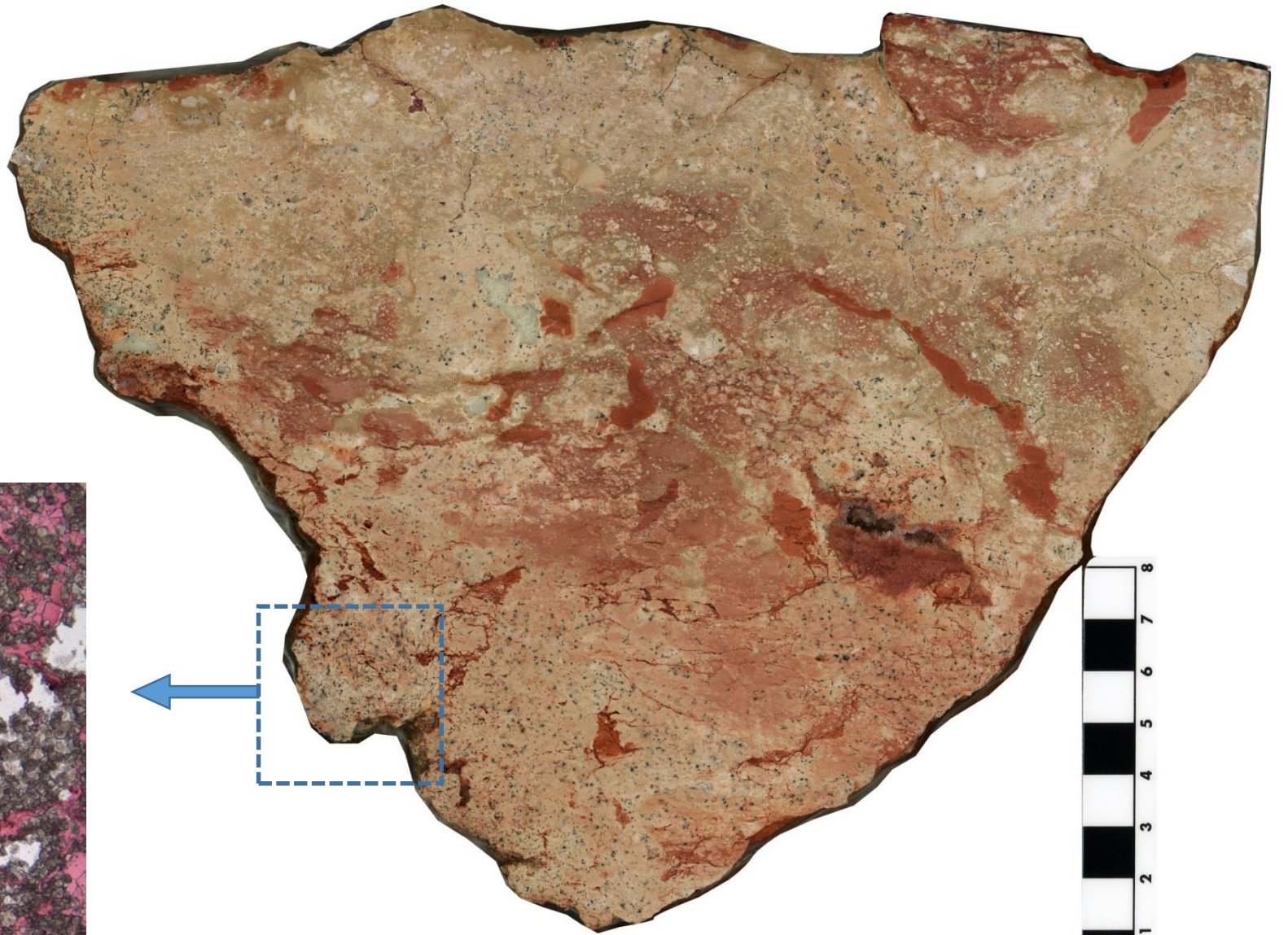
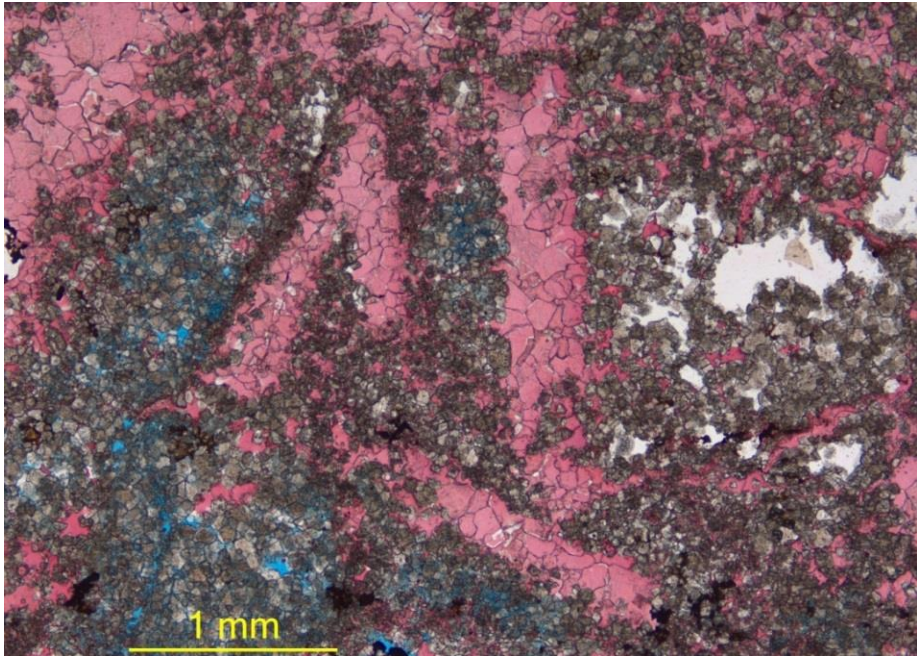


STRATIGRAPHY AND PETROGRAPHY OF HETTANGIAN TO SINEMURIAN LACUSTRINE CARBONATES OF THE GLEN CANYON GROUP, WASHINGTON COUNTY (SW UTAH)

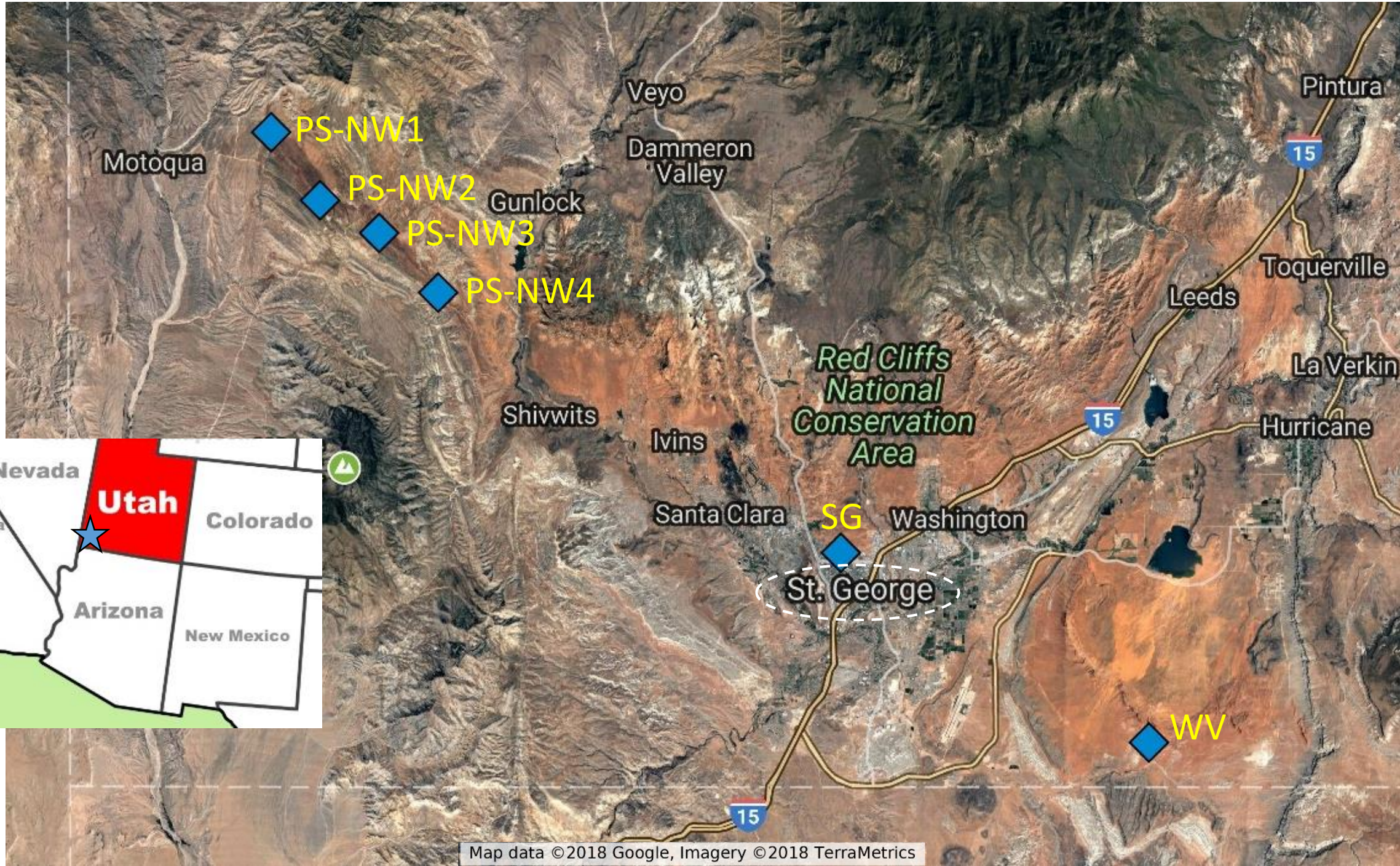
Samuel A. Abdala, Kevin E. Nick, H. Paul Buchheim

samuel.abdala@gmail.com





Kayenta Fm, St. George (UT)





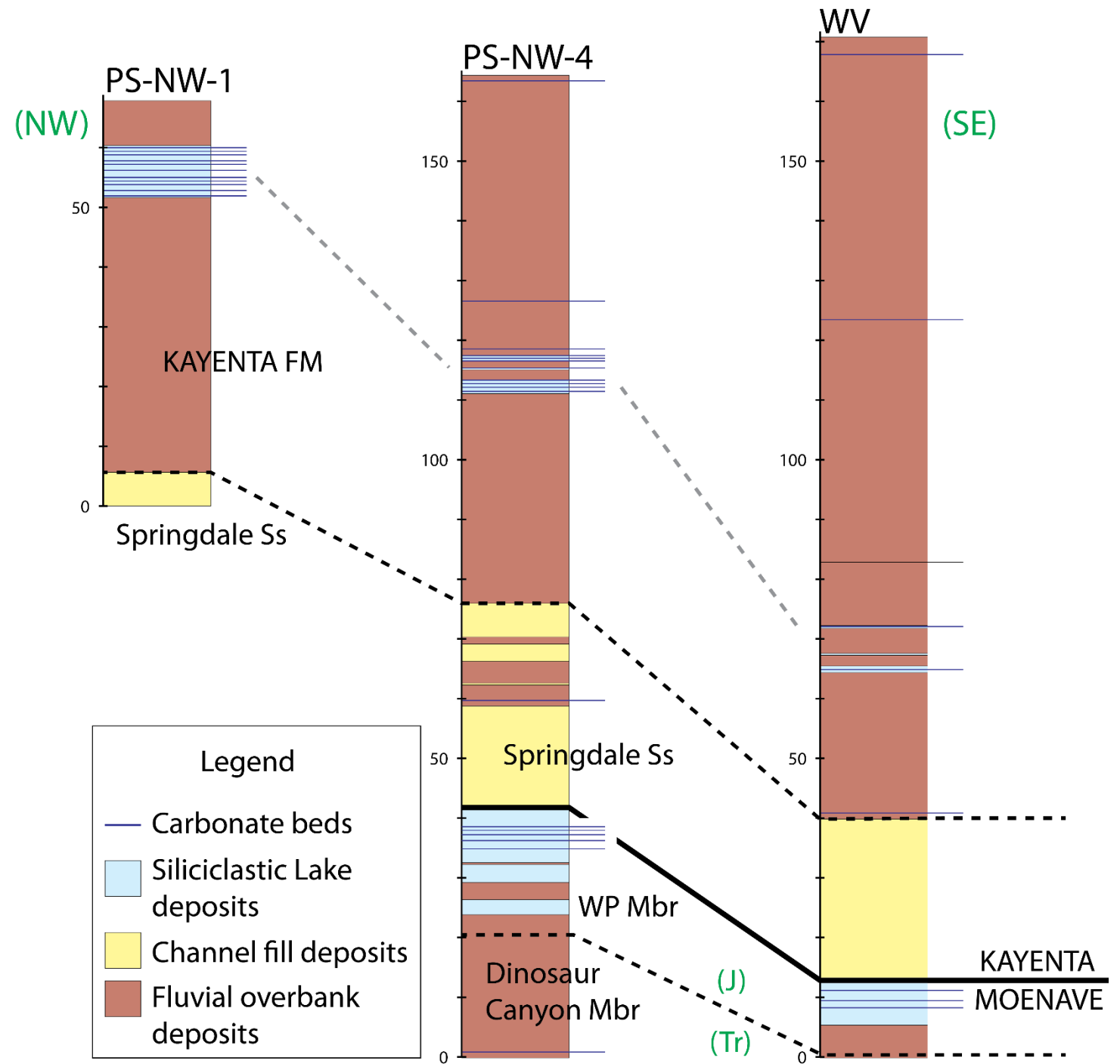
Pahcoon Spring area

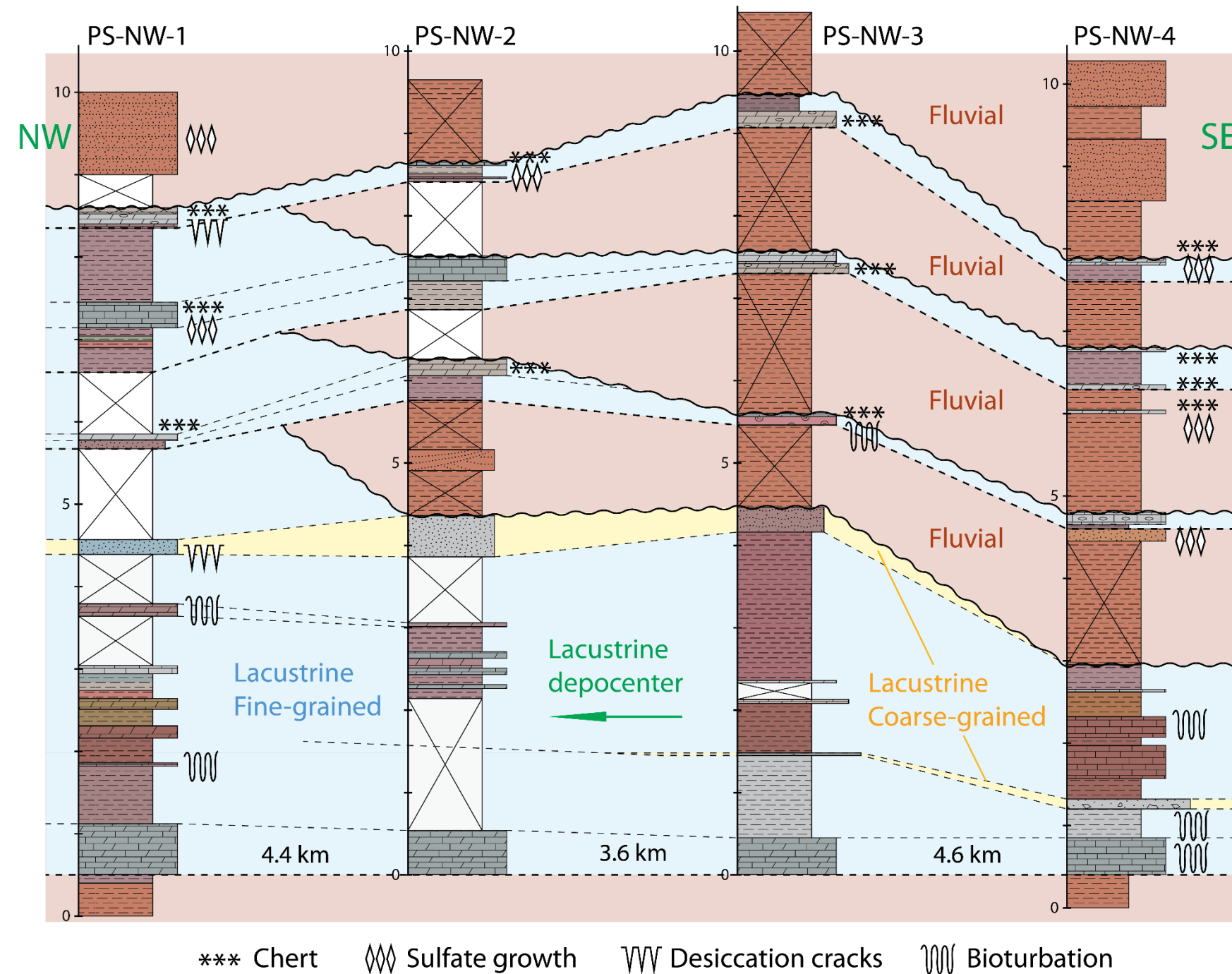


Warner Valley area

Stratigraphy

- Carbonate beds 2 to 60 cm thick
- [Carbonate : Siliciclastic] in Whitmore Point Mbr (1:33) < Kayenta Fm (1:6)
- Different fluvial systems





KAYENTA FM

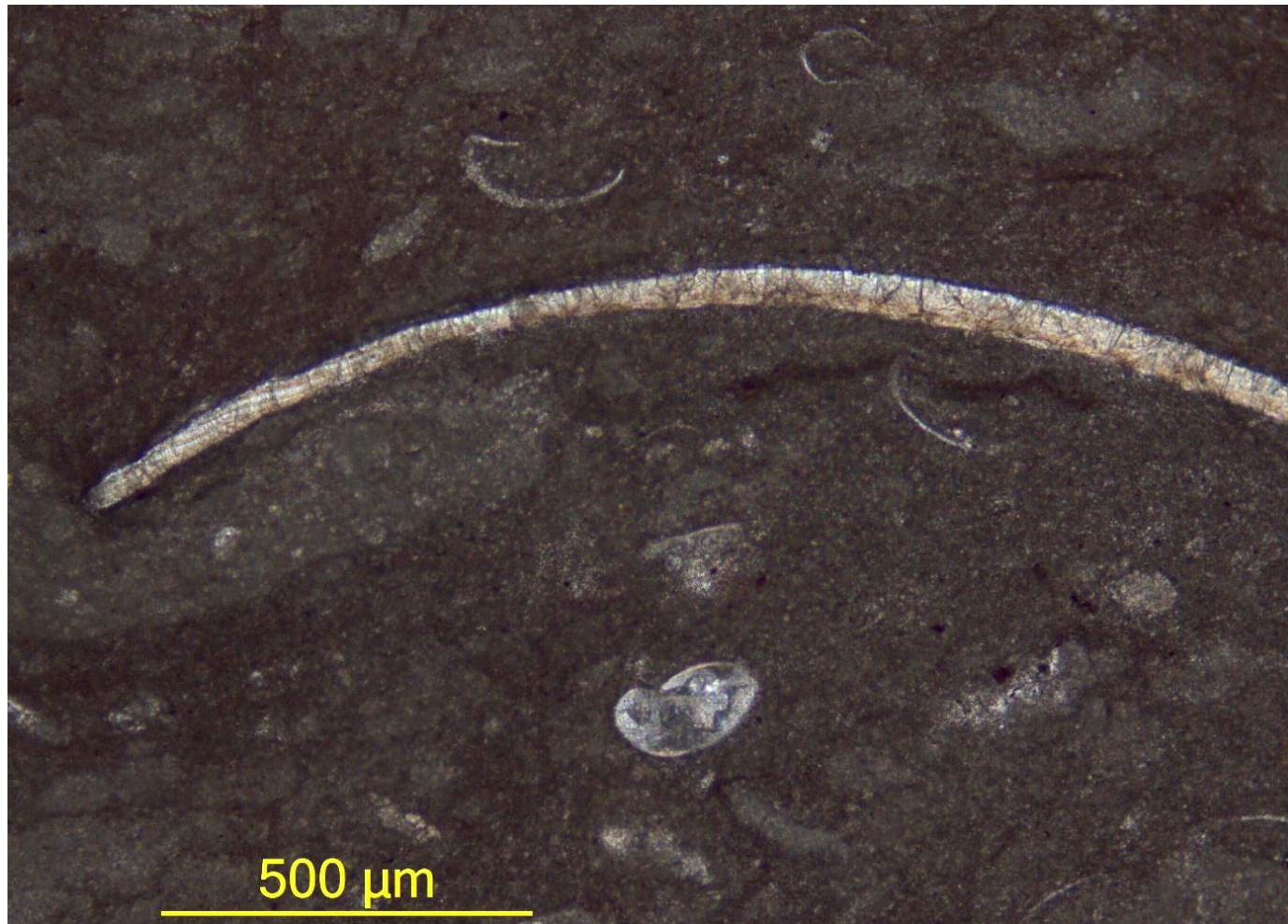
- Lacustrine depocenter to NW
- Replaced by fluvial red-bed deposits
- Lake margin deposits less significant



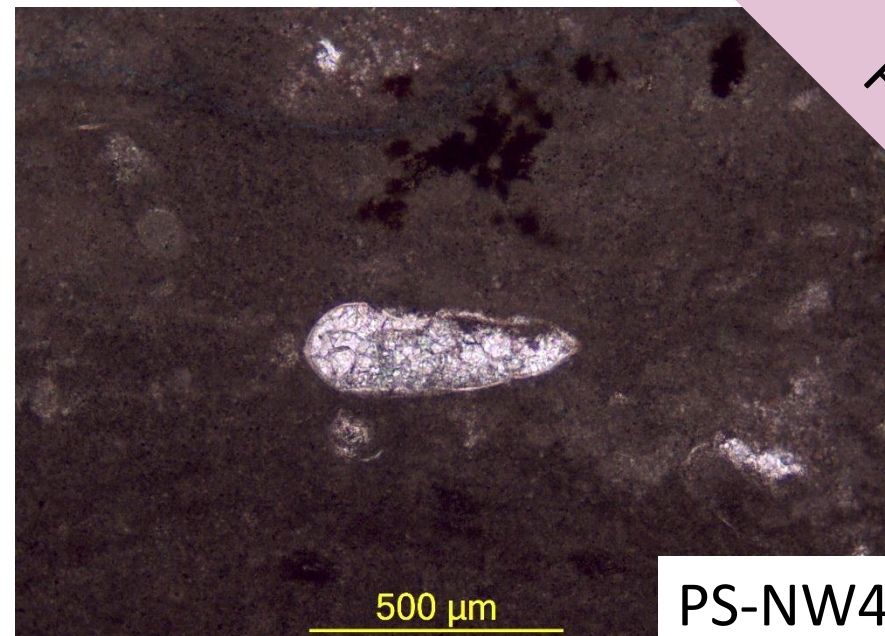
Lithologies and fossils



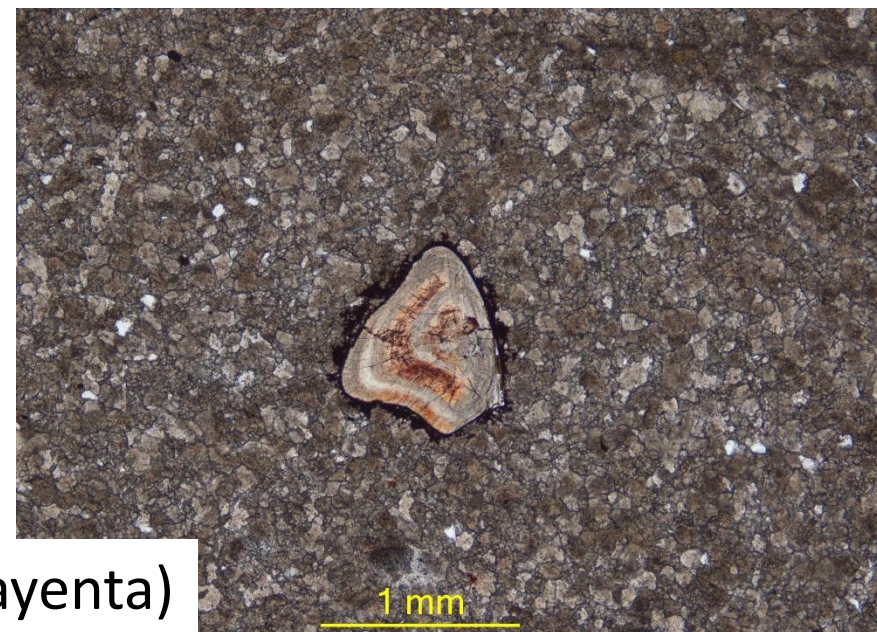
PS-NW4-A, (Kayenta)



PS-NW4-C (Kayenta)

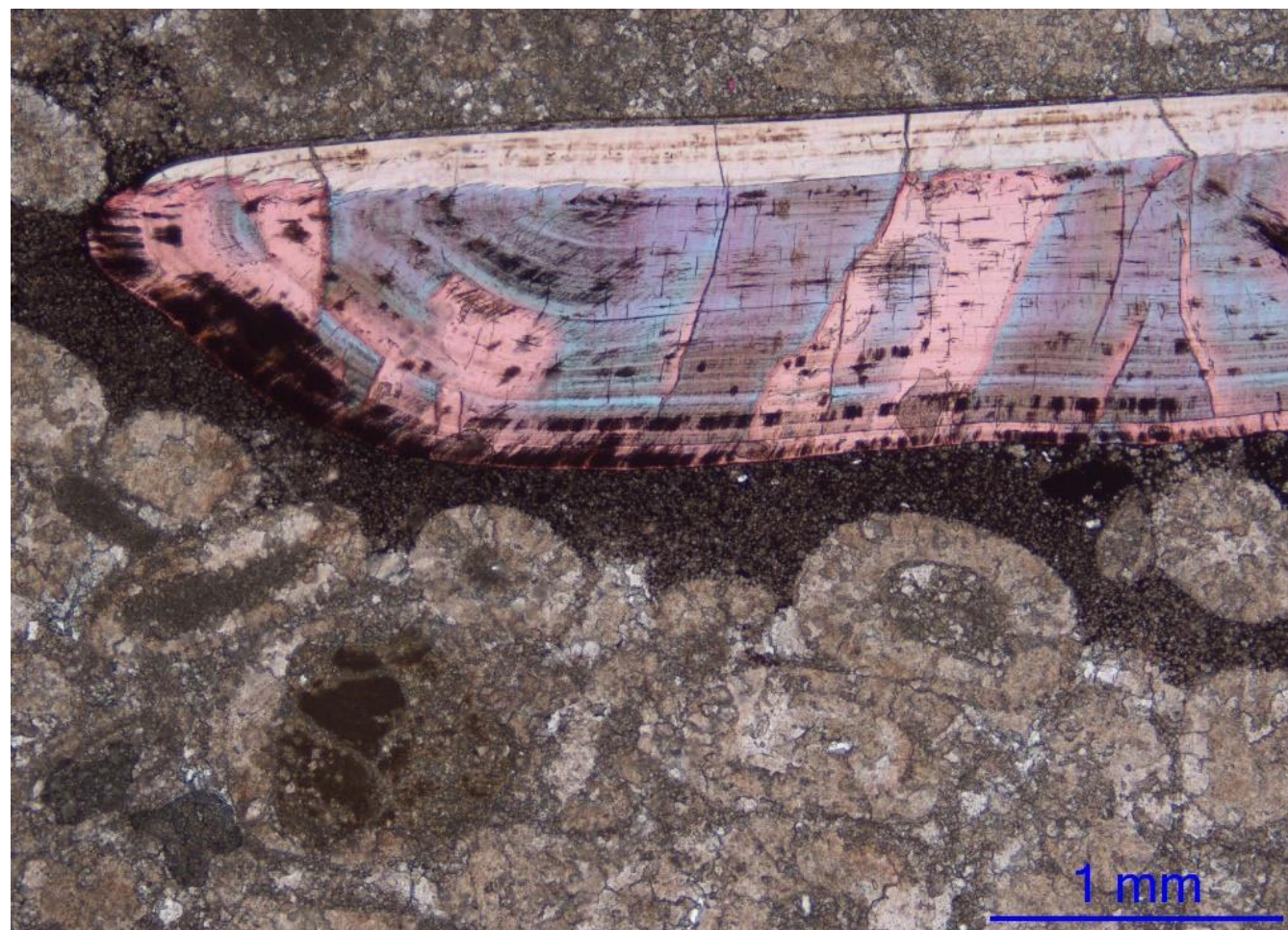
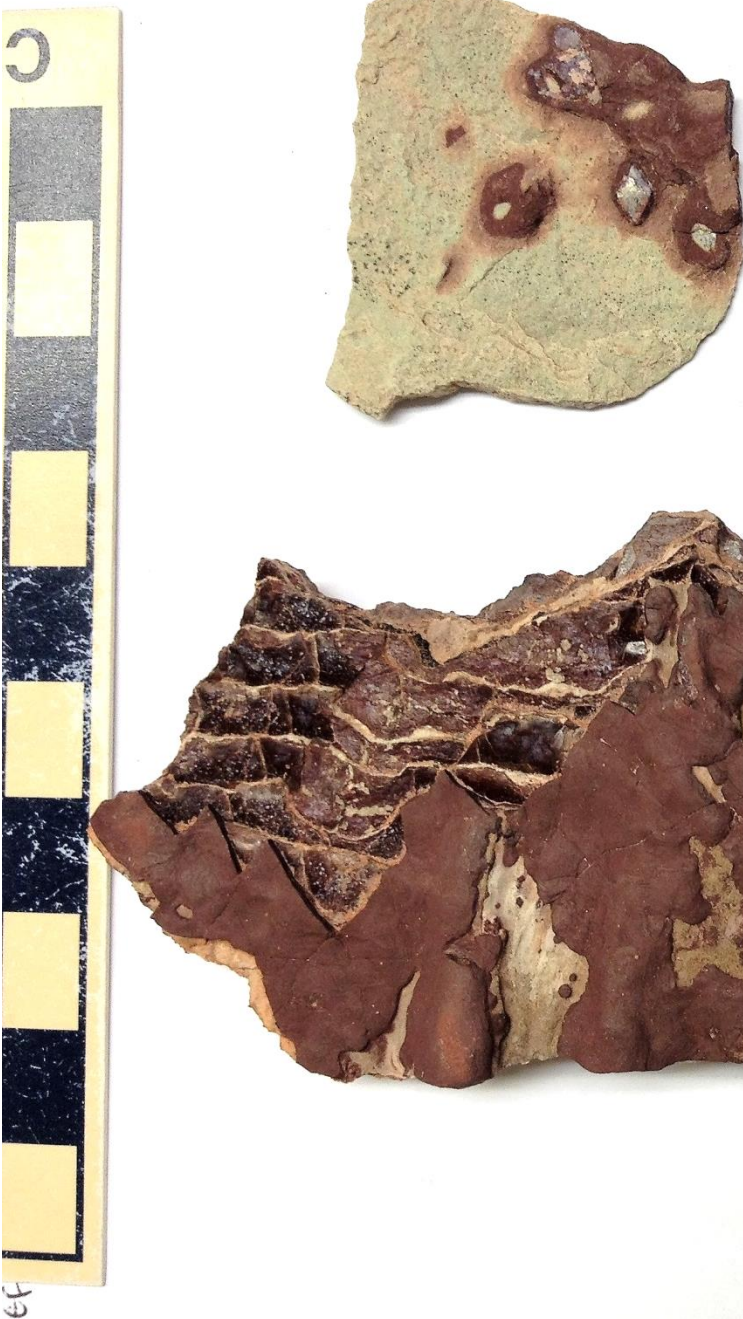


PS-NW4-1
(Kayenta)

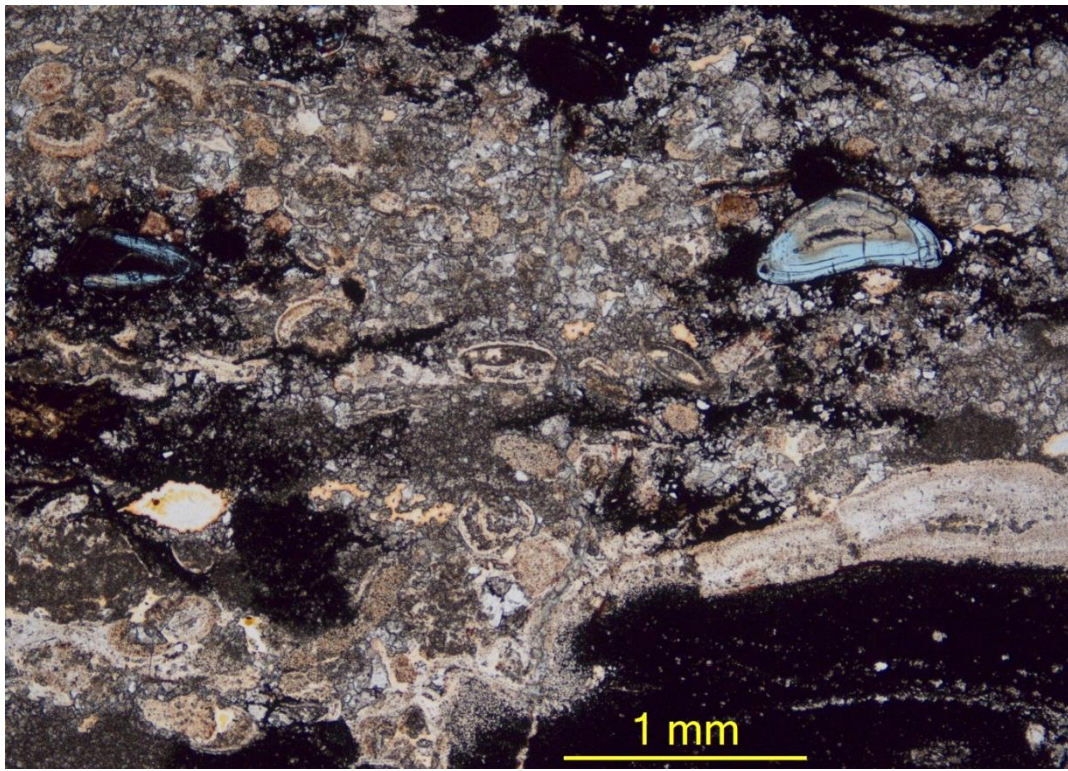


WV-Sd1 (Kayenta)

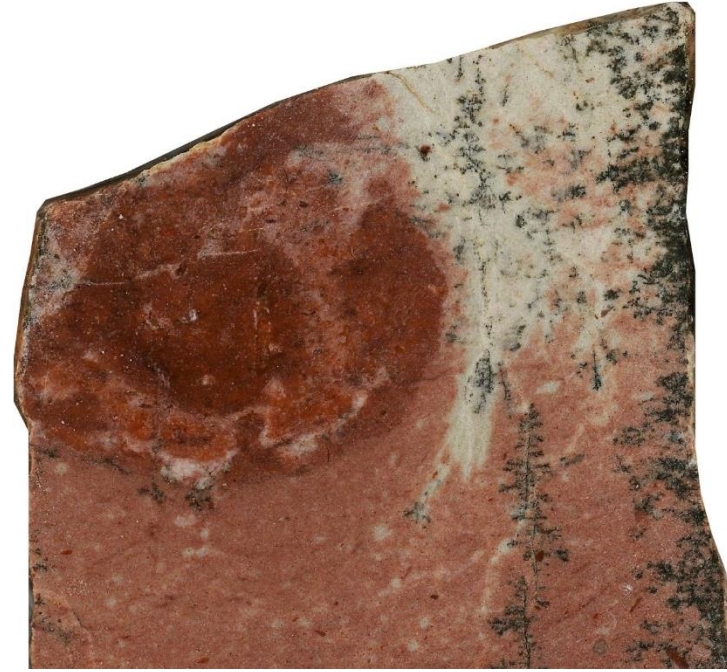
- Ganoid fish scales



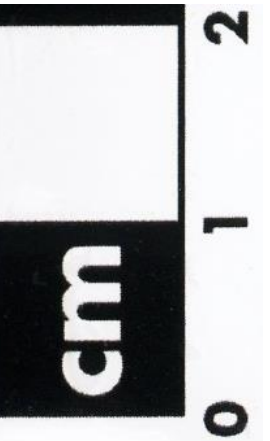
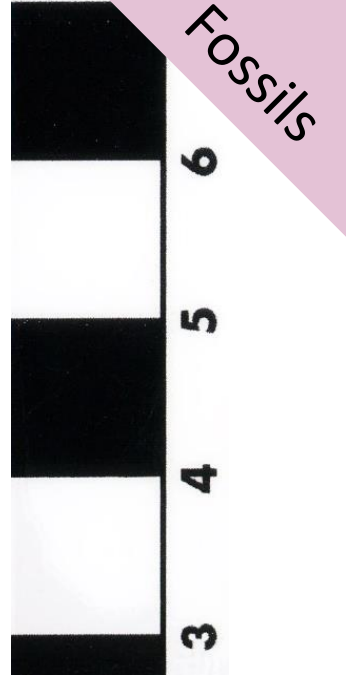
PS-NW4-Oolite (Whitmore Point)

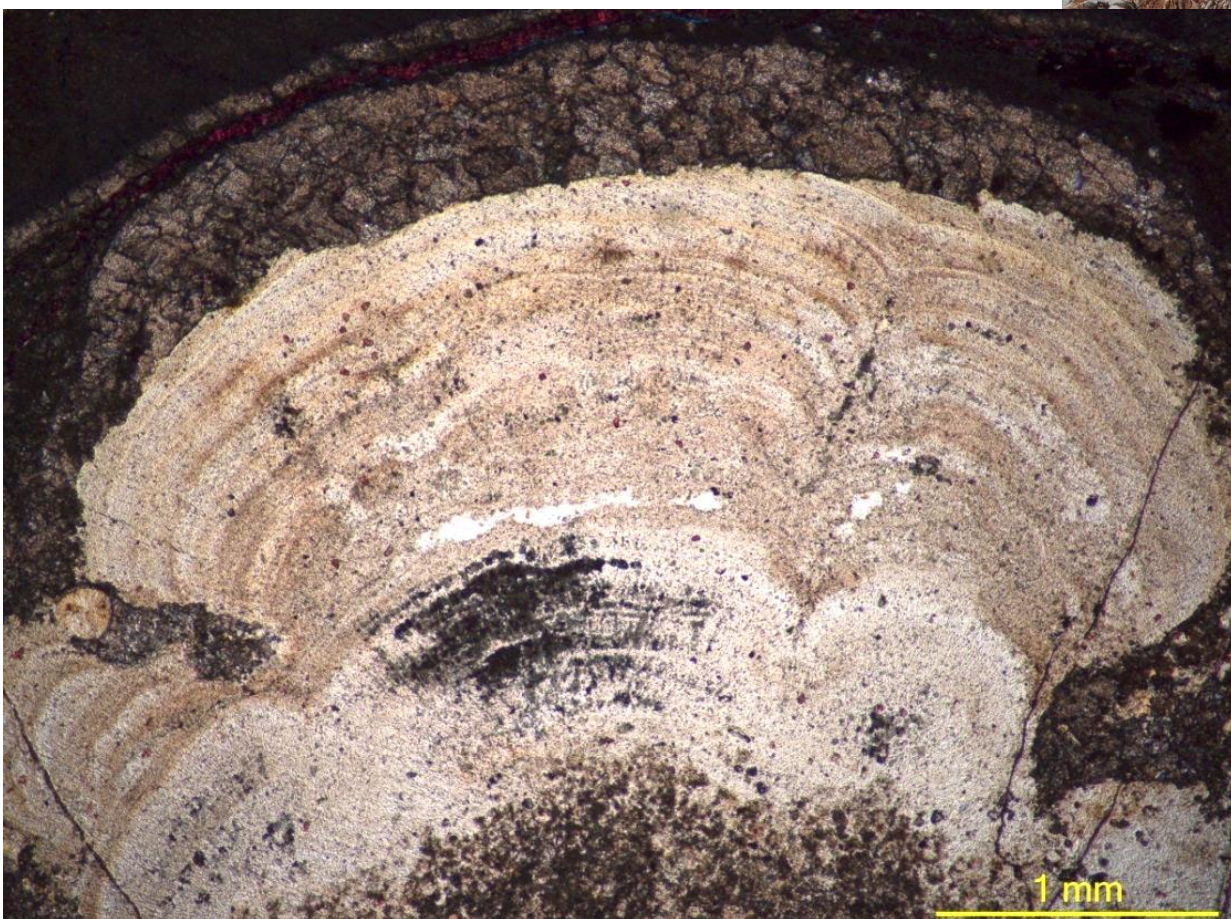


WV-WP1
(Whitmore Point)



PS-NW4-Delta
(Whitmore Point)





Whitmore Point microbialites, WV

- Usually with silicification or neomorphism
- Related to fish mortality events

Pedogenesis

Nodulization

Brecciation

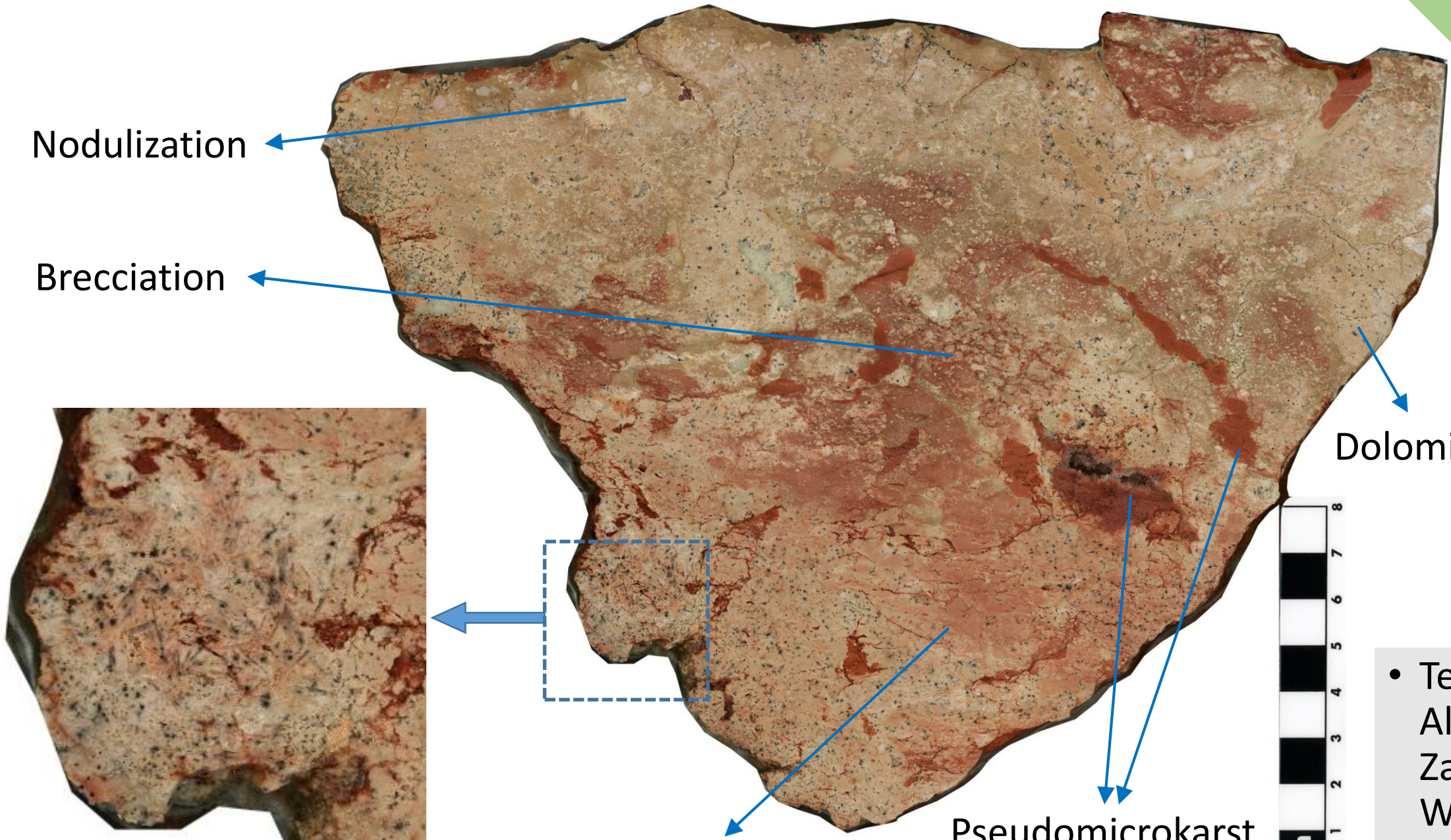
Dolomitization

Pseudomicrokarst

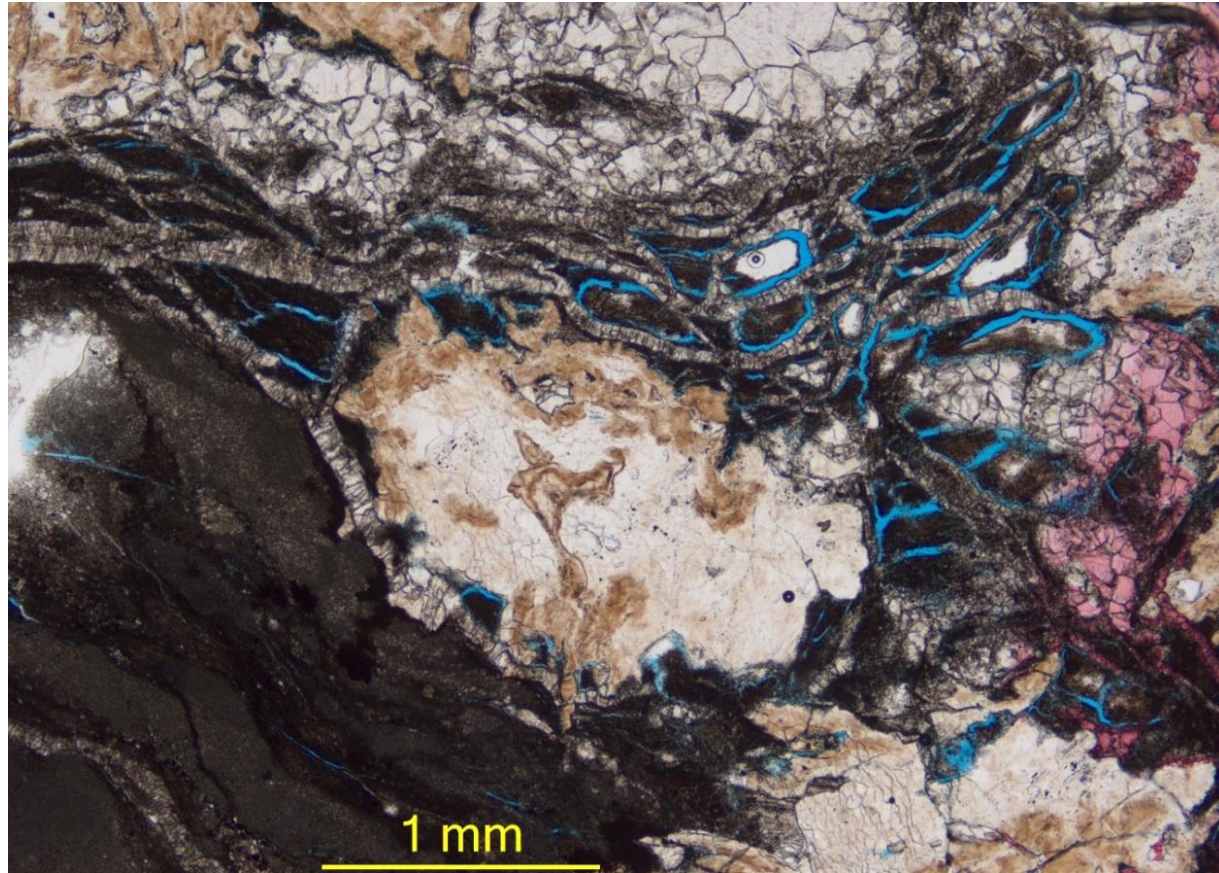
Marmorization?

Pseudomorphs after sulfates

- Textures:
Alonso-
Zarza &
Wright
(2010)



Alveolar-septal; root textures

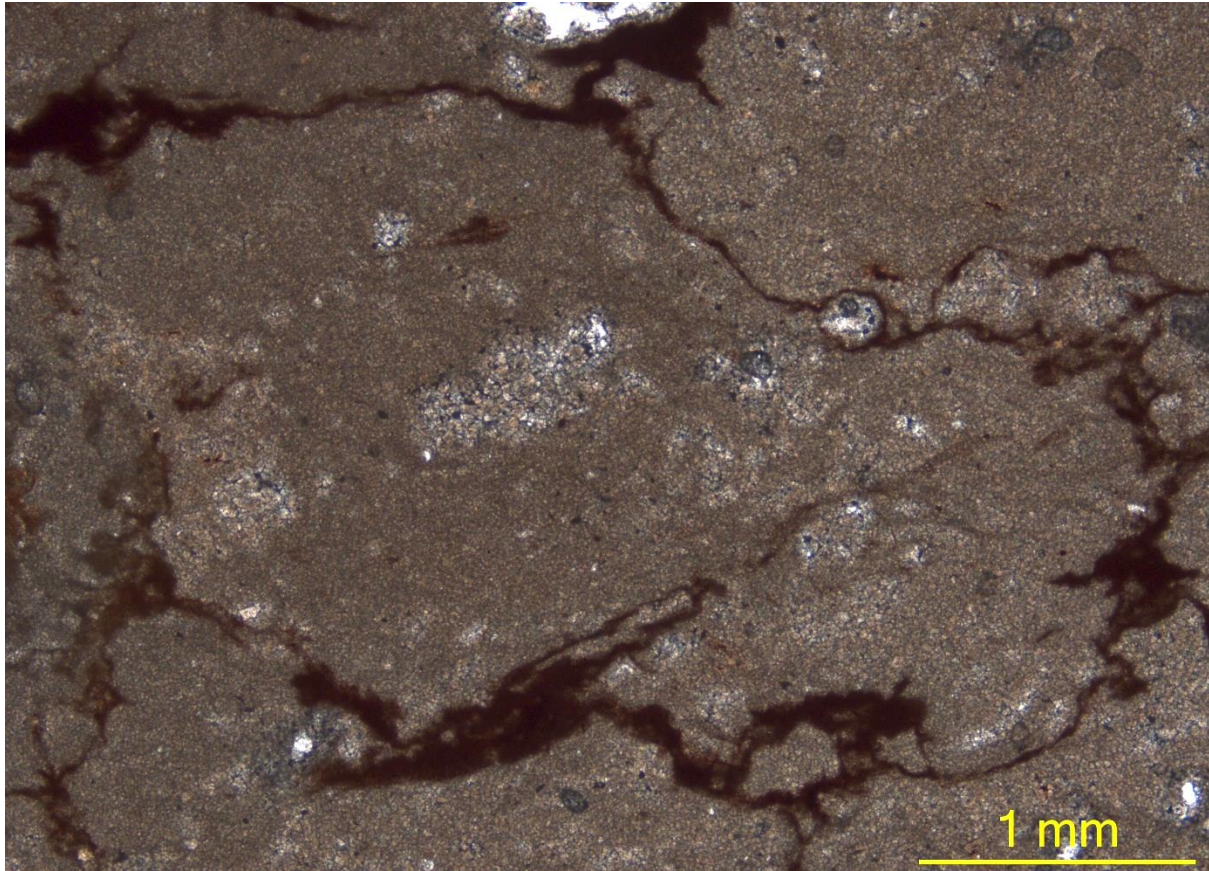


PS-NW4-4 (Kayenta)

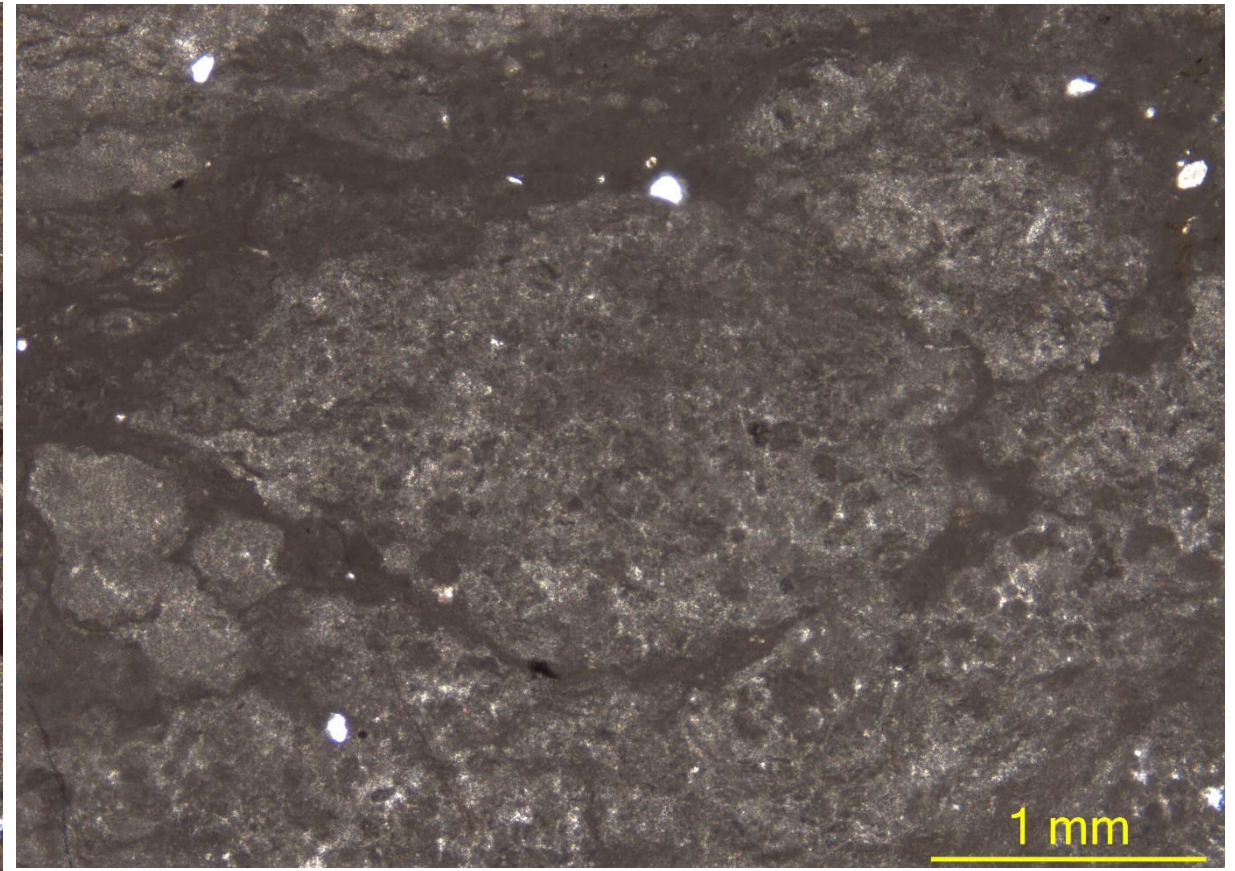


(Whitmore Point) WV

Circumgranular cracks and nodulization



K (Kayenta), St. George



M-2 (Kayenta), Kanab

Sulfate-related features

- More common in the Kayenta Fm.
- Evaporative environment



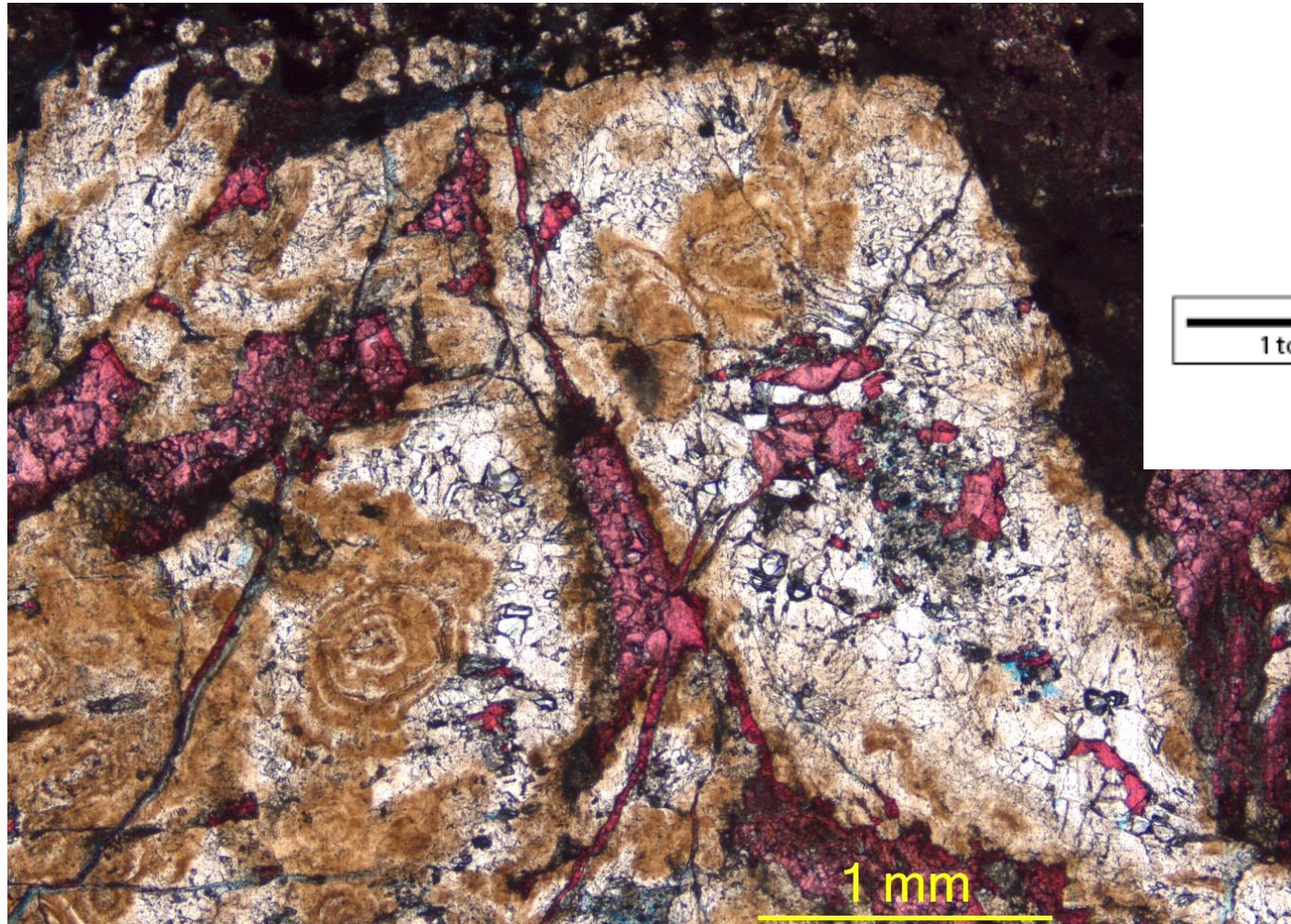
Sandstone below
PS-NW4-1 (Kayenta)



PS-NW4-4 (Kayenta)

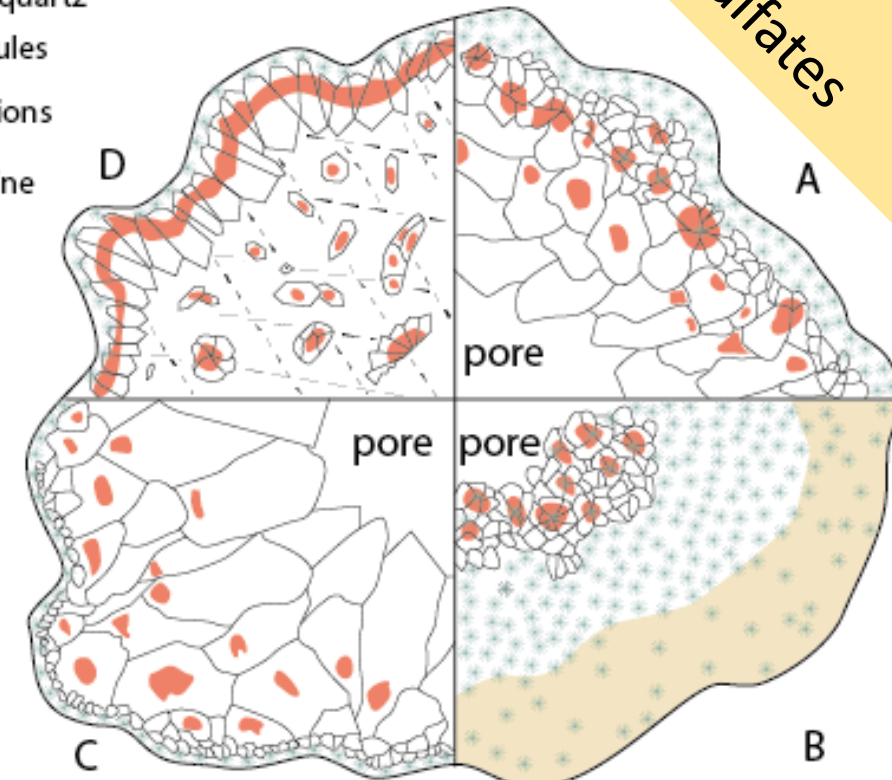
Sulfates

Cauliflower chert



- Randomly fibrous microcrystalline quartz
- Quartzine spherules
- Anhydrite inclusions
- Coarsely crystalline calcite

1 to 10 cm



- John Warren, from Milliken (1979)

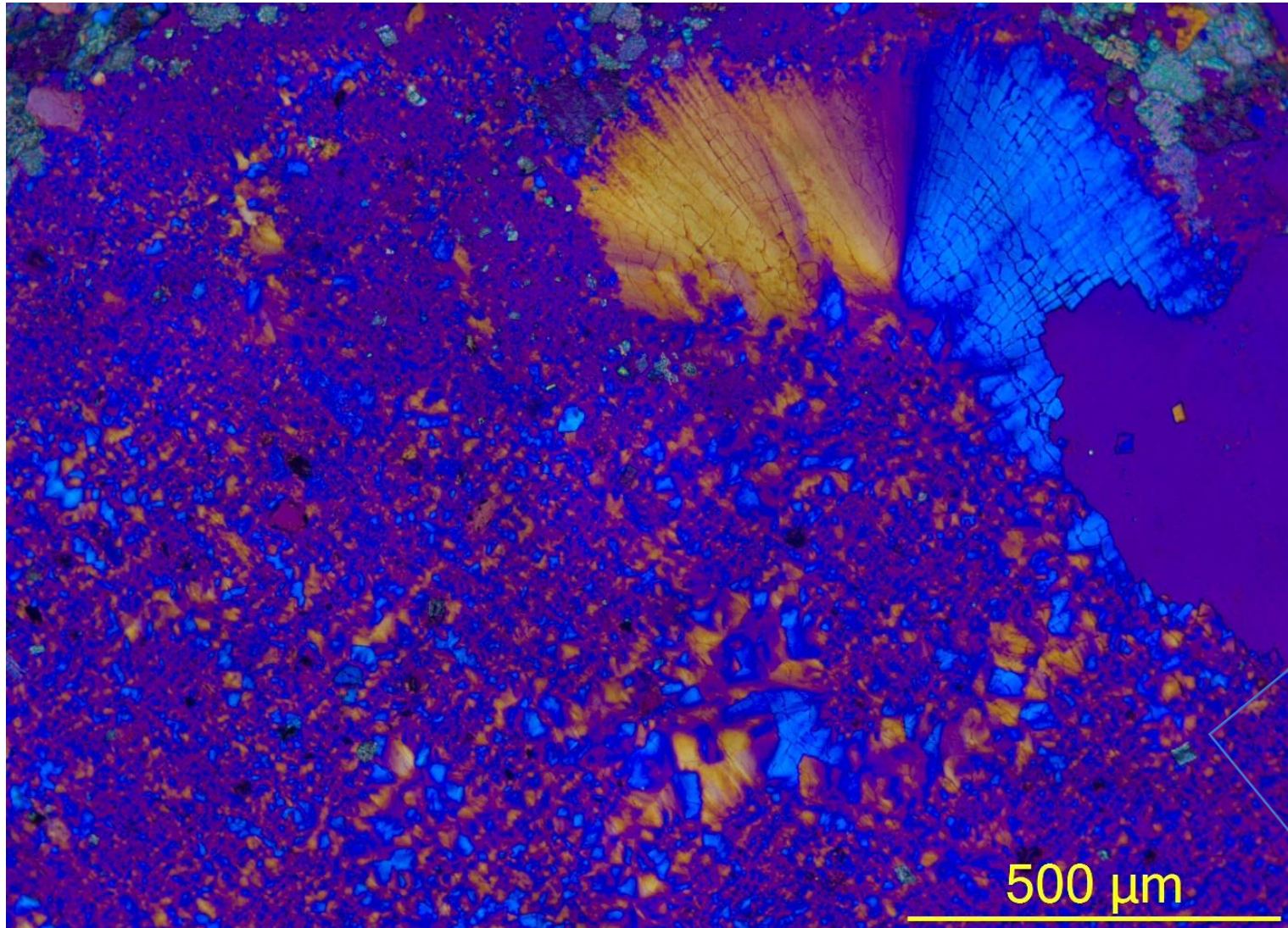
PS-NW4-4 (Kayenta)

Magadi-type chert, length-slow chalcedony

Chert

- Length-slow chalcedony (quartzine or lutecite): alkaline or sulfate-rich environments

Folk and Pittman (1971)



500 μm

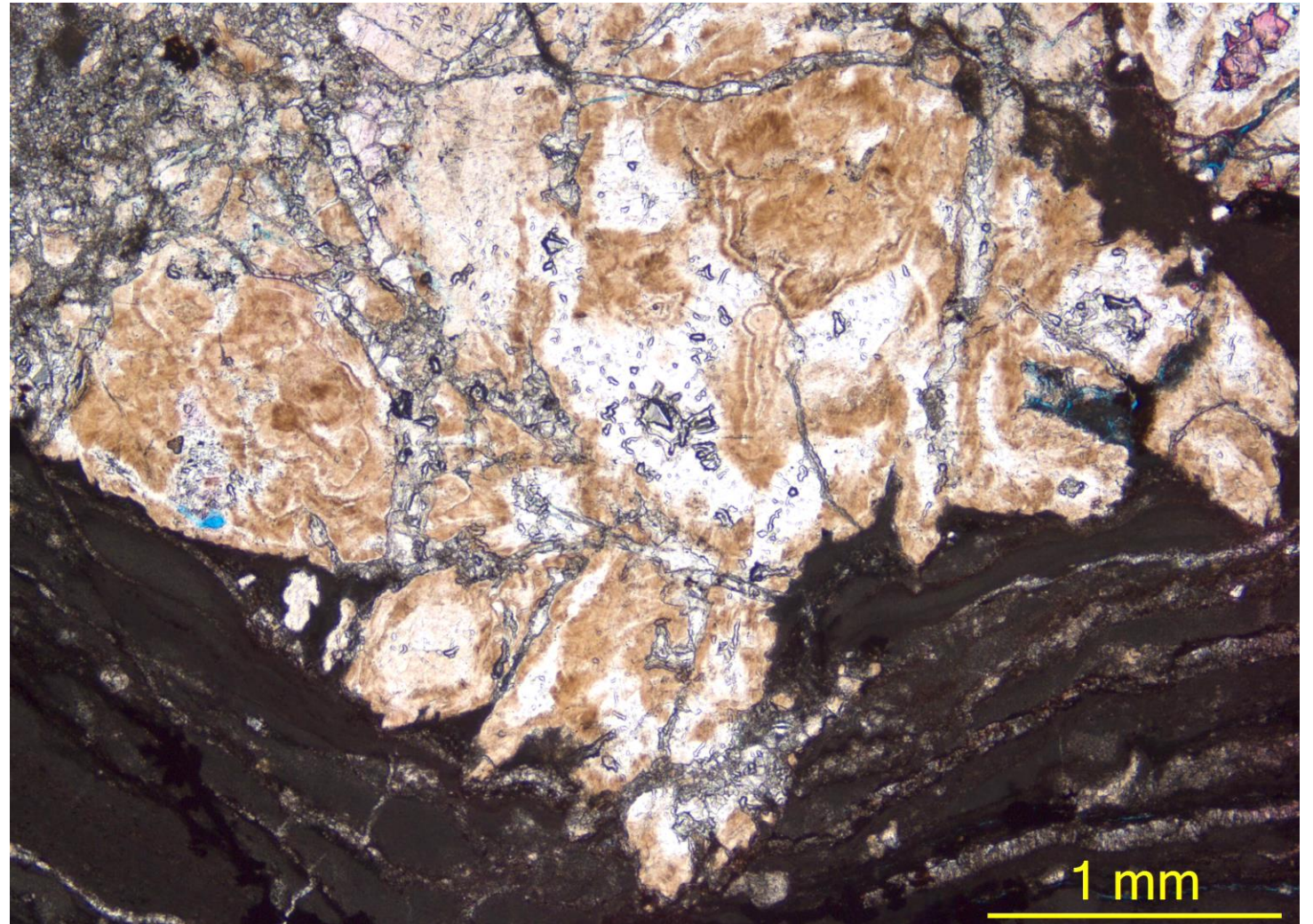
Slow

PS-NW4-Gamma
(Whitmore Point)

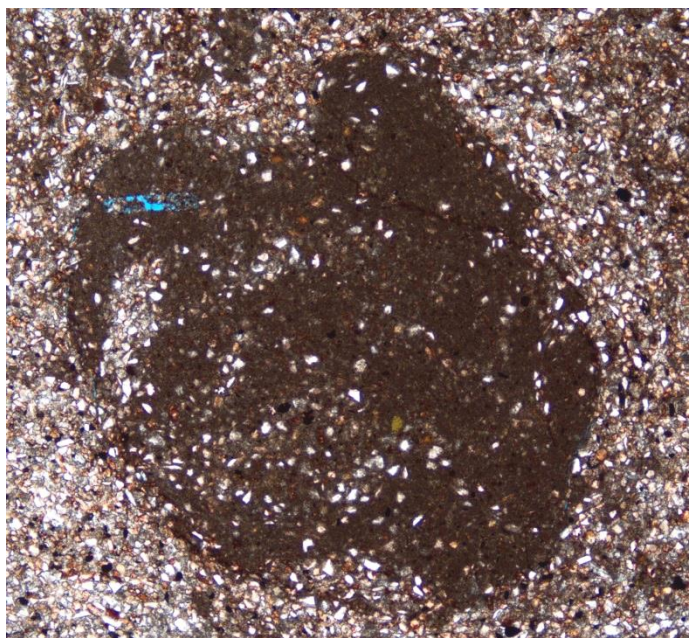
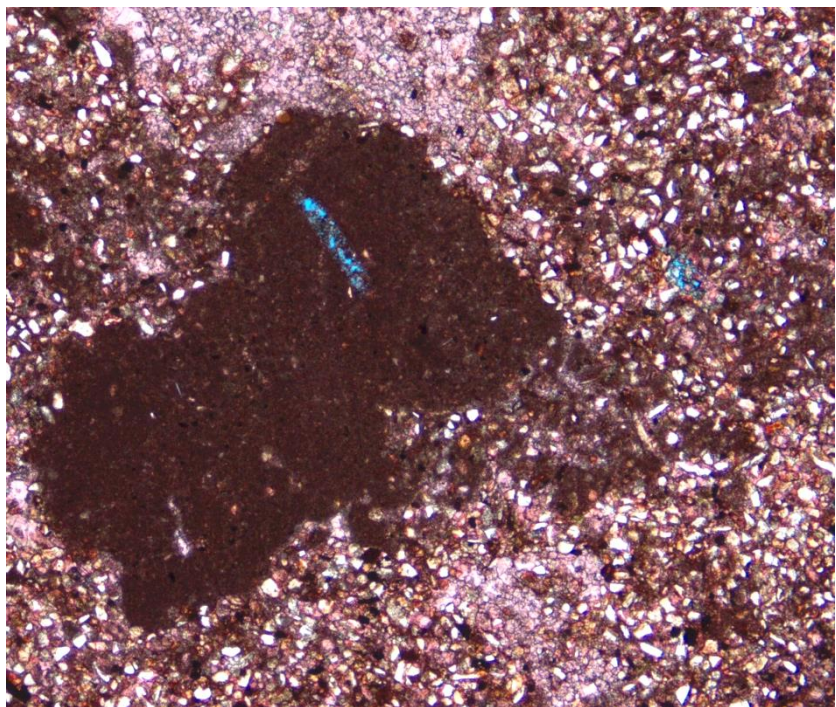
Petrofabrics and paragenesis timing

- Eogenesis:
pedogenesis,
sulfates, chert,
silicification,
dolomitization

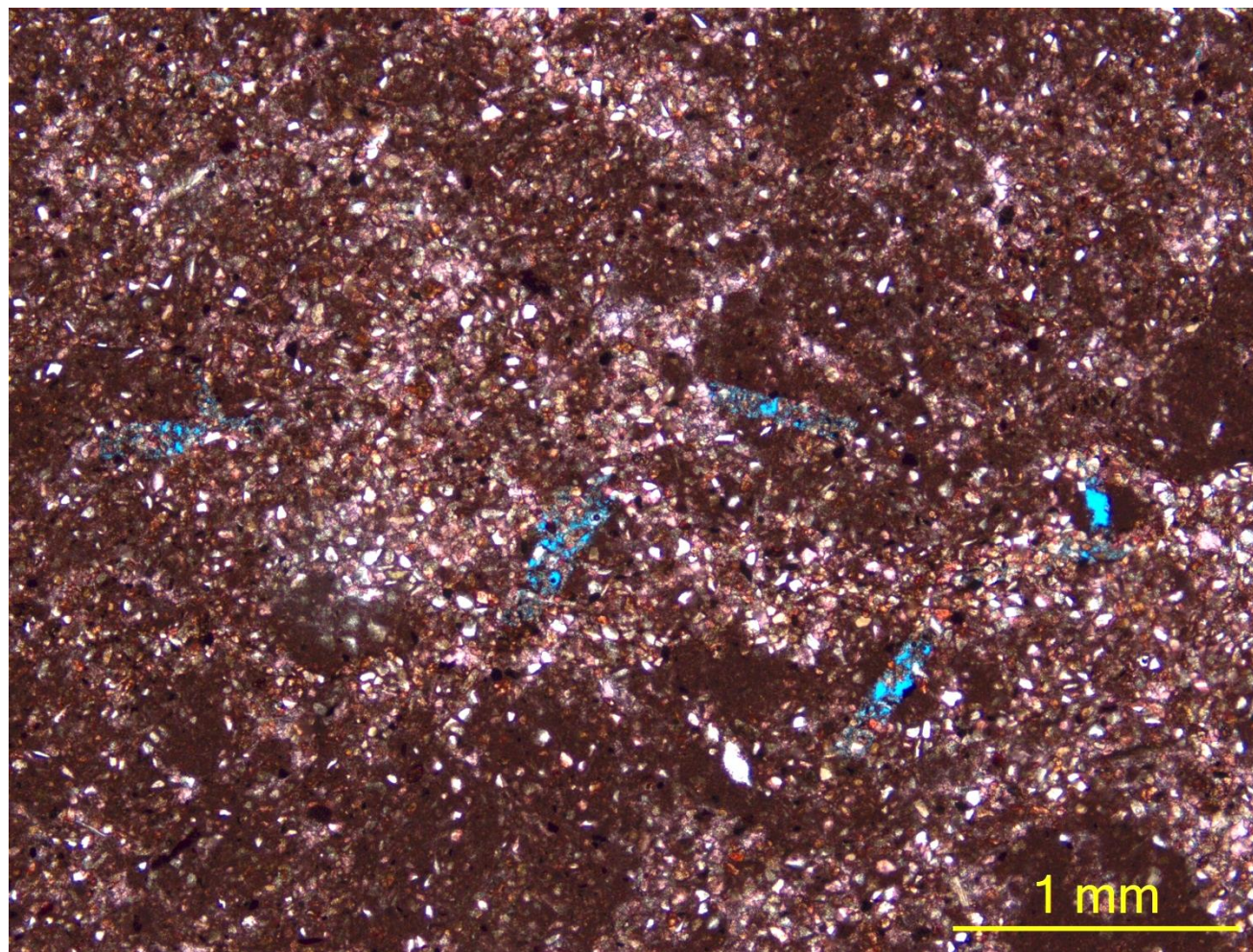
PS-NW4-4
(Kayenta)



Sulfates after or during bioturbation



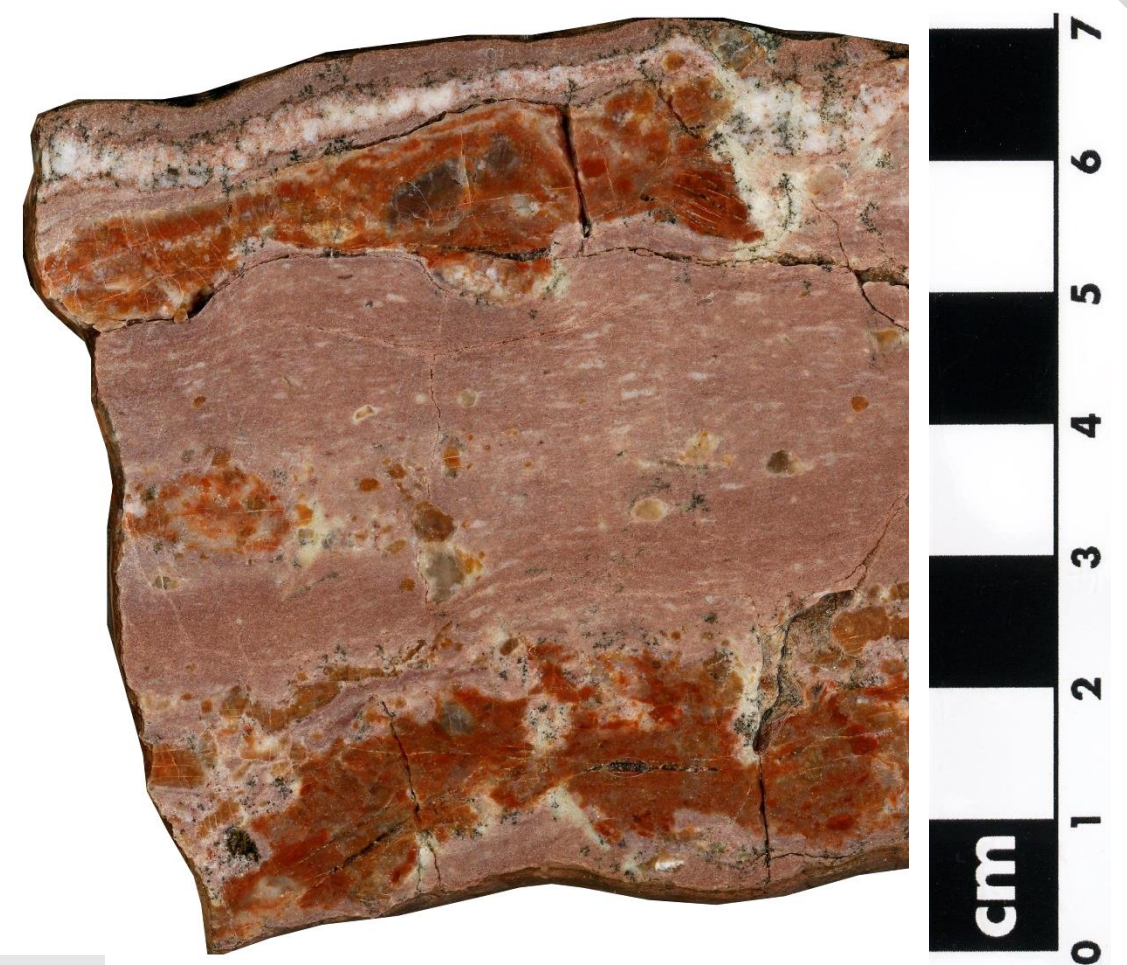
WV-2.2
(Kayenta)





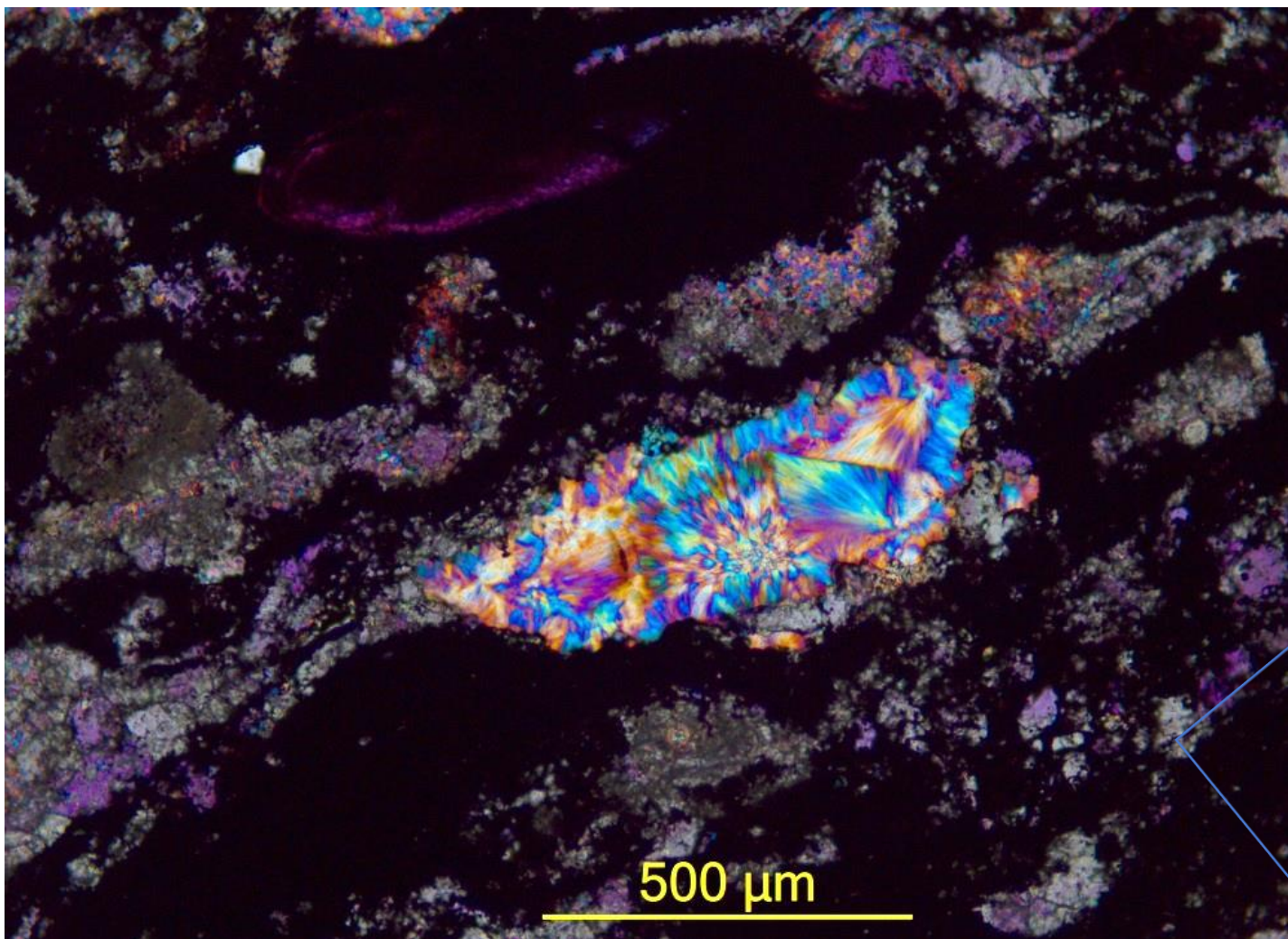
PS-NW4-2 (Kayenta)

- Early silicification features: Bustillo (2010)



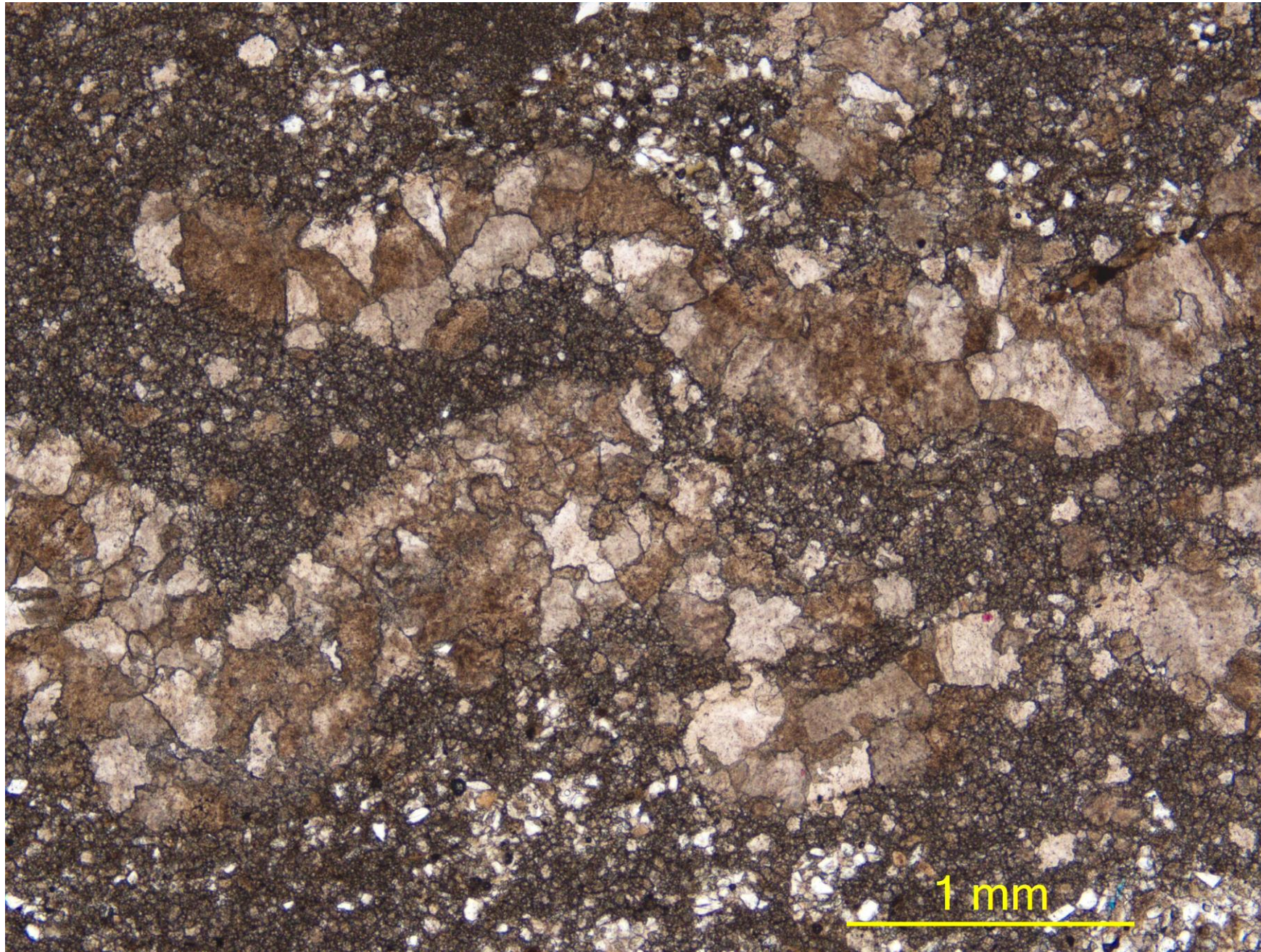
PS-NW4-Gamma
(Whitmore Point)

Silica: at least 2 phases



- Length-fast chalcedony: silicification or replacement (posterior phase)

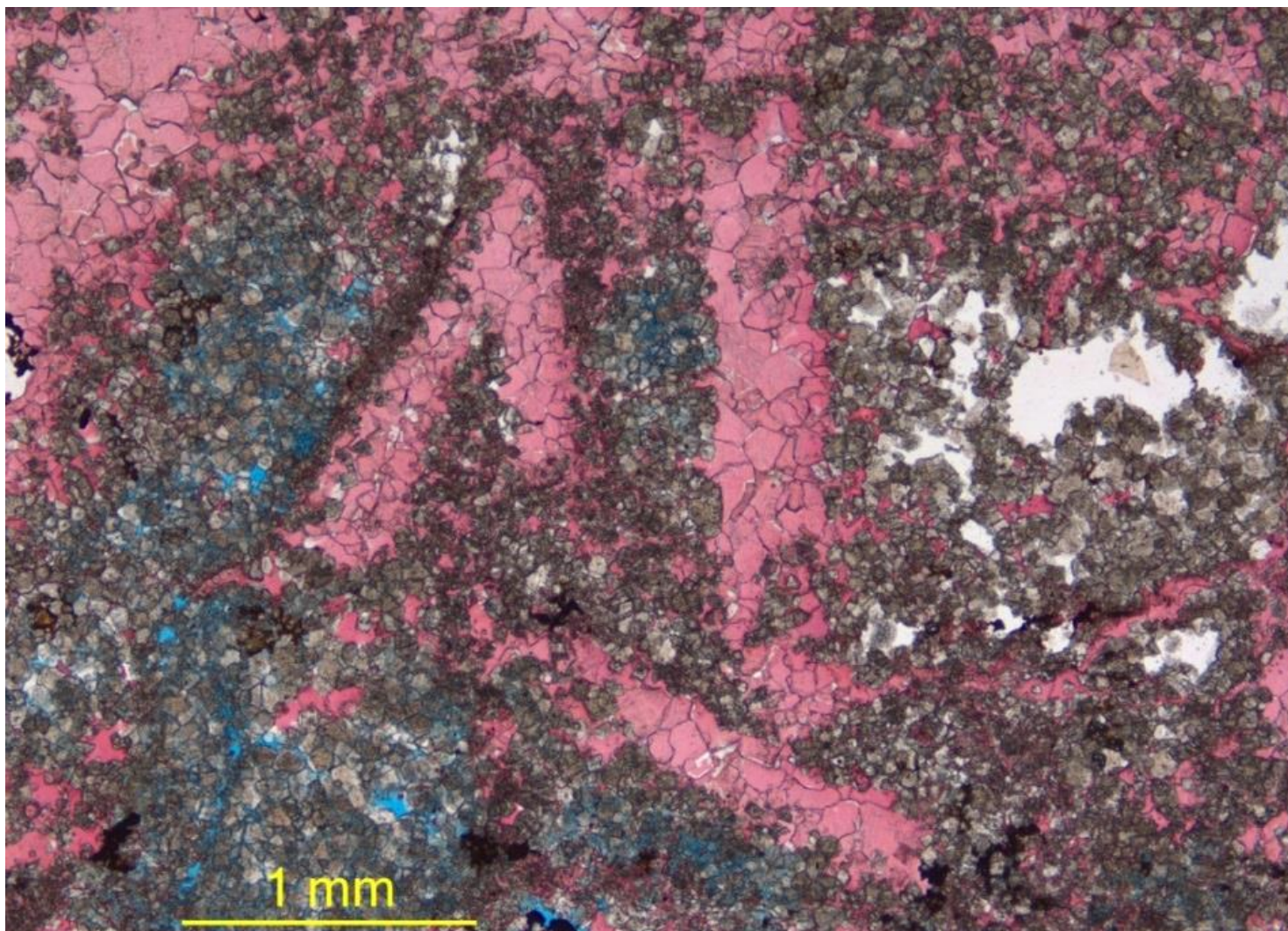
WV-WP1
(Whitmore Point)



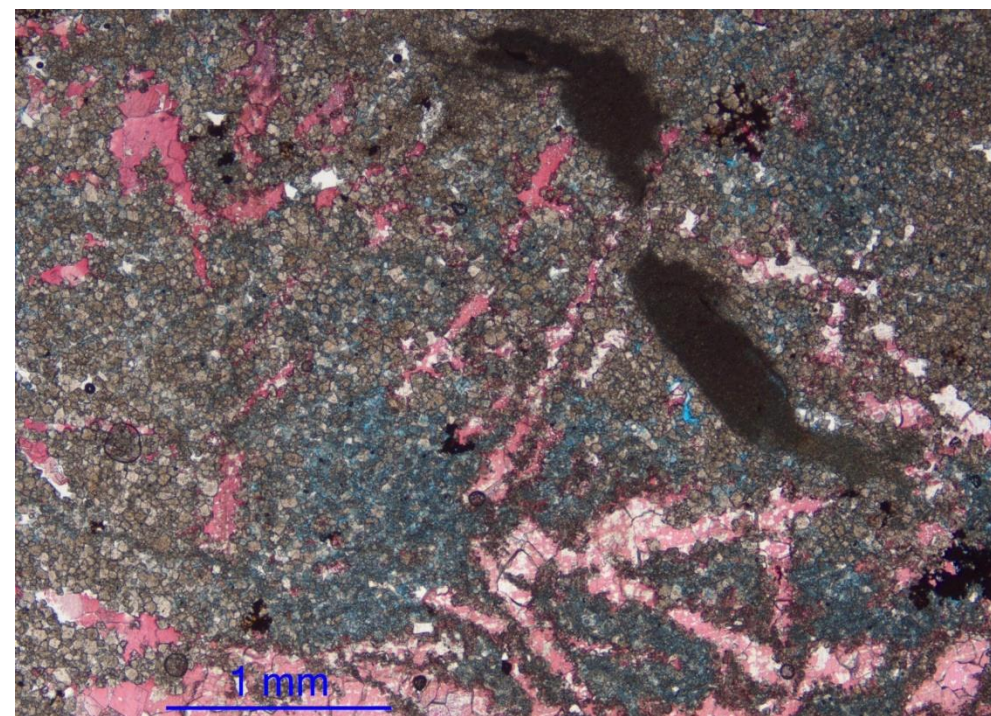
- Burrows prior to dolomitization

WV-3 (Kayenta)

Dolomicrospar after calcite pseudomorphs after sulfate



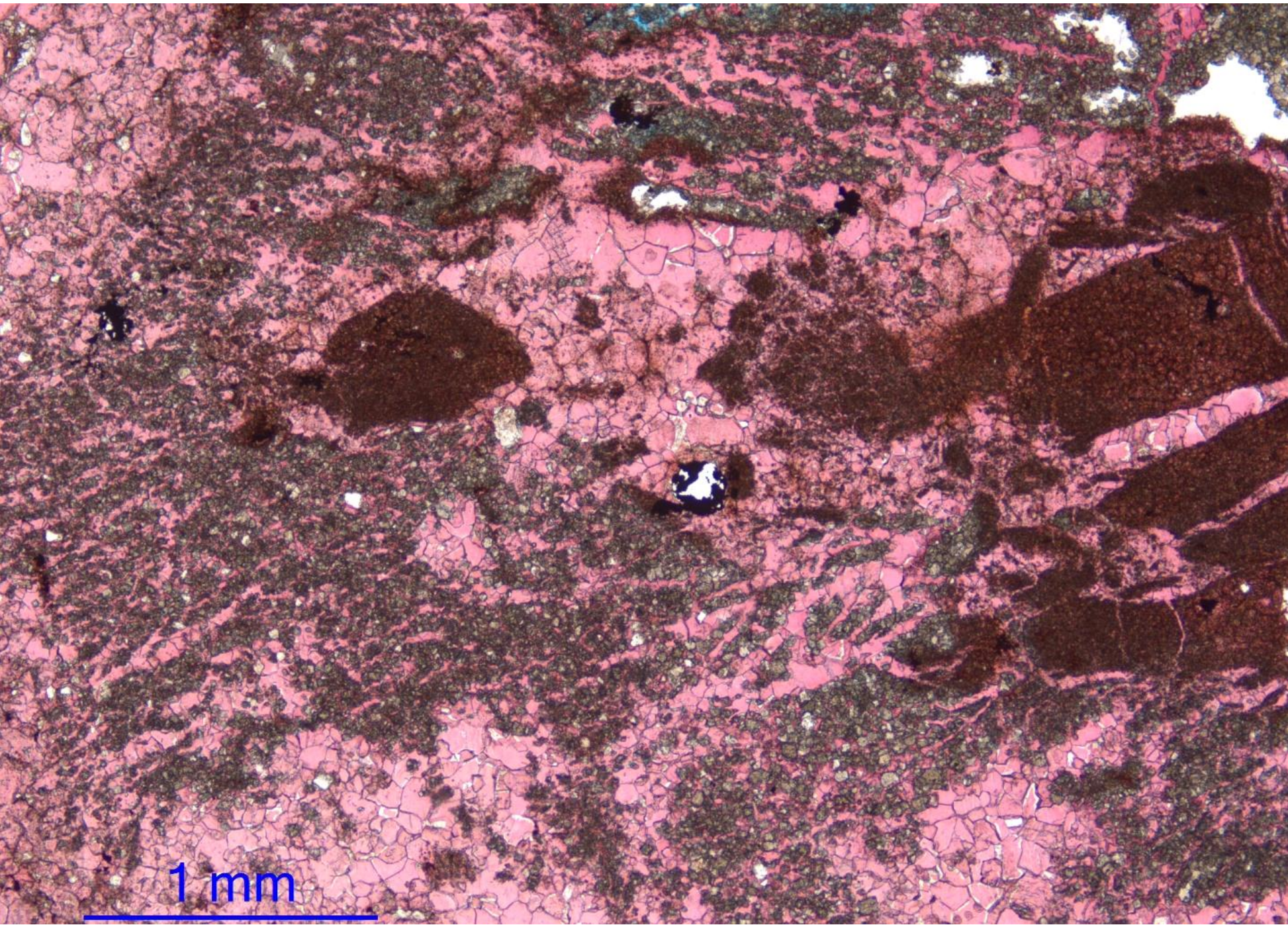
K (Kayenta),
St. George

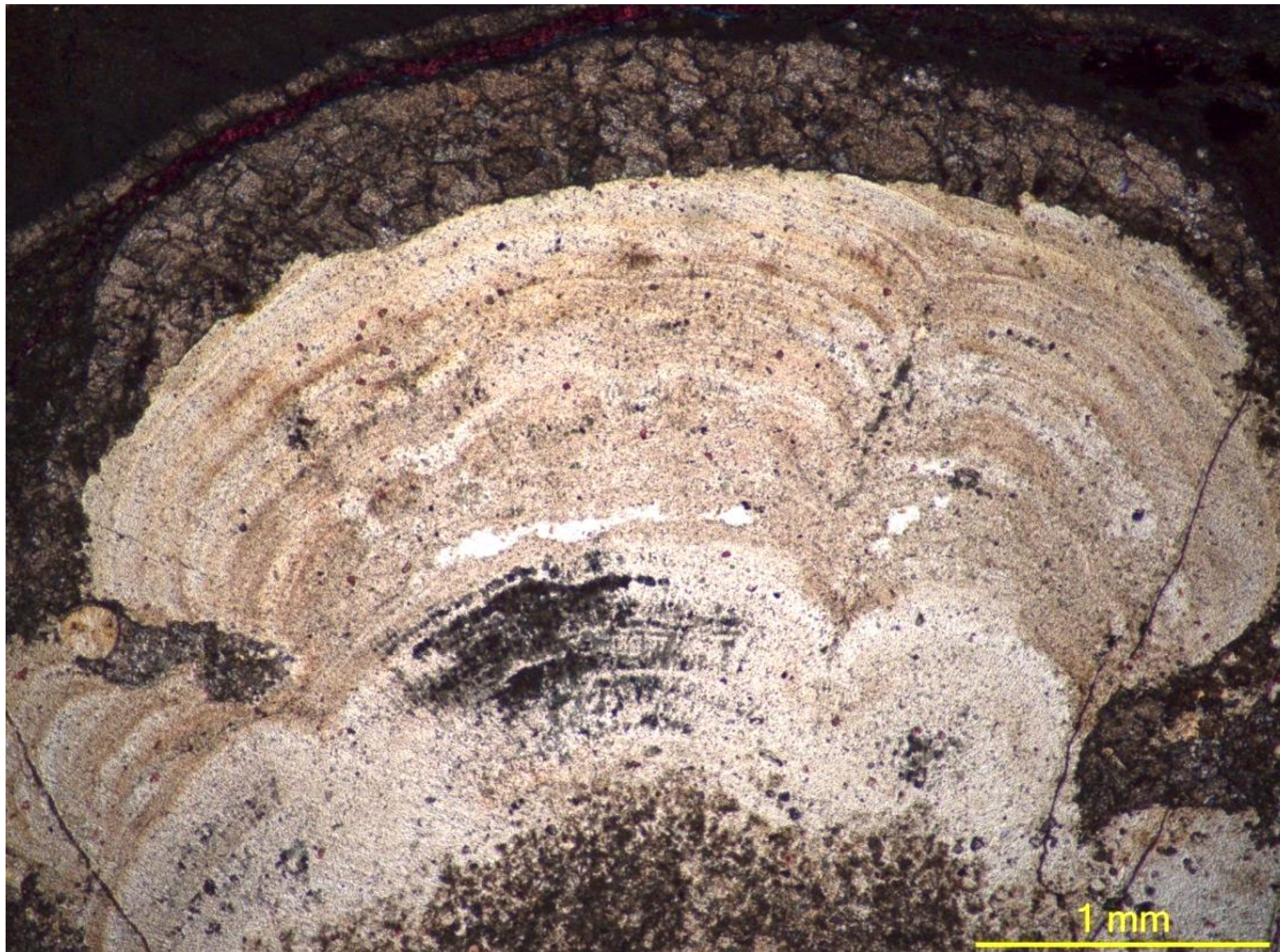


- Dolomicrospar after alveolar-septal

K (Kayenta),
St. George

1 mm





- Dolomitization after silicification

WV-WP1
(Whitmore Point)

Conclusions

- Lacustrine depocenter and adjacent paleoenvironments.
- Low-grade, low-energy, frequent regressions (fine-grained, restricted shore units, pedogenesis and desiccation).
- Ephemeral lakes or closed hydrographic basin (desiccation, water chemistry, evaporation). Balanced-filled or underfilled lake successions.
- The above factors and the overall complex early diagenesis may suggest a semi-arid climate.

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