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Probability density functions characterizing PSC particle size distribution parameters for NAT and STS derived from in situ measurements between 1989 and 2010 above McMurdo Station, Antarctica, and between 1991-2004 above Kiruna, Sweden

Terry Deshler
University of Wyoming, Atmospheric Science, Laramie, United States (deshler@uwyo.edu)

Balloon-borne optical particle counters were used to make in situ size resolved particle concentration measurements within polar stratospheric clouds (PSCs) over 20 years in the Antarctic and over 10 years in the Arctic. The measurements were made primarily during the late winter in the Antarctic and in the early and mid-winter in the Arctic. Measurements in early and mid-winter were also made during 5 years in the Antarctic.

For the analysis bimodal lognormal size distributions are fit to 250 meter averages of the particle concentration data. The characteristics of these fits, along with temperature, water and nitric acid vapor mixing ratios, are used to classify the PSC observations as either NAT, STS, ice, or some mixture of these. The vapor mixing ratios are obtained from satellite when possible, otherwise assumptions are made. This classification of the data is used to construct probability density functions for NAT, STS, and ice number concentration, median radius and distribution width for mid and late winter clouds in the Antarctic and for early and mid-winter clouds in the Arctic. Additional analysis is focused on characterizing the temperature histories associated with the particle classes and the different time periods. The results from theses analyses will be presented, and should be useful to set bounds for retrievals of PSC properties from remote measurements, and to constrain model representations of PSCs.