

## AQRP Monthly Technical Report

<b>PROJECT TITLE</b>	<b>Improving the Modeling of Wildfire Impacts on Ozone and Particulate Matter for Texas Air Quality Planning</b>	<b>PROJECT #</b>	AQRP 17-024
<b>PROJECT PARTICIPANTS</b>	Matthew Alvarado (AER) Chantelle Lonsdale (AER) Christopher Brodowski (AER)	<b>DATE SUBMITTED</b>	12/08/2016
<b>REPORTING PERIOD</b>	<b>From:</b> 11/01/2016 <b>To:</b> 11/30/2016	<b>REPORT #</b>	2

A Financial Status Report (FSR) and Invoice will be submitted separately from each of the Project Participants reflecting charges for this Reporting Period. I understand that the FSR and Invoice are due to the AQRP by the 15<sup>th</sup> of the month following the reporting period shown above.

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### Detailed Accomplishments by Task

#### *Task 1: Develop improved parameterization and assess the impact on Texas air quality*

In this reporting period we evaluated the preliminary runs of the coupled SAM-ASP model that were performed in the last reporting period against the box model simulations of the Williams fire performed by Alvarado et al. (2015). These initial evaluations uncovered errors in the simulations due to incorrect photolysis inputs, which were then fixed during the reporting period. However, the coupled model appears to be underestimating the horizontal diffusion of the plume for this case, leading to an overestimate of CO concentration downwind. The causes for this are currently being investigated.

We also began test CAMx simulations using the TCEQ 2012 modeling episode during this reporting period and verified we were able to reproduce previous results.

#### *Task 2: Investigate the impact of long-range transport of BB pollution on Texas air quality*

The CO mixing ratios along the outer boundary of the TCEQ 2012 modeling episode are being investigated for areas where the concentrations are above 120 ppb on the western and southern borders, indicating potential long-range transport of biomass burning pollution. Satellite observations of fire locations, CO, and aerosol optical depth over Asia and the Pacific are also being used to investigate potential areas of long-range BB transport. Once these areas are identified, they will be simulated with STILT-ASP to determine how this “Lagrangian” estimate of the impact of fires on the boundary conditions for CO, O<sub>3</sub>, NO<sub>y</sub> species, OA, etc., differs from the “Eulerian” estimate from GEOS-Chem. Sensitivity runs of CAMx where the boundary concentrations attributable to biomass burning are perturbed by 20% will also be performed to investigate the impacts of long-range biomass burning transport on Texas air quality.

Alvarado, M. J., C. R. Lonsdale, R. J. Yokelson, S. K. Akagi, H. Coe, J. S. Craven, E. V. Fischer, G. R. McMeeking, J. H. Seinfeld, T. Soni, J. W. Taylor, D. R. Weise, and C. E. Wold (2015), Investigating the Links Between Ozone and Organic Aerosol Chemistry in a Biomass Burning Plume from a Prescribed Fire in California Chaparral, *Atmos. Chem. Phys.*, 15, 6667–6688, doi:10.5194/acp-15-6667-2015.

**Preliminary Analysis**            Nothing to report.

**Data Collected**                None.

### **Identify Problems or Issues Encountered and Proposed Solutions or Adjustments**

As noted above, we are investigating some errors in the dilution of the biomass burning plumes within the coupled SAM-ASP model. We hope to resolve these quickly so that they do not hold up the progress for the rest of Task 1.

### **Goals and Anticipated Issues for the Succeeding Reporting Period**

Task 1:

- Begin adding fires to the CAMx simulations via the Plume-in-Grid module
- Begin running BBOP plume simulations.

Task 2:

- Identify periods where biomass burning CO may have impacted the GEOS-Chem derived boundary conditions.
- Use STILT back-trajectory runs to evaluate the contribution of fires to the observed CO during these episodes.

### **Detailed Analysis of the Progress of the Task Order to Date**

As of the end of this reporting period, the following milestones have been completed for each task:

Task 1:

- Coupling of SAM-ASP completed
- Preliminary runs and evaluation against Alvarado et al. (2015) completed, revisions of SAM-ASP based on these results on-going
- Verified that our CAMx simulation can reproduce the 2012 TCEQ modeling episode

Task 2:

- Examination of boundary condition files for potential episodes of biomass burning influence on-going.

**Do you have any publications related to this project currently under development? If so, please provide a working title, and the journals you plan to submit to.**

Yes         No

**Do you have any publications related to this project currently under review by a journal? If so, what is the working title and the journal name? Have you sent a copy of the article to your AQRP Project Manager and your TCEQ Liaison?**

Yes       No

**Do you have any bibliographic publications related to this project that have been published? If so, please list the reference information. List all items for the lifetime of the project.**

Yes       No

**Do you have any presentations related to this project currently under development? If so, please provide working title, and the conference you plan to present it (this does not include presentations for the AQRP Workshop).**

Yes       No

**Do you have any presentations related to this project that have been published? If so, please list reference information. List all items for the lifetime of the project.**

Yes       No

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Submitted to AQRP by      Matthew J. Alvarado (AER)

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