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

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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.

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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.

The formative condition of the "Gohei" type is becoming clear by the observations and experiments. (1) There was a rule in the tip angle of the "Gohei" type, (2) the "Gohei" type grew as a part of combination of bullets, and (3) the condition of saturation at the nucleation was at or near the water saturation. Therefore, it was concluded that the "Gohei" type crystals grew from frozen cloud droplets. From these results, it is considered that a polycrystalline snow crystal was defined by their *c*-axes when a cloud droplet was frozen, and if at that time, two prism planes grew and crossed each other at a small angle, their crossing planes grew as "Gohei" type crystals.

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A NUMERICAL EXPERIMENT ON KATABATIC WIND WITH A TWO-DIMENSIONAL AXIAL SYMMETRIC MODEL (Abstract)

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The vertical structure of the katabatic wind and the surface temperature inversion on a clear day in winter are well represented by a two-dimensional numerical model.

An axially symmetric circular continent, which has an elliptic cross-section of 2000 km in radius and 4000 m in height, is supposed, assuming that all variables are uniform along the direction perpendicular to the fall line. Radiative cooling, turbulent transfer and transport of heat and momentum by stationary and transient eddies are included in the model. The time marching method is adopted. The model is integrated for 5 days. Some features of the katabatic wind are well represented. An inversion layer of 24°C in strength and 450 m in height is formed on the slope (inclination is 2.9×10^{-3}); the wind speed is 20 m/s at the height of 70 m, and decreases to 6 m/s at the height of 200 m. Strong wind blows in the layer above which the temperature gradient is very large. An inversion layer of 30°C in strength and 650 m in height is formed on the plateau (inclination is 0.5×10^{-3}); the wind speed is 10 m/s at the height of 30 m.

The surface temperature and the wind profile get almost steady state. However, the atmosphere is still cooling at the rate of 0.4–2°C/day due to radiative cooling; this must be compensated with adiabatic heating by subsidence about 3 mm/s, though it is only 1–2 mm/s in this model. This is a matter of meridional circulation.

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HEAT FLUX IN SURFACE SNOW AT MIZUHO STATION, ANTARCTICA: HOURLY VALUES (Abstract)

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The errors in short term snow heat flux calculation (T. KIKUCHI: Mem. Natl Inst. Polar Res., Spec. Issue, **29**, 61, 1983) are corrected (1) by using the