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Characteristics of Polar Stratospheric Clouds inferred from ILAS measurements

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The ILAS (Improved Limb Atmospheric Spectrometer) on board the ADEOS (Advanced Earth Observing Satellite) successfully observed the profiles of stratospheric ozone and other related species such as aerosol extinction, nitric acid and water vapor both polar regions from November 1996 through June 1997 [*Sasano et al.,* 1999]. It was reported that the ILAS captured many PSC events during the winter and early spring of 1997 in the Northern Hemisphere [*Hayashida et al.,* 2000]. Preliminary analysis made it clear that the ILAS also observed many PSC events during the early winter of 1997 in the Southern Hemisphere.

We carried out intensive examinations of the identification method to distinguish PSCs from the background aerosols. PSC event was identified when its extinction coefficient was larger than the threshold value that was defined as an average of the background extinction coefficient plus five standard deviations where the collocated temperature was above 200 K for each 10-day period and at each 1-km altitude.

Extinction data were compared with the theoretically predicted volume of particles, utilizing the Carslaw's analytic expression assuming the formation of super-cooled ternary solution (STS) particles [*Carslaw et al.,* 1995]. The fraction of nitric acid remaining in gas phase after the uptake into STS particles was compared with ILAS nitric acid data. Similar approach was also applied to nitric acid trihydrate (NAT) particles based on the work of *Hanson and Mauersberger* [1988]. As a result, the ILAS aerosol and nitric acid data for some PSC events showed good correspondence to the theoretically predicted values for STS or NAT formation.

The temperature history for all of the observed PSC events was also intensively analyzed based on trajectory calculations. We found some representative temperature histories showing the characteristic of the liquid phase particles and the solid phase particles. Combined analysis of the temperature history and the theoretically predicted NAT/STS formation temperature will allow us to reveal the chemical composition of observed PSC particles.

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