AQRP Monthly Technical Report

PROJECT TITLE	Improved Land Cover and Emission Factor Inputs for Estimating Biogenic Isoprene and Monoterpene Emissions for Texas Air Quality Simulations	**PROJECT #**	14-016
PROJECT PARTICIPANTS	Alex Guenther (Battelle/PNNL) Joost de Gouw (NOAA) Greg Yarwood, Sue Kemball-Cook (ENVIRON)	**DATE SUBMITTED**	1/8/2015
REPORTING PERIOD	**From:** December 1, 2014 **To:** December 31, 2014	**REPORT #**	8

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: Estimation of Terpenoid Emission Fluxes from Aircraft Data

Work continued on using the measurements of isoprene onboard the NOAA WP-3D and NCAR C-130 during SAS to estimate isoprene emission fluxes using the mass balance approach published previously [Warneke et al., 2010]. The results were compared vs. the eddy fluxes determined from the C-130 measurements. Good agreement was obtained in some cases. In other cases, the mass balance approach yields higher values than the eddy fluxes. Research is in progress to understand the differences between those cases. Work continued on comparing the fluxes according to the mass balance approach with the emissions according to the BEIS 3.13 and MEGAN 2.0 inventories using the aircraft measured temperature and photoactive radiation. Preliminary findings include that (1) BEIS 3.13 captures the variability in emissions better than MEGAN 2.0, (2) BEIS 3.13 gives lower emissions than estimated from the measurements, and (3) MEGAN 2.0 gives higher emissions than those estimated from the measurements. These findings qualitatively agree with those from a previous study that used data from the SOS99, TexAQS 2000 and 2006, and ICARTT 2004 campaigns. Work was started to compare the isoprene fluxes derived from the measurements with those calculated from chemical transport models.

Task 2: Development of High Resolution Land Cover Data for MEGAN Modeling in Texas and the Southeastern U.S.

No work was performed on Task 2 during December.

Task 3: Emission Factor Database Development

PNNL continued work on developing high resolution land cover database for the continental US. The database was developed by combining MEGAN v2.1 land cover, LandFire vegetation cover,

National Land Cover Database 2011, Forest Inventory and Analysis (FIA) survey and Cropland Data Layer (CDL) data. The database products are expected to be available soon.

Task 4: Development of MEGAN Biogenic Emission Inventories and Inventory Evaluation using Regional Photochemical Modeling

ENVIRON re-ran MEGAN using default inputs and the new WRF run that was evaluated during November and prepared MEGAN emissions summary tables.

ENVIRON completed development of software to perform CAMx model performance evaluation along aircraft flight tracks and merged the TCEQ 2013 emission inventory with the new MEGAN emission inventory based on default inputs.

Data Collected
None

Identify Problems or Issues Encountered and Proposed Solutions or Adjustments

None to date

Goals and Anticipated Issues for the Succeeding Reporting Period

Task 1: We will extend the analysis to other data sets and biogenic VOCs. We will also incorporate emissions according to the updated MEGAN 2.1 inventory. Investigate further on potential method to correct P-3 VOC measurement data.

Task 3: Continue developing high resolution land cover database based on available datasets.

Task 4: Run CAMx for the period June 1 – July 15, 2013 using default MEGAN inputs, evaluate model performance against surface observations of ozone and compare modeled and aircraft concentrations for isoprene, monoterpenes and other species of interest.

Detailed Analysis of the Progress of the Task Order to Date

The project remains on schedule and budget for completion and delivery of the final AQRP-reviewed report by the AQRP contract end date of June 30, 2015.

References

Warneke, C. et al. 2010. Biogenic emission measurement and inventories determination of biogenic emissions in the eastern United States and Texas and comparison with biogenic emission inventories, *J. Geophys. Res.-Atmos*., 115, D00F18, doi:10.1029/2009JD012445.

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