



TCEQ and AQRP Research Projects

Jim Smith
Air Modeling and Data Analysis Section
Air Quality Division

Southeast Texas Photochemical Modeling Technical Committee
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FY 2019 TCEQ Air Quality Division Approved Projects

FY 2019 AQD Round 1 Approved Projects

Project Number	Project Name	Project Manager	Additional Information and Description
2019-01	2017 Updated Commercial Marine Vessel Inventory and Trend Inventories	Cody McLain	This project will develop an updated 2017 Commercial Marine Vessel emissions inventory and 2014 through 2050 trend inventories using the most up-to-date EPA approved methodologies. Emissions estimates will be supplied by county, SCC code, and vessel type. Vessel Type will be formatted in a class-type structure to allow for querying from the TexAER database by vessel type.
2019-02	Non-road Model Source Equipment Population Update for use with MOVES	Cody McLain	This project will develop updated non-road mobile model equipment populations to be incorporated into the county databases used for emissions inventory development. The Contractor will use a range of methods to update the equipment populations, including published reports from federal or Texas state agencies, survey work, etc.
2019-03	2014-2050 Aircraft Trend Inventories using the AEDT model	Cody McLain	This project will develop growth factors and trend emissions inventories from 2014-2050 using the AEDT model.
2019-04	Phase II MOVES QA Tool	Mary McGarry-Barber	This project will develop phase II of the MOVES QA Tool for on-road mobile emissions inventories. Phase II will allow for the QA of on-road mobile emissions outputs using the emissions rate mode functionality of the MOVES Model.
2019-05	Flyovers	Adam Bullock	This project will conduct helicopter flyovers to identify equipment leaks.
2019-06	Analysis and Enhancement of TexAER Inventory File Loading Capabilities	Latrice Bradford	This project will analyze TexAER and server capabilities and modernize the underlying code to allow for the efficient loading of CERS XML files that can accommodate all 254 Texas counties for on-road and non-road inventories.

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2019-07	Texas Upstream Oil and Gas Compressor Engine and Gas Transmission Pipeline Analysis	Michael Ege	This project will build upon ERG's 2018 Upstream Oil and Gas Compressor Engine Study, doing additional evaluation of the differences in the upstream compression requirements for the eight geologic areas of the state. This project will also evaluate Texas natural gas transmission pipelines used in the various areas of the state. The contractor will delineate pipeline characteristics at the county level for each of the eight oil and gas geologic areas of the state.
2019-08 2019-09	Development of 2020 Future Case On-Road Modeling Inventory for HGB and DFW with MOVES2014a	Chris Kite	These projects will develop projected year 2020 on-road mobile source emissions inventories for the HGB and DFW areas. This work will support attainment demonstration modeling for the areas' anticipated bump-up from Moderate to Serious ozone nonattainment.
2019-10	Improving Spatial Resolution of Emissions in Mexico	Jim Smith	This project will use various tools to develop a better spatial distribution of emissions in Mexican cities which may impact Texas air . Google Maps has an API which provides real-world traffic data. This will be used to improve the spatial and temporal emission inventories for on-road vehicles for Mexico. The contractor will use the Mexican 2010 census by state to further segregate areas of higher/lower emissions based on population density and other parameters.
2019-11	Expand Direct Decoupled Method (DDM) maximum application size and add deposition sensitivity	Shantha Daniel	This project will produce two DDM enhancements that will enable larger DDM applications. These enhancements will enable TCEQ to better characterize background and impacts of international transport.

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2019-12	Technical support for project to characterize international and background emissions using GEOS-Chem	Shantha Daniel	This project will provide assistance to TCEQ staff with GEOS-Chem model setup and evaluation with specific focus on (1) selecting emission inventories, and (2) obtaining non-US air quality data for model performance evaluation. TCEQ uses GEOS-Chem to provide boundary conditions for CAMx that represent background and international transport to North America.
2019-13	Regional Haze Model Input	Stephanie Shirley	This project will provide assistance with Regional Haze modeling. The TCEQ may ask for assistance on the development of modeling inventories, CAMx PSAT configuration, workplan and QAPP, and with inspection of PSAT output for Regional Haze technical work. The TCEQ may also ask for a visualization tool for PSAT output. The contractor will assist with post-processing PSAT output for developing Regional Haze metrics, consult on data analysis, model performance evaluation and communication or reporting of results for the Regional Haze SIP.
2019-14	Near real time ozone modeling to identify exceptional events	Mark Estes	This project will conduct near-real-time ozone modeling for Texas. The current modeling system has proven effective at identifying days with wildfire and international emission contributions. For FY2019, satellite imagery will be used to assist in modeling development and evaluation. Model output can be used to provide technical support to exceptional event demonstrations, for wildfire, international emission, and stratospheric intrusion events, as appropriate.

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2019-15	Development and Testing of a Hemispheric CAMx Application	Jim Smith	This project will develop and test a proof of concept for a northern hemispheric CAMx modeling application that would replace the use of third-party global models for generating regional domain boundary conditions, and provide a consistent, stream-lined global-to-regional modeling system that includes important Probing Tools such as source apportionment.
2019-16	Uncertainty analysis and improvement of STILT-ASP for determining O3 formation from biomass burning	Erik Gribbin	This project will use a global uncertainty analysis of the current STILT-ASP model (using a statistical emulator approach) to identify the key input parameters that need to be studied to further improve model performance. A version of the STILT-ASP model will be developed that uses the complex step approach to estimate the sensitivity of O3 formation to fire emissions and other inputs.
2019-17	VOC Speciation Update for TX Point Sources	Miranda Kosty	This project will update the CB6 mappings for VOCs identified by TCEQ CONTAM codes so that the TCEQ can update the EPS3 processing for Texas Point Source VOC emissions. This process has not been thoroughly reviewed in 12 years.

FY 2019 AQD Round 1 Approved Projects

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2019-18	Separate poor air quality events in El Paso based on dominant sources of emissions	Erik Gribbin	This project will use clustering algorithms, WRF-STILT, and other tools (e.g., tracer species) to separate poor air quality events predominantly influenced by Mexican emissions from those predominantly influenced by US emissions. The investigators will use WRF-STILT footprints and clustering algorithms to quantify the relative influence of US and Mexican emissions sources on VOCs and NOx during events.
2019-19	Coast Guard AIS data to Shipping EI tool	Jim MacKay	This project will develop a python package to automate the process of generating emissions from AIS data by leveraging the knowledge gained from the prior offshore and near-shore emission inventory efforts.
2019-20	Continued Operation of Select HGB Ozone-related Non-regulatory Monitoring	Jim Price	This project will continue operation of select ozone-related non-regulatory monitors in the HGB Region, November 1, 2018 through October 31, 2019
2019-21	Continuation of PM2.5 Speciation Monitoring at West Liberty	Erik Gribbin	This project will extend speciated PM2.5 monitoring by UH at their West Liberty monitoring site. The data is used for a better understanding of continental background PM2.5 for the Houston area and documentation of biomass burning plumes in case of an exceptional event.

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2019-22 2017-09	Continue monitoring in El Paso	Fernando Mercado	This project will continue VOC monitoring at the Delta site, currently managed by UT, and will add NOX monitor to enhance the usefulness of the data.
2019-23	El Paso and San Antonio ozonesonde launches	Dave Westenbarger	This project will conduct 25 ozonesonde launches from UTEP campus as follow-up to 2017 sampling and 30 ozonesonde launches from campuses of UT-SA and/or Trinity Univ. as follow-up to 2017 San Antonio Field Study.
2019-24	Analysis of mesoscale and synoptic-scale patterns on ozone transport and formation in southeast Texas (proposed originally as AQRP 18-015)	Mark Estes	This project will use reanalysis data, radar profiler data, and other wind data from SE Texas to determine relative importance of local and synoptic-scale wind flows upon ozone formation and transport in Houston.
2019-25	Logistical support and project extension for black carbon/brown carbon sampling in El Paso	Jim Price	Provide appropriate logistical support for AQRP study investigating wildfire signatures, using novel techniques for measuring black and brown carbon.



FY 2019 Air Quality Research Program Projects

FY 2019 AQRP Projects

Proposal Number	Project Title	Entities/ Budget	Project Description (Abridged)
18-005	Next steps for improving Texas biogenic VOC and NO emission estimates	UC Irvine, Ramboll \$168,146	This project aims to improve numerical model predictions of regional ozone and aerosol distributions in Texas by reducing uncertainties associated with quantitative estimates of biogenic volatile organic compound and biogenic nitric oxide emissions from Texas and the surrounding region.
18-007	DDM Enhancements in CAMx: Local Chemistry Sensitivity and Deposition Sensitivity	Ramboll \$150,000	This project will develop a new and efficient sensitivity analysis tool for CAMx called Chemistry Sensitivity Analysis (CSA) that is based on the decoupled direct method (DDM) for sensitivity analysis already present in CAMx. The contractor will combine the effects of estimated uncertainty in the chemistry with uncertainty due to model emissions, boundary concentrations, and dry deposition velocity to estimate an overall uncertainty in CAMx ozone predictions for Texas.

FY 2019 AQRP Projects

Proposal Number	Project Title	Entities/ Budget	Project Description (Abridged)
18-010	A synthesis study of the role of mesoscale and synoptic-scale wind on the concentrations of ozone and its precursors in Houston	Texas A&M \$120,000	This project aims to synthesize existing data, previous analyses, and photochemical model experiments to provide a comprehensive and reconciled description of how mesoscale and synoptic-scale winds affects dispersion and accumulation of air pollutants emitted in the Houston area and from other regions, and how they contribute to high ozone events.
18-022	Development and Evaluation of the FINN v.2 Global Model Application and Fire Emissions Estimates for the Expanded Texas Air Quality Modeling Domain	UT Austin, Sonoma Tech \$172.114	This project's objective is produce a fully operational, next generation global FINN (Fire Inventory from NCAR) application. The new FINN application will be used to develop fire emissions estimates for 2012-2017, a time period that includes 2016, which is the base year for the U.S. Environmental Protection Agency's national air quality modeling platform.

FY 2019 AQRP Projects

Proposal Number	Project Title	Entities/ Budget	Project Description (Abridged)
18-023	Emission Inventory Development and Projections for the Transforming Mexican Energy Sector	UT Austin, Ramboll \$158,309	This project's overall objective is to apply new information to develop a bottom-up assessment of emissions for the upstream and midstream oil and gas sectors and power sector and to develop future emission projections based on likely outcomes of on-going bid rounds that are attracting new investment for exploration and production of oil and gas resources.
18-025	Apportioning the Sources of Ozone Production during the San Antonio Field Study	Aerodyne \$199,974	This project aims to discover which sources contribute to the formation of ground-level ozone in and around San Antonio, and in what quantities. Raw data from the 2017 San Antonio Field Study (SAFS) will be examined closely and analyzed in full to identify characteristic sets of VOCs associated with different source types. An ozone formation computer model will be used to understand how each source type contributes to ozone formation in and around San Antonio.

FY 2019 AQRP Projects

Proposal Number	Project Title	Entities/ Budget	Project Description (Abridged)
18-031	Detecting events and seasonal trends in biomass burning plumes using black and brown carbon: (BC)2 El Paso	Baylor, UH \$131,294	This project aims to provide critical insight on the influence of biomass burning on the air quality in El Paso, TX through the characterization of black and brown carbon (BC and BrC). Biomass burning plumes will be identified using aerosol composition and light absorption properties, including BC and BrC concentrations, absorption Ångström exponents, and aerosol light absorption coefficients for specific ultraviolet and visible wavelengths.
18-040	Analysis of Ozone Production Data from the San Antonio Field Study	Drexel \$130,264	This project will analyze many aspects of the San Antonio Field Study data in order to determine rate at which ozone was being produced by chemical reactions in the air, to determine the relative importance of upwind and urban sources of ozone precursor emissions, and to determine the importance of different types of emissions (e.g., nitrogen oxides from fossil fuel combustion vs. biogenic volatile organic compounds from trees).

Questions?