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Aerosol Lifecycle Field Campaign Information Collection

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ABSTRACT

The Atmospheric Sciences Division (ASD) of the Environmental Sciences Department at Brookhaven National Lab conducted an Intensive Observational Period (IOP) from July 15 through August 15, 2011 to study the physical, chemical, and optical properties of aerosols. A wiki site was created through the Atmospheric Radiation Measurement (ARM) program of the U.S. Department of Energy as a singular location for the primary investigators and other participants to keep up to date with information related to this IOP. Collaboration with the ARM External Data Center and a colleague at Pacific Northwest National Laboratory led to its development, with password access given to all involved in the IOP. Within this wiki are sections for announcements, instrument status, data quick-looks, blogs, photos, and a calendar. Investigators can quickly find out about any important or interesting occurrences (such as power outages or measurement spikes), as well as the current status of any of the forty-three participating instruments. Each instrument was also given its own page to provide users with further information about how it works and the data it collects. Additionally, daily quick-look images (i.e., summaries of each day's data) were posted for each of the individual instruments, which facilitated investigators in seeing and understanding interesting occurrences and anomalies in the data and their causes. The images also allowed for a check on duplicate instruments to ensure that they are functioning correctly. Other sections enabled scientists to keep up on the work of other participants, easing communication within the ASD and with the high number of guest scientists. The calendar was utilized to keep track of meetings and the progress of the IOP, and also as a location to post presentations given at each weekly meeting for others to access. The wiki site's development allowed for a much more involved experiment, enabling a more thorough understanding of what the outcome would be before the data collection was even completed.

Instrument Status 20110725

Instrument	MEASUREMENTS	CONTACT	Status
Infrastructure	-	Springston-BNL	OK
PSAP	Light Absorption Coefficient	Sedlacek-BNL	OK
Dual Nephelometer Humidigraph (DNH)	Aerosol Scattering Coefficient at Ambient/Various RH	Serum-BNL	OK
CCN-100	Cloud Condensation Nuclei Concentration	Serum-BNL	OK
CPC > 10 nm	Condensation Particle Concentration	Serum-BNL	OK
CAPS-PMs	Aerosol Optical Extinction	Freedman-Aerodyne	OK
HTDMA	Aerosol Hygroscopic Growth Factor	Serum-BNL	OK
Local Met	Temperature, Pressure, Wind Speed/Direction, Precip	Springston-BNL	OK
Ozone	Ozone Concentration	Springston-BNL	OK
DMPS	Aerosol Size Distribution	Hallier-DHI	OK
UV-AMS	Aerosol Size Distribution, Fluorescence	Hallier-DHI	OK
MAOS-A	-	Springston-BNL	OK
Infrastructure	-	Sedlacek-BNL	OK
PSAP	Light Absorption Coefficient	Sedlacek-BNL	OK
Dual Nephelometer Humidigraph (DNH)	Aerosol Scattering Coefficient at Ambient/Various RH	Serum-BNL	OK
CCN-200 (ltdal column)	Cloud Condensation Nuclei Concentration	Serum-BNL	OK
CPC > 10 nm	Condensation Particle Concentration	Serum-BNL	OK
CPC > 2.5 nm	Condensation Particle Concentration	Serum-BNL	OK
AMS	Aerosol Size Distribution	Kubler-BNL	OK

Figure 2: Example Instrument Status page from July 25, 2011.

RESULTS

The site was a success. Quick-look pages were very useful in enabling scientists to see raw data from a number of instruments at once. The announcement section on the main page served very well in keeping everyone updated on problems such as power outages and successes such as collection and posting of data. While much data analysis is still to be done, the site facilitated a basic understanding of what further results are to be expected.

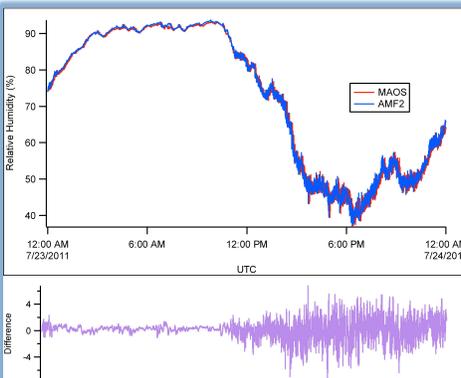


Figure 5: Relative humidity comparison for two separate meteorology instruments.



Figure 1: The homepage of the Aerosol Lifecycle OSC wiki site. Created through the Atmospheric Radiation Measurement (ARM) Climate Research program. All participants had password access to view all the contents. Over one hundred separate pages stemmed from this page, allowing the user to find information about over forty instruments, three months of events relating to the IOP, weeks of quick looks as well as the status of the plots corresponding instruments.

INTRODUCTION

The principle mission of this project was to keep the wiki site updated and collect information about the instruments and happenings within the experiment. Figure 1 is a view of the home page of the wiki for this Off-Site Campaign (OSC). The purpose of the campaign is to better understand the physical, chemical, and optical properties of aerosols. Not well understood, aerosols are being studied to better understand their part in the global climate system. The wiki site helped facilitate a more thorough study.

METHODS & MATERIALS

Collaboration with the ARM External Data Center at Brookhaven and Pacific Northwest National Laboratory led to the site's development. Each person involved in the IOP was given password access to view and edit the pages. The site was formatted using language specific to TWiki, the host platform, much of which is similar to or the same as HTML. New instrument status (Figure 2) and quick-look (Figure 4) pages were created for each day of the IOP. Scientists were able to update the status of their instruments, and each page was made to reflect the status of the previous day, eliminating the need for daily updates if there was no change. Images of quick-look plots were added to a directory to automatically show up on any page with the correct coding. Along with a page for each day of quick looks, instrument information pages also included all the quick looks derived from that instrument. Figure 3 is an example of an instrument information page.

Figure 3: Instrument information page for the Cmel Sunphotometer.

DISCUSSION & CONCLUSION

While completion of this aerosol field campaign would certainly have been possible without the wiki site, it proved to be a useful tool in advancing the IOP to gaining a comprehensive understanding of the local atmosphere and its changes in near real time. Rather than waiting until the completion of data collection, scientists could already know how their results were comparing to those of their colleagues. A more detailed data comparison is shown in Figure 5. The site also served as a focal point for learning more about the vast array of instruments participating, from sunphotometers to mass spectrometers to nephelometers. This site will hopefully help serve as a basis for future similar endeavors.

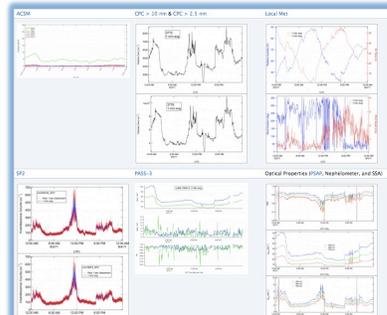


Figure 4: Part of the quick look page for August 3, 2011. This view allows for a scientist to see the raw data from multiple instruments at once. This makes it easier to understand and interpret the events of the day.

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