Stromatolite facies of the 3.43 Ga Strelley Pool Chert: Pilbara Craton, Western Australia

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3.43 billion year old conical stromatolites in the Strelley Pool Chert (SPC; Pilbara Craton, Western Australia) are perhaps the best preserved, most visible and most easily traceable of purported Early Archean fossils. Such excellent exposure allows rapid investigation of statistically significant populations over a wide area and is critical for interpreting the origins of the structures, the environment in which they formed, and the influence of environmental changes on stromatolite formation.

We discuss the distribution and character of stromatolitic structures along a 20 km section of SPC outcrop in the SW North Pole Dome. There are seven different types of possible stromatolitic structures, each occurring in distinct parts of the succession. These stromatolite "facies" are defined by a set of easily recognizable morphologic characteristics, and their interplay mimics in some respects the environmentally-influenced biofacies variations of younger microbial carbonate platforms or reefs. Some stromatolite facies display greater morphologic complexity than others, thereby encoding more information about their origins. Morphologic analysis of biogenicity is conducted on a single facies only, thereby ensuring that evidence from one set of structures is not used to reason the interpretation of another set of structures. A biogenic interpretation of the analyzed facies is not used to imply a biogenic origin for other stromatolite facies in

the SPC, but supports the existence of life at 3.43 Ga and would make biogenic interpretation of other stromatolite-like structures in the SPC less controversial.