

Geological constraints on the evolution and propagation of deep biosphere within the oceanic crust

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Since the astounding estimation of Whitman et al.(1998) that more than 99% of the biomass in the ocean exists not in the ocean itself but beneath the ocean floor as deep biosphere, research on sub-vent biosphere has been stimulated at several seafloor hydrothermal sites. Apparently, hydrothermal systems do not represent entire ocean floor, but two main candidates for basic metabolic energy sources that support primary biomass production at various geologic settings can be predicted. That is; sulfur-compound-based ecosystem at volcanic-hydrothermal environment and hydrogen-based ecosystem at tectonically-active environment. Since the sub-seafloor ecosystems are affected by various geologic phenomena including global tectonics, volcanism, and convective flow of chemical energy and nutrients, we propose that the main parameters that controls the nature of the ecosystem are not only evolution and propagation but also dynamic processes of the earth itself.