Extraction of molecular fossils from a Proterozoic/Phanerozoic boundary section in the Three Gorge area, South China

Kentaro Yamada[1]; Yuichiro Ueno[2]; Keita Yamada[3]; Naohiro Yoshida[4]; Shigenori Maruyama[5]

[1] Earth & Planetary Sciences, Tokyo inst. of Technol.; [2] Global Edge Inst., Tokyo Tech.; [3] Environ. Chem. and Engr, Tokyo Tech.
; [4] IGSSE, Tokyo Institute of Technology; [5] Earth and Planetary Sci., Tokyo Institute of Technology

Proterozoic/Phanerozoic boundary (or Pc/C boundary) is one of the most important intervals for the evolution of life. The first multicellular animal appeared after Marinoan glaciation (˜600Ma), and Cambrian-type shelly biota were diversified just after the Pc/C boundary (c. 540 Ma). It is essential to understand link between the global environmental changes and early animal evolution. Molecular fossils (or biomarker) are molecules originated from a specific biosynthesis and preserved in sedimentary rocks, which could be useful for reconstructing past ecosystems. Previous study of biomarkers from Neoproterozoic to Early Cambrian sedimentary rocks suggested unusual carbon cycle developed in the Neoproterozoic ocean (Logan et al.,1997). However, extraction of biomarker from such an old sedimentary rocks has continuously suffered from the problems of contamination and preservation due to weathering and post-depositional thermal alteration. We have tried to extract reliable biomarker molecules using pristine drill core samples collected from the Three Gorge area, South China. Exceptionally well-preserved Neoproterozoic to Early Cambrian sedimentary rocks occur in this area. We chose the samples rich in organic carbon, for example black shales, and extracted aliphatic hydrocarbons using Soxhlet extractor, removed sulfur by reacting with reduced copper, concentrate the liquids with a rotary evaporater and purified by a silica-gel column chromatography. After that, the samples were analyzed by a gas chromatograph mass spectrometer (GC-MS). Our preliminary results suggest that indigenous n-alkane is present in the drill core samples. It shows unimodal distribution with a peak at n-C17, which is typical distribution pattern observed in Neoproterozoic sedimentary rocks.