

SEASONAL VARIATION OF LOW MOLECULAR WEIGHT
DICARBOXYLIC ACIDS IN THE ARCTIC ATMOSPHERE
(ABSTRACT)

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Normal saturated dicarboxylic acids (C₂-C₁₁) and unsaturated diacids (maleic, fumaric, methylmaleic, phthalic acids) were detected in Arctic aerosol samples collected from Alert (82.5°N, 62.3°W), Canada, in 1987-1988, by capillary gas chromatography (GC) and GC-mass spectrometry employing dibutyl ester derivatization. In addition to diacids, ω-oxo acids (C₂-C₅, C₉), pyruvic acid and α-dicarbonyls (methylglyoxal and glyoxal) were detected. Oxalic (C₂) acid was generally found as a dominant diacid species (1.8-70 ng/m³, av. 14±12 ng/m³) followed by malonic (C₃; 0.05-19 ng/m³, av. 2.5±3.3 ng/m³) and succinic (C₄; 0.51-18 ng/m³, av. 3.8±3.5 ng/m³) acids throughout all seasons. Total concentrations of dicarboxylic acids showed seasonal variation (4.3-97 ng/m³, av. 25±20 ng/m³), with two maxima both in September to October and in March to April. The autumn peak was suggested to be caused by enhanced contributions from both biogenic and anthropogenic sources followed by photochemical reactions, because this was consistent with higher concentrations of *n*-alkanes from terrestrial plant waxes and of soil-derived aluminum in the autumn aerosol samples. On the other hand, the spring peak was observed during the period of "Arctic Sunrise". This result suggested that diacids in the spring aerosols were secondarily produced by photochemical reactions of organic pollutants carried into the Arctic during the winter season, with O₃ and OH radicals which were produced under a strong solar radiation.

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