How “representative” was summer 2006?: Regional O_3 trends in Texas

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Rationale

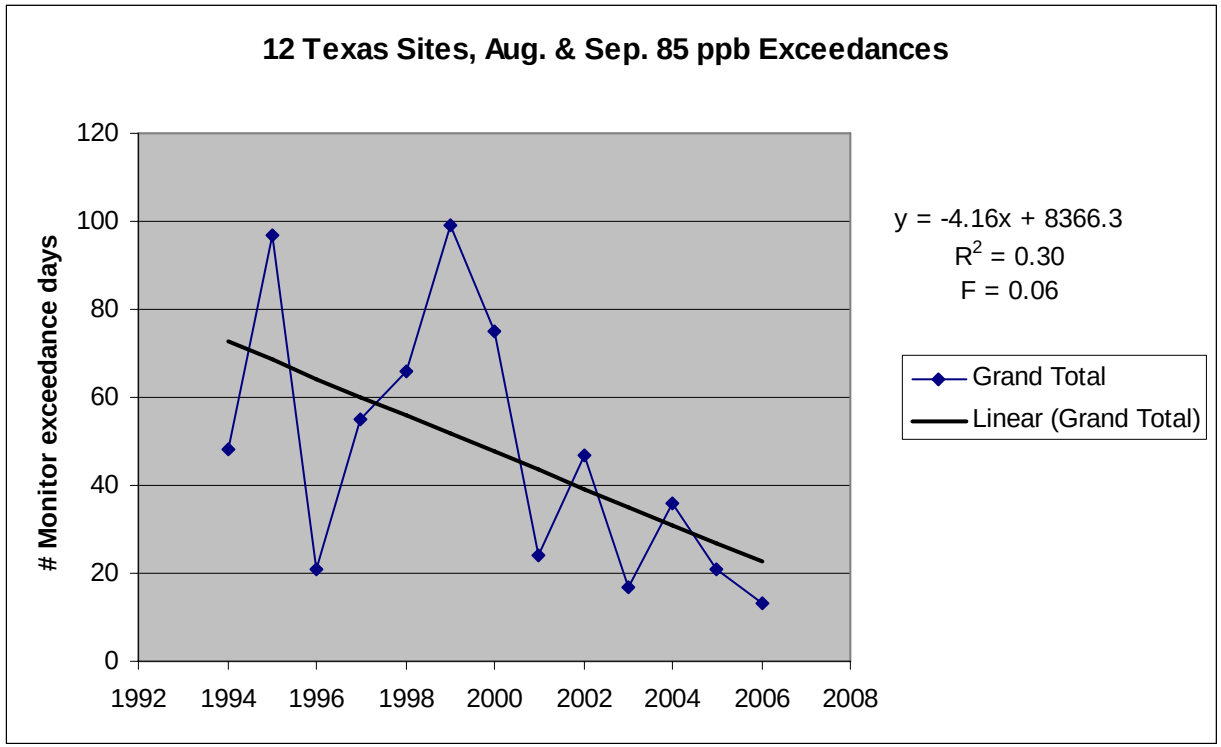
- In order to use research results from 2006, TCEQ may wish to know how typical that summer was in terms of pollution and meteorology.
- Assess pollution by analyzing regional ozone across eastern EPA Region 4.
- Assess meteorology by analyzing regional temperatures and air flow patterns across eastern Texas.

What is “regional ozone”?

- Download O_3 data from AQS from 1994 – 2006 (13 yrs), compute 8-hr daily maxima.
- Select subset of monitoring sites w complete (>75%) data in Aug. & Sept. each year.
- Pare list of monitoring sites to use only 1 / county (2 for Harris Co. – 1 industrial, 1 suburb).
- Count monitor-exceedance days by year:
  - Use 85 ppb & 75 ppb,
  - TX/OK/LA combined & TX only.

Regional O_3 trend

- Texas-85ppb trend shown; other graphs look similar.
- Wide year-to-year variability.
- Appears to have been a change after 2000.
- Classify 6 recent years as follows:
  - 2003, 2006, low;
  - 2001, 2005, moderate;
  - 2002, 2004, high;
  - Recall 2005 Katrina late-Aug., Rita mid/late-Sept.)
- 12 Texas sites:
  - 481830001 Longview C19
  - 480850005 Frisco C31/C680
  - 484392003 Keller C17
  - 482010024 Aldine C8
  - 482010051 Croquet C409
  - 483611001 W. Orange C9
  - 482450009 Beau.-Lamar C2
  - 484530014 Austin NW C3
  - 480290032 San Ant. NW C23
  - 484690003 Victoria C87
  - 483550025 CC West C4
  - 480610006 Brownsville C80



2006 Aug. & Sept. LEADS color-coded O_3 8hr

Monitoring Site	Aug-06																														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Dallas-Fort Worth																															
Frisco C31/C680	[illegible]	[illegible]	[illegible]	68	65	[illegible]	60	[illegible]	62	[illegible]	[illegible]	49	38	[illegible]	[illegible]	63	71	81	72	[illegible]	[illegible]	66	[illegible]	78	65	56	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dallas Hinton St. C401/C60/AH161	[illegible]	[illegible]	[illegible]	53	[illegible]	[illegible]	47	[illegible]	42	[illegible]	[illegible]	[illegible]	31	[illegible]	[illegible]	52	[illegible]	[illegible]	[illegible]	65	[illegible]	82	[illegible]	63	[illegible]	42	[illegible]	[illegible]	53	[illegible]	[illegible]
Dallas North No 2 C63/C679	35	[illegible]	[illegible]	56	[illegible]	[illegible]	51	47	[illegible]	[illegible]	[illegible]	[illegible]	33	[illegible]	[illegible]	56	60	[illegible]	70	68	[illegible]	74	[illegible]	70	57	48	[illegible]	[illegible]	51	[illegible]	[illegible]
Dallas Executive Airport C402	[illegible]	34	40	[illegible]	48	[illegible]	[illegible]	43	[illegible]	[illegible]	[illegible]	[illegible]	32	[illegible]	[illegible]	54	[illegible]	73	66	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	36	[illegible]	[illegible]	[illegible]	[illegible]
Denton Airport South C56/A163/X157	42	42	51	71	65	60	65	58	58	60	[illegible]	56	39	48	61	64	66	91	84	74	84	71	76	74	64	58	52	41	52	58	94
Pilot Point C1032	43	44	55	71	68	55	50	58	62	63	47	49	40	48	67	68	75	81	68	64	70	65	73	75	66	55	47	35	50	54	83
Midlothian Tower C94/A305/X158	34	35	38	40	44	48	49	38	41	44	44	41	32	36	40	46	56	67	62	59	62	63	59	61	46	36	33	32	52	74	74
Midlothian OFW C52/A137	28	30	32	39	41	47	45	34	36	37	41	34	26	31	38	44	54	68	62	58	61	68	59	58	44	34	35	33	57	75	74
Italy High School C650	34	34	41	39	41	50	52	42	39	43	45	41	31	37	37	45	55	68	63	60	63	57	64	59	43	35	39	36	60	71	72
Granbury C73/C681	37	37	36	45	46	50	54	40	37	42	45	46	33	33	42	39	52	68	62	57	62	71	57	61	50	41	39	32	54	77	70
Greenville C1006/A198	41	44	39	51	61	54	54	48	47	52	48	45	34	43	52	61	60	72	66	62	64	58	61	68	59	46	41	37	53	58	77
Cleburne Airport C77/C682	35	35	35	44	46	48	52	40	38	42	47	43	32	32	39	40	53	68	61	53	60	69	59	62	51	39	35	31	55	76	73
Kaufman C71/A304/X071	39	49	39	46	50	51	56	46	42	48	NV	NA	NA	NA	NA	NV	57	70	62	64	64	65	68	67	53	40	36	34	60	63	76
Parker County C76	37	37	38	52	47	52	62	41	42	45	44	47	34	35	46	40	50	75	65	66	73	69	59	61	54	42	47	37	50	67	70
Rockwall Heath C69	37	40	40	52	54	51	53	44	43	47	50	43	31	42	50	60	56	73	66	61	65	67	70	67	53	41	41	29	52	56	80
Eagle Mountain Lake C75	41	40	45	64	55	61	69	50	44	50	50	53	34	40	52	55	57	88	78	75	87	68	65	69	60	52	52	38	51	64	83
Ft. Worth Northwest C13/AH302	39	36	39	54	51	56	62	48	45	51	49	49	33	38	52	50	57	80	74	68	78	78	71	67	54	45	NV	32	56	69	85
Keller C17	41	40	46	63	57	61	68	53	44	54	57	53	35	43	58	56	61	90	78	74	87	76	76	71	59	51	45	32	52	65	93
Grapevine Fairway C70/A301/X182	38	38	46	63	69	58	52	48	49	54	55	44	33	47	59	58	64	91	78	72	88	72	83	68	56	50	42	30	55	64	98
Arlington Municipal Airport C61	36	35	34	47	47	49	48	41	41	46	46	41	31	36	44	NV	NA	NV	63	54	62	84	63	59	46	37	32	29	56	71	78
Tyler-Longview-Marshall																															
Palestine C647	37	NV	34	36	45	54	33	36	37	41	NV	32	29	35	38	51	56	66	58	57	54	58	66	54	43	31	33	44	58	61	75
Wamba NTRD C645	48	46	50	65	57	67	53	51	54	69	61	62	47	53	63	67	86	79	78	72	66	77	67	65	74	61	48	49	55	50	53
Longview C19/A127/C644	31	35	39	51	61	68	42	40	37	48	50	39	27	32	50	66	88	72	67	70	66	56	86	63	45	35	29	38	56	53	73
Karnack C85/AFH303	33	35	48	55	44	64	41	44	52	57	54	40	38	53	67	55	68	68	69	67	70	54	65	63	55	41	37	28	51	50	64
Panola C627	24	24	37	50	51	56	36	38	40	41	45	40	32	42	53	71	80	62	57	65	60	46	67	56	42	33	29	30	64	52	61
Clarksville NTRD C648/C668	NA	NV	50	55	62	57	57	64	52	60	53	61	42	47	59	54	77	66	64	61	59	68	57	78	73	57	40	40	53	48	63
Tyler Airport Relocated C82	43	42	40	47	53	72	53	44	46	57	49	44	33	44	47	61	72	72	68	68	67	62	79	61	45	42	42	40	55	62	81
Waco																															
Temple C651	30	29	39	36	37	46	40	42	36	41	45	32	27	34	36	36	57	69	58	50	50	49	62	52	37	33	29	40	53	65	78
Beaumont-Port Arthur																															
Beaumont-Lamar C2/A112	21	23	37	55	55	52	29	36	38	39	31	26	23	27	73	NV	66	59	46	49	47	51	49	42	25	19	20	19	NV	53	56
Port Arthur West C28/A128/A228	21	20	26	36	44	47	26	26	34	35	28	26	21	20	34	59	78	54	38	36	35	43	46	33	24	20	22	20	NV	53	61
Jefferson Co. Airport C1019/A317	23	22	28	40	46	45	26	28	37	36	28	26	21	22	46	56	66	52	38	41	39	45	NV	NA	NA	NA	NA	NA	NA	NA	NA
Hamshire C64/C654	20	21	26	38	38	42	25	29	29	33	29	22	21	22	57	55	75	56	36	39	38	44	39	37	22	19	20	NV	47	47	56
SETRPC 40 Sabine Pass C640/C654	24	23	28	35	41	46	25	28	30	36	29	26	18	20	33	47	92	52	37	36	37	43	NV	29	20	20	20	20	49	58	71
SETRPC 43 Jefferson Co Airport C643	21	20	26	38	44	43	24	26	35	34	27	23	20	20	45	54	66	52	36	39	38	43	43	31	23	18	18	18	49	52	58
SETRPC Port Arthur C628	22	23	29	36	40	47	25	27	39	32	28	24	20	21	38	59	87	53	37	34	36	44	NV	31	21	15	18	18	48	50	64
Newton NTRD C639	26	30	39	28	40	41	34	33	31	39	35	32	31	34	42	50	61	54	44	49	50	39	53	43	33	21	18	31	51	53	60
West Orange C9/A141	22	22	28	40	44	46	26	30	45	38	33	29	29	31	69	74	66	55	36	37	41	46	56	49	26	18	22	23	44	NV	51
SETRPC Mauriceville 42 C642/C311/C665	22	22	27	39	38	40	29	32	66	34	33	26	27	34	46	65	54	57	35	39	43	42	47	50	26	20	19	23	42	46	49
C1027-Alabama-Coushatta-TX	22	24	24	30	36	47	35	30	34	34	47	35	33	56	37	41	60	55	42	41	49	43	41	43	40	24	26	38	52	62	56
San Augustine Airport NTRD C646	24	33	24	29	38	46	34	29	33	36	34	28	28	32	43	48	60	52	45	51	52	41	50	46	37	21	21	22	57	57	65
Austin																															
CAPCOG McKinney Roughs C684	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	50	42	33	27	27	41	46	67	71
Fayette County C601	22	21	32	31	30	39	32	37	30	29	31	24	23	26	30	36	53	80	48	38	43	38	44	38	28	24	25	27	45	64	71
Dripping Springs School C614	28	27	34	33	34	36	35	34	34	39	41	30	26	32	34	41	57	64	51	43	44	41	51	49	32	28	26	36	31	65	66
CAPCOG San Marcos C675	25	25	28	28	29	28	30	28	27	28	NV	26	25	27	27	29	43	57	42	36	38	NV	45	38	28	25	25	38	36	63	63
Austin Northwest C3	30	28	35	39	36	43	39	38	34	40	41	31	28	33	34	36	55	70	53	48	50	46	64	51	35	31	29	35	37	70	78
Audubon C38	33	31	41	47	42	47	39	44	40	44	49	35	30	36	40	42	63	74	55	53	58	56	68	59	41	33	32	37	37	70	86
Pflugerville Wastewater C613	32	31	37	NV	NA	NA	NV	41	32	34	38	30	29	33	35	39	56	76	54	47	50	42	64	51	36	32	28	36	43	66	74
CAPCOG Round Rock C674	29	29	36	37	36	42	39	36	36	40	45	34	30	36	39	41	50	72	53	47	50	47	63	53	38	35	32	31	46	66	74
Houston-Galveston-Brazoria																															
Danciger C618	17	19	23	29	24	42	23	26	25	21	22	16	16	17	20	24	41	50	36	34	26	32	26	23	17	18	13	16	31	66	72
Mustang Bayou C619	15	17	18	29	24	37	21	19	21	23	21	20	13	17	19	29	70	45	30	35	24	38	25	26	19	17	17	18	40	79	66
Manvel Croix Park C84	20	23	29	43	40	56	29	33	36	29	28	20	26	22	30	38	94	57	36	43	35	47	24	30	21	22	18	16	54	80	92
Lake Jackson C1016	18	20	23	29	25	36	23	25	29	20	25	19	16	17	18	24	48	46	39	32	26	34	37	20	18	19	15	18	28	79	75
Smith Point Hawkins Camp C96/C638	22	25	29	36	37	48	35	29	43	41	33	25	20	22	42	58	78	53	43	37	35	41	49	43	28	25	21	23	78	61	68
Galveston Airport C34/A109/X152	19	19	25	31	31	41	26	26	27	30	26	19	16	16	17	33	77	52	39	35	30	43	43	27	21	22	19	16	56	64	NV
Texas City 34th St. C620	NV	19	22	25	30	33	22	27	32	28	25	16	15	16	26	44	75	49	36	40	33	41	40	29	18	18	14	16	66	73	64
Houston Aldine C8/AF108/X150	NA	NV	31	NV	NA	NA	NA	NA	NV	34	31	28	29	39	59	76	72	56	38	60	51	52	NV	NA	NA	NA	NA	NA	NA	NA	NV
Channelview C15/AH115	18	24	27	58	61	49	27	27	63	35	29	28	26	31	55	74	70	51	35	55	35	48	29	52	23	20	23	22	64	59	69
Northwest Harris Co. C26/A110/X154	25	38	39	61	61	55	38	47	54	34	34	27	30	32	45	57	66	70	46	65	73	67	36	45	32	23	28	28	51	59	87
Houston North Wayside C405	12	19	24	56	44	47	22	28	52	NV	NV	21	24	27	53	59	67	55	32	59	45	49	18	37	15	18	20	13	50	63	68
Lang C408	16	21	23	49	57	49	NV	33	52	27	25	22	19	29	NV	47	69	57	33	67	50	48	16	36	19	18	21	17	46	55	86
Houston Croquet C409	21	20	27	43	39	43	26	29	32	28	25	22	19	21	30	NV	92	54	36	40	34	45	14	30	19	18	18	16	47	NV	101
Houston Bayland Park C53/A146	24	26	32	68	63	50	30	37	40	30	29	25	21	31	42	45	105	72	51	54	48	53	18	38	23	21	23	20	59	70	124
Houston Monroe C406	20	21	22	44	45	53	26	31	36	27	28	19	21	24	34	40	104	51	41	51	43	49	17	32	21	20	19	17	58	68	99
Houston Westhollow C410	18	26	27	58	47	52	32	40	42	28	27	22	21	26	34	39	97	82	46	54	46	56	23	35	25	20	24	20	48	63	126
Houston Regional Office C81	18	21	25	64	49	49	25	31	46	29	28	22	24	24	43	46	75	63	40	67	44	53	13	36	19	19	20	14	53	68	87
Houston Texas Avenue C411	10	17	19	60	45	44	21	27	36	23	22	20	21	20	39	NV	70	63	37	64	43	50	11	32	17	17	19	12	46	64	78
Park Place C416	20	23	26	55	52	52	28	34	44	29	NV	22	25	22	42	47	94	59	44	66	50	59	12	38	23	23	21	18	60	78	118
Sheldon C551	18	23	30	53	49	50	31	27	58	35	32	27	27	34	58	80	67	55	37	50	37	47	26	48	23	17	23	19	62	58	63
Baytown Wetlands Center C552	23	25	28	44	45	51	31	29	46	35	32	27	22	29	50	70	84	48	38	41	33	44	33	45	26	21	24	21	70	59	62
Crosby Library C553	23	27	27	44	43	50	38	27	58	38	38	32	31	46	63	87	60	53	39	44	38	49	34	58	33	20	24	25	58	54	55
West Houston C554	21	29	36	67	67	50	33	48	50	33	31	24	26	29	39	47	80	82	46	71	60	62	25	40	27	22	23	22	51	62	112
Kingwood Library C555	25	36	37	41	45	52	39	28	64	37	44	36	39	49	61	93	61	58	44	48	43	51	34	60	31	19	27	24	49	52	56
La Porte Sylvan Beach C556	23	26	29	41	43	51	32	32	47	36	31	29	20	27	38	65	88	54	41	44	36	47	NV	NA	NA	NA	NA	NA	NA	NA	NA
Mercer Arboretum C557	22	37	44	52	66	52	40	29	76	37	40	35	36	50	62	95	70	62	42	65	57	63	34	59	30	17	28	24	52	61	70
Tom Bass C558	20	23	25	45	40	54	28	32	37	29	30	19	25	23	31	39	113	56	42	45	40	52	18	31	23	21	19	18	58	76	108
Katy Park C559	22	29	34	61	49	51	32	49	43	32	28	22	23	25	32	43	72	89	46	60	50	59	29	37	26	20	23	23	51	61	111
Atascocita C560	23	35	43	48	55	50	37	29	69	37	41	33	37	46	62	92	68	56	41	56	46	53	34	55	29	18	26	25	54	57	63
Meyer Park C561	23	36	37	58	65	53	40	39	74	36	36	29	29	40	57	74	74	67	45	69	73	70	34	53	32	20	28	26	51	62	91
Bunker Hill Village C562	22	27	32	62	56	55	26	40	46	31	29	25	21	32	43	48	85	81	49	65	51	56	17	40	24	21	24	19	51	68	113
Clear Brook High School C570	13	16	19	27	36	37	22	28	34	22	20	15	14	20	23	31	88	39	34	43	29	36	17	20	13	11	14	10	46	59	74
Clear Lake High School C572	18	19	27	30	43	42	27	28	43	29	28	22	18	27	31	49	91	43	38	48	35	42	29	NV	NA	20	22	17	NV	77	74
Wallisville Road C617	26	27	28	48	47	50	34	28	52	42	36	31	24	38	61	86	67	52	39	43	36	50	36	59	30	22	25	25	61	57	65
HRM-3 Haden Road C603/A114	18	24	32	64	59	49	32	29	60	32	34	24	25	32	56	71	80	56	34	66	41	54	24	41	23	20	20	17	60	60	85
Lynchburg Ferry C1015/A165	18	NV	24	47	60	41	28	30	66	42	35	29	25	33	56	77	85	53	40	54	37	50	40	57	26	23	24	23	60	57	79
Houston East C1/G316	19	24	34	64	67	50	30	29	59	30	30	20	22	29	53	67	78	61	40	75	47	58	31	45	25	24	19	18	53	52	90
Clinton C403/C304/AH113	12	NV	NV	63	40	38	17	23	36	19	21	17	20	19	34	40	71	54	28	53	33	42	11	27	14	14	15	10	NV	63	84
Hou DeerPrk 2 C35/235/1001/AFH139F239	16	21	30	41	45	50	27	27	46	29	27	20	18	26	36	56	104	45	37	56	NV	NV	28	37	23	21	20	17	60	60	83
Seabrook Friendship Park C45	20	24	28	37	42	47	30	33	45	34	29	27	18	25	31	55	83	52	41	43	35	44	35	40	23	21	22	23	72	65	60
Conroe Relocated C78	34	47	56	44	44	48	43	32	68	37	44	42	43	56	55	88	67	59	47	60	52	59	40	67	40	26	29	29	54	58	63
San Antonio																															
San Antonio Northwest C23	27	30	33	36	36	39	35	36	31	31	41	29	25	29	28	33	52	69	52	45	43	47	56	48	36	NV	27	36	40	65	60
Camp Bullis C58	32	34	38	42	42	43	41	40	39	40	49	35	28	33	35	NV	62	76	54	50	47	53	67	59	44	34	33	44	38	71	74
CPS Pecan Valley C678	27	28	28	28	32	32	27	32	28	29	35	26	23	26	25	31	47	63	45	37	39	36	47	45	33	27	26	36	38	68	61
Calaveras Lake C59	30	31	29	31	33	34	30	35	30	31	35	28	27	30	27	30	49	63	50	38	42	36	45	41	33	27	27	31	42	70	66
Elm Creek Elementary C501	23	26	27	25	25	25	31	27	24	22	31	21	19	21	21	25	39	57	44	28	30	30	39	36	27	19	20	27	34	65	55
Fair Oaks Ranch C502	32	35	38	42	41	38	41	38	39	38	49	36	29	33	36	42	59	70	50	47	49	52	64	58	44	33	32	40	32	65	72
Heritage Middle School C622	27	28	28	29	31	32	31	34	27	29	32	25	24	25	23	30	48	61	45	37	40	33	42	39	31	25	24	30	38	67	60
Bulverde Elementary C503	31	34	37	39	39	41	40	37	38	44	46	36	30	35	35	43	60	72	52	47	48	47	65	59	42	37	34	45	35	72	70
City of Garden Ridge C505	27	28	31	31	32	36	33	32	30	34	35	27	24	28	27	32	49	66	49	39	42	38	55	46	33	28	26	44	35	67	62
New Braunfels Airport C504	26	26	30	29	30	31	31	30	28	28	32	25	24	26	27	30	45	62	46	37	39	37	52	44	34	29	28	39	42	67	71
Seguin Outdoor Learning Center C506	27	28	32	31	33	32	33	33	31	30	34	28	26	31	30	33	50	63	51	39	43	NV	NV	40	33	26	26	34	39	66	67
Corpus Christi-Victoria																															
Beeville Airport C641	23	25	26	24	27	27	25	29	25	28	27	22	23	23	28	26	43	46	40	32	29	28	29	31	28	20	20	22	17	55	73
Port O Connor C657	21	20	23	21	24	30	26	28	23	26	26	19	19	18	20	20	38	60	43	27	25	25	32	24	21	22	20	21	31	86	82
Hallettsville C649	22	25	32	28	30	39	32	36	29	33	30	26	23	25	29	37	53	61	53	36	36	38	39	38	29	26	24	32	46	70	76
Corpus Christi West C4	18	21	20	20	23	26	20	29	20	23	19	18	19	16	18	19	22	51	37	22	25	21	38	20	22	18	16	18	27	71	82
Corpus Christi Tuloso C21	18	21	NV	NV	27	26	21	28	24	24	NV	16	17	NV	18	19	30	60	38	26	30	25	40	24	24	17	16	18	30	50	77
Holly Road C660	14	16	17	16	20	23	16	25	18	20	15	15	15	15	13	14	20	44	30	18	20	19	29	18	17	12	14	16	17	70	77
Violet C664	17	19	19	20	26	26	20	29	24	22	19	17	17	17	17	17	29	49	38	21	26	24	31	NV	21	14	14	16	31	41	73
Aransas Pass C659	12	14	15	16	18	20	18	16	13	14	14	11	13	13	14	14	21	40	29	20	21	19	29	16	17	14	13	14	16	62	62
Victoria C87	19	21	26	25	28	30	23	28	25	26	23	18	19	16	18	21	44	48	42	34	28	29	36	29	23	18	17	20	26	64	76

Monitoring Site	Sep-06																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Dallas-Fort Worth																														
Frisco C31/C680	[illegible]	66	46	40	49	[illegible]	66	[illegible]	[illegible]	65	[illegible]	49	55	[illegible]	64	33	[illegible]	41	[illegible]	[illegible]	[illegible]	[illegible]	46	41	48	64	65	34	56	55
Dallas Hinton St. C401/C60/AH161	[illegible]	70	[illegible]	[illegible]	60	[illegible]	71	75	[illegible]	[illegible]	49	[illegible]	[illegible]	[illegible]	48	27	[illegible]	39	53	[illegible]	[illegible]	[illegible]	49	40	47	57	55	32	50	43
Dallas North No 2 C63/C679	[illegible]	[illegible]	[illegible]	[illegible]	49	[illegible]	67	76	[illegible]	[illegible]	56	[illegible]	54	[illegible]	56	31	[illegible]	[illegible]	[illegible]	[illegible]	49	[illegible]	43	38	47	60	60	30	52	47
Dallas Executive Airport C402	95	72	[illegible]	37	[illegible]	[illegible]	80	[illegible]	[illegible]	61	[illegible]	[illegible]	62	[illegible]	50	[illegible]	21	[illegible]	60	[illegible]	52	[illegible]	51	43	53	60	64	36	57	44
Denton Airport South C56/A163/X157	102	64	44	38	60	57	70	83	76	70	56	52	57	84	53	33	28	[illegible]	54	70	53	44	49	41	48	65	66	35	58	52
Pilot Point C1032	80	60	38	35	49	56	63	87	76	63	53	49	54	77	61	32	24	41	49	72	52	43	46	41	48	68	65	35	59	56
Midlothian Tower C94/A305/X158	82	63	50	34	48	63	64	74	62	53	46	54	56	69	40	31	24	34	58	65	52	41	42	41	53	60	66	33	63	44
Midlothian OFW C52/A137	84	63	47	35	53	64	63	75	61	53	47	59	57	69	37	23	22	42	60	60	45	35	47	41	51	55	54	33	54	38
Italy High School C650	78	65	54	36	57	65	68	72	67	55	47	70	62	72	41	31	22	44	66	67	51	39	49	43	60	64	69	38	59	43
Granbury C73/C681	60	62	58	37	52	62	74	74	64	59	51	58	61	72	38	33	28	46	67	67	51	41	54	41	49	57	56	40	58	42
Greenville C1006/A198	84	66	48	37	54	56	67	71	74	51	53	50	63	66	70	31	29	44	54	67	56	37	40	40	50	66	71	34	58	46
Cleburne Airport C77/C682	69	66	58	32	54	65	75	78	61	56	49	61	60	72	37	31	23	45	65	71	46	41	51	40	54	61	53	36	60	40
Kaufman C71/A304/X071	86	70	42	34	54	60	69	74	67	50	50	56	54	67	60	33	26	45	60	62	55	38	42	41	53	60	64	34	59	39
Parker County C76	62	54	47	40	50	56	77	72	66	60	55	52	55	73	43	32	26	45	59	67	54	40	49	39	46	57	64	37	60	42
Rockwall Heath C69	86	66	39	35	51	57	69	77	72	58	59	52	54	72	66	30	25	43	57	66	54	36	45	43	51	69	68	35	57	46
Eagle Mountain Lake C75	81	58	46	39	51	58	81	80	73	70	64	53	56	82	44	32	27	44	63	73	50	43	49	41	54	62	64	36	59	46
Ft. Worth Northwest C13/AH302	86	66	50	35	63	61	82	79	68	70	57	55	60	76	37	29	25	42	62	71	46	41	52	41	56	62	60	35	53	42
Keller C17	94	67	46	37	60	59	78	82	72	72	61	50	68	82	43	33	27	41	61	71	50	42	49	40	54	62	59	34	58	48
Grapevine Fairway C70/A301/X182	90	71	43	36	51	61	78	85	73	71	53	52	67	80	48	29	27	43	59	70	49	41	49	42	41	65	60	36	57	48
Arlington Municipal Airport C61	85	62	46	35	52	63	76	77	62	56	50	53	55	73	38	26	22	42	64	69	50	37	50	43	57	65	57	36	59	42
Tyler-Longview-Marshall																														
Palestine C647	79	64	59	46	55	66	72	71	63	46	43	63	60	69	NV	33	25	38	61	59	55	31	35	44	53	61	77	44	58	41
Wamba NTRD C645	51	49	47	42	55	55	61	74	74	54	49	57	53	61	64	40	24	16	46	49	63	39	20	35	42	64	71	34	49	51
Longview C19/A127/C644	64	57	52	49	47	57	67	79	72	52	51	71	54	68	72	30	23	24	59	66	56	35	27	42	52	59	68	42	52	38
Karnack C85/AFH303	52	51	46	46	52	54	59	71	78	57	50	51	60	70	72	33	23	20	51	60	58	37	24	35	42	63	68	38	50	48
Panola C627	59	55	51	52	47	59	67	75	68	46	39	58	51	63	NV	30	22	31	55	55	56	31	25	35	43	63	65	40	47	38
Clarksville NTRD C648/C668	56	49	45	40	55	52	61	65	71	51	51	52	49	60	69	41	29	37	48	54	65	39	35	36	46	64	74	37	59	48
Tyler Airport Relocated C82	86	71	65	50	56	61	79	74	76	48	43	66	60	75	70	31	24	40	61	64	59	32	39	44	54	61	73	46	58	47
Waco																														
Temple C651	71	62	64	54	54	71	74	67	55	52	36	52	62	77	31	28	26	48	60	72	45	32	35	40	NV	NV	67	43	56	39
Beaumont-Port Arthur																														
Beaumont-Lamar C2/A112	67	62	58	52	47	60	64	73	44	32	36	46	57	72	45	20	19	31	47	65	21	17	NV	36	43	53	60	47	52	40
Port Arthur West C28/A128/A228	70	62	71	57	52	74	82	74	45	27	36	57	67	63	41	21	19	34	48	65	46	17	20	35	43	54	60	49	51	40
Jefferson Co. Airport C1019/A317																														
Hamshire C64/C654	73	61	67	51	42	60	72	72	41	25	35	39	52	74	35	20	16	31	48	74	35	15	20	33	41	52	59	49	51	38
SETRPC 40 Sabine Pass C640/C654	95	67	57	64	69	74	70	73	43	24	32	68	84	NV	38	20	18	35	47	56	54	17	19	33	44	61	62	50	53	44
SETRPC 43 Jefferson Co Airport C643	67	61	64	52	48	66	67	70	38	25	35	54	62	64	40	18	16	31	47	68	22	14	17	35	43	51	60	48	51	36
SETRPC Port Arthur C628	77	65	63	56	49	73	68	65	42	23	36	55	64	59	37	17	17	32	46	56	42	14	17	30	38	52	56	45	48	39
Newton NTRD C639	57	57	52	52	51	55	61	62	50	25	35	46	55	56	54	28	23	23	55	53	45	22	26	39	49	48	73	58	49	46
West Orange C9/A141	59	55	53	50	47	57	58	72	42	25	36	47	52	69	45	19	19	31	48	61	26	16	19	32	39	46	65	45	49	43
SETRPC Mauriceville 42 C642/C311/C665	53	53	48	50	43	49	55	71	41	26	29	44	46	69	45	19	16	23	41	49	23	14	17	30	36	42	65	42	50	36
C1027-Alabama-Coushatta-TX	65	57	52	50	43	59	63	62	49	32	36	57	65	64	49	24	24	29	59	57	43	26	28	36	50	57	76	56	62	53
San Augustine Airport NTRD C646	64	57	53	57	62	60	65	68	59	34	34	60	59	60	62	25	22	25	66	54	54	25	24	48	47	50	63	52	50	35
Austin																														
CAPCOG McKinney Roughs C684	71	70	67	60	40	70	74	64	55	38	28	35	63	73	30	27	25	47	61	70	37	31	30	40	57	64	59	56	56	41
Fayette County C601	70	68	58	57	37	67	78	74	46	37	23	25	62	77	23	22	24	28	54	78	42	NV	NA	NA	NA	NA	NA	NA	NA	NA
Dripping Springs School C614	67	58	54	51	34	59	76	55	42	34	25	34	64	68	26	23	29	39	63	NV	38	27	32	34	47	58	55	50	52	34
CAPCOG San Marcos C675	64	70	65	59	30	62	71	55	45	36	12	24	65	63	26	25	22	38	55	57	36	30	34	38	58	57	58	53	48	36
Austin Northwest C3	81	78	69	74	46	69	80	61	55	51	28	43	66	76	30	28	29	43	58	69	45	32	35	38	59	72	70	47	57	41
Audubon C38	71	63	61	61	41	66	76	68	54	47	36	42	59	78	33	30	33	47	58	74	50	36	36	37	54	70	69	49	63	43
Pflugerville Wastewater C613	80	77	72	67	48	72	79	70	58	51	34	NV	NV	79	35	32	32	49	59	74	45	34	34	40	56	71	69	48	58	42
CAPCOG Round Rock C674	77	72	66	65	49	67	73	66	56	55	34	44	61	75	32	30	29	45	59	71	43	32	38	37	55	71	65	44	58	42
Houston-Galveston-Brazoria																														
Danciger C618	63	61	61	49	50	59	72	58	NA	NA	NA	NV	77	64	21	17	15	31	71	75	23	19	25	44	58	87	71	54	48	34
Mustang Bayou C619	65	73	58	59	62	80	77	65	34	23	27	34	84	58	20	17	15	25	43	60	37	15	18	39	52	70	56	47	48	33
Manvel Croix Park C84	86	80	88	77	46	77	89	71	42	33	30	39	88	71	21	23	16	32	57	68	21	19	23	43	54	78	71	53	52	36
Lake Jackson C1016	66	73	64	50	63	76	80	61	32	20	20	21	74	51	20	16	14	25	46	63	36	15	21	43	57	69	60	47	47	31
Smith Point Hawkins Camp C96/C638	111	83	67	62	49	70	NV	74	46	26	35	69	67	65	31	21	19	42	51	63	53	17	25	44	50	71	65	60	54	35
Galveston Airport C34/A109/X152	NV	76	60	67	49	68	72	64	44	25	28	57	69	56	23	16	17	32	51	65	49	NV	NA	NA	NA	NV	57	52	57	39
Texas City 34th St. C620	97	73	64	63	49	72	75	70	40	23	20	58	75	61	20	15	14	29	50	61	49	13	NV	NA	NA	NA	NA	NA	NA	NA
Houston Aldine C8/AF108/X150	102	62	54	50	30	72	70	68	38	37	36	42	64	81	36	28	21	29	47	62	21	19	22	35	44	61	76	44	54	46
Channelview C15/AH115	104	60	57	48	36	68	77	70	40	32	30	44	64	74	23	23	19	32	45	66	20	20	22	38	48	55	70	51	52	43
Northwest Harris Co. C26/A110/X154	82	68	55	54	32	65	87	76	42	40	43	42	58	97	44	26	19	28	53	64	26	23	22	34	48	64	86	48	65	38
Houston North Wayside C405	95	58	51	45	31	67	71	65	37	31	25	27	62	80	27	20	14	24	46	64	16	18	21	34	42	55	64	41	47	31
Lang C408	88	NA	NA	NA	NV	60	73	60	30	32	22	34	52	88	21	18	17	23	41	56	17	16	16	27	35	55	66	33	40	34
Houston Croquet C409	84	64	58	63	34	67	86	67	33	32	29	38	69	67	21	19	15	26	41	69	20	18	18	37	48	62	63	46	44	36
Houston Bayland Park C53/A146	90	74	61	67	34	66	110	72	36	37	28	39	70	80	23	18	16	26	52	86	30	19	20	40	54	74	73	53	56	42
Houston Monroe C406	90	64	73	70	33	74	83	69	38	35	23	32	63	65	20	19	14	27	43	65	20	18	20	32	39	66	68	41	49	34
Houston Westhollow C410	80	74	66	67	33	64	103	78	44	35	32	37	68	93	26	19	17	26	56	78	24	19	21	36	47	72	79	47	52	37
Houston Regional Office C81	94	60	56	53	28	70	87	65	32	31	20	34	66	77	18	18	14	26	44	69	29	15	17	36	44	57	66	42	48	33
Houston Texas Avenue C411	89	62	56	54	26	69	83	64	35	30	18	34	64	82	18	18	13	23	45	64	29	13	15	35	44	59	62	38	45	34
Park Place C416	103	67	66	66	33	76	106	74	36	37	23	36	73	72	22	21	16	27	48	77	18	15	20	37	45	61	68	45	51	35
Sheldon C551	100	58	54	48	34	NV	72	69	35	29	32	43	61	79	26	23	19	31	47	NV	NA	NA	NA	NA	NV	53	70	45	51	42
Baytown Wetlands Center C552	95	67	60	55	39	67	76	71	40	27	38	42	64	64	25	21	18	32	50	64	37	16	20	37	47	63	66	51	51	39
Crosby Library C553	85	58	53	46	33	61	66	71	38	29	32	45	55	74	30	24	21	32	44	62	23	21	22	36	45	52	80	46	52	45
West Houston C554	84	73	64	62	32	63	96	78	42	36	34	37	69	118	32	23	18	28	56	76	24	22	22	37	48	71	79	48	57	40
Kingwood Library C555	81	54	49	46	26	61	61	69	36	28	36	40	51	72	34	31	23	21	44	54	30	20	24	32	41	55	80	41	55	45
La Porte Sylvan Beach C556																														
Mercer Arboretum C557	95	62	53	51	30	69	73	69	38	33	34	37	66	79	42	29	22	25	52	59	26	20	21	34	47	57	83	45	64	47
Tom Bass C558	91	74	82	79	40	79	91	76	39	36	26	39	74	72	22	23	16	31	52	73	28	18	19	40	50	74	NV	46	54	35
Katy Park C559	83	70	63	61	37	67	107	80	45	35	33	40	60	120	27	22	18	28	60	77	24	22	22	33	47	66	81	50	53	36
Atascocita C560	95	57	53	48	28	71	70	70	39	32	36	40	56	75	35	28	21	28	46	60	27	21	24	35	44	58	78	43	57	47
Meyer Park C561	89	68	55	53	29	65	82	74	39	38	39	43	61	89	42	27	20	27	52	62	24	22	24	35	49	70	90	49	63	42
Bunker Hill Village C562	91	74	65	65	34	67	96	78	40	36	27	37	66	107	26	20	19	29	56	77	21	21	21	39	52	71	78	49	53	39
Clear Brook High School C570	64	69	60	52	38	71	66	58	34	23	19	25	72	64	8	8	9	21	46	54	12	6	13	35	44	66	48	34	39	24
Clear Lake High School C572	103	78	64	61	49	87	80	75	42	29	27	46	83	65	19	18	19	34	53	63	28	15	22	41	55	68	72	54	48	42
Wallisville Road C617	87	62	59	49	36	64	78	75	40	31	38	43	59	75	26	23	18	34	47	67	22	18	20	37	48	56	74	53	52	43
HRM-3 Haden Road C603/A114	117	64	59	53	31	NV	82	71	38	33	29	42	63	78	21	21	17	28	45	68	25	19	21	34	44	58	74	42	50	39
Lynchburg Ferry C1015/A165	111	65	66	52	35	75	87	78	45	34	43	42	65	75	29	25	21	30	51	72	52	22	23	35	45	61	74	46	58	45
Houston East C1/G316	111	56	53	47	20	70	81	69	32	34	NV	NV	64	85	25	24	18	22	40	70	27	18	19	29	35	53	76	37	53	39
Clinton C403/C304/AH113	84	50	51	45	25	60	76	49	25	20	8	16	56	58	15	15	11	18	46	66	28	10	14	34	45	56	51	29	34	24
Hou DeerPrk 2 C35/235/1001/AFH139F239	121	60	62	59	35	75	77	67	38	38	29	41	70	63	25	19	18	31	50	67	42	18	21	37	46	67	70	51	52	39
Seabrook Friendship Park C45	119	67	58	53	42	68	74	72	41	25	28	49	66	61	23	18	17	31	46	64	52	16	21	35	46	60	62	50	52	37
Conroe Relocated C78	83	60	52	48	41	64	67	67	46	38	45	53	60	69	41	36	24	27	51	57	44	27	29	35	46	58	97	47	66	45
San Antonio																														
San Antonio Northwest C23	62	73	70	66	38	51	62	58	50	44	12	29	68	58	31	28	32	33	63	65	35	34	38	36	45	67	51	61	49	34
Camp Bullis C58	77	82	79	68	38	59	68	66	51	50	15	NV	NV	69	33	28	32	35	66	72	38	37	38	37	47	76	57	62	56	37
CPS Pecan Valley C678	66	73	68	63	27	59	74	57	49	36	8	24	69	62	29	25	31	38	62	66	38	33	31	36	52	68	56	64	62	36
Calaveras Lake C59	66	69	69	64	45	69	82	63	54	37	18	25	76	51	31	29	30	52	63	65	42	35	33	42	62	67	60	68	52	37
Elm Creek Elementary C501	55	63	60	55	31	53	71	57	43	29	14	18	68	42	24	22	22	32	58	57	30	29	25	29	54	56	45	61	39	23
Fair Oaks Ranch C502	71	74	71	66	36	55	61	65	48	43	18	34	54	71	35	31	33	35	64	75	41	40	37	37	44	77	57	58	55	36
Heritage Middle School C622	62	63	65	61	35	62	75	60	51	32	15	24	73	52	30	23	29	45	60	61	38	30	30	37	55	61	55	61	46	33
Bulverde Elementary C503	77	82	72	63	40	60	70	65	51	45	18	30	58	71	34	31	37	40	69	71	43	40	39	39	50	80	61	61	62	42
City of Garden Ridge C505	69	74	69	61	32	59	77	61	49	42	10	23	59	58	31	26	32	41	58	66	38	32	36	38	52	67	58	63	51	36
New Braunfels Airport C504	70	72	69	65	38	65	80	68	54	43	23	35	75	69	36	30	30	42	60	70	43	37	35	40	64	69	64	54	48	34
Seguin Outdoor Learning Center C506	66	68	67	61	34	65	77	67	53	39	13	23	64	63	32	27	26	33	57	68	39	34	31	38	60	68	59	56	50	37
Corpus Christi-Victoria																														
Beeville Airport C641	68	60	61	58	51	64	72	54	31	23	15	13	32	31	27	19	20	25	48	56	29	25	24	34	47	57	54	47	37	34
Port O Connor C657	67	64	68	61	62	66	85	59	39	24	22	NV	44	43	23	17	19	29	66	67	36	22	23	43	54	66	56	41	36	38
Hallettsville C649	75	70	66	65	41	75	83	67	52	35	20	23	71	63	27	21	17	25	57	71	32	25	24	37	55	68	59	59	60	41
Corpus Christi West C4	64	63	66	65	61	63	84	54	NV	NA	NA	NA	27	32	24	16	15	NV	52	61	21	23	25	41	53	73	50	37	30	36
Corpus Christi Tuloso C21	59	60	65	63	56	61	78	51	26	22	18	13	24	29	22	16	16	26	48	55	21	23	24	35	48	64	48	38	33	33
Holly Road C660	57	57	61	60	58	57	77	48	20	16	12	10	22	23	19	13	14	21	58	50	21	NV	23	35	47	NV	NA	NA	NA	NA
Violet C664	58	58	62	62	57	61	73	53	24	21	19	15	27	31	21	15	18	27	50	59	23	22	24	36	52	71	46	36	32	33
Aransas Pass C659	43	45	48	47	NV	NA	NV	53	28	22	20	19	29	31	25	17	18	29	66	63	27	23	29	41	54	71	51	35	34	38
Victoria C87	70	60	63	61	[illegible]	66	78	59	38	25	16	15	59	39	24	18	19	25	51	66	23	22	25	35	50	61	54	53	41	38

2004 Aug. & Sept. LEADS color-coded O_3 8hr

| Monitoring Site | Aug-04 | | |

1999 Aug. & Sept. LEADS color-coded O_3 8hr

| Monitoring Site | Aug-99 | | |

Regional temperature trend

- Use hourly outdoor temp data from EPA AQS for East Texas.
- Selected long running sites, 1994-2006.
- Calc. average daily max and daily avg temp over 61 days Aug.-Sept. each year.
- Rank all years and see how 2006 stands.

Regional temperatures: daily max

San Ant. Brownsv. Frisco Longv. Aldine Beaum. CC W. Orang Keller Austin Victo.

yr	480290032	480610006	480850005	481830001	482010024	482450009	483550025	483611001	484392003	484530014	484690003	Grand Total
1994	31.19	30.43	29.83	32.25	31.22	30.13	33.81	30.44	33.52	33.73	33.71	31.84
1995	32.85	31.69	30.83	34.75	32.81	32.03	31.37	32.38	31.36	35.44	35.01	32.77
1996	**31.97**	**31.34**	**28.69**	**29.68**	**31.19**	**30.74**	**30.69**	**30.26**	**29.48**	**30.96**	**30.87**	**30.53**
1997	33.45	31.81	32.15	31.28	33.08	33.42	31.53	32.18	31.99	32.87	32.43	32.38
1998	31.84	32.31	34.09	32.98	33.57	32.22	31.47	32.08	34.36	32.48	32.61	32.73
1999	33.50	32.14	33.39	32.44	32.96	32.47	31.19	32.01	33.43	34.16	33.51	32.84
2000	**33.98**	**32.92**	**33.95**	**34.04**	**33.40**	**32.69**	**31.83**	**32.33**	**34.26**	**34.18**	**34.08**	**33.42**
2001	31.99	32.25	30.31	29.82	30.82	30.18	30.83	29.90	30.44	31.59	31.83	30.91
2002	31.37	32.98	31.96	32.08	31.16	30.58	31.24	30.65	32.21	32.14	31.97	31.67
2003	30.98	31.89	30.77	30.81	31.02	30.61	30.54	30.53	30.64	31.51	31.47	30.98
2004	31.53	32.16	30.42	30.74	31.90	31.55	30.98	31.57	29.97	31.54	32.05	31.31
2005	**33.97**	**34.05**	**33.50**	**33.69**	**33.03**	**32.97**	**32.84**	**32.82**	**33.94**	**33.70**	**33.64**	**33.47**
2006	33.17	33.01	32.81	32.56	32.50	30.97	31.94	31.09	32.95	33.34	32.20	32.41
Grand Tot	32.44	32.23	31.75	32.09	32.20	31.58	31.56	31.40	32.20	32.90	32.72	33.47

Rank of recent Aug.-Sept. periods for daily max tempurature

yr	480290032	480610006	480850005	481830001	482010024	482450009	483550025	483611001	484392003	484530014	484690003	Grand Total	Annual rank
1994	12	13	12	7	9	13	1	11	4	4	3	8.09	6
1995	6	11	8	1	6	6	7	2	9	1	1	5.27	9
1996	**8**	**12**	**13**	**13**	**10**	**9**	**12**	**12**	**13**	**13**	**13**	**11.64**	1
1997	4	10	6	9	3	1	5	4	8	7	7	5.82	7
1998	9	5	1	4	1	5	6	5	1	8	6	4.64	11
1999	3	8	4	6	5	4	9	6	5	3	5	5.27	9
2000	**1**	**4**	**2**	**2**	**2**	**3**	**4**	**3**	**2**	**2**	**2**	**2.45**	13
2001	7	6	11	12	13	12	11	13	11	10	11	10.64	3
2002	11	3	7	8	11	11	8	9	7	9	10	8.55	5
2003	13	9	9	10	12	10	13	10	10	12	12	10.91	2
2004	10	7	10	11	8	7	10	7	12	11	9	9.27	4
2005	**2**	**1**	**3**	**3**	**4**	**2**	**2**	**1**	**3**	**5**	**4**	**2.73**	12
2006	5	2	5	5	7	8	3	8	6	6	8	5.73	8

1996 coolest year; 2005 warmest year both Pk & Avg.

2006 in the middle of the pack.

Met-adjusted regional trend

- Run Hysplit[1] to gen back-trajectories to assess effects of variability of synoptic-scale meteorology on regional O_3:
  - Six starting locations in east Texas
  - 300 m AGL
  - 72 hours from 18Z (12 CST, 1 p.m. CDT)
  - Model vertical option

Draxler, R.R. and Rolph, G.D., 2003. HYSPLIT (HYbrid Single-Particle Lagrangian Integrated Trajectory) Model access via NOAA ARL READY Website (http://www.arl.noaa.gov/ready/hysplit4.html). NOAA Air Resources Laboratory, Silver Spring, MD.

Rolph, G.D., 2003. Real-time Environmental Applications and Display sYstem (READY) Website (http://www.arl.noaa.gov/ready/hysplit4.html). NOAA Air Resources Laboratory, Silver Spring, MD.

One example “regional” 72 hr back-traj

- 6 starting points in a matrix from DFW east to Tyler, south to Austin and Houston

name	latitude	longitude	altitude
1	33	-97	300
2	31.5	-97	300
3	30	-97	300
4	33	-95.5	300
5	31.5	-95.5	300
6	30	-95.5	300

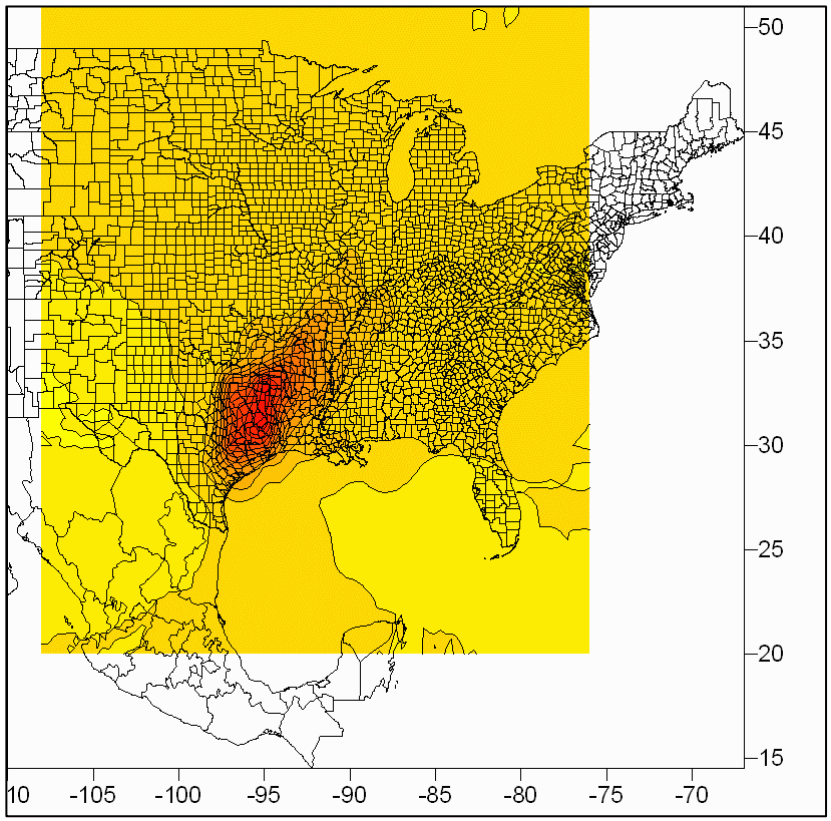
- Sept. 20, 2006 case shown

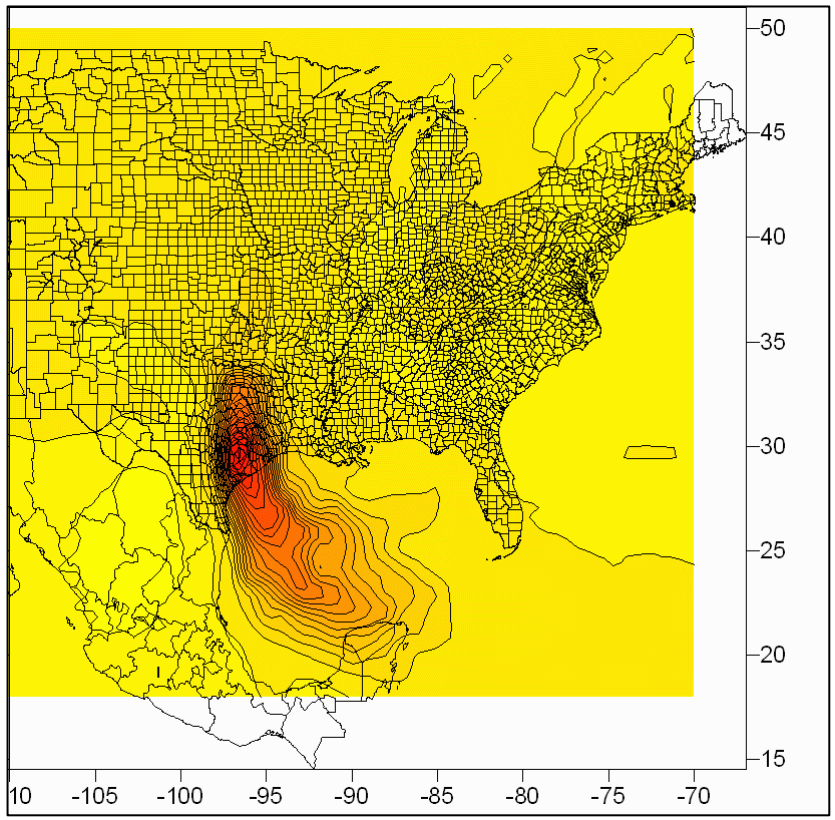
Met-adjusted regional trend

- Ensemble Analyses: Run back trajs for 61 days each year
- Assess the variability –
  - It is known that longer fetches from the southeast over the Gulf correspond to lower O_3; shorter fetches from the NE → higher O_3.
  - Do years with more fetches from NE have higher O_3 and vice versa?
  - How did 2006 look compared to other recent years?

Characterizing “high O_3” and “low O_3” air flow

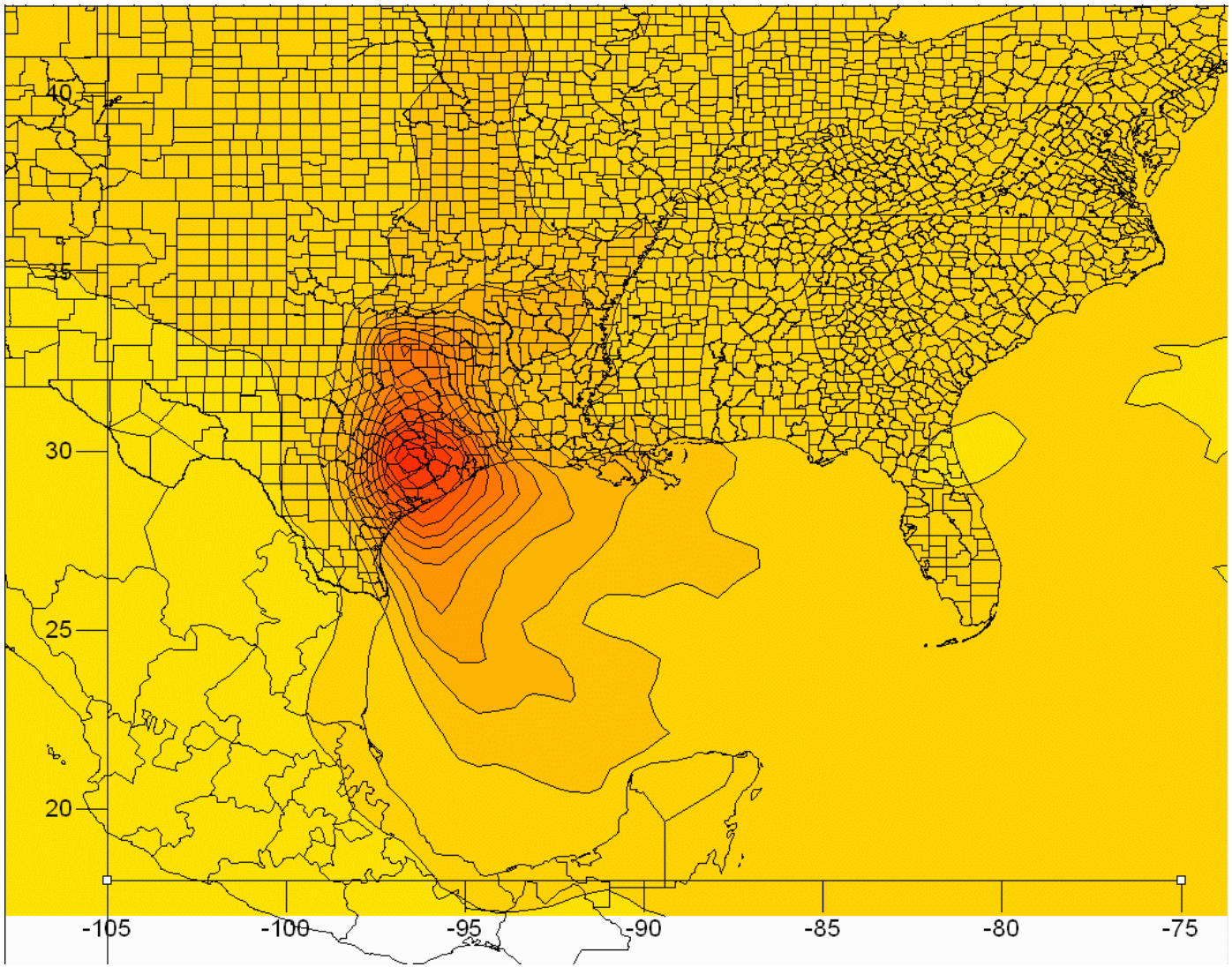
- Based on O_3 8hr daily maxima Aug.-Sept. 2001-2006 from 12 Texas monitors.
- “high reg. day” iff >3 areas (Hou. ~ 2) has O_3 >= 75 ppb, N=40;
- “low reg. day” iff all sites have 40 <= O_3 < 50 ppb, N=43;



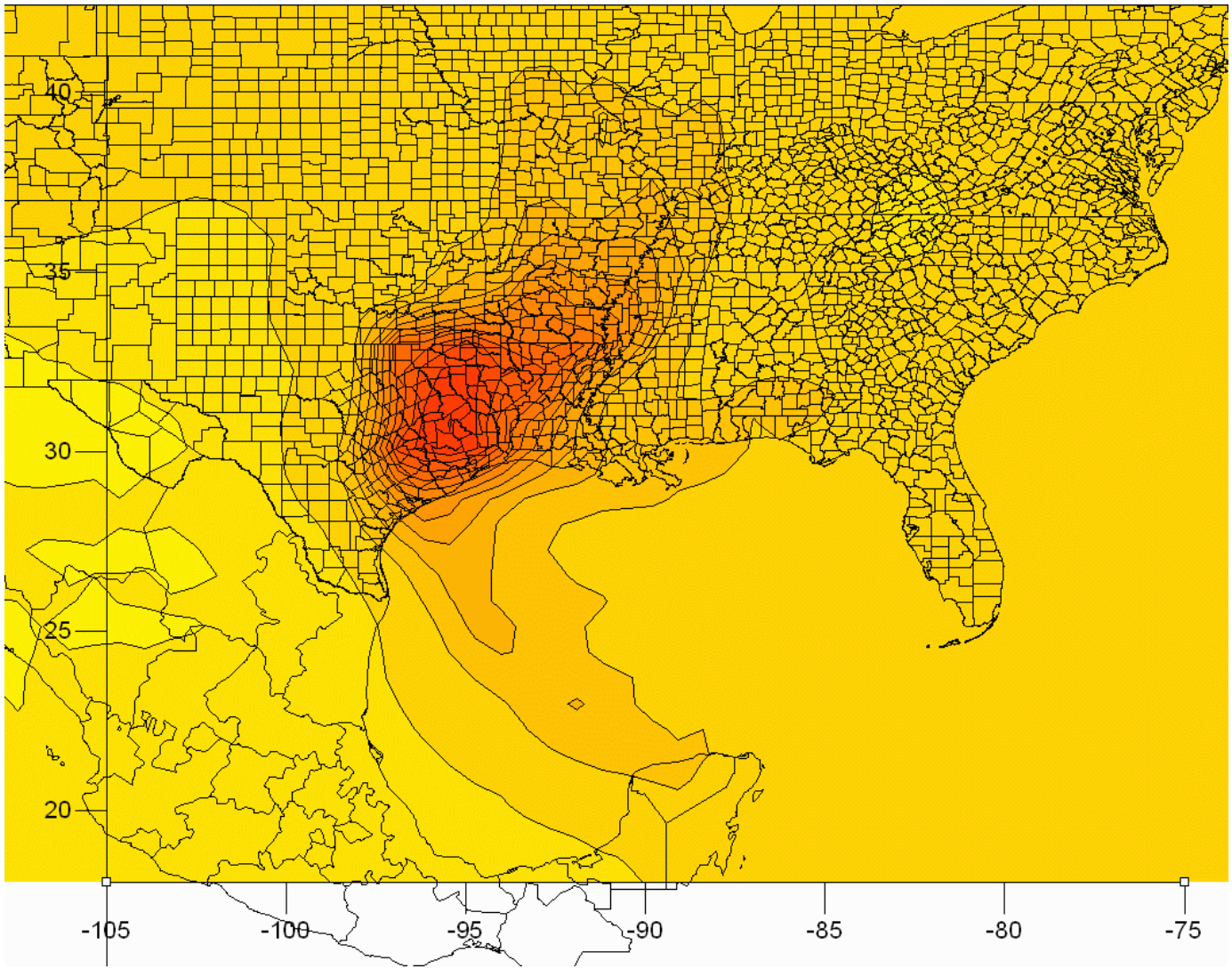


“Spaghetti map” of 2006 Aug.-Sep. back-trajs

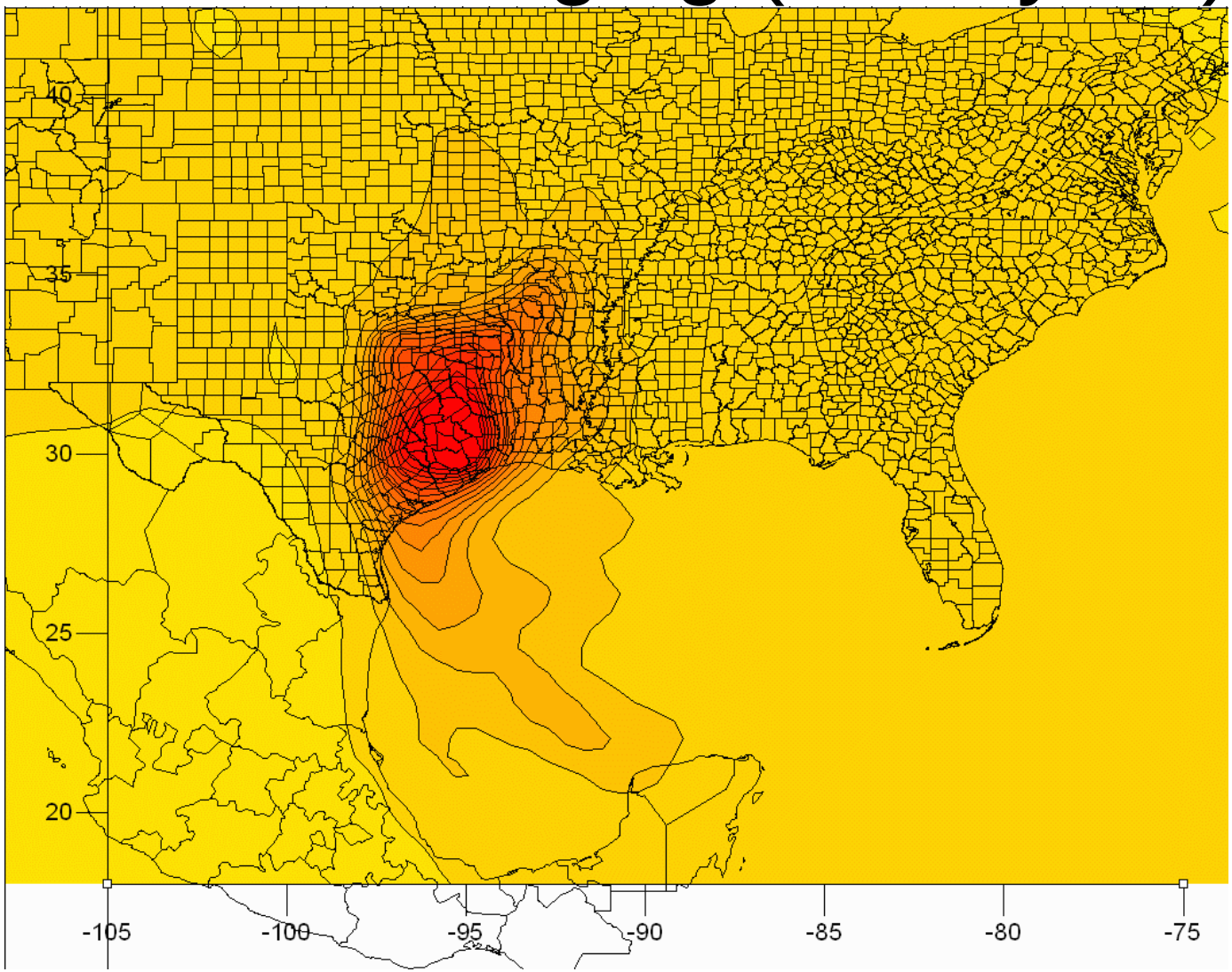
2006 Back-trajectory points contoured kriging (“low” year)



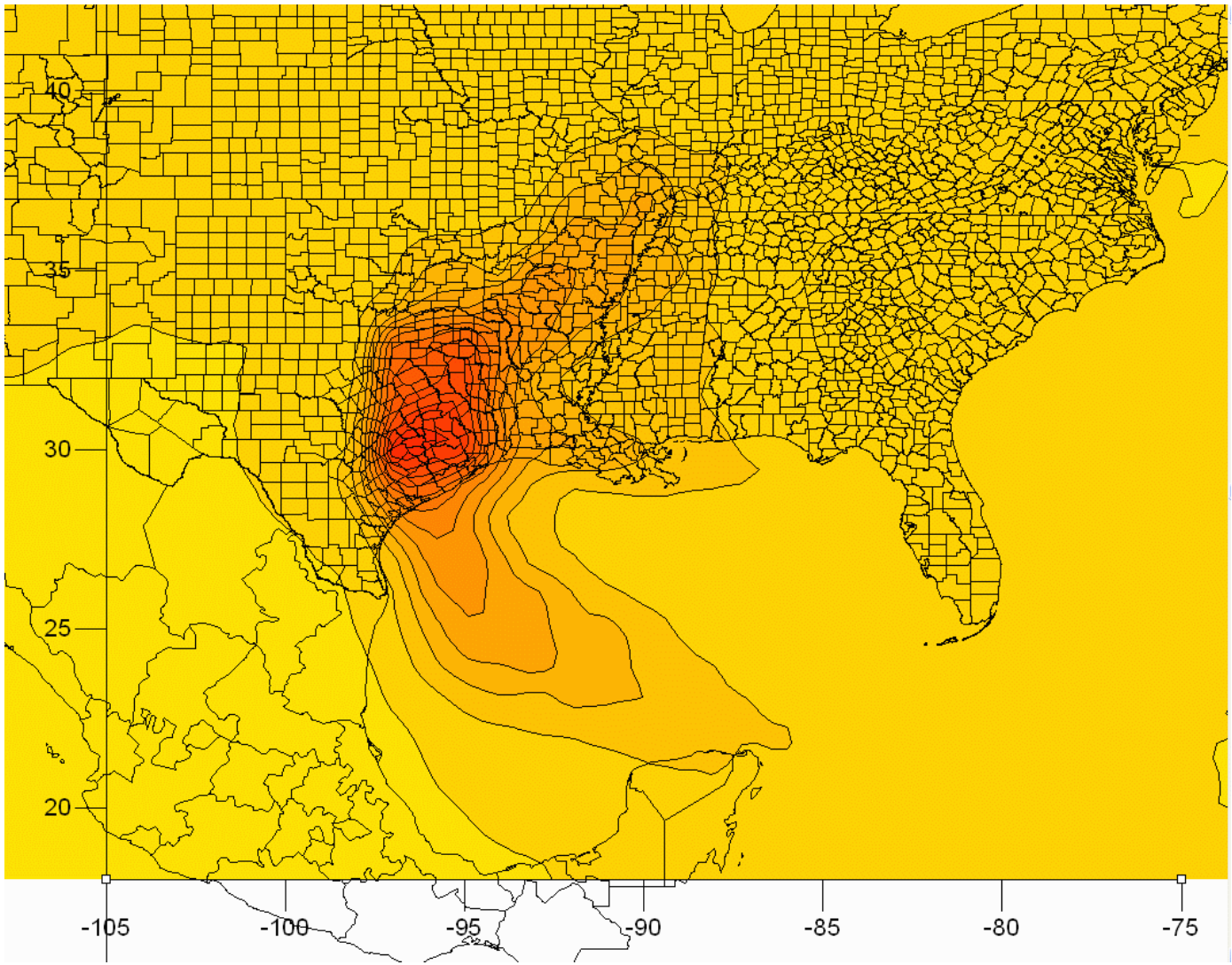
2004 Back-trajectory points contoured kriging (“high” year)



2003 Back-trajectory points contoured kriging (“low” year)



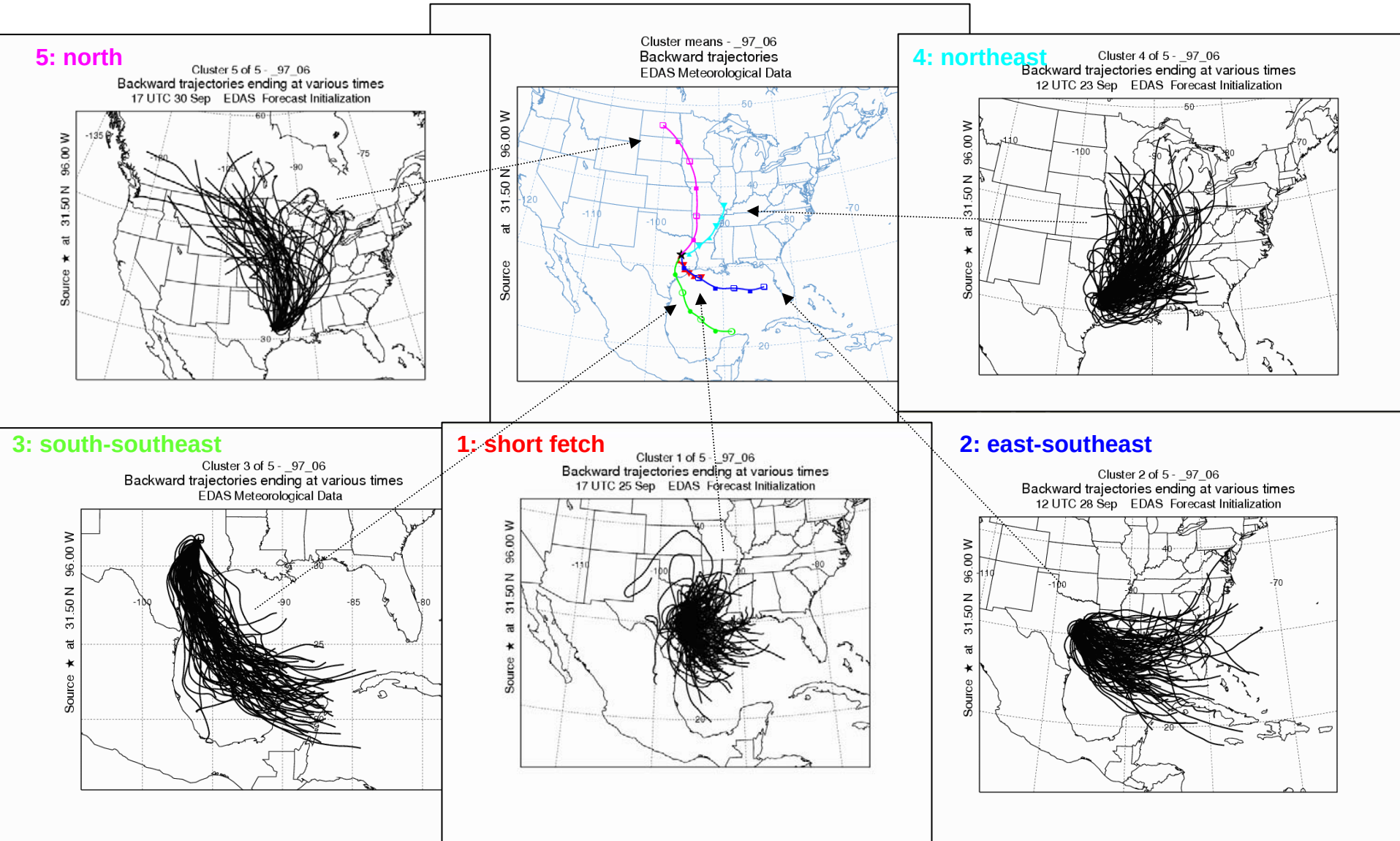
2002 Back-trajectory points contoured kriging (“high” year)



Quantifying annual trajectory patterns

- Hysplit 4.8 contains cluster analysis tool.
- Cluster analysis
  - looks for like members of a sample to form clusters,
  - begins combining clusters,
  - user looks at changes in overall reduced sample variance to decide when to stop joining clusters.

5 Clusters found in Aug./Sept. 1997-2006 trajectories



Numerical summary of traj. factors & regional O_3 by year

- Using 12 East Texas long-running sites, % of sites > 75ppb
- E.g., in 1999, on days w NE trajs, on avg 48% of sites > 75 ppb
- 2006 seems to have more “norths” than unusual

Average pct of "high" sites by factor and year											
		year (Aug.-Sept.)									
Factor		1997	1999	2000	2001	2002	2003	2004	2005	2006	Avg by factor
short	1	16.98	23.61	33.33	5.30	23.15	12.37	27.78	11.52	5.21	17.69
E-SE	2	1.19	6.25	10.87	4.17	1.82	2.08	0.00	3.79	4.63	3.87
S-SE	3	2.08	1.39	1.67	0.88	0.00	0.00	0.00	1.04	0.60	0.85
NE	4	23.48	48.48	47.62	19.23	28.24	14.81	18.21	19.10	12.50	25.74
north	5	16.67	19.44	12.50	0.00	8.33	1.67	2.78	8.33	6.11	8.43
Max		23.48	48.48	47.62	19.23	28.24	14.81	27.78	19.10	12.50	25.74

Count of trajs by factor and year										
	year (Aug.-Sept.)									
Factor	1997	1999	2000	2001	2002	2003	2004	2005	2006	Count by factor
0	2	3	5	1	1	3	1	1	3	20
1	27	18	13	11	9	31	6	25	8	148
2	7	8	23	12	15	4	12	11	9	101
3	8	6	5	19	8	7	7	8	14	82
4	11	11	7	13	22	9	27	14	12	126
5	2	9	4	3	4	5	6	2	15	50
Num trajs	57	55	57	59	59	59	59	61	61	527

How representative 2006?

- Lower regional ozone, but similar to 2003
- Typical regional temperatures.
- Highest fraction of N winds in recent years (factor 5 ~ 25% of days).
- Second highest fraction of SSE winds in recent years (factor 3 ~ 23% of days).