

Title: Exploring the Role of Sediment Size and Compaction on the Microbial Factory

Addison K. Savage^{1,2}

Advisor: Peter B. Flemings^{1,2}

1. Department of Geological Sciences, The University of Texas at Austin, Austin, Texas.
2. Institute for Geophysics, The University of Texas at Austin, Austin, Texas.

We explore how sediment burial and consequent compaction of mud and sand impacts marine bacteria within the sediment. We do this by mixing the bacteria with two types of lithologies: 1) muddy sediments composed of both clay and silt sized grains, and 2) a pure sand mixture. We load these sediments to equivalent depths of 15 meters and 60 meters. We evaluate the cell counts from the compressed sediment and compare them to the cell counts of an uncompressed control sample. Cell counts in the compressed muddy sediment were up to 52 times lower than in the control samples; cell counts in the compressed sand were up to 3 times lower. I interpret that the high compressibility of the clay sediment could be the cause of the lower cell counts in comparison to the sand compacted to the same equivalent depth. Due to the high compressibility, the reduction in pore size during burial was much higher in the clay than the sand, reducing the volume of pores large enough to house cells. Exploring the mechanical limitations on cellular life can help understand how microorganisms live in deep subsurface sediments, at what depth microbes are viable and metabolizing, and understand what processes limit microbial life at great depths.

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