



Office of the Federal Coordinator for Meteorological Services and Supporting Research

2017 Special Session, 21st Annual George Mason University (GMU) Atmospheric Transport and Dispersion (ATD) Conference

This document provides a summary of the OFCM-sponsored special session within the 21st Annual Atmospheric Transport and Dispersion Conference at George Mason University (GMU). The session was chaired and moderated by Mr. Jeff McQueen of National Weather Service (NWS)/Environment Modeling Center, College Park, Maryland, with assistance from Mr. Jud Stailey of OFCM. The conference was held on the GMU campus in Fairfax, VA, and the session was conducted on Tuesday June 13, 2017.

OVERVIEW

The OFCM supports the annual GMU ATD conference and has sponsored a special session since 2003 to inform attendees on the status and plans of the Federal government's atmospheric transport and dispersion experimental, observational, and modeling efforts.

In recent years the OFCM session has focused on particular issues. This year the agencies provided an update on important activities without regard for a particular emphasis, which resulted in a broad and rather eclectic agenda. However, the session was well-attended, and the presentations were well received. Representatives of the Department of Commerce/National Oceanic and Atmospheric Administration (NOAA); the Department of Defense, including the Army Research Laboratory and the Navy Research Laboratory; the Department of Energy's Brookhaven Laboratory; and NASA. Attendees represented academia, industry, the emergency management community, and federal, state, and local governments.

SYNOPSIS OF PRESENTATIONS

The session consisted of nine presentations which followed opening remarks by the Federal Coordinator for Meteorology and the session chair. Questions were taken after each presentation. Slides from session presentations are available on the [OFCM Web site](#).

1. Opening Remarks:

Dr. Bill Schulz, Federal Coordinator for Meteorology, welcomed the participants and introduced the session. He noted that without a theme this year, the presentations would be covering a wide variety of topics, from updates on field instrumentation and modeling to the potential use of standard cloud observing equipment for boundary PBL depth observations, to several other topics. He closed by thanking a number of people for their help in making this session happen, including the session chair Jeff, McQueen, whom he introduced. Mr. McQueen, Research Meteorologist at National Weather Service's National Centers for Environmental Prediction, welcomed the participants and [reviewed the agenda](#).

2. Presentations:

- **Dr. Chatt Williamson**, Army Research Laboratory, provided an overview of the lab, then updated progress on the new sensor array at White Sands Missile Range. He had introduced the project at this session last year, and was pleased to inform the community that the first phase of the project is complete, and about half the instrumentation for the second phase has

been installed. A third phase is being planned. He went on to describe field campaigns in which the Lab has been involved, including a dust transport study and participation in the international field experiment at Perdigo, Portugal. Dr. Williamson closed with an invitation to the community to consider the White Sands instrumented range for future field campaigns.

- **Dr. Mike [Hicks](#)**, National Weather Service Office of Observations, Evaluation Branch, briefed on a project investigating the use of the current operational ceilometer to characterize the boundary layer. He started by describing the system, its deployment across the country, and the location of the handful of instruments being used in the project. The results of the study (some of which were presented) led to recommendations to start providing data to NCEI when communication capabilities are improved with a planned upgrade to the operational observing system. These data would be available for studies and post analysis, but there is no plan at this point to make the data available in real time.
- **Dr. Ruben [Delgado](#)**, NASA Joint Center for Earth Systems Technology and University of Maryland Baltimore County, built on Dr. Hicks' briefing, presenting the results of a study comparing the performance of a number of commercial ceilometers (including the one used in the NWS study) with other sources of mixing layer height data. Performance of the systems varied. The ceilometers generally show the mixing layer height within 100 meters of the height determined by sondes, but algorithms are not yet mature, so an experienced analyst is still needed to properly interpret the data.
- **Dr. Andy [Vogelmann](#)**, Brookhaven National Laboratory, spoke about large eddy simulations (LES) using data from DOE's Atmospheric Radiation Measurement (ARM) Climate Research Facility. He briefly described the ARM Southern Great Plains instrumented site in northern Oklahoma/southern Kansas, then addressed the LASSO (LES ARM Symbiotic Simulation and Observation) project, its objectives, and potential data users. He illustrated the LASSO workflow and how it supports research. He closed by showing how data access has been facilitated, described the current and planned data releases, and provided contact information through which more details on the data and how to acquire it is available.
- **Dr. Daniel [Tong](#)**, NOAA Air Resources Laboratory, covered a variety of topics related to dust while discussing the potential for another "Dust Bowl" to occur. After reviewing the history of the Dust Bowl, he discussed monitoring dust from ground-based sensors and satellite imagery, and then showed where dust storms are most likely to occur. Data show a significant increase in the incidence of large dust storms in recent years, which has led to the concern about another dust bowl, and that they tend to occur in the spring. Analysis indicated a statistical relationship between the Pacific Decadal Oscillation and the incidence of dust storms, and Dr. Tong proposed a physical explanation for that relationship. He then presented a model for dust emission and closed with comments on NOAA's dust forecasting.
- **Dr. Fantine [Ngan](#)**, also from NOAA's Air Resources Laboratory, spoke about a long term archive of WRF dispersion simulations and its application to tracer experiments. There exists today an archive called DATEM (Data Archive of Tracer Experiments and Meteorology), which includes nine tracer experiments and two meteorological datasets. It was developed for HYSPLIT development and verification and consists of standard software and uniformly formatted emissions, tracer, meteorological, and statistical data. The objective of this effort was to generate a WRF configuration for dispersion application based on tracer experiments. This would provide an archive of WRF data for HYSPLIT modeling. Four tracer experiments were used and results of the analysis were presented. The new dataset, which provided hourly data for HYSPLIT covering 1980 to 2016, will be available on line. Future work will include using the dataset to generate dispersion ensembles with variations in meteorological inputs.

- **Mr. Chris [Wamsley](#)**, National Weather Service Decision Support Services National Program Manager, spoke on the operational use of HYSPLIT. After a brief introduction to HYSPLIT, he explained that all of the 122 NWS offices practice using HYSPLIT, averaging about 30 exercises per year at each office. Practice is important to minimize response time, which is expected to be within 10 minutes from notification of emergency responders to provision of HYSPLIT results. Mr. Wamsley explained how HYSPLIT fits into Interagency Modeling and Atmospheric Assessment Center (IMACC) activities, then wrapped up his presentation with several examples of the application of HYSPLIT to actual events or to planning for potential events in high-impact situations.
- **Dr. Juli [Rubin](#)**, Navy Research Laboratory (NRL), spoke about the use of ensembles in Navy aerosol forecasting. She began by explaining why aerosol forecasting is important to naval operations, how is being done deterministically, and why these types of forecasts can be problematic by not acknowledging and scoping the uncertainty in the results. NRL is involved in two thrusts—single and multi-model ensembles. In the multi-model approach, NRL participates in the International Cooperative on Aerosol Prediction Multi-Model Ensemble (ICAP-MME) with seven other organizations. This system consistently outperforms the individual members. The single model ensemble is based on the Navy Aerosol Analysis Prediction System (NAAPS) which is driven by the Navy’s NAVGEM meteorological model. The system accounts for uncertainty with between 20 and 80 runs. Development efforts for this system have focused on data assimilation and making better use of observations, including situations where observational data is sparse. Efforts are also underway to address systematic errors that bias the results. Going forward, this capability is moving toward operational implementation while work continues of improve ensemble performance.

DISCUSSION

Discussion was stimulated by a review of results of a live survey conducted at this session last year. Conference participants had responded to survey questions by logging into a web site using their smart phones, and the results of the survey were projected in real time as the responses were entered. The questions and responses can be viewed [here](#). The process of polling consumed much of last year’s available discussion time, so session planners thought it would be interesting to review the results with this year’s participants. Mr. Stailey (OFCM) stepped through the results, explaining how the questions were stated and the options for answering were constrained. This review led to a discussion of how the community could better work together to improve ATD modeling. The participants acknowledged a variety of areas for cooperation, many of which are being facilitated informally by such activities as this annual conference. Sharing data from field experiments was identified as one of the more approachable opportunities. Dr. Vogelmann’s brief on the ARM data highlighted a good example, and Dr. Chang commented on the [presentation he made last year](#) on trying to get data into an archive before it disappeared. Mr. Stailey discussed concepts that had been considered for meteorological data involving a virtual database where data was not moved or copied, but stored and/or made available in a standard format through a registry providing discovery and access services. Dr. Schulz explained how OFCM’s structure, which includes senior leaders from the federal agencies, could be used to encourage, organize, and track interagency initiatives related to ATD.