Engineering Models for Titan's Atmosphere

R. V. Yelle[1], D. F. Strobell,[2] E. Lellouch[3] & D. Gautier[3]

[1]*Lunar and Planetary Laboratory, University of Arizona, Tucson, AZ 85721, USA*
E-mail: yelle@bu-ast.bu.edu Fax: +1 617 353-6463

[2]*Department of Earth and Planetary Sciences and Department of Physics and Astronomy, The Johns Hopkins University, Baltimore, MD 21218, USA*

[3]*Departement de Recherche Spatiale, Observatoire de Paris-Meudon, F-92195 Meudon Cedex, France*

1. Introduction

This report presents engineering models for Titan's atmospheric structure used in the design and analysis of the Huygens Probe and its mission. It supersedes an earlier report by Lellouch & Hunten published in 1987 (hereafter LH; also see the Lellouch & Runten paper in this volume). There has been significant progress in our under-standing of Titan's atmosphere in the last few years, particularly in the thermal structure of the upper atmosphere and in the chemical composition of the atmosphere. We make use of these advances in constructing the new models.

These models will be used in the study of two problems: the Probe's heat loading during atmospheric entry, and the descent time to the surface. The first problem concerns primarily the atmospheric structure below 600 km, and the second the atmospheric structure in the lowest 200 km. If the models are to be used for other purposes, the authors should be consulted.

As in the LH report, we present three models: a recommended model; a model for maximum mass density; and a model for minimum mass density. The minimum and maximum models also have the lowest and highest temperatures. It is an assumption on our part that atmospheres with the minimum and maximum possible mass densities and temperatures will produce extreme values for heat loading and descent times of the Huygens Probe.

The models are based on observations made by the Voyager 1 radio science subsytem (RSS), infrared spectrometer (IRIS) and ultraviolet spectrometer (UVS). The recommended model provides an adequate fit to all three data sets.

2. Recommended Model

2.1 Temperature profile

The thermal structure of Titan's atmosphere below 200 km altitude can be inferred from the RSS occultation measurements. The inference of temperatures in this manner depends upon the atmosphere's composition. The thermal structure of Titan's atmosphere at altitudes from 120 km to 300 km is also constrained by IRIS measurements of the brightness of the CH_4 band centred at 1304 cm~' (Lellouch et al., 1989). The determination of temperature from these measurements depends on the mole fraction of CH_4 in the Stratosphere. The thermal structure at altitudes above 1000 km was measured by the UVS solar occultation experiment (Smith et al., 1982; Strobel et al., 1992). In addition to these direct measurements, the different regions of the atmosphere must be connected by the equation of hydrostatic equilibrium. Finally, we require that the temperature profile bears a resemblance to profiles based on theoretical calculations. We first discuss determination of the thermal structure from the measurements, hydrostatic equilibrium and theoretical calculations for an assumed composition, then discuss UVS and IRIS constraints on the atmospheric composition.

Results from the RSS occultation experiment constitute the primary data set used in determination of the temperature profile at altitudes below 200 km. Analysis of these data has determined the refractivity of

the atmosphere (Lindal et al., 1983). The RSS experiment measured the refractivity of the atmosphere during both ingress and egress occultations. Although there are slight differences between the ingress and egress occultation at altitudes above 150 km, they are small compared with other uncertainties in the model atmosphere and can be ignored. Thus we will rely upon the RSS ingress data exclusively for determination of atmospheric structure below 200 km.

We infer number densities from the refractivity data through

$$R(z) = \sum N_i(z)\alpha_i \tag{1}$$

where z is altitude, $R(z)$ is the measured refractivity, $N_i(z)$ number density of the *i*th constituent, and is the refractivity of the *i*th constituent. We use values for α_i of 294, 277 and 430 x 10^{-6} for N_i, Ar and CH_4, respectively.

The pressure is obtained from the mass density through the equation of hydrostatic equilibrium,

$$\frac{dP(z)}{dz} = -\rho(z)g(z), \tag{2}$$

where $P(z)$ is the pressure, r(z) is the mass density, and g(z) is the acceleration of gravity. The temperature, $T(z)$, is obtained from the pressure and number densities through the equation of state,

$$P(z) = N(z)kT(z) / F_c(Z) \tag{3}$$

where k is Boltzmann's constant and $N(z) = \Sigma N_i(z)$ is the total number density. The quantity $F_c(z)$ is a correction factor that takes account of the non-ideal nature of the gas in Titan's atmosphere. We calculate $F_c(z)$ in the manner suggested by Lindal et al. (1983). $F_c(z)$ has a maximum value of about 1.03 at the surface.

At altitudes above 150 km the quality of the RSS data diminishes. This manifests itself primarily as noise in the derived temperature profile. To rectify this problem, we use a smoothed representation of the temperature profile obtained by averaging over the noise in the derived temperature profile. Using this smoothed temperature profile we then solve equation (2) again to obtain pressure and mass density. The values of $P(z)$ and $r(z)$ so derived are found to be in excellent agreement with those derived directly from the data.

To model the temperature profile in the upper atmosphere, we take an empirical approach based on the Yelle (1991) physical models for the thermal structure. Yelle (1991) calculated radiative-conductive equilibrium temperature profiles for a variety of conditions and was able to explain successfully several features of the thermal structure. However, these calculations are costly and time-consuming; therefore, we have chosen to model the temperature profile with an empirical function similar to those calculated by Yelle (1991). The empirical temperature profiles are constrained to have a temperature minimum (the mesopause) at 0.3 *m*bar and to be isothermal (i.e. $dT/dz = 0$) at 1 x 10^{-4} *m*bar. The temperature at 7 X 10^{2} *m*bar is also treated as a free parameter. Spline interpolation on log pressure is used to calculate temperatures at levels between these three grid points. For all the models considered here the temperature at 1 x 10^{-4} *m*bar is set to 175 K (Strobel et al., 1992). The temperature at 7 x 10^{2} *m*bar is adjusted to fit the IRIS measurements of the CH_4 1304 cm^{-1} band, and the temperature at 0.3 *m*bar is adjusted so that the densities at 1240 km agree with the UVS measurements. The densities at 1240 km depend on the temperature profile at lower altitudes because hydrostatic equilibrium is applied to the entire atmosphere.

2.2 Composition

The UVS occultation measurements determined that Titan's atmosphere is composed primarily of N_2. There is also evidence for significant quantities of CH_4 from IRIS and UVS data. There is a theoretical expectation that argon is present in the atmosphere, but there has been no direct detection of this atom. However, because it is difficult to detect, argon might still be present in significant amounts (i.e. mole fractions of <10%).

The relative abundance of CH_4 and argon will vary with altitude in the upper atmosphere because of diffusive separation. The relative abundance of CH_4 may also vary with altitude in the troposphere (altitudes below 40 km) because of condensation. Diffusive separation does not become significant until ~600 km; therefore, the mole fraction of argon should be constant at altitudes below 600 km and the mole fraction of CH_4 should be constant in the 40-600 km region.

To model the effects of diffusive separation, we adopt the analytic expression of Strobel et al. (1992; see also Steiner & Bauer, 1990) for the CH_4 and Ar mole fractions as a function of altitude. The CH_4 mole fraction is calculated from

$$f_{CH_4} = A_1 (1 + e^{(1-\kappa)x})^{\frac{3}{7(1-\kappa)}} + A_2 \qquad (4)$$

and the Ar mole fraction from

$$f_{Ar} = A_3 (1 + e^{(1-\kappa)x})^{\frac{-0.3}{(1-\kappa)}} \qquad (5)$$

where x = 1.76 x 10^5*(z-z_h)/((*R_T+z_h)(*R_T+z))*, and A_1, A_2 and A_3 are integration constants used to match conditions deep in the atmosphere. The parameter κ describes the altitude variation of the eddy diffusion coefficient (Strobel et al., 1992).

The recommended model has a constant CH_4 mole fraction in the troposphere and lower stratosphere. The value of the CH_4 mole fraction is adjusted along with the temperature profile to fit the IRIS spectra. We find that good fits to the IRIS data can be obtained with a mole fraction in the 1-5% range. The UVS data are best fit with a CH_4 mole fraction in the lower stratosphere of 2.6-5.0% (Strobel et al., 1992). Thus, we adopt a CH_4 mole fraction of 3% for the recommended model. A mole fraction of 3% implies some supersaturation in the troposphere; however, the degree of supersaturation is small (a maximum value of 18%) and limited to a 15 km region just below the tropopause. It is possible to remove this difficulty with a more complicated CH_4 distribution but the resulting atmosphere would differ trivially from a model with a constant CH_4 mole fraction; therefore, we have retained this simple model.

Argon is potentially a significant component of Titan's atmosphere. In order that its effects can be evaluated in engineering model studies, we include it in the recommended model with a mole fraction of 2 % in the troposphere and lower stratosphere. However, we emphasise that there is no observational evidence yet for argon in Titan's atmosphere.

2.3 Results

We find that the RSS, UVS and IRIS data can be matched with a model described by the parameters listed in Table 1. The temperature, mass density, CH_4 and argon mole fractions are shown in Figs. 1-3. A fit to the IRIS spectra based on this model is shown in Fig. 4. The surface pressure is 1.46 bar.

Fig. 1. Mass density (left) and temperature profiles with altitude for Titan's atmosphere.

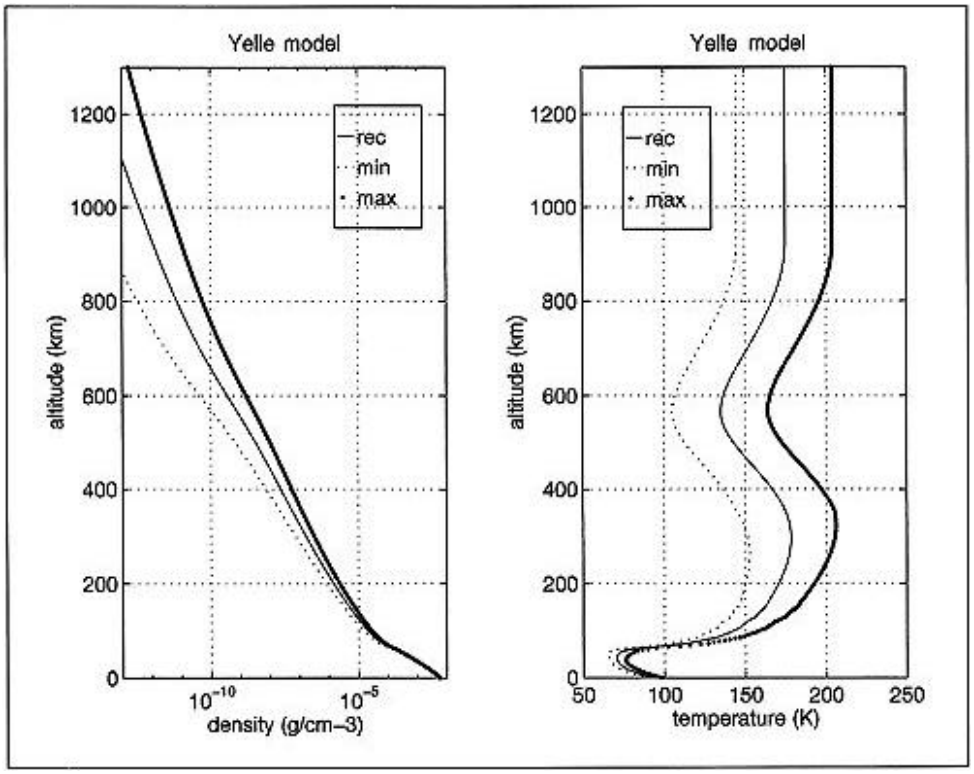
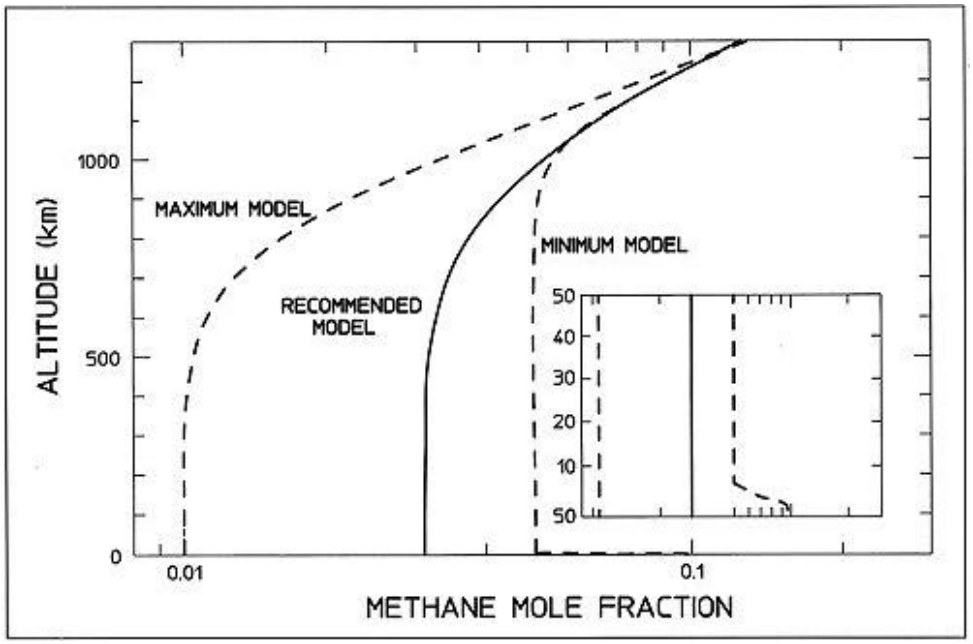


Fig. 2. Methane mole fraction profiles with altitude for Titan's atmosphere.



3. Maximum and Minimum Models

The uncertainties in our ability to predict the structure of Titan's atmosphere at the time of Huygens' deployment arise from several different causes. First, there are uncertainties in the models caused by uncertainties in the analysis of Voyager data. Second, there may be latitudinal variations in the atmospheric structure not properly accounted for in the models. Third, the atmosphere may exhibit temporal variations. The minimum and maximum models presented here include all three sources of uncertainty.

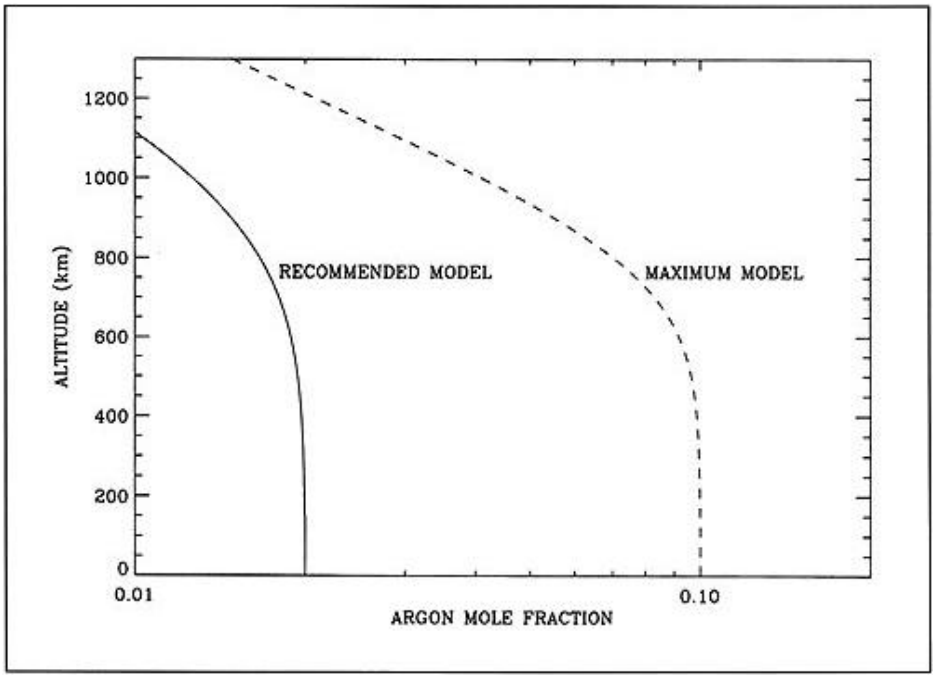


Fig. 3. Argon mole fraction profiles with altitude for Titan's atmosphere.

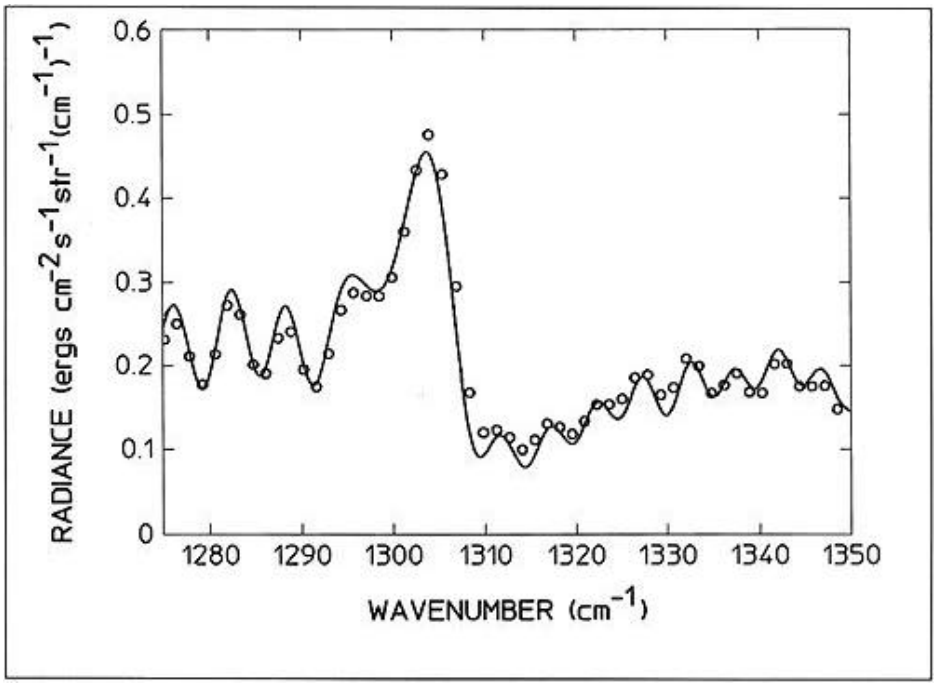


Fig. 4. A fit to Voyager's IRIS spectra based on the model described by the parameters given in Table 1.

We construct maximum and minimum models for Titan's atmosphere in several stages. The first step consists of determining the uncertainty in atmospheric densities inherent in the analysis of the RSS occultation experiment. This uncertainty is due almost completely to our lack of knowledge of the relative abundances of the different constituents. Therefore, we first determine the maximum and minimum density profiles consistent with the RSS data and some basic physical constraints on the atmosphere. We join these new models to the upper atmosphere in the same manner as was done for the recommended model. The parameters describing the models are adjusted so that these new models (prior to incorporation of the latitudinal and temporal

variations in temperature) are also consistent with the RSS, IRIS and UVS observations.

To understand the uncertainties in the interpretation of the RSS data, two effects need to be considered. First, the total number density derived from the refractivity depends on the composition through equation (1). CH_4 has the highest molecular refractivity and Ar the lowest; therefore, the models with maximum number density will be achieved with the smallest possible abundance of CH_4 and the largest possible abundance of Ar. Second, the mass density is related to the number density by the molecular weights of the constituents. Because CH_4 has the smallest mass and Ar the largest, the maximum mass density is again achieved with the smallest possible CH_4 abundance and the largest possible Ar abundance. Also, the RSS data, by defining the variation of number density with altitude, determine the ratio of temperature to mean molecular mass, *Tim.* Therefore, the models with the largest CH_4 abundance will have the lowest temperatures as well as the smallest mass density. Conversely, models with the smallest CH_4 abundance will have the largest temperatures. It may seem obvious that the minimum mass density will also be achieved with the largest possible CH_4 abundance, but the situation is actually more complicated because CH_4 is condensible. This is discussed further below.

Strobel et al. (1993) have determined the Ar mole fraction to be less than 10% and the CH_4 mole fraction just above the tropopause to be greater than 2.6%. We adopt values of 10% and 1% for Ar and CH_4, respectively, to be conservative. Using these values, we calculate a maximum mass density model from the RSS occultation data. The mole fraction of CH_4 in the troposphere is taken to be constant because at this low abundance it will not condense.

Choosing a minimum mass density model is more difficult. As mentioned above, to minimise the mass density inferred from the RSS data requires using the minimum abundance of Ar and maximum abundance of CH_4. We find that it is difficult to fit the UVS and IRIS data simultaneously with CH_4 mole fractions greater than *5%* and adopt this value for the CH_4 mole fraction in the stratosphere. Assuming no argon, we find that a CH_4 abundance near the surface greater than 10% implies a super-adiabatic temperature profile at the surface, relative to the dry adiabat. Therefore, the CH_4 profile adopted for the minimum model has a mole fraction of 10% at the surface. CH_4 continues with this relative abundance until the condensation point is reached. The CH_4 distribution then decreases with increasing altitude (and decreasing temperature) until a mole fraction of 5% is reached. The CH_4 mole fraction then remains constant until diffusive equilibrium takes effect near 600 km. The CH_4 distribution in this model is supersaturated in the troposphere and the abundance in the stratosphere is larger than implied by the vapour pressure value at the tropopause. This situation is unlikely but this choice was made because it is our intent to construct a model with the maximum abundance of CH_4 (and minimum mass density). The minimum model contains no argon.

Temporal and/or spatial variations in atmospheric structure are accounted for by perturbing the temperature profiles of the maximum and minimum models just described. We add (to the maximum model) and subtract (from the minimum model) a temperature difference that varies with altitude. Below 200 km we use values for the temperature difference from the LR report, which are reproduced in Table 2. These values are obtained by considering known latitudinal temperature variations in the stratosphere and plausible variations in the troposphere. The temperature perturbations at altitudes above 200 km are chosen with guidance from physically-based thermal structure calculations. Using the calculations described in YelIe (1991), we construct temperature profiles under a variety of assumptions about composition and aerosol heating rates. The coldest temperatures are obtained with no aerosol heating and the warmest when the aerosol heating rate corresponds to 30% of the solar flux absorbed in the upper atmosphere. These temperature profiles differ from the recommended temperature profile by roughly 30 K; therefore, we adopt this as the uncertainty in the upper atmospheric temperature profile.

After constructing new maximum and minimum temperature profiles, we integrated the hydrostatic equilibrium equation upward from the surface, assuming that the composition is the same

as in the unperturbed maximum and minimum models. This integration requires a lower boundary condition on surface pressure.

Large temporal variations in surface pressure on Titan are not expected because the time constants for changing the structure of the lower atmosphere or ocean (if it exists) are very long. There may be variations in surface pressure due to topography and/or weather systems. Topography at the 1 km level would produce variations in surface pressure on the order of 2%. Variations in surface pressure due to weather systems are difficult to predict because we know so little about weather on Titan. On Earth, weather systems produce variations of surface pressure of roughly 5 % and we adopt this as an estimate of the surface pressure uncertainty on Titan. Titan's weather is likely to be less intense than Earth's, so this assumption is conservative. We include the uncertainty in surface pressure and topography in the models by decreasing (increasing) the surface pressure by 5% for the minimum (maximum) models. The uncertainty in composition also causes an uncertainty in surface pressure by altering the density and mean molecular mass of the atmosphere. Both uncertainties are incorporated in the models. The minimum model has a surface pressure of 1.35 bar and the maximum model a surface pressure of 1.61 bar.

The temperature uncertainty, DT grows with altitude in Titan's atmosphere. Near the surface, where DT is fairly small, the uncertainties in composition dominate the error budget. The uncertainty in the upper atmospheric structure, however, is totally dominated by the uncertainty in temperature. Therefore, when constructing the maximum and minimum models, we neglect the possibility of further changes in composition and use the same parameters to calculate diffusive separation that were used in the recommended model. Specifically, we used equations (3) and (4) to calculate the CH_4 and Ar mole fractions, with the parameters listed in Table 1.

The maximum and minimum profiles constructed in this fashion represent physically possible, if implausible, atmospheres. They have well-defined compositions and the atmospheric parameters of pressure, temperature and density are related in the proper way by the equation of state and the hydrostatic equilibrium equation. The temperature profiles are everywhere subadiabatic, but CH_4 is supersaturated in limited regions in both the recommended model and the minimum model.

Table 1. Parameters used in the construction of the compositional profiles for the recommended, minimum and maximum models.

Parameter	*Rec.*	*Min.*	*Max.*
k	0.625	0.500	0.100
A1	0.240	0.009	0.044
A2	0.006	0.001	0.006
Z_h	1050.0	830.0	1100.0

Table 2. Parameters used in the construction of the temperature profiles for the recommended, minimum and maximum models.

Pressure (mbar)	*DT(K)*
1.5×10^6	3
1.5×10^2	3
300.0	20
30.0	30

4. Summary

We close this report with some remarks on the meaning of the maximum and minimum models.

For the purposes of an engineering reliability study, it is useful to assign formal probabilities to the range of model atmospheres presented in this report. Unfortunately, the models presented here are not easily identified with members of a statistical ensemble and therefore assignment of formal probabilities is more guesswork than science or engineering. The maximum and minimum models are based on physical consideration of atmospheric processes but we have made conservative assumptions. To construct the maximum and minimum models we assumed that the uncertainties in temperature and composition combine to maximise the distance from the recommended model. It is probably more realistic to assume that these uncertainties may partially offset each other. Moreover, we have assumed a large value of AT of the same sign at each altitude in the maximum and minimum models. Realistic spatial and temporal variations are more likely to result from changes in shape of the heating profile, causing larger temperatures at one level and lower temperatures at another. Therefore, the maximum and minimum models represent extreme cases and it is highly likely that Titan's atmosphere as measured by Huygens will fall between these extremes. However, we know of no justifiable way to assign a formal probability to this statement.

Table 3. Recommended Yelle model for Titan's atmosphere. CH_4 3%, Ar 2%, N_2 95%, mean mass 27.81, T(1) = 175.0, T(2) = 135.0, T(3) = 175.0, κ = 0.625, A_1 = 0.024, A_2 = 0.006, A_3 = 0.020, Z_h = 1050.0.

Z (km)	Number Densities (cm^{-3}) Total	N_2	CH_4	Ar	Mass (gm/cm^3)	Pressure (erg/cm^3)	Temp (K)	F_c
1300.0	.229E+09	.197E+09	.299E+08	.144E+07	.100E-13	.552E-05	175.00	.000E+00
1295.0	.241E+09	.209E+09	.310E+08	.154E+07	.106E-13	.583E-05	175.00	.000E+00
1290.0	.255E+09	.221E+09	.322E+08	.165E+07	.112E-13	.616E-05	175.00	.000E+00
1285.0	.269E+09	.234E+09	.334E+08	.177E+07	.119E-13	.651E-05	175.00	.000E+00
1280.0	.285E+09	.248E+09	.347E+08	.189E+07	.126E-13	.687E-05	175.00	.000E+00
1275.0	.301E+09	.263E+09	.360E+08	.203E+07	.133E-13	.727E-05	175.00	.000E+00
1270.0	.318E+09	.278E+09	.374E+08	.217E+07	.141E-13	.768E-05	175.00	.000E+00
1265.0	.336E+09	.295E+09	.388E+08	.233E+07	.149E-13	.812E-05	175.00	.000E+00
1260.0	.356E+09	.313E+09	.403E+08	.249E+07	.158E-13	.859E-05	175.00	.000E+00
1255.0	.376E+09	.332E+09	.419E+08	.267E+07	.167E-13	.908E-05	175.00	.000E+00
1250.0	.398E+09	.351E+09	.435E+08	.286E+07	.177E-13	.961E-05	175.00	.000E+00
1245.0	.421E+09	.373E+09	.453E+08	.307E+07	.187E-13	.102E-04	175.00	.000E+00
1240.0	.446E+09	.395E+09	.471E+08	.329E+07	.198E-13	.108E-04	175.00	.000E+00
1235.0	.472E+09	.419E+09	.490E+08	.353E+07	.210E-13	.114E-04	175.00	.000E+00
1230.0	.499E+09	.445E+09	.510E+08	.378E+07	.222E-13	.121E-04	175.00	.000E+00
1225.0	.529E+09	.472E+09	.531E+08	.406E+07	.236E-13	.128E-04	175.00	.000E+00
1220.0	.560E+09	.501E+09	.553E+08	.435E+07	.250E-13	.135E-04	175.00	.000E+00
1215.0	.593E+09	.531E+09	.575E+08	.467E+07	.265E-13	.143E-04	175.00	.000E+00
1210.0	.629E+09	.564E+09	.600E+08	.501E+07	.281E-13	.152E-04	175.00	.000E+00
1205.0	.666E+09	.598E+09	.625E+08	.538E+07	.298E-13	.161E-04	175.00	.000E+00
1200.0	.706E+09	.635E+09	.651E+08	.577E+07	.316E-13	.171E-04	175.00	.000E+00
1195.0	.749E+09	.675E+09	.679E+08	.620E+07	.335E-13	.181E-04	175.00	.000E+00
1190.0	.794E+09	.717E+09	.708E+08	.665E+07	.356E-13	.192E-04	175.00	.000E+00
1185.0	.842E+09	.761E+09	.739E+08	.714E+07	.378E-13	.203E-04	175.00	.000E+00
1180.0	.894E+09	.809E+09	.771E+08	.767E+07	.401E-13	.216E-04	175.00	.000E+00
1175.0	.948E+09	.859E+09	.805E+08	.824E+07	.426E-13	.229E-04	175.00	.000E+00
1170.0	.101E+10	.912E+09	.841E+08	.885E+07	.452E-13	.243E-04	175.00	.000E+00
1165.0	.107E+10	.971E+09	.879E+08	.951E+07	.480E-13	.258E-04	175.00	.000E+00
1160.0	.113E+10	.103E+10	.918E+08	.102E+08	.510E-13	.274E-04	175.00	.000E+00
1155.0	.120E+10	.110E+10	.960E+08	.110E+08	.542E-13	.291E-04	175.00	.000E+00
1150.0	.128E+10	.117E+10	.100E+09	.118E+08	.576E-13	.309E-04	175.00	.000E+00
1145.0	.136E+10	.124E+10	.105E+09	.127E+08	.612E-13	.328E-04	175.00	.000E+00
1140.0	.144E+10	.132E+10	.110E+09	.136E+08	.651E-13	.349E-04	175.00	.000E+00
1135.0	.153E+10	.140E+10	.115E+09	.147E+08	.692E-13	.370E-04	175.00	.000E+00
1130.0	.163E+10	.149E+10	.120E+09	.158E+08	.736E-13	.394E-04	175.00	.000E+00
1125.0	.173E+10	.159E+10	.126E+09	.169E+08	.783E-13	.419E-04	175.00	.000E+00
1120.0	.184E+10	.169E+10	.132E+09	.182E+08	.833E-13	.445E-04	175.00	.000E+00
1115.0	.196E+10	.180E+10	.138E+09	.196E+08	.886E-13	.473E-04	175.00	.000E+00
1110.0	.209E+10	.192E+10	.145E+09	.211E+08	.943E-13	.504E-04	175.00	.000E+00
1105.0	.222E+10	.204E+10	.152E+09	.227E+08	.100E-12	.536E-04	175.00	.000E+00
1100.0	.236E+10	.218E+10	.160E+09	.244E+08	.107E-12	.570E-04	175.00	.000E+00
1095.0	.251E+10	.232E+10	.167E+09	.263E+08	.114E-12	.607E-04	175.00	.000E+00
1090.0	.268E+10	.247E+10	.176E+09	.283E+08	.121E-12	.646E-04	175.00	.000E+00
1085.0	.285E+10	.263E+10	.185E+09	.304E+08	.129E-12	.688E-04	175.00	.000E+00
1080.0	.303E+10	.281E+10	.194E+09	.328E+08	.138E-12	.733E-04	175.00	.000E+00
1075.0	.323E+10	.299E+10	.204E+09	.353E+08	.147E-12	.781E-04	175.00	.000E+00
1070.0	.344E+10	.319E+10	.214E+09	.380E+08	.156E-12	.832E-04	175.00	.000E+00
1065.0	.367E+10	.340E+10	.225E+09	.409E+08	.167E-12	.886E-04	175.00	.000E+00
1060.0	.391E+10	.363E+10	.237E+09	.440E+08	.178E-12	.945E-04	175.00	.000E+00
1055.0	.417E+10	.387E+10	.249E+09	.474E+08	.190E-12	.101E-03	175.00	.000E+00
1050.0	.445E+10	.413E+10	.262E+09	.511E+08	.202E-12	.107E-03	175.00	.000E+00
1045.0	.474E+10	.441E+10	.276E+09	.550E+08	.216E-12	.115E-03	175.00	.000E+00
1040.0	.506E+10	.471E+10	.291E+09	.593E+08	.230E-12	.122E-03	175.00	.000E+00
1035.0	.540E+10	.503E+10	.307E+09	.639E+08	.246E-12	.130E-03	175.00	.000E+00
1030.0	.576E+10	.537E+10	.323E+09	.688E+08	.262E-12	.139E-03	175.00	.000E+00
1025.0	.615E+10	.574E+10	.341E+09	.742E+08	.280E-12	.149E-03	175.00	.000E+00
1020.0	.657E+10	.613E+10	.359E+09	.800E+08	.299E-12	.159E-03	175.00	.000E+00
1015.0	.701E+10	.655E+10	.379E+09	.862E+08	.320E-12	.169E-03	175.00	.000E+00
1010.0	.749E+10	.699E+10	.400E+09	.929E+08	.341E-12	.181E-03	175.00	.000E+00
1005.0	.800E+10	.748E+10	.423E+09	.100E+09	.365E-12	.193E-03	175.00	.000E+00
1000.0	.855E+10	.799E+10	.447E+09	.108E+09	.390E-12	.206E-03	175.00	.000E+00
995.0	.913E+10	.855E+10	.472E+09	.116E+09	.417E-12	.221E-03	175.00	.000E+00
990.0	.976E+10	.914E+10	.499E+09	.126E+09	.446E-12	.236E-03	175.00	.000E+00
985.0	.104E+11	.978E+10	.527E+09	.135E+09	.477E-12	.252E-03	175.00	.000E+00
980.0	.112E+11	.105E+11	.558E+09	.146E+09	.510E-12	.270E-03	175.00	.000E+00
975.0	.119E+11	.112E+11	.590E+09	.158E+09	.545E-12	.288E-03	175.00	.000E+00
970.0	.128E+11	.120E+11	.625E+09	.170E+09	.584E-12	.308E-03	175.00	.000E+00
965.0	.137E+11	.128E+11	.662E+09	.183E+09	.625E-12	.330E-03	175.00	.000E+00
960.0	.146E+11	.137E+11	.701E+09	.198E+09	.669E-12	.353E-03	175.00	.000E+00
955.0	.157E+11	.147E+11	.743E+09	.214E+09	.716E-12	.378E-03	175.00	.000E+00
950.0	.168E+11	.157E+11	.787E+09	.231E+09	.767E-12	.405E-03	175.00	.000E+00
945.0	.180E+11	.169E+11	.835E+09	.249E+09	.821E-12	.434E-03	175.00	.000E+00
940.0	.192E+11	.181E+11	.886E+09	.269E+09	.880E-12	.464E-03	175.00	.000E+00
935.0	.206E+11	.194E+11	.940E+09	.290E+09	.943E-12	.498E-03	175.00	.000E+00
930.0	.221E+11	.208E+11	.998E+09	.313E+09	.101E-11	.533E-03	175.00	.000E+00
925.0	.237E+11	.223E+11	.106E+10	.338E+09	.108E-11	.572E-03	175.00	.000E+00
920.0	.254E+11	.239E+11	.113E+10	.365E+09	.116E-11	.613E-03	174.98	.000E+00
915.0	.272E+11	.256E+11	.120E+10	.395E+09	.125E-11	.657E-03	174.94	.000E+00
910.0	.292E+11	.275E+11	.127E+10	.427E+09	.134E-11	.705E-03	174.86	.000E+00
905.0	.314E+11	.295E+11	.136E+10	.461E+09	.144E-11	.756E-03	174.76	.000E+00
900.0	.337E+11	.317E+11	.144E+10	.499E+09	.154E-11	.811E-03	174.63	.000E+00
895.0	.362E+11	.341E+11	.154E+10	.539E+09	.166E-11	.871E-03	174.48	.000E+00
890.0	.389E+11	.367E+11	.164E+10	.584E+09	.178E-11	.935E-03	174.29	.000E+00
885.0	.418E+11	.394E+11	.175E+10	.632E+09	.192E-11	.100E-02	174.08	.000E+00
880.0	.450E+11	.424E+11	.187E+10	.684E+09	.206E-11	.108E-02	173.85	.000E+00
875.0	.484E+11	.457E+11	.199E+10	.741E+09	.222E-11	.116E-02	173.58	.000E+00
870.0	.521E+11	.492E+11	.213E+10	.802E+09	.239E-11	.125E-02	173.30	.000E+00
865.0	.562E+11	.530E+11	.228E+10	.870E+09	.258E-11	.134E-02	172.98	.000E+00
860.0	.605E+11	.572E+11	.244E+10	.944E+09	.278E-11	.144E-02	172.65	.000E+00
855.0	.653E+11	.617E+11	.261E+10	.102E+10	.300E-11	.155E-02	172.28	.000E+00
850.0	.705E+11	.666E+11	.280E+10	.111E+10	.323E-11	.167E-02	171.90	.000E+00
845.0	.761E+11	.719E+11	.300E+10	.121E+10	.349E-11	.180E-02	171.49	.000E+00
840.0	.822E+11	.777E+11	.322E+10	.131E+10	.377E-11	.194E-02	171.05	.000E+00
835.0	.888E+11	.839E+11	.345E+10	.143E+10	.408E-11	.209E-02	170.60	.000E+00
830.0	.961E+11	.908E+11	.371E+10	.155E+10	.441E-11	.226E-02	170.12	.000E+00
825.0	.104E+12	.983E+11	.399E+10	.169E+10	.478E-11	.243E-02	169.61	.000E+00
820.0	.113E+12	.106E+12	.429E+10	.183E+10	.517E-11	.263E-02	169.09	.000E+00
815.0	.122E+12	.115E+12	.462E+10	.200E+10	.560E-11	.284E-02	168.55	.000E+00
810.0	.132E+12	.125E+12	.498E+10	.218E+10	.608E-11	.307E-02	167.98	.000E+00
805.0	.143E+12	.136E+12	.537E+10	.237E+10	.659E-11	.331E-02	167.39	.000E+00
800.0	.156E+12	.147E+12	.580E+10	.259E+10	.716E-11	.358E-02	166.79	.000E+00
795.0	.169E+12	.160E+12	.626E+10	.283E+10	.778E-11	.388E-02	166.16	.000E+00
790.0	.184E+12	.174E+12	.677E+10	.309E+10	.845E-11	.420E-02	165.51	.000E+00
785.0	.200E+12	.189E+12	.733E+10	.337E+10	.920E-11	.455E-02	164.85	.000E+00
780.0	.218E+12	.206E+12	.793E+10	.369E+10	.100E-10	.493E-02	164.17	.000E+00
775.0	.237E+12	.225E+12	.860E+10	.403E+10	.109E-10	.535E-02	163.47	.000E+00
770.0	.259E+12	.245E+12	.932E+10	.442E+10	.119E-10	.580E-02	162.75	.000E+00
765.0	.282E+12	.267E+12	.101E+11	.484E+10	.130E-10	.631E-02	162.02	.000E+00
760.0	.308E+12	.292E+12	.110E+11	.530E+10	.142E-10	.685E-02	161.27	.000E+00
755.0	.336E+12	.319E+12	.120E+11	.582E+10	.155E-10	.745E-02	160.51	.000E+00
750.0	.368E+12	.348E+12	.130E+11	.638E+10	.169E-10	.811E-02	159.74	.000E+00
745.0	.402E+12	.381E+12	.142E+11	.701E+10	.185E-10	.883E-02	158.95	.000E+00
740.0	.441E+12	.418E+12	.154E+11	.771E+10	.203E-10	.962E-02	158.15	.000E+00
735.0	.483E+12	.458E+12	.169E+11	.848E+10	.222E-10	.105E-01	157.33	.000E+00
730.0	.530E+12	.502E+12	.184E+11	.933E+10	.244E-10	.114E-01	156.51	.000E+00
725.0	.582E+12	.551E+12	.201E+11	.103E+11	.268E-10	.125E-01	155.68	.000E+00
720.0	.639E+12	.606E+12	.220E+11	.113E+11	.294E-10	.137E-01	154.84	.000E+00
715.0	.703E+12	.666E+12	.241E+11	.125E+11	.324E-10	.149E-01	153.99	.000E+00
710.0	.773E+12	.733E+12	.265E+11	.138E+11	.356E-10	.163E-01	153.14	.000E+00
705.0	.852E+12	.807E+12	.290E+11	.153E+11	.392E-10	.179E-01	152.28	.000E+00
700.0	.939E+12	.890E+12	.319E+11	.169E+11	.432E-10	.196E-01	151.42	.000E+00
695.0	.104E+13	.982E+12	.351E+11	.187E+11	.477E-10	.215E-01	150.56	.000E+00
690.0	.114E+13	.108E+13	.386E+11	.207E+11	.527E-10	.236E-01	149.70	.000E+00
685.0	.126E+13	.120E+13	.425E+11	.229E+11	.582E-10	.260E-01	148.84	.000E+00
680.0	.140E+13	.133E+13	.468E+11	.254E+11	.644E-10	.286E-01	147.99	.000E+00
675.0	.155E+13	.147E+13	.517E+11	.282E+11	.713E-10	.314E-01	147.14	.000E+00
670.0	.172E+13	.163E+13	.571E+11	.314E+11	.791E-10	.346E-01	146.29	.000E+00
665.0	.190E+13	.180E+13	.631E+11	.349E+11	.877E-10	.382E-01	145.46	.000E+00
660.0	.211E+13	.200E+13	.699E+11	.388E+11	.973E-10	.422E-01	144.64	.000E+00
655.0	.235E+13	.223E+13	.774E+11	.432E+11	.108E-09	.466E-01	143.83	.000E+00
650.0	.261E+13	.247E+13	.858E+11	.482E+11	.120E-09	.515E-01	143.04	.000E+00
645.0	.290E+13	.275E+13	.951E+11	.537E+11	.134E-09	.570E-01	142.27	.000E+00
640.0	.323E+13	.308E+13	.106E+12	.599E+11	.149E-09	.631E-01	141.52	.000E+00
635.0	.360E+13	.341E+13	.117E+12	.669E+11	.166E-09	.699E-01	140.79	.000E+00
630.0	.401E+13	.381E+13	.131E+12	.748E+11	.185E-09	.776E-01	140.09	.000E+00
625.0	.448E+13	.425E+13	.145E+12	.836E+11	.206E-09	.861E-01	139.43	.000E+00
620.0	.500E+13	.474E+13	.162E+12	.935E+11	.230E-09	.957E-01	138.79	.000E+00
615.0	.558E+13	.530E+13	.180E+12	.105E+12	.257E-09	.106E+00	138.19	.000E+00
610.0	.624E+13	.592E+13	.201E+12	.117E+12	.287E-09	.118E+00	137.64	.000E+00
605.0	.697E+13	.662E+13	.224E+12	.131E+12	.321E-09	.132E+00	137.12	.000E+00
600.0	.780E+13	.740E+13	.250E+12	.147E+12	.359E-09	.147E+00	136.65	.000E+00
595.0	.872E+13	.828E+13	.279E+12	.165E+12	.402E-09	.164E+00	136.24	.000E+00
590.0	.976E+13	.927E+13	.312E+12	.185E+12	.450E-09	.183E+00	135.87	.000E+00
585.0	.109E+14	.104E+14	.348E+12	.207E+12	.504E-09	.204E+00	135.57	.000E+00
580.0	.122E+14	.116E+14	.389E+12	.232E+12	.564E-09	.228E+00	135.33	.000E+00
575.0	.137E+14	.130E+14	.435E+12	.261E+12	.631E-09	.255E+00	135.15	.000E+00
570.0	.153E+14	.146E+14	.486E+12	.292E+12	.707E-09	.286E+00	135.04	.000E+00
565.0	.172E+14	.163E+14	.543E+12	.328E+12	.791E-09	.320E+00	135.00	.000E+00
560.0	.192E+14	.182E+14	.607E+12	.367E+12	.886E-09	.358E+00	135.05	.000E+00
555.0	.215E+14	.204E+14	.678E+12	.411E+12	.991E-09	.400E+00	135.22	.000E+00
550.0	.240E+14	.228E+14	.756E+12	.460E+12	.111E-08	.449E+00	135.49	.000E+00
545.0	.268E+14	.255E+14	.843E+12	.515E+12	.124E-08	.503E+00	135.85	.000E+00
540.0	.299E+14	.284E+14	.940E+12	.575E+12	.138E-08	.563E+00	136.32	.000E+00
535.0	.334E+14	.317E+14	.105E+13	.643E+12	.154E-08	.631E+00	136.87	.000E+00
530.0	.372E+14	.353E+14	.117E+13	.718E+12	.172E-08	.706E+00	137.50	.000E+00
525.0	.415E+14	.394E+14	.130E+13	.800E+12	.191E-08	.791E+00	138.22	.000E+00
520.0	.462E+14	.438E+14	.144E+13	.892E+12	.213E-08	.885E+00	139.01	.000E+00
515.0	.513E+14	.487E+14	.160E+13	.993E+12	.237E-08	.991E+00	139.86	.000E+00
510.0	.571E+14	.542E+14	.178E+13	.110E+13	.263E-08	.111E+01	140.78	.000E+00
505.0	.634E+14	.602E+14	.197E+13	.123E+13	.292E-08	.124E+01	141.75	.000E+00
500.0	.703E+14	.668E+14	.218E+13	.136E+13	.324E-08	.139E+01	142.78	.000E+00
495.0	.780E+14	.741E+14	.242E+13	.152E+13	.360E-08	.155E+01	143.85	.000E+00
490.0	.864E+14	.821E+14	.268E+13	.168E+13	.399E-08	.173E+01	144.96	.000E+00

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Table 3. (Continued).

Z	Number Densities (cm^{-3})				Mass	Pressure	Temp	F_c
(km)	Total	N_2	CH_4	Ar	(gm/cm^3)	(erg/cm^3)	(K)	
485.0	.957E+14	.909E+14	.296E+13	.186E+13	.442E-08	.193E+01	146.10	.000E+00
480.0	.106E+15	.101E+15	.328E+13	.205E+13	.489E-08	.215E+01	147.28	.000E+00
475.0	.117E+15	.111E+15	.362E+13	.228E+13	.541E-08	.240E+01	148.48	.000E+00
470.0	.130E+15	.123E+15	.400E+13	.253E+13	.598E-08	.268E+01	149.70	.000E+00
465.0	.143E+15	.136E+15	.441E-13	.280E+13	.660E-08	.298E+01	150.93	.000E+00
460.0	.158E+15	.150E+15	.487E+13	.309E+13	.729E-08	.332E+01	152.18	.000E+00
455.0	.174E+15	.166E+15	.537E+13	.341E+13	.805E-08	.369E+01	153.43	.000E+00
450.0	.192E+15	.183E+15	.591E-13	.377E+13	.888E-08	.411E+01	154.69	.000E+00
445.0	.212E+15	.201E+15	.652E+13	.416E+13	.979E-08	.457E+01	155.94	.000E+00
440.0	.234E+15	.222E+15	.718E+13	.458E+13	.108E-07	.507E+01	157.19	.000E+00
435.0	.258E+15	.245E+15	.790E-13	.505E+13	.119E-07	.563E+01	158.44	.000E+00
430.0	.284E+15	.269E+15	.869E+13	.557E+13	.131E-07	.625E+01	159.67	.000E+00
425.0	.312E+15	.297E+15	.957E+13	.614E+13	.144E-07	.694E+01	160.88	.000E+00
420.0	.344E+15	.327E+15	.105E-14	.676E+13	.159E-07	.769E+01	162.08	.000E+00
415.0	.378E+15	.359E+15	.116E+14	.745E+13	.175E-07	.853E+01	163.25	.000E+00
410.0	.416E+15	.396E+15	.127E+14	.820E+13	.192E-07	.945E+01	164.40	.000E+00
405.0	.458E+15	.435E+15	.140E-14	.902E+13	.211E-07	.105E+02	165.52	.000E+00
400.0	.504E+15	.479E+15	.154E-14	.991E+13	.233E-07	.116E+02	166.61	.000E+00
395.0	.555E+15	.527E+15	.169E+14	.109E+14	.256E-07	.128E+02	167.66	.000E+00
390.0	.610E+15	.579E+15	.186E+14	.120E+14	.281E-07	.142E+02	168.68	.000E+00
385.0	.671E+15	.637E+15	.204E+14	.132E+14	.310E-07	.157E+02	169.66	.000E+00
380.0	.738E+15	.701E+15	.225E+14	.146E+14	.341E-07	.174E+02	170.60	.000E+00
375.0	.812E+15	.771E+15	.247E+14	.160E+14	.375E-07	.192E+02	171.49	.000E+00
370.0	.894E+15	.849E+15	.272E+14	.177E+14	.412E-07	.213E+02	172.33	.000E+00
365.0	.983E+15	.934E+15	.299E+14	.194E+14	.454E-07	.235E+02	173.12	.000E+00
360.0	.108E+16	.103E+16	.329E+14	.214E+14	.500E-07	.260E+02	173.85	.000E+00
355.0	.119E+16	.113E+16	.362E+14	.236E+14	.550E-07	.287E+02	174.53	.000E+00
350.0	.131E+16	.125E+16	.399E+14	.260E+14	.606E-07	.317E+02	175.15	.000E+00
345.0	.145E+16	.137E+16	.439E+14	.287E+14	.668E-07	.351E+02	175.71	.000E+00
340.0	.159E+16	.151E+16	.484E+14	.316E+14	.736E-07	.388E+02	176.21	.000E+00
335.0	.176E+16	.167E+16	.533E+14	.349E+14	.812E-07	.429E+02	176.65	.000E+00
330.0	.194E+16	.184E+16	.588E+14	.385E+14	.895E-07	.474E+02	177.03	.000E+00
325.0	.214E+16	.203E+16	.649E+14	.425E+14	.988E-07	.524E+02	177.36	.000E+00
320.0	.236E+16	.225E+16	.716E+14	.469E+14	.109E-06	.580E+02	177.63	.000E+00
315.0	.261E+16	.248E+16	.791E+14	.519E+14	.121E-06	.641E+02	177.85	.000E+00
310.0	.289E+16	.274E+16	.874E+14	.573E+14	.133E-06	.710E+02	178.01	.000E+00
305.0	.319E+16	.303E+16	.966E+14	.634E+14	.147E-06	.785E+02	178.13	.000E+00
300.0	.354E+16	.336E+16	.107E-15	.702E+14	.163E-06	.870E+02	178.19	.000E+00
295.0	.392E+16	.372E+16	.118E+15	.778E+14	.181E-06	.963E+02	178.21	.000E+00
290.0	.434E+16	.412E+16	.131E+15	.862E+14	.200E-06	.107E+03	178.17	.000E+00
285.0	.481E+16	.457E+16	.145E-15	.956E+14	.222E-06	.118E+03	178.09	.000E+00
280.0	.534E+16	.507E+16	.161E+15	.106E+15	.246E-06	.131E+03	177.97	.000E+00
275.0	.593E+16	.563E+16	.179E-15	.118E+15	.274E-06	.145E+03	177.80	.000E+00
270.0	.659E+16	.626E+16	.199E-15	.131E+15	.304E-06	.161E+03	177.58	.000E+00
265.0	.732E+16	.696E+16	.221E-15	.146E+15	.338E-06	.179E+03	177.32	.000E+00
260.0	.815E+16	.774E+16	.246E+15	.162E+15	.376E-06	.199E+03	177.02	.000E+00
255.0	.908E+16	.862E+16	.274E+15	.181E+15	.419E-06	.221E+03	176.68	.000E+00
250.0	.101E+17	.961E+16	.305E+15	.201E+15	.467E-06	.246E+03	176.30	.000E+00
245.0	.113E+17	.107E+17	.340E+15	.225E+15	.521E-06	.274E+03	175.88	.000E+00
240.0	.126E+17	.120E+17	.380E+15	.251E+15	.582E-06	.305E+03	175.42	.000E+00
235.0	.141E+17	.134E+17	.425E+15	.281E+15	.650E-06	.340E+03	174.92	.000E+00
230.0	.158E+17	.150E+17	.475E+15	.314E+15	.728E-06	.379E+03	174.39	.000E+00
225.0	.176E+17	.168E+17	.532E+15	.352E+15	.815E-06	.423E+03	173.82	.000E+00
220.0	.198E+17	.188E+17	.596E+15	.394E+15	.913E-06	.473E+03	173.21	.000E+00
215.0	.222E+17	.211E+17	.668E+15	.442E+15	.102E-05	.529E+03	172.58	.000E+00
210.0	.249E+17	.237E+17	.751E+15	.497E+15	.115E-05	.591E+03	171.91	.000E+00
205.0	.280E+17	.266E+17	.844E+15	.559E+15	.129E-05	.662E+03	171.21	.000E+00
200.0	.315E+17	.300E+17	.949E+15	.629E+15	.146E-05	.742E+03	170.48	.000E+00
198.0	.331E+17	.314E+17	.996E+15	.660E+15	.153E-05	.777E+03	170.18	.000E+00
196.0	.347E+17	.330E+17	.104E+16	.692E+15	.160E-05	.813E+03	169.88	.000E+00
194.0	.364E+17	.346E+17	.110E+16	.726E+15	.168E-05	.852E+03	169.57	.000E+00
192.0	.382E+17	.363E+17	.115E+16	.762E+15	.176E-05	.892E+03	169.26	.000E+00
190.0	.400E+17	.381E+17	.121E+16	.799E+15	.185E-05	.934E+03	168.94	.000E+00
188.0	.421E+17	.400E+17	.127E+16	.839E+15	.194E-05	.979E+03	168.62	.000E+00
186.0	.442E+17	.420E+17	.133E+16	.881E+15	.204E-05	.103E+04	168.30	.000E+00
184.0	.464E+17	.441E+17	.140E+16	.925E+15	.214E-05	.107E+04	167.97	.000E+00
182.0	.487E+17	.463E+17	.147E+16	.972E+15	.225E-05	.113E+04	167.64	.000E+00
180.0	.512E+17	.486E+17	.154E+16	.102E+16	.236E-05	.118E+04	167.30	.100E-04
178.0	.538E+17	.511E+17	.162E+16	.107E+16	.248E-05	.124E+04	166.96	.100E-04
176.0	.565E+17	.537E+17	.170E+16	.113E+16	.261E-05	.130E+04	166.62	.100E-04
174.0	.594E+17	.564E+17	.179E+16	.118E+16	.274E-05	.136E+04	166.27	.100E-04
172.0	.624E+17	.593E+17	.188E+16	.125E+16	.288E-05	.143E+04	165.92	.100E-04
170.0	.656E+17	.623E+17	.197E+16	.131E+16	.303E-05	.150E+04	165.57	.100E-04
168.0	.690E+17	.656E+17	.208E+16	.138E+16	.319E-05	.157E+04	165.22	.100E-04
166.0	.726E+17	.690E+17	.218E+16	.145E+16	.335E-05	.165E+04	164.86	.100E-04
164.0	.764E+17	.726E+17	.230E+16	.152E+16	.353E-05	.173E+04	164.50	.100E-04
162.0	.804E+17	.764E+17	.242E+16	.160E+16	.371E-05	.182E+04	164.14	.100E-04
160.0	.846E+17	.804E+17	.254E+16	.169E+16	.390E-05	.191E+04	163.77	.100E-04
158.0	.890E+17	.846E+17	.268E+16	.178E+16	.411E-05	.201E+04	163.41	.100E-04
156.0	.938E+17	.891E+17	.282E+16	.187E+16	.433E-05	.211E+04	163.04	.100E-04
154.0	.987E+17	.938E+17	.297E+16	.197E+16	.456E-05	.222E+04	162.67	.100E-04
152.0	.104E+18	.988E+17	.313E+16	.208E+16	.480E-05	.233E+04	162.29	.100E-04

Z	Number Densities (cm^{-3})				Mass	Pressure	Temp	F_c
(km)	Total	N_2	CH_4	Ar	(gm/cm^3)	(erg/cm^3)	(K)	
150.0	.110E+18	.104E+18	.329E+16	.219E+16	.506E-05	.245E+04	161.92	.100E-04
148.0	.116E+18	.110E+18	.347E+16	.231E+16	.533E-05	.257E+04	161.50	.100E-04
146.0	.122E+18	.116E+18	.367E+16	.245E+16	.565E-05	.271E+04	160.26	.100E-04
144.0	.128E+18	.122E+18	.385E+16	.257E+16	.592E-05	.285E+04	160.79	.100E-04
142.0	.136E+18	.129E+18	.409E+16	.272E+16	.629E-05	.303E+04	159.36	.100E-04
140.0	.144E+18	.137E+18	.432E+16	.288E+16	.665E-05	.319E+04	158.55	.200E-04
138.0	.152E+18	.144E+18	.456E+16	.304E+16	.702E-05	.332E+04	158.25	.200E-04
136.0	.161E+18	.153E+18	.483E+16	.322E+16	.743E-05	.351E+04	157.45	.200E-04
134.0	.170E+18	.161E+18	.509E+16	.340E+16	.784E-05	.368E+04	157.18	.200E-04
132.0	.180E+18	.171E+18	.539E+16	.359E+16	.829E-05	.388E+04	156.51	.200E-04
130.0	.190E+18	.180E+18	.569E+16	.379E+16	.875E-05	.409E+04	156.34	.200E-04
128.0	.201E+18	.191E+18	.604E+16	.403E+16	.930E-05	.431E+04	155.11	.200E-04
126.0	.214E+18	.204E+18	.643E+16	.428E+16	.989E-05	.455E+04	153.80	.200E-04
124.0	.227E+18	.216E+18	.681E+16	.454E+16	.105E-04	.483E+04	153.11	.300E-04
122.0	.242E+18	.230E+18	.726E+16	.484E+16	.112E-04	.505E+04	151.73	.300E-04
120.0	.257E+18	.244E+18	.770E+16	.513E+16	.118E-04	.535E+04	151.00	.300E-04
118.0	.272E+18	.259E+18	.817E+16	.545E+16	.126E-04	.565E+04	150.28	.300E-04
116.0	.289E+18	.275E+18	.868E+16	.579E+16	.134E-04	.597E+04	149.61	.401E-04
114.0	.307E+18	.292E+18	.921E+16	.614E+16	.142E-04	.631E+04	149.01	.401E-04
112.0	.327E+18	.310E+18	.980E+16	.654E+16	.151E-04	.668E+04	148.06	.401E-04
110.0	.348E+18	.330E+18	.104E+17	.695E+16	.160E-04	.706E+04	147.31	.401E-04
108.0	.369E+18	.351E+18	.111E+17	.738E+16	.170E-04	.748E+04	146.73	.499E-04
106.0	.393E+18	.373E+18	.118E+17	.786E+16	.181E-04	.792E+04	145.98	.499E-04
104.0	.421E+18	.400E+18	.126E+17	.841E+16	.194E-04	.838E+04	144.47	.499E-04
102.0	.449E+18	.427E+18	.135E+17	.898E+16	.207E-04	.889E+04	143.37	.600E-04
100.0	.481E+18	.457E+18	.144E+17	.962E+16	.222E-04	.943E+04	142.06	.600E-04
98.0	.514E+18	.489E+18	.154E+17	.103E+17	.237E-04	.100E+05	140.98	.700E-04
96.0	.551E+18	.523E+18	.165E+17	.110E+17	.254E-04	.106E+05	139.70	.800E-04
94.0	.592E+18	.563E+18	.178E+17	.118E+17	.273E-04	.113E+05	138.05	.800E-04
92.0	.639E+18	.607E+18	.192E+17	.128E+17	.295E-04	.120E+05	136.15	.900E-04
90.0	.686E+18	.652E+18	.206E+17	.137E+17	.317E-04	.128E+05	134.90	.100E-03
88.0	.735E+18	.698E+18	.220E+17	.147E+17	.339E-04	.136E+05	134.20	.110E-03
86.0	.795E+18	.755E+18	.238E+17	.159E+17	.367E-04	.145E+05	132.19	.120E-03
84.0	.866E+18	.823E+18	.260E+17	.173E+17	.400E-04	.155E+05	129.47	.140E-03
82.0	.948E+18	.900E+18	.284E+17	.190E+17	.438E-04	.165E+05	126.41	.150E-03
80.0	.104E+19	.986E+18	.311E+17	.208E+17	.479E-04	.177E+05	123.61	.180E-03
78.0	.114E+19	.109E+19	.343E+17	.228E+17	.527E-04	.190E+05	120.42	.200E-03
76.0	.126E+19	.119E+19	.377E+17	.252E+17	.581E-04	.204E+05	117.51	.230E-03
74.0	.139E+19	.132E+19	.417E+17	.278E+17	.641E-04	.220E+05	114.55	.270E-03
72.0	.156E+19	.148E+19	.469E+17	.313E+17	.721E-04	.237E+05	109.90	.330E-03
70.0	.179E+19	.170E+19	.537E+17	.358E+17	.827E-04	.257E+05	103.94	.410E-03
68.0	.206E+19	.196E+19	.618E+17	.412E+17	.951E-04	.280E+05	98.37	.520E-03
66.0	.243E+19	.231E+19	.729E+17	.486E+17	.112E-03	.308E+05	91.37	.700E-03
64.0	.289E+19	.275E+19	.867E+17	.578E+17	.133E-03	.338E+05	84.71	.950E-03
62.0	.341E+19	.324E+19	.102E+18	.681E+17	.157E-03	.375E+05	79.89	.124E-02
60.0	.396E+19	.376E+19	.119E+18	.791E+17	.183E-03	.419E+05	76.87	.154E-02
58.0	.457E+19	.435E+19	.137E+18	.915E+17	.211E-03	.470E+05	74.56	.188E-02
56.0	.525E+19	.499E+19	.158E+18	.105E+18	.243E-03	.528E+05	73.05	.225E-02
54.0	.599E+19	.569E+19	.180E+18	.120E+18	.277E-03	.595E+05	72.21	.262E-02
52.0	.682E+19	.648E+19	.205E+18	.136E+18	.315E-03	.673E+05	71.70	.301E-02
50.0	.775E+19	.736E+19	.232E+18	.155E+18	.358E-03	.760E+05	71.35	.346E-02
48.0	.879E+19	.835E+19	.264E+18	.176E+18	.406E-03	.859E+05	71.11	.395E-02
46.0	.998E+19	.948E+19	.299E+18	.200E+18	.461E-03	.972E+05	70.93	.451E-02
44.0	.113E+20	.108E+20	.340E+18	.226E+18	.522E-03	.110E+06	70.84	.513E-02
42.0	.129E+20	.122E+20	.386E+18	.257E+18	.594E-03	.125E+06	70.64	.587E-02
40.0	.146E+20	.139E+20	.438E+18	.292E+18	.673E-03	.141E+06	70.66	.666E-02
38.0	.165E+20	.157E+20	.494E+18	.330E+18	.761E-03	.160E+06	70.91	.749E-02
36.0	.186E+20	.177E+20	.559E+18	.373E+18	.860E-03	.181E+06	71.17	.842E-02
34.0	.211E+20	.200E+20	.632E+18	.421E+18	.972E-03	.205E+06	71.41	.948E-02
32.0	.237E+20	.226E+20	.712E+18	.475E+18	.110E-02	.233E+06	71.81	.106E-01
30.0	.267E+20	.254E+20	.801E+18	.534E+18	.123E-02	.264E+06	72.34	.118E-01
28.0	.300E+20	.285E+20	.901E+18	.600E+18	.139E-02	.298E+06	72.92	.131E-01
26.0	.336E+20	.319E+20	.101E+19	.673E+18	.155E-02	.337E+06	73.68	.145E-01
24.0	.376E+20	.357E+20	.113E+19	.752E+18	.174E-02	.381E+06	74.55	.159E-01
22.0	.419E+20	.398E+20	.126E+19	.837E+18	.193E-02	.429E+06	75.63	.173E-01
20.0	.467E+20	.444E+20	.140E+19	.935E+18	.216E-02	.484E+06	76.43	.190E-01
18.0	.519E+20	.493E+20	.156E+19	.104E+19	.240E-02	.545E+06	77.59	.206E-01
16.0	.575E+20	.546E+20	.172E+19	.115E+19	.265E-02	.612E+06	78.88	.222E-01
14.0	.635E+20	.604E+20	.191E+19	.127E+19	.293E-02	.687E+06	80.19	.239E-01
12.0	.701E+20	.666E+20	.210E+19	.140E+19	.324E-02	.769E+06	81.56	.257E-01
10.0	.772E+20	.733E+20	.232E+19	.154E+19	.356E-02	.861E+06	83.01	.275E-01
8.0	.846E+20	.804E+20	.254E+19	.169E+19	.391E-02	.961E+06	84.72	.292E-01
6.0	.925E+20	.879E+20	.278E+19	.185E+19	.427E-02	.107E+07	86.47	.309E-01
5.0	.967E+20	.918E+20	.290E+19	.193E+19	.446E-02	.115E+07	87.40	.317E-01
4.0	.101E+21	.960E+20	.303E+19	.202E+19	.467E-02	.119E+07	88.20	.327E-01
3.0	.105E+21	.100E+21	.316E+19	.211E+19	.486E-02	.125E+07	89.26	.335E-01
2.0	.109E+21	.104E+21	.328E+19	.219E+19	.505E-02	.132E+07	90.54	.339E-01
1.5	.112E+21	.106E+21	.335E+19	.223E+19	.515E-02	.136E+07	91.22	.341E-01
1.0	.114E+21	.108E+21	.341E+19	.227E+19	.524E-02	.139E+07	91.90	.343E-01
.5	.116E+21	.110E+21	.347E+19	.231E+19	.534E-02	.143E+07	92.58	.345E-01
.0	.118E+21	.112E+21	.353E+19	.235E+19	.544E-02	.146E+07	93.28	.347E-01

Table 4. Minimum Yelle model for Titan's atmosphere. CH_4 5% (larger in troposphere), Ar 0%, N_2 95%, mean mass 27.40, T(1) = 175.0, T(2) = 135.0, T(3) = 175.0, ϵ = 0.100, A_1 = 0.044, A_2 = 0.006, A_3 = 0.000, Z_h = 1100.0.

Z	Number Densities (cm^{-3})				Mass	Pressure	Temp	F_c
(km)	Total	N_2	CH_4	Ar	(gm/cm^3)	(erg/cm^3)	(K)	
1300.0	.286E+07	.244E+07	.399E+06	.000E+00	.125E-15	.573E-07	145.00	.000E+00
1295.0	.305E+07	.264E+07	.416E+06	.000E+00	.134E-15	.611E-07	145.00	.000E+00
1290.0	.326E+07	.283E+07	.435E+06	.000E+00	.143E-15	.653E-07	145.00	.000E+00
1285.0	.348E+07	.302E+07	.455E+06	.000E+00	.153E-15	.697E-07	145.00	.000E+00
1280.0	.372E+07	.325E+07	.476E+06	.000E+00	.164E-15	.745E-07	145.00	.000E+00
1275.0	.398E+07	.348E+07	.498E+06	.000E+00	.175E-15	.796E-07	145.00	.000E+00
1270.0	.425E+07	.373E+07	.521E+06	.000E+00	.187E-15	.851E-07	145.00	.000E+00
1265.0	.455E+07	.400E+07	.545E+06	.000E+00	.201E-15	.910E-07	145.00	.000E+00
1260.0	.486E+07	.429E+07	.571E+06	.000E+00	.215E-15	.973E-07	145.00	.000E+00
1255.0	.520E+07	.460E+07	.599E+06	.000E+00	.230E-15	.104E-06	145.00	.000E+00
1250.0	.557E+07	.494E+07	.627E+06	.000E+00	.246E-15	.111E-06	145.00	.000E+00
1245.0	.596E+07	.530E+07	.658E+06	.000E+00	.264E-15	.119E-06	145.00	.000E+00
1240.0	.638E+07	.569E+07	.690E+06	.000E+00	.283E-15	.128E-06	145.00	.000E+00
1235.0	.683E+07	.611E+07	.724E+06	.000E+00	.303E-15	.137E-06	145.00	.000E+00
1230.0	.732E+07	.656E+07	.760E+06	.000E+00	.325E-15	.146E-06	145.00	.000E+00
1225.0	.784E+07	.704E+07	.798E+06	.000E+00	.349E-15	.157E-06	145.00	.000E+00
1220.0	.840E+07	.756E+07	.839E+06	.000E+00	.374E-15	.168E-06	145.00	.000E+00
1215.0	.901E+07	.812E+07	.882E+06	.000E+00	.401E-15	.180E-06	145.00	.000E+00
1210.0	.966E+07	.873E+07	.927E+06	.000E+00	.430E-15	.193E-06	145.00	.000E+00
1205.0	.104E+08	.938E+07	.976E+06	.000E+00	.462E-15	.207E-06	145.00	.000E+00
1200.0	.111E+08	.101E+08	.103E+07	.000E+00	.496E-15	.222E-06	145.00	.000E+00
1195.0	.119E+08	.108E+08	.108E+07	.000E+00	.532E-15	.238E-06	145.00	.000E+00
1190.0	.128E+08	.117E+08	.114E+07	.000E+00	.572E-15	.256E-06	145.00	.000E+00
1185.0	.137E+08	.125E+08	.120E+07	.000E+00	.614E-15	.275E-06	145.00	.000E+00
1180.0	.147E+08	.135E+08	.127E+07	.000E+00	.660E-15	.295E-06	145.00	.000E+00
1175.0	.158E+08	.145E+08	.134E+07	.000E+00	.709E-15	.317E-06	145.00	.000E+00
1170.0	.170E+08	.156E+08	.141E+07	.000E+00	.762E-15	.340E-06	145.00	.000E+00
1165.0	.183E+08	.168E+08	.149E+07	.000E+00	.820E-15	.366E-06	145.00	.000E+00
1160.0	.196E+08	.181E+08	.158E+07	.000E+00	.881E-15	.393E-06	145.00	.000E+00
1155.0	.211E+08	.194E+08	.167E+07	.000E+00	.948E-15	.422E-06	145.00	.000E+00
1150.0	.227E+08	.209E+08	.176E+07	.000E+00	.102E-14	.454E-06	145.00	.000E+00
1145.0	.244E+08	.225E+08	.187E+07	.000E+00	.110E-14	.488E-06	145.00	.000E+00
1140.0	.263E+08	.241E+08	.198E+07	.000E+00	.118E-14	.525E-06	145.00	.000E+00
1135.0	.283E+08	.262E+08	.209E+07	.000E+00	.127E-14	.565E-06	145.00	.000E+00
1130.0	.304E+08	.282E+08	.222E+07	.000E+00	.137E-14	.608E-06	145.00	.000E+00
1125.0	.327E+08	.304E+08	.235E+07	.000E+00	.147E-14	.655E-06	145.00	.000E+00
1120.0	.352E+08	.327E+08	.250E+07	.000E+00	.159E-14	.705E-06	145.00	.000E+00
1115.0	.380E+08	.353E+08	.265E+07	.000E+00	.171E-14	.760E-06	145.00	.000E+00
1110.0	.409E+08	.381E+08	.282E+07	.000E+00	.184E-14	.818E-06	145.00	.000E+00
1105.0	.441E+08	.411E+08	.300E+07	.000E+00	.199E-14	.882E-06	145.00	.000E+00
1100.0	.475E+08	.443E+08	.319E+07	.000E+00	.214E-14	.950E-06	145.00	.000E+00
1095.0	.512E+08	.478E+08	.340E+07	.000E+00	.231E-14	.102E-05	145.00	.000E+00
1090.0	.552E+08	.516E+08	.362E+07	.000E+00	.249E-14	.110E-05	145.00	.000E+00
1085.0	.595E+08	.557E+08	.386E+07	.000E+00	.269E-14	.119E-05	145.00	.000E+00
1080.0	.642E+08	.601E+08	.411E+07	.000E+00	.290E-14	.128E-05	145.00	.000E+00
1075.0	.693E+08	.649E+08	.439E+07	.000E+00	.313E-14	.139E-05	145.00	.000E+00
1070.0	.748E+08	.700E+08	.469E+07	.000E+00	.338E-14	.150E-05	145.00	.000E+00
1065.0	.807E+08	.757E+08	.501E+07	.000E+00	.365E-14	.162E-05	145.00	.000E+00
1060.0	.872E+08	.818E+08	.535E+07	.000E+00	.394E-14	.174E-05	145.00	.000E+00
1055.0	.941E+08	.884E+08	.572E+07	.000E+00	.426E-14	.188E-05	145.00	.000E+00
1050.0	.102E+09	.956E+08	.613E+07	.000E+00	.460E-14	.203E-05	145.00	.000E+00
1045.0	.110E+09	.103E+09	.656E+07	.000E+00	.498E-14	.220E-05	145.00	.000E+00
1040.0	.119E+09	.112E+09	.703E+07	.000E+00	.538E-14	.238E-05	145.00	.000E+00
1035.0	.128E+09	.121E+09	.753E+07	.000E+00	.582E-14	.257E-05	145.00	.000E+00
1030.0	.139E+09	.131E+09	.808E+07	.000E+00	.629E-14	.278E-05	145.00	.000E+00
1025.0	.150E+09	.141E+09	.867E+07	.000E+00	.680E-14	.300E-05	145.00	.000E+00
1020.0	.162E+09	.153E+09	.931E+07	.000E+00	.736E-14	.325E-05	145.00	.000E+00
1015.0	.176E+09	.166E+09	.100E+08	.000E+00	.797E-14	.352E-05	145.00	.000E+00
1010.0	.190E+09	.179E+09	.108E+08	.000E+00	.862E-14	.380E-05	145.00	.000E+00
1005.0	.206E+09	.194E+09	.116E+08	.000E+00	.934E-14	.412E-05	145.00	.000E+00
1000.0	.223E+09	.210E+09	.124E+08	.000E+00	.101E-13	.446E-05	145.00	.000E+00
995.0	.241E+09	.228E+09	.134E+08	.000E+00	.110E-13	.483E-05	145.00	.000E+00
990.0	.261E+09	.247E+09	.144E+08	.000E+00	.119E-13	.523E-05	145.00	.000E+00
985.0	.283E+09	.268E+09	.156E+08	.000E+00	.129E-13	.567E-05	145.00	.000E+00
980.0	.307E+09	.290E+09	.168E+08	.000E+00	.139E-13	.614E-05	145.00	.000E+00
975.0	.333E+09	.315E+09	.181E+08	.000E+00	.151E-13	.666E-05	145.00	.000E+00
970.0	.361E+09	.341E+09	.195E+08	.000E+00	.164E-13	.722E-05	145.00	.000E+00
965.0	.391E+09	.370E+09	.211E+08	.000E+00	.178E-13	.783E-05	145.00	.000E+00
960.0	.425E+09	.402E+09	.228E+08	.000E+00	.193E-13	.850E-05	145.00	.000E+00
955.0	.461E+09	.436E+09	.246E+08	.000E+00	.209E-13	.922E-05	145.00	.000E+00
950.0	.500E+09	.473E+09	.266E+08	.000E+00	.227E-13	.100E-04	145.00	.000E+00
945.0	.543E+09	.514E+09	.288E+08	.000E+00	.247E-13	.109E-04	145.00	.000E+00
940.0	.589E+09	.558E+09	.311E+08	.000E+00	.268E-13	.118E-04	145.00	.000E+00
935.0	.640E+09	.606E+09	.337E+08	.000E+00	.291E-13	.128E-04	145.00	.000E+00
930.0	.695E+09	.659E+09	.365E+08	.000E+00	.316E-13	.139E-04	145.00	.000E+00
925.0	.756E+09	.716E+09	.396E+08	.000E+00	.343E-13	.151E-04	145.00	.000E+00
920.0	.821E+09	.779E+09	.429E+08	.000E+00	.373E-13	.164E-04	144.99	.000E+00
915.0	.893E+09	.847E+09	.465E+08	.000E+00	.406E-13	.179E-04	144.95	.000E+00
910.0	.972E+09	.921E+09	.505E+08	.000E+00	.442E-13	.194E-04	144.89	.000E+00
905.0	.106E+10	.100E+10	.548E+08	.000E+00	.481E-13	.211E-04	144.79	.000E+00
900.0	.115E+10	.109E+10	.596E+08	.000E+00	.524E-13	.230E-04	144.67	.000E+00
895.0	.126E+10	.119E+10	.648E+08	.000E+00	.571E-13	.250E-04	144.52	.000E+00
890.0	.137E+10	.130E+10	.705E+08	.000E+00	.622E-13	.273E-04	144.35	.000E+00
885.0	.149E+10	.142E+10	.768E+08	.000E+00	.679E-13	.297E-04	144.14	.000E+00
880.0	.163E+10	.155E+10	.836E+08	.000E+00	.741E-13	.324E-04	143.91	.000E+00
875.0	.178E+10	.169E+10	.912E+08	.000E+00	.809E-13	.353E-04	143.66	.000E+00
870.0	.194E+10	.184E+10	.995E+08	.000E+00	.884E-13	.385E-04	143.38	.000E+00
865.0	.213E+10	.202E+10	.109E+09	.000E+00	.966E-13	.420E-04	143.07	.000E+00
860.0	.233E+10	.221E+10	.119E+09	.000E+00	.106E-12	.458E-04	142.74	.000E+00
855.0	.255E+10	.242E+10	.130E+09	.000E+00	.116E-12	.500E-04	142.38	.000E+00
850.0	.279E+10	.265E+10	.142E+09	.000E+00	.127E-12	.547E-04	142.00	.000E+00
845.0	.306E+10	.290E+10	.155E+09	.000E+00	.139E-12	.598E-04	141.60	.000E+00
840.0	.335E+10	.318E+10	.170E+09	.000E+00	.153E-12	.654E-04	141.17	.000E+00
835.0	.368E+10	.350E+10	.187E+09	.000E+00	.167E-12	.715E-04	140.72	.000E+00
830.0	.405E+10	.384E+10	.205E+09	.000E+00	.184E-12	.783E-04	140.24	.000E+00
825.0	.445E+10	.422E+10	.225E+09	.000E+00	.202E-12	.858E-04	139.75	.000E+00
820.0	.489E+10	.465E+10	.248E+09	.000E+00	.223E-12	.940E-04	139.23	.000E+00
815.0	.539E+10	.512E+10	.272E+09	.000E+00	.245E-12	.103E-03	138.69	.000E+00
810.0	.594E+10	.564E+10	.300E+09	.000E+00	.270E-12	.113E-03	138.13	.000E+00
805.0	.655E+10	.622E+10	.331E+09	.000E+00	.298E-12	.124E-03	137.55	.000E+00
800.0	.723E+10	.687E+10	.365E+09	.000E+00	.329E-12	.137E-03	136.94	.000E+00
795.0	.799E+10	.759E+10	.403E+09	.000E+00	.363E-12	.150E-03	136.32	.000E+00
790.0	.884E+10	.839E+10	.445E+09	.000E+00	.402E-12	.165E-03	135.68	.000E+00
785.0	.978E+10	.929E+10	.491E+09	.000E+00	.445E-12	.182E-03	135.02	.000E+00
780.0	.108E+11	.103E+11	.546E+09	.000E+00	.493E-12	.201E-03	134.34	.000E+00
775.0	.120E+11	.114E+11	.605E+09	.000E+00	.547E-12	.222E-03	133.65	.000E+00
770.0	.133E+11	.127E+11	.670E+09	.000E+00	.607E-12	.245E-03	132.94	.000E+00
765.0	.148E+11	.141E+11	.745E+09	.000E+00	.674E-12	.270E-03	132.21	.000E+00
760.0	.165E+11	.157E+11	.829E+09	.000E+00	.750E-12	.299E-03	131.46	.000E+00
755.0	.184E+11	.174E+11	.922E+09	.000E+00	.835E-12	.331E-03	130.70	.000E+00
750.0	.205E+11	.194E+11	.103E+10	.000E+00	.930E-12	.367E-03	129.93	.000E+00
745.0	.228E+11	.217E+11	.115E+10	.000E+00	.104E-11	.407E-03	129.14	.000E+00
740.0	.255E+11	.242E+11	.128E+10	.000E+00	.116E-11	.452E-03	128.34	.000E+00
735.0	.285E+11	.271E+11	.143E+10	.000E+00	.130E-11	.502E-03	127.53	.000E+00
730.0	.319E+11	.303E+11	.160E+10	.000E+00	.145E-11	.558E-03	126.71	.000E+00
725.0	.358E+11	.340E+11	.179E+10	.000E+00	.163E-11	.621E-03	125.88	.000E+00
720.0	.401E+11	.381E+11	.201E+10	.000E+00	.183E-11	.693E-03	125.04	.000E+00
715.0	.451E+11	.428E+11	.226E+10	.000E+00	.205E-11	.773E-03	124.20	.000E+00
710.0	.507E+11	.482E+11	.254E+10	.000E+00	.231E-11	.863E-03	123.35	.000E+00
705.0	.571E+11	.542E+11	.286E+10	.000E+00	.260E-11	.965E-03	122.49	.000E+00
700.0	.644E+11	.611E+11	.323E+10	.000E+00	.293E-11	.108E-02	121.63	.000E+00
695.0	.727E+11	.690E+11	.364E+10	.000E+00	.330E-11	.121E-02	120.77	.000E+00
690.0	.821E+11	.780E+11	.411E+10	.000E+00	.373E-11	.136E-02	119.91	.000E+00
685.0	.929E+11	.882E+11	.465E+10	.000E+00	.423E-11	.153E-02	119.05	.000E+00
680.0	.105E+12	.100E+12	.527E+10	.000E+00	.479E-11	.172E-02	118.19	.000E+00
675.0	.119E+12	.113E+12	.598E+10	.000E+00	.543E-11	.193E-02	117.34	.000E+00
670.0	.136E+12	.129E+12	.679E+10	.000E+00	.617E-11	.218E-02	116.49	.000E+00
665.0	.154E+12	.146E+12	.772E+10	.000E+00	.701E-11	.246E-02	115.66	.000E+00
660.0	.175E+12	.167E+12	.879E+10	.000E+00	.798E-11	.278E-02	114.83	.000E+00
655.0	.200E+12	.190E+12	.100E+11	.000E+00	.910E-11	.315E-02	114.02	.000E+00
650.0	.228E+12	.217E+12	.114E+11	.000E+00	.104E-10	.357E-02	113.22	.000E+00
645.0	.261E+12	.248E+12	.130E+11	.000E+00	.119E-10	.405E-02	112.45	.000E+00
640.0	.298E+12	.283E+12	.149E+11	.000E+00	.136E-10	.460E-02	111.69	.000E+00
635.0	.341E+12	.324E+12	.171E+11	.000E+00	.155E-10	.523E-02	110.96	.000E+00
630.0	.391E+12	.372E+12	.196E+11	.000E+00	.178E-10	.595E-02	110.25	.000E+00
625.0	.449E+12	.427E+12	.225E+11	.000E+00	.204E-10	.679E-02	109.58	.000E+00
620.0	.516E+12	.490E+12	.258E+11	.000E+00	.235E-10	.775E-02	108.93	.000E+00
615.0	.593E+12	.563E+12	.296E+11	.000E+00	.270E-10	.886E-02	108.33	.000E+00
610.0	.682E+12	.648E+12	.341E+11	.000E+00	.310E-10	.101E-01	107.76	.000E+00
605.0	.785E+12	.746E+12	.393E+11	.000E+00	.357E-10	.116E-01	107.23	.000E+00
600.0	.904E+12	.859E+12	.452E+11	.000E+00	.411E-10	.133E-01	106.76	.000E+00
595.0	.104E+13	.990E+12	.521E+11	.000E+00	.474E-10	.153E-01	106.33	.000E+00
590.0	.120E+13	.114E+13	.601E+11	.000E+00	.546E-10	.176E-01	105.95	.000E+00
585.0	.139E+13	.132E+13	.693E+11	.000E+00	.630E-10	.202E-01	105.63	.000E+00
580.0	.160E+13	.152E+13	.800E+11	.000E+00	.727E-10	.233E-01	105.38	.000E+00
575.0	.185E+13	.175E+13	.923E+11	.000E+00	.839E-10	.268E-01	105.18	.000E+00
570.0	.213E+13	.202E+13	.107E+12	.000E+00	.969E-10	.309E-01	105.06	.000E+00
565.0	.246E+13	.233E+13	.123E+12	.000E+00	.112E-09	.356E-01	105.00	.000E+00
560.0	.283E+13	.269E+13	.142E+12	.000E+00	.129E-09	.411E-01	105.03	.000E+00
555.0	.327E+13	.310E+13	.163E+12	.000E+00	.149E-09	.474E-01	105.17	.000E+00
550.0	.376E+13	.358E+13	.188E+12	.000E+00	.171E-09	.548E-01	105.42	.000E+00
545.0	.433E+13	.411E+13	.217E+12	.000E+00	.197E-09	.632E-01	105.77	.000E+00
540.0	.498E+13	.473E+13	.249E+12	.000E+00	.226E-09	.730E-01	106.21	.000E+00
535.0	.577E+13	.543E+13	.286E+12	.000E+00	.260E-09	.842E-01	106.75	.000E+00
530.0	.656E+13	.623E+13	.328E+12	.000E+00	.298E-09	.972E-01	107.37	.000E+00
525.0	.752E+13	.714E+13	.376E+12	.000E+00	.342E-09	.112E+00	108.07	.000E+00
520.0	.860E+13	.817E+13	.430E+12	.000E+00	.391E-09	.129E+00	108.84	.000E+00
515.0	.984E+13	.934E+13	.492E+12	.000E+00	.447E-09	.149E+00	109.69	.000E+00
510.0	.112E+14	.107E+14	.562E+12	.000E+00	.511E-09	.171E+00	110.60	.000E+00
505.0	.128E+14	.122E+14	.641E+12	.000E+00	.583E-09	.197E+00	111.56	.000E+00
500.0	.146E+14	.139E+14	.730E+12	.000E+00	.664E-09	.227E+00	112.58	.000E+00
495.0	.166E+14	.158E+14	.830E+12	.000E+00	.755E-09	.260E+00	113.64	.000E+00
490.0	.189E+14	.179E+14	.944E+12	.000E+00	.858E-09	.299E+00	114.75	.000E+00

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Table 4. (Continued).

Z	Number Densities (cm^{-3})				Mass	Pressure	Temp	F_c
(km)	Total	N_2	CH_4	Ar	(gm/cm^3)	(erg/cm^3)	(K)	
485.0	.214E+14	.204E+14	.107E+13	.000E+00	.975E-09	.343E+00	115.89	.000E-00
480.0	.243E+14	.23 E+14	.122E+13	.000E+00	.111E-08	.393E+00	117.06	.000E-00
475.0	.275E+14	.262E+14	.138E+13	.000E+00	.125E-08	.449E+00	118.26	.000E-00
470.0	.312E+14	.296E+14	.156E+13	.000E+00	.142E-08	.514E+00	119.48	.000E-00
465.0	.352E+14	.335E+14	.176E+13	.000E+00	.160E-08	.587E+00	120.71	.000E-00
460.0	.398E+14	.378E+14	.199E+13	.000E+00	.181E-08	.670E+00	121.96	.000E-00
455.0	.449E+14	.427E+14	.225E+13	.000E+00	.204E-08	.764E+00	123.21	.000E-00
450.0	.507E+14	.48 E+14	.253E+13	.000E+00	.230E-08	.870E+00	124.47	.000E-00
445.0	.571E+14	.542E+14	.285E+13	.000E+00	.260E-08	.990E+00	125.73	.000E-00
440.0	.643E+14	.611E+14	.321E+13	.000E+00	.292E-08	.113E+01	126.98	.000E-00
435.0	.723E+14	.687E+14	.362E+13	.000E+00	.329E-08	.128E+01	128.23	.000E-00
430.0	.813E+14	.773E+14	.407E+13	.000E+00	.370E-08	.145E+01	129.46	.000E-00
425.0	.914E+14	.868E+14	.457E+13	.000E+00	.416E-08	.165E+01	130.68	.000E-00
420.0	.103E+15	.975E+14	.513E+13	.000E+00	.467E-08	.187E+01	131.88	.000E-00
415.0	.115E+15	.110E+15	.576E+13	.000E+00	.524E-08	.212E+01	133.06	.000E-00
410.0	.129E+15	.123E+15	.647E+13	.000E+00	.589E-08	.240E-01	134.21	.000E-00
405.0	.145E+15	.138E+15	.726E+13	.000E+00	.660E-08	.271E+01	135.34	.000E-00
400.0	.163E+15	.155E+15	.814E+13	.000E+00	.741E-08	.307E+01	136.43	.000E-00
395.0	.183E+15	.173E+15	.913E+13	.000E+00	.830E-08	.346E-01	137.49	.000E-00
390.0	.205E+15	.194E+15	.102E+14	.000E+00	.931E-08	.391E+01	138.52	.000E-00
385.0	.229E+15	.218E+15	.115E+14	.000E+00	.104E-07	.442E-01	139.50	.000E-00
380.0	.257E+15	.244E+15	.129E+14	.000E+00	.117E-07	.498E-01	140.44	.000E-00
375.0	.288E+15	.274E+15	.144E+14	.000E+00	.131E-07	.562E-01	141.34	.000E-00
370.0	.323E+15	.307E+15	.162E+14	.000E+00	.147E-07	.634E+01	142.19	.000E-00
365.0	.362E+15	.344E+15	.181E+14	.000E+00	.165E-07	.715E+01	142.98	.000E-00
360.0	.406E+15	.386E+15	.203E+14	.000E+00	.185E-07	.806E+01	143.72	.000E-00
355.0	.456E+15	.433E+15	.228E+14	.000E+00	.207E-07	.908E-01	144.41	.000E-00
350.0	.511E+15	.485E+15	.255E+14	.000E+00	.232E-07	.102E+02	145.06	.000E-00
345.0	.572E+15	.543E+15	.286E+14	.000E+00	.260E-07	.115E+02	145.95	.000E-00
340.0	.641E+15	.609E+15	.320E+14	.000E+00	.291E-07	.130E+02	146.77	.000E-00
335.0	.717E+15	.682E+15	.359E+14	.000E+00	.326E-07	.146E+02	147.53	.000E-00
330.0	.804E+15	.76 E+15	.402E+14	.000E+00	.366E-07	.164E+02	148.24	.000E-00
325.0	.901E+15	.856E+15	.450E+14	.000E+00	.410E-07	.185E+02	148.88	.000E-00
320.0	.101E+16	.959E+15	.505E+14	.000E+00	.459E-07	.208E+02	149.48	.000E-00
315.0	.113E+16	.108E+16	.566E+14	.000E+00	.515E-07	.234E+02	150.02	.000E-00
310.0	.127E+16	.121E+16	.635E+14	.000E+00	.578E-07	.264E+02	150.50	.000E-00
305.0	.142E+16	.135E+16	.712E+14	.000E+00	.648E-07	.297E+02	150.94	.000E-00
300.0	.160E+16	.152E+16	.800E+14	.000E+00	.728E-07	.334E+02	151.33	.000E-00
295.0	.180E+16	.171E+16	.898E+14	.000E+00	.817E-07	.376E+02	151.67	.000E-00
290.0	.202E+16	.192E+16	.101E+15	.000E+00	.918E-07	.423E+02	151.95	.000E-00
285.0	.227E+16	.216E+16	.113E+15	.000E+00	.103E-06	.477E+02	152.19	.000E-00
280.0	.255E+16	.243E+16	.128E+15	.000E+00	.115E-06	.537E+02	152.39	.000E-00
275.0	.287E+16	.273E+16	.144E+15	.000E+00	.131E-06	.605E+02	152.54	.000E-00
270.0	.324E+16	.307E+16	.162E+15	.000E+00	.147E-06	.682E+02	152.66	.000E-00
265.0	.365E+16	.347E+16	.182E+15	.000E+00	.166E-06	.769E+02	152.72	.000E-00
260.0	.411E+16	.39 E+16	.206E+15	.000E+00	.187E-06	.867E+02	152.75	.000E-00
255.0	.464E+16	.44 E+16	.232E+15	.000E+00	.211E-06	.978E+02	152.74	.000E-00
250.0	.524E+16	.498E+16	.262E+15	.000E+00	.238E-06	.110E+03	152.69	.000E-00
245.0	.592E+16	.563E+16	.296E+15	.000E+00	.269E-06	.125E+03	152.59	.000E-00
240.0	.670E+16	.636E+16	.335E+15	.000E+00	.305E-06	.141E+03	152.46	.000E-00
235.0	.758E+16	.720E+16	.379E+15	.000E+00	.345E-06	.159E+03	152.30	.000E-00
230.0	.859E+16	.816E+16	.429E+15	.000E+00	.391E-06	.180E+03	152.10	.000E-00
225.0	.974E+16	.925E+16	.487E+15	.000E+00	.443E-06	.204E+03	151.87	.000E-00
220.0	.110E+17	.105E+17	.552E+15	.000E+00	.502E-06	.231E+03	151.60	.000E-00
215.0	.125E+17	.118E+17	.627E+15	.000E+00	.571E-06	.262E+03	151.30	.000E-00
210.0	.143E+17	.135E+17	.713E+15	.000E+00	.649E-06	.297E+03	150.98	.000E-00
205.0	.162E+17	.154E+17	.811E+15	.000E+00	.738E-06	.337E+03	150.62	.000E-00
200.0	.185E+17	.176E+17	.924E+15	.000E+00	.841E-06	.383E+03	150.23	.000E-00
198.0	.195E+17	.185E+17	.974E+15	.000E+00	.886E-06	.403E+03	150.08	.000E-00
196.0	.205E+17	.195E+17	.103E+16	.000E+00	.933E-06	.425E+03	149.91	.000E-00
194.0	.216E+17	.205E+17	.108E+16	.000E+00	.984E-06	.447E+03	149.74	.000E-00
192.0	.228E+17	.217E+17	.114E+16	.000E+00	.104E-05	.471E+03	149.57	.000E-00
190.0	.240E+17	.228E+17	.120E+16	.000E+00	.109E-05	.496E+03	149.39	.000E-00
188.0	.254E+17	.241E+17	.127E+16	.000E+00	.115E-05	.522E+03	149.21	.000E-00
186.0	.267E+17	.254E+17	.134E+16	.000E+00	.122E-05	.550E+03	149.03	.000E-00
184.0	.282E+17	.268E+17	.141E+16	.000E+00	.128E-05	.579E+03	148.85	.000E-00
182.0	.298E+17	.283E+17	.149E+16	.000E+00	.135E-05	.610E+03	148.66	.000E-00
180.0	.314E+17	.298E+17	.157E+16	.000E+00	.143E-05	.643E+03	148.46	.000E-00
178.0	.331E+17	.315E+17	.166E+16	.000E+00	.151E-05	.678E+03	148.26	.000E-00
176.0	.350E+17	.332E+17	.175E+16	.000E+00	.159E-05	.715E+03	148.06	.000E-00
174.0	.369E+17	.351E+17	.185E+16	.000E+00	.168E-05	.754E+03	147.87	.000E-00
172.0	.390E+17	.370E+17	.195E+16	.000E+00	.177E-05	.795E+03	147.66	.000E-00
170.0	.412E+17	.391E+17	.206E+16	.000E+00	.187E-05	.838E+03	147.45	.000E-00
168.0	.435E+17	.413E+17	.218E+16	.000E+00	.198E-05	.884E+03	147.25	.000E-00
166.0	.460E+17	.437E+17	.230E+16	.000E+00	.209E-05	.933E-03	147.03	.000E-00
164.0	.486E+17	.461E+17	.243E+16	.000E+00	.221E-05	.984E-03	146.82	.000E-00
162.0	.513E+17	.488E+17	.257E+16	.000E+00	.233E-05	.104E+04	146.60	.000E-00
160.0	.543E+17	.515E+17	.271E+16	.000E+00	.247E-05	.110E+04	146.38	.000E-00
158.0	.574E+17	.545E+17	.287E+16	.000E+00	.261E-05	.116E+04	146.17	.000E-00
156.0	.606E+17	.576E+17	.303E+16	.000E+00	.276E-05	.122E+04	145.95	.000E-00
154.0	.641E+17	.609E+17	.321E+16	.000E+00	.292E-05	.129E+04	145.72	.000E-00
152.0	.678E+17	.645E+17	.339E+16	.000E+00	.309E-05	.136E+04	145.49	.000E-00

Z	Number Densities (cm^{-3})				Mass	Pressure	Temp	F_c
(km)	Total	N_2	CH_4	Ar	(gm/cm^3)	(erg/cm^3)	(K)	
150.0	.718E+17	.682E+17	.359E+16	.000E+00	.326E-05	.144E+04	145.27	.100E-04
148.0	.760E+17	.722E+17	.380E+16	.000E+00	.346E-05	.152E+04	144.92	.100E-04
146.0	.803E+17	.769E+17	.405E+16	.000E+00	.368E-05	.161E+04	143.76	.100E-04
144.0	.853E+17	.810E+17	.426E+16	.000E+00	.388E-05	.170E+04	144.37	.100E-04
142.0	.910E+17	.864E+17	.455E+16	.000E+00	.414E-05	.180E+04	143.04	.100E-04
140.0	.967E+17	.919E+17	.484E+16	.000E+00	.440E-05	.190E+04	142.31	.100E-04
138.0	.102E+18	.974E+17	.512E+16	.000E+00	.466E-05	.201E+04	142.11	.100E-04
136.0	.109E+18	.104E+18	.545E+16	.000E+00	.496E-05	.213E+04	141.41	.100E-04
134.0	.116E+18	.110E-18	.578E+16	.000E+00	.526E-05	.225E+04	141.24	.200E-04
132.0	.123E+18	.117E-18	.614E+16	.000E+00	.559E-05	.239E+04	140.68	.200E-04
130.0	.130E+18	.124E+18	.651E+16	.000E+00	.592E-05	.253E+04	140.63	.200E-04
128.0	.139E+18	.132E+18	.695E+16	.000E+00	.632E-05	.268E+04	139.52	.200E-04
126.0	.149E+18	.141E-18	.743E+16	.000E+00	.676E-05	.284E+04	138.33	.200E-04
124.0	.158E+18	.150E+18	.79 E+16	.000E+00	.720E-05	.301E+04	137.77	.200E-04
122.0	.169E+18	.161E-18	.847E+16	.000E+00	.771E-05	.319E+04	136.53	.200E-04
120.0	.181E+18	.172E+18	.903E+16	.000E+00	.822E-05	.339E+04	135.93	.300E-04
118.0	.193E+18	.183E+18	.964E+16	.000E+00	.877E-05	.360E+04	135.35	.300E-04
116.0	.206E+18	.195E+18	.103E+17	.000E+00	.935E-05	.382E+04	134.82	.300E-04
114.0	.219E+18	.208E+18	.110E+17	.000E+00	.997E-05	.406E+04	134.26	.300E-04
112.0	.234E+18	.223E+18	.117E+17	.000E+00	.107E-04	.432E+04	133.57	.300E-04
110.0	.250E+18	.238E+18	.125E+17	.000E+00	.114E-04	.459E+04	132.97	.401E-04
108.0	.267E+18	.254E+18	.134E+17	.000E+00	.122E-04	.489E+04	132.55	.401E-04
106.0	.286E+18	.271E+18	.143E+17	.000E+00	.130E-04	.520E+04	131.96	.401E-04
104.0	.307E+18	.292E+18	.154E+17	.000E+00	.140E-04	.554E+04	130.52	.499E-04
102.0	.330E+18	.313E+18	.165E+17	.000E+00	.150E-04	.590E+04	129.68	.499E-04
100.0	.355E+18	.337E+18	.177E+17	.000E+00	.161E-04	.629E+04	128.55	.600E-04
98.0	.381E+18	.362E+18	.19 E+17	.000E+00	.173E-04	.671E+04	127.58	.600E-04
96.0	.410E+18	.390E+18	.205E+17	.000E+00	.187E-04	.716E+04	126.55	.700E-04
94.0	.443E+18	.421E+18	.222E+17	.000E+00	.202E-04	.765E+04	125.09	.700E-04
92.0	.480E+18	.456E+18	.240E+17	.000E+00	.219E-04	.818E+04	123.39	.800E-04
90.0	.519E+18	.493E+18	.259E+17	.000E+00	.236E-04	.875E+04	122.34	.900E-04
88.0	.558E+18	.530E+18	.279E+17	.000E+00	.254E-04	.937E+04	121.83	.100E-03
86.0	.606E+18	.576E+18	.303E+17	.000E+00	.276E-04	.100E+05	120.02	.110E-03
84.0	.665E+18	.631E+18	.332E+17	.000E+00	.302E-04	.108E+05	117.53	.120E-03
82.0	.732E+18	.695E+18	.366E+17	.000E+00	.333E-04	.116E+05	114.71	.140E-03
80.0	.806E+18	.766E+18	.403E+17	.000E+00	.367E-04	.125E+05	112.14	.160E-03
78.0	.893E+18	.848E+18	.447E+17	.000E+00	.406E-04	.135E+05	109.20	.190E-03
76.0	.990E+18	.940E+18	.495E+17	.000E+00	.450E-04	.145E+05	106.54	.220E-03
74.0	.110E+19	.105E+19	.550E+17	.000E+00	.500E-04	.158E+05	103.84	.250E-03
72.0	.125E+19	.119E-19	.624E+17	.000E+00	.568E-04	.171E+05	99.50	.310E-03
70.0	.144E+19	.137E+19	.722E+17	.000E+00	.657E-04	.187E+05	93.86	.400E-03
68.0	.168E+19	.159E+19	.839E+17	.000E+00	.763E-04	.205E+05	88.63	.510E-03
66.0	.200E+19	.190E+19	.100E+18	.000E+00	.912E-04	.227E+05	82.01	.700E-03
64.0	.242E+19	.230E+19	.12 E+18	.000E+00	.110E-03	.252E+05	75.74	.970E-03
62.0	.288E+19	.274E+19	.144E+18	.000E+00	.131E-03	.283E+05	71.31	.128E-02
60.0	.338E+19	.322E+19	.169E+18	.000E+00	.154E-03	.320E+05	68.67	.161E-02
58.0	.395E+19	.375E+19	.198E+18	.000E+00	.180E-03	.363E+05	66.76	.198E-02
56.0	.458E+19	.435E+19	.229E+18	.000E+00	.208E-03	.414E+05	65.64	.236E-02
54.0	.526E+19	.499E+19	.263E+18	.000E+00	.239E-03	.471E+05	65.19	.274E-02
52.0	.601E+19	.571E+19	.301E+18	.000E+00	.273E-03	.538E+05	65.06	.315E-02
50.0	.686E+19	.652E+19	.343E+18	.000E+00	.312E-03	.614E+05	65.09	.360E-02
48.0	.782E+19	.742E+19	.391E+18	.000E+00	.355E-03	.701E+05	65.26	.408E-02
46.0	.890E+19	.845E+19	.445E+18	.000E+00	.405E-03	.800E+05	65.47	.462E-02
44.0	.101E+20	.961E+19	.506E+18	.000E+00	.460E-03	.913E+05	65.77	.522E-02
42.0	.115E+20	.109E-20	.576E+18	.000E+00	.524E-03	.104E+06	65.97	.592E-02
40.0	.131E+20	.124E-20	.653E+18	.000E+00	.594E-03	.119E+06	66.37	.665E-02
38.0	.148E+20	.140E-20	.739E+18	.000E+00	.672E-03	.135E+06	66.88	.744E-02
36.0	.168E+20	.160E-20	.840E+18	.000E+00	.764E-03	.154E+06	67.14	.841E-02
34.0	.191E+20	.181E+20	.954E+18	.000E+00	.868E-03	.176E+06	67.38	.951E-02
32.0	.216E+20	.206E+20	.108E+19	.000E+00	.984E-03	.200E+06	67.77	.107E-01
30.0	.245E+20	.232E+20	.122E+19	.000E+00	.111E-02	.228E+06	68.30	.120E-01
28.0	.276E+20	.263E+20	.138E+19	.000E+00	.126E-02	.259E+06	68.87	.134E-01
26.0	.311E+20	.296E+20	.156E+19	.000E+00	.142E-02	.295E+06	69.62	.148E-01
24.0	.350E+20	.332E+20	.175E+19	.000E+00	.159E-02	.335E+06	70.48	.163E-01
22.0	.391E+20	.371E+20	.196E+19	.000E+00	.178E-02	.379E+06	71.54	.178E-01
20.0	.439E+20	.417E-20	.219E+19	.000E+00	.200E-02	.430E+06	72.33	.197E-01
18.0	.489E+20	.465E+20	.245E+19	.000E+00	.223E-02	.486E+06	73.48	.214E-01
16.0	.544E+20	.517E-20	.272E+19	.000E+00	.247E-02	.549E+06	74.75	.231E-01
14.0	.604E+20	.574E+20	.302E+19	.000E+00	.275E-02	.618E+06	76.05	.250E-01
12.0	.669E+20	.636E+20	.335E+19	.000E+00	.304E-02	.696E+06	77.39	.270E-01
10.0	.740E+20	.703E+20	.370E+19	.000E+00	.336E-02	.782E+06	78.82	.290E-01
8.0	.814E+20	.773E+20	.407E+19	.000E+00	.370E-02	.877E+06	80.51	.308E-01
6.0	.893E+20	.848E+20	.446E+19	.000E+00	.406E-02	.981E+06	82.24	.327E-01
5.0	.932E+20	.880E+20	.519E+19	.000E+00	.423E-02	.104E+07	83.33	.334E-01
4.0	.974E+20	.914E-20	.593E+19	.000E+00	.441E-02	.110E+07	84.29	.342E-01
3.0	.101E+21	.939E+20	.724E+19	.000E+00	.456E-02	.116E+07	85.65	.346E-01
2.0	.105E+21	.954E+20	.987E+19	.000E+00	.468E-02	.122E+07	87.39	.345E-01
1.5	.106E+21	.959E+20	.102E+20	.000E+00	.473E-02	.125E+07	88.31	.344E-01
1.0	.108E+21	.971E-20	.106E+20	.000E+00	.480E-02	.128E+07	89.08	.344E-01
.5	.110E+21	.990E+20	.110E+20	.000E+00	.489E-02	.132E+07	89.68	.347E-01
.0	.112E+21	.101E-21	.112E+20	.000E+00	.498E-02	.135E+07	90.29	.350E-01

Table 5. Maximum Yelle model for Titan's atmosphere. CH_4 1%, Ar 10%, N_2 89%, mean mass 28.72, T(1) = 175.0, T(2) = 134.0, T(3) = 174.0, ϵ = 0.500, A_1 = 0.009, A_2 = 0.001, A_3 = 0.100, Z_h = 830.0.

Z	Number Densities (cm^{-3})				Mass	Pressure	Temp	F_c
(km)	Total	N_2	CH_4	Ar	(gm/cm^3)	(erg/cm^3)	(K)	
1300.0	.383E+10	.324E+10	.529E+09	.569E+08	.168E-12	.108E-03	204.00	.000E+00
1295.0	.401E+10	.341E+10	.541E+09	.606E+08	.177E-12	.113E-03	204.00	.000E+00
1290.0	.420E+10	.359E+10	.553E+09	.646E+08	.185E-12	.118E-03	204.00	.000E+00
1285.0	.441E+10	.377E+10	.566E+09	.689E+08	.195E-12	.124E-03	204.00	.000E+00
1280.0	.462E+10	.397E+10	.580E+09	.735E+08	.204E-12	.130E-03	204.00	.000E+00
1275.0	.485E+10	.417E+10	.594E+09	.784E+08	.214E-12	.136E-03	204.00	.000E+00
1270.0	.508E+10	.439E+10	.608E+09	.836E+08	.225E-12	.143E-03	204.00	.000E+00
1265.0	.533E+10	.462E+10	.622E+09	.892E+08	.237E-12	.150E-03	204.00	.000E+00
1260.0	.559E+10	.486E+10	.638E+09	.952E+08	.249E-12	.158E-03	204.00	.000E+00
1255.0	.587E+10	.512E+10	.653E+09	.102E+09	.261E-12	.165E-03	204.00	.000E+00
1250.0	.616E+10	.539E+10	.669E+09	.109E+09	.275E-12	.174E-03	204.00	.000E+00
1245.0	.647E+10	.567E+10	.686E+09	.116E+09	.289E-12	.182E-03	204.00	.000E+00
1240.0	.679E+10	.597E+10	.703E+09	.124E+09	.304E-12	.191E-03	204.00	.000E+00
1235.0	.714E+10	.628E+10	.721E+09	.132E+09	.389E-12	.201E-03	204.00	.000E+00
1230.0	.750E+10	.662E+10	.739E+09	.141E+09	.336E-12	.211E-03	204.00	.000E+00
1225.0	.788E+10	.697E+10	.758E+09	.151E+09	.353E-12	.222E-03	204.00	.000E+00
1220.0	.828E+10	.734E+10	.777E+09	.161E+09	.371E-12	.233E-03	204.00	.000E+00
1215.0	.870E+10	.773E+10	.798E+09	.173E+09	.391E-12	.245E-03	204.00	.000E+00
1210.0	.914E+10	.814E+10	.818E+09	.185E+09	.411E-12	.257E-03	204.00	.000E+00
1205.0	.961E+10	.858E+10	.840E+09	.197E+09	.433E-12	.271E-03	204.00	.000E+00
1200.0	.101E+11	.904E+10	.862E+09	.211E+09	.456E-12	.285E-03	204.00	.000E+00
1195.0	.106E+11	.952E+10	.885E+09	.226E+09	.480E-12	.299E-03	204.00	.000E+00
1190.0	.112E+11	.100E+11	.909E+09	.242E+09	.505E-12	.315E-03	204.00	.000E+00
1185.0	.118E+11	.106E+11	.933E+09	.259E+09	.532E-12	.331E-03	204.00	.000E+00
1180.0	.124E+11	.112E+11	.959E+09	.277E+09	.561E-12	.349E-03	204.00	.000E+00
1175.0	.130E+11	.118E+11	.985E+09	.297E+09	.591E-12	.367E-03	204.00	.000E+00
1170.0	.137E+11	.124E+11	.101E+10	.318E+09	.622E-12	.387E-03	204.00	.000E+00
1165.0	.145E+11	.131E+11	.104E+10	.341E+09	.656E-12	.407E-03	204.00	.000E+00
1160.0	.152E+11	.138E+11	.107E+10	.365E+09	.691E-12	.429E-03	204.00	.000E+00
1155.0	.160E+11	.145E+11	.110E+10	.391E+09	.729E-12	.452E-03	204.00	.000E+00
1150.0	.169E+11	.153E+11	.113E+10	.419E+09	.769E-12	.476E-03	204.00	.000E+00
1145.0	.178E+11	.162E+11	.116E+10	.449E+09	.811E-12	.501E-03	204.00	.000E+00
1140.0	.188E+11	.171E+11	.120E+10	.482E+09	.855E-12	.528E-03	204.00	.000E+00
1135.0	.198E+11	.180E+11	.123E+10	.517E+09	.902E-12	.557E-03	204.00	.000E+00
1130.0	.209E+11	.190E+11	.127E+10	.554E+09	.952E-12	.587E-03	204.00	.000E+00
1125.0	.220E+11	.201E+11	.131E+10	.595E+09	.100E-11	.619E-03	204.00	.000E+00
1120.0	.232E+11	.212E+11	.134E+10	.638E+09	.106E-11	.653E-03	204.00	.000E+00
1115.0	.245E+11	.224E+11	.138E+10	.685E+09	.112E-11	.689E-03	204.00	.000E+00
1110.0	.258E+11	.237E+11	.143E+10	.735E+09	.118E-11	.727E-03	204.00	.000E+00
1105.0	.273E+11	.250E+11	.147E+10	.789E+09	.125E-11	.767E-03	204.00	.000E+00
1100.0	.288E+11	.264E+11	.151E+10	.847E+09	.132E-11	.810E-03	204.00	.000E+00
1095.0	.304E+11	.279E+11	.156E+10	.909E+09	.139E-11	.855E-03	204.00	.000E+00
1090.0	.321E+11	.295E+11	.161E+10	.976E+09	.147E-11	.903E-03	204.00	.000E+00
1085.0	.339E+11	.312E+11	.166E+10	.105E+10	.156E-11	.953E-03	204.00	.000E+00
1080.0	.358E+11	.329E+11	.171E+10	.113E+10	.164E-11	.101E-02	204.00	.000E+00
1075.0	.378E+11	.348E+11	.177E+10	.121E+10	.174E-11	.106E-02	204.00	.000E+00
1070.0	.399E+11	.368E+11	.182E+10	.130E+10	.184E-11	.112E-02	204.00	.000E+00
1065.0	.422E+11	.389E+11	.188E+10	.140E+10	.194E-11	.119E-02	204.00	.000E+00
1060.0	.446E+11	.412E+11	.194E+10	.150E+10	.206E-11	.126E-02	204.00	.000E+00
1055.0	.472E+11	.435E+11	.201E+10	.162E+10	.218E-11	.133E-02	204.00	.000E+00
1050.0	.499E+11	.461E+11	.208E+10	.174E+10	.230E-11	.140E-02	204.00	.000E+00
1045.0	.528E+11	.487E+11	.214E+10	.187E+10	.244E-11	.149E-02	204.00	.000E+00
1040.0	.558E+11	.516E+11	.222E+10	.201E+10	.258E-11	.157E-02	204.00	.000E+00
1035.0	.591E+11	.546E+11	.229E+10	.216E+10	.273E-11	.166E-02	204.00	.000E+00
1030.0	.625E+11	.578E+11	.237E+10	.233E+10	.289E-11	.176E-02	204.00	.000E+00
1025.0	.662E+11	.612E+11	.245E+10	.250E+10	.306E-11	.186E-02	204.00	.000E+00
1020.0	.700E+11	.648E+11	.254E+10	.269E+10	.324E-11	.197E-02	204.00	.000E+00
1015.0	.742E+11	.686E+11	.263E+10	.290E+10	.344E-11	.209E-02	204.00	.000E+00
1010.0	.785E+11	.727E+11	.272E+10	.312E+10	.364E-11	.221E-02	204.00	.000E+00
1005.0	.832E+11	.770E+11	.282E+10	.336E+10	.386E-11	.234E-02	204.00	.000E+00
1000.0	.881E+11	.816E+11	.292E+10	.361E+10	.409E-11	.248E-02	204.00	.000E+00
995.0	.934E+11	.865E+11	.303E+10	.389E+10	.434E-11	.263E-02	204.00	.000E+00
990.0	.990E+11	.917E+11	.314E+10	.419E+10	.460E-11	.279E-02	204.00	.000E+00
985.0	.105E+12	.972E+11	.326E+10	.451E+10	.488E-11	.295E-02	204.00	.000E+00
980.0	.111E+12	.103E+12	.338E+10	.486E+10	.517E-11	.313E-02	204.00	.000E+00
975.0	.118E+12	.109E+12	.351E+10	.524E+10	.549E-11	.332E-02	204.00	.000E+00
970.0	.125E+12	.116E+12	.364E+10	.564E+10	.582E-11	.352E-02	204.00	.000E+00
965.0	.133E+12	.123E+12	.378E+10	.608E+10	.618E-11	.374E-02	204.00	.000E+00
960.0	.141E+12	.130E+12	.393E+10	.655E+10	.656E-11	.397E-02	204.00	.000E+00
955.0	.150E+12	.138E+12	.409E+10	.706E+10	.697E-11	.421E-02	204.00	.000E+00
950.0	.159E+12	.147E+12	.425E+10	.760E+10	.740E-11	.447E-02	204.00	.000E+00
945.0	.169E+12	.156E+12	.442E+10	.820E+10	.786E-11	.475E-02	204.00	.000E+00
940.0	.179E+12	.166E+12	.460E+10	.883E+10	.835E-11	.504E-02	204.00	.000E+00
935.0	.190E+12	.176E+12	.479E+10	.952E+10	.888E-11	.535E-02	204.00	.000E+00
930.0	.202E+12	.187E+12	.498E+10	.103E+11	.943E-11	.569E-02	204.00	.000E+00
925.0	.215E+12	.198E+12	.519E+10	.111E+11	.100E-10	.604E-02	204.00	.000E+00
920.0	.228E+12	.211E+12	.541E+10	.119E+11	.107E-10	.642E-02	203.97	.000E+00
915.0	.243E+12	.224E+12	.564E+10	.129E+11	.113E-10	.683E-02	203.91	.000E+00
910.0	.258E+12	.238E+12	.589E+10	.139E+11	.121E-10	.726E-02	203.83	.000E+00
905.0	.275E+12	.253E+12	.615E+10	.150E+11	.129E-10	.772E-02	203.72	.000E+00
900.0	.292E+12	.270E+12	.642E+10	.162E+11	.137E-10	.821E-02	203.58	.000E+00
895.0	.311E+12	.287E+12	.671E+10	.175E+11	.146E-10	.874E-02	203.41	.000E+00

Z	Number Densities (cm^{-3})				Mass	Pressure	Temp	F_c
(km)	Total	N_2	CH_4	Ar	(gm/cm^3)	(erg/cm^3)	(K)	
890.0	.332E+12	.306E+12	.702E+10	.188E+11	.155E-10	.930E-02	203.22	.000E+00
885.0	.353E+12	.326E+12	.735E+10	.204E+11	.166E-10	.990E-02	202.99	.000E+00
880.0	.377E+12	.347E+12	.770E+10	.220E+11	.177E-10	.105E-01	202.75	.000E+00
875.0	.402E+12	.370E+12	.807E+10	.238E+11	.189E-10	.112E-01	202.47	.000E+00
870.0	.429E+12	.395E+12	.846E+10	.257E+11	.201E-10	.120E-01	202.17	.000E+00
865.0	.458E+12	.421E+12	.888E+10	.278E+11	.215E-10	.128E-01	201.85	.000E+00
860.0	.489E+12	.450E+12	.932E+10	.300E+11	.230E-10	.136E-01	201.50	.000E+00
855.0	.523E+12	.480E+12	.979E+10	.325E+11	.245E-10	.145E-01	201.13	.000E+00
850.0	.559E+12	.513E+12	.103E+11	.352E+11	.263E-10	.155E-01	200.73	.000E+00
845.0	.598E+12	.549E+12	.108E+11	.381E+11	.281E-10	.165E-01	200.30	.000E+00
840.0	.639E+12	.587E+12	.114E+11	.412E+11	.301E-10	.176E-01	199.86	.000E+00
835.0	.684E+12	.628E+12	.120E+11	.446E+11	.322E-10	.188E-01	199.39	.000E+00
830.0	.733E+12	.672E+12	.127E+11	.484E+11	.345E-10	.201E-01	198.90	.000E+00
825.0	.786E+12	.720E+12	.134E+11	.524E+11	.370E-10	.215E-01	198.38	.000E+00
820.0	.842E+12	.771E+12	.141E+11	.568E+11	.397E-10	.230E-01	197.85	.000E+00
815.0	.904E+12	.827E+12	.149E+11	.616E+11	.426E-10	.246E-01	197.29	.000E+00
810.0	.970E+12	.887E+12	.158E+11	.669E+11	.457E-10	.263E-01	196.71	.000E+00
805.0	.104E+13	.952E+12	.167E+11	.726E+11	.491E-10	.282E-01	196.12	.000E+00
800.0	.112E+13	.102E+13	.177E+11	.788E+11	.527E-10	.302E-01	195.50	.000E+00
795.0	.120E+13	.110E+13	.188E+11	.855E+11	.567E-10	.323E-01	194.86	.000E+00
790.0	.129E+13	.118E+13	.200E+11	.929E+11	.610E-10	.347E-01	194.20	.000E+00
785.0	.139E+13	.127E+13	.212E+11	.101E+12	.657E-10	.372E-01	193.52	.000E+00
780.0	.150E+13	.137E+13	.226E+11	.110E+12	.708E-10	.399E-01	192.83	.000E+00
775.0	.162E+13	.147E+13	.240E+11	.119E+12	.763E-10	.428E-01	192.12	.000E+00
770.0	.174E+13	.159E+13	.256E+11	.130E+12	.823E-10	.460E-01	191.39	.000E+00
765.0	.188E+13	.171E+13	.273E+11	.142E+12	.888E-10	.495E-01	190.65	.000E+00
760.0	.203E+13	.185E+13	.291E+11	.154E+12	.959E-10	.532E-01	189.89	.000E+00
755.0	.219E+13	.199E+13	.310E+11	.168E+12	.104E-09	.572E-01	189.12	.000E+00
750.0	.237E+13	.215E+13	.332E+11	.183E+12	.112E-09	.616E-01	188.33	.000E+00
745.0	.256E+13	.233E+13	.355E+11	.200E+12	.121E-09	.663E-01	187.53	.000E+00
740.0	.277E+13	.252E+13	.380E+11	.218E+12	.131E-09	.714E-01	186.72	.000E+00
735.0	.300E+13	.272E+13	.407E+11	.238E+12	.142E-09	.770E-01	185.90	.000E+00
730.0	.325E+13	.295E+13	.437E+11	.260E+12	.154E-09	.831E-01	185.07	.000E+00
725.0	.353E+13	.320E+13	.469E+11	.284E+12	.167E-09	.897E-01	184.23	.000E+00
720.0	.383E+13	.347E+13	.504E+11	.310E+12	.181E-09	.969E-01	183.38	.000E+00
715.0	.416E+13	.376E+13	.542E+11	.339E+12	.197E-09	.105E+00	182.53	.000E+00
710.0	.452E+13	.409E+13	.584E+11	.371E+12	.214E-09	.113E+00	181.67	.000E+00
705.0	.491E+13	.444E+13	.629E+11	.406E+12	.233E-09	.123E+00	180.80	.000E+00
700.0	.534E+13	.483E+13	.679E+11	.445E+12	.253E-09	.133E+00	179.94	.000E+00
695.0	.582E+13	.526E+13	.733E+11	.487E+12	.276E-09	.144E+00	179.07	.000E+00
690.0	.634E+13	.572E+13	.792E+11	.534E+12	.300E-09	.156E+00	178.21	.000E+00
685.0	.691E+13	.624E+13	.856E+11	.586E+12	.328E-09	.169E+00	177.35	.000E+00
680.0	.754E+13	.680E+13	.927E+11	.643E+12	.357E-09	.184E+00	176.49	.000E+00
675.0	.823E+13	.742E+13	.100E+12	.706E+12	.390E-09	.199E+00	175.64	.000E+00
670.0	.899E+13	.810E+13	.109E+12	.775E+12	.426E-09	.217E+00	174.80	.000E+00
665.0	.982E+13	.885E+13	.118E+12	.852E+12	.466E-09	.236E+00	173.97	.000E+00
660.0	.107E+14	.968E+13	.128E+12	.937E+12	.510E-09	.257E+00	173.15	.000E+00
655.0	.118E+14	.106E+14	.140E+12	.103E+13	.558E-09	.280E+00	172.35	.000E+00
650.0	.129E+14	.116E+14	.152E+12	.113E+13	.611E-09	.305E+00	171.57	.000E+00
645.0	.141E+14	.127E+14	.165E+12	.125E+13	.670E-09	.333E+00	170.80	.000E+00
640.0	.155E+14	.139E+14	.180E+12	.137E+13	.734E-09	.363E+00	170.06	.000E+00
635.0	.170E+14	.153E+14	.196E+12	.151E+13	.806E-09	.396E+00	169.35	.000E+00
630.0	.186E+14	.167E+14	.214E+12	.167E+13	.884E-09	.433E+00	168.67	.000E+00
625.0	.204E+14	.184E+14	.234E+12	.184E+13	.971E-09	.474E+00	168.02	.000E+00
620.0	.224E+14	.202E+14	.256E+12	.203E+13	.107E-08	.519E+00	167.40	.000E+00
615.0	.247E+14	.221E+14	.280E+12	.224E+13	.117E-08	.568E+00	166.83	.000E+00
610.0	.271E+14	.243E+14	.306E+12	.247E+13	.129E-08	.622E+00	166.29	.000E+00
605.0	.298E+14	.267E+14	.335E+12	.273E+13	.142E-08	.682E+00	165.81	.000E+00
600.0	.328E+14	.294E+14	.366E+12	.301E+13	.156E-08	.748E+00	165.37	.000E+00
595.0	.361E+14	.323E+14	.401E+12	.332E+13	.171E-08	.821E+00	164.99	.000E+00
590.0	.397E+14	.356E+14	.439E+12	.367E+13	.189E-08	.901E+00	164.66	.000E+00
585.0	.437E+14	.391E+14	.481E+12	.405E+13	.208E-08	.990E+00	164.40	.000E+00
580.0	.480E+14	.430E+14	.528E+12	.447E+13	.228E-08	.109E+01	164.20	.000E+00
575.0	.529E+14	.473E+14	.578E+12	.493E+13	.251E-08	.120E+01	164.06	.000E+00
570.0	.582E+14	.521E+14	.634E+12	.544E+13	.277E-08	.132E+01	164.00	.000E+00
565.0	.640E+14	.573E+14	.695E+12	.600E+13	.304E-08	.145E+01	164.03	.000E+00
560.0	.704E+14	.630E+14	.762E+12	.662E+13	.335E-08	.159E+01	164.16	.000E+00
555.0	.773E+14	.692E+14	.834E+12	.729E+13	.368E-08	.175E+01	164.40	.000E+00
550.0	.850E+14	.760E+14	.914E+12	.803E+13	.404E-08	.193E+01	164.74	.000E+00
545.0	.933E+14	.835E+14	.100E+13	.884E+13	.444E-08	.213E+01	165.18	.000E+00
540.0	.102E+15	.916E+14	.109E+13	.972E+13	.487E-08	.234E+01	165.72	.000E+00
535.0	.112E+15	.100E+15	.120E+13	.107E+14	.535E-08	.258E+01	166.34	.000E+00
530.0	.123E+15	.110E+15	.131E+13	.117E+14	.586E-08	.284E+01	167.04	.000E+00
525.0	.135E+15	.121E+15	.143E+13	.129E+14	.642E-08	.312E+01	167.82	.000E+00
520.0	.148E+15	.132E+15	.156E+13	.141E+14	.703E-08	.344E+01	168.67	.000E+00
515.0	.162E+15	.145E+15	.171E+13	.155E+14	.770E-08	.378E+01	169.58	.000E+00
510.0	.177E+15	.158E+15	.186E+13	.170E+14	.842E-08	.416E+01	170.55	.000E+00
505.0	.193E+15	.173E+15	.203E+13	.186E+14	.921E-08	.458E+01	171.58	.000E+00
500.0	.211E+15	.189E+15	.222E+13	.204E+14	.101E-07	.504E+01	172.65	.000E+00
495.0	.231E+15	.206E+15	.241E+13	.223E+14	.110E-07	.554E+01	173.77	.000E+00
490.0	.252E+15	.225E+15	.263E+13	.244E+14	.120E-07	.609E+01	174.92	.000E+00

continued on next page

Table 5. (Continued).

Z	Number Densities (cm^{-3})				Mass	Pressure	Temp	F_c
(km)	Total	N_2	CH_4	Ar	(gm/cm^3)	(erg/cm^3)	(K)	
485.0	.275E+15	.246E+15	.287E+13	.267E+14	.131E-07	.669E+01	176.11	.000E+00
480.0	.300E+15	.268E+15	.312E+13	.291E+14	.143E-07	.734E+01	177.32	.000E+00
475.0	.327E+15	.292E+15	.340E+13	.318E+14	.156E-07	.806E+01	178.56	.000E+00
470.0	.357E+15	.318E+15	.370E+13	.347E+14	.170E-07	.885E+01	179.81	.000E+00
465.0	.389E+15	.347E+15	.402E+13	.378E+14	.185E-07	.971E+01	181.08	.000E+00
460.0	.423E+15	.378E+15	.437E+13	.413E+14	.202E-07	.106E+02	182.36	.000E+00
455.0	.461E+15	.411E+15	.475E+13	.450E+14	.219E-07	.117E+02	183.64	.000E+00
450.0	.502E+15	.447E+15	.517E+13	.490E+14	.239E-07	.128E+02	184.92	.000E+00
445.0	.546E+15	.487E+15	.561E+13	.534E+14	.260E-07	.140E+02	186.20	.000E+00
440.0	.594E+15	.530E+15	.610E+13	.582E+14	.283E-07	.154E+02	187.47	.000E+00
435.0	.646E+15	.576E+15	.663E+13	.633E+14	.308E-07	.168E+02	188.74	.000E+00
430.0	.702E+15	.626E+15	.720E+13	.689E+14	.335E-07	.184E+02	189.99	.000E+00
425.0	.764E+15	.681E+15	.782E+13	.750E+14	.364E-07	.202E+02	191.22	.000E+00
420.0	.830E+15	.740E+15	.849E+13	.816E+14	.396E-07	.220E+02	192.43	.000E+00
415.0	.903E+15	.805E+15	.922E+13	.888E+14	.430E-07	.241E+02	193.62	.000E+00
410.0	.981E+15	.875E+15	.100E+14	.966E+14	.468E-07	.264E+02	194.78	.000E+00
405.0	.107E+16	.951E+15	.109E+14	.105E+15	.508E-07	.288E+02	195.92	.000E+00
400.0	.116E+16	.103E+16	.118E+14	.114E+15	.552E-07	.315E+02	197.02	.000E+00
395.0	.126E+16	.112E+16	.128E+14	.124E+15	.600E-07	.344E+02	198.09	.000E+00
390.0	.137E+16	.122E+16	.139E+14	.135E+15	.653E-07	.376E+02	199.11	.000E+00
385.0	.149E+16	.133E+16	.151E+14	.147E+15	.710E-07	.411E+02	200.10	.000E+00
380.0	.162E+16	.144E+16	.164E+14	.160E+15	.772E-07	.449E+02	201.05	.000E+00
375.0	.176E+16	.157E+16	.179E+14	.174E+15	.839E-07	.491E+02	201.95	.000E+00
370.0	.191E+16	.171E+16	.194E+14	.189E+15	.912E-07	.536E+02	202.80	.000E+00
365.0	.208E+16	.186E+16	.211E+14	.205E+15	.993E-07	.585E+02	203.60	.000E+00
360.0	.227E+16	.202E+16	.229E+14	.224E+15	.108E-06	.639E+02	204.35	.000E+00
355.0	.247E+16	.220E+16	.250E+14	.244E+15	.118E-06	.698E+02	205.01	.000E+00
350.0	.269E+16	.240E+16	.272E+14	.267E+15	.128E-06	.762E+02	205.32	.000E+00
345.0	.294E+16	.261E+16	.297E+14	.291E+15	.140E-06	.833E+02	205.57	.000E+00
340.0	.320E+16	.285E+16	.324E+14	.318E+15	.153E-06	.910E+02	205.76	.000E+00
335.0	.350E+16	.312E+16	.353E+14	.347E+15	.167E-06	.994E+02	205.90	.000E+00
330.0	.382E+16	.341E+16	.386E+14	.380E+15	.182E-06	.109E+03	205.99	.000E+00
325.0	.418E+16	.372E+16	.422E+14	.415E+15	.199E-06	.119E+03	206.03	.000E+00
320.0	.457E+16	.407E+16	.461E+14	.454E+15	.218E-06	.130E+03	206.01	.000E+00
315.0	.500E+16	.446E+16	.504E+14	.497E+15	.239E-06	.142E+03	205.94	.000E+00
310.0	.548E+16	.488E+16	.552E+14	.545E+15	.261E-06	.156E+03	205.82	.000E+00
305.0	.601E+16	.535E+16	.605E+14	.597E+15	.286E-06	.170E+03	205.66	.000E+00
300.0	.659E+16	.586E+16	.663E+14	.655E+15	.314E-06	.187E+03	205.45	.000E+00
295.0	.723E+16	.643E+16	.727E+14	.719E+15	.344E-06	.205E+03	205.18	.000E+00
290.0	.793E+16	.706E+16	.798E+14	.790E+15	.378E-06	.224E+03	204.88	.000E+00
285.0	.872E+16	.776E+16	.877E+14	.868E+15	.416E-06	.246E+03	204.52	.000E+00
280.0	.959E+16	.853E+16	.964E+14	.955E+15	.457E-06	.270E+03	204.13	.000E+00
275.0	.105E+17	.939E+16	.106E+15	.105E+16	.503E-06	.296E+03	203.69	.000E+00
270.0	.116E+17	.103E+17	.117E+15	.116E+16	.554E-06	.326E+03	203.21	.000E+00
265.0	.128E+17	.114E+17	.129E+15	.128E+16	.610E-06	.358E+03	202.69	.000E+00
260.0	.141E+17	.126E+17	.142E+15	.141E+16	.673E-06	.394E+03	202.13	.000E+00
255.0	.156E+17	.139E+17	.156E+15	.155E+16	.743E-06	.433E+03	201.52	.000E+00
250.0	.172E+17	.153E+17	.173E+15	.172E+16	.820E-06	.477E+03	200.88	.000E+00
245.0	.190E+17	.169E+17	.191E+15	.190E+16	.907E-06	.526E+03	200.20	.000E+00
240.0	.211E+17	.187E+17	.211E+15	.210E+16	.100E-05	.580E+03	199.48	.000E+00
235.0	.233E+17	.208E+17	.234E+15	.233E+16	.111E-05	.640E+03	198.73	.000E+00
230.0	.259E+17	.230E+17	.259E+15	.258E+16	.123E-05	.706E+03	197.95	.000E+00
225.0	.287E+17	.255E+17	.288E+15	.286E+16	.137E-05	.781E+03	197.13	.000E+00
220.0	.319E+17	.284E+17	.320E+15	.318E+16	.152E-05	.863E+03	196.27	.000E+00
215.0	.354E+17	.316E+17	.355E+15	.354E+16	.169E-05	.956E+03	195.39	.000E+00
210.0	.395E+17	.351E+17	.396E+15	.394E+16	.188E-05	.106E+04	194.47	.000E+00
205.0	.440E+17	.391E+17	.441E+15	.439E+16	.210E-05	.117E+04	193.52	.000E+00
200.0	.490E+17	.436E+17	.491E+15	.489E+16	.234E-05	.130E+04	192.55	.000E+00
198.0	.512E+17	.456E+17	.513E+15	.512E+16	.244E-05	.136E+04	192.15	.000E+00
196.0	.535E+17	.477E+17	.537E+15	.535E+16	.255E-05	.142E+04	191.75	.000E+00
194.0	.560E+17	.498E+17	.561E+15	.559E+16	.267E-05	.148E+04	191.34	.000E+00
192.0	.585E+17	.521E+17	.586E+15	.584E+16	.279E-05	.154E+04	190.93	.000E+00
190.0	.612E+17	.545E+17	.613E+15	.611E+16	.292E-05	.161E+04	190.52	.000E+00
188.0	.640E+17	.570E+17	.641E+15	.639E+16	.305E-05	.168E+04	190.10	.100E-04
186.0	.670E+17	.596E+17	.671E+15	.669E+16	.319E-05	.175E+04	189.67	.100E-04
184.0	.700E+17	.624E+17	.702E+15	.700E+16	.334E-05	.183E+04	189.25	.100E-04
182.0	.733E+17	.653E+17	.734E+15	.732E+16	.349E-05	.191E+04	188.82	.100E-04
180.0	.767E+17	.683E+17	.769E+15	.766E+16	.366E-05	.199E+04	188.39	.100E-04
178.0	.803E+17	.715E+17	.805E+15	.802E+16	.383E-05	.208E+04	187.95	.100E-04
176.0	.841E+17	.749E+17	.842E+15	.840E+16	.401E-05	.218E+04	187.51	.100E-04
174.0	.881E+17	.784E+17	.882E+15	.880E+16	.420E-05	.227E+04	187.07	.100E-04
172.0	.922E+17	.821E+17	.924E+15	.921E+16	.440E-05	.238E+04	186.62	.100E-04
170.0	.966E+17	.860E+17	.968E+15	.965E+16	.461E-05	.248E+04	186.17	.100E-04
168.0	.101E+18	.901E+17	.101E+16	.101E+17	.483E-05	.260E+04	185.72	.100E-04
166.0	.106E+18	.945E+17	.106E+16	.105E+17	.506E-05	.271E+04	185.27	.100E-04
164.0	.111E+18	.990E+17	.111E+16	.111E+17	.530E-05	.284E+04	184.81	.100E-04
162.0	.117E+18	.104E+18	.117E+16	.117E+17	.556E-05	.297E+04	184.34	.100E-04
160.0	.122E+18	.109E+18	.122E+16	.122E+17	.583E-05	.310E+04	183.88	.100E-04
158.0	.128E+18	.114E+18	.128E+16	.128E+17	.612E-05	.325E+04	183.42	.100E-04
156.0	.135E+18	.120E+18	.135E+16	.134E+17	.642E-05	.340E+04	182.95	.100E-04
154.0	.141E+18	.126E+18	.141E+16	.141E+17	.673E-05	.356E+04	182.48	.100E-04
152.0	.148E+18	.132E+18	.148E+16	.148E+17	.707E-05	.372E+04	182.01	.100E-04

Z	Number Densities (cm^{-3})				Mass	Pressure	Temp	F_c
(km)	Total	N_2	CH_4	Ar	(gm/cm^3)	(erg/cm^3)	(K)	
150.0	.156E+18	.138E+18	.156E+16	.156E+17	.742E-05	.390E+04	181.54	.100E-04
148.0	.163E+18	.145E+18	.163E+16	.163E+17	.779E-05	.408E+04	181.03	.100E-04
146.0	.172E+18	.153E+18	.172E+16	.172E+17	.822E-05	.428E+04	179.68	.200E-04
144.0	.180E+18	.160E+18	.180E+16	.180E+17	.859E-05	.448E+04	180.12	.200E-04
142.0	.191E+18	.170E+18	.191E+16	.191E+17	.908E-05	.469E+04	178.57	.200E-04
140.0	.201E+18	.179E+18	.201E+16	.201E+17	.957E-05	.492E+04	177.64	.200E-04
138.0	.211E+18	.188E+18	.211E+16	.211E+17	.101E-04	.516E+04	177.22	.200E-04
136.0	.223E+18	.198E+18	.223E+16	.223E+17	.106E-04	.541E+04	176.30	.200E-04
134.0	.234E+18	.208E+18	.234E+16	.234E+17	.112E-04	.568E+04	175.90	.200E-04
132.0	.247E+18	.220E+18	.247E+16	.247E+17	.118E-04	.596E+04	175.11	.200E-04
130.0	.259E+18	.231E+18	.259E+16	.259E+17	.124E-04	.626E+04	174.82	.200E-04
128.0	.274E+18	.244E+18	.274E+16	.274E+17	.131E-04	.657E+04	173.44	.300E-04
126.0	.291E+18	.259E+18	.291E+16	.291E+17	.139E-04	.690E+04	171.96	.300E-04
124.0	.307E+18	.273E+18	.307E+16	.307E+17	.146E-04	.725E+04	171.13	.300E-04
122.0	.326E+18	.290E+18	.326E+16	.326E+17	.155E-04	.762E+04	169.58	.300E-04
120.0	.344E+18	.306E+18	.344E+16	.344E+17	.164E-04	.802E+04	168.69	.300E-04
118.0	.364E+18	.324E+18	.364E+16	.364E+17	.174E-04	.843E+04	167.81	.400E-04
116.0	.385E+18	.343E+18	.385E+16	.385E+17	.184E-04	.888E+04	166.98	.401E-04
114.0	.407E+18	.363E+18	.407E+16	.407E+17	.194E-04	.935E+04	166.22	.401E-04
112.0	.432E+18	.384E+18	.432E+16	.432E+17	.206E-04	.984E+04	165.10	.401E-04
110.0	.458E+18	.407E+18	.458E+16	.458E+17	.218E-04	.104E+05	164.17	.499E-04
108.0	.485E+18	.431E+18	.485E+16	.485E+17	.231E-04	.109E+05	163.43	.499E-04
106.0	.514E+18	.457E+18	.514E+16	.514E+17	.245E-04	.115E+05	162.50	.499E-04
104.0	.548E+18	.488E+18	.548E+16	.548E+17	.261E-04	.122E+05	160.78	.600E-04
102.0	.583E+18	.519E+18	.583E+16	.583E+17	.278E-04	.128E+05	159.49	.600E-04
100.0	.622E+18	.553E+18	.622E+16	.622E+17	.296E-04	.136E+05	157.97	.700E-04
98.0	.663E+18	.590E+18	.663E+16	.663E+17	.316E-04	.143E+05	156.62	.700E-04
96.0	.707E+18	.629E+18	.707E+16	.707E+17	.337E-04	.151E+05	155.20	.800E-04
94.0	.757E+18	.674E+18	.757E+16	.757E+17	.361E-04	.160E+05	153.33	.900E-04
92.0	.813E+18	.724E+18	.813E+16	.813E+17	.388E-04	.170E+05	151.19	.100E-03
90.0	.870E+18	.774E+18	.870E+16	.870E+17	.415E-04	.180E+05	149.73	.110E-03
88.0	.928E+18	.826E+18	.928E+16	.928E+17	.443E-04	.191E+05	148.82	.110E-03
86.0	.100E+19	.890E+18	.100E+17	.100E+18	.477E-04	.202E+05	146.55	.130E-03
84.0	.108E+19	.965E+18	.108E+17	.108E+18	.517E-04	.215E+05	143.56	.140E-03
82.0	.118E+19	.105E+19	.118E+17	.118E+18	.563E-04	.229E+05	140.21	.160E-03
80.0	.129E+19	.115E+19	.129E+17	.129E+18	.614E-04	.244E+05	137.11	.180E-03
78.0	.141E+19	.125E+19	.141E+17	.141E+18	.672E-04	.260E+05	133.61	.210E-03
76.0	.154E+19	.137E+19	.154E+17	.154E+18	.736E-04	.278E+05	130.39	.240E-03
74.0	.170E+19	.151E+19	.170E+17	.170E+18	.809E-04	.298E+05	127.11	.270E-03
72.0	.190E+19	.169E+19	.190E+17	.190E+18	.905E-04	.320E+05	122.09	.330E-03
70.0	.216E+19	.192E+19	.216E+17	.216E+18	.103E-03	.344E+05	115.68	.480E-03
68.0	.246E+19	.219E+19	.246E+17	.246E+18	.117E-03	.373E+05	109.68	.520E-03
66.0	.288E+19	.256E+19	.288E+17	.288E+18	.137E-03	.405E+05	102.18	.680E-03
64.0	.339E+19	.301E+19	.339E+17	.339E+18	.161E-03	.444E+05	94.99	.900E-03
62.0	.395E+19	.352E+19	.395E+17	.395E+18	.188E-03	.489E+05	89.69	.118E-02
60.0	.455E+19	.405E+19	.455E+17	.455E+18	.217E-03	.541E+05	86.23	.145E-02
58.0	.523E+19	.465E+19	.523E+17	.523E+18	.249E-03	.601E+05	83.48	.177E-02
56.0	.597E+19	.531E+19	.597E+17	.597E+18	.285E-03	.670E+05	81.55	.209E-02
54.0	.677E+19	.603E+19	.677E+17	.677E+18	.323E-03	.749E+05	80.31	.245E-02
52.0	.767E+19	.683E+19	.767E+17	.767E+18	.366E-03	.838E+05	79.40	.284E-02
50.0	.869E+19	.773E+19	.869E+17	.869E+18	.414E-03	.940E+05	78.64	.327E-02
48.0	.983E+19	.875E+19	.983E+17	.983E+18	.469E-03	.105E+06	78.02	.375E-02
46.0	.111E+20	.991E+19	.111E+18	.111E+19	.531E-03	.119E+06	77.45	.431E-02
44.0	.126E+20	.112E+20	.126E+18	.126E+19	.601E-03	.133E+06	76.96	.494E-02
42.0	.143E+20	.127E+20	.143E+18	.143E+19	.683E-03	.150E+06	76.36	.570E-02
40.0	.162E+20	.145E+20	.162E+18	.162E+19	.774E-03	.169E+06	75.97	.653E-02
38.0	.183E+20	.163E+20	.183E+18	.183E+19	.871E-03	.191E+06	76.20	.732E-02
36.0	.206E+20	.183E+20	.206E+18	.206E+19	.980E-03	.215E+06	76.47	.809E-02
34.0	.231E+20	.206E+20	.231E+18	.231E+19	.110E-02	.243E+06	76.72	.918E-02
32.0	.260E+20	.231E+20	.260E+18	.260E+19	.124E-02	.273E+06	77.12	.102E-01
30.0	.291E+20	.259E+20	.291E+18	.291E+19	.139E-02	.308E+06	77.67	.113E-01
28.0	.325E+20	.289E+20	.325E+18	.325E+19	.155E-02	.347E+06	78.26	.125E-01
26.0	.363E+20	.323E+20	.363E+18	.363E+19	.173E-02	.390E+06	79.05	.138E-01
24.0	.404E+20	.359E+20	.404E+18	.404E+19	.192E-02	.439E+06	79.94	.151E-01
22.0	.448E+20	.398E+20	.448E+18	.448E+19	.213E-02	.493E+06	81.05	.164E-01
20.0	.498E+20	.443E+20	.498E+18	.498E+19	.237E-02	.553E+06	81.87	.179E-01
18.0	.551E+20	.490E+20	.551E+18	.551E+19	.263E-02	.619E+06	83.07	.194E-01
16.0	.608E+20	.541E+20	.608E+18	.608E+19	.290E-02	.693E+06	84.39	.208E-01
14.0	.669E+20	.596E+20	.669E+18	.669E+19	.319E-02	.775E+06	85.74	.224E-01
12.0	.736E+20	.655E+20	.736E+18	.736E+19	.351E-02	.864E+06	87.14	.240E-01
10.0	.808E+20	.719E+20	.808E+18	.808E+19	.385E-02	.963E+06	88.63	.256E-01
8.0	.882E+20	.785E+20	.882E+18	.882E+19	.421E-02	.107E+07	90.39	.271E-01
6.0	.962E+20	.856E+20	.962E+18	.962E+19	.459E-02	.119E+07	92.19	.286E-01
5.0	.100E+21	.893E+20	.100E+19	.100E+20	.478E-02	.125E+07	93.15	.294E-01
4.0	.105E+21	.933E+20	.105E+19	.105E+20	.500E-02	.132E+07	93.97	.302E-01
3.0	.109E+21	.970E+20	.109E+19	.109E+20	.520E-02	.139E+07	95.07	.309E-01
2.0	.113E+21	.101E+21	.113E+19	.113E+20	.539E-02	.146E+07	96.38	.313E-01
1.5	.115E+21	.103E+21	.115E+19	.115E+20	.549E-02	.150E+07	97.08	.315E-01
1.0	.117E+21	.104E+21	.117E+19	.117E+20	.559E-02	.153E+07	97.78	.316E-01
.5	.119E+21	.106E+21	.119E+19	.119E+20	.569E-02	.157E+07	98.49	.318E-01
.0	.121E+21	.108E+21	.121E+19	.121E+20	.579E-02	.161E+07	99.20	.320E-01

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