

# AQRP Monthly Technical Report

<b>PROJECT TITLE</b>	<b>Update and evaluation of model algorithms needed to predict particulate matter from isoprene</b>	<b>PROJECT #</b>	14-003
<b>PROJECT PARTICIPANTS</b>	UNC-CH	<b>DATE SUBMITTED</b>	4/14/2015
<b>REPORTING PERIOD</b>	<b>From:</b> March 1, 2015 <b>To:</b> March 31, 2015	<b>REPORT #</b>	10

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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## **Task**

*1. Integration of Gas-Phase Epoxide Formation and Subsequent SOA Formation into UNC MORPHO Box Model*

## **Preliminary Analysis**

We are confident in the QA/QC testing of the algorithms for the predicted uptake of gaseous IEPOX onto an aerosol of variable acidity, temperature, and relative humidity.

## **Data Collected**

We have generated simulations necessary for QA of data from the model including the predicted bulk SOA formation in our indoor chamber using reactive uptake coefficients we recently derived in flow tube studies (Gaston et al., 2014, ES&T).

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

N/A

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

N/A

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

N/A

## **Task**

*2. Synthesis of Isoprene-derived Epoxides and Known SOA Tracers*

## **Preliminary Analysis**

We have completed all syntheses needed for the project including dealing with the impurity of the organosulfate standards.

## **Data Collected**

QA/QC data verifying synthesis.

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

N/A

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

N/A

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

N/A

### Task

#### 3. Indoor Chamber Experiments Generating SOA Formation Directly from Isoprene-Derived Epoxides

### Preliminary Analysis

Our experimental plan is listed in Table 1. In the month of February we continued to conduct experiments listed in Table 1.

**Table 1. Indoor experiments to be conducted at UNC.**

Expt. #	[Epoxide]		Initial Seed		RH	
	Epoxide	(ppb)	Seed Aerosol Type	Aerosol ( $\mu\text{g}/\text{m}^3$ )	(%)	T ( $^{\circ}\text{C}$ )
1	IEPOX	300	(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	~20-30	~50-60	~20-25
2		300	(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> + H <sub>2</sub> SO <sub>4</sub>	~20-30	~50-60	~20-25
3	MAE	300	(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	~20-30	~50-60	~20-25
4		300	(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> + H <sub>2</sub> SO <sub>4</sub>	~20-30	~50-60	~20-25
5	none		(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	~20-30	~50-60	~20-25
6	none		(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> + H <sub>2</sub> SO <sub>4</sub>	~20-30	~50-60	~20-25
7	IEPOX	300	none	none	~50-60	~20-25
8	MAE	300	none	none	~50-60	~20-25

0.6 M (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> + 0.6 M H<sub>2</sub>SO<sub>4</sub>

### Data Collected

We continue to collect, process, and quality assure our data for completed experiments. We now have completed this process for all but two of the experiments listed in Table 1.

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

N/A

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

We expect to complete our experiments in the next month.

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

We are currently on schedule to complete this task in time allocated.

**Task****4. Modeling of Isoprene-derived SOA Formation From Environmental Simulation Chambers****Preliminary Analysis**

We have designed a model to explicitly simulate both gas- and aqueous- phase reactions that lead to SOA from IEPOX heterogeneous reactions.

**Data Collected**

We have processed the existing experimental data so that it is now compatible with our box model.

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

N/A

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

We will plan on completing our initial simulations of completed experiments.

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

We are currently on schedule to complete this task in time allocated.

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Submitted to AQRP by:  
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