

# **Modern Bahamian Thrombolites: The Products of Extensive Remodeling\***

**Noah Planavsky<sup>1,2</sup> and Robert N. Ginsburg<sup>1</sup>**

Search and Discovery Article #50142 (2008)

Posted November 20, 2008

\*Adapted from oral presentation at AAPG Annual Convention, San Antonio, Texas, April 20-23, 2008

<sup>1</sup>University of Miami Rosenstiel School of Marine and Atmospheric Sciences ([planavsky@gmail.com](mailto:planavsky@gmail.com))

<sup>2</sup>University of California, Riverside

## **Abstract**

The discovery of extensive fields of stromatolites, first in Shark Bay, Western Australia, and later in the Exuma Islands of the Bahamas, initiated an enormous amount of study on modern microbial deposits. These modern analogues have added valuable new concepts about the genesis of these most ancient traces of life on earth. Although all of the Bahamian mounds were initially described as stromatolites, implying the presence of laminations, it was soon noted that there is a large amount of fabric variation in the columns. The internal fabric varies from a completely laminated to an irregular, mottled fabric. The columns composed predominantly of mottled fabrics have been classified as thrombolites. There has been considerable progress in understanding the origin and lithification of laminations, but models for thrombolite morphogenesis remain speculative. We propose a new model for morphogenesis of subtidal Bahamian thrombolites. The growth model is focused on detailed descriptions and interpretations of the microbialite fabrics in the context of our observations and published descriptions of the benthic communities and physical processes. Our findings suggest that variations in the amount and style of penecontemporaneous diagenesis rather than differences in surficial benthic communities cause the disparate internal morphologies of the Bahamian microbialites.

**Modern Bahamian Thrombolites:  
The Products of Extensive Remodeling**

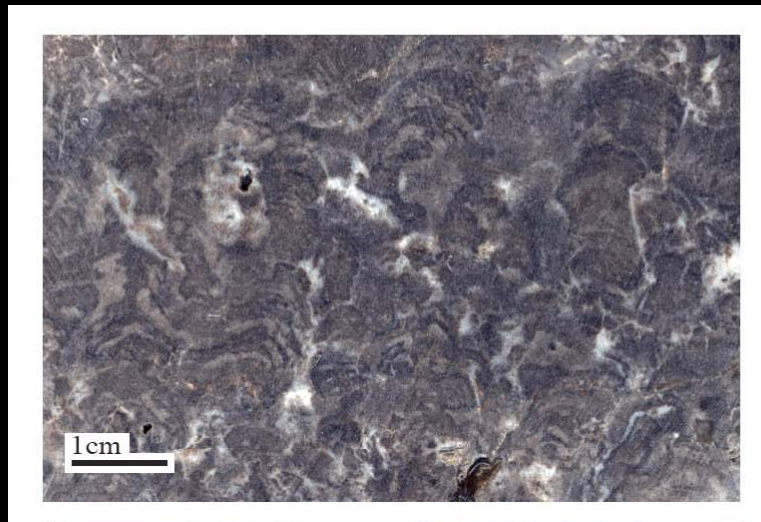
Noah Planavsky <sup>1,2</sup> and Robert N. Ginsburg <sup>1</sup>

<sup>1</sup> University of Miami Rosenstiel School of Marine and Atmospheric Sciences

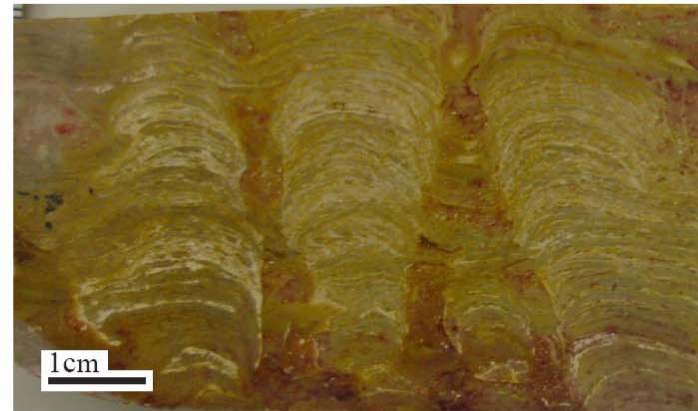
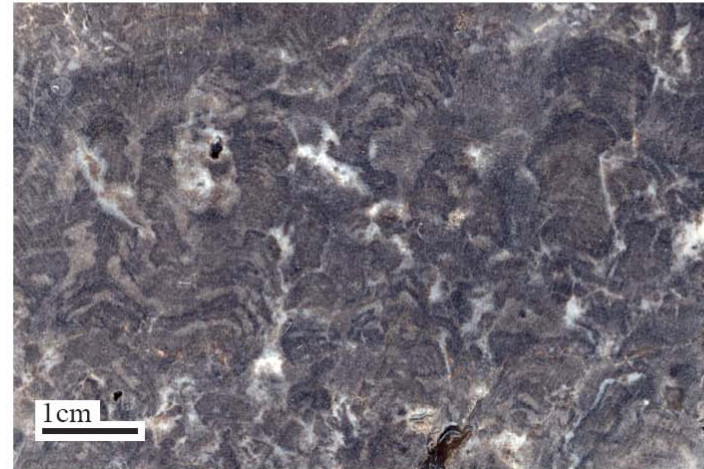
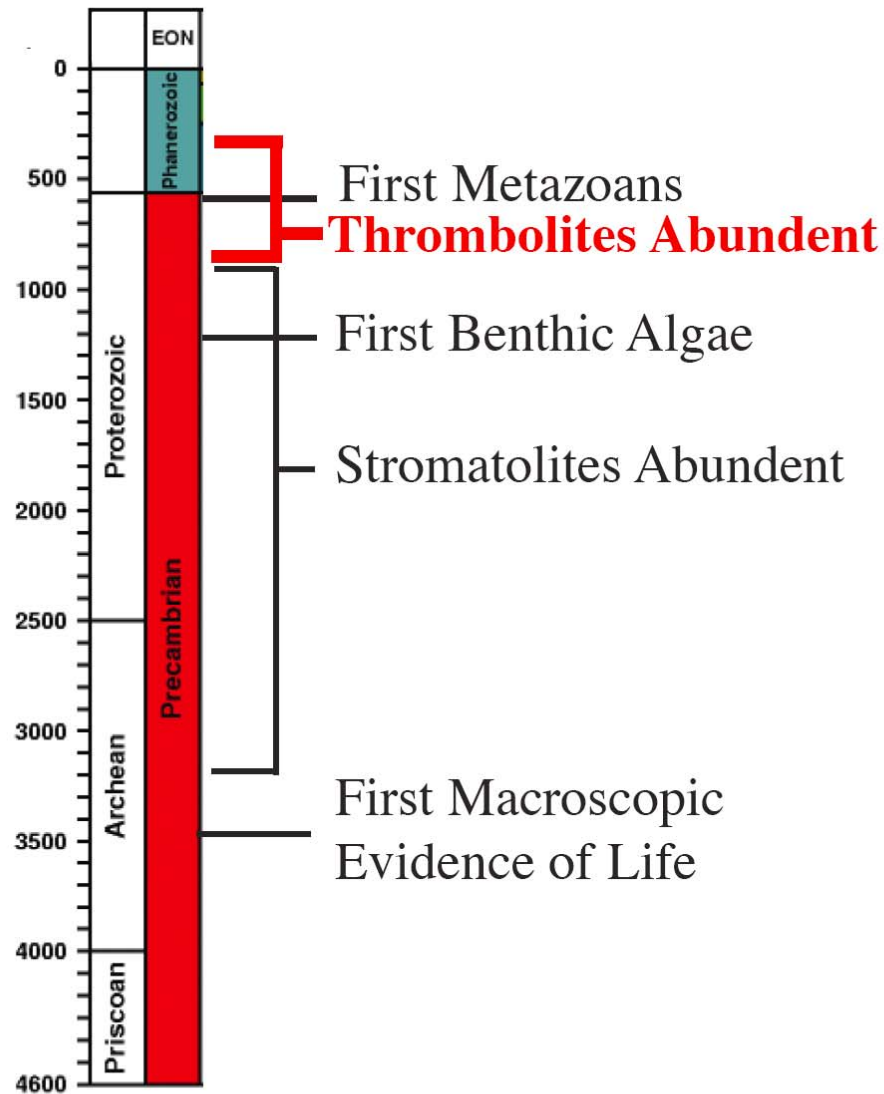
<sup>2</sup> University of California, Riverside

## Why Are We Interested in Thrombolites?

- Formation is poorly understood



- Reservoir rocks in the Neoproterozoic and Paleozoic
- Tell us about the Evolution of Reefs and Life



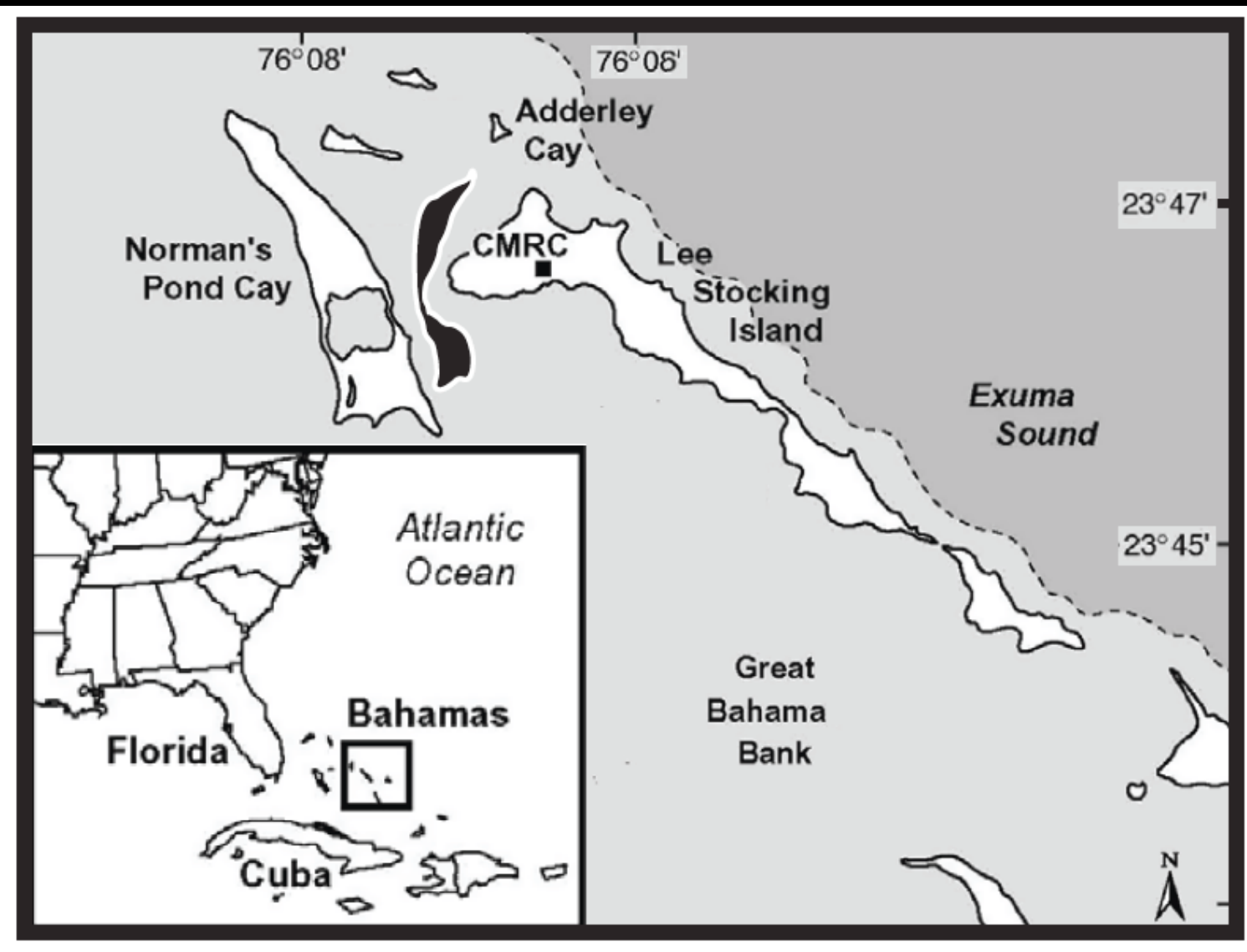


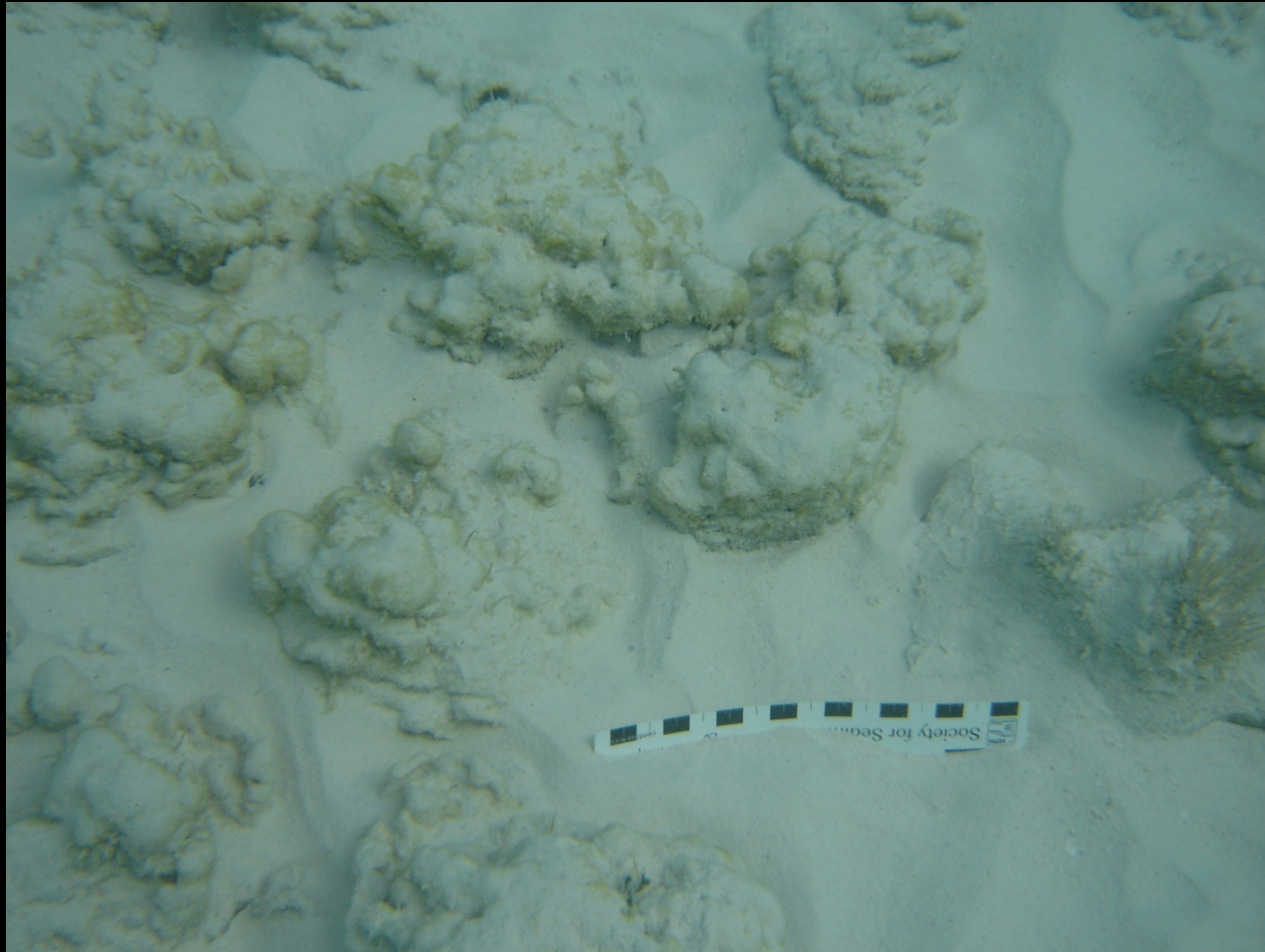


Photo S. Awramik

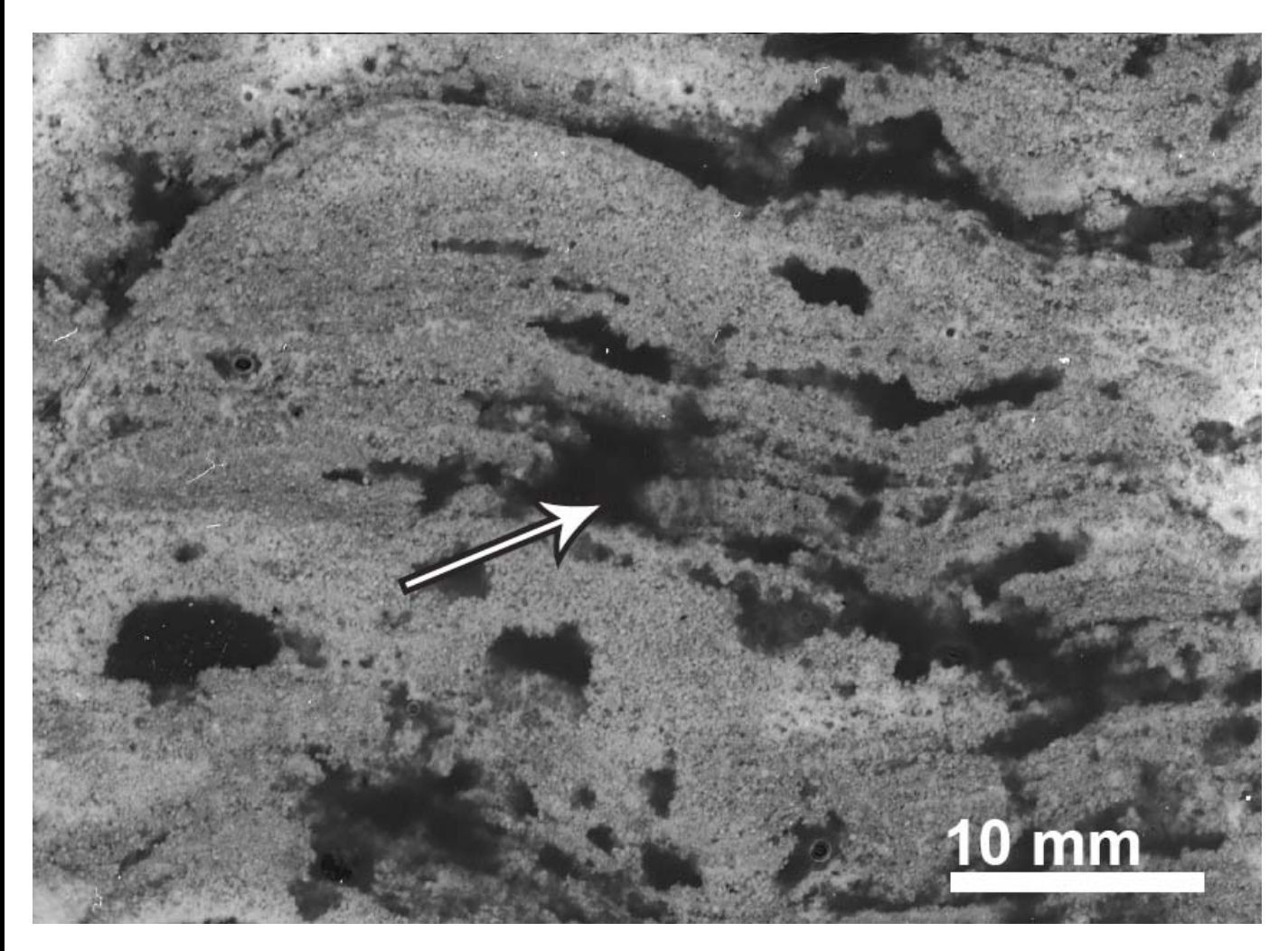


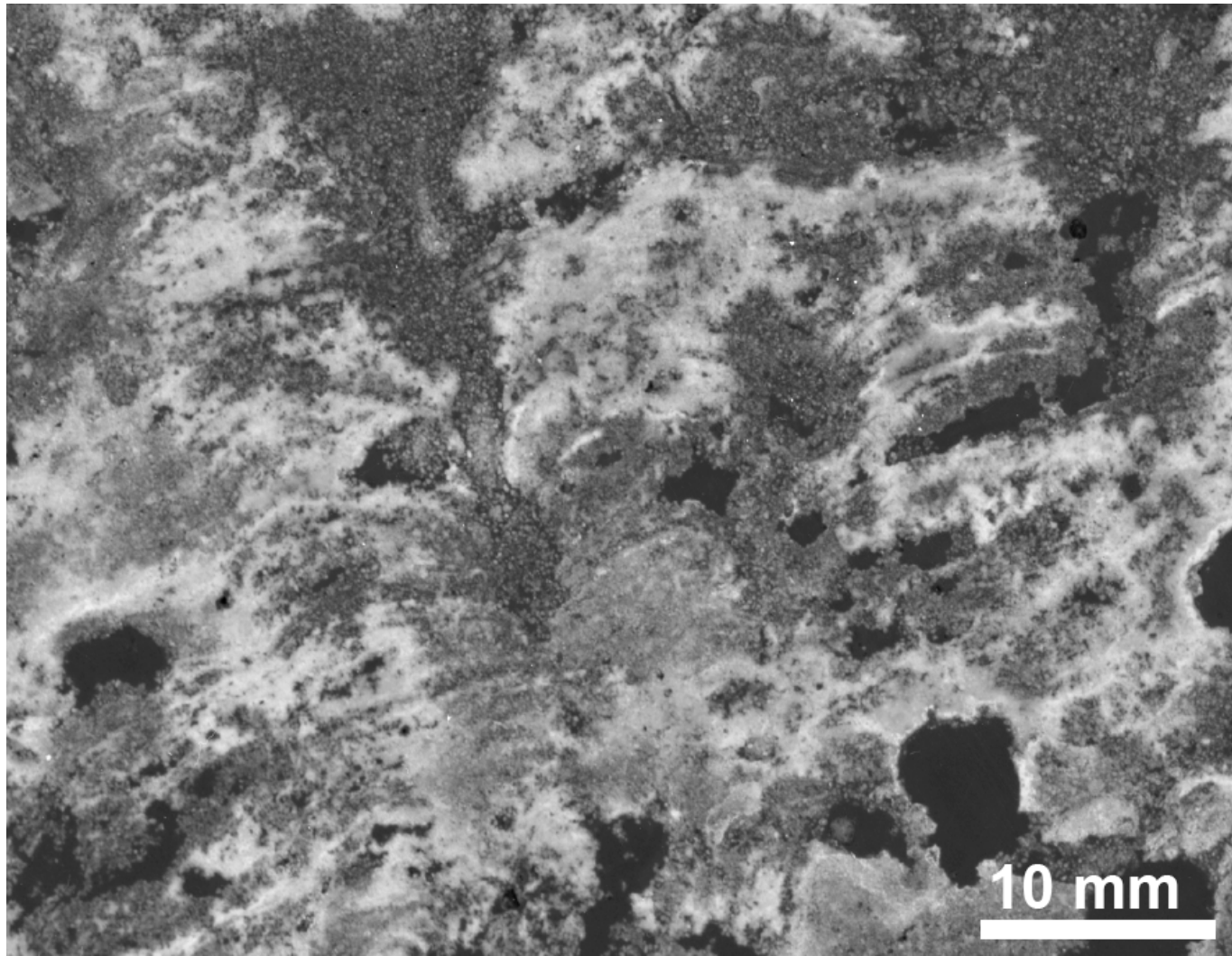


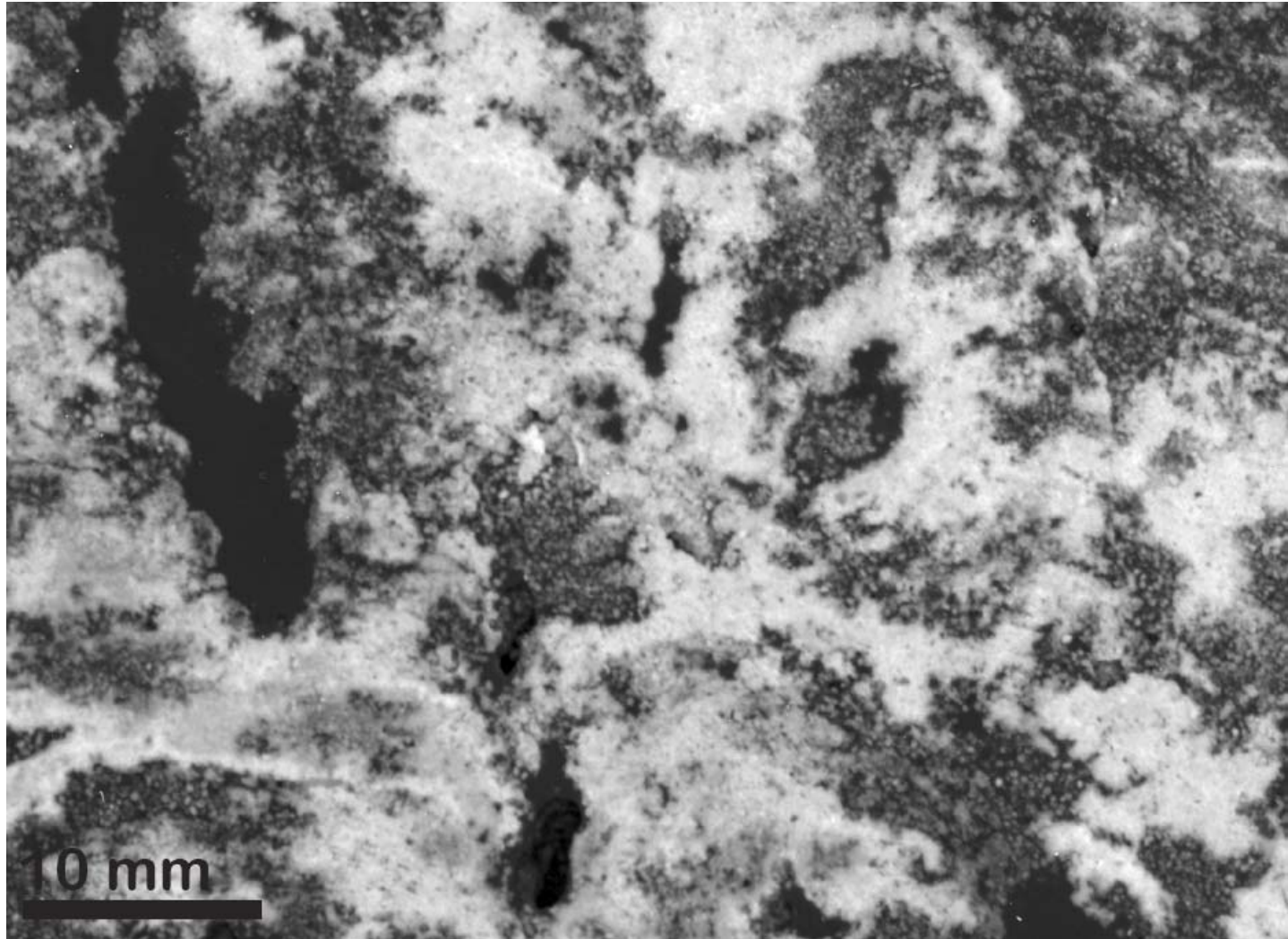
# Cyanobacteria: The Original Architects



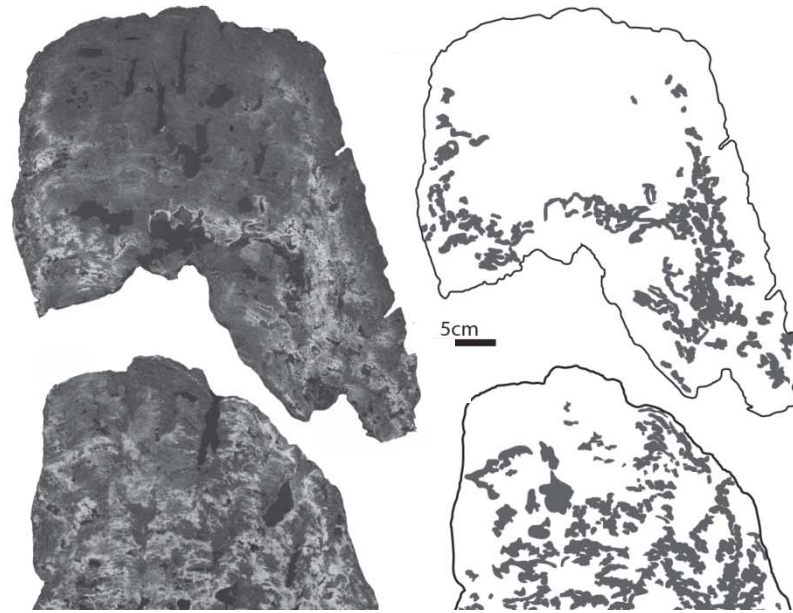




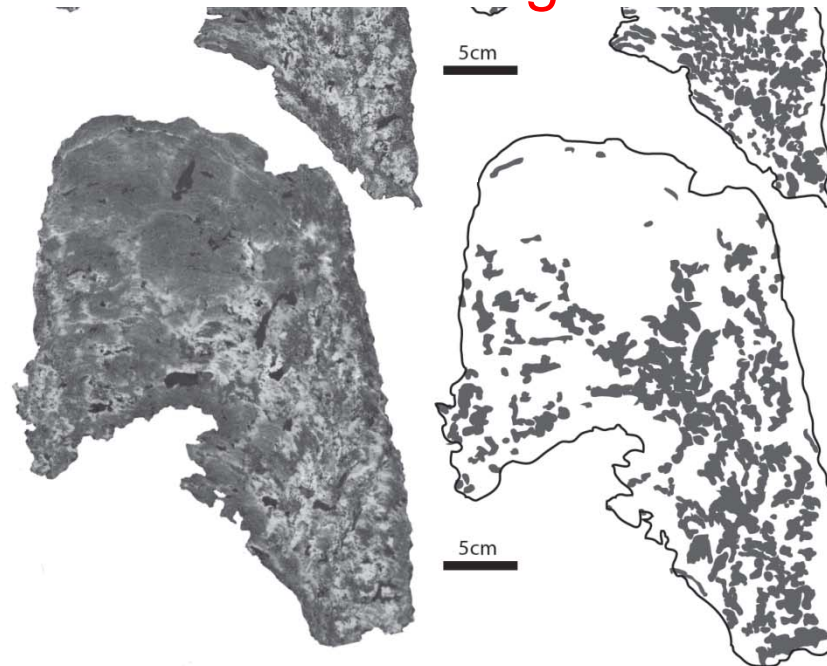


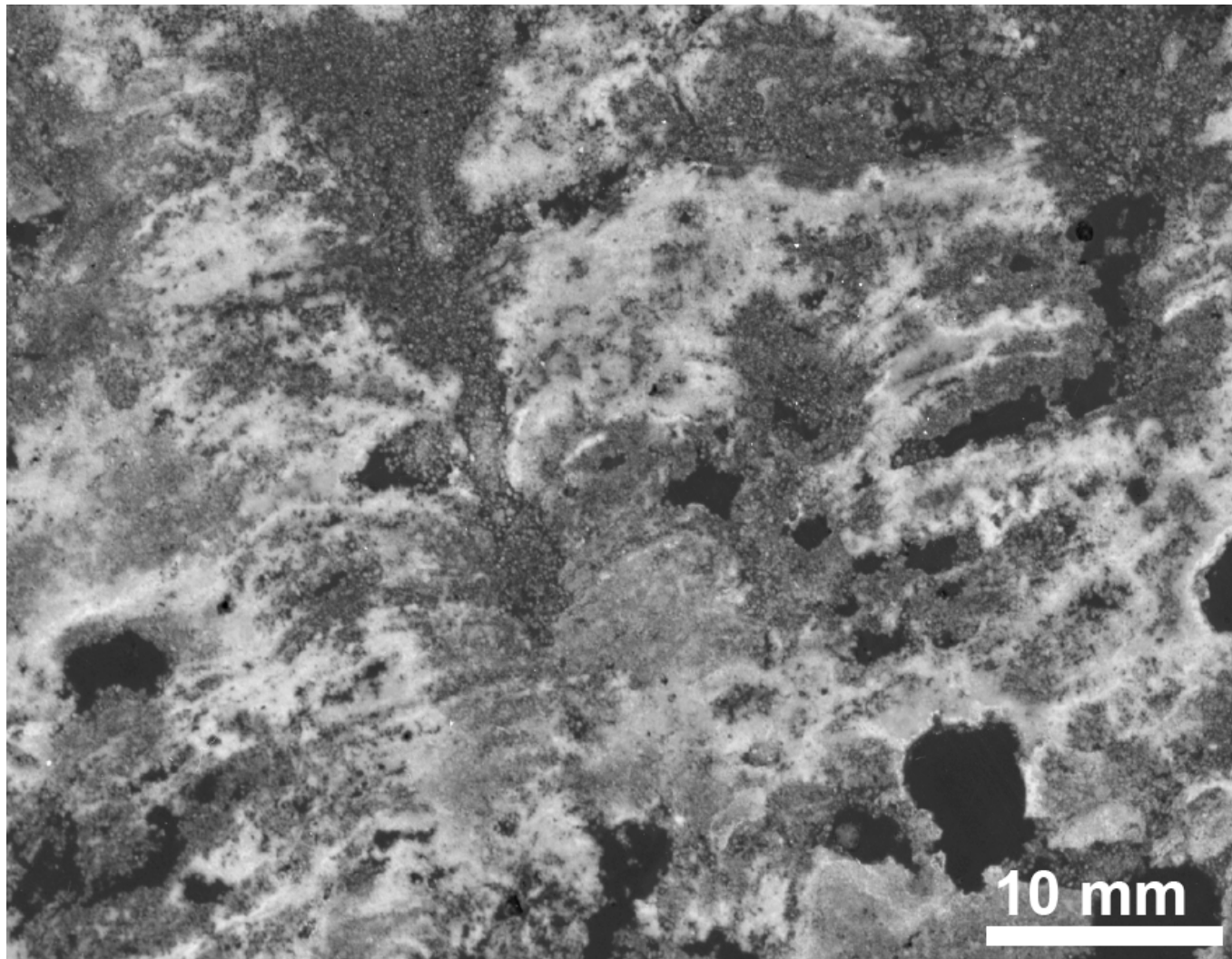






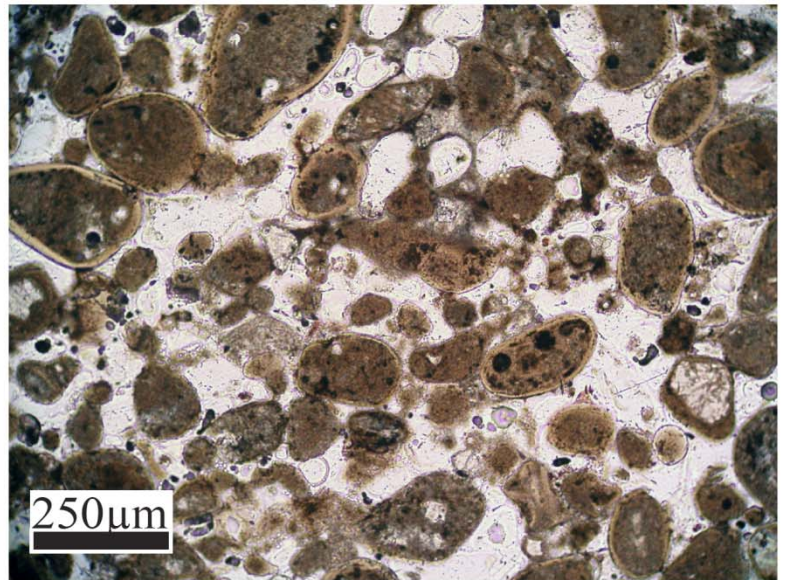
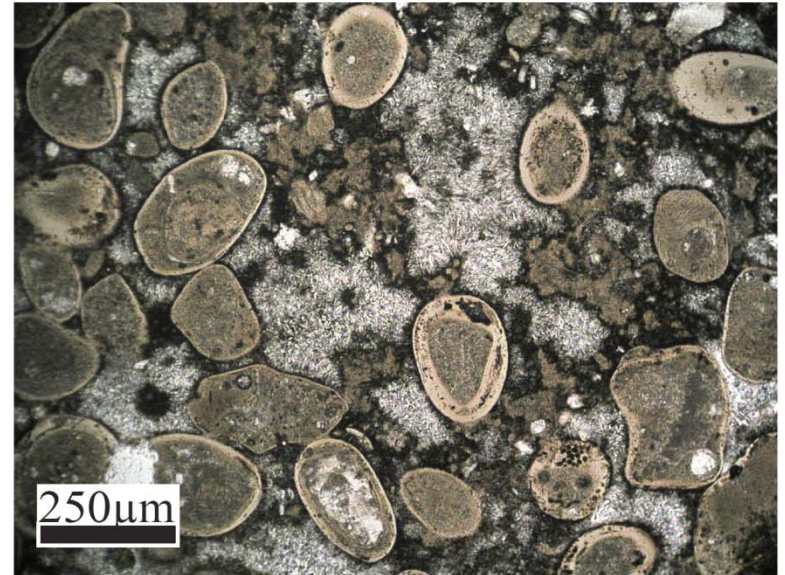
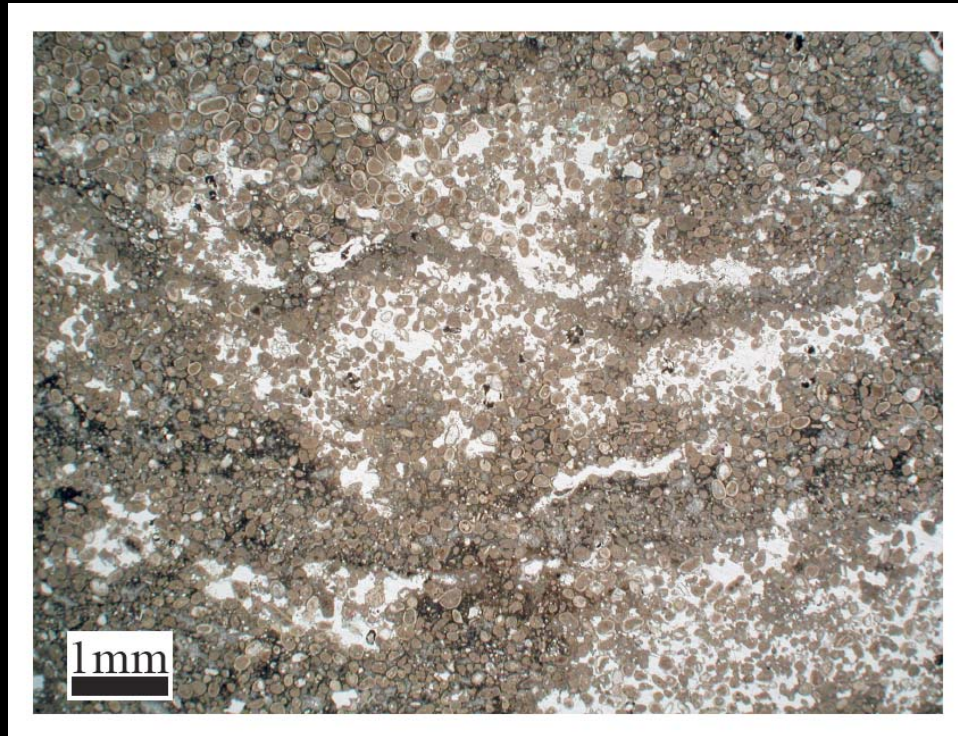
Clot Formation is a Diagenetic Process





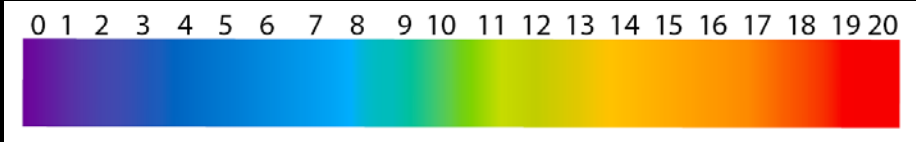
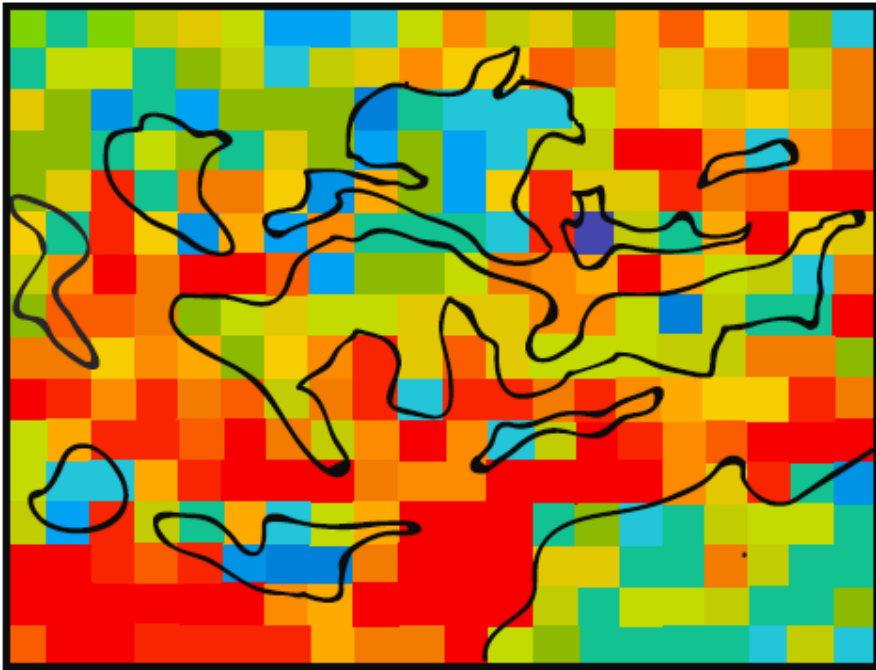
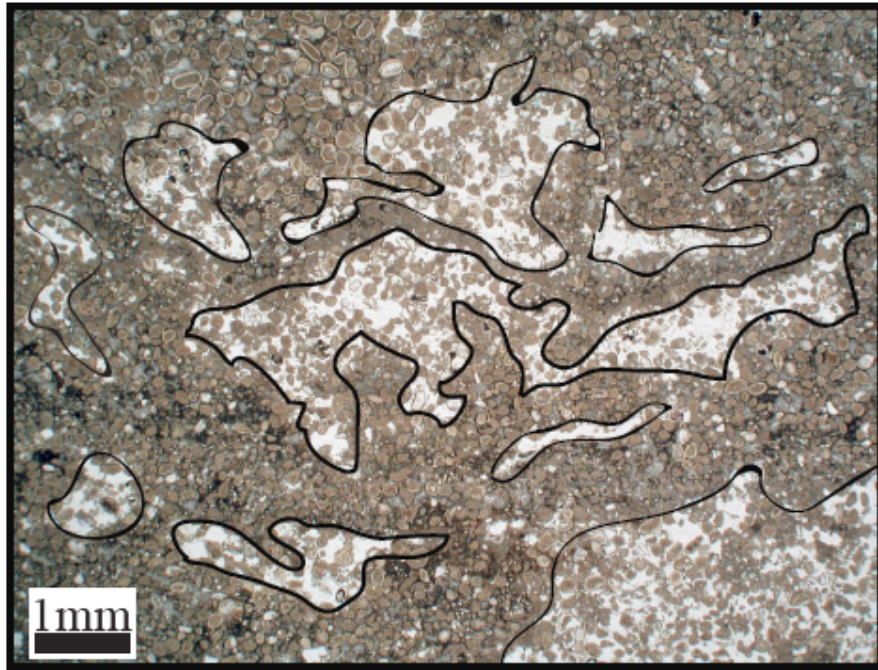


# Remodeling Process: Secondary Cement Deposition



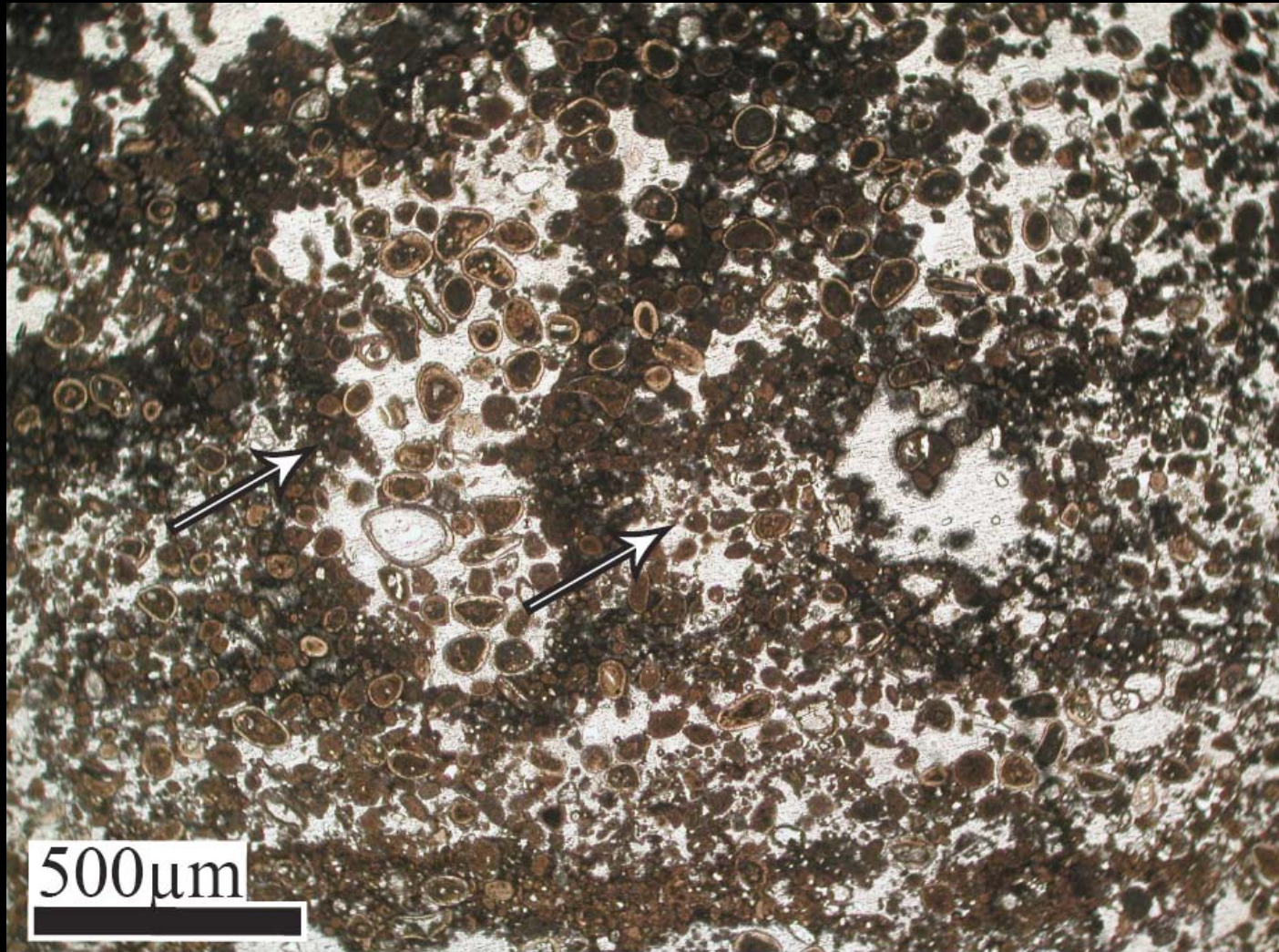


# Grain Packing Control on Cement Distribution

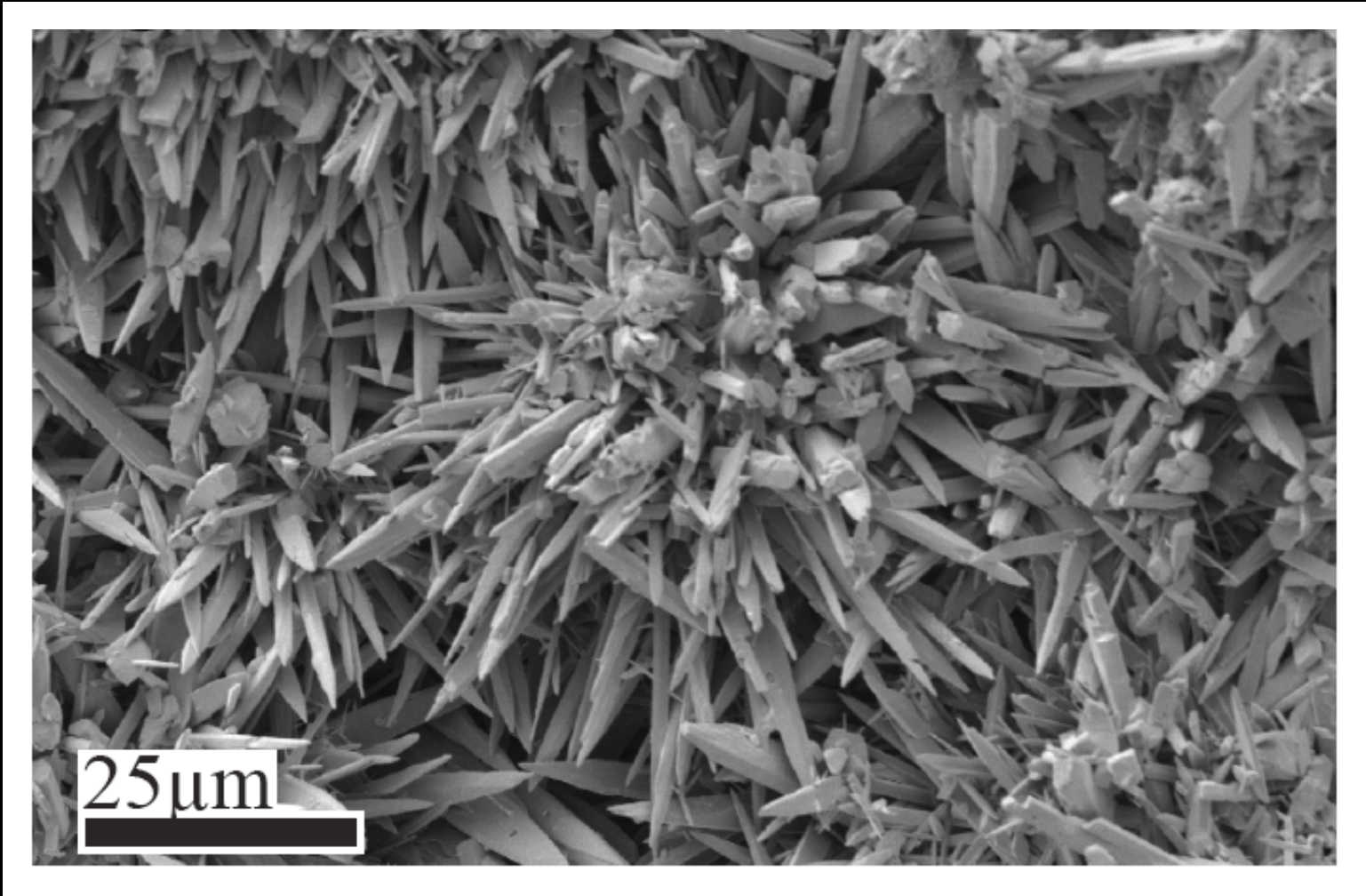


Number of grains/unit square

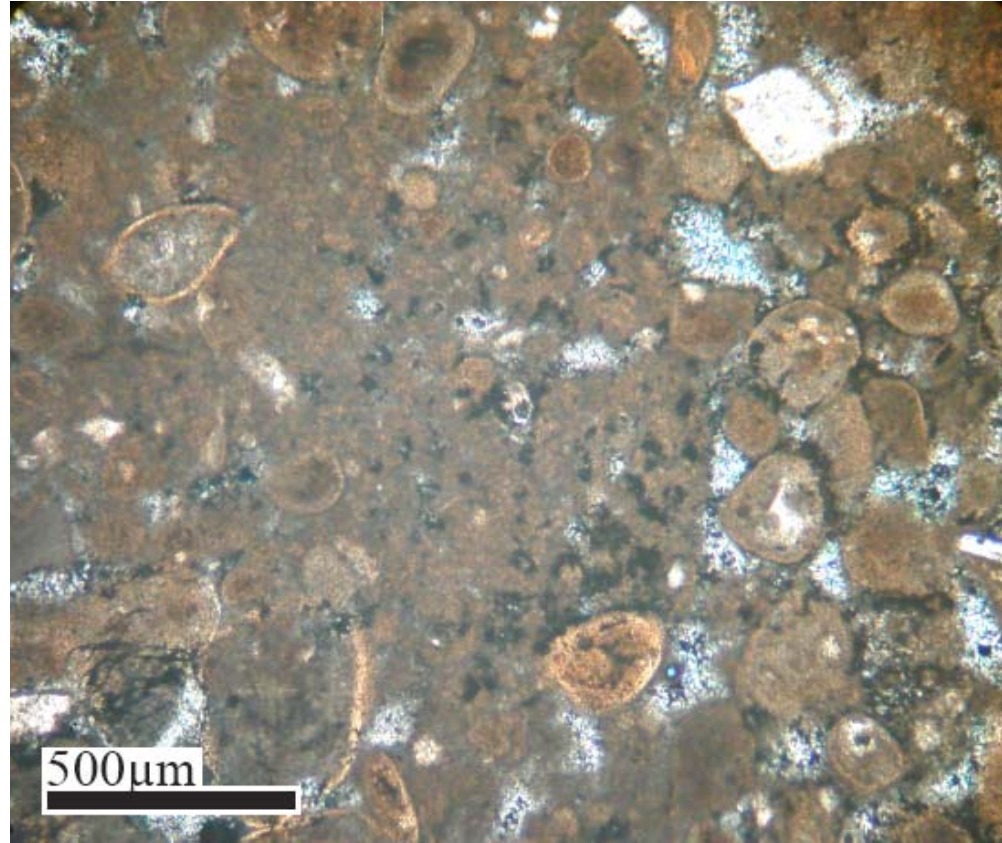
# Remodeling Crew: Metazoans



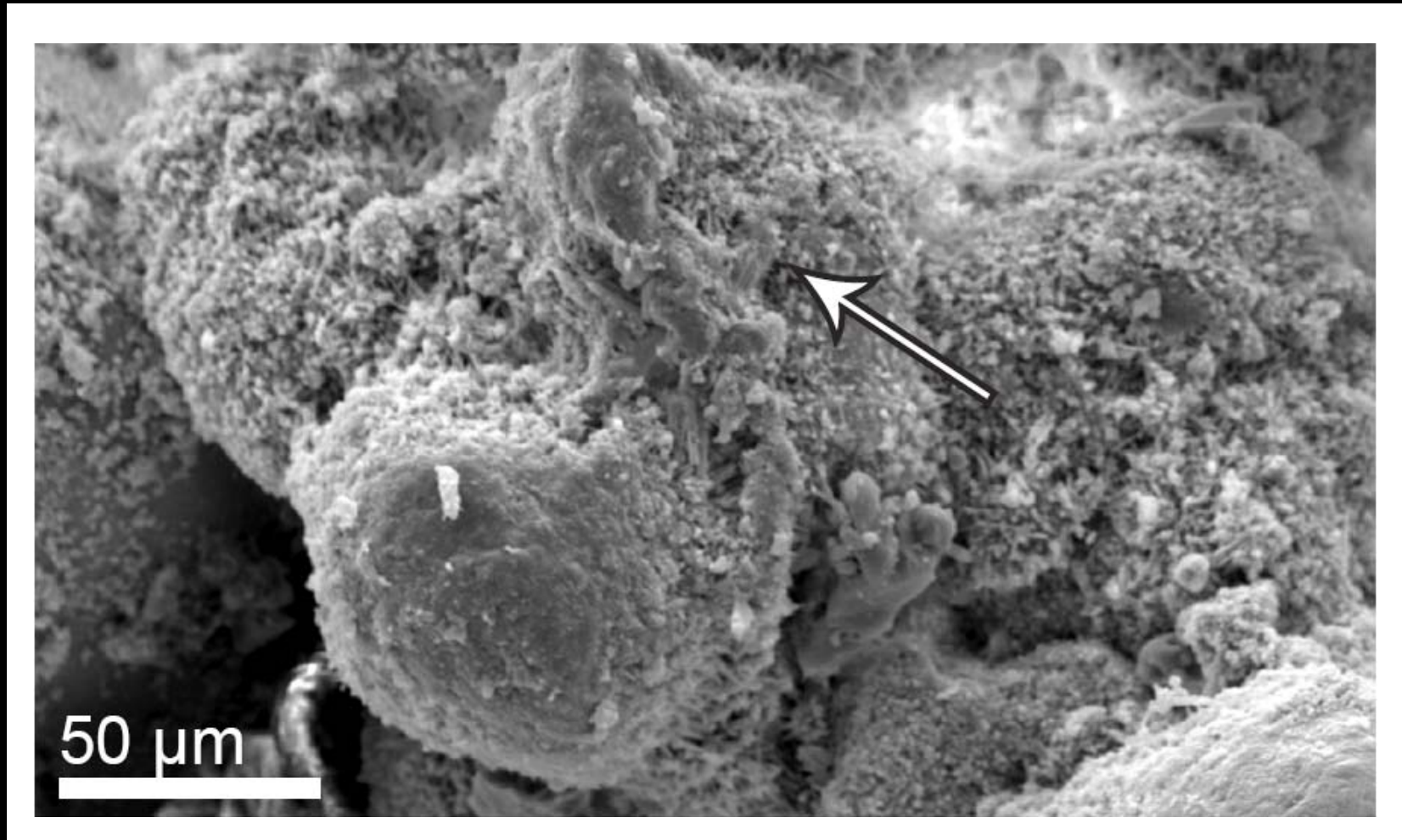




# Remodeling Process: Extensive Micritization

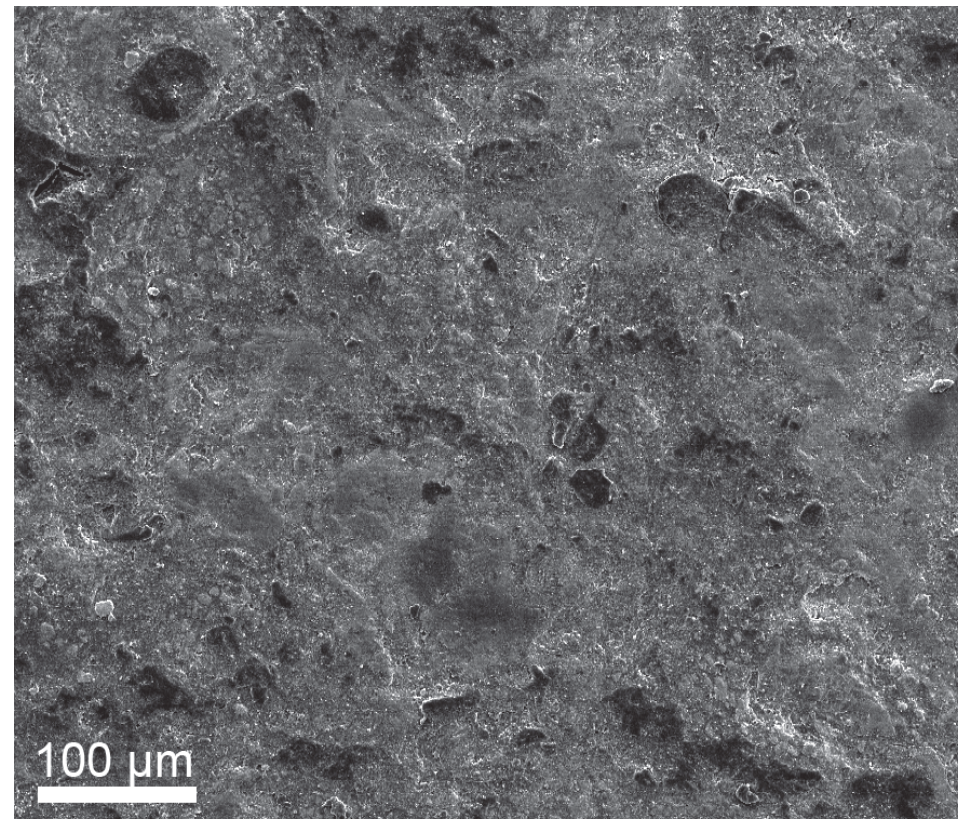
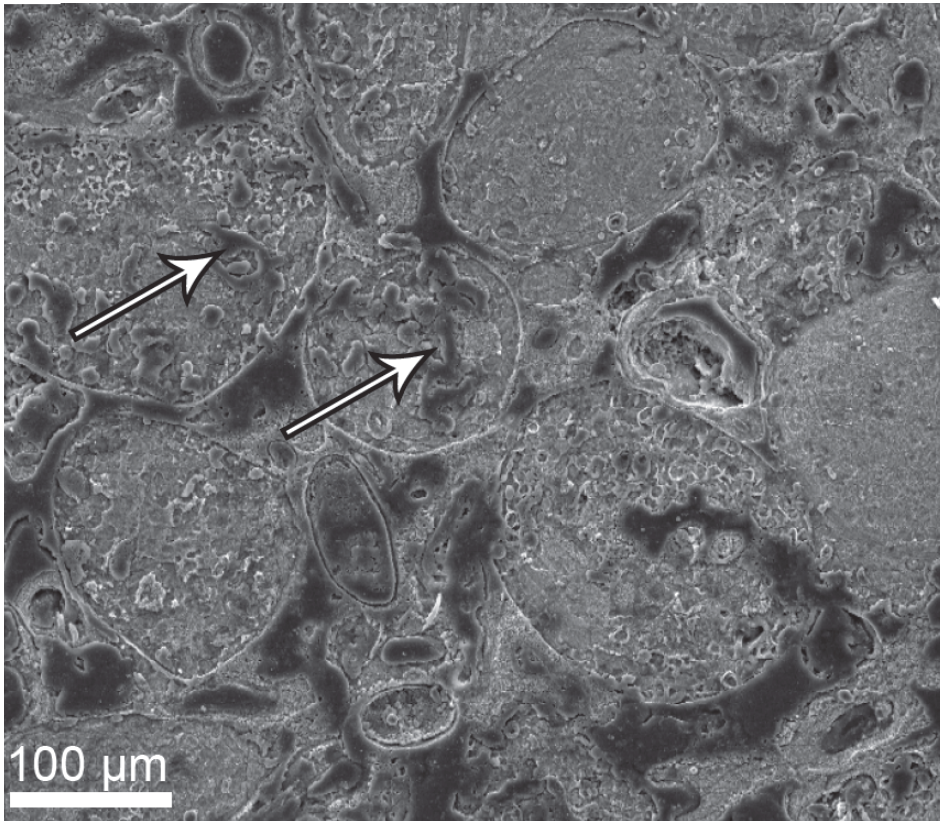


# Remodeling Process: Dissolution and Reprecipitation

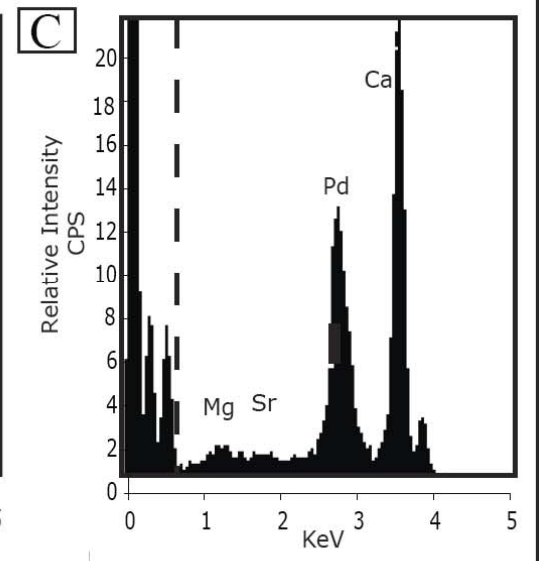
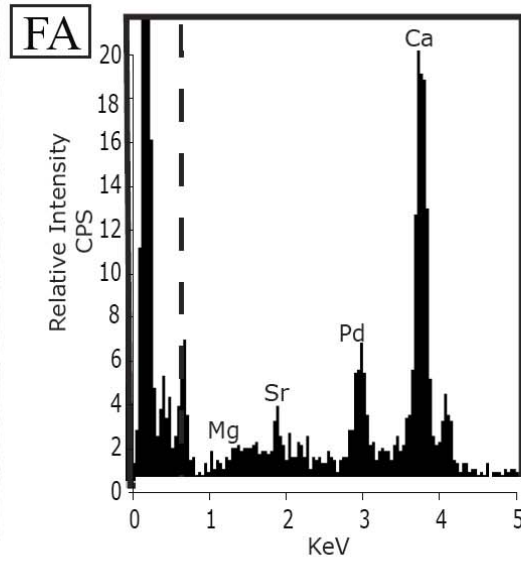
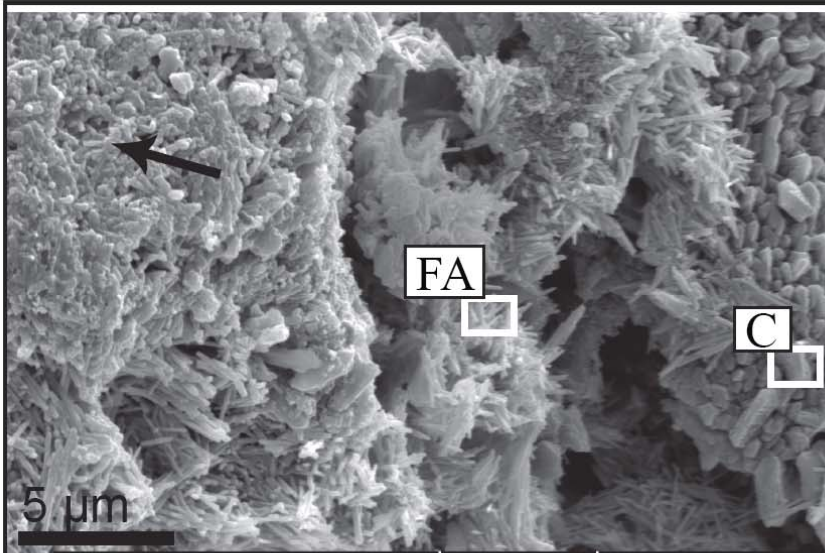




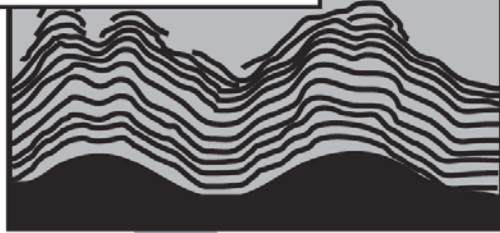
# Remodeling Process: Dissolution and Reprecipitation







Laminated Fabric



Weakly Laminated Fabric



Algae Dominated  
Benthic community?

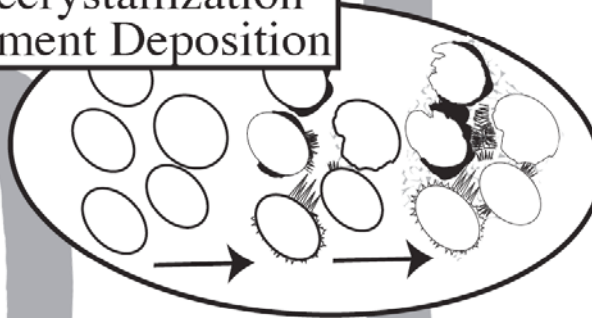
Burrowing  
and Boring



Disrupted Fabric



Recrystallization  
Cement Deposition



Thrombotic Fabric

Clots made of recrystallized  
sand grains and aragonite  
and calcite precipitates



## **What Does This Tell Us?**

- **The Bahamian Thrombolites are the result of remodeling**
- **This process was likely common in the many ancient thrombolites**
  - **Extensive early diagenesis enhances porosity**

# ACKNOWLEDGMENTS

- Pat Blackwelder for SEM assistance
- Funding from Green Cay Research Fund, Ocean Research and Education, Lawrence University, Pew Research Consortium for funding
- Pam Reid and Russell Shaprio for discussions and help on various aspects of the projects