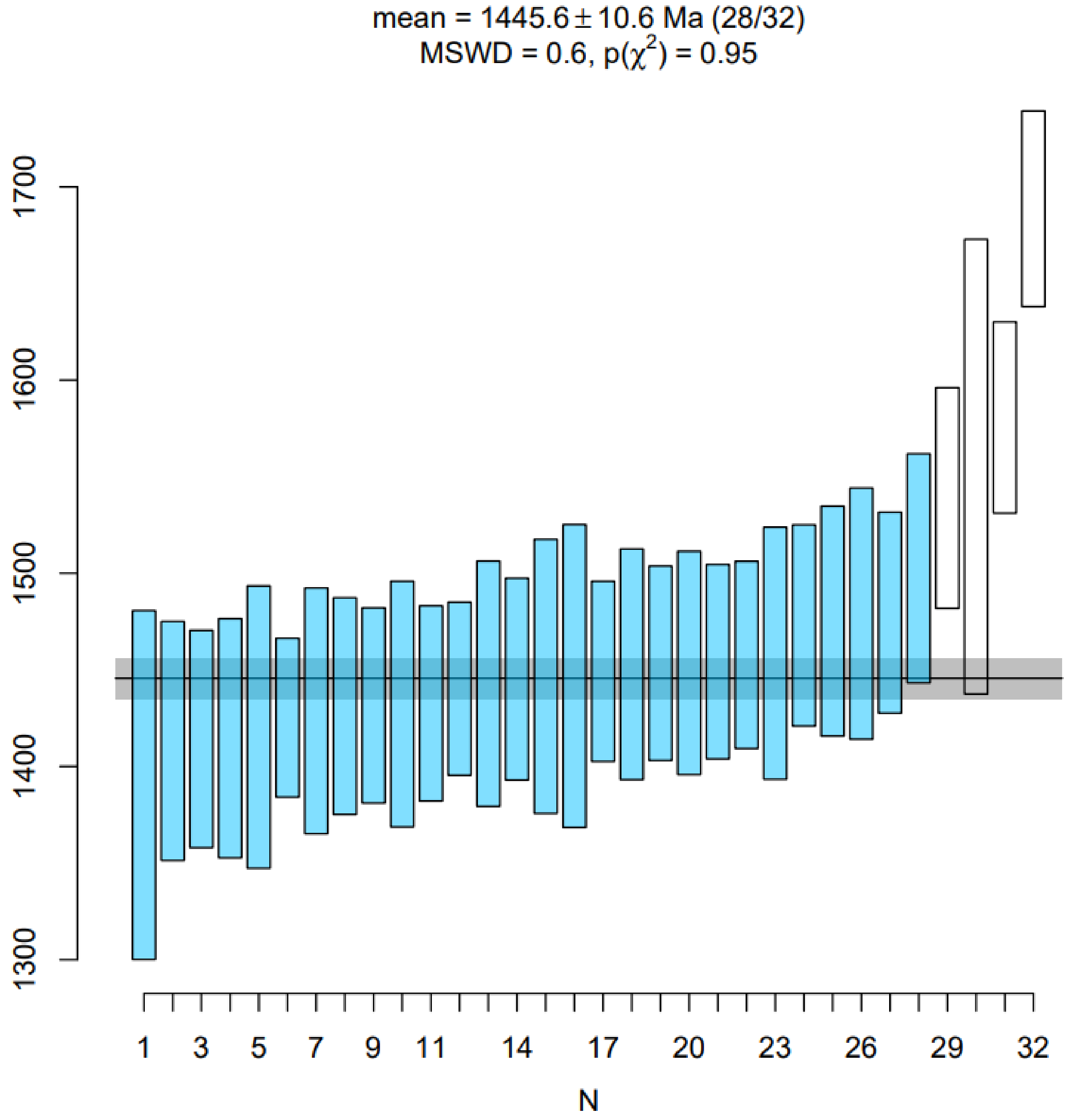
Intact Oracle Sample

C2C-AW-3

1446±16 Ma



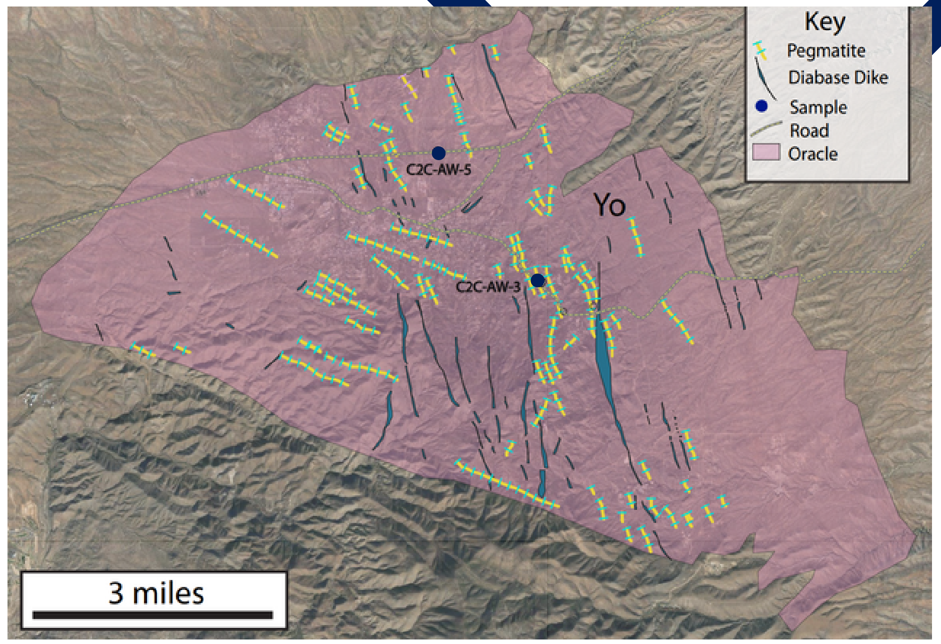


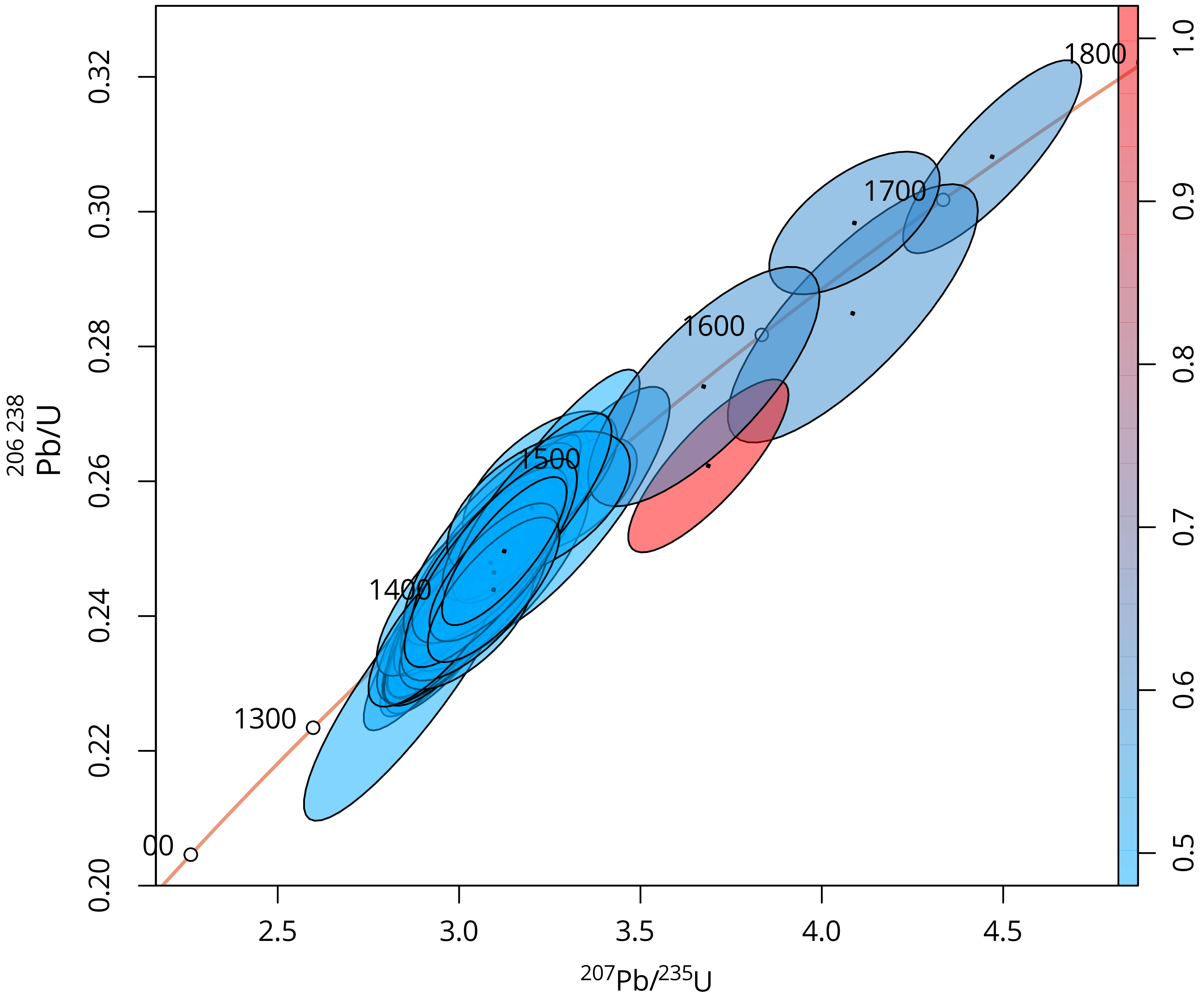


Crumbly Oracle Sample

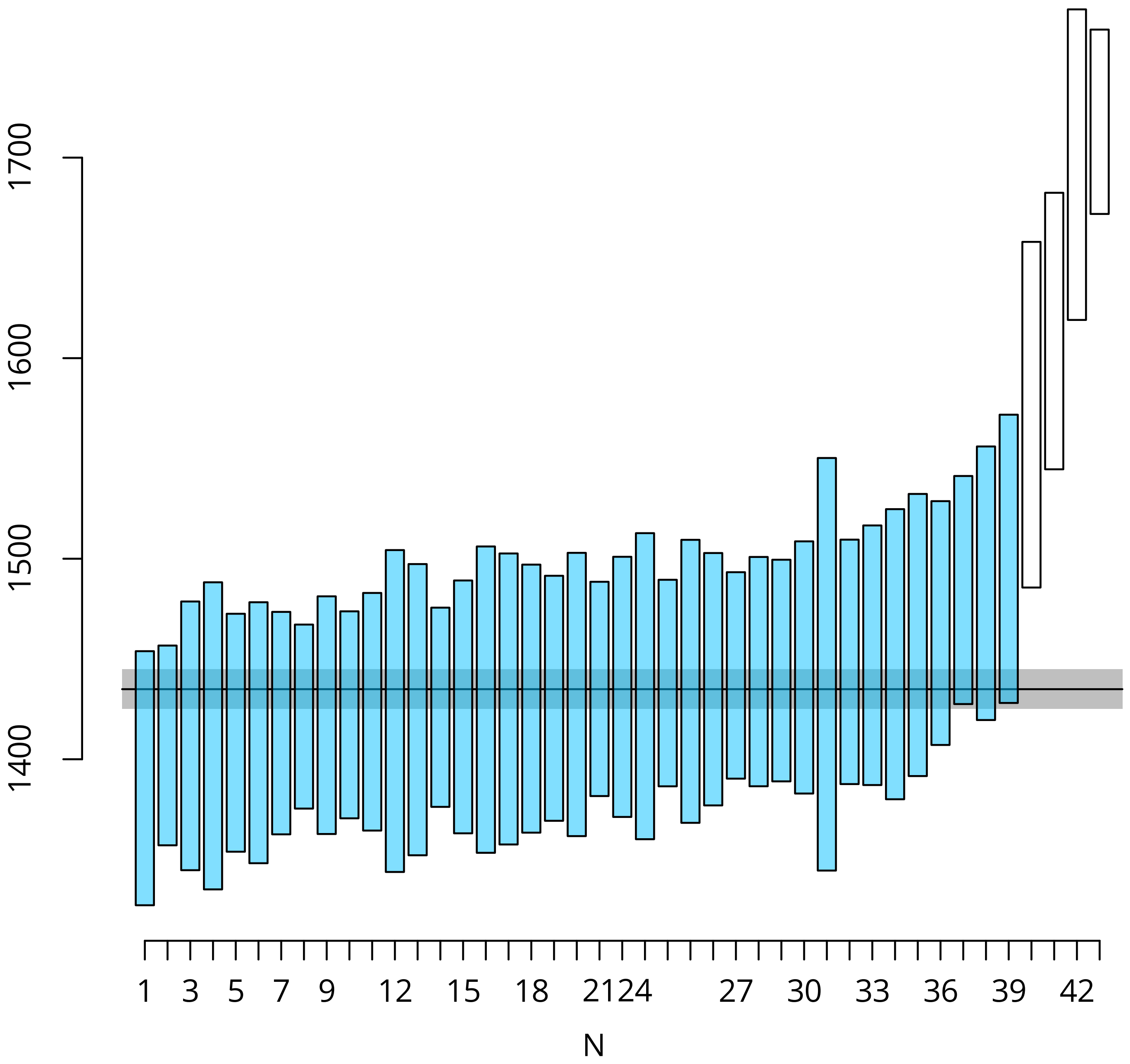
C2C-AW-5

1435±14 Ma

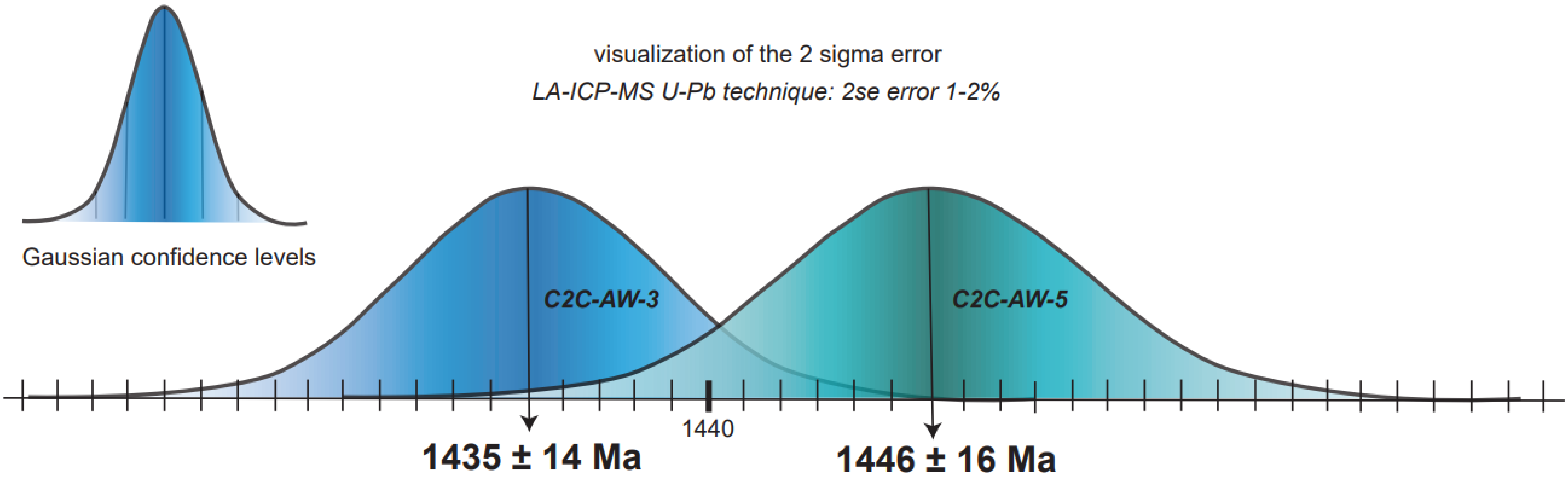




mean = 1435.08±9.90 Ma(39/43)
MSWD = 0.49, p(χ2) =1



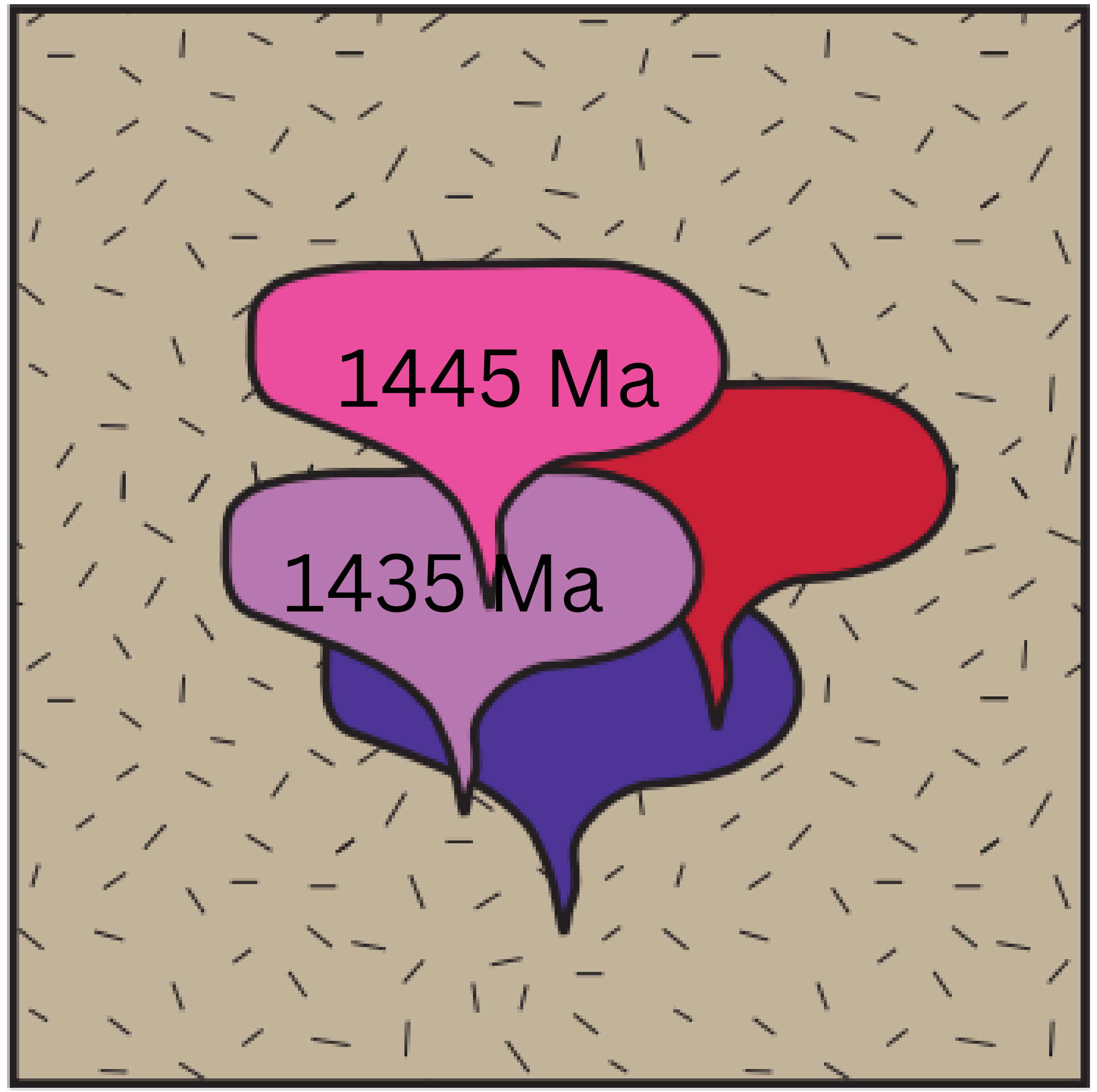
Oracle Granite: Two ages versus one?



What's next?

Continue work in the fall

Hafnium and Trace Elements



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