

# NASA TECHNICAL MEMORANDUM

NASA TM-82480

## ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-3) LAUNCH

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April 1982



**NASA**

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(NASA-TM-82480) ATMOSPHERIC ENVIRONMENT FOR N82-27913  
SPACE SHUTTLE (STS-3) LAUNCH (NASA) E1 P  
HC A04/MF A01 CACL 04B

Unclas  
G3/47 28249

1. REPORT NO. NASA TM-82480		2. GOVERNMENT ACCESSION NO.		3. RECIPIENT'S CATALOG NO.	
4. TITLE AND SUBTITLE  Atmospheric Environment for Space Shuttle (STS-3) Launch				5. REPORT DATE April 1982	
				6. PERFORMING ORGANIZATION CODE	
7. AUTHOR(S) D. L. Johnson, S. C. Brown, and G. W. Batts*				8. PERFORMING ORGANIZATION REPORT #	
9. PERFORMING ORGANIZATION NAME AND ADDRESS  George C. Marshall Space Flight Center Marshall Space Flight Center, Alabama 35812				10. WORK UNIT NO.	
				11. CONTRACT OR GRANT NO.	
				13. TYPE OF REPORT & PERIOD COVERED  Technical Memorandum	
12. SPONSORING AGENCY NAME AND ADDRESS  National Aeronautics and Space Administration Washington, D.C. 20546				14. SPONSORING AGENCY CODE	
15. SUPPLEMENTARY NOTES  Prepared by Space Sciences Laboratory, Science and Engineering *Computer Sciences Corporation, Huntsville, Alabama.					
16. ABSTRACT  This report presents a summary of selected atmospheric conditions observed near Space Shuttle STS-3 launch time on March 22, 1982, 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. Also presented are the wind and thermodynamic parameters measured at the surface and aloft in the SRB descent/impact ocean area. Final meteorological tapes, which consist of wind and thermodynamic parameters versus altitude, for STS-3 vehicle ascent and SRB descent have been constructed. The STS-3 ascent meteorological data tape has been constructed by Marshall Space Flight Center in response to Shuttle task agreement No. 989-13-22-368 with Johnson Space Center.					
17. KEY WORDS STS-3 Launch Atmospheric Summary Pressure Temperature Relative Humidity Winds, Winds Aloft Clouds SRB Descent Atmospheric Summary			18. DISTRIBUTION STATEMENT  <i>Dale F. Johnson</i> Unclassified -- Unlimited		
19. SECURITY CLASSIF. (of this report)  Unclassified		20. SECURITY CLASSIF. (of this page)  Unclassified		21. NO. OF PAGES  49	22. PRICE  NTIS

## ACKNOWLEDGMENTS

The authors wish to thank Dr. Greg Wilson and Dr. James Arnold of the Environmental Applications Branch, MSFC, for their help in extracting synoptic weather data and satellite cloud photographs that are used in this report. Also, special thanks to Messrs. Bill Jeffries and Joe Willett of Computer Sciences Corporation for their assistance in processing all the upper air data used in producing the STS-3 final meteorological data tapes.

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## TECHNICAL MEMORANDUM

# ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-3) LAUNCH

### I. INTRODUCTION

This report presents an evaluation of the atmospheric environmental data taken during the launch of the Space Shuttle/STS-3 vehicle. This Space Shuttle vehicle was launched from Pad 39A at Kennedy Space Center (KSC), Florida, on a bearing of 60 degrees east of north at 1600 GMT (1100 EST) on March 22, 1982.

This report presents a summary of the atmospheric environment at launch time (L+0) of the STS-3, together with the sequence of prelaunch Jimsphere measured winds aloft profiles from L-14 h through liftoff. The general weather situation for the launch and flight area is described, and surface and upper level wind/thermodynamic observations near launch time are given. Surface and upper level wind/thermodynamic parameter measurements are also presented for the SRB descent/impact analyses.

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, and STS-2 launch conditions are presented in References 3, 4, and 5, respectively.

### II. SOURCES OF DATA

Atmospheric observational data used in this report were taken from weather 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) and from the ship Gen. H. S. Vandenberg in the Atlantic Ocean off the Florida Coast. High-altitude winds and thermodynamic data were measured by the Super Loki rocketsondes launched from the CCAFS. Table 1 presents a listing of systems used to obtain the upper level wind profiles used in compiling the final ascent meteorological data tape. Only the ship-launched Omegasonde-Rawinsonde and Super Loki rocket data were used in the upper level atmospheric regions for the construction of the final SRB descent/impact meteorological data tape. Data cutoff altitudes are also given in Table 1.

### III. GENERAL SYNOPTIC SITUATION AT LAUNCH TIME

A high pressure ridge oriented west-northwest to east-southeast was pushing into the central United States during the morning of launch. A cold frontal system, preceding this eastward advancing, cooler air mass was located off the Atlantic coast, out of a low-pressure system near Maine. This front extended southward through Jacksonville, Florida, to become a stationary front in the Gulf of Mexico. Surface winds in the KSC area were light (7 to 8 ft/s) from the west, with humid conditions and warm temperatures (low 70's°F) being experienced throughout the early morning countdown. Figure 1 gives the surface weather map 4 hr prior to launch. Figure 2 presents the wind flow aloft at the 500 mb level. West-southwesterly to westerly winds dominated the flow aloft over the KSC area.

Cloud bands were located over, and in the ocean area east of, the KSC launch complex as shown in Figure 3. Figure 3 presents the GOES east (SMS II) visible satellite picture taken an hour and one half after launch (1730 GMT). Scattered stratocumulus clouds at 1800 ft, along with some scattered cirrus at 30,000 ft, were present during launch. Figure 4 shows the contrail of the Shuttle at launch as recorded by the GOES east satellites visible photograph taken at 1600 GMT.

### IV. SURFACE OBSERVATIONS AT LAUNCH TIME

Surface observations at launch time for selected KSC locations are given in Table 2. Included are pad 39A, Shuttle runway, and CCAFS balloon release station observations. Neither precipitation nor lightning was observed at launch time.

Table 3 presents Pad 39A wind data along with other standard hourly meteorological measurements and sky observations for the 6 hr prior to launch of STS-3. Values for wind speed and direction are given for the 84 m (275 ft) FSS reference level and 18 m (60 ft) pad light pole level.

### V. UPPER AIR MEASUREMENTS DURING LAUNCH

The FPS-16 Jimsphere (1618 GMT), GMD rawinsonde (1603 GMT), Loki-Dart rocketsonde (1934 GMT), and Super-Loki rocketsonde (1730 GMT) systems were used to measure the upper level wind and thermodynamic parameters for STS-3 launch. At altitudes above the rocket-measured data, the Global Reference Atmosphere (GRA) [6] parameters for March KSC conditions were used. A tabulation of the STS-3 final meteorological data for ascent is presented in Table 4 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 7.0 ft/s (4.1 kn) at 60 ft and increasing to a maximum of 119 ft/s (70.5 kn) blowing from 250 degrees. This maximum occurred at an altitude of 45,000 ft (13,716 m). The winds decreased above this level and then became stronger again at much higher levels, as shown in Figure 5. The overall maximum speed was 268 ft/s (158.7 kn) at 197,000 ft (60,046 m) altitude.



## B. Wind Direction

At launch time, the 60 ft wind direction was from the northeast (50 degrees) and shifted to a westerly component above 2000 ft (610 m). Figure 5 shows the complete wind direction versus altitude profile. As shown in Figure 5, wind directions became quite variable at altitudes with low wind speeds.

Over the last 6 or more hours of the countdown, westerly surface (60 ft) winds prevailed at Pad 39A. However, just 7 min prior to launch (1053 EST), the late morning sea breeze entered the launch area and changed the wind direction toward an easterly component. By 1057 EST winds were from the northeast to east. Wind magnitudes also dropped slightly during this transition period of sea breeze establishment. The 60 ft wind directional plot, just prior to until just after STS-3 launch, is shown in Figure 6. The sea-breeze effect of wind directional shift just prior to launch is easily observable in this figure.

## C. Prelaunch/Launch Wind Profiles

All wind profiles, except the L-1.75 hr, shown in Figures 7 through 10 were measured by the Jimsphere FPS-16 system. The L-1.75 hr profile was measured by the MSS-windsonde.

Wind speeds, although lighter than normal throughout the period, approached March mean values at launch time.

## D. Thermodynamic Data

The thermodynamic data taken at STS-3 launch time, consisting of atmospheric temperature, dew-point temperature, pressure, and density have been compiled as the STS-3 ascent meteorological data and are presented in Table 4. The associated thermodynamic data taken in support of the SRB descent have also been assembled as the STS-3 SRB descent/impact meteorological data and are presented in Table 5. The vertical structure of temperature for the STS-3 ascent and for the SRB descent is shown graphically versus altitude in Figure 11.

The atmospheric thermodynamic parameters of temperature, pressure, and density, measured during STS-3 launch below 140,000 ft, were all close to their respective PRA-63 [7] annual values. Temperature deviated only a maximum of -2.8 percent from the PRA-63 at 63,000 ft (19,200 m). Pressure deviated a maximum of -1.3 percent from the PRA-63 at 97,000 ft (29,566 m), while density deviated 2.6 percent at 63,000 ft (19,202 m).

## E. SRB Upper Air and Surface Measurements

As has been mentioned in earlier paragraphs, an SRB descent meteorological data tape has also been constructed which consists of data taken from the Omega-sonde-Rawinsonde system (1630 GMT) aboard the USNS Vandenberg, which was stationed off the coast in the Atlantic Ocean. The CCAFS measured Super-Loki Rocket-sonde data and the GRA model data were used at altitude levels above the measured Omegasonde data. The tabular values for the SRB descent meteorological tape are presented in Table 5, with wind speed and direction profiles presented in Figure 12. Figure 11 gives the vertical temperature profile.

The surface-ship meteorological and oceanographical observations taken close to STS-3 SRB impact are presented in Table 6.

## VI. ATMOSPHERIC SUMMARY CONDITIONS FOR STS LAUNCHES

Given in Table 7 are selected atmospheric L+0 launch conditions for all the Space Shuttle launches.

TABLE 1. SYSTEMS USED TO MEASURE UPPER AIR WIND DATA FOR STS-3 ASCENT\*

Type of Data	Date: March 22, 1982		Portion of Data Used			
	Release Time		Start		End	
	Time (UT) (h:min)	Time After T+0 (min)	Altitude m (ft)	Time After T+0 (min)	Altitude m (ft)	Time After T+0 (min)
FPS-16 Jimsphere	16:18	18	6 (21)	18	17,374 (57,000)	77
Rawinsonde	16:03	3	17,678 (58,000)	61	29,566 (97,000)	100
Loki-Dart Rocketsonde	19:34	214	69,494 (228,000)	214	29,870 (98,000)	230
Super-Loki Rocketsonde (Robin)	17:30	90	78,943 (259,000)	90	69,799 (229,000)	91
Omegasonde-Rawinsonde*	16:30	30	18 (60)	30	29,261 (96,000)	126

\*The Omegasonde-Rawinsonde was released from the USNS Gen. H.S. Vandenberg to measure the upper atmosphere for SRB descent/impact analyses.

TABLE 2. SURFACE OBSERVATIONS AT STS-3 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 (Tenths)	Cloud Type	Height of Base Meters (ft)	Speed f/s (kn)	Direction (deg)
NASA Space Shuttle Runway Winds Measured at 10.4 m (34 ft)	0	10.166 (14.745)	299.8 (80.0)	292.0 (66.0)	66	16 (10)	4	Strato-Cumulus	549 (1,800)	3.4 (2.0)	250
CCAFS <sup>c</sup> Surface Measurements	3	10.163* (14.740)	299.3 (79.0)	292.5 (67.0)	66	-	-	-	-	5.0 (3.0)	240
Pad 39A lightpole <sup>d</sup> NW 18.3 m (60.0 ft)	0	10.160** (14.736)	297.6 (76.0)	292.0 (66.0)	71	-	-	-	-	7.0 <sup>b</sup> (4.1)	50 <sup>b</sup>
Pad 39A FSS (Top-NW) 83.8 m (275 ft)	0	-	-	-	-	-	-	-	-	8.0 <sup>b</sup> (4.7)	145 <sup>b</sup>

\* Pressure value at 13 ft above MSL.

\*\* Pad 39A Camera Site 3 barometric pressure instrument appeared to be reading too low. Therefore, the KSC Shuttle runway station pressure value interpolated to 10.160 N/cm<sup>2</sup> at 21 ft above MSL would be more appropriate as the L+0 pad atmospheric pressure measurement.

\*\*\* 5/10 total sky cover.

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

b. 10 sec average prior to L+0.

c. Balloon release site.

d. Pad 39A thermodynamic measurements are taken at camera site #3, 6.4 m (21 ft) above MSL.

TABLE 3. STS-3 PRE-LAUNCH THROUGH LAUNCH KSC PAD 39A  
METEOROLOGICAL MEASUREMENTS \*

22 March 1982 Time Z	Hourly Atmospheric Measurements							Sky Condition			
	Temp. (°F)	Dew Pt. (°F)	RH (%)	275' Level (SE) **		60' Level (NW) **		Clouds	Total Sky Cover	Vis. (mi.)	Other Remarks
				WS Kt	WD°	WS Kt	WD°				
0900	69	67	94	10	250	4	220	2/10 SC at 3,000 ft	2/10	10	
1000	69	68	98	12	260	5	290	7/10 SC at 1,200 ft	7/10	8	Patches shallow ground fog
1100	68	68	100	15	240	5	220	7/10 SC at 1,200 ft	7/10	8	Patches ground fog
1200	68	68	100	14	250	5	230	8/10 SC at 1,200 ft	8/10	8	
1300	70	70	100	13	250	5	260	1/10 CU at 600 ft 8/10 SC at 1,400 ft 6/10 Ci at 30,000 ft	8/10	7	
1400	73	73	100	17	250	8	260	3/10 SC at 1,600 ft 1/10 Ci at 30,000 ft	4/10	8	
1500	74	68	81	14	250	7	260	8/10 SC at 1,400 ft 1/10 Ci at 30,000 ft	8/10	10	
L+0***1600	76	66	71	5	145	4	50	4/10 SC at 1,800 ft 1/10 Ci at 30,000 ft	5/10	10	

\* Hourly observations obtained verbally from CCAFS.

\*\* 10 min mean about the hour from pad 39A instrumentation.

\*\*\* L+0 PAD Wind and thermodynamic parameters obtained from KSC strip charts. NW Anemometers used at 60 and 275 ft levels for L+0 wind conditions (10 sec average prior to L+0). PAD 39A L+0 atmospheric pressure, at 21 ft (MSL), was 10.160 N/cm<sup>2</sup>. Sea level pressure was 10.166 N/cm<sup>2</sup>.

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TABLE 4. STS-3 FINAL T+0 ASCENT METEOROLOGICAL DATA TAPE

METEOROLOGICAL DATA TAPE	ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
000021	005	005	085	28.8	.1016+04	.1180+04	18.8
000100	007	080	080	29.1	.1013+04	.1178+04	18.7
000200	008	110	110	23.7	.1010+04	.1175+04	18.6
000300	006	195	195	23.0	.1006+04	.1173+04	18.5
000400	003	283	283	23.3	.1003+04	.1170+04	18.4
000500	001	346	346	22.6	.9993+03	.1168+04	18.3
000600	001	239	239	22.2	.9958+03	.1165+04	18.1
000700	004	093	093	21.8	.9924+03	.1163+04	18.0
000800	007	275	275	21.5	.9889+03	.1160+04	17.9
000900	004	303	303	21.1	.9855+03	.1158+04	17.8
001000	003	329	329	20.7	.9821+03	.1155+04	17.7
001100	005	299	299	20.4	.9786+03	.1152+04	17.6
001200	008	281	281	20.2	.9752+03	.1149+04	17.6
001300	009	285	285	19.9	.9718+03	.1146+04	17.5
001400	010	283	283	19.6	.9683+03	.1143+04	17.4
001500	007	279	279	19.4	.9649+03	.1140+04	17.3
001600	017	301	301	19.1	.9615+03	.1137+04	17.3
001700	008	305	305	18.8	.9582+03	.1134+04	17.2
001800	008	300	300	18.5	.9548+03	.1131+04	17.1
001900	007	282	282	18.3	.9514+03	.1129+04	17.1
002000	012	280	280	18.0	.9481+03	.1126+04	17.0
002100	012	272	272	17.8	.9447+03	.1123+04	16.5
002200	010	258	258	17.7	.9414+03	.1119+04	16.0
002300	010	262	262	17.5	.9380+03	.1116+04	15.6
002400	007	208	208	17.3	.9347+03	.1113+04	15.1
002500	013	233	233	17.2	.9314+03	.1110+04	14.6
002600	002	284	284	17.0	.9281+03	.1107+04	14.1
002700	008	270	270	16.8	.9248+03	.1104+04	13.6
002800	010	217	217	16.6	.9215+03	.1101+04	13.2
002900	013	262	262	16.5	.9182+03	.1098+04	12.7
003000	016	260	260	16.3	.9150+03	.1095+04	12.2
003100	017	259	259	16.3	.9117+03	.1091+04	11.4
003200	018	260	260	16.2	.9084+03	.1088+04	10.7
003300	019	259	259	16.2	.9052+03	.1084+04	9.9
003400	019	258	258	16.1	.9020+03	.1081+04	9.2
003500	020	259	259	16.1	.8988+03	.1077+04	8.4
003600	021	251	251	16.1	.8956+03	.1074+04	7.6
003700	022	260	260	16.0	.8924+03	.1070+04	6.9
003800	025	259	259	16.0	.8892+03	.1067+04	6.1
003900	027	257	257	15.9	.8860+03	.1064+04	5.4
004000	029	256	256	15.9	.8828+03	.1060+04	4.6
004100	029	256	256	15.6	.8797+03	.1057+04	4.6
004200	028	258	258	15.4	.8765+03	.1054+04	4.6
004300	029	255	255	15.1	.8734+03	.1052+04	4.6
004400	029	253	253	14.8	.8702+03	.1049+04	4.6
004500	029	252	252	14.6	.8671+03	.1046+04	4.6
004600	029	251	251	14.3	.8640+03	.1043+04	4.7
004700	029	248	248	14.0	.8609+03	.1040+04	4.7
004800	029	250	250	13.7	.8578+03	.1038+04	4.7
004900	028	249	249	13.5	.8547+03	.1035+04	4.7

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TABLE 4. (Continued)

OFT NUMBER	LAUNCH DATE	RZ0322	METEOROLOGICAL DATA TAPE	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M <sup>3</sup> )	DEW POINT (DEG C)
005100	021	250	11.2	.8516+03	1032+04	4.7			
005200	026	252	12.9	.8486+03	1030+04	4.6			
005300	026	252	12.6	.8455+03	1027+04	4.5			
005400	026	252	12.2	.8424+03	1024+04	4.4			
005500	026	254	11.9	.8394+03	1022+04	4.3			
005600	026	254	11.6	.8363+03	1019+04	4.2			
005700	021	256	11.1	.8331+03	1017+04	4.0			
005800	026	258	11.0	.8303+03	1014+04	3.9			
005900	027	258	10.6	.8272+03	1012+04	3.8			
006000	026	259	10.3	.8242+03	1009+04	3.7			
006100	026	256	10.0	.8213+03	1007+04	3.6			
006200	027	257	9.8	.8183+03	1004+04	2.8			
006300	026	255	9.6	.8153+03	1001+04	1.9			
006400	027	253	9.4	.8123+03	.9983+03	1.1			
006500	027	253	9.2	.8093+03	.9955+03	.2			
006600	028	253	9.1	.8063+03	.9927+03	-.6			
006700	030	256	8.9	.8034+03	.9898+03	-1.5			
006800	030	257	8.7	.8004+03	.9870+03	-2.3			
006900	031	259	8.5	.7975+03	.9842+03	-3.2			
007000	031	266	8.3	.7946+03	.9814+03	-4.0			
007100	031	265	8.1	.7917+03	.9786+03	-4.9			
007200	030	264	8.2	.7888+03	.9747+03	-5.9			
007300	030	268	8.4	.7859+03	.9707+03	-6.9			
007400	030	273	8.5	.7830+03	.9668+03	-7.8			
007500	028	271	8.7	.7801+03	.9629+03	-8.8			
007600	030	280	8.8	.7772+03	.9590+03	-9.8			
007700	032	286	8.9	.7744+03	.9551+03	-10.8			
007800	035	289	9.1	.7715+03	.9512+03	-11.8			
007900	035	293	9.2	.7687+03	.9473+03	-12.7			
008000	034	297	9.4	.7659+03	.9434+03	-13.7			
008100	034	297	9.5	.7631+03	.9396+03	-14.7			
008200	032	297	9.6	.7603+03	.9357+03	-14.8			
008300	032	298	9.8	.7575+03	.9318+03	-14.8			
008400	029	294	9.9	.7547+03	.9280+03	-14.9			
008500	028	293	10.1	.7520+03	.9241+03	-14.9			
008600	029	291	10.2	.7492+03	.9203+03	-15.0			
008700	028	285	10.1	.7465+03	.9165+03	-15.1			
008800	028	278	10.5	.7438+03	.9127+03	-15.1			
008900	027	273	10.6	.7411+03	.9089+03	-15.2			
009000	026	270	10.8	.7384+03	.9051+03	-15.2			
009100	025	268	10.9	.7356+03	.9014+03	-15.3			
009200	027	271	10.7	.7330+03	.8986+03	-15.4			
009300	028	271	10.6	.7303+03	.8959+03	-15.5			
009400	030	272	10.4	.7276+03	.8931+03	-15.5			
009500	031	269	10.2	.7249+03	.8904+03	-15.6			
009600	032	264	10.1	.7223+03	.8877+03	-15.7			
009700	030	264	9.9	.7197+03	.8850+03	-15.8			
009800	029	265	9.7	.7170+03	.8823+03	-15.9			
009900	028	268	9.5	.7144+03	.8796+03	-15.9			
010000	029	267	9.4	.7118+03	.8769+03	-16.0			

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TABLE 4. (Continued)

OFT NUMBER	LAUNCH DATE	METEOROLOGICAL DATA TAPE	ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/CM <sup>3</sup> )	DEW POINT (DEG C)
3	62G322		61000	031	261	9.2	7092.03	.8742.03	-16.1
			61000	032	261	8.9	7066.03	.8718.03	-16.3
			61000	032	258	8.7	7040.03	.8693.03	-16.4
			61000	031	257	8.4	7014.03	.8669.03	-16.6
			61000	032	256	8.2	6988.03	.8645.03	-16.8
			61000	036	252	7.9	6962.03	.8621.03	-16.9
			61000	036	252	7.7	6937.03	.8597.03	-17.1
			61000	036	252	7.4	6911.03	.8573.03	-17.3
			61000	036	249	7.2	6886.03	.8549.03	-17.5
			61000	037	247	6.9	6860.03	.8525.03	-17.6
			61000	036	247	6.7	6835.03	.8501.03	-17.8
			61000	039	243	6.5	6810.03	.8477.03	-18.0
			61100	042	241	6.2	6784.03	.8452.03	-18.1
			61100	042	240	6.0	6759.03	.8428.03	-18.3
			61100	043	239	5.8	6734.03	.8404.03	-18.5
			61100	045	237	5.6	6709.03	.8379.03	-18.6
			61100	044	236	5.3	6684.03	.8355.03	-18.8
			61100	044	235	5.1	6659.03	.8331.03	-19.0
			61100	046	234	4.9	6635.03	.8307.03	-19.2
			61200	045	234	4.6	6610.03	.8283.03	-19.3
			61200	047	233	4.4	6585.03	.8259.03	-19.5
			61200	047	232	4.2	6561.03	.8233.03	-19.6
			61200	050	230	4.1	6536.03	.8207.03	-19.7
			61200	050	230	3.9	6512.03	.8181.03	-19.9
			61200	050	227	3.8	6487.03	.8154.03	-20.0
			61200	052	227	3.6	6463.03	.8128.03	-20.1
			61200	051	228	3.5	6439.03	.8102.03	-20.2
			61200	050	231	3.4	6415.03	.8076.03	-20.3
			61200	049	234	3.2	6391.03	.8051.03	-20.5
			61200	048	237	3.1	6367.03	.8025.03	-20.6
			61300	045	238	2.9	6343.03	.7999.03	-20.7
			61300	044	237	2.7	6319.03	.7974.03	-20.8
			61300	041	239	2.6	6296.03	.7949.03	-21.0
			61300	038	240	2.4	6272.03	.7923.03	-21.1
			61300	036	241	2.3	6248.03	.7898.03	-21.3
			61300	033	240	2.1	6225.03	.7873.03	-21.4
			61300	032	236	1.9	6201.03	.7848.03	-21.5
			61300	032	236	1.8	6178.03	.7823.03	-21.7
			61300	032	234	1.6	6155.03	.7798.03	-21.8
			61300	032	235	1.5	6132.03	.7774.03	-22.0
			61400	033	234	1.3	6109.03	.7749.03	-22.1
			61400	034	236	1.1	6086.03	.7725.03	-22.3
			61400	035	235	.9	6063.03	.7702.03	-22.4
			61400	037	237	.7	6040.03	.7678.03	-22.6
			61400	039	237	.5	6017.03	.7655.03	-22.8
			61450	039	237	.3	5994.03	.7632.03	-22.9
			61460	038	238	.1	5971.03	.7608.03	-23.1
			61470	039	237	-.1	5948.03	.7585.03	-23.3
			61480	038	239	-.3	5926.03	.7562.03	-23.5
			61490	040	238	-.5	5904.03	.7539.03	-23.6

TABLE 4. (Continued)

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3 OFT NUMBER	LAUNCH DATE #20322	METEOROLOGICAL DATA TAPE	ALTIITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
015000			043	230	-9	.5881+03	.7518+03	-23.8	
015100			043	240	-9	.5859+03	.7493+03	-23.9	
015200			044	243	-1.1	.5837+03	.7469+03	-24.1	
015300			045	244	-1.3	.5814+03	.7446+03	-24.2	
015400			046	244	-1.5	.5792+03	.7423+03	-24.4	
015500			045	244	-1.6	.5770+03	.7400+03	-24.5	
015600			046	245	-1.8	.5748+03	.7377+03	-24.6	
015700			046	247	-2.0	.5726+03	.7354+03	-24.8	
015800			046	247	-2.2	.5704+03	.7331+03	-24.9	
015900			048	247	-2.4	.5683+03	.7308+03	-25.1	
016000			047	247	-2.6	.5661+03	.7285+03	-25.2	
016100			048	245	-2.9	.5639+03	.7263+03	-25.4	
016200			048	243	-3.1	.5617+03	.7241+03	-25.6	
016300			050	243	-3.4	.5596+03	.7223+03	-25.8	
016400			052	242	-3.7	.5574+03	.7203+03	-26.0	
016500			052	242	-3.9	.5553+03	.7183+03	-26.2	
016600			055	241	-4.2	.5532+03	.7162+03	-26.4	
016700			057	242	-4.5	.5510+03	.7142+03	-26.6	
016800			059	240	-4.8	.5489+03	.7122+03	-26.8	
016900			061	241	-5.0	.5468+03	.7102+03	-27.0	
017000			061	241	-5.3	.5447+03	.7081+03	-27.2	
017100			062	239	-5.5	.5426+03	.7059+03	-27.4	
017200			062	240	-5.7	.5405+03	.7036+03	-27.5	
017300			062	239	-5.8	.5384+03	.7014+03	-27.7	
017400			062	239	-6.0	.5363+03	.6991+03	-27.8	
017500			063	240	-6.2	.5342+03	.6969+03	-28.0	
017600			064	239	-6.4	.5322+03	.6947+03	-28.2	
017700			065	240	-6.6	.5301+03	.6924+03	-28.3	
017800			068	239	-6.7	.5281+03	.6902+03	-28.5	
017900			069	241	-6.9	.5260+03	.6880+03	-28.6	
018000			068	240	-7.1	.5240+03	.6858+03	-28.8	
018100			068	240	-7.3	.5219+03	.6834+03	-29.0	
018200			067	241	-7.6	.5199+03	.6817+03	-29.1	
018300			067	241	-7.8	.5178+03	.6797+03	-29.3	
018400			065	241	-8.1	.5158+03	.6777+03	-29.5	
018500			065	241	-8.3	.5138+03	.6757+03	-29.6	
018600			064	244	-8.6	.5118+03	.6737+03	-29.8	
018700			064	244	-8.8	.5098+03	.6717+03	-30.0	
018800			065	244	-9.1	.5078+03	.6697+03	-30.2	
018900			066	245	-9.3	.5058+03	.6677+03	-30.3	
019000			066	243	-9.6	.5038+03	.6658+03	-30.5	
019100			067	244	-9.8	.5019+03	.6638+03	-30.7	
019200			066	243	-10.1	.4999+03	.6618+03	-30.8	
019300			066	243	-10.3	.4979+03	.6599+03	-31.0	
019400			066	244	-10.6	.4959+03	.6578+03	-31.2	
019500			067	242	-10.8	.4940+03	.6558+03	-31.3	
019600			067	242	-11.1	.4920+03	.6539+03	-31.5	
019700			067	240	-11.3	.4901+03	.6519+03	-31.7	
019800			067	240	-11.6	.4881+03	.6500+03	-31.9	
019900			067	240	-11.6	.4862+03	.6480+03	-32.0	



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TABLE 4. (Continued)

OFI NUMBER LAUNCH DATE METEOROLOGICAL DATA TAPE ALTIMETER (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
020000	066	280	-12.1	.6893+03	.6861+03	-32.2
020100	066	281	-12.3	.6874+03	.6841+03	-32.4
020200	065	280	-12.6	.6805+03	.6421+03	-32.6
020300	064	280	-12.8	.6785+03	.6402+03	-32.8
020400	063	239	-13.1	.6766+03	.6382+03	-33.0
020500	063	240	-13.3	.6747+03	.6363+03	-33.1
020600	062	241	-13.5	.6728+03	.6344+03	-33.3
020700	065	240	-13.8	.6710+03	.6325+03	-33.5
020800	066	241	-14.0	.6691+03	.6305+03	-33.7
020900	066	241	-14.3	.6672+03	.6285+03	-33.9
021000	065	241	-14.5	.6654+03	.6266+03	-34.1
021100	064	242	-14.8	.6635+03	.6248+03	-34.3
021200	065	242	-15.1	.6616+03	.6230+03	-34.5
021300	064	242	-15.4	.6598+03	.6212+03	-34.7
021400	065	240	-15.7	.6579+03	.6194+03	-34.9
021500	064	240	-15.9	.6561+03	.6176+03	-35.1
021600	064	238	-16.2	.6542+03	.6158+03	-35.4
021700	064	239	-16.5	.6524+03	.6140+03	-35.6
021800	064	238	-16.8	.6506+03	.6122+03	-35.8
021900	066	236	-17.1	.6488+03	.6105+03	-36.0
022000	066	237	-17.4	.6470+03	.6087+03	-36.2
022100	067	236	-17.6	.6452+03	.6068+03	-36.5
022200	067	237	-17.9	.6434+03	.6049+03	-36.7
022300	068	238	-18.1	.6415+03	.6029+03	-37.0
022400	068	238	-18.3	.6398+03	.6010+03	-37.3
022500	069	240	-18.5	.6380+03	.5991+03	-37.5
022600	068	241	-18.8	.6362+03	.5972+03	-37.8
022700	068	240	-19.0	.6344+03	.5954+03	-38.1
022800	067	242	-19.2	.6326+03	.5935+03	-38.4
022900	068	242	-19.5	.6309+03	.5916+03	-38.6
023000	069	244	-19.7	.6291+03	.5897+03	-38.9
023100	068	245	-20.0	.6274+03	.5880+03	-39.1
023200	068	246	-20.3	.6256+03	.5862+03	-39.2
023300	068	247	-20.5	.6239+03	.5845+03	-39.4
023400	070	247	-20.8	.6221+03	.5827+03	-39.5
023500	069	249	-21.1	.6204+03	.5810+03	-39.7
023600	069	247	-21.4	.6187+03	.5792+03	-39.9
023700	069	247	-21.7	.6170+03	.5775+03	-40.0
023800	069	249	-21.9	.6153+03	.5758+03	-40.2
023900	069	247	-22.2	.6136+03	.5740+03	-40.3
024000	069	245	-22.5	.6119+03	.5723+03	-40.5
024100	070	246	-22.8	.6102+03	.5706+03	-40.7
024200	069	246	-23.0	.6084+03	.5688+03	-40.9
024300	070	245	-23.3	.6068+03	.5670+03	-41.0
024400	070	245	-23.5	.6051+03	.5652+03	-41.2
024500	070	246	-23.8	.6034+03	.5635+03	-41.4
024600	070	248	-24.1	.6017+03	.5617+03	-41.6
024700	069	249	-24.3	.6000+03	.5600+03	-41.8
024800	069	247	-24.6	.5984+03	.5582+03	-41.9
024900	071	247	-24.8	.5967+03	.5565+03	-42.1





TABLE 4. (Continued)

OFI NUMBER LAUNCH DATE #20372 METEOROLOGICAL DATA TAPE	ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M <sup>3</sup> )	DEW POINT (DEG C)
	036000	103	270	-45.5	2552.03	.3905.03	-53.9
	035100	103	271	-45.6	2549.03	.3888.03	-53.9
	035200	103	272	-45.6	2529.03	.3871.03	-53.9
	035300	104	273	-45.7	2517.03	.3855.03	-53.9
	035400	107	276	-45.7	2506.03	.3838.03	-53.9
	035500	107	278	-45.8	2494.03	.3822.03	-53.9
	035600	109	281	-45.9	2483.03	.3805.03	-53.9
	035700	109	281	-45.9	2472.03	.3789.03	-53.9
	035800	107	279	-46.0	2460.03	.3773.03	-53.9
	035900	107	279	-46.0	2449.03	.3757.03	-53.9
	036000	106	278	-46.1	2438.03	.3741.03	-53.9
	036100	105	280	-46.4	2427.03	.3728.03	-54.0
	036200	103	279	-46.6	2416.03	.3715.03	-54.1
	036300	103	278	-46.9	2405.03	.3703.03	-54.3
	036400	105	278	-47.2	2394.03	.3690.03	-54.4
	036500	105	277	-47.4	2383.03	.3678.03	-54.5
	036600	104	277	-47.7	2372.03	.3665.03	-54.6
	036700	104	277	-48.0	2361.03	.3653.03	-54.7
	036800	103	277	-48.3	2350.03	.3640.03	-54.9
	036900	102	276	-48.5	2340.03	.3628.03	-55.0
	037000	103	278	-48.8	2329.03	.3616.03	-55.1
	037100	101	276	-48.9	2318.03	.3601.03	-55.4
	037200	101	276	-49.1	2307.03	.3587.03	-55.6
	037300	100	275	-49.2	2297.03	.3573.03	-55.9
	037400	099	274	-49.4	2286.03	.3559.03	-56.1
	037500	098	273	-49.5	2276.03	.3544.03	-56.4
	037600	100	274	-49.6	2265.03	.3530.03	-56.7
	037700	102	272	-49.8	2255.03	.3516.03	-56.9
	037800	103	271	-49.9	2244.03	.3502.03	-57.2
	037900	103	270	-50.1	2234.03	.3488.03	-57.4
	038000	104	271	-50.2	2223.03	.3474.03	-57.7
	038100	102	271	-50.3	2213.03	.3460.03	-57.8
	038200	104	270	-50.4	2203.03	.3445.03	-57.9
	038300	106	269	-50.5	2193.03	.3431.03	-58.0
	038400	106	270	-50.6	2182.03	.3416.03	-58.1
	038500	107	268	-50.7	2172.03	.3402.03	-58.1
	038600	110	269	-50.8	2162.03	.3388.03	-58.2
	038700	113	267	-50.9	2152.03	.3373.03	-58.3
	038800	114	265	-51.0	2142.03	.3359.03	-58.4
	038900	113	264	-51.1	2132.03	.3345.03	-58.5
	039000	113	263	-51.2	2122.03	.3331.03	-58.6
	039100	113	260	-51.4	2112.03	.3318.03	-58.7
	039200	109	260	-51.5	2103.03	.3305.03	-58.9
	039300	108	259	-51.7	2093.03	.3292.03	-59.0
	039400	106	256	-51.8	2083.03	.3279.03	-59.2
	039500	105	256	-52.0	2073.03	.3266.03	-59.3
	039600	105	259	-52.2	2064.03	.3253.03	-59.4
	039700	106	254	-52.3	2054.03	.3240.03	-59.6
	039800	105	257	-52.5	2044.03	.3227.03	-59.7
	039900	106	257	-52.6	2035.03	.3215.03	-59.9

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TABLE 4. (Continued)

3			3		3	
OFT NUMBER		LAUNCH DATE 820322	METEOROLOGICAL DATA TAPR			
ALTIUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/CM3)	DEW POINT (DEG C)
040000	106	255	-52.0	.2025+03	.3202+03	-60.0
040100	106	255	-53.0	.2016+03	.3189+03	-60.2
040200	106	252	-53.1	.2006+03	.3176+03	-60.3
040300	105	254	-53.3	.1997+03	.3164+03	-60.5
040400	104	252	-53.4	.1987+03	.3151+03	-60.6
040500	105	250	-53.6	.1978+03	.3139+03	-60.8
040600	104	251	-53.8	.1969+03	.3126+03	-61.0
040700	105	250	-53.9	.1960+03	.3114+03	-61.1
040800	105	251	-54.1	.1950+03	.3101+03	-61.3
040900	107	250	-54.2	.1941+03	.3089+03	-61.4
041000	107	250	-54.4	.1932+03	.3077+03	-61.6
041100	107	249	-54.6	.1923+03	.3065+03	-61.7
041200	106	248	-54.8	.1914+03	.3053+03	-61.9
041300	105	248	-55.0	.1905+03	.3041+03	-62.0
041400	107	246	-55.2	.1896+03	.3029+03	-62.2
041500	104	248	-55.3	.1887+03	.3017+03	-62.3
041600	105	248	-55.5	.1878+03	.3006+03	-62.5
041700	106	248	-55.7	.1869+03	.2994+03	-62.6
041800	105	248	-55.9	.1860+03	.2983+03	-62.8
041900	106	248	-56.1	.1851+03	.2971+03	-62.9
042000	105	249	-56.3	.1842+03	.2960+03	-63.1
042100	105	247	-56.5	.1834+03	.2948+03	-63.3
042200	104	247	-56.6	.1825+03	.2936+03	-63.4
042300	105	245	-56.8	.1816+03	.2924+03	-63.6
042400	104	245	-56.9	.1807+03	.2912+03	-63.7
042500	106	244	-57.1	.1799+03	.2900+03	-63.9
042600	104	245	-57.3	.1790+03	.2889+03	-64.1
042700	105	245	-57.4	.1782+03	.2877+03	-64.2
042800	107	243	-57.6	.1773+03	.2865+03	-64.4
042900	105	245	-57.7	.1765+03	.2854+03	-64.5
043000	107	248	-57.9	.1756+03	.2842+03	-64.7
043100	107	243	-58.1	.1748+03	.2832+03	-64.9
043200	106	244	-58.4	.1739+03	.2821+03	-64.9
043300	107	244	-58.6	.1731+03	.2811+03	-64.9
043400	107	244	-58.9	.1723+03	.2801+03	-64.9
043500	106	245	-59.1	.1714+03	.2791+03	-64.9
043600	109	248	-59.4	.1706+03	.2780+03	-64.9
043700	108	247	-59.6	.1698+03	.2770+03	-64.9
043800	111	246	-59.9	.1689+03	.2760+03	-64.9
043900	112	245	-60.1	.1681+03	.2750+03	-64.9
044000	111	252	-60.4	.1673+03	.2740+03	-64.9
044100	112	246	-60.6	.1665+03	.2729+03	-64.9
044200	112	249	-60.8	.1657+03	.2719+03	-64.9
044300	112	252	-61.1	.1649+03	.2709+03	-64.9
044400	114	249	-61.3	.1641+03	.2698+03	-64.9
044500	114	249	-61.5	.1633+03	.2688+03	-64.9
044600	114	250	-61.7	.1625+03	.2677+03	-64.9
044700	115	250	-61.9	.1617+03	.2667+03	-64.9
044800	115	251	-62.2	.1609+03	.2657+03	-64.9
044900	117	249	-62.4	.1601+03	.2647+03	-64.9



TABLE 4. (Continued)

OFF NUMBER LAUNCH DATE 820322 METEOROLOGICAL DATA TAPE	ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
	050500	093	256	-67.3	.1233*03	.2104*03	-9999.
	050100	094	258	-67.4	.1237*03	.2094*03	-9999.
	050200	094	258	-67.4	.1231*03	.2084*03	-9999.
	050300	094	261	-67.5	.1225*03	.2075*03	-9997.
	050400	093	259	-67.6	.1218*03	.2065*03	-9999.
	050500	091	264	-67.6	.1212*03	.2055*03	-9999.
	050600	088	264	-67.7	.1206*03	.2046*03	-9999.
	050700	089	266	-67.8	.1200*03	.2036*03	-9999.
	050800	087	269	-67.9	.1194*03	.2026*03	-9999.
	050900	085	270	-67.9	.1188*03	.2017*03	-9999.
	051000	080	272	-68.0	.1182*03	.2008*03	-9999.
	051100	082	272	-68.2	.1176*03	.1999*03	-9999.
	051200	082	270	-68.1	.1170*03	.1990*03	-9999.
	051300	082	269	-68.5	.1164*03	.1982*03	-9999.
	051400	084	271	-68.6	.1159*03	.1973*03	-9999.
	051500	084	272	-68.8	.1153*03	.1965*03	-9999.
	051600	082	270	-69.0	.1147*03	.1957*03	-9999.
	051700	078	270	-69.1	.1141*03	.1948*03	-9999.
	051800	077	268	-69.1	.1135*03	.1940*03	-9999.
	051900	076	270	-69.4	.1130*03	.1932*03	-9999.
	052000	076	268	-69.6	.1124*03	.1924*03	-9959.
	052100	075	266	-69.7	.1118*03	.1915*03	-9959.
	052200	072	263	-69.9	.1112*03	.1906*03	-9999.
	052300	070	262	-70.0	.1107*03	.1898*03	-9999.
	052400	068	262	-70.1	.1101*03	.1889*03	-9959.
	052500	068	258	-70.2	.1096*03	.1881*03	-9999.
	052600	068	261	-70.4	.1090*03	.1873*03	-9999.
	052700	069	263	-70.5	.1084*03	.1864*03	-9999.
	052800	070	263	-70.6	.1079*03	.1856*03	-9999.
	052900	068	263	-70.8	.1073*03	.1848*03	-9999.
	053000	067	260	-70.9	.1068*03	.1840*03	-9999.
	053100	066	265	-71.0	.1063*03	.1831*03	-9999.
	053200	066	266	-71.1	.1057*03	.1822*03	-9959.
	053300	066	266	-71.2	.1052*03	.1814*03	-9999.
	053400	065	263	-71.3	.1046*03	.1806*03	-9999.
	053500	062	262	-71.3	.1041*03	.1797*03	-9999.
	053600	058	266	-71.4	.1036*03	.1789*03	-9999.
	053700	055	264	-71.5	.1030*03	.1780*03	-9999.
	053800	055	267	-71.6	.1025*03	.1772*03	-9999.
	053900	053	263	-71.7	.1020*03	.1764*03	-9999.
	054000	050	261	-71.8	.1015*03	.1756*03	-9999.
	054100	049	260	-71.7	.1009*03	.1747*03	-9959.
	054200	050	256	-72.0	.1004*03	.1739*03	-9999.
	054300	049	261	-72.1	.9992*02	.1731*03	-9799.
	054400	049	260	-72.2	.9980*02	.1723*03	-9999.
	054500	049	254	-72.3	.9889*02	.1715*03	-9999.
	054600	049	254	-72.4	.9638*02	.1707*03	-9999.
	054700	050	254	-72.5	.9788*02	.1699*03	-9999.
	054800	050	252	-72.6	.9738*02	.1692*03	-9999.
	054900	052	248	-72.7	.9688*02	.1684*03	-9999.

TABLE 4. (Continued)

OFI NUMBER 3  
LAUNCH DATE R2U322  
METEOROLOGICAL DATA TAPE

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	PEW POINT (DEG C)
65500	052	251	-72.8	921.8+02	1.676+03	-9999.
655100	055	247	-73.0	958.0+02	1.669+03	-9999.
655200	057	249	-73.2	953.9+02	1.662+03	-9999.
655300	057	255	-73.4	948.9+02	1.655+03	-9999.
655400	059	255	-73.6	944.0+02	1.648+03	-9999.
655500	060	255	-73.7	939.1+02	1.641+03	-9999.
655600	060	257	-73.9	934.3+02	1.634+03	-9999.
655700	061	259	-74.1	929.4+02	1.627+03	-9999.
655800	060	260	-74.3	924.6+02	1.620+03	-9999.
655900	061	263	-74.5	919.9+02	1.613+03	-9999.
656000	061	261	-74.7	915.1+02	1.606+03	-9999.
656100	060	265	-74.7	910.4+02	1.599+03	-9999.
656200	057	265	-74.6	905.6+02	1.589+03	-9999.
656300	055	267	-74.6	900.9+02	1.581+03	-9799.
656400	055	269	-74.6	896.2+02	1.572+03	-9799.
656500	053	267	-74.6	891.6+02	1.564+03	-9999.
656600	051	264	-74.5	887.0+02	1.556+03	-9999.
656700	050	262	-74.5	882.4+02	1.547+03	-9999.
656800	050	268	-74.5	877.8+02	1.539+03	-9999.
656900	051	265	-74.4	873.2+02	1.531+03	-9999.
657000	052	264	-74.4	868.7+02	1.523+03	-9999.
658000	046	261	-74.1	864.8+02	1.494+03	-9999.
659000	040	260	-72.2	860.3+02	1.358+03	-9999.
660000	036	258	-71.4	855.8+02	1.285+03	-9999.
661000	032	258	-70.9	851.3+02	1.218+03	-9999.
662000	027	245	-70.1	846.8+02	1.153+03	-9999.
663000	026	233	-70.7	842.3+02	1.099+03	-9999.
664000	028	231	-69.4	837.8+02	1.037+03	-9999.
665000	028	231	-67.9	833.3+02	979.2+02	-9999.
666000	026	233	-66.4	828.8+02	924.7+02	-9999.
667000	021	236	-64.4	824.3+02	871.3+02	-9999.
668000	018	239	-61.0	819.8+02	816.3+02	-9999.
669000	012	238	-59.8	815.3+02	773.3+02	-9999.
670000	009	230	-59.7	810.8+02	736.4+02	-9999.
671000	008	220	-59.4	806.3+02	700.6+02	-9999.
672000	008	215	-58.5	801.8+02	664.9+02	-9999.
673000	007	221	-57.9	797.3+02	632.2+02	-9999.
674000	007	234	-57.7	792.8+02	601.8+02	-9799.
675000	005	245	-57.2	788.3+02	572.4+02	-9999.
676000	002	274	-55.8	783.8+02	542.2+02	-9999.
677000	002	028	-56.0	779.3+02	517.5+02	-9999.
678000	005	051	-56.1	774.8+02	493.9+02	-9999.
679000	008	062	-55.8	770.3+02	470.3+02	-9999.
680000	011	072	-54.1	765.8+02	445.0+02	-9999.
681000	017	078	-53.2	761.3+02	422.9+02	-9999.
682000	003	106	-52.6	756.8+02	402.5+02	-9999.
683000	004	213	-52.6	752.3+02	384.1+02	-9999.
684000	015	254	-51.3	747.8+02	364.5+02	-9999.
685000	022	238	-50.5	743.3+02	346.7+02	-9799.
686000	026	240	-50.0	738.8+02	330.3+02	-9999.

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TABLE 4. (Continued)

OFF NUMBER	LAUNCH DATE	METEOLOGICAL DATA TAPE	ALTIITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	NEW POINT (DEG C)
			3						
UR8000	6871-00		034	246	-49.6	2020.02	.3151.02	-9999.	
UR9000	6900-00		036	250	-49.3	1842.02	.2867.02	-9999.	
UR9000	691000		037	254	-48.8	1759.02	.2731.02	-9999.	
UR91000	691000		038	255	-48.7	1681.02	.2609.02	-9999.	
UR92000	692000		038	255	-48.6	1605.02	.2490.02	-9999.	
UR93000	693000		038	251	-48.1	1533.02	.2373.02	-9999.	
UR94000	694000		040	246	-47.5	1465.02	.2262.02	-9999.	
UR95000	695000		042	241	-46.8	1400.02	.2155.02	-9999.	
UR96000	696000		044	237	-46.1	1337.02	.2051.02	-9999.	
UR97000	697000		048	234	-45.5	1278.02	.1956.02	-9999.	
UR98000	698000		048	240	-43.5	1225.02	.1858.02	-9999.	
UR99000	699000		050	248	-41.6	1173.02	.1765.02	-9999.	
UR10000	700000		054	254	-40.8	1122.02	.1682.02	-9999.	
UR101000	701000		055	261	-40.2	1074.02	.1605.02	-9999.	
UR102000	702000		060	267	-39.7	1027.02	.1533.02	-9999.	
UR103000	703000		062	271	-39.3	9831.01	.1465.02	-9999.	
UR104000	704000		065	276	-38.9	9408.01	.1399.02	-9999.	
UR105000	705000		067	277	-38.6	9004.01	.1337.02	-9999.	
UR106000	706000		067	278	-37.9	8618.01	.1276.02	-9999.	
UR107000	707000		067	278	-36.3	8251.01	.1213.02	-9999.	
UR108000	708000		067	278	-34.4	7902.01	.1153.02	-9999.	
UR109000	709000		067	279	-32.7	7570.01	.1097.02	-9999.	
UR110000	710000		067	279	-31.3	7254.01	.1045.02	-9999.	
UR111000	711000		067	278	-30.5	6952.01	.9983.01	-9999.	
UR112000	712000		067	277	-30.0	6664.01	.9547.01	-9999.	
UR113000	713000		065	277	-29.5	6388.01	.9133.01	-9999.	
UR114000	714000		060	273	-29.0	6125.01	.8739.01	-9999.	
UR115000	715000		057	264	-28.5	5873.01	.8362.01	-9999.	
UR116000	716000		057	255	-28.1	5631.01	.8004.01	-9999.	
UR117000	717000		059	251	-27.3	5400.01	.7653.01	-9999.	
UR118000	718000		064	247	-25.9	5180.01	.7299.01	-9999.	
UR119000	719000		065	246	-25.3	4969.01	.6984.01	-9999.	
UR120000	720000		069	245	-25.1	4767.01	.6696.01	-9999.	
UR121000	721000		070	246	-25.0	4574.01	.6420.01	-9999.	
UR122000	722000		074	250	-24.8	4389.01	.6157.01	-9999.	
UR123000	723000		074	255	-24.7	4211.01	.5904.01	-9999.	
UR124000	724000		084	256	-24.5	4040.01	.5662.01	-9999.	
UR125000	725000		087	257	-24.3	3877.01	.5427.01	-9999.	
UR126000	726000		084	259	-23.8	3721.01	.5197.01	-9999.	
UR127000	727000		089	259	-23.1	3571.01	.4975.01	-9999.	
UR128000	728000		087	259	-22.5	3427.01	.4763.01	-9999.	
UR129000	729000		089	258	-21.8	3290.01	.4561.01	-9999.	
UR130000	730000		092	255	-21.2	3158.01	.4367.01	-9799.	
UR131000	731000		097	251	-20.6	3033.01	.4184.01	-9999.	
UR132000	732000		104	247	-19.9	2912.01	.4006.01	-9999.	
UR133000	733000		113	246	-18.9	2796.01	.3831.01	-9999.	
UR134000	734000		119	248	-17.4	2686.01	.3659.01	-9999.	
UR135000	735000		126	248	-15.8	2591.01	.3494.01	-9999.	
UR136000	736000		130	251	-14.4	2480.01	.3345.01	-9999.	

TABLE 4. (Continued)

FT NUMBER	LAUNCH DATE 620322	METEOROLOGICAL DATA TAPE	ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/CM3)	DLM POINT (DEG C)
			13200	133	255	-18.2	.2389+01	.1210+01	-9999.
			13600	136	258	-18.2	.2291+01	.3083+01	-9999.
			13600	138	259	-18.1	.2202+01	.2961+01	-9999.
			14000	140	259	-13.8	.2117+01	.2894+01	-9999.
			14100	140	259	-13.6	.2035+01	.2732+01	-9999.
			14200	140	259	-13.5	.1956+01	.2624+01	-9999.
			14300	138	258	-13.3	.1880+01	.2521+01	-9999.
			14400	136	256	-13.1	.1808+01	.2422+01	-9999.
			14500	140	253	-13.0	.1738+01	.2327+01	-9999.
			14600	140	253	-12.5	.1671+01	.2233+01	-9999.
			14700	141	253	-11.8	.1606+01	.2141+01	-9999.
			14800	146	253	-10.7	.1545+01	.2051+01	-9999.
			14900	150	253	-9.9	.1486+01	.1962+01	-9999.
			15000	157	254	-8.2	.1429+01	.1879+01	-9999.
			15100	163	254	-7.1	.1375+01	.1801+01	-9999.
			15200	167	255	-6.5	.1323+01	.1729+01	-9999.
			15300	170	257	-6.0	.1273+01	.1661+01	-9999.
			15400	172	259	-5.6	.1226+01	.1596+01	-9999.
			15500	172	261	-5.3	.1180+01	.1534+01	-9999.
			15600	172	263	-5.0	.1135+01	.1475+01	-9999.
			15700	170	266	-4.5	.1093+01	.1417+01	-9999.
			15800	172	264	-4.3	.1052+01	.1363+01	-9999.
			15900	192	263	-4.2	.1013+01	.1312+01	-9999.
			16000	212	267	-4.5	.9749+00	.1264+01	-9999.
			16100	214	273	-4.9	.9385+00	.1219+01	-9999.
			16200	203	273	-5.2	.9033+00	.1174+01	-9999.
			16300	189	272	-5.7	.8694+00	.1133+01	-9999.
			16400	184	268	-5.8	.8368+00	.1091+01	-9999.
			16500	182	266	-5.6	.8054+00	.1049+01	-9999.
			16600	185	268	-5.2	.7752+00	.1008+01	-9999.
			16700	184	268	-5.0	.7462+00	.9693+00	-9999.
			16800	182	266	-4.8	.7183+00	.9323+00	-9999.
			16900	184	265	-4.4	.6914+00	.8963+00	-9999.
			17000	184	267	-4.2	.6656+00	.8620+00	-9999.
			17100	175	264	-4.0	.6408+00	.8294+00	-9999.
			17200	173	258	-3.7	.6169+00	.7976+00	-9999.
			17300	172	257	-3.6	.5940+00	.7676+00	-9999.
			17400	149	257	-3.2	.5719+00	.7381+00	-9999.
			17500	195	257	-3.1	.5507+00	.7103+00	-9999.
			17600	199	257	-2.8	.5302+00	.6832+00	-9999.
			17700	202	255	-3.3	.510	.6591+00	-9999.
			17800	204	254	-4.1	.491	.6364+00	-9999.
			17900	204	252	-5.0	.473	.6137+00	-9999.
			18000	197	250	-5.7	.455	.5934+00	-9999.
			18100	199	248	-6.6	.438	.5729+00	-9999.
			18200	200	247	-7.4	.421	.5531+00	-9999.
			18300	199	246	-8.1	.406	.5336+00	-9999.
			18400	202	249	-9.0	.390	.5151+00	-9999.
			18500	212	252	-9.6	.375	.4967+00	-9999.
			18600	214	255	-10.5	.361	.4794+00	-9999.

TABLE 4. (Continued)

3

OFF NUMBER  
LAUNCH DATE 020322  
METEOROLOGICAL DATA TAPE

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	OLM POINT (MKG C)
18700	222	256	-11.2	.3477+00	.8623+00	-9999.
18000	231	255	-11.9	.344+00	.859+00	-9999.
18000	231	255	-12.8	.3215+00	.8301+00	-9999.
19000	231	253	-13.4	.30+00	.8147+00	-9999.
191000	234	252	-14.2	.2972+00	.3998+00	-9999.
192000	239	249	-14.9	.2857+00	.3854+00	-9999.
193000	246	248	-15.6	.2787+00	.3715+00	-9999.
194000	255	249	-16.5	.2680+00	.3563+00	-9999.
195000	263	251	-17.3	.2537+00	.3454+00	-9999.
196000	266	255	-17.8	.2437+00	.3325+00	-9999.
197000	268	259	-18.7	.2342+00	.3206+00	-9999.
198000	265	261	-19.5	.2250+00	.3090+00	-9999.
199000	256	264	-20.1	.2161+00	.2975+00	-9999.
200000	249	266	-21.0	.2075+00	.2867+00	-9999.
201000	243	268	-21.8	.1993+00	.2762+00	-9999.
202000	244	269	-22.4	.1914+00	.2659+00	-9999.
203000	248	268	-23.3	.1837+00	.2561+00	-9999.
204000	248	268	-24.3	.1764+00	.2469+00	-9999.
205000	251	263	-25.5	.1692+00	.2381+00	-9999.
206000	254	263	-25.8	.1625+00	.2289+00	-9999.
207000	249	262	-26.5	.1559+00	.2201+00	-9999.
208000	249	263	-26.7	.1496+00	.2114+00	-9999.
209000	251	263	-26.5	.1435+00	.2027+00	-9999.
210000	251	263	-26.5	.1377+00	.1945+00	-9999.
211000	255	263	-27.1	.1321+00	.1872+00	-9999.
212000	263	266	-27.3	.1268+00	.1797+00	-9999.
213000	263	269	-27.5	.1216+00	.1724+00	-9999.
214000	260	272	-27.6	.1167+00	.1656+00	-9999.
215000	261	272	-27.4	.1120+00	.1587+00	-9999.
216000	260	274	-27.8	.1074+00	.1525+00	-9999.
217000	256	276	-28.1	.1030+00	.1465+00	-9999.
218000	253	278	-28.8	.9860-01	.1409+00	-9999.
219000	251	278	-29.8	.9480-01	.1357+00	-9999.
220000	246	278	-31.0	.9070-01	.1306+00	-9999.
221000	239	278	-32.8	.8720-01	.1264+00	-9999.
222000	236	277	-34.4	.8350-01	.1214+00	-9999.
223000	234	275	-35.8	.8000-01	.1174+00	-9999.
224000	229	274	-38.2	.7670-01	.1137+00	-9999.
225000	222	274	-40.8	.7340-01	.1101+00	-9999.
226000	214	276	-43.7	.7050-01	.1055+00	-9999.
227000	200	273	-45.4	.6600-01	.1010+00	-9999.
228000	180	264	-48.0	.6250-01	.9670-01	-9999.
229000	160	259	-52.0	.5900-01	.9294-01	-9999.
230000	133	262	-55.0	.5550-01	.8863-01	-9999.
231000	121	265	-62.2	.5200-01	.8587-01	-9999.
232000	109	268	-63.7	.4870-01	.8101-01	-9999.
233000	097	272	-65.2	.4640-01	.7775-01	-9999.
234000	046	276	-66.4	.4420-01	.7461-01	-9999.
235000	024	279	-68.2	.4210-01	.7154-01	-9999.
236000	044	283	-68.2	.4000-01	.6797-01	-9999.

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TABLE 4. (Continued)

ORIGINAL PAGE IS  
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OFF NUMBER 3  
LAUNCH DATE 820322  
METEOROLOGICAL DATA TAPE

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/CM <sup>3</sup> )	DEW POINT (DEG C)
232000	052	286	-68.3	0.1810-01	0.6801-01	-9999.
238000	040	289	-69.2	0.3620-01	0.6182-01	-9999.
239000	027	292	-68.9	0.3450-01	0.5885-01	-9999.
240000	015	296	-68.2	0.3280-01	0.5578-01	-9999.
241000	003	321	-67.9	0.3120-01	0.5295-01	-9999.
242000	011	114	-67.2	0.2970-01	0.5023-01	-9999.
243000	023	118	-66.2	0.2830-01	0.4763-01	-9999.
244000	037	120	-66.2	0.2700-01	0.4548-01	-9999.
245000	050	122	-66.2	0.2570-01	0.4325-01	-9999.
246000	062	124	-66.2	0.2440-01	0.4106-01	-9999.
247000	074	126	-67.2	0.2330-01	0.3940-01	-9999.
248000	084	127	-68.1	0.2210-01	0.3755-01	-9999.
249000	094	129	-68.2	0.2110-01	0.3586-01	-9999.
250000	104	131	-69.2	0.2010-01	0.3432-01	-9999.
251000	114	132	-70.2	0.1910-01	0.3278-01	-9999.
252000	123	134	-71.2	0.1820-01	0.3139-01	-9999.
253000	130	135	-71.7	0.1730-01	0.2992-01	-9999.
254000	136	137	-72.3	0.1640-01	0.2845-01	-9999.
255000	143	139	-73.2	0.1560-01	0.2717-01	-9999.
256000	148	140	-74.3	0.1480-01	0.2593-01	-9999.
257000	153	142	-75.2	0.1410-01	0.2481-01	-9999.
258000	157	144	-76.2	0.1340-01	0.2370-01	-9999.
259000	160	145	-76.9	0.1270-01	0.2258-01	-9999.
260000	151	145	-76.8	0.1208-01	0.2145-01	-9999.
261000	141	145	-76.7	0.1150-01	0.2041-01	-9999.
262000	132	146	-76.6	0.1094-01	0.1942-01	-9999.
263000	123	147	-76.5	0.1041-01	0.1846-01	-9999.
264000	113	147	-76.4	0.9908-02	0.1758-01	-9999.
265000	104	148	-76.3	0.9428-02	0.1673-01	-9999.
266000	095	149	-76.3	0.8971-02	0.1592-01	-9999.
267000	086	150	-76.2	0.8536-02	0.1513-01	-9999.
268000	077	152	-76.1	0.8123-02	0.1442-01	-9999.
269000	068	154	-76.0	0.7729-02	0.1372-01	-9999.
270000	059	157	-75.9	0.7355-02	0.1305-01	-9999.
271000	050	160	-75.8	0.6999-02	0.1242-01	-9999.
272000	041	165	-75.7	0.6660-02	0.1182-01	-9999.
273000	033	173	-75.6	0.6337-02	0.1125-01	-9999.
274000	026	184	-75.6	0.6030-02	0.1070-01	-9999.
277000	030	182	-76.6	0.5180-02	0.9150-02	-9999.
280000	030	179	-77.5	0.4400-02	0.7890-02	-9999.
283000	023	175	-78.3	0.3790-02	0.6770-02	-9999.
286000	016	168	-79.2	0.3240-02	0.5810-02	-9999.
289000	009	151	-80.0	0.2770-02	0.4990-02	-9999.
292000	006	098	-80.8	0.2370-02	0.4260-02	-9999.
295000	009	048	-81.6	0.2030-02	0.3670-02	-9999.
298000	006	008	-83.2	0.1630-02	0.2970-02	-9999.
301000	009	208	-82.3	0.1390-02	0.2520-02	-9999.
304000	017	280	-81.4	0.1180-02	0.2130-02	-9999.
307000	025	274	-80.4	0.1010-02	0.1810-02	-9999.
310000	032	271	-79.5	0.8600-03	0.1530-02	-9999.

TABLE 4. (Concluded)

OFF NUMBER	LAUNCH DATE 820322	METEOROLOGICAL DATA TAPE	ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	OCM POINT (DEG C)
			313000	036	269	-78.1	7360-03	1300-02	-9999.
			316000	038	269	-76.2	6320-03	1100-02	-9999.
			319000	039	269	-74.2	5430-03	9310-03	-9999.
			322000	040	269	-72.3	4660-03	7490-03	-9999.
			325000	039	268	-70.4	4000-03	6690-03	-9999.
			328000	038	267	-68.4	3440-03	5670-03	-9999.
			331000	039	268	-68.7	2980-03	4810-03	-9999.
			334000	041	267	-60.9	2580-03	4080-03	-9999.
			337000	041	266	-57.2	2230-03	3470-03	-9999.
			340000	040	265	-53.4	1930-03	2940-03	-9999.
			343000	038	263	-49.7	1670-03	2500-03	-9999.
			346000	037	264	-44.2	1460-03	2130-03	-9999.
			349000	038	263	-37.0	1290-03	1820-03	-9999.
			352000	038	260	-29.8	1140-03	1560-03	-9999.
			355000	037	256	-22.6	1010-03	1330-03	-9999.
			358000	035	251	-15.4	8900-04	1140-03	-9999.
			361000	029	255	-8.1	7850-04	9730-04	-9999.
			364000	028	249	1.9	7130-04	8490-04	-9999.
			367000	027	241	12.0	6460-04	7400-04	-9999.
			370000	026	230	22.1	5840-04	6450-04	-9999.
			373000	025	214	32.1	5280-04	5620-04	-9999.
			376000	027	193	42.2	4770-04	4900-04	-9999.
			379000	016	189	53.1	4340-04	4300-04	-9999.
			382000	016	190	64.8	3990-04	3810-04	-9999.
			385000	020	191	76.9	3690-04	3380-04	-9999.
			388000	022	191	89.3	3410-04	3010-04	-9999.
			391000	024	191	102.1	3160-04	2690-04	-9999.
			394000	027	192	115.1	2940-04	2420-04	-9999.
			397000	029	192	128.4	2740-04	2170-04	-9999.
			400000	032	193	141.8	2560-04	1960-04	-9999.

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TABLE 5. STS-3 FINAL SRB DESCENT METEOROLOGICAL DATA TAPE

METEOROLOGICAL DATA TAPE ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/MI)	DEW POINT (DEG C)
000000	020	260	24.0	.1014*04	.1178*04	20.0
001000	026	344	23.0	.9809*03	.1143*04	20.0
002000	023	314	22.0	.9476*03	.1105*04	18.5
003000	023	293	21.4	.9150*03	.1076*04	11.6
004000	023	279	20.1	.8834*03	.1045*04	6.1
005000	026	262	17.8	.8527*03	.1017*04	4.4
006000	036	241	15.8	.8228*03	.9887*03	2.5
007000	050	233	14.8	.7938*03	.9591*03	-3.1
008000	051	235	15.2	.7657*03	.9237*03	-9.3
009000	050	239	13.2	.7386*03	.8973*03	-10.2
010000	051	240	12.6	.7123*03	.8675*03	-15.7
011000	054	241	11.2	.6868*03	.8407*03	-17.0
012000	054	246	8.7	.6621*03	.8176*03	-16.7
013000	055	251	6.5	.6381*03	.7943*03	-18.9
014000	054	255	3.9	.6148*03	.7725*03	-20.4
015000	057	250	1.8	.5921*03	.7497*03	-22.1
016000	061	248	0	.5701*03	.7267*03	-23.8
017000	063	251	-2.0	.5488*03	.7047*03	-25.5
018000	060	249	-4.0	.5281*03	.6833*03	-26.4
019000	075	246	-6.6	.5081*03	.6638*03	-28.9
020000	080	246	-8.6	.4886*03	.6452*03	-30.5
021000	084	247	-11.1	.4698*03	.6283*03	-32.6
022000	085	252	-13.9	.4514*03	.6065*03	-34.9
023000	083	257	-15.9	.4337*03	.5872*03	-36.2
024000	084	259	-18.6	.4165*03	.5699*03	-38.1
025000	087	256	-20.6	.3998*03	.5548*03	-39.9
026000	087	253	-23.0	.3836*03	.5342*03	-41.7
027000	087	253	-24.9	.3680*03	.5164*03	-42.8
028000	085	254	-27.3	.3529*03	.5000*03	-42.8
029000	084	258	-29.7	.3382*03	.4840*03	-44.3
030000	087	264	-32.2	.3241*03	.4685*03	-46.0
031000	084	271	-34.7	.3104*03	.4534*03	-47.7
032000	091	274	-37.3	.2971*03	.4388*03	-49.7
033000	096	275	-39.6	.2843*03	.4240*03	-51.7
034000	102	275	-42.0	.2719*03	.4097*03	-53.0
035000	108	275	-43.0	.2599*03	.3935*03	-54.1
036000	114	279	-43.4	.2485*03	.3766*03	-55.1
037000	115	279	-44.3	.2375*03	.3615*03	-56.0
038000	113	272	-46.3	.2270*03	.3485*03	-57.7
039000	111	265	-47.8	.2169*03	.3352*03	-59.4
040000	110	261	-48.6	.2071*03	.3212*03	-60.4
041000	110	256	-50.3	.1977*03	.3090*03	-61.8
042000	115	244	-51.7	.1887*03	.2968*03	-63.0
043000	114	246	-54.4	.1800*03	.2867*03	-65.2
044000	110	259	-56.0	.1717*03	.2754*03	-66.6
045000	107	263	-57.1	.1637*03	.2639*03	-67.5
046000	106	263	-58.6	.1560*03	.2533*03	-68.9
047000	103	263	-59.4	.1486*03	.2427*03	-70.9
048000	102	260	-61.4	.1416*03	.2329*03	-70.9
049000	102	255	67.7	.1348*03	.2231*03	-70.9

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TABLE 5. (Continued)

OFT NUMBER	LAUNCH DATE 820722	METEOROLOGICAL DATA TAPE	WIND SPEED (FT/S)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
050000			102	252	-64.5	.1283+03	.2142+03	-9999.
051000			100	252	-65.7	.1221+03	.2050+03	-9999.
052000			095	255	-66.3	.1161+03	.1956+03	-9999.
053000			092	258	-68.0	.1104+03	.1876+03	-9999.
054000			089	261	-68.1	.1050+03	.1784+03	-9999.
055000			081	265	-68.6	.9985+02	.1701+03	-9999.
056000			069	268	-68.5	.9493+02	.1616+03	-9999.
057000			058	269	-68.3	.9026+02	.1535+03	-9999.
058000			049	263	-68.6	.8582+02	.1462+03	-9999.
059000			045	253	-68.2	.8159+02	.1387+03	-9999.
060000			042	248	-68.5	.7758+02	.1321+03	-9999.
061000			040	245	-68.7	.7376+02	.1257+03	-9999.
062000			038	240	-69.2	.7012+02	.1198+03	-9999.
063000			036	235	-68.9	.6666+02	.1137+03	-9999.
064000			033	232	-67.2	.6338+02	.1072+03	-9999.
065000			029	232	-65.8	.6029+02	.1013+03	-9999.
066000			022	235	-65.1	.5737+02	.9606+02	-9999.
067000			017	237	-63.6	.5460+02	.9086+02	-9999.
068000			013	237	-62.0	.5198+02	.8576+02	-9999.
069000			011	233	-59.9	.4951+02	.8087+02	-9999.
070000			013	224	-58.5	.4718+02	.7657+02	-9999.
071000			017	212	-57.1	.4497+02	.7251+02	-9999.
072000			019	208	-56.0	.4288+02	.6879+02	-9999.
073000			018	210	-55.4	.4089+02	.6542+02	-9999.
074000			015	209	-54.9	.3900+02	.6225+02	-9999.
075000			012	204	-54.2	.3720+02	.5919+02	-9999.
076000			011	195	-53.1	.3549+02	.5619+02	-9999.
077000			009	175	-53.4	.3387+02	.5369+02	-9999.
078000			007	168	-52.8	.3232+02	.5110+02	-9999.
079000			002	174	-51.9	.3084+02	.4856+02	-9999.
080000			008	181	-51.4	.2944+02	.4625+02	-9999.
081000			008	189	-51.8	.2810+02	.4422+02	-9999.
082000			004	216	-51.0	.2682+02	.4206+02	-9999.
083000			003	254	-50.9	.2561+02	.4014+02	-9999.
084000			005	272	-50.9	.2445+02	.3832+02	-9999.
085000			006	271	-51.0	.2334+02	.3660+02	-9999.
086000			009	270	-49.7	.2228+02	.3474+02	-9999.
087000			012	270	-48.8	.2128+02	.3304+02	-9999.
088000			015	254	-47.8	.2033+02	.3143+02	-9999.
089000			024	241	-46.7	.1942+02	.2988+02	-9999.
090000			029	232	-45.7	.1856+02	.2843+02	-9999.
091000			035	235	-45.7	.1774+02	.2717+02	-9999.
092000			031	238	-45.8	.1695+02	.2597+02	-9999.
093000			031	241	-46.1	.1610+02	.2470+02	-9999.
094000			035	239	-46.4	.1530+02	.2351+02	-9999.
095000			042	235	-45.8	.1460+02	.2237+02	-9999.
096000			050	232	-43.9	.1390+02	.2112+02	-9999.
097000			047	231	-43.3	.1320+02	.2000+02	-9999.
098000			048	240	-43.5	.1250+02	.1896+02	-9999.
099000			050	248	-41.6	.1180+02	.1775+02	-9999.

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/ML)	DLM POINT (DEG C)
10000	054	254	-40.8	.1122+02	.1682+02	-9999.
10100	055	261	-40.1	.1074+02	.1605+02	-9999.
10200	060	267	-39.7	.1027+02	.1533+02	-9999.
10300	062	271	-39.3	.9831+01	.1465+02	-9999.
10400	065	276	-38.9	.9408+01	.1399+02	-9999.
10500	067	277	-38.6	.9004+01	.1337+02	-9999.
10600	067	278	-37.8	.8618+01	.1276+02	-9999.
10700	067	278	6.3	.8251+01	.1213+02	-9999.
10800	067	278	-34.4	.7902+01	.1153+02	-9999.
10900	067	279	-32.7	.7570+01	.1097+02	-9999.
11000	067	279	-31.3	.7254+01	.1045+02	-9999.
11100	067	278	-30.5	.6952+01	.9983+01	-9999.
11200	067	277	-30.0	.6664+01	.9547+01	-9999.
11300	065	277	-29.5	.6388+01	.9133+01	-9999.
11400	060	273	-29.0	.6125+01	.8739+01	-9999.
11500	057	264	-28.5	.5873+01	.8362+01	-9999.
11600	057	255	-28.1	.5631+01	.8004+01	-9999.
11700	059	251	-27.3	.5400+01	.7853+01	-9999.
11800	064	247	-25.9	.5180+01	.7299+01	-9999.
11900	065	246	-25.3	.4965+01	.6984+01	-9999.
12000	069	245	-25.1	.4767+01	.6696+01	-9999.
12100	070	246	-25.0	.4574+01	.6420+01	-9999.
12200	074	250	-24.8	.4389+01	.6157+01	-9999.
12300	079	255	-24.7	.4211+01	.5904+01	-9999.
12400	084	256	-24.5	.4040+01	.5662+01	-9999.
12500	087	257	-24.3	.3877+01	.5427+01	-9999.
12600	089	259	-23.8	.3721+01	.5197+01	-9999.
12700	084	259	-23.1	.3571+01	.4975+01	-9999.
12800	087	259	-22.5	.3427+01	.4763+01	-9999.
12900	089	258	-21.8	.3290+01	.4561+01	-9999.
13000	092	255	-21.2	.3158+01	.4367+01	-9999.
13100	097	251	-20.6	.3033+01	.4184+01	-9999.
13200	104	247	-19.9	.2914+01	.4006+01	-9999.
13300	113	246	-18.9	.2796+01	.3831+01	-9999.
13400	119	248	-17.4	.2686+01	.3658+01	-9999.
13500	126	248	-15.8	.2581+01	.3494+01	-9999.
13600	130	251	-14.8	.2480+01	.3345+01	-9999.
13700	133	255	-14.5	.2384+01	.3210+01	-9999.
13800	136	258	-14.2	.2291+01	.3083+01	-9999.
13900	136	259	-14.1	.2202+01	.2961+01	-9999.
14000	140	259	-13.8	.2117+01	.2844+01	-9999.
14100	140	259	-13.6	.2035+01	.2737+01	-9999.
14200	140	259	-13.5	.1956+01	.2624+01	-9999.
14300	136	258	-13.3	.1880+01	.2521+01	-9999.
14400	138	256	-13.1	.1808+01	.2427+01	-9999.
14500	140	253	-13.0	.1738+01	.2327+01	-9999.
14600	140	253	-12.5	.1671+01	.2233+01	-9999.
14700	141	253	-11.8	.1606+01	.2141+01	-9999.
14800	146	253	-10.7	.1545+01	.2051+01	-9999.
14900	150	253	-9.4	.1486+01	.1967+01	-9999.

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TABLE 5. (Continued)

OFI NUMBER  
 LAUNCH DATE 820322  
 METEOROLOGICAL DATA TAPE

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M <sup>3</sup> )	DEW POINT (DEG C)
15000	157	254	-8.2	.1429+01	.1879+01	-9999.
15100	163	254	-7.1	.1375+01	.1801+01	-9999.
15200	167	255	-6.5	.1323+01	.1729+01	-9999.
15300	170	257	-6.0	.1273+01	.1661+01	-9999.
15400	172	259	-5.6	.1226+01	.1596+01	-9999.
15500	172	261	-5.3	.1180+01	.1534+01	-9999.
15600	172	263	-5.0	.1135+01	.1475+01	-9999.
15700	170	266	-4.5	.1093+01	.1417+01	-9999.
15800	172	264	-4.3	.1052+01	.1363+01	-9999.
15900	192	263	-4.2	.1013+01	.1312+01	-9999.
16000	212	267	-4.5	.9749+00	.1264+01	-9999.
16100	214	273	-4.9	.9385+00	.1219+01	-9999.
16200	200	273	-5.2	.9033+00	.1174+01	-9999.
16300	189	272	-5.7	.8694+00	.1133+01	-9999.
16400	184	268	-5.8	.8368+00	.1091+01	-9999.
16500	182	266	-5.6	.8054+00	.1049+01	-9999.
16600	185	268	-5.2	.7752+00	.1008+01	-9999.
16700	184	268	-5.0	.7462+00	.9693+00	-9999.
16800	182	266	-4.8	.7183+00	.9323+00	-9999.
16900	184	265	-4.4	.6914+00	.8963+00	-9999.
17000	184	267	-4.2	.6656+00	.8620+00	-9999.
17100	175	264	-4.0	.6408+00	.8294+00	-9999.
17200	173	258	-3.7	.6169+00	.7976+00	-9999.
17300	177	257	-3.6	.5940+00	.7676+00	-9999.
17400	189	257	-3.2	.5719+00	.7381+00	-9999.
17500	195	257	-3.1	.5507+00	.7103+00	-9999.
17600	199	257	-2.8	.5302+00	.6832+00	-9999.
17700	202	255	-3.3	.5105+00	.6591+00	-9999.
17800	204	254	-4.1	.4915+00	.6364+00	-9999.
17900	206	252	-5.0	.4732+00	.6147+00	-9999.
18000	197	250	-5.7	.4555+00	.5934+00	-9999.
18100	199	248	-6.6	.4384+00	.5729+00	-9999.
18200	200	247	-7.4	.4219+00	.5531+00	-9999.
18300	199	246	-8.1	.4060+00	.5336+00	-9999.
18400	202	249	-9.0	.3906+00	.5151+00	-9999.
18500	212	252	-9.6	.3758+00	.4967+00	-9999.
18600	214	255	-10.5	.3615+00	.4794+00	-9999.
18700	222	256	-11.2	.3477+00	.4623+00	-9999.
18800	231	255	-11.9	.3344+00	.4459+00	-9999.
18900	231	253	-12.8	.3215+00	.4301+00	-9999.
19000	234	252	-13.4	.3092+00	.4147+00	-9999.
19100	239	249	-14.2	.2972+00	.3998+00	-9999.
19200	246	248	-14.9	.2857+00	.3854+00	-9999.
19300	255	249	-15.6	.2747+00	.3715+00	-9999.
19400	263	251	-16.5	.2640+00	.3583+00	-9999.
19500	266	255	-17.3	.2537+00	.3454+00	-9999.
19600	268	259	-17.8	.2437+00	.3325+00	-9999.
19700	268	261	-18.7	.2342+00	.3206+00	-9999.
19800	285	261	-19.5	.2250+00	.3090+00	-9999.
19900	256	264	-20.1	.2161+00	.2975+00	-9999.

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TABLE 5. (Continued)

LAUNCH DATE	WIND SPEED	WIND DIRECTION	TEMPERATURE	PRESSURE	DENSITY	DEM POINT
620322	(FT/SEC)	(DEG)	(DEG C)	(MILLIBARS)	(GRAM/CM <sup>3</sup> )	(DEG C)
201000	249	266	-21.0	.2075+00	.2867+00	-9999.
201100	243	268	-21.8	.1993+00	.2762+00	-9999.
202000	244	269	-22.4	.1914+00	.2659+00	-9999.
203000	248	268	-23.3	.1837+00	.2561+00	-9999.
204000	248	268	-24.3	.1764+00	.2469+00	-9999.
205000	251	267	-25.5	.1693+00	.2361+00	-9999.
206000	256	263	-25.8	.1625+00	.2269+00	-9999.
207000	249	262	-26.5	.1559+00	.2201+00	-9999.
208000	249	263	-26.7	.1496+00	.2114+00	-9999.
209000	251	263	-26.5	.1435+00	.2027+00	-9999.
210000	251	263	-26.5	.1377+00	.1945+00	-9999.
211000	255	263	-27.3	.1321+00	.1872+00	-9999.
212000	263	266	-27.3	.1268+00	.1797+00	-9999.
213000	263	269	-27.5	.1216+00	.1724+00	-9999.
214000	260	272	-27.6	.1167+00	.1656+00	-9999.
215000	261	272	-27.4	.1120+00	.1587+00	-9999.
216000	260	274	-27.8	.1074+00	.1525+00	-9999.
217000	256	276	-28.3	.1030+00	.1465+00	-9999.
218000	253	278	-28.8	.9880-01	.1409+00	-9999.
219000	251	278	-29.8	.9480-01	.1357+00	-9999.
220000	246	278	-31.0	.9090-01	.1308+00	-9999.
221000	239	278	-32.8	.8720-01	.1264+00	-9999.
222000	236	277	-34.4	.8350-01	.1218+00	-9999.
223000	234	275	-35.8	.8000-01	.1174+00	-9999.
224000	229	274	-38.2	.7670-01	.1137+00	-9999.
225000	222	274	-40.8	.7340-01	.1101+00	-9999.
226000	214	276	-43.7	.6950-01	.1055+00	-9999.
227000	200	273	-45.4	.6600-01	.1010+00	-9999.
228000	180	264	-48.0	.6250-01	.9670-01	-9999.
229000	160	259	-52.0	.5900-01	.9294-01	-9999.
230000	133	262	-55.0	.5550-01	.8863-01	-9999.
231000	121	265	-62.2	.5200-01	.8587-01	-9999.
232000	109	268	-63.7	.4870-01	.8101-01	-9999.
233000	097	272	-65.2	.4640-01	.7775-01	-9999.
234000	086	276	-66.8	.4420-01	.7461-01	-9999.
235000	074	279	-68.2	.4210-01	.7154-01	-9999.
236000	064	283	-68.2	.4000-01	.6797-01	-9999.
237000	052	286	-68.3	.3810-01	.6461-01	-9999.
238000	040	289	-69.2	.3620-01	.6182-01	-9999.
239000	027	292	-68.9	.3450-01	.5885-01	-9999.
240000	015	296	-68.2	.3280-01	.5574-01	-9999.
241000	001	321	-67.9	.3120-01	.5295-01	-9999.
242000	011	114	-67.2	.2970-01	.5023-01	-9999.
243000	023	118	-66.2	.2780-01	.4763-01	-9999.
244000	037	120	-66.2	.2700-01	.4544-01	-9999.
245000	050	122	-66.2	.2570-01	.4325-01	-9999.
246000	062	124	-66.2	.2440-01	.4106-01	-9999.
247000	074	126	-67.2	.2330-01	.3940-01	-9999.
248000	084	127	-68.1	.2210-01	.3755-01	-9999.
249000	094	129	-68.2	.2110-01	.3566-01	-9999.

TABLE 5. (Continued)

OFF NUMBER	LAUNCH DATE	METEOROLOGICAL DATA TAPE	ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
3	820322		25000	104	131	-69.2	.2010-01	.3432-01	-9999.
			25100	114	132	-70.2	.1910-01	.3278-01	-9999.
			25200	123	134	-71.2	.1820-01	.3139-01	-9999.
			25300	130	135	-71.7	.1730-01	.2992-01	-9999.
			25400	136	137	-72.3	.1640-01	.2845-01	-9999.
			25500	143	143	-73.2	.1560-01	.2717-01	-9999.
			25600	148	140	-74.3	.1480-01	.2593-01	-9999.
			25700	153	142	-75.2	.1410-01	.2481-01	-9999.
			25800	157	144	-76.2	.1340-01	.2370-01	-9999.
			25900	160	145	-76.9	.1270-01	.2254-01	-9999.
			26000	151	145	-76.8	.1208-01	.2145-01	-9999.
			26100	141	145	-76.7	.1150-01	.2041-01	-9999.
			26200	132	146	-76.6	.1094-01	.1942-01	-9999.
			26300	123	147	-76.5	.1041-01	.1848-01	-9999.
			26400	113	147	-76.4	.9908-02	.1758-01	-9999.
			26500	104	148	-76.3	.9428-02	.1673-01	-9999.
			26600	095	149	-76.3	.8971-02	.1592-01	-9999.
			26700	086	150	-76.2	.8536-02	.1515-01	-9999.
			26800	077	152	-76.1	.8123-02	.1442-01	-9999.
			26900	068	154	-76.0	.7729-02	.1379-01	-9999.
			27000	059	157	-75.9	.7355-02	.1305-01	-9999.
			27100	050	160	-75.8	.6999-02	.1242-01	-9999.
			27200	041	165	-75.7	.6660-02	.1182-01	-9999.
			27300	033	173	-75.6	.6337-02	.1125-01	-9999.
			27400	026	184	-75.6	.6030-02	.1070-01	-9999.
			27500	030	182	-76.6	.5780-02	.9150-02	-9999.
			28000	030	179	-77.5	.4440-02	.7890-02	-9999.
			28300	023	175	-78.3	.3790-02	.6770-02	-9999.
			28600	016	168	-79.2	.3240-02	.5410-02	-9999.
			28900	009	151	-80.0	.2770-02	.4990-02	-9999.
			29200	006	098	-80.8	.2370-02	.4280-02	-9999.
			29500	009	048	-81.6	.2030-02	.3670-02	-9999.
			29800	006	000	-83.2	.1630-02	.2970-02	-9999.
			30100	009	298	-82.3	.1390-02	.2520-02	-9999.
			30400	017	280	-81.4	.1180-02	.2130-02	-9999.
			30700	025	274	-80.4	.1010-02	.1810-02	-9999.
			31000	032	271	-79.5	.8600-03	.1530-02	-9999.
			31300	036	269	-78.1	.7360-03	.1300-02	-9999.
			31600	038	269	-76.2	.6320-03	.1100-02	-9999.
			31900	039	269	-74.4	.5430-03	.9310-03	-9999.
			32200	040	269	-72.3	.4660-03	.7890-03	-9999.
			32500	039	268	-70.4	.4000-03	.6690-03	-9999.
			32800	038	267	-68.4	.3440-03	.5670-03	-9999.
			33100	039	268	-64.7	.2980-03	.4410-03	-9999.
			33400	041	267	-60.9	.2540-03	.4080-03	-9999.
			33700	041	266	-57.2	.2210-03	.3470-03	-9999.
			34000	040	265	-53.4	.1930-03	.2940-03	-9999.
			34300	038	263	-49.7	.1670-03	.2500-03	-9999.
			34600	037	264	-44.2	.1460-03	.2130-03	-9999.
			34900	036	263	-37.0	.1290-03	.1820-03	-9999.

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TABLE 5. (Concluded)

OFF NUMBER	LAUNCH DATE	METEOROLOGICAL DATA TAPE	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/CM <sup>3</sup> )	DEW POINT (DEG C)
3	020327							
322000			038	260	-29.8	.1140-03	.1560-03	-9999.
355000			037	256	-22.6	.1010-03	.1330-03	-9999.
358000			035	251	-15.4	.0900-04	.1140-03	-9999.
361000			029	255	-8.1	.7850-04	.9730-04	-9999.
364000			028	249	1.9	.7130-04	.8490-04	-9999.
367000			027	241	12.0	.6460-04	.7400-04	-9999.
370000			026	230	22.1	.5840-04	.6450-04	-9999.
373000			025	214	32.1	.5280-04	.5620-04	-9999.
376000			027	193	42.2	.4770-04	.4900-04	-9999.
379000			016	189	53.1	.4340-04	.4300-04	-9999.
382000			018	190	64.8	.3990-04	.3810-04	-9999.
385000			020	191	76.9	.3680-04	.3360-04	-9999.
388000			022	191	89.3	.3410-04	.3010-04	-9999.
391000			024	191	102.1	.3160-04	.2690-04	-9999.
394000			027	192	115.1	.2940-04	.2420-04	-9999.
397000			029	192	128.4	.2740-04	.2170-04	-9999.
400000			032	193	141.8	.2560-04	.1960-04	-9999.

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TABLE 6. STS-3 SRB DESCENT-IMPACT SURFACE SHIP OBSERVATIONS

Site: USN Ship, Gen. H.S. Vandenberg						
Location: 30°N Latitude 78°W Longitude						
Date: March 22, 1982						
Time: 1607Z						
Surface Observation:						
<u>Air Temp. °F</u>	<u>Wet-Bulb °F</u>	<u>Dew Pt. °F</u>	<u>Pressure (MSL) mb</u>	<u>Wind Dir.</u>	<u>Wind Sp. Kt.</u>	
75.1	70.3	68	1015.7	260°	12	
Sky Observation:						
<u>Clouds</u>						
2/10 Cumulus at 2,000 ft			<u>Total Sky Cover</u>	<u>Total Opaque Sky</u>	<u>Visibility (miles)</u>	
1/10 Stratocumulus at 4,500 ft			6/10	6/10	7	
3/10 Altocumulus at 10,000 ft						
Sea Observations:						
<u>Sea Condition:</u>						
Sea Slight to Moderate - Code 3-4			<u>Wind Waves:</u>	<u>Swell Conditions:</u>		
1/10 Breaking Waves	<u>Freq. Sec.</u>	<u>Ht. m.</u>		Data Not Available		
0/10 Foam	5	1½				
Surface Sea Water Temp = 24.4°C (75.9°F)						

TABLE 7. SELECTED ATMOSPHERIC OBSERVATIONS FOR THE FLIGHT TESTS OF THE SPACE SHUTTLE VEHICLES

Seq. No.	Vehicle Data			Surface Observations				Inflight Conditions Max. Wind Below 60,000 ft			Count Down and Launch Comments of Meteorological Significance		
	Vehicle No.	Launch Date	Time <sup>c</sup> (EST) Nearest Minute	Launch Pad	Thermodynamic <sup>a</sup>		Wind <sup>b</sup>		AK. (ft)	Speed (ft/sec)		Dir. (deg)	
					Press N/cm <sup>2</sup>	Temp. (°C)	Rel. Hum. (%)	Speed (ft/sec)					Dir. (deg)
1	STS-1	4/12/81	0700	39A	10.234 <sup>e</sup>	21	82	11.8 15.2	125 120	44,300	98	250	Wind directional change observed at Pad just prior to L+0.5
2	STS-2	11/12/81	1010	39A	10.166	23	61	27.0 27.0	345 355	36,300	158	286	
3	STS-3	3/22/82	1100	39A	10.160	24	71	7.0 <sup>f</sup> 8.0 <sup>f</sup>	50 <sup>f</sup> 145	45,000	119	250	

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 (listed first) and 275 ft FSS winds measured above natural grade.

c. Eastern Standard Time unless otherwise noted.

d. Pressure measurement applicable to 21 ft above MSL unless otherwise indicated.

e. Pressure measurement applicable to 14 ft above MSL.

f. 10 sec average prior to L+0.

g. Due to onset of sea breeze.

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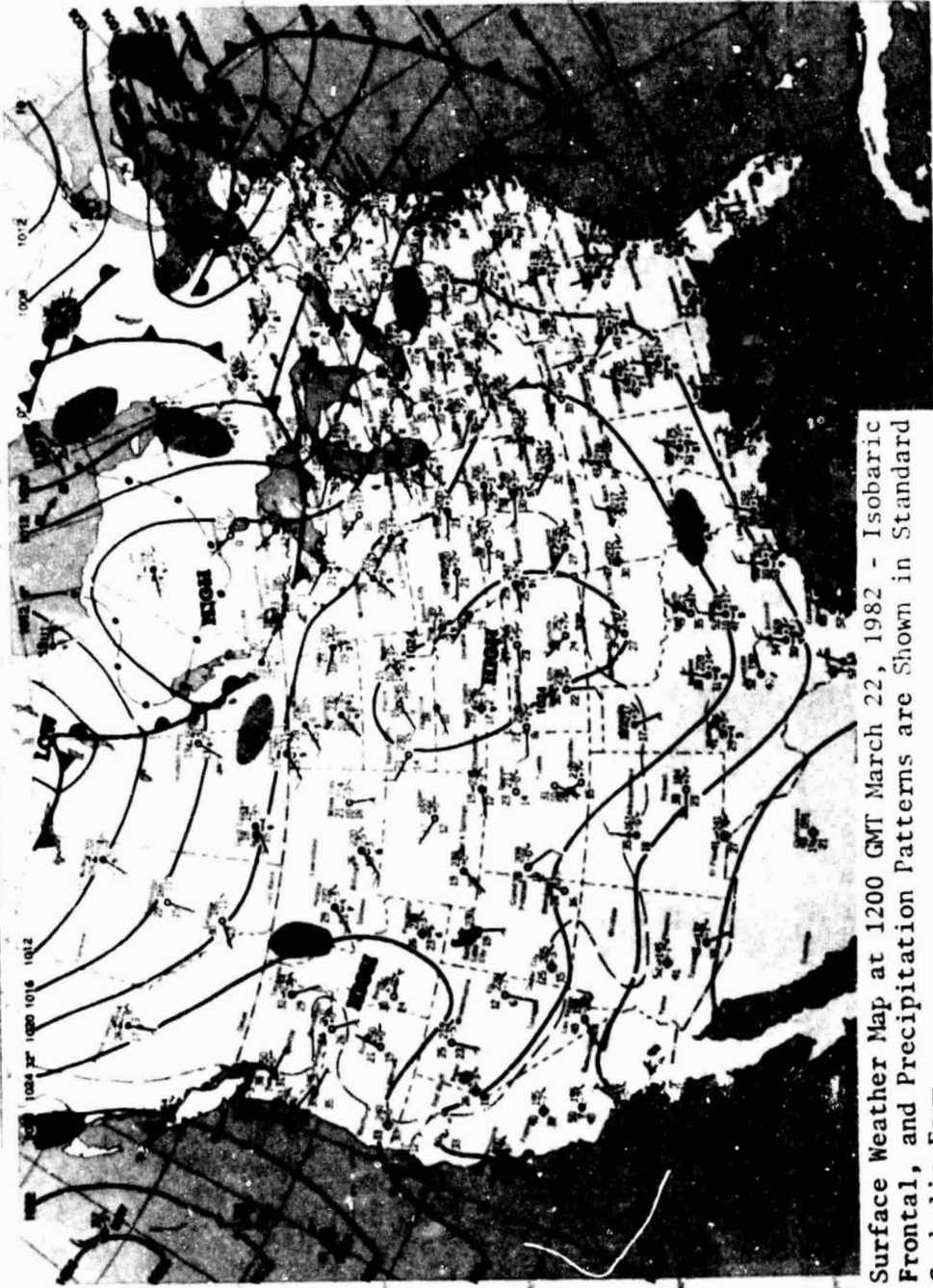


Figure 1. Surface weather map 4 hr prior to launch of STS-3.

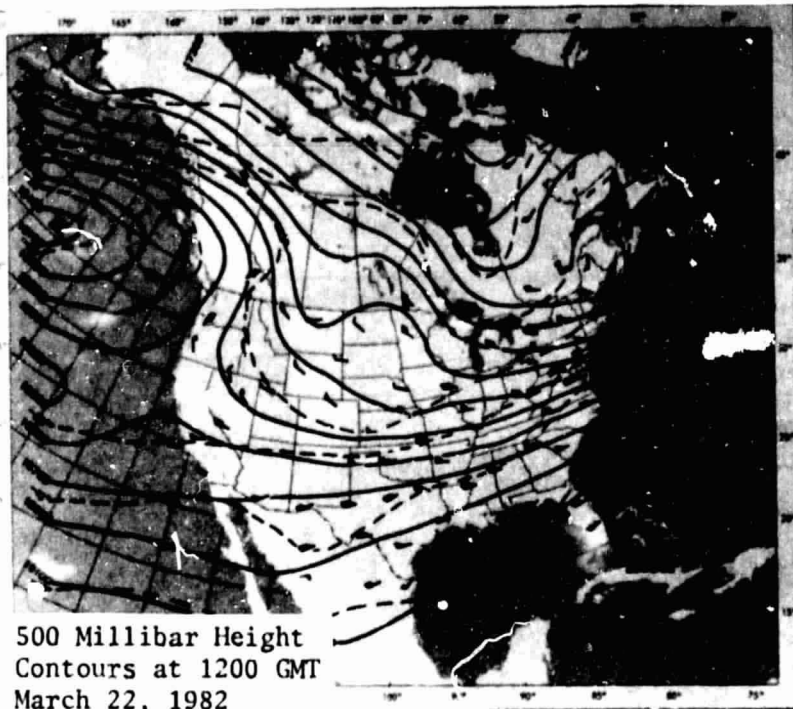


Figure 2. 500 mb map 4 hr prior to launch of STS-3.

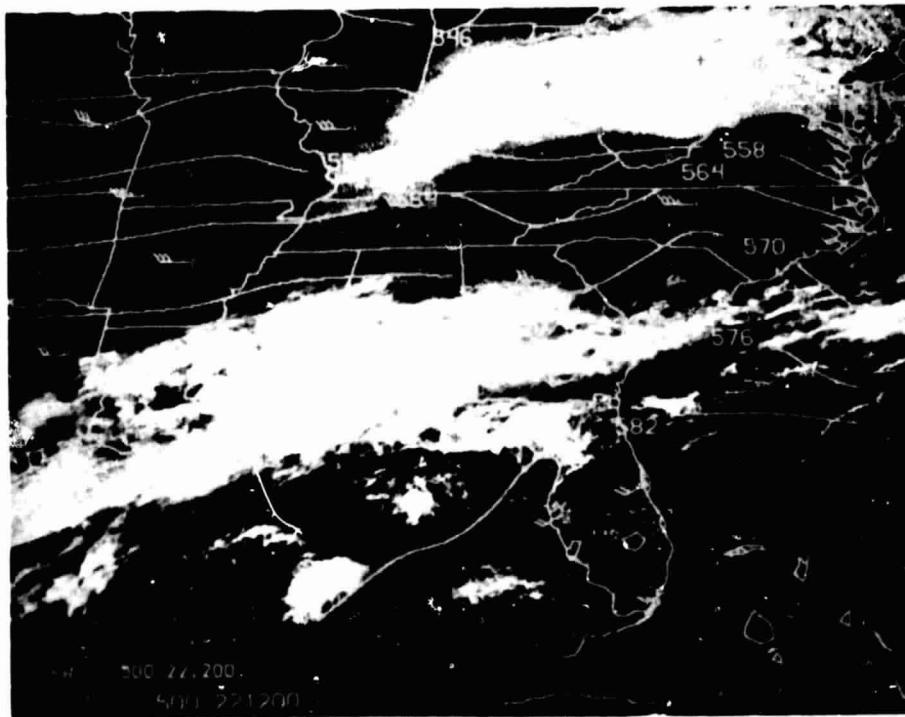


Figure 3. GOES SMS-II visible imagery of cloud cover 1 hr, 30 min after launch of STS-3 (1730Z, 22 March 1982). 500 mb contours and wind barbs are also included for 1200Z.



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Figure 4. Enlarged view of GOES SMS-II visible imagery of cloud cover with exhaust trail visible (indicated by arrow) during launch of STS-3 (160JZ, 22 March 1982).

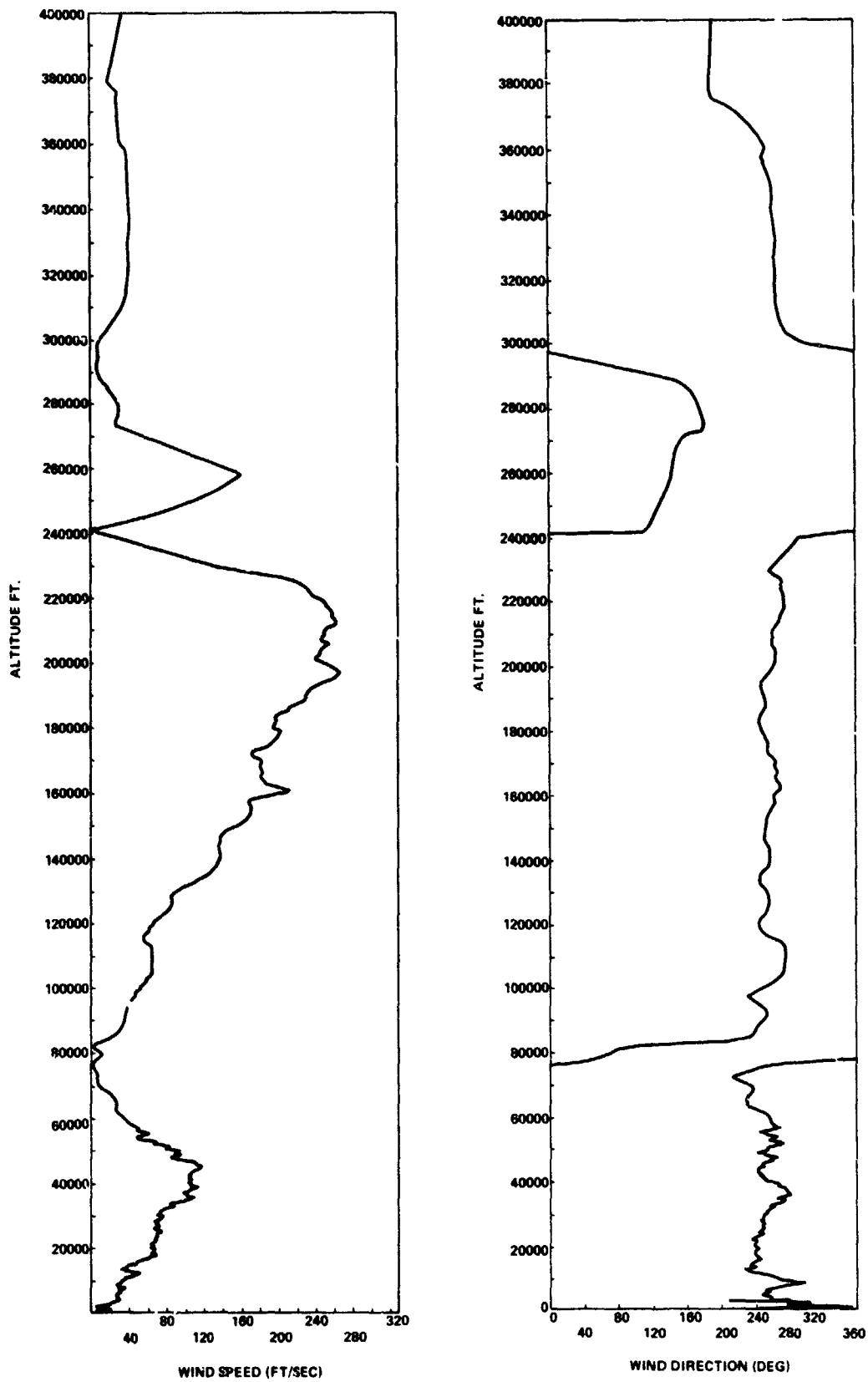


Figure 5. Scalar wind speed and direction at launch time of STS-3.

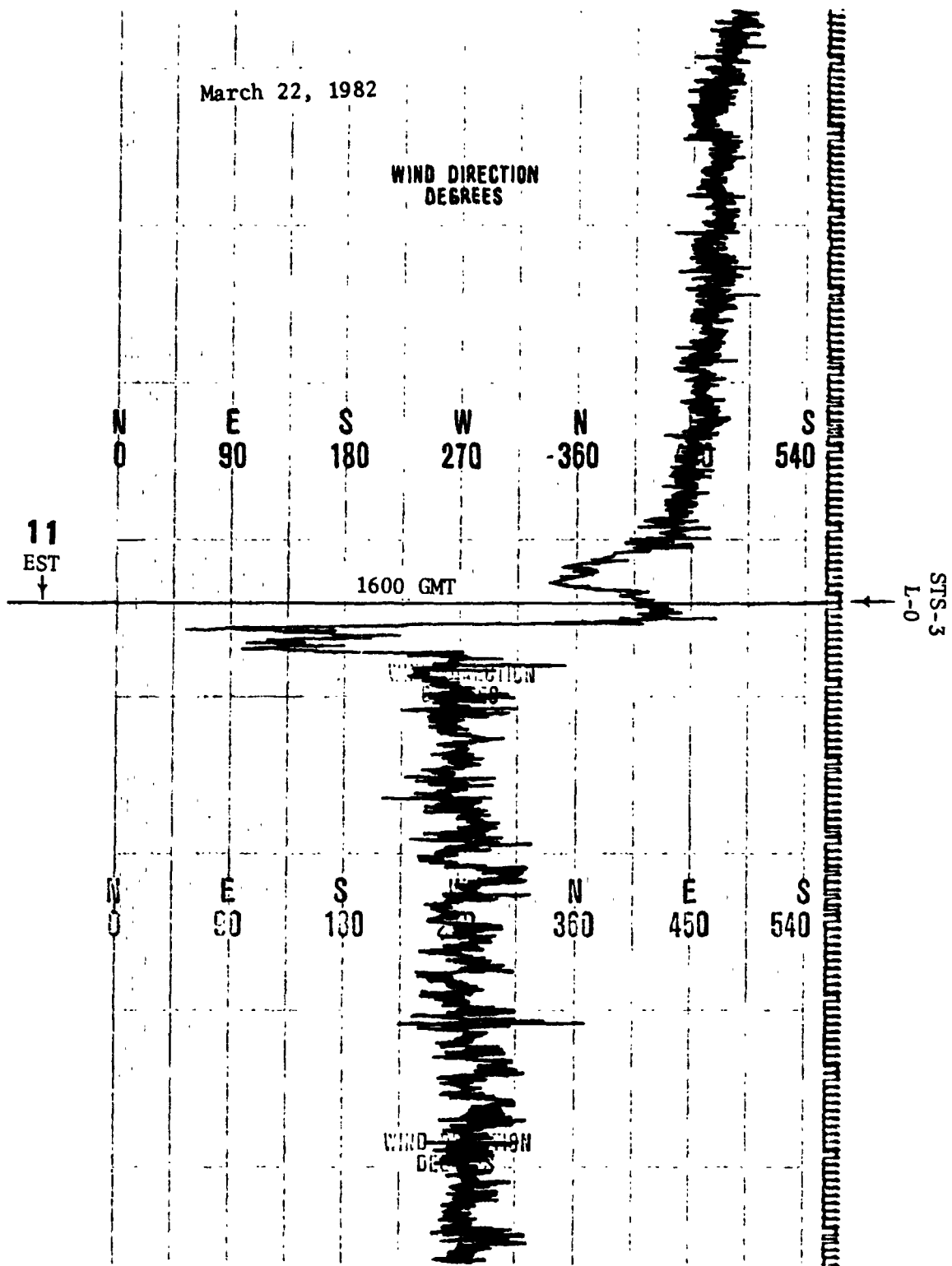


Figure 6. NW 60 ft pad light pole wind directional trace showing sea-breeze establishment starting just prior to STS-3 launch.

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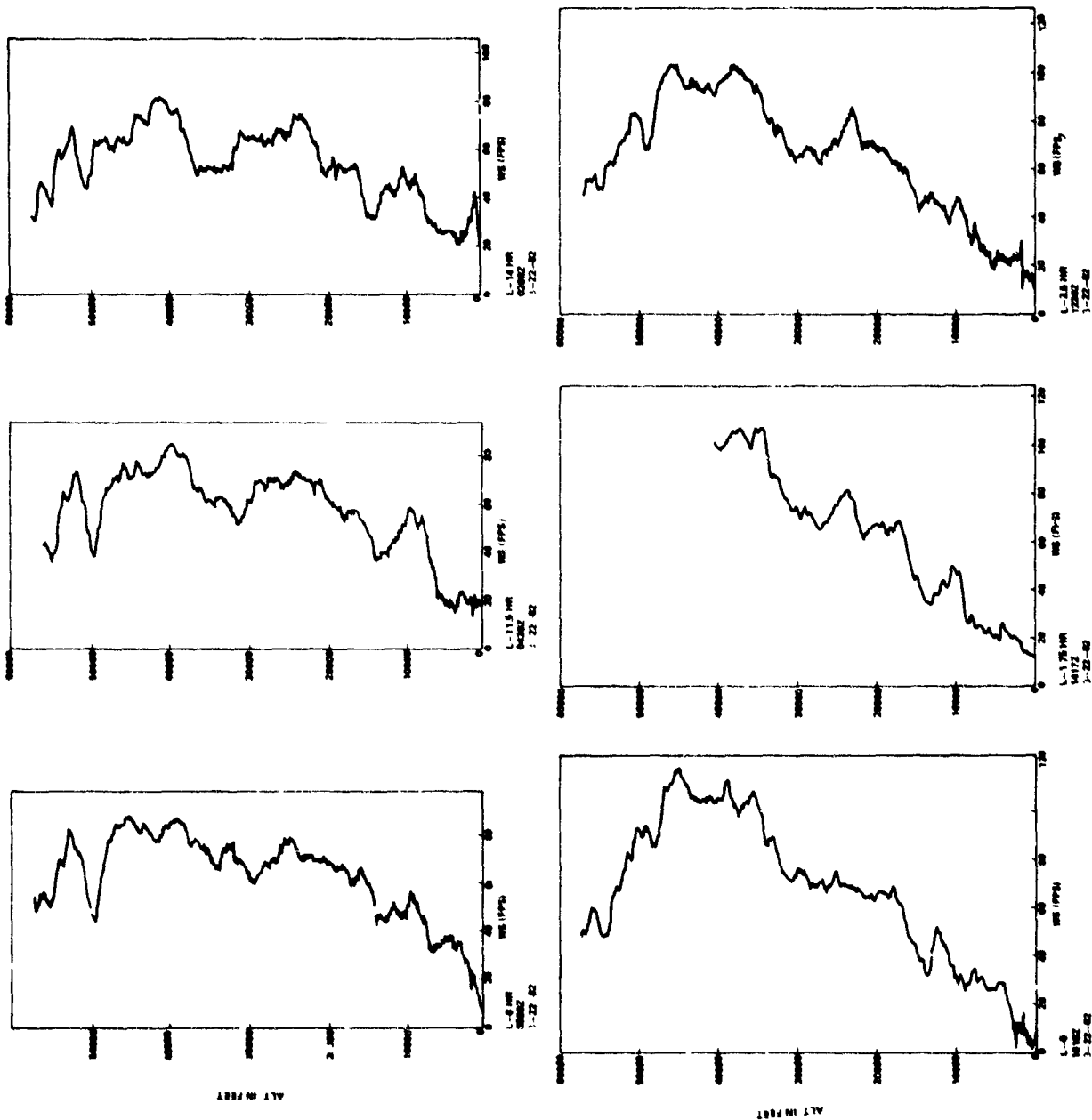


Figure 7. STS-3 prelaunch/launch Jimsphere\*-measured wind speeds (FPS).

\*L-1.75 hr is an MSS-Windsond.

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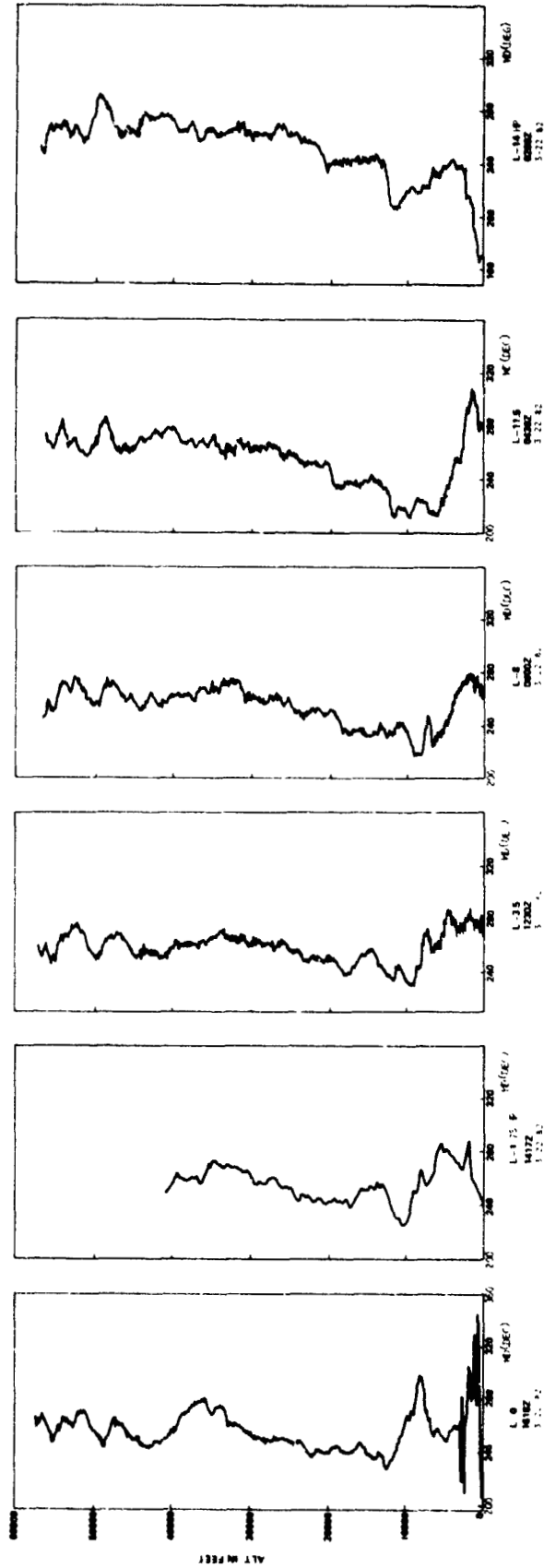


Figure 8. STS-3 prelaunch/launch Jimsphere\*-measured wind directions (degrees).

39 \*L-1.75 hr is an MSS-Windsonde.

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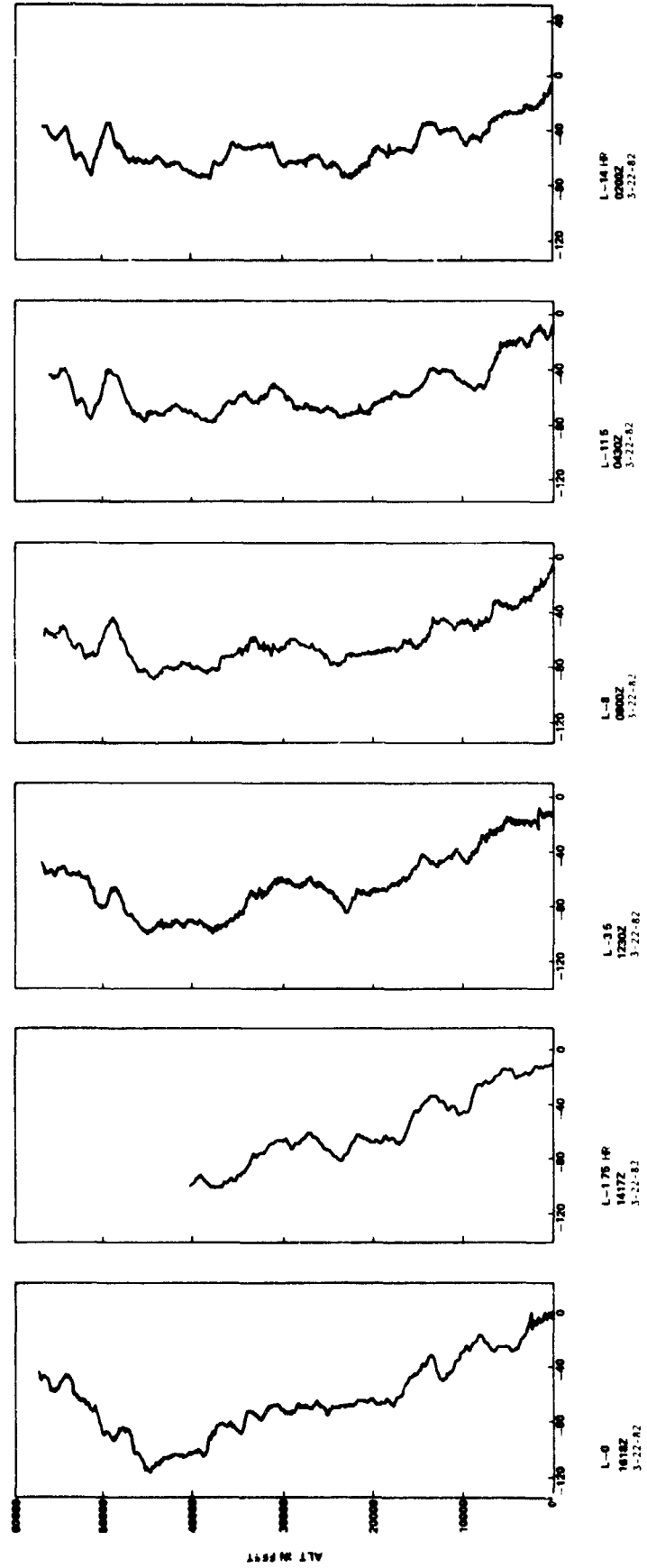


Figure 9. STS-3 prelaunch/launch Jimisphere\*-measured in-plane component winds (FPS). Flight azimuth = 60 degrees.

\*L-1.75 hr is an MSS-Windsonde.

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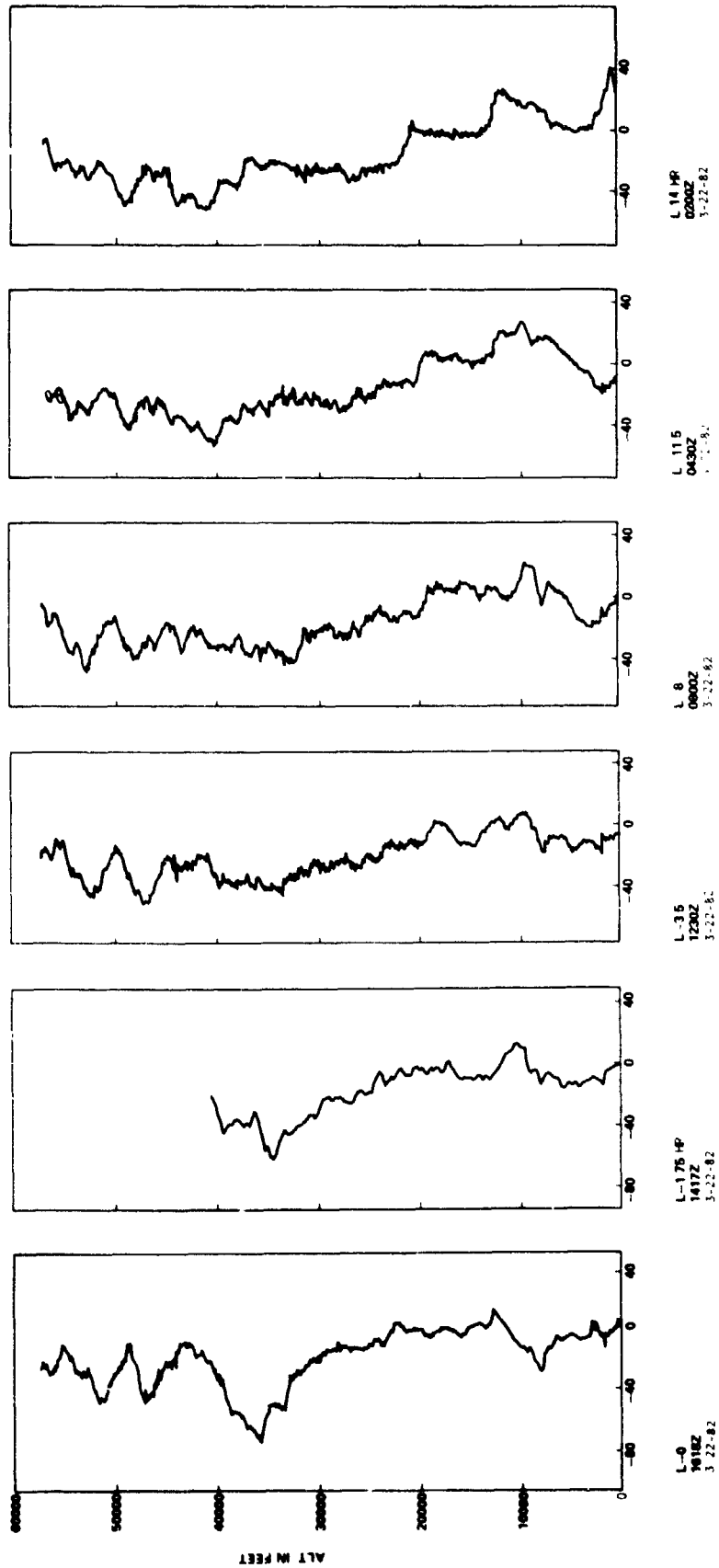
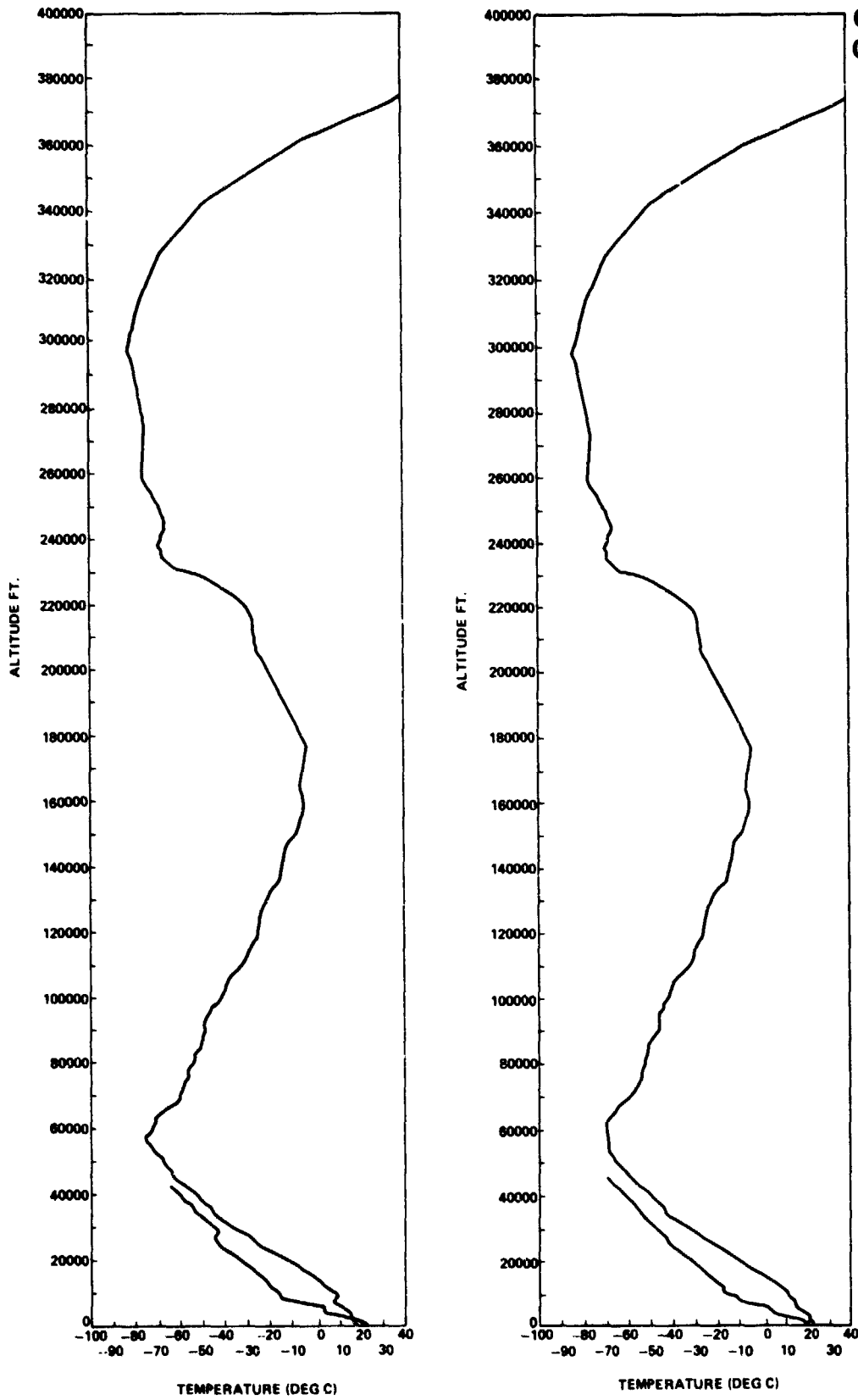


Figure 10. STS-3 prelaunch/launch Jimsphere\*-measured out-of-plane component winds (FPS). Flight azimuth = 60 degrees.

41 \*L-1.75 hr is an MSS-Windsonde.

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$T_D$  - Dew point temperature  
 $T$  - Temperature

Figure 11. STS-3 temperature profiles versus altitude for launch (left) and SRB descent (right).



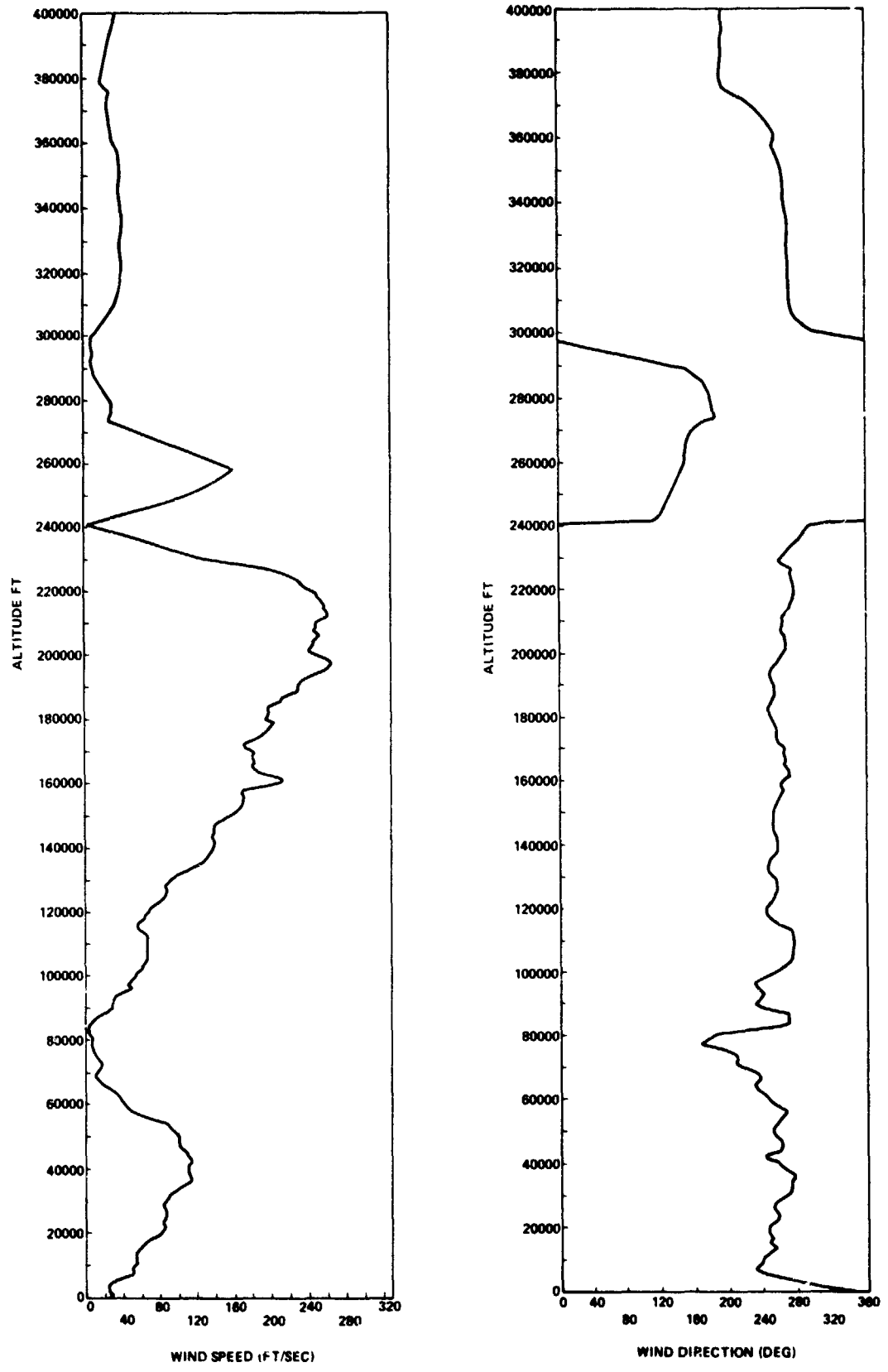


Figure 12. STS-3 scalar wind speed and direction for SRB descent.

REFERENCES

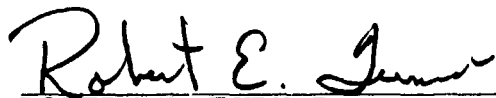
1. Saturn Flight Evaluation Working Group: Saturn Launch Vehicle Flight Evaluation Report -- Appendix A -- Atmosphere (A separate report is prepared for each Saturn Vehicle launch operation). George C. Marshall Space Flight Center, Alabama.
2. Johnson, D. L.: Summary of Atmospheric Data Observations 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. Justus, C. G., et al.: The NASA/MSFC Global Reference Atmosphere Model -- Mod 3 (with Spherical Harmonic Wind Model). NASA CR-3256, March 1980.
7. Smith, O. E.; and Weidner, D. K.: A Reference Atmosphere for Patrick AFB, Florida, Annual (1963 Revision). NASA TM X-53139, September 23, 1964.

APPROVAL

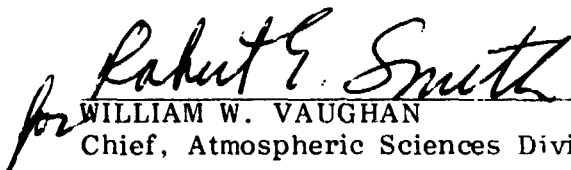
ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE  
(STS-3) LAUNCH

By D. L. Johnson, S. C. Brown, 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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