Nine CCD push-broom cameras

Nine view angles at Earth surface:
70.5° forward to 70.5° aft

Four spectral bands at each angle:
446, 558, 672, 866 nm

Studies Aerosols, Clouds, & Surface

http://www-misr.jpl.nasa.gov
http://eosweb.larc.nasa.gov

MISR Aerosol Typing

Ralph Kahn
NASA Goddard Space Flight Center
Global Distribution of MISR
Most Frequently Retrieved Mixture Group

January 2007

July 2007

Kahn, Gaitley, et al. JGR, submitted
**January 2007** | **Sahara Desert** | **July 2007**

Mean Best Estimate AOD Map & Histogram Distribution

AOD

#SuccMix vs. Normalized AOD & vs. Normalized Scattering Angle Range

Histograms of Lowest Residual & All Successful Aerosol Type Mixture Groups

*Kahn & Gaitley, JGR submitted*
January 2007 Eastern China (Pollution) July 2007

Mean Best Estimate AOD Map & Histogram Distribution

Number of Successful Mixtures vs. Normalized AOD & vs. Normalized Scattering Angle Range

Histograms of Lowest Residual & All Successful Aerosol Type Mixture Groups

Kahn & Gaitley, JGR submitted
Plume Particles
• Distinct from background
  -- larger, darker
  -- much higher AOD
• Non-spherical dominated
• Brighten downwind
• Tend to decrease in size downwind

• 1-2 days downwind
  (not shown):
  • High AOD
  • Non-spherical dust grains
  • Back-trajectory needed
to identify plume confidently

Kahn & Limbacher, ACP 2012
SEAC^4RS Campaign **DC-8 and ER-2 Flights**

Monday, 19 August 2013

**Smoke Plume 1**
- AOD 0.35-0.9
- ANG 1.5-1.9 (small)
- SSA 0.94-0.98 (absorbing)
- FrNon-Sph 0-0.2 (mostly sph.)

**Smoke Plume 2**
- AOD 0.35-0.6
- ANG 1.6-2.0 (smaller)
- SSA 0.96-0.98 (less abs.)
- FrNon-Sph 0-0.1 (more sph.)

**Continental Background**
- AOD 0.15-0.2
- ANG 1.0-1.5 (medium)
- SSA 0.99-1.0 (non-abs.)
- FrNon-Sph 0.0 (spherical)

Passive-remote-sensing *Aerosol Type* is a **Total-Column-Effective, Categorical** variable!!
Backup Slides
Desert Site – Solar Village

**0 < AOD < 0.2**
- Mean Optical Depth
- Mean Angstrom Exponent
- Counts

**0.2 < AOD < 0.4**
- Mean Optical Depth
- Mean Angstrom Exponent
- Counts

**0.4 < AOD < 6.0**
- Mean Optical Depth
- Mean Angstrom Exponent
- Counts

*Figure 5*
Fine-Mode Fraction

Desert Site – Solar Village

Figure 5
Urban Polluted Site – Beijing – MISR-AERONET Comparisons

0 < AOD < 0.2

0.2 < AOD < 0.4

0.4 < AOD < 6.0

Kahn & Gaitley, JGR submitted
Urban Polluted Site – Beijing – MISR-AERONET Comparisons

Fine-Mode Fraction

0 < AOD < 0.2

0.2 < AOD < 0.4

0.4 < AOD < 6.0

SSA

Kahn & Gaitley, JGR submitted