LaRC Aerosol Lidar: Two-Wavelength, Polarization-Sensitive Lidar for Observations of Aerosols and Clouds

(Piggy-back on AROTAL)

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Instrument and Data Products

- Use AROTAI laser and telescope
- Acquire
  - 1064 nm backscatter
  - 532 nm backscatter
  - 532 nm depolarization
- Archival Products
  - Scattering ratios
  - Backscatter cross-sections
  - Depolarization Ratio
Objective: Validate SAGE III aerosol extinction

1064 nm observations of background aerosol in SAGE III occultation volume used for validation comparison
Validation of SAGE III Extinction

Profile of extinction will be retrieved from lidar backscatter profile assuming an appropriate extinction-to-backscatter ratio.
Objective: PSC Observations

LaRC AEROSOL / GSFC AROTEL LIDAR
January 23, 2000

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</thead>
<tbody>
<tr>
<td>Altitude, km</td>
<td>30</td>
<td>27</td>
<td>24</td>
<td>21</td>
<td>18</td>
<td>15</td>
<td>18</td>
<td>21</td>
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- **UT**: Universal Time
- **Altitude, km**: Altitude in kilometers

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<tr>
<th>LAT</th>
<th>70.6</th>
<th>68.5</th>
<th>59.2</th>
<th>67.4</th>
<th>68.4</th>
<th>71.0</th>
<th>71.5</th>
<th>68.3</th>
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<td>LON</td>
<td>16.4</td>
<td>17.0</td>
<td>20.4</td>
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<td>-2.7</td>
<td>-24.6</td>
<td>-12.7</td>
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New processing scheme will allow horizontal resolution without sacrificing accuracy

Need input on maximum resolution required for various applications, e.g.,
- What resolution is required for mountain wave PSC studies?
PSC Observations

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1064 nm Ratio 1

18 20 22 24 26 28 30

Altitude, km

532 nm Aerosol Depol

18 20 22 24 26 28 30

Altitude, km

532 nm Coeff / 1064 nm Coeff

15 16 17 18 19 20 21 22 23 24

Lat & Long
Objective: Validate SAGE III Aerosol Extinction Retrieval

- Background stratospheric aerosol is validation target
  - PSCs not a suitable target for extinction validation due to non-uniformity and sampling miss-match
- 1064 nm is the primary validation wavelength
  - Low loading makes accurate 532 nm aerosol measurement impractical – relative error becomes large as loading decreases
- Profile of extinction will be retrieved from lidar backscatter profile assuming an appropriate extinction-to-backscatter ratio