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HOT AND COLD ATMOSPHERES FOR VANDENBERG AFB, CALIFORNIA (1973 VERSION)

By D. L. Johnson
Aero-Astrodynamics Laboratory

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16. ABSTRACT

Extreme atmospheres, pertaining to summer (hot) and winter (cold) conditions for Vandenberg Air Force Base, California, are presented from 0- to 90-km altitudes. Computed values of pressure, e, kinetic temperature, virtual temperature, density, and relative differences [percentages from Vandenberg Reference Atmosphere, 1971 (VRA 71)] of the atmospheric parameters versus altitude are tabulated in increments of 250 m. Hydrostatic and gas law equations were used in conjunction with radiosonde and rocketsonde thermodynamic data in determining the vertical structure of the two atmospheric models. The summer-type density profile deviated from -9.0 percent (of the VRA-71) at the ground to 28.4 percent at 74.5-km altitude. The winter density profile went from 5.2 percent at the surface to -31.4 percent at 72 km.

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DEFINITION OF SYMBOLS AND ABBREVIATIONS

Symbol	Definition
D	Atmospheric density (kg/m^3)
e_s	Saturation vapor pressure
g_o	Acceleration of gravity at sea level (9.80665 m/sec^2)
H	Geopotential altitude (geopotential m)
M_o	Mean molecular weight of air from 0- to 90-km altitude (28.9644)
P	Atmospheric pressure (N/cm^2)
R*	Universal gas constant 8.31432×10^3 m^2/sec^2 °K
RD(D)	Relative deviation of density (percent) from VRA-71
RD(P)	Relative deviation of pressure (percent) from VRA-71
RD(T*)	Relative deviation of virtual temperature (percent) from VRA-71
RH	Relative humidity (percent)
r'	6346873 } function of latitude to convert geopotential altitude to geometric altitude (m)
r*	6348794 }
T	Kinetic temperature (°K)
T*	Virtual temperature (°K)
Z	Geometric altitude (m)

Abbreviation	
KCA-71	Kennedy Cold Atmosphere, 1971
KHA-71	Kennedy Hot Atmosphere, 1971
PRA-63	Patrick Reference Atmosphere, 1963
VCA-73	Vandenberg Cold Atmosphere, 1973
VHA-73	Vandenberg Hot Atmosphere, 1973
VRA-71	Vandenberg Reference Atmosphere, 1971

TECHNICAL MEMORANDUM X-64756

HOT AND COLD ATMOSPHERES FOR VANDENBERG AFB, CALIFORNIA (1973 VERSION)

INTRODUCTION

This report presents two density profiles representing extreme atmospheric conditions from 0- to 90-km altitude for Vandenberg Air Force Base (AFB), California. They are the Vandenberg Hot Atmosphere (VHA-73) (summer type) and Vandenberg Cold Atmosphere (VCA-73) (winter type) and should be used in design studies (launch and reentry analyses) of aerospace vehicles applicable to the Vandenberg AFB area. The development of these two model atmospheres is similar to the construction of the Cape Kennedy hot and cold atmospheric models [1].

An annual Patrick Reference Atmosphere (PRA-63) [2], along with extreme winter (KCA-71) and summer (KHA-71) atmospheres [1], have previously been developed for the Cape Kennedy, Florida, area. A demand for a reference atmosphere for Vandenberg AFB resulted in the construction of the annual Vandenberg Reference Atmosphere (VRA-71) in 1971 [3]. The present report was then prepared to supplement the annual model.

ATMOSPHERIC PARAMETER RELATIONSHIPS

Since the objective of this study is to produce a typical extreme density profile, the question to be answered here is what actually constitutes a typical extreme atmospheric density profile? The envelopes of deviations of density for Cape Kennedy [1], as shown in Figure 1, imply that a typical individual extreme density profile may be represented by a similarly shaped profile; that is, deviations of density, either all negative or all positive, from sea level to 90-km altitude. However, it is unrealistic for either all low- or all high-density values to occur simultaneously at all altitudes in the atmosphere. Examinations of many individual density profiles show that when large positive deviations (with respect to the mean) of density occur at the surface, correspondingly large negative deviations will occur near 15-km altitude and above. Such a situation occurs during the winter season (cold atmosphere). The reverse is also true – density profiles with large negative deviations at lower levels will have correspondingly large positive deviations at higher levels. This situation occurs in the summer season (hot atmosphere) (Fig. 1).

An idealized vertical temperature profile (associated with an extreme density profile), along with a sea-level pressure value, was used to derive the required pressure versus altitude profile by use of the hypsometric equation. Density was then determined

by the ideal gas law. Now, with temperature being the parameter actually used in the modeling program, what is an extreme temperature profile and how are these profiles related to extreme density profiles?

To help answer this question, the National Climatic Center of the National Oceanic and Atmospheric Administration and the U. S. Air Force - Environmental Technical Applications Center conducted interlevel and intralevel correlation studies [4, 5] on Cape Kennedy, Florida, and Vandenberg AFB/Point Arguello, California, radiosonde thermodynamic data. The Cape Kennedy interlevel temperature correlation, as a function of altitude, showed a negative correlation between the lower (2 to 10 km) and higher (14 to 19 km) levels. Monthly maximum negative correlations between 4 km and above ranged from -0.345 (at 16 km in July) to -0.735 (at 18 km in May). The interlevel density correlation study for both Vandenberg and Cape Kennedy showed a high negative correlation between the lower (1 to 3 km) and higher (14 to 18 km) levels. For Vandenberg, on a monthly basis, the interlevel correlations between 2 km and above showed a peak negative density correlation occurring at 16 and 17 km from May through November (maximum of -0.837 in June at 17 km) and occurring slightly lower at 14 and 15 km from December through April (maximum of -0.798 in April at 15 km). Figure 2 gives the seasonal and annual interlevel density correlations between 2 km and other levels. It shows density being positively correlated directly below 8 km and negatively correlated above 8-km altitude. The isopycnic (constant density) level is indicated by the zero interlevel correlation near 8 km. Note that a negative correlation exists up to 35-km altitude. Cape Kennedy data showed very similar results. These studies indicated that temperature and density profiles do exhibit negative correlation characteristics of being either of low value near the surface while high near the tropopause, or high near the ground and low aloft.

Cape Kennedy intralevel correlations between temperature and density ranged from -0.929 (September) to -0.980 (December) at the surface. The correlation at the tropopause level ranged from -0.860 (September) to -0.938 (January). These high negative correlations indicate a low temperature - high density, and high temperature - low density relationship both near the earth's surface and at the tropopause level (15 to 18 km).

DATA USED

The actual construction of the extreme atmospheric models for Vandenberg AFB involved using radiosonde and rocketsonde data for Point Mugu, California [6]. A total of 967 soundings of Point Mugu radiosonde data up to 25-km altitude was substituted for Vandenberg data because of the unavailability of Vandenberg data in the short time period in which this report was to be prepared. Point Mugu rocketsonde data, consisting of 482 temperature profiles, were used between 25- and 60-km altitude with the size of the data sample diminishing considerably above 50 km. The atmospheric data sample used between 60 and 90 km consisted of a small number of worldwide soundings that had been taken between 21.5- and 37.5-deg latitude. This procedure was followed because no mesopheric soundings were available over the Point Mugu/Vandenberg AFB area at approximately 34.5 deg N. latitude.

CONSTRUCTION OF MODEL

Point Mugu is located on the California coast approximately 90 mi southeast of Vandenberg AFB, and its climatology versus altitude is very similar to that of Vandenberg. Monthly mean temperatures for both Point Mugu and Vandenberg [7, 8] show warm temperatures, relative to the annual, from June through October from 0- through 13-km altitude, with cooler temperatures occurring from November through May (Fig. 3). From 14- through 18-km altitude, cooler temperatures exist from July through December (warm from January through June). Conditions reverse again at and above 19-km altitude, with warm temperatures prevailing from April through September. Above 30 km, Point Mugu rocket data show a slight displacement of this warm sector toward the spring and summer months, as shown in Figure 3.

Although we are interested in a typical extreme temperature (or density) profile and not a monthly average profile, it became apparent after reviewing many extreme profiles that individual extreme profiles have characteristics similar to seasonal mean profiles. Mean seasonal temperature profiles exhibit a warm surface temperature and a 2-km-thick cold tropopause centered around 16-km altitude for fall and summer (June through October). Winter and spring (November through May) seasons show cooler surface values and a thicker, warmer tropopause centered around the 16- to 18-km altitude region. The profiles tend to reverse again above these levels up through 50-km altitude, as shown in Figure 4. The seasonal mean radiosonde temperature profiles up to 30-km altitude were taken from Reference 6, with data above this level obtained from Point Mugu summarized rocketsonde data.

The five highest and five lowest temperatures, pressures, and densities at 1-km altitude intervals were searched out by computer from 0 to 55-km altitude. These 10 temperature extreme occurrences (five high and five low) at each level fell very well into their respective winter or summer monthly mean temperature bands versus altitude, as was shown in Figure 3. Approximately 90 percent of the 560 extreme temperatures obtained fell within these seasonal bands. One extreme summer temperature profile at Point Mugu, which occurred on June 4, 1963, actually went from the hottest at 0 km to the coldest at 16- and 17-km altitude. This profile also gave the lowest density at 0 and 1 km, the fourth lowest at 2 km, the second highest at 16 km, and the third highest occurring at both 15- and 17-km altitude. An extreme cold day temperature profile occurred on November 16, 1964, which gave the lowest temperature at 2 km, 3 km, and 4 km, with warm temperatures existing between 14- and 18-km altitude. The density profile for this day ranked as the second highest density at 3 km and 4 km, with the lowest density occurring at 10- and 11-km altitude. These two extreme days again indicate the high correlation existing between temperature and density versus altitude. The two extreme individual profiles of temperature and density are shown in Figures 5 and 6, respectively.

A series of 13 extreme hot and 12 extreme cold day temperature profiles was searched out and average temperature profiles for each type of extreme were constructed, as shown in Figure 7. This figure shows a trend between the summer seasonal mean,

△1 , the mean of many hot extremes, △2 , and the actual observed extreme hot summer type profile, △3 . The three temperature profiles become successively warmer at levels close to the ground and above 25 km, whereas they get successively cooler near the tropopause level. The cold winter atmospheric profiles △4 , △5 , and △6 in Figure 7 show a similar but opposite trend from the three summer-type profiles.

A temperature relationship, though not a particularly strong one, exists between the tropopause/stratopause levels over Vandenberg AFB. The monthly mean profiles of Figure 4 do indicate a cold tropopause and warm stratopause for a summer-type condition. The reverse situation is also true for the winter period. Eighteen of the warmest summer temperature profiles in the 30- to 45-km region were searched out and averaged, as were 11 of the coldest winter profiles. These two averaged profiles are shown in Figure 8. Temperature spreads of different magnitudes exist at the three levels of interest. A large 20° C to 24° C temperature spread occurs from 35- to 40-km altitude, with the summer profile warmer. The tropopause region exhibited a spread of only 1° C to 2° C, with the summer profile being slightly colder. Below 12-km altitude, summer temperatures ranged from 7° C to 8° C warmer than the winter profile.

The preceding five paragraphs described the vertical structure of temperature aloft. These relationships were applied in the actual temperature construction of the VHA-73 and VCA-73 atmospheres from 0 to 90-km altitude. The earth's surface, tropopause, stratopause, and mesopause altitude levels were the four key levels used, as break points, in modeling the vertical temperature structure. First, linear temperature legs were used between the four key altitude levels. Then the temperature profiles were further adjusted with additional linear segments so that the resulting density profiles would be realistic. These two Vandenberg extreme temperature profiles are shown in Figure 9 and the temperature/altitude break points are given in Table 1. The actual surface extreme temperature values for the Vandenberg/Point Arguello area [9] were used in the model, with no low-level temperature inversions incorporated.

Since virtual temperature (T*) was used as input in the hypsometric pressure equation, the extreme Vandenberg surface kinetic temperatures (T) were adjusted to approximate what T* would actually be. This was accomplished through the following procedure. Thirteen of the hot summer day temperature radiosonde profiles for Point Mugu were obtained and values of temperature, relative humidity, and sea-level pressure were used to compute saturation vapor pressure (e_s), then T*. Twelve of the cold winter profiles were also analyzed separately. The mean difference between T* and T for the two cases is shown in Table 2. This mean difference ($\Delta T = \overline{T}^* - \overline{T}$) versus altitude was used as a guideline for adding an increment of temperature to the kinetic value on the hot and cold profiles in order to arrive at virtual temperature-versus-altitude profiles. The surface hot ΔT averaged 2.3° K, with a smaller difference extending up to 9-km altitude. The surface cold ΔT had only a small difference, generally about 0.5° K, with a smaller change existing up to 5-km altitude. In a similar manner, the surface pressure values for the hot and cold profiles were established as 10.10 N/cm^2 and 10.18 N/cm^2, respectively.

EQUATIONS USED

As was stated earlier, the hydrostatic and ideal gas equations were used as the two governing atmospheric equations in the model. The input requirement is for a surface pressure value and a virtual temperature profile which have been determined as an extreme for the model. Pressure versus altitude was computed using the following iterative equation:

$$P_i = P_{i-1} \exp\left[\frac{-g_o M_o \left(H_i - H_{i-1}\right)}{R^* \frac{\left(T_i^* + T_{i-1}^*\right)}{2}}\right] , \quad (1)$$

where P_{i-1} is the base pressure for the first computation and P_i is the pressure level to be computed, above level i-1. Density was computed using the ideal gas law as given in equation (2):

$$D = \frac{10^2 M_o P}{R^* T^*} . \quad (2)$$

The equation used in converting geometric altitude (Z) to geopotential altitude (H) was

$$H = \frac{Zr'}{Z + r^*} . \quad (3)$$

See the list of symbols in the front of this report for the definition of all parameters and constants used in the equations.

DATA COMPARISONS

The wide range of values assumed by the thermodynamic parameters makes it necessary to compute relative comparisons. Such a computation more satisfactorily depicts departures in the higher altitudes where pressure and density values are small. The relative differences between temperature, pressure, and density values from the atmospheres defined by this report and the annual VRA-71 are computed as follows:

$$RD(T^*) = \frac{T_R - T_S}{T_S} \times 100 \quad , \tag{4}$$

$$RD\,(P) = \frac{P_R - P_S}{P_S} \times 100 \quad , \tag{5}$$

and

$$RD\,(D) = \frac{D_R - D_S}{D_S} \times 100 \quad , \tag{6}$$

where the subscript R denotes parameters from the VHA-73 or VCA-73 and S denotes parameters from the VRA-71.

The two finalized extreme density profiles for Vandenberg AFB are given in Figure 10. They are shown as relative (percent) deviations from the VRA-71 density values. The two density profiles follow very similar patterns, as did the previously constructed Cape Kennedy extreme density departures of Reference 1. Levels of minimum density variation are noted at approximately 8-, 30-, and 90-km altitude. Levels of maximum variability occur near 0, 15, and 73 km. The Vandenberg hot density profile goes from -9.0 percent at ground level to a peak of 13.3 percent at 15 km, decreasing slightly and then increasing to another peak of 28.4 percent at 74.5-km altitude. The Vandenberg cold density profile is 5.2 percent at 0 km and increases to 6.7 percent at 1.5 km. The values then fall to a negative peak of -12.4 percent by 15.5 km. A slight increase with altitude is followed by another negative peak of -31.4 percent at 72-km altitude. Hot and cold pressure and temperature deviations are given in Figure 11, also as percentages from the VRA-71 model. Tables 3 and 4 give the numerical results for all the atmospheric thermodynamic parameters at 250-m intervals.

CONCLUSIONS

The atmospheres defined by this report provide a consistent set of thermodynamic parameters representative of extreme conditions over Vandenberg AFB to 90-km altitude. The results presented here are the most current and complete tabulations of extreme thermodynamic profiles for the Vandenberg launch area. These atmospheres are subject to future revisions as more frequent and accurate measurements are obtained. It is recommended that these two extreme atmospheres be used in space vehicle design, performance, heating, and trajectory studies applicable to the Space and Missile Test Center (SAMTEC), Vandenberg Air Force Base, California.

The VHA-73 and VCA-73 have been programmed under those designations as computer subroutines and are available, upon request, from the NASA-MSFC Aerospace Environment Division of the Aero-Astrodynamics Laboratory. The two subroutines will operate similarly to those previously issued to qualified requesters (i.e., the VRA-71 subroutine of Reference 3).

Although this report presents pressure, temperature, and density values, other associated parameters may be of interest to users (i.e., the coefficient of viscosity, kinematic viscosity, speed of sound, etc.). These parameters can easily be obtained through the use of their respective equations given in Reference 3. However, the Vandenberg hot and cold computerized subroutines (VHA-73 and VCA-73) will give all the parameters of Reference 3, as listed above.

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TABLE 1. TEMPERATURE-ALTITUDE BREAK POINTS USED FOR THE VANDENBERG AFB HOT AND COLD ATMOSPHERE MODELS

Vandenberg Hot (Summer)		
Altitude (km)	Virtual Temperature (°K)	Kinetic Temperature (°K)
0	312.7	310.4
9	249.2	249.2
15	197.2	197.2
16	195.7	195.7
17	197.2	197.2
30	243.2	243.2
47	296.2	296.2
52	296.2	296.2
80	180.2	180.2
90	180.2	180.2
Vandenberg Cold (Winter)		
0	272.7	272.1
5	244.0	244.0
9	221.2	221.2
18	218.2	218.2
32	225.2	225.2
47	258.2	258.2
52	258.2	258.2
83	215.2	215.2
90	215.2	215.2

TABLE 2. VIRTUAL TEMPERATURE, TEMPERATURE RELATIONSHIP (MEAN DIFFERENCE, ΔT) THAT EXISTS VERSUS ALTITUDE FOR HOT AND COLD DAYS AT VANDENBERG AFB, CALIFORNIA

Altitude (km)	Vandenberg Hot (Summer) $(\overline{T}^* - \overline{T}) = \Delta T$ (°K)	Vandenberg Cold (Winter) $(\overline{T}^* - \overline{T}) = \Delta T$ (°K)
0	2.3	0.5
1	1.8	0.4
2	1.5	0.3
3	1.1	0.2
4	0.8	0.1
5	0.6	0
6	0.4	0
7	0.2	0
8	0.1	0
9	0	0

NOTES ON TABULAR VALUES IN TABLES 3 AND 4

The two-digit numbers that are preceded by the plus or minus sign indicate the power of 10 by which the respective principal value must be multiplied. For example, a tabular value indicated as:

.28588177 + 03 is 285.88177

and

.15663607 - 04 is 0.000015663607

TABLE 3. VANDENBERG AFB, CALIFORNIA, HOT (SUMMER) ATMOSPHERE, 1973

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm²)	Density D(kg/m³)	Rel. Dev. (T*) with Respect to VRA-7I [RD(T*)%]	Rel. Dev. (P) with Respect to VRA-7I [RD(P)%]	Rel. Dev. (D) with Respect to VRA 7I [RD(D)%]
0.	.0	.31270000+03	.31040000+03	.10100000+02	.11559041+01	8.90	-.38	-8.98
250.	249.9	.31033612+03	.30870000+03	.99271127+01	.11010133+01	8.14	-.66	-8.14
500.	499.8	.30917223+03	.30700000+03	.95601089+01	.10772095+01	7.80	-.45	-7.40
750.	749.7	.30740834+03	.30530000+03	.92388935+01	.10537985+01	6.96	-.24	-6.74
1000.	999.5	.30564445+03	.30360000+03	.90433739+01	.10307463+01	6.50	-.05	-6.15
1250.	1249.4	.30388056+03	.30190000+03	.87934573+01	.10080789+01	6.11	.14	-5.64
1500.	1499.2	.30211667+03	.30020000+03	.85490524+01	.98573248+00	5.79	.31	-5.18
1750.	1749.0	.30035278+03	.29850000+03	.83100687+01	.96378291+00	5.51	.49	-4.77
2000.	1998.8	.29858889+03	.29680000+03	.80764172+01	.94228637+00	5.29	.65	-4.41
2250.	2248.5	.29682500+03	.29510000+03	.78480086+01	.92107882+00	5.10	.81	-4.09
2500.	2498.3	.29506112+03	.29340000+03	.76247555+01	.90022641+00	4.94	.96	-3.80
2750.	2748.0	.29329723+03	.29170000+03	.74065717+01	.87972530+00	4.81	1.11	-3.54
3000.	2997.7	.29153334+03	.29000000+03	.71933710+01	.85957157+00	4.71	1.25	-3.30
3250.	3247.4	.28976945+03	.28830000+03	.69850695+01	.83976147+00	4.62	1.39	-3.09
3500.	3497.0	.28800556+03	.28660000+03	.67815830+01	.82029114+00	4.55	1.53	-2.89
3750.	3746.7	.28624167+03	.28490000+03	.65828284+01	.80115673+00	4.50	1.66	-2.71
4000.	3996.3	.28447778+03	.28320000+03	.63887240+01	.78235450+00	4.45	1.79	-2.54
4250.	4245.9	.28271389+03	.28150000+03	.61991894+01	.76388075+00	4.42	1.93	-2.39
4500.	4495.5	.28095000+03	.27980000+03	.60141438+01	.74573165+00	4.40	2.06	-2.24
4750.	4745.0	.27918612+03	.27810000+03	.58335087+01	.72790354+00	4.39	2.19	-2.10
5000.	4994.6	.27742223+03	.27640000+03	.56572056+01	.71039274+00	4.39	2.32	-1.97
5250.	5244.1	.27565834+03	.27470000+03	.54851562+01	.69319540+00	4.39	2.46	-1.85
5500.	5493.6	.27389445+03	.27300000+03	.53172852+01	.67630801+00	4.41	2.60	-1.74
5750.	5743.1	.27213056+03	.27130000+03	.51535169+01	.65972691+00	4.44	2.74	-1.63
6000.	5992.5	.27036667+03	.26960000+03	.49937765+01	.64344846+00	4.47	2.88	-1.53
6250.	6242.0	.26860278+03	.26790000+03	.48379903+01	.62746903+00	4.52	3.03	-1.43
6500.	6491.4	.26683889+03	.26620000+03	.46860854+01	.61178508+00	4.58	3.18	-1.35
6750.	6740.8	.26507500+03	.26450000+03	.45379393+01	.59639301+00	4.65	3.33	-1.26
7000.	6990.2	.26331112+03	.26280000+03	.43935324+01	.58128929+00	4.73	3.49	-1.19
7250.	7239.5	.26154723+03	.26110000+03	.42529430+01	.56647044+00	4.82	3.66	-1.12
7500.	7488.9	.25978334+03	.25940000+03	.41158521+01	.55193289+00	4.92	3.83	-1.05
7750.	7738.2	.25801945+03	.25770000+03	.39822912+01	.53767318+00	5.03	4.00	-.99
8000.	7987.5	.25625556+03	.25600000+03	.38521925+01	.52368784+00	5.15	4.18	-.93
8250.	8236.8	.25449167+03	.25430000+03	.37254823+01	.50997343+00	5.27	4.36	-.87

TABLE 3. (Continued)

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm^2)	Density D(kg/m^3)	Rel. Dev. (T*) with Respect to VRA-71 [RD(T*)%]	Rel. Dev. (P) with Respect to VRA-71 [RD(P)%]	Rel. Dev. (D) with Respect to VRA-71 [RD(D)%]
8500.	8486.1	.25272778+03	.25260000+03	.36021151+01	.49652648+00	5.40	4.54	-.81
8750.	8735.3	.25096389+03	.25090000+03	.34820053+01	.48334362+00	5.52	4.73	-.74
9000.	8984.5	.24920000+03	.24920000+03	.33650957+01	.47042152+00	5.64	4.92	-.67
9250.	9233.7	.24703333+03	.24703333+03	.32512316+01	.45849030+00	5.58	5.12	-.42
9500.	9482.9	.24486667+03	.24486667+03	.31402676+01	.44676053+00	5.49	5.30	-.16
9750.	9732.1	.24270000+03	.24270000+03	.30321549+01	.43523059+00	5.37	5.49	.12
10000.	9981.3	.24053333+03	.24053333+03	.29268444+01	.42389678+00	5.27	5.64	.35
10250.	10230.4	.23836667+03	.23836667+03	.28242880+01	.41276347+00	5.21	5.86	.61
10500.	10479.5	.23620000+03	.23620000+03	.27244379+01	.40182302+00	5.05	6.06	.95
10750.	10728.6	.23403333+03	.23403333+03	.26272461+01	.39107571+00	4.80	6.25	1.38
11000.	10977.7	.23186667+03	.23186667+03	.25326658+01	.38051999+00	4.47	6.43	1.87
11250.	11226.7	.22970000+03	.22970000+03	.24406501+01	.37015390+00	4.07	6.59	2.42
11500.	11475.7	.22753333+03	.22753333+03	.23511527+01	.35997605+00	3.60	6.73	3.03
11750.	11724.7	.22536667+03	.22536667+03	.22641276+01	.34998467+00	3.07	6.85	3.68
12000.	11973.7	.22320000+03	.22320000+03	.21795295+01	.34017810+00	2.48	6.95	4.37
12250.	12222.7	.22103333+03	.22103333+03	.20973129+01	.33055465+00	1.86	7.03	5.09
12500.	12471.7	.21886667+03	.21886667+03	.20174336+01	.32111266+00	1.19	7.08	5.83
12750.	12720.6	.21670000+03	.21670000+03	.19398471+01	.31185046+00	.50	7.11	6.59
13000.	12969.5	.21453333+03	.21453333+03	.18645095+01	.30276636+00	-.23	7.11	7.36
13250.	13218.4	.21236667+03	.21236667+03	.17913773+01	.29385867+00	-.97	7.08	8.13
13500.	13467.3	.21020000+03	.21020000+03	.17204074+01	.28512572+00	-1.74	7.02	8.91
13750.	13716.1	.20803333+03	.20803333+03	.16515573+01	.27656582+00	-2.51	6.93	9.67
14000.	13965.0	.20586667+03	.20586667+03	.15847846+01	.26817730+00	-3.30	6.80	10.43
14250.	14213.8	.20370000+03	.20370000+03	.15200478+01	.25995849+00	-4.10	6.63	11.18
14500.	14462.6	.20153333+03	.20153333+03	.14573053+01	.25190772+00	-4.91	6.43	11.90
14750.	14711.4	.19936667+03	.19936667+03	.13965162+01	.24402327+00	-5.72	6.19	12.62
15000.	14960.1	.19720000+03	.19720000+03	.13376399+01	.23630347+00	-6.55	5.90	13.31
15250.	15208.9	.19682500+03	.19682500+03	.12808903+01	.22870937+00	-6.53	5.60	12.97
15500.	15457.6	.19645000+03	.19645000+03	.12264469+01	.21748761+00	-6.53	5.29	12.64
15750.	15706.3	.19607500+03	.19607500+03	.11742201+01	.20862439+00	-6.54	4.98	12.32
16000.	15954.9	.19570000+03	.19570000+03	.11241236+01	.20010642+00	-6.57	4.66	12.02
16250.	16203.6	.19607500+03	.19607500+03	.10761643+01	.19120277+00	-6.27	4.35	11.33
16500.	16452.2	.19645000+03	.19645000+03	.10303371+01	.18271118+00	-5.99	4.05	10.70
16750.	16700.9	.19682500+03	.19682500+03	.99654335+00	.17461185+00	-5.76	3.76	10.12
17000.	16949.5	.19720000+03	.19720000+03	.94489907+00	.16688595+00	-5.57	3.49	9.61
17250.	17198.1	.19808462+03	.19808462+03	.90473536+00	.15911408+00	-5.20	3.21	8.90
17500.	17446.6	.19896923+03	.19896923+03	.86563870+00	.15173640+00	-4.91	2.97	8.30
17750.	17695.2	.19985385+03	.19985385+03	.83030384+00	.14473126+00	-4.70	2.74	7.81

TABLE 3. (Continued)

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm^2)	Density D(kg/m^3)	Rel. Dev. (T*) with Respect to VRA-7 [RD(T*)%]	Rel. Dev. (P) with Respect to VRA-7 [RD(P)%]	Rel. Dev. (D) with Respect to VRA-7 [RD(D)%]
18000.	17943.7	.20073846+03	.20073640+03	.79564330+00	.13807836+00	-4.59	2.53	7.44
18250.	18192.2	.20162308+03	.20162308+03	.76257201+00	.13175854+00	-4.32	2.34	6.94
18500.	18440.7	.20250769+03	.20250769+03	.73101230+00	.12575376+00	-4.02	2.06	6.35
18750.	18689.1	.20339231+03	.20339231+03	.70088734+00	.12004705+00	-3.75	1.82	5.82
19000.	18937.6	.20427692+03	.20427692+03	.67212650+00	.11462241+00	-3.49	1.60	5.33
19250.	19186.0	.20516154+03	.20516154+03	.64466260+00	.10946476+00	-3.25	1.41	4.88
19500.	19434.4	.20604615+03	.20604615+03	.61843192+00	.10455991+00	-3.03	1.24	4.47
19750.	19682.8	.20693077+03	.20693077+03	.59337410+00	.99894442-01	-2.82	1.09	4.09
20000.	19931.2	.20781538+03	.20781538+03	.56943204+00	.95455732-01	-2.61	.97	3.73
20250.	20179.5	.20870000+03	.20870000+03	.54655162+00	.91231864-01	-2.42	.86	3.41
20500.	20427.8	.20958462+03	.20958462+03	.52468155+00	.87211588-01	-2.23	.76	3.10
20750.	20676.1	.21046923+03	.21046923+03	.50377326+00	.83384305-01	-2.04	.68	2.81
21000.	20924.4	.21135385+03	.21135385+03	.48378066+00	.79733934-01	-1.86	.61	2.53
21250.	21172.7	.21223846+03	.21223846+03	.46466005+00	.76269175-01	-1.68	.54	2.27
21500.	21421.0	.21312308+03	.21312308+03	.44637004+00	.72962946-01	-1.50	.49	2.01
21750.	21669.2	.21400769+03	.21400769+03	.42887128+00	.69812853-01	-1.31	.45	1.76
22000.	21917.4	.21489231+03	.21489231+03	.41212652+00	.66810926-01	-1.13	.41	1.52
22250.	22165.6	.21577692+03	.21577692+03	.39610031+00	.63949623-01	-.93	.37	1.28
22500.	22413.8	.21666154+03	.21666154+03	.38075909+00	.61221823-01	-.74	.34	1.04
22750.	22661.9	.21754615+03	.21754615+03	.36607095+00	.58620790-01	-.53	.31	.80
23000.	22910.0	.21843077+03	.21843077+03	.35200562+00	.56140153-01	-.32	.29	.56
23250.	23158.2	.21931538+03	.21931538+03	.33853433+00	.53773886-01	-.11	.27	.32
23500.	23406.3	.22020000+03	.22020000+03	.32562972+00	.51516283-01	.12	.25	.08
23750.	23654.3	.22108462+03	.22108462+03	.31326583+00	.49361950-01	.35	.23	-.16
24000.	23902.4	.22196923+03	.22196923+03	.30141799+00	.47305779-01	.58	.21	-.41
24250.	24150.4	.22285385+03	.22285385+03	.29006270+00	.45342927-01	.83	.20	-.65
24500.	24398.4	.22373846+03	.22373846+03	.27917768+00	.43468820-01	1.08	.19	-.90
24750.	24646.4	.22462308+03	.22462308+03	.26874167+00	.41679111-01	1.34	.19	-1.14
25000.	24894.4	.22550769+03	.22550769+03	.25873452+00	.39969634-01	1.60	.19	-1.39
25250.	25142.4	.22639231+03	.22639231+03	.24913702+00	.38336672-01	1.86	.19	-1.63
25500.	25390.3	.22727692+03	.22727692+03	.23993091+00	.36776353-01	2.13	.20	-1.86
25750.	25638.2	.22816154+03	.22816154+03	.23109877+00	.35285234-01	2.39	.22	-2.09
26000.	25886.1	.22904615+03	.22904615+03	.22262406+00	.33859990-01	2.66	.25	-2.30
26250.	26134.0	.22993077+03	.22993077+03	.21449102+00	.32497491-01	2.92	.30	-2.50
26500.	26381.9	.23081538+03	.23081538+03	.20668464+00	.31194732-01	3.18	.35	-2.68
26750.	26629.7	.23170000+03	.23170000+03	.19919062+00	.29948885-01	3.43	.43	-2.85

TABLE 3. (Continued)

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm²)	Density D(kg/m³)	Rel. Dev. (T*) with Respect to VRA-7I [RD(T*)%]	Rel. Dev. (P) with Respect to VRA-7I [RD(P)%]	Rel. Dev. (D) with Respect to VRA-7I [RD(D)%]
27000.	26877.5	.23258462+03	.23258462+03	.19199534+00	.28757261-01	3.66	.52	-2.98
27250.	27125.3	.23346923+03	.23346923+03	.18508582+00	.27617305-01	3.89	.64	-3.09
27500.	27373.1	.23435385+03	.23435385+03	.17844968+00	.26526595-01	4.09	.78	-3.16
27750.	27620.9	.23523846+03	.23523846+03	.17207516+00	.25482830-01	4.28	.95	-3.20
28000.	27868.6	.23612308+03	.23612308+03	.16595099+00	.24487823-01	4.44	1.15	-3.18
28250.	28116.3	.23700769+03	.23700769+03	.16006647+00	.23527498-01	4.74	1.28	-3.30
28500.	28364.0	.23789231+03	.23789231+03	.15441140+00	.22611885-01	4.84	1.39	-3.28
28750.	28611.7	.23877692+03	.23877692+03	.14897599+00	.21735105-01	4.94	1.51	-3.27
29000.	28859.4	.23966154+03	.23966154+03	.14375097+00	.20895378-01	5.05	1.64	-3.24
29250.	29107.0	.24054615+03	.24054615+03	.13872744+00	.20091010-01	5.17	1.78	-3.22
29500.	29354.7	.24143077+03	.24143077+03	.13389696+00	.19320390-01	5.29	1.92	-3.20
29750.	29602.3	.24231538+03	.24231538+03	.12925142+00	.18581986-01	5.41	2.07	-3.17
30000.	29849.9	.24320000+03	.24320000+03	.12478311+00	.17874341-01	5.54	2.23	-3.14
30250.	30097.4	.24397941+03	.24397941+03	.12048375+00	.17203353-01	5.63	2.39	-3.07
30500.	30345.0	.24475882+03	.24475882+03	.11634554+00	.16559575-01	5.72	2.55	-2.99
30750.	30592.5	.24553823+03	.24553823+03	.11236194+00	.15941821-01	5.81	2.72	-2.92
31000.	30840.0	.24631765+03	.24631765+03	.10852673+00	.15348961-01	5.90	2.90	-2.84
31250.	31087.5	.24709706+03	.24709706+03	.10483392+00	.14779919-01	6.00	3.08	-2.76
31500.	31335.0	.24787647+03	.24787647+03	.10127780+00	.14233666-01	6.10	3.26	-2.67
31750.	31582.5	.24865588+03	.24865588+03	.97852924-01	.13709224-01	6.20	3.45	-2.59
32000.	31829.9	.24943529+03	.24943529+03	.94554038-01	.13205656-01	6.30	3.64	-2.50
32250.	32077.3	.25021471+03	.25021471+03	.91376145-01	.12722071-01	6.39	3.83	-2.41
32500.	32324.7	.25099412+03	.25099412+03	.88314445-01	.12257616-01	6.49	4.03	-2.31
32750.	32572.1	.25177353+03	.25177353+03	.85364355-01	.11811479-01	6.59	4.23	-2.21
33000.	32819.4	.25255294+03	.25255294+03	.82521473-01	.11382885-01	6.68	4.43	-2.11
33250.	33066.8	.25333235+03	.25333235+03	.79781595-01	.10971092-01	6.78	4.64	-2.00
33500.	33314.1	.25411176+03	.25411176+03	.77140689-01	.10575394-01	6.87	4.84	-1.90
33750.	33561.4	.25489118+03	.25489118+03	.74594888-01	.10195113-01	6.96	5.05	-1.78
34000.	33808.7	.25567059+03	.25567059+03	.72140493-01	.98296066-02	7.05	5.26	-1.66
34250.	34055.9	.25645000+03	.25645000+03	.69773961-01	.94782569-02	7.13	5.48	-1.54
34500.	34303.2	.25722941+03	.25722941+03	.67491893-01	.91404755-02	7.21	5.69	-1.42
34750.	34550.4	.25800882+03	.25800882+03	.65291032-01	.88156996-02	7.29	5.91	-1.29
35000.	34797.6	.25878823+03	.25878823+03	.63168256-01	.85033913-02	7.36	6.13	-1.15
35250.	35044.8	.25956765+03	.25956765+03	.61120572-01	.82030367-02	7.43	6.35	-1.01
35500.	35291.9	.26034706+03	.26034706+03	.59145110-01	.79141445-02	7.50	6.57	-.87
35750.	35539.1	.26112647+03	.26112647+03	.57239118-01	.76362448-02	7.57	6.79	-.72
36000.	35786.2	.26190588+03	.26190588+03	.55399955-01	.73688882-02	7.62	7.01	-.57
36250.	36033.3	.26268529+03	.26268529+03	.53625091-01	.71116454-02	7.68	7.23	-.42

TABLE 3. (Continued)

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm²)	Density D(kg/m³)	Rel. Dev. (T*) with Respect to VRA-71 [RD(T*)%]	Rel. Dev. (P) with Respect to VRA-71 [RD(P)%]	Rel. Dev. (D) with Respect to VRA-71 [RD(D)%]
36500.	36280.4	.26346471+03	.26346471+03	.51912095-01	.68641050-02	7.73	7.46	-.26
36750.	36527.4	.26424412+03	.26424412+03	.50258640-01	.66258746-02	7.78	7.68	-.09
37000.	36774.5	.26502353+03	.26502353+03	.48662488-01	.63965778-02	7.82	7.91	.08
37250.	37021.5	.26580294+03	.26580294+03	.47121494-01	.61758547-02	7.86	8.13	.25
37500.	37268.5	.26658235+03	.26658235+03	.45633598-01	.59633612-02	7.90	8.36	.43
37750.	37515.5	.26736176+03	.26736176+03	.44196823-01	.57587677-02	7.93	8.58	.60
38000.	37762.5	.26814117+03	.26814117+03	.42809272-01	.55617586-02	7.96	8.81	.79
38250.	38009.4	.26892059+03	.26892059+03	.41469120-01	.53720319-02	7.98	9.03	.97
38500.	38256.4	.26970000+03	.26970000+03	.40174621-01	.51892984-02	8.00	9.26	1.16
38750.	38503.3	.27047941+03	.27047941+03	.38924093-01	.50132816-02	8.02	9.49	1.36
39000.	38750.2	.27125882+03	.27125882+03	.37715923-01	.48437159-02	8.04	9.71	1.55
39250.	38997.0	.27203823+03	.27203823+03	.36548559-01	.46803476-02	8.05	9.94	1.75
39500.	39243.9	.27281765+03	.27281765+03	.35420513-01	.45229334-02	8.06	10.16	1.95
39750.	39490.7	.27359706+03	.27359706+03	.34330354-01	.43712401-02	8.06	10.39	2.15
40000.	39737.5	.27437647+03	.27437647+03	.33276706-01	.42250443-02	8.07	10.62	2.36
40250.	39984.3	.27515588+03	.27515588+03	.32258249-01	.40841322-02	8.07	10.84	2.56
40500.	40231.1	.27593529+03	.27593529+03	.31273711-01	.39482985-02	8.08	11.07	2.77
40750.	40477.9	.27671471+03	.27671471+03	.30321873-01	.38173466-02	8.08	11.29	2.98
41000.	40724.6	.27749412+03	.27749412+03	.29401561-01	.36910881-02	8.08	11.52	3.18
41250.	40971.3	.27827353+03	.27827353+03	.28511646-01	.35693423-02	8.08	11.74	3.39
41500.	41218.0	.27905294+03	.27905294+03	.27651044-01	.34519360-02	8.08	11.97	3.60
41750.	41464.7	.27983235+03	.27983235+03	.26818711-01	.33387030-02	8.08	12.19	3.80
42000.	41711.4	.28061176+03	.28061176+03	.26013643-01	.32294838-02	8.09	12.42	4.01
42250.	41958.0	.28139117+03	.28139117+03	.25234876-01	.31241257-02	8.09	12.65	4.21
42500.	42204.6	.28217059+03	.28217059+03	.24481480-01	.30224821-02	8.10	12.87	4.41
42750.	42451.2	.28295000+03	.28295000+03	.23752563-01	.29244123-02	8.11	13.10	4.61
43000.	42697.8	.28372941+03	.28372941+03	.23047266-01	.28297812-02	8.13	13.33	4.81
43250.	42944.4	.28450882+03	.28450882+03	.22364761-01	.27384595-02	8.15	13.56	5.00
43500.	43190.9	.28528823+03	.28528823+03	.21704251-01	.26503227-02	8.17	13.79	5.19
43750.	43437.4	.28606765+03	.28606765+03	.21064972-01	.25652514-02	8.20	14.02	5.37
44000.	43683.9	.28684706+03	.28684706+03	.20446185-01	.24831313-02	8.24	14.25	5.55
44250.	43930.4	.28762647+03	.28762647+03	.19847180-01	.24038523-02	8.29	14.48	5.72
44500.	44176.9	.28840588+03	.28840588+03	.19267275-01	.23273087-02	8.34	14.72	5.89
44750.	44423.3	.28918529+03	.28918529+03	.18705811-01	.22533993-02	8.40	14.96	6.05
45000.	44669.8	.28996471+03	.28996471+03	.18162154-01	.21820265-02	8.47	15.20	6.20
45250.	44916.2	.29074412+03	.29074412+03	.17635694-01	.21130969-02	8.56	15.44	6.34
45500.	45162.6	.29152353+03	.29152353+03	.17125843-01	.20465207-02	8.65	15.68	6.47
45750.	45408.9	.29230294+03	.29230294+03	.16632034-01	.19822114-02	8.76	15.93	6.60

TABLE 3. (Continued)

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm^2)	Density D(kg/m^3)	Rel. Dev. (T*) with Respect to VRA-7 [RD(T*)%]	Rel. Dev. (P) with Respect to VRA-7 [RD(P)%]	Rel. Dev. (D) with Respect to VRA-7 [RD(D)%]
46000.	45655.3	.29308235+03	.29308235+03	.16153722-01	.19200863-02	8.88	16.18	6.71
46250.	45901.6	.29386176+03	.29386176+03	.15690381-01	.18600655-02	9.01	16.43	6.81
46500.	46147.9	.29464117+03	.29464117+03	.15241506-01	.18020725-02	9.16	16.69	6.90
46750.	46394.2	.29542059+03	.29542059+03	.14806608-01	.17460337-02	9.33	16.95	6.97
47000.	46640.5	.29620000+03	.29620000+03	.14385216-01	.16918783-02	9.51	17.22	7.04
47250.	46886.8	.29620000+03	.29620000+03	.13976348-01	.16437904-02	9.43	17.49	7.36
47500.	47133.0	.29620000+03	.29620000+03	.13579101-01	.15970693-02	9.37	17.75	7.66
47750.	47379.2	.29620000+03	.29620000+03	.13193145-01	.15516761-02	9.33	18.01	7.94
48000.	47625.4	.29620000+03	.29620000+03	.12818158-01	.15075731-02	9.31	18.27	8.19
48250.	47871.6	.29620000+03	.29620000+03	.12453830-01	.14647237-02	9.32	18.52	8.42
48500.	48117.7	.29620000+03	.29620000+03	.12099858-01	.14230921-02	9.35	18.77	8.61
48750.	48363.9	.29620000+03	.29620000+03	.11755946-01	.13826438-02	9.41	19.02	8.78
49000.	48610.0	.29620000+03	.29620000+03	.11421809-01	.13433452-02	9.51	19.27	8.92
49250.	48856.1	.29620000+03	.29620000+03	.11097169-01	.13051636-02	9.45	19.72	9.38
49500.	49102.2	.29620000+03	.29620000+03	.10781756-01	.12680671-02	9.36	19.93	9.67
49750.	49348.2	.29620000+03	.29620000+03	.10475308-01	.12320251-02	9.29	20.15	9.94
50000.	49594.3	.29620000+03	.29620000+03	.10177570-01	.11970075-02	9.24	20.37	10.20
50250.	49840.3	.29620000+03	.29620000+03	.98882952-02	.11629852-02	9.20	20.60	10.44
50500.	50086.3	.29620000+03	.29620000+03	.96072421-02	.11299298-02	9.18	20.83	10.67
50750.	50332.3	.29620000+03	.29620000+03	.93341772-02	.10978141-02	9.18	21.07	10.89
51000.	50578.3	.29620000+03	.29620000+03	.90688736-02	.10666111-02	9.19	21.31	11.10
51250.	50824.2	.29620000+03	.29620000+03	.88111107-02	.10362950-02	9.22	21.55	11.29
51500.	51070.1	.29620000+03	.29620000+03	.85606743-02	.10068406-02	9.26	21.80	11.48
51750.	51316.1	.29620000+03	.29620000+03	.83173559-02	.97822337-03	9.31	22.06	11.66
52000.	51561.9	.29620000+03	.29620000+03	.80809533-02	.95041952-03	9.39	22.32	11.82
52250.	51807.8	.29516429+03	.29516429+03	.78508732-02	.92659927-03	9.09	22.58	12.37
52500.	52053.7	.29412857+03	.29412857+03	.76265695-02	.90329544-03	8.80	22.83	12.90
52750.	52299.5	.29309286+03	.29309286+03	.74079168-02	.88049858-03	8.53	23.08	13.41
53000.	52545.3	.29205714+03	.29205714+03	.71947919-02	.85819941-03	8.27	23.32	13.91
53250.	52791.1	.29102143+03	.29102143+03	.69870740-02	.83638875-03	8.01	23.56	14.39
53500.	53036.9	.28998572+03	.28998572+03	.67846446-02	.81505757-03	7.77	23.79	14.86
53750.	53282.6	.28895000+03	.28895000+03	.65873865-02	.79419703-03	7.55	24.01	15.31
54000.	53528.4	.28791429+03	.28791429+03	.63951862-02	.77379833-03	7.33	24.23	15.75
54250.	53774.1	.28687857+03	.28687857+03	.62079313-02	.75385287-03	7.12	24.44	16.17
54500.	54019.8	.28584286+03	.28584286+03	.60255115-02	.73435216-03	6.92	24.65	16.59
54750.	54265.5	.28480714+03	.28480714+03	.58478191-02	.71528786-03	6.72	24.85	16.98

TABLE 3. (Continued)

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm²)	Density D(kg/m³)	Rel. Dev. (T*) with Respect to VRA-7 I [RD(T*)%]	Rel. Dev. (P) with Respect to VRA-7 I [RD(P)%]	Rel. Dev. (D) with Respect to VRA-7 I [RD(D)%]
55000.	54511.1	.28377143+03	.28377143+03	.56747479-02	.69665172-03	6.54	25.04	17.37
55250.	54756.8	.28273572+03	.28273572+03	.55061941-02	.67843562-03	6.36	25.23	17.74
55500.	55002.4	.28170000+03	.28170000+03	.53420555-02	.66063161-03	6.20	25.42	18.10
55750.	55248.0	.28066429+03	.28066429+03	.51822321-02	.64323180-03	6.04	25.59	18.44
56000.	55493.6	.27962857+03	.27962857+03	.50266259-02	.62622849-03	5.88	25.77	18.78
56250.	55739.1	.27859286+03	.27859286+03	.48751404-02	.60961403-03	5.74	25.94	19.10
56500.	55984.7	.27755714+03	.27755714+03	.47276813-02	.59338094-03	5.60	26.10	19.42
56750.	56230.2	.27652143+03	.27652143+03	.45841562-02	.57752184-03	5.46	26.26	19.72
57000.	56475.7	.27548572+03	.27548572+03	.44444739-02	.56202945-03	5.33	26.41	20.01
57250.	56721.2	.27445000+03	.27445000+03	.43085457-02	.54689666-03	5.21	26.56	20.29
57500.	56966.7	.27341429+03	.27341429+03	.41762841-02	.53211639-03	5.09	26.70	20.56
57750.	57212.1	.27237857+03	.27237857+03	.40476036-02	.51768173-03	4.98	26.84	20.82
58000.	57457.5	.27134286+03	.27134286+03	.39224204-02	.50358588-03	4.87	26.97	21.07
58250.	57703.0	.27030714+03	.27030714+03	.38006522-02	.48982213-03	4.77	27.10	21.31
58500.	57948.3	.26927143+03	.26927143+03	.36822184-02	.47638390-03	4.67	27.22	21.55
58750.	58193.7	.26823572+03	.26823572+03	.35670400-02	.46326466-03	4.57	27.34	21.77
59000.	58439.1	.26720000+03	.26720000+03	.34550394-02	.45045806-03	4.48	27.45	21.99
59250.	58684.4	.26616429+03	.26616429+03	.33461410-02	.43795779-03	4.39	27.56	22.20
59500.	58929.7	.26512857+03	.26512857+03	.32402702-02	.42575769-03	4.30	27.67	22.40
59750.	59175.0	.26409286+03	.26409286+03	.31373544-02	.41385168-03	4.22	27.77	22.60
60000.	59420.3	.26305714+03	.26305714+03	.30373220-02	.40223378-03	4.13	27.86	22.79
60250.	59665.5	.26202143+03	.26202143+03	.29401032-02	.39089811-03	4.06	27.96	22.97
60500.	59910.8	.26098572+03	.26098572+03	.28456296-02	.37983890-03	3.98	28.04	23.15
60750.	60156.0	.25995000+03	.25995000+03	.27538340-02	.36905045-03	3.90	28.13	23.32
61000.	60401.2	.25891429+03	.25891429+03	.26646508-02	.35852718-03	3.83	28.21	23.48
61250.	60646.4	.25787857+03	.25787857+03	.25780156-02	.34826360-03	3.75	28.28	23.64
61500.	60891.5	.25684286+03	.25684286+03	.24938653-02	.33825427-03	3.68	28.35	23.80
61750.	61136.7	.25580714+03	.25580714+03	.24121383-02	.32849393-03	3.61	28.42	23.95
62000.	61381.8	.25477143+03	.25477143+03	.23327743-02	.31897732-03	3.54	28.48	24.09
62250.	61626.9	.25373572+03	.25373572+03	.22557140-02	.30969931-03	3.47	28.54	24.23
62500.	61872.0	.25270000+03	.25270000+03	.21808997-02	.30065488-03	3.40	28.59	24.37
62750.	62117.1	.25166429+03	.25166429+03	.21082747-02	.29183906-03	3.33	28.64	24.50
63000.	62362.1	.25062857+03	.25062857+03	.20377835-02	.28324696-03	3.26	28.69	24.63
63250.	62607.1	.24959286+03	.24959286+03	.19693718-02	.27487381-03	3.18	28.73	24.76
63500.	62852.1	.24855714+03	.24855714+03	.19029866-02	.26671489-03	3.11	28.77	24.88
63750.	63097.1	.24752143+03	.24752143+03	.18385758-02	.25876560-03	3.04	28.80	25.00
64000.	63342.1	.24648572+03	.24648572+03	.17760888-02	.25102138-03	2.97	28.83	25.12
64250.	63587.1	.24545000+03	.24545000+03	.17154756-02	.24347778-03	2.89	28.86	25.24

TABLE 3. (Continued)

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm^2)	Density D(kg/m^3)	Rel. Dev. (T*) with Respect to VRA-71 [RD(T*)%]	Rel. Dev. (P) with Respect to VRA-71 [RD(P)%]	Rel. Dev. (D) with Respect to VRA-71 [RD(D)%]
64500.	63932.0	.24441429+03	.24441429+03	.16566878-02	.23613040-03	2.82	28.88	25.35
64750.	64076.9	.24337857+03	.24337857+03	.15996777-02	.22897494-03	2.74	28.90	25.46
65000.	64321.8	.24234286+03	.24234286+03	.15443988-02	.22200718-03	2.66	28.91	25.57
65250.	64566.7	.24130714+03	.24130714+03	.14908055-02	.21522297-03	2.59	28.92	25.68
65500.	64811.5	.24027143+03	.24027143+03	.14388535-02	.20861822-03	2.50	28.93	25.79
65750.	65056.4	.23923572+03	.23923572+03	.13884990-02	.20218892-03	2.41	28.93	25.89
66000.	65301.2	.23820000+03	.23820000+03	.13396997-02	.19593116-03	2.33	28.93	26.00
66250.	65546.0	.23716429+03	.23716429+03	.12924141-02	.18984108-03	2.24	28.92	26.10
66500.	65790.9	.23612857+03	.23612857+03	.12466013-02	.18391487-03	2.15	28.91	26.20
66750.	66035.5	.23509286+03	.23509286+03	.12022217-02	.17814881-03	2.05	28.89	26.30
67000.	66280.3	.23405714+03	.23405714+03	.11592365-02	.17253926-03	1.96	28.87	26.40
67250.	66525.0	.23302143+03	.23302143+03	.11176078-02	.16708264-03	1.86	28.85	26.50
67500.	66769.7	.23198572+03	.23198572+03	.10772984-02	.16177543-03	1.76	28.82	26.59
67750.	67014.4	.23095000+03	.23095000+03	.10382722-02	.15661418-03	1.66	28.79	26.69
68000.	67259.0	.22991429+03	.22991429+03	.10004939-02	.15159549-03	1.55	28.75	26.78
68250.	67503.7	.22887857+03	.22887857+03	.96392881-03	.14671605-03	1.44	28.71	26.88
68500.	67748.3	.22784286+03	.22784286+03	.92854328-03	.14197260-03	1.33	28.66	26.97
68750.	67992.9	.22680714+03	.22680714+03	.89430432-03	.13736194-03	1.22	28.61	27.06
69000.	68237.5	.22577143+03	.22577143+03	.86117982-03	.13288093-03	1.10	28.55	27.15
69250.	68482.1	.22473572+03	.22473572+03	.82913830-03	.12852650-03	.98	28.49	27.24
69500.	68726.6	.22370000+03	.22370000+03	.79814914-03	.12429563-03	.86	28.43	27.33
69750.	68971.2	.22266429+03	.22266429+03	.76818238-03	.12019536-03	.74	28.36	27.42
70000.	69215.7	.22162857+03	.22162857+03	.73920883-03	.11619280-03	.61	28.28	27.50
70250.	69460.2	.22059286+03	.22059286+03	.71119997-03	.11231508-03	.48	28.20	27.58
70500.	69704.6	.21955714+03	.21955714+03	.68412802-03	.10854945-03	.35	28.11	27.66
70750.	69949.1	.21852143+03	.21852143+03	.65796580-03	.10489314-03	.21	28.02	27.74
71000.	70193.5	.21748572+03	.21748572+03	.63268688-03	.10134350-03	.08	27.92	27.82
71250.	70437.9	.21645000+03	.21645000+03	.60826537-03	.97897885-04	-.06	27.82	27.89
71500.	70682.3	.21541429+03	.21541429+03	.58467616-03	.94553735-04	-.20	27.71	27.96
71750.	70926.7	.21437857+03	.21437857+03	.56189462-03	.91308520-04	-.34	27.59	28.03
72000.	71171.1	.21334286+03	.21334286+03	.53989683-03	.88159774-04	-.49	27.47	28.09
72250.	71415.4	.21230714+03	.21230714+03	.51865943-03	.85105077-04	-.64	27.34	28.15
72500.	71659.7	.21127143+03	.21127143+03	.49815966-03	.82142059-04	-.78	27.21	28.21
72750.	71904.0	.21023572+03	.21023572+03	.47837531-03	.79268394-04	-.93	27.06	28.26
73000.	72148.3	.20920000+03	.20920000+03	.45928474-03	.76481807-04	-1.08	26.92	28.30
73250.	72392.5	.20816429+03	.20816429+03	.44086691-03	.73780074-04	-1.23	26.76	28.34
73500.	72636.8	.20712857+03	.20712857+03	.42310128-03	.71161014-04	-1.38	26.60	28.38
73750.	72881.1	.20609286+03	.20609286+03	.40596732-03	.68622490-04	-1.54	26.43	28.41

TABLE 3. (Continued)

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm^2)	Density D(kg/m^3)	Rel. Dev. (T*) with Respect to VRA-7I [RD(T*)%]	Rel. Dev. (P) with Respect to VRA-7I [RD(P)%]	Rel. Dev. (D) with Respect to VRA-7I [RD(D)%]
74000.	73125.3	.20505714+03	.20505714+03	.38944709-03	.66162417-04	-1.69	26.26	28.43
74250.	73363.5	.20402143+03	.20402143+03	.37352006-03	.63778742-04	-1.84	26.07	28.44
74500.	73613.6	.20298572+03	.20298572+03	.35816928-03	.61469466-04	-1.99	25.88	28.44
74750.	73857.8	.20195000+03	.20195000+03	.34377372-03	.59232629-04	-2.14	25.68	28.44
75000.	74101.9	.20091429+03	.20091429+03	.32911889-03	.57066310-04	-2.29	25.48	28.42
75250.	74346.0	.19987857+03	.19987857+03	.31538670-03	.54968634-04	-2.44	25.26	28.40
75500.	74590.1	.19884286+03	.19884286+03	.30216057-03	.52937763-04	-2.59	25.04	28.36
75750.	74834.2	.19780714+03	.19780714+03	.28942433-03	.50971906-04	-2.74	24.80	28.32
76000.	75078.3	.19677143+03	.19677143+03	.27716227-03	.49069300-04	-2.88	24.56	28.26
76250.	75322.3	.19573572+03	.19573572+03	.26535907-03	.47228230-04	-3.02	24.31	28.18
76500.	75566.3	.19470000+03	.19470000+03	.25399989-03	.45447016-04	-3.16	24.05	28.10
76750.	75810.3	.19366429+03	.19366429+03	.24307021-03	.43724011-04	-3.29	23.78	28.00
77000.	76054.3	.19262857+03	.19262857+03	.23255599-03	.42057614-04	-3.42	23.51	27.88
77250.	76298.3	.19159286+03	.19159286+03	.22244353-03	.40446251-04	-3.54	23.22	27.75
77500.	76542.2	.19055714+03	.19055714+03	.21271954-03	.38889390-04	-3.66	22.92	27.59
77750.	76786.1	.18952143+03	.18952143+03	.20337108-03	.37382529-04	-3.78	22.61	27.43
78000.	77030.0	.18848572+03	.18848572+03	.19438558-03	.35927203-04	-3.89	22.29	27.24
78250.	77273.9	.18745000+03	.18745000+03	.18575083-03	.34520980-04	-3.99	21.96	27.03
78500.	77517.8	.18641429+03	.18641429+03	.17745497-03	.33162462-04	-4.08	21.62	26.80
78750.	77761.6	.18537857+03	.18537857+03	.16948647-03	.31850283-04	-4.17	21.27	26.54
79000.	78005.4	.18434286+03	.18434286+03	.16183412-03	.30583105-04	-4.24	20.91	26.26
79250.	78249.3	.18330714+03	.18330714+03	.15448705-03	.29359624-04	-4.31	20.53	25.96
79500.	78493.0	.18227143+03	.18227143+03	.14743472-03	.28178571-04	-4.37	20.14	25.63
79750.	78736.8	.18123572+03	.18123572+03	.14066686-03	.27038701-04	-4.42	19.74	25.28
80000.	78980.6	.18020000+03	.18020000+03	.13417355-03	.25938802-04	-4.45	19.33	24.90
80250.	79224.3	.18020000+03	.18020000+03	.12796259-03	.24738083-04	-3.93	18.92	23.78
80500.	79468.0	.18020000+03	.18020000+03	.12203914-03	.23592945-04	-3.38	18.54	22.68
80750.	79711.7	.18020000+03	.18020000+03	.11638990-03	.22500817-04	-2.81	18.17	21.58
81000.	79955.4	.18020000+03	.18020000+03	.11100215-03	.21459244-04	-2.22	17.82	20.49
81250.	80199.1	.18020000+03	.18020000+03	.10586381-03	.20465886-04	-1.60	17.49	19.40
81500.	80442.7	.18020000+03	.18020000+03	.10096333-03	.19518510-04	-.96	17.17	18.31
81750.	80686.3	.18020000+03	.18020000+03	.96289687-04	.18614989-04	-.25	16.88	17.17
82000.	80929.9	.18020000+03	.18020000+03	.91832393-04	.17753293-04	-.25	16.73	17.02
82250.	81173.5	.18020000+03	.18020000+03	.87581429-04	.16931485-04	-.25	16.57	16.86
82500.	81417.1	.18020000+03	.18020000+03	.83527243-04	.16147718-04	-.25	16.41	16.71
82750.	81660.6	.18020000+03	.18020000+03	.79660728-04	.15400233-04	-.25	16.26	16.55

TABLE 3. (Concluded)

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm^2)	Density D(kg/m^3)	Rel. Dev. (T*) with Respect to VRA-7I [RD(T*)%]	Rel. Dev. (P) with Respect to VRA-7I [RD(P)%]	Rel. Dev. (D) with Respect to VRA-7I [RD(D)%]
83000.	81904.1	.18020000+03	.18020000+03	.75973197-04	.14687349-04	-.25	16.10	16.39
83250.	82147.6	.18020000+03	.18020000+03	.72456362-04	.14007465-04	-.25	15.95	16.24
83500.	82391.1	.18020000+03	.18020000+03	.69102324-04	.13359053-04	-.25	15.79	16.08
83750.	82634.6	.18020000+03	.18020000+03	.65903545-04	.12740656-04	-.25	15.63	15.92
84000.	82878.0	.18020000+03	.18020000+03	.62852839-04	.12150885-04	-.25	15.48	15.77
84250.	83121.5	.18020000+03	.18020000+03	.59943353-04	.11588415-04	-.25	15.32	15.61
84500.	83364.9	.18020000+03	.18020000+03	.57168547-04	.11051982-04	-.25	15.16	15.45
84750.	83608.3	.18020000+03	.18020000+03	.54522188-04	.10540381-04	-.25	15.01	15.29
85000.	83851.6	.18020000+03	.18020000+03	.51998330-04	.10052462-04	-.25	14.85	15.13
85250.	84095.0	.18020000+03	.18020000+03	.49591304-04	.95871284-05	-.25	14.69	14.98
85500.	84338.3	.18020000+03	.18020000+03	.47295699-04	.91433358-05	-.25	14.53	14.82
85750.	84581.7	.18020000+03	.18020000+03	.45106360-04	.87200865-05	-.25	14.37	14.66
86000.	84824.9	.18020000+03	.18020000+03	.43018365-04	.83164297-05	-.25	14.22	14.50
86250.	85068.2	.18020000+03	.18020000+03	.41027025-04	.79314583-05	-.25	14.06	14.34
86500.	85311.5	.18020000+03	.18020000+03	.39127865-04	.75643075-05	-.25	13.90	14.18
86750.	85554.7	.18020000+03	.18020000+03	.37316618-04	.72141522-05	-.25	13.74	14.02
87000.	85798.0	.18020000+03	.18020000+03	.35589215-04	.68802057-05	-.25	13.58	13.86
87250.	86041.2	.18020000+03	.18020000+03	.33941773-04	.65617178-05	-.25	13.42	13.70
87500.	86284.3	.18020000+03	.18020000+03	.32370593-04	.62579728-05	-.25	13.26	13.54
87750.	86527.5	.18020000+03	.18020000+03	.30872143-04	.59682883-05	-.25	13.10	13.38
88000.	86770.7	.18020000+03	.18020000+03	.29443057-04	.56920135-05	-.25	12.94	13.22
88250.	87013.8	.18020000+03	.18020000+03	.28080125-04	.54285276-05	-.25	12.78	13.06
88500.	87256.9	.18020000+03	.18020000+03	.26780283-04	.51772385-05	-.25	12.62	12.90
88750.	87500.0	.18020000+03	.18020000+03	.25540611-04	.49375817-05	-.25	12.46	12.74
89000.	87743.1	.18020000+03	.18020000+03	.24358324-04	.47090188-05	-.25	12.30	12.58
89250.	87986.1	.18020000+03	.18020000+03	.23230766-04	.44910361-05	-.25	12.14	12.42
89500.	88229.1	.18020000+03	.18020000+03	.22155403-04	.42831440-05	-.25	11.98	12.26
89750.	88472.2	.18020000+03	.18020000+03	.21129819-04	.40848752-05	-.25	11.82	12.10
90000.	88715.1	.18020000+03	.18020000+03	.20151710-04	.38957845-05	******	11.65	11.93

TABLE 4. VANDENBERG AFB, CALIFORNIA, COLD (WINTER) ATMOSPHERE, 1973

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm²)	Density D(kg/m³)	Rel. Dev. (T*) with Respect to VRA-7I [RD(T*)%]	Rel. Dev. (P) with Respect to VRA-7I [RD(P)%]	Rel. Dev. (D) with Respect to VRA-7I [RD(D)%]
0.	.0	.27270000+03	.27210000+03	.10180000+02	.13004703+01	-5.03	-.10	5.20
250.	249.9	.27126500+03	.27069500+03	.98652961+01	.12669345+01	-5.66	-.27	5.70
500.	499.8	.26983000+03	.26929000+03	.95587276+01	.12340923+01	-6.18	-.46	6.09
750.	749.7	.26839500+03	.26788500+03	.92601272+01	.12019332+01	-5.62	-.66	6.37
1000.	999.5	.26696000+03	.26649000+03	.89693280+01	.11704464+01	-6.98	-.87	6.57
1250.	1249.4	.26552500+03	.26507500+03	.86861677+01	.11395214+01	-7.28	-1.08	6.68
1500.	1499.2	.26409000+03	.26367000+03	.84104342+01	.11094477+01	-7.53	-1.31	6.72
1750.	1749.0	.26265500+03	.26226500+03	.81421201+01	.10799152+01	-7.73	-1.55	6.70
2000.	1998.8	.26122000+03	.26086000+03	.78809183+01	.10510133+01	-7.89	-1.79	6.62
2250.	2248.5	.25978500+03	.25945500+03	.76267251+01	.10227319+01	-8.02	-2.04	6.50
2500.	2498.3	.25835000+03	.25805000+03	.73793908+01	.99506132+00	-8.11	-2.29	6.34
2750.	2748.0	.25691500+03	.25664500+03	.71387673+01	.96799155+00	-8.19	-2.55	6.14
3000.	2997.7	.25548000+03	.25524000+03	.69047074+01	.94151267+00	-8.24	-2.81	5.92
3250.	3247.4	.25404500+03	.25383500+03	.66770679+01	.91561510+00	-8.28	-3.08	5.67
3500.	3497.0	.25261000+03	.25243000+03	.64557074+01	.89028919+00	-8.30	-3.35	5.40
3750.	3746.7	.25117500+03	.25102500+03	.62404865+01	.86552544+00	-8.30	-3.63	5.11
4000.	3996.3	.24974000+03	.24962000+03	.60312686+01	.84131448+00	-8.30	-3.90	4.80
4250.	4245.9	.24830500+03	.24821500+03	.58279199+01	.81764712+00	-8.29	-4.18	4.49
4500.	4495.5	.24687000+03	.24681000+03	.56303083+01	.79451419+00	-8.26	-4.46	4.16
4750.	4745.0	.24543500+03	.24540500+03	.54383031+01	.77190654+00	-8.23	-4.73	3.82
5000.	4994.6	.24400000+03	.24400000+03	.52517769+01	.74981521+00	-8.19	-5.01	3.47
5250.	5244.1	.24257500+03	.24257500+03	.50706079+01	.72820187+00	-8.13	-5.28	3.11
5500.	5493.6	.24115000+03	.24115000+03	.48946761+01	.70709968+00	-8.07	-5.56	2.74
5750.	5743.1	.23972500+03	.23972500+03	.47238602+01	.68646993+00	-8.00	-5.83	2.36
6000.	5992.5	.23830000+03	.23830000+03	.45580398+01	.66633385+00	-7.92	-6.09	1.98
6250.	6242.0	.23687500+03	.23687500+03	.43970979+01	.64667297+00	-7.83	-6.36	1.58
6500.	6491.4	.23545000+03	.23545000+03	.42409185+01	.62747876+00	-7.72	-6.62	1.19
6750.	6740.8	.23402500+03	.23402500+03	.40893936+01	.60874234+00	-7.61	-6.88	.78
7000.	6990.2	.23260000+03	.23260000+03	.39423968+01	.59045721+00	-7.49	-7.14	.37
7250.	7239.5	.23117500+03	.23117500+03	.37998335+01	.57261339+00	-7.35	-7.39	-.05
7500.	7488.9	.22975000+03	.22975000+03	.36615917+01	.55520349+00	-7.21	-7.63	-.47
7750.	7738.2	.22832500+03	.22832500+03	.35275657+01	.53821952+00	-7.06	-7.88	-.89
8000.	7987.5	.22690000+03	.22690000+03	.33976521+01	.52165360+00	-6.90	-8.12	-1.31
8250.	8236.8	.22547500+03	.22547500+03	.32717495+01	.50549801+00	-6.73	-8.35	-1.74

TABLE 4. (Continued)

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm²)	Density D(kg/m³)	Rel. Dev. (T*) with Respect to VRA-7I [RD(T*)%]	Rel. Dev. (P) with Respect to VRA-7I [RD(P)%]	Rel. Dev. (D) with Respect to VRA-7I [RD(D)%]
8500.	8486.1	.22405000+03	.22405000+03	.31497580+01	.48974504+00	-6.56	-8.59	-2.16
8750.	8735.3	.22262500+03	.22262500+03	.30315800+01	.47438714+00	-6.39	-8.82	-2.58
9000.	8984.5	.22120000+03	.22120000+03	.29171198+01	.45941687+00	-6.23	-9.04	-2.99
9250.	9233.7	.22111667+03	.22111667+03	.28066130+01	.44217976+00	-5.50	-9.26	-3.96
9500.	9482.9	.22103333+03	.22103333+03	.27002532+01	.42558325+00	-4.78	-9.45	-4.89
9750.	9732.1	.22095000+03	.22095000+03	.25978861+01	.40960373+00	-4.07	-9.62	-5.78
10000.	9981.3	.22086667+03	.22086667+03	.24993634+01	.39421853+00	-3.34	-9.79	-6.68
10250.	10230.4	.22078333+03	.22078333+03	.24045420+01	.37940573+00	-2.55	-9.88	-7.52
10500.	10479.5	.22070000+03	.22070000+03	.23132842+01	.36514424+00	-1.84	-9.94	-8.26
10750.	10728.6	.22061667+03	.22061667+03	.22254573+01	.35141374+00	-1.21	-10.00	-8.90
11000.	10977.7	.22053333+03	.22053333+03	.21409335+01	.33819466+00	-.63	-10.03	-9.46
11250.	11226.7	.22045000+03	.22045000+03	.20595899+01	.32546812+00	-.12	-10.05	-9.94
11500.	11475.7	.22036667+03	.22036667+03	.19813078+01	.31321593+00	.33	-10.06	-10.35
11750.	11724.7	.22028333+03	.22028333+03	.19059731+01	.30142060+00	.74	-10.05	-10.71
12000.	11973.7	.22020000+03	.22020000+03	.18334760+01	.29006526+00	1.11	-10.03	-11.01
12250.	12222.7	.22011667+03	.22011667+03	.17637107+01	.27913367+00	1.44	-9.99	-11.26
12500.	12471.7	.22003333+03	.22003333+03	.16965750+01	.26861014+00	1.73	-9.95	-11.47
12750.	12720.6	.21995000+03	.21995000+03	.16319708+01	.25847957+00	2.00	-9.89	-11.65
13000.	12969.5	.21986667+03	.21986667+03	.15698037+01	.24872747+00	2.25	-9.82	-11.80
13250.	13218.4	.21978333+03	.21978333+03	.15099824+01	.23933980+00	2.49	-9.74	-11.93
13500.	13467.3	.21970000+03	.21970000+03	.14524194+01	.23030310+00	2.71	-9.65	-12.03
13750.	13716.1	.21961667+03	.21961667+03	.13970302+01	.22160436+00	2.92	-9.55	-12.12
14000.	13965.0	.21953333+03	.21953333+03	.13437334+01	.21323105+00	3.12	-9.45	-12.19
14250.	14213.8	.21945000+03	.21945000+03	.12924508+01	.20517113+00	3.32	-9.33	-12.25
14500.	14462.6	.21936667+03	.21936667+03	.12431071+01	.19741299+00	3.51	-9.21	-12.30
14750.	14711.4	.21928333+03	.21928333+03	.11956295+01	.18994540+00	3.70	-9.09	-12.34
15000.	14960.1	.21920000+03	.21920000+03	.11499482+01	.18275763+00	3.88	-8.96	-12.37
15250.	15208.9	.21911667+03	.21911667+03	.11059958+01	.17583928+00	4.05	-8.82	-12.38
15500.	15457.6	.21903333+03	.21903333+03	.10637076+01	.16918032+00	4.21	-8.68	-12.38
15750.	15706.3	.21895000+03	.21895000+03	.10230210+01	.16277114+00	4.36	-8.54	-12.37
16000.	15954.9	.21886667+03	.21886667+03	.98387621+00	.15660248+00	4.49	-8.39	-12.33
16250.	16203.6	.21878333+03	.21878333+03	.94621523+00	.15066539+00	4.59	-8.25	-12.27
16500.	16452.2	.21870000+03	.21870000+03	.90998229+00	.14495125+00	4.66	-8.10	-12.18
16750.	16700.9	.21861667+03	.21861667+03	.87512378+00	.13945176+00	4.68	-7.96	-12.05
17000.	16949.5	.21853333+03	.21853333+03	.84158803+00	.13415895+00	4.64	-7.81	-11.89
17250.	17198.1	.21845000+03	.21845000+03	.80932534+00	.12906512+00	4.54	-7.67	-11.66
17500.	17446.6	.21836667+03	.21836667+03	.77828787+00	.12416286+00	4.36	-7.53	-11.38
17750.	17695.2	.21828333+03	.21828333+03	.74842952+00	.11944504+00	4.09	-7.39	-11.03

TABLE 4. (Continued)

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm^2)	Density D(kg/m^3)	Rel. Dev. (T*) with Respect to VRA-7I [RD(T*)%]	Rel. Dev. (P) with Respect to VRA-7I [RD(P)%]	Rel. Dev. (D) with Respect to VRA-7I [RD(D)%]
18000.	17943.7	.21820000+03	.21820000+03	.71970595+00	.11490479+00	3.71	-7.26	-10.59
18250.	18192.2	.21832500+03	.21832500+03	.69208721+00	.11043206+00	3.61	-7.12	-10.37
18500.	18440.7	.21845000+03	.21845000+03	.66554322+00	.10613583+00	3.53	-7.08	-10.24
18750.	18689.1	.21857500+03	.21857500+03	.64003159+00	.10200906+00	3.44	-7.03	-10.08
19000.	18937.6	.21870000+03	.21870000+03	.61551163+00	.98044963-01	3.32	-6.96	-9.91
19250.	19186.0	.21882500+03	.21882500+03	.59194428+00	.94237052-01	3.19	-6.89	-9.71
19500.	19434.4	.21895000+03	.21895000+03	.56929202+00	.90579089-01	3.04	-6.80	-9.50
19750.	19682.8	.21907500+03	.21907500+03	.54751884+00	.87065089-01	2.89	-6.72	-9.28
20000.	19931.2	.21920000+03	.21920000+03	.52659006+00	.83689297-01	2.72	-6.63	-9.05
20250.	20179.5	.21932500+03	.21932500+03	.50647252+00	.80446202-01	2.55	-6.54	-8.82
20500.	20427.8	.21945000+03	.21945000+03	.48713434+00	.77330527-01	2.37	-6.45	-8.58
20750.	20676.1	.21957500+03	.21957500+03	.46854493+00	.74337193-01	2.19	-6.36	-8.35
21000.	20924.4	.21970000+03	.21970000+03	.45067487+00	.71461329-01	2.01	-6.28	-8.11
21250.	21172.7	.21982500+03	.21982500+03	.43349597+00	.68698267-01	1.83	-6.20	-7.88
21500.	21421.0	.21995000+03	.21995000+03	.41698110+00	.66043519-01	1.66	-6.13	-7.66
21750.	21669.2	.22007500+03	.22007500+03	.40110426+00	.63492783-01	1.48	-6.06	-7.45
22000.	21917.4	.22020000+03	.22020000+03	.38584043+00	.61041925-01	1.32	-6.00	-7.25
22250.	22165.6	.22032500+03	.22032500+03	.37116563+00	.58686983-01	1.15	-5.95	-7.05
22500.	22413.8	.22045000+03	.22045000+03	.35705682+00	.56424151-01	1.00	-5.91	-6.88
22750.	22661.9	.22057500+03	.22057500+03	.34349186+00	.54249779-01	.85	-5.87	-6.71
23000.	22910.0	.22070000+03	.22070000+03	.33044950+00	.52160359-01	.71	-5.85	-6.57
23250.	23158.2	.22082500+03	.22082500+03	.31790933+00	.50152529-01	.58	-5.84	-6.43
23500.	23406.3	.22095000+03	.22095000+03	.30585174+00	.48223059-01	.46	-5.84	-6.32
23750.	23654.3	.22107500+03	.22107500+03	.29425791+00	.46368848-01	.34	-5.85	-6.22
24000.	23902.4	.22120000+03	.22120000+03	.28310973+00	.44586920-01	.24	-5.87	-6.13
24250.	24150.4	.22132500+03	.22132500+03	.27238986+00	.42874421-01	.14	-5.90	-6.06
24500.	24398.4	.22145000+03	.22145000+03	.26208161+00	.41228607-01	.05	-5.94	-6.01
24750.	24646.4	.22157500+03	.22157500+03	.25216894+00	.39646846-01	-.04	-5.99	-5.96
25000.	24894.4	.22170000+03	.22170000+03	.24263648+00	.38126611-01	-.12	-6.05	-5.94
25250.	25142.4	.22182500+03	.22182500+03	.23346943+00	.36665476-01	-.19	-6.11	-5.92
25500.	25390.3	.22195000+03	.22195000+03	.22465360+00	.35261114-01	-.27	-6.18	-5.90
25750.	25638.2	.22207500+03	.22207500+03	.21617533+00	.33911287-01	-.34	-6.25	-5.90
26000.	25886.1	.22220000+03	.22220000+03	.20802155+00	.32613851-01	-.41	-6.32	-5.90
26250.	26134.0	.22232500+03	.22232500+03	.20017964+00	.31366742-01	-.48	-6.39	-5.89
26500.	26381.9	.22245000+03	.22245000+03	.19263751+00	.30167982-01	-.56	-6.47	-5.89
26750.	26629.7	.22257500+03	.22257500+03	.18538354+00	.29015670-01	-.65	-6.53	-5.87

TABLE 4. (Continued)

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm²)	Density D(kg/m³)	Rel. Dev. (T*) with Respect to VRA-7I [RD(T*)%]	Rel. Dev. (P) with Respect to VRA-7I [RD(P)%]	Rel. Dev. (D) with Respect to VRA-7I [RD(D)%]
27000.	26877.5	.22270000+03	.22270000+03	.17840657+00	.27907982-01	-.74	-6.59	-5.85
27250.	27125.3	.22282500+03	.22282500+03	.17169587+00	.26843166-01	-.85	-6.64	-5.81
27500.	27373.1	.22295000+03	.22295000+03	.16524116+00	.25819543-01	-.97	-6.68	-5.74
27750.	27620.9	.22307500+03	.22307500+03	.15903251+00	.24835494-01	-1.11	-6.70	-5.66
28000.	27868.6	.22320000+03	.22320000+03	.15306042+00	.23889470-01	-1.28	-6.70	-5.53
28250.	28116.3	.22332500+03	.22332500+03	.14731576+00	.22979982-01	-1.31	-6.79	-5.55
28500.	28364.0	.22345000+03	.22345000+03	.14178974+00	.22105598-01	-1.53	-6.89	-5.45
28750.	28611.7	.22357500+03	.22357500+03	.13647393+00	.21264945-01	-1.74	-7.01	-5.36
29000.	28859.4	.22370000+03	.22370000+03	.13136023+00	.20456706-01	-1.95	-7.12	-5.28
29250.	29107.0	.22382500+03	.22382500+03	.12644082+00	.19679612-01	-2.15	-7.24	-5.20
29500.	29354.7	.22395000+03	.22395000+03	.12170824+00	.18932446-01	-2.34	-7.36	-5.14
29750.	29602.3	.22407500+03	.22407500+03	.11715529+00	.18214041-01	-2.52	-7.48	-5.09
30000.	29849.9	.22420000+03	.22420000+03	.11277507+00	.17523275-01	-2.71	-7.61	-5.04
30250.	30097.4	.22432500+03	.22432500+03	.10856092+00	.16859071-01	-2.88	-7.75	-5.01
30500.	30345.0	.22445000+03	.22445000+03	.10450645+00	.16220390-01	-3.05	-7.88	-4.98
30750.	30592.5	.22457500+03	.22457500+03	.10060554+00	.15606241-01	-3.22	-8.02	-4.96
31000.	30840.0	.22470000+03	.22470000+03	.96852294-01	.15015667-01	-3.39	-8.17	-4.95
31250.	31087.5	.22482500+03	.22482500+03	.93241036-01	.14447753-01	-3.55	-8.32	-4.94
31500.	31335.0	.22495000+03	.22495000+03	.89766326-01	.13901615-01	-3.71	-8.47	-4.94
31750.	31582.5	.22507500+03	.22507500+03	.86422929-01	.13376408-01	-3.87	-8.63	-4.95
32000.	31829.9	.22520000+03	.22520000+03	.83205808-01	.12871319-01	-4.03	-8.80	-4.97
32250.	32077.3	.22575000+03	.22575000+03	.80112997-01	.12386691-01	-4.01	-8.97	-5.16
32500.	32324.7	.22630000+03	.22630000+03	.77142256-01	.11875327-01	-3.99	-9.13	-5.36
32750.	32572.1	.22685000+03	.22685000+03	.74288488-01	.11409290-01	-3.96	-9.29	-5.55
33000.	32819.4	.22740000+03	.22740000+03	.71546821-01	.10960685-01	-3.94	-9.46	-5.74
33250.	33066.8	.22795000+03	.22795000+03	.68912596-01	.10531660-01	-3.92	-9.62	-5.93
33500.	33314.1	.22850000+03	.22850000+03	.66381359-01	.10120402-01	-3.90	-9.78	-6.12
33750.	33561.4	.22905000+03	.22905000+03	.63948851-01	.97261342-02	-3.89	-9.94	-6.30
34000.	33808.7	.22960000+03	.22960000+03	.61610998-01	.93481175-02	-3.87	-10.10	-6.48
34250.	34055.9	.23015000+03	.23015000+03	.59363902-01	.89856451-02	-3.86	-10.26	-6.66
34500.	34303.2	.23070000+03	.23070000+03	.57203833-01	.86380425-02	-3.85	-10.42	-6.84
34750.	34550.4	.23125000+03	.23125000+03	.55127230-01	.83046672-02	-3.84	-10.58	-7.01
35000.	34797.6	.23180000+03	.23180000+03	.53130679-01	.79849047-02	-3.83	-10.74	-7.18
35250.	35044.8	.23235000+03	.23235000+03	.51210913-01	.76781687-02	-3.83	-10.90	-7.35
35500.	35291.9	.23290000+03	.23290000+03	.49364809-01	.73838996-02	-3.83	-11.06	-7.51
35750.	35539.1	.23345000+03	.23345000+03	.47589377-01	.71015630-02	-3.84	-11.21	-7.67
36000.	35786.2	.23400000+03	.23400000+03	.45881753-01	.68306486-02	-3.84	-11.37	-7.83
36250.	36033.3	.23455000+03	.23455000+03	.44239198-01	.65706694-02	-3.85	-11.54	-7.99

TABLE 4. (Continued)

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm²)	Density D(kg/m³)	Rel. Dev. (T*) with Respect to VRA-7 [RD(T*)%]	Rel. Dev. (P) with Respect to VRA-7 [RD(P)%]	Rel. Dev. (D) with Respect to VRA-7 [RD(D)%]
36500.	36280.4	.23510000+03	.23510000+03	.42659089-01	.63211595-02	-3.87	-11.70	-8.14
36750.	36527.4	.23565000+03	.23565000+03	.41138913-01	.60816745-02	-3.88	-11.86	-8.30
37000.	36774.5	.23620000+03	.23620000+03	.39676265-01	.58517896-02	-3.90	-12.02	-8.45
37250.	37021.5	.23675000+03	.23675000+03	.38268843-01	.56310988-02	-3.93	-12.18	-8.59
37500.	37268.5	.23730000+03	.23730000+03	.36914438-01	.54192144-02	-3.95	-12.35	-8.74
37750.	37515.5	.23785000+03	.23785000+03	.35610940-01	.52157658-02	-3.98	-12.51	-8.88
38000.	37762.5	.23840000+03	.23840000+03	.34356322-01	.50203988-02	-4.02	-12.68	-9.02
38250.	38009.4	.23895000+03	.23895000+03	.33148695-01	.48327747-02	-4.05	-12.84	-9.16
38500.	38256.4	.23950000+03	.23950000+03	.31986051-01	.46525700-02	-4.09	-13.01	-9.30
38750.	38503.3	.24005000+03	.24005000+03	.30866761-01	.44794753-02	-4.13	-13.18	-9.44
39000.	38750.2	.24060000+03	.24060000+03	.29789065-01	.43131985-02	-4.17	-13.35	-9.57
39250.	38997.0	.24115000+03	.24115000+03	.28751330-01	.41534451-02	-4.22	-13.52	-9.70
39500.	39243.9	.24170000+03	.24170000+03	.27751987-01	.39999562-02	-4.27	-13.69	-9.84
39750.	39490.7	.24225000+03	.24225000+03	.26789533-01	.38524692-02	-4.32	-13.86	-9.97
40000.	39737.5	.24280000+03	.24280000+03	.25862528-01	.37107363-02	-4.37	-14.03	-10.10
40250.	39984.3	.24335000+03	.24335000+03	.24969589-01	.35745210-02	-4.42	-14.20	-10.24
40500.	40231.1	.24390000+03	.24390000+03	.24109393-01	.34435967-02	-4.47	-14.38	-10.37
40750.	40477.9	.24445000+03	.24445000+03	.23280668-01	.33177465-02	-4.53	-14.55	-10.50
41000.	40724.6	.24500000+03	.24500000+03	.22482197-01	.31967633-02	-4.58	-14.73	-10.64
41250.	40971.3	.24555000+03	.24555000+03	.21712811-01	.30804482-02	-4.63	-14.90	-10.77
41500.	41218.0	.24610000+03	.24610000+03	.20971388-01	.29686116-02	-4.68	-15.08	-10.91
41750.	41464.7	.24665000+03	.24665000+03	.20256854-01	.28610713-02	-4.73	-15.26	-11.05
42000.	41711.4	.24720000+03	.24720000+03	.19568176-01	.27576534-02	-4.78	-15.43	-11.19
42250.	41958.0	.24775000+03	.24775000+03	.18904365-01	.26581913-02	-4.83	-15.61	-11.33
42500.	42204.6	.24830000+03	.24830000+03	.18264469-01	.25625252-02	-4.87	-15.79	-11.47
42750.	42451.2	.24885000+03	.24885000+03	.17647579-01	.24705024-02	-4.92	-15.97	-11.62
43000.	42697.8	.24940000+03	.24940000+03	.17052817-01	.23819766-02	-4.95	-16.15	-11.78
43250.	42944.4	.24995000+03	.24995000+03	.16479345-01	.22968075-02	-4.99	-16.33	-11.93
43500.	43190.9	.25050000+03	.25050000+03	.15926355-01	.22148609-02	-5.02	-16.50	-12.09
43750.	43437.4	.25105000+03	.25105000+03	.15393074-01	.21360083-02	-5.04	-16.68	-12.26
44000.	43683.9	.25160000+03	.25160000+03	.14878758-01	.20601264-02	-5.06	-16.86	-12.43
44250.	43930.4	.25215000+03	.25215000+03	.14382694-01	.19870971-02	-5.07	-17.04	-12.61
44500.	44176.9	.25270000+03	.25270000+03	.13904197-01	.19168073-02	-5.07	-17.21	-12.79
44750.	44423.3	.25325000+03	.25325000+03	.13442607-01	.18491488-02	-5.07	-17.39	-12.98
45000.	44669.8	.25380000+03	.25380000+03	.12997293-01	.17840174-02	-5.06	-17.56	-13.17
45250.	44916.2	.25435000+03	.25435000+03	.12567647-01	.17213137-02	-5.03	-17.74	-13.38
45500.	45162.6	.25490000+03	.25490000+03	.12153086-01	.16609423-02	-5.00	-17.91	-13.59
45750.	45408.9	.25545000+03	.25545000+03	.11753050-01	.16028116-02	-4.96	-18.08	-13.81

TABLE 4. (Continued)

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm^2)	Density D(kg/m^3)	Rel. Dev. (T*) with Respect to VRA-7I [RD(T*)%]	Rel. Dev. (P) with Respect to VRA-7I [RD(P)%]	Rel. Dev. (D) with Respect to VRA-7I [RD(D)%]
46000.	45655.3	.25600000+03	.25600000+03	.11367000-01	.15468340-02	-4.90	-18.25	-14.03
46250.	45901.6	.25655000+03	.25655000+03	.10994418-01	.14929252-02	-4.83	-18.41	-14.27
46500.	46147.9	.25710000+03	.25710000+03	.10634808-01	.14410047-02	-4.75	-18.58	-14.52
46750.	46394.2	.25765000+03	.25765000+03	.10287691-01	.13909950-02	-4.65	-18.74	-14.78
47000.	46640.5	.25820000+03	.25820000+03	.99526080-02	.13428220-02	-4.54	-18.90	-15.05
47250.	46886.8	.25820000+03	.25820000+03	.96287788-02	.12991305-02	-4.61	-19.06	-15.15
47500.	47133.0	.25820000+03	.25820000+03	.93154861-02	.12568605-02	-4.66	-19.22	-15.27
47750.	47379.2	.25820000+03	.25820000+03	.90123870-02	.12159659-02	-4.70	-19.39	-15.41
48000.	47625.4	.25820000+03	.25820000+03	.87191499-02	.11764019-02	-4.71	-19.55	-15.57
48250.	47871.6	.25820000+03	.25820000+03	.84354538-02	.11381251-02	-4.71	-19.72	-15.76
48500.	48117.7	.25820000+03	.25820000+03	.81609885-02	.11010938-02	-4.68	-19.89	-15.96
48750.	48363.9	.25820000+03	.25820000+03	.78954534-02	.10652674-02	-4.62	-20.06	-16.19
49000.	48610.0	.25820000+03	.25820000+03	.76385581-02	.10306067-02	-4.54	-20.23	-16.44
49250.	48856.1	.25820000+03	.25820000+03	.73900215-02	.99707372-03	-4.59	-20.28	-16.44
49500.	49102.2	.25820000+03	.25820000+03	.71495716-02	.96463182-03	-4.67	-20.47	-16.57
49750.	49348.2	.25820000+03	.25820000+03	.69169452-02	.93324549-03	-4.73	-20.66	-16.72
50000.	49594.3	.25820000+03	.25820000+03	.66918877-02	.90288038-03	-4.78	-20.85	-16.88
50250.	49840.3	.25820000+03	.25820000+03	.64741531-02	.87350326-03	-4.81	-21.04	-17.05
50500.	50086.3	.25820000+03	.25820000+03	.62635028-02	.84508199-03	-4.83	-21.22	-17.23
50750.	50332.3	.25820000+03	.25820000+03	.60597066-02	.81758547-03	-4.83	-21.40	-17.42
51000.	50578.3	.25820000+03	.25820000+03	.58625413-02	.79098361-03	-4.82	-21.58	-17.61
51250.	50824.2	.25820000+03	.25820000+03	.56717913-02	.76524730-03	-4.80	-21.76	-17.82
51500.	51070.1	.25820000+03	.25820000+03	.54872477-02	.74034838-03	-4.76	-21.93	-18.03
51750.	51316.1	.25820000+03	.25820000+03	.53087086-02	.71625959-03	-4.71	-22.10	-18.25
52000.	51561.9	.25820000+03	.25820000+03	.51359787-02	.69295459-03	-4.65	-22.26	-18.47
52250.	51807.8	.25785323+03	.25785323+03	.49687583-02	.67129452-03	-4.70	-22.42	-18.59
52500.	52053.7	.25750645+03	.25750645+03	.48067683-02	.65028371-03	-4.75	-22.58	-18.73
52750.	52299.5	.25715968+03	.25715968+03	.46498517-02	.62990351-03	-4.78	-22.74	-18.87
53000.	52545.3	.25681290+03	.25681290+03	.44978562-02	.61013583-03	-4.80	-22.90	-19.02
53250.	52791.1	.25646613+03	.25646613+03	.43506339-02	.59096303-03	-4.81	-23.06	-19.18
53500.	53036.9	.25611936+03	.25611936+03	.42080409-02	.57236801-03	-4.81	-23.22	-19.34
53750.	53282.6	.25577258+03	.25577258+03	.40699376-02	.55433407-03	-4.80	-23.38	-19.52
54000.	53528.4	.25542581+03	.25542581+03	.39361885-02	.53684501-03	-4.78	-23.54	-19.70
54250.	53774.1	.25507904+03	.25507904+03	.38066620-02	.51988508-03	-4.76	-23.69	-19.88
54500.	54019.8	.25473226+03	.25473226+03	.36812302-02	.50343896-03	-4.72	-23.85	-20.07
54750.	54265.5	.25438549+03	.25438549+03	.35597690-02	.48749177-03	-4.68	-24.00	-20.27

TABLE 4. (Continued)

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm^2)	Density D(kg/m^3)	Rel. Dev. (T°) with Respect to VRA-7I [RD(T°)%]	Rel. Dev. (P) with Respect to VRA-7I [RD(P)%]	Rel. Dev. (D) with Respect to VRA-7I [RD(D)%]
55000.	54511.1	.25403871+03	.25403871+03	.34421577-02	.47202899-03	-4.62	-24.15	-20.48
55250.	54756.8	.25369194+03	.25369194+03	.33282796-02	.45703656-03	-4.56	-24.30	-20.68
55500.	55002.4	.25334517+03	.25334517+03	.32180208-02	.44250076-03	-4.49	-24.45	-20.90
55750.	55248.0	.25299839+03	.25299839+03	.31112710-02	.42840831-03	-4.42	-24.60	-21.11
56000.	55493.6	.25265162+03	.25265162+03	.30079233-02	.41474626-03	-4.33	-24.74	-21.33
56250.	55739.1	.25230484+03	.25230484+03	.29078735-02	.40150202-03	-4.24	-24.88	-21.56
56500.	55984.7	.25195807+03	.25195807+03	.28110209-02	.38866336-03	-4.14	-25.02	-21.78
56750.	56230.2	.25161129+03	.25161129+03	.27172673-02	.37621841-03	-4.04	-25.16	-22.01
57000.	56475.7	.25126452+03	.25126452+03	.26265177-02	.36415558-03	-3.93	-25.30	-22.24
57250.	56721.2	.25091774+03	.25091774+03	.25386799-02	.35246368-03	-3.81	-25.43	-22.48
57500.	56966.7	.25057097+03	.25057097+03	.24536641-02	.34113177-03	-3.69	-25.56	-22.71
57750.	57212.1	.25022420+03	.25022420+03	.23713835-02	.33014924-03	-3.56	-25.69	-22.95
58000.	57457.5	.24987742+03	.24987742+03	.22917537-02	.31950579-03	-3.42	-25.82	-23.19
58250.	57703.0	.24953065+03	.24953065+03	.22146927-02	.30919139-03	-3.29	-25.94	-23.42
58500.	57948.3	.24918387+03	.24918387+03	.21401212-02	.29919632-03	-3.14	-26.06	-23.66
58750.	58193.7	.24883710+03	.24883710+03	.20679619-02	.28951110-03	-2.99	-26.18	-23.90
59000.	58439.1	.24849033+03	.24849033+03	.19981401-02	.28012654-03	-2.84	-26.29	-24.14
59250.	58684.4	.24814355+03	.24814355+03	.19305831-02	.27103371-03	-2.68	-26.40	-24.38
59500.	58929.7	.24779678+03	.24779678+03	.18652205-02	.26222394-03	-2.52	-26.51	-24.61
59750.	59175.0	.24745000+03	.24745000+03	.18019839-02	.25368878-03	-2.35	-26.61	-24.85
60000.	59420.3	.24710323+03	.24710323+03	.17408071-02	.24542004-03	-2.18	-26.72	-25.08
60250.	59665.5	.24675645+03	.24675645+03	.16816256-02	.23740977-03	-2.01	-26.81	-25.31
60500.	59910.8	.24640968+03	.24640968+03	.16243770-02	.22965022-03	-1.83	-26.91	-25.55
60750.	60156.0	.24606290+03	.24606290+03	.15690008-02	.22213389-03	-1.65	-27.00	-25.77
61000.	60401.2	.24571613+03	.24571613+03	.15154383-02	.21485349-03	-1.47	-27.09	-26.00
61250.	60646.4	.24536936+03	.24536936+03	.14636326-02	.20780191-03	-1.28	-27.17	-26.23
61500.	60891.5	.24502258+03	.24502258+03	.14135282-02	.20097229-03	-1.09	-27.25	-26.45
61750.	61136.7	.24467581+03	.24467581+03	.13650718-02	.19435794-03	-.90	-27.33	-26.67
62000.	61381.8	.24432904+03	.24432904+03	.13182113-02	.18795236-03	-.71	-27.40	-26.88
62250.	61626.9	.24398226+03	.24398226+03	.12728964-02	.18174924-03	-.51	-27.47	-27.09
62500.	61872.0	.24363549+03	.24363549+03	.12290780-02	.17574246-03	-.31	-27.53	-27.30
62750.	62117.1	.24328871+03	.24328871+03	.11867088-02	.16992607-03	-.11	-27.59	-27.51
63000.	62362.1	.24294194+03	.24294194+03	.11457428-02	.16429428-03	.09	-27.64	-27.71
63250.	62607.1	.24259517+03	.24259517+03	.11061355-02	.15884151-03	.29	-27.69	-27.91
63500.	62852.1	.24224839+03	.24224839+03	.10678437-02	.15356229-03	.50	-27.74	-28.10
63750.	63097.1	.24190162+03	.24190162+03	.10308254-02	.14845134-03	.70	-27.78	-28.29
64000.	63342.1	.24155484+03	.24155484+03	.99504000-03	.14350354-03	.91	-27.82	-28.47
64250.	63587.1	.24120807+03	.24120807+03	.96044816-03	.13871387-03	1.11	-27.85	-28.65

TABLE 4. (Continued)

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm^2)	Density D(kg/m^3)	Rel. Dev. (T*) with Respect to VRA-7I [RD(T*)%]	Rel. Dev. (P) with Respect to VRA-7I [RD(P)%]	Rel. Dev. (D) with Respect to VRA-7I [RD(D)%]
64500.	63832.0	.24086129+03	.24086129+03	.92701169-03	.13407753-03	1.32	-27.88	-28.82
64750.	64076.9	.24051452+03	.24051452+03	.89469359-03	.12958980-03	1.53	-27.91	-28.99
65000.	64321.8	.24016774+03	.24016774+03	.86345797-03	.12524613-03	1.74	-27.93	-29.16
65250.	64566.7	.23982097+03	.23982097+03	.83327008-03	.12104210-03	1.95	-27.94	-29.32
65500.	64811.5	.23947420+03	.23947420+03	.80409618-03	.11697339-03	2.16	-27.95	-29.47
65750.	65056.4	.23912742+03	.23912742+03	.77590362-03	.11303585-03	2.37	-27.95	-29.62
66000.	65301.2	.23878065+03	.23878065+03	.74866075-03	.10922543-03	2.58	-27.95	-29.76
66250.	65546.0	.23843387+03	.23843387+03	.72233690-03	.10553819-03	2.79	-27.95	-29.90
66500.	65790.8	.23808710+03	.23808710+03	.69690233-03	.10197034-03	2.99	-27.93	-30.03
66750.	66035.5	.23774033+03	.23774033+03	.67232820-03	.98518158-04	3.20	-27.92	-30.15
67000.	66280.3	.23739355+03	.23739355+03	.64858662-03	.95178066-04	3.41	-27.90	-30.27
67250.	66525.0	.23704678+03	.23704678+03	.62565054-03	.91946580-04	3.62	-27.87	-30.39
67500.	66769.7	.23670000+03	.23670000+03	.60349372-03	.88820314-04	3.83	-27.83	-30.50
67750.	67014.4	.23635323+03	.23635323+03	.58209077-03	.85795988-04	4.04	-27.80	-30.60
68000.	67259.0	.23600645+03	.23600645+03	.56141715-03	.82870431-04	4.24	-27.75	-30.69
68250.	67503.7	.23565968+03	.23565968+03	.54144898-03	.80040549-04	4.45	-27.70	-30.78
68500.	67748.3	.23531290+03	.23531290+03	.52216317-03	.77303346-04	4.65	-27.65	-30.87
68750.	67992.9	.23496613+03	.23496613+03	.50353738-03	.74655919-04	4.86	-27.59	-30.94
69000.	68237.5	.23461936+03	.23461936+03	.48554993-03	.72095449-04	5.06	-27.52	-31.01
69250.	68482.1	.23427258+03	.23427258+03	.46817983-03	.69619202-04	5.27	-27.44	-31.08
69500.	68726.6	.23392581+03	.23392581+03	.45140679-03	.67224527-04	5.47	-27.37	-31.13
69750.	68971.2	.23357904+03	.23357904+03	.43521110-03	.64909848-04	5.68	-27.28	-31.19
70000.	69215.7	.23323226+03	.23323226+03	.41957368-03	.62669672-04	5.88	-27.19	-31.23
70250.	69460.2	.23288549+03	.23288549+03	.40447612-03	.60504583-04	6.08	-27.09	-31.27
70500.	69704.6	.23253871+03	.23253871+03	.38990051-03	.58411230-04	6.28	-26.99	-31.30
70750.	69949.1	.23219194+03	.23219194+03	.37582956-03	.56387341-04	6.48	-26.88	-31.33
71000.	70193.5	.23184517+03	.23184517+03	.36224652-03	.54430708-04	6.69	-26.76	-31.35
71250.	70437.9	.23149839+03	.23149839+03	.34913513-03	.52539191-04	6.89	-26.64	-31.36
71500.	70682.3	.23115162+03	.23115162+03	.33647973-03	.50710720-04	7.09	-26.51	-31.37
71750.	70926.7	.23080484+03	.23080484+03	.32426508-03	.48943280-04	7.29	-26.37	-31.37
72000.	71171.1	.23045807+03	.23045807+03	.31247647-03	.47234922-04	7.49	-26.23	-31.37
72250.	71415.4	.23011129+03	.23011129+03	.30109964-03	.45583756-04	7.70	-26.07	-31.36
72500.	71659.7	.22976452+03	.22976452+03	.29012080-03	.43987947-04	7.90	-25.92	-31.34
72750.	71904.0	.22941774+03	.22941774+03	.27952658-03	.42445721-04	8.11	-25.75	-31.32
73000.	72148.3	.22907097+03	.22907097+03	.26930408-03	.40955355-04	8.31	-25.58	-31.29
73250.	72392.6	.22872420+03	.22872420+03	.25944079-03	.39515178-04	8.52	-25.40	-31.26
73500.	72636.8	.22837742+03	.22837742+03	.24992459-03	.38123575-04	8.73	-25.22	-31.22
73750.	72881.1	.22803065+03	.22803065+03	.24074376-03	.36778975-04	8.94	-25.02	-31.18

TABLE 4. (Continued)

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm²)	Density D(kg/m³)	Rel. Dev. (T*) with Respect to VRA-7I [RD(T*)%]	Rel. Dev. (P) with Respect to VRA-7I [RD(P)%]	Rel. Dev. (D) with Respect to VRA-7I [RD(D)%]
74000.	73125.3	.22768387+03	.22768387+03	.23188698-03	.35479860-04	9.16	-24.82	-31.13
74250.	73369.5	.22733710+03	.22733710+03	.22334327-03	.34224756-04	9.38	-24.62	-31.08
74500.	73613.6	.22699033+03	.22699033+03	.21510204-03	.33012239-04	9.60	-24.40	-31.02
74750.	73857.8	.22664355+03	.22664355+03	.20715298-03	.31840921-04	9.82	-24.18	-30.96
75000.	74101.9	.22629678+03	.22629678+03	.19948617-03	.30709463-04	10.05	-23.95	-30.89
75250.	74346.0	.22595000+03	.22595000+03	.19209201-03	.29616570-04	10.28	-23.71	-30.82
75500.	74590.1	.22560323+03	.22560323+03	.18496118-03	.28560979-04	10.52	-23.46	-30.75
75750.	74834.2	.22525645+03	.22525645+03	.17808471-03	.27541476-04	10.76	-23.21	-30.67
76000.	75078.3	.22490968+03	.22490968+03	.17145389-03	.26556878-04	11.01	-22.94	-30.59
76250.	75322.3	.22456290+03	.22456290+03	.16506030-03	.25606041-04	11.26	-22.67	-30.50
76500.	75566.3	.22421613+03	.22421613+03	.15889580-03	.24687855-04	11.52	-22.40	-30.41
76750.	75810.3	.22386936+03	.22386936+03	.15295251-03	.23801249-04	11.79	-22.11	-30.33
77000.	76054.3	.22352258+03	.22352258+03	.14722282-03	.22945183-04	12.07	-21.81	-30.23
77250.	76298.3	.22317581+03	.22317581+03	.14169937-03	.22118649-04	12.36	-21.51	-30.14
77500.	76542.2	.22282904+03	.22282904+03	.13637504-03	.21320673-04	12.65	-21.20	-30.05
77750.	76786.1	.22248226+03	.22248226+03	.13124294-03	.20550310-04	12.96	-20.87	-29.95
78000.	77030.0	.22213549+03	.22213549+03	.12629642-03	.19806644-04	13.27	-20.54	-29.85
78250.	77273.9	.22178871+03	.22178871+03	.12152903-03	.19088790-04	13.60	-20.21	-29.76
78500.	77517.8	.22144194+03	.22144194+03	.11693457-03	.18395892-04	13.94	-19.86	-29.66
78750.	77761.6	.22109517+03	.22109517+03	.11250700-03	.17727117-04	14.30	-19.50	-29.57
79000.	78005.4	.22074839+03	.22074839+03	.10824052-03	.17081662-04	14.67	-19.13	-29.48
79250.	78249.3	.22040162+03	.22040162+03	.10412950-03	.16458749-04	15.05	-18.76	-29.39
79500.	78493.0	.22005484+03	.22005484+03	.10016851-03	.15857623-04	15.45	-18.37	-29.30
79750.	78736.8	.21970807+03	.21970807+03	.96352306-04	.15277557-04	15.87	-17.98	-29.21
80000.	78980.6	.21936129+03	.21936129+03	.92675794-04	.14717842-04	16.31	-17.58	-29.13
80250.	79224.3	.21901452+03	.21901452+03	.89134090-04	.14177796-04	16.77	-17.16	-29.06
80500.	79468.0	.21866774+03	.21866774+03	.85722436-04	.13656757-04	17.25	-16.74	-28.99
80750.	79711.7	.21832097+03	.21832097+03	.82436260-04	.13154085-04	17.75	-16.31	-28.92
81000.	79955.4	.21797420+03	.21797420+03	.79271131-04	.12669159-04	18.28	-15.86	-28.87
81250.	80199.1	.21762742+03	.21762742+03	.76222783-04	.12201381-04	18.83	-15.41	-28.82
81500.	80442.7	.21728065+03	.21728065+03	.73287072-04	.11750169-04	19.41	-14.95	-28.77
81750.	80686.3	.21693387+03	.21693387+03	.70460008-04	.11314963-04	20.09	-14.47	-28.78
82000.	80929.9	.21658710+03	.21658710+03	.67737737-04	.10895218-04	19.89	-13.90	-28.19
82250.	81173.5	.21624033+03	.21624033+03	.65116530-04	.10490408-04	19.70	-13.33	-27.60
82500.	81417.1	.21589355+03	.21589355+03	.62592788-04	.10100025-04	19.51	-12.76	-27.00
82750.	81660.6	.21554678+03	.21554678+03	.60163037-04	.97235762-05	19.32	-12.20	-26.41

TABLE 4. (Concluded)

Geometric Altitude Z(m)	Geopotential Altitude H(m)	Virtual Temperature T*(°K)	Kinetic Temperature T(°K)	Pressure P(N/cm^2)	Density D(kg/m^3)	Rel. Dev. (T*) with Respect to VRA-7I [RD(T*)%]	Rel. Dev. (P) with Respect to VRA-7I [RD(P)%]	Rel. Dev. (D) with Respect to VRA-7I [RD(D)%]
83000.	81904.1	.21520000+03	.21520000+03	.57823921-04	.93605867-05	19.13	-11.63	-25.82
83250.	82147.6	.21520000+03	.21520000+03	.55573979-04	.89963642-05	19.13	-11.07	-25.35
83500.	82391.1	.21520000+03	.21520000+03	.53411583-04	.86463136-05	19.13	-10.50	-24.87
83750.	82634.6	.21520000+03	.21520000+03	.51333326-04	.83098836-05	19.13	-9.93	-24.39
84000.	82878.0	.21520000+03	.21520000+03	.49335935-04	.79865441-05	19.13	-9.36	-23.91
84250.	83121.5	.21520000+03	.21520000+03	.47416263-04	.76757859-05	19.13	-8.78	-23.43
84500.	83364.9	.21520000+03	.21520000+03	.45571285-04	.73771194-05	19.13	-8.20	-22.94
84750.	83608.3	.21520000+03	.21520000+03	.43798097-04	.70900741-05	19.13	-7.62	-22.45
85000.	83851.6	.21520000+03	.21520000+03	.42093902-04	.68141977-05	19.13	-7.03	-21.95
85250.	84095.0	.21520000+03	.21520000+03	.40456020-04	.65490558-05	19.13	-6.44	-21.45
85500.	84338.3	.21520000+03	.21520000+03	.38881867-04	.62942305-05	19.13	-5.84	-20.96
85750.	84581.7	.21520000+03	.21520000+03	.37368965-04	.60493206-05	19.13	-5.25	-20.46
86000.	84824.9	.21520000+03	.21520000+03	.35914930-04	.58139402-05	19.13	-4.64	-19.95
86250.	85068.2	.21520000+03	.21520000+03	.34517472-04	.55877184-05	19.13	-4.04	-19.45
86500.	85311.5	.21520000+03	.21520000+03	.33174389-04	.53702991-05	19.13	-3.43	-18.94
86750.	85554.7	.21520000+03	.21520000+03	.31883566-04	.51613395-05	19.13	-2.82	-18.42
87000.	85798.0	.21520000+03	.21520000+03	.30642970-04	.49605106-05	19.13	-2.21	-17.91
87250.	86041.2	.21520000+03	.21520000+03	.29450645-04	.47674961-05	19.13	-1.59	-17.39
87500.	86284.3	.21520000+03	.21520000+03	.28304714-04	.45819917-05	19.13	-.96	-16.86
87750.	86527.5	.21520000+03	.21520000+03	.27203371-04	.44037054-05	19.13	-.34	-16.34
88000.	86770.7	.21520000+03	.21520000+03	.26144882-04	.42323563-05	19.13	.29	-15.81
88250.	87013.8	.21520000+03	.21520000+03	.25127579-04	.40676743-05	19.13	.92	-15.28
88500.	87256.9	.21520000+03	.21520000+03	.24149859-04	.39094002-05	19.13	1.56	-14.75
88750.	87500.0	.21520000+03	.21520000+03	.23210182-04	.37572846-05	19.13	2.20	-14.21
89000.	87743.1	.21520000+03	.21520000+03	.22307069-04	.36110878-05	19.13	2.84	-13.67
89250.	87986.1	.21520000+03	.21520000+03	.21439096-04	.34705796-05	19.13	3.49	-13.12
89500.	88229.1	.21520000+03	.21520000+03	.20604896-04	.33355386-05	19.13	4.14	-12.58
89750.	88472.2	.21520000+03	.21520000+03	.19803155-04	.32057520-05	19.13	4.80	-12.03
90000.	88715.1	.21520000+03	.21520000+03	.19032610-04	.30810154-05	******	5.45	-11.48

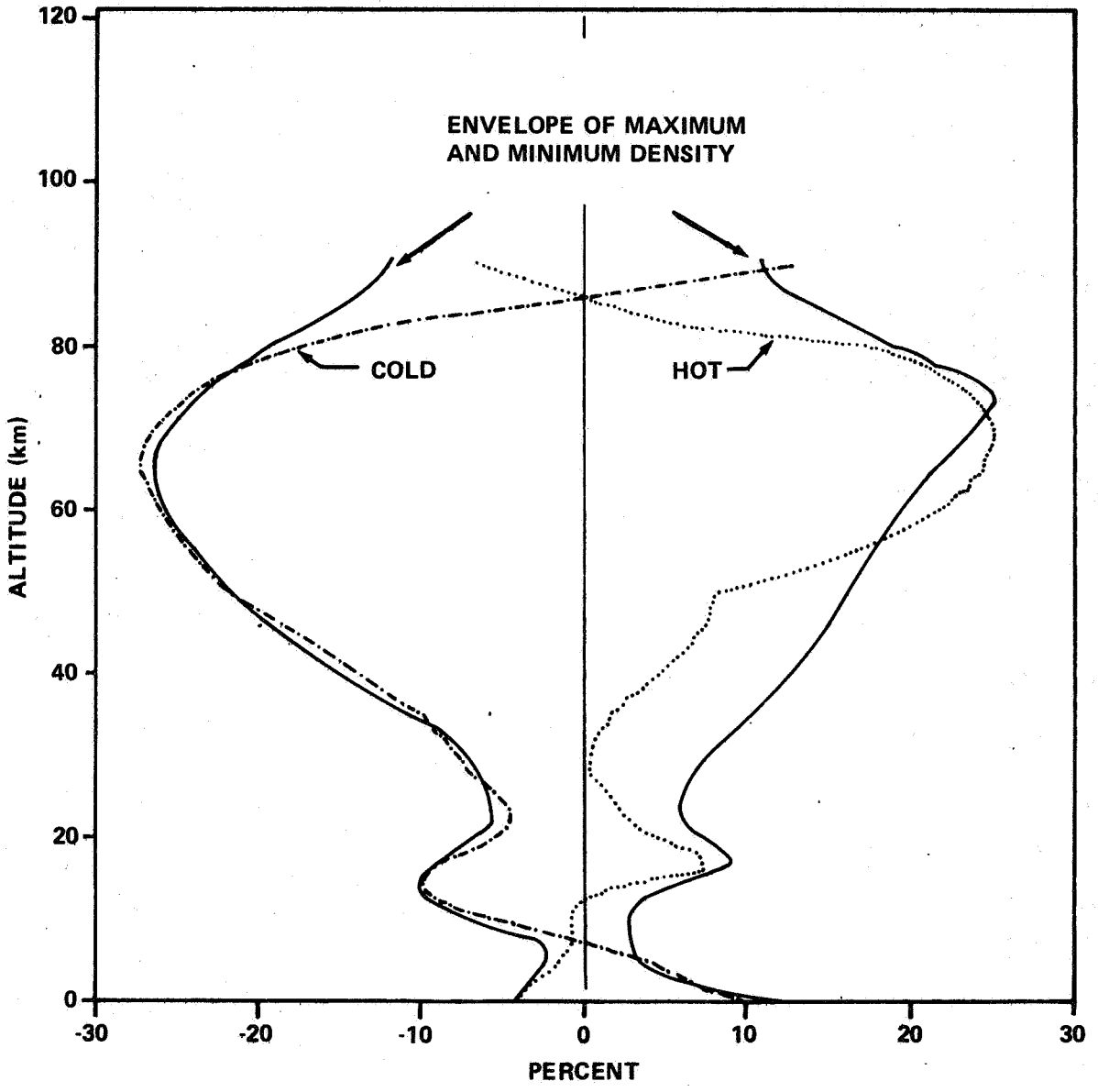

Figure 1. Relative deviations (percent) of extreme Cape Kennedy, Florida, density profiles with respect to PRA-63.

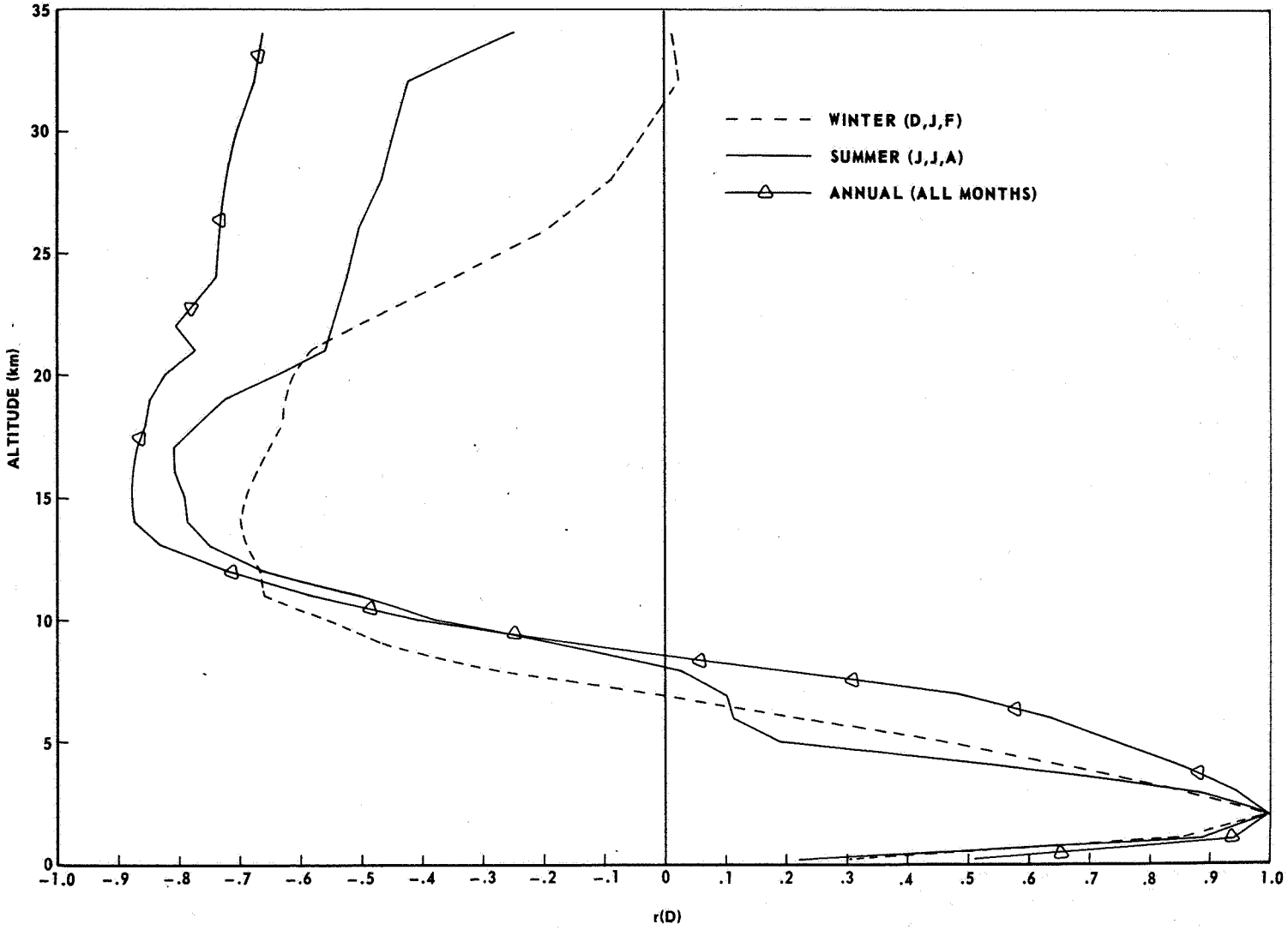

Figure 2. Point Arguello, California, density correlation coefficient profiles, by season, between 2 km and all other altitude levels.

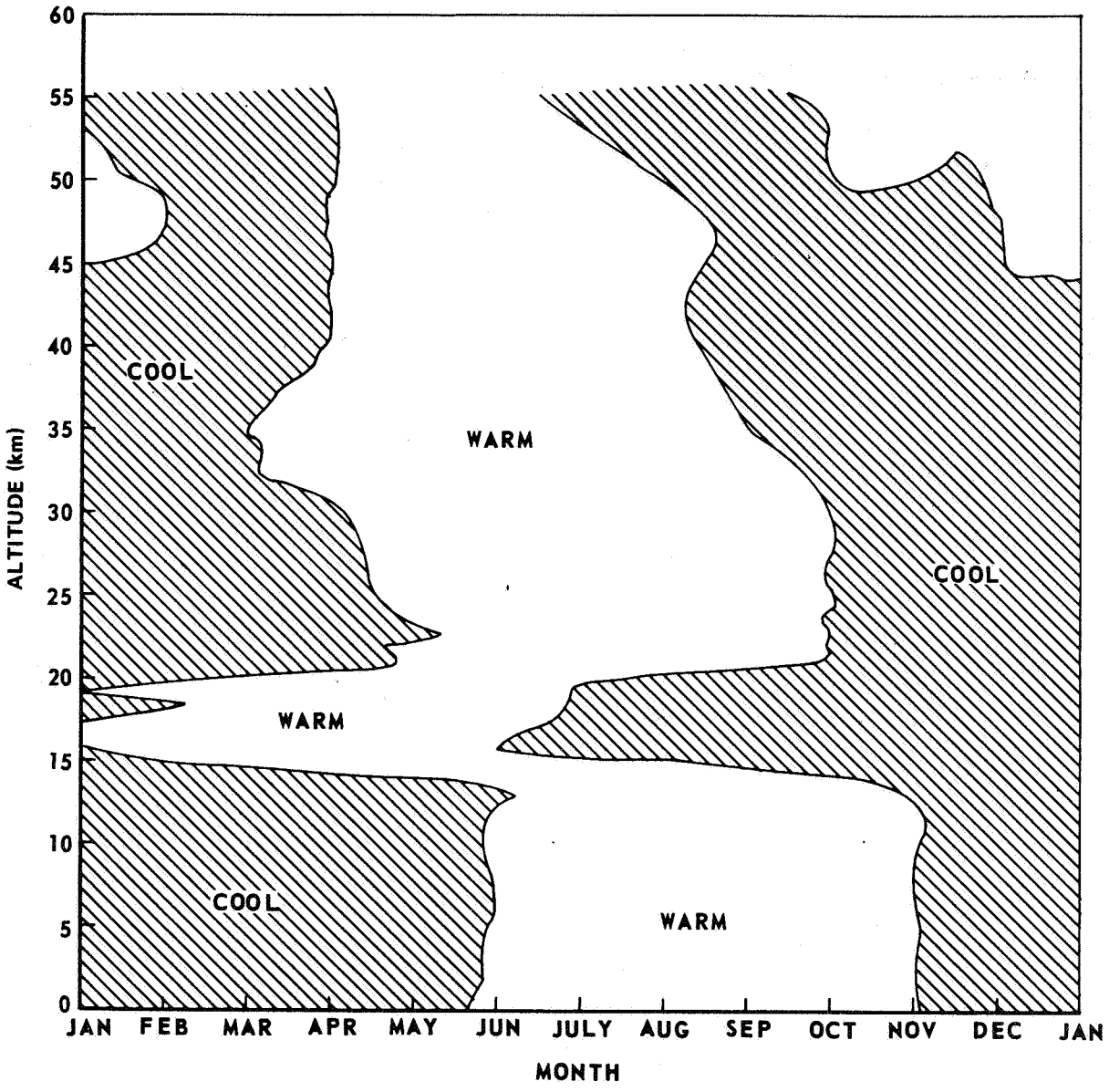

Figure 3. Point Arguello monthly mean temperature versus altitude structure. (Areas designated as cool and warm are either cooler or warmer, respectively, than the annual mean temperature.)

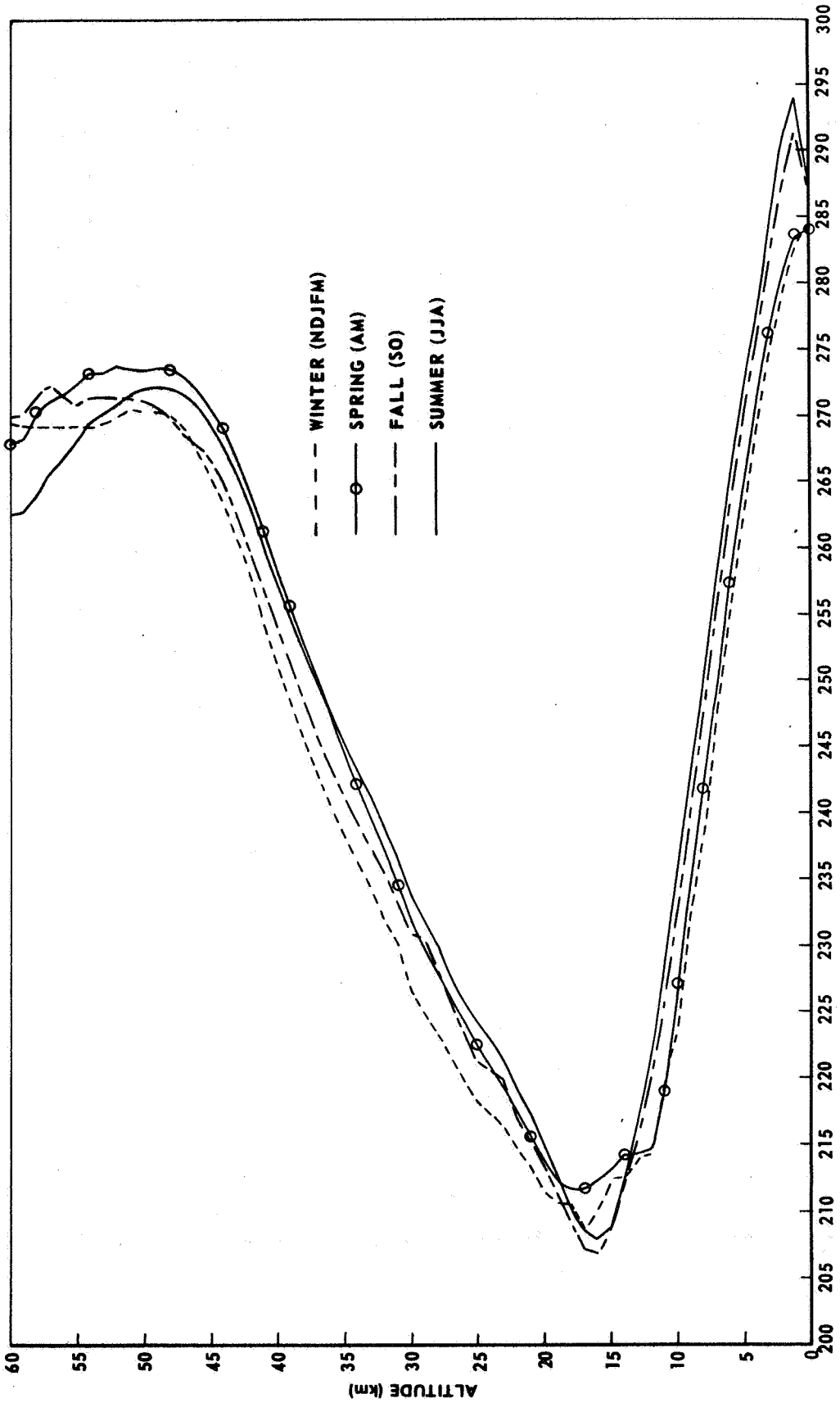

Figure 4. Point Arguello mean seasonal temperature profiles.

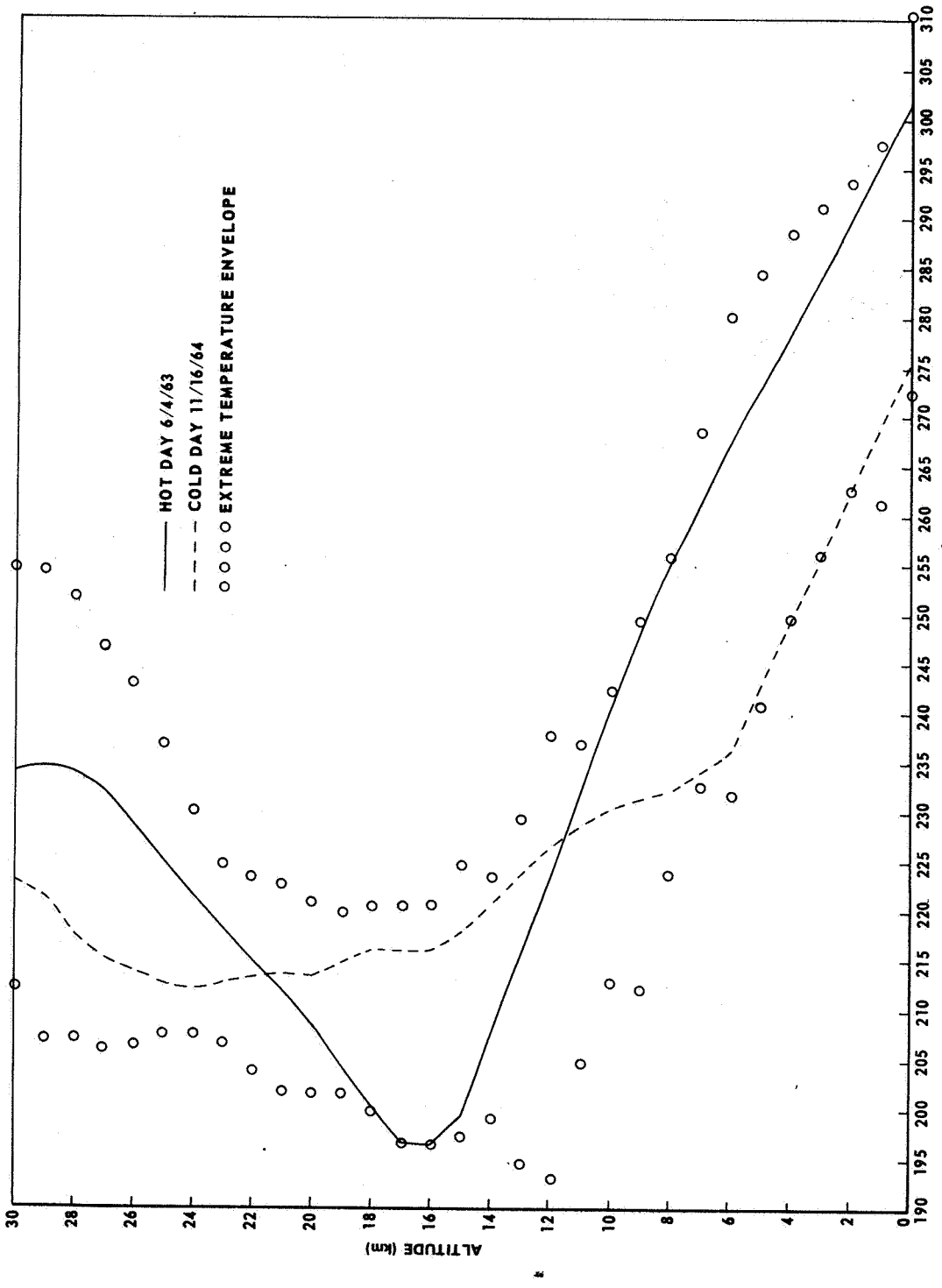

Figure 5. Two actual observed extreme temperature profiles, applicable to Vandenberg AFB, California.

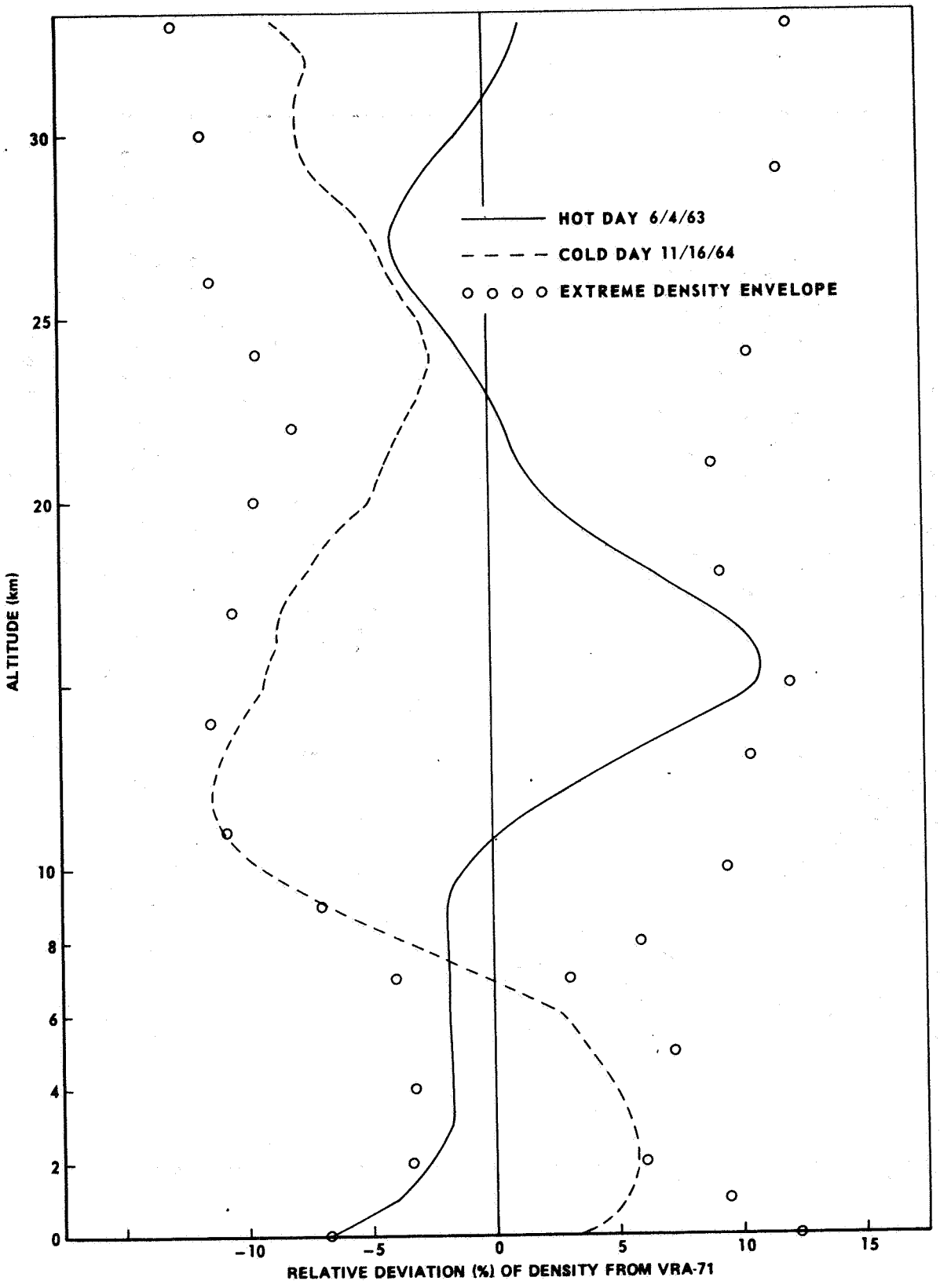

Figure 6. Two actual observed extreme density deviation profiles, applicable to Vandenberg AFB.

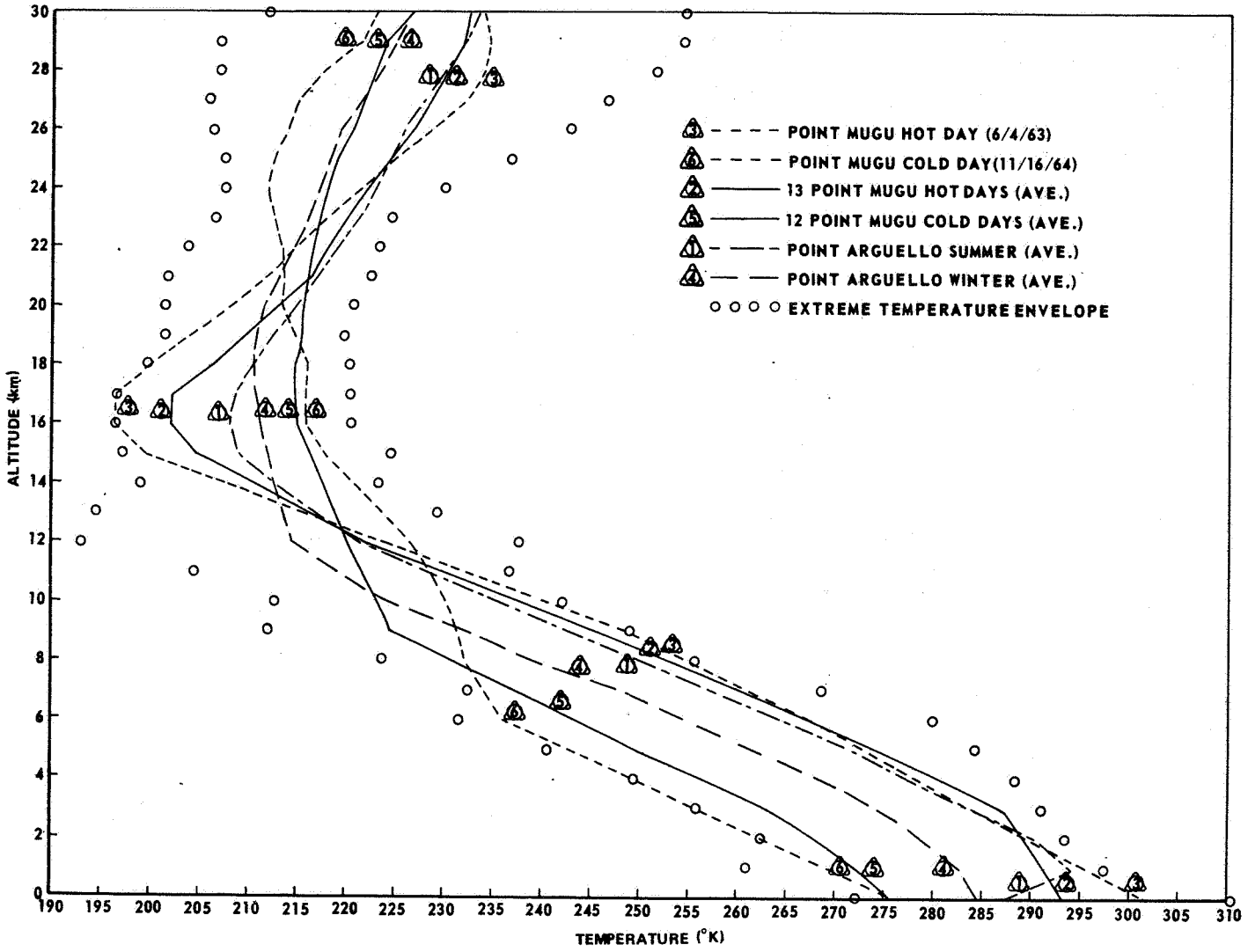

Figure 7. Mean, mean-extreme, and extreme temperature profiles representing summer (hot) and winter (cold) conditions over Vandenberg AFB.

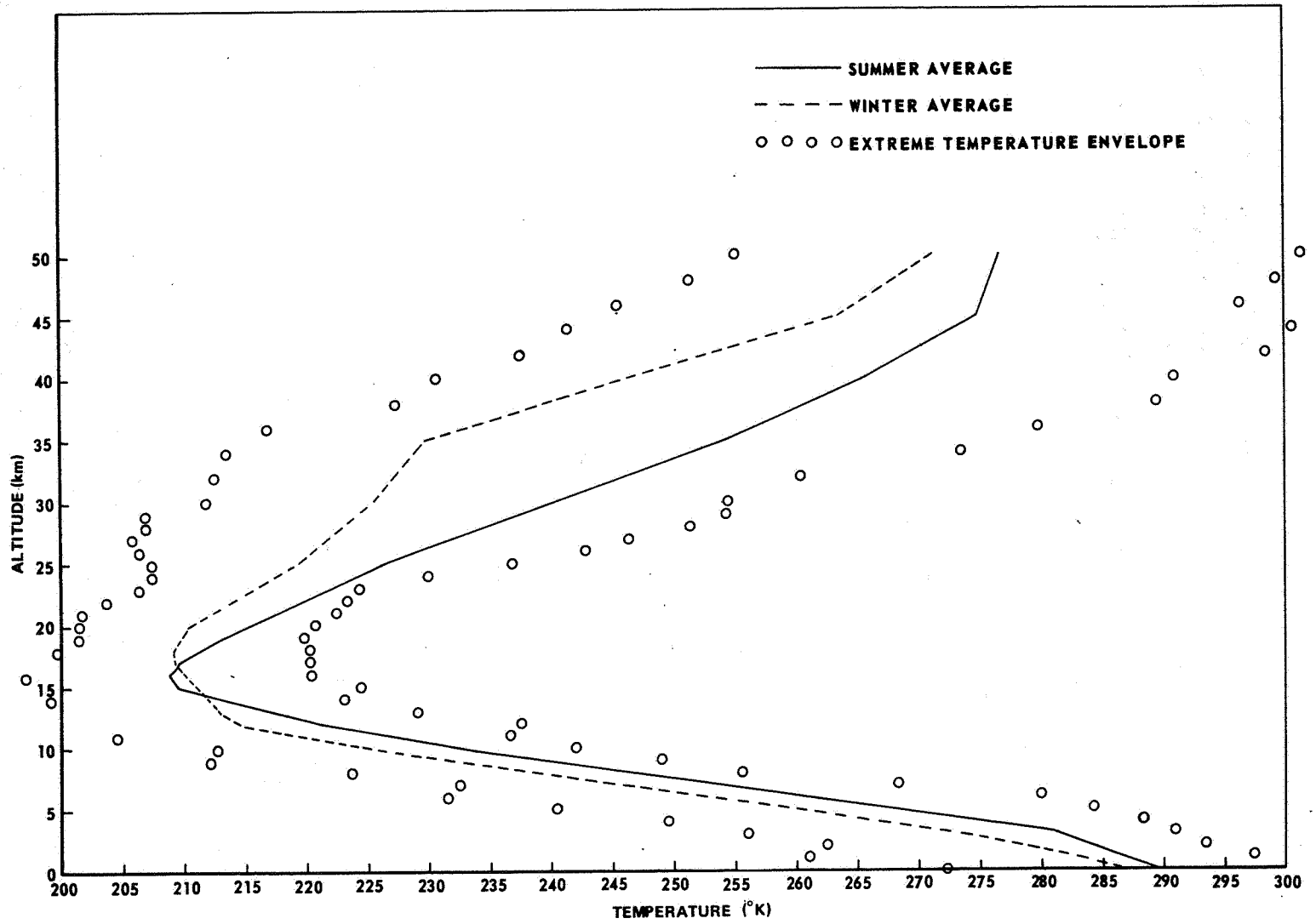

Figure 8. Extreme averaged winter and summer temperature profiles between 30- and 45-km altitude over Vandenberg AFB.

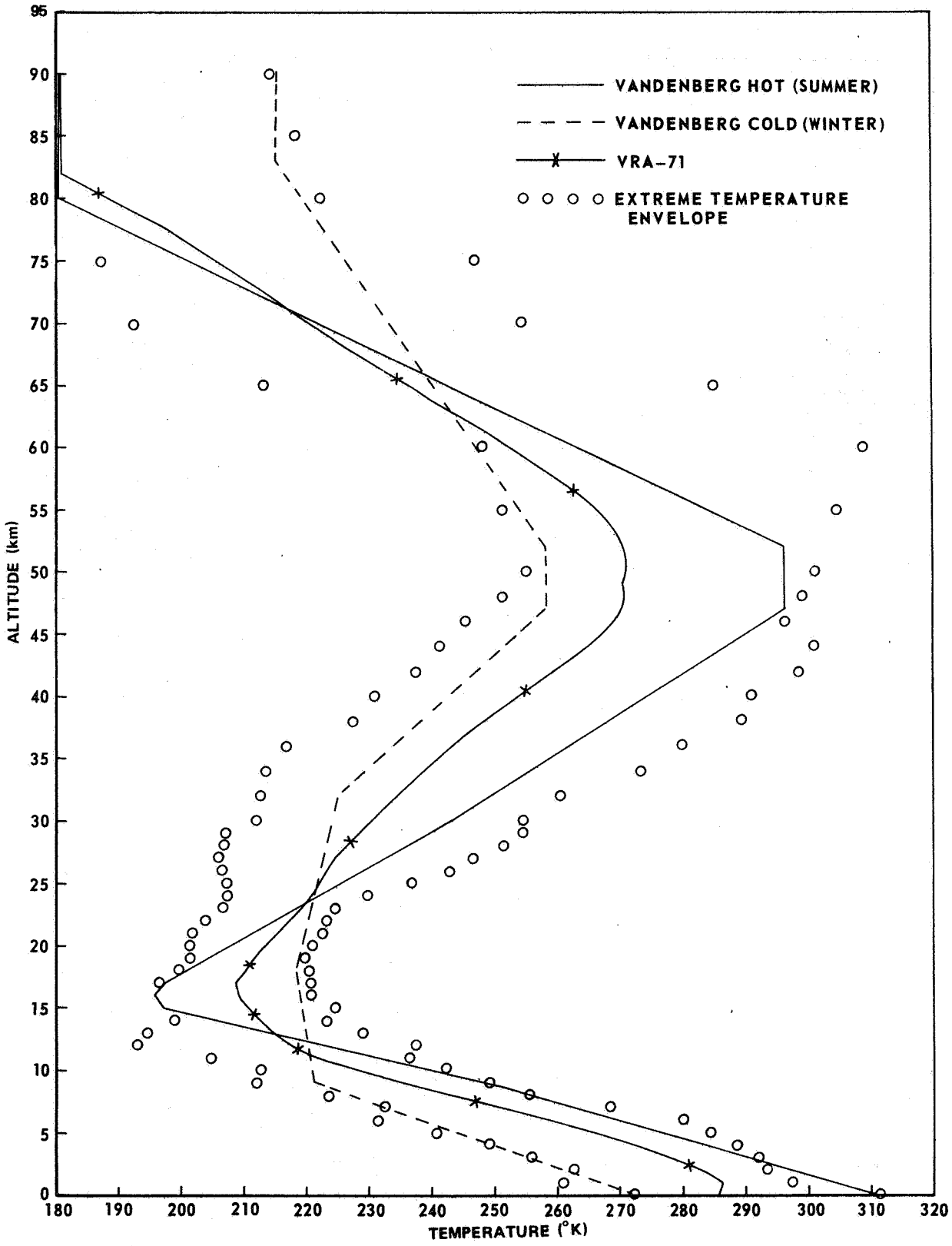

Figure 9. Temperature profiles of the hot, cold, and VRA-71 for Vandenberg AFB.

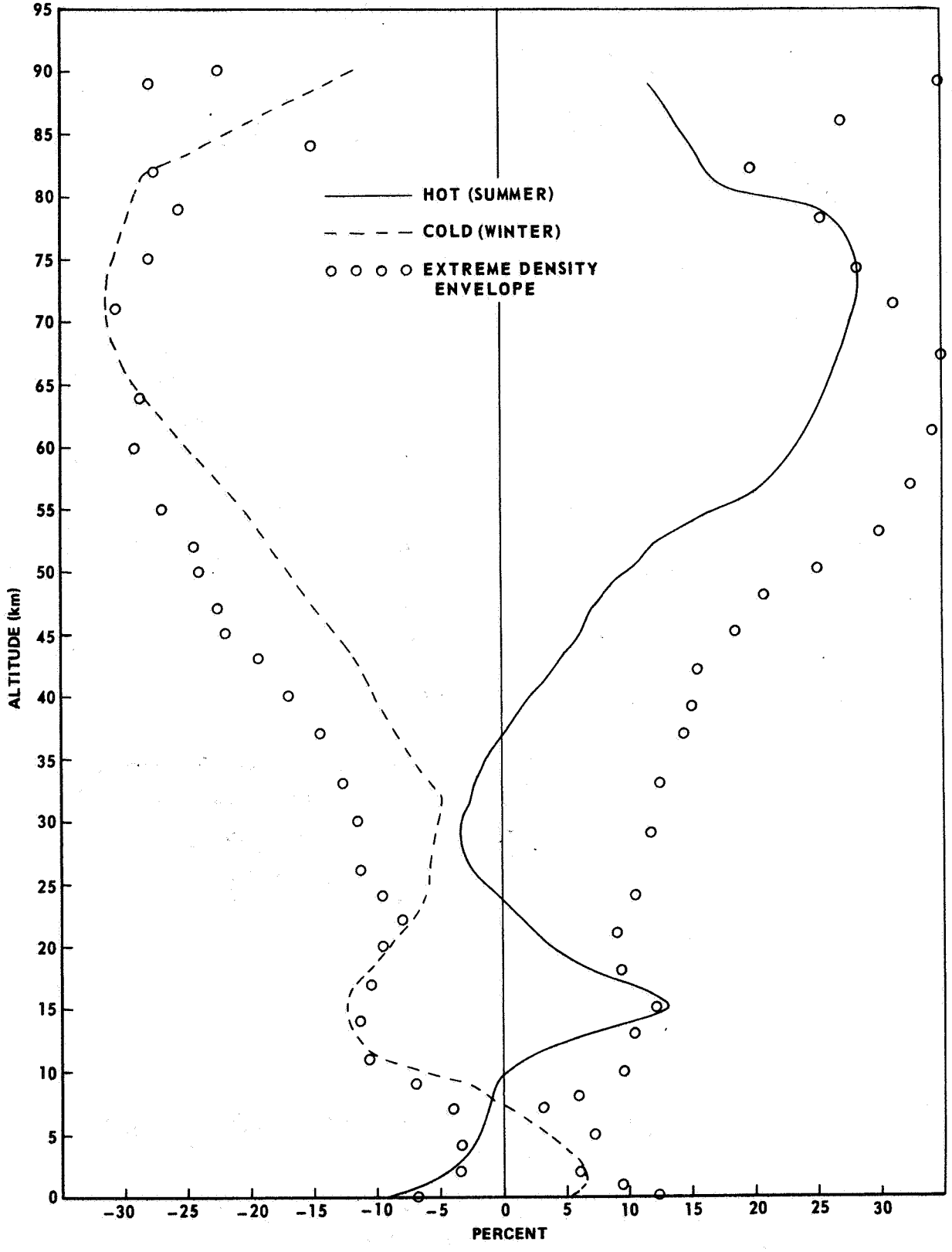

Figure 10. Hot and cold density deviation profiles (as percent of VRA-71) applicable to Vandenberg AFB.

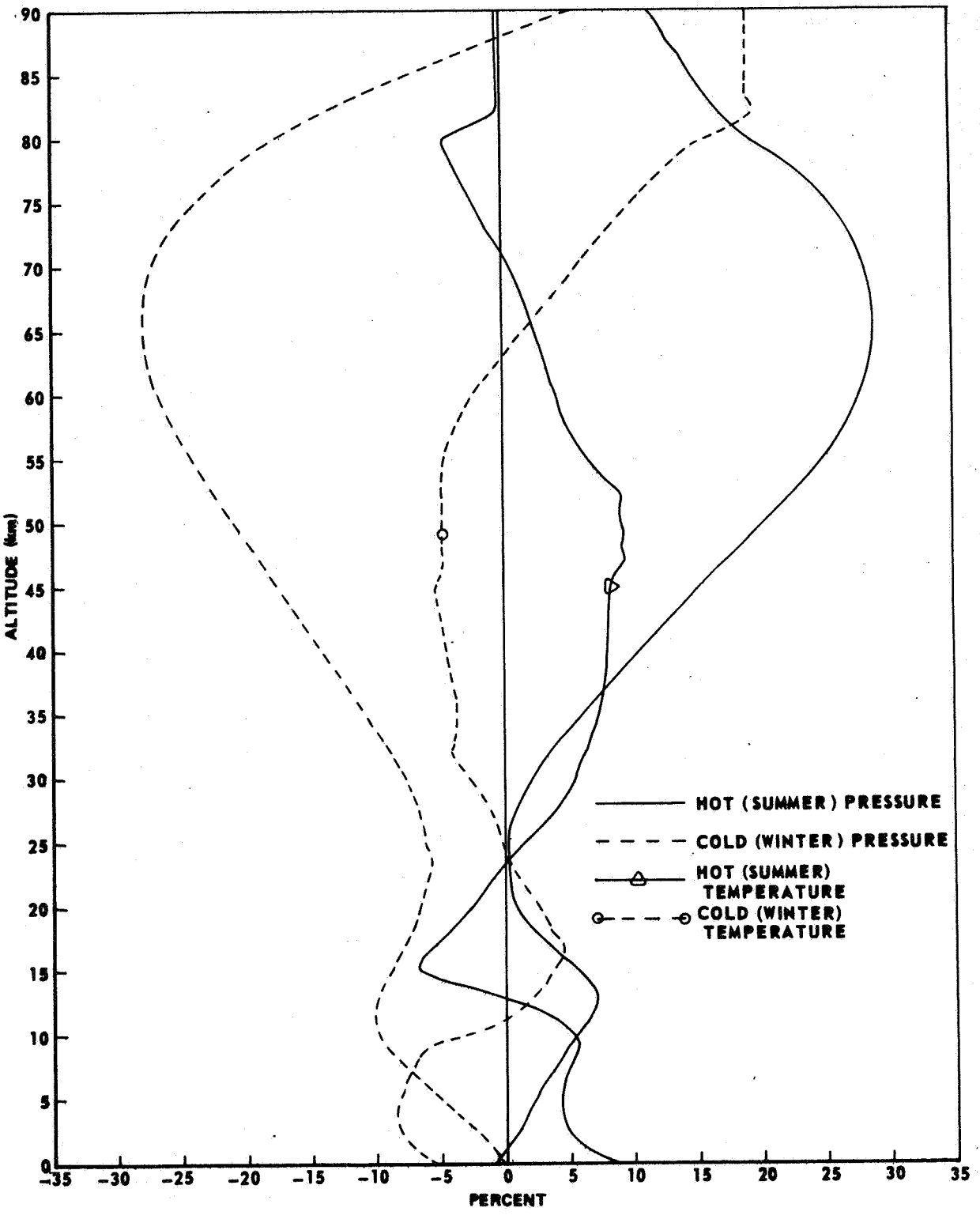

Figure 11. Relative deviations (percent) of Vandenberg hot and cold temperature and pressure profiles with respect to VRA-71.

APPROVAL

HOT AND COLD ATMOSPHERES FOR VANDENBERG AFB, CALIFORNIA (1973 VERSION)

By D. L. Johnson

The information in this report has been reviewed for security classification. Review of any information concerning Department of Defense or Atomic Energy Commission programs has been made by the MSFC Security Classification Officer. This report, in its entirety, has been determined to be unclassified.

This document has also been reviewed and approved for technical accuracy.

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