

OBSERVATIONAL STUDY OF LOW-LEVEL RADAR ECHOES
IN ANTARCTICA (ABSTRACT)

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Precipitating clouds was made with a vertically pointing radar of 3.2 cm wavelength at Syowa Station from February 1988 to February 1989 (in relation to ACR). The echoes, the top-heights of which were lower than 3 km, were often observed without being directly associated with a cyclone. About 15% of total annual precipitation amount and about 20% of annual precipitation days were given by these low-level radar echoes.

In most cases of low-level radar echoes, the lapse rate in the cloud layer was nearly moist adiabatic. This implies that the clouds formed in close association with ascending air motion. The vertical profiles of radar-echo intensity showed that precipitation particles grew in these cloud layers.

Low-level radar echoes in May and June showed sometimes as nearly large intensity as in the other seasons. It is suggested that a large amount of precipitation formed in spite of the small amount of water vapor in the cold atmosphere; precipitation formed efficiently.

It is interesting that graupels and densely-rimed ice crystals were often observed in relation to low-level intensive radar-echoes in May and June. T. Iro (Pap. Meteorol. Geophys., 34, 151, 1983) pointed out that the number concentration of Aitken aerosols is low in winter in Antarctica. It appears that even in winter when the atmosphere is cold and contains only a small amount of water vapor, graupels and rimed ice crystals can form efficiently because of the existence of large cloud droplets, which result from the low number concentration of cloud condensation nuclei.

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