

Record of a fluctuating lacustrine margin: Updates from the HSPDP West Turkana Kaitio drill leg



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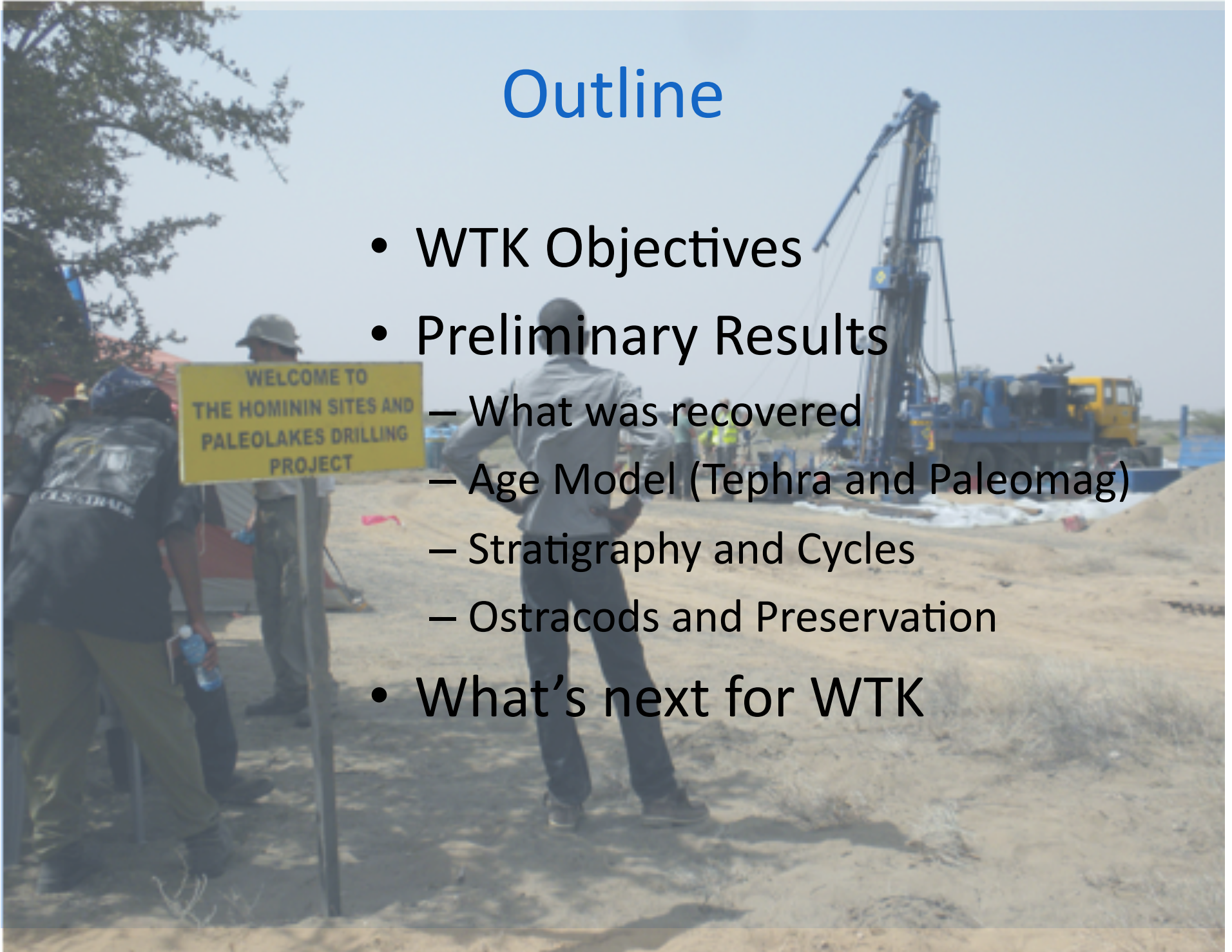
Acknowledgements

- Entire HSPDP-WTK field and sampling party teams
- LacCore, DOSECC, Chris Vidito
- Field support crew



Outline

- WTK Objectives
- Preliminary Results
 - What was recovered
 - Age Model (Tephra and Paleomag)
 - Stratigraphy and Cycles
 - Ostracods and Preservation
- What's next for WTK



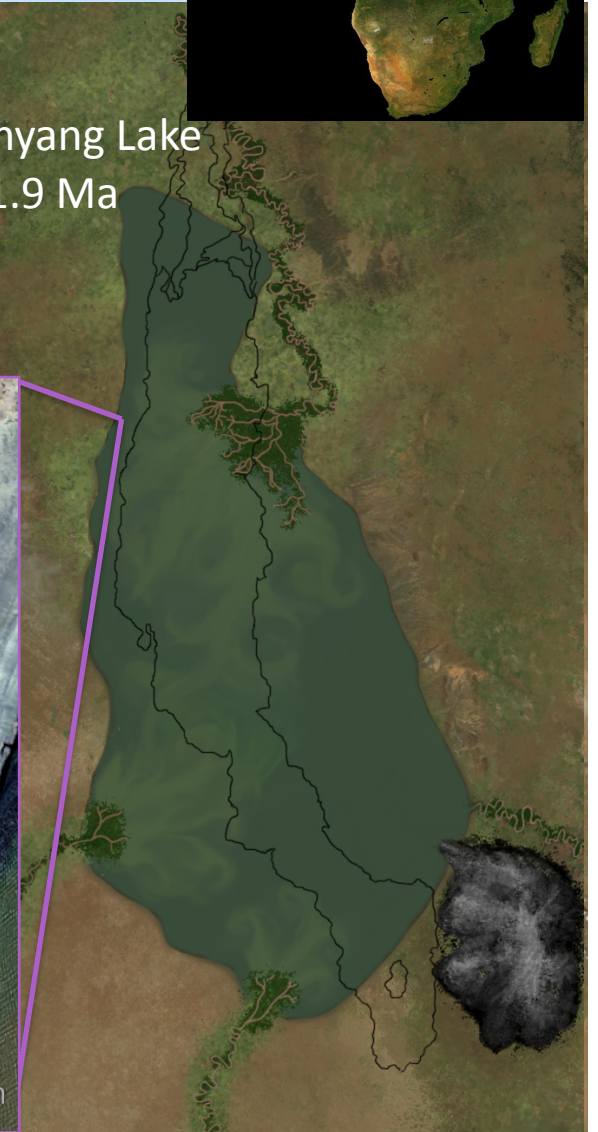
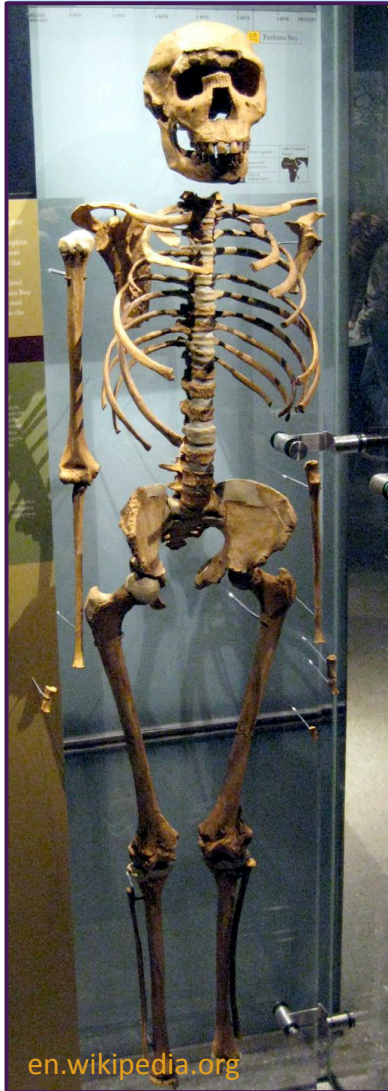
WTK Objectives

Opportunity for comparison between outcrop and core



Drilling target = Kaitio Mb
Lacustrine sequence ~2 Ma

Lorenyang Lake
1.9 Ma



Record Recovered

Drilling Logistics

10° drilling angle + 5° natural dip to the W
HQ pipe

Outcomes

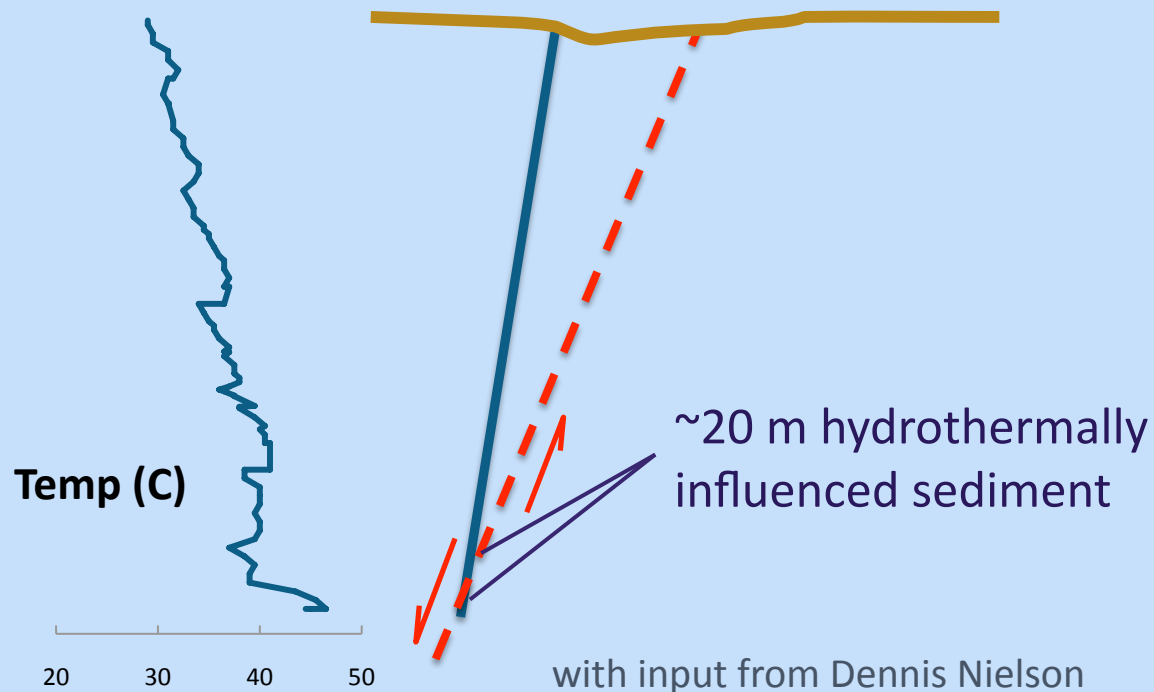
Cored 215 m with 95% recovery



Hydrothermal Evidence

Hydrothermal fracture composed of series of small faults with cm-scale offset

No stratigraphically significant offset



Tephra

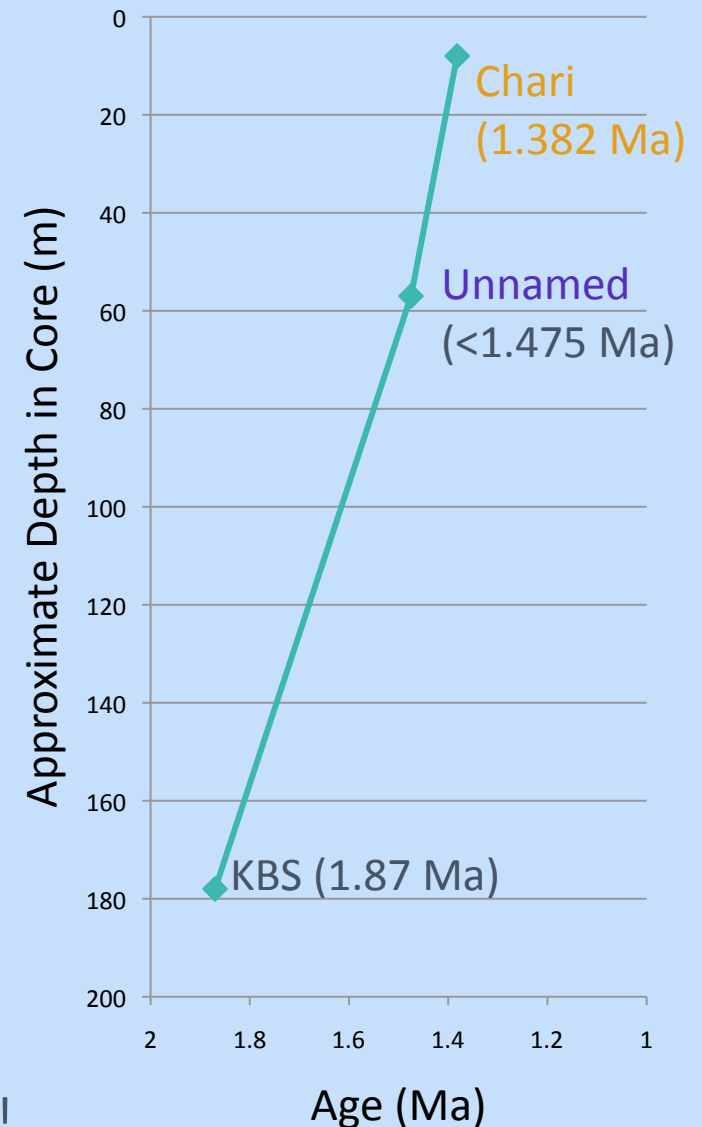
- Drawing on extensive data (Brown, Feibel, others) from outcrop
- Fingerprinting tephra with single glass shard analysis using Electron Microprobe

Oxide Percents

	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	CaO	K ₂ O	Na ₂ O	TiO ₂
4Q-2: 14-16	73.83	10.77	2.73	0.17	3.93	4.72	0.18
Chari avg	74.36	10.69	2.80	0.17	4.08	3.86	0.17
20Q-3: 52-54	71.87	9.13	5.57	0.18	3.03	3.99	0.31

Unnamed but with shards of the Ebei and Etirr
Contains pumice so opportunity to date directly!

Preliminary Sed Rates



Paleomagnetic

Vrica

Additional age control

- Some challenges as segments of the core rotated within the tool

Reunion

High sed rate and relatively continuous deposition

- Top of Olduvai potential Vrica Event?
- Comparison with outcrop study



Matuyuma

Olduvai

Matuyuma

Matuyuma

Gauss

Stratigraphy

> 96% of the core is clay/silt

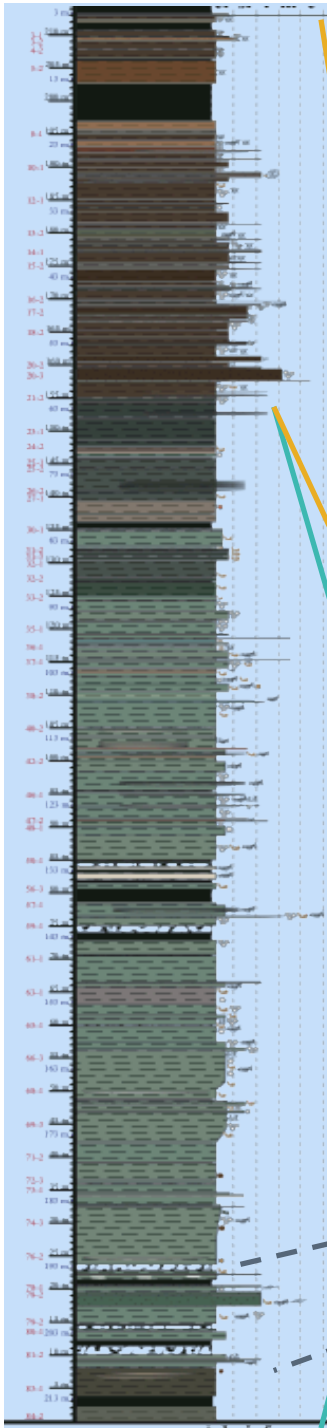
- low energy environment
- good preservation for proxies

Deltaically influenced

Littoral lacustrine deposition with flooding cycles as evidenced by weak soil overprint

Evidence of hydrothermal overprinting

lithologic log by Robyn Henderek



Stratigraphy

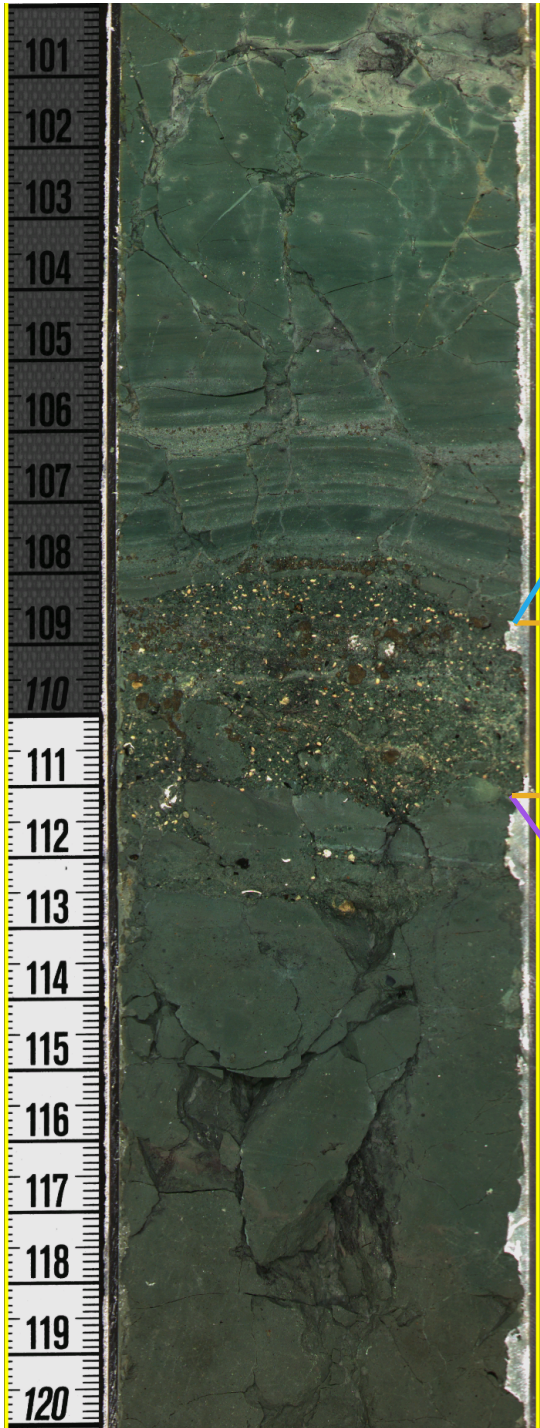
Example of a flooding cycle

Laminated lacustrine clay

Fine to medium grained
sand, often ostracod-rich

Weakly pedogenically
modified lacustrine clay

See this cycle repeat ~32 times in
parallel outcrop section



Ostracods

> 75% of 10 m initial scan
with ostracods

15Q-3: 32-34 cm
n = 2933

Un-ID
Fragments

Un-ID
Juveniles

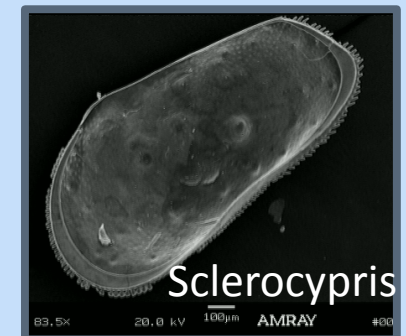
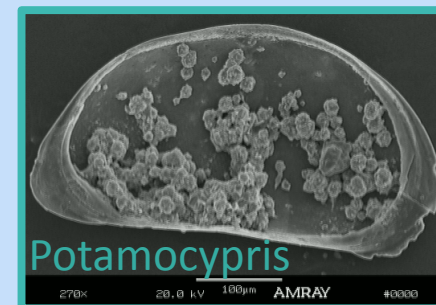
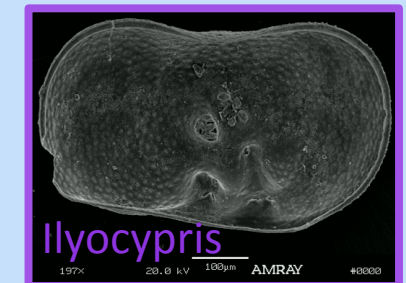
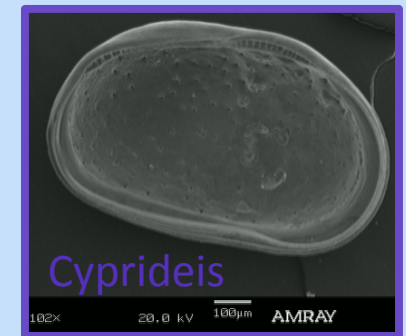
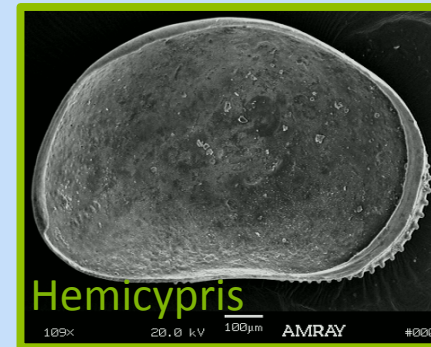
30Q-1: 45-47 cm
n = 32

Un-ID
Fragments

74Q-1: 55.5-57.5 cm
n = 429

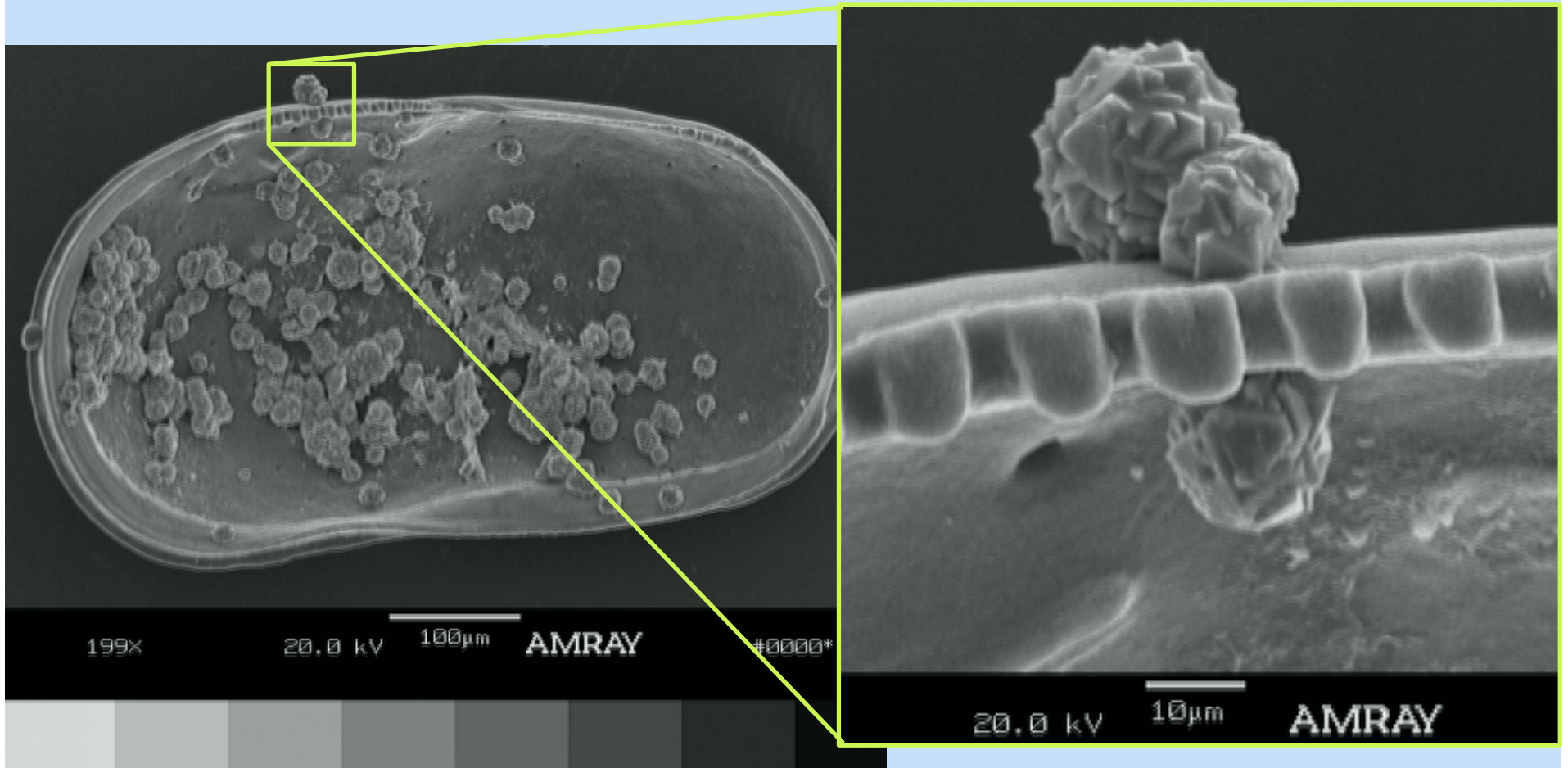
Un-ID
Fragments

Un-ID
Juveniles



Ostracods and Pyrite

- First time pyrite has been observed in these sediments
 - Hypothesized to be source for diagenetic gypsum
- Are the pyrite vs. non-pyrite cod assemblages different?



Conclusions

- Unique record
 - Sensitive littoral margin
 - First observed pyrite
 - Parallel outcrop study
- Stay tuned for more results!



Thank You

