

## **LIFE IN MARINE SEDIMENTS: PROBING THE LIMITS OF EARTH'S DEEP BIOSPHERE**

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The presence of an active microbial community inhabiting deeply buried marine sediments has previously been inferred from profiles of chemical compounds involved in microbial metabolism (e.g., sulfate and methane). Studies on recent ODP Legs to quantify microbial abundance in cores have confirmed their presence down to at least 800 m below the sea floor. Extrapolation of these results suggests that the cumulative biomass in subsurface marine sediments comprises a significant portion of the total biomass on Earth. Recently, the capabilities of the JOIDES Resolution have been expanded so that microbiological experiments can now be conducted onboard. This allows microbiologists to better understand what controls microbial distribution and activity and consequently their biogeochemical impact in the marine subsurface. Approaches include measuring rates of metabolic reactions, cultivating microbes recovered from the cores, and characterizing the microbial community through nucleic acid analysis. These efforts will provide insights into the adaptations of microorganisms to this environment and will help us define the limits of the deep biosphere on Earth. Dr. Smith has sailed as a microbiologist on ODP Legs 185, 190 and 201.