Instrument: High Spectral Resolution Lidar
Platform: NASA King Air B200
Flight Date: 3 March 2006

PRELIMINARY DATA
DO NOT CITE OR QUOTE WITHOUT CONTACTING INSTRUMENT TEAM

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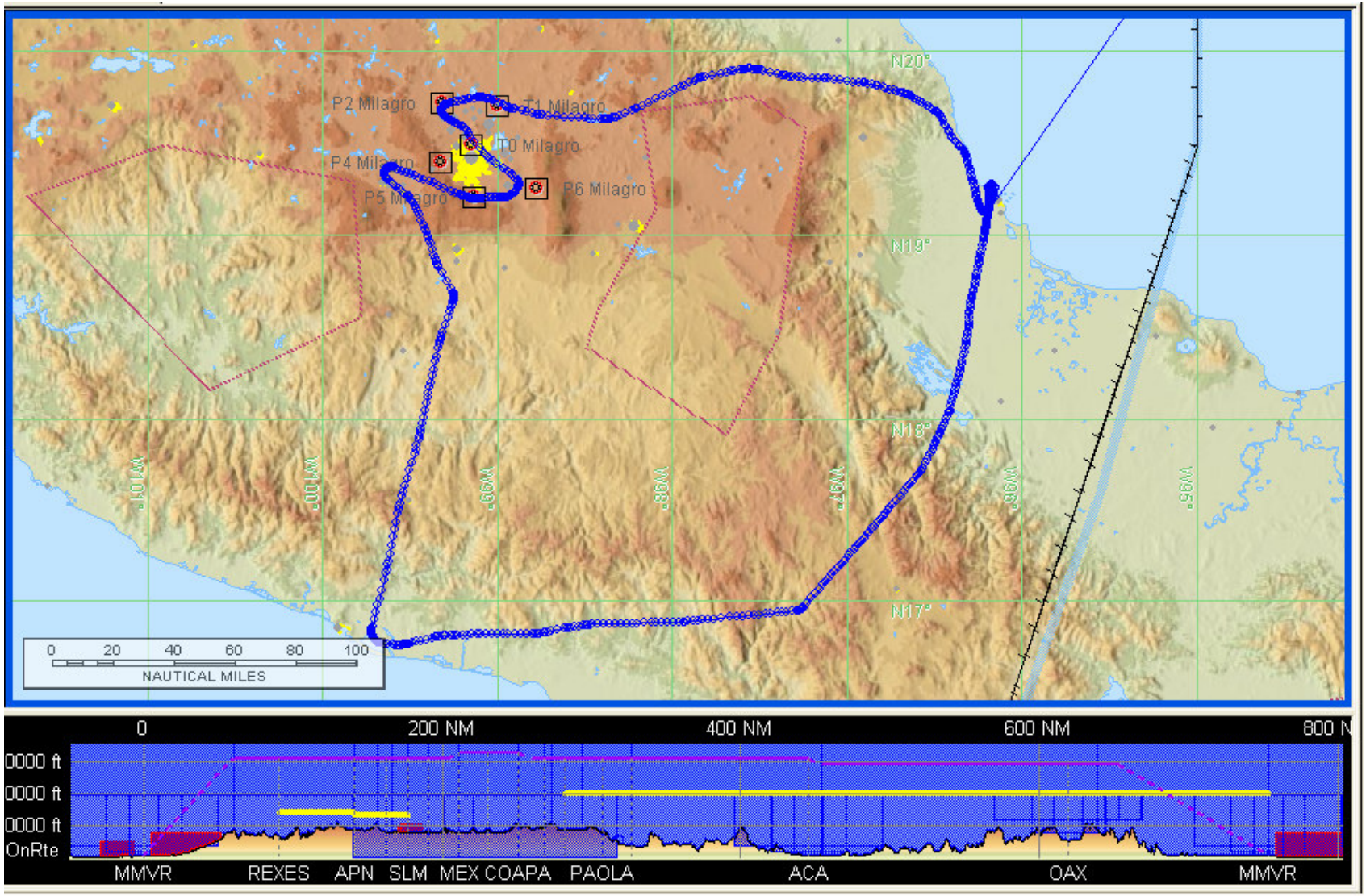
B-200 Flight Track, 3 March 2006



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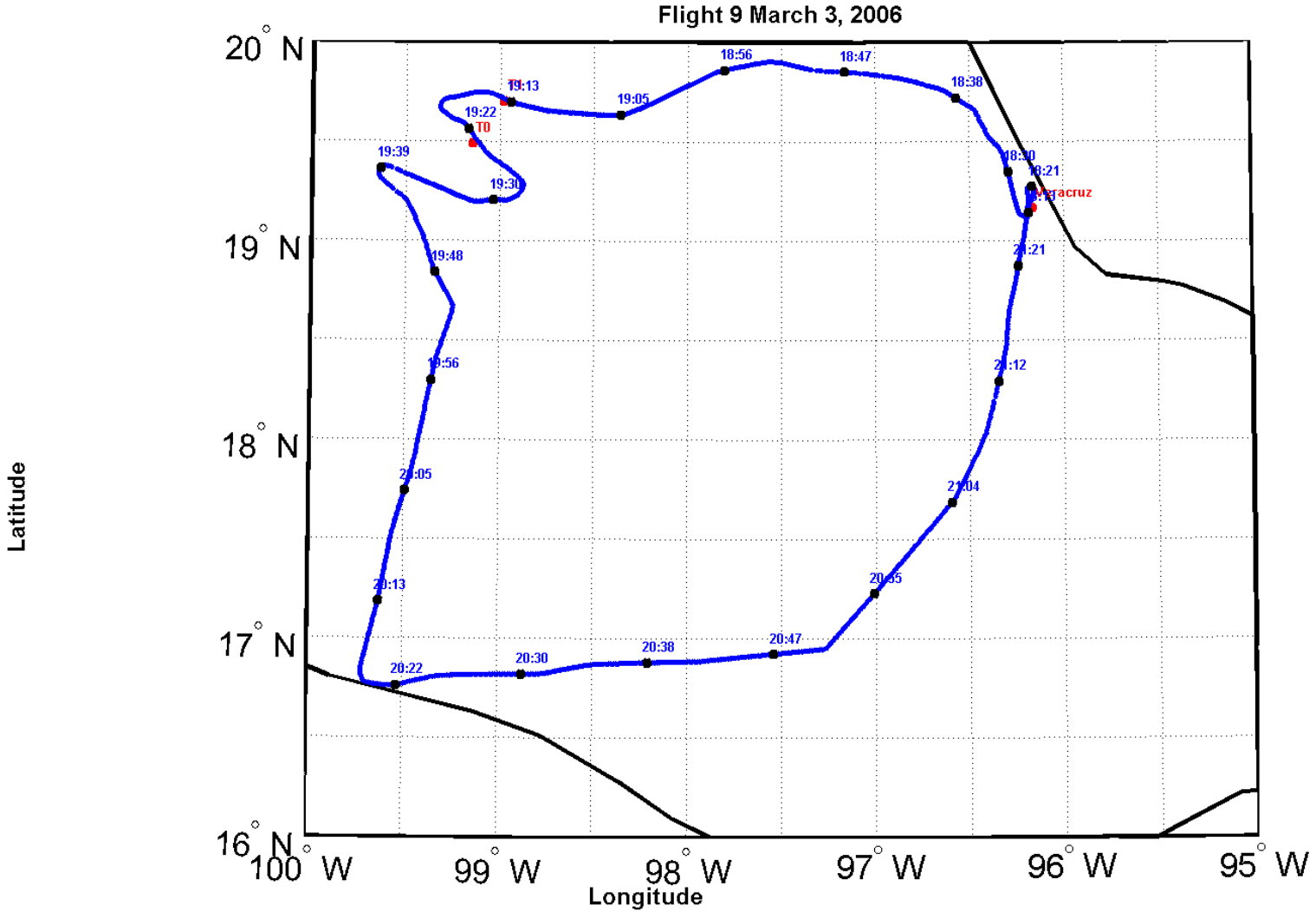
B-200 Flight Track, 3 March 2006
Time Markers in UT



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Parameter Definitions

Basic Definitions

$\beta_{aerosol}$	Aerosol backscatter coefficient (km^{-1} sr^{-1})
$\beta_{molecular}$	Molecular backscatter coefficient (km^{-1} sr^{-1})

Extensive Products

Depend on aerosol type and amount

$ASR = \frac{\beta_{aerosol}}{\beta_{molecular}}$	Aerosol scattering ratio = ratio of aerosol to molecular backscatter
$\alpha_{aerosol}$	Aerosol extinction coefficient (km^{-1})
$\delta_T = \frac{\beta_{\perp aerosol+molecular}}{\beta_{\parallel aerosol+molecular}}$	Total depolarization ratio = ratio of perpendicularly polarized backscatter to parallel polarized backscatter (referenced to the polarization axis of the transmitted beam, which is linearly polarized)

Intensive Products

Depend on aerosol type; independent of aerosol amount

$\delta_a = \frac{\beta_{\perp aerosol}}{\beta_{\parallel aerosol}}$	Aerosol depolarization ratio = ratio of perpendicularly polarized backscatter to parallel polarized backscatter (referenced to the polarization axis of the transmitted beam, which is linearly polarized)
$WVD = \frac{\mathrm{Ln}\left(\frac{\beta_{532\,nm}}{\beta_{1064\,nm}}\right)}{\mathrm{Ln}\left(\frac{1064\ \mathrm{nm}}{532\ \mathrm{nm}}\right)}$	Wavelength dependence = Angstrom coefficient for backscatter (similar to Angstrom coefficient for extinction, except limited to the 180° component of the scattering phase function)
$S_a = \frac{\alpha_{aerosol}}{\beta_{aerosol}}$	Extinction-to-backscatter ratio (also called "lidar ratio") = ratio of aerosol extinction to aerosol backscatter

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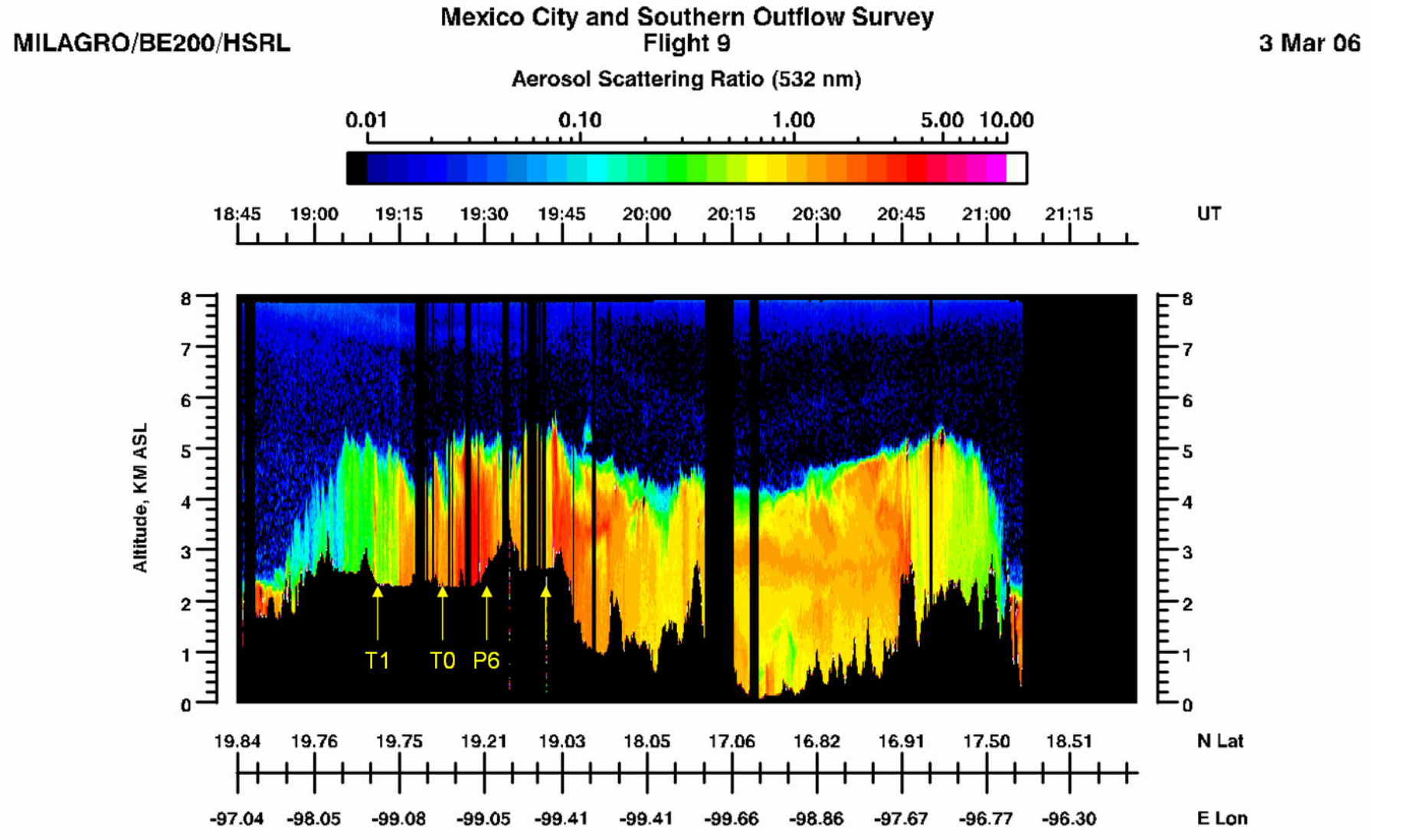
Aerosol Scattering Ratio



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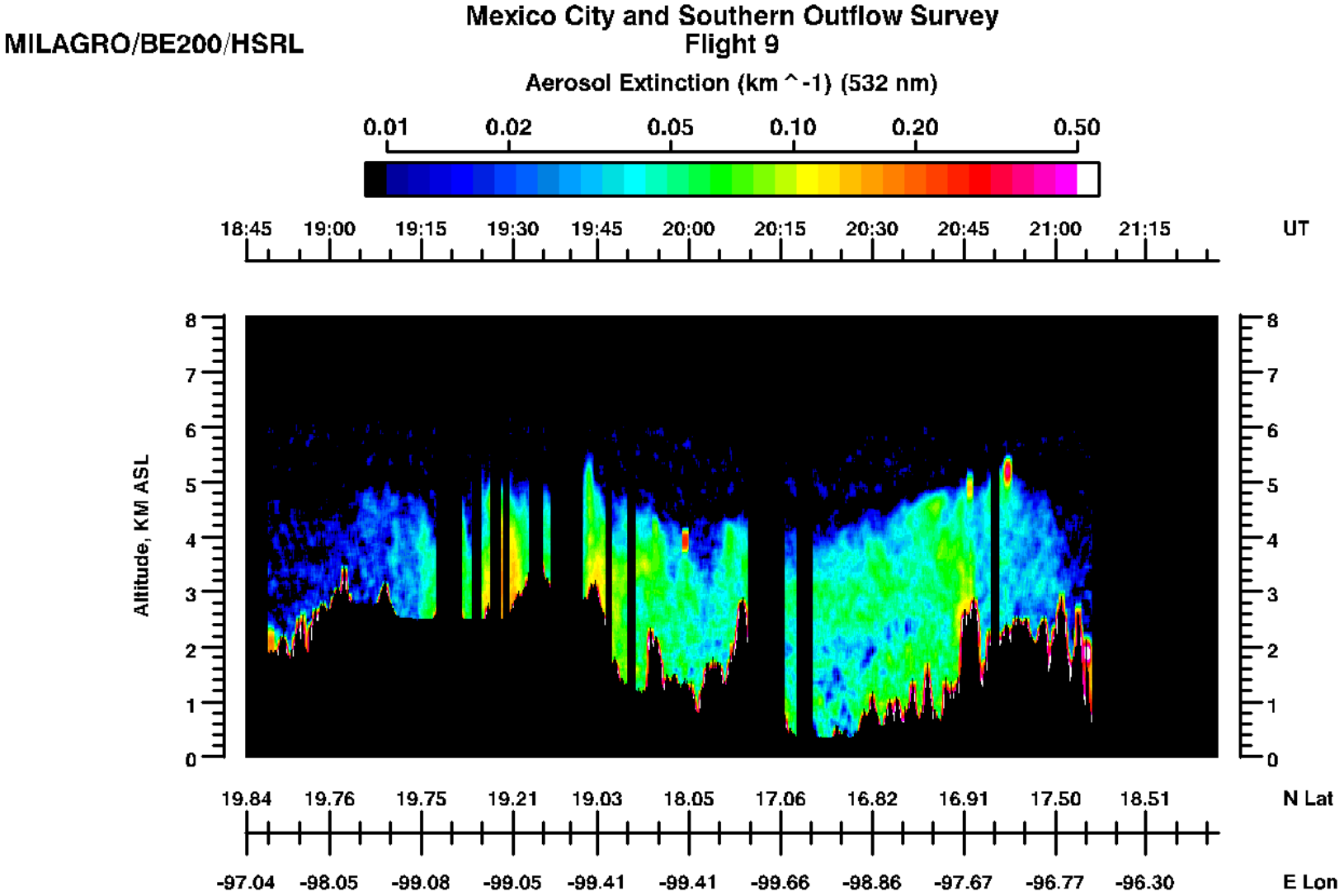
Aerosol Extinction at 532 nm



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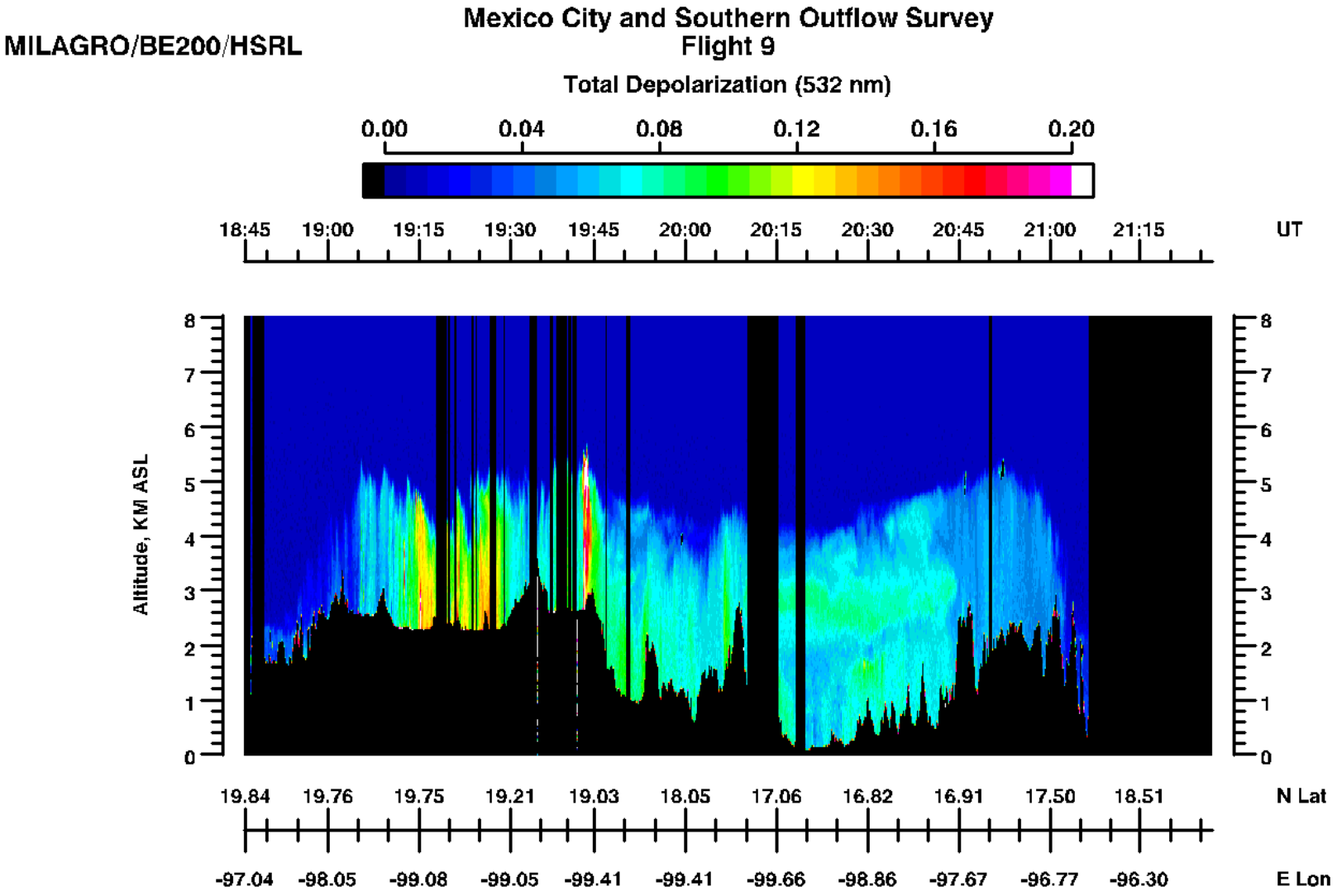
Total Depolarization Ratio at 532 nm



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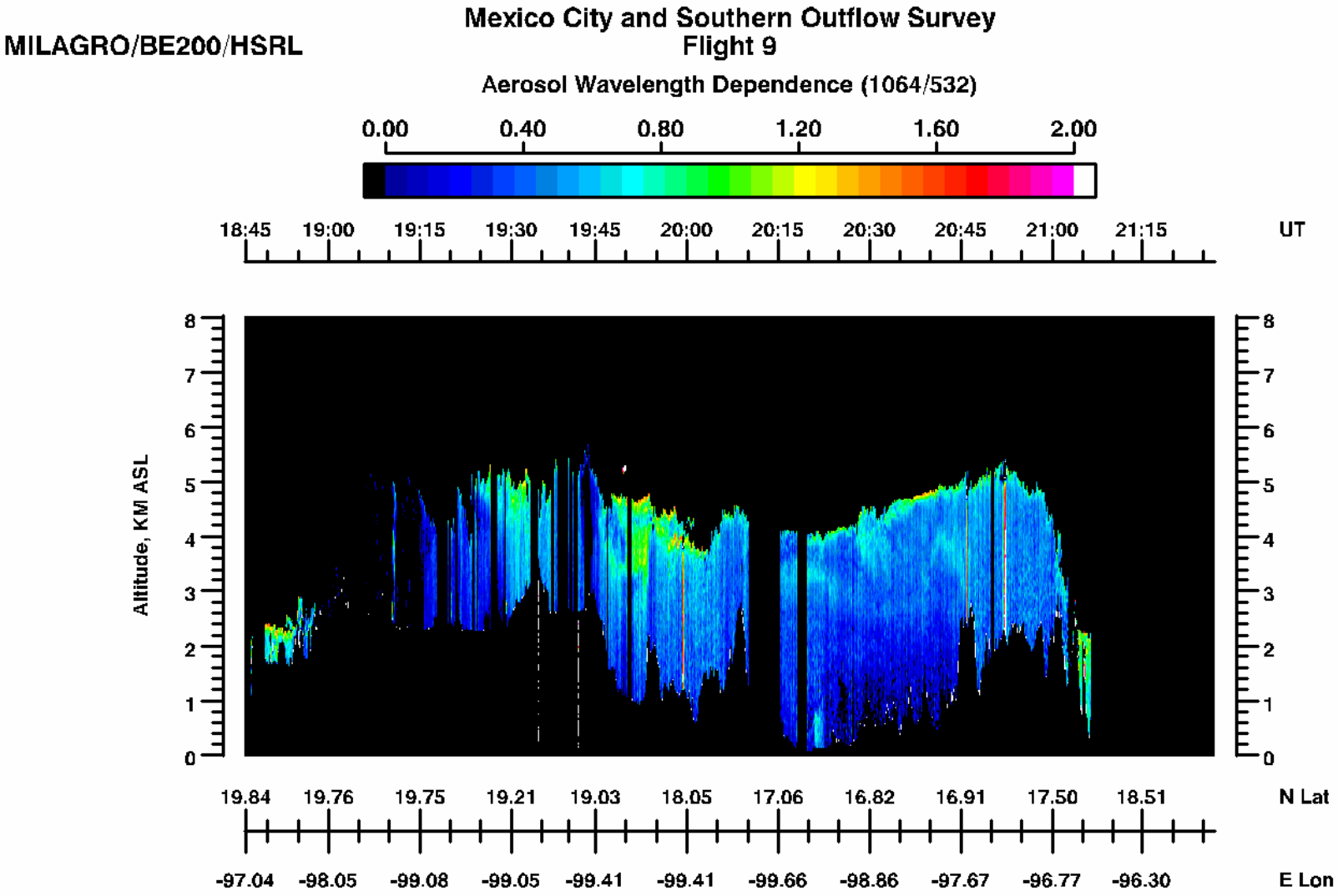
Aerosol Wavelength Dependence (Angstrom coefficient for backscatter)



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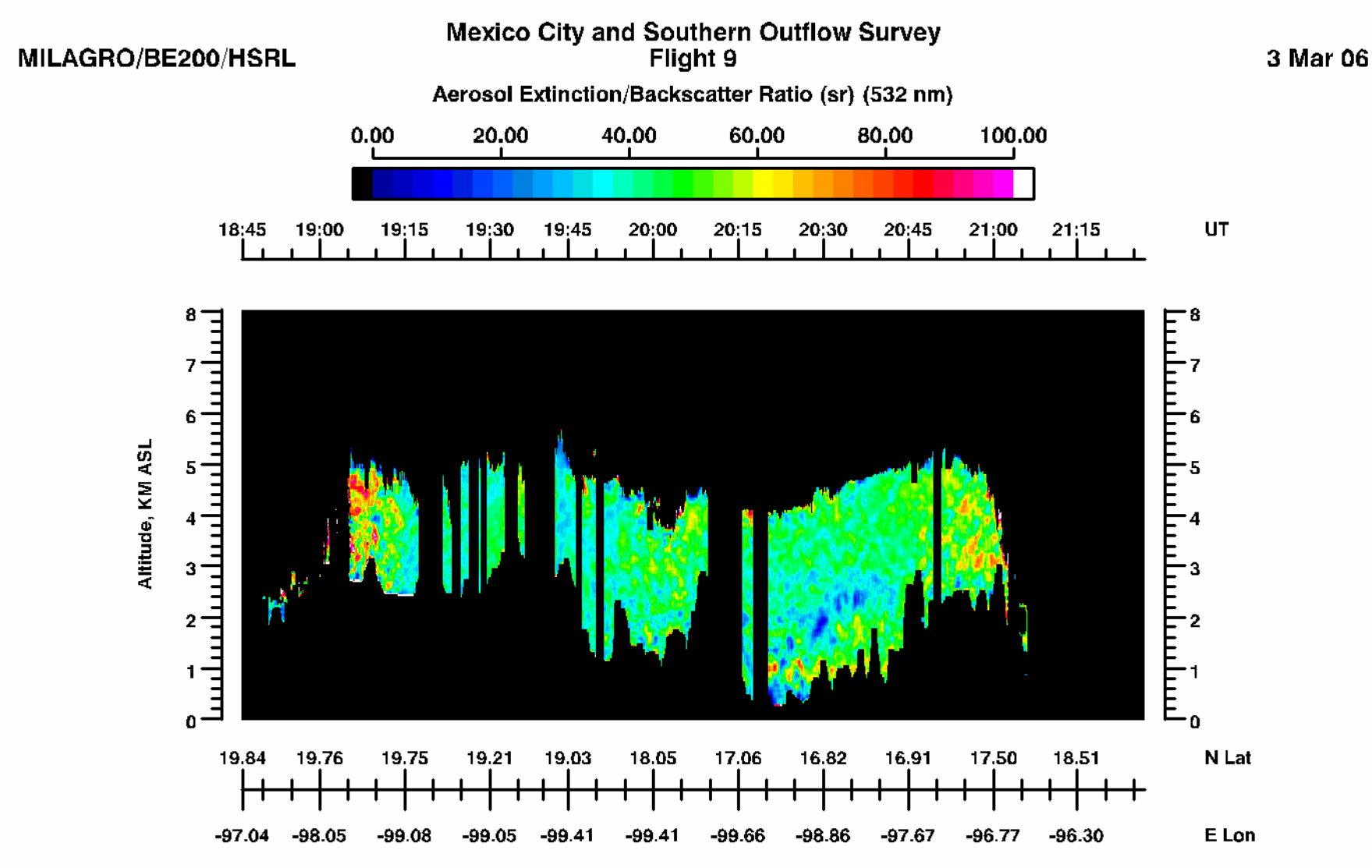
Aerosol Extinction/Backscatter Ratio (S_a) at 532 nm



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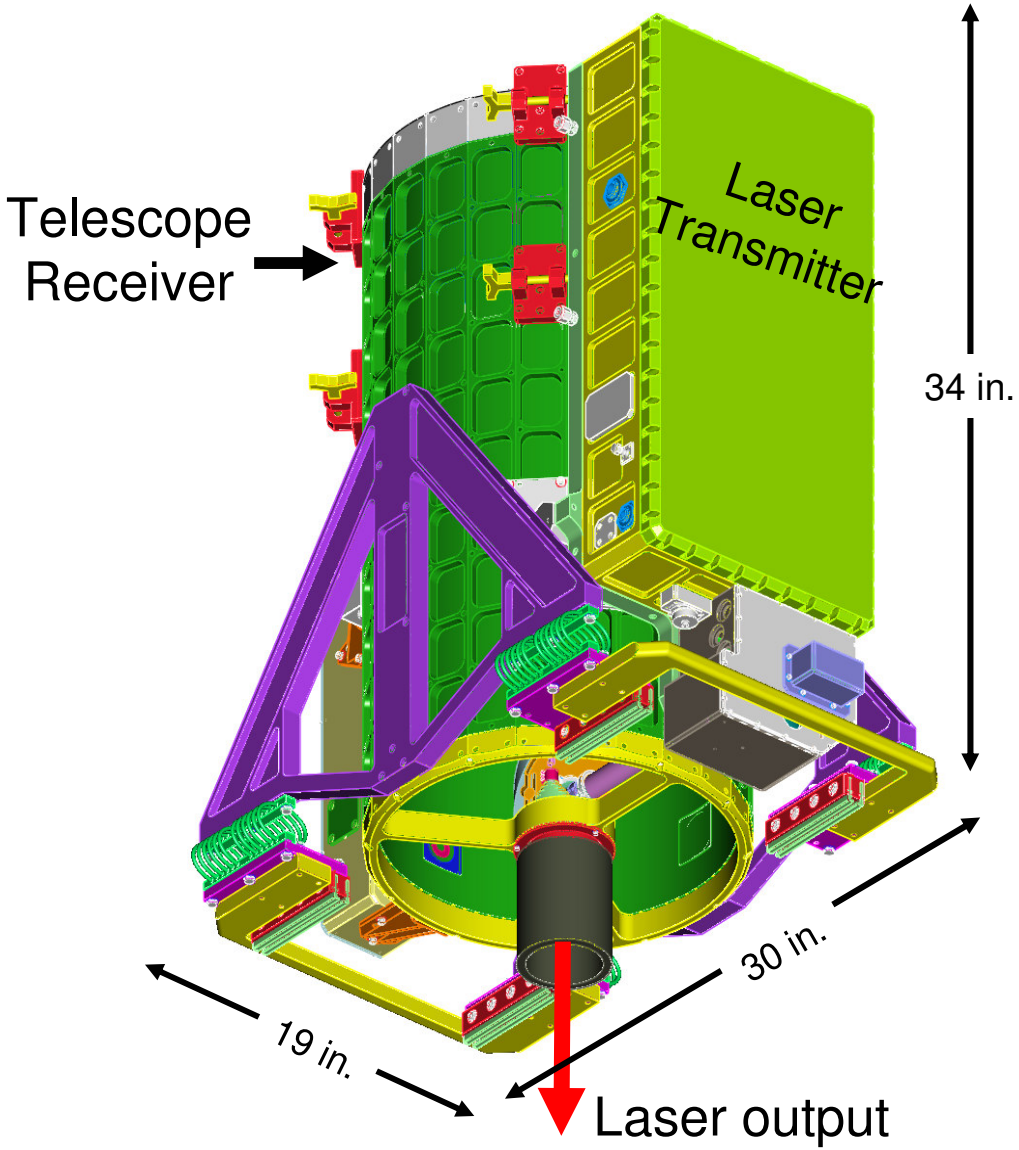
Airborne High Spectral Resolution Lidar



- Independently measures aerosol/cloud extinction and backscatter at 532 nm
- Includes
  - Backscatter channels at 1064 nm
  - Polarization sensitivity at 532 and 1064 nm
- Measurement capabilities
  - Extensive measurements
    - Backscatter at 532 and 1064 nm
    - Extinction at 532 nm
  - Intensive measurements
    - Color ratio (or Angstrom coeff.) for backscatter (β_{1064}/β_{532})
    - Extinction-to-backscatter ratio at 532 nm
    - Depolarization at 532 and 1064 nm

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