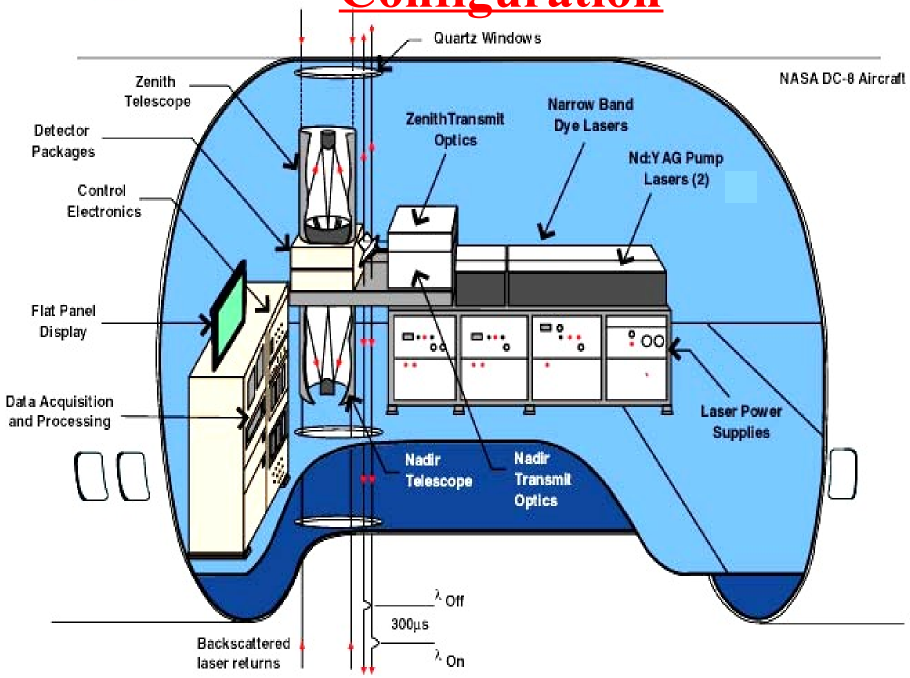
Airborne Ozone & Aerosol Lidar (DIAL)

Airborne DIAL Configuration

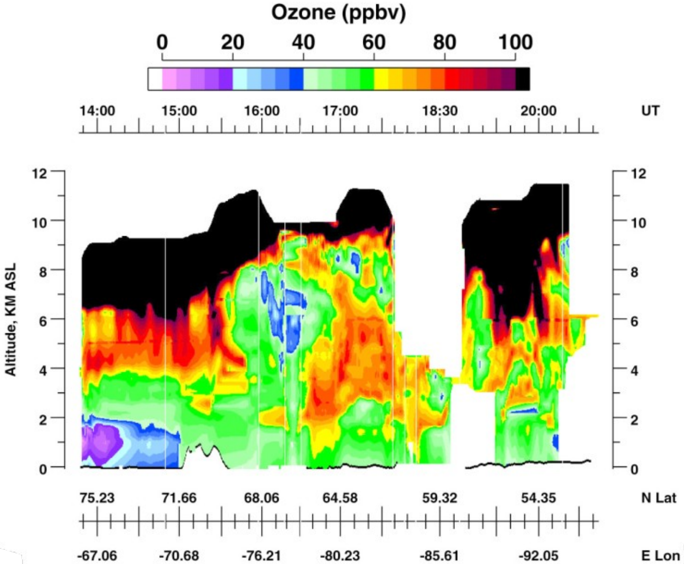


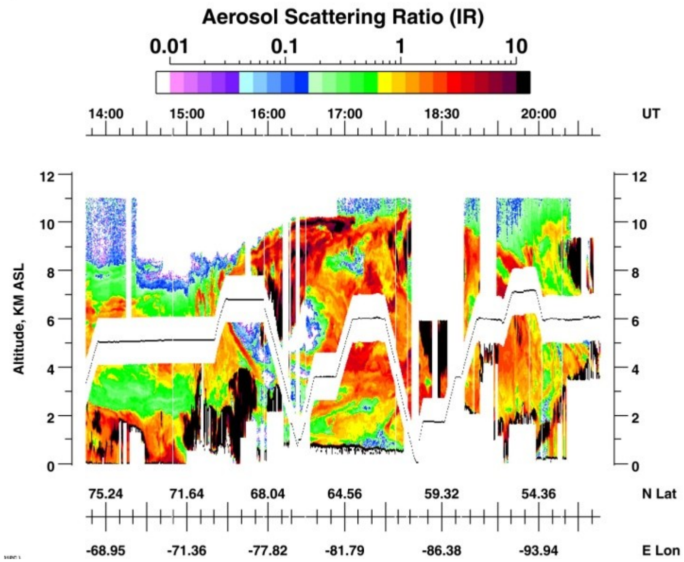
Airborne DIAL on NASA DC-8 Aircraft

- **Ozone Differential Absorption Lidar (DIAL) (λ_{on}=290 nm & λ_{off} =300 nm) ($\Delta x \sim 12$km, $\Delta z \sim 300$m)**
- **Aerosol & Cloud Backscatter (600 & 1064 nm) ($\Delta x \sim 400$m, $\Delta z \sim 60$m)**
- **Aerosol & Cloud Depolarization (600 nm) ($\Delta x \sim 400$m, $\Delta z \sim 60$m)**
- **Simultaneous Nadir and Zenith Profiling**

Airborne Ozone & Aerosol Lidar (DIAL)

Example: TOPSE Flight 41 - May 22, 2000
Thule to Winnipeg





Objectives

- Characterize the vertical and horizontal distribution of ozone
  - Long range transport of pollution
  - Strat-trop exchange
  - Low ozone events (Halogen Chemistry)
- Characterize the vertical and horizontal distribution of aerosols and clouds
  - Long range transport of pollution
  - Fire plumes (vertical and horizontal extent)
- Provide real-time ozone, aerosol, and cloud distributions to help in-flight profiling decisions
- Provide vertical and horizontal context for in situ measurements of trace gases and aerosols.
- Evaluate and compare satellite ozone, aerosol, & cloud measurements at high latitudes
- Evaluate and compare ozone distributions with Chemical Transport Models.

http://asd-www.larc.nasa.gov/lidar/

Browell, E. V., et al., Ozone, aerosol, potential vorticity, and trace gas trends observed at high latitudes over North America from February to May 2000, *J. Geophys. Res., 108*(D4), 8369, doi:10.1029/2001JD001390, 2003a.