



Condition that Favor High Ozone in DFW

DFW Photochemical Modeling
Technical Committee

TCEQ

September 15, 2006

Texas Commission on Environmental Quality

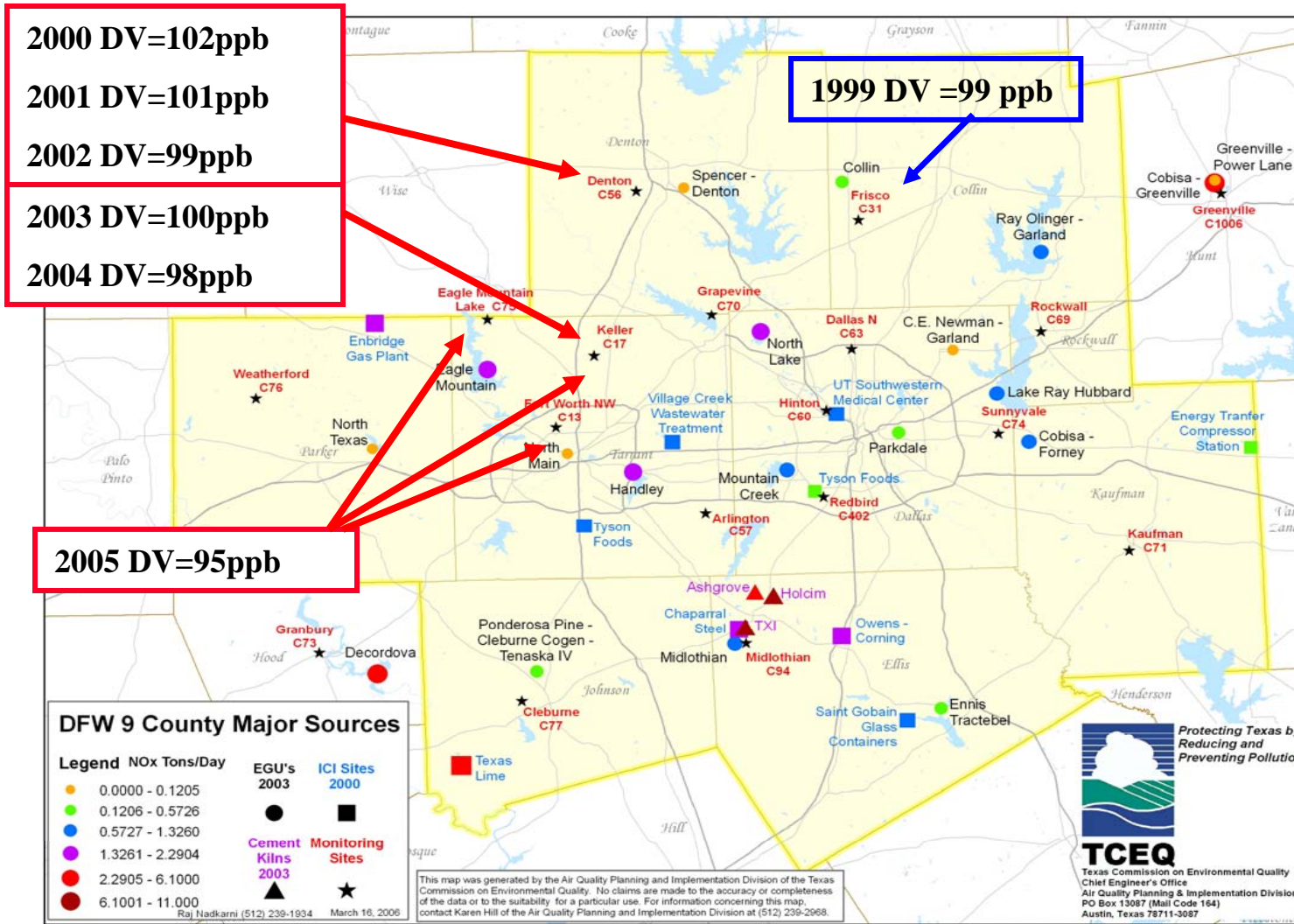


What are the Conditions that Favor High Ozone

- Background Ozone Concentrations
- Meteorology
 - Low wind speeds and favoring wind directions
 - Shallow mixing layer
 - Precipitation and cloud cover
 - Temperature
- Emissions
 - Anthropogenic
 - Biogenic
- Others



Where are the Highest 8-hour Design Values in DFW ?



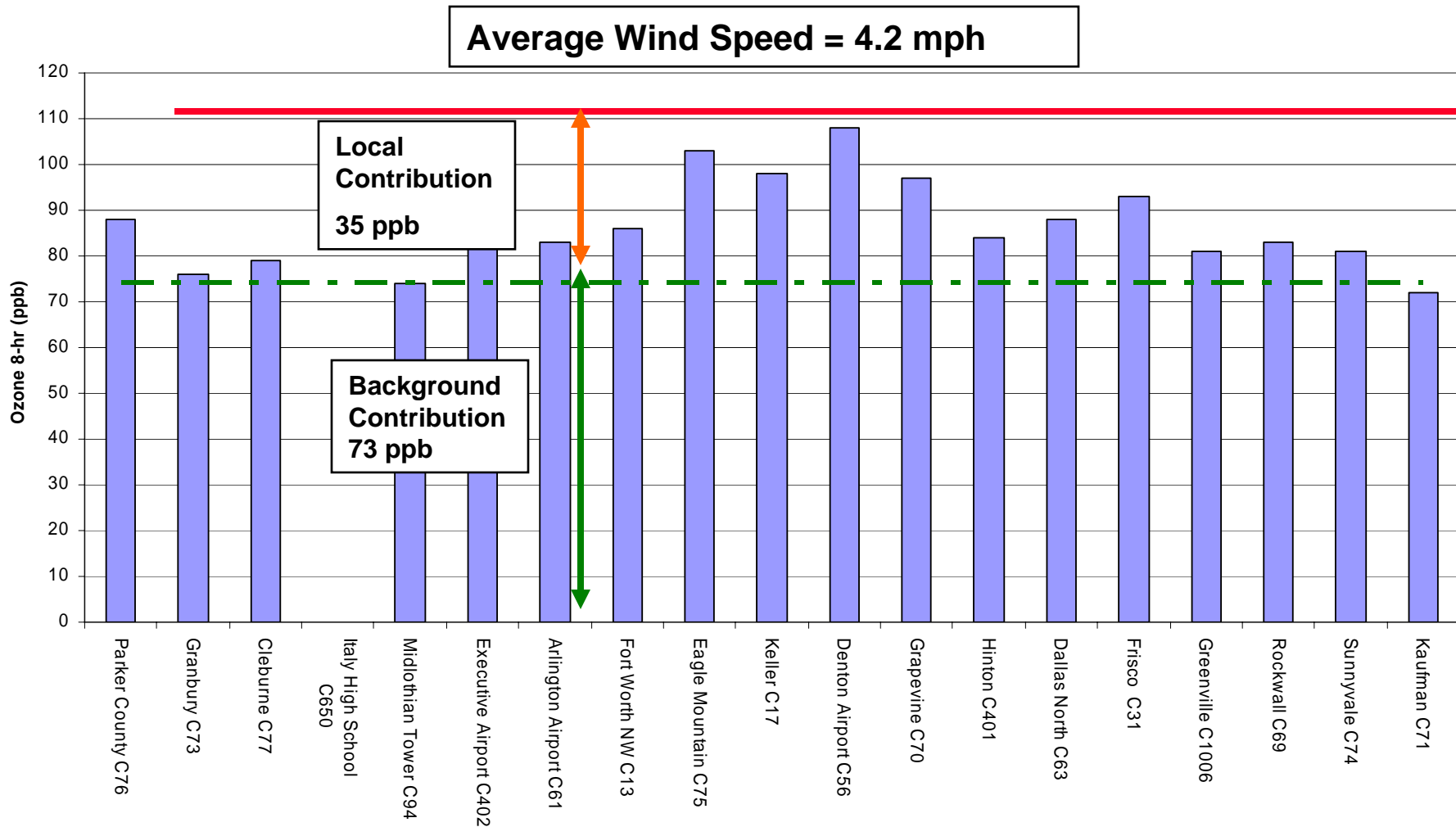


Why Are We Concerned About the Background Ozone?

- 8-Hour ozone exceedances are often associated with high background concentrations
- Local contribution on top of high upwind ozone increases likelihood of an 8-hour exceedance

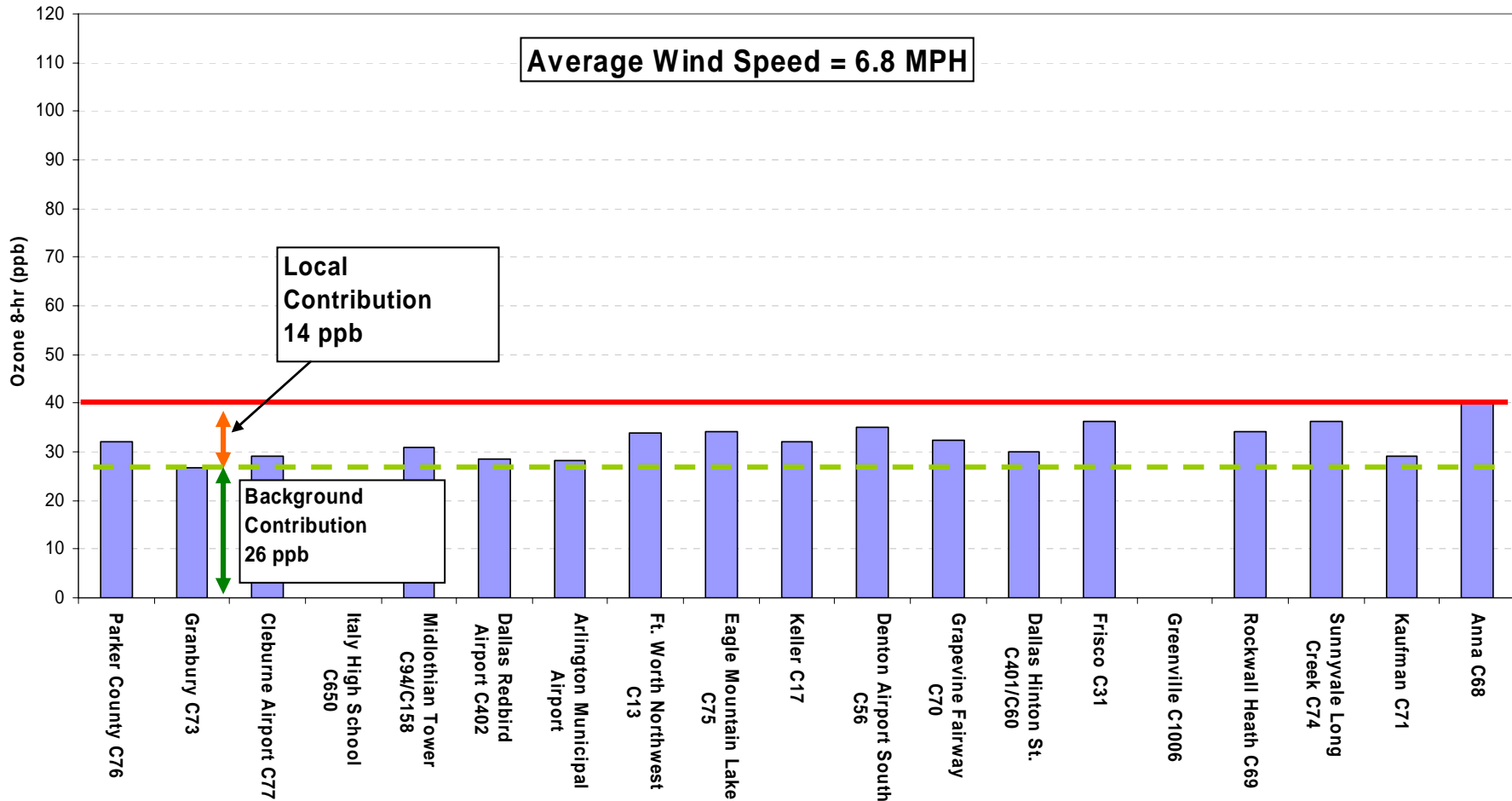


Daily Maximum Ozone 8-hour Average for DFW Area (6/22/05)





Daily Maximum Ozone 8-hour Average for DFW Area (7/5/03)





Upwind and Downwind Comparison

8-hr Exceedance Days 2001-2004

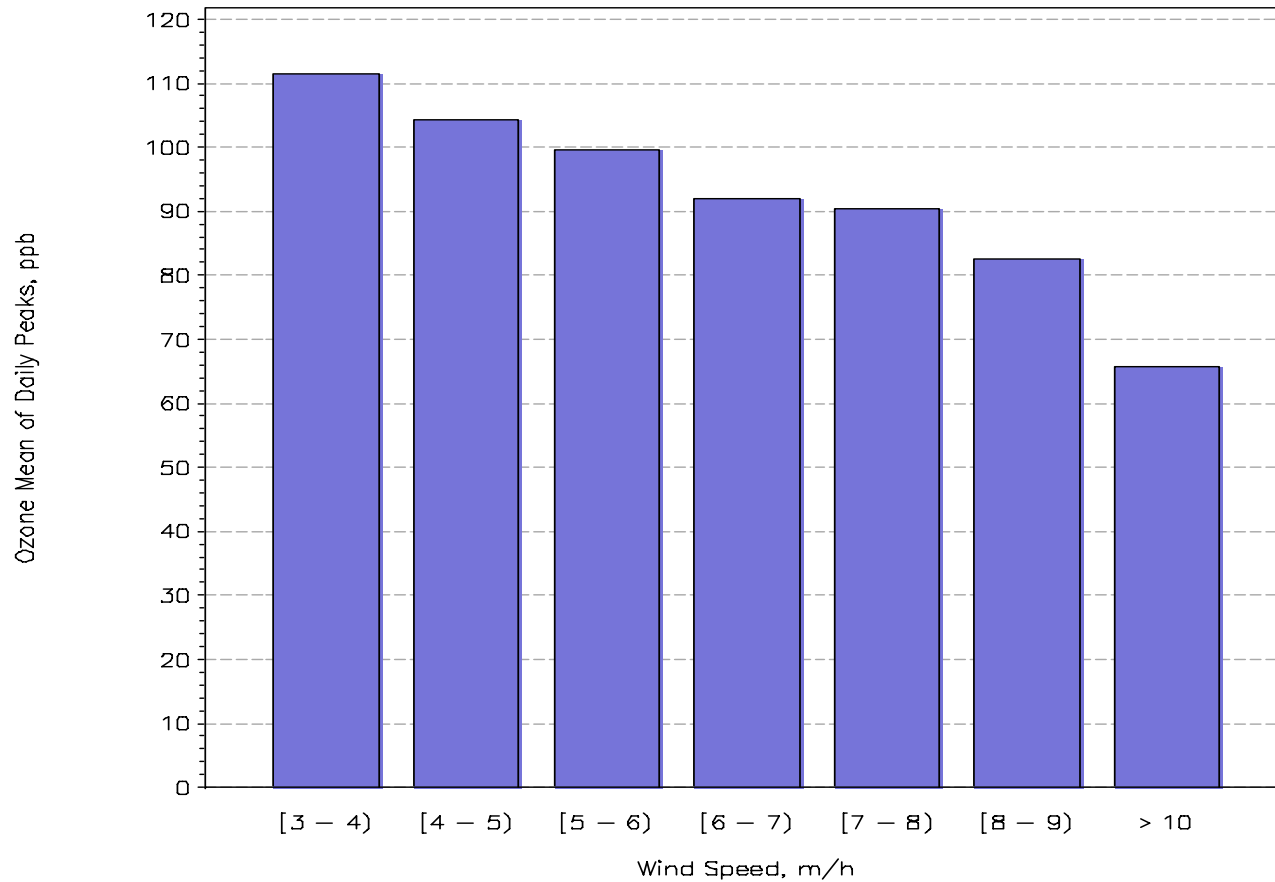
	Avg. Upwind 8hr ozone (ppb)	Avg. Downwind 8hr ozone (ppb)	Avg. Difference 8hr ozone (ppb)
Average	64	88	23
Northeast	64	84	20
South	66	91	24
Southeast	64	90	26
East	62	85	23



Ozone Vs Wind Speed

DFW Ozone Average of Maximum Ozone

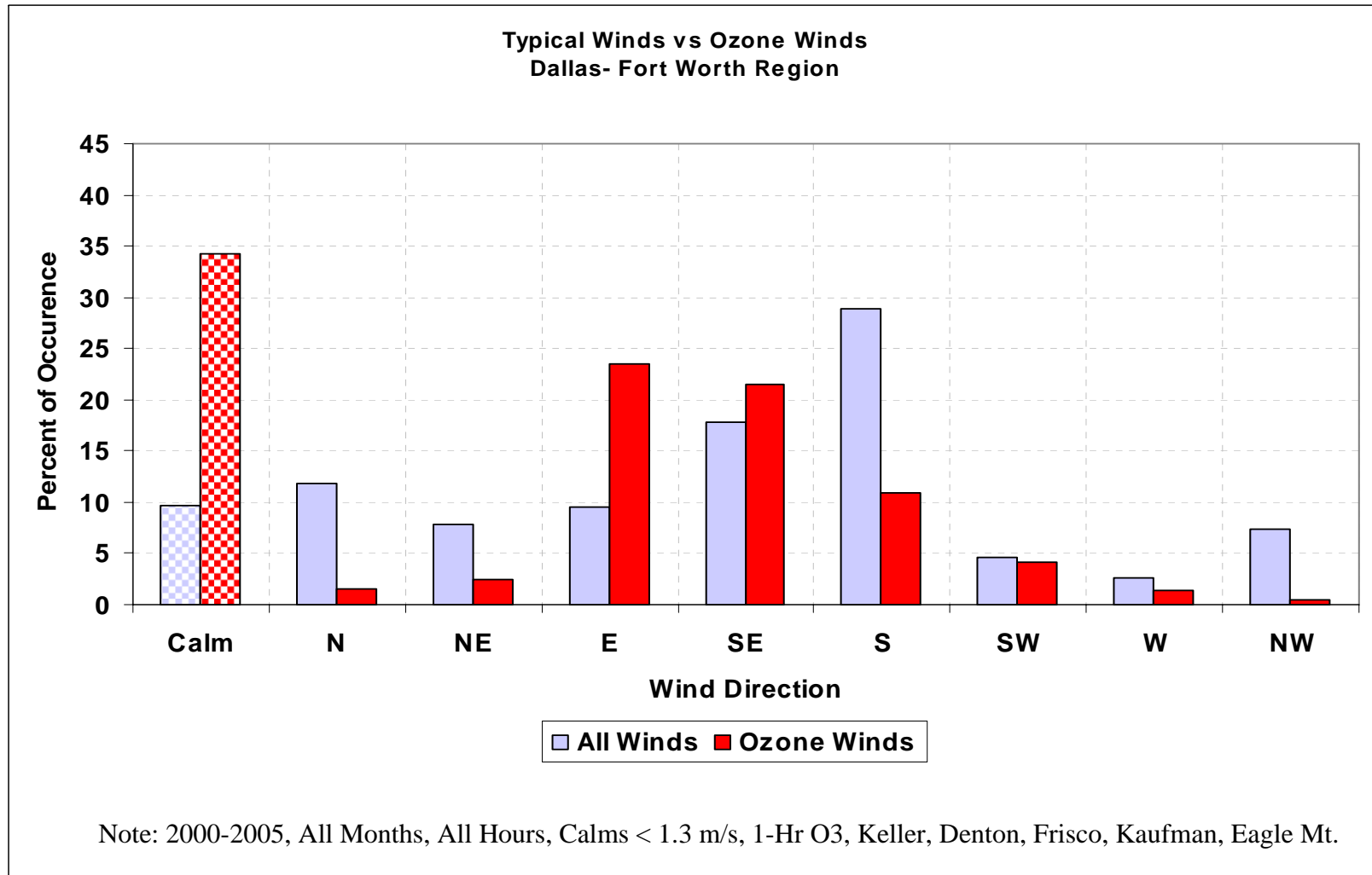
Years: 2001–2005, Month: 5–9, Hours: 600–1300



Note: There was no data for wind bins [0–1) and [1–2)



Typical Ozone and Non Ozone Winds

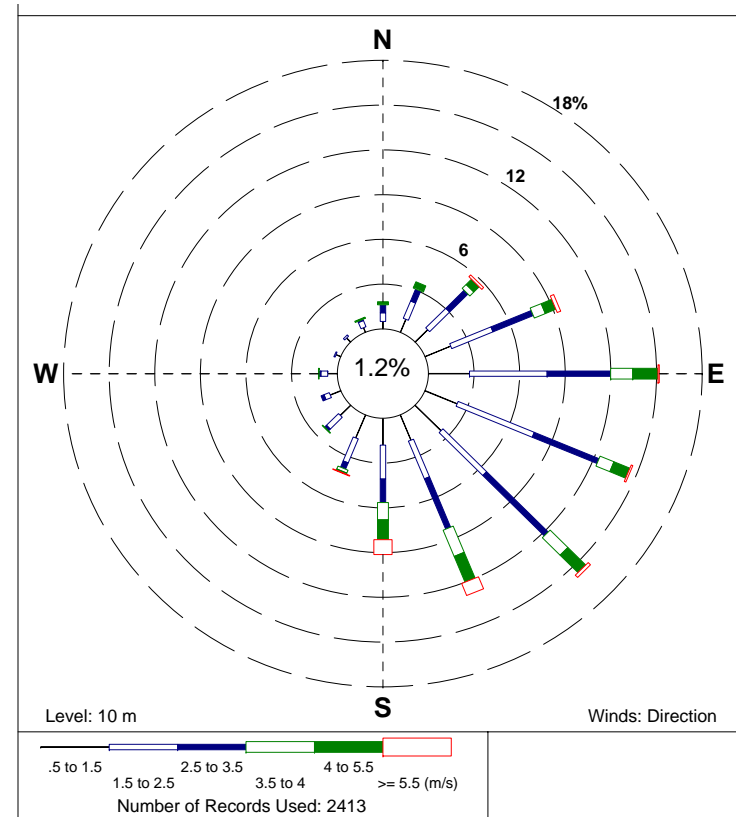
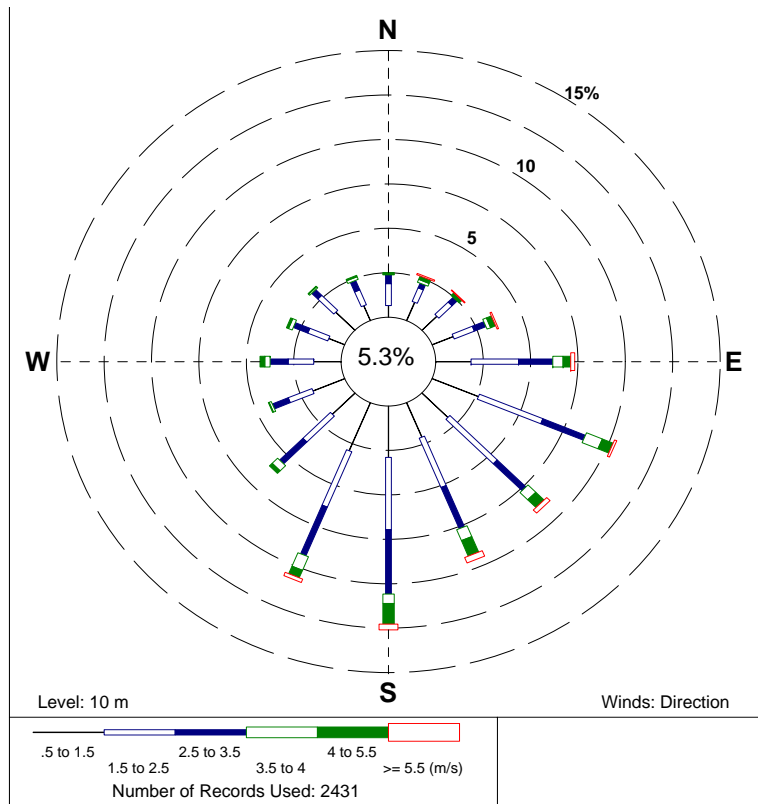




DFW Wind Rose for High Ozone Days (Ozone \geq 85 pbb)

Morning Hours
(7:00-10:00)

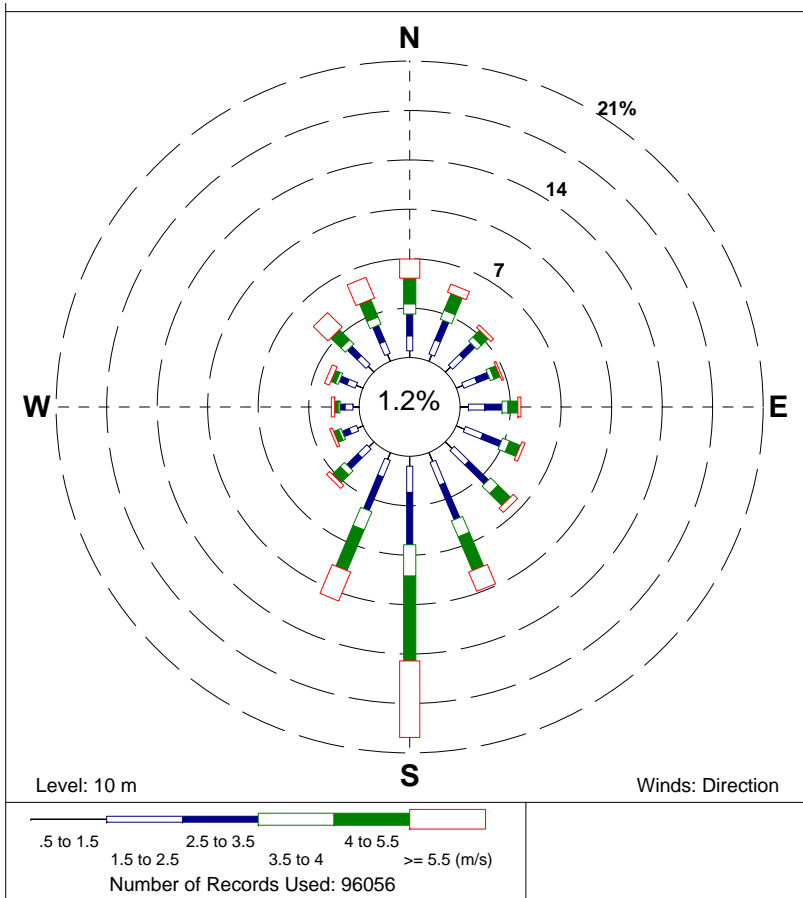
Afternoon Hours
(13:00-16:00)



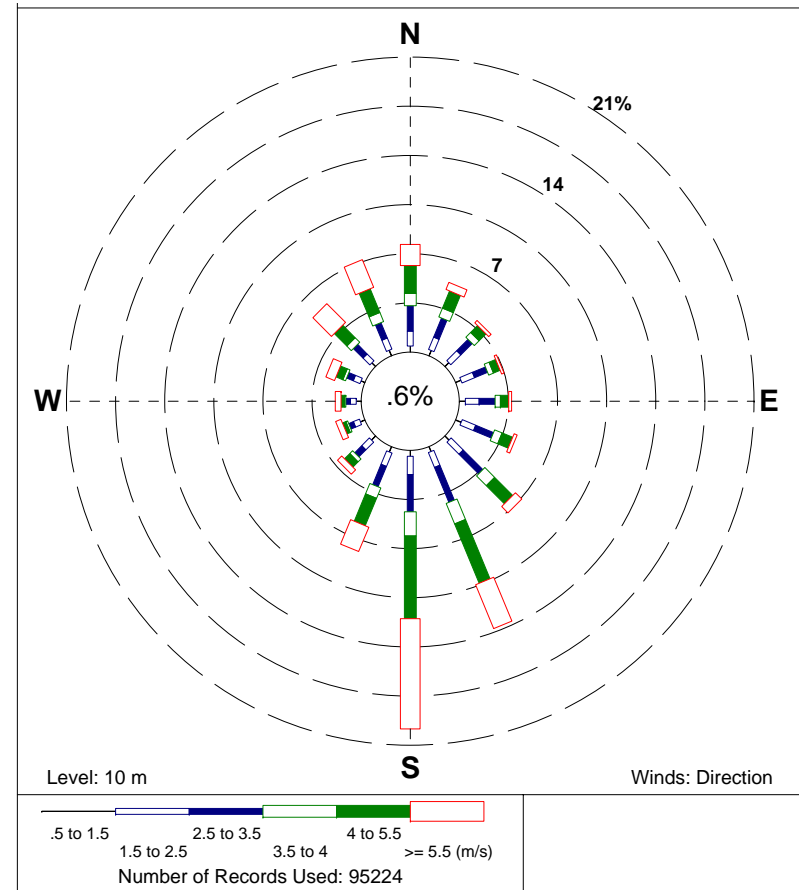


DFW Wind Rose for Low Ozone Days (Ozone < 60 pbb)

Morning Hours (7:00-10:00)



Afternoon Hours (13:00-16:00)



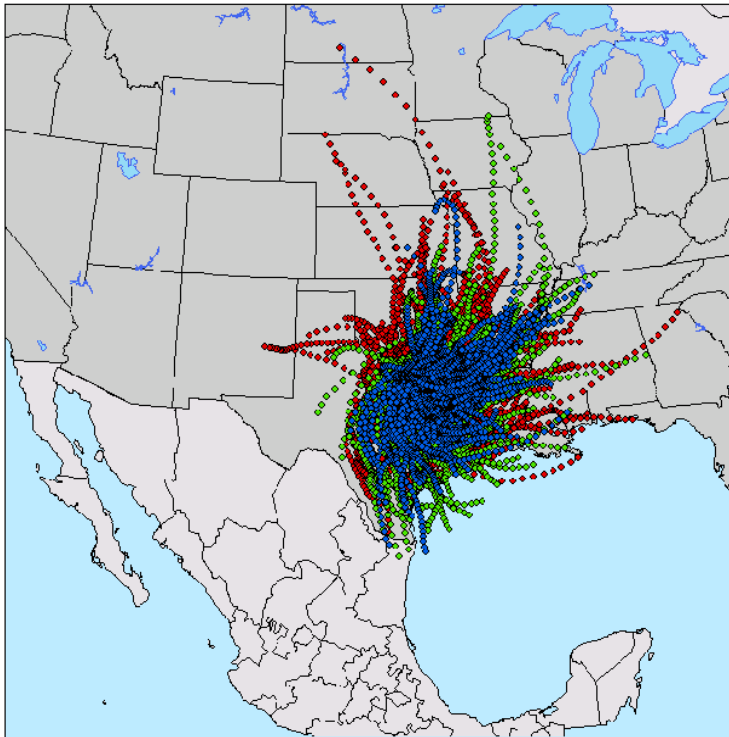


Upper Level Back Trajectories for DFW

(2000–2004)

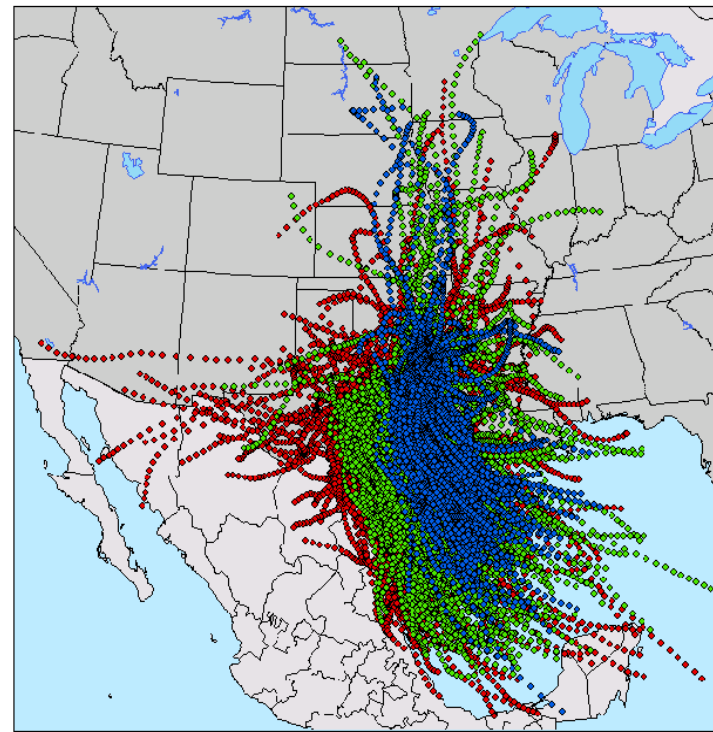
8-Hour High Ozone Days for Dallas-Fort Worth

8-hour Ozone value greater than 85 ppm
155 days during ozone season, May- Sept
For 2000-2004



8-Hour Low Ozone Days for Dallas-Fort Worth

8-hour Ozone value less than 40 ppm
335 days during ozone season, May- Sept
For 2000-2004



Height in Meters

- 100
- 500
- 1300



Upper Level Back Trajectories Density for DFW

Trajectory Density for the DFW Region

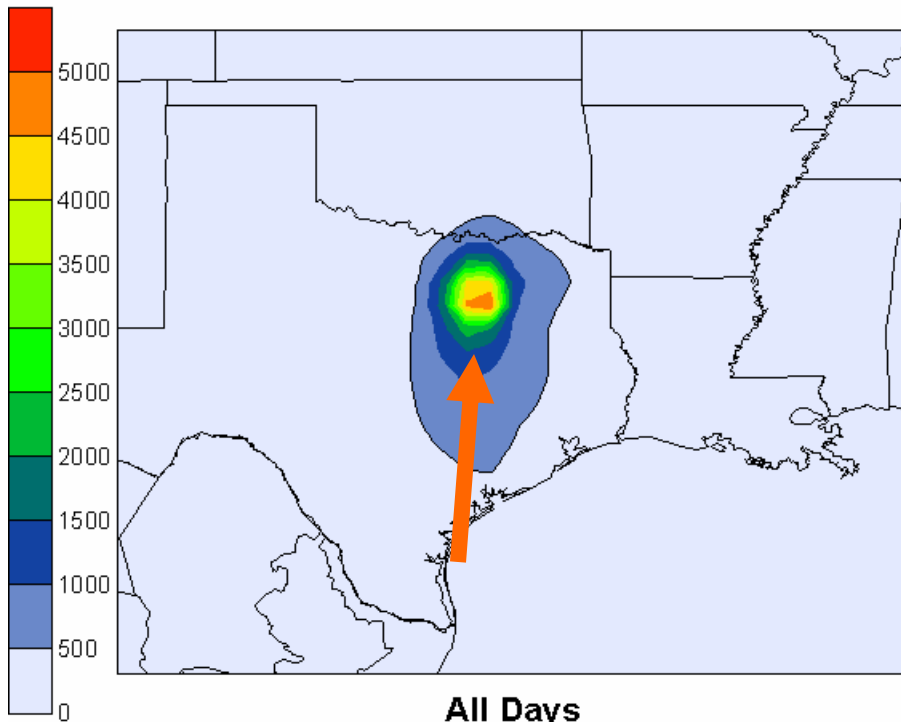
Years of 2001 - 2004

Hgts 100, 500 & 1300 meters

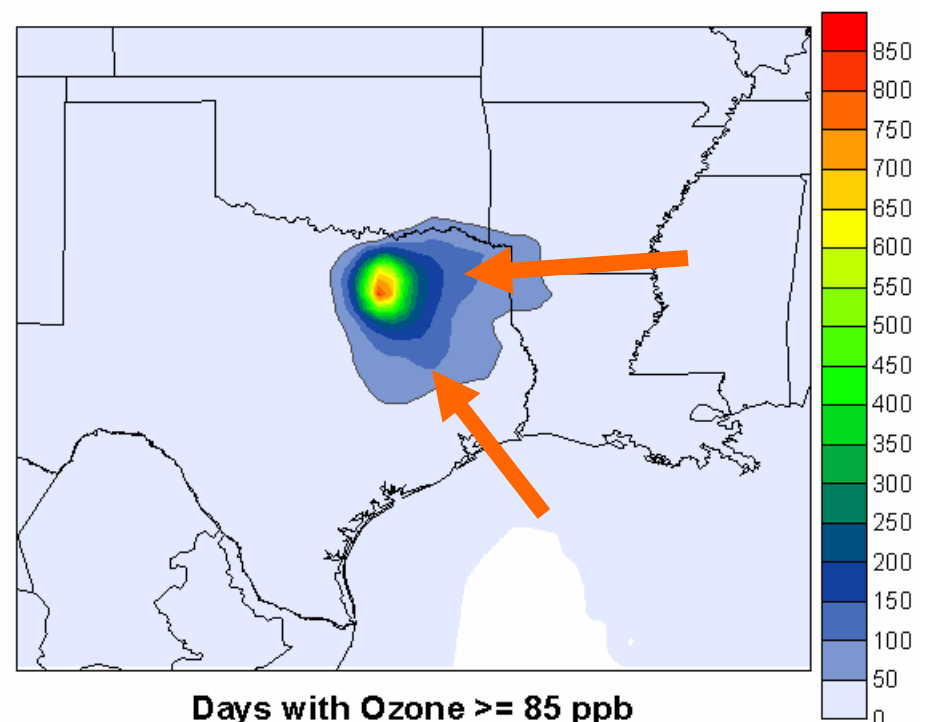
Start Time 21:00 GMT (Midday Local Time)

36 Hours Backtrajectories centered at Hinton

Frequency
of
End Points

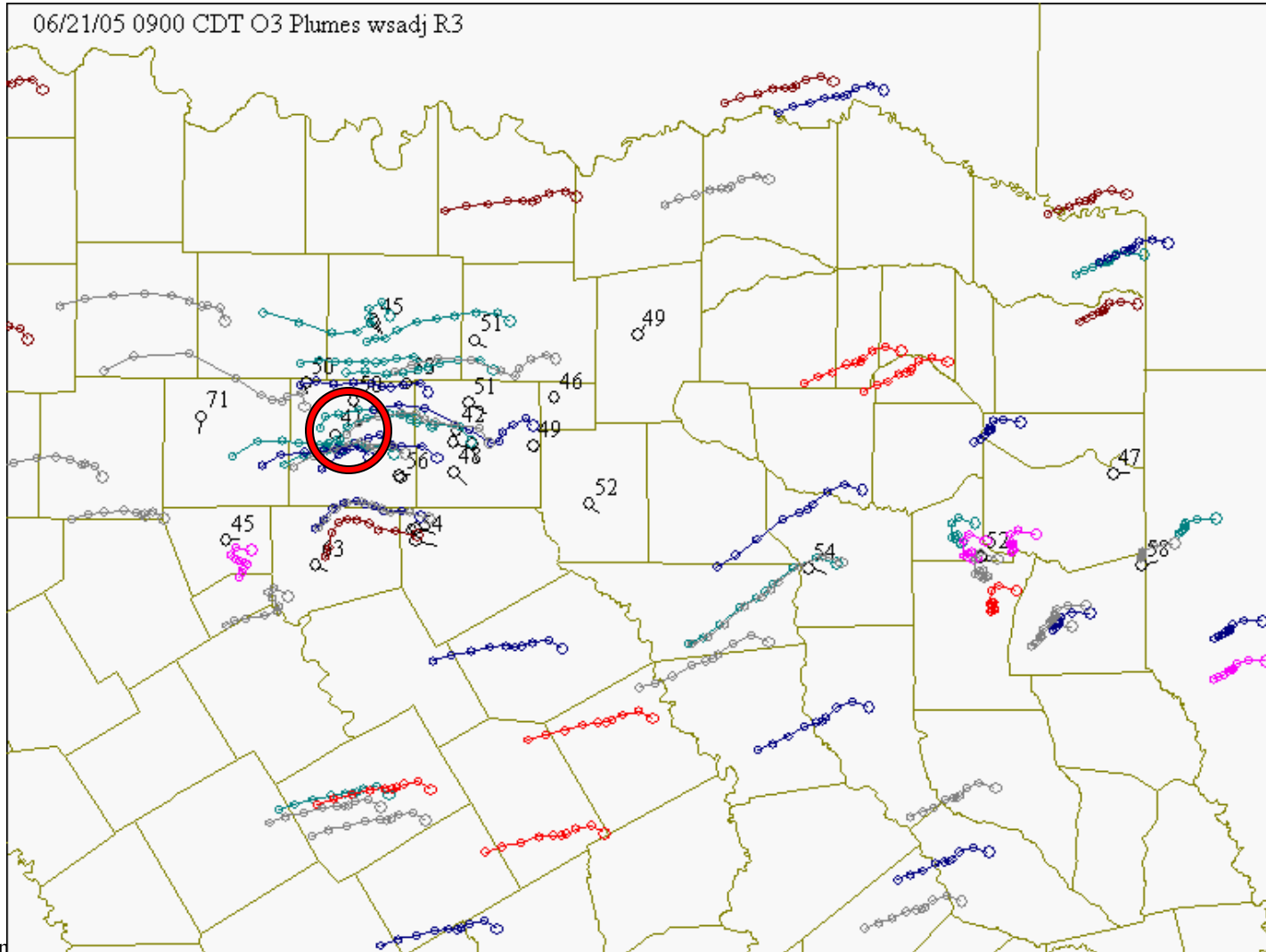


Frequency
of
End Points



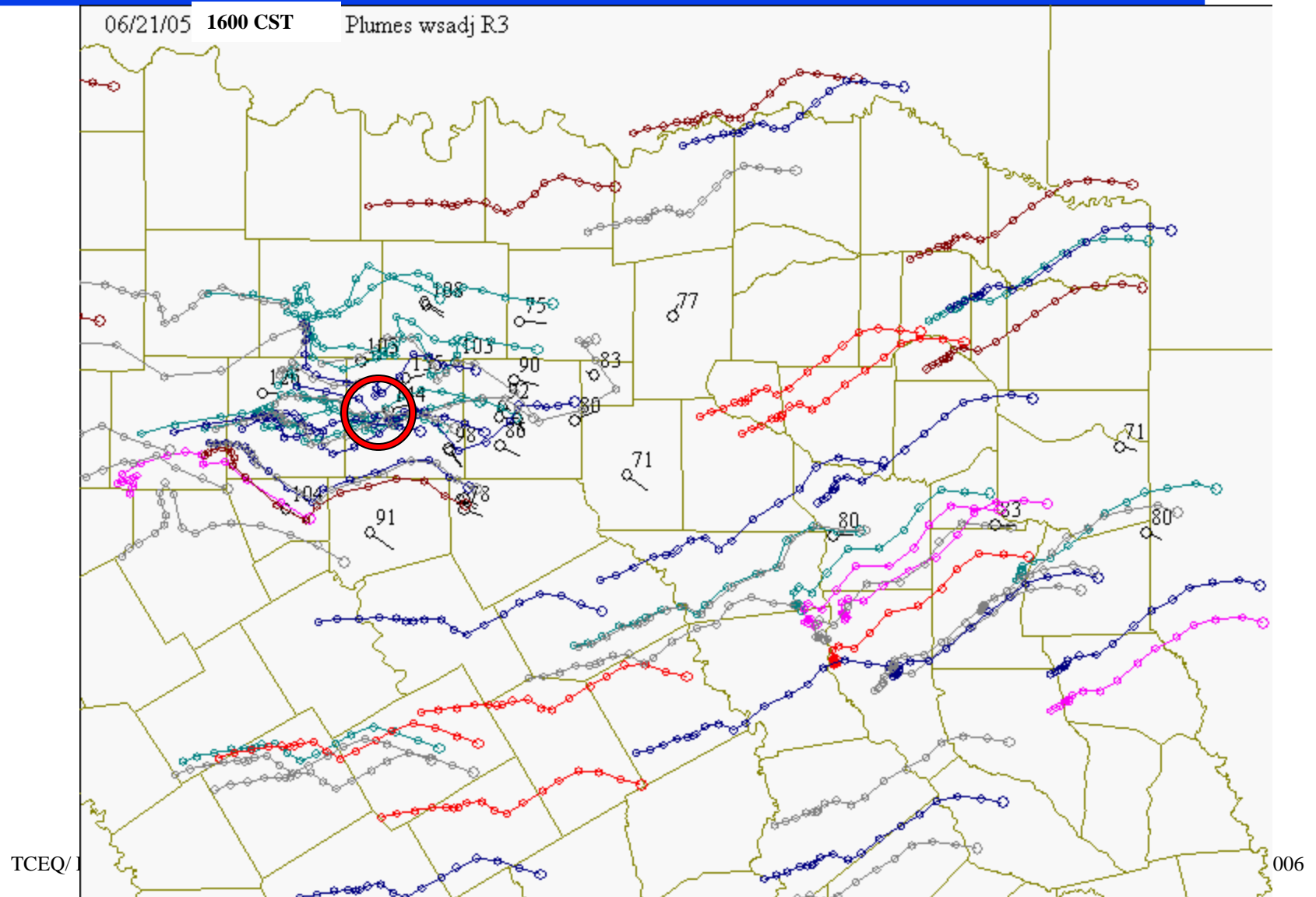


June 21, 2005 Plume



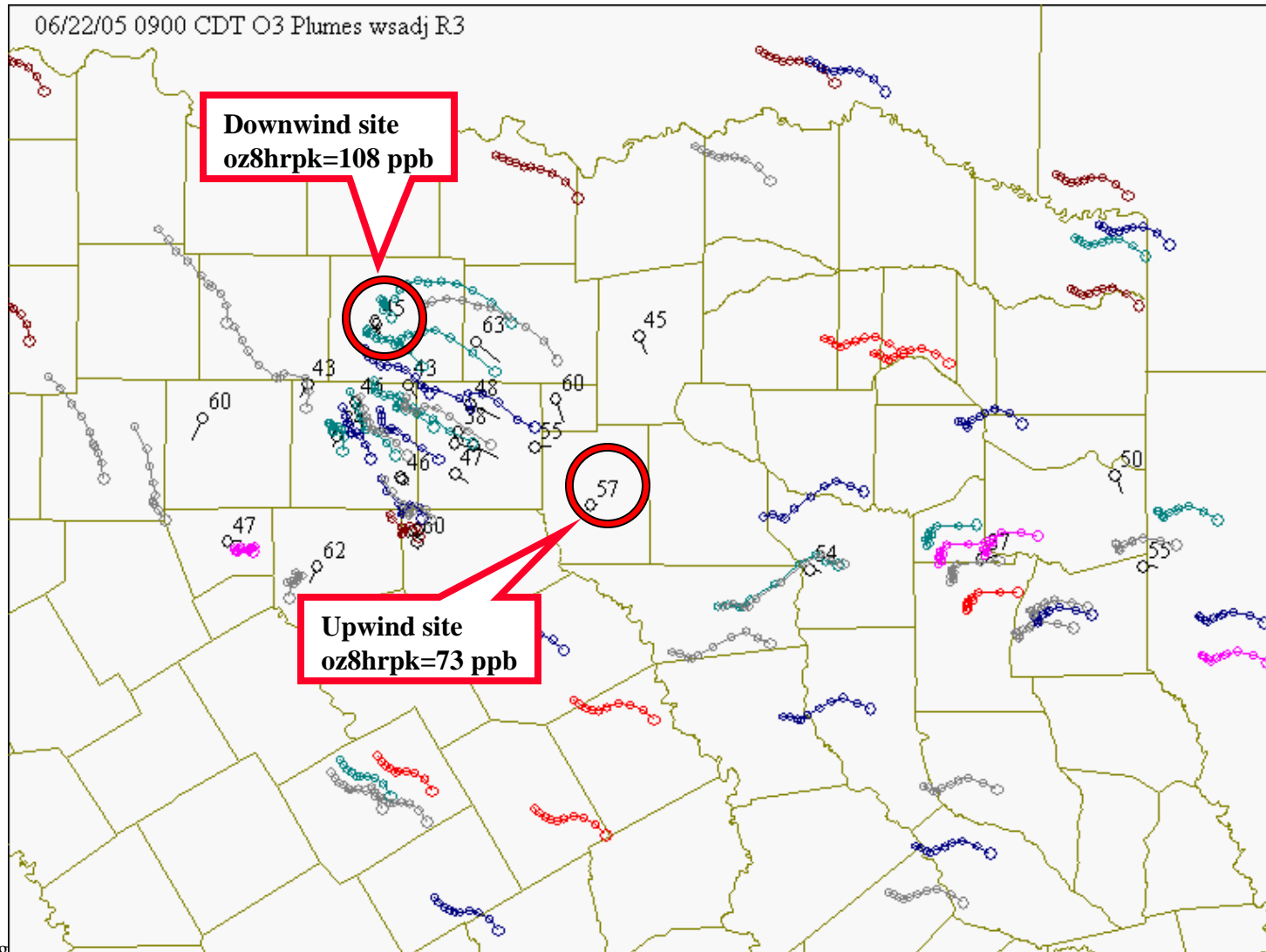


June 21, 2005 Plume



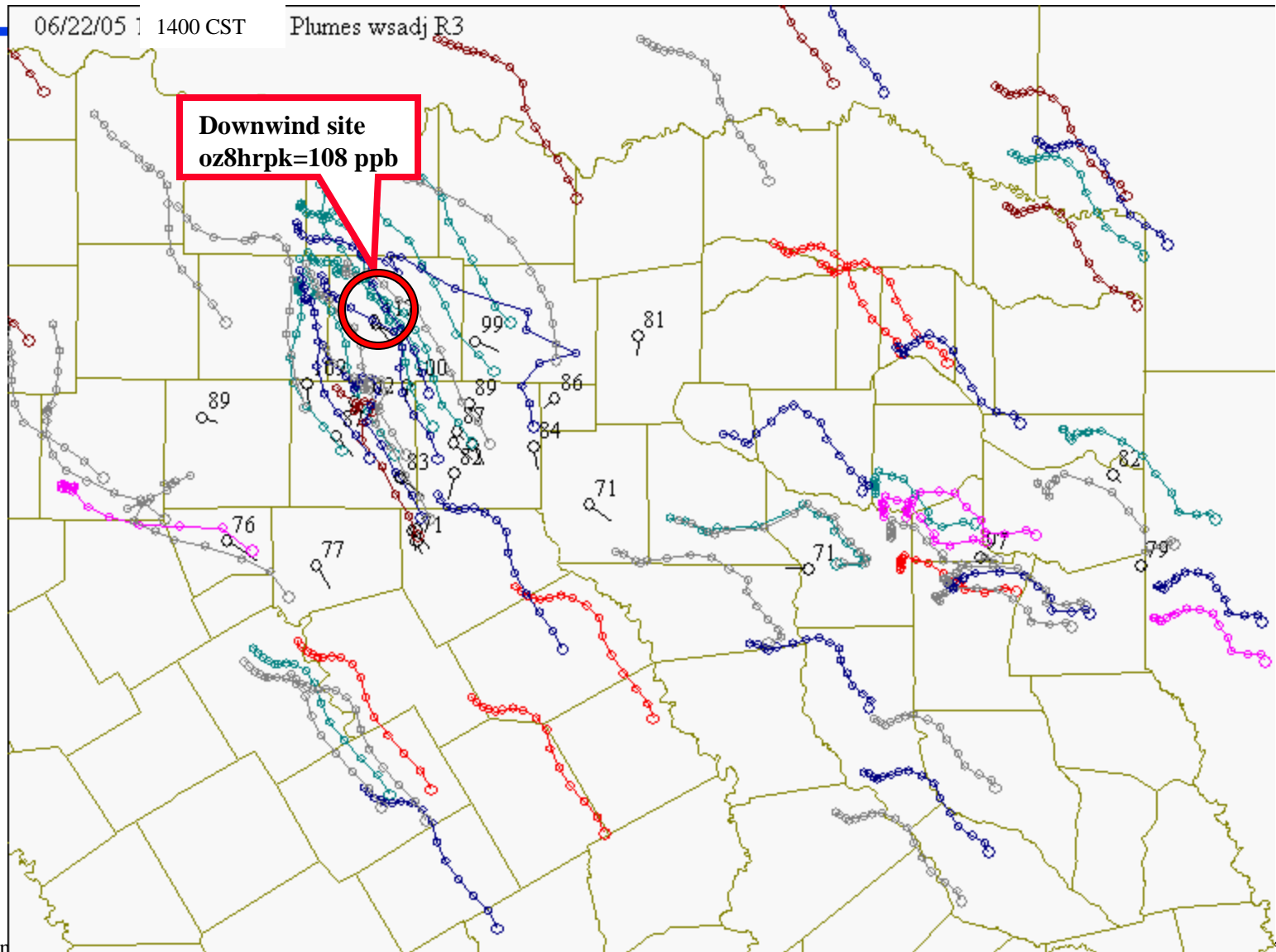


June 22, 2005





June 22, 2005 Plume





Conclusions

- Days with light winds are associated with high 8-Hour ozone
- Background ozone contributes to the exceedance of the 8-Hour ozone standard
- Background ozone concentrations are higher with winds from the east and southeast
- DFW contributes approximately 23 ppb on high 8-hour days