# Vertical Aerosol Profiles with Wyoming Optical Particle Counters and Condensation Nuclei Counters

**Terry Deshler**
**University of Wyoming**

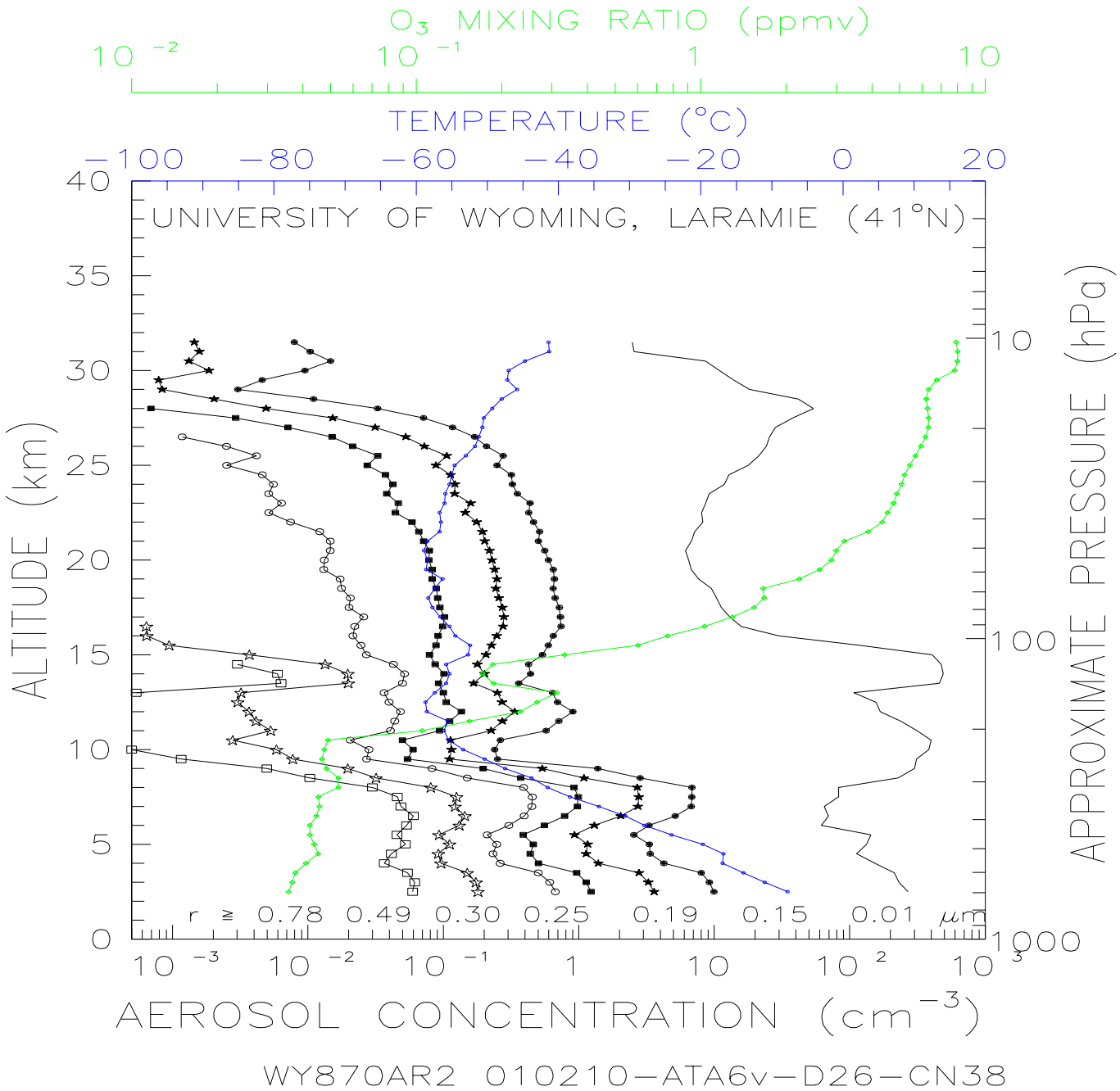
- **Aerosol size capability:**
  - **Condensation Nuclei (CN), $r \geq 0.01$ μm**
  - **Aerosol with radius ≥ 0.15, 0.19, 0.25, 0.30, 0.38, 0.49, 0.62, 0.78, 1.08, 1.25, 1.58, 2.00 μm**
  - **Size channels are somewhat dependent on the particle index of refraction assumed.**

- **Concentration range:**
  - **0.0006 - 30 $cm^{-3}$ for $r \geq 0.15$ μm**
  - **0.006 - 2000 $cm^{-3}$ for CN**

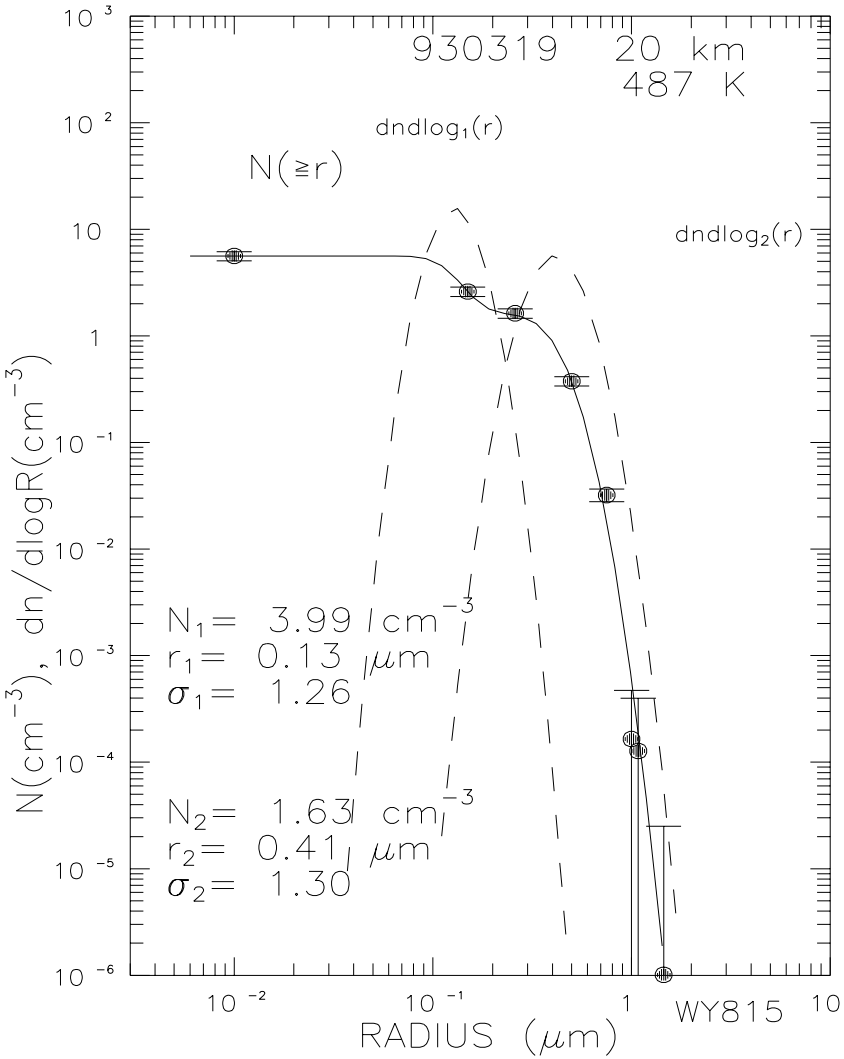
- **Precision:**
    - **Concentration - determined by Poisson counting statistics for low concentrations and a minimum of 10% at high concentrations.**
    - **Size - 8-10%.**

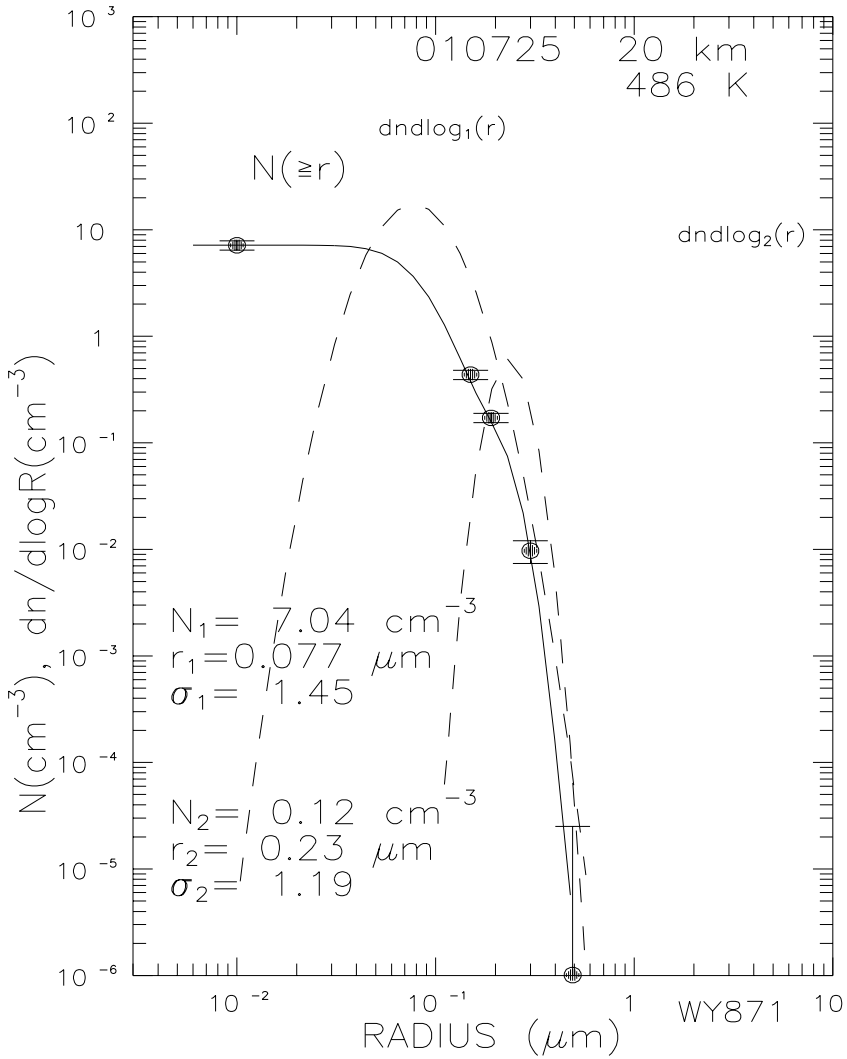
- **Altitude range**
    - **Surface to balloon burst, typically 30 km.**

- **Particle composition or phase**
    - **No information**

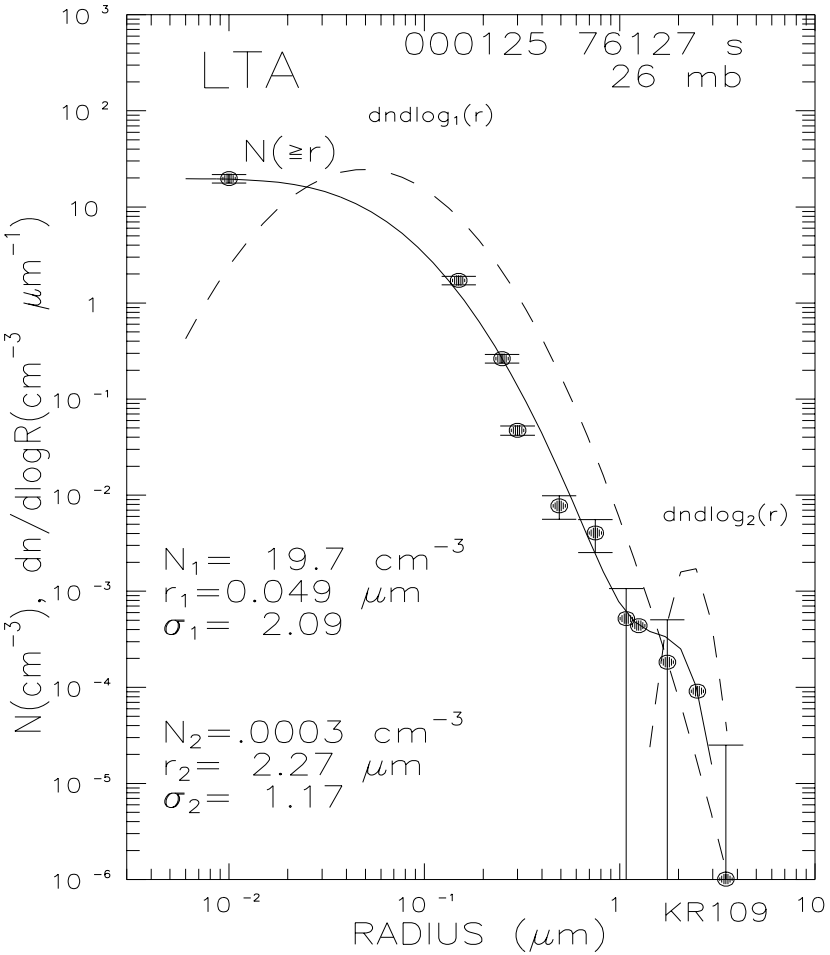

O3 MIXING RATIO (ppmv)
10 -2
10 -1
1
10
TEMPERATURE (°C)
−100 −80 −60 −40 −20 0 20
UNIVERSITY OF WYOMING, LARAMIE (41°N)
ALTITUDE (km)
0 5 10 15 20 25 30 35 40
APPROXIMATE PRESSURE (hPa)
1000 100 10
r ≥ 0.78 0.49 0.30 0.25 0.19 0.15 0.01 μm
10 -3 10 -2 10 -1 1 10 10 2 10 3
AEROSOL CONCENTRATION (cm-3)
WY870AR2 010210—ATA6v—D26—CN38

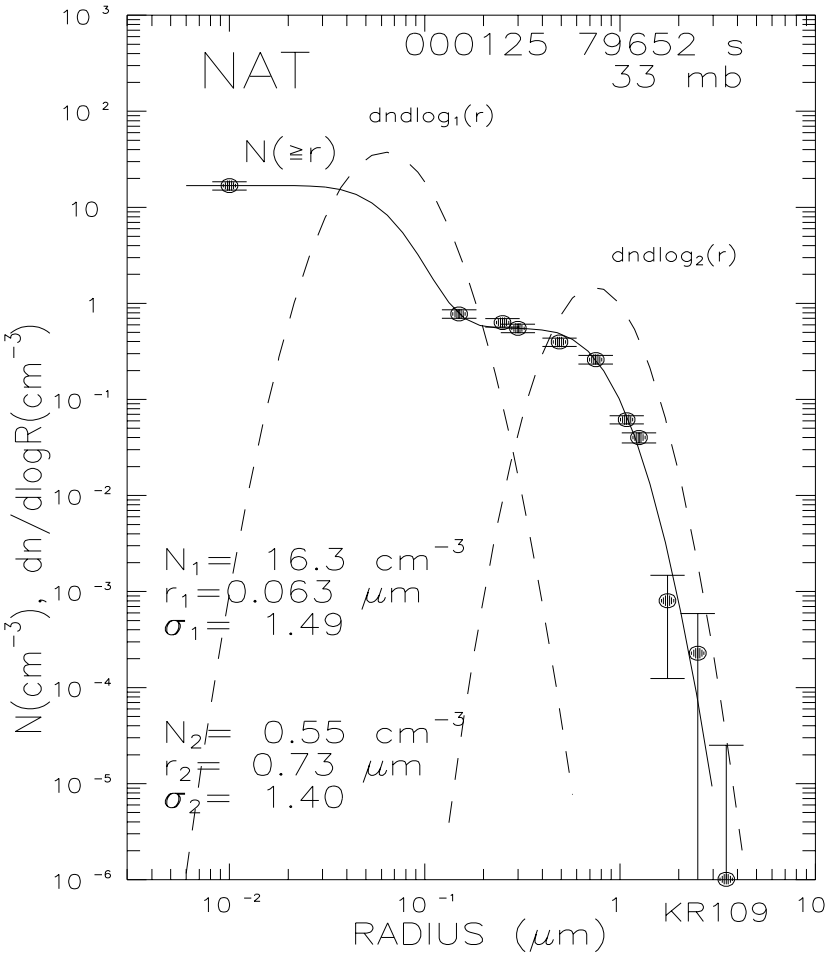
# Mid latitude stratospheric aerosol size distributions for volcanically perturbed (930319) and volcanically quiescent (010725) conditions



Polar stratospheric cloud size distributions for liquid ternary aerosol (left) and nitric acid trihydrate (right). These compositions were determined by a companion instrument on the gondola on 000125

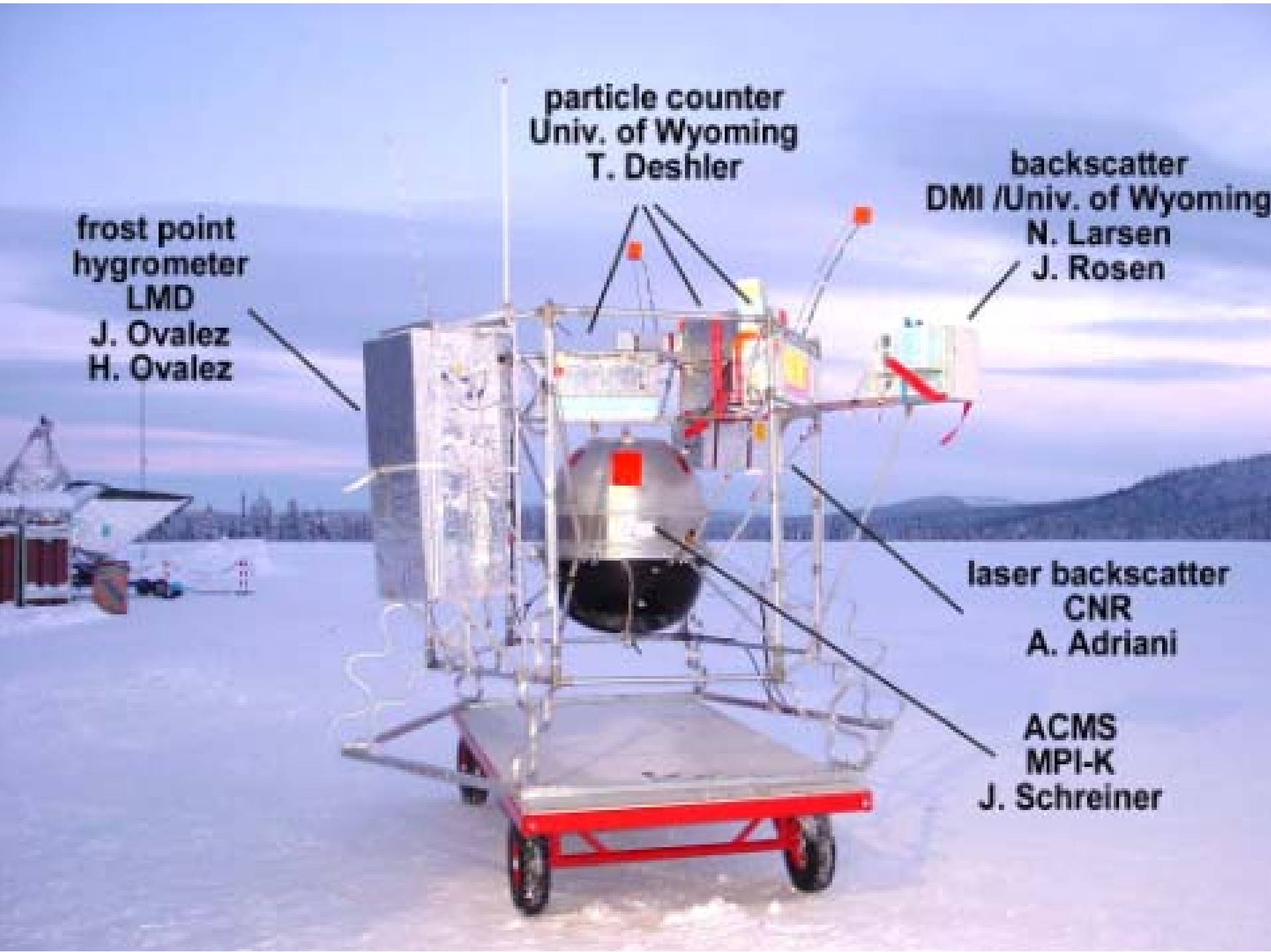


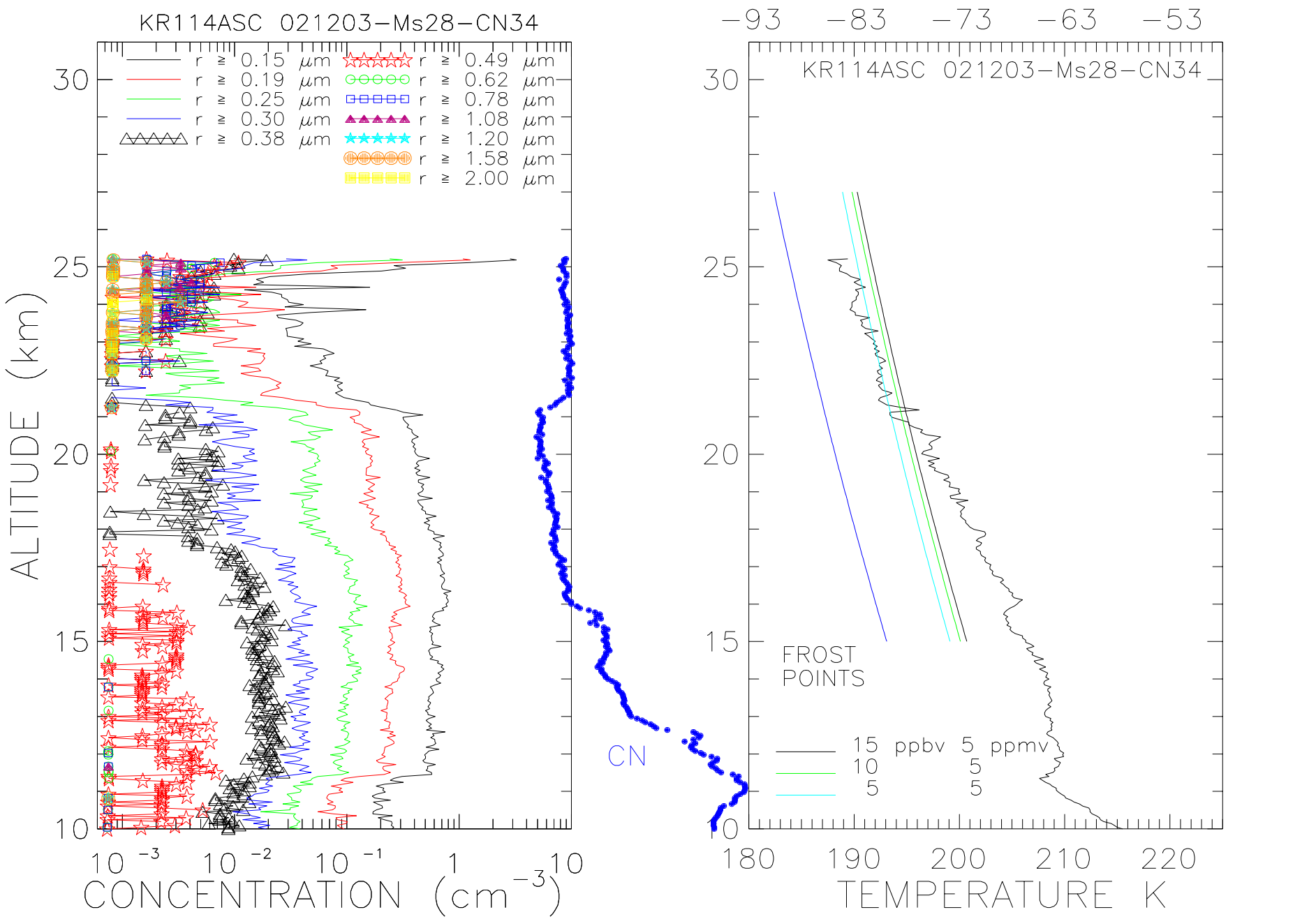
# Plans December 2002 - January 2003

- **SOLVE II** - Three vertical profiles of CN and particles r > 0.15 - 2.0 μm in conjunction with SAGE III overpasses of Esrange 67.9°N, 21.1°E.
  - One flight has been completed on 3 December.

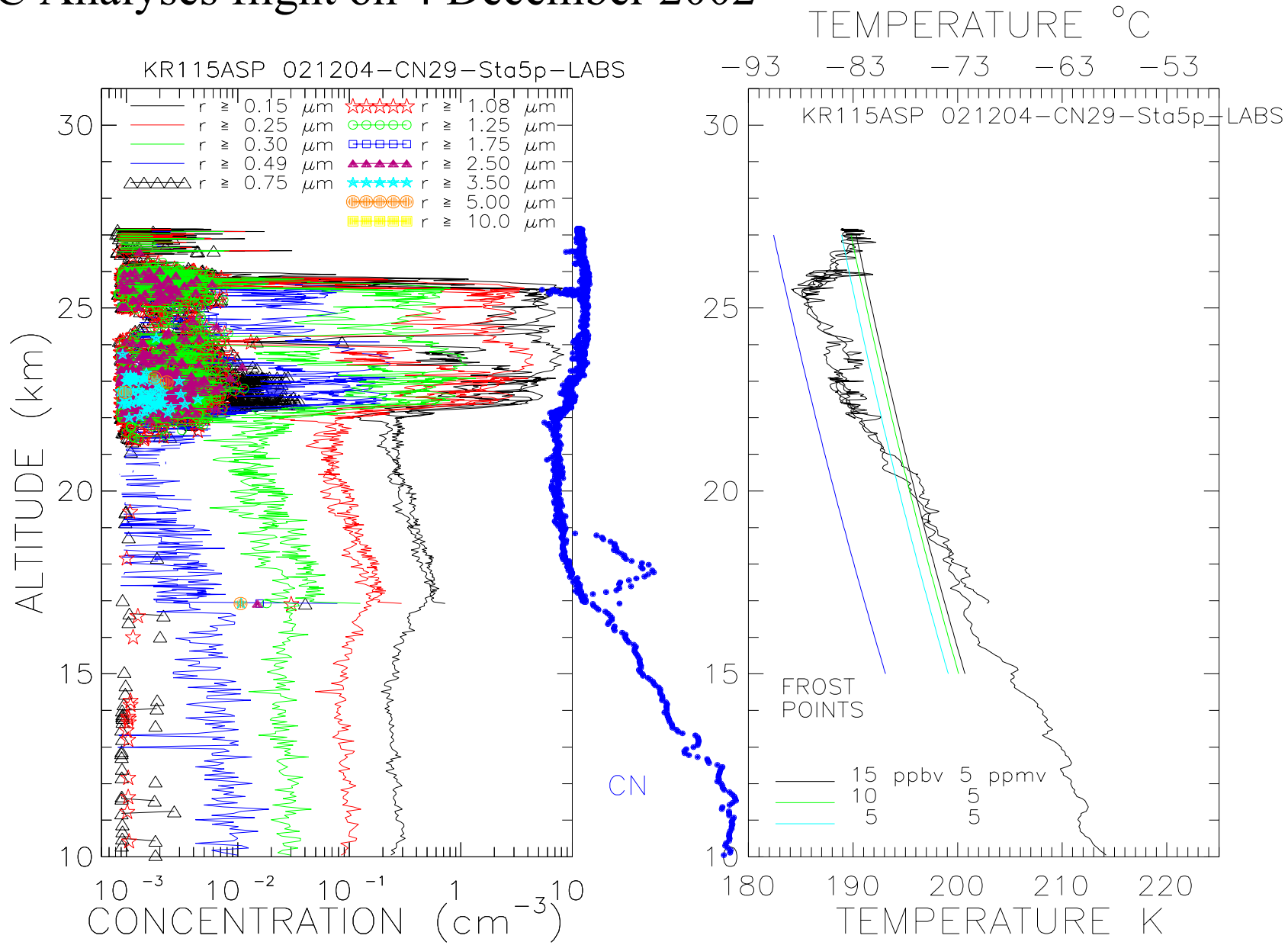
- **PSC analyses gondola** - comprehensive in situ measurements within polar stratospheric clouds, two flights. Measurements include:
  - Composition (MPI, Germany)
  - Size distribution (U Wyoming, USA, funded by NSF)
  - Phase (IFA, Italy)
  - Optical properties (IFA, Italy, DMI, Denmark)
  - Gas phase water vapor (LMD, France)
- These two flights have been completed on 4 and 6 December


particle counter
Univ. of Wyoming
T. Deshler
backscatter
DMI /Univ. of Wyoming
N. Larsen
J. Rosen
frost point
hygrometer
LMD
J. Ovalez
H. Ovalez
laser backscatter
CNR
A. Adriani
ACMS
MPI-K
J. Schreiner

# SOLVE II flight on 3 December 2002



# PSC Analyses flight on 4 December 2002



# PSC Analyses flight on 6 December 2002