

NW-AIRQUEST Annual Meeting

October 25, 2007 Seattle, Washington

Many of the presentations listed below in **bold** are available on the NW-AIRQUEST Web page at the following URL: <http://lar.wsu.edu/nw-airquest/docs.html>. Those that have not submitted their presentations for posting on the Web page, please ensure they make it to Joe and Jen at WSU. Thanks.

MODELING:

Evaluating 12-km AIRPACT3 performance for O₃, PM_{2.5}, and deposition for the years 2003-2005 -- Bob Kotchenruther

AQI forecast performance - uses forecast meteorology from MM5 to drive CMAQ runs.

-- Compared three most-recent versions of AIRPACT model

- Ozone:

-- O₃ was over-predicted <30 ppb and under-predicted >75ppb

-- Newest version of AIRQUEST is the worst of the three versions at low O₃ concentrations

- PM_{2.5}:

-- An initial look at PM_{2.5} in bulk rather than with speciation was done using FRMs and the most recent version of AIRPACT

-- Generally, AIRPACT under-predicts PM_{2.5} with more over-prediction in urban areas (with wildfires excluded).

-- Emissions inventories and speciation believed to play a part in Utah and Montana areas being low or under-predicted.

- Deposition:

-- Nitrogen - Model is improved 2006 to 2007 in wet deposition.

-- Ammonium - Model is equal in versions with little or no improvement.

-- Sulfate - Model is improved in wet deposition, but still over-predicting.

Question: Should we ask the Air Directors about O₃ monitor coverage in the region and if it is acceptable for the new O₃ NAAQS that is coming?

Impact of high resolution modeling on O₃ predictions in the Cascadia region -- Ying Xie and Brian Lamb

Use of a 4-km emissions inventory and 1-km meteorology data in models, then 1-km data of each type in later model runs to determine impacts.

-- Resolution doesn't effect mean bias or mean gross error.

-- Better pictures with better resolution, but the 4-km resolution looks fine

BlueSky in Western Canada -- Steve Sakiyama

There is need for a smoke forecasting tool in Canada. They have used CALPUFF to track smoke trajectories and CHRONOS model in the past, but have nothing operational for use in decision making.

-- A pilot was proposed to extend domain of BlueSky into BC and Alberta provinces.

-- University of BC testing 4-km grid MM5 data for all BC/Alberta complete

-- Emissions data from MODIS/AVHR satellite imagery and forest inventory info.

-- There is a huge volume of MM5 outputs and the transfer from UBC to Seattle Bluesky was a bottleneck, so a machine with BlueSky loaded on it was sent to UBC.

-- Set up and testing to begin in December – goal is to have operational system by 2008 fire season

MONITORING:

Update - recent project results and plans - Dan Jaffe

A look at global pollutant effects on U.S. air quality

- Use of rented plane for air quality measurement flights and research site at Mt. Bachelor continue to look at international transport of pollutants - mainly from China and Russia.
- Plan includes looking into mercury levels in the American Southwest and possible use of a larger aircraft that can handle more instrumentation.

A climatology database and analysis of Profiler/RASS data in Seattle - Bonnie Brown

PSCAA conducted a "clean-up" of profiler data from the Sandpoint site to get profiles and to analyze inversions and burn ban events.

- The Sandpoint Profiler is a low-mode profiler.
- "Wind folding" issues had to be dealt with using specific algorithms.
- Once wind folding was corrected, wind roses were developed, a database made, inversions were analyzed.
- The profiler's data goes back all the way to 2001 and is available on the PSCAA Web site, with more data available back to 1994 after clean-up of those years is completed.

Controlled wood smoke air monitoring experiment results -- Walter Zylowski

PSCAA tried to determine if wood smoke can be found with a UV range signature.

- Tough balance to do this with monitors and wood smoke conditions, so a yurt was used to control smoke plumes and concentrations.
- Select types of fuels were burned in a grill placed inside the yurt and surrounded by an array of monitoring instruments.

ARM demonstrations - Erik Saganic

Approved Regional Method (ARM) - ARM equals FRM equivalency.

- Demonstrated the sites ARM can be applied to, the EPA tools for this, findings for the PSCAA, and continuous devices and comparison to the NAAQS.
- Found that 1 of 14 sites is to be done this way and EPA has templates for packaging the data for each monitor (approval of site through EPA or ORD)
- Determined that states may not be able to reach ARM status.
- It was suggested that agencies work together to get ARM done for as many monitors as possible in the Northwest to save budget on running FRMs.

CLIMATE CHANGE:

Sensitivity of regional air quality to global change parameters -- Jeremy Avise and Brian Lamb

WSU looked into the effects of global climate change on the U.S. air quality.

- Used 36-km data with MOZART model
- Two 10-year time periods were analyzed - 1990 to 1999 and 2045 to 2055
- Different model elements allow multiple run scenarios.
- Indications are that Poplar farms might be problematic in the future due to isoprene emissions.

SPECIATION:

PM2.5 speciation issues -- Neil Frank

Sulfate adjusted nitrate derived water inferred carbon hybrid - SANDWICH

- Method indicates that nitrates are lower in FRM than STN measured on Teflon filters.
 - The speciation data is available on EPA Web site.
- For this type of work, more speciation monitoring is needed.

Preliminary analysis of PM2.5 speciation data in the Puget Sound -- Erik Saganic

A product of the Speciation Work Group; monitoring sites are characterized by concentration.

- A tool is available on the PSCAA Web site to play with.
- There is a lot of data available and NW-AIRQUEST is helping to move this forward.

Regional analysis of PM2.5 Speciation - Ranil Dhammapala

Looked at Region 10 (minus Alaska) data in EPA Explorer Web site.

- FRM collocated with STN -- looked for what pops out immediately when reviewing what fraction of PM2.5 is EC
- Higher levels of PM2.5 are not enhanced by EC. At higher PM2.5 concentrations, OC is more a player than EC. PM2.5 is winter enhanced.
- Sulfate tends to be coastal in nature (shipping emissions), while nitrates are in PM2.5 inland.
- In Nampa, Idaho, OC is higher in summer and nitrates in winter. Weekends tend to bring lower EC from lower VMT on those days and EC goes up with PM2.5.

Question: How do we pass this information to the Air Directors?

- One size does not fit all when it comes to PM2.5 speciation. Many sites display their own characteristics, when similar results are expected.

PROJECT AND WORK GROUP UPDATES:

NASA Satellite data project -- Joe Vaughan

Multiple looks within ROSES for decision support systems.

- Presentation provides good graphical depictions of Omi instruments on Aura satellite and the over-light swaths looked at.
- Omi tropospheric column NO2 information as taken on cloud-free days and pixel comparisons to AIRPACT3 were done.
- Method may give places to look at in the emissions inventory used in AIRPACT.
- O3 may be difficult to get from Omi because of interference from stratospheric portion of O3, but they are looking at methods for use of this information.

WORK GROUP BREAK-OUT SESSIONS:

The Speciation and Level of Accuracy work groups met briefly as the remaining time was short.

Level of Accuracy Work Group -- Rick Hardy

The goals of this workgroup are to develop an understanding of the accuracy needs of model users and an evaluation of model performance for NW-AIRQUEST products that support policy or operational needs relative to the state-of-the-science efforts nationwide.

-- The workgroup concurred with pursuing the following initiatives, if feasible:

1. Complete the *Level of Accuracy* or *Model Performance* table on the NW-AIRQUEST Wiki forum, including the following:
 - User needs/goals
 - Current performance statistics of NW-AIRQUEST products
 - State-of-the-art performance levels and goal by others in the US and Canada
2. Consider routinely plotting model performance statistics on the Web page
 - To facilitate day-to-day diagnosis of model performance and performance trends, as an aid in model interpretation and forecast development, and
 - To track performance improvement toward reasonable goals

NOTES FROM THE NW-AIRQUEST WORKING LUNCH / BUSINESS MEETING:

- We need to keep resources coming in to ensure the Air directors continue to stand by their agreement to keep our product production going.
- Does group feel issues and concerns are being taken care of?
- Currently, Idaho DEQ wrangle conference calls, annual meeting, contracts; Washington Ecology helps with contracts and the listserv; and WSU does the Web page and wiki work. We need these things to continue and others to step-up and help out with running NW-AIRQUEST. Who wants to help?
- NW-AIRQUEST is already sold to the Air Directors. That has been done and they trust we will do the work with the money they provide us to make these products.
- Maybe we should place more effort into new and different tools / products for forthcoming SIPs we'll all be writing (PM2.5, etc.).
- Work groups in NW-AIRQUEST may bring new projects and products to light - Speciation group is rolling, Monitoring group could do a joint agency ARM project, etc. other ideas?
- Possible projects might include PBL issues with PM2.5, complex terrain, ammonia, or mercury work.
- Mercury - The transport mechanism should be known. Is this an Air or Water issue, or both? Maybe we can get Water partners on this as mercury typically begins as an air problem and ends up in water.
- Air Directors - Is there funding in your agency to handle or cover the work assigned? - Monitoring networks for PM2.5 and O3? We should share with the Air Directors the consequences we are facing if cuts and shortages exist in budgets and personnel?
- Let Air Directors know NW-AIRQUEST does more than use a few hundred thousand dollars a year via our products, projects, and finding new partnerships.
- No list has been generated of NW-AIRQUEST product users and possible partners. This needs to be done as it is overdue.
- Can money begin to be shifted from "near-final" products like AIRPACT to say boundary layer work?
 - We must sell ideas to Air Directors and balance this with showing / telling of products and successes.

- Group agreed to look at existing products and how they are morphing or issues changing in regard to the product's capabilities.
 - - AIRPACT3 looks to be adjusting rapidly
 - ClearSky moved into BlueSky?
 - Users of ClearSky to fund the move?
 - A state-of-the-model report is needed for each product.
- What should we do as a group about port emissions?
 - EI work was already done for NW ports - Washington State and British Columbia
 - Infusions of funds for port work though this work might have already been done?
- We need a priority list of possible projects.
 - Brainstorm within your agencies for projects
 - Share your list with NW-AIRQUEST on a call in about three weeks (November 13?)
 - We amass a long list and cut it down to a small group of possible projects
 - Lastly, we prioritize them as individual agencies and share the order on the next call
 - NW-AIRQUEST then tallies the order and has a master list 1-5 or 1-10 of projects and shares this with all members.
 - Chris will schedule the call.
- Climate Change - Is there something more we can do to take advantage of funding?
 - Are there ties or impacts to regional haze reasonable-progress glide path results from climate change?
- NOTE: new computer resources in use at WSU - original, old cluster to retire; second to keep churning alongside new one that has 30TB RAID.