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南中国三峡地域の堆積有機物から示唆される前期カンブリア紀の微生物学
Microbiota in the Early Cambrian implicated by the molecular fossils extracted from the sedimentary rocks in Three Gorge

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The Cambrian period (542 - 488 Ma) is one of the most important intervals for the evolution of life. After the Ediacaran/Cambrian (E/C) boundary, the Cambrian-type shelly biota radiated. In the Atdabanian, almost all of modern phyla had appeared, namely Cambrian Explosion. Although it is expected that the biological evolution influenced biogeochemical cycle in the ocean, the detail is still ambiguous. Biogeochemical cycle is driven by majorly microorganisms such as biological pump and microbial loop. Thus, microbiota at that time should be revealed more to understand how the biogeochemical cycle was changed and the emergence of large animals was influenced.

Molecular fossils which are organic compounds found from sediments are useful tools to understand microbiota in geological time because the sedimentary organic compounds are majorly derived from microorganisms such as phototrophic eukaryote, bacteria or archaea, and they can not be remained well as body fossils. In this study, molecular fossils are extracted from the Early Cambrian sedimentary rocks in Three Gorges area, South China. The rocks are sampled as drilling cores. That makes the continuous and precisely dated sampling possible. Therefore, the data could be correlated with other geochemical proxies analyzed from the core. Analyzed molecular fossils are bitumen and saturated aliphatic hydrocarbons from 63 samples. n-Alkanes and isoprenoids are detected from almost all of samples. Steranes and hopanes are detected from some samples. They are used as the maturity parameter and for the identification of origins.

Longer chain n-alkanes are notably found from many samples, and indicate that they were derived from sulfate-reducing bacteria and their sizes of biomass compared with that of phototrophs were well correlated with the remineralization rate (Ishikawa et al., 2011). That is the first evidence that the remineralization was driven by the sulfate-reducing bacteria at that time (Yamada et al., in prep.). Furthermore, gammaceranes and carotenoid and longer chain n-alkanes which have different carbon isotope ratio from shorter chain n-alkanes are found from some samples. That indicates the existence of stratified sea in the Early Cambrian.

They constrain the condition of the environment which allows the emergence of large nektons need much oxygen. It is more needed to reveal the activity and influence of microbiota in the Early Cambrian.

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