

## **GSA Connects 2023 Meeting in Pittsburgh, Pennsylvania**

Paper No. 223-1

Presentation Time: 8:05 AM

### **A BIOFILM CHANNEL ORIGIN FOR VERMIFORM MICROSTRUCTURE IN CARBONATE MICROBIALITES (Invited Presentation)**

**IBARRA, Yadira**, Earth and Climate Sciences, San Francisco State University, 1600 Holloway Avenue, TH 509, San Francisco, CA 94132, MARENCO, Pedro, Department of Geology, Bryn Mawr College, 101 N Merion Avenue, Bryn Mawr, PA 19010, GREENE, Sarah E., School of Geography, Earth and Environmental Sciences, University of Birmingham, Birmingham, B15 2TT, UNITED KINGDOM, BOTTJER, David, Department of Earth Sciences, University of Southern California, 3651 Trousdale Pkwy, ZHS 119, Los Angeles, CA 90089-0740 and CORSETTI, Frank, Department of Earth Sciences, University of Southern California, 3651 Trousdale Pkwy, ZHS 119, Los Angeles, CA 90089

Three-dimensional tubular microfabrics known as 'vermiform microstructure' in Phanerozoic and Neoproterozoic carbonate microbialites have been hypothesized to represent the body fossil of nonspicular keratosan demosponges. If correct, this interpretation extends the sponge body fossil record to ~890 Ma, in good agreement with molecular clock estimates for the emergence of metazoans. However, the veracity of the keratose sponge interpretation for tubular microstructures remains in question and the origin of the microtubule texture is enigmatic.

Here, we compare exceptionally preserved microbialite textures from Upper Triassic microbialites to channel networks created by modern microbial biofilms. We demonstrate that anastomosing channel networks of similar size and geometries to 'vermiform microstructure', are produced by microbial biofilms in the absence of sponges, suggesting the origin for the three-dimensional tubular microfabric in ancient carbonates is not unique to sponges and perhaps best interpreted conservatively as likely microbial in origin. We present a taphonomic model of early biofilm lithification in seawater with anomalously high carbonate supersaturation necessary to preserve delicate microbial textures. This work has implications for the understanding of three-dimensional biofilm architecture that goes beyond the current micro-scale observations available from living biofilm experiments and suggests that biofilm channel networks have an extensive fossil record.

Session No. 223

T133. New Advances in the Study of Microbialites Wednesday, 18 October 2023: 8:00 AM-12:00 PM

335 (David L Lawrence Convention Center)

Geological Society of America *Abstracts with Programs*. Vol. 55, No. 6 doi: 10.1130/abs/2023AM-393499

© Copyright 2023 The Geological Society of America (GSA), all rights reserved. Permission is hereby granted to the author(s) of this abstract to reproduce and distribute it freely, for noncommercial purposes. Permission is hereby granted to any individual scientist to download a single copy of this electronic file and reproduce up to 20 paper copies for noncommercial purposes advancing science and education, including classroom use, providing all reproductions include the complete content shown here, including the author information. All other forms of reproduction and/or transmittal are prohibited without written permission from GSA Copyright Permissions.

[Back to: T133. New Advances in the Study of Microbialites](#)