AQRP Monthly Technical Report

PROJECT TITLE	Improving Modeled Biogenic Isoprene Emissions under Drought Conditions and Evaluating Their Impact on Ozone Formation	**PROJECT #**	14-030
PROJECT PARTICIPANTS	Texas A&M University	**DATE SUBMITTED**	8/7/2014
REPORTING PERIOD	**From:** June 25, 2014 **To:** July 31, 2014	**REPORT #**	1

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.

Detailed Accomplishments by Task

Task 1: Meteorology simulation with WRF.

National Land Cover Database 2011 has been downloaded and processed with GDAL to reduce resolution to 30 second. Preliminary WRF simulations using default WRF land use/land cover and the North American Regional Reanalysis (NARR) data have been conducted for April 2011.

Task 2: Perform field and laboratory measurements on common Texas tree species

Note: Due to an additional project start delay from June to July and the unanticipated need to move all our seedlings to a different greenhouse in July, all monthly milestones described in the QAPP had to be moved by one month ahead

The original June (now July, 1st reporting month) milestones were addressed as follows:

a. assess seedling mortality rates - completed
b. maintain water status of all living seedlings - The initial watering schedule was 1-2 times a week and we have increased it to 2-3 times a week to minimize water stress on all seedlings
c. begin leaf-level physiology and isoprene emission baseline measurements
   Post-doctoral researcher Monica Madronich was trained on the photosynthesis analyzer in July 2014. She has begun leaf-level measurements the first week of August. – Preparatory laboratory measurements currently executed include testing/comparing all soil moisture sensors in the soil and pots used for the greenhouse-based seedling; associated with this task is a soil physical and chemical analysis/characterization done by the TAMU soil laboratory, which will be reported next month.
d. send out purchase orders for consumables - We have submitted purchase orders and received some of the consumables needed, including a new CO2 calibration gas, replacement parts for our ATD400, consumables for our CIRAS-2 analyzer, and a new T/rH sensor for greenhouse monitoring
e. execute 1st field trip to Freeman ranch for *Q. fusiformis* measurements, and two regular field trips - We executed one field trip to Sam Houston National Forest in July. Additional field trips will be executed in August, including to nearby parks in the Bryan/College Station area.

The first field trip to the Freeman Ranch is scheduled for the second week of August.

Task 3: Evaluate drought parameterization for isoprene emissions – Not started yet.

Task 4: Perform regional BVOC modeling using MEGAN – Not started yet.

Task 5: Perform regional air quality simulations

We have started preparing emissions for 2007 and 2011. Emission inventory for 2007 based on the 2007v5 modeling platform was downloaded from ftp://ftp.epa.gov/EmisInventory/2007v5/; and emission inventory for 2011 based on 2011 NEIv1 modeling platform was download from ftp://ftp.epa.gov/EmisInventory/2011v6/v1platform/. Spatial allocation surrogates were prepared for the RPO 36-km, Texas 12-km, and 4-km domains. We are modifying SMOKE scripts to processing the emissions.

Preliminary Analysis

Task 2: Current mortality rates are significantly higher than expected, likely due to the combined effect of late repotting (for Texas) in late April / early May this year (post oak is very sensitive to root impairment), the unanticipated move of all seedlings to a different greenhouse, and some minor pest effects. Water oak mortality is approximately 50%, post oak mortality is approximately 75%, with many seedlings still alive but not yet, and potentially not this season, leaving out. That left us so far with 40 water oak seedlings, and 22 post oak seedlings to work with in the coming months.

Data Collected

None to report

Identify Problems or Issues Encountered and Proposed Solutions or Adjustments

None to report

Goals and Anticipated Issues for the Succeeding Reporting Period

Goals

Task 1: 1) Finish preprocessing NLCD 2011 and making it ready for WRF simulations. 2) Perform WRF modeling for 2011 using soil moisture from North American Land Data Assimilation System (NLDAS) archive and the Noah LSM. 3) Download and prepare observation data for model performance evaluation.

Task 2: 1) Execute field work; 2) begin intensive leaf-level measurements in the greenhouse; 3) deploy data logger to greenhouse and begin monitoring

Task 5: Finish generating all anthropogenic emissions (except point and mobile source, which depend on meteorological inputs) for 2007 and 2011.

Issues: For Task 2, seedlings may have to moved and stored outside the greenhouse for 1-2 days in August to allow for asbestos abatement.

Detailed Analysis of the Progress of the Task Order to Date

Task 1: Due to delayed start of the project, we are behind schedule slightly. We expect Task 1 to be completed by end of October instead of September, as stated in the work plan. However, we will start Task 4 in October 2014 as planned, generating biogenic emissions with completed WRF runs at that time. We don't expect a delay in Task 4 at this point.

Task 2: Due to delayed start of the project, we are one month behind schedule.

Task 5: On schedule.

Submitted to AQRP by: Qi Ying

Principal Investigator: Qi Ying