PRESERVATION OF MICROFOSSILS IN CARBONATE DEPOSITS FROM THE CRYOGENIAN NON-GLACIAL INTERLUDE. K. R. Moore[1], T. Bosak[1], F. A. Macdonald[2], D.J.G. Lahr[3], S. A. Newman[1], C. Settens[4], S. B. Pruss[5], [1]The Department of Earth, Atmospheric and Planetary Sciences, Massachusetts Institute of Technology, Cambridge, MA, USA, [2]The Department of Earth and Planetary Sciences, Harvard University, Cambridge, MA, USA, [3]The Department of Zoology, University of São Paulo, SP, Brazil, [4]The Center for Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, MA, USA, [5]The Department of Geosciences, Smith College, Northampton, MA, USA.

Cap carbonates deposited during the Cryogenian non-glacial interlude preserve a fossil record following the Sturtian low latitude glaciation (~717-660 Ma). Here, we present new fossil assemblages from the Kakontwe Formation of Zambia, the Taishir Formation of Mongolia, and limestones of the Ikiakpuk Formation of Arctic Alaska, and compare them to previously described fossils of the Rasthof Formation of Namibia. The cap carbonates in Zambia, Mongolia and Namibia preserve aluminosilicate-rich microfossils at multiple localities, whereas those from Arctic Alaska preserve pyritized microfossils.

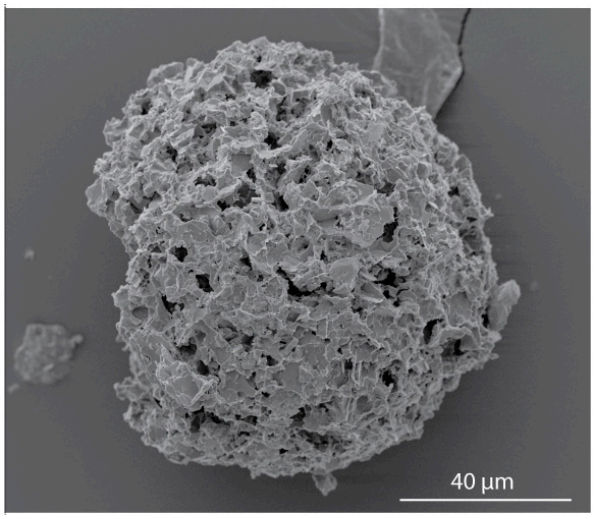

Figure 1: SEM image of an agglutinated microfossil from the Taishir Formation of Mongolia.

The aluminosilicate- and organic-rich fossils are walled structures preserved within microbially laminated and unlaminated limestones and dolostones. Mineralogical analyses of the microfossil walls reveal aluminosilicate clay minerals, especially muscovite and illite, as well as quartz, iron and titanium oxides, feldspar, and dolomite. The same minerals are also present in the clay-sized fraction of sediments from each locality, and could have been used by organisms that built shells by agglutination. Microfossils from Namibia, Zambia and Mongolia have similar morphologies and surficial textures comprised of uniformly sized and shaped mineral grains. These analyses support the interpretation of walled structures as fossils of agglutinating eukaryotic organisms similar to modern benthic testate amoebae or foraminifera.

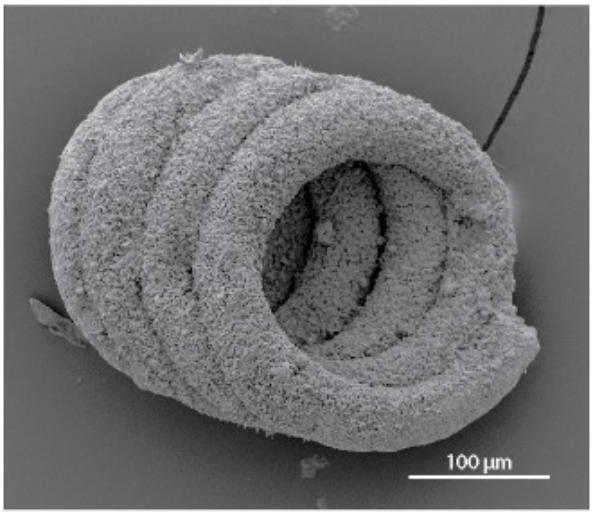

Figure 2: SEM image of a pyritized coil from the Ikiakpuk Formation of Arctic Alaska.

In contrast, the unlaminated limestone deposits of the Ikiakpuk Formation—which represents a deeper water depositional setting from the Kakontwe, Taishir and Rasthof formations—preserve pyritized fossils of planktonic cyanobacteria and other filamentous bacteria. Rare pyritized structures with triangular or circular apertures similar to testate amoebae are also present. Thus, carbonate deposits from different paleocontinents and depositional settings preserve communities of organisms with different lifestyles and demonstrate that planktonic communities of primary producers including cyanobacteria and benthic communities of agglutinating eukaryotes were present in the aftermath of the Sturtian glaciation.