

AQRP Monthly Technical Report

PROJECT TITLE	Update and evaluation of model algorithms needed to predict particulate matter from isoprene	PROJECT #	14-003
PROJECT PARTICIPANTS	UNC-CH	DATE SUBMITTED	5/6/2015
REPORTING PERIOD	From: April 1, 2015 To: April 30, 2015	REPORT #	11

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 15th of the month following the reporting period shown above.

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

We have completed the experiments listed in Table 1.

Table 1. Indoor experiments to be conducted at UNC.

Expt. #	Epoxide	[Epoxide]		Initial Seed		RH	
		(ppb)	Seed Aerosol Type	Aerosol ($\mu\text{g}/\text{m}^3$)	(%)	T ($^{\circ}\text{C}$)	
1	IEPOX	300	(NH ₄) ₂ SO ₄	~20-30	~50-60	~20-25	
2		300	(NH ₄) ₂ SO ₄ + H ₂ SO ₄	~20-30	~50-60	~20-25	
3	MAE	300	(NH ₄) ₂ SO ₄	~20-30	~50-60	~20-25	
4		300	(NH ₄) ₂ SO ₄ + H ₂ SO ₄	~20-30	~50-60	~20-25	
5	none		(NH ₄) ₂ SO ₄	~20-30	~50-60	~20-25	
6	none		(NH ₄) ₂ SO ₄ + H ₂ SO ₄	~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 (NH₄)₂SO₄ + 0.6 M H₂SO₄

Data Collected

We continue to collect, process, and quality assure our data from the completed experiments.

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 processing of experimental data 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.

Submitted to AQRP by:
William Vizueté

Principal Investigator: