

ATMOSPHERIC CF_2Cl_2 AND CFCl_3 IN ANTARCTICA (ABSTRACT)

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In order to understand the global distributions and trends of atmospheric CF_2Cl_2 , CFCl_3 and N_2O , air samples have been collected at Syowa Station since February 1982. Samples were analyzed by a GC-ECD method. Linear trends were calculated with the data of the period between February 1982 and January 1984. Annual increases of 19.2 ppt yr^{-1} for CF_2Cl_2 and 10.2 ppt yr^{-1} for CFCl_3 were obtained. Annual increase was 2.2 ppb yr^{-1} for N_2O , which was within the range of experimental uncertainty, and further improvements are in progress (M. HIROTA *et al.*: Mem. Natl Inst. Polar Res., Spec. Issue, 39, 57, 1985).

In JARE-26, air samples were only collected on board of the SHIRASE between Tokyo and Syowa Station late in 1984. Volume mixing ratios of CF_2Cl_2 and CFCl_3 at 60° and 66°S were compared with those at Syowa Station. Mixing ratios at 60° and 66°S were 353 and 351 ppt for CF_2Cl_2 and 206 and 208 ppt for CFCl_3 , and were in agreement with those estimated by extrapolating the linear trends, which were 354 ppt for CF_2Cl_2 and 202 ppt for CFCl_3 as of December 1984. These results indicate that atmospheric CF_2Cl_2 and CFCl_3 have been increasing steadily in the last few years in Antarctica.

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SPECTROSCOPIC MEASUREMENTS OF ATMOSPHERIC N_2O
AT SYOWA STATION, ANTARCTICA (ABSTRACT)

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Infrared solar spectra observed at Syowa Station, Antarctica (69°00'S, 39°35'E) were analyzed with respect to the N_2O $2\nu_1$ absorption band. Transmittances at the three wavenumbers were used to deduce the atmospheric total nitrous oxide columnar density, *i.e.* at the center of N_2O absorption band (2576 cm^{-1}) and at both margins of the band (2521 and 2611 cm^{-1} , respectively).

Synthetic transmittances corresponding to the observed spectra were calculated with a multi-layered model atmosphere, in which the radiosonde data were adopted for the lower layers and the U. S. Standard Atmosphere, 1976 for the upper layers respectively, using the AFGL Atmospheric Absorption Line Parameters Compilation, 1982.

The deduced values showed two maximums in April–May and September and two minimums in the austral summer and winter in 1983. However, the ampli-

tude of this seasonal variation was less than $\pm 10\%$ of the average. The average of N_2O columnar density was 5.9×10^{18} molecule/cm² corresponding to 300 ppbv for tropospheric mixing ratio.

A more detailed analysis is under way using the whole spectral information on the absorption band to estimate more accurately the zero-absorption spectrum.

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VARIATIONS OF ATMOSPHERIC CARBON DIOXIDE
CONCENTRATION AT SYOWA STATION (69°00'S, 39°35'E),
ANTARCTICA (ABSTRACT)

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Precise measurements of the atmospheric CO_2 concentration were initiated at Syowa Station, Antarctica in 1983. Preliminary inspection of the data obtained up to the present showed that; (1) a regular diurnal variation is not observable, (2) irregular variations are sometimes observed with extremely small amplitude of 0.2 ppmv at most, (3) a seasonal variation with the minimum concentration in mid-April and the maximum concentration in mid-October and peak-to-peak amplitude of about 1.2 ppmv is detected, and (4) annual mean values of the CO_2 concentration are 341.2 and 342.6 ppmv for 1983 and 1984, respectively.

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INCREASING ATMOSPHERIC CONCENTRATIONS OF
HALOCARBONS AND METHANE IN ANTARCTICA
(ABSTRACT)

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We have been measuring the atmospheric concentrations of halocarbons (CCl_2F_2 , CCl_3F , CH_3CCl_3 , etc.) and methane (CH_4) in Antarctica as well as in the Northern Hemisphere (N.H.) in order to clarify behaviors and lifetimes of these compounds in the atmosphere and to estimate their effects on the earth's environment.