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SNOW PARTICLE SIZE DISTRIBUTION FUNCTION AT SYOWA STATION EVALUATED FROM VTR IMAGE (ABSTRACT)

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It is very important for meteorological radar observations to know the precipitation particle size distribution functions. In this paper, we report a very simple method to evaluate snow particle size distribution functions using snow particle VTR images, and show our results at Syowa Station, Antarctica.

Snow particles on the ground were recorded by a VTR camera set, and the VTR image was digitized and stored on frame memories using a video digitizer board in a personal computer. To avoid the overlap of snow particles and to reduce background offset noise on images, we used subtraction processing between images at different recording times. Next, we obtained projections of this subtracted image in the x and y directions, and determined the position of each particle using back projection processing. Since radar echo from snow is usually analyzed on the assumption that snow particles are spherical, we measured the maximum radius (r_max) and equivalent radius (r_area) from the identified individual snow particle images. The former is defined as the maximum diameter through the center of gravity on the particle image, the latter is calculated from its area.

In this study, we used two sets of VTR tapes which were recorded at Syowa Station on April 5 and October 1, 1988. Using a personal computer, we have counted more than 2500 particles. The obtained distributions, $N(r\_\mathrm{max})$ and $N(r\_\mathrm{area})$, are approximated as straight lines on semi-logarithmic graph paper, $N(r) \sim 10^{-B*r}$. In April, radii of snow particles, which may be graupels, were mainly distributed between 0.2 and 0.6 mm, and the exponents (B) of r_max and r_area were 42 and 50, respectively. Otherwise, in October, most particles were distributed from 0.1 to 0.5 mm, and the exponents of r_max and r_area were 62 and 33.

We believe that our method is a practical approach for obtaining snow particle size distribution functions.

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