

AERONET

Aerosol Robotic Network

of Sun/Sky Radiometers

What we can and cannot do for AEROCOM

3d AEROCOM Workshop
December 1 - 3, 2004, New York, NY

Many thanks to contributors and collaborators

AERONET

+

AEROCAN

+

PHOTON

Brent Holben, Tom Eck,

Alexander Smirnov,

Oleg Dubovik, Ilya Slutsker,

Joel Schaffer, David Giles,

Anne Vermeulen,

Alexander Siniuk,

Wayne Newcomb, An Ho,

Mikhail Sorokin

+

CIMEL

+

Jean-Pierre Buis,

Marius Canini

Norm O'Neill,

Alain Royer,

Bruce McArthur,

Jim Freemantle,

David Halliwell,

Patrick Cliche

AEROSIBNET

Mikhail Panchenko,

Sergei Sakerin,

Dmitry Kabanov

Didier Tanre,

Philippe Goloub,

Bernadette Chatenet,

Francois Lavenu,

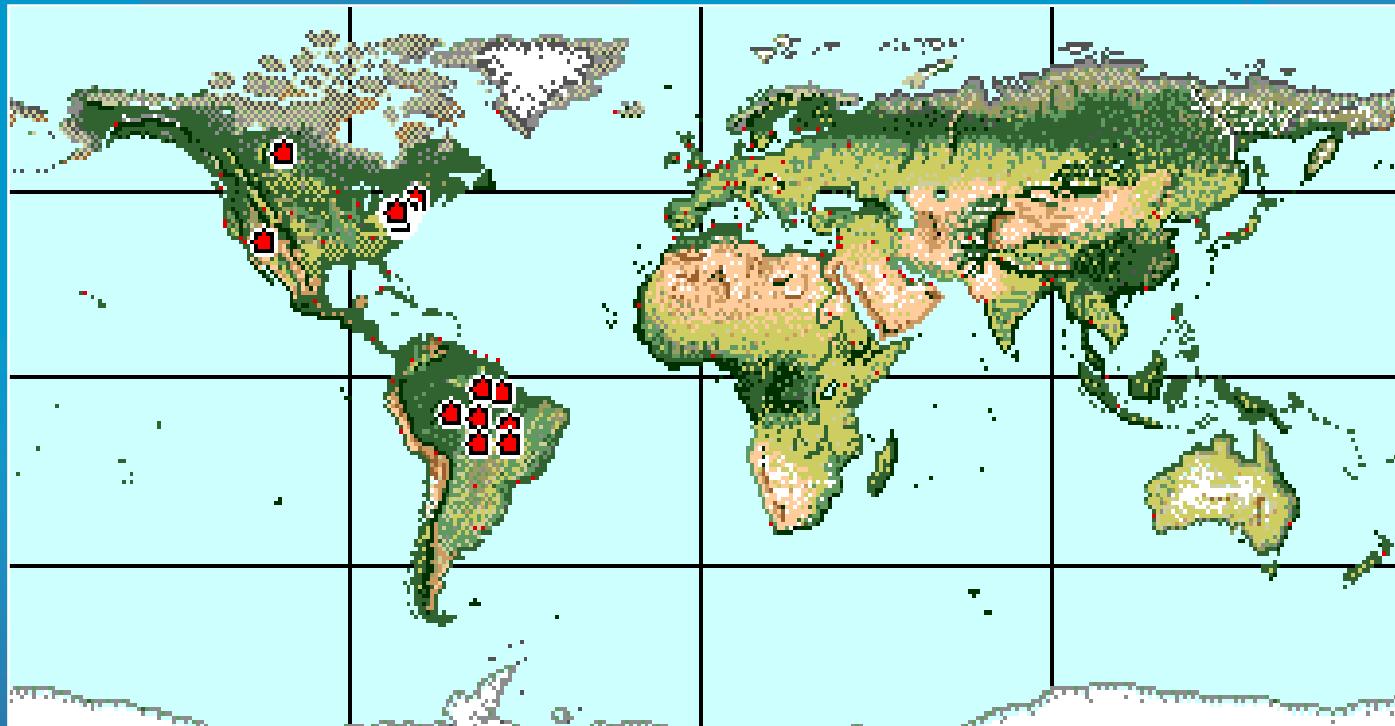
Luc Blarel,

Damiri Bahaiiddin

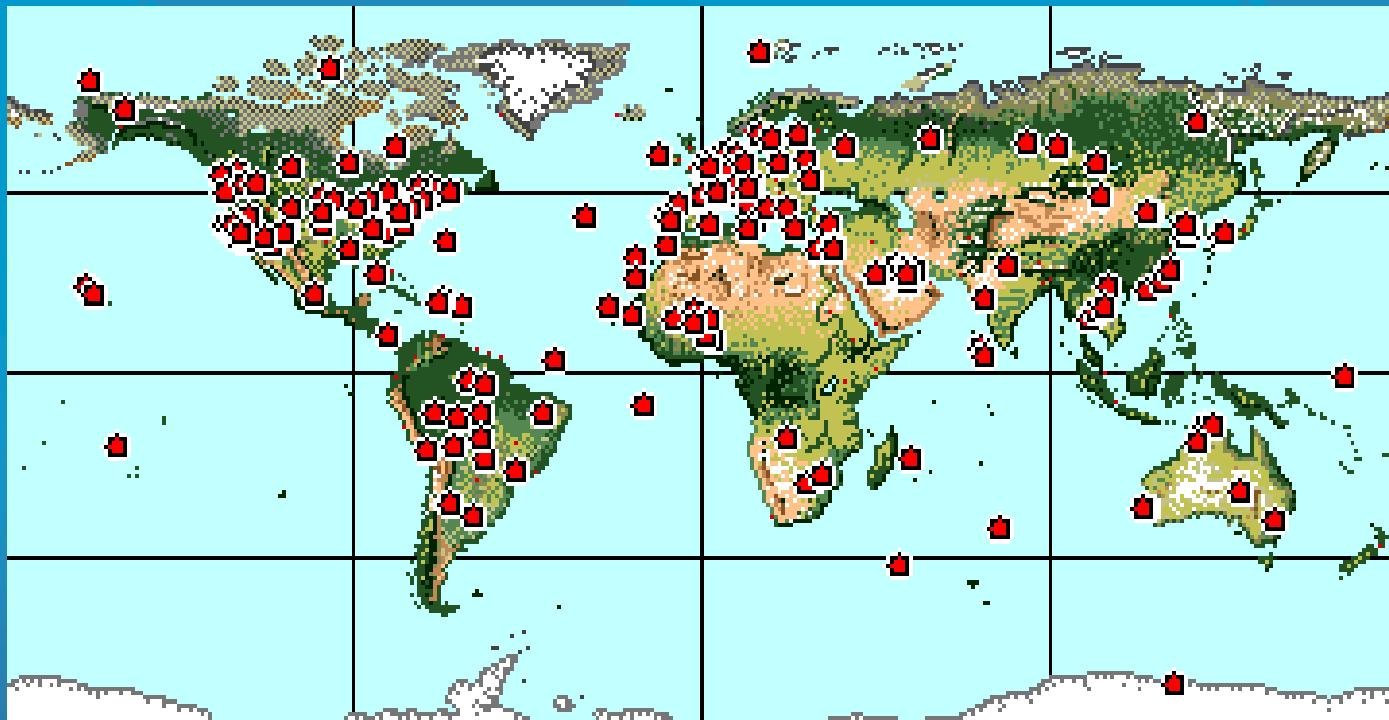
Thierry Podvin

= **AERONET**

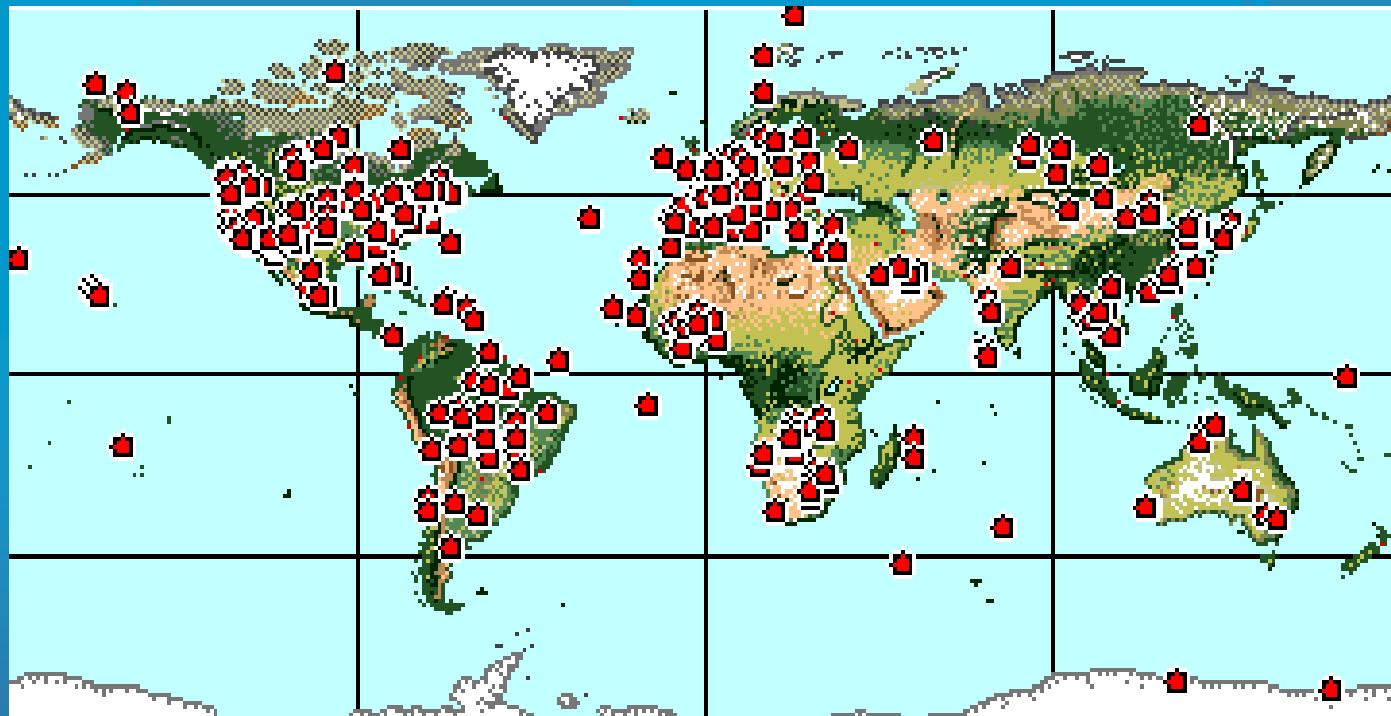
1993



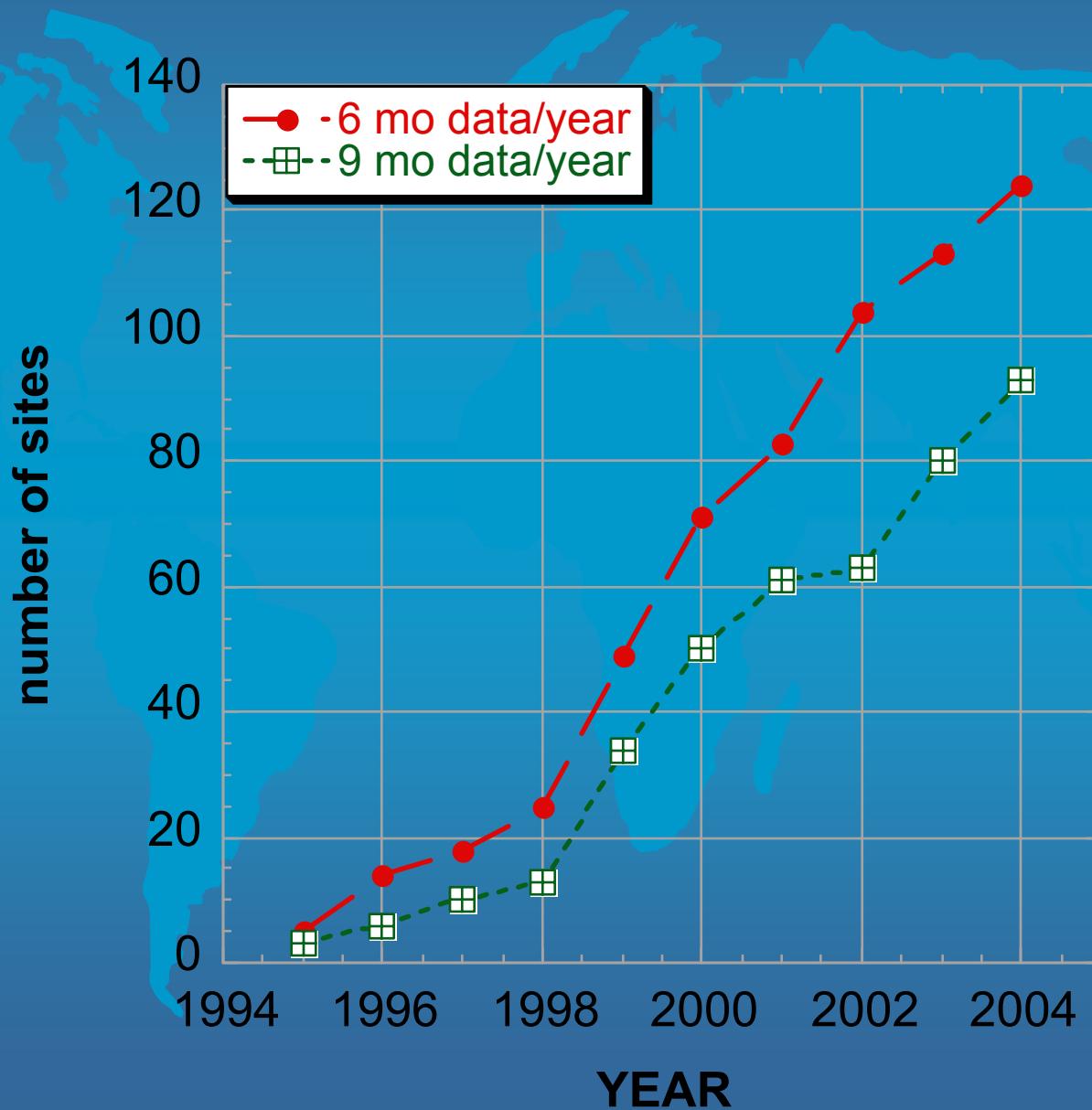
2004



1993-2004



AERONET



Walker Branch, Tennessee



Data Acquisition

Measurements and Transmission



Relay Transmission to Receiving Station



AERONET Server

Download and Transfer Data via Internet



Transfer Data via Internet

Internal Server



Web Server



AERONET Data Flows

<http://aeronet.gsfc.nasa.gov>

368
Holben et al.
RSE, 1998

112
Holben et al.
JGR, 2001

71
Eck et al.
JGR, 1999

76
Smirnov et al.
RSE, 2000

113
Dubovik and King
JGR, 2000

85
Dubovik et al.
JGR, 2000

Flux measurements

Direct - $\lambda=340, 380, 440, 500, 670, 870, 940, 1020, 1640$ nm

Diffuse - $\lambda=340, 380, 440, 500, 670, 870, 1020, 1640$ nm

Calibration and processing information

**Aerosol optical depth and
precipitable water computations**

Cloud screening and quality control

Inversion products

Volume size distribution ($0.05 < R < 15$ mm),
refractive index, single scattering albedo
($\lambda=440, 670, 870, 1020$ nm)

Estimated uncertainties in aerosol optical depth, size distribution, complex refractive index, and single scattering albedo

- From Eck et al. JGR, 1999.



- From Dubovik et al. JGR, 2000.

		Master	Field
UV	$\Delta\tau_a$	0.009	0.02
VIS-NIR	$\Delta\tau_a$	0.005	0.01

Table 4. Errors in the Size Distribution, Complex Refractive Index, and Single-Scattering Albedo

	Water-Soluble	Dust	Biomass Burning
$dV/dr \ln r(r_i)$, %			
$0.1 \mu\text{m} < r < 7 \mu\text{m}$	15	35	25
$r < 0.1 \mu\text{m}$ and $r > 7 \mu\text{m}$	15–100	35–100	25–100
$n(\lambda)$			
$\tau_a(440) \leq 0.2$	0.05		
$\tau_a(440) > 0.2$	0.025		
$\tau_a(440) \geq 0.5$		0.04	0.04
$k(\lambda)$			
$\tau_a(440) \leq 0.2$		80–100%	
$\tau_a(440) > 0.2$		50%	
$\tau_a(440) \geq 0.5$		50%	30%
$\omega_0(\lambda)$			
$\tau_a(440) \leq 0.2$	0.05–0.07		
$\tau_a(440) > 0.2$	0.03		
$\tau_a(440) \geq 0.5$		0.03	0.03

Errors should be expected in the retrievals from the combination of spectral optical depth (440, 670, 870, and 1020 nm) and angular distribution of sky radiance in the solar almucantar (440, 670, 870, and 1020 nm; solar zenith angle of 60°) in the presence of the following instrumental offsets: in optical thickness, $\Delta\tau(\lambda) = \pm 0.01$; in sky radiances $I(\Theta; \lambda)$, $[\Delta_I(\Theta; \lambda)/I(\Theta; \lambda)] 100\% = \pm 5\%$; in azimuth angle pointing, $\Delta\phi = 0.5^\circ$; and in the a priori estimates of ground reflectance $A(\lambda)$, $[\Delta A(\lambda)/A(\lambda)] 100\% = \pm 50\%$.

AERONET Data Flows

Current additions

Flux measurements

Sun - $\lambda=340, 380, 440, 500, 670, 870, 940, 1020$ nm + 1640 nm (412, 532, 555 nm)

Sky - $\lambda=440, 670, 870, 1020$ nm + 500, 1640 nm + 340, 380 nm

Calibration and processing information H₂O, CO₂, CH₄

Aerosol optical depth and precipitable water computations (1020, 1640, 940 nm) + extra $\tau_a(1020$ nm)

Cloud screening and quality control

Inversion products

Almucantar retrievals - spherical and spheroid models (4 wavelengths), level 2

Almucantar retrievals - 6 wavelengths + 340, 380 nm

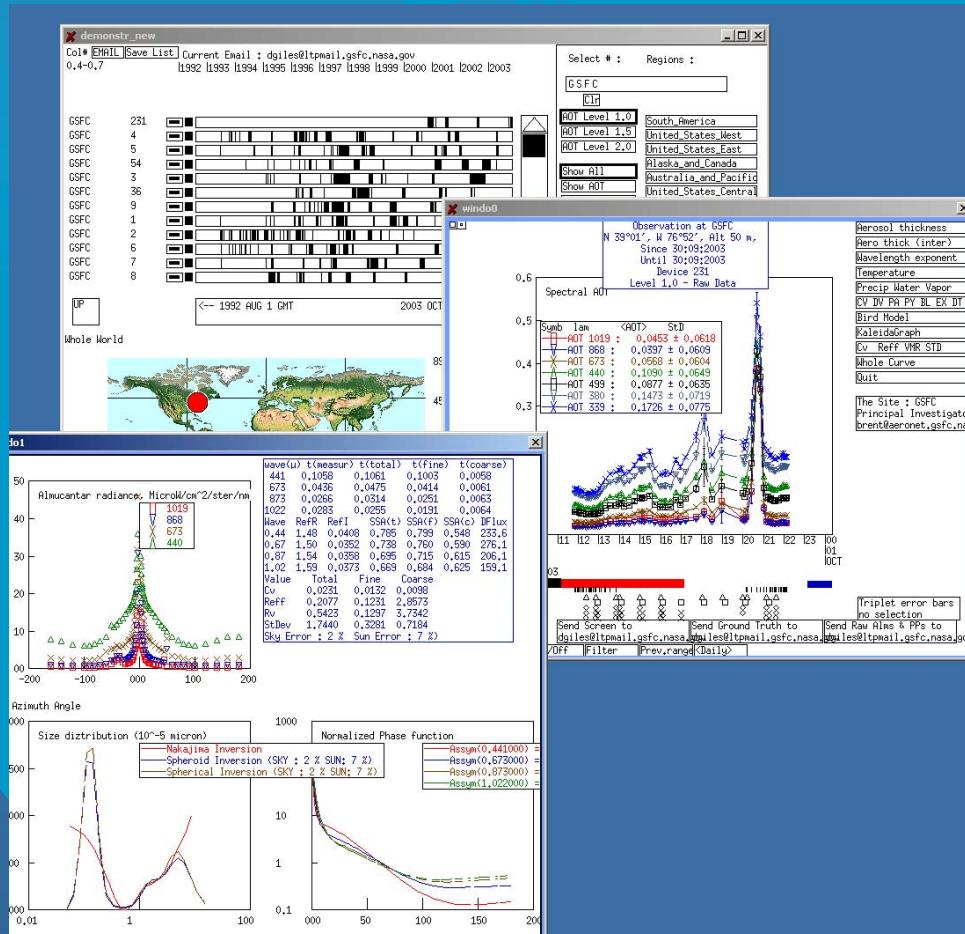
Principal plane retrievals - 4 wavelengths, level 2; 6 wavelengths

? Combined retrievals (almucantar and principal plane)

Internal Data Interface

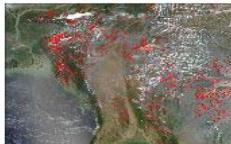
“Demonstrat”

- Provides interactive data browsing and analysis
- Accesses all AERONET and experimental products
- Functions as a intercalibration utility



AERONET Web Site

<http://aeronet.gsfc.nasa.gov>

 <h2>Aerosol Robotic Network (AERONET)</h2>				
<p>- HOME + DATA + OPERATIONS + PAPERS + CAMPAIGNS</p>				
QUICK LINKS	MISSION			NEWS
<ul style="list-style-type: none">+ AERONET Collaborators+ AerosolFlux Networks+ Contacts+ Installations/Shipping+ Other NASA Projects+ Site/Photos Information+ Site Outline+ System Description	<p>The AERONET (AErosol ROBotic NETwork) program is an inclusive federation of ground-based remote sensing aerosol networks established by AERONET and PHOTONS and greatly expanded by AEROCAN and other agency, institute, and university partners. The goal is to assess aerosol optical properties and validate satellite retrievals of aerosol optical properties. The network imposes standardization of instruments, calibration, and processing. Data from this collaboration provides globally distributed observations of spectral aerosol optical depths, inversion products, and precipitable water in geographically diverse aerosol regimes. Three levels of data are available from this website: Level 1.0 (unscreened), Level 1.5 (cloud-screened), and Level 2.0 (Cloud-screened and quality-assured). Descriptions may be found of program objectives, affiliations, the instrumentation, operational issues, data products, database browser "demonstrat", research activities, links to similar data sets, NASA EOS links and personnel involved in AERONET.</p> <p>+ Read More</p> <p>CAUTION: Data presented in the real time data version are unscreened and may not have final calibration reprocessing.</p> <p>NOTICE TO NON-AERONET INVESTIGATORS: To maintain the integrity of the database and fairness to the individuals who have contributed, use of these data for publication requires an offer of authorship to the AERONET PI(s).</p>			
<p>DATA</p> <ul style="list-style-type: none">Data Display+ Level 1.0 AOT+ Level 1.5 AOT+ Level 2.0 AOT <p>Data Download Tool</p> <ul style="list-style-type: none">+ All AERONET Data <p>Level 2.0 Climatology</p> <ul style="list-style-type: none">+ AOT Tables <p>Climatology Map Animation</p> <ul style="list-style-type: none">+ 500nm AOT+ 870-440nm Angstrom Parameter				<p>2004 AERONET/PHOTONS Workshop in Spain</p> <ul style="list-style-type: none">• UPDATES (4/29/2004)• Overview• Rationale• Preliminary agenda (PDF)• Logistics (PDF) - Updated 4/28/2004• Additional lodging and logistical information - Updated 4/28/2004• Tourism <p>+ Read More</p> <ul style="list-style-type: none">• Current list of participants presenting posters. <p>IMPORTANT: Workshop Notice</p> <p>All attendees must send the following information to Ms. Pilar Sanz Cabeza:</p> <ol style="list-style-type: none">1. Name2. Institution3. Nationality4. Passport Number <p>Please submit responses as soon as possible.</p> <p>+ Read More</p>
	<p>Important Announcements</p> <ul style="list-style-type: none">• 18 February 2004 - The AERONET/PHOTONS workshop will be held on the south coast of Spain from May 10 to May 14, 2004. The workshop will be located at the facilities of the experimental range "El Arenosillo" which is operated by INTA's Department of Earth Observation, Remote Sensing and Atmosphere (Spain).• 12 January 2004 - Please read the January 2004 AERONET quarterly report for an update on the upcoming project workshop, activities, and new products.• Former Announcements			<p>Features</p>  <p>Aerosol Optical Properties in Southeast Asia + Read More (PDF)</p>
		<p>Campaign</p>  <p>2004 United Arab Emirates Campaign</p>		

Display Interface

- Time Selection
- Site Selection
 - Map Interface
 - Text Interface
- Additional Options
 - Site Type
 - AOT Level

The screenshot shows the AERONET Data Display Interface homepage. At the top, there's a banner with the NASA Goddard Space Flight Center logo and the text "Aerosol Robotic Network (AERONET)". Below the banner, there are navigation links: + HOME, + DATA, + OPERATIONS, + PAPERS, and + CAMPAIGNS. The main content area has a heading "AERONET Data Display Interface" and a sub-heading "Level 1.0. Real Time Data." It states that the following AERONET data are unscreened and may not have final calibration applied, listing years from 1993 to 2004. A link "To zoom the map click on it." is provided, along with a "Back to World Map" link. Below these, there are filter options for "Site Type" (radio buttons for All, Permanent, Seasonal, Temporary) and "AOT Level" (radio buttons for Level 1.0, Level 1.5, Level 2.0). The central part of the page is a world map with numerous red square markers indicating AERONET sites. At the bottom, there's a table listing 24 site names and their coordinates.

Abracos_Hill (10S,62W)	Agoufou (15N,1W)	Agri_School (10S,56W)
Aguascalientes (21N,102W)	Aguas_Emedendas (15S,47W)	Ahi_De_Cara (37N,3W)
Aire_Adour (43N,0E)	Albany_Oregon (44N,123W)	Albuquerque (35N,106W)
Al_Dhafra (24N,54E)	Alta_Floresta (9S,56W)	Amsterdam_Island (37S,77E)
Andenes (69N,16E)	Andros_Island (24N,77W)	Angiola (35N,119W)
Anmyon (36N,126E)	AntarcticaDomeC (75S,123E)	Arica (18S,70W)
Ariquimbas (9S,63W)	Arizona (32N,110W)	Armilla (37N,3W)
Ascension_Island (7S,14W)	Avignon (43N,4E)	Azores (38N,28W)
Bac_Giang (21N,106E)	Bac_Lieu (9N,105E)	Bahrain (26N,50E)
Balbina (1S,59W)	Banizoubou (13N,2E)	Barbados (13N,59W)

Display Interface

- Time Selection Menu
- Display Aerosol Optical Depth Plots
- Direct Data Download Links
- Additional Data Products
 - Almucantar Retrieval Products (AERONET)
 - Satellite Images (AQUA/TERRA-MODIS, GOES)
 - MPLNET
 - Back Trajectory Analyses

 Goddard Space Flight Center

Aerosol Robotic Network (AERONET)

+ HOME + DATA + OPERATIONS + PAPERS + CAMPAIGNS

AERONET Data Display

Site: GSFC

Additional Site Information

DISCLAIMER AERONET Level 1.0. Real Time Data.
The following AERONET data are unscreened and may not have final calibration applied.

The principal investigator(s) of the 'GSFC' site:
Brent Holben

If you intend to use the following data please contact principal investigator(s) via e-mail:
brent@aeronet.gsfc.nasa.gov

Return to the World Map

Data Display Controls

Related Product Availability for GSFC (select each day below):

- Show Inverted Spherical Almucantars
- Show Back Trajectory Analyses - Disclaimer
- Show MPLNET Images - Disclaimer
- Show TERRA-MODIS Rapid Response Images - More Information
- Show AQUA-MODIS Rapid Response Images - More Information
- Show Visible Satellite Images - Disclaimer
- Show Infrared Satellite Images - Disclaimer

Choose year : 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004

Choose month of 2003 : JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Choose day of DEC 2003

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31					

AOT Level 1.0 data from DEC of 2003

GSFC , N 39 01' , W 76 52' , Alt 50 m,
PT : Brent Holben, brent@aeronet.gsfc.nasa.gov
Level 1.0 AOT Data from DEC 2003

Aerosol Optical Thickness

AOT_1020 : <0.131>
AOT_870 : <0.131>
AOT_670 : <0.136>
AOT_500 : <0.166>
AOT_440 : <0.183>
AOT_380 : <0.204>
AOT_340 : <0.216>

AERONET Project, NASA GSFC

AERONET DOWNLOAD

- AOT Level 1.0
- AOT Level 1.5
- AOT Level 2.0
- Raw Almucantars
- Raw Principal Planes
- More AERONET Downloadable Products...

AOT Level 1.0 data from DEC 13 of 2003

GSFC , N 39 01' , W 76 52' , Alt 50 m,
PT : Brent Holben, brent@aeronet.gsfc.nasa.gov
Level 1.0 AOT Data from 13 DEC 2003

Aerosol Optical Thickness

AOT_1020 : <0.142>
AOT_870 : <0.142>
AOT_670 : <0.144>
AOT_500 : <0.169>
AOT_440 : <0.184>
AOT_380 : <0.205>
AOT_340 : <0.219>

AERONET Project, NASA GSFC

AERONET DOWNLOAD

- AOT Level 1.0
- AOT Level 1.5
- AOT Level 2.0
- Raw Almucantars
- Raw Principal Planes
- More AERONET Downloadable Products...

Download Tool

- Geographical Site Selection
 - Map
 - Region, Country/State, and AERONET Site

The screenshot shows the AERONET Data Download Tool interface. At the top, there's a header with the NASA Goddard Space Flight Center logo, a photograph of a telescope, and the text "Aerosol Robotic Network (AERONET)". Below the header is a navigation menu with links for HOME, DATA, OPERATIONS, PAPERS, and CAMPAIGNS. The main content area has a sub-header "AERONET Data Download Tool" and a section titled "Select the Geographic Region of interest:" with a dropdown menu set to "Alaska_and_Canada" and a "Get Country/State" button. Below this is a map of the world with numerous red square markers indicating AERONET sites. A legend at the bottom left identifies the site types: All (radio button checked), Permanent, Seasonal, and Temporary. A table at the bottom lists 20 AERONET sites with their coordinates:

Abracos_Hill (10S,62W)	Agoufou (15N,1W)	Agri_School (10S,56W)
Aguascalientes (21N,102W)	Aguas_Emendadas (15S,47W)	Ahi_De_Cara (37N,3W)
Aire_Adour (43N,0E)	Albany_Oregon (44N,123W)	Albuquerque (35N,106W)
AI_Dhatra (24N,54E)	Alta_Floresta (9S,56W)	Amsterdam_Island (37S,77E)
Andenes (69N,16E)	Andros_Island (24N,77W)	Angiola (35N,119W)
Anmyon (36N,126E)	AntarcticaDomeC (75S,123E)	Arica (18S,70W)
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Ascension_Island (7S,14W)	Avignon (43N,4E)	Azores (38N,28W)
Bac_Giang (21N,106E)	Bac_Lieu (9N,105E)	Bahrain (26N,50E)
Balibina (1S,59W)	Banizoumbou (13N,2E)	Barbados (13N,59W)
Barnaul (53N,83E)	Barrow (71N,156W)	Beijing (39N,116E)
BEIJING_2002 (39N,116E)	Belsk (51N,20E)	Beltterra (2S,54W)

Download Tool

- Time Selection
- AOT Products
 - Levels 1.0, 1.5, 2.0
 - Instrument number and wavelength information
- Raw Radiance Data with calibration applied
 - Almucantar, Principal Plane (Polar), BRDF
- Nakajima Almucantar Retrievals

Download Data for Capo_Verde

Select the start and end time of the data download period:

START:	1	JAN	1994	END:	1	JAN	2003
--------	---	-----	------	------	---	-----	------

[Data Descriptions](#) [Data Units](#) [Development Status](#) [Update Log](#)

Note: Data are not available if the data type is *italicized*

Select the data type(s) with checkbox:

Aerosol Optical Thickness*:

- 1. Level 1.0 (Raw)
- 2. Level 1.5 (Cloud Screened)
- 3. Level 2.0 (Quality Assured)
- * also WV and Angstrom Parameters
- Select All AOT

Raw Data (Calibration Applied):

- 4. Almucantars
- 5. Polar Principal Planes
- 6. *BRDF*
- 7. Principal Planes
- Select All Raw Data

Nakajima Almucantar Retrievals

- 8. SKYRAD.PAK

Almucantar Retrievals

Total Only	Total/Fine/Coarse Modes
9. <input type="checkbox"/> Size Distribution	12. <input type="checkbox"/> Volume
10. <input type="checkbox"/> Refractive Index	13. <input type="checkbox"/> AOT Absorption
11. <input type="checkbox"/> AOT Coincident	14. <input type="checkbox"/> AOT Extinction
15. <input type="checkbox"/> SSA	
16. <input type="checkbox"/> Asymmetry Factor	
17. <input type="checkbox"/> Phase Functions	
18. <input type="checkbox"/> Combined Retrievals (9-16)	
<input type="checkbox"/> Select All Retrievals	

Download Tool

- Almucantar Retrievals (Dubovik)
 - Spherical, Spheroid
 - Default Option
 - Advanced Parameters
- Data Type Formats
 - All Points
 - Daily and Monthly Averages

ALMUCANTAR RETRIEVAL MODELS				
Models	SPHERICAL	SPHEROID	COMBINED SPHERICAL AND SPHEROID	
Levels	<input type="radio"/> 1.5	<input type="radio"/> 1.5	<input type="radio"/> 2.0	
	<input checked="" type="radio"/> 2.0 (Spherical Particles)	<input type="radio"/> 2.0		
	<input type="radio"/> 2.0 (Non-spherical Particles)			
Data Mode	<input checked="" type="radio"/> Recommended Default Parameters			<input type="radio"/> User-defined Options
User-defined Almucantar Retrieval Options				
Angles (No.)	Solar Zenith Angle Range		Spherical Sky Error Limit (%)	Spheroid Sky Error Limit (%)
Min	Min	Max	Max	Max
21	25	77	5	10
Angstrom Parameter Limit (870-440)	Solar Zenith Angle (Fine Mode Filter)	AOT at 440nm (Fine Mode Filter)		
Max	Min	Min		
0.6	45	0.4		
Data Format				
<input type="radio"/> All Points	<input checked="" type="radio"/> Daily Averages	<input type="radio"/> Monthly Averages		

Please wait for the new window
(larger intervals will require longer processing time)

Level 2.0 Climatology

- Averages:
 - Daily
 - Monthly
 - Multi-Year
 - Monthly
 - Yearly

AERONET Climatology, Level 2.0 - Quality Assured Data									
GSFC (N 39°01', W 76°52', Alt 50 m)									
Site Index									
Year: 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003									
Channel (nm): 1020, 870, 670, 500, 440, 380, 340, 500 (not interpolated)									
Explanation of Statistics									
Aerosol optical depth at 500 nm ($\tau_{\text{a}500}$), Angstrom exponent ($\alpha_{440-870}$), precipitable water (PW), the associated standard deviations (sigma), the number of days (N) and months (Month) in the observation periods.									
Overall Averages of	$\tau_{\text{a}500}$	sigma	$\alpha_{440-870}$	sigma	PW	sigma	N	Month	
JAN	0.09	0.05	1.74	0.31	0.75	0.45	134	9	
FEB	0.12	0.07	1.56	0.38	0.73	0.35	135	9	
MAR	0.15	0.10	1.58	0.37	0.98	0.55	166	10	
APR	0.20	0.11	1.38	0.33	1.37	0.78	189	10	
MAY	0.26	0.18	1.49	0.32	1.94	0.85	183	11	
JUN	0.40	0.27	1.72	0.29	2.96	1.01	207	11	
JUL	0.45	0.31	1.76	0.30	3.39	0.97	229	11	
AUG	0.47	0.29	1.74	0.28	3.35	0.98	223	11	
SEP	0.26	0.23	1.76	0.28	2.47	0.96	200	11	
OCT	0.15	0.12	1.68	0.36	1.58	0.69	199	11	
NOV	0.11	0.07	1.75	0.28	1.12	0.65	167	11	
DEC	0.09	0.06	1.80	0.34	0.83	0.50	188	11	
YEAR	0.23	0.14	1.66	0.13	1.79	1.01	2240	126	
Overall Download					Years Combined Download				

Level 2.0 Climatology

Animation: AERONET Climatology Maps

Level 2.0 Aerosols Optical Thickness (Selected Sites)

Current Data Range: May 1993 to Present

Maps updated at 03:00 ET daily.

[Download AOT and Angstrom Parameter Data \(Zip file\)](#)

AOT 500nm

Frame Controls:

Loop Mode:

Animate Frames:

Dwell First:

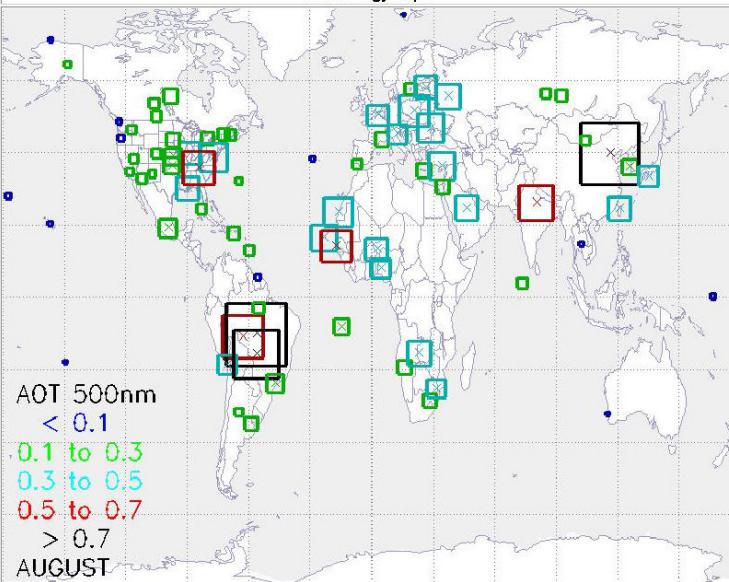
Dwell Last:

Adjust Speed:

Advance One:

Frame No: 8

Climatology Maps:



870-440nm Angstrom

Animation: AERONET Climatology Maps

870-440nm Angstrom Exponent (Selected Sites)

Current Data Range: May 1993 to Present

Maps updated at 03:00 ET daily.

[Download AOT and Angstrom Parameter Data \(Zip file\)](#)

Frame Controls:

Loop Mode:

Animate Frames:

Dwell First:

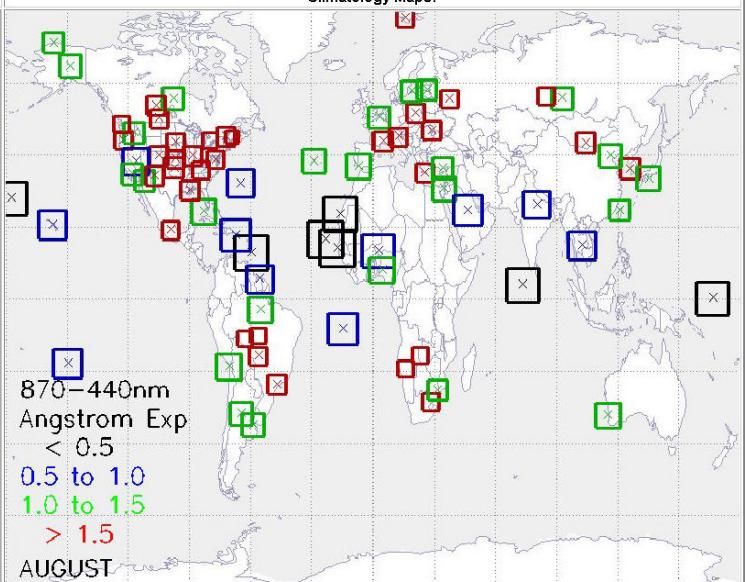
Dwell Last:

Adjust Speed:

Advance One:

Frame No: 8

Climatology Maps:





Aerosol Robotic Network (AERONET)

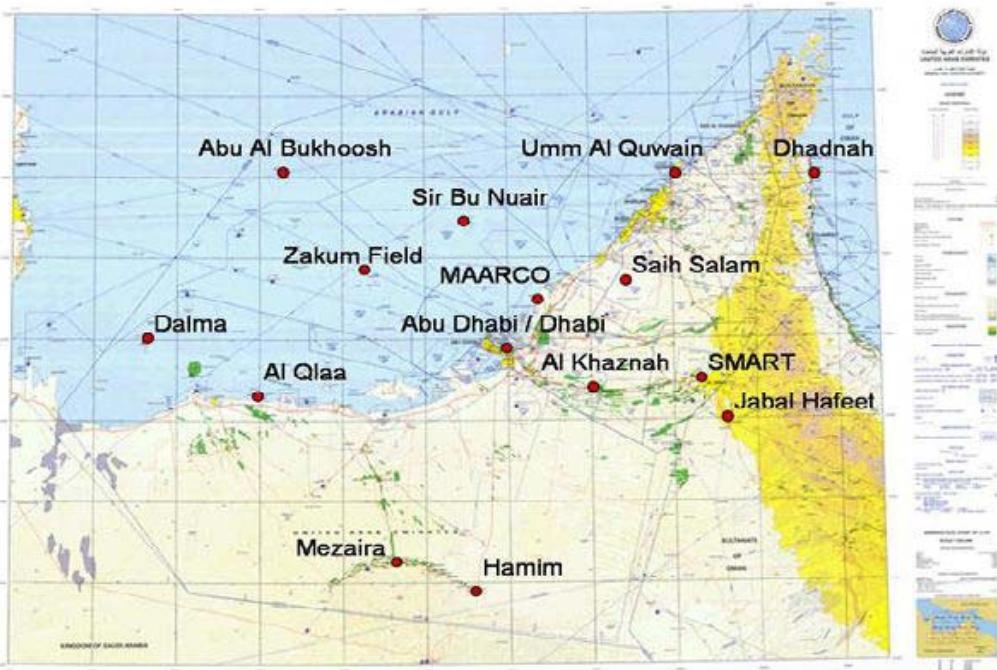
[+ HOME](#)[+ DATA](#)[+ OPERATIONS](#)[+ PAPERS](#)[+ CAMPAIGNS](#)

United Arab Emirates Summer Field Campaign (2004)

[+ UAE² HOME](#)[+ ABSTRACT](#)[- DATA](#)[+ MEETINGS](#)[+ RATIONALE](#)[+ OBJECTIVES](#)[+ REFERENCES](#)[+ LINKS](#)[+ SCHEDULE](#)[+ MAPS](#)[+ PHOTOGRAPHS](#)[+ SATELLITE](#)[+ CONTACTS](#)[+](#)[INFORMATION
FOR
TRAVELERS](#)[+ STATUS AND
REPORTS](#)[+ SCIENCE
TEAM](#)[+ WEATHER](#)

AERONET UAE Data

Red circles indicate the data are available for the site.



- ◆ Abu Al Bukhoosh
- ◆ Al Qlaa
- ◆ Al Khaznah
- ◆ Dalma
- ◆ Dhabi

- ◆ Dhadnah
- ◆ Hamim
- ◆ Jabal Hafeet
- ◆ MAARCO
- ◆ Mezaira

- ◆ Saih Salam
- ◆ Sir Bu Nuair
- ◆ SMART
- ◆ Umm Al Quwain
- ◆ Zakum_Field

[Send Us Your Comments](#)



Goddard
Space
Flight
Center



+ HOME

+ DATA

+ OPERATIONS

+ PAPERS

+ CAMPAIGNS

2004 United Arab Emirates Unified Aerosol Experiment (UAE²)

+ UAE² HOME

+ ABSTRACT

+ DATA

+ MEETINGS

+ RATIONALE

+ OBJECTIVES

+ REFERENCES

+ LINKS

+ SCHEDULE

+ MAPS

+ PHOTOGRAPHS

- SATELLITE

+ CONTACTS

+ INFORMATION FOR TRAVELERS

+ STATUS AND REPORTS

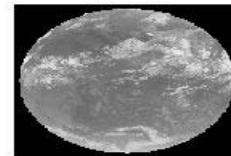
+ SCIENCE TEAM

+ WEATHER

SATELLITE



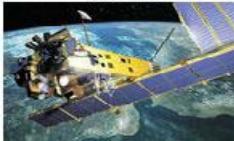
+ Satellite Overpass Predictor



+ EUMETSAT Images

- + TERRA/AQUA/SeaWiFS Orbit Track Plots - Navy Post Graduate School
- + NOAA Orbit Track Plots - Navy Post Graduate School
- + Global Rain Rate - NRL
- + Scatterometer Winds - NRL
- + MeteoSat 5 Cloud Tops - NRL

AATSR



+ UAE² Support Information

- ◆ + AATSR Impression for UAE² (PDF)
- ◆ + AATSR Coverage for UAE² (PDF)

MISR-TERRA



- ◆ + MISR Daily Imagery
 - ◆ + MISR Regional Imagery
 - ◆ + MISR Regional Archive Imagery (password protected)
 - ◆ + MISR Regional Product Imagery overall access table
 - ◆ + Overflight Schedule Table (PDF)
 - ◆ + Imaging Site Maps (PDF)
 - ◆ + MISR data detailed products and information table
-
- ◆ + UAE² MISR Goals and Products Presentation (PowerPoint)
 - ◆ + UAE² Support Information
 - ◆ + MISR UAE² campaign page

MODIS-AQUA



+ UAE² Rapid Response Images

- ◆ + Granules (Cloud Top Pressure and Temperature; Water Vapor IR and near IR; Aerosol Depth Land/Ocean; Cloud Optical Thickness; Effective Particle Radius; Aerosol Depth Ratio Small)
- ◆ + Average and Standard Deviation Statistics - 50km Box - Collocated with AERONET sites - Spectral AOT, Particle Size Information, and Reflectances from which the products are derived etc., separate for land and ocean.

MODIS-TERRA



+ TERRA/AQUA/SEAWIFS Orbits

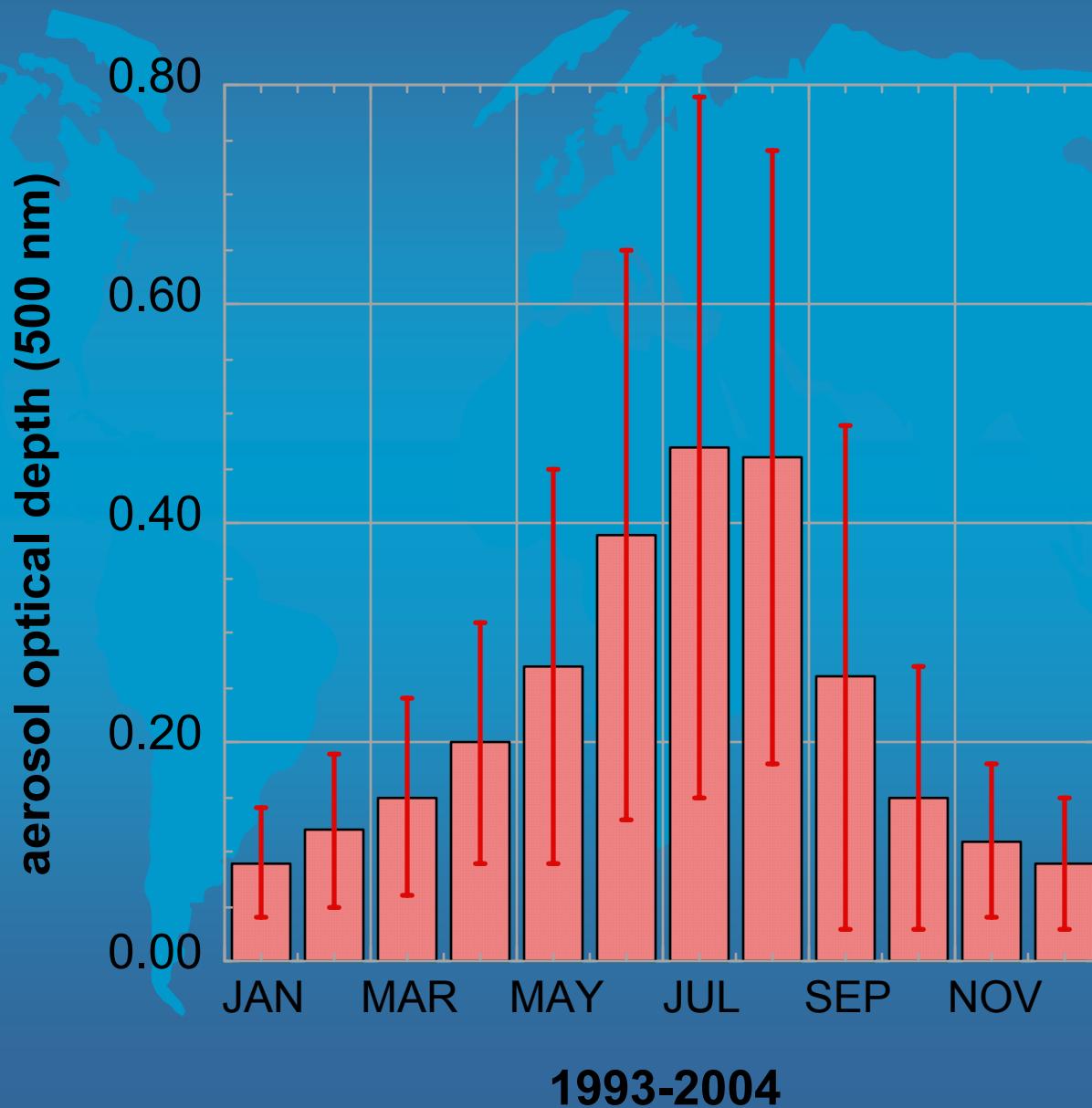
Glint Angle Information

+ UAE² Rapid Response Images

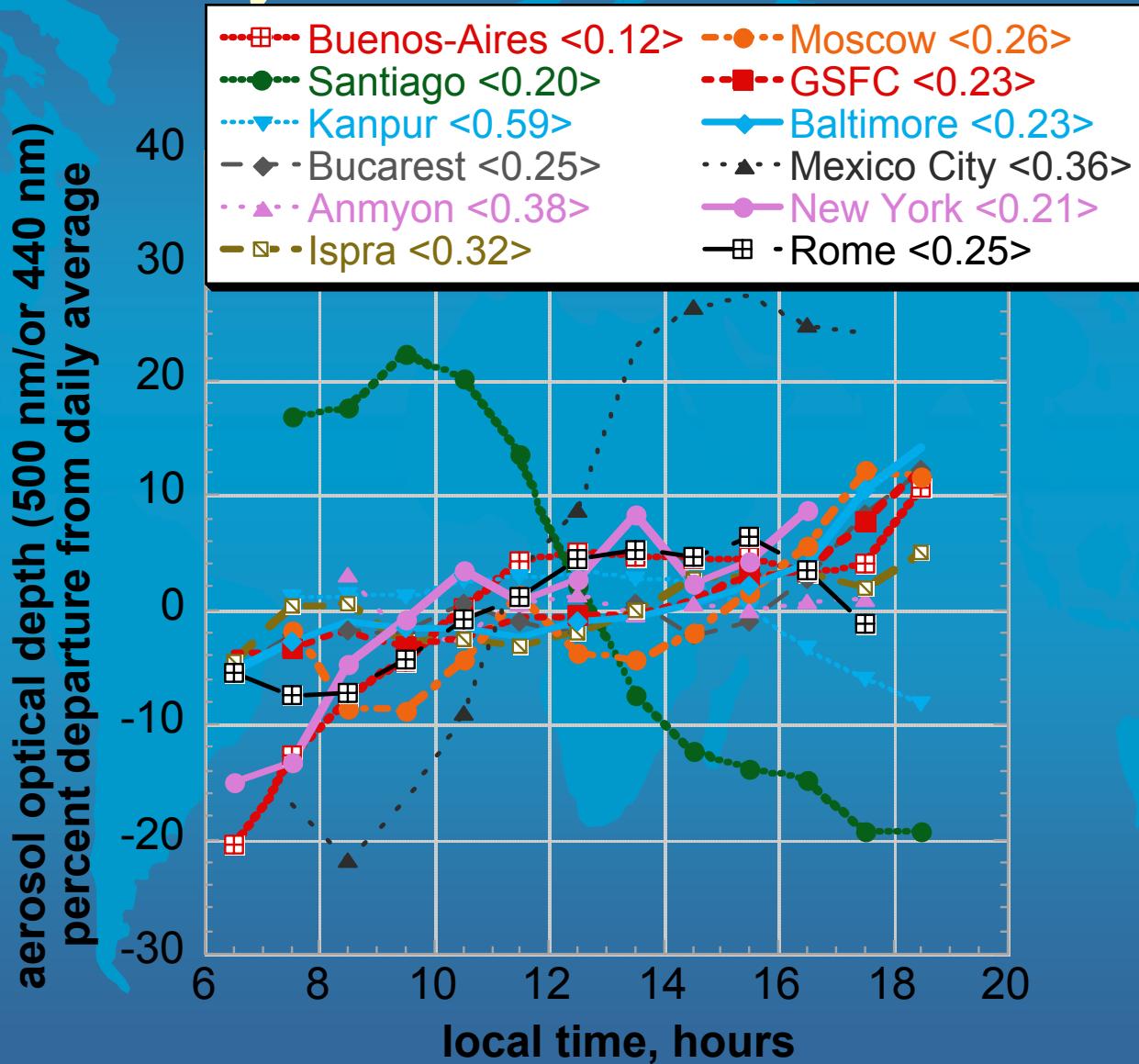
- ◆ + Granules (Cloud Top Pressure and Temperature; Water Vapor IR and near IR; Aerosol Depth Land/Ocean; Cloud Optical Thickness; Effective Particle Radius; Aerosol Depth Ratio Small)
- ◆ + Average and Standard Deviation Statistics- 50km Box - Collocated with AERONET sites - Spectral AOT, Particle Size Information, and Reflectances from which the products are derived etc., separate for land and ocean.



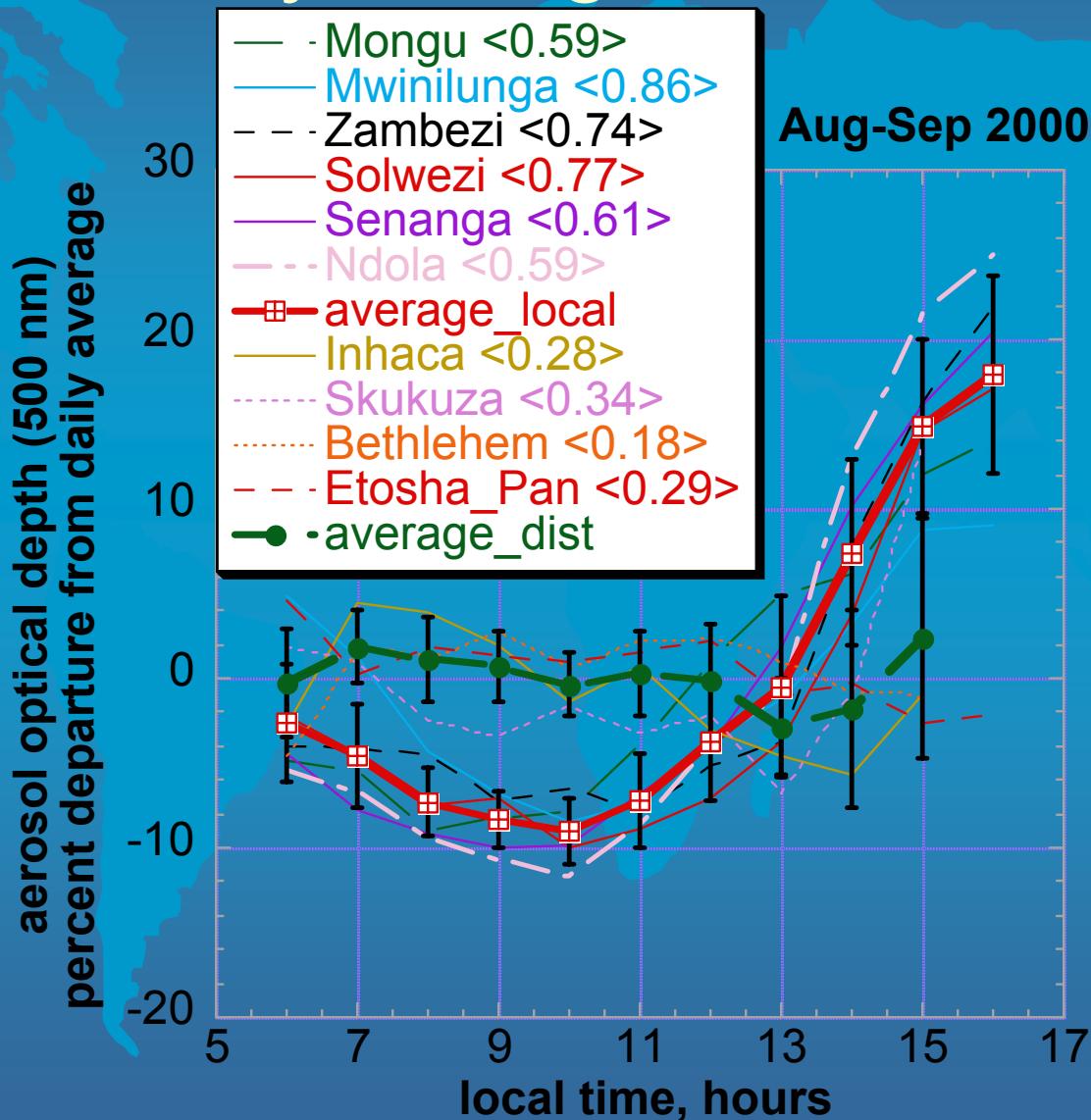
Goddard Space Flight Center



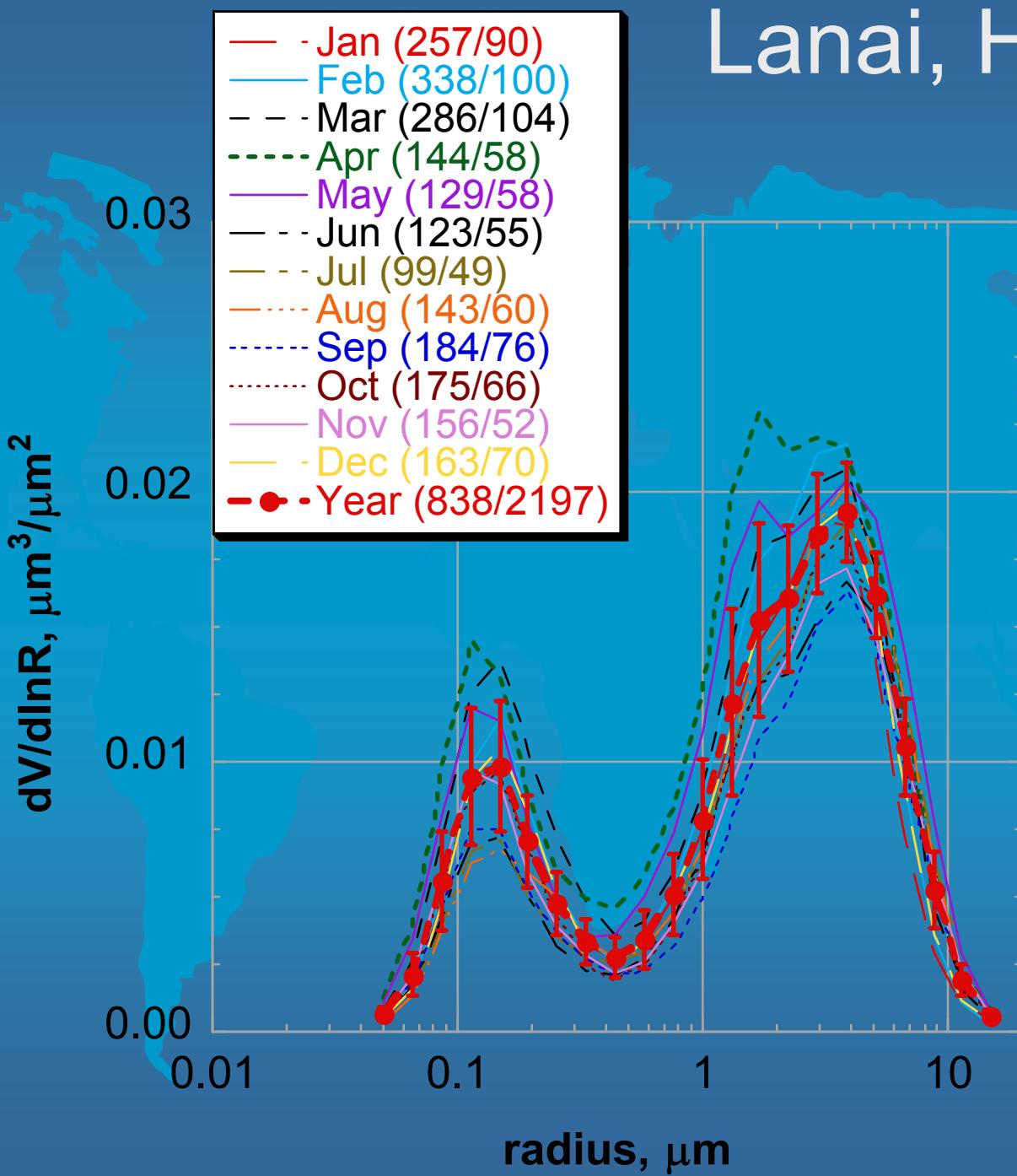
Aerosol optical depth diurnal variability at various urban sites



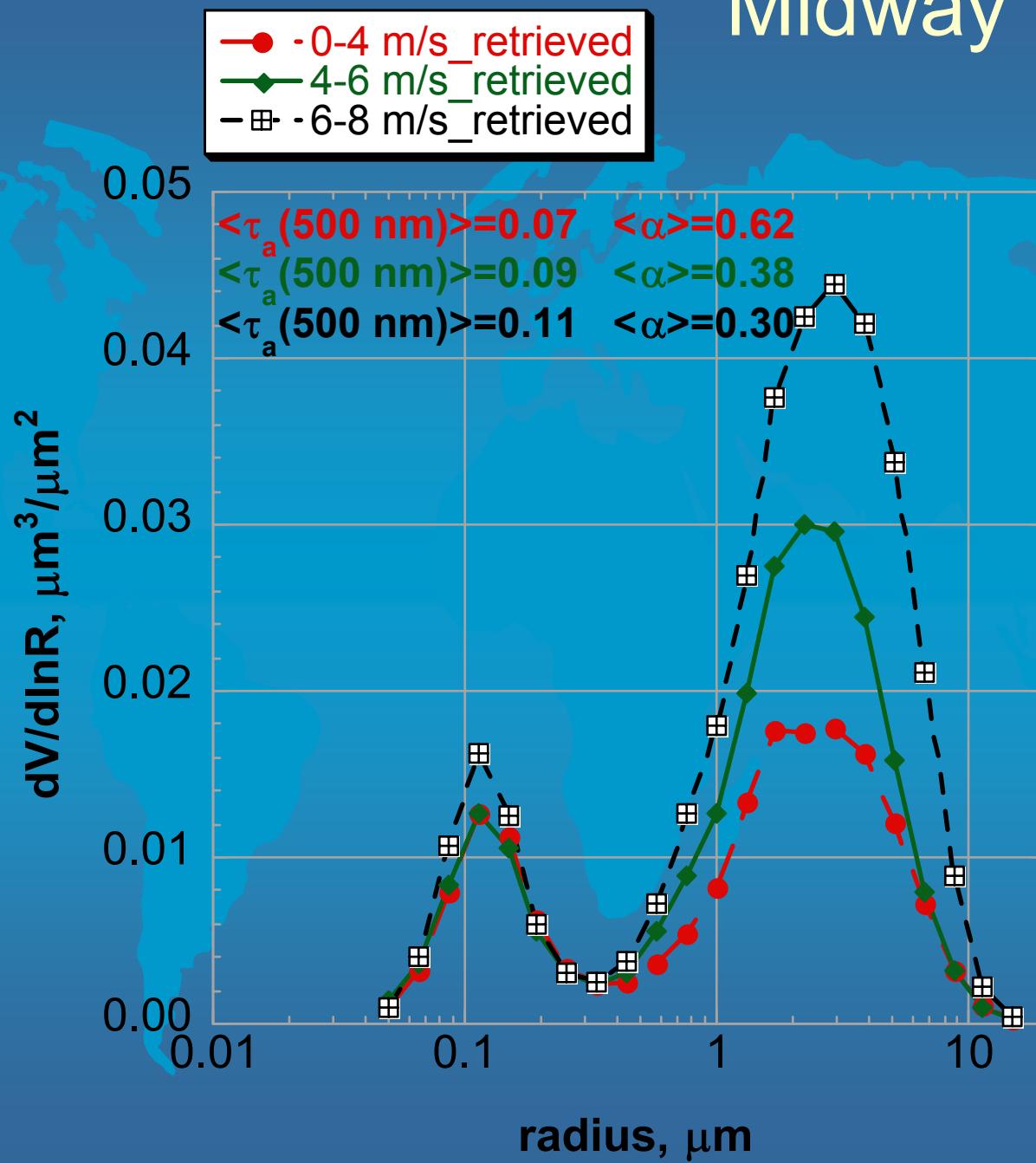
Aerosol optical depth diurnal variability during SAFARI 2000



Lanai, Hawaii



Midway Island



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