



# NW-AIRQUEST project Status Report

NW-AIRQUEST ANNUAL MEETING

JUNE 9-11, 2020

JOE VAUGHAN FOR LAR/CEE/VCEA/WSU

# BUDGET STATUS

Budget as of 06/ 08 /2020 (effectively a biennial budget)

BTD Through: 06/08/2020

14E      3815-5561      NW AIRQUEST REG AIR QUAL MODEL SYSTEM: AIRPACT 5      #SYNTAX      #ERROR      #SYNTAX

Category	Object	Allocation	Expense	Encumbrance	Balance	Alloc Spent
Salaries	00	122,343.00	100,460.31	5,391.96	16,490.73	86.52 %
Wages	01	2,251.00	11,112.29	0.00	-8,861.29	493.66 %
Consumable Goods And Services	03	18,700.00	15,872.40	0.00	2,827.60	84.88 %
Travel	04	6,157.00	7,783.40	0.00	-1,626.40	126.42 %
Equipment - Capitalized	06	40,000.00	30,190.24	0.00	9,809.76	75.48 %
Employer Contributions	07	46,335.00	40,779.87	814.11	4,741.02	89.77 %
Facilities & Administrative Cost	13	23,214.00	19,720.68	3,493.32	0.00	100.00 %
<b>Account Totals:</b>		<b>259,000.00</b>	<b>225,919.19</b>	<b>9,699.39</b>	<b>23,381.42</b>	<b>90.97 %</b>

## META TASK: STAFFING AT LAR

For AQ  
Modeling

Brian K Lamb, Professor, Emeritus ...

Yunha Lee, Assistant Professor working half-time remotely.

Mahshid Etesamifard, PhD student, working w/ CMAQ in Ports & Boise Proj.

Amit Sharma, Postdoc April 2019 – April 2020. Departing for IIT.

Joe Vaughan, 60% of a Research Associate Prof.

For Machine  
Learning

Nicole June, 2018 REU student & PSU Met. Grad, now starting at CSU. KFBC,

Ana Fernandez (PhD student) WRF-Chem and now working into ML

For Sensor  
work

Kai Fan (PhD student) Machine Learning

Von Walden, working on Lightweight & Dense Sensor Networks

Matthew Roetcisoender (PhD student) working with Von Walden on Sensors.

# META TASKS

## Cluster upgrades

Aeolus cluster is being updated:  
(PGI license, but different, update for Centos, ...)

Aeolus remains, after much hand-wringing, a VCEA HPC resource!

Currently waiting for approval/denial of updated rates filing for an existing service center, now to cover Aeolus, which may alleviate purchasing difficulties!

Technical and User Support remains a challenging college issue.

Purchase pending!

# ONGOING TASKS

Task	Status January 2020	
1. Provide daily forecasts of air quality for the three state region that can be used in daily AQ management.	DAY-ONE runs for July thru December 2019: for for 185 days, six were missed and four were late for success rate of <b>96%</b> . (update!)  DAY-TWO runs ... a tale of three bugs...but for success rate of <b>94%</b> . (update!)	

# ONGOING TASKS

Task	Status June 2020
<p>2. Provide near real-time verification statistics of the current AIRPACT system accuracy by pollutant, by month, and Provide for user access to AIRPACT results and monitoring data for user-defined periods for download &amp; analysis.</p>	<p>Statistics maintained.</p> <p>Current data requests: Olivia Sanderfoot (UW) for Bird vocalization research, <i>responding with KFBC.</i></p> <p>Kim Serry (UW) inquired for Human health research?</p>

# ONGOING TASKS

Task	Status June 2020	
3. Track and continue to improve model performance so that model predictions provide useful guidance for air quality forecasting.	Ongoing concern.	

# ONGOING TASKS

Task	Status June 2020	
4. Maintain ambient air monitoring data streams from AIRNow.	Ongoing.	
5. Maintain satellite retrievals.	Ongoing.	
6. Continue improvements and requested additions to web graphical display.	No new graphics requests. (Maybe soon?)	

# ONGOING TASKS

## Task

## Status June 2020

7. Maintain the “Change Log”, posted on the AIRPACT website.

Ongoing.

8. Archive daily model output of the first 24 hours...

Ongoing.

Web-based graphical displays for each day’s first 24 hours of forecast should be available for the most recent 5 years & gridded files for at least one month.

Forecast graphics available beginning December 2015.

# ONGOING TASKS

Task	Status June 2020
9. Modify AIRPACT as needed to respond to changes in fire emissions produced by other organizations.	Received info on USDA/FS new Fire Info System. Addressing in AIRPACT6
10. Continue hosting the link to the latest background concentration lookup tool.	Hosted at <a href="http://lar.wsu.edu/nw-airquest/lookup.html">http://lar.wsu.edu/nw-airquest/lookup.html</a>

# TASKS CARRIED FORWARD TO 2019-2020

SFY 2019 Task		Comments
Incorporate dust-suppression module for rainy days (AFDUST)		Instead was addressed by FHT: <ul style="list-style-type: none"><li>• Splitting Eastside from Westside</li><li>• Leaving Westside dust OFF.</li><li>• Leaving Eastside dust ON.</li></ul>

## TASKS CARRIED FORWARD TO 2019-2020

SFY 2019 Task	Comments
Incorporate new emission inventory (MOVES, Canada, etc) (MOVES update from Idaho...)	FHT has updated emissions and run through CMAQ.  SMOKEv4.5 has been built, tested, and tested for AIRPACT5 by FHT. Testing for AIRPACT6 pending...

# TASKS CARRIED FORWARD TO 2019-2020

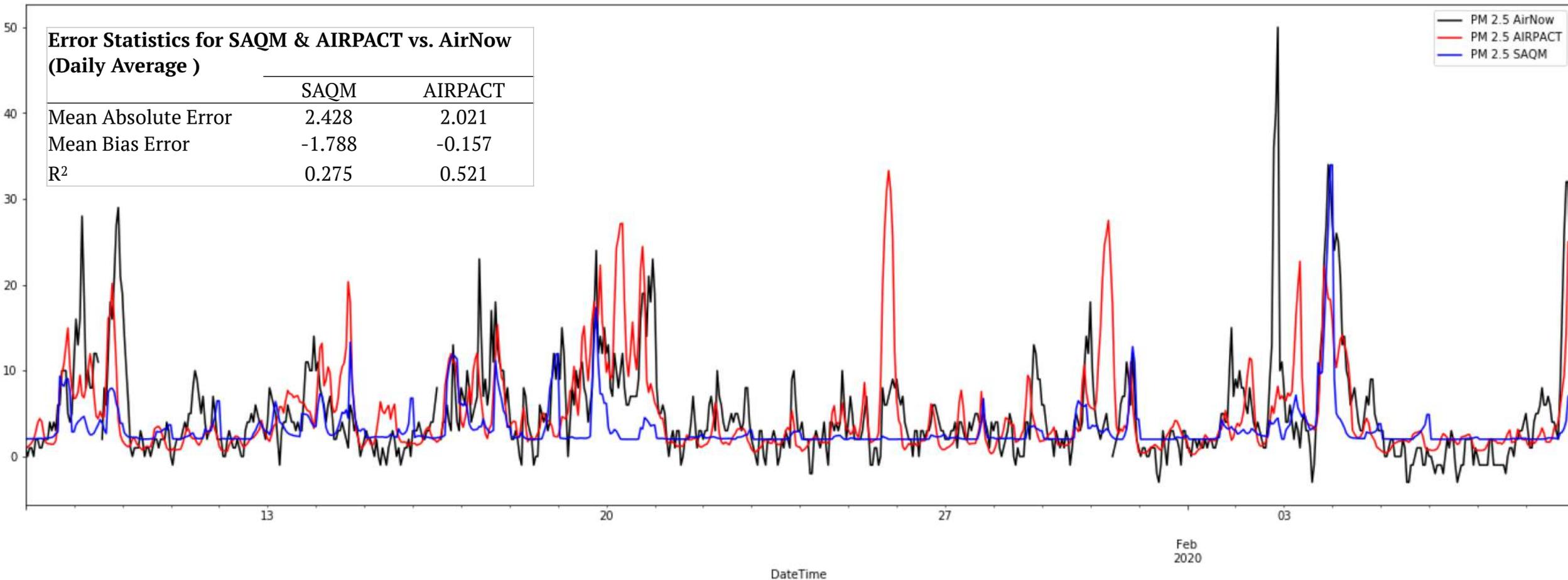
SFY 2019 Task	Comments
Develop PM2.5 bias correction scheme.	Nicole June (Penn State, Meteorology) continues work with Vaughan & Lamb on a Kalman Filter bias correction scheme and interpolation throughout domain. Results today!
Possibly apply a Bayesian-Kriging approach?	Linear and Gaussian Kriging implemented, but Bayesian-Kriging was not implemented.

# TASKS CARRIED FORWARD TO 2019-2020

SFY 2019 Task	Comments
Hosting wood smoke PM forecast models from formulas shared by the state and local agencies	<p>Phil Swartzendruber at PSCAA provided algorithm in April, 2019, for Simple Air Quality Model (SAQM) for RWC season PM2.5 in Tacoma.</p> <p>Lauryn Guerrissi (CEE student) <i>has results!</i> Will review implementation with Phil @ PSCAA to decide next steps.</p>

# Model Performance: 1-Month Run Period January 8-February 8

- SAQM and AIRPACT Model Outputs compared to AirNow data for Tacoma L-Street Monitor



# TASKS CARRIED FORWARD TO 2019-2020

SFY 2019 Task	Comments
<p>Convert to SMOKE 4.5,</p> <p>CMAQ 5.2 with in-line photolysis</p> <p>and include latest MCIP</p>	<p>SMOKE4.5 has been built and tested. ..</p> <p>CMAQv5.2 is in use now in the PORTS project.</p> <p>Currently at MCIP v4.3 supporting CMAQv5.0.2 and CMAQv5.2. MCIPv5.0 released with CMAQv5.3.</p> <p>MEGANv3 requires modification for parallelization following our MEGAN 2.10</p>

# TASKS CARRIED FORWARD TO 2019-2020

SFY 2019 Task	Comments
Use the WRF-Chem system on the WSU Kamiak cluster to demonstrate WRF-Chem capabilities.	Ana Fernandez and Yunha Lee:  Recently the focus was on a nested version for Spokane.  Work completed.

# NEW 2020 TASKS

SFY 2020 Task	Comments
<p>Develop standard annual evaluation report using the AIRNow/web generated statistics along with one or two episode case studies (perhaps).</p> <p>Do this every year (except 2020), but keep it simple and concise.</p>	<p>Jordan Munson performed decadal evaluation and paper is in preparation.</p> <p>Also created automated scripts for rerunning an annual analysis.</p> <p>Deferring rerunning until 2021.</p>

# NEW 2020 TASKS

SFY 2020 Task	Comments
Test machine learning methods in the AIRPACT domain for PM and ozone	<i>Kai Fan has a report on machine learning for PM and ozone.</i>

# NEW 2020 TASKS

SFY 2019 Task	Comments
Incorporate machine learning methods into AIRPACT forecast for bias correction.	Kalman Filter Bias Correction being tested for PM2.5. <i>We have a report on this.</i>  Conversion for ozone could follow?

Thank you!

