Cimel Sunphotometers at ACRF Sites
History and Current Status
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Locations and Availability
The CSPHOT datastream officially started in 1996 with SGP. Since then additional instruments were added to cover NSA, TWP C2, and AMF sites. ACRF owns a 5th CSPHOT that rotates to the SGP, TWP, and AMF sites to swap out instruments that need to go back for post-deployment calibration at Aeronet. The NSA CSPHOT gets calibrated during the winter months Nov through Feb. This year, the AMF CSPHOT will be deployed in the China supplementary site at Taihu. The CSPHOT at Danan is owned and operated by CSIRO.

SGP-C1 – Cart_Site
NSA-C1 – Barrow
TWP-C2 – Nauru
TWP-C3 – Darwin(CSIRO)
AMF-M1 – Niamey
AMF-M1 – Black Forest
AMF-S1 – Taihu

Recent Hardware Changes
The CSPHOT was originally conceived as a standalone instrument, with its own power source (solar panel and battery) and communication channel (GOES satellite transponder). ARM had encountered operational problems with both of these systems and in the past 2 years, we have made changes to more fully integrate the CSPHOTS into the ACRF hardware infrastructure:
- Moved SGP CSPHOT next to SWS on top of optical trailer in 2006
- Added serial line data collection on local instrument PC and internet transfer
- Site power supply instead of solar panel and battery
- Added zenith-pointing cloud mode (new PROMs)
- Added 1640 nm channel in 2007

Upcoming Software Changes
With the removal of the satellite transponder, we lost a means to get real-time diagnostic messages. Currently the data are transmitted directly from the instrument PC to Aeronet, bypassing the site data system. In order to reestablish a data status monitoring capability for site operations, we will add a collection of the raw data and status information.

The calibrated and quality assured data from Aeronet will continue to be converted to netCDF and archived in the ACRF Archive. The 3 separate datastreams for fine, coarse, and total phase-functions will be consolidated into one.

Recent Applications
In ARM, the Aeronet derived column integrated aerosol parameters are most often used as a baseline measurement for comparison against other independent aerosol measurements. The most recent such direct comparison field campaign was:
2007/08 SGP: Connor Flynn: Prode Cimel Comparison
Other recent uses of CSPHOT data are highlighted in the following posters here at the 2008 ARM STM (On average there are 4 posters every year since 2001 that directly mention the Cimel Sunphotometer in the abstract):
- “4STAR Spectrometer for Sky-scanning Sun-tracking Atmospheric Research: Airborne Concepts, Ground Prototype Measurements, and Aeronet style Retrievals” Connor Flynn et al. (2-C)
- “Integrated Cloud Optical Properties from Zenith Radiance Measurements Collected During the ARM COPS Experiment”, Christine Chiu, et al. (7-H)
- “Atmospheric Aerosol and Water Vapor Retrievals from SGP’s MFRSR Network Data”, Mikhail Alexandrov, et al. (11-C)
- “GCM Aerosol Diagnostic Constraints from Satellite, AERONET, and SGP Observational Data” Li Liu, et al. (11-M)

More Information
Cimel (CSPHOT) Instrument Page:
http://www.arm.gov/instruments/instrument.php?id=csphot
Aeronet
http://aeronet.gsfc.nasa.gov/
ARM eXternal Data Center (XDC):
http://www.xdc.arm.gov/, xdc_oper@arm.gov.
ARM Google:
http://google.arm.gov/search for “Cimel OR CSPHOT OR CSPOT”

Cimel Sunphotometer Measurements

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<tr>
<th>Direct Sun and Sky Radiances</th>
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<tbody>
<tr>
<td>AOT Level 1.0</td>
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<td>AOT level 1.5 (Cloud Screened):</td>
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<td>AOT level 2 (Quality Assured):</td>
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<td>Principle Plane</td>
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<td>Almucantar</td>
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Almucantar Retrievals

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<td>Size distribution and optical properties derived by optimized retrieval from Sun and sky radiances (csphotalm1dubo)</td>
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<tr>
<td>Size distribution</td>
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<td>Phase function</td>
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Availability of ARM CSPHOT DATA

CSPHOT AOT Quality Assured 1996-2008

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<td>AOT</td>
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Up-to-date information is available at:
http://www.arm.gov/instruments/instrument.php?id=csphot

CSPHOT Instrument Page:
http://www.arm.gov/instruments/instrument.php?id=csphot

Aeronet
http://aeronet.gsfc.nasa.gov/

ARM eXternal Data Center (XDC):
http://www.xdc.arm.gov/ xdc_oper@arm.gov.

ARM Google:
http://google.arm.gov/search for “Cimel OR CSPHOT OR CSPOT”