

Highlights

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The Daily Plan-It

*The TexAQS 2000
Field Study Newsletter
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Clear Today but Rain Chances on Rise

Weather Forecast

Karl Schulze provided today's weather forecast. Morning background ozone levels are elevated in comparison to the past week, with 6 to 7 AM surface hourly concentrations ranging from the mid-20's to the mid-30's. These elevated background levels are associated with the influx of more polluted continental air advected by the east-northeasterly flow.

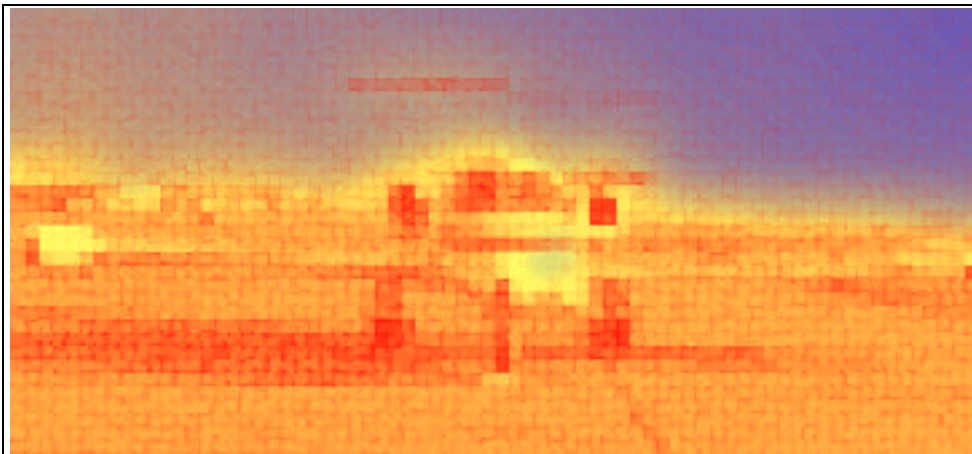
Given yesterday's persistent north-northeasterly flow, the maximum surface levels of hourly ozone occurred south of downtown Houston - at Clute - 20 miles southwest of Galveston - (185 ppbv) from 2 to 3 PM and at Galveston Airport (133 ppbv) from noon to 1 PM. The only other monitoring site to record a preliminary hourly average in excess of 120 ppbv was the Haden Road site - just northwest of the western end of the

ship channel - which recorded 130 ppbv from 2 to 3 PM.

High pressure continues to hang on to our northwest and is keeping low pressure at bay to our east. The dewpoints - through the surface and mid-levels - are still low, and so is today's probability of precipitation. As the flow aloft continues to veer to the

hour-a-day coverage starting on August 15th (depending on the specific instrument) for ozone, formaldehyde, PAN, NO, NO_x, CO, VOCs, temperature, moisture and aerosols (size and composition), scientists at the tower are detecting power plant plumes, changes in the chemical mix that appear to be related to moist convection, and ozone levels that frequently exceed those reported at nearby ground sites. While all these observations are preliminary, they are suggestive of the wealth of information contained within this data set.

A strong day-to-night pattern has been regularly observed in the temperature, moisture and many of the chemical species being sampled 850 feet above-ground-level. Qualitatively, the diurnal patterns seem to parallel those that might be expected at the surface. For example, we are seeing a daily build-up of ozone that reaches a maximum in the afternoon at the same time the relative humidity reaches its minimum (typically 30%) and air temperature reaches its highest value.



The NASA Learjet (N933WA) is conducting thermal mapping today over Houston

east-southeast there is an increasing chance of precipitation on Thursday PM, Friday and Saturday.

Williams Tower Report

By Carl Berkowitz

Preliminary results from the Williams Tower site are already helping to refine our understanding about the chemistry and meteorology in and around the Houston area. With 24-

While this pattern suggests that the Williams Tower site is not de-coupled from the surface at night (as would be implied if only a weak diurnal cycle were observed in ozone, suggesting no nighttime interaction with NO from surface auto emissions), such a conclusion would be premature until a closer comparison can be done with similar day/night measurements taken from other TexAQS2000 surface sites. It is possible that the day/night cycles being observed at 850 feet may be greatly damped from that seen at the surface, implying either weak de-coupling, or some other nocturnal vertical exchange process (e.g., mechanically generated turbulence). We anticipate that the airsonde and profiler observations being taken at the downtown site will help clarify this issue.

We have observed that this regular day/night cycle is disrupted during moist convection. During one such episode (the evening of September 1), relative humidity rose abruptly from below 20% to greater than 50%, with a corresponding drop in temperature (possibly associated with cool downdrafts from the convective cells). Little change in ozone was detected during this event as might be expected with a compound having a relatively low solubility. What changes were observed in ozone mixing ratios may be the result of vertical exchange processes occurring during convection, bringing the local atmosphere into a well-mixed state. In contrast, the more soluble nitrogen species (e.g. many of the component species of NO_y) quickly dropped from between 10 and 20 ppb, to well below 10 ppb as the storm passed the Williams Tower.

Sulfur dioxide levels have been generally quite low (~ 1 ppb). But short excursions of SO₂ up to the many 10's of ppb have been measured several times during the campaign, usually under synoptic-scale southerly flow, suggesting plumes that may have

come from the Parish Power Plant. These events have been very brief in nature, lasting well under an hour. They are also associated with an ozone reduction well below the levels measured just prior to the SO₂ spikes, and showed an increase in NO of a few ppb (consistent with the lower ozone levels).

Nitrous acid levels measured by the API-365 system have been very low during the night, with values increasing shortly after sunrise. Although the low nighttime levels might be expected, the increase at sunrise is somewhat surprising given its rapid photolysis rate. One possibility that we hope to look into using the downtown Houston airsonde observations is that this chemical feature is related to the upward mixing of a ground-based source of this compound.

It has not been unusual for the tower ozone measurements to be much greater than those reported by the surface Houston area network. While not a regular occurrence, we have noted this on a number of mornings, suggesting the presence of layers of ozone and other species aloft that are not being seen at the surface. Pollutant layers have been reported during other aircraft campaigns (e.g., the NARSTO studies). However, the presence of these layers, and their chemical composition has been difficult to assess with the aircraft observations due to the scattered nature of such measurements. Seeing similar features in the Williams Tower data offers hope that we can develop a better understanding of the role of these layers on surface chemistry via analysis of the associated PAN, NO_x and VOC observations being made during the Texas 2000 Air Quality Study.

The above observations and postulated interpretations are very preliminary and are presented only to illustrate the wealth of information in

this data set. When combined with measurements from the aircraft and profiler/airsonde network, we hope to follow up these and other lines of inquiry involving regional transport into the Houston area, the role of emissions from the ship channel and issues related to a variety of photochemical processes.

NARSTO NEWS -- Request for TexAQS 2000 Articles

A request from Jake Hales of NARSTO.

The NARSTO News is interested in publishing a series of short articles summarizing early scientific results of the TexAQS 2000 campaign. The current newsletter edition (viewable on the NARSTO Web site, <http://www.cgenv.com/Narsto>) features an overview of TexAQS 2000. This is a highly qualitative description, however; and in the next issue we hope to include some more "meaty" articles describing early scientific results of the effort.

We'd like to encourage everyone who's associated with TexAQS 2000 to consider submitting short articles of this type, which essentially preview "first results" of your individual scientific efforts. We can handle equations and (electronic) graphics in the newsletter, although contributors should note that the printed version is produced in grayscale, not color.

We're going to shoot for a late December deadline for the next issue. Please send your contributions to the NARSTO Management Coordinator's office by e-mail to jake@cgenv.com.

Electra N308D

The Electra is flying today with a take off scheduled at 10:30 AM for a 5 to 6 hour Houston urban area characterization flight - likely a stack (a series of parallel, crosswind transects) proceeding downwind from the

northeast through the southwest at a nominal altitude of 2000 feet msl. The Electra will also conduct a brief intercomparison with the NASA WB-57 over the Gulf at altitudes of 5, 10, 15, and 20k feet.

Tomorrow the Electra is leaving at 11 AM for a 6-hour research flight upwind, over and downwind of the Dallas/Fort Worth area. It is anticipated that the Dallas/Fort Worth plume will be advected to the northwest. This flight is designed to mimic the August 23rd flight over the Dallas area in which high-efficiency ozone production was encountered.

G-1 N701BN

The G-1 is conducting a 3-hour urban characterization flight beginning at 2:30 PM. The G-1 will fly at 1500 to 2000 feet msl along east/west transects from the northeast to the southwest of Houston.

The G-1 is also planning a research flight tomorrow with a possible I-10 corridor intercomparison with the Twin Otter. The flight is currently planned for mid-afternoon but it could leave earlier to accommodate the weather.

DC-3 N56KS

Now that resources for three additional flights have been secured, the DC-3 is conducting a 5 to 6 hour urban characterization flight today. The DC-3 took off at 11 AM to fly a

series of northwest-to-southeast oriented transects from northeast of Houston through the southwest at an altitude of 11.5k feet msl.

Weather permitting, the DC-3 is also planning a mid-day flight tomorrow beginning at 11 AM.

Twin Otter N153BU

The Twin Otter is not flying today but is planning a flight tomorrow. It

Upcoming Events

Daily Meteorological and Aircraft Planning Meetings - 7:30 AM and 1:00 PM (Ellington CapRock Building, Conference Room).

Aerosol Group Meeting - To be announced. Dave Allen may be back late today so a Thursday meeting is possible.

LaPorte Team Meeting - Will be held tomorrow (Thursday, September 7th) from 2 to 4 PM in Room 1408 of the Bayou Building at the University of Houston-Clear Lake.

Thoughts for the Day

“Never mistake knowledge for wisdom. One helps you make a

living; the other helps you make a life.”

–Sandra Carey

“Real knowledge is to know the extent of one's ignorance.”

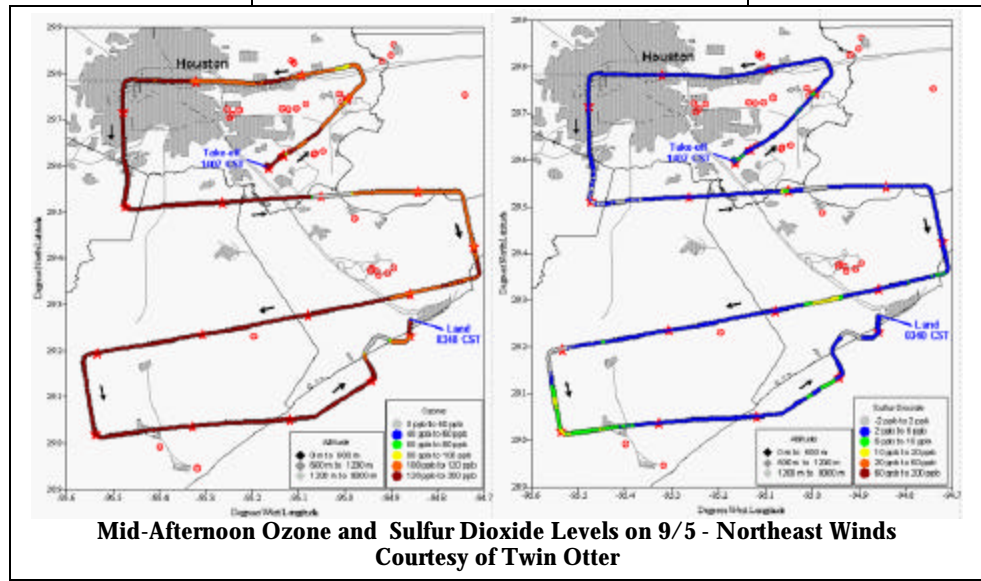
–Confucius

“Expecting the world to treat you fairly because you are a good person is like expecting a bull not to attack you because you are a vegetarian.”

–Dennis Wholey

“The reputation of a thousand years may be determined by the conduct of one hour.”

–Japanese proverb



will conduct a 2.5-hour urban characterization flight beginning mid-day with a possible intercomparison with the G-1.

Learjet N933WA & Citation N10EG

The thermal mapping aircraft are here today and gone tomorrow. Both aircraft are conducting high-resolution thermal scans of the Houston area today. The Learjet flew (at 16.5k msl) from 10:30 AM through about 2:30 PM before returning to Stennis. The Citation flew this morning and this evening (6:30 PM to 9:00PM) at 40k msl.