

**A 35 KYRS RECORD OF ORGANIC MATTER COMPOSITION AND $\delta^{13}\text{C}$ OF
N-ALKANES IN BOG SEDIMENTS CLOSE TO LAKE BAIKAL:
IMPLICATIONS FOR THE PALEOENVIRONMENTAL STUDY**

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Previous studies of Lake Baikal sediments have shown that organic parameters such as total organic carbon (TOC), C/N ratio, ratio of lignin phenols to TOC, higher-molecular weight fatty acids to TOC (HFA/TOC), $\delta^{13}\text{C}$ of bulk organic carbon are markedly different between the last glacial to Holocene (Brincat et al., 2000; Ishiwatari et al., 2005, 2006). We are now faced with detailed interpretation of these differences. However, there is a problem arising from uncertainty in these parameters for source materials (aquatic vs. land organisms) and their modification during diagenesis. Our primary interest is to estimate the relative contribution of aquatic and land plant by use of these parameters. Here we present the result of a study of land record of organic parameters from sediments of a bog close to Lake Baikal with discussion of this approach for overcoming the present situation, because the bog sediment is expected to preserve good records of history of changes in land environment.

A 7.5m-long sediment core from the Cheremushka bog located in the eastern coast of Lake Baikal (Central basin) was analyzed for lignin phenols and fatty acids and carbon isotopic composition of long-chain *n*-alkanes. Pollen analysis showed that record of vegetational changes over the past 35,000 yrs are preserved in this bog sediments (Takahara, 2000; Kataoka et al., 2003; Shichi et al., unpublished). The core consists lithologically of three layers, sandy clay (750-580cm in depth), peaty clay (580-370cm) and peat (370-0cm). Lignin phenols and fatty acids (*n*-C₁₄-C₃₀) were analyzed for 18 samples from the core using an on-line TMAH thermochemolysis method (Ishiwatari et al., 2006) and $\delta^{13}\text{C}$ of long-chain *n*-alkanes were measured by GC-IR (isotope ratio) MS.

Fossil pollen data (Takahara, 1999; Kataoka et al., 2003; Shichi et al., unpublished) indicate that herbs such as Gramineae and *Artemisia* are dominant during the last glacial maximum (LGM: ca. 460-660cm in depth) (Fig. 1). Spruce forests expand in this area in the early Holocene, pine trees increase gradually after 8,000 ¹⁴C years BP and then dramatically become dominant after 6,000 ¹⁴C years BP. A ratio of vanillyl (V) plus syringyl (S) phenols over TOC ((V+S)/TOC ratios) in the Holocene are more than twice higher than those in the LGM. HFA/TOC ratio (*n*-C₂₄-C₃₀ fatty acids over TOC), which is expected to be high for

leaves and herbs, in the LGM are slightly higher than those in the Holocene. HFA/(V+S) ratios in the LGM are about twice of those in the Holocene. $\delta^{13}\text{C}$ of $n\text{-C}_{27}\text{-C}_{33}$ (odd-numbered) alkanes are similar throughout the core. Vertical changes in these and other parameters are roughly in accord with pollen analytical data. TOC concentrations, (V+S)/TOC, and HFA/(V+S) ratios in the bog sediments are 2-20 times higher than those in a Lake Baikal sediment (Academician Ridge), suggesting a large difference in TOC sources for both sediments. We conclude that the results for the bog sediments provide a good reference to interpret organic geochemical parameters in Lake Baikal sediments.

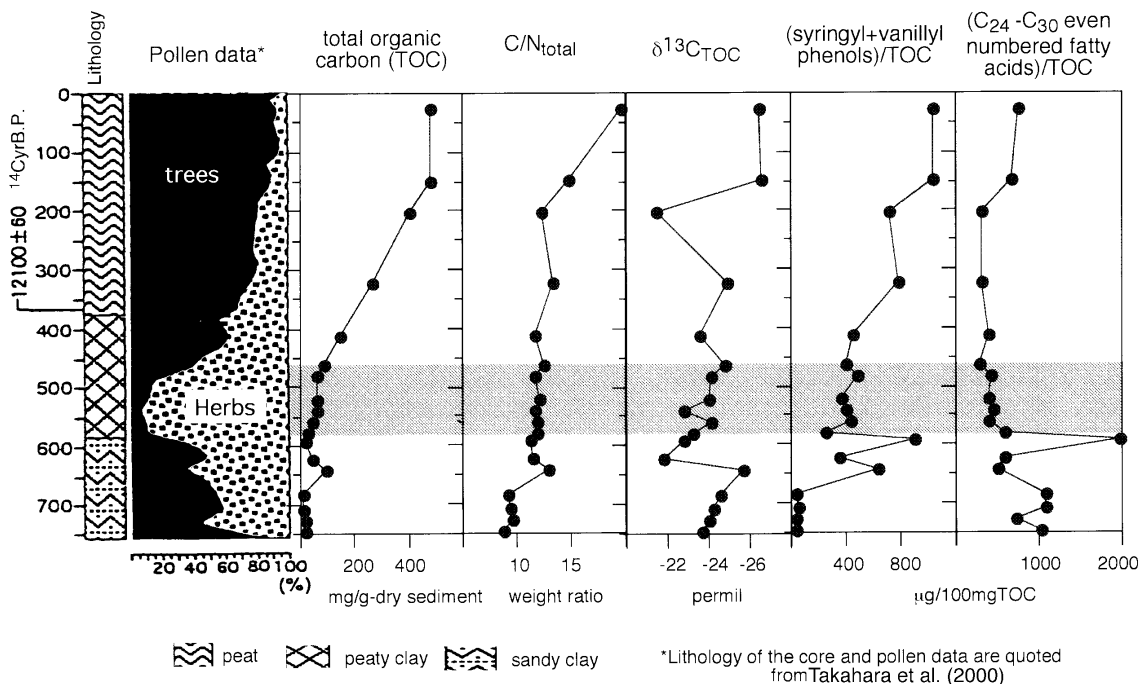


Figure 1. Vertical profiles of fossil pollen, bulk organic matter, lignin phenols, and fatty acids in a sediment of Cheremushka bog located near the eastern coast of Lake Baikal

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