TERRESTRIAL CAVE MICROBIOTA: MODELS OF MARTIAN SUBSURFACE BIOLOGY. P. J. Boston[1,2], D. E. Northrup[2], M. N. Spilde[3], and L. D. Hose[4], [1]Complex Systems Research Inc., P. O. Box 11320, Boulder CO 80301, USA (pboston@complex.org), [2]Department of Biology, University of New Mexico, Albuquerque NM 87131, USA, [3]Institute of Meteoritics, Department of Earth and Planetary Sciences, University of New Mexico, Albuquerque NM 87131, USA, [4] Environmental Studies Program, Westminster College, Fulton MO 65251, USA.

Our studies of microbial life in chemically diverse and unusual caves on Earth and the in situ biomineralization that we are observing form a unique basis for constructing a catalog of potential metabolic types, chemical processes, and physical biomarkers of use to future Martian subsurface exploration and study.

We will discuss the diverse microbial ecosystems of Earth's subsurface as revealed in the sulfide, carbon dioxide, and relict caves of our studies. We will touch on the salient features of the bizarre means by which they make their livings, including dissolving rock, scavenging from the air, living in sulfuric acid, and using inorganic chemical reactions to provide energy.

We will then consider the possibility of such communities in the deep subsurface of Mars and potential exploration methods for studying them based on our field-tested protocols in physically rigorous and hazardous conditions.

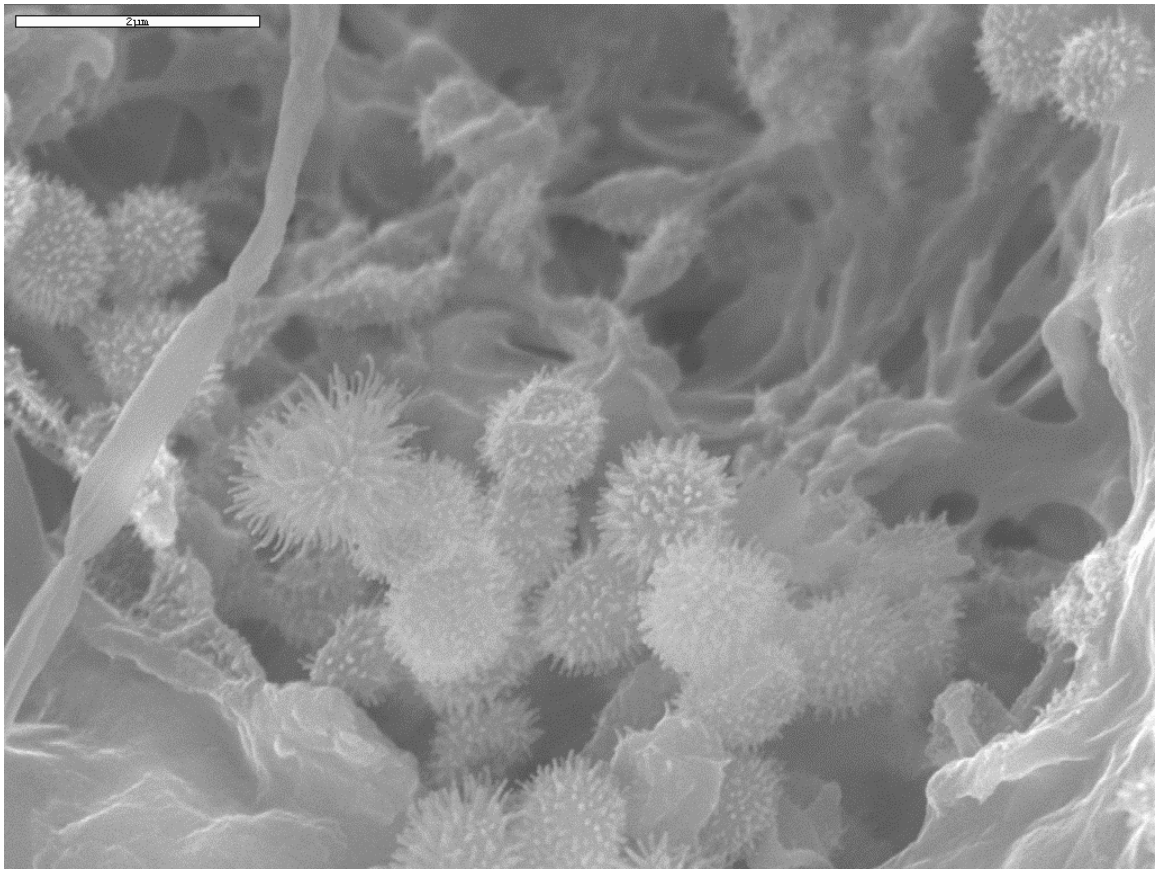

Figure 1. Microbial garden within the tiny fractures of a lava cave from Cape Verde Island.