Proc. NIPR Symp. Antarct. Geosci., 6, 153-154, 1993

ORGANIC GEOCHEMICAL STUDY OF LAKE SEDIMENTS AND ALGAL MATS FROM THE LÜTZOW-HOLM BAY REGION, ANTARCTICA (ABSTRACT)

Genki I. MATSUMOTO[1], Shuji OHTANI[2], Haruta MURAYAMA[3], Kunihiko WATANUKI[4]* and Tetsuya TORII[5]

[1]*Department of Environmental Information Science, School of Social Information Studies, Otsuma Women's University, 7-1, Karakida 2-chome, Tama-shi, Tokyo 206*
[2]*Department of Biology, Faculty of Education, Shimane University, Nishikawatsu-cho, Matsue 690*
[3]*Department of Chemistry, Faculty of Education, Yokohama National University, Tokiwadai, Midori-ku, Yokohama 240*
[4]*Department of Chemistry, College of Arts and Sciences, University of Tokyo, Komaba, Meguro-ku, Tokyo 153*
[5]*Japan Polar Research Association, Hirakawa-cho, Chiyoda-ku, Tokyo 102*

The organic geochemical study of hydrocarbons and fatty acids in lake sediments and algal mats from the Lützow-Holm Bay region, East Antarctica was carried out to elucidate their features for the paucity of vascular plants in relation to source organisms. Normal alkanes ranging in carbon chain length from C_{15} to C_{35} with a predominance of odd-carbon numbers were found in the sediment and algal mat samples, together with monomethyl- and dimethyl-branched alkanes and/or alkenes. Interestingly, long-chain *n*-alkenes were present in some sediment samples. Also, triterpenes, such as hop-22(29)-ene and 17β(H), 21β(H)-hopane, and 5α(H), 14α(H), 17α(H)-C_{27}-C_{29} steranes were found in most samples. Normal alkanoic acids in carbon chain length ranging from C_{10}-C_{32} with a predominance of even-carbon numbers were detected in the samples, along with *iso*- and *anteiso*-alkanoic acids (C_{12}-C_{17}) and *n*-alkenoic acids (C_{16} and C_{18}). Unusually, long-chain *n*-alkanes and *n*-alkanoic acids ($>C_{19}$) were major components in certain samples.

The major organisms in algal mats were Cyanophyceae (*Nostoc* sp. or *Phormidium* sp.), Bacillariophyceae (*Amphora veneta, Coscinodiscus* sp., *Fradilariopsis curta* or *Navicula cryptocephala*) or Chlorophyceae (*Cosmarium clepsydra* or *Oedogonium* sp. These algae and cyanobacteria are commonly distributed in Antarctic lakes and ponds. However, the major organisms in the sediments are all Bacillariophyceae, suggesting that settled organic matter in the sediments is degraded largely after sedimentation, and only Bacillariophyceae remained. Also, *n*-alkenoic acid/*n*-alkanoic acid ratios probably reflect the degree of destruction of organic matter.

The abundance of alkenes may be explained by low environmental temperatures in the region, since it is known that unsaturated compounds in some plankton increase with decreasing ambient temperatures.

The absence of thermally matured triterpanes and steranes indicates that organic matter in the lakes is mainly synthesized by *in situ* organisms, and the contribution of eroded materials is small. These compounds may be derived from diatoms, green algae and/or cyanobacteria, with some influence of bacteria. However, the specific source organisms of

* Present address: 20-20, Rinkan 1-chome, Yamato 242.

these organic compounds are not yet clear. Algal mats are important sources of organic matter in the lake and ice-free areas in Antarctica.

(Received November 19, 1992; Revised manuscript received July 5, 1993)