

# *Summary of Current TCEQ Air Quality Projects*

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**Southeast Texas Photochemical  
Modeling Technical Committee Meeting**

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## *TCEQ 2010 Planned Air Quality Projects*

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- Air Quality Monitoring Projects
- Air Quality Emission Projects
- Air Quality Modeling Projects



## Air Quality Monitoring Projects

TCEQ Project Numbers	Project Description	Principal Investigator
TCEQ-2010-08 TCEQ-2010-10	Launching ozonesondes in eastern Texas during the 2010 ozone season for the primary purpose of obtaining vertical profiles of ozone	Valparaiso University
TCEQ-2010-23	Enhanced data analysis using SHARP (April/March 2009) data sets	University of Houston
TCEQ-2010-27	Ozone, NO <sub>x</sub> , meteorology monitoring on the Moody, Texas, broadcast tower	NOAA
TCEQ-2010-32	Development of a cloud cover analysis procedure using satellite imagery data	NOAA
TCEQ-2010-36	Aerometric data collection and analysis at the UH Moody Tower.	University of Houston
TCEQ-2010-44	Ozone monitoring in HGB perimeter counties ,e.g., Fort Bend	University of Houston



## *Air Quality Monitoring Projects*

<b>TCEQ Project Numbers</b>	<b>Project Description</b>	<b>Principal Investigator</b>
TCEQ-2010-66	Identification of transport events into Texas, in particular across the Gulf of Mexico, using satellite data (TES, OMI, AIRS, MISR, MODIS)	NOAA
TCEQ-2010-73	Enhanced data analysis for nighttime VOC and nitrate chemistry using TexAQS II data sets	NOAA
TCEQ-2010-74	Enhanced data analysis for peroxy radical cycles using TexAQS II data sets	NOAA
TCEQ-2010-76	Enhanced data analysis for shear-induced vertical mixing between the boundary layer and the free troposphere by gravity waves using TexAQS II data sets	University of Houston



## Air Quality Emission Projects

TCEQ Project Numbers	Project Description	Principal Investigator
TCEQ-2009-41	Update biogenic emissions using ground surveys and airborne LIDAR of vegetative species to develop bio-mass densities for input to GloBEIS	TAMU
TCEQ-2009-42	Develop a cross reference of new Texas-specific land-use/land-cover (LU/LC) categories to the National Land Cover data set	TAMU
TCEQ-2010-03	Update on-road emissions development processing to use EPA's new MOVES emissions factor model	TTI
TCEQ-2010-04	Identify, observe, and measure HRVOC emissions from flares in a laboratory and a field setting, using remote sensing technology to improve flare VOC emissions estimates	UT
TCEQ-2010-09	Update biogenic emissions using HyperSpectral Imaging of vegetative species to develop bio-mass densities for input to GloBEIS	TAMU
TCEQ-2010-11	Update HGB marine vessel emissions using Port of Houston's current emissions inventory and harmonize the remaining 8-county marine vessel emissions inventory	ENVIRON



# Air Quality Emission Projects

TCEQ Project Numbers	Project Description	Principal Investigator
TCEQ-2009-12	Evaluate the effect of fuel prices on VMT using the most recent quality-assured VMT data (2008)	TTI
TCEQ-2009-13	HRVOC and NO <sub>x</sub> emissions reconciliation for HGB and BPA nonattainment area (revised PSCF application)	Lamar University
TCEQ-2010-14	Develop 2005, 2006, and 2018 Summer Weekday HGB on-road emissions using updated on-road emissions development processing with MOVES and compare to current on-road emissions developed with MOBILE6.2	TTI
TCEQ-2010-16	Estimated emissions from barges while in transit for the HGB, BPA and Corpus Christi industrial waterways using the Louisiana study protocol	ERG
TCEQ-2010-17	Evaluate existing methods and models for estimating oil and gas production emissions for multiple area source categories (e.g., heater-treater, dehydrator)	ERG
TCEQ-2010-18	Update emissions from oil and gas platforms in Texas state waters	ERG



## *Air Quality Emission Projects*

<b>TCEQ Project Numbers</b>	<b>Project Description</b>	<b>Principal Investigator</b>
TCEQ-2009-21	Develop county-level growth factors from 2005 to 2035 at the SIC/NAICS and SCC level for stationary source emissions	ERG
TCEQ-2009-29	Collect samples for VOC analysis from produced water/saltwater storage tanks to develop an activity-based emissions factor	ENVIRON
TCEQ-2010-30	Evaluate emissions, activity and equipment population data collected on drayage trucks operating at the Port of Houston to refine NO <sub>x</sub> and PM emissions	H-GAC
TCEQ-2010-33	Locate and quantify HRVOC emissions loss from pipelines	ERG
TCEQ-2010-39	Collect samples from 10 to 20 upstream oil and gas tanks to refine emission factors	ENVIRON
TCEQ-2010-42	Conduct aerial surveys in the HGB area using IR-camera technology to identify potentially under-reported VOC emissions	Leak Survey



## Air Quality Emission Projects

TCEQ Project Numbers	Project Description	Principal Investigator
TCEQ-2009-43	Conduct a survey in the HGB area of tank flash emissions to quantify the VOC emission reductions achieved by the 2007 rule (30 TAC, Chapter 115)	ENVIRON
TCEQ-2009-45	Update NO <sub>x</sub> emission rates from oil and gas production combustion sources using TexAQS II monitoring data	NOAA
TCEQ-2010-48	Update GloBEIS model to estimate other VOCs (e.g., sesquiterpene)	ENVIRON
TCEQ-2010-56	Use GIS software to verify current oil and gas point and area source emission estimates	TAMU
TCEQ-2010-61	Updated emissions from locomotive and commercial marine sources, including growth factors	Pechan
TCEQ-2010-62 TCEQ-2010-64	Update TexN for 2008 CERR, including new EPA rules	ERG



## *Air Quality Emission Projects*

<b>TCEQ Project Numbers</b>	<b>Project Description</b>	<b>Principal Investigator</b>
TCEQ-2009-69	Evaluate the difference between Isoprene estimates using the GloBEIS and MEGAN biogenic emission models	ENVIRON
TCEQ-2009-71	Collect samples for VOC analysis from brine ponds in facilities that have degassing drums to develop an activity-based emissions factor	UT



## Air Quality Modeling Projects

TCEQ Project Numbers	Project Description	Principal Investigator
TCEQ-2009-21 TCEQ-2010-05	Update the Carbon-Bond chemical mechanism with new aromatic, isoprene, and inorganic reactions (CB6)	ENVIRON
TCEQ-2010-06	Develop and test an alternative isoprene reaction mechanism for CB6 using recent TAMU laboratory experimental results	ENVIRON TAMU
TCEQ-2010-22	Investigate the 2006 TexAQS II modeling episodes for accuracy and precision in quantifying ozone and precursor transport into and inside Texas	ENVIRON
TCEQ-2010-24	Update EPS3 software to provide parallel processing	ENVIRON
TCEQ-2010-25	Update the HDDM assessment in CAMx to add data and input/output options for calculating the sensitivities of radical species, e.g., OH	ENVIRON
TCEQ-2010-26	Develop an alternate plume-rise algorithm in CAMx that distributes emissions to multiple layers and perform sensitivity tests	ENVIRON



## Air Quality Modeling Projects

TCEQ Project Numbers	Project Description	Principal Investigator
TCEQ-2010-37	Cloud assimilation into WRF, adding functionality to allow WRF to integrate satellite cloud data	LAMAR
TCEQ-2010-38	Enhance WRF to assimilate locally-specific wind, temperature and moisture data from radar profilers and NEXRAD	TAMU
TCEQ-2010-40	Model impacts of clouds on photolysis within CAMx using an embedded efficient radiative transfer model and perform a photolysis attenuation calculation for each cloudy column	ENVIRON
TCEQ-2009-40 TCEQ-2010-46	Compare MM5 and WRF meteorological modeling results using integrated satellite-derived soil moisture data	NOAA
TCEQ-2010-67	Development of enhanced future boundary conditions using the 2006 GEOS-Chem global model with the 2018 projected regional modeling (CENRAP)	ENVIRON
TCEQ-2010-70	Remodeling of TexAQS II episodes with the HDDM tool	ENVIRON



## *Air Quality Modeling Projects*

<b>TCEQ Project Numbers</b>	<b>Project Description</b>	<b>Principal Investigator</b>
TCEQ-2010-75	Box modeling with the MCM chemistry mechanism using TexAQS II data sets to evaluate nighttime VOC and nitrate measurements	NOAA



## *Current HGB Modeling Activities for 2013 MCR/SIP*

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- Emission Modeling Activities
- Meteorological Modeling Activities
- CAMx Modeling Activities



## *Emission Modeling Activities*

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- Update 2005/2006 base case emissions with EPA Speciate4.0, including chemical speciation profiles containing ethane
- Run GloBEIS with revised vegetative species mix by LULC and kriged temperature inputs
- Revise emissions reconciliation (PSCF) with emissions adjustment limited to the flares



## *Meteorological Modeling Activities*

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- Configure WRF for FDDA (observational data nudging), SST and LULC
- Run WRF for 2005/2006 base cases ( 2013 MCR/SIP expected to use WRF)
- Test WRF sub-regional parameterizations (e.g., PBL schemes) – within 4 km domain; different portions may be run with different parameterizations
- Revise met domains to include all of Texas in 12 km domain; 36 km will also be expanded to current 108 km domain, and 108 km domain will no longer exist
- Run WRF for 2005/2006 base cases with revised met domains

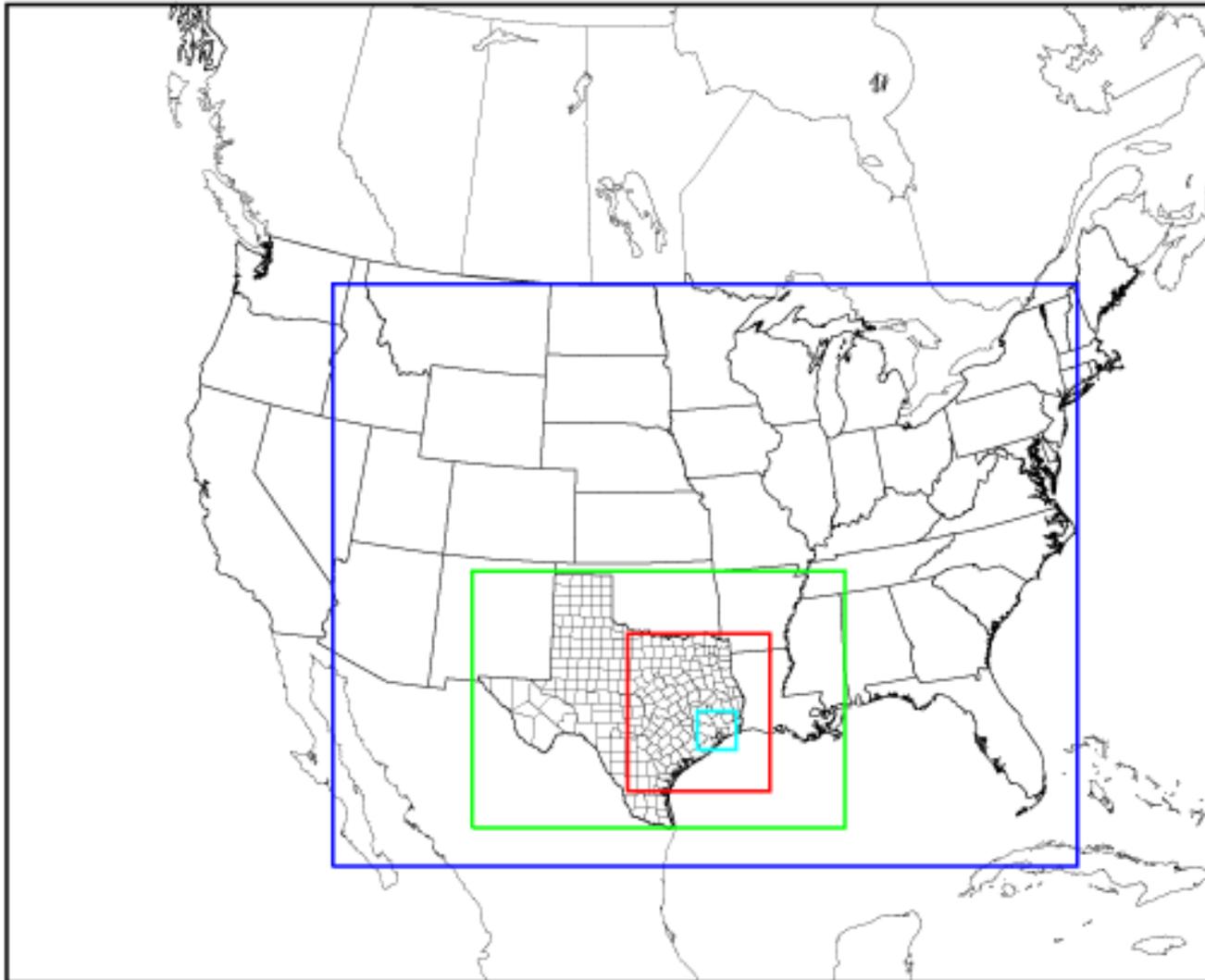


## *CAMx Modeling Activities*

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- Run OSAT/APCA for 2005/2006 base cases to explore overestimation of eight-hour ozone; use to evaluate whether all six episodes should be retained
- Run CAMx with alternative plume-rise algorithms – using results of on-going research project
- Run CAMx with revised biogenic emissions – using results of ongoing research project
- Run CAMx with revised chemical speciation profiles using EPA's new Speciate4.0 program
- Run CAMx with revised PSCF (flares)
- Run CAMx with WRF-generated met inputs
- Run CAMx with revised domains described under Met Modeling

# Meteorological Modeling Domains



**Continental**  
108 KM

**US**  
36 KM

**South US**  
12 KM

**East Texas**  
4 KM

**HGB**  
2 KM

# CAMx Modeling Domains

