**Japan Geoscience Union Meeting 2011**
(May 22-27 2011 at Makuhari, Chiba, Japan)


MIS023-05 Room:303 Time:May 22 11:15-11:30

# Biosphere and its biogeochemical processes: a linkage between past and present during recycles of organic matter

Yoshinori Takano[1*]

[1]Institute of Biogeosciences, JAMSTEC

Deep-sea sediments harbor a novel biosphere with uncultured prokaryotic lineages and their global biogeochemical processes. Exploring these habitats poses interdisciplinary challenges for the biogeochemical and geomicrobiological community. The limits of deep biosphere are on-going subject, which were not yet known in terms of environmental properties, including depth, temperature, energy availability, and geologic age; subseafloor microbes play a significant role in chemical reactions that were previously thought to have been abiotic processes. These limits are set by a variety of physical and chemical properties such as temperature, availability of energy and nutrients, pH, pressure, water availability, and salinity. In addition, molecular analyses and cultivation experiments demonstrate a high diversity of microbial life in the sub-seafloor, although the relative abundances and roles of archaea, bacteria, eukarya, and viruses have been largely unknown.

Recent intensive researches on deep biosphere revealed that carbon isotopic signatures of sedimentary archaeal membrane polar lipids indicate utilization of sedimentary organic carbon by the living archaeal community. Further deep drilling of marine sediments and igneous crust offers a unique opportunity to explore how life persists and evolves in the deep sub-seafloor ecosystems. Here, the author overviewed about historical background of the deep biosphere and its latest progresses in terms of biogeochemical processes together with prokaryotic ecology and limit of life on the Earth.

Takano, Y., Chikaraishi, Y., Ogawa, O.N., Nomaki, H., Morono, Y., Inagaki, F., Kitazato, H., Hinrichs, K.-U., Ohkouchi, N., (2010) Sedimentary membrane lipids recycled by deep-sea benthic archaea. Nature Geoscience, 3, 858-861.

Keywords: Organic compound, Recycle process, Biogeochemistry