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LARGE SIZE LIQUID PSC PARTICLES OBSERVED OVER NY-ÅLESUMD (ABSTRACT)

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Polar stratospheric clouds (PSCs) were observed by lidar at Ny-Ålesund, Spitsbergen in December 1994 and January 1995. The backscattering coefficient at wavelengths of 1064 nm and 532 nm, and the depolarization ratio of PSCs at 532 nm, were measured by the lidar system. The stratospheric temperature from mid-December to mid-January was below the estimated frost point of nitric acid tri-hydrate (NAT) in winter 1994/1995. PSCs were observed more frequently in this low temperature period than in previous winters since 1991. The characteristics of the PSCs observed by lidar were very variable, but had a noticeable vertical "sandwich" structure in January in which a layer of liquid PSC particles at altitude around 20 km existed between two solid particle layers. The wavelength dependence of the backscattering shows that the size of both liquid and solid particles was larger than the average size of background stratospheric aerosols. Lidar observations of liquid layer particles show characteristics in qualitative agreement with those expected from model PSC particles grown in ternary solutions of H_2SO_4, HNO_3, and H_2O with a temperature decrease. However, the observed backscattering coefficient and its wavelength dependence indicate that PSC particles require further growth than that predicted by the ternary solution model at temperature at which most HNO_3 molecules in the surrounding atmosphere are considered to be condensed on PSCs.

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SEASONAL VARIATION OF CLOUDS AND PRECIPITATION IN NY-ÅLESUND, SVALBARD (ABSTRACT)

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We started radar observations of clouds and precipitation in Ny-Ålesund, Svalbard, Arctic in August 1992. Although there were some no data periods because the station was not manned, we obtaied data from August 1992 to March 1995. Monthly precipitation was calculated from the 5 minutes mean radar reflectivity factor. For calculation we need the equation of the relationship between radar reflectivity factor Z (mm^6/m^3) and rainfall intensity R (mm/hr). Data of March 5, 1995 were used for obtaining the relationship. An equation, $Z = 1585\,R^{1.52}$, was obtained. Monthly precipitation from August 1993 to March 1995 was estimated using this equation. Two minima of January or February and June were shown in the monthly variation. Monthly cloud amount variation in the same period observed by the Norwegian Polar Institute, in cooperation with the Norwegian Meteorological Institute, showed one minimum of December or January, but did not show another minimum around June. This result suggests that the clouds in June are inefficient for forming precipitation.

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