Centennial Honors College

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Poster Presentation

Testing Entombed Microbes as Biosignatures In Order To Evaluate Biogenicity

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This study set out to test the hypothesis that pool spar will contain less entombed microbes than pool fingers. It is currently believed that pool spar forms purely by geochemical means without influence from microbial life. By comparing pool fingers, which are known to contain microbial fossils, to pool spar, we can then determine if any microbial remnants are present in the form of biofilm and filaments. Using petrographic observations from a petrographic microscope and a scanning electron microscope (SEM) from the University of New Mexico, four clear spar pool finger samples were compared to five clear spar pool spar samples.

Under a petrographic microscope filaments were visible in only two samples, but when the samples were observed at 4000X magnification using the SEM, filaments and biofilm were present in all the samples used in this research. Pool fingers contained an average of 471 filaments and biofilm/ mm^2. The pool spar samples contained an average of 554 filaments and biofilm/ mm^2. The pool spar samples used in this research contained micrite on the edges of the samples, but no micritic fabrics were studied. The pool finger filament count used in this research was then compared to filament counts from Cottonwood Cave New Mexico. The micritic and spar laminated fingers from Cottonwood Cave contain less than 200 filaments and biofilm/ mm^2. The starting hypothesis turned out to be false. Pool spar contains equal amounts of filaments and biofilm as pool fingers do. Raising the question, are filaments and biofilms a good biosignature to evaluate biogenicity? This research has determined that filaments and biofilms are not biosignatures that can be used to evaluate biogenicity.