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ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE *COLUMBIA* (STS-40) LAUNCH

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This report presents a summary of selected atmospheric conditions observed near Space Shuttle *Columbia* (STS-40) launch time on June 5, 1991, at Kennedy Space Center, Florida. Values of ambient pressure, temperature, moisture, ground winds, visual observations (cloud), and winds aloft are included. The sequence of prelaunch Jimsphere-measured vertical wind profiles is given in this report. The final atmospheric tape, which consists of wind and thermodynamic parameters versus altitude, for STS-40 vehicle ascent has been constructed. The STS-40 ascent atmospheric data tape has been constructed by Marshall Space Flight Center's Earth Science and Applications Division to provide an internally consistent data set for use in postflight performance assessments and represents the best estimate of the launch environment to the 400,000-ft altitude that was traversed by the STS-40 vehicle.

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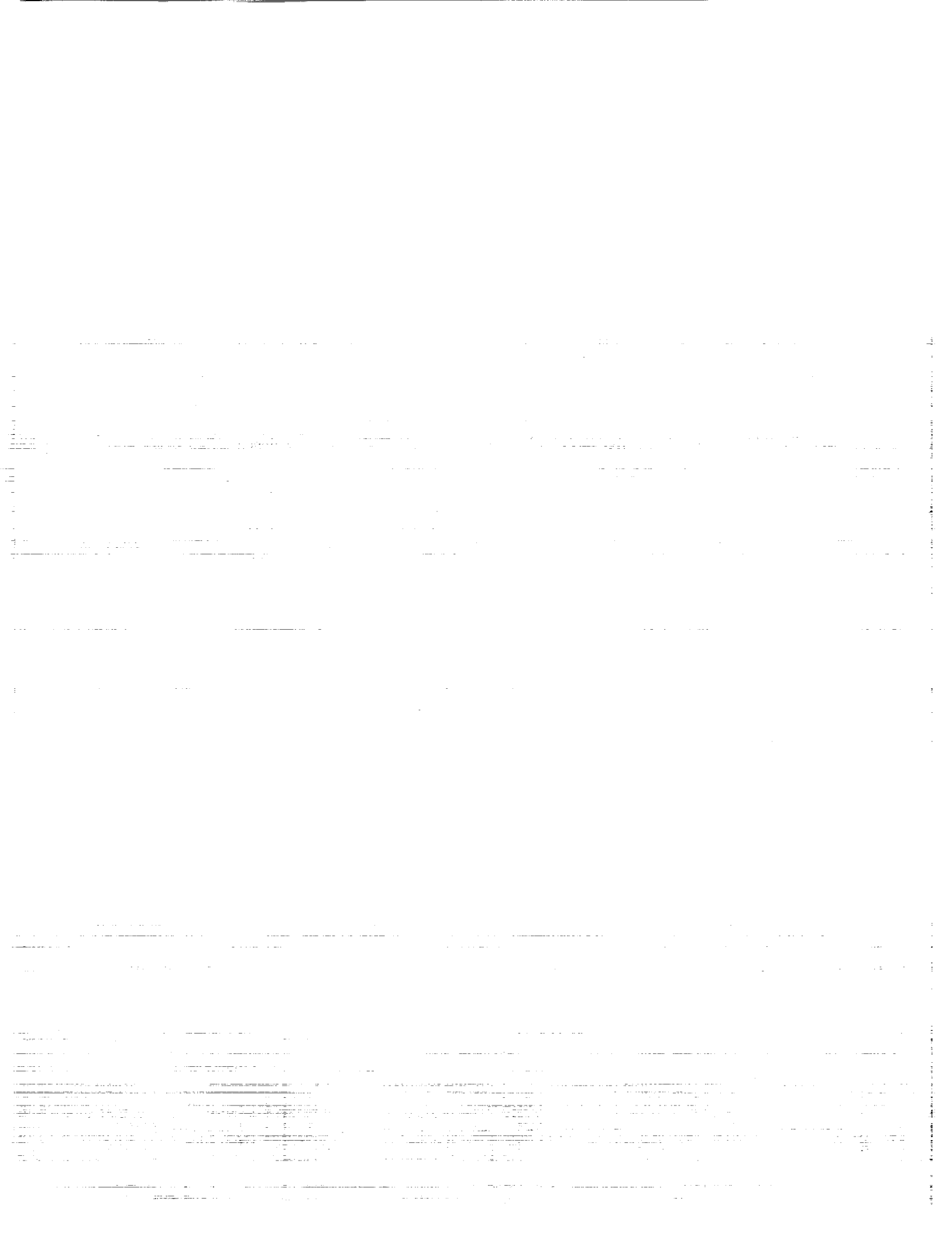

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ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE *COLUMBIA* (STS-40) LAUNCH

I. INTRODUCTION

This report presents an evaluation of the atmospheric environmental data taken during the launch of the Space Shuttle *Columbia*/STS-40 vehicle. This space shuttle vehicle was launched from pad 39B at Kennedy Space Center (KSC), Florida, on a flight azimuth of 62° east of north, at 1325 u.t. (0925 e.d.t.) on June 5, 1991.

This report presents a summary of the atmospheric environment at launch time (L+0) of the STS-40, together with the sequence of prelaunch Jimsphere-measured winds-aloft profiles from L–5 h 10 min through lift-off. The general atmospheric situation for the launch and flight area is described, and surface and upper level wind/thermodynamic observations near launch time are given. Since a ship was unavailable for STS-40 duty, the solid rocket booster (SRB) descent/impact atmospheric data were not taken. However, one can use the STS-40 ascent data for SRB studies as the best substitute.

Previous MSFC-related launch vehicle atmospheric environmental conditions have been published as appendix A of individual MSFC Saturn Flight Evaluation Working Group reports.[1] Office memorandums have been issued for previous flights giving launch pad wind information. A report[2] has also been published which summarizes most launch atmospheric conditions observed for the past 155 MSFC/ABMA-related vehicle launches through SA-208 (Skylab 4). Reports summarizing ASTP, STS-1 through STS-39 launch conditions are presented in references 3 through 36, respectively. Table 1 gives the atmospheric L+0 launch conditions for all the space shuttle missions.

II. SOURCES OF DATA

Atmospheric observational data used in this report were taken from synoptic maps made by the National Weather Service, plus all available surface observations and measurements from around the launch area. Upper air observations were taken from balloon-released instruments sent aloft from Cape Canaveral Air Force Station (CCAFS). High-altitude winds and thermodynamic data were measured by rocketsondes launched from the CCAFS. Table 2 presents a listing of systems used to obtain the upper level wind profiles used in compiling the final ascent atmospheric data tape. Data cutoff altitudes are also given in table 2.

III. GENERAL SYNOPTIC SITUATION AT LAUNCH TIME

A developing area of low pressure located over central Florida prevailed over the Cape Kennedy region during the launch of STS-40. Surface winds were light and southwesterly prior to the lift-off of STS-40. Figure 1 depicts the surface map 1 h 25 min before the launch. West to

northwest winds dominated the flow aloft over the KSC region. Figure 2 shows the winds aloft condition at the 500-mb level 1 h 25 min before the launch of STS-40.

Skies were mostly cloudy over the launch area prior to and during the launch of STS-40. Figure 3 depicts the GOES-7 visible satellite picture at 1326 u.t. (1 min after the lift-off) with 500-mb heights denoted in meters and wind barbs superimposed. Figure 4 gives an up-close shot of the Florida peninsula as recorded by GOES-7 also taken at 1326 u.t. with surface data of temperatures, wind barbs, and pressure superimposed.

IV. SURFACE OBSERVATIONS AT LAUNCH TIME

Surface observations at launch time for selected KSC locations are given in table 3. Included are pad 39B, shuttle runway, and CCAFS balloon release station observations. Neither precipitation nor lightning was observed at launch time.

Table 4 presents pad 39B wind data along with other standard hourly atmospheric measurements and sky observations for the 6-h period prior to launch of STS-40. Values for wind speed and direction are given for the 18-m (60-ft) pad light pole level.

V. UPPER AIR MEASUREMENTS DURING LAUNCH

The FPS-16 Jimsphere (1340 u.t.), MSS Rawinsonde (1236 u.t.), Super-Loki rocketsonde (1501 u.t.), and Super-Loki Robin (1425 u.t.) were used to measure the upper-level wind and thermodynamic parameters for STS-40 launch. At altitudes above the rocket-measured data, the Global Reference Atmosphere Model (GRAM)[37] parameters for June KSC conditions were used. A tabulation of the STS-40 final atmospheric data for ascent is presented in table 5 which lists the wind and thermodynamic parameters versus altitude. A brief summary of parameters is given in the following paragraphs.

A. Wind Speed

At launch time, wind speeds were 6.8 ft/s (4.0 kn) at the 60-ft level and increased to a maximum of 50.2 ft/s (29.7 kn) at 8,300 ft (2,530 m). Wind speeds generally decreased above this altitude and were a minimum of 1.97 ft/s (1.2 kn) at 44,900 ft (13,686 m). Wind speeds fluctuated (increased and decreased) from 45,000 ft (13,716 m) throughout 127,000 ft (38,709 m). Above this altitude, wind speeds increased from 48.9 ft/s (28.9 kn) to a maximum of 173.8 ft/s (103.0 kn) at 166,000 ft (50,597 m). The last measurable maximum wind speed was 197.4 ft/s (116.9 kn) at 279,000 ft (85,039 m).

B. Wind Direction

At launch time, the 60-ft wind direction was from the southwest and shifted to a westerly component above this altitude. Near 28,400 ft (8,656 m) winds shifted to the north and remained northerly throughout the 38,400 ft (11,704 m) level, shifting slightly to the northeast at 38,500 ft (11,735 m). Above 46,100 ft (14,051 m) winds fluctuated from west to northwest and shifted to an easterly component around 60,000 ft (18,288 m). The winds began to shift through north to a

northwest component near 250,000 ft (76,200 m). The last measurable wind direction was from the west northwest at 282,000 ft (85,954 m).

C. Prelaunch/Launch Wind Profiles

Prelaunch/launch wind profiles given in figures 6 through 9 were measured by the Jimsphere FPS-16 system. Data are shown for four measurement periods beginning at L–5 h 10 min and extending through L+15 min. The wind speed and direction profiles for the 5-h 10-min period prior to and including L+15 min are shown in figures 6 and 7.

The in-plane (head-tail wind) and out-of-plane (left-right crosswind) profiles are given in figures 8 and 9. The in-plane profiles (fig. 8) show a head wind component from 25,000 to 48,000 ft and a tail wind component at all other altitudes. The out-of-plane profiles (fig. 9) with the exception of the L+15-min profile depict mostly left crosswind values with right crosswind values from 46,000 to 50,000 ft. The L+15-min profile shows right crosswind values from 14,000 to 20,000 ft and from 48,000 to 51,000 ft.

D. Thermodynamic Data

The thermodynamic data, taken at STS-40 launch time, consisted of atmospheric temperature, dew-point temperature, pressure, and density. These data have been compiled as the STS-40 ascent atmospheric data and are presented in table 5. Missing data are indicated by –9999.00 in table 5. The vertical structure of temperature and dew-point temperature for STS-40 ascent are shown graphically versus altitude in figure 10.

E. SRB Upper Air and Surface Measurements

As has been mentioned in the introduction, since there was no ship available, an SRB descent atmospheric data tape has not been constructed. The tabular values for the ascent atmospheric tape, as presented in table 5, should be used for SRB descent/impact studies since it is the closest measured data source.

Table 1. Selected atmospheric observations for the flights of the space shuttle vehicles.

Vehicle Data[h]				Surface Observations					Inflight Conditions Max. Wind Below 60,000 ft			Count Down and Launch Comments of Meterological Significance
				Thermodynamic[a]			Wind[b]					
Seq. No.	Vehicle No.	Launch Date	Time (EST) Nearest Minute	Press.[c] N/cm^2	Temp. (°C)	Rel. Hum. (%)	Speed (ft/s)	Dir. (°)	Alt. (ft)	Speed (ft/s)	Dir. (°)	
1	STS-1 Columbia	4/12/81	0700	10.234[d]	21	82	11.8 15.2	125 120	44,300	98	250	
2	STS-2 Columbia	11/12/81	1010	10.166	23	61	27.0 27.0	345 355	36,300	158	286	
3	STS-3 Columbia	3/22/82	1100	10.160	24	71	7.0[e] 8.0[e]	50[e] 145[e]	45,000	119	250	Wind directional change observed at Pad just prior to L+0. Onset of sea breeze.
4	STS-4 Columbia	6/27/82	1100[f]	10.200	29	70	5.8[g] 4.9[g]	133[g] 141[g]	47,900	37	329	
5	STS-5 Columbia	11/11/82	0719	10.227	22	68	22.0 35.0	90 90	40,600	146	336	
6	STS-6 Challenger	4/4/83	1330	10.183	23	55	12.7 16.4	63 55	46,100	155	277	
7	STS-7 Challenger	6/18/83	0733[f]	10.146	25	80	5.9[e] 10.3[e]	10[e] 350[e]	45,900	76	278	
8	STS-8 Challenger	8/30/83	0232[f]	10.111	24	97	8.8 14.0	269 268	45,100	30	349	17-min countdown delay due to adverse weather conditions.
9	STS-9 (SL-1) Columbia	11/28/83	1100	10.153	24	83	19.1 32.0	183 190	47,100	117	252	
10	STS-11 (41-B) Challenger	2/3/84	0800	10.173	17	75	0.0 NA	0 NA	38,200	143	288	
11	STS-13 (41-C) Challenger	4/6/84	0858	10.149	16	56	21.5 18.6	320 275	37,700	176	289	
12	STS-41D Discovery	8/30/84	0842[f]	10.172	26	81	3.0 3.6	106 39	40,300	44	270	
13	STS-41G Challenger	10/5/84	0703[f]	10.210	23	60	16.5 14.8	73 58	40,600	78	303	
14	STS-51A Discovery	11/8/84	0715	10.227	20	59	23.0 31.1	24 10	33,100	131	272	1-day delay due to excessive wind loads, calculated at high altitudes.
15	STS-51C Discovery	1/24/85	1450	10.173	18	46	17.1 15.5	228 253	42,900	199	265	1-day delay due to extreme cold surface temperatures.

Table 1. Selected atmospheric observations for the flights of the space shuttle vehicles (continued).

Vehicle Data[h]				Surface Observations					Inflight Conditions Max. Wind Below 60,000 ft			Count Down and Launch Comments of Meteorological Significance
				Thermodynamic[a]			Wind[b]					
Seq. No.	Vehicle No.	Launch Date	Time (EST) Nearest Minute	Press.[c] N/cm^2	Temp. (°C)	Rel. Hum. (%)	Speed (ft/s)	Dir. (°)	Alt. (ft)	Speed (ft/s)	Dir. (°)	
16	STS-51D Discovery	4/12/85	1359	10.257	21	55	19.9 22.3	82 82	42,600	134	265	55-min delay due to a ship in the SRB impact area, and concerns over potential weather related impacts (cloud cover).
17	STS-51B Challenger	4/29/85	1202[f]	10.128	27	65	11.5 18.4	005 337	32,900 40,700	68 68	320 297	
18	STS-51G Discovery	6/17/85	0733[f]	10.201	23	91	2.9 11.8	201 206	40,100 46,700	55 55	298 302	
19	STS-51F Challenger	7/29/85	1700[f]	10.174	28	72	14.9 13.4	101 113	48,000	53	035	(20) 8/24 launch scrub due to unexceptable weather in launch area. Rain during countdown.
20	STS-51I Discovery	8/27/85	0658[f]	10.225	24	86	14.2 16.6	073 070	41,000	43	123	
21	STS-51J Atlantis	10/3/85	1115[f]	10.185	28	79	17.0 13.7	213 171	48,000	48	283	(24) 1/7 launch scrub due to unexceptable weather at TAW sites. 1/10 launch scrub due to heavy rain in launch area.
22	STS-61A Challenger	10/30/85	1200	10.059	28	72	12.7 14.1	217 174	43,000	81	218	
23	STS-61B Atlantis	11/26/85	1929	10.202	23	81	10.1 10.4	165 112	49,300	75	270	(25) 1/26 launch scrub due in part to potential bad weather associated with frontal passage. 1/27 launch scrub due in part to strong cross winds at X68. 1/28 2-hr delay due in part to cold early morning temps.
24	STS-61C Columbia	1/12/86	0655	10.206	12	84	15.4 18.6	323 342	40,000	221	263	
25[j]	STS-51L[i] Challenger	1/28/86	1138	10.253	3	27	20.1 15.3	331 262	42,000	174	264	
26[j]	STS-26 Discovery	9/29/88	1137[f]	10.182	29	56	13.7 13.5	058 047	53,100	44	304	(26) 1-hr and 37-min delay due to light winds aloft.
27[j]	STS-27 Atlantis	12/2/88	930	10.270	14	50	25.5 22.0	314 352	40,200	187	245	(27) 1-day delay due to excessive wind loads, calculated at high altitudes.
28[j]	STS-29 Discovery	3/13/89	957	10.190	18	78	16.9	242	45,200	105	283	(28) 2-hr delay due to fog and strong winds aloft.
29[j]	STS-30 Atlantis	5/4/89	1437[f]	10.200	26	57	21.6	106	44,200	157	255	(29) 59-min delay due to cloud cover over the launch area.

Table 1. Selected atmospheric observations for the flights of the space shuttle vehicles (continued).

Vehicle Data[h]				Surface Observations					Inflight Conditions Max. Wind Below 60,000 ft			Count Down and Comments of Mete Significance
				Thermodynamic[a]			Wind[b]					
Seq. No.	Vehicle No.	Launch Date	Time (EST) Nearest Minute	Press.[c] N/cm^2	Temp. (°C)	Rel. Hum. (%)	Speed (ft/s)	Dir. (°)	Alt. (ft)	Speed (ft/s)	Dir. (°)	
30[j]	STS-28 Columbia	8/8/89	0837[f]	10.120	27	80	12.5	252	24,100	35	286	
31[j]	STS-34 Atlantis	10/18/89	1254[f]	10.152	30	52	13.5	193	45,800 47,100	61 61	287 294	(31) 1 day delay due to rain showers in launch area.
32[j]	STS-33 Discovery	11/22/89	1924	10.132	19	80	16.9	208	41,900	110	237	
33	STS-32 Columbia	1/9/90	0735	10.194	12	100	6.8	246	43,800	160	242	(33) 1-day delay due to cloud cover over the launch area.
34	STS-36 Atlantis	2/28/90	0250	10.268	18	71	23.6	72	41,600	177	289	(34) 6-day delay due partially to showers and cloud cover over launch area.
35[j]	STS-31 Discovery	4/24/90	0834[f]	10.186	22	63	18.6	80	31,300	96	307	
36[j]	STS-41 Discovery	10/6/90	0747[f]	10.176	27	73	23.6	90	41,300	86	293	
37	STS-38 Atlantis	11/15/90	1848	10.254	21	63	28.7	84	41,500	148	273	
39[j]	STS-37 Atlantis	4/5/91	0923	10.256	23	84	18.6	74	46,400	149	262	
40	STS-39 Discovery	4/28/91	0733[f]	10.149	22	95	12.8	191	51,200 51,300	103 103	284 279	
41[i]	STS-40 Columbia	6/5/91	0925[f]	10.096	24	83	6.8	234	8,300	50	265	

a. Pad 39A thermodynamic measurements taken at approximately 1.2 m (4 ft) above natural grade at camera site No. 3.
b. 1-min average prior to L+0 of 60-ft PLP winds measured above natural grade. 275-ft FSS wind measurements were not available after sequence No. 27.
c. Pressure measurement applicable to 21 ft above MSL unless otherwise indicated.
d. Pressure measurement applicable to 14 ft above MSL.
e. 10-sec average prior to L+0.
f. Eastern daylight time.
g. 30-sec average prior to L+0.
h. All vehicles launched from LC 39A except where noted.
i. Shuttle exploded in flight.
j. Vehicle launched from 39B.

Table 2. Systems used to measure upper air wind data for STS-40 ascent.

Type of Data	Date: June 5, 1991		Portion of Data Used			
	Release Time		Start		End	
	Time (u.t.) (h:min)	Time After L+0 (min)	Altitude m (ft)	Time After L+0 (min)	Altitude m (ft)	Time After L+0 (min)
FPS-16 Jimsphere	13:40	15	6 (21)	15	16,764 (55,000)	70
MSS Rawinsonde	12:36	-49	17,069 (56,000)	7	25,298 (83,000)	34
Super-Loki Rocketsonde (Datasonde)	15:01	96	65,532 (215,000)	96	25,603 (84,000)	116
Super-Loki Rocketsonde (Robin)	14:25	60	85,954 (282,000)	60	65,837 (216,000)	61

Table 3. KSC surface observations at STS-40 launch time.

Location[a]	Time After L+0 (min)	Pressure (MSL) N/cm^2 (psia)	Temperature K (°F)	Dew Point K (°F)	Relative Humidity (%)	Visibility km (miles)	Sky Cover*			Wind	
							Cloud Amount	Cloud Type	Height of Base Meters (ft)	Wind ft/s (kt)	Direction (°)
NASA Space Shuttle Runway X68[e] Winds Measured at 10.4 m (34 ft)	0	10.200 (14.794)	298.2 (77.0)	294.3 (70.0)	78	16 (10)	1 5 7	Stratocumulus Altocumulus Cirrostratus	305 (1,000) 4,267 (14,000) 6,096 (20,000)	5.1 (3.0)	270
CCAFS XMR[c] Surface Measurements	−19	10.200 (14.794)	298.2 (77.0)	292.0 (66.0)	69	16 (10)	7 2	Altocumulus Cirrostratos	4,267 (14,000) 6,096 (20,000)	3.4 (2.0)	300
Pad 39A[d] Lightpole SE 18.3 m (60.0 ft)[b]	0	10.096 (14.643)	297.0 (75.0)	293.7 (69.0)	83	–	–	–	–	6.8 (4.0)	234

* 7/10 total sky cover at X68 and 9/10 total sky cover at XMR.

a. Altitudes of measurements are above natural grade, except where noted.

b. Approximately 1-min average prior to L+0.

c. Balloon release site.

d. Pad 39B thermodynamic measurements are taken at camera site No. 3, approximately 6.4 m (21 ft) above MSL.

e. Official STS-40 sky observational site.

Table 4. STS-40 prelaunch through launch KSC pad 39B atmospheric measurements.

Hourly Atmospheric Measurements[a]						Sky Condition[b]			
5 June 1991 Time u.t.	Temperature (°F)	Dew Point (°F)	Relative Humidity (%)	60' Level (SE)		Clouds	Total Sky Cover	Visibility mi.)	Other Remarks
				WS Kt	WD°				
0800	75	72	89	6	237	Scattered at 1,700, 14,000 ft and overcast at 30,000 ft	10/10	8	
0900	73	67	82	8	233	Scattered at 1,700, 14,000 ft, and overcast at 30,000 ft	10/10	9	
1000	71	66	84	4	290	Scattered at 1,700 ft, 16,000 ft, and overcast at 29,000 ft	10/10	10	
1100	70	66	86	3	259	Scattered at 1,000, 14,000 ft, and overcast at 20,000 ft	10/10	10	
1200	71	67	86	3	231	Scattered at 1,000 ft, broken at 14,000 ft, and overcast at 20,000 ft	10/10	10	
1300	73	68	85	4	245	Scattered at 1,000 ft, broken at 14,000 and 20,000 ft	8/10	10	
L+0[c] 1325	75	69	83	4	234	Scattered at 1,000, broken at 14,000 and 20,000 ft	7/10	10	

a. Hourly pad observations (obtained via MSFC/MIDDS) averaged over 5 min, centered on the hour.

b. Sky observations taken at the shuttle runway site X68.

c. L+0 pad 39B wind and thermodynamic parameters obtained from HOSC strip charts. The SE anemometer was used at the 60-ft level for L+0 wind conditions (approximately 1-min average prior to L+0).

Table 5. STS-40 ascent atmospheric data profile.

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
21.	6.80	234.00	23.90	0.1010E+04	0.1174E+04	20.80
100.	3.61	285.00	23.80	0.1007E+04	0.1171E+04	20.65
200.	3.61	281.00	23.68	0.1004E+04	0.1167E+04	20.45
300.	3.94	277.00	23.56	0.1000E+04	0.1164E+04	20.26
400.	3.94	275.00	23.44	0.9966E+03	0.1160E+04	20.07
500.	4.27	272.00	23.32	0.9931E+03	0.1157E+04	19.88
600.	4.59	270.00	23.20	0.9896E+03	0.1153E+04	19.68
700.	4.59	269.00	23.07	0.9862E+03	0.1150E+04	19.49
800.	4.92	268.00	22.95	0.9827E+03	0.1146E+04	19.30
900.	4.92	266.00	22.83	0.9792E+03	0.1143E+04	19.10
1000.	5.25	265.00	22.71	0.9758E+03	0.1139E+04	18.91
1100.	5.25	264.00	22.62	0.9724E+03	0.1136E+04	18.60
1200.	5.58	263.00	22.53	0.9690E+03	0.1132E+04	18.29
1300.	5.58	262.00	22.44	0.9656E+03	0.1129E+04	17.98
1400.	5.91	262.00	22.35	0.9623E+03	0.1125E+04	17.67
1500.	6.23	261.00	22.26	0.9589E+03	0.1122E+04	17.36
1600.	6.56	260.00	22.17	0.9556E+03	0.1119E+04	17.05
1700.	6.56	260.00	22.08	0.9522E+03	0.1115E+04	16.74
1800.	6.89	259.00	21.99	0.9489E+03	0.1112E+04	16.43
1900.	6.89	259.00	21.90	0.9456E+03	0.1108E+04	16.12
2000.	7.22	258.00	21.81	0.9423E+03	0.1105E+04	15.81
2100.	7.22	258.00	21.67	0.9390E+03	0.1102E+04	15.75
2200.	7.55	257.00	21.53	0.9357E+03	0.1098E+04	15.69
2300.	7.55	257.00	21.39	0.9324E+03	0.1095E+04	15.63
2400.	7.87	256.00	21.25	0.9292E+03	0.1092E+04	15.57
2500.	7.87	255.00	21.11	0.9259E+03	0.1088E+04	15.51
2600.	24.61	286.00	20.97	0.9227E+03	0.1085E+04	15.45
2700.	18.37	287.00	20.83	0.9194E+03	0.1082E+04	15.39
2800.	16.40	283.00	20.69	0.9162E+03	0.1078E+04	15.33
2900.	12.47	290.00	20.55	0.9130E+03	0.1075E+04	15.27
3000.	16.08	302.00	20.41	0.9098E+03	0.1072E+04	15.21
3100.	14.44	290.00	20.24	0.9066E+03	0.1069E+04	15.06
3200.	11.15	283.00	20.07	0.9034E+03	0.1066E+04	14.91
3300.	15.09	303.00	19.90	0.9002E+03	0.1063E+04	14.76
3400.	11.81	308.00	19.73	0.8971E+03	0.1060E+04	14.61
3500.	12.47	284.00	19.56	0.8939E+03	0.1056E+04	14.46
3600.	12.47	277.00	19.39	0.8908E+03	0.1053E+04	14.31
3700.	14.44	284.00	19.22	0.8876E+03	0.1050E+04	14.16
3800.	15.42	262.00	19.05	0.8845E+03	0.1047E+04	14.01
3900.	15.09	260.00	18.88	0.8814E+03	0.1044E+04	13.86
4000.	17.39	264.00	18.71	0.8783E+03	0.1041E+04	13.71
4100.	19.69	255.00	18.53	0.8752E+03	0.1038E+04	13.41
4200.	18.70	259.00	18.35	0.8721E+03	0.1035E+04	13.11
4300.	21.33	264.00	18.17	0.8690E+03	0.1032E+04	12.81
4400.	21.98	261.00	17.99	0.8659E+03	0.1030E+04	12.51
4500.	20.34	268.00	17.81	0.8629E+03	0.1027E+04	12.21
4600.	10.17	243.00	17.63	0.8598E+03	0.1024E+04	11.91
4700.	21.65	264.00	17.45	0.8568E+03	0.1021E+04	11.61
4800.	23.62	269.00	17.27	0.8537E+03	0.1018E+04	11.31
4900.	22.31	259.00	17.09	0.8507E+03	0.1015E+04	11.01

Table 5. STS-40 ascent atmospheric data profile (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
5000.	21.65	266.00	16.91	0.8477E+03	0.1012E+04	10.71
5100.	23.95	267.00	16.73	0.8447E+03	0.1009E+04	10.60
5200.	24.61	261.00	16.55	0.8417E+03	0.1006E+04	10.49
5300.	25.59	267.00	16.37	0.8387E+03	0.1003E+04	10.38
5400.	27.56	273.00	16.19	0.8357E+03	0.1000E+04	10.27
5500.	28.22	265.00	16.01	0.8327E+03	0.9976E+03	10.16
5600.	31.82	270.00	15.83	0.8298E+03	0.9946E+03	10.05
5700.	19.03	271.00	15.65	0.8268E+03	0.9917E+03	9.94
5800.	34.45	276.00	15.47	0.8239E+03	0.9888E+03	9.83
5900.	32.15	266.00	15.29	0.8209E+03	0.9860E+03	9.72
6000.	31.17	267.00	15.11	0.8180E+03	0.9831E+03	9.61
6100.	32.48	270.00	14.93	0.8151E+03	0.9802E+03	9.46
6200.	36.42	266.00	14.75	0.8121E+03	0.9773E+03	9.31
6300.	36.09	261.00	14.57	0.8092E+03	0.9745E+03	9.16
6400.	35.43	261.00	14.39	0.8063E+03	0.9716E+03	9.01
6500.	38.71	263.00	14.21	0.8034E+03	0.9688E+03	8.86
6600.	27.89	250.00	14.03	0.8005E+03	0.9659E+03	8.71
6700.	39.04	259.00	13.85	0.7977E+03	0.9631E+03	8.56
6800.	38.71	261.00	13.67	0.7948E+03	0.9603E+03	8.41
6900.	37.73	257.00	13.49	0.7919E+03	0.9575E+03	8.26
7000.	37.07	253.00	13.31	0.7891E+03	0.9547E+03	8.11
7100.	35.10	250.00	13.12	0.7862E+03	0.9518E+03	8.03
7200.	37.07	254.00	12.93	0.7834E+03	0.9490E+03	7.95
7300.	42.65	250.00	12.74	0.7806E+03	0.9462E+03	7.87
7400.	41.99	244.00	12.55	0.7777E+03	0.9434E+03	7.79
7500.	40.03	246.00	12.36	0.7749E+03	0.9407E+03	7.71
7600.	41.34	251.00	12.17	0.7721E+03	0.9379E+03	7.63
7700.	42.65	251.00	11.98	0.7693E+03	0.9351E+03	7.55
7800.	43.96	247.00	11.79	0.7665E+03	0.9324E+03	7.47
7900.	41.67	249.00	11.60	0.7638E+03	0.9296E+03	7.39
8000.	42.32	255.00	11.41	0.7610E+03	0.9269E+03	7.31
8100.	42.65	255.00	11.29	0.7582E+03	0.9240E+03	7.10
8200.	36.42	254.00	11.17	0.7555E+03	0.9211E+03	6.89
8300.	50.20	265.00	11.05	0.7528E+03	0.9182E+03	6.68
8400.	36.42	267.00	10.93	0.7500E+03	0.9153E+03	6.47
8500.	37.73	270.00	10.81	0.7473E+03	0.9124E+03	6.26
8600.	37.73	262.00	10.69	0.7446E+03	0.9095E+03	6.05
8700.	40.03	270.00	10.57	0.7419E+03	0.9067E+03	5.84
8800.	39.70	269.00	10.45	0.7392E+03	0.9038E+03	5.63
8900.	38.39	271.00	10.33	0.7366E+03	0.9010E+03	5.42
9000.	39.70	274.00	10.21	0.7339E+03	0.8981E+03	5.21
9100.	37.73	271.00	9.95	0.7312E+03	0.8957E+03	5.12
9200.	38.06	277.00	9.69	0.7285E+03	0.8932E+03	5.03
9300.	33.46	275.00	9.43	0.7258E+03	0.8908E+03	4.94
9400.	34.78	273.00	9.17	0.7232E+03	0.8883E+03	4.85
9500.	32.15	275.00	8.91	0.7205E+03	0.8859E+03	4.76
9600.	32.81	271.00	8.65	0.7179E+03	0.8835E+03	4.67
9700.	31.50	278.00	8.39	0.7152E+03	0.8810E+03	4.58
9800.	28.22	278.00	8.13	0.7126E+03	0.8786E+03	4.49
9900.	32.48	278.00	7.87	0.7100E+03	0.8762E+03	4.40

Table 5. STS-40 ascent atmospheric data profile (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
10000.	31.82	286.00	7.61	0.7074E+03	0.8738E+03	4.31
10100.	33.46	284.00	7.43	0.7048E+03	0.8712E+03	4.16
10200.	35.10	289.00	7.25	0.7022E+03	0.8686E+03	4.01
10300.	32.15	294.00	7.07	0.6996E+03	0.8660E+03	3.86
10400.	34.78	294.00	6.89	0.6970E+03	0.8634E+03	3.71
10500.	35.10	301.00	6.71	0.6945E+03	0.8608E+03	3.56
10600.	34.78	299.00	6.53	0.6919E+03	0.8582E+03	3.41
10700.	36.42	304.00	6.35	0.6894E+03	0.8556E+03	3.26
10800.	34.78	304.00	6.17	0.6868E+03	0.8530E+03	3.11
10900.	38.06	309.00	5.99	0.6843E+03	0.8505E+03	2.96
11000.	37.73	316.00	5.81	0.6818E+03	0.8479E+03	2.81
11100.	40.68	311.00	5.70	0.6793E+03	0.8451E+03	2.87
11200.	43.31	313.00	5.59	0.6767E+03	0.8422E+03	2.93
11300.	43.96	312.00	5.48	0.6742E+03	0.8394E+03	2.99
11400.	47.57	311.00	5.37	0.6717E+03	0.8366E+03	3.05
11500.	47.57	310.00	5.26	0.6692E+03	0.8338E+03	3.11
11600.	46.92	306.00	5.15	0.6667E+03	0.8310E+03	3.17
11700.	46.26	306.00	5.04	0.6643E+03	0.8282E+03	3.23
11800.	41.99	309.00	4.93	0.6618E+03	0.8254E+03	3.29
11900.	41.34	305.00	4.82	0.6593E+03	0.8226E+03	3.35
12000.	42.98	308.00	4.71	0.6569E+03	0.8199E+03	3.41
12100.	40.35	308.00	4.50	0.6545E+03	0.8175E+03	3.27
12200.	39.04	303.00	4.29	0.6520E+03	0.8151E+03	3.13
12300.	41.01	308.00	4.08	0.6496E+03	0.8127E+03	2.99
12400.	38.39	305.00	3.87	0.6472E+03	0.8103E+03	2.85
12500.	39.70	300.00	3.66	0.6448E+03	0.8079E+03	2.71
12600.	40.68	302.00	3.45	0.6424E+03	0.8056E+03	2.57
12700.	38.06	296.00	3.24	0.6400E+03	0.8032E+03	2.43
12800.	39.37	295.00	3.03	0.6376E+03	0.8008E+03	2.29
12900.	38.39	296.00	2.82	0.6353E+03	0.7985E+03	2.15
13000.	41.01	291.00	2.61	0.6329E+03	0.7962E+03	2.01
13100.	40.03	295.00	2.52	0.6305E+03	0.7934E+03	1.88
13200.	38.39	293.00	2.43	0.6281E+03	0.7907E+03	1.75
13300.	40.35	292.00	2.34	0.6258E+03	0.7880E+03	1.62
13400.	41.01	298.00	2.25	0.6234E+03	0.7854E+03	1.49
13500.	42.32	292.00	2.16	0.6211E+03	0.7827E+03	1.36
13600.	42.32	293.00	2.07	0.6188E+03	0.7800E+03	1.23
13700.	40.03	298.00	1.98	0.6164E+03	0.7773E+03	1.10
13800.	41.99	296.00	1.89	0.6141E+03	0.7747E+03	0.97
13900.	41.99	299.00	1.80	0.6118E+03	0.7720E+03	0.84
14000.	41.01	298.00	1.71	0.6095E+03	0.7694E+03	0.71
14100.	42.65	296.00	1.49	0.6072E+03	0.7672E+03	0.59
14200.	41.34	302.00	1.27	0.6049E+03	0.7649E+03	0.47
14300.	41.01	302.00	1.05	0.6027E+03	0.7627E+03	0.35
14400.	42.32	302.00	0.83	0.6004E+03	0.7604E+03	0.23
14500.	41.99	305.00	0.61	0.5981E+03	0.7582E+03	0.11
14600.	38.71	304.00	0.39	0.5959E+03	0.7560E+03	-0.01
14700.	41.67	301.00	0.17	0.5937E+03	0.7537E+03	-0.13
14800.	38.39	302.00	-0.05	0.5914E+03	0.7515E+03	-0.25
14900.	39.37	296.00	-0.27	0.5892E+03	0.7493E+03	-0.37

Table 5. STS-40 ascent atmospheric data profile (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
15000.	41.67	302.00	-0.49	0.5870E+03	0.7471E+03	-0.49
15100.	39.70	304.00	-0.63	0.5848E+03	0.7447E+03	-0.68
15200.	42.98	299.00	-0.77	0.5826E+03	0.7423E+03	-0.87
15300.	45.93	306.00	-0.91	0.5803E+03	0.7399E+03	-1.06
15400.	45.28	306.00	-1.05	0.5781E+03	0.7375E+03	-1.25
15500.	46.26	301.00	-1.19	0.5759E+03	0.7351E+03	-1.44
15600.	45.60	301.00	-1.33	0.5738E+03	0.7327E+03	-1.63
15700.	42.65	305.00	-1.47	0.5716E+03	0.7303E+03	-1.82
15800.	41.67	301.00	-1.61	0.5694E+03	0.7280E+03	-2.01
15900.	45.28	303.00	-1.75	0.5673E+03	0.7256E+03	-2.20
16000.	43.64	306.00	-1.89	0.5651E+03	0.7232E+03	-2.39
16100.	41.99	302.00	-2.09	0.5629E+03	0.7210E+03	-2.54
16200.	43.64	300.00	-2.29	0.5608E+03	0.7188E+03	-2.69
16300.	43.64	304.00	-2.49	0.5587E+03	0.7166E+03	-2.84
16400.	41.01	305.00	-2.69	0.5565E+03	0.7144E+03	-2.99
16500.	36.09	300.00	-2.89	0.5544E+03	0.7123E+03	-3.14
16600.	34.78	300.00	-3.09	0.5523E+03	0.7101E+03	-3.29
16700.	34.78	306.00	-3.29	0.5502E+03	0.7079E+03	-3.44
16800.	31.17	311.00	-3.49	0.5481E+03	0.7058E+03	-3.59
16900.	27.89	302.00	-3.69	0.5460E+03	0.7036E+03	-3.74
17000.	28.22	301.00	-3.89	0.5439E+03	0.7015E+03	-3.89
17100.	22.64	309.00	-4.08	0.5418E+03	0.6993E+03	-4.08
17200.	21.33	300.00	-4.27	0.5397E+03	0.6971E+03	-4.27
17300.	21.98	292.00	-4.46	0.5376E+03	0.6949E+03	-4.46
17400.	18.37	306.00	-4.65	0.5356E+03	0.6927E+03	-4.65
17500.	19.03	299.00	-4.84	0.5335E+03	0.6906E+03	-4.84
17600.	21.65	293.00	-5.03	0.5314E+03	0.6884E+03	-5.03
17700.	21.98	302.00	-5.22	0.5294E+03	0.6863E+03	-5.22
17800.	21.00	297.00	-5.41	0.5274E+03	0.6842E+03	-5.41
17900.	22.97	299.00	-5.60	0.5253E+03	0.6820E+03	-5.60
18000.	23.62	305.00	-5.79	0.5233E+03	0.6799E+03	-5.79
18100.	22.97	300.00	-5.97	0.5213E+03	0.6777E+03	-5.97
18200.	25.26	299.00	-6.15	0.5193E+03	0.6756E+03	-6.15
18300.	24.61	303.00	-6.33	0.5172E+03	0.6735E+03	-6.33
18400.	24.61	295.00	-6.51	0.5152E+03	0.6713E+03	-6.51
18500.	22.31	292.00	-6.69	0.5133E+03	0.6692E+03	-6.69
18600.	21.65	299.00	-6.87	0.5113E+03	0.6671E+03	-6.87
18700.	18.70	291.00	-7.05	0.5093E+03	0.6650E+03	-7.05
18800.	20.01	290.00	-7.23	0.5073E+03	0.6628E+03	-7.23
18900.	17.39	289.00	-7.41	0.5054E+03	0.6607E+03	-7.41
19000.	21.33	283.00	-7.59	0.5034E+03	0.6587E+03	-7.59
19100.	19.03	286.00	-7.81	0.5014E+03	0.6566E+03	-7.81
19200.	18.70	293.00	-8.03	0.4995E+03	0.6546E+03	-8.03
19300.	21.00	285.00	-8.25	0.4975E+03	0.6526E+03	-8.25
19400.	21.98	286.00	-8.47	0.4955E+03	0.6506E+03	-8.47
19500.	21.98	288.00	-8.69	0.4936E+03	0.6486E+03	-8.69
19600.	22.64	283.00	-8.91	0.4917E+03	0.6466E+03	-8.91
19700.	23.29	291.00	-9.13	0.4897E+03	0.6447E+03	-9.13
19800.	25.59	276.00	-9.35	0.4878E+03	0.6427E+03	-9.35
19900.	27.56	285.00	-9.57	0.4859E+03	0.6407E+03	-9.57

Table 5. STS-40 ascent atmospheric data profile (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
20000.	26.25	290.00	-9.79	0.4840E+03	0.6388E+03	-9.79
20100.	28.54	286.00	-9.93	0.4821E+03	0.6366E+03	-9.94
20200.	30.18	280.00	-10.07	0.4802E+03	0.6345E+03	-10.09
20300.	31.17	273.00	-10.21	0.4783E+03	0.6323E+03	-10.24
20400.	30.84	277.00	-10.35	0.4764E+03	0.6302E+03	-10.39
20500.	30.51	284.00	-10.49	0.4746E+03	0.6280E+03	-10.54
20600.	34.12	277.00	-10.63	0.4727E+03	0.6259E+03	-10.69
20700.	32.81	278.00	-10.77	0.4708E+03	0.6238E+03	-10.84
20800.	29.86	282.00	-10.91	0.4690E+03	0.6217E+03	-10.99
20900.	32.48	271.00	-11.05	0.4671E+03	0.6196E+03	-11.14
21000.	33.79	279.00	-11.19	0.4653E+03	0.6175E+03	-11.29
21100.	31.17	280.00	-11.36	0.4635E+03	0.6155E+03	-11.59
21200.	30.18	273.00	-11.53	0.4616E+03	0.6135E+03	-11.89
21300.	35.10	266.00	-11.70	0.4598E+03	0.6115E+03	-12.19
21400.	28.22	272.00	-11.87	0.4580E+03	0.6095E+03	-12.49
21500.	29.86	264.00	-12.04	0.4562E+03	0.6075E+03	-12.79
21600.	29.53	267.00	-12.21	0.4544E+03	0.6055E+03	-13.09
21700.	28.54	267.00	-12.38	0.4526E+03	0.6036E+03	-13.39
21800.	28.22	267.00	-12.55	0.4508E+03	0.6016E+03	-13.69
21900.	30.51	269.00	-12.72	0.4491E+03	0.5997E+03	-13.99
22000.	36.09	269.00	-12.89	0.4473E+03	0.5977E+03	-14.29
22100.	32.15	281.00	-12.98	0.4455E+03	0.5956E+03	-14.72
22200.	31.82	283.00	-13.07	0.4437E+03	0.5934E+03	-15.15
22300.	33.79	272.00	-13.16	0.4420E+03	0.5913E+03	-15.58
22400.	35.43	279.00	-13.25	0.4402E+03	0.5892E+03	-16.01
22500.	31.82	278.00	-13.34	0.4385E+03	0.5871E+03	-16.44
22600.	31.17	272.00	-13.43	0.4367E+03	0.5849E+03	-16.87
22700.	32.81	275.00	-13.52	0.4350E+03	0.5828E+03	-17.30
22800.	27.89	272.00	-13.61	0.4332E+03	0.5808E+03	-17.73
22900.	29.53	266.00	-13.70	0.4315E+03	0.5787E+03	-18.16
23000.	28.22	271.00	-13.79	0.4298E+03	0.5766E+03	-18.59
23100.	31.50	265.00	-13.92	0.4281E+03	0.5746E+03	-18.81
23200.	31.82	263.00	-14.05	0.4264E+03	0.5726E+03	-19.03
23300.	29.20	266.00	-14.18	0.4247E+03	0.5706E+03	-19.25
23400.	30.84	260.00	-14.31	0.4230E+03	0.5686E+03	-19.47
23500.	26.25	269.00	-14.44	0.4213E+03	0.5666E+03	-19.69
23600.	25.26	264.00	-14.57	0.4196E+03	0.5646E+03	-19.91
23700.	23.95	262.00	-14.70	0.4179E+03	0.5627E+03	-20.13
23800.	20.34	268.00	-14.83	0.4162E+03	0.5607E+03	-20.35
23900.	22.31	265.00	-14.96	0.4146E+03	0.5587E+03	-20.57
24000.	21.00	265.00	-15.09	0.4129E+03	0.5568E+03	-20.79
24100.	21.33	263.00	-15.29	0.4112E+03	0.5550E+03	-21.00
24200.	22.97	257.00	-15.49	0.4096E+03	0.5532E+03	-21.21
24300.	17.72	262.00	-15.69	0.4079E+03	0.5514E+03	-21.42
24400.	20.34	259.00	-15.89	0.4063E+03	0.5496E+03	-21.63
24500.	17.06	267.00	-16.09	0.4047E+03	0.5479E+03	-21.84
24600.	19.36	259.00	-16.29	0.4030E+03	0.5461E+03	-22.05
24700.	19.69	266.00	-16.49	0.4014E+03	0.5443E+03	-22.26
24800.	15.75	270.00	-16.69	0.3998E+03	0.5426E+03	-22.47
24900.	19.69	256.00	-16.89	0.3982E+03	0.5408E+03	-22.68

Table 5. STS-40 ascent atmospheric data profile (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
25000.	16.73	264.00	-17.09	0.3966E+03	0.5391E+03	-22.89
25100.	15.42	273.00	-17.32	0.3950E+03	0.5374E+03	-23.07
25200.	12.80	272.00	-17.55	0.3934E+03	0.5357E+03	-23.25
25300.	12.14	283.00	-17.78	0.3918E+03	0.5340E+03	-23.43
25400.	11.81	279.00	-18.01	0.3902E+03	0.5323E+03	-23.61
25500.	11.15	286.00	-18.24	0.3886E+03	0.5306E+03	-23.79
25600.	12.14	315.00	-18.47	0.3870E+03	0.5290E+03	-23.97
25700.	9.84	281.00	-18.70	0.3855E+03	0.5273E+03	-24.15
25800.	9.51	294.00	-18.93	0.3839E+03	0.5256E+03	-24.33
25900.	6.89	288.00	-19.16	0.3824E+03	0.5240E+03	-24.51
26000.	9.51	272.00	-19.39	0.3808E+03	0.5223E+03	-24.69
26100.	9.51	313.00	-19.64	0.3792E+03	0.5207E+03	-24.88
26200.	4.59	309.00	-19.89	0.3777E+03	0.5191E+03	-25.07
26300.	3.28	283.00	-20.14	0.3761E+03	0.5175E+03	-25.26
26400.	4.92	325.00	-20.39	0.3746E+03	0.5159E+03	-25.45
26500.	5.58	270.00	-20.64	0.3731E+03	0.5143E+03	-25.64
26600.	6.56	277.00	-20.89	0.3715E+03	0.5127E+03	-25.83
26700.	4.59	282.00	-21.14	0.3700E+03	0.5111E+03	-26.02
26800.	6.56	271.00	-21.39	0.3685E+03	0.5095E+03	-26.21
26900.	9.19	263.00	-21.64	0.3670E+03	0.5080E+03	-26.40
27000.	10.83	273.00	-21.89	0.3655E+03	0.5064E+03	-26.59
27100.	14.44	276.00	-22.11	0.3640E+03	0.5048E+03	-26.94
27200.	16.08	277.00	-22.33	0.3625E+03	0.5031E+03	-27.29
27300.	18.37	264.00	-22.55	0.3610E+03	0.5015E+03	-27.64
27400.	15.42	277.00	-22.77	0.3595E+03	0.4999E+03	-27.99
27500.	11.48	274.00	-22.99	0.3580E+03	0.4983E+03	-28.34
27600.	9.51	304.00	-23.21	0.3565E+03	0.4967E+03	-28.69
27700.	6.56	296.00	-23.43	0.3551E+03	0.4951E+03	-29.04
27800.	9.19	278.00	-23.65	0.3536E+03	0.4935E+03	-29.39
27900.	9.19	297.00	-23.87	0.3522E+03	0.4919E+03	-29.74
28000.	6.89	321.00	-24.09	0.3507E+03	0.4903E+03	-30.09
28100.	8.86	341.00	-24.34	0.3492E+03	0.4887E+03	-30.26
28200.	7.22	333.00	-24.59	0.3478E+03	0.4872E+03	-30.43
28300.	9.19	326.00	-24.84	0.3463E+03	0.4856E+03	-30.60
28400.	9.19	359.00	-25.09	0.3449E+03	0.4841E+03	-30.77
28500.	5.25	356.00	-25.34	0.3434E+03	0.4825E+03	-30.94
28600.	4.92	345.00	-25.59	0.3420E+03	0.4810E+03	-31.11
28700.	7.87	10.00	-25.84	0.3406E+03	0.4795E+03	-31.28
28800.	5.25	350.00	-26.09	0.3391E+03	0.4780E+03	-31.45
28900.	7.87	354.00	-26.34	0.3377E+03	0.4764E+03	-31.62
29000.	8.86	334.00	-26.59	0.3363E+03	0.4749E+03	-31.79
29100.	9.84	357.00	-26.82	0.3349E+03	0.4734E+03	-31.99
29200.	6.23	340.00	-27.05	0.3335E+03	0.4718E+03	-32.19
29300.	7.87	340.00	-27.28	0.3321E+03	0.4703E+03	-32.39
29400.	9.51	352.00	-27.51	0.3307E+03	0.4687E+03	-32.59
29500.	5.25	322.00	-27.74	0.3293E+03	0.4672E+03	-32.79
29600.	7.55	12.00	-27.97	0.3279E+03	0.4657E+03	-32.99
29700.	4.92	339.00	-28.20	0.3265E+03	0.4642E+03	-33.19
29800.	4.27	328.00	-28.43	0.3251E+03	0.4626E+03	-33.39
29900.	5.91	4.00	-28.66	0.3238E+03	0.4611E+03	-33.59

Table 5. STS-40 ascent atmospheric data profile (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
30000.	3.94	346.00	-28.89	0.3224E+03	0.4596E+03	-33.79
30100.	6.56	329.00	-29.12	0.3210E+03	0.4581E+03	-34.39
30200.	3.94	3.00	-29.35	0.3197E+03	0.4566E+03	-34.99
30300.	4.27	305.00	-29.58	0.3183E+03	0.4551E+03	-35.59
30400.	5.58	323.00	-29.81	0.3170E+03	0.4536E+03	-36.19
30500.	5.58	301.00	-30.04	0.3156E+03	0.4521E+03	-36.79
30600.	8.20	339.00	-30.27	0.3143E+03	0.4507E+03	-37.39
30700.	8.86	338.00	-30.50	0.3130E+03	0.4492E+03	-37.99
30800.	10.17	345.00	-30.73	0.3116E+03	0.4477E+03	-38.59
30900.	13.12	311.00	-30.96	0.3103E+03	0.4462E+03	-39.19
31000.	16.73	318.00	-31.19	0.3090E+03	0.4448E+03	-39.79
31100.	12.80	328.00	-31.43	0.3077E+03	0.4433E+03	-40.16
31200.	14.11	310.00	-31.67	0.3064E+03	0.4419E+03	-40.53
31300.	15.42	316.00	-31.91	0.3050E+03	0.4404E+03	-40.90
31400.	15.75	321.00	-32.15	0.3037E+03	0.4390E+03	-41.27
31500.	15.42	303.00	-32.39	0.3024E+03	0.4375E+03	-41.64
31600.	15.42	323.00	-32.63	0.3011E+03	0.4361E+03	-42.01
31700.	15.09	323.00	-32.87	0.2998E+03	0.4346E+03	-42.38
31800.	13.45	313.00	-33.11	0.2986E+03	0.4332E+03	-42.75
31900.	12.14	325.00	-33.35	0.2973E+03	0.4318E+03	-43.12
32000.	10.50	312.00	-33.59	0.2960E+03	0.4304E+03	-43.49
32100.	10.17	314.00	-33.83	0.2947E+03	0.4289E+03	-44.11
32200.	11.15	324.00	-34.07	0.2934E+03	0.4275E+03	-44.73
32300.	11.48	308.00	-34.31	0.2922E+03	0.4261E+03	-45.35
32400.	13.78	330.00	-34.55	0.2909E+03	0.4247E+03	-45.97
32500.	14.44	327.00	-34.79	0.2896E+03	0.4233E+03	-46.59
32600.	14.11	331.00	-35.03	0.2884E+03	0.4218E+03	-47.21
32700.	13.12	326.00	-35.27	0.2871E+03	0.4204E+03	-47.83
32800.	14.11	340.00	-35.51	0.2859E+03	0.4190E+03	-48.45
32900.	12.14	330.00	-35.75	0.2846E+03	0.4176E+03	-49.07
33000.	13.45	325.00	-35.99	0.2834E+03	0.4163E+03	-49.69
33100.	13.78	343.00	-36.26	0.2822E+03	0.4149E+03	-50.06
33200.	12.80	349.00	-36.53	0.2809E+03	0.4136E+03	-50.43
33300.	13.45	342.00	-36.80	0.2797E+03	0.4122E+03	-50.80
33400.	14.44	348.00	-37.07	0.2785E+03	0.4109E+03	-51.17
33500.	14.44	341.00	-37.34	0.2772E+03	0.4095E+03	-51.54
33600.	15.42	346.00	-37.61	0.2760E+03	0.4082E+03	-51.91
33700.	12.47	338.00	-37.88	0.2748E+03	0.4069E+03	-52.28
33800.	14.44	343.00	-38.15	0.2736E+03	0.4056E+03	-52.65
33900.	16.40	354.00	-38.42	0.2724E+03	0.4042E+03	-53.02
34000.	13.78	343.00	-38.69	0.2712E+03	0.4029E+03	-53.39
34100.	16.08	348.00	-38.93	0.2700E+03	0.4016E+03	-53.72
34200.	16.40	345.00	-39.17	0.2688E+03	0.4002E+03	-54.05
34300.	13.78	337.00	-39.41	0.2676E+03	0.3988E+03	-54.38
34400.	15.42	345.00	-39.65	0.2664E+03	0.3975E+03	-54.71
34500.	13.12	343.00	-39.89	0.2652E+03	0.3961E+03	-55.04
34600.	12.80	323.00	-40.13	0.2641E+03	0.3948E+03	-55.37
34700.	13.78	347.00	-40.37	0.2629E+03	0.3934E+03	-55.70
34800.	13.12	342.00	-40.61	0.2617E+03	0.3921E+03	-56.03
34900.	13.78	332.00	-40.85	0.2606E+03	0.3907E+03	-56.36

Table 5. STS-40 ascent atmospheric data profile (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
35000.	16.40	351.00	-41.09	0.2594E+03	0.3894E+03	-56.69
35100.	13.45	338.00	-41.34	0.2582E+03	0.3881E+03	-56.94
35200.	15.42	333.00	-41.59	0.2571E+03	0.3867E+03	-57.19
35300.	14.44	343.00	-41.84	0.2559E+03	0.3854E+03	-57.44
35400.	13.45	346.00	-42.09	0.2548E+03	0.3841E+03	-57.69
35500.	9.51	321.00	-42.34	0.2536E+03	0.3828E+03	-57.94
35600.	13.12	348.00	-42.59	0.2525E+03	0.3815E+03	-58.19
35700.	10.50	357.00	-42.84	0.2514E+03	0.3802E+03	-58.44
35800.	7.87	336.00	-43.09	0.2502E+03	0.3789E+03	-58.69
35900.	11.15	342.00	-43.34	0.2491E+03	0.3776E+03	-58.94
36000.	11.15	2.00	-43.59	0.2480E+03	0.3763E+03	-59.19
36100.	6.89	360.00	-43.86	0.2469E+03	0.3751E+03	-59.41
36200.	10.50	342.00	-44.13	0.2458E+03	0.3738E+03	-59.63
36300.	12.14	350.00	-44.40	0.2446E+03	0.3726E+03	-59.85
36400.	13.78	356.00	-44.67	0.2435E+03	0.3713E+03	-60.07
36500.	14.44	353.00	-44.94	0.2424E+03	0.3701E+03	-60.29
36600.	14.44	355.00	-45.21	0.2413E+03	0.3688E+03	-60.51
36700.	10.83	330.00	-45.48	0.2402E+03	0.3676E+03	-60.73
36800.	15.42	341.00	-45.75	0.2392E+03	0.3664E+03	-60.95
36900.	17.39	358.00	-46.02	0.2381E+03	0.3652E+03	-61.17
37000.	14.11	350.00	-46.29	0.2370E+03	0.3639E+03	-61.39
37100.	16.40	358.00	-46.56	0.2359E+03	0.3627E+03	-61.60
37200.	14.11	5.00	-46.83	0.2348E+03	0.3615E+03	-61.81
37300.	14.11	355.00	-47.10	0.2338E+03	0.3603E+03	-62.02
37400.	15.42	8.00	-47.37	0.2327E+03	0.3590E+03	-62.23
37500.	12.80	5.00	-47.64	0.2316E+03	0.3578E+03	-62.44
37600.	17.06	8.00	-47.91	0.2306E+03	0.3566E+03	-62.65
37700.	16.08	14.00	-48.18	0.2295E+03	0.3554E+03	-62.86
37800.	15.09	20.00	-48.45	0.2285E+03	0.3542E+03	-63.07
37900.	18.04	26.00	-48.72	0.2274E+03	0.3530E+03	-63.28
38000.	13.45	17.00	-48.99	0.2264E+03	0.3518E+03	-63.49
38100.	16.08	17.00	-49.24	0.2253E+03	0.3506E+03	-63.69
38200.	15.42	26.00	-49.49	0.2243E+03	0.3494E+03	-63.89
38300.	14.44	33.00	-49.74	0.2233E+03	0.3481E+03	-64.09
38400.	17.06	34.00	-49.99	0.2222E+03	0.3469E+03	-64.29
38500.	15.42	51.00	-50.24	0.2212E+03	0.3457E+03	-64.49
38600.	10.83	52.00	-50.49	0.2202E+03	0.3445E+03	-64.69
38700.	16.08	57.00	-50.74	0.2191E+03	0.3432E+03	-64.89
38800.	17.39	54.00	-50.99	0.2181E+03	0.3420E+03	-65.09
38900.	12.80	59.00	-51.24	0.2171E+03	0.3408E+03	-65.29
39000.	13.78	59.00	-51.49	0.2161E+03	0.3396E+03	-65.49
39100.	12.80	59.00	-51.78	0.2151E+03	0.3385E+03	-65.72
39200.	15.75	54.00	-52.07	0.2141E+03	0.3373E+03	-65.95
39300.	10.50	66.00	-52.36	0.2131E+03	0.3362E+03	-66.18
39400.	13.12	58.00	-52.65	0.2121E+03	0.3351E+03	-66.41
39500.	9.19	65.00	-52.94	0.2111E+03	0.3339E+03	-66.64
39600.	8.86	44.00	-53.23	0.2101E+03	0.3328E+03	-66.87
39700.	7.87	59.00	-53.52	0.2091E+03	0.3317E+03	-67.10
39800.	10.50	41.00	-53.81	0.2081E+03	0.3306E+03	-67.33
39900.	12.80	37.00	-54.10	0.2072E+03	0.3295E+03	-67.56

Table 5. STS-40 ascent atmospheric data profile (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
40000.	10.50	32.00	-54.39	0.2062E+03	0.3284E+03	-67.79
40100.	17.06	38.00	-54.61	0.2052E+03	0.3271E+03	-67.97
40200.	12.47	46.00	-54.83	0.2042E+03	0.3259E+03	-68.15
40300.	14.44	39.00	-55.05	0.2033E+03	0.3247E+03	-68.33
40400.	13.12	45.00	-55.27	0.2023E+03	0.3235E+03	-68.51
40500.	14.11	47.00	-55.49	0.2013E+03	0.3222E+03	-68.69
40600.	15.75	48.00	-55.71	0.2004E+03	0.3210E+03	-68.87
40700.	14.11	47.00	-55.93	0.1994E+03	0.3198E+03	-69.05
40800.	18.04	50.00	-56.15	0.1985E+03	0.3186E+03	-69.23
40900.	15.42	50.00	-56.37	0.1975E+03	0.3174E+03	-69.41
41000.	16.40	49.00	-56.59	0.1966E+03	0.3163E+03	-69.59
41100.	15.75	47.00	-56.83	0.1957E+03	0.3151E+03	-69.78
41200.	16.08	52.00	-57.07	0.1947E+03	0.3139E+03	-69.97
41300.	18.37	51.00	-57.31	0.1938E+03	0.3128E+03	-70.16
41400.	17.06	52.00	-57.55	0.1929E+03	0.3116E+03	-70.35
41500.	18.70	41.00	-57.79	0.1919E+03	0.3105E+03	-70.54
41600.	18.04	29.00	-58.03	0.1910E+03	0.3093E+03	-70.73
41700.	20.34	38.00	-58.27	0.1901E+03	0.3082E+03	-70.92
41800.	16.73	29.00	-58.51	0.1892E+03	0.3071E+03	-71.11
41900.	21.00	38.00	-58.75	0.1883E+03	0.3060E+03	-71.30
42000.	19.69	29.00	-58.99	0.1874E+03	0.3048E+03	-71.49
42100.	20.01	35.00	-59.23	0.1865E+03	0.3037E+03	-9999.00
42200.	23.29	30.00	-59.47	0.1856E+03	0.3026E+03	-9999.00
42300.	22.64	27.00	-59.71	0.1847E+03	0.3014E+03	-9999.00
42400.	22.64	27.00	-59.95	0.1838E+03	0.3003E+03	-9999.00
42500.	21.00	20.00	-60.19	0.1829E+03	0.2992E+03	-9999.00
42600.	22.64	22.00	-60.43	0.1820E+03	0.2981E+03	-9999.00
42700.	16.40	6.00	-60.67	0.1811E+03	0.2970E+03	-9999.00
42800.	26.90	19.00	-60.91	0.1802E+03	0.2959E+03	-9999.00
42900.	22.31	14.00	-61.15	0.1794E+03	0.2947E+03	-9999.00
43000.	24.61	20.00	-61.39	0.1785E+03	0.2937E+03	-9999.00
43100.	27.89	18.00	-61.58	0.1776E+03	0.2925E+03	-9999.00
43200.	25.26	14.00	-61.77	0.1767E+03	0.2913E+03	-9999.00
43300.	24.28	11.00	-61.96	0.1759E+03	0.2901E+03	-9999.00
43400.	20.01	27.00	-62.15	0.1750E+03	0.2889E+03	-9999.00
43500.	17.39	28.00	-62.34	0.1741E+03	0.2878E+03	-9999.00
43600.	18.04	22.00	-62.53	0.1733E+03	0.2866E+03	-9999.00
43700.	16.73	41.00	-62.72	0.1724E+03	0.2855E+03	-9999.00
43800.	13.78	26.00	-62.91	0.1716E+03	0.2843E+03	-9999.00
43900.	14.44	18.00	-63.10	0.1707E+03	0.2832E+03	-9999.00
44000.	14.11	24.00	-63.29	0.1699E+03	0.2820E+03	-9999.00
44100.	8.53	39.00	-63.52	0.1691E+03	0.2810E+03	-9999.00
44200.	10.50	32.00	-63.75	0.1682E+03	0.2799E+03	-9999.00
44300.	8.53	45.00	-63.98	0.1674E+03	0.2788E+03	-9999.00
44400.	13.78	42.00	-64.21	0.1666E+03	0.2777E+03	-9999.00
44500.	8.20	39.00	-64.44	0.1657E+03	0.2767E+03	-9999.00
44600.	11.15	30.00	-64.67	0.1649E+03	0.2756E+03	-9999.00
44700.	8.20	31.00	-64.90	0.1641E+03	0.2745E+03	-9999.00
44800.	3.61	16.00	-65.13	0.1633E+03	0.2735E+03	-9999.00
44900.	1.97	348.00	-65.36	0.1625E+03	0.2724E+03	-9999.00

Table 5. STS-40 ascent atmospheric data profile (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
45000.	6.23	40.00	-65.59	0.1617E+03	0.2714E+03	-9999.00
45100.	10.50	54.00	-65.76	0.1609E+03	0.2703E+03	-9999.00
45200.	3.61	29.00	-65.93	0.1601E+03	0.2691E+03	-9999.00
45300.	5.58	62.00	-66.10	0.1593E+03	0.2680E+03	-9999.00
45400.	6.23	84.00	-66.27	0.1585E+03	0.2669E+03	-9999.00
45500.	3.28	77.00	-66.44	0.1577E+03	0.2658E+03	-9999.00
45600.	2.95	18.00	-66.61	0.1569E+03	0.2647E+03	-9999.00
45700.	6.23	15.00	-66.78	0.1561E+03	0.2636E+03	-9999.00
45800.	3.28	1.00	-66.95	0.1553E+03	0.2625E+03	-9999.00
45900.	6.56	321.00	-67.12	0.1546E+03	0.2614E+03	-9999.00
46000.	8.86	11.00	-67.29	0.1538E+03	0.2603E+03	-9999.00
46100.	7.22	3.00	-67.44	0.1530E+03	0.2592E+03	-9999.00
46200.	6.89	319.00	-67.59	0.1523E+03	0.2581E+03	-9999.00
46300.	10.50	332.00	-67.74	0.1515E+03	0.2570E+03	-9999.00
46400.	9.84	310.00	-67.89	0.1508E+03	0.2559E+03	-9999.00
46500.	9.51	284.00	-68.04	0.1500E+03	0.2548E+03	-9999.00
46600.	7.87	262.00	-68.19	0.1493E+03	0.2537E+03	-9999.00
46700.	8.20	269.00	-68.34	0.1485E+03	0.2526E+03	-9999.00
46800.	10.50	254.00	-68.49	0.1478E+03	0.2515E+03	-9999.00
46900.	14.44	252.00	-68.64	0.1470E+03	0.2505E+03	-9999.00
47000.	16.73	252.00	-68.79	0.1463E+03	0.2494E+03	-9999.00
47100.	14.44	242.00	-69.00	0.1456E+03	0.2484E+03	-9999.00
47200.	14.44	248.00	-69.21	0.1448E+03	0.2474E+03	-9999.00
47300.	15.75	245.00	-69.42	0.1441E+03	0.2464E+03	-9999.00
47400.	14.44	238.00	-69.63	0.1433E+03	0.2453E+03	-9999.00
47500.	15.09	233.00	-69.84	0.1426E+03	0.2443E+03	-9999.00
47600.	16.08	236.00	-70.05	0.1419E+03	0.2434E+03	-9999.00
47700.	15.09	245.00	-70.26	0.1412E+03	0.2424E+03	-9999.00
47800.	22.31	237.00	-70.47	0.1404E+03	0.2414E+03	-9999.00
47900.	26.57	236.00	-70.68	0.1397E+03	0.2404E+03	-9999.00
48000.	20.01	245.00	-70.89	0.1390E+03	0.2394E+03	-9999.00
48100.	24.28	248.00	-71.05	0.1383E+03	0.2384E+03	-9999.00
48200.	20.01	265.00	-71.21	0.1376E+03	0.2373E+03	-9999.00
48300.	22.97	257.00	-71.37	0.1369E+03	0.2363E+03	-9999.00
48400.	22.31	263.00	-71.53	0.1362E+03	0.2353E+03	-9999.00
48500.	21.00	271.00	-71.69	0.1355E+03	0.2342E+03	-9999.00
48600.	22.64	281.00	-71.85	0.1348E+03	0.2332E+03	-9999.00
48700.	25.92	292.00	-72.01	0.1341E+03	0.2322E+03	-9999.00
48800.	24.28	302.00	-72.17	0.1334E+03	0.2312E+03	-9999.00
48900.	28.22	289.00	-72.33	0.1327E+03	0.2302E+03	-9999.00
49000.	28.87	291.00	-72.49	0.1320E+03	0.2292E+03	-9999.00
49100.	28.54	308.00	-72.37	0.1313E+03	0.2279E+03	-9999.00
49200.	33.79	294.00	-72.25	0.1307E+03	0.2266E+03	-9999.00
49300.	36.75	299.00	-72.13	0.1300E+03	0.2253E+03	-9999.00
49400.	35.43	304.00	-72.01	0.1293E+03	0.2240E+03	-9999.00
49500.	35.76	308.00	-71.89	0.1287E+03	0.2227E+03	-9999.00
49600.	40.03	300.00	-71.77	0.1280E+03	0.2214E+03	-9999.00
49700.	37.07	315.00	-71.65	0.1273E+03	0.2202E+03	-9999.00
49800.	35.10	322.00	-71.53	0.1267E+03	0.2189E+03	-9999.00
49900.	30.84	324.00	-71.41	0.1260E+03	0.2177E+03	-9999.00

Table 5. STS-40 ascent atmospheric data profile (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
50000.	32.48	308.00	-71.29	0.1254E+03	0.2164E+03	-9999.00
50100.	30.18	321.00	-71.27	0.1248E+03	0.2153E+03	-9999.00
50200.	30.84	315.00	-71.25	0.1241E+03	0.2142E+03	-9999.00
50300.	31.50	309.00	-71.23	0.1235E+03	0.2131E+03	-9999.00
50400.	30.51	306.00	-71.21	0.1229E+03	0.2120E+03	-9999.00
50500.	30.51	304.00	-71.19	0.1223E+03	0.2109E+03	-9999.00
50600.	32.48	311.00	-71.17	0.1216E+03	0.2098E+03	-9999.00
50700.	28.87	305.00	-71.15	0.1210E+03	0.2087E+03	-9999.00
50800.	28.22	317.00	-71.13	0.1204E+03	0.2076E+03	-9999.00
50900.	26.90	313.00	-71.11	0.1198E+03	0.2066E+03	-9999.00
51000.	30.84	294.00	-71.09	0.1192E+03	0.2055E+03	-9999.00
51100.	29.53	292.00	-70.90	0.1186E+03	0.2043E+03	-9999.00
51200.	31.50	297.00	-70.71	0.1180E+03	0.2030E+03	-9999.00
51300.	34.12	305.00	-70.52	0.1174E+03	0.2018E+03	-9999.00
51400.	33.14	318.00	-70.33	0.1168E+03	0.2006E+03	-9999.00
51500.	39.70	314.00	-70.14	0.1162E+03	0.1993E+03	-9999.00
51600.	36.75	326.00	-69.95	0.1156E+03	0.1981E+03	-9999.00
51700.	35.10	322.00	-69.76	0.1150E+03	0.1969E+03	-9999.00
51800.	30.84	333.00	-69.57	0.1144E+03	0.1957E+03	-9999.00
51900.	26.90	333.00	-69.38	0.1138E+03	0.1945E+03	-9999.00
52000.	31.82	334.00	-69.19	0.1132E+03	0.1933E+03	-9999.00
52100.	32.81	343.00	-69.13	0.1126E+03	0.1923E+03	-9999.00
52200.	24.93	343.00	-69.07	0.1121E+03	0.1913E+03	-9999.00
52300.	23.62	344.00	-69.01	0.1115E+03	0.1903E+03	-9999.00
52400.	19.36	350.00	-68.95	0.1109E+03	0.1892E+03	-9999.00
52500.	17.39	354.00	-68.89	0.1104E+03	0.1882E+03	-9999.00
52600.	20.67	13.00	-68.83	0.1098E+03	0.1872E+03	-9999.00
52700.	6.89	338.00	-68.77	0.1093E+03	0.1862E+03	-9999.00
52800.	8.86	9.00	-68.71	0.1087E+03	0.1852E+03	-9999.00
52900.	4.27	11.00	-68.65	0.1081E+03	0.1842E+03	-9999.00
53000.	6.23	26.00	-68.59	0.1076E+03	0.1832E+03	-9999.00
53100.	7.22	56.00	-68.53	0.1071E+03	0.1823E+03	-9999.00
53200.	3.28	64.00	-68.47	0.1065E+03	0.1813E+03	-9999.00
53300.	5.91	201.00	-68.41	0.1060E+03	0.1803E+03	-9999.00
53400.	8.86	210.00	-68.35	0.1054E+03	0.1794E+03	-9999.00
53500.	9.51	204.00	-68.29	0.1049E+03	0.1784E+03	-9999.00
53600.	5.25	216.00	-68.23	0.1044E+03	0.1775E+03	-9999.00
53700.	3.61	229.00	-68.17	0.1039E+03	0.1765E+03	-9999.00
53800.	7.87	253.00	-68.11	0.1033E+03	0.1756E+03	-9999.00
53900.	14.76	241.00	-68.05	0.1028E+03	0.1746E+03	-9999.00
54000.	15.75	259.00	-67.99	0.1023E+03	0.1737E+03	-9999.00
54100.	15.09	259.00	-68.03	0.1018E+03	0.1729E+03	-9999.00
54200.	16.73	254.00	-68.07	0.1013E+03	0.1720E+03	-9999.00
54300.	12.14	248.00	-68.11	0.1008E+03	0.1712E+03	-9999.00
54400.	12.80	245.00	-68.15	0.1003E+03	0.1704E+03	-9999.00
54500.	11.15	241.00	-68.19	0.9977E+02	0.1696E+03	-9999.00
54600.	6.56	245.00	-68.23	0.9928E+02	0.1688E+03	-9999.00
54700.	3.61	279.00	-68.27	0.9878E+02	0.1680E+03	-9999.00
54800.	3.61	279.00	-68.31	0.9829E+02	0.1672E+03	-9999.00
54900.	8.86	231.00	-68.35	0.9780E+02	0.1664E+03	-9999.00

Table 5. STS-40 ascent atmospheric data profile (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
55000.	9.51	246.00	-68.39	0.9731E+02	0.1656E+03	-9999.00
56000.	8.86	223.00	-68.59	0.9251E+02	0.1575E+03	-9999.00
57000.	4.92	173.00	-67.89	0.8796E+02	0.1493E+03	-9999.00
58000.	2.95	55.00	-67.49	0.8365E+02	0.1417E+03	-9999.00
59000.	9.51	29.00	-66.89	0.7955E+02	0.1344E+03	-9999.00
60000.	10.83	44.00	-65.49	0.7567E+02	0.1269E+03	-9999.00
61000.	9.84	54.00	-63.49	0.7202E+02	0.1197E+03	-9999.00
62000.	11.15	74.00	-62.89	0.6856E+02	0.1136E+03	-9999.00
63000.	12.47	88.00	-61.39	0.6529E+02	0.1074E+03	-9999.00
64000.	9.19	64.00	-59.39	0.6220E+02	0.1014E+03	-9999.00
65000.	13.12	22.00	-59.19	0.5926E+02	0.9649E+02	-9999.00
66000.	13.78	22.00	-59.29	0.5647E+02	0.9199E+02	-9999.00
67000.	13.78	57.00	-56.89	0.5382E+02	0.8670E+02	-9999.00
68000.	30.84	65.00	-53.49	0.5133E+02	0.8141E+02	-9999.00
69000.	41.67	71.00	-54.99	0.4897E+02	0.7820E+02	-9999.00
70000.	44.29	81.00	-56.89	0.4670E+02	0.7523E+02	-9999.00
71000.	44.29	89.00	-56.19	0.4452E+02	0.7148E+02	-9999.00
72000.	43.31	90.00	-55.09	0.4246E+02	0.6783E+02	-9999.00
73000.	40.35	97.00	-55.09	0.4050E+02	0.6470E+02	-9999.00
74000.	36.75	101.00	-54.89	0.3863E+02	0.6166E+02	-9999.00
75000.	33.14	111.00	-53.09	0.3685E+02	0.5834E+02	-9999.00
76000.	30.51	112.00	-51.89	0.3517E+02	0.5537E+02	-9999.00
77000.	30.84	99.00	-51.79	0.3357E+02	0.5283E+02	-9999.00
78000.	29.20	94.00	-49.89	0.3205E+02	0.5001E+02	-9999.00
79000.	26.57	108.00	-50.09	0.3060E+02	0.4779E+02	-9999.00
80000.	24.93	110.00	-50.29	0.2922E+02	0.4568E+02	-9999.00
81000.	27.23	104.00	-50.19	0.2789E+02	0.4358E+02	-9999.00
82000.	27.89	93.00	-49.29	0.2664E+02	0.4146E+02	-9999.00
83000.	29.86	83.00	-47.99	0.2544E+02	0.3936E+02	-9999.00
84000.	28.67	80.00	-49.99	0.2377E+02	0.3711E+02	-9999.00
85000.	28.67	77.00	-50.26	0.2269E+02	0.3546E+02	-9999.00
86000.	27.00	71.00	-49.99	0.2167E+02	0.3383E+02	-9999.00
87000.	27.00	64.00	-49.44	0.2069E+02	0.3222E+02	-9999.00
88000.	30.38	58.00	-48.84	0.1976E+02	0.3069E+02	-9999.00
89000.	37.14	61.00	-48.24	0.1888E+02	0.2924E+02	-9999.00
90000.	42.19	69.00	-48.05	0.1803E+02	0.2790E+02	-9999.00
91000.	40.52	75.00	-48.08	0.1722E+02	0.2665E+02	-9999.00
92000.	40.52	81.00	-48.13	0.1645E+02	0.2547E+02	-9999.00
93000.	42.19	87.00	-48.18	0.1572E+02	0.2434E+02	-9999.00
94000.	42.19	89.00	-47.32	0.1502E+02	0.2317E+02	-9999.00
95000.	42.19	88.00	-46.39	0.1435E+02	0.2205E+02	-9999.00
96000.	40.52	84.00	-45.44	0.1371E+02	0.2097E+02	-9999.00
97000.	38.81	80.00	-44.44	0.1311E+02	0.1997E+02	-9999.00
98000.	37.14	82.00	-43.41	0.1253E+02	0.1900E+02	-9999.00
99000.	37.14	89.00	-42.40	0.1198E+02	0.1809E+02	-9999.00
100000.	37.14	102.00	-39.34	0.1146E+02	0.1707E+02	-9999.00
101000.	40.52	114.00	-39.15	0.1097E+02	0.1633E+02	-9999.00
102000.	42.19	122.00	-39.28	0.1050E+02	0.1564E+02	-9999.00
103000.	40.52	125.00	-39.42	0.1005E+02	0.1498E+02	-9999.00
104000.	37.14	123.00	-39.53	0.9614E+01	0.1434E+02	-9999.00

Table 5. STS-40 ascent atmospheric data profile (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
105000.	33.76	119.00	-39.65	0.9199E+01	0.1372E+02	-9999.00
106000.	32.05	116.00	-39.78	0.8803E+01	0.1314E+02	-9999.00
107000.	30.38	113.00	-39.89	0.8423E+01	0.1258E+02	-9999.00
108000.	28.67	110.00	-39.73	0.8060E+01	0.1203E+02	-9999.00
109000.	27.00	100.00	-38.95	0.7713E+01	0.1147E+02	-9999.00
110000.	27.00	86.00	-38.10	0.7382E+01	0.1094E+02	-9999.00
111000.	28.67	72.00	-36.45	0.7067E+01	0.1040E+02	-9999.00
112000.	33.76	53.00	-36.46	0.6767E+01	0.9960E+01	-9999.00
113000.	38.81	44.00	-36.84	0.6479E+01	0.9551E+01	-9999.00
114000.	38.81	46.00	-35.89	0.6204E+01	0.9109E+01	-9999.00
115000.	43.86	55.00	-34.92	0.5941E+01	0.8688E+01	-9999.00
116000.	52.33	66.00	-33.95	0.5691E+01	0.8288E+01	-9999.00
117000.	59.06	75.00	-33.02	0.5452E+01	0.7909E+01	-9999.00
118000.	57.38	86.00	-32.13	0.5224E+01	0.7551E+01	-9999.00
119000.	50.62	105.00	-29.80	0.5007E+01	0.7168E+01	-9999.00
120000.	45.57	126.00	-27.06	0.4801E+01	0.6796E+01	-9999.00
121000.	42.19	133.00	-25.12	0.4606E+01	0.6469E+01	-9999.00
122000.	38.81	117.00	-24.55	0.4419E+01	0.6192E+01	-9999.00
123000.	47.24	98.00	-24.03	0.4240E+01	0.5929E+01	-9999.00
124000.	52.33	93.00	-23.55	0.4069E+01	0.5679E+01	-9999.00
125000.	52.33	94.00	-23.15	0.3905E+01	0.5442E+01	-9999.00
126000.	48.95	95.00	-22.57	0.3748E+01	0.5211E+01	-9999.00
127000.	48.95	93.00	-21.51	0.3598E+01	0.4981E+01	-9999.00
128000.	52.33	91.00	-20.30	0.3455E+01	0.4760E+01	-9999.00
129000.	59.06	92.00	-19.10	0.3318E+01	0.4550E+01	-9999.00
130000.	64.14	94.00	-17.89	0.3187E+01	0.4349E+01	-9999.00
131000.	64.14	95.00	-17.10	0.3061E+01	0.4165E+01	-9999.00
132000.	62.43	96.00	-16.74	0.2941E+01	0.3996E+01	-9999.00
133000.	64.14	99.00	-16.41	0.2826E+01	0.3835E+01	-9999.00
134000.	67.52	104.00	-16.08	0.2715E+01	0.3679E+01	-9999.00
135000.	69.19	108.00	-15.78	0.2609E+01	0.3531E+01	-9999.00
136000.	70.87	108.00	-15.46	0.2507E+01	0.3389E+01	-9999.00
137000.	72.57	106.00	-15.15	0.2409E+01	0.3253E+01	-9999.00
138000.	70.87	100.00	-14.89	0.2315E+01	0.3123E+01	-9999.00
139000.	70.87	92.00	-14.70	0.2225E+01	0.2999E+01	-9999.00
140000.	74.25	86.00	-12.27	0.2139E+01	0.2856E+01	-9999.00
141000.	79.33	85.00	-11.45	0.2057E+01	0.2738E+01	-9999.00
142000.	84.38	85.00	-11.06	0.1978E+01	0.2629E+01	-9999.00
143000.	87.76	87.00	-10.75	0.1902E+01	0.2525E+01	-9999.00
144000.	92.81	88.00	-10.69	0.1829E+01	0.2428E+01	-9999.00
145000.	99.57	91.00	-11.03	0.1759E+01	0.2338E+01	-9999.00
146000.	109.71	86.00	-10.36	0.1692E+01	0.2243E+01	-9999.00
147000.	118.14	80.00	-8.67	0.1627E+01	0.2143E+01	-9999.00
148000.	111.38	83.00	-8.34	0.1565E+01	0.2059E+01	-9999.00
149000.	106.33	87.00	-8.41	0.1506E+01	0.1982E+01	-9999.00
150000.	111.38	88.00	-8.30	0.1449E+01	0.1906E+01	-9999.00
151000.	114.76	92.00	-7.93	0.1394E+01	0.1831E+01	-9999.00
152000.	114.76	95.00	-7.56	0.1341E+01	0.1759E+01	-9999.00
153000.	114.76	100.00	-7.17	0.1290E+01	0.1690E+01	-9999.00
154000.	113.06	106.00	-6.78	0.1242E+01	0.1624E+01	-9999.00

Table 5. STS-40 ascent atmospheric data profile (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
155000.	111.38	104.00	-6.45	0.1195E+01	0.1561E+01	-9999.00
156000.	116.44	98.00	-6.05	0.1150E+01	0.1500E+01	-9999.00
157000.	116.44	98.00	-5.67	0.1107E+01	0.1442E+01	-9999.00
158000.	111.38	101.00	-5.34	0.1065E+01	0.1385E+01	-9999.00
159000.	119.82	96.00	-5.08	0.1025E+01	0.1332E+01	-9999.00
160000.	136.71	93.00	-5.90	0.9869E+00	0.1286E+01	-9999.00
161000.	156.96	100.00	-6.87	0.9498E+00	0.1243E+01	-9999.00
162000.	170.44	105.00	-7.82	0.9139E+00	0.1200E+01	-9999.00
163000.	163.71	107.00	-8.00	0.8793E+00	0.1155E+01	-9999.00
164000.	156.96	107.00	-7.98	0.8460E+00	0.1111E+01	-9999.00
165000.	167.09	109.00	-7.89	0.8140E+00	0.1069E+01	-9999.00
166000.	173.82	110.00	-7.75	0.7832E+00	0.1028E+01	-9999.00
167000.	170.44	111.00	-7.67	0.7536E+00	0.9889E+00	-9999.00
168000.	170.44	111.00	-7.63	0.7251E+00	0.9513E+00	-9999.00
169000.	160.33	109.00	-7.58	0.6978E+00	0.9154E+00	-9999.00
170000.	143.44	106.00	-7.50	0.6714E+00	0.8805E+00	-9999.00
171000.	138.39	104.00	-7.49	0.6461E+00	0.8473E+00	-9999.00
172000.	141.77	102.00	-7.44	0.6217E+00	0.8151E+00	-9999.00
173000.	140.09	99.00	-7.36	0.5982E+00	0.7841E+00	-9999.00
174000.	140.09	96.00	-7.41	0.5756E+00	0.7546E+00	-9999.00
175000.	150.20	100.00	-7.36	0.5539E+00	0.7260E+00	-9999.00
176000.	162.01	105.00	-6.92	0.5330E+00	0.6974E+00	-9999.00
177000.	151.90	107.00	-6.33	0.5130E+00	0.6698E+00	-9999.00
178000.	135.01	104.00	-5.89	0.4937E+00	0.6435E+00	-9999.00
179000.	123.20	103.00	-5.34	0.4752E+00	0.6181E+00	-9999.00
180000.	133.33	109.00	-4.79	0.4575E+00	0.5939E+00	-9999.00
181000.	146.82	117.00	-5.27	0.4404E+00	0.5727E+00	-9999.00
182000.	150.20	125.00	-5.97	0.4239E+00	0.5527E+00	-9999.00
183000.	140.09	130.00	-6.46	0.4080E+00	0.5330E+00	-9999.00
184000.	124.90	135.00	-7.88	0.3926E+00	0.5156E+00	-9999.00
185000.	108.01	138.00	-9.54	0.3777E+00	0.4991E+00	-9999.00
186000.	96.19	136.00	-11.15	0.3633E+00	0.4831E+00	-9999.00
187000.	86.06	129.00	-12.80	0.3494E+00	0.4675E+00	-9999.00
188000.	75.95	116.00	-14.42	0.3359E+00	0.4523E+00	-9999.00
189000.	75.95	95.00	-16.00	0.3229E+00	0.4374E+00	-9999.00
190000.	86.06	79.00	-17.46	0.3103E+00	0.4228E+00	-9999.00
191000.	101.25	70.00	-19.08	0.2981E+00	0.4087E+00	-9999.00
192000.	116.44	69.00	-20.59	0.2864E+00	0.3950E+00	-9999.00
193000.	124.90	74.00	-22.28	0.2750E+00	0.3819E+00	-9999.00
194000.	126.57	80.00	-23.78	0.2640E+00	0.3688E+00	-9999.00
195000.	133.33	88.00	-24.55	0.2534E+00	0.3551E+00	-9999.00
196000.	145.14	95.00	-25.17	0.2432E+00	0.3417E+00	-9999.00
197000.	156.96	99.00	-25.88	0.2334E+00	0.3288E+00	-9999.00
198000.	163.71	102.00	-26.77	0.2239E+00	0.3166E+00	-9999.00
199000.	162.01	106.00	-27.47	0.2148E+00	0.3046E+00	-9999.00
200000.	150.20	109.00	-28.15	0.2061E+00	0.2931E+00	-9999.00
201000.	136.71	111.00	-29.07	0.1977E+00	0.2822E+00	-9999.00
202000.	124.90	113.00	-30.23	0.1896E+00	0.2719E+00	-9999.00
203000.	116.44	114.00	-30.68	0.1818E+00	0.2612E+00	-9999.00
204000.	111.38	112.00	-31.13	0.1743E+00	0.2509E+00	-9999.00

Table 5. STS-40 ascent atmospheric data profile (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
205000.	101.25	109.00	-31.12	0.1671E+00	0.2405E+00	-9999.00
206000.	89.44	104.00	-31.13	0.1602E+00	0.2306E+00	-9999.00
207000.	87.76	98.00	-31.73	0.1536E+00	0.2216E+00	-9999.00
208000.	92.81	90.00	-31.76	0.1473E+00	0.2126E+00	-9999.00
209000.	108.01	83.00	-31.68	0.1412E+00	0.2037E+00	-9999.00
210000.	124.90	79.00	-32.36	0.1353E+00	0.1957E+00	-9999.00
211000.	141.77	79.00	-32.58	0.1297E+00	0.1878E+00	-9999.00
212000.	153.58	80.00	-32.66	0.1243E+00	0.1801E+00	-9999.00
213000.	158.63	83.00	-33.22	0.1192E+00	0.1731E+00	-9999.00
214000.	160.33	85.00	-34.09	0.1142E+00	0.1664E+00	-9999.00
215000.	160.33	87.00	-34.34	0.1095E+00	0.1597E+00	-9999.00
216000.	155.25	90.00	-40.15	0.9750E-01	0.1458E+00	-9999.00
217000.	156.96	93.00	-40.15	0.9330E-01	0.1395E+00	-9999.00
218000.	158.63	97.00	-40.15	0.8940E-01	0.1337E+00	-9999.00
219000.	158.63	102.00	-40.15	0.8550E-01	0.1278E+00	-9999.00
220000.	156.96	106.00	-41.15	0.8190E-01	0.1230E+00	-9999.00
221000.	156.96	109.00	-45.54	0.7840E-01	0.1200E+00	-9999.00
222000.	155.25	111.00	-50.13	0.7490E-01	0.1170E+00	-9999.00
223000.	153.58	113.00	-54.71	0.7150E-01	0.1140E+00	-9999.00
224000.	151.90	113.00	-57.90	0.6830E-01	0.1105E+00	-9999.00
225000.	150.20	112.00	-60.95	0.6510E-01	0.1069E+00	-9999.00
226000.	150.20	110.00	-62.94	0.6200E-01	0.1027E+00	-9999.00
227000.	150.20	107.00	-64.10	0.5890E-01	0.9815E-01	-9999.00
228000.	151.90	103.00	-64.15	0.5610E-01	0.9351E-01	-9999.00
229000.	153.58	98.00	-65.15	0.5340E-01	0.8944E-01	-9999.00
230000.	158.63	93.00	-67.67	0.5090E-01	0.8630E-01	-9999.00
231000.	162.01	89.00	-69.24	0.4850E-01	0.8286E-01	-9999.00
232000.	167.09	85.00	-72.42	0.4610E-01	0.8001E-01	-9999.00
233000.	170.44	81.00	-75.15	0.4380E-01	0.7706E-01	-9999.00
234000.	173.82	77.00	-75.77	0.4160E-01	0.7342E-01	-9999.00
235000.	178.90	74.00	-77.46	0.3950E-01	0.7032E-01	-9999.00
236000.	182.28	70.00	-78.61	0.3750E-01	0.6722E-01	-9999.00
237000.	183.96	67.00	-80.15	0.3560E-01	0.6426E-01	-9999.00
238000.	183.96	65.00	-80.15	0.3380E-01	0.6101E-01	-9999.00
239000.	183.96	62.00	-80.15	0.3200E-01	0.5776E-01	-9999.00
240000.	183.96	59.00	-80.15	0.3040E-01	0.5487E-01	-9999.00
241000.	180.58	56.00	-81.15	0.2880E-01	0.5226E-01	-9999.00
242000.	177.20	53.00	-81.43	0.2740E-01	0.4979E-01	-9999.00
243000.	173.82	50.00	-80.59	0.2600E-01	0.4704E-01	-9999.00
244000.	168.77	47.00	-79.29	0.2470E-01	0.4439E-01	-9999.00
245000.	165.39	43.00	-77.77	0.2340E-01	0.4172E-01	-9999.00
246000.	160.33	39.00	-77.15	0.2220E-01	0.3946E-01	-9999.00
247000.	155.25	35.00	-76.15	0.2110E-01	0.3731E-01	-9999.00
248000.	150.20	31.00	-76.15	0.2010E-01	0.3554E-01	-9999.00
249000.	146.82	26.00	-76.15	0.1910E-01	0.3378E-01	-9999.00
250000.	143.44	22.00	-76.15	0.1810E-01	0.3201E-01	-9999.00
251000.	140.09	17.00	-76.15	0.1720E-01	0.3042E-01	-9999.00
252000.	138.39	12.00	-76.15	0.1630E-01	0.2882E-01	-9999.00
253000.	136.71	6.00	-76.15	0.1550E-01	0.2741E-01	-9999.00
254000.	135.01	1.00	-76.25	0.1470E-01	0.2601E-01	-9999.00

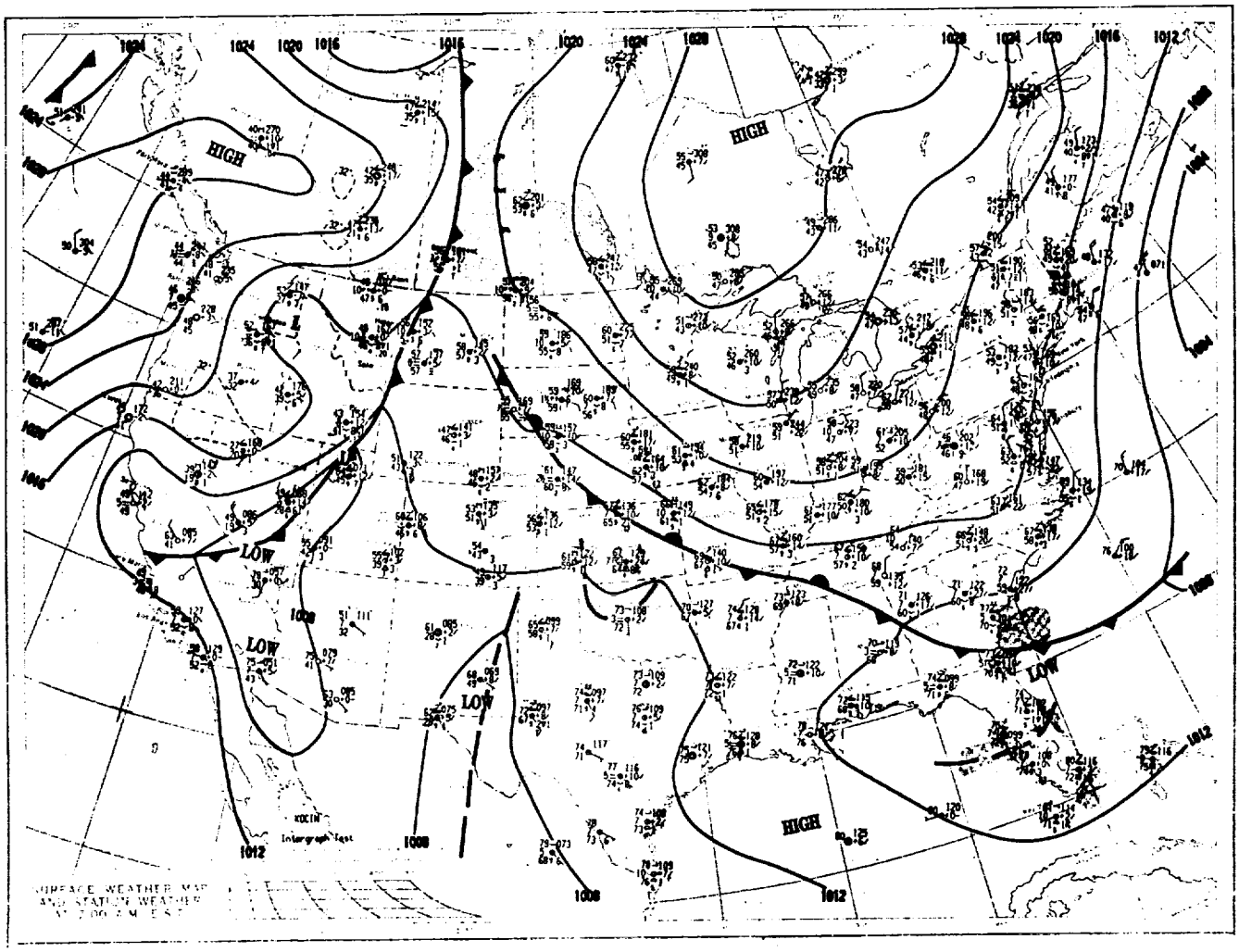
Table 5. STS-40 ascent atmospheric data profile (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
255000.	135.01	356.00	-77.15	0.1400E-01	0.2488E-01	-9999.00
256000.	138.39	351.00	-78.29	0.1330E-01	0.2378E-01	-9999.00
257000.	140.09	346.00	-79.15	0.1260E-01	0.2263E-01	-9999.00
258000.	143.44	341.00	-80.15	0.1200E-01	0.2166E-01	-9999.00
259000.	146.82	337.00	-80.87	0.1140E-01	0.2065E-01	-9999.00
260000.	150.20	333.00	-82.15	0.1080E-01	0.1970E-01	-9999.00
261000.	155.25	329.00	-82.91	0.1020E-01	0.1868E-01	-9999.00
262000.	158.63	326.00	-84.44	0.9700E-02	0.1791E-01	-9999.00
263000.	163.71	322.00	-85.96	0.9200E-02	0.1712E-01	-9999.00
264000.	167.09	319.00	-86.49	0.8700E-02	0.1624E-01	-9999.00
265000.	170.44	317.00	-87.95	0.8200E-02	0.1542E-01	-9999.00
266000.	175.52	314.00	-88.53	0.7800E-02	0.1472E-01	-9999.00
267000.	178.90	312.00	-89.98	0.7400E-02	0.1407E-01	-9999.00
268000.	180.58	310.00	-90.58	0.7000E-02	0.1336E-01	-9999.00
269000.	183.96	308.00	-92.15	0.6600E-02	0.1270E-01	-9999.00
270000.	185.63	306.00	-93.15	0.6200E-02	0.1200E-01	-9999.00
271000.	189.01	305.00	-94.15	0.5900E-02	0.1148E-01	-9999.00
272000.	190.72	303.00	-95.68	0.5600E-02	0.1099E-01	-9999.00
273000.	190.72	302.00	-97.20	0.5300E-02	0.1049E-01	-9999.00
274000.	192.39	301.00	-98.73	0.5000E-02	0.9986E-02	-9999.00
275000.	194.09	300.00	-100.15	0.4700E-02	0.9464E-02	-9999.00
276000.	195.77	299.00	-101.15	0.4400E-02	0.8912E-02	-9999.00
277000.	195.77	298.00	-102.15	0.4200E-02	0.8556E-02	-9999.00
278000.	195.77	297.00	-102.82	0.3900E-02	0.7976E-02	-9999.00
279000.	197.44	296.00	-103.15	0.3700E-02	0.7582E-02	-9999.00
280000.	195.77	296.00	-103.15	0.3500E-02	0.7172E-02	-9999.00
281000.	195.77	295.00	-103.15	0.3300E-02	0.6762E-02	-9999.00
282000.	194.09	295.00	-103.15	0.3100E-02	0.6353E-02	-9999.00
283000.	192.01	294.06	-102.49	0.2961E-02	0.6044E-02	-9999.00
286000.	186.09	291.12	-100.50	0.2580E-02	0.5206E-02	-9999.00
289000.	180.70	287.99	-98.50	0.2249E-02	0.4485E-02	-9999.00
292000.	175.88	284.68	-96.51	0.1959E-02	0.3865E-02	-9999.00
295000.	171.67	281.19	-94.52	0.1708E-02	0.3330E-02	-9999.00
298000.	168.14	277.55	-92.53	0.1488E-02	0.2870E-02	-9999.00
301000.	165.31	273.76	-90.54	0.1297E-02	0.2474E-02	-9999.00
304000.	163.22	269.86	-88.55	0.1130E-02	0.2132E-02	-9999.00
307000.	211.33	269.41	-87.12	0.9580E-03	0.1794E-02	-9999.00
310000.	257.93	269.18	-85.68	0.8120E-03	0.1509E-02	-9999.00
313000.	285.67	269.10	-83.85	0.6910E-03	0.1272E-02	-9999.00
316000.	291.70	269.08	-81.51	0.5930E-03	0.1078E-02	-9999.00
319000.	290.29	269.06	-79.17	0.5090E-03	0.9141E-03	-9999.00
322000.	278.48	269.03	-76.83	0.4360E-03	0.7737E-03	-9999.00
325000.	252.57	268.98	-74.48	0.3740E-03	0.6558E-03	-9999.00
328000.	207.65	268.89	-72.14	0.3210E-03	0.5563E-03	-9999.00
331000.	210.05	268.88	-67.96	0.2790E-03	0.4737E-03	-9999.00
334000.	209.14	268.77	-63.71	0.2420E-03	0.4025E-03	-9999.00
337000.	201.14	268.62	-59.47	0.2100E-03	0.3424E-03	-9999.00
340000.	183.60	268.38	-55.23	0.1820E-03	0.2909E-03	-9999.00
343000.	153.35	267.94	-50.99	0.1580E-03	0.2478E-03	-9999.00
346000.	133.44	268.11	-45.14	0.1380E-03	0.2108E-03	-9999.00

Table 5. STS-40 ascent atmospheric data profile (continued).

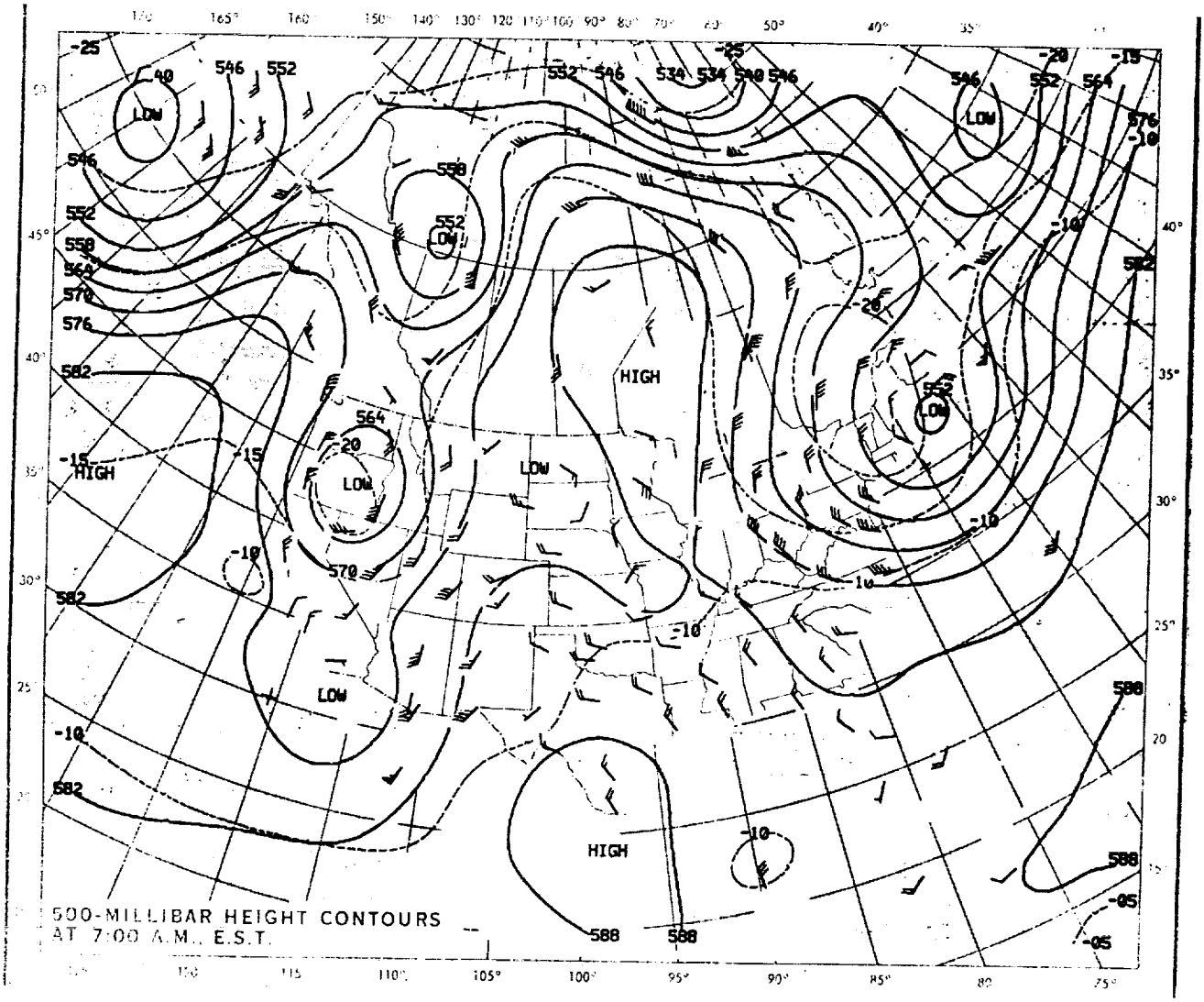
ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
349000.	133.52	267.61	-37.71	0.1230E-03	0.1820E-03	-9999.00
352000.	129.95	266.90	-30.27	0.1090E-03	0.1563E-03	-9999.00
355000.	121.58	265.85	-22.84	0.9670E-04	0.1346E-03	-9999.00
358000.	106.92	264.14	-15.41	0.8570E-04	0.1158E-03	-9999.00
361000.	84.52	265.19	-7.85	0.7590E-04	0.9967E-04	-9999.00
364000.	85.35	263.56	3.15	0.6920E-04	0.8725E-04	-9999.00
367000.	84.71	261.42	14.14	0.6290E-04	0.7627E-04	-9999.00
370000.	82.23	258.49	25.13	0.5720E-04	0.6681E-04	-9999.00
373000.	77.56	254.32	36.13	0.5180E-04	0.5835E-04	-9999.00
376000.	70.51	247.89	47.12	0.4700E-04	0.5112E-04	-9999.00
379000.	60.68	255.31	58.77	0.4290E-04	0.4503E-04	-9999.00
382000.	58.93	253.04	71.20	0.3950E-04	0.3996E-04	-9999.00
385000.	57.34	250.55	83.99	0.3650E-04	0.3560E-04	-9999.00
388000.	55.90	247.83	97.10	0.3380E-04	0.3180E-04	-9999.00
391000.	54.60	244.82	110.51	0.3140E-04	0.2851E-04	-9999.00
394000.	53.44	241.55	124.18	0.2930E-04	0.2569E-04	-9999.00
397000.	52.45	238.01	138.08	0.2740E-04	0.2321E-04	-9999.00
400000.	51.66	234.20	152.17	0.2560E-04	0.2097E-04	-9999.00

WEDNESDAY, JUNE 5, 1991



Surface synoptic map at 1200 u.t. June 5, 1991—isobaric, frontal, and precipitation patterns are shown in standard symbolic form.

Figure 1. Surface synoptic chart 1 h 25 min before the launch of STS-40.



500-mb height
Contours at 1200 u.t.
June 5, 1991
Continuous lines indicate height contours at feet above sea level.
Dashed lines are isotherms in degrees centigrade. Arrows show wind direction and speed at the 500-mb level.

Figure 2. 500-mb map 1 h 25 min before the launch of STS-40.

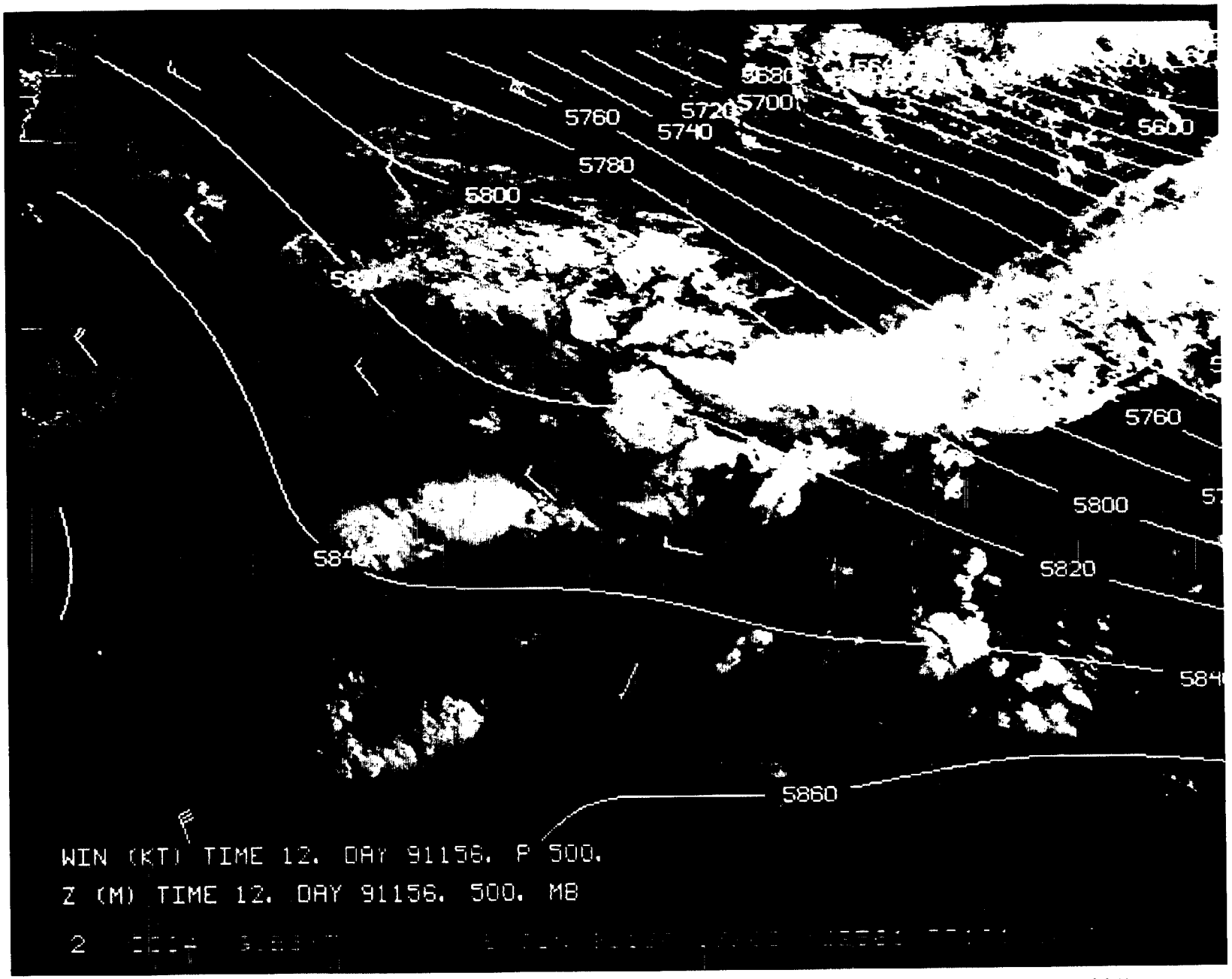


Figure 3. GOES-7 visible imagery of cloud cover 1 min after the launch of STS-40 (1326 u.t., June 5, 1991). 500-mb heights (meters) and wind barbs are also included for 1200 u.t.

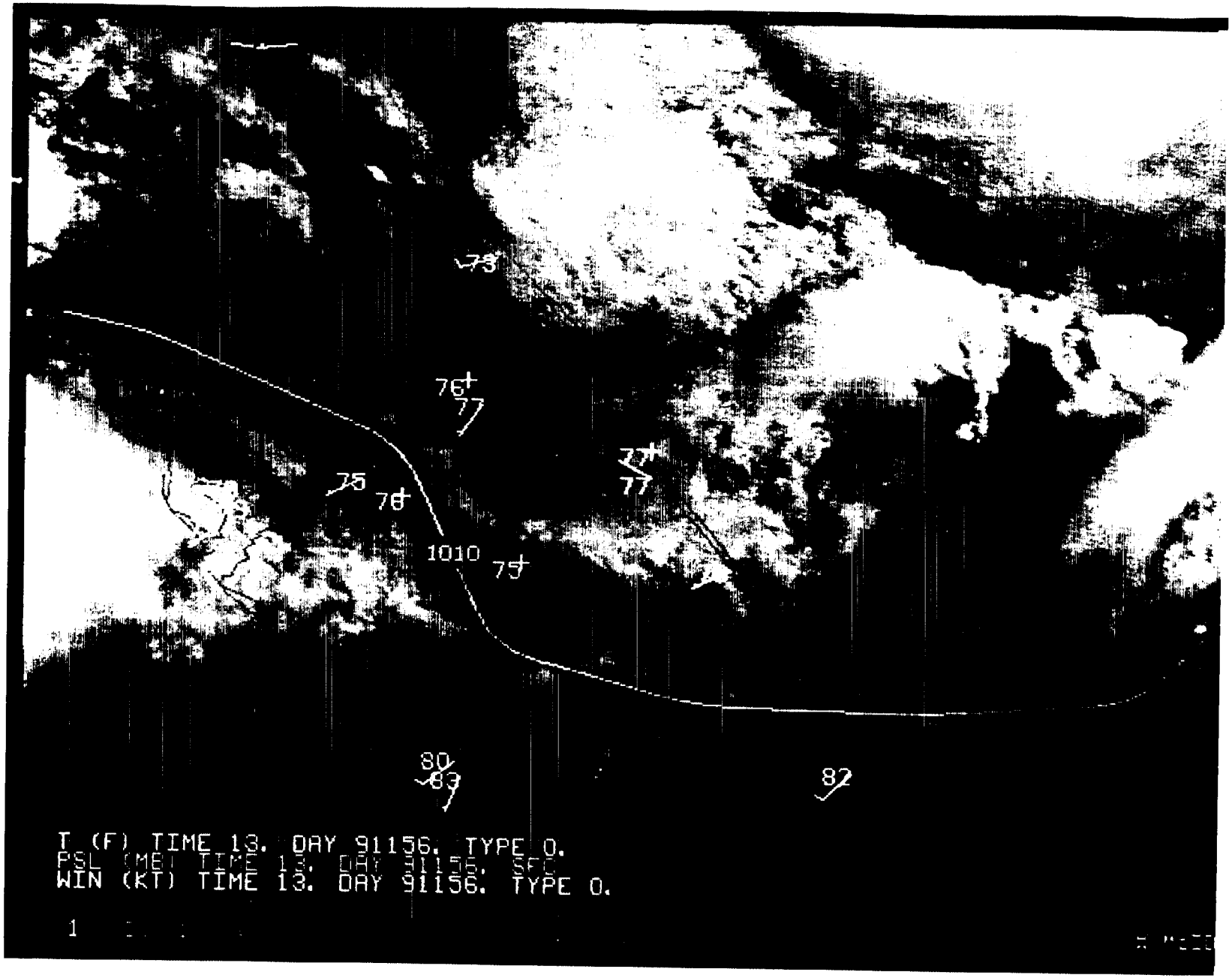


Figure 4. Enlarged view of GOES-7 visible imagery of cloud cover taken 1 min after the launch of STS-40 (1326 u.t., June 5, 1991). Surface temperatures, isobaric parameters, and wind barbs for 1300 u.t. are also included.

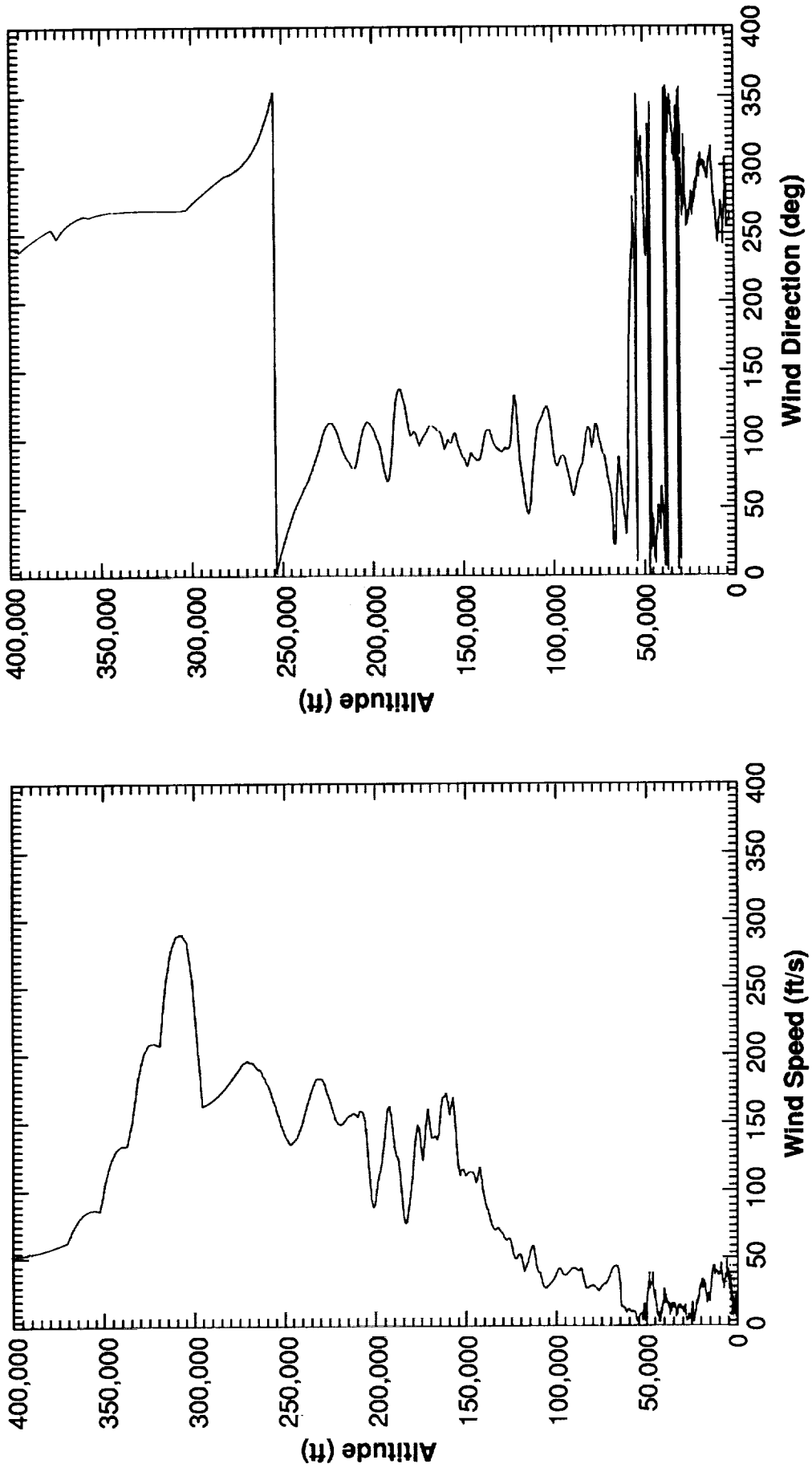


Figure 5. Scalar wind speed and direction at launch time of STS-40.

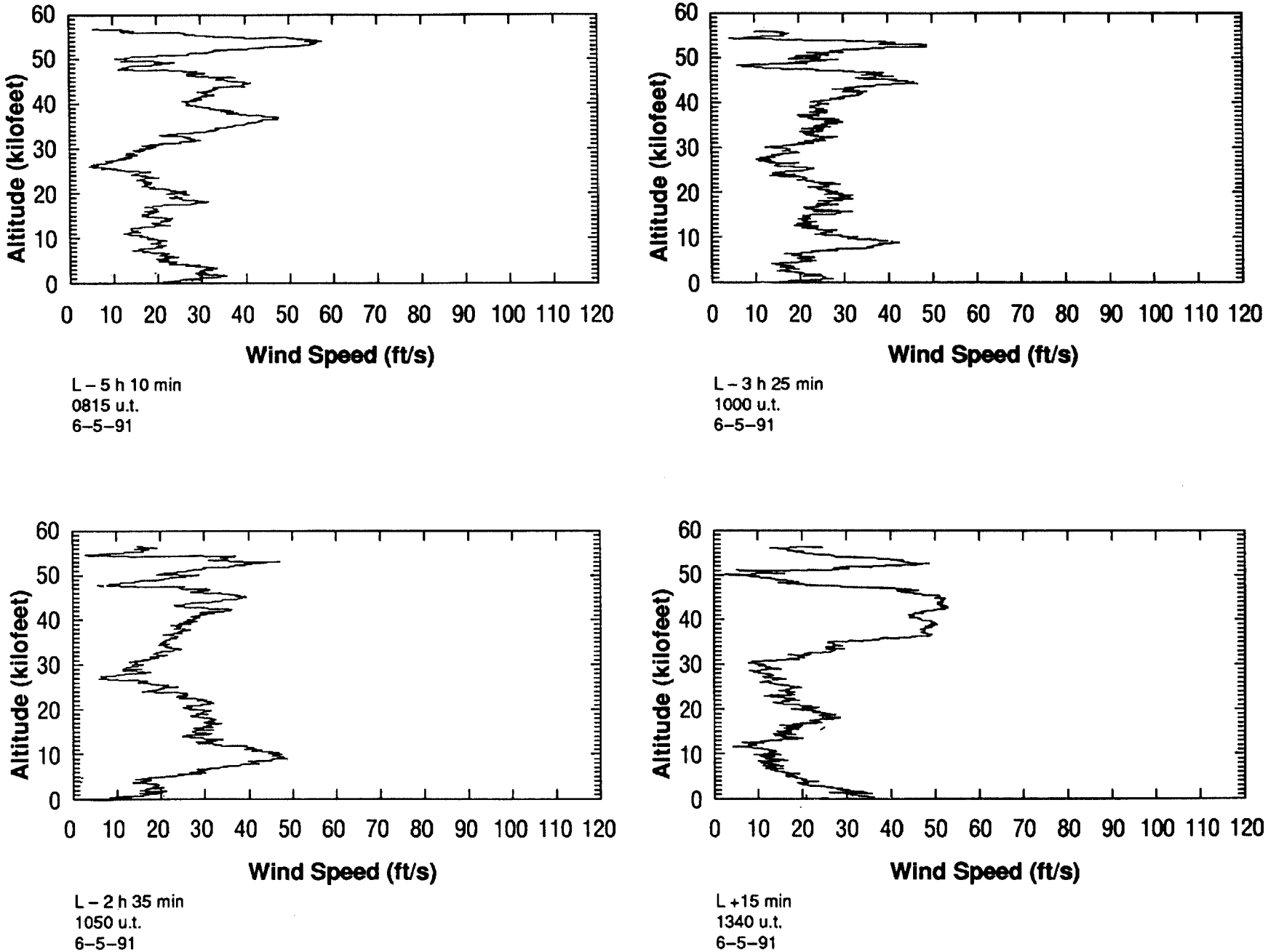


Figure 6. STS-40 prelaunch/launch Jimsphere-measured wind speeds (ft/s).

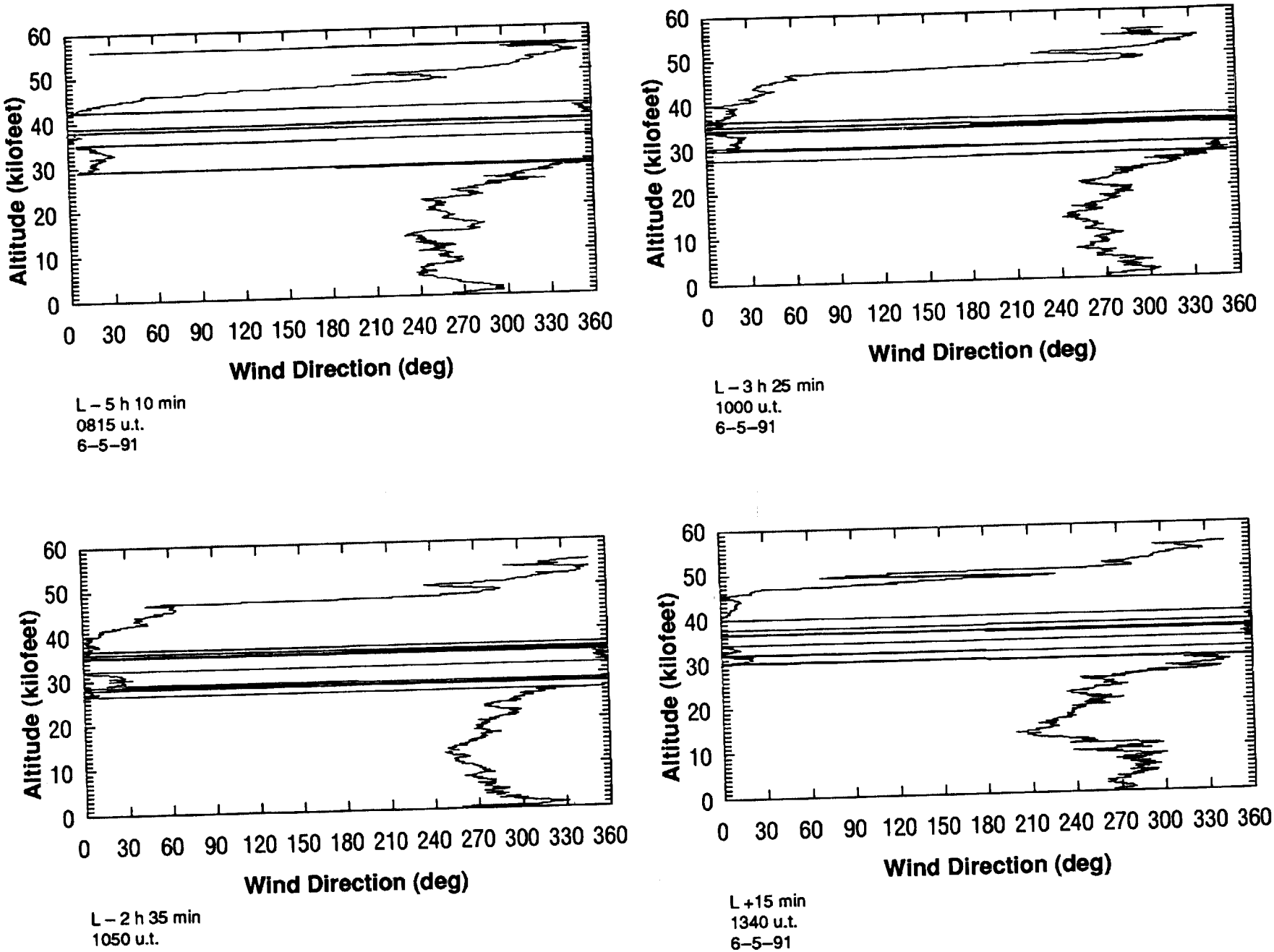


Figure 7. STS-40 prelaunch/launch Jimsphere-measured wind directions (degrees).

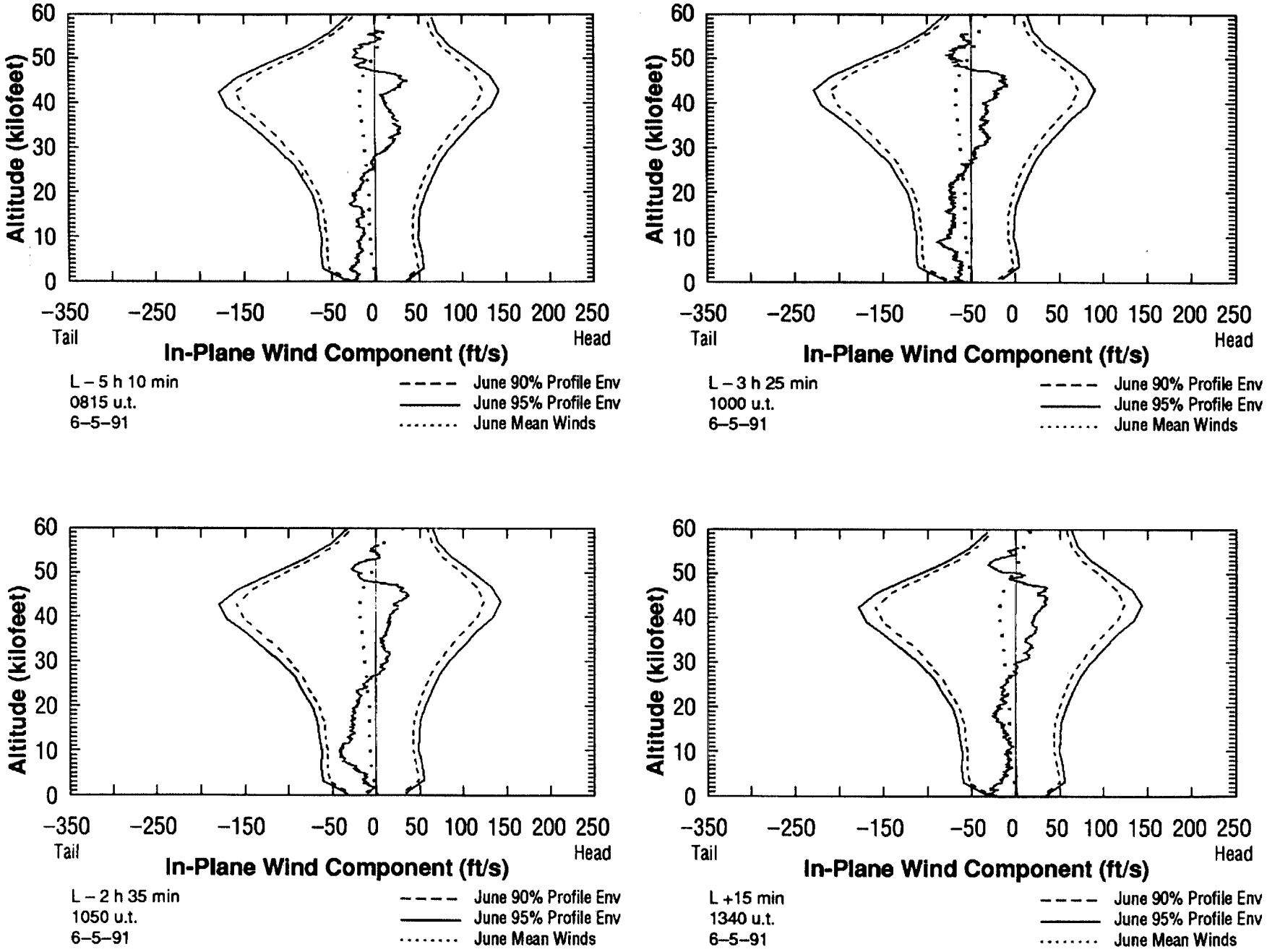


Figure 8. STS-40 prelaunch/launch Jimsphere-measured in-plane component winds (ft/s). Flight azimuth = 62°.

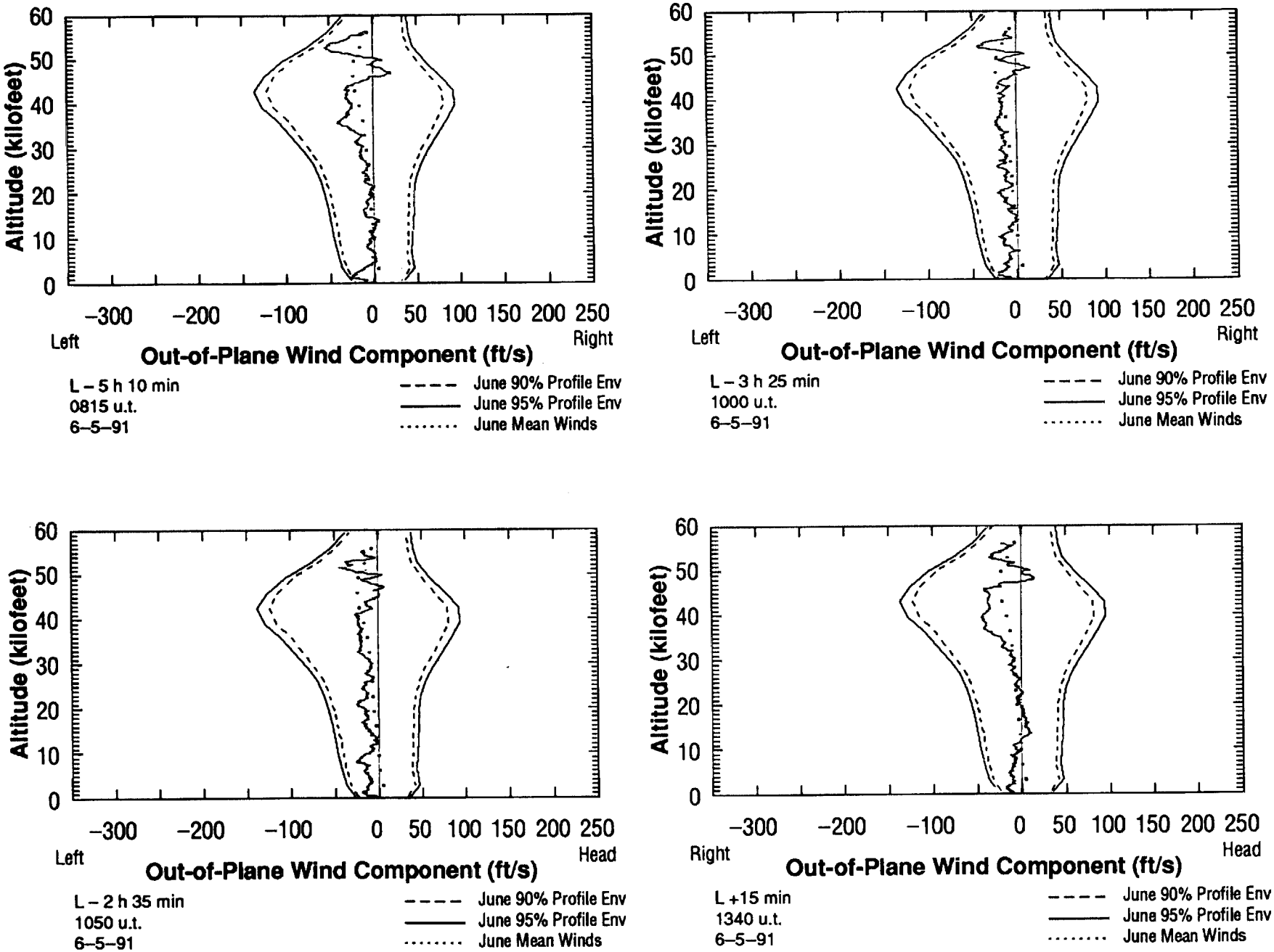


Figure 9. STS-40 prelaunch/launch Jimsphere-measured out-of-plane component winds (ft/s). Flight azimuth = 62°.

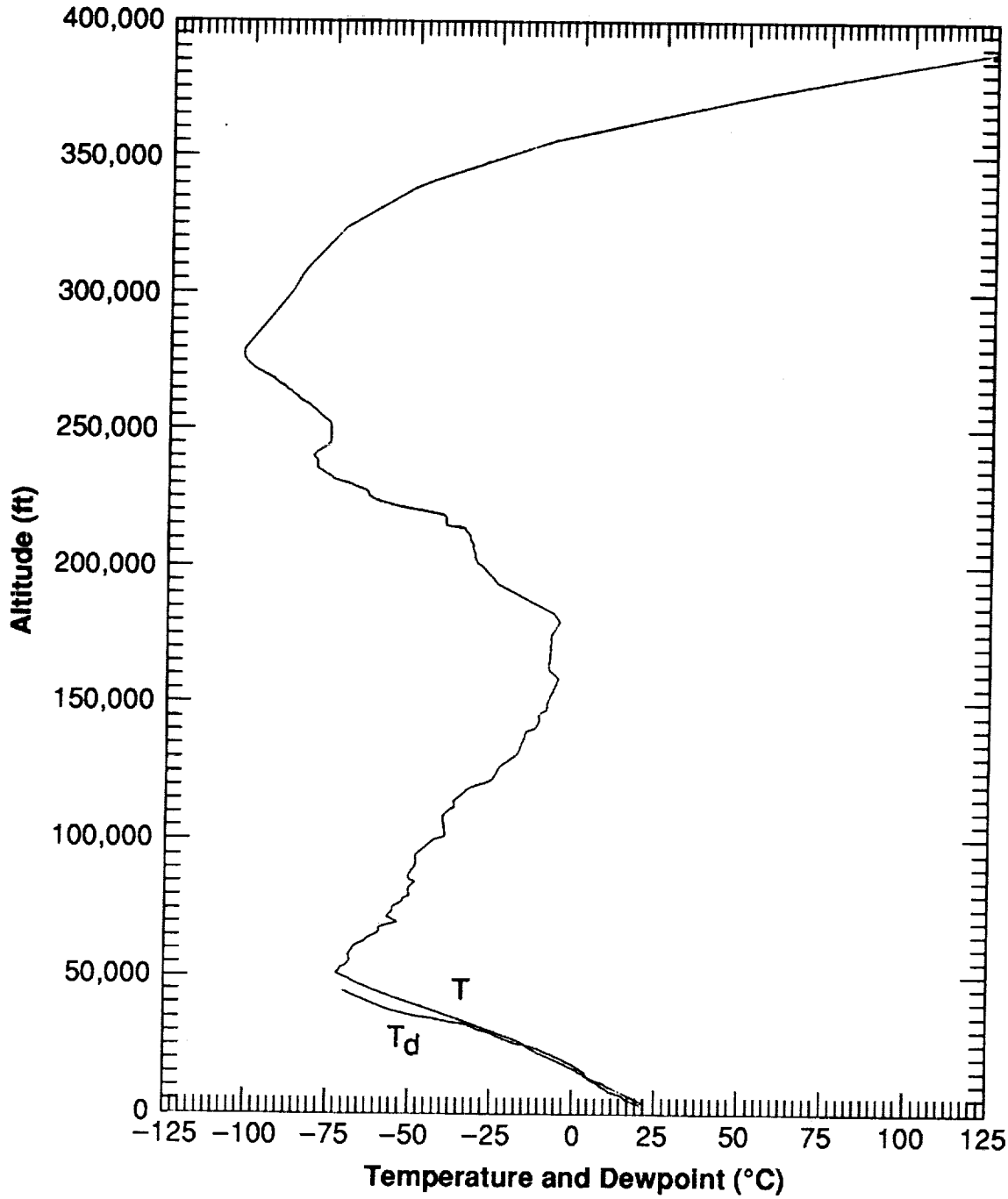


Figure 10. STS-40 temperature profiles versus altitude for launch (ascent).

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APPROVAL

ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE *COLUMBIA* (STS-40) LAUNCH

By G.L. Jasper and G.W. Batts

The information in this report has been reviewed for technical content. Review of any information concerning Department of Defense or nuclear energy activities or programs has been made by the MSFC Security Classification Officer. This report, in its entirety, has been determined to be unclassified.

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