NASA
Technical
Memorandum

NASA TM - 103603

ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE *ATLANTIS* (STS-43) LAUNCH

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

Space Science Laboratory
Science and Engineering Directorate

September 1992

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	September 1992	Technical Memorandum

4. TITLE AND SUBTITLE
Atmospheric Environment for Space Shuttle *Atlantis* (STS-43) Launch

5. FUNDING NUMBERS

6. AUTHOR(S)
G.L. Jasper and G.W. Batts*

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
National Aeronautics and Space Administration
Washington, DC 20546

10. SPONSORING/MONITORING AGENCY REPORT NUMBER
NASA TM - 103603

11. SUPPLEMENTARY NOTES
Prepared by Space Science Laboratory, Science and Engineering Directorate.
*New Technology Incorporated, Huntsville, Alabama.

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Unclassified — Unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

This report presents a summary of selected atmospheric conditions observed near Space Shuttle *Atlantis* (STS-43) launch time on August 2, 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 profile, which consists of wind and thermodynamic parameters versus altitude, for STS-43 vehicle ascent has been constructed. The STS-43 ascent atmospheric data profile 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-43 vehicle.

14. SUBJECT TERMS	15. NUMBER OF PAGES
STS-43 Launch Atmospheric Summary, Pressure, Temperature, Relative Humidity, Winds, Winds Aloft, Clouds, and Space Shuttle *Atlantis*	48
	16. PRICE CODE NTIS

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited

ACKNOWLEDGMENTS

The authors wish to thank the personnel of the NASA Kennedy Space Center (KSC), along with those at the Cape Canaveral Air Force Station and their Computer Sciences Raytheon contractors, for the acquisition and distribution of all related KSC atmospheric data received at MSFC.

Thanks are due to Calvin Prather of Sverdrup Technology, Inc., for his help in extracting atmospheric data that are used in this report. Appreciation is also expressed to Kimberly Wilkie of NTI for the computer support in attaining pad measurements.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

TECHNICAL MEMORANDUM

ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE *ATLANTIS* (STS-43) LAUNCH

I. INTRODUCTION

This report presents an evaluation of the atmospheric environmental data taken during the launch of the Space Shuttle *Atlantis*/STS-43 vehicle. This space shuttle vehicle was launched from pad 39A at Kennedy Space Center (KSC), Florida, on a flight azimuth of 90° east of north, at 1502 u.t. (1102 e.d.t.) on August 2, 1991.

This report presents a summary of the atmospheric environment at launch time (L+0) of the STS-43, together with the sequence of prelaunch Jimsphere-measured winds-aloft profiles from L–3 h 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-43 duty, the solid rocket booster (SRB) descent/impact atmospheric data were not taken. However, one can use the STS-43 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-40 launch conditions are presented in references 3 through 37, 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 ridge of high pressure just east of Florida and an area of low pressure moving west from northwest Florida dominated the Cape Kennedy region during the launch of STS-43. Moderate southerly winds were prevalent at the surface prior to the lift-off of STS-43. Figure 1 depicts the surface map 3 h 2 min before the launch. Southwesterly winds dominated the flow

aloft over the KSC region. Figure 2 shows the winds aloft condition at the 500-mb level 3 h 2 min before the launch of STS-43.

Clouds were scattered over the launch area prior to and during the launch of STS-43. Figure 3 depicts the GOES-7 visible satellite picture at 1501 u.t. (1 min before 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 1501 u.t. with surface data of temperature and wind barbs superimposed.

IV. SURFACE OBSERVATIONS AT LAUNCH TIME

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

Table 4 presents pad 39A wind data along with other standard hourly atmospheric measurements and sky observations for the 6-h period prior to launch of STS-43. 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 (1517 u.t.), MSS Rawinsonde (1432 u.t.), Super-Loki rocketsonde (1645 u.t.), and Super-Loki Robin (1603 u.t.) were used to measure the upper-level wind and thermodynamic parameters for STS-43 launch. At altitudes above the rocket-measured data, the Global Reference Atmosphere Model (GRAM)[38] parameters for July KSC conditions were used. A tabulation of the STS-43 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 16.9 ft/s (10.0 kn) at the 60-ft level and increased to a maximum of 77.1 ft/s (45.7 kn) at 38,100 ft (11,613 m). Wind speeds decreased above this level with a minimum of 16.1 ft/s (9.5 kn) recorded at 51,500 ft (15,697 m). The wind speeds increased consistently above the 51,500-ft (15,697-m) level, and the next maximum wind speed of 204.2 ft/s (120.9 kn) occurred at 190,000 ft (57,912 m). Wind speeds decreased to a minimum of 25.3 ft/s (15.0 kn) at 204,000 ft (62,179 m). Above this altitude, wind speeds increased to a maximum of 167.1 ft/s (98.9 kn) at the 243,000-ft (74,066-m) level. Wind speeds generally decreased above this level, and the last measurable windspeed was 74.3 ft/s (44.0 kn) at 282,000 ft (85,954 m). The left side of figure 5 depicts the wind speed versus altitude profile.

B. Wind Direction

At launch time, the 60-ft wind direction was from the south and maintained a southerly component throughout the 22,300-ft (6,797-m) altitude. The wind direction took on an easterly component at the 22,400-ft (6,828-m) level and shifted to the north at the 206,000-ft (62,789-m)

altitude. Above this level the winds shifted through the northeast and the last measurable wind direction was from the east at 282,000 ft (85,954 m). The right side of figure 5 presents the wind direction versus altitude profile.

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–3 h and extending through L+15 min. The wind speed and direction profiles for the 3-h 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 slight tail wind component near and below 20,000 ft and a head wind component for all other altitudes. The out-of-plane profiles (fig. 9) depict right crosswind values near or below 26,000 ft and generally left crosswind values at all other altitudes.

D. Thermodynamic Data

The thermodynamic data, taken at STS-43 launch time, consisted of atmospheric temperature, dew-point temperature, pressure, and density. These data have been compiled as the STS-43 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-43 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			Countdown and Launch Comments of Meteorological Significance
				Thermodynamic[a]			Wind[b]					
Seq. No.	Vehicle No.	Launch Date	Time (EST) Nearest Minute	Pressure[c] N/cm^2	Temp. (°C)	Rel. Hum. (%)	Speed (ft/s)	Dir. (°)	Altitude (ft)	Speeed (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 priorto 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	

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			Countdown and Launch Comments of Meteorological Significance
				Thermodynamic[a]			Wind[b]					
Seq. No.	Vehicle No.	Launch Date	Time (EST) Nearest Minute	Pressure[c] N/cm^2	Temp. (°C)	Rel. Hum. (%)	Speed (ft/s)	Dir. (°)	Altitude (ft)	Speeed (ft/s)	Dir. (°)	
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.
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	STS-51I *Discovery*	8/27/85	0658[f]	10.225	24	86	14.2 16.6	073 070	41,000	43	123	20. 8/24 launch scrub due to unacceptable weather in launch area. Rain during countdown
21	STS-51J *Atlantis*	10/3/85	1115[f]	10.185	28	79	17.0 13.7	213 171	48,000	48	283	
22	STS-61A *Challenger*	10/30/85	1200	10.059	28	72	12.7 14.1	217 174	43,000	81	218	24. 1/7 launch scrub due to unacceptable weather at TAW sites. 1/10 launch scrub due to heavy rain in launch area.
23	STS-61B *Atlantis*	11/26/85	1929	10.202	23	81	10.1 10.4	165 112	49,300	75	270	
24	STS-61C *Columbia*	1/12/86	0655	10.206	12	84	15.4 18.6	323 342	40,000	221	263	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-h delay due in part to cold early morning temps.
25[j]	STS-51L[j] *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-h and 37-min delay due to light winds aloft.

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			Countdown and Launch Comments of Meteorological Significance
				Thermodynamic[a]			Wind[b]					
Seq. No.	Vehicle No.	Launch Date	Time (EST) Nearest Minute	Pressure[c] N/cm^2	Temp. (°C)	Rel. Hum. (%)	Speed (ft/s)	Dir. (°)	Altitude (ft)	Speeed (ft/s)	Dir. (°)	
27[i]	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[i]	STS-29 *Discovery*	3/13/89	957	10.190	18	78	16.9	242	45,200	105	283	**28.** 2-h delay due to fog and strong winds aloft.
29[i]	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.
30[i]	STS-28 *Columbia*	8/8/89	0837[f]	10.120	27	80	12.5	252	24,100	35	286	
31[i]	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[i]	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[i]	STS-31 *Discovery*	4/24/90	0834[f]	10.186	22	63	18.6	80	31,300	96	307	
36[i]	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[i]	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	

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			Countdown and Launch Comments of Meteorological Significance
				Thermodynamic[a]			Wind[b]					
Seq. No.	Vehicle No.	Launch Date	Time (EST) Nearest Minute	Pressure[c] N/cm^2	Temp. (°C)	Rel. Hum. (%)	Speed (ft/s)	Dir. (°)	Altitude (ft)	Speeed (ft/s)	Dir. (°)	
41[j]	STS-40 *Columbia*	6/5/91	0925[f]	10.096	24	83	6.8	234	8,300	50	265	
42	STS-43 *Atlantis*	8/2/91	1102[f]	10.186	28	73	16.9	170	38,100	77	86	**42.** 1-day delay due to surface winds and thunderstorms in the area.

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 for 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-s average prior to L+0.
f. Eastern daylight time.
g. 30-s 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-43 ascent.

Type of Data	Date: August 2, 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	15:17	15	6 (21)	15	16,459 (54,000)	69
MSS Rawinsonde	14:32	−30	16,764 (55,000)	25	31,394 (103,000)	73
Super-Loki Rocketsonde (Datasonde)	16:45	103	66,751 (219,000)	103	31,699 (104,000)	105
Super-Loki Rocketsonde (Robin)	16:03	61	85,954 (282,000)	61	67,056 (220,000)	62

Table 3. KSC surface observations at STS-43 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)	Speed ft/s (kt)	Direction (°)
NASA Space Shuttle Runway X68[e] Winds Measured at 10.4 m (34 ft)	0	10.190 (14.780)	302.6 (85.0)	298.2 (77.0)	77	16 (10)	2 6	Cumulus Cirrostratus	701 (2,300) 11,887 (39,000)	15.2 (9.0)	200
CCAFS XMR[c] Surface Measurements	0	10.190 (14.780)	303.7 (87.0)	297.6 (76.0)	78	16 (10)	3 6	Cumulus Cirrus	701 (2,300) 11,887 (39,000)	15.2 (9.0)	180
Pad 39A[d] Lightpole SE 18.3 m (60.0 ft)[b]	0	10.186 (14.774)	300.9 (82.0)	295.9 (73.0)	73	–	–	–	–	16.9 (10.0)	170

* 6/10 total sky cover at X68 and 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 39A thermodynamic measurements are taken at camera site No. 3, approximately 6.4 m (21 ft) above MSL.

e. Official STS-43 sky observational site.

Table 4. STS-43 prelaunch through launch KSC pad 39A atmospheric measurements.

Hourly Atmospheric Measurements[a]						Sky Condition[b]			
August 2, 1991 Time u.t.	Temperature (°F)	Dew Point (°F)	Relative Humidity (%)	60' Level (SE) WS Kt	60' Level (SE) WD°	Clouds	Total Sky Cover	Visibility mi.)	Other Remarks
1000	72	70	93	2	179	Scattered at 15,000 ft, and thin broken at 20,000 ft	6/10	10	
1100	71	69	94	4	139	Scattered at 15,000 ft and thin broken at 24,000 ft	6/10	10	
1200	74	71	91	6	149	Scattered at 1,700, 3,000 ft and thin broken at 24,000 ft	7/10	10	
1300	79	73	81	8	150	Scattered at 1,400, 2,000 ft and thin broken at 24,000 ft	7/10	10	
1400	80	71	75	9	158	Scattered at 1,500, 1,700 ft and thin broken at 39,000 ft	7/10	10	
1500	82	73	73	10	167	Scattered at 2,200 ft and thin broken at 39,000 ft	6/10	10	
L+0[c] 1502	82	73	73	10	170	Scattered at 2,300 and thin broken at 39,000 ft	6/10	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 39A 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-43 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.	16.90	170.00	27.80	0.1019E+04	0.1168E+04	22.50
100.	18.04	165.00	27.54	0.1016E+04	0.1165E+04	22.35
200.	19.36	170.00	27.22	0.1013E+04	0.1163E+04	22.15
300.	20.34	173.00	26.89	0.1009E+04	0.1160E+04	21.96
400.	21.65	175.00	26.57	0.1006E+04	0.1157E+04	21.77
500.	22.64	177.00	26.24	0.1002E+04	0.1155E+04	21.58
600.	23.95	178.00	25.91	0.9986E+03	0.1152E+04	21.38
700.	21.98	181.00	25.59	0.9952E+03	0.1149E+04	21.19
800.	21.65	190.00	25.26	0.9917E+03	0.1147E+04	21.00
900.	21.33	192.00	24.94	0.9882E+03	0.1144E+04	20.80
1000.	21.33	184.00	24.61	0.9848E+03	0.1141E+04	20.61
1100.	19.36	190.00	24.38	0.9814E+03	0.1138E+04	20.56
1200.	24.61	186.00	24.15	0.9780E+03	0.1135E+04	20.51
1300.	26.90	193.00	23.92	0.9746E+03	0.1132E+04	20.46
1400.	25.26	193.00	23.69	0.9713E+03	0.1129E+04	20.41
1500.	23.95	194.00	23.46	0.9679E+03	0.1126E+04	20.36
1600.	26.25	182.00	23.23	0.9646E+03	0.1123E+04	20.31
1700.	28.87	187.00	23.00	0.9612E+03	0.1120E+04	20.26
1800.	26.90	188.00	22.77	0.9579E+03	0.1117E+04	20.21
1900.	24.61	191.00	22.54	0.9546E+03	0.1114E+04	20.16
2000.	27.23	190.00	22.31	0.9513E+03	0.1111E+04	20.11
2100.	27.23	190.00	22.16	0.9480E+03	0.1108E+04	19.86
2200.	24.28	194.00	22.01	0.9447E+03	0.1105E+04	19.61
2300.	22.97	190.00	21.86	0.9414E+03	0.1102E+04	19.36
2400.	26.90	193.00	21.71	0.9381E+03	0.1098E+04	19.11
2500.	26.25	197.00	21.56	0.9348E+03	0.1095E+04	18.86
2600.	22.97	196.00	21.41	0.9315E+03	0.1092E+04	18.61
2700.	24.93	192.00	21.26	0.9283E+03	0.1089E+04	18.36
2800.	25.59	198.00	21.11	0.9250E+03	0.1086E+04	18.11
2900.	22.97	196.00	20.96	0.9218E+03	0.1083E+04	17.86
3000.	23.95	190.00	20.81	0.9186E+03	0.1080E+04	17.61
3100.	25.59	197.00	20.68	0.9154E+03	0.1076E+04	17.29
3200.	23.95	202.00	20.55	0.9122E+03	0.1073E+04	16.97
3300.	20.01	202.00	20.42	0.9090E+03	0.1070E+04	16.65
3400.	21.98	196.00	20.29	0.9058E+03	0.1067E+04	16.33
3500.	23.29	201.00	20.16	0.9026E+03	0.1064E+04	16.01
3600.	21.33	206.00	20.03	0.8994E+03	0.1061E+04	15.69
3700.	20.67	201.00	19.90	0.8963E+03	0.1058E+04	15.37
3800.	25.26	206.00	19.77	0.8932E+03	0.1055E+04	15.05
3900.	23.62	207.00	19.64	0.8900E+03	0.1051E+04	14.73
4000.	20.67	202.00	19.51	0.8869E+03	0.1048E+04	14.41
4100.	24.61	202.00	19.38	0.8838E+03	0.1045E+04	14.21
4200.	24.28	205.00	19.25	0.8807E+03	0.1042E+04	14.01
4300.	21.33	204.00	19.12	0.8775E+03	0.1039E+04	13.81
4400.	23.62	199.00	18.99	0.8744E+03	0.1036E+04	13.61
4500.	25.26	205.00	18.86	0.8714E+03	0.1033E+04	13.41
4600.	22.31	213.00	18.73	0.8683E+03	0.1029E+04	13.21
4700.	20.67	216.00	18.60	0.8652E+03	0.1026E+04	13.01
4800.	22.97	217.00	18.47	0.8622E+03	0.1023E+04	12.81
4900.	24.61	226.00	18.34	0.8591E+03	0.1020E+04	12.61

Table 5. STS-43 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.	22.97	228.00	18.21	0.8561E+03	0.1017E+04	12.41
5100.	22.31	225.00	18.02	0.8531E+03	0.1014E+04	12.19
5200.	23.62	233.00	17.83	0.8500E+03	0.1011E+04	11.97
5300.	21.98	235.00	17.64	0.8470E+03	0.1008E+04	11.75
5400.	23.62	227.00	17.45	0.8440E+03	0.1006E+04	11.53
5500.	24.28	230.00	17.26	0.8410E+03	0.1003E+04	11.31
5600.	21.00	235.00	17.07	0.8380E+03	0.9999E+03	11.09
5700.	22.31	230.00	16.88	0.8351E+03	0.9971E+03	10.87
5800.	23.29	236.00	16.69	0.8321E+03	0.9943E+03	10.65
5900.	19.69	228.00	16.50	0.8291E+03	0.9915E+03	10.43
6000.	21.98	222.00	16.31	0.8262E+03	0.9887E+03	10.21
6100.	19.36	226.00	16.09	0.8232E+03	0.9859E+03	9.99
6200.	18.37	215.00	15.87	0.8203E+03	0.9832E+03	9.77
6300.	21.98	215.00	15.65	0.8174E+03	0.9805E+03	9.55
6400.	19.03	212.00	15.43	0.8144E+03	0.9778E+03	9.33
6500.	20.34	205.00	15.21	0.8115E+03	0.9751E+03	9.11
6600.	19.36	209.00	14.99	0.8086E+03	0.9724E+03	8.89
6700.	18.37	208.00	14.77	0.8057E+03	0.9697E+03	8.67
6800.	20.67	209.00	14.55	0.8028E+03	0.9671E+03	8.45
6900.	18.70	214.00	14.33	0.8000E+03	0.9644E+03	8.23
7000.	17.39	211.00	14.11	0.7971E+03	0.9617E+03	8.01
7100.	20.34	217.00	13.88	0.7942E+03	0.9591E+03	7.79
7200.	20.01	224.00	13.65	0.7914E+03	0.9564E+03	7.57
7300.	18.70	214.00	13.42	0.7885E+03	0.9538E+03	7.35
7400.	20.67	216.00	13.19	0.7857E+03	0.9512E+03	7.13
7500.	18.04	221.00	12.96	0.7828E+03	0.9486E+03	6.91
7600.	20.34	216.00	12.73	0.7800E+03	0.9460E+03	6.69
7700.	20.67	224.00	12.50	0.7772E+03	0.9434E+03	6.47
7800.	18.04	225.00	12.27	0.7744E+03	0.9408E+03	6.25
7900.	18.70	216.00	12.04	0.7716E+03	0.9382E+03	6.03
8000.	18.70	223.00	11.81	0.7688E+03	0.9356E+03	5.81
8100.	17.06	222.00	11.68	0.7660E+03	0.9327E+03	5.53
8200.	20.67	216.00	11.55	0.7632E+03	0.9298E+03	5.25
8300.	19.36	218.00	11.42	0.7605E+03	0.9269E+03	4.97
8400.	19.69	213.00	11.29	0.7577E+03	0.9241E+03	4.69
8500.	22.97	214.00	11.16	0.7550E+03	0.9212E+03	4.41
8600.	20.34	216.00	11.03	0.7522E+03	0.9183E+03	4.13
8700.	22.31	205.00	10.90	0.7495E+03	0.9155E+03	3.85
8800.	24.28	208.00	10.77	0.7468E+03	0.9127E+03	3.57
8900.	21.98	211.00	10.64	0.7441E+03	0.9098E+03	3.29
9000.	23.95	209.00	10.51	0.7414E+03	0.9070E+03	3.01
9100.	24.93	217.00	10.34	0.7387E+03	0.9043E+03	2.83
9200.	22.31	220.00	10.17	0.7360E+03	0.9015E+03	2.65
9300.	25.26	215.00	10.00	0.7333E+03	0.8988E+03	2.47
9400.	25.26	220.00	9.83	0.7306E+03	0.8961E+03	2.29
9500.	25.26	222.00	9.66	0.7280E+03	0.8934E+03	2.11
9600.	26.25	218.00	9.49	0.7253E+03	0.8907E+03	1.93
9700.	28.22	221.00	9.32	0.7227E+03	0.8880E+03	1.75
9800.	25.26	226.00	9.15	0.7200E+03	0.8854E+03	1.57
9900.	25.26	217.00	8.98	0.7174E+03	0.8827E+03	1.39

Table 5. STS-43 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.	26.90	218.00	8.81	0.7148E+03	0.8800E+03	1.21
10100.	24.61	222.00	8.61	0.7122E+03	0.8775E+03	0.90
10200.	24.93	214.00	8.41	0.7095E+03	0.8749E+03	0.59
10300.	25.26	211.00	8.21	0.7069E+03	0.8724E+03	0.28
10400.	22.31	218.00	8.01	0.7043E+03	0.8698E+03	-0.03
10500.	21.00	212.00	7.81	0.7017E+03	0.8673E+03	-0.34
10600.	24.61	207.00	7.61	0.6991E+03	0.8648E+03	-0.65
10700.	20.67	220.00	7.41	0.6966E+03	0.8622E+03	-0.96
10800.	19.03	208.00	7.21	0.6940E+03	0.8597E+03	-1.27
10900.	23.62	202.00	7.01	0.6914E+03	0.8572E+03	-1.58
11000.	22.31	208.00	6.81	0.6889E+03	0.8547E+03	-1.89
11100.	20.34	204.00	6.61	0.6863E+03	0.8522E+03	-1.95
11200.	21.98	199.00	6.41	0.6838E+03	0.8496E+03	-2.01
11300.	22.97	207.00	6.21	0.6813E+03	0.8471E+03	-2.07
11400.	21.33	217.00	6.01	0.6787E+03	0.8445E+03	-2.13
11500.	21.33	212.00	5.81	0.6762E+03	0.8420E+03	-2.19
11600.	24.61	209.00	5.61	0.6737E+03	0.8395E+03	-2.25
11700.	21.65	215.00	5.41	0.6712E+03	0.8370E+03	-2.31
11800.	20.34	210.00	5.21	0.6687E+03	0.8345E+03	-2.37
11900.	23.95	202.00	5.01	0.6663E+03	0.8320E+03	-2.43
12000.	22.64	209.00	4.81	0.6638E+03	0.8295E+03	-2.49
12100.	21.00	210.00	4.64	0.6613E+03	0.8270E+03	-2.58
12200.	24.93	203.00	4.47	0.6589E+03	0.8244E+03	-2.67
12300.	24.61	210.00	4.30	0.6564E+03	0.8218E+03	-2.76
12400.	23.62	213.00	4.13	0.6540E+03	0.8193E+03	-2.85
12500.	27.56	204.00	3.96	0.6515E+03	0.8167E+03	-2.94
12600.	27.89	208.00	3.79	0.6491E+03	0.8142E+03	-3.03
12700.	25.26	211.00	3.62	0.6467E+03	0.8117E+03	-3.12
12800.	28.54	197.00	3.45	0.6443E+03	0.8092E+03	-3.21
12900.	27.56	203.00	3.28	0.6419E+03	0.8066E+03	-3.30
13000.	25.59	202.00	3.11	0.6395E+03	0.8041E+03	-3.39
13100.	27.56	194.00	2.93	0.6371E+03	0.8017E+03	-3.59
13200.	27.89	197.00	2.75	0.6347E+03	0.7992E+03	-3.79
13300.	24.61	192.00	2.57	0.6323E+03	0.7968E+03	-3.99
13400.	26.90	194.00	2.39	0.6300E+03	0.7943E+03	-4.19
13500.	26.57	196.00	2.21	0.6276E+03	0.7919E+03	-4.39
13600.	25.92	191.00	2.03	0.6252E+03	0.7894E+03	-4.59
13700.	26.25	198.00	1.85	0.6229E+03	0.7870E+03	-4.79
13800.	24.93	202.00	1.67	0.6205E+03	0.7846E+03	-4.99
13900.	26.57	197.00	1.49	0.6182E+03	0.7822E+03	-5.19
14000.	25.92	197.00	1.31	0.6159E+03	0.7798E+03	-5.39
14100.	22.64	197.00	1.19	0.6136E+03	0.7772E+03	-5.79
14200.	25.59	201.00	1.07	0.6113E+03	0.7747E+03	-6.19
14300.	21.33	202.00	0.95	0.6089E+03	0.7721E+03	-6.59
14400.	25.59	196.00	0.83	0.6066E+03	0.7696E+03	-6.99
14500.	24.93	194.00	0.71	0.6043E+03	0.7671E+03	-7.39
14600.	21.65	189.00	0.59	0.6021E+03	0.7646E+03	-7.79
14700.	23.62	185.00	0.47	0.5998E+03	0.7620E+03	-8.19
14800.	23.95	189.00	0.35	0.5975E+03	0.7595E+03	-8.59
14900.	21.98	187.00	0.23	0.5953E+03	0.7570E+03	-8.99

Table 5. STS-43 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.	23.95	186.00	0.11	0.5930E+03	0.7545E+03	-9.39
15100.	22.97	190.00	-0.04	0.5908E+03	0.7521E+03	-9.84
15200.	24.93	186.00	-0.19	0.5885E+03	0.7497E+03	-10.29
15300.	23.95	189.00	-0.34	0.5863E+03	0.7474E+03	-10.74
15400.	21.33	188.00	-0.49	0.5841E+03	0.7450E+03	-11.19
15500.	23.62	181.00	-0.64	0.5818E+03	0.7426E+03	-11.64
15600.	26.25	184.00	-0.79	0.5796E+03	0.7402E+03	-12.09
15700.	22.64	187.00	-0.94	0.5774E+03	0.7379E+03	-12.54
15800.	23.62	181.00	-1.09	0.5753E+03	0.7355E+03	-12.99
15900.	23.62	189.00	-1.24	0.5731E+03	0.7332E+03	-13.44
16000.	21.98	193.00	-1.39	0.5709E+03	0.7308E+03	-13.89
16100.	22.64	185.00	-1.53	0.5687E+03	0.7284E+03	-14.38
16200.	23.62	188.00	-1.67	0.5666E+03	0.7261E+03	-14.87
16300.	20.34	191.00	-1.81	0.5644E+03	0.7237E+03	-15.36
16400.	23.95	184.00	-1.95	0.5622E+03	0.7214E+03	-15.85
16500.	24.93	186.00	-2.09	0.5601E+03	0.7190E+03	-16.34
16600.	23.29	182.00	-2.23	0.5580E+03	0.7167E+03	-16.83
16700.	24.93	185.00	-2.37	0.5558E+03	0.7143E+03	-17.32
16800.	21.98	192.00	-2.51	0.5537E+03	0.7120E+03	-17.81
16900.	22.31	185.00	-2.65	0.5516E+03	0.7097E+03	-18.30
17000.	25.26	186.00	-2.79	0.5495E+03	0.7074E+03	-18.79
17100.	22.97	189.00	-2.97	0.5474E+03	0.7052E+03	-19.43
17200.	23.95	186.00	-3.15	0.5453E+03	0.7030E+03	-20.07
17300.	25.59	189.00	-3.33	0.5432E+03	0.7008E+03	-20.71
17400.	21.33	189.00	-3.51	0.5411E+03	0.6986E+03	-21.35
17500.	23.95	180.00	-3.69	0.5391E+03	0.6964E+03	-21.99
17600.	24.93	181.00	-3.87	0.5370E+03	0.6942E+03	-22.63
17700.	21.00	184.00	-4.05	0.5349E+03	0.6920E+03	-23.27
17800.	24.28	178.00	-4.23	0.5329E+03	0.6899E+03	-23.91
17900.	22.97	180.00	-4.41	0.5308E+03	0.6877E+03	-24.55
18000.	18.37	178.00	-4.59	0.5288E+03	0.6856E+03	-25.19
18100.	19.69	176.00	-4.82	0.5268E+03	0.6835E+03	-24.90
18200.	23.95	173.00	-5.05	0.5247E+03	0.6814E+03	-24.61
18300.	22.64	168.00	-5.28	0.5227E+03	0.6793E+03	-24.32
18400.	21.33	165.00	-5.51	0.5207E+03	0.6773E+03	-24.03
18500.	26.25	163.00	-5.74	0.5187E+03	0.6752E+03	-23.74
18600.	23.62	166.00	-5.97	0.5166E+03	0.6732E+03	-23.45
18700.	21.98	169.00	-6.20	0.5146E+03	0.6711E+03	-23.16
18800.	23.62	163.00	-6.43	0.5127E+03	0.6691E+03	-22.87
18900.	21.00	165.00	-6.66	0.5107E+03	0.6671E+03	-22.58
19000.	19.69	167.00	-6.89	0.5087E+03	0.6651E+03	-22.29
19100.	22.97	152.00	-7.06	0.5067E+03	0.6629E+03	-22.14
19200.	18.04	160.00	-7.23	0.5047E+03	0.6607E+03	-21.99
19300.	16.40	162.00	-7.40	0.5028E+03	0.6585E+03	-21.84
19400.	18.37	154.00	-7.57	0.5008E+03	0.6564E+03	-21.69
19500.	16.73	164.00	-7.74	0.4989E+03	0.6542E+03	-21.54
19600.	16.73	169.00	-7.91	0.4969E+03	0.6521E+03	-21.39
19700.	17.72	162.00	-8.08	0.4950E+03	0.6500E+03	-21.24
19800.	17.06	172.00	-8.25	0.4930E+03	0.6478E+03	-21.09
19900.	16.08	164.00	-8.42	0.4911E+03	0.6457E+03	-20.94

Table 5. STS-43 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.	19.36	163.00	-8.59	0.4892E+03	0.6436E+03	-20.79
20100.	17.06	166.00	-8.77	0.4873E+03	0.6415E+03	-21.09
20200.	14.44	156.00	-8.95	0.4854E+03	0.6394E+03	-21.39
20300.	14.76	164.00	-9.13	0.4835E+03	0.6374E+03	-21.69
20400.	12.80	173.00	-9.31	0.4816E+03	0.6353E+03	-21.99
20500.	11.81	171.00	-9.49	0.4797E+03	0.6332E+03	-22.29
20600.	14.44	171.00	-9.67	0.4778E+03	0.6312E+03	-22.59
20700.	10.50	173.00	-9.85	0.4759E+03	0.6292E+03	-22.89
20800.	15.42	162.00	-10.03	0.4740E+03	0.6271E+03	-23.19
20900.	17.06	166.00	-10.21	0.4722E+03	0.6251E+03	-23.49
21000.	14.76	160.00	-10.39	0.4703E+03	0.6231E+03	-23.79
21100.	19.36	154.00	-10.59	0.4684E+03	0.6211E+03	-24.02
21200.	17.06	146.00	-10.79	0.4666E+03	0.6191E+03	-24.25
21300.	19.36	143.00	-10.99	0.4648E+03	0.6172E+03	-24.48
21400.	20.34	146.00	-11.19	0.4629E+03	0.6152E+03	-24.71
21500.	20.34	142.00	-11.39	0.4611E+03	0.6133E+03	-24.94
21600.	21.33	144.00	-11.59	0.4593E+03	0.6113E+03	-25.17
21700.	19.69	146.00	-11.79	0.4575E+03	0.6094E+03	-25.40
21800.	18.37	142.00	-11.99	0.4557E+03	0.6075E+03	-25.63
21900.	22.97	135.00	-12.19	0.4539E+03	0.6055E+03	-25.86
22000.	18.04	129.00	-12.39	0.4521E+03	0.6036E+03	-26.09
22100.	18.04	120.00	-12.64	0.4503E+03	0.6018E+03	-26.08
22200.	17.72	122.00	-12.89	0.4485E+03	0.6000E+03	-26.07
22300.	14.44	131.00	-13.14	0.4467E+03	0.5982E+03	-26.06
22400.	14.76	114.00	-13.39	0.4449E+03	0.5963E+03	-26.05
22500.	13.12	110.00	-13.64	0.4432E+03	0.5945E+03	-26.04
22600.	13.45	116.00	-13.89	0.4414E+03	0.5927E+03	-26.03
22700.	14.76	105.00	-14.14	0.4396E+03	0.5909E+03	-26.02
22800.	12.47	112.00	-14.39	0.4379E+03	0.5891E+03	-26.01
22900.	12.80	119.00	-14.64	0.4361E+03	0.5874E+03	-26.00
23000.	14.44	115.00	-14.89	0.4344E+03	0.5856E+03	-25.99
23100.	17.39	128.00	-15.12	0.4326E+03	0.5837E+03	-25.84
23200.	18.04	127.00	-15.35	0.4309E+03	0.5819E+03	-25.69
23300.	18.70	124.00	-15.58	0.4292E+03	0.5801E+03	-25.54
23400.	18.70	122.00	-15.81	0.4274E+03	0.5782E+03	-25.39
23500.	18.37	112.00	-16.04	0.4257E+03	0.5764E+03	-25.24
23600.	21.00	114.00	-16.27	0.4240E+03	0.5746E+03	-25.09
23700.	22.97	113.00	-16.50	0.4223E+03	0.5728E+03	-24.94
23800.	21.98	106.00	-16.73	0.4206E+03	0.5710E+03	-24.79
23900.	23.62	113.00	-16.96	0.4189E+03	0.5692E+03	-24.64
24000.	21.33	110.00	-17.19	0.4172E+03	0.5674E+03	-24.49
24100.	22.31	109.00	-17.38	0.4155E+03	0.5655E+03	-25.30
24200.	21.98	109.00	-17.57	0.4138E+03	0.5637E+03	-26.11
24300.	21.98	109.00	-17.76	0.4121E+03	0.5618E+03	-26.92
24400.	22.31	112.00	-17.95	0.4105E+03	0.5600E+03	-27.73
24500.	20.01	103.00	-18.14	0.4088E+03	0.5582E+03	-28.54
24600.	23.62	106.00	-18.33	0.4072E+03	0.5564E+03	-29.35
24700.	22.64	103.00	-18.52	0.4055E+03	0.5545E+03	-30.16
24800.	24.61	104.00	-18.71	0.4039E+03	0.5527E+03	-30.97
24900.	25.59	100.00	-18.90	0.4022E+03	0.5509E+03	-31.78

Table 5. STS-43 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.	24.28	104.00	-19.09	0.4006E+03	0.5491E+03	-32.59
25100.	27.89	106.00	-19.32	0.3990E+03	0.5473E+03	-32.61
25200.	23.62	107.00	-19.55	0.3973E+03	0.5456E+03	-32.63
25300.	23.95	104.00	-19.78	0.3957E+03	0.5439E+03	-32.65
25400.	23.62	106.00	-20.01	0.3941E+03	0.5421E+03	-32.67
25500.	22.97	98.00	-20.24	0.3925E+03	0.5404E+03	-32.69
25600.	26.25	98.00	-20.47	0.3909E+03	0.5387E+03	-32.71
25700.	23.62	106.00	-20.70	0.3893E+03	0.5370E+03	-32.73
25800.	26.90	94.00	-20.93	0.3877E+03	0.5352E+03	-32.75
25900.	27.23	99.00	-21.16	0.3861E+03	0.5335E+03	-32.77
26000.	30.18	96.00	-21.39	0.3845E+03	0.5318E+03	-32.79
26100.	31.50	96.00	-21.57	0.3829E+03	0.5300E+03	-32.48
26200.	29.53	91.00	-21.75	0.3813E+03	0.5282E+03	-32.17
26300.	32.81	94.00	-21.93	0.3798E+03	0.5264E+03	-31.86
26400.	33.46	94.00	-22.11	0.3782E+03	0.5246E+03	-31.55
26500.	34.45	92.00	-22.29	0.3767E+03	0.5228E+03	-31.24
26600.	30.84	95.00	-22.47	0.3751E+03	0.5211E+03	-30.93
26700.	31.82	91.00	-22.65	0.3736E+03	0.5193E+03	-30.62
26800.	32.48	92.00	-22.83	0.3720E+03	0.5175E+03	-30.31
26900.	29.86	89.00	-23.01	0.3705E+03	0.5158E+03	-30.00
27000.	33.79	92.00	-23.19	0.3690E+03	0.5140E+03	-29.69
27100.	32.81	89.00	-23.43	0.3675E+03	0.5123E+03	-29.52
27200.	36.75	92.00	-23.67	0.3659E+03	0.5107E+03	-29.35
27300.	35.43	87.00	-23.91	0.3644E+03	0.5090E+03	-29.18
27400.	39.04	84.00	-24.15	0.3629E+03	0.5074E+03	-29.01
27500.	37.40	83.00	-24.39	0.3614E+03	0.5058E+03	-28.84
27600.	39.04	80.00	-24.63	0.3599E+03	0.5041E+03	-28.67
27700.	43.31	79.00	-24.87	0.3584E+03	0.5025E+03	-28.50
27800.	40.35	75.00	-25.11	0.3569E+03	0.5009E+03	-28.33
27900.	41.99	74.00	-25.35	0.3554E+03	0.4993E+03	-28.16
28000.	42.65	76.00	-25.59	0.3539E+03	0.4977E+03	-27.99
28100.	38.71	77.00	-25.74	0.3524E+03	0.4959E+03	-28.52
28200.	40.03	80.00	-25.89	0.3510E+03	0.4942E+03	-29.05
28300.	37.73	77.00	-26.04	0.3495E+03	0.4924E+03	-29.58
28400.	41.67	80.00	-26.19	0.3480E+03	0.4907E+03	-30.11
28500.	43.31	81.00	-26.34	0.3466E+03	0.4889E+03	-30.64
28600.	44.95	80.00	-26.49	0.3451E+03	0.4872E+03	-31.17
28700.	46.92	83.00	-26.64	0.3437E+03	0.4855E+03	-31.70
28800.	47.24	85.00	-26.79	0.3423E+03	0.4837E+03	-32.23
28900.	49.87	85.00	-26.94	0.3408E+03	0.4820E+03	-32.76
29000.	51.51	87.00	-27.09	0.3394E+03	0.4803E+03	-33.29
29100.	52.49	85.00	-27.31	0.3380E+03	0.4787E+03	-33.96
29200.	56.43	88.00	-27.53	0.3365E+03	0.4771E+03	-34.63
29300.	57.74	85.00	-27.75	0.3351E+03	0.4756E+03	-35.30
29400.	55.45	83.00	-27.97	0.3337E+03	0.4740E+03	-35.97
29500.	57.09	83.00	-28.19	0.3323E+03	0.4724E+03	-36.64
29600.	57.09	82.00	-28.41	0.3309E+03	0.4708E+03	-37.31
29700.	57.74	79.00	-28.63	0.3295E+03	0.4693E+03	-37.98
29800.	58.73	78.00	-28.85	0.3281E+03	0.4677E+03	-38.65
29900.	54.79	73.00	-29.07	0.3267E+03	0.4662E+03	-39.32

Table 5. STS-43 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.	56.76	71.00	-29.29	0.3253E+03	0.4646E+03	-39.99
30100.	57.09	74.00	-29.40	0.3239E+03	0.4629E+03	-40.62
30200.	56.43	71.00	-29.51	0.3226E+03	0.4611E+03	-41.25
30300.	59.38	72.00	-29.62	0.3212E+03	0.4594E+03	-41.88
30400.	56.76	71.00	-29.73	0.3198E+03	0.4576E+03	-42.51
30500.	56.43	67.00	-29.84	0.3185E+03	0.4559E+03	-43.14
30600.	57.09	69.00	-29.95	0.3171E+03	0.4542E+03	-43.77
30700.	54.46	68.00	-30.06	0.3158E+03	0.4525E+03	-44.40
30800.	56.76	69.00	-30.17	0.3145E+03	0.4508E+03	-45.03
30900.	54.79	69.00	-30.28	0.3131E+03	0.4491E+03	-45.66
31000.	55.77	68.00	-30.39	0.3118E+03	0.4474E+03	-46.29
31100.	56.43	70.00	-30.66	0.3105E+03	0.4460E+03	-46.57
31200.	56.76	70.00	-30.93	0.3091E+03	0.4446E+03	-46.85
31300.	56.43	69.00	-31.20	0.3078E+03	0.4431E+03	-47.13
31400.	57.41	71.00	-31.47	0.3065E+03	0.4417E+03	-47.41
31500.	57.09	69.00	-31.74	0.3052E+03	0.4403E+03	-47.69
31600.	59.71	72.00	-32.01	0.3039E+03	0.4390E+03	-47.97
31700.	57.09	70.00	-32.28	0.3026E+03	0.4376E+03	-48.25
31800.	56.43	69.00	-32.55	0.3013E+03	0.4362E+03	-48.53
31900.	55.12	70.00	-32.82	0.3000E+03	0.4348E+03	-48.81
32000.	56.43	70.00	-33.09	0.2987E+03	0.4334E+03	-49.09
32100.	57.74	73.00	-33.35	0.2974E+03	0.4320E+03	-49.30
32200.	55.12	75.00	-33.61	0.2961E+03	0.4306E+03	-49.51
32300.	55.45	75.00	-33.87	0.2948E+03	0.4292E+03	-49.72
32400.	55.45	77.00	-34.13	0.2936E+03	0.4278E+03	-49.93
32500.	55.12	76.00	-34.39	0.2923E+03	0.4264E+03	-50.14
32600.	57.41	79.00	-34.65	0.2910E+03	0.4250E+03	-50.35
32700.	58.07	82.00	-34.91	0.2898E+03	0.4237E+03	-50.56
32800.	59.06	83.00	-35.17	0.2885E+03	0.4223E+03	-50.77
32900.	62.66	86.00	-35.43	0.2872E+03	0.4209E+03	-50.98
33000.	60.37	86.00	-35.69	0.2860E+03	0.4195E+03	-51.19
33100.	64.30	84.00	-35.97	0.2847E+03	0.4182E+03	-51.50
33200.	61.68	85.00	-36.25	0.2835E+03	0.4169E+03	-51.81
33300.	62.01	84.00	-36.53	0.2823E+03	0.4155E+03	-52.12
33400.	64.96	85.00	-36.81	0.2810E+03	0.4142E+03	-52.43
33500.	62.66	85.00	-37.09	0.2798E+03	0.4129E+03	-52.74
33600.	62.34	85.00	-37.37	0.2786E+03	0.4115E+03	-53.05
33700.	62.66	88.00	-37.65	0.2773E+03	0.4102E+03	-53.36
33800.	62.99	87.00	-37.93	0.2761E+03	0.4089E+03	-53.67
33900.	64.96	86.00	-38.21	0.2749E+03	0.4076E+03	-53.98
34000.	66.60	89.00	-38.49	0.2737E+03	0.4063E+03	-54.29
34100.	64.96	88.00	-38.75	0.2725E+03	0.4050E+03	-54.50
34200.	65.94	89.00	-39.01	0.2713E+03	0.4036E+03	-54.71
34300.	68.90	90.00	-39.27	0.2701E+03	0.4023E+03	-54.92
34400.	66.93	89.00	-39.53	0.2689E+03	0.4009E+03	-55.13
34500.	69.23	90.00	-39.79	0.2677E+03	0.3996E+03	-55.34
34600.	65.62	90.00	-40.05	0.2665E+03	0.3983E+03	-55.55
34700.	66.93	88.00	-40.31	0.2653E+03	0.3969E+03	-55.76
34800.	67.59	87.00	-40.57	0.2641E+03	0.3956E+03	-55.97
34900.	66.60	88.00	-40.83	0.2630E+03	0.3943E+03	-56.18

Table 5. STS-43 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.	66.60	89.00	-41.09	0.2618E+03	0.3930E+03	-56.39
35100.	65.62	88.00	-41.32	0.2606E+03	0.3916E+03	-56.57
35200.	66.27	89.00	-41.55	0.2595E+03	0.3903E+03	-56.75
35300.	64.63	87.00	-41.78	0.2583E+03	0.3889E+03	-56.93
35400.	64.96	85.00	-42.01	0.2571E+03	0.3875E+03	-57.11
35500.	62.99	88.00	-42.24	0.2560E+03	0.3862E+03	-57.29
35600.	66.93	87.00	-42.47	0.2548E+03	0.3848E+03	-57.47
35700.	66.60	90.00	-42.70	0.2537E+03	0.3835E+03	-57.65
35800.	68.90	90.00	-42.93	0.2526E+03	0.3822E+03	-57.83
35900.	68.57	93.00	-43.16	0.2514E+03	0.3808E+03	-58.01
36000.	69.88	93.00	-43.39	0.2503E+03	0.3795E+03	-58.19
36100.	70.87	93.00	-43.60	0.2492E+03	0.3781E+03	-58.34
36200.	72.18	94.00	-43.81	0.2481E+03	0.3768E+03	-58.49
36300.	70.87	92.00	-44.02	0.2469E+03	0.3754E+03	-58.64
36400.	66.93	93.00	-44.23	0.2458E+03	0.3741E+03	-58.79
36500.	68.57	90.00	-44.44	0.2447E+03	0.3728E+03	-58.94
36600.	67.26	91.00	-44.65	0.2436E+03	0.3714E+03	-59.09
36700.	67.59	90.00	-44.86	0.2425E+03	0.3701E+03	-59.24
36800.	70.54	89.00	-45.07	0.2415E+03	0.3688E+03	-59.39
36900.	68.90	89.00	-45.28	0.2404E+03	0.3675E+03	-59.54
37000.	71.85	89.00	-45.49	0.2393E+03	0.3662E+03	-59.69
37100.	73.16	90.00	-45.77	0.2382E+03	0.3649E+03	-59.92
37200.	72.51	90.00	-46.05	0.2371E+03	0.3637E+03	-60.15
37300.	74.15	89.00	-46.33	0.2360E+03	0.3625E+03	-60.38
37400.	70.54	88.00	-46.61	0.2350E+03	0.3613E+03	-60.61
37500.	71.85	87.00	-46.89	0.2339E+03	0.3601E+03	-60.84
37600.	71.52	87.00	-47.17	0.2328E+03	0.3589E+03	-61.07
37700.	72.18	86.00	-47.45	0.2318E+03	0.3577E+03	-61.30
37800.	72.51	87.00	-47.73	0.2307E+03	0.3565E+03	-61.53
37900.	74.48	88.00	-48.01	0.2296E+03	0.3553E+03	-61.76
38000.	72.83	87.00	-48.29	0.2286E+03	0.3542E+03	-61.99
38100.	77.10	86.00	-48.56	0.2275E+03	0.3529E+03	-62.20
38200.	74.15	87.00	-48.83	0.2265E+03	0.3517E+03	-62.41
38300.	70.87	88.00	-49.10	0.2254E+03	0.3505E+03	-62.62
38400.	74.48	85.00	-49.37	0.2244E+03	0.3493E+03	-62.83
38500.	70.87	85.00	-49.64	0.2233E+03	0.3481E+03	-63.04
38600.	70.54	82.00	-49.91	0.2223E+03	0.3469E+03	-63.25
38700.	71.85	83.00	-50.18	0.2213E+03	0.3457E+03	-63.46
38800.	71.19	82.00	-50.45	0.2202E+03	0.3445E+03	-63.67
38900.	71.85	81.00	-50.72	0.2192E+03	0.3433E+03	-63.88
39000.	72.51	82.00	-50.99	0.2182E+03	0.3422E+03	-64.09
39100.	68.90	81.00	-51.28	0.2172E+03	0.3410E+03	-64.31
39200.	70.54	80.00	-51.57	0.2162E+03	0.3398E+03	-64.53
39300.	68.24	82.00	-51.86	0.2152E+03	0.3387E+03	-64.75
39400.	69.88	79.00	-52.15	0.2141E+03	0.3376E+03	-64.97
39500.	68.57	79.00	-52.44	0.2131E+03	0.3364E+03	-65.19
39600.	69.88	77.00	-52.73	0.2121E+03	0.3353E+03	-65.41
39700.	68.57	78.00	-53.02	0.2112E+03	0.3342E+03	-65.63
39800.	65.94	76.00	-53.31	0.2102E+03	0.3330E+03	-65.85
39900.	68.90	73.00	-53.60	0.2092E+03	0.3319E+03	-66.07

Table 5. STS-43 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.	63.65	73.00	-53.89	0.2082E+03	0.3308E+03	-66.29
40100.	64.63	70.00	-54.11	0.2072E+03	0.3296E+03	-66.46
40200.	62.99	70.00	-54.33	0.2062E+03	0.3283E+03	-66.63
40300.	64.30	69.00	-54.55	0.2053E+03	0.3271E+03	-66.80
40400.	62.34	67.00	-54.77	0.2043E+03	0.3259E+03	-66.97
40500.	64.63	66.00	-54.99	0.2033E+03	0.3247E+03	-67.14
40600.	61.68	65.00	-55.21	0.2024E+03	0.3235E+03	-67.31
40700.	62.01	65.00	-55.43	0.2014E+03	0.3223E+03	-67.48
40800.	62.34	63.00	-55.65	0.2005E+03	0.3211E+03	-67.65
40900.	62.01	63.00	-55.87	0.1995E+03	0.3199E+03	-67.82
41000.	61.02	65.00	-56.09	0.1986E+03	0.3187E+03	-67.99
41100.	62.01	60.00	-56.36	0.1976E+03	0.3176E+03	-68.21
41200.	62.01	58.00	-56.63	0.1967E+03	0.3165E+03	-68.43
41300.	60.37	57.00	-56.90	0.1958E+03	0.3154E+03	-68.65
41400.	60.70	56.00	-57.17	0.1948E+03	0.3142E+03	-68.87
41500.	59.71	56.00	-57.44	0.1939E+03	0.3131E+03	-69.09
41600.	57.41	56.00	-57.71	0.1930E+03	0.3120E+03	-69.31
41700.	57.41	56.00	-57.98	0.1920E+03	0.3109E+03	-69.53
41800.	56.76	55.00	-58.25	0.1911E+03	0.3098E+03	-69.75
41900.	54.13	58.00	-58.52	0.1902E+03	0.3087E+03	-69.97
42000.	56.43	59.00	-58.79	0.1893E+03	0.3076E+03	-70.19
42100.	62.66	59.00	-59.00	0.1884E+03	0.3064E+03	-9999.00
42200.	63.65	62.00	-59.21	0.1875E+03	0.3053E+03	-9999.00
42300.	60.04	65.00	-59.42	0.1866E+03	0.3041E+03	-9999.00
42400.	60.04	66.00	-59.63	0.1856E+03	0.3029E+03	-9999.00
42500.	60.04	70.00	-59.84	0.1847E+03	0.3017E+03	-9999.00
42600.	61.35	70.00	-60.05	0.1838E+03	0.3005E+03	-9999.00
42700.	64.63	70.00	-60.26	0.1830E+03	0.2994E+03	-9999.00
42800.	65.29	71.00	-60.47	0.1821E+03	0.2982E+03	-9999.00
42900.	64.30	75.00	-60.68	0.1812E+03	0.2971E+03	-9999.00
43000.	64.63	73.00	-60.89	0.1803E+03	0.2959E+03	-9999.00
43100.	66.60	74.00	-61.06	0.1794E+03	0.2947E+03	-9999.00
43200.	64.96	75.00	-61.23	0.1785E+03	0.2935E+03	-9999.00
43300.	65.62	74.00	-61.40	0.1777E+03	0.2923E+03	-9999.00
43400.	60.04	76.00	-61.57	0.1768E+03	0.2911E+03	-9999.00
43500.	58.40	73.00	-61.74	0.1759E+03	0.2899E+03	-9999.00
43600.	57.09	71.00	-61.91	0.1751E+03	0.2887E+03	-9999.00
43700.	55.45	68.00	-62.08	0.1742E+03	0.2876E+03	-9999.00
43800.	54.46	70.00	-62.25	0.1734E+03	0.2864E+03	-9999.00
43900.	52.49	76.00	-62.42	0.1725E+03	0.2852E+03	-9999.00
44000.	48.88	82.00	-62.59	0.1717E+03	0.2841E+03	-9999.00
44100.	49.87	79.00	-62.74	0.1709E+03	0.2829E+03	-9999.00
44200.	50.85	82.00	-62.89	0.1700E+03	0.2817E+03	-9999.00
44300.	52.82	84.00	-63.04	0.1692E+03	0.2805E+03	-9999.00
44400.	49.21	90.00	-63.19	0.1683E+03	0.2793E+03	-9999.00
44500.	51.51	85.00	-63.34	0.1675E+03	0.2781E+03	-9999.00
44600.	51.51	84.00	-63.49	0.1667E+03	0.2769E+03	-9999.00
44700.	49.87	88.00	-63.64	0.1658E+03	0.2758E+03	-9999.00
44800.	46.92	89.00	-63.79	0.1650E+03	0.2746E+03	-9999.00
44900.	45.93	87.00	-63.94	0.1642E+03	0.2734E+03	-9999.00

Table 5. STS-43 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.	42.98	88.00	-64.09	0.1634E+03	0.2723E+03	-9999.00
45100.	40.03	86.00	-64.19	0.1626E+03	0.2711E+03	-9999.00
45200.	39.70	81.00	-64.29	0.1618E+03	0.2699E+03	-9999.00
45300.	36.75	81.00	-64.39	0.1610E+03	0.2686E+03	-9999.00
45400.	40.03	72.00	-64.49	0.1602E+03	0.2674E+03	-9999.00
45500.	35.76	68.00	-64.59	0.1594E+03	0.2663E+03	-9999.00
45600.	34.12	68.00	-64.69	0.1586E+03	0.2651E+03	-9999.00
45700.	35.10	69.00	-64.79	0.1578E+03	0.2639E+03	-9999.00
45800.	39.04	67.00	-64.89	0.1570E+03	0.2627E+03	-9999.00
45900.	38.06	62.00	-64.99	0.1563E+03	0.2615E+03	-9999.00
46000.	39.04	62.00	-65.09	0.1555E+03	0.2604E+03	-9999.00
46100.	42.32	60.00	-65.12	0.1547E+03	0.2591E+03	-9999.00
46200.	40.35	60.00	-65.15	0.1540E+03	0.2579E+03	-9999.00
46300.	38.71	62.00	-65.18	0.1532E+03	0.2566E+03	-9999.00
46400.	42.32	60.00	-65.21	0.1525E+03	0.2554E+03	-9999.00
46500.	39.70	64.00	-65.24	0.1517E+03	0.2542E+03	-9999.00
46600.	42.65	63.00	-65.27	0.1510E+03	0.2530E+03	-9999.00
46700.	42.65	69.00	-65.30	0.1502E+03	0.2518E+03	-9999.00
46800.	40.68	73.00	-65.33	0.1495E+03	0.2506E+03	-9999.00
46900.	42.65	76.00	-65.36	0.1487E+03	0.2494E+03	-9999.00
47000.	39.37	85.00	-65.39	0.1480E+03	0.2482E+03	-9999.00
47100.	39.04	82.00	-65.46	0.1473E+03	0.2470E+03	-9999.00
47200.	36.09	85.00	-65.53	0.1465E+03	0.2459E+03	-9999.00
47300.	33.14	91.00	-65.60	0.1458E+03	0.2447E+03	-9999.00
47400.	31.50	101.00	-65.67	0.1451E+03	0.2436E+03	-9999.00
47500.	32.15	92.00	-65.74	0.1444E+03	0.2425E+03	-9999.00
47600.	32.81	89.00	-65.81	0.1436E+03	0.2413E+03	-9999.00
47700.	32.48	88.00	-65.88	0.1429E+03	0.2402E+03	-9999.00
47800.	30.84	85.00	-65.95	0.1422E+03	0.2391E+03	-9999.00
47900.	30.51	81.00	-66.02	0.1415E+03	0.2380E+03	-9999.00
48000.	27.56	87.00	-66.09	0.1408E+03	0.2369E+03	-9999.00
48100.	28.22	88.00	-66.19	0.1401E+03	0.2358E+03	-9999.00
48200.	31.50	84.00	-66.29	0.1394E+03	0.2347E+03	-9999.00
48300.	27.23	89.00	-66.39	0.1387E+03	0.2337E+03	-9999.00
48400.	29.86	75.00	-66.49	0.1380E+03	0.2326E+03	-9999.00
48500.	30.84	70.00	-66.59	0.1373E+03	0.2316E+03	-9999.00
48600.	28.54	63.00	-66.69	0.1366E+03	0.2305E+03	-9999.00
48700.	28.22	61.00	-66.79	0.1359E+03	0.2295E+03	-9999.00
48800.	29.86	66.00	-66.89	0.1353E+03	0.2284E+03	-9999.00
48900.	30.84	62.00	-66.99	0.1346E+03	0.2274E+03	-9999.00
49000.	26.57	69.00	-67.09	0.1339E+03	0.2264E+03	-9999.00
49100.	26.57	64.00	-67.34	0.1332E+03	0.2255E+03	-9999.00
49200.	28.54	64.00	-67.59	0.1326E+03	0.2246E+03	-9999.00
49300.	23.62	78.00	-67.84	0.1319E+03	0.2238E+03	-9999.00
49400.	30.18	74.00	-68.09	0.1312E+03	0.2229E+03	-9999.00
49500.	31.50	70.00	-68.34	0.1306E+03	0.2221E+03	-9999.00
49600.	24.28	85.00	-68.59	0.1299E+03	0.2212E+03	-9999.00
49700.	24.28	88.00	-68.84	0.1292E+03	0.2204E+03	-9999.00
49800.	30.18	81.00	-69.09	0.1286E+03	0.2195E+03	-9999.00
49900.	26.57	83.00	-69.34	0.1279E+03	0.2187E+03	-9999.00

Table 5. STS-43 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.	30.51	72.00	-69.59	0.1273E+03	0.2179E+03	-9999.00
50100.	25.59	72.00	-69.79	0.1267E+03	0.2170E+03	-9999.00
50200.	25.92	63.00	-69.99	0.1260E+03	0.2161E+03	-9999.00
50300.	24.93	62.00	-70.19	0.1254E+03	0.2152E+03	-9999.00
50400.	18.37	73.00	-70.39	0.1247E+03	0.2143E+03	-9999.00
50500.	25.92	62.00	-70.59	0.1241E+03	0.2134E+03	-9999.00
50600.	24.93	62.00	-70.79	0.1235E+03	0.2126E+03	-9999.00
50700.	24.28	58.00	-70.99	0.1229E+03	0.2117E+03	-9999.00
50800.	18.37	71.00	-71.19	0.1222E+03	0.2108E+03	-9999.00
50900.	18.37	62.00	-71.39	0.1216E+03	0.2100E+03	-9999.00
51000.	18.70	60.00	-71.59	0.1210E+03	0.2091E+03	-9999.00
51100.	25.26	55.00	-71.57	0.1204E+03	0.2080E+03	-9999.00
51200.	19.03	60.00	-71.55	0.1198E+03	0.2069E+03	-9999.00
51300.	16.40	63.00	-71.53	0.1191E+03	0.2058E+03	-9999.00
51400.	19.69	56.00	-71.51	0.1185E+03	0.2048E+03	-9999.00
51500.	16.08	65.00	-71.49	0.1179E+03	0.2037E+03	-9999.00
51600.	17.06	65.00	-71.47	0.1173E+03	0.2026E+03	-9999.00
51700.	17.06	75.00	-71.45	0.1167E+03	0.2016E+03	-9999.00
51800.	26.25	91.00	-71.43	0.1161E+03	0.2005E+03	-9999.00
51900.	28.54	98.00	-71.41	0.1155E+03	0.1994E+03	-9999.00
52000.	31.50	91.00	-71.39	0.1149E+03	0.1984E+03	-9999.00
52100.	31.82	96.00	-71.30	0.1143E+03	0.1973E+03	-9999.00
52200.	32.48	91.00	-71.21	0.1137E+03	0.1962E+03	-9999.00
52300.	29.53	103.00	-71.12	0.1132E+03	0.1951E+03	-9999.00
52400.	29.86	93.00	-71.03	0.1126E+03	0.1940E+03	-9999.00
52500.	27.23	100.00	-70.94	0.1120E+03	0.1930E+03	-9999.00
52600.	28.54	99.00	-70.85	0.1114E+03	0.1919E+03	-9999.00
52700.	25.92	95.00	-70.76	0.1109E+03	0.1909E+03	-9999.00
52800.	21.65	113.00	-70.67	0.1103E+03	0.1898E+03	-9999.00
52900.	15.75	110.00	-70.58	0.1098E+03	0.1888E+03	-9999.00
53000.	20.34	84.00	-70.49	0.1092E+03	0.1877E+03	-9999.00
53100.	22.97	69.00	-70.43	0.1086E+03	0.1867E+03	-9999.00
53200.	18.37	76.00	-70.37	0.1081E+03	0.1857E+03	-9999.00
53300.	21.98	67.00	-70.31	0.1076E+03	0.1847E+03	-9999.00
53400.	25.59	74.00	-70.25	0.1070E+03	0.1837E+03	-9999.00
53500.	26.57	85.00	-70.19	0.1065E+03	0.1827E+03	-9999.00
53600.	25.92	90.00	-70.13	0.1059E+03	0.1818E+03	-9999.00
53700.	31.17	90.00	-70.07	0.1054E+03	0.1808E+03	-9999.00
53800.	32.15	86.00	-70.01	0.1049E+03	0.1798E+03	-9999.00
53900.	31.50	87.00	-69.95	0.1043E+03	0.1789E+03	-9999.00
54000.	33.46	96.00	-69.89	0.1038E+03	0.1779E+03	-9999.00
55000.	31.23	92.00	-70.09	0.9861E+02	0.1692E+03	-9999.00
56000.	30.84	90.00	-69.39	0.9373E+02	0.1602E+03	-9999.00
57000.	31.82	82.00	-69.09	0.8910E+02	0.1521E+03	-9999.00
58000.	31.17	77.00	-69.89	0.8469E+02	0.1452E+03	-9999.00
59000.	34.78	76.00	-70.39	0.8049E+02	0.1383E+03	-9999.00
60000.	42.32	76.00	-67.89	0.7652E+02	0.1299E+03	-9999.00
61000.	48.23	77.00	-67.29	0.7277E+02	0.1231E+03	-9999.00
62000.	49.87	81.00	-65.89	0.6922E+02	0.1163E+03	-9999.00
63000.	49.21	86.00	-65.39	0.6585E+02	0.1104E+03	-9999.00

Table 5. STS-43 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)
64000.	46.92	86.00	-62.69	0.6268E+02	0.1038E+03	-9999.00
65000.	46.92	87.00	-59.49	0.5970E+02	0.9734E+02	-9999.00
66000.	47.24	95.00	-59.39	0.5689E+02	0.9271E+02	-9999.00
67000.	48.56	108.00	-57.89	0.5421E+02	0.8773E+02	-9999.00
68000.	48.23	121.00	-56.29	0.5168E+02	0.8302E+02	-9999.00
69000.	44.29	129.00	-56.69	0.4928E+02	0.7931E+02	-9999.00
70000.	37.07	127.00	-56.09	0.4699E+02	0.7542E+02	-9999.00
71000.	34.12	115.00	-55.59	0.4481E+02	0.7175E+02	-9999.00
72000.	37.40	101.00	-55.59	0.4273E+02	0.6842E+02	-9999.00
73000.	43.96	93.00	-54.49	0.4076E+02	0.6494E+02	-9999.00
74000.	46.26	89.00	-54.39	0.3888E+02	0.6192E+02	-9999.00
75000.	46.92	85.00	-56.09	0.3708E+02	0.5951E+02	-9999.00
76000.	49.21	81.00	-56.29	0.3536E+02	0.5680E+02	-9999.00
77000.	55.45	81.00	-56.59	0.3372E+02	0.5424E+02	-9999.00
78000.	61.02	79.00	-54.99	0.3215E+02	0.5134E+02	-9999.00
79000.	65.29	78.00	-54.39	0.3067E+02	0.4884E+02	-9999.00
80000.	69.23	79.00	-54.09	0.2926E+02	0.4653E+02	-9999.00
81000.	70.87	80.00	-53.99	0.2792E+02	0.4438E+02	-9999.00
82000.	70.21	81.00	-52.79	0.2664E+02	0.4212E+02	-9999.00
83000.	66.27	79.00	-51.19	0.2542E+02	0.3990E+02	-9999.00
84000.	62.34	76.00	-47.99	0.2428E+02	0.3757E+02	-9999.00
85000.	62.01	79.00	-46.39	0.2319E+02	0.3563E+02	-9999.00
86000.	62.34	85.00	-46.79	0.2216E+02	0.3410E+02	-9999.00
87000.	60.04	84.00	-47.99	0.2117E+02	0.3275E+02	-9999.00
88000.	57.09	86.00	-48.69	0.2023E+02	0.3140E+02	-9999.00
89000.	57.09	88.00	-49.39	0.1932E+02	0.3008E+02	-9999.00
90000.	62.66	89.00	-48.89	0.1845E+02	0.2866E+02	-9999.00
91000.	66.27	87.00	-47.99	0.1762E+02	0.2726E+02	-9999.00
92000.	72.18	87.00	-46.79	0.1684E+02	0.2592E+02	-9999.00
93000.	81.04	90.00	-45.19	0.1609E+02	0.2459E+02	-9999.00
94000.	84.97	93.00	-44.59	0.1538E+02	0.2344E+02	-9999.00
95000.	82.68	96.00	-44.79	0.1470E+02	0.2243E+02	-9999.00
96000.	73.16	94.00	-43.39	0.1406E+02	0.2132E+02	-9999.00
97000.	67.91	93.00	-42.59	0.1344E+02	0.2031E+02	-9999.00
98000.	65.29	89.00	-40.89	0.1286E+02	0.1929E+02	-9999.00
99000.	63.98	88.00	-39.99	0.1230E+02	0.1838E+02	-9999.00
100000.	62.99	85.00	-37.99	0.1177E+02	0.1744E+02	-9999.00
101000.	63.65	89.00	-38.09	0.1127E+02	0.1670E+02	-9999.00
102000.	64.96	91.00	-37.99	0.1078E+02	0.1597E+02	-9999.00
103000.	65.29	94.00	-38.49	0.1032E+02	0.1532E+02	-9999.00
104000.	65.81	81.00	-40.84	0.9867E+01	0.1480E+02	-9999.00
105000.	67.52	82.00	-41.54	0.9439E+01	0.1420E+02	-9999.00
106000.	69.19	83.00	-41.79	0.9028E+01	0.1359E+02	-9999.00
107000.	67.52	85.00	-41.33	0.8636E+01	0.1298E+02	-9999.00
108000.	64.14	90.00	-40.79	0.8262E+01	0.1239E+02	-9999.00
109000.	59.06	99.00	-40.44	0.7904E+01	0.1183E+02	-9999.00
110000.	54.00	107.00	-41.50	0.7562E+01	0.1137E+02	-9999.00
111000.	52.33	110.00	-42.44	0.7233E+01	0.1092E+02	-9999.00
112000.	55.71	103.00	-42.01	0.6918E+01	0.1043E+02	-9999.00
113000.	67.52	96.00	-41.43	0.6617E+01	0.9948E+01	-9999.00

Table 5. STS-43 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)
114000.	74.25	94.00	-40.87	0.6331E+01	0.9495E+01	-9999.00
115000.	75.95	93.00	-40.31	0.6057E+01	0.9062E+01	-9999.00
116000.	79.33	92.00	-38.45	0.5796E+01	0.8603E+01	-9999.00
117000.	82.71	91.00	-36.44	0.5549E+01	0.8167E+01	-9999.00
118000.	87.76	93.00	-34.52	0.5314E+01	0.7758E+01	-9999.00
119000.	92.81	93.00	-32.60	0.5091E+01	0.7373E+01	-9999.00
120000.	99.57	91.00	-30.66	0.4879E+01	0.7009E+01	-9999.00
121000.	106.33	89.00	-29.46	0.4677E+01	0.6686E+01	-9999.00
122000.	113.06	88.00	-29.24	0.4484E+01	0.6404E+01	-9999.00
123000.	116.44	89.00	-26.32	0.4300E+01	0.6069E+01	-9999.00
124000.	118.14	89.00	-22.75	0.4126E+01	0.5740E+01	-9999.00
125000.	119.82	90.00	-20.41	0.3961E+01	0.5460E+01	-9999.00
126000.	118.14	90.00	-19.39	0.3804E+01	0.5222E+01	-9999.00
127000.	114.76	91.00	-18.46	0.3653E+01	0.4997E+01	-9999.00
128000.	111.38	92.00	-17.58	0.3509E+01	0.4783E+01	-9999.00
129000.	109.71	94.00	-16.72	0.3371E+01	0.4580E+01	-9999.00
130000.	108.01	95.00	-15.84	0.3239E+01	0.4385E+01	-9999.00
131000.	108.01	94.00	-14.95	0.3113E+01	0.4200E+01	-9999.00
132000.	111.38	92.00	-14.72	0.2992E+01	0.4033E+01	-9999.00
133000.	113.06	93.00	-15.38	0.2875E+01	0.3885E+01	-9999.00
134000.	109.71	95.00	-16.26	0.2763E+01	0.3747E+01	-9999.00
135000.	104.63	99.00	-17.16	0.2654E+01	0.3612E+01	-9999.00
136000.	99.57	102.00	-17.60	0.2550E+01	0.3476E+01	-9999.00
137000.	96.19	103.00	-17.22	0.2450E+01	0.3335E+01	-9999.00
138000.	96.19	100.00	-16.68	0.2354E+01	0.3197E+01	-9999.00
139000.	97.90	94.00	-16.17	0.2261E+01	0.3065E+01	-9999.00
140000.	101.25	88.00	-15.64	0.2173E+01	0.2940E+01	-9999.00
141000.	106.33	84.00	-15.12	0.2088E+01	0.2819E+01	-9999.00
142000.	108.01	81.00	-14.63	0.2007E+01	0.2705E+01	-9999.00
143000.	108.01	79.00	-14.12	0.1929E+01	0.2594E+01	-9999.00
144000.	108.01	78.00	-13.64	0.1854E+01	0.2489E+01	-9999.00
145000.	114.76	88.00	-13.22	0.1783E+01	0.2390E+01	-9999.00
146000.	109.71	95.00	-12.78	0.1714E+01	0.2293E+01	-9999.00
147000.	101.25	94.00	-12.55	0.1648E+01	0.2203E+01	-9999.00
148000.	87.76	86.00	-12.99	0.1584E+01	0.2121E+01	-9999.00
149000.	101.25	92.00	-13.40	0.1523E+01	0.2043E+01	-9999.00
150000.	109.71	94.00	-13.84	0.1464E+01	0.1967E+01	-9999.00
151000.	113.06	86.00	-14.28	0.1407E+01	0.1893E+01	-9999.00
152000.	119.82	83.00	-14.69	0.1352E+01	0.1822E+01	-9999.00
153000.	116.44	91.00	-15.07	0.1300E+01	0.1755E+01	-9999.00
154000.	111.38	98.00	-15.04	0.1249E+01	0.1686E+01	-9999.00
155000.	104.63	90.00	-14.45	0.1201E+01	0.1617E+01	-9999.00
156000.	114.76	80.00	-13.85	0.1154E+01	0.1550E+01	-9999.00
157000.	140.09	77.00	-13.23	0.1110E+01	0.1488E+01	-9999.00
158000.	146.82	77.00	-12.68	0.1067E+01	0.1427E+01	-9999.00
159000.	141.77	80.00	-12.10	0.1026E+01	0.1369E+01	-9999.00
160000.	150.20	80.00	-11.50	0.9864E+00	0.1313E+01	-9999.00
161000.	155.25	79.00	-11.04	0.9486E+00	0.1261E+01	-9999.00
162000.	143.44	80.00	-10.54	0.9123E+00	0.1210E+01	-9999.00
163000.	136.71	80.00	-8.84	0.8775E+00	0.1157E+01	-9999.00

Table 5. STS-43 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)
164000.	140.09	81.00	-7.13	0.8443E+00	0.1106E+01	-9999.00
165000.	136.71	84.00	-6.03	0.8125E+00	0.1060E+01	-9999.00
166000.	128.25	85.00	-6.07	0.7820E+00	0.1020E+01	-9999.00
167000.	126.57	81.00	-6.12	0.7526E+00	0.9818E+00	-9999.00
168000.	145.14	77.00	-6.28	0.7243E+00	0.9455E+00	-9999.00
169000.	146.82	78.00	-6.28	0.6971E+00	0.9100E+00	-9999.00
170000.	138.39	82.00	-6.82	0.6709E+00	0.8776E+00	-9999.00
171000.	128.25	83.00	-8.68	0.6455E+00	0.8503E+00	-9999.00
172000.	124.90	78.00	-10.71	0.6210E+00	0.8243E+00	-9999.00
173000.	128.25	73.00	-12.63	0.5972E+00	0.7986E+00	-9999.00
174000.	133.33	66.00	-14.55	0.5741E+00	0.7734E+00	-9999.00
175000.	141.77	64.00	-16.69	0.5518E+00	0.7496E+00	-9999.00
176000.	145.14	66.00	-16.91	0.5302E+00	0.7208E+00	-9999.00
177000.	146.82	70.00	-17.03	0.5095E+00	0.6930E+00	-9999.00
178000.	150.20	75.00	-17.18	0.4895E+00	0.6662E+00	-9999.00
179000.	160.33	79.00	-18.02	0.4704E+00	0.6423E+00	-9999.00
180000.	168.77	83.00	-19.04	0.4519E+00	0.6195E+00	-9999.00
181000.	170.44	85.00	-20.38	0.4340E+00	0.5981E+00	-9999.00
182000.	162.01	84.00	-21.40	0.4168E+00	0.5768E+00	-9999.00
183000.	140.09	81.00	-22.47	0.4002E+00	0.5562E+00	-9999.00
184000.	121.52	78.00	-24.19	0.3842E+00	0.5376E+00	-9999.00
185000.	111.38	74.00	-23.82	0.3687E+00	0.5152E+00	-9999.00
186000.	116.44	73.00	-22.25	0.3540E+00	0.4915E+00	-9999.00
187000.	138.39	78.00	-20.73	0.3399E+00	0.4691E+00	-9999.00
188000.	167.09	84.00	-19.34	0.3265E+00	0.4481E+00	-9999.00
189000.	194.09	88.00	-17.64	0.3136E+00	0.4276E+00	-9999.00
190000.	204.20	91.00	-16.55	0.3014E+00	0.4092E+00	-9999.00
191000.	199.15	96.00	-16.44	0.2897E+00	0.3931E+00	-9999.00
192000.	182.28	102.00	-16.20	0.2784E+00	0.3774E+00	-9999.00
193000.	163.71	111.00	-15.94	0.2675E+00	0.3623E+00	-9999.00
194000.	150.20	120.00	-15.20	0.2571E+00	0.3472E+00	-9999.00
195000.	143.44	128.00	-16.28	0.2472E+00	0.3353E+00	-9999.00
196000.	131.63	134.00	-18.16	0.2375E+00	0.3245E+00	-9999.00
197000.	119.82	141.00	-20.21	0.2281E+00	0.3142E+00	-9999.00
198000.	109.71	146.00	-22.15	0.2191E+00	0.3041E+00	-9999.00
199000.	97.90	147.00	-24.31	0.2103E+00	0.2944E+00	-9999.00
200000.	86.06	145.00	-26.69	0.2019E+00	0.2854E+00	-9999.00
201000.	72.57	139.00	-27.87	0.1937E+00	0.2751E+00	-9999.00
202000.	55.71	130.00	-28.10	0.1858E+00	0.2641E+00	-9999.00
203000.	37.14	113.00	-28.20	0.1782E+00	0.2534E+00	-9999.00
204000.	25.33	78.00	-28.46	0.1709E+00	0.2433E+00	-9999.00
205000.	28.67	31.00	-29.00	0.1640E+00	0.2340E+00	-9999.00
206000.	42.19	9.00	-29.90	0.1572E+00	0.2251E+00	-9999.00
207000.	55.71	2.00	-31.21	0.1508E+00	0.2171E+00	-9999.00
208000.	64.14	358.00	-32.61	0.1445E+00	0.2093E+00	-9999.00
209000.	74.25	357.00	-33.73	0.1385E+00	0.2015E+00	-9999.00
210000.	81.00	359.00	-34.92	0.1327E+00	0.1940E+00	-9999.00
211000.	81.00	359.00	-36.65	0.1272E+00	0.1874E+00	-9999.00
212000.	79.33	4.00	-37.59	0.1218E+00	0.1801E+00	-9999.00
213000.	77.62	12.00	-39.05	0.1166E+00	0.1735E+00	-9999.00

Table 5. STS-43 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)
214000.	77.62	18.00	-40.40	0.1117E+00	0.1672E+00	-9999.00
215000.	74.25	25.00	-41.54	0.1069E+00	0.1608E+00	-9999.00
216000.	67.52	35.00	-42.66	0.1023E+00	0.1546E+00	-9999.00
217000.	59.06	45.00	-44.46	0.9780E-01	0.1490E+00	-9999.00
218000.	48.95	52.00	-45.68	0.9360E-01	0.1433E+00	-9999.00
219000.	44.14	66.00	-47.28	0.8940E-01	0.1379E+00	-9999.00
220000.	40.52	108.00	-52.15	0.8570E-01	0.1351E+00	-9999.00
221000.	43.86	108.00	-56.57	0.8180E-01	0.1316E+00	-9999.00
222000.	43.86	104.00	-61.79	0.7800E-01	0.1286E+00	-9999.00
223000.	45.57	98.00	-67.71	0.7440E-01	0.1262E+00	-9999.00
224000.	48.95	88.00	-71.26	0.7090E-01	0.1223E+00	-9999.00
225000.	55.71	80.00	-73.95	0.6740E-01	0.1179E+00	-9999.00
226000.	64.14	72.00	-75.15	0.6380E-01	0.1123E+00	-9999.00
227000.	74.25	65.00	-76.15	0.6030E-01	0.1066E+00	-9999.00
228000.	84.38	60.00	-77.15	0.5710E-01	0.1015E+00	-9999.00
229000.	96.19	57.00	-78.15	0.5430E-01	0.9701E-01	-9999.00
230000.	108.01	55.00	-78.15	0.5170E-01	0.9236E-01	-9999.00
231000.	118.14	53.00	-79.15	0.4920E-01	0.8835E-01	-9999.00
232000.	128.25	52.00	-79.15	0.4670E-01	0.8386E-01	-9999.00
233000.	136.71	52.00	-79.15	0.4430E-01	0.7955E-01	-9999.00
234000.	143.44	51.00	-79.15	0.4200E-01	0.7542E-01	-9999.00
235000.	150.20	50.00	-78.15	0.3990E-01	0.7128E-01	-9999.00
236000.	156.96	50.00	-78.15	0.3790E-01	0.6771E-01	-9999.00
237000.	160.33	49.00	-78.15	0.3600E-01	0.6431E-01	-9999.00
238000.	163.71	48.00	-78.86	0.3420E-01	0.6132E-01	-9999.00
239000.	165.39	48.00	-79.15	0.3240E-01	0.5818E-01	-9999.00
240000.	167.09	47.00	-79.15	0.3080E-01	0.5531E-01	-9999.00
241000.	167.09	46.00	-80.15	0.2920E-01	0.5271E-01	-9999.00
242000.	167.09	45.00	-80.15	0.2770E-01	0.5000E-01	-9999.00
243000.	167.09	44.00	-80.15	0.2630E-01	0.4747E-01	-9999.00
244000.	165.39	43.00	-79.29	0.2500E-01	0.4493E-01	-9999.00
245000.	163.71	42.00	-78.77	0.2370E-01	0.4248E-01	-9999.00
246000.	160.33	41.00	-78.15	0.2250E-01	0.4020E-01	-9999.00
247000.	158.63	40.00	-78.15	0.2130E-01	0.3805E-01	-9999.00
248000.	155.25	39.00	-79.10	0.2030E-01	0.3644E-01	-9999.00
249000.	151.90	38.00	-79.63	0.1920E-01	0.3456E-01	-9999.00
250000.	150.20	38.00	-81.15	0.1830E-01	0.3320E-01	-9999.00
251000.	146.82	37.00	-81.15	0.1730E-01	0.3139E-01	-9999.00
252000.	143.44	36.00	-82.15	0.1640E-01	0.2991E-01	-9999.00
253000.	140.09	34.00	-82.15	0.1560E-01	0.2845E-01	-9999.00
254000.	138.39	33.00	-82.15	0.1480E-01	0.2699E-01	-9999.00
255000.	135.01	32.00	-82.77	0.1400E-01	0.2562E-01	-9999.00
256000.	133.33	32.00	-83.15	0.1330E-01	0.2439E-01	-9999.00
257000.	129.95	31.00	-83.15	0.1260E-01	0.2310E-01	-9999.00
258000.	126.57	31.00	-82.15	0.1200E-01	0.2189E-01	-9999.00
259000.	123.20	30.00	-82.15	0.1130E-01	0.2061E-01	-9999.00
260000.	121.52	30.00	-81.91	0.1080E-01	0.1967E-01	-9999.00
261000.	118.14	30.00	-81.15	0.1020E-01	0.1851E-01	-9999.00
262000.	114.76	30.00	-81.15	0.9700E-02	0.1760E-01	-9999.00
263000.	111.38	30.00	-80.34	0.9200E-02	0.1662E-01	-9999.00

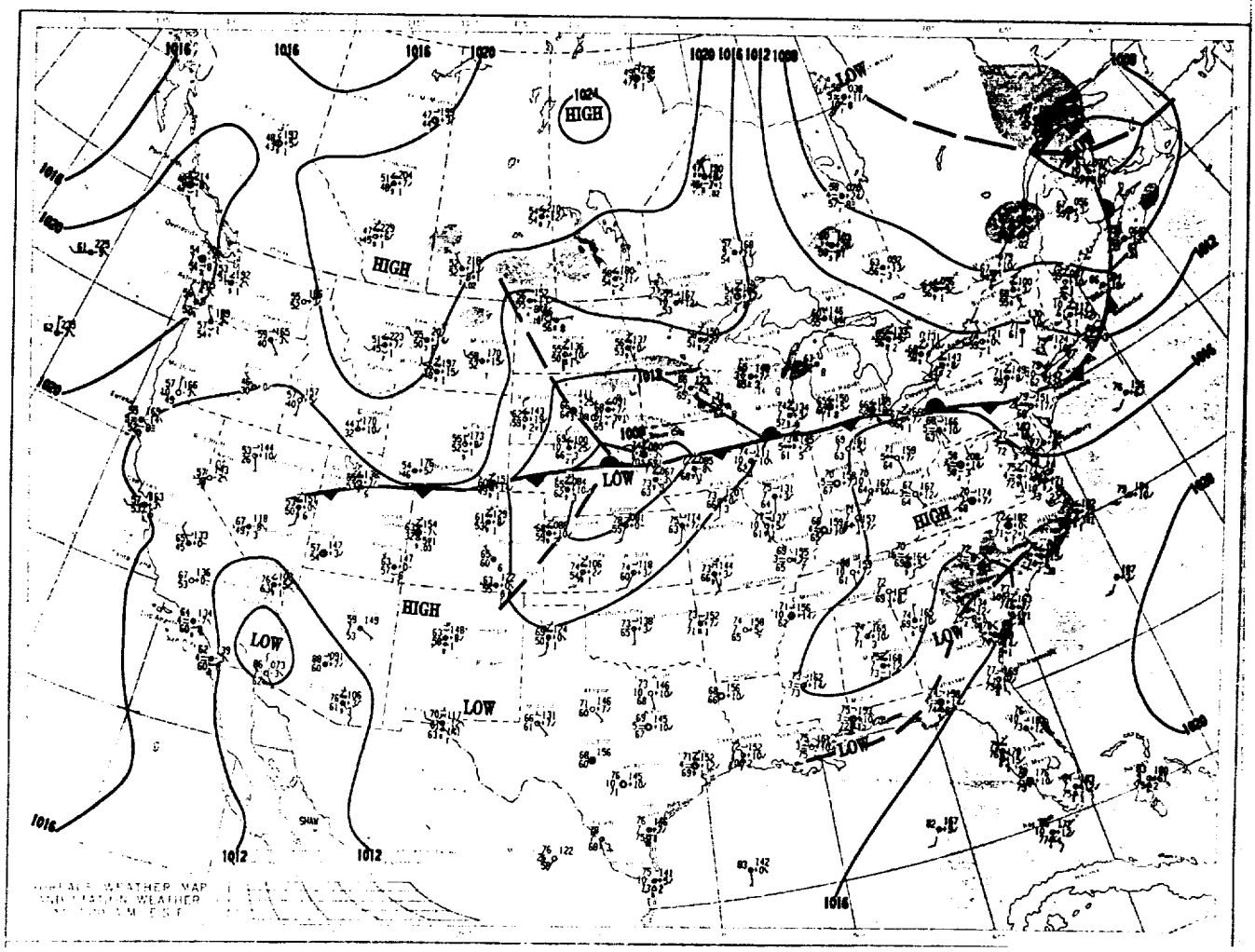
Table 5. STS-43 ascent atmospheric data profile (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
264000.	109.71	30.00	-80.15	0.8700E-02	0.1570E-01	-9999.00
265000.	106.33	31.00	-80.15	0.8300E-02	0.1498E-01	-9999.00
266000.	102.95	32.00	-81.15	0.7800E-02	0.1415E-01	-9999.00
267000.	97.90	33.00	-82.06	0.7400E-02	0.1349E-01	-9999.00
268000.	96.19	35.00	-82.58	0.7100E-02	0.1298E-01	-9999.00
269000.	92.81	36.00	-84.11	0.6700E-02	0.1235E-01	-9999.00
270000.	89.44	38.00	-85.15	0.6300E-02	0.1167E-01	-9999.00
271000.	86.06	40.00	-86.16	0.6000E-02	0.1118E-01	-9999.00
272000.	84.38	43.00	-87.68	0.5700E-02	0.1071E-01	-9999.00
273000.	81.00	46.00	-89.15	0.5400E-02	0.1022E-01	-9999.00
274000.	79.33	50.00	-89.73	0.5100E-02	0.9686E-02	-9999.00
275000.	75.95	54.00	-90.25	0.4800E-02	0.9143E-02	-9999.00
276000.	74.25	59.00	-91.15	0.4600E-02	0.8805E-02	-9999.00
277000.	72.57	65.00	-91.30	0.4300E-02	0.8237E-02	-9999.00
278000.	70.87	71.00	-92.15	0.4100E-02	0.7891E-02	-9999.00
279000.	70.87	79.00	-93.35	0.3900E-02	0.7556E-02	-9999.00
280000.	72.57	86.00	-94.87	0.3600E-02	0.7035E-02	-9999.00
281000.	72.57	93.00	-95.39	0.3400E-02	0.6663E-02	-9999.00
282000.	74.25	101.00	-96.15	0.3300E-02	0.6495E-02	-9999.00
283000.	65.07	101.08	-95.44	0.3165E-02	0.6205E-02	-9999.00
286000.	37.52	101.56	-93.30	0.2793E-02	0.5411E-02	-9999.00
289000.	9.99	104.65	-91.17	0.2465E-02	0.4719E-02	-9999.00
292000.	17.60	278.04	-89.03	0.2176E-02	0.4117E-02	-9999.00
295000.	45.14	279.50	-86.90	0.1920E-02	0.3591E-02	-9999.00
298000.	96.37	273.75	-85.61	0.1640E-02	0.3046E-02	-9999.00
301000.	156.71	271.91	-84.15	0.1400E-02	0.2581E-02	-9999.00
304000.	218.12	271.08	-82.69	0.1190E-02	0.2177E-02	-9999.00
307000.	274.43	270.62	-81.23	0.1010E-02	0.1833E-02	-9999.00
310000.	316.47	270.33	-79.77	0.8640E-03	0.1556E-02	-9999.00
313000.	336.03	270.18	-78.30	0.7380E-03	0.1319E-02	-9999.00
316000.	348.69	270.17	-76.80	0.6330E-03	0.1123E-02	-9999.00
319000.	355.12	270.15	-75.30	0.5430E-03	0.9561E-03	-9999.00
322000.	352.69	270.13	-73.80	0.4650E-03	0.8126E-03	-9999.00
325000.	337.99	270.09	-72.30	0.3990E-03	0.6921E-03	-9999.00
328000.	306.69	270.04	-70.81	0.3420E-03	0.5888E-03	-9999.00
331000.	315.42	270.02	-67.37	0.2950E-03	0.4994E-03	-9999.00
334000.	319.36	269.92	-63.89	0.2550E-03	0.4245E-03	-9999.00
337000.	314.34	269.78	-60.40	0.2200E-03	0.3602E-03	-9999.00
340000.	296.99	269.56	-56.91	0.1900E-03	0.3061E-03	-9999.00
343000.	262.98	269.20	-53.43	0.1640E-03	0.2600E-03	-9999.00
346000.	240.24	269.33	-48.10	0.1430E-03	0.2214E-03	-9999.00
349000.	240.07	268.89	-40.97	0.1260E-03	0.1891E-03	-9999.00
352000.	232.72	268.25	-33.83	0.1110E-03	0.1616E-03	-9999.00
355000.	215.73	267.29	-26.70	0.9780E-04	0.1382E-03	-9999.00
358000.	186.04	265.64	-19.57	0.8600E-04	0.1181E-03	-9999.00
361000.	140.98	266.05	-12.33	0.7570E-04	0.1011E-03	-9999.00
364000.	137.35	264.35	-2.20	0.6870E-04	0.8833E-04	-9999.00
367000.	129.74	261.90	7.92	0.6220E-04	0.7709E-04	-9999.00
370000.	117.24	258.13	18.04	0.5620E-04	0.6724E-04	-9999.00
373000.	99.13	251.60	28.16	0.5080E-04	0.5873E-04	-9999.00

Table 5. STS-43 ascent atmospheric data profile (continued).

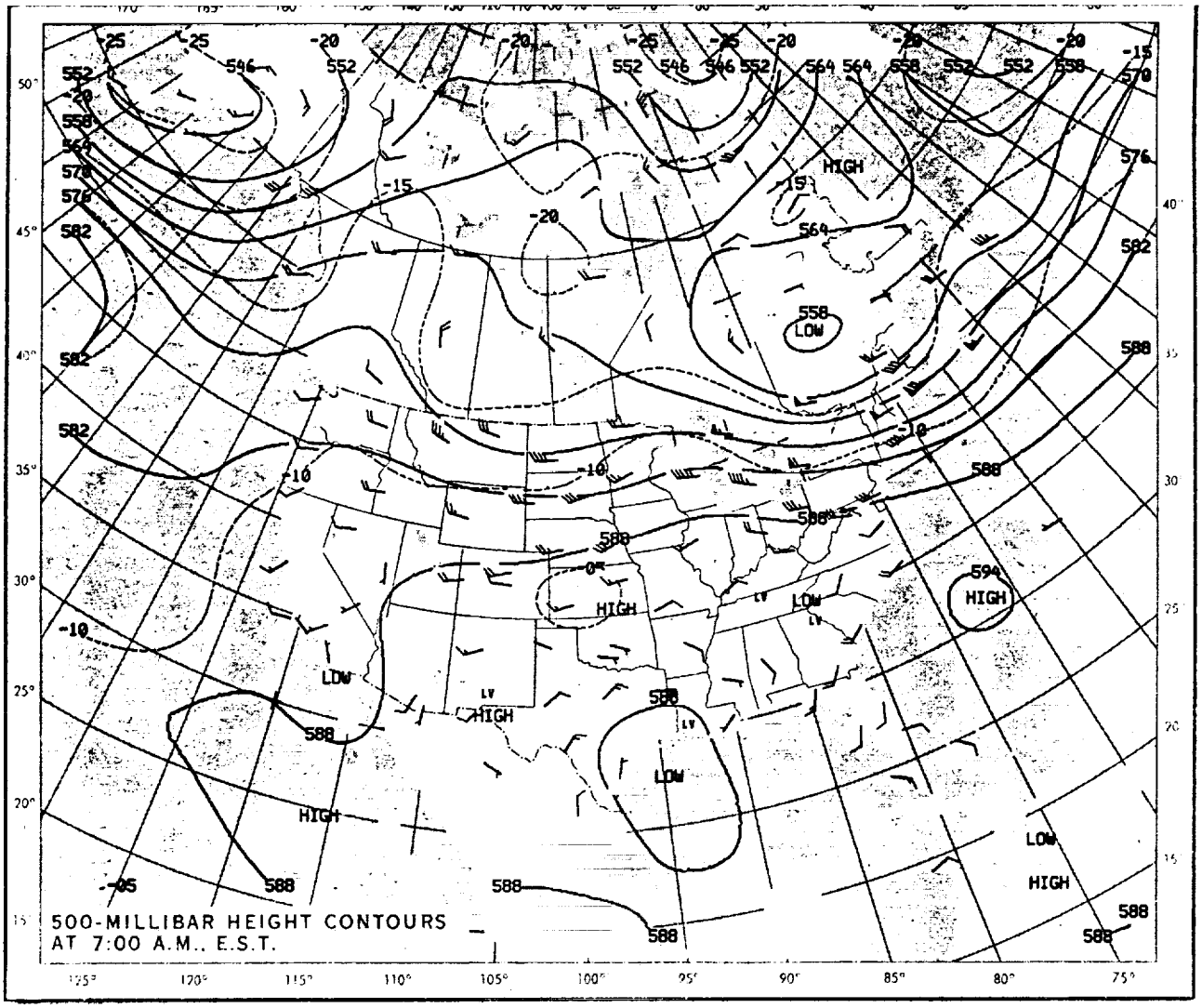
ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
376000.	76.11	238.21	38.28	0.4580E-04	0.5123E-04	-9999.00
379000.	53.58	243.22	49.08	0.4170E-04	0.4508E-04	-9999.00
382000.	53.45	239.74	60.66	0.3830E-04	0.3997E-04	-9999.00
385000.	53.66	236.07	72.58	0.3530E-04	0.3557E-04	-9999.00
388000.	54.17	232.33	84.81	0.3260E-04	0.3173E-04	-9999.00
391000.	55.02	228.51	97.32	0.3030E-04	0.2849E-04	-9999.00
394000.	56.21	224.69	110.07	0.2810E-04	0.2554E-04	-9999.00
397000.	57.73	220.90	123.04	0.2620E-04	0.2304E-04	-9999.00
400000.	59.59	217.19	136.19	0.2450E-04	0.2085E-04	-9999.00

FRIDAY, AUGUST 2, 1991



Surface synoptic map at 1200 u.t. August 2, 1991—isobaric, frontal, and precipitation patterns are shown in standard symbolic form.

Figure 1. Surface synoptic chart 3 h 2 min before the launch of STS-43.



500-mb height
Contours at 1200 u.t.
August 2, 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 3 h 2 min before the launch of STS-43.

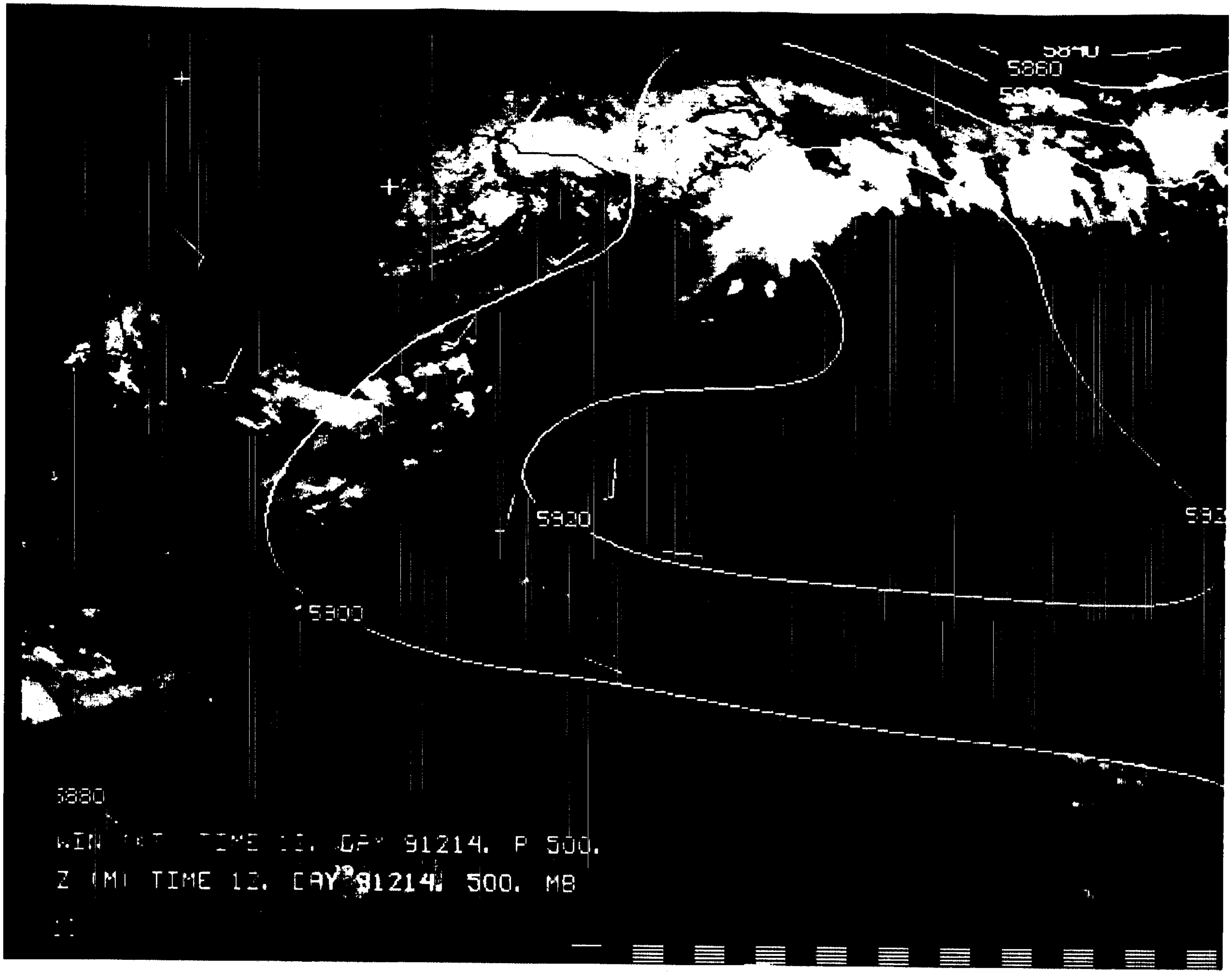


Figure 3. GOES-7 visible imagery of cloud cover 1 min before the launch of STS-43 (1501 u.t., August 2, 1991). 500-mb heights (meters) and wind barbs are also included for 1200 u.t.

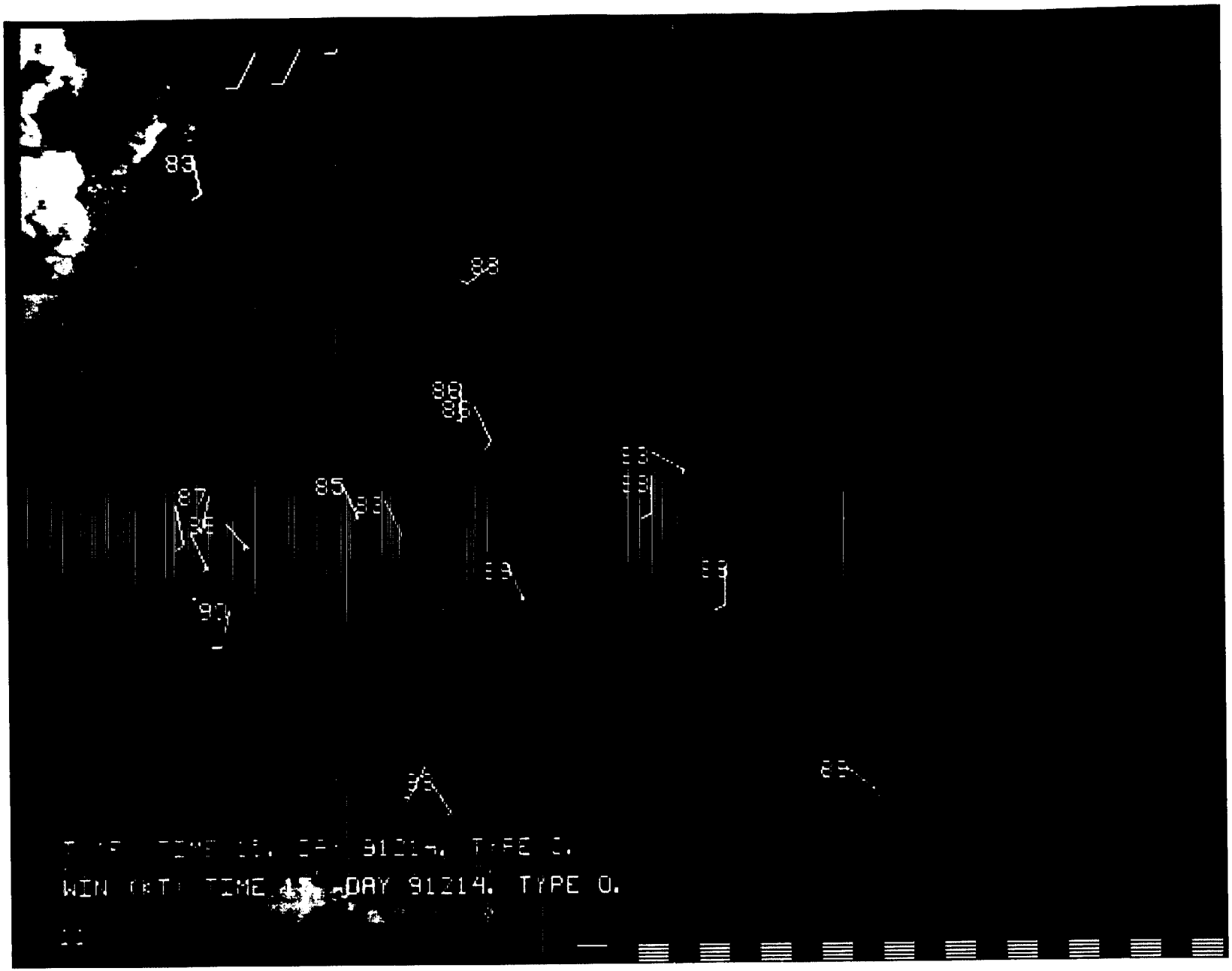


Figure 4. Enlarged view of GOES-7 visible imagery of cloud cover taken 1 min before the launch of STS-43 (1501 u.t., August 2, 1991). Surface temperatures and wind barbs for 1500 u.t. are also included.

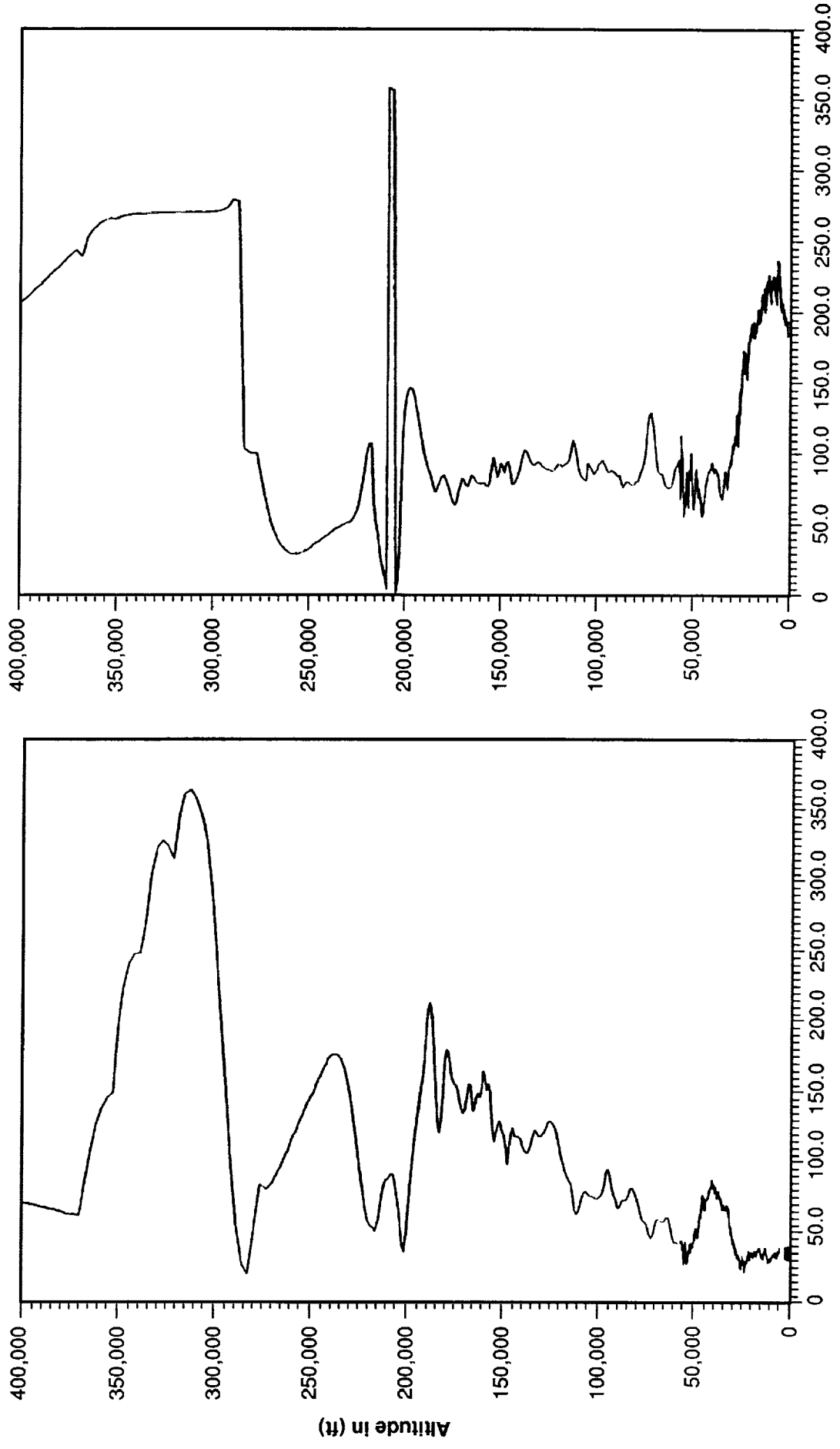


Figure 5. Scalar wind speed and direction at launch time of STS-43.

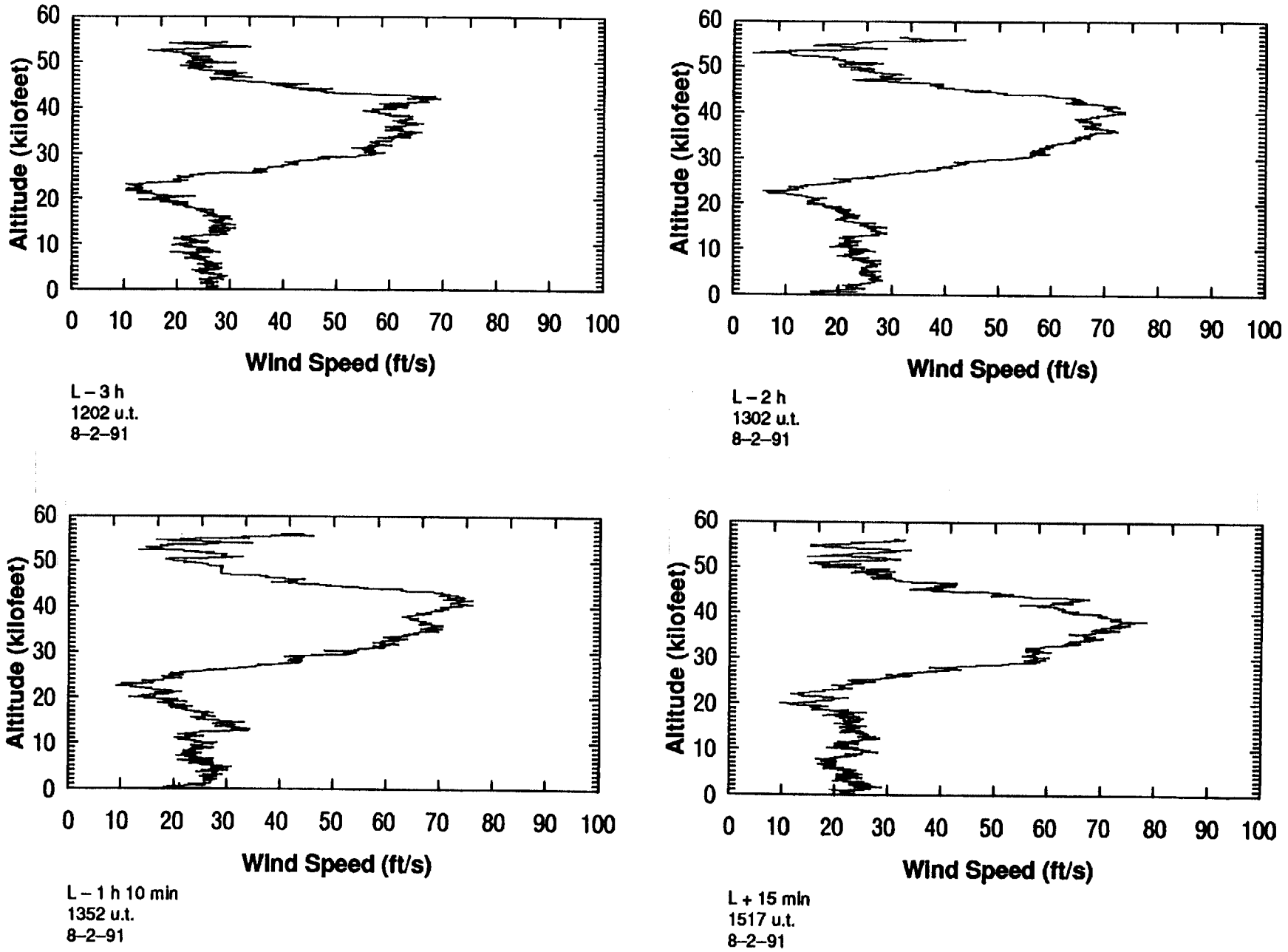


Figure 6. STS-43 prelaunch/launch Jimsphere-measured wind speeds (ft/s).

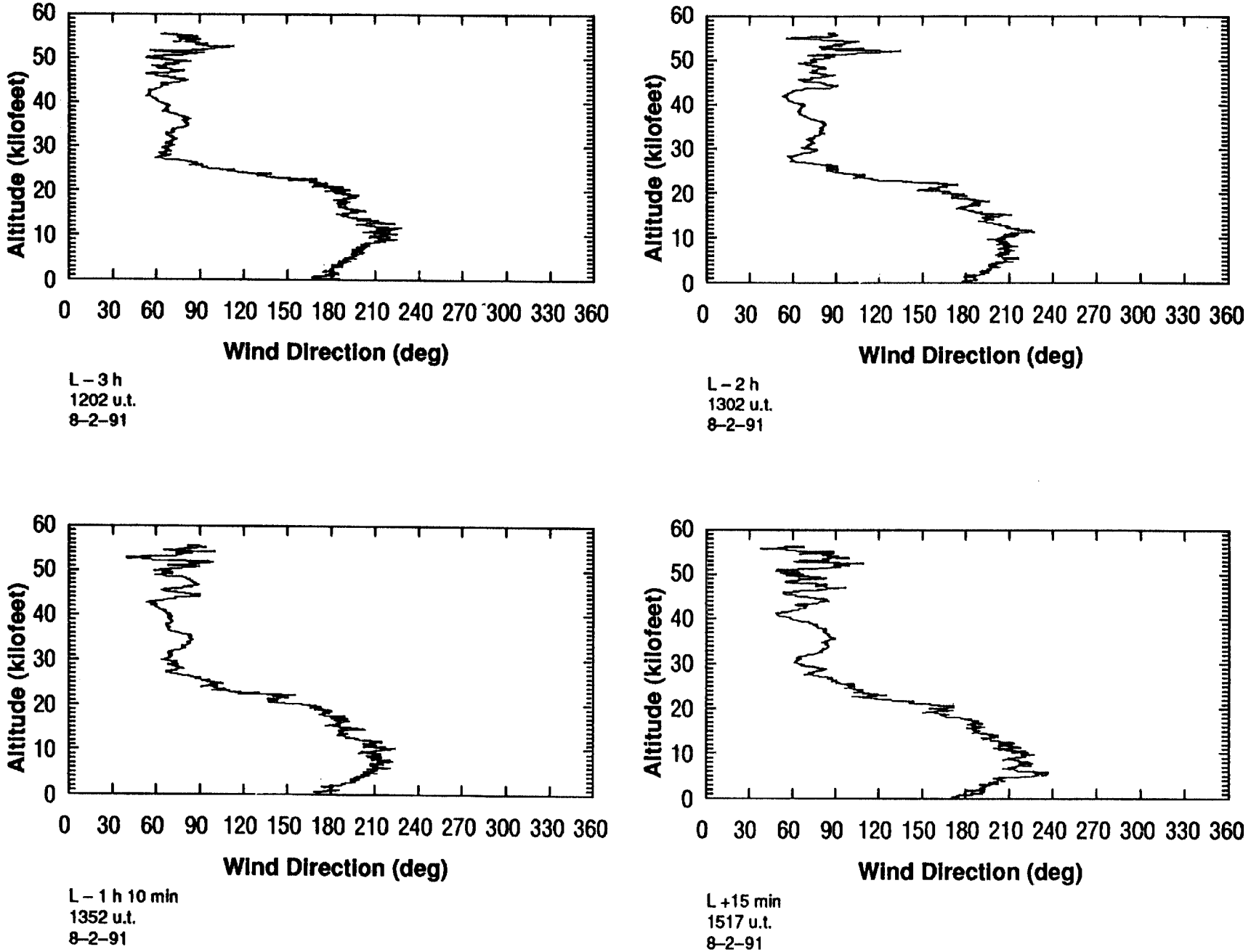


Figure 7. STS-43 prelaunch/launch Jimsphere-measured wind directions (degrees).

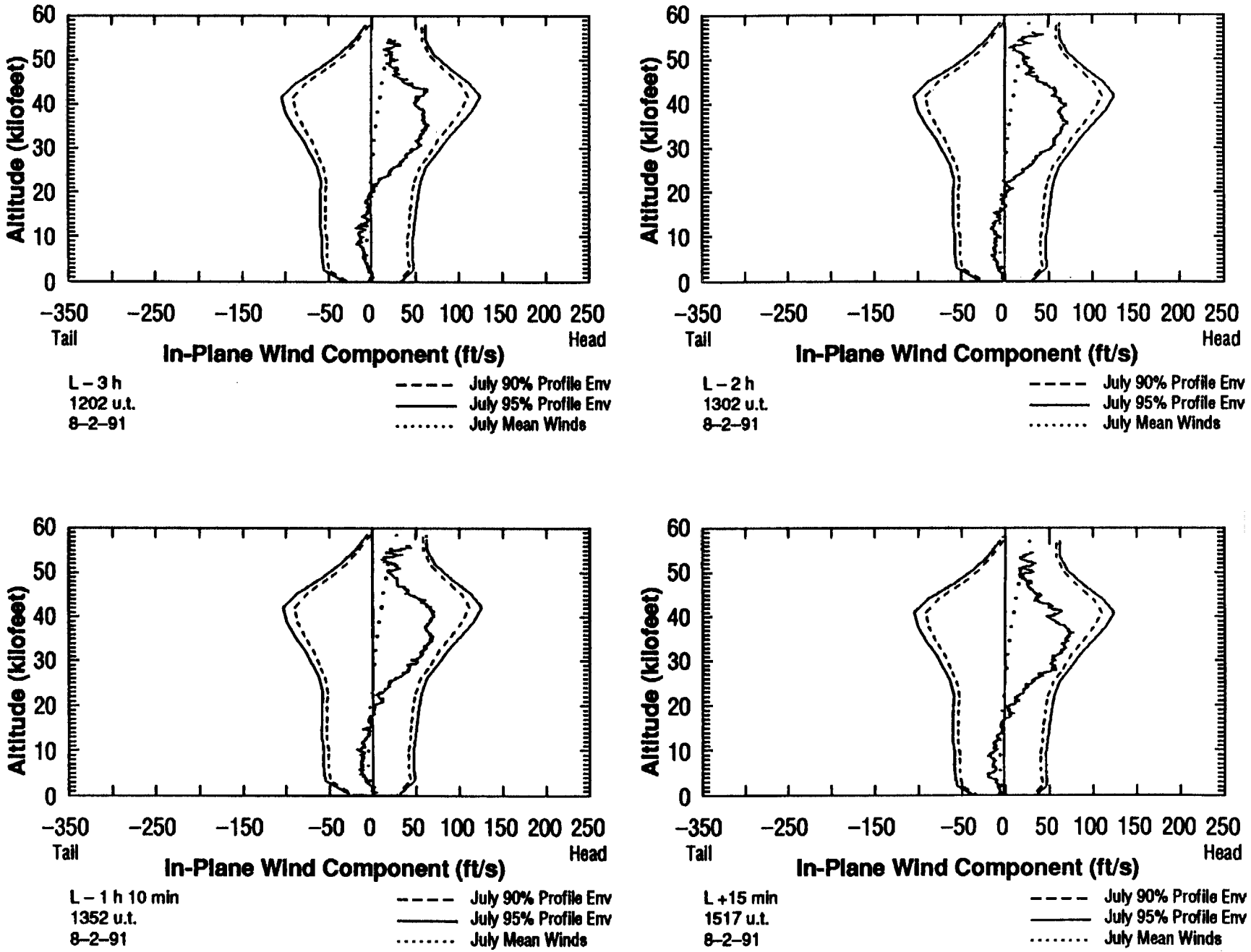


Figure 8. STS-43 prelaunch/launch Jimsphere-measured in-plane component winds (ft/s). Flight azimuth = 90°.

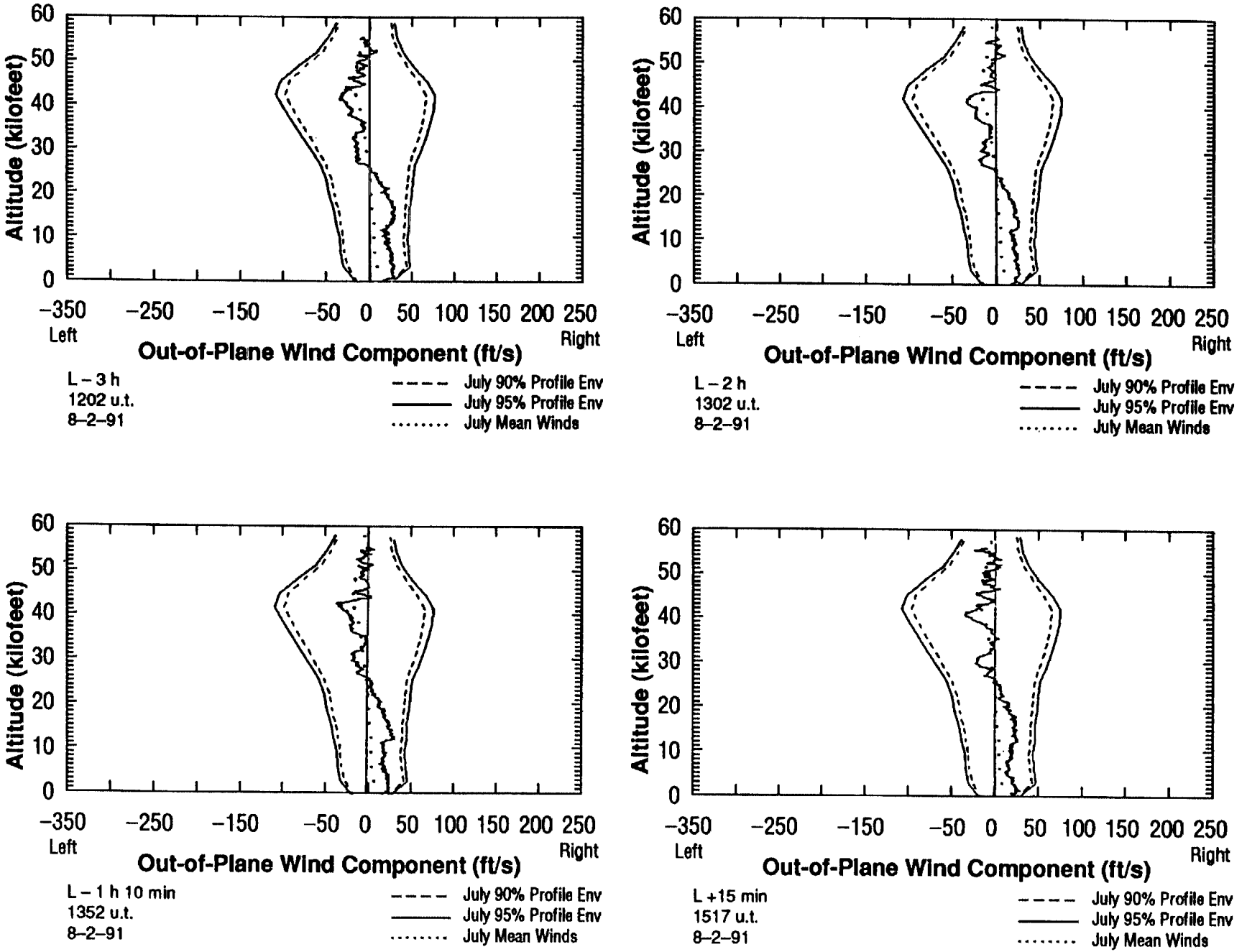


Figure 9. STS-43 prelaunch/launch Jimsphere-measured out-of-plane component winds (ft/s). Flight azimuth = 90°.

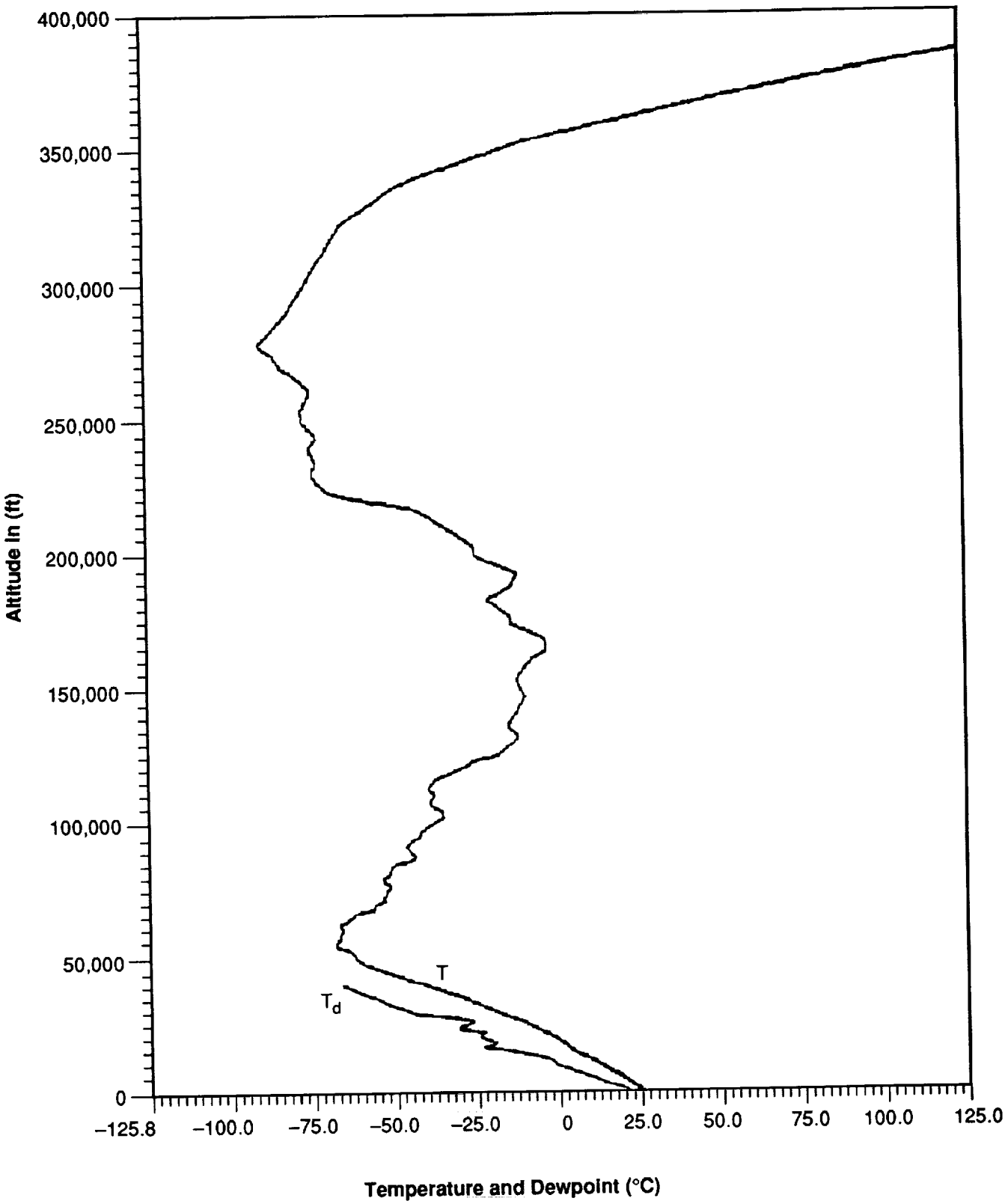


Figure 10. STS-43 temperature profiles versus altitude for launch (ascent).

REFERENCES

1. Saturn Flight Evaluation Working Group: "Saturn Launch Vehicle Flight Evaluation Report—Appendix A—Atmosphere" (a separate report is prepared for each Saturn vehicle launch operation). George C. Marshall Space Flight Center, Alabama.

2. Johnson, D.L.: "Summary of Atmospheric Data Observations for 155 Flights of MSFC/ABMA Related Aerospace Vehicles." NASA TM X-64796, December 5, 1973.

3. Johnson, D.L.: "Atmospheric Environment for ASTP (SA-210) Launch." NASA TM X-64990, February 1976.

4. Johnson, D.L., Jasper, G., and Brown, S.C.: "Atmospheric Environment for Space Shuttle (STS-1) Launch." NASA TM 82436, July 1981.

5. Johnson, D.L., and Brown, S.C.: "Atmospheric Environment for Space Shuttle (STS-2) Launch." NASA TM 82463, December 1981.

6. Johnson, D.L., Brown, S.C., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-3) Launch." NASA TM 82480, April 1982.

7. Johnson, D.L., Hill, C.K., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-4) Launch." NASA TM 82498, July 1982.

8. Johnson, D.L., Hill, C.K., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-5) Launch." NASA TM 82515, March 1983.

9. Johnson, D.L., Hill, C.K., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-6) Launch." NASA TM 82529, May 1983.

10. Johnson, D.L., Hill, C.K., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-7) Launch." NASA TM 82542, July 1983.

11. Johnson, D.L., Hill, C.K., Turner, R.E., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-8) Launch." NASA TM 82560, October 1983.

12. Johnson, D.L., Hill, C.K., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-9) Launch." NASA TM 82572, January 1984.

13. Johnson, D.L., Hill, C.K., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-11) Launch." NASA TM 82580, March 1984.

14. Johnson, D.L., Hill, C.K., Jasper, G., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-13) Launch." NASA TM 82588, May 1984.

15. Johnson, D.L., Hill, C.K., Jasper, G., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-41D) Launch." NASA TM 86484, October 1984.

16. Johnson, D.L., Hill, C.K., Jasper, G., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-41G) Launch." NASA TM 86486, November 1984.

17. Johnson, D.L., Jasper, G., Hill, C.K., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-51A) Launch." NASA TM 84697, December 1984.

18. Jasper, G.L., Johnson, D.L., Hill, C.K., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-51C) Launch." NASA TM 86508, April 1985.

19. Jasper, G.L., Johnson, D.L., Hill, C.K., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-51D) Launch." NASA TM 86524, June 1985.

20. Jasper, G.L., Johnson, D.L., Hill, C.K., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-51B) Launch." NASA TM 86525, July 1985.

21. Jasper, G.L., Johnson, D.L., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-51L) Launch." NASA TM 86577, December 1986.

22. Jasper, G.L., Johnson, D.L., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-26) Launch." NASA TM 100359, March 1989.

23. Jasper, G.L., Johnson, D.L., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-27) Launch." NASA TM 100370, May 1989.

24. Jasper, G.L., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-29) Launch." NASA TM 100376, July 1989.

25. Jasper, G.L., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-30) Launch." NASA TM 100381, July 1989.

26. Jasper, G.L., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-28) Launch." NASA TM 100386, July 1990.

27. Jasper, G.L., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-34) Launch." NASA TM 100396, December 1989.

28. Jasper, G.L., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-33) Launch." NASA TM 100399, March 1990.

29. Jasper, G.L., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-32) Launch." NASA TM 100400, March 1990.

30. Jasper, G.L., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-36) Launch." NASA TM-100403, May 1990.

31. Jasper, G.L., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-31) Launch." NASA TM 103508, June 1990.

32. Jasper, G.L., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-41) Launch." NASA TM 103525, November 1990.

33. Jasper, G.L., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-38) Launch." NASA TM 103530, February 1991.

34. Jasper, G.L., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-35) Launch." NASA TM 103538, June 1991.

35. Jasper, G.L., and Batts, G.W.: "Atmospheric Environment for Space Shuttle (STS-37) Launch." NASA TM 103556, August 1991.

36. Jasper, G.L., and Batts, G.W.: "Atmospheric Environment for Space Shuttle *Atlantis* (STS-39) Launch." NASA TM 103574, January 1992.

37. Jasper, G.L., and Batts, G.W.: "Atmospheric Environment for Space Shuttle *Columbia* (STS-40) Launch." NASA TM 103585, June 1992.

38. Justus, C.G., et al.: "The NASA/MSFC Global Reference Atmospheric Model—1990 Version (GRAM-90)." NASA TM 4268 Part I, April 1991.

APPROVAL

ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE *ATLANTIS* (STS-43) 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.

E. TANDBERG-HANSSEN
Director, Space Science Laboratory

☆ U.S. GOVERNMENT PRINTING OFFICE 1992—631-060/60187