measured by the satellite and at the ground surface both over the Antarctic were compared and the atmospheric component of radiation budget was estimated. The satellite data were from Nimbus-7 ERB Experiment, measured by the broad-band scanning radiometer and averaged over about 500×500 km (72–67.5°S, 36–48°E). The surface data were from POLEX-South radiation measurements made at Mizuho Station (70°42′S, 44°20′E). Comparison was made for the data of 1979.

The daily albedo at the top was always less than the surface albedo about 10%, and the correlation between the both was low. The surface albedo varied according to the cloud amount. The upward longwave flux at the top was about 10 to 50 Wm^{-2} smaller than that at the surface. The surface flux showed large daily variations according to the cloud amount and the flux at the top also followed some variations, which meant that the effect of large-scale cloud movements could appear in the both fluxes, whereas, small-scale cloud movements were masked in the wide region satellite data.

The atmospheric component of the net radiation was estimated as a difference of those at the top and at the surface. Calculations were made for the monthly value, since the seasonal variations seemed to be comparable in spite of the different sizes of field of view. The net shortwave flux was very similar for both the atmosphere and the surface. The net longwave flux of the atmosphere was larger than that of the surface about twice to four times. The total net flux for the atmosphere was 130 Wm^{-2} at most in April and 50 Wm^{-2} in December. The atmospheric cooling was largest in the autumn before the polar night and smaller in the spring side even in the winter.

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TWO-DIMENSIONAL NUMERICAL MODELING OF KATABATIC WINDS (Abstract)

Nobutaka MANNOUJI

Geophysical Institute, University of Tokyo, 3-1, Hongo 7-chome, Bunkyo-ku, Tokyo 113

A two-dimensional numerical model is made. The present purpose is to represent the vertical structure of the surface temperature inversion and the katabatic wind on a clear day of the winter. An anelastic equation system is used. It is assumed that all variables are uniform along the direction perpendicular to the fall line. Radiative cooling and turbulent transfer are included in the equations. The topography consists of a slightly inclined plateau of 1525 km in length and 3500 m in height, with the slope of 500 km in length and the plain of 875 km in length.

The model is integrated for 5 days. Some of the features of the katabatic wind are represented, though they are not yet stationary. An inversion layer of 20°C in strength and 580 m in height is formed on the slope; wind speed is 18 m/s at the height of 100 m. Strong wind blows in the layer above which the temperature gradient is very large. An inversion layer of 25°C in strength and 600 m in height is formed on the plateau; wind speed is 6 m/s at the height of 60 m. Qualitatively realistic profiles of wind and temperature can be obtained, though they are not good quantitatively. The circulation over Antarctica is not formed; no return current of the katabatic wind is found.

Some improvement is necessary. Calculations of radiative flux and turbulence

must be criticized. Axis symmetry model is preferable. Interaction between the mid-latitudes is also an important probelm.

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SNOW CRYSTAL OBSERVATIONS DURING THE FIRST LONGITUDINAL CROSSING OF GREENLAND, 1978 (Abstract)

Keiji HIGUCHI and Naomi UEMURA

Water Research Institute, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464

Snow crystal observations were carried out during the trip across the ice sheet of the First Longitudinal Crossing of Greenland, from May 12 to August 22, 1978. Plastic replicas of snow crystals were made at 19 points, and photographs of snow crystals were taken at 17 points. Meteorological observations on temperature, pressure, wind and weather were carried out at least once a day during the trip. The shapes of observed snow crystals were mainly column, plate and their combinations, and temperature at the ground in these cases was in a wide range between −2°C and −18°C. It is interesting that large dendritic crystals were observed on June 20 and July 7. In the case of June 20, diameter of dendritic crystals was mainly in the range between 4 and 5 mm, and air temperature at the ground (2450 m above mean sea level) was −10°C. From these data and experimental results of artificial snow crystals, it can be said that cloud layer where snow crystals formed is 1000 m in thickness and with stable lapse rate of 0.3°C/100 m.

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ARTIFICIAL MAKING OF SNOW CRYSTALS OF COLD TEMPERATURE TYPES (Abstract)

Katsuhiro KIKUCHI and Noboru SATO

Department of Geophysics, Faculty of Science, Hokkaido University, Kita-10, Nishi-8, Kita-ku, Sapporo 060

In order to study in detail the growth mechanism and crystalline structure of the snow crystals of cold temperature types (peculiar shapes) growing below −20°C, a new diffusion type cloud chamber was constructed. Using the new chamber, various types of peculiar shapes of snow crystals were made artificially under the temperature conditions below −20°C. Almost all peculiar shapes grown artificially were already observed under natural conditions at Syowa Station and South Pole Station in Antarctica, in Arctic Canada, and in Hokkaido Island of Japan, by KIKUCHI. The production frequency of peculiar shapes in the experiments was nearly of the same percentage as that observed in Arctic Canada and Hokkaido Island of Japan. Some considerations were made on the snow crystals of cold temperature types.

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