

THE FEATURES OF HYDROCARBONS IN THE MCMURDO
DRY VALLEYS SOIL, ANTARCTICA (ABSTRACT)

Genki I. MATSUMOTO¹, Masaru AKIYAMA², Kunihiko WATANUKI¹
and Tetsuya TORII³

¹*Department of Chemistry, College of Arts and Sciences, University of Tokyo,
8-1, Komaba 3-chome, Meguro-ku, Tokyo 153*

²*Faculty of Education, Shimane University, 1060, Nishikawatsu, Matsue 690*

³*Japan Polar Research Association, 8-7, Kojimachi 1-chome,
Chiyoda-ku, Tokyo 102*

Hydrocarbons in the McMurdo Dry Valleys (Ross Desert) soil samples from southern Victoria Land, Antarctica were studied using a capillary gas chromatography-mass spectrometry to clarify their features in relation to source materials. Also, a detailed microscopic study was made for microalgae and cyanobacteria. A suite of *n*-alkanes and *n*-alkenes in carbon chain length ranging from nC_{13} to nC_{35} were found in concentrations changing from 13 to 2200 and 1.1 to 5000 ng/g of dry soil, respectively, varying largely among the samples. Normal alkene/*n*-alkane ratios ranged from 0.085 to 2.4. Surprisingly, the major hydrocarbons were all odd-carbon numbered long-chain *n*-alkanes ($\geq C_{20}$), maximum $nC_{23:0}$ (carbon chain length: number of double bonds), $nC_{25:0}$ or $nC_{27:0}$ and/or *n*-alkenes, maximum $nC_{23:1}$, $nC_{25:1}$ or $nC_{29:2}$. The odd/even carbon ratios for *n*-alkanes and *n*-alkenes were all much greater than unity.

For the possible sources of these unusual hydrocarbons, mosses, insects, aeolian transport of the waxes of vascular plants from the mid and lower latitudes, erosion of sedimentary rocks, and microorganisms, such as bacteria, fungi, cyanobacteria and microalgae were considered. No evidence of mosses and insects was found in the studied sites. Also, the microscopic study revealed that living cells were rare and no green algae were detected, but the colonial envelopes of *Anacystis*- and *Nostoc*-type cyanobacteria were found in some soil samples. The hydrocarbon composition was much different from airborne vascular plant waxes. Consequently, these hydrocarbons may have resulted from the erosion of sedimentary rocks and due to the accumulation of *in situ* long-term microbial activity.

(Received February 9, 1989)