MICROBIAL RESPONSES TO PRESSURE AT THE MID-CAYMAN SPREADING CENTER: IMPLICATIONS FOR EXTRATERRESTRIAL ENVIRONMENTS. D. Morgan-Smith[1], M.O. Schrenk[1] and P. Narasingarao[2], [1]Michigan State University (288 Farm Ln Rm 206, East Lansing, MI 48824; dmorgansmith@gmail.com), [2]Scripps Institution of Oceanography (9500 Gilman Drive, La Jolla, California 92093).

Introduction: Hydrothermal venting has recently been discovered on Enceladus, and is proposed to occur on Europa, while on Earth, such vents are often cited as the most likely location for the origin of life. The Mid-Cayman Spreading Center (MCSC) hosts the deepest and hottest known vents, which are an ideal location for the study of the extremes to which life can adapt.

Hydrostatic pressure is often overlooked as a factor in microbiological studies, but can affect cell morphology, membrane structure, flagellar motility, protein function, and gene expression.

Methods: To assess metabolic potential under near *in situ* conditions, ^{13}C tracer experiments were conducted at 85°C and 50 MPa on freshly-collected chimney samples and analyzed for methane production; additional treatments were incubated at atmospheric and elevated pressure levels for comparison.

In addition, acetate uptake was measured in a culture isolated from MCSC vent fluids. Raman spectroscopy was paired with diamond anvil cells to measure uptake at *in situ* and elevated pressure conditions.

Results: Methanogenesis rates were not dependent on pressure, though results varied based on the carbon substrate provided. The rate of acetate uptake was maximized near *in situ* pressure, but observed at pressures greater than those at bottom of the deepest ocean trench on Earth.

Conclusion: These studies show that pressure is a factor that should not be ignored in microbiological studies of the deep biosphere, particularly when those environments are considered to be analogues for possible extraterrestrial environments.