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ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-8) LAUNCH

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16. ABSTRACT

This report presents a summary of selected atmospheric conditions observed near Space Shuttle STS-8 launch time on August 30, 1983, 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 wind and thermodynamic parameters representative of surface and aloft conditions in the SRB descent/impact ocean area. Final meteorological tapes, which consist of wind and thermodynamic parameters versus altitude, for STS-8 vehicle ascent and SRB descent/impact have been constructed. The STS-8 ascent meteorological data tape has been constructed by Marshall Space Flight Center in response to Shuttle task agreement No. 936-53-22-368 with Johnson Space Center.

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I. INTRODUCTION

This report presents an evaluation of the atmospheric environmental data taken during the launch of the Space Shuttle/STS-8 vehicle. This Space Shuttle vehicle was launched from Pad 39A at Kennedy Space Center (KSC), Florida, on a bearing of 88 deg east of north at 0632 UT (0232 EDT) on August 30, 1983.

This report presents a summary of the atmospheric environment at launch time (L+0) of the STS-8, together with the sequence of prelaunch Jimsphere measured winds aloft profiles from L-14 hr 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 estimates 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, STS-2, STS-3, STS-4, STS-5, STS-6, and STS-7 launch conditions are presented in References 3, 4, 5, 6, 7, 8, 9, and 10, respectively.

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 1 presents a listing of systems used to obtain the upper level wind profiles used in compiling the final ascent meteorological data tape. The L-0 rawinsonde and Super-Loki rocket data were used in the upper level atmospheric regions for the construction of the final SRB impact/descent meteorological data tape. Data cutoff altitudes are also given in Table 1.

III. GENERAL SYNOPTIC SITUATION AT LAUNCH TIME

A slowly moving cold frontal system, located in the Atlantic Ocean off the northeastern U.S. coastline and extending as a trough line through southern Georgia and westward along the Gulf coast, produced numerous thunderstorm activities along and in advance of this instability line. Figure 1 presents the surface map conditions 5.5 hr after STS-8 launch. The front, with a low aloft over the

eastern section of the Florida peninsula, helped produce the thunderstorm activity that prevailed along the eastern and southern Florida coastline throughout the evening countdown period. Figure 2 presents the winds aloft conditions at the 500 mb pressure level 5.5 hr after launch. Weak easterly winds prevailed aloft at this pressure level.

Cloudiness increased throughout the evening of August 29, 1983, with the first thunder being reported at 0057 UT (2057 EDT) with frequent cloud-to-cloud and cloud-to-ground lightning being observed. By 0240 UT (2240 EDT) the sky was overcast with a thunderstorm rain shower overhead. At 0303 UT (2303 EDT) heavy rain showers from the thunderstorm existed with frequent lightning, and a sharp atmospheric pressure rise was reported. The rain showers became light by 0313 UT (2313 EDT) with decreasing thunderstorm activity, resulting in occasional lightning reported at 0410 UT (0010 EDT, 30 August 1983). By 0445 UT (0045 EDT) light rain showers were still occurring with the thunderstorm having moved south out of the launch complex area. Light rain showers with no lightning became light rain by 0515 UT (0115 EDT), and all precipitation ceased by 0550 UT (0150 EDT). The overcast skies prevailed in the launch area through the launch of STS-8.

Figure 3 shows some of the lightning activity present around LC 39A during the thunderstorms passage through the area. The meteorological instrumentation located at camera site 3, on the SE perimeter of the pad, failed within 3 hours of liftoff – possibly due to the thunderstorm/electrical activity present within this time interval. The scheduled liftoff for STS-8 at 0615 UT never took place because of a countdown delay of 17 min due to the adverse weather conditions present. The thunderstorm activity produced a lightning hazard along with cloud cover which gave poor visibility for RTLS, thus resulting in the countdown delay of 17 minutes. Liftoff of STS-8 took place at 0632 UT (0232 EDT).

At launch time cloudiness was prevalent over the KSC launch complex and adjacent ocean areas as shown in Figure 4. Figure 4 presents the GOES-5 infrared southeast U.S. picture taken 2 min prior to launch (0630 UT). Overcast skys consisting of 4/10 cumulus clouds at 3500 ft, 7/10 altocumulus at 13,000 ft, and 3/10 cirrus were present during launch. Figure 5 shows an up-close infrared shot of the Florida peninsula as recorded by GOES-5, taken at 0630 UT.

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 period prior to launch of STS-8. 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 (0702 UT), MSS Rawinsonde (0640 UT), Super-Loki Rocketsonde (1015 UT), and Super-Loki Robin (0801 UT) systems were used to measure the upper level wind and thermodynamic parameters for STS-8 launch. At altitudes above the rocket-measured data, the Global

Reference Atmosphere (GRA) [11] parameters for August KSC conditions were used. A tabulation of the STS-8 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 8.8 ft/sec (5.2 kn) at 60 ft and increased to a maximum of 30 ft/sec (18 kn) blowing from 349 deg. This maximum occurred at an altitude of 45,100 ft (13,746 m). The winds increased above this level as shown in Figure 6. The overall maximum measured speed was 180 ft/sec (107 kn) at 185,000 ft (56,388 m) altitude.

B. Wind Direction

At launch time, the 60-ft wind direction was from the west (269 deg) and shifted through the south to a southeasterly component above 2600 ft (792 m) extending to 7500 ft (2286 m). Wind directions were then from the west-northwest at 9400 ft (2865 m) and slowly shifted through north into the summer-easterly regime starting at 48,800 ft (14,874 m). Winds remained easterly throughout the stratosphere and lower mesosphere to 220,000 ft (67,056 m). Westerly winds established themselves above this altitude. Figure 6 shows the complete wind direction versus altitude profile. As shown in Figure 6, wind direction became quite variable at altitudes with low wind speeds.

C. Prelaunch/Launch Wind Profiles

Prelaunch/launch wind profiles presented in Figures 7 through 10 were measured by the Jimsphere FPS-16 system. Data are shown for the L-13 hr, L-7.25 hr, and L+0 measurement periods.

The wind speed and direction profiles for the 13-hr period prior to and including L+0 are shown in Figures 7 and 8. The in-plane (right crosswind) and out-of-plane (left crosswind) profiles are given on Figures 9 and 10. The wind speeds and component speeds were not significantly different from the August mean values in the 30,000 to 50,000 ft layer during the period for which data are shown. However, significant concern developed when the L-3.5 hr wind profile data and backup were lost due to thunderstorms at the launch site. The prelaunch weather conditions are discussed in more detail in Section III. The Shuttle ascent loads limitations, therefore, could not be run using the required L-3.5 hr wind profile. It was then decided to obtain the L-1.5 hr wind profile for the final ascent loads assessment prior to launch. A discussion of this is found in Appendix A of this document.

D. Thermodynamic Data

The thermodynamic data taken at STS-8 launch time, consisting of atmospheric temperature, dew-point temperature, pressure, and density have been compiled as the STS-8 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-8 SRB descent/impact meteorological data and are presented in Table 5. The vertical structure of temperature for the STS-8 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-8 launch below 95,000 ft (28,956 m) were all within 6 percent of their respective PRA-63 [12] annual values. All these parameters stayed within 12 percent of their respective PRA-63 values, at all levels of measurement.

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 Omegasonde-Rawinsonde system (0714 UT) aboard the USNS Redstone, which was stationed off the coast in the Atlantic Ocean. The CCAFS measured Super-Loki rocketsonde 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 oceanographic observations taken close to STS-8 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-8 ASCENT*

Type of Data	Date: August 30, 1983		Portion of Data Used			
	Release Time		Start		End	
	Time (UT) (hr: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	07:02	30	6 (21)	30	17,069 (56,000)	89
MSS Rawinsonde	06:40	8	17,374 (57,000)	65	24,994 (82,000)	90
Super-Loki Rocketsonde (Datasonde)	10:15	223	58,522 (192,000)	223	25,298 (83,000)	249
Super-Loki Rocketsonde (Robin)	08:01	89	85,344 (280,000)	89	58,826 (193,000)	90
Omegasonde-Rawinsonde*	07:14	42	9 (28)	42	18,898 (62,000)	104

*The Omegasonde-Rawinsonde was released from the USNS Redstone to measure the upper atmosphere for SRB descent/impact analyses.

TABLE 2. SURFACE OBSERVATIONS AT STS-8 LAUNCH TIME

Location[a]	Time After L+0 (min)	Pressure(MSL) N/cm^2 (psia)	Temperature °K (°F)	Dew Point °K (°F)	Relative Humidity (%)	Visibility km (miles)	Sky Cover			Wind	
							Cloud** Amount	Cloud Type	Height of Base Meters (ft)	Speed ft/sec (kt)	Direction (deg)
NASA Space Shuttle Runway[e] Winds Measured at 10.4 m (34 ft)	1	10.119[d] (14.676)	297.0[d] (75.0)	296.5[d] (74.0)	97[d]	16 (10)	4 7 3	Cumulus Alto-Cumulus Cirrus	914 (3,000) 4877 (16,000) 7010 (23,000)	6.8 (4.0)	250
CCAFS[c] Surface Measurements	0	10.117 (14.673)	297.0 (75.0)	296.5 (74.0)	96	13 (8)	2 4 10	Strato-Cumulus Alto-Stratus Cirrostratus	914 (3,000) 4877 (16,000) 7620 (25,000)	10.1 (6.0)	230
Pad 39A Lightpole NW 18.3 m (60.0 ft)	0	d	d	d	d	–	–	–	–	8.8[b] (5.2)	269[b]
Pad 39A FSS (Top-NW) 83.8 m (275 ft)	0	–	–	–	–	–	–	–	–	14.0[b] (8.3)	268[b]

*Pad 39A Camera Site 3 barometric pressure instrument was inoperative due to storm passage approximately 3 hr prior to liftoff. Therefore, the KSC Shuttle runway station pressure value interpolated to 10.111 N/cm^2 at 21 ft above MSL was used as the L+0 pad atmospheric pressure measurement.

**Ten-tenths total sky cover.

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 were out at camera site No. 3, therefore Shuttle runway site observations are considered official.

e. Official STS-8 sky observational site.

TABLE 3. STS-8 PRE-LAUNCH THROUGH LAUNCH KSC PAD 39A METEOROLOGICAL MEASUREMENTS

Hourly Atmospheric Measurements[a]								Sky Condition[b]			
August 30, 1983 Time UT	Temp. (°F)	Dew Point (°F)	RH (%)	275′ Level (NW)**		60′ Level (NW)**		Clouds	Total Sky Cover	Vis. (mi)	Other Remarks
				WS Kt	WD°	WS Kt	WD°				
0000	84	77	79	11	219	6	229	Scattered at 15,000 ft Broken at 25,000 ft	6/10	7	
0057	83	77	84	12	222	5	231	Scattered at 3,300 ft Broken at 12,000 ft Broken at 25,000 ft	7/10	8	Thunderstorm N., moving S. Freq. lightning
0200	83	78	85	10	228	5	231	Broken at 3,300 ft Broken at 25,000 ft	8/10	8	Thunderstorm N-NE, moving S. Freq. lightning
0226	–	–	–	–	–	–	–	Scattered at 600 ft Broken at 2,000 ft Broken at 3,300 ft Broken at 25,000 ft	–	8	Thunderstorm NW-N-E, moving S. Freq. lightning
0240	–	–	–	–	–	–	–	Scattered at 600 ft Broken at 2,000 ft Broken at 3,300 ft Overcast at 25,000 ft	10/10	6	Thunderstorm – light rain shower overhead, W, N & E, Moving S. Freq. lightning
0300	75	67	77	13	360	12	335	Scattered at 600 ft Overcast at 2,000 ft	10/10	4	Thunderstorm – rain shower all quadrants, moving S. Freq. lightning
0303	–	–	–	–	–	–	–	Scattered at 500 ft Overcast at 2,000 ft	10/10	2	Thunderstorm – Heavy rain shower all quadrants, moving S. Freq. lightning. Pressure rapidly rising.
0313	–	–	–	–	–	–	–	Scattered at 500 ft Broken at 2,000 ft Overcast at 25,000 ft	10/10	8	Thunderstorm – Light rain shower all quads, moving S. Freq. lightning
0335	–	–	–	–	–	–	–	Scattered at 2,000 ft Overcast at 10,000 ft	10/10	8	Thunderstorm – Light rain shower overhead, moving S. Freq. lightning
0400[d]	73	71	93	9	234	13	229	Scattered at 2,500 ft Overcast at 10,000 ft	10/10	7	Thunderstorm – Light rain shower overhead, moving S. Freq. lightning
0410	–	–	–	–	–	–	–	Scattered at 3,500 ft Overcast at 10,000 ft	10/10	8	Thunderstorm overhead, S-W, moving S. Occasional lightning.

TABLE 3. (Concluded)

Hourly Atmospheric Measurements[a]								Sky Condition[b]			
August 30, 1983 Time UT	Temp. (°F)	Dew Point (°F)	RH (%)	275′ Level (NW)**		60′ Level (NW)**		Clouds	Total Sky Cover	Vis. (mi)	Other Remarks
				WS Kt	WD°	WS Kt	WD°				
0422	–	–	–	–	–	–	–	Scattered at 3,500 ft Overcast at 10,000 ft	10/10	8	Thunderstorm – Light rain shower overhead, S-W, moving S. Occ. lightning
0445	–	–	–	–	–	–	–	Scattered at 3,500 ft Overcast at 10,000 ft	10/10	8	Light rain shower. Thunderstorm moved south
0500[d]	74	73	97	9	271	6	264	Scattered at 3,500 ft Overcast at 10,000 ft	10/10	8	Light rain shower
0515	–	–	–	–	–	–	–	Scattered at 3,500 ft Overcast at 10,000 ft	10/10	8	Light rain
0530	–	–	–	–	–	–	–	Scattered at 3,500 ft Overcast at 13,000 ft	10/10	8	Light rain
0545	–	–	–	–	–	–	–	Scattered at 3,500 ft Broken at 13,000 ft Overcast at 23,000 ft	10/10	10	Light rain
0550	–	–	–	–	–	–	–	Scattered at 3,500 ft Broken at 13,000 ft Overcast at 23,000 ft	10/10	10	
0600[d]	74	73	97	11	302	5	302	Scattered at 3,500 ft Broken at 13,000 ft Overcast at 23,000 ft	10/10	10	
L+0[c] 0632[d]	75	74	97	8	268	5	269	4/10 Cumulus at 3,500 ft 7/10 Altocumulus at 13,000 ft 3/10 Cirrus at 23,000 ft	10/10	10	

a. 1 min mean about the hour from pad 39A instrumentation.
b. Sky observations taken at the Shuttle runway site X68.
c. L+0 PAD Wind parameters obtained from (MSFC/HOSC data) NW Anemometers used at 60 and 275 ft levels (approximately 1 min average prior to L+0). The L+0 atmospheric pressure, at 21 ft (MSL), was 10.111 N/cm^2. Sea level pressure was 10.118 N/cm^2.
d. Thermodynamic measurements of temperature, dew point, relative humidity and pressure were obtained from site X68 due to equipment, at PAD 39A camera site 3, being out after 0300 UT.

TABLE 4. STS-8 FINAL L+0 ASCENT 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	006	230	25.0	.1011+04	.1168+04	24.3
000100	009	269	25.1	.1008+04	.1165+04	24.2
000200	011	268	25.1	.1005+04	.1160+04	24.0
000300	014	267	25.2	.1001+04	.1156+04	23.8
000400	017	265	25.3	.9980+03	.1152+04	23.7
000500	025	263	25.3	.9946+03	.1148+04	23.5
000600	024	275	25.4	.9912+03	.1144+04	23.4
000700	023	290	25.5	.9878+03	.1140+04	23.2
000800	023	288	25.6	.9844+03	.1136+04	23.0
000900	022	284	25.6	.9811+03	.1132+04	22.9
001000	022	290	25.7	.9777+03	.1127+04	22.7
001100	020	289	25.6	.9743+03	.1124+04	22.2
001200	023	286	25.6	.9710+03	.1121+04	21.7
001300	022	294	25.5	.9677+03	.1118+04	21.2
001400	019	289	25.5	.9644+03	.1114+04	20.7
001500	020	281	25.4	.9611+03	.1111+04	20.2
001600	016	287	25.3	.9578+03	.1108+04	19.6
001700	014	273	25.3	.9545+03	.1104+04	19.1
001800	014	266	25.2	.9512+03	.1101+04	18.6
001900	011	279	25.2	.9480+03	.1098+04	18.1
002000	008	259	25.1	.9447+03	.1095+04	17.6
002100	009	256	24.9	.9414+03	.1091+04	17.5
002200	007	259	24.7	.9382+03	.1088+04	17.5
002300	005	254	24.5	.9349+03	.1085+04	17.5
002400	005	234	24.3	.9317+03	.1082+04	17.4
002500	002	230	24.1	.9285+03	.1079+04	17.3
002600	004	126	23.9	.9253+03	.1076+04	17.3
002700	006	145	23.7	.9221+03	.1073+04	17.3
002800	005	154	23.5	.9189+03	.1070+04	17.2
002900	006	103	23.3	.9157+03	.1067+04	17.2
003000	009	095	23.1	.9125+03	.1064+04	17.1
003100	005	104	22.9	.9094+03	.1061+04	17.0
003200	009	093	22.7	.9062+03	.1058+04	16.8
003300	011	076	22.6	.9030+03	.1055+04	16.7
003400	008	086	22.4	.8999+03	.1052+04	16.6
003500	009	106	22.2	.8967+03	.1049+04	16.5
003600	009	103	22.0	.8936+03	.1046+04	16.3
003700	011	119	21.8	.8905+03	.1043+04	16.2
003800	010	142	21.7	.8874+03	.1040+04	16.1
003900	010	130	21.5	.8843+03	.1037+04	15.9
004000	012	133	21.3	.8812+03	.1035+04	15.8
004100	010	155	21.2	.8782+03	.1031+04	15.6
004200	007	154	21.0	.8751+03	.1028+04	15.4
004300	011	132	20.9	.8720+03	.1025+04	15.3
004400	010	162	20.7	.8689+03	.1022+04	15.1
004500	009	161	20.6	.8659+03	.1019+04	14.9
004600	010	153	20.5	.8629+03	.1016+04	14.7
004700	012	164	20.3	.8598+03	.1013+04	14.5
004800	011	171	20.2	.8568+03	.1010+04	14.4
004900	009	160	20.0	.8538+03	.1007+04	14.2

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
005000	012	154	19.9	.8508+03	.1004+04	14.0
005100	010	170	19.7	.8478+03	.1001+04	13.7
005200	008	147	19.5	.8448+03	.9986+03	13.5
005300	010	131	19.4	.8419+03	.9958+03	13.2
005400	011	144	19.2	.8389+03	.9930+03	12.9
005500	009	147	19.0	.8359+03	.9902+03	12.7
005600	009	131	18.8	.8330+03	.9874+03	12.4
005700	010	144	18.6	.8301+03	.9846+03	12.1
005800	009	144	18.5	.8271+03	.9818+03	11.8
005900	007	131	18.3	.8242+03	.9791+03	11.6
006000	009	137	18.1	.8213+03	.9763+03	11.3
006100	008	155	17.9	.8184+03	.9736+03	11.1
006200	006	124	17.7	.8155+03	.9709+03	10.8
006300	009	112	17.5	.8126+03	.9682+03	10.6
006400	007	129	17.3	.8097+03	.9655+03	10.3
006500	006	133	17.1	.8068+03	.9628+03	10.1
006600	008	116	16.9	.8040+03	.9601+03	9.9
006700	009	140	16.7	.8011+03	.9574+03	9.6
006800	008	141	16.5	.7983+03	.9547+03	9.4
006900	008	151	16.3	.7955+03	.9521+03	9.1
007000	008	166	16.1	.7926+03	.9494+03	8.9
007100	006	152	15.9	.7898+03	.9468+03	8.8
007200	008	132	15.6	.7870+03	.9443+03	8.6
007300	008	150	15.4	.7841+03	.9417+03	8.5
007400	005	143	15.1	.7813+03	.9391+03	8.3
007500	006	141	14.9	.7785+03	.9366+03	8.2
007600	005	180	14.7	.7758+03	.9340+03	8.1
007700	001	231	14.4	.7730+03	.9315+03	7.9
007800	000	031	14.2	.7702+03	.9290+03	7.8
007900	001	207	13.9	.7675+03	.9265+03	7.6
008000	003	267	13.7	.7647+03	.9239+03	7.5
008100	001	295	13.5	.7619+03	.9213+03	7.3
008200	003	235	13.3	.7592+03	.9188+03	7.2
008300	003	258	13.0	.7565+03	.9162+03	7.0
008400	002	300	12.8	.7537+03	.9136+03	6.8
008500	000	284	12.6	.7510+03	.9111+03	6.7
008600	003	327	12.4	.7483+03	.9085+03	6.5
008700	006	016	12.2	.7456+03	.9060+03	6.3
008800	006	028	11.9	.7429+03	.9034+03	6.1
008900	001	064	11.7	.7402+03	.9009+03	6.0
009000	003	031	11.5	.7375+03	.8984+03	5.8
009100	002	034	11.3	.7349+03	.8957+03	5.6
009200	001	212	11.1	.7322+03	.8931+03	5.4
009300	004	261	10.9	.7295+03	.8905+03	5.2
009400	004	287	10.7	.7269+03	.8879+03	5.0
009500	002	250	10.6	.7242+03	.8853+03	4.8
009600	006	259	10.4	.7216+03	.8827+03	4.6
009700	007	270	10.2	.7190+03	.8801+03	4.4
009800	003	284	10.0	.7164+03	.8776+03	4.2
009900	005	248	9.8	.7138+03	.8750+03	4.0

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
010000	008	273	9.6	.7112+03	.8725+03	3.8
010100	004	308	9.4	.7086+03	.8699+03	3.8
010200	005	290	9.2	.7060+03	.8674+03	3.7
010300	008	297	9.0	.7034+03	.8648+03	3.7
010400	007	302	8.8	.7008+03	.8623+03	3.7
010500	005	291	8.6	.6982+03	.8598+03	3.7
010600	010	291	8.3	.6957+03	.8572+03	3.6
010700	009	311	8.1	.6931+03	.8547+03	3.6
010800	007	304	7.9	.6906+03	.8522+03	3.6
010900	010	282	7.7	.6881+03	.8497+03	3.5
011000	010	297	7.5	.6855+03	.8473+03	3.5
011100	006	287	7.3	.6830+03	.8449+03	3.2
011200	008	268	7.1	.6805+03	.8425+03	2.9
011300	009	284	6.8	.6780+03	.8401+03	2.5
011400	007	298	6.6	.6755+03	.8377+03	2.2
011500	006	289	6.4	.6730+03	.8353+03	1.9
011600	009	285	6.2	.6705+03	.8330+03	1.6
011700	010	308	6.0	.6680+03	.8306+03	1.3
011800	007	322	5.7	.6656+03	.8283+03	.9
011900	006	273	5.5	.6631+03	.8259+03	.6
012000	006	261	5.3	.6607+03	.8236+03	.3
012100	009	309	5.1	.6582+03	.8211+03	.1
012200	004	316	4.9	.6558+03	.8186+03	-.2
012300	002	282	4.8	.6533+03	.8161+03	-.4
012400	004	314	4.6	.6509+03	.8137+03	-.6
012500	003	273	4.4	.6485+03	.8112+03	-.8
012600	005	254	4.2	.6461+03	.8087+03	-1.1
012700	004	256	4.0	.6436+03	.8063+03	-1.3
012800	004	201	3.9	.6413+03	.8038+03	-1.5
012900	008	218	3.7	.6389+03	.8014+03	-1.8
013000	006	224	3.5	.6365+03	.7990+03	-2.0
013100	006	185	3.3	.6341+03	.7965+03	-2.3
013200	007	205	3.2	.6317+03	.7941+03	-2.5
013300	005	171	3.0	.6294+03	.7916+03	-2.8
013400	006	181	2.8	.6270+03	.7892+03	-3.0
013500	005	202	2.7	.6247+03	.7867+03	-3.3
013600	005	202	2.5	.6223+03	.7843+03	-3.6
013700	006	219	2.3	.6200+03	.7819+03	-3.8
013800	003	224	2.1	.6177+03	.7795+03	-4.1
013900	004	203	2.0	.6154+03	.7771+03	-4.3
014000	005	232	1.8	.6130+03	.7747+03	-4.6
014100	002	265	1.7	.6107+03	.7721+03	-4.7
014200	002	255	1.5	.6084+03	.7696+03	-4.8
014300	005	298	1.4	.6061+03	.7671+03	-4.9
014400	006	346	1.2	.6039+03	.7646+03	-5.0
014500	006	327	1.1	.6016+03	.7622+03	-5.1
014600	003	324	1.0	.5993+03	.7597+03	-5.3
014700	006	356	.8	.5971+03	.7572+03	-5.4
014800	005	005	.7	.5948+03	.7548+03	-5.5
014900	005	015	.5	.5926+03	.7523+03	-5.6

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM [illegible])	DEW POINT (DEG C)
015000	005	026	.4	.550[illegible]+03	.7499+03	-5.7
015100	005	038	.3	.5881+03	.7474+03	-5.7
015200	005	050	.1	.5859+03	.7450+03	-5.8
015300	004	050	.0	.5837+03	.7425+03	-5.8
015400	005	032	-.2	.5814+03	.7401+03	-5.8
015500	006	062	-.3	.5792+03	.7377+03	-5.8
015600	007	069	-.4	.5771+03	.7352+03	-5.9
015700	006	064	-.6	.5749+03	.7328+03	-5.9
015800	006	092	-.7	.5727+03	.7304+03	-5.9
015900	005	072	-.9	.5705+03	.7280+03	-6.0
016000	006	102	-1.0	.5684+03	.7257+03	-6.0
016100	003	077	-1.1	.5662+03	.7233+03	-6.3
016200	005	080	-1.3	.5641+03	.7209+03	-6.7
016300	003	108	-1.4	.5619+03	.7186+03	-7.0
016400	003	110	-1.5	.5598+03	.7162+03	-7.4
016500	004	112	-1.6	.5576+03	.7139+03	-7.8
016600	004	113	-1.8	.5555+03	.7115+03	-8.1
016700	005	114	-1.9	.5534+03	.7092+03	-8.4
016800	005	115	-2.0	.5513+03	.7069+03	-8.8
016900	005	089	-2.2	.5492+03	.7046+03	-9.1
017000	006	106	-2.3	.5471+03	.7022+03	-9.5
017100	004	109	-2.5	.5450+03	.7001+03	-9.9
017200	007	104	-2.7	.5429+03	.6979+03	-10.2
017300	007	120	-2.8	.5408+03	.6957+03	-10.6
017400	007	106	-3.0	.5388+03	.6935+03	-10.9
017500	008	120	-3.2	.5367+03	.6914+03	-11.3
017600	006	123	-3.4	.5347+03	.6892+03	-11.7
017700	009	112	-3.6	.5326+03	.6871+03	-12.0
017800	009	123	-3.7	.5306+03	.6849+03	-12.4
017900	009	116	-3.9	.5285+03	.6828+03	-12.7
018000	011	129	-4.1	.5265+03	.6806+03	-13.1
018100	009	142	-4.3	.5245+03	.6786+03	-13.1
018200	009	135	-4.6	.5225+03	.6766+03	-13.1
018300	010	142	-4.8	.5204+03	.6745+03	-13.1
018400	008	152	-5.0	.5184+03	.6725+03	-13.1
018500	011	159	-5.2	.5164+03	.6705+03	-13.1
018600	009	185	-5.5	.5144+03	.6684+03	-13.2
018700	009	166	-5.7	.5125+03	.6664+03	-13.2
018800	009	174	-5.9	.5105+03	.6644+03	-13.2
018900	008	173	-6.2	.5085+03	.6624+03	-13.2
019000	010	166	-6.4	.5066+03	.6604+03	-13.2
019100	010	187	-6.5	.5046+03	.6581+03	-12.8
019200	011	185	-6.6	.5026+03	.6557+03	-12.4
019300	012	198	-6.7	.5007+03	.6534+03	-11.9
019400	011	208	-6.8	.4987+03	.6511+03	-11.5
019500	010	189	-6.9	.4968+03	.6487+03	-11.1
019600	007	196	-7.0	.4949+03	.6464+03	-10.7
019700	007	155	-7.1	.4929+03	.6441+03	-10.3
019800	007	167	-7.2	.4910+03	.6418+03	-9.8
019900	004	187	-7.3	.4891+03	.6395+03	-9.4

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
020000	005	149	-7.4	.4872+03	.6372+03	-9.0
020100	005	189	-7.6	.4853+03	.6351+03	-9.1
020200	002	168	-7.7	.4834+03	.6330+03	-9.3
020300	004	137	-7.9	.4816+03	.6310+03	-9.4
020400	002	166	-8.1	.4797+03	.6289+03	-9.5
020500	002	288	-8.2	.4778+03	.6269+03	-9.6
020600	000	245	-8.4	.4759+03	.6249+03	-9.8
020700	001	203	-8.6	.4741+03	.6228+03	-9.9
020800	001	336	-8.8	.4722+03	.6208+03	-10.0
020900	001	102	-8.9	.4704+03	.6188+03	-10.2
021000	002	224	-9.1	.4686+03	.6168+03	-10.3
021100	002	293	-9.3	.4667+03	.6148+03	-10.5
021200	000	116	-9.4	.4649+03	.6127+03	-10.7
021300	002	238	-9.6	.4631+03	.6107+03	-10.9
021400	002	242	-9.7	.4613+03	.6087+03	-11.1
021500	001	182	-9.9	.4595+03	.6067+03	-11.3
021600	002	281	-10.1	.4576+03	.6047+03	-11.6
021700	001	186	-10.2	.4559+03	.6027+03	-11.8
021800	004	211	-10.4	.4541+03	.6008+03	-12.0
021900	003	226	-10.5	.4523+03	.5988+03	-12.2
022000	002	209	-10.7	.4505+03	.5968+03	-12.4
022100	004	281	-10.9	.4487+03	.5949+03	-12.6
022200	002	219	-11.1	.4470+03	.5931+03	-12.9
022300	004	247	-11.3	.4452+03	.5912+03	-13.1
022400	004	263	-11.5	.4434+03	.5894+03	-13.3
022500	003	276	-11.7	.4417+03	.5875+03	-13.5
022600	006	297	-12.0	.4399+03	.5857+03	-13.8
022700	003	301	-12.2	.4382+03	.5839+03	-14.0
022800	008	292	-12.4	.4365+03	.5821+03	-14.2
022900	008	310	-12.6	.4347+03	.5802+03	-14.5
023000	006	298	-12.8	.4330+03	.5784+03	-14.7
023100	010	291	-13.0	.4313+03	.5766+03	-14.9
023200	010	297	-13.2	.4296+03	.5748+03	-15.2
023300	012	301	-13.5	.4279+03	.5730+03	-15.4
023400	012	301	-13.7	.4262+03	.5712+03	-15.6
023500	011	300	-13.9	.4245+03	.5695+03	-15.8
023600	013	305	-14.1	.4228+03	.5677+03	-16.1
023700	012	303	-14.3	.4211+03	.5659+03	-16.3
023800	010	305	-14.6	.4194+03	.5642+03	-16.5
023900	010	293	-14.8	.4177+03	.5624+03	-16.8
024000	010	304	-15.0	.4161+03	.5607+03	-17.0
024100	010	299	-15.2	.4144+03	.5588+03	-17.2
024200	013	300	-15.4	.4127+03	.5570+03	-17.4
024300	012	299	-15.6	.4111+03	.5552+03	-17.6
024400	013	307	-15.8	.4094+03	.5534+03	-17.8
024500	015	296	-15.9	.4078+03	.5516+03	-17.9
024600	015	301	-16.1	.4061+03	.5498+03	-18.1
024700	014	294	-16.3	.4045+03	.5480+03	-18.3
024800	012	297	-16.5	.4029+03	.5462+03	-18.5
024900	012	294	-16.7	.4013+03	.5444+03	-18.7

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TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
025000	012	296	-16.9	.3996+03	.5426+03	-18.9
025100	011	292	-17.1	.3980+03	.5408+03	-19.1
025200	011	293	-17.2	.3964+03	.5390+03	-19.3
025300	012	295	-17.4	.3948+03	.5372+03	-19.5
025400	011	294	-17.6	.3932+03	.5353+03	-19.7
025500	011	293	-17.7	.3916+03	.5335+03	-19.9
025600	013	297	-17.9	.3901+03	.5317+03	-20.1
025700	013	291	-18.1	.3885+03	.5300+03	-20.3
025800	013	305	-18.3	.3869+03	.5282+03	-20.5
025900	012	298	-18.4	.3853+03	.5264+03	-20.7
026000	014	301	-18.6	.3838+03	.5246+03	-20.9
026100	012	294	-18.8	.3822+03	.5230+03	-21.2
026200	013	301	-19.1	.3807+03	.5214+03	-21.6
026300	013	293	-19.3	.3791+03	.5197+03	-21.9
026400	014	302	-19.6	.3776+03	.5181+03	-22.2
026500	011	298	-19.8	.3760+03	.5165+03	-22.5
026600	013	293	-20.0	.3745+03	.5149+03	-22.9
026700	010	293	-20.3	.3730+03	.5133+03	-23.2
026800	011	289	-20.5	.3714+03	.5117+03	-23.5
026900	010	292	-20.8	.3699+03	.5101+03	-23.9
027000	009	281	-21.0	.3684+03	.5085+03	-24.2
027100	010	282	-21.2	.3669+03	.5069+03	-24.4
027200	008	276	-21.5	.3654+03	.5053+03	-24.7
027300	011	274	-21.7	.3639+03	.5037+03	-24.9
027400	010	291	-21.9	.3624+03	.5021+03	-25.1
027500	011	276	-22.1	.3609+03	.5005+03	-25.3
027600	010	276	-22.4	.3594+03	.4989+03	-25.6
027700	010	285	-22.6	.3579+03	.4973+03	-25.8
027800	009	286	-22.8	.3564+03	.4957+03	-26.0
027900	012	291	-23.1	.3550+03	.4941+03	-26.3
028000	010	288	-23.3	.3535+03	.4925+03	-26.5
028100	012	290	-23.5	.3521+03	.4910+03	-26.8
028200	012	284	-23.8	.3506+03	.4894+03	-27.0
028300	015	291	-24.0	.3491+03	.4878+03	-27.3
028400	010	292	-24.2	.3477+03	.4862+03	-27.5
028500	014	288	-24.4	.3462+03	.4847+03	-27.8
028600	014	291	-24.7	.3448+03	.4831+03	-28.0
028700	013	288	-24.9	.3434+03	.4815+03	-28.3
028800	014	292	-25.1	.3419+03	.4800+03	-28.5
028900	014	291	-25.4	.3405+03	.4784+03	-28.8
029000	016	292	-25.6	.3391+03	.4769+03	-29.0
029100	014	302	-25.8	.3377+03	.4754+03	-29.3
029200	015	298	-26.1	.3363+03	.4738+03	-29.6
029300	014	302	-26.3	.3349+03	.4723+03	-29.9
029400	016	294	-26.5	.3334+03	.4707+03	-30.2
029500	017	302	-26.7	.3320+03	.4692+03	-30.4
029600	016	300	-27.0	.3307+03	.4677+03	-30.7
029700	016	308	-27.2	.3293+03	.4662+03	-31.0
029800	013	316	-27.4	.3279+03	.4646+03	-31.3
029900	016	306	-27.7	.3265+03	.4631+03	-31.6

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
030000	014	316	-27.9	.3251+03	.4616+03	-31.9
030100	013	312	-28.1	.3238+03	.4601+03	-32.2
030200	015	309	-28.4	.3224+03	.4586+03	-32.5
030300	012	303	-28.6	.3210+03	.4571+03	-32.7
030400	009	304	-28.9	.3197+03	.4557+03	-33.0
030500	009	293	-29.1	.3183+03	.4542+03	-33.3
030600	010	277	-29.3	.3170+03	.4527+03	-33.6
030700	011	289	-29.6	.3156+03	.4512+03	-33.9
030800	009	280	-29.8	.3143+03	.4498+03	-34.1
030900	007	286	-30.1	.3130+03	.4483+03	-34.4
031000	009	280	-30.3	.3116+03	.4469+03	-34.7
031100	008	270	-30.5	.3103+03	.4454+03	-34.9
031200	007	271	-30.8	.3090+03	.4439+03	-35.1
031300	007	275	-31.0	.3077+03	.4425+03	-35.4
031400	008	269	-31.3	.3063+03	.4410+03	-35.6
031500	005	266	-31.5	.3050+03	.4396+03	-35.8
031600	005	287	-31.7	.3037+03	.4381+03	-36.0
031700	004	260	-32.0	.3024+03	.4367+03	-36.2
031800	004	266	-32.2	.3011+03	.4353+03	-36.5
031900	003	275	-32.5	.2998+03	.4338+03	-36.7
032000	006	272	-32.7	.2986+03	.4324+03	-36.9
032100	004	278	-33.0	.2973+03	.4310+03	-37.2
032200	006	266	-33.2	.2960+03	.4297+03	-37.5
032300	004	298	-33.5	.2947+03	.4283+03	-37.7
032400	003	283	-33.8	.2934+03	.4269+03	-38.0
032500	003	274	-34.0	.2922+03	.4256+03	-38.3
032600	002	261	-34.3	.2909+03	.4242+03	-38.6
032700	003	273	-34.6	.2896+03	.4228+03	-38.9
032800	002	262	-34.9	.2884+03	.4215+03	-39.1
032900	002	302	-35.1	.2871+03	.4202+03	-39.4
033000	002	028	-35.4	.2859+03	.4188+03	-39.7
033100	003	033	-35.6	.2847+03	.4174+03	-40.0
033200	005	054	-35.9	.2834+03	.4160+03	-40.2
033300	004	063	-36.1	.2822+03	.4146+03	-40.5
033400	007	054	-36.3	.2809+03	.4132+03	-40.8
033500	007	063	-36.5	.2797+03	.4117+03	-41.0
033600	007	063	-36.8	.2785+03	.4103+03	-41.3
033700	006	070	-37.0	.2773+03	.4090+03	-41.6
033800	006	065	-37.2	.2761+03	.4076+03	-41.9
033900	007	077	-37.5	.2749+03	.4062+03	-42.1
034000	008	066	-37.7	.2736+03	.4048+03	-42.4
034100	008	072	-37.9	.2724+03	.4034+03	-42.8
034200	008	071	-38.1	.2712+03	.4020+03	-43.2
034300	007	076	-38.4	.2700+03	.4006+03	-43.6
034400	006	077	-38.6	.2689+03	.3992+03	-44.0
034500	008	087	-38.8	.2677+03	.3978+03	-44.4
034600	007	090	-39.0	.2665+03	.3965+03	-44.8
034700	008	093	-39.2	.2653+03	.3951+03	-45.2
034800	009	097	-39.5	.2641+03	.3937+03	-45.6
034900	006	105	-39.7	.2630+03	.3923+03	-46.0

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
035000	008	109	-39.9	.2618+03	.3910+03	-46.4
035100	007	111	-40.1	.2607+03	.3896+03	-46.7
035200	009	120	-40.4	.2595+03	.3883+03	-47.0
035300	005	123	-40.6	.2583+03	.3869+03	-47.3
035400	007	127	-40.8	.2572+03	.3856+03	-47.6
035500	003	161	-41.0	.2560+03	.3843+03	-47.9
035600	003	104	-41.3	.2549+03	.3829+03	-48.2
035700	000	068	-41.5	.2538+03	.3816+03	-48.5
035800	002	005	-41.7	.2526+03	.3803+03	-48.8
035900	002	072	-42.0	.2515+03	.3790+03	-49.1
036000	004	330	-42.2	.2504+03	.3777+03	-49.4
036100	003	026	-42.5	.2493+03	.3765+03	-49.6
036200	004	053	-42.8	.2481+03	.3753+03	-49.8
036300	004	022	-43.1	.2470+03	.3740+03	-50.1
036400	005	352	-43.4	.2459+03	.3729+03	-50.3
036500	006	357	-43.7	.2448+03	.3717+03	-50.5
036600	008	343	-44.0	.2437+03	.3705+03	-50.7
036700	010	000	-44.3	.2426+03	.3693+03	-50.9
036800	012	001	-44.6	.2415+03	.3681+03	-51.2
036900	013	010	-44.9	.2404+03	.3669+03	-51.4
037000	013	010	-45.2	.2393+03	.3658+03	-51.6
037100	013	007	-45.4	.2383+03	.3645+03	-51.8
037200	017	355	-45.7	.2372+03	.3632+03	-52.1
037300	016	003	-45.9	.2361+03	.3620+03	-52.3
037400	014	359	-46.2	.2350+03	.3607+03	-52.6
037500	016	009	-46.4	.2339+03	.3595+03	-52.8
037600	018	004	-46.7	.2329+03	.3582+03	-53.1
037700	016	359	-46.9	.2318+03	.3570+03	-53.3
037800	018	006	-47.2	.2308+03	.3558+03	-53.6
037900	018	013	-47.4	.2297+03	.3545+03	-53.8
038000	018	011	-47.7	.2287+03	.3533+03	-54.1
038100	018	006	-47.9	.2276+03	.3520+03	-54.3
038200	022	006	-48.1	.2266+03	.3507+03	-54.5
038300	025	004	-48.3	.2255+03	.3494+03	-54.8
038400	027	002	-48.5	.2245+03	.3481+03	-55.0
038500	026	003	-48.7	.2235+03	.3468+03	-55.2
038600	028	001	-48.9	.2224+03	.3455+03	-55.4
038700	026	002	-49.1	.2214+03	.3442+03	-55.6
038800	026	000	-49.3	.2204+03	.3429+03	-55.9
038900	025	356	-49.5	.2194+03	.3417+03	-56.1
039000	025	356	-49.7	.2184+03	.3404+03	-56.3
039100	024	356	-50.0	.2173+03	.3393+03	-56.6
039200	024	352	-50.3	.2163+03	.3381+03	-56.9
039300	024	357	-50.6	.2153+03	.3370+03	-57.2
039400	027	352	-50.9	.2143+03	.3359+03	-57.5
039500	027	357	-51.1	.2133+03	.3347+03	-57.8
039600	029	355	-51.4	.2123+03	.3336+03	-58.1
039700	029	359	-51.7	.2114+03	.3325+03	-58.4
039800	029	356	-52.0	.2104+03	.3314+03	-58.7
039900	029	358	-52.3	.2094+03	.3303+03	-59.0

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
040000	028	002	-52.6	.2084+03	.3292+03	-59.3
040100	027	002	-52.9	.2074+03	.3280+03	-59.5
040200	028	012	-53.1	.2065+03	.3269+03	-59.8
040300	029	008	-53.4	.2055+03	.3258+03	-60.0
040400	027	010	-53.7	.2045+03	.3246+03	-60.2
040500	027	014	-53.9	.2036+03	.3235+03	-60.4
040600	027	016	-54.2	.2026+03	.3224+03	-60.7
040700	026	009	-54.5	.2016+03	.3213+03	-60.9
040800	021	013	-54.8	.2007+03	.3201+03	-61.1
040900	023	011	-55.0	.1998+03	.3190+03	-61.4
041000	023	009	-55.3	.1988+03	.3179+03	-61.6
041100	020	359	-55.5	.1979+03	.3167+03	-61.8
041200	019	358	-55.7	.1969+03	.3155+03	-62.0
041300	018	356	-55.9	.1960+03	.3143+03	-62.3
041400	019	351	-56.1	.1950+03	.3130+03	-62.5
041500	021	003	-56.3	.1941+03	.3118+03	-62.7
041600	017	007	-56.5	.1932+03	.3106+03	-62.9
041700	020	354	-56.7	.1923+03	.3095+03	-63.1
041800	021	356	-56.9	.1914+03	.3083+03	-63.4
041900	019	354	-57.1	.1904+03	.3071+03	-63.6
042000	018	341	-57.3	.1895+03	.3059+03	-63.8
042100	022	337	-57.5	.1886+03	.3047+03	-64.0
042200	022	334	-57.6	.1877+03	.3034+03	-64.1
042300	025	327	-57.8	.1868+03	.3022+03	-64.3
042400	025	335	-58.0	.1859+03	.3010+03	-64.5
042500	022	332	-58.1	.1850+03	.2998+03	-64.6
042600	023	339	-58.3	.1841+03	.2986+03	-64.8
042700	022	346	-58.5	.1833+03	.2974+03	-65.0
042800	024	344	-58.7	.1824+03	.2962+03	-65.2
042900	024	343	-58.8	.1815+03	.2950+03	-65.3
043000	026	340	-59.0	.1806+03	.2939+03	-65.5
043100	023	338	-59.2	.1798+03	.2928+03	-9999.
043200	023	335	-59.5	.1789+0	.2917+03	-9999.
043300	022	335	-59.7	.1780+03	.2906+03	-9999.
043400	020	337	-60.0	.1772+03	.2895+03	-9999.
043500	020	338	-60.2	.1763+03	.2884+03	-9999.
043600	023	336	-60.4	.1754+03	.2873+03	-9999.
043700	023	336	-60.7	.1746+03	.2863+03	-9999.
043800	026	337	-60.9	.1738+03	.2852+03	-9999.
043900	026	340	-61.2	.1729+03	.2841+03	-9999.
044000	026	336	-61.4	.1721+03	.2831+03	-9999.
044100	028	336	-61.6	.1712+03	.2820+03	-9999.
044200	029	340	-61.8	.1704+03	.2808+03	-9999.
044300	028	340	-62.0	.1696+03	.2797+03	-9999.
044400	028	339	-62.2	.1687+03	.2786+03	-9999.
044500	027	341	-62.3	.1679+03	.2775+03	-9999.
044600	029	347	-62.5	.1671+03	.2764+03	-9999.
044700	029	352	-62.7	.1663+03	.2753+03	-9999.
044800	027	347	-62.9	.1654+03	.2742+03	-9999.
044900	028	343	-63.1	.1646+03	.2731+03	-9999.

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
045000	029	346	-63.3	.1638+03	.2720+03	-9999.
045100	030	349	-63.5	.1630+03	.2709+03	-9999.
045200	026	350	-63.7	.1622+03	.2698+03	-9999.
045300	024	348	-63.9	.1614+03	.2687+03	-9999.
045400	025	346	-64.1	.1606+03	.2676+03	-9999.
045500	026	344	-64.2	.1598+03	.2665+03	-9999.
045600	023	344	-64.4	.1590+03	.2654+03	-9999.
045700	022	342	-64.6	.1582+03	.2644+03	-9999.
045800	021	346	-64.8	.1575+03	.2633+03	-9999.
045900	018	359	-65.0	.1567+03	.2622+03	-9999.
046000	018	352	-65.2	.1559+03	.2612+03	-9999.
046100	019	358	-65.4	.1551+03	.2602+03	-9999.
046200	019	007	-65.7	.1544+03	.2592+03	-9999.
046300	020	003	-65.9	.1536+03	.2582+03	-9999.
046400	019	358	-66.1	.1528+03	.2572+03	-9999.
046500	017	003	-66.3	.1521+03	.2562+03	-9999.
046600	016	007	-66.6	.1513+03	.2552+03	-9999.
046700	014	014	-66.8	.1506+03	.2542+03	-9999.
046800	013	023	-67.0	.1498+03	.2532+03	-9999.
046900	012	033	-67.3	.1491+03	.2522+03	-9999.
047000	012	045	-67.5	.1483+03	.2512+03	-9999.
047100	011	041	-67.7	.1476+03	.2502+03	-9999.
047200	010	013	-67.9	.1468+03	.2492+03	-9999.
047300	012	014	-68.1	.1461+03	.2482+03	-9999.
047400	012	034	-68.3	.1453+03	.2472+03	-9999.
047500	012	046	-68.5	.1446+03	.2462+03	-9999.
047600	013	032	-68.7	.1439+03	.2452+03	-9999.
047700	011	041	-68.9	.1431+03	.2442+03	-9999.
047800	016	066	-69.1	.1424+03	.2432+03	-9999.
047900	018	070	-69.3	.1417+03	.2422+03	-9999.
048000	017	062	-69.5	.1410+03	.2412+03	-9999.
048100	018	062	-69.6	.1403+03	.2401+03	-9999.
048200	017	060	-69.7	.1396+03	.2390+03	-9999.
048300	016	050	-69.8	.1389+03	.2379+03	-9999.
048400	015	046	-69.9	.1382+03	.2368+03	-9999.
048500	013	038	-70.0	.1375+03	.2357+03	-9999.
048600	013	043	-70.1	.1368+03	.2346+03	-9999.
048700	012	059	-70.2	.1361+03	.2335+03	-9999.
048800	011	078	-70.3	.1354+03	.2325+03	-9999.
048900	010	094	-70.4	.1347+03	.2314+03	-9999.
049000	008	112	-70.5	.1340+03	.2304+03	-9999.
049100	010	128	-70.6	.1333+03	.2293+03	-9999.
049200	013	125	-70.6	.1326+03	.2282+03	-9999.
049300	011	129	-70.7	.1320+03	.2271+03	-9999.
049400	009	117	-70.8	.1313+03	.2260+03	-9999.
049500	006	118	-70.8	.1306+03	.2249+03	-9999.
049600	008	110	-70.9	.1299+03	.2238+03	-9999.
049700	010	108	-71.0	.1293+03	.2228+03	-9999.
049800	009	103	-71.1	.1286+03	.2217+03	-9999.
049900	011	095	-71.1	.1280+03	.2207+03	-9999.

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
050000	012	085	-71.2	.1273+03	.2196+03	-9999.
050100	014	069	-71.2	.1267+03	.2184+03	-9999.
050200	015	076	-71.1	.1260+03	.2173+03	-9999.
050300	019	081	-71.1	.1254+03	.2161+03	-9999.
050400	016	091	-71.0	.1247+03	.2150+03	-9999.
050500	015	095	-71.0	.1241+03	.2139+03	-9999.
050600	018	094	-71.0	.1235+03	.2127+03	-9999.
050700	023	087	-70.9	.1228+03	.2116+03	-9999.
050800	025	085	-70.9	.1222+03	.2105+03	-9999.
050900	027	086	-70.8	.1216+03	.2094+03	-9999.
051000	023	096	-70.8	.1210+03	.2082+03	-9999.
051100	023	092	-70.8	.1203+03	.2072+03	-9999.
051200	018	094	-70.9	.1197+03	.2062+03	-9999.
051300	019	091	-70.9	.1191+03	.2052+03	-9999.
051400	007	058	-71.0	.1185+03	.2042+03	-9999.
051500	010	080	-71.0	.1179+03	.2032+03	-9999.
051600	008	085	-71.1	.1173+03	.2022+03	-9999.
051700	005	026	-71.1	.1167+03	.2013+03	-9999.
051800	008	019	-71.2	.1161+03	.2003+03	-9999.
051900	008	036	-71.2	.1155+03	.1993+03	-9999.
052000	008	038	-71.3	.1149+03	.1983+03	-9999.
052100	008	030	-71.1	.1143+03	.1972+03	-9999.
052200	010	007	-71.0	.1138+03	.1960+03	-9999.
052300	016	355	-70.8	.1132+03	.1948+03	-9999.
052400	017	353	-70.6	.1126+03	.1937+03	-9999.
052500	012	359	-70.4	.1120+03	.1925+03	-9999.
052600	013	002	-70.3	.1115+03	.1914+03	-9999.
052700	016	002	-70.1	.1109+03	.1903+03	-9999.
052800	018	014	-69.9	.1103+03	.1891+03	-9999.
052900	018	032	-69.8	.1098+03	.1880+03	-9999.
053000	021	033	-69.6	.1092+03	.1869+03	-9999.
053100	024	031	-69.6	.1086+03	.1859+03	-9999.
053200	021	028	-69.5	.1081+03	.1849+03	-9999.
053300	024	009	-69.4	.1076+03	.1839+03	-9999.
053400	026	018	-69.4	.1070+03	.1830+03	-9999.
053500	025	014	-69.3	.1065+03	.1820+03	-9999.
053600	029	018	-69.3	.1059+03	.1810+03	-9999.
053700	028	021	-69.3	.1054+03	.1801+03	-9999.
053800	029	023	-69.2	.1049+03	.1791+03	-9999.
053900	028	026	-69.1	.1043+03	.1782+03	-9999.
054000	027	032	-69.1	.1038+03	.1772+03	-9999.
054100	026	034	-69.1	.1033+03	.1763+03	-9999.
054200	022	041	-69.0	.1028+03	.1754+03	-9999.
054300	020	042	-69.0	.1022+03	.1745+03	-9999.
054400	018	031	-69.0	.1017+03	.1736+03	-9999.
054500	021	012	-68.9	.1012+03	.1727+03	-9999.
054600	021	013	-68.9	.1007+03	.1718+03	-9999.
054700	020	021	-68.9	.1002+03	.1709+03	-9999.
054800	021	018	-68.9	.9968+02	.1700+03	-9999.
054900	021	023	-68.8	.9918+02	.1691+03	-9999.

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
055000	022	018	-68.8	.9868+02	.1682+03	-9999.
055100	021	033	-68.8	.9818+02	.1674+03	-9999.
055200	019	046	-68.8	.9769+02	.1665+03	-9999.
055300	021	054	-68.8	.9720+02	.1657+03	-9999.
055400	022	070	-68.8	.9671+02	.1649+03	-9999.
055500	018	062	-68.8	.9622+02	.1640+03	-9999.
055600	020	078	-68.8	.9573+02	.1632+03	-9999.
055700	023	089	-68.8	.9525+02	.1624+03	-9999.
055800	025	091	-68.8	.9477+02	.1616+03	-9999.
055900	016	098	-68.8	.9430+02	.1608+03	-9999.
056000	018	109	-68.8	.9382+02	.1599+03	-9999.
057000	022	096	-70.4	.8917+02	.1532+03	-9999.
058000	023	080	-69.9	.8474+02	.1452+03	-9999.
059000	015	056	-69.2	.8054+02	.1376+03	-9999.
060000	020	068	-67.1	.7657+02	.1295+03	-9999.
061000	017	120	-64.8	.7285+02	.1218+03	-9999.
062000	012	157	-64.5	.6933+02	.1158+03	-9999.
063000	010	074	-65.2	.6597+02	.1105+03	-9999.
064000	024	083	-64.1	.6278+02	.1046+03	-9999.
065000	031	085	-63.2	.5976+02	.9916+02	-9999.
066000	035	080	-61.5	.5691+02	.9367+02	-9999.
067000	036	063	-59.5	.5421+02	.8839+02	-9999.
068000	043	054	-59.6	.5165+02	.8426+02	-9999.
069000	050	062	-59.2	.4921+02	.8013+02	-9999.
070000	052	076	-59.9	.4689+02	.7660+02	-9999.
071000	056	077	-58.3	.4468+02	.7245+02	-9999.
072000	054	085	-57.9	.4259+02	.6893+02	-9999.
073000	050	086	-57.8	.4060+02	.6568+02	-9999.
074000	045	087	-57.4	.3870+02	.6249+02	-9999.
075000	045	086	-56.5	.3689+02	.5932+02	-9999.
076000	045	086	-55.1	.3519+02	.5622+02	-9999.
077000	049	085	-54.9	.3356+02	.5357+02	-9999.
078000	057	091	-53.9	.3201+02	.5086+02	-9999.
079000	064	100	-53.3	.3055+02	.4841+02	-9999.
080000	064	105	-52.3	.2915+02	.4598+02	-9999.
081000	061	106	-51.5	.2782+02	.4372+02	-9999.
082000	061	109	-50.3	.2667+02	.4169+02	-9999.
083000	059	109	-49.0	.2565+02	.3986+02	-9999.
084000	060	108	-47.6	.2459+02	.3798+02	-9999.
085000	060	107	-46.7	.2349+02	.3614+02	-9999.
086000	059	103	-45.3	.2245+02	.3432+02	-9999.
087000	055	098	-44.1	.2146+02	.3264+02	-9999.
088000	054	092	-43.4	.2052+02	.3111+02	-9999.
089000	054	089	-42.9	.1960+02	.2959+02	-9999.
090000	054	087	-42.5	.1871+02	.2833+02	-9999.
091000	054	085	-42.0	.1784+02	.2709+02	-9999.
092000	052	086	-41.6	.1701+02	.2582+02	-9999.
093000	052	088	-41.1	.1642+02	.2464+02	-9999.
094000	052	088	-40.6	.1570+02	.2352+02	-9999.
095000	052	087	-40.0	.1502+02	.2245+02	-9999.

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
096000	054	084	-39.5	.1438+02	.2143+02	-9999.
097000	055	081	-39.1	.1376+02	.2047+02	-9999.
098000	059	079	-38.8	.1317+02	.1957+02	-9999.
099000	060	077	-38.8	.1260+02	.1873+02	-9999.
100000	062	076	-39.0	.1206+02	.1794+02	-9999.
101000	064	076	-39.4	.1154+02	.1720+02	-9999.
102000	065	076	-39.8	.1104+02	.1649+02	-9999.
103000	069	076	-40.2	.1056+02	.1580+02	-9999.
104000	072	077	-40.5	.1011+02	.1513+02	-9999.
105000	076	080	-40.4	.9671+01	.1448+02	-9999.
106000	077	084	-39.6	.9254+01	.1380+02	-9999.
107000	081	087	-38.3	.8856+01	.1314+02	-9999.
108000	084	090	-36.6	.8479+01	.1249+02	-9999.
109000	087	092	-34.9	.8119+01	.1187+02	-9999.
110000	092	096	-33.2	.7777+01	.1129+02	-9999.
111000	096	100	-31.6	.7451+01	.1074+02	-9999.
112000	101	105	-30.0	.7142+01	.1023+02	-9999.
113000	106	110	-29.6	.6847+01	.9792+01	-9999.
114000	106	114	-29.9	.6563+01	.9399+01	-9999.
115000	104	114	-30.1	.6292+01	.9019+01	-9999.
116000	101	111	-29.5	.6032+01	.8623+01	-9999.
117000	099	108	-28.5	.5783+01	.8233+01	-9999.
118000	092	105	-27.5	.5546+01	.7864+01	-9999.
119000	084	101	-26.5	.5319+01	.7513+01	-9999.
120000	077	095	-25.6	.5103+01	.7181+01	-9999.
121000	072	091	-25.0	.4895+01	.6872+01	-9999.
122000	065	086	-24.8	.4697+01	.6587+01	-9999.
123000	060	080	-24.7	.4507+01	.6319+01	-9999.
124000	057	074	-24.8	.4324+01	.6067+01	-9999.
125000	057	070	-25.0	.4149+01	.5824+01	-9999.
126000	059	067	-25.1	.3981+01	.5591+01	-9999.
127000	064	066	-25.3	.3819+01	.5368+01	-9999.
128000	069	066	-25.2	.3664+01	.5148+01	-9999.
129000	074	069	-24.6	.3516+01	.4927+01	-9999.
130000	079	071	-23.4	.3374+01	.4707+01	-9999.
131000	084	074	-21.8	.3239+01	.4489+01	-9999.
132000	091	076	-20.1	.3110+01	.4280+01	-9999.
133000	096	078	-18.3	.2986+01	.4082+01	-9999.
134000	101	081	-17.1	.2869+01	.3948+01	-9999.
135000	104	084	-16.1	.2756+01	.3736+01	-9999.
136000	104	086	-14.9	.2648+01	.3573+01	-9999.
137000	104	088	-13.7	.2546+01	.3418+01	-9999.
138000	104	089	-11.9	.2448+01	.3264+01	-9999.
139000	103	090	-10.0	.2354+01	.3116+01	-9999.
140000	101	091	-8.5	.2264+01	.2980+01	-9999.
141000	099	092	-7.2	.2178+01	.2853+01	-9999.
142000	097	093	-6.0	.2096+01	.2733+01	-9999.
143000	094	092	-5.0	.2017+01	.2621+01	-9999.
144000	094	089	-4.2	.1942+01	.2514+01	-9999.
145000	103	084	-3.4	.1869+01	.2413+01	-9999.

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
146000	111	083	-2.6	.1800+01	.2317+01	-9999.
147000	113	081	-1.9	.1733+01	.2225+01	-9999.
148000	108	076	-2.3	.1669+01	.2146+01	-9999.
149000	103	069	-3.3	.1606+01	.2074+01	-9999.
150000	104	063	-4.3	.1546+01	.2004+01	-9999.
151000	111	063	-5.4	.1488+01	.1937+01	-9999.
152000	116	065	-6.4	.1433+01	.1871+01	-9999.
153000	114	069	-7.5	.1378+01	.1808+01	-9999.
154000	111	071	-8.6	.1326+01	.1746+01	-9999.
155000	103	070	-9.6	.1276+01	.1686+01	-9999.
156000	099	067	-10.6	.1227+01	.1628+01	-9999.
157000	106	067	-10.8	.1180+01	.1567+01	-9999.
158000	114	068	-9.8	.1135+01	.1502+01	-9999.
159000	121	071	-8.9	.1092+01	.1439+01	-9999.
160000	126	074	-9.0	.1051+01	.1386+01	-9999.
161000	126	074	-9.9	.1010+01	.1337+01	-9999.
162000	128	074	-10.7	.9719+00	.1290+01	-9999.
163000	133	074	-11.7	.9347+00	.1245+01	-9999.
164000	140	075	-12.1	.8988+00	.1200+01	-9999.
165000	150	080	-11.7	.8643+00	.1152+01	-9999.
166000	157	085	-11.5	.8311+00	.1107+01	-9999.
167000	157	089	-12.1	.7992+00	.1066+01	-9999.
168000	150	091	-12.6	.7685+00	.1027+01	-9999.
169000	143	091	-13.3	.7389+00	.9908+00	-9999.
170000	136	090	-14.1	.7103+00	.9552+00	-9999.
171000	126	087	-14.1	.6828+00	.9180+00	-9999.
172000	116	082	-12.7	.6565+00	.8780+00	-9999.
173000	111	077	-10.9	.6313+00	.8384+00	-9999.
174000	111	075	-9.9	.6072+00	.8035+00	-9999.
175000	114	073	-10.4	.5841+00	.7744+00	-9999.
176000	119	074	-11.5	.5617+00	.7478+00	-9999.
177000	124	078	-12.8	.5402+00	.7228+00	-9999.
178000	133	083	-14.2	.5193+00	.6986+00	-9999.
179000	140	087	-15.5	.4992+00	.6749+00	-9999.
180000	152	090	-16.4	.4798+00	.6509+00	-9999.
181000	160	091	-16.3	.4611+00	.6255+00	-9999.
182000	167	091	-16.2	.4431+00	.6006+00	-9999.
183000	173	091	-16.0	.4258+00	.5768+00	-9999.
184000	179	092	-17.1	.4092+00	.5566+00	-9999.
185000	180	092	-18.4	.3932+00	.5376+00	-9999.
186000	179	093	-19.8	.3777+00	.5194+00	-9999.
187000	175	095	-21.3	.3627+00	.5017+00	-9999.
188000	168	099	-22.9	.3483+00	.4848+00	-9999.
189000	158	105	-24.5	.3343+00	.4683+00	-9999.
190000	150	111	-25.6	.3170+00	.4460+00	-9999.
191000	143	105	-27.2	.3007+00	.4258+00	-9999.
192000	141	096	-29.2	.2852+00	.4072+00	-9999.
193000	140	089	-31.2	.2704+00	.3893+00	-9999.
194000	148	085	-33.2	.2565+00	.3723+00	-9999.
195000	155	084	-34.3	.2433+00	.3549+00	-9999.

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
196000	158	084	-36.2	.2307+00	.3391+00	-9999.
197000	157	082	-37.2	.2222+00	.3280+00	-9999.
198000	152	079	-40.4	.2131+00	.3189+00	-9999.
199000	145	076	-43.4	.2040+00	.3094+00	-9999.
200000	133	071	-45.8	.1951+00	.2989+00	-9999.
201000	123	065	-46.2	.1865+00	.2862+00	-9999.
202000	116	057	-46.2	.1783+00	.2736+00	-9999.
203000	109	050	-45.2	.1705+00	.2605+00	-9999.
204000	106	042	-44.3	.1630+00	.2481+00	-9999.
205000	106	037	-44.2	.1560+00	.2373+00	-9999.
206000	104	032	-43.2	.1492+00	.2260+00	-9999.
207000	104	030	-42.9	.1427+00	.2159+00	-9999.
208000	101	029	-41.2	.1365+00	.2050+00	-9999.
209000	099	030	-39.4	.1307+00	.1948+00	-9999.
210000	094	032	-37.1	.1251+00	.1846+00	-9999.
211000	087	035	-35.6	.1199+00	.1758+00	-9999.
212000	081	040	-35.2	.1148+00	.1681+00	-9999.
213000	072	045	-36.4	.1100+00	.1619+00	-9999.
214000	064	051	-38.3	.1054+00	.1563+00	-9999.
215000	054	058	-40.5	.1009+00	.1511+00	-9999.
216000	042	066	-41.3	.9650-01	.1450+00	-9999.
217000	032	075	-43.5	.9240-01	.1402+00	-9999.
218000	021	087	-46.6	.8830-01	.1358+00	-9999.
219000	013	109	-49.7	.8440-01	.1316+00	-9999.
220000	008	166	-53.1	.8070-01	.1277+00	-9999.
221000	013	219	-56.8	.7700-01	.1240+00	-9999.
222000	021	237	-59.8	.7350-01	.1200+00	-9999.
223000	028	245	-62.2	.7010-01	.1157+00	-9999.
224000	035	249	-63.2	.6660-01	.1105+00	-9999.
225000	040	251	-63.2	.6340-01	.1052+00	-9999.
226000	043	251	-62.6	.6030-01	.9976-01	-9999.
227000	047	249	-63.2	.5750-01	.9539-01	-9999.
228000	048	247	-62.2	.5490-01	.9064-01	-9999.
229000	050	244	-61.2	.5230-01	.8594-01	-9999.
230000	052	242	-60.6	.4990-01	.8180-01	-9999.
231000	054	239	-60.2	.4760-01	.7785-01	-9999.
232000	055	237	-60.2	.4540-01	.7425-01	-9999.
233000	057	236	-60.2	.4330-01	.7082-01	-9999.
234000	059	235	-60.2	.4130-01	.6755-01	-9999.
235000	060	235	-59.9	.3940-01	.6437-01	-9999.
236000	060	235	-59.2	.3760-01	.6121-01	-9999.
237000	060	236	-59.2	.3580-01	.5828-01	-9999.
238000	062	238	-59.2	.3420-01	.5567-01	-9999.
239000	062	240	-58.2	.3260-01	.5282-01	-9999.
240000	062	242	-58.2	.3110-01	.5039-01	-9999.
241000	062	245	-58.2	.2960-01	.4796-01	-9999.
242000	062	249	-58.2	.2830-01	.4585-01	-9999.
243000	060	252	-58.5	.2700-01	.4382-01	-9999.
244000	060	257	-59.2	.2570-01	.4184-01	-9999.
245000	060	261	-59.8	.2450-01	.4001-01	-9999.

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
246000	062	266	-61.1	.2340-01	.3843-01	-9999.
247000	062	272	-61.6	.2230-01	.3672-01	-9999.
248000	062	277	-63.1	.2130-01	.3533-01	-9999.
249000	064	282	-64.6	.2020-01	.3375-01	-9999.
250000	065	287	-66.2	.1930-01	.3248-01	-9999.
251000	067	292	-68.2	.1830-01	.3111-01	-9999.
252000	070	297	-70.2	.1750-01	.3004-01	-9999.
253000	072	301	-72.3	.1660-01	.2879-01	-9999.
254000	074	305	-74.3	.1580-01	.2767-01	-9999.
255000	077	308	-76.4	.1500-01	.2656-01	-9999.
256000	079	312	-78.3	.1420-01	.2539-01	-9999.
257000	082	315	-80.5	.1350-01	.2441-01	-9999.
259000	087	321	-84.9	.1210-01	.2239-01	-9999.
260000	089	323	-87.4	.1150-01	.2157-01	-9999.
261000	092	325	-89.7	.1090-01	.2070-01	-9999.
262000	094	327	-91.4	.1030-01	.1975-01	-9999.
263000	096	328	-93.0	.9700-02	.1875-01	-9999.
264000	096	329	-94.5	.9200-02	.1794-01	-9999.
265000	096	331	-96.0	.8700-02	.1711-01	-9999.
266000	096	331	-97.5	.8200-02	.1627-01	-9999.
267000	096	332	-99.1	.7700-02	.1541-01	-9999.
268000	094	332	-99.6	.7300-02	.1465-01	-9999.
269000	092	332	-100.2	.6900-02	.1369-01	-9999.
270000	089	332	-100.6	.6500-02	.1313-01	-9999.
271000	086	332	-101.2	.6100-02	.1235-01	-9999.
272000	081	331	-100.6	.5800-02	.1171-01	-9999.
273000	076	329	-100.2	.5500-02	.1108-01	-9999.
274000	070	327	-99.6	.5200-02	.1044-01	-9999.
275000	064	324	-99.1	.4900-02	.9805-02	-9999.
276000	057	319	-97.5	.4600-02	.9125-02	-9999.
277000	050	312	-96.2	.4300-02	.8463-02	-9999.
278000	045	302	-94.8	.4100-02	.8006-02	-9999.
279000	042	287	-93.0	.3900-02	.7540-02	-9999.
280000	040	270	-91.4	.3700-02	.7093-02	-9999.
281000	040	270	-91.1	.3542-02	.6790-02	-9999.
282000	041	271	-90.8	.3391-02	.6500-02	-9999.
283000	041	271	-90.5	.3246-02	.6222-02	-9999.
284000	041	272	-90.2	.3107-02	.5956-02	-9999.
285000	042	273	-89.9	.2974-02	.5702-02	-9999.
286000	042	273	-89.6	.2847-02	.5458-02	-9999.
287000	042	274	-89.3	.2726-02	.5225-02	-9999.
288000	043	275	-89.0	.2609-02	.5002-02	-9999.
289000	043	275	-88.7	.2498-02	.4788-02	-9999.
290000	043	276	-88.4	.2391-02	.4584-02	-9999.
291000	044	276	-88.1	.2289-02	.4388-02	-9999.
292000	044	277	-87.8	.2191-02	.4200-02	-9999.
293000	044	277	-87.5	.2097-02	.4021-02	-9999.
294000	045	278	-87.2	.2008-02	.3849-02	-9999.
295000	045	279	-86.9	.1922-02	.3685-02	-9999.
298000	089	273	-84.2	.1667-02	.3060-02	-9999.

TABLE 4. (Concluded)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
301000	140	271	-82.7	.1421-02	.2584-02	-9999.
304000	193	271	-81.3	.1211-02	.2181-02	-9999.
307000	241	270	-79.8	.1032-02	.1842-02	-9999.
310000	276	270	-78.3	.8793-03	.1555-02	-9999.
313000	292	270	-76.9	.7512-03	.1315-02	-9999.
316000	303	270	-75.5	.6439-03	.1116-02	-9999.
319000	308	270	-74.1	.5520-03	.9470-03	-9999.
322000	305	270	-72.8	.4731-03	.8035-03	-9999.
325000	291	270	-71.4	.4054-03	.6818-03	-9999.
328000	263	270	-70.0	.3475-03	.5785-03	-9999.
331000	270	270	-67.3	.2992-03	.4900-03	-9999.
334000	272	270	-64.4	.2576-03	.4151-03	-9999.
337000	265	270	-61.6	.2217-03	.3516-03	-9999.
340000	248	270	-58.8	.1908-03	.2978-03	-9999.
343000	216	270	-56.0	.1642-03	.2523-03	-9999.
346000	195	270	-51.8	.1426-03	.2144-03	-9999.
349000	193	270	-46.3	.1250-03	.1827-03	-9999.
352000	195	270	-40.8	.1095-03	.1558-03	-9999.
355000	169	270	-35.3	.9581-04	.1328-03	-9999.
358000	141	270	-29.7	.8382-04	.1132-03	-9999.
361000	100	270	-24.1	.7336-04	.9654-04	-9999.
364000	095	270	-16.2	.6592-04	.8381-04	-9999.
367000	086	271	-8.3	.5918-04	.7277-04	-9999.
370000	073	271	-.4	.5307-04	.6318-04	-9999.
373000	054	273	7.5	.4756-04	.5485-04	-9999.
376000	027	277	15.4	.4258-04	.4762-04	-9999.
379000	011	283	24.1	.3847-04	.4164-04	-9999.
382000	009	287	33.5	.3508-04	.3669-04	-9999.
385000	007	294	43.3	.3210-04	.3244-04	-9999.
388000	006	307	53.2	.2945-04	.2877-04	-9999.
391000	004	328	63.4	.2710-04	.2559-04	-9999.
394000	004	359	73.9	.2500-04	.2284-04	-9999.
397000	005	027	84.5	.2313-04	.2044-04	-9999.
400000	007	044	95.2	.2145-04	.1835-04	-9999.

TABLE 5. STS-8 FINAL SRB DESCENT METEOROLOGICAL DATA TAPE

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
000028	017	220	28.9	.1013+04	.1151+04	25.0
001000	024	200	26.2	.9773+03	.1125+04	22.7
002000	021	204	23.6	.9407+03	.1097+04	22.7
003000	016	214	21.3	.9132+03	.1070+04	20.5
004000	015	235	22.1	.8819+03	.1031+04	18.2
005000	013	219	18.1	.8514+03	.1010+04	15.3
006000	009	197	16.9	.8217+03	.9812+03	10.3
007000	006	182	15.0	.7929+03	.9534+03	8.8
008000	008	166	12.9	.7649+03	.9263+03	8.8
009000	007	154	10.9	.7376+03	.8999+03	7.3
010000	002	078	8.8	.7112+03	.8745+03	5.5
011000	001	116	6.1	.6855+03	.8510+03	5.3
012000	003	154	4.3	.6605+03	.8256+03	3.7
013000	004	157	4.0	.6364+03	.7974+03	-2.4
014000	004	218	2.8	.6130+03	.7729+03	-14.8
015000	007	282	1.0	.5903+03	.7501+03	-9999.
016000	009	289	-.6	.5683+03	.7264+03	-9999.
017000	010	296	-2.1	.5470+03	.7030+03	-9999.
018000	015	311	-4.9	.5264+03	.6836+03	-9999.
019000	018	322	-6.5	.5064+03	.6615+03	-9999.
020000	022	315	-8.3	.4870+03	.6406+03	-9999.
021000	025	303	-10.2	.4682+03	.6203+03	-9999.
022000	024	293	-11.2	.4501+03	.5986+03	-9999.
023000	018	285	-12.6	.4326+03	.5784+03	-9999.
024000	014	283	-15.3	.4156+03	.5615+03	-9999.
025000	010	274	-17.4	.3992+03	.5437+03	-9999.
026000	010	247	-19.1	.3833+03	.5255+03	-9999.
027000	012	223	-20.9	.3679+03	.5081+03	-9999.
028000	010	223	-22.7	.3530+03	.4911+03	-9999.
029000	008	228	-24.9	.3387+03	.4752+03	-9999.
030000	007	230	-27.8	.3247+03	.4611+03	-9999.
031000	006	271	-30.3	.3112+03	.4465+03	-9999.
032000	006	294	-32.8	.2982+03	.4322+03	-9999.
033000	005	301	-35.7	.2855+03	.4189+03	-9999.
034000	003	297	-38.2	.2733+03	.4052+03	-9999.
035000	003	258	-41.2	.2614+03	.3926+03	-9999.
036000	005	236	-43.2	.2499+03	.3787+03	-9999.
037000	006	226	-45.8	.2389+03	.3660+03	-9999.
038000	005	275	-48.0	.2282+03	.3531+03	-9999.
039000	007	292	-50.1	.2179+03	.3403+03	-9999.
040000	006	283	-52.4	.2079+03	.3282+03	-9999.
041000	006	335	-54.8	.1984+03	.3165+03	-9999.
042000	012	351	-56.3	.1892+03	.3039+03	-9999.
043000	014	357	-59.5	.1803+03	.2940+03	-9999.
044000	011	009	-61.8	.1717+03	.2830+03	-9999.
045000	011	023	-63.4	.1635+03	.2715+03	-9999.
046000	013	027	-65.9	.1556+03	.2615+03	-9999.
047000	016	019	-67.6	.1480+03	.2508+03	-9999.
048000	022	017	-69.5	.1407+03	.2407+03	-9999.
049000	022	027	-69.9	.1377+03	.2292+03	-9999.

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
050000	019	046	-70.0	.1271+03	.2179+03	-9999.
051000	019	063	-69.6	.1208+03	.2067+03	-9999.
052000	020	062	-67.8	.1148+03	.1948+03	-9999.
053000	021	044	-66.6	.1092+03	.1841+03	-9999.
054000	021	042	-66.8	.1038+03	.1753+03	-9999.
055000	020	044	-67.7	.9876+02	.1675+03	-9999.
056000	019	057	-70.7	.9389+02	.1616+03	-9999.
057000	017	064	-69.1	.8924+02	.1524+03	-9999.
058000	018	072	-68.3	.8488+02	.1443+03	-9999.
059000	018	092	-67.4	.8067+02	.1366+03	-9999.
060000	013	064	-65.5	.7674+02	.1287+03	-9999.
061000	013	029	-64.8	.7302+02	.1221+03	-9999.
062000	015	020	-63.9	.6950+02	.1157+03	-9999.
063000	020	030	-63.2	.6623+02	.1099+03	-9999.
064000	025	040	-62.5	.6311+02	.1044+03	-9999.
065000	030	050	-61.7	.6013+02	.9907+02	-9999.
066000	035	060	-61.0	.5730+02	.9410+02	-9999.
067000	042	066	-60.7	.5460+02	.8953+02	-9999.
068000	048	072	-59.4	.5202+02	.8480+02	-9999.
069000	052	080	-58.3	.4957+02	.8037+02	-9999.
070000	055	090	-57.4	.4725+02	.7629+02	-9999.
071000	055	097	-56.7	.4505+02	.7249+02	-9999.
072000	052	101	-55.9	.4296+02	.6889+02	-9999.
073000	048	103	-55.2	.4097+02	.6548+02	-9999.
074000	043	103	-54.6	.3907+02	.6227+02	-9999.
075000	043	101	-53.9	.3728+02	.5924+02	-9999.
076000	043	098	-53.3	.3556+02	.5636+02	-9999.
077000	047	096	-52.7	.3394+02	.5363+02	-9999.
078000	047	093	-51.8	.3239+02	.5097+02	-9999.
079000	048	094	-50.3	.3092+02	.4833+02	-9999.
080000	052	100	-48.6	.2953+02	.4581+02	-9999.
081000	054	105	-47.6	.2820+02	.4357+02	-9999.
082000	055	108	-47.5	.2694+02	.4159+02	-9999.
083000	059	109	-47.7	.2574+02	.3976+02	-9999.
084000	060	108	-47.6	.2459+02	.3798+02	-9999.
085000	060	107	-46.7	.2349+02	.3614+02	-9999.
086000	059	103	-45.3	.2245+02	.3432+02	-9999.
087000	055	098	-44.1	.2146+02	.3264+02	-9999.
088000	054	092	-43.4	.2052+02	.3111+02	-9999.
089000	054	089	-42.9	.1962+02	.2969+02	-9999.
090000	054	087	-42.5	.1876+02	.2833+02	-9999.
091000	054	085	-42.0	.1794+02	.2705+02	-9999.
092000	052	086	-41.6	.1716+02	.2582+02	-9999.
093000	052	088	-41.1	.1642+02	.2464+02	-9999.
094000	052	088	-40.6	.1570+02	.2352+02	-9999.
095000	052	087	-40.0	.1502+02	.2245+02	-9999.
096000	054	084	-39.5	.1438+02	.2143+02	-9999.
097000	055	081	-39.1	.1376+02	.2047+02	-9999.
098000	059	079	-38.8	.1317+02	.1957+02	-9999.
099000	060	077	-38.8	.1260+02	.1873+02	-9999.

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
100000	062	076	-39.0	.1206+02	.1794+02	-9999.
101000	064	076	-39.4	.1154+02	.1720+02	-9999.
102000	065	076	-39.8	.1104+02	.1649+02	-9999.
103000	069	076	-40.2	.1056+02	.1580+02	-9999.
104000	072	077	-40.5	.1011+02	.1513+02	-9999.
105000	076	080	-40.4	.9671+01	.1448+02	-9999.
106000	077	084	-39.6	.9254+01	.1380+02	-9999.
107000	081	087	-38.3	.8856+01	.1314+02	-9999.
108000	084	090	-36.6	.8479+01	.1249+02	-9999.
109000	087	092	-34.9	.8119+01	.1187+02	-9999.
110000	092	096	-33.2	.7777+01	.1129+02	-9999.
111000	096	100	-31.6	.7451+01	.1074+02	-9999.
112000	101	105	-30.0	.7142+01	.1023+02	-9999.
113000	106	110	-29.6	.6847+01	.9792+01	-9999.
114000	106	114	-29.9	.6563+01	.9399+01	-9999.
115000	104	114	-30.1	.6292+01	.9019+01	-9999.
116000	101	111	-29.5	.6032+01	.8623+01	-9999.
117000	099	108	-28.5	.5783+01	.8233+01	-9999.
118000	092	105	-27.5	.5546+01	.7864+01	-9999.
119000	084	101	-26.5	.5319+01	.7513+01	-9999.
120000	077	095	-25.6	.5103+01	.7181+01	-9999.
121000	072	091	-25.0	.4895+01	.6872+01	-9999.
122000	065	086	-24.8	.4697+01	.6587+01	-9999.
123000	060	080	-24.7	.4507+01	.6319+01	-9999.
124000	057	074	-24.8	.4324+01	.6067+01	-9999.
125000	057	070	-25.0	.4149+01	.5824+01	-9999.
126000	059	067	-25.1	.3981+01	.5591+01	-9999.
127000	064	066	-25.3	.3819+01	.5368+01	-9999.
128000	069	066	-25.2	.3664+01	.5148+01	-9999.
129000	074	069	-24.6	.3516+01	.4927+01	-9999.
130000	079	071	-23.4	.3374+01	.4707+01	-9999.
131000	084	074	-21.8	.3239+01	.4489+01	-9999.
132000	091	076	-20.1	.3110+01	.4280+01	-9999.
133000	096	078	-18.3	.2986+01	.4082+01	-9999.
134000	101	081	-17.1	.2869+01	.3904+01	-9999.
135000	104	084	-16.1	.2756+01	.3736+01	-9999.
136000	104	086	-14.9	.2649+01	.3573+01	-9999.
137000	104	088	-13.7	.2546+01	.3418+01	-9999.
138000	104	089	-11.9	.2448+01	.3264+01	-9999.
139000	103	090	-10.0	.2354+01	.3116+01	-9999.
140000	101	091	-8.5	.2264+01	.2980+01	-9999.
141000	099	092	-7.2	.2178+01	.2853+01	-9999.
142000	097	092	-6.0	.2096+01	.2733+01	-9999.
143000	094	092	-5.0	.2017+01	.2621+01	-9999.
144000	094	089	-4.2	.1942+01	.2514+01	-9999.
145000	103	084	-3.4	.1869+01	.2413+01	-9999.
146000	111	083	-2.6	.1800+01	.2317+01	-9999.
147000	113	081	-1.9	.1733+01	.2225+01	-9999.
148000	108	076	-2.3	.1669+01	.2146+01	-9999.
149000	103	069	-3.3	.1606+01	.2074+01	-9999.

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
150000	104	063	-4.3	.1546+01	.2004+01	-9999.
151000	111	063	-5.4	.1489+01	.1937+01	-9999.
152000	116	065	-6.4	.1433+01	.1871+01	-9999.
153000	114	069	-7.5	.1378+01	.1808+01	-9999.
154000	111	071	-8.6	.1326+01	.1746+01	-9999.
155000	103	070	-9.6	.1276+01	.1686+01	-9999.
156000	099	067	-10.6	.1227+01	.1628+01	-9999.
157000	106	067	-10.8	.1180+01	.1567+01	-9999.
158000	114	068	-9.8	.1135+01	.1502+01	-9999.
159000	121	071	-8.9	.1092+01	.1439+01	-9999.
160000	126	074	-9.0	.1051+01	.1386+01	-9999.
161000	126	074	-9.9	.1010+01	.1337+01	-9999.
162000	128	074	-10.7	.9719+00	.1290+01	-9999.
163000	133	074	-11.7	.9347+00	.1245+01	-9999.
164000	140	075	-12.1	.8988+00	.1200+01	-9999.
165000	150	080	-11.7	.8643+00	.1152+01	-9999.
166000	157	085	-11.5	.8311+00	.1107+01	-9999.
167000	157	089	-12.1	.7992+00	.1066+01	-9999.
168000	150	091	-12.6	.7685+00	.1027+01	-9999.
169000	143	091	-13.3	.7389+00	.9908+00	-9999.
170000	136	090	-14.1	.7103+00	.9552+00	-9999.
171000	126	087	-14.1	.6828+00	.9180+00	-9999.
172000	116	082	-12.7	.6565+00	.8780+00	-9999.
173000	111	077	-10.9	.6313+00	.8384+00	-9999.
174000	111	075	-9.9	.6072+00	.8035+00	-9999.
175000	114	073	-10.4	.5841+00	.7744+00	-9999.
176000	119	074	-11.5	.5617+00	.7478+00	-9999.
177000	124	078	-12.8	.5402+00	.7228+00	-9999.
178000	133	083	-14.2	.5193+00	.6986+00	-9999.
179000	140	087	-15.5	.4992+00	.6749+00	-9999.
180000	152	090	-16.4	.4798+00	.6509+00	-9999.
181000	160	091	-16.3	.4611+00	.6255+00	-9999.
182000	167	091	-16.2	.4431+00	.6006+00	-9999.
183000	173	091	-16.0	.4258+00	.5768+00	-9999.
184000	179	092	-17.1	.4092+00	.5566+00	-9999.
185000	180	092	-18.4	.3932+00	.5376+00	-9999.
186000	179	093	-19.8	.3777+00	.5194+00	-9999.
187000	175	095	-21.3	.3627+00	.5017+00	-9999.
188000	168	099	-22.9	.3483+00	.4848+00	-9999.
189000	156	105	-24.5	.3343+00	.4683+00	-9999.
190000	150	111	-25.6	.3170+00	.4460+00	-9999.
191000	143	105	-27.2	.3007+00	.4258+00	-9999.
192000	141	096	-29.2	.2852+00	.4072+00	-9999.
193000	140	089	-31.2	.2704+00	.3893+00	-9999.
194000	148	085	-33.2	.2565+00	.3723+00	-9999.
195000	155	084	-34.3	.2433+00	.3549+00	-9999.
196000	158	084	-36.2	.2307+00	.3391+00	-9999.
197000	157	082	-37.2	.2222+00	.3280+00	-9999.
198000	152	079	-40.4	.2131+00	.3189+00	-9999.
199000	145	076	-43.4	.2040+00	.3094+00	-9999.

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
200000	133	071	-45.8	.1951+00	.2989+00	-9999.
201000	123	065	-46.2	.1865+00	.2862+00	-9999.
202000	116	057	-46.2	.1783+00	.2736+00	-9999.
203000	109	050	-45.2	.1705+00	.2605+00	-9999.
204000	106	042	-44.3	.1630+00	.2481+00	-9999.
205000	106	037	-44.2	.1560+00	.2373+00	-9999.
206000	104	032	-43.2	.1492+00	.2260+00	-9999.
207000	104	030	-42.9	.1427+00	.2159+00	-9999.
208000	101	029	-41.2	.1365+00	.2050+00	-9999.
209000	099	030	-39.4	.1307+00	.1948+00	-9999.
210000	094	032	-37.1	.1251+00	.1846+00	-9999.
211000	087	035	-35.6	.1199+00	.1758+00	-9999.
212000	081	040	-35.2	.1148+00	.1681+00	-9999.
213000	072	045	-36.4	.1100+00	.1619+00	-9999.
214000	064	051	-38.3	.1054+00	.1563+00	-9999.
215000	054	058	-40.5	.1009+00	.1511+00	-9999.
216000	042	066	-41.3	.9650-01	.1450+00	-9999.
217000	032	075	-43.5	.9240-01	.1402+00	-9999.
218000	021	087	-46.6	.8830-01	.1358+00	-9999.
219000	013	109	-49.7	.8440-01	.1316+00	-9999.
220000	008	166	-53.1	.8070-01	.1277+00	-9999.
221000	013	219	-56.8	.7700-01	.1240+00	-9999.
222000	021	237	-59.8	.7350-01	.1200+00	-9999.
223000	028	245	-62.2	.7010-01	.1157+00	-9999.
224000	035	249	-63.2	.6660-01	.1105+00	-9999.
225000	040	251	-63.2	.6340-01	.1052+00	-9999.
226000	043	251	-62.6	.6030-01	.9976-01	-9999.
227000	047	249	-63.2	.5750-01	.9539-01	-9999.
228000	048	247	-62.2	.5490-01	.9064-01	-9999.
229000	050	244	-61.2	.5230-01	.8594-01	-9999.
230000	052	242	-60.6	.4990-01	.8180-01	-9999.
231000	054	239	-60.2	.4760-01	.7785-01	-9999.
232000	055	237	-60.2	.4540-01	.7425-01	-9999.
233000	057	236	-60.2	.4330-01	.7082-01	-9999.
234000	059	235	-60.2	.4130-01	.6755-01	-9999.
235000	060	235	-59.9	.3940-01	.6437-01	-9999.
236000	060	235	-59.2	.3760-01	.6121-01	-9999.
237000	060	236	-59.2	.3580-01	.5828-01	-9999.
238000	062	238	-59.2	.3420-01	.5567-01	-9999.
239000	062	240	-58.2	.3260-01	.5282-01	-9999.
240000	062	242	-58.2	.3110-01	.5039-01	-9999.
241000	062	245	-58.2	.2960-01	.4796-01	-9999.
242000	062	249	-58.2	.2830-01	.4585-01	-9999.
243000	060	252	-58.5	.2700-01	.4382-01	-9999.
244000	060	257	-59.2	.2570-01	.4184-01	-9999.
245000	060	261	-59.8	.2450-01	.4001-01	-9999.
246000	062	264	-61.1	.2340-01	.3843-01	-9999.
247000	062	272	-61.6	.2230-01	.3672-01	-9999.
248000	062	277	-63.1	.2130-01	.3533-01	-9999.
249000	064	282	-64.6	.2020-01	.3375-01	-9999.

TABLE 5. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
250000	065	287	-66.2	.1930-01	.3248-01	-9999.
251000	067	292	-68.2	.1830-01	.3111-01	-9999.
252000	070	297	-70.2	.1750-01	.3004-01	-9999.
253000	072	301	-72.3	.1660-01	.2879-01	-9999.
254000	074	305	-74.3	.1580-01	.2767-01	-9999.
255000	077	308	-76.4	.1500-01	.2656-01	-9999.
256000	079	312	-78.3	.1420-01	.2539-01	-9999.
257000	082	315	-80.5	.1350-01	.2441-01	-9999.
258000	084	318	-82.5	.1280-01	.2339-01	-9999.
259000	087	321	-84.9	.1210-01	.2239-01	-9999.
260000	089	323	-87.4	.1150-01	.2157-01	-9999.
261000	092	325	-89.7	.1090-01	.2070-01	-9999.
262000	094	327	-91.4	.1030-01	.1975-01	-9999.
263000	096	328	-93.0	.9700-02	.1875-01	-9999.
264000	096	329	-94.5	.9200-02	.1794-01	-9999.
265000	096	331	-96.0	.8700-02	.1711-01	-9999.
266000	096	331	-97.5	.8200-02	.1627-01	-9999.
267000	096	332	-99.1	.7700-02	.1541-01	-9999.
268000	094	332	-99.6	.7300-02	.1465-01	-9999.
269000	092	332	-100.2	.6900-02	.1389-01	-9999.
270000	089	332	-100.6	.6500-02	.1313-01	-9999.
271000	086	332	-101.2	.6100-02	.1235-01	-9999.
272000	081	331	-100.6	.5800-02	.1171-01	-9999.
273000	076	329	-100.2	.5500-02	.1108-01	-9999.
274000	070	327	-99.6	.5200-02	.1044-01	-9999.
275000	064	324	-99.1	.4900-02	.9805-02	-9999.
276000	057	319	-97.5	.4600-02	.9125-02	-9999.
277000	050	312	-96.2	.4300-02	.8463-02	-9999.
278000	045	307	-94.8	.4100-02	.8006-02	-9999.
279000	042	287	-93.0	.3900-02	.7540-02	-9999.
280000	040	270	-91.4	.3700-02	.7097-02	-9999.
281000	040	270	-91.1	.3542-02	.6790-02	-9999.
282000	041	271	-90.8	.3391-02	.6500-02	-9999.
283000	041	271	-90.5	.3246-02	.6222-02	-9999.
284000	041	272	-90.2	.3107-02	.5956-02	-9999.
285000	042	273	-89.9	.2974-02	.5702-02	-9999.
286000	042	273	-89.6	.2847-02	.5458-02	-9999.
287000	042	274	-89.3	.2726-02	.5225-02	-9999.
288000	043	275	-89.0	.2609-02	.5002-02	-9999.
289000	043	275	-88.7	.2498-02	.4788-02	-9999.
290000	043	276	-88.4	.2391-02	.4584-02	-9999.
291000	044	276	-88.1	.2289-02	.4388-02	-9999.
292000	044	277	-87.8	.2191-02	.4200-02	-9999.
293000	044	277	-87.5	.2097-02	.4021-02	-9999.
294000	045	278	-87.2	.2008-02	.3849-02	-9999.
295000	045	279	-86.9	.1922-02	.3685-02	-9999.
298000	089	273	-94.2	.1667-02	.3060-02	-9999.
301000	140	271	-92.7	.1421-02	.2586-02	-9999.
304000	193	271	-91.3	.1211-02	.2181-02	-9999.
307000	241	270	-79.8	.1032-02	.1842-02	-9999.

TABLE 5. (Concluded)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
			-78.3	.8793-03	.1555-02	-9999.
	276	270	-76.9	.7512-03	.1315-02	-9999.
310000	292	270	-75.5	.6439-03	.1116-02	-9999.
313000	303	270	-74.1	.5520-03	.9670-03	-9999.
316000	308	270	-72.8	.4731-03	.8035-03	-9999.
319000	305	270	-71.4	.4054-03	.6818-03	-9999.
322000	291	270	-70.0	.3475-03	.5785-03	-9999.
325000	263	270	-67.3	.2992-03	.4900-03	-9999.
328000	270	270	-64.4	.2576-03	.4151-03	-9999.
331000	272	270	-61.6	.2217-03	.3516-03	-9999.
334000	265	270	-58.8	.1908-03	.2978-03	-9999.
337000	248	270	-56.0	.1642-03	.2523-03	-9999.
340000	216	270	-51.8	.1426-03	.2144-03	-9999.
343000	195	270	-46.3	.1250-03	.1827-03	-9999.
346000	193	270	-40.8	.1095-03	.1558-03	-9999.
349000	185	270	-35.3	.9581-04	.1328-03	-9999.
352000	169	270	-29.7	.8382-04	.1132-03	-9999.
355000	141	270	-24.1	.7336-04	.9654-04	-9999.
358000	100	270	-16.2	.6592-04	.8381-04	-9999.
361000	095	270	-8.3	.5918-04	.7277-04	-9999.
364000	086	271	-.4	.5307-04	.6318-04	-9999.
367000	073	271	7.5	.4756-04	.5485-04	-9999.
370000	054	273	15.4	.4258-04	.4762-04	-9999.
373000	027	277	24.1	.3847-04	.4164-04	-9999.
376000	011	283	33.5	.3508-04	.3669-04	-9999.
379000	009	287	43.3	.3210-04	.3244-04	-9999.
382000	007	298	53.2	.2945-04	.2977-04	-9999.
385000	006	307	63.4	.2710-04	.2559-04	-9999.
388000	004	328	73.9	.2500-04	.2286-04	-9999.
391000	004	359	84.5	.2313-04	.2044-04	-9999.
394000	005	027	95.2	.2145-04	.1835-04	-9999.
397000	007	048				
400000						

TABLE 6. STS-8 SRB DESCENT-IMPACT SURFACE SHIP OBSERVATIONS

Site: U.S.N. Ship Redstone

Location: 29°N Latitude
78°W Longitude

Date: August 30, 1983

Time: 0640 UT

Surface Observations:

Air Temp °F	Wet-Bulb °F	Dew Point °F	Pressure (MSL) mb	Wind Direction	Wind Speed Kt.
84.0	79.0	77.0	1011.1	220	10

Sky Observation:

Clouds	Total Sky Cover	Total Opaque Sky	Visibility (miles)
3/10 Cumulonimbus at 2000 ft 10/10 Altostratus at E 10000 ft	10/10	7/10	10

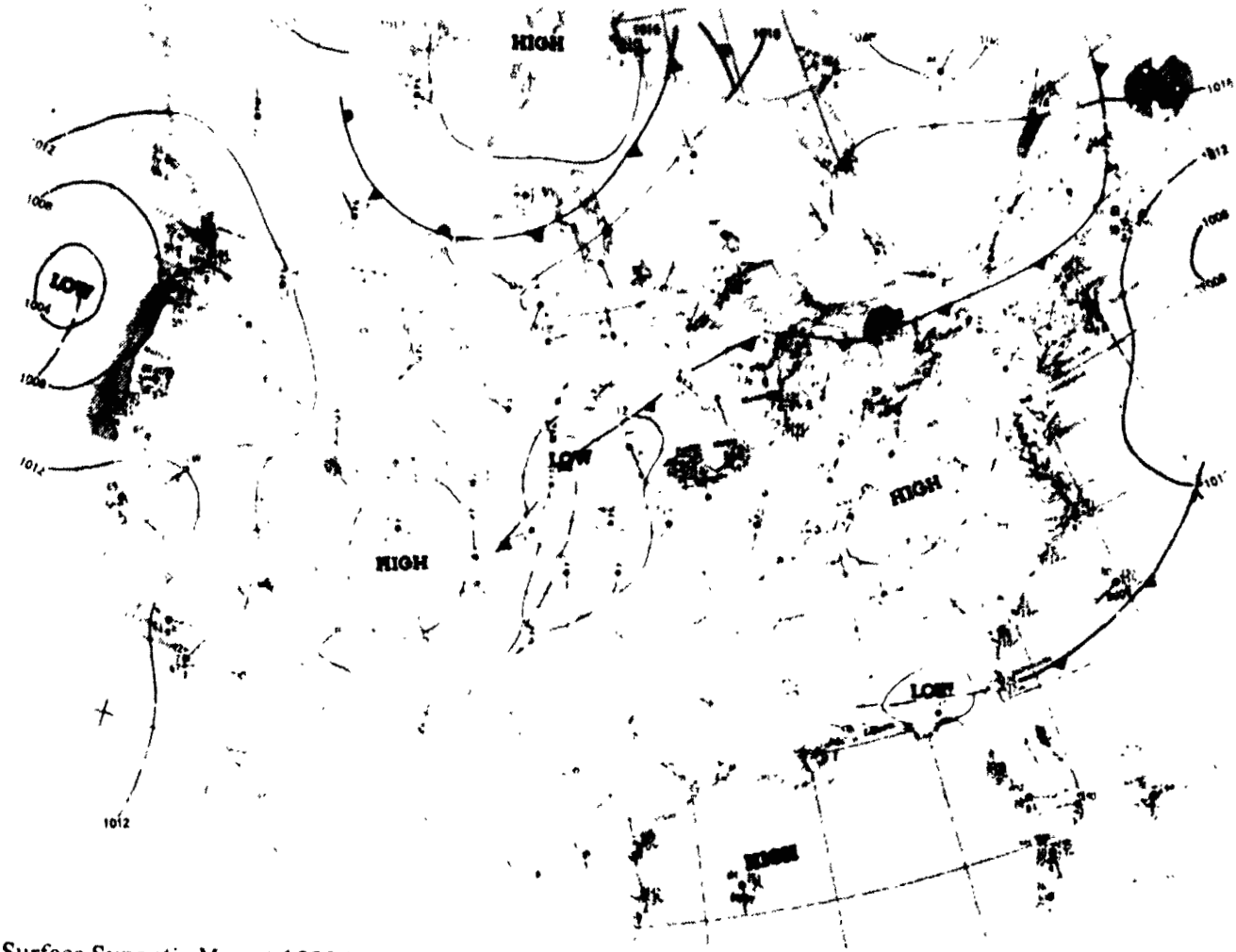
Sea Observation:

Sea Condition:	Wind Waves		Swell Conditions		
	Freq. Sec.	Ht. m.	Dir. from which Swell is coming	Freq Sec.	Ht. m.
Sea Slight – Code 3 Surface Sea Water Temp. = 27.8°C (82.0°F)	1	½	220°	2	1

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

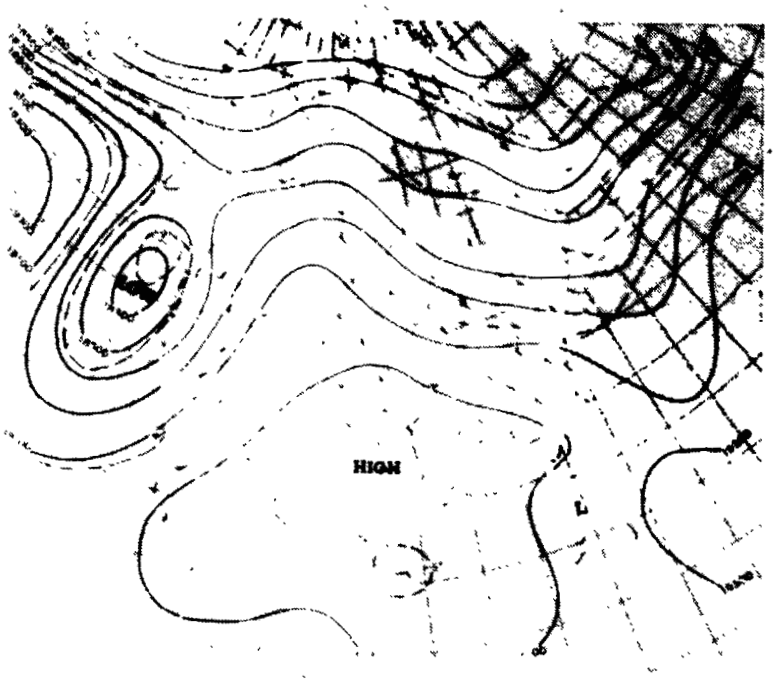
Vehicle Data					Surface Observations					Inflight Conditions Max. Wind Below 60,000 ft			Count Down and Launch Comments of Meteorological Significance
					Thermodynamic[a]			Wind[b]					
Seq. No.	Vehicle No.	Launch Date	Time[c] (EST) Nearest Minute	Launch Pad	Press[d] N/cm^2	Temp. (°C)	Rel. Hum. (%)	Speed (ft/sec)	Dir. (deg)	Alt. (ft)	Speed (ft/sec)	Dir. (deg)	
1	STS-1 Columbia	4/12/81	0700	39A	10.234[e]	21	82	11.8 15.2	125 120	44,300	98	250	
2	STS-2 Columbia	11/12/81	1010	39A	10.166	23	61	27.0 27.0	345 355	36,300	158	286	
3	STS-3 Columbia	3/22/82	1100	39A	10.160	24	71	7.0[f] 8.0[f]	50[f] 145[f]	45,000	119	250	Wind directional change observed at Pad just prior to L+0.[g]
4	STS-4 Columbia	6/27/82	1100[h]	39A	10.200	29	70	5.8[i] 4.9[i]	133[i] 141[i]	47,900	37	329	
5	STS-5 Columbia	11/11/82	0719	39A	10.227	22	68	22.0 35.0	90 90	40,600	146	336	
6	STS-6 Challenger	4/4/83	1330	39A	10.183	23	55	12.7 16.4	63 55	46,100	155	277	
7	STS-7 Challenger	6/18/83	0733[h]	39A	10.146	25	80	5.9[f] 10.3[f]	10[f] 350[f]	45,900	76	278	
8	STS-8 Challenger	8/30/83	0232[h]	39A	10.111	24	97	8.8 14.0	269 268	45,100	30	349	17 min countdown delay due to adverse weather conditions.

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.
h. Eastern Daylight Time.
i. 30 sec average prior to L+0.



Surface Synoptic Map at 1200 UT August 30, 1983 – Isobaric, Frontal, and Precipitation Patterns are Shown in Standard Symbolic Form.

Figure 1. Surface synoptic chart 5 hr 28 min after launch of STS-8.



500 Millibar Height
Contours at 1200 UT
August 30, 1983.
Continuous Lines Indicate Height Contours In 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 5 hr 28 min after launch of STS-8.

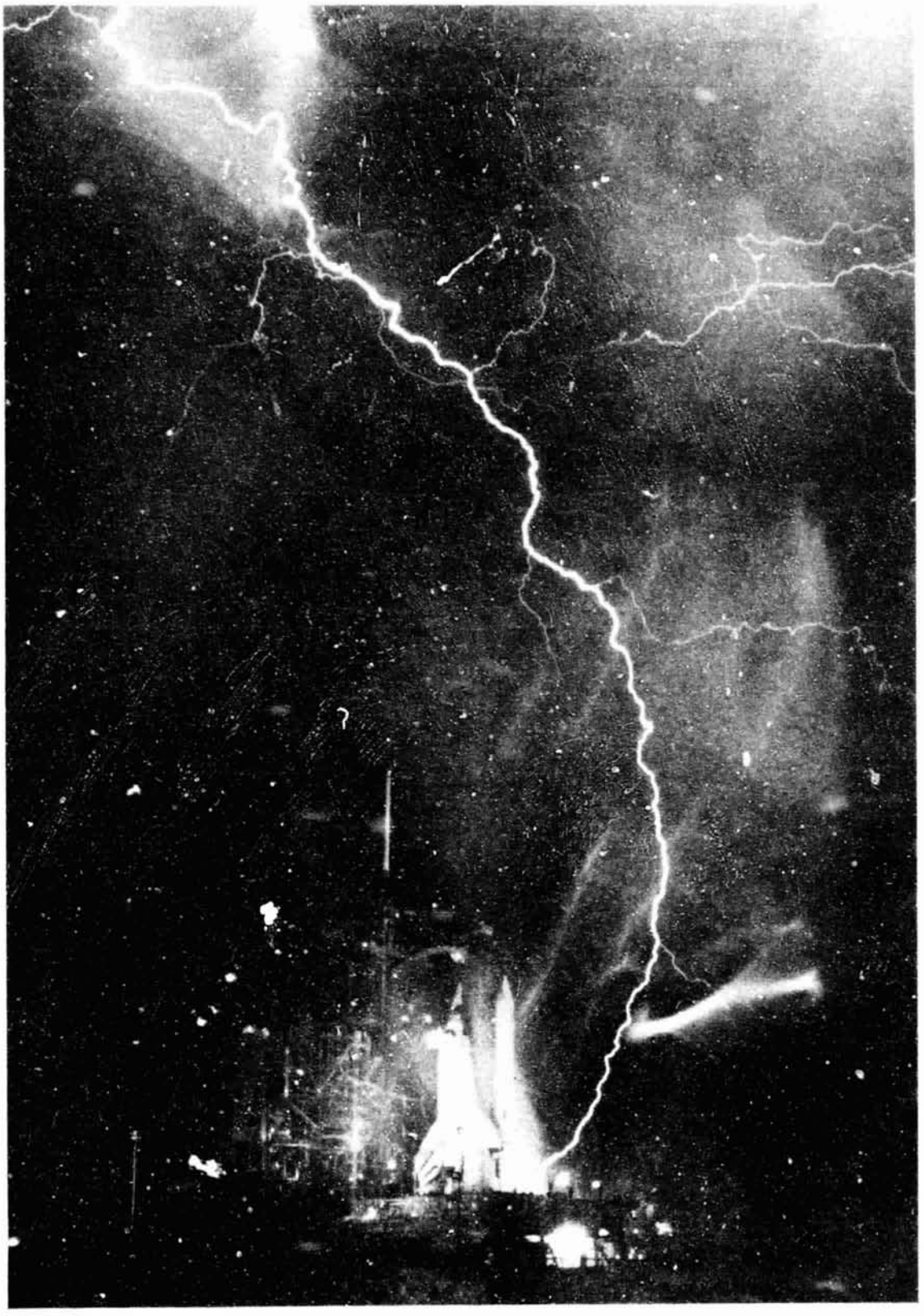


Figure 3. Lightning activity around LC 39A during the countdown of STS-8.

Figure 4. GOES-5 infrared imagery of cloud cover 2 min prior to launch of STS-8 (0630 UT, August 30, 1983). 500-mb contours and wind barbs are also included for 1200 UT.

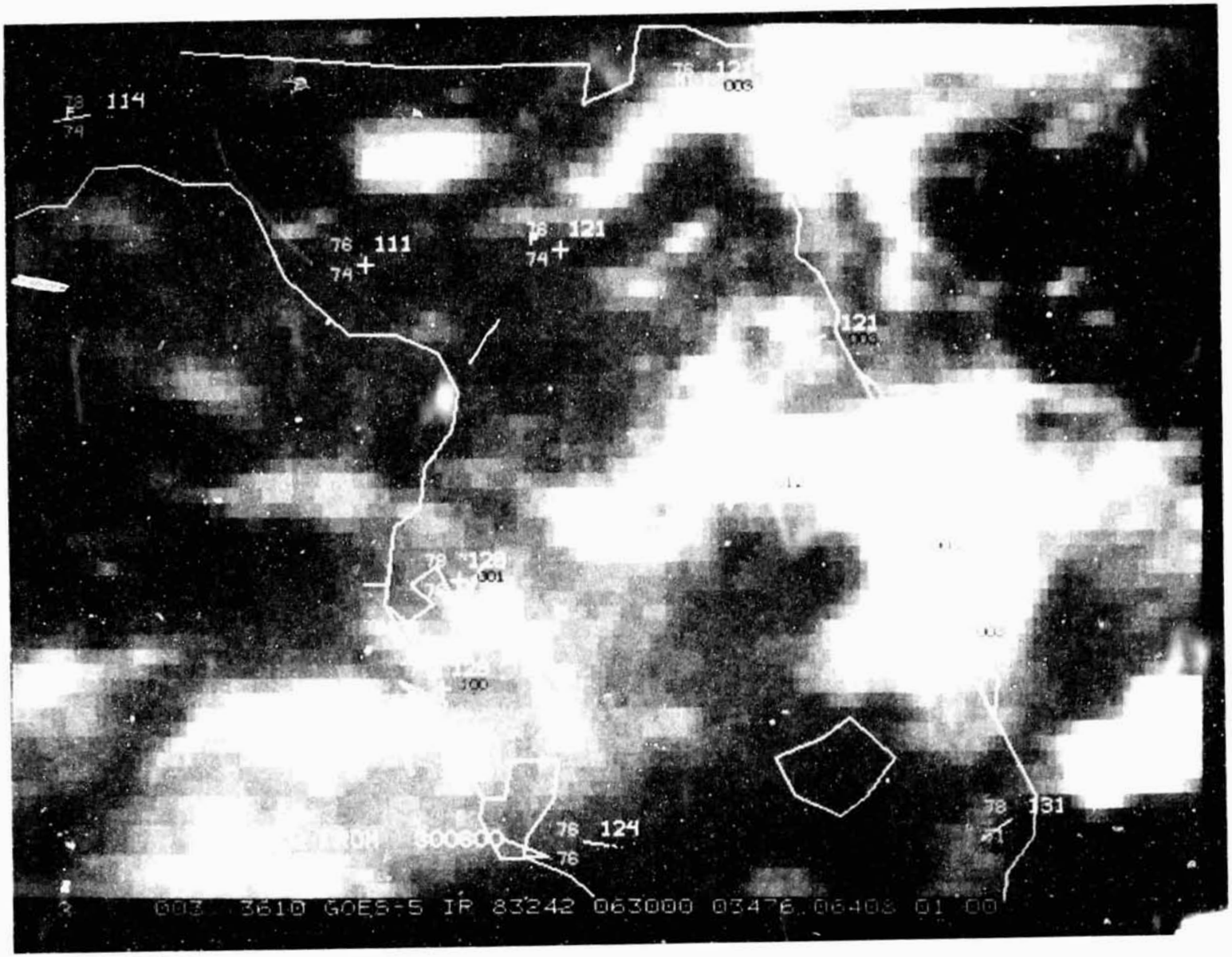


Figure 5. Enlarged view of GOES-5 infrared imagery of cloud cover 2 min prior to launch of STS-8 (0630 UT, August 30, 1983). Surface parameters and wind barbs for 0600 UT are also included.

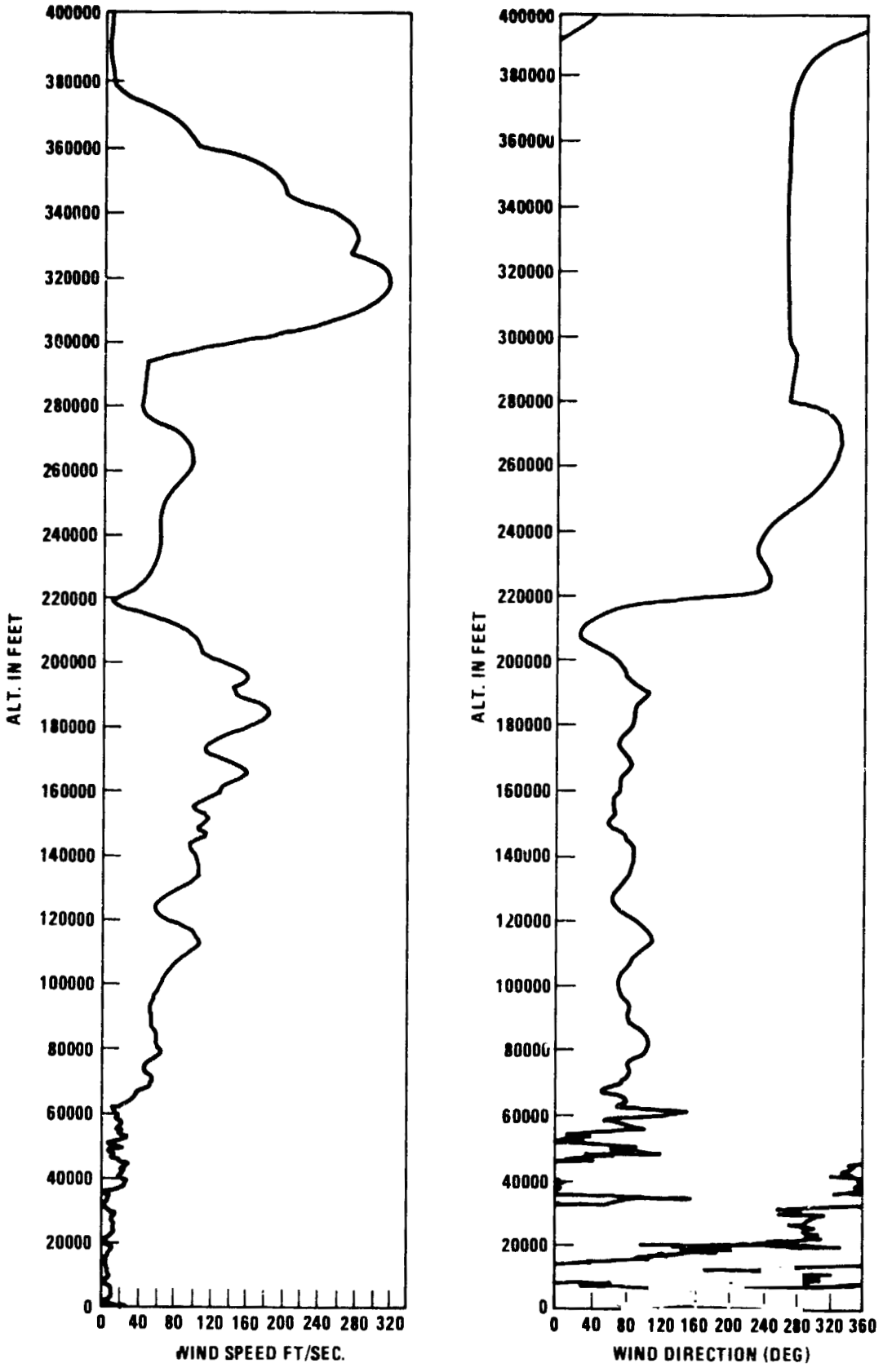


Figure 6. Scalar wind speed and direction at launch time of STS-8.

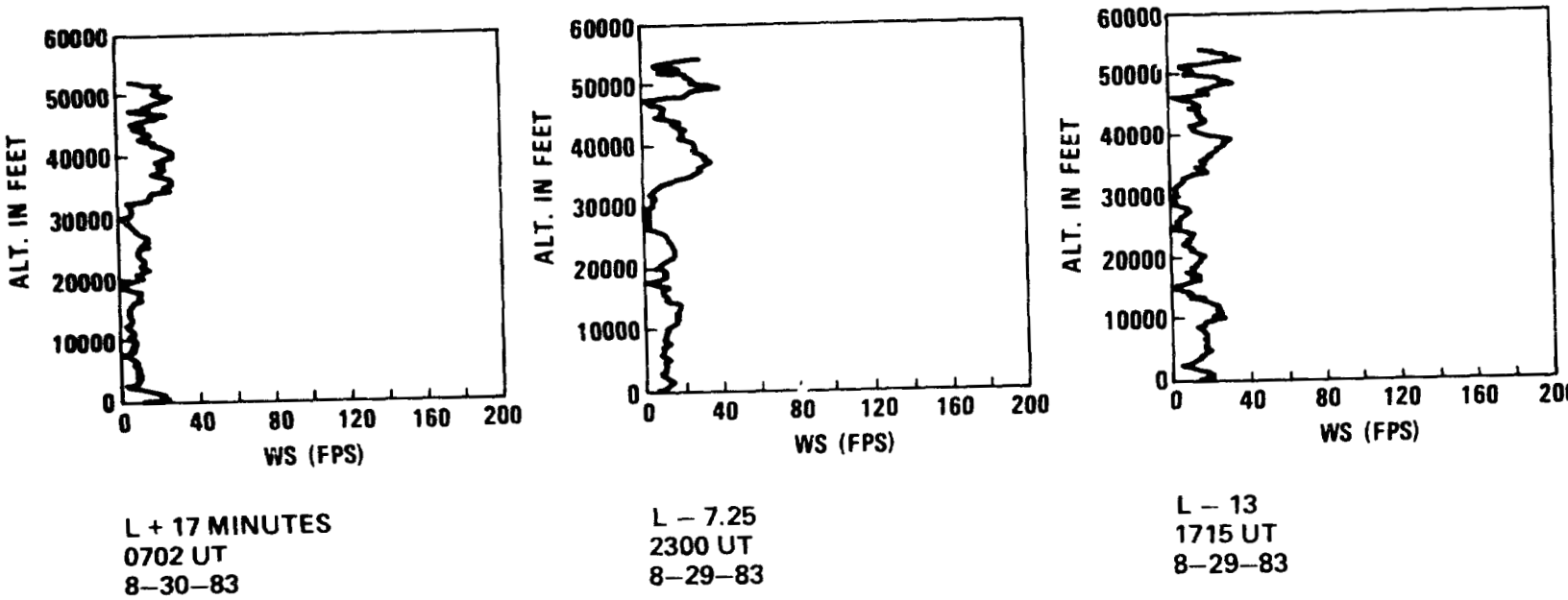


Figure 7. STS-8 prelaunch/launch Jimsphere-measured wind speeds (FPS).

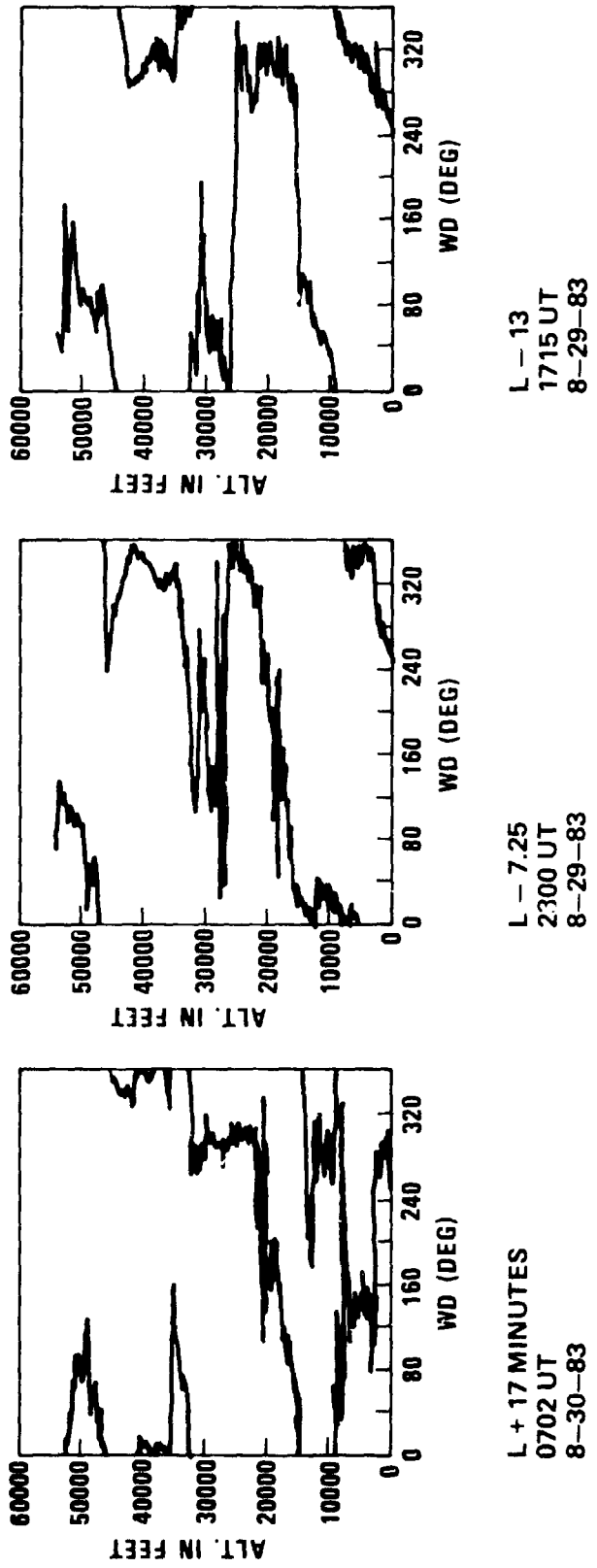


Figure 8. STS-8 prelaunch/launch Jimsphere-measured wind directions (degrees).

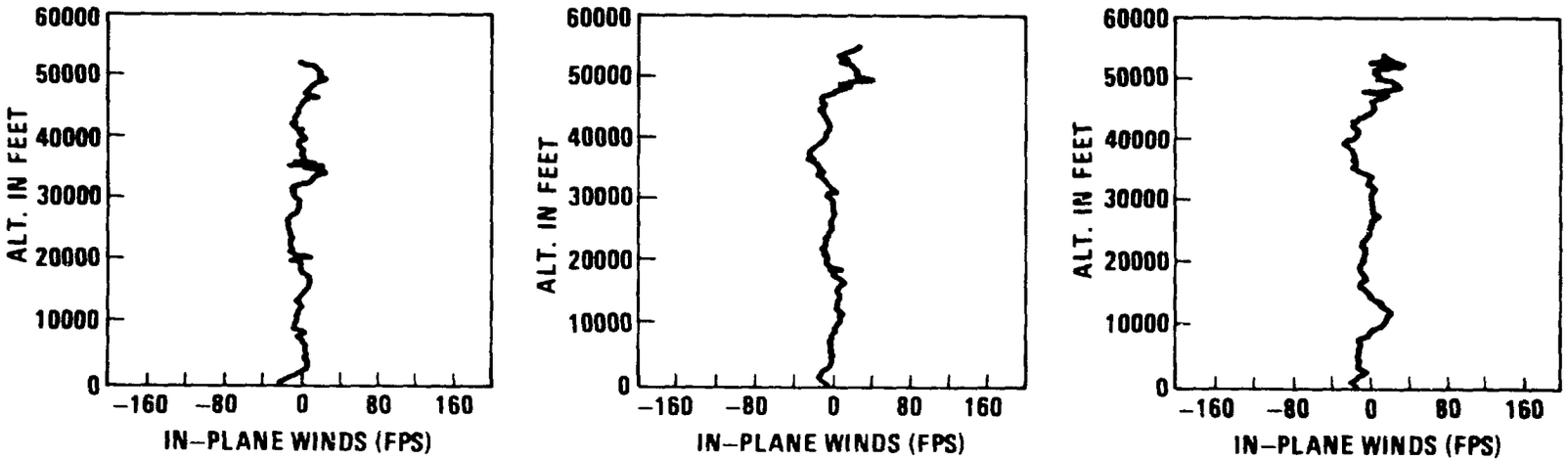


Figure 9. STS-8 prelaunch/launch Jimsphere-measured in-plane component winds (FPS). Flight azimuth = 88 degrees.

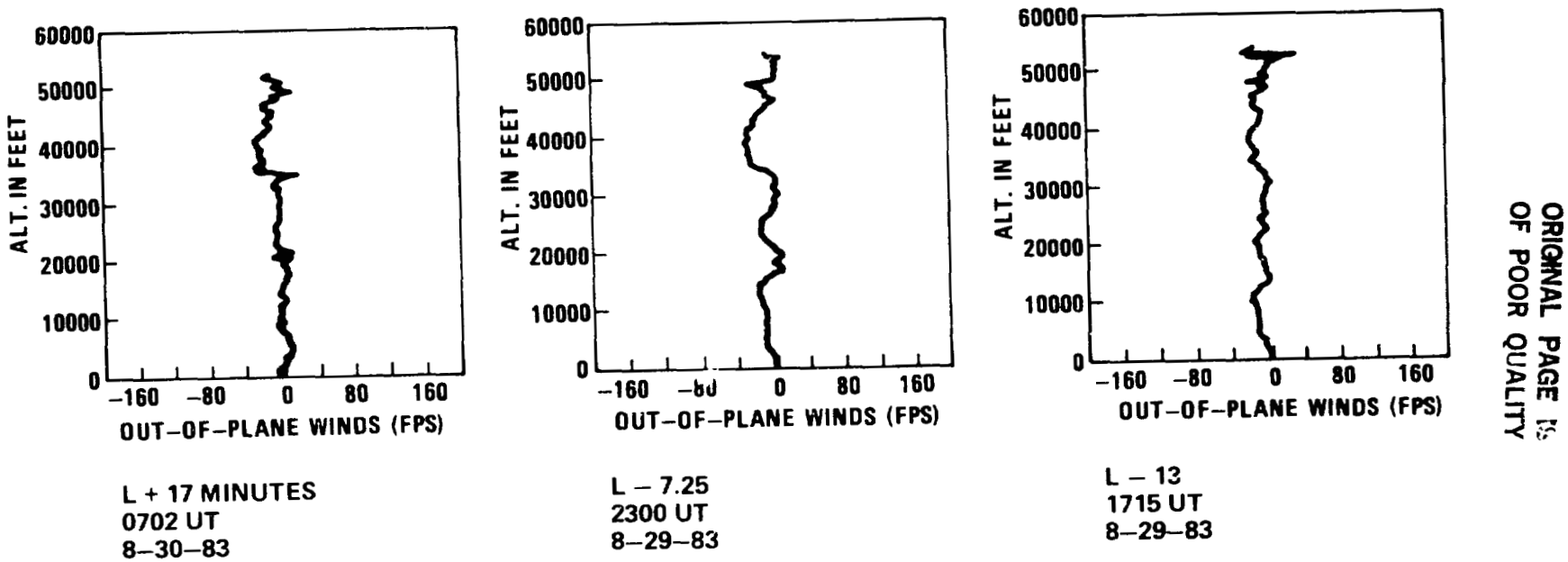
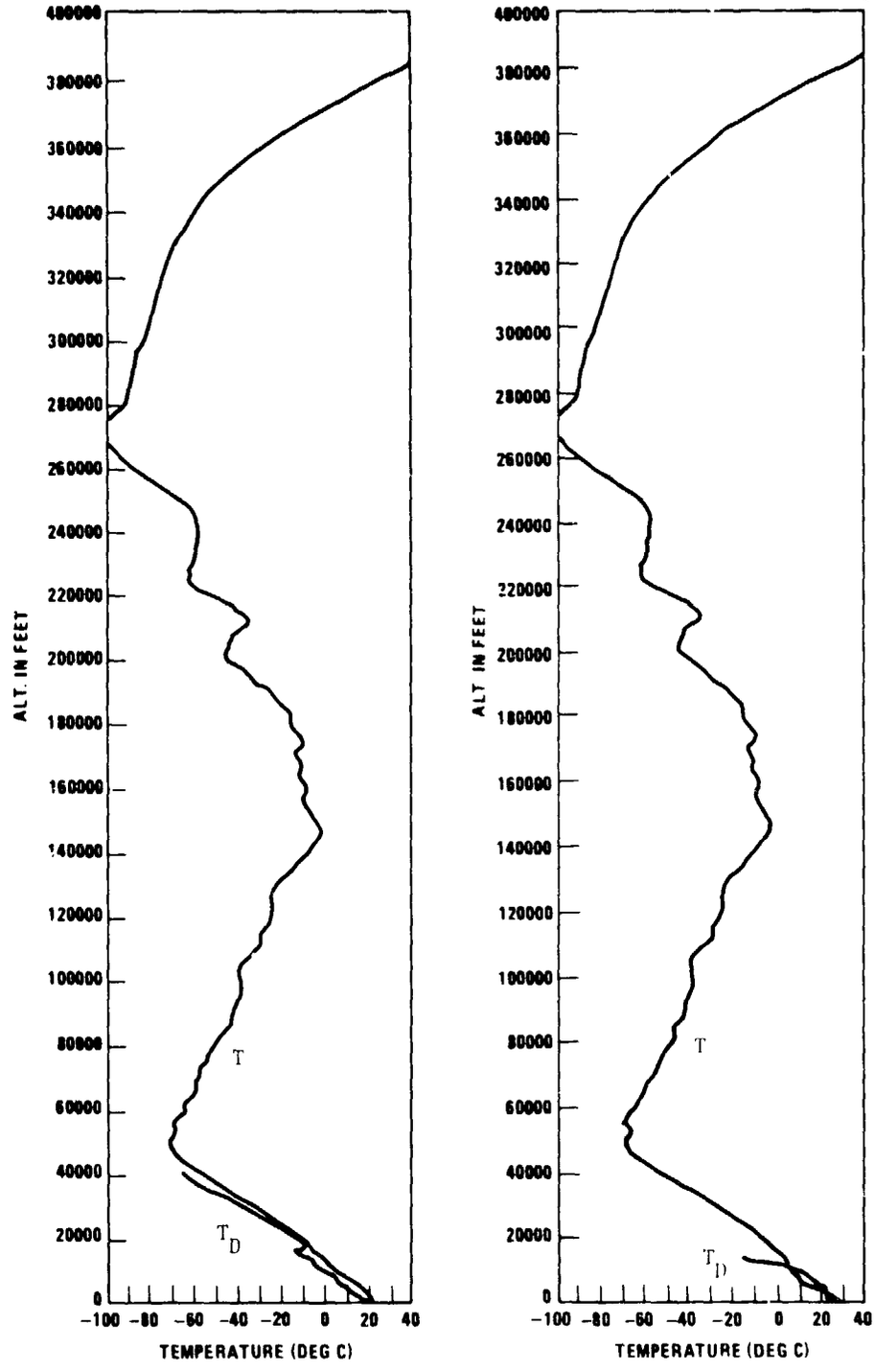


Figure 10. STS-8 prelaunch/launch Jimsphere-measured out-of-plane component winds (FPS). Flight azimuth = 88 degrees.



T - Temperature

T_D - Dew Point Temperature

Figure 11. STS-8 temperature profiles versus altitude for launch (left) and SRB descent (right).

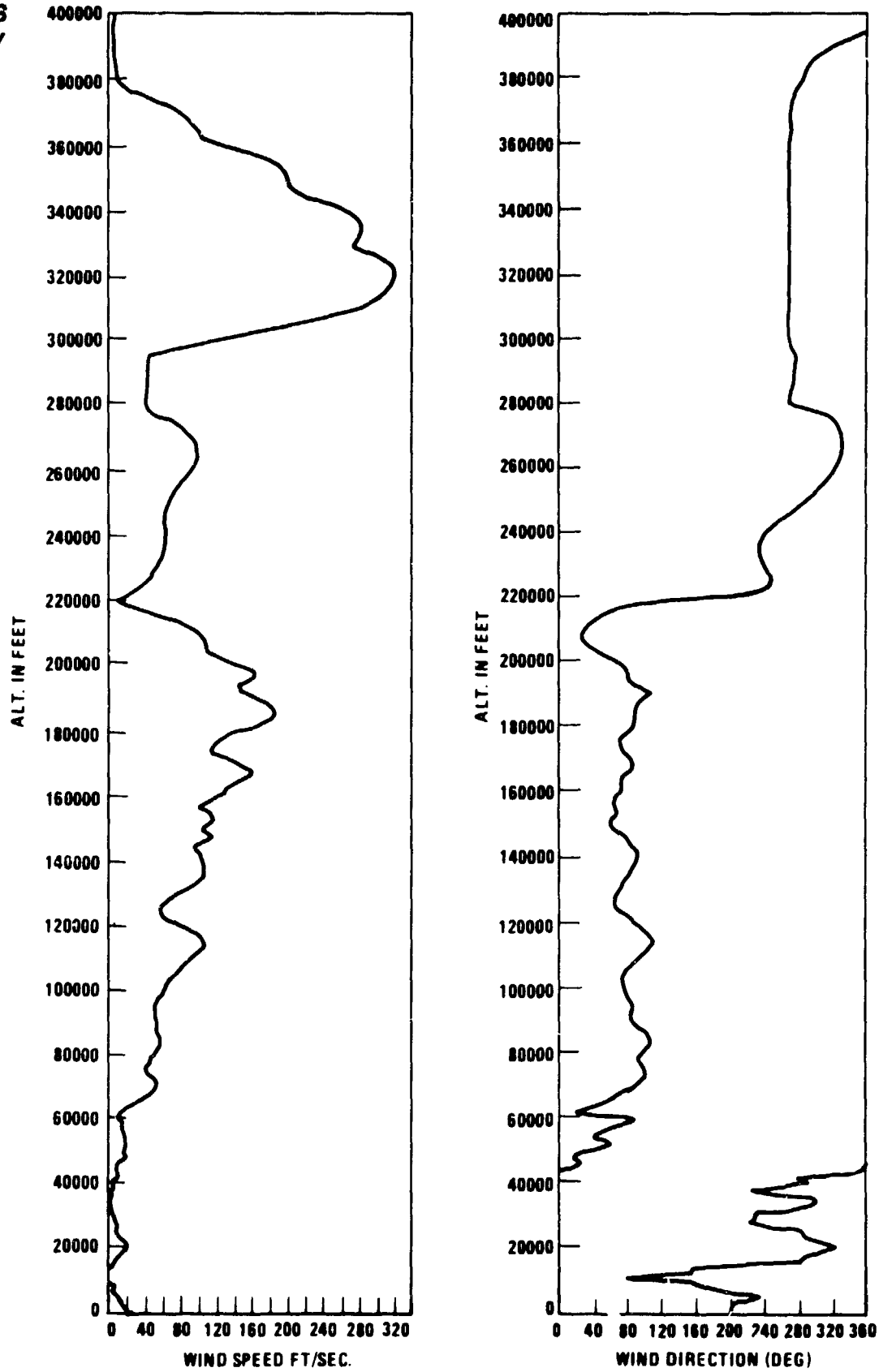


Figure 12. STS-8 scalar wind speed and direction for SRB descent.

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APPENDIX A

PRELAUNCH STS-8 SUPPORT TO LSEAT AND WIND LOADS MONITORING ACTIVITIES AT JSC

STS-8 support was provided at Johnson Space Center by Mr. Kelly Hill, ED44, of the MSFC Atmospheric Sciences Division, through participation on the Launch Systems Evaluation and Assessment Team (LSEAT) and the Prelaunch Winds Loads Monitoring Team. The LSEAT provides go/no-go recommendations to the Mission Management Team (MMT) at scheduled points in the countdown based on inflight vehicle simulation results provided by the Prelaunch Wind Loads Monitoring Team. Mr. Hill was responsible for assessing the validity of the Kennedy Space Center wind profile data used in the inflight loads simulation and responding to the LSEAT when necessary relative to the wind profile data. During the STS-8 countdown, the L-3.5 hr Jimsphere balloon was lost in a thunderstorm. The backup windsonde balloon using a different tracking system acquired data which were analyzed by Mr. Hill and determined to be invalid for simulation purposes. These data reflected inaccuracies produced by the thunderstorms which were occurring during the balloon's ascent. A preliminary loads assessment indicated that had these data been accepted as valid, a no-go recommendation would have resulted. The acquisition, transmission from Kennedy Space Center to Johnson Space Center, and processing of the L-1.5 hr balloon wind profile was expedited in order that it could be used in the LSEAT go/no-go recommendation process. An evaluation by Mr. Hill indicated that these data did not contain inaccuracies produced by thunderstorms or other transient effects and, therefore, were acceptable for use in the ascent loads program. The ascent loads analysis using these L-1.5 hr data resulted in a "go" recommendation by the LSEAT.

APPROVAL

ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-8) LAUNCH

By D. L. Johnson, C. K. Hill, R. E. Turner, 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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