

DETERMINATION OF ATMOSPHERIC CONCENTRATIONS OF  
HALOCARBONS AND METHANE IN THE  
ANTARCTIC (Abstract)

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The background atmospheric concentrations of halocarbons ( $\text{CCl}_2\text{F}_2$ ,  $\text{CCl}_3\text{F}$ ,  $\text{CH}_3\text{CCl}_3$ , etc.) and methane ( $\text{CH}_4$ ) in the Antarctic were measured and compared with those observed in the Northern Hemisphere (N.H.) in order to clarify behaviors and lifetimes of these compounds in the atmosphere. Sampling canisters used in the Antarctic are made of stainless steel vessels in extremely clean conditions and equipped with stainless steel bellows valves. The inner surface of canisters was silanized to prevent adsorption of trace constituents during the long-period storage. Inactivation of the surface was also attempted by introducing water vapor into the canister. All the antarctic samples collected in 1981–1984 at 500–1000 m NE (upwind direction) of Syowa Station were analyzed after 3–15 months at the University of Tokyo by ECD gas chromatography (for halocarbons) and by FID gas chromatography (for methane). The primary calibration standards were carefully prepared with a newly developed technique and the values of concentration of the halocarbons and methane were accurately determined.

The concentrations of  $\text{CCl}_2\text{F}_2$  and  $\text{CCl}_3\text{F}$  observed in the Antarctic in January–February 1983 (330.8 and 176.6 pptv (pptv =  $10^{-12}$  v/v), respectively) were about 10% lower than those observed in the N.H. in accordance with their predominant emissions in the N.H., their extremely long lifetimes exceeding 50 years, and the delayed diffusion into the Southern Hemisphere (S.H.) due to the existence of Intertropical Convergence Zone between the hemispheres. The atmospheric concentrations in both hemispheres tend to increase steadily at rates of 18–19 pptv/year ( $\text{CCl}_2\text{F}_2$ ) and 8–9 pptv/year ( $\text{CCl}_3\text{F}$ ) corresponding to the unchanged worldwide uses and releases of these compounds in large amounts. The concentration of  $\text{CH}_3\text{CCl}_3$  in the Antarctic was 81.5 pptv in January 1983 and about 30% lower than in the N.H. in accordance with its relatively short atmospheric lifetime (*i.e.*, 6–7 years due to the reaction with OH radicals in the troposphere). The methane concentration in the Antarctic (1.56 ppmv) was slightly increasing with small seasonal variations.

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DECOMPOSITION OF CARBON DIOXIDE IN THE LOWER  
STRATOSPHERE DUE TO AURORAL X-RAYS (Abstract)

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It is pointed out that the circumpolar stratospheric measurement by a commercial airliner reported by PRATT and FALCONER (*J. Geophys. Res.*, **84**, 7876, 1979) was by chance undertaken after a strong geomagnetic storm.

Thus the result showed specific maxima of CO concentrations accompanied by simultaneous minima of temperature.