

Paleovegetation inferred from the carbon isotope composition of long-chain n-alkanes in lacustrine sediments from the Song-nen Plain, northeast China

ZHIFU WEI ^{1*}, YONGLI WANG ¹, GEN WANG ¹, ZEPENG SUN ¹, LIANG XU ¹, TING ZHANG ¹

¹ Key Laboratory of Petroleum Resources, Gansu Province/ Key Laboratory of Petroleum Resources Research, Institute of Geology and Geophysics, Chinese Academy of Sciences, Lanzhou 730000, PR China.

(*correspondence: weizf@lzb.ac.cn)

Abundant n-alkanes were identified by GC/MS analysis in core sediments from Xianghai Lake and the Huola Basin, on the Song-nen Plain, northeast China. The n-alkanes extracted from Xianghai Lake samples showed unimodal and bimodal distribution. The main peaks of unimodal distribution were at n-C29 or n-C31, and the mid- and long-chain n-alkanes had odd-carbon-number predominance, suggesting they were derived mainly from terrestrial higher plants. Bimodal distributions of n-alkanes had maximum values centered at n-C17 and n-C31 in all samples. The short-chain n-alkanes with a maximum at n-C17 showed no odd-even predominance, however there was a strong odd-carbon-number predominance of long-chain n-alkanes, with a maximum at n-C31. These results suggest that organic matter in Xianghai Lake was derived from mixed sources, including bacteria, algae and terrestrial plants. The n-alkanes extracted from Huola Basin sediments were characterized by a unimodal distribution, with the maximum value at n-C31, and the long-chain n-alkanes had an odd-carbon-number predominance, indicating that they were derived mainly from terrestrial higher plants. In addition, the compound-specific carbon isotope composition was determined for C27, C29 and C31 n-alkanes in the core sediments, and the relative contributions of C3 and C4 plants were estimated using a binary model. Calculations indicated that C3 plants were the dominant input during the late glacial and Holocene. The relative abundance of C3 and C4 plants changed significantly through time, likely determined by cool versus warm climate conditions.