

TexAQS2K6 Point Source Emission Inventory

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Version 3, 14 May 2007

NO_x and SO₂ emissions from electric power generation facilities statewide are now updated to September/October 2006 average daily levels using hourly CEMS data (see version 1 below for more explanation of this procedure). The changes affect only 124 of the 1858 sources included in each of the NOX_TPD_04, SO2_TPD_04, NOX_MPS_04, and SO2_MPS_04 fields/waves. NO_x and SO₂ from all other sources and emissions of other compounds remain the same as in Version 2.

Non-zero power plant September/October 2006 average daily CO₂ emissions (in units of tons/day and molecules/second) measured by CEMS are now included. See the CO2_TPD_06 and CO2_MPS_06 fields/waves. The CO₂ data are ONLY available for power generation sources, and no information on CO₂ emissions from other Texas point sources is included.

Version 2, 3 October 2006

Account BL0082R, Dow Chemical Freeport Plant B, actually represents the merged results of 3 Dow Freeport facilities: Plant B, Plant A, and Oyster Creek. These three plants were separate accounts in the 1999 point source emissions inventory. In the 2004 data set, these 3 accounts have been merged into one account, BL0082R, which retains the "Plant B" site name. The 2004 coordinates put the facility slightly to the east of Plant B's coordinates in 1999. I was unaware of the account merger and didn't include data for Plant A and Oyster Creek Plant when calculating the 1999 total emissions for account BL0082R in Version 1. Also, estimated 2004 speciated VOC levels for this account in Version 1 were in error in 2 ways:

- 1999 speciated emissions for Plant A and Oyster Creek were missing
- 1999 total VOC for this account was underestimated, so the ratio of (2004 total VOC)/(1999 total VOC) used to scale 1999 speciated VOC emissions was too high.

I have included all three Dow Freeport plants in the 1999 emissions of account BL0082R and in the estimated 2004 speciated VOC emissions.

Be aware that similar account mergers have occurred throughout the state. TCEQ was careful to note the Dow Freeport merger because of the size and complexity of the site. However, TCEQ cannot tell me which other accounts in the 2004 data set might also represent merged versions of 1999 accounts. For now I have no way to identify such errors.

The 2004 latitude and longitude of P H Robinson Power Plant (Account GB0037T) in Version 1 were significantly in error. In Version 2, 2004 coordinates were set equal to 1999 values, which agree with Ron Brown observations and satellite photos on Google Maps.

IGOR experiment contains some improved map data.

Version 1, 2 August 2006

An interim point source emission inventory (EI) for the state of Texas is now available. The inventory includes emissions of NO_x, SO₂, CO, total and selected speciated VOCs, PM_{2.5}, and PM₁₀ from 1858 fixed-location pollution sources statewide, identified by their Texas Commission on Environmental Quality (TCEQ) account number. The data are based on TCEQ's 2004 annual totals, with updates of NO_x and SO₂ emitted by electric power generation facilities to August 2005 levels. Facility information (company, site name, county, latitude/longitude, and Standard Industrial Classification code) is also included. The point EI is available in Excel spreadsheet and IGOR experiment format. IGOR emission maps can be converted to pdf or other formats upon request. The data set structure is very similar to that used by many of you in the TexAQS 2000 study. I have included the 1999 emissions of NO_x, SO₂, CO, and total VOC and the 1999 facility coordinates used in the TexAQS 2000 study ("1999 point EI") for reference purposes.

The files are available through links on the Field Operations page of the 2006 TexAQS/GoMACCS web site (<http://www.esrl.noaa.gov/csd/2006/fieldops>), through FTP at <ftp.al.noaa.gov> (ask me for user and password if you don't know) in /gfrost/Texas_emissions, and for CSD folks in alfs/AL Public/Texas_emissions.

Warning!

These data are meant to be an interim tool for mission planning and initial analysis of observations until a complete, official inventory is available. Look for updates to this data set during and after the field study. **The data should be considered only preliminary estimates of current emissions.**

For example, TexAQS 2000 observations showed that 1999 inventory estimates of VOC emissions, particularly light olefins from petroleum refining, were low by at least an order of magnitude. The 2004 inventory typically contains even lower VOC emissions than the 1999 point EI. The VOC data are useful for indicating relative source strengths, but absolute VOC emissions should be regarded as highly uncertain.

On the bright side, NO_x and SO₂ emission data from electric power plants are generally of higher quality and have been found to agree well with observations on numerous occasions.

Detailed explanation of data fields

In all of the following, "ton" = 1 short ton = 2000 pounds.

- Facility information – Taken from the 2004 TCEQ Annual Point Source EI, obtained in July 2006 from staff in TCEQ's Industrial Emissions Assessment Section.
 - ACCOUNT: TCEQ account number, identifies a particular facility
 - COMPANY: owner of facility
 - SITE_NAME: name of facility
 - COUNTY: Texas county
 - REGION: TCEQ region number
 - SIC: Standard Industrial Classification code. Indicates primary type of industry at facility. Codes of interest include 4911 = Electric Services (i.e., power generation) and 2911 = Petroleum Refining. Code descriptions available at <http://www.osha.gov/pls/imis/sicsearch.html>
 - LAT_04: latitude in 2004 point EI (recommended)
 - LON_04: longitude in 2004 point EI (recommended)
 - LAT_99: latitude in 1999 point EI (for reference only, some are clearly incorrect)
 - LON_99: longitude in 1999 point EI (for reference only, some are clearly incorrect)

- 2004/2005 criteria pollutant mass emissions – For most sources, taken from the 2004 TCEQ Annual Point Source EI, obtained in July 2006 from staff in TCEQ's Industrial Emissions Assessment Section. Annual data in tons/year were divided by 365 to give average daily values. For roughly 120 facilities, nearly all of which are electric power generation plants, hourly reported Continuous Emission Monitoring System (CEMS) emissions of NO_x and SO₂ for August 1-31, 2005 were averaged to get a representative August daily value in tons/day. The CEMS data were then substituted for the 2004 TCEQ data at these facilities.
 - PM10_TPD_04: 2004 PM10 emissions, tons/day
 - PM25_TPD_04: 2004 PM2.5 emissions, tons/day
 - VOC_TPD_04: 2004 total VOC emissions, tons/day
 - NOX_TPD_04: 2004/2005 NO_x emissions, tons/day (as NO₂)
 - SO2_TPD_04: 2004/2005 SO₂ emissions, tons/day
 - CO_TPD_04: 2004 CO emissions, tons/day

- 1999 criteria pollutant mass emissions taken from the TNRCC (now TCEQ) Point Source Database used in the TexAQS 2000 study. Annual data were divided by 365 to give average daily values. Included for comparisons to previous observations.

- VOC_TPD_99: 1999 total VOC emissions, tons/day
- NOX_TPD_99: 1999 NOx emissions, tons/day (as NO2)
- SO2_TPD_99: 1999 SO2 emissions, tons/day
- CO_TPD_99: 1999 CO emissions, tons/day
- 2004/2005 criteria pollutant molar emissions – 2004/2005 mass emission data (see above) converted to molecules/second.
 - VOC_MPS_04: 2004 total VOC emissions, molecules/second
 - NOX_MPS_04: 2004/2005 total NOx emissions, molecules/second
 - SO2_MPS_04: 2004/2005 total SO2 emissions, molecules/second
 - CO_MPS_04: 2004 total CO emissions, molecules/second
- 2004 speciated VOC molar emissions - 1999 speciated VOC molar emissions, from TNRCC data sets provided after the TexAQS 2000 study, were scaled to 2004 levels using the ratio of 2004 total VOC to 1999 total VOC. A value of 0 was used for all species when no 1999 VOC data exist or 1999 total VOC emissions = 0. Units are molecules/second.
 - ACETALDEHYDE_MPS_04
 - ACETONE_MPS_04
 - ACETYLENE_MPS_04
 - ACROLEIN_MPS_04
 - ALKANES_MPS_04
 - ALKENES_MPS_04
 - BENZENE_MPS_04
 - BUTADIENE_MPS_04
 - BUTENE_MPS_04
 - CIS-2-BUTENE_MPS_04
 - CYCLOHEXANE_MPS_04
 - CYCLOPENTANE_MPS_04
 - CYCLOPENTENE_MPS_04
 - ETHANE_MPS_04
 - ETHANOL_MPS_04
 - ETHYLENE_MPS_04
 - FORMALDEHYDE_MPS_04
 - HEXANE_MPS_04
 - HEXENE_MPS_04
 - ISOBUTANE_MPS_04
 - ISOBUTENE_MPS_04
 - ISOPENTANE_MPS_04
 - ISOPRENE_MPS_04
 - MEK_MPS_04
 - METHANOL_MPS_04
 - MTBE_MPS_04
 - N-BUTANE_MPS_04
 - N-HEXANE_MPS_04
 - N-PENTANE_MPS_04

- OLEFINS_MPS_04
- PARRAFINS_MPS_04
- PENTANE_MPS_04
- PROPANE_MPS_04
- PROPYLENE_MPS_04
- UNSPC-NMVOC_MPS_04 (unspeciated non-methane VOCs)

IGOR Experiment

This experiment is similar to the ones Christine Wiedinmyer and I created for the TexAQS 2000 study. It contains GIS data (latitude/longitude waves for state boundary, urban boundaries, primary and secondary roads, water, and airports) identical to those used in TexAQS 2000. These data are saved in Table_MapData (also saved as a macro). As long you don't close that table or remove waves from it, you can close all graphs and delete all waves and still retain the underlying GIS data waves in the experiment. Some clean map template macros with the GIS data and no emissions are saved under the *Graph Macros* list, with views of East Texas, Southeast TX, and the Houston-Galveston area.

The point EI data are loaded and displayed in Table_Emission_Data (also saved as a macro). The maps that come up when opening the experiment (also saved as macros) show the Southeast TX view. They display some GIS data and the point EI 2004 latitude-longitude, shown as red solid circles whose size is determined by the emission level of various species. The 6 maps displayed when the experiment opens are 2004/05 NO_x, 1999 NO_x, 2004 VOC, 1999 VOC, 2004 ethylene, and 2004 propylene.

The 2004 coordinates appear to be more consistent than the 1999 coordinates. The 1999 coordinates locate a few small sources out in the Gulf of Mexico, while the 2004 data at least put everything on land. In most cases, though, the differences between the 2004 and 1999 coordinates are very small. I recommend using 2004 coordinates to make your plots, unless you're looking at differences between the two coordinate data sets.

To make emission maps of any other species besides those shown, just double click on the data within a map. When the *Modify Trace Appearance* window appears, select the *LAT_04* wave and click the *Set as f(z)...* button. Under the *Marker size as f(z)* heading, choose the *Z Wave* you want to use to size the markers. You will probably need to change the *zMin* and *zMax* limits, or use their *Auto* settings. Then hit *OK* and you're set. To avoid later confusion, you should probably also change the caption in the legend window to reflect what you're using as a *Z wave*. I would also recommend saving the graph with a different name than the one it currently has (by closing the graph window and changing the window's name when asked if you want to save the window). The new graph macro will then be listed under the *Graph Macros* tab under *Windows*.

Ask me for help if any of this is unclear.