

## 海底下の大河

### — 海洋地殻内熱水循環の多様性と生物地球化学プロセス —

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#### Trans-crustal Advections and In-situ Biogeochemical Processes of Global Sub-seafloor Aquifer: The Sub-seafloor “TAIGA”

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#### Abstract

Since the discovery of rich microbial communities at and around seafloor hydrothermal sites, their extension towards the oceanic crust beneath the seafloor is of great interest not only for microbial physiology/ecology but also for a wide range of Earth and planetary sciences. How can the communities survive in such an extreme environment? What kinds of metabolism are in action? It is proposed that the sub-seafloor ecosystems are characterized by different kinds of chemosynthetic primary production (carbon fixation), all of which are supported by chemical energy supplied from the sub-seafloor aquifers. We designate the unseen aquifers as sub-seafloor TAIGAs (great rivers) which are responsible for a geochemical flux equivalent to or even larger than that of terrestrial river runoff (*e.g.* Wheat and Mottl, 2000). Besides, they are responsible for supplying nutrients to microbes beneath the seafloor. We hypothesize that there are four representative TAIGAs based on the chemical energy of compounds of sulfur, carbon (methane), iron, and hydrogen, all of which are supported by the TAIGAs. It is important to note that the sub-seafloor ecosystems are controlled extensively by or are mutually related to the types of TAIGA that flow at the site. The hypothesis can be tested through cooperative research among microbiologists, geochemists, geophysicists, and geologists.

**Key words** : deep biosphere, chemosynthesis, hydrothermal convection, hydrothermal activity, geochemical cycle

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