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# Ediacaran Seepage-related Cloudina-Microbialites from Southern Namibia

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Little is known about the lifestyle of the calcified tube organisms of the Cloudina group. This late Proterozoic group, whose overall morphology slightly resembles modern calcified worm tubes, were the first animals with calcified skeletons. The modern seep-related vestimentiferan worm tubes of Escarpia are composed of chitin; in few cases we note the beginning of $CaCO_3$ (aragonite) mineralisation on the chitin surfaces. The calcified skeleton of C. hartmannae exhibits a more complicated microstructure. The calcareous skeleton, which was probably originally aragonitic, appears to be produced by a probably enzymatically controlled biomineralisation. Seilacher (1999) reconstructed the Cloudina group as typical soft bottom dwellers. Some millimeter-sized C. riemkeae specimens are indeed common in soft micritic, lagoonal carbonates. However, we have observed large C. hartmannae tubes inside very large (5-8 meters high, 30-50 cm in diameter) pillar-like microbialites ("organ-pipes") from the Zaris Mountains/Zebra River (Omkyk Member, Kuibis Subgroup, Nama Group). These microbialiates have a complex structure. The inner portions of these microbialites are formed by large, cm-sized recrystallized aragonitic spherulites covered by calcified microbial matter exhibiting a typical thrombolitic structure. The outer portions of the microbialites exhibit a typical stromatolitic structure. These "organ-pipe" microbialites strongly resemble the modern ones known from Lake Van and Mono Lake. In both modern cases the microbialites grow in extremely alkaline water located at sites where Ca2+-rich ground water is seeping in the lake water. Geochemical data, from the still Sr-rich neomorphic former aragonitic spherulites and all other noted carbonate phases, suggest that the microbialites from the Zaris Mountains in Namibia formed under comparable conditions.
Cloudina is very common within the thrombolitic portion of the microbialites and the occurrence is definitely autochthonous; Cloudina has probably filtered the seep fluids. A chemosynthetic life style cannot be excluded and will be the subject of further investigations. The occurrence of the heavy calcified metazoan skeletons in potentially Ca2+-rich seep fluid environments support the idea that Ca2+-detoxification was a driving force of the beginning of an enzymatically controlled biomineralisation.

Seilacher, A. (1999) Biomat-related lifestyles in the Precambrian. Palaios 14:86-93.