

THERMOSPHERIC TEMPERATURE, DENSITY, AND COMPOSITION: NEW MODELS

L. G. Jacchia

INTRODUCTION

The models presented herein are a thoroughly revised version of our 1971 models (Jacchia, 1971a), which in turn were a revision of earlier, similarly patterned models (Jacchia, 1965, 1970). Following a widespread custom, we shall refer to these models as J65, J70, and J71. The models essentially consist of two parts: 1) the basic static models, which give temperature and density profiles for the relevant atmospheric constituents for any specified exospheric temperature, and 2) a set of formulae to compute the exospheric temperature and the expected deviations from the static models as a result of all the recognized types of thermospheric variation.

In revising the basic models, we strove to reproduce the results from the OGO 6 satellite concerning the relative concentrations of N_2 and O at 450 km (Taeusch and Carignan, 1972; Hedin, Mayr, Reber, Spencer, and Carignan, 1974), while keeping the total-density profiles anchored to satellite drag. This was also the aim of the Committee for the Extension of the U.S. Standard Atmosphere in constructing the higher altitude end of the U.S. Standard Atmosphere, 1976 (COESA, 1976), which consists of temperature and density profiles for a single exospheric temperature, 1000 K. As a consequence of this common aim and of mutual consultations, our profiles for 1000 K are very similar to the U.S. Standard profiles. In the lower thermosphere, where the U.S. Standard Atmosphere (USSA) relies heavily on the Aladdin experiments, we have tried to keep as close as possible to its O and O_2 profiles. Our helium densities at 1000 km are about 30% smaller than those of the USSA. To obtain the higher

This work was supported in part by Grant NGR 09-015-002 from the National Aeronautics and Space Administration and Grants SRF 450123 and SRF 460117 from the Smithsonian Research Foundation.

helium densities, which were thought to be necessary to fit some results from satellite drag, the USSA introduced an ad hoc vertical flux for helium. We have found this flux to be entirely unnecessary to fit our satellite-drag results at 1000 km. The difference in the interpretation of the drag lies in the theory used to compute the drag coefficient in a helium atmosphere. We have followed the formulation given by Cook (1965), according to which the drag coefficient becomes quite high, exceeding even 3.0, when a satellite moves in an atmosphere in which helium is the main constituent.

The densities of earlier models relied almost entirely on satellite drag, for which the coefficient 2.2 had been adopted in the 200- to 400-km region, in accordance with an unwritten agreement among investigators. Table 1 gives mean residuals from the present models of densities computed from the drag of 10 satellites using a value of 2.20 for the drag coefficient in the region where it is nearly independent of height (around 200 to 400 km); \bar{z} is the mean "effective height" - this being the average of the actual height around the satellite's orbit weighted by the local atmospheric drag. The residual observed minus computed (model) ($O - C$) is given in units of $\log_{10} \rho$; n is the number of density determinations used in the comparison.

Table 1. Residuals from the models of densities from satellite drag.

Satellite	\bar{z} (km)	$O - C$ ($\log \rho$)	n	Interval
1962 $\beta\tau 2$	268	+0.001	1973	1963.0-1967.4
1966 44A	303	-0.020	5094	1966.4-1975.0
1958 Alpha	368	+0.005	5456	1958.1-1970.2
1966 70A	398	-0.001	2601	1969.0-1975.0
1960 $\xi 1$	455	+0.013	5279	1960.9-1975.0
1964 76A	610	-0.042	4126	1964.9-1968.6
1959 $\alpha 1$	614	+0.001	2589	1959.2-1975.0
1963 53A	763	-0.011	6150	1964.0-1968.4
1968 66A	842	+0.001	4172	1968.6-1975.0
1964 4A	999	[+0.036] [*]	3371	1964.1-1969.4
		Total		Extremes
		40811		1958.1-1975.0

*Uncertain, because the near-circular orbit of the satellite caused the "observed" densities to be closer to the mean global densities than to the densities given by the model for the effective height at the geographic position of perigee.

The description of the models is given in two parts. In Part I, we outline the construction of the static models. Part II deals with the several types of thermospheric variation and with the empirical equations that have been devised to represent them using the static models as a reference frame. Auxiliary tables to illustrate and facilitate the computation of some of the variations are interspersed in the text. A summary of all the equations and a numerical example are to be found at the end of Part II. A detailed tabulation of the basic static models is given in Table 10, following the references: number densities of six atmospheric constituents are given in the range from 90 to 2500 km for 19 temperature profiles ending in exospheric temperatures from 500 to 2600 K; also tabulated are the total number density, the mean molecular mass, and the total density and pressure. The total densities are repeated in a compact summary form (Table 11) following the tables of the basic static models.

PART I

THE STATIC MODELS

1. TEMPERATURE PROFILES

All temperature profiles start from a constant value $T_0 = 188$ K at the height $z_0 = 90$ km with a gradient $G_0 = (dT/dz)_{z=z_0} = 0$, rise to an inflection point at a fixed height $z_x = 125$ km, and become asymptotic to a temperature T_∞ (often referred to as the "exospheric" temperature). Both the temperature T_x and the temperature gradient $G_x = (dT/dz)_{z=z_x}$ at the inflection point are functions of T_∞ , defined as follows:

$$T_x - T_0 = 110.5 \sinh^{-1} 0.0045 (T_\infty - T_0) , \quad (1)$$

$$G_x = 1.9 \frac{T_x - T_0}{z_x - z_0} , \quad (z \text{ in km}) , \quad (2)$$

$$(T_0 = 188 \text{ K}, z_0 = 90 \text{ km}, \text{ and } z_x = 125 \text{ km}) .$$

The temperature profiles are given by the following:

For $z < z_x$,

$$T = T_x + \frac{T_x - T_0}{\pi/2} \tan^{-1} \left\{ \frac{G_x}{(T_x - T_0)/(\pi/2)} (z - z_x) \left[1 + 1.7 \left(\frac{z - z_x}{z - z_0} \right)^2 \right] \right\} , \quad (z \text{ in km}) . \quad (3)$$

For $z > z_x$,

$$T = T_x + \frac{T_\infty - T_x}{\pi/2} \tan^{-1} \left\{ \frac{G_x}{(T_\infty - T_x)/(\pi/2)} (z - z_x) \left[1 + 5.5 \times 10^{-5} (z - z_x)^2 \right] \right\} , \quad (z \text{ in km}) . \quad (4)$$

Table 2 shows the dependence of the maximum temperature gradient G_x on the exospheric temperature T_∞ . The family of temperature profiles originated by equations (1) to (4) is graphically illustrated in Figure 1.

Table 2. Dependence of the maximum temperature gradient on the exospheric temperature.

T_∞ (°K)	G_x (deg km $^{-1}$)	T_∞ (°K)	G_x (deg km $^{-1}$)
500	6.84	1400	14.38
600	8.26	1600	15.29
800	10.42	1800	16.07
1000	12.04	2000	16.77
1200	13.32	2200	17.39

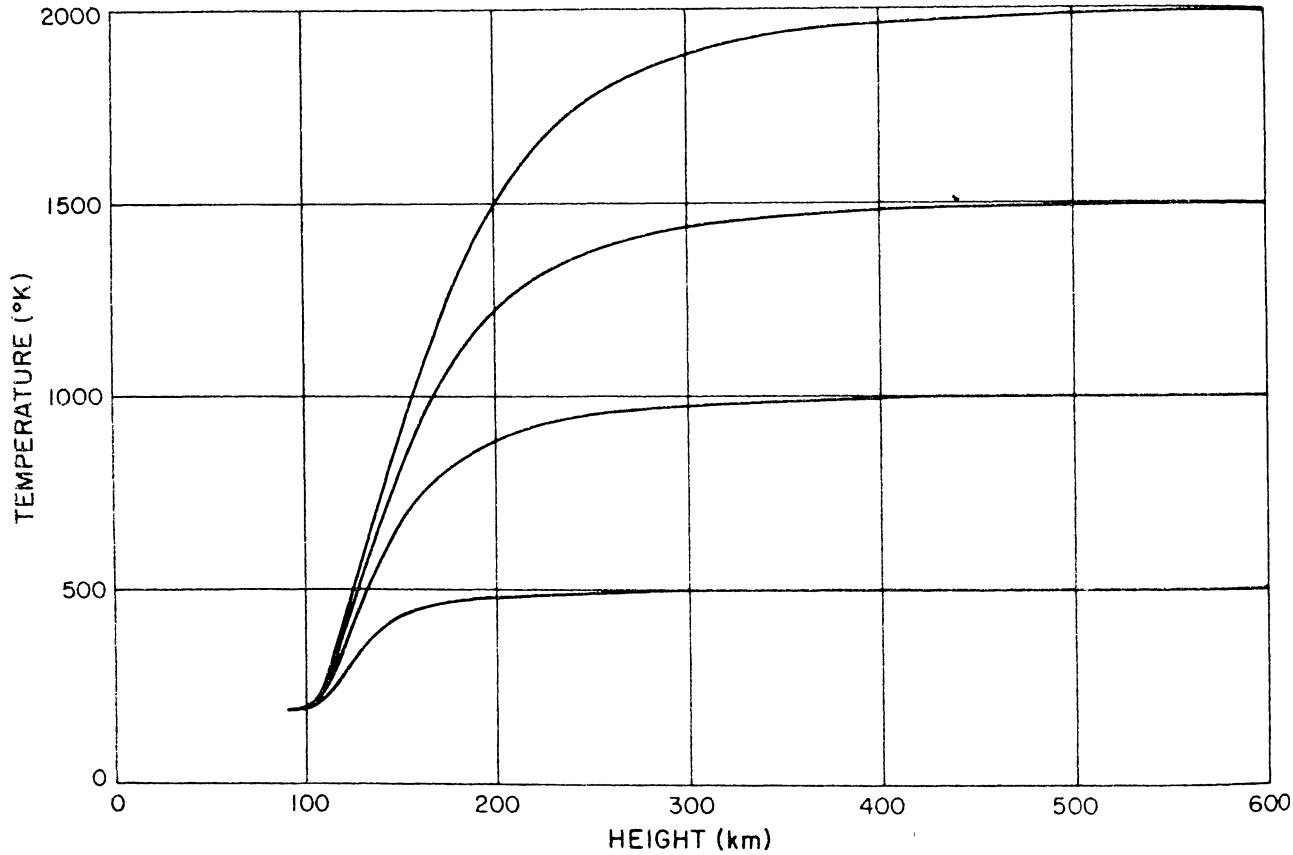


Figure 1. Four temperature profiles from the present models.

2. COMPOSITION

We have assumed that the atmosphere is composed only of nitrogen, oxygen, argon, helium, and hydrogen, in a condition of mixing up to 100 km and in diffusion above this height. We have adopted the sea-level composition of the U.S. Standard Atmosphere 1962 (COESA, 1962) such as would obtain after elimination of the minor constituents and of hydrogen (which is introduced in our models at a height of 150 km). Thus, the assumed sea-level composition is as shown in Table 3. The resulting sea-level mean molecular mass is $\bar{M}_0 = 28.960$.

Table 3. Assumed sea-level composition.

Constituent	Fraction by volume $q_0(i)$	Molecular weight M_i
Nitrogen (N_2)	0.78110	28.0134
Oxygen (O_2)	0.20955	31.9988
Argon (Ar)	0.009343	39.948
Helium (He)	<u>0.000005242</u>	4.0026
Sum	1.00000	

In our 1971 models, we had assumed that at heights below 100 km, any change in the mean molecular mass \bar{M} was caused only by oxygen dissociation. The ratio $n(O)/n(O_2)$ was thus uniquely determined by \bar{M} , for which an empirical profile was given for heights between 90 and 100 km. Since above 100 km composition was rigidly determined by molecular diffusion, there was no provision to account for oxygen dissociation or for any departure from diffusion equilibrium. In the present models, we still use an empirical profile of a mean molecular mass \bar{M}' from 90 to 100 km, but we have added independent corrections to the values of $n(O)$ and $n(O_2)$ determined from this profile; these corrections extend right across the homopause. The final mean molecular mass \bar{M} is computed in the usual manner after the corrections to $n(O)$ and $n(O_2)$ have been applied.

The \bar{M}' profile is defined by

$$\bar{M}'(z) = \sum_{n=0}^5 c_n (z - 90)^n , \quad (90 < z < 100 ; \quad z \text{ in km}) . \quad (5)$$

The coefficients c_n are given below:

$$\begin{aligned} c_0 &= 28.89122 , \\ c_1 &= -2.83071 \times 10^{-2} , \\ c_2 &= -6.59924 \times 10^{-3} , \\ c_3 &= -3.39574 \times 10^{-4} , \\ c_4 &= +6.19256 \times 10^{-5} , \\ c_5 &= -1.84796 \times 10^{-6} . \end{aligned}$$

First, a density profile ρ' is computed from \bar{M}' by integrating the barometric equation

$$\frac{dp'}{\rho'} = \frac{T}{\bar{M}} d\left(\frac{\bar{M}'}{T}\right) - \frac{\bar{M}' g}{R^* T} dz , \quad (6)$$

in which the temperature profiles of equation (3) are used with a fixed boundary value $\rho'_0 = 3.43 \times 10^{-6} \text{ kg m}^{-3}$ at $z = 90 \text{ km}$. The acceleration due to gravity, g , is defined by

$$g = 9.80665 \left(1 + \frac{z}{R_e}\right)^2 \text{ m sec}^{-2} , \quad R_e = 6.356766 \times 10^6 \text{ m} . \quad (7)$$

This equation (Harrison, 1951; Minzner and Ripley, 1956) is an excellent approximation to the mean value of g (centrifugal acceleration included) at the latitude of $45^\circ 32' 40''$. The universal gas constant $R^* = 8.31432 \times 10^3 \text{ kg m (kg-mol)}^{-1} \text{ K}^{-1}$.

From ρ' we derive a number density N' by

$$N' = \frac{A \rho'}{\bar{M}'} , \quad (8)$$

where A is Avogadro's number, 6.02217×10^{26} (mks). For N₂, Ar, and He, the number densities n(i) are computed from

$$n(i) = q_0(i) \frac{\bar{M}'}{\bar{M}'_0} N' , \quad (9)$$

while for O and O₂, we have

$$n'(O) = 2N' \left(1 - \frac{\bar{M}'}{\bar{M}'_0} \right) , \quad (10)$$

$$n'(O_2) = N' \left\{ \frac{\bar{M}'}{\bar{M}'_0} \left[1 + q_0(O_2) \right] - 1 \right\} . \quad (11)$$

To n'(O) and n'(O₂) we apply empirical corrections to account for atomic oxygen production above the homopause, so that the final number densities of O and O₂ become

$$\log n(O) = \log n'(O) + \Delta \log n'(O) , \quad (12)$$

$$\log n(O_2) = \log n'(O_2) + \Delta \log n'(O_2) . \quad (13)$$

The corrections are

$$\Delta \log n'(O) = -0.24 \exp [-0.009(z - 97.7)^2] , \quad (14)$$

$$\Delta \log n'(O_2) = -0.07 \{ 1 + \tanh [0.18(z - 111)] \} , \quad (z \text{ in km}) . \quad (15)$$

The final values of N and ρ are computed from $\Sigma n(i)$ and $\Sigma n(i) M_i$ by using the original values of n(i) for N₂, Ar, and He as computed from equation (9) and the corrected values of n(O) and n(O₂) as computed from equations (10) to (15).

The number densities n(i) at 100 km computed in the manner just described are taken as boundary values in the integration of the diffusion equation, which is used to compute n(i) for heights above 100 km. We can write the equation in the form

$$\frac{dn(i)}{n(i)} + \frac{dT}{T} (1 + a_i) + \frac{dz}{H_i} + \frac{\Phi_i}{D} \frac{dz}{n(i)} = 0 \quad , \quad (z > 100 \text{ km}) \quad . \quad (16)$$

Here, a_i and Φ_i are, respectively, the thermal diffusion coefficient and the vertical flux proper to the species i , D is the mutual diffusion coefficient, and $H_i = R^* T / M_i g$, the scale height of species i . For helium and hydrogen, we assumed $a_i = -0.38$ and -0.25 , respectively; for all other constituents, $a_i = 0$. We took Φ_i to be zero for all constituents except hydrogen, for which we used a vertical flux proportional to the number density at a height of 500 km, as given by

$$\log_{10} n_{500}(H) = 5.94 + 28.9 T_\infty^{-1/4} \quad , \quad (\text{mks}) \quad , \quad (17)$$

$$\log_{10} \Phi(H) = 6.90 + 28.9 T_\infty^{-1/4} \quad , \quad (\text{mks}) \quad , \quad (18)$$

and a diffusion coefficient D taken from the U.S. Standard Atmosphere, 1976:

$$D = 2.0 \times 10^{20} \frac{\sqrt{T}}{N} \quad , \quad (19)$$

where N is the total number density. The hydrogen densities are based mainly on Brinton, Mayr, and Potter (1975), while the absolute term in the equation for $\Phi(H)$ was chosen such as to make the flux for $T_\infty = 1000$ K equal to that used in the U.S. Standard Atmosphere, 1976.

The variations of the number densities of the various atmospheric species and of the total density with temperature and height are illustrated in Figures 2 and 3.

Atomic nitrogen. Mauersberger, Engebretson, Kayser, and Potter (1976) have succeeded in measuring atomic nitrogen with the open-source neutral mass spectrometer on the Atmosphere Explorer C satellite. Introducing their data into our models,

we find that for an exospheric temperature of 700 K, $n(N)/n(O)$ increases from 0.012 at 500 km to 0.048 at 1000 km; for 1500 K, the ratio is only 0.0027 at 500 km and increases to 0.0049 at 1000 km. Although not insignificant, N never becomes important enough to justify its introduction into our models at the present state of knowledge about its behavior.

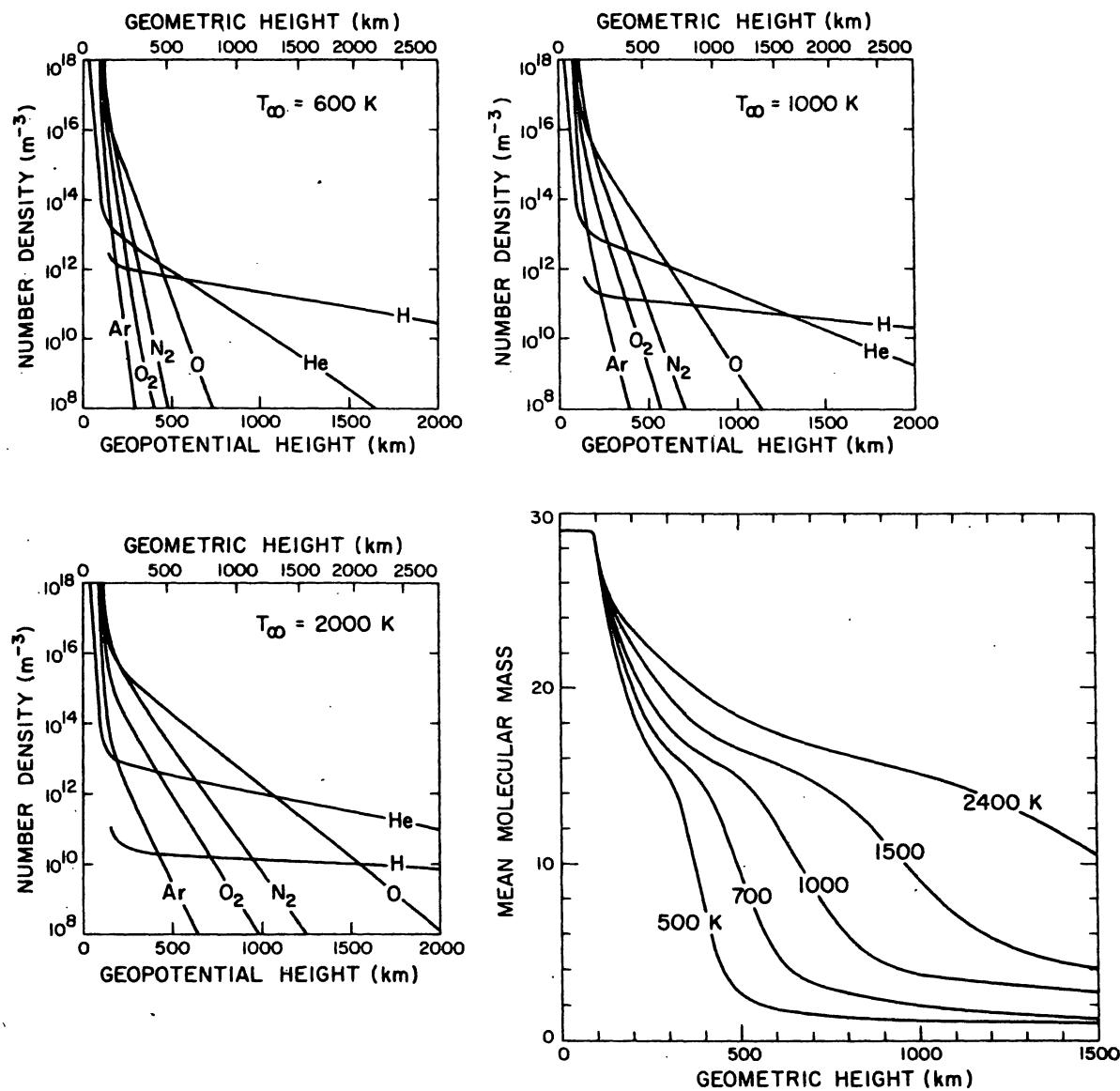


Figure 2. Number densities of individual atmospheric constituents as a function of height for three representative exospheric temperatures. The mean molecular mass as a function of height is shown for various exospheric temperatures in the lower right diagram.

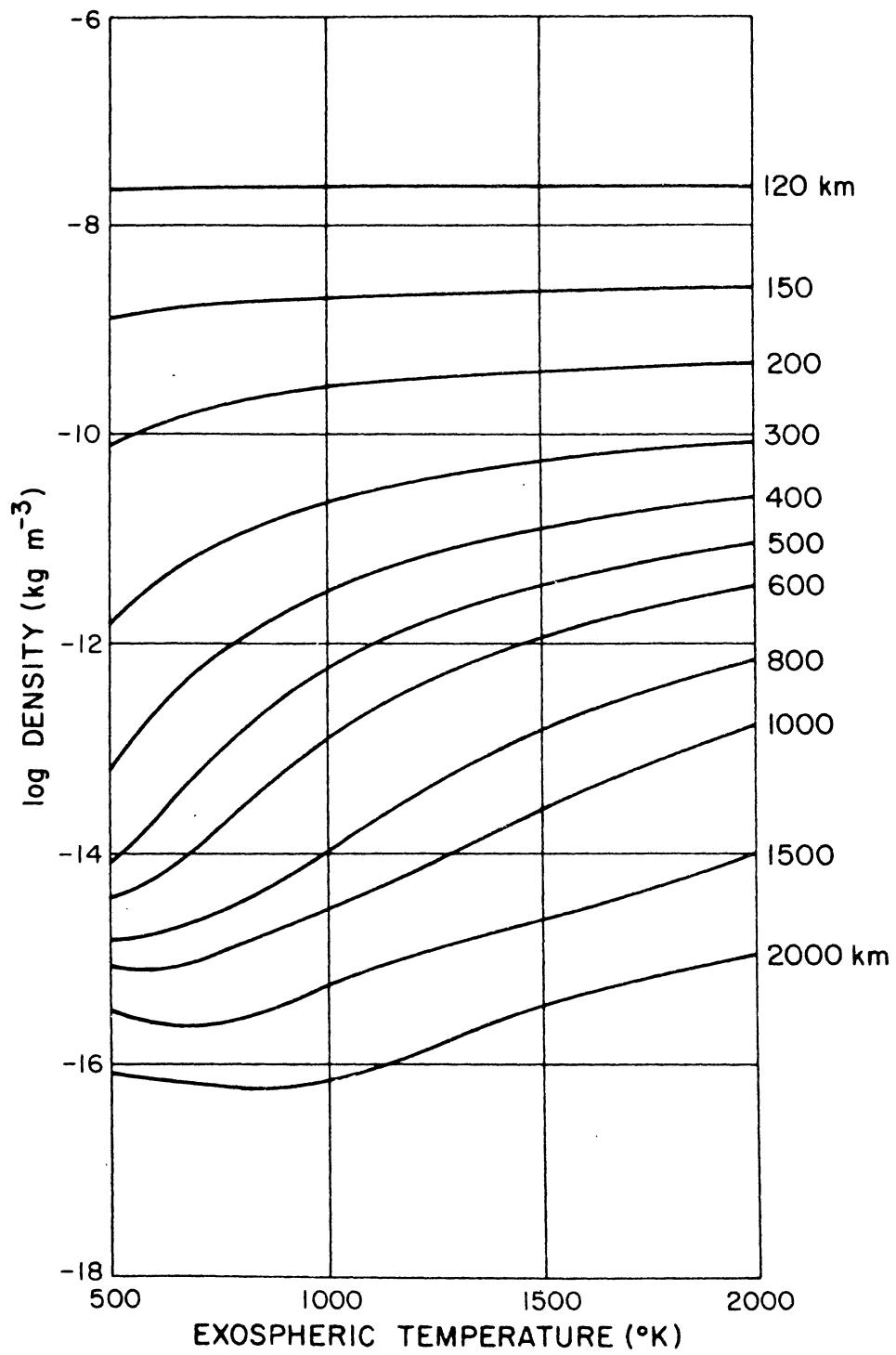


Figure 3. Total density as a function of exospheric temperature for various heights.

PART II

THERMOSPHERIC VARIATIONS

1. VARIATIONS IN THE THERMOSPHERE AND EXOSPHERE

Several types of variation are recognized in the atmospheric regions covered by the present models. They can be classified as follows:

1. Variation with the solar cycle.
2. Variation with the daily change in activity on the visible disk of the sun.
3. The daily, or diurnal, variation.
4. Variation with geomagnetic activity.
5. Seasonal-latitudinal variations.
6. The semiannual variation.
7. Rapid density fluctuations probably connected with gravity waves.

All these variations, with the exception of the last, are subject to some amount of regularity and can be predicted with varying degrees of accuracy on the basis of ground-based observational data. It should be obvious that static models cannot represent all types of variation equally well. They should be quite adequate when the characteristic time of the variation is much longer than the time involved in the conduction, convection, and diffusion processes; when, on the other hand, it is comparable or shorter – as in the daily variation and the geomagnetic effect – we must expect poorer results. By this, we mean that if we try to represent the observed density variations, we may have to introduce temperature variations that are not entirely correct, or vice versa. Since, by far, the largest observational material consists of density measurements, it is the density variation that we have tried to keep correct. We have no direct evidence so far that the resulting temperature variation might be grossly in error; some error, however, must be expected in the daily variation and in the geomagnetic effect.

In the analytic formulation of the different types of variation, we have tried to avoid a proliferation of symbols or the use of numerical subscripts for the many constants. Therefore, we have made no effort to keep the symbolism consistent throughout: the same letters have often been used for exponents or coefficients in equations pertaining to separate types of variation. We have assumed that no confusion would result if it is understood that, apart from such universally accepted symbols as T , ρ , ϕ , and z for temperature, density, latitude, and height, each type of variation has its own separate symbolism.

2. THE VARIATION WITH SOLAR ACTIVITY

The ultraviolet solar radiation that heats the earth's upper atmosphere actually consists of two components, one related to active regions on the solar disk and the other to the disk itself. The active-region component comes from areas of higher temperature and consists mainly of the spectral lines of highly ionized atoms, such as Fe XIV–XVI, Si IX–X, and Mg X; radiation from the clear disk comes from much less ionized atoms, such as He I–II and O IV, and the helium continuum. The active-region component varies rapidly from day to day in correspondence with the appearance and disappearance of active areas caused by the rotation of the sun and by spot formation; the disk component presumably varies more slowly in the course of the 11-year solar cycle. Since the radiation in the two components is different, we must expect the atmosphere to react in a different manner to each of them — and this is actually observed.

The 10.7-cm solar flux F is generally used as a readily available index of solar EUV radiation. It also consists of a disk component and an active-area component, which can be separated statistically by relating the observed values of the flux integrated over the whole solar disk to the corresponding sunspot numbers (Hachenberg, 1965) or, better, to sunspot areas (Jacchia and Slowey, 1973). When the 10.7-cm flux increases, there is an increase in the temperature of the thermosphere and exosphere; for a given increase in the disk component, however, the temperature increases much more than for the same increase in the active-area component. Separate values of the two components of the solar flux are not readily available; fortunately, we have found (Jacchia and Slowey, 1973) that the disk component is, for all practical purposes, linearly related to \bar{F} , the flux averaged, or smoothed, over a few solar rotations. We can, therefore, replace the relation between the temperature and the disk component with an equivalent relation between the temperature and the decimetric solar flux.

From an analysis of about 40,000 densities derived from satellite drag in the interval 1958 to 1975, we find that $T_{1/2}$, the arithmetic mean of the global extrema

of the diurnal variation in the exospheric temperature under quiet geomagnetic conditions, $K_p = 0$, is related to F and \bar{F} by the equation

$$T_{1/2} = 5.48 \bar{F}^{0.8} + 101.8 F^{0.4} . \quad (20)$$

F and \bar{F} are in the customary units of 10^4 Jansky ($10^{-22} \text{ W m}^{-2} \text{ Hz}^{-1}$ bandwidth). For a better definition of $T_{1/2}$, see Section 3, including the warning note. In our analysis, we took for \bar{F} the average of F over six solar rotations. A smoother version of \bar{F} , which we consider superior and definitely recommend, is obtained by taking a weighted mean of F , in which the weight is a gaussian function of time:

$$\bar{F} = \frac{\sum wF}{\sum w} , \quad (21)$$

with

$$w = \exp \left[- \left(\frac{t - t_0}{\tau} \right)^2 \right] . \quad (22)$$

Here, t is time and t_0 the instant for which we want to compute \bar{F} . A recommended value of τ is three solar rotations, or 71 days. The variation of $T_{1/2}$ as a function of \bar{F} is illustrated in Figure 4, where the extrema of the diurnal variation are also shown. In Table 4, values of \bar{F} computed with equations (21) and (22) are given at 10-day intervals from 1958 to 1976.

Table 5 compares the temperatures of the present models (J) with those of the models of Thuillier, Falin, and Wachtel (1976) (T) and Hedin *et al.* (1974) (H) for the same values of \bar{F} when $F = \bar{F}$ and $K_p = 0$. It should be remembered that the temperatures of Thuillier *et al.* are Doppler temperatures, those of Hedin *et al.* are N_2 temperatures, and those of the present model are mainly atomic oxygen temperatures.

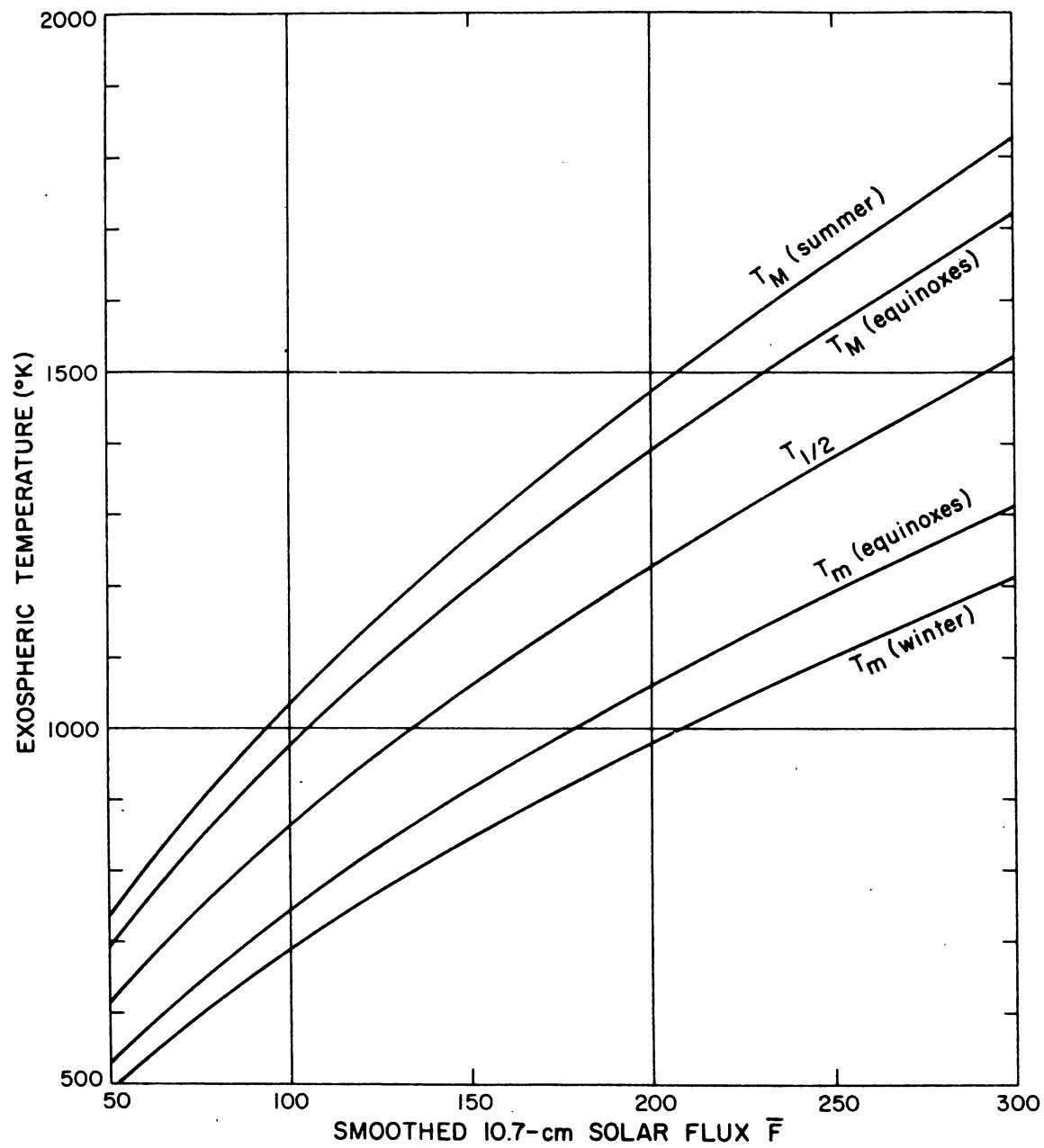


Figure 4. Mean global exospheric temperature $T_{1/2}$ for quiet geomagnetic conditions ($K_p = 0$) as a function of the smoothed 10.7-cm solar flux [$F = \bar{F}$ in equation (20)]. Also given are the corresponding extrema of the global diurnal temperature variation at the time of solstices and equinoxes.

Table 4. The smoothed 10.7-cm solar flux \bar{F} , computed from equations (21) and (22).

M.J.D.	FLUX	M.J.D.	FLUX	M.J.D.	FLUX	M.J.D.	FLUX	M.J.D.	FLUX	M.J.D.	FLUX
36330	234.45	36830	197.59	37330	114.87	37830	92.50	38330	80.53	38830	74.12
36340	233.80	36840	193.60	37340	112.34	37840	91.33	38340	79.84	38840	74.30
36350	233.09	36850	190.00	37350	110.40	37850	90.18	38350	75.62	38850	75.01
36360	232.56	36860	186.94	37360	108.64	37860	89.04	38360	78.24	38860	75.42
36370	232.45	36870	184.33	37370	107.69	37870	88.10	38370	77.44	38870	75.42
36380	232.61	36880	182.04	37380	106.80	37880	87.20	38380	76.67	38880	75.87
36390	232.64	36890	180.30	37390	106.33	37890	86.55	38390	75.96	38890	76.33
36400	233.04	36900	178.94	37400	106.33	37900	86.06	38400	75.38	38900	76.75
36410	233.76	36910	178.24	37410	106.55	37910	85.60	38410	74.88	38910	77.11
36420	233.89	36920	176.95	37420	106.90	37920	85.22	38420	74.49	38920	77.40
36430	234.18	36930	175.97	37430	107.65	37930	84.96	38430	74.22	38930	77.62
36440	234.12	36940	174.87	37440	108.32	37940	84.45	38440	74.01	38940	77.73
36450	233.59	36950	173.80	37450	109.16	37950	84.02	38450	73.84	38950	77.74
36460	232.57	36960	172.16	37460	110.03	37960	83.57	38460	73.53	38960	77.73
36470	231.41	36970	170.44	37470	110.66	37970	82.81	38470	73.53	38970	77.67
36480	230.28	36980	168.96	37480	111.31	37980	82.22	38480	73.33	38980	77.57
36490	229.06	36990	167.50	37490	111.63	37990	81.43	38490	73.11	38990	77.51
36500	227.95	37000	166.04	37500	111.57	38000	80.65	38500	72.87	39000	77.48
36510	226.99	37010	165.24	37510	111.52	38010	79.97	38510	72.55	39010	77.43
36520	226.39	37020	164.82	37520	110.67	38020	79.38	38520	72.24	39020	77.33
36530	226.28	37030	164.34	37530	109.66	38030	78.80	38530	71.95	39030	77.30
36540	226.27	37040	164.58	37540	108.52	38040	78.44	38540	71.68	39040	77.23
36550	226.22	37050	164.78	37550	106.75	38050	78.17	38550	71.39	39050	77.20
36560	226.53	37060	165.25	37560	105.00	38060	78.07	38560	71.18	39060	77.28
36570	226.67	37070	165.93	37570	103.03	38070	78.10	38570	71.00	39070	77.33
36580	226.45	37080	166.46	37580	100.96	38080	78.37	38580	70.87	39080	77.50
36590	226.23	37090	167.10	37590	99.01	38090	78.64	38590	70.79	39090	77.81
36600	225.91	37100	167.43	37600	97.24	38100	79.11	38600	70.74	39100	78.27
36610	224.72	37110	167.77	37610	95.49	38110	79.72	38610	70.77	39110	78.94
36620	223.90	37120	167.88	37620	94.16	38120	80.42	38620	70.82	39120	79.49
36630	222.92	37130	167.62	37630	93.16	38130	81.07	38630	70.92	39130	80.67
36640	222.07	37140	167.14	37640	92.41	38140	81.71	38640	71.03	39140	81.55
36650	221.29	37150	166.49	37650	92.01	38150	82.33	38650	71.19	39150	82.87
36660	220.64	37160	165.38	37660	92.01	38160	82.82	38660	71.44	39160	84.23
36670	220.00	37170	163.94	37670	92.27	38170	83.18	38670	71.58	39170	85.53
36680	219.43	37180	162.96	37680	92.81	38180	83.38	38680	71.84	39180	87.13
36690	219.15	37190	159.67	37690	93.38	38190	83.46	38690	72.13	39190	88.12
36700	218.79	37200	157.14	37700	94.12	38200	83.62	38700	72.34	39200	89.07
36710	218.48	37210	154.36	37710	94.90	38210	83.19	38710	72.60	39210	91.06
36720	218.25	37220	151.29	37720	95.52	38220	83.12	38720	72.85	39220	93.11
36730	218.01	37230	148.16	37730	96.14	38230	82.97	38730	73.08	39230	94.64
36740	217.66	37240	144.87	37740	96.67	38240	82.84	38740	73.30	39240	96.06
36750	217.39	37250	141.20	37750	96.94	38250	82.70	38750	73.43	39250	97.00
36760	216.52	37260	138.07	37760	97.09	38260	82.62	38760	73.55	39260	98.03
36770	215.11	37270	134.45	37770	97.07	38270	82.53	38770	73.67	39270	99.99
36780	213.40	37280	130.95	37780	96.74	38280	82.42	38780	73.70	39280	101.19
36790	211.19	37290	127.50	37790	96.24	38290	82.25	38790	73.73	39290	102.44
36800	208.47	37300	123.99	37800	95.57	38300	81.99	38800	73.78	39300	103.66
36810	205.03	37310	120.66	37810	94.68	38310	81.63	38810	73.82	39310	104.64
36820	201.39	37320	117.56	37820	93.63	38320	81.14	38820	73.92	39320	105.66

Table 4. (Cont.)

M.J.D.	FLUX	M.J.D.	FLUX	M.J.D.	FLUX								
39830	154.45	40280	155.07	40730	161.33	41180	112.18	41630	108.99	42080	81.56	42530	72.84
39840	156.85	40390	156.23	40740	160.13	41190	111.92	41640	107.42	42090	81.80	42540	73.31
39850	158.74	40400	157.16	40750	159.08	41200	111.48	41650	103.92	42100	82.19	42550	73.80
39860	159.41	40210	158.01	40760	157.91	41210	111.34	41660	104.66	42110	82.68	42560	74.56
39870	160.59	40320	158.20	40770	156.39	41220	111.17	41670	103.40	42120	83.45	42570	75.48
39880	160.58	40330	158.19	40780	154.82	41230	111.08	41680	102.37	42130	84.14	42580	76.51
39890	159.65	40340	158.19	40790	153.96	41240	111.41	41690	101.57	42140	85.10	42590	77.57
39900	158.40	40350	157.44	40800	152.00	41250	111.78	41700	100.89	42150	85.89	42600	78.57
39910	156.71	40360	156.69	40810	150.77	41260	112.30	41710	100.45	42160	86.81	42610	79.55
39920	154.67	40370	155.80	40820	149.81	41270	113.15	41720	100.27	42170	87.61	42620	80.30
39930	152.61	40380	154.53	40830	149.10	41280	114.00	41730	99.92	42180	88.23	42630	80.85
39940	150.85	40390	153.29	40840	148.99	41290	115.11	41740	99.96	42190	88.92	42640	81.15
39950	149.30	40400	151.81	40850	148.86	41300	116.24	41750	99.84	42200	89.31	42650	82.23
39960	147.92	40410	150.31	40860	148.87	41310	117.49	41760	99.68	42210	89.63	42660	81.01
39970	147.13	40420	149.03	40870	149.24	41320	118.93	41770	99.69	42220	89.88	42670	80.55
39980	146.55	40430	147.73	40880	149.61	41330	120.21	41780	99.33	42230	89.98	42680	79.97
39990	146.29	40440	146.64	40890	149.90	41340	121.57	41790	98.91	42240	90.04	42690	79.29
40000	146.21	40550	145.67	40900	150.11	41350	122.92	41800	98.46	42250	90.06	42700	78.53
40010	146.15	40460	145.13	40910	149.99	41360	123.84	41810	97.79	42260	89.99	42710	77.76
40020	146.25	40470	144.90	40920	149.62	41370	124.69	41820	97.03	42270	90.00	42720	77.01
40030	146.10	40480	145.00	40930	148.91	41380	125.41	41830	96.34	42280	89.94	42730	76.28
40040	145.85	40490	145.21	40940	147.66	41390	125.90	41840	95.29	42290	89.81	42740	75.63
40050	145.77	40550	145.67	40950	145.99	41400	126.46	41850	94.54	42300	89.70	42750	74.98
40060	145.50	40510	146.47	40960	144.00	41410	126.90	41860	93.76	42310	89.47	42760	74.39
40070	145.49	40520	147.08	40970	141.56	41420	127.11	41870	93.08	42320	89.11	42770	73.89
40080	145.10	40530	145.00	40980	139.09	41430	127.54	41880	92.62	42330	88.62	42780	73.46
40090	145.85	40540	148.60	40990	135.96	41440	128.00	41890	92.18	42340	87.90	42790	73.18
40100	144.93	40550	149.42	41000	133.06	41450	128.36	41900	91.88	42350	87.02	42800	72.97
40110	144.53	40560	150.46	41010	129.98	41460	128.85	41910	91.60	42360	86.05		
40120	144.44	40570	151.45	41020	127.05	41470	129.02	41920	91.29	42370	84.82		
40130	144.30	40580	152.65	41030	124.29	41480	129.08	41930	90.92	42380	83.63		
40140	144.23	40590	154.07	41040	121.02	41490	128.84	41940	90.50	42390	82.26		
40150	144.39	40500	155.33	41050	119.88	41500	128.32	41950	89.84	42400	80.89		
40160	144.38	40510	156.71	41060	117.80	41510	127.58	41960	89.14	42410	82.37		
40170	144.66	40620	158.21	41070	116.31	41520	126.62	41970	88.25	42420	79.41		
40180	144.74	40630	159.44	41080	115.10	41530	125.31	41980	87.18	42430	77.18		
40190	145.01	40640	160.54	41090	114.21	41540	123.91	41990	86.27	42440	76.13		
40200	145.58	40550	161.57	41100	113.10	41550	122.48	42000	85.24	42450	75.19		
40210	146.45	40660	162.19	41110	113.14	41560	120.81	42010	84.35	42460	74.37		
40220	147.02	40670	162.74	41120	112.98	41570	119.24	42020	83.56	42470	73.72		
40230	148.25	40680	163.10	41130	112.85	41580	117.58	42030	82.84	42480	73.20		
40240	149.32	40790	163.01	41140	112.76	41590	115.85	42040	82.31	42490	72.82		
40250	150.74	40700	163.05	41150	112.68	41600	114.12	42050	81.88	42500	72.56		
40260	152.77	40710	162.52	41160	112.70	41610	112.38	42060	81.65	42510	72.51		
40270	153.62	40720	161.97	41170	112.40	41620	110.63	42070	81.55	42520	72.60		

Table 5. Comparison of exospheric temperatures as a function of the smoothed 10.7-cm solar flux \bar{F} .

\bar{F}	$T_{1/2}$ ($^{\circ}$ K)		
	J	T	H
70	720.9	784.2	864.0
100	860.5	865.4	944.2
150	1057.2	1000.8	1078.0
200	1227.4	1136.2	1212.0
250	1380.7	1271.6	1345.4
300	1522.2	1406.9	1479.2

These three temperature curves are shown in Figure 5. As can be seen, the slope of the J curve is greater than that of the straight lines T and H. For $\bar{F} = 103$, the J temperatures are the same as T, while for $\bar{F} = 175$, they are the same as H. It should be remarked that the slopes of both the H and the T models were derived from relatively short time intervals during 1969 to 1971, when solar activity hovered around a flat maximum without large changes, whereas that of the J models was derived from a 17-year interval that comprised two periods of minimum solar activity and two maxima, of which one was the highest in 200 years.

The reaction of the exospheric temperature to a change in F is not instantaneous. We find (Jacchia, Slowey, and Campbell, 1973) a lag Δt that varies from 0.9^d at 12^h noon local solar time (LST) to 1.6^d at 0^h LST according to the equation

$$\Delta t = 1.26 + 0.37 \sin(H - 92^\circ), \quad (23)$$

$$\pm .12 \quad \pm .17 \quad \pm 25$$

where H is the hour angle of the sun, i.e., $LST + 12^h$. According to Paul, Volland, and Roemer (1974), the lag is a little greater, although almost exactly in phase with the above expression:

$$\Delta t = 1.74 + 0.26 \cos H .$$

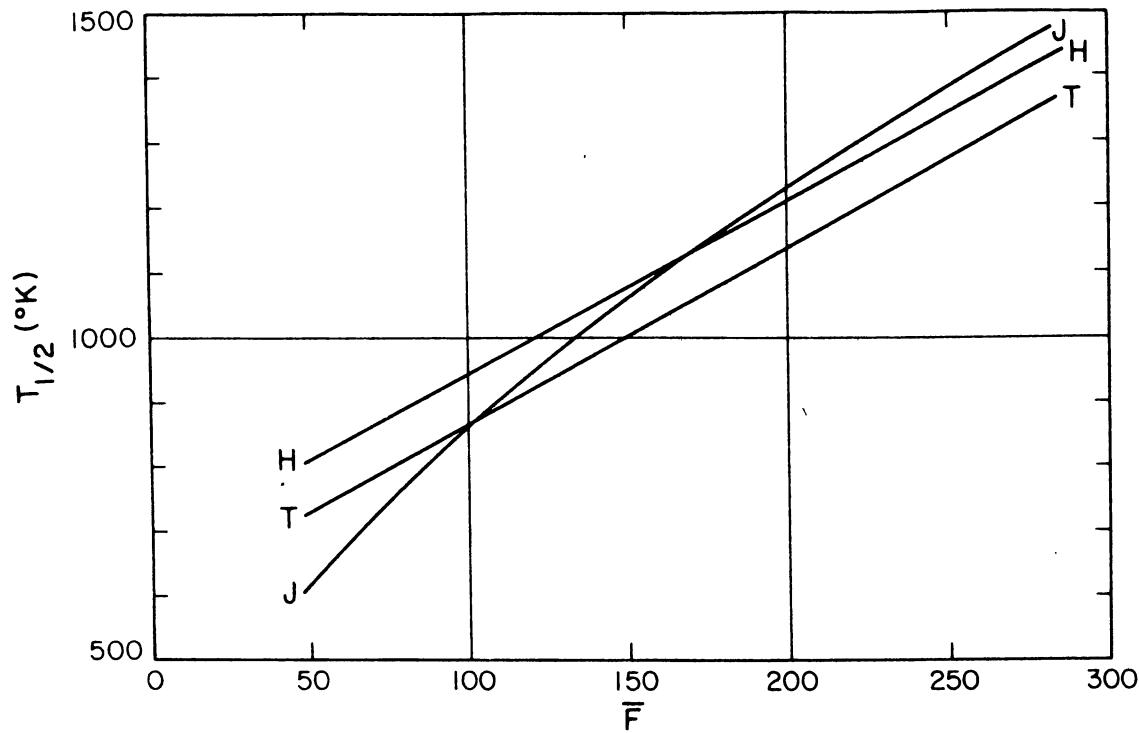


Figure 5. Comparison between the temperatures of the present models (J) with those of the models of Thuillier et al. (1976) (T) and Hedin et al. (1974) (H) as a function of the smoothed 10.7-cm solar flux \bar{F} , for $F = \bar{F}$ and $K_p = 0$.

3. THE DIURNAL VARIATION

Our approach in dealing with the diurnal variation follows, in its main lines, the pattern established in our previous models, although a higher degree of sophistication is required to represent the recently discovered height-dependent phase shifts in the variation of the individual atmospheric species. We shall still consider the phenomenon of the diurnal variation in its global aspect, giving equations valid for the whole earth, from which the variation for any given latitude and season can be derived as a particular case.

At any instant, the global distribution of the exospheric temperatures will show a nighttime minimum T_0 and a daytime maximum T_M , in opposite hemispheres; let their arithmetic mean be $T_{1/2}$. In previous models, we had taken T_0 as the basic temperature to relate to the solar flux F and to use in the equations defining the daily variation. Here we shall use $T_{1/2}$ instead.

In the older models, we had assumed that the ratio T/T_0 could be expressed as $T/T_0 = 1 + RD$, where R is a constant, $D = \sin^m \theta + (\cos^m \eta - \sin^m \theta) f(H)$ and $\eta = \frac{1}{2} |\phi - \phi_M|$; $\theta = \frac{1}{2} |\phi + \phi_M|$, ϕ being the latitude of a given point and ϕ_M the latitude of the point where the maximum daily temperature occurs; m is a constant close to 2, and $f(H)$ a function of the hour angle H of the sun that varies between the limits 0 and 1. When $m = 2$, the expression for D reduces to

$$D = \frac{1}{2} \sin \phi_M \sin \phi + \cos \phi_M \cos \phi f(H) .$$

As we can see, D consists of two terms, of which the first is seasonal-latitudinal and thus independent of local time. The two terms are mutually constrained by the presence of $\sin \phi_M$ in the first and $\cos \phi_M$ in the second, thus making the seasonal-latitudinal term dependent on the diurnal term. In the present models, we shall eliminate this unnecessary constraint and express $T/T_{1/2}$ as follows:

$$\frac{T}{T_{1/2}} = 1 + c_1 \frac{\delta_\odot}{\epsilon} \sin \phi + c_2 \cos \phi \left[f(H) - \frac{1}{2} \right] , \quad (24)$$

where c_1 and c_2 are two constants, δ_\odot is the declination of the sun, and ϵ is the obliquity of the ecliptic, $23^\circ 44'$; $f(H)$ determines the shape of the diurnal temperature curve. We find that both the N_2 temperature curve (Mayr, Hedin, Reber, and Carignan, 1974) and the Doppler temperature curve (Thuillier *et al.*, 1976), obtained from two separate experiments on the OGO 6 satellite, can be remarkably well represented by an equation of the form

$$f(H) = \cos^3 \frac{1}{2} (H + \beta) + c_3 \cos [3(H + \beta) + \chi] . \quad (25)$$

For the N_2 temperature curve, $\beta = -50^\circ$ and $c_3 = 0.14$; for the Doppler temperature curve, $\beta = -72^\circ$ and $c_3 = 0.08$; for both, $\chi = -75^\circ$. The difference in β results in a phase difference of 1.5 hours between the two temperature curves, but this will be of no immediate concern to us, as we shall presently see.

A fit of equation (24) to the spherical-harmonics model by Thuillier *et al.* (1976) yields $c_1 = 0.15$ and $c_2 = 0.24$. It is noteworthy that, assuming $c_1 = 0.15$, we obtain exactly the same value of c_2 , i.e., 0.24, from a least-squares analysis of 30,373 densities derived from the drag of six satellites with perigee heights between 350 and 850 km: this leads to the important conclusion that the Doppler temperatures also account very well for the amplitude of the diurnal variation of atomic oxygen. We have therefore adopted the values

$$c_1 = 0.15 , \quad c_2 = 0.24 , \quad c_3 = 0.08 .$$

As for β , the value -72° derived from the Doppler temperatures gives a minimum temperature at $6^h 2$ and a maximum at $17^h 6$ LST, both about 1.5 hours later than incoherent-scatter temperatures (McClure, 1969, 1971; Carru and Waldteufel, 1969; Salah and Evans, 1973). Since the phase of the Doppler temperature, according to Thuillier *et al.*, is very strongly affected by the way the observational material is

screened, we prefer to lean in the direction of incoherent-scatter temperatures and have adopted $\beta = -60^\circ$, which gives a minimum at 5.4 and a maximum at 16.8 LST.

The OGO 6 mass-spectrometer analysis (Mayr et al., 1974) has revealed that the density of each atmospheric constituent peaks at a different hour of the day. A comparison with the lower altitude San Marco 3 data (Newton, Kasprzak, Curtis, and Pelz, 1975) shows that the phase shift varies with height, while satellite-drag analysis (Jacchia, Campbell, and Slowey, 1973) indicates that the total density always peaks at the same time, independently of height. To describe such behavior, we must make β variable (Jacchia, 1974) in equation (25):

$$\beta_i = \beta_0 + \beta_1 \left(\frac{\bar{M}}{M_i} - 1 \right) , \quad (26)$$

where β_0 and β_1 are two constants, \bar{M} is the mean molecular mass, and M_i is the mass of the atmospheric species i (hydrogen excluded); \bar{M} can be evaluated from the models as a function of z and $T_{1/2}$. For the two constants, we have adopted

$$\beta_0 = -35^\circ , \quad \beta_1 = 27^\circ .$$

Each β_i defines a different $f_i(H)$, so that in equation (24), we are presented with a new parameter, a pseudo-temperature Θ_i , different for each species i :

$$\frac{\Theta_i}{T_{1/2}} = 1 + 0.15 \frac{\delta_\odot}{\epsilon} \sin \phi + 0.24 \cos \phi \left[f_i(H) - \frac{1}{2} \right] \quad (27)$$

with

$$f_i(H) = \cos^n \frac{1}{2} (H + \beta_i) + 0.08 \cos [3(H + \beta_i) - 75^\circ]$$

and

$$n = 2 + \cos^2 \left(\frac{\phi}{90^\circ} \right) .$$

Here we have replaced the exponent 3 in equation (25) with a variable exponent n , which decreases from 3 at the equator to 2 at the poles (where the diurnal term vanishes). This device (Jacchia, 1973) eliminates a discontinuity in $dT/d\phi$ (or $d\Theta_i/d\phi$) at the poles — a feature that seems to have caused some discomfiture to a few investigators (Blum and Harris, 1973).

Figure 6 shows the diurnal variation of the exospheric temperature at the equator at the time of the equinoxes when $T_{1/2} = 1000$ K. The global distribution of exospheric temperatures for quiet geomagnetic conditions ($K_p = 0$) for the equinoxes and for the June solstice is given in Table 6 and illustrated in Figure 7. The variation with height in the hour of the maximum density of the individual constituents is shown in Figure 8.

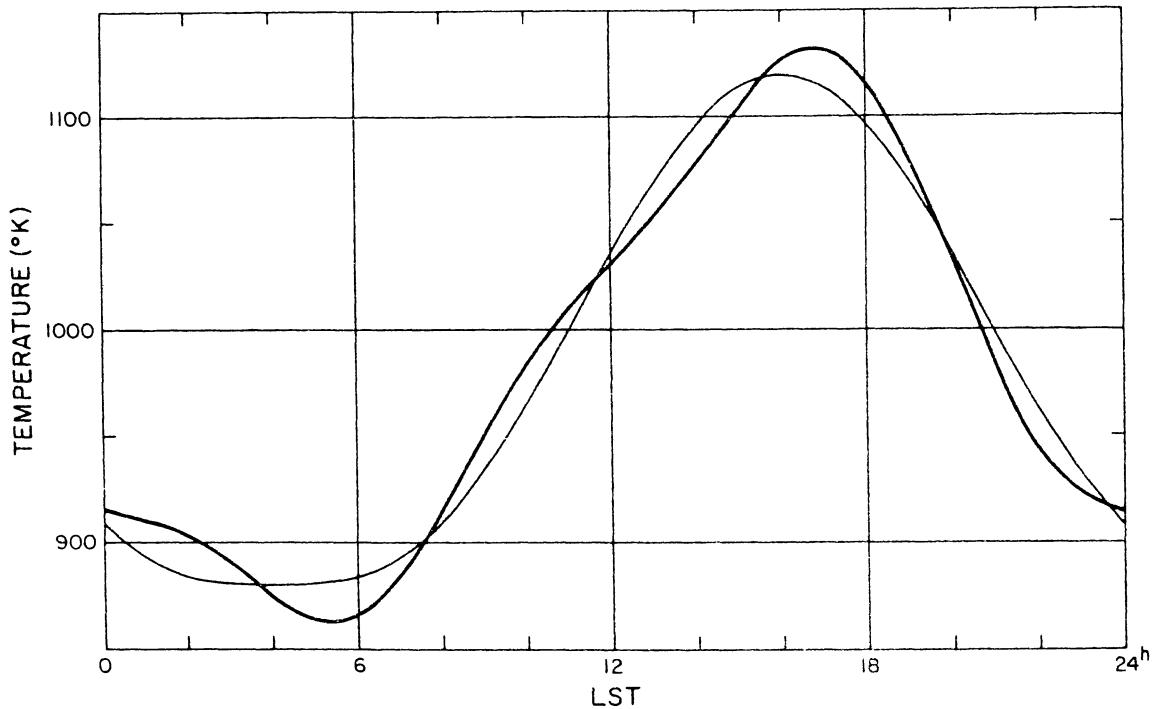
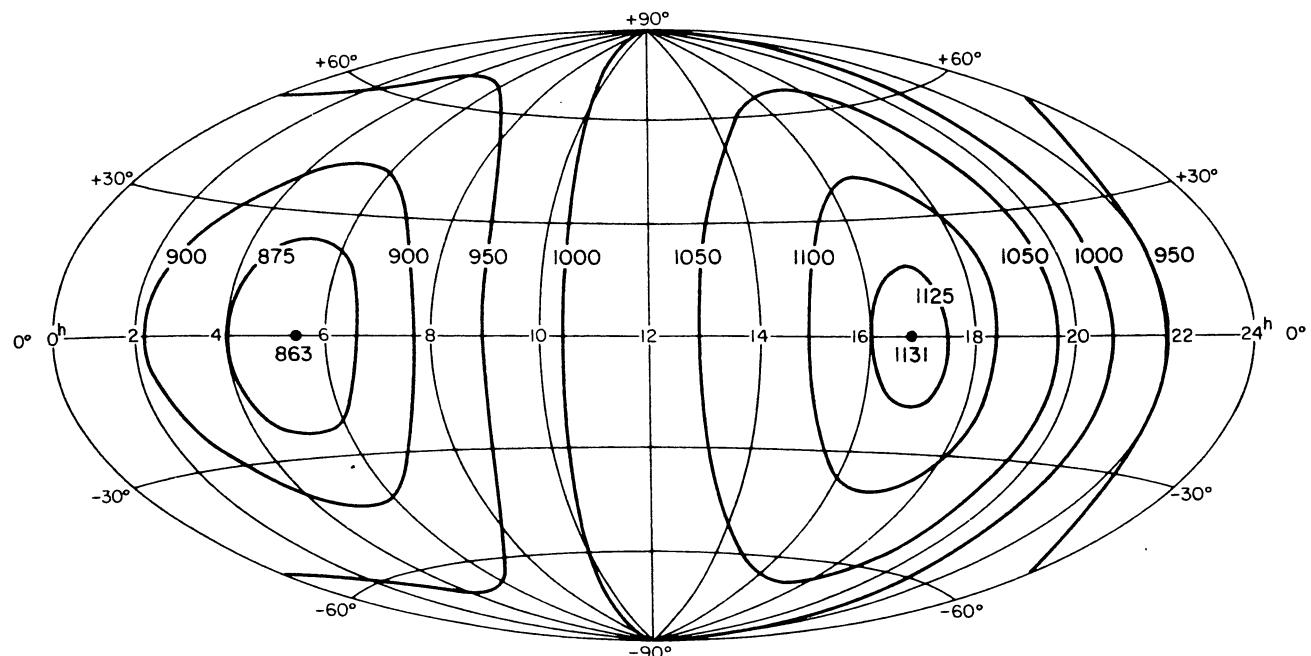


Figure 6. The diurnal variation of the exospheric temperature at the equator at the time of equinoxes, when $T_{1/2} = 1000$ K, represented by the heavy curve. The light curve represents the variation minus the terdiurnal term.

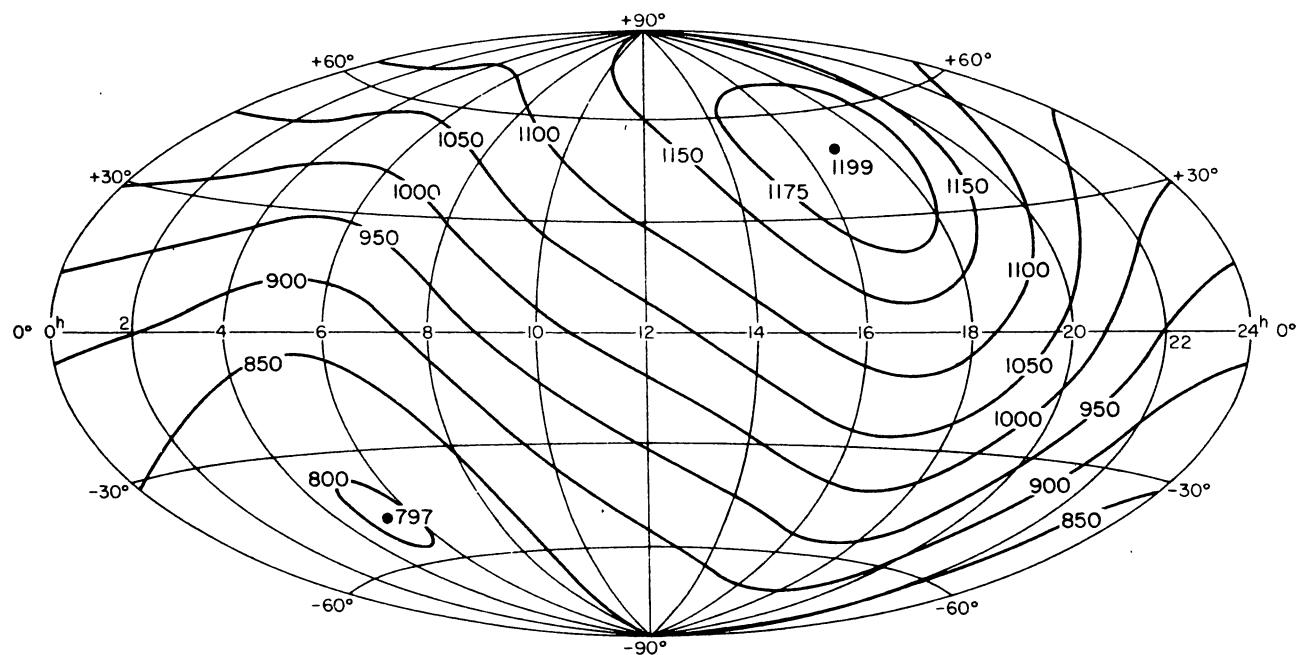
Table 6. Global distribution of exospheric temperatures at the time of the equinoxes and of the June solstice.

DECLINATION OF SUN = 0.00											
1	2	3	4	5	6	7	8	9	10	11	12
1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
90.0	988	985	981	978	975	978	983	990	997	1002	1006
-80.0	973	969	963	957	954	956	964	977	990	1002	1015
-70.0	958	953	945	938	932	934	945	962	982	1001	1018
-60.0	944	938	930	920	913	915	927	948	972	994	1011
-50.0	932	926	916	904	896	897	912	936	964	989	1009
-40.0	922	916	905	892	882	884	900	927	958	986	1009
-30.0	916	909	897	883	872	874	891	920	954	985	1009
-20.0	911	904	892	877	866	868	886	916	952	984	1009
-10.0	910	903	890	875	864	866	884	915	951	983	1009
0	911	904	892	877	866	868	886	916	952	984	1009
-10.0	909	897	883	872	874	891	900	927	958	986	1009
-20.0	916	905	892	882	884	890	900	927	958	986	1009
-30.0	922	916	905	892	882	884	890	927	958	986	1009
-40.0	932	926	916	904	896	897	912	936	964	989	1009
-50.0	944	938	930	920	913	915	927	948	972	994	1010
-60.0	958	953	945	938	932	934	945	962	982	998	1011
-70.0	973	969	963	957	954	956	964	977	990	1002	1016
-80.0	988	985	981	978	977	978	983	990	997	1002	1015
-90.0	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000

Table 6. (Cont.)



a) Equinoxes.



b) June solstice.

Figure 7. Global distribution of the exospheric temperature for quiet geomagnetic conditions ($K_p = 0$). The coordinates are local solar time and geographic latitude. The modifications introduced by disturbed geomagnetic conditions are illustrated in Figure 10.

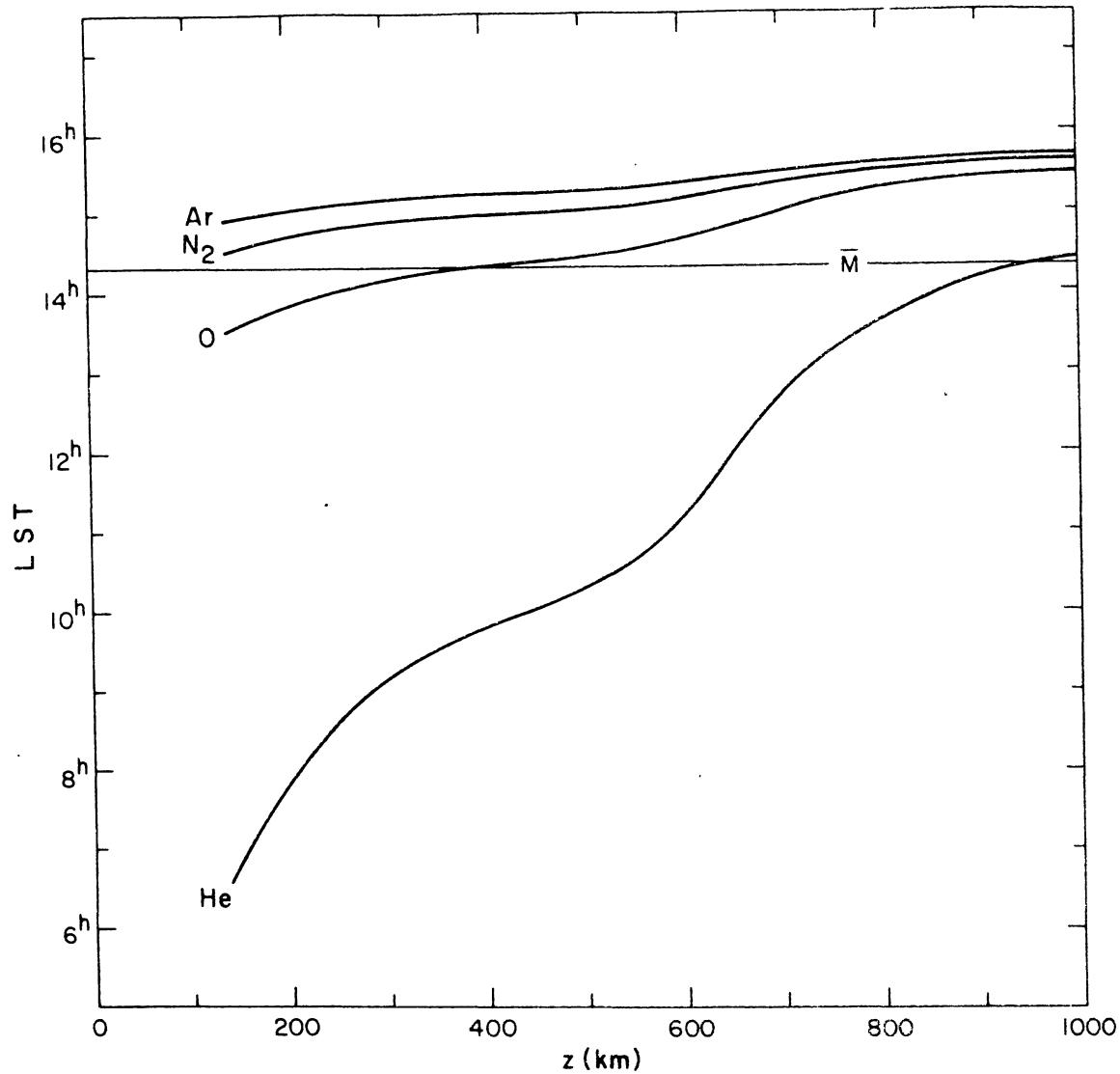


Figure 8. Local solar time of the maximum density of four atmospheric constituents as a function of height, for $T_{1/2} = 1000$ K.

Warning. Densities derived from satellite drag have a limited resolution in local solar time, especially when the orbital inclination is small and when the density scale height at perigee is large – not to speak of small orbital eccentricities, which make the density insensitive to local solar time. This limited resolution will result in a smaller value of c_3 , the amplitude of the terdiurnal term; also, c_2 might be decreased, although to a smaller degree. In some cases, the outright elimination of the terdiurnal term might even be advisable in comparing drag-derived densities with the models.

Notice also that, with the introduction of the terdiurnal term, $T_{1/2}$ is no longer the arithmetic mean between the daytime maximum and the nighttime minimum: it is, rather, the arithmetic mean of the extrema of the diurnal term.

Diurnal variations of hydrogen. Brinton et al. (1975) have inferred the diurnal variation of hydrogen at 250 km using Atmosphere Explorer C measurements around the December solstice 1974–75. They found a variation by a factor of 2 in the time-dependent component at the equator and at midlatitudes, with a maximum around 3^h LST and a minimum around 16^h or 17^h LST. The time-independent component also shows a variation by a factor of 2, with a maximum in middle-high latitudes in the winter hemisphere and a minimum in high latitudes in the summer hemisphere. All of this is in fair agreement with our models if we enter them with the actual temperature, i.e., if we use equations (26) and (27) with $\beta = \text{const} = -60^\circ$: we obtain a variation by a factor of 2.0 in the time-dependent component and by a factor of 1.6 in the time-independent component [these components are the two terms of equation (24)]. It shows that not only the long-term variations, such as those with the solar cycle, but also the short-term variations can be handled, to a fair degree of approximation, by a hydrogen model in which the density at any given height is controlled by escape.

4. VARIATIONS WITH GEOMAGNETIC ACTIVITY

The formula relating the exospheric temperature to the decimetric solar flux, equation (20), is valid for ideally quiet geomagnetic conditions, $K_p = 0$. In the general case, when $K_p \neq 0$, geomagnetic activity produces a temperature increase $\Delta_G T$, which depends on magnetic latitude. At the same time, atmospheric composition changes, not only because of the change in scale height induced by $\Delta_G T$, but also because of a change in the interface between the regimes of mixing and diffusion. In addition, there is a density wave propagating from high to low magnetic latitudes. In this model of the geomagnetic phenomenon in the upper atmosphere, we follow the analytical formulation given by Jacchia, Slowey, and von Zahn (1976, 1977a).

Let us denote by $\Delta_G \log n_i$ the change in the logarithm of the number density of the species i that occurs as K_p changes from zero to a given value. We assume that $\Delta \log n_i$ is the sum of three separate effects:

$$\Delta_G \log n_i = \Delta_T \log n_i + \Delta_H \log n_i + \Delta_e \log n_i , \quad (28)$$

where $\Delta_T \log n_i$ is the purely thermal component, originated by the change in scale height caused by the temperature increase $\Delta_G T$. In previous models, we had assumed that $\Delta_T \log n_i$ can be evaluated from static models by taking the difference between the value of $\log n_i$ that corresponds to the "quiet" ($K_p = 0$) temperature $T_0(\infty)$ and the one that corresponds to $T_0(\infty) + \Delta_G T_\infty$, $T_0(\infty)$ being the value of T_∞ from equation (24) with $\beta = -60^\circ$. Admittedly this is a shaky assumption, because it implies that the shape of the temperature profiles is not altered by the magnetic disturbance. Since a distortion of the profiles is likely to occur, especially in the 100- to 120-km region, we must expect our model to become poorer as we approach the homopause boundary. The only remedy to such a situation, as we can see it, is to integrate the diffusion equation (16) with new "perturbed" temperature profiles; more about this in Section 4.1. In equation (28), $\Delta_H \log n_i$ is the contribution caused by a change in the height z_H of the homopause as a consequence of the magnetic disturbance, and $\Delta_e \log n_i$ is the contribution of the "equatorial wave," the density pileup in the equatorial regions as a consequence of convection toward the equator; it affects all atmospheric constituents by the same amount.

4.1 The Thermal Component

For a given level of geomagnetic activity, measured by the K_p index, we express the geomagnetic heating, i.e., the increase $\Delta_G T$ in the exospheric temperature above the quiet temperature level corresponding to $K_p = 0$, as a function of the invariant magnetic latitude ϕ_I (McIlwain, 1966), which we have found to give better results than the centered-dipole geomagnetic latitude ϕ' . If ϕ_I is not readily available, ϕ' can be used without too much loss in accuracy. For the convenience of the users of these models, we give here the equation to compute ϕ' assuming geographic coordinates for the north geomagnetic pole of $L = 291^\circ E$, $\phi = +78.3^\circ$:

$$\sin \phi' = 0.9792 \sin \phi + 0.2028 \cos \phi \cos (L - 291^\circ) , \quad (29)$$

where L is the longitude counted eastward from Greenwich.

To account for the propagation time τ , we have introduced a fictitious index K'_p , equal to K_p at the time $t - \tau$; for τ , we use

$$\tau = 0.1 + 0.2 \cos^2 \phi_I . \quad (30)$$

We then compute

$$\Delta_G T_\infty = A \sin^m \phi_I , \quad (31a)$$

where

$$A = 57.5 K'_p \left[1 + 0.027 \exp (0.4 K'_p) \right] , \quad (T \text{ in } ^\circ\text{K}) . \quad (31b)$$

We find that $m = 4$ gives satisfactory results in most cases, but there is some indication that, as the perturbation extends to lower latitudes, m becomes smaller, perhaps as small as 3.

As we said earlier, a change in T_∞ only will not give satisfactory results in the lower thermosphere: it becomes necessary to modify the whole temperature profile from the boundary upward, adding a correction $\Delta_G T(z)$ to the "quiet" temperatures $T_0(z)$. After some experimenting, we found that an expression of the form

$$\Delta_G T(z) = \Delta_G T_\infty \tanh [c(z - z_0)] \quad , \quad (z > z_0) \quad , \quad (32)$$

with a proper selection of the constants c and z_0 , will provide a disturbed temperature profile capable of representing density observations in the 150- to 200-km region without substantially altering the results obtained at greater heights by using a change in the exospheric temperature only. Expressing z in kilometers, values of

$$c = 0.006 \quad , \quad z_0 = 90$$

introduced into equation (32) lead to disturbed densities [equation (28)] that are in reasonable agreement with densities of N_2 , Ar, and O observed at 160 km by Philbrick, McIsaac, and Faucher (1976) during a magnetic storm.

4.2 Effect of a Change in the Height of the Homopause

We assume that the temperature increase $\Delta_G T$ is accompanied by a change Δz_H in the height of the homopause, where Δz_H is a strongly nonlinear function of $\Delta_G T$:

$$\Delta z_H = 5.0 \times 10^3 \sinh^{-1} (0.010 \Delta_G T) \quad , \quad (z_H \text{ in meters}) \quad . \quad (33)$$

The mean molecular mass at the height of the homopause is very nearly 28, so we assume that a change in z_H does not affect N_2 ; for all other constituents, we have

$$\Delta_H \log n_i = \left[\frac{\partial \log n(N_2)}{\partial z} - \frac{\partial \log n_i}{\partial z} \right]_{z_{H+}} \Delta z_H = a_i \Delta z_H \quad . \quad (34)$$

The subscript z_{H+} indicates that the derivatives in the bracket must be evaluated at a point immediately above the homopause (assumed to be a layer of zero thickness), in diffusive regime. From the models, we obtain

$$a(Ar) = +3.07 \times 10^{-5} \text{ (mks)} \quad ,$$

$$a(O_2) = +1.03 \times 10^{-5} \text{ (mks)} \quad ,$$

$$a(N_2) = 0$$

$$[a(O) = -4.03 \times 10^{-5} \text{ (mks)}]^* \quad ,$$

$$a(He) = -6.30 \times 10^{-5} \text{ (mks)} \quad .$$

* Use -4.85×10^{-5} (mks) .

While the observed variations of Ar, N₂, and He are consistent with these theoretical values of α , we find that for atomic oxygen we need a value of α close to -4.85×10^{-5} . This is not surprising, considering that at the height of the homopause, oxygen dissociation is still very active, so that O is very far from being in diffusion equilibrium.

4.3 The Equatorial Wave

The equatorial wave can be represented by

$$\Delta_e \log n_i = \Delta_e \log \rho = 5.2 \times 10^{-4} A \cos^4 \phi_I , \quad (35)$$

where ρ is the total density. By using A [equation (31b)] in equation (35), we automatically assume that the travel time of the equatorial wave is τ , the same as the propagation time for the temperature. Although there is no compelling reason to believe that this assumption is entirely correct, it would be very difficult to disentangle the two propagation times if they were different. All we can say is that at high latitudes, we observe a lag of about 0.^d1 in the density variations with respect to those in K_p, while in low latitudes, the lag amounts to about 0.^d3.

The density variation of four atmospheric constituents as a function of the invariant latitude ϕ_I is shown in Figure 9, together with the corresponding variation of the exospheric temperature.

4.4 The Global Temperature Distribution

Owing to its latitude dependence, the geomagnetic effect causes the maximum temperature to be shifted in the direction of the magnetic poles. Figure 10 shows the temperature distribution along the meridional circle crossing the geomagnetic poles at 17^h LST in one hemisphere and 5^h LST in the other, for four levels of geomagnetic activity. As can be seen, it takes only a very moderate degree of magnetic activity ($K_p \approx 2$) to shift the maximum temperature at the time of equinoxes from the equator to the polar regions.

Warning. Mass-spectrometer data show that there is no appreciable smoothing in the variation of n_i when compared with the variation of K_p. In other words, the reaction time of the atmosphere is smaller than the 3-hour

resolution of the K_p indices. If these models are compared with observations having a lower degree of resolution, such as some satellite-drag densities, it is essential to use in the equation a set of K_p 's smoothed to match the resolution of the data. Also, with a limited resolution such as in satellite drag, the temperature peak at the magnetic poles will appear flattened, with the result that the exponent m in equation (31a) and the numerical coefficient in equation (31b) will both become smaller; the effect will be a complicated function of the orbital inclination and of the density scale height at perigee, which must be evaluated before accurate comparisons can be made between drag-derived densities and those of the models. Another result of limited resolution is that the rotation of the earth under a satellite orbit tends to reduce or cancel the difference between magnetic and geographic coordinates. Whenever the smallest time interval in which drag is detectable is 1 day or more, geographic coordinates should be used.

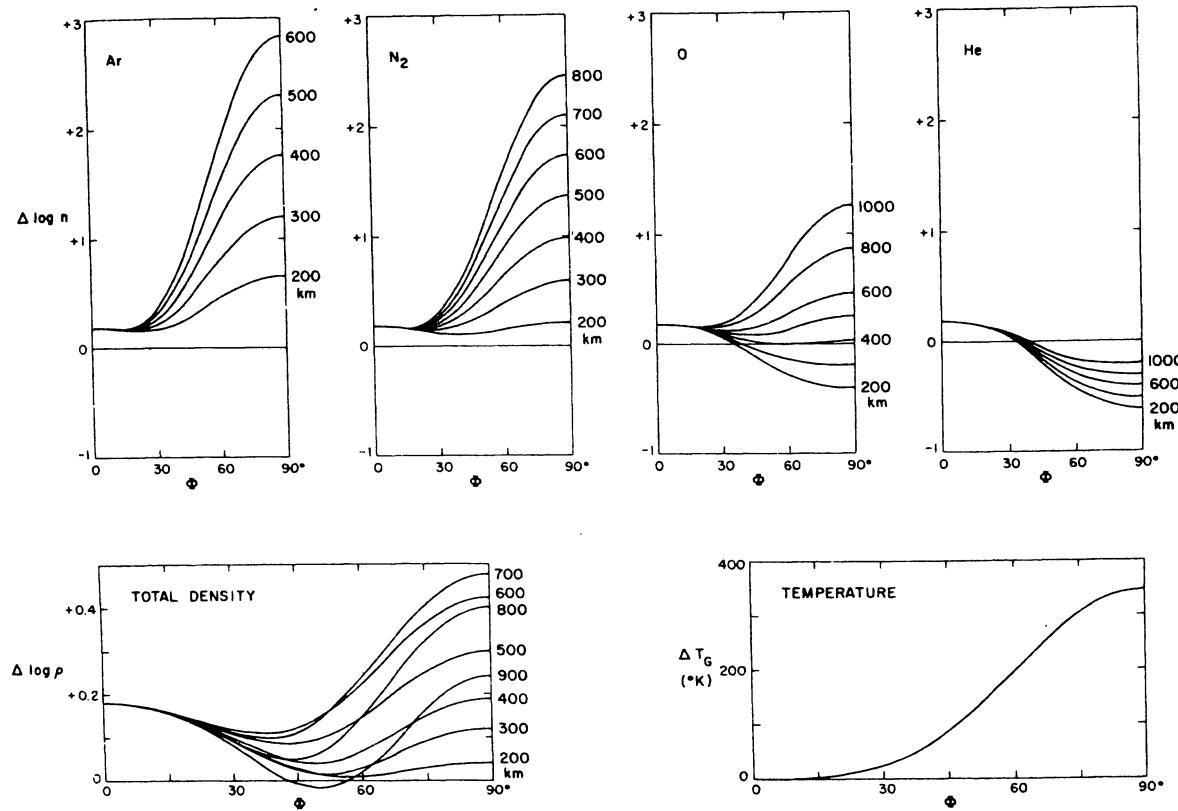


Figure 9. The density variation of four atmospheric constituents as a function of the invariant latitude ϕ_I , for various heights when the geomagnetic index $K_p = 5$. The curves were computed using a "quiet" ($K_p = 0$) exospheric temperature of 900 K. The diagram in the lower left corner depicts the variation of the total density; that in the lower right corner gives the corresponding variation in the exospheric temperature.

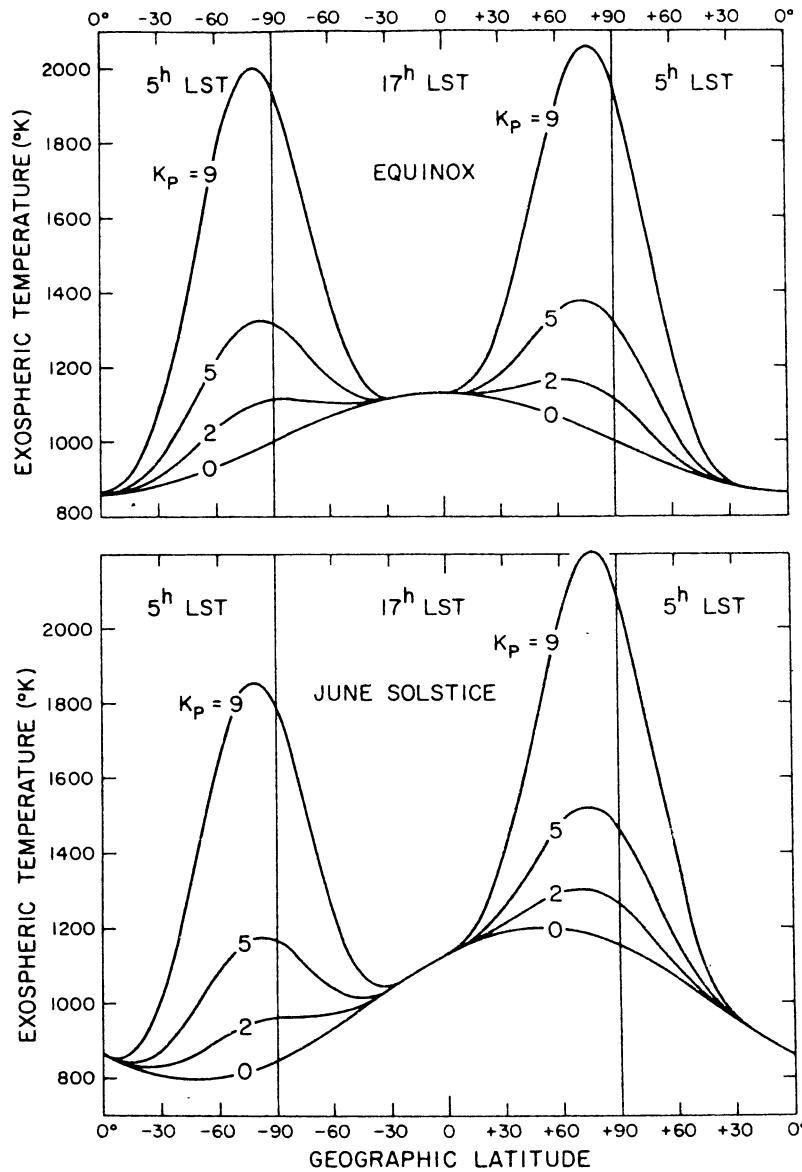


Figure 10. Exospheric temperature profiles along the complete (360°) meridional circle along which the local solar time is 17^{h} in one hemisphere and 5^{h} in the other, for various levels of geomagnetic activity. Even a moderate level of activity ($K_p \approx 2$) has the effect of shifting the temperature maximum from the equator to the poles at the time of equinoxes.

5. SEASONAL-LATITUDINAL VARIATIONS

When we deal with seasonal-latitudinal variations, we must first of all distinguish between the large variation of composition that is observed throughout the thermosphere and higher and the seasonal variation of temperature and density in the stratosphere and mesosphere, which spills over into the lower thermosphere and seems to vanish at heights above 140 to 150 km. To avoid confusion, we call the first the "thermospheric" and the second the "mesospheric" seasonal-latitudinal variation.

5.1 The Thermospheric Seasonal-Latitudinal Variation

The observed thermospheric seasonal-latitudinal variation of density and composition is the result of two distinct contributions. The first comes from the seasonal-latitudinal component of the diurnal temperature variation, $c_1(\delta_{\odot}/\epsilon) \sin \phi$ in equation (24). Its effect is to change the density and composition through a change in the scale height of the individual components; it is, therefore, strongly height dependent. When the contribution from this effect is subtracted, we are left with an intrinsic seasonal-latitudinal variation, essentially independent of height, whose origin must be traced to the lower boundary of the thermosphere. The so-called "winter helium bulge" is the first known example of this type of variation.

This "intrinsic" part of the thermospheric seasonal-latitudinal variation can be represented by a formula similar to the sin term of equation (24). Let $\Delta_{SL} \log n_i$ measure the departure of the number density of the species i from its yearly mean as a result of this variation. We can write

$$\Delta_{SL} \log n_i = c_i \frac{\delta_{\odot}}{\epsilon} \sin \phi . \quad (36)$$

Clearly, we cannot determine the c_i 's independently of c_1 , the corresponding coefficient in equation (24). This means that we must have a good model of the diurnal temperature variation, or at least of its seasonal-latitudinal component, before we can proceed to compute the c_i 's.

Using the model of the diurnal variation described in Section 3, with $c_1 = 0.15$ as derived from the OGO 6 Doppler temperatures, we have determined values of c_i from the ESRO 4 data on four species (Jacchia, Slowey, and von Zahn, 1977b), as well as from the drag of six satellites (for O and He only); they are given in Table 7.

Table 7. Parameters of the seasonal-latitudinal variation.

Species	ESRO 4	Satellite drag	Adopted
N_2	+0.06	—	0
O	-0.15	-0.18	-0.16
He	-0.79	-0.76	-0.79
Ar	0.00	—	0
O_2	—	—	[0?]

5.2 The Mesospheric Seasonal-Latitudinal Variation

As is well known, the temperature in the troposphere and stratosphere is warmer in summer and colder in winter; at a height of 66 km, however, the situation reverses, and at the mesopause, around 88 km, the variation reaches its greatest amplitude, with a minimum in summer and a maximum in winter. Proceeding to greater heights, the amplitude decreases and reaches zero at 100 km; above 100 km, it is again warmer in summer and colder in winter. The density, for obvious reasons, follows a phase-shifted pattern: it is higher in summer than in winter throughout the stratosphere and mesosphere, to a height of 91 km, where there is an isopycnic layer. At 100 to 120 km, the density is higher in winter than in summer, but there is a second reversal somewhere around 140 to 160 km, because at a height where the daily variation becomes observable, i.e., at 180 to 200 km, we again have the highest densities in summer. At these heights, the picture merges with the thermospheric variations. There must be a transition layer, but it is difficult to establish with any degree of assurance what its height and thickness are. In a general theory that makes use of solar-energy absorption and reradiation variable with height (or, better, with density and composition), there should be no reason for distinguishing between mesospheric and thermospheric seasonal-latitudinal variations; in the absence of such a theory, however, the distinction becomes a practical necessity.

Tables of monthly temperature, pressure, and density means at heights from 25 to 110 km for latitudes from 0° to 70° have been compiled by Groves for the COSPAR International Reference Atmosphere (CIRA, 1972). Trying to fit a simple and consistent analytical model to these data, even when only heights above 90 km are considered, appears to be a hopeless task. In the 1971 models, we fitted the densities only, leaving the temperatures alone and using our imagination for heights above 120 km. We repeat here the formula, with warnings of caution to the users:

$$\Delta_{sl} \log \rho = \frac{\phi}{|\phi|} SP \sin^2 \phi , \quad (37)$$

where the maximum half-range

$$S = 0.014 (z - 91) \exp [-0.0013 (z - 91)^2] , \quad (z \text{ in km}) \quad (38a)$$

and the phase

$$P = \sin (2\pi\Phi + 1.72) ; \quad (38b)$$

ϕ is the geographic latitude and $\Phi = (t - \text{Jan. 1})/365$. Values for S and P are tabulated in Table 8.

We find that $\Delta_{sl} \log \rho$ as expressed by equations (37) and (38) is roughly consistent with temperature deviations $\Delta_{sl} T$ from the basic models given by

$$\Delta_{sl} T = -2.9P(z - 102.5) \exp (-7.8 \times 10^{-5} |z - 102.5|^{2.7}) . \quad (39)$$

Table 8. The "mesospheric" seasonal-latitudinal density variation according to equation (37): $\Delta_{S\ell} \log \rho = (\phi/|\phi|) SP \sin^2 \phi$.

a) Maximum half-range $S = 0.014 (z - 91) \exp [-0.0013 (z - 91)^2]$

z (km)	S	z (km)	S	z (km)	S
91	0.000	121	0.130	151	0.008
96	0.068	126	0.100	156	0.004
101	0.123	131	0.070	161	0.002
106	0.157	136	0.045	166	0.001
111	0.166	141	0.027	171	0.000
116	0.155	146	0.015		

b) Phase $P = \sin (2\pi\Phi + 1.72)^*$

Day	P	Day	P	Day	P	Day	P
Jan. 1	± 0.989	Apr. 1	∓ 0.129	June 30	∓ 0.994	Sept. 28	± 0.086
11	± 0.948	11	∓ 0.297	July 10	∓ 0.961	Oct. 8	± 0.255
21	± 0.880	21	∓ 0.456	20	∓ 0.900	18	± 0.417
31	± 0.786	May 1	∓ 0.602	30	∓ 0.812	28	± 0.567
Feb. 10	± 0.668	11	∓ 0.730	Aug. 9	∓ 0.699	Nov. 7	± 0.699
20	± 0.531	21	∓ 0.836	19	∓ 0.567	17	± 0.812
Mar. 2	± 0.378	31	∓ 0.918	29	∓ 0.417	27	± 0.900
12	± 0.214	June 10	∓ 0.972	Sept. 8	∓ 0.255	Dec. 7	± 0.961
22	± 0.043	20	∓ 0.998	18	∓ 0.086	17	± 0.994
						27	± 0.998

* Take the upper sign for the Northern Hemisphere, the lower for the Southern Hemisphere.

6. THE SEMIANNUAL VARIATION

In the J65 models, the semiannual variation was represented by a temperature oscillation. We abandoned this model in J71 in favor of a density wave without a corresponding temperature variation and discussed the reasons for such a change (see also Jacchia, 1971b). Since then, several papers dealing with the semiannual variation have appeared. Wulf-Mathies (1972) found marginal evidence for a latitudinal dependence of the variation; Hedin *et al.* (1974) also found a weak latitudinal dependence, different for each atmospheric species; and according to Volland, Wulf-Mathies, and Priester (1972), the height dependence of the amplitude is almost entirely due to the semiannual component, the annual component being nearly independent of height. In all these papers, the analysis is limited to a relatively short time interval, from 1 to 3 years. As has been shown by King-Hele (1966), Jacchia, Slowey, and Campbell (1969), and Jacchia (1971b), the semiannual variation undergoes marked changes from year to year; this being the case, we still prefer to use the model of J71, which was derived from 12 years of satellite-drag data covering a wide range of heights. The pertinent equations are reported here with some minor modifications.

We express the semiannual density variation in $\log \rho$ as the product of two functions — one of the height z , and the other of time t :

$$\Delta_{\text{sa}} \log \rho = f(z) g(t) , \quad (40)$$

with

$$f(z) = \left[0.04 \left(\frac{z}{200} \right)^2 + 0.05 \right] \exp \left(-0.25 \frac{z}{100} \right) , \quad (z \text{ in km}) \quad (41)$$

and

$$g(t) = 0.0284 + 0.382 [1 + 0.467 \sin (2\pi\tau + 4.14)] \sin (4\pi\tau + 4.26) . \quad (42)$$

Here, τ is a periodic function of the fraction of the tropical year T corresponding to the time t

$$\Phi = \frac{t - t_0}{T} , \quad (t_0 = \text{Jan. 1.0}) , \quad (43)$$

$$\tau = \Phi + 0.0954 \left\{ \left[\frac{1}{2} + \frac{1}{2} \sin(2\pi\Phi + 6.04) \right]^{1.65} - \frac{1}{2} \right\} . \quad (44)$$

The absolute term in $g(t)$, 0.0284, has the purpose of making $\int g(t) dt = 0$ over one cycle of the variation. Values of $f(z)$ and $g(t)$ are tabulated in Table 9.

Volland et al. (1972) decomposed the "semiannual variation" into an annual and a semiannual term, both strictly sinusoidal, and – as we mentioned – found that the amplitude of the annual term was nearly independent of height. They were able to reproduce the large observed difference in depth between the January and the July minima, but not the difference in height between the April and the October maxima, which they dismissed as probably not real, on the basis of a paper by Wulf-Mathies (1972). The difference, however, is real, although smaller than that between the minima, as can be seen from the independent analysis of all other investigators. If it is true that the amplitude of the annual component is nearly constant, there might be some advantage in using this feature. Accordingly, we offer here our alternate model constructed along the line of that by Volland et al.:

$$\Delta_{sa} \log \rho = f_1(z) g_1(t) + f_2(z) g_2(t) . \quad (45)$$

The subscript 1 refers to the annual component, the subscript 2 to the semiannual,

$$f_1(z) = 0.03 \tanh \left(0.6 \frac{z}{100} \right) , \quad (46a)$$

$$f_2(z) = \left[0.017 \left(\frac{z}{100} \right)^2 + 0.015 \right] \exp \left(-0.25 \frac{z}{100} \right) , \quad (46b)$$

and

$$g_1(t) = \cos [2\pi(\Phi - 0.047)] , \quad (47a)$$

$$g_2(t) = \cos [4\pi(\Phi - 0.296)] . \quad (47b)$$

Table 9. Tables for the computation of the semiannual density variation using equation (40): $\Delta_{\text{sa}} \log \rho = f(z) g(t)$.

a) $f(z)$

z (km)	$f(z)$	z (km)	$f(z)$	z (km)	$f(z)$
100	0.070	500	0.301	900	0.347
150	0.096	550	0.319	950	0.340
200	0.127	600	0.332	1000	0.332
250	0.161	650	0.343	1050	0.323
300	0.194	700	0.349	1100	0.313
350	0.225	750	0.353	1150	0.301
400	0.254	800	0.353	1200	0.289
450	0.279	850	0.351		

b) $g(t)$

Φ	$g(t)$	Φ	$g(t)$	Φ	$g(t)$	Φ	$g(t)$
0.00	-0.145	0.26	+0.361	0.52	-0.478	0.78	+0.415
0.02	-0.178	0.28	+0.346	0.54	-0.508	0.80	+0.463
0.04	-0.188	0.30	+0.307	0.56	-0.522	0.82	+0.478
0.06	-0.178	0.32	+0.247	0.58	-0.517	0.84	+0.463
0.08	-0.150	0.34	+0.173	0.60	-0.490	0.86	+0.418
0.10	-0.106	0.36	+0.090	0.62	-0.439	0.88	+0.350
0.12	-0.049	0.38	+0.003	0.64	-0.364	0.90	+0.265
0.14	+0.020	0.40	-0.084	0.66	-0.267	0.92	+0.170
0.16	+0.097	0.42	-0.167	0.68	-0.150	0.94	+0.074
0.18	+0.176	0.44	-0.245	0.70	-0.022	0.96	-0.015
0.20	+0.249	0.46	-0.317	0.72	+0.108	0.98	-0.090
0.22	+0.309	0.48	-0.380	0.74	+0.231	1.00	-0.145
0.24	+0.348	0.50	-0.434	0.76	+0.336		

Here we have brought the amplitudes in line with our first model. As we said, this model does not reproduce the difference in the April and October maxima. A comparison between the semiannual variation computed with equations (40) to (44) and that computed with equations (45) to (47) is shown in Figure 11.

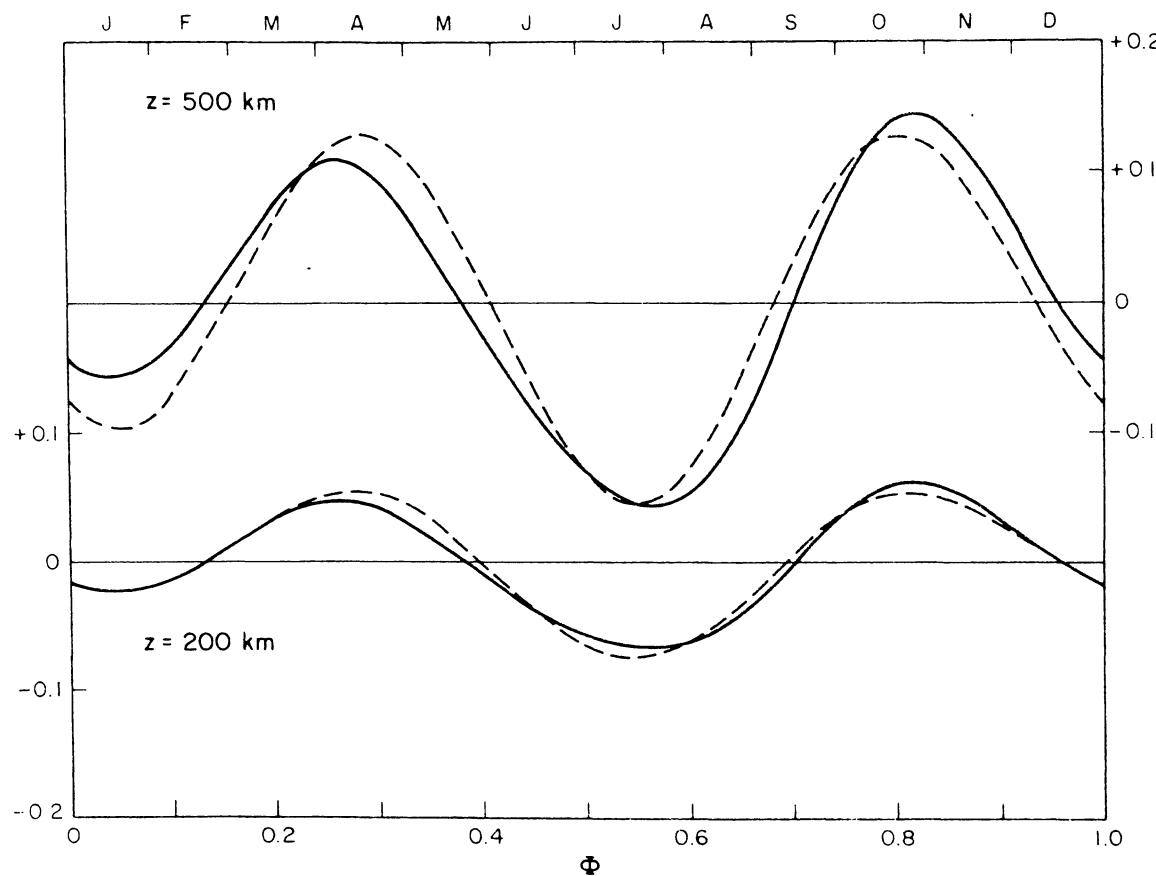


Figure 11. The semiannual density variation at 200 and 500 km, according to equations (40) to (44) (solid line) and according to equations (45) to (47) (dashed line).

It should be pointed out that if drag data from a single satellite are used to derive the semiannual variation, the annual component might get badly contaminated by the seasonal-latitudinal effect. It is only by using satellites in a variety of orbits and over long time intervals that the two effects can be clearly separated.

7. RAPID DENSITY FLUCTUATIONS

Density gauges on the Explorer 32 satellite have detected the existence of waves throughout the upper atmosphere in the height range from 286 (satellite perigee) to at least 510 km (Newton, Pelz, and Volland, 1969). An analysis of these waves indicates that they propagate in the neutral atmosphere. The waves are most prevalent at the higher latitudes near the auroral zone (the orbital inclination of the satellite is 65°) and were observed most frequently in the late evening and early morning hours, but they were not limited to those latitudes and times. The apparent vertical half-wavelengths of the waves increase with altitude from 1 km at 286-km altitude to 70 km at 510-km altitude; their half-amplitudes in density range from the limit of detectability to a maximum of about 50% of the mean density. It appears that some of the observed wavelengths are integrally related, indicating the existence of "fundamental" wavelengths and of second, third, and fourth harmonics.

Analyzing mass-spectrometer data from the Atmosphere Explorer C satellite in the 150- to 350-km region, Reber, Hedin, Pelz, Potter, and Brace (1975) found that the waves are accompanied by a change in composition: to an increase in nitrogen and argon density there corresponds a decrease in the helium density, just as in the geomagnetic phenomenon.

These waves have been interpreted as free internal gravity waves propagating predominantly from north to south or from south to north, with maximum horizontal wavelengths between 130 and 520 km. The altitude dependence of the apparent vertical half-wavelengths results from the satellite moving with varying vertical velocity through a slowly propagating wave pattern with nearly vertical phase planes. It is tempting to visualize these waves as part of the mechanism by which energy deposited in the auroral zones is conveyed to lower latitudes.

8. SUMMARY OF FORMULAE USED IN THE TEXT

Solar activity

$$T_{1/2} = 5.48 \bar{F}^{0.8} + 101.8 F^{0.4} \quad (20)$$

F to be taken at time $t - \Delta t$, where

$$\Delta t = 1.26 + 0.37 \sin(H - 92^\circ) \quad (23)$$

$$\bar{F} = \frac{\sum wF}{\sum w} \quad (21)$$

$$w = \exp \left[-\left(\frac{t - t_0}{\tau} \right)^2 \right], \quad (\tau = 71 \text{ days}) \quad (22)$$

Diurnal variation

$$\frac{\Theta_i}{T_{1/2}} = 1 + 0.15 \frac{\delta_\odot}{\epsilon} \sin \phi + 0.24 \cos \phi \left[f_i(H) - \frac{1}{2} \right] \quad (27)$$

$$f_i(H) = \cos^n \frac{1}{2} (H + \beta_i) + 0.08 \cos [3(H + \beta_i) - 75^\circ]$$

$$n = 2 + \cos^2 \left(\frac{\phi}{90^\circ} \right)$$

$$\beta_i = -35^\circ + 27^\circ \left(\frac{\bar{M}}{M_i} - 1 \right) \quad (26)$$

(for actual temperature, $\beta_T = -60^\circ$)

Geomagnetic activity

$$\Delta_G \log n_i = \Delta_T \log n_i + \Delta_H \log n_i + \Delta_e \log n_i \quad (28)$$

$$\Delta_G T_\infty = A \sin^4 \phi_I \quad (31a)$$

$$A = 57.5 K'_p \left[1 + 0.027 \exp(0.4 K'_p) \right] \quad (31b)$$

$K'_p = K_p$ at time $t - \tau$, where

$$\tau = 0.1 + 0.2 \cos^2 \phi_I \quad (30)$$

$$\Delta_G T(z) = \Delta_G T_\infty \tanh [0.006(z - 90)] , \quad (z \text{ in km}) \quad (32)$$

$$\Delta_H \log n_i = a_i \Delta z_H \quad (34)$$

$$\Delta z_H = 5.0 \times 10^3 \sinh^{-1} (0.010 \Delta_G T) , \quad (\text{meters}) \quad (33)$$

$$a(\text{Ar}) = +3.07 \times 10^{-5} , \quad a(\text{O}_2) = +1.03 \times 10^{-5} (?) , \quad a(\text{N}_2) = 0 ,$$

$$a(\text{O}) = -4.85 \times 10^{-5} , \quad a(\text{He}) = -6.30 \times 10^{-5} \text{ (mks)}$$

$$\Delta_e \log n_i = 5.2 \times 10^{-4} A \cos^4 \phi_I \quad (35)$$

Seasonal-latitudinal variations

a) Thermospheric:

$$\Delta_{SL} \log n_i = c_i \frac{\delta_\odot}{\epsilon} \sin \phi \quad (36)$$

$$\text{Values of } c_i: \quad c(\text{N}_2) = 0 , \quad c(\text{O}) = -0.16 , \quad c(\text{He}) = -0.79 ,$$

$$c(\text{Ar}) = 0$$

b) "Mesospheric":

$$\Delta_{SL} \log \rho = \frac{\phi}{|\phi|} SP \sin^2 \phi \quad (37)$$

$$S = 0.014 (z - 91) \exp [-0.0013 (z - 91)^2] , \quad (z \text{ in km}) \quad (38a)$$

$$P = \sin \left(2\pi \frac{t - t_0}{365} + 1.72 \right) , \quad (t \text{ in days, } t_0 = \text{Jan. 1}) \quad (38b)$$

$$\Delta_{sa} T = -2.9 P(z - 102.5) \exp (-7.8 \times 10^{-5} |z - 102.5|^2 \cdot 7) \quad (39)$$

Semiannual variation

a) J71 model:

$$\Delta_{sa} \log \rho = f(z) g(t) \quad (40)$$

$$f(z) = \left[0.04 \left(\frac{z}{100} \right)^2 + 0.05 \right] \exp \left(-0.25 \frac{z}{100} \right) , \quad (z \text{ in km}) \quad (41)$$

$$g(t) = 0.0284 + 0.382 [1 + 0.467 \sin (2\pi\tau + 4.14)] \sin (4\pi\tau + 4.26) \quad (42)$$

$$\tau = \Phi + 0.0954 \left\{ \left[\frac{1}{2} + \frac{1}{2} \sin (2\pi\Phi + 6.04) \right]^{1.65} - \frac{1}{2} \right\} \quad (44)$$

$$\Phi = (t - \text{Jan. 1})/365 \quad (43)$$

b) Alternate model:

$$\Delta_{sa} \log \rho = f_1(z) g_1(t) + f_2(z) g_2(t) \quad (45)$$

$$f_1(z) = 0.03 \tanh \left(0.6 \frac{z}{100} \right) \quad (46a)$$

$$f_2(z) = \left[0.017 \left(\frac{z}{100} \right)^2 + 0.015 \right] \exp \left(-0.25 \frac{z}{100} \right) \quad (46b)$$

$$g_1(t) = \cos [2\pi (\Phi - 0.047)] \quad (47a)$$

$$g_2(t) = \cos [4\pi (\Phi - 0.296)] \quad (47b)$$

9. NUMERICAL EXAMPLE

Suppose we want to find the temperature, density, and composition for a point with the following coordinates:

Longitude = 45°W of Greenwich ($= 315^{\circ}\text{E}$) ,

Latitude = 40°N ,

Height = 320 km ,

on May 4, 1974, at $14^{\text{h}}0^{\text{m}}$ UT ($= \text{MJD } 42171.5833$). For that instant, we find:

Sun's declination, δ_{\odot} = $+15.96^{\circ}$,

δ_{\odot}/ϵ = +0.6808 ,

Local solar time, LST = $11^{\text{h}}3^{\text{m}}.3$,

Hour angle of the sun, H = -14.18° ,

Fraction of tropical year, Φ = 0.338 ,

Geomagnetic latitude, ϕ' = 50.47° .

The 10.7-cm solar flux has to be evaluated at time $t - \Delta t$. With $\Delta t \approx 1$ day, we find $\bar{F} = 87.6$, $F = 114$; with these values, equation (20) gives $T_{1/2} = 873.1$ K. Entering the models with this exospheric temperature and $z = 320$ km, we find $\bar{M} = 16.90$, for use in equation (26). From equations (24) to (27), we find the Θ_i 's appropriate for each constituent, with its corresponding number density:

Species	$\underline{\Theta}_i$	$\log(n_i)_0$
N_2	952.6	13.670
O_2	950.8	12.224
O	963.9	14.587
Ar	948.2	9.765
He	996.8	12.719
H	939.3*	11.265

* = T_0 , the "quiet" exospheric temperature.

We can now proceed to evaluate the geomagnetic effect. Corresponding to $\phi' = 50^\circ 47'$, equation (30) gives the time lag $\tau = 0.18$ day = 4.3 hours. For $t - \tau = 1974$ May 4.40, we find $K'_p = 5_0$, which, introduced in equations (31a) and (31b), gives $A = 345$ K, $\Delta_G T_\infty = 122$ K. We now must compute the three components of the total "geomagnetic" variation $\Delta_G \log n_i$ [equation (28)]. The quantity $\Delta_T \log n_i$ is the change in $\log n_i$ as the exospheric temperature increases from its "quiet" value $T_0(\infty) = 939.3$ K to $T_0(\infty) + \Delta_G T_\infty = 1061$ K. For simplicity, we shall ignore equation (32) and the integrations it involves; for lower heights, this would not be justified. For $\Delta_H \log n_i$, we must use equations (33) and (34); for $\Delta_e \log n_i$, equation (35). We find

<u>Species</u>	$\Delta_T \log n_i$	$\Delta_H \log n_i$	$\Delta_e \log n_i$	$\Delta_G \log n_i$
N_2	+0.267	0	+0.063	+0.330
O_2	+0.312	+0.080	+0.063	+0.455
O	+0.131	-0.374	+0.063	-0.180
Ar	+0.403	+0.237	+0.063	+0.703
He	+0.014	-0.487	+0.063	-0.410
H	-0.161	?	+0.063	[-0.098]

The effect of the seasonal-latitudinal variation is computed from equation (36):

<u>Species</u>	$\Delta_{SL} \log n_i$
N_2	0
O_2	0(?)
O	-0.070
Ar	0
He	-0.346
H	(?)

The mesospheric seasonal-latitudinal variation is negligible at 320 km.

Finally, we can compute the effect of the semiannual variation from equations (40) to (44) or (45) to (47). Opting for the first set, we obtain $\Delta_{sa} \log \rho = +0.037$. Assembling all the various effects, we have

<u>Species</u>	<u>$\log(n_i)_0$</u>	<u>$\Delta_G \log n_i$</u>	<u>$\Delta_{SL} \log n_i$</u>	<u>$\Delta_{sa} \log n_i$</u>	<u>Final $\log n_i$</u>
N ₂	13.670	+0.330	0	+0.037	14.037
O ₂	12.224	+0.455	[0]	+0.037	12.716
O	14.587	-0.180	-0.070	+0.037	14.374
Ar	9.765	+0.703	0	+0.037	10.505
He	12.719	-0.410	-0.346	+0.037	12.000
H	11.265	[-0.098]	-	+0.037	[11.204]

The total density is given by $\rho = \sum M_i n_i / A$, where A is Avogadro's number,
 6.02217×10^{26} (mks); we obtain $\rho = 1.164 \times 10^{-11}$, $\log \rho = -10.934$.

REFERENCES

BLUM, P. W., and HARRIS, I.

1973. On empirical models of the upper atmosphere in the polar regions.

Planet. Space Sci., vol. 21, pp. 377-381.

BRINTON, H. C., MAYR, H. G., and POTTER, W. E.

1975. Winter bulge and diurnal variations in hydrogen inferred from AE-C composition measurements. Geophys. Res. Lett., vol. 2, pp. 389-392.

CARRU, H., and WALDTEUFEL, P.

1969. Étude par diffusion de Thomson des variations de la température exosphérique. Ann. de Géophys., vol. 25, pp. 485-494.

CIRA

1972. COSPAR International Reference Atmosphere 1972. Compiled by COSPAR Working Group IV, Akademie-Verlag, Berlin, 450 pp.

COESA, Committee on Extension of the Standard Atmosphere

1962. U.S. Standard Atmosphere 1962. U.S. Government Printing Office, Washington, D.C., 278 pp.

1976. U.S. Standard Atmosphere, 1976. U.S. Government Printing Office, Washington, D.C., 227 pp.

COOK, G. E.

1965. Satellite drag coefficients. Planet. Space Sci., vol. 13, pp. 929-946.

HACHENBERG, O.

1965. Radio frequency emissions of the sun in the centimeter wavelength range: The slowly varying sunspot component. In Solar System Radio Astronomy, ed. by J. Aarons, Plenum Press, New York, pp. 95-108.

HARRISON, L. P.

1951. Relation between geopotential and geometric height. In Smithsonian Meteorological Tables, 6th ed., U.S. Government Printing Office, Washington, D.C., pp. 217-219.

HEDIN, A. E., MAYR, H. G., REBER, C. A., SPENCER, N. W., and CARIGNAN, G. R.

1974. Empirical model of global thermospheric temperature and composition based on data from the OGO 6 quadrupole mass spectrometer. Journ. Geophys. Res., vol. 79, pp. 215-225.

JACCHIA, L. G.

1965. Static diffusion models of the upper atmosphere with empirical temperature profiles. Smithsonian Contr. Astrophys., vol. 8, pp. 215-257.
1970. New static models of the thermosphere and exosphere with empirical temperature profiles. Smithsonian Astrophys. Obs. Spec. Rep. No. 313, 87 pp.
- 1971a. Revised static models of the thermosphere and exosphere with empirical temperature profiles. Smithsonian Astrophys. Obs. Spec. Rep. No. 332, 113 pp.
- 1971b. The semiannual density variation in the heterosphere: A reappraisal. Presented at the 14th International COSPAR Meeting, Seattle, Washington, June.
1973. Comments on the paper "On empirical models of the upper atmosphere in the polar regions." Planet. Space Sci., vol. 21, pp. 883-884.
1974. Variations in thermospheric composition: A model based on mass spectrometer and satellite drag data. Journ. Geophys. Res., vol. 79, pp. 1923-1927.

JACCHIA, L. G., CAMPBELL, I. G., and SLOWEY, J. W.

1973. A study of the diurnal variation in the thermosphere as derived by satellite drag. Planet. Space Sci., vol. 21, pp. 1825-1834.

JACCHIA, L. G., and SLOWEY, J. W.

1973. A study of the variations in the thermosphere related to solar activity. In Space Research XIII, ed. by M. J. Rycroft and S. K. Runcorn, Akademie-Verlag, Berlin, pp. 343-348.

JACCHIA, L. G., SLOWEY, J. W., and CAMPBELL, I. G.

1969. A study of the semi-annual density variation in the upper atmosphere from 1958 to 1966, based on satellite drag analysis. Planet. Space Sci., vol. 17, pp. 49-60.
1973. An analysis of the solar activity effects in the upper atmosphere. Planet. Space Sci., vol. 21, pp. 1835-1842.

JACCHIA, L. G., SLOWEY, J. W., and VON ZAHN, U.

1976. Latitudinal changes of composition in the disturbed thermosphere from ESRO 4 measurements. Journ. Geophys. Res., vol. 81, pp. 36-42.

JACCHIA, L. G., SLOWEY, J. W., and VON ZAHN, U.

- 1977a. Temperature, density, and composition in the disturbed thermosphere from ESRO 4 gas-analyzer measurements: A global model. *Journ. Geophys. Res.*, vol. 82, pp. 684-688.
- 1977b. Seasonal-latitudinal variations of composition from ESRO 4 gas analyzer measurements and satellite drag. In preparation.

KING-HELE, D. G.

1966. Semi-annual variation in upper-atmosphere density. *Nature*, vol. 210, p. 1032.

MAUERSBERGER, K., ENGBRETSON, M. J., KAYSER, D. C., and POTTER, W. E.

1976. Diurnal variation of atomic nitrogen. *Journ. Geophys. Res.*, vol. 81, pp. 2413-2416.

MAYR, H. G., HEDIN, A. E., REBER, C. A., and CARIGNAN, G. R.

1974. Global characteristic in the diurnal variations of thermospheric temperature and composition. *Journ. Geophys. Res.*, vol. 79, pp. 619-628.

McCLURE, J. P.

1969. Diurnal variation of neutral and charged particle temperatures in the equatorial F region. *Journ. Geophys. Res.*, vol. 74, pp. 279-291.
1971. Thermospheric temperature variations inferred from incoherent scatter observations. *Journ. Geophys. Res.*, vol. 76, pp. 3106-3115.

McILWAIN, C. E.

1966. Magnetic coordinates. In Radiation Trapped in the Earth's Magnetic Field, ed. by B. M. McCormac, D. Reidel Publ. Co., Dordrecht, Holland, pp. 45-61.

MINZNER, R. A., and RIPLEY, W. S.

1956. The ARDC Model Atmosphere, 1956. AFCRC TN-56-204; ASTIA Document 110233, 202 pp.

NEWTON, G. P., KASPRZAK, W. T., CURTIS, S. A., and PELZ, D. T.

1975. Local time variation of equatorial thermospheric composition determined by the San Marco 3 Nace. *Journ. Geophys. Res.*, vol. 80, pp. 2289-2299.

NEWTON, G. P., PELZ, D. T., and VOLAND, H.

1969. Direct in situ measurements of wave propagation in the neutral thermosphere. *Journ. Geophys. Res.*, vol. 74, pp. 183-196.

PAUL, G., VOLAND, H., and ROEMER, M.

1974. A study of the time lag between the 27-day variations of thermospheric density and 10.7 cm solar radiation. In Space Research XIV, ed. by M. J. Rycroft and R. D. Reasenberg, Akademie-Verlag, Berlin, pp. 189-193.

PHILBRICK, C. R., McISAAC, J. P., and FAUCHER, G. A.

1976. Variations in the atmospheric composition and density during a magnetic storm. Presented at the 19th Plenary Meeting of COSPAR, Philadelphia, June.

REBER, C. A., HEDIN, A. E., PELZ, D. T., POTTER, W. E., and BRACE, L. H.

1975. Phase and amplitude relationship of wave structure observed in the lower thermosphere. *Journ. Geophys. Res.*, vol. 80, pp. 4576-4580.

SALAH, J. E., and EVANS, J. V.

1973. Measurements of thermospheric temperatures by incoherent scatter radar. In Space Research XIII, ed. by M. J. Rycroft and S. K. Runcorn, Akademie-Verlag, Berlin, pp. 267-286.

TAEUSCH, D. R., and CARIGNAN, G. R.

1972. Neutral composition in the thermosphere. *Journ. Geophys. Res.*, vol. 77, pp. 4870-4876.

THUILLIER, G., FALIN, J. L., and WACHTEL, C.

1976. Experimental global model of the exospheric temperature based on measurements from the Fabry-Perot interferometer on board the OGO-6 satellite. Presented at the 19th Plenary Meeting of COSPAR, Philadelphia, June.

VOLLAND, H., WULF-MATHIES, C., and PRIESTER, W.

1972. On the semiannual variations of the thermospheric density. *Journ. Atmos. Terr. Phys.*, vol. 34, pp. 1053-1063.

WULF-MATHIES, C.

1972. The latitudinal dependence of the semi-annual effect. In Space Research XII, ed. by S. A. Bowhill, L. D. Jaffe, and M. J. Rycroft, Akademie-Verlag, Berlin, pp. 815-819.

Table 10. Basic static models.

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 500 K

HEIGHT KM	TEMP LOG(N(N2) /M3)	LOG(N(C2) /M3)	LOG(N(O; /M3)	LOG(N(A) /M3)	LOG(N(HE) /M3)	LOG(N(H) /M3)	(PRESSURE NT/M2)	LOG (DEN KG/M3)	MEAN MOL WT	DENSITY HT KM	DENSITY KG/M3	LOG(DEN KG/M3)
420	498.8	8.883	6.722	11.955	12.160	12.124	12.566	-7.596	5.86	40.49	3.5E-14	-13.446
440	499.0	8.378	6.145	10.667	12.088	12.106	12.472	-7.690	4.59	47.05	2.26E-14	-13.646
460	499.1	7.876	7.378	11.380	12.017	12.088	12.398	-7.763	3.69	56.57	1.53E-14	-13.815
480	499.3	7.378	11.095	11.945	12.070	12.070	12.338	-7.823	3.08	69.49	1.11E-14	-13.953
500	499.4	6.882	10.612	12.052	12.074	12.078	12.288	-7.874	2.67	85.5	8.9E-15	-14.066
520	499.5	6.390	10.531	11.804	12.034	12.034	12.243	-7.918	1.39	103.59	6.94E-15	-14.158
540	499.5	6.390	10.251	11.734	12.016	12.016	12.204	-7.958	2.19	121.95	5.81E-15	-14.236
560	499.6	9.973	11.664	11.999	12.167	12.167	12.995	-7.995	2.05	139.15	4.99E-15	-14.302
580	499.6	9.973	11.595	11.981	12.132	12.132	12.945	-8.029	1.93	154.45	4.35E-15	-14.361
600	499.7	9.422	11.526	11.964	12.100	12.100	12.961	-8.061	1.84	167.80	3.84E-15	-14.415
620	499.7	9.149	11.458	11.947	12.069	12.069	12.969	-8.092	1.76	179.61	3.43E-15	-14.465
640	499.7	8.877	8.877	11.390	11.930	11.930	12.040	-8.121	1.69	190.37	3.07E-15	-14.512
660	499.8	8.323	8.323	11.323	11.912	11.912	12.012	-8.149	1.63	200.55	2.78E-15	-14.557
680	499.8	8.339	8.339	11.255	11.896	11.896	12.017	-8.176	1.57	210.51	2.52E-15	-14.599
700	499.8	8.072	11.189	11.879	11.959	11.959	12.020	-8.202	1.52	220.49	2.30E-15	-14.639
720	499.8	7.806	11.122	11.862	11.935	11.935	12.026	-8.226	1.47	230.67	2.01E-15	-14.678
740	499.8	7.542	11.056	11.845	11.911	11.911	12.025	-8.250	1.43	241.17	1.93E-15	-14.715
760	499.9	7.280	10.991	11.829	11.888	11.888	12.027	-8.273	1.39	252.02	1.78E-15	-14.750
780	499.9	7.019	10.925	11.812	11.865	11.865	12.029	-8.296	1.35	263.26	1.65E-15	-14.783
800	499.9	6.760	10.860	11.796	11.844	11.844	12.031	-8.317	1.32	274.89	1.53E-15	-14.816
820	499.9	6.502	10.796	11.780	11.823	11.823	12.038	-8.338	1.29	286.83	1.42E-15	-14.847
840	499.9	6.245	10.732	11.764	11.802	11.802	12.040	-8.359	1.26	299.09	1.33E-15	-14.876
860	499.9	6.000	10.668	11.747	11.782	11.782	12.042	-8.379	1.24	311.63	1.25E-15	-14.905
880	499.9	5.800	10.604	11.731	11.763	11.763	12.043	-8.398	1.22	324.40	1.17E-15	-14.932
900	499.9	5.600	10.541	11.716	11.744	11.744	12.044	-8.417	1.20	337.33	1.10E-15	-14.958
920	499.9	5.400	10.478	11.700	11.725	11.725	12.045	-8.436	1.18	350.36	1.04E-15	-14.984
940	499.9	5.200	10.416	11.684	11.707	11.707	12.046	-8.454	1.16	363.42	9.82E-16	-15.008
960	499.9	5.000	10.354	11.668	11.689	11.689	12.047	-8.472	1.15	376.45	9.30E-16	-15.031
980	499.9	4.800	10.292	11.653	11.671	11.671	12.049	-8.490	1.13	389.39	8.83E-16	-15.054
1000	499.9	4.600	10.231	11.637	11.654	11.654	12.050	-8.507	1.12	402.18	8.39E-16	-15.076
1050	500.0	10.079	11.599	11.612	11.651	11.651	12.054	-8.549	1.10	433.10	7.45E-16	-15.128
1100	500.0	9.929	11.561	11.651	11.671	11.671	12.059	-8.590	1.08	462.23	6.66E-16	-15.177
1150	500.0	9.781	11.524	11.652	11.672	11.672	12.062	-8.629	1.06	489.13	5.99E-16	-15.222
1200	500.0	9.634	11.487	11.649	11.673	11.673	12.066	-8.668	1.05	513.56	5.43E-16	-15.266
1250	500.0	9.490	11.451	11.656	11.675	11.675	12.070	-8.705	1.04	535.72	4.93E-16	-15.307
1300	500.0	9.348	11.415	11.649	11.674	11.674	12.074	-8.742	1.03	555.69	4.50E-16	-15.347
1350	500.0	9.208	11.380	11.638	11.683	11.683	12.078	-8.778	1.03	573.67	4.12E-16	-15.385
1400	500.0	9.069	11.345	11.637	11.687	11.687	12.082	-8.814	1.02	589.87	3.78E-16	-15.422
1450	500.0	8.932	11.310	11.632	11.684	11.684	12.086	-8.849	1.02	604.75	3.48E-16	-15.459
1500	500.0	8.797	11.276	11.627	11.678	11.678	12.088	-8.883	1.02	618.44	3.20E-16	-15.494
1600	500.0	8.532	11.210	11.620	11.670	11.670	12.091	-8.951	1.01	642.97	2.73E-16	-15.563
1700	500.0	8.273	11.144	11.615	11.665	11.665	12.096	-9.016	1.01	665.04	2.35E-16	-15.630
1800	500.0	8.021	11.081	11.608	11.658	11.658	12.101	-9.080	1.01	685.30	2.02E-16	-15.694
1900	500.0	7.775	11.019	11.598	11.649	11.649	12.104	-9.142	1.01	704.74	1.75E-16	-15.756
2000	500.0	7.535	10.958	11.568	11.649	11.649	12.108	-9.202	1.01	723.59	1.52E-16	-15.817
2100	500.0	7.300	10.899	11.500	11.640	11.640	12.112	-9.261	1.01	741.92	1.33E-16	-15.876
2200	500.0	7.071	10.842	11.442	11.632	11.632	12.116	-9.319	1.01	760.38	1.16E-16	-15.934
2300	500.0	6.848	10.785	11.347	11.585	11.585	12.120	-9.376	1.01	778.85	9.02E-16	-15.991
2400	500.0	6.629	10.730	11.310	11.575	11.575	12.124	-9.431	1.01	797.22	9.00E-17	-16.046
2500	500.0	6.415	10.677	11.276	11.567	11.567	12.128	-9.484	1.01	815.85	7.95E-17	-16.100

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 550 K							LOG (N(O ₂) /M ₃)				LOG (N(A) /M ₃)				LOG (N(HE) /M ₃)				LOG (N(H) /M ₃)				(PRESSURE NT/M ²)				LOG(MW)				MEAN SCALE HT KM				DENSITY KG/M ³				LOG(DEN KG/M ³)			
HEIGHT KM	TEMP K	LOG(N(N ₂) /M ₃)	LOG(N(O ₂) /M ₃)	LOG(N(A) /M ₃)	LOG(N(HE) /M ₃)	LOG(N(H) /M ₃)	(PRESSURE NT/M ²)	LOG(MW)	MEAN WT	DENSITY HT KM	DENSITY KG/M ³	LOG(DEN KG/M ³)																														
90	188.0	19.746	19.170	17.390	17.824	14.573	19.854	-7.732	28.91	5.63	3.43E-06	-5.465																														
92	188.1	19.592	19.009	17.547	17.670	14.419	19.700	-8.86	28.85	5.59	2.40E-06	-5.620																														
94	188.3	19.437	18.843	17.646	17.515	14.264	19.545	-1.040	28.76	5.56	1.68E-06	-5.776																														
96	188.9	19.282	18.673	17.687	17.360	14.109	19.391	-1.193	28.65	5.55	1.17E-06	-5.932																														
98	189.9	19.128	18.500	17.689	17.205	13.954	19.236	-1.345	28.52	5.57	8.16E-07	-6.088																														
100	191.6	18.974	18.326	17.668	17.052	13.801	19.083	-1.494	28.36	5.66	5.70E-07	-6.244																														
102	194.2	18.824	18.153	17.605	16.840	13.776	18.932	-1.639	28.21	5.67	4.01E-07	-6.397																														
104	198.2	18.673	17.977	17.550	16.629	13.750	18.782	-1.781	28.01	5.69	2.82E-07	-6.550																														
106	204.0	18.522	17.797	17.498	16.419	13.723	18.633	-1.917	27.79	5.71	1.98E-07	-6.703																														
108	211.8	18.372	17.612	17.442	16.213	13.694	18.486	-2.048	27.52	5.75	1.40E-07	-6.854																														
110	221.8	18.224	17.424	17.380	16.010	13.663	18.341	-2.173	27.24	5.87	9.91E-08	-7.004																														
115	254.2	17.873	16.975	17.199	15.534	13.585	18.001	-2.454	26.53	6.61	4.41E-08	-7.355																														
120	290.4	17.561	16.605	17.009	15.113	13.512	17.705	-2.692	25.94	7.65	2.19E-08	-7.661																														
125	327.7	17.284	16.293	16.831	14.741	13.448	17.448	-2.897	25.41	8.69	1.18E-08	-7.927																														
130	364.8	17.038	16.018	16.671	14.411	13.391	17.222	-3.076	24.90	9.92	6.90E-09	-8.161																														
135	397.6	16.820	15.774	16.531	14.116	13.342	17.026	-3.234	24.40	11.31	4.30E-09	-8.366																														
140	424.4	16.625	15.555	16.407	13.849	13.300	16.854	-3.379	23.92	12.69	2.84E-09	-8.547																														
145	445.3	16.446	15.384	16.296	13.604	13.265	16.699	-3.512	23.45	13.96	1.95E-09	-8.710																														
150	461.5	16.280	15.166	16.194	13.373	13.233	12.507	-3.637	22.98	15.08	1.38E-09	-8.860																														
155	474.3	16.122	14.987	16.099	13.152	12.454	16.428	-3.756	22.52	16.08	1.00E-09	-8.999																														
160	484.4	15.970	14.815	16.008	12.940	12.179	16.306	-3.869	22.07	16.97	7.40E-10	-9.130																														
170	499.5	15.680	14.486	15.837	12.532	13.131	12.362	-4.083	21.20	18.54	4.22E-10	-9.375																														
180	509.9	15.402	14.169	15.674	12.139	13.087	12.093	-4.283	20.39	19.95	2.51E-10	-9.601																														
190	517.6	15.132	13.862	15.517	11.757	13.046	12.256	-4.471	19.65	21.26	1.54E-10	-9.811																														
200	523.4	14.868	13.560	13.364	11.382	13.006	12.221	-4.649	19.00	22.50	9.77E-11	-10.010																														
210	527.9	14.608	13.264	15.214	11.013	12.967	12.197	-4.821	18.43	23.68	6.34E-11	-10.198																														
220	531.5	14.351	12.972	15.066	10.649	12.949	12.118	-4.985	17.93	24.80	4.20E-11	-10.377																														
230	534.4	14.098	12.682	14.921	10.288	12.891	12.061	-5.144	17.51	25.83	2.83E-11	-10.549																														
240	536.7	13.847	12.396	14.776	9.931	12.855	12.046	-5.298	17.14	26.78	1.93E-11	-10.714																														
250	538.7	13.598	12.112	14.634	9.577	12.818	12.133	-5.448	16.83	27.63	1.34E-11	-10.873																														
260	540.2	13.351	11.830	14.492	9.225	12.782	12.121	-5.533	16.55	28.40	9.37E-12	-11.028																														
270	541.6	13.105	11.549	13.451	8.875	12.747	12.110	-5.798	16.30	29.08	6.62E-12	-11.179																														
280	542.7	12.861	11.271	14.211	8.527	12.711	12.099	-5.878	16.05	29.69	4.71E-12	-11.327																														
290	543.6	12.618	10.994	14.073	8.182	12.676	12.089	-6.016	15.81	30.23	3.37E-12	-11.472																														
300	544.4	12.377	10.718	13.934	7.837	12.642	12.080	-6.151	15.56	30.72	2.43E-12	-11.615																														
310	545.0	12.137	10.443	13.797	7.495	12.607	12.071	-6.283	15.29	31.17	1.76E-12	-11.755																														
320	545.6	11.897	10.170	13.660	7.054	12.573	12.061	-6.412	14.98	31.61	1.28E-12	-11.893																														
330	546.1	11.659	9.898	13.524	6.814	12.538	12.052	-6.538	14.63	32.03	9.34E-13	-12.030																														
340	546.5	11.422	9.627	13.388	6.476	12.504	12.043	-6.660	14.22	32.46	6.85E-13	-12.165																														
350	546.9	11.185	9.357	13.253	6.139	12.470	12.034	-6.778	13.75	32.91	5.04E-13	-12.297																														
360	547.2	10.950	9.088	13.118	5.425	12.437	12.025	-6.891	13.20	33.40	3.73E-13	-12.428																														
370	547.5	10.715	8.820	12.984	5.063	12.403	12.016	-6.999	12.59	33.96	2.77E-13	-12.557																														
380	547.7	10.481	8.553	12.850	4.736	12.369	12.008	-7.101	11.90	34.59	2.07E-13	-12.684																														
390	548.0	10.248	8.287	12.717	4.476	12.336	11.999	-7.197	11.15	35.34	1.55E-13	-12.808																														
400	548.1	10.016	8.021	12.585	4.201	12.303	11.991	-7.286	10.35	36.23	1.18E-13	-12.930																														

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 550 K

HEIGHT KM	TEMP K	LOG(N(N ₂) /M ₃)	LOG(N(O ₂) /M ₃)	LOG(N(O) /M ₃)	LOG(N(A) /M ₃)	LOG(N(HE) /M ₃)	LOG(N(H) /M ₃)	LOG /M ₃)	LOG(PRESSURE NT/M ²)	MEAN MCL WT	DENSITY HT KM	DENSITY KG/M ³	LOG(DEN KG/M ³)
420	548.5	9.554	7.493	12.321	12.237	11.974	12.678	-7.443	8.70	38.58	6.88E-14	-13.163	
440	548.7	9.095	6.969	12.058	12.171	11.557	12.548	-7.573	7.13	4.03	4.0E-14	-13.379	
460	548.9	8.638	6.448	11.798	12.106	11.940	12.443	-7.677	5.78	47.05	2.66E-14	-13.517	
480	549.1	8.185		11.539	12.041	11.624	12.359	-7.762	4.72	54.18	1.79E-14	-13.747	
500	549.2	7.734		11.281	11.976	11.908	12.289	-7.831	3.94	63.90	1.27E-14	-13.895	
520	549.3	7.287		11.025	11.912	11.591	12.231	-7.889	3.38	76.37	9.55E-15	-14.020	
540	549.4	6.841		10.771	11.849	11.875	12.181	-7.940	2.99	91.24	7.52E-15	-14.124	
560	549.5	6.399		10.518	11.85	11.559	12.136	-7.984	2.71	107.58	6.14E-15	-14.212	
580	549.5	6.055		10.267	11.723	11.844	12.095	-8.025	2.50	124.14	5.17E-15	-14.287	
600	549.6			10.017	11.660	11.828	12.057	-8.063	2.35	139.80	4.44E-15	-14.353	
620	549.6			9.769	11.598	11.812	12.022	-8.098	2.22	153.88	3.88E-15	-14.412	
640	549.7			9.522	11.536	11.797	11.988	-8.132	2.12	166.23	3.42E-15	-14.466	
660	549.7			9.277	11.475	11.781	11.956	-8.164	2.03	177.05	3.04E-15	-14.517	
680	549.7			9.033	11.414	11.766	11.926	-8.194	1.95	186.75	2.73E-15	-14.564	
700	549.8			8.790	11.353	11.50	11.977	-8.223	1.88	195.70	2.48E-15	-14.610	
720	549.8			8.549	11.293	11.735	11.869	-8.251	1.81	204.23	2.22E-15	-14.653	
740	549.8			8.309	11.233	11.720	11.843	-8.277	1.75	212.60	2.04E-15	-14.695	
760	549.8			8.070	11.173	11.705	11.817	-8.303	1.69	221.01	1.84E-15	-14.735	
780	549.8			7.833	11.114	11.690	11.792	-8.328	1.64	229.59	1.68E-15	-14.773	
800	549.8			7.597	11.055	11.675	11.768	-8.351	1.59	238.54	1.55E-15	-14.811	
820	549.9			7.363	10.996	11.660	11.745	-8.374	1.54	247.74	1.42E-15	-14.846	
840	549.9			7.130	10.38	11.446	11.723	-8.396	1.50	257.33	1.32E-15	-14.881	
860	549.9			6.898	10.880	11.631	11.702	-8.418	1.46	267.33	1.22E-15	-14.914	
880	549.9			6.667	10.122	11.16	11.681	-8.439	1.42	277.75	1.13E-15	-14.946	
900	549.9			6.438	10.765	11.602	11.661	-8.459	1.39	288.60	1.06E-15	-14.976	
920	549.9			6.210	10.707	11.598	11.641	-8.478	1.36	299.95	9.86E-16	-15.006	
940	549.9				10.651	11.573	11.622	-8.497	1.33	311.48	9.24E-16	-15.034	
960	549.9				10.594	11.559	11.604	-8.516	1.30	323.46	8.68E-16	-15.062	
980	549.9				10.538	11.545	11.586	-8.534	1.28	335.76	8.16E-16	-15.088	
1000	549.9				10.482	11.531	11.568	-8.552	1.25	348.34	7.70E-16	-15.113	
1050	549.9				10.344	11.496	11.526	-8.594	1.21	380.67	6.71E-16	-15.173	
1100	549.9				10.008	11.662	11.485	-8.634	1.17	413.79	5.92E-16	-15.228	
1150	550.0				10.073	11.428	11.447	-8.673	1.13	446.91	5.22E-16	-15.278	
1200	550.0					11.394	11.409	-8.716	1.11	479.27	4.73E-16	-15.325	
1250	550.0					11.361	11.373	-8.746	1.09	510.42	4.28E-16	-15.369	
1300	550.0					11.349	11.359	-8.781	1.07	539.50	3.89E-16	-15.410	
1350	550.0					11.304	11.304	-8.815	1.06	567.42	3.55E-16	-15.450	
1400	550.0					11.265	11.271	-8.848	1.05	592.83	3.26E-16	-15.487	
1450	550.0					11.234	11.239	-8.881	1.04	616.36	3.00E-16	-15.523	
1500	550.0				9.179	11.203	11.207	-8.913	1.04	637.99	2.77E-16	-15.558	
1600	550.0					8.238	11.142	-8.975	1.03	676.08	2.38E-16	-15.624	
1700	550.0					8.703	11.083	-9.035	1.02	708.87	2.06E-16	-15.686	
1800	550.0					8.474	11.025	-9.093	1.02	737.46	1.79E-16	-15.746	
1900	550.0					8.250	10.969	-9.150	1.01	763.43	1.57E-16	-15.804	
2000	550.0					8.032	10.914	-9.205	1.01	787.49	1.38E-16	-15.860	
2100	550.0					9.809	10.860	-9.259	1.01	810.09	1.22E-16	-15.915	
2200	550.0					9.680	10.819	-9.312	1.01	832.10	1.06E-16	-15.967	
2300	550.0					9.552	10.761	-9.363	1.01	853.61	9.57E-17	-16.019	
2400	550.0					9.407	10.757	-9.413	1.01	874.62	8.53E-17	-16.069	
2500	550.0					7.014	10.658	-9.462	1.01	895.74	7.61E-17	-16.118	

EXOSPHERIC TEMPERATURE = 600 K

HEIGHT K	TEMP (N ₂) K	LOG(N ₂) /M ₃	LOG(N(O ₂) /M ₃)	LOG(N(A) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H ₂) /M ₃)	LOG(N(H) /M ₃)	(PRESSURE NT/M ²)	LOG (DEN KG/M ³)	MEAN DENSITY	MOL WT	SCALE	HGT	DENSITY	KM
										LOG (DEN KG/M ³)	MOL WT	SCALE	HGT	DENSITY	KM
90	188.0	19.746	19.170	17.390	17.824	14.573	19.854	-•732	28•91	5.63	3.43E-06	2.40E-06	5.620	-5.620	
92	188.1	19.592	19.009	17.547	17.670	14.418	19.700	-•886	28•85	5.59	2.40E-06	1.68E-06	5.776	-5.776	
94	188.4	19.437	18.843	17.646	17.515	14.264	19.545	-1.040	28•76	5.56	1.17E-06	5.932	-5.932		
96	189.0	19.282	18.673	17.687	17.360	14.109	19.390	-1.193	28•65	5.55	6.15E-07	6.089	-6.089		
98	190.1	19.127	18.500	17.689	17.205	13.954	19.236	-1.345	28•52	5.56	5.06	7.0E-07	-6.244		
100	191.9	18.973	18.326	17.667	17.051	13.800	19.083	-1.494	28•36	5.66	4.00E-07	6.398	-6.398		
102	194.8	18.823	18.152	17.604	16.839	13.776	18.932	-1.639	28•21	5.68	2.81E-07	6.551	-6.551		
104	199.2	18.672	17.976	17.549	16.628	13.749	18.781	-1.779	28•02	5.68	1.98E-07	6.704	-6.704		
106	205.4	18.521	17.796	17.496	16.419	13.721	18.632	-1.915	27•79	5.70	1.39E-07	6.856	-6.856		
108	213.9	18.371	17.611	17.439	16.212	13.692	18.484	-2.045	27•53	5.75	1.39E-07	6.856	-6.856		
110	224.8	18.223	17.423	17.377	16.010	13.660	18.339	-2.169	27•24	5.87	9.88E-08	7.005	-7.005		
115	260.1	17.873	16.976	17.195	15.538	13.580	18.000	-2.445	26•55	6.65	4.41E-08	7.356	-7.356		
120	299.4	17.564	16.611	17.005	15.123	13.507	17.707	-2.676	25•97	7.75	2.20E-08	7.658	-7.658		
125	340.1	17.292	16.304	16.829	14.759	13.441	17.453	-2.875	25•46	8.85	1.20E-08	7.920	-7.920		
130	380.6	17.052	16.036	16.671	14.438	13.384	17.232	-3.047	24•98	10.14	7.08E-09	8.150	-8.150		
135	417.0	16.839	15.799	16.533	14.152	13.334	17.040	-3.200	24•52	11.59	4.46E-09	8.350	-8.350		
140	447.4	16.650	15.587	16.412	13.895	13.293	16•672	-3.338	24•06	13.05	2.97E-09	8.527	-8.527		
145	471.7	16.476	15.393	16.303	13.659	13.257	16•722	-3.465	23•62	14.42	2.07E-09	8.685	-8.685		
150	490.9	16.318	15.213	16.205	13.439	13.226	12•387	-3.583	23•18	15.66	1.48E-09	8.829	-8.829		
155	506.2	16.168	15.043	16.113	13.230	13.198	12•332	-3.696	22•75	16.76	1.09E-09	8.963	-8.963		
160	518.5	16.024	14.881	16.026	13.029	13.173	12.286	-3.803	22•33	17.75	6.15E-10	9.089	-9.089		
170	536.9	15.751	14.571	15.864	12.646	13.126	12.215	-4.005	21•51	19.47	4.76E-10	9.322	-9.322		
180	549.9	15.490	14.275	15.711	12.279	13.084	12.162	-4.194	20•75	20.99	2.91E-10	9.537	-9.537		
190	559.4	15.239	13.988	15.564	11.923	13.045	12.122	-4.371	20•04	22.38	1.83E-10	9.737	-9.737		
200	566.7	14.993	13.709	15.421	11.576	13.007	12.084	-4.540	19•40	23.70	1.19E-10	9.926	-9.926		
210	572.3	14.753	13.434	15.282	11.234	12.971	12.059	-4.701	18•82	24.94	7.87E-11	10.104	-10.104		
220	576.8	14.516	13.164	15.145	10.898	12.935	12.038	-4.856	18•32	26.14	3.32E-11	10.274	-10.274		
230	580.4	14.282	12.897	15.010	10.565	12.900	12.020	-5.006	17•88	27.26	3.66E-11	10.437	-10.437		
240	583.4	14.050	12.633	14.877	10.236	12.866	12.005	-5.150	17•49	28.31	2.55E-11	10.593	-10.593		
250	585.8	13.821	12.371	14.745	9.910	12.833	11.992	-5.291	17•16	29.27	1.80E-11	10.744	-10.744		
260	587.8	13.593	12.112	14.615	9.586	12.799	11.980	-5.428	16•87	30.15	1.29E-11	10.890	-10.890		
270	589.4	13.367	11.854	14.485	9.264	12.767	11.969	-5.563	16•62	30.94	9.28E-12	11.032	-11.032		
280	590.8	13.143	11.598	14.357	8.945	12.734	11.958	-5.694	16•38	31.65	6.74E-12	11.171	-11.171		
290	592.0	12.920	11.343	14.229	8.627	12.702	11.948	-5.823	16•16	32.29	6.93E-12	11.307	-11.307		
300	592.9	12.698	11.090	14.102	8.311	12.670	11.939	-5.950	15•95	32.87	3.63E-12	11.440	-11.440		
310	593.8	12.477	10.837	13.975	7.996	12.638	11.930	-6.074	15•73	33.40	2.68E-12	11.571	-11.571		
320	594.5	12.257	10.586	13.850	7.683	12.606	11.921	-6.197	15•50	33.88	1.99E-12	11.700	-11.700		
330	595.1	12.038	10.337	13.725	7.371	12.575	11.912	-6.317	15•25	34.34	1.49E-12	11.828	-11.828		
340	595.6	11.821	10.088	13.600	7.061	12.543	11.904	-6.434	14•98	34.77	1.11E-12	11.953	-11.953		
350	596.1	11.604	9.840	13.476	6.751	12.512	11.896	-6.549	14•66	35.20	6.37E-13	12.077	-12.077		
360	596.5	11.387	9.593	13.352	6.443	12.481	11.887	-6.660	14•31	35.64	6.31E-13	12.200	-12.200		
370	596.9	11.172	9.347	13.229	6.136	12.450	11.879	-6.769	13•316	36.10	4.77E-13	12.321	-12.321		
380	597.2	9.102	9.102	13.107	12.420	11.871	13•211	-6.873	13•44	36.59	3.63E-13	12.441	-12.441		
390	597.4	10.744	8.858	12.984	12.389	11.863	13•110	-6.974	12•92	37.14	2.76E-13	12.558	-12.558		
400	597.7	10.531	8.615	12.863	12.358	11.856	13•014	-7.070	12•35	37.75	2.12E-13	12.674	-12.674		

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 600 K										LOG(PRESSURE NT/m ²)				LOG(DENSITY KG/m ³)			
HEIGHT KM	TEMP K	LOG(N(N ₂)/M ₃)	LOG(N(O ₂)/M ₃)	LOG(N(A)/M ₃)	LOG(N(HE)/M ₃)	LOG(N(H)/M ₃)	(P)PRESSURE NT/m ²	MEAN MOL WT	DENSITY KM	SCALE HT	DENSITY KG/M ₃	LOG(DEN KG/M ₃)					
420	598.1	10.107	8.131	12.620	12.298	11.840	-7.247	11.04	39.26	1.26E-13	-12.900						
440	598.4	9.686	7.650	12.380	12.237	11.825	-7.402	9.61	41.34	7.65E-14	-13.116						
460	598.6	9.267	7.172	12.141	12.178	11.809	-7.534	8.16	44.25	4.79E-14	-13.320						
480	598.8	8.852	6.697	11.903	12.118	11.794	-7.646	6.84	48.34	3.11E-14	-13.508						
500	599.0	8.438	6.225	11.667	12.059	11.779	-7.345	5.71	54.01	2.10E-14	-13.678						
520	599.1	8.028	5.944	11.433	12.000	11.764	-7.268	4.82	61.66	1.48E-14	-13.829						
540	599.2	7.620	5.620	11.200	11.750	11.750	-7.203	4.14	71.56	1.10E-14	-13.960						
560	599.3	7.214	5.300	10.968	11.884	11.735	-7.147	3.64	83.76	8.46E-15	-14.072						
580	599.4	6.811	4.984	10.737	11.826	11.720	-7.097	3.27	97.86	6.79E-15	-14.168						
600	599.5	6.410	4.610	10.508	11.769	11.706	-7.052	3.00	113.10	5.61E-15	-14.251						
620	599.5	6.011	4.281	10.281	11.712	11.692	-7.011	-8.071	2.79	128.47	4.75E-15	-14.323					
640	599.6	5.604	3.929	10.054	11.655	11.677	-6.973	-8.109	2.63	143.10	4.10E-15	-14.387					
660	599.6	5.196	3.566	9.806	11.599	11.663	-6.937	-8.145	2.50	156.39	3.59E-15	-14.445					
680	599.7	4.800	3.243	9.606	11.543	11.649	-6.902	-8.180	2.39	168.14	3.17E-15	-14.498					
700	599.7	4.412	2.915	9.383	11.487	11.635	-6.870	-8.212	2.30	178.44	2.83E-15	-14.549					
720	599.7	4.024	2.600	9.162	11.432	11.621	-6.839	-8.243	2.21	187.55	2.54E-15	-14.596					
740	599.8	3.637	2.300	8.942	11.377	11.607	-6.809	-8.273	2.14	195.75	2.28E-15	-14.641					
760	599.8	3.250	2.000	8.723	11.322	11.593	-6.780	-8.302	2.07	203.36	2.07E-15	-14.685					
780	599.8	2.860	1.700	8.506	11.268	11.580	-6.752	-8.330	2.00	210.63	1.88E-15	-14.727					
800	599.8	2.490	1.400	8.290	11.214	11.566	-6.726	-8.356	1.93	217.82	1.71E-15	-14.767					
820	599.8	2.075	1.100	8.075	11.160	11.552	-6.700	-8.382	1.87	224.95	1.56E-15	-14.807					
840	599.8	1.761	8.861	7.648	11.107	11.539	-6.676	-8.406	1.82	232.21	1.43E-15	-14.845					
860	599.9	1.453	7.437	7.437	11.053	11.526	-6.652	-8.430	1.76	239.70	1.31E-15	-14.881					
880	599.9	1.147	6.000	7.227	10.998	11.512	-6.629	-8.453	1.71	247.46	1.21E-15	-14.917					
900	599.9	8.000	5.596	7.018	10.948	11.499	-6.607	-8.475	1.67	255.56	1.12E-15	-14.952					
920	599.9	5.900	4.186	9.400	10.896	11.486	-6.585	-8.497	1.62	264.02	1.04E-15	-14.985					
940	599.9	4.810	3.000	6.810	10.844	11.473	-6.564	-8.518	1.58	272.85	9.61E-16	-15.017					
960	599.9	3.603	1.800	6.603	10.792	11.460	-6.544	-8.538	1.54	282.09	9.94E-16	-15.049					
980	599.9	2.397	0.700	6.397	10.740	11.447	-6.525	-8.557	1.50	291.73	8.34E-16	-15.079					
1000	599.9	1.193	0.689	6.193	10.689	11.434	-6.506	-8.576	1.46	301.77	7.79E-16	-15.108					
1050	599.9	1.052	1.402	11.461	11.461	11.461	-6.621	1.39	328.57	6.65E-16	-15.177						
1100	599.9	1.037	1.370	11.370	11.418	11.418	-6.664	1.32	357.71	5.75E-16	-15.241						
1150	599.9	1.034	1.339	11.339	11.378	11.378	-6.703	1.27	388.81	5.03E-16	-15.299						
1200	600.0	1.019	1.309	11.309	11.341	11.341	-6.741	1.22	421.32	4.44E-16	-15.352						
1250	600.0	1.007	1.278	11.305	11.350	11.350	-6.777	1.18	454.84	3.96E-16	-15.402						
1300	600.0	9.954	1.249	11.249	11.270	11.270	-6.812	1.15	488.72	3.56E-16	-15.448						
1350	600.0	9.837	1.219	11.219	11.237	11.237	-6.845	1.13	522.36	3.23E-16	-15.491						
1400	600.0	9.721	1.190	11.190	11.204	11.204	-6.877	1.11	555.25	2.94E-16	-15.531						
1450	600.0	9.607	1.161	11.161	11.173	11.173	-6.909	1.09	587.07	2.70E-16	-15.569						
1500	600.0	9.495	1.133	11.133	11.143	11.143	-6.939	1.08	617.46	2.48E-16	-15.605						
1600	600.0	9.274	1.077	11.084	11.084	11.084	-6.998	1.05	673.05	2.12E-16	-15.73						
1700	600.0	9.058	1.023	11.023	11.028	11.028	-7.054	1.04	722.05	1.84E-16	-15.735						
1800	600.0	8.848	9.970	10.970	10.973	10.973	-7.108	1.03	764.67	1.61E-16	-15.793						
1900	600.0	8.643	10.918	10.921	9.161	9.161	-7.161	1.02	802.27	1.42E-16	-15.849						
2000	600.0	8.443	10.868	10.870	9.212	9.212	-7.220	1.02	835.80	1.25E-16	-15.902						
2100	600.0	8.248	10.819	10.820	9.262	9.262	-7.280	1.02	866.06	1.11E-16	-15.953						
2200	600.0	8.057	10.771	10.772	9.310	9.310	-7.340	1.01	894.31	9.95E-17	-16.002						
2300	600.0	7.870	10.724	10.724	9.357	9.357	-7.400	1.01	920.97	8.91E-17	-16.050						
2400	600.0	7.688	10.678	10.678	9.403	9.403	-7.460	1.01	946.23	8.01E-17	-16.097						
2500	600.0	7.510	10.633	10.633	9.448	9.448	-7.510	1.01	971.08	7.21E-17	-16.142						

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 650 K									
HEIGHT KM	TEMP K	LOG(N(N ₂) /M ₃)	LOG(N(O ₂) /M ₃)	LOG(N(O) /M ₃)	LOG(N(A) /M ₃)	LOG(N(HE) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(PRESSURE (NT/M ₂)
90	188.0	19.746	19.170	17.390	17.824	14.573	19.854	19.732	28.91
92	188.1	19.592	19.009	17.547	17.669	14.418	19.700	28.86	5.63
94	188.4	19.437	18.847	17.646	17.515	14.264	19.545	1.040	2.40E-06
96	189.0	19.282	18.673	17.686	17.360	14.109	19.390	-1.193	1.68E-06
98	190.2	19.127	18.500	17.689	17.205	13.954	19.236	-1.365	5.54
100	192.2	18.973	18.325	17.667	17.051	13.800	19.082	-1.494	2.15E-07
102	195.3	18.822	18.152	17.604	16.839	13.775	18.931	-1.638	5.69E-07
104	200.0	18.671	17.975	17.548	16.628	13.748	18.781	-1.778	4.00E-07
106	206.7	18.520	17.795	17.495	16.419	13.720	18.631	-1.914	6.39E-07
108	215.8	18.370	17.611	17.437	16.212	13.690	18.483	-2.043	2.81E-07
110	227.6	18.222	17.423	17.374	16.011	13.657	18.338	-2.165	6.705
115	265.5	17.872	16.978	17.191	15.541	13.576	18.000	-2.436	5.43E-08
120	307.7	17.566	16.616	17.002	15.132	13.501	17.709	-2.663	2.41E-08
125	351.4	17.299	16.314	16.827	14.775	13.436	17.458	-2.856	7.65E-08
130	395.0	17.063	16.051	16.671	14.460	13.378	17.241	-3.023	1.22E-08
135	434.7	16.855	16.855	15.820	14.182	13.328	17.052	-3.170	10.33
140	468.5	16.671	16.613	16.415	13.933	13.286	16.887	-3.302	2.46E-09
145	496.2	16.504	16.426	16.309	13.705	13.250	16.740	-3.424	1.33E-09
150	518.4	16.350	15.253	16.213	13.494	13.219	12.279	-3.537	3.09E-09
155	536.4	16.205	15.090	16.124	13.294	13.192	12.224	-3.645	8.509
160	551.0	16.068	14.935	16.040	13.103	13.166	12.177	-3.747	2.17E-09
170	573.0	15.809	14.641	15.885	12.740	13.121	12.102	-3.98	8.804
180	588.7	15.563	14.362	15.740	12.395	13.081	12.047	-4.117	8.933
190	600.3	15.327	14.093	15.601	12.062	13.043	12.005	-4.286	9.48E-10
200	609.1	15.097	13.832	15.467	11.737	13.007	11.964	-4.446	9.675
210	616.0	14.872	13.576	15.337	11.419	12.973	11.937	-4.598	9.855
220	621.5	14.652	13.324	15.209	11.106	12.939	11.915	-4.745	10.025
230	626.0	14.434	13.076	15.083	10.796	12.907	11.896	-4.886	10.187
240	629.6	14.219	12.831	14.960	10.491	12.875	11.880	-5.038	10.342
250	632.5	14.006	12.588	14.837	10.188	12.843	11.866	-5.156	10.491
260	635.0	13.795	12.347	14.716	9.888	12.812	11.854	-5.285	10.634
270	637.0	13.586	12.108	14.596	9.590	12.782	11.843	-5.412	10.773
280	638.7	13.378	11.871	14.477	9.294	12.752	11.832	-5.535	10.907
290	640.1	13.171	11.635	14.358	9.000	12.722	11.823	-5.657	11.039
300	641.3	12.966	11.401	14.241	8.708	12.692	11.813	-5.776	11.167
310	642.4	12.762	11.168	14.124	8.417	12.662	11.805	-5.894	11.292
320	643.2	12.559	10.936	14.007	8.127	12.633	11.796	-6.009	11.416
330	644.0	12.356	10.705	13.892	7.839	12.604	11.788	-6.122	11.537
340	644.7	12.155	10.475	13.776	7.552	12.575	11.780	-6.234	11.657
350	645.2	11.954	10.246	13.662	7.266	12.546	11.772	-6.344	11.774
360	645.7	11.755	10.017	13.547	6.981	12.517	11.764	-6.451	11.891
370	646.1	11.556	9.790	13.434	6.698	12.489	11.757	-6.556	12.119
380	646.5	11.357	9.564	13.320	6.415	12.460	11.749	-6.659	12.232
390	646.8	11.160	9.338	13.207	6.134	12.432	11.742	-6.759	12.343
400	647.1	10.963	9.113	13.095	6.095	12.404	11.734	-6.856	12.453

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 650 K

HEIGHT KM	TEMP K	LOG(N(N ₂) /M ₃)	LOG(N(O ₂) /M ₃)	LOG(N(O) /M ₃)	LOG(N(A) /M ₃)	LOG(N(HE) /M ₃)	LOG(N(H) /M ₃)	(LOG(N /M ₃)) LOG(N(H) /M ₃)	LOG(PRESSURE NT/M ²)	LOG WT	MEAN WT	DENSITY KM	DENSITY HT	DENSITY KG/M ³	LOG(DEN KG/M ³)
420	647.6	10.572	8.666	12.871	12.348	11.720	13.010	-7.039	12.66	40.97	2.15E-3	-12.668	-12.668	-12.668	
440	648.0	10.183	8.222	12.649	12.292	11.706	12.841	-7.207	11.54	42.41	1.33E-13	-12.876	-12.876	-12.876	
460	648.3	9.796	7.781	12.428	12.237	11.691	12.690	-7.358	10.29	44.31	8.38E-14	-13.077	-13.077	-13.077	
480	648.6	9.412	7.342	12.209	12.182	11.677	12.558	-7.490	8.99	46.87	5.40E-14	-13.268	-13.268	-13.268	
500	648.8	9.031	6.906	11.991	12.127	11.664	12.444	-7.504	7.74	50.35	3.57E-14	-13.447	-13.447	-13.447	
520	648.9	8.652	6.473	11.774	12.073	11.650	12.347	-7.703	6.61	55.05	2.44E-14	-13.612	-13.612	-13.612	
540	649.1	8.275	6.043	11.559	12.019	11.636	12.265	-7.783	6.12	59.29	1.73E-14	-13.762	-13.762	-13.762	
560	649.2	7.900	11.345	11.965	11.623	12.194	-7.853	4.90	69.38	1.27E-14	-13.895	-13.895	-13.895		
580	649.3	7.528	11.132	11.912	11.609	12.133	-7.914	4.30	79.47	9.71E-15	-14.013	-14.013	-14.013		
600	649.4	7.158	10.921	11.859	11.596	12.080	-7.968	3.85	91.48	7.68E-15	-14.115	-14.115	-14.115		
620	649.4	6.790	10.711	11.807	11.583	12.031	-8.016	3.51	105.04	6.26E-15	-14.203	-14.203	-14.203		
640	649.5	6.424	10.502	11.754	11.569	11.987	-8.060	3.25	119.52	5.24E-15	-14.281	-14.281	-14.281		
660	649.5	6.060	10.294	11.702	11.556	11.946	-8.101	3.05	134.12	4.47E-15	-14.349	-14.349	-14.349		
680	649.6	10.087	11.651	11.543	11.908	-8.139	2.89	148.10	3.88E-15	-14.411	-14.411	-14.411			
700	649.6	9.882	11.599	11.530	11.872	-8.176	2.76	160.91	3.41E-15	-14.467	-14.467	-14.467			
720	649.7	9.678	11.548	11.517	11.837	-8.210	2.65	172.35	3.03E-15	-14.519	-14.519	-14.519			
740	649.7	9.475	11.497	11.505	11.804	-8.243	2.56	182.42	2.70E-15	-14.568	-14.568	-14.568			
760	649.7	9.072	11.447	11.492	11.772	-8.275	2.47	191.28	2.43E-15	-14.615	-14.615	-14.615			
780	649.7	8.873	11.397	11.479	11.742	-8.305	2.39	199.17	2.19E-15	-14.659	-14.659	-14.659			
800	649.8	8.674	11.347	11.467	11.712	-8.335	2.32	206.35	1.99E-15	-14.702	-14.702	-14.702			
820	649.8	8.477	11.248	11.442	11.657	-8.390	2.25	212.98	1.81E-15	-14.743	-14.743	-14.743			
840	649.8	8.281	11.199	11.429	11.630	-8.417	2.22	219.32	1.65E-15	-14.783	-14.783	-14.783			
860	649.8	8.085	11.150	11.417	11.605	-8.442	2.06	225.51	1.50E-15	-14.823	-14.823	-14.823			
880	649.8	7.891	11.101	11.405	11.580	-8.467	2.01	231.68	1.38E-15	-14.861	-14.861	-14.861			
900	649.8	7.698	11.053	11.392	11.556	-8.491	1.95	237.93	1.27E-15	-14.898	-14.898	-14.898			
920	649.9	7.506	11.005	11.380	11.533	-8.514	1.90	244.33	1.17E-15	-14.934	-14.934	-14.934			
940	649.9	7.315	10.957	11.368	11.511	-8.536	1.85	250.93	1.07E-15	-14.969	-14.969	-14.969			
960	649.9	7.126	10.910	11.356	11.489	-8.558	1.80	257.79	9.94E-16	-15.003	-15.003	-15.003			
980	649.9	6.937	10.862	11.344	11.468	-8.579	1.75	264.93	9.20E-16	-15.036	-15.036	-15.036			
1000	649.9	6.469	10.746	11.315	11.419	-8.628	1.64	272.38	8.54E-16	-15.068	-15.068	-15.068			
1050	649.9	6.008	10.630	11.286	11.373	-8.674	1.55	292.45	7.16E-16	-15.145	-15.145	-15.145			
1100	649.9	5.516	10.516	11.257	11.430	-8.717	1.47	314.84	6.07E-16	-15.217	-15.217	-15.217			
1150	649.9	5.040	10.404	11.229	11.289	-8.758	1.40	339.58	5.21E-16	-15.283	-15.283	-15.283			
1200	649.9	4.529	10.293	11.201	11.252	-8.795	1.34	366.50	4.52E-16	-15.345	-15.345	-15.345			
1250	649.9	4.076	10.184	11.173	11.216	-8.831	1.29	395.73	3.96E-16	-15.402	-15.402	-15.402			
1300	650.0	3.609	10.076	11.146	11.182	-8.865	1.24	426.76	3.51E-16	-15.455	-15.455	-15.455			
1350	650.0	3.196	9.969	11.119	11.149	-8.898	1.21	459.87	3.13E-16	-15.504	-15.504	-15.504			
1400	650.0	2.864	9.864	11.093	11.118	-8.929	1.17	492.87	2.82E-16	-15.549	-15.549	-15.549			
1450	650.0	2.590	9.760	11.067	11.088	-9.059	1.15	527.22	2.56E-16	-15.592	-15.592	-15.592			
1500	650.0	2.336	9.728	10.605	10.667	-9.0441	1.01	561.78	2.33E-16	-15.632	-15.632	-15.632			
1600	650.0	2.077	9.556	11.015	11.030	-9.017	1.11	629.77	1.97E-16	-15.705	-15.705	-15.705			
1700	650.0	1.824	9.357	10.965	10.976	-9.071	1.08	694.34	1.70E-16	-15.771	-15.771	-15.771			
1800	650.0	1.569	9.163	10.916	10.924	-9.123	1.06	753.51	1.48E-16	-15.830	-15.830	-15.830			
1900	650.0	1.314	9.074	10.869	10.874	-9.173	1.05	807.01	1.30E-16	-15.886	-15.886	-15.886			
2000	650.0	1.059	8.789	10.822	10.826	-9.221	1.04	854.87	1.15E-16	-15.938	-15.938	-15.938			
2100	650.0	8.609	10.777	10.780	-9.267	1.03	897.50	1.03E-16	-15.988	-15.988	-15.988				
2200	650.0	8.433	10.732	10.735	-9.312	1.02	936.33	9.22E-17	-16.035	-16.035	-16.035				
2300	650.0	8.261	10.689	10.691	-9.356	1.02	971.90	8.30E-17	-16.081	-16.081	-16.081				
2400	650.0	8.092	10.647	10.648	-9.399	1.02	1004.73	7.50E-17	-16.125	-16.125	-16.125				
2500	650.0	7.928	10.605	-10.006	-9.441	1.01	1045.90	6.80E-17	-16.167	-16.167	-16.167				

EXOSPHERIC TEMPERATURE = 700 K

FLIGHT K ^r	TEMP K	LOG(N(N ₂) /M ₃)			LOG(N(O ₂) /M ₃)			LOG(N(NA) /M ₃)			LOG(N(H) /M ₃)			LOG(PRESSURE NT/M ²)			MEAN MOL WT	DENSITY KM	DENSITY KG/M ³	LOG(DEN KG/M ³)
		LOG(N(N ₂) /M ₃)	LOG(N(O ₂) /M ₃)	LOG(N(H) /M ₃)	LOG(N(NA) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(PRESSURE NT/M ²)	MEAN MOL WT	DENSITY KM	DENSITY KG/M ³	LOG(DEN KG/M ³)					
90	188.0	19.746	19.170	17.390	17.824	14.573	19.854	-0.732	28.91	5.63	3.43E-06	-5.465				2.60E-06	-5.620			
92	188.1	19.592	19.009	17.547	17.669	14.418	19.545	-0.886	28.85	5.59	5.56	-1.68E-06	-5.776				1.17E-06	-5.932		
94	188.4	19.437	18.843	17.646	17.515	14.264	19.545	-1.040	28.76	5.54	5.54	-1.34E-06	-5.895				8.55E-07	-6.089		
96	189.1	19.282	18.673	17.686	17.360	14.109	19.90	-1.193	28.65	5.50	5.55	-1.34E-06	-6.245				5.69E-07	-6.399		
98	190.4	19.127	18.500	17.688	17.205	13.954	19.236	-1.345	28.52	5.46	5.46	-1.494	-1.494				3.99E-07	-6.552		
100	192.5	18.973	18.350	17.667	17.050	13.799	19.082	-1.494	28.36	5.41	5.41	-1.638	-1.638				2.80E-07	-6.706		
102	195.8	18.822	18.151	17.603	16.839	13.774	18.931	-1.777	28.02	5.36	5.36	-1.912	-1.912				1.97E-07	-6.858		
104	200.7	18.671	17.975	17.547	16.418	13.748	18.80	-1.777	27.79	5.31	5.31	-1.402	-1.402				1.39E-07	-6.858		
106	207.9	18.519	17.795	17.493	16.418	13.719	18.630	-1.912	27.53	5.27	5.27	-1.402	-1.402				1.24E-09	-8.908		
108	217.6	18.369	17.610	17.435	16.212	13.688	18.402	-2.040	27.53	5.23	5.23	-1.402	-1.402				1.24E-09	-8.908		
110	230.1	18.221	17.422	17.371	16.011	13.655	18.337	-2.161	27.25	5.18	5.18	-2.161	-2.161				1.24E-08	-7.007		
115	270.4	17.872	16.978	17.187	15.544	13.572	17.999	-2.429	26.58	6.72	6.72	-2.429	-2.429				4.40E-08	-7.356		
120	315.3	17.569	16.620	16.999	15.140	13.497	17.710	-2.651	26.03	7.92	7.92	-2.651	-2.651				2.22E-08	-7.654		
125	361.7	17.305	16.322	16.825	14.788	13.430	17.463	-2.839	25.56	9.11	9.11	-2.839	-2.839				1.33E-08	-7.910		
130	408.2	17.073	16.064	16.670	14.480	13.372	17.248	-3.001	25.11	10.50	10.50	-3.001	-3.001				7.38E-09	-8.132		
135	451.0	16.869	15.838	16.535	14.208	13.322	17.062	-3.144	24.69	12.04	12.04	-3.144	-3.144				4.73E-09	-8.325		
140	488.1	16.689	15.636	16.418	13.965	13.280	16.900	-3.272	24.28	13.63	13.63	-3.272	-3.272				3.20E-09	-8.495		
145	518.9	16.526	15.454	16.313	13.745	13.244	16.756	-3.389	23.88	15.17	15.17	-3.389	-3.389				2.66E-09	-8.645		
150	544.2	16.376	15.286	16.219	13.540	13.213	16.627	-3.498	23.50	16.60	16.60	-3.498	-3.498				1.65E-09	-8.782		
155	564.8	16.237	15.129	13.348	13.213	12.127	16.508	-3.600	23.11	17.90	17.90	-3.600	-3.600				1.24E-09	-8.908		
160	581.8	16.105	14.980	16.051	13.165	13.160	12.079	16.397	22.74	19.08	19.08	-3.698	-3.698				9.43E-10	-9.026		
170	607.7	15.857	14.700	15.902	12.820	13.116	12.002	16.196	22.02	21.13	21.13	-3.881	-3.881				5.74E-10	-9.241		
180	626.3	15.624	14.435	15.763	12.493	13.076	11.945	16.012	21.33	22.90	22.90	-4.051	-4.051				3.64E-10	-9.439		
190	640.2	15.400	14.181	15.631	12.179	13.040	11.901	15.842	20.67	24.49	24.49	-4.211	-4.211				2.39E-10	-9.622		
200	650.8	15.184	13.935	15.505	11.873	13.006	11.857	15.683	20.07	25.97	25.97	-4.363	-4.363				1.61E-10	-9.794		
210	659.1	14.973	13.695	15.382	11.574	12.973	11.828	15.533	-4.508	19.51	27.35	-4.508	-4.508				1.01E-10	-9.957		
220	665.7	14.766	13.459	15.262	11.281	12.941	11.805	15.389	-4.648	19.00	28.68	-4.648	-4.648				7.73E-11	-10.112		
230	671.0	14.562	13.227	15.144	10.992	12.911	11.785	15.251	-4.782	18.55	31.15	-4.782	-4.782				5.49E-11	-10.260		
240	675.3	14.361	12.998	15.028	10.707	12.880	11.769	15.119	-4.912	18.15	31.15	-4.912	-4.912				3.96E-11	-10.402		
250	678.9	14.162	12.771	14.913	10.424	12.851	11.754	14.990	-5.038	17.79	32.28	-5.038	-5.038				2.89E-11	-10.539		
260	681.8	13.966	12.966	14.800	10.144	12.822	11.741	14.866	-5.160	17.47	33.34	-5.160	-5.160				2.13E-11	-10.672		
270	684.3	13.770	12.324	14.688	9.867	12.793	11.730	14.745	-5.280	17.19	34.33	-5.280	-5.280				1.58E-11	-10.800		
280	686.3	13.577	12.103	14.577	9.591	12.675	11.719	14.626	-5.397	16.94	35.25	-5.397	-5.397				1.19E-11	-10.925		
290	688.1	13.384	11.883	14.467	9.317	12.737	11.709	14.510	-5.512	16.71	36.08	-5.512	-5.512				8.98E-12	-11.047		
300	689.5	13.193	11.665	14.357	9.045	12.709	11.700	14.397	-5.625	16.50	36.85	-5.625	-5.625				6.93E-12	-11.166		
310	690.8	13.003	11.448	14.248	8.774	12.682	11.692	14.285	-5.736	16.31	37.55	-5.736	-5.736				5.22E-12	-11.282		
320	691.8	12.814	11.232	14.140	8.505	12.654	11.683	14.175	-5.845	16.13	38.20	-5.845	-5.845				4.01E-12	-11.397		
330	692.8	12.626	11.017	14.032	8.237	12.627	11.675	14.067	-5.952	15.95	38.78	-5.952	-5.952				3.09E-12	-11.510		
340	693.5	12.439	10.803	13.925	7.970	12.600	11.668	13.961	-6.058	15.77	39.33	-6.058	-6.058				2.39E-12	-11.621		
350	694.2	12.252	10.590	13.818	7.704	12.573	11.660	13.856	-6.162	15.59	39.83	-6.162	-6.162				1.86E-12	-11.731		
360	694.8	12.066	10.378	13.712	7.440	12.547	11.653	13.753	-6.265	15.39	40.32	-6.265	-6.265				1.45E-12	-11.839		
370	695.3	11.882	10.167	13.606	7.176	12.520	11.646	13.652	-6.365	15.18	40.78	-6.365	-6.365				1.03E-12	-11.946		
380	695.8	11.697	9.957	13.501	6.913	12.494	11.639	13.553	-6.464	14.94	41.23	-6.464	-6.464				8.07E-13	-12.052		
390	696.2	11.514	9.747	13.396	6.652	12.467	11.632	13.456	-6.561	14.68	41.68	-6.561	-6.561				6.97E-13	-12.157		
400	696.5	11.331	9.538	13.291	6.391	12.441	11.625	13.361	-6.656	14.40	42.14	-6.656	-6.656				5.49E-13	-12.261		

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 700 K									
HEIGHT KM	TEMP K	LOG(N(N ₂) /M ₃)	LOG(N(O ₂) /M ₃)	LOG(N(O) /M ₃)	LOG(N(A) /M ₃)	LOG(N(HE) /M ₃)	LOG(N(H) /M ₃)	LOG(PRESSURE NT/M ²)	LOG(DEN KG/M ³)
420	697.1	10.967	9.123	13.083	12.389	11.611	13.178	-6.839	1.3E-13
440	697.6	10.606	8.710	12.877	12.337	11.598	13.006	-7.010	4.2E-13
460	698.0	10.247	8.300	12.672	12.286	11.584	12.847	-7.169	1.39E-13
480	698.3	9.890	7.893	12.468	12.235	11.571	12.702	-7.314	4.5E-14
500	698.5	9.536	7.488	12.266	12.184	11.559	12.572	-7.443	9.6E-14
520	698.7	9.184	7.085	12.064	12.134	11.546	12.458	-7.557	8.4E-14
540	698.9	8.834	6.686	11.864	12.084	11.533	12.359	-7.656	5.2E-14
560	699.0	8.486	6.288	11.666	12.034	11.520	12.273	-7.742	6.8E-14
580	699.1	8.140	6.1468	11.468	11.984	11.508	12.199	-7.817	2.0E-14
600	699.2	7.796	6.1272	11.935	11.496	12.134	-7.881	4.9E-14	-13.831
620	699.3	7.454	6.115	11.077	11.886	11.483	12.077	-7.939	4.4E-14
640	699.4	7.115	6.083	11.833	11.471	12.025	-7.990	4.0E-14	-14.149
660	699.5	6.777	6.060	10.690	11.790	11.459	11.979	-8.036	3.7E-15
680	699.5	6.441	6.441	10.498	11.742	11.447	11.936	-8.079	1.2E-15
700	699.6	6.107	6.107	10.307	11.694	11.435	11.896	-8.120	5.8E-15
720	699.6	5.771	5.771	10.118	11.646	11.423	11.858	-8.157	3.2E-15
740	699.6	5.435	5.435	9.929	11.599	11.411	11.822	-8.193	7.3E-15
760	699.7	5.100	5.100	9.742	11.552	11.399	11.787	-8.228	3.0E-15
780	699.7	4.764	4.764	9.555	11.506	11.387	11.754	-8.261	1.6E-15
800	699.7	4.430	4.430	9.370	11.459	11.375	11.722	-8.293	2.7E-15
820	699.7	4.096	4.096	9.186	11.413	11.364	11.692	-8.323	2.6E-15
840	699.8	3.762	3.762	8.820	11.367	11.352	11.662	-8.353	2.5E-15
860	699.8	3.427	3.427	8.639	11.322	11.341	11.633	-8.382	2.4E-15
880	699.8	3.091	3.091	8.459	11.276	11.329	11.605	-8.410	2.4E-15
900	699.8	2.755	2.755	8.279	11.231	11.318	11.578	-8.437	2.3E-15
920	699.8	2.419	2.419	8.101	11.186	11.307	11.552	-8.463	2.3E-15
940	699.8	2.083	2.083	7.924	11.142	11.295	11.527	-8.488	2.2E-15
960	699.9	1.747	1.747	7.747	11.097	11.284	11.502	-8.513	2.1E-15
980	699.9	1.411	1.411	7.572	11.053	11.273	11.478	-8.537	2.1E-15
1000	699.9	1.075	1.075	7.372	11.010	11.262	11.455	-8.560	2.0E-15
1050	699.9	7.138	7.138	10.901	11.235	11.400	11.349	-8.615	1.9E-15
1100	699.9	6.710	6.710	10.794	11.208	11.349	11.366	-8.666	1.8E-15
1150	699.9	6.287	6.287	10.688	11.181	11.302	11.713	-8.714	1.7E-15
1200	699.9	5.864	5.864	10.584	11.155	11.258	11.757	-8.757	1.6E-15
1250	699.9	5.438	5.438	10.481	11.129	11.217	11.798	-8.798	1.5E-15
1300	699.9	5.002	5.002	10.379	11.103	11.178	11.837	-8.837	1.4E-15
1350	700.0	4.566	4.566	10.279	11.078	11.142	11.873	-8.873	1.4E-15
1400	700.0	4.130	4.130	10.180	11.053	11.108	11.907	-8.907	1.3E-15
1450	700.0	3.794	3.794	10.082	11.028	11.075	11.940	-8.940	1.3E-15
1500	700.0	3.458	3.458	9.986	11.004	11.044	11.971	-8.971	1.2E-15
1600	700.0	3.122	3.122	9.796	10.956	10.985	10.985	-9.029	1.2E-15
1700	700.0	2.787	2.787	9.612	10.910	10.931	10.984	-9.084	1.1E-15
1800	700.0	2.451	2.451	9.431	10.865	10.880	10.9135	-9.135	1.1E-15
1900	700.0	2.115	2.115	9.256	10.820	10.832	10.9183	-9.183	1.0E-15
2000	700.0	1.779	1.779	9.084	10.777	10.736	10.9227	-9.227	1.0E-15
2100	700.0	1.443	1.443	8.917	10.735	10.741	10.9273	-9.273	1.0E-15
2200	700.0	1.107	1.107	8.753	10.534	10.699	10.9316	-9.316	1.0E-15
2300	700.0	7.653	7.653	8.593	10.653	10.657	10.9358	-9.358	9.9E-16
2400	700.0	4.337	4.337	8.437	10.614	10.617	10.9380	-9.380	1.0E-15
2500	700.0	2.885	2.885	8.285	10.576	10.578	10.9371	-9.437	1.0E-15

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 800 K						LOG(N(N ₂) /M ₃) LOG(N(O ₂) /M ₃) LOG(N(O) /M ₃) LOG(N(A) /M ₃) LOG(N(He) /M ₃) LOG(N(H) /M ₃)						LOG(PRESSURE N ₁ /M ₂)						MEAN MOL WT		DENSITY HT KM		DENSITY KG/M ₃		LOG(DEN KG/M ₃)	
HEIGHT KM	TEMP K	LOG(N(N ₂) /M ₃)	LOG(N(O ₂) /M ₃)	LOG(N(O) /M ₃)	LOG(N(A) /M ₃)	LOG(N(He) /M ₃)	LOG(N(H) /M ₃)	LOG(PRESSURE N ₁ /M ₂)	MEAN MOL WT	DENSITY HT KM	DENSITY KG/M ₃	LOG(DEN KG/M ₃)	LOG(DEN KG/M ₃)	LOG(DEN KG/M ₃)	LOG(DEN KG/M ₃)	LOG(DEN KG/M ₃)	LOG(DEN KG/M ₃)								
90	188.0	19.746	19.170	17.390	17.824	14.573	19.854	-7.32	28.91	5.63	3.43E-06	-5.465													
92	188.1	19.592	19.009	17.547	17.669	14.418	19.700	-8.86	28.85	5.59	2.40E-06	-5.620													
94	188.4	19.437	18.843	17.646	17.515	14.264	19.545	-1.040	28.76	5.55	1.68E-06	-5.773													
96	189.2	19.282	18.673	17.686	17.349	14.108	19.390	-1.193	28.65	5.54	1.17E-06	-5.933													
98	190.6	19.127	18.499	17.688	17.204	13.953	19.235	-1.344	28.52	5.55	8.14E-07	-6.089													
100	192.9	18.972	18.324	17.666	17.050	13.799	19.082	-1.493	28.36	5.64	5.68E-07	-6.246													
102	196.6	18.821	18.150	17.602	16.838	13.773	18.930	-1.637	28.21	5.64	3.98E-07	-6.400													
104	202.1	18.670	17.974	17.546	16.627	13.746	18.779	-1.776	28.02	5.65	2.79E-07	-6.554													
106	210.0	18.518	17.793	17.491	16.418	13.716	18.629	-1.909	27.79	5.67	1.96E-07	-6.707													
108	220.7	18.367	17.609	17.432	16.212	13.685	18.480	-2.036	27.54	5.73	1.38E-07	-6.860													
110	234.5	18.219	17.421	17.367	16.012	13.651	18.335	-2.155	27.26	5.88	9.79E-08	-7.009													
115	279.0	17.872	16.980	17.182	15.549	13.565	17.998	-2.416	26.60	6.78	4.40E-08	-7.357													
120	328.7	17.573	16.627	16.994	15.153	13.489	17.713	-2.631	26.08	8.05	2.23E-08	-7.651													
125	380.0	17.314	16.336	16.821	14.811	13.422	17.470	-2.811	25.63	9.32	1.25E-08	-7.902													
130	431.5	17.089	16.086	16.669	14.513	13.363	17.260	-2.965	25.21	10.78	7.62E-09	-8.118													
135	479.9	16.892	15.867	16.537	14.252	13.213	17.079	-3.100	24.82	12.39	4.94E-09	-8.306													
140	522.9	16.717	15.673	16.421	14.019	13.270	16.921	-3.220	24.45	14.06	3.38E-09	-8.471													
145	559.9	16.561	15.499	16.319	13.009	13.234	16.782	-3.330	24.08	15.72	2.42E-09	-8.616													
150	591.1	16.418	15.339	16.228	13.615	13.202	16.654	-3.432	23.73	17.31	1.79E-09	-8.749													
155	617.2	16.286	15.191	16.144	13.435	13.174	16.543	-3.527	23.39	18.79	1.35E-09	-8.868													
160	639.1	16.162	15.052	16.067	13.265	13.149	16.437	-3.617	23.05	20.14	1.05E-09	-8.980													
170	673.3	15.932	14.792	15.926	12.946	13.106	16.830	-3.785	22.40	22.53	6.56E-10	-9.183													
180	698.3	15.719	14.550	15.797	12.648	13.067	16.769	-3.942	21.77	24.59	4.29E-10	-9.388													
190	717.1	15.516	14.320	15.676	12.364	13.033	16.722	-4.088	21.17	26.41	2.90E-10	-9.538													
200	731.7	15.320	14.098	15.561	12.089	13.001	16.674	-4.227	20.61	28.08	2.01E-10	-9.697													
210	743.1	15.131	13.883	15.400	11.822	12.971	16.642	-4.360	20.08	29.61	1.42E-10	-9.848													
220	752.3	14.946	13.673	15.342	11.561	12.942	16.616	-4.487	19.59	31.07	1.02E-10	-9.991													
230	759.6	14.765	13.466	15.237	11.304	12.914	15.959	-4.570	19.14	32.47	5.45E-11	-10.128													
240	765.7	14.587	13.263	15.133	11.051	12.887	15.577	-4.727	18.73	33.80	5.51E-11	-10.259													
250	770.6	14.411	13.062	15.032	10.801	12.860	15.151	-4.842	18.36	35.06	4.12E-11	-10.385													
260	774.7	14.237	12.864	14.931	10.554	12.834	15.047	-4.953	18.02	36.27	3.11E-11	-10.507													
270	778.1	14.065	12.667	14.932	10.310	12.809	15.035	-4.907	17.72	37.41	2.37E-11	-10.674													
280	781.0	13.894	12.473	14.734	10.067	12.784	15.024	-5.168	17.45	38.49	1.82E-11	-10.739													
290	783.4	13.724	12.279	14.637	9.826	12.759	15.014	-5.272	17.20	39.50	1.41E-11	-10.850													
300	785.4	13.556	12.087	14.50	9.586	12.734	15.005	-5.374	16.98	40.44	1.01E-11	-10.959													
310	787.1	13.389	11.897	14.444	9.349	12.710	14.996	-5.474	16.78	41.31	8.61E-12	-11.065													
320	788.6	13.223	11.707	14.349	9.112	12.686	14.988	-5.573	16.59	42.12	6.77E-12	-11.169													
330	789.9	13.058	11.518	14.254	8.877	12.662	14.980	-5.669	16.42	42.87	5.35E-12	-11.271													
340	791.0	12.893	11.331	14.160	8.642	12.638	14.973	-5.765	16.26	43.57	4.25E-12	-11.372													
350	791.9	12.730	11.144	14.067	8.409	12.614	14.966	-5.859	16.10	44.21	3.38E-12	-11.471													
360	792.8	12.567	10.958	13.973	8.177	12.591	14.009	-5.952	15.95	44.81	2.70E-12	-11.568													
370	793.5	12.405	10.772	13.881	7.946	12.567	13.917	-6.044	15.79	45.37	2.16E-12	-11.665													
380	794.1	12.243	10.588	13.788	7.716	12.544	13.446	-6.134	15.63	45.91	1.74E-12	-11.760													
390	794.7	12.082	10.404	13.696	7.486	12.521	13.439	-6.223	15.47	46.41	1.40E-12	-11.854													
400	795.2	11.922	10.221	13.604	7.258	12.498	13.433	-6.311	15.29	46.90	1.13E-12	-11.947													

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 800 K

HEIGHT KM	TEMP K	LOG(N(N ₂) /M ₃)			LOG(N(O ₂) /M ₃)			LOG(N(O) /M ₃)			LOG(N(A) /M ₃)			LOG(N(HE) /M ₃)			LOG(N(H) /M ₃)			(PRESSURE NT/M ²)			LOG (DEN KG/M ³)		
		N ₂	O ₂	O	N ₂	O ₂	O	N ₂	O ₂	O	N ₂	O ₂	O	N ₂	O ₂	O	N ₂	O ₂	O	MOL WT	MEAN DENSITY KM	MEAN DENSITY HT KM	DENSITY KG/M ³	LOG(DEN KG/M ³)	LOG(DEN KG/M ³)
420	796.0	11.603	9.857	13.422	12.552	11.421	13.476	11.483	14.90	14.84	12.416	13.130	14.43	11.409	12.409	14.90	14.83	14.90	14.84	7.41E-13	-12.130	-12.130	-12.310	-12.310	
440	796.6	11.287	9.496	13.241	12.407	11.409	13.310	11.648	14.43	14.80	14.905	12.807	13.87	11.397	12.151	12.807	14.81	14.805	14.81	4.90E-13	-12.486	-12.486	-12.486	-12.486	
460	797.1	10.972	9.337	13.062	12.362	11.397	13.151	11.648	14.81	14.80	14.905	12.636	13.20	11.385	12.000	12.636	14.81	14.805	14.81	3.26E-13	-12.659	-12.659	-12.659	-12.659	
480	797.6	10.660	8.780	12.883	12.317	11.317	12.858	11.700	14.94	14.94	14.94	12.273	12.374	12.056	11.200	12.273	14.94	14.94	14.94	14.94	5.22E-13	-12.827	-12.827	-12.827	-12.827
500	797.9	10.350	8.425	12.506	12.229	11.363	12.726	11.732	14.94	14.94	14.94	12.229	12.363	12.056	11.232	12.229	14.94	14.94	14.94	14.94	1.02E-13	-12.991	-12.991	-12.991	-12.991
520	798.2	10.041	8.073	12.530	12.185	11.352	12.605	11.735	14.94	14.94	14.94	12.185	12.352	12.056	11.353	12.185	14.94	14.94	14.94	14.94	7.09E-14	-13.149	-13.149	-13.149	-13.149
540	798.4	9.735	7.723	12.355	12.141	11.341	12.494	11.746	14.94	14.94	14.94	12.141	12.341	12.056	11.343	12.494	14.94	14.94	14.94	14.94	5.00E-14	-13.301	-13.301	-13.301	-13.301
560	798.6	9.430	7.375	12.181	12.098	11.330	12.395	11.750	14.94	14.94	14.94	12.098	12.330	12.056	11.319	12.395	14.94	14.94	14.94	14.94	3.58E-14	-13.446	-13.446	-13.446	-13.446
580	798.8	9.128	7.030	12.008	12.055	11.836	12.307	11.750	14.94	14.94	14.94	12.055	12.307	12.055	11.319	12.307	14.94	14.94	14.94	14.94	2.61E-14	-13.583	-13.583	-13.583	-13.583
600	798.9	8.827	6.686	11.836	12.055	11.836	12.307	11.750	14.94	14.94	14.94	12.055	12.307	12.055	11.319	12.307	14.94	14.94	14.94	14.94	1.02E-14	-13.583	-13.583	-13.583	-13.583
620	799.0	8.528	6.344	11.665	12.012	11.308	12.229	11.728	14.94	14.94	14.94	12.012	12.229	12.012	11.308	12.229	14.94	14.94	14.94	14.94	1.95E-14	-13.711	-13.711	-13.711	-13.711
640	799.1	8.210	6.005	11.495	11.970	11.297	12.059	11.798	14.94	14.94	14.94	11.970	12.059	11.970	11.297	12.059	14.94	14.94	14.94	14.94	1.48E-14	-13.828	-13.828	-13.828	-13.828
660	799.2	7.915	5.677	11.326	11.927	11.286	12.097	11.860	14.94	14.94	14.94	11.927	12.097	11.927	11.286	12.097	14.94	14.94	14.94	14.94	1.66E-14	-13.936	-13.936	-13.936	-13.936
680	799.3	7.641	5.358	11.188	11.885	11.276	12.042	11.916	14.94	14.94	14.94	11.885	12.042	11.885	11.276	12.042	14.94	14.94	14.94	14.94	9.25E-15	-14.034	-14.034	-14.034	-14.034
700	799.4	7.349	5.039	11.044	11.844	11.265	11.991	11.966	14.94	14.94	14.94	11.844	11.991	11.844	11.265	11.991	14.94	14.94	14.94	14.94	1.04E-15	-14.122	-14.122	-14.122	-14.122
720	799.4	7.058	4.826	10.826	11.802	11.255	11.945	11.902	14.94	14.94	14.94	10.826	11.255	10.826	11.802	11.255	14.94	14.94	14.94	14.94	6.29E-15	-14.201	-14.201	-14.201	-14.201
740	799.5	6.769	4.601	10.661	11.761	11.244	11.902	11.855	14.94	14.94	14.94	10.661	11.244	10.661	11.761	11.244	14.94	14.94	14.94	14.94	5.34E-15	-14.272	-14.272	-14.272	-14.272
760	799.5	6.482	4.375	10.497	11.720	11.234	11.862	11.805	14.94	14.94	14.94	10.497	11.234	10.497	11.720	11.234	14.94	14.94	14.94	14.94	4.61E-15	-14.337	-14.337	-14.337	-14.337
780	799.6	6.196	4.149	10.333	11.679	11.224	11.824	11.733	14.94	14.94	14.94	10.333	11.224	10.679	11.679	11.224	14.94	14.94	14.94	14.94	4.03E-15	-14.395	-14.395	-14.395	-14.395
800	799.6	5.906	3.923	10.171	11.638	11.213	11.788	11.700	14.94	14.94	14.94	10.171	11.213	10.906	11.638	11.213	14.94	14.94	14.94	14.94	3.56E-15	-14.449	-14.449	-14.449	-14.449
820	799.6	5.616	3.707	10.010	11.598	11.203	11.753	11.727	14.94	14.94	14.94	10.010	11.203	10.616	11.598	11.203	14.94	14.94	14.94	14.94	3.17E-15	-14.499	-14.499	-14.499	-14.499
840	799.7	5.329	3.490	9.850	11.558	11.193	11.720	11.687	14.94	14.94	14.94	9.850	11.193	10.518	11.558	11.193	14.94	14.94	14.94	14.94	2.85E-15	-14.545	-14.545	-14.545	-14.545
860	799.7	5.042	3.273	9.590	11.518	11.183	11.687	11.630	14.94	14.94	14.94	9.590	11.183	10.518	11.518	11.183	14.94	14.94	14.94	14.94	2.58E-15	-14.589	-14.589	-14.589	-14.589
880	799.7	4.755	3.056	9.331	11.478	11.173	11.656	11.630	14.94	14.94	14.94	9.331	11.173	10.478	11.478	11.173	14.94	14.94	14.94	14.94	2.34E-15	-14.631	-14.631	-14.631	-14.631
900	799.7	4.468	2.839	9.074	11.439	11.163	11.626	11.631	14.94	14.94	14.94	9.074	11.163	10.439	11.439	11.163	14.94	14.94	14.94	14.94	2.13E-15	-14.671	-14.671	-14.671	-14.671
920	799.8	4.181	2.622	9.217	11.400	11.153	11.596	11.596	14.94	14.94	14.94	9.217	11.153	10.400	11.400	11.153	14.94	14.94	14.94	14.94	1.95E-15	-14.710	-14.710	-14.710	-14.710
940	799.8	3.894	2.405	9.061	11.360	11.143	11.568	11.568	14.94	14.94	14.94	9.061	11.143	10.360	11.360	11.143	14.94	14.94	14.94	14.94	1.79E-15	-14.748	-14.748	-14.748	-14.748
960	799.8	3.607	2.188	8.906	11.322	11.134	11.540	11.540	14.94	14.94	14.94	8.906	11.134	10.322	11.322	11.134	14.94	14.94	14.94	14.94	1.64E-15	-14.784	-14.784	-14.784	-14.784
980	799.8	3.310	1.971	8.751	11.283	11.124	11.512	11.512	14.94	14.94	14.94	8.751	11.124	10.283	11.283	11.124	14.94	14.94	14.94	14.94	1.51E-15	-14.820	-14.820	-14.820	-14.820
1000	799.8	3.013	1.754	8.598	11.245	11.114	11.486	11.486	14.94	14.94	14.94	8.598	11.114	10.245	11.245	11.114	14.94	14.94	14.94	14.94	1.40E-15	-14.855	-14.855	-14.855	-14.855
1050	799.8	2.716	1.537	10.218	11.150	11.090	11.422	11.422	14.94	14.94	14.94	10.218	11.090	10.056	11.090	11.056	14.94	14.94	14.94	14.94	1.15E-15	-14.940	-14.940	-14.940	-14.940
1100	799.9	2.419	1.320	9.846	10.963	11.043	11.306	11.306	14.94	14.94	14.94	9.846	10.963	10.963	11.043	11.043	14.94	14.94	14.94	14.94	9.53E-16	-15.021	-15.021	-15.021	-15.021
1150	799.9	2.122	1.103	9.473	10.872	10.766	11.043	11.043	14.94	14.94	14.94	9.473	10.872	10.872	10.766	10.766	14.94	14.94	14.94	14.94	8.53E-16	-15.173	-15.173	-15.173	-15.173
1200	799.9	1.824	0.886	7.059	10.872	10.702	11.020	11.020	14.94	14.94	14.94	7.059	10.872	10.872	10.702	10.702	14.94	14.94	14.94	14.94	7.62E-16	-15.245	-15.245	-15.245	-15.245
1250	799.9	1.526	0.669	6.748	10.782	10.698	11.204	11.204	14.94	14.94	14.94	6.748	10.782	10.782	10.698	10.698	14.94	14.94	14.94	14.94	6.71E-16	-15.313	-15.313	-15.313	-15.313
1300	799.9	1.228	0.452	6.993	10.693	10.975	11.158	11.158	14.94	14.94	14.94	6.993	10.693	10.693											

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 900 K									
HEIGHT KM	TEMP K	LOG(N(12)/M3)	LOG(N(O2)/M3)	LOG(N(O)/M3)	LOG(N(A)/M3)	LOG(N(HE)/M3)	LOG(N(H)/M3)	LOG(N/M3)	(PRESSURE NT/m2)
90	188.0	19.746	19.170	17.390	17.824	14.573	19.854	-7.732	28.91
92	188.1	19.592	19.009	17.547	17.669	14.418	19.545	-7.886	5.63
94	188.5	19.437	18.843	17.646	17.515	14.263	19.040	-1.040	5.55
96	189.3	19.281	18.673	17.686	17.359	14.108	19.390	-1.193	2.40E-06
98	190.8	19.126	18.499	17.688	17.204	13.953	19.235	-1.344	1.68E-06
100	193.3	18.972	18.324	17.666	17.049	13.798	19.081	-1.493	8.13E-07
102	197.3	18.820	18.150	17.601	16.837	13.773	18.929	-1.636	5.67E-07
104	203.2	18.668	17.973	17.544	16.626	13.745	18.778	-1.774	3.98E-07
106	211.8	18.517	17.792	17.488	16.417	13.714	18.627	-1.907	2.79E-07
108	223.4	18.366	17.608	17.429	16.212	13.682	18.479	-2.032	1.96E-07
110	238.3	18.217	17.420	17.363	16.012	13.647	18.333	-2.150	5.66
115	286.6	17.872	16.981	17.177	15.553	13.560	17.997	-2.406	9.75E-08
120	340.3	17.576	16.632	15.919	15.163	13.482	17.714	-2.614	4.39E-08
125	395.9	17.322	16.347	16.818	14.829	13.414	17.475	-2.787	2.25E-08
130	451.8	17.011	16.103	16.668	14.540	13.355	17.269	-2.936	1.27E-08
135	504.9	16.909	15.890	15.538	14.286	13.305	17.092	-3.065	9.51E-09
140	553.2	16.740	15.702	16.424	14.061	13.262	16.938	-3.179	5.12E-09
145	595.8	16.588	15.533	16.323	13.859	13.225	16.801	-3.284	3.53E-09
150	632.7	16.450	15.380	16.234	13.673	13.193	16.679	-3.379	2.45E-09
155	664.2	16.324	15.238	16.152	13.502	13.164	16.569	-3.469	1.615
160	691.1	16.206	15.106	16.077	13.341	13.139	16.467	-3.553	2.24E-09
170	734.0	15.989	14.861	15.942	13.042	13.096	16.176	-3.710	1.13E-09
180	766.1	15.89	14.636	15.820	12.766	13.058	16.123	-3.855	7.69E-10
190	790.5	15.601	14.424	15.707	12.504	13.025	15.972	-3.990	4.85E-10
200	809.5	15.422	14.221	15.600	12.253	12.995	15.522	-4.119	3.35E-10
210	824.6	15.249	14.024	15.498	12.010	12.966	15.488	-4.241	2.38E-10
220	836.6	15.081	13.833	15.400	11.773	12.939	15.460	-4.358	1.72E-10
230	846.4	14.917	13.647	15.304	11.541	12.913	15.437	-4.471	1.27E-10
240	854.4	14.756	13.463	15.210	11.313	12.888	15.417	-4.580	7.93E-11
250	860.9	14.598	13.283	15.118	11.089	12.864	11.400	-4.695	4.44E-11
260	866.4	14.442	13.105	15.028	10.867	12.840	11.385	-5.240	3.13E-11
270	870.9	14.287	12.929	14.939	10.648	12.817	11.372	-5.332	2.26E-11
280	874.7	14.134	12.754	14.850	10.430	12.794	11.360	-5.485	1.41E-11
290	877.9	13.983	12.581	14.763	10.215	12.772	11.350	-5.680	2.55E-11
300	880.6	13.832	12.410	14.677	10.001	12.750	11.340	-5.880	1.01E-11
310	882.9	13.683	12.239	14.591	9.789	12.728	11.331	-6.080	1.60E-11
320	884.9	13.535	12.070	14.506	9.578	12.706	11.323	-6.280	1.27E-11
330	886.6	13.387	11.902	14.421	9.368	12.685	11.315	-6.480	1.02E-11
340	888.0	13.241	11.734	14.337	9.159	12.664	11.308	-6.680	5.02E-11
350	889.3	13.095	11.568	14.254	8.951	12.642	11.301	-6.878	3.22E-12
360	890.4	12.949	11.402	14.170	8.744	12.621	11.295	-7.02	8.22E-12
370	891.3	12.805	11.237	14.088	8.538	12.601	11.288	-7.22	1.11E-12
380	892.2	12.661	11.073	14.005	8.333	12.580	11.282	-7.42	1.44E-12
390	892.9	12.518	10.909	13.923	8.129	12.559	11.276	-7.62	1.76E-12
400	893.6	12.375	10.746	13.842	7.926	12.539	11.270	-7.82	1.11E-12

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 900 K										LOG(MEAN MCL WT SCALE HT KM DENSITY KG/M3)				LOG(PRESSURE NT/M2) LOG(N(H) /M3) LOG(N(A) /M3) LOG(N(O2) /M3) LOG(N(N2) /M3) TEMP KM			
HEIGHT KM	TEMP K	LOG(N(N2) /M3)	LOG(N(O2) /M3)	LOG(N(0) /M3)	LOG(N(A) /M3)	LOG(N(H) /M3)	LOG(N(E) /M3)	LOG(N(M) /M3)	LOG(N(I) /M3)	LOG(PRESSURE NT/M2)	MEAN MCL WT	DENSITY HT KM	DENSITY KG/M3	LOG(DEN KG/M3)			
420	894.7	12.091	10.422	13.679	7.521	12.498	11.259	13.719	-6.189	15.52	52.61	1.35E-12	-11.870				
440	895.5	11.810	10.100	13.518	7.120	12.457	11.248	13.565	-6.343	15.21	53.63	9.26E-13	-12.033				
460	896.2	11.530	9.781	13.358	6.721	12.417	11.237	13.414	-6.493	14.85	54.61	6.40E-13	-12.194				
480	896.8	11.252	9.463	13.200	6.325	12.377	11.227	13.269	-6.638	14.55	55.60	4.45E-13	-12.351				
500	897.2	10.976	9.148	13.042	6.042	12.338	11.216	13.129	-6.778	13.96	56.65	3.12E-13	-12.506				
520	897.6	10.702	8.835	12.885	5.770	12.299	11.206	12.995	-6.912	13.40	57.81	2.20E-13	-12.658				
540	897.9	10.429	8.567	12.730	5.524	12.260	11.196	12.867	-7.039	12.76	59.12	1.56E-13	-12.807				
560	898.2	10.158	8.214	12.575	5.271	12.221	11.186	12.747	-7.159	12.05	60.65	1.12E-13	-12.952				
580	898.4	9.889	7.907	12.421	5.021	12.182	11.177	12.635	-7.271	11.27	62.49	8.08E-14	-13.053				
600	898.6	9.622	7.601	12.268	4.771	12.144	11.167	12.531	-7.375	10.45	64.71	5.90E-14	-13.229				
620	898.7	9.356	7.297	12.116	4.521	12.106	11.157	12.436	-7.470	9.61	67.41	4.35E-14	-13.361				
640	898.9	9.091	6.995	11.965	4.271	12.068	11.148	12.349	-7.557	8.78	70.72	3.26E-14	-13.487				
660	899.0	8.828	6.695	11.815	4.021	12.031	11.138	12.271	-7.636	7.99	74.75	2.47E-14	-13.606				
680	899.1	8.567	6.397	11.666	3.771	11.993	11.129	12.199	-7.707	7.26	79.66	1.79E-14	-13.719				
700	899.2	8.307	6.100	11.517	3.521	11.956	11.119	12.135	-7.771	6.61	85.57	1.50E-14	-13.824				
720	899.3	8.049	5.857	11.370	3.271	11.919	11.110	12.077	-7.829	6.04	92.60	1.20E-14	-13.922				
740	899.3	7.792	5.607	11.223	3.021	11.883	11.101	12.024	-7.882	5.55	100.82	9.73E-15	-14.012				
760	899.4	7.537	5.357	11.077	2.771	11.846	11.091	11.975	-7.931	5.13	110.28	8.04E-15	-14.094				
780	899.4	7.283	5.107	10.932	2.521	11.810	11.082	11.930	-7.976	4.78	120.91	6.76E-15	-14.170				
800	899.5	7.031	4.888	10.788	2.271	11.774	11.073	11.888	-8.017	4.50	132.60	5.78E-15	-14.238				
820	899.5	6.780	4.645	10.645	2.021	11.738	11.064	11.849	-8.057	4.26	145.06	5.00E-15	-14.301				
840	899.6	6.530	4.395	10.502	1.771	11.702	11.055	11.812	-8.094	4.07	158.02	4.38E-15	-14.358				
860	899.6	6.282	4.145	10.360	1.521	11.667	11.046	11.777	-8.129	3.91	171.13	3.88E-15	-14.411				
880	899.6	6.035	3.895	10.219	1.271	11.631	11.037	11.743	-8.163	3.77	184.07	3.47E-15	-14.460				
900	899.7	5.807	3.645	10.079	1.021	11.596	11.028	11.711	-8.195	3.66	196.52	3.12E-15	-14.506				
920	899.7	5.520	3.405	9.940	7.749	11.561	11.020	11.679	-8.227	3.57	208.26	2.83E-15	-14.549				
940	899.7	5.233	3.155	9.801	7.499	11.527	11.011	11.648	-8.257	3.48	219.11	2.57E-15	-14.589				
960	899.7	4.946	2.905	9.663	7.249	11.492	11.002	11.619	-8.287	3.41	229.02	2.39E-15	-14.628				
980	899.7	4.659	2.655	9.526	6.998	11.458	10.993	11.590	-8.316	3.35	237.98	2.16E-15	-14.665				
1000	899.8	4.390	2.405	9.390	6.744	11.424	10.985	11.562	-8.344	3.29	246.04	1.99E-15	-14.701				
1050	899.8	4.052	2.155	9.052	6.494	11.339	10.964	11.493	-8.412	3.16	262.79	1.64E-15	-14.786				
1100	899.8	3.719	1.905	8.719	6.256	11.256	10.943	11.429	-8.477	3.05	276.06	1.36E-15	-14.867				
1150	899.8	3.390	1.655	8.390	6.014	11.174	10.922	11.367	-8.539	2.94	287.26	1.14E-15	-14.944				
1200	899.9	3.066	1.405	8.066	5.771	11.092	10.901	11.309	-8.597	2.84	297.39	9.59E-16	-15.018				
1250	899.9	2.775	1.155	7.745	5.521	11.012	10.881	11.253	-8.653	2.73	307.25	8.13E-16	-15.090				
1300	899.9	2.492	1.005	7.429	5.271	10.933	10.861	11.200	-8.706	2.63	317.24	6.92E-16	-15.160				
1350	899.9	2.210	855	7.118	4.981	10.855	10.842	11.150	-8.756	2.53	327.64	5.93E-16	-15.227				
1400	899.9	1.930	6810	6.810	4.729	10.778	10.822	11.102	-8.804	2.43	338.64	5.10E-16	-15.292				
1450	899.9	1.650	6506	6.506	4.571	10.702	10.803	11.057	-8.849	2.33	350.47	4.41E-16	-15.355				
1500	899.9	1.369	6206	6.206	4.321	10.627	10.784	11.014	-8.892	2.24	363.21	3.84E-16	-15.416				
1600	899.9	1.089	5908	5.908	4.071	10.747	10.935	10.935	-8.971	2.06	391.70	2.94E-16	-15.531				
1700	900.0	8336	5608	5.336	3.821	10.711	10.864	10.864	-9.042	1.90	425.00	2.30E-16	-15.638				
1800	900.0	6196	5356	5.016	3.571	10.676	10.800	10.800	-9.106	1.75	463.45	1.84E-16	-15.736				
1900	900.0	4060	4816	4.060	3.321	10.641	10.742	10.742	-9.163	1.63	507.74	1.49E-16	-15.825				
2000	900.0	926	6008	3.926	3.071	10.608	10.690	10.690	-9.216	1.52	557.95	1.24E-16	-15.907				
2100	900.0	796	5755	3.796	2.921	10.575	10.642	10.642	-9.264	1.44	613.94	1.04E-16	-15.981				
2200	900.0	669	5453	3.669	2.771	10.543	10.597	10.597	-9.309	1.36	675.68	8.94E-17	-16.049				
2300	900.0	544	5151	3.544	2.621	10.511	10.556	10.556	-9.350	1.30	742.44	7.76E-17	-16.110				
2400	900.0	423	481	3.423	2.471	10.481	10.517	10.517	-9.388	1.25	813.20	6.82E-17	-16.166				
2500	900.0	304	451	3.304	2.221	10.451	10.481	10.481	-9.425	1.21	887.43	6.07E-17	-16.217				

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 1000 K

HEIGHT KM	TEMP K	LOG(N(N ₂) /M ₃)			LOG(N(O ₂) /M ₃)			LOG(N(O) /M ₃)			LOG(N(A) /M ₃)			LOG(N(H) /M ₃)			LOG(N(H) /M ₃)			LOG(G NT/M ₂)			(PRESSURE NT/M ₂)			MEAN MOL WT			DENSITY SCALE HT KM			DENSITY KG/M ₃		
		LOG(N(N ₂) /M ₃)	LOG(N(O ₂) /M ₃)	LOG(N(O) /M ₃)	LOG(N(A) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)			
90	188.0	19.746	19.170	17.390	17.824	14.573	19.454	-0.732	28.91	5.63	3.43E-06	-5.465																						
92	188.1	19.592	19.009	17.547	17.669	14.418	19.700	-0.886	28.85	5.59	2.40E-06	-5.620																						
94	188.5	19.437	18.843	17.646	17.514	14.263	19.545	-1.040	28.76	5.55	1.67E-06	-5.776																						
96	189.4	18.281	18.673	17.686	17.108	14.108	19.390	-1.93	28.85	5.53	1.17E-06	-5.933																						
98	191.0	19.126	18.499	17.687	17.204	13.953	19.235	-1.344	28.52	5.54	8.13E-07	-6.090																						
100	193.7	18.971	18.323	17.665	17.049	13.798	19.081	-1.492	28.36	5.62	5.67E-07	-6.247																						
102	197.9	18.820	18.149	17.600	16.837	13.772	18.928	-1.635	28.21	5.62	3.97E-07	-6.401																						
104	204.3	18.666	17.972	17.543	16.626	13.744	18.777	-1.773	28.02	5.63	2.78E-07	-6.556																						
106	213.4	18.515	17.792	17.486	16.417	13.713	18.626	-1.05	27.80	5.65	1.95E-07	-6.710																						
108	225.8	18.364	17.607	17.426	16.212	13.679	18.477	-2.029	27.55	5.72	1.37E-07	-6.862																						
110	241.7	18.216	17.419	17.360	16.013	13.644	18.332	-2.145	27.28	5.88	9.72E-08	-7.012																						
115	293.2	17.871	16.982	17.172	15.557	13.555	17.996	-2.997	26.64	6.86	4.39E-08	-7.358																						
120	350.5	17.578	16.637	16.985	15.172	13.476	17.716	-2.599	26.15	8.26	2.26E-08	-7.646																						
125	409.8	17.328	16.356	16.816	14.844	13.408	17.480	-2.668	25.73	9.65	1.29E-08	-7.890																						
130	469.6	17.112	16.117	16.667	14.561	13.349	17.277	-2.911	25.36	11.22	7.97E-09	-8.098																						
135	526.9	16.924	15.909	16.538	14.314	13.298	17.103	-3.05	25.01	12.91	5.26E-09	-8.279																						
140	580.0	16.758	15.725	16.425	14.095	13.254	16.951	-3.146	24.68	14.69	3.66E-09	-8.436																						
145	627.7	16.610	15.561	16.326	13.899	13.217	16.817	-3.445	24.26	16.50	2.66E-09	-8.576																						
150	669.8	16.476	15.412	16.238	13.184	11.756	16.698	-3.336	24.06	18.29	1.99E-09	-8.701																						
155	706.6	16.353	15.276	16.158	13.555	13.156	11.697	-3.596	23.76	20.02	1.53E-09	-8.814																						
160	738.5	16.240	15.148	16.085	13.401	13.130	11.646	16.491	-3.501	23.48	21.67	1.21E-09	-8.918																					
170	790.4	16.032	14.916	15.953	13.118	13.087	11.563	16.314	-3.648	22.93	24.69	7.84E-10	-9.106																					
180	829.9	15.843	14.703	15.836	12.857	13.050	11.498	16.157	-3.784	22.40	27.34	5.34E-10	-9.273																					
190	860.4	15.667	14.504	15.729	12.613	13.017	11.446	16.015	-3.911	21.89	29.69	3.76E-10	-9.425																					
200	884.4	15.501	14.315	15.629	12.381	12.987	11.392	15.883	-4.030	21.40	31.81	2.72E-10	-9.566																					
210	903.5	15.341	14.134	15.534	12.157	12.960	11.357	15.760	-4.144	20.94	33.71	2.00E-10	-9.699																					
220	918.8	15.186	13.959	15.442	11.939	12.935	11.327	15.644	-4.253	20.50	35.49	1.50E-10	-9.824																					
230	931.3	15.036	13.787	15.354	11.727	12.910	11.302	15.533	-4.358	20.38	37.16	1.14E-10	-9.944																					
240	941.5	14.888	13.620	15.198	11.519	12.887	11.281	15.427	-4.459	19.69	38.74	8.74E-11	-10.048																					
250	949.9	14.744	13.455	15.183	11.315	12.864	11.262	15.325	-4.557	19.32	40.24	6.79E-11	-10.168																					
260	956.8	14.601	13.293	15.019	10.914	12.821	11.233	15.132	-4.652	18.98	41.68	5.32E-11	-10.274																					
270	962.6	14.461	13.133	15.019	10.919	10.717	12.800	11.220	15.040	-4.744	18.66	43.06	4.20E-11	-10.377																				
280	967.5	14.322	12.975	15.014	10.860	10.522	12.780	11.209	14.949	-4.923	18.10	45.63	2.68E-11	-10.573																				
290	971.6	14.185	12.818	14.860	10.781	10.328	12.760	11.199	14.862	-5.009	17.85	46.83	2.16E-11	-10.667																				
300	975.1	14.049	12.663	14.781	10.704	10.136	12.740	11.190	14.776	-5.094	17.62	47.98	1.75E-11	-10.758																				
310	978.0	13.914	12.509	14.704	10.627	10.059	12.720	11.182	14.691	-5.177	17.41	49.07	1.42E-11	-10.848																				
320	980.6	13.779	12.356	14.627	9.945	12.701	11.174	14.609	-5.259	17.22	50.0	1.16E-11	-10.935																					
330	982.7	13.646	12.204	14.550	9.756	12.681	11.166	14.527	-5.339	17.04	51.08	9.53E-12	-11.021																					
340	984.6	13.514	12.053	14.474	9.567	12.681	11.166	14.447	-5.419	16.87	52.00	7.85E-12	-11.105																					
350	986.2	13.382	11.902	14.399	9.380	12.662	11.160	14.447	-5.497	16.72	52.88	6.48E-12	-11.188				</																	

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 1000 K

HEIGHT KM	TEMP K	LOG(N(N2))			LOG(N(O2))			LOG(N(O))			LOG(N(A))			LOG(N(HE))			LOG(N(H))			LOG(N/M3)			(PRESSURE NT/M2)			MEAN MCL WT			DENSITY KM			LOG(DEN KG/M3)		
		/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3	/M3				
420	993.1	12.477	10.869	13.880	8.091	12.531	11.118	13.917	-5.946	15.93	57.20	2.18E-12	-11.661																					
440	994.2	12.223	10.579	13.735	7.729	12.495	11.108	13.773	-6.089	15.68	58.37	1.54E-12	-11.811																					
460	995.1	11.971	10.591	13.459	7.369	12.459	11.098	13.633	-6.229	15.42	59.46	1.10E-12	-11.959																					
480	995.8	11.721	10.005	13.446	7.013	12.423	11.089	13.496	-6.365	15.13	60.50	7.88E-13	-12.103																					
500	996.4	11.672	9.722	13.306	6.658	12.387	11.079	13.363	-6.498	14.81	61.52	5.68E-13	-12.246																					
520	996.9	11.225	9.439	13.165	6.306	12.352	11.070	13.234	-6.627	14.44	62.56	4.11E-13	-12.386																					
540	997.3	10.980	9.159	13.025	12.317	11.061	13.110	-6.752	14.02	63.65	3.00E-13	-12.523																						
560	997.6	10.736	8.881	12.885	12.282	11.052	12.989	-6.872	13.54	64.82	2.19E-13	-12.659																						
580	997.9	10.594	8.604	12.747	12.247	11.043	12.874	-6.986	13.00	66.13	1.62E-13	-12.791																						
600	998.2	10.253	8.329	12.609	12.213	11.034	12.765	-7.096	12.40	67.63	1.20E-13	-12.921																						
620	998.4	10.013	8.055	12.472	12.178	11.025	12.662	-7.199	11.74	69.35	8.95E-14	-13.048																						
640	998.5	9.775	7.783	12.336	12.144	11.017	12.565	-7.295	11.04	71.38	6.74E-14	-13.172																						
660	998.7	9.539	7.513	12.201	12.110	11.008	12.475	-7.386	10.32	73.77	5.32E-14	-13.291																						
680	998.8	9.303	7.244	12.077	12.077	11.000	12.391	-7.469	9.59	76.63	3.92E-14	-13.407																						
700	998.9	9.070	6.977	11.933	12.043	10.991	12.314	-7.546	8.86	80.02	3.03E-14	-13.518																						
720	999.0	8.837	6.712	11.800	12.010	10.983	12.244	-7.617	8.17	84.07	2.38E-14	-13.624																						
740	999.1	8.606	6.448	11.668	11.977	10.974	12.179	-7.682	7.53	88.87	1.89E-14	-13.724																						
760	999.2	8.376	6.185	11.537	11.944	10.966	12.119	-7.741	6.94	94.52	1.52E-14	-13.819																						
780	999.3	8.148	6.148	11.407	11.911	10.958	12.065	-7.795	6.41	101.12	1.24E-14	-13.908																						
800	999.3	7.920	6.127	11.277	11.879	10.95n	12.015	-7.845	5.94	108.75	1.02E-14	-13.991																						
820	999.4	7.694	6.148	11.148	11.847	10.941	11.969	-7.891	5.53	117.43	8.55E-15	-14.068																						
840	999.4	7.470	6.019	11.815	10.933	11.926	-7.934	5.19	127.16	7.26E-15	-14.139																							
860	999.5	7.246	5.892	11.783	10.925	11.886	-7.975	4.89	137.89	6.24E-15	-14.205																							
880	999.5	7.024	6.765	11.751	10.917	11.848	-8.012	4.64	149.50	5.43E-15	-14.265																							
900	999.6	6.803	6.639	11.719	10.909	11.812	-8.048	4.43	161.80	4.77E-15	-14.321																							
920	999.6	6.583	6.513	11.688	10.901	11.778	-8.082	4.26	174.56	4.24E-15	-14.373																							
940	999.6	6.365	6.388	11.657	10.894	11.745	-8.115	4.11	187.53	3.80E-15	-14.421																							
960	999.6	6.148	6.264	11.626	10.886	11.714	-8.146	3.98	200.42	3.42E-15	-14.466																							
980	999.7	5.997	6.048	11.595	10.878	11.684	-8.176	3.88	213.01	3.01E-15	-14.508																							
1000	999.7	5.877	6.018	11.564	10.870	11.654	-8.206	3.79	225.07	2.84E-15	-14.547																							
1050	999.7	9.714	9.414	11.413	10.832	11.518	-8.276	3.61	252.00	2.30E-15	-14.638																							
1100	999.8	9.118	9.339	10.813	11.454	-8.406	-8.466	3.48	273.85	1.90E-15	-14.721																							
1150	999.8	8.826	8.538	11.266	10.795	11.394	-8.525	3.37	291.09	1.59E-15	-14.797																							
1200	999.8	8.524	8.254	11.194	10.777	11.335	-8.581	3.19	304.82	1.35E-15	-14.870																							
1250	999.9	8.224	7.973	11.123	10.759	11.279	-8.635	3.11	316.29	1.15E-15	-14.940																							
1300	999.9	7.924	7.696	10.983	10.724	11.174	-8.686	3.03	326.39	9.82E-16	-15.008																							
1350	999.9	7.623	7.423	10.915	10.706	11.124	-8.736	2.94	335.74	8.45E-16	-15.073																							
1400	999.9	7.323	7.153	10.847	10.689	11.077	-8.783	2.86	344.79	6.32E-16	-15.137																							
1450	999.9	7.023	6.873	9.873	10.416	10.504	-9.356	1.64	353.92	6.32E-16	-15.199																							
1500	999.9	6.723	6.106	10.585	10.623	10.906	-9.028	2.28	363.29	5.50E-16	-15.260																							
1600	999.9	6.423	6.106	10.459	10.592	10.632	-9.096	2.13	373.84	4.05E-15	-15.376																							
1700	999.9	6.123	5.336	10.561	10.764	10.702	-9.158	2.11	383.85	3.26E-16	-15.487																							
1800	1000.0	5.823	5.036	10.216	10.530	10.501	-9.214	1.88	393.85	2.05E-16	-15.590																							
1900	1000.0	5.523	4.836	10.099	10.407	10.472	-9.266	1.74	403.85	1.66E-16	-15.688																							
2000	1000.0	5.223	4.636	10.099	10.399	10.433	-9.333	1.61	413.85	1.33E-16	-15.780																							
2100	1000.0	4.923	4.436	10.099	10.399	10.433	-9.400	1.48	423.85	1.00E-16	-15.865																							
2200	1000.0	4.623	4.236	10.099	10.399	10.433	-9.467	1.35	433.85	7.68E-17	-15.944																							
2300	1000.0	4.323	4.036	10.099	10.399	10.433	-9.534	1.22	443.85	5.32E-17	-16.017																							
2400	1000.0	4.023	3.836	10.099	10.399	10.433	-9.600	1.10	453.85	3.22E-17	-																							

EXOSPHERIC TEMPERATURE = 1100 K

HEIGHT KM	TEMP K	LOG(N(N2) /M3)			LOG(N(O) /M3)			LOG(N(HF) /M3)			LOG(N(H) /M3)			(PRESSURE NT/M2)			LOG DEN KG/M3)		
		LOG(N(A) /M3)	LOG(N(HF) /M3)	LOG(N(H) /M3)	LOG MOL WT	MEAN SCALE HT KM	DENSITY KG/M3	DENSITY KG/M3	DENSITY KG/M3										
90	188.0	19.746	19.170	17.390	17.824	14.573	19.054	-7.732	28.91	5.63	3.43E-06	-5.465	-5.620	2.0E-06	-5.620	5.58	5.58	5.58	
92	188.1	19.592	19.009	17.547	17.669	14.418	19.700	-7.886	28.85	5.55	1.67E-06	-5.776	-5.933	1.7E-06	-5.776	5.55	5.55	5.55	
94	188.5	19.437	18.843	17.646	17.514	14.263	19.545	-1.040	28.76	5.53	1.7E-06	-6.027	-6.247	1.7E-06	-6.027	5.53	5.53	5.53	
96	189.5	19.281	18.672	17.686	17.359	14.108	19.390	-1.193	28.65	5.52	8.12E-07	-6.556	-6.884	1.7E-07	-6.556	5.52	5.52	5.52	
98	191.2	19.126	18.499	17.687	17.204	13.953	19.335	-1.344	28.52	5.51	5.66E-07	-7.014	-7.358	1.7E-07	-7.014	5.51	5.51	5.51	
100	194.0	18.971	18.323	17.665	17.049	13.798	19.080	-1.492	28.36	5.62	5.66E-07	-7.402	-7.885	1.7E-07	-7.402	5.62	5.62	5.62	
102	198.5	18.819	18.149	17.599	16.836	13.771	18.928	-1.634	28.21	5.61	3.97E-07	-8.091	-8.561	1.7E-07	-8.091	5.61	5.61	5.61	
104	205.2	18.667	17.971	17.542	16.625	13.743	18.776	-1.772	28.02	5.62	1.95E-07	-8.684	-9.120	1.7E-07	-8.684	5.62	5.62	5.62	
106	214.8	18.514	17.791	17.485	16.417	13.711	18.625	-1.903	27.80	5.65	1.95E-07	-9.711	-10.090	1.7E-07	-9.711	5.65	5.65	5.65	
108	227.9	18.363	17.606	17.424	16.212	13.677	18.476	-2.026	27.55	5.71	1.37E-07	-10.090	-10.476	1.7E-07	-10.090	5.71	5.71	5.71	
110	244.7	18.215	17.419	17.357	16.013	13.641	18.310	-2.141	27.28	5.88	9.66E-08	-10.476	-10.864	1.7E-08	-10.476	5.88	5.88	5.88	
115	299.1	17.871	16.983	17.169	15.560	13.551	17.996	-2.389	26.65	6.89	4.38E-08	-11.240	-11.645	2.2E-08	-11.240	6.89	6.89	6.89	
120	359.6	17.580	16.640	16.982	15.179	13.471	17.717	-2.587	26.17	8.34	2.2E-08	-12.033	-12.438	1.3E-08	-12.033	8.34	8.34	8.34	
125	422.2	17.333	16.364	16.813	14.857	13.402	17.483	-2.751	25.77	9.78	1.30E-08	-12.825	-13.230	1.1E-08	-12.825	9.78	9.78	9.78	
130	485.4	17.120	16.129	16.666	14.580	13.343	17.284	-2.890	25.42	11.39	6.11E-09	-13.616	-14.021	1.0E-09	-13.616	11.39	11.39	11.39	
135	546.5	16.935	15.925	16.538	14.338	13.292	17.112	-3.011	25.08	13.12	5.39E-09	-14.409	-14.814	9.9E-09	-14.409	13.12	13.12	13.12	
140	603.8	16.773	15.745	16.427	14.124	13.248	16.962	-3.117	24.77	14.93	3.77E-09	-15.204	-15.610	9.8E-09	-15.204	3.77E-09	3.77E-09	3.77E-09	
145	656.1	16.628	15.584	16.328	14.932	13.210	16.830	-3.213	24.47	16.78	2.55E-09	-16.005	-16.413	9.7E-09	-16.005	2.55E-09	2.55E-09	2.55E-09	
150	703.2	16.497	15.439	16.241	13.759	13.177	16.713	-3.300	24.18	18.64	2.07E-09	-16.804	-17.212	9.6E-09	-16.804	2.07E-09	2.07E-09	2.07E-09	
155	745.0	16.377	15.306	16.162	13.599	13.148	16.607	-3.381	23.90	20.46	1.60E-09	-17.595	-18.004	9.5E-09	-17.595	1.60E-09	1.60E-09	1.60E-09	
160	781.8	16.267	15.183	16.090	13.450	13.122	11.540	-3.457	23.64	22.22	1.27E-09	-18.389	-18.804	8.9E-09	-18.389	22.22	22.22	22.22	
170	842.8	16.066	14.959	15.756	13.078	11.455	16.510	-3.597	23.12	25.50	8.34E-10	-19.079	-19.490	5.6E-10	-19.079	23.12	23.12	23.12	
180	890.0	15.886	14.756	15.848	12.931	13.041	11.389	-3.725	22.63	28.43	5.6E-10	-19.240	-19.645	4.11E-10	-19.240	22.63	22.63	22.63	
190	927.1	15.719	14.568	15.745	12.701	13.009	11.335	-3.844	22.16	31.05	4.11E-10	-19.386	-19.791	3.02E-10	-19.386	22.16	22.16	22.16	
200	956.4	15.562	14.391	15.650	12.483	12.980	11.280	-3.956	21.70	31.43	3.02E-10	-19.520	-19.925	2.26E-10	-19.520	21.70	21.70	21.70	
210	979.9	15.411	14.222	15.560	12.274	12.954	11.243	-4.063	21.27	35.54	2.26E-10	-19.646	-20.051	1.72E-10	-19.646	21.27	21.27	21.27	
220	998.9	15.269	14.058	15.474	12.073	12.929	11.222	-4.165	20.85	37.51	1.72E-10	-19.765	-20.174	1.32E-10	-19.765	20.85	20.85	20.85	
230	1014.3	15.129	13.900	15.391	11.876	12.906	11.185	-4.263	20.45	39.34	1.32E-10	-19.878	-20.283	1.03E-10	-19.878	20.45	20.45	20.45	
240	1027.0	14.993	13.745	15.311	11.685	12.884	11.183	-4.358	20.08	41.07	1.03E-10	-19.986	-20.494	8.13E-11	-19.986	20.08	20.08	20.08	
250	1037.4	14.860	13.593	15.233	11.496	12.863	11.144	-4.449	19.72	42.69	8.13E-11	-20.090	-20.500	8.13E-11	-20.090	19.72	19.72	19.72	
260	1046.1	14.729	13.444	15.157	11.311	12.842	11.127	-4.538	19.39	44.24	6.46E-11	-20.190	-20.600	6.46E-11	-20.190	19.39	19.39	19.39	
270	1053.4	14.600	13.298	15.082	11.129	12.822	11.112	-4.624	19.07	45.71	5.17E-11	-20.286	-20.700	4.17E-11	-20.286	19.07	19.07	19.07	
280	1059.4	14.473	13.152	15.008	10.948	12.803	11.099	-4.709	18.78	47.13	4.17E-11	-20.380	-20.797	3.8E-11	-20.380	18.78	18.78	18.78	
290	1064.5	14.347	13.009	14.936	10.770	12.784	11.087	-4.791	18.51	48.49	3.8E-11	-20.471	-20.889	3.7E-11	-20.471	18.51	18.51	18.51	
300	1068.9	14.222	12.867	14.864	10.593	12.705	11.077	-4.872	18.25	49.79	2.76E-11	-20.559	-21.004	2.66E-11	-20.559	18.25	18.25	18.25	
310	1072.6	14.099	12.726	14.792	10.417	12.747	11.067	-4.951	18.01	51.04	2.66E-11	-20.645	-21.200	2.66E-11	-20.645	18.01	18.01	18.01	
320	1075.7	13.976	12.586	14.722	10.243	12.729	11.058	-5.028	17.79	52.23	1.86E-11	-20.729	-21.400	1.86E-11	-20.729	17.79	17.79	17.79	
330	1078.4	13.854	12.447	14.652	10.070	12.711	11.050	-5.104	17.59	53.38	1.54E-11	-20.812	-21.591	1.54E-11	-20.812	17.59	17.59	17.59	
340	1080.8	13.734	12.309	14.582	9.898	12.693	11.043	-5.179	17.40	54.47	1.28E-11	-20.892	-21.477	1.28E-11	-20.892	17.40	17.40	17.40	
350	1082.8	13.613	12.172	14.514	9.727	12.676	11.036	-5.253	17.23	55.52	1.07E-11	-20.971	-21.550	1.07E-11	-20.971	17.23	17.23	17.23	
360	1084.6	13.494	12.036	14.445	9.557	12.658	11.029	-5.326	17.06	56.51	8.94E-12	-21.049	-21.747	8.94E-12	-21.049	17.06	17.06	17.06	
370	1086.1	13.375	11.900	14.377	9.388	12.641	11.023	-5.397	16.91	57.46	7.04E-12	-21.125	-21.848	7.04E-12	-21.125	16.91	16.91	16.91	
380	1087.5	13.257	11.765	14.309	9.219	12.624	11.017	-5.468	16.77	58.36	6.31E-12	-21.200	-21.921	6.31E-12	-21.200	16.77	16.77	16.77	
390	1088.6	13.139	11.631	14.242	9.051	12.607	11.011	-5.538	16.63	59.21	5.22E-12	-21.274	-21.986	5.22E-12	-21.274	16.63	16.63	16.63	
400	1089.7	13.022	11.497	14.174	8.884	12.590	11.006	-5.607	16.51	60.03	4.50E-12	-21.347	-22.053	4.50E-12	-21.347	16.51	16.51	16.51	

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 1100 K

HEIGHT KM	TEMP K	LOG(N(N ₂) /M ₃)			LOG(N(O ₂) /M ₃)			LOG(N(O) /M ₃)			LOG(N(A) /M ₃)			LOG(N(H) /M ₃)			LOG(N(H ₃) /M ₃)			(PRESSURE NT/M ²)			LÜG LOG(DEN) KG/M ³)			
		LOG(N(N ₂) /M ₃)	LOG(N(O ₂) /M ₃)	LOG(N(O) /M ₃)	LOG(N(H) /M ₃)	LOG(N(A) /M ₃)	LOG(N(H ₃) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)										
420	1091.4	12.789	11.231	14.041	8.553	12.556	10.995	14.079	-5.743	16.27	61.54	3.24E-12	-11.489													
440	1092.8	12.558	10.967	13.909	8.223	12.523	10.985	13.946	-5.876	16.04	62.91	2.35E-12	-11.629													
460	1093.9	12.328	10.705	7.896	12.490	10.976	13.815	-6.006	15.81	64.16	1.72E-12	-11.766														
480	1094.8	12.101	10.445	13.648	7.572	12.457	10.967	13.687	-6.133	15.58	65.33	1.26E-12	-11.900													
500	1095.5	11.875	10.187	13.518	7.249	12.425	10.958	13.562	-6.258	15.34	66.44	9.30E-13	-12.032													
520	1096.1	11.650	9.930	13.390	6.929	12.393	10.950	13.440	-6.380	15.08	67.51	6.90E-13	-12.161													
540	1096.6	11.427	9.675	13.262	6.611	12.361	10.941	13.321	-6.499	14.78	68.57	5.14E-13	-12.289													
560	1097.0	11.205	9.422	13.136	6.295	12.329	10.933	13.205	-6.614	14.45	69.65	3.85E-13	-12.415													
580	1097.4	10.984	9.170	13.010	12.297	10.925	13.093	-6.727	14.07	70.78	2.89E-13	-12.538														
600	1097.7	10.765	8.920	12.884	12.266	10.917	12.985	-6.835	13.65	71.99	2.19E-13	-12.660														
620	1098.0	10.548	8.671	12.760	12.235	10.909	12.880	-6.939	13.18	73.31	1.66E-13	-12.780														
640	1098.2	10.331	8.424	12.636	12.204	10.901	12.780	-7.039	12.66	74.78	1.27E-13	-12.897														
660	1098.4	10.116	8.178	12.513	12.173	10.893	12.685	-7.134	12.10	76.44	9.73E-14	-13.012														
680	1098.5	9.902	7.934	12.391	12.143	10.885	12.595	-7.224	11.50	78.34	7.51E-14	-13.124														
700	1098.7	9.690	7.691	12.270	12.112	10.877	12.510	-7.309	10.87	80.54	5.84E-14	-13.234														
720	1098.8	9.478	7.450	12.149	12.082	10.870	12.430	-7.389	10.22	83.09	4.57E-14	-13.340														
740	1098.9	9.268	7.210	12.059	12.052	10.862	12.356	-7.463	9.57	86.06	3.61E-14	-13.443														
760	1099.0	9.059	6.971	11.910	12.022	10.855	12.287	-7.532	8.94	89.53	2.87E-14	-13.542														
780	1099.1	8.851	6.734	11.791	11.992	10.847	12.223	-7.596	8.32	93.57	2.31E-14	-13.637														
800	1099.2	8.645	6.498	11.673	11.963	10.840	12.164	-7.655	7.74	98.30	1.87E-14	-13.727														
820	1099.2	8.439	6.263	11.556	11.933	10.832	12.109	-7.710	7.20	103.73	1.54E-14	-13.813														
840	1099.3	8.235	6.030	11.349	11.904	10.825	12.058	-7.761	6.71	109.98	1.27E-14	-13.895														
860	1099.4	8.032	5.803	11.323	11.875	10.817	12.011	-7.808	6.27	117.12	1.07E-14	-13.971														
880	1099.4	7.830	5.570	11.077	11.846	10.810	11.967	-7.851	5.88	125.19	9.06E-15	-14.043														
900	1099.4	7.629	5.343	11.093	11.818	10.803	11.927	-7.892	5.54	134.20	7.76E-15	-14.110														
920	1099.5	7.429	5.110	11.789	11.796	11.888	-7.931	5.24	144.13	6.72E-15	-14.172															
940	1099.5	7.230	4.886	10.865	11.761	10.789	11.852	-7.967	4.98	154.93	5.88E-15	-14.231														
960	1099.6	7.033	4.652	10.752	11.732	10.781	11.818	-8.001	4.76	166.50	5.19E-15	-14.283														
980	1099.6	6.836	4.418	10.640	11.704	11.774	11.785	-8.034	4.57	178.68	4.62E-15	-14.335														
1000	1099.6	6.641	4.176	10.528	11.676	10.767	11.754	-8.065	4.41	191.31	4.15E-15	-14.382														
1050	1099.7	6.157	10.252	9.979	11.539	10.733	11.612	-8.138	4.10	223.43	3.26E-15	-14.487														
1100	1099.7	5.710	9.445	9.183	11.405	10.699	11.487	-8.270	3.89	254.00	2.64E-15	-14.578														
1150	1099.8	5.272	8.925	8.669	11.275	10.666	11.372	-8.446	3.74	280.81	2.19E-15	-14.659														
1200	1099.8	5.067	8.032	8.418	10.560	10.634	11.318	-8.501	3.62	303.02	1.85E-15	-14.733														
1250	1099.8	4.854	7.344	7.091	10.340	10.682	11.429	-8.390	3.53	321.08	1.57E-15	-14.803														
1300	1099.8	4.642	6.925	6.669	10.211	10.635	11.362	-8.127	3.46	335.76	1.35E-15	-14.869														
1350	1099.9	4.432	6.505	6.418	10.139	10.580	11.265	-8.054	3.39	348.00	1.17E-15	-14.932														
1400	1099.9	4.222	6.169	6.086	10.086	10.618	11.214	-8.025	3.32	358.55	9.19E-16	-14.994														
1450	1099.9	4.012	5.942	5.942	10.330	10.603	11.164	-8.054	3.19	368.14	8.84E-16	-15.054														
1500	1099.9	3.802	5.730	5.730	10.293	10.475	11.070	-8.076	3.05	377.15	7.73E-16	-15.112														
1600	1099.9	3.592	5.442	5.442	10.977	10.543	10.983	-8.098	2.92	412.34	4.65E-16	-15.225														
1700	1099.9	3.382	5.172	5.172	10.705	10.672	10.514	-8.017	2.78	431.32	3.67E-16	-15.332														
1800	1099.9	3.172	4.902	4.902	10.445	10.625	10.486	-8.026	2.63	452.15	2.93E-16	-15.435														
1900	1100.0	3.062	4.692	4.692	10.211	10.405	10.486	-8.036	2.53	475.12	2.36E-16	-15.534														
2000	1100.0	2.952	4.482	4.482	10.045	10.458	10.756	-8.046	2.49	500.43	1.92E-16	-15.627														
2100	1100.0	2.842	4.272	4.272	10.344	10.432	10.691	-8.057	2.36	528.62	1.58E-16	-15.801														
2200	1100.0	2.732	4.062	4.062	10.240	10.405	10.632	-8.068	2.22	547.88	1.22E-16	-15.881														
2300	1100.0	2.622	3.852	3.852	10.139	10.380	10.577	-8.079	2.10	559.88	9.11E-16	-15.956														
2400	1100.0	2.512	3.642	3.642	10.039	10.355	10.526	-8.092	1.98	564.32	6.11E-16	-16.027				</td										

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 1200 K

HEIGHT KM	TEMP K	LOG(N(N2) /M3)			LOG(N(O2) /M3)			LOG(N(O) /M3)			LOG(N(A) /M3)			LOG(N(HE) /M3)			LOG(N(H) /M3)			LOG(N /M3)			LOG(PRESSURE NT/M2)			MEAN MOL WT			DENSITY HT KM			LOG(DEN KG/M3)		
		LOG(N(N2) /M3)	LOG(N(O2) /M3)	LOG(N(O) /M3)	LOG(N(A) /M3)	LOG(N(HE) /M3)	LOG(N(H) /M3)	LOG(N /M3)	LOG(N(N2) /M3)	LOG(N(O2) /M3)	LOG(N(O) /M3)	LOG(N(A) /M3)	LOG(N(HE) /M3)	LOG(N(H) /M3)	LOG(N /M3)	LOG(PRESSURE NT/M2)	LOG(MOL WT)	LOG(SCALE HT KM)	DENSITY KG/M3	DENSITY KG/M3	DENSITY KG/M3	DENSITY KG/M3	DENSITY KG/M3	DENSITY KG/M3	DENSITY KG/M3	DENSITY KG/M3	DENSITY KG/M3	DENSITY KG/M3	DENSITY KG/M3	DENSITY KG/M3				
90	188.0	19.746	19.170	17.390	17.824	14.573	19.854	19.00	-0.732	28.91	5.63	3.43E-06	-5.465	-0.732	28.85	5.58	2.0E-06	-5.620																
92	188.1	19.592	19.009	17.547	17.669	14.418	19.00	-0.886	28.85	5.58	2.0E-06	-5.620	-1.040	28.76	5.54	1.67E-06	-5.776																	
94	188.6	19.437	18.843	17.646	17.514	14.263	19.545	-1.040	28.76	5.52	1.7E-06	-5.933	-1.193	28.65	5.52	1.17E-06	-5.933																	
96	189.6	19.281	18.672	17.686	17.359	14.108	19.390	-1.344	28.52	5.53	8.22E-07	-6.090	-1.344	28.52	5.53	5.66E-07	-6.247																	
98	191.3	19.126	18.498	17.687	17.203	13.952	19.234	-1.492	28.36	5.61	5.66E-07	-6.402	-1.000	17.797	5.61	3.96E-07	-6.402																	
100	194.3	18.970	18.323	17.664	17.048	13.797	19.070	-1.634	28.21	5.60	1.634E-07	-6.557	-1.771	18.927	5.61	2.77E-07	-6.557																	
102	199.0	18.819	18.148	17.599	16.836	13.771	18.971	-1.771	28.02	5.61	1.94E-07	-6.712	-1.666	17.971	18.775	1.94E-07	-6.712																	
104	206.0	18.513	17.971	17.541	16.625	13.742	18.624	-1.901	27.80	5.64	1.94E-07	-6.865	-1.416	17.513	18.624	-1.901	-6.865																	
106	216.1	18.513	17.790	17.483	16.416	13.710	18.624	-2.024	27.55	5.71	1.37E-07	-6.865	-1.212	17.483	18.624	-2.024	-6.865																	
108	229.8	18.362	17.605	17.422	16.212	13.675	18.625	-2.045	27.55	5.71	1.37E-07	-6.865	-1.013	17.422	18.625	-2.045	-6.865																	
110	247.4	18.214	17.418	17.354	16.014	13.639	18.329	-2.137	27.29	5.88	9.67E-08	-7.015	-0.714	17.354	18.329	-2.137	-7.015																	
115	304.4	17.871	16.984	17.165	15.563	13.547	17.995	-2.382	6.67	6.92	4.38E-08	-7.359	-0.671	16.984	17.995	-2.382	-7.359																	
120	367.8	17.582	16.644	16.979	15.186	13.467	17.718	-2.576	6.19	8.41	2.27E-08	-7.643	-0.630	16.644	17.718	-2.576	-7.643																	
125	433.4	17.338	16.371	16.811	14.868	13.398	17.486	-2.737	5.81	9.89	1.31E-08	-7.882	-0.599	16.811	17.486	-2.737	-7.882																	
130	499.7	17.128	16.139	16.665	14.595	13.338	17.289	-2.872	5.46	11.55	8.22E-09	-8.085	-0.568	16.665	17.289	-2.872	-8.085																	
135	564.2	16.946	15.938	16.538	14.358	13.287	17.119	-2.989	5.14	13.30	5.50E-09	-8.413	-0.547	16.538	17.119	-2.989	-8.413																	
140	625.2	16.785	15.762	16.428	14.148	13.243	16.972	-3.092	5.04	15.13	3.86E-09	-8.548	-0.526	16.428	16.972	-3.092	-8.548																	
145	681.8	16.643	15.604	16.330	13.961	13.204	16.841	-3.185	4.55	17.02	2.83E-09	-8.669	-0.505	13.961	16.841	-3.185	-8.669																	
150	733.4	16.514	15.462	16.243	13.791	13.171	16.725	-3.269	4.28	18.93	2.14E-09	-8.778	-0.484	13.791	16.725	-3.269	-8.778																	
155	779.9	16.397	15.332	16.165	13.636	13.142	16.497	-3.347	4.02	20.81	1.67E-09	-8.778	-0.463	13.636	16.497	-3.347	-8.778																	
160	821.5	16.289	15.212	16.093	13.491	13.115	16.445	-3.420	3.77	22.66	1.32E-09	-8.878	-0.442	13.491	16.445	-3.420	-8.878																	
170	891.5	16.095	14.995	15.967	13.229	13.071	16.360	-3.553	3.56	23.28	8.78E-10	-9.056	-0.421	15.967	16.360	-3.553	-9.056																	
180	946.8	15.921	14.800	15.856	12.992	13.033	16.292	-3.675	3.28	22.82	6.13E-10	-9.213	-0.400	15.856	16.292	-3.675	-9.213																	
190	990.7	15.761	14.620	15.757	12.773	13.001	16.238	-3.788	3.00	22.38	4.43E-10	-9.354	-0.379	15.757	16.238	-3.788	-9.354																	
200	1025.8	15.612	14.452	15.665	12.567	12.973	16.181	-3.894	2.95	21.95	3.29E-10	-9.483	-0.358	15.665	16.181	-3.894	-9.483																	
210	1054.0	15.471	14.293	15.580	12.371	12.967	16.142	-3.994	2.73	21.55	2.49E-10	-9.604	-0.337	15.580	16.142	-3.994	-9.604																	
220	1076.9	15.336	14.139	15.498	12.182	12.923	16.110	-4.090	2.51	21.15	1.92E-10	-9.717	-0.316	15.498	16.110	-4.090	-9.717																	
230	1095.6	15.205	14.091	15.421	11.999	12.901	16.083	-4.182	2.28	20.78	1.50E-10	-9.824	-0.295	15.991	16.083	-4.182	-9.824																	
240	1111.0	15.078	13.847	15.345	11.820	12.880	16.059	-4.271	2.04	20.42	1.18E-10	-9.927	-0.274	13.847	16.059	-4.271	-9.927																	
250	1123.7	14.954	13.706	15.272	11.645	12.860	16.039	-4.357	1.80	20.08	9.44E-11	-10.025	-0.253	13.706	16.039	-4.357	-10.025																	
260	1134.3	14.833	13.568	15.201	11.474	12.840	16.021	-4.441	1.57	19.75	7.59E-11	-10.120	-0.232	13.568	16.021	-4.441	-10.120																	
270	1143.1	14.713	13.432	15.132	11.305	12.822	16.006	-4.522	1.34	19.44	4.830	-10.211	-0.211	13.432	16.006	-4.522	-10.211																	
280	1150.5	14.595	13.298	15.063	11.138	12.804	15.98	-4.601	1.11	19.15	49.81	-10.300	-0.190	13.298	15.98	-4.601	-10.300																	
290	1156.7	14.479	13.165	14.996	10.973	12.786	15.980	-4.679	0.88	18.88	51.26	-10.386	-0.169	14.996	15.980	-4.679	-10.386																	
300	1162.0	14.364	13.034	14.929	10.810	12.768	15.969	-4.754	0.62	18.62	52.66	-10.469	-0.148	14.929	15.969	-4.754	-10.469																	
310	1166.5	14.250	12.904	14.863	10.648	12.751	15.959	-4.838	0.38	18.38	53.99	-10.551	-0.127	14.863	15.959	-4.838	-10.551																	
320	1170.4	14.137	12.775	14.798	10.488	12.735	15.950	-4.901	0.16	18.16	55.28	-10.630	-0.106	14.798	15.950	-4.901	-10.630																	
330	1173.7	14.025	12.648	14.734	10.329	12.718	15.941	-4.973	0.01	17.95	56.52	-10.708	-0.085	14.734	15.941	-4.973	-10.708																	
340	1176.5	13.914	12.521	14.670	10.171	12.702	15.934	-5.043	-0.47	17.75	57.71	-10.784	-0.064	14.670	15.934	-5.043	-10.784																	
350	1179.0	13.803	12.395	14.606	10.013	12.685	15.926	-5.112	-0.87	17.57	58.85	-10.858	-0.044	14.606	15.926	-5.112	-10.858																	
360	1181.2	13.094	12.269	14.543	9.857	12.669	15.920	-5.180	-1.40	17.40	59.95	-10.932	-0.023	14.543	15.920	-5.180	-10.932																	
370	1183.0	13.584	12.144	14.481	9.702	12.653	15.913	-5.247	-1.24	17.24	61.01	-11.003	-0.012	14.481	15.913	-5.247	-11.003																	
380	1184.7	13.476	12.020	14.418	9.547	12.638	15.907	-5.313	-1.08	17.08	62.01	-11.074	-0.001	14.418	15.907	-5.313	-11.074																	
390	1186.1	13.367	11.897	14.356	9.393	12.622	15.901	-5.379	-0.92	16.94	62.98	-11.143	-0.001	14.356	15.901	-5.379	-11.143																	
400	1187.4	13.260	11.774	14.295	9.240	12.606	15.896	-5.443	-0.76	16.81	63.90	-11.212	-0.001	14.295	15.896	-5.443	-11.212																	

Table 10. (Cont.)

FXOSPHERIC TEMPERATURE = 1200 K									
HEIGHT KM	TEMP K	LOG(N(N ₂) /M ₃)	LOG(N(O ₂) /M ₃)	LOG(N(O) /M ₃)	LOG(N(A) /M ₃)	LOG(N(HE) /M ₃)	LOG(N(H) /M ₃)	LOG(N /M ₃)	LOG(PRESSURE NT/M ²)
420	1189.5	13.046	11.530	14.172	8.935	12.575	10.886	14.215	-5.570
440	1191.2	12.834	11.288	14.051	8.633	12.545	10.876	14.090	-5.694
460	1192.6	12.623	11.047	13.930	8.333	12.514	10.867	13.968	-5.816
480	1193.7	12.414	10.809	13.811	8.035	12.484	10.858	13.848	-5.935
500	1194.5	12.207	10.572	13.692	7.739	12.455	10.850	13.731	-6.052
520	1195.3	12.001	10.336	13.574	7.445	12.425	10.842	13.616	-6.167
540	1195.9	11.796	10.102	13.457	7.153	12.396	10.835	13.503	-6.279
560	1196.4	9.870	13.341	6.863	12.366	10.827	13.393	6.389	-6.389
580	1196.8	11.390	9.639	13.225	6.575	12.337	10.819	13.285	-6.496
600	1197.2	11.190	9.410	13.111	6.289	12.309	10.812	13.181	-6.601
620	1197.5	10.990	9.182	12.997	6.004	12.280	10.804	13.079	-6.703
640	1197.8	10.791	8.955	12.883	8.730	12.252	10.797	12.980	-6.802
660	1198.0	10.594	8.730	12.770	8.506	12.223	10.790	12.885	-6.897
680	1198.2	10.398	8.506	12.658	8.283	12.195	10.782	12.793	-6.988
700	1198.4	10.203	8.280	12.547	8.062	12.168	10.775	12.705	-7.076
720	1198.5	10.009	8.062	12.436	7.842	12.140	10.768	12.621	-7.160
740	1198.7	9.817	7.842	12.326	7.623	12.112	10.761	12.541	-7.240
760	1198.8	9.625	7.405	12.217	7.405	12.085	10.754	12.466	-7.315
780	1198.9	9.434	7.189	12.108	7.045	12.058	10.747	12.395	-7.386
800	1199.0	9.245	7.048	12.000	6.924	12.031	10.740	12.328	-7.453
820	1199.1	9.057	6.974	11.892	6.974	12.004	10.734	12.266	-7.515
840	1199.1	8.869	6.760	11.785	6.547	11.977	10.727	12.207	-7.574
860	1199.2	8.683	6.547	11.679	6.336	11.573	10.720	12.153	-7.628
880	1199.3	8.498	6.336	11.573	6.125	11.498	10.713	12.102	-7.679
900	1199.3	8.314	6.146	11.468	6.125	11.468	10.707	12.055	-7.726
920	1199.4	8.131	5.963	11.363	6.125	11.363	10.701	12.011	-7.770
940	1199.4	7.949	5.777	11.259	6.125	11.845	10.694	11.969	-7.812
960	1199.5	7.767	5.597	11.156	6.105	11.819	10.687	11.930	-7.851
980	1199.5	7.587	5.417	11.053	6.053	11.794	10.681	11.894	-7.887
1000	1199.5	7.408	5.237	10.951	5.951	11.768	10.674	11.859	-7.922
1050	1199.6	6.965	5.057	10.697	5.057	11.705	10.658	11.779	-8.001
1100	1199.7	6.527	4.877	10.447	5.021	11.642	10.642	11.708	-8.073
1150	1199.7	6.095	4.697	10.201	5.001	11.580	10.627	11.642	-8.139
1200	1199.7	5.957	4.517	9.957	5.001	11.520	10.611	11.581	-8.200
1250	1199.8	5.771	4.337	9.710	4.959	11.459	10.596	11.522	-8.259
1300	1199.8	5.580	4.157	9.480	4.801	11.400	10.581	11.466	-8.315
1350	1199.8	5.396	3.977	9.246	4.621	11.342	10.567	11.412	-8.369
1400	1199.8	5.216	3.807	9.016	4.441	11.284	10.552	11.360	-8.421
1450	1199.9	5.036	3.637	8.788	4.261	11.227	10.538	11.309	-8.472
1500	1199.9	4.853	3.467	8.563	4.081	11.171	10.523	11.260	-8.521
1600	1199.9	4.675	3.297	8.121	3.521	11.060	10.496	11.165	-8.616
1700	1199.9	4.497	3.127	7.691	3.271	10.952	10.468	11.076	-8.705
1800	1199.9	4.317	2.957	7.271	3.041	10.847	10.442	10.991	-8.789
1900	1199.9	4.137	2.787	6.881	2.861	10.745	10.416	10.912	-8.869
2000	1200.0	4.057	2.617	6.461	2.671	10.645	10.391	10.837	-8.944
2100	1200.0	3.977	2.447	6.070	2.581	10.547	10.366	10.767	-9.014
2200	1200.0	3.897	2.277	6.070	2.492	10.452	10.342	10.701	-9.079
2300	1200.0	3.817	2.107	5.999	2.401	10.358	10.319	10.640	-9.141
2400	1200.0	3.737	1.937	5.999	2.321	10.296	10.296	10.543	-9.198
2500	1200.0	3.657	1.767	5.999	2.241	10.267	10.267	10.452	-9.251
2600	1200.0	3.577	1.597	5.999	2.161	10.237	10.237	10.359	-9.308
2700	1200.0	3.497	1.427	5.999	2.081	10.207	10.207	10.259	-9.357
2800	1200.0	3.417	1.257	5.999	2.001	10.178	10.178	10.159	-9.406
2900	1200.0	3.337	1.087	5.999	1.921	10.148	10.148	10.108	-9.455
3000	1200.0	3.257	0.917	5.999	1.841	10.118	10.118	10.068	-9.504
3100	1200.0	3.177	0.747	5.999	1.761	10.088	10.088	10.018	-9.553
3200	1200.0	3.097	0.577	5.999	1.681	10.058	10.058	9.968	-9.602
3300	1200.0	3.017	0.407	5.999	1.601	10.028	10.028	9.918	-9.651
3400	1200.0	2.937	0.237	5.999	1.521	9.998	9.998	9.868	-9.700
3500	1200.0	2.857	0.067	5.999	1.441	9.968	9.968	9.818	-9.749
3600	1200.0	2.777	-0.103	5.999	1.361	9.938	9.938	9.768	-9.798
3700	1200.0	2.697	-0.273	5.999	1.281	9.908	9.908	9.618	-9.847
3800	1200.0	2.617	-0.443	5.999	1.201	9.878	9.878	9.468	-9.896
3900	1200.0	2.537	-0.613	5.999	1.121	9.848	9.848	9.218	-9.945
4000	1200.0	2.457	-0.783	5.999	1.041	9.818	9.818	8.968	-9.994
4100	1200.0	2.377	-0.953	5.999	9.611	9.788	9.788	8.718	-10.043
4200	1200.0	2.297	-1.123	5.999	9.111	9.268	9.268	8.468	-10.092
4300	1200.0	2.217	-1.293	5.999	8.611	8.761	8.761	8.218	-10.141
4400	1200.0	2.137	-1.463	5.999	8.111	8.261	8.261	7.968	-10.189
4500	1200.0	2.057	-1.633	5.999	7.611	7.761	7.761	7.618	-10.238
4600	1200.0	1.977	-1.803	5.999	7.111	7.261	7.261	7.468	-10.287
4700	1200.0	1.897	-1.973	5.999	6.611	6.761	6.761	7.668	-10.336
4800	1200.0	1.817	-2.143	5.999	6.111	6.261	6.261	8.568	-10.385
4900	1200.0	1.737	-2.313	5.999	5.611	5.761	5.761	9.475	-10.434
5000	1200.0	1.657	-2.483	5.999	5.111	5.261	5.261	10.372	-10.483
5100	1200.0	1.577	-2.653	5.999	4.611	4.761	4.761	11.269	-10.531
5200	1200.0	1.497	-2.823	5.999	4.111	4.261	4.261	12.166	-10.580
5300	1200.0	1.417	-3.003	5.999	3.611	3.761	3.761	13.063	-10.629
5400	1200.0	1.337	-3.173	5.999	3.111	3.261	3.261	13.956	-10.678
5500	1200.0	1.257	-3.343	5.999	2.611	2.761	2.761	14.853	-10.727
5600	1200.0	1.177	-3.513	5.999	2.111	2.261	2.261	15.750	-10.776
5700	1200.0	1.097	-3.683	5.999	1.611	1.761	1.761	16.647	-10.825
5800	1200.0	1.017	-3.853	5.999	1.111	1.261	1.261	17.544	-10.874
5900	1200.0	937	-4.023	5.999	6.11	7.261	7.261	18.441	-10.923
6000	1200.0	857	-4.193	5.999	11.11	12.261	12.261	19.338	-10.972
6100	1200.0	777	-4.363	5.999	16.11	17.261	17.261	20.235	-11.021
6200	1200.0	697	-4.533	5.999	21.11	22.261	22.261	21.132	-11.069
6300	1200.0	617	-4.703	5.999	26.11	27.261	27.261	22.030	-11.118
6400	1200.0	537	-4.873	5.999	31.11	32.261	32.261	22.927	-11.167
6500	1200.0	457	-5.043	5.999	36.11	37.261	37.261	23.824	-11.216
6600	1200.0	377	-5.213	5.999	41.11	42.261	42.261	24.721	-11.265
6700	1200.0	297	-5.383	5.999	46.11	47.261	47.261	25.618	-11.314
6800	1200.0	217	-5.553	5.999	51.11	52.261	52.261	26.515	-11.363
6900	1200.0	137	-5.723	5.999	56.11	57.261	57.261	27.412	-11.412
7000	1200.0	57	-5.893	5.999	61.11	62.261	62.261	28.309	-11.461
7100	1200.0	-	-	5.999	66.11	67.261	67.261	29.206	-11.509

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 1300 K

HEIGHT KM	TEMP K	LOG(N(N2)) /M3)	LOG(N(O2)) /M3)	LOG(N(O)) /M3)	LOG(N(A)) /M3)	LOG(N(HE)) /M3)	LOG(N(H)) /M3)	(PRESSURE NT/M2)	LOG (DEN KG/M3)
								MCL WT KM	DENSITY KG/M3
90	188.0	19.746	19.170	17.390	17.824	14.573	19.854	-732	5.63
92	188.1	19.592	19.009	17.547	17.669	14.418	19.00	-886	5.58
94	188.6	19.437	18.843	17.646	17.514	14.263	19.545	-1040	5.54
96	189.6	19.281	18.672	17.685	17.359	14.108	19.889	-1193	5.52
98	191.5	19.125	18.498	17.687	17.203	13.952	19.734	-344	5.52
100	194.6	18.970	18.322	17.664	17.048	13.797	19.080	-1491	5.51
102	199.4	18.818	18.148	17.598	16.836	13.770	18.927	-1633	5.61
104	206.7	18.665	17.970	17.540	16.625	13.741	18.775	-1770	5.60
106	217.3	18.513	17.789	17.482	16.416	13.709	18.623	-1900	5.63
108	231.6	18.361	17.604	17.420	16.212	13.674	18.474	-2021	5.71
110	249.9	18.213	17.418	17.352	16.014	13.637	18.328	-2134	5.88
115	309.2	17.870	16.984	17.162	15.565	13.564	17.994	-2375	6.95
120	375.3	17.583	16.647	16.976	15.192	13.493	17.719	-2567	6.68
125	443.6	17.341	16.376	16.809	14.879	13.393	17.489	-2724	5.84
130	512.7	17.134	16.148	16.664	14.609	13.334	17.294	-2856	5.50
135	580.2	16.954	15.950	16.538	14.375	13.282	17.126	-2970	5.19
140	644.7	16.796	16.428	16.170	14.238	13.238	16.980	-3071	5.01
145	705.1	16.656	15.621	16.331	13.986	13.199	16.851	-3161	4.63
150	761.0	16.529	15.481	16.245	13.819	13.166	16.736	-3242	4.37
155	811.9	16.414	15.353	16.167	13.667	13.136	16.633	-3318	4.12
160	858.1	16.308	15.236	16.096	13.526	13.109	16.361	-3388	3.88
170	936.9	16.118	15.024	15.971	13.272	13.064	16.274	-3516	3.42
180	1000.4	15.949	14.036	15.863	13.043	12.026	16.172	-3632	3.07
190	1051.4	15.796	14.663	15.766	12.834	12.994	16.050	-3739	2.57
200	1092.5	15.653	14.503	15.677	12.637	12.965	16.092	-3840	2.04
210	1125.8	15.519	14.351	15.595	12.451	12.940	16.053	-3935	1.73
220	1153.0	15.391	14.206	15.451	12.273	12.917	16.020	-4026	1.41
230	1175.2	15.267	14.067	15.443	12.101	12.895	16.092	-4113	1.17
240	1193.5	15.148	13.931	15.372	11.933	12.875	16.067	-4197	0.97
250	1208.7	15.032	13.799	15.303	11.770	12.856	16.046	-4278	0.78
260	1221.3	14.918	13.670	15.237	11.610	12.837	16.022	-4357	0.61
270	1231.9	14.807	13.543	15.171	11.452	12.820	16.011	-4434	0.51
280	1240.7	14.697	13.418	15.107	11.297	12.802	16.002	-508	0.49
290	1248.2	14.589	13.295	15.044	11.144	12.786	16.084	-581	0.22
300	1254.5	14.482	13.173	14.982	10.992	12.769	16.073	-653	0.09
310	1259.9	14.376	13.053	14.921	10.842	12.753	16.062	-723	0.07
320	1264.5	14.271	12.933	14.861	10.693	12.738	16.053	-791	0.06
330	1268.5	14.167	12.815	14.801	10.546	12.722	16.044	-859	0.05
340	1271.9	14.064	12.697	14.741	10.399	12.707	16.036	-925	0.04
350	1274.9	13.962	12.580	14.682	10.234	12.692	16.028	-990	0.03
360	1277.4	13.860	12.464	14.624	10.109	12.677	16.022	-996	0.02
370	1279.7	13.759	12.349	14.566	9.965	12.662	16.015	-1117	0.01
380	1281.7	13.658	12.234	14.508	9.822	12.647	16.009	-1179	0.00
390	1283.4	13.558	12.120	14.451	9.680	12.633	16.003	-241	0.00
400	1284.9	13.459	12.006	14.394	9.538	12.616	16.000	-302	0.00

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 1300 K

HEIGHT KM	TEMP K	LOG(N(N ₂) /M ₃)	LOG(N(O ₂) /M ₃)	LOG(N(O) /M ₃)	LOG(N(A) /M ₃)	LOG(N(HE) /M ₃)	LOG(N(H) /M ₃)	LOG(N /M ₃)	LOG(PRESSURE NT/M ²)	LOG(MOL WT)	MEAN WT	DENSITY KM	SCALE HT	DENSITY KG/M ³	LOG(DEN KG/M ³)
420	1287.5	13.261	11.780	14.280	9.256	12.590	10.787	14.329	-5.421	16.85	69.50	5.97E-12	-11.224		
440	1289.5	13.065	11.557	14.168	8.977	12.561	10.778	14.212	-5.538	16.62	71.28	4.49E-12	-11.347		
460	1291.1	12.870	11.334	14.057	8.700	12.533	10.769	14.097	-5.652	16.41	72.93	3.41E-12	-11.468		
480	1292.4	12.677	11.114	13.966	8.424	12.505	10.761	13.984	-5.764	16.21	74.45	2.60E-12	-11.586		
500	1293.5	12.486	10.895	13.837	8.151	12.478	10.753	13.874	-5.874	16.01	75.86	1.99E-12	-11.701		
520	1294.3	12.295	10.678	13.728	7.880	12.451	10.746	13.766	-5.982	15.82	77.19	1.53E-12	-11.815		
540	1295.1	12.106	10.462	13.620	7.610	12.423	10.738	13.660	-6.088	15.63	78.45	1.18E-12	-11.926		
560	1295.7	11.918	10.247	13.512	7.343	12.396	10.731	13.555	-6.192	15.43	79.65	9.20E-13	-12.036		
580	1296.2	11.732	10.034	13.405	7.076	12.370	10.724	13.453	-6.294	15.22	80.81	7.17E-13	-12.144		
600	1296.6	11.546	9.822	13.299	6.812	12.343	10.717	13.353	-6.394	14.98	81.96	5.61E-13	-12.251		
620	1297.0	11.362	9.611	13.194	6.549	12.317	10.710	13.255	-6.492	14.73	83.11	4.40E-13	-12.356		
640	1297.3	11.178	9.402	13.089	6.288	12.290	10.693	13.160	-6.587	14.45	84.28	3.47E-13	-12.460		
660	1297.6	10.995	9.194	12.985	6.028	12.264	10.676	13.067	-6.680	14.15	85.49	2.74E-13	-12.563		
680	1297.8	10.815	8.987	12.882	5.778	12.238	10.659	12.976	-6.771	13.81	86.76	2.17E-13	-12.663		
700	1298.1	10.635	8.782	12.779	5.527	12.213	10.633	12.889	-6.858	13.44	88.01	1.73E-13	-12.763		
720	1298.2	10.456	8.577	12.677	5.277	12.187	10.616	12.804	-6.943	13.06	89.58	1.38E-13	-12.860		
740	1298.4	10.278	8.374	12.575	5.027	12.162	10.590	12.722	-7.024	12.61	91.18	1.11E-13	-12.957		
760	1298.5	10.101	8.172	12.474	4.777	12.136	10.563	12.644	-7.102	12.15	92.94	8.89E-14	-13.051		
780	1298.7	9.926	7.971	12.374	4.527	12.111	10.537	12.569	-7.177	11.67	94.90	7.19E-14	-13.145		
800	1298.8	9.751	7.771	12.274	4.277	12.086	10.500	12.498	-7.248	11.16	97.12	5.83E-14	-13.234		
820	1298.9	9.577	7.573	12.174	3.927	12.061	10.444	12.430	-7.316	10.64	99.58	4.76E-14	-13.322		
840	1299.0	9.404	7.375	12.076	3.677	12.037	10.318	12.366	-7.380	10.31	102.36	3.90E-14	-13.408		
860	1299.0	9.232	7.179	11.978	3.427	12.012	10.206	12.262	-7.440	9.59	105.50	3.26E-14	-13.492		
880	1299.1	9.061	6.984	11.880	3.177	11.988	10.185	12.149	-7.497	9.08	109.06	2.67E-14	-13.573		
900	1299.2	8.891	6.789	11.783	2.927	11.963	10.119	12.195	-7.551	8.58	113.09	2.23E-14	-13.651		
920	1299.2	8.722	6.596	11.686	2.677	11.939	10.063	12.145	-7.601	8.09	117.64	1.88E-14	-13.727		
940	1299.3	8.554	6.404	11.590	2.427	11.915	10.007	12.098	-7.668	7.64	122.76	1.59E-14	-13.799		
960	1299.3	8.387	6.213	11.495	2.177	11.891	10.001	12.053	-7.693	7.22	128.51	1.36E-14	-13.868		
980	1299.4	8.220	6.023	11.400	1.927	11.867	10.012	12.012	-7.734	6.82	134.93	1.16E-14	-13.934		
1000	1299.4	8.055	5.855	11.305	1.677	11.844	10.059	11.973	-7.774	6.46	142.07	1.01E-14	-13.997		
1050	1299.5	7.646	5.505	11.071	1.427	11.785	10.574	11.684	-7.862	5.70	163.18	7.25E-15	-14.140		
1100	1299.6	7.242	5.155	10.841	1.177	11.728	10.560	11.560	-7.940	5.13	188.93	5.44E-15	-14.263		
1150	1299.6	6.843	4.803	10.613	1.027	11.671	10.545	11.476	-8.010	4.71	218.53	4.26E-15	-14.370		
1200	1299.7	6.450	4.453	10.388	0.877	11.614	10.531	11.412	-8.074	4.41	250.36	3.44E-15	-14.463		
1250	1299.7	6.062	4.107	10.167	0.727	11.559	10.517	11.313	-8.134	4.19	282.47	2.85E-15	-14.545		
1300	1299.8	5.948	3.880	10.504	0.577	11.503	10.456	11.250	-8.190	4.03	312.92	2.41E-15	-14.618		
1350	1299.8	5.732	3.630	11.450	0.427	11.490	10.406	11.153	-8.243	3.92	340.35	2.01E-15	-14.684		
1400	1299.8	5.519	3.430	11.397	0.277	11.451	10.346	11.075	-8.295	3.83	364.15	1.80E-15	-14.746		
1450	1299.8	5.309	3.230	11.344	0.127	11.463	10.301	10.989	-8.345	3.75	384.48	1.57E-15	-14.804		
1500	1299.9	5.101	3.027	11.292	0.050	11.450	10.253	10.933	-8.393	3.70	401.69	1.38E-15	-14.859		
1600	1299.9	4.693	2.826	11.190	0.024	11.260	10.184	10.887	-8.486	3.60	428.94	1.09E-15	-14.963		
1700	1299.9	4.296	2.625	11.091	0.000	10.399	11.172	10.794	-8.574	3.51	450.43	8.67E-16	-15.062		
1800	1299.9	3.908	2.425	10.994	0.000	10.375	11.088	10.698	-8.658	3.43	468.92	6.97E-16	-15.157		
1900	1299.9	3.530	2.225	10.899	0.000	10.351	11.008	10.598	-8.738	3.35	486.38	5.66E-16	-15.248		
2000	1299.9	3.161	2.025	10.807	0.000	10.328	10.931	10.495	-8.815	3.26	503.67	4.62E-16	-15.335		
2100	1299.9	2.800	1.825	10.717	0.000	10.305	10.859	10.397	-8.887	3.17	521.24	3.80E-16	-15.420		
2200	1300.0	2.448	1.625	10.629	0.000	10.283	10.790	10.296	-8.956	3.07	539.70	3.15E-16	-15.502		
2300	1300.0	2.104	1.425	10.543	0.000	10.261	10.725	10.197	-9.021	2.97	559.16	2.22E-16	-15.581		
2400	1300.0	1.804	1.225	10.459	0.000	10.240	10.664	10.066	-9.082	2.87	579.65	2.02E-16	-15.657		
2500	1300.0	1.500	1.025	10.376	0.000	10.219	10.562	9.9140	-10.606	2.77	601.62	1.86E-16	-15.731		

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 1400 K

HEIGHT KM	TEMP K	LOG(N(N2) /M3)			LOG(N(O2) /M3)			LOG(N(O) /M3)			LOG(N(A) /M3)			LOG(N(HE) /M3)			LOG(N(H) /M3)			(PRESSURE NT/M2)			LOG(DEN KG/M3)				
		LOG(N(N2) /M3)	LOG(N(O2) /M3)	LOG(N(O) /M3)	LOG(N(A) /M3)	LOG(N(HE) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)																
90	188.0	19.746	19.170	17.390	17.824	14.573	19.854	19.700	19.545	19.514	14.418	17.669	17.547	14.263	14.108	13.952	13.797	13.635	13.473	13.32	12.886	12.886	12.886	12.886	12.886	12.886	
92	188.1	19.592	19.009	17.547	17.646	17.514	19.700	19.545	19.514	14.263	17.669	17.547	14.418	14.332	14.288	14.240	14.193	14.089	13.939	13.889	13.734	13.644	13.552	13.476	13.406	13.326	
94	188.6	19.436	18.843	18.645	18.672	17.685	19.389	19.234	19.079	17.359	17.685	18.645	18.672	18.672	18.672	18.672	18.672	18.672	18.672	18.672	18.672	18.672	18.672	18.672	18.672	18.672	
96	189.7	19.281	19.125	18.918	18.918	17.687	19.079	19.079	17.203	17.687	18.918	18.918	18.918	18.918	18.918	18.918	18.918	18.918	18.918	18.918	18.918	18.918	18.918	18.918	18.918	18.918	
98	191.6	19.125	18.970	18.322	17.664	17.048	19.079	19.079	17.048	17.664	18.970	18.322	18.322	18.322	18.322	18.322	18.322	18.322	18.322	18.322	18.322	18.322	18.322	18.322	18.322	18.322	
100	194.8	18.970	18.818	17.147	17.598	16.835	19.079	19.079	17.770	17.598	18.818	17.147	17.598	17.598	17.598	17.598	17.598	17.598	17.598	17.598	17.598	17.598	17.598	17.598	17.598	17.598	
102	199.9	18.818	18.665	17.970	17.481	16.416	18.774	18.774	17.740	16.624	18.665	17.970	17.481	17.481	17.481	17.481	17.481	17.481	17.481	17.481	17.481	17.481	17.481	17.481	17.481	17.481	
104	207.4	18.665	18.512	17.789	17.481	16.212	18.473	18.473	16.212	16.212	17.481	18.665	18.512	18.512	18.512	18.512	18.512	18.512	18.512	18.512	18.512	18.512	18.512	18.512	18.512	18.512	
106	218.3	18.360	17.604	17.604	17.418	16.212	18.473	18.473	16.212	16.212	17.418	18.360	18.360	18.360	18.360	18.360	18.360	18.360	18.360	18.360	18.360	18.360	18.360	18.360	18.360	18.360	
108	233.2	18.360	18.360	17.604	17.604	17.418	18.473	18.473	16.212	16.212	17.418	18.360	18.360	18.360	18.360	18.360	18.360	18.360	18.360	18.360	18.360	18.360	18.360	18.360	18.360	18.360	
110	252.1	18.212	17.417	17.350	16.014	13.635	18.327	18.327	13.635	13.541	16.014	17.350	17.350	17.350	17.350	17.350	17.350	17.350	17.350	17.350	17.350	17.350	17.350	17.350	17.350	17.350	
115	313.6	17.870	16.985	17.159	15.567	13.541	17.994	17.994	13.541	13.459	15.567	17.159	17.159	17.159	17.159	17.159	17.159	17.159	17.159	17.159	17.159	17.159	17.159	17.159	17.159	17.159	
120	382.1	17.585	16.649	16.973	15.197	13.459	17.720	17.720	13.459	13.386	15.197	16.973	16.973	16.973	16.973	16.973	16.973	16.973	16.973	16.973	16.973	16.973	16.973	16.973	16.973	16.973	
125	452.9	17.345	16.382	16.807	14.886	13.390	17.492	17.492	13.390	13.300	14.886	16.382	16.382	16.382	16.382	16.382	16.382	16.382	16.382	16.382	16.382	16.382	16.382	16.382	16.382	16.382	
130	524.6	17.140	16.156	16.663	14.621	13.330	17.298	17.298	13.330	13.278	14.621	16.156	16.156	16.156	16.156	16.156	16.156	16.156	16.156	16.156	16.156	16.156	16.156	16.156	16.156	16.156	
135	594.9	16.962	15.960	16.538	15.960	14.391	17.132	17.132	14.391	14.234	15.960	16.962	16.962	16.962	16.962	16.962	16.962	16.962	16.962	16.962	16.962	16.962	16.962	16.962	16.962	16.962	
140	662.5	16.806	15.789	16.29	14.007	13.195	16.860	16.860	13.195	13.195	14.007	15.789	15.789	15.789	15.789	15.789	15.789	15.789	15.789	15.789	15.789	15.789	15.789	15.789	15.789	15.789	
145	726.5	16.667	15.542	15.498	16.246	13.844	16.746	16.746	13.844	13.844	16.246	15.542	15.542	15.542	15.542	15.542	15.542	15.542	15.542	15.542	15.542	15.542	15.542	15.542	15.542	15.542	
150	786.2	16.542	15.428	15.372	16.169	13.694	16.643	16.643	13.694	13.694	16.169	15.428	15.428	15.428	15.428	15.428	15.428	15.428	15.428	15.428	15.428	15.428	15.428	15.428	15.428	15.428	
155	841.4	16.428	15.372	15.372	15.372	15.372	18.327	18.327	15.372	15.372	15.372	16.428	16.428	16.428	16.428	16.428	16.428	16.428	16.428	16.428	16.428	16.428	16.428	16.428	16.428	16.428	
160	891.8	16.324	15.257	16.098	13.507	13.038	17.994	17.994	13.038	13.038	16.098	15.257	15.257	15.257	15.257	15.257	15.257	15.257	15.257	15.257	15.257	15.257	15.257	15.257	15.257	15.257	
170	979.4	16.138	15.050	15.050	15.050	15.050	17.994	17.994	15.050	15.050	15.050	16.138	16.138	16.138	16.138	16.138	16.138	16.138	16.138	16.138	16.138	16.138	16.138	16.138	16.138	16.138	
180	1051.1	15.974	14.866	14.866	14.866	14.866	17.994	17.994	14.866	14.866	14.866	15.974	15.974	15.974	15.974	15.974	15.974	15.974	15.974	15.974	15.974	15.974	15.974	15.974	15.974	15.974	
190	1109.3	15.825	14.772	14.885	14.772	14.772	17.994	17.994	14.772	14.772	14.885	15.825	15.825	15.825	15.825	15.825	15.825	15.825	15.825	15.825	15.825	15.825	15.825	15.825	15.825	15.825	
200	1156.8	15.688	14.506	14.506	14.506	14.506	17.994	17.994	14.506	14.506	14.506	15.688	15.688	15.688	15.688	15.688	15.688	15.688	15.688	15.688	15.688	15.688	15.688	15.688	15.688	15.688	
210	1195.5	15.559	14.401	14.401	14.401	14.401	17.994	17.994	14.401	14.401	14.401	15.559	15.559	15.559	15.559	15.559	15.559	15.559	15.559	15.559	15.559	15.559	15.559	15.559	15.559	15.559	
220	1227.1	15.437	14.263	14.263	14.263	14.263	17.994	17.994	14.263	14.263	14.263	15.437	15.437	15.437	15.437	15.437	15.437	15.437	15.437	15.437	15.437	15.437	15.437	15.437	15.437	15.437	
230	1253.1	15.320	14.207	14.002	14.002	14.002	17.994	17.994	14.002	14.002	14.002	15.320	15.320	15.320	15.320	15.320	15.320	15.320	15.320	15.320	15.320	15.320	15.320	15.320	15.320	15.320	
240	1274.6	15.204	14.097	14.097	14.097	14.097	17.994	17.994	14.097	14.097	14.097	15.204	15.204	15.204	15.204	15.204	15.204	15.204	15.204	15.204	15.204	15.204	15.204	15.204	15.204	15.204	
250	1292.4	15.097	14.096	12.738	14.096	14.096	17.994	17.994	14.096	14.096	14.096	15.097	15.097	15.097	15.097	15.097	15.097	15.097	15.097	15.097	15.097	15.097	15.097	15.097	15.097	15.097	
260	1307.3	14.990	13.756	15.203	11.577	11.577	17.994	17.994	11.577	11.577	11.577	14.990	14.990	14.990	14.990	14.990	14.990	14.990	14.990	14.990	14.990	14.990	14.990	14.990	14.990	14.990	
270	1319.7	14.885	13.637	13.520	15.143	11.432	12.800	12.800	10.811	10.811	10.811	14.885	14.885	14.885	14.885	14.885	14.885	14.885	14.885	14.885	14.885	14.885	14.885	14.885	14.885	14.885	14.885
280	1330.1	14.782	13.405	13.405	13.405	13.405	17.994	17.994	13.405	13.405	13.405	14.782	14.782	14.782	14.782	14.782	14.782	14.782	14.782	14.782	14.782	14.782	14.782	14.782	14.782	14.782	
290	1338.9	14.681	13.291	13.291	13.291	13.291</																					

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 1400 K

HEIGHT KM	TEMP K	LOG(N(N2) /M3)			LOG(N(O2) /M3)			LOG(N(O) /M3)			LOG(N(A) /M3)			LOG(N(HE) /M3)			LOG(N(H) /M3)			(PRESSURE NT/M2)			LOG (DEN. KG/M3)		
		MEAN MCL WT	DENSITY KM	DENSITY HT	MEAN MCL WT	DENSITY KM	DENSITY HT	MEAN MCL WT	DENSITY KM	DENSITY HT	MEAN MCL WT	DENSITY KM	DENSITY HT	MEAN MCL WT	DENSITY KM	DENSITY HT	MEAN MCL WT	DENSITY KM	DENSITY HT	MEAN MCL WT	DENSITY KM	DENSITY HT			
420	1385.2	13.443	11.993	14.371	9.530	12.601	10.698	14.428	5.291	17.12	73.19	7.61E-12	-11.119												
440	1387.6	13.261	11.785	14.666	9.270	12.574	10.689	14.317	-5.401	16.88	5.81E-12	-11.236													
460	1389.5	13.080	11.579	14.163	9.012	12.548	10.680	14.208	-5.509	16.67	7.69	4.47E-12	-11.350												
480	1391.0	12.901	11.374	14.060	8.957	12.522	10.672	14.102	-5.615	16.46	7.80	3.46E-12	-11.461												
500	1392.3	12.723	11.170	13.958	8.503	12.496	10.665	13.998	-5.719	16.28	8.02	2.69E-12	-11.571												
520	1393.3	12.546	10.968	13.857	8.051	12.471	10.651	13.895	-5.821	16.10	7.78	2.10E-12	-11.678												
540	1394.2	12.370	10.767	13.757	8.000	12.446	10.651	13.795	-5.921	15.92	8.31	1.65E-12	-11.783												
560	1394.9	12.195	10.568	13.657	7.751	12.221	10.644	13.696	-6.019	15.74	8.45	1.50E-12	-11.887												
580	1395.5	12.022	10.370	13.558	7.504	12.396	10.637	13.599	-6.116	15.56	8.57	1.03E-12	-11.989												
600	1396.0	11.850	10.173	13.459	7.258	12.371	10.630	13.504	-6.211	15.37	8.70	8.14E-13	-12.089												
620	1396.5	11.678	9.978	13.361	7.014	12.347	10.623	13.410	-6.305	15.17	8.82	6.48E-13	-12.188												
640	1396.9	11.508	9.783	13.264	6.771	12.322	10.617	13.319	-6.396	14.95	8.94	5.17E-13	-12.286												
660	1397.2	11.339	9.590	13.167	6.530	12.298	10.611	13.229	-6.485	14.72	9.05	4.14E-13	-12.383												
680	1397.5	11.171	9.398	13.071	6.290	12.274	10.604	13.142	-6.573	14.46	9.18	3.33E-13	-12.477												
700	1397.7	11.004	9.207	12.976	6.052	12.250	10.598	13.056	-6.658	14.18	9.36	2.68E-13	-12.572												
720	1397.9	10.837	9.017	12.881	5.807	12.226	10.597	12.973	-6.742	13.88	9.43	2.16E-13	-12.665												
740	1398.1	10.672	8.828	12.886	5.603	12.203	10.586	12.892	-6.823	13.55	9.57	1.75E-13	-12.756												
760	1398.3	10.508	8.641	12.693	5.408	12.179	10.580	12.813	-6.901	13.19	9.72	1.43E-13	-12.846												
780	1398.4	10.345	8.454	12.599	5.216	12.156	10.574	12.738	-6.977	12.80	9.88	1.16E-13	-12.935												
800	1398.6	10.182	8.269	12.507	5.013	12.133	10.568	12.665	-7.050	12.40	10.56	9.51E-14	-13.022												
820	1398.7	10.021	8.084	12.414	4.814	12.109	10.562	12.594	-7.120	11.96	10.24	7.81E-14	-13.108												
840	1398.8	9.860	7.901	12.323	4.623	12.087	10.556	12.527	-7.187	11.51	10.45	6.43E-14	-13.191												
860	1398.9	9.700	7.718	12.231	4.424	12.064	10.550	12.463	-7.251	11.05	10.40	6.33E-14	-13.274												
880	1399.0	9.542	7.537	12.141	4.224	12.041	10.545	12.401	-7.313	10.58	10.41	4.43E-14	-13.354												
900	1399.0	9.384	7.357	12.051	4.024	12.018	10.539	12.343	-7.371	10.10	11.29	3.69E-14	-13.432												
920	1399.1	9.227	7.177	11.961	3.851	11.996	10.533	12.288	-7.426	9.62	11.50	3.10E-14	-13.509												
940	1399.2	9.071	6.999	11.872	3.652	11.974	10.528	12.236	-7.479	9.15	12.10	2.61E-14	-13.583												
960	1399.2	8.915	6.822	11.783	3.452	11.951	10.522	12.186	-7.528	8.69	12.30	2.02E-14	-13.655												
980	1399.3	8.761	6.695	11.695	3.252	11.929	10.516	12.139	-7.575	8.25	12.75	1.89E-14	-13.724												
1000	1399.3	8.607	6.470	11.607	3.052	11.907	10.511	12.095	-7.619	7.83	13.22	1.62E-14	-13.791												
1050	1399.4	8.227	6.036	11.390	11.853	10.497	11.996	-7.718	6.89	14.75	1.13E-14	-13.946													
1100	1399.5	7.852	5.76	11.236	11.800	10.484	11.909	-7.805	6.11	16.6	8.22E-15	-14.085													
1150	1399.6	7.482	5.464	11.118	11.747	10.470	11.832	-7.882	5.50	18.9	8.21E-15	-14.207													
1200	1399.6	7.117	5.166	11.056	11.694	10.457	11.764	-7.950	5.03	21.7	9.43E-15	-14.314													
1250	1399.7	6.756	4.901	10.950	11.643	10.444	11.701	-8.013	4.68	24.7	3.91E-15	-14.408													
1300	1399.7	6.401	4.641	10.847	11.592	10.431	11.644	-8.070	4.42	27.9	3.23E-15	-14.490													
1350	1399.8	6.050	4.346	10.746	11.542	10.418	11.589	-8.125	4.23	31.2	2.73E-15	-14.564													
1400	1399.8	9.748	11.492	10.406	11.538	10.406	11.538	-8.176	4.09	34.2	2.34E-15	-14.630													
1450	1399.8	9.753	11.444	10.394	11.489	10.444	11.489	-8.225	3.98	37.0	2.04E-15	-14.691													
1500	1399.8	9.660	11.395	10.382	11.441	10.441	11.441	-8.273	3.90	39.5	1.79E-15	-14.748													
1600	1399.9	9.182	11.301	10.358	11.358	10.484	11.909	-7.805	3.78	43.5	8.3	1.41E-15	-14.852												
1700	1399.9	8.813	11.208	10.334	11.264	10.470	11.82	-8.450	3.69	46.6	10.13E-15	-14.948													
1800	1399.9	8.453	10.964	10.312	11.118	10.431	11.782	-8.532	3.62	48.9	8.05	9.14E-16	-15.039												
1900	1399.9	8.101	10.101	11.030	10.290	11.103	11.030	-8.611	3.55	51.0	7.49E-16	-15.126													
2000	1399.9	7.759	10.945	10.268	11.028	10.268	11.028	-8.696	3.49	52.8	6.18E-16	-15.209													
2100	1399.9	7.424	10.861	10.247	10.956	10.247	10.956	-8.758	3.42	54.6	5.13E-16	-15.290													
2200	1399.9	7.097	10.779	10.226	10.886	10.226	10.886	-8.828	3.35	56.3	4.28E-16	-15.368													
2300	1400.0	6.778	10.699	10.206	10.820	10.206	10.820	-8.894	3.28	58.1	4.06E-16	-15.444													
2400	1400.0	6.465	10.621	10.186	10.757	10.186	10.757	-8.957	3.20	60.0	3.04E-16	-15.518													
2500	1400.0	6.160	10.545	10.167	10.697	10.167	10.697	-9.017	3.12	61.9	2.58E-16	-15.589													

EXOSPHERIC TEMPERATURE \approx 1500 K

HEIGHT KM	TEMP K	LOG(N(N ₂) /M ₃)			LOG(N(O ₂) /M ₃)			LOG(N(A) /M ₃)			LOG(N(H) /M ₃)			(PRESSURE NT/M ²)			MOL WT SCALE HT KM			DENSITY KG/M ³			LOG(DEN KG/M ³)						
		LOG(N(O ₂))	LOG(N(N ₂))	LOG(N(A))	LOG(N(H))	LOG(N(H ₂))	LOG(N(O))	LOG(N(A))	LOG(N(H))	LOG(N(H ₂))	LOG(N(O))	LOG(N(A))	LOG(N(H))	LOG(N(H ₂))	LOG(N(O))	LOG(N(A))	LOG(N(H))	LOG(N(H ₂))	LOG(N(O))	LOG(N(A))	LOG(N(H))	LOG(N(H ₂))	LOG(N(O))	LOG(N(A))	LOG(N(H))	LOG(N(H ₂))			
90	188.0	19.746	19.170	17.390	17.824	14.573	19.854	•732	28.91	5.63	3.43E-06	-5.465	-5.620	-5.620	-5.40E-06	-5.620	-5.620	-5.40E-06	-5.620	-5.620	-5.40E-06	-5.620	-5.620	-5.40E-06	-5.620	-5.620			
92	188.1	19.592	19.009	17.547	17.669	14.418	19.700	•886	28.15	5.58	5.54	1.67E-06	-5.776	-5.776	-5.776	-1.040	28.76	5.52	5.52	1.17E-06	-5.933	-5.933	-5.933	-1.17E-06	-5.933	-5.933			
94	188.6	19.436	18.843	18.672	17.645	17.514	19.263	19.515	28.65	5.52	5.52	1.17E-06	-5.776	-5.776	-5.776	-1.040	28.76	5.52	5.52	1.17E-06	-5.933	-5.933	-5.933	-1.17E-06	-5.933	-5.933			
96	189.7	19.281	18.672	18.479	17.685	17.359	19.108	19.389	28.65	5.52	5.52	1.17E-06	-5.776	-5.776	-5.776	-1.040	28.76	5.52	5.52	1.17E-06	-5.933	-5.933	-5.933	-1.17E-06	-5.933	-5.933			
98	191.7	19.125	18.498	17.686	17.686	17.203	19.952	19.234	28.52	5.52	5.52	1.17E-06	-5.776	-5.776	-5.776	-1.040	28.76	5.52	5.52	1.17E-06	-5.933	-5.933	-5.933	-1.17E-06	-5.933	-5.933			
100	195.0	18.970	18.322	17.664	17.664	17.047	13.796	19.079	28.36	5.50	5.50	1.17E-06	-5.776	-5.776	-5.776	-1.040	28.76	5.50	5.50	1.17E-06	-5.933	-5.933	-5.933	-1.17E-06	-5.933	-5.933			
102	200.1	18.817	18.147	17.597	16.855	13.769	18.926	16.632	28.21	5.50	5.50	1.17E-06	-5.776	-5.776	-5.776	-1.040	28.76	5.50	5.50	1.17E-06	-5.933	-5.933	-5.933	-1.17E-06	-5.933	-5.933			
104	208.1	18.664	17.969	17.538	16.624	13.739	18.773	16.622	28.02	5.50	5.50	1.17E-06	-5.776	-5.776	-5.776	-1.040	28.76	5.50	5.50	1.17E-06	-5.933	-5.933	-5.933	-1.17E-06	-5.933	-5.933			
106	219.3	18.511	17.788	17.479	16.415	13.707	18.622	16.897	27.81	5.62	5.62	1.17E-06	-5.776	-5.776	-5.776	-1.040	28.76	5.62	5.62	1.17E-06	-5.933	-5.933	-5.933	-1.17E-06	-5.933	-5.933			
108	234.6	18.359	17.603	17.417	16.211	13.671	18.472	16.017	27.56	5.70	5.70	1.17E-06	-5.776	-5.776	-5.776	-1.040	28.76	5.70	5.70	1.17E-06	-5.933	-5.933	-5.933	-1.17E-06	-5.933	-5.933			
110	254.2	18.211	17.417	17.348	16.014	13.633	18.326	16.365	27.30	5.88	5.88	1.17E-06	-5.776	-5.776	-5.776	-1.040	28.76	5.88	5.88	1.17E-06	-5.933	-5.933	-5.933	-1.17E-06	-5.933	-5.933			
115	317.7	17.870	16.985	17.157	15.569	13.538	17.993	2.365	26.70	6.99	4.36E-08	-7.360	-7.360	-7.360	-2.365	26.70	6.99	4.36E-08	-7.360	-7.360	-7.360	-2.365	26.70	6.99	4.36E-08	-7.360	-7.360		
120	388.4	17.586	16.652	16.971	15.201	13.456	17.720	2.702	26.25	8.59	2.29E-08	-7.673	-7.673	-7.673	-2.702	26.25	8.59	2.29E-08	-7.673	-7.673	-7.673	-2.702	26.25	8.59	2.29E-08	-7.673	-7.673		
125	461.6	17.348	16.386	16.805	14.894	13.386	17.494	2.702	25.89	10.16	1.34E-08	-8.070	-8.070	-8.070	-2.702	25.89	10.16	1.34E-08	-8.070	-8.070	-8.070	-2.702	25.89	10.16	1.34E-08	-8.070	-8.070		
130	535.6	17.145	16.662	16.662	14.632	13.326	17.302	2.829	25.57	11.91	8.51E-09	-8.405	-8.405	-8.405	-2.829	25.57	11.91	8.51E-09	-8.405	-8.405	-8.405	-2.829	25.57	11.91	8.51E-09	-8.405	-8.405		
135	608.5	16.969	15.969	16.538	14.405	13.275	17.137	2.939	25.28	13.73	5.76E-09	-8.740	-8.740	-8.740	-2.939	25.28	13.73	5.76E-09	-8.740	-8.740	-8.740	-2.939	25.28	13.73	5.76E-09	-8.740	-8.740		
140	678.9	16.814	15.800	16.429	14.205	13.230	16.994	3.034	25.01	15.62	4.09E-09	-9.519	-9.519	-9.519	-3.034	25.01	15.62	4.09E-09	-9.519	-9.519	-9.519	-3.034	25.01	15.62	4.09E-09	-9.519	-9.519		
145	746.2	16.677	15.649	16.333	14.026	13.191	16.867	3.120	24.75	17.56	3.03E-09	-9.636	-9.636	-9.636	-3.120	24.75	17.56	3.03E-09	-9.636	-9.636	-9.636	-3.120	24.75	17.56	3.03E-09	-9.636	-9.636		
150	809.5	16.553	15.513	15.389	14.247	13.865	16.754	3.198	24.51	19.56	2.31E-09	-9.710	-9.710	-9.710	-3.198	24.51	19.56	2.31E-09	-9.710	-9.710	-9.710	-3.198	24.51	19.56	2.31E-09	-9.710	-9.710		
155	868.6	16.441	15.411	15.718	14.170	13.126	16.653	3.269	24.28	21.57	1.81E-09	-9.886	-9.886	-9.886	-3.269	24.28	21.57	1.81E-09	-9.886	-9.886	-9.886	-3.269	24.28	21.57	1.81E-09	-9.886	-9.886		
160	923.2	16.339	15.275	16.100	13.583	13.098	11.214	16.560	3.334	24.06	23.59	1.45E-09	-9.838	-9.838	-9.838	-3.334	24.06	23.59	1.45E-09	-9.838	-9.838	-9.838	-3.334	24.06	23.59	1.45E-09	-9.838	-9.838	
170	1019.2	16.155	15.072	15.977	13.340	13.052	11.127	16.398	3.454	23.64	27.58	9.81E-10	-9.008	-9.008	-9.008	-3.454	23.64	27.58	9.81E-10	-9.008	-9.008	-9.008	-3.454	23.64	27.58	9.81E-10	-9.008	-9.008	
180	1099.0	15.994	14.893	15.871	13.124	13.013	11.057	16.258	3.561	23.25	31.42	6.99E-10	-9.156	-9.156	-9.156	-3.561	23.25	31.42	6.99E-10	-9.156	-9.156	-9.156	-3.561	23.25	31.42	6.99E-10	-9.156	-9.156	
190	1164.7	15.849	14.731	15.778	12.929	12.980	11.000	16.134	3.660	22.88	35.04	5.17E-10	-9.286	-9.286	-9.286	-3.660	22.88	35.04	5.17E-10	-9.286	-9.286	-9.286	-3.660	22.88	35.04	5.17E-10	-9.286	-9.286	
200	1218.7	15.717	14.582	15.693	12.747	12.952	10.940	16.023	3.751	22.52	38.42	3.94E-10	-9.405	-9.405	-9.405	-3.751	22.52	38.42	3.94E-10	-9.405	-9.405	-9.405	-3.751	22.52	38.42	3.94E-10	-9.405	-9.405	
210	1263.0	15.593	14.442	15.616	12.415	12.904	10.864	15.826	3.920	22.17	41.48	3.07E-10	-9.513	-9.513	-9.513	-3.920	22.17	41.48	3.07E-10	-9.513	-9.513	-9.513	-3.920	22.17	41.48	3.07E-10	-9.513	-9.513	
220	1299.4	15.475	14.310	15.543	12.415	12.904	10.864	15.826	3.920	21.84	44.33	2.43E-10	-9.615	-9.615	-9.615	-3.920	21.84	44.33	2.43E-10	-9.615	-9.615	-9.615	-3.920	21.84	44.33	2.43E-10	-9.615	-9.615	
230	1329.4	15.364	14.184	14.184	15.475	12.260	12.883	10.835	15.737	3.995	21.52	46.94	1.95E-10	-9.710	-9.710	-9.710	-3.995	21.52	46.94	1.95E-10	-9.710	-9.710	-9.710	-3.995	21.52	46.94	1.95E-10	-9.710	-9.710
240	1354.3	15.256	14.063	14.063	15.411	12.111	12.864	10.809	15.653	4.075	21.21	49.71	1.59E-10	-9.800	-9.800	-9.800	-4.075	21.21	49.71	1.59E-10	-9.800	-9.800	-9.800	-4.075	21.21	49.71	1.59E-10	-9.800	-9.800
250	1374.9	15.152	13.945	15.348	12.846	11.965	10.786	15.574	4.148	20.91	51.60	1.30E-10	-9.886	-9.886	-9.886	-4.148	20.91	51.60	1.30E-10	-9.886	-9.886	-9.886	-4.148	20.91	51.60	1.30E-10	-9.886	-9.886	
260	1392.1	15.051	13.830	15.288	11.823	12.829	10.767	15.497	4.197	20.62	53.69	1.08E-10	-9.968	-9.968	-9.968	-4.197	20.62	53.69	1.08E-10	-9.968	-9.968	-9.968	-4.197	20.62	53.69	1.08E-10	-9.968	-9.968	
270	1404.5	14.952	13.717	15.230	11.684	12.813	10.749	15.424	4.288	20.34	55.62	8.96E-11	-10.048	-10.048	-10.048	-4.288	20.34	55.62	8.96E-11	-10.048	-10.048	-10.048	-4.288	20.34	55.62	8.96E-11	-10.048	-10.048	
280	1418.6	14.855	13.607	15.173	11.547	12.797	10.737	15.352	4.356	20.08	57.46	7.51E-11	-10.125	-10.125	-10.125	-4.356	20.08	57.46	7.51E-11	-10.125	-10.125	-10.125	-4.356	20.08	57.46	7.51E-11	-10.125	-10.125	
290	1428.9	14.759	13.498	15.117	11.412	12.782	10.720	15.284	4.421	19.82	59.20	6.32E-11	-10.199	-10.199	-10.199	-4.421	19.82	59.20	6.32E-11	-10.199	-10.199	-10.199	-4.421	19.82	59.20	6.32E-11	-10.199	-10.199	
300	1437.5	14.665	13.391	15.062	11.279	12.767	10.708	15.217	4.486	19.57	60.86	5.35E-11	-10.271	-10.271	-10.271	-4.486	19.57	60.86	5.35E-11	-10.271	-10.271	-10.271	-4.486	19.57	60.86	5.35E-11	-10.271	-10.271	
310	1444.9	14.573	13.286	15.008	11.017	12.753	10.696	15.152	4.549	19.34	62.44	4.55E-11	-10.342	-10.342	-10.342	-4.549	19.34	62.44	4.55E-11	-10.342	-10.342	-10.342	-4.549	19.34	62.44	4.55E-11	-10.342	-10.342	
320	1451.3	14.481	13.181	14.955	11.017	12.739	10.686	15.088	4.610	19.11	63.96	3.89E-11	-10.411	-10.411	-10.411	-4.610</													

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 1500 K

HEIGHT KM	TEMP K	LOG(N(N ₂) /M ₃)			LOG(N(O ₂) /M ₃)			LOG(N(O) /M ₃)			LOG(N(A) /M ₃)			LOG(N(HE) /M ₃)			LOG(N(H) /M ₃)			(PRESSURE NT/M ²)		
		MEAN MCL WT	DENSITY KM	SCALE HT	MEAN MCL WT	DENSITY KM	SCALE HT	MEAN MCL WT	DENSITY KM	SCALE HT	MEAN MCL WT	DENSITY KM	SCALE HT	MEAN MCL WT	DENSITY KM	SCALE HT	MEAN MCL WT	DENSITY KM	SCALE HT	MEAN MCL WT	DENSITY KM	
420	1482.8	13.600	12.176	14.448	9.765	12.609	10.617	14.513	-5.176	17.39	76.75	9.40E-12	-11.027	-5.281	17.14	78.88	7.27E-12	-11.138	-5.383	16.91	80.87	5.66E-12
440	1485.5	13.429	11.981	14.350	9.522	12.584	10.607	14.407	-5.281	17.14	78.88	4.43E-15	-11.247	-5.483	16.71	82.75	4.43E-15	-11.353	-5.582	16.52	84.51	3.49E-12
460	1487.8	13.260	11.789	14.253	9.282	12.560	10.599	14.305	-5.383	16.91	80.87	-4.30E-15	-11.457	-5.582	16.52	84.51	3.49E-12	-11.559	-5.682	16.34	86.17	2.76E-12
480	1489.6	13.093	11.597	14.157	9.043	12.535	10.591	14.204	-5.483	16.71	82.75	-4.17E-15	-11.659	-5.582	16.52	84.51	3.49E-12	-11.757	-5.782	16.34	86.17	2.76E-12
500	1491.0	12.926	11.407	14.062	8.806	12.511	10.584	14.105	-5.582	16.71	82.75	-4.07E-15	-11.853	-5.582	16.52	84.51	3.49E-12	-11.949	-5.882	16.34	86.17	2.76E-12
520	1492.2	12.761	11.228	13.967	8.570	12.488	10.577	14.008	-5.678	16.34	82.75	-3.97E-15	-12.057	-5.582	16.52	84.51	3.49E-12	-12.155	-5.982	16.34	86.17	2.76E-12
540	1493.2	12.597	11.031	13.874	8.336	12.464	10.570	13.912	-5.773	16.17	82.73	-3.87E-15	-12.256	-5.582	16.52	84.51	3.49E-12	-12.353	-5.882	16.34	86.17	2.76E-12
560	1494.1	12.434	10.845	13.80	8.104	12.441	10.564	13.819	-5.867	16.00	82.70	-3.77E-15	-12.455	-5.582	16.52	84.51	3.49E-12	-12.553	-5.782	16.34	86.17	2.76E-12
580	1494.8	12.272	10.660	13.688	7.873	12.417	10.557	13.727	-5.959	15.84	80.60	-3.67E-15	-12.653	-5.582	16.52	84.51	3.49E-12	-12.751	-5.682	16.34	86.17	2.76E-12
600	1495.4	12.111	10.476	13.596	7.644	12.394	10.551	13.636	-6.049	15.67	91.94	-3.57E-15	-12.851	-5.582	16.52	84.51	3.49E-12	-12.949	-5.582	16.34	86.17	2.76E-12
620	1495.9	11.951	10.293	13.504	7.416	12.371	10.544	13.547	-6.138	15.50	93.23	-3.47E-15	-13.042	-5.582	16.52	84.51	3.49E-12	-13.140	-5.482	16.34	86.17	2.76E-12
640	1496.3	11.792	10.112	13.414	7.189	12.349	10.538	13.460	-6.225	15.32	94.50	-3.37E-15	-13.238	-5.582	16.52	84.51	3.49E-12	-13.336	-5.382	16.34	86.17	2.76E-12
660	1496.7	11.634	9.931	13.323	6.964	12.326	10.532	13.374	-6.311	15.13	95.74	-3.27E-15	-13.434	-5.582	16.52	84.51	3.49E-12	-13.532	-5.282	16.34	86.17	2.76E-12
680	1497.0	11.477	9.752	13.234	6.740	12.304	10.526	13.289	-6.395	14.92	96.97	-3.17E-15	-13.630	-5.582	16.52	84.51	3.49E-12	-13.728	-5.182	16.34	86.17	2.76E-12
700	1497.3	11.321	9.574	13.144	6.518	12.281	10.520	13.207	-6.478	14.71	98.20	-3.07E-15	-13.826	-5.582	16.52	84.51	3.49E-12	-13.924	-5.082	16.34	86.17	2.76E-12
720	1497.6	11.166	9.397	13.056	6.296	12.259	10.514	13.126	-6.559	14.47	99.47	-2.97E-15	-14.022	-5.582	16.52	84.51	3.49E-12	-14.119	-4.982	16.34	86.17	2.76E-12
740	1497.8	11.012	9.221	12.968	6.076	12.237	10.509	13.047	-6.637	14.21	100.76	-2.87E-15	-14.218	-5.582	16.52	84.51	3.49E-12	-14.316	-4.882	16.34	86.17	2.76E-12
760	1498.0	10.858	9.045	12.880	5.871	12.215	10.503	12.970	-6.714	13.93	102.11	-2.77E-15	-14.414	-5.582	16.52	84.51	3.49E-12	-14.512	-4.792	16.34	86.17	2.76E-12
780	1498.2	10.706	9.228	12.793	5.698	12.193	10.497	12.895	-6.789	13.63	103.52	-2.67E-15	-14.609	-5.582	16.52	84.51	3.49E-12	-14.707	-4.692	16.34	86.17	2.76E-12
800	1498.3	10.554	9.085	12.706	5.498	12.171	10.492	12.822	-6.862	13.31	105.02	-2.57E-15	-14.805	-5.582	16.52	84.51	3.49E-12	-14.893	-4.592	16.34	86.17	2.76E-12
820	1498.5	10.404	8.926	12.620	5.296	12.150	10.486	12.751	-6.933	12.97	106.30	-2.47E-15	-15.001	-5.582	16.52	84.51	3.49E-12	-15.196	-4.492	16.34	86.17	2.76E-12
840	1498.6	10.254	8.735	12.535	5.096	12.128	10.481	12.683	-7.001	12.60	108.30	-2.37E-15	-15.296	-5.582	16.52	84.51	3.49E-12	-15.394	-4.392	16.34	86.17	2.76E-12
860	1498.7	10.105	8.185	12.450	4.886	12.107	10.475	12.617	-7.067	12.22	110.15	-2.27E-15	-15.494	-5.582	16.52	84.51	3.49E-12	-15.592	-4.292	16.34	86.17	2.76E-12
880	1498.8	9.957	8.015	12.365	4.636	12.086	10.470	12.553	-7.131	11.82	112.17	-2.17E-15	-15.691	-5.582	16.52	84.51	3.49E-12	-15.789	-4.192	16.34	86.17	2.76E-12
900	1498.9	9.809	7.809	12.281	4.386	12.065	10.465	12.492	-7.192	11.40	114.38	-2.07E-15	-15.889	-5.582	16.52	84.51	3.49E-12	-15.987	-4.092	16.34	86.17	2.76E-12
920	1499.0	9.663	7.663	12.197	4.136	12.044	10.454	12.434	-7.251	11.00	116.80	-1.97E-15	-16.086	-5.582	16.52	84.51	3.49E-12	-16.184	-3.992	16.34	86.17	2.76E-12
940	1499.0	9.517	7.513	12.114	3.886	12.023	10.454	12.378	-7.306	10.53	118.48	-1.87E-15	-16.284	-5.582	16.52	84.51	3.49E-12	-16.382	-3.892	16.34	86.17	2.76E-12
960	1499.1	9.372	7.347	12.031	3.636	12.002	10.449	12.324	-7.360	10.10	122.43	-1.77E-15	-16.481	-5.582	16.52	84.51	3.49E-12	-16.579	-3.792	16.34	86.17	2.76E-12
980	1499.2	9.228	7.183	11.949	3.386	11.982	10.444	12.273	-7.411	9.66	125.69	-1.67E-15	-16.677	-5.582	16.52	84.51	3.49E-12	-16.775	-3.692	16.34	86.17	2.76E-12
1000	1499.2	9.085	7.019	11.867	3.136	11.961	10.438	12.225	-7.459	9.23	129.30	-1.57E-15	-16.873	-5.582	16.52	84.51	3.49E-12	-16.971	-3.592	16.34	86.17	2.76E-12
1050	1499.3	8.730	6.614	11.664	1.986	11.911	10.426	12.115	-7.569	8.20	140.05	-1.47E-15	-17.171	-5.582	16.52	84.51	3.49E-12	-17.269	-3.492	16.34	86.17	2.76E-12
1100	1499.4	8.379	6.214	11.464	1.836	11.861	10.413	12.018	-7.666	7.28	153.80	-1.37E-15	-17.479	-5.582	16.52	84.51	3.49E-12	-17.577	-3.392	16.34	86.17	2.76E-12
1150	1499.5	8.034	5.974	11.267	1.681	11.811	10.400	11.933	-7.751	6.50	171.06	-1.27E-15	-17.777	-5.582	16.52	84.51	3.49E-12	-17.875	-3.292	16.34	86.17	2.76E-12
1200	1499.6	7.693	5.724	11.072	1.529	11.762	10.388	11.858	-7.826	5.87	192.16	-1.17E-15	-18.075	-5.582	16.52	84.51	3.49E-12	-18.173	-3.192	16.34	86.17	2.76E-12
1250	1499.6	7.357	5.474	10.880	1.374	11.714	10.376	11.791	-7.893	5.36	217.19	-1.07E-15	-18.373	-5.582	16.52	84.51	3.49E-12	-18.471	-3.092	16.34	86.17	2.76E-12
1300	1499.7	7.025	5.224	10.690	1.224	11.667	10.364	11.730	-7.954	4.97	245.72	-9.7E-15	-18.671	-5.582	16.52	84.51	3.49E-12	-18.769	-2.992	16.34	86.17	2.76E-12
1350	1499.7	6.697	4.974	10.503	1.074	11.620	10.352	11.673	-8.011	4.67	276.83	-8.66E-15	-19.070	-5.582	16.52	84.51	3.49E-12	-19.158	-2.892	16.34	86.17	2.76E-12
1400	1499.7	6.374	4.724	10.319	1.034	11.574	10.341	11.621	-8.063	4.44	309.24	-7.66E-15	-19.468	-5.582	16.52	84.51	3.49E-12	-19.556	-2.792	16.34	86.17	2.76E-12
1450	1499.8	6.055	4.474	10.136	1.004	11.528	10.329	11.571	-8.113	4.27	341.64	-6.64E-15	-19.866	-5.582	16.52	84.51	3.49E-12	-19.954	-2.692	16.34	86.17	2.76E-12
1500	1499.8	5.783	4.224	9.956	9.956	11.483	10.318	11.524	-8.160	4.14	372.69	-5.64E-15	-20.274	-5.582	16.52	84.51	3.49E-12	-20.362	-2.592	16.34	86.17	2.76E-12
1600	1499.8	5.603	3.974	9.259	9.259	11.395	10.295	11.435	-8.249	3.96												

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 1600 K

HEIGHT KM	TEMP K	LOG(N(O2) /M3)			LOG(N(O) /M3)			LOG(N(A) /M3)			LOG(N(HE) /M3)			LOG(N(H) /M3)			LOG(PRESSURE NT/M2)			LOG(DEN KG/M3)			
		MEAN DENSITY KG/M3	MOL WT	SCALE HT KM	MEAN DENSITY KG/M3	MOL WT	SCALE HT KM	MEAN DENSITY KG/M3	MOL WT	SCALE HT KM	MEAN DENSITY KG/M3	MOL WT	SCALE HT KM										
90	188.0	19.746	19.170	17.390	17.824	14.573	19.854	19.732	28.91	5.63	3.43E-06	5.465	1.42E-06	5.465	2.40E-06	5.58	1.42E-06	5.58	2.40E-06	5.58	1.42E-06	5.58	2.40E-06
92	188.1	19.592	19.009	17.547	17.669	14.418	19.700	18.886	28.85	5.58	3.43E-06	5.620	1.42E-06	5.620	2.40E-06	5.54	1.42E-06	5.54	2.40E-06	5.54	1.42E-06	5.54	2.40E-06
94	188.7	19.436	18.843	17.645	17.514	14.263	19.545	17.040	28.76	5.51	1.67E-06	5.776	1.42E-06	5.776	2.40E-06	5.51	1.67E-06	5.51	2.40E-06	5.51	1.67E-06	5.51	2.40E-06
96	189.8	19.281	18.672	17.685	17.359	14.108	19.389	17.193	28.65	5.51	1.17E-06	5.933	1.42E-06	5.933	2.40E-06	5.51	1.17E-06	5.51	2.40E-06	5.51	1.17E-06	5.51	2.40E-06
98	191.8	19.125	18.498	17.686	17.203	13.952	19.234	17.343	28.52	5.51	8.11E-07	6.091	1.42E-06	6.091	2.40E-06	5.51	8.11E-07	5.51	2.40E-06	5.51	8.11E-07	5.51	2.40E-06
100	195.2	18.969	18.322	17.663	17.047	13.796	19.079	17.491	28.36	5.60	5.64E-07	6.248	1.42E-06	6.248	2.40E-06	5.60	5.64E-07	5.60	2.40E-06	5.60	5.64E-07	5.60	2.40E-06
102	200.6	18.817	18.147	17.597	16.835	13.769	18.926	17.632	28.21	5.58	3.95E-07	6.404	1.42E-06	6.404	2.40E-06	5.58	3.95E-07	5.58	2.40E-06	5.58	3.95E-07	5.58	2.40E-06
104	208.7	18.664	17.969	17.537	16.624	13.739	18.773	17.768	28.03	5.59	2.76E-07	6.559	1.42E-06	6.559	2.40E-06	5.59	2.76E-07	5.59	2.40E-06	5.59	2.76E-07	5.59	2.40E-06
106	220.2	18.511	17.788	17.478	16.415	13.706	18.621	17.896	27.81	5.62	1.93E-07	6.714	1.42E-06	6.714	2.40E-06	5.62	1.93E-07	5.62	2.40E-06	5.62	1.93E-07	5.62	2.40E-06
108	236.0	18.359	17.603	17.416	16.211	13.670	18.471	17.016	27.56	5.70	1.36E-07	6.868	1.42E-06	6.868	2.40E-06	5.70	1.36E-07	5.70	2.40E-06	5.70	1.36E-07	5.70	2.40E-06
110	256.2	18.210	17.416	17.346	16.015	13.631	18.325	17.126	27.30	5.88	9.59E-08	7.018	1.42E-06	7.018	2.40E-06	5.88	9.59E-08	5.88	2.40E-06	5.88	9.59E-08	5.88	2.40E-06
115	231.5	17.869	16.985	17.155	15.571	13.536	17.993	17.360	26.71	7.01	4.36E-08	7.360	1.42E-06	7.360	2.40E-06	7.01	4.36E-08	7.01	2.40E-06	7.01	4.36E-08	7.01	2.40E-06
120	394.3	17.587	16.654	16.969	15.206	13.453	17.721	17.543	26.26	8.63	2.29E-08	7.640	1.42E-06	7.640	2.40E-06	8.63	2.29E-08	8.63	2.40E-06	8.63	2.29E-08	8.63	2.40E-06
125	469.6	17.350	16.390	16.804	14.901	13.383	17.492	17.693	25.91	10.24	1.35E-08	7.871	1.42E-06	7.871	2.40E-06	10.24	1.35E-08	10.24	2.40E-06	10.24	1.35E-08	10.24	2.40E-06
130	565.8	17.149	16.169	16.661	14.642	13.323	17.305	17.818	25.60	12.01	8.59E-09	8.066	1.42E-06	8.066	2.40E-06	12.01	8.59E-09	12.01	2.40E-06	12.01	8.59E-09	12.01	2.40E-06
135	621.0	16.975	15.978	16.537	14.417	13.271	17.142	17.925	25.32	13.85	5.83E-09	8.335	1.42E-06	8.335	2.40E-06	13.85	5.83E-09	13.85	2.40E-06	13.85	5.83E-09	13.85	2.40E-06
140	694.1	16.822	15.810	16.429	14.220	13.226	16.999	17.019	25.05	15.75	4.15E-09	8.381	1.42E-06	8.381	2.40E-06	15.75	4.15E-09	15.75	2.40E-06	15.75	4.15E-09	15.75	2.40E-06
145	764.4	16.686	15.660	16.334	14.043	13.187	16.874	17.013	24.81	17.71	3.08E-09	8.511	1.42E-06	8.511	2.40E-06	17.71	3.08E-09	17.71	2.40E-06	17.71	3.08E-09	17.71	2.40E-06
150	831.1	16.564	15.526	16.248	13.885	13.152	16.762	17.179	24.57	19.71	2.36E-09	8.628	1.42E-06	8.628	2.40E-06	19.71	2.36E-09	19.71	2.40E-06	19.71	2.36E-09	19.71	2.40E-06
155	893.8	16.453	15.404	16.171	13.740	13.121	16.661	17.248	24.35	21.75	1.85E-09	8.732	1.42E-06	8.732	2.40E-06	21.75	1.85E-09	21.75	2.40E-06	21.75	1.85E-09	21.75	2.40E-06
160	952.3	16.351	15.291	16.102	13.607	13.094	16.569	17.312	24.14	23.80	1.49E-09	8.828	1.42E-06	8.828	2.40E-06	23.80	1.49E-09	23.80	2.40E-06	23.80	1.49E-09	23.80	2.40E-06
170	1056.5	16.172	15.091	15.979	13.368	13.046	16.408	17.628	23.73	27.91	1.02E-09	8.996	1.42E-06	8.996	2.40E-06	23.73	1.02E-09	23.73	2.40E-06	23.73	1.02E-09	23.73	2.40E-06
180	1144.4	16.012	14.916	15.874	13.157	13.007	16.992	17.270	23.52	31.91	7.02E-10	9.142	1.42E-06	9.142	2.40E-06	23.52	7.02E-10	23.52	2.40E-06	23.52	7.02E-10	23.52	2.40E-06
190	1217.6	15.871	14.758	15.781	12.967	12.974	16.934	17.626	23.00	35.73	5.37E-10	9.270	1.42E-06	9.270	2.40E-06	23.00	5.37E-10	23.00	2.40E-06	23.00	5.37E-10	23.00	2.40E-06
200	1278.3	15.741	14.613	15.698	12.792	12.946	16.039	17.155	22.66	39.36	4.11E-10	9.386	1.42E-06	9.386	2.40E-06	22.66	4.11E-10	22.66	2.40E-06	22.66	4.11E-10	22.66	2.40E-06
210	1328.4	15.621	14.478	15.623	12.628	12.472	16.939	17.832	22.33	42.64	3.25E-10	9.492	1.42E-06	9.492	2.40E-06	22.33	3.25E-10	22.33	2.40E-06	22.33	3.25E-10	22.33	2.40E-06
220	1369.9	15.509	14.351	15.553	12.472	12.898	16.877	17.076	22.02	45.73	2.57E-10	9.590	1.42E-06	9.590	2.40E-06	22.02	2.57E-10	22.02	2.40E-06	22.02	2.57E-10	22.02	2.40E-06
230	1404.1	15.401	14.231	15.487	12.324	12.181	16.761	17.060	21.92	48.56	2.08E-10	9.682	1.42E-06	9.682	2.40E-06	21.92	2.08E-10	21.92	2.40E-06	21.92	2.08E-10	21.92	2.40E-06
240	1432.5	15.299	14.114	15.424	12.181	12.059	16.680	16.940	21.62	51.19	1.70E-10	9.769	1.42E-06	9.769	2.40E-06	21.62	1.70E-10	21.62	2.40E-06	21.62	1.70E-10	21.62	2.40E-06
250	1456.2	15.199	14.002	15.365	12.043	11.394	12.765	16.936	21.33	53.60	1.41E-10	9.852	1.42E-06	9.852	2.40E-06	21.33	1.41E-10	21.33	2.40E-06	21.33	1.41E-10	21.33	2.40E-06
260	1475.9	15.103	13.893	15.307	11.908	12.825	10.697	15.529	20.85	55.85	1.17E-10	9.931	1.42E-06	9.931	2.40E-06	20.85	1.17E-10	20.85	2.40E-06	20.85	1.17E-10	20.85	2.40E-06
270	1492.5	15.009	13.786	15.251	11.776	12.809	10.679	15.458	20.59	57.93	9.82E-11	10.008	1.42E-06	10.008	2.40E-06	20.59	9.82E-11	20.59	2.40E-06	20.59	9.82E-11	20.59	2.40E-06
280	1506.4	14.917	13.682	15.197	11.647	12.794	10.663	15.390	20.33	59.89	8.29E-11	10.081	1.42E-06	10.081	2.40E-06	20.33	8.29E-11	20.33	2.40E-06	20.33	8.29E-11	20.33	2.40E-06
290	1518.1	14.827	13.579	15.177	11.519	12.779	10.649	15.324	20.08	61.73	7.03E-11	10.153	1.42E-06	10.153	2.40E-06	20.08	7.03E-11	20.08	2.40E-06	20.08	7.03E-11	20.08	2.40E-06
300	1528.1	14.738	13.478	15.092	11.394	12.765	10.636	15.260	19.84	63.49	5.99E-11	10.222	1.42E-06	10.222	2.40E-06	19.84	5.99E-11	19.84	2.40E-06	19.84	5.99E-11	19.84	2.40E-06
310	1536.6	14.650	13.378	15.041	11.220	12.751	10.624	15.198	19.61	65.15	5.13E-11	10.290	1.42E-06	10.290	2.40E-06	19.61	5.13E-11	19.61	2.40E-06	19.61	5.13E-11	19.61	2.40E-06
320	1543.9	14.564	13.280	14.991	11.147	12.738	10.614	15.137	19.39	66.16	4.41E-11	10.356	1.42E-06	10.356	2.40E-06	19.39	66.16	19.39	2.40E-06	19.39	66.16	19.39	2.40E-06
330	1550.2	14.478	13.182	14.961	11.026	12.725	10.604	15.077	19.02	67.90	3.80E-11	10.420	1.42E-06	10.420	2.40E-06	19.02	3.80E-11	19.02	2.40E-06	19.02	3.80E-11	19.02	2.40E-06
340	1555.6	14.393	13.085	14.892	10.905	12.712	10.595	15.019	18.69	68.79	3.29E-11	10.483	1.42E-06	10.483	2.40E-06	18.69	3.29E-11	18.69	2.40E-06	18.69	3.29E-11	18.69	2.40E-06
350	1560.3	14.309	12.989	14.843	10.786	12.700	10.587	14.962	18.78	71.21	2.85E-11	10.544	1.42E-06	10.544	2.40E-06	18.78	2.85E-11	18.78	2.40E-06	18.78	2.85E-11	18.78	2.40E-06
360	1564.3	14.225	12.894	14.795	10.667	12.687	10.549	14.747	18.54	72.60	2.48E-11	10.605	1.42E-06	10.605	2.40E-06	18.54	2.48E-11	18.54	2.40E-06	18.54	2.48E-11	18.54	2.40E-06
370	1567.9	14.143	12.799	14.747	10.549	12.675	10.532	14.700	18.42	73.96	2.17E-11	10.664	1.42E-06	10.664	2.40E-06</								

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 1600 K

HEIGHT K ^a	TEMP K	LOG(N(H ₂))			LOG(N(O ₂))			LOG(N(A))			LOG(N(HE))			LOG(N(H))			(PRESSURE NT/M ²)			LOG(DEN KG/M ³)				
		/M ₃)	/M ₃)	/M ₃)	/M ₃)	/M ₃)	/M ₃)	/M ₃)	/M ₃)	/M ₃)	/M ₃)	/M ₃)	/M ₃)	/M ₃)	/M ₃)	/M ₃)	/M ₃)	/M ₃)	/M ₃)	/M ₃)	/M ₃)	/M ₃)	/M ₃)	
420	1580.2	13.735	12.335	14.513	9.970	12.615	10.543	14.387	-5.074	17.65	80.19	1.13E-11	-10.94E											
440	1583.3	13.575	12.152	14.421	9.742	12.592	10.533	14.487	-5.173	17.39	82.46	8.86E-12	-11.052											
460	1585.9	13.417	11.971	13.331	9.516	12.569	10.524	14.389	-5.271	17.16	84.61	6.98E-12	-11.156											
480	1588.0	13.259	11.791	14.240	9.292	12.546	10.516	14.293	-5.366	16.94	86.65	5.92E-12	-11.258											
500	1589.7	13.103	11.613	14.151	9.070	12.523	10.510	14.199	-5.460	16.75	88.57	4.40E-12	-11.357											
520	1591.0	12.948	11.436	14.062	8.849	12.501	10.503	14.106	-5.552	16.57	90.39	3.51E-12	-11.454											
540	1592.2	12.794	11.260	13.974	8.629	12.479	10.497	14.016	-5.642	16.40	92.10	2.82E-12	-11.549											
560	1593.2	12.641	11.085	13.887	8.411	12.457	10.490	13.927	-5.731	16.23	93.72	2.28E-12	-11.643											
580	1594.0	12.489	10.912	13.800	8.195	12.435	10.484	13.839	-5.819	16.08	95.26	1.84E-12	-11.735											
600	1594.7	12.338	10.740	13.714	7.980	12.413	10.477	13.753	-5.905	15.92	96.74	1.50E-12	-11.825											
620	1595.3	12.188	10.568	13.628	7.766	12.392	10.471	13.668	-5.989	15.77	98.15	1.22E-12	-11.914											
640	1595.8	12.039	10.398	13.543	7.553	12.371	10.465	13.584	-6.073	15.61	99.52	9.95E-13	-12.002											
660	1596.2	11.891	10.229	13.458	7.342	12.349	10.460	13.502	-6.155	15.44	100.84	8.15E-13	-12.089											
680	1596.6	11.744	10.061	13.374	7.132	12.328	10.454	13.421	-6.235	15.27	102.13	6.69E-13	-12.174											
700	1596.9	11.598	9.894	13.290	6.924	12.307	10.448	13.342	-6.315	15.09	103.41	5.51E-13	-12.259											
720	1597.2	11.452	9.727	13.207	6.716	12.287	10.443	13.264	-6.393	14.90	104.69	4.55E-13	-12.342											
740	1597.5	11.307	9.562	13.125	6.510	12.266	10.437	13.188	-6.469	14.70	104.97	3.72E-13	-12.425											
760	1597.7	11.164	9.398	13.042	6.305	12.245	10.432	13.113	-6.544	14.48	107.28	3.07E-13	-12.506											
780	1597.9	11.021	9.235	12.961	6.101	12.225	10.427	13.039	-6.617	14.24	108.61	2.59E-13	-12.587											
800	1598.1	10.879	9.072	12.880	5.902	12.204	10.421	12.968	-6.689	13.99	110.02	2.16E-13	-12.666											
820	1598.2	10.737	8.911	12.769	5.719	12.184	10.416	12.898	-6.758	13.71	111.44	1.80E-13	-12.745											
840	1598.4	10.597	8.750	12.719	5.539	12.164	10.411	12.830	-6.827	13.42	112.94	1.51E-13	-12.822											
860	1598.5	10.457	8.591	12.639	5.359	12.144	10.406	12.764	-6.893	13.11	114.54	1.26E-13	-12.899											
880	1598.6	10.318	8.432	12.559	5.179	12.124	10.401	12.699	-6.957	12.78	116.24	1.02E-13	-12.974											
900	1598.7	10.180	8.274	12.481	5.000	12.105	10.396	12.637	-7.019	12.44	118.06	8.95E-14	-13.048											
920	1598.8	10.043	8.117	12.402	4.811	12.085	10.391	12.577	-7.079	12.07	120.03	7.57E-14	-13.121											
940	1598.9	9.906	7.961	12.324	4.621	12.065	10.386	12.519	-7.137	11.70	122.16	6.42E-14	-13.193											
960	1599.0	9.777	7.806	12.246	4.431	12.046	10.381	12.463	-7.193	11.31	124.47	5.46E-14	-13.263											
980	1599.0	9.635	7.652	12.169	4.251	12.027	10.376	12.410	-7.247	10.91	126.99	4.65E-14	-13.332											
1000	1599.1	9.501	7.498	12.092	4.071	12.007	10.371	12.358	-7.298	10.51	129.74	3.98E-14	-13.400											
1050	1599.2	9.168	7.118	11.902	3.902	11.913	10.347	12.134	-7.417	9.51	137.81	2.74E-14	-13.562											
1100	1599.3	8.840	6.743	11.715	3.715	11.813	10.335	12.040	-7.522	8.54	147.97	1.93E-14	-13.715											
1150	1599.4	8.516	6.373	11.530	3.525	11.867	10.335	12.040	-7.616	7.66	160.70	1.39E-14	-13.856											
1200	1599.5	8.196	6.008	11.347	3.335	11.821	10.324	11.957	-7.699	6.88	176.46	1.04E-14	-13.985											
1250	1599.6	7.881	6.167	11.167	3.147	11.776	10.313	11.883	-7.773	6.23	195.62	7.91E-15	-14.102											
1300	1599.6	7.570	5.990	11.099	3.020	11.731	10.301	11.817	-7.839	5.70	218.52	6.21E-15	-14.207											
1350	1599.7	7.262	5.814	11.014	2.900	11.688	10.290	11.757	-7.899	5.27	244.87	5.00E-15	-14.301											
1400	1599.7	6.959	5.641	11.044	2.779	11.644	10.279	11.702	-7.954	4.93	274.24	4.12E-15	-14.385											
1450	1599.7	6.660	5.470	11.060	2.668	11.601	10.268	11.651	-8.005	4.67	305.84	3.47E-15	-14.460											
1500	1599.8	6.364	5.301	11.559	2.578	11.603	10.258	11.603	-8.053	4.47	338.57	2.97E-15	-14.527											
1600	1599.8	9.970	6.647	11.476	2.337	11.513	10.237	11.513	-8.143	4.19	402.66	2.27E-15	-14.644											
1700	1599.8	9.647	6.396	11.217	2.17	11.431	10.217	11.431	-8.225	4.02	459.35	1.80E-15	-14.745											
1800	1599.9	9.332	6.031	11.317	1.97	11.353	10.197	11.353	-8.303	3.91	505.55	1.46E-15	-14.835											
1900	1599.9	9.025	5.733	11.025	1.77	11.240	10.177	11.240	-8.377	3.83	542.36	1.21E-15	-14.918											
2000	1599.9	8.725	5.432	11.092	1.57	11.149	10.178	11.149	-8.449	3.77	572.01	1.01E-15	-14.996											
2100	1599.9	8.416	5.146	11.020	1.37	11.122	10.172	11.122	-8.517	3.73	596.73	8.51E-16	-15.070											
2200	1599.9	8.146	4.846	11.050	1.17	11.104	10.108	11.104	-8.584	3.68	618.70	7.22E-16	-15.142											
2300	1599.9	7.866	4.560	11.020	1.07	11.072	10.087	11.072	-8.648	3.64	638.99	6.16E-16	-15.211											
2400	1599.9	7.593	4.270	11.088	1.087	11.087	10.094	11.087	-8.709	3.59	658.24	5.28E-16	-15.278											
2500	1599.9	7.326	4.015	11.031	1.070	11.070	10.087	11.070	-8.769	3.55	677.32	4.54E-16	-15.343											

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 1800 K

HEIGHT KM	TEMP K	LOG(N(N2) /M3)			LOG(N(O2) /M3)			LOG(N(O) /M3)			LOG(N(A) /M3)			LOG(N(HE) /M3)			LOG(N(H) /M3)			(PRESSURE NT/M2)			MEAN MOL WT			DENSITY HT KM			DENSITY KG/M3		
		LOG(N(N2) /M3)	LOG(N(O2) /M3)	LOG(N(O) /M3)	LOG(N(A) /M3)	LOG(N(HE) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(DEN KG/M3)																	
90	188.0	19.746	19.170	17.390	17.824	14.573	14.418	17.669	17.547	17.645	17.514	14.263	19.545	19.000	-0.732	19.854	19.891	5.63	3.43E-06	-5.465	-5.620	-5.620	-5.620	-5.620	-5.620	-5.620	-5.620				
92	188.1	19.592	19.009	17.547	17.645	17.514	14.263	14.418	17.669	17.547	17.645	17.514	19.545	-1.040	19.000	-0.886	19.854	28.91	5.58	2.40E-06	1.67E-06										
94	188.7	19.436	18.843	17.685	17.672	17.685	17.672	17.685	17.672	17.685	17.672	17.685	17.672	17.685	-1.077	19.089	-1.192	28.65	5.51	1.17E-06	-5.934	-5.934	-5.934	-5.934	-5.934	-5.934	-5.934				
96	189.9	19.281	18.672	17.358	17.686	17.686	17.686	17.686	17.686	17.686	17.686	17.686	17.686	17.686	-1.047	19.951	-1.233	1.343	28.52	5.51	8.00E-07	-6.091	-6.091	-6.091	-6.091	-6.091	-6.091	-6.091			
98	192.0	19.125	18.497	17.686	17.686	17.686	17.686	17.686	17.686	17.686	17.686	17.686	17.686	17.686	-1.047	17.047	-1.018	1.490	28.36	5.51	6.64E-07	-6.249	-6.249	-6.249	-6.249	-6.249	-6.249	-6.249			
100	195.6	18.969	18.321	17.663	17.663	17.663	17.663	17.663	17.663	17.663	17.663	17.663	17.663	17.663	-1.025	13.796	-1.018	1.631	28.21	5.51	3.94E-07	-6.404	-6.404	-6.404	-6.404	-6.404	-6.404	-6.404			
102	201.2	18.816	18.146	17.596	17.596	17.596	17.596	17.596	17.596	17.596	17.596	17.596	17.596	17.596	-1.025	13.768	-1.018	1.631	28.03	5.51	2.75E-07	-6.560	-6.560	-6.560	-6.560	-6.560	-6.560	-6.560			
104	209.7	18.663	17.968	17.448	17.448	17.448	17.448	17.448	17.448	17.448	17.448	17.448	17.448	17.448	-1.025	13.737	-1.018	1.631	28.03	5.51	1.33E-07	-6.716	-6.716	-6.716	-6.716	-6.716	-6.716	-6.716			
106	221.9	18.509	17.787	17.445	17.445	17.445	17.445	17.445	17.445	17.445	17.445	17.445	17.445	17.445	-1.025	13.704	-1.018	1.631	27.81	5.61	1.33E-07	-6.869	-6.869	-6.869	-6.869	-6.869	-6.869	-6.869			
108	238.5	18.357	17.602	17.413	17.413	17.413	17.413	17.413	17.413	17.413	17.413	17.413	17.413	17.413	-1.025	13.667	-1.012	1.631	27.56	5.69	1.35E-07	-6.869	-6.869	-6.869	-6.869	-6.869	-6.869	-6.869			
110	259.7	18.209	17.415	17.343	17.343	17.343	17.343	17.343	17.343	17.343	17.343	17.343	17.343	17.343	-1.025	13.628	-1.012	1.631	27.31	5.88	9.56E-08	-7.020	-7.020	-7.020	-7.020	-7.020	-7.020	-7.020			
115	328.4	17.869	16.986	17.151	17.151	17.151	17.151	17.151	17.151	17.151	17.151	17.151	17.151	17.151	-1.025	15.574	-1.025	1.631	26.72	7.05	4.35E-08	-7.361	-7.361	-7.361	-7.361	-7.361	-7.361	-7.361			
120	404.9	17.588	16.657	16.213	16.213	16.213	16.213	16.213	16.213	16.213	16.213	16.213	16.213	16.213	-1.025	14.448	-1.025	1.631	26.29	8.72	2.30E-08	-7.638	-7.638	-7.638	-7.638	-7.638	-7.638	-7.638			
125	484.1	17.355	16.397	16.801	16.801	16.801	16.801	16.801	16.801	16.801	16.801	16.801	16.801	16.801	-1.025	13.377	-1.025	1.631	26.76	9.95	10.36E-08	-7.867	-7.867	-7.867	-7.867	-7.867	-7.867	-7.867			
130	564.3	17.157	16.179	16.659	16.659	16.659	16.659	16.659	16.659	16.659	16.659	16.659	16.659	16.659	-1.025	13.317	-1.025	1.631	27.97	6.65	12.19	8.72E-09	-8.060	-8.060	-8.060	-8.060	-8.060	-8.060	-8.060		
135	643.7	16.985	15.992	15.537	15.537	15.537	15.537	15.537	15.537	15.537	15.537	15.537	15.537	15.537	-1.025	14.438	-1.025	1.631	26.65	17.50	14.06	5.95E-09	-8.225	-8.225	-8.225	-8.225	-8.225	-8.225	-8.225		
140	721.6	16.835	15.827	16.430	16.430	16.430	16.430	16.430	16.430	16.430	16.430	16.430	16.430	16.430	-1.025	14.245	-1.025	1.631	22.20	17.09	15.99	4.26E-09	-8.370	-8.370	-8.370	-8.370	-8.370	-8.370	-8.370		
145	797.2	16.701	15.680	16.250	16.250	16.250	16.250	16.250	16.250	16.250	16.250	16.250	16.250	16.250	-1.025	13.181	-1.025	1.631	22.00	16.75	14.89	3.17E-09	-8.498	-8.498	-8.498	-8.498	-8.498	-8.498	-8.498		
150	869.9	16.581	15.548	15.095	15.095	15.095	15.095	15.095	15.095	15.095	15.095	15.095	15.095	15.095	-1.025	13.918	-1.025	1.631	22.00	16.75	14.67	2.44E-09	-8.613	-8.613	-8.613	-8.613	-8.613	-8.613	-8.613		
155	939.3	16.472	15.429	15.095	15.095	15.095	15.095	15.095	15.095	15.095	15.095	15.095	15.095	15.095	-1.025	13.776	-1.025	1.631	22.00	16.75	14.67	2.44E-09	-8.716	-8.716	-8.716	-8.716	-8.716	-8.716	-8.716		
160	1005.0	16.372	15.319	16.104	16.104	16.104	16.104	16.104	16.104	16.104	16.104	16.104	16.104	16.104	-1.025	13.086	-1.025	1.631	22.00	16.75	14.67	2.44E-09	-8.810	-8.810	-8.810	-8.810	-8.810	-8.810	-8.810		
170	1124.7	16.196	15.124	15.982	15.982	15.982	15.982	15.982	15.982	15.982	15.982	15.982	15.982	15.982	-1.025	13.415	-1.025	1.631	22.00	16.75	14.67	2.44E-09	-8.976	-8.976	-8.976	-8.976	-8.976	-8.976	-8.976		
180	1228.4	16.042	14.954	15.878	15.878	15.878	15.878	15.878	15.878	15.878	15.878	15.878	15.878	15.878	-1.025	12.997	-1.025	1.631	22.00	16.75	14.67	2.44E-09	-9.118	-9.118	-9.118	-9.118	-9.118	-9.118	-9.118		
190	1316.7	15.905	14.802	15.787	15.787	15.787	15.787	15.787	15.787	15.787	15.787	15.787	15.787	15.787	-1.025	13.031	-1.025	1.631	22.00	16.75	14.67	2.44E-09	-9.243	-9.243	-9.243	-9.243	-9.243	-9.243	-9.243		
200	1391.2	15.782	14.664	15.706	15.706	15.706	15.706	15.706	15.706	15.706	15.706	15.706	15.706	15.706	-1.025	12.934	-1.025	1.631	22.00	16.75	14.67	2.44E-09	-9.355	-9.355	-9.355	-9.355	-9.355	-9.355	-9.355		
210	1453.6	15.668	14.537	15.633	15.633	15.633	15.633	15.633	15.633	15.633	15.633	15.633	15.633	15.633	-1.025	12.908	-1.025	1.631	22.00	16.75	14.67	2.44E-09	-9.457	-9.457	-9.457	-9.457	-9.457	-9.457	-9.457		
220	1505.6	15.562	14.418	15.503	15.503	15.503	15.503	15.503	15.503	15.503	15.503	15.503	15.503	15.503	-1.025	12.429	-1.025	1.631	22.00	16.75	14.67	2.44E-09	-9.550	-9.550	-9.550	-9.550	-9.550	-9.550	-9.550		
230	1548.9	15.462	14.306	15.445	15.445	15.445	15.445	15.445	15.445	15.445	15.445	15.445	15.445	15.445	-1.025	12.297	-1.025	1.631	22.00	16.75	14.67	2.44E-09	-9.638	-9.638	-9.638	-9.638	-9.638	-9.638	-9.638		
240	1585.0	15.367	14.199	15.445	15.445	15.445	15.445	15.445	15.445	15.445	15.445	15.445	15.445	15.445	-1.025	12.847	-1.025	1.631	22.00	16.75	14.67	2.44E-09	-9.719	-9.719	-9.719	-9.719	-9.719	-9.719	-9.719		
250	1615.2	15.276	14.095	15.389	15.389	15.389	15.389	15.389	15.389	15.389	15.389	15.389	15.389	15.389	-1.025	12.830	-1.025	1.631	22.00	16.75	14.67	2.44E-09	-9.797	-9.797	-9.797	-9.797	-9.797	-9.797	-9.797		
260	1640.4	15.187	13.996	15.336	15.336	15.336	15.336	15.336	15.336	15.336	15.336	15.336	15.336	15.336	-1.025	12.815	-1.025	1.631	22.00	16.75	14.67	2.44E-09	-9.871	-9.							

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 1800 K

HEIGHT KM	TEMP K	LOG(N(N2) /M3)			LOG(N(O) /M3)			LOG(N(A) /M3)			LOG(N(HE) /M3)			LOG(N(H) /M3)			(PRESSURE NT/M2)			LOG (DEN KG/M3)		
		LOG(N(N2) /M3)	LOG(N(O) /M3)	LOG(N(A) /M3)	LOG(N(HE) /M3)	LOG(N(H) /M3)	MGL WT	DENSITY KM	MEAN SCALE HT	DENSITY KG/M3	LOG(N(N2) /M3)	LOG(N(O) /M3)	LOG(N(A) /M3)	LOG(N(HE) /M3)	LOG(N(H) /M3)	MGL WT	DENSITY KM	MEAN SCALE HT	DENSITY KG/M3			
420	1774.4	13.958	12.596	14.619	10.308	12.623	10.410	14.712	-4.899	18.14	8.685	1.55E-11	-10.810									
440	1778.5	13.815	12.433	14.537	10.105	12.602	10.400	14.619	-4.990	17.87	8.934	1.24E-11	-10.908									
460	1781.8	13.674	12.272	14.456	9.904	12.581	10.391	14.530	-5.000	17.63	9.175	9.91E-12	-11.004									
480	1784.5	13.533	12.112	14.375	9.704	12.561	10.384	14.442	-5.167	17.40	9.406	7.99E-12	-11.098									
500	1786.7	13.394	11.953	14.296	9.506	12.541	10.377	14.356	-5.252	17.19	9.625	6.47E-12	-11.189									
520	1788.5	13.256	11.795	14.217	9.310	12.521	10.371	14.271	-5.336	17.00	9.835	5.27E-12	-11.278									
540	1790.0	13.119	11.639	14.138	9.114	12.501	10.365	14.188	-5.419	16.82	10.034	4.31E-12	-11.366									
560	1791.2	12.983	11.483	14.061	8.921	12.482	10.358	14.107	-5.500	16.65	10.226	3.54E-12	-11.451									
580	1792.3	12.848	11.329	13.983	8.728	12.462	10.352	14.027	-5.580	16.50	10.410	2.91E-12	-11.535									
600	1793.1	12.714	11.176	13.906	8.537	12.443	10.346	13.948	-5.658	16.35	10.585	2.41E-12	-11.618									
620	1793.9	12.580	11.023	13.830	8.346	12.424	10.340	13.870	-5.736	16.20	10.752	2.00E-12	-11.700									
640	1794.6	12.448	10.872	13.754	8.157	12.405	10.335	13.794	-5.812	16.07	10.913	1.66E-12	-11.780									
660	1795.1	12.316	10.721	13.679	7.970	12.386	10.329	13.719	-5.887	15.93	11.098	1.38E-12	-11.859									
680	1795.6	12.185	10.572	13.604	7.783	12.367	10.324	13.645	-5.961	15.79	11.218	1.16E-12	-11.937									
700	1796.0	12.055	10.423	13.530	7.597	12.348	10.319	13.572	-6.034	15.65	11.363	9.69E-13	-12.014									
720	1796.4	11.926	10.275	13.456	7.413	12.330	10.314	13.500	-6.106	15.51	11.505	8.13E-13	-12.090									
740	1796.7	11.797	10.128	13.382	7.230	12.311	10.309	13.429	-6.177	15.36	11.645	6.84E-13	-12.165									
760	1797.0	11.669	9.982	13.309	7.047	12.293	10.304	13.359	-6.247	15.21	11.783	5.77E-13	-12.239									
780	1797.3	11.542	9.837	13.237	6.866	12.275	10.299	13.290	-6.315	15.05	11.920	4.87E-13	-12.312									
800	1797.5	11.416	9.693	13.165	6.686	12.257	10.294	13.223	-6.383	14.88	12.058	4.12E-13	-12.385									
820	1797.7	11.290	9.549	13.093	6.507	12.239	10.290	13.156	-6.449	14.70	12.194	3.50E-13	-12.456									
840	1797.9	11.165	9.407	13.021	6.329	12.221	10.285	13.091	-6.514	14.50	12.332	2.97E-13	-12.527									
860	1798.1	11.041	9.265	12.950	6.151	12.203	10.280	13.027	-6.578	14.30	12.474	2.53E-13	-12.597									
880	1798.2	10.917	9.124	12.880	6.017	12.186	10.276	12.965	-6.640	14.08	12.619	2.16E-13	-12.666									
900	1798.3	10.794	8.983	12.810	5.883	12.168	10.271	12.903	-6.702	13.85	12.769	1.84E-13	-12.735									
920	1798.5	10.672	8.844	12.740	5.740	12.150	10.267	12.844	-6.762	13.61	12.925	1.58E-13	-12.802									
940	1798.6	10.551	8.705	12.671	5.602	12.133	10.262	12.785	-6.820	13.35	13.088	1.35E-13	-12.869									
960	1798.7	10.430	8.567	12.602	5.460	12.116	10.258	12.728	-6.877	13.08	13.260	1.16E-13	-12.935									
980	1798.8	10.310	8.430	12.533	5.321	12.099	10.254	12.673	-6.932	12.80	13.440	1.00E-13	-13.000									
1000	1798.8	10.190	8.293	12.465	5.182	12.082	10.249	12.619	-6.986	12.50	13.632	8.62E-14	-13.064									
1050	1799.0	9.895	7.956	12.296	5.039	12.038	10.238	12.491	-7.114	11.70	14.164	6.02E-14	-13.221									
1100	1799.2	9.603	7.622	12.129	4.998	12.028	10.228	12.373	-7.232	10.86	14.798	4.26E-14	-13.371									
1150	1799.3	9.315	7.293	11.965	4.956	12.021	10.217	12.266	-7.339	10.00	15.61	3.06E-14	-13.514									
1200	1799.4	9.031	6.969	11.802	4.902	11.916	10.207	12.169	-7.436	9.15	16.482	2.24E-14	-13.650									
1250	1799.5	8.750	6.649	11.642	4.856	11.876	10.197	12.081	-7.533	8.34	17.603	1.67E-14	-13.777									
1300	1799.5	8.474	6.333	11.484	4.806	11.836	10.187	12.003	-7.602	7.60	18.956	1.27E-14	-13.896									
1350	1799.6	8.201	6.021	11.328	4.757	11.797	10.177	11.932	-7.673	6.94	20.775	9.86E-15	-14.006									
1400	1799.6	7.931	6.022	11.174	4.708	11.759	10.167	11.866	-7.737	6.37	22.487	7.81E-15	-14.107									
1450	1799.7	7.665	5.872	11.022	4.660	11.721	10.158	11.810	-7.795	5.89	24.712	6.32E-15	-14.200									
1500	1799.7	7.403	10.872	11.683	5.148	11.148	10.148	11.756	-7.848	5.50	27.446	5.21E-15	-14.283									
1600	1799.8	6.887	10.578	11.610	5.130	11.661	10.112	11.577	-7.944	4.91	33.117	3.73E-15	-14.428									
1700	1799.8	6.385	10.291	11.538	4.904	11.500	10.094	11.500	-8.028	4.52	39.670	2.83E-15	-14.548									
1800	1799.8	6.011	11.468	4.668	10.077	11.428	-8.105	-4.27	-8.176	4.01	57.557	2.24E-15	-14.649									
1900	1799.9	5.738	11.333	4.060	11.361	-8.244	-8.308	3.93	5.14	52.134	1.83E-15	-14.737										
2000	1799.9	5.471	9.211	11.267	4.043	11.296	-8.371	-8.371	3.88	6.249	46.249	2.24E-15	-14.816									
2100	1799.9	5.201	11.204	4.027	11.234	-8.430	-8.430	3.84	7.05	53.157	1.53E-15	-14.889										
2200	1799.9	4.956	8.708	4.012	11.174	-8.488	-8.488	3.80	7.14	55.94	1.10E-15	-14.957										
2300	1799.9	4.665	11.081	9.996	11.116	-8.545	-8.545	3.77	7.38	68.05	9.52E-16	-15.021										
2400	1799.9	4.228	11.022	9.981	11.1060	-8.645	-8.645	3.77	7.38	63.3	7.19E-16	-15.083										
2500	1799.9																					

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 2000 K

HEIGHT KM	TEMP K	LOG(N(N ₂) /M ₃)			LOG(N(O) /M ₃)			LOG(N(A) /M ₃)			LOG(N(HE) /M ₃)			LOG(N(H) /M ₃)			LOG(PRESSURE NT/M ²)			LOG(DEN KG/M ³)		
		LOG(N(N ₂) /M ₃)	LOG(N(O) /M ₃)	LOG(N(A) /M ₃)	LOG(N(HE) /M ₃)	LOG(N(H) /M ₃)	MOL WT	MEAN WT	DENSITY HT KM	DENSITY HT KM	DENSITY HT KM	DENSITY HT KM	DENSITY HT KM	DENSITY HT KM	DENSITY HT KM	DENSITY HT KM	DENSITY HT KM	DENSITY HT KM				
90	188.0	19.746	19.170	17.390	17.824	14.573	19.854	7.732	28.91	5.63	3.43E-06	-5.465										
92	188.2	19.592	19.009	17.547	17.669	14.418	19.700	-0.886	28.85	5.58	2.40E-06	-5.620										
94	188.7	19.416	18.843	17.645	17.514	14.263	19.545	-0.040	28.76	5.53	1.67E-06	-5.776										
96	190.0	19.280	18.672	17.358	14.107	14.07	19.389	-1.042	28.65	5.51	1.16E-05	-5.934										
98	192.2	18.497	17.686	17.686	17.202	13.951	19.233	-1.343	28.52	5.50	8.10E-07	-6.092										
100	195.9	18.968	18.321	17.662	17.046	13.795	19.078	-1.490	28.36	5.58	5.63E-07	-6.249										
102	201.8	18.816	18.145	17.595	16.834	13.767	18.924	-1.631	28.21	5.57	3.93E-07	-6.407										
104	210.7	18.662	17.967	17.535	16.623	13.736	18.771	-1.765	28.03	5.58	2.75E-07	-6.561										
106	223.4	18.508	17.786	17.455	16.414	13.702	18.619	-1.892	27.81	5.60	1.92E-07	-6.717										
108	240.7	18.356	17.601	17.411	16.211	13.665	18.469	-2.010	27.57	5.69	1.35E-07	-6.871										
110	262.8	18.207	17.415	17.340	16.015	13.626	18.323	-2.118	27.31	5.88	9.53E-08	-7.021										
115	334.5	17.868	16.987	17.147	15.516	13.227	17.991	-2.345	26.73	7.08	4.35E-08	-7.362										
120	414.3	17.590	16.660	16.962	15.219	13.443	17.723	-2.520	26.31	8.79	2.31E-08	-7.637										
125	496.9	17.359	16.403	16.798	14.23	13.372	17.502	-2.662	25.98	10.48	1.37E-08	-7.863										
130	580.6	17.163	16.188	16.658	14.673	13.312	17.316	-2.780	25.70	12.34	8.83E-09	-8.054										
135	663.8	16.994	16.003	16.536	14.556	13.660	17.157	-2.881	25.43	14.24	6.06E-09	-8.219										
140	745.8	16.846	15.841	16.430	14.267	13.215	17.018	-2.970	25.19	16.19	4.36E-09	-8.361										
145	826.0	16.714	15.697	16.336	14.098	13.175	16.895	-3.048	24.97	18.18	3.26E-09	-8.487										
150	904.0	16.596	15.567	16.251	13.945	13.139	16.786	-3.118	24.76	20.22	2.51E-09	-8.601										
155	979.3	16.488	15.450	16.175	13.807	13.107	16.991	-3.182	24.56	22.30	1.98E-09	-8.709										
160	1051.5	16.390	15.342	16.106	13.680	13.079	16.597	-3.241	24.37	24.43	1.60E-09	-8.796										
170	1185.5	16.216	15.151	15.984	13.554	13.029	16.848	-3.346	24.02	28.78	1.10E-09	-8.959										
180	1304.3	16.065	14.984	15.880	13.257	12.988	16.776	-3.439	23.69	33.22	7.95E-10	-9.100										
190	1407.7	15.932	14.837	15.790	13.082	12.953	16.716	-3.523	23.39	37.68	5.99E-10	-9.222										
200	1496.3	15.813	14.704	15.704	15.710	12.923	16.653	-3.600	23.10	42.07	4.66E-10	-9.331										
210	1571.4	15.704	14.583	15.639	15.776	12.897	16.610	-3.672	22.82	46.24	3.72E-10	-9.430										
220	1634.7	15.603	14.470	15.574	15.639	12.875	16.597	-3.740	22.56	50.25	3.02E-10	-9.520										
230	1687.8	15.509	14.364	15.514	15.511	12.855	16.540	-3.804	22.30	53.98	2.49E-10	-9.603										
240	1732.3	15.419	14.264	15.458	15.488	12.837	16.512	-3.866	22.05	57.48	2.08E-10	-9.681										
250	1769.6	15.334	14.168	15.406	15.271	12.820	16.487	-3.926	21.81	60.69	1.76E-10	-9.755										
260	1800.9	15.252	14.015	15.316	15.308	12.057	12.805	-3.983	21.58	63.67	1.50E-10	-9.824										
270	1827.3	15.173	13.986	15.261	15.939	12.777	10.446	-4.039	21.35	66.40	1.28E-10	-9.891										
280	1849.5	15.096	13.899	15.217	15.834	12.764	10.429	-4.093	21.13	68.95	1.11E-10	-9.955										
290	1868.3	15.021	13.813	15.217	15.731	12.752	10.413	-4.142	20.91	71.30	9.61E-11	-10.017										
300	1884.3	14.947	13.730	15.648	15.130	11.629	12.740	-4.198	20.70	73.51	8.37E-11	-10.077										
310	1898.0	14.875	13.668	15.089	15.089	11.529	12.728	-4.249	20.49	75.55	7.32E-11	-10.136										
320	1909.7	14.804	13.567	15.048	15.048	11.430	12.717	-4.299	20.29	77.51	6.42E-11	-10.192										
330	1919.8	14.734	13.487	15.007	15.007	11.332	12.706	-4.329	20.10	79.36	5.65E-11	-10.248										
340	1928.4	14.665	13.409	14.967	14.967	11.235	12.696	-4.396	19.91	81.13	4.99E-11	-10.302										
350	1936.0	14.596	13.331	14.596	14.596	11.131	12.696	-4.443	19.73	82.82	4.42E-11	-10.355										
360	1942.5	14.528	13.253	14.928	14.928	11.039	12.685	-4.490	19.55	84.45	3.92E-11	-10.407										
370	1948.2	14.461	13.177	14.889	14.889	11.044	12.675	-4.535	19.38	86.03	3.49E-11	-10.458										
380	1953.2	14.394	13.101	14.851	14.851	10.949	12.665	-4.581	19.21	87.55	3.11E-11	-10.508										
390	1957.7	14.328	13.025	14.812	14.812	10.855	12.655	-4.625	19.05	89.04	2.77E-11	-10.557										
400	1961.5	14.262	12.950	14.774	14.774	10.761	12.645	-4.669	18.89	90.48	2.48E-11	-10.605										

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 2000 K

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 2200 K							LOG (DEN. KG/M3)			
HEIGHT KM	TEMP K	LOG(N(N2) /M3)	LOG(N(O2) /M3)	LOG(N(O) /M3)	LOG(N(He) /M3)	LOG(N(H) /M3)	(PRESSURE NT/M2)	LOG MEAN HOL WT SCALE HT KM	DENSITY KG/M3	LOG (DEN. KG/M3)
90	188.0	19.746	19.170	17.390	14.573	19.854	-0.732	28.91	5.63	3.43E-06
92	188.2	19.592	19.009	17.547	14.418	19.700	-0.886	28.85	5.58	2.40E-06
94	188.7	19.436	18.843	17.645	14.263	19.544	-1.040	28.76	5.53	1.67E-06
96	190.0	19.280	18.672	17.358	14.107	19.389	-1.192	28.65	5.50	1.16E-06
98	192.3	19.124	18.497	17.686	17.202	19.233	-1.343	28.52	5.50	6.09E-07
100	196.2	18.968	18.320	17.662	13.795	19.078	-1.490	28.36	5.58	5.62E-07
102	202.3	18.815	18.145	17.595	16.833	18.924	-1.630	28.21	5.56	3.93E-07
104	211.5	18.661	17.967	17.534	16.622	18.736	-1.764	28.03	5.57	2.74E-07
106	224.7	18.507	17.785	17.473	16.414	18.618	-1.890	27.81	5.60	1.92E-07
108	242.6	18.355	17.600	17.409	16.211	18.468	-2.007	27.57	5.68	1.34E-07
110	265.6	18.206	17.414	17.338	16.016	18.321	-2.114	27.32	5.89	9.51E-08
115	339.9	17.868	16.987	17.144	15.579	17.524	-2.338	26.74	7.10	4.34E-08
120	422.7	17.591	16.663	16.959	15.224	17.439	-2.511	26.33	8.85	2.31E-08
125	508.4	17.362	16.408	16.796	14.932	17.368	-2.650	26.01	10.58	1.38E-08
130	595.3	17.168	16.196	16.656	14.685	17.308	-2.765	25.73	12.47	8.92E-09
135	681.7	17.001	16.014	16.536	14.472	17.256	-2.864	25.48	14.40	6.15E-09
140	767.4	16.855	15.854	16.430	14.285	17.210	-1.950	25.25	16.37	4.44E-09
145	851.8	16.725	15.711	16.336	14.119	17.170	-3.026	25.03	18.37	3.33E-09
150	934.4	16.608	15.583	16.252	13.969	17.134	-3.095	24.83	20.42	2.57E-09
155	1015.0	16.502	15.467	16.176	13.833	17.102	-3.157	24.64	22.51	2.04E-09
160	1093.0	16.405	15.361	16.107	13.708	13.073	10.851	16.008	24.46	1.65E-09
170	1240.1	16.233	15.173	15.985	13.487	13.022	10.761	16.452	24.12	29.06
180	1373.2	16.085	15.060	15.882	13.294	12.980	10.687	16.319	23.82	33.62
190	1491.3	15.954	14.866	15.792	13.123	12.964	10.626	16.203	23.53	38.28
200	1594.2	15.838	14.737	15.713	12.970	12.914	10.563	16.101	23.26	42.97
210	1682.5	15.732	14.620	15.643	12.829	12.887	10.519	16.009	23.00	47.52
220	1757.6	15.635	14.511	15.579	12.699	12.864	10.486	15.27	22.76	51.94
230	1821.1	15.545	14.411	15.521	12.577	12.844	10.447	15.851	22.52	56.12
240	1874.6	15.460	14.316	15.467	12.461	12.826	10.419	15.781	22.29	60.06
250	1919.6	15.380	14.225	15.417	12.351	12.810	10.393	15.715	22.07	63.70
260	1957.5	15.303	14.139	15.369	12.245	12.795	10.371	15.653	21.85	1.63E-10
270	1989.5	15.229	14.055	15.324	12.142	12.781	10.351	15.594	21.64	70.19
280	2016.5	15.157	13.974	15.280	12.043	12.768	10.333	15.537	21.43	73.08
290	2039.4	15.088	13.895	15.239	11.945	12.755	10.317	15.483	21.23	75.72
300	2058.9	15.020	13.818	15.198	11.850	12.744	10.302	15.331	21.03	78.20
310	2075.5	14.953	13.742	15.158	11.756	12.732	10.289	15.380	20.84	80.49
320	2089.8	14.887	13.668	15.120	11.664	12.722	10.277	15.331	20.65	82.65
330	2102.0	14.823	13.594	15.082	11.573	12.711	10.266	15.283	20.47	84.67
340	2112.6	14.759	13.522	15.044	11.484	12.701	10.256	15.236	20.29	86.61
350	2121.8	14.696	13.451	15.008	11.395	12.691	10.246	15.190	20.11	88.44
360	2129.8	14.634	13.380	14.971	11.307	12.682	10.237	15.145	19.94	90.20
370	2136.8	14.573	13.310	14.936	11.219	12.672	10.229	15.101	19.78	91.90
380	2142.9	14.512	13.240	14.900	11.133	12.663	10.221	15.058	19.61	93.52
390	2148.3	14.451	13.171	14.865	11.047	12.654	10.214	15.015	19.46	95.11
400	2153.0	14.391	13.103	14.831	10.962	12.645	10.207	14.913	19.30	96.64

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 2200 K

HEIGHT KM	TEMP K	LOG(N(N ₂) /M ₃)			LOG(N(O ₂) /M ₃)			LOG(N(A) /M ₃)			LOG(N(HE) /M ₃)			LOG(N(H) /M ₃)			LOG (PRESSURE NT/M ₂)			MEAN DENSITY MCL WT			MEAN DENSITY HT			MEAN DENSITY KM			LOG(DEN KG/M ₃)								
		14.272	12.967	14.762	10.793	12.627	10.195	14.891	-4.634	19.01	99.62	2.46E-11	-10.609	14.891	-4.712	18.74	102.47	2.02E-11	-10.695	14.891	-4.789	18.48	105.3	1.66E-11	-10.779	14.891	-4.864	18.24	107.91	1.38E-11	-10.861	14.891	-4.938	18.01	110.49	1.15E-11	-10.940
420	2161.0	14.154	12.833	14.694	10.626	12.609	10.184	14.812	-4.712	18.74	102.47	2.02E-11	-10.695	14.154	12.833	14.694	10.626	12.609	10.184	14.812	-4.712	18.74	102.47	2.02E-11	-10.695	14.154	12.833	14.694	10.626	12.609	10.184	14.812	-4.712	18.74	102.47	2.02E-11	-10.695
440	2167.2	14.154	12.833	14.694	10.626	12.609	10.184	14.812	-4.712	18.74	102.47	2.02E-11	-10.695	14.154	12.833	14.694	10.626	12.609	10.184	14.812	-4.712	18.74	102.47	2.02E-11	-10.695	14.154	12.833	14.694	10.626	12.609	10.184	14.812	-4.712	18.74	102.47	2.02E-11	-10.695
460	2172.3	14.038	12.700	14.627	10.460	12.592	10.174	14.734	-4.789	18.48	105.3	1.66E-11	-10.779	14.038	12.700	14.627	10.460	12.592	10.174	14.734	-4.789	18.48	105.3	1.66E-11	-10.779	14.038	12.700	14.627	10.460	12.592	10.174	14.734	-4.789	18.48	105.3	1.66E-11	-10.779
480	2176.3	13.923	12.568	14.561	10.296	12.575	10.166	14.658	-4.864	18.24	107.91	1.38E-11	-10.861	13.923	12.568	14.561	10.296	12.575	10.166	14.658	-4.864	18.24	107.91	1.38E-11	-10.861	13.923	12.568	14.561	10.296	12.575	10.166	14.658	-4.864	18.24	107.91	1.38E-11	-10.861
500	2179.6	13.808	12.438	14.496	10.133	12.559	10.160	14.584	-4.938	18.01	110.49	1.15E-11	-10.940	13.808	12.438	14.496	10.133	12.559	10.160	14.584	-4.938	18.01	110.49	1.15E-11	-10.940	13.808	12.438	14.496	10.133	12.559	10.160	14.584	-4.938	18.01	110.49	1.15E-11	-10.940
520	2182.4	13.695	12.309	14.431	9.972	12.542	10.154	14.511	-5.010	17.80	113.01	9.60E-12	-11.018	13.695	12.309	14.431	9.972	12.542	10.154	14.511	-5.010	17.80	113.01	9.60E-12	-11.018	13.695	12.309	14.431	9.972	12.542	10.154	14.511	-5.010	17.80	113.01	9.60E-12	-11.018
540	2184.7	13.583	12.180	14.366	9.812	12.526	10.148	14.440	-5.080	17.61	105.6	8.06E-12	-11.094	13.583	12.180	14.366	9.812	12.526	10.148	14.440	-5.080	17.61	105.6	8.06E-12	-11.094	13.583	12.180	14.366	9.812	12.526	10.148	14.440	-5.080	17.61	105.6	8.06E-12	-11.094
560	2186.6	13.471	12.053	14.302	9.653	12.510	10.142	14.370	-5.150	17.43	117.83	6.79E-12	-11.168	13.471	12.053	14.302	9.653	12.510	10.142	14.370	-5.150	17.43	117.83	6.79E-12	-11.168	13.471	12.053	14.302	9.653	12.510	10.142	14.370	-5.150	17.43	117.83	6.79E-12	-11.168
580	2188.2	13.360	11.926	14.239	9.495	12.494	10.136	14.302	-5.218	17.25	120.13	5.74E-12	-11.241	13.360	11.926	14.239	9.495	12.494	10.136	14.302	-5.218	17.25	120.13	5.74E-12	-11.241	13.360	11.926	14.239	9.495	12.494	10.136	14.302	-5.218	17.25	120.13	5.74E-12	-11.241
600	2189.5	13.250	11.801	14.176	9.338	12.478	10.130	14.234	-5.286	17.09	122.37	4.86E-12	-11.313	13.250	11.801	14.176	9.338	12.478	10.130	14.234	-5.286	17.09	122.37	4.86E-12	-11.313	13.250	11.801	14.176	9.338	12.478	10.130	14.234	-5.286	17.09	122.37	4.86E-12	-11.313
620	2190.7	13.141	11.713	14.113	9.182	12.462	10.124	14.167	-5.352	16.94	124.53	4.14E-12	-11.383	13.141	11.713	14.113	9.182	12.462	10.124	14.167	-5.352	16.94	124.53	4.14E-12	-11.383	13.141	11.713	14.113	9.182	12.462	10.124	14.167	-5.352	16.94	124.53	4.14E-12	-11.383
640	2191.7	13.032	11.552	14.051	9.028	12.447	10.119	14.102	-5.417	16.80	126.64	3.53E-12	-11.452	13.032	11.552	14.051	9.028	12.447	10.119	14.102	-5.417	16.80	126.64	3.53E-12	-11.452	13.032	11.552	14.051	9.028	12.447	10.119	14.102	-5.417	16.80	126.64	3.53E-12	-11.452
660	2192.6	12.924	11.429	13.990	8.874	12.431	10.114	14.037	-5.482	16.67	128.68	3.02E-12	-11.521	12.924	11.429	13.990	8.874	12.431	10.114	14.037	-5.482	16.67	128.68	3.02E-12	-11.521	12.924	11.429	13.990	8.874	12.431	10.114	14.037	-5.482	16.67	128.68	3.02E-12	-11.521
680	2193.3	12.817	11.306	13.928	8.721	12.416	10.109	13.914	-5.545	16.54	130.66	2.9E-12	-11.588	12.817	11.306	13.928	8.721	12.416	10.109	13.914	-5.545	16.54	130.66	2.9E-12	-11.588	12.817	11.306	13.928	8.721	12.416	10.109	13.914	-5.545	16.54	130.66	2.9E-12	-11.588
700	2194.0	12.710	11.184	13.867	8.569	12.401	10.104	13.914	-5.608	16.41	132.57	2.8E-12	-11.654	12.710	11.184	13.867	8.569	12.401	10.104	13.914	-5.608	16.41	132.57	2.8E-12	-11.654	12.710	11.184	13.867	8.569	12.401	10.104	13.914	-5.608	16.41	132.57	2.8E-12	-11.654
720	2194.5	12.605	11.063	13.807	8.418	12.385	10.100	13.849	-5.669	16.29	134.43	1.9E-12	-11.719	12.605	11.063	13.807	8.418	12.385	10.100	13.849	-5.669	16.29	134.43	1.9E-12	-11.719	12.605	11.063	13.807	8.418	12.385	10.100	13.849	-5.669	16.29	134.43	1.9E-12	-11.719
740	2195.0	12.499	10.943	13.747	8.268	12.370	10.095	13.788	-5.730	16.18	136.24	1.8E-12	-11.783	12.499	10.943	13.747	8.268	12.370	10.095	13.788	-5.730	16.18	136.24	1.8E-12	-11.783	12.499	10.943	13.747	8.268	12.370	10.095	13.788	-5.730	16.18	136.24	1.8E-12	-11.783
760	2195.5	12.395	10.823	13.687	8.119	12.355	10.091	13.728	-5.791	16.06	137.88	1.7E-12	-11.846	12.395	10.823	13.687	8.119	12.355	10.091	13.728	-5.791	16.06	137.88	1.7E-12	-11.846	12.395	10.823	13.687	8.119	12.355	10.091	13.728	-5.791	16.06	137.88	1.7E-12	-11.846
780	2195.9	12.290	10.705	13.627	8.056	12.326	10.082	13.668	-5.850	15.95	139.72	1.6E-12	-11.909	12.290	10.705	13.627	8.056	12.326	10.082	13.668	-5.850	15.95	139.72	1.6E-12	-11.909	12.290	10.705	13.627	8.056	12.326	10.082	13.668	-5.850	15.95	139.72	1.6E-12	-11.909
800	2196.2	12.187	10.586	13.568	7.823	12.282	10.071	13.494	-5.917	15.81	140.53	1.5E-12	-11.976	12.187	10.586	13.568	7.823	12.282	10.071	13.494	-5.917	15.81	140.53	1.5E-12	-11.976	12.187	10.586	13.568	7.823	12.282	10.071	13.494	-5.917	15.81	140.53	1.5E-12	-11.976
820	2196.5	12.084	10.469	13.509	7.676	12.296	10.074	13.494	-6.024	15.61	144.64	8.09E-13	-12.032	12.084	10.469	13.509	7.676	12.296	10.074	13.494	-6.024	15.61	144.64	8.09E-13	-12.032	12.084	10.469	13.509	7.676	12.296	10.074	13.494	-6.024	15.61	144.64	8.09E-13	-12.032
840	2196.8	11.982	10.352	13.451	7.530	12.282	10.071	13.494	-6.080	15.50	146.22	7.05E-13	-12.152	11.982	10.352	13.451	7.530	12.282	10.071	13.494	-6.080	15.50	146.22	7.05E-13	-12.152	11.982	10.352	13.451	7.530	12.282	10.071	13.494	-6.080	15.50	146.22	7.05E-13	-12.152
860	2197.0	11.880	10.236	13.393	7.385	12.241	10.067	13.382	-6.136	15.38	147.79	6.16E-13	-12.211	11.880	10.236	13.393	7.385	12.241	10.067	13.382	-6.136	15.38	147.79	6.16E-13	-12.211	11.880	10.236	13.393	7.385	12							

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 2400 K

HEIGHT KM	TEMP K	LOG(N(N ₂) /M ₃)			LOG(N(O ₂) /M ₃)			LOG(N(A) /M ₃)			LOG(N(HE) /M ₃)			LOG(N(H) /M ₃)			(PRESSURE NT/M ²)			LOG(DEN KG/M ³)		
		LOG(MOL WT)	MEAN SCALE HT KM	DENSITY KG/M ³	LOG(MOL WT)	MEAN SCALE HT KM	DENSITY KG/M ³	LOG(MOL WT)	MEAN SCALE HT KM	DENSITY KG/M ³	LOG(MOL WT)	MEAN SCALE HT KM	DENSITY KG/M ³	LOG(MOL WT)	MEAN SCALE HT KM	DENSITY KG/M ³	LOG(MOL WT)	MEAN SCALE HT KM	DENSITY KG/M ³	LOG(MOL WT)	MEAN SCALE HT KM	DENSITY KG/M ³
90	188.0	19.746	19.170	17.350	17.824	14.573	19.854	**732	28.91	5.63	3.43E-06	-5.465										
92	188.2	19.592	19.009	17.547	17.669	14.418	19.700	**886	28.85	5.58	2.40E-06	-5.620										
94	188.8	19.436	18.843	17.645	17.114	14.263	19.544	-1.040	28.76	5.53	1.67E-06	-5.776										
96	190.1	19.280	18.671	17.885	17.358	14.107	19.389	-1.192	28.65	5.50	1.16E-06	-5.934										
98	192.5	19.124	18.497	17.685	17.051	13.051	19.233	-1.343	28.52	5.50	8.09E-07	-6.092										
100	196.5	18.968	18.320	17.662	17.046	13.795	19.077	-1.489	28.36	5.55	5.63E-07	-6.250										
102	202.8	18.815	18.144	17.594	16.933	13.766	18.923	-1.630	28.21	5.55	3.93E-07	-6.406										
104	212.3	18.661	17.966	17.533	16.622	13.735	18.770	-1.763	28.03	5.55	2.74E-07	-6.562										
106	225.9	18.507	17.785	17.472	16.414	13.700	18.617	-1.889	27.81	5.59	1.91E-07	-6.718										
108	244.4	18.354	17.599	17.407	16.211	13.662	18.467	-2.005	27.57	5.68	1.34E-07	-6.873										
110	268.1	18.205	17.413	17.336	16.016	13.621	18.320	-2.111	27.32	5.89	9.48E-08	-7.023										
115	344.8	17.868	16.988	17.141	15.981	13.521	17.990	-2.333	26.75	7.12	4.34E-08	-7.363										
120	430.4	17.592	16.665	16.956	15.229	13.436	17.724	-2.502	26.35	8.91	2.32E-08	-7.635										
125	518.8	17.365	16.413	16.794	14.39	13.264	17.506	-2.639	26.03	10.67	1.39E-08	-7.858										
130	608.5	17.173	16.203	16.655	14.695	13.304	17.323	-2.752	25.76	12.59	9.01E-09	-8.045										
135	698.0	17.008	16.022	16.535	14.885	13.552	17.167	-2.849	25.52	14.54	6.23E-09	-8.206										
140	786.9	16.863	15.864	16.430	14.301	13.206	17.031	-2.933	25.29	16.53	4.51E-09	-8.346										
145	875.0	16.734	15.724	16.337	14.137	13.166	16.911	-3.007	25.08	18.54	3.39E-09	-8.476										
150	961.8	16.619	15.597	16.253	13.989	13.130	16.803	-3.074	24.89	20.60	2.63E-09	-8.581										
155	1047.0	16.514	15.483	16.177	13.655	13.097	16.827	-3.134	24.71	22.69	2.08E-09	-8.681										
160	1130.3	16.418	15.378	16.108	13.733	13.068	16.617	-3.189	24.53	24.83	1.69E-09	-8.773										
170	1289.4	16.248	15.192	15.987	13.515	13.016	16.683	-3.287	24.21	29.27	1.17E-09	-8.934										
180	1436.1	16.101	15.031	15.883	13.326	12.973	16.609	-3.373	23.92	33.92	8.48E-10	-9.071										
190	1568.5	15.973	14.890	15.793	13.559	12.936	16.547	-3.450	23.65	38.75	6.44E-10	-9.191										
200	1685.5	15.858	14.764	15.714	13.905	12.905	16.483	-3.519	23.40	43.64	5.05E-10	-9.297										
210	1787.3	15.755	14.650	15.645	12.813	12.878	16.438	-3.584	23.16	48.51	4.06E-10	-9.391										
220	1874.6	15.661	14.545	15.582	12.748	12.855	16.399	-3.644	22.93	53.31	3.34E-10	-9.476										
230	1949.1	15.574	14.448	15.525	12.631	12.334	16.365	-3.701	22.71	57.91	2.79E-10	-9.555										
240	2012.1	15.493	14.358	15.473	12.521	12.816	16.335	-3.755	22.49	62.29	2.36E-10	-9.627										
250	2065.3	15.417	14.272	15.424	12.417	12.000	16.31n	-3.808	22.29	66.37	2.02E-10	-9.694										
260	2110.3	15.344	14.190	15.379	12.317	12.785	16.287	-3.858	22.08	70.18	1.75E-10	-9.758										
270	2148.3	15.274	14.111	15.315	12.221	12.771	16.266	-3.907	21.89	73.67	1.52E-10	-9.818										
280	2180.5	15.207	14.035	15.294	12.127	12.558	16.248	-3.954	21.69	76.93	1.33E-10	-9.876										
290	2207.8	15.141	13.961	15.255	12.037	12.322	16.232	-4.000	21.50	79.89	1.17E-10	-9.931										
300	2231.1	15.078	13.889	15.216	11.948	12.735	16.217	-4.045	21.32	82.67	1.04E-10	-9.985										
310	2251.0	15.016	13.819	15.179	11.861	12.725	16.203	-4.089	21.14	85.21	9.19E-11	-10.037										
320	2268.0	14.955	13.750	15.143	11.775	12.714	16.19n	-4.133	20.96	87.61	8.19E-11	-10.087										
330	2282.7	14.895	13.682	15.108	11.691	12.704	16.179	-4.175	20.79	89.84	7.32E-11	-10.136										
340	2295.4	14.836	13.615	15.073	11.608	12.695	16.168	-4.217	20.62	91.96	6.55E-11	-10.184										
350	2306.4	14.778	13.549	15.039	11.526	12.686	16.158	-4.258	20.45	93.94	5.89E-11	-10.230										
360	2316.0	14.720	13.483	15.005	11.445	12.676	16.149	-4.299	20.29	95.84	5.30E-11	-10.276										
370	2324.3	14.663	13.418	14.972	11.364	12.668	16.141	-4.339	20.13	97.67	4.78E-11	-10.322										
380	2331.6	14.607	13.354	14.939	11.285	12.559	16.133	-4.378	19.97	99.41	4.32E-11	-10.365										
390	2338.1	14.551	13.291	14.907	11.205	12.650	16.125	-4.417	19.82	101.10	3.91E-11	-10.408										
400	2343.7	14.496	13.228	14.875	11.127	12.642	16.118	-4.455	19.67	102.72	3.54E-11	-10.451										

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 2400 K

HEIGHT KM	TEMP K	LOG(N(N2) /M3)	LOG(N(O2) /M3)	LOG(N(O) /M3)	LOG(N(A) /M3)	LOG(N(HE) /M3)	LOG(N(H) /M3)	LOG /M3)	(PRESSURE NT/M2)	LOG MEAN MCL WT	DENSITY KM	DENSITY KG/M3	LOG(DEN KG/M3)
		14.386	13.103	14.811	10.971	12.625	10.105	14.958	-4.530	19.39	105.87	2.92E-11	10.534
420	2353.2	14.278	12.979	14.749	10.818	12.609	10.094	14.883	-4.604	19.12	108.88	2.43E-11	-10.615
440	2360.8	14.287	12.857	14.687	10.666	12.594	10.083	14.810	-4.675	18.86	111.77	2.02E-11	-10.694
460	2366.8	14.171	12.736	14.627	10.515	12.578	10.076	14.739	-4.746	18.62	114.58	1.70E-11	-10.771
480	2371.6	14.065	12.617	14.566	10.366	12.563	10.069	14.670	-4.814	18.39	117.30	1.43E-11	-10.845
500	2375.6	13.960	12.498	14.507	10.217	12.547	10.063	14.602	-4.882	18.18	119.97	1.21E-11	-10.919
520	2378.9	13.856	12.380	14.447	10.070	12.532	10.057	14.535	-4.948	17.98	122.58	1.02E-11	-10.950
540	2381.6	13.753	12.263	14.389	9.925	12.518	10.051	14.469	-5.013	17.79	125.12	8.70E-12	-11.060
560	2383.9	13.650	12.147	14.330	9.780	12.503	10.045	14.405	-5.077	17.61	127.59	7.43E-12	-11.129
580	2385.8	13.549	12.032	14.273	9.636	12.488	10.039	14.342	-5.140	17.44	130.02	6.36E-12	-11.197
600	2387.5	13.448	11.918	14.215	9.493	12.474	10.033	14.279	-5.202	17.29	132.40	5.46E-12	-11.263
620	2388.9	13.347	11.803	14.158	9.351	12.460	10.028	14.218	-5.264	17.14	134.71	4.70E-12	-11.328
640	2390.1	13.248	11.690	14.102	9.210	12.445	10.023	14.158	-5.324	17.00	136.94	4.06E-12	-11.392
660	2391.1	13.149	11.578	14.045	9.070	12.431	10.018	14.098	-5.383	16.86	139.12	3.45E-12	-11.455
680	2392.0	13.050	11.466	13.934	8.930	12.417	10.014	14.039	-5.442	16.74	141.25	3.04E-12	-11.517
700	2393.8	12.953	12.345	13.855	8.792	12.403	10.009	13.982	-5.499	16.62	143.33	2.64E-12	-11.578
720	2395.4	12.855	12.245	13.879	8.654	12.389	10.005	13.924	-5.556	16.50	145.36	2.30E-12	-11.638
740	2397.0	12.759	12.135	13.824	8.517	12.376	10.000	13.868	-5.613	16.39	147.34	2.01E-12	-11.697
760	2394.6	12.663	12.026	13.769	8.381	12.362	9.996	13.812	-5.668	16.28	149.28	1.75E-12	-11.756
780	2395.0	12.567	11.918	13.715	8.246	12.348	9.992	13.757	-5.723	16.18	151.19	1.54E-12	-11.814
800	2395.5	12.473	10.918	13.661	8.111	12.335	10.033	14.279	-5.777	16.07	153.01	1.35E-12	-11.871
820	2395.8	12.378	10.810	13.608	7.978	12.321	9.985	13.649	-5.831	15.97	154.80	1.18E-12	-11.927
840	2396.2	12.284	10.703	13.554	7.845	12.308	9.981	13.596	-5.884	15.87	156.57	1.04E-12	-11.983
860	2396.5	12.191	10.597	13.501	7.713	12.295	9.977	13.544	-5.936	15.76	158.30	9.16E-13	-12.038
880	2396.7	12.099	10.491	13.449	7.581	12.282	9.974	13.492	-5.988	15.66	160.01	8.08E-13	-12.093
900	2397.0	12.006	10.385	13.396	7.450	12.268	9.970	13.441	-6.039	15.56	161.70	7.13E-13	-12.147
920	2397.2	11.915	10.281	13.344	7.320	12.255	9.967	13.391	-6.089	15.45	163.37	6.31E-13	-12.200
940	2397.4	11.824	10.177	13.293	7.191	12.242	9.963	13.341	-6.139	15.34	165.03	5.58E-13	-12.253
960	2397.6	11.733	10.073	13.241	7.063	12.230	9.960	13.292	-6.188	15.23	166.68	4.95E-13	-12.305
980	2397.7	11.643	9.970	13.190	6.935	12.217	9.956	13.243	-6.237	15.11	168.33	4.39E-13	-12.357
1000	2397.9	11.553	9.868	13.190	6.842	12.185	9.948	13.125	-6.356	14.81	172.42	3.28E-13	-12.485
1050	2398.2	11.331	9.614	13.063	6.618	12.154	9.940	13.010	-6.470	14.47	176.60	2.46E-13	-12.609
1100	2398.5	11.112	9.364	12.938	6.306	12.123	9.932	12.900	-6.580	14.10	180.92	1.86E-13	-12.731
1150	2398.7	10.896	9.117	12.815	6.074	12.092	9.924	12.794	-6.686	13.69	185.41	1.42E-13	-12.849
1200	2398.8	10.683	8.874	12.693	5.874	12.062	9.916	12.693	-6.787	13.24	190.24	1.05E-13	-12.965
1250	2399.0	10.473	8.634	12.573	5.634	12.033	9.908	12.597	-6.883	12.75	195.46	8.37E-14	-13.077
1300	2399.1	10.265	8.397	12.454	5.437	12.003	9.901	12.505	-6.975	12.23	201.16	6.50E-14	-13.187
1350	2399.2	10.061	8.163	12.337	5.237	11.975	9.894	12.419	-7.061	11.68	207.43	5.09E-14	-13.293
1400	2399.3	9.858	7.932	12.222	5.037	11.946	9.886	12.338	-7.142	11.11	214.45	4.02E-14	-13.396
1450	2399.4	9.659	7.704	12.108	4.842	11.918	9.879	12.262	-7.218	10.52	222.31	3.19E-14	-13.496
1500	2399.4	9.462	7.479	11.995	4.647	11.809	9.851	12.125	-7.355	9.37	241.10	2.07E-14	-13.684
1600	2399.6	9.075	7.037	11.775	4.306	11.809	9.851	12.006	-7.474	8.28	265.16	1.39E-14	-13.856
1700	2399.6	8.698	6.607	11.559	4.031	11.756	9.838	11.904	-7.576	7.33	295.64	9.75E-15	-14.011
1800	2399.7	8.331	6.187	11.349	3.761	11.705	9.825	11.815	-7.665	6.54	333.85	7.09E-15	-14.149
1900	2399.7	7.972	6.144	10.944	3.500	11.655	9.813	11.737	-7.742	5.90	380.42	5.35E-15	-14.271
2000	2399.8	7.622	6.026	10.749	3.240	11.606	9.801	11.668	-7.811	5.41	435.20	4.18E-15	-14.378
2100	2399.8	7.280	5.901	10.558	3.000	11.558	9.788	11.606	-7.873	5.03	497.42	3.38E-15	-14.472
2200	2399.8	6.946	5.620	10.372	2.761	11.512	9.776	11.549	-7.930	4.75	565.00	2.79E-15	-14.554
2300	2399.9	6.620	5.301	10.190	2.522	11.466	9.765	11.497	-7.983	4.54	635.24	2.37E-15	-14.626
2400	2399.9	6.301	5.012	10.012	2.301	11.422	9.754	11.447	-8.033	4.38	705.68	2.04E-15	-14.691

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 2600 K

HEIGHT KM	TEMP K	LOG(N(N2) /M3)			LOG(N(O) /M3)			LOG(N(A) /M3)			LOG(N(HE) /M3)			LOG(N(H) /M3)			(PRESSURE NT/M2)			MEAN MCL WT			DENSITY SCALE HT KM			DENSITY KG/M3			
		LOG(N(N2) /M3)	LOG(N(O) /M3)	LOG(N(A) /M3)	LOG(N(HE) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(N(H) /M3)	LOG(DEN KG/M3)	LOG(DEN KG/M3)		
90	188.0	19.746	19.170	17.390	17.824	14.573	19.854	-7.732	28.91	5.63	3.43E-06	-5.465																	
92	188.2	19.592	19.009	17.547	17.669	14.418	19.700	-8.886	28.85	5.58	2.40E-06	-5.620																	
94	188.8	19.436	18.843	17.645	17.514	14.263	19.544	-1.040	28.76	5.53	1.67E-06	-5.777																	
96	190.2	19.280	18.671	17.358	14.107	19.389	19.389	-1.192	28.65	5.50	1.16E-06	-5.934																	
98	192.6	19.124	18.497	17.685	17.202	13.951	19.233	-1.343	28.52	5.49	8.09E-07	-6.092																	
100	196.7	18.968	18.320	17.661	17.045	13.794	19.077	-1.489	28.36	5.57	5.62E-07	-6.250																	
102	203.2	18.814	18.144	17.593	16.833	13.766	18.923	-1.629	28.03	5.55	2.74E-07	-6.563																	
104	213.0	18.660	17.966	17.532	16.622	13.734	18.762	-1.762	27.81	5.59	1.91E-07	-6.719																	
106	227.0	18.506	17.784	17.471	16.413	13.699	18.616	-1.888	27.61	5.59	1.91E-07	-6.719																	
108	246.0	18.353	17.599	17.405	16.211	13.660	18.466	-2.003	27.58	5.68	1.34E-07	-6.873																	
110	270.4	18.205	17.867	16.988	17.139	15.583	13.518	18.319	-2.109	27.32	5.89	9.47E-08	-7.024																
115	349.4	17.593	16.667	16.954	15.233	13.432	17.724	-2.328	26.76	7.14	4.33E-08	-7.363																	
120	437.3	17.367	16.417	16.792	14.946	13.361	17.508	-2.695	26.36	8.96	2.32E-08	-7.635																	
125	528.3	17.367	16.417	16.792	14.946	13.361	17.300	-2.629	26.06	10.74	1.39E-08	-7.856																	
130	620.7	17.177	16.208	16.654	14.705	13.300	17.327	-2.741	25.79	12.70	9.08E-09	-8.042																	
135	712.9	17.014	16.030	16.535	14.497	13.248	17.172	-2.835	25.55	14.67	6.30E-09	-8.201																	
140	804.7	16.870	15.874	16.430	14.315	13.203	17.037	-2.938	25.33	16.67	4.58E-09	-8.340																	
145	896.1	16.743	15.735	16.337	14.153	13.162	16.911	-2.990	25.13	18.69	3.45E-09	-8.462																	
150	986.7	16.628	15.610	16.254	14.007	13.126	16.810	-3.056	24.94	20.76	2.68E-09	-8.573																	
155	1076.1	16.524	15.496	16.178	13.875	13.093	16.758	-3.114	24.76	22.85	2.13E-09	-8.672																	
160	1164.2	16.429	15.392	16.109	13.754	13.063	16.705	16.626	-3.168	24.60	25.00	1.73E-09	-8.763																
170	1334.3	16.260	15.208	15.988	13.539	13.011	16.613	16.471	-3.264	24.29	29.44	1.19E-09	-8.923																
180	1493.8	16.115	15.050	15.884	13.353	12.967	16.538	16.339	-3.346	24.01	34.13	8.71E-10	-9.060																
190	1639.9	15.988	14.910	15.794	13.189	12.897	16.475	16.225	-3.420	23.80	39.13	6.62E-10	-9.177																
200	1771.0	15.876	14.786	15.715	13.043	12.897	16.411	16.125	-3.487	23.51	44.13	5.20E-10	-9.284																
210	1886.3	15.775	14.675	15.646	12.910	12.870	16.364	16.036	-3.548	23.29	49.28	4.20E-10	-9.377																
220	1986.1	15.683	14.573	15.584	12.789	12.846	16.325	15.956	-3.606	23.07	54.42	3.46E-10	-9.461																
230	2071.9	15.599	14.480	15.528	12.677	12.825	16.290	15.884	-3.660	22.87	59.41	2.90E-10	-9.537																
240	2144.9	15.520	14.392	15.476	12.571	12.807	16.217	15.817	-3.711	22.67	64.21	2.47E-10	-9.607																
250	2207.0	15.447	14.310	15.429	12.472	12.790	16.234	15.756	-3.761	22.47	68.72	2.13E-10	-9.673																
260	2259.5	15.377	14.232	15.385	12.377	12.775	16.211	15.698	-3.808	22.28	72.96	1.85E-10	-9.734																
270	2303.9	15.311	14.157	15.343	12.286	12.762	16.190	15.644	-3.854	22.10	76.86	1.62E-10	-9.792																
280	2341.7	15.247	14.086	15.304	12.198	12.749	16.171	15.592	-3.898	21.92	80.50	1.42E-10	-9.847																
290	2373.8	15.185	14.016	15.266	12.112	12.738	16.154	15.543	-3.942	21.74	83.81	1.26E-10	-9.901																
300	2401.1	15.125	13.948	15.230	12.029	12.727	16.139	15.495	-3.984	21.57	86.91	1.12E-10	-9.951																
310	2424.5	15.067	13.882	15.195	11.948	12.717	16.125	15.450	-4.026	21.40	89.74	1.00E-10	-10.000																
320	2444.5	15.010	13.818	15.161	11.868	12.707	16.112	15.405	-4.067	21.23	92.40	8.96E-11	-10.048																
330	2461.8	14.954	13.754	15.127	11.789	12.697	16.100	15.362	-4.106	21.07	94.84	8.05E-11	-10.094																
340	2476.7	14.899	13.691	15.095	11.712	12.688	16.089	15.320	-4.146	20.91	97.16	7.26E-11	-10.139																
350	2489.7	14.845	13.630	15.063	11.636	12.679	16.079	15.279	-4.184	20.75	99.32	6.56E-11	-10.183																
360	2501.0	14.791	13.569	15.031	11.560	12.671	16.070	15.239	-4.222	20.59	101.39	5.93E-11	-10.227																
370	2510.8	14.738	13.509	15.000	11.485	12.662	16.061	15.200	-4.260	20.44	103.35	5.38E-11	-10.269																
380	2519.4	14.686	13.449	14.970	11.411	12.654	16.053	15.162	-4.297	20.29	105.20	4.89E-11	-10.311																
390	2527.0	14.634	13.390	14.940	11.338	12.646	16.045	15.124	-4.333	20.15	107.00	4.55E-11	-10.352																
400	2533.7	14.583	13.332	14.910	11.265	12.638	16.038	15.087	-4.369	20.00	108.73	4.06E-11	-10.392																

Table 10. (Cont.)

EXOSPHERIC TEMPERATURE = 2600 K

HEIGHT KM	TEMP K	LOG(N(N ₂) /M ₃)	LOG(N(O ₂) /M ₃)	LOG(N(O) /M ₃)	LOG(N(A) /M ₃)			LOG(N(H) /M ₃)			LOG(N /M ₃)			(PRESSURE NT/M ²)	LOG(DEN KG/M ³)
					LOG(N(H _E) /M ₃)	LOG(N(H) /M ₃)	LOG(N(H) /M ₃)	MCL WT	DENSITY KM	DENSITY KG/M ³					
420	2544.9	14.481	13.216	14.851	11.121	12.623	10.024	15.014	-4.440	19.73	112.06	3.38E-11	-10.471		
440	2553.7	14.381	13.101	14.793	10.979	12.608	10.012	14.944	-4.509	19.46	115.21	2.84E-11	-10.547		
460	2560.8	14.282	12.988	14.736	10.838	12.593	10.002	14.875	-4.577	19.21	118.23	2.39E-11	-10.621		
480	2566.6	14.184	12.877	14.680	10.698	12.579	9.994	14.808	-4.643	18.97	121.16	2.08E-11	-10.694		
500	2571.3	14.086	12.766	14.624	10.560	12.564	9.987	14.742	-4.708	18.75	124.02	1.72E-11	-10.765		
520	2575.1	13.990	12.656	14.569	10.423	12.550	9.982	14.678	-4.771	18.53	126.82	1.47E-11	-10.834		
540	2578.3	13.895	12.547	14.514	10.287	12.536	9.975	14.615	-4.834	18.33	129.53	1.25E-11	-10.902		
560	2581.0	13.800	12.439	14.460	10.153	12.523	9.969	14.553	-4.895	18.13	132.21	1.08E-11	-10.968		
580	2583.3	13.706	12.332	14.406	10.019	12.509	9.963	14.492	-4.955	17.95	134.83	9.26E-12	-11.033		
600	2585.2	13.613	12.225	14.352	9.886	12.495	9.957	14.433	-5.015	17.78	137.41	8.00E-12	-11.097		
620	2586.9	13.520	12.119	14.299	9.754	12.482	9.951	14.374	-5.073	17.62	139.95	6.92E-12	-11.160		
640	2588.3	13.428	12.014	14.247	9.623	12.469	9.946	14.316	-5.131	17.46	142.43	6.01E-12	-11.221		
660	2589.5	13.337	11.910	14.194	9.492	12.456	9.941	14.260	-5.187	17.32	144.83	5.23E-12	-11.282		
680	2590.5	13.246	11.806	14.142	9.363	12.443	9.936	14.204	-5.243	17.18	147.21	4.56E-12	-11.341		
700	2591.5	13.155	11.703	14.091	9.234	12.430	9.931	14.148	-5.298	17.05	149.55	3.98E-12	-11.400		
720	2592.3	13.066	11.600	14.039	9.106	12.417	9.927	14.094	-5.352	16.92	151.83	3.49E-12	-11.457		
740	2593.0	12.977	11.498	13.988	8.979	12.404	9.922	14.040	-5.406	16.80	154.06	3.06E-12	-11.514		
760	2593.6	12.888	11.397	13.938	8.853	12.391	9.918	13.987	-5.459	16.69	156.23	2.69E-12	-11.570		
780	2594.2	12.800	11.297	13.887	8.727	12.379	9.914	13.935	-5.511	16.58	158.36	2.37E-12	-11.625		
800	2594.6	12.712	11.197	13.837	8.602	12.366	9.910	13.883	-5.563	16.48	160.49	2.09E-12	-11.680		
820	2595.1	12.625	11.097	13.787	8.478	12.354	9.907	13.832	-5.614	16.37	162.52	1.85E-12	-11.734		
840	2595.5	12.539	10.998	13.738	8.355	12.341	9.903	13.781	-5.664	16.28	164.50	1.63E-12	-11.787		
860	2595.8	12.452	10.900	13.689	8.235	12.329	9.900	13.732	-5.714	16.18	166.46	1.45E-12	-11.841		
880	2596.1	12.367	10.802	13.640	8.110	12.317	9.896	13.682	-5.763	16.08	168.38	1.28E-12	-11.891		
900	2596.4	12.282	10.705	13.591	7.989	12.304	9.893	13.634	-5.812	15.99	170.27	1.12E-12	-11.942		
920	2596.7	12.197	10.608	13.543	7.868	12.292	9.889	13.585	-5.860	15.89	172.13	1.02E-12	-11.993		
940	2596.9	12.113	10.512	13.495	7.748	12.280	9.886	13.538	-5.908	15.80	173.97	9.05E-13	-12.043		
960	2597.1	12.029	10.417	13.447	7.629	12.268	9.883	13.491	-5.955	15.71	175.78	8.07E-13	-12.093		
980	2597.3	11.946	10.321	13.399	7.510	12.256	9.879	13.444	-6.001	15.61	177.57	7.17E-13	-12.142		
1000	2597.5	11.863	10.227	13.352	7.392	12.245	9.876	13.398	-6.047	15.51	179.35	6.44E-13	-12.191		
1050	2597.9	11.658	9.993	13.235	7.100	12.215	9.868	13.286	-6.160	15.27	183.70	4.89E-13	-12.311		
1100	2598.2	11.456	9.762	13.120	6.812	12.186	9.860	13.176	-6.269	15.08	188.05	3.74E-13	-12.427		
1150	2598.4	11.257	9.534	13.006	6.527	12.158	9.853	13.071	-6.375	14.71	192.42	2.87E-13	-12.542		
1200	2598.6	11.060	9.310	12.893	6.247	12.130	9.845	12.968	-6.477	14.40	196.85	2.22E-13	-12.653		
1250	2598.8	10.866	9.088	12.783	6.027	12.102	9.838	12.870	-6.575	14.06	201.44	1.73E-13	-12.762		
1300	2599.0	10.675	8.869	12.673	5.835	12.075	9.831	12.775	-6.670	13.69	206.24	1.06E-13	-12.869		
1350	2599.1	10.485	8.653	12.565	5.648	12.048	9.824	12.684	-6.761	13.28	211.30	1.06E-13	-12.973		
1400	2599.2	10.299	8.440	12.459	5.461	12.021	9.817	12.597	-6.848	12.85	216.67	8.43E-14	-13.074		
1450	2599.3	10.115	8.230	12.353	5.274	12.004	9.811	12.514	-6.931	12.39	222.52	6.71E-14	-13.173		
1500	2599.3	9.933	8.022	12.249	5.084	12.435	-7.010	11.90	228.87	5.38E-14	-13.269	-			
1600	2599.5	9.576	7.614	12.046	4.891	12.290	-7.155	10.88	243.43	3.52E-14	-13.454	-			
1700	2599.6	9.228	7.217	11.847	4.688	9.778	12.161	-7.284	9.84	261.31	2.37E-14	-13.626	-		
1800	2599.6	8.889	6.829	11.653	4.464	9.766	12.048	-7.397	8.84	283.33	1.64E-14	-13.786	-		
1900	2599.7	8.557	6.451	11.464	4.272	9.754	11.949	-7.499	7.92	310.66	1.17E-14	-13.932	-		
2000	2599.7	8.234	6.081	11.279	4.081	9.742	11.862	-7.583	7.12	344.23	8.61E-15	-14.065	-		
2100	2599.8	7.918	5.811	11.099	3.881	9.731	11.786	-7.659	6.45	384.77	6.58E-15	-14.185	-		
2200	2599.8	7.610	5.623	10.923	3.691	9.720	11.718	-7.727	5.90	432.94	5.11E-15	-14.291	-		
2300	2599.8	7.309	5.437	10.751	3.501	9.709	11.657	-7.788	5.46	488.55	4.11E-15	-14.386	-		
2400	2599.9	7.015	5.253	10.583	3.311	9.698	11.601	-7.844	5.12	550.59	3.39E-15	-14.469	-		
2500	2599.9	6.727	5.019	10.419	3.111	9.685	11.550	-7.895	4.85	618.30	2.88E-15	-14.544	-		

HEIGHT km	EXOSPHERIC TEMPERATURE (K)							1100	1200
	500	550	600	650	700	800	900		
90	-5•465	-5•465	-5•465	-5•465	-5•465	-5•465	-5•465	-5•465	-5•465
92	-5•620	-5•620	-5•620	-5•620	-5•620	-5•620	-5•620	-5•620	-5•620
94	-5•776	-5•776	-5•776	-5•776	-5•776	-5•776	-5•776	-5•776	-5•776
96	-5•932	-5•932	-5•932	-5•932	-5•932	-5•932	-5•932	-5•932	-5•932
98	-6•088	-6•088	-6•089	-6•089	-6•089	-6•089	-6•089	-6•090	-6•090
100	-6•243	-6•244	-6•245	-6•245	-6•246	-6•246	-6•246	-6•247	-6•247
102	-6•397	-6•398	-6•398	-6•398	-6•399	-6•400	-6•400	-6•402	-6•402
104	-6•549	-6•550	-6•551	-6•552	-6•552	-6•554	-6•555	-6•556	-6•557
106	-6•702	-6•703	-6•704	-6•705	-6•706	-6•707	-6•708	-6•711	-6•712
108	-6•853	-6•854	-6•856	-6•857	-6•858	-6•860	-6•861	-6•864	-6•865
110	-7•002	-7•004	-7•005	-7•006	-7•007	-7•009	-7•011	-7•012	-7•015
115	-7•355	-7•355	-7•356	-7•356	-7•357	-7•357	-7•358	-7•358	-7•359
120	-7•664	-7•661	-7•658	-7•656	-7•654	-7•651	-7•648	-7•646	-7•643
125	-7•935	-7•927	-7•920	-7•915	-7•910	-7•902	-7•895	-7•890	-7•885
130	-8•175	-8•161	-8•150	-8•140	-8•132	-8•118	-8•107	-8•098	-8•091
135	-8•386	-8•366	-8•350	-8•337	-8•325	-8•306	-8•291	-8•279	-8•269
140	-8•573	-8•547	-8•527	-8•509	-8•495	-8•471	-8•452	-8•436	-8•413
145	-8•742	-8•710	-8•685	-8•664	-8•645	-8•616	-8•594	-8•576	-8•548
150	-8•898	-8•860	-8•829	-8•804	-8•782	-8•748	-8•722	-8•701	-8•669
155	-9•044	-8•999	-8•963	-8•933	-8•908	-8•868	-8•838	-8•814	-8•778
160	-9•182	-9•130	-9•089	-9•054	-9•026	-8•980	-8•945	-8•918	-8•878
170	-9•440	-9•375	-9•322	-9•278	-9•241	-9•183	-9•140	-9•106	-9•056
180	-9•679	-9•601	-9•537	-9•494	-9•439	-9•368	-9•314	-9•273	-9•213
190	-9•902	-9•811	-9•737	-9•655	-9•622	-9•538	-9•474	-9•425	-9•354
200	-10•112	-10•101	-10•926	-9•855	-9•794	-9•697	-9•624	-9•566	-9•520
210	-10•311	-10•198	-10•104	-10•025	-9•957	-9•848	-9•764	-9•699	-9•604
220	-10•501	-10•377	-10•274	-10•187	-10•112	-9•991	-9•898	-9•824	-9•717
230	-10•683	-10•549	-10•437	-10•342	-10•260	-10•128	-10•025	-9•944	-9•824
240	-10•856	-10•714	-10•593	-10•491	-10•402	-10•259	-10•147	-10•058	-9•927
250	-11•029	-10•873	-10•744	-10•634	-10•539	-10•385	-10•264	-10•168	-10•025
260	-11•194	-11•028	-10•890	-10•773	-10•672	-10•507	-10•378	-10•190	-10•120
270	-11•356	-11•327	-11•171	-11•032	-10•805	-10•624	-10•487	-10•286	-10•211
280	-11•515	-11•472	-11•307	-11•167	-11•047	-10•739	-10•593	-10•476	-10•300
290	-11•671	-11•625	-11•440	-11•292	-11•166	-10•850	-10•697	-10•573	-10•471
300	-11•825	-11•755	-11•571	-11•416	-11•282	-10•959	-10•797	-10•667	-10•539
310	-11•976	-12•125	-11•893	-11•700	-11•517	-11•397	-11•169	-10•991	-10•758
320	-12•273	-12•030	-11•828	-11•657	-11•510	-11•271	-11•085	-10•935	-10•708
330	-12•417	-12•165	-11•953	-11•774	-11•621	-11•372	-11•178	-11•021	-10•784
340	-12•559	-12•297	-12•077	-11•891	-11•731	-11•471	-11•268	-11•105	-10•858
350	-12•699	-12•428	-12•200	-12•006	-11•839	-11•568	-11•358	-11•188	-10•932
360	-12•835	-12•557	-12•321	-12•119	-11•946	-11•665	-11•446	-11•270	-11•053
370	-12•967	-12•684	-12•441	-12•232	-12•052	-11•760	-11•532	-11•200	-11•074
380	-13•095	-12•808	-12•558	-12•343	-12•157	-11•854	-11•618	-11•429	-11•143
390	-13•218	-12•930	-12•674	-12•453	-12•261	-11•947	-11•703	-11•507	-11•212

Table 11. (Cont.)

HEIGHT KM	EXOSPHERIC TEMPERATURE (K)							1100	1200
	500	550	600	650	700	800	900		
420	-13.446	-13.163	-12.900	-12.668	-12.464	-12.130	-11.661	-11.489	-11.346
440	-13.646	-13.379	-13.116	-12.876	-12.663	-12.310	-11.811	-11.629	-11.477
460	-13.815	-13.575	-13.320	-13.077	-12.877	-12.486	-11.959	-11.766	-11.605
480	-13.953	-13.747	-13.508	-13.268	-13.044	-12.659	-12.351	-12.103	-11.730
500	-14.066	-13.895	-13.678	-13.447	-13.223	-12.827	-12.506	-12.246	-12.032
520	-14.158	-14.020	-13.829	-13.612	-13.392	-12.991	-12.658	-12.386	-12.053
540	-14.236	-14.124	-13.960	-13.762	-13.551	-13.149	-12.807	-12.523	-12.289
560	-14.302	-14.212	-14.072	-13.895	-13.698	-13.301	-12.952	-12.659	-12.415
580	-14.361	-14.287	-14.168	-14.013	-13.831	-13.446	-13.093	-12.791	-12.538
600	-14.415	-14.353	-14.251	-14.115	-13.950	-13.583	-13.229	-12.921	-12.660
620	-14.465	-14.412	-14.323	-14.203	-14.056	-13.711	-13.361	-13.048	-12.780
640	-14.512	-14.466	-14.387	-14.281	-14.049	-13.828	-13.487	-13.172	-12.897
660	-14.557	-14.517	-14.445	-14.349	-14.231	-13.936	-13.606	-13.291	-12.770
680	-14.599	-14.564	-14.498	-14.411	-14.304	-14.034	-13.719	-13.407	-12.877
700	-14.639	-14.610	-14.549	-14.467	-14.369	-14.127	-13.824	-13.518	-13.234
720	-14.678	-14.653	-14.596	-14.519	-14.428	-14.201	-13.922	-13.624	-13.340
740	-14.715	-14.695	-14.641	-14.568	-14.482	-14.277	-14.012	-13.724	-13.443
760	-14.750	-14.735	-14.685	-14.615	-14.522	-14.337	-14.094	-13.819	-13.542
780	-14.783	-14.773	-14.727	-14.659	-14.580	-14.395	-14.170	-13.908	-13.637
800	-14.816	-14.811	-14.767	-14.702	-14.625	-14.449	-14.238	-13.991	-13.721
820	-14.847	-14.846	-14.807	-14.743	-14.668	-14.499	-14.301	-14.068	-13.560
840	-14.876	-14.881	-14.845	-14.783	-14.710	-14.545	-14.358	-14.139	-13.645
860	-14.905	-14.914	-14.881	-14.823	-14.750	-14.589	-14.411	-14.205	-13.971
880	-14.932	-14.946	-14.901	-14.841	-14.789	-14.631	-14.460	-14.265	-13.806
900	-14.958	-14.976	-14.952	-14.898	-14.828	-14.671	-14.506	-14.321	-13.881
920	-14.984	-15.006	-14.985	-14.934	-14.865	-14.710	-14.549	-14.373	-13.952
940	-15.008	-15.034	-15.017	-14.969	-14.901	-14.748	-14.589	-14.421	-14.231
960	-15.031	-15.062	-15.049	-15.003	-14.937	-14.784	-14.628	-14.466	-14.285
980	-15.054	-15.088	-15.079	-15.036	-14.972	-14.820	-14.665	-14.508	-14.335
1000	-15.076	-15.113	-15.108	-15.068	-15.006	-14.855	-14.701	-14.547	-14.382
1050	-15.128	-15.173	-15.177	-15.145	-15.088	-14.940	-14.786	-14.638	-14.487
1100	-15.177	-15.228	-15.241	-15.217	-15.165	-15.021	-14.867	-14.721	-14.578
1150	-15.222	-15.278	-15.299	-15.283	-15.238	-15.099	-14.944	-14.797	-14.659
1200	-15.266	-15.325	-15.352	-15.345	-15.306	-15.173	-15.018	-14.870	-14.733
1250	-15.307	-15.369	-15.402	-15.402	-15.370	-15.245	-15.090	-14.940	-14.803
1300	-15.347	-15.410	-15.448	-15.455	-15.430	-15.313	-15.160	-15.008	-14.869
1350	-15.385	-15.450	-15.491	-15.504	-15.486	-15.379	-15.227	-15.073	-14.932
1400	-15.422	-15.487	-15.531	-15.549	-15.441	-15.292	-15.137	-14.994	-14.865
1450	-15.459	-15.523	-15.569	-15.592	-15.581	-15.500	-15.355	-15.199	-14.923
1500	-15.494	-15.558	-15.605	-15.632	-15.632	-15.556	-15.416	-15.260	-14.979
1600	-15.563	-15.624	-15.673	-15.705	-15.715	-15.660	-15.531	-15.376	-15.225
1700	-15.630	-15.686	-15.735	-15.771	-15.807	-15.752	-15.638	-15.487	-15.332
1800	-15.694	-15.746	-15.793	-15.830	-15.852	-15.835	-15.736	-15.590	-15.435
1900	-15.756	-15.804	-15.849	-15.886	-15.911	-15.908	-15.805	-15.688	-15.534
2000	-15.817	-15.860	-15.902	-15.938	-15.966	-15.974	-15.907	-15.780	-15.627
2100	-15.876	-15.915	-15.953	-15.988	-16.016	-16.034	-15.981	-15.865	-15.716
2200	-15.934	-15.967	-16.002	-16.035	-16.063	-16.088	-16.049	-15.944	-15.801
2300	-15.991	-16.019	-16.050	-16.081	-16.108	-16.138	-16.110	-15.981	-15.729
2400	-16.046	-16.069	-16.097	-16.125	-16.151	-16.183	-16.166	-16.085	-15.956
2500	-16.100	-16.118	-16.142	-16.177	-16.192	-16.226	-16.217	-16.148	-16.027

Table 11. (Cont.)

HEIGHT KM	EXOSPHERIC TEMPERATURE (K)						2200	2400	2600
	1200	1300	1400	1500	1600	1800			
90	-5.465	-5.465	-5.465	-5.465	-5.465	-5.465	-5.465	-5.465	-5.465
92	-5.620	-5.620	-5.620	-5.620	-5.620	-5.620	-5.620	-5.620	-5.620
94	-5.776	-5.776	-5.776	-5.776	-5.776	-5.776	-5.776	-5.776	-5.776
96	-5.933	-5.933	-5.933	-5.933	-5.933	-5.933	-5.934	-5.934	-5.934
98	-6.091	-6.091	-6.091	-6.091	-6.091	-6.091	-6.092	-6.092	-6.092
100	-6.248	-6.248	-6.248	-6.248	-6.248	-6.248	-6.249	-6.250	-6.250
102	-6.403	-6.403	-6.403	-6.403	-6.404	-6.404	-6.404	-6.406	-6.406
104	-6.557	-6.558	-6.558	-6.559	-6.559	-6.560	-6.561	-6.562	-6.563
106	-6.712	-6.712	-6.713	-6.714	-6.714	-6.714	-6.717	-6.717	-6.719
108	-6.865	-6.866	-6.867	-6.867	-6.868	-6.869	-6.871	-6.873	-6.873
110	-7.015	-7.016	-7.017	-7.017	-7.018	-7.020	-7.021	-7.023	-7.024
115	-7.359	-7.359	-7.360	-7.360	-7.360	-7.361	-7.362	-7.363	-7.363
120	-7.643	-7.642	-7.641	-7.640	-7.640	-7.638	-7.637	-7.635	-7.635
125	-7.882	-7.878	-7.875	-7.873	-7.871	-7.867	-7.863	-7.858	-7.856
130	-8.085	-8.079	-8.074	-8.070	-8.066	-8.060	-8.054	-8.045	-8.042
135	-8.260	-8.252	-8.246	-8.240	-8.235	-8.225	-8.218	-8.206	-8.201
140	-8.413	-8.404	-8.395	-8.388	-8.381	-8.370	-8.361	-8.353	-8.346
145	-8.548	-8.537	-8.528	-8.519	-8.511	-8.498	-8.487	-8.478	-8.462
150	-8.669	-8.657	-8.646	-8.636	-8.628	-8.613	-8.601	-8.590	-8.573
155	-8.778	-8.765	-8.753	-8.742	-8.732	-8.716	-8.703	-8.691	-8.672
160	-8.878	-8.863	-8.850	-8.838	-8.828	-8.810	-8.796	-8.773	-8.763
170	-9.056	-9.038	-9.022	-9.008	-8.996	-8.976	-8.959	-8.934	-8.923
180	-9.213	-9.190	-9.172	-9.156	-9.142	-9.118	-9.100	-9.084	-9.060
190	-9.354	-9.327	-9.305	-9.286	-9.270	-9.243	-9.222	-9.205	-9.191
200	-9.483	-9.452	-9.426	-9.405	-9.386	-9.355	-9.331	-9.312	-9.297
210	-9.604	-9.568	-9.538	-9.513	-9.492	-9.457	-9.430	-9.408	-9.377
220	-9.717	-9.677	-9.643	-9.615	-9.590	-9.550	-9.520	-9.496	-9.476
230	-9.824	-9.779	-9.742	-9.710	-9.682	-9.638	-9.603	-9.576	-9.537
240	-9.927	-9.877	-9.835	-9.800	-9.769	-9.719	-9.681	-9.651	-9.627
250	-10.025	-9.971	-9.925	-9.886	-9.852	-9.797	-9.755	-9.721	-9.694
260	-10.120	-10.061	-10.011	-9.968	-9.931	-9.871	-9.824	-9.788	-9.758
270	-10.211	-10.148	-10.094	-10.048	-10.008	-9.947	-9.891	-9.851	-9.792
280	-10.300	-10.232	-10.174	-10.125	-10.081	-10.011	-9.955	-9.911	-9.847
290	-10.386	-10.314	-10.252	-10.199	-10.153	-10.077	-10.017	-9.970	-9.931
300	-10.469	-10.393	-10.328	-10.271	-10.222	-10.141	-10.077	-10.026	-9.985
310	-10.551	-10.470	-10.401	-10.342	-10.290	-10.204	-10.136	-10.081	-10.037
320	-10.630	-10.546	-10.473	-10.411	-10.356	-10.264	-10.192	-10.134	-10.087
330	-10.708	-10.620	-10.544	-10.478	-10.420	-10.324	-10.258	-10.186	-10.136
340	-10.784	-10.692	-10.612	-10.543	-10.483	-10.387	-10.327	-10.257	-10.184
350	-10.858	-10.762	-10.680	-10.608	-10.544	-10.439	-10.355	-10.286	-10.183
360	-10.932	-10.832	-10.746	-10.671	-10.605	-10.495	-10.407	-10.335	-10.227
370	-11.003	-10.900	-10.810	-10.733	-10.664	-10.549	-10.458	-10.383	-10.321
380	-11.074	-10.967	-10.874	-10.793	-10.722	-10.603	-10.508	-10.430	-10.365
390	-11.143	-11.032	-10.937	-10.853	-10.779	-10.656	-10.557	-10.476	-10.408
400	-11.212	-11.097	-10.998	-10.912	-10.836	-10.708	-10.605	-10.521	-10.451

Table 11. (Cont.)

HEIGHT KM	EXOSPHERIC TEMPERATURE (K)							2400	2200	2000	1800	1600	1500	1400	1300	1200
	2600	2400	2200	2000	1800	1600	1500									
420	-11.224	-11.119	-11.027	-10.946	-10.810	-10.700	-10.609	-10.534	-10.471	-10.415	-10.365	-10.315	-10.266	-10.216	-10.157	-10.097
440	-11.347	-11.236	-11.138	-11.052	-10.908	-10.792	-10.695	-10.615	-10.547	-10.486	-10.426	-10.366	-10.306	-10.246	-10.186	-10.126
460	-11.468	-11.350	-11.247	-11.156	-11.004	-10.881	-10.779	-10.694	-10.624	-10.553	-10.493	-10.433	-10.373	-10.313	-10.253	-10.193
480	-11.586	-11.461	-11.353	-11.258	-11.094	-10.968	-10.861	-10.771	-10.694	-10.621	-10.551	-10.491	-10.431	-10.371	-10.311	-10.251
500	-11.701	-11.571	-11.457	-11.357	-11.189	-11.053	-10.940	-10.845	-10.765	-10.694	-10.624	-10.554	-10.494	-10.434	-10.374	-10.314
520	-11.815	-11.678	-11.559	-11.454	-11.278	-11.136	-11.018	-10.919	-10.834	-10.765	-10.694	-10.624	-10.564	-10.504	-10.444	-10.384
540	-11.926	-11.783	-11.659	-11.549	-11.366	-11.217	-11.094	-10.990	-10.902	-10.832	-10.762	-10.692	-10.632	-10.572	-10.512	-10.452
560	-12.036	-11.887	-11.757	-11.643	-11.451	-11.296	-11.168	-11.060	-10.968	-10.898	-10.828	-10.758	-10.698	-10.638	-10.578	-10.518
580	-12.210	-11.989	-11.853	-11.735	-11.535	-11.375	-11.241	-11.129	-11.033	-10.963	-10.893	-10.823	-10.753	-10.693	-10.633	-10.573
600	-12.325	-12.089	-11.949	-11.825	-11.618	-11.451	-11.313	-11.197	-11.097	-10.960	-10.890	-10.820	-10.750	-10.680	-10.620	-10.560
620	-12.551	-12.356	-12.188	-12.042	-11.914	-11.700	-11.526	-11.383	-11.263	-11.160	-11.054	-10.954	-10.854	-10.754	-10.654	-10.554
640	-12.662	-12.60	-12.286	-12.135	-12.002	-11.780	-11.601	-11.452	-11.328	-11.221	-11.121	-11.021	-10.921	-10.821	-10.721	-10.621
660	-12.770	-12.563	-12.383	-12.226	-12.089	-11.859	-11.673	-11.532	-11.392	-11.282	-11.182	-11.082	-10.982	-10.882	-10.782	-10.682
680	-12.877	-12.663	-12.478	-12.316	-12.174	-11.937	-11.745	-11.588	-11.455	-11.345	-11.245	-11.145	-11.045	-10.945	-10.845	-10.745
700	-12.982	-12.763	-12.572	-12.405	-12.259	-12.014	-11.816	-11.654	-11.517	-11.400	-11.300	-11.200	-11.090	-10.980	-10.880	-10.780
720	-13.085	-12.860	-12.665	-12.493	-12.342	-12.090	-11.886	-11.719	-11.578	-11.467	-11.367	-11.267	-11.167	-11.067	-10.967	-10.867
740	-13.185	-12.957	-12.756	-12.580	-12.425	-12.165	-11.955	-11.783	-11.642	-11.531	-11.431	-11.331	-11.231	-11.131	-11.031	-10.931
760	-13.283	-13.051	-12.846	-12.666	-12.506	-12.245	-12.046	-11.846	-11.746	-11.645	-11.545	-11.445	-11.345	-11.245	-11.145	-11.045
780	-13.378	-13.143	-12.935	-12.750	-12.587	-12.312	-12.091	-11.909	-11.809	-11.708	-11.608	-11.508	-11.408	-11.308	-11.208	-11.108
800	-13.470	-13.234	-13.022	-12.834	-12.666	-12.385	-12.157	-11.970	-11.870	-11.769	-11.669	-11.569	-11.469	-11.369	-11.269	-11.169
820	-13.560	-13.322	-13.108	-12.916	-12.745	-12.456	-12.223	-12.032	-11.871	-11.734	-11.634	-11.534	-11.434	-11.334	-11.234	-11.134
840	-13.645	-13.408	-13.191	-12.96	-12.796	-12.527	-12.288	-12.092	-11.927	-11.787	-11.687	-11.587	-11.487	-11.387	-11.287	-11.187
860	-13.728	-13.492	-13.274	-13.076	-12.899	-12.597	-12.353	-12.152	-11.983	-11.883	-11.783	-11.683	-11.583	-11.483	-11.383	-11.283
880	-13.806	-13.573	-13.354	-13.154	-12.974	-12.666	-12.417	-12.211	-12.038	-11.938	-11.838	-11.738	-11.638	-11.538	-11.438	-11.338
900	-13.881	-13.651	-13.432	-13.231	-13.048	-12.735	-12.480	-12.269	-12.093	-11.993	-11.893	-11.793	-11.693	-11.593	-11.493	-11.393
920	-13.952	-13.727	-13.509	-13.306	-13.121	-12.802	-12.542	-12.327	-12.147	-12.043	-11.943	-11.843	-11.743	-11.643	-11.543	-11.443
940	-14.019	-13.799	-13.583	-13.380	-13.193	-12.869	-12.604	-12.384	-12.200	-12.099	-11.999	-11.899	-11.799	-11.699	-11.599	-11.499
960	-14.082	-13.868	-13.655	-13.451	-13.263	-12.935	-12.665	-12.444	-12.253	-12.093	-11.993	-11.893	-11.793	-11.693	-11.593	-11.493
980	-14.142	-13.934	-13.724	-13.521	-13.332	-13.000	-12.725	-12.525	-12.325	-12.125	-11.925	-11.825	-11.725	-11.625	-11.525	-11.425
1000	-14.197	-13.997	-13.791	-13.590	-13.400	-13.064	-12.785	-12.585	-12.385	-12.185	-11.985	-11.885	-11.785	-11.685	-11.585	-11.485
1050	-14.322	-14.140	-13.946	-13.751	-13.562	-13.221	-12.932	-12.632	-12.432	-12.232	-12.032	-11.832	-11.632	-11.432	-11.232	-11.032
1100	-14.428	-14.263	-14.085	-13.899	-13.715	-13.371	-13.074	-12.874	-12.674	-12.474	-12.274	-12.074	-11.874	-11.674	-11.474	-11.274
1150	-14.520	-14.370	-14.207	-14.033	-13.856	-13.514	-13.211	-12.952	-12.752	-12.552	-12.352	-12.152	-11.952	-11.752	-11.552	-11.352
1200	-14.601	-14.463	-14.314	-14.153	-13.985	-13.650	-13.344	-13.044	-12.744	-12.544	-12.344	-12.144	-11.944	-11.744	-11.544	-11.344
1250	-14.674	-14.545	-14.408	-14.260	-14.102	-13.777	-13.477	-13.177	-12.877	-12.677	-12.477	-12.277	-12.077	-11.877	-11.677	-11.477
1300	-14.741	-14.618	-14.490	-14.354	-14.207	-13.896	-13.593	-13.293	-13.093	-12.893	-12.693	-12.493	-12.293	-12.093	-11.893	-11.693
1350	-14.805	-14.684	-14.564	-14.437	-14.301	-14.006	-13.706	-13.406	-13.106	-12.806	-12.506	-12.206	-11.906	-11.606	-11.306	-11.006
1400	-14.865	-14.746	-14.630	-14.511	-14.385	-14.087	-13.787	-13.487	-13.187	-12.887	-12.587	-12.287	-11.987	-11.687	-11.387	-11.087
1450	-14.923	-14.804	-14.691	-14.578	-14.371	-14.071	-13.771	-13.471	-13.171	-12.871	-12.571	-12.271	-11.971	-11.671	-11.371	-11.071
1500	-14.979	-14.859	-14.748	-14.639	-14.527	-14.227	-13.927	-13.627	-13.327	-13.027	-12.727	-12.427	-12.127	-11.827	-11.527	-11.227
1600	-15.087	-14.963	-14.852	-14.747	-14.644	-14.344	-14.044	-13.744	-13.444	-13.144	-12.844	-12.544	-12.244	-11.944	-11.644	-11.344
1700	-15.190	-15.062	-14.953	-14.843	-14.733	-14.433	-14.133	-13.833	-13.533	-13.233	-12.933	-12.633	-12.333	-12.033	-11.733	-11.433
1800	-15.289	-15.157	-15.039	-14.933	-14.823	-14.523	-14.223	-13.923	-13.623	-13.323	-13.023	-12.723	-12.423	-12.123	-11.823	-11.523
1900	-15.384	-15.248	-15.126	-15.017	-14.907	-14.607	-14.307	-14.007	-13.707	-13.407	-13.107	-12.807	-12.507	-12.207	-11.907	-11.607
2000	-15.476	-15.335	-15.209	-15.097	-14.996	-14.796	-14.496	-14.196	-13.896	-13.596	-13.296	-12.996	-12.696	-12.396	-12.096	-11.796
2100	-15.564	-15.450	-15.320	-15.209	-15.098	-14.898	-14.598	-14.298	-13.998	-13.698	-13.398	-13.098	-12.798	-12.498	-12.198	-11.898
2200	-15.648	-15.520	-15.396	-15.280	-15.170	-14.969	-14.669	-14.369	-14.069	-13.769	-13.469	-13.169	-12.869	-12.569	-12.269	-11.969
2300	-15.729	-15.591	-15.464	-15.351	-15.232	-15.031	-14.731	-14.431	-14.131	-13.831	-13.531	-13.231	-12.931	-12.631	-12.331	-12.031
2400	-15.807	-15.657	-15.520	-15.408	-15.289	-15.089	-14.789	-14.489	-14.189	-13.889	-13.589	-13.289	-12.989	-12.689	-12.389	-12.089
2500	-15.881	-15.731	-15.607	-15.489	-15.369	-15.169	-14.869	-14.569	-14.269	-13.969	-13.669	-13.369	-13.069	-12.769	-12.469	-12.169