

SOUTHEAST TEXAS PHOTOCHEMICAL MODELING TECHNICAL COMMITTEE

*Houston-Galveston Area Council Offices
3555 Timmons Avenue
Houston, Texas*

July 21, 2014 10:00 a.m. – 3:30 p.m.

ATTENDEES

Rohit Sharma, Liz Hendler, Greg Stella, Dan O'Brien, Allison DenBleyker, Barry Lefer, Ryan Perna, Bruce Davis, Jian Zhang, John Koupal, Ziyuan Wang, Graciela Lubertino, Sarah Roberts, Dan Cohan, Jin San Lee, Nicholas Williams, Charles Airiohuodion, Dan Baker, Ken Gathright, Yunsoo Choi, Anirban Roy, Lola Brown, Melanie Rousseau, Jim Smith, Erik Gribbin, John Jolly, Doug Boyer

MINUTES

Doug Boyer with the Texas Commission on Environmental Quality (TCEQ) welcomed the group and started the meeting. All presentations are available on the [SET PMTC Web site](http://www.tceq.state.tx.us/implementation/air/airmod/committee/pmtc_set.html), http://www.tceq.state.tx.us/implementation/air/airmod/committee/pmtc_set.html.

SIP Planning and Implementation Update – Lola Brown (TCEQ)

Lola gave an update on the SIP and Rule actions that occurred since our last meeting. Lola also discussed the upcoming Redesignation Substitute report for the Revoked One-Hour Ozone Standard for the HGB nonattainment area.

H-GAC Air Quality Issues – Graciela Lubertino, Ph.D. (H-GAC)

Graciela updated the group on an \$800,000 grant from EPA to reduce emissions from non-road equipment and marine vessels. A request for grant applications will go out this year and more information is expected to be posted to the [H-GAC website](http://www.h-gac.com/), <http://www.h-gac.com/>. Also, as part of the 2040 Regional Transportation Plan due in January 2015 H-GAC will complete new MOVES for many years through 2040.

Overview of a new MOVES Emission Inventory Development Tool – John Koupal (ERG)

John described the new tool that ERG is developing for H-GAC. The tool is intended to take traffic demand model link-level data and determine unique combinations of road type and average speed to reduce the amount of MOVES run time. A Graphical User Interface (GUI) will help the user pre-process, run MOVES, and post-process the output with the help of custom Perl scripts. For off-network emissions, their tool is expected to provide better spatial allocation than current tools. A unique speed model built for H-GAC will also be used.

NASA Air Quality Applied Sciences Team (AQAAT) Update – Dan Cohan, Ph.D. (Rice University)

Dan provided the group an overview of the NASA AQAAT program and the leaders. AQAAT is intended to interface the science and data products from NASA with the needs from local, state, regional, and federal air quality managers. Tiger teams have been created to address air quality issues important to the air quality managers. Dan summarized many of the recent teams and projects. TCEQ participated in the January AQAAT meeting held at Rice University and provides input on some of the recent Tiger team projects. Contact Dan if you'd like to collaborate on any of the AQAAT teams/projects.

HGB Monitoring Trends for NO_x and VOCs – John Jolly (TCEQ)

John showed trends in NO_x concentrations from the 21 HGB-area monitors. From 2000 to 2013, all monitors had a statistically-significant downward trend in concentrations. John showed a wind direction analysis for the HRM-3 and Clinton monitors. The highest concentrations appeared to come from the direction of highways and railyards rather than the industrial Ship Channel. It was noted that the industrial NO_x emissions may be elevated and pass over these surface monitors. Using a heat map analysis, John showed the diurnal pattern of NO_x concentrations from 2000 to 2013. The highest concentrations appeared during the rush hour period for the 21 NO_x monitors and overnight during the winter. Over time these concentrations have been decreasing.

John also showed trends for Total Non-Methane Hydrocarbons (TNMHC) and Ethylene (Ethene) from canister and automatic Gas Chromatographs (augo-GCs). While there are fewer measurements of VOCs than NO_x, most monitors showed decreasing trends. TNMHC heat maps for the Texas City and Deer Park monitors showed decreases in concentrations, especially during the morning and overnight hours.

A suggestion was made to evaluate the trends in VOCs by weighting the compounds according to MIR reactivity.

TCEQ Modeling Update – Doug Boyer (TCEQ)

Doug updated the group on the TCEQ's current photochemical modeling by comparing to the setup presented at the 2/27 SET PMTC meeting. The current work is focused on the DFW AD SIP revision. The TCEQ has changed to the latest version of the CAMx photochemical model (6.10p1) using the latest chemical mechanism update (CB6r2). The TCEQ added monthly leaf area index to CAMx from MODIS satellite data. Fires were added to the base case modeling from the FINN database. Oil and gas production data was updated using the 2013 Railroad Commission of Texas data.

Estimated 2018 emission totals for the eight-county HGB area indicate that NO_x will decrease almost 50% from 2006 modeled levels. VOC emissions are projected to decrease approximately 25% by 2018. The draft CAMx modeling has an ozone over-prediction bias in both the June and August/September 2006 episodes. The TCEQ is investigating the causes but some issues appear to be too much ozone over the Gulf of Mexico and the misplacement of clouds. Preliminary estimates of 2018 future design values indicate five monitors will be above the 2008 eight-hour ozone standard. Modeling sensitivities using the Tier 3 and Cross State Air Pollution rules show slightly lower future design values. Doug noted that the emission inventories and modeling were focused on DFW and the projected future design values are only estimates.

Doug also provided detail on the biogenic emission model MEGAN. The TCEQ used the default inputs for emission factors and plant functional types but has updated the leaf area index with the once-every eight-day product from the MODIS satellite. He also showed how LAI in urban areas, which is excluded from the MODIS product, were filled according to a function using four urban land-use categories. If the urban areas had zero LAI, MEGAN wouldn't create biogenic emissions in the core areas of interest. With the urban areas filled, the LAI and VOC emissions increase slightly due to the shade trees, parks, and other vegetation.

The Impact of Observational Nudging and Nesting on the Simulated Meteorology and Ozone Concentrations from WRF-CMAQ during the DISCOVER-AQ 2013 Texas Campaign – Yunsoo Choi, Ph.D. (University of Houston)

Dr. Choi showed the results of four CMAQ runs using different WRF inputs for the 2013 DISCOVER-AQ period. They attempted to model the 9/25/2013 day when one-hour ozone peaked at 151 ppb at the La Porte monitor. WRF had difficulty replicating the bay breeze that developed in the late afternoon even with objective analysis nudging. The once-every three hour nudging wasn't frequent enough to capture the rotation of winds. The model performed worse without nudging however. The group is working on improving the temporal frequency of objective analysis nudging within WRF because the meteorological fields are available on an hourly basis.

August 26, 2011: Evidence of an Exceptional Event? – Erik Gribbin (TCEQ)

Erik showed a high one-hour ozone event (128 ppb) that occurred on 8/26/2011 at the Houston East C1 monitor that may have been impacted by fires from the NW United States. Erik showed that this day had many of the features of an exceptional event as defined by EPA. According to back and forward trajectories, air parcels from the fires in Oregon/Washington and closer areas were carried into the southeast Texas region. Area-wide monitors experienced one-hour ozone values above the 95th percentile from recent years. Ozone and PM2.5 concentrations also increased regionally in Louisiana. Satellite imagery and analyses indicate smoke from fires was over Texas and may have been near the surface. Comparison to background ozone values and a surrogate day indicate that the day would not have exceeded the one-hour ozone NAAQS if Houston East wasn't impacted by the fires.

Next Meeting

No suggestions for future meeting dates were given. A suggestion was given to start the meeting earlier.