

DFW Modeling

Status Report Modeling and Field Studies

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Photochemical Modeling Committee

NCTCOG

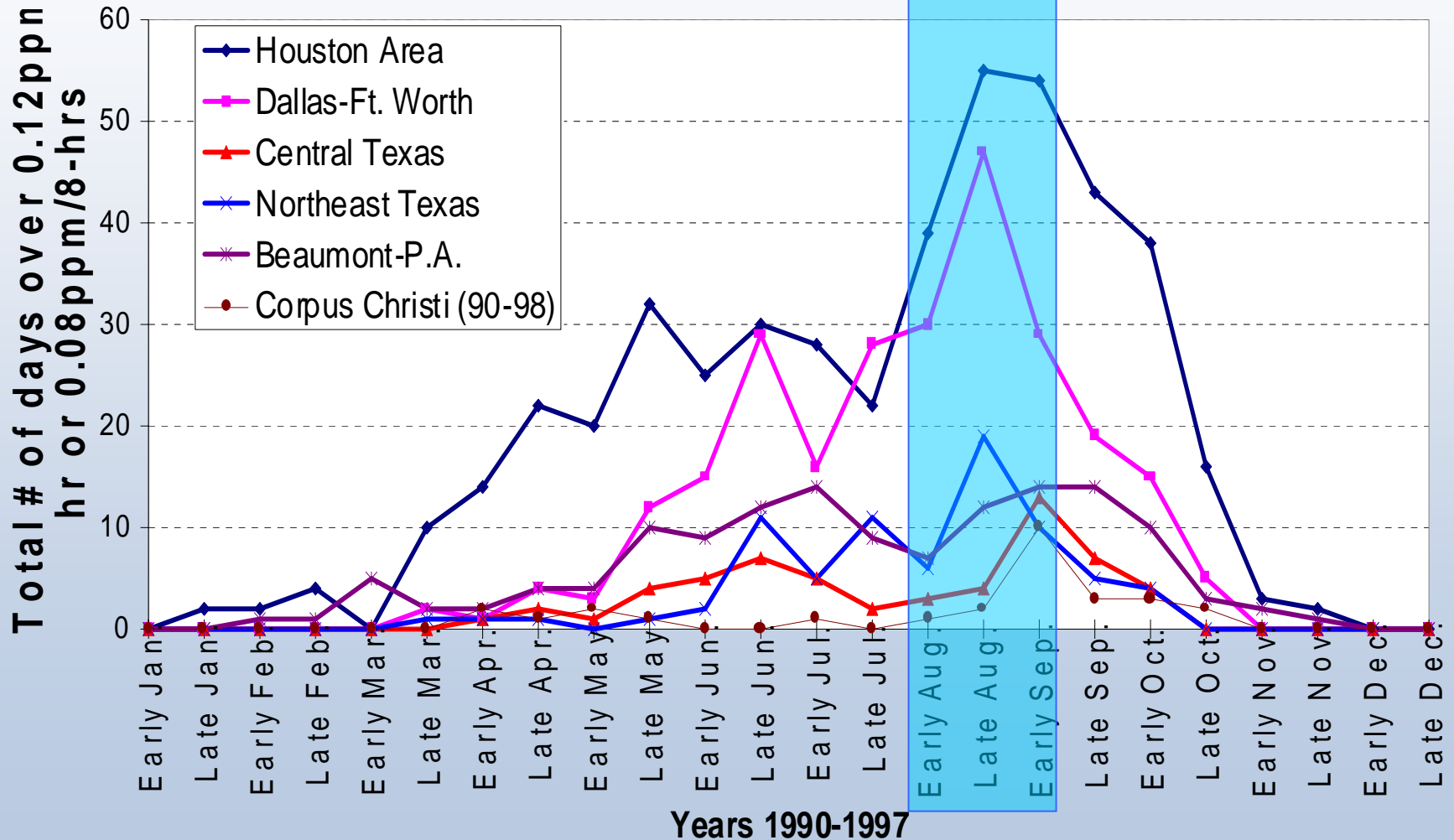
September 1, 2005



DFW Status Overview

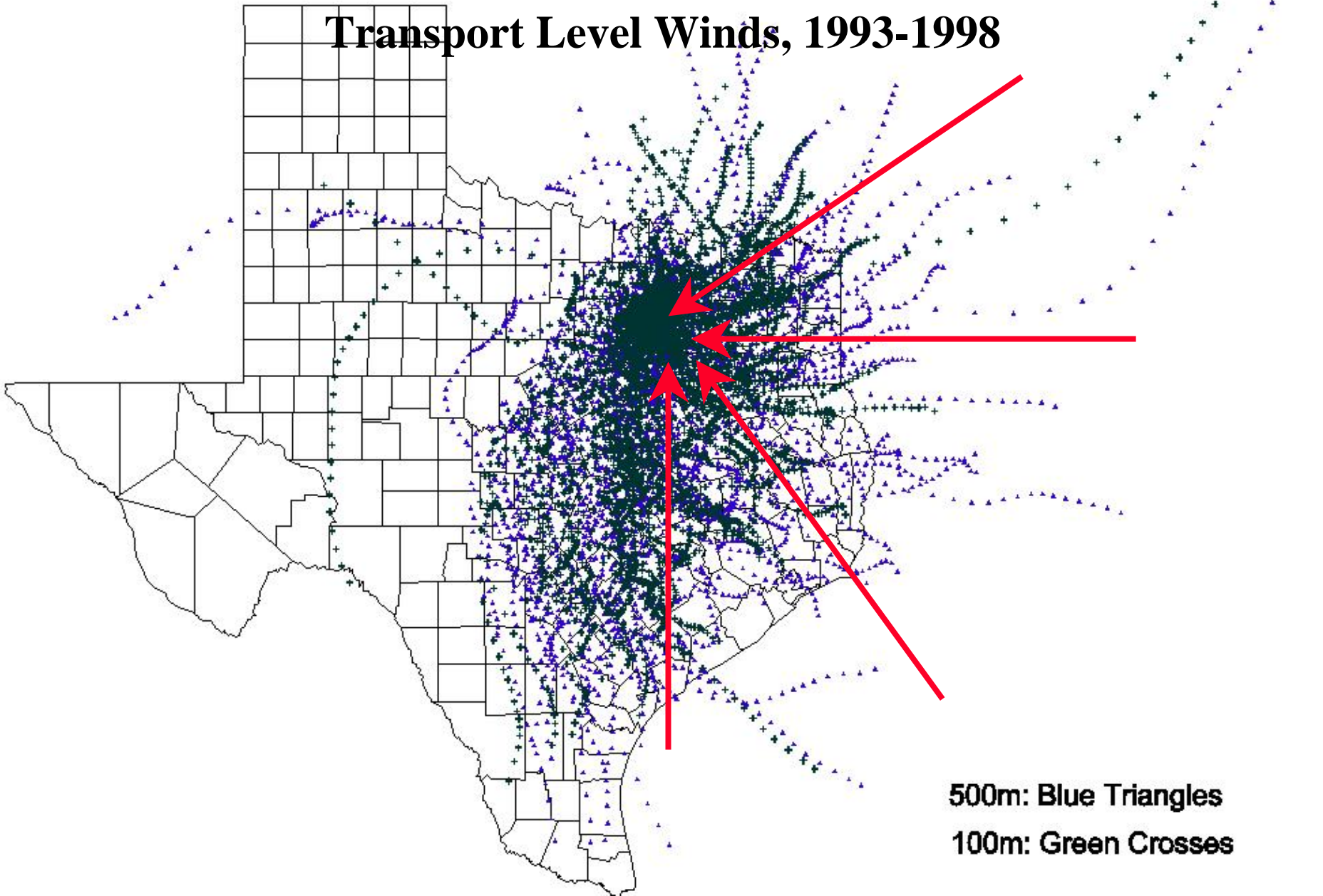
- Review Episode Selection
 - Representativeness
 - Residual Issues
- TexAQS Field Studies
 - Tetron/Transport Study
 - Texas Plume Study
- Projects Launched and Underway
 - APCA Hot Spot Analysis
 - Cement Kiln Emissions Variability
 - Building the 2009 Emissions Inventory

When does High Ozone Occur in Dallas?



DFW Back Trajectories for 8-Hour Ozone

Transport Level Winds, 1993-1998



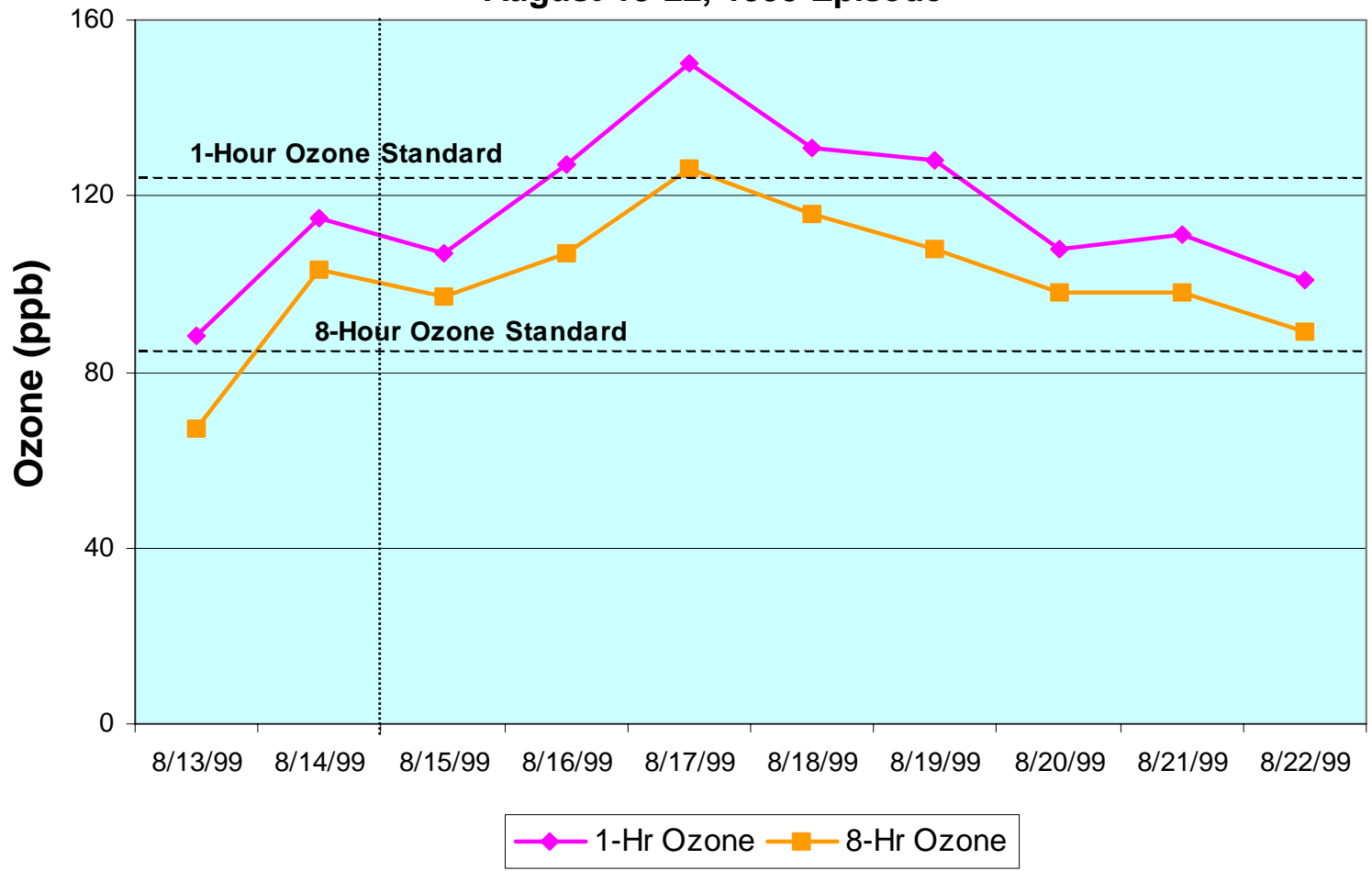
500m: Blue Triangles
100m: Green Crosses

DFW 8-Hour Episode Data

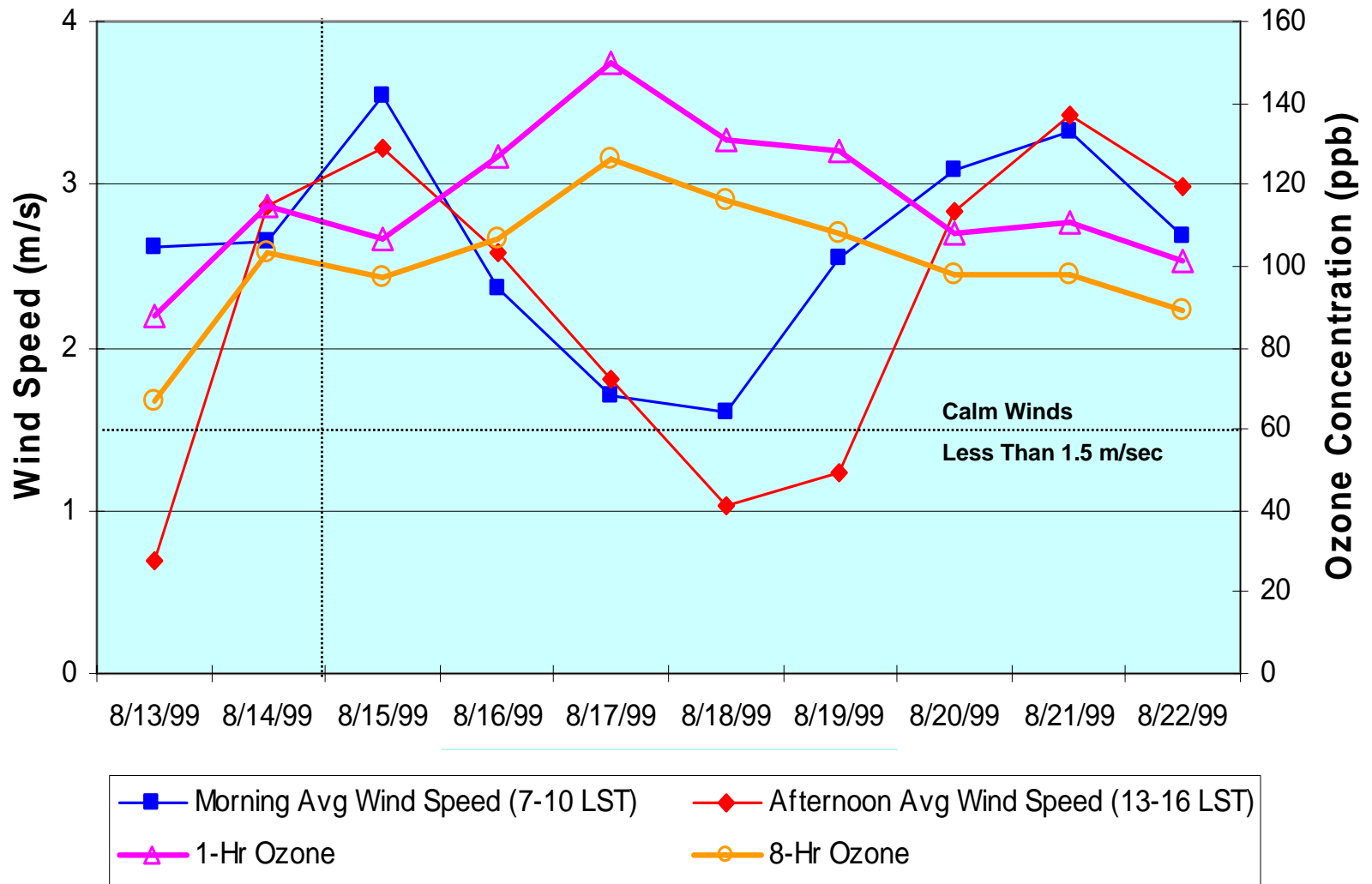
- August 13 - August 22, 1999 Episode

– Day	Date	Max O3	Site Name	# Sites	Remarks
– F	Aug 13	67	Frisco	0	Ramp Up Day
– Sa	Aug 14	103	Arlington	4	
– Sun	Aug 15	97	Keller	6	
– M	Aug 16	107	Keller	6	
– T	Aug 17	<u>126</u>	Frisco, Denton	7	
– W	Aug 18	116	Frisco	4	
– Th	Aug 19	108	Midlothian	2	
– Fri	Aug 20	98	Midlothian	1	
– Sa	Aug 21	98	Arlington	5	
– Sun	Aug 22	89	Denton	2	
– Mon	Aug 23	59	Denton	0	

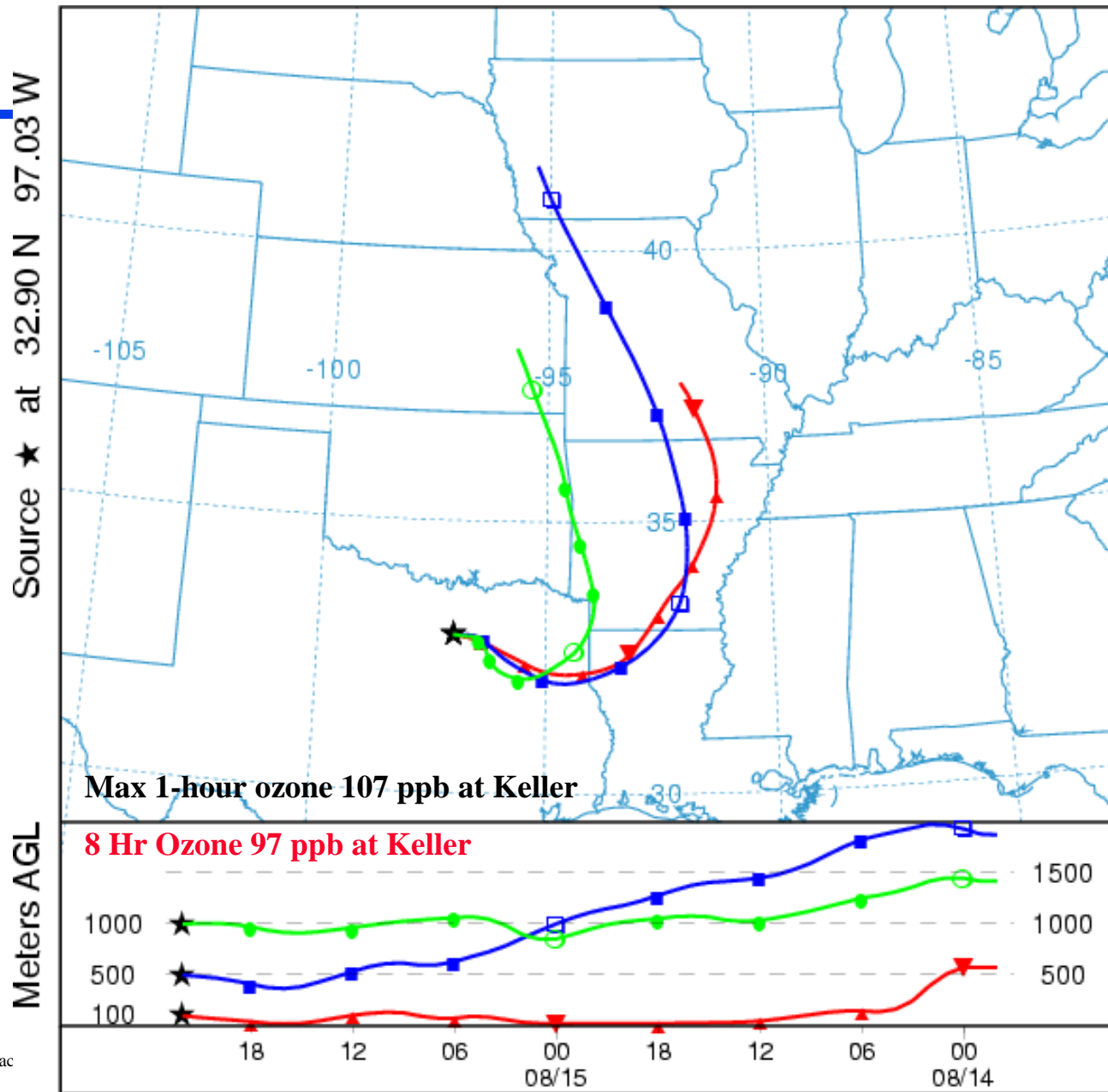
DFW 1-hour and 8-Hour Ozone Measurements August 13-22, 1999 Episode



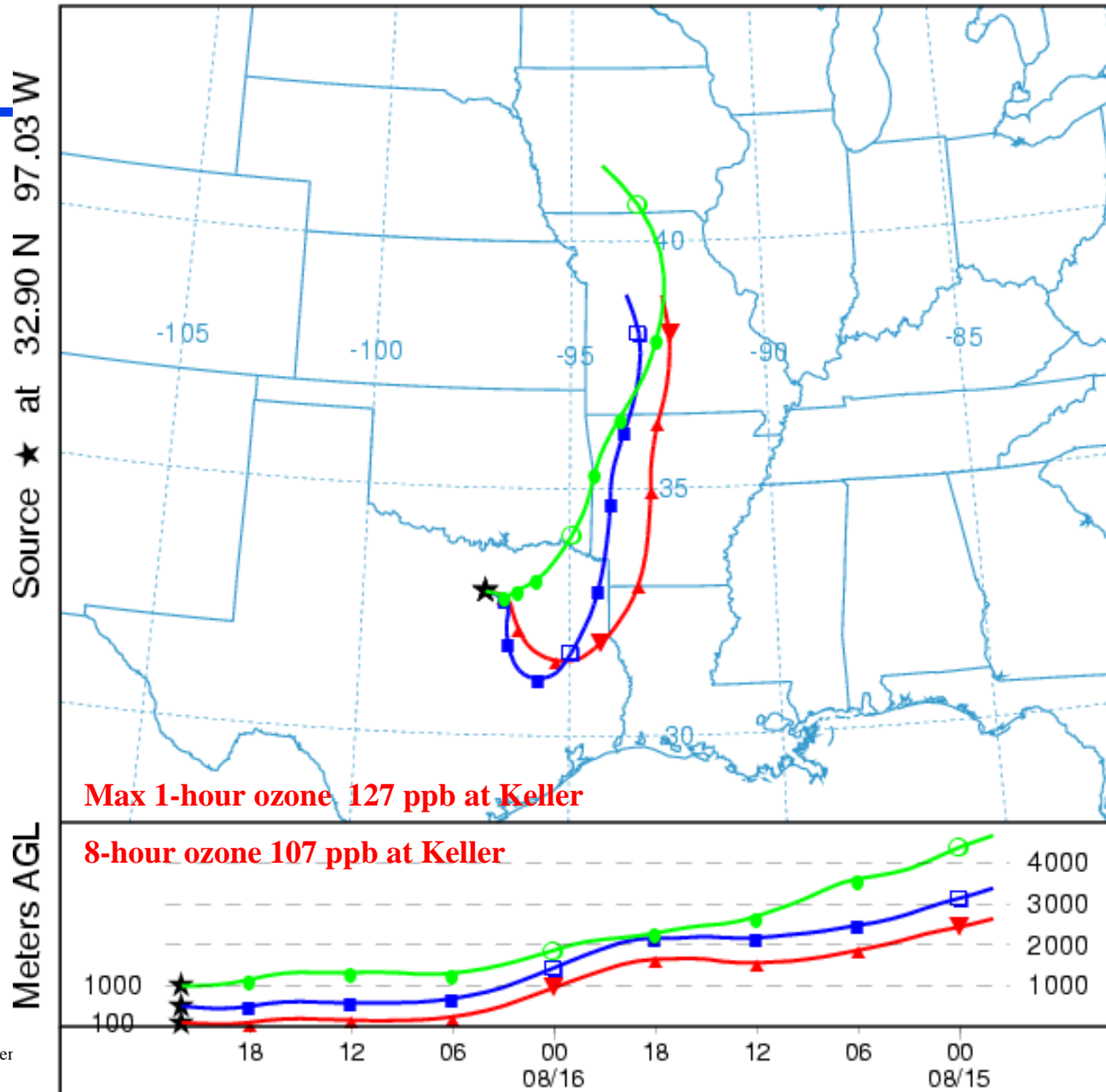
DFW Domain Average Wind Speeds vs Ozone Concentrations Aug 13-22, 1999 Ozone episode



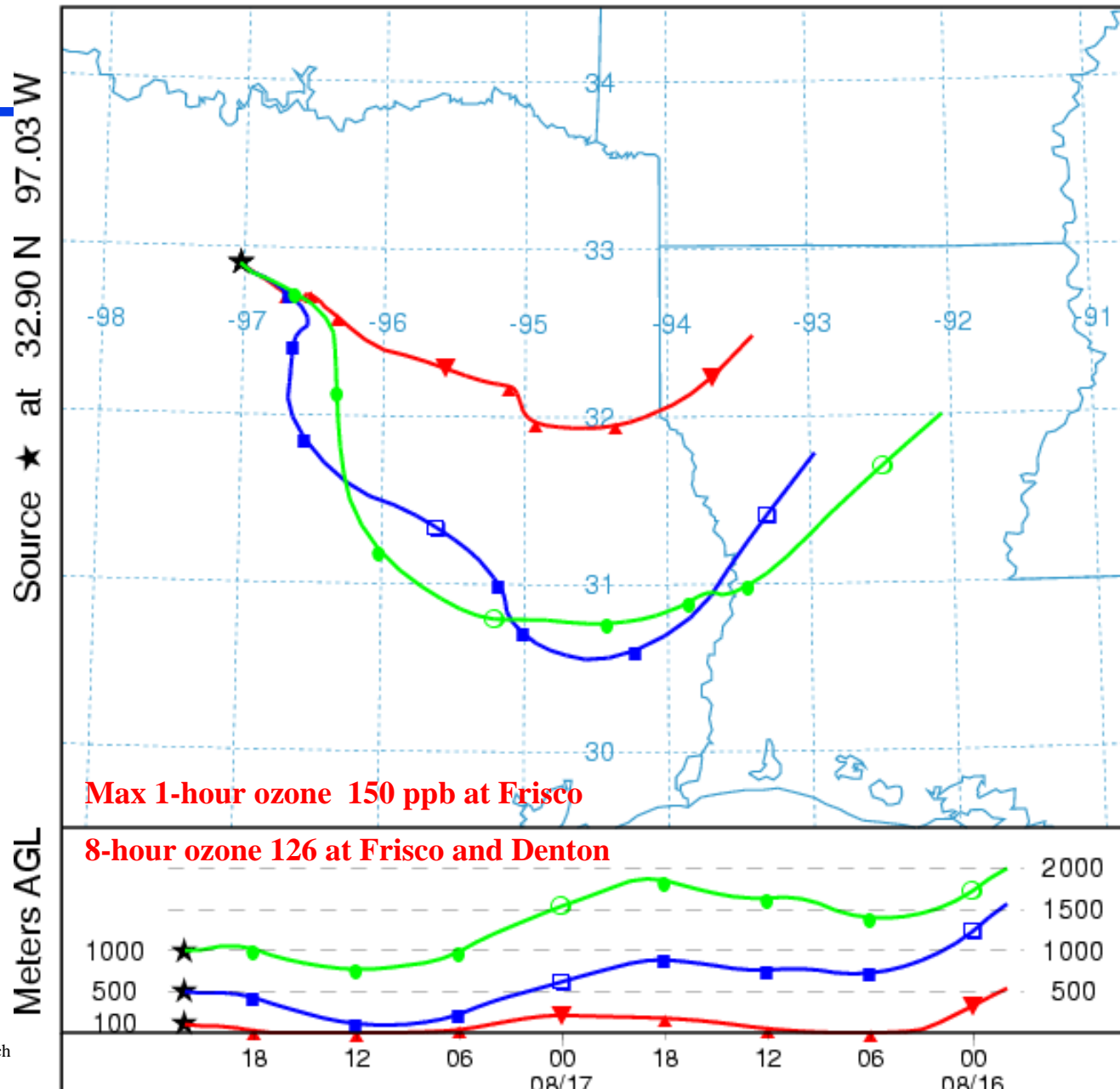
Sunday, August 15, 1999



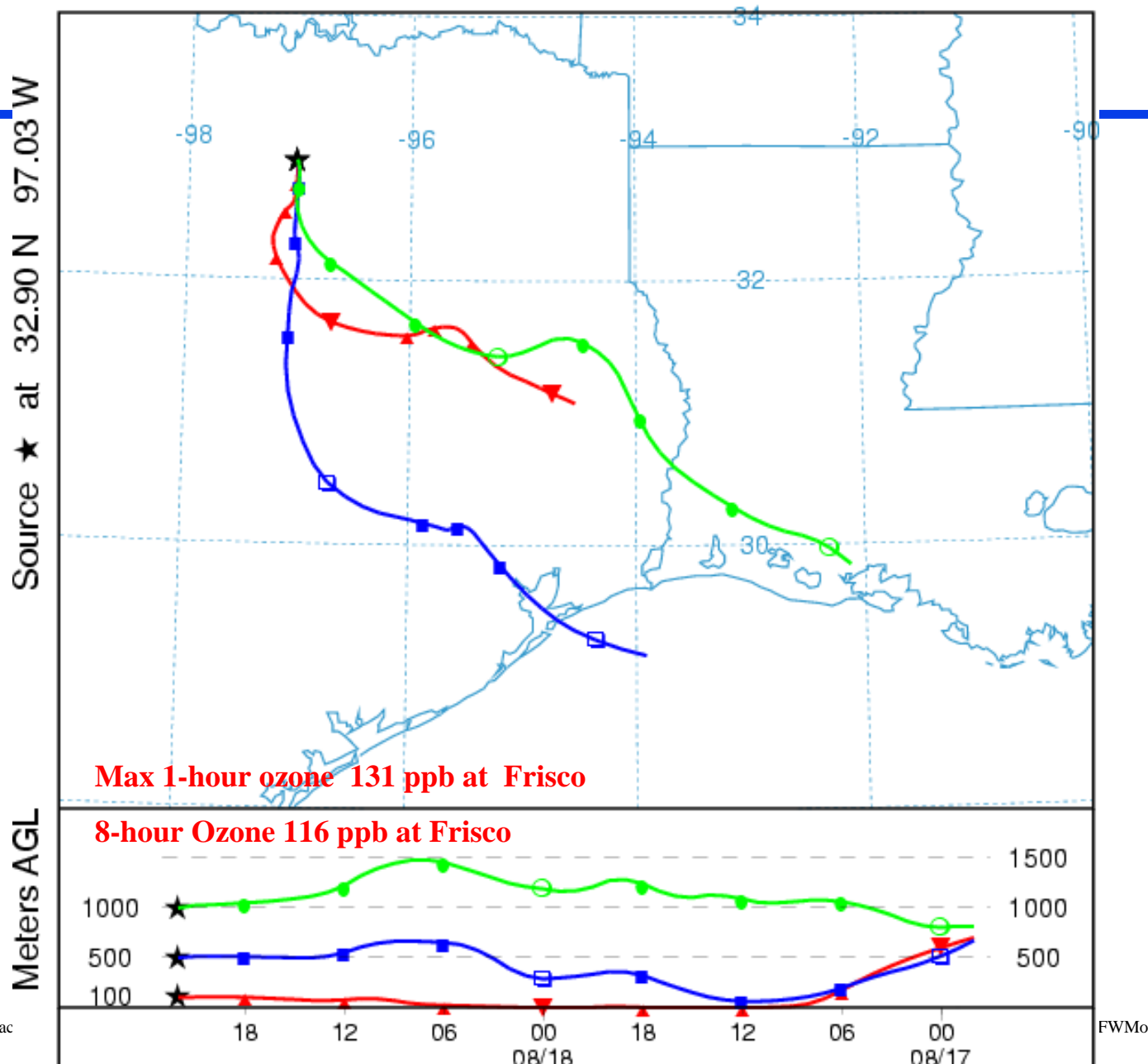
Monday, August 16, 1999



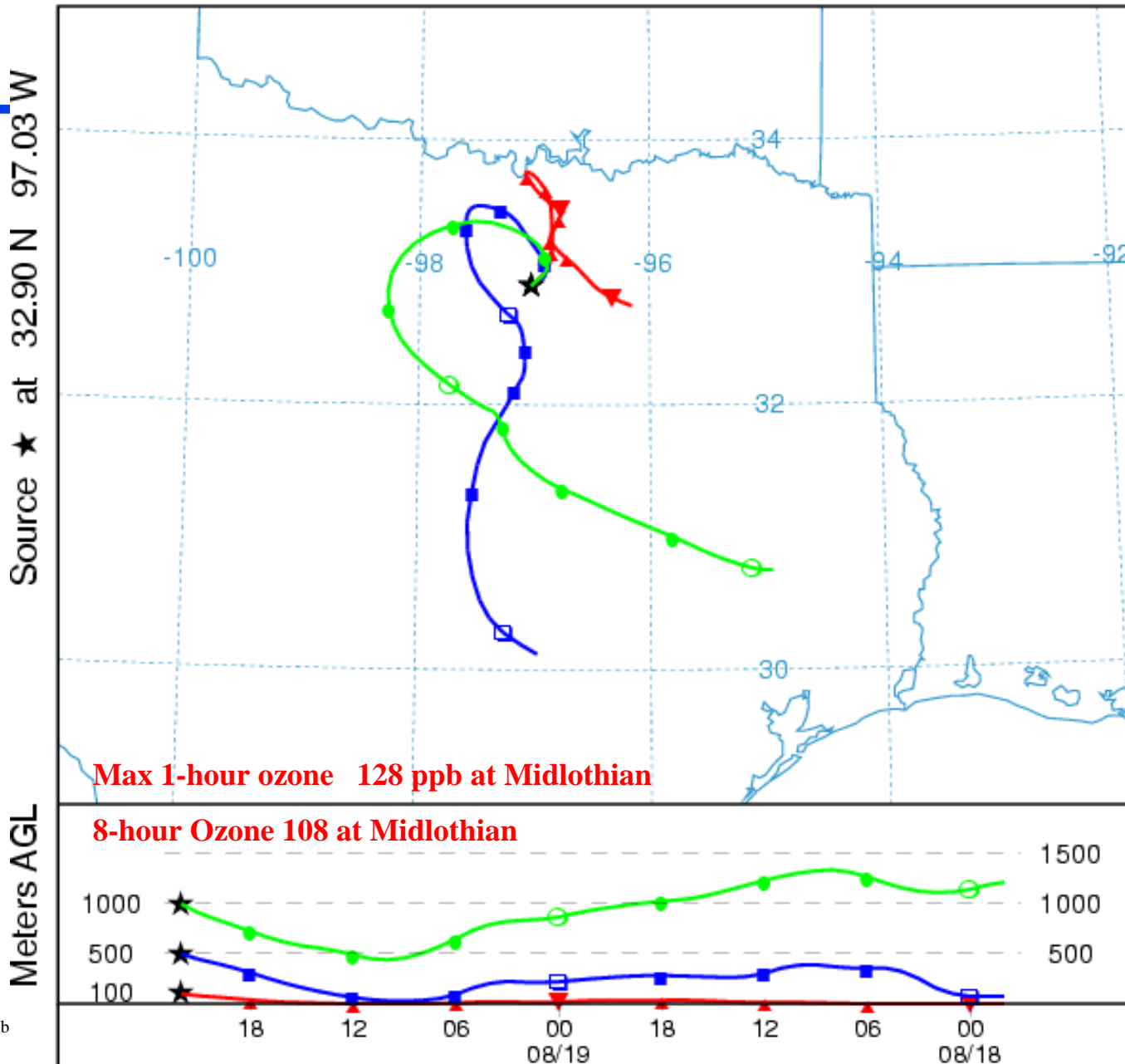
Tuesday, August 17, 1999



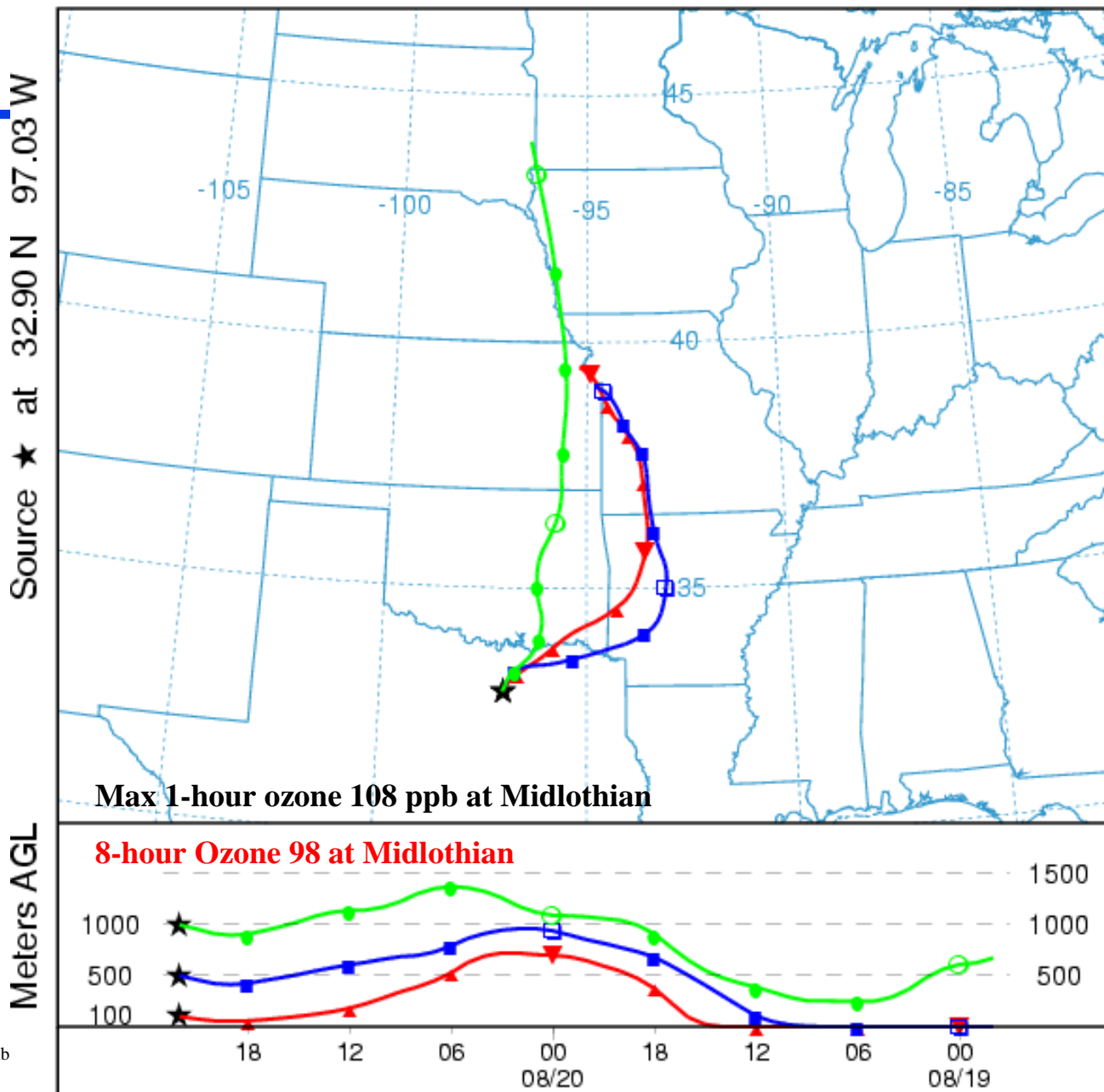
Wednesday, August 18, 1999



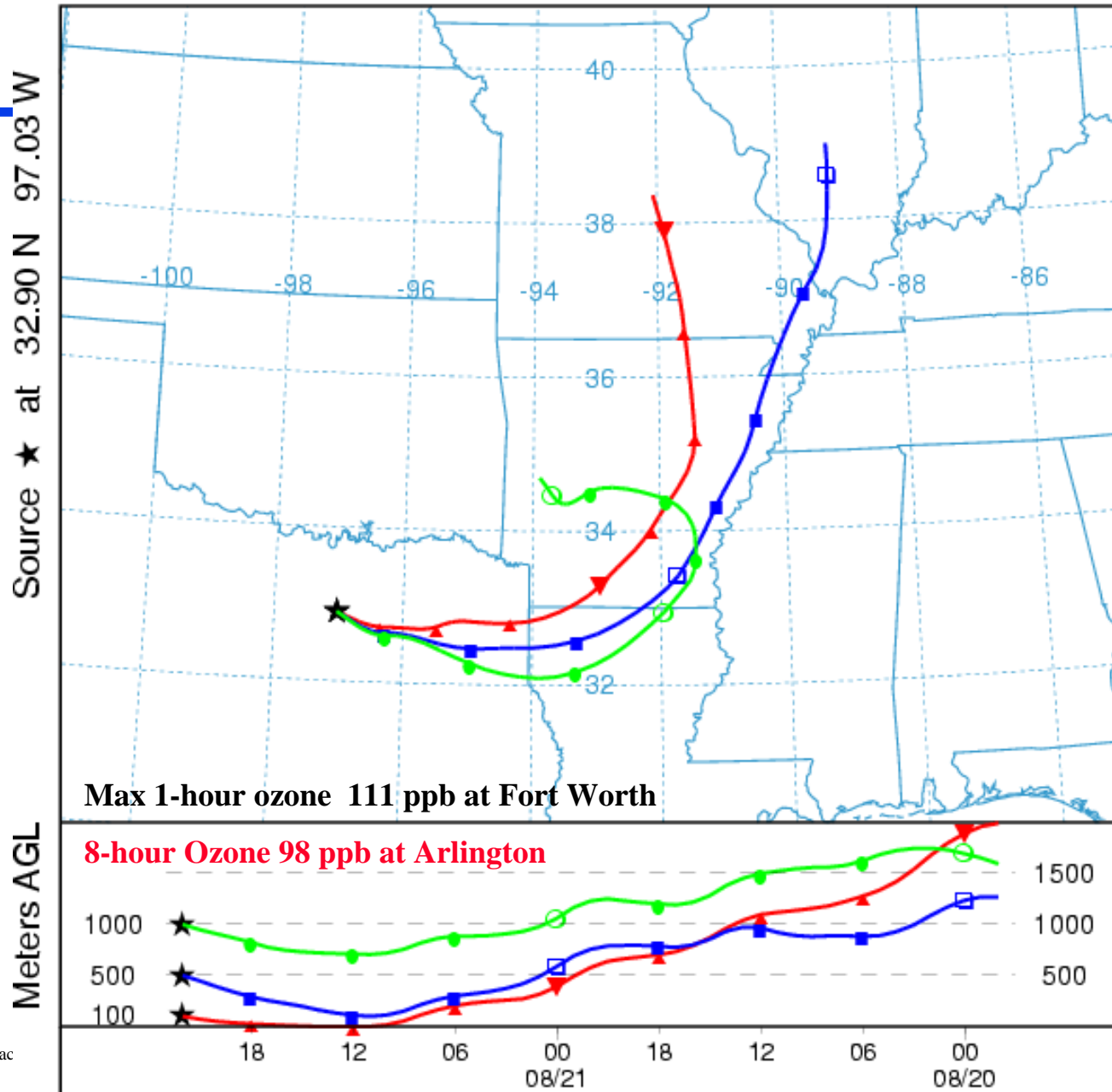
Thursday, August 19, 1999



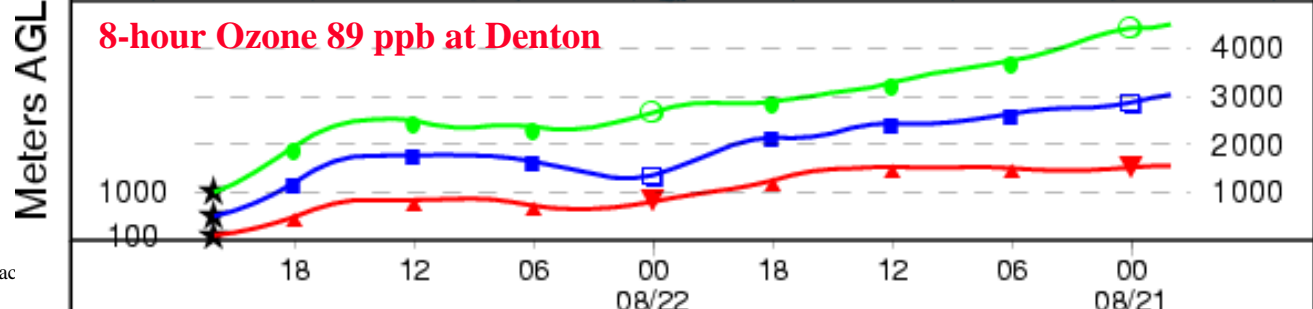
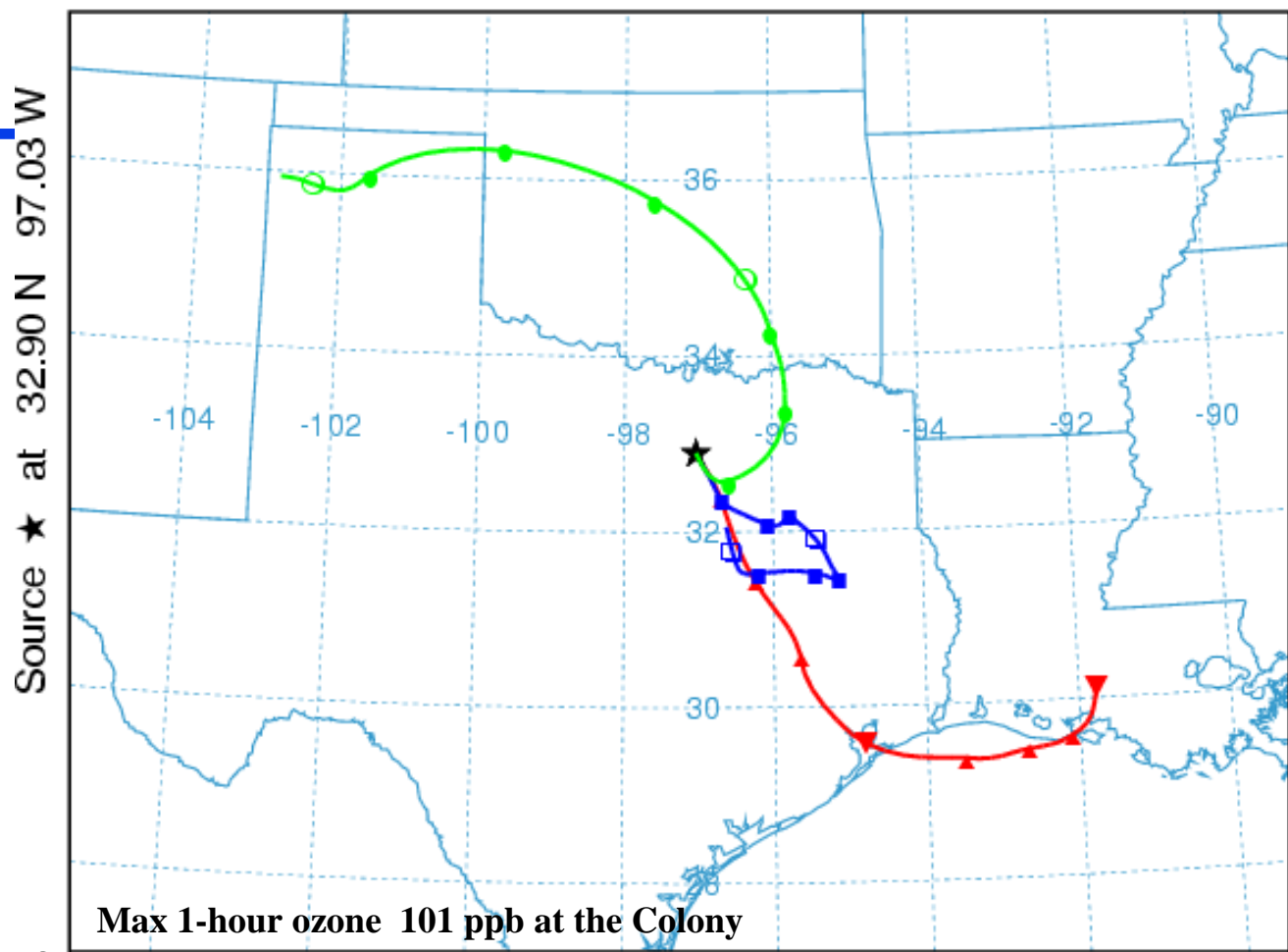
Friday, August 20, 1999



Saturday, August 21, 1999



Sunday, August 22, 1999



Episode Selection Summary

- August 13-22 is core of DFW ozone season
- Natural Progression in wind directions
- Eight 8-hour exceedance days
- Modeled through the ozone cycle
- Light Winds during highest days of episode
- 5 Weekdays, 1 Saturday, 2 Sundays
- Transport from other areas, other states

Transport Issues

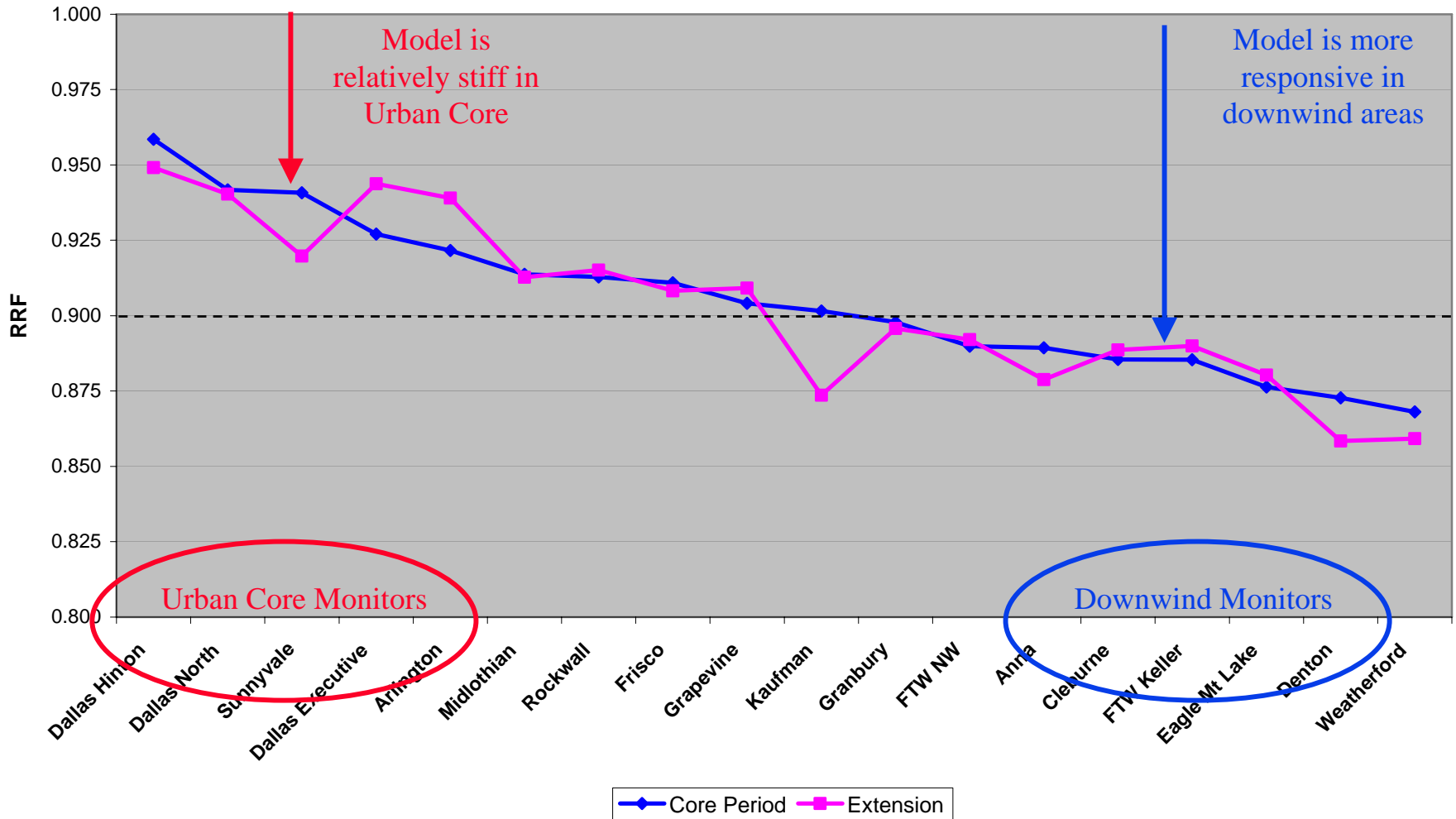
- Episode not chosen to demonstrate transport
 - Includes natural progression in wind directions
 - Does not focus on persistent winds.
 - Louisiana impacts show on some days,
 - 5-6 day periods of persistent winds unlikely
- Evaluation Plan
 - CENRAP 2002 Summer Season Modeling
 - Four Months (June, July August, September)

EPA Issues

- EPA wants more days in the demonstration
 - 10 exceedance days at each monitor unrealistic
 - Some monitors don't exceed
- Oklahoma extension has been tested
 - Performance weaker than core episode
 - Will take months to improve performance
 - Relative Reduction factors essentially the same
- TCEQ sees no benefit to extending episode

DFW Monitor Specific 2010 Relative Reduction Factors

Core vs Episode Extension, Sorted by Core RRF



TexAQS II Field Studies

1. Tetroon/Transport Study
 - Berkovitz, Voss, Voss, Valente
 - Joint Funding by TCEQ, HARC
 - July 2005

2. NE Texas Plume Study
 - Gillani, Luria, Fortner, Valente
 - Joint Funding by TCEQ, HARC
 - August 2005

Tetroon Study

July 2005

- Tetroon is a constant altitude balloon
 - Designed to move with a parcel of air
 - Allows wind and chemistry measurements
- Follow the the parcel with aircraft
 - Check accuracy of meteorological forecast
 - Measure chemical composition of parcel
 - Evaluate chemistry as it progresses
- Fly at Night
 - Validate nighttime transport and chemistry
 - Determine location/contribution next morning

NE Texas Plume Study

August 2005

- Evaluate impact of point source plumes on DFW
 - Cement Kiln Emissions
 - Power Plant Emissions
- Track plumes with aircraft
 - Evaluate point source emissions & signatures
 - Measure plume chemistry as it evolves
- Evaluate contribution to DFW area
 - Test model conclusions against real data

Ongoing Modeling Projects

- APCA Hot Spot Analysis
 - Frisco, Denton, Midlothian
- Model/Evaluate Cement Kiln Emissions
 - How do these emissions interact with DFW?
- 2009 Emissions Inventory Development
 - Traffic Demand Modeling from NCTCOG
- Emissions Inventory Surveys
 - Coordinated with HARC

