

AIRQUEST Annual Report and State of the Model

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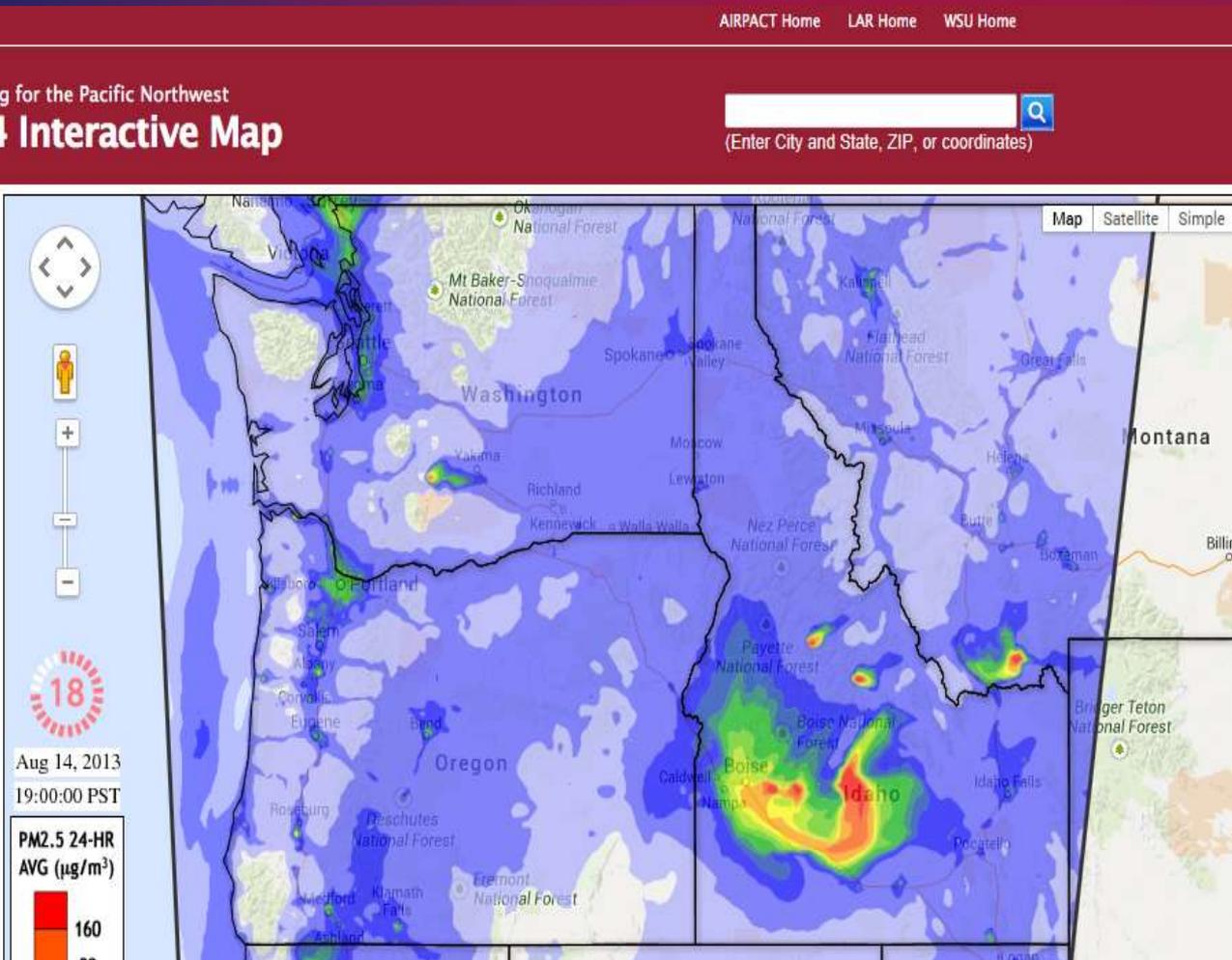
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Ongoing operational tasks

1. Provide daily forecasts of air quality for the three state region that can be used as guidance in daily air quality management.
2. Provide real-time verification statistics of AIRPACT-4 accuracy by pollutant, by month, and provide for user access to AIRPACT-4 results and monitoring data for user-defined periods for download and user analysis.
3. Continue improvements to web graphical display.
4. Maintain the “Change Log”, posted on the AIRPACT website.
5. Archive daily model output and provide access to same upon requests from users.

AIRPACT Air Quality Forecast System



- Daily automated operations
- WRF meteorology
- Dynamic emissions
 - Anthropogenic
 - Biogenic
 - Wildfires
- CMAQ chemical transport model
- 4 km horizontal grid cells

<http://lar.wsu.edu/airpact>

Specific Workplan Tasks

- 6. Evaluate automated incorporation of speciated $PM_{2.5}$ (nitrate, sulfate, ammonium, OC, and EC) for AIRPACT-4 and provide appropriate model performance statistics with data from EPA's AQS database.
 - Scripting implemented for automated comparison on a quarterly basis
 - Initial results will be shown in separate presentation
- Carry over to SFY2015.
 - Need input on web page design
 - Display results on a new web page
 - Expected completion by Dec 31, 2014

Specific Workplan Tasks

- 7. Update emission inventories with data supplied by Washington, Oregon, Idaho, and Canada
 - Expected 2011 SMOKE input files by July 1, 2014 or later(?)
 - New EI incorporated by Oct 1, 2014 (depends on receipt of new files)
 - Evaluation of new EI from Oct 1 through Dec 31, 2014

Specific Work Plan Tasks

- 7b. Potential wood smoke refinements
 - Spatial surrogate for wood stove emissions may be inaccurate/unrepresentative and will be updated.
 - Recent tests using Temperature adjustment plus all temporal factors were completed, but results yielded significant overestimation of PM_{2.5}
 - Further tests with a modified approach are complete and under evaluation (see separate presentation)
 - Pending review of wood smoke results at the 2014 Annual Meeting, decide on further testing and/or a new approach.
- Carry forward to SFY 2015
 - Additional testing of woodstove algorithm during summer, 2014. Revisions implemented by Sept 15, 2014

Specific Workplan Tasks

- 7c. Complete the SMOKE-MOVES integration into AIRPACT
 - Integration completed using SMOKE v3.0
 - IDEQ is updating SMOKE-MOVES to SMOKE v3.5.1
 - Carry forward to SFY 2015
 - Further updates using IDEQ results and in new EI
- 7d. Incorporate BlueSky wildfires in AP4 daily runs. (NASA supported this task)
 - Integration complete using new SMARTFIRE and BlueSky framework with MCIP meteorology for plume rise

Specific Work Plan Tasks

- 8. Continue to develop a 'ClearSky-type' AIRPACT-4 run to include scenarios of prescribed agricultural burns.
 - Building of 21 tracer version of CMAQ completed
 - Scripting of user web interface completed
 - Scripting of emissions completed
 - CMAQ operations in testing.
 - Post-processing yet to be scripted.
- Carry forward to SFY2015
 - Complete scripting and implement default scenario operations
 - Initial implementation by Sept 1, 2014
 - Provide ceiliometer data to RARE ag burn project (data requested by R. Elleman)

Specific Work Plan Tasks

- 9. Continue to evaluate AIRPACT-4 performance.
 - Statistical evaluation for winter 2013 and summer 2012 with and without fires (A. Arroyo, MS student)
 - Initial WRF (MCIP) statistical evaluation completed
 - CMAQ evaluation in progress
 - AP3 Wildfires evaluation (NASA supported)
 - Paper online under review (Herron-Thorpe et al., 2014)
 - Boise Wintertime Field Program Evaluation
 - Analysis completed, draft paper in progress (Zhang et al., 2014)
 - YAWNS Field Program Evaluation (D. Polley, MS student)
 - Initial WRF runs completed
 - Analysis in progress
- Carry forward SFY 2015
 - Statistical evaluation, to be completed Dec, 2014 (MS Thesis)
 - YAWNS evaluation, to be completed, May, 2015 (MS Thesis)

Specific Work Plan Tasks

- 10. Provide support to Washington, Oregon, and Idaho as they evaluate spatial surrogates for the 4-km AIRPACT-4 grids, including a review of land use based emissions, like isoprene and pinene over forest zones, SO₂ over waterways, NH₃ over agricultural zones, wood smoke over residential areas, and NO_x over industrially zoned areas.
 - No requests received
 - Corrected error in NH₃ emissions in California
 - Modified land-use data to treat isoprene emissions from Boardman and Columbia River poplar plantations
- Carry forward to SFY 2015
 - As needed

Specific Work Plan Tasks

- 11. Update model code to CMAQ v 5.x when emission inventory updates are completed.
- Carry forward to SFY 2015
 - Begin testing Jan 1, 2015, implement new versions of CMAQ and SMOKE by March 1, 2015

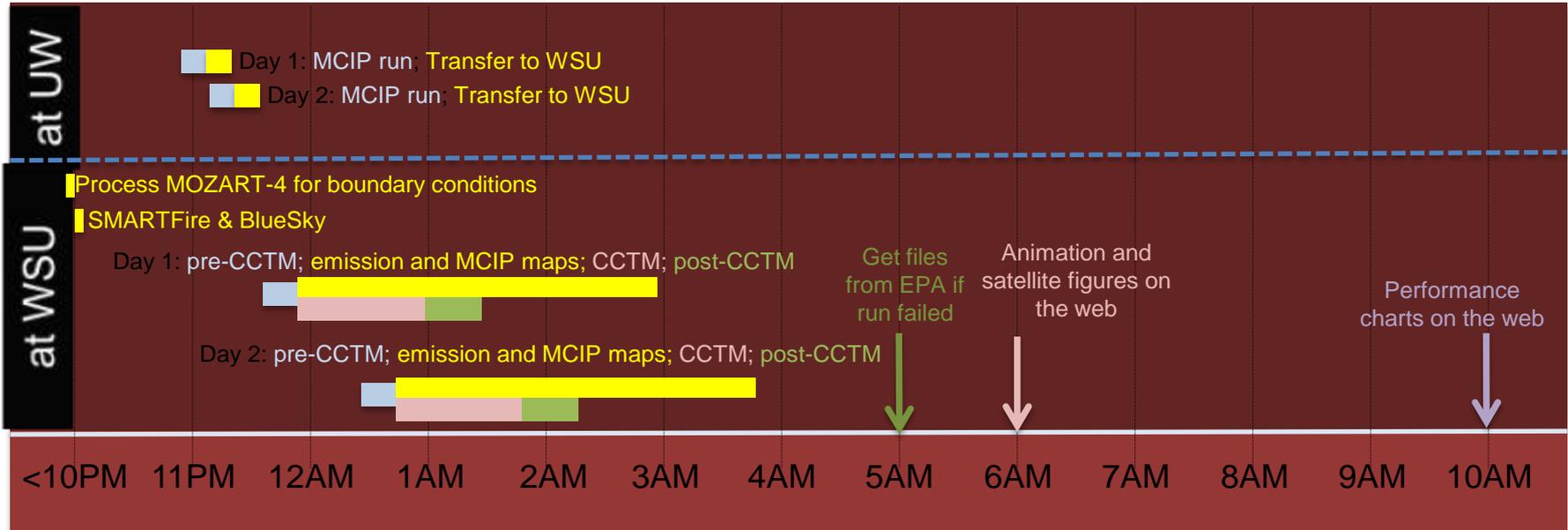
Specific Work Plan Tasks

- 12. Incorporate a BCON operational tracer product for ozone to assess contributions of long range transport and stratospheric ozone to surface ozone concentrations in the AP-4 domain. (NASA supported task)
 - Evaluating effects of adding more layers to AP4 in the boundary layer and also in the free troposphere
 - Analysis of BCON ozone tracer underway for draft paper due in Aug, 2014
- Carry forward to SFY 2015
 - Evaluate layer effects during summer, 2014
 - Complete analysis of BCON tracer to decide whether to implement as an operational product, TBD

State of the Model

- AIRPACT 4 status
 - SMOKE version 2.7
 - MCIP version 3.6
 - BlueSky version 3.5.1.with SMARTFire 2
 - CMAQ version 4.7.1
 - AIRNOW obs automatically ingested and used for automated evaluation
 - By station and pollutant
 - Monthly summaries available
 - Data can be downloaded
 - Range of satellite products routinely ingested for display and analysis
- AIRPACT-3 has been deactivated (Breezy cluster failure and removal)

AIRPACT-4 Operation Timing



External Project Contributions

- EPA GEOSS
 - Web site upgrades
 - Incorporation of msc satellite products
 - Interactions with AIRPACT users
- NASA ROSES
 - MOZART BCON and analysis
 - Fires in AIRPACT, upgrades and analysis
 - Long range transport (with Jaffe et al)
 - O3 tracer in BCON
- Joint Fire Sciences Program
 - High resolution wind measurements and analysis (WRF at 1.3 km)
 - Wind erosion from burn scars measurements and modeling
 - Impact of fires on BC
 - Speciated PM analysis
- NARA Biojet Project
 - Modeling of wood products industry
 - Impact of prescribed fires and slash burns

Questions

