Modern Bahamian Thrombolites: The Products of Extensive Remodeling*

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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 surfical benthic communities cause the disparate internal morphologies of the Bahamian microbialites.
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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
First Macroscopic Evidence of Life

Stromatolites Abundent

First Benthic Algae

First Metazoans

Thrombolites Abundent
Cyanobacteria: The Original Architectures
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
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
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