Geochemistry of loess sections from high altitude region, Yili Basin, NW China

S. YABUKI[1], W. YE[1,2], S. KANAYAMA[1,3], M. HONDA[1,4] AND Q. CHANG[1,4]

The Insitute of Physical and Chemical Research (RIKEN), Wako, Japan (syabuki@riken.go.jp)
Zhejiang Normal Univ., Zhejiang, China
Yamagata Univ., Yamagata, Japan
IFREE, JAMSTEC, Inst. Geotherm. Sci., Kyoto Univ., Beppu, Japan

Yili Basin is located in the northwest of China, where loess deposits up to several ten meters are exposed. As controlled by the westerly circulation in and year out, the modern climate is different from the other loess distribute areas in China. In this study, we selected two loess-paleosol sections from step zone, Kuerdenengbulake Section (43º29'N, 83º58'E), and desert step zone, Zeketai Section (43º32'N, 83º19'E), for systematic geochemical studies, such as major elements, trace elements and REE abundances, Rb-Sr, Sr-Nd and Sm-Nd isotope systems.

Based on the major and trace element abundance, the paleosols from steppe zone can be distinguished from the loess by decarbonation and higher contents of stable and relatively stable elements, such as Al_2O_3, TiO_2, K_2O and Rb, whereas the paleosols from desert steppe zone do not show distinct difference of major and trace elements concentration between loess and paleosols. Pedogenesis is thought to be influenced strongly by climate, especially by precipitation.

REE patterns of Yili loess and paleosols are remarkably uniform with $(La/Yb)_N \approx 7.6$, this value is amaller than that of the upper continental crust (UCC), $(La/Yb)_N \approx 9.0$. Negative Eu anomalies, expressed in Eu/Eu* ratios vary from 0.61 to 0.82.

Rb-Sr isotopic systematics of the loess-paleosols show a well-correlated pseudo-isochron, which reflects the mixing of two components, i.e., the silicate material with high $^{87}Rb/^{86}Sr$ ratios and high $^{87}Sr/^{86}Sr$ ratios and the carbonate materials with low $^{87}Rb/^{86}Sr$ and low $^{87}Sr/^{86}Sr$ (0.710).

Neodymium isotopic compositions of Yili loess-paleosols are uniform with $\varepsilon_{Nd}(0)$ varies from –9.0 to –8.0, obviously higher than Luochuan loess-paleosols, from –9.3 to -10.4.

The geochemical evidences suggest that the Yili loess is an aeolian deposit and its material source and accumulating environment differs from the Central Loess Plateau.

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Aliphatic hydrocarbons in the K/T boundary sediments at Kawaruppu, Hokkaido, Japan

H. YABUTA, H. MITA, AND A. SHIMOYAMA

Department of Chemistry, University of Tsukuba, Tsukuba 305-8571, Japan (yabhika@hotmail.com)

Introduction

We analyzed aliphatic hydrocarbons in the K/T (Cretaceous/Tertiary) boundary sediments at Kawaruppu, Hokkaido, Japan. And we discussed their distribution patterns in relation to biomass extinction.

Results and Discussion

Detected aliphatic hydrocarbons were 25 *n*-alkanes from C_{12} to C_{36}, pristane, phytane, 22 steranes, 17 triterpanes, 62 monocyclic alkanes, 4 bicyclic alkanes, and 11 diamondoid hydrocarbons (adamantanes and diamantanes). They were detected at a concentration level of nmol g^{-1} or pmol g^{-1}.

Concentrations of all aliphatic hydrocarbons were smaller within the K/T boundary claystone than in the sediments above and below the claystone, which are likely related to the large biomass extinction event at the end of the Cretaceous (Figure). Particularly, marked decreases in concentration of longer chain *n*-alkanes (C_{27} to C_{31}), 5_-stigmastane and oleanane within the boundary claystone was likely due to a large devastation of terrestrial plants.

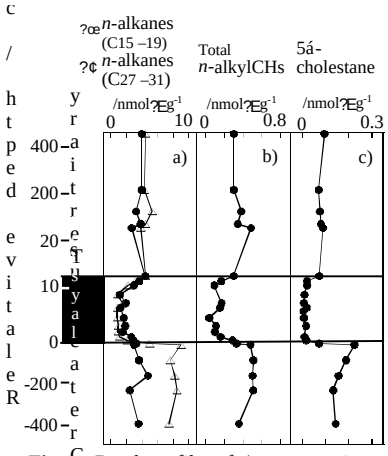

Figure. Depth profiles of a) concentrations of *n*-alkanes, b) *n*-alkylcyclohexanes, and c) 5á-cholestane in the K/T sediments at Kawaruppu.

The diastereomer ratios of 5_-stigmastanes and 17_,21_-30,31-bishomohopanes, and isomer ratios of methyladamantanes and methyldiamantanes which have been known as maturity indices, were roughly constant over sedimentary sequence. This indicated that diagenetic effect to these compounds had been nearly constant over the sedimentary sequence.

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