

ATMOSPHERIC CONCENTRATIONS OF HALOCARBONS AND METHANE IN ANTARCTICA (Abstract)

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Atmospheric concentrations of halocarbons (CCl_2F_2 , CCl_3F and CH_3CCl_3) and methane (CH_4) in Antarctica were measured and compared with those observed in the Northern Hemisphere (N.H.). These compounds are all related to the depletion of ozone in the stratosphere and the green-house effect. Air samples were collected in preevacuated all-stainless steel canisters at 500–1000 m NE (upwind direction) of Syowa Station in January–February of 1981–1983, and analyzed after 3–4 months at the University of Tokyo by EC gas chromatography (for halocarbons) and by FID gas chromatography (for methane). The observed concentrations of CCl_2F_2 and CCl_3F in Antarctica were 331 and 177 pptv (pptv = 10^{-12} v/v), respectively, in 1983, which were 10 and 11% lower than the background concentrations we observed in the mid-latitude N.H. (Hokkaido). Such a difference can be explained in terms of their predominant emissions in the N.H. and extremely long lifetimes in the troposphere (>50 years). The concentration of CH_3CCl_3 was 30% lower in Antarctica indicating a tropospheric lifetime of 6–7 years. The methane concentration was 1.56 ppmv (ppmv = 10^{-6} v/v) in Antarctica and about 10% lower than in Hokkaido; this may provide information on the source and behavior of atmospheric methane which are not fully understood.

(Received April 6, 1984)

IN SITU MEASUREMENTS OF MOLECULAR FORM OF STRATOSPHERIC SULFATE PARTICLES (Abstract)

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As part of scientific activities on MAP in Japan, direct sampling and analysis of trace species and aerosols in the lower stratosphere using a Merlin-IV aircraft has been planned.

In stratospheric aerosol sampling, we concentrated on obtaining the molecular form of sulfate particles by using a vapor-deposited thin film of calcium as a reactive particle collected surface. Chemical testing by the thin calcium film is a specific test for the detection of the sulfuric acid component in individual submicron particles under low ambient relative humidities (A. ONO *et al.*: *Tellus*, **35B**, 197, 1983).

On February 20, 1983, Merlin-IV sampled aerosols in the lower stratosphere at an altitude of 8.3 km over the Sea of Japan (40°N/137°E). It was observed that almost all particles etched a thin calcium film and formed reaction spots spread around the original particles. This indicates clearly that dominant

particles were present as liquid droplets in the lower stratosphere, and the most probable liquid which reacts directly with calcium upon impactation under stratospheric conditions is obviously hydrated sulfuric acid.

(Received January 5, 1984)

AIRCRAFT MEASUREMENTS OF AEROSOL IN THE FREE TROPOSPHERE (Abstract)

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Aircraft measurements of aerosol in the free troposphere were made in 1982 and 1983 in order to investigate the behavior of the background aerosols. Number concentration and size distribution of Mie particles (size range 0.3–1.0 μm) were measured by using a light scattering aerosol particle counter. The particle counter was improved to be suitable for aircraft measurement in the free troposphere. Eight vertical profiles and five horizontal distributions of Mie particles were obtained up to about 8 km over the northern and southern coastal areas of the main island of Japan. In some cases, the influence of local atmospheric pollution originating from the land surface was observed on the aerosol concentration at altitudes of 5–6 km. Measurements at altitudes of 6–8 km over the Sea of Japan showed the existence of stratospheric aerosols. The background concentration of Mie particles was about 0.1 cm^{-3} at altitudes of 6–8 km in the free troposphere.

(Received April 9, 1984)

ON THE FORMATION OF SNOW CRYSTALS OF THE "GOHEI" TYPE (Abstract)

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In order to study the crystal structure, formation mechanism, and growth mechanism of the snow crystals of cold temperature types, especially the "Gohei" type, experiments using a new diffusion type of cold chamber were carried out. As a result, the "Gohei" type crystals were also made artificially.

To know the presence of a rule in the tip angle of "Gohei" type, microphotographs and replicas of the crystals of the polar regions were available for examination. It was found that the number frequency of the tip angle had a maximum peak around 77° and a minor peak around 54° . The distribution around 66° was indistinct.