Japan Geoscience Union Meeting 2010
(May 23-28 2010 at Makuhari, Chiba, Japan)

BBG005-11 会場: 301B 時間: 5月23日13:45-14:10

宇宙生物学の現状

Astrobiology right here on Earth: Probing microbial life in deep-sea sediment

クリストファー・ハウス[1], 高井 研[2*]

Christopher House[1], Ken Takai[2*]

[1]ペンシルバニア州立大学, [2]海洋研究開発機構プレカンラボ

[1]Penn State University, [2]PEL, JAMSTEC

Deep-sea sediment contains microorganisms with unusual metabolisms and in some cases very low activity. These environments provide one of the best places on Earth to study unusual life and test astrobiological approaches that might be important as we explore other worlds. For example, we have recently shown that microbes can oxidize methane through the oxidation of metals (e.g., manganese and iron) in addition to sulfate. Such anaerobic methanotrophs, that is microbes that consume methane in the absence of oxygen, are interesting to the field of Astrobiology because their style of respiration could be sustained in the subsurface of Mars and was a likely metabolism for the Earth Late Archean oceans. Low activity microbes are abundant in deeply buried marine sediment (as revealed by the drilling programs ? DSDP, ODP, and IODP). Considerable international efforts have established the widespread occurrence of microbes in deeply buried marine sediments, revealed initial phylogenetic identities of microbial groups present, and provided some subsurface microbial cultures. Many of the indigenous microbial groups are presently unculturable and prokaryotes there appear to live on extremely long timescales with estimated doubling times of decades, if not longer. Due to these very slow doubling times, studying these microbes is very analogous to studying life from a different world. In this case, we have had to rely on the direct analysis of cells or biomolecules and other culture-independent methods.

Keywords: Astrobiology, Isotope geochemistry, microbial paleontology