

On ionized molecules in the solar atmosphere

K. Sinha and B. M. Tripathi

U.P. State Observatory, Manora Peak, Naini Tal 263 129

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Abstract. The partial pressures of 20 ionic molecular species are reported here for standard facular, photospheric and sunspot model atmospheres with a view to picking up ionized molecules for a possible identification in the solar spectrum. Comparing the partial pressures with those of the molecule SiH^+ , which is already detected in the solar spectrum, it appears probable that additional ionic species can be identified in the same spectrum. To predict the line intensities of such species, accurate values of oscillator strengths and dissociation energies are needed.

Key words : ionic species—solar spectrum—solar atmosphere

1. Introduction

Detection of a molecular ion, SiH^+ , in the solar photospheric spectrum (Grevesse & Sauval 1970) lead to similar investigations for other ionic species. The molecules CH^+ , MgH^+ , OH^+ , HS^+ , and AlH^+ , were studied by different authors (Grevesse & Sauval, 1971b; Sauval *et al.* 1977). Some efforts on the basis of integral number calculations were made by Pande & Gaur (1973) for photospheric molecules. Equivalent widths (EWs) for ionic species in facula models were predicted by Tripathi (1978) and Tripathi *et al.* (1981). Recent calculations of EWs of MgH^+ lines (Sinha *et al.* 1988) show that these lines are stronger in sunspots than in photosphere and faculae and are observable in the sunspot spectrum. Noting that all such sites of molecule formation were not included in previous studies, we felt prompted to reinvestigate the above problem and to prepare a list of ionic species for possible identifications in the solar spectrum. This list may also be of interest to those engaged in the studies of other cosmic sources. Lacking reliable oscillator strengths, we could not predict EWs. However, it must be realized here that the expected EWs may be very small (Sauval *et al.* 1977) and most of the electronic transitions originating from the ground state of the molecules fall in the UV region of the spectrum where detection is not easy.

An effort to identify the Fraunhofer lines due to ionic species is important because of the following additional reasons:

- (i) Observations of ionic species in laboratory pose difficulties (Curtiss & Erman

1977). If they can be detected in a cosmic source, vital informations on oscillator strengths can be deduced as in the case of CH^+ (Lambert & Danks 1986) and SiH^+ (Grevesse & Sauval 1971a).

(ii) Since many atoms have large ionization energies, it is possible that molecular ions are formed deep inside the solar atmosphere. If undetected, such lines may still be important as contributors of weak lines to a veil of unresolved lines producing enhanced opacities.

2. Methods and calculations

Besides the papers cited above on ionic molecules, the monograph by Huber & Herzberg (1979) has been our guide in the preparation of the list of molecules for calculations. Additionally the following criterion was kept in mind:

(i) The atoms constituting the molecule should be fairly abundant in the sun, (ii) ionization potential of at least one of the atoms constituting the molecule should be low as in the case of AlH^+ , (iii) ionic species formed out of the same atoms which produce already detected un-ionized solar molecules, were also included.

In table 1 we summarise all the relevant data regarding the ~ 20 molecular ionic species chosen by us. It may be noted that the abundances of some elements have recently been revised (Grevesse 1989) but the slight changes in some cases of table 1 are of little consequence for the purpose of the present study. It may also be noted that some of the ionic species are more stable than their neutral counterparts because of higher dissociation energy. The molecular partial pressures were obtained by using the polynomials given by Tatum & Sauval (1984) except in the case of AlH^+ where we used Tarafdar's (1977). In addition to the different facula, photosphere and sunspot models, we decided to use Sobotka's (1985) models which take into account the different sizes of umbrae, and Maltby *et al.* (1986) models which account for the early, middle and late phases of the solar cycle. The reasons for selecting the two facular models by Stenflo (1975) and Shine & Linsky (1974) are given in Sinha *et al.* (1988) and for selecting the two photospheric models by Holweger & Müller (1974) and Maltby *et al.* (1986) are summarized by Sinha & Tripathi (1990). The sunspot models used here are due to Henoux (1969), Zwaan (1974) Stellmacher & Wiehr (1975), Boyer (1980) and Maltby *et al.* (1986). Five sunspot models were selected to keep our conclusions independent of the choice of the model atmosphere.

We also wanted to assess if SiH^+ lines can be detected in facular and sunspot spectrum. Atomic partition functions for Si^+ and H^+ were borrowed from Irwin (1981). The line identifications, wavelengths etc. are from Grevesse & Sauval (1970) whereas the rotational and vibrational constants are from Huber & Herzberg (1979).

3. Results and discussions

Considering the rotational constant B_v and the temperature T (*cf.* Schadee 1964), the SiH^+ lines originating from $J=15$ and $J=11$ can be expected to be the most intense amongst the other lines of the (0-0) band of the $A'\pi - X'\Sigma$ transitions of the same molecules in photosphere and spot spectra respectively. For EW calculations we chose all the lines marked P in table 1 of Grevesse & Sauval (1970). The solar value of $f_{0,0}$ derived by Grevesse & Sauval (1971) is shown to be in error by Carlsson *et al.* (1980). Also the D_0^0

Table 1. Molecular ions and abundances of elements considered in this study

Molecule	Dissociation energy ¹ (eV)	
	ionic	neutral
<i>A. Hydrogen containing molecules</i>		
AlH ⁺	1.0 ²	3.0600
CH ⁺	4.0850	3.4650
HCl ⁺	4.653	4.4336
HF ⁺	3.4230	5.8690
MgH ⁺	2,0800	1.27 ³
NH ⁺	3.3900	3.4700
OH ⁺	5.0900	4.3920
PH ⁺	3.3600	3.0200
SH ⁺	3.4800	3.5500
SiH ⁺	3.1700	3.0600
<i>B. Oxygen containing molecules</i>		
CO ⁺	8.3380	11.0920
NO ⁺	10.8506	6.4968
PO ⁺	8.4100	6.1500
SO ⁺	5.4300	5.3590
SiO ⁺	4.9800	8.2600
<i>C. Cyanogen and Homonuclear molecules</i>		
CN ⁺	4.8500	7.76
C ₂ ⁺	5.3200	6.2100
H ₂ ⁺	2.6508	4.4781
N ₂ ⁺	8.7128	9.7594
O ₂ ⁺	6.6630	5.1156
<i>D Elemental abundances⁴ on the scale log N(H) = 12.00</i>		
log N(Al)	=	6.49
log N(C)	=	8.67
log N(Cl)	=	5.5 ⁵
log N(F)	=	4.56 ⁵
log N(Mg)	=	7.62
log N(N)	=	7.99
log N(O)	=	8.92
log N(P)	=	5.45
log N(S)	=	7.23
log N(Si)	=	7.63

1. General reference Huber & Herzberg (1979). 2. Tarafdar (1977). 3. Balfour & Lindgren (1978). 4. Lambert (1978); Lambert & Luck (1978), 5. Grevesse (1984).

and $f_{0,0}$ values provided by the latter authors do not seem reliable because of the breakdown of the r -centroid approximation in their calculations. The values $D_0^0 = 3.26$ eV and $f_{0,0} = 1.186 \times 10^{-3}$ recommended by Larsson (1987, personal communication) and used here are in excellent agreement with the recent calculations by Matos *et al.* (1988) which give $D_0^0 = 3.30$ eV and $f_{0,0} = 1.2 \times 10^{-3}$.

The results of our EW calculations for SiH⁺ are shown in table 2. An inspection shows that besides the photosphere, the spot and facular spectrum too can show weak lines of this molecule around $J = 10$. The very small values of EW in Sobotka's model 13

Table 2. Equivalent widths of SiH⁺ in different model atmospheres. If microturbulence is not given in a model, a depth independent value 0.85 Kms⁻¹ is assumed

Wavelength (Å)	4024.209	4079.046	4000.706	4004.659	4022.946	4041.005	4094.114	4005 921	4011.841
Branch (J)	P(6)	P(11)	Q(3)	Q(4)	Q(7)	Q(9)	Q(13)	R(6)	R(7)
Model									
Photosphere									
Observations	0.7	1.0	1.1	1.8	1.5	3.5	2.0	1.5	1.7
Holweger & Muller (1974)	0.63	1.06	0.92	1.17	1.81	2.14	2.57	1.00	1.09
Maltby <i>et al.</i> (1986)	0.67	1.13	0.99	1.25	1.93	2.29	2.73	1.06	1.16
Facula									
Shina & Linsky (1974)	0.78	1.32	1.14	1.44	2.23	2.65	3.19	1.23	1.35
Stenflo (1975)	0.59	0.99	0.86	1.09	1.69	2.00	2.40	0.93	1.02
Sunspot									
Henoux (1969)	1.87	2.89	2.76	3.43	5.01	5.71	6.30	2.91	3.14
Zwaan (1974)	2.24	3.51	3.30	4.10	6.02	6.89	7.68	3.50	3.78
Stellmacher & Wiehr (1975)	1.81	2.67	2.62	3.19	4.44	4.94	5.29	2.75	2.95
Boyer (1980)	1.63	2.49	2.43	3.01	4.39	4.99	5.43	2.56	2.76
Avrett (1981)	1.39	2.12	2.04	2.51	3.62	4.09	4.47	2.15	2.32
Maltby <i>et al.</i> (1986)									
Model M _L	1.03	1.62	1.54	1.93	2.89	3.33	3.71	1.63	1.77
Model E	1.03	1.59	1.55	1.93	2.83	3.23	3.53	1.63	1.76
Model M	1.47	2.27	2.19	2.72	4.00	4.57	5.03	2.31	2.50
Model L	1.91	2.98	2.84	3.53	5.19	5.94	6.59	3.00	3.25
Sobotka's (1985)									
Model 12	0.69	1.13	1.02	1.28	1.96	2.30	2.69	1.09	1.18
Model 22	1.55	2.45	2.30	2.87	4.26	4.90	5.49	2.44	2.64
Model 13	0.03	0.05	0.05	0.06	0.09	0.10	0.11	0.05	0.05

arise because this model does not extend to photospheric layers deeper than optical depth $\tau = 1.16$.

Having assessed the case of SiH⁺ we can move now to other ionic species, keeping in mind the predictions of the observable EWs for MgH⁺ lines in sunspot spectrum (Sinha *et al.* 1988). The line intensities that we observe in a spectrum depend upon the oscillator strengths and the dissociation energy on the one hand and the model atmosphere, opacities and molecular concentration or partial pressures on the other. The effect of model atmosphere, elemental abundance, dissociation energy etc. can be assessed if we intercompare the molecular concentration or the partial pressures of different ionic species as a function of optical depth. In the absence of elaborate and accurate measurements of oscillator strengths and dissociation energies, we decided to compare the run of partial pressures of different species with that of SiH⁺. The results of calculations for two facular models, two photospheric models and five sunspot models are presented in tables 3 to 11 in alphabetical order. Since the structure of atmosphere is model-dependent, calculations were performed in more than one model of the same feature in order to keep our conclusions independent of the choice of model atmosphere.

There is a growing feeling that sunspots of different sizes might have different structures and also the spots appearing at different phases of the solar activity cycle may not be the same. To consider these aspects the three sunspot models each by Sobotka (1985) and Maltby *et al.* (1986) were included in the present study. The results are presented in tables 12 to 17.

As an illustration we have plotted curves for some selected molecules in figures 1b to 5b. The different models due to Maltby *et al.* (1986) have been referred to as MACKKL model in the figures. In figures 1(a) to 5(a) we also give the temperature versus log (optical depth) plots for different models for a ready assessment of temperature effects on partial pressures.

Considering the partial pressures alone, we find that the molecules AlH^+ , CO^+ , H_2^+ , MgH^+ , NH^+ , OH^+ , SH^+ and SiH^+ may be important in the solar spectrum. To assess their role, reliable molecular parameters like the dissociation energies and the oscillator strengths are needed. Even if these molecules are found to lie on the threshold of detectability limits, they may contribute towards unresolved weak molecular lines producing 'line haze opacity' (Holweger 1970) (see also Sinha & Tripathi 1990).

We feel that in the solar atmosphere, the CO^+ lines should be more intense than $0.084 \text{ m}\text{\AA}$, a value given by Pande & Gaur (1973) for the following reasons.

(i) Their effort was based upon calculations for the comet tail bands only, whereas the first negative band system of CO^+ seems more intense because of an order of magnitude higher oscillator strength (Krupenie 1966). (ii) They calculated EWs for a line originating from $v'' = 3$, whereas at photospheric temperature, $v'' = 0$ is the vibrational level where most of the molecules are to be found. We feel that on this consideration alone their result is underestimated by a factor of about 7. At sunspot temperatures this factor may be as high as 24.

In the conclusion, it is felt that detailed and exhaustive calculations alone will be able to show which ionic species in our list are of utmost importance in the solar spectrum.

It is interesting to see from figures 4b and 5b, how the different species, particularly the carbon-containing molecules, behave as the sunspot atmosphere heats up. This heating may be due to the fact that the spot is formed at a different phase of the solar cycle (Maltby *et al.* 1986). Also it may be a pointer towards the fact that spots of different diameters are different in physical characteristics too (Sobotka 1985).

Out of the list of diatomic ionic species considered by Riter *et al.* (1976), we are of the opinion that the molecules AlO^+ , and O_2^+ with low concentrations may not be important.

Acknowledgement

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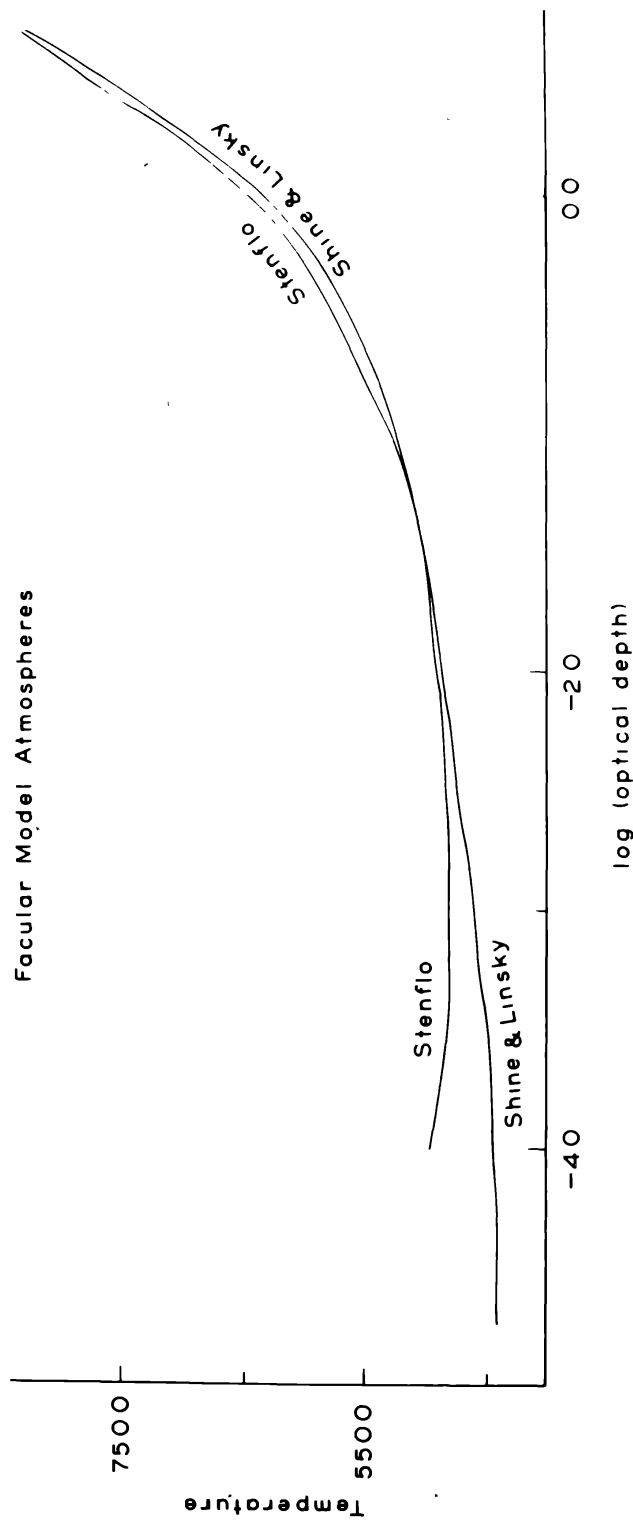


Figure 1a. Temperature-optical depth run in the two facular models.

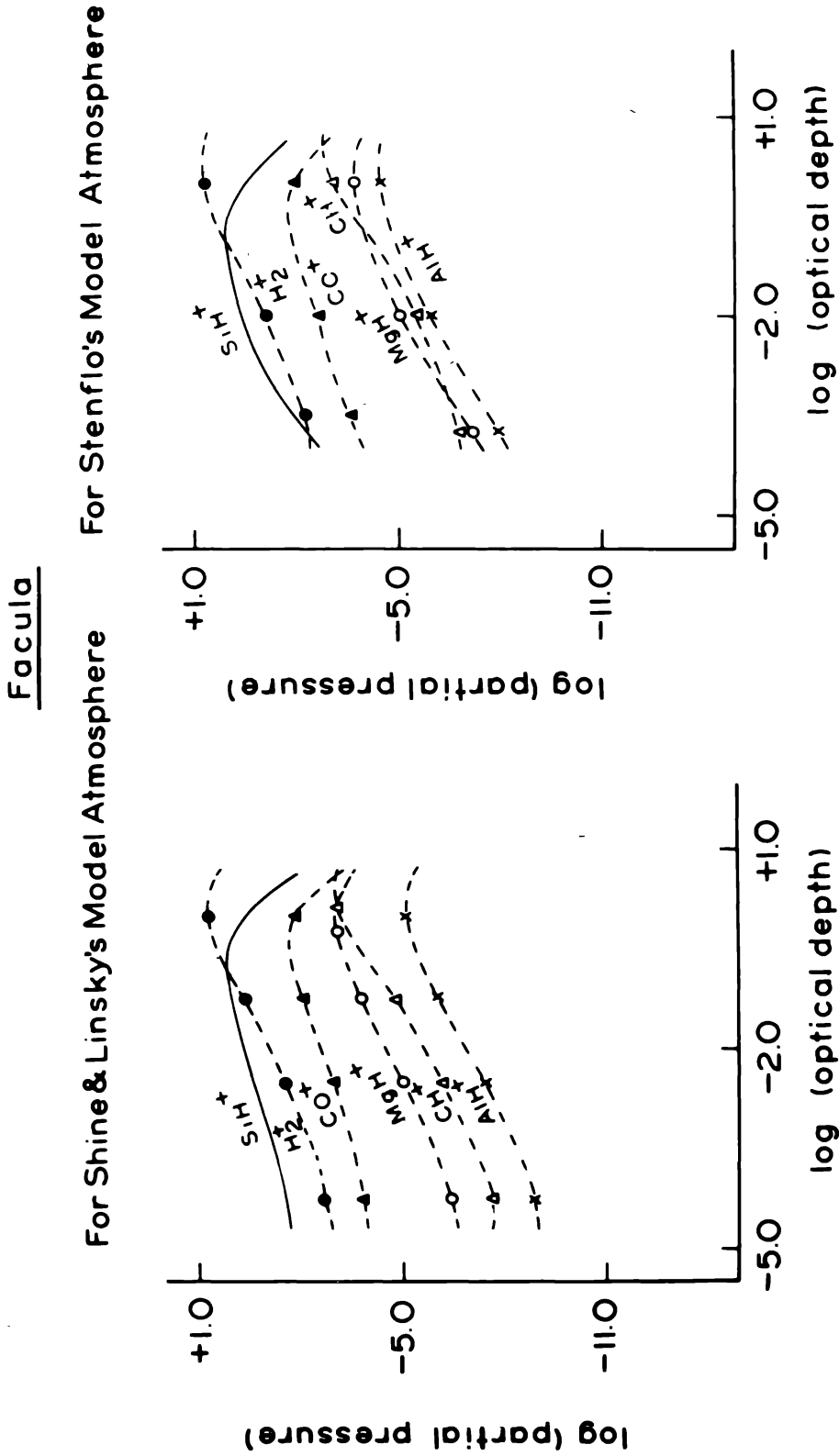


Figure 1b. Partial pressures of selected molecular ions plotted as functions of optical depth in the considered facular models.

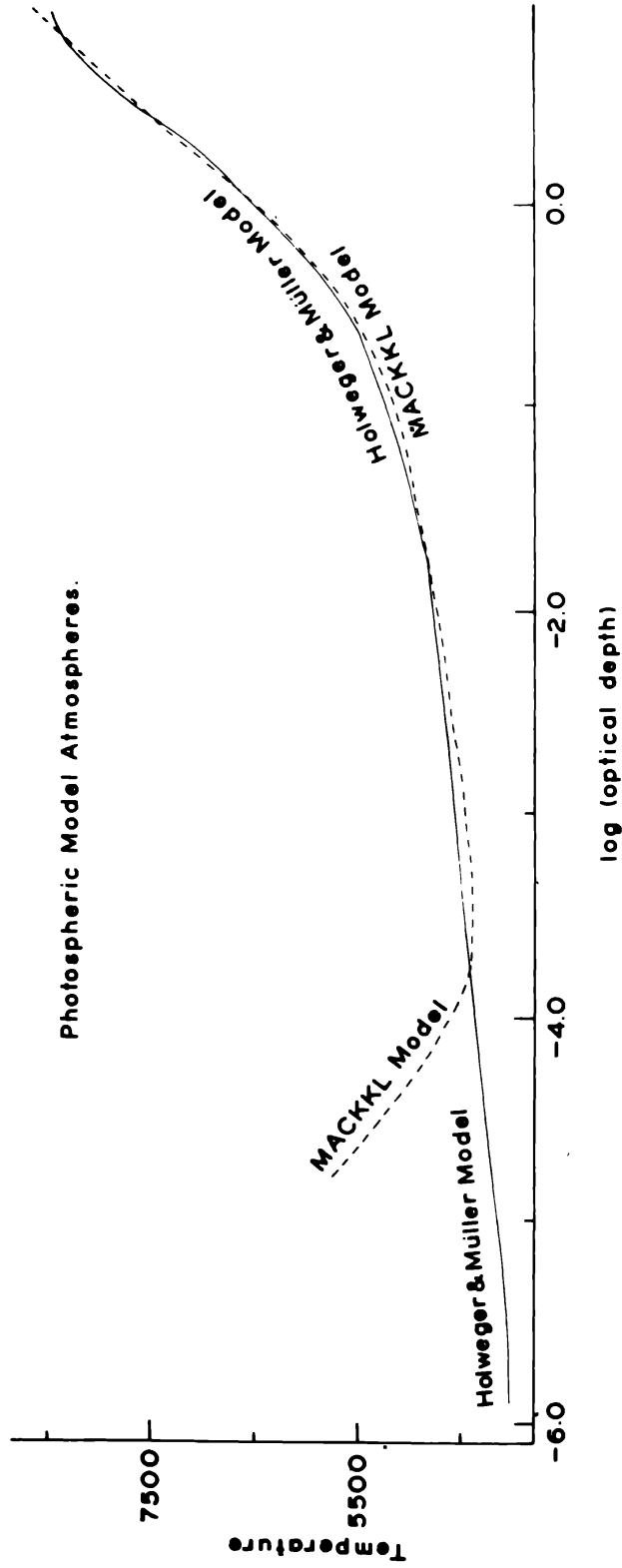


Figure 2a. Same as in figure 1a but for photospheric models.

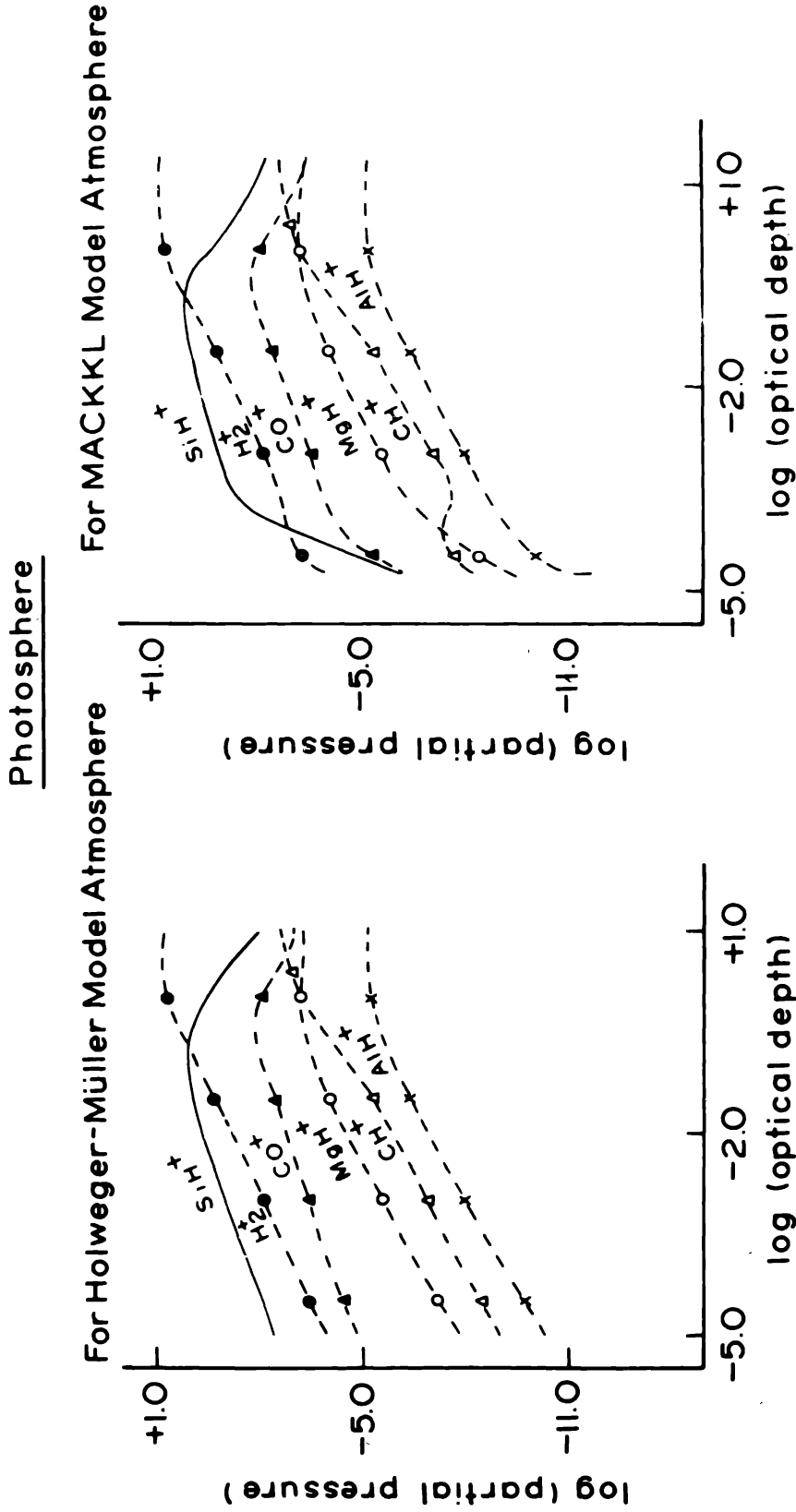


Figure 2b. Same as in figure 1b but for photospheric models.

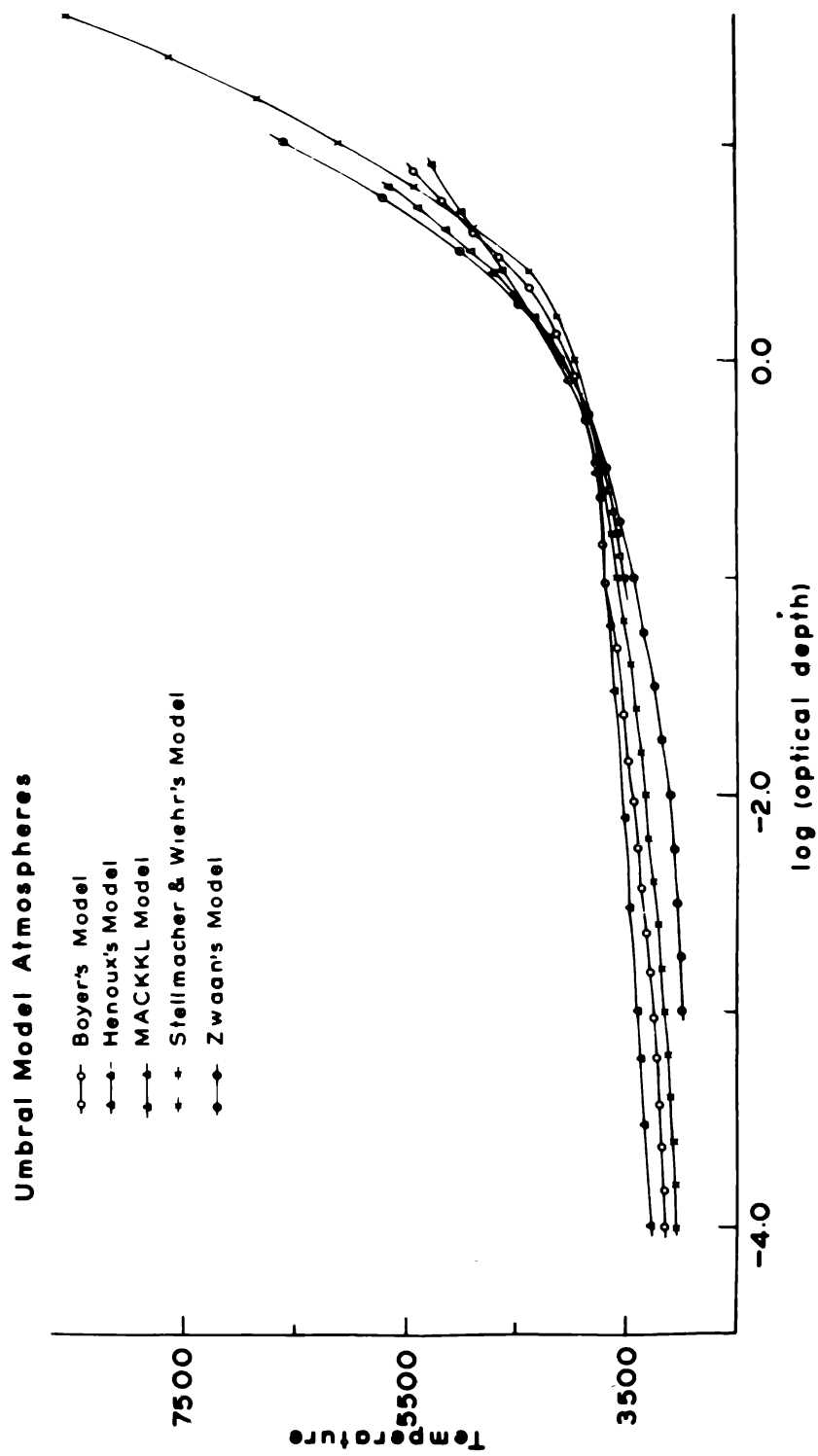


Figure 3a. Same as in figure 1a but for umbra models.

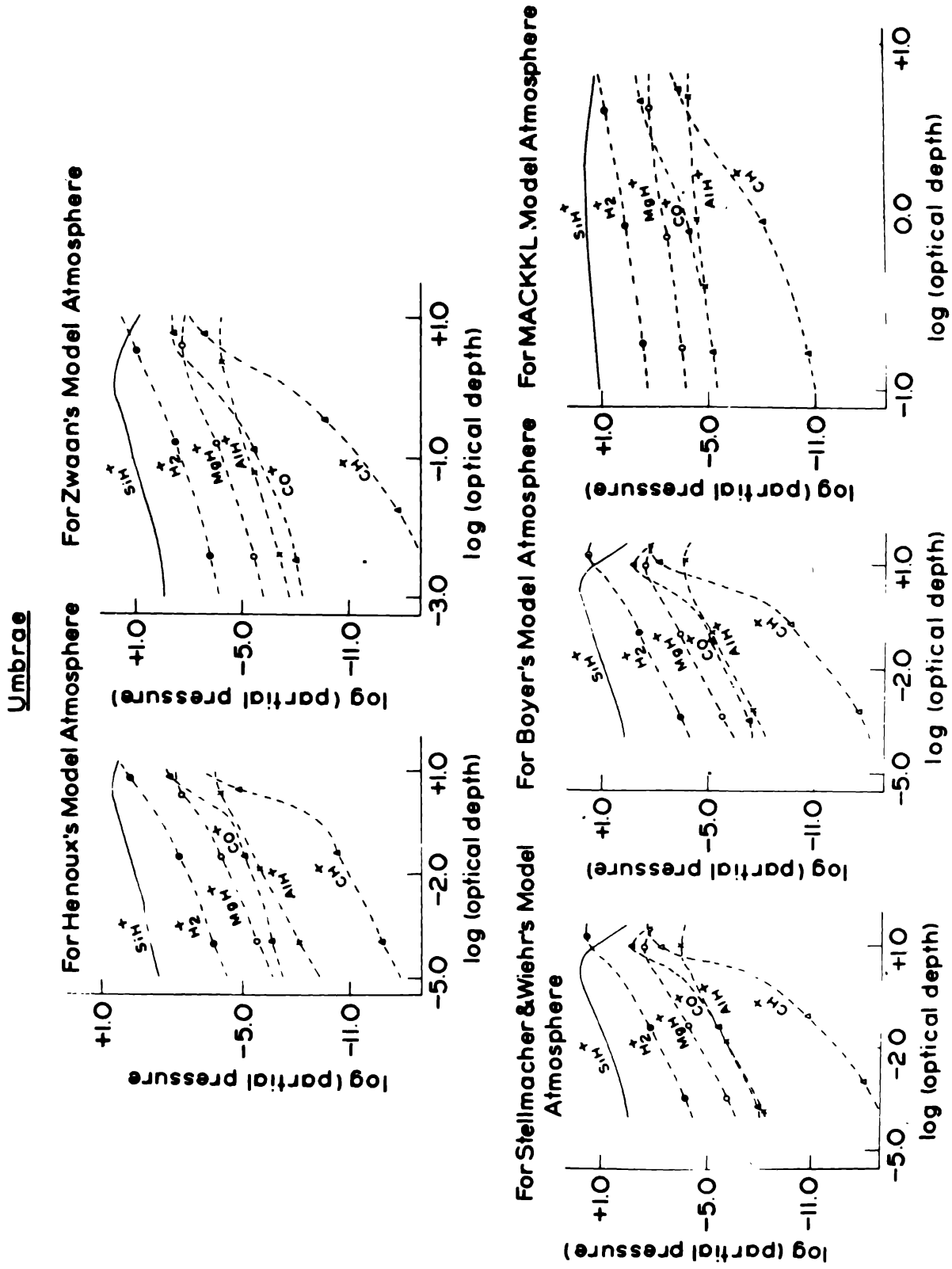


Figure 3b. Same as in figure 1b but for umbra models.

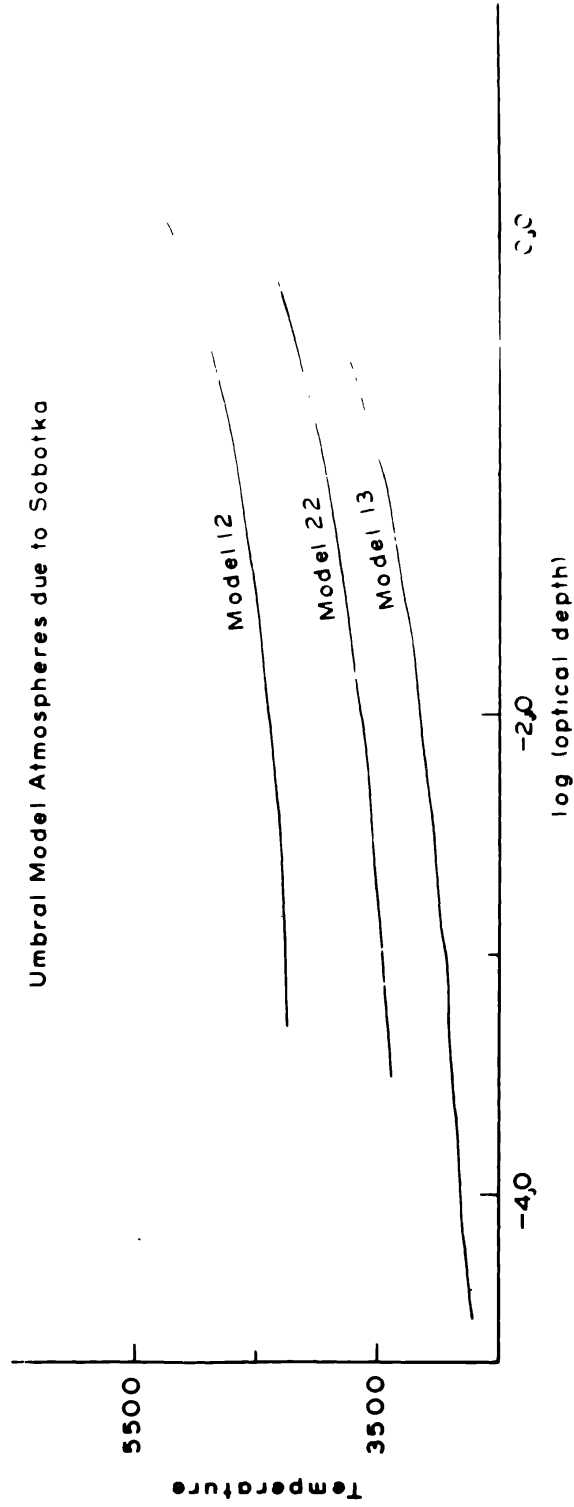


Figure 4a. Same as in figure 1a but for Sobotka's (1985) umbral models. These models account for the different sized umbrae

Umbræ
For Model Atmospheres due to Sobotka

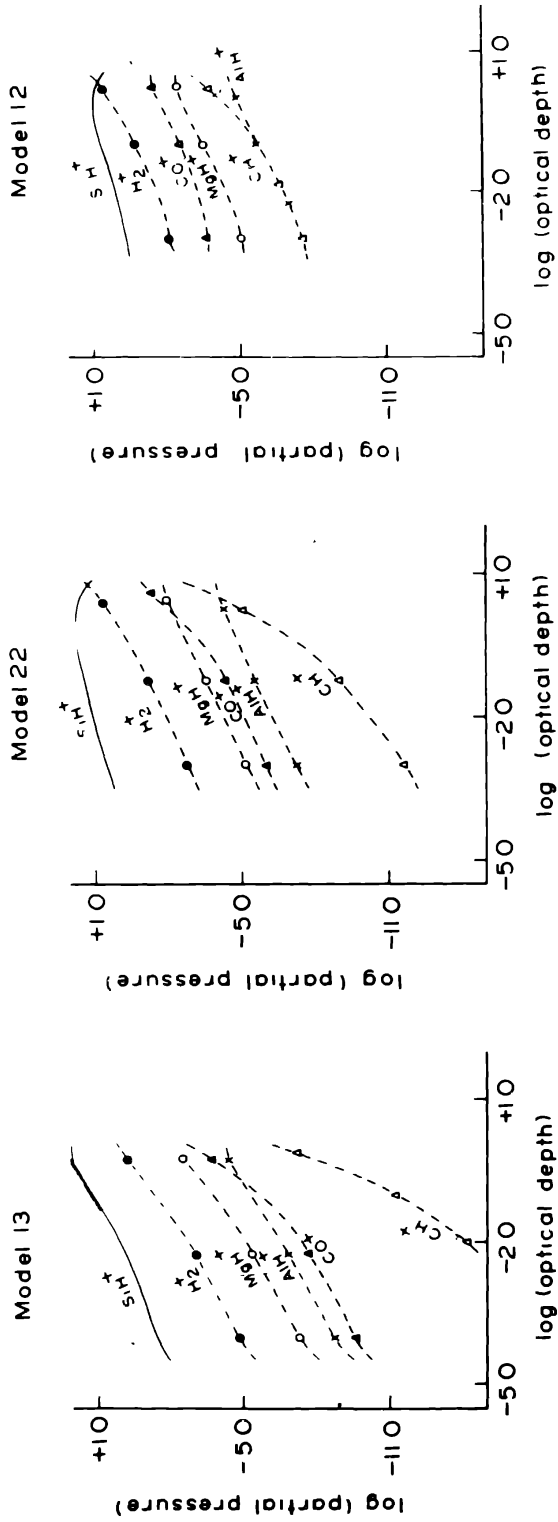


Figure 4b. Same as in figure 1b but for the umbral models of Sobotka (1985). Notice the effect of hotter models on partial pressures of carbon containing molecules CO⁺ and CH⁺

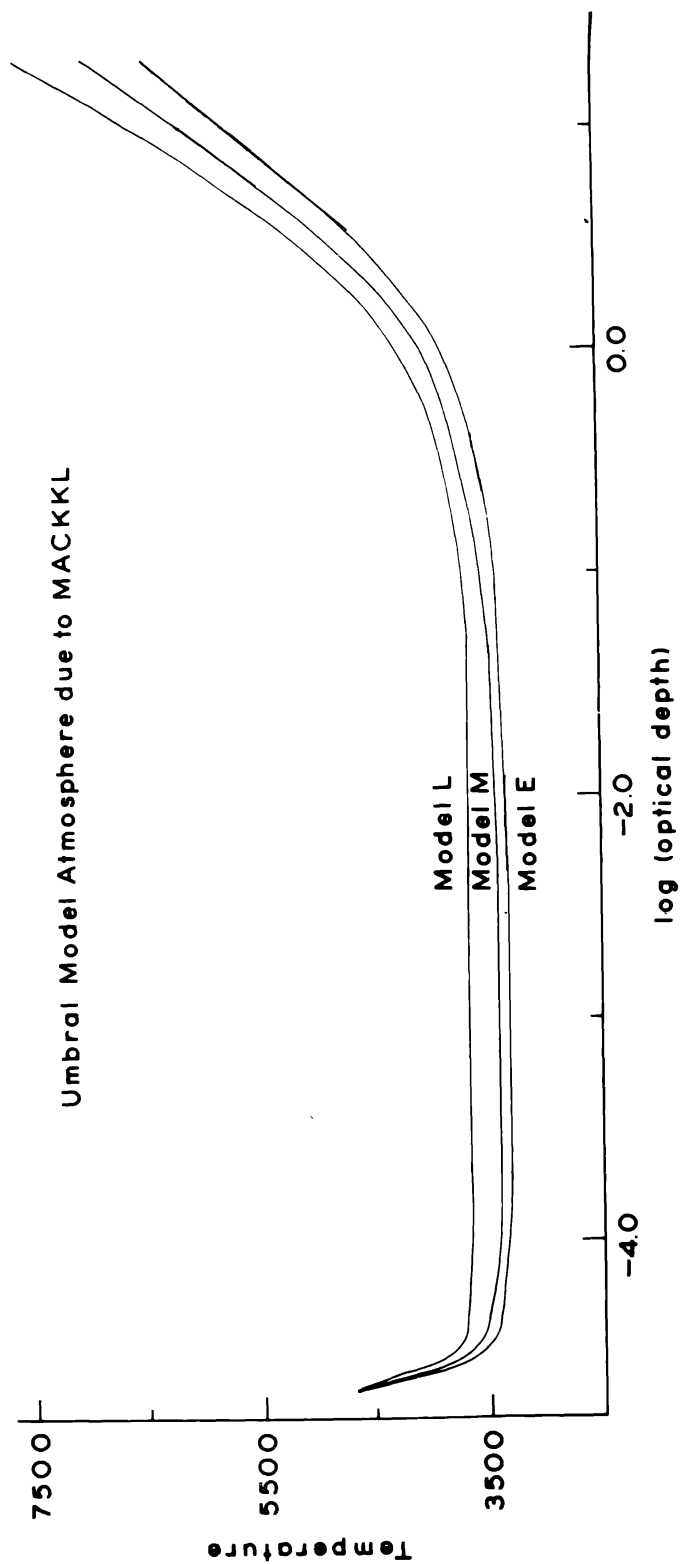


Figure 5a. Same as in figure 1a but for the umbral models due to Maltby *et al* (1986), abbreviated as MACKKL. These models consider the effect of activity cycle also. The letters L, M and E stand for late, middle, and early phases of the solar cycle

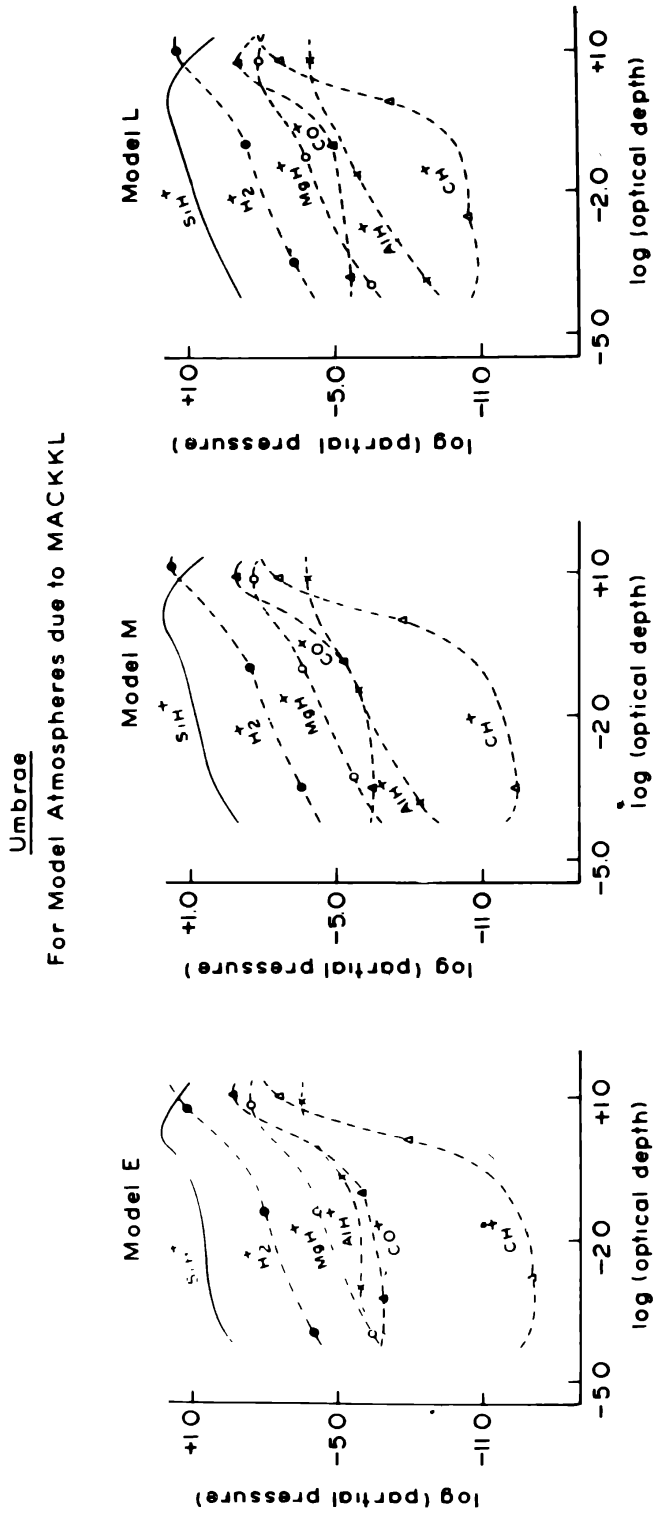


Figure 5b. Same as in figure 1b but for the MACKKL (Maltby *et al.* 1986) models.

Table 3. Logarithms of molecular partial pressures in Stenflo's facular model

Log Tau	AlH ⁺	C ₂ ⁺	CH ⁺	CN ⁺	CO ⁺	H ₂	HCl ⁺	HF ⁺	MgH ⁺	N ₂
-4.00E+0	-9.229E+0	-1.097E+1	-6.875E+0	-1.039E+1	-4.011E+0	-2.439E+0	-1.167E+1	-1.412E+1	-7.488E+0	-1.260E+1
-3.50E+0	-8.577E+0	-1.084E+1	-6.693E+0	-1.017E+1	-3.626E+0	-2.180E+0	-1.152E+1	-1.401E+1	-6.803E+0	-1.242E+1
-3.00E+0	-7.989E+0	-1.051E+1	-6.342E+0	-9.809E+0	-3.248E+0	-1.802E+0	-1.116E+1	-1.366E+1	-6.212E+0	-1.206E+1
-2.50E+0	-7.431E+0	-1.016E+1	-5.989E+0	-9.469E+0	-2.957E+0	-1.453E+0	-1.078E+1	-1.327E+1	-5.666E+0	-1.169E+1
-2.10E+0	-6.990E+0	-9.863E+0	-5.685E+0	-9.179E+0	-2.718E+0	-1.155E+0	-1.046E+1	-1.294E+1	-5.240E+0	-1.137E+1
-2.00E+0	-6.884E+0	-9.770E+0	-5.594E+0	-9.094E+0	-2.653E+0	-1.071E+0	-1.036E+1	-1.283E+1	-5.137E+0	-1.128E+1
-1.52E+0	-6.357E+0	-9.258E+0	-5.118E+0	-8.657E+0	-2.354E+0	-6.576E-1	-9.848E+0	-1.229E+1	-4.642E+0	-1.079E+1
-1.22E+0	-6.026E+0	-8.792E+0	-4.709E+0	-8.291E+0	-2.136E+0	-3.332E-1	-9.414E+0	-1.182E+1	-4.373E+0	-1.039E+1
-1.00E+0	-5.866E+0	-8.457E+0	-4.424E+0	-8.045E+0	-2.023E+0	-1.226E-1	-9.105E+0	-1.148E+1	-4.211E+0	-1.010E+1
-5.09E-1	-5.437E+0	-7.585E+0	-3.683E+0	-7.428E+0	-1.820E+0	4.116E-1	-8.273E+0	-1.054E+1	-3.866E+0	-9.353E+0
-3.01E-0	-5.300E+0	-7.284E+0	-3.434E+0	-7.234E+0	-1.815E+0	5.766E-1	-7.975E+0	-1.020E+1	-3.768E+0	-9.093E+0
-1.02E-1	-5.198E+0	-7.017E+0	-3.225E+0	-7.094E+0	-1.899E+0	6.883E-1	-7.707E+0	-9.875E+0	-3.711E+0	-8.868E+0
0.00E+0	-5.163E+0	-6.896E+0	-3.136E+0	-7.044E+0	-1.979E+0	7.235E-1	-7.582E+0	-9.718E+0	-3.702E+0	-8.769E+0
9.69E-1	-5.141E+0	-6.780E+0	-3.055E+0	-7.007E+0	-2.084E+0	7.472E-1	-7.460E+0	-9.561E+0	-3.708E+0	-8.675E+0
1.99E-1	-5.129E+0	-6.677E+0	-2.988E+0	-6.986E+0	-2.214E+0	7.559E-1	-7.348E+0	-9.411E+0	-3.726E+0	-8.593E+0
3.01E-1	-5.149E+0	-6.606E+0	-2.952E+0	-7.000E+0	-2.384E+0	7.333E-1	-7.264E+0	-9.285E+0	-3.777E+0	-8.539E+0
4.00E-1	-5.132E+0	-6.503E+0	-2.882E+0	-6.979E+0	-2.520E+0	7.491E-1	-7.143E+0	-9.121E+0	-3.789E+0	-8.448E+0
5.00E-1	-5.141E+0	-6.439E+0	-2.845E+0	-6.991E+0	-2.681E+0	7.374E-1	-7.056E+0	-8.991E+0	-3.826E+0	-8.389E+0
6.00E-1	-5.148E+0	-6.391E+0	-2.818E+0	-7.004E+0	-2.820E+0	7.282E-1	-6.984E+0	-8.881E+0	-3.856E+0	-8.340E+0
6.99E-1	-5.154E+0	-6.356E+0	-2.798E+0	-7.020E+0	-2.944E+0	7.199E-1	-6.923E+0	-8.784E+0	-3.883E+0	-8.298E+0

Note : E ± n = 10ⁿ

Table 3. Continued

Log Tau	NH ⁺	NO ⁺	O ₂ ⁺	OH ⁺	PH ⁺	PO ⁺	SH ⁺	SiH ⁺	SiO ⁺	SO ⁺
-4.00E+0	-1.002E+1	-9.603E+0	-1.245E+1	-7.953E+0	-8.734E+0	-1.098E+1	-8.387E+0	-2.705E+0	-9.796E+0	-1.030E+1
-3.50E+0	-9.941E+0	-9.380E+0	-1.235E+1	-7.804E+0	-8.456E+0	-1.065E+1	-8.165E+0	-1.868E+0	-9.072E+0	-1.003E+1
-3.00E+0	-9.595E+0	-9.016E+0	-1.201E+1	-7.452E+0	-8.073E+0	-1.027E+1	-7.793E+0	-1.273E+0	-8.505E+0	-9.656E+0
-2.50E+0	-9.201E+0	-8.668E+0	-1.164E+1	-7.086E+0	-7.703E+0	-9.918E+0	-7.425E+0	-8.111E-1	-8.025E+0	-9.310E+0
-2.10E+0	-8.855E+0	-8.371E+0	-1.132E+1	-6.768E+0	-7.387E+0	-9.625E+0	-7.109E+0	-4.662E-1	-7.659E+0	-9.017E+0
-2.00E+0	-8.750E+0	-8.284E+0	-1.122E+1	-6.673E+0	-7.296E+0	-9.543E+0	-7.018E+0	-3.892E-1	-7.570E+0	-8.933E+0
-1.52E+0	-8.182E+0	-7.845E+0	-1.068E+1	-6.171E+0	-6.834E+0	-9.129E+0	-6.550E+0	-6.801E-2	-7.157E+0	-8.510E+0
-1.22E+0	-7.683E+0	-7.483E+0	-1.020E+1	-5.738E+0	-6.461E+0	-8.802E+0	-6.166E+0	-4.979E-2	-6.928E+0	-8.170E+0
-1.00E+0	-7.317E+0	-7.240E+0	-9.850E+0	-5.431E+0	-6.209E+0	-8.592E+0	-5.902E+0	-7.360E-2	-6.804E+0	-7.946E+0
-5.09E-1	-6.310E+0	-6.623E+0	-8.911E+0	-4.614E+0	-5.573E+0	-8.093E+0	-5.213E+0	-1.205E-2	-6.595E+0	-7.390E+0
-3.01E-1	-5.935E+0	-6.426E+0	-8.575E+0	-4.327E+0	-5.376E+0	-7.959E+0	-4.982E+0	-1.139E-1	-6.569E+0	-7.223E+0
-1.02E-1	-5.575E+0	-6.281E+0	-8.263E+0	-4.070E+0	-5.236E+0	-7.895E+0	-4.796E+0	-3.023E-1	-6.606E+0	-7.115E+0
0.00E+0	-5.397E+0	-6.227E+0	-8.115E+0	-3.952E+0	-5.191E+0	-7.894E+0	-4.721E+0	-4.352E-1	-6.652E+0	-7.084E+0
9.69E-2	-5.217E+0	-6.184E+0	-7.968E+0	-3.838E+0	-5.164E+0	-7.914E+0	-4.656E+0	-5.969E-1	-6.719E+0	-7.069E+0
1.99E-1	-5.044E+0	-6.157E+0	-7.829E+0	-3.732E+0	-5.157E+0	-7.957E+0	-4.606E+0	-7.802E-1	-6.802E+0	-7.074E+0
3.01E-1	-4.895E+0	-6.162E+0	-7.717E+0	-3.654E+0	-5.191E+0	-8.043E+0	-4.591E+0	-1.004E+0	-6.921E+0	-7.115E+0
4.00E-1	-4.708E+0	-6.129E+0	-7.569E+0	-3.537E+0	-5.196E+0	-8.099E+0	-4.542E+0	-1.189E+0	-7.002E+0	-7.124E+0
5.00E-1	-4.558E+0	-6.127E+0	-7.455E+0	-3.452E+0	-5.235E+0	-8.186E+0	-4.529E+0	-1.391E+0	-7.105E+0	-7.166E+0
6.00E-1	-4.432E+0	-6.126E+0	-7.359E+0	-3.380E+0	-5.273E+0	-8.263E+0	-4.522E+0	-1.559E+0	-7.189E+0	-7.206E+0
6.99E-1	-4.322E+0	-6.126E+0	-7.277E+0	-3.316E+0	-5.311E+0	-8.334E+0	-4.520E+0	-1.705E+0	-7.263E+0	-7.245E+0

Table 4. Logarithms of molecular partial pressures in Shine & Linsky's facular model

Log Tau	AlH ⁺	C ₂	CH ⁺	CN ⁺	CO ⁺	H ₂	HCl ⁺	HF ⁺	MgH ⁺	N ₂ ⁺
-4.74E+0	-9.083E+0	-1.206E+1	-7.734E+0	-1.104E+1	-3.976E+0	-2.892E+0	-1.262E+1	-1.524E+1	-6.598E+0	-1.342E+1
-4.17E+0	-8.887E+0	-1.190E+1	-7.569E+0	-1.088E+1	-3.842E+0	-2.727E+0	-1.244E+1	-1.506E+1	-6.406E+0	-1.325E+1
-3.85E+0	-8.696E+0	-1.175E+1	-7.421E+0	-1.070E+1	-3.742E+0	-2.590E+0	-1.228E+1	-1.489E+1	-6.223E+0	-1.310E+1
-3.60E+0	-8.504E+0	-1.155E+1	-7.241E+0	-1.057E+1	-3.627E+0	-2.434E+0	-1.209E+1	-1.468E+1	-6.043E+0	-1.291E+1
-3.38E+0	-8.321E+0	-1.133E+1	-7.042E+0	-1.039E+1	-3.510E+0	-2.271E+0	-1.188E+1	-1.446E+1	-5.873E+0	-1.271E+1
-3.24E+0	-8.129E+0	-1.114E+1	-6.867E+0	-1.023E+1	-3.397E+0	-2.117E+0	-1.169E+1	-1.426E+1	-5.692E+0	-1.253E+1
-2.98E+0	-7.943E+0	-1.095E+1	-6.688E+0	-1.006E+1	-3.285E+0	-1.963E+0	-1.150E+1	-1.405E+1	-5.517E+0	-1.235E+1
-2.79E+0	-7.753E+0	-1.074E+1	-6.498E+0	-9.892E+0	-3.168E+0	-1.802E+0	-1.130E+1	-1.384E+1	-5.339E+0	-1.216E+1
-2.61E+0	-7.568E+0	-1.052E+1	-6.298E+0	-9.710E+0	-3.049E+0	-1.637E+0	-1.108E+1	-1.361E+1	-5.167E+0	-1.196E+1
-2.43E+0	-7.383E+0	-1.030E+1	-6.096E+0	-9.527E+0	-2.931E+0	-1.471E+0	-1.087E+1	-1.338E+1	-4.996E+0	-1.176E+1
-2.25E+0	-7.194E+0	-1.010E+1	-5.916E+0	-9.362E+0	-2.818E+0	-1.316E+0	-1.068E+1	-1.318E+1	-4.818E+0	-1.158E+1
-2.07E+0	-7.005E+0	-9.900E+0	-5.731E+0	-9.192E+0	-2.703E+0	-1.157E+0	-1.048E+1	-1.297E+1	-4.641E+0	-1.139E+1
-1.89E+0	-6.819E+0	-9.698E+0	-5.545E+0	-9.023E+0	-2.590E+0	-9.994E-1	-1.028E+1	-1.276E+1	-4.467E+0	-1.120E+1
-1.71E+0	-6.628E+0	-9.494E+0	-5.357E+0	-8.851E+0	-2.473E+0	-8.380E-1	-1.008E+1	-1.254E+1	-4.288E+0	-1.101E+1
-1.53E+0	-6.446E+0	-9.275E+0	-5.159E+0	-8.672E+0	-2.359E+0	-6.746E-1	-9.872E+0	-1.232E+1	-4.119E+0	-1.082E+1
-1.35E+0	-6.263E+0	-9.007E+0	-4.922E+0	-8.462E+0	-2.234E+0	-4.878E-1	-9.621E+0	-1.204E+1	-3.953E+0	-1.058E+1
-1.17E+0	-6.083E+0	-8.764E+0	-4.706E+0	-8.270E+0	-2.121E+0	-3.152E-1	-9.391E+0	-1.180E+1	-3.789E+0	-1.037E+1
-9.91E-1	-5.903E+0	-8.490E+0	-4.465E+0	-8.059E+0	-2.007E+0	-1.284E-1	-9.133E+0	-1.151E+1	-3.628E+0	-1.013E+1
-8.07E-1	-5.727E+0	-8.208E+0	-4.219E+0	-7.846E+0	-1.904E+0	5.886E-2	-8.866E+0	-1.122E+1	-3.475E+0	-9.881E+0
-6.18E-1	-5.559E+0	-7.892E+0	-3.946E+0	-7.618E+0	-1.817E+0	2.569E-1	-8.566E+0	-1.088E+1	-3.335E+0	-9.608E+0
-4.17E-1	-5.398E+0	-7.567E+0	-3.670E+0	-7.397E+0	-1.769E+0	4.467E-1	-8.252E+0	-1.053E+1	-3.208E+0	-9.329E+0
-1.94E-1	-5.248E+0	-7.223E+0	-3.385E+0	-7.185E+0	-1.787E+0	6.229E-1	-7.914E+0	-1.013E+1	-3.104E+0	-9.036E+0
9.69E-2	-5.140E+0	-6.826E+0	-3.079E+0	-7.013E+0	-2.017E+0	7.477E-1	-7.510E+0	-9.629E+0	-3.078E+0	-8.710E+0
6.96E-1	-5.492E+0	-6.701E+0	-3.093E+0	-7.357E+0	-3.262E+0	3.815E-1	-7.273E+0	-9.141E+0	-3.626E+0	-8.645E+0

Table 4. Continued

Log Tau	NH ⁺	NO ⁺	O ₂	OH ⁺	PH ⁺	PO ⁺	SH ⁺	SiH ⁺	SiO ⁺	SO ⁺
-4.74E+0	-1.127E+1	-1.023E+1	-1.363E+1	-8.902E+0	-9.337E+0	-1.137E+1	-9.084E+0	-1.706E+0	-9.308E+0	-1.080E+1
-4.17E+0	-1.108E+1	-1.007E+1	-1.346E+1	-8.729E+0	-9.164E+0	-1.121E+1	-8.911E+0	-1.543E+0	-9.136E+0	-1.064E+1
-3.85E+0	-1.091E+1	-9.928E+0	-1.330E+1	-8.572E+0	-9.014E+0	-1.107E+1	-8.759E+0	-1.411E+0	-8.984E+0	-1.050E+1
-3.60E+0	-1.069E+1	-9.762E+0	-1.309E+1	-8.382E+0	-8.839E+0	-1.092E+1	-8.583E+0	-1.294E+0	-8.832E+0	-1.034E+1
-3.38E+0	-1.046E+1	-9.582E+0	-1.286E+1	-8.173E+0	-8.653E+0	-1.075E+1	-8.394E+0	-1.198E+0	-8.690E+0	-1.017E+1
-3.24E+0	-1.025E+1	-9.419E+0	-1.266E+1	-7.988E+0	-8.481E+0	-1.060E+1	-8.221E+0	-1.077E+0	-8.537E+0	-1.001E+1
-2.98E+0	-1.003E+1	-9.254E+0	-1.246E+1	-7.800E+0	-8.309E+0	-1.044E+1	-8.047E+0	-9.665E-1	-8.390E+0	-9.856E+0
-2.79E+0	-9.808E+0	-9.081E+0	-1.224E+1	-7.601E+0	-8.128E+0	-1.028E+1	-7.863E+0	-8.562E-1	-8.241E+0	-9.690E+0
-2.61E+0	-9.569E+0	-8.900E+0	-1.201E+1	-7.390E+0	-7.940E+0	-1.011E+1	-7.672E+0	-7.587E-1	-8.096E+0	-9.518E+0
-2.43E+0	-9.327E+0	-8.718E+0	-1.178E+1	-7.178E+0	-7.750E+0	-9.945E+0	-7.480E+0	-6.623E-1	-7.952E+0	-9.345E+0
-2.25E+0	-9.113E+0	-8.552E+0	-1.157E+1	-6.989E+0	-7.577E+0	-9.789E+0	-7.304E+0	-5.485E-1	-7.803E+0	-9.187E+0
-2.07E+0	-8.892E+0	-8.382E+0	-1.136E+1	-6.794E+0	-7.399E+0	-9.630E+0	-7.123E+0	-4.368E-1	-7.654E+0	-9.024E+0
-1.89E+0	-8.670E+0	-8.212E+0	-1.115E+1	-6.598E+0	-7.222E+0	-9.472E+0	-6.943E+0	-3.305E-1	-7.508E+0	-8.862E+0
-1.71E+0	-8.447E+0	-8.040E+0	-1.093E+1	-6.400E+0	-7.042E+0	-9.311E+0	-6.760E+0	-2.171E-1	-7.357E+0	-8.696E+0
-1.53E+0	-8.209E+0	-7.862E+0	-1.070E+1	-6.192E+0	-6.856E+0	-9.146E+0	-6.571E+0	-1.224E-1	-7.216E+0	-8.527E+0
-1.35E+0	-7.921E+0	-7.654E+0	-1.043E+1	-5.943E+0	-6.641E+0	-8.958E+0	-6.350E+0	-4.887E-2	-7.078E+0	-8.331E+0
-1.17E+0	-7.657E+0	-7.463E+0	-1.017E+1	-5.714E+0	-6.442E+0	-8.785E+0	-6.145E+0	2.758E-2	-6.944E+0	-8.151E+0
-9.91E-1	-7.357E+0	-7.253E+0	-9.887E+0	-5.459E+0	-6.226E+0	-8.599E+0	-5.920E+0	8.411E-2	-6.815E+0	-7.955E+0
-8.07E-1	-7.044E+0	-7.042E+0	-9.589E+0	-5.195E+0	-6.006E+0	-8.415E+0	-5.690E+0	1.210E-1	-6.699E+0	-7.759E+0
-6.18E-1	-6.684E+0	-6.814E+0	-9.251E+0	-4.899E+0	-5.771E+0	-8.226E+0	-5.438E+0	1.113E-1	-6.607E+0	-7.552E+0
-4.17E-1	-6.298E+0	-6.592E+0	-8.896E+0	-4.593E+0	-5.542E+0	-8.055E+0	-5.185E+0	5.383E-2	-6.544E+0	-7.356E+0
-1.94E-1	-5.866E+0	-6.377E+0	-8.510E+0	-4.267E+0	-5.325E+0	-7.915E+0	-4.929E+0	-8.980E-2	-6.530E+0	-7.176E+0
9.69E-2	-5.297E+0	-6.194E+0	-8.030E+0	-3.884E+0	-5.164E+0	-7.890E+0	-4.676E+0	-5.012E-1	-6.672E+0	-7.064E+0
6.96E-1	-4.681E+0	-6.466E+0	-7.631E+0	-3.667E+0	-5.643E+0	-8.661E+0	-4.859E+0	-2.019E+0	-7.590E+0	-7.578E+0

Table 5. Logarithms of molecular partial pressures in Holweger & Müller's model

Log Tau	AlH ⁺	C ₂	CH ⁺	CN ⁺	CO ⁺	H ₂	HCl ⁺	HF ⁺	MgH ⁺	N ₂
-6.54E+0	-1.325E+1	-1.559E+1	-1.111E+1	-1.420E+1	-6.300E+0	-5.967E+0	-1.628E+1	-1.908E+1	-1.059E+1	-1.693E+1
-6.28E+0	-1.246E+1	-1.517E+1	-1.067E+1	-1.377E+1	-5.921E+0	-5.515E+0	-1.580E+1	-1.859E+1	-9.801E+0	-1.646E+1
-5.87E+0	-1.162E+1	-1.464E+1	-1.014E+1	-1.326E+1	-5.514E+0	-4.981E+0	-1.520E+1	-1.797E+1	-8.988E+0	-1.588E+1
-5.59E+0	-1.115E+1	-1.423E+1	-9.740E+0	-1.289E+1	-5.253E+0	-4.626E+0	-1.477E+1	-1.752E+1	-8.544E+0	-1.546E+1
-5.33E+0	-1.077E+1	-1.389E+1	-9.417E+0	-1.259E+1	-5.040E+0	-4.336E+0	-1.442E+1	-1.715E+1	-8.180E+0	-1.513E+1
-5.00E+0	-1.032E+1	-1.342E+1	-8.983E+0	-1.219E+1	-4.769E+0	-3.965E+0	-1.396E+1	-1.666E+1	-7.761E+0	-1.469E+1
-4.75E+0	-9.998E+0	-1.311E+1	-8.693E+0	-1.192E+1	-4.581E+0	-3.709E+0	-1.364E+1	-1.632E+1	-7.453E+0	-1.439E+1
-4.49E+0	-9.681E+0	-1.277E+1	-8.385E+0	-1.163E+1	-4.389E+0	-3.446E+0	-1.331E+1	-1.598E+1	-7.156E+0	-1.408E+1
-4.13E+0	-9.269E+0	-1.237E+1	-8.011E+0	-1.129E+1	-4.148E+0	-3.118E+0	-1.291E+1	-1.555E+1	-6.767E+0	-1.370E+1
-3.86E+0	-8.960E+0	-1.205E+1	-7.713E+0	-1.102E+1	-3.961E+0	-2.862E+0	-1.259E+1	-1.521E+1	-6.477E+0	-1.340E+1
-3.58E+0	-8.652E+0	-1.174E+1	-7.424E+0	-1.075E+1	-3.779E+0	-2.612E+0	-1.228E+1	-1.488E+1	-6.187E+0	-1.310E+1
-3.20E+0	-8.242E+0	-1.135E+1	-7.063E+0	-1.041E+1	-3.543E+0	-2.291E+0	-1.189E+1	-1.447E+1	-5.799E+0	-1.273E+1
-2.91E+0	-7.932E+0	-1.104E+1	-6.775E+0	-1.015E+1	-3.358E+0	-2.040E+0	-1.158E+1	-1.414E+1	-5.506E+0	-1.244E+1
-2.62E+0	-7.620E+0	-1.077E+1	-6.516E+0	-9.908E+0	-3.185E+0	-1.804E+0	-1.130E+1	-1.385E+1	-5.210E+0	-1.217E+1
-2.23E+0	-7.212E+0	-1.038E+1	-6.146E+0	-9.567E+0	-2.946E+0	-1.479E+0	-1.091E+1	-1.342E+1	-4.825E+0	-1.179E+1
-1.94E+0	-6.906E+0	-1.003E+1	-5.829E+0	-9.278E+0	-2.752E+0	-1.213E+0	-1.057E+1	-1.307E+1	-4.539E+0	-1.147E+1
-1.65E+0	-6.607E+0	-9.648E+0	-5.488E+0	-8.971E+0	-2.558E+0	-9.382E-1	-1.021E+1	-1.268E+1	-4.264E+0	-1.114E+1
-1.26E+0	-6.220E+0	-9.056E+0	-4.971E+0	-8.511E+0	-2.288E+0	-5.361E-1	-9.667E+0	-1.209E+1	-3.914E+0	-1.063E+1
-9.61E-1	-5.936E+0	-8.568E+0	-4.547E+0	-8.143E+0	-2.098E+0	-2.159E-1	-9.215E+0	-1.159E+1	-3.665E+0	-1.021E+1
-5.71E-1	-5.581E+0	-7.912E+0	-3.978E+0	-7.661E+0	-1.894E+0	-2.062E-1	-8.591E+0	-1.090E+1	-3.364E+0	-9.641E+0
-3.71E-1	-5.444E+0	-7.517E+0	-3.649E+0	-7.410E+0	-1.889E+0	-4.156E-1	-8.207E+0	-1.046E+1	-3.275E+0	-9.305E+0
-1.33E-1	-5.321E+0	-7.131E+0	-3.337E+0	-7.200E+0	-1.992E+0	-5.841E-1	-7.820E+0	-9.992E+0	-3.215E+0	-8.979E+0
1.90E-2	-5.273E+0	-6.932E+0	-3.184E+0	-7.117E+0	-2.121E+0	-6.448E-1	-7.613E+0	-9.732E+0	-3.211E+0	-8.813E+0
1.91E-1	-5.230E+0	-6.771E+0	-3.062E+0	-7.062E+0	-2.260E+0	-6.835E-1	-7.442E+0	-9.511E+0	-3.207E+0	-8.680E+0
3.12E-1	-5.215E+0	-6.669E+0	-2.989E+0	-7.047E+0	-2.404E+0	-6.895E-1	-7.326E+0	-9.354E+0	-3.227E+0	-8.596E+0
5.97E-1	-5.204E+0	-6.471E+0	-2.846E+0	-7.044E+0	-2.783E+0	-6.872E-1	-7.075E+0	-8.995E+0	-3.300E+0	-8.417E+0
7.61E-1	-5.196E+0	-6.407E+0	-2.796E+0	-7.050E+0	-2.933E+0	-6.883E-1	-6.981E+0	-8.856E+0	-3.325E+0	-8.349E+0
8.77E-1	-5.182E+0	-6.372E+0	-2.767E+0	-7.049E+0	-3.001E+0	-6.940E-1	-6.932E+0	-8.783E+0	-3.327E+0	-8.311E+0
9.67E-1	-5.164E+0	-6.346E+0	-2.744E+0	-7.038E+0	-3.023E+0	-7.065E-1	-6.899E+0	-8.740E+0	-3.317E+0	-8.283E+0

Table 5. Continued

Log Tau	NH ⁺	NO ⁺	O ₂ ⁺	OH ⁺	PH ⁺	PO ⁺	SH ⁺	SiH ⁺	SiO ⁺	SO ⁺
-6.54E+0	-1.526E+1	-1.345E+1	-1.740E+1	-1.247E+1	-1.273E+1	-1.444E+1	-1.248E+1	-4.666E+0	-1.277E+1	-1.391E+1
-6.28E+0	-1.476E+1	-1.300E+1	-1.695E+1	-1.201E+1	-1.225E+1	-1.399E+1	-1.201E+1	-3.947E+0	-1.204E+1	-1.346E+1
-5.87E+0	-1.413E+1	-1.247E+1	-1.637E+1	-1.144E+1	-1.168E+1	-1.347E+1	-1.144E+1	-3.274E+0	-1.133E+1	-1.294E+1
-5.59E+0	-1.366E+1	-1.209E+1	-1.592E+1	-1.102E+1	-1.128E+1	-1.312E+1	-1.105E+1	-2.964E+0	-1.096E+1	-1.258E+1
-5.33E+0	-1.327E+1	-1.179E+1	-1.556E+1	-1.067E+1	-1.096E+1	-1.283E+1	-1.072E+1	-2.710E+0	-1.065E+1	-1.229E+1
-5.00E+0	-1.275E+1	-1.139E+1	-1.506E+1	-1.022E+1	-1.054E+1	-1.245E+1	-1.030E+1	-2.446E+0	-1.030E+1	-1.190E+1
-4.75E+0	-1.241E+1	-1.112E+1	-1.473E+1	-9.910E+0	-1.026E+1	-1.220E+1	-1.001E+1	-2.238E+0	-1.004E+1	-1.164E+1
-4.49E+0	-1.204E+1	-1.083E+1	-1.438E+1	-9.585E+0	-9.959E+0	-1.193E+1	-9.713E+0	-2.052E+0	-9.787E+0	-1.137E+1
-4.13E+0	-1.159E+1	-1.048E+1	-1.395E+1	-9.190E+0	-9.593E+0	-1.160E+1	-9.343E+0	-1.794E+0	-9.460E+0	-1.104E+1
-3.86E+0	-1.124E+1	-1.021E+1	-1.361E+1	-8.877E+0	-9.305E+0	-1.134E+1	-9.053E+0	-1.609E+0	-9.216E+0	-1.077E+1
-3.58E+0	-1.090E+1	-9.941E+0	-1.328E+1	-8.571E+0	-9.024E+0	-1.109E+1	-8.769E+0	-1.423E+0	-8.973E+0	-1.052E+1
-3.20E+0	-1.047E+1	-9.603E+0	-1.288E+1	-8.190E+0	-8.668E+0	-1.077E+1	-8.411E+0	-1.161E+0	-8.649E+0	-1.019E+1
-2.91E+0	-1.012E+1	-9.336E+0	-1.255E+1	-7.887E+0	-8.388E+0	-1.052E+1	-8.128E+0	-9.683E-1	-8.403E+0	-9.936E+0
-2.62E+0	-9.817E+0	-9.091E+0	-1.226E+1	-7.613E+0	-8.129E+0	-1.029E+1	-7.867E+0	-7.636E-1	-8.158E+0	-9.699E+0
-2.23E+0	-9.377E+0	-8.746E+0	-1.184E+1	-7.223E+0	-7.767E+0	-9.961E+0	-7.501E+0	-5.096E-1	-7.837E+0	-9.367E+0
-1.94E+0	-9.001E+0	-8.458E+0	-1.148E+1	-6.891E+0	-7.468E+0	-9.693E+0	-7.197E+0	-3.365E-1	-7.596E+0	-9.092E+0
-1.65E+0	-8.594E+0	-8.155E+0	-1.108E+1	-6.534E+0	-7.153E+0	-9.414E+0	-6.876E+0	-1.886E-1	-7.363E+0	-8.804E+0
-1.26E+0	-7.966E+0	-7.702E+0	-1.047E+1	-5.990E+0	-6.685E+0	-9.004E+0	-6.396E+0	-3.879E-2	-7.067E+0	-8.379E+0
-9.61E-1	-7.436E+0	-7.338E+0	-9.964E+0	-5.540E+0	-6.308E+0	-8.684E+0	-6.004E+0	2.612E-2	-6.867E+0	-8.040E+0
-5.71E-1	-6.695E+0	-6.858E+0	-9.267E+0	-4.926E+0	-5.810E+0	-8.277E+0	-5.475E+0	3.859E-2	-6.655E+0	-7.600E+0
-3.71E-1	-6.309E+0	-6.604E+0	-8.827E+0	-4.553E+0	-5.553E+0	-8.101E+0	-5.178E+0	-1.290E-1	-6.652E+0	-7.384E+0
-1.33E-1	-5.694E+0	-6.387E+0	-8.379E+0	-4.183E+0	-5.347E+0	-8.001E+0	-4.907E+0	-4.061E-1	-6.718E+0	-7.220E+0
1.90E-2	-5.400E+0	-6.297E+0	-8.133E+0	-3.987E+0	-5.278E+0	-8.003E+0	-4.783E+0	-6.317E-1	-6.802E+0	-7.171E+0
1.91E-1	-5.149E+0	-6.233E+0	-7.928E+0	-3.824E+0	-5.240E+0	-8.030E+0	-4.691E+0	-8.395E-1	-6.881E+0	-7.148E+0
3.12E-1	-4.968E+0	-6.208E+0	-7.784E+0	-3.715E+0	-5.243E+0	-8.086E+0	-4.645E+0	-1.034E+0	-6.969E+0	-7.160E+0
5.97E-1	-4.556E+0	-6.173E+0	-7.465E+0	-3.471E+0	-5.305E+0	-8.271E+0	-4.578E+0	-1.516E+0	-7.197E+0	-7.233E+0
7.61E-1	-4.399E+0	-6.161E+0	-7.343E+0	-3.375E+0	-5.338E+0	-8.348E+0	-4.559E+0	-1.693E+0	-7.279E+0	-7.269E+0
8.77E-1	-4.318E+0	-6.150E+0	-7.279E+0	-3.324E+0	-5.347E+0	-8.379E+0	-4.545E+0	-1.769E+0	-7.309E+0	-7.281E+0
9.67E-1	-4.271E+0	-6.136E+0	-7.240E+0	-3.290E+0	-5.340E+0	-8.382E+0	-4.528E+0	-1.793E+0	-7.311E+0	-7.276E+0

Table 6. Logarithms of molecular partial pressures in Maltby *et al.*'s photospheric model

Log Tau	AlH ⁺	C ₂ ⁺	CH ⁺	CN ⁺	CO ⁺	H ₂ ⁺	HCl ⁺	HF ⁺	MgH ⁺	N ₂ ⁺
-4.78E+0	-1.174E+1	-1.247E+1	-8.269E+0	-1.200E+1	-6.401E+0	-3.852E+0	-1.256E+1	-1.479E+1	-9.552E+0	-1.361E+1
-4.32E+0	-1.026E+1	-1.152E+1	-7.448E+0	-1.097E+1	-4.667E+0	-3.016E+0	-1.219E+1	-1.462E+1	-7.922E+0	-1.313E+1
-3.75E+0	-8.878E+0	-1.199E+1	-7.657E+0	-1.096E+1	-3.924E+0	-2.810E+0	-1.253E+1	-1.514E+1	-6.399E+0	-1.334E+1
-3.24E+0	-8.257E+0	-1.179E+1	-7.385E+0	-1.069E+1	-3.686E+0	-2.469E+0	-1.219E+1	-1.480E+1	-5.790E+0	-1.300E+1
-2.70E+0	-7.690E+0	-1.106E+1	-6.740E+0	-1.010E+1	-3.291E+0	-1.947E+0	-1.152E+1	-1.409E+1	-5.263E+0	-1.237E+1
-2.52E+0	-7.504E+0	-1.083E+1	-6.535E+0	-9.917E+0	-3.167E+0	-1.779E+0	-1.131E+1	-1.386E+1	-5.091E+0	-1.216E+1
-2.34E+0	-7.321E+0	-1.060E+1	-6.333E+0	-9.733E+0	-3.044E+0	-1.614E+0	-1.110E+1	-1.363E+1	-4.921E+0	-1.196E+1
-2.00E+0	-6.961E+0	-1.014E+1	-5.917E+0	-9.356E+0	-2.797E+0	-1.277E+0	-1.066E+1	-1.317E+1	-4.588E+0	-1.156E+1
-1.66E+0	-6.611E+0	-9.695E+0	-5.522E+0	-8.998E+0	-2.565E+0	-9.553E-1	-1.024E+1	-1.272E+1	-4.264E+0	-1.116E+1
-1.33E+0	-6.272E+0	-9.277E+0	-5.147E+0	-8.659E+0	-2.347E+0	-6.483E-1	-9.849E+0	-1.230E+1	-3.950E+0	-1.079E+1
-1.16E+0	-6.111E+0	-9.044E+0	-4.943E+0	-8.477E+0	-2.238E+0	-4.879E-1	-9.634E+0	-1.206E+1	-3.804E+0	-1.059E+1
-1.00E+0	-5.9957E+0	-8.780E+0	-4.714E+0	-8.277E+0	-2.127E+0	-3.151E-1	-9.394E+0	-1.180E+1	-3.667E+0	-1.037E+1
-8.48E-1	-5.812E+0	-8.475E+0	-4.454E+0	-8.053E+0	-2.020E+0	-1.252E-1	-9.117E+0	-1.149E+1	-3.544E+0	-1.011E+1
-6.95E-1	-5.675E+0	-8.169E+0	-4.193E+0	-7.833E+0	-1.931E+0	6.276E-2	-8.833E+0	-1.118E+1	-3.432E+0	-9.856E+0
-5.42E-1	-5.548E+0	-7.858E+0	-3.929E+0	-7.617E+0	-1.868E+0	2.467E-1	-8.538E+0	-1.084E+1	-3.335E+0	-9.591E+0
-3.79E-1	-5.432E+0	-7.553E+0	-3.672E+0	-7.417E+0	-1.848E+0	4.157E-1	-8.242E+0	-1.050E+1	-3.253E+0	-9.330E+0
-2.83E-1	-5.376E+0	-7.350E+0	-3.507E+0	-7.301E+0	-1.884E+0	5.091E-1	-8.041E+0	-1.026E+1	-3.228E+0	-9.159E+0
-1.71E-1	-5.323E+0	-7.174E+0	-3.367E+0	-7.210E+0	-1.944E+0	5.806E-1	-7.864E+0	-1.005E+1	-3.206E+0	-9.011E+0
-8.95E-2	-5.293E+0	-7.059E+0	-3.278E+0	-7.159E+0	-2.008E+0	6.185E-1	-7.747E+0	-9.905E+0	-3.198E+0	-8.917E+0
-2.61E-4	-5.265E+0	-6.948E+0	-3.193E+0	-7.116E+0	-2.087E+0	6.493E-1	-7.631E+0	-9.759E+0	-3.196E+0	-8.825E+0
9.80E-2	-5.241E+0	-6.843E+0	-3.115E+0	-7.082E+0	-2.181E-1	6.719E-1	-7.520E+0	-9.615E+0	-3.199E+0	-8.739E+0
2.07E-1	-5.226E+0	-6.734E+0	-3.035E+0	-7.057E+0	-2.313E+0	6.852E-1	-7.400E+0	-9.454E+0	-3.216E+0	-8.650E+0
3.31E-1	-5.214E+0	-6.630E+0	-2.961E+0	-7.042E+0	-2.465E+0	6.914E-1	-7.280E+0	-9.290E+0	-3.240E+0	-8.563E+0
4.69E-1	-5.205E+0	-6.541E+0	-2.896E+0	-7.036E+0	-2.618E+0	6.943E-1	-7.171E+0	-9.137E+0	-3.266E+0	-8.484E+0
6.15E-1	-5.194E+0	-6.465E+0	-2.838E+0	-7.034E+0	-2.763E+0	6.978E-1	-7.070E+0	-8.993E+0	-3.287E+0	-8.411E+0
7.67E-1	-5.185E+0	-6.401E+0	-2.788E+0	-7.037E+0	-2.907E+0	7.002E-1	-6.978E+0	-8.856E+0	-3.310E+0	-8.342E+0
9.22E-1	-5.175E+0	-6.348E+0	-2.744E+0	-7.045E+0	-3.045E+0	7.034E-1	-6.893E+0	-8.727E+0	-3.331E+0	-8.279E+0
1.08E+0	-5.165E+0	-6.306E+0	-2.706E+0	-7.057E+0	-3.178E+0	7.065E-1	-6.817E+0	-8.606E+0	-3.351E+0	-8.221E+0
1.23E+0	-5.153E+0	-6.275E+0	-2.676E+0	-7.068E+0	-3.288E+0	7.117E-1	-6.755E+0	-8.503E+0	-3.365E+0	-8.172E+0
1.37E+0	-5.139E+0	-6.248E+0	-2.647E+0	-7.077E+0	-3.384E+0	7.195E-1	-6.700E+0	-8.408E+0	-3.373E+0	-8.127E+0

Table 6. Continued

Log Tau	NH ⁺	NO ⁺	O ₂ ⁺	OH ⁺	PH ⁺	PO ⁺	SH ⁺	SiH ⁺	SiO ⁺	SO ⁺
-4.78E+0	-1.056E+1	-1.088E+1	-1.316E+1	-8.868E+0	-1.101E+1	-1.353E+1	-1.024E+1	-6.253E+0	-1.282E+1	-1.241E+1
-4.32E+0	-1.050E+1	-1.016E+1	-1.295E+1	-8.477E+0	-9.466E+0	-1.174E+1	-9.010E+0	-3.828E+0	-1.086E+1	-1.095E+1
-3.75E+0	-1.117E+1	-1.016E+1	-1.355E+1	-8.817E+0	-9.247E+0	-1.129E+1	-8.995E+0	-1.554E+0	-9.153E+0	-1.072E+1
-3.24E+0	-1.083E+1	-9.850E+0	-1.328E+1	-8.510E+0	-8.904E+0	-1.098E+1	-8.654E+0	-1.043E+0	-8.675E+0	-1.041E+1
-2.70E+0	-1.008E+1	-9.272E+0	-1.254E+1	-7.840E+0	-8.308E+0	-1.044E+1	-8.050E+0	-7.384E-1	-8.219E+0	-9.864E+0
-2.52E+0	-9.836E+0	-9.087E+0	-1.230E+1	-7.626E+0	-8.116E+0	-1.027E+1	-7.856E+0	-6.387E-1	-8.072E+0	-9.689E+0
-2.34E+0	-9.598E+0	-8.905E+0	-1.207E+1	-7.415E+0	-7.928E+0	-1.010E+1	-7.665E+0	-5.393E-1	-7.926E+0	-9.516E+0
-2.00E+0	-9.106E+0	-8.533E+0	-1.159E+1	-6.982E+0	-7.544E+0	-9.760E+0	-7.275E+0	-3.521E-1	-7.639E+0	-9.162E+0
-1.66E+0	-8.637E+0	-8.180E+0	-1.113E+1	-6.569E+0	-7.177E+0	-9.433E+0	-6.902E+0	-1.697E-1	-7.363E+0	-8.826E+0
-1.33E+0	-8.189E+0	-7.843E+0	-1.070E+1	-6.176E+0	-6.828E+0	-9.123E+0	-6.546E+0	6.109E-3	-7.098E+0	-8.506E+0
-1.16E+0	-7.942E+0	-7.664E+0	-1.046E+1	-5.961E+0	-6.642E+0	-8.960E+0	-6.355E+0	7.447E-2	-6.973E+0	-8.337E+0
-1.00E+0	-7.662E+0	-7.467E+0	-1.018E+1	-5.721E+0	-6.439E+0	-8.784E+0	-6.146E+0	1.190E-1	-6.858E+0	-8.153E+0
-8.48E-1	-7.334E+0	-7.247E+0	-9.868E+0	-5.444E+0	-6.213E+0	-8.594E+0	-5.909E+0	1.279E-1	-6.760E+0	-7.950E+0
-6.95E-1	-6.993E+0	-7.029E+0	-9.544E+0	-5.163E+0	-5.988E+0	-8.410E+0	-5.670E+0	1.085E-1	-6.682E+0	-7.751E+0
-5.42E-1	-6.634E+0	-6.814E+0	-9.210E+0	-4.874E+0	-5.766E+0	-8.238E+0	-5.428E+0	5.039E-2	-6.631E+0	-7.559E+0
-3.79E-1	-6.264E+0	-6.612E+0	-8.873E+0	-4.586E+0	-5.561E+0	-8.093E+0	-5.195E+0	-5.540E-2	-6.612E+0	-7.385E+0
-2.83E-1	-6.000E+0	-6.493E+0	-8.640E+0	-4.393E+0	-5.445E+0	-8.028E+0	-5.050E+0	-1.921E-1	-6.645E+0	-7.291E+0
-1.71E-1	-5.761E+0	-6.399E+0	-8.434E+0	-4.224E+0	-5.356E+0	-7.991E+0	-4.929E+0	-3.330E-1	-6.684E+0	-7.222E+0
-8.95E-2	-5.597E+0	-6.344E+0	-8.295E+0	-4.112E+0	-5.309E+0	-7.982E+0	-4.855E+0	-4.504E-1	-6.725E+0	-7.188E+0
-2.61E-4	-5.432E+0	-6.296E+0	-8.157E+0	-4.003E+0	-5.273E+0	-7.987E+0	-4.788E+0	-5.811E-1	-6.774E+0	-7.164E+0
9.80E-2	-5.268E+0	-6.257E+0	-8.023E+0	-3.898E+0	-5.248E+0	-8.006E+0	-4.729E+0	-7.245E-1	-6.831E+0	-7.151E+0
2.07E-1	-5.083E+0	-6.224E+0	-7.875E+0	-3.785E+0	-5.241E+0	-8.050E+0	-4.675E+0	-9.119E-1	-6.914E+0	-7.153E+0
3.31E-1	-4.895E+0	-6.199E+0	-7.727E+0	-3.671E+0	-5.250E+0	-8.114E+0	-4.630E+0	-1.118E+0	-7.009E+0	-7.169E+0
4.69E-1	-4.719E+0	-6.180E+0	-7.589E+0	-3.566E+0	-5.269E+0	-8.185E+0	-4.596E+0	-1.314E+0	-7.100E+0	-7.193E+0
6.15E-1	-4.555E+0	-6.163E+0	-7.462E+0	-3.466E+0	-5.292E+0	-8.255E+0	-4.569E+0	-1.494E+0	-7.181E+0	-7.220E+0
7.67E-1	-4.401E+0	-6.150E+0	-7.342E+0	-3.372E+0	-5.322E+0	-8.329E+0	-4.549E+0	-1.666E+0	-7.260E+0	-7.253E+0
9.22E-1	-4.257E+0	-6.138E+0	-7.230E+0	-3.282E+0	-5.354E+0	-8.401E+0	-4.534E+0	-1.823E+0	-7.331E+0	-7.288E+0
1.08E+0	-4.124E+0	-6.128E+0	-7.127E+0	-3.198E+0	-5.387E+0	-8.471E+0	-4.524E+0	-1.969E+0	-7.397E+0	-7.325E+0
1.23E+0	-4.012E+0	-6.119E+0	-7.039E+0	-3.126E+0	-5.413E+0	-8.526E+0	-4.515E+0	-2.084E+0	-7.446E+0	-7.355E+0
1.37E+0	-3.911E+0	-6.108E+0	-6.960E+0	-3.058E+0	-5.434E+0	-8.573E+0	-4.505E+0	-2.181E+0	-7.486E+0	

Table 7. Logarithms of molecular partial pressures in Henoux's sunspot model

Log Tau	AlH*	C ₂	CH*	CN*	CO*	H ₂	HCl*	HF*	MgH*	N ₂
-5.00E+0	-9.276E+0	-2.250E+1	-1.380E+1	-1.737E+1	-7.193E+0	-4.126E+0	-1.565E+1	-1.908E+1	-6.751E+0	-1.780E+1
-4.00E+0	-8.176E+0	-2.138E+1	-1.285E+1	-1.650E+1	-6.659E+0	-3.414E+0	-1.470E+1	-1.816E+1	-5.920E+0	-1.690E+1
-3.52E+0	-7.634E+0	-2.080E+1	-1.235E+1	-1.604E+1	-6.362E+0	-3.030E+0	-1.420E+1	-1.768E+1	-5.492E+0	-1.642E+1
-3.22E+0	-7.402E+0	-2.057E+1	-1.218E+1	-1.588E+1	-6.291E+0	-2.925E+0	-1.403E+1	-1.752E+1	-5.359E+0	-1.626E+1
-3.10E+0	-7.275E+0	-2.054E+1	-1.214E+1	-1.586E+1	-6.287E+0	-2.880E+0	-1.397E+1	-1.748E+1	-5.299E+0	-1.622E+1
-3.00E+0	-7.130E+0	-2.032E+1	-1.196E+1	-1.568E+1	-6.169E+0	-2.751E+0	-1.380E+1	-1.731E+1	-5.161E+0	-1.604E+1
-2.52E+0	-6.629E+0	-1.978E+1	-1.148E+1	-1.523E+1	-5.850E+0	-2.340E+0	-1.329E+1	-1.684E+1	-4.720E+0	-1.557E+1
-2.22E+0	-6.330E+0	-1.948E+1	-1.120E+1	-1.497E+1	-5.666E+0	-2.101E+0	-1.299E+1	-1.657E+1	-4.461E+0	-1.529E+1
-2.10E+0	-6.182E+0	-1.923E+1	-1.100E+1	-1.478E+1	-5.536E+0	-1.963E+0	-1.281E+1	-1.639E+0	-4.314E+0	-1.510E+1
-2.00E+0	-6.098E+0	-1.912E+1	-1.091E+1	-1.470E+1	-5.482E+0	-1.898E+0	-1.272E+1	-1.631E+0	-4.243E+0	-1.501E+1
-1.52E+0	-5.563E+0	-1.859E+1	-1.041E+1	-1.424E+1	-5.135E+0	-1.454E+0	-1.218E+1	-1.582E+1	-3.762E+0	-1.451E+1
-1.22E+0	-5.277E+0	-1.811E+1	-1.003E+1	-1.386E+1	-4.890E+0	-1.200E+0	-1.184E+1	-1.548E+1	-3.487E+0	-1.415E+1
-1.10E+0	-5.164E+0	-1.803E+0	-9.954E+1	-1.379E+1	-4.840E+0	-1.124E+0	-1.175E+1	-1.540E+1	-3.400E+0	-1.406E+1
-1.00E+0	-5.062E+0	-1.792E+1	-9.858E+0	-1.370E+1	-4.776E+0	-1.044E+0	-1.165E+1	-1.531E+1	-3.311E+0	-1.397E+1
-5.23E-1	-4.582E+0	-1.736E+1	-9.361E+0	-1.323E+1	-4.430E+0	-6.420E-1	-1.114E+1	-1.484E+1	-2.869E+0	-1.347E+1
-2.22E-1	-4.227E+0	-1.599E+1	-8.445E+0	-1.224E+1	-3.872E+0	-2.271E-1	-1.053E+1	-1.407E+1	-2.442E+0	-1.263E+1
-9.69E-2	-4.093E+0	-1.485E+1	-7.735E+0	-1.146E+1	-3.458E+0	1.024E-2	-1.014E+1	-1.350E+1	-2.215E+0	-1.200E+1
0.00E+0	-3.998E+0	-1.430E+1	-7.383E+0	-1.107E+1	-3.251E+0	1.423E-1	-9.931E+0	-1.322E+1	-2.086E+0	-1.169E+1
3.01E-1	-3.760E+0	-1.121E+1	-5.508E+0	-9.038E+0	-2.167E+0	6.856E-1	-8.961E+0	-1.181E+1	-1.638E+0	-1.018E+1
6.02E-1	-3.578E+0	-8.908E+0	-4.085E+0	-7.608E+0	-1.323E+0	1.135E+0	-8.161E+0	-1.075E+1	-1.369E+0	-9.182E+0
7.78E-1	-3.481E+0	-7.856E+0	-3.407E+0	-6.978E+0	-9.298E-1	1.382E+0	-7.720E+0	-1.020E+1	-1.265E+0	-8.726E+0
9.03E-1	-3.400E+0	-7.467E+0	-3.132E+0	-6.729E+0	-7.693E-1	1.520E+0	-7.504E+0	-9.947E+0	-1.188E+0	-8.518E+0

Table 7. Continued

Log Tau	NH ⁺	NO ⁺	O ₂ ⁺	OH ⁺	PH ⁺	PO ⁺	SH ⁺	SiH ⁺	SiO ⁺	SO ⁺
-5.00E+0	-1.624E+1	-1.321E+1	-1.783E+1	-1.206E+1	-1.152E+1	-1.295E+1	-1.131E+1	-1.694E-1	-9.710E+0	-1.252E+1
-4.00E+0	-1.514E+1	-1.242E+1	-1.679E+1	-1.113E+1	-1.068E+1	-1.222E+1	-1.046E+1	2.136E-1	-9.109E+0	-1.177E+1
-3.52E+0	-1.457E+1	-1.199E+1	-1.625E+1	-1.063E+1	-1.022E+1	-1.182E+1	-1.000E+1	4.314E-1	-8.780E+0	-1.136E+1
-3.22E+0	-1.436E+1	-1.186E+1	-1.606E+1	-1.047E+1	-1.008E+1	-1.171E+1	-9.864E+0	4.581E-1	-8.699E+0	-1.125E+1
-3.10E+0	-1.430E+1	-1.181E+1	-1.598E+1	-1.041E+1	-1.003E+1	-1.166E+1	-9.806E+0	4.642E-1	-8.672E+0	-1.120E+1
-3.00E+0	-1.410E+1	-1.166E+1	-1.580E+1	-1.024E+1	-9.874E+0	-1.153E+1	-9.654E+0	5.461E-1	-8.554E+0	-1.106E+1
-2.52E+0	-1.354E+1	-1.122E+1	-1.524E+1	-9.734E+0	-9.402E+0	-1.110E+1	-9.181E+0	8.078E-1	-8.195E+0	-1.063E+1
-2.22E+0	-1.321E+1	-1.096E+1	-1.492E+1	-9.436E+0	-9.125E+0	-1.085E+1	-8.904E+0	9.567E-1	-7.986E+0	-1.037E+1
-2.10E+0	-1.300E+1	-1.080E+1	-1.472E+1	-9.260E+0	-8.964E+0	-1.070E+1	-8.742E+0	1.049E+0	-7.857E+0	-1.022E+1
-2.00E+0	-1.290E+1	-1.072E+1	-1.463E+1	-9.175E+0	-8.886E+0	-1.064E+1	-8.664E+0	1.086E+0	-7.799E+0	-1.015E+1
-1.52E+0	-1.230E+1	-1.024E+1	-1.402E+1	-8.626E+0	-8.375E+0	-1.016E+1	-8.152E+0	1.374E+0	-7.405E+0	-9.669E+0
-1.22E+0	-1.190E+1	-9.927E+0	-1.365E+1	-8.294E+0	-8.071E+0	-9.888E+0	-7.848E+0	1.538E+0	-7.163E+0	-9.393E+0
-1.10E+0	-1.180E+1	-9.844E+0	-1.354E+1	-8.195E+0	-7.981E+0	-9.801E+0	-7.757E+0	1.579E+0	-7.099E+0	-9.306E+0
-1.00E+0	-1.168E+1	-9.753E+0	-1.342E+1	-8.093E+0	-7.886E+0	-9.713E+0	-7.662E+0	1.628E+0	-7.026E+0	-9.216E+0
-5.23E-1	-1.112E+1	-9.288E+0	-1.285E+1	-7.580E+0	-7.412E+0	-9.267E+0	-7.188E+0	1.892E+0	-6.652E+0	-8.764E+0
-2.22E-1	-1.025E+1	-8.684E+0	-1.220E+1	-6.997E+0	-6.900E+0	-8.865E+0	-6.672E+0	2.158E+0	-6.216E+0	-8.349E+0
-9.69E-2	-9.628E+0	-8.283E+0	-1.179E+1	-6.636E+0	-6.594E+0	-8.657E+0	-6.364E+0	2.264E+0	-5.983E+0	-8.130E+0
0.00E+0	-9.313E+0	-8.074E+0	-1.156E+1	-6.438E+0	-6.426E+0	-8.534E+0	-6.193E+0	2.316E+0	-5.864E+0	-8.000E+0
3.01E-1	-7.764E+0	-7.104E+0	-1.050E+1	-5.524E+0	-5.688E+0	-8.033E+0	-5.439E+0	2.326E+0	-5.474E+0	-7.464E+0
6.02E-1	-6.610E+0	-6.353E+0	-9.473E+0	-4.697E+0	-5.073E+0	-7.536E+0	-4.804E+0	2.263E+0	-5.148E+0	-6.935E+0
7.78E-1	-6.022E+0	-5.949E+0	-8.828E+0	-4.200E+0	-4.736E+0	-7.223E+0	-4.453E+0	2.198E+0	-4.957E+0	-6.603E+0
9.03E-1	-5.754E+0	-5.756E+0	-8.532E+0	-3.963E+0	-4.562E+0	-7.059E+0	-4.272E+0	2.205E+0	-4.848E+0	-6.431E+0

Table 8. Logarithms of molecular partial pressures in Zwaan's sunspot model

Log Tau	AlH ⁺	C ₂	CH ⁺	CN ⁺	CO ⁺	H ₂	HCl ⁺	HF ⁺	MgH ⁺	N ₂
-3.00E+0	-7.600E+0	-2.654E+1	-1.566E+1	-2.001E+1	-8.353E+0	-3.733E+0	-1.557E+1	-2.027E+1	-6.132E+0	-1.943E+1
-2.75E+0	-7.380E+0	-2.633E+1	-1.546E+1	-1.982E+1	-8.202E+0	-3.547E+0	-1.533E+1	-2.006E+1	-5.915E+0	-1.921E+1
-2.50E+0	-7.150E+0	-2.601E+1	-1.519E+1	-1.955E+1	-8.013E+0	-3.345E+0	-1.507E+1	-1.980E+1	-5.681E+0	-1.893E+1
-2.25E+0	-6.900E+0	-2.556E+1	-1.484E+1	-1.920E+1	-7.784E+0	-3.124E+0	-1.477E+1	-1.949E+1	-5.431E+0	-1.858E+1
-2.00E+0	-6.630E+0	-2.489E+1	-1.436E+1	-1.869E+1	-7.475E+0	-2.858E+0	-1.440E+1	-1.906E+1	-5.139E+0	-1.811E+1
-1.75E+0	-6.340E+0	-2.410E+1	-1.381E+1	-1.810E+1	-7.126E+0	-2.570E+0	-1.399E+1	-1.858E+1	-4.830E+0	-1.758E+1
-1.50E+0	-6.020E+0	-2.312E+1	-1.314E+1	-1.737E+1	-6.710E+0	-2.241E+0	-1.352E+1	-1.800E+1	-4.485E+0	-1.695E+1
-1.25E+0	-5.700E+0	-2.205E+1	-1.242E+1	-1.660E+1	-6.273E+0	-1.908E+0	-1.304E+1	-1.739E+1	-4.138E+0	-1.627E+1
-1.00E+0	-5.300E+0	-2.091E+1	-1.165E+1	-1.576E+1	-5.808E+0	-1.559E+0	-1.253E+1	-1.674E+1	-3.779E+0	-1.556E+1
-7.50E-1	-5.050E+0	-1.956E+1	-1.076E+1	-1.479E+1	-5.274E+0	-1.177E+0	-1.196E+1	-1.599E+1	-3.390E+0	-1.474E+1
-2.50E-1	-4.440E+0	-1.657E+1	-8.842E+0	-1.267E+1	-4.137E+0	-4.235E-1	-1.080E+1	-1.440E+1	-2.632E+0	-1.299E+1
0.00E+0	-4.160E+0	-1.454E+1	-7.585E+0	-1.128E+1	-3.412E+0	-1.432E-2	-1.011E+1	-1.341E+1	-2.235E+0	-1.189E+1
2.50E-1	-3.950E+0	-1.144E+1	-5.733E+0	-9.252E+0	-2.352E+0	4.714E-1	-9.199E+0	-1.204E+1	-1.829E+0	-1.041E+1
5.00E-1	-3.840E+0	-8.520E+0	-3.976E+0	-7.510E+0	-1.332E+0	9.414E-1	-8.262E+0	-1.077E+1	-1.616E+0	-9.252E+0
7.50E-1	-3.790E+0	-6.700E+0	-2.746E+0	-6.459E+0	-8.125E-1	1.438E+0	-7.291E+0	-9.590E+0	-1.614E+0	-8.361E+0
1.00E+0	-3.790E+0	-5.772E+0	-2.032E+0	-5.966E+0	-9.716E-1	1.788E+0	-6.469E+0	-8.591E+0	-1.728E+0	-7.670E+0

Table 8. Continued

Log Tau	NH ⁺	NO ⁺	O ₂ ⁺	OH ⁺	PH ⁺	PO ⁺	SH ⁺	SiH ⁺	SiO ⁺	SO ⁺
-3.00E+0	-1.725E+1	-1.368E+1	-1.761E+1	-1.184E+1	-1.122E+1	-1.235E+1	-1.098E+1	-6.599E-1	-1.037E+1	-1.191E+1
-2.75E+0	-1.700E+1	-1.346E+1	-1.732E+1	-1.159E+1	-1.100E+1	-1.212E+1	-1.075E+1	-5.695E-1	-1.022E+1	-1.167E+1
-2.50E+0	-1.668E+1	-1.320E+1	-1.700E+1	-1.131E+1	-1.075E+1	-1.188E+1	-1.050E+1	-4.512E-1	-1.002E+1	-1.142E+1
-2.25E+0	-1.631E+1	-1.290E+1	-1.665E+1	-1.100E+1	-1.048E+1	-1.163E+1	-1.022E+1	-3.044E-1	-9.793E+0	-1.116E+1
-2.00E+0	-1.582E+1	-1.253E+1	-1.623E+1	-1.064E+1	-1.014E+1	-1.135E+1	-9.889E+0	-9.368E-2	-9.483E+0	-1.088E+1
-1.75E+0	-1.527E+1	-1.213E+1	-1.579E+1	-1.024E+1	-9.786E+0	-1.105E+1	-9.536E+0	1.478E-1	-9.135E+0	-1.058E+1
-1.50E+0	-1.462E+1	-1.167E+1	-1.529E+1	-9.795E+0	-9.379E+0	-1.072E+1	-9.136E+0	4.414E-1	-8.722E+0	-1.025E+1
-1.25E+0	-1.393E+1	-1.119E+1	-1.478E+1	-9.336E+0	-8.965E+0	-1.040E+1	-8.730E+0	7.465E-1	-8.291E+0	-9.926E+0
-1.00E+0	-1.320E+1	-1.068E+1	-1.425E+1	-8.857E+0	-8.536E+0	-1.007E+1	-8.306E+0	1.066E+0	-7.841E+0	-9.592E+0
-7.50E-1	-1.237E+1	-1.012E+1	-1.367E+1	-8.329E+0	-8.066E+0	-9.724E+0	-7.841E+0	1.417E+0	-7.342E+0	-9.236E+0
-2.50E-1	-1.061E+1	-8.951E+0	-1.247E+1	-7.250E+0	-7.127E+0	-9.049E+0	-6.901E+0	2.010E+0	-6.420E+0	-8.538E+0
0.00E+0	-9.517E+0	-8.249E+0	-1.175E+1	-6.618E+0	-6.596E+0	-8.693E+0	-6.364E+0	2.188E+0	-6.015E+0	-8.161E+0
2.50E-1	-8.013E+0	-7.325E+0	-1.075E+1	-5.762E+0	-5.916E+0	-8.252E+0	-5.668E+0	2.146E+0	-5.678E+0	-7.685E+0
5.00E-1	-6.629E+0	-6.441E+0	-9.440E+0	-4.753E+0	-5.226E+0	-7.682E+0	-4.950E+0	1.925E+0	-5.346E+0	-7.072E+0
7.50E-1	-5.356E+0	-5.634E+0	-7.996E+0	-3.656E+0	-4.521E+0	-7.044E+0	-4.196E+0	1.530E+0	-5.123E+0	-6.377E+0
1.00E+0	-4.256E+0	-5.154E+0	-6.992E+0	-2.844E+0	-4.045E+0	-6.771E+0	-3.605E+0	8.100E-1	-5.360E+0	-5.994E+0

Table 9. Logarithms of molecular partial pressures in Stellmacher & Wiehr's sunspot model

Log Tau	AlH*	C ₂	CH*	CN*	CO*	H ₂	HCl*	HF*	MgH*	N ₂
-4.00E+0	-8.392E+0	-2.487E+1	-1.506E+1	-1.903E+1	-8.121E+0	-4.231E+0	-1.594E+1	-1.993E+1	-6.719E+0	-1.897E+1
-3.80E+0	-8.183E+0	-2.484E+1	-1.496E+1	-1.898E+1	-8.049E+0	-4.074E+0	-1.576E+1	-1.982E+1	-6.551E+0	-1.887E+1
-3.60E+0	-7.970E+0	-2.476E+1	-1.476E+1	-1.879E+1	-7.910E+0	-3.894E+0	-1.554E+1	-1.962E+1	-6.358E+0	-1.867E+1
-3.40E+0	-7.763E+0	-2.442E+1	-1.456E+1	-1.862E+1	-7.779E+0	-3.721E+0	-1.532E+1	-1.944E+1	-6.171E+0	-1.847E+1
-3.20E+0	-7.554E+0	-2.414E+1	-1.433E+1	-1.839E+1	-7.623E+0	-3.540E+0	-1.509E+1	-1.922E+1	-5.975E+0	-1.824E+1
-3.00E+0	-7.342E+0	-2.377E+1	-1.404E+1	-1.810E+1	-7.437E+0	-3.348E+0	-1.484E+1	-1.897E+1	-5.767E+0	-1.796E+1
-2.80E+0	-7.134E+0	-2.343E+1	-1.377E+1	-1.783E+1	-7.259E+0	-3.162E+0	-1.459E+1	-1.872E+1	-5.565E+0	-1.770E+1
-2.60E+0	-6.927E+0	-2.308E+1	-1.350E+1	-1.756E+1	-7.079E+0	-2.976E+0	-1.435E+1	-1.847E+1	-5.364E+0	-1.743E+1
-2.40E+0	-6.717E+0	-2.266E+1	-1.318E+1	-1.724E+1	-6.877E+0	-2.782E+0	-1.408E+1	-1.819E+1	-5.153E+0	-1.712E+1
-2.20E+0	-6.503E+0	-2.218E+1	-1.283E+1	-1.686E+1	-6.650E+0	-2.577E+0	-1.380E+1	-1.788E+1	-4.932E+0	-1.678E+1
-2.00E+0	-6.281E+0	-2.168E+1	-1.247E+1	-1.649E+1	-6.423E+0	-2.373E+0	-1.352E+1	-1.756E+1	-4.712E+0	-1.644E+1
-1.80E+0	-6.081E+0	-2.121E+1	-1.212E+1	-1.613E+1	-6.201E+0	-2.172E+0	-1.325E+1	-1.726E+1	-4.495E+0	-1.610E+1
-1.60E+0	-5.871E+0	-2.072E+1	-1.177E+1	-1.576E+1	-5.976E+0	-1.970E+0	-1.297E+1	-1.694E+1	-4.278E+0	-1.576E+1
-1.40E+0	-5.662E+0	-2.023E+1	-1.142E+1	-1.539E+1	-5.751E+0	-1.770E+0	-1.269E+1	-1.663E+1	-4.061E+0	-1.542E+1
-1.20E+0	-5.450E+0	-1.969E+1	-1.103E+1	-1.498E+1	-5.506E+0	-1.560E+0	-1.240E+1	-1.629E+1	-3.836E+0	-1.505E+1
-1.00E+0	-5.237E+0	-1.909E+1	-1.061E+1	-1.454E+1	-5.244E+0	-1.342E+0	-1.209E+1	-1.593E+1	-3.605E+0	-1.465E+1
-8.00E-1	-5.028E+0	-1.853E+1	-1.022E+1	-1.412E+1	-4.998E+0	-1.133E+0	-1.180E+1	-1.559E+1	-3.381E+0	-1.428E+1
-6.00E-1	-4.814E+0	-1.784E+1	-9.741E+0	-1.362E+1	-4.705E+0	-9.034E-1	-1.147E+1	-1.518E+1	-3.139E+0	-1.384E+1
-4.00E-1	-4.610E+0	-1.722E+1	-9.311E+0	-1.316E+1	-4.439E+0	-6.885E-1	-1.116E+1	-1.482E+1	-2.912E+0	-1.344E+1
-2.00E-1	-4.398E+0	-1.642E+1	-8.774E+0	-1.258E+1	-4.113E+0	-4.461E-1	-1.080E+1	-1.436E+1	-2.661E+0	-1.294E+1
0.00E+0	-4.187E+0	-1.541E+1	-8.120E+0	-1.187E+1	-3.722E+0	-1.789E-1	-1.039E+1	-1.382E+1	-2.390E+0	-1.235E+1
2.00E-1	-4.985E+0	-1.412E+1	-7.304E+0	-1.098E+1	-3.242E+0	1.161E-1	-9.920E+0	-1.317E+1	-2.101E+0	-1.164E+1
4.00E-1	-3.808E+0	-1.224E+1	-6.154E+0	-9.727E+0	-2.576E+0	4.631E-1	-9.314E+0	-1.230E+1	-1.790E+0	-1.069E+1
6.00E-1	-3.703E+0	-9.075E+0	-4.263E+0	-7.779E+0	-1.477E+0	9.496E-1	-8.359E+0	-1.094E+1	-1.511E+0	-9.372E+0
8.00E-1	-3.654E+0	-7.129E+0	-3.008E+0	-6.649E+0	-8.049E-1	1.394E+0	-7.508E+0	-9.880E+0	-1.450E+0	-8.537E+0
1.00E+0	-3.637E+0	-6.070E+0	-2.237E+0	-6.054E+0	-7.174E-1	1.754E+0	-6.744E+0	-8.950E+0	-1.513E+0	-7.877E+0
1.20E+0	-3.657E+0	-5.612E+0	-1.909E+0	-5.895E+0	-1.050E+0	1.840E+0	-6.312E+0	-8.397E+0	-1.629E+0	-7.544E+0
1.40E+0	-3.704E+0	-5.353E+0	-1.743E+0	-5.884E+0	-1.471E+0	1.812E+0	-6.043E+0	-8.016E+0	-1.766E+0	-7.363E+0
1.60E+0	-3.770E+0	-5.174E+0	-1.634E+0	-5.931E+0	-1.924E+0	1.753E+0	-5.831E+0	-7.688E+0	-1.925E+0	-7.232E+0

Table 9. Continued

Log Tau	NH ⁺	NO ⁺	O ₂ ⁺	OH ⁺	PH ⁺	PO ⁺	SH ⁺	SiH ⁺	SiO ⁺	SO ⁺
-4.00E+0	-1.709E+1	-1.382E+1	-1.813E+1	-1.230E+1	-1.171E+1	-1.302E+1	-1.149E+1	-5.411E-1	-1.022E+1	-1.260E+1
-3.80E+0	-1.694E+1	-1.368E+1	-1.793E+1	-1.212E+1	-1.154E+1	-1.286E+1	-1.132E+1	-4.734E-1	-1.013E+1	-1.243E+1
-3.60E+0	-1.670E+1	-1.349E+1	-1.769E+1	-1.190E+1	-1.133E+1	-1.266E+1	-1.111E+1	-3.715E-1	-9.987E+0	-1.223E+1
-3.40E+0	-1.647E+1	-1.330E+1	-1.745E+1	-1.169E+1	-1.113E+1	-1.248E+1	-1.091E+1	-2.752E-1	-9.849E+0	-1.204E+1
-3.20E+0	-1.620E+1	-1.309E+1	-1.719E+1	-1.146E+1	-1.092E+1	-1.228E+1	-1.070E+1	-1.652E-1	-9.689E+0	-1.184E+1
-3.00E+0	-1.589E+1	-1.286E+1	-1.691E+1	-1.120E+1	-1.069E+1	-1.208E+1	-1.047E+1	-3.802E-2	-9.503E+0	-1.164E+1
-2.80E+0	-1.560E+1	-1.263E+1	-1.664E+1	-1.096E+1	-1.047E+1	-1.188E+1	-1.024E+1	8.335E-2	-9.325E+0	-1.143E+1
-2.60E+0	-1.530E+1	-1.240E+1	-1.636E+1	-1.072E+1	-1.024E+1	-1.168E+1	-1.002E+1	2.055E-1	-9.144E+0	-1.123E+1
-2.40E+0	-1.497E+1	-1.215E+1	-1.607E+1	-1.046E+1	-1.001E+1	-1.148E+1	-9.785E+0	3.406E-1	-8.945E+0	-1.102E+1
-2.20E+0	-1.461E+1	-1.188E+1	-1.576E+1	-1.018E+1	-9.758E+0	-1.126E+1	-9.535E+0	4.901E-1	-8.724E+0	-1.080E+1
-2.00E+0	-1.424E+1	-1.160E+1	-1.545E+1	-9.906E+0	-9.509E+0	-1.105E+1	-9.286E+0	6.384E-1	-8.504E+0	-1.058E+1
-1.80E+0	-1.388E+1	-1.134E+1	-1.515E+1	-9.636E+0	-9.264E+0	-1.084E+1	-9.042E+0	7.823E-1	-8.290E+0	-1.037E+1
-1.60E+0	-1.352E+1	-1.107E+1	-1.484E+1	-9.363E+0	-9.018E+0	-1.063E+1	-8.795E+0	9.275E-1	-8.074E+0	-1.015E+1
-1.40E+0	-1.316E+1	-1.080E+1	-1.454E+1	-9.091E+0	-8.773E+0	-1.042E+1	-8.535E+0	1.071E+0	-7.859E+0	-9.940E+0
-1.20E+0	-1.277E+1	-1.052E+1	-1.421E+1	-8.805E+0	-8.516E+0	-1.020E+1	-8.293E+0	1.223E+0	-7.630E+0	-9.719E+0
-1.00E+0	-1.236E+1	-1.021E+1	-1.388E+1	-8.506E+0	-8.249E+0	-9.980E+0	-8.026E+0	1.381E+0	-7.391E+0	-9.493E+0
-8.00E-1	-1.196E+1	-9.928E+0	-1.356E+1	-8.220E+0	-7.993E+0	-9.766E+0	-7.770E+0	1.528E+0	-7.166E+0	-9.273E+0
-6.00E-1	-1.150E+1	-9.602E+0	-1.320E+1	-7.901E+0	-7.710E+0	-9.538E+0	-7.486E+0	1.689E+0	-6.915E+0	-9.038E+0
-4.00E-1	-1.108E+1	-9.301E+0	-1.286E+1	-7.604E+0	-7.446E+0	-9.322E+0	-7.221E+0	1.833E+0	-6.688E+0	-8.817E+0
-2.00E-1	-1.058E+1	-8.947E+0	-1.248E+1	-7.262E+0	-7.146E+0	-9.086E+0	-6.920E+0	1.987E+0	-6.433E+0	-8.574E+0
0.00E+0	-9.975E+0	-8.540E+0	-1.205E+1	-6.876E+0	-6.812E+0	-8.834E+0	-6.582E+0	2.134E+0	-6.165E+0	-8.312E+0
2.00E-1	-9.251E+0	-8.640E+0	-1.154E+1	-6.433E+0	-6.434E+0	-8.564E+0	-6.200E+0	2.249E+0	-5.898E+0	-8.027E+0
4.00E-1	-8.287E+0	-7.456E+0	-1.089E+1	-5.865E+0	-5.970E+0	-8.248E+0	-5.726E+0	2.283E+0	-5.639E+0	-7.690E+0
6.00E-1	-6.813E+0	-6.538E+0	-9.670E+0	-4.892E+0	-5.266E+0	-7.721E+0	-4.998E+0	2.103E+0	-5.318E+0	-7.121E+0
8.00E-1	-5.677E+0	-5.774E+0	-8.363E+0	-3.908E+0	-4.636E+0	-7.125E+0	-4.333E+0	1.847E+0	-5.021E+0	-6.482E+0
1.00E+0	-4.674E+0	-5.244E+0	-7.344E+0	-3.107E+0	-4.123E+0	-6.738E+0	-3.756E+0	1.352E+0	-5.058E+0	-6.030E+0
1.20E+1	-4.039E+0	-5.082E+0	-6.808E+0	-2.695E+0	-3.958E+0	-6.734E+0	-3.495E+0	7.381E-1	-5.332E+0	-5.937E+0
1.40E+0	-3.595E+0	-5.062E+0	-6.467E+0	-2.444E+0	-3.970E+0	-6.887E+0	-3.388E+0	1.488E-1	-5.633E+0	-5.986E+0
1.60E+0	-3.216E+0	-5.088E+0	-6.188E+0	-2.238E+0	-4.075E+0	-7.119E+0	-3.348E+0	-4.294E-1	-5.943E+0	-6.100E+0

Table 10. Logarithms of molecular partial pressures in Boyer's sunspot model

Log Tau	AlH ⁺	C ₂	CH ⁺	CN ⁺	CO ⁺	H ₂	HCl ⁺	HF ⁺	MgH ⁺	N ₂ ⁺
-4.00E+0	-8.322E+0	-2.340E+1	-1.418E+1	-1.800E+1	-7.589E+0	-4.002E+0	-1.552E+1	-1.924E+1	-6.477E+0	-1.816E+1
-3.83E+0	-8.112E+0	-2.336E+1	-1.408E+1	-1.794E+1	-7.511E+0	-3.840E+0	-1.534E+1	-1.912E+1	-6.306E+0	-1.805E+1
-3.63E+0	-7.886E+0	-2.315E+1	-1.388E+1	-1.775E+1	-7.371E+0	-3.652E+0	-1.511E+1	-1.892E+1	-6.105E+0	-1.785E+1
-3.43E+0	-7.673E+0	-2.296E+1	-1.369E+1	-1.759E+1	-7.245E+0	-3.477E+0	-1.489E+1	-1.874E+1	-5.918E+0	-1.766E+1
-3.22E+0	-7.445E+0	-2.269E+1	-1.345E+1	-1.737E+1	-7.089E+0	-3.283E+0	-1.465E+1	-1.851E+1	-5.710E+0	-1.743E+1
-3.03E+0	-7.242E+0	-2.234E+1	-1.317E+1	-1.709E+1	-6.909E+0	-3.097E+0	-1.441E+1	-1.826E+1	-5.511E+0	-1.716E+1
-2.82E+0	-7.022E+0	-2.201E+1	-1.291E+1	-1.683E+1	-6.734E+0	-2.903E+0	-1.416E+1	-1.802E+1	-5.303E+0	-1.690E+1
-2.64E+0	-6.823E+0	-2.166E+1	-1.264E+1	-1.656E+1	-6.560E+0	-2.723E+0	-1.392E+1	-1.778E+1	-5.110E+0	-1.664E+1
-2.43E+0	-6.603E+0	-2.127E+1	-1.233E+1	-1.625E+1	-6.363E+0	-2.523E+0	-1.365E+1	-1.750E+1	-4.894E+0	-1.634E+1
-2.24E+0	-6.403E+0	-2.080E+1	-1.199E+1	-1.590E+1	-6.147E+0	-2.328E+0	-1.338E+1	-1.720E+1	-4.686E+0	-1.602E+1
-2.03E+0	-6.184E+0	-2.033E+1	-1.165E+1	-1.554E+1	-5.928E+0	-2.122E+0	-1.310E+1	-1.690E+1	-4.464E+0	-1.568E+1
-1.84E+0	-5.988E+0	-1.988E+1	-1.131E+1	-1.520E+1	-5.717E+0	-1.932E+0	-1.284E+1	-1.660E+1	-4.261E+0	-1.537E+1
-1.63E+0	-5.771E+0	-1.940E+1	-1.097E+1	-1.484E+1	-5.496E+0	-1.726E+0	-1.256E+1	-1.630E+1	-4.040E+0	-1.503E+1
-1.32E+0	-5.463E+0	-1.899E+1	-1.062E+1	-1.450E+1	-5.265E+0	-1.465E+0	-1.222E+1	-1.597E+1	-3.755E+0	-1.469E+1
-1.24E+0	-5.363E+0	-1.841E+1	-1.025E+1	-1.409E+1	-5.046E+0	-1.328E+0	-1.201E+1	-1.567E+1	-3.615E+0	-1.435E+1
-1.03E+0	-5.157E+0	-1.784E+1	-9.852E+0	-1.367E+1	-4.799E+0	-1.120E+0	-1.171E+1	-1.533E+1	-3.394E+0	-1.398E+1
-8.46E-1	-4.980E+0	-1.772E+1	-9.720E+0	-1.356E+1	-4.704E+0	-9.848E-1	-1.155E+1	-1.519E+1	-3.243E+0	-1.384E+1
-6.34E-1	-4.770E+0	-1.749E+1	-9.518E+0	-1.337E+1	-4.565E+0	-8.157E-1	-1.134E+1	-1.500E+1	-3.055E+0	-1.364E+1
-4.69E-1	-4.600E+0	-1.719E+1	-9.285E+0	-1.313E+1	-4.413E+0	-6.653E-1	-1.114E+1	-1.479E+1	-2.891E+0	-1.341E+1
-2.79E-1	-4.393E+0	-1.639E+1	-8.753E+0	-1.256E+1	-4.092E+0	-4.281E-1	-1.078E+1	-1.434E+1	-2.645E+0	-1.292E+1
-8.20E-2	-4.186E+0	-1.540E+1	-8.106E+0	-1.186E+1	-3.708E+0	-1.675E-1	-1.038E+1	-1.381E+1	-2.380E+0	-1.234E+1
1.22E-1	-3.987E+0	-1.412E+1	-7.300E+0	-1.098E+1	-3.237E+0	1.186E-1	-9.917E+0	-1.317E+1	-2.100E+0	-1.163E+1
3.34E-1	-3.810E+0	-1.225E+1	-6.165E+0	-9.738E+0	-2.587E+0	4.523E-1	-9.325E+0	-1.231E+1	-1.798E+0	-1.070E+1
5.82E-1	-3.696E+0	-9.118E+0	-4.302E+0	-7.818E+0	-1.516E+0	9.157E-1	-8.393E+0	-1.098E+1	-1.518E+0	-9.407E+0
7.34E-1	-3.648E+0	-7.936E+0	-3.558E+0	-7.132E+0	-1.095E+0	1.155E+0	-7.929E+0	-1.039E+1	-1.446E+0	-8.930E+0
8.69E-1	-3.606E+0	-7.173E+0	-3.046E+0	-6.687E+0	-8.455E-1	1.364E+0	-7.538E+0	-9.912E+0	-1.411E+0	-8.568E+0
1.00E+0	-3.637E+0	-6.070E+0	-2.237E+0	-6.054E+0	-7.174E-1	1.754E+0	-6.744E+0	-8.957E+0	-1.513E+0	-7.877E+0
1.20E+0	-3.657E+0	-5.612E+0	-1.909E+0	-5.895E+0	-1.050E+0	1.840E+0	-6.312E+0	-8.397E+0	-1.629E+0	-7.544E+0
1.40E+0	-3.704E+0	-5.353E+0	-1.743E+0	-5.884E+0	-1.471E+0	1.812E+0	-6.043E+0	-8.016E+0	-1.766E+0	-7.363E+0
1.60E+0	-3.770E+0	-5.174E+0	-1.634E+0	-5.931E+0	-1.924E+0	1.753E+0	-5.831E+0	-7.668E+0	-1.925E+0	-7.232E+0

Table 10. Continued

Log Tau	NH ⁺	NO ⁺	O ₂	OH ⁺	PH ⁺	PO ⁺	SH ⁺	SiH ⁺	SiO ⁺	SO ⁺
-4.00E+0	-1.634E+1	-1.332E+1	-1.767E+1	-1.191E+1	-1.138E+1	-1.280E+1	-1.117E+1	-2.841E-1	-9.805E+0	-1.237E+1
-3.83E+0	-1.619E+1	-1.318E+1	-1.748E+1	-1.173E+1	-1.121E+1	-1.264E+1	-1.099E+1	-1.923E-1	-9.694E+0	-1.220E+1
-3.63E+0	-1.594E+1	-1.298E+1	-1.723E+1	-1.150E+1	-1.100E+1	-1.244E+1	-1.078E+1	-7.965E-2	-9.541E+0	-1.200E+1
-3.43E+0	-1.572E+1	-1.280E+1	-1.699E+1	-1.129E+1	-1.080E+1	-1.225E+1	-1.058E+1	2.272E-2	-9.401E+0	-1.181E+1
-3.22E+0	-1.544E+1	-1.259E+1	-1.673E+1	-1.105E+1	-1.057E+1	-1.205E+1	-1.035E+1	1.408E-1	-9.235E+0	-1.160E+1
-3.03E+0	-1.515E+1	-1.236E+1	-1.646E+1	-1.081E+1	-1.035E+1	-1.186E+1	-1.013E+1	2.622E-1	-9.058E+0	-1.140E+1
-2.82E+0	-1.485E+1	-1.213E+1	-1.618E+1	-1.056E+1	-1.012E+1	-1.165E+1	-9.903E+0	3.851E-1	-8.880E+0	-1.120E+1
-2.64E+0	-1.456E+1	-1.191E+1	-1.592E+1	-1.032E+1	-9.908E+0	-1.146E+1	-9.688E+0	5.025E-1	-8.708E+0	-1.100E+1
-2.43E+0	-1.424E+1	-1.166E+1	-1.563E+1	-1.006E+1	-9.669E+0	-1.125E+1	-9.448E+0	6.338E-1	-8.515E+0	-1.079E+1
-2.24E+0	-1.389E+1	-1.141E+1	-1.533E+1	-9.800E+0	-9.432E+0	-1.105E+1	-9.211E+0	7.678E-1	-8.313E+0	-1.058E+1
-2.03E+0	-1.353E+1	-1.114E+1	-1.502E+1	-9.524E+0	-9.182E+0	-1.084E+1	-8.961E+0	9.064E-1	-8.105E+0	-1.036E+1
-1.84E+0	-1.319E+1	-1.089E+1	-1.474E+1	-9.268E+0	-8.952E+0	-1.064E+1	-8.730E+0	1.034E+0	-7.910E+0	-1.016E+1
-1.63E+0	-1.283E+1	-1.062E+1	-1.443E+1	-8.992E+0	-8.703E+0	-1.042E+1	-8.480E+0	1.171E+0	-7.703E+0	-9.943E+0
-1.32E+0	-1.244E+1	-1.031E+1	-1.405E+1	-8.655E+0	-8.393E+0	-1.014E+1	-8.170E+0	1.336E+0	-7.462E+0	-9.655E+0
-1.24E+0	-1.211E+1	-1.009E+1	-1.382E+1	-8.452E+0	-8.217E+0	-1.002E+1	-7.994E+0	1.433E+0	-7.298E+0	-9.523E+0
-1.03E+0	-1.171E+1	-9.804E+0	-1.350E+1	-8.166E+0	-7.962E+0	-9.803E+0	-7.738E+0	1.567E+0	-7.085E+0	-9.305E+0
-8.46E-1	-1.154E+1	-9.661E+0	-1.331E+1	-7.998E+0	-7.805E+0	-9.650E+0	-7.581E+0	1.653E+0	-6.966E+0	-9.150E+0
-6.34E-1	-1.131E+1	-9.467E+0	-1.307E+1	-7.781E+0	-7.605E+0	-9.461E+0	-7.380E+0	1.761E+0	-6.811E+0	-8.959E+0
-4.69E-1	-1.106E+1	-9.277E+0	-1.284E+1	-7.581E+0	-7.423E+0	-9.300E+0	-7.198E+0	1.857E+0	-6.664E+0	-8.794E+0
-2.79E-1	-1.056E+1	-8.928E+0	-1.246E+1	-7.245E+0	-7.128E+0	-9.069E+0	-6.902E+0	2.006E+0	-6.415E+0	-8.557E+0
-8.20E-2	-9.963E+0	-8.528E+0	-1.204E+1	-6.865E+0	-6.800E+0	-8.824E+0	-6.571E+0	2.146E+0	-6.154E+0	-8.301E+0
1.22E-1	-9.248E+0	-8.061E+0	-1.154E+1	-6.430E+0	-6.432E+0	-8.562E+0	-6.198E+0	2.252E+0	-5.896E+0	-8.025E+0
3.34E-1	-8.298E+0	-7.466E+0	-1.090E+1	-5.876E+0	-5.980E+0	-8.258E+0	-5.737E+0	2.273E+0	-5.649E+0	-7.701E+0
5.82E-1	-6.848E+0	-6.573E+0	-9.706E+0	-4.927E+0	-5.300E+0	-7.755E+0	-5.031E+0	2.075E+0	-5.348E+0	-7.156E+0
7.34E-1	-6.215E+0	-6.177E+0	-8.991E+0	-4.390E+0	-4.956E+0	-7.432E+0	-4.671E+0	1.957E+0	-5.160E+0	-6.810E+0
8.69E-1	-5.707E+0	-5.808E+0	-8.400E+0	-3.942E+0	-4.665E+0	-7.157E+0	-4.362E+0	1.845E+0	-5.026E+0	-6.515E+0
1.00E+0	-4.674E+0	-5.244E+0	-7.344E+0	-3.107E+0	-4.123E+0	-6.738E+0	-3.756E+0	1.352E+0	-5.058E+0	-6.030E+0
1.20E+0	-4.039E+0	-5.082E+0	-6.808E+0	-2.695E+0	-3.958E+0	-6.734E+0	-3.495E+0	7.381E-1	-5.332E+0	-5.937E+0
1.40E+0	-3.595E+0	-5.062E+0	-6.467E+0	-2.444E+0	-3.970E+0	-6.887E+0	-3.388E+0	1.488E-1	-5.633E+0	-5.986E+0
1.60E+0	-3.216E+0	-5.088E+0	-6.188E+0	-2.238E+0	-4.075E+0	-7.119E+0	-3.348E+0	-4.294E-1	-5.943E+0	-6.100E+0

Table 11. Logarithms of molecular partial pressures in Maltby *et al.*'s sunspot model M_L.

Log Tau	AlH ⁺	C ₂	CH ⁺	CN ⁺	CO ⁺	H ₂	HCl ⁺	HF ⁺	MgH ⁺	N ₂
-1.00E+0	-5.314E+0	-1.963E+1	-1.096E+1	-1.493E+1	-5.462E+0	-1.479E+0	-1.229E+1	-1.622E+1	-3.738E+0	-1.497E+1
-9.00E-1	-5.212E+0	-1.939E+1	-1.078E+1	-1.474E+1	-5.351E+0	-1.381E+0	-1.216E+1	-1.606E+1	-3.632E+0	-1.480E+1
-8.00E-1	-5.107E+0	-1.912E+1	-1.059E+1	-1.454E+1	-5.232E+0	-1.278E+0	-1.201E+1	-1.590E+1	-3.521E+0	-1.462E+1
-7.00E-1	-4.999E+0	-1.876E+1	-1.034E+1	-1.428E+1	-5.080E+0	-1.161E+0	-1.184E+1	-1.569E+1	-3.398E+0	-1.439E+1
-6.00E-1	-4.890E+0	-1.840E+1	-1.010E+1	-1.402E+1	-4.930E+0	-1.044E+0	-1.167E+1	-1.548E+1	-3.275E+0	-1.416E+1
-5.00E-1	-4.784E+0	-1.800E+1	-9.835E+0	-1.373E+1	-4.770E+0	-9.248E-1	-1.150E+1	-1.526E+1	-3.150E+0	-1.392E+1
-4.00E-1	-4.669E+0	-1.749E+1	-9.498E+0	-1.336E+1	-4.568E+0	-7.841E-1	-1.128E+1	-1.498E+1	-3.005E+0	-1.361E+1
-3.00E-1	-4.535E+0	-1.690E+1	-9.117E+0	-1.294E+1	-4.341E+0	-6.350E-1	-1.105E+1	-1.466E+1	-2.854E+0	-1.326E+1
-2.00E-1	-4.445E+0	-1.628E+1	-8.725E+0	-1.251E+1	-4.110E+0	-4.864E-1	-1.082E+1	-1.434E+1	-2.704E+0	-1.291E+1
-1.00E-1	-4.339E+0	-1.557E+1	-8.276E+0	-1.202E+1	-3.847E+0	-3.296E-1	-1.056E+1	-1.398E+1	-2.548E+0	-1.251E+1
0.00E+0	-4.241E+0	-1.477E+1	-7.780E+0	-1.147E+1	-3.561E+0	-1.705E-1	-1.030E+1	-1.359E+1	-2.392E+0	-1.208E+1
1.00E-1	-4.148E+0	-1.362E+1	-7.089E+0	-1.070E+1	-3.166E+0	2.014E-2	-9.948E+0	-1.307E+1	-2.214E+0	-1.150E+1
2.00E-1	-4.070E+0	-1.244E+1	-6.384E+0	-9.931E+0	-2.762E+0	2.053E-1	-9.600E+0	-1.255E+1	-2.053E+0	-1.094E+1
3.00E-1	-4.010E+0	-1.123E+1	-5.671E+0	-9.172E+0	-2.354E+0	3.793E-1	-9.255E+0	-1.205E+1	-1.919E+0	-1.041E+1
4.00E-1	-3.962E+0	-1.006E+1	-4.972E+0	-8.460E+0	-1.949E+0	5.551E-1	-8.902E+0	-1.156E+1	-1.811E+0	-9.940E+0
5.00E-1	-3.926E+0	-8.995E+0	-4.325E+0	-7.838E+0	-1.571E+0	7.367E-1	-8.540E+0	-1.109E+1	-1.733E+0	-9.529E+0
6.00E-1	-3.898E+0	-8.115E+0	-3.766E+0	-7.330E+0	-1.259E+0	9.240E-1	-8.177E+0	-1.063E+1	-1.688E+0	-9.169E+0
7.00E-1	-3.871E+0	-7.403E+0	-3.284E+0	-6.914E+0	-1.031E+0	1.124E+0	-7.802E+0	-1.018E+1	-1.667E+0	-8.824E+0
8.00E-1	-3.845E+0	-6.866E+0	-2.893E+0	-6.592E+0	-9.036E-1	1.320E+0	-7.441E+0	-9.751E+0	-1.663E+0	-8.503E+0

Table 11. Continued

Log Tau	NH ⁺	NO ⁺	O ₂ ⁺	OH ⁺	PH ⁺	PO ⁺	SH ⁺	SiH ⁺	SiO ⁺	SO ⁺
-1.00E+0	-1.266E+1	-1.042E+1	-1.408E+1	-8.692E+0	-8.413E+0	-1.010E+1	-8.190E+0	-1.249E+0	-7.572E+0	-9.614E+0
-9.00E-1	-1.248E+1	-1.029E+1	-1.393E+1	-8.558E+0	-8.293E+0	-9.996E+0	-8.069E+0	-1.319E+0	-7.466E+0	-9.509E+0
-8.00E-1	-1.230E+1	-1.015E+1	-1.377E+1	-8.418E+0	-8.167E+0	-9.890E+0	-7.944E+0	-1.392E+0	-7.355E+0	-9.401E+0
-7.00E-1	-1.206E+1	-9.984E+0	-1.359E+1	-8.254E+0	-8.022E+0	-9.774E+0	-7.799E+0	-1.480E+0	-7.220E+0	-9.282E+0
-6.00E-1	-1.182E+1	-9.817E+0	-1.340E+1	-8.092E+0	-7.878E+0	-9.659E+0	-7.654E+0	-1.566E+0	-7.088E+0	-9.164E+0
-5.00E-1	-1.157E+1	-9.642E+0	-1.322E+1	-7.924E+0	-7.730E+0	-9.543E+0	-7.506E+0	-1.652E+0	-6.953E+0	-9.044E+0
-4.00E-1	-1.126E+1	-9.429E+0	-1.299E+1	-7.723E+0	-7.555E+0	-9.411E+0	-7.330E+0	-1.753E+0	-6.792E+0	-8.908E+0
-3.00E-1	-1.091E+1	-9.195E+0	-1.275E+1	-7.507E+0	-7.368E+0	-9.274E+0	-7.142E+0	-1.851E+0	-6.626E+0	-8.765E+0
-2.00E-1	-1.055E+1	-8.959E+0	-1.250E+1	-7.289E+0	-7.180E+0	-9.138E+0	-6.953E+0	-1.938E+0	-6.468E+0	-8.624E+0
-1.00E-1	-1.016E+1	-8.699E+0	-1.224E+1	-7.051E+0	-6.978E+0	-8.997E+0	-6.749E+0	-2.014E+0	-6.310E+0	-8.475E+0
0.00E+0	-9.724E+0	-8.424E+0	-1.195E+1	-6.802E+0	-6.769E+0	-8.855E+0	-6.537E+0	-2.066E+0	-6.165E+0	-8.325E+0
1.00E-1	-9.146E+0	-8.064E+0	-1.158E+1	-6.480E+0	-6.507E+0	-8.687E+0	-6.271E+0	-2.081E+0	-6.017E+0	-8.145E+0
2.00E-1	-8.573E+0	-7.712E+0	-1.119E+1	-6.154E+0	-6.247E+0	-8.517E+0	-6.004E+0	-2.061E+0	-5.891E+0	-7.961E+0
3.00E-1	-8.014E+0	-7.372E+0	-1.079E+1	-5.819E+0	-5.993E+0	-8.345E+0	-5.742E+0	-2.004E+0	-5.783E+0	-7.774E+0
4.00E-1	-7.474E+0	-7.037E+0	-1.032E+1	-5.454E+0	-5.733E+0	-8.146E+0	-5.473E+0	-1.929E+0	-5.664E+0	-7.560E+0
5.00E-1	-6.959E+0	-6.700E+0	-9.790E+0	-5.050E+0	-5.466E+0	-7.911E+0	-5.195E+0	-1.843E+0	-5.523E+0	-7.308E+0
6.00E-1	-6.471E+0	-6.368E+0	-9.220E+0	-4.625E+0	-5.196E+0	-7.652E+0	-4.912E+0	-1.747E+0	-5.375E+0	-7.031E+0
7.00E-1	-5.985E+0	-6.046E+0	-8.656E+0	-4.196E+0	-4.917E+0	-7.390E+0	-4.616E+0	-1.634E+0	-5.252E+0	-6.750E+0
8.00E-1	-5.525E+0	-5.764E+0	-8.163E+0	-3.807E+0	-4.650E+0	-7.162E+0	-4.331E+0	-1.498E+0	-5.189E+0	-6.501E+0

Table 12. Logarithms of molecular partial pressures in Sobotka's sunspot model 12

Log Tau	AlH*	C ₂	CH*	CN*	CO*	H ₂	HCl*	HF*	MgH*	N ₂
-3.30E+0	-7.685E+0	-1.248E+1	-7.671E+0	-1.092E+1	-3.758E+0	-2.295E+0	-1.221E+1	-1.489E+1	-5.214E+0	-1.300E+1
-2.87E+0	-7.483E+0	-1.230E+1	-7.496E+0	-1.076E+1	-3.643E+0	-2.134E+0	-1.201E+1	-1.469E+1	-5.026E+0	-1.281E+1
-2.58E+0	-7.283E+0	-1.212E+1	-7.318E+0	-1.060E+1	-3.527E+0	-1.973E+0	-1.182E+1	-1.448E+1	-4.839E+0	-1.263E+1
-2.33E+0	-7.086E+0	-1.192E+1	-7.137E+0	-1.043E+1	-3.409E+0	-1.813E+0	-1.162E+1	-1.428E+1	-4.656E+0	-1.244E+1
-2.12E+0	-6.893E+0	-1.172E+1	-6.950E+0	-1.026E+1	-3.288E+0	-1.653E+0	-1.143E+1	-1.407E+1	-4.477E+0	-1.226E+1
-1.91E+0	-6.699E+0	-1.150E+1	-6.757E+0	-1.008E+1	-3.164E+0	-1.491E+0	-1.122E+1	-1.386E+1	-4.296E+0	-1.206E+1
-1.72E+0	-6.505E+0	-1.128E+1	-6.552E+0	-9.888E+0	-3.030E+0	-1.322E+0	-1.101E+1	-1.363E+1	-4.115E+0	-1.186E+1
-1.53E+0	-6.319E+0	-1.104E+1	-6.348E+0	-9.701E+0	-2.901E+0	-1.161E+0	-1.081E+1	-1.342E+1	-3.942E+0	-1.167E+1
-1.34E+0	-6.133E+0	-1.079E+1	-6.132E+0	-9.501E+0	-2.762E+0	-9.931E-1	-1.059E+1	-1.319E+1	-3.768E+0	-1.147E+1
-1.16E+0	-5.949E+0	-1.052E+1	-5.907E+0	-9.295E+0	-2.621E+0	-8.257E-1	-1.038E+1	-1.295E+1	-3.597E+0	-1.126E+1
-9.83E-1	-5.771E+0	-1.024E+1	-5.674E+0	-9.081E+0	-2.475E+0	-6.572E-1	-1.015E+1	-1.271E+1	-3.431E+0	-1.105E+1
-8.04E-1	-5.596E+0	-9.935E+0	-5.428E+0	-8.856E+0	-2.322E+0	-4.847E-1	-9.923E+0	-1.246E+1	-3.268E+0	-1.083E+1
-6.31E-1	-5.424E+0	-9.612E+0	-5.170E+0	-8.621E+0	-2.165E+0	-3.088E-1	-9.683E+0	-1.220E+1	-3.108E+0	-1.060E+1
-4.61E-1	-5.258E+0	-9.266E+0	-4.897E+0	-8.375E+0	-2.003E+0	-1.288E-1	-9.432E+0	-1.193E+1	-2.954E+0	-1.036E+1
-2.92E-1	-5.100E+0	-8.899E+0	-4.609E+0	-8.117E+0	-1.838E+0	5.610E-2	-9.168E+0	-1.164E+1	-2.810E+0	-1.012E+1
-1.27E-1	-4.944E+0	-8.508E+0	-4.304E+0	-7.847E+0	-1.674E+0	2.503E-2	-8.884E+0	-1.132E+1	-2.669E+0	-9.851E+0
3.34E-2	-4.800E+0	-8.090E+0	-3.976E+0	-7.562E+0	-1.514E+0	4.560E-1	-8.573E+0	-1.097E+1	-2.545E+0	-9.564E+0
1.93E-1	-4.664E+0	-7.640E+0	-3.619E+0	-7.257E+0	-1.368E+0	6.832E-1	-8.219E+0	-1.057E+1	-2.434E+0	-9.242E+0
3.48E-1	-4.548E+0	-7.166E+0	-3.237E+0	-6.946E+0	-1.269E+0	9.235E-1	-7.817E+0	-1.011E+1	-2.356E+0	-8.882E+0
5.16E-1	-4.461E+0	-6.674E+0	-2.843E+0	-6.655E+0	-1.293E+0	1.149E+0	-7.363E+0	-9.576E+0	-2.328E+0	-8.492E+0

Table 12. Continued

Log Tau	NH ⁺	NO ⁺	O ₂ ⁺	OH ⁺	PH ⁺	PO ⁺	SH ⁺	SiH ⁺	SiO ⁺	SO ⁺
-3.30E+0	-1.098E+1	-9.873E+0	-1.361E+1	-8.635E+0	-8.825E+0	-1.093E+1	-8.584E+0	-4.177E-1	-8.354E+0	-1.038E+1
-2.87E+0	-1.076E+1	-9.705E+0	-1.341E+1	-8.447E+0	-8.647E+0	-1.077E+1	-8.405E+0	-2.951E-1	-8.203E+0	-1.022E+1
-2.58E+0	-1.055E+1	-9.536E+0	-1.320E+1	-8.257E+0	-8.469E+0	-1.061E+1	-8.225E+0	-1.736E-1	-8.052E+0	-1.006E+1
-2.33E+0	-1.034E+1	-9.367E+0	-1.300E+1	-8.065E+0	-8.290E+0	-1.045E+1	-8.045E+0	-5.614E-2	-7.902E+0	-9.895E+0
-2.12E+0	-1.012E+1	-9.196E+0	-1.279E+1	-7.870E+0	-8.111E+0	-1.029E+1	-7.865E+0	5.572E-2	-7.754E+0	-9.731E+0
-1.91E+0	-9.892E+0	-9.021E+0	-1.257E+1	-7.670E+0	-7.928E+0	-1.013E+1	-7.680E+0	1.683E-1	-7.603E+0	-9.563E+0
-1.72E+0	-9.657E+0	-8.837E+0	-1.234E+1	-7.461E+0	-7.738E+0	-9.955E+0	-7.488E+0	2.827E-1	-7.448E+0	-9.387E+0
-1.53E+0	-9.427E+0	-8.659E+0	-1.212E+1	-7.256E+0	-7.555E+0	-9.789E+0	-7.303E+0	3.854E-1	-7.300E+0	-9.218E+0
-1.34E+0	-9.184E+0	-8.471E+0	-1.188E+1	-7.040E+0	-7.363E+0	-9.615E+0	-7.109E+0	4.892E-1	-7.147E+0	-9.040E+0
-1.16E+0	-8.936E+0	-8.280E+0	-1.163E+1	-6.820E+0	-7.170E+0	-9.440E+0	-6.914E+0	5.864E-1	-6.995E+0	-8.860E+0
-9.83E-1	-8.681E+0	-8.085E+0	-1.137E+1	-6.592E+0	-6.975E+0	-9.261E+0	-6.716E+0	6.781E-1	-6.843E+0	-8.677E+0
-8.04E-1	-8.413E+0	-7.882E+0	-1.110E+1	-6.354E+0	-6.773E+0	-9.076E+0	-6.510E+0	7.646E-1	-6.689E+0	-8.486E+0
-6.31E-1	-8.134E+0	-7.672E+0	-1.081E+1	-6.105E+0	-6.565E+0	-8.885E+0	-6.299E+0	8.443E-1	-6.534E+0	-8.290E+0
-4.61E-1	-7.839E+0	-7.452E+0	-1.050E+1	-5.842E+0	-6.350E+0	-8.687E+0	-6.080E+0	9.133E-1	-6.380E+0	-8.085E+0
-2.92E-1	-7.527E+0	-7.222E+0	-1.017E+1	-5.564E+0	-6.127E+0	-8.482E+0	-5.851E+0	9.690E-1	-6.228E+0	-7.872E+0
-1.27E-1	-7.188E+0	-6.979E+0	-9.809E+0	-5.265E+0	-5.890E+0	-8.267E+0	-5.607E+0	1.010E+0	-6.079E+0	-7.647E+0
3.34E-2	-6.814E+0	-6.718E+0	-9.416E+0	-4.938E+0	-5.636E+0	-8.039E+0	-5.344E+0	1.023E+0	-5.941E+0	-7.408E+0
1.93E-1	-6.384E+0	-6.434E+0	-8.978E+0	-4.571E+0	-5.354E+0	-7.796E+0	-5.047E+0	9.970E-1	-5.823E+0	-7.148E+0
3.48E-1	-5.887E+0	-6.135E+0	-8.493E+0	-4.164E+0	-5.050E+0	-7.553E+0	-4.720E+0	8.864E-1	-5.761E+0	-6.880E+0
5.16E-1	-5.301E+0	-5.847E+0	-7.957E+0	-3.720E+0	-4.754E+0	-7.357E+0	-4.376E+0	6.088E-1	-5.811E+0	-6.638E+0

Table 13. Logarithms of molecular partial pressures in Sobotka's sunspot model 22

Log Tau	AlH ⁺	C ₂	CH ⁺	CN ⁺	CO ⁺	H ₂	HCl ⁺	HF ⁺	MgH ⁺	N ₂
-3.52E+0	-7.71E+0	-2.036E+1	-1.222E+1	-1.583E+1	-6.393E+0	-3.223E+0	-1.430E+1	-1.767E+1	-5.658E+0	-1.632E+1
-3.25E+0	-7.472E+0	-2.002E+1	-1.194E+1	-1.555E+1	-6.211E+0	-3.013E+0	-1.403E+1	-1.740E+1	-5.435E+0	-1.605E+1
-3.00E+0	-7.232E+0	-1.965E+1	-1.164E+1	-1.526E+1	-6.019E+0	-2.800E+0	-1.376E+1	-1.712E+1	-5.210E+0	-1.577E+1
-2.75E+0	-7.998E+0	-1.926E+1	-1.134E+1	-1.496E+1	-5.823E+0	-2.590E+0	-1.348E+1	-1.684E+1	-4.987E+0	-1.548E+1
-2.51E+0	-6.769E+0	-1.884E+1	-1.101E+1	-1.464E+1	-5.617E+0	-2.379E+0	-1.320E+1	-1.654E+1	-4.764E+0	-1.517E+1
-2.27E+0	-6.536E+0	-1.841E+1	-1.068E+1	-1.430E+1	-5.405E+0	-2.164E+0	-1.291E+1	-1.624E+1	-4.537E+0	-1.485E+1
-2.04E+0	-6.314E+0	-1.794E+1	-1.033E+1	-1.395E+1	-5.188E+0	-1.955E+0	-1.263E+1	-1.594E+1	-4.316E+0	-1.452E+1
-1.81E+0	-6.090E+0	-1.743E+1	-9.957E+0	-1.357E+1	-4.956E+0	-1.740E+0	-1.233E+1	-1.562E+1	-4.089E+0	-1.418E+1
-1.58E+0	-5.871E+0	-1.690E+1	-9.574E+0	-1.318E+1	-4.718E+0	-1.527E+0	-1.204E+1	-1.528E+1	-3.866E+0	-1.382E+1
-1.36E+0	-5.656E+0	-1.631E+1	-9.163E+0	-1.275E+1	-4.465E+0	-1.312E+0	-1.173E+1	-1.494E+1	-3.641E+0	-1.344E+1
-1.13E+0	-5.444E+0	-1.568E+1	-8.726E+0	-1.230E+1	-4.199E+0	-1.095E+0	-1.142E+1	-1.457E+1	-3.416E+0	-1.305E+1
-9.03E-1	-5.238E+0	-1.500E+1	-8.259E+0	-1.181E+1	-3.916E+0	-8.763E-1	-1.110E+1	-1.419E+1	-3.192E+0	-1.263E+1
-6.82E-1	-5.038E+0	-1.424E+1	-7.757E+0	-1.128E+1	-3.615E+0	-6.556E-1	-1.076E+1	-1.378E+1	-2.970E+0	-1.219E+1
-4.58E-1	-4.842E+0	-1.340E+1	-7.206E+0	-1.070E+1	-3.286E+0	-4.279E-1	-1.041E+1	-1.335E+1	-2.746E+0	-1.173E+1
-2.37E-1	-4.658E+0	-1.246E+1	-6.601E+0	-1.007E+1	-2.928E+0	-1.978E-1	-1.004E+1	-1.289E+1	-2.530E+0	-1.124E+1
-1.59E-2	-4.482E+0	-1.140E+1	-5.930E+0	-9.386E+0	-2.531E+0	4.462E-2	-9.637E+0	-1.239E+1	-2.318E+0	-1.073E+1
2.01E-1	-4.318E+0	-1.022E+1	-5.186E+0	-8.648E+0	-2.088E+0	3.066E-1	-9.190E+0	-1.183E+1	-2.119E+0	-1.020E+1
4.17E-1	-4.176E+0	-8.957E+0	-4.374E+0	-7.881E+0	-1.609E+0	5.984E-1	-8.674E+0	-1.120E+1	-1.951E+0	-9.647E+0
6.47E-1	-4.069E+0	-7.660E+0	-3.504E+0	-7.110E+0	-1.152E+0	9.585E-1	-8.025E+0	-1.042E+1	-1.848E+0	-9.033E+0
8.12E-1	-4.019E+0	-6.475E+0	-2.621E+0	-6.411E+0	-9.859E-1	1.410E+0	-7.150E+0	-9.382E+0	-1.877E+0	-8.265E+0

Table 13. Continued

Log Tau	NH ⁺	NO ⁺	O ₂ ⁺	OH ⁺	PH ⁺	PO ⁺	SH ⁺	SiH ⁺	SiO ⁺	SO ⁺
-3.52E+0	-1.451E+1	-1.205E+1	-1.632E+1	-1.075E+1	-1.037E+1	-1.202E+1	-1.015E+1	1.826E-1	-8.950E+0	-1.155E+1
-3.25E+0	-1.420E+1	-1.181E+1	-1.604E+1	-1.048E+1	-1.012E+1	-1.180E+1	-9.905E+0	3.167E-1	-8.762E+0	-1.133E+1
-3.00E+0	-1.387E+1	-1.156E+1	-1.576E+1	-1.021E+1	-9.877E+0	-1.159E+1	-9.656E+0	4.504E-1	-8.570E+0	-1.111E+1
-2.75E+0	-1.354E+1	-1.131E+1	-1.544E+1	-9.942E+0	-9.630E+0	-1.137E+1	-9.409E+0	5.811E-1	-8.380E+0	-1.089E+1
-2.51E+0	-1.320E+1	-1.106E+1	-1.514E+1	-9.668E+0	-9.380E+0	-1.116E+1	-9.158E+0	7.089E-1	-8.188E+0	-1.067E+1
-2.27E+0	-1.285E+1	-1.080E+1	-1.483E+1	-9.388E+0	-9.126E+0	-1.094E+1	-8.903E+0	8.387E-1	-7.993E+0	-1.045E+1
-2.04E+0	-1.249E+1	-1.053E+1	-1.452E+1	-9.111E+0	-8.875E+0	-1.072E+1	-8.651E+0	9.600E-1	-7.802E+0	-1.023E+1
-1.81E+0	-1.212E+1	-1.026E+1	-1.420E+1	-8.822E+0	-8.615E+0	-1.050E+1	-8.391E+0	1.082E-0	-7.607E+0	-1.000E+1
-1.58E+0	-1.173E+1	-9.977E+0	-1.387E+1	-8.534E+0	-8.357E+0	-1.028E+1	-8.132E+0	1.197E+0	-7.415E+0	-9.780E+0
-1.36E+0	-1.133E+1	-9.687E+0	-1.354E+1	-8.237E+0	-8.093E+0	-1.007E+1	-7.866E+0	1.306E+0	-7.222E+0	-9.555E+0
-1.13E+0	-1.090E+1	-9.387E+0	-1.319E+1	-7.932E+0	-7.824E+0	-9.845E+0	-7.595E+0	1.410E+0	-7.031E+0	-9.328E+0
-9.03E-1	-1.046E+1	-9.078E+0	-1.284E+1	-7.620E+0	-7.551E+0	-9.625E+0	-7.320E+0	1.502E+0	-6.843E+0	-9.100E+0
-6.82E-1	-9.994E+0	-8.758E+0	-1.247E+1	-7.297E+0	-7.272E+0	-9.403E+0	-7.037E+0	1.583E+0	-6.658E+0	-8.870E+0
-4.58E-1	-9.495E+0	-8.421E+0	-1.208E+1	-6.955E+0	-6.980E+0	-9.174E+0	-6.742E+0	1.651E+0	-6.474E+0	-8.631E+0
-2.37E-1	-8.966E+0	-8.069E+0	-1.166E+1	-6.594E+0	-6.679E+0	-8.940E+0	-6.436E+0	1.697E+0	-6.294E+0	-8.386E+0
-1.59E-2	-8.395E+0	-7.693E+0	-1.118E+1	-6.196E+0	-6.357E+0	-8.686E+0	-6.108E+0	1.723E+0	-6.108E+0	-8.119E+0
2.01E-1	-7.774E+0	-7.281E+0	-1.061E+1	-5.733E+0	-6.004E+0	-8.393E+0	-5.746E+0	1.724E+0	-5.902E+0	-7.810E+0
4.17E-1	-7.081E+0	-6.807E+0	-9.879E+0	-5.162E+0	-5.604E+0	-8.030E+0	-5.332E+0	1.680E+0	-5.660E+0	-7.426E+0
6.47E-1	-6.242E+0	-6.234E+0	-8.911E+0	-4.422E+0	-5.109E+0	-7.562E+0	-4.814E+0	1.546E+0	-5.403E+0	-6.928E+0
8.12E-1	-5.115E+0	-5.601E+0	-7.765E+0	-3.508E+0	-4.492E+0	-7.077E+0	-4.135E+0	1.088E+0	-5.381E+0	-6.378E+0

Table 14. Logarithms of molecular partial pressures in Sobotka's sunspot model 13

Log Tau	AlH ⁺	C ₂	CH ⁺	CN ⁺	CO ⁺	H ₂	HCl ⁺	HF ⁺	MgH ⁺	N ₂
-4.52E+0	-9.480E+0	-3.056E+0	-1.866E+1	-2.311E+1	-1.029E+1	-5.566E+0	-1.807E+1	-2.296E+1	-8.143E+0	-2.237E+1
-4.40E+0	-9.202E+0	-3.014E+0	-1.832E+1	-2.277E+1	-1.006E+1	-5.322E+0	-1.775E+1	-2.265E+1	-7.875E+0	-2.203E+1
-4.24E+0	-8.926E+0	-2.969E+0	-1.797E+1	-2.242E+1	-9.830E+0	-5.079E+0	-1.743E+1	-2.232E+1	-7.607E+0	-2.168E+1
-4.03E+0	-8.647E+0	-2.924E+0	-1.761E+1	-2.206E+1	-9.592E+0	-4.834E+0	-1.710E+1	-2.200E+1	-7.337E+0	-2.132E+1
-3.79E+0	-8.365E+0	-2.876E+0	-1.723E+1	-2.167E+1	-9.341E+0	-4.585E+0	-1.677E+1	-2.165E+1	-7.061E+0	-2.095E+1
-3.53E+0	-8.086E+0	-2.823E+0	-1.683E+1	-2.126E+1	-9.078E+0	-4.334E+0	-1.643E+1	-2.129E+1	-6.784E+0	-2.056E+1
-3.27E+0	-7.807E+0	-2.768E+0	-1.642E+1	-2.084E+1	-8.809E+0	-4.083E+0	-1.609E+1	-2.092E+1	-6.507E+0	-2.015E+1
-3.00E+0	-7.523E+0	-2.707E+0	-1.598E+1	-2.037E+1	-8.520E+0	-3.821E+0	-1.573E+1	-2.052E+1	-6.220E+0	-1.972E+1
-2.73E+0	-7.239E+0	-2.644E+0	-1.552E+1	-1.988E+1	-8.221E+0	-3.556E+0	-1.537E+1	-2.011E+1	-5.929E+0	-1.926E+1
-2.46E+0	-7.954E+0	-2.575E+0	-1.503E+1	-1.937E+1	-7.908E+0	-3.285E+0	-1.499E+1	-1.968E+1	-5.634E+0	-1.879E+1
-2.20E+0	-6.666E+0	-2.500E+0	-1.450E+1	-1.880E+1	-7.571E+0	-3.002E+0	-1.459E+1	-1.921E+1	-5.330E+0	-1.828E+1
-1.94E+0	-6.372E+0	-2.418E+0	-1.392E+1	-1.819E+1	-7.209E+0	-2.705E+0	-1.417E+1	-1.871E+1	-5.012E+0	-1.773E+1
-1.69E+0	-6.081E+0	-2.329E+0	-1.331E+1	-1.753E+1	-6.829E+0	-2.402E+0	-1.374E+1	-1.818E+1	-4.691E+0	-1.715E+1
-1.44E+0	-5.787E+0	-2.230E+0	-1.264E+1	-1.680E+1	-6.415E+0	-2.082E+0	-1.328E+1	-1.760E+1	-4.354E+0	-1.651E+1
-1.19E+0	-5.491E+0	-2.119E+0	-1.189E+1	-1.599E+1	-5.962E+0	-1.744E+0	-1.278E+1	-1.697E+1	-4.003E+0	-1.582E+1
-9.51E-1	-5.201E+0	-1.994E+0	-1.107E+1	-1.509E+1	-5.468E+0	-1.392E+0	-1.226E+1	-1.628E+1	-3.640E+0	-1.505E+1
-7.10E-1	-5.917E+0	-1.851E+0	-1.015E+1	-1.407E+1	-4.920E+0	-1.023E+0	-1.169E+1	-1.551E+1	-3.265E+0	-1.420E+1
-4.66E-1	-4.654E+0	-1.681E+0	-9.080E+0	-1.289E+1	-4.299E+0	-6.437E-1	-1.107E+1	-1.464E+1	-2.884E+0	-1.324E+1
-2.10E-1	-4.422E+0	-1.474E+0	-7.812E+0	-1.147E+1	-3.574E+0	-2.555E-1	-1.040E+1	-1.364E+1	-2.504E+0	-1.213E+1
6.45E-2	-4.230E+0	-1.204E+0	-6.203E+0	-9.709E+0	-2.661E+0	-1.591E-1	-9.605E+0	-1.247E+1	-2.142E+0	-1.084E+1

Table 14. Continued

Log Tau	NH ⁺	NO ⁺	O ₂ ⁺	OH ⁺	PH ⁺	PO ⁺	SH ⁺	SiH ⁺	SiO ⁺	SO ⁺
-4.52E+0	-2.042E+1	-1.609E+1	-2.043E+1	-1.432E+1	-1.348E+1	-1.433E+1	-1.323E+1	-1.963E+0	-1.231E+1	-1.393E+1
-4.40E+0	-2.005E+1	-1.579E+1	-2.006E+1	-1.400E+1	-1.318E+1	-1.406E+1	-1.294E+1	-1.811E+0	-1.209E+1	-1.366E+1
-4.24E+0	-1.966E+1	-1.549E+1	-1.970E+1	-1.367E+1	-1.289E+1	-1.380E+1	-1.264E+1	-1.653E+0	-1.185E+1	-1.338E+1
-4.03E+0	-1.927E+1	-1.518E+1	-1.933E+1	-1.335E+1	-1.260E+1	-1.353E+1	-1.234E+1	-1.494E+0	-1.161E+1	-1.311E+1
-3.79E+0	-1.886E+1	-1.486E+1	-1.895E+1	-1.302E+1	-1.229E+1	-1.325E+1	-1.204E+1	-1.325E+0	-1.136E+1	-1.283E+1
-3.53E+0	-1.843E+1	-1.453E+1	-1.857E+1	-1.268E+1	-1.198E+1	-1.298E+1	-1.173E+1	-1.148E+0	-1.109E+1	-1.254E+1
-3.27E+0	-1.800E+1	-1.420E+1	-1.818E+1	-1.234E+1	-1.168E+1	-1.270E+1	-1.142E+1	-9.667E-1	-1.082E+1	-1.226E+1
-3.00E+0	-1.754E+1	-1.385E+1	-1.777E+1	-1.198E+1	-1.135E+1	-1.242E+1	-1.110E+1	-7.700E-1	-1.053E+1	-1.198E+1
-2.73E+0	-1.706E+1	-1.349E+1	-1.736E+1	-1.162E+1	-1.102E+1	-1.214E+1	-1.077E+1	-5.659E-1	-1.023E+1	-1.169E+1
-2.46E+0	-1.656E+1	-1.312E+1	-1.694E+1	-1.125E+1	-1.069E+1	-1.185E+1	-1.044E+1	-3.504E-1	-9.920E+0	-1.139E+1
-2.20E+0	-1.602E+1	-1.272E+1	-1.651E+1	-1.086E+1	-1.034E+1	-1.156E+1	-1.009E+1	-1.176E-1	-9.583E+0	-1.110E+1
-1.94E+0	-1.546E+1	-1.231E+1	-1.605E+1	-1.045E+1	-9.968E+0	-1.125E+1	-9.727E+0	1.342E-1	-9.222E+0	-1.079E+1
-1.69E+0	-1.486E+1	-1.188E+1	-1.558E+1	-1.004E+1	-9.592E+0	-1.094E+1	-9.355E+0	3.977E-1	-8.846E+0	-1.048E+1
-1.44E+0	-1.421E+1	-1.142E+1	-1.509E+1	-9.595E+0	-9.195E+0	-1.063E+1	-8.963E+0	6.833E-1	-8.439E+0	-1.016E+1
-1.19E+0	-1.350E+1	-1.093E+1	-1.457E+1	-9.127E+0	-8.777E+0	-1.031E+1	-8.549E+0	9.895E-1	-8.003E+0	-9.832E+0
-9.51E+0	-1.273E+1	-1.040E+1	-1.402E+1	-8.633E+0	-8.399E+0	-9.978E+0	-8.115E+0	1.306E+0	-7.544E+0	-9.496E+0
-7.10E-1	-1.187E+1	-9.827E+0	-1.343E+1	-8.104E+0	-7.878E+0	-9.642E+0	-7.654E+0	1.616E+0	-7.072E+0	-9.149E+0
-4.66E-1	-1.091E+1	-9.199E+0	-1.279E+1	-7.535E+0	-7.391E+0	-9.303E+0	-7.165E+0	1.876E+0	-6.621E+0	-8.795E+0
-2.10E-1	-9.811E+0	-8.499E+0	-1.208E+1	-6.911E+0	-6.871E+0	-8.959E+0	-6.639E+0	2.010E+0	-6.246E+0	-8.429E+0
6.45E-2	-8.495E+0	-7.692E+0	-1.119E+1	-6.164E+0	-6.278E+0	-8.572E+0	-6.033E+0	1.956E+0	-5.960E+0	-8.013E+0

Table 15. Logarithms of molecular partial pressures in Maltby *et al.*'s sunspot model E

Log Tau	AlH*	C ₂	CH*	CN*	CO*	H ₂	HCl*	HF*	MgH*	N ₂
-4.68E+0	-1.175E+1	-1.288E+1	-8.706E+0	-1.212E+1	-5.423E+0	-4.098E+0	-1.354E+1	-1.606E+1	-9.334E+0	-1.442E+1
-4.52E+0	-1.021E+1	-1.719E+1	-1.135E+1	-1.436E+1	-6.096E+0	-4.728E+0	-1.546E+1	-1.841E+1	-7.570E+0	-1.616E+1
-4.30E+0	-9.333E+0	-1.972E+1	-1.248E+1	-1.572E+1	-6.687E+0	-4.376E+0	-1.544E+1	-1.854E+1	-6.924E+0	-1.672E+1
-3.70E+0	-8.138E+0	-2.144E+1	-1.301E+1	-1.664E+1	-6.901E+0	-3.681E+0	-1.492E+1	-1.835E+1	-6.134E+0	-1.707E+1
-2.52E+0	-6.750E+0	-2.206E+1	-1.285E+1	-1.683E+1	-6.699E+0	-2.746E+0	-1.397E+1	-1.794E+1	-5.122E+0	-1.683E+1
-1.40E+0	-5.741E+0	-2.162E+1	-1.225E+1	-1.636E+1	-6.240E+0	-2.012E+0	-1.310E+1	-1.730E+1	-4.283E+0	-1.617E+1
-1.00E+0	-5.409E+0	-2.140E+1	-1.202E+1	-1.614E+1	-6.059E+0	-1.774E+0	-1.280E+1	-1.706E+1	-4.001E+0	-1.590E+1
-9.00E-1	-5.319E+0	-2.131E+1	-1.194E+1	-1.607E+1	-6.001E+0	-1.707E+0	-1.272E+1	-1.698E+1	-3.921E+0	-1.582E+1
-8.01E-1	-5.202E+0	-2.097E+1	-1.170E+1	-1.581E+1	-5.852E+0	-1.586E+0	-1.255E+1	-1.677E+1	-3.794E+0	-1.559E+1
-6.99E-1	-5.086E+0	-2.063E+1	-1.146E+1	-1.556E+1	-5.706E+0	-1.468E+0	-1.238E+1	-1.657E+1	-3.667E+0	-1.537E+1
-6.00E-1	-5.962E+0	-2.017E+1	-1.116E+1	-1.523E+1	-5.519E+0	-1.327E+0	-1.217E+1	-1.631E+1	-3.522E+0	-1.508E+1
-5.00E-1	-5.852E+0	-1.985E+1	-1.093E+1	-1.499E+1	-5.379E+0	-1.213E+0	-1.201E+1	-1.611E+1	-3.401E+0	-1.487E+1
-4.00E-1	-4.721E+0	-1.929E+1	-1.056E+1	-1.459E+1	-5.159E+0	-1.054E+0	-1.178E+1	-1.580E+1	-3.240E+0	-1.453E+1
-3.00E-1	-4.596E+0	-1.875E+1	-1.020E+1	-1.420E+1	-4.944E+0	-9.007E-1	-1.155E+1	-1.551E+1	-3.083E+0	-1.420E+1
-2.00E-1	-4.467E+0	-1.811E+1	-9.792E+0	-1.374E+1	-4.699E+0	-7.322E-1	-1.129E+1	-1.516E+1	-2.914E+0	-1.383E+1
-1.00E-1	-4.340E+0	-1.739E+1	-9.330E+0	-1.324E+1	-4.427E+0	-5.543E-1	-1.102E+1	-1.478E+1	-2.737E+0	-1.341E+1
0.00E+0	-4.216E+0	-1.660E+1	-8.827E+0	-1.268E+1	-4.134E+0	-3.709E-1	-1.073E+1	-1.437E+1	-2.556E+0	-1.296E+1
1.00E-1	-4.090E+0	-1.546E+1	-8.124E+0	-1.190E+1	-3.730E+0	-1.449E-1	-1.035E+1	-1.382E+1	-2.338E+0	-1.234E+1
1.99E-1	-3.985E+0	-1.422E+1	-7.375E+0	-1.106E+1	-3.304E+0	7.095E-2	-9.968E+0	-1.323E+1	-2.135E+0	-1.170E+1
3.01E-1	-3.898E+0	-1.299E+1	-6.638E+0	-1.024E+1	-2.884E+0	2.699E-1	-9.602E+0	-1.268E+1	-1.955E+0	-1.109E+1
4.00E-1	-3.832E+0	-1.164E+1	-5.839E+0	-9.377E+0	-2.428E+0	4.689E-1	-9.217E+0	-1.210E+1	-1.793E+0	-1.048E+1
5.00E-1	-3.779E+0	-1.045E+1	-5.129E+0	-8.636E+0	-2.018E+0	6.481E-1	-8.866E+0	-1.160E+1	-1.669E+0	-9.971E+0
6.00E-1	-3.744E+0	-9.279E+0	-4.426E+0	-7.938E+0	-1.608E+0	8.324E-1	-8.498E+0	-1.109E+1	-1.574E+0	-9.513E+0
7.00E-1	-3.710E+0	-8.354E+0	-3.854E+0	-7.402E+0	-1.278E+0	1.005E+0	-8.156E+0	-1.065E+1	-1.516E+0	-9.151E+0
8.00E-1	-3.684E+0	-7.579E+0	-3.350E+0	-6.956E+0	-1.014E+0	1.187E+0	-7.804E+0	-1.022E+1	-1.485E+0	-8.816E+0
9.00E-1	-3.656E+0	-7.020E+0	-2.962E+0	-6.627E+0	-8.499E-1	1.360E+0	-7.482E+0	-9.829E+0	-1.468E+0	-8.524E+0
1.00E+0	-3.629E+0	-6.563E+0	-2.624E+0	-6.354E+0	-7.587E-1	1.532E+0	-7.160E+0	-9.447E+0	-1.464E+0	-8.240E+0
1.10E+0	-3.601E+0	-6.219E+0	-2.358E+0	-6.150E+0	-7.358E-1	1.678E+0	-6.878E+0	-9.112E+0	-1.465E+0	-7.994E+0
1.20E+0	-3.574E+0	-5.957E+0	-2.154E+0	-6.004E+0	-7.649E-1	1.786E+0	-6.643E+0	-8.830E+0	-1.470E+0	-7.795E+0
1.30E+0	-3.550E+0	-5.748E+0	-1.992E+0	-5.900E+0	-8.333E-1	1.862E+0	-6.445E+0	-8.588E+0	-1.479E+0	-7.632E+0

Table 15. Continued

Log Tau	NH ⁺	NO ⁺	O ₂ ⁺	OH ⁺	PH ⁺	PO ⁺	SH ⁺	SiH ⁺	SiO ⁺	SO ⁺
-4.68E+0	-1.202E+1	-1.132E+1	-1.438E+1	-9.808E+0	-1.073E+1	-1.286E+1	-1.027E+1	-4.789E+0	-1.208E+1	-1.208E+1
-4.52E+0	-1.477E+1	-1.272E+1	-1.734E+1	-1.192E+1	-1.170E+1	-1.350E+1	-1.147E+1	-1.699E+0	-1.050E+1	-1.301E+1
-4.30E+0	-1.526E+1	-1.283E+1	-1.747E+1	-1.189E+1	-1.152E+1	-1.319E+1	-1.130E+1	-8.934E-1	-1.002E+1	-1.272E+1
-3.70E+0	-1.530E+1	-1.264E+1	-1.700E+1	-1.135E+1	-1.092E+1	-1.248E+1	-1.070E+1	-1.016E-1	-9.379E+0	-1.203E+1
-2.52E+0	-1.471E+1	-1.200E+1	-1.597E+1	-1.037E+1	-9.941E+0	-1.146E+1	-9.720E+0	4.261E-1	-8.806E+0	-1.101E+1
-1.40E+0	-1.387E+1	-1.124E+1	-1.492E+1	-9.445E+0	-9.076E+0	-1.059E+1	-8.849E+0	7.615E-1	-8.280E+0	-1.012E+1
-1.00E+0	-1.355E+1	-1.096E+1	-1.454E+1	-9.125E+0	-8.783E+0	-1.029E+1	-8.552E+0	8.732E-1	-8.087E+0	-9.808E+0
-9.00E-1	-1.346E+1	-1.087E+1	-1.443E+1	-9.033E+0	-8.700E+0	-1.020E+1	-8.468E+0	9.086E-1	-8.027E+0	-9.723E+0
-8.01E-1	-1.322E+1	-1.070E+1	-1.425E+1	-8.869E+0	-8.552E+0	-1.008E+1	-8.321E+0	1.009E+0	-7.882E+0	-9.600E+0
-6.99E-1	-1.299E+1	-1.054E+1	-1.406E+1	-8.706E+0	-8.406E+0	-9.963E+0	-8.176E+0	1.107E+0	-7.739E+0	-9.478E+0
-6.00E-1	-1.270E+1	-1.034E+1	-1.385E+1	-8.512E+0	-8.233E+0	-9.829E+0	-8.005E+0	1.232E+0	-7.561E+0	-9.343E+0
-5.00E-1	-1.248E+1	-1.018E+1	-1.368E+1	-8.356E+0	-8.093E+0	-9.715E+0	-7.866E+0	1.324E+0	-7.427E+0	-9.226E+0
-4.00E-1	-1.213E+1	-9.944E+0	-1.344E+1	-8.137E+0	-7.899E+0	-9.571E+0	-7.673E+0	1.467E+0	-7.223E+0	-9.079E+0
-3.00E-1	-1.180E+1	-9.718E+0	-1.320E+1	-7.924E+0	-7.710E+0	-9.430E+0	-7.485E+0	1.601E+0	-7.029E+0	-8.935E+0
-2.00E-1	-1.142E+1	-9.464E+0	-1.294E+1	-7.688E+0	-7.503E+0	-9.281E+0	-7.279E+0	1.745E+0	-6.817E+0	-8.782E+0
-1.00E-1	-1.100E+1	-9.188E+0	-1.266E+1	-7.435E+0	-7.284E+0	-9.127E+0	-7.059E+0	1.890E+0	-6.597E+0	-8.622E+0
0.00E+0	-1.055E+1	-8.896E+0	-1.237E+1	-7.169E+0	-7.055E+0	-8.970E+0	-6.829E+0	2.022E+0	-6.380E+0	-8.458E+0
1.00E-1	-9.945E+0	-8.510E+0	-1.199E+1	-6.827E+0	-6.766E+0	-8.784E+0	-6.537E+0	2.147E+0	-6.136E+0	-8.261E+0
1.99E-1	-9.310E+0	-8.116E+0	-1.159E+1	-6.479E+0	-6.479E+0	-8.605E+0	-6.246E+0	2.207E+0	-5.942E+0	-8.069E+0
3.01E-1	-8.702E+0	-7.742E+0	-1.120E+1	-6.142E+0	-6.207E+0	-8.433E+0	-5.967E+0	2.212E+0	-5.795E+0	-7.883E+0
4.00E-1	-8.066E+0	-7.356E+0	-1.077E+1	-5.778E+0	-5.923E+0	-8.250E+0	-5.676E+0	2.169E+0	-5.669E+0	-7.684E+0
5.00E-1	-7.514E+0	-7.017E+0	-1.034E+1	-5.430E+0	-5.664E+0	-8.065E+0	-5.408E+0	2.110E+0	-5.555E+0	-7.484E+0
6.00E-1	-6.968E+0	-6.671E+0	-9.827E+0	-5.034E+0	-5.393E+0	-7.843E+0	-5.126E+0	2.025E+0	-5.422E+0	-7.246E+0
7.00E-1	-6.495E+0	-6.355E+0	-9.301E+0	-4.641E+0	-5.141E+0	-7.610E+0	-4.863E+0	1.937E+0	-5.284E+0	-6.996E+0
8.00E-1	-6.029E+0	-6.040E+0	-8.751E+0	-4.230E+0	-4.881E+0	-7.360E+0	-4.588E+0	1.835E+0	-5.151E+0	-6.727E+0
9.00E-1	-5.615E+0	-5.773E+0	-8.282E+0	-3.869E+0	-4.642E+0	-7.142E+0	-4.334E+0	1.732E+0	-5.060E+0	-6.492E+0
1.00E+0	-5.204E+0	-5.530E+0	-7.852E+0	-3.527E+0	-4.409E+0	-6.949E+0	-4.080E+0	1.600E+0	-5.017E+0	-6.278E+0
1.10E+0	-4.840E+0	-5.337E+0	-7.501E+0	-3.240E+0	-4.213E+0	-6.805E+0	-3.861E+0	1.448E+0	-5.021E+0	-6.111E+0
1.20E+0	-4.532E+0	-5.195E+0	-7.219E+0	-3.009E+0	-4.065E+0	-6.712E+0	-3.686E+0	1.283E+0	-5.058E+0	-5.992E+0
1.30E+0	-4.263E+0	-5.091E+0	-6.984E+0	-3.957E+0	-3.957E+0	-6.660E+0	-3.548E+0	1.106E+0	-5.115E+0	-5.912E+0

Table 16. Logarithms of molecular partial pressures in Maltby *et al.*'s sunspot model M

Log Tau	AlH ⁺	C ₂	CH ⁺	CN ⁺	CO ⁺	H ₂	HCl ⁺	HF ⁺	MgH ⁺	N ₂ ⁺
-4.68E+0	-1.177E+1	-1.293E+1	-8.759E+0	-1.217E+1	-5.477E+0	-4.153E+0	-1.360E+1	-1.612E+1	-9.353E+0	-1.447E+1
-4.52E+0	-1.026E+1	-1.621E+1	-1.078E+1	-1.381E+1	-5.758E+0	-4.620E+0	-1.520E+1	-1.810E+1	-7.612E+0	-1.586E+1
-4.30E+0	-9.434E+0	-1.854E+1	-1.186E+1	-1.499E+1	-6.354E+0	-4.360E+0	-1.525E+1	-1.827E+1	-6.953E+0	-1.627E+1
-3.70E+0	-8.260E+0	-2.012E+1	-1.232E+1	-1.579E+1	-6.525E+0	-3.660E+0	-1.472E+1	-1.795E+1	-6.115E+0	-1.646E+1
-2.52E+0	-6.765E+0	-2.070E+1	-1.208E+1	-1.591E+1	-6.264E+0	-2.617E+0	-1.367E+1	-1.735E+1	-4.994E+0	-1.614E+1
-1.40E+0	-5.695E+0	-2.055E+1	-1.162E+1	-1.562E+1	-5.880E+0	-1.845E+0	-1.280E+1	-1.680E+1	-4.133E+0	-1.560E+1
-1.00E+0	-5.300E+0	-1.960E+1	-1.093E+1	-1.490E+1	-5.446E+0	-1.464E+0	-1.227E+1	-1.620E+1	-3.722E+0	-1.495E+1
-9.00E-1	-5.203E+0	-1.940E+1	-1.078E+1	-1.475E+1	-5.350E+0	-1.375E+0	-1.215E+1	-1.606E+1	-3.624E+0	-1.480E+1
-8.01E-1	-5.099E+0	-1.908E+1	-1.068E+1	-1.452E+1	-5.215E+0	-1.266E+0	-1.200E+1	-1.588E+1	-3.509E+0	-1.460E+1
-6.99E-1	-5.993E+0	-1.878E+1	-1.035E+1	-1.429E+1	-5.083E+0	-1.158E+0	-1.184E+1	-1.569E+1	-3.394E+0	-1.440E+1
-6.00E-1	-4.883E+0	-1.836E+1	-1.007E+1	-1.399E+1	-4.913E+0	-1.032E+0	-1.166E+1	-1.546E+1	-3.263E+0	-1.414E+1
-5.00E-1	-4.775E+0	-1.796E+1	-9.803E+0	-1.370E+1	-4.749E+0	-9.101E-1	-1.148E+1	-1.523E+1	-3.136E+0	-1.389E+1
-4.00E-1	-4.663E+0	-1.745E+1	-9.474E+0	-1.334E+1	-4.551E+0	-7.730E-1	-1.127E+1	-1.496E+1	-2.995E+0	-1.358E+1
-3.00E-1	-4.551E+0	-1.686E+1	-9.093E+0	-1.292E+1	-4.326E+0	-6.251E-1	-1.104E+1	-1.464E+1	-2.844E+0	-1.324E+1
-2.00E-1	-4.444E+0	-1.629E+1	-8.726E+0	-1.252E+1	-4.108E+0	-4.840E-1	-1.082E+1	-1.434E+1	-2.702E+0	-1.291E+1
-1.00E-1	-4.337E+0	-1.554E+1	-8.259E+0	-1.200E+1	-3.836E+0	-3.227E-1	-1.056E+1	-1.397E+1	-2.542E+0	-1.250E+1
0.00E+0	-4.237E+0	-1.474E+1	-7.763E+0	-1.145E+1	-3.548E+0	-1.613E-1	-1.028E+1	-1.358E+1	-2.384E+0	-1.206E+1
1.00E-1	-4.144E+0	-1.364E+1	-7.097E+0	-1.071E+1	-3.166E+0	2.709E-2	-9.945E+0	-1.307E+1	-2.208E+0	-1.150E+1
1.99E-1	-4.068E+0	-1.246E+1	-6.393E+0	-9.941E+0	-2.763E+0	2.107E-1	-9.599E+0	-1.255E+1	-2.049E+0	-1.094E+1
3.01E-1	-4.005E+0	-1.124E+1	-5.673E+0	-9.175E+0	-2.350E+0	3.906E-1	-9.247E+0	-1.204E+1	-1.911E+0	-1.041E+1
4.00E-1	-3.958E+0	-1.006E+1	-4.970E+0	-8.459E+0	-1.943E+0	5.674E-1	-8.893E+0	-1.155E+1	-1.803E+0	-9.933E+0
5.00E-1	-3.921E+0	-8.998E+0	-4.320E+0	-7.833E+0	-1.563E+0	7.500E-1	-8.530E+0	-1.108E+1	-1.725E+0	-9.520E+0
6.00E-1	-3.891E+0	-8.097E+0	-3.748E+0	-7.312E+0	-1.242E+0	9.421E-1	-8.158E+0	-1.061E+1	-1.679E+0	-9.150E+0
7.00E-1	-3.864E+0	-7.398E+0	-3.276E+0	-6.905E+0	-1.019E+0	1.137E+0	-7.792E+0	-1.017E+1	-1.659E+0	-8.813E+0
8.00E-1	-3.840E+0	-6.851E+0	-2.878E+0	-6.578E+0	-8.927E-1	1.333E+0	-7.427E+0	-9.736E+0	-1.657E+0	-8.488E+0
9.00E-1	-3.812E+0	-6.464E+0	-2.581E+0	-6.347E+0	-8.543E-1	1.495E+0	-7.116E+0	-9.369E+0	-1.660E+0	-8.217E+0
1.00E+0	-3.787E+0	-6.157E+0	-2.341E+0	-6.175E+0	-8.838E-1	1.622E+0	-6.842E+0	-9.041E+0	-1.672E+0	-7.984E+0
1.10E+0	-3.769E+0	-5.926E+0	-2.163E+0	-6.063E+0	-9.682E-1	1.703E+0	-6.623E+0	-8.771E+0	-1.691E+0	-7.804E+0
1.20E+0	-3.758E+0	-5.752E+0	-2.033E+0	-5.996E+0	-1.083E+0	1.747E+0	-6.452E+0	-8.554E+0	-1.716E+0	-7.670E+0
1.30E+0	-3.753E+0	-5.608E+0	-1.930E+0	-5.955E+0	-1.223E+0	1.768E+0	-6.306E+0	-8.362E+0	-1.748E+0	-7.561E+0

Table 16. Continued

Log Tau	NH ⁺	NO ⁺	O ₂	OH ⁺	PH ⁺	PO ⁺	SH ⁺	SiH ⁺	SiO ⁺	SO ⁺
-4.68E+0	-1.208E+1	-1.137E+1	-1.444E+1	-9.863E+0	-1.076E+1	-1.290E+1	-1.032E+1	-4.809E+0	-1.210E+1	-1.212E+1
-4.52E+0	-1.438E+1	-1.249E+1	-1.696E+1	-1.164E+1	-1.151E+1	-1.335E+1	-1.128E+1	-1.826E+0	-1.046E+1	-1.285E+1
-4.30E+0	-1.482E+1	-1.260E+1	-1.723E+1	-1.172E+1	-1.141E+1	-1.316E+1	-1.119E+1	-1.092E+0	-1.006E+1	-1.268E+1
-3.70E+0	-1.478E+1	-1.234E+1	-1.675E+1	-1.117E+1	-1.080E+1	-1.246E+1	-1.058E+1	-2.170E-1	-9.339E+0	-1.200E+1
-2.52E+0	-1.409E+1	-1.163E+1	-1.565E+1	-1.010E+1	-9.733E+0	-1.137E+1	-9.513E+0	5.831E-1	-8.511E+0	-1.090E+1
-1.40E+0	-1.334E+1	-1.092E+1	-1.464E+1	-9.191E+0	-8.862E+0	-1.048E+1	-8.639E+0	9.855E-1	-7.969E+0	-1.000E+1
-1.00E+0	-1.264E+1	-1.041E+1	-1.406E+1	-8.673E+0	-8.396E+0	-1.008E+1	-8.172E+0	1.261E+0	-7.556E+0	-9.599E+0
-9.00E-1	-1.248E+1	-1.029E+1	-1.392E+1	-8.552E+0	-8.287E+0	-9.987E+0	-8.063E+0	1.322E+0	-7.463E+0	-9.501E+0
-8.01E-1	-1.227E+1	-1.014E+1	-1.375E+1	-8.402E+0	-8.153E+0	-9.879E+0	-7.930E+0	1.403E+0	-7.341E+0	-9.389E+0
-6.99E-1	-1.206E+1	-9.984E+0	-1.359E+1	-8.253E+0	-8.020E+0	-9.769E+0	-7.796E+0	1.482E+0	-7.220E+0	-9.277E+0
-6.00E-1	-1.180E+1	-9.800E+0	-1.339E+1	-8.077E+0	-7.865E+0	-9.648E+0	-7.641E+0	1.577E+0	-7.075E+0	-9.152E+0
-5.00E-1	-1.154E+1	-9.621E+0	-1.320E+1	-7.905E+0	-7.713E+0	-9.530E+0	-7.489E+0	1.665E+0	-6.936E+0	-9.031E+0
-4.00E-1	-1.123E+1	-9.413E+0	-1.298E+1	-7.709E+0	-7.542E+0	-9.401E+0	-7.318E+0	1.762E+0	-6.779E+0	-8.898E+0
-3.00E-1	-1.089E+1	-9.181E+0	-1.274E+1	-7.494E+0	-7.356E+0	-9.265E+0	-7.131E+0	1.859E+0	-6.615E+0	-8.757E+0
-2.00E-1	-1.055E+1	-8.958E+0	-1.250E+1	-7.287E+0	-7.178E+0	-9.135E+0	-6.951E+0	1.942E+0	-6.465E+0	-8.621E+0
-1.00E-1	-1.014E+1	-8.689E+0	-1.223E+1	-7.043E+0	-6.970E+0	-8.991E+0	-6.741E+0	2.018E+0	-6.304E+0	-8.469E+0
0.00E+0	-9.709E+0	-8.412E+0	-1.194E+1	-6.791E+0	-6.759E+0	-8.846E+0	-6.527E+0	2.073E+0	-6.157E+0	-8.316E+0
1.00E-1	-9.150E+0	-8.062E+0	-1.158E+1	-6.477E+0	-6.502E+0	-8.680E+0	-6.266E+0	2.093E+0	-6.008E+0	-8.138E+0
1.99E-1	-8.578E+0	-7.711E+0	-1.119E+1	-6.152E+0	-6.244E+0	-8.511E+0	-6.001E+0	2.072E+0	-5.885E+0	-7.956E+0
3.01E-1	-8.012E+0	-7.365E+0	-1.078E+1	-5.811E+0	-5.983E+0	-8.334E+0	-5.733E+0	2.020E+0	-5.771E+0	-7.764E+0
4.00E-1	-7.469E+0	-7.029E+0	-1.032E+1	-5.446E+0	-5.722E+0	-8.135E+0	-5.463E+0	1.946E+0	-5.652E+0	-7.549E+0
5.00E-1	-6.952E+0	-6.690E+0	-9.784E+0	-5.041E+0	-5.454E+0	-7.899E+0	-5.183E+0	1.860E+0	-5.510E+0	-7.296E+0
6.00E-1	-6.452E+0	-6.350E+0	-9.201E+0	-4.606E+0	-5.177E+0	-7.634E+0	-4.894E+0	1.761E+0	-5.360E+0	-7.013E+0
7.00E-1	-5.976E+0	-6.035E+0	-8.649E+0	-4.187E+0	-4.905E+0	-7.378E+0	-4.605E+0	1.649E+0	-5.241E+0	-6.738E+0
8.00E-1	-5.510E+0	-5.751E+0	-8.148E+0	-3.793E+0	-4.637E+0	-7.150E+0	-4.317E+0	1.504E+0	-5.181E+0	-6.488E+0
9.00E-1	-5.111E+0	-5.534E+0	-7.757E+0	-3.475E+0	-4.418E+0	-6.984E+0	-4.074E+0	1.344E+0	-5.181E+0	-6.298E+0
1.00E+0	-4.752E+0	-5.366E+0	-7.427E+0	-3.205E+0	-4.245E+0	-6.874E+0	-3.870E+0	1.148E+0	-5.227E+0	-6.158E+0
1.10E+0	-4.451E+0	-5.253E+0	-7.165E+0	-2.994E+0	-4.129E+0	-6.822E+0	-3.719E+0	9.354E-1	-5.304E+0	-6.073E+0
1.20E+0	-4.207E+0	-5.184E+0	-6.960E+0	-2.832E+0	-4.061E+0	-6.815E+0	-3.612E+0	7.238E-1	-5.392E+0	-6.030E+0
1.30E+0	-3.988E+0	-5.140E+0	-6.783E+0	-2.695E+0	-4.024E+0	-6.837E+0	-3.531E+0	5.040E-1	-5.491E+0	-6.013E+0

Table 17. Logarithms of molecular partial pressures in Malby *et al.*'s sunspot model L

Log Tau	AlH ⁺	C ₂	CH ⁺	CN ⁺	CO ⁺	H ₂	HCl ⁺	HF ⁺	MgH ⁺	N ₂
-4.68E+0	-1.168E+1	-1.287E+1	-8.701E+0	-1.211E+1	-5.419E+0	-4.097E+0	-1.354E+1	-1.606E+1	-9.269E+0	-1.442E+1
-4.52E+0	-1.030E+1	-1.501E+1	-1.006E+1	-1.313E+1	-5.314E+0	-4.414E+0	-1.479E+1	-1.761E+1	-7.656E+0	-1.545E+1
-4.30E+0	-9.550E+0	-1.634E+1	-1.062E+1	-1.368E+1	-5.628E+0	-4.162E+0	-1.475E+1	-1.765E+1	-6.961E+0	-1.548E+1
-3.70E+0	-8.454E+0	-1.716E+1	-1.070E+1	-1.390E+1	-5.607E+0	-3.491E+0	-1.415E+1	-1.711E+1	-6.039E+0	-1.518E+1
-2.52E+0	-6.895E+0	-1.766E+1	-1.041E+1	-1.390E+1	-5.313E+0	-2.401E+0	-1.306E+1	-1.620E+1	-4.793E+0	-1.467E+1
-1.40E+0	-5.688E+0	-1.811E+1	-1.021E+1	-1.397E+1	-5.087E+0	-1.561E+0	-1.221E+1	-1.572E+1	-3.870E+0	-1.436E+1
-1.00E+0	-5.310E+0	-1.794E+1	-9.979E+0	-1.378E+1	-4.914E+0	-1.275E+0	-1.188E+1	-1.546E+1	-3.554E+0	-1.411E+1
-9.00E-1	-5.211E+0	-1.776E+1	-9.845E+0	-1.365E+1	-4.829E+0	-1.188E+0	-1.176E+1	-1.534E+1	-3.460E+0	-1.398E+1
-8.01E-1	-5.106E+0	-1.737E+1	-9.581E+0	-1.336E+1	-4.668E+0	-1.069E+0	-1.159E+1	-1.512E+1	-3.336E+0	-1.370E+1
-6.99E-1	-5.001E+0	-1.709E+1	-9.384E+0	-1.316E+1	-4.545E+0	-9.638E-1	-1.144E+1	-1.495E+1	-3.224E+0	-1.356E+1
-6.00E-1	-4.899E+0	-1.671E+1	-9.131E+0	-1.289E+1	-4.391E+0	-8.487E-1	-1.127E+1	-1.474E+1	-3.104E+0	-1.332E+1
-5.00E-1	-4.794E+0	-1.624E+1	-8.824E+0	-1.255E+1	-4.206E+0	-7.217E-1	-1.107E+1	-1.449E+1	-2.974E+0	-1.304E+1
-4.00E-1	-4.692E+0	-1.579E+1	-8.525E+0	-1.223E+1	-4.026E+0	-5.969E-1	-1.088E+1	-1.424E+1	-2.846E+0	-1.277E+1
-3.00E-1	-4.592E+0	-1.525E+1	-8.182E+0	-1.186E+1	-3.823E+0	-4.672E-1	-1.068E+1	-1.397E+1	-2.715E+0	-1.247E+1
-2.00E-1	-4.486E+0	-1.462E+1	-7.780E+0	-1.142E+1	-3.578E+0	-3.122E-1	-1.044E+1	-1.364E+1	-2.564E+0	-1.212E+1
-1.00E-1	-4.395E+0	-1.388E+1	-7.321E+0	-1.092E+1	-3.314E+0	-1.707E-1	-1.019E+1	-1.329E+1	-2.427E+0	-1.173E+1
0.00E+0	-4.313E+0	-1.308E+1	-6.838E+0	-1.039E+1	-3.038E+0	-3.060E-2	-9.938E+0	-1.294E+1	-2.298E+0	-1.134E+1
1.00E-1	-4.240E+0	-1.203E+1	-6.210E+0	-9.714E+0	-2.677E+0	1.336E-1	-9.625E+0	-1.249E+1	-2.161E+0	-1.085E+1
1.99E-1	-4.181E+0	-1.094E+1	-5.560E+0	-9.037E+0	-2.301E+0	2.998E-1	-9.300E+0	-1.203E+1	-2.042E+0	-1.039E+1
3.01E-1	-4.131E+0	-9.825E+0	-4.889E+0	-8.369E+0	-1.908E+0	4.806E-1	-8.945E+0	-1.156E+1	-1.942E+0	-9.947E+0
4.00E-1	-4.093E+0	-8.835E+0	-4.276E+0	-7.791E+0	-1.551E+0	6.669E-1	-8.581E+0	-1.110E+1	-1.875E+0	-9.558E+0
5.00E-1	-4.060E+0	-8.008E+0	-3.738E+0	-7.311E+0	-1.261E+0	8.635E-1	-8.207E+0	-1.064E+1	-1.837E+0	-9.199E+0
6.00E-1	-4.033E+0	-7.327E+0	-3.265E+0	-6.910E+0	-1.062E+0	1.075E+0	-7.814E+0	-1.017E+1	-1.825E+0	-8.843E+0
7.00E-1	-4.006E+0	-6.823E+0	-2.888E+0	-6.606E+0	-9.708E-1	1.273E+0	-7.444E+0	-9.734E+0	-1.828E+0	-8.516E+0
8.00E-1	-3.981E+0	-6.438E+0	-2.588E+0	-6.382E+0	-9.711E-1	1.436E+0	-7.114E+0	-9.342E+0	-1.842E+0	-8.232E+0
9.00E-1	-3.961E+0	-6.165E+0	-2.375E+0	-6.240E+0	-1.042E+0	1.540E+0	-6.858E+0	-9.032E+0	-1.862E+0	-8.019E+0
1.00E+0	-3.951E+0	-5.957E+0	-2.219E+0	-6.155E+0	-1.166E+0	1.597E+0	-6.655E+0	-8.776E+0	-1.893E+0	-7.858E+0
1.10E+0	-3.949E+0	-5.798E+0	-2.105E+0	-6.110E+0	-1.319E+0	1.620E+0	-6.495E+0	-8.565E+0	-1.932E+0	-7.737E+0
1.20E+0	-3.954E+0	-5.673E+0	-2.020E+0	-6.089E+0	-1.480E+0	1.625E+0	-6.365E+0	-8.389E+0	-1.974E+0	-7.645E+0
1.30E+0	-3.965E+0	-5.565E+0	-1.947E+0	-6.083E+0	-1.656E+0	1.618E+0	-6.248E+0	-8.223E+0	-2.024E+0	-7.564E+0

Table 17. Continued

Log Tau	NH ⁺	NO ⁺	O ₂ ⁺	OH ⁺	PH ⁺	PO ⁺	SH ⁺	SiH ⁺	SiO ⁺	SO ⁺
-4.68E+0	-1.202E+1	-1.132E+1	-1.438E+1	-9.806E+0	-1.070E+1	-1.283E+1	-1.025E+1	-4.725E+0	-1.202E+1	-1.206E+1
-4.52E+0	-1.382E+1	-1.211E+1	-1.632E+1	-1.117E+1	-1.119E+1	-1.306E+1	-1.096E+1	-1.995E+0	-1.035E+1	-1.254E+1
-4.30E+0	-1.396E+1	-1.210E+1	-1.657E+1	-1.122E+1	-1.105E+1	-1.293E+1	-1.082E+1	-1.328E+0	-9.990E+0	-1.243E+1
-3.70E+0	-1.357E+1	-1.164E+1	-1.605E+1	-1.064E+1	-1.042E+1	-1.228E+1	-1.019E+1	-5.297E-1	-9.286E+0	-1.179E+1
-2.52E+0	-1.276E+1	-1.084E+1	-1.496E+1	-9.549E+0	-9.319E+0	-1.118E+1	-9.096E+0	5.355E-1	-8.219E+0	-1.069E+1
-1.40E+0	-1.219E+1	-1.024E+1	-1.406E+1	-8.678E+0	-8.452E+0	-1.029E+1	-8.228E+0	1.251E+0	-7.473E+0	-9.792E+0
-1.00E+0	-1.187E+1	-9.955E+0	-1.368E+1	-8.336E+0	-8.128E+0	-9.969E+0	-7.904E+0	1.442E+0	-7.226E+0	-9.472E+0
-9.00E-1	-1.173E+1	-9.846E+0	-1.355E+1	-8.220E+0	-8.023E+0	-9.877E+0	-7.799E+0	1.496E+0	-7.143E+0	-9.378E+0
-8.01E-1	-1.148E+1	-9.671E+0	-1.336E+1	-8.052E+0	-7.875E+0	-9.760E+0	-7.650E+0	1.567E+0	-7.021E+0	-9.257E+0
-6.99E-1	-1.128E+1	-9.529E+0	-1.320E+1	-7.908E+0	-7.746E+0	-9.653E+0	-7.521E+0	1.632E+0	-6.918E+0	-9.147E+0
-6.00E-1	-1.104E+1	-9.361E+0	-1.301E+1	-7.745E+0	-7.603E+0	-9.539E+0	-7.377E+0	1.697E+0	-6.804E+0	-9.030E+0
-5.00E-1	-1.076E+1	-9.167E+0	-1.280E+1	-7.560E+0	-7.443E+0	-9.416E+0	-7.215E+0	1.763E+0	-6.679E+0	-8.902E+0
-4.00E-1	-1.048E+1	-8.977E+0	-1.260E+1	-7.379E+0	-7.285E+0	-9.295E+0	-7.057E+0	1.824E+0	-6.561E+0	-8.777E+0
-3.00E-1	-1.017E+1	-8.770E+0	-1.238E+1	-7.184E+0	-7.118E+0	-9.171E+0	-6.888E+0	1.876E+0	-6.443E+0	-8.647E+0
-2.00E-1	-9.811E+0	-8.527E+0	-1.212E+1	-6.955E+0	-6.922E+0	-9.023E+0	-6.690E+0	1.937E+0	-6.307E+0	-8.492E+0
-1.00E-1	-9.417E+0	-8.277E+0	-1.185E+1	-6.723E+0	-6.730E+0	-8.890E+0	-6.494E+0	1.955E+0	-6.196E+0	-8.352E+0
0.00E+0	-9.013E+0	-8.023E+0	-1.157E+1	-6.484E+0	-6.536E+0	-8.758E+0	-6.297E+0	1.956E+0	-6.094E+0	-8.210E+0
1.00E-1	-8.508E+0	-7.712E+0	-1.121E+1	-6.184E+0	-6.301E+0	-8.598E+0	-6.056E+0	1.924E+0	-5.986E+0	-8.038E+0
1.99E-1	-8.000E+0	-7.398E+0	-1.081E+1	-5.861E+0	-6.059E+0	-8.423E+0	-5.806E+0	1.872E+0	-5.878E+0	-7.849E+0
3.01E-1	-7.476E+0	-7.064E+0	-1.032E+1	-5.482E+0	-5.794E+0	-8.207E+0	-5.532E+0	1.801E+0	-5.746E+0	-7.618E+0
4.00E-1	-6.973E+0	-6.727E+0	-9.771E+0	-5.067E+0	-5.523E+0	-7.957E+0	-5.250E+0	1.716E+0	-5.597E+0	-7.351E+0
5.00E-1	-6.479E+0	-6.390E+0	-9.189E+0	-4.631E+0	-5.243E+0	-7.688E+0	-4.957E+0	1.616E+0	-5.451E+0	-7.064E+0
6.00E-1	-5.973E+0	-6.064E+0	-8.615E+0	-4.190E+0	-4.951E+0	-7.422E+0	-4.646E+0	1.483E+0	-5.347E+0	-6.777E+0
7.00E-1	-5.501E+0	-5.789E+0	-8.130E+0	-3.802E+0	-4.682E+0	-7.205E+0	-4.353E+0	1.316E+0	-5.317E+0	-6.535E+0
8.00E-1	-5.073E+0	-5.573E+0	-7.726E+0	-3.472E+0	-4.461E+0	-7.051E+0	-4.103E+0	1.106E+0	-5.354E+0	-6.350E+0
9.00E-1	-4.729E+0	-5.431E+0	-7.421E+0	-3.224E+0	-4.316E+0	-6.975E+0	-3.921E+0	8.804E-1	-5.429E+0	-6.239E+0
1.00E+0	-4.441E+0	-5.344E+0	-7.177E+0	-3.031E+0	-4.229E+0	-6.958E+0	-3.792E+0	6.352E-1	-5.532E+0	-6.183E+0
1.10E+0	-4.199E+0	-5.295E+0	-6.981E+0	-2.880E+0	-4.188E+0	-6.983E+0	-3.703E+0	3.890E-1	-5.645E+0	-6.164E+0
1.20E+0	-3.996E+0	-5.269E+0	-6.821E+0	-2.759E+0	-4.178E+0	-7.031E+0	-3.642E+0	1.550E-1	-5.758E+0	-6.169E+0
1.30E+0	-3.805E+0	-5.257E+0	-6.673E+0	-2.648E+0	-4.189E+0	-7.102E+0	-3.597E+0	-8.630E-2	-5.878E+0	-6.191E+0

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Note added in proof : The important molecule CaH could not be included in the study because of a lack of molecular data. The elemental abundances cited in Grevesse (1989) are essentially based upon the work by Anders and Grevesse (1989, *Geochim. Cosmochim. Acta* **53**, 197). The Carbon and Nitrogen abundances have since been revised to $\log N(\text{N}) = 8.00 \pm 0.05$ (Grevesse *et al.*, 1990, *Astr. Ap.* **232**, 225) and $\log N(\text{C}) = 8.60 \pm 0.05$ [Grevesse *et al.* (1990) *Astr. Ap.* to appear].

