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## ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-36) LAUNCH

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Space Science Laboratory

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16. Abstract <p>This report presents a summary of selected atmospheric conditions observed near space shuttle STS-36 launch time on February 28, 1990, at Kennedy Space Center, Florida. STS-36 carried a Department of Defense payload and the flight azimuth in this report will be denoted by a reference flight azimuth, since the actual flight azimuth is not known. Values of ambient pressure, temperature, moisture, ground winds, visual observations (cloud), and winds aloft are included. The sequence of pre-launch 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-36 vehicle ascent has been constructed. The STS-36 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-36 vehicle.</p>			
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## TECHNICAL MEMORANDUM

# ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-36) LAUNCH

### I. INTRODUCTION

This report presents an evaluation of the atmospheric environmental data taken during the launch of the space shuttle/STS-36 vehicle. This space shuttle vehicle was launched from Pad 39A at Kennedy Space Center (KSC), Florida, on a reference flight azimuth of 39-degrees east of north, at 0750 u.t. (0250 e.s.t.) on February 28, 1990.

This report presents a summary of the atmospheric environment at launch time (L+0) of the STS-36, together with the sequence of prelaunch Jimsphere-measured winds-aloft profiles from L-3.42 h through liftoff. 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-36 duty, the solid rocket booster (SRB) descent/impact atmospheric data were not taken. However, one can use the STS-36 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 has also been published [2] 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-32 launch conditions are presented in references 3 through 29, 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 the Super-Loki 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 weak area of high pressure prevailed over the KSC area during the launch of STS-36. Surface winds were mostly light and northerly. Figure 1 presents the surface map 4 h and 10 min after the launch of STS-36. The flow aloft over the KSC area was dominated by light westerly winds. Figure 2 shows the wind aloft conditions at the 500-mb level 4 h and 10 min after launch.

Showers were scattered over the KSC area 2 h prior to the launch of STS-36 and dissipated about 0.5 h before the launch.

### 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-36. 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 (0805 u.t.), MSS Rawinsonde (0805 u.t.), and Super-Loki Robin (0833 u.t.) systems were used to measure the upper level wind and thermodynamic parameters for STS-36 launch. The Super-Loki rocketsonde (Datasonde) was not launched for STS-36. At altitudes above the rocket-measured data, the Global Reference Atmosphere Model (GRAM) [30] parameters for February KSC conditions were used. A tabulation of the STS-36 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 23.6 ft/s (13.9 kn) at the 60-ft level and increased to a maximum of 177 ft/s (104.8 kn) at 41,600 ft (12,680 m). The next measurable maximum wind speed was 92 ft/s (155.4 kn) at 53,600 ft (16,337 m). The winds remained below this maximum through the 269,000 ft (81,991 m) level which was the altitude of the last measurable speed. The left side of figure 3 shows a plot of wind speed versus altitude.



## **B. Wind Direction**

The 60-ft wind direction was from the east ( $72^\circ$ ) at launch time and shifted to a northerly component at 12,900 ft (3,932 m). The winds were variable above this level and became westerly around 19,000 ft (5,791 m). Winds remained westerly above this level to about 67,000 ft (20,422 m) where winds took on an easterly component. Above this level winds oscillated from west to north-west. Winds were northwesterly around 269,000 ft (81,991 m) which was the last measurable directional height. Figure 3 depicts the complete wind versus altitude profile specifying wind direction on the right side.

## **C. Prelaunch/Launch Wind Profiles**

Prelaunch/launch wind profiles given in figures 4 through 7 were measured by the Jimsphere FPS-16 system. Data are shown for four measurement periods beginning at L-3.42 h and extending through L+15 min.

The wind speed and direction profiles for the L-3.4-h period prior to and including L+15 min are shown in figures 4 and 5. The in-plane and out-of-plane profiles are given in figures 6 and 7. The in-plane component wind speeds were less than the February mean wind values. The out-of-plane wind speeds were less than the February mean wind values at altitudes below the 38,000 ft (11,582 m) level and greater than the mean wind value above this altitude.

## **D. Thermodynamic Data**

The thermodynamic data, taken at STS-36 launch time, consisted of atmospheric temperature, dew-point temperature, pressure, and density. These data have been compiled as the STS-36 ascent atmospheric data and are presented in table 5. The vertical structure of temperature and dew-point temperature for STS-36 ascent are shown graphically versus altitude in figure 8.

## **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 <sup>h</sup>				Surface Observations					Inflight Conditions Max. Wind Below 60,000 ft			Count Down and Launch Comments of Meterological Significance	
				Thermodynamic <sup>a</sup>			Wind <sup>b</sup>		Alt. (ft)	Speed (ft/sec)	Dir. (deg)		
Seq. No.	Vehicle No.	Launch Date	Time (EST) Nearest Minute	Press. <sup>c</sup> N/cm <sup>2</sup>	Temp. (°C)	Rel. Hum. (%)	Speed (ft/sec)	Dir. (deg)				Alt. (ft)	Speed (ft/sec)
1	STS-1 Columbia	4/12/81	0700	10.234 <sup>d</sup>	21	82	11.8 15.2	125 120	44,300	98	250	Wind directional change observed at Pad just prior to L+0. Onset of sea breeze.	
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 <sup>e</sup> 8.0 <sup>e</sup>	50 <sup>e</sup> 145 <sup>e</sup>	45,000	119	250		
4	STS-4 Columbia	6/27/82	1100 <sup>f</sup>	10.200	29	70	5.8 <sup>g</sup> 4.9 <sup>g</sup>	133 <sup>g</sup> 141 <sup>g</sup>	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 <sup>f</sup>	10.146	25	80	5.9 <sup>e</sup> 10.3 <sup>e</sup>	10 <sup>e</sup> 350 <sup>e</sup>	45,900	76	278		
8	STS-8 Challenger	8/30/83	0232 <sup>f</sup>	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 <sup>f</sup>	10.172	26	81	3.0 3.6	106 39	40,300	44	270		
13	STS-41G Challenger	10/5/84	0703 <sup>f</sup>	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 <sup>h</sup>				Surface Observations					Inflight Conditions Max. Wind Below 60,000 ft			Count Down and Launch Comments of Meteorological Significance
Seq. No.	Vehicle No.	Launch Date	Time (EST) Nearest Minute	Thermodynamic <sup>a</sup>			Wind <sup>b</sup>		Alt. (ft)	Speed (ft/sec)	Dir. (deg)	
				Press. <sup>c</sup> N/cm <sup>2</sup>	Temp. (°C)	Rel. Hum. (%)	Speed (ft/sec)	Dir. (deg)				
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 <sup>f</sup>	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 <sup>f</sup>	10.201	23	91	2.9 11.3	201 206	40,100 46,700	55 55	298 302	
19	STS-51F Challenger	7/29/85	1700 <sup>f</sup>	10.174	28	72	14.9 13.4	101 113	48,000	53	035	(20) 8/24 launch scrub due to unexceptionable weather in launch area. Rain during countdown.
20	STS-51I Discovery	8/27/85	0658 <sup>f</sup>	10.225	24	86	14.2 16.6	073 070	41,000	43	123	
21	STS-51J Atlantis	10/3/85	1115 <sup>f</sup>	10.185	28	79	17.0 13.7	213 171	48,000	48	283	(24) 1/7 launch scrub due to unexceptionable 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	(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.
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	(26) 1-hr and 37-min delay due to light winds.
25 <sup>j</sup>	STS-51L <sup>i</sup> Challenger	1/28/86	1138	10.253	3	27	20.1 15.3	331 262	42,000	174	264	
26 <sup>j</sup>	STS-26 Discovery	9/29/88	1137 <sup>f</sup>	10.182	29	56	13.7 13.5	058 047	53,100	44	304	(27) 1-day delay due to excessive wind loads, calculated at high altitudes.
27 <sup>j</sup>	STS-27 Atlantis	12/2/88	930	10.270	14	50	25.5 22.0	314 352	40,200	187	245	(28) 2-hr delay due to fog and strong winds aloft.
28 <sup>j</sup>	STS-29 Discovery	3/13/89	957	10.190	18	78	16.9	242	45,200	105	283	
29 <sup>j</sup>	STS-30 Atlantis	5/4/89	1437 <sup>f</sup>	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 <sup>h</sup>				Surface Observations					Inflight Conditions Max. Wind Below 60,000 ft			Count Down and Launch Comments of Meteorological Significance
				Thermodynamic <sup>a</sup>			Wind <sup>b</sup>		Alt. (ft)	Speed (ft/sec)	Dir. (deg)	
Seq. No.	Vehicle No.	Launch Date	Time (EST) Nearest Minute	Press. <sup>c</sup> N/cm <sup>2</sup>	Temp. (°C)	Rel. Hum. (%)	Speed (ft/sec)	Dir. (deg)				Alt. (ft)
30 <sup>j</sup>	STS-28 Columbia	8/8/89	0837 <sup>f</sup>	10.120	27	80	12.5	252	24,100	35	286	(31) 1-day delay due to rain showers in launch area.  (33) 1-day delay due to cloud cover over the launch area.  (34) 6-day delay due to crew illness and various weather conditions.
31 <sup>j</sup>	STS-34 Atlantis	10/18/89	1254 <sup>f</sup>	10.152	30	52	13.5	193	45,800 47,100	61 61	287 294	
32 <sup>j</sup>	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	
34	STS-36 Atlantis	2/28/90	0250	10.268	18	71	23.6	72	41,600	177	289	

- 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-36 ascent.

Type of Data	Date: February 28, 1990		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	08:05	15	6 (21)	15	17,069 (56,000)	71
MSS Rawinsonde	08:05	15	17,374 (57,000)	72	30,175 (99,000)	114
Super-Loki Rocketsonde (Robin)	08:33	43	81,991 (269,000)	43	30,480 (100,000)	46

Table 3. KSC surface observations at STS-36 launch time.

Location <sup>a</sup>	Time After L+0 (min)	Pressure (MSL) N/cm <sup>2</sup> (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 (degree)
NASA Space Shuttle Runway X68 <sup>e</sup> Winds Measured at 10.4 m (34 ft)	0	10.284 (14.916)	290.9 (64.0)	286.5 (56.0)	76	16 (10)	2	Strato-cumulus	1,829 (6,000)	10.1 (6.0)	070
							7	Alto-cumulus	2,286 (7,500)		
CCAFS XMR <sup>c</sup> Surface Measurements	0	10.281 (14.912)	291.5 (65.0)	287.0 (57.0)	75	16 (7)	2	Strato-cumulus	1,219 (4,000)	13.5 (8.0)	090
							9	Alto-cumulus	2,438 (8,000)		
Pad 39A <sup>b</sup> Lightpole NW 18.3 m (60.0 ft) <sup>d</sup>	0	10.268 (14.893)	291.5 (65.0)	286.2 (55.0)	71	-	-	-	-	23.6 (13.9)	072

\*7/10 total sky cover reported at X68 and 9/10 total sky cover reported 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 39A thermodynamic measurements are taken at camera site No. 3, approximately 6.4 m (21 ft) above MSL.
- e. Official STS-36 sky observational site.

Table 4. STS-36 pre-launch through launch KSC pad 39A atmospheric measurements.<sup>a</sup>

Hourly Atmospheric Measurements						Sky Condition <sup>b</sup>			
28 February 1990 Time u.t.	Temperature (°F)	Dew Point (°F)	Relative Humidity (%)	60' Level (NW)		Clouds	Total Sky Cover	Vis. (mi.)	Other Remarks
				WS Kt	WD°				
0200	64	49	58	15	070	Clear	0	10	
0300	65	49	57	16	071	Scattered at 4,000 ft	1/10	10	
0400	65	50	58	15	069	Scattered at 4,000 ft	1/10	10	
0500	65	51	60	14	068	Scattered at 4,000 ft	2/10	10	
0600	65	52	63	13	067	Scattered at 5,000 ft	5/10	10	
0700	63	57	80	8	039	Scattered at 3,900 ft and overcast at 5,500 ft	10/10	10	Light rainstorm
L+0 <sup>c</sup> 0750	65	55	71	14	072	Scattered at 6,000 ft and broken at 7,500 ft	7/10	10	

- a. Hourly pad observations (obtained via MSFC/HOSC) averaged over 1 min, centered on the hour.
- b. Sky observations taken at the shuttle runway site X68.
- c. L+0 PAD wind and thermodynamic parameters obtained from HOSC strip charts. The NW anemometer was used at 60 ft for L+0 wind conditions approximately 1-min average prior to L+0.

Table 5. STS-36 ascent atmospheric data tape.

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
21.	11.81	100.00	18.11	0.1028E+04	0.1222E+04	14.71
100.	17.72	87.00	18.05	0.1025E+04	0.1219E+04	14.44
200.	23.62	83.00	17.98	0.1021E+04	0.1215E+04	14.09
300.	29.53	80.00	17.91	0.1018E+04	0.1211E+04	13.74
400.	35.43	79.00	17.84	0.1014E+04	0.1207E+04	13.39
500.	37.40	79.00	17.77	0.1011E+04	0.1203E+04	13.05
600.	37.07	84.00	17.70	0.1007E+04	0.1199E+04	12.70
700.	37.73	80.00	17.62	0.1003E+04	0.1196E+04	12.35
800.	36.75	83.00	17.55	0.9998E+03	0.1192E+04	12.00
900.	37.40	86.00	17.48	0.9962E+03	0.1188E+04	11.66
1000.	31.50	87.00	17.41	0.9927E+03	0.1184E+04	11.31
1100.	33.14	86.00	17.14	0.9892E+03	0.1181E+04	11.15
1200.	34.45	89.00	16.87	0.9856E+03	0.1178E+04	10.99
1300.	31.82	89.00	16.60	0.9821E+03	0.1175E+04	10.83
1400.	33.46	87.00	16.33	0.9786E+03	0.1172E+04	10.67
1500.	35.43	92.00	16.06	0.9751E+03	0.1169E+04	10.51
1600.	31.82	95.00	15.79	0.9717E+03	0.1166E+04	10.35
1700.	31.17	91.00	15.52	0.9682E+03	0.1163E+04	10.19
1800.	34.12	91.00	15.25	0.9648E+03	0.1160E+04	10.03
1900.	33.79	95.00	14.98	0.9613E+03	0.1157E+04	9.87
2000.	32.81	92.00	14.71	0.9579E+03	0.1154E+04	9.71
2100.	33.79	94.00	14.41	0.9544E+03	0.1151E+04	9.60
2200.	32.81	97.00	14.11	0.9510E+03	0.1148E+04	9.49
2300.	33.79	94.00	13.81	0.9476E+03	0.1145E+04	9.38
2400.	34.12	95.00	13.51	0.9442E+03	0.1142E+04	9.27
2500.	32.15	96.00	13.21	0.9407E+03	0.1139E+04	9.16
2600.	34.45	93.00	12.91	0.9374E+03	0.1136E+04	9.05
2700.	35.10	96.00	12.61	0.9340E+03	0.1133E+04	8.94
2800.	33.79	94.00	12.31	0.9306E+03	0.1130E+04	8.83
2900.	36.42	92.00	12.01	0.9272E+03	0.1128E+04	8.72
3000.	36.09	97.00	11.71	0.9239E+03	0.1125E+04	8.61
3100.	33.79	93.00	11.45	0.9205E+03	0.1122E+04	8.62
3200.	36.42	91.00	11.19	0.9172E+03	0.1119E+04	8.63
3300.	37.73	96.00	10.93	0.9138E+03	0.1115E+04	8.64
3400.	36.09	98.00	10.67	0.9105E+03	0.1112E+04	8.65
3500.	38.06	93.00	10.41	0.9072E+03	0.1109E+04	8.66
3600.	37.07	96.00	10.15	0.9039E+03	0.1106E+04	8.67
3700.	35.76	93.00	9.89	0.9006E+03	0.1103E+04	8.68
3800.	36.09	96.00	9.63	0.8973E+03	0.1100E+04	8.69
3900.	34.12	90.00	9.37	0.8941E+03	0.1097E+04	8.70
4000.	34.45	88.00	9.11	0.8908E+03	0.1094E+04	8.71
4100.	33.46	87.00	8.87	0.8875E+03	0.1091E+04	8.51
4200.	33.79	89.00	8.63	0.8843E+03	0.1088E+04	8.31
4300.	32.81	86.00	8.39	0.8810E+03	0.1085E+04	8.11
4400.	31.82	87.00	8.15	0.8778E+03	0.1082E+04	7.91
4500.	30.18	87.00	7.91	0.8746E+03	0.1079E+04	7.71
4600.	30.51	87.00	7.67	0.8713E+03	0.1076E+04	7.51
4700.	29.53	85.00	7.43	0.8681E+03	0.1073E+04	7.31
4800.	30.18	84.00	7.19	0.8649E+03	0.1070E+04	7.11
4900.	28.87	83.00	6.95	0.8618E+03	0.1067E+04	6.91



Table 5. STS-36 ascent atmospheric data tape (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
5000.	28.54	75.00	6.71	0.8586E+03	0.1064E+04	6.71
5100.	30.84	79.00	6.53	0.8554E+03	0.1061E+04	6.53
5200.	26.25	83.00	6.35	0.8523E+03	0.1058E+04	6.35
5300.	28.87	81.00	6.17	0.8491E+03	0.1055E+04	6.17
5400.	29.20	77.00	5.99	0.8460E+03	0.1051E+04	5.99
5500.	25.92	90.00	5.81	0.8429E+03	0.1048E+04	5.81
5600.	24.28	90.00	5.63	0.8397E+03	0.1045E+04	5.63
5700.	21.65	75.00	5.45	0.8366E+03	0.1042E+04	5.45
5800.	24.93	65.00	5.27	0.8335E+03	0.1039E+04	5.27
5900.	26.90	76.00	5.09	0.8305E+03	0.1036E+04	5.09
6000.	24.28	77.00	4.91	0.8274E+03	0.1032E+04	4.91
6100.	27.23	75.00	4.60	0.8243E+03	0.1030E+04	4.43
6200.	30.51	71.00	4.29	0.8212E+03	0.1027E+04	3.95
6300.	24.28	76.00	3.98	0.8182E+03	0.1025E+04	3.47
6400.	22.97	76.00	3.67	0.8151E+03	0.1022E+04	2.99
6500.	23.62	74.00	3.36	0.8121E+03	0.1020E+04	2.51
6600.	23.62	74.00	3.05	0.8090E+03	0.1017E+04	2.03
6700.	19.36	75.00	2.74	0.8060E+03	0.1014E+04	1.55
6800.	19.03	68.00	2.43	0.8030E+03	0.1012E+04	1.07
6900.	22.31	72.00	2.12	0.8000E+03	0.1009E+04	0.59
7000.	18.70	75.00	1.81	0.7970E+03	0.1007E+04	0.11
7100.	18.70	67.00	1.58	0.7940E+03	0.1004E+04	-0.35
7200.	21.65	72.00	1.35	0.7910E+03	0.1001E+04	-0.81
7300.	20.34	73.00	1.12	0.7880E+03	0.9982E+03	-1.27
7400.	22.97	72.00	0.89	0.7850E+03	0.9954E+03	-1.73
7500.	21.65	78.00	0.66	0.7821E+03	0.9925E+03	-2.19
7600.	22.97	75.00	0.43	0.7791E+03	0.9897E+03	-2.65
7700.	22.31	80.00	0.20	0.7762E+03	0.9868E+03	-3.11
7800.	22.97	78.00	-0.03	0.7732E+03	0.9840E+03	-3.57
7900.	21.33	82.00	-0.26	0.7703E+03	0.9812E+03	-4.03
8000.	19.36	81.00	-0.49	0.7674E+03	0.9784E+03	-4.49
8100.	21.33	81.00	-0.57	0.7645E+03	0.9750E+03	-4.87
8200.	17.72	85.00	-0.65	0.7616E+03	0.9716E+03	-5.25
8300.	19.69	84.00	-0.73	0.7587E+03	0.9682E+03	-5.63
8400.	20.34	94.00	-0.81	0.7558E+03	0.9649E+03	-6.01
8500.	17.39	87.00	-0.89	0.7529E+03	0.9615E+03	-6.39
8600.	17.72	71.00	-0.97	0.7500E+03	0.9582E+03	-6.77
8700.	19.36	76.00	-1.05	0.7472E+03	0.9549E+03	-7.15
8800.	17.72	76.00	-1.13	0.7444E+03	0.9516E+03	-7.53
8900.	18.70	68.00	-1.21	0.7415E+03	0.9483E+03	-7.91
9000.	20.67	62.00	-1.29	0.7387E+03	0.9450E+03	-8.29
9100.	19.36	72.00	-0.92	0.7359E+03	0.9403E+03	-9.85
9200.	17.72	77.00	-0.55	0.7331E+03	0.9356E+03	-11.41
9300.	17.72	78.00	-0.18	0.7303E+03	0.9310E+03	-12.97
9400.	22.64	79.00	0.19	0.7276E+03	0.9263E+03	-14.53
9500.	23.95	87.00	0.56	0.7248E+03	0.9217E+03	-16.09
9600.	21.00	84.00	0.93	0.7221E+03	0.9171E+03	-17.65
9700.	19.03	72.00	1.30	0.7193E+03	0.9124E+03	-19.21
9800.	21.33	64.00	1.67	0.7166E+03	0.9078E+03	-20.77
9900.	17.39	81.00	2.04	0.7139E+03	0.9033E+03	-22.33

Table 5. STS-36 ascent atmospheric data tape (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
10000.	17.39	81.00	2.41	0.7112E+03	0.8987E+03	-23.89
10100.	16.73	86.00	2.26	0.7085E+03	0.8958E+03	-23.88
10200.	16.73	75.00	2.11	0.7059E+03	0.8929E+03	-23.87
10300.	15.42	85.00	1.96	0.7032E+03	0.8900E+03	-23.86
10400.	14.44	83.00	1.81	0.7006E+03	0.8872E+03	-23.85
10500.	13.45	94.00	1.66	0.6979E+03	0.8843E+03	-23.84
10600.	14.44	84.00	1.51	0.6953E+03	0.8815E+03	-23.83
10700.	13.78	93.00	1.36	0.6927E+03	0.8786E+03	-23.82
10800.	15.42	76.00	1.21	0.6901E+03	0.8758E+03	-23.81
10900.	16.40	70.00	1.06	0.6875E+03	0.8730E+03	-23.80
11000.	18.04	66.00	0.91	0.6849E+03	0.8702E+03	-23.79
11100.	17.72	64.00	0.75	0.6823E+03	0.8674E+03	-23.86
11200.	18.37	71.00	0.59	0.6797E+03	0.8646E+03	-23.93
11300.	17.72	69.00	0.43	0.6771E+03	0.8618E+03	-24.00
11400.	18.37	69.00	0.27	0.6745E+03	0.8590E+03	-24.07
11500.	17.39	67.00	0.11	0.6720E+03	0.8563E+03	-24.14
11600.	19.36	71.00	-0.05	0.6694E+03	0.8535E+03	-24.21
11700.	17.06	71.00	-0.21	0.6669E+03	0.8508E+03	-24.28
11800.	18.04	70.00	-0.37	0.6643E+03	0.8480E+03	-24.35
11900.	14.44	67.00	-0.53	0.6618E+03	0.8453E+03	-24.42
12000.	17.06	59.00	-0.69	0.6593E+03	0.8426E+03	-24.49
12100.	13.45	58.00	-0.80	0.6568E+03	0.8397E+03	-24.68
12200.	15.42	50.00	-0.91	0.6543E+03	0.8369E+03	-24.87
12300.	10.83	57.00	-1.02	0.6518E+03	0.8340E+03	-25.06
12400.	9.51	39.00	-1.13	0.6493E+03	0.8312E+03	-25.25
12500.	8.86	47.00	-1.24	0.6469E+03	0.8284E+03	-25.44
12600.	5.25	56.00	-1.35	0.6444E+03	0.8256E+03	-25.63
12700.	6.89	20.00	-1.46	0.6420E+03	0.8228E+03	-25.82
12800.	4.92	49.00	-1.57	0.6395E+03	0.8200E+03	-26.01
12900.	1.97	25.00	-1.68	0.6371E+03	0.8172E+03	-26.20
13000.	6.23	4.00	-1.79	0.6347E+03	0.8145E+03	-26.39
13100.	5.58	18.00	-1.95	0.6323E+03	0.8118E+03	-26.48
13200.	1.64	300.00	-2.11	0.6298E+03	0.8092E+03	-26.57
13300.	4.59	324.00	-2.27	0.6274E+03	0.8066E+03	-26.66
13400.	4.92	342.00	-2.43	0.6250E+03	0.8040E+03	-26.75
13500.	3.94	288.00	-2.59	0.6226E+03	0.8014E+03	-26.84
13600.	6.56	295.00	-2.75	0.6202E+03	0.7988E+03	-26.93
13700.	6.23	327.00	-2.91	0.6179E+03	0.7962E+03	-27.02
13800.	4.27	296.00	-3.07	0.6155E+03	0.7936E+03	-27.11
13900.	5.58	287.00	-3.23	0.6131E+03	0.7910E+03	-27.20
14000.	6.23	340.00	-3.39	0.6108E+03	0.7885E+03	-27.29
14100.	2.30	281.00	-3.66	0.6084E+03	0.7862E+03	-27.39
14200.	2.62	288.00	-3.93	0.6061E+03	0.7840E+03	-27.49
14300.	2.95	347.00	-4.20	0.6037E+03	0.7817E+03	-27.59
14400.	1.31	117.00	-4.47	0.6014E+03	0.7795E+03	-27.69
14500.	0.33	290.00	-4.74	0.5991E+03	0.7772E+03	-27.79
14600.	0.66	154.00	-5.01	0.5968E+03	0.7750E+03	-27.89
14700.	1.97	214.00	-5.28	0.5945E+03	0.7728E+03	-27.99
14800.	0.98	249.00	-5.55	0.5922E+03	0.7706E+03	-28.09
14900.	3.28	192.00	-5.82	0.5899E+03	0.7684E+03	-28.19

Table 5. STS-36 ascent atmospheric data tape (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
15000.	2.95	242.00	-6.09	0.5876E+03	0.7662E+03	-28.29
15100.	2.62	227.00	-6.30	0.5853E+03	0.7638E+03	-28.47
15200.	3.61	243.00	-6.51	0.5830E+03	0.7615E+03	-28.65
15300.	2.62	233.00	-6.72	0.5808E+03	0.7591E+03	-28.83
15400.	5.25	228.00	-6.93	0.5785E+03	0.7568E+03	-29.01
15500.	5.25	223.00	-7.14	0.5763E+03	0.7544E+03	-29.19
15600.	7.22	222.00	-7.35	0.5741E+03	0.7521E+03	-29.37
15700.	5.25	237.00	-7.56	0.5718E+03	0.7498E+03	-29.55
15800.	6.89	241.00	-7.77	0.5696E+03	0.7475E+03	-29.73
15900.	5.25	258.00	-7.98	0.5674E+03	0.7452E+03	-29.91
16000.	7.87	254.00	-8.19	0.5652E+03	0.7429E+03	-30.09
16100.	4.92	265.00	-8.36	0.5630E+03	0.7404E+03	-30.21
16200.	6.56	268.00	-8.53	0.5608E+03	0.7380E+03	-30.33
16300.	5.25	271.00	-8.70	0.5586E+03	0.7356E+03	-30.45
16400.	5.58	288.00	-8.87	0.5564E+03	0.7332E+03	-30.57
16500.	6.56	304.00	-9.04	0.5542E+03	0.7308E+03	-30.69
16600.	7.22	298.00	-9.21	0.5520E+03	0.7284E+03	-30.81
16700.	8.20	300.00	-9.38	0.5499E+03	0.7260E+03	-30.93
16800.	9.84	296.00	-9.55	0.5477E+03	0.7236E+03	-31.05
16900.	10.83	311.00	-9.72	0.5455E+03	0.7212E+03	-31.17
17000.	10.83	293.00	-9.89	0.5434E+03	0.7189E+03	-31.29
17100.	11.15	311.00	-10.08	0.5413E+03	0.7165E+03	-31.49
17200.	10.50	299.00	-10.27	0.5391E+03	0.7142E+03	-31.69
17300.	11.48	309.00	-10.46	0.5370E+03	0.7119E+03	-31.89
17400.	11.48	308.00	-10.65	0.5349E+03	0.7096E+03	-32.09
17500.	12.80	317.00	-10.84	0.5327E+03	0.7073E+03	-32.29
17600.	12.47	317.00	-11.03	0.5306E+03	0.7050E+03	-32.49
17700.	12.80	313.00	-11.22	0.5285E+03	0.7028E+03	-32.69
17800.	14.11	334.00	-11.41	0.5265E+03	0.7005E+03	-32.89
17900.	13.45	324.00	-11.60	0.5244E+03	0.6982E+03	-33.09
18000.	16.73	318.00	-11.79	0.5223E+03	0.6960E+03	-33.29
18100.	14.76	324.00	-11.92	0.5202E+03	0.6936E+03	-33.43
18200.	15.42	320.00	-12.05	0.5182E+03	0.6912E+03	-33.57
18300.	18.37	322.00	-12.18	0.5161E+03	0.6888E+03	-33.71
18400.	17.39	324.00	-12.31	0.5141E+03	0.6864E+03	-33.85
18500.	19.36	305.00	-12.44	0.5120E+03	0.6840E+03	-33.99
18600.	21.98	308.00	-12.57	0.5100E+03	0.6817E+03	-34.13
18700.	20.67	296.00	-12.70	0.5080E+03	0.6793E+03	-34.27
18800.	23.62	290.00	-12.83	0.5060E+03	0.6770E+03	-34.41
18900.	23.62	291.00	-12.96	0.5040E+03	0.6746E+03	-34.55
19000.	24.93	281.00	-13.09	0.5020E+03	0.6723E+03	-34.69
19100.	25.92	282.00	-13.31	0.5000E+03	0.6702E+03	-34.77
19200.	25.26	280.00	-13.53	0.4980E+03	0.6681E+03	-34.85
19300.	27.56	274.00	-13.75	0.4960E+03	0.6660E+03	-34.93
19400.	26.57	273.00	-13.97	0.4940E+03	0.6639E+03	-35.01
19500.	24.93	265.00	-14.19	0.4921E+03	0.6618E+03	-35.09
19600.	26.90	260.00	-14.41	0.4901E+03	0.6597E+03	-35.17
19700.	26.25	261.00	-14.63	0.4881E+03	0.6576E+03	-35.25
19800.	27.23	258.00	-14.85	0.4862E+03	0.6556E+03	-35.33
19900.	28.54	260.00	-15.07	0.4842E+03	0.6535E+03	-35.41

Table 5. STS-36 ascent atmospheric data tape (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
20000.	28.87	262.00	-15.29	0.4823E+03	0.6514E+03	-35.49
20100.	30.51	260.00	-15.55	0.4804E+03	0.6495E+03	-35.47
20200.	31.17	263.00	-15.81	0.4784E+03	0.6475E+03	-35.45
20300.	32.15	257.00	-16.07	0.4765E+03	0.6455E+03	-35.43
20400.	33.79	260.00	-16.33	0.4746E+03	0.6436E+03	-35.41
20500.	32.48	264.00	-16.59	0.4727E+03	0.6416E+03	-35.39
20600.	32.81	264.00	-16.85	0.4707E+03	0.6397E+03	-35.37
20700.	33.14	268.00	-17.11	0.4688E+03	0.6378E+03	-35.35
20800.	33.79	267.00	-17.37	0.4670E+03	0.6358E+03	-35.33
20900.	37.07	266.00	-17.63	0.4651E+03	0.6339E+03	-35.31
21000.	35.43	267.00	-17.89	0.4632E+03	0.6320E+03	-35.29
21100.	37.73	262.00	-18.16	0.4613E+03	0.6301E+03	-35.49
21200.	36.75	266.00	-18.43	0.4594E+03	0.6282E+03	-35.69
21300.	36.75	263.00	-18.70	0.4575E+03	0.6263E+03	-35.89
21400.	39.04	264.00	-18.97	0.4557E+03	0.6244E+03	-36.09
21500.	38.71	263.00	-19.24	0.4538E+03	0.6225E+03	-36.29
21600.	40.68	261.00	-19.51	0.4519E+03	0.6206E+03	-36.49
21700.	39.37	263.00	-19.78	0.4501E+03	0.6187E+03	-36.69
21800.	38.39	262.00	-20.05	0.4483E+03	0.6169E+03	-36.89
21900.	38.71	265.00	-20.32	0.4464E+03	0.6150E+03	-37.09
22000.	35.43	264.00	-20.59	0.4446E+03	0.6131E+03	-37.29
22100.	38.39	267.00	-20.76	0.4428E+03	0.6110E+03	-37.65
22200.	40.35	271.00	-20.93	0.4410E+03	0.6089E+03	-38.01
22300.	37.73	269.00	-21.10	0.4392E+03	0.6069E+03	-38.37
22400.	41.34	269.00	-21.27	0.4374E+03	0.6048E+03	-38.73
22500.	41.67	272.00	-21.44	0.4356E+03	0.6027E+03	-39.09
22600.	42.98	272.00	-21.61	0.4338E+03	0.6006E+03	-39.45
22700.	43.96	272.00	-21.78	0.4320E+03	0.5986E+03	-39.81
22800.	44.29	274.00	-21.95	0.4302E+03	0.5965E+03	-40.17
22900.	45.93	273.00	-22.12	0.4285E+03	0.5945E+03	-40.53
23000.	43.64	276.00	-22.29	0.4267E+03	0.5925E+03	-40.89
23100.	41.67	275.00	-22.50	0.4249E+03	0.5905E+03	-41.13
23200.	43.31	279.00	-22.71	0.4232E+03	0.5885E+03	-41.37
23300.	41.67	285.00	-22.92	0.4214E+03	0.5866E+03	-41.61
23400.	44.29	282.00	-23.13	0.4197E+03	0.5846E+03	-41.85
23500.	43.31	284.00	-23.34	0.4179E+03	0.5827E+03	-42.09
23600.	41.34	282.00	-23.55	0.4162E+03	0.5808E+03	-42.33
23700.	42.98	282.00	-23.76	0.4144E+03	0.5789E+03	-42.57
23800.	42.65	284.00	-23.97	0.4127E+03	0.5769E+03	-42.81
23900.	41.67	280.00	-24.18	0.4110E+03	0.5750E+03	-43.05
24000.	41.67	281.00	-24.39	0.4093E+03	0.5731E+03	-43.29
24100.	41.67	280.00	-24.63	0.4076E+03	0.5713E+03	-43.48
24200.	40.68	283.00	-24.87	0.4059E+03	0.5695E+03	-43.67
24300.	40.68	280.00	-25.11	0.4042E+03	0.5677E+03	-43.86
24400.	40.35	282.00	-25.35	0.4025E+03	0.5658E+03	-44.05
24500.	40.35	282.00	-25.59	0.4009E+03	0.5640E+03	-44.24
24600.	40.68	283.00	-25.83	0.3992E+03	0.5622E+03	-44.43
24700.	40.68	282.00	-26.07	0.3975E+03	0.5604E+03	-44.62
24800.	42.98	282.00	-26.31	0.3959E+03	0.5587E+03	-44.81
24900.	40.68	282.00	-26.55	0.3942E+03	0.5569E+03	-45.00

Table 5. STS-36 ascent atmospheric data tape (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
25000.	42.65	281.00	-26.79	0.3926E+03	0.5551E+03	-45.19
25100.	44.29	281.00	-27.02	0.3909E+03	0.5533E+03	-45.35
25200.	47.57	283.00	-27.25	0.3893E+03	0.5514E+03	-45.51
25300.	46.92	286.00	-27.48	0.3876E+03	0.5496E+03	-45.67
25400.	47.24	286.00	-27.71	0.3860E+03	0.5478E+03	-45.83
25500.	45.60	287.00	-27.94	0.3844E+03	0.5460E+03	-45.99
25600.	46.26	287.00	-28.17	0.3827E+03	0.5442E+03	-46.15
25700.	44.95	288.00	-28.40	0.3811E+03	0.5424E+03	-46.31
25800.	45.28	288.00	-28.63	0.3795E+03	0.5406E+03	-46.47
25900.	43.31	287.00	-28.86	0.3779E+03	0.5389E+03	-46.63
26000.	43.96	288.00	-29.09	0.3763E+03	0.5371E+03	-46.79
26100.	43.64	287.00	-29.33	0.3747E+03	0.5353E+03	-46.99
26200.	43.96	287.00	-29.57	0.3731E+03	0.5336E+03	-47.19
26300.	43.31	287.00	-29.81	0.3715E+03	0.5318E+03	-47.39
26400.	43.96	289.00	-30.05	0.3699E+03	0.5301E+03	-47.59
26500.	43.64	287.00	-30.29	0.3684E+03	0.5284E+03	-47.79
26600.	43.31	290.00	-30.53	0.3668E+03	0.5266E+03	-47.99
26700.	44.95	288.00	-30.77	0.3652E+03	0.5249E+03	-48.19
26800.	43.96	290.00	-31.01	0.3637E+03	0.5232E+03	-48.39
26900.	44.62	290.00	-31.25	0.3621E+03	0.5215E+03	-48.59
27000.	47.57	292.00	-31.49	0.3606E+03	0.5198E+03	-48.79
27100.	49.54	291.00	-31.66	0.3591E+03	0.5179E+03	-48.96
27200.	51.18	294.00	-31.83	0.3575E+03	0.5161E+03	-49.13
27300.	49.54	296.00	-32.00	0.3560E+03	0.5142E+03	-49.30
27400.	53.81	296.00	-32.17	0.3544E+03	0.5124E+03	-49.47
27500.	52.17	294.00	-32.34	0.3529E+03	0.5105E+03	-49.64
27600.	54.79	291.00	-32.51	0.3514E+03	0.5087E+03	-49.81
27700.	53.15	291.00	-32.68	0.3499E+03	0.5069E+03	-49.98
27800.	54.79	289.00	-32.85	0.3484E+03	0.5050E+03	-50.15
27900.	54.13	291.00	-33.02	0.3469E+03	0.5032E+03	-50.32
28000.	51.84	293.00	-33.19	0.3454E+03	0.5014E+03	-50.49
28100.	54.46	293.00	-33.46	0.3439E+03	0.4998E+03	-50.67
28200.	51.51	293.00	-33.73	0.3424E+03	0.4982E+03	-50.85
28300.	52.49	295.00	-34.00	0.3409E+03	0.4966E+03	-51.03
28400.	53.48	295.00	-34.27	0.3394E+03	0.4950E+03	-51.21
28500.	53.15	298.00	-34.54	0.3380E+03	0.4934E+03	-51.39
28600.	55.45	298.00	-34.81	0.3365E+03	0.4918E+03	-51.57
28700.	55.45	301.00	-35.08	0.3350E+03	0.4902E+03	-51.75
28800.	57.41	300.00	-35.35	0.3336E+03	0.4887E+03	-51.93
28900.	58.07	303.00	-35.62	0.3321E+03	0.4871E+03	-52.11
29000.	59.38	301.00	-35.89	0.3307E+03	0.4855E+03	-52.29
29100.	60.04	302.00	-36.16	0.3293E+03	0.4840E+03	-52.57
29200.	61.02	300.00	-36.43	0.3278E+03	0.4824E+03	-52.85
29300.	62.99	300.00	-36.70	0.3264E+03	0.4808E+03	-53.13
29400.	62.01	303.00	-36.97	0.3249E+03	0.4793E+03	-53.41
29500.	63.65	302.00	-37.24	0.3235E+03	0.4777E+03	-53.69
29600.	62.99	303.00	-37.51	0.3221E+03	0.4762E+03	-53.97
29700.	64.96	303.00	-37.78	0.3207E+03	0.4746E+03	-54.25
29800.	64.96	301.00	-38.05	0.3193E+03	0.4731E+03	-54.53
29900.	66.93	299.00	-38.32	0.3179E+03	0.4716E+03	-54.81

Table 5. STS-36 ascent atmospheric data tape (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
30000.	67.26	301.00	-38.59	0.3165E+03	0.4700E+03	-55.09
30100.	67.59	301.00	-38.81	0.3151E+03	0.4684E+03	-55.26
30200.	69.88	300.00	-39.03	0.3137E+03	0.4668E+03	-55.43
30300.	70.87	301.00	-39.25	0.3123E+03	0.4652E+03	-55.60
30400.	74.15	300.00	-39.47	0.3109E+03	0.4635E+03	-55.77
30500.	71.85	301.00	-39.69	0.3096E+03	0.4619E+03	-55.94
30600.	71.85	301.00	-39.91	0.3082E+03	0.4603E+03	-56.11
30700.	72.83	300.00	-40.13	0.3068E+03	0.4587E+03	-56.28
30800.	70.87	300.00	-40.35	0.3055E+03	0.4571E+03	-56.45
30900.	73.49	299.00	-40.57	0.3041E+03	0.4555E+03	-56.62
31000.	72.18	300.00	-40.79	0.3028E+03	0.4540E+03	-56.79
31100.	72.51	299.00	-41.03	0.3014E+03	0.4524E+03	-56.97
31200.	74.48	299.00	-41.27	0.3001E+03	0.4508E+03	-57.15
31300.	72.51	298.00	-41.51	0.2987E+03	0.4493E+03	-57.33
31400.	74.48	297.00	-41.75	0.2974E+03	0.4477E+03	-57.51
31500.	75.13	296.00	-41.99	0.2951E+03	0.4462E+03	-57.69
31600.	76.77	295.00	-42.23	0.2947E+03	0.4446E+03	-57.87
31700.	79.07	295.00	-42.47	0.2934E+03	0.4431E+03	-58.05
31800.	77.10	297.00	-42.71	0.2921E+03	0.4416E+03	-58.23
31900.	77.43	297.00	-42.95	0.2908E+03	0.4401E+03	-58.41
32000.	77.43	297.00	-43.19	0.2895E+03	0.4386E+03	-58.59
32100.	79.07	297.00	-43.43	0.2882E+03	0.4370E+03	-58.78
32200.	80.38	296.00	-43.67	0.2869E+03	0.4355E+03	-58.97
32300.	81.36	295.00	-43.91	0.2856E+03	0.4340E+03	-59.16
32400.	83.33	295.00	-44.15	0.2843E+03	0.4325E+03	-59.35
32500.	84.65	294.00	-44.39	0.2830E+03	0.4310E+03	-59.54
32600.	85.30	294.00	-44.63	0.2818E+03	0.4295E+03	-59.73
32700.	83.99	295.00	-44.87	0.2805E+03	0.4280E+03	-59.92
32800.	83.33	295.00	-45.11	0.2792E+03	0.4265E+03	-60.11
32900.	84.97	293.00	-45.35	0.2780E+03	0.4251E+03	-60.30
33000.	84.32	294.00	-45.59	0.2767E+03	0.4236E+03	-60.49
33100.	83.01	295.00	-45.88	0.2754E+03	0.4222E+03	-60.73
33200.	84.65	294.00	-46.17	0.2742E+03	0.4208E+03	-60.97
33300.	83.66	293.00	-46.46	0.2729E+03	0.4194E+03	-61.21
33400.	86.61	293.00	-46.75	0.2717E+03	0.4180E+03	-61.45
33500.	84.97	294.00	-47.04	0.2704E+03	0.4166E+03	-61.69
33600.	89.89	292.00	-47.33	0.2692E+03	0.4153E+03	-61.93
33700.	88.91	296.00	-47.62	0.2680E+03	0.4139E+03	-62.17
33800.	87.60	295.00	-47.91	0.2667E+03	0.4125E+03	-62.41
33900.	90.88	297.00	-48.20	0.2655E+03	0.4112E+03	-62.65
34000.	89.24	300.00	-48.49	0.2643E+03	0.4098E+03	-62.89
34100.	90.55	299.00	-48.70	0.2631E+03	0.4083E+03	-63.04
34200.	91.86	298.00	-48.91	0.2619E+03	0.4068E+03	-63.19
34300.	90.55	301.00	-49.12	0.2606E+03	0.4053E+03	-63.34
34400.	94.16	300.00	-49.33	0.2594E+03	0.4038E+03	-63.49
34500.	94.82	303.00	-49.54	0.2582E+03	0.4023E+03	-63.64
34600.	95.80	301.00	-49.75	0.2570E+03	0.4008E+03	-63.79
34700.	95.80	302.00	-49.96	0.2558E+03	0.3993E+03	-63.94
34800.	96.13	303.00	-50.17	0.2547E+03	0.3978E+03	-64.09
34900.	98.43	303.00	-50.38	0.2535E+03	0.3964E+03	-64.24

Table 5. STS-36 ascent atmospheric data tape (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
35000.	100.07	301.00	-50.59	0.2523E+03	0.3949E+03	-64.39
35100.	102.36	301.00	-50.83	0.2511E+03	0.3935E+03	-64.59
35200.	102.36	301.00	-51.07	0.2500E+03	0.3921E+03	-64.79
35300.	104.00	300.00	-51.31	0.2488E+03	0.3907E+03	-64.99
35400.	102.03	303.00	-51.55	0.2476E+03	0.3893E+03	-65.19
35500.	103.35	302.00	-51.79	0.2465E+03	0.3879E+03	-65.39
35600.	103.35	300.00	-52.03	0.2453E+03	0.3865E+03	-65.59
35700.	102.36	301.00	-52.27	0.2442E+03	0.3851E+03	-65.79
35800.	107.28	298.00	-52.51	0.2431E+03	0.3838E+03	-65.99
35900.	105.97	300.00	-52.75	0.2419E+03	0.3824E+03	-66.19
36000.	104.33	299.00	-52.99	0.2408E+03	0.3810E+03	-66.39
36100.	105.64	298.00	-53.22	0.2397E+03	0.3796E+03	-66.57
36200.	104.00	300.00	-53.45	0.2385E+03	0.3782E+03	-66.75
36300.	104.33	298.00	-53.68	0.2374E+03	0.3768E+03	-66.93
36400.	104.99	299.00	-53.91	0.2363E+03	0.3755E+03	-67.11
36500.	104.33	298.00	-54.14	0.2352E+03	0.3741E+03	-67.29
36600.	107.28	295.00	-54.37	0.2341E+03	0.3727E+03	-67.47
36700.	106.30	300.00	-54.60	0.2330E+03	0.3714E+03	-67.65
36800.	107.28	299.00	-54.83	0.2319E+03	0.3700E+03	-67.83
36900.	109.25	297.00	-55.06	0.2308E+03	0.3686E+03	-68.01
37000.	108.27	297.00	-55.29	0.2297E+03	0.3673E+03	-68.19
37100.	109.25	296.00	-55.48	0.2286E+03	0.3659E+03	-68.35
37200.	109.91	296.00	-55.67	0.2275E+03	0.3644E+03	-68.51
37300.	107.94	296.00	-55.86	0.2264E+03	0.3630E+03	-68.67
37400.	107.28	295.00	-56.05	0.2254E+03	0.3616E+03	-68.83
37500.	110.56	293.00	-56.24	0.2243E+03	0.3602E+03	-68.99
37600.	110.24	292.00	-56.43	0.2232E+03	0.3588E+03	-69.15
37700.	110.24	294.00	-56.62	0.2222E+03	0.3574E+03	-69.31
37800.	112.53	294.00	-56.81	0.2211E+03	0.3560E+03	-69.47
37900.	112.20	296.00	-57.00	0.2200E+03	0.3546E+03	-69.63
38000.	112.20	295.00	-57.19	0.2190E+03	0.3533E+03	-69.79
38100.	114.17	294.00	-57.23	0.2179E+03	0.3516E+03	-69.82
38200.	114.17	293.00	-57.27	0.2169E+03	0.3500E+03	-69.85
38300.	111.88	291.00	-57.31	0.2159E+03	0.3484E+03	-69.88
38400.	114.17	291.00	-57.35	0.2148E+03	0.3468E+03	-69.91
38500.	114.50	292.00	-57.39	0.2138E+03	0.3452E+03	-69.94
38600.	114.50	292.00	-57.43	0.2128E+03	0.3436E+03	-69.97
38700.	118.11	290.00	-57.47	0.2117E+03	0.3420E+03	-70.00
38800.	117.45	291.00	-57.51	0.2107E+03	0.3404E+03	-70.03
38900.	116.80	291.00	-57.55	0.2097E+03	0.3388E+03	-70.06
39000.	125.66	288.00	-57.59	0.2087E+03	0.3373E+03	-70.09
39100.	121.39	289.00	-57.26	0.2077E+03	0.3352E+03	-69.83
39200.	125.33	289.00	-56.93	0.2067E+03	0.3331E+03	-69.57
39300.	130.58	287.00	-56.60	0.2057E+03	0.3310E+03	-69.31
39400.	132.55	285.00	-56.27	0.2048E+03	0.3289E+03	-69.05
39500.	139.11	285.00	-55.94	0.2038E+03	0.3268E+03	-68.79
39600.	140.42	287.00	-55.61	0.2028E+03	0.3248E+03	-68.53
39700.	149.93	285.00	-55.28	0.2019E+03	0.3228E+03	-68.27
39800.	158.46	286.00	-54.95	0.2009E+03	0.3207E+03	-68.01
39900.	163.39	287.00	-54.62	0.1999E+03	0.3187E+03	-67.75

Table 5. STS-36 ascent atmospheric data tape (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
40000.	166.67	284.00	-54.29	0.1990E+03	0.3168E+03	-67.49
40100.	162.07	286.00	-54.40	0.1981E+03	0.3154E+03	-67.59
40200.	160.43	285.00	-54.51	0.1971E+03	0.3141E+03	-67.69
40300.	160.76	285.00	-54.62	0.1962E+03	0.3128E+03	-67.79
40400.	164.37	285.00	-54.73	0.1953E+03	0.3114E+03	-67.89
40500.	165.35	285.00	-54.84	0.1943E+03	0.3101E+03	-67.99
40600.	164.70	286.00	-54.95	0.1934E+03	0.3088E+03	-68.09
40700.	166.34	286.00	-55.06	0.1925E+03	0.3075E+03	-68.19
40800.	163.71	287.00	-55.17	0.1916E+03	0.3062E+03	-68.29
40900.	165.03	286.00	-55.28	0.1907E+03	0.3049E+03	-68.39
41000.	171.59	285.00	-55.39	0.1898E+03	0.3036E+03	-68.49
41100.	168.96	288.00	-55.30	0.1889E+03	0.3021E+03	-68.43
41200.	171.26	287.00	-55.21	0.1880E+03	0.3005E+03	-68.37
41300.	172.57	289.00	-55.12	0.1871E+03	0.2990E+03	-68.31
41400.	174.54	289.00	-55.03	0.1862E+03	0.2974E+03	-68.25
41500.	174.87	289.00	-54.94	0.1853E+03	0.2959E+03	-68.19
41600.	176.84	289.00	-54.85	0.1845E+03	0.2944E+03	-68.13
41700.	171.59	294.00	-54.76	0.1836E+03	0.2929E+03	-68.07
41800.	174.21	290.00	-54.67	0.1827E+03	0.2914E+03	-68.01
41900.	173.88	290.00	-54.58	0.1819E+03	0.2899E+03	-67.95
42000.	168.96	294.00	-54.49	0.1810E+03	0.2884E+03	-67.89
42100.	166.99	292.00	-54.61	0.1801E+03	0.2872E+03	-68.00
42200.	166.67	294.00	-54.73	0.1793E+03	0.2860E+03	-68.11
42300.	167.32	296.00	-54.85	0.1784E+03	0.2848E+03	-68.22
42400.	165.03	293.00	-54.97	0.1776E+03	0.2836E+03	-68.33
42500.	164.04	294.00	-55.09	0.1768E+03	0.2824E+03	-68.44
42600.	160.10	295.00	-55.21	0.1759E+03	0.2812E+03	-68.55
42700.	159.45	290.00	-55.33	0.1751E+03	0.2800E+03	-68.66
42800.	157.81	292.00	-55.45	0.1742E+03	0.2788E+03	-68.77
42900.	156.82	293.00	-55.57	0.1734E+03	0.2777E+03	-68.88
43000.	157.81	289.00	-55.69	0.1726E+03	0.2765E+03	-68.99
43100.	156.17	289.00	-55.88	0.1718E+03	0.2754E+03	-69.15
43200.	154.86	290.00	-56.07	0.1709E+03	0.2743E+03	-69.31
43300.	154.20	289.00	-56.26	0.1701E+03	0.2733E+03	-69.47
43400.	152.23	288.00	-56.45	0.1693E+03	0.2722E+03	-69.63
43500.	151.57	289.00	-56.64	0.1685E+03	0.2711E+03	-69.79
43600.	153.87	287.00	-56.83	0.1677E+03	0.2701E+03	-69.95
43700.	149.93	287.00	-57.02	0.1669E+03	0.2690E+03	-70.11
43800.	151.25	286.00	-57.21	0.1661E+03	0.2679E+03	-70.27
43900.	147.97	286.00	-57.40	0.1653E+03	0.2669E+03	-70.43
44000.	145.01	285.00	-57.59	0.1645E+03	0.2658E+03	-70.59
44100.	142.72	285.00	-57.69	0.1637E+03	0.2647E+03	-70.68
44200.	144.36	282.00	-57.79	0.1629E+03	0.2636E+03	-70.77
44300.	142.72	284.00	-57.89	0.1622E+03	0.2624E+03	-70.86
44400.	140.42	285.00	-57.99	0.1614E+03	0.2613E+03	-70.95
44500.	135.17	283.00	-58.09	0.1606E+03	0.2602E+03	-71.04
44600.	137.14	279.00	-58.19	0.1598E+03	0.2590E+03	-71.13
44700.	138.45	279.00	-58.29	0.1591E+03	0.2579E+03	-71.22
44800.	132.87	279.00	-58.39	0.1583E+03	0.2568E+03	-71.31
44900.	130.25	280.00	-58.49	0.1576E+03	0.2557E+03	-71.40



Table 5. STS-36 ascent atmospheric data tape (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M <sup>3</sup> )	DEW POINT (DEG C)
45000.	131.56	275.00	-58.59	0.1568E+03	0.2546E+03	-71.49
45100.	132.22	277.00	-58.68	0.1560E+03	0.2535E+03	-9999.00
45200.	130.91	276.00	-58.77	0.1553E+03	0.2523E+03	-9999.00
45300.	126.31	277.00	-58.86	0.1545E+03	0.2512E+03	-9999.00
45400.	126.64	276.00	-58.95	0.1538E+03	0.2501E+03	-9999.00
45500.	125.00	275.00	-59.04	0.1531E+03	0.2490E+03	-9999.00
45600.	123.36	272.00	-59.13	0.1523E+03	0.2479E+03	-9999.00
45700.	126.97	272.00	-59.22	0.1516E+03	0.2468E+03	-9999.00
45800.	124.02	272.00	-59.31	0.1509E+03	0.2458E+03	-9999.00
45900.	121.72	276.00	-59.40	0.1501E+03	0.2447E+03	-9999.00
46000.	122.38	275.00	-59.49	0.1494E+03	0.2436E+03	-9999.00
46100.	124.34	275.00	-59.69	0.1487E+03	0.2426E+03	-9999.00
46200.	124.67	274.00	-59.89	0.1480E+03	0.2417E+03	-9999.00
46300.	121.06	275.00	-60.09	0.1472E+03	0.2407E+03	-9999.00
46400.	119.75	276.00	-60.29	0.1465E+03	0.2398E+03	-9999.00
46500.	125.98	275.00	-60.49	0.1458E+03	0.2389E+03	-9999.00
46600.	125.66	279.00	-60.69	0.1451E+03	0.2379E+03	-9999.00
46700.	121.72	278.00	-60.89	0.1444E+03	0.2370E+03	-9999.00
46800.	126.97	275.00	-61.09	0.1437E+03	0.2361E+03	-9999.00
46900.	130.25	274.00	-61.29	0.1430E+03	0.2351E+03	-9999.00
47000.	127.30	274.00	-61.49	0.1423E+03	0.2342E+03	-9999.00
47100.	125.33	279.00	-61.68	0.1416E+03	0.2333E+03	-9999.00
47200.	131.56	274.00	-61.87	0.1409E+03	0.2323E+03	-9999.00
47300.	127.62	276.00	-62.06	0.1402E+03	0.2314E+03	-9999.00
47400.	132.22	275.00	-62.25	0.1395E+03	0.2305E+03	-9999.00
47500.	130.25	276.00	-62.44	0.1389E+03	0.2296E+03	-9999.00
47600.	132.22	275.00	-62.63	0.1382E+03	0.2287E+03	-9999.00
47700.	131.23	277.00	-62.82	0.1375E+03	0.2277E+03	-9999.00
47800.	126.31	283.00	-63.01	0.1368E+03	0.2268E+03	-9999.00
47900.	124.67	281.00	-63.20	0.1362E+03	0.2259E+03	-9999.00
48000.	125.00	281.00	-63.39	0.1355E+03	0.2250E+03	-9999.00
48100.	121.72	283.00	-63.54	0.1348E+03	0.2241E+03	-9999.00
48200.	120.08	279.00	-63.69	0.1342E+03	0.2231E+03	-9999.00
48300.	116.14	285.00	-63.84	0.1335E+03	0.2222E+03	-9999.00
48400.	115.16	286.00	-63.99	0.1328E+03	0.2212E+03	-9999.00
48500.	113.19	287.00	-64.14	0.1322E+03	0.2203E+03	-9999.00
48600.	113.19	281.00	-64.29	0.1315E+03	0.2193E+03	-9999.00
48700.	110.89	284.00	-64.44	0.1308E+03	0.2184E+03	-9999.00
48800.	107.28	289.00	-64.59	0.1302E+03	0.2175E+03	-9999.00
48900.	104.99	288.00	-64.74	0.1295E+03	0.2165E+03	-9999.00
49000.	102.36	287.00	-64.89	0.1289E+03	0.2156E+03	-9999.00
49100.	98.43	287.00	-65.07	0.1283E+03	0.2147E+03	-9999.00
49200.	96.78	286.00	-65.25	0.1276E+03	0.2139E+03	-9999.00
49300.	92.85	288.00	-65.43	0.1270E+03	0.2130E+03	-9999.00
49400.	90.88	291.00	-65.61	0.1264E+03	0.2121E+03	-9999.00
49500.	89.57	291.00	-65.79	0.1258E+03	0.2113E+03	-9999.00
49600.	85.63	292.00	-65.97	0.1251E+03	0.2104E+03	-9999.00
49700.	83.33	288.00	-66.15	0.1245E+03	0.2096E+03	-9999.00
49800.	81.36	284.00	-66.33	0.1239E+03	0.2087E+03	-9999.00
49900.	80.05	282.00	-66.51	0.1233E+03	0.2079E+03	-9999.00

Table 5. STS-36 ascent atmospheric data tape (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
50000.	75.79	287.00	-66.69	0.1227E+03	0.2070E+03	-9999.00
50100.	78.08	283.00	-66.82	0.1221E+03	0.2061E+03	-9999.00
50200.	76.12	281.00	-66.95	0.1215E+03	0.2052E+03	-9999.00
50300.	79.40	281.00	-67.08	0.1209E+03	0.2043E+03	-9999.00
50400.	78.41	280.00	-67.21	0.1203E+03	0.2034E+03	-9999.00
50500.	79.72	280.00	-67.34	0.1197E+03	0.2025E+03	-9999.00
50600.	84.65	275.00	-67.47	0.1191E+03	0.2017E+03	-9999.00
50700.	86.94	277.00	-67.60	0.1185E+03	0.2008E+03	-9999.00
50800.	89.57	280.00	-67.73	0.1179E+03	0.1999E+03	-9999.00
50900.	86.61	277.00	-67.86	0.1173E+03	0.1990E+03	-9999.00
51000.	82.02	279.00	-67.99	0.1167E+03	0.1982E+03	-9999.00
51100.	81.36	280.00	-68.18	0.1161E+03	0.1973E+03	-9999.00
51200.	88.25	270.00	-68.37	0.1155E+03	0.1965E+03	-9999.00
51300.	80.05	281.00	-68.56	0.1149E+03	0.1957E+03	-9999.00
51400.	78.74	276.00	-68.75	0.1143E+03	0.1949E+03	-9999.00
51500.	75.46	286.00	-68.94	0.1138E+03	0.1941E+03	-9999.00
51600.	74.48	285.00	-69.13	0.1132E+03	0.1933E+03	-9999.00
51700.	69.23	285.00	-69.32	0.1126E+03	0.1925E+03	-9999.00
51800.	70.54	280.00	-69.51	0.1120E+03	0.1917E+03	-9999.00
51900.	71.85	282.00	-69.70	0.1115E+03	0.1909E+03	-9999.00
52000.	70.54	284.00	-69.89	0.1109E+03	0.1901E+03	-9999.00
52100.	73.82	278.00	-70.03	0.1103E+03	0.1892E+03	-9999.00
52200.	74.48	276.00	-70.17	0.1098E+03	0.1884E+03	-9999.00
52300.	74.48	283.00	-70.31	0.1092E+03	0.1876E+03	-9999.00
52400.	77.10	277.00	-70.45	0.1087E+03	0.1868E+03	-9999.00
52500.	79.40	271.00	-70.59	0.1081E+03	0.1859E+03	-9999.00
52600.	74.15	281.00	-70.73	0.1076E+03	0.1851E+03	-9999.00
52700.	72.83	281.00	-70.87	0.1070E+03	0.1843E+03	-9999.00
52800.	75.79	276.00	-71.01	0.1065E+03	0.1835E+03	-9999.00
52900.	77.76	272.00	-71.15	0.1059E+03	0.1827E+03	-9999.00
53000.	75.46	274.00	-71.29	0.1054E+03	0.1819E+03	-9999.00
53100.	77.43	270.00	-71.39	0.1049E+03	0.1811E+03	-9999.00
53200.	78.74	273.00	-71.49	0.1043E+03	0.1802E+03	-9999.00
53300.	83.66	271.00	-71.59	0.1038E+03	0.1794E+03	-9999.00
53400.	86.94	269.00	-71.69	0.1032E+03	0.1785E+03	-9999.00
53500.	86.94	273.00	-71.79	0.1027E+03	0.1777E+03	-9999.00
53600.	91.86	269.00	-71.89	0.1022E+03	0.1769E+03	-9999.00
53700.	88.25	278.00	-71.99	0.1017E+03	0.1761E+03	-9999.00
53800.	86.61	282.00	-72.09	0.1011E+03	0.1752E+03	-9999.00
53900.	90.22	279.00	-72.19	0.1006E+03	0.1744E+03	-9999.00
54000.	89.57	281.00	-72.29	0.1001E+03	0.1736E+03	-9999.00
54100.	89.57	277.00	-72.27	0.9959E+02	0.1727E+03	-9999.00
54200.	87.93	281.00	-72.25	0.9908E+02	0.1718E+03	-9999.00
54300.	90.55	277.00	-72.23	0.9857E+02	0.1709E+03	-9999.00
54400.	89.24	287.00	-72.21	0.9807E+02	0.1700E+03	-9999.00
54500.	88.91	291.00	-72.19	0.9756E+02	0.1691E+03	-9999.00
54600.	86.94	295.00	-72.17	0.9706E+02	0.1682E+03	-9999.00
54700.	84.97	291.00	-72.15	0.9657E+02	0.1674E+03	-9999.00
54800.	84.32	298.00	-72.13	0.9607E+02	0.1665E+03	-9999.00
54900.	83.33	300.00	-72.11	0.9558E+02	0.1656E+03	-9999.00

Table 5. STS-36 ascent atmospheric data tape (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
55000.	81.69	296.00	-72.09	0.9509E+02	0.1648E+03	-9999.00
55100.	78.41	292.00	-72.20	0.9460E+02	0.1640E+03	-9999.00
55200.	78.08	292.00	-72.31	0.9411E+02	0.1632E+03	-9999.00
55300.	73.82	300.00	-72.42	0.9363E+02	0.1625E+03	-9999.00
55400.	71.85	301.00	-72.53	0.9315E+02	0.1617E+03	-9999.00
55500.	69.23	291.00	-72.64	0.9267E+02	0.1610E+03	-9999.00
55600.	65.94	299.00	-72.75	0.9219E+02	0.1603E+03	-9999.00
55700.	65.94	293.00	-72.86	0.9172E+02	0.1595E+03	-9999.00
55800.	62.99	294.00	-72.97	0.9125E+02	0.1588E+03	-9999.00
55900.	64.63	289.00	-73.08	0.9078E+02	0.1581E+03	-9999.00
56000.	62.01	281.00	-73.19	0.9031E+02	0.1573E+03	-9999.00
56500.	62.01	286.00	-73.19	0.8801E+02	0.1533E+03	-9999.00
57000.	58.40	285.00	-72.39	0.8577E+02	0.1488E+03	-9999.00
57500.	55.45	285.00	-72.09	0.8359E+02	0.1448E+03	-9999.00
58000.	52.82	286.00	-72.19	0.8147E+02	0.1412E+03	-9999.00
58500.	47.24	288.00	-71.79	0.7940E+02	0.1374E+03	-9999.00
59000.	43.64	289.00	-71.99	0.7739E+02	0.1340E+03	-9999.00
59500.	38.39	290.00	-71.99	0.7543E+02	0.1306E+03	-9999.00
60000.	33.14	287.00	-72.19	0.7351E+02	0.1274E+03	-9999.00
60500.	30.51	283.00	-71.89	0.7165E+02	0.1240E+03	-9999.00
61000.	29.20	282.00	-71.09	0.6983E+02	0.1204E+03	-9999.00
61500.	28.54	285.00	-71.59	0.6807E+02	0.1176E+03	-9999.00
62000.	26.25	291.00	-70.89	0.6635E+02	0.1143E+03	-9999.00
62500.	22.31	298.00	-69.49	0.6468E+02	0.1106E+03	-9999.00
63000.	16.73	304.00	-68.89	0.6307E+02	0.1076E+03	-9999.00
63500.	12.14	303.00	-68.69	0.6149E+02	0.1048E+03	-9999.00
64000.	7.22	282.00	-68.19	0.5996E+02	0.1019E+03	-9999.00
64500.	6.89	257.00	-67.99	0.5847E+02	0.9928E+02	-9999.00
65000.	7.87	239.00	-67.79	0.5702E+02	0.9673E+02	-9999.00
65500.	8.86	237.00	-68.79	0.5560E+02	0.9478E+02	-9999.00
66000.	8.20	257.00	-69.29	0.5421E+02	0.9264E+02	-9999.00
66500.	8.20	297.00	-68.69	0.5285E+02	0.9005E+02	-9999.00
67000.	9.51	333.00	-66.49	0.5154E+02	0.8688E+02	-9999.00
67500.	12.47	6.00	-65.69	0.5027E+02	0.8441E+02	-9999.00
68000.	14.11	32.00	-64.89	0.4904E+02	0.8203E+02	-9999.00
68500.	16.40	54.00	-64.29	0.4784E+02	0.7979E+02	-9999.00
69000.	18.37	71.00	-63.79	0.4668E+02	0.7767E+02	-9999.00
69500.	19.36	83.00	-63.99	0.4554E+02	0.7585E+02	-9999.00
70000.	19.03	92.00	-64.59	0.4443E+02	0.7421E+02	-9999.00
70500.	17.72	98.00	-64.39	0.4334E+02	0.7232E+02	-9999.00
71000.	15.75	103.00	-64.79	0.4228E+02	0.7069E+02	-9999.00
71500.	12.80	102.00	-64.69	0.4125E+02	0.6893E+02	-9999.00
72000.	10.50	94.00	-63.89	0.4024E+02	0.6699E+02	-9999.00
72500.	9.51	80.00	-62.39	0.3926E+02	0.6489E+02	-9999.00
73000.	9.84	63.00	-61.09	0.3832E+02	0.6295E+02	-9999.00
73500.	12.47	56.00	-60.69	0.3740E+02	0.6132E+02	-9999.00
74000.	14.44	58.00	-60.59	0.3650E+02	0.5982E+02	-9999.00
74500.	16.40	71.00	-60.09	0.3563E+02	0.5826E+02	-9999.00
75000.	18.04	79.00	-60.09	0.3477E+02	0.5685E+02	-9999.00
75500.	19.03	88.00	-60.59	0.3394E+02	0.5562E+02	-9999.00

Table 5. STS-36 ascent atmospheric data tape (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
76000.	18.70	94.00	-60.69	0.3313E+02	0.5432E+02	-9999.00
76500.	16.73	94.00	-60.39	0.3233E+02	0.5294E+02	-9999.00
77000.	13.45	84.00	-59.39	0.3156E+02	0.5143E+02	-9999.00
77500.	11.81	71.00	-58.69	0.3081E+02	0.5005E+02	-9999.00
78000.	11.81	59.00	-58.59	0.3008E+02	0.4884E+02	-9999.00
78500.	12.80	47.00	-58.69	0.2936E+02	0.4769E+02	-9999.00
79000.	13.78	42.00	-58.99	0.2866E+02	0.4662E+02	-9999.00
79500.	14.76	42.00	-59.29	0.2798E+02	0.4558E+02	-9999.00
80000.	16.73	46.00	-59.59	0.2731E+02	0.4455E+02	-9999.00
80500.	19.36	52.00	-59.49	0.2666E+02	0.4347E+02	-9999.00
81000.	22.64	58.00	-58.89	0.2603E+02	0.4232E+02	-9999.00
81500.	25.59	60.00	-58.59	0.2541E+02	0.4126E+02	-9999.00
82000.	27.89	61.00	-58.39	0.2481E+02	0.4024E+02	-9999.00
82500.	28.87	64.00	-57.49	0.2422E+02	0.3912E+02	-9999.00
83000.	29.20	67.00	-56.69	0.2365E+02	0.3806E+02	-9999.00
83500.	28.87	73.00	-56.59	0.2309E+02	0.3714E+02	-9999.00
84000.	29.20	81.00	-56.39	0.2255E+02	0.3624E+02	-9999.00
84500.	28.21	80.91	-55.82	0.2201E+02	0.3529E+02	-9999.00
85000.	27.23	80.82	-55.24	0.2149E+02	0.3436E+02	-9999.00
85500.	26.24	80.72	-54.67	0.2098E+02	0.3345E+02	-9999.00
86000.	25.25	80.61	-54.09	0.2048E+02	0.3257E+02	-9999.00
86500.	24.26	80.49	-53.52	0.1999E+02	0.3171E+02	-9999.00
87000.	23.28	80.37	-52.94	0.1952E+02	0.3087E+02	-9999.00
87500.	22.29	80.23	-52.37	0.1905E+02	0.3006E+02	-9999.00
88000.	21.30	80.08	-51.79	0.1860E+02	0.2927E+02	-9999.00
88500.	20.32	79.91	-51.22	0.1816E+02	0.2850E+02	-9999.00
89000.	19.33	79.73	-50.64	0.1772E+02	0.2775E+02	-9999.00
89500.	18.35	79.53	-50.07	0.1730E+02	0.2702E+02	-9999.00
90000.	17.36	79.30	-49.49	0.1689E+02	0.2631E+02	-9999.00
90500.	16.38	79.05	-48.92	0.1649E+02	0.2562E+02	-9999.00
91000.	15.39	78.77	-48.34	0.1610E+02	0.2494E+02	-9999.00
91500.	14.41	78.45	-47.77	0.1571E+02	0.2429E+02	-9999.00
92000.	13.42	78.08	-47.20	0.1534E+02	0.2365E+02	-9999.00
92500.	12.44	77.65	-46.62	0.1497E+02	0.2303E+02	-9999.00
93000.	11.46	77.14	-46.05	0.1462E+02	0.2242E+02	-9999.00
93500.	10.47	76.55	-45.47	0.1427E+02	0.2184E+02	-9999.00
94000.	9.49	75.83	-44.90	0.1393E+02	0.2126E+02	-9999.00
94500.	8.52	74.94	-44.32	0.1360E+02	0.2070E+02	-9999.00
95000.	7.54	73.83	-43.75	0.1328E+02	0.2016E+02	-9999.00
95500.	6.57	72.38	-43.17	0.1296E+02	0.1963E+02	-9999.00
96000.	5.60	70.43	-42.60	0.1265E+02	0.1912E+02	-9999.00
96500.	4.64	67.68	-42.02	0.1235E+02	0.1862E+02	-9999.00
97000.	3.70	63.51	-41.45	0.1206E+02	0.1813E+02	-9999.00
97500.	2.79	56.58	-40.87	0.1177E+02	0.1765E+02	-9999.00
98000.	1.96	43.42	-40.30	0.1149E+02	0.1719E+02	-9999.00
98500.	1.37	15.67	-39.72	0.1122E+02	0.1674E+02	-9999.00
99000.	1.35	333.00	-39.15	0.1095E+02	0.1630E+02	-9999.00
100000.	0.70	339.00	-43.00	0.1048E+02	0.1586E+02	-9999.00
101000.	0.51	333.00	-42.95	0.1001E+02	0.1515E+02	-9999.00
102000.	0.68	293.00	-42.50	0.9570E+01	0.1445E+02	-9999.00

Table 5. STS-36 ascent atmospheric data tape (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
103000.	0.84	327.00	-37.93	0.9160E+01	0.1357E+02	-9999.00
104000.	1.01	200.00	-46.74	0.8760E+01	0.1348E+02	-9999.00
105000.	2.02	214.00	-34.42	0.8382E+01	0.1223E+02	-9999.00
106000.	3.38	225.00	-53.74	0.8013E+01	0.1272E+02	-9999.00
107000.	4.05	248.00	-44.62	0.7619E+01	0.1166E+02	-9999.00
108000.	3.21	238.00	-33.19	0.7322E+01	0.1063E+02	-9999.00
109000.	3.88	225.00	-37.01	0.7018E+01	0.1035E+02	-9999.00
110000.	3.88	253.00	-51.02	0.6708E+01	0.1052E+02	-9999.00
111000.	4.56	280.00	-34.82	0.6413E+01	0.9374E+01	-9999.00
112000.	3.71	277.00	-36.36	0.6145E+01	0.9041E+01	-9999.00
113000.	4.22	285.00	-37.49	0.5881E+01	0.8694E+01	-9999.00
114000.	3.54	260.00	-26.70	0.5636E+01	0.7967E+01	-9999.00
115000.	5.57	228.00	-27.13	0.5406E+01	0.7655E+01	-9999.00
116000.	7.76	247.00	-29.80	0.5184E+01	0.7421E+01	-9999.00
117000.	6.58	258.00	-24.22	0.4973E+01	0.6960E+01	-9999.00
118000.	5.57	253.00	-31.15	0.4769E+01	0.6865E+01	-9999.00
119000.	8.44	259.00	-30.37	0.4570E+01	0.6558E+01	-9999.00
120000.	9.45	261.00	-26.80	0.4384E+01	0.6199E+01	-9999.00
121000.	9.96	266.00	-28.19	0.4205E+01	0.5980E+01	-9999.00
122000.	11.31	270.00	-29.15	0.4033E+01	0.5758E+01	-9999.00
123000.	10.80	267.00	-25.98	0.3867E+01	0.5450E+01	-9999.00
124000.	10.46	267.00	-24.15	0.3711E+01	0.5192E+01	-9999.00
125000.	10.80	277.00	-25.15	0.3559E+01	0.4999E+01	-9999.00
126000.	10.97	287.00	-22.12	0.3416E+01	0.4741E+01	-9999.00
127000.	9.96	287.00	-25.13	0.3279E+01	0.4606E+01	-9999.00
128000.	9.11	281.00	-11.71	0.3150E+01	0.4197E+01	-9999.00
129000.	9.45	280.00	-7.15	0.3030E+01	0.3968E+01	-9999.00
130000.	9.96	282.00	-12.59	0.2914E+01	0.3896E+01	-9999.00
131000.	9.79	277.00	-9.71	0.2802E+01	0.3705E+01	-9999.00
132000.	9.45	265.00	-3.27	0.2697E+01	0.3481E+01	-9999.00
133000.	9.96	249.00	1.61	0.2597E+01	0.3293E+01	-9999.00
134000.	10.63	245.00	-3.90	0.2502E+01	0.3237E+01	-9999.00
135000.	10.97	250.00	-5.77	0.2408E+01	0.3137E+01	-9999.00
136000.	11.31	254.00	-4.64	0.2317E+01	0.3006E+01	-9999.00
137000.	11.31	257.00	-4.61	0.2231E+01	0.2894E+01	-9999.00
138000.	10.80	257.00	-6.15	0.2147E+01	0.2801E+01	-9999.00
139000.	10.80	259.00	-9.85	0.2066E+01	0.2733E+01	-9999.00
140000.	11.14	265.00	-6.90	0.1988E+01	0.2601E+01	-9999.00
141000.	11.31	272.00	-7.47	0.1913E+01	0.2508E+01	-9999.00
142000.	11.31	274.00	-8.49	0.1840E+01	0.2422E+01	-9999.00
143000.	10.80	270.00	-1.98	0.1772E+01	0.2276E+01	-9999.00
144000.	9.96	265.00	-5.74	0.1706E+01	0.2222E+01	-9999.00
145000.	9.28	258.00	-7.23	0.1641E+01	0.2150E+01	-9999.00
146000.	8.94	249.00	-1.43	0.1580E+01	0.2026E+01	-9999.00
147000.	8.78	240.00	-1.15	0.1522E+01	0.1949E+01	-9999.00
148000.	8.44	240.00	-2.67	0.1465E+01	0.1887E+01	-9999.00
149000.	8.61	241.00	-1.87	0.1411E+01	0.1812E+01	-9999.00
150000.	8.61	241.00	1.91	0.1359E+01	0.1721E+01	-9999.00
151000.	8.61	239.00	-0.64	0.1309E+01	0.1673E+01	-9999.00
152000.	8.94	237.00	-4.12	0.1261E+01	0.1633E+01	-9999.00

Table 5. STS-36 ascent atmospheric data tape (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
153000.	9.28	234.00	-4.15	0.1214E+01	0.1572E+01	-9999.00
154000.	9.79	235.00	-4.14	0.1169E+01	0.1514E+01	-9999.00
155000.	9.96	237.00	-3.31	0.1125E+01	0.1452E+01	-9999.00
156000.	9.96	240.00	-9.84	0.1083E+01	0.1433E+01	-9999.00
157000.	9.79	242.00	-13.73	0.1041E+01	0.1398E+01	-9999.00
158000.	9.62	242.00	-12.02	0.1001E+01	0.1335E+01	-9999.00
159000.	9.79	241.00	-12.15	0.9629E+00	0.1285E+01	-9999.00
160000.	9.96	240.00	-12.52	0.9259E+00	0.1238E+01	-9999.00
161000.	10.30	241.00	-11.15	0.8904E+00	0.1184E+01	-9999.00
162000.	10.30	246.00	-12.04	0.8565E+00	0.1143E+01	-9999.00
163000.	10.12	251.00	-16.66	0.8233E+00	0.1118E+01	-9999.00
164000.	10.12	258.00	-20.15	0.7910E+00	0.1089E+01	-9999.00
165000.	10.30	260.00	-20.07	0.7597E+00	0.1046E+01	-9999.00
166000.	10.63	260.00	-18.15	0.7299E+00	0.9972E+00	-9999.00
167000.	10.80	259.00	-18.15	0.7013E+00	0.9581E+00	-9999.00
168000.	10.97	259.00	-20.15	0.6737E+00	0.9277E+00	-9999.00
169000.	11.31	260.00	-21.29	0.6471E+00	0.8951E+00	-9999.00
170000.	11.48	262.00	-23.02	0.6212E+00	0.8652E+00	-9999.00
171000.	11.64	264.00	-19.27	0.5966E+00	0.8186E+00	-9999.00
172000.	11.64	266.00	-17.15	0.5732E+00	0.7800E+00	-9999.00
173000.	11.48	268.00	-22.37	0.5507E+00	0.7650E+00	-9999.00
174000.	11.64	270.00	-29.15	0.5284E+00	0.7544E+00	-9999.00
175000.	11.64	272.00	-28.11	0.5068E+00	0.7205E+00	-9999.00
176000.	11.98	274.00	-21.70	0.4864E+00	0.6739E+00	-9999.00
177000.	12.32	276.00	-19.67	0.4671E+00	0.6420E+00	-9999.00
178000.	12.66	276.00	-21.58	0.4487E+00	0.6213E+00	-9999.00
179000.	12.82	276.00	-22.82	0.4308E+00	0.5995E+00	-9999.00
180000.	12.82	277.00	-20.15	0.4138E+00	0.5698E+00	-9999.00
181000.	12.82	278.00	-22.91	0.3973E+00	0.5531E+00	-9999.00
182000.	12.66	279.00	-24.99	0.3814E+00	0.5354E+00	-9999.00
183000.	12.66	282.00	-26.04	0.3661E+00	0.5161E+00	-9999.00
184000.	12.49	285.00	-24.99	0.3513E+00	0.4932E+00	-9999.00
185000.	12.32	288.00	-21.33	0.3373E+00	0.4666E+00	-9999.00
186000.	12.15	290.00	-19.22	0.3240E+00	0.4445E+00	-9999.00
187000.	11.98	291.00	-16.17	0.3113E+00	0.4220E+00	-9999.00
188000.	11.81	292.00	-14.15	0.2993E+00	0.4026E+00	-9999.00
189000.	11.64	291.00	-14.08	0.2877E+00	0.3869E+00	-9999.00
190000.	11.48	290.00	-12.15	0.2767E+00	0.3693E+00	-9999.00
191000.	11.31	289.00	-11.40	0.2661E+00	0.3542E+00	-9999.00
192000.	11.14	287.00	-14.37	0.2559E+00	0.3445E+00	-9999.00
193000.	11.14	284.00	-16.41	0.2460E+00	0.3338E+00	-9999.00
194000.	10.97	282.00	-20.05	0.2364E+00	0.3254E+00	-9999.00
195000.	10.97	279.00	-20.15	0.2271E+00	0.3127E+00	-9999.00
196000.	10.97	275.00	-19.19	0.2181E+00	0.2992E+00	-9999.00
197000.	10.97	271.00	-17.15	0.2108E+00	0.2869E+00	-9999.00
198000.	10.97	266.00	-18.90	0.2026E+00	0.2776E+00	-9999.00
199000.	10.97	262.00	-19.43	0.1947E+00	0.2673E+00	-9999.00
200000.	10.97	259.00	-20.15	0.1870E+00	0.2575E+00	-9999.00
201000.	10.97	256.00	-21.80	0.1796E+00	0.2489E+00	-9999.00
202000.	10.97	252.00	-24.85	0.1724E+00	0.2419E+00	-9999.00

Table 5. STS-36 ascent atmospheric data tape (continued).

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
203000.	10.97	249.00	-26.52	0.1654E+00	0.2336E+00	-9999.00
204000.	10.97	247.00	-27.15	0.1587E+00	0.2247E+00	-9999.00
205000.	11.14	244.00	-27.29	0.1523E+00	0.2158E+00	-9999.00
206000.	11.31	242.00	-28.15	0.1461E+00	0.2077E+00	-9999.00
207000.	11.64	240.00	-28.15	0.1401E+00	0.1992E+00	-9999.00
208000.	11.81	238.00	-30.14	0.1344E+00	0.1927E+00	-9999.00
209000.	12.15	236.00	-31.18	0.1289E+00	0.1856E+00	-9999.00
210000.	12.66	235.00	-33.19	0.1236E+00	0.1794E+00	-9999.00
211000.	13.16	234.00	-34.71	0.1184E+00	0.1730E+00	-9999.00
212000.	13.84	234.00	-36.15	0.1134E+00	0.1667E+00	-9999.00
213000.	14.51	234.00	-36.76	0.1087E+00	0.1602E+00	-9999.00
214000.	15.19	234.00	-38.15	0.1041E+00	0.1543E+00	-9999.00
215000.	16.03	235.00	-38.15	0.9960E-01	0.1476E+00	-9999.00
216000.	16.88	236.00	-37.97	0.9540E-01	0.1413E+00	-9999.00
217000.	17.89	237.00	-36.44	0.9140E-01	0.1345E+00	-9999.00
218000.	18.56	238.00	-35.15	0.8760E-01	0.1282E+00	-9999.00
219000.	19.24	239.00	-35.63	0.8390E-01	0.1231E+00	-9999.00
220000.	20.08	241.00	-36.15	0.8040E-01	0.1182E+00	-9999.00
221000.	20.59	243.00	-36.95	0.7700E-01	0.1136E+00	-9999.00
222000.	21.10	246.00	-38.48	0.7370E-01	0.1094E+00	-9999.00
223000.	21.43	248.00	-40.00	0.7060E-01	0.1055E+00	-9999.00
224000.	21.43	251.00	-42.91	0.6750E-01	0.1021E+00	-9999.00
225000.	21.43	254.00	-45.95	0.6460E-01	0.9905E-01	-9999.00
226000.	21.10	258.00	-47.57	0.6180E-01	0.9544E-01	-9999.00
227000.	20.76	261.00	-49.15	0.5900E-01	0.9176E-01	-9999.00
228000.	20.42	265.00	-50.62	0.5640E-01	0.8829E-01	-9999.00
229000.	19.91	268.00	-51.16	0.5390E-01	0.8459E-01	-9999.00
230000.	19.24	272.00	-51.67	0.5160E-01	0.8116E-01	-9999.00
231000.	18.40	276.00	-54.15	0.4920E-01	0.7826E-01	-9999.00
232000.	17.72	279.00	-54.15	0.4700E-01	0.7476E-01	-9999.00
233000.	17.04	282.00	-55.24	0.4480E-01	0.7162E-01	-9999.00
234000.	16.20	285.00	-56.15	0.4280E-01	0.6871E-01	-9999.00
235000.	15.36	289.00	-57.15	0.4080E-01	0.6580E-01	-9999.00
236000.	14.68	291.00	-57.81	0.3890E-01	0.6293E-01	-9999.00
237000.	13.84	294.00	-59.15	0.3710E-01	0.6039E-01	-9999.00
238000.	13.00	297.00	-60.15	0.3540E-01	0.5790E-01	-9999.00
239000.	12.32	299.00	-61.15	0.3370E-01	0.5538E-01	-9999.00
240000.	11.48	301.00	-61.15	0.3220E-01	0.5291E-01	-9999.00
241000.	10.63	303.00	-62.43	0.3070E-01	0.5075E-01	-9999.00
242000.	9.96	305.00	-63.15	0.2920E-01	0.4844E-01	-9999.00
243000.	9.28	307.00	-64.15	0.2780E-01	0.4634E-01	-9999.00
244000.	8.78	308.00	-65.01	0.2650E-01	0.4435E-01	-9999.00
245000.	8.27	310.00	-66.53	0.2520E-01	0.4249E-01	-9999.00
246000.	7.76	312.00	-68.05	0.2400E-01	0.4076E-01	-9999.00
247000.	7.42	313.00	-68.58	0.2290E-01	0.3900E-01	-9999.00
248000.	7.09	314.00	-70.08	0.2180E-01	0.3740E-01	-9999.00
249000.	6.92	316.00	-71.97	0.2070E-01	0.3584E-01	-9999.00
250000.	6.75	317.00	-73.15	0.1970E-01	0.3431E-01	-9999.00
251000.	6.75	319.00	-73.67	0.1870E-01	0.3266E-01	-9999.00
252000.	6.58	321.00	-74.15	0.1780E-01	0.3116E-01	-9999.00

Table 5. STS-36 ascent atmospheric data tape (continued).

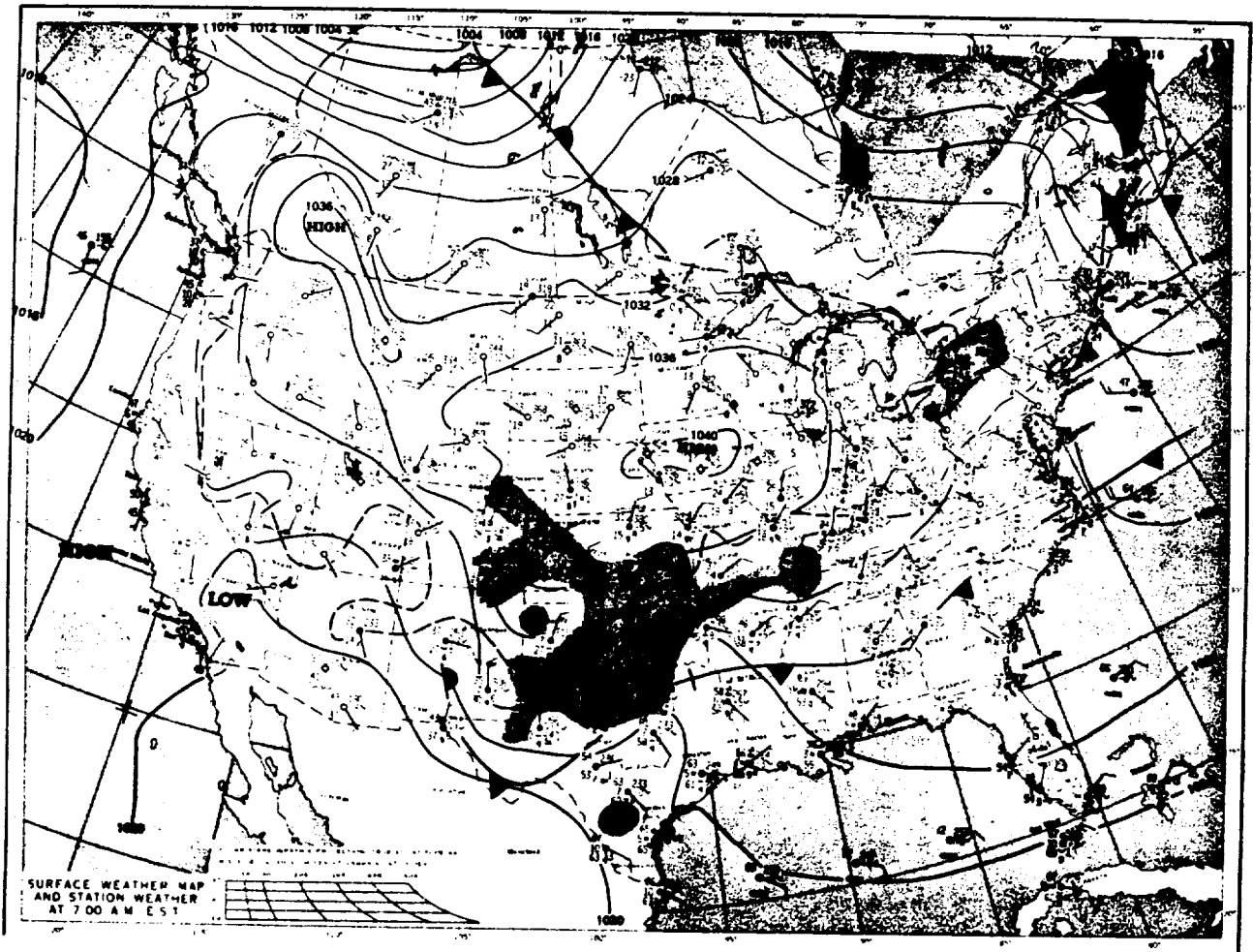
ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
253000.	6.58	323.00	-74.72	0.1690E-01	0.2967E-01	-9999.00
254000.	6.75	325.00	-75.25	0.1600E-01	0.2817E-01	-9999.00
255000.	6.92	328.00	-76.77	0.1520E-01	0.2696E-01	-9999.00
256000.	7.26	330.00	-78.29	0.1450E-01	0.2592E-01	-9999.00
257000.	7.60	331.00	-79.54	0.1370E-01	0.2465E-01	-9999.00
258000.	8.10	332.00	-80.34	0.1300E-01	0.2349E-01	-9999.00
259000.	8.44	333.00	-81.15	0.1240E-01	0.2250E-01	-9999.00
260000.	9.11	334.00	-82.15	0.1170E-01	0.2134E-01	-9999.00
261000.	9.62	335.00	-82.91	0.1110E-01	0.2033E-01	-9999.00
262000.	10.12	336.00	-83.44	0.1050E-01	0.1928E-01	-9999.00
263000.	10.63	337.00	-84.15	0.1000E-01	0.1843E-01	-9999.00
264000.	11.14	337.00	-85.15	0.9500E-02	0.1760E-01	-9999.00
265000.	11.64	337.00	-86.01	0.9000E-02	0.1675E-01	-9999.00
266000.	12.15	338.00	-86.15	0.8500E-02	0.1583E-01	-9999.00
267000.	12.66	338.00	-87.06	0.8100E-02	0.1516E-01	-9999.00
268000.	13.16	339.00	-87.15	0.7600E-02	0.1423E-01	-9999.00
269000.	13.67	339.00	-87.15	0.7200E-02	0.1349E-01	-9999.00
271000.	9.60	353.10	-86.11	0.6476E-02	0.1206E-01	-9999.00
274000.	6.47	43.68	-84.56	0.5525E-02	0.1021E-01	-9999.00
277000.	10.09	90.99	-83.00	0.4713E-02	0.8635E-02	-9999.00
280000.	16.49	107.74	-81.45	0.4021E-02	0.7306E-02	-9999.00
283000.	23.50	114.85	-79.89	0.3430E-02	0.6183E-02	-9999.00
286000.	26.90	80.17	-80.79	0.2940E-02	0.5324E-02	-9999.00
289000.	36.97	59.02	-81.69	0.2520E-02	0.4585E-02	-9999.00
292000.	49.84	47.77	-82.59	0.2160E-02	0.3949E-02	-9999.00
295000.	47.84	44.83	-82.59	0.1850E-02	0.3382E-02	-9999.00
298000.	25.08	49.94	-81.46	0.1580E-02	0.2871E-02	-9999.00
301000.	3.87	121.13	-80.33	0.1350E-02	0.2439E-02	-9999.00
304000.	24.20	215.18	-79.21	0.1150E-02	0.2066E-02	-9999.00
307000.	48.50	222.04	-78.08	0.9840E-03	0.1757E-02	-9999.00
310000.	71.58	226.75	-76.95	0.8410E-03	0.1493E-02	-9999.00
313000.	75.60	226.78	-75.18	0.7230E-03	0.1272E-02	-9999.00
316000.	75.80	226.00	-73.32	0.6230E-03	0.1086E-02	-9999.00
319000.	73.77	224.89	-71.46	0.5360E-03	0.9258E-03	-9999.00
322000.	68.70	223.22	-69.61	0.4610E-03	0.7890E-03	-9999.00
325000.	59.70	220.39	-67.75	0.3970E-03	0.6733E-03	-9999.00
328000.	51.64	217.31	-65.38	0.3420E-03	0.5734E-03	-9999.00
331000.	53.06	218.42	-61.97	0.2960E-03	0.4883E-03	-9999.00
334000.	53.34	219.86	-58.56	0.2560E-03	0.4156E-03	-9999.00
337000.	52.13	221.94	-55.15	0.2220E-03	0.3548E-03	-9999.00
340000.	48.90	225.05	-51.75	0.1920E-03	0.3021E-03	-9999.00
343000.	43.22	230.27	-48.34	0.1660E-03	0.2572E-03	-9999.00
346000.	40.42	230.96	-42.70	0.1460E-03	0.2207E-03	-9999.00
349000.	37.49	229.05	-36.42	0.1280E-03	0.1884E-03	-9999.00
352000.	32.53	225.90	-30.15	0.1130E-03	0.1620E-03	-9999.00
355000.	25.04	219.36	-23.87	0.9930E-04	0.1388E-03	-9999.00
358000.	15.27	200.11	-17.60	0.8740E-04	0.1191E-03	-9999.00
361000.	10.80	144.77	-10.73	0.7730E-04	0.1026E-03	-9999.00
364000.	12.07	132.80	-1.78	0.6990E-04	0.8973E-04	-9999.00
367000.	14.09	120.80	7.16	0.6310E-04	0.7842E-04	-9999.00



Table 5. STS-36 ascent atmospheric data tape (continued).

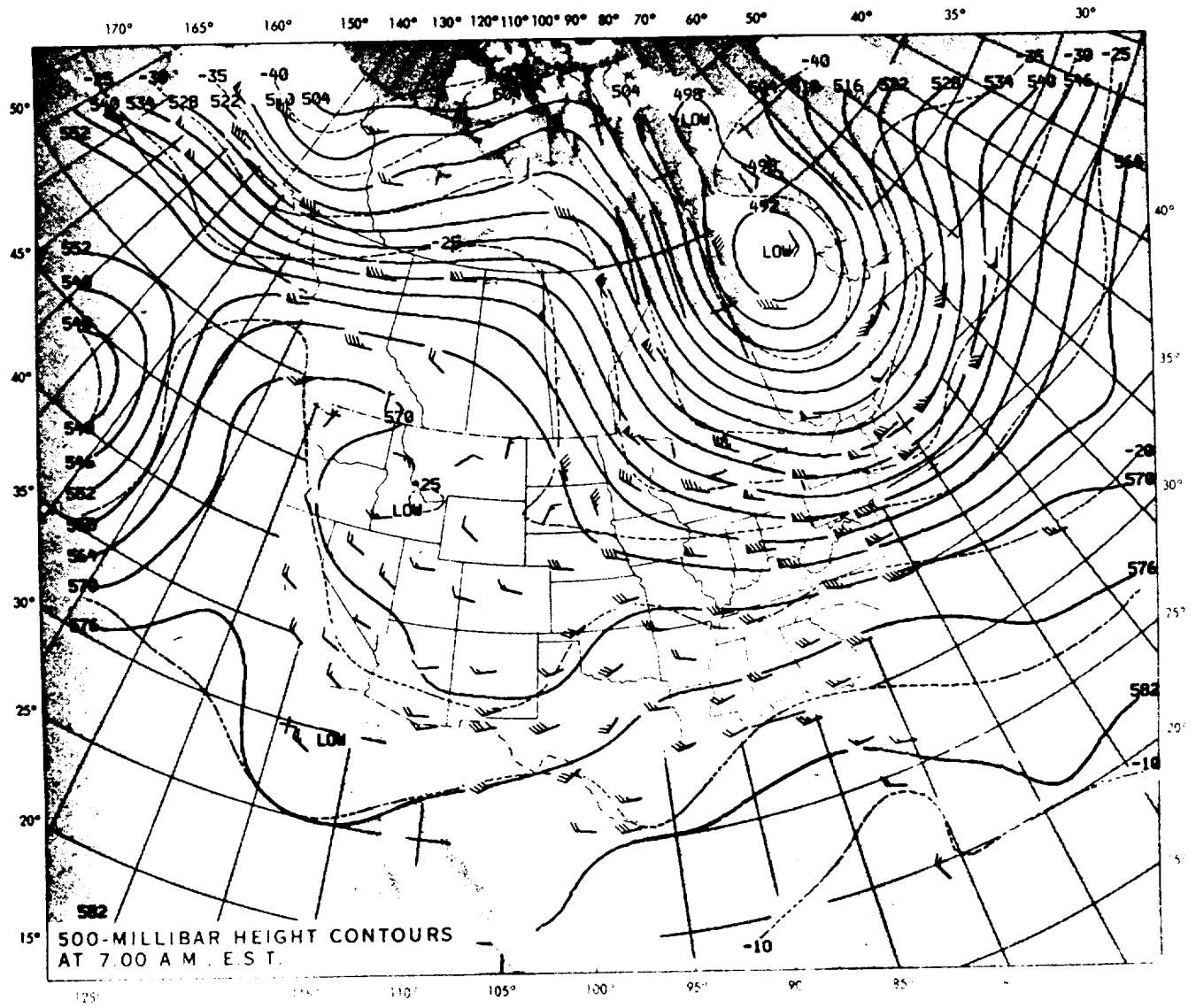
ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
370000.	17.11	109.72	16.11	0.5690E-04	0.6853E-04	-9999.00
373000.	21.35	100.00	25.05	0.5130E-04	0.5993E-04	-9999.00
376000.	27.08	92.01	34.00	0.4620E-04	0.5240E-04	-9999.00
379000.	29.07	89.68	43.90	0.4210E-04	0.4626E-04	-9999.00
382000.	28.74	89.67	54.59	0.3860E-04	0.4103E-04	-9999.00
385000.	28.48	89.60	65.61	0.3560E-04	0.3661E-04	-9999.00
388000.	28.25	89.60	76.95	0.3290E-04	0.3274E-04	-9999.00
391000.	28.05	89.53	88.56	0.3040E-04	0.2928E-04	-9999.00
394000.	27.92	89.46	100.43	0.2830E-04	0.2639E-04	-9999.00
397000.	27.79	89.39	112.52	0.2630E-04	0.2376E-04	-9999.00
400000.	27.66	89.39	124.79	0.2460E-04	0.2154E-04	-9999.00

WEDNESDAY, FEBRUARY 28, 1990



Surface synoptic map at 1200 u.t. February 28, 1990—isobaric, frontal, and precipitation patterns are shown in standard symbolic form.

Figure 1. Surface synoptic chart 4 h 10 min after launch of STS-36.



500-mb height  
Contours at 1200 u.t.  
February 28, 1990  
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 4 h 10 min after launch of STS-36.

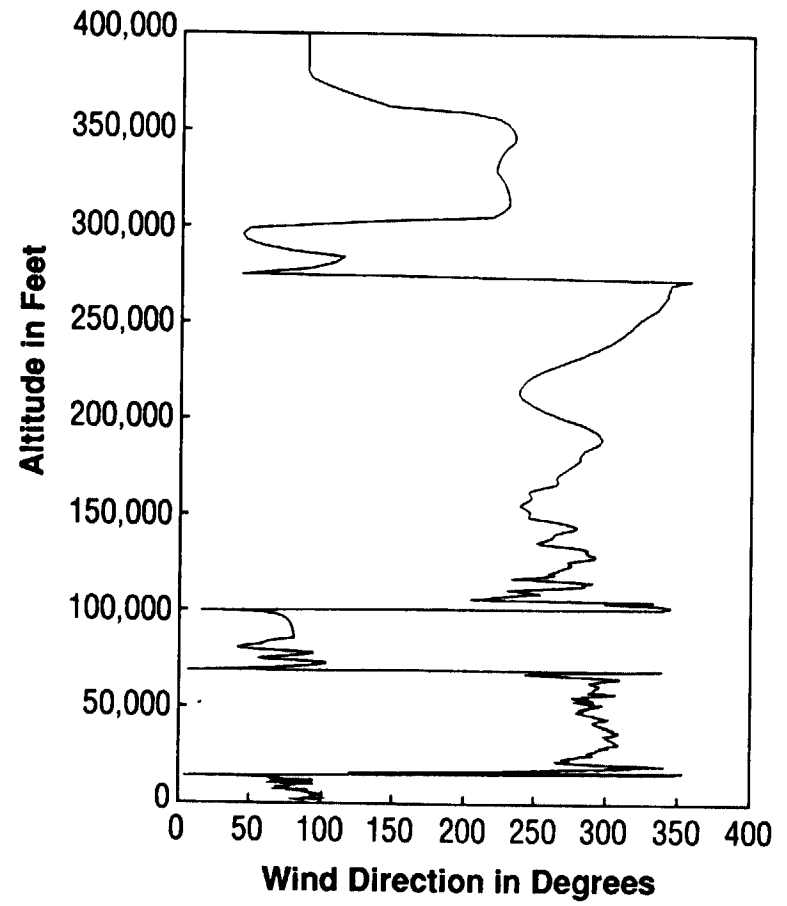
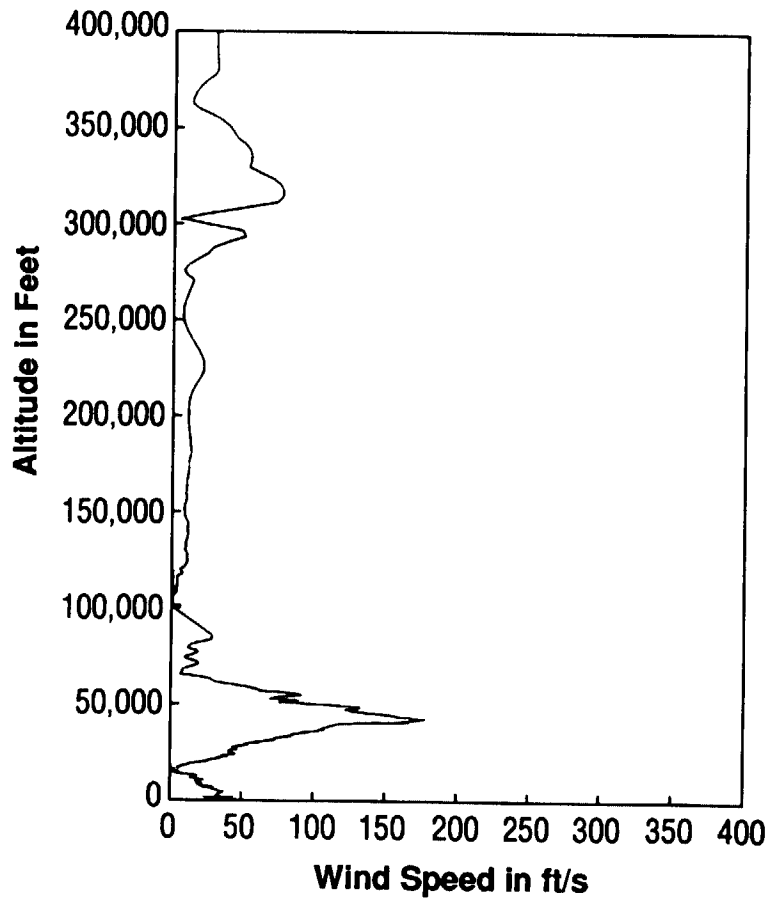


Figure 3. Scalar wind speed and direction at launch time of STS-36.

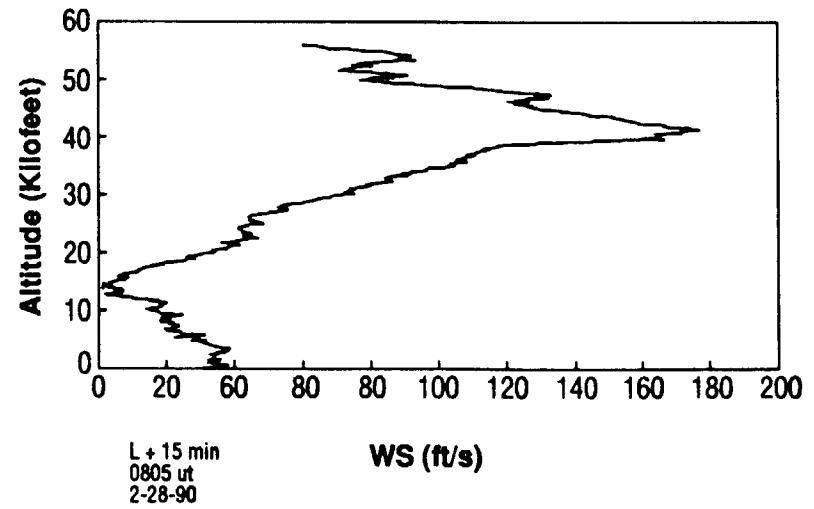
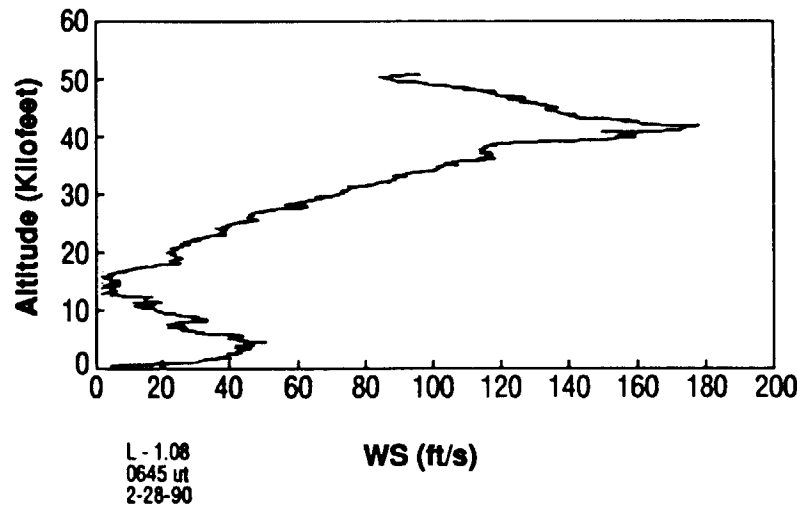
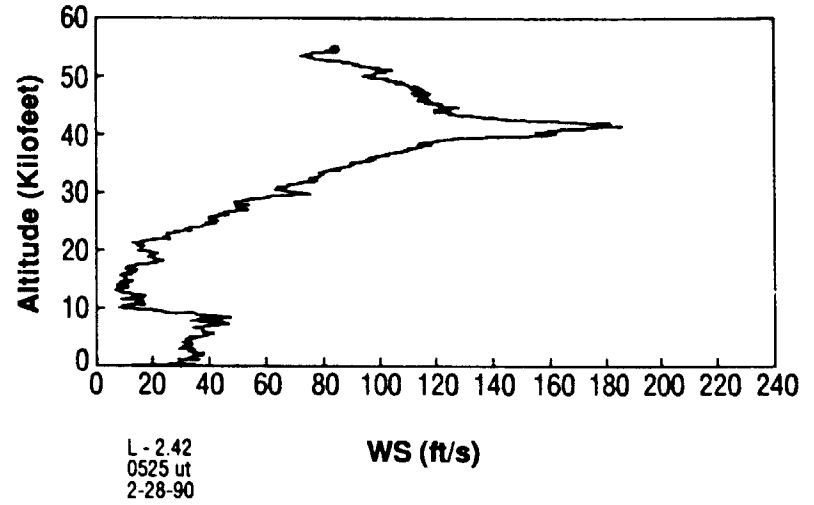
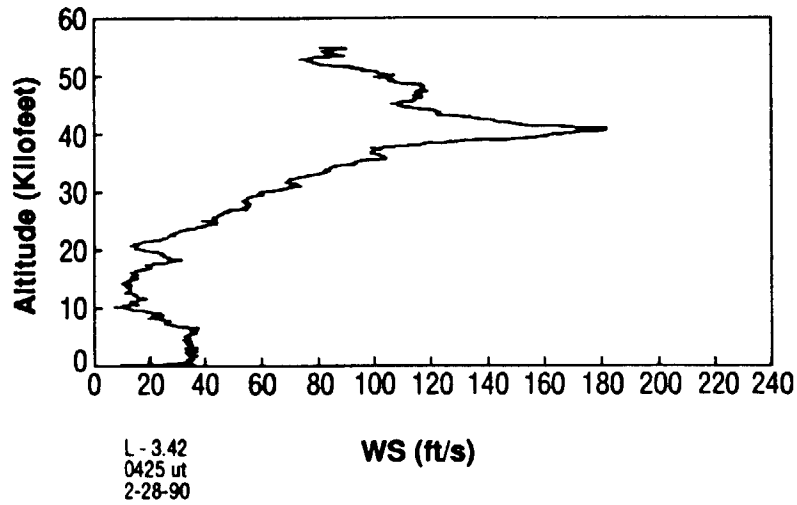


Figure 4. STS-36 prelaunch/launch Jimsphere-measured wind speeds (ft/s).

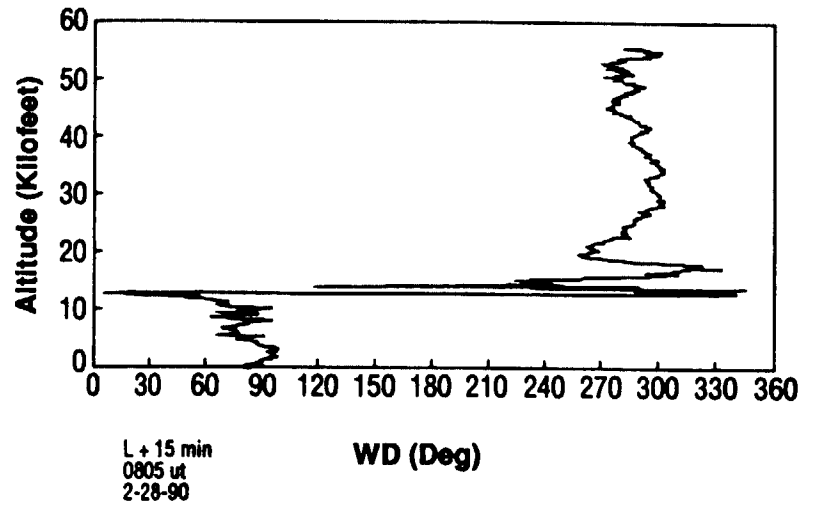
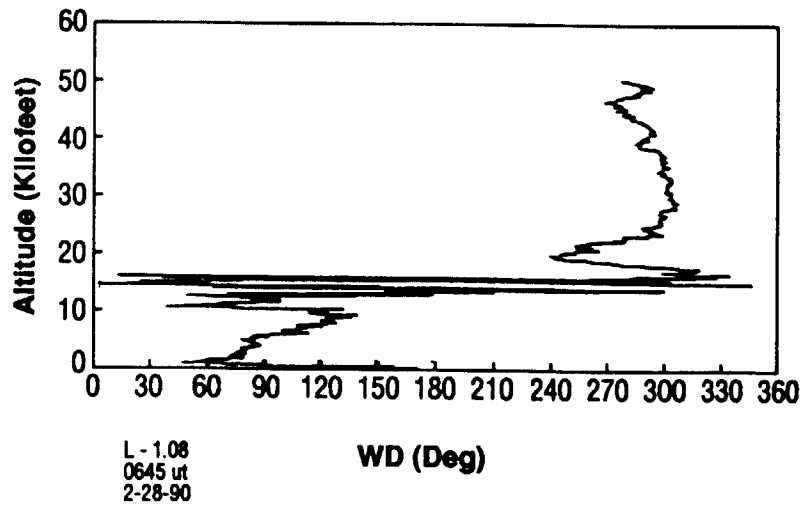
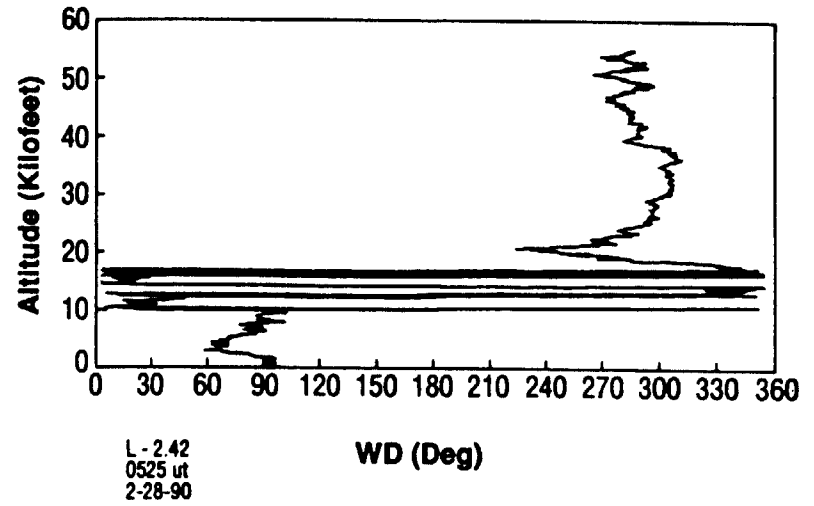
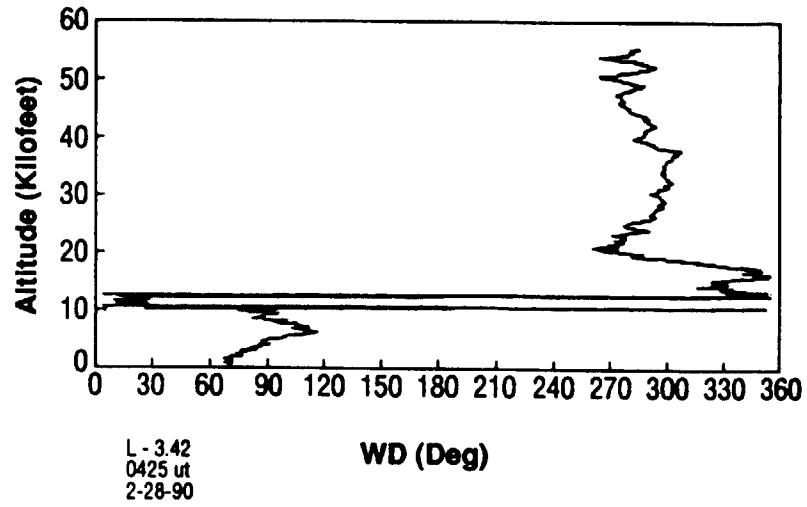
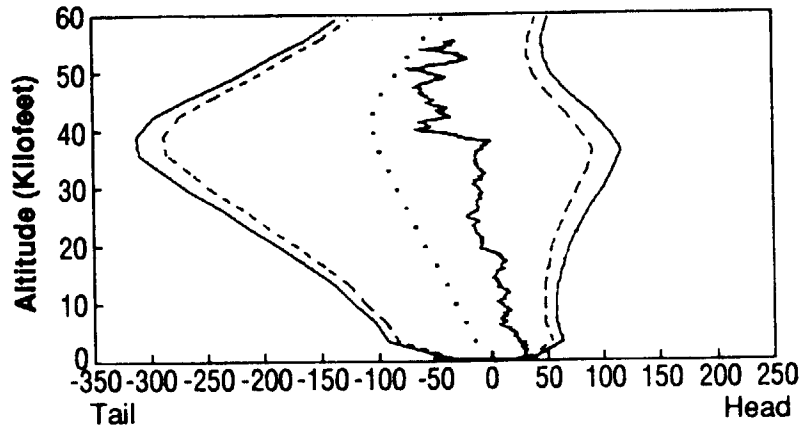


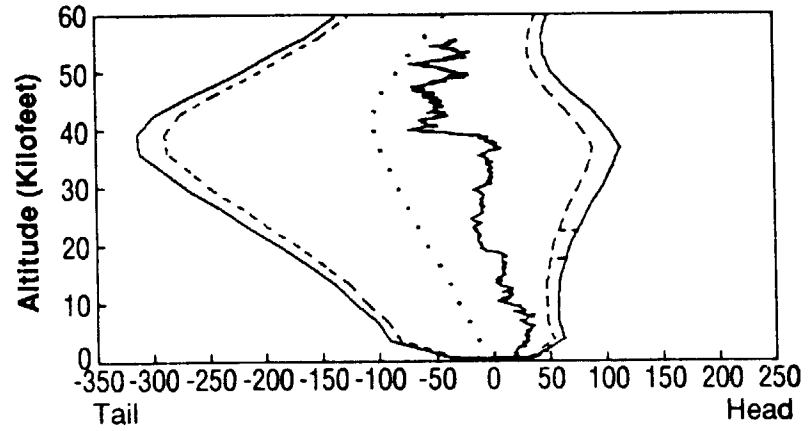
Figure 5. STS-36 prelaunch/launch Jimsphere-measured wind directions (degrees).



L - 3.42  
0425 ut  
2-28-90

**In-Plane Wind Component (ft/s)**

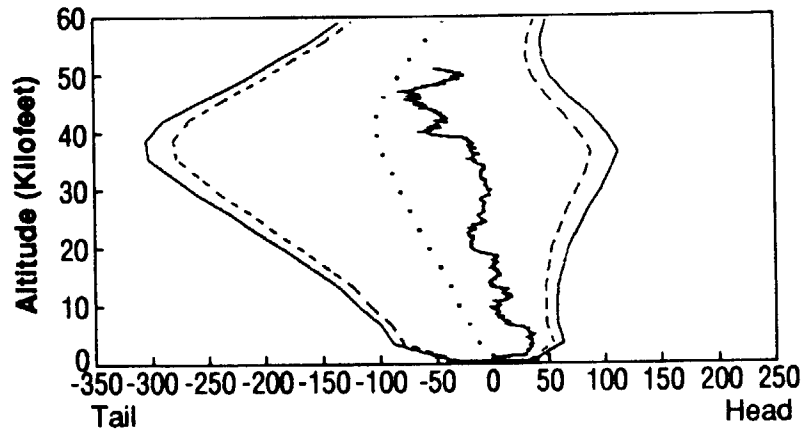
--- Feb 90% Profile Env  
— Feb 95% Profile Env  
•• Feb Mean Winds



L - 2.42  
0525 ut  
2-28-90

**In-Plane Wind Component (ft/s)**

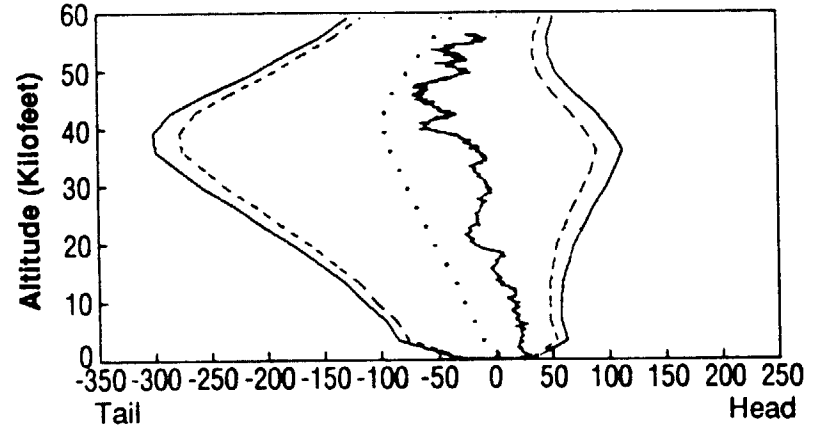
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— Feb 95% Profile Env  
•• Feb Mean Winds



L - 1.08  
0645 ut  
2-28-90

**In-Plane Wind Component (ft/s)**

--- Feb 90% Profile Env  
— Feb 95% Profile Env  
•• Feb Mean Winds



L + 15 min  
0805 ut  
2-28-90

**In-Plane Wind Component (ft/s)**

--- Feb 90% Profile Env  
— Feb 95% Profile Env  
•• Feb Mean Winds

Figure 6. STS-36 prelaunch/launch Jimsphere-measured in-plane component winds (ft/s).  
Reference flight azimuth = 39 degrees.

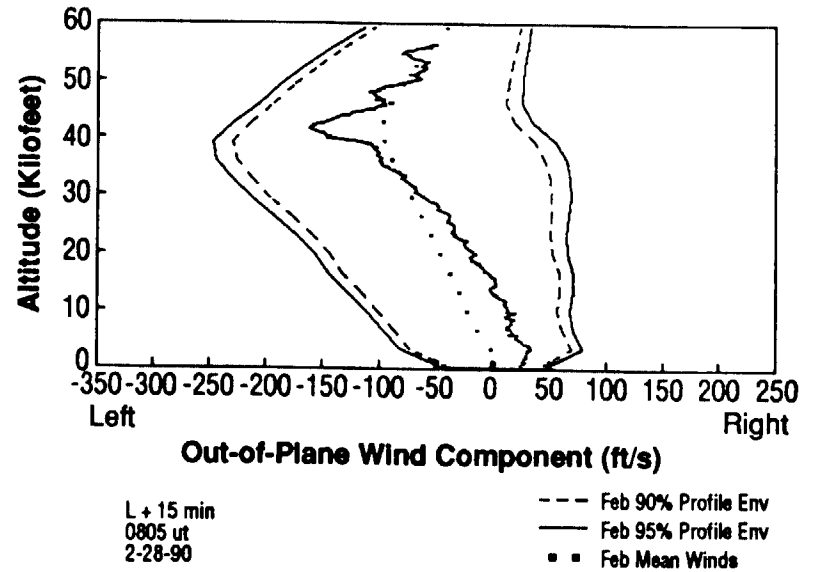
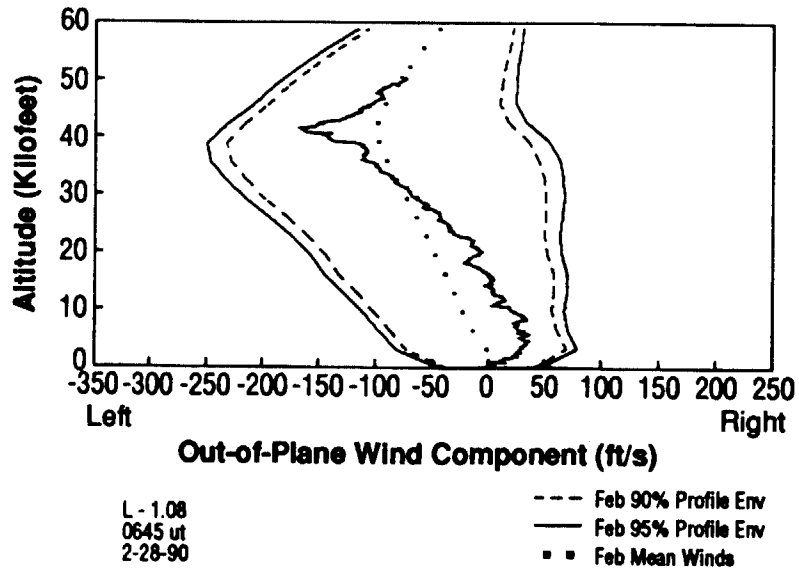
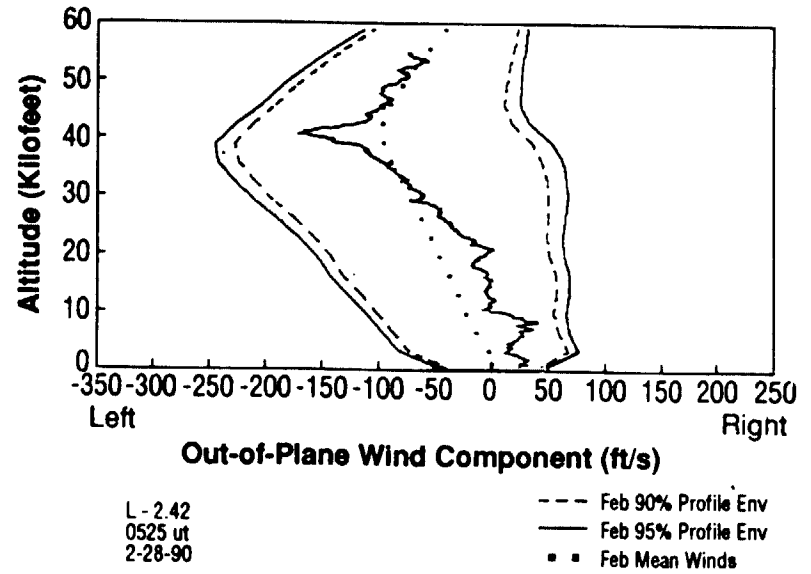
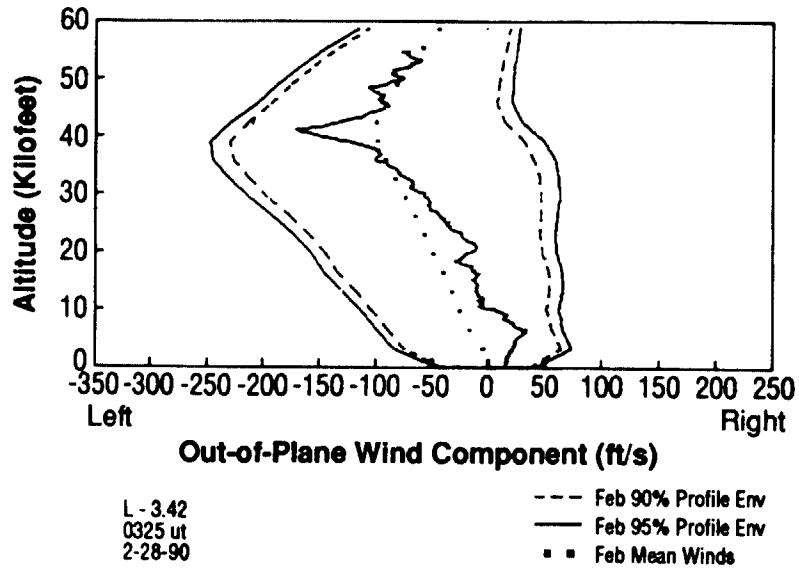


Figure 7. STS-36 prelaunch/launch Jimsphere-measured out-of-plane component winds (ft/s).  
Reference flight azimuth = 39 degrees.



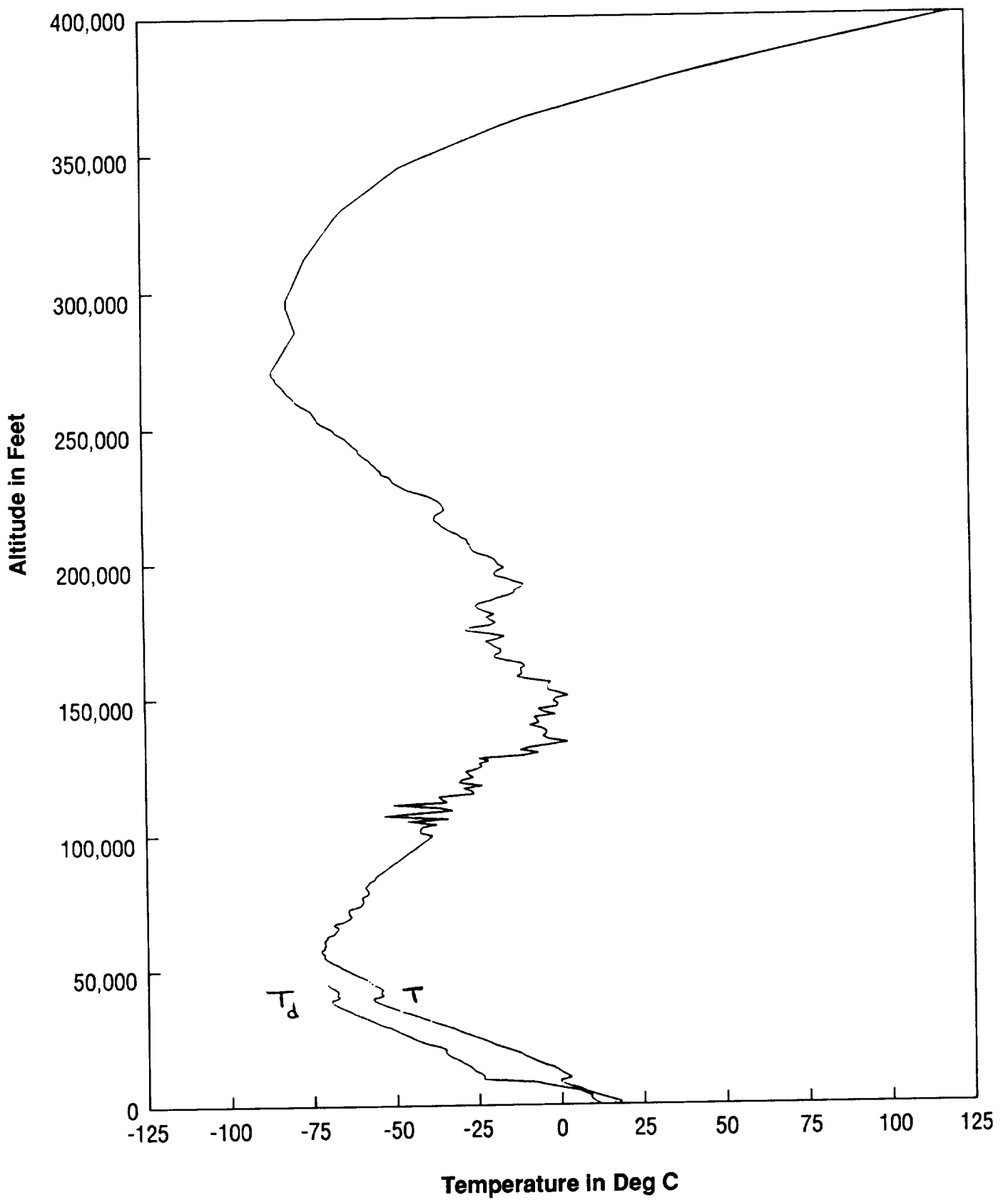


Figure 8. STS-36 temperature profiles versus altitude for launch (ascent).

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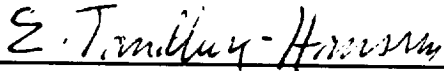
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## APPROVAL

### ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-36) 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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