Low-latitude influence on the East Asian monsoon variation: Geochemical evidence from Chinese loess deposits

L.W. LIU, J. CHEN, J. F. JI AND Y. CHEN

Department of Earth Sciences, Nanjing University, Nanjing 210093, China (liulianwen@hotmail.com)

Most of our knowledge of the evolution of the East Asian Monsoon (EAM) comes from the Chinese loess-paleosol sequence. It is generally accepted the variation of the EAM as recorded in loess are highly correlated to the marine $\delta^{18}O$ record and shows a strong 100 ka-cyclicity during the past 800 ka. The evidences for the conclusion come from both the weathering and pedogenesis intensities changes and the grain size variations in the loess-paleosol sequences, the latter usually serving as a proxy for the variation of winter monsoon. However, the initial grain size distribution has been modified by pedogenic processes. Recently, we found that the Zr/Rb ratio in loess may reflect the initial grain size distribution in the loess-paleosol sequence and thereby indicate the variation of winter monsoon and provide significant insights into the history of EAM.

The concentrations of Zr and Rb were analyzed from the Lingtai section representing the past 1.8 Ma on the Loess Plateau in central China. Comparing the Zr/Rb record from Lingtai section and the marine $\delta^{18}O$ record during the past 1.8 Ma show a very strong 41 ka obliquity perioditcity cycle during 1.8-1.2 Ma BP interval, implying the variation of winter monsoon during this interval is controlled by the high latitude climate, while Zr/Rb ratio record shows very stronger precession cycles during the past 0.8 Ma, suggesting a possible low latitude influence on the East Asian Monsoon regime during this interval.

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Stable carbon isotopic composition of *n*-alkanes in the marine aerosols from the western pacific: Implications for the source and atmospheric transport

J.A. BENDLE AND K. KAWAMURA

Institute of Low Temperature Science, Hokkaido University, Sapporo, Japan (bendle@lowtem.hokudai.ac.jp)

In order to constrain seasonal changes in the long-range atmospheric transport of land derived lipid biomarker compounds (LDLBs) over the open ocean, marine aerosol samples were collected on a biweekly basis from 1990 to 1993 at a remote island, Chichi-Jima (27°04'N, 142°13'E) in the western North Pacific. We report results of the compound specific stable carbon isotope analysis of the *n*-alkanes isolated from the marine aerosols fraction using gas chromatography/isotope ratio/mass spectrometry (GC-ir-MS). Strong seasonal changes in the $\delta^{13}C$ values of the C_{29} and C_{31} *n*-alkanes (biomarkers for higher plants) were evident (see Figure 1 below for the seasonal averages of the C_{29} alkane).

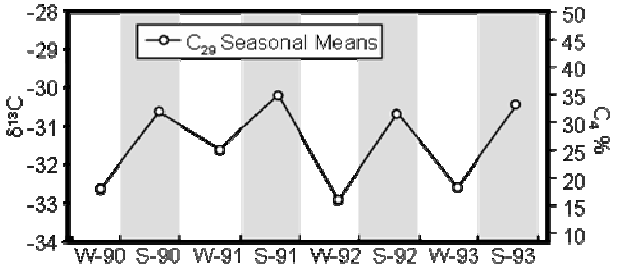

Figure 1: Seasonal mean distributions of carbon isotopic composition ($\delta^{13}C$ – left axis) and $\%C_4$ plant contribution (C_4 % - right axis) of the C_{29} n-alkane in aerosol samples collected at Chichi-Jima Island between 1990 and 1993.

Lighter $\delta^{13}C$ values were observed in winter – with a transition to heavier values in summer. Using a mixing equation, we suggest this is due to relative increases in the contributions from C_4 plants in the summer season. However, in a few samples significant biasing of the $\delta^{13}C$ signal by anthropogenic fossil fuel contributions was also inferred. Using backward air mass trajectory analyses we relate the biomarker data to the seasonal changes prevailing winds and source areas, both in terms of the natural and anthropogenic signal. These results form the initial part of a project to map inputs of LDLBs to the aerosols and sediments of the North Pacific. We also present some preliminary aerosol and sediment data from the next phases of the project.