18th Meeting of the DMCC

Charleston, SC
May 2, 2011

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Executive Summary

The U.S. Department of Energy (DOE) Meteorological Coordinating Council (DMCC) convened a meeting at the Marriott Hotel, Charleston, S.C., on May 2, 2011. This meeting was held in conjunction with the 25th Emergency Management Issues Special Interest Group (EMI SIG) Annual Meeting. DMCC, a program created in 1994, has operated under the oversight of the EMI SIG since 2004.

This year was the 18th DMCC Meeting since its inception on December 2, 1994. About 40 people participated in one or more of the DMCC Meeting sessions, with 18 people participating in the early morning session. Attendees from the public and private sectors actively participated.

This meeting provides a forum for DMCC members and DMCC associates to review accomplishments, products, and projects; discuss the mission and implementation of its organizational goals; and resolve outstanding objectives. The following was accomplished:

1. NNSA/DOE site meteorological program managers were provided an opportunity to discuss their programs to obtain feedback from the DMCC membership on various issues they were facing.

2. NNSA/DOE site meteorological program managers made technical presentations on relevant operational and research topics to the DMCC membership to enhance their knowledge of the atmospheric sciences and assist them in their program execution.

3. The results of recent DMCC Assist Visits (AVs) were presented.

4. The status of ANSI/ANS meteorological monitoring and consequence assessment standards development was given.

5. New DMCC products were discussed, and the DMCC Assist Visit program was reviewed.

6. Discussions on the FY11 accomplishments and FY12 planning of the DMCC took place.

Additionally, early planning for the 19th DMCC Meeting, scheduled to be held in conjunction with the next EMI SIG meeting in May 2012, was briefly discussed.

Lastly, a special joint session involving the DMCC, Subcommittee on Consequence Assessment and Protective Actions (SCAPA), and Hazard Assessment Subcommittee (HASC) members was held after the adjournment of the DMCC Meeting and is included in this report. The joint session covered topics of technical interest to DOE meteorological programs.

1.0 Overview

The DOE Meteorological Coordinating Council (DMCC) convened at the Marriott Hotel, Charleston, S.C., on May 2, 2011. This was the eighteenth meeting sponsored by DMCC since its inception on December 2, 1994. DMCC Chairman, Walt Schalk, who is also the Director, National Oceanic and Atmospheric Administration (NOAA) Air Resources Laboratory Special Operations & Research Division (ARLSORD), called the meeting to order.

During this meeting, facilitated by John Merrick, leaders presented new DMCC initiatives to its membership and associates, shared the many DMCC accomplishments over the past 16 ½ years, and provided discussions on recent advancements in the atmospheric sciences to the DMCC membership.

The following activities occurred at the meeting:

1. NNSA/DOE site meteorological program managers or associates discussed their programs and obtained constructive feedback from the DMCC membership on various issues they were facing.

2. Several technical presentations on relevant operational and research topics were provided to the DMCC membership to enhance their knowledge of the atmospheric sciences and assist them in their program execution.

3. New DMCC products were discussed.

4. The DMCC Assist Visit Program was reviewed.

5. The status of ANSI/ANS meteorological monitoring and consequence assessment standards development was given.

6. The status of the 8 ANS voluntary consensus standards was reviewed.

Sixteen members attended the meeting, and two other members participated via Microsoft Live Meeting. Participants and their respective affiliations are listed in Table 1-1.

Table 1-1: DMCC Meeting Attendees

Walter Bach	Office of the Federal Coordinator for Meteorology (OFCM)
Tom Bellinger	BWXT Y-12 (Live Meeting)
Kevin Birdwell	Oak Ridge National Laboratory (ORNL)
Casey Brown	Oak Ridge Institute for Science and Education (ORISE)
John Ciolek	AlphaTRAC, Inc.
Kirk Clawson	NOAA ARLFRD
Rick Eckman	NOAA ARLFRD
Jim Fairobent	DOE/NA-41
Dave Freshwater	DOE/NA-41
Cliff Glantz	Pacific Northwest National Laboratory (PNNL)
Erik Kabela	Savannah River National Laboratory (SRNL)
Carl Mazzola	Shaw Environmental & Infrastructure (SEI)
John Merrick	Consultant DOE Savannah River Ops Office Retired
John Nasstrom	Lawrence Livermore National Laboratory (LLNL) NARAC
Jeremy Rishel	PNNL
Walt Schalk	NOAA ARLSORD
Richard Thomas	Intercet
Steve Vigeant	SEI

2.0 DMCC Business, Products, Projects and Activities

2.1 Overview of DMCC Activities

Walt Schalk, DMCC Chairman, presented an overview of the DMCC activities since its last meeting in May 2010. Walt indicated that the May 2010 Meeting, which was held in Las Vegas, NV, had 15 attendees. The activities highlighted included the site Assist Visit (AV) Program, support to others, and support to the private sector. The AV Program was introduced with details presented later by Carl Mazzola. Support to others included several articles posted to the DMCC website, the development of a draft Consequence Assessment (CA) Self-Assessment Guide, and the development of the Software Quality Assurance (SQA) process. Support to the private sector involved the continued positive relationship with the Nuclear Utility Meteorological data User Group (NUMUG), and supporting 8 American National Standards Institute/American Nuclear Society (ANSI/ANS) meteorological monitoring and dispersion modeling standards.

Walt closed his discussion stating that the goals of the DMCC are to continue these activities and look for ways to provide value-added assistance to the efforts of the Department of Energy/National Nuclear Security Administration (DOE/NNSA) site meteorological programs.

2.2 Assist Visit Program Update

Carl Mazzola provided an update of the successful DMCC AV program that was initiated in 1996. He reviewed the objectives of an AV, which are to evaluate all aspects of a DOE/NNSA site meteorological monitoring program and the meteorological aspects of the site CA program. The AV team looks at the adequacy of the program relative to fulfilling its present mission requirements as well as expected future mission requirements, and evaluates the effectiveness of the program with respect to meeting its services to site customers.

Carl overviewed many program improvements resulting from implementing recommendations from AVs. These included enhanced management awareness of meteorological program vitality to operations, Integrated Safety Management System (ISMS) and other programs, better deployment of human resources, and better integration and deployment of technical resources through additional Full Time Equivalents (FTEs) or summer intern assistance. One site received a $240,000 capital improvement to purchase sonic anemometers and Sound Detection and Ranging (SODAR) equipment, while another site purchased a higher-resolution lightning detection system, and yet another received funding to develop a state-of-the-art CA model. The AVs also resulted in improvements to existing CA models. In all cases, there was better integration of the CA-meteorological monitoring interfaces. Some sites stated that there was improvement in severe weather monitoring and reporting, improved siting of its meteorological tower arrays, and improved data acquisition and certification procedures and improved calibration procedures. Lastly, some sites improved their existing interfaces with their State agencies.

Carl indicated that 24 performance criteria in ANSI/ANS-3.11(2010) and new DOE O 458.1, which are captured in DOE/EH-0173 Chapter 4 and the DMCC Meteorological Monitoring Assessment Guide, are used for the meteorological monitoring portion of the AV and nine performance criteria in DOE G 151.1-1 Series: *Consequence Assessment* are used for the CA portion of the AV. For

each of these 33 performance criteria, it is determined whether its objective is met, partially met, or not met. These objectives address a full spectrum of program elements, and the observations and recommendations refer to one or more specific objectives.

Carl mentioned that customer satisfaction interviews are also conducted and recorded in the body of the AV report. These customers and the programs supported are as follows:

1. Environmental Compliance (NESHAP, NPDES)
2. Emergency Management (EPHA, CA)
3. Integrated Safety Management (DSA, LCO, BIO)
4. Environment Safety & Health (OSHA PSM, RMP)
5. Environmental Monitoring (ASER, DOE O 458)
6. NEPA (EA, EIS, PEIS)
7. Operations
8. NNSA/DOE oversight and State agency interfaces (UDAC)

After the information is gathered, the AV team rolls it up into several noteworthy practices, various observations and recommendations, and determines the quantity of meteorological monitoring objectives and CA objectives that were met, partially met, or not met with a cross-reference to the specific observation/recommendation that applies to that performance objective.

Carl stressed that theses AVs are governed by a no-fault posture, and addressing any program improvements is at the total discretion of site management and its budget constraints and program priorities. DMCC makes itself available for advice, upon request, after each AV and recommends a follow-up AV every three to four years, also upon request. Very importantly, there is full confidentiality of the results. The AV team usually is comprised of a program specialist, a team leader for the meteorological monitoring portion, and a team leader for the CA portion.

Carl closed the presentation by identifying where the most likely future AVs will be conducted and why these sites were selected.

2.3 DMCC Web Page Update

Cliff Glantz discussed some of the recent updates to the DMCC web page on the EMI SIG website. Additional improvements in the design of the website allow for better navigation.

Cliff discussed a path-forward vision, which includes fixing any detected technical and editorial problems plus additional improvements to navigation menu design. He encouraged DMCC members to review the current web page content and submit comments and suggestions.

2.4 NUMUG Interactions

Walt Schalk reviewed the recent interactions of DMCC with its private sector sister organization. The meteorological monitoring system survey project, undertaken by both DMCC and NUMUG over the past several years, is complete, and a report is available. John Ciolek and Ken Wastrack will present the results at the June 2011 NUMUG Meeting. Although previous efforts occurred in 1992, 1997, and 2009, this survey includes the most DOE sites and is a useful overview of the stations and mesonets at DOE and nuclear power plant sites.

The report and its associated spreadsheets provide measured parameters, instrument vendors, site locations, site contact information, maintenance and calibration information, quality assurance, data usage and problems encountered during operations.

2.5 Status of ANS Meteorological Monitoring and Dispersion Modeling Standards

Carl Mazzola presented an overview of the ANSI/ANS national voluntary consensus standards (VCSs) that are supported by DMCC members. The primary legislative drivers are the 1995 National Technology Transfer and Advancement Act and Office of Management and Budget Circular A-119, which encourage the development of national standards that can be used by Federal agencies. The Nuclear Regulatory Commission's Management Directive 6.5 implements this within its regulatory body. Moreover, the DOE Technical Standards Project Office encourages the use of these standards. ANS is an ANSI-accredited Standards Development Organization with an ANS Standards Administrator and a Standards Board with the following consensus committees and its scope:

1. Nuclear Facilities Standards Committee: Siting, design, and operation of nuclear facilities (other than N17), including radioactive waste management, site remediation and restoration

2. N16: Nuclear criticality safety

3. N17: Research reactors, reactor physics, radiation shielding and computational methods

4. RISC: Criteria and methods for risk assessment and risk management as applied to design and operation of nuclear facilities, including radioactive waste management, site remediation and restoration

Carl discussed the NFSC subcommittees that include: (1) ANS-21: Maintenance, Operations, Testing & Training; (2) ANS-22: Systems Design Criteria; (3) ANS-24: Modeling & Analysis; (4) ANS-25: Siting and Environmental; (5) ANS-26: Emergency Preparedness; (6) ANS-27: Fuel Cycle, Waste Management & Decommissioning; (7) ANS-28: HTGR Design Criteria; and, (8) ANS-29: Advanced Initiatives (Gen IIIA/IV, GNEP).

By definition, a standard is a document to set forth requirements for design, manufacture, or operation of a piece of equipment, which can also address computer firmware and software. It is also a document to address necessary physical and functional features of equipment, and its safe application, or some combination of these. A standard has a specific structure that includes a foreword to explain why the standard was created in the manner it is presented, a one or two

paragraph scoping statement, definitions specifically applicable to understanding the standard, requirements in a format suitable to the subject matter, references, and one or more appendices to provide examples of application of standard or offer other non-mandatory explanations.

Carl then presented the purposes, working groups, and the status of the following standards in which the DMCC is involved:

- ANSI/ANS-2.3-2011: Standard for Estimating Tornado, Hurricane and Extreme Straight-Line Wind Characteristics at Nuclear Facility Sites (Approved on April 22, 2011)
- ANS-2.15: Criteria for Modeling & Calculating Atmospheric Transport of Routine Releases from Nuclear Facilities (WG draft in consensus review)
- ANS-2.16: Criteria for Modeling & Calculating Atmospheric Transport of Accident Releases from Nuclear Facilities (WG is preparing draft)
- ANS-2.21: Criteria for Assessing Atmospheric Effects on the Ultimate Heat Sink (WG draft in consensus review)
- ANS-2.31: Standard for Estimating Extreme Precipitation at Nuclear Facility Sites (still populating WG)
- ANSI/ANS-3.8.7(1995W): Criteria for Planning, Development, Conduct, and Evaluation of Drills and Exercises for Emergency Preparedness at Nuclear Facilities (WG is preparing draft)
- ANS-3.8.10:Criteria for Modeling Real-time Accidental Release Consequences at Nuclear Facilities (WG will begin work after ANS-2.16 reaches ANS-25 consensus review)
- ANSI/ANS-3.11(2010): Determining Meteorological Information at Nuclear Facilities (recently reaffirmed; new WG forming for future revision)
- ANS-58.25: American National Standard Radiological Accident Offsite Consequence Analysis (Level 3 PRA) to Support Nuclear Installation Applications (WG draft in RISC consensus review)

2.6 Status of ANS-2.15 Dispersion Modeling Standard

John Ciolek, Chairman of the Working Group, reported on the progress of ANS-2.15. He discussed the background events that led to a decision in 2004 to produce the following three voluntary consensus standards for atmospheric modeling:

1. ANS-2.15 Routine releases of radiological material from nuclear facilities
2. ANS-2.16 Design basis accidental releases
3. ANS-3.8.10 Real-time accidental releases

The Working Group decided to develop ANS-2.15 first and then build off of the previous work since there are commonalities in all three standards.

John discussed the process for developing a standard, which includes the formation of a working group and the development of a Project Initiation Notification System that defines the scope and intention of the standard and its stakeholders. The Working Group then develops the draft standard, which receives Subcommittee technical content approval before the consensus committee and public review. Once comments are resolved, the draft standard receives a compliance review from ANSI and approval as an American National Standard.

Subjects that the Working Group considered in ANS-2.15 include model types, frames of reference, time scales, release modes, sources, ground-level and elevated releases, mixed-mode releases, plume rise, aerodynamic effects of buildings, removal mechanisms, radioactive decay, wet and dry deposition, geospatial data, meteorological data, meteorological networks, quality assurance, and recirculation.

A special Working Group Subgroup investigated the influence of complex flow systems including recirculation. The Subgroup did not identify any studies that specifically address this issue, but did find multiple studies showing the magnitude of consequence increases, and the frequency of occurrence. The Subgroup made a unanimous recommendation to eliminate the recirculation factor from the standard and instead explicitly treat complex flow if that might have significant effect on results. This decision led to the addition of "modeling process" as a first section of ANS-2.15 that explicitly treats requirements of complex modeling processes that require variable-trajectory modeling under some circumstances.

Specifically, the draft standard states that variable-trajectory models shall be used if you have (1) a requirement to use them or (2) straight-line Gaussian modeling results are > 10% of regulatory limits and complex flow occur > 15% of the year. The potential for complex flow can be determined by documented flow features (this may require the expertise of a qualified meteorologist). The last change addressed large bodies of water (> 500 km^2) and the airflow trajectories associated with land-water interfaces.

3.0 Topics of General Interest and Emergency Management and Response

3.1 Weather Ready Certification

Erik Kabela and Tom Bellinger each shared the Weather Ready certifications received at SRS and Y-12, respectively.

Erik discussed the SRS Weather Ready certification. He began his discussion by defining the Storm Ready program as a nationwide community preparedness program that uses a grassroots approach to help communities develop plans to handle all types of severe weather. This program encourages participants to take a proactive approach to improving local hazardous weather operations.

Both Erik and Tom recanted the steps that each took at their respective sites to becoming Storm Ready-certified within their community. To be officially Storm Ready, a community must: (1) Establish a 24-hour warning point and emergency operations center; (2) have more than one way to receive severe weather warnings and forecasts and to alert the public; (3) create a system that monitors weather conditions locally; (4) promote the importance of public readiness through community seminars; and, (5) develop a formal hazardous weather plan, which includes training severe-weather spotters and hold emergency exercises.

Erik indicated that SRS applied for the Storm Ready program in July 2008 and received its Storm Ready status in October 2008. SRS became the 8th government site and 3rd DOE site to attain such status, with Idaho National Laboratory and BWXT Pantex the first two sites to achieve this. This status lasts only three years, so SRS is up for renewal in 2011.

Erik described the SRS meteorological monitoring program which consists of nine site towers, three offsite towers, two NWS feeds, and one Tall Tower that is about 10 miles offsite. SRNL provides severe weather notifications to many onsite customers and conducts hurricane drills. The SRS is over 300 square miles in area, and with American Reinvestment and Recovery Act (ARRA) work, SRS averages more than 4,000 remote workers per month. A remote worker who cannot hear the Public Address (PA) system needs another form of communication (e.g., radio). In order to protect remote workers from severe weather there is a need for a quick and effective dissemination of NWS watches and warnings including lightning advisories. The average notification time via pager to remote workers was five to ten minutes after receipt from NWS. To solve this time problem, SRNL implemented an automated method for dissemination of advisories that reduces lead time for notification by five to ten minutes, which allows workers to seek shelter sooner.

SRNL is also working with NWS-CAE to obtain Universal Geographic Code (UGC) for SRS-proper because SRS is located in three separate counties, and the NWS works on the county level. In the short term, NWS-CAE has added "Savannah River Site" to the list of communities that may be impacted by weather events.

Erik closed his discussion with a briefing on a recently conducted hurricane preparedness drill with fictional Hurricane "Pedro." In this exercise, Pedro hits Savannah, Georgia and moves up the Savannah River to impact SRS. This is an unlikely and conservative hurricane pathway.

Tom Bellinger discussed the Y-12 Weather Ready certification from Oak Ridge, Tennessee, through the Live Meeting hook-up.

3.2 Update on the Spatial Climatology of the Wind Environment in the Great Valley of Eastern Tennessee

Kevin Birdwell presented his Ph.D research to define the mesoscale flows in the valley-ridge morphology to characterize the Central Great Valley of Eastern Tennessee where Y-12 and ORNL are located.

Kevin's approach for characterizing the local wind flows first involved the development of wind regime analyses for Eastern Tennessee. He assessed cluster analysis performance, identified statistically significant wind classes, and determined the importance and roles of physical wind mechanisms with respect to wind class and terrain features. These physical wind mechanisms include forced channeling, vertically coupled flow, pressure-driven channeling, thermally-driven winds, and down sloping.

After the physical mechanisms were identified, Kevin developed wind flow prediction guidelines in association with mesoscale and synoptic weather patterns, ambient meteorological variables, major wind shifts, wind reversals, and wind class succession.

The study includes 16 monthly and seasonally balanced data sets; representing 11,712 hours of surface, multi-level, and upper air data.

Kevin closed by identifying future projects that could further characterize the wind fields in the Oak Ridge, Tennessee, area. These include a comparison of wind classes to worst-case meteorology, a routine analysis of wind fields for wind prediction, characterization of other wind environments, weather model refinement, and environmental characterization for wind power generation.

4.0 Round Robin: Best Practices and Lessons Learned from DOE/NNSA Sites

4.1 Savannah River National Laboratory

Erik Kabela reported on various SRNL projects and expounded more on the Weather Ready certification. Erik indicated that SRNL has posted a mesoscale modeler position to replace the retiring Lance Osteen. He also shared the use of the RAMS code coupled with local WRF.

Carl Mazzola indicated that in his position with MOX Services, he works with SRNL to get severe weather information to the construction project; a 15-meter meteorological tower was specified nearby the MOX Fuel Fabrication Facility (MFFF). Installation of the tower will begin in 2012.

4.2 Idaho National Laboratory

Rick Eckman and Kirk Clawson discussed National Oceanic and Atmospheric Administration (NOAA)/INL meteorological research and its major activities and accomplishments over the past year.

Kirk mentioned that ARLFRD is transitioning from the 30-year-old MDIFF to using HYSPLIT to support consequence assessment in the INL EOC. They are leveraging the small INL group with the NOAA-ARL expertise. They enabled a forecast mode in INL HYSPLIT with WRF at 4-km grid spacing. They recently worked with ARL HQ and made some HYSPLIT runs to support the consequence assessment of the Fukushima nuclear plants, which compared well with aircraft observations of the Aerial Monitoring System.

Kirk also complimented DMCC for its 2010 follow-up Assist Visit and is preparing a letter of response.

Rick stated that since this area of southeastern Idaho has one of the highest wind energy potentials, it is now a wind energy test bed. ARLFRD is involved in a localized wind energy characterization project and is working with Energy Efficiency and Renewable Energy on a project that is predicting the reliable production of wind energy.

Rick also mentioned that ARLFRD does its SQA in house since NOAA does not have a formal SQA process. ARLFRD has developed its own SQA documentation.

4.3 Nevada National Security Site

Walt Schalk reported on the operational support that ARL SORD provides the Nevada National Security Site (NNSS). Due to NNSA/Nevada Site Office funding reductions and a lack of local support, ARL SORD ceased routine upper-air operations at KDRA on October 1, 2010. As a result, ARLSORD is purchasing a sodar to obtain needed upper air data. However, ARLSORD will retain their mobile balloon launched radiosonde capability to support forecasting and experimental support needs for the NNSS.

Walt mentioned that obsolete Vaisala data loggers will be upgraded with new Campbell data loggers (CSI) in the next year.

Walt indicated that his staff is reduced with the retirement of Don Bullardm and it will focus on emergency preparedness and emergency response support. Two of the meteorological technicians are being trained for the third and an extra fourth ERO position.

Walt elaborated on the NNSS lightning detection and warning system that supports its explosives work. The system had five sensors that needed upgrading and four new sensors replaced the old sensors.

ARLSORD has two partnerships with other ARL organizations. It is partnering with ARLFRD to overhaul its QA program and on various modeling research assignments.

Walt mentioned that ARL SORD is also doing more field and experimental work with some of the NNSS organizations and special projects.

4.4 Oak Ridge National Laboratory

Kevin Birdwell discussed some of the issues associated with his support to the ORNL meteorological program.

Kevin indicated that on April 27, 2011, a tornado warning response was supported by the meteorological program for the series of tornadoes that killed more than 330 people in the southeast.

Kevin is still having problems with ORNL hiring back-up personnel to support his program. No second position has been filled yet, although summer interns help.

Kevin discussed the effects of the April 16, 2011, cyber attack at ORNL in which he had to rebuild 200 Windows servers although the Linux systems were not affected. There was an adverse effect on the meteorological data, which Kevin will discuss in more detail at the August 2011 topical meeting. Emergency operations may need to be on a special network.

ORNL entered into a Memorandum of Understanding (MOU) with NOAA ATDD for use of the Chestnut Ridge tower to expand the scope of the ORNL meteorological network.

ORNL is upgrading its wind monitors and meteorological data collection hardware and software.

A Pennsylvania utility excessed a SODAR which will be installed at ORNL.

The CAPARS system underwent several new upgrades, and Kevin is looking into using the wind study to modify the CAPARS algorithms.

Lastly, Kevin discussed the contents of the ORNL meteorological web page.

4.5 Y-12

Tom Bellinger discussed some issues associated with his support to the Y-12 meteorological program.

Tom trained the PSS to become proficient with the development and implementation of storm warnings. During the recent tornado outbreak of April 27, 2011, the PSS issued three separate take-cover protective actions.

Tom added that all of the meteorological sensors are operating effectively. He will present a paper at the NUMUG Meeting.

4.6 Hanford

Cliff Glantz, on behalf of the Hanford program, discussed the progress of the meteorological program in addressing the September 2008 observations and recommendations. The AV report was used by Hanford's Mission Support Alliance (MSA) to provide information on the status of the meteorological program and its equipment prior to the May 8, 2011, transition of the program. All of the meteorological staff follow the program from PNNL to MSA. However, the long-term instrument technician remains with PNNL, and his expertise will be lost to the meteorological program. Paul Fransioli is advising MSA on meteorological program transition issues.

Cliff recommended that there should be a follow-up AV soon. Carl Mazzola will contact Dana Ward or Ken Burk.

4.7 Other Sites

An opportunity for other sites to report was provided, but none of the meteorological program managers for sites active in the DMCC program (i.e., BNL, LANL, LLNL, Pantex, SNL, WIPP) was available for discussion.

Walt Schalk mentioned that LLNL and WIPP have new meteorologists, but neither has engaged with the DMCC yet.

5.0 Wrap-up

5.1 New Business and Future DMCC Direction

Walt Schalk facilitated a roundtable discussion on future initiatives. He indicated that DOE O 458.1 was recently issued putting all meteorological programs under the responsibility of DOE/HS-22.

Carl and Walt are to present the AV program to HS-20, tentatively scheduled for July 2011.

5.2 Relationship between Eastern Equatorial Pacific Ocean Sea Surface Temperatures and Precipitation at NTS

Kip Smith presented his research on the relationship between Eastern Equatorial Pacific Ocean sea surface temperatures (SSTs) and how that affects the precipitation on the NTS throughout the year. He showed typical Continental United States (CONUS) temperature, precipitation and jet stream patterns during El Niño winters and presented a table that shows the location, elevation, and average monthly precipitation for the 12 stations used in this study with the NTS precipitation index calculated from its 12 stations from October 1964 – March 2010.

Kip presented a SST data map showing the El Niño regions and discussed the recent evolution, current status and predictions of the El Nino Southern Oscillation (ENSO) cycle. He then presented several graphical representations of his analysis and subsequent results. The most recent El Niño began in May 2009. Anomalously warm SSTs in the eastern equatorial Pacific (i.e., El Niño) usually are associated with abnormally wet weather from late fall through the following spring on the NTS. In contrast, anomalously cool SSTs (i.e., La Niña) usually are associated with abnormally dry weather from late fall through the following spring on the NTS.

Kip shared the results of this study, which show that the probabilities for above normal precipitation on the NTS from late-fall 2009 through spring-2010 were higher than those estimated from the corresponding Climate Prediction Center (CPC) outlooks, and that a wet winter was predicted for the NTS.

6.0 Joint Session of SMCC/SCAPA/HASC

6.1 INL HYSPLIT

Rick Eckman presented a status briefing on the HYSPLIT code that INL is developing for emergency response to replace the 30-year-old MDIFF code.

Rick discussed the MDIFF Modeling System, the rationale for NOAA HYSPLIT model adoption, and the requirements and drivers for the new INL HYSPLIT system. The talk then focused on the current modeling applications of HYSPLIT, the HYSPLIT model evaluation, HYSPLIT training, popularity, and its relevancy, and finally the adaptation of HYSPLIT for use at the INL.

Rick briefly discussed the attributes of the older MDIFF model, which is an in-house system—largely unchanged since the 1990s. This code is DOS/Windows 3.1-based, a puff model with a two-dimensional wind field. The main reasons this code is being replaced by HYSPLIT is that there is no effective outside support for MDIFF and resources are insufficient to continue operating this model in isolation. Moreover, it lacks important features such as deposition, dose computations, and forecast capability.

Rick moved on to discuss the NOAA HYbrid, Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model, first developed in the 1980s, and continuously updated. This code is widely used within and outside NOAA for assessment of emergency response, radiological plumes, chemical plumes, volcanic ash, air quality, wildfire smoke, dust, dioxin, and mercury impact assessment.

Rick stated that HYSPLIT uses NOAA forecast models; is a three-dimensional wind field model; and includes deposition, decay, doses, and multiple radionuclides.

Rick provided additional detail on HYSPLIT. HYSPLIT follows particle motion; is run off-line (which makes it easy to re-run); requires meteorological fields; and provides particle or puff solutions on UNIX, PC, Mac, Web architectures.

Rick briefly discussed future directions for the INL HYSPLIT code. This includes in-line and multi-CPU architectures and shared memory optimization.

Rick reviewed some of the requirements for new INL HYSPLIT System. It must retain the popular features from MDIFF system, have the appropriate client/server configuration, be able to run pre-configured INL release scenarios, and execute rapidly.

INL HYSPLIT has a high-quality background map with terrain, cities, and other important features and provides the user with an easy manipulation of output plots. HYSPLIT provides "now-casts" or forecasts, addresses multiple radionuclides with dose computations, and provides meaningful contours for emergency managers. In deference to INL desires, HYSPLIT uses existing NOAA modeling capability when possible.

Rick then reviewed the national drivers associated with NOAA HYSPLIT, which includes the National Response Framework (NRF) that has been approved by the President.

An interesting aspect of this modeling effort is the collaboration with NOAA to include the ALOHA source model, which provides a link to the CAMEO chemicals data.

Rick reviewed the HYSPLIT model annual training which involves three-day training workshops; 14 have been held since 2004.

HYSPLIT is a popular and relevant code used to perform consequence assessments on the Deep Water Horizon oil spill, the Iceland volcano, and the Japanese Fukushima Dai-ichi nuclear reactors.

Rick outlined future work that ARLFRD hopes to accomplish. It would like to add new INL-specific features, address radiological releases from arbitrary location (e.g., transportation event), improve its execution speed, use the emerging technology of Graphics Processing Units (GPUs), employ multi-core processing, improve the mesonet pre-processor with an improved diagnostic model, develop a scenario management program, and integrate with other NOAA dispersion codes (e.g., ALOHA).

6.2 LANL CAPARS

John Ciolek discussed the new CAPARS code that is being installed at Los Alamos National Laboratory (LANL).

John reviewed the CAPARS requirements, which are to automate as much as possible, reduce input error, provide decision-critical information, and eliminate the tendency to play. Other desirable attributes are to address client-specific requirements, ensure timeliness for emergency response requirements, rapid simulation completion, contingency modeling, redundancy, and the ability to rapidly incorporate new meteorological data sources.

John reviewed the CAPARS basics. CAPARS was developed for real-time analyses and is a localized modeling system which is customized for individual sites. It is a diagnostic code which can use prognostic model output. It has automated meteorological data collection and time-varying 3D meteorological fields. CAPARS simulates the emission of ellipsoidal puffs and tracks their dispersion using similarity theory, plume characteristics, wet and dry deposition, plume rise, and radiological in-growth and decay. Impacts are presented using nested receptors, time-varying dose, concentration, and deposition.

John then presented some CAPARS wind field images at LANL, which he characterized as a domain that poses interesting challenges. These include very complex terrain, steep canyons and finger mesas, a location on an extinct-volcano caldera, and drainage into the Rio Grande rift valley.

In each nested domain, the following data sets are presented: (1) terrain elevation; (2) land use/land cover; (3) terrain variability; (4) GIS map features; (5) meteorological data from 25 to 50 surface stations; (6) met data from 5 LANL towers; (7) input from the LANL SODAR; and, (8) 13 MAPS profiles. Although this data set is comprehensive and rather large, LANL is still investigating the availability of additional data sources.

One unique feature is the use of embedded meteorological data profiles since the terrain is so rugged and complex. This technique determines regional meteorological fields and extracts profiles along the middle-domain lateral boundaries, while inserting profiles into middle-domain meteorology input data set. Thus it is built on middle-domain meteorological fields, which is then repeated for the inner-domain.

John showed CAPARS outputs of a canyon flow with a reversal and a detailed view of the canyon.

6.3 Turbulence and Concentration Averaging Times in Plume Models

John Nasstrom discussed the effect of averaging times on plume concentrations using Gaussian models and the sensitivity of the results to the selected averaging time.

7.0 Acronyms

A

ALOHA	Areal Locations of Hazardous Atmospheres
AMS	American Meteorological Society
ANS	American Nuclear Society
ANSI	American National Standards Institute
ARL	Air Resources Laboratory
ARRA	American Reinvestment and Recovery Act
ATDD	Atmospheric Transport and Diffusion Division
AV	Assist Visit

B

BIO	Basis for Interim Operations
BNL	Brookhaven National Laboratory
BWXT	Y-12 M & O Contractor

C

CA	Consequence Assessment
CAE	Columbia weather station
CAMEO	Computer-Aided Management of Emergency Operations

D

D	Dimension
DMCC	DOE Meteorological Coordinating Council
DOC	Department of Commerce
DoD	Department of Defense
DOE	Department of Energy
Dos	Disk Operating System
DSA	Documented Safety Analysis

E

EA	Environmental Assessment
EERE	Energy Efficiency and Renewable Energy
EIS	Environmental Impact Statement
EMI SIG	Emergency Management Issues Special Interest Group
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
EPHA	Emergency Preparedness Hazard Assessment
ERO	Emergency Response Organization
ES & H	Environment Safety & Health

F

FRD	Field Research Division
FTE	Full-Time Equivalent
FY	Fiscal Year

G

G	Guide
GIS	Geographic Information System
GPU	Graphics Processing Unit

H

HASC	Hazards Assessment Subcommittee
HS	Health, Safety & Security
HYSPLIT	An atmospheric transport and dispersion model

I

ID	Idaho
INL	Idaho National Laboratory
ISMS	Integrated Safety Management System

J - K

km	kilometer

L

LANL	Los Alamos National Laboratory
LCO	Limiting Condition for Operation
LLNL	Lawrence Livermore National Laboratory

M

MAPS	Mesoscale Analysis and Predictive System
MDIFF	Atmospheric dispersion code
MFFF	MOX Fuel Fabrication Facility
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MOX	Mixed Oxide
MSA	Mission Support Alliance

N

NA-41	Office of Nuclear Non-Proliferation
NARAC	National Atmospheric Release Advisory Center
NEPA	National Environmental Policy Act
NESHAPS	National Environmental Standards for Hazardous Air Pollutants
NFSC	Nuclear Facilities Standards Committee
NIWC	NOAA/INL Weather Center

NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission
NRF	National Response Framework
NTTAA	National Technology Transfer and Advancement Act
NUMUG	Nuclear Utility Meteorological data User Group
NWS	National Weather Service

O

O	Order
OMB	Office of Management and Budget
ORISE	Oak Ridge Institute for Science and Education
OSHA	Occupational Safety and Health Association

P

PA	Public Address
PC	Personal Computer
PEIS	Programmatic Environmental Impact Statement
PINS	Project Initiation and Notification System
PNNL	Pacific Northwest National Laboratory
PSM	Process Safety Management
PSS	Plant Security Supervisor

Q

QA	Quality Assurance

R

R & D	Research & Development
RISC	ANS Standards Consensus Committee
RMP	Risk Management Plan

S

SC	Office of Science
SCAPA	Subcommittee on Consequence Assessment and Protective Actions
Sdo	Standards Development Organization
SEI	Shaw Environmental & Infrastructure
SNL	Sandia National Laboratory
SODAR	Sonic Detection and Ranging
SORD	Special Operations & Research Division
SQA	Software Quality Assurance
SRNL	Savannah River National Laboratory
SRS	Savannah River Site

T

TSPO	Technical Standards Project Office

U

UDAC	Unified Dose Assessment Center
UGC	Universal Geographic Code
UHS	Ultimate Heat Sink
USFS	United States Forest Service

V

V & V	Verification & Validation
VCS	Voluntary Consensus Standard

W

WG	Working Group
WIPP	Waste Isolation Pilot Plant

X – Y - Z