Compilation and Analysis of Meteorological Data

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http://www.met.tamu.edu/texaqs2

Main Tasks (H84)

- Develop comprehensive meteorological dataset for TexAQS-II Field Intensive
- Post data on web
- Assess usefulness of data for model evaluation
- Characterize meteorological conditions, especially TRAMP and VME
- Determine model successes and failures, recommend path toward model improvement

Data Collection

- Surface
  - METAR/ASOS
  - TCEQ
  - Buoys
  - Ports
- Radar and Satellite
- Upper Air
  - NWS sondes
  - UH sondes
  - Valparaiso O3sondes
  - STI profilers
  - NOAA HRDL lidar
  - NASA lidar
  - NOAA lidar
  - In situ aircraft data

TexAQS 2 Atmospheric Data Repository

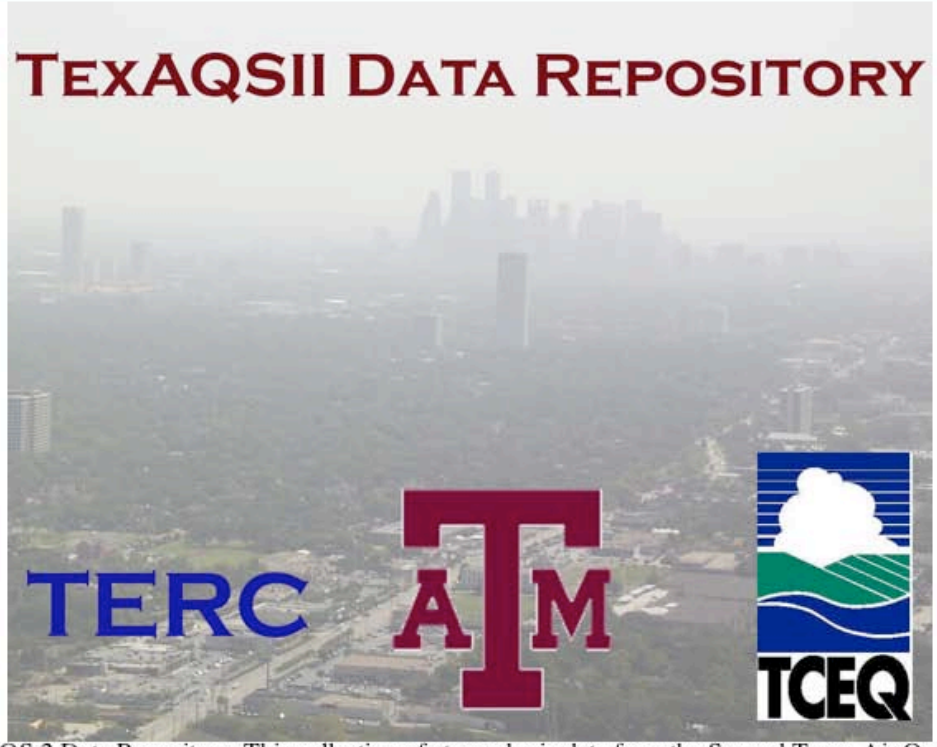
HOME PAGE

DATA BY STATION
- NCDC Surface Data
- TCEQ Surface Data
- NCDC Upper Air Data
- NDBC Buoy Data
- NOAA Ports Data
- STI Profiler Data

DATA BY DATE
Click above for calendar

OUTSIDE LINKS
Will open in a new window
- CRWS Satellite Archive
- HPC Surface Analyses
- HRDL Lidar Data
- NOAA ESRL Trajectory
- NOAA TexAQS2 Home
- Rice Ozonesonde Data
- RSST Working Group L Links
- TAMU Forecast Archive
- UH Rawinsonde Data

More Coming Soon!



Welcome to the TexAQS 2 Data Repository. This collection of atmospheric data from the Second Texas Air Quality Study is provided by Department of Atmospheric Science at Texas A&M University in conjunction with TCEQ and TERC.

Agencies currently providing data include:
Texas A&M University (TAMU) • Rice University • University of Houston (UH)
Texas Commission on Environmental Quality (TCEQ) • NOAA-ESRL
NOAA-NCDC • NOAA-NCEP • NOAA-NDBC
Some data available here now or in the future may also be furnished by other agencies.

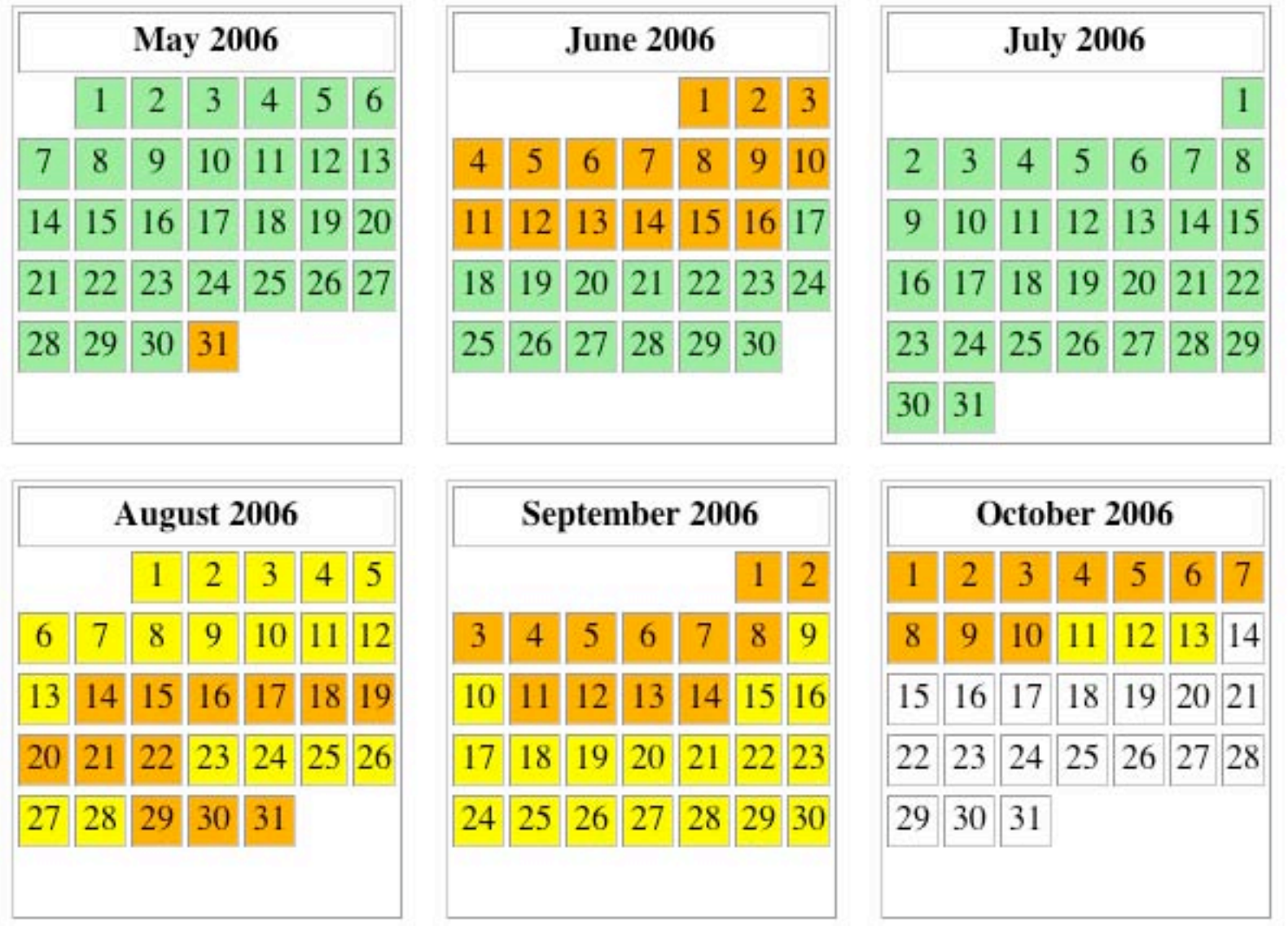
The Texas A&M TexAQS 2 team is:
Dr. John Nielsen-Gammon (PI)
James Tobin (webmaster)
Steve Bliujus
Andrew McNeel
Brent McRoberts
Boksoon Myoung

Thanks for visiting!

Access full time series (surface or upper air) for an individual station

Main portal: access any and all data for a specific date

Links to UH, NOAA, other useful info



TCEQ episodes (orange)

Field Intensive (yellow)

Field program (green)

Who cares? (white)

Previous Day

Daily Summary for August 17, 2006

Next Day

Peak Ozone:	Peak Station:	Bkgd Ozone:	Bkgd Station:
113 ppb	Tom Bass C558	49 ppb	Lake Jackson C1016

Overview

This Thursday was the fourth day of episode ep06B. The day was characterized by extremely light morning winds and moderate background ozone values. The remnants of a frontal zone were present across eastern Texas. The highest ozone was measured along the southern edge of Harris County. There were 13 exceedances and 24 near-exceedances.

Data

Raw data for this event can be found by clicking here.

Radar Composites


1200 UTC

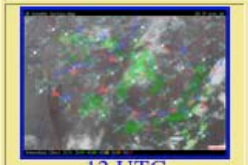

1500 UTC

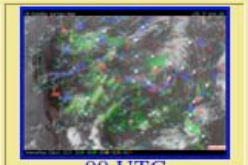

1800 UTC


2100 UTC


0000 UTC

Satellite-Surface Map Composites


12 UTC


00 UTC

Profiler Maps


06 UTC


12 UTC

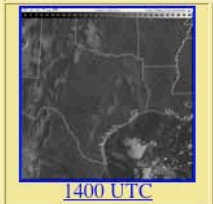

18 UTC

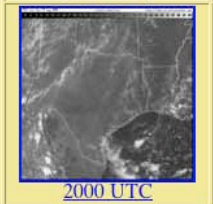

00 UTC

Visible Satellite Images

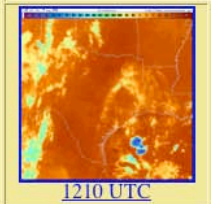

06 UTC | 12 UTC | 18 UTC | 00 UTC

Visible Satellite Images


1400 UTC | 1500 UTC | 1600 UTC | 1700 UTC | 1800 UTC


2000 UTC | 2100 UTC | 2200 UTC | 2300 UTC | 0000 UTC

Infrared Satellite Images


1210 UTC | 1810 UTC | 0010 UTC

Surface Plots

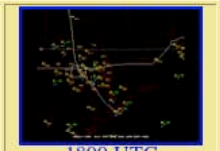
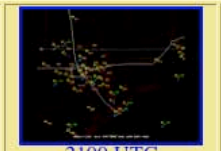

04 UTC | 08 UTC | 12 UTC

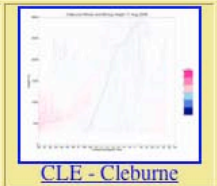
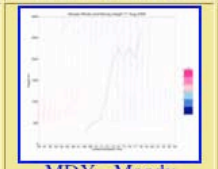
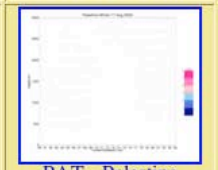
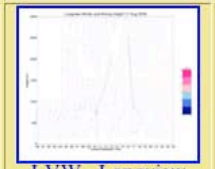
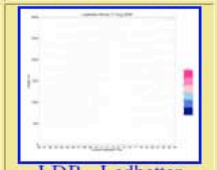
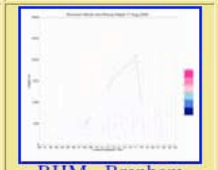
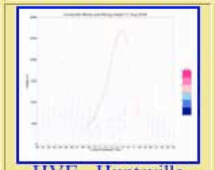
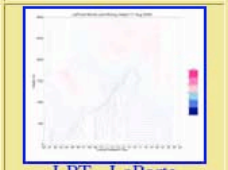
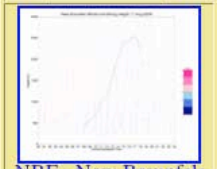
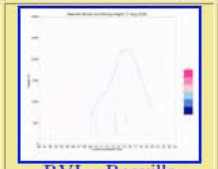
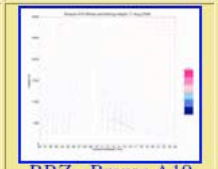
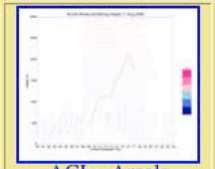
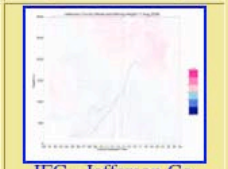

16 UTC | 20 UTC | 00 UTC

High Resolution Surface Plots

Houston-Galveston

16 UTC	20 UTC	00 UTC

High Resolution Surface Plots				
Houston-Galveston				
 1200 UTC	 1500 UTC	 1800 UTC	 2100 UTC	 0000 UTC
Dallas-Fort Worth				
 1200 UTC	 1500 UTC	 1800 UTC	 2100 UTC	 0000 UTC

Time-Height Profiler Plots				
IMAGE NOT AVAILABLE SeOK - SE OK	 CLE - Cleburne	IMAGE NOT AVAILABLE EcOK - E Cen OK	IMAGE NOT AVAILABLE SwAR - SW AR	
 JTN - Jayton	 MDY - Moody	 PAT - Palestine	 LVW - Longview	IMAGE NOT AVAILABLE Winnfield - Winnfield
 SNR - Sonora	 LDB - Ledbetter	 BHM - Brenham	 HVE - Huntsville	 LPT - LaPorte
 NBF - New Braunfels	 BVL - Beeville	 BRZ - Brazos A19	 ACL - Arcola	 JFC - Jefferson Co.

Event Description

Meteorology

Event Description

Meteorology

Skies were mostly clear, with scattered boundary-layer cumulus and some thin cirrus. The mixing height grew steadily during the day, reaching 1800-2500 m by mid to late afternoon, with an indistinct top according to the UH sounding. Winds were light and convergent across Houston during the morning. Stations to the north and east tended to detect northeasterly winds, while stations to the south and west tended to detect westerly winds. Winds became erratic but predominantly easterly during the late afternoon. High temperatures were in the upper 90s and afternoon dew points were in the low 70s, making the day unusually humid.

Local Effects

The winds were "squirrelly". There was no dominant wind direction through most of the day. However, individual stations typically recorded wind directions consistent with those of their immediate neighbors. This localized variation of wind direction may be due to the remnants of the cold front and outflow boundaries stalling over the area, or it may be due to local land surface inhomogeneities. A Galveston Bay breeze formed during the afternoon along the western coast of Galveston Bay, but the Gulf breeze was very weak in the presence of large-scale northeasterlies along the coast. A sudden increase in ozone and other pollutants was likely observed in the early afternoon at the Moody Tower. This represents a transition between relatively clean air being advected from the west and relatively dirty air being transported from the east.

Nighttime Processes

Nighttime winds should have carried the previous day's ozone plume some distance to the north and west of Houston. After 4:00 AM, low-level winds in Houston were light and from the west, allowing development of a shallow plume of ozone precursors along and to the east of the Ship Channel. The following evening, winds were from the southeast at about 10 mph, weakening to essentially calm conditions by the next morning.

Ozone Conceptual Model

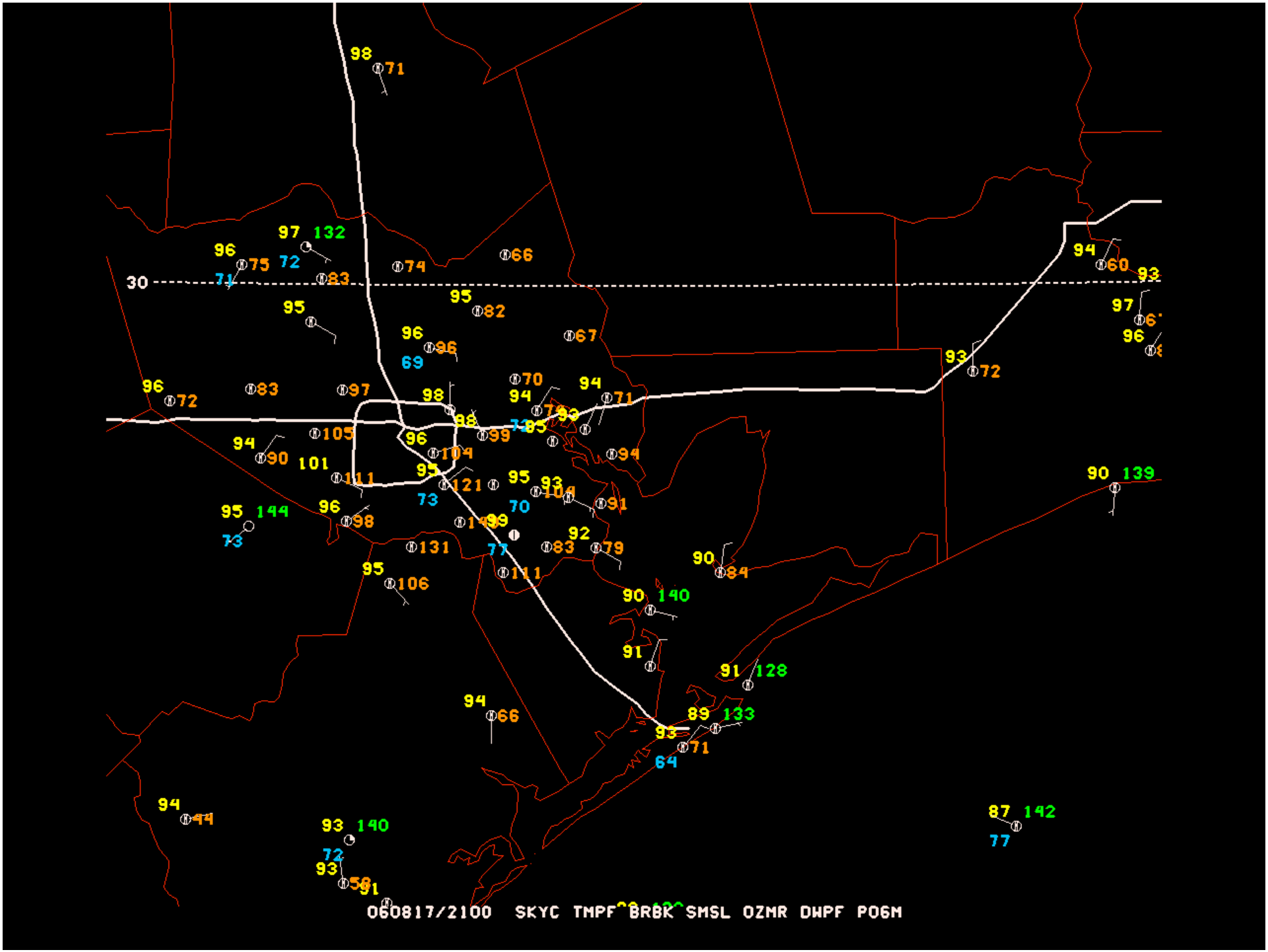
The wind evolution did not fit the coastal oscillation model, perhaps because the cold front brought in new continental air that had not yet responded to the diurnal heating contrast. The high ozone was a consequence of the light wind field, while rapid increases of ozone in certain areas appears to have been due to the spatial variability of the wind field rather than exceptional releases of precursors. Ozone in outlying areas increased toward the north, even though transport during the day was from north to south. This suggests that the northeasterly winds behind the decaying cold front were associated with transport of high background levels of ozone from the central and eastern United States. Because winds above 1000 m were much more prominently from the northeast than lower level winds, because the peak ozone occurred in mid-afternoon, and because the mixing height was largest at about that time, it seems likely that high background ozone was advected over Houston during the morning and then mixed downward into Houston during the afternoon.

Model Evaluation

The UH F2 8-h ozone forecast was poor. The model meteorology did not provide a sufficiently accurate wind field. This may partly due to the variable wind pattern associated with the dissipating cold front and outflow boundaries, and partly due to a burst of simulated convection overnight along the front east of Houston. Both the F2 and the TAMU models produced light northerly winds during the morning in the Houston area, unlike the observed westerly winds. As a result, no stagnation or wind reversal took place in the models and the simulated ozone in F2 was broadly distributed south of Houston and less highly concentrated. The model should perform significantly better through assimilation of wind information, but because of the significant local wind variations, an accurate simulation of this day may be difficult to achieve. Even if the winds are perfect during the day, however, the inferred substantial background ozone gradient will be difficult to position properly, as it depends on winds over North America for the past several days. The UH TMNS11n2 run has vastly better positioning of the highest ozone, but its high ozone area slightly to the northwest of where it was observed, the high-ozone stations to the northeast (indicative of a spatially variable background) are only moderate-ozone in the simulation. Simulated mixing heights were a bit larger than observed.

Author(s): John Nielsen-Gammon

Last update: Feb. 16, 2008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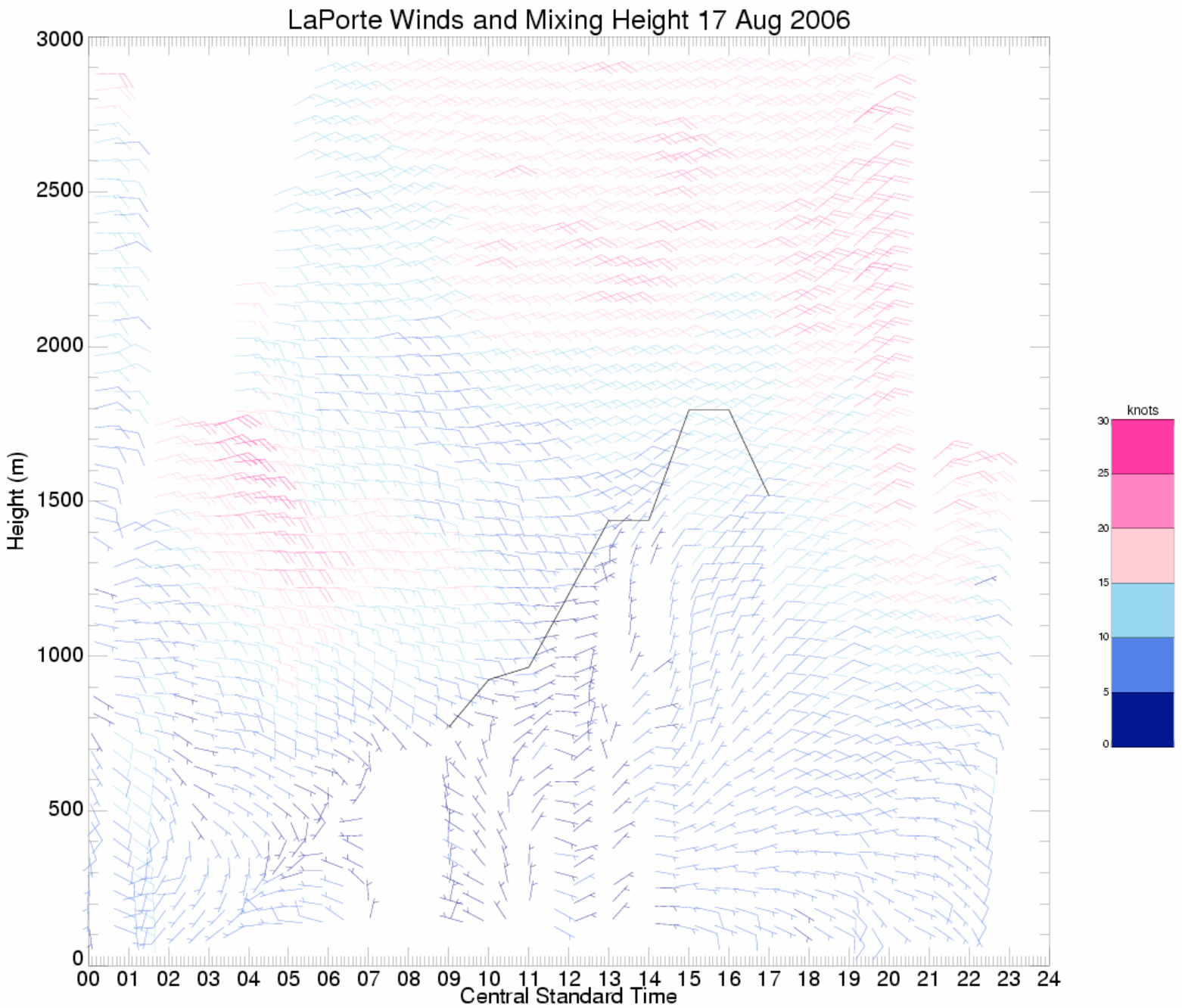
LaPorte Winds and Mixing Height 17 Aug 2006
Height (m)
3000
2500
2000
1500
1000
500
0
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Central Standard Time
knots
30
25
20
15
10
5
0

2006 August 17 Daily Data

- The QC level represents the level of quality control the data have undergone. Level 0 indicates the data have not yet undergone any quality control aside from that performed by the agency providing the data. Level 1 indicates that the data have been filtered for highly improbable values only. Level 2 indicates that the data have been more thoroughly reviewed. Use at your own risk.
- See the stations section of each data file for information regarding the data format.
- These files will contain all the data for the specifed date. The first column will be the station. The date may or may not still appear. All actual data is still in the same order as it appears in the station files.

DATA FILES

File Name	File Description	Password	QC Level
NCDCsurface.TX2	NCDC Surface Data	**YES**	0
NCDCupperair.TX2	NCDC Upper Air Data	NO	0
NDBCbuoys.TX2	NDBC Buoy Data	NO	0
NOAAports.TX2	NOAA Ports Data	NO	1
TCEQsurface_fivemin.TX2	TCEQ Five-Minute Surface Data (Events/Intensive Only)	NO	0
TCEQsurface_hourly.TX2	TCEQ Hourly Surface Data	NO	0
060817.ACL_RWP.txt	ACL Arcola Radar Wind Profiler	NO	2
060817.BHM_RWP.txt	BHM Brenham Radar Wind Profiler	NO	2
060817.BRZ_RWP.txt	BRZ Brazos A19 Radar Wind Profiler	NO	2
060817.BRZ_SODAR.txt	BRZ Brazos A19 SODAR	NO	2
060817.BVL_RWP.txt	BVL Beeville Radar Wind Profiler	NO	2
060817.CLE_RWP.txt	CLE Cleburne Radar Wind Profiler	NO	2
060817.HVE_RWP.txt	HVE Huntsville Radar Wind Profiler	NO	2
060817.JEF_RWP.txt	JEF Jefferson County Airport Radar Wind Profiler	NO	2
060817.JTN_RWP.txt	JTN Jayton Radar Wind Profiler	NO	2
060817.LDB_RWP.txt	LDB Ledbetter Radar Wind Profiler	NO	2
060817.LPT_RWP.txt	LPT La Porte Radar Wind Profiler	NO	2
060817.LVW_RWP.txt	LVW Longview Radar Wind Profiler	NO	2
060817.MDY_RWP.txt	MDY Moody Radar Wind Profiler	NO	2
060817.NBF_RWP.txt	NBF New Braunfels Radar Wind Profiler	NO	2
060817.PAT_RWP.txt	PAT Palestine Radar Wind Profiler	NO	2

IMAGE FILES

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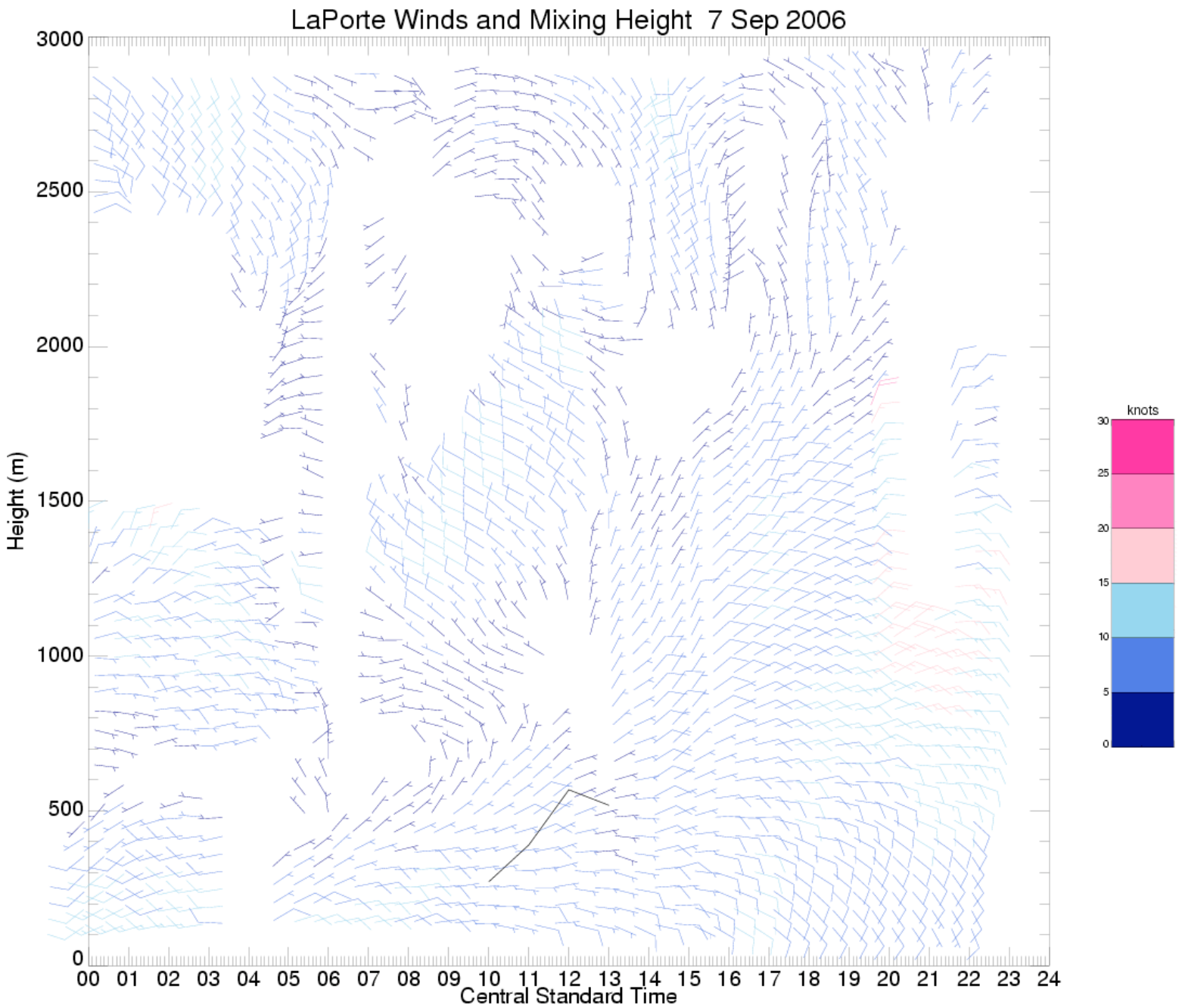
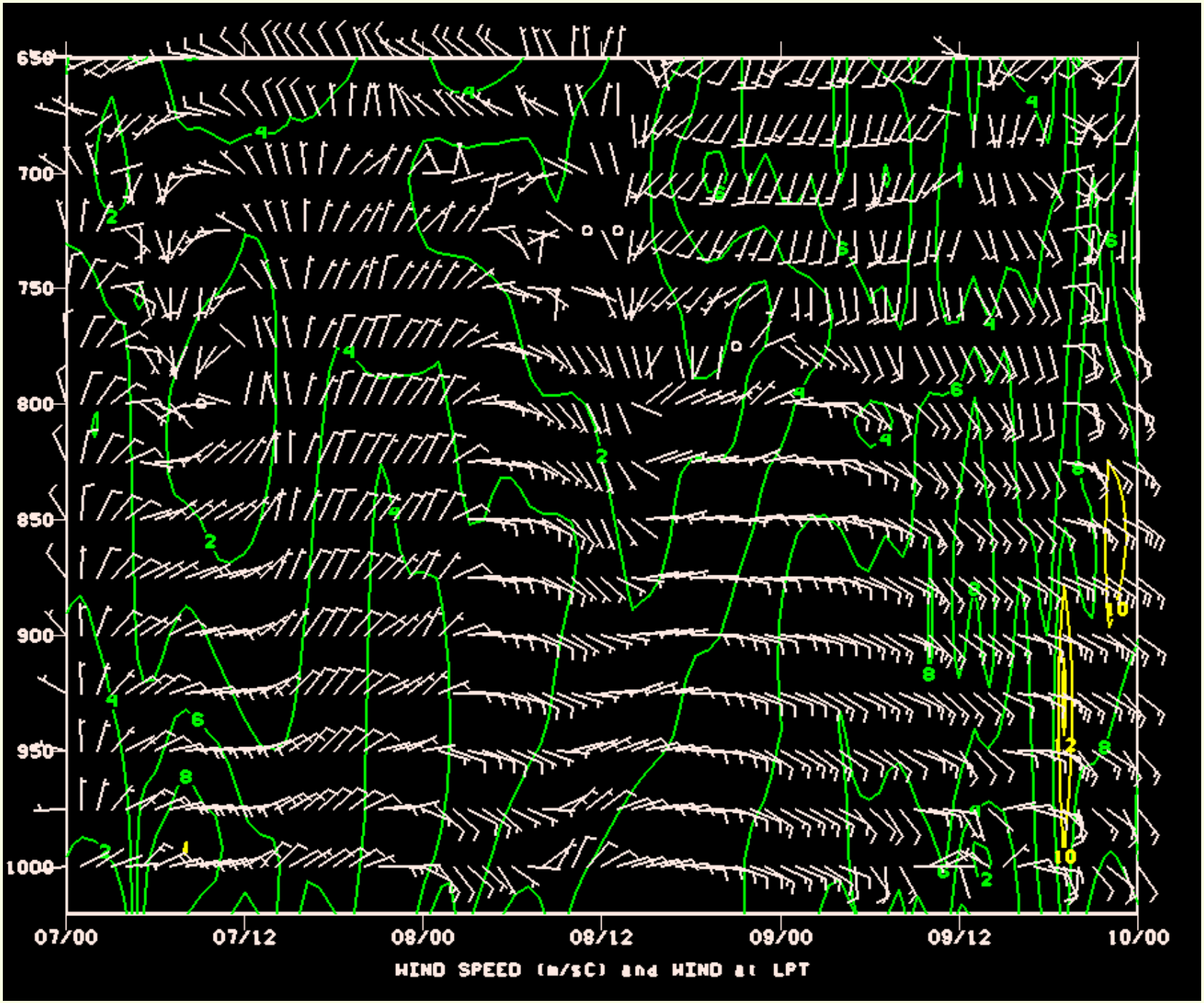
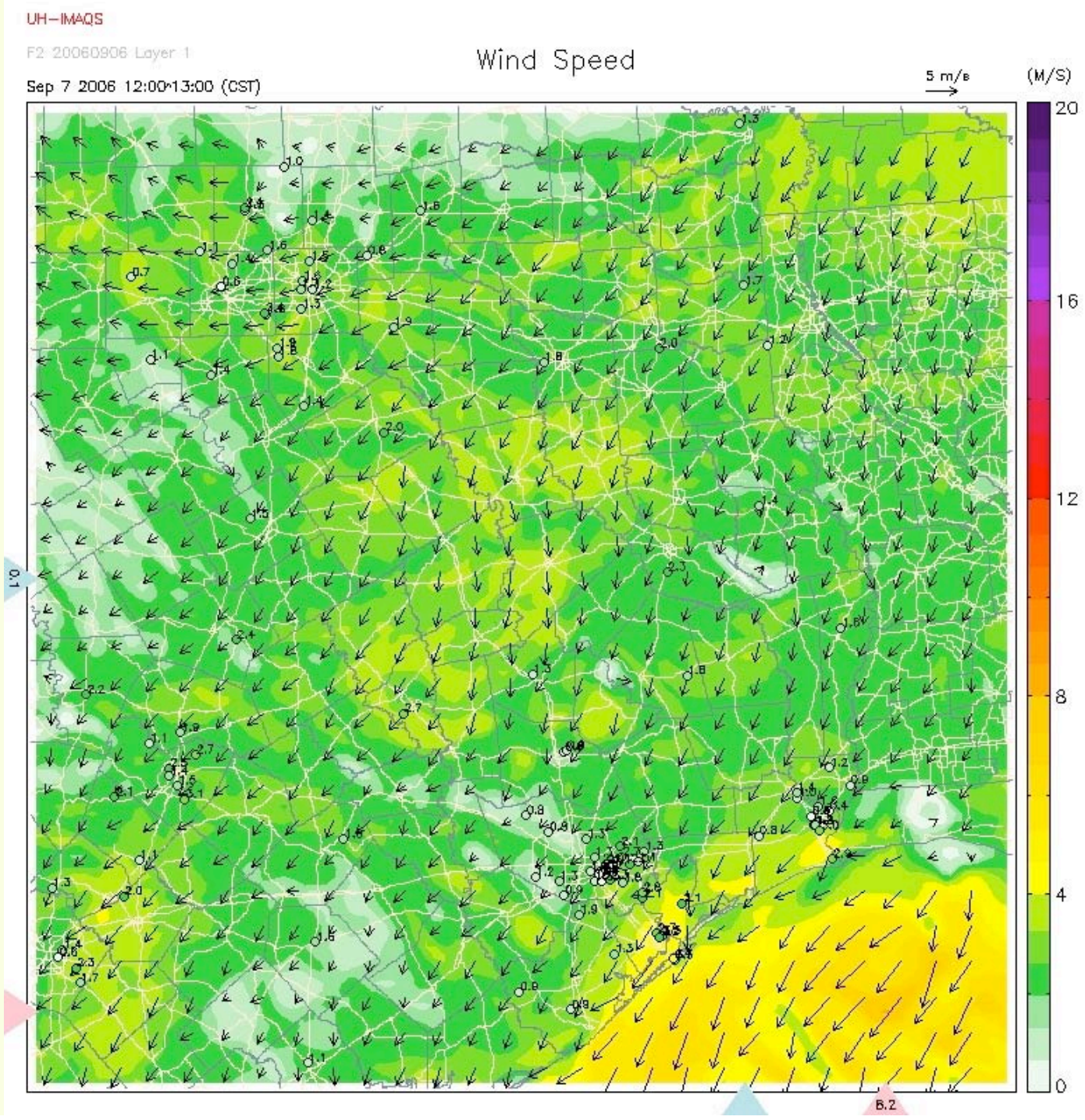
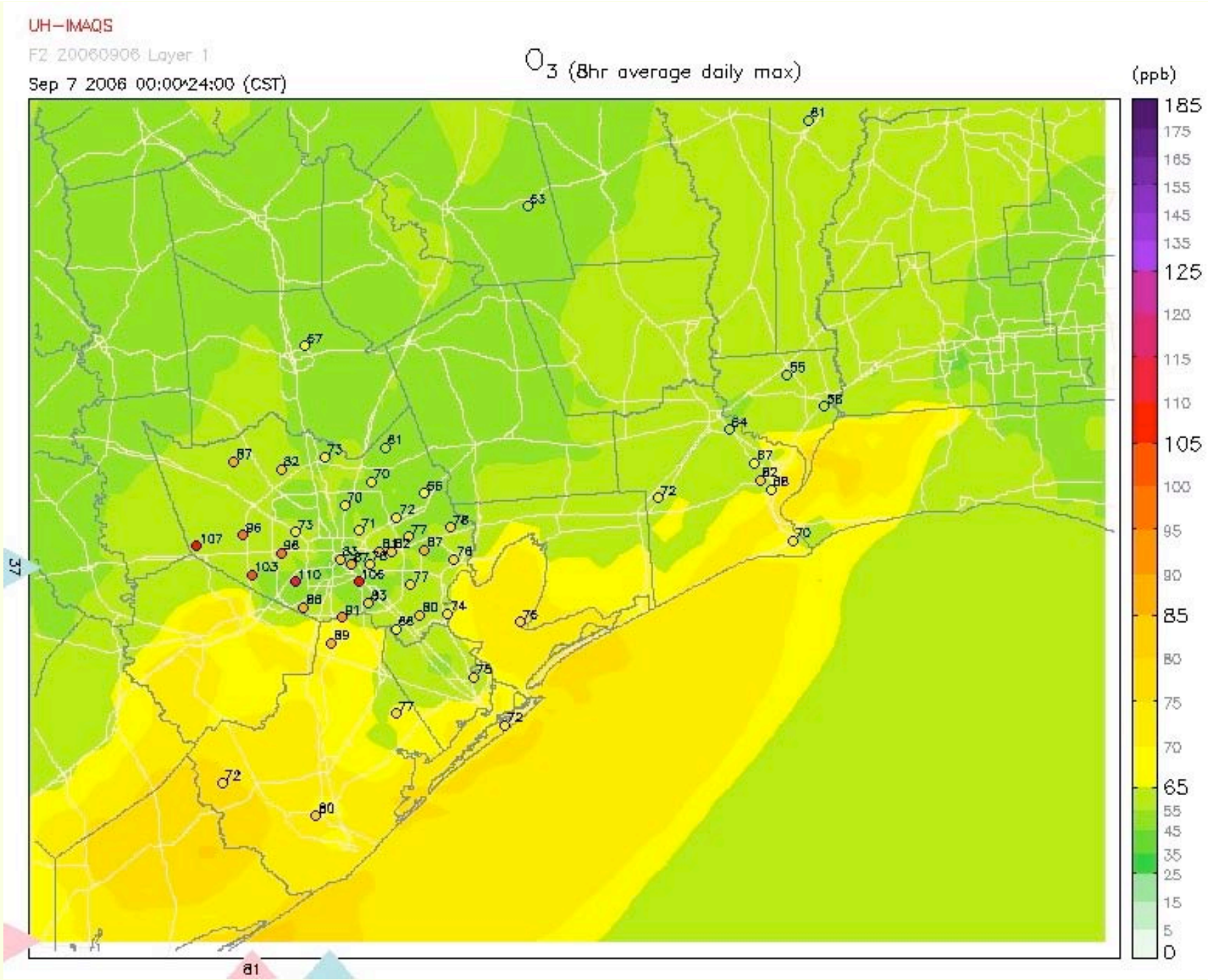
RWP_BHM_20060817.gif	
RWP_BRZ_20060817.gif	

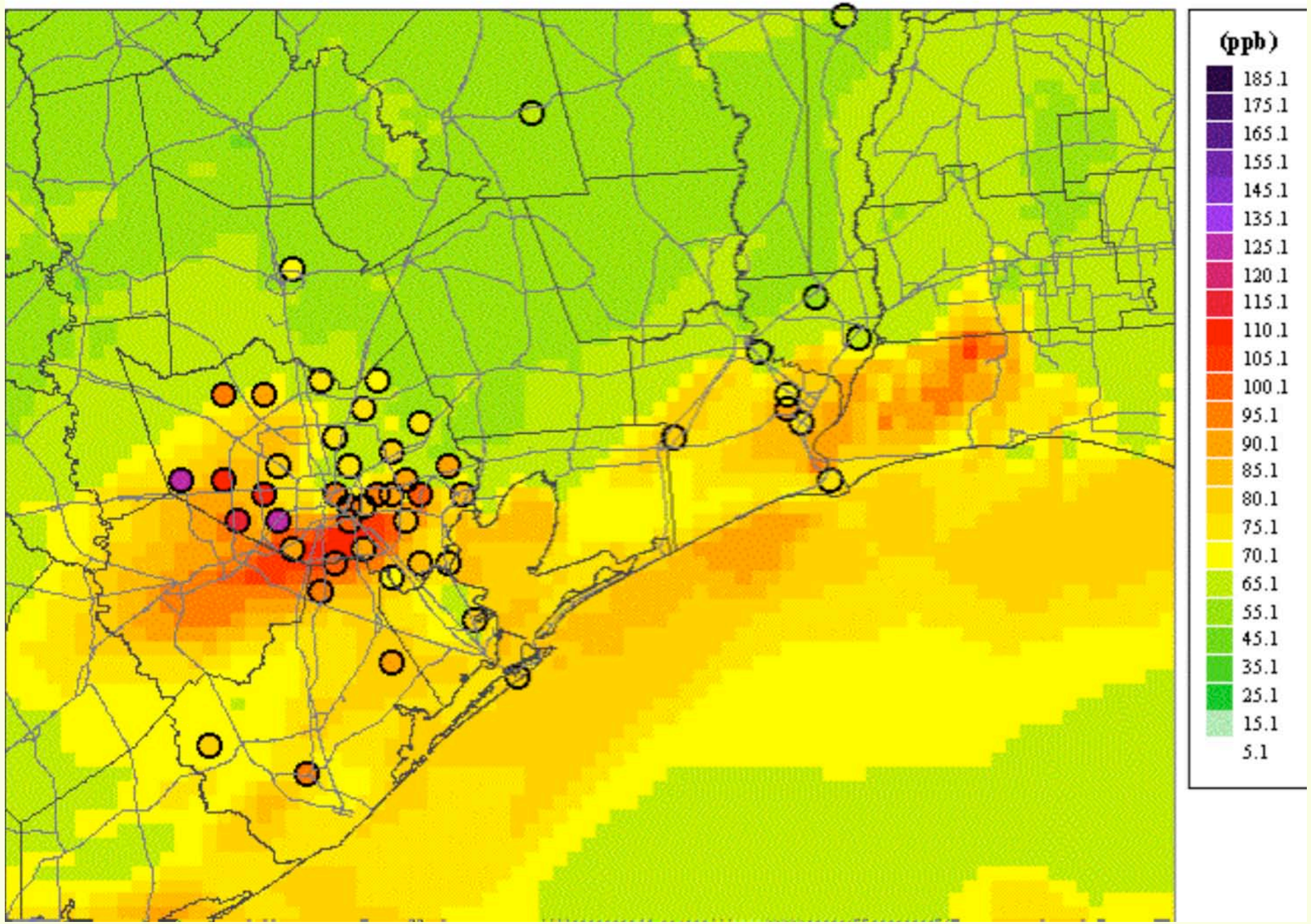

LaPorte Winds and Mixing Height 7 Sep 2006
Height (m)
3000
2500
2000
1500
1000
500
0
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Central Standard Time
knots
30
25
20
15
10
5
0


650
700
750
800
850
900
950
1000
07/00
07/12
08/00
08/12
09/00
09/12
10/00
WIND SPEED (m/sC) and WIND at LPT


UH-IMAQS
F2 20060906 Layer 1
Wind Speed
Sep 7 2006 12:00-13:00 (CST)
5 m/s
(M/S)
20
16
12
8
4
0
0.1
8.2


UH-IMAQS
FZ 20060906 Layer 1
Sep 7 2006 00:00^24:00 (CST)
O3 (8hr average daily max)
(ppb)
185
175
165
155
145
135
125
120
115
110
105
100
95
90
85
80
75
70
65
55
45
35
25
15
5
0
37
81

Ozone Conc. at 20060907:14cst [TMNS11n2]



August 17, 2006

- Observed mixing heights much deeper than on August 25, 2000
- Simulated mixing heights deeper yet, on average
- Wide spatial variability

Recommendations

- Careful diagnosis of northerly wind error
- Vertical mixing improvement…see project concept