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[2], GEN WANG[1]

[1] *Key Laboratory of Petroleum Resources Research, Gansu Province, Northwest Institute of Eco-Environment and Resources, Chinese Academy of Sciences, Lanzhou 730000, PR China; e-mail:weizf@lzb.ac.cn*

[2] *Key Laboratory of Cenozoic Geology and Environment, Institute of Geology and Geophysics, Chinese Academy of Sciences; CAS Center for Excellence in Life and Paleoenvironment, Beijing 100029, PR China; e-mail: ylwang@mail.iggcas.ac.cn*

[3] *Key Laboratory of Petroleum Resources Research, Gansu Province, Northwest Institute of Eco-Environment and Resources, Chinese Academy of Sciences, Lanzhou 730000, PR China; e-mail:wanggen12@mails.ucas.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*-C_{29} or *n*-C_{31}, 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*-C_{17} and *n*-C_{31} in all samples. The short-chain *n*-alkanes with a maximum at *n*-C_{17} showed no odd–even predominance, however there was a strong odd-carbon-number predominance of long-chain *n*-alkanes, with a maximum at *n*-C_{31}. 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*-C_{31}, 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 C_{27}, C_{29} and C_{31} *n*-alkanes in the core sediments, and the relative contributions of C_3 and C_4 plants were estimated using a binary model. Calculations indicated that C_3 plants were the dominant input during the late glacial and Holocene. The relative abundance of C_3 and C_4 plants changed significantly through time, likely determined by cool versus warm climate conditions.