



DFW Modeling

Updates 1999 Base Case and Baseline

Pete Breitenbach

Photochemical Modeling Technical Committee

NCTCOG

February 2, 2006



DFW 8-Hour Ozone Episode

August 13-22, 1999

Day	Date	Max O3	Site Name	# Sites	Remarks
Fri	Aug 13	67	Frisco	0	SW Winds, Ramp Day
Sa	Aug 14	103	Arlington	4	NE Winds
Sun	Aug 15	97	Keller	6	East Winds
Mon	Aug 16	107	Keller	6	East Winds
Tue	Aug 17	<u>126</u>	Frisco, Denton	7	Light SE Winds
Wed	Aug 18	116	Frisco	4	Light South Winds
Th	Aug 19	108	Midlothian	2	Weak Front, N Winds
Fri	Aug 20	98	Midlothian	1	NE Winds
Sa	Aug 21	98	Arlington	5	East Winds
Sun	Aug 22	89	Denton	2	SE Winds
Mon	Aug 23	59	Denton	0	S Winds, Low Ozone



New (Updated) Base Case Run 45

- Texas Emissions Inventory Updates
 - Reduced Texas NO_x by 380 tons (-7%)
 - Reduced Texas VOCs by 783 tons (-24%)
 - Mobile, Area/Off Road updates
- Significant National Inventory Changes
 - Reduced National NO_x by 5334 tons (-8%)
 - Reduced National VOCs by 3858 tons (-10%)
 - Update from 99 NEI v2 >>> 99 NEI v3
- Results: Texas Ozone Production decreased
1-5 ppb

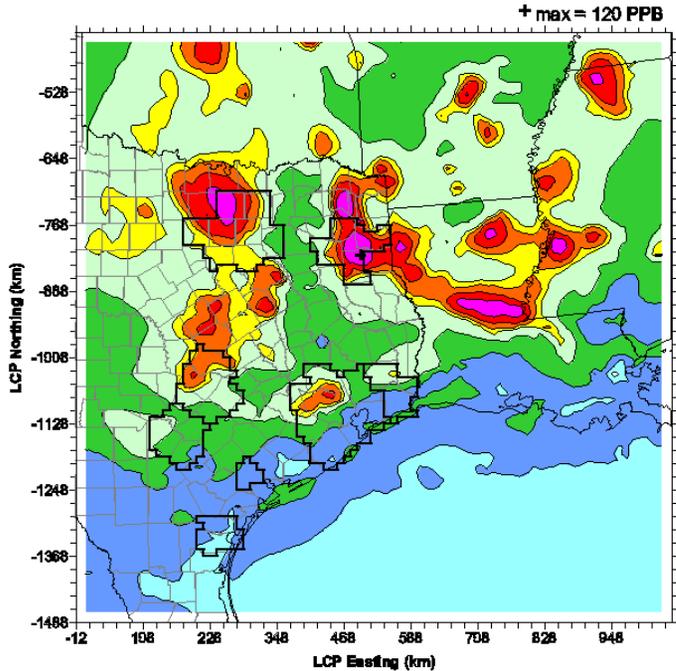


Comparing Base Cases

New (Run 45) vs Old (Run 42)

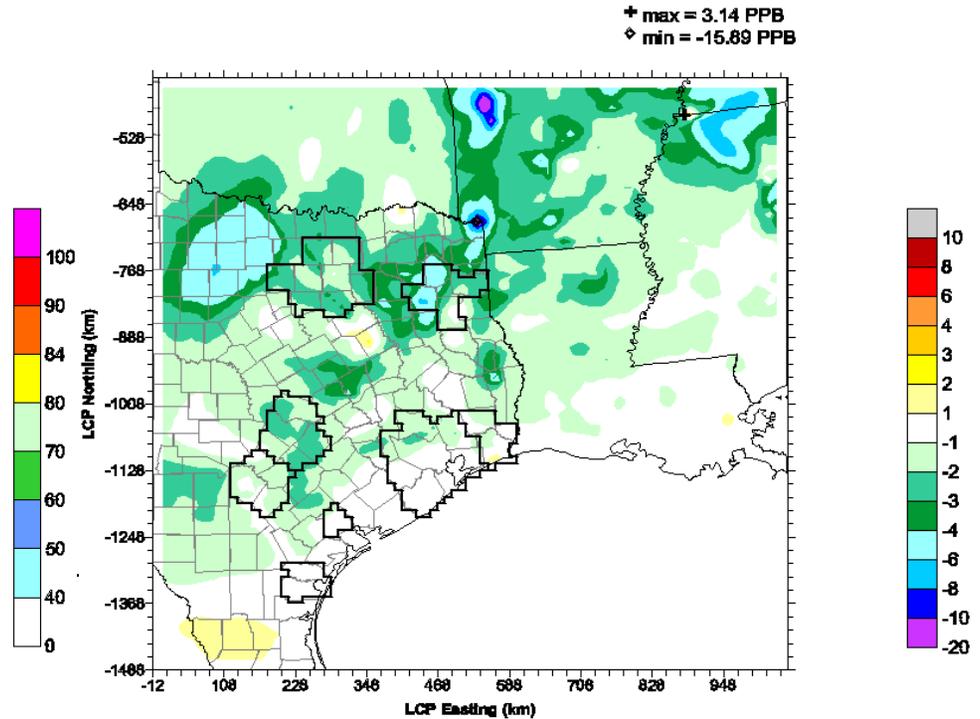
August 17, 1999

Base Case Run 45



Daily Max 8hr O3 (ppb)
DFW 1999 Baseline Case, 12km, Run 45
August 17, 1999

Difference Plot



Difference in Daily Max 8hr O3 (ppb)
1999 Base Case: Run 45 - Run 42
August 17, 1999

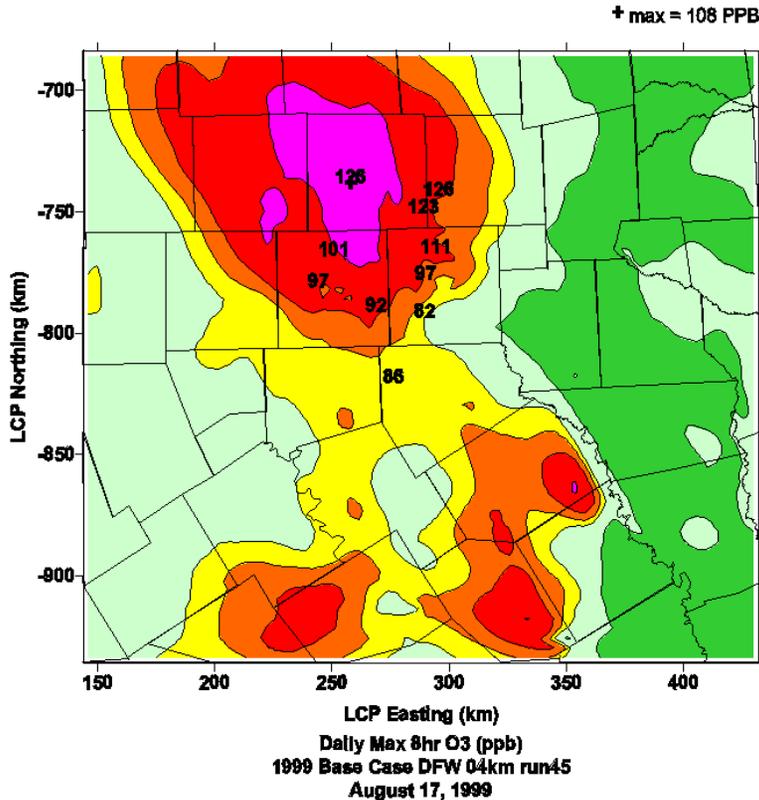


Comparing Base Cases

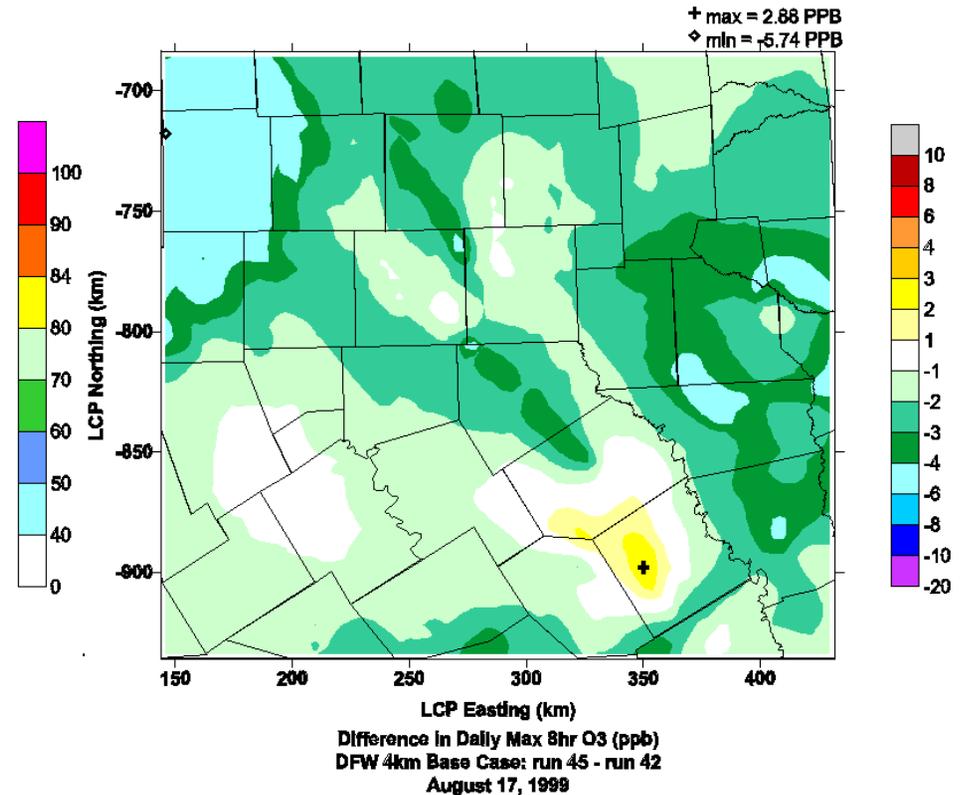
New (Run 45) vs Old (Run 42)

August 17, 1999

Base Case Run 45



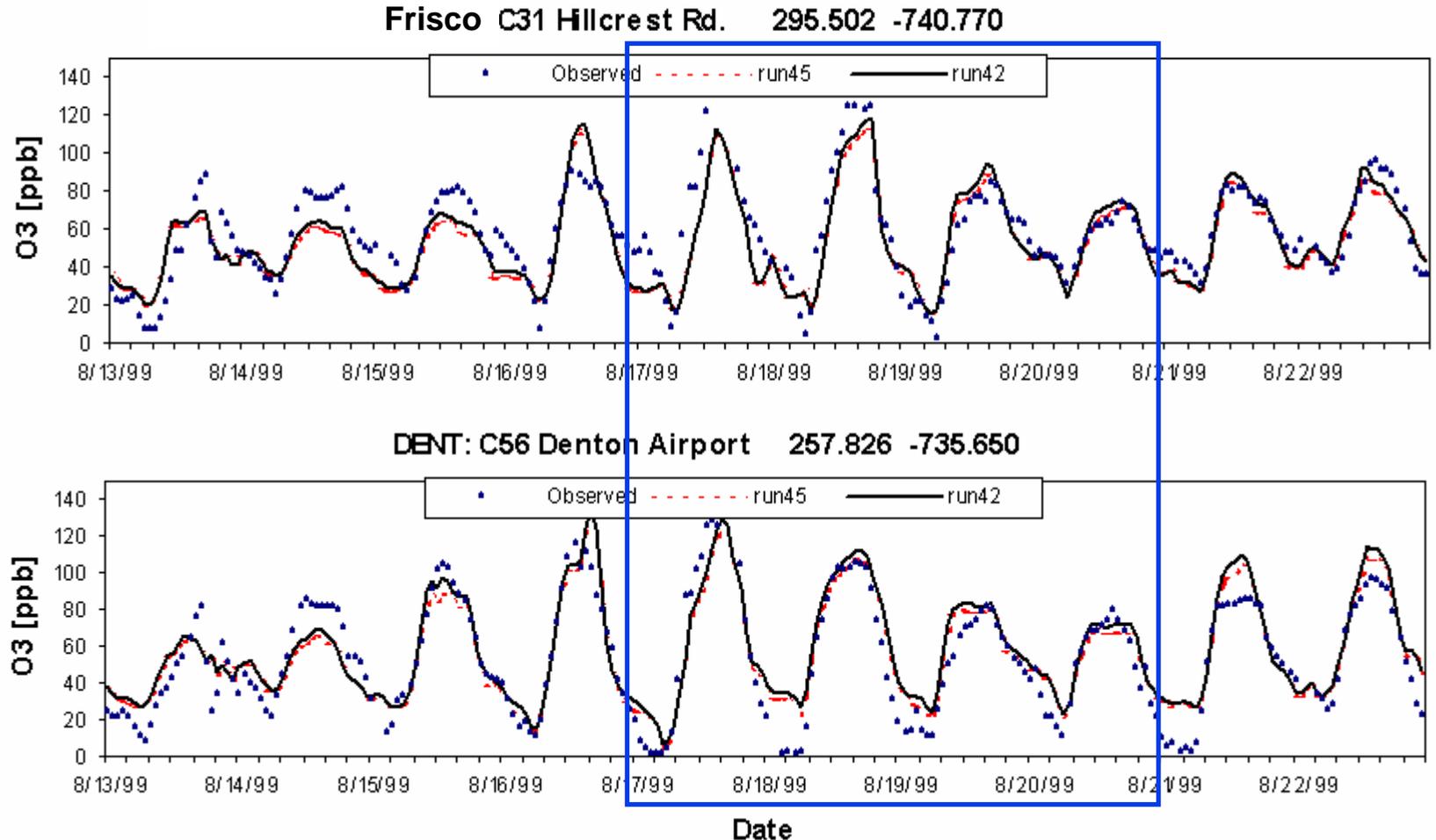
Difference Plot





Impact on Dallas Ozone

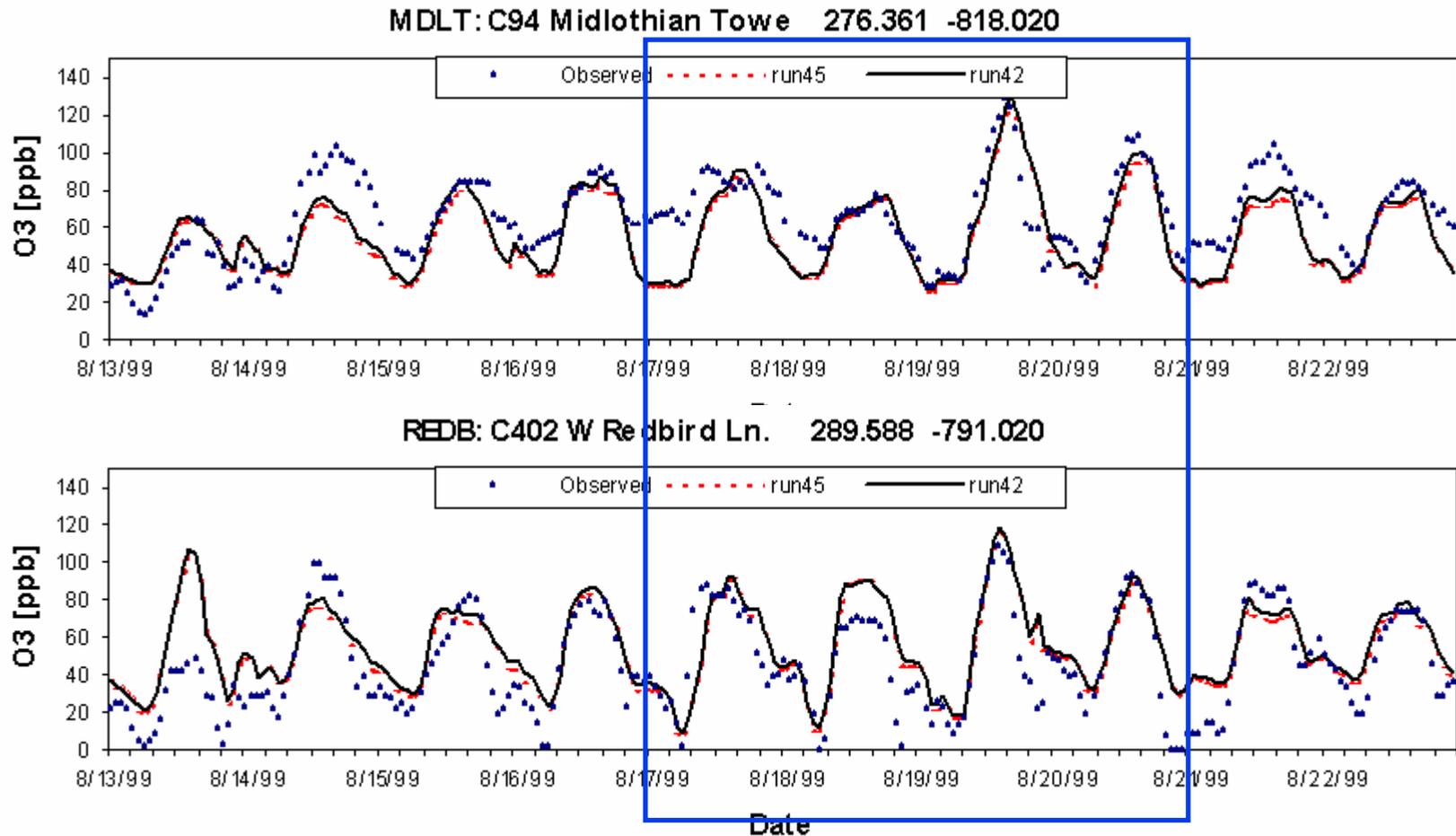
New (Run 45) vs Old (Run 42)





Impact on Dallas Ozone

New (Run 45) vs Old (Run 42)





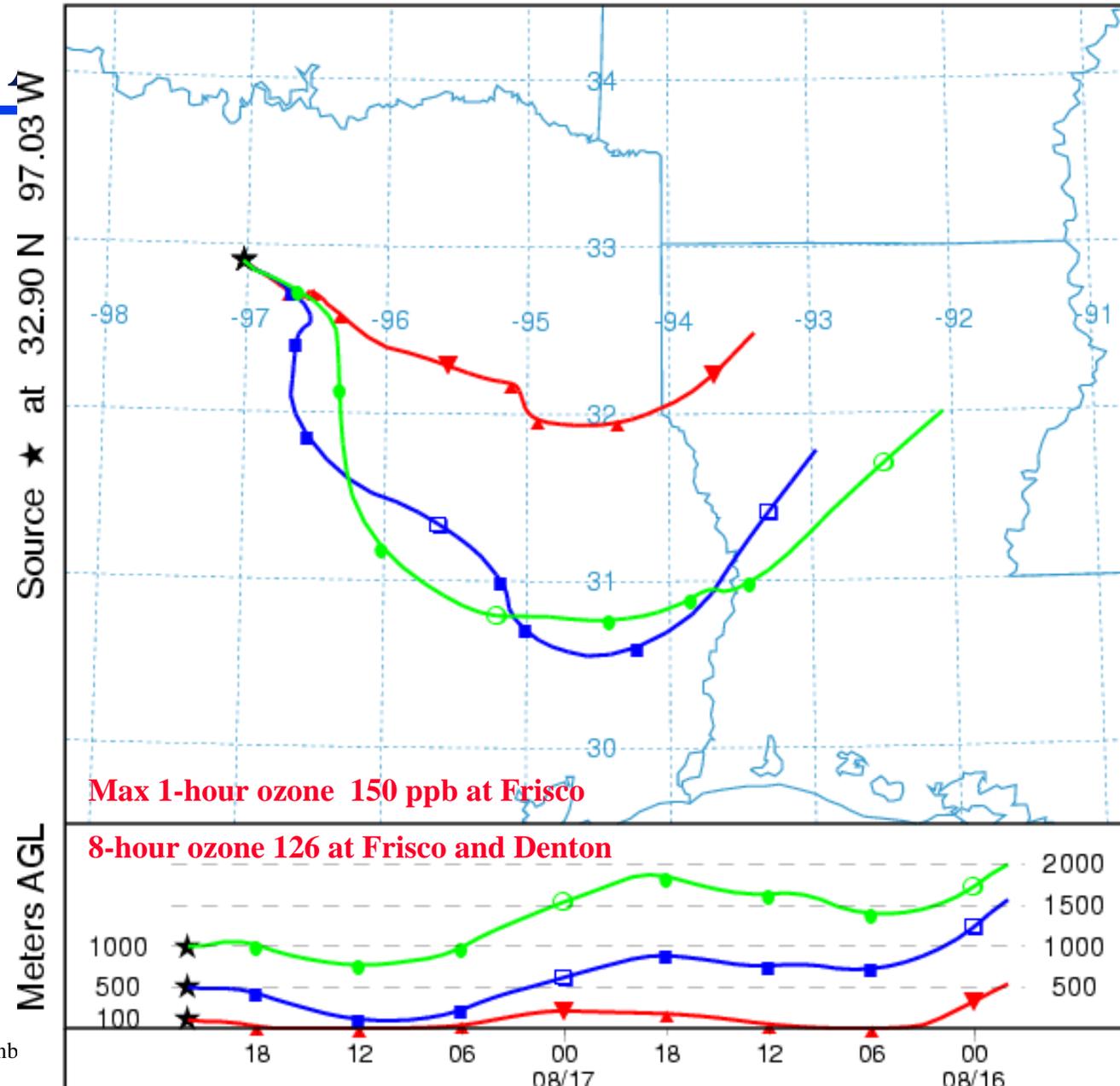
New (Updated) Baseline

Run 44

- Replaced day specific emissions with averages to make results comparable to future case
 - Point sources replaced with 32 day average in Texas
 - NEI v2 >>> NEI v3 in Oklahoma and Louisiana
 - Mobile unchanged (Mon, T-Th, Fri, Sat, Sun)
 - Area/Non Road unchanged
- Question: Does baseline averaging affect performance?
 - Very little difference between Base Case and Baseline
 - Slight ozone increase on Aug 17, 18 from Freestone



Tuesday, August 17, 1999

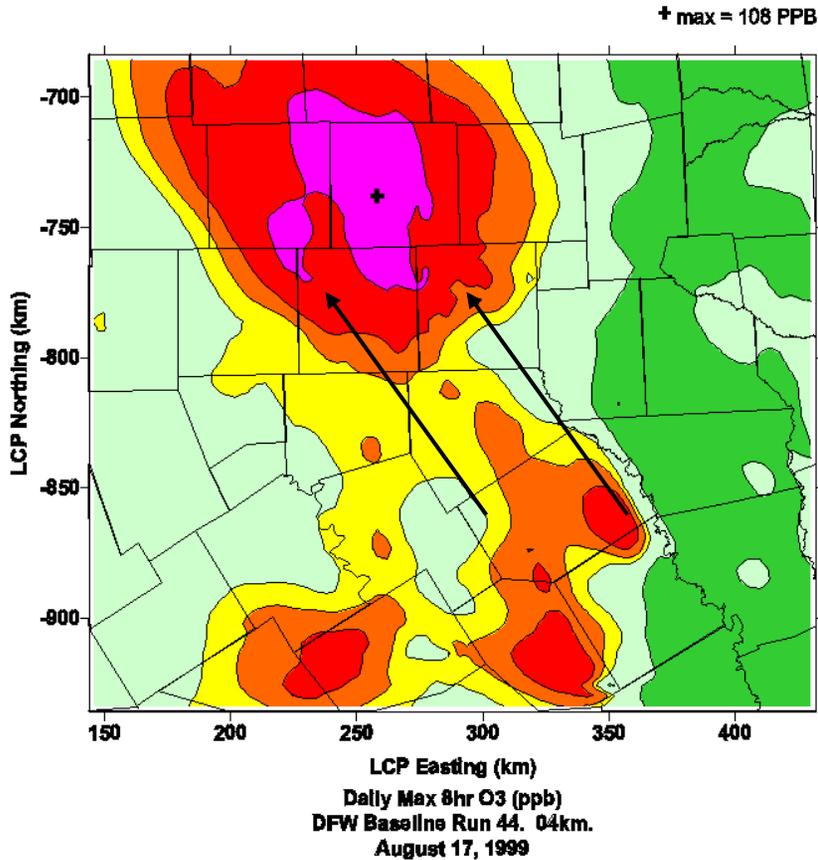




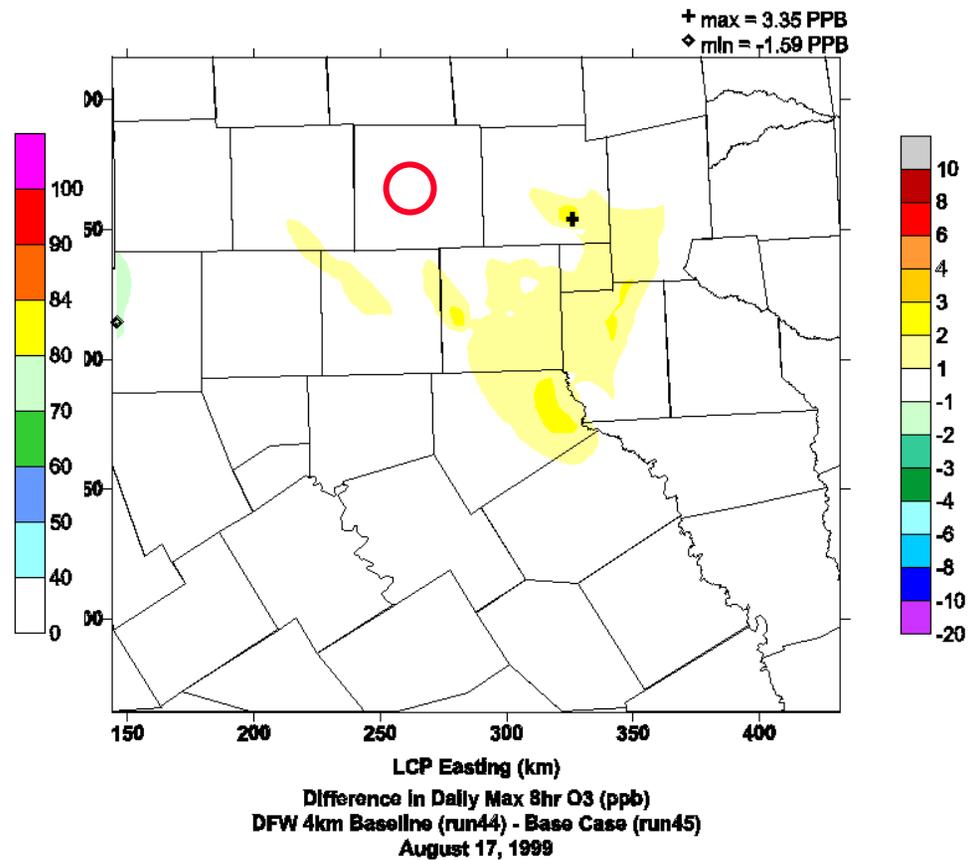
Baseline vs Base Case Ozone

Tuesday, August 17, 1999

Baseline Run 44

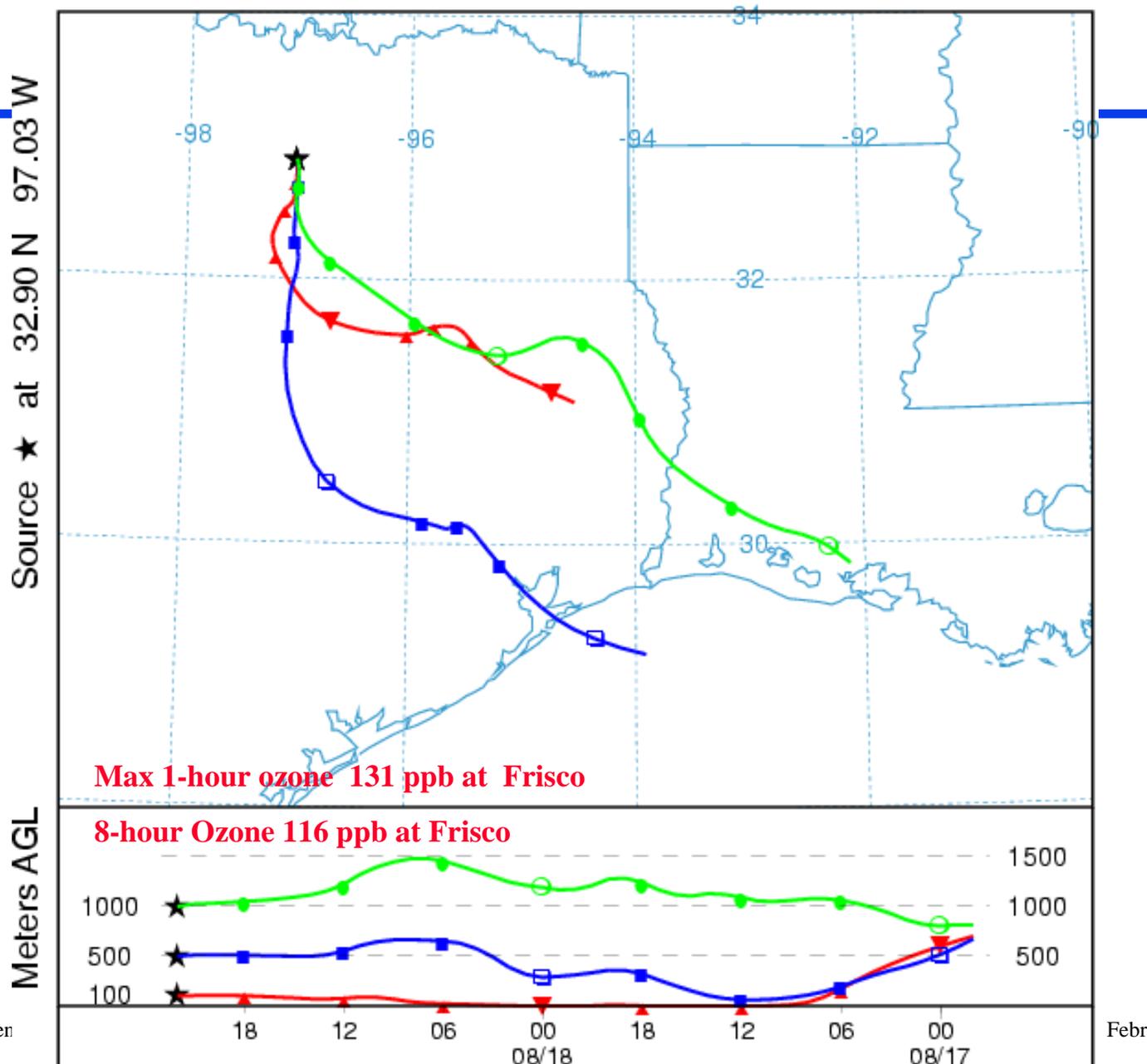


Difference Plot





Wednesday, August 18, 1999



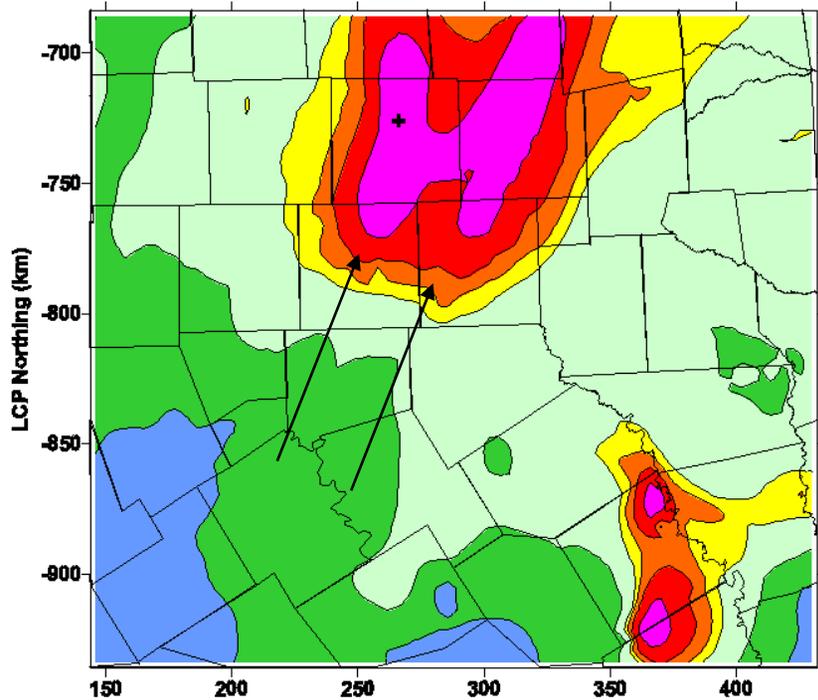


Baseline vs Base Case Ozone

Wednesday, August 18, 1999

Baseline Run 44

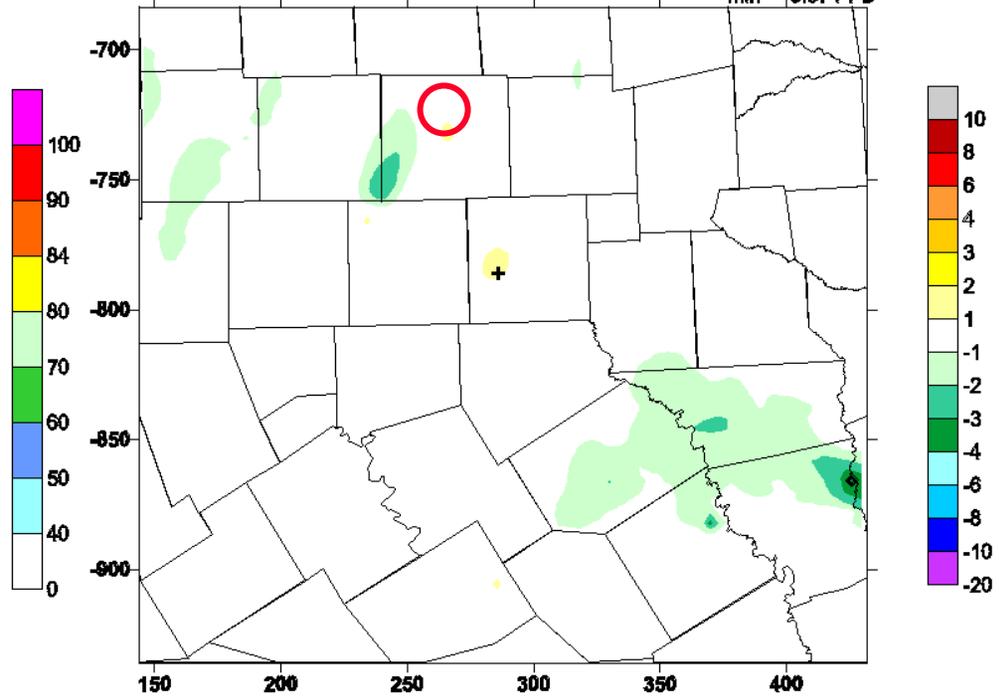
+ max = 113 PPB



LCP Easting (km)
LCP Northing (km)
Daily Max 8hr O3 (ppb)
DFW Baseline Run 44. 04km.
August 18, 1999

Difference Plot

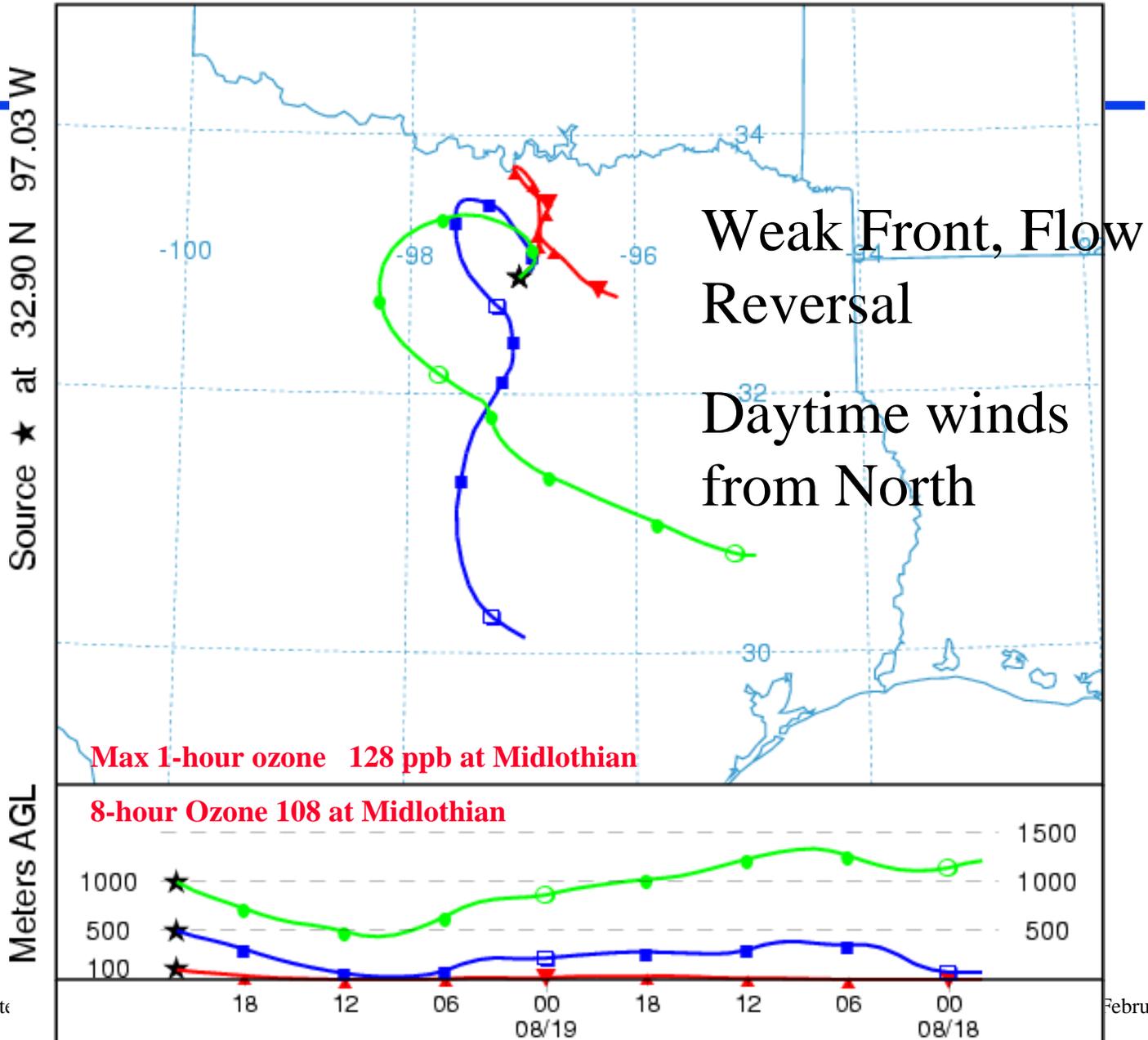
+ max = 2 PPB
◇ min = -3.57 PPB



LCP Easting (km)
LCP Northing (km)
Difference in Daily Max 8hr O3 (ppb)
DFW 4km Baseline (run44) - Base Case (run45)
August 18, 1999



Thursday, August 19, 1999

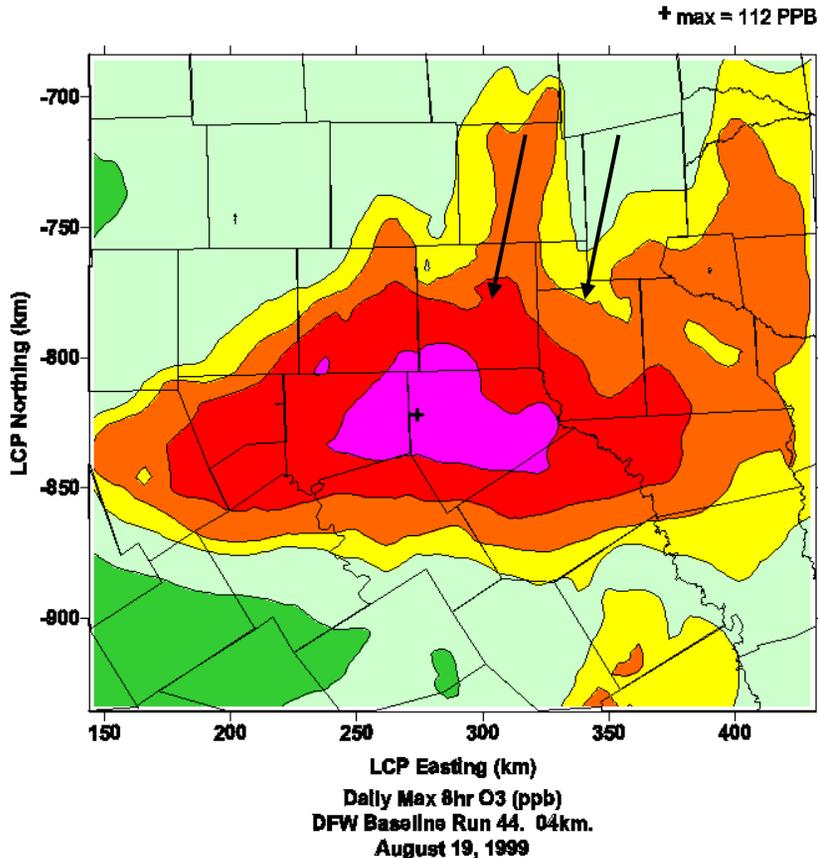




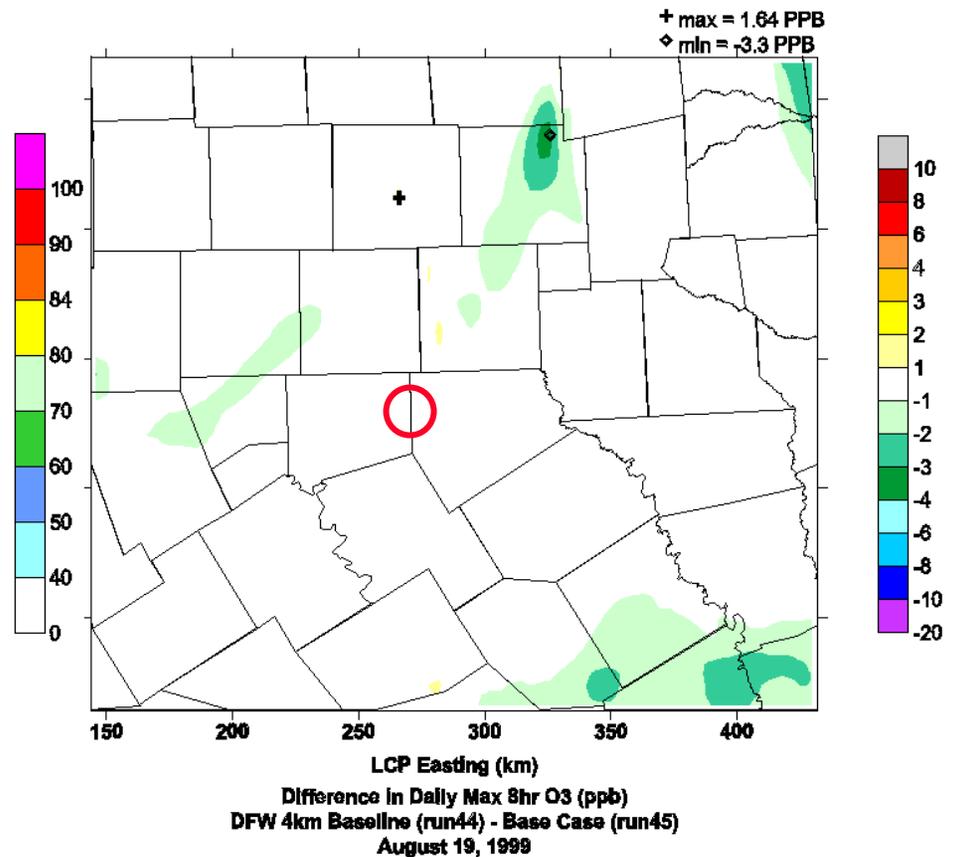
Baseline vs Base Case Ozone

Thursday, August 19, 1999

Baseline Run 44



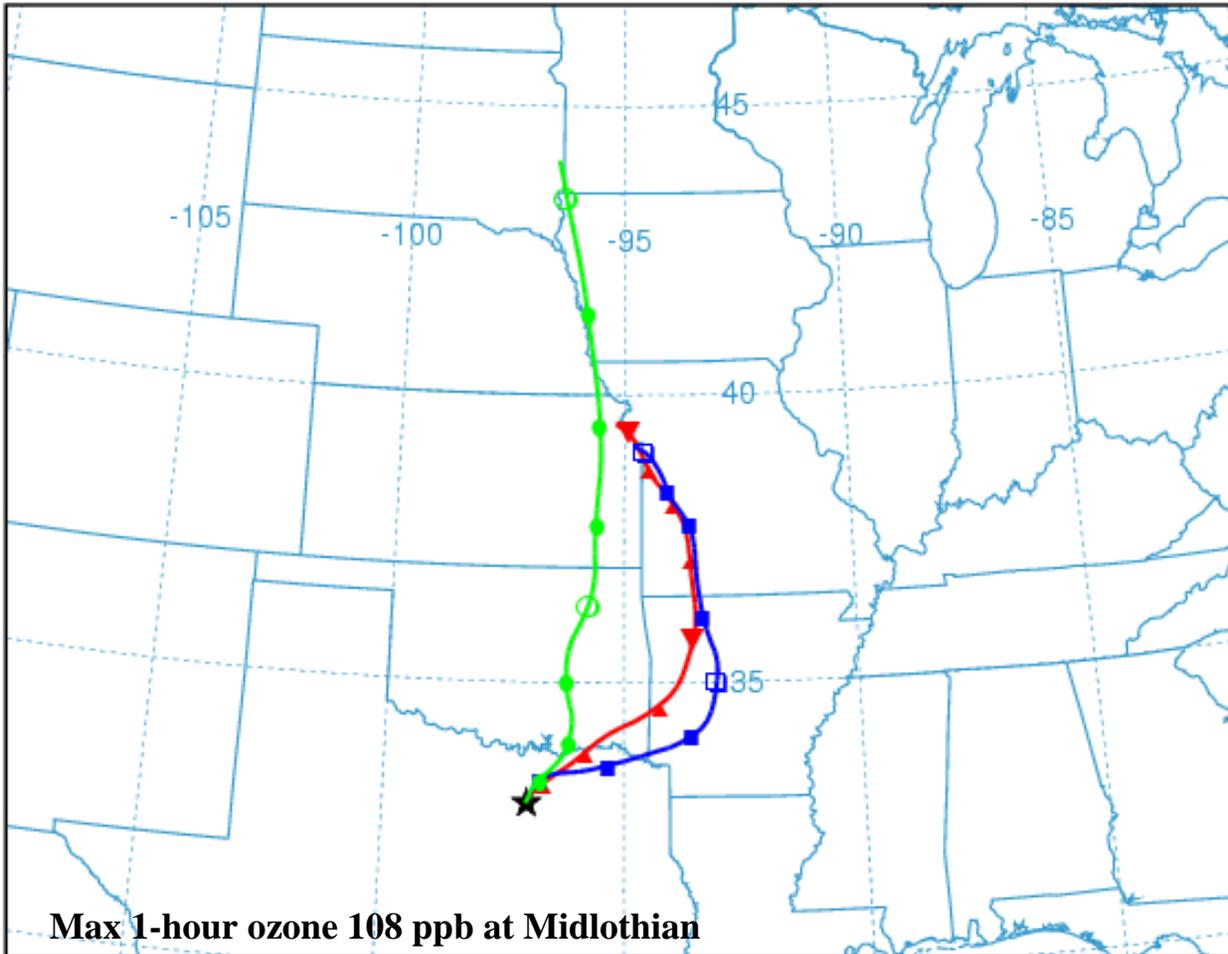
Difference Plot





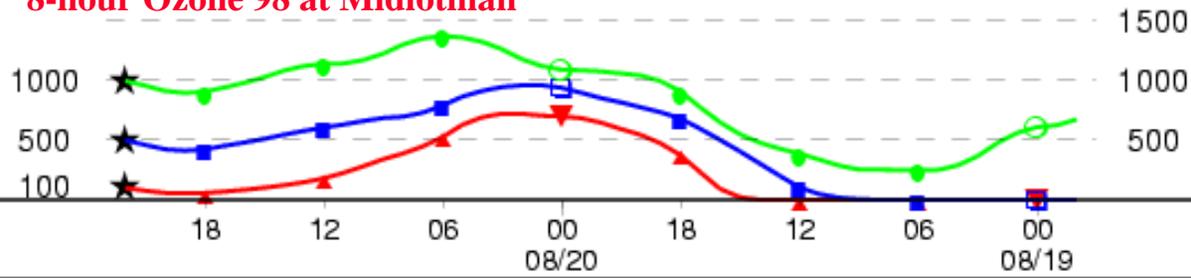
Friday, August 20, 1999

Source ★ at 32.90 N 97.03 W



Meters AGL

8-hour Ozone 98 at Midlothian

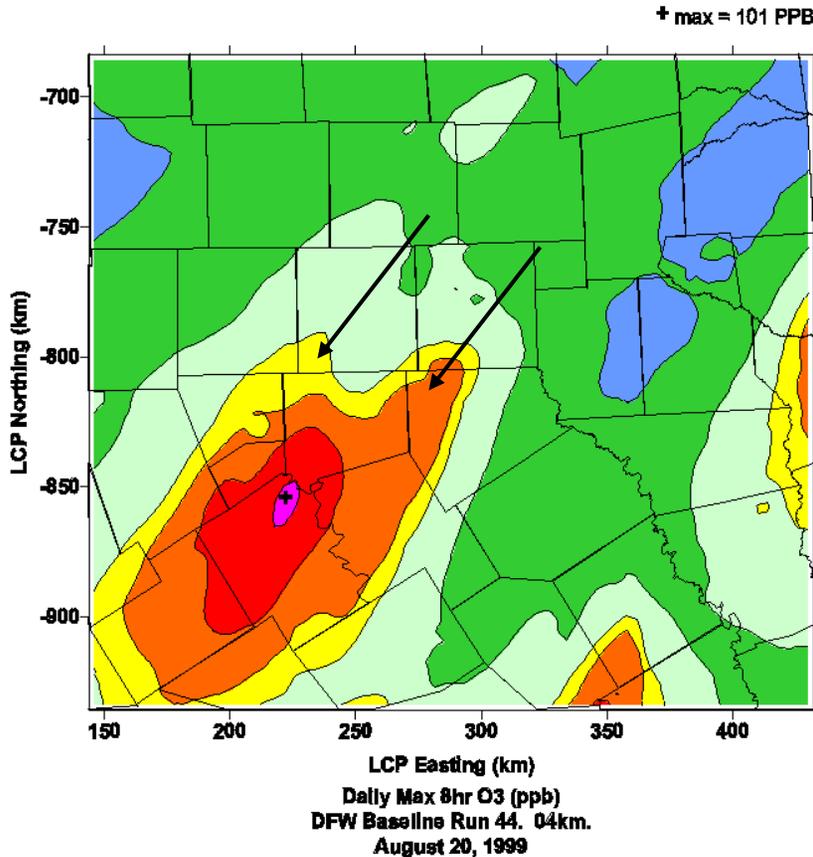




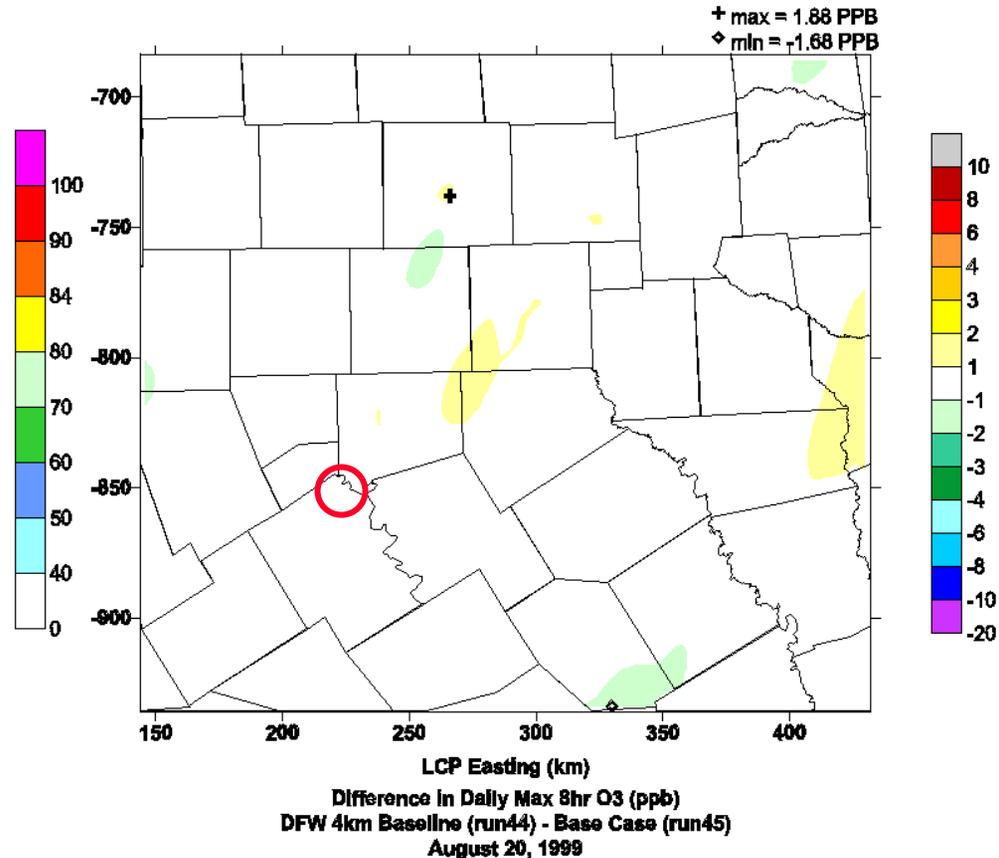
Baseline vs Base Case Ozone

Friday, August 20, 1999

Baseline Run 44



Difference Plot

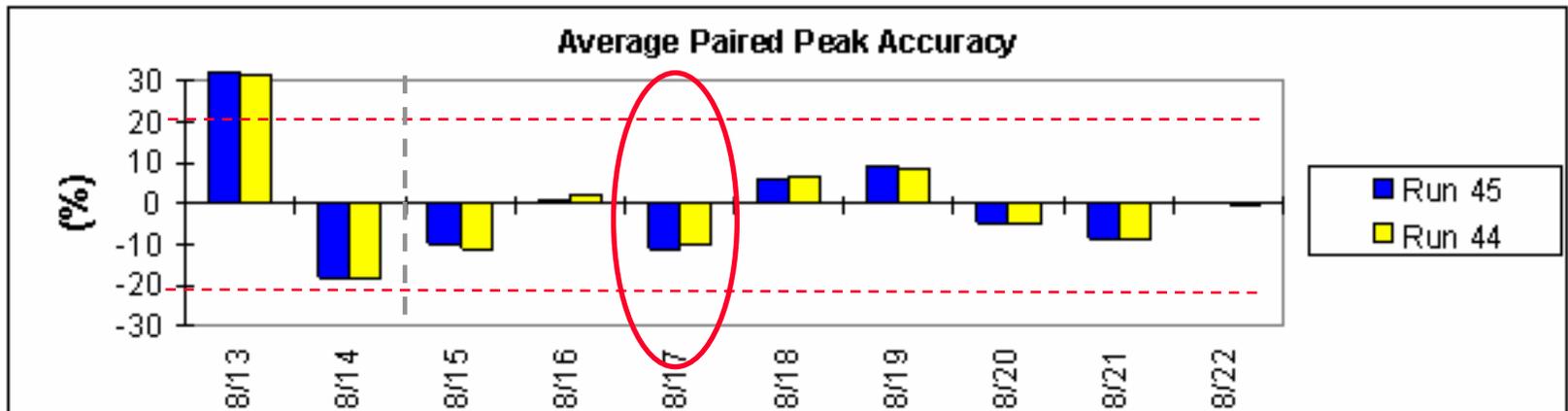
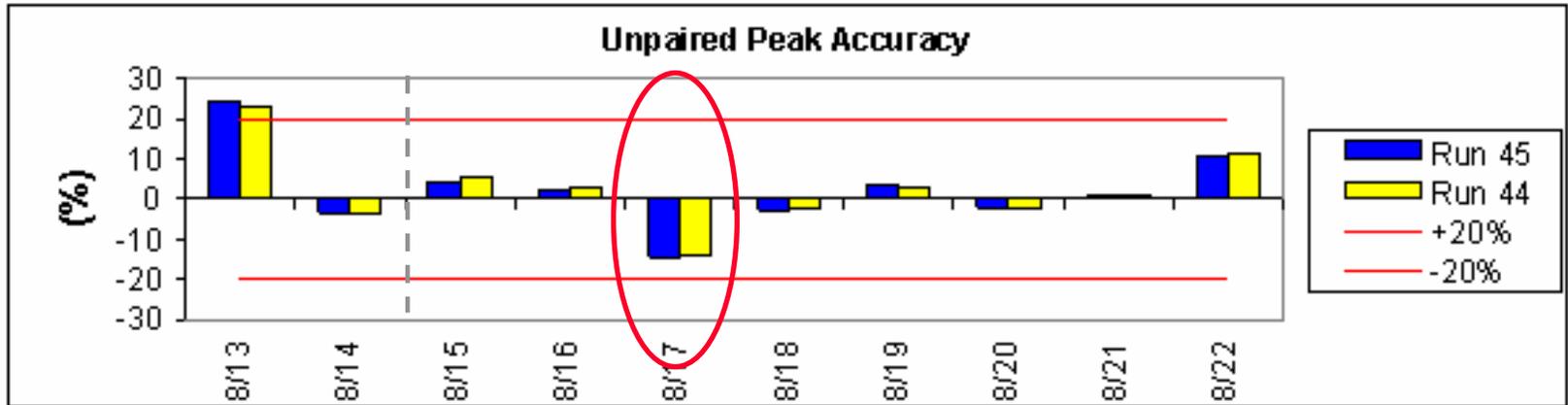




8-Hour Performance Statistics

Comparing Peak Ozone

DFW 1999 8hr O3.

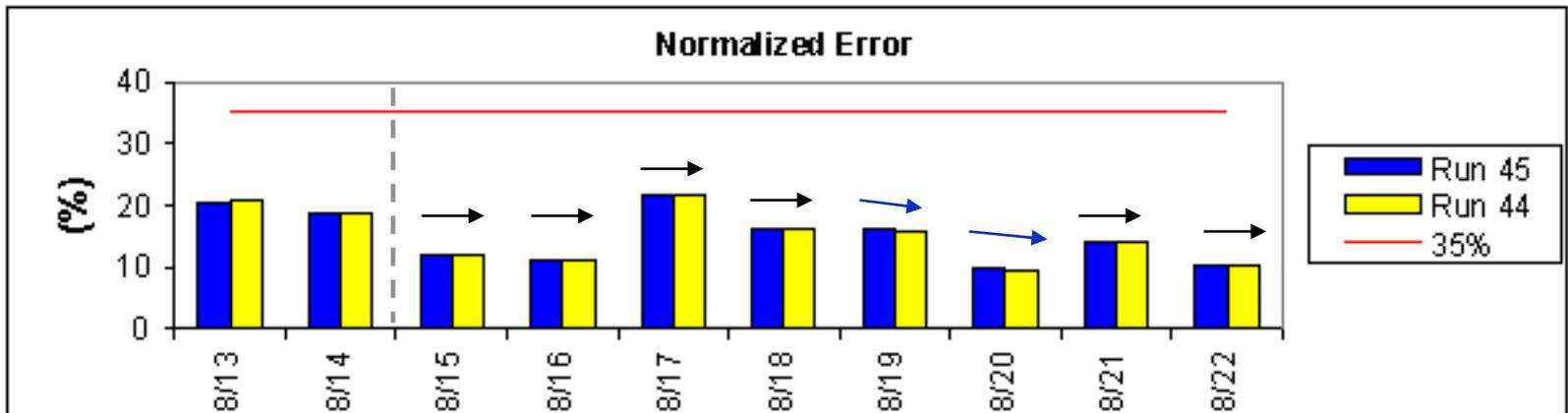
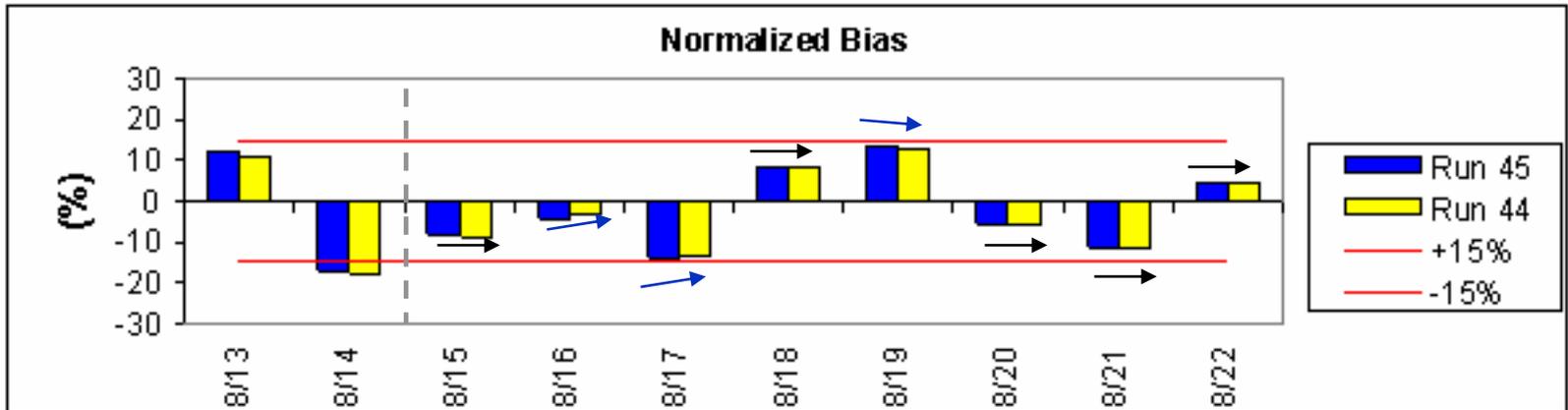


Run 45 is the Base Case, Run 44 is the Baseline,



8-Hour Performance Statistics

Comparing Bias, Gross Error



Run 45 is the Base Case, Run 44 is the Baseline,



Run 2009 Future Case

- Project Baseline Emissions Inventory into Future
 - Apply economic growth as expected
 - Apply mandated controls
- Run CAMx for 2009 Future Case
 - Calculate Relative Response Factors
 - Calculate Future Design Values
- Estimate 2009 Control Requirements
 - Run Matrix of NO_x and VOC Controls
 - Plot Revised Response Curves



DFW Proposed Sensitivity Runs

- East Texas Engines
- Cement Kilns
- EGUs
- CAIR Phase II
- DFW Major/Minor Sources
- NCTCOG Local Strategies
- CENRAP (2002) Transport Assessment