REPORT UAG-82

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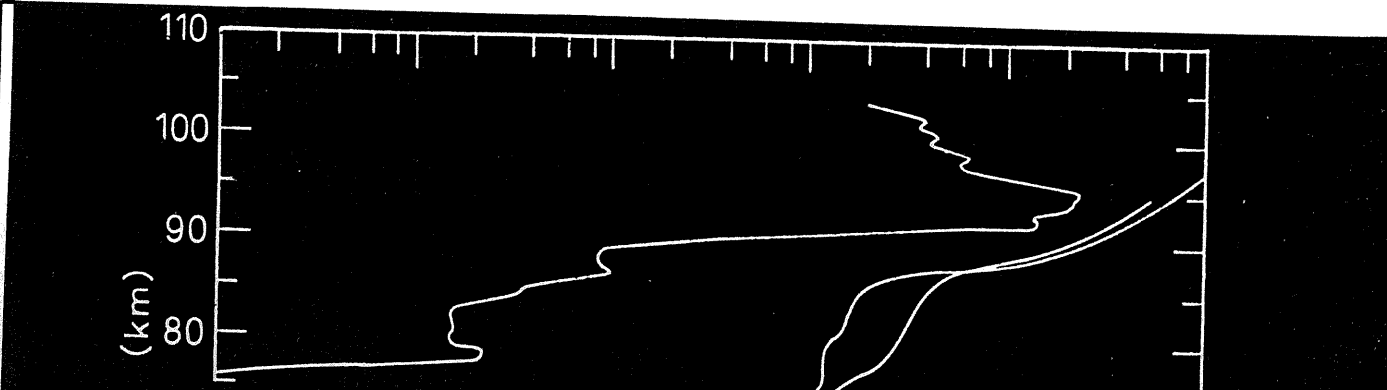
INTERNATIONAL REFERENCE IONOSPHERE - IRI 79

November 1981



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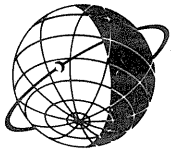


REPORT UAG-82

INTERNATIONAL REFERENCE IONOSPHERE - IRI 79

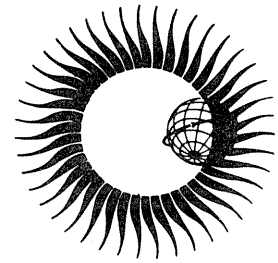
Report of URSI Working group G.4 (identical with COSPAR task group on International Reference Ionosphere)

Chairman: K. Rawer

Edited by

J. Virginia Lincoln and Raymond O. Conkright
National Geophysical and Solar-Terrestrial Data Center
NOAA, Boulder, Colorado

November 1981



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CONTENTS

1. CONTRIBUTED PAPERS

1.1 Introduction to IRI 1979

by

K. Rawer
University, D7800, Freiburg, F.R.G.

This report is the second edition of the International Reference Ionosphere (IRI) succeeding the first one, IRI 1978, and edited by the International Scientific Radio Union (URSI). It has been prepared by the Steering Committee (St. C.) on the International Reference Ionosphere (IRI) established by URSI and COSPAR with, at present, the following members: S.A. Bowhill, K.S.W. Champion, A.D. Danilov (v. chmn.), K. Rawer (chmn.), M.J. Rycroft, and J. Taubenheim.

The aim of the IRI is to establish a summary compendium of height profiles through the ionosphere for the four main plasma parameters, namely: plasma density, plasma temperatures of electrons and ions, and ion composition. These parameters are generated from a descriptive model containing reliable data that can be extracted and used to obtain average profiles. The IRI-generated parameters compare well with COSPAR International Reference Atmosphere (CIRA) values (last edition CIRA 1972). Basic material was contributed to our work by many colleagues. In addition to the members mentioned above, material was contributed by: P. Bauer (France), K.I. Maeda (Japan), S. Gnanalingam (Sri Lanka), H.G. Booker, J. Evans, J.V. Lincoln, H.A. Taylor (USA), E. Kazimirovskij, and T.N. Soboleva (USSR).

IRI is not a theoretical model. The emphasis of IRI is to summarize reliable experimental data when available. During the years of preparation, the St. C. made suggestions on the types of additional data to be included and other kinds of measurements to obtain data. There was, for example, a special symposium on the lower ionosphere in 1973 at Konstanz during which an agreement was reached on what data should be considered as primary inputs in that height range.

The sources used for the present IRI edition have been described in several publications, the most recent being Rawer [1977] and Rawer et al., [1978a,b]. From these papers it appears the "data base" is different for the different parameters and is rather poor for a few of them, in particular for ion composition. Regardless, the St. C. decided to publish a first edition of the IRI in 1978 in the hope that publication of a preliminary model would encourage research workers in the field to concentrate on filling the gaps. It is hoped this model will be discussed and criticized by colleagues working in different fields who are interested in the ionosphere.

A few improvements were introduced in the new programs IRIAL7 and IRIF07. These resulted from experience in my own group, and remarks obtained from colleagues, in particular S. Gnanalingam, T.L. Gulyaeva, and H. Maeda. Improvements were made to the electron density profile between the E and F regions for nighttime, and to the ion compositions below 300 km. Inconsistencies created under certain conditions with the original numerical programs were avoided with the new ones. Most of the corrections were given in the sheet entitled "Corrections to IRI 1978" (May 14, 1979) and follow up sheets dated August 20, 1979 and July 15, 1980. The present edition was current as of December 1980. There were a few more improvements made with regard to the classification of seasons. For the ion composition the transition from the lower to the upper height range was made continuous. More comments were obtained at the workshop on IRI held at Budapest in 1980. These comments will be used to make improvements and produce an amended edition later.

After combining the basic data from different sources, a critical evaluation of them was the first step undertaken. The St. C. found that a selective process was more appropriate than a statistical approach, where all the data would be combined without evaluating them. Various types of information not used as primary input can now be compared with the profiles presented. This enables conclusions to be drawn which will eventually lead to improvments of our model. It particularly applies to different types of radio wave propagation data not used as primary inputs.

A preliminary report was presented to the General Assembly of URSI in 1975 [Rawer et al., 1975]. URSI asked for the presentation of IRI in a form which could be readily applied by workers in the field. Unlike the presentation in the earlier editions of CIRA, it was felt that a computerized approach should be undertaken. In essence the IRI is a computer program which produces profiles (see section 5). To provide examples and give an opportunity to show the variability of the output we have produced numerical tables for certain locations and conditions (see section 4.1), as well as Figures with profile shapes for another, smaller set of basic conditions (see section 4.2). All examples were computed with the program IRIAL7.

The main programs are given in ALGOL-60* and FORTRAN-4. The profiles are calculated by descriptive functions suitably layered, with different equations being applied to the different height ranges. Standard coefficient input is now done inside the program itself, e.g. the ALGOL-procedures KOEFFB, KOEFF., KOEFG1..3, with the call-in by procedure SUFE. If input by a peripheral is desired, the data can easily be extracted from these procedures.

H.G. Booker [1977] expressed the opinion that, for full wave computations, a unique analytical profile function for the plasma density would be preferable. He proposed a particular system called "skeleton functions", which can be approximated by a sum of several Epstein-step-functions. These are of the form $1/(1 + \exp(-z))$, asymptotic values being 0 and 1 for z going towards large negative and positive values. A description along these

*ALGOL-60 program may be obtained upon request to World Data Center A for Solar-Terrestrial Physics. The FORTRAN-4 program will be found in Section 5.

or similar lines may be a future project. It appeared too difficult to deduce the parameters of these functions from the established characteristics of the ionospheric layers (see, however, T.L. Gulyaeva, 1981). Therefore, we felt that Booker's proposal could not be incorporated in our present schedule. To take account of his viewpoint, we have produced some profiles with the presentation he proposes. To this end, the Epstein parameters were obtained by a screen-controlled trial-and-error procedure of specific profiles. The programs to establish such profiles are IRIALA (ALGOL-60) and IRIALF (FORTRAN-4) by use of the input parameters IRIPAA [Rawer et al., 1978c, p. 74].

Two height ranges for temperature (different for ion and electron temperatures, day and night) were given with the upper or lower region described by one analytical function each.

For ion composition, we followed Booker's [1977] proposal with an amendment: instead of using the above step function we took the integral function obtained from it. In its simplest form it reads

$$A \cdot \ln((1 + \exp(z)) / (1 + \exp(z_0)))$$

and may be called an Epstein-transition, namely between the asymptotes y = constant for large negative values of z and y = A · z + constant for large positive values. The full profile is then described as a sum of such transition functions with a suitably chosen center coordinate z_0 and steepness A.

CIRA started with profiles for given locations, and the original intention was that the IRI should be similarly restricted. Later, it was found that a worldwide description would be more valuable. Sufficient data for all parameters and locations was not available to write a complete description. We followed an intermediate procedure and tried to give a continuous description in space and time where it was felt this was readily attainable.

The difficult question of which description would be taken for the worldwide variation of the values of the peak plasma density and its height was decided by taking over the well-known descriptive program of CCIR [Comité Consultatif International des Radio Communications, 1967] which is based on a particular kind of Fourier and Legendre development. The original Jones and Gallet [1960, 1962] publications produced the analysis in geographic coordinates. Introduction of Rawer's [1963] "modified dip" coordinate (Modip) considerably improved the consistency of the charts. Modip was taken as a basic variable in the final program adopted on the proposal of W.G. Baker [CCIR, 1967]. The geophysical argument is that, when interpolating on maps, the well-known magnetic dip control of the F2 layer is preserved when these coordinates are used but not with geographic coordinates. Our program therefore needs a magnetic field model which is given in procedure FIELD G. Additional information may be found in Sheikh et al. [1978]. In order to obtain the peak height, the CCIR program for the propagation factor M(3000)F2 is used together with an empirical relation based upon a critical review of recent publications [Bilitza et al., 1979].

We are aware that the CCIR schedule widely used for communication predictions has shortcomings, especially in the regions where ionospheric sounding stations are missing as in areas over the oceans and in some parts of the Southern Hemisphere. The set of coefficients needed for the computations was in fact uniquely derived from the measurements of groundbased ionosonde stations. These are recorded on the CCIR data tape which can be obtained at the International Telecommunication Union, Geneva. World Data Center-A/STP has a shortened version which contains only the coefficients for foF2 and M(3000)F2. The program assumes the use of the WDC-A/STP version (procedure/subroutine CCIRCA). A specific effort is underway in CCIR-IWP 6/3 to improve the data bases with satellite measurements. The St. C. feels this particular problem is outside of its own jurisdiction.

It was felt for users not in possession of a CCIR or WDC-A/STP coefficient tape an alternative description should be readily available. The programs IRIAL7 and IRIFO7 provide for the replacement of the CCIR representations with a much simpler description proposed by Chiu [1975]. His set of equations is largely based upon research conducted in Japan by T. Yonezawa [1971]. It does not use the many parameters that the CCIR model uses, so its ability to reproduce complex features is limited. In order to accomplish this simplification the special procedure/subroutine F2OUT (IRIAL7) must be cut out and be replaced by the procedure/subroutine IONDEM. The call to procedure/subroutine F2OUT must, of course, be replaced by a call to IONDEM with the correct variables in both programs.

The simplified programs, called IRIAL7A and IRIFO7A do not use the CCIR or WDC-A/STP tape as input. The worldwide representation of mean peak values of foF2 and hmF2 is better with the original programs than with the use of the subprogram IONDEM. The profile definition is based on the peak values, so a choice of the peak description does not seriously change the relative profile when a peak is taken as reference. As a third option, the program can also be applied with direct input of the peak data when these are available from other sources. The profile shape of the topside electron density is not deduced from incoherent scatter data but from a summary of topside ionosonde measurements (mainly ALOUETTE) as given by Bent et al. [1970]. The topside slope was checked against available incoherent scatter results and the results were found to agree rather well.

Unfortunately for our purpose, Bent's description admits certain discontinuities in the slope of the electron density vs. height profile and has only a limited number of combinations of the input variables (plasma frequency, geomagnetic latitude, and solar activity). In order to have a continuous, analytical description and use Booker's proposal (see above), Bent's profile parameter is now expressed by a sum of two Epstein step-functions, the coefficients of which are dependent on the above variables. This includes some smoothing of Bent's original tables. It was recently shown by S. Ramakrishnan et al. [1979] that our "harmonized" Bent model is in better agreement with determinations of standardized topside profiles evaluated very carefully by W. Becker [1975]. In the future it is hoped more detailed comparisons can be made from in situ satellites, from new sounding satellites, and from profiles obtained by incoherent scatter techniques.

The sources of information used for the bottomside profile shape were described in earlier publications [Rawer et al., 1978a].

The bottomside electron density profile is composed of five height ranges which are numbered 2 through 6. We have six ranges, since the last one is subdivided. The ranges and designations are shown in Figure 1. The profile functions given in the subprograms NE/XE 2...6, and their functions are explained in the program comments.

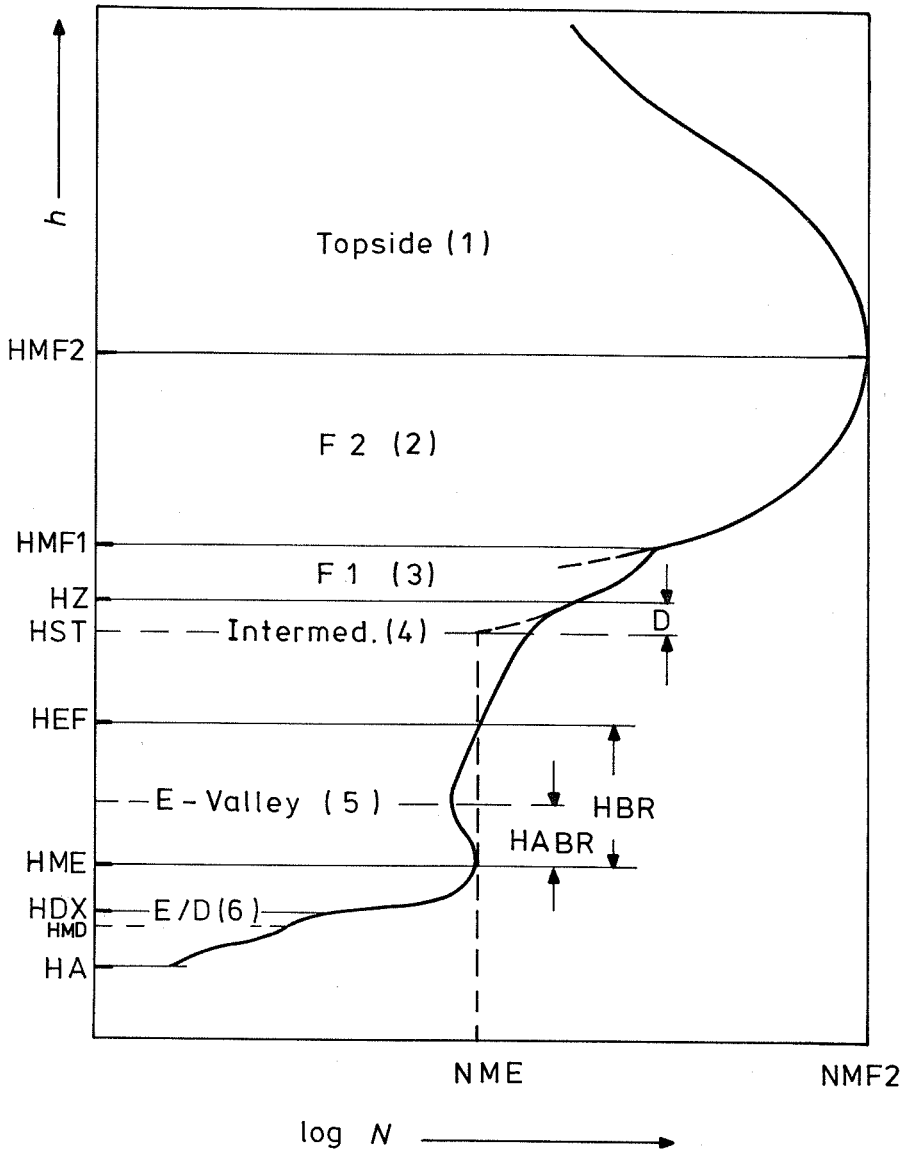

Fig. 1. The IRI model profile.

Let us first consider regions (5) to (2) beginning with the "valley region" (5), which starts at the peak height HME of the E region. Characteristic HME values were estimated from special ionogram reductions combined with Maeda's [1971] compilation of in situ rocket measurements. The shape function NE5 was designed after some incoherent scatter measurements. Around noon the depth of the valley is quite small, there is even no valley (condition NOT VALLEY) at lower latitudes. At low solar height and during the night there is a deep valley above the E region. Rawer et al. [1975] used a then-recent compilation from Soboleva [1973] giving an extremely low density value at the minimum height (HME + HABR in Figure 1). Later on, H.G. Booker found out that Schumann resonance cannot be understood with such a deep valley. Our procedures TAL and NE5 were adapted to older computations [Maeda, 1969, 1971] which at night give a larger density value in the valley, so the valley is not so deep.

The upper edge of the valley region (5) is found at height HEF, which is the sum of HME + valley thickness HBR (Figure 1). Values of HBR were mainly derived from incoherent scatter data. In the absence of a valley (condition NOT VALLEY) we put HBR = 0. HEF is the lower edge of the "intermediate region" (4) which was introduced to bridge the gap between the valley and the F region above.

Jumping to the F region, we distinguish two classes according to whether an F1 layer is present (condition F1REG) or not (NOT F1REG). In both cases we use the subdivision in regions (2) for F2 and (3) for F1, but if F1 is absent both functions/procedures NE2 and NE3 are identical. This is arranged by putting C1 = 0 when condition F1REG is not valid. C1 is the amplitude of the additional term in NE3 (which produces a stronger gradient at HMF1 when F1REG is valid).

In most cases there is a gap between HEF and the F region, called the "intermediate region" (4). To close the gap, we determined the height HST where the extrapolated F-region profile NE3 reaches the value of NME. To avoid a layer of constant density between HEF and HST the upper edge of the intermediate region is shifted upwards to meet a higher density value. This higher level is called HZ. It was chosen as the arithmetic mean of HST and HMF1 (Figure 1). If no F1 layer is present (condition F1REG not valid) NMF1 is formally replaced by the mean value between NME and NMF2, the corresponding height then being taken as a fictitious value for HMF1 (since in such cases C1 = 0 this has no effect upon the profile shape). If this procedure leads to a "bottle neck" the value of HMF1 is shifted further upwards and may even reach HMF2. A discontinuous method was used in IRI-78 and in the first correction. This has been replaced by a continuous method in the second correction and the present programs IRIAL7 and IRIF07.

More difficult conditions are set when HMF1 is rather low and the thickness parameter of the F region B_0 is large. These conditions may occur during certain night situations when HST goes below HEF, i.e. there is a "negative gap". These cases are resolved by adjusting an exponent (b1) in NE2. The program will cause a smooth interpolation between the levels HEF (or HME if VALLEY is not valid) and HZ (see procedure/function NE4).

Except for the F2-peak data, derived from the CCIR coefficient method, the characteristics of the different layers are deduced from descriptive formulas found in the literature. The critical frequencies (which correspond to peak densities) and the zenith-angle, the solar cycle, and latitudinal dependencies were taken from Eyfrig [1955] and Ducharme et al. [1971, 1973] for foF1 (procedure/function FOF1ED), earlier foE formulas were replaced by those of Kouris and Muggleton [1973 a, b] (procedure/function FOEEDI). Thickness parameters were adapted according to general knowledge, mainly obtained by ionogram reduction.

No information is given in IRI about the occasional existence of sporadic layers, despite the importance of Es layers to radio wave propagation and their interest as ionospheric phenomena linked with effects of upper atmosphere dynamics. It was not practicable to have this feature in our computer programs. Es layers are usually quite thin (often less than 1 km thick) and appear irregularly in space and time. They have a clear preference for the summer season, areas near the magnetic equator, and the auroral zones. For more information the reader is directed to the special conference reports edited by Smith and Matsushita [1962, 1966, 1968, 1971]. The lower ionosphere region (6)) is modeled from procedure/function NE6. A substratification is admitted at height HDX, slightly above HMD. This latter characterizes the inflection point in the D-region shape [Mechtly and Bilitza, 1974] with density NMD. NMD (at HMD), HMD and the shape parameters are generated in procedure/function NE6 which is derived from different sources as indicated in D. Bilitza's first contribution (section 1.2) to this publication. Two different functions are used for the bottomside E region and in the D region; they are matched at level HDX.

The D region is still a weak point in our description; data are scarce, and worse than that, different techniques seem to lead to different results. The numerical values were taken from mid-latitude in situ measurements only [Mechtly and Bilitza, 1974]. The formula could be improved by using equatorial measurements, and was checked with some radio wave propagation results obtained from Gnanalingam and Kane [1978]. Our formula is certainly not applicable at auroral and polar latitudes. We are also aware that some discrepancies with absorption measurements emerged from computations using our profiles and standard collision frequency data [Singer et al., 1980]. We also refer to the semi-empirical model of Mitra and Somayajulu [1979].

Profiles of the electron temperature, TE, were originally deduced from incoherent scatter measurements, and are represented by expressions for high and low altitudes. The distinctive level between both ranges, H_0, was chosen between 200 and 400 km. In the upper range one noon and one midnight profile are given, depending on the geomagnetic latitude. For a given hour the program interpolates between the two times. In the lower range TE is linearly matched with the neutral temperature, TN (i.e. the average of CIRA 72, procedure TN in the programs). Both temperatures are identical at HTA = 120 km. We did not compensate for a solar activity effect, even though it is obvious that more energy is fed into the aeronomic system during periods of high solar activity. Since the electron density is much greater during these periods, we have higher thermal conductivity in the electron gas and thus an effect producing a temperature decrease. Measured data available at present are rather scarce. Long term experimental evidence is available from only one incoherent scatter radar station (Millstone Hill). The results show conditions are rather involved, and no clear solar cycle effect could be identified [Evans, 1973 and later data]. We are urgently in need of more long term data.

The recent analytical model describing the AEROS-A measurements [Spenner and Plugge, 1979] compares well with results from Millstone Hill and Jicamarca for day and night. It gives values which, by day, are slightly too high for Arecibo. This input combined with standard height profiles from the incoherent scatter stations was used, however, with a simplified descriptive function, for the height range 200 to 1000 km.

As for the ion temperature, TI, we rely primarily on results from incoherent scatter stations comparing these with some data from AEROS.

At the bottomside, all temperature profiles are adjusted to the average CIRA [1971] neutral temperature value at 120 km. Above this height a linear increase of (TE - TN) with height is assumed. The computing schedule is discussed and explained in D. Bilitza's second contribution to this publication (section 1.3).

It does not allow TE or TI to become less than the neutral temperature TN.

The ion composition data are too scarce to produce a continuous description in space and time. Below 200 km the recently established models of Danilov and Semenov [1978] were approximated analytically. The relative percentages of O_2^+ and O^+ are represented by a sequence of Epstein-transitions, two for O_2^+ but four for O^+. Near the F2-peak height there is almost only O^+. From the AEROS data set, we determined an upper fixpoint of 98% O^+ at 300 km (but at 249 km for high solar activity in the summer season) and lower fixpoint at 290 (237) km. Above and below this range of O^+ predominance, the profile function permits transitions of the parameters which were adapted to the (summarized) data measured with rockets (below) and satellites (above). This is also done for the O_2^+ profile but with only three ranges (two transitions). NO^+ is determined so that all three ions together reach 100%. Above the O^+ peak region light ions are permitted. Since nighttime observations are missing, the sunset curves are provisionally assumed to be valid during the whole night (an assumption possibly far from the truth). For higher altitudes AEROS data were combined with some results obtained by Taylor [1971].

Our program only allows for O^+, H^+, and He^+ as atomic ions. From OGO-6 observations it appears that about 5-10% of the share attributed to O^+ could possible be N^+. Similar evidence exists also from AEROS. The expressions give only average shares. They cannot account for special phenomena such as molecular ions at greater heights, as were observed under disturbed conditions.

Positive cluster ions appear regularly in the D region below 90 km. Existing data are not good enough to describe readily the relevant profiles. Clusters are not identified in the computer program which gives NO^+. The ratio of clusters to the total positive ion density might roughly be estimated from Figure 2 (after Danilov and Semenov). Unfortunately, these data are scarce and only available for mid-latitude, at low solar activity, in summer.

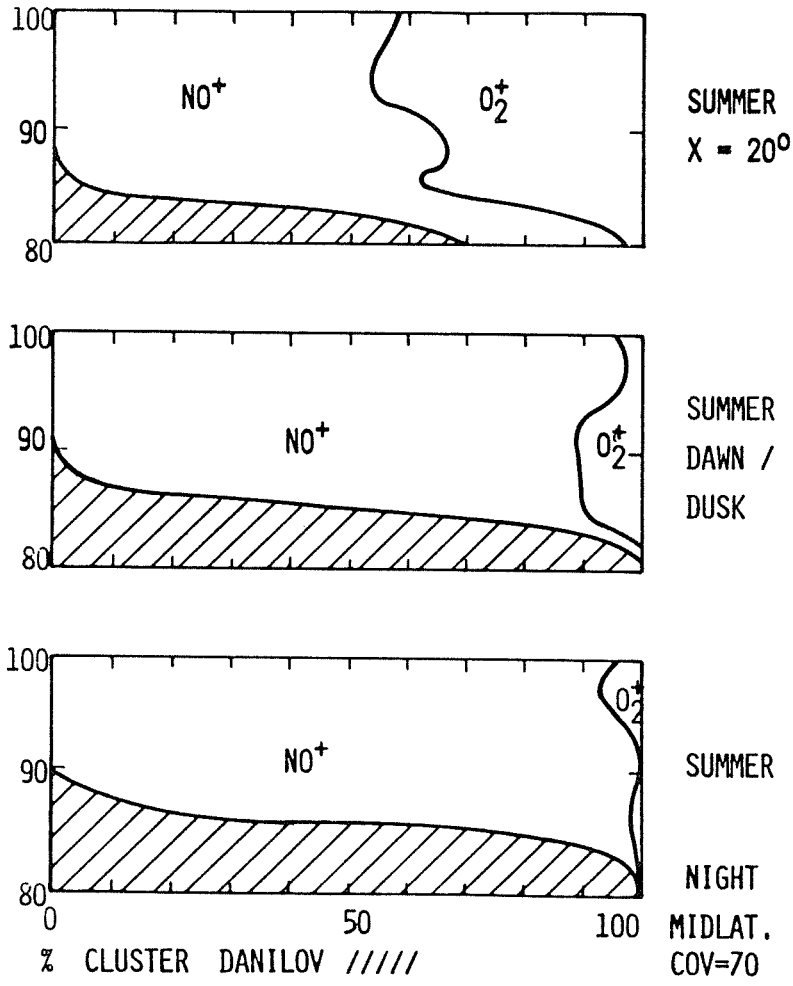

Fig. 2. Percentage of cluster ions at various heights.

At the present time, only a rough guess can be made for the height of the transition between electrons and negative cluster ions. Numerical values are not given in our program. Existing evidence from a few mass spectrometer measurements seems to show that sharp transitions occur at altitudes between 68 and 74 km during the day and 70 to 78 km during the night [Arnold and Krankowsky, 1977]. It appears premature for the official IRI program to introduce numerical equations describing the conditions at the bottom of the ionosphere (e.g. cluster ions), or at great heights (Ne, Te). Reference is made to preliminary relations established by individual authors. We have asked two authors working with measurements and theory of ion composition in the lower ionosphere to give written reports in this volume. The reader is directed to the comprehensive contribution by F. Arnold (which includes the stratosphere (section 1.5) and to the shorter one by B.S.N. Prasad and S. Mohanty (section 1.4).

It was found that at altitudes above 1000 km data obtained by different methods are not in very close agreement with each other. Further critical examination of the plasma parameters in this region of space is urgently needed and is planned by COSPAR. At the present time our profiles are confined to below 1000 km altitude. M. Rycroft is in charge of these problems in the St. C. As a provisional guide we refer to the recent paper by Chiu et al. [1979].

IRI describes monthly average values. Values for individual days are spread around with roughly the following (2 sigma) dispersion ranges:

	Heights	Peak Densities	Temperatures
F region	±15%	±30%	±30%
E region	± 5%	±10%	±10%

These indications are not valid at latitudes in the auroral zone or on the polar cap where larger fluctuations must be expected. The basic values are not good under these conditions. This includes the CCIR coefficients. An example can be found on page 217: for Modip -70 degrees, during the polar night, the CCIR map of M(3000)F2 combined with our empirical relation gives a value below 200 km for HMF2, which is probably much too low.

A more detailed description of how the programs can be used is given in the following Technical Note (section 2) which, together with the comments in the program itself, should allow users to make the program workable on their own computers. The ALGOL and FORTRAN programs IRIAL7 and IRIF07 can be obtained on request as punched cards (026 or 029 punch) or on magnetic tape in various formats and densities. The tape can be delivered either in ASCII(2) or EBCDIC(1). The tape contains the programs mentioned above as well as the CCIR coefficients and the fully analytical profile program IRIALA. Requestors wishing a copy should write to

World Data Center-A
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Boulder, Colorado 80303
USA

Acknowledgments: The Deutsche Forschungsgemeinschaft sponsored D. Bilitza's and H. Thiemann's activities in this project (grant Ra 68/65). Great help in the present edition was a rearranged and corrected FORTRAN program from T.L. Gulyeava (IZMIRAN, USSR).

1.2 Electron Density in the D-Region as Given by the International Reference Ionosphere

by

D. Bilitza*
NASA/Goddard Space Flight Center
Laboratory for Planetary Atmospheres
Greenbelt, Maryland 20771 USA

ABSTRACT

The model for the electron density in the D region as used in the International Reference Ionosphere (IRI) is explained and the actual model functions are given depending on time, solar zenith angle and solar activity.

Introduction

A major problem in modeling D-region electron density is selection of experimental data which are both accurate and representative of the unperturbed ionosphere.

The evaluation of the relative accuracies of various methods of measuring electron concentration in the D region was one of the objectives of the 1973 COSPAR Symposium on the Lower Ionosphere held in Constance, F.R.G. Participants in the Symposium arrived at important conclusions:

1. D-region profiles of greatest accuracy are derived from measurements of differential absorption and/or differential phase (Faraday rotation) of radio waves propagating between the ground and ascending rockets. Improved resolution is possible when Langmuir dc-probes are flown on the same rockets. However, they must be calibrated on every occasion by radio data.

2 All the ground-based techniques (VLF, LF, partial reflection, and wave interaction) begin with assumed profiles of electron concentration and collision frequency for the inversion of propagation integrals. Available measurements are never sufficiently comprehensive to determine unique profiles without relatively large probable errors.

The foundation of these conclusions is discussed in detail by THRANE [1974], THOMAS [1974] and SECHRIST [1974]. The representation used in the International Reference Ionosphere (RAWER et al. [1978c]) which will be described in this paper is strongly based on a rocket data evaluation done by MECHTLEY and BILITZA [1974].

Height Dependence

The typical electron density profile in the D region shows a steep gradient just below the E-layer maximum, reaching an inflection point at HMD, NMD and decreases to lower heights with a much weaker gradient (Fig. 1). As recommended by MECHTLEY and BILITZA [1974] we used a third degree polynomial centered at the inflection point to approximate the logarithm of the density

$$N_e^1(h) = NMD*\exp(FP_1*X+FP_2*X^2+FP_3X^3)$$

$$X = h-HMD$$

HMD/km height
NMD/m^{-3} density } of the inflection point

For HMD to become an inflection point the second derivative has to be zero. That gives us

$$FP_2 = \frac{FP_1^2}{2}.$$

We also find that FP_1 is the logarithmic derivative at the height HMD

$$FP_1 = \frac{d\ln N_e^1}{dh} \quad (h=HMD)$$

*on leave from the Institut für Physikalische Weltraumforschung, Heidenhofstrasse 8, D-7800, Freiburg, Federal Republic of Germany.

Finally, FP_3 can be explained in terms of a scale height S which is the height difference between HMD and the height where the electron density has dropped to NMD/e.

$$FP_3 = (FP_1{}^2*S^2/2 - FP_1*S-1)/S^3$$

Because the gradient above HMD is much greater than it is below HMD, we have a different scale height above HMD, S_a, and a different $FP_3{}^a$.

$$FP_3{}^a = (FP_1{}^2*S_a{}^2/2 - FP_1*S_a+1)/S_a{}^3$$

These considerations make it easy to calculate the model parameters FP_1, FP_2 and FP_3 from experimental graphs. All you need is to find the inflection point, the logarithmic derivative at this point and the two scale heights mentioned above. An example is shown in Figure 1. To connect this profile function with the values at the E region maximum we recommend the following function

$$N_e{}^2(h) = NME*\exp(-D_1*(HME-h)^K)$$

NME/m^{-3} density, HME/km height } of the E-region maximum

which proved to be representative for the given data feature. D_1, K are determined as to meet the $N_e{}^1$ function at the height HDX.

$$K = -\,DNDX*(HME-HDX)/(NDX*\ln\frac{NDX}{NME})$$

$$D_1 = DNDX/(NDX*K*(HME-HDX)^{K-1})$$

$$DNDX = \frac{dN_e{}^1}{dh}(h=HDX)$$

$$NDX = N_e{}^1(HDX)$$

$$HDX = HMD + S_a$$

Besides the described variation with height, there are a number of other profile shapes which are less frequent and show more disturbance. These profiles were not considered in our present analysis, dealing only with the quiet ionosphere. From the more than 200 profiles given by MAEDA [1971], MECHTLEY and BILITZA [1974], DICKINSON et al. [1976], GUPTA [1977] and GNANALINGAM [1976] only about 80 were useful (in the above stated sense) for our modeling purposes.

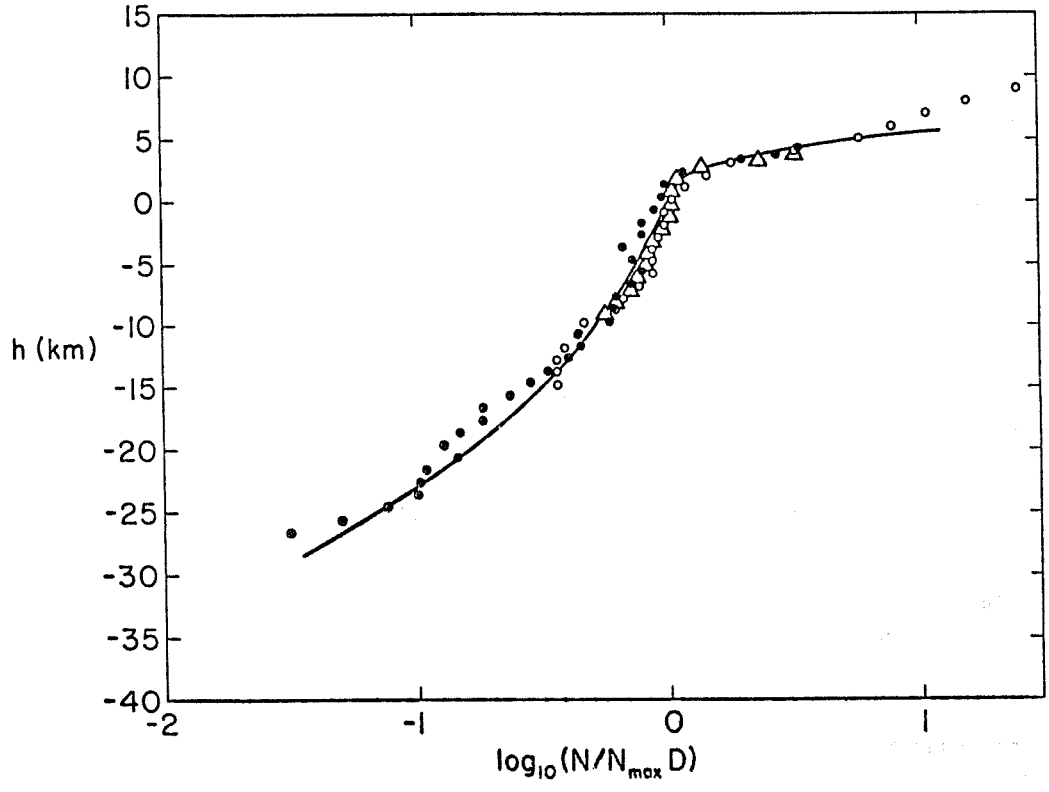

Fig. 1. Typical D region electron density profiles taken from MECHTLEY and BILITZA [1974], together with the model.

Variation With Time and Latitude

The remaining profiles were normalized to their point of inflection and sampled into day and night groups for low and middle latitudes. Most of the variation was obviously removed by the normalization, and only FP_1 showed latitudinal differences. The model parameters for day and night are listed in Table 1.

Table 1. Model coefficients for day and night.

	$\frac{HMD}{km}$	$\frac{\Delta \ln Ne}{\Delta h\,(h=HMD)}$ km^{-1}	$\frac{S_a}{km}$	$\frac{S}{km}$	FP_1	FP_2	FP_3^a	FP_3
DAY low	81	0.02	4.6	-11.5	0.02	$-2\cdot10^{-4}$	$9.37\cdot10^{-3}$	$4.89\cdot10^{-4}$
DAY middle latitude	81	0.05	4.6	-11.5	0.05	$-1.25\cdot10^{-3}$	$8.18\cdot10^{-3}$	$1.707\cdot10^{-4}$
NIGHT	88	0.05	4.5	-4	0.05	$-1.25\cdot10^{-3}$	$8.79\cdot10^{-3}$	$1.22\cdot10^{-2}$

The density at the inflection point shows a strong dependence on the solar zenith angle and solar activity. A good representation is given by the following function:

$$NMD/m^{-3} = F(R_{12})*10^8* \exp\left(\frac{0.1}{(\cos Z)^{2.7}}\right)$$

$$F(R_{12}) = 6.05 + 0.088*R_{12}$$

Z = Solar Zenith Angle

R_{12} = Smoothed Zurich sunspot number

as is seen in Fig. 2.

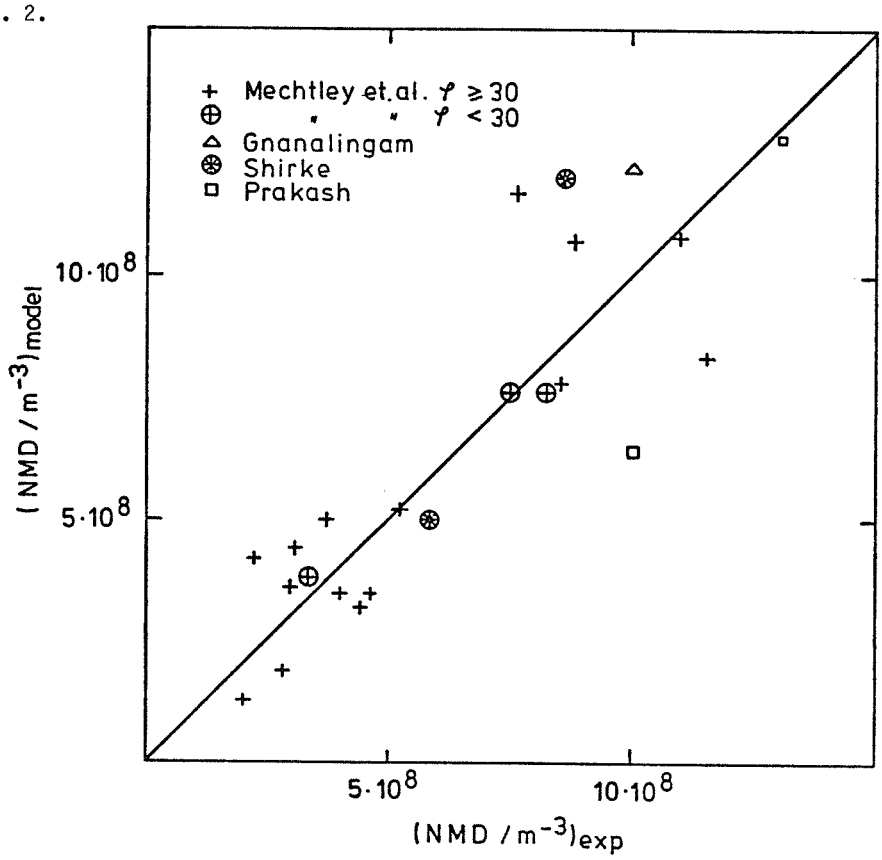

Fig. 2. Comparison between measured and model value for the density at the inflection point (References: Mechtly et al. [1974], Gnanalingam, Shirke, and Parkash private communications).

To connect this daytime behavior with the typical nighttime value NW=4 $10^8 m^{-3}$, we recommend the following procedure. Calculate the solar zenith angle Z_S for which the model reaches the nighttime value

$$Z_S = \cos^{-1}\left[\left(\frac{0.1}{\ln(F \cdot 10^8/NW)}\right)^{\frac{1}{2.7}}\right]$$

and set NMD equal NW for zenith angles larger than Z_S.

It should be noted that the nighttime coefficients are based on a still small data base mainly guided by Maeda's and Gupta's data and also ELF propagation calculation by BOOKER [1976].

It seems interesting that the winter anomaly profiles as reported for example by BEYNON et al.[1976] can be approximated by multiplying the "normal" NMD (as it would be given by our model) by a factor of 10.

To get a continuous variation between day (DV) and night values (NV) we recommend the following step function, which was used in the IRI:

$$W = MW = \frac{DV-NV}{1+\exp(-(t-SA)/D_1)} + \frac{NV-DV}{1+\exp(-(t-SS)/D_2)}$$

t/h time

SA, SS/h time of sunrise and sunset

D_1, D_2 transition time at sunrise and sunset. We put $D_1=D_2=1$ h.

1.3 Models for Ionospheric Electron and Ion Temperature

by

Dieter Bilitza*
NASA/Goddard Space Flight Center
Laboratory for Planetary Atmospheres
Greenbelt, MD 20771 USA

Abstract

By using measurements of the incoherent scatter stations Millstone Hill, Arecibo and Jicamarca, and data measured by the Retarding Potential Analyzer (RPA) aboard the satellites AEROS-A and B we have constructed models of the ionospheric temperatures in the height range 200-800 km to be used for the International Reference Ionosphere. Our models give the overall global, time, and height dependence but exclude one on solar activity and specific diurnal behavior.

Introduction

There have been different attempts to model the ionospheric temperatures. A great number of scientists investigated the relationship between the temperatures and the electron density to make use of the quite representative electron density models. For these studies the incoherent scatter stations meet the ideal requirements with their simultaneous measurements of electron density and electron and ion temperature. LEJEUNE and WALDTEUFEL [1970], WALDTEUFEL [1971] and LEJEUNE [1972] examined the data of the stations St. Santin/France and Arecibo/Puerto Rico, MAHAJAN [1977] worked with data from Arecibo, BILITZA [1975] with data from Millstone Hill/USA, and TAYLOR and RISK [1974] with data from the U.K. station Malvern. All these theoretical and empirical examinations show an anticorrelation between the electron density and temperature. One can understand this feature from theoretical considerations. The heat gain of the electron gas depends on the electron density whereas the heat loss depends on the square of the electron density. But for greater heights these correlation considerations are made more difficult by the increasing importance of heat conduction with its strong latitude dependence. SPENNER et al. [1977] have investigated the global features of this anticorrelation by using data of the satellite AEROS-B. They found that the anticorrelation holds true only in daytime and within a dip of $\pm 40°$, and is not sufficiently significant at the magnetic equator. The same is true for the correlation between ion temperature and electron density, which is explained by the strong heat contact between electrons and ions. By using a height dependent correlation, BRACE and THEIS [1978] were quite successful in representing electron density and temperature data measured by the AE-C satellite. Considering the International Reference Ionosphere it seems unreasonable to incorporate a correlation between the parameters because in this way degrees of freedom are lost.

Different from this there have been attempts to approximate satellite data by an expansion in spherical harmonics and other series depending on longitude, latitude, height and local time. SPENNER and PLUGGE [1978] have done this for the AEROS-RPA data, while DORLING and RAITT [1976] approximated the ESRO-4 data in this way. Besides the problem of misrepresentation in regions with no satellite data this method is limited to one satellite mission and corrections introduced from other measurements can be incorporated only by changing a large number of coefficients.

In this work, an attempt was made to approximate the latitudinal dependence of the electron and ion temperature as represented by the AEROS satellite data and the height dependence as measured at the incoherent scatter stations by simple analytic functions. That seems adequate to the present state of data collection.

The Data

The data used in this study are summarized in Table 1, noting the time and solar activity range. The AEROS data have been longitudinally averaged and mean values for the height ranges 150-250,....., 650-750 and 5 degree magnetic latitude intervals have been calculated. This was done for day (14-26 LT) and night (2-4 LT) time. Due to the orbit of the AEROS satellites these were the main measurement times. The incoherent scatter (ICS) data have been averaged over the whole period given in Table 1 and for the time intervals 11-13 LT and 23-1 LT. In a first attempt the data were in addition sorted by season and solar activity but no clear dependences were recognizable.

Table 1. Location and time of the used data

STATIONS AND SATELLITES	LOCATION GEOG.	LOCATION GEOM.	MISSION TIME	R_{12}	MEDIAN IS CALCULATED FOR	NUMBER OF THE DATA POINTS PER MEDIAN DETERMINATION
ARECIBO 2 PUERTO RICO 1	18N 293E	30N 2E	12/71-12/72 7/66-6/70	58-73 50-100	THE WHOLE MISSION	50 100
JICAMARCA PERU	12S 283E	1N 352E	11/66-4/69	75-110	DAY: 11-13 LT NIGHT: 23- 1 LT	700
MILLSTONE HILL USA	43N 289E	54N 357E	2/72-10/75	25-71		100
AEROS-A			12/72-8/73	40-50	1/73-3/73 ALL LONGITUDES DAY: 14-16 LT NIGHT: 2- 4 LT	50
AEROS-B			6/74-9/75	35-10	6/74-9/74 ALL LONGITUDES DAY: 15-17 LT NIGHT: 3- 5 LT	100

*on leave from Institut für Physikalische Weltraumforschung, Heidenhofstrasse 8, D-7800, Freiburg, Federal Republic of Germany.

The Electron Temperature Model

The electron temperature shows a different latitudinal behavior for different heights (Fig. 1). For higher altitudes (h>400km) the temperature is lowest at the magnetic equator and increases towards the poles. For lowerr altitudes there is a maximum at the magnetic equator within the low latitude valley. That means the height profiles near the magnetic equator show a maximum at about 250 km whereas for higher latitudes a continuous increasing profile is seen (Fig. 2). That is explained by the decreasing heat conduction towards the equator due to the more and more horizontal field lines. We are aware that this temperature bulb can also occur at moderate latitudes in case the heat loss and gain terms dominate the heat conduction at heights of about 300 km, but this should be considered in an additional solar activity dependence which is not clearly established..

We composed the described feature by the summation of three different functions, one for the latitudinal variation, one for the height dependence and one representing the low latitude bulb.

$$T_e(h,\phi) = f_1(\phi) + f_2(h) + f_3(h,\phi)$$

$$f_1(\phi) = A - B \cdot \frac{g(\phi)}{|g(\phi)|} \cdot |g(\phi)|^n$$

$$g(\phi) = a_1 \cdot \phi + a_2 \cdot \phi^2$$

h= height/km

ϕ= geomag. latitude/°

$$f_2(h) = D \cdot (h-700)$$

$$f_3(h) = C \cdot v_1(\phi) \cdot v_2(h)$$

$$v_1(\phi) = \frac{\exp(-0.1 \cdot \phi)}{(1+\exp(-0.1 \cdot \phi))^2}$$

$$v_2(h) = \frac{\exp(-0.03 \cdot (h-h_{max}))}{(1+\exp(-0.03 \cdot (h-h_{max})))^2}$$

$$h_{max} = 70 \cdot \exp(-1.4 \cdot 10^{-3} \cdot \phi^2) + 200$$

where	A	B	C	D	a_1	a_2	n
Day	2325	725	25600	2	3.4	-0.014	1
Night	1600	700	0	0	0.47	0.024	0.5

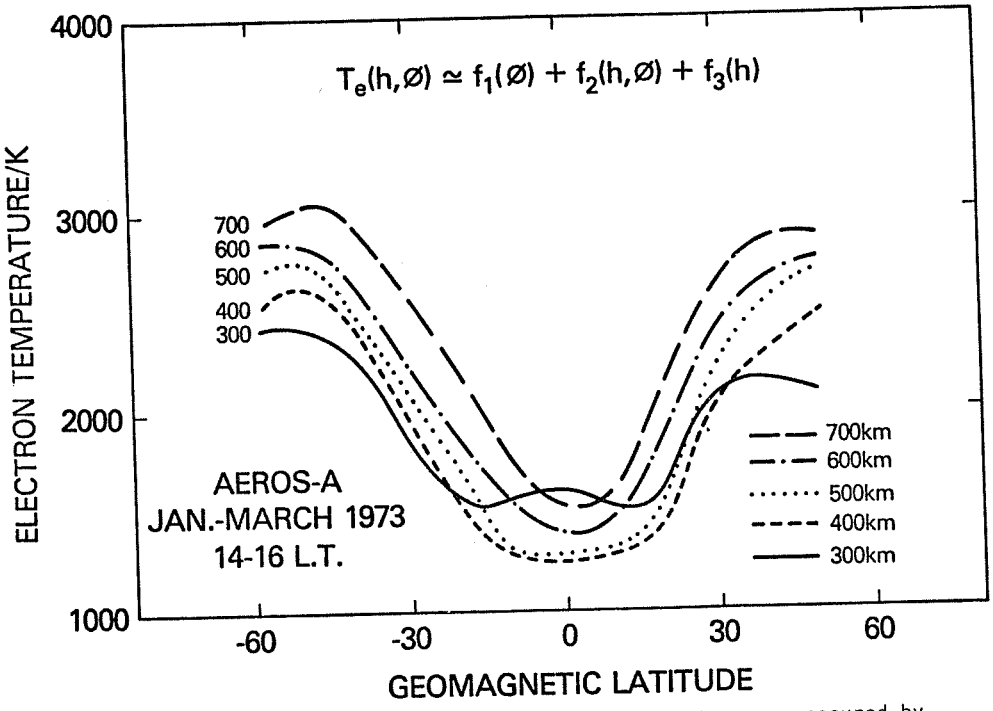

Fig. 1. Latitudinal variation of the electron temperature as measured by the AEROS-A RPA for different heights h, as a function of geomagnetic latitude ϕ.

Function f_1 represents the general latitudinal behavior of the AEROS-A data for all heights ignoring the low latitude bulge. For the height gradient we took a constant value, which gives sufficient agreement in the region 400 to 800 km for the AEROS-A and the ICS data. Below that region we recommend a linear decreasing difference between electron and neutral temperature towards agreement at 120 km. For day and moderate latitudes ($\phi \leq \pm 40°$) our model represents the electron temperature fairly well down to 200 km due to the bulge function. This bulge function is the product of two peak functions one in latitude and one in height, thus giving enhanced values for a region around the magnetic equator and heights near the maximum height h_{max}. The height function v_2 was established from the ICS data, while the latitudinal part v_1 was derived from the AEROS-A data. Figure 2 shows our model together with the corresponding ICS and AEROS-A mean profiles.

The Ion Temperature Model

The ion temperature as seen by the RPA on AEROS-B shows fairly constant latitudinal values at low altitudes and a significant minimum at the magnetic equator at altitudes higher 500 km (Fig. 3). That is confirmed by the ICS data which show increasing ion temperature with increasing height and this increase being larger for Arecibo than Jicamarca (Fig. 4). For nighttime there is an increase towards the poles being steeper for greater heights. For modeling the ion temperature the height profile was divided in three parts. Above 430 km we use a constant height gradient and different latitudinal representations for day and night. Below a height HS ≈ 200 km we set T_i equal to the neutral temperature T_n. These two regions are connected by choosing an appropriate HS, namely the height at which the tangent to the neutral profile passes through the ion temperature value at 430 km.

$$T_i(h) = \begin{cases} u(\phi) + M \cdot (h-430) & 800 \text{ km} \gtrsim h \gtrsim 430 \text{ km} \\ u(\phi) - \dfrac{u(\phi) - T_n(HS)}{HS-430} \cdot (h-430) & 430 \text{ km} \gtrsim h \gtrsim HS \\ T_n(h) & HS \gtrsim h \gtrsim 120 \text{ km} \end{cases}$$

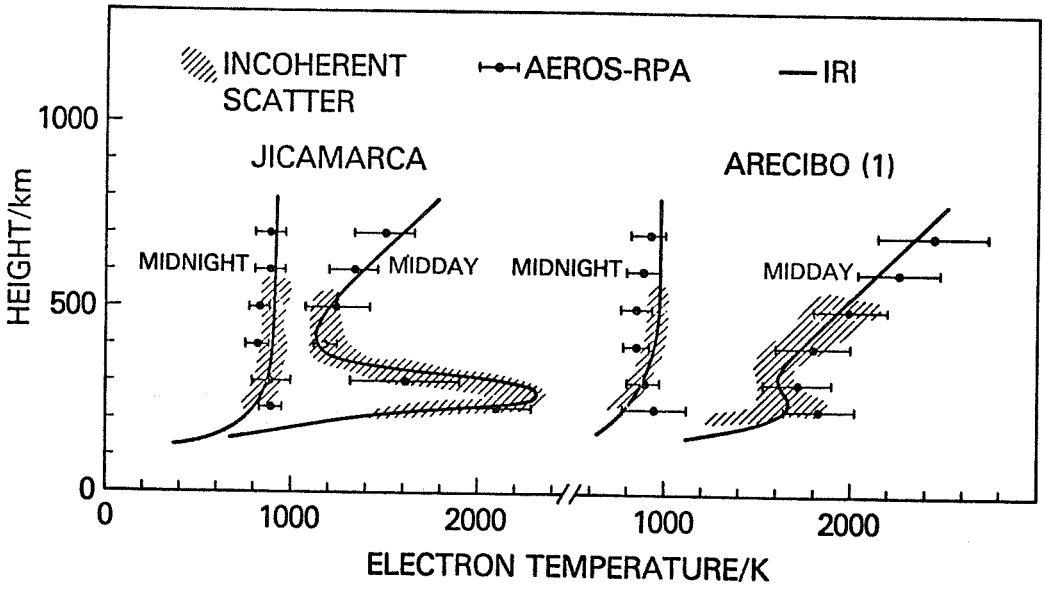

Fig. 2. Comparison between electron temperature data and model for the location of Jicamarca and Arecibo.

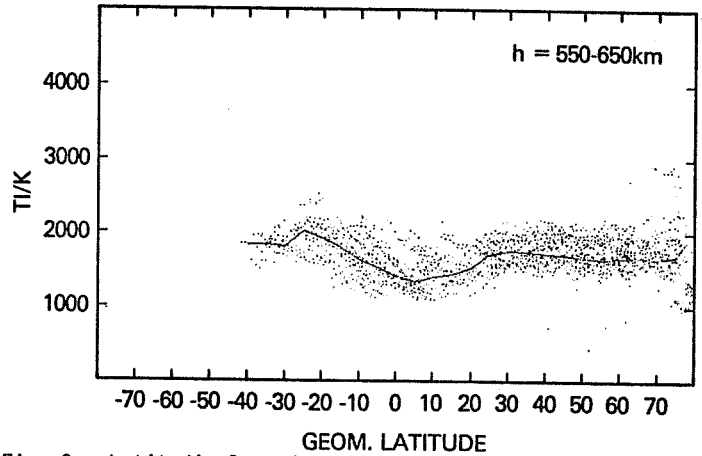

Fig. 3. Latitudinal variation of the ion temperature around 600 km as measured by the AEROS-B-RPA.

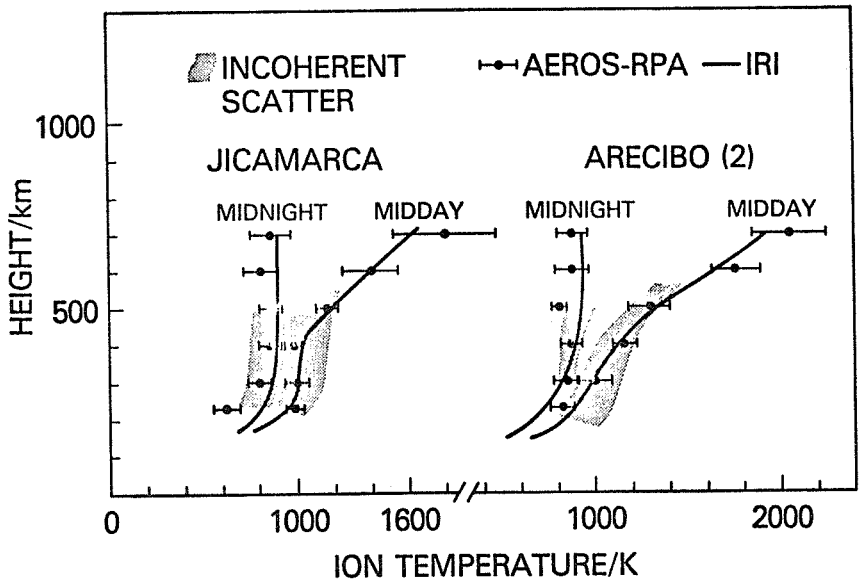

Fig. 4. Comparison between ion temperature data and model for the location of Jicamarca and Arecibo.

	$u(\phi)$	M
day	$u_1(\phi)$	3
night	$u_2(\phi)$	0

$$u_1(\phi) = 1240-1400\cdot \frac{\exp(-0.09\cdot\phi)}{(1+\exp(-0.09\cdot\phi))^2}$$

$$u_2(\phi) = 1200-300\cdot \frac{\cos(X)}{|\cos(X)|}\cdot\sqrt{|\cos(X)|}$$

$$X(\phi) = 0.47\cdot\phi+0.024\cdot\phi^2$$

To get a representation with a steady slope ($T_i^{(s)}$) above HS use was made of EPSTEIN-Step functions [BOOKER, 1977] between the different regions of constant gradient.

$$\frac{dT_i}{dh} = MM_o + \sum_{j=1}^{m} \frac{MM_j-MM_{j-1}}{1+\exp(-(h-XSM_j)/G_j)}$$

m = number
$MM_o...m$ = gradients
} of the different regions

$XSM_j...m$ = height of the intersections between different regions

$G_j...m$ = transition thickness between different regions

Integration from HS to h gives us the ion temperature

$$T_i^{(s)}(h) = MM_o\cdot(h-HS) + T_n(HS)+$$

$$+\sum_{j=1}^{m}(MM_j-MM_{j-1})\cdot G_j\cdot \ln\frac{1+\exp((h-XSM_j)/G_j)}{1+\exp((HS-XSM_j)/G_j)}$$

To get a continuous transition to the neutral temperature at HS we set T_i equal T_n at HS by choosing the appropriate integration constant.

As the heat capacity of the electron gas is much less than that of the ion gas, the ion temperature should not exceed the electron temperature. Therefore we add a fourth region for the case of T_i not less T_e at a height of 1000 km. In this region the ion temperature is approaching the electron temperature. Herewith the parameters are:

$$m = 2$$

$$MM_o = \frac{u(\emptyset)-T_n(HS)}{HS-430} \qquad \text{for } u(\emptyset), M \qquad \text{see } T_i(h)$$

$$MM_1 = M$$

$$MM_2 = \begin{cases} MM_1 & T_i(1000) < T_e(1000) \\ \dfrac{dT_e}{dh}(h = 1000) & \text{elsewhere} \end{cases}$$

$$XSM_1 = 430 \text{ km}$$

$$XSM_2 = \begin{cases} XSM_1 & T_i(1000) < T_e(1000) \\ \dfrac{T_e(1000)-10-u_1(\emptyset)+MM_1 \cdot XSM_1-MM_2 \cdot 1000}{MM_1-MM_2} & \text{elsewhere} \end{cases}$$

$$G_1 = 20 \text{ km} \qquad G_2 = 50 \text{ km}$$

Figure 4 shows our model in comparison with the AEROS and ICS measurements. For the neutral temperature the CIRA 1972 model was used.

The Diurnal Variation

In summary the electron and ion temperatures are constant through the day and through the night with transitions at sunset and sunrise. This gross behavior is modified by small seasonal (Fig. 5) and latitudinal changes and special features induced by conjugate sunrise or magnetic storms.

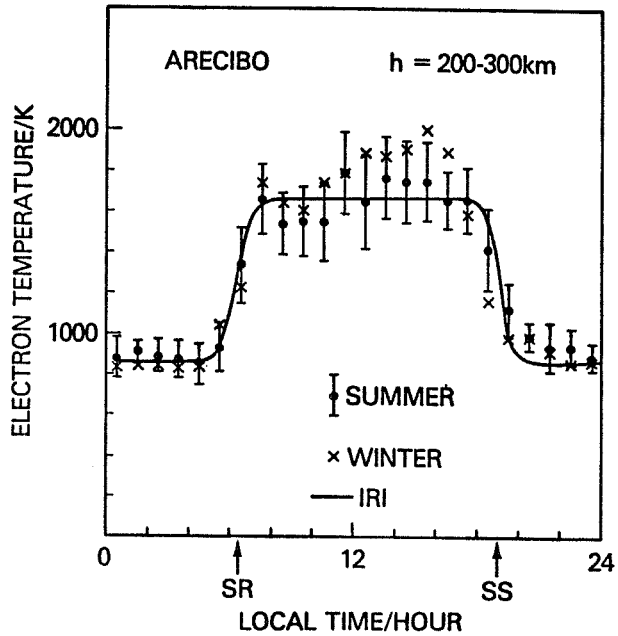

Fig. 5. Day-night variation as given by the data and the model over Arecibo.

In this study we restrict ourselves to the general variation. For the transition between day and night value (T_D and T_N) the already mentioned EPSTEIN step functions have been used.

$$T(h,t) = T_N(h) + \frac{T_D(h)-T_N(h)}{1+\exp(-(t-t_{SR})/D)} + \frac{T_N(h)-T_D(h)}{1+\exp(-(t-t_{ss})/D)}$$

$t_{SR/SS}$ time of sunrise and sunset

D = 1h transition time

With a transition time of 1 hour the temporal variation is well represented as shown in Figure 5.

6. Summary

Comparing every measured data point with its model value, we counted the number of data points within ±10 percent and ±20 percent strips around the model. The results are listed in Table 2. Almost 70 percent of all the data deviate by not more than 10 percent from the model. Only 10 percent of the 72,000 measured data points lie outside the 20 percent margin. Thus the models described give a fairly good representation of the mean behavior of the electron and ion temperature in latitude, height and time as it is confirmed by satellite and ground based incoherent scatter measurements. Seasonal and solar activity variations of the ionospheric temperatures are not yet clearly established due to the lack of global full solar cycle data. EVANS [1973] has reported an increase in summer and decrease in winter with increasing solar activity for data of the incoherent scatter station Millstone Hill from 1964 to 1968. Special features like conjugate sunrise and magnetic storm effects might be incorporated as adequate supplementary functions to our models.

Table 2. Number of data points within ±10 percent and ±20 percent strips around the model.

	ELECTRON TEMPERATURE			ION TEMPERATURE		
	AMOUNT	±10	±20	AMOUNT	±10	±20
ARE1	4,939	3,650 74	4,437 90	4,898	3,429 70	4,491 90
ARE2	3,752	2,664 71	3,205 85	3,551	2,768 78	3,255 92
JIC	17,740	12,734 71	15,819 88	6,852	5,002 73	6,304 92
MH	2,500	1,250 50	1,975 79	2,470	1,754 71	2,297 93
AEROS	6,443	4,317 67	5,404 84	19,149	12,947 65	16,152 84
TOTAL	35,574	24,615 69	30,840 80	36,920	25,400 69	32,499 88

Besides these corrections and additions of new dependencies in the course of new data there should be refinement of the given latitudinal, height and time variations. The auroral feature needs further investigation.

Acknowledgements

We are indebted to the World Data Center A in Boulder for supplying us with the incoherent scatter tapes. The AEROS-RPA data were kindly given to our disposal by K. Spenner.

1.4 D-region Positive Ion Concentrations

by

B.S.N. Prasad and S. Mohanty
Department of Physics, Utkal University
Bhubaneswar -751004 India

Rocket measurements of positive ion composition at several geographic locations and under different D-region conditions have invariably shown the presence of oxonium ions of the type $H^+(H_2O)_n$, n = 1,2,3 etc. There is a sharply defined cluster cutoff level above which the positive ion species are the molecular ions NO^+ and O_2^+. The height of this level is around 82 km for the mid-latitude quiet D-region and this level is either raised or lowered depending on reduced or enhanced D-region ionization. It is now known [Reid, 1977], that the transition from the predominantly cluster ions below the cluster cutoff level to molecular ions above it, is due to (a) strong temperature dependence of the clustering reactions for the conversion of the precursor NO^+ ions to its hydrates and (b) the relative life time of the precursor ions for recombination with electrons compared to that for the formation of cluster ions. In this regard the role of minor neutral constituents such as atomic oxygen in the switching reaction chain would be important under disturbed conditions such as PCA or solar X-ray events where the majority of the primary ions happen to be O_2^+.

A comparison of the partial concentrations of the D-region positive ions obtained from different rocket flights would not be realistic because of (a) the destruction of heavier cluster ions due to thermal breakup during rocket sampling and (b) the cluster cutoff level which depends on the seasonally varying mesospheric temperature and D-region ionization conditions. On the other hand, height variation of the relative concentration of cluster ions (with respect to total positive ions or molecular ions) can be used as an indicator of D-region conditions. Defining $[Z^+]$ as the total cluster ion density and $N^+ = [NO^+]+[O_2^+]+[Z^+]$ as the total positive ion density, the relative concentration of cluster ions is $[Z^+]/N^+$ or $f^+ = [Z^+]/([NO^+]+[O_2^+])$. These quantities are shown in Fig. 1 for different D-region conditions at equatorial and middle latitudes. In all these graphs ($[Z^+]/N^+) \simeq f^+$ above the cluster cutoff level where $N^+ \simeq [O_2^+]+[NO^+]$. The graphs of Fig. 1 show that

(1) For normal D-region conditions, cluster cutoff level is higher for summer than for other seasons (curves 2, 3 and 4),
(2) Enhanced D-region ionization lowers the cluster cutoff level (curves 1, 5 and 6).

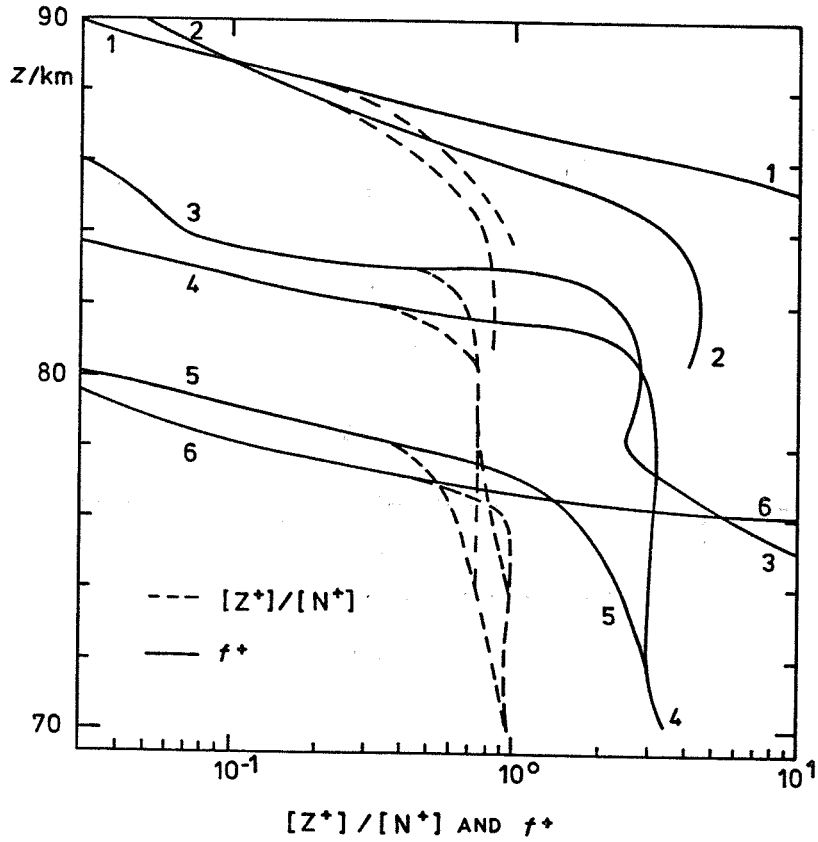

Fig. 1. Cluster cutoff level.

These conclusions are valid for the high latitude stations also as seen from Fig. 2. Although D-region ionization enhancement due to particle precipitation is a common feature at high latitudes, there was no indication of enhanced particle ionization for summer rocket data of Aug. 10, 1970 [KRANKOWSKY et al., 1972]. Compared to this, there was a mild particle precipitation event in progress during the rocket flight of Aug. 8, 1971, and the rocket encountered increased D-region ionization during the downleg trajectory compared to upleg flight [JOHANNESSEN and KRANKOWSKY, 1972]. Thus the general nature of the variation in the height of cluster cutoff level with D-region conditions is evident from rocket data for different latitudes.

More experimental data covering latitudinal and seasonal variations under different D-region conditions would be necessary to formulate any empirical relation for the height variation of D-region positive ion concentrations.

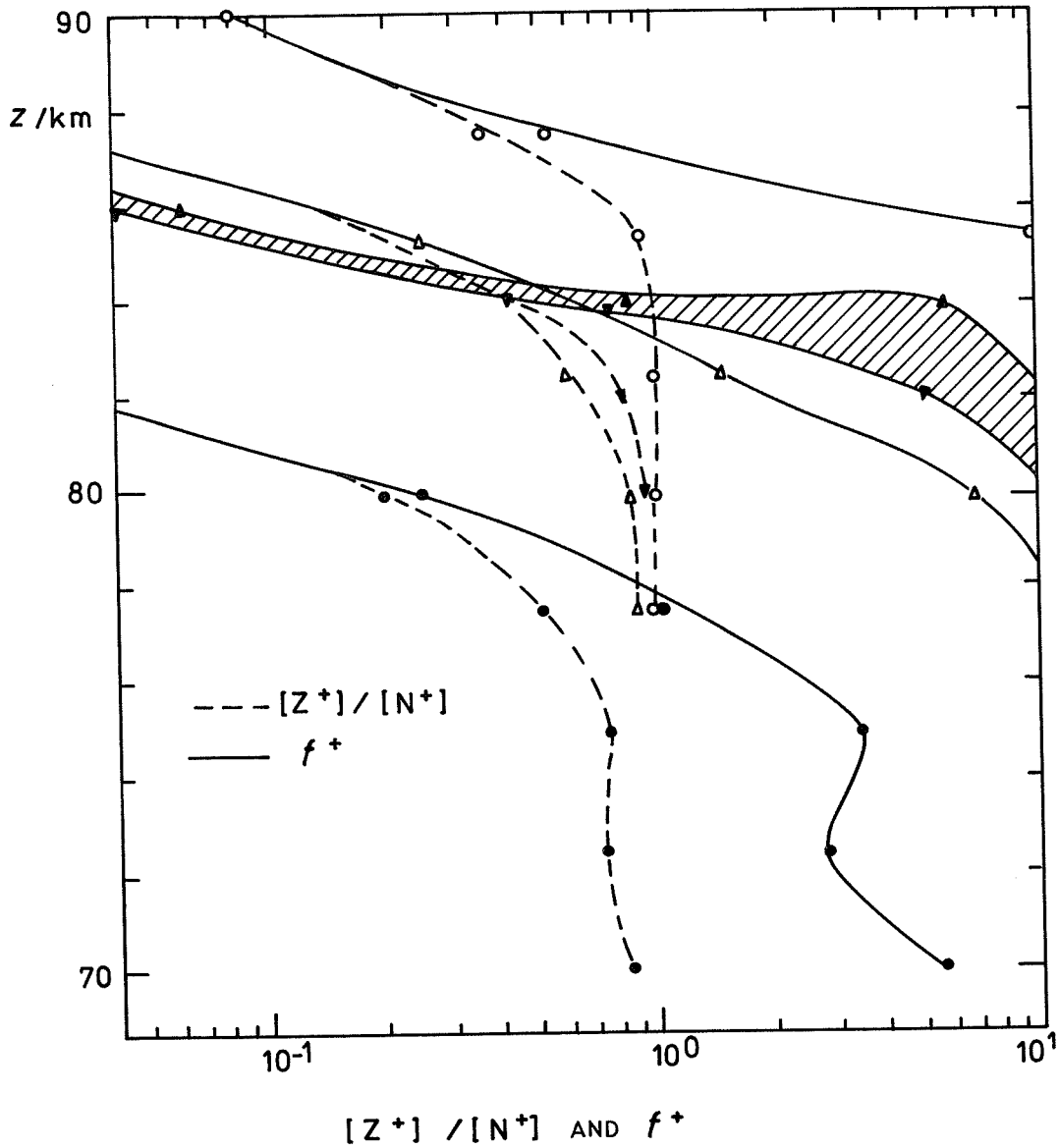

Fig. 2. Cluster cutoff level for high latitudes.

1.5 Structure and Composition of the Middle Atmosphere Ionized Component

by

F. Arnold
Max-Planck-Institut für Kernphysik
D6900 Heidelberg, FRG

Abstract

Our current understanding of the structure and composition of the middle atmosphere ionized component (MAIC) and underlying processes is briefly reviewed. Problems associated with the definition of a reference-MAIC are discussed. It is concluded that a reference-MAIC of reasonably good precision cannot be defined at present since the observational data available are insufficient. A major complication results from the strong coupling of charged species to the thermal structure and dynamics of the neutral atmosphere which are poorly known.

Introduction

The ionized component of the Earth's middle atmosphere (20-100 km altitude; hereafter: MAIC) is much less explored than the major part of the ionosphere located above, mainly because of the higher gas pressures which complicate both processes involving charged species and in-situ measurements. Although our understanding of the MAIC is far from being satisfactory, considerable progress has been made in recent years. As far as the lower ionosphere (65-100 km) is concerned we are approaching an understanding of the most important processes controlling charged species. However, as will be shown in the following, we are not yet in a position allowing us to develop a quantitative model of this region. Concerning the ionized component of the stratosphere our knowledge is very limited and a more intense era of exploration has just begun.

The purpose of this article is to briefly summarize the present knowledge of the composition of the MAIC and to point out both those areas in which progress has been made and which are still uncertain.

Lower Ionosphere

The lower ionosphere is characterized by a steep increase of charged particle concentrations with height and by the presence of free electrons (Fig. 1). It exhibits strong temporal and spatial variations concerning both the total densities as well as the composition of charged particles. These variations, in particular, those occurring in the ionospheric D region (65-85 km altitude) have a strong component which cannot be related to changes of solar radiations.

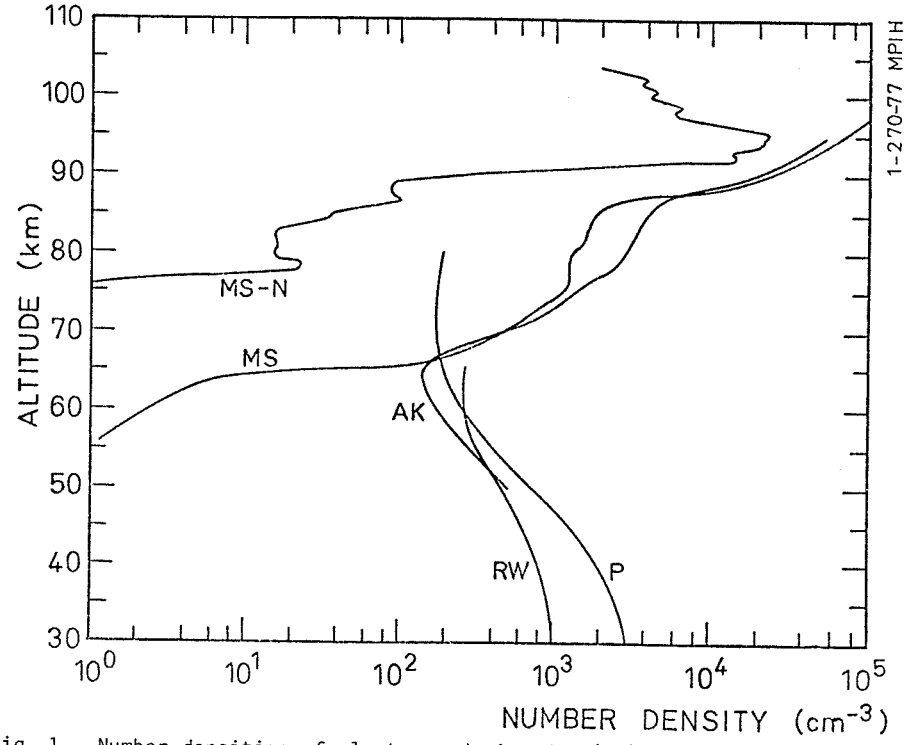

Fig. 1. Number densities of electrons during day (MS) and night (MS-N) from MECHTLY and SMITH [1970]. Number densities of positive ions during day (AK, P, RW) from ARNOLD and KRANKOWSKY [unpublished] (AK); PEDERSEN [1966] (P); ROSE and WIDDEL [1972] (RW).

In the following our current understanding of the processes controlling the structure, composition and morphology of the lower ionosphere will be summarized.

The most important sources of ionization are shown in Fig. 2. In the lower E-region (85-100 km altitude) solar extreme ultraviolet, Ly-β and x-radiations contribute most. As these radiations which are able to ionize major atmospheric gases (N_2 and or O_2) become heavily absorbed above about 85 km, a strong dependence on the solar elevation is introduced. This results in seasonal, diurnal and latitudinal variations of the lower E region [KENESHEA et al., 1970].

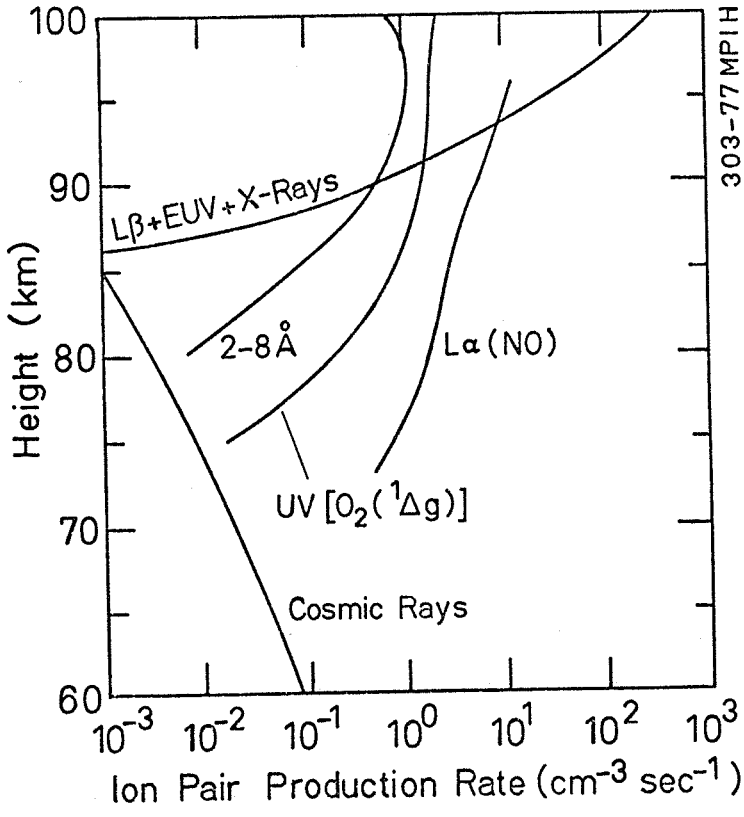

Fig. 2. Rates for the most important daytime ionization sources of the middle atmosphere [after THOMAS, 1971].

The most abundant charged species are free elecrons and positive molecular ions, namely NO^+ and O^+ among which NO+ is a secondary ion formed primarily by ion molecule reactions [ARNOLD and KRANKOWSKY, 1977]. Atomic metal ions (mainly Mg^+ and Fe^+) whose total fractional abundance undergoes considerable temporal and spatial variations may also become quite abundant. They are formed mainly by charge transfer reactions involving molecular ions and neutral metal atoms which result from meteor ablation [FERGUSON and FEHSENFELD, 1968]. Two examples of daytime lower ionosphere positive ion composition measurements during summer and winter are shown in Figs. 3 and 4. Since atomic ions recombine only very slowly with electrons by radiative recombination (see Table 1), they are long-lived and thus may reach high abundances. In contrast to the molecular ions they may also be transported downward from the upper into the lower E region by the combined action of the Earth's magnetic field and horizontal winds [CHIMONAS and AXFORD, 1968]. At night, when the ionization rates are drastically reduced, the atomic metal ions may become even dominant as the short-lived molecular ions are destroyed by recombination.

While the formation, chemistry and recombination of lower E-region molecular ions can be quantitatively modelled with a certain accuracy, the formation rate and transport of atomic metal ions are only poorly known. Therefore, a complete model of the lower E-region structure and composition cannot be formulated at present.

In the D region the situation is much more complicated as will be shown. The most important sources of ionization are photoionization of the trace gases NO and $O_2(^1\Delta g)$ (Fig. 2) whose concentrations are variable in time and space. This is particularly true for NO which is photodissociated, but not significantly produced in the D region into which it is transported from its source regions, the lower thermosphere and the stratosphere. Moreover, horizontal NO-transport also plays an important role as the auroral oval represents an important additional NO-source [CRAVENS and STEWART, 1978; SWIDER, 1978]. Since both the vertical and horizontal transport and the auroral source are only poorly known, D-region ionization rates cannot at present be theoretically modelled with a satisfactory precision.

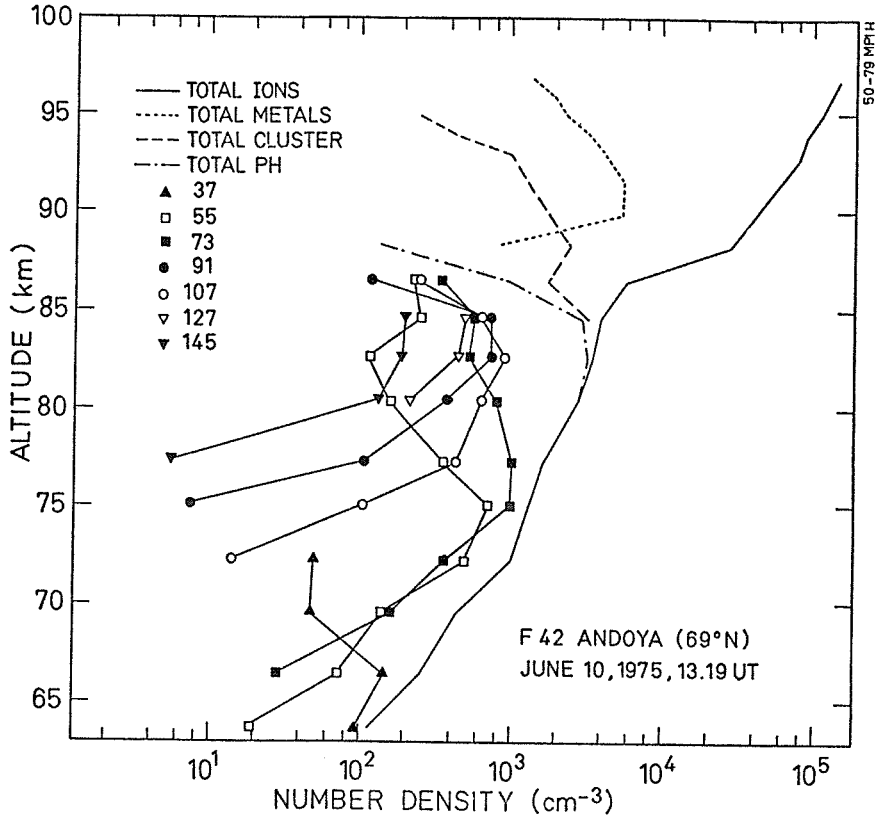

Fig. 3. Composition measurement of positive ions conducted at high latitudes during summer [from ARNOLD and KRANKOWSKY, 1977; ARNOLD and JOOS, 1979].

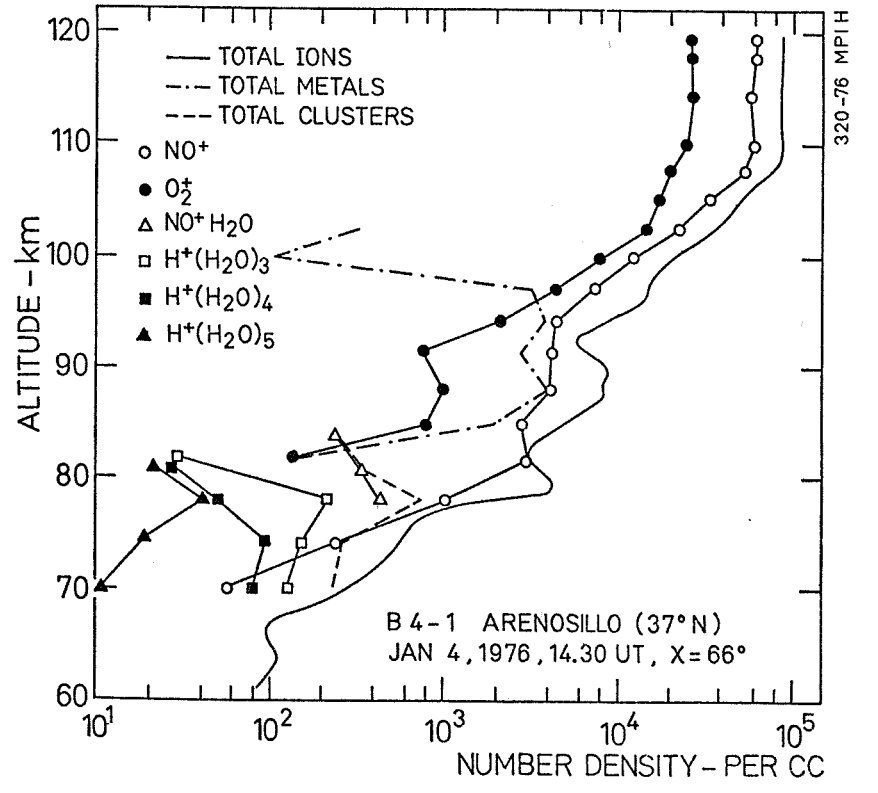

Fig. 4. Composition measurement of positive ions conducted at middle latitudes during winter [from ARNOLD and KRANKOWSKY, 1977].

The loss of charged particles in the D region is far more complicated than in the lower E region. Free electrons may be lost not only by recombination but also by attachment mainly to oxygen molecules [FERGUSON, 1974], which is the much faster process. Associative electron detachment from O_2^- by oxygen atoms, however, prevents O_2^- -formation to become efficient in the daytime D region. The lower boundary of the electron regime is located at the height where reactions converting O^- to more stable negative ions start to dominate the O^--loss. Most important among these are O_2-clustering and an O_3-reaction [FERGUSON, 1974]. Thus, at night when atomic oxygen concentrations decrease steeply below about 75-80 km, the boundary is very sharp and is located in this height range. By day when atomic oxygen is present throughout the D region, the electron-boundary is located around 65 to 70 km. Below this boundary negative ions are the dominant negatively charged species as can be seen from a compilation of measured ratios of total negative and total positive ion concentrations (Fig. 5). The variability of the electron-boundary may be due to not only variations of O and O_3 concentrations, but also of temperature which controls O_2^--clustering. These influences are not sufficiently well known to model the boundary accurately.

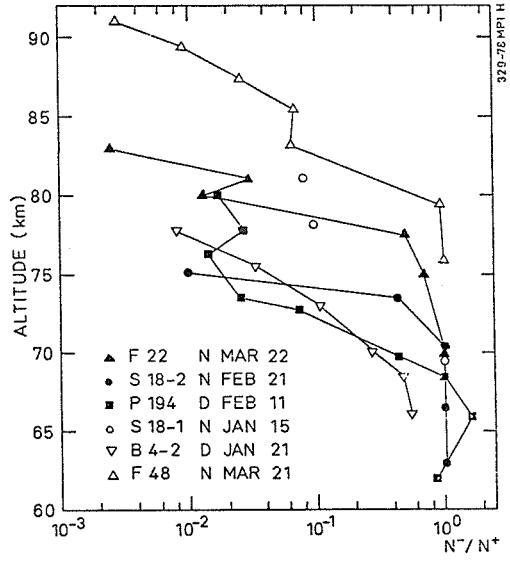

Fig. 5. Ratios of total negative and total positive ion concentrations as measured by rocket-borne ion mass spectrometers by day (D) and night (N). After ARNOLD and KRANKOWSKY [1977 and unpublished manuscript, 1979].

Concerning the composition of negative ions only few measurements exist which differ considerably from each other [ARNOLD et al., 1971; NARCISI et al., 1971, 1972a,b]. At present, it is unclear if these differences are real or instrumental. An example of a negative ion composition measurement is shown in Fig. 6. As can be noted, the negative ion regime (below 78 km) is dominated by molecular (mostly CO_3^-, HCO_3^-, and NO_3^-) and atomic (mostly Cl^-) ions. Very massive ions, probably cluster ions, dominate only in a narrow region around 80-84 km. Because of the scarce and controversial data no reference for the negative ion composition can be defined at present.

The primary positive D-region ions NO^+ and O^+ are lost not only by recombination with free electrons or negative ions, but also by ion-molecule (mainly clustering) reactions which ultimately lead to proton hydrates $(H^+(H_2O)_n)$. As this conversion of molecular-to-cluster ions not only involves trace gases, but also depends very sensitively on temperature, a strong coupling of charged species to the photochemistry, dynamics and thermal structure of the mesosphere is introduced. The temperature influence is most pronounced for the conversion of NO^+, the major D-region molecular ion [ARNOLD et al., 1980]. The time constant for the NO^+-conversion increases with temperature by a factor of about 10,000 in the range of D-region temperatures (Fig. 7). Moreover, it is inversely proportional to the square of the total gas number density. Consequently, the fractional abundance of positive cluster ions decreases steeply with height and undergoes strong temporal and spatial variations which are associated with corresponding temperature fluctuations. The upper boundary of the positive cluster ion regime which is defined by the equality of the NO^+-conversion time constant and the cluster ion lifetime against recombination may vary between about 70 and 95 km altitude mainly depending on temperature (Fig. 8). At night, the cluster ion boundary is around 90-95 km on the average for summer and winter. At day, it is for average conditions around 87 km in summer and around 80 km in winter. Its variability associated with typical temperature fluctuations ($\pm 20°$) is relatively weak in summer (86-88 km) and very pronounced in winter (71-88 km). As temperature variations appear to be stronger in winter when deviations by $\pm 40°$ have been observed quite often [SCHMIDLIN, 1976], the boundary may then vary between about 70 and 90 km. A lower limit for the cluster ion boundary is defined by the lower boundary of the electron regime. As negative ions recombine with positive cluster ions much more slowly (Table 1), the cluster ion boundary, therefore, should not descend below 80-85 km at night and 70-65 km at day even for very high temperatures.

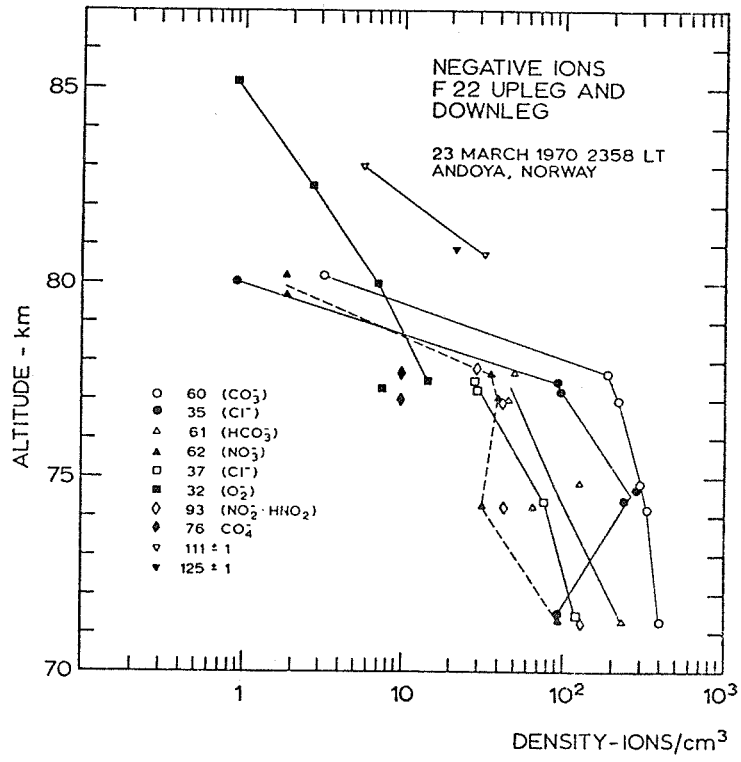

Fig. 6. Composition measurement of negative ions conducted at night and at high latitudes [from ARNOLD and KRANKOWSKY, 1977].

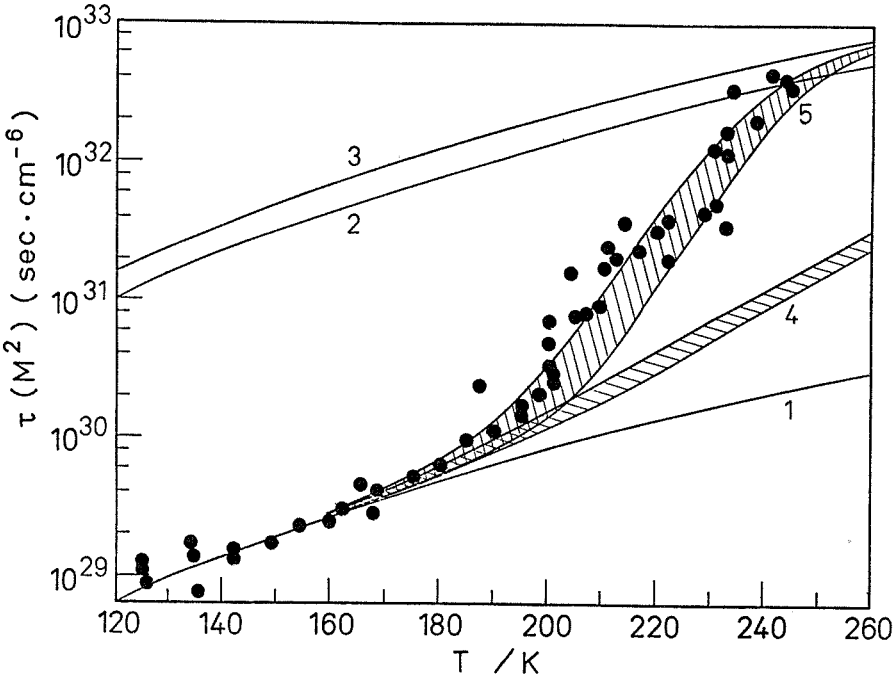

Fig. 7. Effective time constants τ for the conversion of NO^+ to cluster ions and $\tau|M|^2$ as a function of temperature. [M] denotes the total gas density. Effective time constants τ for a fixed ($[M] = 2 \cdot 10^{20}$ m^{-3}) corresponding to a height around 85 km are indicated on the right hand ordinate. Theoretical $[M]^2$ values for N_2-, CO_2-, and H_2O-clustering (curves 1, 2, and 3) are also given. Theoretical $\tau\,|M|^2$ values considering thermal decomposition of NO^+N_2 (curve 4), of NO^+N_2 and NO^+CO_2 (curve 5), and of N_2 switching of NO^+CO_2 (curve 6) in addition are also given [from ARNOLD et al. 1980].

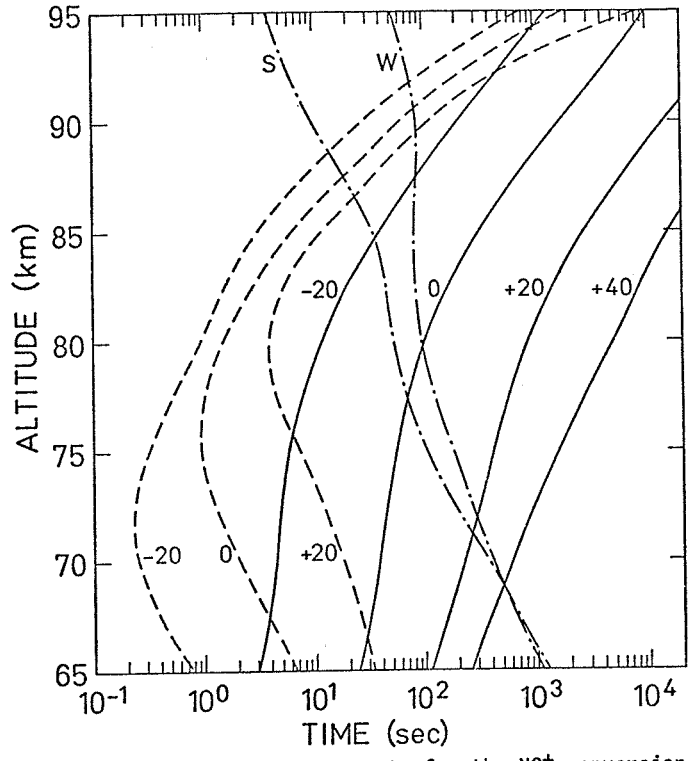

Fig. 8. Effective time constants for the NO^+-conversion as a function of height for summer (broken curves) and winter (solid curves) at 50° latitude. Temperature deviations relative to CIRA [1972] temperatures are indicated. Time constants for recombination of cluster ions with electrons also given for summer (S), winter (W) [from ARNOLD et al. 1980].

Table 1. Recombination processes for positive and negative ions and electrons; reaction coefficients in fourth, sources in fifth column: (a) BATES et al. [1962]; (b) BIONDI [1969]; (c) HUANG et al. [1978]; (d,e) SMITH and CHURCH [1976].

Process	Educts	Products	Typical reaction coeff.	Reference
Radiative R.	$A^+ + e^-$	$A + h\nu$	$10^{-17}\ m^3\ s^{-1}$	(a)
Dissociative R.	$AB^+ + e^-$	$A + B$	$5 \cdot 10^{-13}(T/300K)^{-1}\ m^3\ s^{-1}$	(b)
Electron R. of complex ions	$A^+(B)_n + e^-$		$\leq 5 \cdot 10^{-12}\ m^3\ s^{-1}$	(c)
Ion-Ion R. (2-body)	$A^- + B^+$		$5 \cdot 10^{-14}(T/300K)^{-1/2}\ m^3\ s^{-1}$	(d)
Ion-Ion R. (3-body)	$A^- + B^+ + M$		$2 \cdot 10^{-37}(T/300K)^{-5/2}\ m^6\ s^{-1}$	(e)

As cluster ions recombine much faster with free electrons than do molecular ions (Table 1), total charged particle concentrations are for a given ionization rate significantly smaller at heights where positive cluster ions and free electrons are the dominant charged species. Thus, the cluster ion boundary is usually accompanied by a ledge in the total positive ion- and electron concentration profiles (see Figs. 4 and 5). In summer the ledge merges with the bottom of the E layer (Fig. 4). In winter when the bottom of the E layer due to the lower solar elevation is above 90 km and the cluster ion boundary due to the higher temperature is around 80 km the ledge can be clearly identified.

Considering the strong temperature influence, modelling of the D region is complicated as the thermal structure of the mesosphere which undergoes not only systematic (seasonal and latitudinal) but also pronounced irregular variations, is not sufficiently well known.

In summarizing the above discussion it may be concluded that there are two major obstacles which at present seriously complicate modelling of the D-region structure and composition. They are our poor knowledge of NO-concentrations which mainly control the ionization rates and which depend sensitively on mesospheric dynamics and our poor knowledge of the thermal structure of the mesosphere which determines the loss rates of charged particles through controlling the conversion of molecular ions to rapidly recombining cluster ions. The situation may be improved as far as modelling of systematic trends is concerned in the near future when global mapping of mesopheric NO-concentrations and temperatures by satellite observations will hopefully become available. Considering, however, the strong short term and regional fluctuations of the D region induced by corresponding changes of the thermal and dynamical structure or in other words the "meteorology" of the mesosphere, the chances for defining a reasonably precise reference D region will probably remain low.

Stratospheric Ionized Component

The ionized component of the stratosphere above 20 km altitude is characterized by a decrease of charged particle concentrations with height and by an absence of free electrons (Fig. 1). Measured charged particle concentration profiles show marked variations by factors up to at least 10 [HALE et al., 1968; HALE et al., 1972; ROSE and WIDDEL, 1972]. To which extent the variations are real is unclear at present.

Galactic cosmic radiation represents the most important source of ionization (Fig. 2) and is able to ionize all gases. It suffers from no significant mass absorption in the height region of interest which implies the ionization rate to be proportional to the total gas number density. Since the galactic cosmic radiation is influenced by the Earth and the interplanetary magnetic fields, the ionization rates vary with geomagnetic latitude and solar activity [WEBBER, 1962] being high for high geomagnetic latitudes and low solar activity.

Concerning the nature and composition of charged species very little is known. Crude information on ion masses obtained from in situ ion mobility measurements [ROSE and WIDDEL, 1972; MITCHELL et al., 1977; ISHIKAWA et al., 1969; GRAS, 1975] indicate "small ions" to be dominant. First information on the chemical nature and composition of positive ions became available only recently from rocket- [ARNOLD et al., 1977a] and balloon- [ARNOLD et al., 1977b; OLSEN et al., 1977; ARIJS et al., 1978; ARNOLD et al., 1978] borne mass spectrometer measurements. The latter also provided first information on negative ions [ARNOLD and HENSCHEN, 1978]. From these measurements it appears that both positive and negative ions are massive and rather complex cluster ions whose identification is not yet certain and awaits supporting laboratory studies of relevant ion-molecule reactions.

Preliminary identifications suggest positive core ions to be mostly protonated H_2O and x (unidentified molecule having a mass of 41±1 amu) to which neutral molecules mostly H_2O and x are attached. Negative core ions appear to be mostly NO_3^- and R^- (tentatively identified as HSO^-) to which neutral molecules mostly acids (HNO_3 and HR which was tentatively identified as H_2SO_4) are attached [ARNOLD et al., 1978; ARNOLD and HENSCHEN, 1978].

Considering the early stage of exploration of this region no reference for the ion composition can be given at present. Whether total charged particle concentrations can be accurately modelled is not certain. While the ionization rates can be modelled reasonably well, little is known about the ion loss processes. In particular, it is unclear to which extent they may eventually depend on temperature and on the ion composition which, in turn, should be controlled by trace gases and temperature.

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*Copies of the reports of the former Institut f. Physikalische Weltraumforschung can now be obtained from: University, Library D7800 Freiburg, West Germany.

2. TECHNICAL NOTE CONCERNING THE MAIN PROGRAMS

IRIAL 7 and IRIFO 7

In order to use one of these programs, the user has to take the following steps:

0.1 Procure CCIR input data tape to be read in equivalent of procedure CCIRCA. This tape is a special version of the official "CCIR-map" containing only the numerical coefficient sets for FOF2 and M3000. It is available in code ASCII(2)or in EBCDIC(1) at WDC-A (STP).

0.2 If such tape is not at hand replace procedure F2OUT by IONDEM (p.250) and change the relevant call-in. This means you use program IRIAL7A or IRIFO7A.

1. Adjust to your computing facility:

1.1 Identify by channel numbers of your facility
- the input device EGNR for interactive input
- the output device KONSOL for interactive output
- the output device AGNR for producing final tables

1.2 Adapt procedure/subroutine CCIRCA which takes CCIR input data from the CCIR tape in its standard format for FOF2 and M(3000)F2. In ALGOL replace GETS by the name of your tape reading procedure, and adjust channel numbers. In FORTRAN insert reading subroutine of your computer, adapted to input code ASCII(2) or EBCDIC(1) whichever applies.

2. Start program.

3. Give following formated inputs via EGNR. (In parenthesis you will find the desired format for ALGOL and FORTRAN.)

3.1 Specify location solar activity and time by: Latitude LATI, longitude LONGI (all: +ZZD/F6.1), sunspot number R (ZZD/F6.1), MONTH (ZD/F4.1), HOUR (ZD.D/F4.1), the latter to be inserted as local mean time (LMT). The small shift due to the equation of time is not taken into account but the longitude of the place must be accounted for when going from LMT to a legal hour.

3.2 In the special condition when you like to consider a fixed solar zenith angle, then specify this numerical value XHI/degree (ZD.D/F4.1). In doing so you shall get upper ionosphere parameters according to the value of HOUR, but those of the lower layers according to that of XHI. Both are only coherent if your indications of HOUR and XHI were consistent. Normal use is to put -10.0 for XHI, then the zenith angle is computed in the program itself.

3.3 Specify profile range by lower limit AH, upper limit EH and step-width SH in km (all: B, 32D.D/1X, F6.1). The program stops after 50 height values, i.e. at AH = 49 . SH.

3.4 Specify format for results by inserting for KOBE: (B, D/1X, 11). 0 for printer, 1 for other output devices.

3.5 All of the admitted plasma parameters are printed. There are 10 parameters. The parameters are (decision symbol): electron density (JNE); same but relative to maximum F2-density (JNEMAX): neutral temperature (JTN); electron temperature (JTE); ion temperature (JTI); temperature ratio (JTETI); relative ion densities in percent:

O^+ (JO), H^+ and He^+ (JHHE), O_2^+ (JO_2), NO^+ (JNO).

3.6 Specify decision symbol JMAG (D/I1). If input coordinates (in 3.1.1) are geomagnetic then JMAG = 1, if they are geographic then JMAG = 0.

3.7 Insertion of peak values (two choices):

3.7.1 Choice 1: Use CCIR values; enter 0 for HMF2 and FOF2.

3.7.2 Choice 2: Direct acquisition of peak data through input device (KONSOL). Give peak values HMF2 in km and FOF2 in MHz.

4. Computer works, results are stored.

5. Computer gives results out in the following order:

5.1 The input values specified in 3.4 and 3.1. If JMAG = 1 then MLAT, MLONG else LATI, LONGI; further R, MONTH, HOUR, XHI.

5.2 Characteristic values computed from these: if JMAG = 1 then LATI, LONGI else MLAT, MLONG; further DIP, MODIP, magnetic latitude MAGLA, solar zenith angle XHI, local sunrise, sunset and solar declination angle.

5.3 Peak values of the four layers: NMF2, NMF1, NME, NMD (in m^{-3}); HMF2, HMF1, HME, HMD (in km).

5.4 The desired profiles (parameters as selected in 3.3).

6. An example is documented in the following:

6.1 Inputs via console (st. 89...113 (odd) of FORTRAN program answers questions specified in st. 88...112 (even)).

6.1.1 Inputs after 3.1: location (42.6°S, 288.5°E), solar activity (R = 70) and time (June, 12h): - 42.6 + 288.50700612.0 (- 42.6+288.5 70 612.0 is also accepted).

6.1.2 For normal use of program write -10.0 as input after 3.2 for XHI. (Then XHI is automatically computed.)

6.1.3 Inputs after 3.3 determining height format:
80.0 800.0 20.0

6.1.4 Input KOBE (answering 3.4): 0

6.1.5 Input JMAF after 3.6, specifying coordinates to be geographic: 0
total input (st. 532)
- 42.6+288.5 70 612.0 -10.0
80.0 800.0 20.0 0

6.2 In case, choice 3 in 3.7 is chosen to be applied, i.e. when peak data are available directly (3.7.3):
HMF2 = 264.5 km
NMF2 = 5.23_{10}+11 x^{-3} : 264.5 5.230_{10}+11

6.3 Many examples can be found in Sect. 4.1. Inputs concerning location, activity and time are specified in the top line of each table. The following 5 lines give values which were computed when running the program. Hereafter follows the main profile table.

ELECTRON DENSITY PROFILE

(1) upper F-region $\quad HMF2 \leq h \leq 1000$ km

$$NE1(h) = NMF2 \cdot \exp(-Y)$$

$$Y = \frac{1000-HMF2}{700} \cdot \left(\beta \cdot \eta \cdot \ln \frac{1+\exp((X-394.5)/\beta)}{1+\exp((-94.5-\delta)/\beta)} + \right.$$

$$\left. + \zeta \cdot \left(100 \cdot \ln \frac{1+\exp((X-300)/100)}{1+\exp(-\delta/100)} - X+300-\delta\right)\right)$$

$$X = \frac{h-HMF2}{1000-HMF2} \cdot 700+300-\delta$$

$$\delta = (\eta/(1+Z) - \zeta/2)/(\eta \cdot Z/(\beta \cdot (1+Z)^2) + \zeta/400)$$

$$Z = \exp \frac{94.45}{\beta}$$

ζ, β and η are functions of geomagnetic latitude ϕ ($z_1=\cos^2\phi$), solar radio flux COV (z_2 = (COV-40)/30) and peak plasma frequency (z_3= foF2).

$$f(z_1, z_2, z_3) = a_1+a_2 \cdot z_1+a_3 \cdot z_2+a_4 \cdot z_1 \cdot z_2 + (a_5+a_6 \cdot z_1+a_7 \cdot z_3) \cdot z_3$$

The numerical coefficients are contained in the program.

(2) bottomside F2-region $\quad HMF1 \leq h < HMF2$

$$N(h) = NMF2 \cdot \frac{\exp(-x^{B_1})}{\cosh(x)}$$

$$x = \frac{HMF2-h}{B_o} \qquad B_1 = 3$$

(B_o) are taken from experimental evidence at specific conditions and are interpolated with EPSTEIN functions in local time (steps at sunrise and sunset) and in latitude (30°). For the dependence on solar activity a linear interpolation is used.

B_o (45°) from BECKER (1972) (i)

B_o (18°) from Mexico composite profiles, NOAA

(3) F1-region (day only) $\quad Hz \leq h < HMF1$

$$N(h) = N^{(2)}(h) + NMF2 \cdot C_1 \cdot \sqrt{\frac{HMF1-h}{B_o}}$$

$$C_1 = 0.1244-4.44\%-4 \cdot R + \frac{0.09}{1+\exp(-\frac{|MODIP|-30}{10})}$$

NMF1 as predicted by EYFRIG et al. (1972)

HMF1 is the height at which the function $N^{(2)}(h)$ becomes equal to NMF1

(i) Latitude, hour and activity interpolated with IPOL (XPOL)

(4) intermediate region $HEF \leq h < Hz$

$N(h) = N^{(3)}(\bar{h})$

$A = \left(\frac{STR}{HST} - 1 \right) \cdot \left(H - HZ \right) / \left(HEF - HZ \right) + 1$

$\bar{h} = A \cdot \left(HZ+T/2-sign(T) \cdot \sqrt{T \cdot (HZ-h+T/4)} \right)$

$T = D \cdot D/(HZ-HEF-D)$

HST is the height at which the function $N^{(3)}(h)$ becomes equal to NME

$HZ = (HST+HMF1)/2$

$D = HZ - HST$

$HEF = HME + HBR$

(5) E-valley region $HME \leq h < HEF$

$$N(h) = \begin{cases} NME \cdot (1+P) & \text{by day} \\ NME \cdot \exp(P) & \text{at night} \end{cases}$$

$P = E_1 \cdot x^2 + E_2 \cdot x^3 + E_3 \cdot x^4 + E_4 \cdot x^5$

$x = h - HME$

E_1 to E_4 are calculated from the following parameters defining the valley:

NHABR is the difference between HME and the height, where the minimum density of the valley occurs (ii).

HBR is the difference between HME and the height, where the electron density in the valley again increases to NME (ii).

NDEL is the percentage depth of the valley (ii).

DNDHBR is the height derivative at HME + HBR of the logarithm of the electron density (ii).

The above parameters for midlatitude and midday were taken from Malvern incoherent scatter data and those for midnight from MAEDA (1971).

Low latitude daytime profiles have no valley in the E-region.

NME from equation given in Doc. 6/3/07 (Sept.73) of CCIR IWP 6/3 (presented by KOURIS and MUGGLETON),

HME from K-I.MAEDA's (1971) E-region profile (ii).

HME = 110 for day and 105 for night.

(6) D-region $HA \leqq h < HME$

$$N(h) = \begin{cases} NME \cdot \exp(-D1 \cdot (HME-h)^K) & h > HDX \\ NMD \cdot \exp(FP_1 \cdot x + FP_2 \cdot x^2 + FP_3 \cdot x^3) & h \leqq HDX \end{cases}$$

$x = h - HMD$

NMD and HMD (ii) are the density and height of the inflection point in the D-region profile. NMD is computed with procedure NMDED(XMDED).

$FP_1 = F_1$

$FP_2 = -F_1 \cdot F_1/2$

$$FP_3 = \begin{cases} (-F_2 \cdot FP_2 - FP_1 + 1/F_2)/(F_2 \cdot F_2) & h > HMD \\ (-F_3 \cdot FP_2 - FP_1 - 1/F_3)/(F_3 \cdot F_3) & h \leqq HMD \end{cases}$$

(ii) Hour interpolated with HPOL (HPOL)

HDX = HMD + F_2

HA = { 65 km by day / 80 km at night } deepest height

Continuity of N(h) and its derivative dN/dh at h=HDX (NDX,DNDX) gives

K = -DNDX·(HME-HDX) / (NDX·LN(NDX/NME))

D_1 = DNDX / (NDX·K·(HME-HDX)$^{K-1}$)

The input parameters F_1, F_2, F_3 (ii) have the meaning:

$F_1 = \frac{d(\ln N)}{dh}(h=HMD)$

F_2 (or F_3) is the difference between HMD and the height where the electron density increases (decreases) to NMD·e (NMD/e).

NMD, HMD, F_1, F_2 and F_3 derived from DICKINSON et al. (1976), MAEDA (1971), MECHTLY and BILITZA (1974), PRAKASH et al. (1974) and GNANALINGAM (1978).

NEUTRAL TEMPERATURE PROFILE

We use the equations for deriving the exospheric temperature and the temperature profile $T_n(h)$ as specified in CIRA 1972 (procedures TUNCAL and TN).

ELECTRON TEMPERATURE PROFILE

(1) upper F-region $H_o \leq h \leq 1000$ km

$T_e(h,\phi) = f_1(\phi) + f_2(\phi, h) + f_4(h)$

$f_1(\phi) = a - b \cdot \left|\frac{\cos X}{\cos X}\right| \cdot |\cos X|^n$

$f_2(\phi, h) = c \cdot \frac{e^{-0.1\cdot\phi}}{(1+e^{-0.1\cdot\phi})^2} \cdot \frac{e^{-0.03\cdot(h-h_{max})}}{(1+e^{-0.03\cdot(h-h_{max})})^2}$

$f_4(h) = d \cdot (h - 700)$

ϕ geomagnetic latitude / degree

$X = a_1 + a_2 * \phi^2$

$h_{max} = 70 \cdot \exp(-1.4 \cdot 10^{-3} \cdot \phi^2) + 200$

	a	b	n	a_1	a_2	c	h_{max}	d
DAY	2325	725	1	3.4	-0.014	$2.56_{10}4$	250	2
NIGHT	1600	700	0.5	0.47	0.024	0	0	0

H_o = { 400 NIGHT / 350 $\phi > 40^o$ / 200 $\phi \leq 40^o$ } DAY

Temperature values are interpolated in time between midday and midnight with HPOL.

(2) Extrapolation to the bottomside $\quad HTA \leq h < H_o$

$HTA = 120$ km $\quad TNA = T_n(HTA)$

$T_e(h) = T_n(h) + QUO \cdot (h-HTA)$

$$QUO = \frac{T_e(H_o, HOUR) - T_n(H_o, HOUR)}{H_o - HTA}$$

$T_e(H_o, HOUR)$ is obtained by interpolation in time with HPOL (HPOL).

QUO is first computed for night, then for the desired time HOUR.

ION TEMPERATURE PROFILE

(1) upper region $\quad HS \leq h \leq 1000$ km

$$T_i(h) = MM_o \cdot (h - HS) = T_n(h) + \sum_{j=1}^{2} (MM_j - MM_{j-1}) \cdot G_j \cdot \ln \frac{1+\exp((h-XSM_j)/G_j)}{1+\exp((HS-XSM_j)/G_j)}$$

$G_1 = 20$ km $\quad G_2 = 50$ km

HS is the height at which the tangent to the neutral profile $T_n(h)$ passes through $(XSM_1 // YSM_1)$

$$YSM_1(\phi) = \left\{ \begin{array}{ll} 1240 - 1400 \cdot \dfrac{e^{-0.09\cdot\phi}}{(1+e^{-0.09\cdot\phi})^2} & \text{day} \\ 1200 - 300 \cdot \dfrac{\cos(X)}{|\cos(X)|} \cdot \sqrt{|\cos(X)|} & \text{night} \end{array} \right\}$$

$X = 0.47\phi + 0.024 \cdot \phi^2$

$$MM_0 = \frac{dT_n}{dh}(h=HS)$$

$$MM_1 = \left\{ \begin{array}{l} 3 \text{ day} \\ 0 \text{ night} \end{array} \right. \quad \text{(AEROS-B RPA-data)}$$

$$MM_2 = \left\{ \begin{array}{ll} MM_3 & T_i(HEI) < T_e(HEI) \\ \dfrac{dT_e}{dh}(h=HEI) & T_i(HEI) \geq T_e(HEI) \end{array} \right\} \quad HEI = 1000 \text{ km}$$

$XSM_1 = 430$ km (from AEROS-B RPA-data)

$$XSM_2 = \left\{ \begin{array}{ll} XSM_1 & T_i(HEI) < T_e(HEI) \\ \dfrac{T_e(HEI) - 10 - YSM2 + MM_1 \cdot XSM_1 - MM_2 \cdot HEI}{MM_1 - MM_2} & T_i(HEI) \geq T_e(HEI) \end{array} \right\}$$

We interpolate in time with procedure HPOL.

(2) lower region $\quad HTA \leq h < HS$

$T_i(h) = T_n(h)$

ION RELATIVE PERCENTAGE DENSITY

(I) atomic oxygen positive ions

$$RDO(h) = \widehat{RDO} \exp\left(MO_o \cdot (h-\hat{h}) + \sum_{i=1}^{4} (MO_i - MO_{i-1}) \cdot DO_i \cdot \ln \frac{1+\exp((h-HO_i)/DO_i)}{1+\exp((\hat{h}-HO_i)/DO_i)}\right)$$

DO_1 = 9 km DO_2=5 km DO_3=5 km DO_4=50 km

$MO_o = f(PG10_1, PG10_2, PG10_3, PG10_4)$

$MO_1 = f(PG10_5, PG10_6, PG10_7, PG10_8)$

$HO_1 = f(PG10_9, PG10_{10}, PG10_{11}, PG10_{12})$

The array PG 10 is given in procedure KOEFP1
$f(P_1....P_4) = + (P_2 - P_1) / (1 + \exp (- (\cos(\chi) - P_4)/P_3))$

χ solar zenith angle, at night $\cos(\chi) = o$

$HO_4 = PG20_1$ $MO_2 = 0$ $MO_3 = PG20_2$ $MO_4 = PG20_3$

the array PG20 is given in procedure KEOFP2
HO_2 = 237 for summer, COVI = 140, else 290

$HO_3 = (\ln(100) - MO_4 \cdot (HO_4 - PG20_4)) / MO_3 + HO_4$

The O^+ percentage is assumed to peak at altitude $\hat{h}$

where $RDO(\hat{h}) = \widehat{RDO}$; we put $\widehat{RDO}$ = 98 (higher values may be reached in nature)

$\hat{h}$ = 249 for summer, COVI = 140, else 300.

(II) molecular oxygen positive ions

$$RDO2(h) = \widehat{RDO2} \cdot \exp\left(MO2_o \cdot (h-\widehat{HO}) + \sum_{i=1}^{2} (MO2_i - MO2_{i-1}) \cdot DO2_i \cdot \ln \frac{1+\exp((h-HO2_i)/DO2_i)}{1+\exp((\widehat{HO}-HO2_i)/DO2_i)}\right)$$

$DO2_1$ = 5 km $DO2_2$ = 5 km

$RDO2(\widehat{HO}) = \widehat{RDO2}$ = 1%

$\widehat{HO} = PF30_1 + PF30_2 \cdot \cos\chi$

$HO2_1 = PF30_3 + PF30_4 \cdot \cos\chi$

$HO2_2 = PF30_5 + PF30_6 \cdot \cos\chi$

$MO2_0 = PF30_7 + PF30_8 \cdot \cos\chi$

$MO2_1 = PF30_9 + PF30_{10} \cdot \cos\chi$

$MO2_2 = PF30_{11} + PF30_{12} \cdot \cos\chi$

$RNO = (100 - RDO(\hat{h}) - RDO2(\hat{h}))/RDO2(\hat{h})$

(III) nitric oxide positive ions

$$RDNO(h) = \begin{cases} RNO \cdot RNO2(h) & \text{for } h \geq \hat{h} \\ 100-RDO(h)-RDO2(h) & \text{else} \end{cases}$$

We put RDNO = 0 when it is less than 0.0005

(IV) hydrogen positive ions

$$RDH(h) = \begin{cases} 0 \text{ for } h \leqq \hat{h} \\ (100-RDO(h)-(1+RNO)\cdot RDO2(h)) \cdot (1-PEHE/100) \end{cases}$$

PEHE is the percentage of He^+ against all light ions, namely H^+ and He^+. In the absence of better information we use a constant estimated value of 10%.

(V) helium positive ions

$$RDHE(h) = RDH \cdot PEHE/(100 - PEHE)$$

4. EXAMPLES

4.1 Tables

Output tables computed with IRIAL 7 and the CCIR peak model are presented on the following pages for 108 combinations of input parameters. Six locations were chosen so as to provide some impression of the worldwide behavior of the ionosphere. These are, after geographic latitude, longitude and location:

42.6°N	44.1°N	35.7°N	14.7°N	120.0°S	51.7°S
288.5°E	2.0°E	140.0°E	342.6°E	283.1°E	302.2°E
Boston	St. Santin	Tokyo	Dakar	Lima	Stanley
USA	France	Japan	Senegal	Peru	Falkland

For each location two levels of solar activity are considered namely R (Zurich sunspot number) 10 and 100, further 3 months (March, June, December) and 3 hours (noon, sunrise, midnight). These indications can be found at the top of each table.

Results are given from 80 to 800 km with steps in altitude of 5 km up to 140 km, of 10 km up to 240 km and of 20 km to 800 km (first column). All 11 output parameters which can be chosen in the program are shown in successive columns in the following order:

absolute electron density - relative electron density - neutral temperature -electron temperature - ion temperature - ratio of electron to ion temperature -percentage of O^+ (and N^+) ions - percentage of H^+ ions - percentage of He^+ ions - percentage of O_2^+ ions - percentage of NO^+ ions.

INPUT: LATI= 42.6 LONGI= 288.5 R= 10 MONTH= 3 HOUR=12.0

CALCULATED VALUES: MLAT= 54.0 MLONG= 357.9
DIP= 71.5 MODIP= 55.5 MAGLA= 56.3 XHI= 45.9
SUNRISE: 6.2 L.T. SUNSET:17.8 L.T. SUN DEC.= -3.3
NMF2=3.66%11 NMF1= 2.09% 11 NME=1.16%11 NMD=5.31%08
HMF2=237.7 HMF1=185.2 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.042%08	0.0014	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	1.052%09	0.0029	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.083%10	0.0296	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	4.413%10	0.1206	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	8.831%10	0.2414	-1	-1	-1	-1	0.207	0.000	0.000	54.778	45.015
105.0	1.124%11	0.3072	-1	-1	-1	-1	0.326	0.000	0.000	53.686	45.988
110.0	1.159%11	0.3169	-1	-1	-1	-1	0.513	0.000	0.000	52.537	46.949
115.0	1.124%11	0.3073	-1	-1	-1	-1	0.807	0.000	0.000	51.221	47.972
120.0	1.100%11	0.3007	305.1	305.1	305.1	1.0000	1.266	0.000	0.000	49.516	49.218
125.0	1.133%11	0.3096	351.7	383.4	351.7	1.0903	1.979	0.000	0.000	47.148	50.873
130.0	1.188%11	0.3247	397.0	460.5	397.0	1.1600	3.076	0.000	0.000	44.055	52.869
135.0	1.217%11	0.3326	439.6	534.9	439.6	1.2167	4.736	0.000	0.000	40.545	54.719
140.0	1.248%11	0.3412	477.8	604.8	477.8	1.2659	7.175	0.000	0.000	37.000	55.825
150.0	1.323%11	0.3616	539.0	729.6	539.0	1.3535	15.113	0.000	0.000	30.532	54.355
160.0	1.422%11	0.3887	583.1	837.1	583.1	1.4357	26.363	0.000	0.000	25.097	48.540
170.0	1.585%11	0.4331	615.1	932.7	615.1	1.5163	36.882	0.000	0.000	20.466	42.652
180.0	1.973%11	0.5392	639.2	1020.3	641.3	1.5910	44.217	0.000	0.000	16.010	39.773
190.0	2.345%11	0.6409	657.9	1102.5	667.3	1.6522	49.297	0.000	0.000	11.336	39.367
200.0	2.858%11	0.7811	672.8	1180.9	693.3	1.7033	53.471	0.000	0.000	7.502	39.027
210.0	3.257%11	0.8902	684.8	1256.5	719.3	1.7467	57.448	0.000	0.000	4.887	37.664
220.0	3.514%11	0.9604	694.7	1329.9	745.4	1.7842	61.526	0.000	0.000	3.176	35.298
230.0	3.636%11	0.9938	702.9	1401.5	771.4	1.8169	65.823	0.000	0.000	2.064	32.113
240.0	3.658%11	0.9997	709.6	1471.8	797.4	1.8458	70.397	0.000	0.000	1.341	28.263
260.0	3.575%11	0.9773	719.9	1609.1	849.4	1.8943	80.490	0.000	0.000	0.566	18.944
280.0	3.376%11	0.9229	727.0	1743.2	901.5	1.9338	91.650	0.000	0.000	0.239	8.112
300.0	3.091%11	0.8449	731.9	1875.3	953.5	1.9667	98.000	0.000	0.000	0.101	1.899
320.0	2.755%11	0.7531	735.5	2005.8	1005.6	1.9947	98.409	0.000	0.000	0.043	1.549
340.0	2.403%11	0.6567	738.0	2135.3	1057.7	2.0189	98.416	0.200	0.022	0.018	1.344
360.0	2.059%11	0.5629	739.8	2219.6	1109.9	1.9999	98.414	0.910	0.101	0.008	0.567
380.0	1.744%11	0.4767	741.1	2259.5	1162.3	1.9440	98.411	1.211	0.135	0.003	0.239
400.0	1.466%11	0.4006	742.1	2299.5	1215.2	1.8923	98.408	1.341	0.149	0.001	0.101
420.0	1.228%11	0.3355	742.8	2339.2	1269.3	1.8428	98.399	1.402	0.156	0.001	0.043
440.0	1.029%11	0.2812	743.4	2378.8	1325.2	1.7951	98.276	1.535	0.171	0.000	0.018
460.0	8.649%10	0.2364	743.8	2418.6	1382.7	1.7491	97.221	2.494	0.277	0.000	0.008
480.0	7.315%10	0.1999	744.2	2458.3	1441.4	1.7054	95.705	3.863	0.429	0.000	0.003
500.0	6.236%10	0.1704	744.5	2498.0	1500.7	1.6646	94.186	5.232	0.581	0.000	0.001
520.0	5.364%10	0.1466	744.7	2537.8	1560.2	1.6266	92.678	6.589	0.732	0.000	0.001
540.0	4.661%10	0.1274	744.9	2577.6	1619.8	1.5913	91.176	7.941	0.882	0.000	0.000
560.0	4.092%10	0.1119	745.0	2617.3	1679.4	1.5585	89.673	9.295	1.033	0.000	0.000
580.0	3.631%10	0.0993	745.1	2657.1	1739.0	1.5279	88.158	10.658	1.184	0.000	0.000
600.0	3.256%10	0.0890	745.2	2696.8	1798.7	1.4993	86.619	12.043	1.338	0.000	0.000
620.0	2.949%10	0.0806	745.3	2736.6	1858.3	1.4726	85.039	13.465	1.496	0.000	0.000
640.0	2.697%10	0.0737	745.4	2776.3	1917.9	1.4476	83.403	14.937	1.660	0.000	0.000
660.0	2.489%10	0.0680	745.4	2816.1	1977.6	1.4240	81.692	16.477	1.831	0.000	0.000
680.0	2.316%10	0.0633	745.5	2855.8	2037.2	1.4018	79.895	18.095	2.011	0.000	0.000
700.0	2.172%10	0.0594	745.5	2895.6	2096.8	1.3809	78.005	19.795	2.199	0.000	0.000
720.0	2.051%10	0.0561	745.6	2935.4	2156.5	1.3612	76.031	21.572	2.397	0.000	0.000
740.0	1.950%10	0.0533	745.6	2975.1	2216.1	1.3425	73.986	23.412	2.601	0.000	0.000
760.0	1.864%10	0.0509	745.6	3014.9	2275.7	1.3248	71.895	25.295	2.811	0.000	0.000
780.0	1.792%10	0.0490	745.6	3054.6	2335.4	1.3080	69.781	27.197	3.022	0.000	0.000
800.0	1.730%10	0.0473	745.7	3094.4	2395.0	1.2920	67.669	29.098	3.233	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 42.6 LONGI= 288.5 R= 10 MONTH= 3 HOUR= 6.2

CALCULATED VALUES: MLAT= 54.0 MLONG= 357.9
DIP= 71.5 MODIP= 55.5 MAGLA= 56.3 XHI= 90.0
SUNRISE: 6.2 L.T. SUNSET:17.8 L.T. SUN DEC.= -3.3
NMF2=1.13%11 NMF1= 0.00%-01 NME=3.10%10 NMD=4.00%08
HMF2=235.5 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.814%08	0.0025	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.102%08	0.0036	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.810%09	0.0161	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.147%10	0.1018	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.531%10	0.2245	-1	-1	-1	-1	0.020	0.000	0.000	17.950	82.030
105.0	3.076%10	0.2728	-1	-1	-1	-1	0.031	0.000	0.000	20.889	79.081
110.0	2.999%10	0.2659	-1	-1	-1	-1	0.048	0.000	0.000	24.232	75.721
115.0	2.497%10	0.2215	-1	-1	-1	-1	0.074	0.000	0.000	27.887	72.039
120.0	2.010%10	0.1783	289.8	289.8	289.8	1.0000	0.114	0.000	0.000	31.524	68.361
125.0	1.781%10	0.1579	330.6	358.1	330.6	1.0834	0.177	0.000	0.000	34.509	65.313
130.0	1.836%10	0.1629	370.1	425.2	370.1	1.1490	0.275	0.000	0.000	36.301	63.424
135.0	2.085%10	0.1849	406.7	489.4	406.7	1.2034	0.425	0.000	0.000	36.979	62.596
140.0	2.413%10	0.2140	438.6	548.9	438.6	1.2514	0.655	0.000	0.000	37.000	62.345
150.0	3.185%10	0.2825	487.8	653.2	487.8	1.3391	1.525	0.000	0.000	36.335	62.140
160.0	3.785%10	0.3356	521.4	742.0	521.5	1.4229	3.347	0.000	0.000	35.403	61.250
170.0	4.704%10	0.4172	545.2	820.8	550.0	1.4925	6.466	0.000	0.000	34.020	59.514
180.0	6.325%10	0.5610	562.6	893.4	578.5	1.5443	10.415	0.000	0.000	30.434	59.151
190.0	7.947%10	0.7048	576.0	961.9	607.1	1.5846	14.360	0.000	0.000	22.930	62.710
200.0	9.333%10	0.8277	586.5	1027.6	635.6	1.6168	18.208	0.000	0.000	15.380	66.412
210.0	1.036%11	0.9185	595.0	1091.2	664.1	1.6431	22.316	0.000	0.000	10.039	67.645
220.0	1.098%11	0.9737	601.9	1153.2	692.6	1.6650	27.023	0.000	0.000	6.526	66.451
230.0	1.124%11	0.9973	607.6	1214.1	721.2	1.6835	32.590	0.000	0.000	4.240	63.170
240.0	1.127%11	0.9991	612.3	1273.9	749.7	1.6992	39.250	0.000	0.000	2.755	57.995
260.0	1.100%11	0.9755	619.4	1391.3	806.8	1.7246	56.860	0.000	0.000	1.163	41.977
280.0	1.041%11	0.9237	624.3	1506.5	863.8	1.7440	81.425	0.000	0.000	0.491	18.085
300.0	9.595%10	0.8510	627.8	1620.2	920.8	1.7595	98.000	0.000	0.000	0.207	1.793
320.0	8.633%10	0.7657	630.2	1732.9	977.8	1.7722	99.136	0.000	0.000	0.087	0.777
340.0	7.619%10	0.6757	631.9	1844.9	1034.7	1.7831	99.157	0.000	0.000	0.037	0.806
360.0	6.624%10	0.5875	633.2	1932.2	1091.2	1.7707	99.156	0.418	0.046	0.016	0.364
380.0	5.698%10	0.5054	634.1	1995.2	1147.0	1.7395	99.153	0.618	0.069	0.007	0.154
400.0	4.870%10	0.4319	634.8	2058.1	1200.7	1.7140	99.149	0.705	0.078	0.003	0.065
420.0	4.151%10	0.3681	635.3	2078.0	1250.4	1.6619	99.141	0.748	0.083	0.001	0.027
440.0	3.539%10	0.3139	635.7	2098.0	1293.9	1.6214	99.016	0.875	0.097	0.000	0.012
460.0	3.027%10	0.2685	636.0	2117.9	1331.3	1.5909	97.954	1.837	0.204	0.000	0.005
480.0	2.604%10	0.2309	636.3	2137.9	1364.6	1.5667	96.426	3.215	0.357	0.000	0.002
500.0	2.255%10	0.2000	636.4	2157.9	1396.0	1.5458	94.896	4.593	0.510	0.000	0.001
520.0	1.969%10	0.1746	636.6	2177.9	1426.5	1.5268	93.376	5.961	0.662	0.000	0.000
540.0	1.735%10	0.1539	636.7	2197.9	1456.6	1.5089	91.863	7.323	0.814	0.000	0.000
560.0	1.543%10	0.1368	636.8	2217.9	1486.7	1.4918	90.348	8.686	0.965	0.000	0.000
580.0	1.385%10	0.1229	636.9	2237.9	1516.7	1.4755	88.822	10.060	1.118	0.000	0.000
600.0	1.255%10	0.1113	637.0	2257.9	1546.7	1.4598	87.271	11.456	1.273	0.000	0.000
620.0	1.148%10	0.1018	637.0	2277.9	1576.8	1.4447	85.680	12.888	1.432	0.000	0.000
640.0	1.059%10	0.0939	637.1	2297.9	1606.8	1.4302	84.031	14.372	1.597	0.000	0.000
660.0	9.844%09	0.0873	637.1	2317.9	1636.8	1.4162	82.308	15.923	1.769	0.000	0.000
680.0	9.223%09	0.0818	637.2	2337.9	1666.8	1.4027	80.497	17.553	1.950	0.000	0.000
700.0	8.700%09	0.0772	637.2	2357.9	1696.8	1.3897	78.593	19.266	2.141	0.000	0.000
720.0	8.260%09	0.0733	637.2	2377.9	1726.8	1.3771	76.604	21.057	2.340	0.000	0.000
740.0	7.888%09	0.0700	637.2	2397.9	1756.8	1.3650	74.544	22.911	2.546	0.000	0.000
760.0	7.572%09	0.0672	637.2	2417.9	1786.8	1.3532	72.437	24.807	2.756	0.000	0.000
780.0	7.303%09	0.0648	637.3	2437.9	1816.8	1.3419	70.307	26.723	2.969	0.000	0.000
800.0	7.073%09	0.0627	637.3	2457.9	1846.7	1.3309	68.179	28.639	3.182	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 42.6 LONGI= 288.5 R= 10 MONTH= 3 HOUR= 0.0

CALCULATED VALUES: MLAT= 54.0 MLONG= 357.9
DIP= 71.5 MODIP= 55.5 MAGLA= 56.3 XHI= 140.7
SUNRISE: 6.2 L.T. SUNSET:17.8 L.T. SUN DEC.= -3.3
NMF2=8.57%10 NMF1= 0.00%-01 NME=1.78%09 NMD=4.00%08
HMF2=315.7 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.392%05	6.3%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.473%08	0.0029	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.729%08	0.0055	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.743%09	0.0203	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.775%09	0.0207	-1	-1	-1	-1	0.020	0.000	0.000	17.950	82.030
105.0	1.775%09	0.0207	-1	-1	-1	-1	0.031	0.000	0.000	20.889	79.081
110.0	1.451%09	0.0169	-1	-1	-1	-1	0.048	0.000	0.000	24.232	75.721
115.0	9.453%08	0.0110	-1	-1	-1	-1	0.074	0.000	0.000	27.887	72.039
120.0	6.015%08	0.0070	287.1	287.1	287.1	1.0000	0.115	0.000	0.000	31.524	68.361
125.0	4.234%08	0.0049	326.8	348.2	326.8	1.0654	0.178	0.000	0.000	34.509	65.313
130.0	3.503%08	0.0041	365.3	408.1	365.3	1.1170	0.275	0.000	0.000	36.301	63.424
135.0	3.445%08	0.0040	400.9	465.0	400.9	1.1599	0.425	0.000	0.000	36.979	62.596
140.0	3.928%08	0.0046	431.8	517.3	431.8	1.1980	0.655	0.000	0.000	37.000	62.345
150.0	6.553%08	0.0076	478.9	607.2	478.9	1.2678	1.526	0.000	0.000	36.335	62.139
160.0	1.109%09	0.0129	511.0	682.0	511.3	1.3338	3.349	0.000	0.000	35.403	61.248
170.0	1.811%09	0.0211	533.4	747.2	540.2	1.3832	6.470	0.000	0.000	34.020	59.510
180.0	2.482%09	0.0289	549.9	806.4	569.1	1.4170	10.420	0.000	0.000	30.434	59.146
190.0	3.440%09	0.0401	562.5	861.7	598.0	1.4410	14.368	0.000	0.000	22.930	62.702
200.0	4.847%09	0.0565	572.4	914.4	626.9	1.4585	18.218	0.000	0.000	15.380	66.403
210.0	7.011%09	0.0818	580.3	965.1	655.8	1.4715	22.327	0.000	0.000	10.039	67.634
220.0	1.065%10	0.1242	586.8	1014.3	684.7	1.4813	27.036	0.000	0.000	6.526	66.438
230.0	1.761%10	0.2055	592.2	1062.4	713.6	1.4887	32.605	0.000	0.000	4.240	63.155
240.0	2.732%10	0.3187	596.6	1109.5	742.5	1.4942	39.266	0.000	0.000	2.755	57.979
260.0	5.099%10	0.5948	603.3	1201.7	800.3	1.5015	56.879	0.000	0.000	1.163	41.958
280.0	7.221%10	0.8423	607.9	1291.8	858.1	1.5054	81.441	0.000	0.000	0.491	18.069
300.0	8.363%10	0.9755	611.1	1380.6	915.9	1.5073	98.000	0.000	0.000	0.207	1.793
320.0	8.566%10	0.9991	613.4	1468.3	973.6	1.5082	99.107	0.000	0.000	0.087	0.806
340.0	8.349%10	0.9739	615.0	1555.5	1031.0	1.5087	99.085	0.395	0.044	0.037	0.438
360.0	7.873%10	0.9183	616.2	1642.1	1087.7	1.5097	99.020	0.701	0.078	0.016	0.185
380.0	7.211%10	0.8411	617.1	1728.5	1142.7	1.5126	98.914	0.901	0.100	0.007	0.078
400.0	6.448%10	0.7521	617.7	1814.6	1193.4	1.5205	98.352	1.451	0.161	0.003	0.033
420.0	5.657%10	0.6598	618.2	1814.7	1235.5	1.4688	94.980	4.504	0.500	0.001	0.014
440.0	4.897%10	0.5712	618.6	1814.8	1264.5	1.4352	90.538	8.510	0.946	0.000	0.006
460.0	4.203%10	0.4903	618.8	1814.9	1280.3	1.4175	86.145	12.467	1.385	0.000	0.002
480.0	3.595%10	0.4193	619.1	1815.0	1287.5	1.4096	81.802	16.378	1.820	0.000	0.001
500.0	3.075%10	0.3587	619.2	1815.0	1290.5	1.4065	77.467	20.279	2.253	0.000	0.000
520.0	2.640%10	0.3079	619.4	1815.1	1291.7	1.4052	73.102	24.208	2.690	0.000	0.000
540.0	2.281%10	0.2660	619.5	1815.2	1292.2	1.4047	68.675	28.192	3.132	0.000	0.000
560.0	1.987%10	0.2317	619.6	1815.3	1292.5	1.4045	64.178	32.239	3.582	0.000	0.000
580.0	1.747%10	0.2037	619.7	1815.4	1292.7	1.4044	59.629	36.333	4.037	0.000	0.000
600.0	1.551%10	0.1809	619.7	1815.4	1292.8	1.4043	55.077	40.431	4.492	0.000	0.000
620.0	1.392%10	0.1623	619.8	1815.5	1292.9	1.4042	50.589	44.470	4.941	0.000	0.000
640.0	1.262%10	0.1471	619.8	1815.6	1293.0	1.4041	46.240	48.384	5.376	0.000	0.000
660.0	1.155%10	0.1347	619.9	1815.7	1293.2	1.4041	42.097	52.113	5.790	0.000	0.000
680.0	1.067%10	0.1245	619.9	1815.8	1293.3	1.4040	38.204	55.616	6.180	0.000	0.000
700.0	9.952%09	0.1161	619.9	1815.8	1293.4	1.4039	34.592	58.868	6.541	0.000	0.000
720.0	9.354%09	0.1091	620.0	1815.9	1293.5	1.4038	31.268	61.859	6.873	0.000	0.000
740.0	8.857%09	0.1033	620.0	1816.0	1293.7	1.4038	28.230	64.593	7.177	0.000	0.000
760.0	8.443%09	0.0985	620.0	1816.1	1293.8	1.4037	25.466	67.081	7.453	0.000	0.000
780.0	8.096%09	0.0944	620.0	1816.2	1293.9	1.4036	22.959	69.337	7.704	0.000	0.000
800.0	7.805%09	0.0910	620.0	1816.2	1294.0	1.4036	20.691	71.378	7.931	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 42.6 LONGI= 288.5 R= 10 MONTH= 6 HOUR=12.0

CALCULATED VALUES: MLAT= 54.0 MLONG= 357.9
DIP= 71.5 MODIP= 55.5 MAGLA= 56.3 XHI= 19.5
SUNRISE: 4.5 L.T. SUNSET:19.5 L.T. SUN DEC.= 23.1
NMF2=3.05%11 NMF1= 2.34% 11 NME=1.34%11 NMD=6.16%08
HMF2=205.5 HMF1=160.1 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.865%08	0.0019	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	1.239%09	0.0041	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.272%10	0.0417	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	5.142%10	0.1687	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.023%11	0.3358	-1	-1	-1	-1	0.236	0.000	0.000	48.913	50.851
105.0	1.299%11	0.4262	-1	-1	-1	-1	0.341	0.000	0.000	45.222	54.437
110.0	1.340%11	0.4395	-1	-1	-1	-1	0.491	0.000	0.000	41.927	57.583
115.0	1.306%11	0.4283	-1	-1	-1	-1	0.705	0.000	0.000	39.120	60.174
120.0	1.277%11	0.4188	308.3	308.3	308.3	1.0000	1.012	0.000	0.000	36.937	62.051
125.0	1.319%11	0.4326	356.1	387.4	356.1	1.0878	1.445	0.000	0.000	35.417	63.138
130.0	1.474%11	0.4835	402.7	465.2	402.7	1.1554	2.048	0.000	0.000	34.405	63.547
135.0	1.649%11	0.5410	446.6	540.4	446.6	1.2102	2.869	0.000	0.000	33.676	63.456
140.0	1.824%11	0.5983	486.1	611.2	486.1	1.2574	3.946	0.000	0.000	33.074	62.980
150.0	2.148%11	0.7047	550.0	737.7	550.0	1.3413	6.846	0.000	0.000	32.006	61.149
160.0	2.333%11	0.7654	596.5	846.8	596.5	1.4196	10.224	0.000	0.000	31.000	58.776
170.0	2.624%11	0.8609	630.6	943.5	630.6	1.4961	13.434	0.000	0.000	30.013	56.553
180.0	2.848%11	0.9344	656.4	1031.8	657.0	1.5704	16.473	0.000	0.000	28.942	54.584
190.0	2.983%11	0.9788	676.4	1114.4	682.4	1.6330	19.643	0.000	0.000	27.174	53.184
200.0	3.041%11	0.9978	692.4	1193.0	707.8	1.6854	23.190	0.000	0.000	22.757	54.053
210.0	3.045%11	0.9991	705.4	1268.5	733.2	1.7301	27.286	0.000	0.000	16.099	56.615
220.0	3.020%11	0.9907	716.0	1341.7	758.6	1.7687	32.070	0.000	0.000	10.616	57.314
230.0	2.969%11	0.9742	724.8	1413.1	784.0	1.8024	37.679	0.000	0.000	6.911	55.409
240.0	2.896%11	0.9502	732.1	1482.9	809.4	1.8322	44.264	0.000	0.000	4.491	51.245
260.0	2.693%11	0.8837	743.2	1619.1	860.2	1.8824	61.068	0.000	0.000	1.896	37.036
280.0	2.437%11	0.7997	750.9	1752.0	910.9	1.9232	83.427	0.000	0.000	0.800	15.773
300.0	2.155%11	0.7071	756.2	1882.5	961.7	1.9574	98.000	0.000	0.000	0.338	1.662
320.0	1.870%11	0.6135	760.0	2011.4	1012.5	1.9865	98.986	0.000	0.000	0.143	0.872
340.0	1.599%11	0.5248	762.7	2139.2	1063.4	2.0117	99.004	0.000	0.000	0.060	0.936
360.0	1.354%11	0.4444	764.7	2222.6	1114.3	1.9945	99.003	0.511	0.057	0.025	0.404
380.0	1.140%11	0.3741	766.1	2262.2	1165.6	1.9409	99.000	0.737	0.082	0.011	0.171
400.0	9.577%10	0.3142	767.2	2302.0	1217.5	1.8908	98.996	0.834	0.093	0.005	0.072
420.0	8.053%10	0.2642	768.0	2341.8	1270.7	1.8429	98.988	0.882	0.098	0.002	0.030
440.0	6.796%10	0.2230	768.6	2381.7	1326.1	1.7960	98.864	1.010	0.112	0.001	0.013
460.0	5.769%10	0.1893	769.1	2421.6	1383.5	1.7503	97.803	1.972	0.219	0.000	0.005
480.0	4.934%10	0.1619	769.5	2461.5	1442.3	1.7066	96.278	3.348	0.372	0.000	0.002
500.0	4.256%10	0.1396	769.8	2501.5	1501.8	1.6656	94.749	4.725	0.525	0.000	0.001
520.0	3.707%10	0.1216	770.0	2541.4	1561.6	1.6275	93.232	6.090	0.677	0.000	0.000
540.0	3.260%10	0.1070	770.2	2581.4	1621.5	1.5920	91.722	7.450	0.828	0.000	0.000
560.0	2.896%10	0.0950	770.3	2621.4	1681.4	1.5590	90.209	8.812	0.979	0.000	0.000
580.0	2.598%10	0.0852	770.5	2661.3	1741.3	1.5283	88.685	10.183	1.131	0.000	0.000
600.0	2.353%10	0.0772	770.6	2701.3	1801.2	1.4997	87.137	11.577	1.286	0.000	0.000
620.0	2.150%10	0.0706	770.7	2741.2	1861.2	1.4728	85.548	13.007	1.445	0.000	0.000
640.0	1.983%10	0.0650	770.7	2781.2	1921.1	1.4477	83.902	14.488	1.610	0.000	0.000
660.0	1.843%10	0.0605	770.8	2821.1	1981.0	1.4241	82.181	16.037	1.782	0.000	0.000
680.0	1.726%10	0.0566	770.8	2861.1	2041.0	1.4018	80.373	17.665	1.963	0.000	0.000
700.0	1.627%10	0.0534	770.9	2901.1	2100.9	1.3808	78.472	19.375	2.153	0.000	0.000
720.0	1.544%10	0.0507	770.9	2941.0	2160.9	1.3610	76.485	21.163	2.351	0.000	0.000
740.0	1.473%10	0.0483	771.0	2981.0	2220.8	1.3423	74.429	23.014	2.557	0.000	0.000
760.0	1.413%10	0.0464	771.0	3020.9	2280.7	1.3245	72.325	24.908	2.768	0.000	0.000
780.0	1.362%10	0.0447	771.0	3060.9	2340.7	1.3077	70.199	26.821	2.980	0.000	0.000
800.0	1.318%10	0.0433	771.0	3100.8	2400.6	1.2917	68.074	28.734	3.193	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 42.6 LONGI= 288.5 R= 10 MONTH= 6 HOUR= 4.5

CALCULATED VALUES: MLAT= 54.0 MLONG= 357.9
DIP= 71.5 MODIP= 55.5 MAGLA= 56.3 XHI= 90.0
SUNRISE: 4.5 L.T. SUNSET:19.5 L.T. SUN DEC.= 23.1
NMF2=9.79%10 HMF1= 0.00%-01 HME=2.98%10 NMD=4.00%08
HMF2=235.9 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.814%08	0.0029	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.102%08	0.0042	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.809%09	0.0185	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.132%10	0.1157	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.458%10	0.2512	-1	-1	-1	-1	0.001	0.000	0.000	5.910	94.089
105.0	2.962%10	0.3027	-1	-1	-1	-1	0.002	0.000	0.000	7.935	92.062
110.0	2.887%10	0.2950	-1	-1	-1	-1	0.004	0.000	0.000	10.632	89.364
115.0	2.406%10	0.2459	-1	-1	-1	-1	0.008	0.000	0.000	14.159	85.833
120.0	1.937%10	0.1979	292.9	292.9	292.9	1.0000	0.016	0.000	0.000	18.572	81.412
125.0	1.714%10	0.1752	334.9	362.1	334.9	1.0812	0.031	0.000	0.000	23.544	76.425
130.0	1.769%10	0.1808	375.6	430.0	375.6	1.1447	0.059	0.000	0.000	28.077	71.864
135.0	2.015%10	0.2059	413.4	495.0	413.4	1.1972	0.111	0.000	0.000	31.036	68.853
140.0	2.340%10	0.2391	446.6	555.4	446.6	1.2434	0.210	0.000	0.000	32.271	67.520
150.0	3.102%10	0.3170	498.2	661.3	498.2	1.3274	0.704	0.000	0.000	32.099	67.197
160.0	3.819%10	0.3903	533.8	751.3	533.8	1.4073	2.040	0.000	0.000	31.000	66.960
170.0	4.916%10	0.5023	559.1	830.9	562.0	1.4784	4.568	0.000	0.000	29.795	65.637
180.0	6.222%10	0.6358	577.8	903.9	590.1	1.5319	7.728	0.000	0.000	28.508	63.764
190.0	7.423%10	0.7586	592.1	972.6	618.2	1.5734	10.889	0.000	0.000	26.569	62.541
200.0	8.414%10	0.8598	603.4	1038.3	646.2	1.6067	14.130	0.000	0.000	22.138	63.732
210.0	9.133%10	0.9332	612.5	1101.8	674.3	1.6340	17.781	0.000	0.000	15.634	66.585
220.0	9.569%10	0.9779	620.0	1163.6	702.4	1.6567	22.141	0.000	0.000	10.306	67.552
230.0	9.761%10	0.9974	626.1	1224.1	730.4	1.6758	27.474	0.000	0.000	6.709	65.816
240.0	9.779%10	0.9993	631.1	1283.5	758.5	1.6922	34.052	0.000	0.000	4.360	61.588
260.0	9.557%10	0.9766	638.8	1399.9	814.6	1.7185	52.250	0.000	0.000	1.840	45.910
280.0	9.060%10	0.9258	644.1	1513.9	870.7	1.7387	79.114	0.000	0.000	0.777	20.109
300.0	8.358%10	0.8541	647.9	1626.4	926.8	1.7547	98.000	0.000	0.000	0.328	1.672
320.0	7.532%10	0.7697	650.5	1737.7	982.9	1.7679	99.313	0.000	0.000	0.138	0.548
340.0	6.658%10	0.6804	652.4	1848.3	1038.9	1.7792	99.338	0.000	0.000	0.058	0.603
360.0	5.799%10	0.5926	653.7	1934.4	1094.5	1.7673	99.337	0.329	0.037	0.025	0.273
380.0	4.997%10	0.5107	654.7	1996.2	1149.4	1.7368	99.334	0.486	0.054	0.010	0.115
400.0	4.279%10	0.4372	655.4	2058.1	1202.3	1.7118	99.330	0.555	0.062	0.004	0.049
420.0	3.653%10	0.3733	656.0	2078.0	1251.3	1.6607	99.322	0.590	0.066	0.002	0.021
440.0	3.120%10	0.3188	656.4	2098.0	1294.4	1.6209	99.197	0.714	0.079	0.001	0.009
460.0	2.673%10	0.2731	656.8	2118.0	1331.5	1.5907	98.133	1.677	0.186	0.000	0.004
480.0	2.302%10	0.2353	657.0	2137.9	1364.7	1.5666	96.602	3.056	0.340	0.000	0.002
500.0	1.997%10	0.2040	657.2	2157.9	1396.0	1.5458	95.069	4.437	0.493	0.000	0.001
520.0	1.746%10	0.1784	657.4	2177.9	1426.5	1.5268	93.547	5.807	0.645	0.000	0.000
540.0	1.540%10	0.1574	657.5	2197.9	1456.6	1.5089	92.031	7.172	0.797	0.000	0.000
560.0	1.371%10	0.1401	657.6	2217.9	1486.7	1.4918	90.514	8.538	0.949	0.000	0.000
580.0	1.232%10	0.1259	657.7	2237.9	1516.7	1.4755	88.985	9.914	1.102	0.000	0.000
600.0	1.118%10	0.1142	657.8	2257.9	1546.7	1.4598	87.431	11.312	1.257	0.000	0.000
620.0	1.023%10	0.1045	657.8	2277.9	1576.7	1.4447	85.837	12.747	1.416	0.000	0.000
640.0	9.440%09	0.0965	657.9	2297.9	1606.7	1.4302	84.185	14.233	1.581	0.000	0.000
660.0	8.783%09	0.0897	657.9	2317.9	1636.7	1.4162	82.458	15.788	1.754	0.000	0.000
680.0	8.233%09	0.0841	658.0	2337.9	1666.7	1.4027	80.644	17.421	1.936	0.000	0.000
700.0	7.771%09	0.0794	658.0	2357.9	1696.7	1.3897	78.737	19.137	2.126	0.000	0.000
720.0	7.381%09	0.0754	658.0	2377.9	1726.7	1.3771	76.744	20.931	2.326	0.000	0.000
740.0	7.051%09	0.0720	658.1	2397.9	1756.7	1.3650	74.680	22.788	2.532	0.000	0.000
760.0	6.771%09	0.0692	658.1	2417.9	1786.7	1.3533	72.569	24.688	2.743	0.000	0.000
780.0	6.532%09	0.0667	658.1	2437.9	1816.7	1.3419	70.436	26.608	2.956	0.000	0.000
800.0	6.328%09	0.0647	658.1	2457.9	1846.7	1.3310	68.303	28.527	3.170	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 42.6 LONGI= 288.5 R= 10 MONTH= 6 HOUR= 0.0

CALCULATED VALUES: MLAT= 54.0 MLONG= 357.9
DIP= 71.5 MODIP= 55.5 MAGLA= 56.3 XHI= 114.3
SUNRISE: 4.5 L.T. SUNSET:19.5 L.T. SUN DEC.= 23.1
NMF2=1.17%11 NMF1= 0.00%-01 NME=1.78%09 NMD=4.00%08
HMF2=297.4 HMF1= 0.0 HME=105.1 HMD= 87.9

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	8.809%05	7.5%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.578%08	0.0022	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.777%08	0.0041	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.745%09	0.0149	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.775%09	0.0151	-1	-1	-1	-1	0.001	0.000	0.000	5.910	94.089
105.0	1.775%09	0.0151	-1	-1	-1	-1	0.002	0.000	0.000	7.936	92.062
110.0	1.459%09	0.0124	-1	-1	-1	-1	0.004	0.000	0.000	10.632	89.363
115.0	9.573%08	0.0082	-1	-1	-1	-1	0.008	0.000	0.000	14.159	85.832
120.0	6.139%08	0.0052	291.9	291.9	291.9	1.0000	0.016	0.000	0.000	18.573	81.411
125.0	4.353%08	0.0037	333.5	354.4	333.5	1.0627	0.031	0.000	0.000	23.546	76.424
130.0	3.625%08	0.0031	373.8	415.6	373.8	1.1118	0.059	0.000	0.000	28.079	71.862
135.0	3.580%08	0.0031	411.3	474.0	411.3	1.1525	0.111	0.000	0.000	31.037	68.851
140.0	4.088%08	0.0035	444.1	527.7	444.1	1.1883	0.210	0.000	0.000	32.272	67.518
150.0	6.782%08	0.0058	494.8	620.2	494.8	1.2535	0.705	0.000	0.000	32.100	67.195
160.0	1.135%09	0.0097	529.8	697.0	529.8	1.3156	2.042	0.000	0.000	31.000	66.958
170.0	1.919%09	0.0164	554.6	763.6	558.1	1.3683	4.570	0.000	0.000	29.785	65.644
180.0	4.935%09	0.0421	572.8	823.7	586.3	1.4049	7.732	0.000	0.000	28.432	63.835
190.0	1.024%10	0.0873	586.8	879.5	614.5	1.4312	10.895	0.000	0.000	26.086	63.018
200.0	1.811%10	0.1544	597.9	932.3	642.7	1.4506	14.137	0.000	0.000	20.207	65.656
210.0	2.879%10	0.2454	606.8	983.0	670.9	1.4652	17.790	0.000	0.000	12.192	70.018
220.0	4.216%10	0.3594	614.1	1032.1	699.2	1.4762	22.152	0.000	0.000	6.630	71.218
230.0	5.732%10	0.4886	620.1	1079.9	727.4	1.4846	27.487	0.000	0.000	3.537	68.976
240.0	7.290%10	0.6214	625.0	1126.6	755.6	1.4911	34.066	0.000	0.000	1.882	64.051
260.0	9.953%10	0.8485	632.5	1217.8	812.0	1.4996	52.267	0.000	0.000	0.533	47.201
280.0	1.142%11	0.9732	637.7	1306.6	868.4	1.5045	79.130	0.000	0.000	0.151	20.720
300.0	1.173%11	0.9997	641.3	1393.8	924.8	1.5071	98.000	0.000	0.000	0.043	1.957
320.0	1.146%11	0.9774	643.9	1480.0	981.1	1.5084	99.285	0.000	0.000	0.012	0.703
340.0	1.084%11	0.9241	645.7	1565.4	1037.2	1.5093	99.266	0.405	0.045	0.003	0.280
360.0	9.950%10	0.8483	647.0	1650.3	1092.6	1.5105	99.201	0.647	0.072	0.001	0.079
380.0	8.909%10	0.7595	648.0	1734.9	1146.3	1.5135	99.095	0.794	0.088	0.000	0.022
400.0	7.819%10	0.6666	648.7	1819.2	1195.9	1.5213	98.531	1.316	0.146	0.000	0.006
420.0	6.763%10	0.5766	649.3	1819.7	1237.1	1.4709	95.154	4.360	0.484	0.000	0.002
440.0	5.794%10	0.4939	649.7	1820.2	1265.7	1.4381	90.703	8.367	0.930	0.000	0.001
460.0	4.940%10	0.4211	650.0	1820.6	1281.6	1.4206	86.302	12.328	1.370	0.000	0.000
480.0	4.208%10	0.3587	650.3	1821.1	1289.1	1.4127	81.951	16.244	1.805	0.000	0.000
500.0	3.594%10	0.3064	650.5	1821.5	1292.5	1.4093	77.609	20.152	2.239	0.000	0.000
520.0	3.086%10	0.2631	650.6	1822.0	1294.2	1.4078	73.235	24.088	2.676	0.000	0.000
540.0	2.671%10	0.2277	650.7	1822.4	1295.3	1.4070	68.801	28.079	3.120	0.000	0.000
560.0	2.331%10	0.1987	650.8	1822.9	1296.1	1.4064	64.296	32.134	3.570	0.000	0.000
580.0	2.055%10	0.1752	650.9	1823.4	1296.9	1.4060	59.738	36.235	4.026	0.000	0.000
600.0	1.831%10	0.1561	651.0	1823.8	1297.6	1.4056	55.177	40.340	4.482	0.000	0.000
620.0	1.647%10	0.1404	651.1	1824.3	1298.3	1.4052	50.681	44.387	4.932	0.000	0.000
640.0	1.497%10	0.1277	651.1	1824.7	1299.0	1.4048	46.325	48.308	5.368	0.000	0.000
660.0	1.374%10	0.1172	651.2	1825.2	1299.6	1.4044	42.173	52.044	5.783	0.000	0.000
680.0	1.273%10	0.1085	651.2	1825.6	1300.3	1.4040	38.274	55.553	6.173	0.000	0.000
700.0	1.189%10	0.1014	651.2	1826.1	1301.0	1.4036	34.655	58.811	6.535	0.000	0.000
720.0	1.120%10	0.0954	651.3	1826.6	1301.7	1.4032	31.325	61.808	6.868	0.000	0.000
740.0	1.062%10	0.0905	651.3	1827.0	1302.4	1.4028	28.281	64.547	7.172	0.000	0.000
760.0	1.013%10	0.0864	651.3	1827.5	1303.1	1.4024	25.512	67.039	7.449	0.000	0.000
780.0	9.723%09	0.0829	651.3	1827.9	1303.8	1.4020	23.001	69.299	7.700	0.000	0.000
800.0	9.379%09	0.0800	651.3	1828.4	1304.5	1.4017	20.729	71.344	7.927	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 42.6 LONGI= 288.5 R= 10 MONTH=12 HOUR=12.0

CALCULATED VALUES: MLAT= 54.0 MLONG= 357.9
DIP= 71.5 MODIP= 55.5 MAGLA= 56.3 XHI= 65.5
SUNRISE: 7.5 L.T. SUNSET:16.5 L.T. SUN DEC.= -22.9
NMF2=5.19%11 NMF1= 0.00%-01 NME=9.07%10 NMD=4.00%08
HMF2=213.7 HMF1= 0.0 HME=109.9 HMD= 81.2

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	3.777%08	7.3%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	7.558%08	0.0015	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	7.868%09	0.0152	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	3.316%10	0.0639	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	6.806%10	0.1312	-1	-1	-1	-1	0.265	0.000	0.000	37.372	62.363
105.0	8.773%10	0.1691	-1	-1	-1	-1	0.397	0.000	0.000	39.222	60.381
110.0	9.067%10	0.1748	-1	-1	-1	-1	0.595	0.000	0.000	41.142	58.263
115.0	8.548%10	0.1647	-1	-1	-1	-1	0.893	0.000	0.000	43.093	56.014
120.0	8.080%10	0.1557	301.7	301.7	301.7	1.0000	1.339	0.000	0.000	44.970	53.691
125.0	8.620%10	0.1661	347.0	379.1	347.0	1.0925	2.005	0.000	0.000	46.514	51.481
130.0	9.700%10	0.1870	391.0	455.2	391.0	1.1642	2.999	0.000	0.000	47.251	49.750
135.0	1.044%11	0.2013	432.3	528.5	432.3	1.2227	4.475	0.000	0.000	46.727	48.797
140.0	1.129%11	0.2176	469.0	597.4	469.0	1.2737	6.652	0.000	0.000	45.000	48.348
150.0	1.347%11	0.2596	527.4	720.0	527.4	1.3650	14.332	0.000	0.000	39.856	45.812
160.0	1.715%11	0.3306	569.0	825.7	569.0	1.4512	28.637	0.000	0.000	33.772	37.592
170.0	2.658%11	0.5124	599.0	919.9	599.1	1.5356	48.995	0.000	0.000	24.839	26.166
180.0	3.669%11	0.7071	621.5	1006.5	625.7	1.6086	67.894	0.000	0.000	13.925	18.182
190.0	4.485%11	0.8644	638.8	1088.1	652.4	1.6679	79.315	0.000	0.000	6.738	13.947
200.0	4.985%11	0.9609	652.6	1166.1	679.0	1.7173	84.800	0.000	0.000	3.163	12.036
210.0	5.177%11	0.9977	663.8	1241.4	705.6	1.7592	87.531	0.000	0.000	1.478	10.990
220.0	5.179%11	0.9981	672.9	1314.7	732.3	1.7953	89.237	0.000	0.000	0.691	10.072
230.0	5.125%11	0.9877	680.4	1386.4	758.9	1.8268	90.597	0.000	0.000	0.323	9.080
240.0	5.026%11	0.9687	686.6	1456.8	785.6	1.8544	91.851	0.000	0.000	0.151	7.998
260.0	4.714%11	0.9086	696.1	1594.6	838.8	1.9009	94.308	0.000	0.000	0.033	5.659
280.0	4.289%11	0.8266	702.6	1729.5	892.1	1.9386	96.728	0.000	0.000	0.007	3.264
300.0	3.800%11	0.7324	707.2	1862.5	945.4	1.9700	98.000	0.000	0.000	0.002	1.998
320.0	3.294%11	0.6349	710.4	1994.1	998.7	1.9966	98.079	0.000	0.000	0.000	1.921
340.0	2.808%11	0.5412	712.8	2124.7	1052.0	2.0196	98.079	0.890	0.099	0.000	0.932
360.0	2.365%11	0.4557	714.4	2210.0	1105.4	1.9993	98.078	1.547	0.172	0.000	0.203
380.0	1.976%11	0.3808	715.6	2250.7	1159.0	1.9420	98.075	1.693	0.188	0.000	0.044
400.0	1.645%11	0.3171	716.6	2291.5	1212.9	1.8893	98.071	1.727	0.192	0.000	0.010
420.0	1.370%11	0.2640	717.2	2330.5	1267.6	1.8384	98.063	1.741	0.193	0.000	0.002
440.0	1.144%11	0.2206	717.8	2369.5	1323.6	1.7902	97.940	1.854	0.206	0.000	0.000
460.0	9.614%10	0.1853	718.2	2408.5	1380.8	1.7443	96.889	2.800	0.311	0.000	0.000
480.0	8.138%10	0.1568	718.5	2447.6	1438.8	1.7012	95.378	4.160	0.462	0.000	0.000
500.0	6.950%10	0.1340	718.8	2486.7	1497.2	1.6609	93.864	5.522	0.614	0.000	0.000
520.0	5.995%10	0.1155	719.0	2525.8	1555.7	1.6236	92.361	6.875	0.764	0.000	0.000
540.0	5.225%10	0.1007	719.1	2564.9	1614.3	1.5888	90.864	8.222	0.914	0.000	0.000
560.0	4.602%10	0.0887	719.3	2604.0	1673.0	1.5565	89.366	9.570	1.063	0.000	0.000
580.0	4.097%10	0.0790	719.4	2643.1	1731.6	1.5264	87.857	10.929	1.214	0.000	0.000
600.0	3.685%10	0.0710	719.5	2682.2	1790.2	1.4982	86.323	12.310	1.368	0.000	0.000
620.0	3.347%10	0.0645	719.5	2721.3	1848.9	1.4718	84.749	13.726	1.525	0.000	0.000
640.0	3.068%10	0.0591	719.6	2760.4	1907.5	1.4471	83.118	15.194	1.688	0.000	0.000
660.0	2.837%10	0.0547	719.6	2799.5	1966.2	1.4238	81.413	16.728	1.859	0.000	0.000
680.0	2.645%10	0.0510	719.7	2838.6	2024.8	1.4019	79.622	18.341	2.038	0.000	0.000
700.0	2.484%10	0.0479	719.7	2877.7	2083.5	1.3812	77.739	20.035	2.226	0.000	0.000
720.0	2.349%10	0.0453	719.8	2916.8	2142.1	1.3616	75.771	21.806	2.423	0.000	0.000
740.0	2.235%10	0.0431	719.8	2955.9	2200.8	1.3431	73.733	23.640	2.627	0.000	0.000
760.0	2.139%10	0.0412	719.8	2995.0	2259.4	1.3255	71.649	25.516	2.835	0.000	0.000
780.0	2.056%10	0.0396	719.8	3034.1	2318.1	1.3089	69.543	27.411	3.046	0.000	0.000
800.0	1.986%10	0.0383	719.9	3073.2	2376.7	1.2930	67.438	29.306	3.256	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 42.6 LONGI= 288.5 R= 10 MONTH=12 HOUR= 7.5

CALCULATED VALUES: MLAT= 54.0 MLONG= 357.9
DIP= 71.5 MODIP= 55.5 MAGLA= 56.3 XHI= 90.0
SUNRISE: 7.5 L.T. SUNSET:16.5 L.T. SUN DEC.= -22.9
NMF2=1.79%11 NMF1= 0.00%-01 NME=3.30%10 NMD=4.00%08
HMF2=231.6 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.813%08	0.0016	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.102%08	0.0023	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.811%09	0.0101	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.173%10	0.0654	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.660%10	0.1483	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	3.279%10	0.1828	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	3.195%10	0.1780	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	2.632%10	0.1467	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	2.084%10	0.1161	290.0	290.0	290.0	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	1.824%10	0.1017	330.9	358.4	330.9	1.0831	0.084	0.000	0.000	36.294	63.621
130.0	1.887%10	0.1052	370.5	425.5	370.5	1.1485	0.161	0.000	0.000	40.716	59.123
135.0	2.172%10	0.1211	407.2	489.7	407.2	1.2027	0.307	0.000	0.000	43.939	55.754
140.0	2.549%10	0.1421	439.3	549.3	439.3	1.2505	0.584	0.000	0.000	45.000	54.416
150.0	3.519%10	0.1961	488.6	653.7	488.6	1.3378	2.074	0.000	0.000	41.880	56.046
160.0	4.422%10	0.2465	522.4	742.5	522.4	1.4212	6.909	0.000	0.000	36.631	56.461
170.0	5.856%10	0.3264	546.3	821.4	550.9	1.4908	19.661	0.000	0.000	30.703	49.636
180.0	8.681%10	0.4838	563.8	893.9	579.4	1.5428	41.885	0.000	0.000	21.641	36.474
190.0	1.179%11	0.6572	577.2	962.4	607.9	1.5830	63.787	0.000	0.000	10.559	25.653
200.0	1.452%11	0.8093	587.8	1028.0	636.4	1.6153	76.967	0.000	0.000	4.137	18.896
210.0	1.649%11	0.9192	596.4	1091.5	664.9	1.6416	83.288	0.000	0.000	1.545	15.167
220.0	1.759%11	0.9802	603.3	1153.5	693.4	1.6635	86.496	0.000	0.000	0.573	12.931
230.0	1.794%11	0.9997	609.0	1214.2	721.9	1.6820	88.560	0.000	0.000	0.212	11.228
240.0	1.789%11	0.9969	613.8	1274.0	750.4	1.6978	90.243	0.000	0.000	0.079	9.679
260.0	1.734%11	0.9664	620.9	1391.2	807.4	1.7231	93.359	0.000	0.000	0.011	6.630
280.0	1.629%11	0.9080	625.9	1506.2	864.3	1.7426	96.398	0.000	0.000	0.001	3.600
300.0	1.489%11	0.8298	629.4	1619.7	921.3	1.7580	98.000	0.000	0.000	0.000	2.000
320.0	1.329%11	0.7407	631.8	1732.2	978.2	1.7707	98.100	0.000	0.000	0.000	1.900
340.0	1.164%11	0.6485	633.6	1844.0	1035.0	1.7816	98.101	1.044	0.116	0.000	0.739
360.0	1.004%11	0.5596	634.8	1931.3	1091.5	1.7694	98.099	1.620	0.180	0.000	0.101
380.0	8.574%10	0.4779	635.7	1994.7	1147.2	1.7388	98.096	1.701	0.189	0.000	0.014
400.0	7.278%10	0.4056	636.4	2058.0	1200.8	1.7138	98.093	1.715	0.191	0.000	0.002
420.0	6.163%10	0.3435	637.0	2077.9	1250.5	1.6617	98.084	1.724	0.192	0.000	0.000
440.0	5.225%10	0.2912	637.4	2097.9	1294.0	1.6213	97.961	1.835	0.204	0.000	0.000
460.0	4.445%10	0.2478	637.7	2117.9	1331.3	1.5908	96.910	2.781	0.309	0.000	0.000
480.0	3.805%10	0.2120	637.9	2137.9	1364.6	1.5666	95.399	4.141	0.460	0.000	0.000
500.0	3.281%10	0.1828	638.1	2157.8	1395.9	1.5458	93.884	5.504	0.612	0.000	0.000
520.0	2.853%10	0.1590	638.2	2177.8	1426.4	1.5268	92.381	6.857	0.762	0.000	0.000
540.0	2.505%10	0.1396	638.4	2197.8	1456.6	1.5089	90.884	8.204	0.912	0.000	0.000
560.0	2.221%10	0.1238	638.5	2217.8	1486.7	1.4918	89.386	9.553	1.061	0.000	0.000
580.0	1.988%10	0.1108	638.6	2237.8	1516.7	1.4755	87.876	10.912	1.212	0.000	0.000
600.0	1.797%10	0.1002	638.6	2257.8	1546.7	1.4598	86.341	12.293	1.366	0.000	0.000
620.0	1.639%10	0.0914	638.7	2277.8	1576.7	1.4447	84.767	13.709	1.523	0.000	0.000
640.0	1.509%10	0.0841	638.7	2297.8	1606.7	1.4302	83.136	15.178	1.686	0.000	0.000
660.0	1.401%10	0.0781	638.8	2317.8	1636.7	1.4162	81.431	16.712	1.857	0.000	0.000
680.0	1.310%10	0.0730	638.8	2337.8	1666.7	1.4027	79.639	18.325	2.036	0.000	0.000
700.0	1.234%10	0.0688	638.8	2357.8	1696.7	1.3897	77.756	20.020	2.224	0.000	0.000
720.0	1.170%10	0.0652	638.9	2377.8	1726.6	1.3771	75.787	21.791	2.421	0.000	0.000
740.0	1.116%10	0.0622	638.9	2397.8	1756.6	1.3650	73.749	23.626	2.625	0.000	0.000
760.0	1.070%10	0.0596	638.9	2417.8	1786.6	1.3533	71.665	25.502	2.834	0.000	0.000
780.0	1.031%10	0.0575	638.9	2437.8	1816.6	1.3419	69.558	27.398	3.044	0.000	0.000
800.0	9.980%09	0.0556	638.9	2457.8	1846.6	1.3310	67.452	29.293	3.255	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 42.6 LONGI= 288.5 R= 10 MONTH=12 HOUR= 0.0

CALCULATED VALUES: MLAT= 54.0 MLONG= 357.9
DIP= 71.5 MODIP= 55.5 MAGLA= 56.3 XHI= 160.3
SUNRISE: 7.5 L.T. SUNSET:16.5 L.T. SUN DEC.= -22.9
NMF2=6.34%10 NMF1= 0.00%-01 NME=1.78%09 NMD=4.00%08
HMF2=312.7 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	4.972%05	7.8%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.456%08	0.0039	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.721%08	0.0074	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.742%09	0.0275	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.775%09	0.0280	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	1.775%09	0.0280	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	1.449%09	0.0228	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	9.434%08	0.0149	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	5.995%08	0.0094	285.1	285.1	285.1	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	4.215%08	0.0066	324.1	345.7	324.1	1.0666	0.084	0.000	0.000	36.294	63.621
130.0	3.484%08	0.0055	361.9	405.1	361.9	1.1192	0.161	0.000	0.000	40.716	59.123
135.0	3.424%08	0.0054	396.7	461.4	396.7	1.1632	0.307	0.000	0.000	43.939	55.754
140.0	3.903%08	0.0062	426.8	513.1	426.8	1.2022	0.584	0.000	0.000	45.000	54.416
150.0	6.516%08	0.0103	472.6	602.0	472.6	1.2739	2.075	0.000	0.000	41.880	56.044
160.0	1.105%09	0.0174	503.5	676.1	504.2	1.3410	6.912	0.000	0.000	36.631	56.457
170.0	1.834%09	0.0289	525.1	740.8	533.4	1.3890	19.672	0.000	0.000	30.703	49.625
180.0	2.325%09	0.0366	540.8	799.8	562.5	1.4217	41.907	0.000	0.000	21.641	36.451
190.0	2.976%09	0.0469	552.9	855.0	591.7	1.4449	63.821	0.000	0.000	10.559	25.620
200.0	3.864%09	0.0609	562.3	907.6	620.9	1.4618	77.006	0.000	0.000	4.137	18.857
210.0	5.121%09	0.0807	569.9	958.3	650.0	1.4743	83.329	0.000	0.000	1.545	15.125
220.0	7.036%09	0.1109	576.1	1007.7	679.2	1.4836	86.537	0.000	0.000	0.573	12.890
230.0	1.051%10	0.1656	581.2	1055.9	708.4	1.4906	88.599	0.000	0.000	0.212	11.188
240.0	1.753%10	0.2762	585.4	1103.3	737.6	1.4959	90.280	0.000	0.000	0.079	9.641
260.0	3.620%10	0.5706	591.8	1196.0	795.9	1.5027	93.390	0.000	0.000	0.011	6.599
280.0	5.349%10	0.8430	596.2	1286.7	854.2	1.5063	96.417	0.000	0.000	0.001	3.582
300.0	6.227%10	0.9815	599.3	1376.1	912.5	1.5081	98.000	0.000	0.000	0.000	2.000
320.0	6.330%10	0.9976	601.5	1464.6	970.7	1.5088	98.071	0.628	0.070	0.000	1.231
340.0	6.142%10	0.9681	603.0	1552.4	1028.6	1.5092	98.030	1.621	0.180	0.000	0.169
360.0	5.774%10	0.9101	604.2	1639.9	1085.9	1.5102	97.965	1.810	0.201	0.000	0.023
380.0	5.280%10	0.8322	605.0	1727.0	1141.3	1.5131	97.860	1.923	0.214	0.000	0.003
400.0	4.719%10	0.7437	605.6	1813.9	1192.5	1.5210	97.304	2.426	0.270	0.000	0.000
420.0	4.143%10	0.6530	606.1	1813.9	1235.0	1.4688	93.968	5.429	0.603	0.000	0.000
440.0	3.593%10	0.5662	606.4	1814.0	1264.2	1.4349	89.573	9.384	1.043	0.000	0.000
460.0	3.091%10	0.4872	606.7	1814.0	1280.1	1.4171	85.227	13.296	1.477	0.000	0.000
480.0	2.652%10	0.4179	606.9	1814.0	1287.3	1.4092	80.930	17.163	1.907	0.000	0.000
500.0	2.276%10	0.3588	607.1	1814.0	1290.2	1.4060	76.642	21.022	2.336	0.000	0.000
520.0	1.961%10	0.3091	607.2	1814.0	1291.3	1.4048	72.323	24.909	2.768	0.000	0.000
540.0	1.701%10	0.2681	607.3	1814.1	1291.7	1.4044	67.944	28.851	3.206	0.000	0.000
560.0	1.487%10	0.2343	607.4	1814.1	1291.9	1.4042	63.494	32.855	3.651	0.000	0.000
580.0	1.311%10	0.2067	607.5	1814.1	1292.0	1.4041	58.994	36.905	4.101	0.000	0.000
600.0	1.168%10	0.1841	607.5	1814.1	1292.1	1.4041	54.490	40.959	4.551	0.000	0.000
620.0	1.051%10	0.1657	607.6	1814.1	1292.1	1.4040	50.050	44.955	4.995	0.000	0.000
640.0	9.556%09	0.1506	607.6	1814.2	1292.1	1.4040	45.748	48.827	5.425	0.000	0.000
660.0	8.770%09	0.1382	607.7	1814.2	1292.2	1.4040	41.648	52.517	5.835	0.000	0.000
680.0	8.122%09	0.1280	607.7	1814.2	1292.2	1.4040	37.797	55.982	6.220	0.000	0.000
700.0	7.587%09	0.1196	607.7	1814.2	1292.2	1.4040	34.223	59.199	6.578	0.000	0.000
720.0	7.142%09	0.1126	607.8	1814.3	1292.3	1.4039	30.934	62.159	6.907	0.000	0.000
740.0	6.772%09	0.1067	607.8	1814.3	1292.3	1.4039	27.929	64.864	7.207	0.000	0.000
760.0	6.463%09	0.1019	607.8	1814.3	1292.3	1.4039	25.194	67.325	7.481	0.000	0.000
780.0	6.204%09	0.0978	607.8	1814.3	1292.4	1.4039	22.714	69.557	7.729	0.000	0.000
800.0	5.986%09	0.0943	607.8	1814.3	1292.4	1.4039	20.471	71.576	7.953	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 42.6 LONGI= 288.5 R=100 MONTH= 3 HOUR=12.0

CALCULATED VALUES: MLAT= 54.0 MLONG= 357.9
DIP= 71.5 MODIP= 55.5 MAGLA= 56.3 XHI= 45.9
SUNRISE: 6.2 L.T. SUNSET:17.8 L.T. SUN DEC.= -3.3
NMF2=1.02%12 NMF1= 2.92% 11 NME=1.50%11 NMD=1.14%09
HMF2=281.5 HMF1=184.0 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	1.080%09	0.0011	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.253%09	0.0022	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	2.161%10	0.0212	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	7.424%10	0.0729	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.266%11	0.1244	-1	-1	-1	-1	0.322	0.000	0.000	55.186	44.491
105.0	1.475%11	0.1449	-1	-1	-1	-1	0.488	0.000	0.000	53.852	45.659
110.0	1.497%11	0.1470	-1	-1	-1	-1	0.739	0.000	0.000	52.482	46.779
115.0	1.452%11	0.1426	-1	-1	-1	-1	1.118	0.000	0.000	50.977	47.905
120.0	1.421%11	0.1395	336.2	336.2	336.2	1.0000	1.690	0.000	0.000	49.147	49.163
125.0	1.462%11	0.1437	394.6	420.2	394.6	1.0647	2.552	0.000	0.000	46.754	50.695
130.0	1.518%11	0.1492	451.7	502.8	451.7	1.1130	3.844	0.000	0.000	43.744	52.412
135.0	1.553%11	0.1525	506.8	583.4	506.8	1.1511	5.771	0.000	0.000	40.383	53.846
140.0	1.595%11	0.1567	558.4	660.5	558.4	1.1829	8.609	0.000	0.000	37.000	54.391
150.0	1.714%11	0.1684	648.0	801.2	648.0	1.2364	18.448	0.000	0.000	30.782	50.770
160.0	1.920%11	0.1886	719.6	923.8	719.6	1.2838	35.534	0.000	0.000	25.340	39.126
170.0	2.337%11	0.2296	776.1	1031.3	776.1	1.3289	56.597	0.000	0.000	20.046	23.357
180.0	2.871%11	0.2820	821.0	1127.4	821.0	1.3731	72.989	0.000	0.000	14.714	12.298
190.0	3.534%11	0.3471	857.4	1214.8	857.4	1.4168	81.759	0.000	0.000	10.381	7.860
200.0	4.646%11	0.4564	887.2	1295.6	887.2	1.4604	85.877	0.000	0.000	7.266	6.857
210.0	5.809%11	0.5706	911.7	1371.2	911.7	1.5040	88.060	0.000	0.000	5.080	6.860
220.0	6.939%11	0.6816	932.2	1442.7	932.2	1.5477	89.555	0.000	0.000	3.551	6.895
230.0	7.958%11	0.7817	949.2	1510.8	949.6	1.5910	90.823	0.000	0.000	2.482	6.695
240.0	8.805%11	0.8649	963.4	1576.1	966.7	1.6303	92.025	0.000	0.000	1.735	6.240
260.0	9.871%11	0.9696	985.1	1699.9	1000.9	1.6983	94.409	0.000	0.000	0.848	4.743
280.0	1.018%12	0.9999	1000.2	1817.1	1035.2	1.7554	96.764	0.000	0.000	0.414	2.822
300.0	1.007%12	0.9889	1010.9	1929.9	1069.4	1.8046	98.000	0.000	0.000	0.202	1.798
320.0	9.712%11	0.9541	1018.3	2039.5	1103.7	1.8479	98.077	0.000	0.000	0.099	1.824
340.0	9.159%11	0.8997	1023.7	2146.9	1138.1	1.8865	98.077	0.499	0.055	0.048	1.320
360.0	8.465%11	0.8316	1027.6	2219.8	1172.7	1.8929	98.075	1.131	0.126	0.024	0.645
380.0	7.693%11	0.7557	1030.4	2259.6	1208.2	1.8702	98.073	1.441	0.160	0.012	0.315
400.0	6.896%11	0.6775	1032.5	2299.5	1245.5	1.8462	98.069	1.594	0.177	0.006	0.154
420.0	6.120%11	0.6012	1034.1	2339.2	1286.7	1.8180	98.061	1.675	0.186	0.003	0.075
440.0	5.393%11	0.5298	1035.4	2378.8	1333.6	1.7838	97.938	1.822	0.202	0.001	0.037
460.0	4.735%11	0.4651	1036.3	2418.6	1386.3	1.7446	96.887	2.785	0.309	0.001	0.018
480.0	4.152%11	0.4079	1037.0	2458.3	1442.8	1.7038	95.376	4.154	0.462	0.000	0.009
500.0	3.645%11	0.3581	1037.6	2498.0	1501.2	1.6640	93.862	5.520	0.613	0.000	0.004
520.0	3.211%11	0.3154	1038.1	2537.8	1560.4	1.6264	92.359	6.875	0.764	0.000	0.002
540.0	2.841%11	0.2791	1038.5	2577.6	1619.8	1.5913	90.862	8.223	0.914	0.000	0.001
560.0	2.529%11	0.2484	1038.8	2617.3	1679.4	1.5585	89.364	9.572	1.064	0.000	0.000
580.0	2.265%11	0.2225	1039.0	2657.1	1739.0	1.5279	87.855	10.931	1.215	0.000	0.000
600.0	2.044%11	0.2008	1039.3	2696.8	1798.6	1.4994	86.321	12.311	1.368	0.000	0.000
620.0	1.858%11	0.1825	1039.4	2736.6	1858.3	1.4727	84.747	13.728	1.525	0.000	0.000
640.0	1.701%11	0.1671	1039.6	2776.3	1917.9	1.4476	83.116	15.196	1.688	0.000	0.000
660.0	1.569%11	0.1541	1039.7	2816.1	1977.5	1.4240	81.411	16.730	1.859	0.000	0.000
680.0	1.457%11	0.1432	1039.8	2855.8	2037.2	1.4019	79.620	18.342	2.038	0.000	0.000
700.0	1.363%11	0.1339	1039.9	2895.6	2096.8	1.3810	77.737	20.037	2.226	0.000	0.000
720.0	1.282%11	0.1260	1040.0	2935.4	2156.4	1.3612	75.769	21.808	2.423	0.000	0.000
740.0	1.214%11	0.1193	1040.0	2975.1	2216.1	1.3425	73.732	23.642	2.627	0.000	0.000
760.0	1.156%11	0.1135	1040.1	3014.9	2275.7	1.3248	71.647	25.517	2.835	0.000	0.000
780.0	1.106%11	0.1086	1040.2	3054.6	2335.3	1.3080	69.541	27.413	3.046	0.000	0.000
800.0	1.063%11	0.1044	1040.2	3094.4	2395.0	1.2920	67.436	29.308	3.256	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 42.6 LONGI= 288.5 R=100 MONTH= 3 HOUR= 6.2

CALCULATED VALUES: MLAT= 54.0 MLONG= 357.9
DIP= 71.5 MODIP= 55.5 MAGLA= 56.3 XHI= 90.0
SUNRISE: 6.2 L.T. SUNSET:17.8 L.T. SUN DEC.= -3.3
NMF2=2.75%11 NMF1= 0.00%-01 NME=4.00%10 NMD=4.00%08
HMF2=266.5 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.814%08	0.0010	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.102%08	0.0015	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.815%09	0.0066	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.247%10	0.0453	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.068%10	0.1115	-1	-1	-1	-1	0.012	0.000	0.000	18.280	81.709
105.0	3.954%10	0.1437	-1	-1	-1	-1	0.019	0.000	0.000	21.000	78.981
110.0	3.871%10	0.1407	-1	-1	-1	-1	0.030	0.000	0.000	24.062	75.907
115.0	3.224%10	0.1172	-1	-1	-1	-1	0.049	0.000	0.000	27.391	72.560
120.0	2.595%10	0.0943	321.8	321.8	321.8	1.0000	0.079	0.000	0.000	30.722	69.199
125.0	2.299%10	0.0836	374.8	397.4	374.8	1.0605	0.127	0.000	0.000	33.556	66.317
130.0	2.371%10	0.0862	426.4	471.7	426.4	1.1063	0.205	0.000	0.000	35.464	64.331
135.0	2.692%10	0.0978	475.7	543.7	475.7	1.1429	0.330	0.000	0.000	36.497	63.174
140.0	3.115%10	0.1132	521.0	611.6	521.0	1.1740	0.530	0.000	0.000	37.000	62.470
150.0	4.289%10	0.1559	596.9	732.9	596.9	1.2277	1.364	0.000	0.000	37.333	61.303
160.0	5.856%10	0.2128	654.7	835.9	654.7	1.2769	3.437	0.000	0.000	36.738	59.825
170.0	7.987%10	0.2903	698.5	925.0	698.5	1.3244	8.184	0.000	0.000	32.734	59.082
180.0	1.081%11	0.3927	732.3	1004.2	732.3	1.3713	17.092	0.000	0.000	24.187	58.721
190.0	1.392%11	0.5060	759.1	1076.3	759.1	1.4179	28.794	0.000	0.000	16.193	55.013
200.0	1.708%11	0.6207	780.7	1143.3	781.6	1.4627	39.129	0.000	0.000	10.626	50.246
210.0	2.005%11	0.7286	798.4	1206.3	803.8	1.5006	46.642	0.000	0.000	6.952	46.406
220.0	2.263%11	0.8224	813.0	1266.1	826.0	1.5328	52.531	0.000	0.000	4.547	42.922
230.0	2.468%11	0.8970	825.1	1323.5	848.2	1.5604	57.951	0.000	0.000	2.973	39.076
240.0	2.615%11	0.9503	835.1	1378.9	870.4	1.5842	63.480	0.000	0.000	1.945	34.575
260.0	2.745%11	0.9977	850.4	1484.8	914.8	1.6231	75.747	0.000	0.000	0.832	23.422
280.0	2.739%11	0.9954	861.0	1586.1	959.2	1.6536	89.778	0.000	0.000	0.356	9.867
300.0	2.676%11	0.9726	868.5	1684.1	1003.5	1.6782	98.000	0.000	0.000	0.152	1.848
320.0	2.568%11	0.9332	873.7	1780.0	1047.9	1.6987	98.535	0.000	0.000	0.065	1.400
340.0	2.424%11	0.8808	877.5	1874.4	1092.2	1.7162	98.545	0.000	0.000	0.028	1.428
360.0	2.255%11	0.8197	880.2	1948.6	1136.3	1.7149	98.543	0.739	0.082	0.012	0.624
380.0	2.075%11	0.7540	882.2	2003.4	1180.0	1.6978	98.540	1.069	0.119	0.005	0.267
400.0	1.891%11	0.6872	883.7	2058.1	1222.6	1.6833	98.537	1.212	0.135	0.002	0.114
420.0	1.712%11	0.6222	884.8	2078.0	1263.1	1.6452	98.528	1.280	0.142	0.001	0.049
440.0	1.544%11	0.5611	885.6	2098.0	1300.3	1.6135	98.405	1.417	0.157	0.000	0.021
460.0	1.390%11	0.5050	886.3	2117.9	1334.2	1.5874	97.349	2.378	0.264	0.000	0.009
480.0	1.251%11	0.4545	886.8	2137.9	1365.9	1.5652	95.830	3.749	0.417	0.000	0.004
500.0	1.127%11	0.4098	887.2	2157.9	1396.7	1.5451	94.309	5.120	0.569	0.000	0.002
520.0	1.020%11	0.3705	887.6	2177.9	1426.9	1.5263	92.799	6.480	0.720	0.000	0.001
540.0	9.256%10	0.3364	887.8	2197.9	1457.0	1.5085	91.296	7.834	0.870	0.000	0.000
560.0	8.444%10	0.3069	888.0	2217.9	1487.1	1.4915	89.790	9.189	1.021	0.000	0.000
580.0	7.744%10	0.2815	888.2	2237.9	1517.1	1.4752	88.273	10.554	1.173	0.000	0.000
600.0	7.143%10	0.2596	888.4	2257.9	1547.1	1.4595	86.732	11.941	1.327	0.000	0.000
620.0	6.626%10	0.2408	888.5	2277.9	1577.1	1.4444	85.151	13.364	1.485	0.000	0.000
640.0	6.183%10	0.2247	888.6	2297.9	1607.1	1.4299	83.512	14.839	1.649	0.000	0.000
660.0	5.802%10	0.2108	888.7	2317.9	1637.1	1.4159	81.799	16.381	1.820	0.000	0.000
680.0	5.474%10	0.1989	888.7	2337.9	1667.1	1.4024	79.999	18.001	2.000	0.000	0.000
700.0	5.192%10	0.1887	888.8	2357.9	1697.1	1.3894	78.108	19.703	2.189	0.000	0.000
720.0	4.949%10	0.1798	888.9	2377.9	1727.1	1.3768	76.130	21.483	2.387	0.000	0.000
740.0	4.738%10	0.1722	888.9	2397.9	1757.1	1.3647	74.083	23.325	2.592	0.000	0.000
760.0	4.557%10	0.1656	888.9	2417.9	1787.1	1.3530	71.989	25.210	2.801	0.000	0.000
780.0	4.399%10	0.1599	889.0	2437.9	1817.1	1.3417	69.873	27.114	3.013	0.000	0.000
800.0	4.263%10	0.1549	889.0	2457.9	1847.1	1.3307	67.758	29.018	3.224	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 42.6 LONGI= 288.5 R=100 MONTH= 3 HOUR= 0.0

CALCULATED VALUES: MLAT= 54.0 MLONG= 357.9
DIP= 71.5 MODIP= 55.5 MAGLA= 56.3 XHI= 140.7
SUNRISE: 6.2 L.T. SUNSET:17.8 L.T. SUN DEC.= -3.3
NMF2=2.90%11 NMF1= 0.00%-01 NME=3.20%09 NMD=4.00%08
HMF2=341.7 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.392%05	1.9%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.473%08	8.5%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.729%08	0.0016	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	2.508%09	0.0086	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.193%09	0.0110	-1	-1	-1	-1	0.012	0.000	0.000	18.280	81.709
105.0	3.201%09	0.0110	-1	-1	-1	-1	0.019	0.000	0.000	21.000	78.981
110.0	2.616%09	0.0090	-1	-1	-1	-1	0.030	0.000	0.000	24.062	75.907
115.0	1.705%09	0.0059	-1	-1	-1	-1	0.049	0.000	0.000	27.391	72.560
120.0	1.085%09	0.0037	319.2	319.2	319.2	1.0000	0.079	0.000	0.000	30.722	69.199
125.0	7.635%08	0.0026	371.2	388.3	371.2	1.0459	0.127	0.000	0.000	33.556	66.317
130.0	6.317%08	0.0022	421.9	456.0	421.9	1.0808	0.205	0.000	0.000	35.464	64.331
135.0	6.212%08	0.0021	470.2	521.3	470.2	1.1088	0.330	0.000	0.000	36.497	63.174
140.0	7.083%08	0.0024	514.3	582.5	514.3	1.1326	0.530	0.000	0.000	37.000	62.470
150.0	1.182%09	0.0041	587.9	690.2	587.9	1.1740	1.365	0.000	0.000	37.333	61.302
160.0	2.000%09	0.0069	643.4	779.8	643.4	1.2120	3.439	0.000	0.000	36.738	59.823
170.0	3.249%09	0.0112	685.2	855.6	685.2	1.2488	8.188	0.000	0.000	32.734	59.078
180.0	4.991%09	0.0172	717.3	921.9	717.3	1.2852	17.101	0.000	0.000	24.187	58.712
190.0	7.670%09	0.0264	742.7	981.4	742.7	1.3214	28.809	0.000	0.000	16.193	54.998
200.0	1.181%10	0.0407	763.1	1035.9	765.6	1.3531	39.149	0.000	0.000	10.626	50.226
210.0	1.827%10	0.0630	779.8	1086.6	788.5	1.3782	46.665	0.000	0.000	6.952	46.383
220.0	2.850%10	0.0983	793.5	1134.5	811.4	1.3982	52.556	0.000	0.000	4.547	42.898
230.0	4.499%10	0.1551	804.8	1179.9	834.2	1.4144	57.977	0.000	0.000	2.973	39.050
240.0	6.767%10	0.2333	814.3	1223.4	857.1	1.4274	63.506	0.000	0.000	1.945	34.549
260.0	1.273%11	0.4390	828.7	1306.0	902.9	1.4465	75.771	0.000	0.000	0.832	23.397
280.0	1.939%11	0.6686	838.7	1384.2	948.7	1.4591	89.795	0.000	0.000	0.356	9.849
300.0	2.490%11	0.8584	845.6	1459.4	994.4	1.4676	98.000	0.000	0.000	0.152	1.848
320.0	2.807%11	0.9679	850.6	1532.5	1040.0	1.4735	98.507	0.000	0.000	0.065	1.428
340.0	2.900%11	0.9999	854.1	1604.2	1085.5	1.4779	98.473	0.761	0.085	0.028	0.653
360.0	2.873%11	0.9906	856.6	1675.0	1130.4	1.4817	98.409	1.170	0.130	0.012	0.279
380.0	2.785%11	0.9603	858.5	1745.0	1174.0	1.4865	98.303	1.415	0.157	0.005	0.119
400.0	2.648%11	0.9129	859.9	1814.6	1214.1	1.4946	97.744	1.983	0.220	0.002	0.051
420.0	2.475%11	0.8532	861.0	1814.7	1247.5	1.4547	94.393	5.026	0.558	0.001	0.022
440.0	2.281%11	0.7863	861.8	1814.8	1270.4	1.4285	89.978	9.011	1.001	0.000	0.009
460.0	2.079%11	0.7169	862.4	1814.9	1283.0	1.4146	85.613	12.945	1.438	0.000	0.004
480.0	1.881%11	0.6486	862.9	1815.0	1288.7	1.4084	81.296	16.832	1.870	0.000	0.002
500.0	1.694%11	0.5842	863.3	1815.0	1291.1	1.4059	76.989	20.710	2.301	0.000	0.001
520.0	1.523%11	0.5252	863.6	1815.1	1292.0	1.4049	72.650	24.615	2.735	0.000	0.000
540.0	1.370%11	0.4724	863.8	1815.2	1292.5	1.4044	68.251	28.574	3.175	0.000	0.000
560.0	1.235%11	0.4259	864.0	1815.3	1292.7	1.4042	63.782	32.596	3.622	0.000	0.000
580.0	1.118%11	0.3856	864.2	1815.4	1292.9	1.4041	59.261	36.665	4.074	0.000	0.000
600.0	1.018%11	0.3509	864.3	1815.4	1293.0	1.4040	54.736	40.737	4.526	0.000	0.000
620.0	9.314%10	0.3211	864.4	1815.5	1293.1	1.4040	50.276	44.751	4.972	0.000	0.000
640.0	8.579%10	0.2958	864.5	1815.6	1293.3	1.4039	45.955	48.641	5.405	0.000	0.000
660.0	7.953%10	0.2742	864.6	1815.7	1293.4	1.4038	41.836	52.347	5.816	0.000	0.000
680.0	7.421%10	0.2559	864.7	1815.8	1293.5	1.4038	37.968	55.828	6.203	0.000	0.000
700.0	6.969%10	0.2403	864.7	1815.8	1293.6	1.4037	34.378	59.060	6.562	0.000	0.000
720.0	6.584%10	0.2270	864.8	1815.9	1293.7	1.4036	31.074	62.033	6.893	0.000	0.000
740.0	6.256%10	0.2157	864.8	1816.0	1293.9	1.4035	28.055	64.750	7.194	0.000	0.000
760.0	5.977%10	0.2061	864.9	1816.1	1294.0	1.4035	25.308	67.223	7.469	0.000	0.000
780.0	5.738%10	0.1978	864.9	1816.2	1294.1	1.4034	22.817	69.464	7.718	0.000	0.000
800.0	5.534%10	0.1908	864.9	1816.2	1294.2	1.4033	20.564	71.493	7.944	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 42.6 LONGI= 288.5 R=100 MONTH= 6 HOUR=12.0

CALCULATED VALUES: MLAT= 54.0 MLONG= 357.9
DIP= 71.5 MODIP= 55.5 MAGLA= 56.3 XHI= 19.5
SUNRISE: 4.5 L.T. SUNSET:19.5 L.T. SUN DEC.= 23.1
NMF2=4.84%11 NMF1= 3.32% 11 NME=1.73%11 NMD=1.32%09
HMF2=235.1 HMF1=162.4 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	1.257%09	0.0026	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.656%09	0.0055	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	2.536%10	0.0524	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	8.639%10	0.1784	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.466%11	0.3026	-1	-1	-1	-1	0.336	0.000	0.000	59.195	40.469
105.0	1.705%11	0.3520	-1	-1	-1	-1	0.482	0.000	0.000	52.601	46.917
110.0	1.729%11	0.3571	-1	-1	-1	-1	0.691	0.000	0.000	46.888	52.421
115.0	1.685%11	0.3480	-1	-1	-1	-1	0.989	0.000	0.000	42.097	56.914
120.0	1.648%11	0.3403	339.1	339.1	339.1	1.0000	1.415	0.000	0.000	38.300	60.284
125.0	1.702%11	0.3515	398.8	423.6	398.8	1.0623	2.024	0.000	0.000	35.454	62.522
130.0	2.142%11	0.4424	457.0	506.7	457.0	1.1087	2.887	0.000	0.000	33.303	63.809
135.0	2.423%11	0.5003	513.3	587.8	513.3	1.1452	4.107	0.000	0.000	31.548	64.345
140.0	2.632%11	0.5435	566.2	665.6	566.2	1.1755	5.809	0.000	0.000	30.000	64.191
150.0	3.012%11	0.6218	658.8	807.8	658.8	1.2263	11.251	0.000	0.000	27.223	61.525
160.0	3.326%11	0.6867	733.4	932.2	733.4	1.2710	19.962	0.000	0.000	24.706	55.332
170.0	3.636%11	0.7508	792.9	1041.3	792.9	1.3134	30.669	0.000	0.000	22.264	47.066
180.0	4.006%11	0.8270	840.5	1138.6	840.5	1.3547	40.806	0.000	0.000	19.094	40.100
190.0	4.310%11	0.8898	879.2	1227.0	879.2	1.3956	49.733	0.000	0.000	12.835	37.432
200.0	4.542%11	0.9377	911.0	1308.5	911.0	1.4363	58.351	0.000	0.000	5.437	36.212
210.0	4.702%11	0.9709	937.3	1384.5	937.3	1.4771	67.504	0.000	0.000	1.805	30.691
220.0	4.798%11	0.9906	959.3	1456.2	959.3	1.5180	77.593	0.000	0.000	0.570	21.837
230.0	4.839%11	0.9991	977.6	1524.1	977.6	1.5591	88.070	0.000	0.000	0.179	11.752
240.0	4.840%11	0.9993	992.8	1589.1	993.4	1.5996	95.635	0.000	0.000	0.056	4.309
260.0	4.763%11	0.9835	1016.2	1711.9	1024.8	1.6704	98.527	0.000	0.000	0.006	1.467
280.0	4.594%11	0.9485	1032.5	1827.5	1056.2	1.7302	98.595	0.000	0.000	0.001	1.404
300.0	4.349%11	0.8980	1044.0	1938.4	1087.7	1.7821	98.596	0.734	0.082	0.000	0.588
320.0	4.050%11	0.8363	1052.0	2045.8	1119.1	1.8280	98.596	1.212	0.135	0.000	0.058
340.0	3.720%11	0.7680	1057.8	2151.0	1150.7	1.8692	98.594	1.260	0.140	0.000	0.006
360.0	3.377%11	0.6973	1062.0	2222.6	1182.7	1.8793	98.593	1.266	0.141	0.000	0.001
380.0	3.040%11	0.6276	1065.1	2262.2	1215.5	1.8612	98.590	1.269	0.141	0.000	0.000
400.0	2.719%11	0.5614	1067.3	2302.0	1250.4	1.8410	98.586	1.272	0.141	0.000	0.000
420.0	2.423%11	0.5004	1069.1	2341.8	1289.6	1.8160	98.578	1.280	0.142	0.000	0.000
440.0	2.156%11	0.4452	1070.4	2381.7	1335.2	1.7837	98.454	1.391	0.155	0.000	0.000
460.0	1.920%11	0.3964	1071.4	2421.6	1387.4	1.7455	97.398	2.342	0.260	0.000	0.000
480.0	1.712%11	0.3535	1072.2	2461.5	1443.8	1.7049	95.879	3.709	0.412	0.000	0.000
500.0	1.533%11	0.3164	1072.8	2501.5	1502.4	1.6650	94.357	5.079	0.564	0.000	0.000
520.0	1.378%11	0.2844	1073.3	2541.4	1561.8	1.6273	92.846	6.438	0.715	0.000	0.000
540.0	1.245%11	0.2570	1073.7	2581.4	1621.5	1.5920	91.342	7.793	0.866	0.000	0.000
560.0	1.131%11	0.2335	1074.1	2621.4	1681.4	1.5591	89.836	9.148	1.016	0.000	0.000
580.0	1.034%11	0.2135	1074.4	2661.3	1741.3	1.5284	88.318	10.514	1.168	0.000	0.000
600.0	9.510%10	0.1963	1074.6	2701.3	1801.2	1.4997	86.776	11.902	1.322	0.000	0.000
620.0	8.801%10	0.1817	1074.8	2741.2	1861.1	1.4729	85.194	13.326	1.481	0.000	0.000
640.0	8.194%10	0.1692	1074.9	2781.2	1921.1	1.4477	83.554	14.801	1.645	0.000	0.000
660.0	7.674%10	0.1585	1075.1	2821.1	1981.0	1.4241	81.841	16.344	1.816	0.000	0.000
680.0	7.228%10	0.1492	1075.2	2861.1	2040.9	1.4019	80.040	17.964	1.996	0.000	0.000
700.0	6.844%10	0.1413	1075.3	2901.1	2100.9	1.3809	78.147	19.668	2.185	0.000	0.000
720.0	6.513%10	0.1345	1075.4	2941.0	2160.8	1.3611	76.169	21.448	2.383	0.000	0.000
740.0	6.226%10	0.1286	1075.4	2981.0	2220.7	1.3423	74.121	23.292	2.588	0.000	0.000
760.0	5.979%10	0.1234	1075.5	3020.9	2280.7	1.3246	72.025	25.177	2.797	0.000	0.000
780.0	5.764%10	0.1190	1075.5	3060.9	2340.6	1.3077	69.908	27.083	3.009	0.000	0.000
800.0	5.577%10	0.1151	1075.6	3100.8	2400.6	1.2917	67.792	28.987	3.221	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 42.6 LONGI= 288.5 R=100 MONTH= 6 HOUR= 4.5

CALCULATED VALUES: MLAT= 54.0 MLONG= 357.9
DIP= 71.5 MODIP= 55.5 MAGLA= 56.3 XHI= 90.0
SUNRISE: 4.5 L.T. SUNSET:19.5 L.T. SUN DEC.= 23.1
NMF2=2.12%11 NMF1= 0.00%-01 NME=3.85%10 NMD=4.00%08
HMF2=277.5 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.814%08	0.0013	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.102%08	0.0019	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.815%09	0.0086	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.233%10	0.0582	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.983%10	0.1409	-1	-1	-1	-1	0.016	0.000	0.000	6.623	93.361
105.0	3.808%10	0.1799	-1	-1	-1	-1	0.025	0.000	0.000	8.541	91.434
110.0	3.727%10	0.1760	-1	-1	-1	-1	0.040	0.000	0.000	10.994	88.966
115.0	3.106%10	0.1467	-1	-1	-1	-1	0.064	0.000	0.000	14.085	85.852
120.0	2.500%10	0.1181	324.8	324.8	324.8	1.0000	0.101	0.000	0.000	17.829	82.070
125.0	2.213%10	0.1045	378.9	401.0	378.9	1.0584	0.159	0.000	0.000	21.966	77.875
130.0	2.284%10	0.1079	431.7	475.9	431.7	1.1025	0.252	0.000	0.000	25.782	73.966
135.0	2.601%10	0.1228	482.2	548.5	482.2	1.1376	0.397	0.000	0.000	28.494	71.110
140.0	3.021%10	0.1427	528.8	617.2	528.8	1.1673	0.623	0.000	0.000	30.000	69.377
150.0	4.039%10	0.1908	607.5	740.2	607.5	1.2185	1.498	0.000	0.000	31.126	67.376
160.0	5.181%10	0.2447	667.9	844.9	667.9	1.2649	3.368	0.000	0.000	31.531	65.101
170.0	6.657%10	0.3144	714.2	935.4	714.2	1.3097	6.679	0.000	0.000	31.688	61.633
180.0	8.566%10	0.4045	750.1	1015.6	750.1	1.3539	11.436	0.000	0.000	30.852	57.711
190.0	1.067%11	0.5041	778.7	1088.4	778.7	1.3977	17.669	0.000	0.000	25.763	56.569
200.0	1.281%11	0.6049	801.8	1155.7	801.8	1.4414	26.008	0.000	0.000	16.079	57.913
210.0	1.485%11	0.7013	820.7	1218.9	823.1	1.4808	37.565	0.000	0.000	8.607	53.827
220.0	1.669%11	0.7882	836.3	1278.8	844.4	1.5144	53.681	0.000	0.000	4.466	41.853
230.0	1.824%11	0.8615	849.3	1336.0	865.7	1.5432	74.390	0.000	0.000	2.307	23.303
240.0	1.946%11	0.9190	860.1	1391.0	887.0	1.5682	92.014	0.000	0.000	1.191	6.796
260.0	2.087%11	0.9855	876.5	1495.9	929.6	1.6092	99.365	0.000	0.000	0.317	0.318
280.0	2.117%11	0.9998	888.0	1595.8	972.2	1.6415	99.541	0.000	0.000	0.084	0.374
300.0	2.092%11	0.9878	896.0	1692.3	1014.7	1.6677	99.544	0.063	0.007	0.023	0.364
320.0	2.029%11	0.9582	901.6	1786.4	1057.3	1.6897	99.543	0.318	0.035	0.006	0.097
340.0	1.935%11	0.9140	905.7	1879.0	1099.8	1.7085	99.542	0.387	0.043	0.002	0.026
360.0	1.819%11	0.8590	908.6	1951.5	1142.1	1.7087	99.541	0.407	0.045	0.000	0.007
380.0	1.688%11	0.7972	910.7	2004.9	1184.1	1.6932	99.538	0.414	0.046	0.000	0.002
400.0	1.551%11	0.7326	912.3	2058.1	1225.1	1.6799	99.534	0.419	0.047	0.000	0.000
420.0	1.415%11	0.6681	913.5	2078.0	1264.3	1.6436	99.526	0.427	0.047	0.000	0.000
440.0	1.284%11	0.6062	914.4	2098.0	1300.6	1.6131	99.401	0.539	0.060	0.000	0.000
460.0	1.162%11	0.5486	915.2	2118.0	1334.0	1.5876	98.334	1.499	0.167	0.000	0.000
480.0	1.050%11	0.4960	915.7	2137.9	1365.6	1.5656	96.800	2.880	0.320	0.000	0.000
500.0	9.505%10	0.4489	916.2	2157.9	1396.2	1.5456	95.264	4.262	0.474	0.000	0.000
520.0	8.623%10	0.4073	916.5	2177.9	1426.4	1.5268	93.739	5.635	0.626	0.000	0.000
540.0	7.851%10	0.3708	916.8	2197.9	1456.5	1.5090	92.220	7.002	0.778	0.000	0.000
560.0	7.179%10	0.3391	917.0	2217.9	1486.5	1.4920	90.699	8.371	0.930	0.000	0.000
580.0	6.598%10	0.3116	917.2	2237.9	1516.6	1.4757	89.167	9.750	1.083	0.000	0.000
600.0	6.097%10	0.2879	917.4	2257.9	1546.6	1.4600	87.610	11.151	1.239	0.000	0.000
620.0	5.665%10	0.2675	917.5	2277.9	1576.6	1.4449	86.013	12.588	1.399	0.000	0.000
640.0	5.293%10	0.2500	917.6	2297.9	1606.6	1.4303	84.358	14.078	1.564	0.000	0.000
660.0	4.973%10	0.2349	917.7	2317.9	1636.6	1.4163	82.627	15.635	1.737	0.000	0.000
680.0	4.698%10	0.2219	917.8	2337.9	1666.6	1.4028	80.809	17.272	1.919	0.000	0.000
700.0	4.461%10	0.2107	917.9	2357.9	1696.6	1.3898	78.898	18.992	2.110	0.000	0.000
720.0	4.256%10	0.2010	917.9	2377.9	1726.6	1.3773	76.901	20.789	2.310	0.000	0.000
740.0	4.079%10	0.1926	918.0	2397.9	1756.6	1.3651	74.833	22.650	2.517	0.000	0.000
760.0	3.926%10	0.1854	918.0	2417.9	1786.6	1.3534	72.718	24.554	2.728	0.000	0.000
780.0	3.793%10	0.1792	918.0	2437.9	1816.6	1.3421	70.580	26.478	2.942	0.000	0.000
800.0	3.679%10	0.1737	918.1	2457.9	1846.6	1.3311	68.443	28.401	3.156	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 42.6 LONGI= 288.5 R=100 MONTH= 6 HOUR= 0.0

CALCULATED VALUES: MLAT= 54.0 MLONG= 357.9
DIP= 71.5 MODIP= 55.5 MAGLA= 56.3 XHI= 114.3
SUNRISE: 4.5 L.T. SUNSET:19.5 L.T. SUN DEC.= 23.1
NMF2=2.98%11 NMF1= 0.00%-01 NME=3.20%09 NMD=4.00%08
HMF2=333.3 HMF1= 0.0 HME=105.1 HMD= 87.9

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	8.809%05	3.0%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.578%08	8.7%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.777%08	0.0016	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	2.533%09	0.0085	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.194%09	0.0107	-1	-1	-1	-1	0.016	0.000	0.000	6.623	93.361
105.0	3.201%09	0.0108	-1	-1	-1	-1	0.025	0.000	0.000	8.541	91.434
110.0	2.631%09	0.0088	-1	-1	-1	-1	0.040	0.000	0.000	10.994	88.966
115.0	1.726%09	0.0058	-1	-1	-1	-1	0.064	0.000	0.000	14.085	85.852
120.0	1.107%09	0.0037	323.8	323.8	323.8	1.0000	0.101	0.000	0.000	17.829	82.070
125.0	7.850%08	0.0026	377.6	393.9	377.6	1.0433	0.160	0.000	0.000	21.966	77.875
130.0	6.536%08	0.0022	430.0	462.7	430.0	1.0761	0.252	0.000	0.000	25.782	73.966
135.0	6.455%08	0.0022	480.1	529.2	480.1	1.1022	0.397	0.000	0.000	28.494	71.109
140.0	7.372%08	0.0025	526.3	591.7	526.3	1.1244	0.623	0.000	0.000	30.000	69.377
150.0	1.223%09	0.0041	604.1	702.3	604.1	1.1625	1.499	0.000	0.000	31.125	67.376
160.0	2.047%09	0.0069	663.7	794.5	663.7	1.1972	3.369	0.000	0.000	31.523	65.108
170.0	3.477%09	0.0117	709.1	872.7	709.1	1.2307	6.682	0.000	0.000	31.631	61.688
180.0	8.236%09	0.0277	744.4	940.7	744.4	1.2638	11.440	0.000	0.000	30.463	58.096
190.0	1.628%10	0.0547	772.3	1001.4	772.3	1.2966	17.675	0.000	0.000	24.037	58.288
200.0	2.816%10	0.0946	795.0	1056.8	795.1	1.3290	26.016	0.000	0.000	12.998	60.985
210.0	4.404%10	0.1480	813.5	1108.0	816.8	1.3566	37.577	0.000	0.000	5.759	56.664
220.0	6.454%10	0.2169	828.8	1156.0	838.4	1.3789	53.695	0.000	0.000	2.450	43.855
230.0	8.964%10	0.3012	841.4	1201.4	860.0	1.3970	74.407	0.000	0.000	1.036	24.556
240.0	1.185%11	0.3981	852.0	1244.6	881.6	1.4118	92.029	0.000	0.000	0.438	7.533
260.0	1.811%11	0.6086	868.0	1326.2	924.8	1.4340	99.254	0.000	0.000	0.078	0.667
280.0	2.379%11	0.7994	879.2	1402.8	968.0	1.4491	97.970	1.679	0.187	0.014	0.151
300.0	2.769%11	0.9306	887.0	1476.0	1011.2	1.4597	95.560	3.969	0.441	0.002	0.027
320.0	2.949%11	0.9911	892.5	1547.0	1054.3	1.4673	93.146	6.164	0.685	0.000	0.005
340.0	2.972%11	0.9987	896.5	1616.4	1097.2	1.4732	90.774	8.302	0.922	0.000	0.001
360.0	2.918%11	0.9804	899.3	1684.7	1139.6	1.4783	88.437	10.406	1.156	0.000	0.000
380.0	2.805%11	0.9427	901.4	1752.2	1180.8	1.4840	86.124	12.488	1.388	0.000	0.000
400.0	2.648%11	0.8898	903.0	1819.2	1218.8	1.4927	83.819	14.563	1.618	0.000	0.000
420.0	2.460%11	0.8267	904.2	1819.7	1250.4	1.4553	81.500	16.650	1.850	0.000	0.000
440.0	2.257%11	0.7583	905.1	1820.2	1272.4	1.4305	79.141	18.773	2.086	0.000	0.000
460.0	2.050%11	0.6890	905.8	1820.6	1284.6	1.4172	76.705	20.966	2.330	0.000	0.000
480.0	1.851%11	0.6219	906.3	1821.1	1290.5	1.4111	74.146	23.268	2.585	0.000	0.000
500.0	1.665%11	0.5594	906.7	1821.5	1293.3	1.4084	71.414	25.727	2.859	0.000	0.000
520.0	1.496%11	0.5026	907.1	1822.0	1294.8	1.4072	68.456	28.389	3.154	0.000	0.000
540.0	1.345%11	0.4521	907.4	1822.4	1295.8	1.4064	65.232	31.292	3.477	0.000	0.000
560.0	1.214%11	0.4079	907.6	1822.9	1296.6	1.4059	61.723	34.449	3.828	0.000	0.000
580.0	1.100%11	0.3695	907.8	1823.4	1297.3	1.4055	57.954	37.842	4.205	0.000	0.000
600.0	1.002%11	0.3366	907.9	1823.8	1298.0	1.4051	53.987	41.412	4.601	0.000	0.000
620.0	9.179%10	0.3084	908.0	1824.3	1298.7	1.4047	49.918	45.074	5.008	0.000	0.000
640.0	8.464%10	0.2844	908.2	1824.7	1299.4	1.4043	45.857	48.729	5.414	0.000	0.000
660.0	7.855%10	0.2640	908.2	1825.2	1300.1	1.4039	41.900	52.290	5.810	0.000	0.000
680.0	7.337%10	0.2466	908.3	1825.6	1300.8	1.4035	38.126	55.687	6.187	0.000	0.000
700.0	6.897%10	0.2317	908.4	1826.1	1301.4	1.4031	34.584	58.875	6.542	0.000	0.000
720.0	6.521%10	0.2191	908.4	1826.6	1302.1	1.4027	31.300	61.830	6.870	0.000	0.000
740.0	6.201%10	0.2084	908.5	1827.0	1302.8	1.4024	28.283	64.545	7.172	0.000	0.000
760.0	5.928%10	0.1992	908.5	1827.5	1303.5	1.4020	25.529	67.024	7.447	0.000	0.000
780.0	5.694%10	0.1913	908.6	1827.9	1304.2	1.4016	23.026	69.277	7.697	0.000	0.000
800.0	5.494%10	0.1846	908.6	1828.4	1304.9	1.4012	20.757	71.319	7.924	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 42.6 LONGI= 288.5 R=100 MONTH=12 HOUR=12.0

CALCULATED VALUES: MLAT= 54.0 MLONG= 357.9
DIP= 71.5 MODIP= 55.5 MAGLA= 56.3 XHI= 65.5
SUNRISE: 7.5 L.T. SUNSET:16.5 L.T. SUN DEC.= -22.9
NMF2=1.39%12 NMF1= 0.00%-01 NME=1.17%11 NMD=5.05%08
HMF2=248.8 HMF1= 0.0 HME=109.9 HMD= 81.2

H	NE	N/NMAX	TN	TE	TI	TE/TI	RO+	RH+	RHE+	RO2+	RNO+
80.0	4.765%08	3.4%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	9.534%08	6.8%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	9.952%09	0.0071	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	4.225%10	0.0303	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	8.737%10	0.0627	-1	-1	-1	-1	0.265	0.000	0.000	37.372	62.363
105.0	1.131%11	0.0812	-1	-1	-1	-1	0.397	0.000	0.000	39.222	60.381
110.0	1.171%11	0.0840	-1	-1	-1	-1	0.595	0.000	0.000	41.142	58.263
115.0	1.103%11	0.0792	-1	-1	-1	-1	0.893	0.000	0.000	43.093	56.014
120.0	1.043%11	0.0748	333.0	333.0	333.0	1.0000	1.339	0.000	0.000	44.970	53.691
125.0	1.113%11	0.0798	390.2	416.3	390.2	1.0668	2.005	0.000	0.000	46.514	51.481
130.0	1.239%11	0.0889	446.1	498.3	446.1	1.1169	2.999	0.000	0.000	47.251	49.750
135.0	1.366%11	0.0980	499.9	578.2	499.9	1.1565	4.475	0.000	0.000	46.727	48.797
140.0	1.511%11	0.1084	550.1	654.5	550.1	1.1897	6.652	0.000	0.000	45.000	48.348
150.0	1.872%11	0.1342	636.7	793.2	636.7	1.2458	14.332	0.000	0.000	39.856	45.812
160.0	2.380%11	0.1707	705.0	913.7	705.0	1.2960	28.637	0.000	0.000	33.772	37.592
170.0	3.210%11	0.2303	758.5	1019.3	758.5	1.3439	48.995	0.000	0.000	24.839	26.166
180.0	4.890%11	0.3508	800.8	1113.8	800.8	1.3909	67.894	0.000	0.000	13.925	18.182
190.0	6.934%11	0.4974	834.8	1199.9	834.8	1.4374	79.315	0.000	0.000	6.738	13.947
200.0	9.026%11	0.6475	862.5	1279.8	862.5	1.4839	84.800	0.000	0.000	3.163	12.036
210.0	1.091%12	0.7826	885.4	1354.8	885.4	1.5303	87.531	0.000	0.000	1.478	10.990
220.0	1.238%12	0.8883	904.3	1426.0	904.5	1.5765	89.237	0.000	0.000	0.691	10.072
230.0	1.335%12	0.9577	920.1	1493.9	923.0	1.6186	90.597	0.000	0.000	0.323	9.080
240.0	1.383%12	0.9922	933.2	1559.2	941.4	1.6563	91.851	0.000	0.000	0.151	7.998
260.0	1.388%12	0.9959	953.3	1683.6	978.3	1.7210	94.308	0.000	0.000	0.033	5.659
280.0	1.352%12	0.9695	967.3	1801.9	1015.1	1.7751	96.728	0.000	0.000	0.007	3.264
300.0	1.285%12	0.9218	977.1	1916.1	1052.0	1.8213	98.000	0.000	0.000	0.002	1.998
320.0	1.196%12	0.8580	984.0	2027.3	1089.0	1.8617	98.079	0.000	0.000	0.000	1.921
340.0	1.093%12	0.7840	989.0	2136.6	1126.0	1.8975	98.079	0.890	0.099	0.000	0.932
360.0	9.835%11	0.7054	992.5	2210.7	1163.3	1.9004	98.078	1.547	0.172	0.000	0.203
380.0	8.743%11	0.6271	995.2	2251.0	1201.2	1.8739	98.075	1.693	0.188	0.000	0.044
400.0	7.703%11	0.5525	997.1	2291.5	1240.8	1.8468	98.071	1.727	0.192	0.000	0.010
420.0	6.747%11	0.4840	998.6	2330.5	1283.6	1.8156	98.063	1.741	0.193	0.000	0.002
440.0	5.892%11	0.4226	999.7	2369.5	1331.3	1.7798	97.940	1.854	0.206	0.000	0.000
460.0	5.142%11	0.3689	1000.6	2408.5	1384.0	1.7402	96.889	2.800	0.311	0.000	0.000
480.0	4.495%11	0.3224	1001.3	2447.6	1440.0	1.6997	95.378	4.160	0.462	0.000	0.000
500.0	3.943%11	0.2828	1001.8	2486.7	1497.6	1.6605	93.864	5.522	0.614	0.000	0.000
520.0	3.474%11	0.2492	1002.3	2525.8	1555.8	1.6234	92.361	6.875	0.764	0.000	0.000
540.0	3.079%11	0.2209	1002.6	2564.9	1614.3	1.5888	90.864	8.222	0.914	0.000	0.000
560.0	2.747%11	0.1971	1002.9	2604.0	1672.9	1.5565	89.366	9.570	1.063	0.000	0.000
580.0	2.468%11	0.1771	1003.1	2643.1	1731.6	1.5264	87.857	10.929	1.214	0.000	0.000
600.0	2.234%11	0.1602	1003.3	2682.2	1790.2	1.4983	86.323	12.310	1.368	0.000	0.000
620.0	2.036%11	0.1461	1003.5	2721.3	1848.8	1.4719	84.749	13.726	1.525	0.000	0.000
640.0	1.870%11	0.1341	1003.6	2760.4	1907.5	1.4471	83.118	15.194	1.688	0.000	0.000
660.0	1.729%11	0.1240	1003.7	2799.5	1966.1	1.4238	81.413	16.728	1.859	0.000	0.000
680.0	1.610%11	0.1155	1003.8	2838.6	024.8	1.4019	79.622	18.341	2.038	0.000	0.000
700.0	1.508%11	0.1082	1003.9	2877.7	2083.4	1.3812	77.739	20.035	2.226	0.000	0.000
720.0	1.422%11	0.1020	1004.0	2916.8	2142.1	1.3617	75.771	21.806	2.423	0.000	0.000
740.0	1.348%11	0.0967	1004.1	2955.9	2200.7	1.3431	73.733	23.640	2.627	0.000	0.000
760.0	1.284%11	0.0921	1004.1	2995.0	2259.4	1.3256	71.649	25.516	2.835	0.000	0.000
780.0	1.230%11	0.0882	1004.2	3034.1	2318.0	1.3089	69.543	27.411	3.046	0.000	0.000
800.0	1.183%11	0.0848	1004.2	3073.2	2376.7	1.2931	67.438	29.306	3.256	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 42.6 LONGI= 288.5 R=100 MONTH=12 HOUR= 7.5

CALCULATED VALUES: MLAT= 54.0 MLONG= 357.9
DIP= 71.5 MODIP= 55.5 MAGLA= 56.3 XHI= 90.0
SUNRISE: 7.5 L.T. SUNSET:16.5 L.T. SUN DEC.= -22.9
NMF2=4.34%11 NMF1= 0.00%-01 NME=4.26%10 NMD=4.00%08
HMF2=257.6 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.813%08	6.5%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.102%08	9.4%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.816%09	0.0042	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.272%10	0.0293	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.217%10	0.0741	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	4.213%10	0.0970	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	4.124%10	0.0950	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	3.398%10	0.0782	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	2.690%10	0.0619	322.0	322.0	322.0	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	2.355%10	0.0542	375.1	397.7	375.1	1.0602	0.084	0.000	0.000	36.294	63.621
130.0	2.437%10	0.0561	426.8	472.0	426.8	1.1058	0.161	0.000	0.000	40.716	59.123
135.0	2.804%10	0.0646	476.2	544.0	476.2	1.1422	0.307	0.000	0.000	43.939	55.754
140.0	3.290%10	0.0758	521.6	611.9	521.6	1.1731	0.584	0.000	0.000	45.000	54.416
150.0	4.516%10	0.1040	597.8	733.2	597.8	1.2266	2.074	0.000	0.000	41.880	56.046
160.0	6.290%10	0.1448	655.7	836.3	655.7	1.2754	6.909	0.000	0.000	36.631	56.461
170.0	8.936%10	0.2058	699.7	925.5	699.7	1.3227	19.661	0.000	0.000	30.703	49.636
180.0	1.322%11	0.3045	733.8	1004.7	733.8	1.3692	41.885	0.000	0.000	21.641	36.474
190.0	1.891%11	0.4355	760.7	1076.8	760.7	1.4155	63.787	0.000	0.000	10.559	25.653
200.0	2.502%11	0.5760	782.4	1143.7	783.2	1.4602	76.967	0.000	0.000	4.137	18.896
210.0	3.088%11	0.7112	800.2	1206.6	805.3	1.4982	83.288	0.000	0.000	1.545	15.167
220.0	3.591%11	0.8269	814.8	1266.4	827.5	1.5305	86.496	0.000	0.000	0.573	12.931
230.0	3.969%11	0.9140	827.0	1323.7	849.6	1.5580	88.560	0.000	0.000	0.212	11.228
240.0	4.209%11	0.9691	837.1	1378.9	871.7	1.5819	90.243	0.000	0.000	0.079	9.679
260.0	4.342%11	0.9998	852.5	1484.6	916.0	1.6208	93.359	0.000	0.000	0.011	6.630
280.0	4.284%11	0.9865	863.2	1585.6	960.2	1.6514	96.398	0.000	0.000	0.001	3.600
300.0	4.141%11	0.9535	870.6	1683.4	1004.4	1.6760	98.000	0.000	0.000	0.000	2.000
320.0	3.928%11	0.9044	875.9	1779.0	1048.7	1.6965	98.100	0.000	0.000	0.000	1.900
340.0	3.664%11	0.8437	879.7	1873.1	1092.8	1.7140	98.101	1.044	0.116	0.000	0.739
360.0	3.370%11	0.7760	882.4	1947.5	1136.8	1.7131	98.099	1.620	0.180	0.000	0.101
380.0	3.064%11	0.7056	884.4	2002.8	1180.3	1.6968	98.096	1.701	0.189	0.000	0.014
400.0	2.762%11	0.6360	885.9	2058.0	1222.8	1.6830	98.093	1.715	0.191	0.000	0.002
420.0	2.475%11	0.5699	887.1	2077.9	1263.2	1.6450	98.084	1.724	0.192	0.000	0.000
440.0	2.210%11	0.5088	887.9	2097.9	1300.3	1.6134	97.961	1.835	0.204	0.000	0.000
460.0	1.971%11	0.4538	888.6	2117.9	1334.2	1.5874	96.910	2.781	0.309	0.000	0.000
480.0	1.759%11	0.4050	889.1	2137.9	1366.0	1.5651	95.399	4.141	0.460	0.000	0.000
500.0	1.573%11	0.3622	889.5	2157.8	1396.6	1.5450	93.884	5.504	0.612	0.000	0.000
520.0	1.412%11	0.3252	889.8	2177.8	1426.9	1.5263	92.381	6.857	0.762	0.000	0.000
540.0	1.274%11	0.2933	890.1	2197.8	1457.0	1.5085	90.884	8.204	0.912	0.000	0.000
560.0	1.155%11	0.2660	890.3	2217.8	1487.0	1.4915	89.386	9.553	1.061	0.000	0.000
580.0	1.054%11	0.2426	890.5	2237.8	1517.0	1.4751	87.876	10.912	1.212	0.000	0.000
600.0	9.668%10	0.2226	890.7	2257.8	1547.0	1.4595	86.341	12.293	1.366	0.000	0.000
620.0	8.928%10	0.2056	890.8	2277.8	1577.0	1.4444	84.767	13.709	1.523	0.000	0.000
640.0	8.296%10	0.1910	890.9	2297.8	1607.0	1.4299	83.136	15.178	1.686	0.000	0.000
660.0	7.755%10	0.1786	891.0	2317.8	1637.0	1.4159	81.431	16.712	1.857	0.000	0.000
680.0	7.292%10	0.1679	891.0	2337.8	1667.0	1.4024	79.639	18.325	2.036	0.000	0.000
700.0	6.894%10	0.1588	891.1	2357.8	1697.0	1.3894	77.756	20.020	2.224	0.000	0.000
720.0	6.553%10	0.1509	891.2	2377.8	1727.0	1.3768	75.787	21.791	2.421	0.000	0.000
740.0	6.258%10	0.1441	891.2	2397.8	1757.0	1.3647	73.749	23.626	2.625	0.000	0.000
760.0	6.004%10	0.1382	891.3	2417.8	1787.0	1.3530	71.665	25.502	2.834	0.000	0.000
780.0	5.784%10	0.1332	891.3	2437.8	1817.0	1.3417	69.558	27.398	3.044	0.000	0.000
800.0	5.594%10	0.1288	891.3	2457.8	1847.0	1.3307	67.452	29.293	3.255	0.000	0.000

WE PUT BI= 3.0TO GET HST

INPUT: LATI= 42.6 LONGI= 288.5 R=100 MONTH=12 HOUR= 0.0

CALCULATED VALUES; MLAT= 54.0 MLONG= 357.9
DIP= 71.5 MODIP= 55.5 MAGLA= 56.3 XHI= 160.3
SUNRISE: 7.5 L.T. SUNSET:16.5 L.T. SUN DEC.= -22.9
NMF2=2.21%11 NMF1= 0.00%-01 NME=3.20%09 NMD=4.00%08
HMF2=329.2 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	4.972%05	2.2%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.456%08	0.0011	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.721%08	0.0021	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	2.504%09	0.0113	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.193%09	0.0144	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	3.201%09	0.0145	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	2.614%09	0.0118	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	1.701%09	0.0077	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	1.081%09	0.0049	317.3	317.3	317.3	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	7.600%08	0.0034	368.6	386.0	368.6	1.0470	0.084	0.000	0.000	36.294	63.621
130.0	6.282%08	0.0028	418.6	453.3	418.6	1.0828	0.161	0.000	0.000	40.716	59.123
135.0	6.174%08	0.0028	466.1	518.1	466.1	1.1116	0.307	0.000	0.000	43.939	55.754
140.0	7.037%08	0.0032	509.5	578.8	509.5	1.1361	0.584	0.000	0.000	45.000	54.416
150.0	1.175%09	0.0053	581.4	685.4	581.4	1.1789	2.075	0.000	0.000	41.880	56.044
160.0	1.992%09	0.0090	635.2	773.9	635.2	1.2183	6.912	0.000	0.000	36.631	56.457
170.0	3.362%09	0.0152	675.6	848.9	675.6	1.2566	19.672	0.000	0.000	30.703	49.625
180.0	4.718%09	0.0213	706.6	914.6	706.6	1.2944	41.907	0.000	0.000	21.641	36.451
190.0	6.676%09	0.0302	730.9	973.6	731.2	1.3315	63.821	0.000	0.000	10.559	25.620
200.0	9.560%09	0.0432	750.5	1027.9	754.6	1.3622	77.006	0.000	0.000	4.137	18.857
210.0	1.394%10	0.0630	766.5	1078.5	777.9	1.3864	83.329	0.000	0.000	1.545	15.125
220.0	2.092%10	0.0946	779.6	1126.3	801.3	1.4056	86.537	0.000	0.000	0.573	12.890
230.0	3.335%10	0.1508	790.5	1171.9	824.7	1.4210	88.599	0.000	0.000	0.212	11.188
240.0	5.293%10	0.2393	799.5	1215.6	848.0	1.4334	90.280	0.000	0.000	0.079	9.641
260.0	1.055%11	0.4771	813.3	1298.7	894.7	1.4514	93.390	0.000	0.000	0.011	6.599
280.0	1.619%11	0.7318	822.8	1377.5	941.5	1.4632	96.417	0.000	0.000	0.001	3.582
300.0	2.026%11	0.9160	829.5	1453.6	988.1	1.4710	98.000	0.000	0.000	0.000	2.000
320.0	2.198%11	0.9936	834.2	1527.6	1034.7	1.4763	98.071	0.628	0.070	0.000	1.231
340.0	2.205%11	0.9969	837.6	1600.3	1081.1	1.4802	98.030	1.621	0.180	0.000	0.169
360.0	2.158%11	0.9758	840.0	1672.1	1127.0	1.4837	97.965	1.810	0.201	0.000	0.023
380.0	2.072%11	0.9370	841.8	1743.2	1171.4	1.4881	97.860	1.923	0.214	0.000	0.003
400.0	1.957%11	0.8846	843.1	1813.9	1212.4	1.4961	97.304	2.426	0.270	0.000	0.000
420.0	1.821%11	0.8232	844.1	1813.9	1246.4	1.4553	93.968	5.429	0.603	0.000	0.000
440.0	1.675%11	0.7573	844.9	1814.0	1269.8	1.4285	89.573	9.384	1.043	0.000	0.000
460.0	1.528%11	0.6907	845.5	1814.0	1282.6	1.4143	85.227	13.296	1.477	0.000	0.000
480.0	1.385%11	0.6264	846.0	1814.0	1288.3	1.4080	80.930	17.163	1.907	0.000	0.000
500.0	1.253%11	0.5663	846.3	1814.0	1290.7	1.4055	76.642	21.022	2.336	0.000	0.000
520.0	1.132%11	0.5117	846.6	1814.0	1291.6	1.4045	72.323	24.909	2.768	0.000	0.000
540.0	1.024%11	0.4629	846.9	1814.1	1291.9	1.4042	67.944	28.851	3.206	0.000	0.000
560.0	9.290%10	0.4200	847.0	1814.1	1292.1	1.4040	63.494	32.855	3.651	0.000	0.000
580.0	8.464%10	0.3827	847.2	1814.1	1292.2	1.4039	58.994	36.905	4.101	0.000	0.000
600.0	7.751%10	0.3504	847.3	1814.1	1292.2	1.4039	54.490	40.959	4.551	0.000	0.000
620.0	7.138%10	0.3227	847.5	1814.1	1292.2	1.4039	50.050	44.955	4.995	0.000	0.000
640.0	6.613%10	0.2990	847.5	1814.2	1292.3	1.4039	45.748	48.827	5.425	0.000	0.000
660.0	6.163%10	0.2787	847.6	1814.2	1292.3	1.4038	41.648	52.517	5.835	0.000	0.000
680.0	5.780%10	0.2613	847.7	1814.2	1292.3	1.4038	37.797	55.982	6.220	0.000	0.000
700.0	5.452%10	0.2465	847.7	1814.2	1292.4	1.4038	34.223	59.199	6.578	0.000	0.000
720.0	5.171%10	0.2338	847.8	1814.3	1292.4	1.4038	30.934	62.159	6.907	0.000	0.000
740.0	4.931%10	0.2230	847.8	1814.3	1292.4	1.4038	27.929	64.864	7.207	0.000	0.000
760.0	4.726%10	0.2137	847.9	1814.3	1292.5	1.4037	25.194	67.325	7.481	0.000	0.000
780.0	4.549%10	0.2057	847.9	1814.3	1292.5	1.4037	22.714	69.557	7.729	0.000	0.000
800.0	4.398%10	0.1988	847.9	1814.3	1292.5	1.4037	20.471	71.576	7.953	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 44.1 LONGI= 2.0 R= 10 MONTH= 3 HOUR=12.0

CALCULATED VALUES: MLAT= 46.6 MLONG= 83.1
DIP= 59.6 MODIP= 50.8 MAGLA= 40.5 XHI= 47.4
SUNRISE: 6.2 L.T. SUNSET:17.8 L.T. SUN DEC.= -3.3
NMF2=4.58%11 NMF1= 2.15% 11 NME=1.14%11 NMD=5.20%08
HMF2=243.9 HMF1=184.0 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	4.945%08	0.0011	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	1.029%09	0.0022	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.066%10	0.0233	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	4.351%10	0.0950	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	8.694%10	0.1899	-1	-1	-1	-1	-1	-1	-1	-1	-1
105.0	1.105%11	0.2412	-1	-1	-1	-1	0.207	0.000	0.000	53.129	46.664
110.0	1.139%11	0.2488	-1	-1	-1	-1	0.326	0.000	0.000	52.315	47.359
115.0	1.105%11	0.2412	-1	-1	-1	-1	0.513	0.000	0.000	51.435	48.051
120.0	1.084%11	0.2366	304.9	304.9	304.9	1.0000	0.807	0.000	0.000	50.375	48.818
125.0	1.122%11	0.2451	351.4	380.4	351.4	1.0823	1.266	0.000	0.000	48.907	49.827
130.0	1.171%11	0.2557	396.6	454.5	396.6	1.1459	1.979	0.000	0.000	46.746	51.274
135.0	1.200%11	0.2620	439.2	526.0	439.2	1.1977	3.076	0.000	0.000	43.822	53.102
140.0	1.232%11	0.2690	477.3	593.0	477.3	1.2425	4.736	0.000	0.000	40.443	54.821
150.0	1.311%11	0.2863	538.4	712.0	538.4	1.3225	7.175	0.000	0.000	37.000	55.825
160.0	1.423%11	0.3107	582.3	813.8	582.3	1.3976	15.113	0.000	0.000	30.678	54.209
170.0	1.637%11	0.3575	614.2	903.6	614.2	1.4712	26.363	0.000	0.000	25.335	48.302
180.0	2.086%11	0.4555	638.2	985.5	638.6	1.5431	36.882	0.000	0.000	20.753	42.365
190.0	2.573%11	0.5618	656.8	1061.9	661.8	1.6046	44.217	0.000	0.000	16.294	39.489
200.0	3.248%11	0.7093	671.6	1134.6	685.0	1.6563	49.297	0.000	0.000	11.557	39.146
210.0	3.821%11	0.8343	683.6	1204.5	708.2	1.7008	53.471	0.000	0.000	7.651	38.878
220.0	4.235%11	0.9248	693.5	1272.2	731.4	1.7394	57.448	0.000	0.000	4.985	37.567
230.0	4.479%11	0.9779	701.6	1338.2	754.6	1.7734	61.526	0.000	0.000	3.240	35.234
240.0	4.573%11	0.9986	708.3	1402.8	777.8	1.8035	65.823	0.000	0.000	2.105	32.072
260.0	4.521%11	0.9871	718.5	1528.8	824.2	1.8548	70.397	0.000	0.000	1.367	28.236
280.0	4.299%11	0.9387	725.6	1651.6	870.6	1.8971	80.490	0.000	0.000	0.577	18.933
300.0	3.950%11	0.8625	730.5	1772.3	917.0	1.9327	91.650	0.000	0.000	0.244	8.107
320.0	3.523%11	0.7692	734.0	1891.5	963.4	1.9633	98.000	0.000	0.000	0.103	1.897
340.0	3.065%11	0.6693	736.5	2009.8	1009.9	1.9900	98.409	0.000	0.000	0.043	1.548
360.0	2.616%11	0.5713	738.3	2087.9	1056.6	1.9761	98.416	0.200	0.022	0.018	1.344
380.0	2.203%11	0.4810	739.6	2127.0	1103.6	1.9273	98.414	0.910	0.101	0.008	0.567
400.0	1.838%11	0.4014	740.6	2166.5	1151.6	1.8813	98.411	1.211	0.135	0.003	0.239
420.0	1.528%11	0.3337	741.3	2206.0	1201.6	1.8358	98.408	1.341	0.149	0.001	0.101
440.0	1.271%11	0.2775	741.9	2245.6	1254.7	1.7898	98.399	1.402	0.156	0.001	0.043
460.0	1.060%11	0.2315	742.4	2285.2	1310.7	1.7436	98.276	1.535	0.171	0.000	0.018
480.0	8.905%10	0.1944	742.7	2325.0	1368.7	1.6987	97.221	2.494	0.277	0.000	0.008
500.0	7.541%10	0.1647	743.0	2364.7	1427.7	1.6563	95.705	3.863	0.429	0.000	0.003
520.0	6.450%10	0.1408	743.2	2404.4	1487.0	1.6169	94.186	5.232	0.581	0.000	0.001
540.0	5.577%10	0.1218	743.4	2444.2	1546.6	1.5804	92.678	6.589	0.732	0.000	0.001
560.0	4.876%10	0.1065	743.5	2483.9	1606.2	1.5465	91.176	7.941	0.882	0.000	0.000
580.0	4.312%10	0.0942	743.6	2523.7	1665.8	1.5150	89.673	9.295	1.033	0.000	0.000
600.0	3.856%10	0.0842	743.7	2563.4	1725.4	1.4857	88.158	10.658	1.184	0.000	0.000
620.0	3.486%10	0.0761	743.8	2603.2	1785.1	1.4583	86.619	12.043	1.338	0.000	0.000
640.0	3.183%10	0.0695	743.9	2642.9	1844.7	1.4327	85.039	13.465	1.496	0.000	0.000
660.0	2.934%10	0.0641	743.9	2682.7	1904.3	1.4087	83.403	14.937	1.660	0.000	0.000
680.0	2.729%10	0.0596	744.0	2722.4	1964.0	1.3862	81.692	16.477	1.831	0.000	0.000
700.0	2.559%10	0.0559	744.0	2762.2	2023.6	1.3650	79.895	18.095	2.011	0.000	0.000
720.0	2.417%10	0.0528	744.1	2801.9	2083.2	1.3450	78.005	19.795	2.199	0.000	0.000
740.0	2.298%10	0.0502	744.1	2841.7	2142.9	1.3261	76.031	21.572	2.397	0.000	0.000
760.0	2.198%10	0.0480	744.1	2881.5	2202.5	1.3083	73.986	23.412	2.601	0.000	0.000
780.0	2.114%10	0.0462	744.1	2921.2	2262.1	1.2914	71.895	25.295	2.811	0.000	0.000
800.0	2.043%10	0.0446	744.2	2961.0	2321.8	1.2753	69.781	27.197	3.022	0.000	0.000
							67.669	29.098	3.233	0.000	0.000

WE PUT BI= 3.0TO GET HST

INPUT: LATI= 44.1 LONGI= 2.0 R= 10 MONTH= 3 HOUR= 6.2

CALCULATED VALUES: MLAT= 46.6 MLONG= 83.1
DIP= 59.6 MODIP= 50.8 MAGLA= 40.5 XHI= 90.0
SUNRISE: 6.2 L.T. SUNSET:17.8 L.T. SUN DEC.= -3.3
NMF2=1.54%11 NMF1= 0.00%-01 NME=3.09%10 NMD=4.00%08
HMF2=258.1 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.819%08	0.0018	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.101%08	0.0027	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.812%09	0.0117	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.150%10	0.0745	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.532%10	0.1641	-1	-1	-1	-1	0.020	0.000	0.000	17.950	82.030
105.0	3.073%10	0.1991	-1	-1	-1	-1	0.031	0.000	0.000	20.889	79.081
110.0	2.994%10	0.1940	-1	-1	-1	-1	0.048	0.000	0.000	24.232	75.721
115.0	2.487%10	0.1612	-1	-1	-1	-1	0.074	0.000	0.000	27.887	72.039
120.0	2.001%10	0.1296	290.0	290.0	290.0	1.0000	0.114	0.000	0.000	31.524	68.361
125.0	1.779%10	0.1153	330.8	351.8	330.8	1.0633	0.177	0.000	0.000	34.509	65.313
130.0	1.846%10	0.1196	370.4	412.3	370.4	1.1132	0.275	0.000	0.000	36.301	63.424
135.0	2.103%10	0.1363	407.1	469.9	407.1	1.1544	0.425	0.000	0.000	36.979	62.596
140.0	2.433%10	0.1576	439.1	522.9	439.1	1.1909	0.655	0.000	0.000	37.000	62.345
150.0	3.232%10	0.2094	488.4	614.1	488.4	1.2574	1.525	0.000	0.000	36.335	62.140
160.0	3.613%10	0.2341	522.2	689.8	522.2	1.3210	3.347	0.000	0.000	35.403	61.250
170.0	4.090%10	0.2650	546.0	755.5	546.4	1.3828	6.466	0.000	0.000	34.020	59.514
180.0	4.736%10	0.3068	563.5	814.9	568.9	1.4326	10.415	0.000	0.000	30.434	59.151
190.0	5.881%10	0.3810	576.9	870.3	591.3	1.4717	14.360	0.000	0.000	22.930	62.710
200.0	8.126%10	0.5265	587.5	922.7	613.8	1.5033	18.208	0.000	0.000	15.380	66.412
210.0	1.037%11	0.6722	596.0	973.2	636.3	1.5294	22.316	0.000	0.000	10.039	67.645
220.0	1.236%11	0.8007	602.9	1022.0	658.8	1.5513	27.023	0.000	0.000	6.526	66.451
230.0	1.388%11	0.8994	608.6	1069.6	681.3	1.5700	32.590	0.000	0.000	4.240	63.170
240.0	1.486%11	0.9630	613.3	1116.3	703.8	1.5861	39.250	0.000	0.000	2.755	57.995
260.0	1.543%11	0.9998	620.5	1207.2	748.7	1.6124	56.860	0.000	0.000	1.163	41.977
280.0	1.511%11	0.9787	625.5	1296.0	793.7	1.6329	81.425	0.000	0.000	0.491	18.085
300.0	1.430%11	0.9264	628.9	1383.3	838.7	1.6494	98.000	0.000	0.000	0.207	1.793
320.0	1.314%11	0.8512	631.4	1469.6	883.6	1.6632	99.136	0.000	0.000	0.087	0.777
340.0	1.177%11	0.7625	633.1	1555.1	928.5	1.6749	99.157	0.000	0.000	0.037	0.806
360.0	1.033%11	0.6691	634.4	1618.6	973.2	1.6632	99.156	0.418	0.046	0.016	0.364
380.0	8.923%10	0.5781	635.3	1660.4	1017.4	1.6321	99.153	0.618	0.069	0.007	0.154
400.0	7.627%10	0.4942	636.0	1702.4	1060.5	1.6052	99.149	0.705	0.078	0.003	0.065
420.0	6.481%10	0.4199	636.5	1722.3	1101.4	1.5637	99.141	0.748	0.083	0.001	0.027
440.0	5.495%10	0.3561	636.9	1742.2	1138.9	1.5297	99.016	0.875	0.097	0.000	0.012
460.0	4.667%10	0.3024	637.2	1762.1	1173.0	1.5023	97.954	1.837	0.204	0.000	0.005
480.0	3.981%10	0.2579	637.5	1782.1	1204.8	1.4792	96.426	3.215	0.357	0.000	0.002
500.0	3.419%10	0.2215	637.6	1802.1	1235.6	1.4585	94.896	4.593	0.510	0.000	0.001
520.0	2.960%10	0.1918	637.8	1822.1	1265.8	1.4394	93.376	5.961	0.662	0.000	0.000
540.0	2.587%10	0.1676	637.9	1842.1	1295.9	1.4214	91.863	7.323	0.814	0.000	0.000
560.0	2.284%10	0.1480	638.0	1862.1	1326.0	1.4043	90.348	8.686	0.965	0.000	0.000
580.0	2.037%10	0.1320	638.1	1882.1	1356.0	1.3880	88.822	10.060	1.118	0.000	0.000
600.0	1.835%10	0.1189	638.2	1902.1	1386.0	1.3724	87.271	11.456	1.273	0.000	0.000
620.0	1.670%10	0.1082	638.2	1922.1	1416.0	1.3574	85.680	12.888	1.432	0.000	0.000
640.0	1.534%10	0.0994	638.3	1942.1	1446.0	1.3431	84.031	14.372	1.597	0.000	0.000
660.0	1.422%10	0.0921	638.3	1962.1	1476.0	1.3293	82.308	15.923	1.769	0.000	0.000
680.0	1.328%10	0.0861	638.4	1982.1	1506.0	1.3161	80.497	17.553	1.950	0.000	0.000
700.0	1.251%10	0.0810	638.4	2002.1	1536.0	1.3034	78.593	19.266	2.141	0.000	0.000
720.0	1.186%10	0.0768	638.4	2022.1	1566.0	1.2912	76.604	21.057	2.340	0.000	0.000
740.0	1.131%10	0.0733	638.4	2042.1	1596.0	1.2795	74.544	22.911	2.546	0.000	0.000
760.0	1.085%10	0.0703	638.4	2062.1	1626.0	1.2682	72.437	24.807	2.756	0.000	0.000
780.0	1.046%10	0.0678	638.5	2082.1	1656.0	1.2573	70.307	26.723	2.969	0.000	0.000
800.0	1.013%10	0.0657	638.5	2102.1	1686.0	1.2468	68.179	28.639	3.182	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 44.1 LONGI= 2.0 R= 10 MONTH= 3 HOUR= 0.0

CALCULATED VALUES: MLAT= 46.6 MLONG= 83.1
DIP= 59.6 MODIP= 50.8 MAGLA= 40.5 XHI= 139.2
SUNRISE: 6.2 L.T. SUNSET:17.8 L.T. SUN DEC.= -3.3
NMF2=1.26%11 NMF1= 0.00%-01 NME=1.78%09 NMD=4.00%08
HMF2=349.1 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.385%05	4.3%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.473%08	0.0020	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.729%08	0.0037	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.743%09	0.0138	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.775%09	0.0141	-1	-1	-1	-1	0.020	0.000	0.000	17.950	82.030
105.0	1.775%09	0.0141	-1	-1	-1	-1	0.031	0.000	0.000	20.889	79.081
110.0	1.451%09	0.0115	-1	-1	-1	-1	0.048	0.000	0.000	24.232	75.721
115.0	9.452%08	0.0075	-1	-1	-1	-1	0.074	0.000	0.000	27.887	72.039
120.0	6.014%08	0.0048	287.3	287.3	287.3	1.0000	0.115	0.000	0.000	31.524	68.361
125.0	4.233%08	0.0034	327.2	338.1	327.2	1.0336	0.178	0.000	0.000	34.509	65.313
130.0	3.503%08	0.0028	365.7	387.7	365.7	1.0601	0.275	0.000	0.000	36.301	63.424
135.0	3.445%08	0.0027	401.4	434.4	401.4	1.0821	0.425	0.000	0.000	36.979	62.596
140.0	3.927%08	0.0031	432.4	476.3	432.4	1.1016	0.655	0.000	0.000	37.000	62.345
150.0	6.544%08	0.0052	479.7	545.6	479.7	1.1374	1.526	0.000	0.000	36.335	62.139
160.0	1.103%09	0.0087	511.9	599.8	511.9	1.1717	3.349	0.000	0.000	35.403	61.248
170.0	1.765%09	0.0140	534.5	644.3	534.5	1.2055	6.470	0.000	0.000	34.020	59.510
180.0	2.227%09	0.0177	551.0	682.9	554.1	1.2325	10.420	0.000	0.000	30.434	59.146
190.0	2.747%09	0.0218	563.7	717.5	573.6	1.2508	14.368	0.000	0.000	22.930	62.702
200.0	3.412%09	0.0270	573.6	749.4	593.2	1.2634	18.218	0.000	0.000	15.380	66.403
210.0	4.277%09	0.0339	581.6	779.4	612.7	1.2719	22.327	0.000	0.000	10.039	67.634
220.0	5.428%09	0.0430	588.1	807.9	632.3	1.2777	27.036	0.000	0.000	6.526	66.438
230.0	7.009%09	0.0555	593.5	835.2	651.9	1.2813	32.605	0.000	0.000	4.240	63.155
240.0	9.300%09	0.0737	597.9	861.6	671.4	1.2833	39.266	0.000	0.000	2.755	57.979
260.0	2.092%10	0.1658	604.7	912.3	710.5	1.2839	56.879	0.000	0.000	1.163	41.958
280.0	5.007%10	0.3968	609.3	960.9	749.7	1.2818	81.441	0.000	0.000	0.491	18.069
300.0	8.571%10	0.6793	612.6	1008.1	788.7	1.2781	98.000	0.000	0.000	0.207	1.793
320.0	1.134%11	0.8985	614.9	1054.3	827.8	1.2737	99.107	0.000	0.000	0.087	0.806
340.0	1.252%11	0.9925	616.5	1099.9	866.6	1.2692	99.085	0.395	0.044	0.037	0.438
360.0	1.254%11	0.9940	617.7	1145.0	905.0	1.2652	99.020	0.701	0.078	0.016	0.185
380.0	1.204%11	0.9542	618.5	1189.8	942.2	1.2628	98.914	0.901	0.100	0.007	0.078
400.0	1.116%11	0.8847	619.2	1234.4	976.6	1.2640	98.352	1.451	0.161	0.003	0.033
420.0	1.005%11	0.7965	619.7	1234.5	1005.1	1.2283	94.980	4.504	0.500	0.001	0.014
440.0	8.839%10	0.7005	620.1	1234.6	1024.7	1.2048	90.538	8.510	0.946	0.000	0.006
460.0	7.644%10	0.6058	620.3	1234.7	1035.4	1.1924	86.145	12.467	1.385	0.000	0.002
480.0	6.539%10	0.5183	620.6	1234.8	1040.3	1.1869	81.802	16.378	1.820	0.000	0.001
500.0	5.566%10	0.4412	620.7	1234.8	1042.4	1.1846	77.467	20.279	2.253	0.000	0.000
520.0	4.737%10	0.3754	620.9	1234.9	1043.2	1.1837	73.102	24.208	2.690	0.000	0.000
540.0	4.047%10	0.3207	621.0	1235.0	1043.6	1.1834	68.675	28.192	3.132	0.000	0.000
560.0	3.481%10	0.2759	621.1	1235.1	1043.8	1.1832	64.178	32.239	3.582	0.000	0.000
580.0	3.022%10	0.2395	621.2	1235.2	1044.0	1.1831	59.629	36.333	4.037	0.000	0.000
600.0	2.651%10	0.2101	621.2	1235.2	1044.1	1.1830	55.077	40.431	4.492	0.000	0.000
620.0	2.352%10	0.1864	621.3	1235.3	1044.3	1.1830	50.589	44.470	4.941	0.000	0.000
640.0	2.110%10	0.1673	621.3	1235.4	1044.4	1.1829	46.240	48.384	5.376	0.000	0.000
660.0	1.915%10	0.1518	621.4	1235.5	1044.5	1.1828	42.097	52.113	5.790	0.000	0.000
680.0	1.757%10	0.1392	621.4	1235.6	1044.6	1.1828	38.204	55.616	6.180	0.000	0.000
700.0	1.628%10	0.1290	621.4	1235.6	1044.7	1.1827	34.592	58.868	6.541	0.000	0.000
720.0	1.522%10	0.1207	621.5	1235.7	1044.9	1.1827	31.268	61.859	6.873	0.000	0.000
740.0	1.436%10	0.1138	621.5	1235.8	1045.0	1.1826	28.230	64.593	7.177	0.000	0.000
760.0	1.365%10	0.1082	621.5	1235.9	1045.1	1.1825	25.466	67.081	7.453	0.000	0.000
780.0	1.306%10	0.1035	621.5	1235.9	1045.2	1.1825	22.959	69.337	7.704	0.000	0.000
800.0	1.257%10	0.0996	621.5	1236.0	1045.3	1.1824	20.691	71.378	7.931	0.000	0.000

WE PUT B1= 3.0TU GET HST

INPUT: LATI= 44.1 LONGI= 2.0 R= 10 MONTH= 6 HOUR=12.0

CALCULATED VALUES: MLAT= 46.6 MLONG= 83.1
DIP= 59.6 MODIP= 50.8 MAGLA= 40.5 XHI= 21.0
SUNRISE: 4.4 L.T. SUNSET:19.6 L.T. SUN DEC.= 23.1
NMF2=3.53%11 NMF1= 2.44% 11 NME=1.33%11 NMD=6.14%08
HMF2=231.3 HMF1=179.0 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.854%08	0.0017	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	1.235%09	0.0035	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.274%10	0.0361	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	5.144%10	0.1459	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.019%11	0.2891	-1	-1	-1	-1	0.235	0.000	0.000	48.255	51.510
105.0	1.290%11	0.3659	-1	-1	-1	-1	0.338	0.000	0.000	44.770	54.892
110.0	1.330%11	0.3771	-1	-1	-1	-1	0.488	0.000	0.000	41.644	57.869
115.0	1.295%11	0.3674	-1	-1	-1	-1	0.702	0.000	0.000	38.967	60.331
120.0	1.270%11	0.3602	308.2	308.2	308.2	1.0000	1.007	0.000	0.000	36.868	62.125
125.0	1.318%11	0.3739	356.0	384.5	356.0	1.0800	1.439	0.000	0.000	35.393	63.168
130.0	1.380%11	0.3915	402.5	459.5	402.5	1.1415	2.041	0.000	0.000	34.401	63.558
135.0	1.437%11	0.4075	446.4	531.9	446.4	1.1914	2.861	0.000	0.000	33.677	63.462
140.0	1.501%11	0.4256	485.9	599.8	485.9	1.2345	3.937	0.000	0.000	33.077	62.985
150.0	1.658%11	0.4703	549.8	720.7	549.8	1.3109	6.838	0.000	0.000	32.008	61.154
160.0	1.894%11	0.5371	596.2	824.1	596.2	1.3822	10.219	0.000	0.000	31.000	58.781
170.0	2.253%11	0.6391	630.3	915.1	630.3	1.4519	13.432	0.000	0.000	30.011	56.557
180.0	2.478%11	0.7028	656.0	997.8	656.0	1.5211	16.472	0.000	0.000	28.938	54.590
190.0	2.870%11	0.8138	676.0	1074.8	678.5	1.5840	19.642	0.000	0.000	27.168	53.190
200.0	3.174%11	0.9002	692.0	1147.8	701.1	1.6371	23.190	0.000	0.000	22.751	54.059
210.0	3.379%11	0.9584	704.9	1217.7	723.6	1.6828	27.286	0.000	0.000	16.094	56.620
220.0	3.490%11	0.9899	715.6	1285.3	746.2	1.7225	32.070	0.000	0.000	10.613	57.317
230.0	3.526%11	0.9999	724.3	1351.0	768.7	1.7575	37.679	0.000	0.000	6.909	55.411
240.0	3.513%11	0.9963	731.6	1415.3	791.2	1.7887	44.264	0.000	0.000	4.490	51.246
260.0	3.392%11	0.9621	742.7	1540.3	836.3	1.8417	61.068	0.000	0.000	1.895	37.037
280.0	3.165%11	0.8977	750.3	1661.9	881.4	1.8855	83.427	0.000	0.000	0.800	15.773
300.0	2.865%11	0.8126	755.7	1781.2	926.5	1.9225	98.000	0.000	0.000	0.338	1.662
320.0	2.528%11	0.7170	759.5	1898.9	971.6	1.9544	98.986	0.000	0.000	0.142	0.872
340.0	2.185%11	0.6197	762.2	2015.5	1016.8	1.9822	99.004	0.000	0.000	0.060	0.936
360.0	1.859%11	0.5273	764.1	2092.8	1062.2	1.9703	99.003	0.511	0.057	0.025	0.404
380.0	1.565%11	0.4440	765.6	2131.9	1108.0	1.9241	99.000	0.737	0.082	0.011	0.171
400.0	1.310%11	0.3716	766.6	2171.4	1154.9	1.8802	98.996	0.834	0.093	0.005	0.072
420.0	1.095%11	0.3104	767.4	2211.0	1204.0	1.8364	98.988	0.882	0.098	0.002	0.030
440.0	9.161%10	0.2598	768.1	2250.8	1256.5	1.7913	98.864	1.010	0.112	0.001	0.013
460.0	7.704%10	0.2185	768.5	2290.7	1312.4	1.7454	97.803	1.972	0.219	0.000	0.005
480.0	6.523%10	0.1850	768.9	2330.6	1370.5	1.7005	96.278	3.348	0.372	0.000	0.002
500.0	5.572%10	0.1580	769.2	2370.6	1429.7	1.6580	94.749	4.725	0.525	0.000	0.001
520.0	4.806%10	0.1363	769.4	2410.5	1489.4	1.6184	93.232	6.090	0.677	0.000	0.000
540.0	4.190%10	0.1188	769.6	2450.5	1549.3	1.5817	91.722	7.450	0.828	0.000	0.000
560.0	3.692%10	0.1047	769.8	2490.4	1609.2	1.5477	90.209	8.812	0.979	0.000	0.000
580.0	3.288%10	0.0933	769.9	2530.4	1669.1	1.5160	88.685	10.183	1.131	0.000	0.000
600.0	2.960%10	0.0840	770.0	2570.3	1729.0	1.4866	87.137	11.577	1.286	0.000	0.000
620.0	2.692%10	0.0763	770.1	2610.3	1789.0	1.4591	85.548	13.007	1.445	0.000	0.000
640.0	2.471%10	0.0701	770.2	2650.3	1848.9	1.4334	83.902	14.488	1.610	0.000	0.000
660.0	2.289%10	0.0649	770.2	2690.2	1908.8	1.4093	82.181	16.037	1.782	0.000	0.000
680.0	2.137%10	0.0606	770.3	2730.2	1968.8	1.3867	80.373	17.665	1.963	0.000	0.000
700.0	2.011%10	0.0570	770.3	2770.1	2028.7	1.3655	78.472	19.375	2.153	0.000	0.000
720.0	1.905%10	0.0540	770.4	2810.1	2088.7	1.3454	76.485	21.163	2.351	0.000	0.000
740.0	1.817%10	0.0515	770.4	2850.1	2148.6	1.3265	74.429	23.014	2.557	0.000	0.000
760.0	1.741%10	0.0494	770.4	2890.0	2208.5	1.3086	72.325	24.908	2.768	0.000	0.000
780.0	1.678%10	0.0476	770.5	2930.0	2268.5	1.2916	70.199	26.821	2.980	0.000	0.000
800.0	1.624%10	0.0461	770.5	2969.9	2328.4	1.2755	68.074	28.734	3.193	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 44.1 LONGI= 2.0 R= 10 MONTH= 6 HOUR= 4.4

CALCULATED VALUES: MLAT= 46.6 MLONG= 83.1
DIP= 59.6 MODIP= 50.8 MAGLA= 40.5 XHI= 90.0
SUNRISE: 4.4 L.T. SUNSET:19.6 L.T. SUN DEC.= 23.1
NMF2=1.71%11 NMF1= 0.00%-01 NME=2.97%10 NMD=4.00%08
HMF2=292.4 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.819%08	0.0017	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.101%08	0.0024	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.811%09	0.0106	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.134%10	0.0665	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.457%10	0.1440	-1	-1	-1	-1	0.001	0.000	0.000	5.910	94.089
105.0	2.957%10	0.1734	-1	-1	-1	-1	0.002	0.000	0.000	7.935	92.062
110.0	2.880%10	0.1689	-1	-1	-1	-1	0.004	0.000	0.000	10.632	89.364
115.0	2.395%10	0.1404	-1	-1	-1	-1	0.008	0.000	0.000	14.159	85.833
120.0	1.926%10	0.1129	293.2	293.2	293.2	1.0000	0.016	0.000	0.000	18.572	81.412
125.0	1.712%10	0.1003	335.3	355.9	335.3	1.0613	0.031	0.000	0.000	23.544	76.425
130.0	1.777%10	0.1042	376.1	417.2	376.1	1.1093	0.059	0.000	0.000	28.077	71.864
135.0	2.030%10	0.1190	414.1	475.7	414.1	1.1489	0.111	0.000	0.000	31.036	68.853
140.0	2.356%10	0.1381	447.4	529.6	447.4	1.1838	0.210	0.000	0.000	32.271	67.520
150.0	3.081%10	0.1806	499.1	622.4	499.1	1.2471	0.704	0.000	0.000	32.099	67.197
160.0	3.314%10	0.1943	535.0	699.4	535.0	1.3074	2.040	0.000	0.000	31.000	66.960
170.0	3.582%10	0.2100	560.4	765.9	560.4	1.3668	4.568	0.000	0.000	29.795	65.637
180.0	3.894%10	0.2283	579.2	825.8	582.3	1.4181	7.728	0.000	0.000	28.508	63.764
190.0	4.272%10	0.2504	593.6	881.3	604.3	1.4585	10.889	0.000	0.000	26.569	62.541
200.0	4.756%10	0.2788	605.0	933.8	626.2	1.4912	14.130	0.000	0.000	22.138	63.732
210.0	5.475%10	0.3209	614.1	984.1	648.2	1.5183	17.781	0.000	0.000	15.634	66.585
220.0	7.235%10	0.4241	621.6	1032.7	670.1	1.5411	22.141	0.000	0.000	10.306	67.552
230.0	9.496%10	0.5567	627.8	1080.0	692.1	1.5605	27.474	0.000	0.000	6.709	65.816
240.0	1.171%11	0.6863	632.9	1126.2	714.0	1.5772	34.052	0.000	0.000	4.360	61.588
260.0	1.520%11	0.8910	640.6	1216.1	757.9	1.6046	52.250	0.000	0.000	1.840	45.910
280.0	1.685%11	0.9875	646.0	1303.7	801.8	1.6260	79.114	0.000	0.000	0.777	20.109
300.0	1.701%11	0.9972	649.7	1389.6	845.7	1.6432	98.000	0.000	0.000	0.328	1.672
320.0	1.646%11	0.9648	652.4	1474.5	889.5	1.6576	99.313	0.000	0.000	0.138	0.548
340.0	1.539%11	0.9020	654.2	1558.6	933.3	1.6699	99.338	0.000	0.000	0.058	0.603
360.0	1.396%11	0.8186	655.6	1620.8	977.0	1.6590	99.337	0.329	0.037	0.025	0.273
380.0	1.237%11	0.7249	656.6	1661.6	1020.2	1.6287	99.334	0.486	0.054	0.010	0.115
400.0	1.074%11	0.6297	657.4	1702.4	1062.4	1.6025	99.330	0.555	0.062	0.004	0.049
420.0	9.206%10	0.5397	657.9	1722.3	1102.5	1.5622	99.322	0.590	0.066	0.002	0.021
440.0	7.824%10	0.4586	658.3	1742.2	1139.4	1.5290	99.197	0.714	0.079	0.001	0.009
460.0	6.625%10	0.3884	658.7	1762.2	1173.2	1.5020	98.133	1.677	0.186	0.000	0.004
480.0	5.614%10	0.3291	658.9	1782.1	1204.9	1.4791	96.602	3.056	0.340	0.000	0.002
500.0	4.775%10	0.2799	659.1	1802.1	1235.6	1.4585	95.069	4.437	0.493	0.000	0.001
520.0	4.089%10	0.2397	659.3	1822.1	1265.9	1.4394	93.547	5.807	0.645	0.000	0.000
540.0	3.531%10	0.2070	659.4	1842.1	1296.0	1.4214	92.031	7.172	0.797	0.000	0.000
560.0	3.080%10	0.1805	659.5	1862.1	1326.0	1.4043	90.514	8.538	0.949	0.000	0.000
580.0	2.715%10	0.1591	659.6	1882.1	1356.0	1.3880	88.985	9.914	1.102	0.000	0.000
600.0	2.419%10	0.1418	659.7	1902.1	1386.0	1.3724	87.431	11.312	1.257	0.000	0.000
620.0	2.178%10	0.1277	659.8	1922.1	1416.0	1.3574	85.837	12.747	1.416	0.000	0.000
640.0	1.983%10	0.1162	659.8	1942.1	1446.0	1.3431	84.185	14.233	1.581	0.000	0.000
660.0	1.822%10	0.1068	659.9	1962.1	1476.0	1.3293	82.458	15.788	1.754	0.000	0.000
680.0	1.691%10	0.0991	659.9	1982.1	1506.0	1.3161	80.644	17.421	1.936	0.000	0.000
700.0	1.582%10	0.0927	659.9	2002.1	1536.0	1.3034	78.737	19.137	2.126	0.000	0.000
720.0	1.492%10	0.0874	660.0	2022.1	1566.0	1.2912	76.744	20.931	2.326	0.000	0.000
740.0	1.417%10	0.0831	660.0	2042.1	1596.0	1.2795	74.680	22.788	2.532	0.000	0.000
760.0	1.354%10	0.0794	660.0	2062.1	1626.0	1.2682	72.569	24.688	2.743	0.000	0.000
780.0	1.302%10	0.0763	660.0	2082.1	1656.0	1.2573	70.436	26.608	2.956	0.000	0.000
800.0	1.257%10	0.0737	660.0	2102.1	1686.0	1.2468	68.303	28.527	3.170	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 44.1 LONGI= 2.0 R= 10 MONTH= 6 HOUR= 0.0

CALCULATED VALUES: MLAT= 46.6 MLONG= 83.1
DIP= 59.6 MODIP= 50.8 MAGLA= 40.5 XHI= 112.8
SUNRISE: 4.4 L.T. SUNSET:19.6 L.T. SUN DEC.= 23.1
NMF2=2.40%11 NMF1= 0.00%-01 NME=1.78%09 NMD=4.00%08
HMF2=315.2 HMF1= 0.0 HME=105.1 HMD= 87.9

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	9.273%05	3.9%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.589%08	0.0011	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.783%08	0.0020	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.746%09	0.0073	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.775%09	0.0074	-1	-1	-1	-1	0.001	0.000	0.000	5.910	94.089
105.0	1.775%09	0.0074	-1	-1	-1	-1	0.002	0.000	0.000	7.936	92.062
110.0	1.460%09	0.0061	-1	-1	-1	-1	0.004	0.000	0.000	10.632	89.363
115.0	9.585%08	0.0040	-1	-1	-1	-1	0.008	0.000	0.000	14.159	85.832
120.0	6.151%08	0.0026	292.3	292.3	292.3	1.0000	0.016	0.000	0.000	18.573	81.411
125.0	4.366%08	0.0018	334.0	344.6	334.0	1.0317	0.031	0.000	0.000	23.546	76.424
130.0	3.638%08	0.0015	374.4	395.6	374.4	1.0566	0.059	0.000	0.000	28.079	71.862
135.0	3.595%08	0.0015	412.0	443.8	412.0	1.0772	0.111	0.000	0.000	31.037	68.851
140.0	4.107%08	0.0017	444.9	487.3	444.9	1.0953	0.210	0.000	0.000	32.272	67.518
150.0	6.802%08	0.0028	495.9	559.5	495.9	1.1282	0.705	0.000	0.000	32.100	67.195
160.0	1.132%09	0.0047	531.2	615.9	531.2	1.1596	2.042	0.000	0.000	31.000	66.958
170.0	1.975%09	0.0082	556.1	662.0	556.1	1.1905	4.570	0.000	0.000	29.785	65.644
180.0	3.820%09	0.0159	574.5	701.6	575.3	1.2195	7.732	0.000	0.000	28.432	63.835
190.0	7.202%09	0.0301	588.6	736.9	594.1	1.2404	10.895	0.000	0.000	26.086	63.018
200.0	1.322%10	0.0552	599.7	769.3	612.9	1.2551	14.137	0.000	0.000	20.207	65.656
210.0	2.360%10	0.0985	608.7	799.4	631.7	1.2656	17.790	0.000	0.000	12.192	70.018
220.0	4.035%10	0.1684	616.0	827.9	650.5	1.2729	22.152	0.000	0.000	6.630	71.218
230.0	6.332%10	0.2643	622.1	855.2	669.2	1.2778	27.487	0.000	0.000	3.537	68.976
240.0	9.160%10	0.3824	627.0	881.3	688.0	1.2810	34.066	0.000	0.000	1.882	64.051
260.0	1.549%11	0.6465	634.6	931.3	725.5	1.2836	52.267	0.000	0.000	0.533	47.201
280.0	2.075%11	0.8664	639.9	978.9	763.1	1.2828	79.130	0.000	0.000	0.151	20.720
300.0	2.347%11	0.9800	643.5	1024.9	800.6	1.2802	98.000	0.000	0.000	0.043	1.957
320.0	2.392%11	0.9988	646.1	1069.9	838.1	1.2766	99.285	0.000	0.000	0.012	0.703
340.0	2.322%11	0.9695	647.9	1114.1	875.4	1.2728	99.266	0.405	0.045	0.003	0.280
360.0	2.172%11	0.9068	649.3	1157.8	912.2	1.2693	99.201	0.647	0.072	0.001	0.079
380.0	1.967%11	0.8213	650.2	1201.2	948.0	1.2671	99.095	0.794	0.088	0.000	0.022
400.0	1.735%11	0.7244	651.0	1244.3	981.0	1.2684	98.531	1.316	0.146	0.000	0.006
420.0	1.499%11	0.6260	651.5	1244.8	1008.5	1.2343	95.154	4.360	0.484	0.000	0.002
440.0	1.277%11	0.5332	651.9	1245.3	1027.7	1.2118	90.703	8.367	0.930	0.000	0.001
460.0	1.079%11	0.4503	652.3	1245.8	1038.4	1.1997	86.302	12.328	1.370	0.000	0.000
480.0	9.080%10	0.3791	652.5	1246.3	1043.7	1.1941	81.951	16.244	1.805	0.000	0.000
500.0	7.652%10	0.3195	652.7	1246.8	1046.3	1.1917	77.609	20.152	2.239	0.000	0.000
520.0	6.480%10	0.2705	652.9	1247.3	1047.7	1.1905	73.235	24.088	2.676	0.000	0.000
540.0	5.529%10	0.2308	653.0	1247.8	1048.7	1.1898	68.801	28.079	3.120	0.000	0.000
560.0	4.763%10	0.1988	653.1	1248.3	1049.6	1.1894	64.296	32.134	3.570	0.000	0.000
580.0	4.148%10	0.1731	653.2	1248.8	1050.3	1.1889	59.738	36.235	4.026	0.000	0.000
600.0	3.653%10	0.1525	653.3	1249.3	1051.1	1.1886	55.177	40.340	4.482	0.000	0.000
620.0	3.255%10	0.1359	653.3	1249.8	1051.9	1.1882	50.681	44.387	4.932	0.000	0.000
640.0	2.934%10	0.1225	653.4	1250.3	1052.6	1.1878	46.325	48.308	5.368	0.000	0.000
660.0	2.674%10	0.1116	653.4	1250.8	1053.4	1.1874	42.173	52.044	5.783	0.000	0.000
680.0	2.462%10	0.1028	653.5	1251.3	1054.1	1.1871	38.274	55.553	6.173	0.000	0.000
700.0	2.289%10	0.0955	653.5	1251.8	1054.9	1.1867	34.655	58.811	6.535	0.000	0.000
720.0	2.146%10	0.0896	653.5	1252.3	1055.6	1.1863	31.325	61.808	6.868	0.000	0.000
740.0	2.029%10	0.0847	653.5	1252.8	1056.3	1.1860	28.281	64.547	7.172	0.000	0.000
760.0	1.931%10	0.0806	653.6	1253.3	1057.1	1.1856	25.512	67.039	7.449	0.000	0.000
780.0	1.850%10	0.0772	653.6	1253.8	1057.8	1.1852	23.001	69.299	7.700	0.000	0.000
800.0	1.783%10	0.0744	653.6	1254.3	1058.6	1.1849	20.729	71.344	7.927	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 44.1 LONGI= 2.0 R= 10 MONTH=12 HOUR=12.0

CALCULATED VALUES: MLAT= 46.6 MLONG= 83.1
DIP= 59.6 MODIP= 50.8 MAGLA= 40.5 XHI= 67.0
SUNRISE: 7.6 L.T. SUNSET:16.4 L.T. SUN DEC.= -22.9
NMF2=4.17%11 NMF1= 0.00%-01 NME=8.75%10 NMD=4.00%08
HMF2=215.6 HMF1= 0.0 HME=109.9 HMD= 81.2

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	3.780%08	9.1%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	7.506%08	0.0018	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	7.835%09	0.0188	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	3.274%10	0.0785	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	6.640%10	0.1592	-1	-1	-1	-1	0.247	0.000	0.000	35.877	63.876
105.0	8.487%10	0.2035	-1	-1	-1	-1	0.371	0.000	0.000	37.874	61.755
110.0	8.754%10	0.2099	-1	-1	-1	-1	0.559	0.000	0.000	39.960	59.481
115.0	8.236%10	0.1975	-1	-1	-1	-1	0.842	0.000	0.000	42.100	57.058
120.0	7.824%10	0.1876	301.4	301.4	301.4	1.0000	1.267	0.000	0.000	44.189	54.544
125.0	8.429%10	0.2021	346.6	375.7	346.6	1.0840	1.904	0.000	0.000	45.965	52.131
130.0	9.243%10	0.2216	390.5	448.7	390.5	1.1491	2.859	0.000	0.000	46.938	50.203
135.0	9.791%10	0.2348	431.7	519.0	431.7	1.2023	4.283	0.000	0.000	46.609	49.108
140.0	1.040%11	0.2495	468.3	584.8	468.3	1.2487	6.389	0.000	0.000	45.000	48.611
150.0	1.191%11	0.2856	526.5	701.2	526.5	1.3318	13.875	0.000	0.000	39.937	46.188
160.0	1.416%11	0.3396	567.9	800.8	567.9	1.4101	27.958	0.000	0.000	33.943	38.099
170.0	2.023%11	0.4850	597.8	888.9	597.8	1.4871	48.250	0.000	0.000	25.234	26.516
180.0	2.835%11	0.6797	620.1	969.5	621.7	1.5593	67.331	0.000	0.000	14.234	18.435
190.0	3.516%11	0.8430	637.4	1045.0	645.5	1.6189	78.969	0.000	0.000	6.832	14.199
200.0	3.957%11	0.9488	651.1	1116.9	669.2	1.6689	84.579	0.000	0.000	3.167	12.254
210.0	4.148%11	0.9947	662.1	1186.2	693.0	1.7118	87.369	0.000	0.000	1.461	11.170
220.0	4.167%11	0.9991	671.2	1253.5	716.7	1.7490	89.107	0.000	0.000	0.673	10.220
230.0	4.130%11	0.9902	678.7	1319.2	740.5	1.7816	90.488	0.000	0.000	0.310	9.201
240.0	4.055%11	0.9724	684.9	1383.6	764.2	1.8105	91.761	0.000	0.000	0.143	8.096
260.0	3.811%11	0.9137	694.3	1509.5	811.7	1.8597	94.254	0.000	0.000	0.030	5.716
280.0	3.470%11	0.8321	700.8	1632.4	859.2	1.9000	96.709	0.000	0.000	0.006	3.284
300.0	3.076%11	0.7376	705.3	1753.5	906.7	1.9340	98.000	0.000	0.000	0.001	1.999
320.0	2.667%11	0.6395	708.5	1873.1	954.2	1.9631	98.080	0.000	0.000	0.000	1.920
340.0	2.273%11	0.5450	710.8	1991.9	1001.7	1.9884	98.081	0.900	0.100	0.000	0.919
360.0	1.913%11	0.4588	712.5	2070.4	1049.4	1.9729	98.079	1.553	0.173	0.000	0.195
380.0	1.599%11	0.3834	713.7	2109.6	1097.4	1.9223	98.076	1.694	0.188	0.000	0.041
400.0	1.332%11	0.3193	714.6	2149.2	1146.3	1.8749	98.072	1.727	0.192	0.000	0.009
420.0	1.109%11	0.2660	715.3	2187.9	1196.8	1.8282	98.064	1.740	0.193	0.000	0.002
440.0	9.276%10	0.2224	715.8	2226.8	1249.8	1.7818	97.941	1.853	0.206	0.000	0.000
460.0	7.803%10	0.1871	716.2	2265.7	1305.3	1.7358	96.890	2.799	0.311	0.000	0.000
480.0	6.617%10	0.1587	716.5	2304.7	1362.5	1.6916	95.379	4.159	0.462	0.000	0.000
500.0	5.664%10	0.1358	716.8	2343.7	1420.4	1.6500	93.865	5.521	0.613	0.000	0.000
520.0	4.898%10	0.1174	717.0	2382.7	1478.8	1.6113	92.362	6.874	0.764	0.000	0.000
540.0	4.281%10	0.1026	717.2	2421.7	1537.2	1.5754	90.866	8.221	0.913	0.000	0.000
560.0	3.782%10	0.0907	717.3	2460.7	1595.7	1.5421	89.367	9.569	1.063	0.000	0.000
580.0	3.378%10	0.0810	717.4	2499.7	1654.2	1.5111	87.858	10.928	1.214	0.000	0.000
600.0	3.048%10	0.0731	717.5	2538.7	1712.7	1.4823	86.324	12.309	1.368	0.000	0.000
620.0	2.778%10	0.0666	717.6	2577.8	1771.3	1.4553	84.750	13.725	1.525	0.000	0.000
640.0	2.555%10	0.0613	717.6	2616.8	1829.8	1.4301	83.119	15.193	1.688	0.000	0.000
660.0	2.370%10	0.0568	717.7	2655.8	1888.3	1.4064	81.414	16.727	1.859	0.000	0.000
680.0	2.217%10	0.0532	717.7	2694.8	1946.8	1.3842	79.623	18.340	2.038	0.000	0.000
700.0	2.089%10	0.0501	717.8	2733.8	2005.4	1.3632	77.740	20.034	2.226	0.000	0.000
720.0	1.981%10	0.0475	717.8	2772.8	2063.9	1.3435	75.772	21.805	2.423	0.000	0.000
740.0	1.890%10	0.0453	717.8	2811.9	2122.4	1.3248	73.734	23.639	2.627	0.000	0.000
760.0	1.813%10	0.0435	717.8	2850.9	2180.9	1.3072	71.650	25.515	2.835	0.000	0.000
780.0	1.748%10	0.0419	717.9	2889.9	2239.5	1.2904	69.544	27.411	3.046	0.000	0.000
800.0	1.692%10	0.0406	717.9	2928.9	2298.0	1.2745	67.438	29.305	3.256	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 44.1 LONGI= 2.0 R= 10 MONTH=12 HOUR= 7.6

CALCULATED VALUES: MLAT= 46.6 MLONG= 83.1
DIP= 59.6 MODIP= 50.8 MAGLA= 40.5 XHI= 90.0
SUNRISE: 7.6 L.T. SUNSET:16.4 L.T. SUN DEC.= -22.9
NMF2=2.03%11 NMF1= 0.00%-01 NME=3.31%10 NMD=4.00%08
HMF2=225.8 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.819%08	0.0014	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.101%08	0.0020	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.812%09	0.0089	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.175%10	0.0579	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.665%10	0.1313	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	3.281%10	0.1617	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	3.195%10	0.1574	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	2.626%10	0.1294	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	2.079%10	0.1024	290.2	290.2	290.2	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	1.828%10	0.0901	331.2	352.1	331.2	1.0631	0.084	0.000	0.000	36.294	63.621
130.0	1.904%10	0.0938	370.9	412.6	370.9	1.1127	0.161	0.000	0.000	40.716	59.123
135.0	2.198%10	0.1083	407.6	470.3	407.6	1.1537	0.307	0.000	0.000	43.939	55.754
140.0	2.576%10	0.1269	439.8	523.3	439.8	1.1900	0.584	0.000	0.000	45.000	54.416
150.0	3.702%10	0.1824	489.3	614.6	489.3	1.2562	2.074	0.000	0.000	41.880	56.046
160.0	5.479%10	0.2699	523.2	690.3	523.2	1.3194	6.909	0.000	0.000	36.631	56.461
170.0	8.419%10	0.4148	547.2	756.1	547.5	1.3809	19.661	0.000	0.000	30.703	49.636
180.0	1.194%11	0.5882	564.8	815.5	569.9	1.4308	41.885	0.000	0.000	21.641	36.474
190.0	1.525%11	0.7514	578.3	870.7	592.4	1.4699	63.787	0.000	0.000	10.559	25.653
200.0	1.785%11	0.8797	588.9	923.1	614.8	1.5015	76.967	0.000	0.000	4.137	18.896
210.0	1.949%11	0.9605	597.5	973.5	637.3	1.5276	83.288	0.000	0.000	1.545	15.167
220.0	2.021%11	0.9956	604.4	1022.3	659.7	1.5496	86.496	0.000	0.000	0.573	12.931
230.0	2.028%11	0.9992	610.2	1069.8	682.1	1.5683	88.560	0.000	0.000	0.212	11.228
240.0	2.011%11	0.9910	614.9	1116.3	704.6	1.5843	90.243	0.000	0.000	0.079	9.679
260.0	1.929%11	0.9505	622.1	1207.1	749.5	1.6106	93.359	0.000	0.000	0.011	6.630
280.0	1.793%11	0.8836	627.1	1295.6	794.3	1.6311	96.398	0.000	0.000	0.001	3.600
300.0	1.622%11	0.7994	630.6	1382.7	839.2	1.6476	98.000	0.000	0.000	0.000	2.000
320.0	1.435%11	0.7068	633.1	1468.7	884.1	1.6613	98.100	0.000	0.000	0.000	1.900
340.0	1.246%11	0.6137	634.8	1554.0	928.8	1.6731	98.101	1.044	0.116	0.000	0.739
360.0	1.067%11	0.5257	636.1	1617.6	973.4	1.6617	98.099	1.620	0.180	0.000	0.101
380.0	9.059%10	0.4464	637.0	1659.9	1017.6	1.6312	98.096	1.701	0.189	0.000	0.014
400.0	7.655%10	0.3772	637.7	1702.3	1060.7	1.6049	98.093	1.715	0.191	0.000	0.002
420.0	6.463%10	0.3184	638.2	1722.1	1101.5	1.5635	98.084	1.724	0.192	0.000	0.000
440.0	5.468%10	0.2694	638.6	1742.0	1138.9	1.5296	97.961	1.835	0.204	0.000	0.000
460.0	4.648%10	0.2290	639.0	1762.0	1173.0	1.5022	96.910	2.781	0.309	0.000	0.000
480.0	3.979%10	0.1960	639.2	1782.0	1204.8	1.4791	95.399	4.141	0.460	0.000	0.000
500.0	3.434%10	0.1692	639.4	1801.9	1235.5	1.4585	93.884	5.504	0.612	0.000	0.000
520.0	2.991%10	0.1474	639.5	1821.9	1265.8	1.4394	92.381	6.857	0.762	0.000	0.000
540.0	2.631%10	0.1297	639.7	1841.9	1295.9	1.4214	90.884	8.204	0.912	0.000	0.000
560.0	2.338%10	0.1152	639.8	1861.9	1325.9	1.4043	89.386	9.553	1.061	0.000	0.000
580.0	2.099%10	0.1034	639.9	1881.9	1355.9	1.3879	87.876	10.912	1.212	0.000	0.000
600.0	1.903%10	0.0938	639.9	1901.9	1385.9	1.3723	86.341	12.293	1.366	0.000	0.000
620.0	1.741%10	0.0858	640.0	1921.9	1415.9	1.3574	84.767	13.709	1.523	0.000	0.000
640.0	1.607%10	0.0792	640.0	1941.9	1445.9	1.3430	83.136	15.178	1.686	0.000	0.000
660.0	1.496%10	0.0737	640.1	1961.9	1475.9	1.3293	81.431	16.712	1.857	0.000	0.000
680.0	1.403%10	0.0691	640.1	1981.9	1505.9	1.3161	79.639	18.325	2.036	0.000	0.000
700.0	1.325%10	0.0653	640.1	2001.9	1535.9	1.3034	77.756	20.020	2.224	0.000	0.000
720.0	1.260%10	0.0621	640.2	2021.9	1565.8	1.2912	75.787	21.791	2.421	0.000	0.000
740.0	1.204%10	0.0593	640.2	2041.8	1595.8	1.2795	73.749	23.626	2.625	0.000	0.000
760.0	1.158%10	0.0570	640.2	2061.8	1625.8	1.2682	71.665	25.502	2.834	0.000	0.000
780.0	1.118%10	0.0551	640.2	2081.8	1655.8	1.2573	69.558	27.398	3.044	0.000	0.000
800.0	1.084%10	0.0534	640.2	2101.8	1685.8	1.2468	67.452	29.293	3.255	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 44.1 LONGI= 2.0 R= 10 MONTH=12 HOUR= 0.0

CALCULATED VALUES: MLAT= 46.6 MLONG= 83.1
DIP= 59.6 MODIP= 50.8 MAGLA= 40.5 XHI= 158.8
SUNRISE: 7.6 L.T. SUNSET:16.4 L.T. SUN DEC.= -22.9
NMF2=1.07%11 NMF1= 0.00%-01 NME=1.78%09 NMD=4.00%08
HMF2=330.9 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	4.960%05	4.7%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.455%08	0.0023	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.721%08	0.0044	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.742%09	0.0163	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.775%09	0.0166	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	1.775%09	0.0166	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	1.449%09	0.0136	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	9.433%08	0.0088	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	5.994%08	0.0056	285.3	285.3	285.3	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	4.214%08	0.0040	324.3	335.5	324.3	1.0345	0.084	0.000	0.000	36.294	63.621
130.0	3.483%08	0.0033	362.1	384.5	362.1	1.0618	0.161	0.000	0.000	40.716	59.123
135.0	3.423%08	0.0032	397.0	430.5	397.0	1.0846	0.307	0.000	0.000	43.939	55.754
140.0	3.901%08	0.0037	427.1	471.9	427.1	1.1048	0.584	0.000	0.000	45.000	54.416
150.0	6.507%08	0.0061	473.0	540.1	473.0	1.1420	2.075	0.000	0.000	41.880	56.044
160.0	1.099%09	0.0103	504.0	593.5	504.0	1.1776	6.912	0.000	0.000	36.631	56.457
170.0	1.758%09	0.0165	525.6	637.5	525.8	1.2124	19.672	0.000	0.000	30.703	49.625
180.0	2.218%09	0.0208	541.4	675.7	545.7	1.2382	41.907	0.000	0.000	21.641	36.451
190.0	2.797%09	0.0262	553.5	710.2	565.6	1.2556	63.821	0.000	0.000	10.559	25.620
200.0	3.561%09	0.0334	563.0	742.0	585.5	1.2674	77.006	0.000	0.000	4.137	18.857
210.0	4.591%09	0.0431	570.6	772.0	605.4	1.2753	83.329	0.000	0.000	1.545	15.125
220.0	6.028%09	0.0565	576.8	800.6	625.2	1.2805	86.537	0.000	0.000	0.573	12.890
230.0	8.143%09	0.0764	581.9	828.1	645.1	1.2837	88.599	0.000	0.000	0.212	11.188
240.0	1.162%10	0.1090	586.2	854.7	665.0	1.2853	90.280	0.000	0.000	0.079	9.641
260.0	3.187%10	0.2989	592.6	905.9	704.8	1.2854	93.390	0.000	0.000	0.011	6.599
280.0	6.376%10	0.5979	597.0	955.1	744.5	1.2828	96.417	0.000	0.000	0.001	3.582
300.0	9.190%10	0.8618	600.1	1002.9	784.3	1.2788	98.000	0.000	0.000	0.000	2.000
320.0	1.052%11	0.9869	602.3	1049.9	823.9	1.2742	98.071	0.628	0.070	0.000	1.231
340.0	1.062%11	0.9959	603.8	1096.2	863.4	1.2696	98.030	1.621	0.180	0.000	0.169
360.0	1.024%11	0.9607	604.9	1142.1	902.4	1.2655	97.965	1.810	0.201	0.000	0.023
380.0	9.552%10	0.8958	605.8	1187.7	940.3	1.2631	97.860	1.923	0.214	0.000	0.003
400.0	8.652%10	0.8114	606.4	1233.0	975.2	1.2644	97.304	2.426	0.270	0.000	0.000
420.0	7.656%10	0.7179	606.8	1233.0	1004.1	1.2280	93.968	5.429	0.603	0.000	0.000
440.0	6.656%10	0.6242	607.2	1233.1	1024.0	1.2042	89.573	9.384	1.043	0.000	0.000
460.0	5.720%10	0.5364	607.5	1233.1	1034.8	1.1916	85.227	13.296	1.477	0.000	0.000
480.0	4.885%10	0.4581	607.7	1233.1	1039.7	1.1860	80.930	17.163	1.907	0.000	0.000
500.0	4.165%10	0.3906	607.9	1233.1	1041.7	1.1837	76.642	21.022	2.336	0.000	0.000
520.0	3.561%10	0.3339	608.0	1233.1	1042.5	1.1829	72.323	24.909	2.768	0.000	0.000
540.0	3.061%10	0.2871	608.1	1233.2	1042.8	1.1825	67.944	28.851	3.206	0.000	0.000
560.0	2.653%10	0.2488	608.2	1233.2	1042.9	1.1824	63.494	32.855	3.651	0.000	0.000
580.0	2.322%10	0.2177	608.3	1233.2	1043.0	1.1824	58.994	36.905	4.101	0.000	0.000
600.0	2.053%10	0.1925	608.3	1233.2	1043.1	1.1823	54.490	40.959	4.551	0.000	0.000
620.0	1.835%10	0.1721	608.4	1233.2	1043.1	1.1823	50.050	44.955	4.995	0.000	0.000
640.0	1.659%10	0.1555	608.4	1233.3	1043.1	1.1823	45.748	48.827	5.425	0.000	0.000
660.0	1.515%10	0.1421	608.5	1233.3	1043.1	1.1823	41.648	52.517	5.835	0.000	0.000
680.0	1.398%10	0.1311	608.5	1233.3	1043.2	1.1823	37.797	55.982	6.220	0.000	0.000
700.0	1.302%10	0.1220	608.5	1233.3	1043.2	1.1822	34.223	59.199	6.578	0.000	0.000
720.0	1.222%10	0.1146	608.5	1233.3	1043.2	1.1822	30.934	62.159	6.907	0.000	0.000
740.0	1.157%10	0.1085	608.6	1233.4	1043.3	1.1822	27.929	64.864	7.207	0.000	0.000
760.0	1.103%10	0.1034	608.6	1233.4	1043.3	1.1822	25.194	67.325	7.481	0.000	0.000
780.0	1.058%10	0.0992	608.6	1233.4	1043.3	1.1822	22.714	69.557	7.729	0.000	0.000
800.0	1.020%10	0.0957	608.6	1233.4	1043.4	1.1822	20.471	71.576	7.953	0.000	0.000

WE PUT B1= 4.0TO GET HST

INPUT: LATI= 44.1 LONGI= 2.0 R=100 MONTH= 3 HOUR=12.0

CALCULATED VALUES: MLAT= 46.6 MLONG= 83.1
DIP= 59.6 MODIP= 50.8 MAGLA= 40.5 XHI= 47.4
SUNRISE: 6.2 L.T. SUNSET:17.8 L.T. SUN DEC.= -3.3
NMF2=1.31%12 NMF1= 3.06% 11 NME=1.47%11 NMD=1.11%09
HMF2=285.6 HMF1=182.4 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	1.060%09	8.1%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.204%09	0.0017	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	2.128%10	0.0162	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	7.314%10	0.0557	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.246%11	0.0949	-1	-1	-1	-1	0.322	0.000	0.000	53.540	46.137
105.0	1.450%11	0.1105	-1	-1	-1	-1	0.488	0.000	0.000	52.481	47.031
110.0	1.471%11	0.1120	-1	-1	-1	-1	0.739	0.000	0.000	51.372	47.889
115.0	1.426%11	0.1086	-1	-1	-1	-1	1.118	0.000	0.000	50.117	48.766
120.0	1.399%11	0.1066	336.0	336.0	336.0	1.0000	1.690	0.000	0.000	48.519	49.792
125.0	1.449%11	0.1104	394.4	417.1	394.4	1.0576	2.552	0.000	0.000	46.331	51.118
130.0	1.479%11	0.1126	451.4	496.8	451.4	1.1007	3.844	0.000	0.000	43.493	52.663
135.0	1.495%11	0.1139	506.4	574.6	506.4	1.1346	5.771	0.000	0.000	40.271	53.958
140.0	1.520%11	0.1158	557.9	648.8	557.9	1.1629	8.609	0.000	0.000	37.000	54.391
150.0	1.609%11	0.1225	647.4	783.7	647.4	1.2106	18.448	0.000	0.000	30.946	50.606
160.0	1.805%11	0.1375	718.8	900.5	718.8	1.2529	35.534	0.000	0.000	25.608	38.858
170.0	2.336%11	0.1779	775.1	1002.3	775.1	1.2931	56.597	0.000	0.000	20.356	23.048
180.0	3.117%11	0.2375	819.9	1092.5	819.9	1.3325	72.988	0.000	0.000	15.002	12.009
190.0	4.311%11	0.3284	856.1	1174.2	856.1	1.3715	81.759	0.000	0.000	10.625	7.616
200.0	6.002%11	0.4573	885.7	1249.3	885.7	1.4104	85.877	0.000	0.000	7.464	6.659
210.0	7.694%11	0.5861	910.2	1319.2	910.2	1.4493	88.060	0.000	0.000	5.237	6.703
220.0	9.230%11	0.7031	930.6	1385.0	930.6	1.4883	89.554	0.000	0.000	3.674	6.772
230.0	1.051%12	0.8006	947.5	1447.3	947.5	1.5275	90.823	0.000	0.000	2.577	6.600
240.0	1.150%12	0.8760	961.6	1506.9	961.7	1.5669	92.025	0.000	0.000	1.808	6.167
260.0	1.269%12	0.9665	983.3	1619.4	988.8	1.6378	94.409	0.000	0.000	0.890	4.701
280.0	1.311%12	0.9985	998.3	1725.4	1015.8	1.6985	96.763	0.000	0.000	0.438	2.799
300.0	1.302%12	0.9916	1008.9	1826.8	1042.9	1.7517	98.000	0.000	0.000	0.216	1.784
320.0	1.253%12	0.9545	1016.4	1925.2	1070.0	1.7992	98.077	0.000	0.000	0.106	1.817
340.0	1.172%12	0.8929	1021.7	2021.4	1097.3	1.8422	98.077	0.495	0.055	0.052	1.321
360.0	1.069%12	0.8145	1025.5	2088.1	1124.9	1.8563	98.075	1.124	0.125	0.026	0.650
380.0	9.547%11	0.7273	1028.4	2127.1	1153.5	1.8440	98.073	1.435	0.159	0.013	0.320
400.0	8.381%11	0.6384	1030.5	2166.5	1184.6	1.8289	98.069	1.591	0.177	0.006	0.157
420.0	7.262%11	0.5532	1032.1	2206.0	1220.5	1.8075	98.061	1.673	0.186	0.003	0.077
440.0	6.239%11	0.4753	1033.3	2245.6	1263.8	1.7768	97.938	1.820	0.202	0.002	0.038
460.0	5.334%11	0.4063	1034.2	2285.2	1314.6	1.7384	96.887	2.784	0.309	0.001	0.019
480.0	4.554%11	0.3469	1035.0	2325.0	1370.2	1.6968	95.376	4.153	0.461	0.000	0.009
500.0	3.893%11	0.2966	1035.6	2364.7	1428.2	1.6557	93.862	5.520	0.613	0.000	0.005
520.0	3.342%11	0.2546	1036.0	2404.4	1487.3	1.6167	92.359	6.875	0.764	0.000	0.002
540.0	2.885%11	0.2198	1036.4	2444.2	1546.7	1.5803	90.862	8.223	0.914	0.000	0.001
560.0	2.509%11	0.1911	1036.7	2483.9	1606.2	1.5464	89.364	9.572	1.064	0.000	0.001
580.0	2.199%11	0.1675	1037.0	2523.7	1665.8	1.5150	87.855	10.931	1.215	0.000	0.000
600.0	1.945%11	0.1482	1037.2	2563.4	1725.4	1.4857	86.321	12.311	1.368	0.000	0.000
620.0	1.736%11	0.1322	1037.3	2603.2	1785.1	1.4583	84.747	13.728	1.525	0.000	0.000
640.0	1.563%11	0.1191	1037.5	2642.9	1844.7	1.4327	83.116	15.196	1.688	0.000	0.000
660.0	1.421%11	0.1082	1037.6	2682.7	1904.3	1.4087	81.411	16.730	1.859	0.000	0.000
680.0	1.302%11	0.0992	1037.7	2722.4	1964.0	1.3862	79.620	18.342	2.038	0.000	0.000
700.0	1.203%11	0.0917	1037.8	2762.2	2023.6	1.3650	77.737	20.037	2.226	0.000	0.000
720.0	1.120%11	0.0853	1037.9	2801.9	2083.2	1.3450	75.769	21.808	2.423	0.000	0.000
740.0	1.051%11	0.0800	1038.0	2841.7	2142.9	1.3261	73.732	23.642	2.627	0.000	0.000
760.0	9.921%10	0.0756	1038.0	2881.5	2202.5	1.3083	71.647	25.517	2.835	0.000	0.000
780.0	9.424%10	0.0718	1038.1	2921.2	2262.1	1.2914	69.541	27.413	3.046	0.000	0.000
800.0	9.001%10	0.0686	1038.1	2961.0	2321.7	1.2753	67.436	29.308	3.256	0.000	0.000

WE PUT 81= 3.0TO GET HST

INPUT: LATI= 44.1 LONGI= 2.0 R=100 MONTH= 3 HOUR= 6.2

CALCULATED VALUES: MLAT= 46.6 MLONG= 83.1
DIP= 59.6 MODIP= 50.8 MAGLA= 40.5 XHI= 90.0
SUNRISE: 6.2 L.T. SUNSET:17.8 L.T. SUN DEC.= -3.3
NMF2=3.45%11 NMF1= 0.00%-01 NME=3.99%10 NMD=4.00%08
HMF2=292.6 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RO0+	ROH+	ROHE+	RO02+	RONO+
80.0	2.819%08	8.2%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.101%08	0.0012	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.817%09	0.0053	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.250%10	0.0362	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.070%10	0.0889	-1	-1	-1	-1	0.012	0.000	0.000	18.280	81.709
105.0	3.950%10	0.1144	-1	-1	-1	-1	0.019	0.000	0.000	21.000	78.981
110.0	3.865%10	0.1120	-1	-1	-1	-1	0.030	0.000	0.000	24.062	75.907
115.0	3.211%10	0.0930	-1	-1	-1	-1	0.049	0.000	0.000	27.391	72.560
120.0	2.583%10	0.0748	322.0	322.0	322.0	1.0000	0.079	0.000	0.000	30.722	69.199
125.0	2.297%10	0.0665	375.0	391.1	375.0	1.0428	0.127	0.000	0.000	33.556	66.317
130.0	2.383%10	0.0690	426.7	458.8	426.7	1.0752	0.205	0.000	0.000	35.464	64.331
135.0	2.715%10	0.0786	476.1	524.2	476.1	1.1010	0.330	0.000	0.000	36.497	63.174
140.0	3.141%10	0.0910	521.4	585.6	521.4	1.1230	0.530	0.000	0.000	37.000	62.470
150.0	4.273%10	0.1238	597.6	693.8	597.6	1.1610	1.364	0.000	0.000	37.333	61.303
160.0	4.975%10	0.1441	655.4	783.7	655.4	1.1957	3.437	0.000	0.000	36.738	59.825
170.0	5.852%10	0.1695	699.4	859.7	699.4	1.2293	8.184	0.000	0.000	32.734	59.082
180.0	6.999%10	0.2027	733.4	925.8	733.4	1.2624	17.092	0.000	0.000	24.187	58.721
190.0	8.629%10	0.2500	760.3	984.8	760.3	1.2953	28.794	0.000	0.000	16.193	55.013
200.0	1.149%11	0.3327	782.0	1038.5	782.0	1.3281	39.129	0.000	0.000	10.626	50.246
210.0	1.523%11	0.4411	799.7	1088.3	799.7	1.3609	46.642	0.000	0.000	6.952	46.406
220.0	1.917%11	0.5554	814.3	1135.0	814.9	1.3928	52.531	0.000	0.000	4.547	42.922
230.0	2.305%11	0.6677	826.5	1179.2	830.0	1.4208	57.951	0.000	0.000	2.973	39.076
240.0	2.658%11	0.7699	836.5	1221.4	845.0	1.4454	63.480	0.000	0.000	1.945	34.575
260.0	3.181%11	0.9214	851.9	1300.9	875.2	1.4865	75.747	0.000	0.000	0.832	23.422
280.0	3.420%11	0.9907	862.6	1375.7	905.3	1.5197	89.778	0.000	0.000	0.356	9.867
300.0	3.446%11	0.9982	870.0	1447.3	935.4	1.5473	98.000	0.000	0.000	0.152	1.848
320.0	3.372%11	0.9769	875.3	1516.7	965.5	1.5710	98.535	0.000	0.000	0.065	1.400
340.0	3.225%11	0.9341	879.1	1584.7	995.6	1.5917	98.545	0.000	0.000	0.028	1.428
360.0	3.020%11	0.8748	881.8	1635.0	1025.7	1.5941	98.543	0.739	0.082	0.012	0.624
380.0	2.778%11	0.8046	883.8	1668.7	1055.8	1.5806	98.540	1.069	0.119	0.005	0.267
400.0	2.517%11	0.7292	885.3	1702.4	1085.9	1.5678	98.537	1.212	0.135	0.002	0.114
420.0	2.255%11	0.6534	886.4	1722.3	1116.0	1.5433	98.528	1.280	0.142	0.001	0.049
440.0	2.005%11	0.5807	887.3	1742.2	1146.0	1.5202	98.405	1.417	0.157	0.000	0.021
460.0	1.773%11	0.5135	888.0	1762.1	1176.1	1.4984	97.349	2.378	0.264	0.000	0.009
480.0	1.565%11	0.4532	888.5	1782.1	1206.1	1.4776	95.830	3.749	0.417	0.000	0.004
500.0	1.381%11	0.4002	888.9	1802.1	1236.1	1.4579	94.309	5.120	0.569	0.000	0.002
520.0	1.223%11	0.3542	889.2	1822.1	1266.1	1.4392	92.799	6.480	0.720	0.000	0.001
540.0	1.087%11	0.3148	889.5	1842.1	1296.1	1.4213	91.296	7.834	0.870	0.000	0.000
560.0	9.709%10	0.2813	889.7	1862.1	1326.1	1.4042	89.790	9.189	1.021	0.000	0.000
580.0	8.730%10	0.2529	889.9	1882.1	1356.1	1.3879	88.273	10.554	1.173	0.000	0.000
600.0	7.904%10	0.2290	890.0	1902.1	1386.1	1.3723	86.732	11.941	1.327	0.000	0.000
620.0	7.207%10	0.2088	890.2	1922.1	1416.1	1.3573	85.151	13.364	1.485	0.000	0.000
640.0	6.619%10	0.1917	890.3	1942.1	1446.1	1.3430	83.512	14.839	1.649	0.000	0.000
660.0	6.123%10	0.1774	890.3	1962.1	1476.1	1.3293	81.799	16.381	1.820	0.000	0.000
680.0	5.703%10	0.1652	890.4	1982.1	1506.1	1.3161	79.999	18.001	2.000	0.000	0.000
700.0	5.347%10	0.1549	890.5	2002.1	1536.1	1.3034	78.108	19.703	2.189	0.000	0.000
720.0	5.045%10	0.1462	890.5	2022.1	1566.1	1.2912	76.130	21.483	2.387	0.000	0.000
740.0	4.788%10	0.1387	890.6	2042.1	1596.1	1.2794	74.083	23.325	2.592	0.000	0.000
760.0	4.569%10	0.1324	890.6	2062.1	1626.1	1.2681	71.989	25.210	2.801	0.000	0.000
780.0	4.381%10	0.1269	890.7	2082.1	1656.1	1.2572	69.873	27.114	3.013	0.000	0.000
800.0	4.220%10	0.1223	890.7	2102.1	1686.1	1.2467	67.758	29.018	3.224	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 44.1 LONGI= 2.0 R=100 MONTH= 3 HOUR= 0.0

CALCULATED VALUES: MLAT= 46.6 MLONG= 83.1
DIP= 59.6 MODIP= 50.8 MAGLA= 40.5 XHI= 139.2
SUNRISE: 6.2 L.T. SUNSET:17.8 L.T. SUN DEC.= -3.3
NMF2=3.28%11 NMF1= 0.00%-01 NME=3.20%09 NMD=4.00%08
HMF2=378.1 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.385%05	1.6%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.473%08	7.5%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.729%08	0.0014	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	2.508%09	0.0077	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.193%09	0.0097	-1	-1	-1	-1	0.012	0.000	0.000	18.280	81.709
105.0	3.201%09	0.0098	-1	-1	-1	-1	0.019	0.000	0.000	21.000	78.981
110.0	2.616%09	0.0080	-1	-1	-1	-1	0.030	0.000	0.000	24.062	75.907
115.0	1.704%09	0.0052	-1	-1	-1	-1	0.049	0.000	0.000	27.391	72.560
120.0	1.085%09	0.0033	319.4	319.4	319.4	1.0000	0.079	0.000	0.000	30.722	69.199
125.0	7.634%08	0.0023	371.5	378.2	371.5	1.0179	0.127	0.000	0.000	33.556	66.317
130.0	6.317%08	0.0019	422.3	435.6	422.3	1.0315	0.205	0.000	0.000	35.464	64.331
135.0	6.212%08	0.0019	470.6	490.6	470.6	1.0424	0.330	0.000	0.000	36.497	63.174
140.0	7.082%08	0.0022	514.9	541.5	514.9	1.0517	0.530	0.000	0.000	37.000	62.470
150.0	1.180%09	0.0036	588.7	628.6	588.7	1.0678	1.365	0.000	0.000	37.333	61.302
160.0	1.989%09	0.0061	644.4	697.6	644.4	1.0826	3.439	0.000	0.000	36.738	59.823
170.0	3.182%09	0.0097	686.3	752.8	686.3	1.0969	8.188	0.000	0.000	32.734	59.078
180.0	4.102%09	0.0125	718.6	798.5	718.6	1.1111	17.101	0.000	0.000	24.187	58.712
190.0	5.194%09	0.0158	744.1	837.2	744.1	1.1251	28.809	0.000	0.000	16.193	54.998
200.0	6.616%09	0.0202	764.7	871.1	764.7	1.1392	39.149	0.000	0.000	10.626	50.226
210.0	8.490%09	0.0259	781.4	901.1	781.4	1.1532	46.665	0.000	0.000	6.952	46.383
220.0	1.100%10	0.0336	795.2	928.2	795.2	1.1673	52.556	0.000	0.000	4.547	42.898
230.0	1.445%10	0.0441	806.6	952.9	807.1	1.1807	57.977	0.000	0.000	2.973	39.050
240.0	1.933%10	0.0590	816.1	975.7	818.9	1.1915	63.506	0.000	0.000	1.945	34.549
260.0	3.917%10	0.1195	830.6	1016.8	842.5	1.2069	75.771	0.000	0.000	0.832	23.397
280.0	8.896%10	0.2714	840.6	1053.4	866.1	1.2164	89.795	0.000	0.000	0.356	9.849
300.0	1.592%11	0.4857	847.6	1087.1	889.6	1.2219	98.000	0.000	0.000	0.152	1.848
320.0	2.331%11	0.7110	852.6	1118.6	913.1	1.2250	98.507	0.000	0.000	0.065	1.428
340.0	2.905%11	0.8861	856.1	1148.8	936.6	1.2266	98.473	0.761	0.085	0.028	0.653
360.0	3.209%11	0.9789	858.7	1177.9	959.7	1.2274	98.409	1.170	0.130	0.012	0.279
380.0	3.278%11	0.9999	860.6	1206.4	982.1	1.2284	98.303	1.415	0.157	0.005	0.119
400.0	3.223%11	0.9833	862.0	1234.4	1002.9	1.2309	97.744	1.983	0.220	0.002	0.051
420.0	3.087%11	0.9418	863.0	1234.5	1020.0	1.2103	94.393	5.026	0.558	0.001	0.022
440.0	2.889%11	0.8812	863.8	1234.6	1031.9	1.1964	89.978	9.011	1.001	0.000	0.009
460.0	2.650%11	0.8084	864.5	1234.7	1038.4	1.1890	85.613	12.945	1.438	0.000	0.004
480.0	2.394%11	0.7302	865.0	1234.8	1041.4	1.1857	81.296	16.832	1.870	0.000	0.002
500.0	2.138%11	0.6521	865.4	1234.8	1042.7	1.1843	76.989	20.710	2.301	0.000	0.001
520.0	1.896%11	0.5783	865.7	1234.9	1043.2	1.1837	72.650	24.615	2.735	0.000	0.000
540.0	1.676%11	0.5111	865.9	1235.0	1043.5	1.1835	68.251	28.574	3.175	0.000	0.000
560.0	1.481%11	0.4518	866.1	1235.1	1043.7	1.1834	63.782	32.596	3.622	0.000	0.000
580.0	1.313%11	0.4004	866.3	1235.2	1043.8	1.1833	59.261	36.665	4.074	0.000	0.000
600.0	1.169%11	0.3566	866.4	1235.2	1044.0	1.1832	54.736	40.737	4.526	0.000	0.000
620.0	1.048%11	0.3195	866.5	1235.3	1044.1	1.1831	50.276	44.751	4.972	0.000	0.000
640.0	9.457%10	0.2885	866.6	1235.4	1044.2	1.1831	45.955	48.641	5.405	0.000	0.000
660.0	8.606%10	0.2625	866.7	1235.5	1044.3	1.1830	41.836	52.347	5.816	0.000	0.000
680.0	7.895%10	0.2408	866.8	1235.6	1044.5	1.1830	37.968	55.828	6.203	0.000	0.000
700.0	7.301%10	0.2227	866.8	1235.6	1044.6	1.1829	34.378	59.060	6.562	0.000	0.000
720.0	6.805%10	0.2076	866.9	1235.7	1044.7	1.1828	31.074	62.033	6.893	0.000	0.000
740.0	6.391%10	0.1949	866.9	1235.8	1044.8	1.1828	28.055	64.750	7.194	0.000	0.000
760.0	6.043%10	0.1843	867.0	1235.9	1044.9	1.1827	25.308	67.223	7.469	0.000	0.000
780.0	5.751%10	0.1754	867.0	1235.9	1045.1	1.1827	22.817	69.464	7.718	0.000	0.000
800.0	5.505%10	0.1679	867.0	1236.0	1045.2	1.1826	20.564	71.493	7.944	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 44.1 LONGI= 2.0 R=100 MONTH= 6 HOUR=12.0

CALCULATED VALUES: MLAT= 46.6 MLONG= 83.1
DIP= 59.6 MODIP= 50.8 MAGLA= 40.5 XHI= 21.0
SUNRISE: 4.4 L.T. SUNSET:19.6 L.T. SUN DEC.= 23.1
NMF2=6.78%11 NMF1= 3.53% 11 NME=1.72%11 NMD=1.32%09
HMF2=273.9 HMF1=182.5 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	1.255%09	0.0019	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.646%09	0.0039	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	2.539%10	0.0374	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	8.631%10	0.1273	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.459%11	0.2152	-1	-1	-1	-1	0.336	0.000	0.000	58.280	41.384
105.0	1.693%11	0.2497	-1	-1	-1	-1	0.482	0.000	0.000	51.969	47.549
110.0	1.716%11	0.2532	-1	-1	-1	-1	0.691	0.000	0.000	46.478	52.831
115.0	1.672%11	0.2467	-1	-1	-1	-1	0.989	0.000	0.000	41.850	57.161
120.0	1.640%11	0.2419	339.1	339.1	339.1	1.0000	1.415	0.000	0.000	38.161	60.424
125.0	1.702%11	0.2510	398.7	420.7	398.7	1.0553	2.024	0.000	0.000	35.377	62.599
130.0	1.790%11	0.2640	456.9	501.0	456.9	1.0965	2.887	0.000	0.000	33.262	63.851
135.0	1.877%11	0.2768	513.1	579.3	513.1	1.1289	4.107	0.000	0.000	31.530	64.363
140.0	1.975%11	0.2913	566.0	654.2	566.0	1.1558	5.809	0.000	0.000	30.000	64.191
150.0	2.222%11	0.3277	658.6	790.9	658.6	1.2009	11.251	0.000	0.000	27.252	61.497
160.0	2.579%11	0.3805	733.1	909.5	733.1	1.2406	19.962	0.000	0.000	24.758	55.281
170.0	3.055%11	0.4505	792.5	1013.0	792.5	1.2782	30.669	0.000	0.000	22.334	46.996
180.0	3.499%11	0.5160	840.1	1104.7	840.1	1.3150	40.806	0.000	0.000	19.181	40.012
190.0	3.989%11	0.5884	878.7	1187.4	878.7	1.3513	49.733	0.000	0.000	12.935	37.332
200.0	4.614%11	0.6806	910.5	1263.3	910.5	1.3875	58.351	0.000	0.000	5.514	36.134
210.0	5.188%11	0.7652	936.8	1333.7	936.8	1.4237	67.504	0.000	0.000	1.846	30.650
220.0	5.685%11	0.8386	958.7	1399.7	958.7	1.4600	77.593	0.000	0.000	0.588	21.819
230.0	6.091%11	0.8984	976.9	1462.0	976.9	1.4965	88.070	0.000	0.000	0.186	11.744
240.0	6.398%11	0.9436	992.2	1521.4	992.2	1.5334	95.635	0.000	0.000	0.059	4.306
260.0	6.727%11	0.9923	1015.5	1632.9	1016.9	1.6059	98.527	0.000	0.000	0.006	1.467
280.0	6.771%11	0.9987	1031.8	1737.4	1040.7	1.6694	98.595	0.000	0.000	0.001	1.404
300.0	6.621%11	0.9766	1043.2	1837.0	1064.6	1.7256	98.596	0.731	0.081	0.000	0.592
320.0	6.308%11	0.9303	1051.3	1933.3	1088.5	1.7761	98.596	1.211	0.135	0.000	0.059
340.0	5.869%11	0.8657	1057.1	2027.3	1112.6	1.8221	98.594	1.260	0.140	0.000	0.006
360.0	5.351%11	0.7892	1061.2	2092.9	1137.1	1.8405	98.593	1.266	0.141	0.000	0.001
380.0	4.796%11	0.7074	1064.3	2131.9	1162.7	1.8335	98.590	1.269	0.141	0.000	0.000
400.0	4.242%11	0.6257	1066.6	2171.4	1191.0	1.8231	98.586	1.272	0.141	0.000	0.000
420.0	3.716%11	0.5482	1068.3	2211.0	1224.7	1.8054	98.578	1.280	0.142	0.000	0.000
440.0	3.236%11	0.4773	1069.6	2250.8	1266.6	1.7771	98.454	1.391	0.155	0.000	0.000
460.0	2.809%11	0.4143	1070.6	2290.7	1316.7	1.7398	97.398	2.342	0.260	0.000	0.000
480.0	2.438%11	0.3596	1071.4	2330.6	1372.2	1.6985	95.879	3.709	0.412	0.000	0.000
500.0	2.120%11	0.3127	1072.1	2370.6	1430.4	1.6573	94.357	5.079	0.564	0.000	0.000
520.0	1.852%11	0.2731	1072.6	2410.5	1489.6	1.6182	92.846	6.438	0.715	0.000	0.000
540.0	1.626%11	0.2399	1073.0	2450.5	1549.3	1.5816	91.342	7.793	0.866	0.000	0.000
560.0	1.438%11	0.2121	1073.3	2490.4	1609.2	1.5476	89.836	9.148	1.016	0.000	0.000
580.0	1.281%11	0.1889	1073.6	2530.4	1669.1	1.5160	88.318	10.514	1.168	0.000	0.000
600.0	1.150%11	0.1696	1073.8	2570.3	1729.0	1.4866	86.776	11.902	1.322	0.000	0.000
620.0	1.040%11	0.1535	1074.0	2610.3	1788.9	1.4591	85.194	13.326	1.481	0.000	0.000
640.0	9.490%10	0.1400	1074.2	2650.3	1848.9	1.4334	83.554	14.801	1.645	0.000	0.000
660.0	8.724%10	0.1287	1074.3	2690.2	1908.8	1.4094	81.841	16.344	1.816	0.000	0.000
680.0	8.081%10	0.1192	1074.4	2730.2	1968.8	1.3868	80.040	17.964	1.996	0.000	0.000
700.0	7.539%10	0.1112	1074.5	2770.1	2028.7	1.3655	78.147	19.668	2.185	0.000	0.000
720.0	7.080%10	0.1044	1074.6	2810.1	2088.6	1.3454	76.169	21.448	2.383	0.000	0.000
740.0	6.691%10	0.0987	1074.7	2850.1	2148.6	1.3265	74.121	23.292	2.588	0.000	0.000
760.0	6.360%10	0.0938	1074.7	2890.0	2208.5	1.3086	72.025	25.177	2.797	0.000	0.000
780.0	6.078%10	0.0896	1074.8	2930.0	2268.5	1.2916	69.908	27.083	3.009	0.000	0.000
800.0	5.836%10	0.0861	1074.8	2969.9	2328.4	1.2755	67.792	28.987	3.221	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 44.1 LONGI= 2.0 R=100 MONTH= 6 HOUR= 4.4

CALCULATED VALUES: MLAT= 46.6 MLONG= 83.1
DIP= 59.6 MODIP= 50.8 MAGLA= 40.5 XHI= 90.0
SUNRISE: 4.4 L.T. SUNSET:19.6 L.T. SUN DEC.= 23.1
NMF2=4.09%11 NMF1= 0.00%-01 NME=3.84%10 NMD=4.00%08
HMF2=322.9 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.819%08	6.9%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.101%08	0.0010	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.816%09	0.0044	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.235%10	0.0302	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.983%10	0.0730	-1	-1	-1	-1	0.016	0.000	0.000	6.623	93.361
105.0	3.802%10	0.0931	-1	-1	-1	-1	0.025	0.000	0.000	8.541	91.434
110.0	3.718%10	0.0910	-1	-1	-1	-1	0.040	0.000	0.000	10.994	88.966
115.0	3.091%10	0.0757	-1	-1	-1	-1	0.064	0.000	0.000	14.085	85.852
120.0	2.486%10	0.0609	325.0	325.0	325.0	1.0000	0.101	0.000	0.000	17.829	82.070
125.0	2.210%10	0.0541	379.3	394.8	379.3	1.0408	0.159	0.000	0.000	21.966	77.875
130.0	2.294%10	0.0562	432.2	463.1	432.2	1.0716	0.252	0.000	0.000	25.782	73.966
135.0	2.621%10	0.0642	482.8	529.2	482.8	1.0962	0.397	0.000	0.000	28.496	71.110
140.0	3.042%10	0.0745	529.5	591.4	529.5	1.1169	0.623	0.000	0.000	30.000	69.377
150.0	3.944%10	0.0965	608.4	701.3	608.4	1.1526	1.498	0.000	0.000	31.126	67.376
160.0	4.527%10	0.1108	669.1	793.0	669.1	1.1851	3.368	0.000	0.000	31.531	65.101
170.0	5.229%10	0.1280	715.6	870.4	715.6	1.2163	6.679	0.000	0.000	31.688	61.633
180.0	6.096%10	0.1492	751.7	937.5	751.7	1.2471	11.436	0.000	0.000	30.852	57.711
190.0	7.203%10	0.1763	780.5	997.2	780.5	1.2777	17.669	0.000	0.000	25.769	56.569
200.0	8.704%10	0.2131	803.7	1051.4	803.7	1.3081	26.008	0.000	0.000	16.079	57.913
210.0	1.107%11	0.2709	822.8	1101.4	822.8	1.3386	37.565	0.000	0.000	8.607	53.827
220.0	1.465%11	0.3585	838.5	1148.1	838.5	1.3692	53.681	0.000	0.000	4.466	41.853
230.0	1.859%11	0.4550	851.5	1192.1	852.4	1.3984	74.390	0.000	0.000	2.307	23.303
240.0	2.268%11	0.5553	862.4	1233.9	866.4	1.4242	92.014	0.000	0.000	1.191	6.796
260.0	3.046%11	0.7457	878.9	1312.3	894.2	1.4675	99.365	0.000	0.000	0.317	0.318
280.0	3.641%11	0.8913	890.4	1385.8	922.1	1.5028	99.541	0.000	0.000	0.084	0.374
300.0	3.978%11	0.9738	898.5	1455.7	950.0	1.5324	99.544	0.063	0.007	0.023	0.364
320.0	4.084%11	0.9997	904.2	1523.4	977.9	1.5579	99.543	0.318	0.035	0.006	0.097
340.0	4.045%11	0.9901	908.3	1589.3	1005.7	1.5803	99.542	0.387	0.043	0.002	0.026
360.0	3.903%11	0.9554	911.2	1638.0	1033.6	1.5847	99.541	0.407	0.045	0.000	0.007
380.0	3.678%11	0.9003	913.4	1670.2	1061.6	1.5733	99.538	0.414	0.046	0.000	0.002
400.0	3.395%11	0.8311	915.0	1702.4	1089.7	1.5622	99.534	0.419	0.047	0.000	0.000
420.0	3.081%11	0.7541	916.2	1722.3	1118.2	1.5402	99.526	0.427	0.047	0.000	0.000
440.0	2.758%11	0.6751	917.1	1742.2	1147.1	1.5188	99.401	0.539	0.060	0.000	0.000
460.0	2.446%11	0.5987	917.8	1762.2	1176.5	1.4977	98.334	1.499	0.167	0.000	0.000
480.0	2.156%11	0.5277	918.4	1782.1	1206.3	1.4774	96.800	2.880	0.320	0.000	0.000
500.0	1.895%11	0.4639	918.8	1802.1	1236.2	1.4578	95.264	4.262	0.474	0.000	0.000
520.0	1.666%11	0.4079	919.2	1822.1	1266.1	1.4391	93.739	5.635	0.626	0.000	0.000
540.0	1.469%11	0.3596	919.5	1842.1	1296.1	1.4213	92.220	7.002	0.778	0.000	0.000
560.0	1.301%11	0.3183	919.7	1862.1	1326.1	1.4042	90.699	8.371	0.930	0.000	0.000
580.0	1.158%11	0.2835	919.9	1882.1	1356.1	1.3879	89.167	9.750	1.083	0.000	0.000
600.0	1.039%11	0.2542	920.1	1902.1	1386.1	1.3723	87.610	11.151	1.239	0.000	0.000
620.0	9.382%10	0.2297	920.2	1922.1	1416.1	1.3573	86.013	12.588	1.399	0.000	0.000
640.0	8.542%10	0.2091	920.3	1942.1	1446.1	1.3430	84.358	14.078	1.564	0.000	0.000
660.0	7.838%10	0.1919	920.4	1962.1	1476.1	1.3292	82.627	15.635	1.737	0.000	0.000
680.0	7.247%10	0.1774	920.5	1982.1	1506.1	1.3160	80.809	17.272	1.919	0.000	0.000
700.0	6.750%10	0.1652	920.5	2002.1	1536.1	1.3034	78.898	18.992	2.110	0.000	0.000
720.0	6.332%10	0.1550	920.6	2022.1	1566.1	1.2912	76.901	20.789	2.310	0.000	0.000
740.0	5.978%10	0.1463	920.7	2042.1	1596.1	1.2794	74.833	22.650	2.517	0.000	0.000
760.0	5.679%10	0.1390	920.7	2062.1	1626.1	1.2681	72.718	24.554	2.728	0.000	0.000
780.0	5.425%10	0.1328	920.7	2082.1	1656.1	1.2572	70.580	26.478	2.942	0.000	0.000
800.0	5.209%10	0.1275	920.8	2102.1	1686.1	1.2467	68.443	28.401	3.156	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 44.1 LONGI= 2.0 R=100 MONTH= 6 HOUR= 0.0

CALCULATED VALUES: MLAT= 46.6 MLONG= 83.1
DIP= 59.6 MODIP= 50.8 MAGLA= 40.5 XHI= 112.8
SUNRISE: 4.4 L.T. SUNSET:19.6 L.T. SUN DEC.= 23.1
NMF2=5.25%11 NMF1= 0.00%-01 NME=3.20%09 NMD=4.00%08
HMF2=346.8 HMF1= 0.0 HME=105.1 HMD= 87.9

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	9.273%05	1.8%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.589%08	4.9%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.783%08	9.1%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	2.536%09	0.0048	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.194%09	0.0061	-1	-1	-1	-1	0.016	0.000	0.000	6.623	93.361
105.0	3.201%09	0.0061	-1	-1	-1	-1	0.025	0.000	0.000	8.541	91.434
110.0	2.632%09	0.0050	-1	-1	-1	-1	0.040	0.000	0.000	10.994	88.966
115.0	1.728%09	0.0033	-1	-1	-1	-1	0.064	0.000	0.000	14.085	85.852
120.0	1.109%09	0.0021	324.1	324.1	324.1	1.0000	0.101	0.000	0.000	17.829	82.070
125.0	7.873%08	0.0015	378.0	384.1	378.0	1.0160	0.160	0.000	0.000	21.966	77.875
130.0	6.561%08	0.0012	430.6	442.6	430.6	1.0281	0.252	0.000	0.000	25.782	73.966
135.0	6.484%08	0.0012	480.8	498.9	480.8	1.0377	0.397	0.000	0.000	28.496	71.109
140.0	7.405%08	0.0014	527.1	551.3	527.1	1.0458	0.623	0.000	0.000	30.000	69.377
150.0	1.227%09	0.0023	605.2	641.5	605.2	1.0599	1.499	0.000	0.000	31.125	67.376
160.0	2.041%09	0.0039	665.1	713.4	665.1	1.0726	3.369	0.000	0.000	31.523	65.108
170.0	3.329%09	0.0063	710.8	771.2	710.8	1.0850	6.682	0.000	0.000	31.631	61.688
180.0	7.119%09	0.0136	746.3	818.8	746.3	1.0971	11.440	0.000	0.000	30.463	58.096
190.0	1.399%10	0.0266	774.5	859.0	774.5	1.1092	17.675	0.000	0.000	24.037	58.288
200.0	2.542%10	0.0484	797.2	893.9	797.2	1.1212	26.016	0.000	0.000	12.998	60.985
210.0	4.297%10	0.0819	815.9	924.6	815.9	1.1332	37.577	0.000	0.000	5.759	56.664
220.0	6.796%10	0.1295	831.3	952.1	831.3	1.1453	53.695	0.000	0.000	2.450	43.855
230.0	1.013%11	0.1930	844.1	976.9	844.1	1.1574	74.407	0.000	0.000	1.036	24.556
240.0	1.430%11	0.2724	854.7	999.6	854.7	1.1695	92.029	0.000	0.000	0.438	7.533
260.0	2.456%11	0.4679	870.9	1040.0	874.7	1.1889	99.254	0.000	0.000	0.078	0.667
280.0	3.553%11	0.6769	882.1	1075.4	894.7	1.2019	97.970	1.679	0.187	0.014	0.151
300.0	4.466%11	0.8507	890.0	1107.4	914.7	1.2107	95.560	3.969	0.441	0.002	0.027
320.0	5.029%11	0.9579	895.6	1137.1	934.7	1.2166	93.146	6.164	0.685	0.000	0.005
340.0	5.239%11	0.9979	899.5	1165.3	954.6	1.2207	90.774	8.302	0.922	0.000	0.001
360.0	5.215%11	0.9935	902.4	1192.3	974.2	1.2239	88.437	10.406	1.156	0.000	0.000
380.0	5.043%11	0.9607	904.5	1218.6	993.3	1.2268	86.124	12.488	1.388	0.000	0.000
400.0	4.751%11	0.9050	906.1	1244.3	1010.9	1.2308	83.819	14.563	1.618	0.000	0.000
420.0	4.374%11	0.8333	907.3	1244.8	1025.7	1.2136	81.500	16.650	1.850	0.000	0.000
440.0	3.952%11	0.7529	908.2	1245.3	1036.1	1.2019	79.141	18.773	2.086	0.000	0.000
460.0	3.519%11	0.6704	908.9	1245.8	1042.1	1.1955	76.705	20.966	2.330	0.000	0.000
480.0	3.101%11	0.5908	909.4	1246.3	1045.2	1.1924	74.146	23.268	2.585	0.000	0.000
500.0	2.716%11	0.5174	909.9	1246.8	1046.9	1.1910	71.414	25.727	2.859	0.000	0.000
520.0	2.372%11	0.4519	910.2	1247.3	1048.0	1.1902	68.456	28.389	3.154	0.000	0.000
540.0	2.074%11	0.3950	910.5	1247.8	1048.9	1.1896	65.232	31.292	3.477	0.000	0.000
560.0	1.818%11	0.3464	910.7	1248.3	1049.7	1.1892	61.723	34.449	3.828	0.000	0.000
580.0	1.603%11	0.3053	910.9	1248.8	1050.4	1.1888	57.954	37.842	4.205	0.000	0.000
600.0	1.422%11	0.2709	911.1	1249.3	1051.2	1.1884	53.987	41.412	4.601	0.000	0.000
620.0	1.271%11	0.2422	911.2	1249.8	1052.0	1.1881	49.918	45.074	5.008	0.000	0.000
640.0	1.146%11	0.2183	911.3	1250.3	1052.7	1.1877	45.857	48.729	5.414	0.000	0.000
660.0	1.042%11	0.1985	911.4	1250.8	1053.5	1.1873	41.900	52.290	5.810	0.000	0.000
680.0	9.556%10	0.1820	911.5	1251.3	1054.2	1.1869	38.126	55.687	6.187	0.000	0.000
700.0	8.834%10	0.1683	911.6	1251.8	1054.9	1.1866	34.584	58.875	6.542	0.000	0.000
720.0	8.231%10	0.1568	911.6	1252.3	1055.7	1.1862	31.300	61.830	6.870	0.000	0.000
740.0	7.727%10	0.1472	911.7	1252.8	1056.4	1.1858	28.283	64.545	7.172	0.000	0.000
760.0	7.303%10	0.1391	911.7	1253.3	1057.2	1.1855	25.529	67.024	7.447	0.000	0.000
780.0	6.946%10	0.1323	911.7	1253.8	1057.9	1.1851	23.026	69.277	7.697	0.000	0.000
800.0	6.644%10	0.1266	911.8	1254.3	1058.7	1.1847	20.757	71.319	7.924	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 44.1 LONGI= 2.0 R=100 MONTH=12 HOUR=12.0

CALCULATED VALUES: MLAT= 46.6 MLONG= 83.1
DIP= 59.6 MODIP= 50.8 MAGLA= 40.5 XHI= 67.0
SUNRISE: 7.6 L.T. SUNSET:16.4 L.T. SUN DEC.= -22.9
NMF2=1.26%12 NMF1= 0.00%-01 NME=1.13%11 NMD=4.18%08
HMF2=256.8 HMF1= 0.0 HME=109.9 HMD= 81.2

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	3.949%08	3.1%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	7.842%08	6.2%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	8.390%09	0.0067	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	3.746%10	0.0298	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	8.133%10	0.0646	-1	-1	-1	-1	0.247	0.000	0.000	35.877	63.876
105.0	1.085%11	0.0862	-1	-1	-1	-1	0.371	0.000	0.000	37.874	61.755
110.0	1.130%11	0.0898	-1	-1	-1	-1	0.559	0.000	0.000	39.960	59.481
115.0	1.063%11	0.0844	-1	-1	-1	-1	0.842	0.000	0.000	42.100	57.058
120.0	1.010%11	0.0802	332.7	332.7	332.7	1.0000	1.267	0.000	0.000	44.189	54.544
125.0	1.088%11	0.0864	389.9	413.0	389.9	1.0593	1.904	0.000	0.000	45.965	52.131
130.0	1.225%11	0.0973	445.7	491.9	445.7	1.1038	2.859	0.000	0.000	46.938	50.203
135.0	1.319%11	0.1047	499.4	568.8	499.4	1.1389	4.283	0.000	0.000	46.609	49.108
140.0	1.423%11	0.1130	549.5	642.0	549.5	1.1683	6.389	0.000	0.000	45.000	48.611
150.0	1.672%11	0.1328	635.8	774.5	635.8	1.2182	13.875	0.000	0.000	39.937	46.188
160.0	1.995%11	0.1585	703.9	888.9	703.9	1.2628	27.958	0.000	0.000	33.943	38.099
170.0	2.450%11	0.1946	757.1	988.4	757.1	1.3054	48.250	0.000	0.000	25.234	26.516
180.0	3.241%11	0.2574	799.2	1076.7	799.2	1.3472	67.331	0.000	0.000	14.234	18.435
190.0	4.878%11	0.3874	833.0	1156.8	833.0	1.3887	78.969	0.000	0.000	6.832	14.199
200.0	6.739%11	0.5353	860.6	1230.6	860.6	1.4299	84.579	0.000	0.000	3.167	12.254
210.0	8.586%11	0.6820	883.3	1299.6	883.3	1.4712	87.369	0.000	0.000	1.461	11.170
220.0	1.020%12	0.8100	902.2	1364.7	902.2	1.5127	89.107	0.000	0.000	0.673	10.220
230.0	1.142%12	0.9069	917.8	1426.6	917.9	1.5542	90.488	0.000	0.000	0.310	9.201
240.0	1.218%12	0.9677	930.9	1485.9	932.8	1.5930	91.761	0.000	0.000	0.143	8.096
260.0	1.259%12	0.9996	950.9	1598.4	962.5	1.6606	94.254	0.000	0.000	0.030	5.716
280.0	1.234%12	0.9798	964.8	1704.8	992.3	1.7181	96.709	0.000	0.000	0.006	3.284
300.0	1.175%12	0.9330	974.5	1807.0	1022.0	1.7681	98.000	0.000	0.000	0.001	1.999
320.0	1.090%12	0.8655	981.4	1906.4	1051.8	1.8125	98.080	0.000	0.000	0.000	1.920
340.0	9.880%11	0.7847	986.3	2003.8	1081.8	1.8523	98.081	0.900	0.100	0.000	0.919
360.0	8.786%11	0.6979	989.9	2071.2	1112.1	1.8625	98.079	1.553	0.173	0.000	0.195
380.0	7.694%11	0.6111	992.5	2110.0	1143.2	1.8457	98.076	1.694	0.188	0.000	0.041
400.0	6.661%11	0.5291	994.4	2149.2	1176.5	1.8268	98.072	1.727	0.192	0.000	0.009
420.0	5.722%11	0.4545	995.9	2187.9	1214.1	1.8022	98.064	1.740	0.193	0.000	0.002
440.0	4.895%11	0.3888	997.0	2226.8	1258.2	1.7698	97.941	1.853	0.206	0.000	0.000
460.0	4.183%11	0.3322	997.9	2265.7	1308.9	1.7311	96.890	2.799	0.311	0.000	0.000
480.0	3.580%11	0.2843	998.6	2304.7	1363.9	1.6898	95.379	4.159	0.462	0.000	0.000
500.0	3.075%11	0.2443	999.1	2343.7	1421.0	1.6493	93.865	5.521	0.613	0.000	0.000
520.0	2.656%11	0.2110	999.5	2382.7	1479.0	1.6110	92.362	6.874	0.764	0.000	0.000
540.0	2.310%11	0.1835	999.9	2421.7	1537.3	1.5753	90.866	8.221	0.913	0.000	0.000
560.0	2.025%11	0.1608	1000.2	2460.7	1595.7	1.5420	89.367	9.569	1.063	0.000	0.000
580.0	1.789%11	0.1421	1000.4	2499.7	1654.2	1.5111	87.858	10.928	1.214	0.000	0.000
600.0	1.595%11	0.1267	1000.6	2538.7	1712.8	1.4823	86.324	12.309	1.368	0.000	0.000
620.0	1.434%11	0.1139	1000.7	2577.8	1771.3	1.4553	84.750	13.725	1.525	0.000	0.000
640.0	1.301%11	0.1033	1000.9	2616.8	1829.8	1.4301	83.119	15.193	1.688	0.000	0.000
660.0	1.189%11	0.0945	1001.0	2655.8	1888.3	1.4064	81.414	16.727	1.859	0.000	0.000
680.0	1.096%11	0.0871	1001.1	2694.8	1946.9	1.3842	79.623	18.340	2.038	0.000	0.000
700.0	1.018%11	0.0809	1001.2	2733.8	2005.4	1.3632	77.740	20.034	2.226	0.000	0.000
720.0	9.524%10	0.0756	1001.2	2772.8	2063.9	1.3435	75.772	21.805	2.423	0.000	0.000
740.0	8.968%10	0.0712	1001.3	2811.9	2122.4	1.3248	73.734	23.639	2.627	0.000	0.000
760.0	8.495%10	0.0675	1001.4	2850.9	2181.0	1.3072	71.650	25.515	2.835	0.000	0.000
780.0	8.092%10	0.0643	1001.4	2889.9	2239.5	1.2904	69.544	27.411	3.046	0.000	0.000
800.0	7.747%10	0.0615	1001.4	2928.9	2298.0	1.2745	67.438	29.305	3.256	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 44.1 LONGI= 2.0 R=100 MONTH=12 HOUR= 7.6

CALCULATED VALUES: MLAT= 46.6 MLONG= 83.1
DIP= 59.6 MODIP= 50.8 MAGLA= 40.5 XHI= 90.0
SUNRISE: 7.6 L.T. SUNSET:16.4 L.T. SUN DEC.= -22.9
NMF2=5.14%11 NMF1= 0.00%-01 NME=4.27%10 NMD=4.00%08
HMF2=258.8 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.819%08	5.5%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.101%08	8.0%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.817%09	0.0035	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.276%10	0.0248	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.223%10	0.0627	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	4.216%10	0.0820	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	4.125%10	0.0802	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	3.391%10	0.0660	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	2.684%10	0.0522	322.2	322.2	322.2	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	2.361%10	0.0459	375.4	391.3	375.4	1.0425	0.084	0.000	0.000	36.294	63.621
130.0	2.458%10	0.0478	427.2	459.1	427.2	1.0747	0.161	0.000	0.000	40.716	59.123
135.0	2.838%10	0.0552	476.6	524.5	476.6	1.1004	0.307	0.000	0.000	43.939	55.754
140.0	3.326%10	0.0647	522.1	585.9	522.1	1.1222	0.584	0.000	0.000	45.000	54.416
150.0	4.653%10	0.0905	598.5	694.1	598.5	1.1599	2.074	0.000	0.000	41.880	56.046
160.0	6.895%10	0.1341	656.6	784.2	656.6	1.1943	6.909	0.000	0.000	36.631	56.461
170.0	1.031%11	0.2006	700.7	860.2	700.7	1.2276	19.661	0.000	0.000	30.703	49.636
180.0	1.563%11	0.3040	734.9	926.3	734.9	1.2604	41.885	0.000	0.000	21.641	36.474
190.0	2.225%11	0.4329	761.9	985.2	761.9	1.2931	63.787	0.000	0.000	10.559	25.653
200.0	2.937%11	0.5713	783.7	1038.9	783.7	1.3256	76.967	0.000	0.000	4.137	18.896
210.0	3.625%11	0.7050	801.6	1088.7	801.6	1.3581	83.288	0.000	0.000	1.545	15.167
220.0	4.218%11	0.8205	816.3	1135.3	816.8	1.3899	86.496	0.000	0.000	0.573	12.931
230.0	4.670%11	0.9084	828.5	1179.4	831.8	1.4179	88.560	0.000	0.000	0.212	11.228
240.0	4.963%11	0.9653	838.6	1221.4	846.7	1.4425	90.243	0.000	0.000	0.079	9.679
260.0	5.141%11	0.9999	854.1	1300.7	876.7	1.4837	93.359	0.000	0.000	0.011	6.630
280.0	5.066%11	0.9855	864.8	1375.2	906.6	1.5169	96.398	0.000	0.000	0.001	3.600
300.0	4.871%11	0.9475	872.4	1446.5	936.5	1.5446	98.000	0.000	0.000	0.000	2.000
320.0	4.579%11	0.8906	877.7	1515.6	966.4	1.5682	98.100	0.000	0.000	0.000	1.900
340.0	4.219%11	0.8206	881.5	1583.2	996.4	1.5890	98.101	1.044	0.116	0.000	0.739
360.0	3.822%11	0.7435	884.2	1633.7	1026.3	1.5918	98.099	1.620	0.180	0.000	0.101
380.0	3.416%11	0.6645	886.2	1668.0	1056.2	1.5792	98.096	1.701	0.189	0.000	0.014
400.0	3.022%11	0.5879	887.7	1702.3	1086.2	1.5672	98.093	1.715	0.191	0.000	0.002
420.0	2.655%11	0.5165	888.9	1722.1	1116.1	1.5430	98.084	1.724	0.192	0.000	0.000
440.0	2.323%11	0.4519	889.7	1742.0	1146.1	1.5200	97.961	1.835	0.204	0.000	0.000
460.0	2.030%11	0.3949	890.4	1762.0	1176.1	1.4982	96.910	2.781	0.309	0.000	0.000
480.0	1.776%11	0.3454	890.9	1782.0	1206.0	1.4775	95.399	4.141	0.460	0.000	0.000
500.0	1.558%11	0.3031	891.3	1801.9	1236.0	1.4579	93.884	5.504	0.612	0.000	0.000
520.0	1.373%11	0.2671	891.7	1821.9	1266.0	1.4391	92.381	6.857	0.762	0.000	0.000
540.0	1.217%11	0.2368	891.9	1841.9	1296.0	1.4212	90.884	8.204	0.912	0.000	0.000
560.0	1.086%11	0.2112	892.1	1861.9	1326.0	1.4042	89.386	9.553	1.061	0.000	0.000
580.0	9.758%10	0.1898	892.3	1881.9	1356.0	1.3878	87.876	10.912	1.212	0.000	0.000
600.0	8.833%10	0.1718	892.5	1901.9	1386.0	1.3722	86.341	12.293	1.366	0.000	0.000
620.0	8.055%10	0.1567	892.6	1921.9	1416.0	1.3573	84.767	13.709	1.523	0.000	0.000
640.0	7.400%10	0.1439	892.7	1941.9	1446.0	1.3430	83.136	15.178	1.686	0.000	0.000
660.0	6.848%10	0.1332	892.8	1961.9	1475.9	1.3292	81.431	16.712	1.857	0.000	0.000
680.0	6.380%10	0.1241	892.9	1981.9	1505.9	1.3160	79.639	18.325	2.036	0.000	0.000
700.0	5.983%10	0.1164	892.9	2001.9	1535.9	1.3034	77.756	20.020	2.224	0.000	0.000
720.0	5.646%10	0.1098	893.0	2021.9	1565.9	1.2912	75.787	21.791	2.421	0.000	0.000
740.0	5.358%10	0.1042	893.0	2041.8	1595.9	1.2794	73.749	23.626	2.625	0.000	0.000
760.0	5.111%10	0.0994	893.1	2061.8	1625.9	1.2681	71.665	25.502	2.834	0.000	0.000
780.0	4.900%10	0.0953	893.1	2081.8	1655.9	1.2572	69.558	27.398	3.044	0.000	0.000
800.0	4.718%10	0.0918	893.1	2101.8	1685.9	1.2467	67.452	29.293	3.255	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 44.1 LONGI= 2.0 R=100 MONTH=12 HOUR= 0.0

CALCULATED VALUES: MLAT= 46.6 MLONG= 83.1
DIP= 59.6 MODIP= 50.8 MAGLA= 40.5 XHI= 158.8
SUNRISE: 7.6 L.T. SUNSET:16.4 L.T. SUN DEC.= -22.9
NMF2=1.88%11 NMF1= 0.00%-01 NME=3.20%09 NMD=4.00%08
HMF2=352.3 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	4.960%05	2.6%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.455%08	0.0013	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.721%08	0.0025	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	2.504%09	0.0133	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.193%09	0.0170	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	3.201%09	0.0171	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	2.613%09	0.0139	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	1.701%09	0.0091	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	1.081%09	0.0058	317.5	317.5	317.5	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	7.599%08	0.0040	368.8	375.8	368.8	1.0188	0.084	0.000	0.000	36.294	63.621
130.0	6.281%08	0.0033	418.8	432.7	418.8	1.0332	0.161	0.000	0.000	40.716	59.123
135.0	6.173%08	0.0033	466.4	487.2	466.4	1.0447	0.307	0.000	0.000	43.939	55.754
140.0	7.035%08	0.0037	509.8	537.6	509.8	1.0545	0.584	0.000	0.000	45.000	54.416
150.0	1.173%09	0.0063	581.8	623.5	581.8	1.0716	2.075	0.000	0.000	41.880	56.044
160.0	1.981%09	0.0106	635.7	691.3	635.7	1.0874	6.912	0.000	0.000	36.631	56.457
170.0	3.170%09	0.0169	676.2	745.6	676.2	1.1027	19.672	0.000	0.000	30.703	49.625
180.0	4.138%09	0.0220	707.3	790.6	707.3	1.1178	41.907	0.000	0.000	21.641	36.451
190.0	5.141%09	0.0274	731.7	828.9	731.7	1.1329	63.821	0.000	0.000	10.559	25.620
200.0	6.437%09	0.0343	751.3	862.4	751.3	1.1479	77.006	0.000	0.000	4.137	18.857
210.0	8.140%09	0.0434	767.3	892.3	767.3	1.1629	83.329	0.000	0.000	1.545	15.125
220.0	1.043%10	0.0556	780.5	919.4	780.6	1.1778	86.537	0.000	0.000	0.573	12.890
230.0	1.365%10	0.0727	791.4	944.2	793.0	1.1906	88.599	0.000	0.000	0.212	11.188
240.0	1.847%10	0.0984	800.5	967.1	805.5	1.2006	90.280	0.000	0.000	0.079	9.641
260.0	4.262%10	0.2271	814.2	1008.7	830.5	1.2145	93.390	0.000	0.000	0.011	6.599
280.0	8.558%10	0.4559	823.8	1046.0	855.4	1.2228	96.417	0.000	0.000	0.001	3.582
300.0	1.329%11	0.7082	830.5	1080.5	880.4	1.2273	98.000	0.000	0.000	0.000	2.000
320.0	1.689%11	0.8996	835.2	1113.0	905.3	1.2294	98.071	0.628	0.070	0.000	1.231
340.0	1.856%11	0.9886	838.6	1144.1	930.1	1.2302	98.030	1.621	0.180	0.000	0.169
360.0	1.874%11	0.9982	841.1	1174.4	954.6	1.2302	97.965	1.810	0.201	0.000	0.023
380.0	1.834%11	0.9773	842.9	1203.9	978.3	1.2306	97.860	1.923	0.214	0.000	0.003
400.0	1.757%11	0.9359	844.2	1233.0	1000.2	1.2328	97.304	2.426	0.270	0.000	0.000
420.0	1.650%11	0.8789	845.2	1233.0	1018.4	1.2108	93.968	5.429	0.603	0.000	0.000
440.0	1.524%11	0.8118	846.0	1233.1	1030.9	1.1961	89.573	9.384	1.043	0.000	0.000
460.0	1.389%11	0.7400	846.6	1233.1	1037.7	1.1883	85.227	13.296	1.477	0.000	0.000
480.0	1.254%11	0.6682	847.0	1233.1	1040.8	1.1848	80.930	17.163	1.907	0.000	0.000
500.0	1.126%11	0.5997	847.4	1233.1	1042.0	1.1834	76.642	21.022	2.336	0.000	0.000
520.0	1.007%11	0.5365	847.7	1233.1	1042.5	1.1828	72.323	24.909	2.768	0.000	0.000
540.0	9.009%10	0.4799	847.9	1233.2	1042.7	1.1826	67.944	28.851	3.206	0.000	0.000
560.0	8.075%10	0.4302	848.1	1233.2	1042.8	1.1825	63.494	32.855	3.651	0.000	0.000
580.0	7.266%10	0.3871	848.3	1233.2	1042.9	1.1825	58.994	36.905	4.101	0.000	0.000
600.0	6.572%10	0.3501	848.4	1233.2	1042.9	1.1825	54.490	40.959	4.551	0.000	0.000
620.0	5.981%10	0.3187	848.5	1233.2	1043.0	1.1824	50.050	44.955	4.995	0.000	0.000
640.0	5.480%10	0.2920	848.6	1233.3	1043.0	1.1824	45.748	48.827	5.425	0.000	0.000
660.0	5.056%10	0.2694	848.7	1233.3	1043.0	1.1824	41.648	52.517	5.835	0.000	0.000
680.0	4.698%10	0.2503	848.8	1233.3	1043.0	1.1824	37.797	55.982	6.220	0.000	0.000
700.0	4.395%10	0.2342	848.8	1233.3	1043.1	1.1824	34.223	59.199	6.578	0.000	0.000
720.0	4.139%10	0.2205	848.9	1233.3	1043.1	1.1824	30.934	62.159	6.907	0.000	0.000
740.0	3.922%10	0.2090	848.9	1233.4	1043.1	1.1824	27.929	64.864	7.207	0.000	0.000
760.0	3.738%10	0.1992	849.0	1233.4	1043.2	1.1823	25.194	67.325	7.481	0.000	0.000
780.0	3.582%10	0.1908	849.0	1233.4	1043.2	1.1823	22.714	69.557	7.729	0.000	0.000
800.0	3.449%10	0.1838	849.0	1233.4	1043.2	1.1823	20.471	71.576	7.953	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 35.7 LONGI= 140.0 R= 10 MONTH= 3 HOUR=12.0

CALCULATED VALUES: MLAT= 25.6 MLONG= 206.6
DIP= 48.6 MODIP= 43.3 MAGLA= 29.6 XHI= 39.0
SUNRISE: 6.2 L.T. SUNSET:17.8 L.T. SUN DEC.= -3.3
NMF2=7.90%11 NMF1= 2.31% 11 NME=1.24%11 NMD=5.69%08
HMF2=274.6 HMF1=198.4 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.426%08	6.9%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	1.123%09	0.0014	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.182%10	0.0150	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	4.818%10	0.0610	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	9.550%10	0.1209	-1	-1	-1	-1	0.207	0.000	0.000	62.409	37.384
105.0	1.206%11	0.1526	-1	-1	-1	-1	0.326	0.000	0.000	59.949	39.725
110.0	1.241%11	0.1571	-1	-1	-1	-1	0.513	0.000	0.000	57.512	41.975
115.0	1.204%11	0.1523	-1	-1	-1	-1	0.807	0.000	0.000	54.994	44.199
120.0	1.191%11	0.1508	305.9	305.9	305.9	1.0000	1.266	0.000	0.000	52.200	46.534
125.0	1.242%11	0.1572	352.8	405.9	352.8	1.1505	1.979	0.000	0.000	48.899	49.121
130.0	1.246%11	0.1577	398.4	504.6	398.4	1.2665	3.076	0.000	0.000	45.063	51.860
135.0	1.251%11	0.1583	441.4	600.7	441.4	1.3608	4.736	0.000	0.000	40.984	54.281
140.0	1.258%11	0.1592	479.9	692.3	479.9	1.4425	7.175	0.000	0.000	37.000	55.825
150.0	1.281%11	0.1622	541.8	860.4	541.8	1.5879	15.113	0.000	0.000	29.918	54.969
160.0	1.323%11	0.1675	586.5	1011.3	586.5	1.7242	26.363	0.000	0.000	24.108	49.529
170.0	1.404%11	0.1777	619.1	1150.0	619.1	1.8576	36.882	0.000	0.000	19.286	43.832
180.0	1.616%11	0.2046	643.6	1280.7	643.6	1.9899	44.217	0.000	0.000	14.852	40.931
190.0	2.051%11	0.2595	662.6	1405.9	663.3	2.1197	49.297	0.000	0.000	10.440	40.263
200.0	2.462%11	0.3116	677.8	1527.3	682.5	2.2379	53.471	0.000	0.000	6.898	39.631
210.0	3.539%11	0.4479	690.1	1584.3	701.7	2.2580	57.448	0.000	0.000	4.493	38.059
220.0	4.685%11	0.5930	700.1	1627.5	720.8	2.2577	61.526	0.000	0.000	2.920	35.554
230.0	5.771%11	0.7303	708.5	1652.9	740.0	2.2335	65.824	0.000	0.000	1.897	32.279
240.0	6.679%11	0.8453	715.3	1659.6	759.2	2.1860	70.397	0.000	0.000	1.232	28.371
260.0	7.727%11	0.9780	725.8	1628.6	797.6	2.0419	80.490	0.000	0.000	0.520	18.990
280.0	7.886%11	0.9981	733.0	1572.7	836.0	1.8813	91.650	0.000	0.000	0.220	8.131
300.0	7.591%11	0.9607	738.1	1526.9	874.4	1.7463	98.000	0.000	0.000	0.093	1.907
320.0	6.983%11	0.8838	741.7	1504.9	912.8	1.6487	98.409	0.000	0.000	0.039	1.552
340.0	6.177%11	0.7818	744.2	1505.2	951.3	1.5823	98.416	0.200	0.022	0.017	1.346
360.0	5.292%11	0.6698	746.1	1521.4	990.1	1.5367	98.414	0.910	0.101	0.007	0.568
380.0	4.423%11	0.5598	747.5	1547.6	1029.5	1.5033	98.411	1.211	0.135	0.003	0.240
400.0	3.634%11	0.4600	748.5	1579.9	1070.5	1.4759	98.408	1.341	0.149	0.001	0.101
420.0	2.956%11	0.3742	749.2	1615.3	1114.6	1.4492	98.399	1.402	0.156	0.001	0.043
440.0	2.396%11	0.3033	749.8	1652.7	1163.6	1.4203	98.276	1.535	0.171	0.000	0.018
460.0	1.946%11	0.2462	750.3	1691.2	1217.5	1.3891	97.221	2.494	0.277	0.000	0.008
480.0	1.590%11	0.2012	750.6	1730.3	1274.5	1.3576	95.705	3.863	0.429	0.000	0.003
500.0	1.311%11	0.1659	750.9	1769.6	1333.1	1.3274	94.186	5.232	0.581	0.000	0.001
520.0	1.095%11	0.1385	751.1	1809.2	1392.4	1.2993	92.678	6.589	0.732	0.000	0.001
540.0	9.261%10	0.1172	751.3	1848.8	1451.9	1.2734	91.176	7.941	0.882	0.000	0.000
560.0	7.948%10	0.1006	751.4	1888.5	1511.5	1.2495	89.673	9.295	1.033	0.000	0.000
580.0	6.920%10	0.0876	751.6	1928.3	1571.1	1.2273	88.158	10.658	1.184	0.000	0.000
600.0	6.110%10	0.0773	751.7	1968.0	1630.7	1.2068	86.619	12.043	1.338	0.000	0.000
620.0	5.468%10	0.0692	751.7	2007.8	1690.3	1.1878	85.039	13.465	1.496	0.000	0.000
640.0	4.956%10	0.0627	751.8	2047.5	1749.9	1.1701	83.403	14.937	1.660	0.000	0.000
660.0	4.544%10	0.0575	751.9	2087.3	1809.5	1.1535	81.692	16.477	1.831	0.000	0.000
680.0	4.211%10	0.0533	751.9	2127.1	1869.0	1.1380	79.895	18.095	2.011	0.000	0.000
700.0	3.940%10	0.0499	752.0	2166.8	1928.5	1.1236	78.005	19.795	2.199	0.000	0.000
720.0	3.719%10	0.0471	752.0	2206.6	1987.9	1.1100	76.031	21.572	2.397	0.000	0.000
740.0	3.536%10	0.0448	752.0	2246.4	2047.2	1.0973	73.986	23.412	2.601	0.000	0.000
760.0	3.386%10	0.0429	752.1	2286.1	2106.3	1.0854	71.895	25.295	2.811	0.000	0.000
780.0	3.261%10	0.0413	752.1	2325.9	2165.2	1.0742	69.781	27.197	3.022	0.000	0.000
800.0	3.157%10	0.0399	752.1	2365.7	2223.7	1.0638	67.669	29.098	3.233	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 35.7 LONGI= 140.0 R= 10 MONTH= 3 HOUR= 6.2

CALCULATED VALUES: MLAT= 25.6 MLONG= 206.6
DIP= 48.6 MODIP= 43.3 MAGLA= 29.6 XHI= 90.0
SUNRISE: 6.2 L.T. SUNSET:17.8 L.T. SUN DEC.= -3.3
NMF2=1.72%11 NMF1= 0.00%-01 NME=3.10%10 NMD=4.00%08
HMF2=255.7 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.833%08	0.0016	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.098%08	0.0024	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.816%09	0.0105	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.157%10	0.0671	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.545%10	0.1477	-1	-1	-1	-1	0.020	0.000	0.000	17.950	82.030
105.0	3.083%10	0.1789	-1	-1	-1	-1	0.031	0.000	0.000	20.889	79.081
110.0	2.999%10	0.1740	-1	-1	-1	-1	0.048	0.000	0.000	24.232	75.721
115.0	2.477%10	0.1437	-1	-1	-1	-1	0.074	0.000	0.000	27.887	72.039
120.0	1.989%10	0.1154	289.0	289.0	289.0	1.0000	0.114	0.000	0.000	31.524	68.361
125.0	1.787%10	0.1037	329.5	361.7	329.5	1.0976	0.177	0.000	0.000	34.509	65.313
130.0	1.887%10	0.1095	368.7	433.0	368.7	1.1744	0.275	0.000	0.000	36.301	63.424
135.0	2.181%10	0.1265	405.0	501.5	405.0	1.2382	0.425	0.000	0.000	36.979	62.596
140.0	2.551%10	0.1480	436.7	565.3	436.7	1.2946	0.655	0.000	0.000	37.000	62.345
150.0	3.345%10	0.1941	485.3	678.2	485.3	1.3976	1.525	0.000	0.000	36.335	62.140
160.0	3.833%10	0.2224	518.5	775.7	518.5	1.4962	3.347	0.000	0.000	35.403	61.250
170.0	4.469%10	0.2593	541.8	863.4	541.8	1.5935	6.466	0.000	0.000	34.020	59.514
180.0	5.403%10	0.3135	559.0	944.9	560.4	1.6860	10.415	0.000	0.000	30.434	59.151
190.0	7.359%10	0.4270	572.1	1022.3	578.9	1.7660	14.360	0.000	0.000	22.930	62.710
200.0	9.869%10	0.5727	582.5	1097.0	597.3	1.8365	18.208	0.000	0.000	15.380	66.412
210.0	1.229%11	0.7129	590.8	1135.4	615.8	1.8438	22.316	0.000	0.000	10.039	67.645
220.0	1.434%11	0.8322	597.6	1166.1	634.2	1.8386	27.023	0.000	0.000	6.526	66.451
230.0	1.586%11	0.9201	603.2	1187.3	652.7	1.8192	32.590	0.000	0.000	4.240	63.170
240.0	1.678%11	0.9738	607.8	1198.7	671.1	1.7862	39.250	0.000	0.000	2.755	57.995
260.0	1.722%11	0.9991	614.8	1198.1	708.0	1.6922	56.860	0.000	0.000	1.163	41.977
280.0	1.675%11	0.9720	619.6	1183.9	744.9	1.5894	81.425	0.000	0.000	0.491	18.085
300.0	1.573%11	0.9128	623.0	1174.2	781.8	1.5020	98.000	0.000	0.000	0.207	1.793
320.0	1.432%11	0.8311	625.4	1176.0	818.6	1.4365	99.136	0.000	0.000	0.087	0.777
340.0	1.271%11	0.7376	627.1	1188.6	855.5	1.3894	99.157	0.000	0.000	0.037	0.806
360.0	1.106%11	0.6416	628.3	1209.1	892.3	1.3551	99.156	0.418	0.046	0.016	0.364
380.0	9.479%10	0.5500	629.2	1234.4	928.8	1.3290	99.153	0.618	0.069	0.007	0.154
400.0	8.051%10	0.4672	629.9	1262.7	964.9	1.3086	99.149	0.705	0.078	0.003	0.065
420.0	6.810%10	0.3951	630.4	1280.5	999.9	1.2807	99.141	0.748	0.083	0.001	0.027
440.0	5.760%10	0.3342	630.8	1299.3	1033.3	1.2574	99.016	0.875	0.097	0.000	0.012
460.0	4.889%10	0.2837	631.1	1318.6	1065.2	1.2379	97.954	1.837	0.204	0.000	0.005
480.0	4.176%10	0.2423	631.3	1338.3	1096.0	1.2210	96.426	3.215	0.357	0.000	0.002
500.0	3.597%10	0.2087	631.5	1358.1	1126.4	1.2057	94.896	4.593	0.510	0.000	0.001
520.0	3.129%10	0.1816	631.7	1378.0	1156.5	1.1915	93.376	5.961	0.662	0.000	0.000
540.0	2.751%10	0.1596	631.8	1397.9	1186.5	1.1781	91.863	7.323	0.814	0.000	0.000
560.0	2.445%10	0.1419	631.9	1417.9	1216.6	1.1655	90.348	8.686	0.965	0.000	0.000
580.0	2.197%10	0.1275	632.0	1437.9	1246.6	1.1535	88.822	10.060	1.118	0.000	0.000
600.0	1.996%10	0.1158	632.0	1457.9	1276.5	1.1420	87.271	11.456	1.273	0.000	0.000
620.0	1.831%10	0.1062	632.1	1477.8	1306.5	1.1311	85.680	12.888	1.432	0.000	0.000
640.0	1.696%10	0.0984	632.2	1497.8	1336.5	1.1207	84.031	14.372	1.597	0.000	0.000
660.0	1.585%10	0.0920	632.2	1517.8	1366.5	1.1108	82.308	15.923	1.769	0.000	0.000
680.0	1.493%10	0.0866	632.2	1537.8	1396.4	1.1013	80.497	17.553	1.950	0.000	0.000
700.0	1.416%10	0.0822	632.3	1557.8	1426.4	1.0922	78.593	19.266	2.141	0.000	0.000
720.0	1.352%10	0.0785	632.3	1577.8	1456.3	1.0835	76.604	21.057	2.340	0.000	0.000
740.0	1.299%10	0.0754	632.3	1597.8	1486.1	1.0752	74.544	22.911	2.546	0.000	0.000
760.0	1.254%10	0.0728	632.3	1617.8	1515.9	1.0672	72.437	24.807	2.756	0.000	0.000
780.0	1.217%10	0.0706	632.3	1637.8	1545.6	1.0597	70.307	26.723	2.969	0.000	0.000
800.0	1.185%10	0.0688	632.3	1657.8	1575.2	1.0525	68.179	28.639	3.182	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 35.7 LONGI= 140.0 R= 10 MONTH= 3 HOUR= 0.0

CALCULATED VALUES: MLAT= 25.6 MLONG= 206.6
DIP= 48.6 MODIP= 43.3 MAGLA= 29.6 XHI= 147.6
SUNRISE: 6.2 L.T. SUNSET:17.8 L.T. SUN DEC.= -3.3
NMF2=1.64%11 NMF1= 0.00%-01 NME=1.78%09 NMD=4.00%08
HMF2=337.8 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.417%05	3.3%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.474%08	0.0015	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.729%08	0.0029	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.743%09	0.0106	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.775%09	0.0108	-1	-1	-1	-1	0.020	0.000	0.000	17.950	82.030
105.0	1.775%09	0.0108	-1	-1	-1	-1	0.031	0.000	0.000	20.889	79.081
110.0	1.451%09	0.0088	-1	-1	-1	-1	0.048	0.000	0.000	24.232	75.721
115.0	9.462%08	0.0058	-1	-1	-1	-1	0.074	0.000	0.000	27.887	72.039
120.0	6.022%08	0.0037	286.1	286.1	286.1	1.0000	0.115	0.000	0.000	31.524	68.361
125.0	4.238%08	0.0026	325.5	331.4	325.5	1.0182	0.178	0.000	0.000	34.509	65.313
130.0	3.505%08	0.0021	363.6	375.4	363.6	1.0326	0.275	0.000	0.000	36.301	63.424
135.0	3.447%08	0.0021	398.8	416.5	398.8	1.0445	0.425	0.000	0.000	36.979	62.596
140.0	3.936%08	0.0024	429.3	453.0	429.3	1.0552	0.655	0.000	0.000	37.000	62.345
150.0	6.643%08	0.0040	475.7	511.2	475.7	1.0747	1.526	0.000	0.000	36.335	62.139
160.0	1.161%09	0.0071	507.2	554.6	507.2	1.0934	3.349	0.000	0.000	35.403	61.248
170.0	1.879%09	0.0114	529.2	588.4	529.2	1.1119	6.470	0.000	0.000	34.020	59.510
180.0	2.425%09	0.0148	545.3	616.4	545.4	1.1300	10.420	0.000	0.000	30.434	59.146
190.0	3.154%09	0.0192	557.6	640.5	560.4	1.1430	14.368	0.000	0.000	22.930	62.702
200.0	4.141%09	0.0252	567.3	662.0	575.3	1.1508	18.218	0.000	0.000	15.380	66.403
210.0	5.509%09	0.0336	575.1	681.6	590.2	1.1549	22.327	0.000	0.000	10.039	67.634
220.0	7.469%09	0.0455	581.4	699.8	605.1	1.1565	27.036	0.000	0.000	6.526	66.438
230.0	1.043%10	0.0635	586.6	716.9	620.0	1.1562	32.605	0.000	0.000	4.240	63.155
240.0	1.539%10	0.0938	590.9	733.0	635.0	1.1544	39.266	0.000	0.000	2.755	57.979
260.0	4.301%10	0.2620	597.5	763.2	664.8	1.1481	56.879	0.000	0.000	1.163	41.958
280.0	8.823%10	0.5374	602.0	791.4	694.6	1.1394	81.441	0.000	0.000	0.491	18.069
300.0	1.325%11	0.8074	605.1	818.3	724.4	1.1295	98.000	0.000	0.000	0.207	1.793
320.0	1.584%11	0.9650	607.4	844.2	754.2	1.1193	99.107	0.000	0.000	0.087	0.806
340.0	1.641%11	0.9997	609.0	869.4	783.8	1.1092	99.085	0.395	0.044	0.037	0.438
360.0	1.599%11	0.9738	610.1	894.3	813.1	1.0998	99.020	0.701	0.078	0.016	0.185
380.0	1.497%11	0.9120	610.9	918.8	841.5	1.0919	98.914	0.901	0.100	0.007	0.078
400.0	1.356%11	0.8259	611.6	943.1	867.7	1.0869	98.352	1.451	0.161	0.003	0.033
420.0	1.195%11	0.7281	612.0	943.2	889.4	1.0604	94.980	4.504	0.500	0.001	0.014
440.0	1.033%11	0.6292	612.4	943.2	904.4	1.0430	90.538	8.510	0.946	0.000	0.006
460.0	8.811%10	0.5367	612.7	943.3	912.6	1.0337	86.145	12.467	1.385	0.000	0.002
480.0	7.466%10	0.4548	612.9	943.4	916.4	1.0295	81.802	16.378	1.820	0.000	0.001
500.0	6.320%10	0.3850	613.1	943.5	918.0	1.0278	77.467	20.279	2.253	0.000	0.000
520.0	5.369%10	0.3270	613.2	943.6	918.6	1.0271	73.102	24.208	2.690	0.000	0.000
540.0	4.593%10	0.2798	613.3	943.7	919.0	1.0269	68.675	28.192	3.132	0.000	0.000
560.0	3.968%10	0.2417	613.4	943.7	919.2	1.0267	64.178	32.239	3.582	0.000	0.000
580.0	3.466%10	0.2112	613.5	943.8	919.3	1.0266	59.629	36.333	4.037	0.000	0.000
600.0	3.065%10	0.1867	613.6	943.9	919.5	1.0266	55.077	40.431	4.492	0.000	0.000
620.0	2.744%10	0.1671	613.6	944.0	919.6	1.0265	50.589	44.470	4.941	0.000	0.000
640.0	2.486%10	0.1514	613.7	944.1	919.7	1.0265	46.240	48.384	5.376	0.000	0.000
660.0	2.278%10	0.1388	613.7	944.2	919.9	1.0264	42.097	52.113	5.790	0.000	0.000
680.0	2.110%10	0.1285	613.7	944.2	920.0	1.0264	38.204	55.616	6.180	0.000	0.000
700.0	1.974%10	0.1202	613.8	944.3	920.1	1.0263	34.592	58.868	6.541	0.000	0.000
720.0	1.862%10	0.1134	613.8	944.4	920.2	1.0263	31.268	61.859	6.873	0.000	0.000
740.0	1.771%10	0.1079	613.8	944.5	920.4	1.0262	28.230	64.593	7.177	0.000	0.000
760.0	1.696%10	0.1033	613.8	944.6	920.5	1.0262	25.466	67.081	7.453	0.000	0.000
780.0	1.635%10	0.0996	613.8	944.7	920.6	1.0261	22.959	69.337	7.704	0.000	0.000
800.0	1.584%10	0.0965	613.8	944.7	920.7	1.0261	20.691	71.378	7.931	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 35.7 LONGI= 140.0 R= 10 MONTH= 6 HOUR=12.0

CALCULATED VALUES: MLAT= 25.6 MLONG= 206.6
DIP= 48.6 MODIP= 43.3 MAGLA= 29.6 XHI= 12.6
SUNRISE: 4.8 L.T. SUNSET:19.2 L.T. SUN DEC.= 23.1
NMF2=3.96%11 NMF1= 2.51% 11 NME=1.38%11 NMD=6.23%08
HMF2=255.9 HMF1=195.7 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.952%08	0.0015	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	1.246%09	0.0031	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.311%10	0.0331	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	5.335%10	0.1346	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.058%11	0.2670	-1	-1	-1	-1	0.243	0.000	0.000	51.349	48.409
105.0	1.338%11	0.3375	-1	-1	-1	-1	0.349	0.000	0.000	46.872	52.779
110.0	1.378%11	0.3477	-1	-1	-1	-1	0.501	0.000	0.000	42.939	56.560
115.0	1.341%11	0.3384	-1	-1	-1	-1	0.719	0.000	0.000	39.656	59.625
120.0	1.328%11	0.3351	308.5	308.5	308.5	1.0000	1.029	0.000	0.000	37.169	61.803
125.0	1.382%11	0.3489	356.5	408.8	356.5	1.1468	1.465	0.000	0.000	35.494	63.041
130.0	1.412%11	0.3564	403.1	507.7	403.1	1.2596	2.072	0.000	0.000	34.419	63.510
135.0	1.444%11	0.3644	447.0	604.0	447.0	1.3511	2.896	0.000	0.000	33.667	63.437
140.0	1.479%11	0.3732	486.7	696.0	486.7	1.4301	3.974	0.000	0.000	33.061	62.965
150.0	1.558%11	0.3931	550.8	864.8	550.8	1.5700	6.871	0.000	0.000	31.997	61.131
160.0	1.655%11	0.4176	597.5	1016.1	597.5	1.7006	10.240	0.000	0.000	31.000	58.760
170.0	1.787%11	0.4509	631.7	1155.0	631.7	1.8283	13.442	0.000	0.000	30.022	56.536
180.0	2.038%11	0.5142	657.6	1285.5	657.6	1.9549	16.477	0.000	0.000	28.958	54.565
190.0	2.410%11	0.6081	677.7	1410.3	677.8	2.0807	19.644	0.000	0.000	27.196	53.160
200.0	2.707%11	0.6831	693.8	1531.0	696.4	2.1984	23.190	0.000	0.000	22.780	54.029
210.0	3.138%11	0.7919	706.9	1588.2	715.0	2.2212	27.286	0.000	0.000	16.116	56.598
220.0	3.486%11	0.8798	717.6	1631.5	733.7	2.2237	32.070	0.000	0.000	10.627	57.302
230.0	3.736%11	0.9428	726.4	1656.9	752.3	2.2025	37.679	0.000	0.000	6.919	55.402
240.0	3.887%11	0.9809	733.7	1663.6	770.9	2.1580	44.264	0.000	0.000	4.496	51.240
260.0	3.959%11	0.9990	744.8	1632.3	808.1	2.0198	61.068	0.000	0.000	1.898	37.034
280.0	3.839%11	0.9689	752.6	1576.1	845.4	1.8643	83.427	0.000	0.000	0.801	15.772
300.0	3.578%11	0.9028	758.0	1530.0	882.7	1.7334	98.000	0.000	0.000	0.338	1.662
320.0	3.220%11	0.8125	761.8	1507.8	920.0	1.6390	98.986	0.000	0.000	0.143	0.871
340.0	2.815%11	0.7103	764.5	1508.0	957.3	1.5751	99.004	0.000	0.000	0.060	0.936
360.0	2.405%11	0.6070	766.5	1524.1	995.0	1.5318	99.003	0.511	0.057	0.025	0.404
380.0	2.022%11	0.5103	767.9	1550.4	1033.4	1.5003	99.000	0.737	0.082	0.011	0.171
400.0	1.683%11	0.4247	769.0	1582.6	1073.4	1.4744	98.996	0.834	0.093	0.005	0.072
420.0	1.394%11	0.3518	769.8	1618.3	1116.8	1.4490	98.988	0.882	0.098	0.002	0.030
440.0	1.155%11	0.2915	770.4	1655.8	1165.4	1.4208	98.864	1.010	0.112	0.001	0.013
460.0	9.609%10	0.2425	770.9	1694.4	1219.1	1.3899	97.803	1.972	0.219	0.000	0.005
480.0	8.054%10	0.2032	771.3	1733.7	1276.2	1.3584	96.278	3.348	0.372	0.000	0.002
500.0	6.815%10	0.1720	771.6	1773.2	1335.0	1.3282	94.749	4.725	0.525	0.000	0.001
520.0	5.832%10	0.1472	771.8	1812.9	1394.5	1.3000	93.232	6.090	0.677	0.000	0.000
540.0	5.051%10	0.1275	772.0	1852.7	1454.2	1.2740	91.722	7.450	0.828	0.000	0.000
560.0	4.430%10	0.1118	772.2	1892.6	1514.1	1.2500	90.209	8.812	0.979	0.000	0.000
580.0	3.934%10	0.0993	772.3	1932.5	1574.0	1.2278	88.685	10.183	1.131	0.000	0.000
600.0	3.536%10	0.0892	772.4	1972.4	1633.8	1.2072	87.137	11.577	1.286	0.000	0.000
620.0	3.214%10	0.0811	772.5	2012.4	1693.7	1.1881	85.548	13.007	1.445	0.000	0.000
640.0	2.953%10	0.0745	772.6	2052.3	1753.6	1.1704	83.902	14.488	1.610	0.000	0.000
660.0	2.740%10	0.0691	772.6	2092.2	1813.4	1.1538	82.181	16.037	1.782	0.000	0.000
680.0	2.565%10	0.0647	772.7	2132.2	1873.2	1.1383	80.373	17.665	1.963	0.000	0.000
700.0	2.421%10	0.0611	772.7	2172.1	1932.9	1.1237	78.472	19.375	2.153	0.000	0.000
720.0	2.302%10	0.0581	772.8	2212.1	1992.6	1.1101	76.485	21.163	2.351	0.000	0.000
740.0	2.203%10	0.0556	772.8	2252.0	2052.2	1.0974	74.429	23.014	2.557	0.000	0.000
760.0	2.120%10	0.0535	772.8	2291.9	2111.5	1.0854	72.325	24.908	2.768	0.000	0.000
780.0	2.051%10	0.0517	772.9	2331.9	2170.6	1.0743	70.199	26.821	2.980	0.000	0.000
800.0	1.992%10	0.0503	772.9	2371.8	2229.4	1.0639	68.074	28.734	3.193	0.000	0.000

WE PUT 61= 3.0TO GET HST

INPUT: LATI= 35.7 LONGI= 140.0 R= 10 MONTH= 6 HOUR= 4.8

CALCULATED VALUES: MLAT= 25.6 MLONG= 206.6
DIP= 48.6 MODIP= 43.3 MAGLA= 29.6 XHI= 90.0
SUNRISE: 4.8 L.T. SUNSET:19.2 L.T. SUN DEC.= 23.1
NMF2=1.83%11 NMF1= 0.00%-01 NME=3.00%10 NMD=4.00%08
HMF2=269.0 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.833%08	0.0015	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.098%08	0.0022	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.815%09	0.0099	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.144%10	0.0624	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.481%10	0.1353	-1	-1	-1	-1	0.001	0.000	0.000	5.910	94.089
105.0	2.984%10	0.1628	-1	-1	-1	-1	0.002	0.000	0.000	7.935	92.062
110.0	2.903%10	0.1584	-1	-1	-1	-1	0.004	0.000	0.000	10.632	89.364
115.0	2.399%10	0.1309	-1	-1	-1	-1	0.008	0.000	0.000	14.159	85.833
120.0	1.926%10	0.1051	291.7	291.7	291.7	1.0000	0.016	0.000	0.000	18.572	81.412
125.0	1.729%10	0.0944	333.2	364.9	333.2	1.0952	0.031	0.000	0.000	23.544	76.425
130.0	1.827%10	0.0997	373.5	436.9	373.5	1.1699	0.059	0.000	0.000	28.077	71.864
135.0	2.119%10	0.1156	410.8	506.0	410.8	1.2317	0.111	0.000	0.000	31.036	68.853
140.0	2.484%10	0.1355	443.5	570.4	443.5	1.2861	0.210	0.000	0.000	32.271	67.520
150.0	3.220%10	0.1757	494.1	684.5	494.1	1.3852	0.704	0.000	0.000	32.099	67.197
160.0	3.691%10	0.2014	529.0	782.8	529.0	1.4798	2.040	0.000	0.000	31.000	66.960
170.0	4.291%10	0.2341	553.6	870.9	553.6	1.5730	4.568	0.000	0.000	29.795	65.637
180.0	5.123%10	0.2795	571.8	952.5	572.4	1.6642	7.728	0.000	0.000	28.508	63.764
190.0	6.623%10	0.3613	585.8	1029.9	590.3	1.7446	10.889	0.000	0.000	26.569	62.541
200.0	8.941%10	0.4878	596.8	1104.3	608.3	1.8155	14.130	0.000	0.000	22.138	63.732
210.0	1.132%11	0.6178	605.6	1142.7	626.2	1.8247	17.781	0.000	0.000	15.634	66.585
220.0	1.355%11	0.7393	612.9	1173.2	644.2	1.8212	22.141	0.000	0.000	10.306	67.552
230.0	1.543%11	0.8419	618.8	1194.3	662.2	1.8036	27.474	0.000	0.000	6.709	65.816
240.0	1.685%11	0.9191	623.7	1205.4	680.1	1.7724	34.052	0.000	0.000	4.360	61.588
260.0	1.822%11	0.9940	631.2	1204.1	716.0	1.6817	52.250	0.000	0.000	1.840	45.910
280.0	1.822%11	0.9939	636.4	1189.3	751.9	1.5816	79.114	0.000	0.000	0.777	20.109
300.0	1.749%11	0.9541	640.0	1178.7	787.9	1.4961	98.000	0.000	0.000	0.328	1.672
320.0	1.622%11	0.8847	642.5	1179.7	823.8	1.4320	99.313	0.000	0.000	0.138	0.548
340.0	1.460%11	0.7964	644.3	1191.4	859.6	1.3860	99.338	0.000	0.000	0.058	0.603
360.0	1.283%11	0.6997	645.6	1210.9	895.4	1.3523	99.337	0.329	0.037	0.025	0.273
380.0	1.107%11	0.6037	646.6	1235.4	931.1	1.3268	99.334	0.486	0.054	0.010	0.115
400.0	9.429%10	0.5145	647.3	1262.7	966.3	1.3067	99.330	0.555	0.062	0.004	0.049
420.0	7.978%10	0.4353	647.9	1280.5	1000.6	1.2798	99.322	0.590	0.066	0.002	0.021
440.0	6.736%10	0.3675	648.3	1299.3	1033.5	1.2572	99.197	0.714	0.079	0.001	0.009
460.0	5.697%10	0.3108	648.6	1318.7	1065.1	1.2380	98.133	1.677	0.186	0.000	0.004
480.0	4.844%10	0.2643	648.9	1338.3	1095.9	1.2212	96.602	3.056	0.340	0.000	0.002
500.0	4.151%10	0.2265	649.1	1358.1	1126.2	1.2060	95.069	4.437	0.493	0.000	0.001
520.0	3.590%10	0.1959	649.2	1378.0	1156.3	1.1918	93.547	5.807	0.645	0.000	0.000
540.0	3.139%10	0.1712	649.3	1397.9	1186.3	1.1784	92.031	7.172	0.797	0.000	0.000
560.0	2.775%10	0.1514	649.5	1417.9	1216.3	1.1657	90.514	8.538	0.949	0.000	0.000
580.0	2.481%10	0.1354	649.5	1437.9	1246.3	1.1537	88.985	9.914	1.102	0.000	0.000
600.0	2.243%10	0.1224	649.6	1457.9	1276.3	1.1423	87.431	11.312	1.257	0.000	0.000
620.0	2.049%10	0.1118	649.7	1477.9	1306.3	1.1313	85.837	12.747	1.416	0.000	0.000
640.0	1.891%10	0.1032	649.7	1497.9	1336.3	1.1209	84.185	14.233	1.581	0.000	0.000
660.0	1.762%10	0.0961	649.8	1517.9	1366.2	1.1110	82.458	15.788	1.754	0.000	0.000
680.0	1.655%10	0.0903	649.8	1537.9	1396.2	1.1015	80.644	17.421	1.936	0.000	0.000
700.0	1.566%10	0.0855	649.8	1557.9	1426.1	1.0924	78.737	19.137	2.126	0.000	0.000
720.0	1.493%10	0.0815	649.9	1577.9	1456.0	1.0837	76.744	20.931	2.326	0.000	0.000
740.0	1.432%10	0.0781	649.9	1597.9	1485.9	1.0753	74.680	22.788	2.532	0.000	0.000
760.0	1.381%10	0.0753	649.9	1617.9	1515.7	1.0674	72.569	24.688	2.743	0.000	0.000
780.0	1.338%10	0.0730	649.9	1637.9	1545.4	1.0598	70.436	26.608	2.956	0.000	0.000
800.0	1.301%10	0.0710	649.9	1657.9	1574.9	1.0526	68.303	28.527	3.170	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 35.7 LONGI= 140.0 R= 10 MONTH= 6 HOUR= 0.0

CALCULATED VALUES: MLAT= 25.6 MLONG= 206.6
DIP= 48.6 MODIP= 43.3 MAGLA= 29.6 XHI= 121.2
SUNRISE: 4.8 L.T. SUNSET:19.2 L.T. SUN DEC.= 23.1
NMF2=2.89%11 NMF1= 0.00%-01 NME=1.78%09 NMD=4.00%08
HMF2=336.9 HMF1= 0.0 HME=105.0 HMD= 87.9

H	NE	N/NMAX	TN	TE	TI	TE/TI	RO0+	RDH+	RDHE+	RDO2+	RDNO+
80.0	7.429%05	2.6%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.541%08	8.8%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.759%08	0.0016	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.744%09	0.0060	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.775%09	0.0061	-1	-1	-1	-1	0.001	0.000	0.000	5.910	94.089
105.0	1.775%09	0.0061	-1	-1	-1	-1	0.002	0.000	0.000	7.936	92.062
110.0	1.456%09	0.0050	-1	-1	-1	-1	0.004	0.000	0.000	10.632	89.363
115.0	9.537%08	0.0033	-1	-1	-1	-1	0.008	0.000	0.000	14.159	85.832
120.0	6.099%08	0.0021	290.4	290.4	290.4	1.0000	0.016	0.000	0.000	18.573	81.411
125.0	4.313%08	0.0015	331.4	336.9	331.4	1.0166	0.031	0.000	0.000	23.546	76.424
130.0	3.582%08	0.0012	371.2	382.2	371.2	1.0296	0.059	0.000	0.000	28.079	71.862
135.0	3.534%08	0.0012	408.0	424.5	408.0	1.0404	0.111	0.000	0.000	31.037	68.851
140.0	4.040%08	0.0014	440.2	462.2	440.2	1.0500	0.210	0.000	0.000	32.272	67.518
150.0	6.799%08	0.0024	489.8	522.8	489.8	1.0674	0.705	0.000	0.000	32.100	67.195
160.0	1.180%09	0.0041	523.9	567.9	523.9	1.0840	2.042	0.000	0.000	31.000	66.958
170.0	2.036%09	0.0070	547.9	602.9	547.9	1.1004	4.570	0.000	0.000	29.785	65.644
180.0	2.971%09	0.0103	565.6	631.6	565.6	1.1167	7.732	0.000	0.000	28.432	63.835
190.0	4.370%09	0.0151	579.2	656.2	579.9	1.1314	10.895	0.000	0.000	26.086	63.018
200.0	6.495%09	0.0225	589.8	677.9	594.1	1.1410	14.137	0.000	0.000	20.207	65.656
210.0	9.800%09	0.0339	598.4	697.5	608.2	1.1467	17.790	0.000	0.000	12.192	70.018
220.0	1.514%10	0.0523	605.5	715.5	622.4	1.1495	22.152	0.000	0.000	6.630	71.218
230.0	2.436%10	0.0842	611.2	732.2	636.5	1.1503	27.487	0.000	0.000	3.537	68.976
240.0	4.188%10	0.1448	616.0	748.0	650.7	1.1496	34.066	0.000	0.000	1.882	64.051
260.0	1.008%11	0.3486	623.2	777.3	679.0	1.1447	52.267	0.000	0.000	0.533	47.201
280.0	1.777%11	0.6146	628.2	804.3	707.3	1.1371	79.130	0.000	0.000	0.151	20.720
300.0	2.450%11	0.8470	631.7	829.8	735.6	1.1281	98.000	0.000	0.000	0.043	1.957
320.0	2.816%11	0.9739	634.2	854.2	763.8	1.1184	99.285	0.000	0.000	0.012	0.703
340.0	2.890%11	0.9994	636.0	878.0	791.9	1.1087	99.266	0.405	0.045	0.003	0.280
360.0	2.804%11	0.9696	637.2	901.3	819.7	1.0996	99.201	0.647	0.072	0.001	0.079
380.0	2.608%11	0.9017	638.2	924.2	846.6	1.0917	99.095	0.794	0.088	0.000	0.022
400.0	2.339%11	0.8089	638.9	946.9	871.5	1.0865	98.531	1.316	0.146	0.000	0.006
420.0	2.039%11	0.7051	639.4	947.2	892.2	1.0616	95.154	4.360	0.484	0.000	0.002
440.0	1.740%11	0.6017	639.8	947.5	906.6	1.0451	90.703	8.367	0.930	0.000	0.001
460.0	1.465%11	0.5064	640.1	947.8	914.7	1.0362	86.302	12.328	1.370	0.000	0.000
480.0	1.224%11	0.4234	640.4	948.1	918.6	1.0322	81.951	16.244	1.805	0.000	0.000
500.0	1.023%11	0.3537	640.6	948.5	920.4	1.0305	77.609	20.152	2.239	0.000	0.000
520.0	8.581%10	0.2967	640.7	948.8	921.4	1.0297	73.235	24.088	2.676	0.000	0.000
540.0	7.256%10	0.2509	640.8	949.1	922.1	1.0293	68.801	28.079	3.120	0.000	0.000
560.0	6.200%10	0.2144	640.9	949.4	922.7	1.0290	64.296	32.134	3.570	0.000	0.000
580.0	5.364%10	0.1855	641.0	949.8	923.2	1.0288	59.738	36.235	4.026	0.000	0.000
600.0	4.702%10	0.1626	641.1	950.1	923.7	1.0286	55.177	40.340	4.482	0.000	0.000
620.0	4.177%10	0.1444	641.1	950.4	924.2	1.0284	50.681	44.387	4.932	0.000	0.000
640.0	3.759%10	0.1300	641.2	950.7	924.7	1.0282	46.325	48.308	5.368	0.000	0.000
660.0	3.425%10	0.1184	641.2	951.1	925.1	1.0280	42.173	52.044	5.783	0.000	0.000
680.0	3.156%10	0.1091	641.3	951.4	925.6	1.0278	38.274	55.553	6.173	0.000	0.000
700.0	2.940%10	0.1017	641.3	951.7	926.1	1.0276	34.655	58.811	6.535	0.000	0.000
720.0	2.764%10	0.0956	641.3	952.0	926.6	1.0274	31.325	61.808	6.868	0.000	0.000
740.0	2.621%10	0.0906	641.3	952.3	927.1	1.0273	28.281	64.547	7.172	0.000	0.000
760.0	2.504%10	0.0866	641.4	952.7	927.6	1.0271	25.512	67.039	7.449	0.000	0.000
780.0	2.408%10	0.0833	641.4	953.0	928.1	1.0269	23.001	69.299	7.700	0.000	0.000
800.0	2.328%10	0.0805	641.4	953.3	928.5	1.0267	20.729	71.344	7.927	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 35.7 LONGI= 140.0 R= 10 MONTH=12 HOUR=12.0

CALCULATED VALUES: MLAT= 25.6 MLONG= 206.6
DIP= 48.6 MODIP= 43.3 MAGLA= 29.6 XHI= 58.6
SUNRISE: 7.2 L.T. SUNSET:16.8 L.T. SUN DEC.= -22.9
NMF2=5.38%11 NMF1= 0.00%-01 NME=1.03%11 NMD=3.87%08
HMF2=229.2 HMF1= 0.0 HME=109.9 HMD= 81.1

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	3.681%08	6.8%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	7.420%08	0.0014	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	8.042%09	0.0150	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	3.540%10	0.0658	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	7.551%10	0.1404	-1	-1	-1	-1	0.298	0.000	0.000	44.586	55.116
105.0	9.956%10	0.1852	-1	-1	-1	-1	0.445	0.000	0.000	45.596	53.960
110.0	1.034%11	0.1924	-1	-1	-1	-1	0.664	0.000	0.000	46.605	52.731
115.0	9.743%10	0.1812	-1	-1	-1	-1	0.991	0.000	0.000	47.573	51.436
120.0	9.478%10	0.1763	302.9	302.9	302.9	1.0000	1.479	0.000	0.000	48.395	50.126
125.0	1.060%11	0.1971	348.6	402.3	348.6	1.1540	2.205	0.000	0.000	48.838	48.957
130.0	1.105%11	0.2055	393.1	500.4	393.1	1.2731	3.283	0.000	0.000	48.527	48.190
135.0	1.154%11	0.2146	434.8	595.8	434.8	1.3703	4.876	0.000	0.000	47.193	47.931
140.0	1.207%11	0.2245	472.1	686.7	472.1	1.4548	7.210	0.000	0.000	45.000	47.790
150.0	1.330%11	0.2474	531.5	853.5	531.5	1.6059	15.361	0.000	0.000	39.522	45.116
160.0	1.487%11	0.2766	573.9	1003.3	573.9	1.7482	30.265	0.000	0.000	32.942	36.793
170.0	1.717%11	0.3193	604.6	1141.3	604.6	1.8877	50.911	0.000	0.000	23.106	25.984
180.0	2.373%11	0.4413	627.6	1271.7	627.6	2.0262	69.486	0.000	0.000	12.802	17.712
190.0	3.402%11	0.6326	645.4	1396.8	647.4	2.1577	80.437	0.000	0.000	6.468	13.096
200.0	4.318%11	0.8030	659.6	1518.3	667.1	2.2759	85.627	0.000	0.000	3.214	11.159
210.0	4.966%11	0.9235	671.0	1575.0	686.9	2.2929	88.197	0.000	0.000	1.594	10.209
220.0	5.299%11	0.9855	680.4	1617.9	706.6	2.2895	89.799	0.000	0.000	0.790	9.411
230.0	5.377%11	1.0000	688.1	1643.2	726.4	2.2621	91.075	0.000	0.000	0.392	8.533
240.0	5.341%11	0.9934	694.5	1650.0	746.2	2.2114	92.251	0.000	0.000	0.194	7.555
260.0	5.105%11	0.9493	704.3	1619.6	785.7	2.0614	94.551	0.000	0.000	0.048	5.401
280.0	4.691%11	0.8725	711.0	1564.6	825.2	1.8960	96.813	0.000	0.000	0.012	3.175
300.0	4.168%11	0.7751	715.7	1519.6	864.7	1.7573	98.000	0.000	0.000	0.003	1.997
320.0	3.600%11	0.6696	719.0	1498.1	904.3	1.6566	98.074	0.000	0.000	0.001	1.926
340.0	3.043%11	0.5660	721.4	1498.6	944.0	1.5876	98.074	0.844	0.094	0.000	0.988
360.0	2.533%11	0.4710	723.1	1514.9	983.9	1.5398	98.072	1.516	0.168	0.000	0.243
380.0	2.088%11	0.3882	724.4	1541.2	1024.3	1.5046	98.070	1.684	0.187	0.000	0.060
400.0	1.713%11	0.3187	725.3	1573.3	1066.2	1.4756	98.066	1.728	0.192	0.000	0.015
420.0	1.407%11	0.2617	726.0	1608.4	1111.1	1.4476	98.058	1.745	0.194	0.000	0.004
440.0	1.160%11	0.2158	726.6	1645.5	1160.4	1.4181	97.934	1.858	0.206	0.000	0.001
460.0	9.641%10	0.1793	727.0	1683.5	1214.1	1.3867	96.883	2.805	0.312	0.000	0.000
480.0	8.089%10	0.1504	727.3	1722.2	1270.7	1.3553	95.373	4.165	0.463	0.000	0.000
500.0	6.864%10	0.1277	727.6	1761.1	1328.8	1.3254	93.859	5.527	0.614	0.000	0.000
520.0	5.896%10	0.1097	727.8	1800.3	1387.5	1.2975	92.356	6.879	0.764	0.000	0.000
540.0	5.129%10	0.0954	728.0	1839.5	1446.4	1.2718	90.859	8.227	0.914	0.000	0.000
560.0	4.519%10	0.0840	728.1	1878.8	1505.3	1.2481	89.361	9.575	1.064	0.000	0.000
580.0	4.030%10	0.0750	728.2	1918.1	1564.4	1.2262	87.852	10.934	1.215	0.000	0.000
600.0	3.637%10	0.0676	728.3	1957.5	1623.4	1.2058	86.318	12.314	1.368	0.000	0.000
620.0	3.318%10	0.0617	728.4	1996.8	1682.4	1.1869	84.744	13.730	1.526	0.000	0.000
640.0	3.059%10	0.0569	728.5	2036.2	1741.4	1.1693	83.113	15.198	1.689	0.000	0.000
660.0	2.846%10	0.0529	728.5	2075.5	1800.3	1.1529	81.408	16.732	1.859	0.000	0.000
680.0	2.671%10	0.0497	728.6	2114.9	1859.3	1.1375	79.617	18.345	2.038	0.000	0.000
700.0	2.526%10	0.0470	728.6	2154.3	1918.1	1.1231	77.735	20.039	2.227	0.000	0.000
720.0	2.406%10	0.0447	728.6	2193.6	1976.9	1.1096	75.767	21.810	2.423	0.000	0.000
740.0	2.305%10	0.0429	728.7	2233.0	2035.6	1.0970	73.729	23.644	2.627	0.000	0.000
760.0	2.220%10	0.0413	728.7	2272.3	2094.1	1.0851	71.645	25.519	2.835	0.000	0.000
780.0	2.149%10	0.0400	728.7	2311.7	2152.4	1.0740	69.539	27.415	3.046	0.000	0.000
800.0	2.089%10	0.0389	728.7	2351.1	2210.3	1.0637	67.434	29.310	3.257	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 35.7 LONGI= 140.0 R= 10 MONTH=12 HOUR= 7.2

CALCULATED VALUES: MLAT= 25.6 MLONG= 206.6
DIP= 48.6 MODIP= 43.3 MAGLA= 29.6 XHI= 90.0
SUNRISE: 7.2 L.T. SUNSET:16.8 L.T. SUN DEC.= -22.9
NMF2=1.76%11 NMF1= 0.00%-01 NME=3.29%10 NMD=4.00%08
HMF2=238.2 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.833%08	0.0016	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.098%08	0.0023	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.817%09	0.0103	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.180%10	0.0670	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.660%10	0.1511	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	3.263%10	0.1853	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	3.172%10	0.1802	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	2.595%10	0.1474	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	2.053%10	0.1166	289.3	289.3	289.3	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	1.828%10	0.1038	329.8	361.8	329.8	1.0968	0.084	0.000	0.000	36.294	63.621
130.0	1.940%10	0.1102	369.2	433.0	369.2	1.1730	0.161	0.000	0.000	40.716	59.123
135.0	2.271%10	0.1290	405.6	501.3	405.6	1.2361	0.307	0.000	0.000	43.939	55.754
140.0	2.687%10	0.1526	437.3	565.0	437.3	1.2920	0.584	0.000	0.000	45.000	54.416
150.0	3.566%10	0.2025	486.1	677.6	486.1	1.3941	2.074	0.000	0.000	41.880	56.046
160.0	4.191%10	0.2380	519.4	774.8	519.4	1.4917	6.909	0.000	0.000	36.631	56.461
170.0	5.073%10	0.2881	542.9	862.1	542.9	1.5880	19.661	0.000	0.000	30.703	49.636
180.0	6.796%10	0.3860	560.2	943.2	561.5	1.6799	41.885	0.000	0.000	21.641	36.474
190.0	9.796%10	0.5563	573.4	1020.3	579.9	1.7594	63.787	0.000	0.000	10.559	25.653
200.0	1.271%11	0.7218	583.8	1094.5	598.3	1.8294	76.967	0.000	0.000	4.137	18.896
210.0	1.509%11	0.8571	592.1	1133.0	616.7	1.8371	83.288	0.000	0.000	1.545	15.167
220.0	1.668%11	0.9472	599.0	1163.7	635.1	1.8323	86.496	0.000	0.000	0.573	12.931
230.0	1.745%11	0.9911	604.6	1185.0	653.5	1.8133	88.560	0.000	0.000	0.212	11.228
240.0	1.760%11	0.9998	609.2	1196.5	671.9	1.7807	90.243	0.000	0.000	0.079	9.679
260.0	1.721%11	0.9777	616.3	1196.1	708.7	1.6876	93.359	0.000	0.000	0.011	6.630
280.0	1.625%11	0.9229	621.1	1182.2	745.5	1.5857	96.398	0.000	0.000	0.001	3.600
300.0	1.487%11	0.8446	624.5	1172.7	782.3	1.4990	98.000	0.000	0.000	0.000	2.000
320.0	1.326%11	0.7529	626.9	1174.8	819.1	1.4342	98.100	0.000	0.000	0.000	1.900
340.0	1.157%11	0.6573	628.7	1187.7	855.9	1.3877	98.101	1.044	0.116	0.000	0.739
360.0	9.949%10	0.5650	629.9	1208.4	892.6	1.3539	98.099	1.620	0.180	0.000	0.101
380.0	8.464%10	0.4807	630.8	1234.1	929.0	1.3284	98.096	1.701	0.189	0.000	0.014
400.0	7.161%10	0.4067	631.5	1262.6	965.0	1.3084	98.093	1.715	0.191	0.000	0.002
420.0	6.051%10	0.3437	632.0	1280.5	999.9	1.2805	98.084	1.724	0.192	0.000	0.000
440.0	5.126%10	0.2911	632.4	1299.3	1033.3	1.2573	97.961	1.835	0.204	0.000	0.000
460.0	4.365%10	0.2479	632.7	1318.6	1065.2	1.2379	96.910	2.781	0.309	0.000	0.000
480.0	3.745%10	0.2127	632.9	1338.2	1096.0	1.2210	95.399	4.141	0.460	0.000	0.000
500.0	3.243%10	0.1842	633.1	1358.0	1126.4	1.2057	93.884	5.504	0.612	0.000	0.000
520.0	2.837%10	0.1611	633.3	1377.9	1156.5	1.1915	92.381	6.857	0.762	0.000	0.000
540.0	2.508%10	0.1424	633.4	1397.9	1186.5	1.1781	90.884	8.204	0.912	0.000	0.000
560.0	2.241%10	0.1273	633.5	1417.8	1216.5	1.1655	89.386	9.553	1.061	0.000	0.000
580.0	2.024%10	0.1150	633.6	1437.8	1246.5	1.1534	87.876	10.912	1.212	0.000	0.000
600.0	1.847%10	0.1049	633.6	1457.8	1276.5	1.1420	86.341	12.293	1.366	0.000	0.000
620.0	1.702%10	0.0967	633.7	1477.8	1306.5	1.1311	84.767	13.709	1.523	0.000	0.000
640.0	1.582%10	0.0899	633.7	1497.8	1336.5	1.1207	83.136	15.178	1.686	0.000	0.000
660.0	1.483%10	0.0842	633.8	1517.8	1366.4	1.1107	81.431	16.712	1.857	0.000	0.000
680.0	1.401%10	0.0796	633.8	1537.8	1396.4	1.1012	79.639	18.325	2.036	0.000	0.000
700.0	1.332%10	0.0757	633.8	1557.8	1426.3	1.0922	77.756	20.020	2.224	0.000	0.000
720.0	1.275%10	0.0724	633.9	1577.8	1456.2	1.0835	75.787	21.791	2.421	0.000	0.000
740.0	1.226%10	0.0696	633.9	1597.8	1486.1	1.0751	73.749	23.626	2.625	0.000	0.000
760.0	1.186%10	0.0673	633.9	1617.8	1515.9	1.0672	71.665	25.502	2.834	0.000	0.000
780.0	1.151%10	0.0654	633.9	1637.8	1545.6	1.0596	69.558	27.398	3.044	0.000	0.000
800.0	1.122%10	0.0637	633.9	1657.8	1575.1	1.0525	67.452	29.293	3.255	0.000	0.000

WE PUT W1= 3.0TO GET HST

INPUT: LATI= 35.7 LONGI= 140.0 R= 10 MONTH=12 HOUR= 0.0

CALCULATED VALUES: MLAT= 25.6 MLONG= 206.6
DIP= 48.6 MODIP= 43.3 MAGLA= 29.6 XHI= 167.2
SUNRISE: 7.2 L.T. SUNSET:16.8 L.T. SUN DEC.= -22.9
NMF2=6.41%10 NMF1= 0.00%-01 NME=1.78%09 NMD=4.00%08
HMF2=323.1 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RO0+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.033%05	7.8%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.459%08	0.0038	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.723%08	0.0074	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.742%09	0.0272	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.775%09	0.0277	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	1.775%09	0.0277	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	1.450%09	0.0226	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	9.445%08	0.0147	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	6.004%08	0.0094	284.7	284.7	284.7	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	4.220%08	0.0066	323.5	329.6	323.5	1.0187	0.084	0.000	0.000	36.294	63.621
130.0	3.487%08	0.0054	361.1	373.2	361.1	1.0336	0.161	0.000	0.000	40.716	59.123
135.0	3.427%08	0.0053	395.7	413.9	395.7	1.0460	0.307	0.000	0.000	43.939	55.754
140.0	3.912%08	0.0061	425.7	449.9	425.7	1.0570	0.584	0.000	0.000	45.000	54.416
150.0	6.608%08	0.0103	471.1	507.5	471.1	1.0772	2.075	0.000	0.000	41.880	56.044
160.0	1.157%09	0.0180	501.7	550.2	501.7	1.0966	6.912	0.000	0.000	36.631	56.457
170.0	1.861%09	0.0290	523.1	583.7	523.1	1.1159	19.672	0.000	0.000	30.703	49.625
180.0	2.256%09	0.0352	538.7	611.5	539.1	1.1343	41.907	0.000	0.000	21.641	36.451
190.0	2.755%09	0.0430	550.6	635.5	554.2	1.1466	63.821	0.000	0.000	10.559	25.620
200.0	3.397%09	0.0530	560.0	657.0	569.4	1.1538	77.006	0.000	0.000	4.137	18.857
210.0	4.245%09	0.0662	567.5	676.6	584.6	1.1575	83.329	0.000	0.000	1.545	15.125
220.0	5.412%09	0.0844	573.7	694.9	599.7	1.1587	86.537	0.000	0.000	0.573	12.890
230.0	7.142%09	0.1114	578.7	712.0	614.9	1.1580	88.599	0.000	0.000	0.212	11.188
240.0	1.023%10	0.1595	582.9	728.3	630.0	1.1560	90.280	0.000	0.000	0.079	9.641
260.0	2.602%10	0.4058	589.2	758.9	660.4	1.1492	93.390	0.000	0.000	0.011	6.599
280.0	4.555%10	0.7104	593.5	787.5	690.7	1.1402	96.417	0.000	0.000	0.001	3.582
300.0	5.950%10	0.9279	596.6	814.8	721.0	1.1301	98.000	0.000	0.000	0.000	2.000
320.0	6.406%10	0.9991	598.7	841.2	751.2	1.1198	98.071	0.628	0.070	0.000	1.231
340.0	6.325%10	0.9865	600.3	867.0	781.3	1.1096	98.030	1.621	0.180	0.000	0.169
360.0	6.023%10	0.9394	601.4	892.3	811.1	1.1002	97.965	1.810	0.201	0.000	0.023
380.0	5.560%10	0.8672	602.2	917.4	839.9	1.0923	97.860	1.923	0.214	0.000	0.003
400.0	5.003%10	0.7803	602.8	942.2	866.5	1.0874	97.304	2.426	0.270	0.000	0.000
420.0	4.414%10	0.6884	603.3	942.2	888.6	1.0604	93.968	5.429	0.603	0.000	0.000
440.0	3.841%10	0.5990	603.6	942.3	903.7	1.0426	89.573	9.384	1.043	0.000	0.000
460.0	3.315%10	0.5170	603.9	942.3	912.0	1.0332	85.227	13.296	1.477	0.000	0.000
480.0	2.853%10	0.4450	604.1	942.3	915.8	1.0290	80.930	17.163	1.907	0.000	0.000
500.0	2.459%10	0.3835	604.3	942.4	917.3	1.0273	76.642	21.022	2.336	0.000	0.000
520.0	2.129%10	0.3320	604.4	942.4	917.9	1.0266	72.323	24.909	2.768	0.000	0.000
540.0	1.857%10	0.2896	604.5	942.4	918.2	1.0264	67.944	28.851	3.206	0.000	0.000
560.0	1.635%10	0.2550	604.6	942.5	918.3	1.0263	63.494	32.855	3.651	0.000	0.000
580.0	1.454%10	0.2267	604.7	942.5	918.4	1.0262	58.994	36.905	4.101	0.000	0.000
600.0	1.307%10	0.2038	604.7	942.5	918.5	1.0262	54.490	40.959	4.551	0.000	0.000
620.0	1.187%10	0.1852	604.8	942.5	918.5	1.0262	50.050	44.955	4.995	0.000	0.000
640.0	1.090%10	0.1700	604.8	942.6	918.5	1.0262	45.748	48.827	5.425	0.000	0.000
660.0	1.010%10	0.1576	604.8	942.6	918.6	1.0261	41.648	52.517	5.835	0.000	0.000
680.0	9.452%09	0.1474	604.9	942.6	918.6	1.0261	37.797	55.982	6.220	0.000	0.000
700.0	8.916%09	0.1391	604.9	942.7	918.7	1.0261	34.223	59.199	6.578	0.000	0.000
720.0	8.475%09	0.1322	604.9	942.7	918.7	1.0261	30.934	62.159	6.907	0.000	0.000
740.0	8.110%09	0.1265	604.9	942.7	918.8	1.0261	27.929	64.864	7.207	0.000	0.000
760.0	7.807%09	0.1218	605.0	942.8	918.8	1.0260	25.194	67.325	7.481	0.000	0.000
780.0	7.555%09	0.1178	605.0	942.8	918.9	1.0260	22.714	69.557	7.729	0.000	0.000
800.0	7.345%09	0.1145	605.0	942.8	918.9	1.0260	20.471	71.576	7.953	0.000	0.000

WE PUT B1= 5.0TO GET HST

INPUT: LATI= 35.7 LONGI= 140.0 R=100 MONTH= 3 HOUR=12.0

CALCULATED VALUES: MLAT= 25.6 MLONG= 206.6
DIP= 48.6 MODIP= 45.3 MAGLA= 29.6 XHI= 39.0
SUNRISE: 6.2 L.T. SUNSET:17.8 L.T. SUN DEC.= -3.3
NMF2=1.73%12 NMF1= 3.34% 11 NME=1.60%11 NMD=1.22%09
HMF2=307.3 HMF1=199.7 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDN0+
80.0	1.163%09	6.7%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.407%09	0.0014	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	2.357%10	0.0137	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	8.077%10	0.0468	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.365%11	0.0791	-1	-1	-1	-1	0.322	0.000	0.000	62.797	36.880
105.0	1.581%11	0.0916	-1	-1	-1	-1	0.488	0.000	0.000	60.122	39.390
110.0	1.603%11	0.0929	-1	-1	-1	-1	0.739	0.000	0.000	57.493	41.768
115.0	1.554%11	0.0900	-1	-1	-1	-1	1.118	0.000	0.000	54.818	44.064
120.0	1.538%11	0.0891	336.9	336.9	336.9	1.0000	1.690	0.000	0.000	51.924	46.386
125.0	1.607%11	0.0931	395.7	435.4	395.7	1.1003	2.552	0.000	0.000	48.604	48.845
130.0	1.618%11	0.0938	453.1	532.4	453.1	1.1751	3.844	0.000	0.000	44.831	51.324
135.0	1.631%11	0.0945	508.5	627.5	508.5	1.2341	5.771	0.000	0.000	40.864	53.365
140.0	1.647%11	0.0954	560.4	719.1	560.4	1.2832	8.609	0.000	0.000	37.000	54.391
150.0	1.686%11	0.0977	650.8	888.8	650.8	1.3657	18.448	0.000	0.000	30.090	51.462
160.0	1.742%11	0.1009	723.2	1040.5	723.2	1.4389	35.534	0.000	0.000	24.228	40.237
170.0	1.825%11	0.1057	780.4	1177.1	780.4	1.5083	56.597	0.000	0.000	18.777	24.626
180.0	1.966%11	0.1139	826.0	1302.1	826.0	1.5763	72.989	0.000	0.000	13.542	13.469
190.0	2.474%11	0.1433	863.0	1418.4	863.0	1.6436	81.759	0.000	0.000	9.404	8.837
200.0	3.457%11	0.2003	893.3	1528.0	893.3	1.7106	85.877	0.000	0.000	6.479	7.643
210.0	5.802%11	0.3362	918.3	1585.0	918.3	1.7261	88.060	0.000	0.000	4.460	7.480
220.0	8.347%11	0.4836	939.1	1628.1	939.1	1.7338	89.555	0.000	0.000	3.069	7.376
230.0	1.072%12	0.6212	956.4	1653.5	956.4	1.7289	90.823	0.000	0.000	2.112	7.065
240.0	1.270%12	0.7357	970.9	1660.3	970.9	1.7101	92.025	0.000	0.000	1.453	6.521
260.0	1.533%12	0.8881	993.0	1629.2	993.0	1.6406	94.410	0.000	0.000	0.688	4.902
280.0	1.666%12	0.9655	1008.5	1573.2	1009.1	1.5590	96.764	0.000	0.000	0.326	2.911
300.0	1.722%12	0.9976	1019.3	1527.4	1024.4	1.4910	98.000	0.000	0.000	0.154	1.846
320.0	1.709%12	0.9900	1026.9	1505.3	1039.8	1.4476	98.077	0.000	0.000	0.073	1.850
340.0	1.618%12	0.9375	1032.4	1505.5	1055.4	1.4264	98.077	0.518	0.058	0.035	1.313
360.0	1.467%12	0.8501	1036.3	1521.6	1071.6	1.4200	98.075	1.158	0.129	0.016	0.622
380.0	1.281%12	0.7421	1039.2	1547.7	1089.0	1.4212	98.073	1.462	0.162	0.008	0.295
400.0	1.084%12	0.6279	1041.4	1579.9	1109.8	1.4236	98.069	1.609	0.179	0.004	0.139
420.0	8.945%11	0.5183	1043.0	1615.3	1137.1	1.4205	98.061	1.684	0.187	0.002	0.066
440.0	7.256%11	0.4204	1044.3	1652.7	1174.6	1.4071	97.938	1.827	0.203	0.001	0.031
460.0	5.822%11	0.3373	1045.2	1691.2	1222.2	1.3838	96.887	2.788	0.310	0.000	0.015
480.0	4.648%11	0.2693	1046.0	1730.3	1276.4	1.3556	95.376	4.155	0.462	0.000	0.007
500.0	3.712%11	0.2151	1046.6	1769.6	1333.9	1.3267	93.862	5.521	0.613	0.000	0.003
520.0	2.979%11	0.1726	1047.1	1809.2	1392.7	1.2991	92.359	6.875	0.764	0.000	0.002
540.0	2.410%11	0.1396	1047.4	1848.8	1452.0	1.2733	90.862	8.223	0.914	0.000	0.001
560.0	1.970%11	0.1142	1047.8	1888.5	1511.5	1.2494	89.364	9.572	1.064	0.000	0.000
580.0	1.631%11	0.0945	1048.0	1928.3	1571.1	1.2273	87.855	10.931	1.215	0.000	0.000
600.0	1.368%11	0.0793	1048.2	1968.0	1630.7	1.2068	86.321	12.311	1.368	0.000	0.000
620.0	1.164%11	0.0674	1048.4	2007.8	1690.4	1.1878	84.747	13.728	1.525	0.000	0.000
640.0	1.004%11	0.0582	1048.6	2047.5	1750.0	1.1700	83.116	15.196	1.688	0.000	0.000
660.0	8.783%10	0.0509	1048.7	2087.3	1809.5	1.1535	81.411	16.730	1.859	0.000	0.000
680.0	7.784%10	0.0451	1048.8	2127.1	1869.1	1.1380	79.620	18.342	2.038	0.000	0.000
700.0	6.985%10	0.0405	1048.9	2166.8	1928.6	1.1235	77.737	20.037	2.226	0.000	0.000
720.0	6.340%10	0.0367	1049.0	2206.6	1988.0	1.1100	75.769	21.808	2.423	0.000	0.000
740.0	5.817%10	0.0337	1049.0	2246.4	2047.2	1.0973	73.732	23.642	2.627	0.000	0.000
760.0	5.389%10	0.0312	1049.1	2286.1	2106.4	1.0853	71.647	25.517	2.835	0.000	0.000
780.0	5.037%10	0.0292	1049.1	2325.9	2165.2	1.0742	69.541	27.413	3.046	0.000	0.000
800.0	4.746%10	0.0275	1049.2	2365.7	2223.7	1.0638	67.436	29.308	3.256	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 35.7 LONGI= 140.0 R=100 MONTH= 3 HOUR= 6.2

CALCULATED VALUES: MLAT= 25.6 MLONG= 206.6
DIP= 48.6 MODIP= 43.3 MAGLA= 29.6 XHI= 90.0
SUNRISE: 6.2 L.T. SUNSET:17.8 L.T. SUN DEC.= -3.3
NMF2=5.09%11 NMF1= 0.00%-01 NME=4.00%10 NMD=4.00%08
HMF2=297.3 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDN0+
80.0	2.833%08	5.6%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.098%08	8.1%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.821%09	0.0036	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.259%10	0.0247	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.086%10	0.0607	-1	-1	-1	-1	0.012	0.000	0.000	18.280	81.709
105.0	3.963%10	0.0779	-1	-1	-1	-1	0.019	0.000	0.000	21.000	78.981
110.0	3.872%10	0.0761	-1	-1	-1	-1	0.030	0.000	0.000	24.062	75.907
115.0	3.198%10	0.0629	-1	-1	-1	-1	0.049	0.000	0.000	27.391	72.560
120.0	2.568%10	0.0505	321.1	321.1	321.1	1.0000	0.079	0.000	0.000	30.722	69.199
125.0	2.307%10	0.0454	373.8	397.6	373.8	1.0638	0.127	0.000	0.000	33.556	66.317
130.0	2.436%10	0.0479	425.1	472.8	425.1	1.1122	0.205	0.000	0.000	35.464	64.331
135.0	2.815%10	0.0553	474.1	545.7	474.1	1.1509	0.330	0.000	0.000	36.497	63.174
140.0	3.293%10	0.0647	519.1	614.5	519.1	1.1838	0.530	0.000	0.000	37.000	62.470
150.0	4.354%10	0.0856	594.4	737.5	594.4	1.2408	1.364	0.000	0.000	37.333	61.303
160.0	5.338%10	0.1049	651.5	842.3	651.5	1.2930	3.437	0.000	0.000	36.738	59.825
170.0	6.621%10	0.1302	694.7	933.3	694.7	1.3434	8.184	0.000	0.000	32.734	59.082
180.0	8.359%10	0.1643	728.1	1014.3	728.1	1.3932	17.092	0.000	0.000	24.187	58.721
190.0	1.090%11	0.2143	754.5	1088.4	754.5	1.4427	28.794	0.000	0.000	16.193	55.013
200.0	1.511%11	0.2970	775.7	1157.4	775.7	1.4921	39.129	0.000	0.000	10.626	50.246
210.0	2.035%11	0.4001	793.1	1195.8	793.1	1.5078	46.642	0.000	0.000	6.952	46.406
220.0	2.603%11	0.5118	807.4	1225.8	807.4	1.5181	52.531	0.000	0.000	4.547	42.922
230.0	3.176%11	0.6245	819.3	1245.7	819.3	1.5204	57.951	0.000	0.000	2.973	39.076
240.0	3.714%11	0.7302	829.2	1255.3	829.5	1.5132	63.480	0.000	0.000	1.945	34.575
260.0	4.557%11	0.8958	844.2	1249.8	849.7	1.4709	75.747	0.000	0.000	0.832	23.422
280.0	4.993%11	0.9816	854.6	1229.7	869.9	1.4136	89.778	0.000	0.000	0.356	9.867
300.0	5.085%11	0.9997	861.9	1213.3	890.1	1.3630	98.000	0.000	0.000	0.152	1.848
320.0	4.968%11	0.9766	867.1	1207.8	910.4	1.3267	98.535	0.000	0.000	0.065	1.400
340.0	4.688%11	0.9216	870.8	1212.8	930.6	1.3032	98.545	0.000	0.000	0.028	1.428
360.0	4.288%11	0.8429	873.5	1225.3	951.0	1.2885	98.543	0.739	0.082	0.012	0.624
380.0	3.818%11	0.7505	875.4	1242.6	971.7	1.2788	98.540	1.069	0.119	0.005	0.267
400.0	3.325%11	0.6537	876.9	1262.7	993.1	1.2714	98.537	1.212	0.135	0.002	0.114
420.0	2.848%11	0.5599	878.0	1280.5	1016.0	1.2604	98.528	1.280	0.142	0.001	0.049
440.0	2.410%11	0.4739	878.8	1299.3	1041.1	1.2481	98.405	1.417	0.157	0.000	0.021
460.0	2.026%11	0.3983	879.5	1318.6	1068.4	1.2342	97.349	2.378	0.264	0.000	0.009
480.0	1.698%11	0.3339	880.0	1338.3	1097.2	1.2197	95.830	3.749	0.417	0.000	0.004
500.0	1.425%11	0.2802	880.4	1358.1	1126.7	1.2054	94.309	5.120	0.569	0.000	0.002
520.0	1.201%11	0.2361	880.7	1378.0	1156.5	1.1915	92.799	6.480	0.720	0.000	0.001
540.0	1.019%11	0.2003	881.0	1397.9	1186.4	1.1782	91.296	7.834	0.870	0.000	0.000
560.0	8.714%10	0.1713	881.2	1417.9	1216.4	1.1656	89.790	9.189	1.021	0.000	0.000
580.0	7.526%10	0.1479	881.4	1437.9	1246.4	1.1536	88.273	10.554	1.173	0.000	0.000
600.0	6.567%10	0.1291	881.5	1457.9	1276.4	1.1422	86.732	11.941	1.327	0.000	0.000
620.0	5.792%10	0.1139	881.6	1477.8	1306.4	1.1313	85.151	13.364	1.485	0.000	0.000
640.0	5.164%10	0.1015	881.7	1497.8	1336.4	1.1208	83.512	14.839	1.649	0.000	0.000
660.0	4.652%10	0.0915	881.8	1517.8	1366.3	1.1109	81.799	16.381	1.820	0.000	0.000
680.0	4.233%10	0.0832	881.9	1537.8	1396.3	1.1014	79.999	18.001	2.000	0.000	0.000
700.0	3.889%10	0.0765	881.9	1557.8	1426.2	1.0923	78.108	19.703	2.189	0.000	0.000
720.0	3.604%10	0.0709	882.0	1577.8	1456.1	1.0836	76.130	21.483	2.387	0.000	0.000
740.0	3.368%10	0.0662	882.0	1597.8	1486.0	1.0753	74.083	23.325	2.592	0.000	0.000
760.0	3.171%10	0.0623	882.1	1617.8	1515.8	1.0673	71.989	25.210	2.801	0.000	0.000
780.0	3.006%10	0.0591	882.1	1637.8	1545.5	1.0598	69.873	27.114	3.013	0.000	0.000
800.0	2.867%10	0.0564	882.1	1657.8	1575.0	1.0526	67.758	29.018	3.224	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 35.7 LONGI= 140.0 R=100 MONTH= 3 HOUR= 0.0

CALCULATED VALUES: MLAT= 25.6 MLONG= 206.6
DIP= 48.6 MODIP= 43.3 MAGLA= 29.6 XHI= 147.6
SUNRISE: 6.2 L.T. SUNSET:17.8 L.T. SUN DEC.= -3.3
NMF2=5.51%11 NMF1= 0.00%-01 NME=3.20%09 NMD=4.00%08
HMF2=347.7 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.417%05	9.8%-7	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.474%08	4.5%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.729%08	8.6%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	2.508%09	0.0046	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.193%09	0.0058	-1	-1	-1	-1	0.012	0.000	0.000	18.280	81.709
105.0	3.201%09	0.0058	-1	-1	-1	-1	0.019	0.000	0.000	21.000	78.981
110.0	2.617%09	0.0047	-1	-1	-1	-1	0.030	0.000	0.000	24.062	75.907
115.0	1.706%09	0.0031	-1	-1	-1	-1	0.049	0.000	0.000	27.391	72.560
120.0	1.086%09	0.0020	318.3	318.3	318.3	1.0000	0.079	0.000	0.000	30.722	69.199
125.0	7.642%08	0.0014	369.9	371.6	369.9	1.0044	0.127	0.000	0.000	33.556	66.317
130.0	6.320%08	0.0011	420.2	423.5	420.2	1.0078	0.205	0.000	0.000	35.464	64.331
135.0	6.216%08	0.0011	468.1	473.0	468.1	1.0105	0.330	0.000	0.000	36.497	63.174
140.0	7.098%08	0.0013	511.9	518.4	511.9	1.0128	0.530	0.000	0.000	37.000	62.470
150.0	1.198%09	0.0022	584.6	594.4	584.6	1.0168	1.365	0.000	0.000	37.333	61.302
160.0	2.094%09	0.0038	639.3	652.4	639.3	1.0205	3.439	0.000	0.000	36.738	59.823
170.0	3.573%09	0.0065	680.3	696.7	680.3	1.0241	8.188	0.000	0.000	32.734	59.078
180.0	6.017%09	0.0109	711.9	731.5	711.9	1.0276	17.101	0.000	0.000	24.187	58.712
190.0	1.005%10	0.0182	736.8	759.7	736.8	1.0311	28.809	0.000	0.000	16.193	54.998
200.0	1.666%10	0.0302	756.7	782.9	756.7	1.0346	39.149	0.000	0.000	10.626	50.226
210.0	2.741%10	0.0497	773.0	802.5	773.0	1.0381	46.665	0.000	0.000	6.952	46.383
220.0	4.478%10	0.0813	786.5	819.2	786.5	1.0416	52.556	0.000	0.000	4.547	42.398
230.0	7.239%10	0.1314	797.6	833.6	797.6	1.0452	57.977	0.000	0.000	2.973	39.050
240.0	1.107%11	0.2009	806.8	846.1	806.8	1.0487	63.506	0.000	0.000	1.945	34.549
260.0	2.155%11	0.3911	820.9	866.7	820.9	1.0558	75.771	0.000	0.000	0.832	23.397
280.0	3.397%11	0.6165	830.6	883.0	832.3	1.0609	89.795	0.000	0.000	0.356	9.849
300.0	4.503%11	0.8172	837.5	896.4	843.8	1.0623	98.000	0.000	0.000	0.152	1.848
320.0	5.216%11	0.9466	842.3	907.8	855.2	1.0614	98.507	0.000	0.000	0.065	1.428
340.0	5.493%11	0.9968	845.7	917.8	866.6	1.0590	98.473	0.761	0.085	0.028	0.653
360.0	5.468%11	0.9922	848.2	926.8	877.9	1.0557	98.409	1.170	0.130	0.012	0.279
380.0	5.231%11	0.9493	850.0	935.2	888.8	1.0521	98.303	1.415	0.157	0.005	0.119
400.0	4.829%11	0.8763	851.4	943.1	898.9	1.0491	97.744	1.983	0.220	0.002	0.051
420.0	4.321%11	0.7842	852.4	943.2	907.3	1.0395	94.393	5.026	0.558	0.001	0.022
440.0	3.770%11	0.6842	853.2	943.2	913.1	1.0330	89.978	9.011	1.001	0.000	0.009
460.0	3.226%11	0.5854	853.8	943.3	916.3	1.0295	85.613	12.945	1.438	0.000	0.004
480.0	2.724%11	0.4943	854.3	943.4	917.8	1.0279	81.296	16.832	1.870	0.000	0.002
500.0	2.282%11	0.4142	854.7	943.5	918.5	1.0272	76.989	20.710	2.301	0.000	0.001
520.0	1.907%11	0.3461	855.0	943.6	918.9	1.0269	72.650	24.615	2.735	0.000	0.000
540.0	1.597%11	0.2898	855.2	943.7	919.1	1.0268	68.251	28.574	3.175	0.000	0.000
560.0	1.344%11	0.2439	855.4	943.7	919.2	1.0267	63.782	32.596	3.622	0.000	0.000
580.0	1.140%11	0.2069	855.6	943.8	919.4	1.0266	59.261	36.665	4.074	0.000	0.000
600.0	9.767%10	0.1772	855.7	943.9	919.5	1.0266	54.736	40.737	4.526	0.000	0.000
620.0	8.459%10	0.1535	855.8	944.0	919.6	1.0265	50.276	44.751	4.972	0.000	0.000
640.0	7.412%10	0.1345	855.9	944.1	919.7	1.0265	45.955	48.641	5.405	0.000	0.000
660.0	6.571%10	0.1193	856.0	944.2	919.9	1.0264	41.836	52.347	5.816	0.000	0.000
680.0	5.894%10	0.1070	856.1	944.2	920.0	1.0264	37.968	55.828	6.203	0.000	0.000
700.0	5.345%10	0.0970	856.1	944.3	920.1	1.0263	34.378	59.060	6.562	0.000	0.000
720.0	4.899%10	0.0889	856.2	944.4	920.2	1.0263	31.074	62.033	6.893	0.000	0.000
740.0	4.533%10	0.0823	856.2	944.5	920.4	1.0262	28.055	64.750	7.194	0.000	0.000
760.0	4.233%10	0.0768	856.3	944.6	920.5	1.0262	25.308	67.223	7.469	0.000	0.000
780.0	3.985%10	0.0723	856.3	944.7	920.6	1.0261	22.817	69.464	7.718	0.000	0.000
800.0	3.780%10	0.0686	856.3	944.7	920.7	1.0261	20.564	71.493	7.944	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 35.7 LONGI= 140.0 R=100 MONTH= 6 HOUR=12.0

CALCULATED VALUES: MLAT= 25.6 MLONG= 206.6
DIP= 48.6 MODIP= 43.3 MAGLA= 29.6 XHI= 12.6
SUNRISE: 4.8 L.T. SUNSET:19.2 L.T. SUN DEC.= 23.1
NMF2=8.29%11 NMF1= 3.68% 11 NME=1.78%11 NMD=1.33%09
HMF2=312.4 HMF1=211.0 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	1.275%09	0.0015	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.670%09	0.0032	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	2.612%10	0.0315	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	8.944%10	0.1079	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.513%11	0.1825	-1	-1	-1	-1	0.336	0.000	0.000	62.621	37.043
105.0	1.755%11	0.2117	-1	-1	-1	-1	0.482	0.000	0.000	54.939	44.578
110.0	1.779%11	0.2146	-1	-1	-1	-1	0.691	0.000	0.000	48.386	50.924
115.0	1.731%11	0.2088	-1	-1	-1	-1	0.989	0.000	0.000	42.987	56.024
120.0	1.714%11	0.2068	339.4	339.4	339.4	1.0000	1.415	0.000	0.000	38.800	59.784
125.0	1.790%11	0.2160	399.0	437.7	399.0	1.0969	2.024	0.000	0.000	35.732	62.245
130.0	1.823%11	0.2199	457.3	534.7	457.3	1.1690	2.887	0.000	0.000	33.453	63.660
135.0	1.859%11	0.2242	513.7	629.7	513.7	1.2257	4.107	0.000	0.000	31.614	64.280
140.0	1.897%11	0.2288	566.7	721.4	566.7	1.2728	5.809	0.000	0.000	30.000	64.191
150.0	1.983%11	0.2392	659.5	891.5	659.5	1.3517	11.251	0.000	0.000	27.119	61.629
160.0	2.087%11	0.2517	734.4	1043.7	734.4	1.4211	19.962	0.000	0.000	24.520	55.519
170.0	2.217%11	0.2675	794.0	1180.6	794.0	1.4868	30.669	0.000	0.000	22.009	47.321
180.0	2.396%11	0.2890	841.9	1305.8	841.9	1.5510	40.806	0.000	0.000	18.777	40.417
190.0	2.721%11	0.3283	880.8	1422.0	880.8	1.6145	49.733	0.000	0.000	12.476	37.791
200.0	3.246%11	0.3916	912.7	1531.2	912.7	1.6777	58.351	0.000	0.000	5.160	36.489
210.0	3.721%11	0.4489	939.2	1588.4	939.2	1.6913	67.504	0.000	0.000	1.662	30.833
220.0	4.376%11	0.5279	961.2	1631.7	961.2	1.6975	77.593	0.000	0.000	0.509	21.898
230.0	5.143%11	0.6204	979.6	1657.1	979.6	1.6916	88.070	0.000	0.000	0.155	11.776
240.0	5.872%11	0.7084	994.9	1663.8	994.9	1.6723	95.635	0.000	0.000	0.047	4.318
260.0	7.097%11	0.8562	1018.5	1632.5	1018.5	1.6029	98.527	0.000	0.000	0.004	1.468
280.0	7.889%11	0.9517	1034.9	1576.2	1034.9	1.5231	98.595	0.000	0.000	0.000	1.404
300.0	8.242%11	0.9942	1046.3	1530.1	1047.1	1.4613	98.596	0.747	0.083	0.000	0.574
320.0	8.264%11	0.9969	1054.5	1507.9	1059.2	1.4237	98.596	1.216	0.135	0.000	0.053
340.0	7.966%11	0.9610	1060.3	1508.0	1071.4	1.4075	98.594	1.261	0.140	0.000	0.005
360.0	7.388%11	0.8913	1064.5	1524.2	1084.2	1.4058	98.593	1.266	0.141	0.000	0.000
380.0	6.623%11	0.7989	1067.6	1550.4	1098.5	1.4114	98.590	1.269	0.141	0.000	0.000
400.0	5.769%11	0.6959	1069.9	1582.6	1116.3	1.4177	98.586	1.272	0.141	0.000	0.000
420.0	4.911%11	0.5924	1071.6	1618.3	1141.3	1.4179	98.578	1.280	0.142	0.000	0.000
440.0	4.111%11	0.4960	1072.9	1655.8	1177.2	1.4066	98.454	1.391	0.155	0.000	0.000
460.0	3.404%11	0.4106	1073.9	1694.4	1224.0	1.3843	97.398	2.342	0.260	0.000	0.000
480.0	2.803%11	0.3381	1074.7	1733.7	1278.1	1.3565	95.879	3.709	0.412	0.000	0.000
500.0	2.306%11	0.2782	1075.4	1773.2	1335.6	1.3276	94.357	5.079	0.564	0.000	0.000
520.0	1.903%11	0.2296	1075.9	1812.9	1394.6	1.2999	92.846	6.438	0.715	0.000	0.000
540.0	1.580%11	0.1906	1076.3	1852.7	1454.2	1.2741	91.342	7.793	0.866	0.000	0.000
560.0	1.324%11	0.1597	1076.6	1892.6	1514.0	1.2501	89.836	9.148	1.016	0.000	0.000
580.0	1.121%11	0.1352	1076.9	1932.5	1573.8	1.2279	88.318	10.514	1.168	0.000	0.000
600.0	9.598%10	0.1158	1077.1	1972.4	1633.7	1.2074	86.776	11.902	1.322	0.000	0.000
620.0	8.320%10	0.1004	1077.3	2012.4	1693.5	1.1883	85.194	13.326	1.481	0.000	0.000
640.0	7.300%10	0.0881	1077.5	2052.3	1753.4	1.1705	83.554	14.801	1.645	0.000	0.000
660.0	6.482%10	0.0782	1077.6	2092.2	1813.2	1.1539	81.841	16.344	1.816	0.000	0.000
680.0	5.823%10	0.0702	1077.7	2132.2	1873.0	1.1384	80.040	17.964	1.996	0.000	0.000
700.0	5.288%10	0.0638	1077.8	2172.1	1932.8	1.1238	78.147	19.668	2.185	0.000	0.000
720.0	4.852%10	0.0585	1077.9	2212.1	1992.4	1.1102	76.169	21.448	2.383	0.000	0.000
740.0	4.494%10	0.0542	1078.0	2252.0	2052.0	1.0975	74.121	23.292	2.588	0.000	0.000
760.0	4.199%10	0.0507	1078.0	2291.9	2111.4	1.0855	72.025	25.177	2.797	0.000	0.000
780.0	3.954%10	0.0477	1078.1	2331.9	2170.5	1.0744	69.908	27.083	3.009	0.000	0.000
800.0	3.750%10	0.0452	1078.1	2371.8	2229.2	1.0640	67.792	28.987	3.221	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 35.7 LONGI= 140.0 R=100 MONTH= 6 HOUR= 4.8

CALCULATED VALUES: MLAT= 25.6 MLONG= 206.6
DIP= 48.6 MODIP= 43.3 MAGLA= 29.6 XHI= 90.0
SUNRISE: 4.8 L.T. SUNSET:19.2 L.T. SUN DEC.= 23.1
NMF2=4.90%11 NMF1= 0.00%-01 NME=3.88%10 NMD=4.00%08
HMF2=316.9 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.833%08	5.8%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.098%08	8.4%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.820%09	0.0037	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.246%10	0.0254	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.012%10	0.0614	-1	-1	-1	-1	0.016	0.000	0.000	6.623	93.361
105.0	3.837%10	0.0782	-1	-1	-1	-1	0.025	0.000	0.000	8.541	91.434
110.0	3.747%10	0.0764	-1	-1	-1	-1	0.040	0.000	0.000	10.994	88.966
115.0	3.098%10	0.0632	-1	-1	-1	-1	0.064	0.000	0.000	14.085	85.852
120.0	2.487%10	0.0507	323.6	323.6	323.6	1.0000	0.101	0.000	0.000	17.829	82.070
125.0	2.233%10	0.0455	377.3	400.6	377.3	1.0617	0.159	0.000	0.000	21.966	77.875
130.0	2.359%10	0.0481	429.6	476.2	429.6	1.1084	0.252	0.000	0.000	25.782	73.966
135.0	2.735%10	0.0558	479.7	549.5	479.7	1.1456	0.397	0.000	0.000	28.494	71.110
140.0	3.206%10	0.0654	525.7	618.9	525.7	1.1772	0.623	0.000	0.000	30.000	69.377
150.0	4.200%10	0.0856	603.4	743.1	603.4	1.2315	1.498	0.000	0.000	31.126	67.376
160.0	5.062%10	0.1032	662.8	849.0	662.8	1.2811	3.368	0.000	0.000	31.531	65.101
170.0	6.152%10	0.1254	708.0	940.9	708.0	1.3289	6.679	0.000	0.000	31.688	61.633
180.0	7.570%10	0.1543	743.2	1022.6	743.2	1.3760	11.436	0.000	0.000	30.852	57.711
190.0	9.503%10	0.1938	771.0	1097.0	771.0	1.4228	17.669	0.000	0.000	25.763	56.569
200.0	1.241%11	0.2530	793.6	1166.1	793.6	1.4695	26.008	0.000	0.000	16.079	57.913
210.0	1.652%11	0.3367	812.0	1204.6	812.0	1.4836	37.565	0.000	0.000	8.607	53.827
220.0	2.109%11	0.4300	827.2	1234.6	827.2	1.4925	53.681	0.000	0.000	4.466	41.853
230.0	2.591%11	0.5283	839.8	1254.4	839.8	1.4937	74.390	0.000	0.000	2.307	23.303
240.0	3.073%11	0.6266	850.3	1263.8	850.3	1.4863	92.014	0.000	0.000	1.191	6.796
260.0	3.935%11	0.8022	866.3	1257.7	868.4	1.4483	99.365	0.000	0.000	0.317	0.318
280.0	4.539%11	0.9255	877.4	1236.8	886.4	1.3953	99.541	0.000	0.000	0.084	0.374
300.0	4.842%11	0.9872	885.2	1219.3	904.4	1.3482	99.544	0.063	0.007	0.023	0.364
320.0	4.902%11	0.9995	890.7	1212.7	922.4	1.3147	99.543	0.318	0.035	0.006	0.097
340.0	4.783%11	0.9752	894.6	1216.6	940.5	1.2935	99.542	0.387	0.043	0.002	0.026
360.0	4.505%11	0.9186	897.4	1227.9	958.8	1.2807	99.541	0.407	0.045	0.000	0.007
380.0	4.112%11	0.8385	899.5	1243.9	977.4	1.2727	99.538	0.414	0.046	0.000	0.002
400.0	3.654%11	0.7450	901.1	1262.7	996.8	1.2667	99.534	0.419	0.047	0.000	0.000
420.0	3.177%11	0.6477	902.2	1280.5	1018.1	1.2577	99.526	0.427	0.047	0.000	0.000
440.0	2.717%11	0.5540	903.1	1299.3	1042.1	1.2468	99.401	0.539	0.060	0.000	0.000
460.0	2.299%11	0.4687	903.8	1318.7	1068.8	1.2337	98.334	1.499	0.167	0.000	0.000
480.0	1.933%11	0.3940	904.4	1338.3	1097.4	1.2195	96.800	2.880	0.320	0.000	0.000
500.0	1.622%11	0.3307	904.8	1358.1	1126.8	1.2053	95.264	4.262	0.474	0.000	0.000
520.0	1.364%11	0.2782	905.1	1378.0	1156.6	1.1915	93.739	5.635	0.626	0.000	0.000
540.0	1.153%11	0.2351	905.4	1397.9	1186.5	1.1782	92.220	7.002	0.778	0.000	0.000
560.0	9.822%10	0.2003	905.6	1417.9	1216.4	1.1656	90.699	8.371	0.930	0.000	0.000
580.0	8.441%10	0.1721	905.8	1437.9	1246.4	1.1536	89.167	9.750	1.083	0.000	0.000
600.0	7.328%10	0.1494	906.0	1457.9	1276.4	1.1422	87.610	11.151	1.239	0.000	0.000
620.0	6.431%10	0.1311	906.1	1477.9	1306.4	1.1313	86.013	12.588	1.399	0.000	0.000
640.0	5.706%10	0.1163	906.2	1497.9	1336.4	1.1208	84.358	14.078	1.564	0.000	0.000
660.0	5.117%10	0.1043	906.3	1517.9	1366.3	1.1109	82.627	15.635	1.737	0.000	0.000
680.0	4.638%10	0.0946	906.4	1537.9	1396.3	1.1014	80.809	17.272	1.919	0.000	0.000
700.0	4.246%10	0.0866	906.4	1557.9	1426.2	1.0923	78.898	18.992	2.110	0.000	0.000
720.0	3.923%10	0.0800	906.5	1577.9	1456.1	1.0836	76.901	20.789	2.310	0.000	0.000
740.0	3.656%10	0.0745	906.5	1597.9	1486.0	1.0753	74.833	22.650	2.517	0.000	0.000
760.0	3.435%10	0.0700	906.6	1617.9	1515.8	1.0673	72.718	24.554	2.728	0.000	0.000
780.0	3.250%10	0.0663	906.6	1637.9	1545.5	1.0598	70.580	26.478	2.942	0.000	0.000
800.0	3.095%10	0.0631	906.7	1657.9	1575.0	1.0526	68.443	28.401	3.156	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 35.7 LONGI= 140.0 R=100 MONTH= 6 HOUR= 0.0

CALCULATED VALUES: MLAT= 25.6 MLONG= 206.6
DIP= 48.6 MODIP= 43.3 MAGLA= 29.6 XHI= 121.2
SUNRISE: 4.8 L.T. SUNSET:19.2 L.T. SUN DEC.= 23.1
NMF2=6.76%11 NMF1= 0.00%-01 NME=3.20%09 NMD=4.00%08
HMF2=368.0 HMF1= 0.0 HME=105.0 HMD= 87.9

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	7.429%05	1.1%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.541%08	3.8%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.759%08	7.0%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	2.524%09	0.0037	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.194%09	0.0047	-1	-1	-1	-1	0.016	0.000	0.000	6.623	93.361
105.0	3.201%09	0.0047	-1	-1	-1	-1	0.025	0.000	0.000	8.541	91.434
110.0	2.626%09	0.0039	-1	-1	-1	-1	0.040	0.000	0.000	10.994	88.966
115.0	1.720%09	0.0025	-1	-1	-1	-1	0.064	0.000	0.000	14.085	85.852
120.0	1.100%09	0.0016	322.4	322.4	322.4	1.0000	0.101	0.000	0.000	17.829	82.070
125.0	7.777%08	0.0012	375.6	376.6	375.6	1.0027	0.160	0.000	0.000	21.966	77.875
130.0	6.460%08	9.6%-4	427.5	429.5	427.5	1.0048	0.252	0.000	0.000	25.782	73.966
135.0	6.372%08	9.4%-4	477.0	480.1	477.0	1.0065	0.397	0.000	0.000	28.494	71.109
140.0	7.286%08	0.0011	522.5	526.7	522.5	1.0079	0.623	0.000	0.000	30.000	69.377
150.0	1.226%09	0.0018	599.0	605.2	599.0	1.0103	1.499	0.000	0.000	31.125	67.376
160.0	2.128%09	0.0031	657.3	665.5	657.3	1.0125	3.369	0.000	0.000	31.523	65.108
170.0	3.560%09	0.0053	701.6	711.9	701.6	1.0147	6.682	0.000	0.000	31.631	61.688
180.0	5.640%09	0.0083	735.9	748.2	735.9	1.0168	11.440	0.000	0.000	30.463	58.096
190.0	8.907%09	0.0132	763.0	777.4	763.0	1.0189	17.675	0.000	0.000	24.037	58.288
200.0	1.403%10	0.0208	784.9	801.4	784.9	1.0210	26.016	0.000	0.000	12.998	60.985
210.0	2.205%10	0.0326	802.8	821.4	802.8	1.0231	37.577	0.000	0.000	5.759	56.664
220.0	3.464%10	0.0513	817.6	838.2	817.6	1.0252	53.695	0.000	0.000	2.450	43.855
230.0	5.449%10	0.0807	829.9	852.5	829.9	1.0273	74.407	0.000	0.000	1.036	24.556
240.0	8.546%10	0.1265	840.0	864.7	840.0	1.0294	92.029	0.000	0.000	0.438	7.533
260.0	1.803%11	0.2669	855.6	884.4	855.6	1.0337	99.254	0.000	0.000	0.078	0.667
280.0	3.108%11	0.4601	866.4	899.3	866.4	1.0380	97.970	1.679	0.187	0.014	0.151
300.0	4.517%11	0.6685	873.9	910.9	874.0	1.0422	95.560	3.969	0.441	0.002	0.027
320.0	5.701%11	0.8439	879.2	920.4	881.0	1.0447	93.146	6.164	0.685	0.000	0.005
340.0	6.446%11	0.9541	883.0	928.3	888.0	1.0454	90.774	8.302	0.922	0.000	0.001
360.0	6.736%11	0.9971	885.8	935.2	894.9	1.0450	88.437	10.406	1.156	0.000	0.000
380.0	6.702%11	0.9920	887.8	941.3	901.6	1.0441	86.124	12.488	1.388	0.000	0.000
400.0	6.393%11	0.9463	889.3	946.9	907.8	1.0431	83.819	14.563	1.618	0.000	0.000
420.0	5.868%11	0.8686	890.5	947.2	913.0	1.0375	81.500	16.650	1.850	0.000	0.000
440.0	5.211%11	0.7713	891.3	947.5	916.8	1.0335	79.141	18.773	2.086	0.000	0.000
460.0	4.506%11	0.6669	892.0	947.8	919.0	1.0313	76.705	20.966	2.330	0.000	0.000
480.0	3.819%11	0.5653	892.5	948.1	920.3	1.0302	74.146	23.268	2.585	0.000	0.000
500.0	3.194%11	0.4728	892.9	948.5	921.1	1.0297	71.414	25.727	2.859	0.000	0.000
520.0	2.653%11	0.3927	893.3	948.8	921.7	1.0294	68.456	28.389	3.154	0.000	0.000
540.0	2.200%11	0.3257	893.5	949.1	922.3	1.0291	65.232	31.292	3.477	0.000	0.000
560.0	1.830%11	0.2709	893.8	949.4	922.8	1.0289	61.723	34.449	3.828	0.000	0.000
580.0	1.533%11	0.2269	893.9	949.8	923.3	1.0287	57.954	37.842	4.205	0.000	0.000
600.0	1.296%11	0.1918	894.1	950.1	923.7	1.0285	53.987	41.412	4.601	0.000	0.000
620.0	1.108%11	0.1639	894.2	950.4	924.2	1.0283	49.918	45.074	5.008	0.000	0.000
640.0	9.584%10	0.1419	894.3	950.7	924.7	1.0281	45.857	48.729	5.414	0.000	0.000
660.0	8.398%10	0.1243	894.4	951.1	925.2	1.0279	41.900	52.290	5.810	0.000	0.000
680.0	7.453%10	0.1103	894.5	951.4	925.7	1.0277	38.126	55.687	6.187	0.000	0.000
700.0	6.695%10	0.0991	894.5	951.7	926.2	1.0276	34.584	58.875	6.542	0.000	0.000
720.0	6.085%10	0.0901	894.6	952.0	926.7	1.0274	31.300	61.830	6.870	0.000	0.000
740.0	5.591%10	0.0828	894.6	952.3	927.1	1.0272	28.283	64.545	7.172	0.000	0.000
760.0	5.188%10	0.0768	894.7	952.7	927.6	1.0270	25.529	67.024	7.447	0.000	0.000
780.0	4.859%10	0.0719	894.7	953.0	928.1	1.0268	23.026	69.277	7.697	0.000	0.000
800.0	4.588%10	0.0679	894.8	953.3	928.6	1.0266	20.757	71.319	7.924	0.000	0.000

WE PUT 61= 3.0TO GET HST

INPUT: LATI= 35.7 LONGI= 140.0 R=100 MONTH=12 HOUR=12.0

CALCULATED VALUES: MLAT= 25.6 MLONG= 206.6
DIP= 48.6 MODIP= 43.3 MAGLA= 29.6 XHI= 58.6
SUNRISE: 7.2 L.T. SUNSET:16.8 L.T. SUN DEC.= -22.9
NMF2=1.27%12 NMF1= 0.00%-01 NME=1.34%11 NMD=8.29%08
HMF2=269.7 HMF1= 0.0 HME=109.9 HMD= 81.1

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	7.887%08	6.2%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	1.590%09	0.0012	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.614%10	0.0127	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	6.022%10	0.0473	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.093%11	0.0858	-1	-1	-1	-1	0.298	0.000	0.000	44.586	55.116
105.0	1.311%11	0.1029	-1	-1	-1	-1	0.445	0.000	0.000	45.596	53.960
110.0	1.335%11	0.1049	-1	-1	-1	-1	0.664	0.000	0.000	46.605	52.731
115.0	1.258%11	0.0988	-1	-1	-1	-1	0.991	0.000	0.000	47.573	51.436
120.0	1.224%11	0.0961	334.1	334.1	334.1	1.0000	1.479	0.000	0.000	48.395	50.126
125.0	1.383%11	0.1086	391.8	432.4	391.8	1.1036	2.205	0.000	0.000	48.838	48.957
130.0	1.453%11	0.1141	448.1	529.2	448.1	1.1811	3.283	0.000	0.000	48.527	48.190
135.0	1.529%11	0.1201	502.3	624.1	502.3	1.2423	4.876	0.000	0.000	47.193	47.931
140.0	1.611%11	0.1265	553.0	715.3	553.0	1.2935	7.210	0.000	0.000	45.000	47.790
150.0	1.796%11	0.1411	640.6	884.1	640.6	1.3800	15.361	0.000	0.000	39.522	45.116
160.0	2.020%11	0.1586	710.1	1034.7	710.1	1.4571	30.265	0.000	0.000	32.942	36.793
170.0	2.298%11	0.1805	764.6	1170.3	764.6	1.5307	50.911	0.000	0.000	23.106	25.984
180.0	2.670%11	0.2096	807.8	1294.7	807.8	1.6028	69.486	0.000	0.000	12.802	17.712
190.0	3.252%11	0.2554	842.6	1410.7	842.6	1.6742	80.437	0.000	0.000	6.468	13.096
200.0	4.685%11	0.3679	871.0	1520.2	871.0	1.7454	85.627	0.000	0.000	3.214	11.159
210.0	6.510%11	0.5113	894.5	1576.9	894.5	1.7630	88.197	0.000	0.000	1.594	10.209
220.0	8.357%11	0.6563	913.9	1619.8	913.9	1.7723	89.799	0.000	0.000	0.790	9.411
230.0	1.001%12	0.7863	930.1	1645.0	930.1	1.7686	91.075	0.000	0.000	0.392	8.533
240.0	1.131%12	0.8883	943.6	1651.8	943.6	1.7505	92.251	0.000	0.000	0.194	7.555
260.0	1.262%12	0.9909	964.2	1621.3	964.4	1.6811	94.551	0.000	0.000	0.048	5.401
280.0	1.266%12	0.9941	978.6	1566.0	982.9	1.5933	96.813	0.000	0.000	0.012	3.175
300.0	1.212%12	0.9516	988.7	1520.8	1001.4	1.5186	98.000	0.000	0.000	0.003	1.997
320.0	1.115%12	0.8754	995.8	1499.1	1020.0	1.4697	98.074	0.000	0.000	0.001	1.926
340.0	9.900%11	0.7775	1000.9	1499.4	1038.8	1.4434	98.074	0.844	0.094	0.000	0.988
360.0	8.534%11	0.6702	1004.6	1515.4	1058.1	1.4323	98.072	1.516	0.168	0.000	0.243
380.0	7.180%11	0.5639	1007.3	1541.4	1078.6	1.4292	98.070	1.684	0.187	0.000	0.060
400.0	5.931%11	0.4658	1009.3	1573.3	1102.0	1.4277	98.066	1.728	0.192	0.000	0.015
420.0	4.839%11	0.3800	1010.8	1608.4	1131.6	1.4214	98.058	1.745	0.194	0.000	0.004
440.0	3.919%11	0.3078	1012.0	1645.5	1170.3	1.4059	97.934	1.858	0.206	0.000	0.001
460.0	3.167%11	0.2487	1012.9	1683.5	1218.3	1.3818	96.883	2.805	0.312	0.000	0.000
480.0	2.564%11	0.2013	1013.6	1722.2	1272.4	1.3535	95.373	4.165	0.463	0.000	0.000
500.0	2.086%11	0.1638	1014.1	1761.1	1329.4	1.3247	93.859	5.527	0.614	0.000	0.000
520.0	1.711%11	0.1344	1014.6	1800.3	1387.7	1.2973	92.356	6.879	0.764	0.000	0.000
540.0	1.418%11	0.1113	1014.9	1839.5	1446.5	1.2717	90.859	8.227	0.914	0.000	0.000
560.0	1.188%11	0.0933	1015.2	1878.8	1505.4	1.2481	89.361	9.575	1.064	0.000	0.000
580.0	1.007%11	0.0791	1015.5	1918.1	1564.4	1.2261	87.852	10.934	1.215	0.000	0.000
600.0	8.647%10	0.0679	1015.7	1957.5	1623.4	1.2058	86.318	12.314	1.368	0.000	0.000
620.0	7.519%10	0.0590	1015.8	1996.8	1682.4	1.1869	84.744	13.730	1.526	0.000	0.000
640.0	6.618%10	0.0520	1016.0	2036.2	1741.4	1.1693	83.113	15.198	1.689	0.000	0.000
660.0	5.895%10	0.0463	1016.1	2075.5	1800.4	1.1529	81.408	16.732	1.859	0.000	0.000
680.0	5.310%10	0.0417	1016.2	2114.9	1859.3	1.1375	79.617	18.345	2.038	0.000	0.000
700.0	4.833%10	0.0380	1016.3	2154.3	1918.2	1.1231	77.735	20.039	2.227	0.000	0.000
720.0	4.443%10	0.0349	1016.4	2193.6	1977.0	1.1096	75.767	21.810	2.423	0.000	0.000
740.0	4.121%10	0.0324	1016.4	2233.0	2035.6	1.0969	73.729	23.644	2.627	0.000	0.000
760.0	3.854%10	0.0303	1016.5	2272.3	2094.1	1.0851	71.645	25.519	2.835	0.000	0.000
780.0	3.631%10	0.0285	1016.5	2311.7	2152.4	1.0740	69.539	27.415	3.046	0.000	0.000
800.0	3.445%10	0.0271	1016.6	2351.1	2210.3	1.0637	67.434	29.310	3.257	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 35.7 LONGI= 140.0 R=100 MONTH=12 HOUR= 7.2

CALCULATED VALUES: MLAT= 25.6 MLONG= 206.6
DIP= 48.6 MODIP= 43.3 MAGLA= 29.6 XHI= 90.0
SUNRISE: 7.2 L.T. SUNSET:16.8 L.T. SUN DEC.= -22.9
NMF2=4.38%11 NMF1= 0.00%-01 NME=4.24%10 NMD=4.00%08
HMF2=266.7 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.833%08	6.5%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.098%08	9.4%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.822%09	0.0042	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.281%10	0.0292	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.220%10	0.0735	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	4.193%10	0.0957	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	4.095%10	0.0935	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	3.350%10	0.0765	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	2.651%10	0.0605	321.3	321.3	321.3	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	2.360%10	0.0539	374.1	397.7	374.1	1.0630	0.084	0.000	0.000	36.294	63.621
130.0	2.504%10	0.0571	425.5	472.7	425.5	1.1108	0.161	0.000	0.000	40.716	59.123
135.0	2.932%10	0.0669	474.6	545.4	474.6	1.1490	0.307	0.000	0.000	43.939	55.754
140.0	3.468%10	0.0792	519.7	614.0	519.7	1.1814	0.584	0.000	0.000	45.000	54.416
150.0	4.663%10	0.1064	595.2	736.7	595.2	1.2377	2.074	0.000	0.000	41.880	56.046
160.0	6.024%10	0.1375	652.5	841.1	652.5	1.2891	6.909	0.000	0.000	36.631	56.461
170.0	7.952%10	0.1815	695.9	931.7	695.9	1.3388	19.661	0.000	0.000	30.703	49.636
180.0	1.097%11	0.2505	729.4	1012.3	729.4	1.3878	41.885	0.000	0.000	21.641	36.474
190.0	1.594%11	0.3637	756.0	1086.0	756.0	1.4366	63.787	0.000	0.000	10.559	25.653
200.0	2.164%11	0.4939	777.3	1154.5	777.3	1.4853	76.967	0.000	0.000	4.137	18.896
210.0	2.748%11	0.6272	794.8	1192.9	794.8	1.5009	83.288	0.000	0.000	1.545	15.167
220.0	3.289%11	0.7506	809.2	1222.9	809.2	1.5112	86.496	0.000	0.000	0.573	12.931
230.0	3.739%11	0.8533	821.1	1242.8	821.1	1.5135	88.560	0.000	0.000	0.212	11.228
240.0	4.069%11	0.9287	831.1	1252.5	831.3	1.5066	90.243	0.000	0.000	0.079	9.679
260.0	4.367%11	0.9966	846.2	1247.2	851.3	1.4650	93.359	0.000	0.000	0.011	6.630
280.0	4.349%11	0.9924	856.7	1227.4	871.4	1.4086	96.398	0.000	0.000	0.001	3.600
300.0	4.182%11	0.9544	864.0	1211.3	891.4	1.3589	98.000	0.000	0.000	0.000	2.000
320.0	3.900%11	0.8900	869.2	1206.2	911.4	1.3234	98.100	0.000	0.000	0.000	1.900
340.0	3.539%11	0.8076	872.9	1211.6	931.5	1.3007	98.101	1.044	0.116	0.000	0.739
360.0	3.137%11	0.7160	875.6	1224.5	951.7	1.2867	98.099	1.620	0.180	0.000	0.101
380.0	2.729%11	0.6228	877.6	1242.2	972.2	1.2777	98.096	1.701	0.189	0.000	0.014
400.0	2.340%11	0.5341	879.0	1262.6	993.4	1.2710	98.093	1.715	0.191	0.000	0.002
420.0	1.987%11	0.4535	880.2	1280.5	1016.1	1.2601	98.084	1.724	0.192	0.000	0.000
440.0	1.678%11	0.3829	881.0	1299.3	1041.1	1.2479	97.961	1.835	0.204	0.000	0.000
460.0	1.414%11	0.3227	881.7	1318.6	1068.4	1.2342	96.910	2.781	0.309	0.000	0.000
480.0	1.193%11	0.2723	882.2	1338.2	1097.2	1.2197	95.399	4.141	0.460	0.000	0.000
500.0	1.011%11	0.2307	882.6	1358.0	1126.7	1.2053	93.884	5.504	0.612	0.000	0.000
520.0	8.619%10	0.1967	882.9	1377.9	1156.5	1.1915	92.381	6.857	0.762	0.000	0.000
540.0	7.405%10	0.1690	883.2	1397.9	1186.4	1.1782	90.884	8.204	0.912	0.000	0.000
560.0	6.418%10	0.1465	883.4	1417.8	1216.4	1.1656	89.386	9.553	1.061	0.000	0.000
580.0	5.617%10	0.1282	883.6	1437.8	1246.4	1.1536	87.876	10.912	1.212	0.000	0.000
600.0	4.964%10	0.1133	883.7	1457.8	1276.4	1.1422	86.341	12.293	1.366	0.000	0.000
620.0	4.431%10	0.1011	883.8	1477.8	1306.3	1.1312	84.767	13.709	1.523	0.000	0.000
640.0	3.994%10	0.0912	883.9	1497.8	1336.3	1.1208	83.136	15.178	1.686	0.000	0.000
660.0	3.634%10	0.0829	884.0	1517.8	1366.3	1.1109	81.431	16.712	1.857	0.000	0.000
680.0	3.337%10	0.0762	884.1	1537.8	1396.2	1.1014	79.639	18.325	2.036	0.000	0.000
700.0	3.090%10	0.0705	884.1	1557.8	1426.2	1.0923	77.756	20.020	2.224	0.000	0.000
720.0	2.884%10	0.0658	884.2	1577.8	1456.1	1.0836	75.787	21.791	2.421	0.000	0.000
740.0	2.711%10	0.0619	884.2	1597.8	1485.9	1.0753	73.749	23.626	2.625	0.000	0.000
760.0	2.565%10	0.0585	884.3	1617.8	1515.7	1.0673	71.665	25.502	2.834	0.000	0.000
780.0	2.442%10	0.0557	884.3	1637.8	1545.4	1.0598	69.558	27.398	3.044	0.000	0.000
800.0	2.338%10	0.0534	884.3	1657.8	1574.9	1.0526	67.452	29.293	3.255	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 35.7 LONGI= 140.0 R=100 MONTH=12 HOUR= 0.0

CALCULATED VALUES: MLAT= 25.6 MLONG= 206.6
DIP= 48.6 MODIP= 43.3 MAGLA= 29.6 XHI= 167.2
SUNRISE: 7.2 L.T. SUNSET:16.8 L.T. SUN DEC.= -22.9
NMF2=1.94%11 NMF1= 0.00%-01 NME=3.20%09 NMD=4.00%08
HMF2=337.4 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.033%05	2.6%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.459%08	0.0013	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.723%08	0.0024	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	2.505%09	0.0129	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.193%09	0.0164	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	3.201%09	0.0165	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	2.615%09	0.0135	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	1.703%09	0.0088	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	1.083%09	0.0056	316.9	316.9	316.9	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	7.610%08	0.0039	368.0	369.9	368.0	1.0050	0.084	0.000	0.000	36.294	63.621
130.0	6.288%08	0.0032	417.8	421.5	417.8	1.0088	0.161	0.000	0.000	40.716	59.123
135.0	6.180%08	0.0032	465.2	470.7	465.2	1.0119	0.307	0.000	0.000	43.939	55.754
140.0	7.055%08	0.0036	508.3	515.7	508.3	1.0145	0.584	0.000	0.000	45.000	54.416
150.0	1.192%09	0.0061	579.8	590.9	579.8	1.0190	2.075	0.000	0.000	41.880	56.044
160.0	2.086%09	0.0107	633.3	648.0	633.3	1.0232	6.912	0.000	0.000	36.631	56.457
170.0	3.436%09	0.0177	673.4	691.7	673.4	1.0273	19.672	0.000	0.000	30.703	49.625
180.0	4.679%09	0.0241	704.0	726.1	704.0	1.0313	41.907	0.000	0.000	21.641	36.451
190.0	6.422%09	0.0331	728.2	753.9	728.2	1.0354	63.821	0.000	0.000	10.559	25.620
200.0	8.911%09	0.0459	747.6	777.0	747.6	1.0394	77.006	0.000	0.000	4.137	18.857
210.0	1.257%10	0.0647	763.4	796.5	763.4	1.0434	83.329	0.000	0.000	1.545	15.125
220.0	1.819%10	0.0937	776.4	813.2	776.4	1.0474	86.537	0.000	0.000	0.573	12.890
230.0	2.767%10	0.1425	787.1	827.6	787.1	1.0514	88.599	0.000	0.000	0.212	11.188
240.0	4.305%10	0.2217	796.1	840.2	796.1	1.0555	90.280	0.000	0.000	0.079	9.641
260.0	8.481%10	0.4368	809.7	861.2	809.9	1.0633	93.390	0.000	0.000	0.011	6.599
280.0	1.318%11	0.6790	819.1	878.0	822.6	1.0673	96.417	0.000	0.000	0.001	3.582
300.0	1.697%11	0.8739	825.7	891.9	835.4	1.0677	98.000	0.000	0.000	0.000	2.000
320.0	1.898%11	0.9777	830.4	904.0	848.1	1.0659	98.071	0.628	0.070	0.000	1.231
340.0	1.941%11	0.9997	833.7	914.7	860.7	1.0627	98.030	1.621	0.180	0.000	0.169
360.0	1.903%11	0.9802	836.1	924.4	873.2	1.0587	97.965	1.810	0.201	0.000	0.023
380.0	1.812%11	0.9330	837.9	933.5	885.3	1.0545	97.860	1.923	0.214	0.000	0.003
400.0	1.679%11	0.8649	839.2	942.2	896.5	1.0510	97.304	2.426	0.270	0.000	0.000
420.0	1.522%11	0.7837	840.2	942.2	905.7	1.0403	93.968	5.429	0.603	0.000	0.000
440.0	1.354%11	0.6974	841.0	942.3	912.1	1.0330	89.573	9.384	1.043	0.000	0.000
460.0	1.189%11	0.6121	841.6	942.3	915.6	1.0291	85.227	13.296	1.477	0.000	0.000
480.0	1.034%11	0.5324	842.0	942.3	917.2	1.0274	80.930	17.163	1.907	0.000	0.000
500.0	8.948%10	0.4608	842.4	942.4	917.9	1.0266	76.642	21.022	2.336	0.000	0.000
520.0	7.737%10	0.3985	842.7	942.4	918.2	1.0264	72.323	24.909	2.768	0.000	0.000
540.0	6.704%10	0.3452	842.9	942.4	918.3	1.0262	67.944	28.851	3.206	0.000	0.000
560.0	5.836%10	0.3005	843.1	942.5	918.4	1.0262	63.494	32.855	3.651	0.000	0.000
580.0	5.113%10	0.2633	843.3	942.5	918.5	1.0262	58.994	36.905	4.101	0.000	0.000
600.0	4.516%10	0.2326	843.4	942.5	918.5	1.0261	54.490	40.959	4.551	0.000	0.000
620.0	4.023%10	0.2072	843.5	942.5	918.6	1.0261	50.050	44.955	4.995	0.000	0.000
640.0	3.618%10	0.1863	843.6	942.6	918.6	1.0261	45.748	48.827	5.425	0.000	0.000
660.0	3.283%10	0.1691	843.7	942.6	918.6	1.0261	41.648	52.517	5.835	0.000	0.000
680.0	3.007%10	0.1549	843.7	942.6	918.7	1.0261	37.797	55.982	6.220	0.000	0.000
700.0	2.779%10	0.1431	843.8	942.7	918.7	1.0260	34.223	59.199	6.578	0.000	0.000
720.0	2.589%10	0.1333	843.8	942.7	918.8	1.0260	30.934	62.159	6.907	0.000	0.000
740.0	2.431%10	0.1252	843.9	942.7	918.8	1.0260	27.929	64.864	7.207	0.000	0.000
760.0	2.298%10	0.1184	843.9	942.8	918.9	1.0260	25.194	67.325	7.481	0.000	0.000
780.0	2.187%10	0.1127	843.9	942.8	918.9	1.0260	22.714	69.557	7.729	0.000	0.000
800.0	2.094%10	0.1079	844.0	942.8	919.0	1.0260	20.471	71.576	7.953	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 14.7 LONGI= 342.6 R= 10 MONTH= 3 HOUR=12.0

CALCULATED VALUES: MLAT= 21.4 MLONG= 55.4
DIP= 15.9 MODIP= 15.8 MAGLA= 8.1 XHI= 18.0
SUNRISE: 6.1 L.T. SUNSET:17.9 L.T. SUN DEC.= -3.3
NMF2=1.14%12 NMF1= 2.47% 11 NME=1.43%11 NMD=6.18%08
HMF2=336.7 HMF1=229.9 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	6.004%08	5.2%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	1.204%09	0.0011	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.403%10	0.0123	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	5.815%10	0.0508	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.131%11	0.0988	-1	-1	-1	-1	0.208	0.000	0.000	82.524	17.269
105.0	1.400%11	0.1223	-1	-1	-1	-1	0.327	0.000	0.000	75.934	23.739
110.0	1.435%11	0.1253	-1	-1	-1	-1	0.515	0.000	0.000	69.810	29.676
115.0	1.438%11	0.1256	-1	-1	-1	-1	0.809	0.000	0.000	64.037	35.154
120.0	1.446%11	0.1264	307.7	307.7	307.7	1.0000	1.269	0.000	0.000	58.449	40.282
125.0	1.455%11	0.1271	355.3	404.8	355.3	1.1393	1.984	0.000	0.000	52.874	45.142
130.0	1.464%11	0.1279	401.6	500.6	401.6	1.2465	3.084	0.000	0.000	47.302	49.615
135.0	1.474%11	0.1287	445.3	593.7	445.3	1.3334	4.747	0.000	0.000	41.940	53.314
140.0	1.484%11	0.1296	484.5	682.5	484.5	1.4085	7.191	0.000	0.000	37.000	55.809
150.0	1.507%11	0.1316	548.0	844.9	548.0	1.5419	15.148	0.000	0.000	28.642	56.210
160.0	1.533%11	0.1339	594.0	989.9	594.0	1.6665	26.424	0.000	0.000	22.118	51.458
170.0	1.563%11	0.1365	627.7	1122.6	627.7	1.7884	36.968	0.000	0.000	16.981	46.051
180.0	1.599%11	0.1397	653.2	1247.0	653.2	1.9092	44.319	0.000	0.000	12.645	43.035
190.0	1.645%11	0.1437	673.0	1365.8	673.0	2.0296	49.411	0.000	0.000	8.751	41.837
200.0	1.705%11	0.1490	688.7	1480.6	690.1	2.1454	53.595	0.000	0.000	5.763	40.642
210.0	1.802%11	0.1574	701.5	1564.2	707.3	2.2116	57.582	0.000	0.000	3.752	38.666
220.0	2.144%11	0.1873	712.0	1634.9	724.4	2.2569	61.669	0.000	0.000	2.438	35.893
230.0	2.476%11	0.2163	720.7	1685.1	741.5	2.2725	65.976	0.000	0.000	1.584	32.440
240.0	3.505%11	0.3062	727.9	1709.9	758.7	2.2538	70.560	0.000	0.000	1.029	28.411
260.0	5.972%11	0.5217	738.8	1684.2	792.9	2.1240	80.677	0.000	0.000	0.434	18.889
280.0	8.450%11	0.7382	746.4	1596.5	827.2	1.9300	91.858	0.000	0.000	0.183	7.959
300.0	1.031%12	0.9004	751.7	1504.5	861.5	1.7464	98.000	0.000	0.000	0.077	1.923
320.0	1.125%12	0.9831	755.4	1441.1	895.8	1.6087	96.168	2.618	0.291	0.033	0.890
340.0	1.144%12	0.9992	758.1	1411.8	930.3	1.5176	92.858	6.077	0.675	0.014	0.376
360.0	1.100%12	0.9608	760.0	1409.2	965.0	1.4603	89.608	9.205	1.023	0.006	0.159
380.0	1.002%12	0.8757	761.4	1424.3	1000.5	1.4236	86.470	12.114	1.346	0.002	0.067
400.0	8.730%11	0.7627	762.5	1450.1	1037.9	1.3972	83.441	14.877	1.653	0.001	0.028
420.0	7.335%11	0.6408	763.3	1482.0	1079.1	1.3734	80.517	17.524	1.947	0.000	0.012
440.0	6.004%11	0.5245	763.9	1517.5	1126.1	1.3476	77.692	20.072	2.230	0.000	0.005
460.0	4.834%11	0.4223	764.3	1554.8	1178.8	1.3190	74.964	22.530	2.503	0.000	0.002
480.0	3.863%11	0.3375	764.7	1593.3	1235.4	1.2897	72.327	24.905	2.767	0.000	0.001
500.0	3.087%11	0.2697	765.0	1632.4	1293.8	1.2617	69.776	27.201	3.022	0.000	0.000
520.0	2.483%11	0.2169	765.2	1671.8	1353.0	1.2356	67.307	29.424	3.269	0.000	0.000
540.0	2.019%11	0.1763	765.4	1711.3	1412.4	1.2116	64.912	31.580	3.509	0.000	0.000
560.0	1.665%11	0.1454	765.6	1751.0	1472.0	1.1896	62.584	33.675	3.742	0.000	0.000
580.0	1.395%11	0.1219	765.7	1790.7	1531.5	1.1692	60.315	35.717	3.969	0.000	0.000
600.0	1.189%11	0.1039	765.8	1830.5	1591.0	1.1505	58.095	37.715	4.191	0.000	0.000
620.0	1.031%11	0.0901	765.9	1870.2	1650.5	1.1331	55.912	39.679	4.409	0.000	0.000
640.0	9.092%10	0.0794	766.0	1910.0	1709.8	1.1171	53.757	41.619	4.624	0.000	0.000
660.0	8.141%10	0.0711	766.0	1949.8	1769.0	1.1022	51.619	43.543	4.838	0.000	0.000
680.0	7.393%10	0.0646	766.1	1989.6	1827.9	1.0885	49.490	45.459	5.051	0.000	0.000
700.0	6.802%10	0.0594	766.1	2029.4	1886.4	1.0758	47.370	47.367	5.263	0.000	0.000
720.0	6.331%10	0.0553	766.2	2069.2	1944.4	1.0641	45.264	49.263	5.474	0.000	0.000
740.0	5.953%10	0.0520	766.2	2109.0	2001.8	1.0535	43.181	51.137	5.682	0.000	0.000
760.0	5.648%10	0.0493	766.2	2148.7	2058.1	1.0440	41.137	52.977	5.886	0.000	0.000
780.0	5.400%10	0.0472	766.3	2188.5	2113.2	1.0357	39.144	54.770	6.086	0.000	0.000
800.0	5.199%10	0.0454	766.3	2228.3	2166.7	1.0284	37.215	56.507	6.279	0.000	0.000

WE OUT B1= 3.0TO GET HST

INPUT: LATI= 14.7 LONGI= 342.6 R= 10 MONTH= 3 HOUR= 6.1

CALCULATED VALUES: MLAT= 21.4 MLONG= 55.4
DIP= 15.9 MODIP= 15.8 MAGLA= 8.1 XHI= 90.0
SUNRISE: 6.1 L.T. SUNSET:17.9 L.T. SUN DEC.= -3.3
NMF2=2.52%11 NMF1= 0.00%-01 NME=3.18%10 NMD=4.00%08
HMF2=260.4 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.914%08	0.0012	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.081%08	0.0016	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.839%09	0.0073	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.204%10	0.0478	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.629%10	0.1043	-1	-1	-1	-1	0.020	0.000	0.000	17.951	82.029
105.0	3.158%10	0.1253	-1	-1	-1	-1	0.031	0.000	0.000	20.889	79.080
110.0	3.054%10	0.1212	-1	-1	-1	-1	0.048	0.000	0.000	24.232	75.720
115.0	2.448%10	0.0971	-1	-1	-1	-1	0.074	0.000	0.000	27.888	72.038
120.0	1.951%10	0.0774	287.6	287.6	287.6	1.0000	0.115	0.000	0.000	31.525	68.360
125.0	1.927%10	0.0765	327.6	358.4	327.6	1.0940	0.178	0.000	0.000	34.510	65.312
130.0	2.390%10	0.0948	366.3	427.8	366.3	1.1681	0.275	0.000	0.000	36.302	63.423
135.0	3.050%10	0.1210	402.0	494.4	402.0	1.2297	0.426	0.000	0.000	36.980	62.595
140.0	3.528%10	0.1400	433.1	556.3	433.1	1.2843	0.656	0.000	0.000	37.000	62.344
150.0	4.116%10	0.1633	480.7	665.4	480.7	1.3843	1.529	0.000	0.000	36.329	62.142
160.0	4.873%10	0.1933	513.1	759.4	513.1	1.4800	3.355	0.000	0.000	35.360	61.285
170.0	5.921%10	0.2349	535.8	843.6	535.8	1.5746	6.481	0.000	0.000	33.727	59.792
180.0	7.708%10	0.3058	552.4	921.9	553.7	1.6648	10.439	0.000	0.000	28.912	60.649
190.0	1.088%11	0.4316	565.2	996.2	571.5	1.7431	14.394	0.000	0.000	19.184	66.422
200.0	1.429%11	0.5670	575.2	1067.7	589.2	1.8120	18.251	0.000	0.000	10.701	71.048
210.0	1.760%11	0.6982	583.2	1119.2	607.0	1.8438	22.368	0.000	0.000	5.732	71.900
220.0	2.048%11	0.8127	589.8	1163.5	624.8	1.8623	27.086	0.000	0.000	3.052	69.862
230.0	2.271%11	0.9012	595.2	1197.0	642.5	1.8629	32.666	0.000	0.000	1.624	65.711
240.0	2.420%11	0.9601	599.7	1217.2	660.3	1.8435	39.341	0.000	0.000	0.864	59.795
260.0	2.520%11	1.0000	606.5	1218.9	695.8	1.7518	56.992	0.000	0.000	0.244	42.763
280.0	2.470%11	0.9802	611.1	1188.5	731.3	1.6251	81.610	0.000	0.000	0.069	18.321
300.0	2.329%11	0.9241	614.4	1155.2	766.8	1.5065	98.000	0.000	0.000	0.020	1.980
320.0	2.122%11	0.8420	616.7	1135.9	802.3	1.4158	96.879	2.241	0.249	0.006	0.626
340.0	1.879%11	0.7456	618.4	1133.4	837.8	1.3528	93.557	5.638	0.626	0.002	0.177
360.0	1.627%11	0.6455	619.6	1144.2	873.2	1.3102	90.283	8.700	0.967	0.000	0.050
380.0	1.385%11	0.5497	620.4	1163.6	908.5	1.2808	87.122	11.578	1.286	0.000	0.014
400.0	1.167%11	0.4632	621.1	1188.4	943.3	1.2598	84.070	14.334	1.593	0.000	0.004
420.0	9.786%10	0.3883	621.6	1204.4	977.3	1.2323	81.123	16.988	1.888	0.000	0.001
440.0	8.201%10	0.3254	622.0	1222.2	1010.1	1.2100	78.278	19.550	2.172	0.000	0.000
460.0	6.896%10	0.2736	622.2	1241.0	1041.6	1.1915	75.529	22.024	2.447	0.000	0.000
480.0	5.839%10	0.2317	622.5	1260.3	1072.3	1.1754	72.872	24.415	2.713	0.000	0.000
500.0	4.987%10	0.1979	622.7	1280.0	1102.5	1.1609	70.302	26.728	2.970	0.000	0.000
520.0	4.306%10	0.1708	622.8	1299.8	1132.6	1.1476	67.814	28.967	3.219	0.000	0.000
540.0	3.760%10	0.1492	622.9	1319.7	1162.6	1.1351	65.401	31.139	3.460	0.000	0.000
560.0	3.322%10	0.1318	623.0	1339.6	1192.6	1.1233	63.055	33.250	3.694	0.000	0.000
580.0	2.970%10	0.1178	623.1	1359.6	1222.6	1.1121	60.769	35.308	3.923	0.000	0.000
600.0	2.686%10	0.1066	623.2	1379.6	1252.5	1.1014	58.532	37.321	4.147	0.000	0.000
620.0	2.455%10	0.0974	623.2	1399.5	1282.4	1.0914	56.334	39.300	4.367	0.000	0.000
640.0	2.267%10	0.0900	623.3	1419.5	1312.2	1.0818	54.162	41.254	4.584	0.000	0.000
660.0	2.113%10	0.0839	623.3	1439.5	1342.0	1.0727	52.008	43.193	4.799	0.000	0.000
680.0	1.987%10	0.0788	623.3	1459.5	1371.6	1.0641	49.863	45.123	5.014	0.000	0.000
700.0	1.882%10	0.0747	623.3	1479.5	1401.1	1.0560	47.727	47.046	5.227	0.000	0.000
720.0	1.795%10	0.0712	623.4	1499.5	1430.3	1.0484	45.605	48.956	5.440	0.000	0.000
740.0	1.723%10	0.0684	623.4	1519.5	1459.2	1.0414	43.507	50.844	5.649	0.000	0.000
760.0	1.663%10	0.0660	623.4	1539.5	1487.6	1.0349	41.447	52.698	5.855	0.000	0.000
780.0	1.612%10	0.0640	623.4	1559.5	1515.4	1.0291	39.439	54.505	6.056	0.000	0.000
800.0	1.569%10	0.0623	623.4	1579.5	1542.5	1.0240	37.495	56.254	6.250	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 14.7 LONGI= 342.6 R= 10 MONTH= 3 HOUR= 0.0

CALCULATED VALUES: MLAT= 21.4 MLONG= 55.4
DIP= 15.9 MODIP= 15.8 MAGLA= 8.1 XHI= 168.6
SUNRISE: 6.1 L.T. SUNSET:17.9 L.T. SUN DEC.= -3.3
NMF2=5.46%11 NMF1= 0.00%-01 NME=1.78%09 NMD=4.00%08
HMF2=288.1 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.478%05	1.0%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.477%08	4.5%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.730%08	8.7%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.743%09	0.0032	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.775%09	0.0032	-1	-1	-1	-1	0.020	0.000	0.000	17.951	82.029
105.0	1.775%09	0.0032	-1	-1	-1	-1	0.031	0.000	0.000	20.889	79.079
110.0	1.485%09	0.0027	-1	-1	-1	-1	0.049	0.000	0.000	24.232	75.719
115.0	9.967%08	0.0018	-1	-1	-1	-1	0.076	0.000	0.000	27.888	72.036
120.0	6.365%08	0.0012	284.3	284.3	284.3	1.0000	0.118	0.000	0.000	31.525	68.358
125.0	4.382%08	8.0%-4	323.0	328.8	323.0	1.0179	0.182	0.000	0.000	34.510	65.308
130.0	3.530%08	6.5%-4	360.5	372.1	360.5	1.0321	0.283	0.000	0.000	36.302	63.416
135.0	3.465%08	6.3%-4	395.0	412.3	395.0	1.0440	0.437	0.000	0.000	36.980	62.584
140.0	4.153%08	7.6%-4	424.8	447.9	424.8	1.0546	0.673	0.000	0.000	37.000	62.327
150.0	9.165%08	0.0017	469.9	504.7	469.9	1.0740	1.568	0.000	0.000	36.329	62.102
160.0	2.285%09	0.0042	500.4	546.7	500.4	1.0926	3.441	0.000	0.000	35.360	61.199
170.0	4.470%09	0.0082	521.6	579.5	521.6	1.1111	6.648	0.000	0.000	33.727	59.625
180.0	8.780%09	0.0161	537.1	606.6	537.4	1.1288	10.708	0.000	0.000	28.912	60.380
190.0	1.742%10	0.0319	548.9	630.0	552.3	1.1407	14.764	0.000	0.000	19.184	66.052
200.0	3.533%10	0.0647	558.2	650.9	567.3	1.1475	18.721	0.000	0.000	10.701	70.578
210.0	7.335%10	0.1342	565.7	670.0	582.2	1.1507	22.945	0.000	0.000	5.732	71.323
220.0	1.349%11	0.2468	571.7	687.6	597.1	1.1516	27.785	0.000	0.000	3.052	69.163
230.0	2.167%11	0.3965	576.7	704.2	612.0	1.1506	33.510	0.000	0.000	1.624	64.867
240.0	3.092%11	0.5658	580.9	719.9	627.0	1.1482	40.359	0.000	0.000	0.864	58.777
260.0	4.706%11	0.8612	587.1	749.3	656.8	1.1408	58.472	0.000	0.000	0.244	41.284
280.0	5.418%11	0.9915	591.4	776.9	686.7	1.1313	83.683	0.000	0.000	0.069	16.248
300.0	5.416%11	0.9912	594.5	803.1	716.5	1.1208	98.000	0.000	0.000	0.020	1.980
320.0	5.141%11	0.9408	596.6	828.4	746.3	1.1100	86.769	11.356	1.262	0.006	0.608
340.0	4.679%11	0.8562	598.1	853.1	776.0	1.0994	74.041	23.207	2.579	0.002	0.172
360.0	4.110%11	0.7520	599.2	877.3	805.3	1.0895	63.138	33.132	3.681	0.000	0.049
380.0	3.509%11	0.6422	600.0	901.3	833.7	1.0812	53.857	41.516	4.613	0.000	0.014
400.0	2.936%11	0.5372	600.6	925.1	859.9	1.0758	45.963	48.630	5.403	0.000	0.004
420.0	2.423%11	0.4434	601.1	925.2	881.6	1.0494	39.254	54.671	6.075	0.000	0.001
440.0	1.987%11	0.3636	601.4	925.3	896.6	1.0319	33.558	59.798	6.644	0.000	0.000
460.0	1.628%11	0.2979	601.7	925.3	904.9	1.0226	28.730	64.143	7.127	0.000	0.000
480.0	1.340%11	0.2452	601.9	925.4	908.7	1.0185	24.647	67.818	7.535	0.000	0.000
500.0	1.111%11	0.2034	602.1	925.5	910.3	1.0168	21.202	70.918	7.880	0.000	0.000
520.0	9.321%10	0.1706	602.2	925.6	911.0	1.0161	18.304	73.527	8.170	0.000	0.000
540.0	7.916%10	0.1449	602.3	925.7	911.3	1.0158	15.871	75.716	8.413	0.000	0.000
560.0	6.815%10	0.1247	602.4	925.8	911.5	1.0157	13.832	77.551	8.617	0.000	0.000
580.0	5.950%10	0.1089	602.5	925.9	911.7	1.0156	12.122	79.091	8.788	0.000	0.000
600.0	5.267%10	0.0964	602.5	926.0	911.8	1.0155	10.681	80.387	8.932	0.000	0.000
620.0	4.725%10	0.0865	602.6	926.1	912.0	1.0155	9.460	81.486	9.054	0.000	0.000
640.0	4.292%10	0.0785	602.6	926.2	912.1	1.0154	8.416	82.426	9.158	0.000	0.000
660.0	3.944%10	0.0722	602.7	926.3	912.3	1.0154	7.513	83.238	9.249	0.000	0.000
680.0	3.663%10	0.0670	602.7	926.4	912.4	1.0153	6.726	83.947	9.327	0.000	0.000
700.0	3.434%10	0.0628	602.7	926.5	912.5	1.0152	6.033	84.570	9.397	0.000	0.000
720.0	3.248%10	0.0594	602.7	926.6	912.7	1.0152	5.420	85.122	9.458	0.000	0.000
740.0	3.094%10	0.0566	602.8	926.6	912.8	1.0151	4.874	85.614	9.513	0.000	0.000
760.0	2.967%10	0.0543	602.8	926.7	913.0	1.0151	4.386	86.053	9.561	0.000	0.000
780.0	2.862%10	0.0524	602.8	926.8	913.1	1.0150	3.948	86.446	9.605	0.000	0.000
800.0	2.775%10	0.0508	602.8	926.9	913.2	1.0150	3.556	86.800	9.644	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 14.7 LONGI= 342.6 R= 10 MONTH= 6 HOUR=12.0

CALCULATED VALUES: MLAT= 21.4 MLONG= 55.4
DIP= 15.9 MODIP= 15.8 MAGLA= 8.1 XHI= 8.4
SUNRISE: 5.6 L.T. SUNSET:18.4 L.T. SUN DEC.= 23.1
NMF2=6.36%11 NMF1= 2.50% 11 NME=1.47%11 NMD=6.25%08
HMF2=347.3 HMF1=244.4 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	6.076%08	9.6%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	1.225%09	0.0019	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.429%10	0.0225	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	5.928%10	0.0932	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.155%11	0.1815	-1	-1	-1	-1	0.246	0.000	0.000	52.328	47.427
105.0	1.432%11	0.2250	-1	-1	-1	-1	0.353	0.000	0.000	47.525	52.122
110.0	1.467%11	0.2306	-1	-1	-1	-1	0.506	0.000	0.000	43.332	56.161
115.0	1.480%11	0.2327	-1	-1	-1	-1	0.726	0.000	0.000	39.860	59.415
120.0	1.491%11	0.2344	308.3	308.3	308.3	1.0000	1.037	0.000	0.000	37.255	61.708
125.0	1.503%11	0.2362	356.2	405.5	356.2	1.1386	1.476	0.000	0.000	35.522	63.002
130.0	1.514%11	0.2380	402.7	501.4	402.7	1.2451	2.086	0.000	0.000	34.424	63.491
135.0	1.526%11	0.2399	446.6	594.7	446.6	1.3315	2.912	0.000	0.000	33.665	63.423
140.0	1.539%11	0.2419	486.2	683.6	486.2	1.4060	3.994	0.000	0.000	33.057	62.949
150.0	1.565%11	0.2460	550.2	846.3	550.2	1.5382	6.897	0.000	0.000	31.995	61.108
160.0	1.594%11	0.2506	596.7	991.5	596.7	1.6617	10.270	0.000	0.000	31.000	58.730
170.0	1.626%11	0.2555	630.8	1124.3	630.8	1.7824	13.476	0.000	0.000	30.015	56.508
180.0	1.661%11	0.2610	656.6	1248.8	656.6	1.9020	16.516	0.000	0.000	28.888	54.596
190.0	1.700%11	0.2673	676.6	1367.6	676.6	2.0211	19.690	0.000	0.000	26.711	53.599
200.0	1.746%11	0.2745	692.6	1482.3	693.7	2.1367	23.244	0.000	0.000	20.802	55.954
210.0	1.803%11	0.2834	705.6	1566.0	710.7	2.2035	27.350	0.000	0.000	12.573	60.077
220.0	1.879%11	0.2953	716.3	1636.8	727.7	2.2493	32.145	0.000	0.000	6.839	61.016
230.0	2.057%11	0.3234	725.1	1687.1	744.7	2.2655	37.767	0.000	0.000	3.649	58.584
240.0	2.456%11	0.3861	732.4	1711.9	761.7	2.2475	44.366	0.000	0.000	1.942	53.692
260.0	3.485%11	0.5478	743.4	1686.1	795.7	2.1191	61.210	0.000	0.000	0.549	38.241
280.0	4.656%11	0.7319	751.1	1598.2	829.7	1.9263	83.617	0.000	0.000	0.155	16.228
300.0	5.579%11	0.8770	756.5	1505.9	863.7	1.7436	98.000	0.000	0.000	0.044	1.956
320.0	6.138%11	0.9648	760.3	1442.4	897.7	1.6067	96.732	2.337	0.260	0.012	0.658
340.0	6.349%11	0.9980	763.0	1413.0	931.9	1.5162	93.413	5.757	0.640	0.004	0.186
360.0	6.291%11	0.9888	765.0	1410.3	966.4	1.4594	90.144	8.822	0.980	0.001	0.053
380.0	5.924%11	0.9311	766.4	1425.4	1001.6	1.4231	86.988	11.698	1.300	0.000	0.015
400.0	5.329%11	0.8377	767.5	1451.2	1038.8	1.3970	83.940	14.450	1.606	0.000	0.004
420.0	4.618%11	0.7259	768.3	1483.2	1079.8	1.3736	80.998	17.100	1.900	0.000	0.001
440.0	3.890%11	0.6114	768.9	1518.7	1126.7	1.3479	78.157	19.658	2.184	0.000	0.000
460.0	3.214%11	0.5052	769.4	1556.1	1179.5	1.3194	75.413	22.129	2.459	0.000	0.000
480.0	2.627%11	0.4130	769.8	1594.7	1236.1	1.2901	72.760	24.516	2.724	0.000	0.000
500.0	2.142%11	0.3366	770.1	1633.8	1294.6	1.2620	70.194	26.825	2.981	0.000	0.000
520.0	1.752%11	0.2753	770.3	1673.3	1353.9	1.2359	67.709	29.062	3.229	0.000	0.000
540.0	1.445%11	0.2271	770.5	1712.9	1413.5	1.2119	65.300	31.230	3.470	0.000	0.000
560.0	1.206%11	0.1896	770.6	1752.7	1473.1	1.1898	62.958	33.338	3.704	0.000	0.000
580.0	1.021%11	0.1605	770.8	1792.5	1532.8	1.1694	60.675	35.392	3.932	0.000	0.000
600.0	8.777%10	0.1380	770.9	1832.3	1592.4	1.1506	58.442	37.402	4.156	0.000	0.000
620.0	7.665%10	0.1205	771.0	1872.2	1652.0	1.1333	56.247	39.378	4.375	0.000	0.000
640.0	6.797%10	0.1068	771.0	1912.0	1711.4	1.1172	54.079	41.329	4.592	0.000	0.000
660.0	6.116%10	0.0961	771.1	1951.9	1770.7	1.1023	51.927	43.265	4.807	0.000	0.000
680.0	5.579%10	0.0877	771.2	1991.8	1829.7	1.0885	49.786	45.193	5.021	0.000	0.000
700.0	5.151%10	0.0810	771.2	2031.6	1888.4	1.0758	47.653	47.112	5.235	0.000	0.000
720.0	4.809%10	0.0756	771.2	2071.5	1946.6	1.0642	45.534	49.019	5.447	0.000	0.000
740.0	4.534%10	0.0713	771.3	2111.4	2004.0	1.0536	43.440	50.904	5.656	0.000	0.000
760.0	4.311%10	0.0678	771.3	2151.2	2060.5	1.0441	41.383	52.755	5.862	0.000	0.000
780.0	4.130%10	0.0649	771.3	2191.1	2115.7	1.0357	39.379	54.559	6.062	0.000	0.000
800.0	3.983%10	0.0626	771.3	2231.0	2169.3	1.0284	37.437	56.306	6.256	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 14.7 LONGI= 342.6 R= 10 MONTH= 6 HOUR= 5.6

CALCULATED VALUES: MLAT= 21.4 MLONG= 55.4
DIP= 15.9 MODIP= 15.8 MAGLA= 8.1 XHI= 90.0
SUNRISE: 5.6 L.T. SUNSET:18.4 L.T. SUN DEC.= 23.1
NMF2=1.30%11 NMF1= 0.00%-01 NME=3.17%10 NMD=4.00%08
HMF2=224.0 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.914%08	0.0022	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.081%08	0.0031	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.839%09	0.0141	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.204%10	0.0923	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.626%10	0.2015	-1	-1	-1	-1	-1	-1	-1	-1	-1
105.0	3.153%10	0.2419	-1	-1	-1	-1	0.001	0.000	0.000	5.910	94.089
110.0	3.050%10	0.2340	-1	-1	-1	-1	0.002	0.000	0.000	7.936	92.062
115.0	2.445%10	0.1876	-1	-1	-1	-1	0.004	0.000	0.000	10.632	89.363
120.0	1.948%10	0.1495	289.0	289.0	289.0	1.0000	0.008	0.000	0.000	14.159	85.832
125.0	1.925%10	0.1477	329.5	360.0	329.5	1.0928	0.016	0.000	0.000	18.573	81.411
130.0	2.389%10	0.1833	368.7	429.8	368.7	1.1659	0.031	0.000	0.000	23.546	76.423
135.0	3.047%10	0.2338	405.0	496.7	405.0	1.2266	0.059	0.000	0.000	28.079	71.862
140.0	3.987%10	0.3059	436.6	558.9	436.6	1.2802	0.112	0.000	0.000	31.037	68.851
150.0	6.428%10	0.4932	485.2	668.7	485.2	1.3783	0.210	0.000	0.000	32.272	67.517
160.0	8.362%10	0.6416	518.4	763.1	518.4	1.4721	0.706	0.000	0.000	32.100	67.194
170.0	9.753%10	0.7483	541.7	847.6	541.7	1.5646	2.045	0.000	0.000	31.000	66.955
180.0	1.094%11	0.8394	558.9	925.9	559.7	1.6544	4.578	0.000	0.000	29.785	65.636
190.0	1.186%11	0.9103	572.0	1000.2	577.2	1.7328	7.746	0.000	0.000	28.432	63.822
200.0	1.250%11	0.9593	582.3	1071.7	594.7	1.8020	10.915	0.000	0.000	26.086	62.999
210.0	1.287%11	0.9878	590.6	1123.1	612.2	1.8344	14.162	0.000	0.000	20.207	65.630
220.0	1.302%11	0.9991	597.4	1167.3	629.8	1.8536	17.822	0.000	0.000	12.192	69.986
230.0	1.301%11	0.9983	603.0	1200.7	647.3	1.8549	22.193	0.000	0.000	6.630	71.177
240.0	1.288%11	0.9884	607.6	1220.8	664.8	1.8363	27.538	0.000	0.000	3.537	68.924
260.0	1.231%11	0.9445	614.6	1222.2	699.9	1.7463	34.131	0.000	0.000	1.882	63.986
280.0	1.140%11	0.8750	619.4	1191.4	734.9	1.6211	52.371	0.000	0.000	0.533	47.096
300.0	1.029%11	0.7895	622.8	1157.6	770.0	1.5035	79.294	0.000	0.000	0.151	20.555
320.0	9.086%10	0.6972	625.2	1137.9	805.0	1.4135	98.000	0.000	0.000	0.043	1.957
340.0	7.892%10	0.6055	626.9	1134.9	840.0	1.3511	97.052	2.091	0.232	0.012	0.612
360.0	6.776%10	0.5199	628.1	1145.2	875.0	1.3088	93.728	5.485	0.609	0.003	0.173
380.0	5.778%10	0.4433	629.1	1164.1	909.8	1.2796	90.448	8.552	0.950	0.001	0.049
400.0	4.914%10	0.3770	629.7	1188.4	944.2	1.2586	87.281	11.434	1.270	0.000	0.014
420.0	4.183%10	0.3210	630.2	1204.4	977.9	1.2317	84.224	14.195	1.577	0.000	0.004
440.0	3.575%10	0.2743	630.6	1222.2	1010.4	1.2097	81.272	16.855	1.873	0.000	0.001
460.0	3.075%10	0.2360	630.9	1241.0	1041.8	1.1913	78.421	19.421	2.158	0.000	0.000
480.0	2.667%10	0.2046	631.2	1260.3	1072.4	1.1753	75.667	21.900	2.433	0.000	0.000
500.0	2.334%10	0.1791	631.3	1280.0	1102.6	1.1609	73.005	24.295	2.699	0.000	0.000
520.0	2.064%10	0.1583	631.5	1299.8	1132.7	1.1475	70.431	26.612	2.957	0.000	0.000
540.0	1.843%10	0.1414	631.6	1319.7	1162.7	1.1350	67.938	28.856	3.206	0.000	0.000
560.0	1.663%10	0.1276	631.7	1339.6	1192.7	1.1232	65.520	31.032	3.448	0.000	0.000
580.0	1.515%10	0.1163	631.8	1359.6	1222.6	1.1120	63.171	33.146	3.683	0.000	0.000
600.0	1.394%10	0.1070	631.9	1379.6	1252.6	1.1014	60.880	35.208	3.912	0.000	0.000
620.0	1.294%10	0.0993	631.9	1399.5	1282.4	1.0913	58.639	37.225	4.136	0.000	0.000
640.0	1.211%10	0.0929	632.0	1419.5	1312.3	1.0817	56.437	39.207	4.356	0.000	0.000
660.0	1.142%10	0.0876	632.0	1439.5	1342.0	1.0727	54.261	41.165	4.574	0.000	0.000
680.0	1.084%10	0.0832	632.0	1459.5	1371.7	1.0641	52.103	43.108	4.790	0.000	0.000
700.0	1.035%10	0.0794	632.1	1479.5	1401.1	1.0560	49.954	45.041	5.005	0.000	0.000
720.0	9.947%09	0.0763	632.1	1499.5	1430.3	1.0484	47.814	46.967	5.219	0.000	0.000
740.0	9.603%09	0.0737	632.1	1519.5	1459.2	1.0413	45.688	48.881	5.431	0.000	0.000
760.0	9.312%09	0.0715	632.1	1539.5	1487.6	1.0349	43.586	50.772	5.641	0.000	0.000
780.0	9.066%09	0.0696	632.1	1559.5	1515.5	1.0291	41.523	52.629	5.848	0.000	0.000
800.0	8.856%09	0.0680	632.2	1579.5	1542.5	1.0240	39.511	54.440	6.049	0.000	0.000
							37.564	56.193	6.244	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 14.7 LONGI= 342.6 R= 10 MONTH= 6 HOUR= 0.0

CALCULATED VALUES: MLAT= 21.4 MLONG= 55.4
DIP= 15.9 MODIP= 15.8 MAGLA= 8.1 XHI= 142.2
SUNRISE: 5.6 L.T. SUNSET:18.4 L.T. SUN DEC.= 23.1
NMF2=1.22%11 NMF1= 0.00%-01 NME=1.78%09 NMD=4.00%08
HMF2=310.4 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.922%05	4.8%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.494%08	0.0020	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.737%08	0.0039	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.743%09	0.0143	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.775%09	0.0145	-1	-1	-1	-1	0.001	0.000	0.000	5.910	94.089
105.0	1.775%09	0.0145	-1	-1	-1	-1	0.002	0.000	0.000	7.936	92.062
110.0	1.486%09	0.0122	-1	-1	-1	-1	0.004	0.000	0.000	10.632	89.363
115.0	9.983%08	0.0082	-1	-1	-1	-1	0.009	0.000	0.000	14.159	85.832
120.0	6.381%08	0.0052	286.7	286.7	286.7	1.0000	0.017	0.000	0.000	18.573	81.410
125.0	4.399%08	0.0036	326.3	331.8	326.3	1.0170	0.032	0.000	0.000	23.546	76.423
130.0	3.549%08	0.0029	364.6	375.7	364.6	1.0304	0.060	0.000	0.000	28.079	71.861
135.0	3.488%08	0.0029	400.0	416.7	400.0	1.0416	0.115	0.000	0.000	31.037	68.848
140.0	4.184%08	0.0034	430.7	452.9	430.7	1.0515	0.216	0.000	0.000	32.272	67.512
150.0	9.231%08	0.0076	477.6	510.9	477.6	1.0697	0.724	0.000	0.000	32.100	67.176
160.0	1.940%09	0.0159	509.4	553.8	509.4	1.0871	2.098	0.000	0.000	31.000	66.902
170.0	2.631%09	0.0215	531.7	587.2	531.7	1.1044	4.696	0.000	0.000	29.785	65.519
180.0	3.605%09	0.0295	548.0	614.6	548.0	1.1215	7.945	0.000	0.000	28.432	63.622
190.0	5.013%09	0.0410	560.5	638.1	562.5	1.1344	11.196	0.000	0.000	26.086	62.718
200.0	7.126%09	0.0583	570.3	659.0	577.1	1.1421	14.527	0.000	0.000	20.207	65.265
210.0	1.051%10	0.0861	578.1	678.0	591.6	1.1461	18.282	0.000	0.000	12.192	69.526
220.0	1.685%10	0.1379	584.6	695.5	606.1	1.1476	22.765	0.000	0.000	6.630	70.605
230.0	2.852%10	0.2335	589.9	711.9	620.6	1.1471	28.250	0.000	0.000	3.537	68.213
240.0	4.368%10	0.3576	594.2	727.4	635.1	1.1452	35.014	0.000	0.000	1.882	63.103
260.0	7.889%10	0.6460	600.8	756.2	664.2	1.1386	53.731	0.000	0.000	0.533	45.737
280.0	1.077%11	0.8821	605.4	783.0	693.2	1.1295	81.308	0.000	0.000	0.151	18.541
300.0	1.208%11	0.9895	608.6	808.4	722.2	1.1193	98.000	0.000	0.000	0.043	1.957
320.0	1.216%11	0.9952	610.9	832.8	751.2	1.1087	86.924	11.221	1.247	0.012	0.596
340.0	1.169%11	0.9575	612.5	856.6	780.0	1.0982	74.177	23.086	2.565	0.003	0.169
360.0	1.086%11	0.8895	613.7	880.0	808.5	1.0884	63.254	33.028	3.670	0.001	0.048
380.0	9.798%10	0.8022	614.5	903.0	836.1	1.0800	53.956	41.427	4.603	0.000	0.014
400.0	8.632%10	0.7068	615.1	925.9	861.6	1.0745	46.047	48.554	5.395	0.000	0.004
420.0	7.476%10	0.6122	615.6	926.0	882.8	1.0489	39.325	54.606	6.067	0.000	0.001
440.0	6.405%10	0.5244	616.0	926.1	897.5	1.0319	33.619	59.742	6.638	0.000	0.000
460.0	5.458%10	0.4469	616.3	926.3	905.5	1.0229	28.783	64.095	7.122	0.000	0.000
480.0	4.649%10	0.3807	616.5	926.4	909.3	1.0188	24.692	67.777	7.531	0.000	0.000
500.0	3.975%10	0.3255	616.7	926.6	910.9	1.0172	21.241	70.883	7.876	0.000	0.000
520.0	3.422%10	0.2802	616.8	926.7	911.7	1.0165	18.337	73.497	8.166	0.000	0.000
540.0	2.972%10	0.2433	616.9	926.9	912.1	1.0161	15.900	75.690	8.410	0.000	0.000
560.0	2.608%10	0.2136	617.0	927.0	912.4	1.0160	13.857	77.528	8.614	0.000	0.000
580.0	2.315%10	0.1896	617.1	927.2	912.7	1.0159	12.144	79.071	8.786	0.000	0.000
600.0	2.079%10	0.1702	617.2	927.3	912.9	1.0158	10.701	80.369	8.930	0.000	0.000
620.0	1.887%10	0.1545	617.2	927.5	913.2	1.0157	9.478	81.470	9.052	0.000	0.000
640.0	1.732%10	0.1418	617.3	927.6	913.4	1.0156	8.431	82.412	9.157	0.000	0.000
660.0	1.606%10	0.1315	617.3	927.8	913.6	1.0155	7.527	83.226	9.247	0.000	0.000
680.0	1.503%10	0.1230	617.3	927.9	913.8	1.0154	6.738	83.936	9.326	0.000	0.000
700.0	1.418%10	0.1161	617.4	928.1	914.1	1.0153	6.044	84.560	9.396	0.000	0.000
720.0	1.348%10	0.1104	617.4	928.2	914.3	1.0152	5.430	85.113	9.457	0.000	0.000
740.0	1.291%10	0.1057	617.4	928.4	914.5	1.0151	4.883	85.606	9.512	0.000	0.000
760.0	1.243%10	0.1018	617.4	928.5	914.8	1.0151	4.394	86.046	9.561	0.000	0.000
780.0	1.203%10	0.0985	617.4	928.7	915.0	1.0150	3.956	86.440	9.604	0.000	0.000
800.0	1.170%10	0.0958	617.4	928.8	915.2	1.0149	3.563	86.794	9.644	0.000	0.000

WE PUT B1= 3.0TU GET HST

INPUT: LATI= 14.7 LONGI= 342.6 R= 10 MONTH=12 HOUR=12.0

CALCULATED VALUES: MLAT= 21.4 MLONG= 55.4
DIP= 15.9 MODIP= 15.8 MAGLA= 8.1 XHI= 37.6
SUNRISE: 6.4 L.T. SUNSET:17.6 L.T. SUN DEC.= -22.9
NMF2=1.01%12 NMF1= 0.00%-01 NME=1.29%11 NMD=5.74%08
HMF2=304.8 HMF1= 0.0 HME=110.0 HMD= 81.1

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.577%08	5.5%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	1.111%09	0.0011	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.291%10	0.0128	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	5.314%10	0.0527	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.026%11	0.1017	-1	-1	-1	-1	0.317	0.000	0.000	67.438	32.245
105.0	1.265%11	0.1254	-1	-1	-1	-1	0.474	0.000	0.000	64.558	34.968
110.0	1.294%11	0.1284	-1	-1	-1	-1	0.707	0.000	0.000	61.789	37.504
115.0	1.296%11	0.1285	-1	-1	-1	-1	1.055	0.000	0.000	59.106	39.839
120.0	1.326%11	0.1315	305.9	305.9	305.9	1.0000	1.574	0.000	0.000	56.463	41.964
125.0	1.357%11	0.1346	352.9	402.9	352.9	1.1418	2.345	0.000	0.000	53.780	43.876
130.0	1.389%11	0.1378	398.5	498.6	398.5	1.2512	3.489	0.000	0.000	50.969	45.542
135.0	1.423%11	0.1411	441.4	591.6	441.4	1.3401	5.178	0.000	0.000	48.020	46.802
140.0	1.458%11	0.1446	480.0	680.1	480.0	1.4171	7.651	0.000	0.000	45.000	47.349
150.0	1.533%11	0.1520	541.9	842.2	541.9	1.5541	16.257	0.000	0.000	38.670	45.073
160.0	1.615%11	0.1601	586.6	987.0	586.6	1.6826	31.859	0.000	0.000	30.293	37.848
170.0	1.704%11	0.1690	619.2	1119.6	619.2	1.8083	53.133	0.000	0.000	19.797	27.070
180.0	1.805%11	0.1790	643.7	1244.3	643.7	1.9330	71.864	0.000	0.000	11.703	16.434
190.0	1.918%11	0.1901	662.7	1363.4	662.8	2.0571	82.658	0.000	0.000	6.774	10.568
200.0	2.047%11	0.2030	677.9	1478.7	680.3	2.1735	87.639	0.000	0.000	3.909	8.452
210.0	2.201%11	0.2182	690.2	1562.1	697.9	2.2384	90.009	0.000	0.000	2.255	7.735
220.0	2.391%11	0.2371	700.2	1632.7	715.4	2.2822	91.420	0.000	0.000	1.301	7.279
230.0	2.651%11	0.2629	708.5	1682.8	732.9	2.2960	92.506	0.000	0.000	0.750	6.743
240.0	3.239%11	0.3212	715.4	1707.6	750.5	2.2753	93.489	0.000	0.000	0.433	6.078
260.0	6.490%11	0.6435	725.9	1682.0	785.6	2.1412	95.393	0.000	0.000	0.144	4.463
280.0	9.097%11	0.9021	733.2	1594.6	820.7	1.9431	97.250	0.000	0.000	0.048	2.702
300.0	1.006%12	0.9974	738.2	1502.9	855.8	1.7562	98.000	0.353	0.039	0.016	1.591
320.0	9.922%11	0.9839	741.8	1439.7	890.9	1.6160	95.827	3.274	0.364	0.005	0.529
340.0	9.275%11	0.9197	744.4	1410.5	926.2	1.5230	92.523	6.570	0.730	0.002	0.176
360.0	8.277%11	0.8208	746.2	1408.0	961.7	1.4641	89.284	9.591	1.066	0.001	0.059
380.0	7.109%11	0.7049	747.6	1423.1	998.0	1.4260	86.158	12.440	1.382	0.000	0.020
400.0	5.926%11	0.5877	748.6	1448.9	1036.1	1.3985	83.140	15.169	1.685	0.000	0.006
420.0	4.838%11	0.4798	749.3	1480.8	1077.8	1.3739	80.226	17.795	1.977	0.000	0.002
440.0	3.900%11	0.3868	749.9	1516.1	1125.1	1.3475	77.412	20.329	2.259	0.000	0.001
460.0	3.129%11	0.3103	750.4	1553.4	1178.0	1.3187	74.693	22.776	2.531	0.000	0.000
480.0	2.514%11	0.2493	750.7	1591.7	1234.5	1.2894	72.066	25.141	2.793	0.000	0.000
500.0	2.034%11	0.2017	751.0	1630.7	1292.8	1.2613	69.524	27.428	3.048	0.000	0.000
520.0	1.663%11	0.1649	751.2	1670.0	1351.9	1.2353	67.064	29.643	3.294	0.000	0.000
540.0	1.378%11	0.1367	751.4	1709.5	1411.2	1.2114	64.677	31.791	3.532	0.000	0.000
560.0	1.160%11	0.1150	751.6	1749.1	1470.6	1.1893	62.358	33.878	3.764	0.000	0.000
580.0	9.916%10	0.0983	751.7	1788.7	1530.0	1.1691	60.097	35.913	3.990	0.000	0.000
600.0	8.613%10	0.0854	751.8	1828.4	1589.4	1.1503	57.885	37.904	4.212	0.000	0.000
620.0	7.598%10	0.0753	751.9	1868.0	1648.7	1.1330	55.710	39.861	4.429	0.000	0.000
640.0	6.801%10	0.0674	751.9	1907.7	1707.9	1.1170	53.563	41.793	4.644	0.000	0.000
660.0	6.171%10	0.0612	752.0	1947.4	1766.9	1.1021	51.432	43.711	4.857	0.000	0.000
680.0	5.669%10	0.0562	752.0	1987.1	1825.7	1.0884	49.311	45.620	5.069	0.000	0.000
700.0	5.266%10	0.0522	752.1	2026.8	1884.1	1.0757	47.199	47.521	5.280	0.000	0.000
720.0	4.941%10	0.0490	752.1	2066.5	1942.0	1.0641	45.100	49.410	5.490	0.000	0.000
740.0	4.677%10	0.0464	752.2	2106.2	1999.2	1.0535	43.025	51.277	5.697	0.000	0.000
760.0	4.461%10	0.0442	752.2	2145.9	2055.4	1.0440	40.988	53.110	5.901	0.000	0.000
780.0	4.285%10	0.0425	752.2	2185.6	2110.4	1.0356	39.003	54.897	6.100	0.000	0.000
800.0	4.139%10	0.0410	752.2	2225.3	2163.8	1.0284	37.080	56.628	6.292	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 14.7 LONGI= 342.6 R= 10 MONTH=12 HOUR= 6.4

CALCULATED VALUES: MLAT= 21.4 MLONG= 55.4
DIP= 15.9 MODIP= 15.8 MAGLA= 8.1 XHI= 90.0
SUNRISE: 6.4 L.T. SUNSET:17.6 L.T. SUN DEC.= -22.9
NMF2=2.20%11 NMF1= 0.00%-01 NME=3.20%10 NMD=4.00%08
HMF2=266.3 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.914%08	0.0013	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.081%08	0.0019	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.839%09	0.0084	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.207%10	0.0549	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.643%10	0.1202	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	3.179%10	0.1446	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	3.073%10	0.1398	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	2.454%10	0.1116	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	1.947%10	0.0886	288.1	288.1	288.1	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	1.923%10	0.0875	328.2	358.8	328.2	1.0934	0.084	0.000	0.000	36.294	63.621
130.0	2.396%10	0.1090	367.0	428.3	367.0	1.1670	0.161	0.000	0.000	40.716	59.122
135.0	3.069%10	0.1396	402.9	494.9	402.9	1.2282	0.308	0.000	0.000	43.939	55.753
140.0	3.366%10	0.1531	434.2	556.8	434.2	1.2823	0.586	0.000	0.000	45.000	54.414
150.0	3.670%10	0.1669	482.1	666.0	482.1	1.3815	2.079	0.000	0.000	41.880	56.041
160.0	4.024%10	0.1831	514.7	759.9	514.7	1.4764	6.925	0.000	0.000	36.631	56.445
170.0	4.448%10	0.2024	537.6	844.1	537.6	1.5701	19.707	0.000	0.000	30.703	49.590
180.0	4.979%10	0.2265	554.4	922.2	555.6	1.6600	41.982	0.000	0.000	21.641	36.377
190.0	5.701%10	0.2594	567.3	996.3	573.2	1.7381	63.935	0.000	0.000	10.559	25.506
200.0	7.034%10	0.3200	577.4	1067.8	590.9	1.8069	77.146	0.000	0.000	4.137	18.718
210.0	1.039%11	0.4729	585.5	1119.2	608.6	1.8390	83.481	0.000	0.000	1.545	14.973
220.0	1.395%11	0.6345	592.2	1163.5	626.3	1.8578	86.697	0.000	0.000	0.573	12.730
230.0	1.716%11	0.7808	597.6	1197.0	644.0	1.8587	88.765	0.000	0.000	0.212	11.022
240.0	1.964%11	0.8934	602.1	1217.2	661.7	1.8396	90.452	0.000	0.000	0.079	9.469
260.0	2.188%11	0.9956	609.0	1218.9	697.1	1.7487	93.576	0.000	0.000	0.011	6.413
280.0	2.177%11	0.9902	613.7	1188.5	732.4	1.6227	96.617	0.000	0.000	0.001	3.381
300.0	2.076%11	0.9445	617.0	1155.2	767.8	1.5046	98.000	0.000	0.000	0.000	2.000
320.0	1.912%11	0.8697	619.3	1135.9	803.2	1.4143	95.866	3.459	0.384	0.000	0.290
340.0	1.709%11	0.7774	621.0	1133.4	838.5	1.3517	92.561	6.659	0.740	0.000	0.040
360.0	1.491%11	0.6784	622.2	1144.2	873.8	1.3095	89.321	9.606	1.067	0.000	0.005
380.0	1.279%11	0.5816	623.1	1163.6	908.9	1.2803	86.193	12.425	1.381	0.000	0.001
400.0	1.083%11	0.4927	623.7	1188.4	943.6	1.2594	83.174	15.143	1.683	0.000	0.000
420.0	9.118%10	0.4148	624.2	1204.4	977.5	1.2321	80.259	17.767	1.974	0.000	0.000
440.0	7.665%10	0.3487	624.6	1222.2	1010.2	1.2099	77.444	20.301	2.256	0.000	0.000
460.0	6.461%10	0.2939	624.9	1241.0	1041.6	1.1914	74.724	22.748	2.528	0.000	0.000
480.0	5.478%10	0.2492	625.1	1260.3	1072.3	1.1754	72.096	25.114	2.790	0.000	0.000
500.0	4.684%10	0.2131	625.3	1280.0	1102.5	1.1609	69.553	27.402	3.045	0.000	0.000
520.0	4.046%10	0.1841	625.5	1299.8	1132.6	1.1476	67.091	29.618	3.291	0.000	0.000
540.0	3.534%10	0.1608	625.6	1319.7	1162.6	1.1351	64.704	31.767	3.530	0.000	0.000
560.0	3.123%10	0.1421	625.7	1339.6	1192.6	1.1232	62.383	33.855	3.762	0.000	0.000
580.0	2.792%10	0.1270	625.8	1359.6	1222.6	1.1120	60.122	35.891	3.988	0.000	0.000
600.0	2.524%10	0.1148	625.8	1379.5	1252.5	1.1014	57.909	37.882	4.209	0.000	0.000
620.0	2.307%10	0.1050	625.9	1399.5	1282.4	1.0914	55.734	39.840	4.427	0.000	0.000
640.0	2.131%10	0.0969	625.9	1419.5	1312.2	1.0818	53.585	41.773	4.641	0.000	0.000
660.0	1.986%10	0.0903	626.0	1439.5	1342.0	1.0727	51.453	43.692	4.855	0.000	0.000
680.0	1.867%10	0.0849	626.0	1459.5	1371.6	1.0641	49.332	45.602	5.067	0.000	0.000
700.0	1.768%10	0.0804	626.0	1479.5	1401.1	1.0560	47.218	47.504	5.278	0.000	0.000
720.0	1.687%10	0.0767	626.1	1499.5	1430.3	1.0484	45.119	49.393	5.488	0.000	0.000
740.0	1.619%10	0.0736	626.1	1519.5	1459.2	1.0414	43.043	51.261	5.696	0.000	0.000
760.0	1.562%10	0.0711	626.1	1539.5	1487.6	1.0349	41.005	53.095	5.899	0.000	0.000
780.0	1.514%10	0.0689	626.1	1559.5	1515.4	1.0291	39.019	54.883	6.098	0.000	0.000
800.0	1.474%10	0.0671	626.1	1579.5	1542.5	1.0240	37.096	56.614	6.290	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 14.7 LONGI= 342.6 R= 10 MONTH=12 HOUR= 0.0

CALCULATED VALUES: MLAT= 21.4 MLONG= 55.4
DIP= 15.9 MODIP= 15.8 MAGLA= 8.1 XHI= 171.8
SUNRISE: 6.4 L.T. SUNSET:17.6 L.T. SUN DEC.= -22.9
NMF2=3.68%11 NMF1= 0.00%-01 NME=1.78%09 NMD=4.00%08
HMF2=269.0 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RO+	RH+	RHE+	RO2+	RNO+
80.0	5.271%05	1.4%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.469%08	6.7%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.727%08	0.0013	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.743%09	0.0047	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.775%09	0.0048	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	1.775%09	0.0048	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.594
110.0	1.485%09	0.0040	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.312
115.0	9.960%08	0.0027	-1	-1	-1	-1	0.024	0.000	0.000	27.442	72.535
120.0	6.356%08	0.0017	284.3	284.3	284.3	1.0000	0.045	0.000	0.000	31.698	68.256
125.0	4.373%08	0.0012	323.0	328.8	323.0	1.0179	0.086	0.000	0.000	36.294	63.619
130.0	3.521%08	9.6%-4	360.5	372.1	360.5	1.0321	0.165	0.000	0.000	40.716	59.118
135.0	3.454%08	9.4%-4	395.0	412.3	395.0	1.0439	0.316	0.000	0.000	43.939	55.745
140.0	4.138%08	0.0011	424.8	447.9	424.8	1.0545	0.601	0.000	0.000	45.000	54.399
150.0	9.132%08	0.0025	470.0	504.7	470.0	1.0739	2.132	0.000	0.000	41.880	55.987
160.0	2.894%09	0.0079	500.4	546.7	500.4	1.0925	7.103	0.000	0.000	36.631	56.267
170.0	1.399%10	0.0381	521.7	579.5	521.7	1.1109	20.214	0.000	0.000	30.703	49.083
180.0	3.456%10	0.0940	537.2	606.6	537.5	1.1286	43.062	0.000	0.000	21.641	35.296
190.0	6.565%10	0.1786	549.0	630.0	552.4	1.1405	65.582	0.000	0.000	10.559	23.859
200.0	1.099%11	0.2988	558.3	650.8	567.3	1.1473	79.133	0.000	0.000	4.137	16.730
210.0	1.644%11	0.4471	565.7	669.9	582.2	1.1505	85.634	0.000	0.000	1.545	12.821
220.0	2.228%11	0.6060	571.8	687.5	597.2	1.1514	88.935	0.000	0.000	0.573	10.492
230.0	2.772%11	0.7539	576.8	704.1	612.1	1.1503	91.059	0.000	0.000	0.212	8.729
240.0	3.207%11	0.8723	580.9	719.8	627.0	1.1480	92.792	0.000	0.000	0.079	7.129
260.0	3.642%11	0.9907	587.2	749.2	656.8	1.1406	96.005	0.000	0.000	0.011	3.984
280.0	3.651%11	0.9932	591.5	776.7	686.7	1.1311	99.071	0.000	0.000	0.001	0.927
300.0	3.488%11	0.9487	594.5	802.8	716.5	1.1205	98.000	1.384	0.154	0.000	0.462
320.0	3.205%11	0.8718	596.7	828.1	746.3	1.1097	85.862	12.667	1.407	0.000	0.063
340.0	2.849%11	0.7750	598.2	852.8	775.9	1.0991	73.253	24.065	2.674	0.000	0.009
360.0	2.466%11	0.6707	599.3	877.0	805.2	1.0892	62.465	33.780	3.753	0.000	0.001
380.0	2.092%11	0.5690	600.1	901.0	833.6	1.0809	53.283	42.045	4.672	0.000	0.000
400.0	1.751%11	0.4762	600.7	924.7	859.8	1.0755	45.473	49.074	5.453	0.000	0.000
420.0	1.454%11	0.3956	601.2	924.8	881.5	1.0491	38.835	55.048	6.116	0.000	0.000
440.0	1.206%11	0.3280	601.5	924.8	896.5	1.0316	33.200	60.120	6.680	0.000	0.000
460.0	1.002%11	0.2727	601.8	924.9	904.7	1.0223	28.424	64.418	7.158	0.000	0.000
480.0	8.387%10	0.2281	602.0	925.0	908.4	1.0182	24.384	68.054	7.562	0.000	0.000
500.0	7.080%10	0.1926	602.2	925.0	910.0	1.0165	20.976	71.121	7.902	0.000	0.000
520.0	6.042%10	0.1644	602.3	925.1	910.6	1.0159	18.109	73.702	8.189	0.000	0.000
540.0	5.220%10	0.1420	602.4	925.1	910.9	1.0156	15.702	75.868	8.430	0.000	0.000
560.0	4.567%10	0.1242	602.5	925.2	911.1	1.0155	13.685	77.684	8.632	0.000	0.000
580.0	4.047%10	0.1101	602.6	925.3	911.2	1.0154	11.992	79.207	8.801	0.000	0.000
600.0	3.630%10	0.0988	602.6	925.3	911.4	1.0153	10.567	80.489	8.943	0.000	0.000
620.0	3.295%10	0.0896	602.7	925.4	911.5	1.0153	9.359	81.577	9.064	0.000	0.000
640.0	3.025%10	0.0823	602.7	925.5	911.6	1.0153	8.326	82.507	9.167	0.000	0.000
660.0	2.805%10	0.0763	602.7	925.5	911.7	1.0152	7.433	83.310	9.257	0.000	0.000
680.0	2.625%10	0.0714	602.8	925.6	911.7	1.0152	6.654	84.011	9.335	0.000	0.000
700.0	2.477%10	0.0674	602.8	925.7	911.8	1.0152	5.969	84.628	9.403	0.000	0.000
720.0	2.355%10	0.0641	602.8	925.7	911.9	1.0151	5.362	85.174	9.464	0.000	0.000
740.0	2.254%10	0.0613	602.8	925.8	912.0	1.0151	4.822	85.660	9.518	0.000	0.000
760.0	2.170%10	0.0590	602.9	925.9	912.1	1.0150	4.339	86.095	9.566	0.000	0.000
780.0	2.099%10	0.0571	602.9	925.9	912.2	1.0150	3.906	86.484	9.609	0.000	0.000
800.0	2.041%10	0.0555	602.9	926.0	912.3	1.0150	3.518	86.834	9.648	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 14.7 LONGI= 342.6 R=100 MONTH= 3 HOUR=12.0

CALCULATED VALUES: MLAT= 21.4 MLONG= 55.4
DIP= 15.9 MODIP= 15.8 MAGLA= 8.1 XHI= 18.0
SUNRISE: 6.1 L.T. SUNSET:17.9 L.T. SUN DEC.= -3.3
NMF2=1.99%12 NMF1= 3.59% 11 NME=1.85%11 NMD=1.32%09
HMF2=390.7 HMF1=272.6 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	1.286%09	6.4%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.579%09	0.0013	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	2.783%10	0.0140	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	9.651%10	0.0484	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.603%11	0.0803	-1	-1	-1	-1	0.323	0.000	0.000	82.820	16.857
105.0	1.832%11	0.0918	-1	-1	-1	-1	0.489	0.000	0.000	76.115	23.395
110.0	1.852%11	0.0928	-1	-1	-1	-1	0.741	0.000	0.000	69.895	29.364
115.0	1.855%11	0.0930	-1	-1	-1	-1	1.120	0.000	0.000	64.048	34.832
120.0	1.864%11	0.0934	338.6	338.6	338.6	1.0000	1.694	0.000	0.000	58.411	39.896
125.0	1.872%11	0.0939	398.0	433.9	398.0	1.0902	2.557	0.000	0.000	52.816	44.627
130.0	1.882%11	0.0943	456.0	527.8	456.0	1.1575	3.853	0.000	0.000	47.253	48.894
135.0	1.891%11	0.0948	512.1	619.8	512.1	1.2104	5.784	0.000	0.000	41.915	52.301
140.0	1.901%11	0.0953	564.7	708.4	564.7	1.2544	8.629	0.000	0.000	37.000	54.371
150.0	1.923%11	0.0964	656.8	872.3	656.8	1.3281	18.491	0.000	0.000	28.659	52.850
160.0	1.946%11	0.0976	730.9	1018.2	730.9	1.3931	35.617	0.000	0.000	22.008	42.375
170.0	1.972%11	0.0989	789.7	1148.9	789.7	1.4548	56.728	0.000	0.000	16.323	26.949
180.0	2.001%11	0.1003	836.9	1267.9	836.9	1.5150	73.158	0.000	0.000	11.338	15.504
190.0	2.033%11	0.1019	875.1	1378.0	875.1	1.5746	81.949	0.000	0.000	7.608	10.443
200.0	2.069%11	0.1037	906.6	1481.2	906.6	1.6339	86.077	0.000	0.000	5.069	8.854
210.0	2.110%11	0.1058	932.6	1564.8	932.6	1.6780	88.265	0.000	0.000	3.374	8.361
220.0	2.159%11	0.1082	954.2	1635.5	954.2	1.7140	89.763	0.000	0.000	2.246	7.992
230.0	2.218%11	0.1112	972.3	1685.7	972.3	1.7338	91.034	0.000	0.000	1.495	7.471
240.0	2.294%11	0.1150	987.3	1710.4	987.3	1.7324	92.239	0.000	0.000	0.995	6.766
260.0	2.809%11	0.1408	1010.4	1684.7	1010.4	1.6674	94.629	0.000	0.000	0.441	4.931
280.0	4.714%11	0.2363	1026.5	1597.0	1026.5	1.5558	96.983	0.000	0.000	0.195	2.821
300.0	8.451%11	0.4236	1037.7	1504.9	1037.7	1.4502	98.000	0.204	0.023	0.086	1.687
320.0	1.266%12	0.6346	1045.7	1441.5	1045.8	1.3784	95.844	3.033	0.337	0.038	0.747
340.0	1.635%12	0.8198	1051.4	1412.1	1053.1	1.3409	92.539	6.402	0.711	0.017	0.331
360.0	1.879%12	0.9421	1055.5	1409.4	1061.0	1.3283	89.300	9.491	1.055	0.008	0.147
380.0	1.984%12	0.9944	1058.6	1424.4	1070.6	1.3305	86.173	12.383	1.376	0.003	0.065
400.0	1.982%12	0.9935	1060.8	1450.1	1084.0	1.3378	83.154	15.134	1.682	0.001	0.029
420.0	1.873%12	0.9388	1062.5	1482.0	1105.3	1.3408	80.240	17.772	1.975	0.001	0.013
440.0	1.679%12	0.8415	1063.8	1517.5	1138.7	1.3327	77.425	20.312	2.257	0.000	0.006
460.0	1.439%12	0.7212	1064.8	1554.8	1184.0	1.3133	74.706	22.762	2.529	0.000	0.002
480.0	1.190%12	0.5965	1065.6	1593.3	1237.2	1.2879	72.078	25.128	2.792	0.000	0.001
500.0	9.590%11	0.4807	1066.2	1632.4	1294.2	1.2612	69.536	27.417	3.046	0.000	0.000
520.0	7.603%11	0.3811	1066.7	1671.8	1352.9	1.2357	67.075	29.632	3.292	0.000	0.000
540.0	5.982%11	0.2999	1067.1	1711.3	1412.2	1.2118	64.688	31.781	3.531	0.000	0.000
560.0	4.706%11	0.2359	1067.5	1751.0	1471.7	1.1898	62.368	33.868	3.763	0.000	0.000
580.0	3.724%11	0.1867	1067.7	1790.7	1531.2	1.1695	60.107	35.904	3.989	0.000	0.000
600.0	2.979%11	0.1493	1067.9	1830.5	1590.7	1.1507	57.895	37.895	4.211	0.000	0.000
620.0	2.415%11	0.1211	1068.1	1870.2	1650.1	1.1334	55.720	39.852	4.428	0.000	0.000
640.0	1.990%11	0.0998	1068.3	1910.0	1709.4	1.1173	53.572	41.785	4.643	0.000	0.000
660.0	1.668%11	0.0836	1068.4	1949.8	1768.6	1.1025	51.441	43.703	4.856	0.000	0.000
680.0	1.422%11	0.0713	1068.5	1989.6	1827.5	1.0887	49.320	45.612	5.068	0.000	0.000
700.0	1.232%11	0.0618	1068.6	2029.4	1886.1	1.0760	47.207	47.514	5.279	0.000	0.000
720.0	1.086%11	0.0544	1068.7	2069.2	1944.1	1.0643	45.108	49.403	5.489	0.000	0.000
740.0	9.707%10	0.0487	1068.8	2109.0	2001.4	1.0537	43.033	51.270	5.697	0.000	0.000
760.0	8.800%10	0.0441	1068.8	2148.7	2057.8	1.0442	40.996	53.104	5.900	0.000	0.000
780.0	8.077%10	0.0405	1068.9	2188.5	2112.8	1.0358	39.010	54.891	6.099	0.000	0.000
800.0	7.498%10	0.0376	1068.9	2228.3	2166.4	1.0286	37.087	56.622	6.291	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 14.7 LONGI= 342.6 R=100 MONTH= 3 HOUR= 6.1

CALCULATED VALUES: MLAT= 21.4 MLONG= 55.4
DIP= 15.9 MODIP= 15.8 MAGLA= 8.1 XHI= 90.0
SUNRISE: 6.1 L.T. SUNSET:17.9 L.T. SUN DEC.= -3.3
NMF2=5.69%11 NMF1= 0.00%-01 NME=4.10%10 NMD=4.00%08
HMF2=295.4 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.914%08	5.1%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.081%08	7.2%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.845%09	0.0032	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.313%10	0.0231	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.196%10	0.0562	-1	-1	-1	-1	0.012	0.000	0.000	18.284	81.704
105.0	4.061%10	0.0713	-1	-1	-1	-1	0.019	0.000	0.000	21.005	78.976
110.0	3.942%10	0.0693	-1	-1	-1	-1	0.030	0.000	0.000	24.068	75.901
115.0	3.160%10	0.0555	-1	-1	-1	-1	0.049	0.000	0.000	27.398	72.553
120.0	2.518%10	0.0442	319.7	319.7	319.7	1.0000	0.079	0.000	0.000	30.730	69.191
125.0	2.488%10	0.0437	371.9	394.5	371.9	1.0607	0.127	0.000	0.000	33.564	66.309
130.0	3.085%10	0.0542	422.8	467.9	422.8	1.1067	0.205	0.000	0.000	35.472	64.323
135.0	3.937%10	0.0692	471.3	539.0	471.3	1.1436	0.330	0.000	0.000	36.502	63.167
140.0	4.522%10	0.0794	515.7	605.9	515.7	1.1750	0.531	0.000	0.000	37.000	62.469
150.0	5.629%10	0.0989	589.7	725.1	589.7	1.2296	1.367	0.000	0.000	37.274	61.359
160.0	7.079%10	0.1244	645.6	826.1	645.6	1.2796	3.445	0.000	0.000	36.284	60.271
170.0	9.043%10	0.1589	687.8	913.5	687.8	1.3281	8.203	0.000	0.000	30.549	61.248
180.0	1.187%11	0.2086	720.3	991.1	720.3	1.3759	17.131	0.000	0.000	19.558	63.311
190.0	1.630%11	0.2863	746.0	1061.9	746.0	1.4235	28.861	0.000	0.000	10.838	60.302
200.0	2.169%11	0.3810	766.6	1127.6	766.6	1.4709	39.219	0.000	0.000	5.832	54.949
210.0	2.757%11	0.4842	783.5	1179.0	783.5	1.5049	46.750	0.000	0.000	3.124	50.126
220.0	3.359%11	0.5900	797.4	1222.5	797.4	1.5332	52.653	0.000	0.000	1.673	45.674
230.0	3.939%11	0.6919	808.9	1254.6	808.9	1.5511	58.085	0.000	0.000	0.896	41.019
240.0	4.462%11	0.7838	818.4	1273.0	818.6	1.5552	63.627	0.000	0.000	0.480	35.893
260.0	5.243%11	0.9211	833.0	1269.9	837.4	1.5165	75.922	0.000	0.000	0.137	23.940
280.0	5.624%11	0.9879	843.1	1233.6	856.3	1.4407	89.982	0.000	0.000	0.039	9.979
300.0	5.686%11	0.9989	850.2	1193.7	875.1	1.3640	98.000	0.000	0.000	0.011	1.989
320.0	5.526%11	0.9707	855.2	1167.2	894.0	1.3056	96.292	2.619	0.291	0.003	0.795
340.0	5.177%11	0.9095	858.7	1157.2	912.9	1.2675	92.980	6.112	0.679	0.001	0.228
360.0	4.694%11	0.8247	861.3	1160.2	932.0	1.2448	89.726	9.188	1.021	0.000	0.065
380.0	4.139%11	0.7271	863.2	1171.7	951.4	1.2315	86.584	12.058	1.340	0.000	0.019
400.0	3.567%11	0.6266	864.6	1188.4	971.6	1.2231	83.550	14.800	1.644	0.000	0.005
420.0	3.021%11	0.5307	865.7	1204.4	993.5	1.2123	80.622	17.439	1.938	0.000	0.002
440.0	2.529%11	0.4442	866.5	1222.2	1017.9	1.2007	77.794	19.985	2.221	0.000	0.000
460.0	2.102%11	0.3693	867.1	1241.0	1044.9	1.1877	75.062	22.444	2.494	0.000	0.000
480.0	1.744%11	0.3063	867.6	1260.3	1073.5	1.1740	72.422	24.820	2.758	0.000	0.000
500.0	1.449%11	0.2545	868.0	1280.0	1103.0	1.1605	69.868	27.119	3.013	0.000	0.000
520.0	1.209%11	0.2124	868.3	1299.8	1132.7	1.1475	67.395	29.345	3.261	0.000	0.000
540.0	1.017%11	0.1786	868.6	1319.7	1162.6	1.1351	64.997	31.503	3.500	0.000	0.000
560.0	8.630%10	0.1516	868.8	1339.6	1192.6	1.1233	62.666	33.601	3.733	0.000	0.000
580.0	7.400%10	0.1300	869.0	1359.6	1222.5	1.1121	60.394	35.646	3.961	0.000	0.000
600.0	6.417%10	0.1127	869.1	1379.6	1252.4	1.1015	58.171	37.646	4.183	0.000	0.000
620.0	5.628%10	0.0989	869.2	1399.5	1282.3	1.0914	55.986	39.613	4.401	0.000	0.000
640.0	4.992%10	0.0877	869.3	1419.5	1312.1	1.0818	53.828	41.555	4.617	0.000	0.000
660.0	4.478%10	0.0787	869.4	1439.5	1341.9	1.0728	51.686	43.482	4.831	0.000	0.000
680.0	4.059%10	0.0713	869.5	1459.5	1371.5	1.0642	49.555	45.401	5.045	0.000	0.000
700.0	3.717%10	0.0653	869.5	1479.5	1401.0	1.0561	47.432	47.311	5.257	0.000	0.000
720.0	3.435%10	0.0603	869.6	1499.5	1430.2	1.0485	45.323	49.209	5.468	0.000	0.000
740.0	3.202%10	0.0563	869.6	1519.5	1459.1	1.0414	43.238	51.086	5.676	0.000	0.000
760.0	3.009%10	0.0529	869.7	1539.5	1487.5	1.0350	41.191	52.928	5.881	0.000	0.000
780.0	2.847%10	0.0500	869.7	1559.5	1515.3	1.0292	39.196	54.724	6.080	0.000	0.000
800.0	2.711%10	0.0476	869.7	1579.5	1542.4	1.0241	37.263	56.463	6.274	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 14.7 LONGI= 342.6 R=100 MONTH= 3 HOUR= 0.0

CALCULATED VALUES: MLAT= 21.4 MLONG= 55.4
DIP= 15.9 MODIP= 15.8 MAGLA= 8.1 XHI= 168.6
SUNRISE: 6.1 L.T. SUNSET:17.9 L.T. SUN DEC.= -3.3
NMF2=1.77%12 NMF1= 0.00%-01 NME=3.20%09 NMD=4.00%08
HMF2=309.4 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDD*	RDH*	RDHE*	RDO2*	RDNO*
80.0	5.478%05	3.1%-7	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.477%08	1.4%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.730%08	2.7%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	2.509%09	0.0014	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.193%09	0.0018	-1	-1	-1	-1	0.012	0.000	0.000	18.284	81.704
105.0	3.201%09	0.0018	-1	-1	-1	-1	0.019	0.000	0.000	21.005	78.976
110.0	2.678%09	0.0015	-1	-1	-1	-1	0.031	0.000	0.000	24.068	75.900
115.0	1.797%09	0.0010	-1	-1	-1	-1	0.050	0.000	0.000	27.398	72.552
120.0	1.148%09	6.5%-4	316.6	316.6	316.6	1.0000	0.081	0.000	0.000	30.730	69.189
125.0	7.902%08	4.5%-4	367.6	369.1	367.6	1.0043	0.131	0.000	0.000	33.564	66.305
130.0	6.366%08	3.6%-4	417.2	420.4	417.2	1.0076	0.210	0.000	0.000	35.472	64.318
135.0	6.249%08	3.5%-4	464.4	469.2	464.4	1.0103	0.339	0.000	0.000	36.502	63.159
140.0	7.489%08	4.2%-4	507.4	513.8	507.4	1.0125	0.545	0.000	0.000	37.000	62.455
150.0	1.653%09	9.3%-4	578.6	588.2	578.6	1.0165	1.402	0.000	0.000	37.274	61.323
160.0	6.808%10	0.0385	631.8	644.5	631.8	1.0201	3.534	0.000	0.000	36.284	60.183
170.0	1.330%11	0.0752	671.6	687.5	671.6	1.0236	8.414	0.000	0.000	30.549	61.037
180.0	2.120%11	0.1198	702.1	721.2	702.1	1.0271	17.572	0.000	0.000	19.558	62.870
190.0	3.185%11	0.1800	726.1	748.3	726.1	1.0306	29.604	0.000	0.000	10.838	59.558
200.0	4.530%11	0.2561	745.3	770.7	745.3	1.0341	40.230	0.000	0.000	5.832	53.939
210.0	6.124%11	0.3462	761.0	789.6	761.0	1.0375	47.955	0.000	0.000	3.124	48.920
220.0	7.899%11	0.4465	773.9	805.6	773.9	1.0410	54.012	0.000	0.000	1.673	44.315
230.0	9.758%11	0.5516	784.6	819.5	784.6	1.0445	59.586	0.000	0.000	0.896	39.518
240.0	1.159%12	0.6552	793.4	831.5	793.4	1.0480	65.274	0.000	0.000	0.480	34.247
260.0	1.475%12	0.8338	806.9	851.4	807.0	1.0549	77.893	0.000	0.000	0.137	21.969
280.0	1.678%12	0.9488	816.3	867.1	819.2	1.0584	92.268	0.000	0.000	0.039	7.693
300.0	1.762%12	0.9959	822.8	880.0	831.4	1.0584	98.000	0.925	0.103	0.011	0.961
320.0	1.756%12	0.9926	827.5	890.9	843.6	1.0562	86.243	12.130	1.348	0.003	0.275
340.0	1.666%12	0.9420	830.8	900.6	855.7	1.0525	73.584	23.702	2.634	0.001	0.079
360.0	1.510%12	0.8535	833.1	909.3	867.7	1.0480	62.748	33.506	3.723	0.000	0.023
380.0	1.314%12	0.7427	834.9	917.4	879.3	1.0434	53.525	41.822	4.647	0.000	0.006
400.0	1.105%12	0.6249	836.2	925.1	890.0	1.0395	45.679	48.887	5.432	0.000	0.002
420.0	9.060%11	0.5122	837.2	925.2	898.9	1.0292	39.011	54.890	6.099	0.000	0.001
440.0	7.286%11	0.4119	837.9	925.3	905.1	1.0223	33.351	59.984	6.665	0.000	0.000
460.0	5.791%11	0.3274	838.5	925.3	908.5	1.0185	28.553	64.302	7.145	0.000	0.000
480.0	4.578%11	0.2588	839.0	925.4	910.1	1.0168	24.495	67.955	7.551	0.000	0.000
500.0	3.620%11	0.2046	839.3	925.5	910.8	1.0161	21.071	71.036	7.893	0.000	0.000
520.0	2.876%11	0.1626	839.6	925.6	911.2	1.0158	18.191	73.629	8.181	0.000	0.000
540.0	2.304%11	0.1303	839.9	925.7	911.4	1.0157	15.773	75.804	8.423	0.000	0.000
560.0	1.867%11	0.1056	840.1	925.8	911.6	1.0156	13.746	77.628	8.625	0.000	0.000
580.0	1.533%11	0.0867	840.2	925.9	911.8	1.0155	12.047	79.158	8.795	0.000	0.000
600.0	1.277%11	0.0722	840.3	926.0	911.9	1.0155	10.615	80.446	8.938	0.000	0.000
620.0	1.079%11	0.0610	840.5	926.1	912.0	1.0154	9.402	81.538	9.060	0.000	0.000
640.0	9.259%10	0.0523	840.5	926.2	912.2	1.0153	8.364	82.473	9.164	0.000	0.000
660.0	8.058%10	0.0455	840.6	926.3	912.3	1.0153	7.467	83.280	9.253	0.000	0.000
680.0	7.110%10	0.0402	840.7	926.4	912.5	1.0152	6.684	83.984	9.332	0.000	0.000
700.0	6.356%10	0.0359	840.7	926.5	912.6	1.0152	5.996	84.604	9.400	0.000	0.000
720.0	5.752%10	0.0325	840.8	926.6	912.7	1.0151	5.386	85.152	9.461	0.000	0.000
740.0	5.263%10	0.0298	840.8	926.6	912.9	1.0151	4.844	85.641	9.516	0.000	0.000
760.0	4.865%10	0.0275	840.9	926.7	913.0	1.0150	4.359	86.077	9.564	0.000	0.000
780.0	4.539%10	0.0257	840.9	926.8	913.2	1.0150	3.924	86.468	9.608	0.000	0.000
800.0	4.271%10	0.0241	840.9	926.9	913.3	1.0149	3.534	86.819	9.647	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 14.7 LONGI= 342.6 R=100 MONTH= 6 HOUR=12.0

CALCULATED VALUES: MLAT= 21.4 MLONG= 55.4
DIP= 15.9 MODIP= 15.8 MAGLA= 8.1 XHI= 8.4
SUNRISE: 5.6 L.T. SUNSET:18.4 L.T. SUN DEC.= 23.1
NMF2=1.26%12 NMF1= 3.63% 11 NME=1.89%11 NMD=1.34%09
HMF2=397.1 HMF1=262.0 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	1.302%09	0.0010	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.626%09	0.0021	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	2.835%10	0.0225	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	9.840%10	0.0782	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.637%11	0.1301	-1	-1	-1	-1	0.336	0.000	0.000	64.012	35.652
105.0	1.873%11	0.1489	-1	-1	-1	-1	0.482	0.000	0.000	55.876	43.642
110.0	1.894%11	0.1505	-1	-1	-1	-1	0.691	0.000	0.000	48.977	50.333
115.0	1.907%11	0.1515	-1	-1	-1	-1	0.989	0.000	0.000	43.334	55.677
120.0	1.920%11	0.1526	339.2	339.2	339.2	1.0000	1.415	0.000	0.000	38.994	59.591
125.0	1.935%11	0.1538	398.8	434.5	398.8	1.0895	2.024	0.000	0.000	35.839	62.137
130.0	1.949%11	0.1549	457.0	528.5	457.0	1.1563	2.887	0.000	0.000	33.512	63.601
135.0	1.964%11	0.1561	513.4	620.5	513.4	1.2087	4.107	0.000	0.000	31.639	64.254
140.0	1.980%11	0.1574	566.3	709.1	566.3	1.2523	5.809	0.000	0.000	30.000	64.191
150.0	2.013%11	0.1600	658.9	873.2	658.9	1.3252	11.251	0.000	0.000	27.078	61.670
160.0	2.049%11	0.1628	733.6	1019.3	733.6	1.3894	19.962	0.000	0.000	24.446	55.592
170.0	2.087%11	0.1659	793.1	1150.2	793.1	1.4503	30.669	0.000	0.000	21.909	47.422
180.0	2.130%11	0.1693	840.7	1269.3	840.7	1.5097	40.806	0.000	0.000	18.652	40.542
190.0	2.177%11	0.1730	879.5	1379.4	879.5	1.5685	49.733	0.000	0.000	12.336	37.931
200.0	2.229%11	0.1772	911.3	1482.7	911.3	1.6270	58.351	0.000	0.000	5.054	36.595
210.0	2.290%11	0.1821	937.7	1566.4	937.7	1.6706	67.504	0.000	0.000	1.609	30.887
220.0	2.363%11	0.1878	959.6	1637.2	959.6	1.7061	77.593	0.000	0.000	0.486	21.921
230.0	2.456%11	0.1952	977.9	1687.5	977.9	1.7256	88.070	0.000	0.000	0.146	11.784
240.0	2.599%11	0.2065	993.2	1712.3	993.2	1.7240	95.635	0.000	0.000	0.044	4.321
260.0	3.635%11	0.2889	1016.6	1686.5	1016.6	1.6589	98.527	0.000	0.000	0.004	1.469
280.0	5.364%11	0.4263	1032.9	1598.5	1032.9	1.5476	98.591	0.331	0.037	0.000	1.042
300.0	7.422%11	0.5899	1044.4	1506.2	1044.4	1.4422	98.368	1.384	0.154	0.000	0.094
320.0	9.363%11	0.7442	1052.4	1442.6	1052.4	1.3707	96.128	3.477	0.386	0.000	0.008
340.0	1.092%12	0.8682	1058.2	1413.1	1058.7	1.3348	92.811	6.469	0.719	0.000	0.001
360.0	1.196%12	0.9506	1062.4	1410.4	1065.5	1.3238	89.563	9.393	1.044	0.000	0.000
380.0	1.247%12	0.9912	1065.5	1425.4	1073.9	1.3274	86.427	12.216	1.357	0.000	0.000
400.0	1.257%12	0.9994	1067.8	1451.2	1086.2	1.3360	83.399	14.941	1.660	0.000	0.000
420.0	1.214%12	0.9647	1069.5	1483.2	1106.7	1.3401	80.476	17.572	1.952	0.000	0.000
440.0	1.114%12	0.8853	1070.8	1518.7	1139.5	1.3327	77.653	20.112	2.235	0.000	0.000
460.0	9.785%11	0.7777	1071.8	1556.1	1184.6	1.3137	74.926	22.566	2.507	0.000	0.000
480.0	8.296%11	0.6594	1072.6	1594.7	1237.7	1.2884	72.291	24.938	2.771	0.000	0.000
500.0	6.849%11	0.5444	1073.3	1633.8	1294.9	1.2618	69.741	27.233	3.026	0.000	0.000
520.0	5.556%11	0.4416	1073.8	1673.3	1353.6	1.2361	67.273	29.454	3.273	0.000	0.000
540.0	4.466%11	0.3549	1074.2	1712.9	1413.0	1.2122	64.879	31.609	3.512	0.000	0.000
560.0	3.582%11	0.2847	1074.5	1752.7	1472.6	1.1902	62.552	33.703	3.745	0.000	0.000
580.0	2.885%11	0.2293	1074.8	1792.5	1532.3	1.1698	60.284	35.744	3.972	0.000	0.000
600.0	2.345%11	0.1864	1075.0	1832.3	1591.9	1.1510	58.065	37.741	4.193	0.000	0.000
620.0	1.928%11	0.1533	1075.2	1872.2	1651.4	1.1337	55.884	39.704	4.412	0.000	0.000
640.0	1.609%11	0.1279	1075.4	1912.0	1710.9	1.1176	53.730	41.643	4.627	0.000	0.000
660.0	1.363%11	0.1084	1075.5	1951.9	1770.2	1.1027	51.593	43.567	4.841	0.000	0.000
680.0	1.174%11	0.0933	1075.6	1991.8	1829.2	1.0889	49.465	45.481	5.053	0.000	0.000
700.0	1.026%11	0.0816	1075.7	2031.6	1887.8	1.0762	47.346	47.389	5.265	0.000	0.000
720.0	9.111%10	0.0724	1075.8	2071.5	1946.0	1.0645	45.241	49.283	5.476	0.000	0.000
740.0	8.202%10	0.0652	1075.9	2111.4	2003.4	1.0539	43.160	51.156	5.684	0.000	0.000
760.0	7.480%10	0.0595	1075.9	2151.2	2059.9	1.0443	41.116	52.995	5.888	0.000	0.000
780.0	6.902%10	0.0549	1076.0	2191.1	2115.1	1.0359	39.125	54.788	6.088	0.000	0.000
800.0	6.436%10	0.0512	1076.0	2231.0	2168.7	1.0287	37.196	56.524	6.280	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 14.7 LONGI= 342.6 R=100 MONTH= 6 HOUR= 5.6

CALCULATED VALUES; MLAT= 21.4 MLONG= 55.4
DIP= 15.9 MODIP= 15.8 MAGLA= 8.1 XHI= 90.0
SUNRISE: 5.6 L.T. SUNSET:18.4 L.T. SUN DEC.= 23.1
NMF2=3.20%11 NMF1= 0.00%-01 NME=4.09%10 NMD=4.00%08
HMF2=271.8 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.914%08	9.1%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.081%08	0.0013	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.845%09	0.0058	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.312%10	0.0410	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.193%10	0.0997	-1	-1	-1	-1	0.016	0.000	0.000	6.623	93.361
105.0	4.055%10	0.1267	-1	-1	-1	-1	0.025	0.000	0.000	8.541	91.434
110.0	3.937%10	0.1230	-1	-1	-1	-1	0.040	0.000	0.000	10.994	88.966
115.0	3.157%10	0.0986	-1	-1	-1	-1	0.064	0.000	0.000	14.085	85.852
120.0	2.515%10	0.0786	321.0	321.0	321.0	1.0000	0.101	0.000	0.000	17.829	82.070
125.0	2.485%10	0.0776	373.7	396.0	373.7	1.0597	0.159	0.000	0.000	21.966	77.875
130.0	3.084%10	0.0963	425.1	469.7	425.1	1.1049	0.252	0.000	0.000	25.782	73.966
135.0	3.934%10	0.1229	474.1	541.0	474.1	1.1411	0.397	0.000	0.000	28.494	71.110
140.0	6.132%10	0.1915	519.0	608.2	519.0	1.1719	0.623	0.000	0.000	30.000	69.377
150.0	9.258%10	0.2892	594.3	728.1	594.3	1.2252	1.498	0.000	0.000	31.126	67.376
160.0	1.190%11	0.3716	651.3	829.7	651.3	1.2739	3.368	0.000	0.000	31.531	65.101
170.0	1.472%11	0.4597	694.5	917.5	694.5	1.3211	6.679	0.000	0.000	31.688	61.633
180.0	1.763%11	0.5509	727.9	995.5	727.9	1.3676	11.436	0.000	0.000	30.852	57.711
190.0	2.052%11	0.6409	754.3	1066.5	754.3	1.4139	17.669	0.000	0.000	25.763	56.569
200.0	2.323%11	0.7257	775.5	1132.3	775.5	1.4601	26.008	0.000	0.000	16.079	57.913
210.0	2.566%11	0.8017	792.9	1183.8	792.9	1.4930	37.565	0.000	0.000	8.607	53.827
220.0	2.773%11	0.8663	807.2	1227.3	807.2	1.5204	53.681	0.000	0.000	4.466	41.853
230.0	2.938%11	0.9178	819.1	1259.3	819.1	1.5375	74.390	0.000	0.000	2.307	23.303
240.0	3.060%11	0.9559	828.9	1277.6	828.9	1.5412	92.014	0.000	0.000	1.191	6.796
260.0	3.185%11	0.9951	844.0	1274.1	846.7	1.5048	99.365	0.000	0.000	0.317	0.318
280.0	3.192%11	0.9971	854.4	1237.4	864.5	1.4314	99.536	0.014	0.002	0.084	0.364
300.0	3.098%11	0.9677	861.7	1196.9	882.2	1.3567	99.314	0.510	0.057	0.023	0.097
320.0	2.915%11	0.9107	866.9	1169.8	900.0	1.2998	97.052	2.625	0.292	0.006	0.026
340.0	2.669%11	0.8338	870.5	1159.2	917.9	1.2629	93.704	5.659	0.629	0.002	0.007
360.0	2.387%11	0.7455	873.2	1161.5	935.9	1.2411	90.424	8.616	0.957	0.000	0.002
380.0	2.093%11	0.6537	875.2	1172.4	954.2	1.2286	87.258	11.468	1.274	0.000	0.000
400.0	1.808%11	0.5647	876.6	1188.4	973.5	1.2208	84.201	14.219	1.580	0.000	0.000
420.0	1.545%11	0.4827	877.7	1204.4	994.6	1.2110	81.250	16.875	1.875	0.000	0.000
440.0	1.312%11	0.4100	878.6	1222.2	1018.5	1.2001	78.400	19.440	2.160	0.000	0.000
460.0	1.112%11	0.3473	879.2	1241.0	1045.1	1.1875	75.647	21.918	2.435	0.000	0.000
480.0	9.426%10	0.2944	879.7	1260.3	1073.6	1.1739	72.986	24.313	2.701	0.000	0.000
500.0	8.019%10	0.2505	880.1	1280.0	1103.0	1.1605	70.412	26.629	2.959	0.000	0.000
520.0	6.862%10	0.2143	880.4	1299.8	1132.7	1.1475	67.920	28.872	3.208	0.000	0.000
540.0	5.915%10	0.1848	880.7	1319.7	1162.6	1.1351	65.503	31.048	3.450	0.000	0.000
560.0	5.142%10	0.1606	880.9	1339.6	1192.6	1.1233	63.154	33.162	3.685	0.000	0.000
580.0	4.512%10	0.1409	881.1	1359.6	1222.5	1.1121	60.864	35.223	3.914	0.000	0.000
600.0	3.998%10	0.1249	881.2	1379.6	1252.4	1.1015	58.624	37.239	4.138	0.000	0.000
620.0	3.577%10	0.1117	881.3	1399.5	1282.3	1.0914	56.422	39.221	4.358	0.000	0.000
640.0	3.231%10	0.1009	881.5	1419.5	1312.1	1.0818	54.247	41.178	4.575	0.000	0.000
660.0	2.946%10	0.0920	881.5	1439.5	1341.9	1.0728	52.089	43.120	4.791	0.000	0.000
680.0	2.710%10	0.0846	881.6	1459.5	1371.5	1.0642	49.941	45.054	5.006	0.000	0.000
700.0	2.513%10	0.0785	881.7	1479.5	1401.0	1.0561	47.801	46.979	5.220	0.000	0.000
720.0	2.349%10	0.0734	881.7	1499.5	1430.2	1.0485	45.676	48.892	5.432	0.000	0.000
740.0	2.212%10	0.0691	881.8	1519.5	1459.1	1.0414	43.575	50.783	5.643	0.000	0.000
760.0	2.096%10	0.0655	881.8	1539.5	1487.5	1.0350	41.512	52.639	5.849	0.000	0.000
780.0	1.998%10	0.0624	881.8	1559.5	1515.3	1.0292	39.501	54.449	6.050	0.000	0.000
800.0	1.915%10	0.0598	881.9	1579.5	1542.4	1.0241	37.553	56.202	6.245	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 14.7 LONGI= 342.6 R=100 MONTH= 6 HOUR= 0.0

CALCULATED VALUES: MLAT= 21.4 MLONG= 55.4
DIP= 15.9 MODIP= 15.8 MAGLA= 8.1 XHI= 142.2
SUNRISE: 5.6 L.T. SUNSET:18.4 L.T. SUN DEC.= 23.1
NMF2=5.52%11 NMF1= 0.00%-01 NME=3.20%09 NMD=4.00%08
HMF2=347.7 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDND+
80.0	5.922%05	1.1%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.494%08	4.5%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.737%08	8.6%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	2.513%09	0.0045	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.193%09	0.0058	-1	-1	-1	-1	0.016	0.000	0.000	6.623	93.361
105.0	3.201%09	0.0058	-1	-1	-1	-1	0.025	0.000	0.000	8.541	91.433
110.0	2.680%09	0.0049	-1	-1	-1	-1	0.040	0.000	0.000	10.994	88.965
115.0	1.800%09	0.0033	-1	-1	-1	-1	0.064	0.000	0.000	14.085	85.851
120.0	1.151%09	0.0021	318.8	318.8	318.8	1.0000	0.101	0.000	0.000	17.829	82.070
125.0	7.934%08	0.0014	370.7	371.9	370.7	1.0033	0.160	0.000	0.000	21.966	77.874
130.0	6.400%08	0.0012	421.2	423.7	421.2	1.0059	0.253	0.000	0.000	25.782	73.965
135.0	6.290%08	0.0011	469.3	473.0	469.3	1.0079	0.398	0.000	0.000	28.494	71.108
140.0	7.545%08	0.0014	513.3	518.3	513.3	1.0097	0.624	0.000	0.000	30.000	69.376
150.0	1.665%09	0.0030	586.5	594.0	586.5	1.0127	1.502	0.000	0.000	31.124	67.373
160.0	3.691%09	0.0067	641.7	651.6	641.7	1.0155	3.378	0.000	0.000	31.515	65.107
170.0	6.787%09	0.0123	683.1	695.6	683.1	1.0182	6.698	0.000	0.000	31.573	61.729
180.0	1.205%10	0.0218	715.1	730.0	715.1	1.0208	11.468	0.000	0.000	30.079	58.453
190.0	2.064%10	0.0374	740.2	757.6	740.2	1.0235	17.718	0.000	0.000	22.428	59.854
200.0	3.408%10	0.0617	760.5	780.3	760.5	1.0261	26.081	0.000	0.000	10.508	63.411
210.0	5.420%10	0.0981	777.0	799.3	777.0	1.0288	37.671	0.000	0.000	3.854	58.476
220.0	8.256%10	0.1495	790.6	815.4	790.6	1.0314	53.832	0.000	0.000	1.344	44.824
230.0	1.193%11	0.2159	801.8	829.1	801.8	1.0341	74.597	0.000	0.000	0.466	24.937
240.0	1.640%11	0.2968	811.2	841.0	811.2	1.0367	92.232	0.000	0.000	0.161	7.607
260.0	2.706%11	0.4898	825.4	860.2	825.4	1.0421	97.671	1.345	0.149	0.019	0.815
280.0	3.816%11	0.6907	835.3	875.0	835.8	1.0469	87.497	11.163	1.240	0.002	0.098
300.0	4.727%11	0.8558	842.2	886.9	845.8	1.0486	76.140	21.463	2.385	0.000	0.012
320.0	5.292%11	0.9581	847.1	896.8	855.8	1.0478	66.207	30.412	3.379	0.000	0.001
340.0	5.510%11	0.9975	850.6	905.2	865.8	1.0455	57.575	38.182	4.242	0.000	0.000
360.0	5.479%11	0.9919	853.1	912.7	875.6	1.0424	50.075	44.932	4.992	0.000	0.000
380.0	5.233%11	0.9473	855.0	919.5	885.2	1.0388	43.562	50.795	5.644	0.000	0.000
400.0	4.815%11	0.8717	856.4	925.9	894.0	1.0357	37.907	55.884	6.209	0.000	0.000
420.0	4.290%11	0.7767	857.4	926.0	901.3	1.0274	33.002	60.298	6.700	0.000	0.000
440.0	3.723%11	0.6740	858.2	926.1	906.5	1.0217	28.750	64.125	7.125	0.000	0.000
460.0	3.167%11	0.5733	858.8	926.3	909.4	1.0186	25.069	67.438	7.493	0.000	0.000
480.0	2.657%11	0.4810	859.3	926.4	910.8	1.0172	21.888	70.300	7.811	0.000	0.000
500.0	2.212%11	0.4004	859.7	926.6	911.5	1.0165	19.145	72.770	8.086	0.000	0.000
520.0	1.837%11	0.3325	860.0	926.7	911.9	1.0162	16.783	74.895	8.322	0.000	0.000
540.0	1.528%11	0.2767	860.2	926.9	912.2	1.0161	14.755	76.721	8.525	0.000	0.000
560.0	1.279%11	0.2315	860.4	927.0	912.5	1.0160	13.014	78.287	8.699	0.000	0.000
580.0	1.079%11	0.1954	860.6	927.2	912.7	1.0159	11.519	79.633	8.848	0.000	0.000
600.0	9.200%10	0.1666	860.7	927.3	912.9	1.0158	10.232	80.791	8.977	0.000	0.000
620.0	7.934%10	0.1436	860.9	927.5	913.2	1.0157	9.119	81.793	9.088	0.000	0.000
640.0	6.926%10	0.1254	860.9	927.6	913.4	1.0156	8.150	82.665	9.185	0.000	0.000
660.0	6.120%10	0.1108	861.0	927.8	913.6	1.0155	7.301	83.429	9.270	0.000	0.000
680.0	5.474%10	0.0991	861.1	927.9	913.8	1.0154	6.551	84.104	9.345	0.000	0.000
700.0	4.952%10	0.0897	861.2	928.1	914.1	1.0153	5.886	84.702	9.411	0.000	0.000
720.0	4.530%10	0.0820	861.2	928.2	914.3	1.0152	5.294	85.235	9.471	0.000	0.000
740.0	4.185%10	0.0758	861.2	928.4	914.5	1.0152	4.764	85.712	9.524	0.000	0.000
760.0	3.902%10	0.0706	861.3	928.5	914.8	1.0151	4.290	86.139	9.571	0.000	0.000
780.0	3.670%10	0.0664	861.3	928.7	915.0	1.0150	3.863	86.523	9.614	0.000	0.000
800.0	3.477%10	0.0629	861.3	928.8	915.2	1.0149	3.480	86.868	9.652	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 14.7 LONGI= 342.6 R=100 MONTH=12 HOUR=12.0

CALCULATED VALUES: MLAT= 21.4 MLONG= 55.4
DIP= 15.9 MODIP= 15.8 MAGLA= 8.1 XHI= 37.6
SUNRISE: 6.4 L.T. SUNSET:17.6 L.T. SUN DEC.= -22.9
NMF2=1.88%12 NMF1= 0.00%-01 NME=1.67%11 NMD=1.23%09
HMF2=363.2 HMF1= 0.0 HME=110.0 HMD= 81.1

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	1.195%09	6.4%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.380%09	0.0013	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	2.560%10	0.0136	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	8.808%10	0.0469	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.452%11	0.0773	-1	-1	-1	-1	0.317	0.000	0.000	67.438	32.245
105.0	1.654%11	0.0881	-1	-1	-1	-1	0.474	0.000	0.000	64.558	34.968
110.0	1.671%11	0.0890	-1	-1	-1	-1	0.707	0.000	0.000	61.789	37.504
115.0	1.709%11	0.0910	-1	-1	-1	-1	1.055	0.000	0.000	59.106	39.839
120.0	1.746%11	0.0930	336.9	336.9	336.9	1.0000	1.574	0.000	0.000	56.463	41.964
125.0	1.785%11	0.0951	395.7	432.4	395.7	1.0926	2.345	0.000	0.000	53.780	43.876
130.0	1.826%11	0.0972	453.1	526.4	453.1	1.1617	3.489	0.000	0.000	50.969	45.542
135.0	1.867%11	0.0995	508.5	618.4	508.5	1.2161	5.178	0.000	0.000	48.020	46.802
140.0	1.910%11	0.1018	560.4	707.0	560.4	1.2615	7.651	0.000	0.000	45.000	47.349
150.0	2.001%11	0.1066	650.9	870.7	650.9	1.3377	16.257	0.000	0.000	38.670	45.073
160.0	2.099%11	0.1118	723.2	1016.3	723.2	1.4053	31.859	0.000	0.000	30.293	37.848
170.0	2.204%11	0.1174	780.5	1146.8	780.5	1.4694	53.133	0.000	0.000	19.797	27.070
180.0	2.319%11	0.1235	826.1	1265.8	826.1	1.5322	71.864	0.000	0.000	11.703	16.434
190.0	2.443%11	0.1301	863.1	1376.0	863.1	1.5943	82.658	0.000	0.000	6.774	10.568
200.0	2.581%11	0.1374	893.4	1479.6	893.4	1.6562	87.639	0.000	0.000	3.909	8.452
210.0	2.732%11	0.1455	918.4	1563.0	918.4	1.7019	90.009	0.000	0.000	2.255	7.735
220.0	2.903%11	0.1546	939.2	1633.6	939.2	1.7393	91.420	0.000	0.000	1.301	7.279
230.0	3.096%11	0.1649	956.5	1683.7	956.5	1.7602	92.506	0.000	0.000	0.750	6.743
240.0	3.321%11	0.1769	971.0	1708.4	971.0	1.7594	93.489	0.000	0.000	0.433	6.078
260.0	3.935%11	0.2096	993.2	1682.8	993.2	1.6944	95.393	0.000	0.000	0.144	4.463
280.0	5.860%11	0.3121	1008.6	1595.3	1008.6	1.5817	97.250	0.000	0.000	0.048	2.702
300.0	1.058%12	0.5637	1019.4	1503.4	1019.5	1.4746	98.000	0.353	0.039	0.016	1.591
320.0	1.505%12	0.8017	1027.1	1440.2	1029.5	1.3989	95.827	3.274	0.364	0.005	0.529
340.0	1.786%12	0.9514	1032.5	1410.9	1039.8	1.3569	92.523	6.570	0.730	0.002	0.176
360.0	1.876%12	0.9993	1036.5	1408.2	1050.6	1.3405	89.284	9.591	1.066	0.001	0.059
380.0	1.840%12	0.9801	1039.4	1423.2	1062.9	1.3390	86.158	12.440	1.382	0.000	0.020
400.0	1.710%12	0.9107	1041.5	1448.9	1078.8	1.3431	83.140	15.169	1.685	0.000	0.006
420.0	1.515%12	0.8067	1043.2	1480.8	1102.2	1.3434	80.226	17.795	1.977	0.000	0.002
440.0	1.289%12	0.6863	1044.4	1516.1	1136.9	1.3335	77.412	20.329	2.259	0.000	0.001
460.0	1.062%12	0.5657	1045.4	1553.4	1182.9	1.3132	74.693	22.776	2.531	0.000	0.000
480.0	8.554%11	0.4556	1046.1	1591.7	1236.4	1.2874	72.066	25.141	2.793	0.000	0.000
500.0	6.791%11	0.3617	1046.7	1630.7	1293.5	1.2607	69.524	27.428	3.048	0.000	0.000
520.0	5.356%11	0.2853	1047.2	1670.0	1352.0	1.2352	67.064	29.643	3.294	0.000	0.000
540.0	4.224%11	0.2250	1047.6	1709.5	1411.2	1.2114	64.677	31.791	3.532	0.000	0.000
560.0	3.351%11	0.1785	1047.9	1749.1	1470.5	1.1894	62.358	33.878	3.764	0.000	0.000
580.0	2.684%11	0.1429	1048.2	1788.7	1529.9	1.1691	60.097	35.913	3.990	0.000	0.000
600.0	2.177%11	0.1160	1048.4	1828.4	1589.3	1.1504	57.885	37.904	4.212	0.000	0.000
620.0	1.793%11	0.0955	1048.6	1868.0	1648.6	1.1331	55.710	39.861	4.429	0.000	0.000
640.0	1.500%11	0.0799	1048.7	1907.7	1707.8	1.1171	53.563	41.793	4.644	0.000	0.000
660.0	1.276%11	0.0679	1048.8	1947.4	1766.8	1.1022	51.432	43.711	4.857	0.000	0.000
680.0	1.102%11	0.0587	1049.0	1987.1	1825.6	1.0885	49.311	45.620	5.069	0.000	0.000
700.0	9.672%10	0.0515	1049.0	2026.8	1884.0	1.0758	47.199	47.521	5.280	0.000	0.000
720.0	8.612%10	0.0459	1049.1	2066.5	1941.9	1.0642	45.100	49.410	5.490	0.000	0.000
740.0	7.772%10	0.0414	1049.2	2106.2	1999.1	1.0536	43.025	51.277	5.697	0.000	0.000
760.0	7.101%10	0.0378	1049.3	2145.9	2055.3	1.0441	40.988	53.110	5.901	0.000	0.000
780.0	6.561%10	0.0349	1049.3	2185.6	2110.2	1.0357	39.003	54.897	6.100	0.000	0.000
800.0	6.123%10	0.0326	1049.3	2225.3	2163.7	1.0285	37.080	56.628	6.292	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= 14.7 LONGI= 342.6 R=100 MONTH=12 HOUR= 6.4

CALCULATED VALUES: MLAT= 21.4 MLONG= 55.4
DIP= 15.9 MODIP= 15.8 MAGLA= 8.1 XHI= 90.0
SUNRISE: 6.4 L.T. SUNSET:17.6 L.T. SUN DEC.= -22.9
NMF2=5.09%11 NMF1= 0.00%-01 NME=4.13%10 NMD=4.00%08
HMF2=294.7 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.914%08	5.7%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.081%08	8.0%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.845%09	0.0036	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.316%10	0.0259	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.212%10	0.0631	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	4.088%10	0.0803	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	3.967%10	0.0780	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	3.168%10	0.0623	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	2.513%10	0.0494	320.1	320.1	320.1	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	2.482%10	0.0488	372.5	394.9	372.5	1.0601	0.084	0.000	0.000	36.294	63.621
130.0	3.094%10	0.0608	423.5	468.3	423.5	1.1058	0.161	0.000	0.000	40.716	59.122
135.0	3.962%10	0.0779	472.1	539.3	472.1	1.1423	0.308	0.000	0.000	43.939	55.753
140.0	4.446%10	0.0874	516.7	606.3	516.7	1.1734	0.586	0.000	0.000	45.000	54.414
150.0	5.283%10	0.1038	591.1	725.5	591.1	1.2273	2.079	0.000	0.000	41.880	56.041
160.0	6.338%10	0.1246	647.4	826.5	647.4	1.2767	6.925	0.000	0.000	36.631	56.445
170.0	7.710%10	0.1515	689.9	913.8	689.9	1.3246	19.707	0.000	0.000	30.703	49.590
180.0	9.599%10	0.1887	722.7	991.4	722.7	1.3719	41.982	0.000	0.000	21.641	36.377
190.0	1.255%11	0.2468	748.5	1062.0	748.5	1.4188	63.935	0.000	0.000	10.559	25.506
200.0	1.730%11	0.3400	769.4	1127.7	769.4	1.4657	77.146	0.000	0.000	4.137	18.718
210.0	2.268%11	0.4457	786.4	1179.0	786.4	1.4993	83.481	0.000	0.000	1.545	14.973
220.0	2.832%11	0.5567	800.4	1222.5	800.4	1.5274	86.697	0.000	0.000	0.573	12.730
230.0	3.387%11	0.6657	812.0	1254.6	812.0	1.5451	88.765	0.000	0.000	0.212	11.022
240.0	3.894%11	0.7653	821.7	1273.0	821.7	1.5492	90.452	0.000	0.000	0.079	9.469
260.0	4.657%11	0.9153	836.4	1269.9	840.2	1.5114	93.576	0.000	0.000	0.011	6.413
280.0	5.025%11	0.9877	846.6	1233.6	858.8	1.4365	96.617	0.000	0.000	0.001	3.381
300.0	5.081%11	0.9986	853.7	1193.7	877.3	1.3607	98.000	0.000	0.000	0.000	2.000
320.0	4.935%11	0.9700	858.8	1167.2	895.8	1.3029	95.866	3.459	0.384	0.000	0.290
340.0	4.627%11	0.9094	862.4	1157.2	914.4	1.2655	92.561	6.659	0.740	0.000	0.040
360.0	4.202%11	0.8259	865.0	1160.2	933.2	1.2432	89.321	9.606	1.067	0.000	0.005
380.0	3.714%11	0.7299	866.9	1171.7	952.3	1.2304	86.193	12.425	1.381	0.000	0.001
400.0	3.210%11	0.6310	868.3	1188.4	972.2	1.2224	83.174	15.143	1.683	0.000	0.000
420.0	2.729%11	0.5364	869.4	1204.4	993.8	1.2119	80.259	17.767	1.974	0.000	0.000
440.0	2.294%11	0.4508	870.2	1222.2	1018.1	1.2005	77.444	20.301	2.256	0.000	0.000
460.0	1.915%11	0.3764	870.8	1241.0	1045.0	1.1876	74.724	22.748	2.528	0.000	0.000
480.0	1.595%11	0.3135	871.3	1260.3	1073.5	1.1740	72.096	25.114	2.790	0.000	0.000
500.0	1.331%11	0.2616	871.7	1280.0	1103.0	1.1605	69.553	27.402	3.045	0.000	0.000
520.0	1.116%11	0.2193	872.1	1299.8	1132.7	1.1475	67.091	29.618	3.291	0.000	0.000
540.0	9.422%10	0.1852	872.3	1319.7	1162.6	1.1351	64.704	31.767	3.530	0.000	0.000
560.0	8.027%10	0.1578	872.5	1339.6	1192.6	1.1233	62.383	33.855	3.762	0.000	0.000
580.0	6.908%10	0.1358	872.7	1359.6	1222.5	1.1121	60.122	35.891	3.988	0.000	0.000
600.0	6.009%10	0.1181	872.8	1379.5	1252.4	1.1015	57.909	37.882	4.209	0.000	0.000
620.0	5.286%10	0.1039	872.9	1399.5	1282.3	1.0914	55.734	39.840	4.427	0.000	0.000
640.0	4.702%10	0.0924	873.0	1419.5	1312.1	1.0818	53.585	41.773	4.641	0.000	0.000
660.0	4.228%10	0.0831	873.1	1439.5	1341.9	1.0728	51.453	43.692	4.855	0.000	0.000
680.0	3.841%10	0.0755	873.2	1459.5	1371.5	1.0642	49.332	45.602	5.067	0.000	0.000
700.0	3.524%10	0.0693	873.3	1479.5	1401.0	1.0561	47.218	47.504	5.278	0.000	0.000
720.0	3.262%10	0.0641	873.3	1499.5	1430.2	1.0485	45.119	49.393	5.488	0.000	0.000
740.0	3.046%10	0.0599	873.4	1519.5	1459.1	1.0414	43.043	51.261	5.696	0.000	0.000
760.0	2.865%10	0.0563	873.4	1539.5	1487.5	1.0350	41.005	53.095	5.899	0.000	0.000
780.0	2.714%10	0.0534	873.4	1559.5	1515.3	1.0292	39.019	54.883	6.098	0.000	0.000
800.0	2.588%10	0.0509	873.5	1579.5	1542.4	1.0241	37.096	56.614	6.290	0.000	0.000

WE PUT B1= 3.5TO GET HST

INPUT: LATI= 14.7 LONGI= 342.6 R=100 MONTH=12 HOUR= 0.0

CALCULATED VALUES: MLAT= 21.4 MLONG= 55.4
DIP= 15.9 MODIP= 15.8 MAGLA= 8.1 XHI= 171.8
SUNRISE: 6.4 L.T. SUNSET:17.6 L.T. SUN DEC.= -22.9
NMF2=1.25%12 NMF1= 0.00%-01 NME=3.20%09 NMD=4.00%08
HMF2=300.6 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.271%05	4.2%-7	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.469%08	2.0%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.727%08	3.8%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	2.507%09	0.0020	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.193%09	0.0026	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	3.201%09	0.0026	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.594
110.0	2.678%09	0.0021	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.312
115.0	1.796%09	0.0014	-1	-1	-1	-1	0.024	0.000	0.000	27.442	72.535
120.0	1.146%09	9.2%-4	316.6	316.6	316.6	1.0000	0.045	0.000	0.000	31.698	68.256
125.0	7.886%08	6.3%-4	367.6	369.2	367.6	1.0043	0.086	0.000	0.000	36.294	63.619
130.0	6.349%08	5.1%-4	417.2	420.4	417.2	1.0076	0.165	0.000	0.000	40.716	59.118
135.0	6.228%08	5.0%-4	464.4	469.2	464.4	1.0102	0.316	0.000	0.000	43.939	55.745
140.0	7.461%08	6.0%-4	507.5	513.8	507.5	1.0124	0.601	0.000	0.000	45.000	54.399
150.0	1.647%09	0.0013	578.7	588.2	578.7	1.0164	2.132	0.000	0.000	41.880	55.987
160.0	4.826%09	0.0039	631.9	644.5	631.9	1.0200	7.103	0.000	0.000	36.631	56.267
170.0	2.952%10	0.0236	671.7	687.5	671.7	1.0235	20.214	0.000	0.000	30.703	49.083
180.0	1.178%11	0.0943	702.2	721.1	702.2	1.0270	43.062	0.000	0.000	21.641	35.296
190.0	3.286%11	0.2631	726.2	748.3	726.2	1.0304	65.582	0.000	0.000	10.559	23.859
200.0	5.439%11	0.4356	745.4	770.7	745.4	1.0339	79.133	0.000	0.000	4.137	16.730
210.0	6.735%11	0.5394	761.1	789.5	761.1	1.0373	85.634	0.000	0.000	1.545	12.821
220.0	7.993%11	0.6402	774.0	805.6	774.0	1.0408	88.935	0.000	0.000	0.573	10.492
230.0	9.144%11	0.7323	784.7	819.4	784.7	1.0443	91.059	0.000	0.000	0.212	8.729
240.0	1.014%12	0.8118	793.5	831.4	793.5	1.0477	92.792	0.000	0.000	0.079	7.129
260.0	1.156%12	0.9260	807.0	851.2	807.1	1.0546	96.005	0.000	0.000	0.011	3.984
280.0	1.228%12	0.9837	816.4	866.9	819.3	1.0581	99.071	0.000	0.000	0.001	0.927
300.0	1.249%12	1.0000	822.9	879.8	831.5	1.0581	98.000	1.384	0.154	0.000	0.462
320.0	1.221%12	0.9780	827.6	890.7	843.6	1.0558	85.862	12.667	1.407	0.000	0.063
340.0	1.142%12	0.9144	830.9	900.3	855.7	1.0522	73.253	24.065	2.674	0.000	0.009
360.0	1.025%12	0.8210	833.3	909.0	867.6	1.0477	62.465	33.780	3.753	0.000	0.001
380.0	8.888%11	0.7119	835.0	917.1	879.2	1.0431	53.283	42.045	4.672	0.000	0.000
400.0	7.491%11	0.5999	836.3	924.7	889.9	1.0391	45.473	49.074	5.453	0.000	0.000
420.0	6.177%11	0.4947	837.3	924.8	898.8	1.0289	38.835	55.048	6.116	0.000	0.000
440.0	5.016%11	0.4018	838.1	924.8	904.9	1.0220	33.200	60.120	6.680	0.000	0.000
460.0	4.038%11	0.3234	838.6	924.9	908.3	1.0183	28.424	64.418	7.158	0.000	0.000
480.0	3.240%11	0.2595	839.1	925.0	909.9	1.0166	24.384	68.054	7.562	0.000	0.000
500.0	2.603%11	0.2085	839.5	925.0	910.6	1.0159	20.976	71.121	7.902	0.000	0.000
520.0	2.103%11	0.1685	839.8	925.1	910.9	1.0156	18.109	73.702	8.189	0.000	0.000
540.0	1.714%11	0.1373	840.0	925.1	911.1	1.0154	15.702	75.868	8.430	0.000	0.000
560.0	1.412%11	0.1131	840.2	925.2	911.2	1.0154	13.685	77.684	8.632	0.000	0.000
580.0	1.178%11	0.0943	840.3	925.3	911.3	1.0153	11.992	79.207	8.801	0.000	0.000
600.0	9.957%10	0.0797	840.5	925.3	911.4	1.0153	10.567	80.489	8.943	0.000	0.000
620.0	8.532%10	0.0683	840.6	925.4	911.5	1.0152	9.359	81.577	9.064	0.000	0.000
640.0	7.411%10	0.0593	840.7	925.5	911.6	1.0152	8.326	82.507	9.167	0.000	0.000
660.0	6.522%10	0.0522	840.7	925.5	911.7	1.0152	7.433	83.310	9.257	0.000	0.000
680.0	5.814%10	0.0466	840.8	925.6	911.8	1.0151	6.654	84.011	9.335	0.000	0.000
700.0	5.244%10	0.0420	840.9	925.7	911.9	1.0151	5.969	84.628	9.403	0.000	0.000
720.0	4.783%10	0.0383	840.9	925.7	912.0	1.0151	5.362	85.174	9.464	0.000	0.000
740.0	4.407%10	0.0353	841.0	925.8	912.1	1.0150	4.822	85.660	9.518	0.000	0.000
760.0	4.099%10	0.0328	841.0	925.9	912.2	1.0150	4.339	86.095	9.566	0.000	0.000
780.0	3.844%10	0.0308	841.0	925.9	912.3	1.0149	3.906	86.484	9.609	0.000	0.000
800.0	3.633%10	0.0291	841.0	926.0	912.4	1.0149	3.518	86.834	9.648	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -12.0 LONGI= 283.1 R= 10 MONTH= 3 HOUR=12.0

CALCULATED VALUES: MLAT= -0.7 MLONG= 353.1
  DIP= 2.7 MODIP= 2.8 MAGLA= 1.4 XHI= 8.7
  SUNRISE: 6.0 L.T. SUNSET:18.0 L.T. SUN DEC.= -3.3
  NMF2=7.44%11 NMF1= 2.46% 11 NME=1.47%11 NMD=6.25%08
  HMF2=379.1 HMF1=285.2 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	6.073%08	8.2%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	1.219%09	0.0016	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.424%10	0.0191	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	5.926%10	0.0796	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.157%11	0.1555	-1	-1	-1	-1	0.208	0.000	0.000	87.678	12.114
105.0	1.436%11	0.1930	-1	-1	-1	-1	0.327	0.000	0.000	79.929	19.745
110.0	1.472%11	0.1979	-1	-1	-1	-1	0.515	0.000	0.000	72.806	26.679
115.0	1.466%11	0.1970	-1	-1	-1	-1	0.809	0.000	0.000	66.187	33.004
120.0	1.473%11	0.1980	308.1	308.1	308.1	1.0000	1.269	0.000	0.000	59.900	38.831
125.0	1.480%11	0.1990	355.9	388.9	355.9	1.0928	1.984	0.000	0.000	53.778	44.239
130.0	1.488%11	0.2000	402.4	468.4	402.4	1.1642	3.084	0.000	0.000	47.802	49.115
135.0	1.496%11	0.2010	446.2	545.3	446.2	1.2221	4.747	0.000	0.000	42.150	53.104
140.0	1.503%11	0.2021	485.7	617.8	485.7	1.2720	7.191	0.000	0.000	37.000	55.809
150.0	1.520%11	0.2043	549.5	747.6	549.5	1.3606	15.148	0.000	0.000	28.373	56.479
160.0	1.537%11	0.2066	595.8	860.1	595.8	1.4434	26.424	0.000	0.000	21.708	51.867
170.0	1.556%11	0.2091	629.8	960.1	629.8	1.5244	36.968	0.000	0.000	16.519	46.514
180.0	1.575%11	0.2117	655.5	1051.8	655.5	1.6046	44.319	0.000	0.000	12.212	43.469
190.0	1.596%11	0.2145	675.5	1137.9	675.5	1.6845	49.411	0.000	0.000	8.423	42.166
200.0	1.619%11	0.2176	691.4	1219.9	691.4	1.7643	53.595	0.000	0.000	5.543	40.862
210.0	1.644%11	0.2210	704.3	1396.0	704.3	1.9821	57.582	0.000	0.000	3.608	38.810
220.0	1.672%11	0.2247	714.9	1590.5	714.9	2.2247	61.669	0.000	0.000	2.345	35.987
230.0	1.703%11	0.2288	723.7	1793.4	723.9	2.4774	65.976	0.000	0.000	1.523	32.501
240.0	1.738%11	0.2336	730.9	1989.0	732.7	2.7145	70.560	0.000	0.000	0.990	28.450
260.0	1.836%11	0.2467	742.0	2276.3	750.3	3.0338	80.677	0.000	0.000	0.418	18.905
280.0	2.346%11	0.3154	749.6	2315.6	767.9	3.0155	91.858	0.000	0.000	0.176	7.966
300.0	3.685%11	0.4952	755.0	2107.2	785.5	2.6827	98.000	0.000	0.000	0.074	1.926
320.0	5.318%11	0.7147	758.8	1788.5	803.1	2.2270	96.168	2.618	0.291	0.031	0.892
340.0	6.588%11	0.8853	761.4	1498.1	820.9	1.8249	92.858	6.077	0.675	0.013	0.376
360.0	7.273%11	0.9774	763.4	1295.3	839.1	1.5436	89.608	9.205	1.023	0.006	0.159
380.0	7.440%11	0.9999	764.8	1178.2	858.5	1.3724	86.470	12.114	1.346	0.002	0.067
400.0	7.196%11	0.9670	765.9	1123.7	880.8	1.2757	83.441	14.877	1.653	0.001	0.028
420.0	6.582%11	0.8846	766.7	1109.0	909.3	1.2196	80.517	17.524	1.947	0.000	0.012
440.0	5.749%11	0.7726	767.3	1118.0	947.0	1.1806	77.692	20.072	2.230	0.000	0.005
460.0	4.846%11	0.6512	767.8	1140.7	993.9	1.1477	74.964	22.530	2.503	0.000	0.002
480.0	3.986%11	0.5356	768.2	1171.0	1046.5	1.1190	72.327	24.905	2.767	0.000	0.001
500.0	3.233%11	0.4345	768.5	1205.6	1101.3	1.0947	69.776	27.201	3.022	0.000	0.000
520.0	2.612%11	0.3510	768.7	1242.5	1156.3	1.0745	67.307	29.424	3.269	0.000	0.000
540.0	2.118%11	0.2846	768.9	1280.7	1210.4	1.0581	64.912	31.580	3.509	0.000	0.000
560.0	1.734%11	0.2330	769.0	1319.7	1263.0	1.0449	62.584	33.675	3.742	0.000	0.000
580.0	1.440%11	0.1935	769.2	1359.0	1313.8	1.0344	60.315	35.717	3.969	0.000	0.000
600.0	1.215%11	0.1633	769.3	1398.6	1362.6	1.0264	58.095	37.715	4.191	0.000	0.000
620.0	1.044%11	0.1402	769.4	1438.2	1409.5	1.0204	55.912	39.679	4.409	0.000	0.000
640.0	9.123%10	0.1226	769.4	1478.0	1454.7	1.0160	53.757	41.619	4.624	0.000	0.000
660.0	8.113%10	0.1090	769.5	1517.7	1498.5	1.0128	51.619	43.543	4.838	0.000	0.000
680.0	7.331%10	0.0985	769.5	1557.5	1541.2	1.0106	49.490	45.459	5.051	0.000	0.000
700.0	6.720%10	0.0903	769.6	1597.3	1583.0	1.0090	47.370	47.367	5.263	0.000	0.000
720.0	6.240%10	0.0839	769.6	1637.1	1624.2	1.0079	45.264	49.263	5.474	0.000	0.000
740.0	5.861%10	0.0788	769.7	1676.9	1665.0	1.0072	43.181	51.137	5.682	0.000	0.000
760.0	5.559%10	0.0747	769.7	1716.7	1705.5	1.0066	41.137	52.977	5.886	0.000	0.000
780.0	5.318%10	0.0715	769.7	1756.5	1745.7	1.0062	39.144	54.770	6.086	0.000	0.000
800.0	5.124%10	0.0689	769.7	1796.3	1785.8	1.0059	37.215	56.507	6.279	0.000	0.000

WE PUT 81= 3.0TO GET HST

INPUT: LATI= -12.0 LONGI= 283.1 R= 10 MONTH= 3 HOUR= 6.0

CALCULATED VALUES: MLAT= -0.7 MLONG= 353.1
DIP= 2.7 MODIP= 2.8 MAGLA= 1.4 XHI= 90.0
SUNRISE: 6.0 L.T. SUNSET:18.0 L.T. SUN DEC.= -3.3
NMF2=1.53%11 NMF1= 0.00%-01 NME=2.77%10 NMD=4.00%08
HMF2=244.5 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.914%08	0.0019	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.081%08	0.0027	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.836%09	0.0120	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.145%10	0.0750	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.357%10	0.1544	-1	-1	-1	-1	0.020	0.000	0.000	17.951	82.029
105.0	2.755%10	0.1804	-1	-1	-1	-1	0.031	0.000	0.000	20.889	79.080
110.0	2.666%10	0.1746	-1	-1	-1	-1	0.048	0.000	0.000	24.232	75.720
115.0	2.147%10	0.1406	-1	-1	-1	-1	0.074	0.000	0.000	27.888	72.038
120.0	1.703%10	0.1116	287.6	287.6	287.6	1.0000	0.115	0.000	0.000	31.525	68.360
125.0	1.683%10	0.1102	327.6	350.0	327.6	1.0683	0.178	0.000	0.000	34.510	65.312
130.0	2.123%10	0.1390	366.3	411.1	366.3	1.1222	0.275	0.000	0.000	36.302	63.423
135.0	2.723%10	0.1783	402.0	469.2	402.0	1.1671	0.426	0.000	0.000	36.980	62.595
140.0	3.012%10	0.1973	433.1	522.7	433.1	1.2068	0.656	0.000	0.000	37.000	62.344
150.0	3.589%10	0.2350	480.7	615.0	480.7	1.2794	1.529	0.000	0.000	36.329	62.142
160.0	4.388%10	0.2874	513.1	692.2	513.1	1.3491	3.355	0.000	0.000	35.360	61.285
170.0	5.765%10	0.3776	535.8	759.7	535.8	1.4179	6.481	0.000	0.000	33.727	59.792
180.0	7.797%10	0.5107	552.4	821.1	552.4	1.4863	10.439	0.000	0.000	28.912	60.649
190.0	9.853%10	0.6453	565.2	878.6	566.4	1.5513	14.394	0.000	0.000	19.184	66.422
200.0	1.173%11	0.7680	575.2	933.4	580.3	1.6085	18.251	0.000	0.000	10.701	71.048
210.0	1.325%11	0.8680	583.3	1030.9	594.2	1.7351	22.368	0.000	0.000	5.732	71.900
220.0	1.434%11	0.9393	589.8	1137.0	608.1	1.8698	27.086	0.000	0.000	3.052	69.862
230.0	1.498%11	0.9813	595.2	1246.7	622.0	2.0045	32.666	0.000	0.000	1.624	65.711
240.0	1.525%11	0.9985	599.7	1352.3	635.9	2.1267	39.341	0.000	0.000	0.864	59.795
260.0	1.509%11	0.9883	606.5	1510.4	663.6	2.2759	56.992	0.000	0.000	0.244	42.763
280.0	1.439%11	0.9422	611.2	1542.9	691.4	2.2315	81.610	0.000	0.000	0.069	18.321
300.0	1.327%11	0.8694	614.4	1450.4	719.2	2.0166	98.000	0.000	0.000	0.020	1.980
320.0	1.191%11	0.7802	616.7	1301.9	746.9	1.7430	96.879	2.241	0.249	0.006	0.626
340.0	1.046%11	0.6848	618.4	1167.4	774.7	1.5069	93.557	5.638	0.626	0.002	0.177
360.0	9.028%10	0.5913	619.6	1076.6	802.4	1.3418	90.283	8.700	0.967	0.000	0.050
380.0	7.710%10	0.5050	620.4	1028.8	830.1	1.2394	87.122	11.578	1.286	0.000	0.014
400.0	6.546%10	0.4287	621.1	1012.4	857.9	1.1800	84.070	14.334	1.593	0.000	0.004
420.0	5.551%10	0.3635	621.6	1005.0	886.0	1.1344	81.123	16.988	1.888	0.000	0.001
440.0	4.719%10	0.3090	622.0	1009.5	914.3	1.1042	78.278	19.550	2.172	0.000	0.000
460.0	4.034%10	0.2642	622.3	1020.9	942.9	1.0828	75.529	22.024	2.447	0.000	0.000
480.0	3.476%10	0.2276	622.5	1036.1	971.4	1.0666	72.872	24.415	2.713	0.000	0.000
500.0	3.024%10	0.1980	622.7	1053.5	999.6	1.0539	70.302	26.728	2.970	0.000	0.000
520.0	2.658%10	0.1741	622.8	1072.1	1027.3	1.0436	67.814	28.967	3.219	0.000	0.000
540.0	2.362%10	0.1547	622.9	1091.3	1054.2	1.0352	65.401	31.139	3.460	0.000	0.000
560.0	2.123%10	0.1390	623.0	1110.8	1080.2	1.0284	63.055	33.250	3.694	0.000	0.000
580.0	1.928%10	0.1263	623.1	1130.6	1105.2	1.0230	60.769	35.308	3.923	0.000	0.000
600.0	1.769%10	0.1159	623.2	1150.5	1129.3	1.0188	58.532	37.321	4.147	0.000	0.000
620.0	1.639%10	0.1073	623.2	1170.4	1152.4	1.0156	56.334	39.300	4.367	0.000	0.000
640.0	1.532%10	0.1003	623.3	1190.3	1174.7	1.0133	54.162	41.254	4.584	0.000	0.000
660.0	1.443%10	0.0945	623.3	1210.3	1196.4	1.0116	52.008	43.193	4.799	0.000	0.000
680.0	1.370%10	0.0897	623.3	1230.3	1217.7	1.0104	49.863	45.123	5.014	0.000	0.000
700.0	1.309%10	0.0857	623.4	1250.3	1238.5	1.0095	47.727	47.046	5.227	0.000	0.000
720.0	1.258%10	0.0824	623.4	1270.3	1259.1	1.0089	45.605	48.956	5.440	0.000	0.000
740.0	1.216%10	0.0796	623.4	1290.3	1279.5	1.0085	43.507	50.844	5.649	0.000	0.000
760.0	1.180%10	0.0773	623.4	1310.3	1299.7	1.0081	41.447	52.698	5.855	0.000	0.000
780.0	1.150%10	0.0753	623.4	1330.3	1319.9	1.0079	39.439	54.505	6.056	0.000	0.000
800.0	1.124%10	0.0736	623.5	1350.3	1340.1	1.0076	37.495	56.254	6.250	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -12.0 LONGI= 283.1 R= 10 MONTH= 3 HOUR= 0.0

CALCULATED VALUES: MLAT= -0.7 MLONG= 353.1
  DIP= 2.7 MODIP= 2.8 MAGLA= 1.4 XHI= 164.7
  SUNRISE: 6.0 L.T. SUNSET:18.0 L.T. SUN DEC.= -3.3
  NMF2=5.89%11 NMF1= 0.00%-01 NME=1.78%09 NMD=4.00%08
  HMF2=270.7 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.555%05	9.4%-7	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.480%08	4.2%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.731%08	8.0%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.743%09	0.0030	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.775%09	0.0030	-1	-1	-1	-1	0.020	0.000	0.000	17.951	82.029
105.0	1.775%09	0.0030	-1	-1	-1	-1	0.031	0.000	0.000	20.889	79.079
110.0	1.499%09	0.0025	-1	-1	-1	-1	0.049	0.000	0.000	24.232	75.719
115.0	1.018%09	0.0017	-1	-1	-1	-1	0.076	0.000	0.000	27.888	72.036
120.0	6.506%08	0.0011	284.5	284.5	284.5	1.0000	0.118	0.000	0.000	31.525	68.358
125.0	4.441%08	7.5%-4	323.2	328.6	323.2	1.0165	0.182	0.000	0.000	34.510	65.308
130.0	3.542%08	6.0%-4	360.7	371.4	360.7	1.0296	0.283	0.000	0.000	36.302	63.416
135.0	3.474%08	5.9%-4	395.3	411.3	395.3	1.0405	0.437	0.000	0.000	36.980	62.584
140.0	4.233%08	7.2%-4	425.1	446.5	425.1	1.0502	0.673	0.000	0.000	37.000	62.327
150.0	1.003%09	0.0017	470.4	502.5	470.4	1.0681	1.568	0.000	0.000	36.329	62.102
160.0	2.887%09	0.0049	501.0	543.7	501.0	1.0853	3.441	0.000	0.000	35.360	61.199
170.0	1.049%10	0.0178	522.2	575.6	522.2	1.1023	6.648	0.000	0.000	33.727	59.625
180.0	2.925%10	0.0497	537.8	601.9	537.9	1.1189	10.708	0.000	0.000	28.912	60.380
190.0	6.580%10	0.1118	549.6	624.4	552.4	1.1304	14.764	0.000	0.000	19.184	66.052
200.0	1.256%11	0.2135	559.0	644.4	566.8	1.1368	18.721	0.000	0.000	10.701	70.578
210.0	2.087%11	0.3547	566.5	662.6	581.3	1.1398	22.945	0.000	0.000	5.732	71.323
220.0	3.067%11	0.5211	572.6	679.4	595.8	1.1403	27.785	0.000	0.000	3.052	69.163
230.0	4.051%11	0.6883	577.6	695.0	610.2	1.1390	33.510	0.000	0.000	1.624	64.867
240.0	4.888%11	0.8306	581.7	709.9	624.7	1.1364	40.359	0.000	0.000	0.864	58.777
260.0	5.793%11	0.9843	588.0	737.5	653.6	1.1284	58.472	0.000	0.000	0.244	41.284
280.0	5.852%11	0.9944	592.3	763.2	682.5	1.1183	83.683	0.000	0.000	0.069	16.248
300.0	5.580%11	0.9482	595.4	787.6	711.4	1.1071	98.000	0.000	0.000	0.020	1.980
320.0	5.092%11	0.8652	597.5	811.1	740.2	1.0958	86.769	11.356	1.262	0.006	0.608
340.0	4.476%11	0.7606	599.0	834.0	768.9	1.0846	74.041	23.207	2.579	0.002	0.172
360.0	3.819%11	0.6489	600.1	856.5	797.3	1.0742	63.138	33.132	3.681	0.000	0.049
380.0	3.186%11	0.5414	600.9	878.6	824.8	1.0652	53.857	41.516	4.613	0.000	0.014
400.0	2.620%11	0.4452	601.5	900.6	850.2	1.0593	45.963	48.630	5.403	0.000	0.004
420.0	2.138%11	0.3633	602.0	900.6	871.3	1.0336	39.254	54.671	6.075	0.000	0.001
440.0	1.743%11	0.2961	602.4	900.6	885.8	1.0167	33.558	59.798	6.644	0.000	0.000
460.0	1.426%11	0.2423	602.6	900.6	893.7	1.0077	28.730	64.143	7.127	0.000	0.000
480.0	1.176%11	0.1998	602.8	900.7	897.4	1.0037	24.647	67.818	7.535	0.000	0.000
500.0	9.800%10	0.1665	603.0	900.8	898.9	1.0021	21.202	70.918	7.880	0.000	0.000
520.0	8.275%10	0.1406	603.1	900.9	899.5	1.0015	18.304	73.527	8.170	0.000	0.000
540.0	7.086%10	0.1204	603.2	901.0	899.8	1.0013	15.871	75.716	8.413	0.000	0.000
560.0	6.157%10	0.1046	603.3	901.1	900.0	1.0012	13.832	77.551	8.617	0.000	0.000
580.0	5.426%10	0.0922	603.4	901.2	900.1	1.0012	12.122	79.091	8.788	0.000	0.000
600.0	4.849%10	0.0824	603.5	901.3	900.3	1.0012	10.681	80.387	8.932	0.000	0.000
620.0	4.390%10	0.0746	603.5	901.4	900.4	1.0012	9.460	81.486	9.054	0.000	0.000
640.0	4.022%10	0.0683	603.6	901.5	900.5	1.0012	8.416	82.426	9.158	0.000	0.000
660.0	3.726%10	0.0633	603.6	901.6	900.6	1.0012	7.513	83.238	9.249	0.000	0.000
680.0	3.486%10	0.0592	603.6	901.7	900.7	1.0012	6.726	83.947	9.327	0.000	0.000
700.0	3.290%10	0.0559	603.6	901.8	900.8	1.0012	6.033	84.570	9.397	0.000	0.000
720.0	3.130%10	0.0532	603.7	901.9	900.9	1.0012	5.420	85.122	9.458	0.000	0.000
740.0	2.998%10	0.0509	603.7	902.0	901.0	1.0012	4.874	85.614	9.513	0.000	0.000
760.0	2.889%10	0.0491	603.7	902.1	901.1	1.0012	4.386	86.053	9.561	0.000	0.000
780.0	2.799%10	0.0476	603.7	902.2	901.2	1.0012	3.948	86.446	9.605	0.000	0.000
800.0	2.724%10	0.0463	603.7	902.3	901.3	1.0012	3.556	86.800	9.644	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -12.0 LONGI= 283.1 R= 10 MONTH= 6 HOUR=12.0

CALCULATED VALUES: MLAT= -0.7 MLONG= 353.1
DIP= 2.7 MODIP= 2.8 MAGLA= 1.4 XHI= 35.1
SUNRISE: 6.3 L.T. SUNSET:17.7 L.T. SUN DEC.= 23.1
NMF2=4.59%11 NMF1= 0.00%-01 NME=1.31%11 NMD=5.83%08
HMF2=357.7 HMF1= 0.0 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.666%08	0.0012	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	1.130%09	0.0025	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.312%10	0.0286	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	5.386%10	0.1174	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.037%11	0.2261	-1	-1	-1	-1	0.318	0.000	0.000	69.954	29.728
105.0	1.277%11	0.2784	-1	-1	-1	-1	0.475	0.000	0.000	66.547	32.978
110.0	1.307%11	0.2849	-1	-1	-1	-1	0.709	0.000	0.000	63.296	35.994
115.0	1.330%11	0.2899	-1	-1	-1	-1	1.058	0.000	0.000	60.179	38.762
120.0	1.343%11	0.2927	306.2	306.2	306.2	1.0000	1.579	0.000	0.000	57.158	41.264
125.0	1.356%11	0.2956	353.3	386.9	353.3	1.0953	2.352	0.000	0.000	54.168	43.479
130.0	1.370%11	0.2986	399.0	466.4	399.0	1.1688	3.500	0.000	0.000	51.145	45.354
135.0	1.384%11	0.3017	442.1	543.1	442.1	1.2285	5.195	0.000	0.000	48.078	46.728
140.0	1.398%11	0.3048	480.7	615.4	480.7	1.2802	7.675	0.000	0.000	45.000	47.325
150.0	1.428%11	0.3113	542.9	745.0	542.9	1.3722	16.307	0.000	0.000	38.577	45.115
160.0	1.460%11	0.3182	587.8	857.2	587.8	1.4583	31.954	0.000	0.000	30.030	38.016
170.0	1.493%11	0.3255	620.6	957.4	620.6	1.5427	53.278	0.000	0.000	19.622	27.100
180.0	1.529%11	0.3333	645.3	1049.4	645.3	1.6263	72.039	0.000	0.000	11.725	16.236
190.0	1.567%11	0.3416	664.4	1135.9	664.4	1.7096	82.836	0.000	0.000	6.883	10.281
200.0	1.608%11	0.3506	679.7	1218.5	679.7	1.7928	87.806	0.000	0.000	4.030	8.164
210.0	1.654%11	0.3605	692.1	1394.4	692.1	2.0148	90.162	0.000	0.000	2.358	7.480
220.0	1.704%11	0.3715	702.2	1588.4	702.2	2.2620	91.555	0.000	0.000	1.380	7.065
230.0	1.762%11	0.3841	710.6	1790.9	711.6	2.5166	92.623	0.000	0.000	0.808	6.569
240.0	1.830%11	0.3990	717.5	1986.0	721.0	2.7544	93.587	0.000	0.000	0.473	5.940
260.0	2.065%11	0.4501	728.0	2272.8	739.9	3.0719	95.453	0.000	0.000	0.162	4.385
280.0	2.925%11	0.6378	735.4	2312.1	758.7	3.0475	97.270	0.000	0.000	0.055	2.674
300.0	3.703%11	0.8072	740.5	2104.2	777.5	2.7064	98.000	0.347	0.039	0.019	1.595
320.0	4.248%11	0.9262	744.1	1786.3	796.4	2.2431	95.826	3.259	0.362	0.007	0.546
340.0	4.525%11	0.9865	746.6	1496.6	815.3	1.8355	92.521	6.560	0.729	0.002	0.187
360.0	4.585%11	0.9996	748.5	1294.3	834.7	1.5505	89.283	9.587	1.065	0.001	0.064
380.0	4.435%11	0.9669	749.9	1177.5	855.3	1.3767	86.157	12.439	1.382	0.000	0.022
400.0	4.085%11	0.8905	750.9	1123.2	878.7	1.2782	83.138	15.169	1.685	0.000	0.008
420.0	3.611%11	0.7873	751.7	1108.5	908.0	1.2208	80.225	17.796	1.977	0.000	0.003
440.0	3.092%11	0.6741	752.2	1117.5	946.3	1.1810	77.411	20.330	2.259	0.000	0.001
460.0	2.589%11	0.5644	752.7	1140.1	993.4	1.1477	74.692	22.777	2.531	0.000	0.000
480.0	2.139%11	0.4663	753.0	1170.4	1046.0	1.1189	72.065	25.142	2.794	0.000	0.000
500.0	1.758%11	0.3834	753.3	1204.9	1100.8	1.0946	69.523	27.429	3.048	0.000	0.000
520.0	1.448%11	0.3158	753.6	1241.7	1155.7	1.0744	67.063	29.644	3.294	0.000	0.000
540.0	1.202%11	0.2620	753.7	1279.9	1209.7	1.0580	64.676	31.792	3.532	0.000	0.000
560.0	1.009%11	0.2199	753.9	1318.7	1262.1	1.0448	62.357	33.879	3.764	0.000	0.000
580.0	8.585%10	0.1872	754.0	1358.0	1312.8	1.0344	60.096	35.914	3.990	0.000	0.000
600.0	7.419%10	0.1617	754.1	1397.4	1361.5	1.0264	57.884	37.905	4.212	0.000	0.000
620.0	6.512%10	0.1420	754.2	1437.0	1408.3	1.0204	55.710	39.861	4.429	0.000	0.000
640.0	5.804%10	0.1265	754.3	1476.6	1453.4	1.0160	53.562	41.794	4.644	0.000	0.000
660.0	5.249%10	0.1144	754.3	1516.3	1497.1	1.0128	51.431	43.712	4.857	0.000	0.000
680.0	4.812%10	0.1049	754.4	1556.0	1539.7	1.0106	49.310	45.621	5.069	0.000	0.000
700.0	4.464%10	0.0973	754.4	1595.7	1581.4	1.0090	47.198	47.522	5.280	0.000	0.000
720.0	4.187%10	0.0913	754.5	1635.4	1622.5	1.0079	45.099	49.411	5.490	0.000	0.000
740.0	3.964%10	0.0864	754.5	1675.1	1663.2	1.0072	43.025	51.278	5.698	0.000	0.000
760.0	3.785%10	0.0825	754.5	1714.9	1703.6	1.0066	40.988	53.111	5.901	0.000	0.000
780.0	3.640%10	0.0794	754.5	1754.6	1743.7	1.0062	39.002	54.898	6.100	0.000	0.000
800.0	3.522%10	0.0768	754.6	1794.3	1783.8	1.0059	37.080	56.628	6.292	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -12.0 LONGI= 283.1 R= 10 MONTH= 6 HOUR= 6.3

CALCULATED VALUES: MLAT= -0.7 MLONG= 353.1
DIP= 2.7 MODIP= 2.8 MAGLA= 1.4 XHI= 90.0
SUNRISE: 6.3 L.T. SUNSET:17.7 L.T. SUN DEC.= 23.1
NMF2=1.38%11 NMF1= 0.00%-01 NME=2.78%10 NMD=4.00%08
HMF2=262.6 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.914%08	0.0021	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.081%08	0.0030	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.836%09	0.0133	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.147%10	0.0832	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.366%10	0.1716	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	2.769%10	0.2008	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	2.678%10	0.1942	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	2.149%10	0.1559	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	1.697%10	0.1231	288.0	288.0	288.0	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	1.676%10	0.1216	328.1	350.4	328.1	1.0678	0.084	0.000	0.000	36.294	63.621
130.0	2.126%10	0.1542	366.9	411.5	366.9	1.1213	0.161	0.000	0.000	40.716	59.122
135.0	2.736%10	0.1984	402.9	469.6	402.9	1.1658	0.308	0.000	0.000	43.939	55.753
140.0	2.937%10	0.2130	434.1	523.1	434.1	1.2051	0.586	0.000	0.000	45.000	54.414
150.0	3.344%10	0.2425	481.9	615.5	481.9	1.2771	2.079	0.000	0.000	41.880	56.041
160.0	3.862%10	0.2801	514.5	692.6	514.5	1.3461	6.925	0.000	0.000	36.631	56.445
170.0	4.590%10	0.3329	537.4	760.0	537.4	1.4142	19.707	0.000	0.000	30.703	49.590
180.0	5.888%10	0.4270	554.2	821.3	554.2	1.4820	41.982	0.000	0.000	21.641	36.377
190.0	7.483%10	0.5427	567.0	878.7	568.1	1.5467	63.935	0.000	0.000	10.559	25.506
200.0	9.062%10	0.6572	577.2	933.3	581.9	1.6038	77.146	0.000	0.000	4.137	18.718
210.0	1.051%11	0.7620	585.3	1030.8	595.8	1.7303	83.481	0.000	0.000	1.545	14.973
220.0	1.173%11	0.8505	591.9	1136.9	609.6	1.8650	86.697	0.000	0.000	0.573	12.730
230.0	1.266%11	0.9184	597.4	1246.6	623.4	1.9997	88.765	0.000	0.000	0.212	11.022
240.0	1.330%11	0.9645	601.9	1352.2	637.2	2.1220	90.452	0.000	0.000	0.079	9.469
260.0	1.378%11	0.9996	608.7	1510.3	664.9	2.2716	93.576	0.000	0.000	0.011	6.413
280.0	1.359%11	0.9852	613.4	1542.8	692.5	2.2279	96.617	0.000	0.000	0.001	3.381
300.0	1.290%11	0.9358	616.7	1450.3	720.1	2.0139	98.000	0.000	0.000	0.000	2.000
320.0	1.187%11	0.8606	619.1	1301.9	747.7	1.7411	95.866	3.459	0.384	0.000	0.290
340.0	1.062%11	0.7702	620.7	1167.3	775.3	1.5056	92.561	6.659	0.740	0.000	0.040
360.0	9.305%10	0.6748	621.9	1076.6	802.9	1.3409	89.321	9.606	1.067	0.000	0.005
380.0	8.028%10	0.5822	622.8	1028.8	830.5	1.2388	86.193	12.425	1.381	0.000	0.001
400.0	6.858%10	0.4973	623.5	1012.4	858.2	1.1797	83.174	15.143	1.683	0.000	0.000
420.0	5.832%10	0.4229	624.0	1005.0	886.1	1.1342	80.259	17.767	1.974	0.000	0.000
440.0	4.958%10	0.3596	624.3	1009.5	914.4	1.1041	77.444	20.301	2.256	0.000	0.000
460.0	4.231%10	0.3068	624.6	1020.9	942.9	1.0827	74.724	22.748	2.528	0.000	0.000
480.0	3.634%10	0.2635	624.9	1036.1	971.4	1.0666	72.096	25.114	2.790	0.000	0.000
500.0	3.148%10	0.2283	625.0	1053.5	999.6	1.0539	69.553	27.402	3.045	0.000	0.000
520.0	2.754%10	0.1997	625.2	1072.1	1027.3	1.0436	67.091	29.618	3.291	0.000	0.000
540.0	2.436%10	0.1767	625.3	1091.3	1054.2	1.0352	64.704	31.767	3.530	0.000	0.000
560.0	2.179%10	0.1580	625.4	1110.8	1080.2	1.0284	62.383	33.855	3.762	0.000	0.000
580.0	1.970%10	0.1429	625.5	1130.6	1105.2	1.0230	60.122	35.891	3.988	0.000	0.000
600.0	1.801%10	0.1306	625.6	1150.5	1129.3	1.0188	57.909	37.882	4.209	0.000	0.000
620.0	1.663%10	0.1206	625.6	1170.4	1152.4	1.0156	55.734	39.840	4.427	0.000	0.000
640.0	1.549%10	0.1123	625.7	1190.3	1174.7	1.0133	53.585	41.773	4.641	0.000	0.000
660.0	1.456%10	0.1056	625.7	1210.3	1196.4	1.0116	51.453	43.692	4.855	0.000	0.000
680.0	1.379%10	0.1000	625.7	1230.3	1217.6	1.0104	49.332	45.602	5.067	0.000	0.000
700.0	1.315%10	0.0954	625.8	1250.3	1238.5	1.0095	47.218	47.504	5.278	0.000	0.000
720.0	1.262%10	0.0915	625.8	1270.3	1259.1	1.0089	45.119	49.393	5.488	0.000	0.000
740.0	1.218%10	0.0883	625.8	1290.3	1279.5	1.0085	43.043	51.261	5.696	0.000	0.000
760.0	1.180%10	0.0856	625.8	1310.3	1299.7	1.0081	41.005	53.095	5.899	0.000	0.000
780.0	1.149%10	0.0833	625.8	1330.3	1319.9	1.0079	39.019	54.883	6.098	0.000	0.000
800.0	1.123%10	0.0815	625.8	1350.3	1340.0	1.0076	37.096	56.614	6.290	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -12.0 LONGI= 283.1 R= 10 MONTH= 6 HOUR= 0.0

CALCULATED VALUES: MLAT= -0.7 MLONG= 353.1
DIP= 2.7 MODIP= 2.8 MAGLA= 1.4 XHI= 168.9
SUNRISE: 6.3 L.T. SUNSET:17.7 L.T. SUN DEC.= 23.1
NMF2=2.14%11 NMF1= 0.00%-01 NME=1.78%09 NMD=4.00%08
HMF2=271.4 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.309%05	2.5%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.470%08	0.0012	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.727%08	0.0022	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.743%09	0.0082	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.775%09	0.0083	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	1.775%09	0.0083	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.594
110.0	1.499%09	0.0070	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.312
115.0	1.017%09	0.0048	-1	-1	-1	-1	0.024	0.000	0.000	27.442	72.535
120.0	6.496%08	0.0030	284.4	284.4	284.4	1.0000	0.045	0.000	0.000	31.698	68.256
125.0	4.431%08	0.0021	323.1	328.5	323.1	1.0165	0.086	0.000	0.000	36.294	63.619
130.0	3.531%08	0.0017	360.6	371.3	360.6	1.0296	0.165	0.000	0.000	40.716	59.118
135.0	3.460%08	0.0016	395.1	411.2	395.1	1.0406	0.316	0.000	0.000	43.939	55.745
140.0	4.214%08	0.0020	425.0	446.4	425.0	1.0503	0.601	0.000	0.000	45.000	54.399
150.0	9.988%08	0.0047	470.2	502.3	470.2	1.0682	2.132	0.000	0.000	41.880	55.987
160.0	3.814%09	0.0179	500.7	543.5	500.7	1.0854	7.103	0.000	0.000	36.631	56.267
170.0	1.339%10	0.0627	522.0	575.4	522.0	1.1024	20.214	0.000	0.000	30.703	49.083
180.0	2.755%10	0.1290	537.5	601.6	537.6	1.1190	43.062	0.000	0.000	21.641	35.296
190.0	4.727%10	0.2213	549.3	624.1	552.1	1.1305	65.582	0.000	0.000	10.559	23.859
200.0	7.321%10	0.3428	558.6	644.1	566.6	1.1369	79.133	0.000	0.000	4.137	16.730
210.0	1.034%11	0.4842	566.1	662.3	581.1	1.1398	85.634	0.000	0.000	1.545	12.821
220.0	1.347%11	0.6306	572.2	679.1	595.5	1.1403	88.935	0.000	0.000	0.573	10.492
230.0	1.633%11	0.7647	577.2	694.8	610.0	1.1389	91.059	0.000	0.000	0.212	8.729
240.0	1.864%11	0.8726	581.3	709.6	624.5	1.1362	92.792	0.000	0.000	0.079	7.129
260.0	2.108%11	0.9870	587.6	737.2	653.5	1.1282	96.005	0.000	0.000	0.011	3.984
280.0	2.127%11	0.9960	591.9	762.9	682.4	1.1180	99.071	0.000	0.000	0.001	0.927
300.0	2.047%11	0.9583	595.0	787.3	711.3	1.1069	98.000	1.384	0.154	0.000	0.462
320.0	1.897%11	0.8883	597.1	810.9	740.2	1.0954	85.862	12.667	1.407	0.000	0.063
340.0	1.704%11	0.7978	598.6	833.8	769.0	1.0843	73.253	24.065	2.674	0.000	0.009
360.0	1.492%11	0.6985	599.7	856.2	797.4	1.0738	62.465	33.780	3.753	0.000	0.001
380.0	1.282%11	0.6000	600.5	878.4	824.9	1.0649	53.283	42.045	4.672	0.000	0.000
400.0	1.087%11	0.5089	601.1	900.4	850.3	1.0589	45.473	49.074	5.453	0.000	0.000
420.0	9.156%10	0.4287	601.6	900.4	871.4	1.0332	38.835	55.048	6.116	0.000	0.000
440.0	7.700%10	0.3605	601.9	900.4	885.9	1.0163	33.200	60.120	6.680	0.000	0.000
460.0	6.493%10	0.3040	602.2	900.4	893.9	1.0073	28.424	64.418	7.158	0.000	0.000
480.0	5.510%10	0.2580	602.4	900.5	897.5	1.0033	24.384	68.054	7.562	0.000	0.000
500.0	4.716%10	0.2208	602.6	900.5	899.0	1.0017	20.976	71.121	7.902	0.000	0.000
520.0	4.080%10	0.1910	602.7	900.6	899.6	1.0011	18.109	73.702	8.189	0.000	0.000
540.0	3.571%10	0.1672	602.8	900.7	899.9	1.0009	15.702	75.868	8.430	0.000	0.000
560.0	3.163%10	0.1481	602.9	900.7	900.0	1.0008	13.685	77.684	8.632	0.000	0.000
580.0	2.835%10	0.1327	603.0	900.8	900.1	1.0008	11.992	79.207	8.801	0.000	0.000
600.0	2.571%10	0.1204	603.1	900.9	900.2	1.0008	10.567	80.489	8.943	0.000	0.000
620.0	2.357%10	0.1104	603.1	901.0	900.3	1.0008	9.359	81.577	9.064	0.000	0.000
640.0	2.184%10	0.1022	603.1	901.0	900.3	1.0008	8.326	82.507	9.167	0.000	0.000
660.0	2.042%10	0.0956	603.2	901.1	900.4	1.0008	7.433	83.310	9.257	0.000	0.000
680.0	1.925%10	0.0901	603.2	901.2	900.5	1.0008	6.654	84.011	9.335	0.000	0.000
700.0	1.830%10	0.0857	603.2	901.2	900.5	1.0008	5.969	84.628	9.403	0.000	0.000
720.0	1.750%10	0.0819	603.3	901.3	900.6	1.0008	5.362	85.174	9.464	0.000	0.000
740.0	1.684%10	0.0789	603.3	901.4	900.7	1.0008	4.822	85.660	9.518	0.000	0.000
760.0	1.630%10	0.0763	603.3	901.4	900.7	1.0008	4.339	86.095	9.566	0.000	0.000
780.0	1.584%10	0.0742	603.3	901.5	900.8	1.0008	3.906	86.484	9.609	0.000	0.000
800.0	1.546%10	0.0724	603.3	901.6	900.9	1.0008	3.518	86.834	9.648	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -12.0 LONGI= 283.1 R= 10 MONTH=12 HOUR=12.0

CALCULATED VALUES: MLAT= -0.7 MLONG= 353.1
  DIP=   2.7 MODIP=   2.8 MAGLA=   1.4 XHI= 10.9
  SUNRISE: 5.7 L.T. SUNSET:18.3 L.T. SUN DEC.= -22.9
  NMF2=9.12%11 NMF1= 2.46% 11 NME=1.47%11 NMD=6.24%08
  HMF2=369.6 HMF1=300.6 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	6.063%08	6.6%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	1.222%09	0.0013	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.425%10	0.0156	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	5.917%10	0.0649	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.153%11	0.1265	-1	-1	-1	-1	0.244	0.000	0.000	51.785	47.971
105.0	1.430%11	0.1569	-1	-1	-1	-1	0.351	0.000	0.000	47.164	52.484
110.0	1.466%11	0.1608	-1	-1	-1	-1	0.504	0.000	0.000	43.116	56.380
115.0	1.467%11	0.1608	-1	-1	-1	-1	0.723	0.000	0.000	39.749	59.528
120.0	1.472%11	0.1614	308.2	308.2	308.2	1.0000	1.034	0.000	0.000	37.209	61.758
125.0	1.477%11	0.1620	356.0	389.1	356.0	1.0928	1.472	0.000	0.000	35.508	63.021
130.0	1.483%11	0.1626	402.5	468.6	402.5	1.1642	2.081	0.000	0.000	34.422	63.497
135.0	1.489%11	0.1633	446.4	545.5	446.4	1.2221	2.907	0.000	0.000	33.667	63.426
140.0	1.495%11	0.1639	485.9	618.0	485.9	1.2720	3.988	0.000	0.000	33.060	62.952
150.0	1.507%11	0.1652	549.8	748.0	549.8	1.3606	6.891	0.000	0.000	31.997	61.111
160.0	1.520%11	0.1666	596.2	860.5	596.2	1.4433	10.267	0.000	0.000	31.000	58.733
170.0	1.533%11	0.1681	630.2	960.6	630.2	1.5243	13.474	0.000	0.000	30.014	56.512
180.0	1.547%11	0.1697	655.9	1052.4	655.9	1.6044	16.515	0.000	0.000	28.885	54.600
190.0	1.563%11	0.1714	676.0	1138.5	676.0	1.6843	19.690	0.000	0.000	26.706	53.605
200.0	1.579%11	0.1732	691.9	1220.6	691.9	1.7640	23.244	0.000	0.000	20.797	55.959
210.0	1.597%11	0.1751	704.9	1397.0	704.9	1.9818	27.350	0.000	0.000	12.571	60.080
220.0	1.616%11	0.1772	715.5	1591.7	715.5	2.2245	32.145	0.000	0.000	6.838	61.018
230.0	1.636%11	0.1795	724.3	1794.8	724.5	2.4773	37.767	0.000	0.000	3.648	58.585
240.0	1.659%11	0.1820	731.5	1990.5	733.3	2.7147	44.366	0.000	0.000	1.941	53.692
260.0	1.715%11	0.1881	742.6	2278.2	750.8	3.0344	61.210	0.000	0.000	0.549	38.241
280.0	1.798%11	0.1972	750.3	2317.5	768.3	3.0163	83.617	0.000	0.000	0.155	16.228
300.0	2.431%11	0.2666	755.6	2108.9	785.9	2.6835	98.000	0.000	0.000	0.044	1.956
320.0	5.151%11	0.5649	759.4	1789.7	803.4	2.2276	96.732	2.337	0.260	0.012	0.658
340.0	7.786%11	0.8538	762.1	1498.9	821.2	1.8254	93.413	5.757	0.640	0.004	0.186
360.0	9.013%11	0.9884	764.1	1295.8	839.3	1.5439	90.144	8.822	0.980	0.001	0.053
380.0	9.040%11	0.9914	765.5	1178.6	858.6	1.3726	86.988	11.698	1.300	0.000	0.015
400.0	8.494%11	0.9315	766.6	1124.0	880.9	1.2759	83.940	14.450	1.606	0.000	0.004
420.0	7.570%11	0.8302	767.4	1109.2	909.4	1.2198	80.998	17.100	1.900	0.000	0.001
440.0	6.465%11	0.7090	768.0	1118.3	947.1	1.1807	78.157	19.658	2.184	0.000	0.000
460.0	5.350%11	0.5867	768.5	1141.0	994.0	1.1478	75.413	22.129	2.459	0.000	0.000
480.0	4.337%11	0.4757	768.8	1171.3	1046.6	1.1191	72.760	24.516	2.724	0.000	0.000
500.0	3.482%11	0.3818	769.1	1205.9	1101.5	1.0948	70.194	26.825	2.981	0.000	0.000
520.0	2.792%11	0.3062	769.4	1242.9	1156.6	1.0746	67.709	29.062	3.229	0.000	0.000
540.0	2.253%11	0.2471	769.6	1281.2	1210.8	1.0581	65.300	31.230	3.470	0.000	0.000
560.0	1.840%11	0.2018	769.7	1320.2	1263.5	1.0449	62.958	33.338	3.704	0.000	0.000
580.0	1.526%11	0.1673	769.8	1359.6	1314.3	1.0345	60.675	35.392	3.932	0.000	0.000
600.0	1.287%11	0.1412	769.9	1399.2	1363.2	1.0264	58.442	37.402	4.156	0.000	0.000
620.0	1.106%11	0.1213	770.0	1438.9	1410.1	1.0204	56.247	39.378	4.375	0.000	0.000
640.0	9.677%10	0.1061	770.1	1478.7	1455.4	1.0160	54.079	41.329	4.592	0.000	0.000
660.0	8.613%10	0.0945	770.2	1518.5	1499.3	1.0128	51.927	43.265	4.807	0.000	0.000
680.0	7.788%10	0.0854	770.2	1558.3	1542.0	1.0106	49.786	45.193	5.021	0.000	0.000
700.0	7.144%10	0.0783	770.3	1598.2	1583.9	1.0090	47.653	47.112	5.235	0.000	0.000
720.0	6.638%10	0.0728	770.3	1638.0	1625.1	1.0079	45.534	49.019	5.447	0.000	0.000
740.0	6.237%10	0.0684	770.3	1677.9	1665.9	1.0072	43.440	50.904	5.656	0.000	0.000
760.0	5.918%10	0.0649	770.4	1717.7	1706.5	1.0066	41.383	52.755	5.862	0.000	0.000
780.0	5.663%10	0.0621	770.4	1757.6	1746.8	1.0062	39.379	54.559	6.062	0.000	0.000
800.0	5.457%10	0.0598	770.4	1797.4	1786.9	1.0059	37.437	56.306	6.256	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -12.0 LONGI= 283.1 R= 10 MONTH=12 HOUR= 5.7

CALCULATED VALUES: MLAT= -0.7 MLONG= 353.1
DIP= 2.7 MODIP= 2.8 MAGLA= 1.4 XHI= 90.0
SUNRISE: 5.7 L.T. SUNSET:18.3 L.T. SUN DEC.= -22.9
NMF2=1.73%11 NMF1= 0.00%-01 NME=2.77%10 NMD=4.00%08
HMF2=250.0 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.914%08	0.0017	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.081%08	0.0024	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.836%09	0.0106	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.145%10	0.0663	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.357%10	0.1364	-1	-1	-1	-1	0.001	0.000	0.000	5.910	94.089
105.0	2.756%10	0.1594	-1	-1	-1	-1	0.002	0.000	0.000	7.936	92.062
110.0	2.667%10	0.1542	-1	-1	-1	-1	0.004	0.000	0.000	10.632	89.363
115.0	2.148%10	0.1243	-1	-1	-1	-1	0.008	0.000	0.000	14.159	85.832
120.0	1.704%10	0.0986	288.7	288.7	288.7	1.0000	0.016	0.000	0.000	18.573	81.411
125.0	1.684%10	0.0974	329.1	351.3	329.1	1.0675	0.031	0.000	0.000	23.546	76.423
130.0	2.126%10	0.1230	368.2	412.7	368.2	1.1207	0.059	0.000	0.000	28.079	71.862
135.0	2.724%10	0.1576	404.4	471.1	404.4	1.1648	0.112	0.000	0.000	31.037	68.851
140.0	2.978%10	0.1722	436.0	524.8	436.0	1.2038	0.210	0.000	0.000	32.272	67.517
150.0	3.326%10	0.1924	484.4	617.6	484.4	1.2752	0.706	0.000	0.000	32.100	67.194
160.0	3.755%10	0.2172	517.4	695.1	517.4	1.3435	2.045	0.000	0.000	31.000	66.955
170.0	4.312%10	0.2494	540.6	762.8	540.6	1.4109	4.578	0.000	0.000	29.785	65.636
180.0	5.139%10	0.2973	557.7	824.3	557.7	1.4780	7.746	0.000	0.000	28.432	63.822
190.0	7.152%10	0.4137	570.7	881.7	571.5	1.5428	10.915	0.000	0.000	26.086	62.999
200.0	9.945%10	0.5753	581.0	936.5	585.2	1.6002	14.162	0.000	0.000	20.207	65.630
210.0	1.262%11	0.7297	589.3	1034.0	598.9	1.7264	17.822	0.000	0.000	12.192	69.986
220.0	1.480%11	0.8564	596.0	1139.9	612.6	1.8609	22.193	0.000	0.000	6.630	71.177
230.0	1.630%11	0.9429	601.6	1249.6	626.3	1.9953	27.538	0.000	0.000	3.537	68.924
240.0	1.708%11	0.9879	606.2	1355.1	639.9	2.1175	34.131	0.000	0.000	1.882	63.986
260.0	1.720%11	0.9949	613.1	1512.9	667.3	2.2672	52.371	0.000	0.000	0.533	47.096
280.0	1.654%11	0.9568	617.9	1545.1	694.6	2.2243	79.294	0.000	0.000	0.151	20.555
300.0	1.536%11	0.8887	621.3	1452.2	722.0	2.0114	98.000	0.000	0.000	0.043	1.957
320.0	1.385%11	0.8012	623.7	1303.4	749.3	1.7395	97.052	2.091	0.232	0.012	0.612
340.0	1.219%11	0.7050	625.4	1168.5	776.6	1.5046	93.728	5.485	0.609	0.003	0.173
360.0	1.053%11	0.6092	626.6	1077.4	803.9	1.3402	90.448	8.552	0.950	0.001	0.049
380.0	8.987%10	0.5199	627.5	1029.2	831.2	1.2382	87.281	11.434	1.270	0.000	0.014
400.0	7.615%10	0.4405	628.2	1012.4	858.7	1.1790	84.224	14.195	1.577	0.000	0.004
420.0	6.437%10	0.3724	628.7	1005.0	886.4	1.1338	81.272	16.855	1.873	0.000	0.001
440.0	5.452%10	0.3154	629.0	1009.5	914.5	1.1039	78.421	19.421	2.158	0.000	0.000
460.0	4.642%10	0.2685	629.3	1020.9	942.9	1.0827	75.667	21.900	2.433	0.000	0.000
480.0	3.983%10	0.2304	629.6	1036.1	971.4	1.0666	73.005	24.295	2.699	0.000	0.000
500.0	3.450%10	0.1996	629.8	1053.5	999.6	1.0539	70.431	26.612	2.957	0.000	0.000
520.0	3.021%10	0.1747	629.9	1072.1	1027.3	1.0436	67.938	28.856	3.206	0.000	0.000
540.0	2.674%10	0.1547	630.0	1091.3	1054.2	1.0352	65.520	31.032	3.448	0.000	0.000
560.0	2.395%10	0.1385	630.1	1110.8	1080.2	1.0284	63.171	33.146	3.683	0.000	0.000
580.0	2.168%10	0.1254	630.2	1130.6	1105.2	1.0230	60.880	35.208	3.912	0.000	0.000
600.0	1.984%10	0.1147	630.3	1150.5	1129.3	1.0188	58.639	37.225	4.136	0.000	0.000
620.0	1.833%10	0.1060	630.3	1170.4	1152.4	1.0156	56.437	39.207	4.356	0.000	0.000
640.0	1.710%10	0.0989	630.4	1190.3	1174.7	1.0133	54.261	41.165	4.574	0.000	0.000
660.0	1.608%10	0.0930	630.4	1210.3	1196.4	1.0116	52.103	43.108	4.790	0.000	0.000
680.0	1.524%10	0.0882	630.4	1230.3	1217.7	1.0104	49.954	45.041	5.005	0.000	0.000
700.0	1.454%10	0.0841	630.5	1250.3	1238.5	1.0095	47.814	46.967	5.219	0.000	0.000
720.0	1.396%10	0.0808	630.5	1270.3	1259.1	1.0089	45.688	48.881	5.431	0.000	0.000
740.0	1.348%10	0.0780	630.5	1290.3	1279.5	1.0085	43.586	50.772	5.641	0.000	0.000
760.0	1.307%10	0.0756	630.5	1310.3	1299.7	1.0081	41.523	52.629	5.848	0.000	0.000
780.0	1.273%10	0.0736	630.6	1330.3	1319.9	1.0079	39.511	54.440	6.049	0.000	0.000
800.0	1.244%10	0.0720	630.6	1350.3	1340.1	1.0076	37.564	56.193	6.244	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -12.0 LONGI= 253.1 R= 10 MONTH=12 HOUR= 0.0

CALCULATED VALUES: MLAT= -0.7 MLONG= 353.1
DIP= 2.7 MODIP= 2.8 MAGLA= 1.4 XHI= 145.1
SUNRISE: 5.7 L.T. SUNSET:18.3 L.T. SUN DEC.= -22.9
NMF2=2.57%11 NME1= 0.00%-01 NME=1.78%09 NMD=4.00%08
HMF2=279.7 HME1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.826%05	2.3%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.490%08	9.7%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.736%08	0.0018	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.743%09	0.0068	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.775%09	0.0069	-1	-1	-1	-1	0.001	0.000	0.000	5.910	94.089
105.0	1.775%09	0.0069	-1	-1	-1	-1	0.002	0.000	0.000	7.936	92.062
110.0	1.500%09	0.0058	-1	-1	-1	-1	0.004	0.000	0.000	10.632	89.363
115.0	1.019%09	0.0040	-1	-1	-1	-1	0.009	0.000	0.000	14.159	85.832
120.0	6.516%08	0.0025	286.3	286.3	286.3	1.0000	0.017	0.000	0.000	18.573	81.410
125.0	4.451%08	0.0017	325.7	330.9	325.7	1.0158	0.032	0.000	0.000	23.546	76.423
130.0	3.553%08	0.0014	363.9	374.2	363.9	1.0283	0.060	0.000	0.000	28.079	71.861
135.0	3.488%08	0.0014	399.2	414.6	399.2	1.0387	0.115	0.000	0.000	31.037	68.848
140.0	4.253%08	0.0017	429.7	450.3	429.7	1.0479	0.216	0.000	0.000	32.272	67.512
150.0	1.007%09	0.0039	476.3	507.2	476.3	1.0648	0.724	0.000	0.000	32.100	67.176
160.0	2.345%09	0.0091	507.9	549.1	507.9	1.0810	2.098	0.000	0.000	31.000	66.902
170.0	5.284%09	0.0205	530.0	581.4	530.0	1.0971	4.696	0.000	0.000	29.785	65.519
180.0	1.136%10	0.0441	546.2	607.9	546.2	1.1130	7.945	0.000	0.000	28.432	63.622
190.0	2.320%10	0.0902	558.5	630.5	560.3	1.1254	11.196	0.000	0.000	26.086	62.718
200.0	4.418%10	0.1717	568.2	650.5	574.4	1.1325	14.527	0.000	0.000	20.207	65.265
210.0	7.454%10	0.2896	576.1	668.6	588.5	1.1361	18.282	0.000	0.000	12.192	69.526
220.0	1.123%11	0.4364	582.4	685.3	602.7	1.1371	22.765	0.000	0.000	6.630	70.605
230.0	1.532%11	0.5953	587.7	700.8	616.8	1.1363	28.250	0.000	0.000	3.537	68.213
240.0	1.916%11	0.7446	592.0	715.4	630.9	1.1340	35.014	0.000	0.000	1.882	63.103
260.0	2.437%11	0.9471	598.5	742.6	659.2	1.1266	53.731	0.000	0.000	0.533	45.737
280.0	2.574%11	1.0000	603.1	767.7	687.4	1.1168	81.308	0.000	0.000	0.151	18.541
300.0	2.516%11	0.9775	606.2	791.4	715.6	1.1060	98.000	0.000	0.000	0.043	1.957
320.0	2.361%11	0.9173	608.5	814.3	743.8	1.0948	86.924	11.221	1.247	0.012	0.596
340.0	2.139%11	0.8310	610.1	836.4	771.8	1.0837	74.177	23.086	2.565	0.003	0.169
360.0	1.882%11	0.7313	611.2	858.2	799.5	1.0733	63.254	33.028	3.670	0.001	0.048
380.0	1.620%11	0.6293	612.1	879.6	826.4	1.0643	53.956	41.427	4.603	0.000	0.014
400.0	1.372%11	0.5332	612.7	900.8	851.2	1.0582	46.047	48.554	5.395	0.000	0.004
420.0	1.152%11	0.4476	613.2	900.7	871.8	1.0332	39.325	54.606	6.067	0.000	0.001
440.0	9.640%10	0.3746	613.5	900.8	886.0	1.0167	33.619	59.742	6.638	0.000	0.000
460.0	8.079%10	0.3139	613.8	900.8	893.8	1.0079	28.783	64.095	7.122	0.000	0.000
480.0	6.808%10	0.2645	614.0	901.0	897.4	1.0040	24.692	67.777	7.531	0.000	0.000
500.0	5.786%10	0.2248	614.2	901.1	898.9	1.0024	21.241	70.883	7.876	0.000	0.000
520.0	4.969%10	0.1931	614.4	901.2	899.6	1.0018	18.337	73.497	8.166	0.000	0.000
540.0	4.319%10	0.1678	614.5	901.3	899.9	1.0016	15.900	75.690	8.410	0.000	0.000
560.0	3.801%10	0.1477	614.6	901.5	900.1	1.0015	13.857	77.528	8.614	0.000	0.000
580.0	3.388%10	0.1316	614.6	901.6	900.3	1.0015	12.144	79.071	8.786	0.000	0.000
600.0	3.056%10	0.1188	614.7	901.8	900.4	1.0015	10.701	80.369	8.930	0.000	0.000
620.0	2.789%10	0.1084	614.8	901.9	900.6	1.0015	9.478	81.470	9.052	0.000	0.000
640.0	2.573%10	0.1000	614.8	902.0	900.7	1.0015	8.431	82.412	9.157	0.000	0.000
660.0	2.398%10	0.0932	614.8	902.2	900.8	1.0015	7.527	83.226	9.247	0.000	0.000
680.0	2.255%10	0.0876	614.9	902.3	901.0	1.0015	6.738	83.936	9.326	0.000	0.000
700.0	2.137%10	0.0830	614.9	902.4	901.1	1.0015	6.044	84.560	9.396	0.000	0.000
720.0	2.040%10	0.0793	614.9	902.6	901.3	1.0015	5.430	85.113	9.457	0.000	0.000
740.0	1.960%10	0.0762	614.9	902.7	901.4	1.0015	4.883	85.606	9.512	0.000	0.000
760.0	1.894%10	0.0736	615.0	902.9	901.5	1.0015	4.394	86.046	9.561	0.000	0.000
780.0	1.839%10	0.0714	615.0	903.0	901.7	1.0015	3.956	86.440	9.604	0.000	0.000
800.0	1.793%10	0.0697	615.0	903.1	901.8	1.0015	3.563	86.794	9.644	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -12.0 LONGI= 283.1 R=100 MONTH= 3 HOUR=12.0

CALCULATED VALUES: MLAT= -0.7 MLONG= 353.1
DIP= 2.7 MODIP= 2.8 MAGLA= 1.4 XHI= 8.7
SUNRISE: 6.0 L.T. SUNSET:18.0 L.T. SUN DEC.= -3.3
NMF2=1.48%12 NMF1= 3.56% 11 NME=1.90%11 NMD=1.34%09
HMF2=443.8 HMF1=333.5 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	1.301%09	8.8%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.613%09	0.0018	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	2.826%10	0.0190	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	9.843%10	0.0663	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.641%11	0.1106	-1	-1	-1	-1	0.323	0.000	0.000	87.942	11.734
105.0	1.879%11	0.1266	-1	-1	-1	-1	0.489	0.000	0.000	80.110	19.400
110.0	1.901%11	0.1280	-1	-1	-1	-1	0.741	0.000	0.000	72.920	26.339
115.0	1.916%11	0.1291	-1	-1	-1	-1	1.120	0.000	0.000	66.246	32.633
120.0	1.924%11	0.1296	339.0	339.0	339.0	1.0000	1.694	0.000	0.000	59.921	38.385
125.0	1.932%11	0.1301	398.5	418.0	398.5	1.0487	2.557	0.000	0.000	53.777	43.666
130.0	1.939%11	0.1307	456.7	495.5	456.7	1.0850	3.853	0.000	0.000	47.795	48.352
135.0	1.947%11	0.1312	513.0	571.2	513.0	1.1135	5.784	0.000	0.000	42.146	52.070
140.0	1.956%11	0.1317	565.8	643.4	565.8	1.1373	8.629	0.000	0.000	37.000	54.371
150.0	1.972%11	0.1329	658.2	774.7	658.2	1.1770	18.491	0.000	0.000	28.358	53.151
160.0	1.990%11	0.1341	732.7	888.0	732.7	1.2120	35.617	0.000	0.000	21.554	42.830
170.0	2.008%11	0.1353	792.0	986.1	792.0	1.2451	56.728	0.000	0.000	15.834	27.438
180.0	2.028%11	0.1366	839.5	1072.5	839.5	1.2775	73.158	0.000	0.000	10.909	15.932
190.0	2.048%11	0.1380	878.1	1149.9	878.1	1.3095	81.949	0.000	0.000	7.266	10.785
200.0	2.069%11	0.1394	909.8	1220.4	909.8	1.3414	86.077	0.000	0.000	4.807	9.117
210.0	2.092%11	0.1409	936.0	1396.6	936.0	1.4920	88.265	0.000	0.000	3.176	8.559
220.0	2.116%11	0.1426	957.9	1591.1	957.9	1.6610	89.763	0.000	0.000	2.099	8.139
230.0	2.142%11	0.1443	976.1	1794.0	976.1	1.8379	91.034	0.000	0.000	1.387	7.579
240.0	2.170%11	0.1462	991.3	1989.5	991.3	2.0069	92.239	0.000	0.000	0.916	6.845
260.0	2.234%11	0.1505	1014.6	2276.8	1014.6	2.2440	94.629	0.000	0.000	0.400	4.971
280.0	2.312%11	0.1558	1030.9	2316.0	1030.9	2.2467	96.983	0.000	0.000	0.175	2.842
300.0	2.419%11	0.1630	1042.3	2107.6	1042.3	2.0221	98.000	0.206	0.023	0.076	1.694
320.0	2.663%11	0.1794	1050.3	1788.8	1049.7	1.7041	95.844	3.045	0.338	0.033	0.740
340.0	4.384%11	0.2953	1056.1	1498.3	1052.6	1.4234	92.539	6.412	0.712	0.015	0.323
360.0	7.362%11	0.4960	1060.2	1295.4	1054.6	1.2284	89.300	9.498	1.055	0.006	0.141
380.0	1.044%12	0.7036	1063.3	1178.3	1056.3	1.1154	86.173	12.387	1.376	0.003	0.062
400.0	1.291%12	0.6700	1065.6	1123.7	1060.0	1.0601	83.154	15.136	1.682	0.001	0.027
420.0	1.436%12	0.9674	1067.3	1109.0	1069.5	1.0369	80.240	17.773	1.975	0.001	0.012
440.0	1.483%12	0.9994	1068.6	1118.0	1089.2	1.0264	77.425	20.313	2.257	0.000	0.005
460.0	1.452%12	0.9779	1069.6	1140.7	1119.3	1.0191	74.706	22.762	2.529	0.000	0.002
480.0	1.333%12	0.8978	1070.4	1171.0	1156.1	1.0129	72.078	25.129	2.792	0.000	0.001
500.0	1.157%12	0.7797	1071.0	1205.6	1195.7	1.0083	69.536	27.417	3.046	0.000	0.000
520.0	9.614%11	0.6476	1071.5	1242.5	1236.2	1.0051	67.075	29.632	3.292	0.000	0.000
540.0	7.731%11	0.5208	1071.9	1280.7	1276.8	1.0031	64.688	31.781	3.531	0.000	0.000
560.0	6.093%11	0.4105	1072.3	1319.7	1317.2	1.0018	62.368	33.868	3.763	0.000	0.000
580.0	4.758%11	0.3206	1072.5	1359.0	1357.5	1.0011	60.107	35.904	3.989	0.000	0.000
600.0	3.718%11	0.2505	1072.8	1398.6	1397.7	1.0006	57.895	37.895	4.211	0.000	0.000
620.0	2.928%11	0.1973	1073.0	1438.2	1437.7	1.0003	55.720	39.852	4.428	0.000	0.000
640.0	2.337%11	0.1575	1073.1	1478.0	1477.7	1.0002	53.572	41.785	4.643	0.000	0.000
660.0	1.898%11	0.1278	1073.3	1517.7	1517.6	1.0001	51.441	43.703	4.856	0.000	0.000
680.0	1.570%11	0.1058	1073.4	1557.5	1557.5	1.0000	49.320	45.612	5.068	0.000	0.000
700.0	1.326%11	0.0893	1073.5	1597.3	1597.4	1.0000	47.207	47.514	5.279	0.000	0.000
720.0	1.141%11	0.0769	1073.5	1637.1	1637.2	0.9999	45.108	49.403	5.489	0.000	0.000
740.0	1.000%11	0.0674	1073.6	1676.9	1677.0	0.9999	43.033	51.270	5.697	0.000	0.000
760.0	8.922%10	0.0601	1073.7	1716.7	1716.9	0.9999	40.996	53.104	5.900	0.000	0.000
780.0	8.084%10	0.0545	1073.7	1756.5	1756.7	0.9999	39.010	54.891	6.099	0.000	0.000
800.0	7.428%10	0.0500	1073.8	1796.3	1796.5	0.9999	37.087	56.622	6.291	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -12.0 LONGI= 283.1 R=100 MONTH= 3 HOUR= 6.0

CALCULATED VALUES: MLAT= -0.7 MLONG= 353.1
  DIP=   2.7 MODIP=   2.8 MAGLA=   1.4 XHI= 90.0
  SUNRISE: 6.0 L.T.   SUNSET:18.0 L.T.   SUN DEC.= -3.3
  NMF2=3.88%11 NMF1= 0.00%-01 NME=3.57%10 NMD=4.00%08
  HMF2=275.6 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.914%08	7.5%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.081%08	0.0011	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.842%09	0.0047	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.254%10	0.0323	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.880%10	0.0742	-1	-1	-1	-1	0.012	0.000	0.000	18.284	81.704
105.0	3.546%10	0.0914	-1	-1	-1	-1	0.019	0.000	0.000	21.005	78.976
110.0	3.441%10	0.0887	-1	-1	-1	-1	0.030	0.000	0.000	24.068	75.901
115.0	2.772%10	0.0715	-1	-1	-1	-1	0.049	0.000	0.000	27.398	72.553
120.0	2.199%10	0.0567	319.7	319.7	319.7	1.0000	0.079	0.000	0.000	30.730	69.191
125.0	2.173%10	0.0560	371.9	386.1	371.9	1.0381	0.127	0.000	0.000	33.564	66.309
130.0	2.741%10	0.0707	422.8	451.1	422.8	1.0670	0.205	0.000	0.000	35.472	64.323
135.0	3.515%10	0.0906	471.3	513.8	471.3	1.0902	0.330	0.000	0.000	36.502	63.167
140.0	4.150%10	0.1070	515.7	572.3	515.7	1.1099	0.531	0.000	0.000	37.000	62.469
150.0	5.783%10	0.1491	589.7	674.7	589.7	1.1442	1.367	0.000	0.000	37.274	61.359
160.0	8.007%10	0.2064	645.6	759.0	645.6	1.1756	3.445	0.000	0.000	36.284	60.271
170.0	1.102%11	0.2841	687.8	829.5	687.8	1.2060	8.203	0.000	0.000	30.549	61.248
180.0	1.468%11	0.3785	720.3	890.4	720.3	1.2361	17.131	0.000	0.000	19.558	63.311
190.0	1.868%11	0.4816	746.0	944.4	746.0	1.2659	28.861	0.000	0.000	10.838	60.302
200.0	2.279%11	0.5874	766.6	993.4	766.6	1.2957	39.219	0.000	0.000	5.832	54.949
210.0	2.674%11	0.6895	783.5	1090.8	783.5	1.3922	46.750	0.000	0.000	3.124	50.126
220.0	3.032%11	0.7817	797.4	1196.1	797.4	1.5000	52.653	0.000	0.000	1.673	45.674
230.0	3.334%11	0.8595	808.9	1304.4	808.9	1.6126	58.085	0.000	0.000	0.896	41.019
240.0	3.568%11	0.9198	818.4	1408.2	818.4	1.7206	63.627	0.000	0.000	0.480	35.893
260.0	3.830%11	0.9875	833.0	1561.5	833.0	1.8745	75.922	0.000	0.000	0.137	23.940
280.0	3.875%11	0.9990	843.1	1588.1	843.1	1.8836	89.982	0.000	0.000	0.039	9.979
300.0	3.771%11	0.9721	850.2	1488.9	850.8	1.7500	98.000	0.000	0.000	0.011	1.989
320.0	3.540%11	0.9128	855.2	1333.3	858.4	1.5533	96.292	2.619	0.291	0.003	0.795
340.0	3.219%11	0.8300	858.7	1191.2	866.0	1.3755	92.980	6.112	0.679	0.001	0.228
360.0	2.847%11	0.7340	861.3	1092.7	873.9	1.2504	89.726	9.188	1.021	0.000	0.065
380.0	2.461%11	0.6345	863.2	1036.9	882.4	1.1751	86.584	12.058	1.340	0.000	0.019
400.0	2.090%11	0.5389	864.6	1012.4	892.4	1.1344	83.550	14.800	1.644	0.000	0.005
420.0	1.753%11	0.4521	865.7	1005.0	905.7	1.1096	80.622	17.439	1.938	0.000	0.002
440.0	1.460%11	0.3764	866.5	1009.5	924.0	1.0926	77.794	19.985	2.221	0.000	0.000
460.0	1.212%11	0.3124	867.1	1020.9	947.0	1.0780	75.062	22.444	2.494	0.000	0.000
480.0	1.007%11	0.2595	867.6	1036.1	973.1	1.0648	72.422	24.820	2.758	0.000	0.000
500.0	8.396%10	0.2164	868.0	1053.5	1000.3	1.0532	69.868	27.119	3.013	0.000	0.000
520.0	7.049%10	0.1817	868.3	1072.1	1027.6	1.0433	67.395	29.345	3.261	0.000	0.000
540.0	5.970%10	0.1539	868.6	1091.3	1054.4	1.0350	64.997	31.503	3.500	0.000	0.000
560.0	5.106%10	0.1316	868.8	1110.8	1080.3	1.0282	62.666	33.601	3.733	0.000	0.000
580.0	4.414%10	0.1138	869.0	1130.6	1105.3	1.0229	60.394	35.646	3.961	0.000	0.000
600.0	3.859%10	0.0995	869.1	1150.5	1129.4	1.0187	58.171	37.646	4.183	0.000	0.000
620.0	3.411%10	0.0880	869.2	1170.4	1152.5	1.0155	55.986	39.613	4.401	0.000	0.000
640.0	3.049%10	0.0786	869.3	1190.3	1174.8	1.0132	53.828	41.555	4.617	0.000	0.000
660.0	2.755%10	0.0710	869.4	1210.3	1196.5	1.0115	51.686	43.482	4.831	0.000	0.000
680.0	2.514%10	0.0648	869.5	1230.3	1217.7	1.0103	49.555	45.401	5.045	0.000	0.000
700.0	2.316%10	0.0597	869.5	1250.3	1238.6	1.0095	47.432	47.311	5.257	0.000	0.000
720.0	2.152%10	0.0555	869.6	1270.3	1259.2	1.0088	45.323	49.209	5.468	0.000	0.000
740.0	2.016%10	0.0520	869.6	1290.3	1279.6	1.0084	43.238	51.086	5.676	0.000	0.000
760.0	1.902%10	0.0490	869.7	1310.3	1299.8	1.0080	41.191	52.928	5.881	0.000	0.000
780.0	1.807%10	0.0466	869.7	1330.3	1320.0	1.0078	39.196	54.724	6.080	0.000	0.000
800.0	1.726%10	0.0445	869.7	1350.3	1340.1	1.0076	37.263	56.463	6.274	0.000	0.000

WE PUT B1=   3.0TO GET HST

INPUT: LATI= -12.0 LONGI= 283.1 R=100 MONTH= 3 HOUR= 0.0

CALCULATED VALUES: MLAT= -0.7 MLONG= 353.1
DIP= 2.7 MODIP= 2.8 MAGLA= 1.4 XHI= 164.7
SUNRISE: 6.0 L.T. SUNSET:18.0 L.T. SUN DEC.= -3.3
NMF2=8.84%11 NMF1= 0.00%-01 NME=3.20%09 NMD=4.00%08
HMF2=305.4 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.555%05	6.3%-7	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.480%08	2.8%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.731%08	5.4%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	2.510%09	0.0028	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.193%09	0.0036	-1	-1	-1	-1	0.012	0.000	0.000	18.284	81.704
105.0	3.201%09	0.0036	-1	-1	-1	-1	0.019	0.000	0.000	21.005	78.976
110.0	2.704%09	0.0031	-1	-1	-1	-1	0.031	0.000	0.000	24.068	75.900
115.0	1.835%09	0.0021	-1	-1	-1	-1	0.050	0.000	0.000	27.398	72.552
120.0	1.173%09	0.0013	316.7	316.7	316.7	1.0000	0.081	0.000	0.000	30.730	69.189
125.0	8.008%08	9.1%-4	367.8	368.9	367.8	1.0031	0.131	0.000	0.000	33.564	66.305
130.0	6.387%08	7.2%-4	417.5	419.7	417.5	1.0054	0.210	0.000	0.000	35.472	64.318
135.0	6.265%08	7.1%-4	464.7	468.1	464.7	1.0073	0.339	0.000	0.000	36.502	63.159
140.0	7.633%08	8.6%-4	507.8	512.3	507.8	1.0089	0.545	0.000	0.000	37.000	62.455
150.0	1.809%09	0.0020	579.1	585.9	579.1	1.0117	1.402	0.000	0.000	37.274	61.323
160.0	4.246%10	0.0480	632.4	641.5	632.4	1.0143	3.534	0.000	0.000	36.284	60.183
170.0	8.053%10	0.0911	672.4	683.6	672.4	1.0168	8.414	0.000	0.000	30.549	61.037
180.0	1.253%11	0.1418	702.9	716.5	702.9	1.0192	17.572	0.000	0.000	19.558	62.870
190.0	1.841%11	0.2083	727.0	742.7	727.0	1.0217	29.604	0.000	0.000	10.838	59.558
200.0	2.566%11	0.2903	746.3	764.3	746.3	1.0242	40.230	0.000	0.000	5.832	53.939
210.0	3.403%11	0.3850	762.0	782.3	762.0	1.0266	47.955	0.000	0.000	3.124	48.920
220.0	4.313%11	0.4880	774.9	797.5	774.9	1.0291	54.012	0.000	0.000	1.673	44.315
230.0	5.243%11	0.5933	785.7	810.4	785.7	1.0316	59.586	0.000	0.000	0.896	39.518
240.0	6.138%11	0.6945	794.5	821.6	794.5	1.0340	65.274	0.000	0.000	0.480	34.247
260.0	7.621%11	0.8623	808.1	839.6	808.1	1.0390	77.893	0.000	0.000	0.137	21.969
280.0	8.512%11	0.9632	817.5	853.5	818.9	1.0423	92.268	0.000	0.000	0.039	7.693
300.0	8.827%11	0.9987	824.1	864.6	829.6	1.0422	98.000	0.925	0.103	0.011	0.961
320.0	8.724%11	0.9871	828.7	873.8	840.4	1.0397	86.243	12.130	1.348	0.003	0.275
340.0	8.231%11	0.9313	832.0	881.6	851.1	1.0359	73.584	23.702	2.634	0.001	0.079
360.0	7.443%11	0.8421	834.4	888.5	861.6	1.0312	62.748	33.506	3.723	0.000	0.023
380.0	6.486%11	0.7339	836.2	894.8	871.9	1.0262	53.525	41.822	4.647	0.000	0.006
400.0	5.483%11	0.6204	837.5	900.6	881.3	1.0218	45.679	48.887	5.432	0.000	0.002
420.0	4.527%11	0.5122	838.5	900.6	889.2	1.0128	39.011	54.890	6.099	0.000	0.001
440.0	3.676%11	0.4160	839.2	900.6	894.6	1.0066	33.351	59.984	6.665	0.000	0.000
460.0	2.955%11	0.3344	839.8	900.6	897.7	1.0033	28.553	64.302	7.145	0.000	0.000
480.0	2.366%11	0.2678	840.3	900.7	899.1	1.0018	24.495	67.955	7.551	0.000	0.000
500.0	1.897%11	0.2146	840.6	900.8	899.7	1.0012	21.071	71.036	7.893	0.000	0.000
520.0	1.529%11	0.1730	840.9	900.9	900.0	1.0010	18.191	73.629	8.181	0.000	0.000
540.0	1.243%11	0.1406	841.2	901.0	900.2	1.0009	15.773	75.804	8.423	0.000	0.000
560.0	1.022%11	0.1156	841.4	901.1	900.3	1.0009	13.746	77.628	8.625	0.000	0.000
580.0	8.505%10	0.0962	841.5	901.2	900.4	1.0009	12.047	79.158	8.795	0.000	0.000
600.0	7.179%10	0.0812	841.6	901.3	900.5	1.0009	10.615	80.446	8.938	0.000	0.000
620.0	6.145%10	0.0695	841.7	901.4	900.6	1.0009	9.402	81.538	9.060	0.000	0.000
640.0	5.335%10	0.0604	841.8	901.5	900.7	1.0009	8.364	82.473	9.164	0.000	0.000
660.0	4.695%10	0.0531	841.9	901.6	900.8	1.0009	7.467	83.280	9.253	0.000	0.000
680.0	4.185%10	0.0474	842.0	901.7	900.9	1.0009	6.684	83.984	9.332	0.000	0.000
700.0	3.777%10	0.0427	842.0	901.8	901.1	1.0009	5.996	84.604	9.400	0.000	0.000
720.0	3.448%10	0.0390	842.1	901.9	901.2	1.0009	5.386	85.152	9.461	0.000	0.000
740.0	3.180%10	0.0360	842.1	902.0	901.3	1.0009	4.844	85.641	9.516	0.000	0.000
760.0	2.961%10	0.0335	842.2	902.1	901.4	1.0009	4.359	86.077	9.564	0.000	0.000
780.0	2.780%10	0.0315	842.2	902.2	901.5	1.0009	3.924	86.468	9.608	0.000	0.000
800.0	2.631%10	0.0298	842.2	902.3	901.6	1.0009	3.534	86.819	9.647	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -12.0 LONGI= 283.1 R=100 MONTH= 6 HOUR=12.0

CALCULATED VALUES: MLAT= -0.7 MLONG= 353.1
  DIP= 2.7 MODIP= 2.8 MAGLA= 1.4 XHI= 35.1
  SUNRISE: 6.3 L.T. SUNSET:17.7 L.T. SUN DEC.= 23.1
  NMF2=9.47%11 NMF1= 0.00%-01 NME=1.69%11 NMD=1.25%09
  HMF2=429.0 HMF1= 0.0 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	1.214%09	0.0013	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.422%09	0.0026	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	2.601%10	0.0275	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	8.922%10	0.0942	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.467%11	0.1550	-1	-1	-1	-1	0.318	0.000	0.000	69.954	29.728
105.0	1.670%11	0.1763	-1	-1	-1	-1	0.475	0.000	0.000	66.547	32.978
110.0	1.687%11	0.1782	-1	-1	-1	-1	0.709	0.000	0.000	63.296	35.994
115.0	1.720%11	0.1816	-1	-1	-1	-1	1.058	0.000	0.000	60.179	38.762
120.0	1.740%11	0.1837	337.2	337.2	337.2	1.0000	1.579	0.000	0.000	57.158	41.264
125.0	1.761%11	0.1859	396.1	416.3	396.1	1.0511	2.352	0.000	0.000	54.168	43.479
130.0	1.782%11	0.1881	453.6	494.1	453.6	1.0892	3.500	0.000	0.000	51.145	45.354
135.0	1.803%11	0.1904	509.1	569.8	509.1	1.1193	5.195	0.000	0.000	48.078	46.728
140.0	1.825%11	0.1928	561.2	642.1	561.2	1.1443	7.675	0.000	0.000	45.000	47.325
150.0	1.871%11	0.1976	651.9	773.3	651.9	1.1863	16.307	0.000	0.000	38.577	45.115
160.0	1.919%11	0.2026	724.5	886.4	724.5	1.2235	31.954	0.000	0.000	30.030	38.016
170.0	1.969%11	0.2079	782.0	984.4	782.0	1.2588	53.278	0.000	0.000	19.622	27.100
180.0	2.022%11	0.2135	827.9	1070.8	827.9	1.2933	72.039	0.000	0.000	11.725	16.236
190.0	2.078%11	0.2195	865.1	1148.4	865.1	1.3275	82.836	0.000	0.000	6.883	10.281
200.0	2.138%11	0.2257	895.6	1219.4	895.6	1.3616	87.806	0.000	0.000	4.030	8.164
210.0	2.201%11	0.2324	920.8	1395.2	920.8	1.5153	90.162	0.000	0.000	2.358	7.480
220.0	2.269%11	0.2396	941.7	1589.3	941.7	1.6877	91.555	0.000	0.000	1.380	7.065
230.0	2.342%11	0.2474	959.2	1791.7	959.2	1.8680	92.623	0.000	0.000	0.808	6.569
240.0	2.422%11	0.2558	973.7	1986.8	973.7	2.0404	93.587	0.000	0.000	0.473	5.940
260.0	2.608%11	0.2754	996.0	2273.5	996.0	2.2826	95.453	0.000	0.000	0.162	4.385
280.0	2.851%11	0.3010	1011.6	2312.7	1011.6	2.2862	97.270	0.000	0.000	0.055	2.674
300.0	3.261%11	0.3444	1022.5	2104.8	1022.5	2.0585	98.000	0.347	0.039	0.019	1.595
320.0	4.652%11	0.4912	1030.2	1786.7	1028.8	1.7367	95.826	3.259	0.362	0.007	0.546
340.0	6.194%11	0.6541	1035.7	1496.9	1033.9	1.4478	92.521	6.560	0.729	0.002	0.187
360.0	7.561%11	0.7985	1039.6	1294.5	1038.2	1.2468	89.283	9.587	1.065	0.001	0.064
380.0	8.585%11	0.9066	1042.6	1177.6	1042.4	1.1297	86.157	12.439	1.382	0.000	0.022
400.0	9.201%11	0.9716	1044.7	1123.2	1048.4	1.0713	83.138	15.169	1.685	0.000	0.008
420.0	9.449%11	0.9978	1046.4	1108.5	1060.1	1.0456	80.225	17.796	1.977	0.000	0.003
440.0	9.384%11	0.9909	1047.6	1117.5	1081.5	1.0333	77.411	20.330	2.259	0.000	0.001
460.0	8.827%11	0.9321	1048.6	1140.1	1112.7	1.0247	74.692	22.777	2.531	0.000	0.000
480.0	7.886%11	0.8328	1049.4	1170.4	1150.1	1.0176	72.065	25.142	2.794	0.000	0.000
500.0	6.752%11	0.7129	1050.0	1204.9	1190.2	1.0123	69.523	27.429	3.048	0.000	0.000
520.0	5.595%11	0.5908	1050.5	1241.7	1231.0	1.0087	67.063	29.644	3.294	0.000	0.000
540.0	4.535%11	0.4786	1050.8	1279.9	1271.7	1.0064	64.676	31.792	3.532	0.000	0.000
560.0	3.631%11	0.3834	1051.2	1318.7	1312.3	1.0049	62.357	33.879	3.764	0.000	0.000
580.0	2.897%11	0.3059	1051.4	1358.0	1352.6	1.0040	60.096	35.914	3.990	0.000	0.000
600.0	2.321%11	0.2451	1051.6	1397.4	1392.7	1.0034	57.884	37.905	4.212	0.000	0.000
620.0	1.877%11	0.1982	1051.8	1437.0	1432.7	1.0030	55.710	39.861	4.429	0.000	0.000
640.0	1.539%11	0.1625	1052.0	1476.6	1472.7	1.0027	53.562	41.794	4.644	0.000	0.000
660.0	1.282%11	0.1353	1052.1	1516.3	1512.5	1.0025	51.431	43.712	4.857	0.000	0.000
680.0	1.086%11	0.1147	1052.2	1556.0	1552.3	1.0024	49.310	45.621	5.069	0.000	0.000
700.0	9.361%10	0.0988	1052.3	1595.7	1592.1	1.0023	47.198	47.522	5.280	0.000	0.000
720.0	8.209%10	0.0867	1052.4	1635.4	1631.9	1.0022	45.099	49.411	5.490	0.000	0.000
740.0	7.315%10	0.0772	1052.4	1675.1	1671.6	1.0021	43.025	51.278	5.698	0.000	0.000
760.0	6.615%10	0.0699	1052.5	1714.9	1711.3	1.0021	40.988	53.111	5.901	0.000	0.000
780.0	6.064%10	0.0640	1052.6	1754.6	1751.1	1.0020	39.002	54.898	6.100	0.000	0.000
800.0	5.627%10	0.0594	1052.6	1794.3	1790.8	1.0019	37.080	56.628	6.292	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -12.0 LONGI= 283.1 R=100 MONTH= 6 HOUR= 6.3

CALCULATED VALUES: MLAT= -0.7 MLONG= 353.1
DIP= 2.7 MODIP= 2.8 MAGLA= 1.4 XHI= 90.0
SUNRISE: 6.3 L.T. SUNSET:17.7 L.T. SUN DEC.= 23.1
NMF2=3.21%11 NMF1= 0.00%-01 NME=3.59%10 NMD=4.00%08
HMF2=294.8 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.914%08	9.1%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.081%08	0.0013	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.842%09	0.0057	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.256%10	0.0391	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.890%10	0.0899	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	3.563%10	0.1109	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	3.457%10	0.1076	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	2.775%10	0.0863	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	2.191%10	0.0682	320.1	320.1	320.1	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	2.164%10	0.0673	372.4	386.4	372.4	1.0376	0.084	0.000	0.000	36.294	63.621
130.0	2.745%10	0.0854	423.4	451.4	423.4	1.0662	0.161	0.000	0.000	40.716	59.122
135.0	3.532%10	0.1099	472.0	514.1	472.0	1.0890	0.308	0.000	0.000	43.939	55.753
140.0	4.037%10	0.1256	516.6	572.6	516.6	1.1085	0.586	0.000	0.000	45.000	54.414
150.0	5.184%10	0.1613	591.0	675.0	591.0	1.1422	2.079	0.000	0.000	41.880	56.041
160.0	6.671%10	0.2076	647.2	759.3	647.2	1.1732	6.925	0.000	0.000	36.631	56.445
170.0	8.625%10	0.2684	689.7	829.8	689.7	1.2031	19.707	0.000	0.000	30.703	49.590
180.0	1.113%11	0.3464	722.4	890.5	722.4	1.2327	41.982	0.000	0.000	21.641	36.377
190.0	1.391%11	0.4329	748.3	944.4	748.3	1.2621	63.935	0.000	0.000	10.559	25.506
200.0	1.682%11	0.5236	769.1	993.2	769.1	1.2914	77.146	0.000	0.000	4.137	18.718
210.0	1.974%11	0.6143	786.1	1090.7	786.1	1.3875	83.481	0.000	0.000	1.545	14.973
220.0	2.253%11	0.7011	800.1	1195.9	800.1	1.4947	86.697	0.000	0.000	0.573	12.730
230.0	2.507%11	0.7801	811.7	1304.3	811.7	1.6069	88.765	0.000	0.000	0.212	11.022
240.0	2.726%11	0.8483	821.3	1408.0	821.3	1.7144	90.452	0.000	0.000	0.079	9.469
260.0	3.040%11	0.9459	836.0	1561.3	836.0	1.8676	93.576	0.000	0.000	0.011	6.413
280.0	3.188%11	0.9920	846.2	1588.0	846.2	1.8766	96.617	0.000	0.000	0.001	3.381
300.0	3.209%11	0.9987	853.3	1488.8	853.7	1.7440	98.000	0.000	0.000	0.000	2.000
320.0	3.120%11	0.9708	858.4	1333.2	860.8	1.5488	95.866	3.459	0.384	0.000	0.290
340.0	2.929%11	0.9113	862.0	1191.1	868.0	1.3723	92.561	6.659	0.740	0.000	0.040
360.0	2.665%11	0.8292	864.6	1092.6	875.5	1.2481	89.321	9.606	1.067	0.000	0.005
380.0	2.360%11	0.7345	866.5	1036.9	883.5	1.1736	86.193	12.425	1.381	0.000	0.001
400.0	2.046%11	0.6367	867.9	1012.4	893.2	1.1334	83.174	15.143	1.683	0.000	0.000
420.0	1.744%11	0.5428	869.0	1005.0	906.2	1.1090	80.259	17.767	1.974	0.000	0.000
440.0	1.470%11	0.4576	869.8	1009.5	924.2	1.0923	77.444	20.301	2.256	0.000	0.000
460.0	1.232%11	0.3832	870.5	1020.9	947.1	1.0779	74.724	22.748	2.528	0.000	0.000
480.0	1.029%11	0.3203	871.0	1036.1	973.1	1.0647	72.096	25.114	2.790	0.000	0.000
500.0	8.619%10	0.2682	871.3	1053.5	1000.3	1.0531	69.553	27.402	3.045	0.000	0.000
520.0	7.251%10	0.2256	871.7	1072.1	1027.6	1.0433	67.091	29.618	3.291	0.000	0.000
540.0	6.145%10	0.1912	871.9	1091.3	1054.4	1.0350	64.704	31.767	3.530	0.000	0.000
560.0	5.253%10	0.1635	872.1	1110.8	1080.3	1.0282	62.383	33.855	3.762	0.000	0.000
580.0	4.537%10	0.1412	872.3	1130.6	1105.3	1.0228	60.122	35.891	3.988	0.000	0.000
600.0	3.961%10	0.1233	872.4	1150.5	1129.4	1.0187	57.909	37.882	4.209	0.000	0.000
620.0	3.497%10	0.1088	872.6	1170.4	1152.5	1.0155	55.734	39.840	4.427	0.000	0.000
640.0	3.121%10	0.0971	872.7	1190.3	1174.8	1.0132	53.585	41.773	4.641	0.000	0.000
660.0	2.815%10	0.0876	872.7	1210.3	1196.5	1.0115	51.453	43.692	4.855	0.000	0.000
680.0	2.566%10	0.0798	872.8	1230.3	1217.7	1.0103	49.332	45.602	5.067	0.000	0.000
700.0	2.361%10	0.0735	872.9	1250.3	1238.6	1.0095	47.218	47.504	5.278	0.000	0.000
720.0	2.192%10	0.0682	872.9	1270.3	1259.2	1.0088	45.119	49.393	5.488	0.000	0.000
740.0	2.052%10	0.0638	873.0	1290.3	1279.6	1.0084	43.043	51.261	5.696	0.000	0.000
760.0	1.935%10	0.0602	873.0	1310.3	1299.8	1.0080	41.005	53.095	5.899	0.000	0.000
780.0	1.837%10	0.0572	873.0	1330.3	1320.0	1.0078	39.019	54.883	6.098	0.000	0.000
800.0	1.755%10	0.0546	873.1	1350.3	1340.1	1.0076	37.096	56.614	6.290	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -12.0 LONGI= 283.1 R=100 MONTH= 6 HOUR= 0.0

CALCULATED VALUES: MLAT= -0.7 MLONG= 353.1
DIP= 2.7 MODIP= 2.8 MAGLA= 1.4 XHI= 168.9
SUNRISE: 6.3 L.T. SUNSET:17.7 L.T. SUN DEC.= 23.1
NMF2=5.50%11 NMF1= 0.00%-01 NME=3.20%09 NMD=4.00%08
HMF2=303.1 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.309%05	9.7%-7	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.470%08	4.5%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.727%08	8.6%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	2.507%09	0.0046	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.193%09	0.0058	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	3.201%09	0.0058	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.594
110.0	2.703%09	0.0049	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.312
115.0	1.834%09	0.0033	-1	-1	-1	-1	0.024	0.000	0.000	27.442	72.535
120.0	1.171%09	0.0021	316.6	316.6	316.6	1.0000	0.045	0.000	0.000	31.698	68.256
125.0	7.990%08	0.0015	367.7	368.8	367.7	1.0031	0.086	0.000	0.000	36.294	63.619
130.0	6.367%08	0.0012	417.4	419.6	417.4	1.0054	0.165	0.000	0.000	40.716	59.118
135.0	6.240%08	0.0011	464.6	468.0	464.6	1.0073	0.316	0.000	0.000	43.939	55.745
140.0	7.599%08	0.0014	507.7	512.2	507.7	1.0089	0.601	0.000	0.000	45.000	54.399
150.0	1.801%09	0.0033	578.9	585.7	578.9	1.0117	2.132	0.000	0.000	41.880	55.987
160.0	3.883%10	0.0706	632.2	641.2	632.2	1.0143	7.103	0.000	0.000	36.631	56.267
170.0	6.550%10	0.1192	672.0	683.4	672.0	1.0169	20.214	0.000	0.000	30.703	49.083
180.0	9.745%10	0.1773	702.6	716.2	702.6	1.0194	43.062	0.000	0.000	21.641	35.296
190.0	1.377%11	0.2505	726.6	742.4	726.6	1.0218	65.582	0.000	0.000	10.559	23.859
200.0	1.853%11	0.3371	745.8	764.0	745.8	1.0243	79.133	0.000	0.000	4.137	16.730
210.0	2.385%11	0.4339	761.6	782.0	761.6	1.0268	85.634	0.000	0.000	1.545	12.821
220.0	2.945%11	0.5359	774.5	797.1	774.5	1.0293	88.935	0.000	0.000	0.573	10.492
230.0	3.503%11	0.6373	785.2	810.1	785.2	1.0318	91.059	0.000	0.000	0.212	8.729
240.0	4.025%11	0.7323	794.0	821.2	794.0	1.0343	92.792	0.000	0.000	0.079	7.129
260.0	4.863%11	0.8848	807.6	839.3	807.6	1.0393	96.005	0.000	0.000	0.011	3.984
280.0	5.342%11	0.9720	817.0	853.2	818.4	1.0425	99.071	0.000	0.000	0.001	0.927
300.0	5.494%11	0.9996	823.5	864.3	829.3	1.0423	98.000	1.384	0.154	0.000	0.462
320.0	5.412%11	0.9847	828.2	873.5	840.1	1.0398	85.862	12.667	1.407	0.000	0.063
340.0	5.116%11	0.9309	831.5	881.3	850.9	1.0358	73.253	24.065	2.674	0.000	0.009
360.0	4.659%11	0.8476	833.9	888.3	861.5	1.0311	62.465	33.780	3.753	0.000	0.001
380.0	4.106%11	0.7471	835.6	894.6	871.8	1.0261	53.283	42.045	4.672	0.000	0.000
400.0	3.524%11	0.6411	836.9	900.4	881.3	1.0216	45.473	49.074	5.453	0.000	0.000
420.0	2.962%11	0.5389	837.9	900.4	889.3	1.0125	38.835	55.048	6.116	0.000	0.000
440.0	2.453%11	0.4464	838.7	900.4	894.7	1.0063	33.200	60.120	6.680	0.000	0.000
460.0	2.014%11	0.3665	839.2	900.4	897.7	1.0030	28.424	64.418	7.158	0.000	0.000
480.0	1.648%11	0.2999	839.7	900.5	899.1	1.0015	24.384	68.054	7.562	0.000	0.000
500.0	1.350%11	0.2456	840.1	900.5	899.7	1.0009	20.976	71.121	7.902	0.000	0.000
520.0	1.111%11	0.2022	840.4	900.6	900.0	1.0007	18.109	73.702	8.189	0.000	0.000
540.0	9.216%10	0.1677	840.6	900.7	900.1	1.0006	15.702	75.868	8.430	0.000	0.000
560.0	7.720%10	0.1405	840.8	900.7	900.2	1.0006	13.685	77.684	8.632	0.000	0.000
580.0	6.541%10	0.1190	840.9	900.8	900.3	1.0006	11.992	79.207	8.801	0.000	0.000
600.0	5.610%10	0.1021	841.1	900.9	900.4	1.0006	10.567	80.489	8.943	0.000	0.000
620.0	4.873%10	0.0887	841.2	901.0	900.5	1.0005	9.359	81.577	9.064	0.000	0.000
640.0	4.286%10	0.0780	841.3	901.0	900.5	1.0005	8.326	82.507	9.167	0.000	0.000
660.0	3.816%10	0.0694	841.3	901.1	900.6	1.0005	7.433	83.310	9.257	0.000	0.000
680.0	3.437%10	0.0625	841.4	901.2	900.7	1.0005	6.654	84.011	9.335	0.000	0.000
700.0	3.130%10	0.0570	841.5	901.2	900.7	1.0005	5.969	84.628	9.403	0.000	0.000
720.0	2.880%10	0.0524	841.5	901.3	900.8	1.0005	5.362	85.174	9.464	0.000	0.000
740.0	2.675%10	0.0487	841.6	901.4	900.9	1.0005	4.822	85.660	9.518	0.000	0.000
760.0	2.506%10	0.0456	841.6	901.4	900.9	1.0005	4.339	86.095	9.566	0.000	0.000
780.0	2.365%10	0.0430	841.6	901.5	901.0	1.0005	3.906	86.484	9.609	0.000	0.000
800.0	2.248%10	0.0409	841.6	901.6	901.1	1.0005	3.518	86.834	9.648	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -12.0 LONGI= 283.1 R=100 MONTH=12 HOUR=12.0

CALCULATED VALUES: MLAT= -0.7 MLONG= 353.1
DIP= 2.7 MODIP= 2.8 MAGLA= 1.4 XHI= 10.9
SUNRISE: 5.7 L.T. SUNSET:18.3 L.T. SUN DEC.= -22.9
NMF2=1.54%12 NMF1= 3.55% 11 NME=1.89%11 NMD=1.34%09
HMF2=438.6 HMF1=347.9 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	1.299%09	8.5%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.618%09	0.0017	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	2.828%10	0.0184	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	9.824%10	0.0640	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.635%11	0.1065	-1	-1	-1	-1	0.336	0.000	0.000	63.238	36.426
105.0	1.872%11	0.1219	-1	-1	-1	-1	0.482	0.000	0.000	55.356	44.162
110.0	1.893%11	0.1233	-1	-1	-1	-1	0.691	0.000	0.000	48.649	50.660
115.0	1.909%11	0.1244	-1	-1	-1	-1	0.989	0.000	0.000	43.142	55.869
120.0	1.916%11	0.1248	339.1	339.1	339.1	1.0000	1.415	0.000	0.000	38.887	59.698
125.0	1.923%11	0.1252	398.7	418.1	398.7	1.0487	2.024	0.000	0.000	35.780	62.197
130.0	1.930%11	0.1257	456.8	495.7	456.8	1.0850	2.887	0.000	0.000	33.479	63.633
135.0	1.937%11	0.1262	513.1	571.4	513.1	1.1135	4.107	0.000	0.000	31.625	64.268
140.0	1.945%11	0.1266	566.0	643.6	566.0	1.1372	5.809	0.000	0.000	30.000	64.191
150.0	1.960%11	0.1276	658.5	775.0	658.5	1.1769	11.251	0.000	0.000	27.101	61.648
160.0	1.975%11	0.1286	733.1	888.4	733.1	1.2118	19.962	0.000	0.000	24.487	55.552
170.0	1.992%11	0.1297	792.4	986.6	792.4	1.2450	30.669	0.000	0.000	21.965	47.366
180.0	2.009%11	0.1308	840.0	1073.0	840.0	1.2773	40.806	0.000	0.000	18.721	40.473
190.0	2.027%11	0.1320	878.7	1150.4	878.7	1.3093	49.733	0.000	0.000	12.414	37.854
200.0	2.045%11	0.1332	910.4	1221.0	910.4	1.3411	58.351	0.000	0.000	5.113	36.536
210.0	2.065%11	0.1345	936.7	1397.4	936.7	1.4918	67.504	0.000	0.000	1.638	30.857
220.0	2.086%11	0.1359	958.6	1592.1	958.6	1.6608	77.593	0.000	0.000	0.499	21.908
230.0	2.108%11	0.1373	976.9	1795.2	976.9	1.8377	88.070	0.000	0.000	0.151	11.780
240.0	2.132%11	0.1388	992.1	1990.9	992.1	2.0068	95.635	0.000	0.000	0.046	4.320
260.0	2.185%11	0.1423	1015.4	2278.6	1015.4	2.2439	98.527	0.000	0.000	0.004	1.469
280.0	2.247%11	0.1464	1031.7	2317.8	1031.7	2.2466	98.591	0.329	0.037	0.000	1.043
300.0	2.325%11	0.1514	1043.1	2109.1	1043.1	2.0219	98.368	1.383	0.154	0.000	0.095
320.0	2.435%11	0.1586	1051.2	1790.0	1050.7	1.7036	96.128	3.477	0.386	0.000	0.009
340.0	2.932%11	0.1909	1057.0	1499.1	1053.5	1.4229	92.811	6.469	0.719	0.000	0.001
360.0	5.601%11	0.3648	1061.1	1295.9	1055.4	1.2279	89.563	9.393	1.044	0.000	0.000
380.0	9.548%11	0.6218	1064.2	1178.6	1057.0	1.1150	86.427	12.216	1.357	0.000	0.000
400.0	1.298%12	0.8450	1066.5	1124.0	1060.6	1.0597	83.399	14.941	1.660	0.000	0.000
420.0	1.490%12	0.9704	1068.2	1109.2	1070.1	1.0366	80.476	17.572	1.952	0.000	0.000
440.0	1.535%12	0.9998	1069.5	1118.3	1089.8	1.0262	77.653	20.112	2.235	0.000	0.000
460.0	1.477%12	0.9619	1070.5	1141.0	1119.9	1.0188	74.926	22.566	2.507	0.000	0.000
480.0	1.335%12	0.8696	1071.3	1171.3	1156.6	1.0127	72.291	24.938	2.771	0.000	0.000
500.0	1.145%12	0.7456	1072.0	1205.9	1196.3	1.0081	69.741	27.233	3.026	0.000	0.000
520.0	9.416%11	0.6132	1072.5	1242.9	1236.8	1.0050	67.273	29.454	3.273	0.000	0.000
540.0	7.519%11	0.4897	1072.9	1281.2	1277.4	1.0029	64.879	31.609	3.512	0.000	0.000
560.0	5.899%11	0.3842	1073.2	1320.2	1317.9	1.0017	62.552	33.703	3.745	0.000	0.000
580.0	4.596%11	0.2993	1073.5	1359.6	1358.3	1.0010	60.284	35.744	3.972	0.000	0.000
600.0	3.589%11	0.2337	1073.7	1399.2	1398.5	1.0005	58.065	37.741	4.193	0.000	0.000
620.0	2.828%11	0.1842	1073.9	1438.9	1438.6	1.0002	55.884	39.704	4.412	0.000	0.000
640.0	2.260%11	0.1472	1074.1	1478.7	1478.6	1.0000	53.730	41.643	4.627	0.000	0.000
660.0	1.838%11	0.1197	1074.2	1518.5	1518.6	0.9999	51.593	43.567	4.841	0.000	0.000
680.0	1.524%11	0.0992	1074.3	1558.3	1558.5	0.9999	49.465	45.481	5.053	0.000	0.000
700.0	1.288%11	0.0839	1074.4	1598.2	1598.4	0.9999	47.346	47.389	5.265	0.000	0.000
720.0	1.111%11	0.0723	1074.5	1638.0	1638.3	0.9998	45.241	49.283	5.476	0.000	0.000
740.0	9.753%10	0.0635	1074.6	1677.9	1678.2	0.9998	43.160	51.156	5.684	0.000	0.000
760.0	8.710%10	0.0567	1074.6	1717.7	1718.0	0.9998	41.116	52.995	5.888	0.000	0.000
780.0	7.900%10	0.0514	1074.7	1757.6	1757.9	0.9998	39.125	54.788	6.088	0.000	0.000
800.0	7.265%10	0.0473	1074.7	1797.4	1797.8	0.9998	37.196	56.524	6.280	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -12.0 LONGI= 283.1 R=100 MONTH=12 HOUR= 5.7

CALCULATED VALUES: MLAT= -0.7 MLONG= 353.1
  DIP=   2.7 MODIP=   2.8 MAGLA=   1.4 XHI= 90.0
  SUNRISE: 5.7 L.T.   SUNSET:18.3 L.T.   SUN DEC.= -22.9
  NMF2=4.60%11 NMF1= 0.00%-01 NME=3.57%10 NMD=4.00%08
  HMF2=282.3 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.914%08	6.3%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.081%08	8.9%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.842%09	0.0040	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.254%10	0.0273	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.880%10	0.0627	-1	-1	-1	-1	0.016	0.000	0.000	6.623	93.361
105.0	3.546%10	0.0772	-1	-1	-1	-1	0.025	0.000	0.000	8.541	91.434
110.0	3.442%10	0.0749	-1	-1	-1	-1	0.040	0.000	0.000	10.994	88.966
115.0	2.773%10	0.0604	-1	-1	-1	-1	0.064	0.000	0.000	14.085	85.852
120.0	2.200%10	0.0479	320.8	320.8	320.8	1.0000	0.101	0.000	0.000	17.829	82.070
125.0	2.174%10	0.0473	373.4	387.3	373.4	1.0373	0.159	0.000	0.000	21.966	77.875
130.0	2.744%10	0.0597	424.7	452.5	424.7	1.0657	0.252	0.000	0.000	25.782	73.966
135.0	3.517%10	0.0765	473.6	515.4	473.6	1.0883	0.397	0.000	0.000	28.494	71.110
140.0	4.056%10	0.0883	518.4	574.2	518.4	1.1076	0.623	0.000	0.000	30.000	69.377
150.0	5.194%10	0.1130	593.5	677.1	593.5	1.1409	1.498	0.000	0.000	31.126	67.376
160.0	6.735%10	0.1466	650.3	761.8	650.3	1.1715	3.368	0.000	0.000	31.531	65.101
170.0	8.911%10	0.1939	693.3	832.7	693.3	1.2011	6.679	0.000	0.000	31.688	61.633
180.0	1.227%11	0.2669	726.5	893.8	726.5	1.2303	11.436	0.000	0.000	30.852	57.711
190.0	1.673%11	0.3641	752.8	947.9	752.8	1.2593	17.669	0.000	0.000	25.763	56.569
200.0	2.168%11	0.4717	773.9	997.0	773.9	1.2882	26.008	0.000	0.000	16.079	57.913
210.0	2.679%11	0.5829	791.2	1094.5	791.2	1.3833	37.565	0.000	0.000	8.607	53.827
220.0	3.172%11	0.6903	805.4	1199.7	805.4	1.4895	53.681	0.000	0.000	4.466	41.853
230.0	3.615%11	0.7868	817.2	1308.0	817.2	1.6006	74.390	0.000	0.000	2.307	23.303
240.0	3.984%11	0.8670	827.0	1411.7	827.0	1.7069	92.014	0.000	0.000	1.191	6.796
260.0	4.452%11	0.9688	842.0	1564.7	842.0	1.8584	99.365	0.000	0.000	0.317	0.318
280.0	4.594%11	0.9997	852.3	1591.0	852.3	1.8666	99.536	0.014	0.002	0.084	0.364
300.0	4.524%11	0.9844	859.6	1491.3	859.6	1.7349	99.314	0.510	0.057	0.023	0.097
320.0	4.286%11	0.9328	864.7	1335.3	865.8	1.5422	97.052	2.625	0.292	0.006	0.026
340.0	3.922%11	0.8534	868.4	1192.7	872.1	1.3676	93.704	5.659	0.629	0.002	0.007
360.0	3.480%11	0.7574	871.0	1093.7	878.7	1.2447	90.424	8.616	0.957	0.000	0.002
380.0	3.011%11	0.6552	873.0	1037.4	885.9	1.1711	87.258	11.468	1.274	0.000	0.000
400.0	2.553%11	0.5556	874.4	1012.4	894.7	1.1315	84.201	14.219	1.580	0.000	0.000
420.0	2.134%11	0.4644	875.5	1005.0	907.0	1.1080	81.250	16.875	1.875	0.000	0.000
440.0	1.767%11	0.3846	876.4	1009.5	924.6	1.0919	78.400	19.440	2.160	0.000	0.000
460.0	1.458%11	0.3172	877.0	1020.9	947.3	1.0777	75.647	21.918	2.435	0.000	0.000
480.0	1.202%11	0.2616	877.5	1036.1	973.2	1.0647	72.986	24.313	2.701	0.000	0.000
500.0	9.949%10	0.2165	877.9	1053.5	1000.3	1.0532	70.412	26.629	2.959	0.000	0.000
520.0	8.288%10	0.1804	878.2	1072.1	1027.6	1.0433	67.920	28.872	3.208	0.000	0.000
540.0	6.964%10	0.1515	878.5	1091.3	1054.3	1.0350	65.503	31.048	3.450	0.000	0.000
560.0	5.911%10	0.1286	878.7	1110.8	1080.3	1.0283	63.154	33.162	3.685	0.000	0.000
580.0	5.074%10	0.1104	878.9	1130.6	1105.3	1.0229	60.864	35.223	3.914	0.000	0.000
600.0	4.407%10	0.0959	879.0	1150.5	1129.3	1.0187	58.624	37.239	4.138	0.000	0.000
620.0	3.872%10	0.0843	879.1	1170.4	1152.5	1.0155	56.422	39.221	4.358	0.000	0.000
640.0	3.442%10	0.0749	879.2	1190.3	1174.8	1.0132	54.247	41.178	4.575	0.000	0.000
660.0	3.094%10	0.0673	879.3	1210.3	1196.5	1.0115	52.089	43.120	4.791	0.000	0.000
680.0	2.811%10	0.0612	879.4	1230.3	1217.7	1.0103	49.941	45.054	5.006	0.000	0.000
700.0	2.579%10	0.0561	879.5	1250.3	1238.6	1.0095	47.801	46.979	5.220	0.000	0.000
720.0	2.389%10	0.0520	879.5	1270.3	1259.1	1.0089	45.676	48.892	5.432	0.000	0.000
740.0	2.231%10	0.0485	879.6	1290.3	1279.5	1.0084	43.575	50.783	5.643	0.000	0.000
760.0	2.100%10	0.0457	879.6	1310.3	1299.8	1.0081	41.512	52.639	5.849	0.000	0.000
780.0	1.990%10	0.0433	879.6	1330.3	1320.0	1.0078	39.501	54.449	6.050	0.000	0.000
800.0	1.898%10	0.0413	879.7	1350.3	1340.1	1.0076	37.553	56.202	6.245	0.000	0.000

WE PUT B1=   3.0TO GET HST

INPUT: LATI= -12.0 LONGI= 283.1 R=100 MONTH=12 HOUR= 0.0

CALCULATED VALUES: MLAT= -0.7 MLONG= 353.1
DIP= 2.7 MODIP= 2.8 MAGLA= 1.4 XHI= 145.1
SUNRISE: 5.7 L.T. SUNSET:18.3 L.T. SUN DEC.= -22.9
NMF2=5.10%11 NMF1= 0.00%-01 NME=3.20%09 NMD=4.00%08
HMF2=342.5 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.826%05	1.1%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.490%08	4.9%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.736%08	9.3%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	2.512%09	0.0049	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.193%09	0.0063	-1	-1	-1	-1	0.016	0.000	0.000	6.623	93.361
105.0	3.201%09	0.0063	-1	-1	-1	-1	0.025	0.000	0.000	8.541	91.433
110.0	2.705%09	0.0053	-1	-1	-1	-1	0.040	0.000	0.000	10.994	88.965
115.0	1.837%09	0.0036	-1	-1	-1	-1	0.064	0.000	0.000	14.085	85.851
120.0	1.175%09	0.0023	318.5	318.5	318.5	1.0000	0.101	0.000	0.000	17.829	82.070
125.0	8.027%08	0.0016	370.2	371.0	370.2	1.0023	0.160	0.000	0.000	21.966	77.874
130.0	6.407%08	0.0013	420.5	422.2	420.5	1.0041	0.253	0.000	0.000	25.782	73.965
135.0	6.290%08	0.0012	468.5	471.1	468.5	1.0055	0.398	0.000	0.000	28.494	71.108
140.0	7.669%08	0.0015	512.3	515.8	512.3	1.0067	0.624	0.000	0.000	30.000	69.376
150.0	1.817%09	0.0036	585.2	590.3	585.2	1.0088	1.502	0.000	0.000	31.124	67.373
160.0	4.523%09	0.0089	640.0	646.8	640.0	1.0107	3.378	0.000	0.000	31.515	65.107
170.0	1.062%10	0.0208	681.2	689.8	681.2	1.0125	6.698	0.000	0.000	31.573	61.729
180.0	2.088%10	0.0410	712.9	723.1	712.9	1.0144	11.468	0.000	0.000	30.079	58.453
190.0	3.612%10	0.0709	737.9	749.8	737.9	1.0162	17.718	0.000	0.000	22.428	59.854
200.0	5.667%10	0.1112	757.9	771.6	757.9	1.0180	26.081	0.000	0.000	10.508	63.411
210.0	8.331%10	0.1635	774.3	789.7	774.3	1.0198	37.671	0.000	0.000	3.854	58.476
220.0	1.168%11	0.2293	787.8	804.8	787.8	1.0217	53.832	0.000	0.000	1.344	44.824
230.0	1.568%11	0.3077	798.9	817.7	798.9	1.0235	74.597	0.000	0.000	0.466	24.937
240.0	2.020%11	0.3963	808.2	828.7	808.2	1.0254	92.232	0.000	0.000	0.161	7.607
260.0	2.998%11	0.5883	822.3	846.2	822.3	1.0291	97.671	1.345	0.149	0.019	0.815
280.0	3.913%11	0.7678	832.1	859.4	832.2	1.0327	87.497	11.163	1.240	0.002	0.098
300.0	4.597%11	0.9019	839.0	869.7	841.2	1.0339	76.140	21.463	2.385	0.000	0.012
320.0	4.978%11	0.9768	843.8	878.0	850.2	1.0327	66.207	30.412	3.379	0.000	0.001
340.0	5.095%11	0.9998	847.3	884.8	859.1	1.0300	57.575	38.182	4.242	0.000	0.000
360.0	5.009%11	0.9829	849.8	890.8	867.9	1.0263	50.075	44.932	4.992	0.000	0.000
380.0	4.719%11	0.9260	851.6	896.0	876.4	1.0223	43.562	50.795	5.644	0.000	0.000
400.0	4.279%11	0.8396	853.0	900.8	884.3	1.0186	37.907	55.884	6.209	0.000	0.000
420.0	3.755%11	0.7367	854.0	900.7	890.9	1.0110	33.002	60.298	6.700	0.000	0.000
440.0	3.209%11	0.6297	854.8	900.8	895.5	1.0059	28.750	64.125	7.125	0.000	0.000
460.0	2.690%11	0.5278	855.4	900.8	898.0	1.0032	25.069	67.438	7.493	0.000	0.000
480.0	2.226%11	0.4367	855.9	901.0	899.2	1.0019	21.888	70.300	7.811	0.000	0.000
500.0	1.829%11	0.3589	856.3	901.1	899.8	1.0014	19.145	72.770	8.086	0.000	0.000
520.0	1.502%11	0.2946	856.6	901.2	900.1	1.0012	16.783	74.895	8.322	0.000	0.000
540.0	1.237%11	0.2427	856.8	901.3	900.3	1.0011	14.755	76.721	8.525	0.000	0.000
560.0	1.026%11	0.2013	857.0	901.5	900.5	1.0011	13.014	78.287	8.699	0.000	0.000
580.0	8.591%10	0.1686	857.2	901.6	900.6	1.0011	11.519	79.633	8.848	0.000	0.000
600.0	7.277%10	0.1428	857.3	901.8	900.8	1.0011	10.232	80.791	8.977	0.000	0.000
620.0	6.243%10	0.1225	857.4	901.9	900.9	1.0011	9.119	81.793	9.088	0.000	0.000
640.0	5.426%10	0.1065	857.5	902.0	901.0	1.0011	8.150	82.665	9.185	0.000	0.000
660.0	4.779%10	0.0938	857.6	902.2	901.2	1.0011	7.301	83.429	9.270	0.000	0.000
680.0	4.262%10	0.0836	857.7	902.3	901.3	1.0011	6.551	84.104	9.345	0.000	0.000
700.0	3.848%10	0.0755	857.7	902.4	901.5	1.0011	5.886	84.702	9.411	0.000	0.000
720.0	3.514%10	0.0689	857.8	902.6	901.6	1.0011	5.294	85.235	9.471	0.000	0.000
740.0	3.242%10	0.0636	857.8	902.7	901.7	1.0011	4.764	85.712	9.524	0.000	0.000
760.0	3.021%10	0.0593	857.9	902.9	901.9	1.0011	4.290	86.139	9.571	0.000	0.000
780.0	2.839%10	0.0557	857.9	903.0	902.0	1.0011	3.863	86.523	9.614	0.000	0.000
800.0	2.689%10	0.0528	857.9	903.1	902.2	1.0011	3.480	86.868	9.652	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -51.7 LONGI= 302.2 R= 10 MONTH= 3 HOUR=12.0

CALCULATED VALUES: MLAT= -40.5 MLONG= 9.8
DIP= -48.0 MODIP= -46.8 MAGLA= -29.1 XHI= 48.4
SUNRISE: 5.7 L.T. SUNSET:18.3 L.T. SUN DEC.= -3.3
NMF2=5.30%11 NMF1= 2.18% 11 NME=1.10%11 NMD=5.13%08
HMF2=252.6 HMF1=187.8 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	4.887%08	9.2%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	1.020%09	0.0019	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.062%10	0.0200	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	4.292%10	0.0810	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	8.482%10	0.1600	-1	-1	-1	-1	0.207	0.000	0.000	52.125	47.668
105.0	1.070%11	0.2019	-1	-1	-1	-1	0.326	0.000	0.000	51.477	48.196
110.0	1.102%11	0.2079	-1	-1	-1	-1	0.513	0.000	0.000	50.759	48.728
115.0	1.069%11	0.2017	-1	-1	-1	-1	0.807	0.000	0.000	49.854	49.339
120.0	1.054%11	0.1988	305.0	305.0	305.0	1.0000	1.266	0.000	0.000	48.531	50.203
125.0	1.099%11	0.2074	351.6	377.5	351.6	1.0737	1.979	0.000	0.000	46.498	51.523
130.0	1.131%11	0.2133	396.8	448.7	396.8	1.1307	3.076	0.000	0.000	43.677	53.247
135.0	1.156%11	0.2180	439.4	517.2	439.4	1.1770	4.736	0.000	0.000	40.379	54.885
140.0	1.184%11	0.2234	477.5	581.2	477.5	1.2171	7.175	0.000	0.000	37.000	55.825
150.0	1.255%11	0.2368	538.7	694.2	538.7	1.2887	15.113	0.000	0.000	30.770	54.117
160.0	1.358%11	0.2562	582.7	790.1	582.7	1.3559	26.363	0.000	0.000	25.484	48.152
170.0	1.542%11	0.2908	614.7	873.9	614.7	1.4217	36.882	0.000	0.000	20.934	42.184
180.0	1.979%11	0.3733	638.7	949.8	639.0	1.4865	44.217	0.000	0.000	16.474	39.309
190.0	2.395%11	0.4518	657.4	1020.3	661.6	1.5422	49.297	0.000	0.000	11.697	39.006
200.0	3.186%11	0.6009	672.2	1087.0	684.2	1.5887	53.471	0.000	0.000	7.746	38.784
210.0	3.928%11	0.7409	684.3	1150.9	706.8	1.6282	57.448	0.000	0.000	5.046	37.505
220.0	4.539%11	0.8561	694.1	1212.6	729.5	1.6623	61.526	0.000	0.000	3.280	35.194
230.0	4.969%11	0.9373	702.2	1272.6	752.1	1.6920	65.823	0.000	0.000	2.131	32.046
240.0	5.212%11	0.9831	709.0	1331.1	774.7	1.7182	70.397	0.000	0.000	1.384	28.219
260.0	5.286%11	0.9970	719.2	1445.1	820.0	1.7623	80.490	0.000	0.000	0.584	18.925
280.0	5.097%11	0.9614	726.3	1555.9	865.2	1.7982	91.650	0.000	0.000	0.247	8.104
300.0	4.730%11	0.8922	731.3	1664.5	910.5	1.8282	98.000	0.000	0.000	0.104	1.896
320.0	4.245%11	0.8007	734.8	1771.7	955.8	1.8537	98.409	0.000	0.000	0.044	1.547
340.0	3.704%11	0.6986	737.3	1877.9	1001.1	1.8758	98.416	0.200	0.022	0.019	1.344
360.0	3.161%11	0.5962	739.1	1949.2	1046.6	1.8624	98.414	0.910	0.101	0.008	0.567
380.0	2.654%11	0.5006	740.4	1987.3	1092.6	1.8189	98.411	1.211	0.135	0.003	0.239
400.0	2.205%11	0.4159	741.4	2026.2	1139.6	1.7780	98.408	1.341	0.149	0.001	0.101
420.0	1.822%11	0.3437	742.1	2065.5	1188.9	1.7374	98.399	1.402	0.156	0.001	0.043
440.0	1.505%11	0.2839	742.7	2105.0	1241.4	1.6957	98.276	1.535	0.171	0.000	0.018
460.0	1.247%11	0.2353	743.1	2144.7	1297.2	1.6533	97.221	2.494	0.277	0.000	0.008
480.0	1.040%11	0.1962	743.5	2184.4	1355.2	1.6119	95.705	3.863	0.429	0.000	0.003
500.0	8.753%10	0.1651	743.8	2224.2	1414.2	1.5727	94.186	5.232	0.581	0.000	0.001
520.0	7.442%10	0.1404	744.0	2264.1	1473.7	1.5363	92.678	6.589	0.732	0.000	0.001
540.0	6.400%10	0.1207	744.2	2303.9	1533.4	1.5025	91.176	7.941	0.882	0.000	0.000
560.0	5.571%10	0.1051	744.3	2343.7	1593.2	1.4711	89.673	9.295	1.033	0.000	0.000
580.0	4.908%10	0.0926	744.4	2383.6	1652.9	1.4420	88.158	10.658	1.184	0.000	0.000
600.0	4.376%10	0.0825	744.5	2423.4	1712.7	1.4150	86.619	12.043	1.338	0.000	0.000
620.0	3.946%10	0.0744	744.6	2463.3	1772.5	1.3897	85.039	13.465	1.496	0.000	0.000
640.0	3.597%10	0.0678	744.7	2503.1	1832.2	1.3662	83.403	14.937	1.660	0.000	0.000
660.0	3.312%10	0.0625	744.7	2543.0	1892.0	1.3441	81.692	16.477	1.831	0.000	0.000
680.0	3.078%10	0.0581	744.8	2582.8	1951.8	1.3233	79.895	18.095	2.011	0.000	0.000
700.0	2.885%10	0.0544	744.8	2622.7	2011.6	1.3038	78.005	19.795	2.199	0.000	0.000
720.0	2.725%10	0.0514	744.9	2662.5	2071.3	1.2854	76.031	21.572	2.397	0.000	0.000
740.0	2.591%10	0.0489	744.9	2702.4	2131.1	1.2681	73.986	23.412	2.601	0.000	0.000
760.0	2.479%10	0.0468	744.9	2742.2	2190.9	1.2516	71.895	25.295	2.811	0.000	0.000
780.0	2.386%10	0.0450	744.9	2782.1	2250.7	1.2361	69.781	27.197	3.022	0.000	0.000
800.0	2.306%10	0.0435	745.0	2821.9	2310.4	1.2214	67.669	29.098	3.233	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -51.7 LONGI= 302.2 R= 10 MONTH= 3 HOUR= 5.7

CALCULATED VALUES: MLAT= -40.5 MLONG= 9.8
DIP= -48.0 MODIP= -46.8 MAGLA= -29.1 XHI= 90.0
SUNRISE: 5.7 L.T. SUNSET:18.3 L.T. SUN DEC.= -3.3
NMF2=1.58%11 NMF1= 0.00%-01 NME=3.02%10 NMD=4.00%08
HMF2=269.0 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.826%08	0.0018	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.100%08	0.0026	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.813%09	0.0115	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.144%10	0.0723	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.491%10	0.1574	-1	-1	-1	-1	0.020	0.000	0.000	17.950	82.030
105.0	3.006%10	0.1899	-1	-1	-1	-1	0.031	0.000	0.000	20.889	79.081
110.0	2.925%10	0.1848	-1	-1	-1	-1	0.048	0.000	0.000	24.232	75.721
115.0	2.423%10	0.1531	-1	-1	-1	-1	0.074	0.000	0.000	27.887	72.039
120.0	1.947%10	0.1230	291.5	291.5	291.5	1.0000	0.114	0.000	0.000	31.524	68.361
125.0	1.740%10	0.1100	333.0	351.0	333.0	1.0540	0.177	0.000	0.000	34.509	65.313
130.0	1.819%10	0.1149	373.2	409.2	373.2	1.0964	0.275	0.000	0.000	36.301	63.424
135.0	2.078%10	0.1313	410.5	464.4	410.5	1.1315	0.425	0.000	0.000	36.979	62.596
140.0	2.396%10	0.1514	443.1	515.1	443.1	1.1624	0.655	0.000	0.000	37.000	62.345
150.0	3.142%10	0.1986	493.6	601.6	493.6	1.2187	1.525	0.000	0.000	36.335	62.140
160.0	3.439%10	0.2173	528.4	672.3	528.4	1.2725	3.347	0.000	0.000	35.403	61.250
170.0	3.793%10	0.2397	552.9	732.9	552.9	1.3254	6.466	0.000	0.000	34.020	59.514
180.0	4.233%10	0.2675	571.1	787.0	573.8	1.3717	10.415	0.000	0.000	30.434	59.151
190.0	4.828%10	0.3050	584.9	836.9	594.6	1.4075	14.360	0.000	0.000	22.930	62.710
200.0	5.916%10	0.3738	595.9	883.8	615.4	1.4362	18.208	0.000	0.000	15.380	66.412
210.0	8.198%10	0.5180	604.7	928.6	636.2	1.4597	22.316	0.000	0.000	10.039	67.645
220.0	1.050%11	0.6632	611.9	971.8	657.0	1.4792	27.023	0.000	0.000	6.526	66.451
230.0	1.254%11	0.7925	617.9	1013.7	677.8	1.4956	32.590	0.000	0.000	4.240	63.170
240.0	1.413%11	0.8931	622.8	1054.6	698.6	1.5096	39.250	0.000	0.000	2.755	57.995
260.0	1.570%11	0.9922	630.2	1134.0	740.2	1.5320	56.860	0.000	0.000	1.163	41.977
280.0	1.574%11	0.9943	635.4	1211.2	781.9	1.5491	81.425	0.000	0.000	0.491	18.085
300.0	1.514%11	0.9569	638.9	1286.7	823.5	1.5626	98.000	0.000	0.000	0.207	1.793
320.0	1.410%11	0.8911	641.5	1361.3	865.1	1.5736	99.136	0.000	0.000	0.087	0.777
340.0	1.276%11	0.8064	643.3	1435.1	906.6	1.5829	99.157	0.000	0.000	0.037	0.806
360.0	1.128%11	0.7129	644.6	1489.5	948.0	1.5711	99.156	0.418	0.046	0.016	0.364
380.0	9.794%10	0.6188	645.6	1525.3	989.1	1.5422	99.153	0.618	0.069	0.007	0.154
400.0	8.393%10	0.5303	646.3	1561.5	1029.3	1.5171	99.149	0.705	0.078	0.003	0.065
420.0	7.135%10	0.4509	646.8	1581.2	1067.7	1.4809	99.141	0.748	0.083	0.001	0.027
440.0	6.047%10	0.3821	647.2	1601.1	1103.5	1.4508	99.016	0.875	0.097	0.000	0.012
460.0	5.127%10	0.3240	647.6	1621.0	1136.7	1.4260	97.954	1.837	0.204	0.000	0.005
480.0	4.364%10	0.2758	647.8	1640.9	1168.1	1.4047	96.426	3.215	0.357	0.000	0.002
500.0	3.739%10	0.2363	648.0	1660.9	1198.7	1.3856	94.896	4.593	0.510	0.000	0.001
520.0	3.230%10	0.2041	648.2	1680.9	1228.9	1.3678	93.376	5.961	0.662	0.000	0.000
540.0	2.817%10	0.1780	648.3	1700.9	1259.0	1.3510	91.863	7.323	0.814	0.000	0.000
560.0	2.483%10	0.1569	648.4	1720.9	1289.0	1.3350	90.348	8.686	0.965	0.000	0.000
580.0	2.211%10	0.1397	648.5	1740.9	1319.1	1.3198	88.822	10.060	1.118	0.000	0.000
600.0	1.990%10	0.1258	648.5	1760.9	1349.1	1.3053	87.271	11.456	1.273	0.000	0.000
620.0	1.810%10	0.1144	648.6	1780.9	1379.1	1.2914	85.680	12.888	1.432	0.000	0.000
640.0	1.662%10	0.1050	648.7	1800.9	1409.1	1.2781	84.031	14.372	1.597	0.000	0.000
660.0	1.540%10	0.0973	648.7	1820.9	1439.1	1.2653	82.308	15.923	1.769	0.000	0.000
680.0	1.440%10	0.0910	648.7	1840.9	1469.1	1.2531	80.497	17.553	1.950	0.000	0.000
700.0	1.356%10	0.0857	648.8	1860.9	1499.1	1.2414	78.593	19.266	2.141	0.000	0.000
720.0	1.287%10	0.0813	648.8	1880.9	1529.1	1.2301	76.604	21.057	2.340	0.000	0.000
740.0	1.228%10	0.0776	648.8	1900.9	1559.1	1.2192	74.540	22.911	2.546	0.000	0.000
760.0	1.179%10	0.0745	648.8	1920.9	1589.1	1.2088	72.437	24.807	2.756	0.000	0.000
780.0	1.138%10	0.0719	648.9	1940.9	1619.1	1.1988	70.307	26.723	2.969	0.000	0.000
800.0	1.104%10	0.0697	648.9	1960.9	1649.1	1.1891	68.179	28.639	3.182	0.000	0.000

WE PUT 61= 3.0TO GET HST

INPUT: LATI= -51.7 LONGI= 302.2 R= 10 MONTH= 3 HOUR= 0.0

CALCULATED VALUES: MLAT= -40.5 MLONG= 9.8
DIP= -48.0 MODIP= -46.8 MAGLA= -29.1 XHI= 125.0
SUNRISE: 5.7 L.T. SUNSET:18.3 L.T. SUN DEC.= -3.3
NMF2=1.56%11 NMF1= 0.00%-01 NME=1.78%09 NMD=4.00%08
HMF2=357.5 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDN0+
80.0	5.771%05	3.7%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.487%08	0.0016	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.735%08	0.0030	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.743%09	0.0112	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.775%09	0.0114	-1	-1	-1	-1	0.029	0.000	0.000	17.950	82.030
105.0	1.775%09	0.0114	-1	-1	-1	-1	0.031	0.000	0.000	20.889	79.081
110.0	1.452%09	0.0093	-1	-1	-1	-1	0.048	0.000	0.000	24.232	75.721
115.0	9.468%08	0.0061	-1	-1	-1	-1	0.074	0.000	0.000	27.887	72.039
120.0	6.031%08	0.0039	289.9	289.9	289.9	1.0000	0.115	0.000	0.000	31.524	68.361
125.0	4.249%08	0.0027	330.6	338.9	330.6	1.0249	0.178	0.000	0.000	34.509	65.313
130.0	3.519%08	0.0023	370.2	386.7	370.2	1.0445	0.275	0.000	0.000	36.301	63.424
135.0	3.463%08	0.0022	406.8	431.5	406.8	1.0607	0.425	0.000	0.000	36.979	62.596
140.0	3.949%08	0.0025	438.8	471.7	438.8	1.0751	0.655	0.000	0.000	37.000	62.345
150.0	6.553%08	0.0042	488.0	537.4	488.0	1.1012	1.526	0.000	0.000	36.335	62.139
160.0	1.088%09	0.0070	521.7	587.6	521.7	1.1263	3.349	0.000	0.000	35.403	61.248
170.0	1.681%09	0.0108	545.5	627.8	545.5	1.1510	6.470	0.000	0.000	34.020	59.510
180.0	2.096%09	0.0134	562.9	661.8	563.3	1.1749	10.420	0.000	0.000	30.434	59.146
190.0	2.575%09	0.0165	576.3	691.6	580.1	1.1922	14.368	0.000	0.000	22.930	62.702
200.0	3.184%09	0.0204	586.9	718.6	596.9	1.2039	18.218	0.000	0.000	15.380	66.403
210.0	3.968%09	0.0254	595.3	743.6	613.7	1.2115	22.327	0.000	0.000	10.039	67.634
220.0	4.994%09	0.0320	602.3	767.0	630.6	1.2163	27.036	0.000	0.000	6.526	66.438
230.0	6.370%09	0.0408	608.0	789.1	647.4	1.2190	32.605	0.000	0.000	4.240	63.155
240.0	8.284%09	0.0531	612.7	810.3	664.2	1.2200	39.266	0.000	0.000	2.755	57.979
260.0	1.588%10	0.1019	619.8	850.4	697.8	1.2186	56.879	0.000	0.000	1.163	41.958
280.0	4.318%10	0.2768	624.8	888.3	731.5	1.2143	81.441	0.000	0.000	0.491	18.069
300.0	8.610%10	0.5518	628.2	924.7	765.1	1.2086	98.000	0.000	0.000	0.207	1.793
320.0	1.272%11	0.8154	630.6	960.0	798.6	1.2021	99.107	0.000	0.000	0.087	0.806
340.0	1.509%11	0.9670	632.4	994.7	832.1	1.1955	99.085	0.395	0.044	0.037	0.438
360.0	1.560%11	0.9997	633.6	1028.9	865.1	1.1894	99.020	0.701	0.078	0.016	0.185
380.0	1.519%11	0.9738	634.6	1062.8	897.1	1.1847	98.914	0.901	0.100	0.007	0.078
400.0	1.424%11	0.9127	635.3	1096.4	926.6	1.1832	98.352	1.451	0.161	0.003	0.033
420.0	1.291%11	0.8276	635.8	1096.5	951.2	1.1528	94.980	4.504	0.500	0.001	0.014
440.0	1.140%11	0.7306	636.2	1096.7	968.1	1.1328	90.538	8.510	0.946	0.000	0.006
460.0	9.867%10	0.6324	636.5	1096.8	977.4	1.1222	86.145	12.467	1.385	0.000	0.002
480.0	8.430%10	0.5403	636.7	1096.9	981.7	1.1174	81.802	16.378	1.820	0.000	0.001
500.0	7.154%10	0.4585	636.9	1097.0	983.5	1.1154	77.467	20.279	2.253	0.000	0.000
520.0	6.064%10	0.3887	637.1	1097.2	984.3	1.1146	73.102	24.208	2.690	0.000	0.000
540.0	5.157%10	0.3305	637.2	1097.3	984.8	1.1143	68.675	28.192	3.132	0.000	0.000
560.0	4.416%10	0.2831	637.3	1097.4	985.1	1.1141	64.178	32.239	3.582	0.000	0.000
580.0	3.817%10	0.2447	637.4	1097.6	985.3	1.1140	59.629	36.333	4.037	0.000	0.000
600.0	3.336%10	0.2138	637.4	1097.7	985.5	1.1139	55.077	40.431	4.492	0.000	0.000
620.0	2.950%10	0.1891	637.5	1097.8	985.7	1.1138	50.589	44.470	4.941	0.000	0.000
640.0	2.640%10	0.1692	637.5	1098.0	985.9	1.1137	46.240	48.384	5.376	0.000	0.000
660.0	2.391%10	0.1533	637.6	1098.1	986.1	1.1136	42.097	52.113	5.790	0.000	0.000
680.0	2.191%10	0.1404	637.6	1098.2	986.3	1.1135	38.204	55.616	6.180	0.000	0.000
700.0	2.028%10	0.1300	637.6	1098.4	986.5	1.1134	34.592	58.868	6.541	0.000	0.000
720.0	1.896%10	0.1215	637.7	1098.5	986.7	1.1133	31.268	61.859	6.873	0.000	0.000
740.0	1.788%10	0.1146	637.7	1098.6	986.9	1.1132	28.230	64.593	7.177	0.000	0.000
760.0	1.699%10	0.1089	637.7	1098.7	987.1	1.1131	25.466	67.081	7.453	0.000	0.000
780.0	1.626%10	0.1042	637.7	1098.9	987.3	1.1130	22.959	69.337	7.704	0.000	0.000
800.0	1.566%10	0.1004	637.7	1099.0	987.5	1.1130	20.691	71.378	7.931	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -51.7 LONGI= 302.2 R= 10 MONTH= 6 HOUR=12.0

CALCULATED VALUES: MLAT= -40.5 MLONG= 9.8
DIP= -48.0 MODIP= -46.8 MAGLA= -29.1 XHI= 74.8
SUNRISE: 8.2 L.T. SUNSET:15.8 L.T. SUN DEC.= 23.1
NMF2=2.83%11 NMF1= 0.00%-01 NME=6.92%10 NMD=4.00%08
HMF2=261.4 HMF1= 0.0 HME=109.8 HMD= 81.3

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	3.761%08	0.0013	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	7.129%08	0.0025	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	7.313%09	0.0258	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	2.900%10	0.1023	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	5.517%10	0.1947	-1	-1	-1	-1	0.050	0.000	0.000	28.639	71.310
105.0	6.770%10	0.2389	-1	-1	-1	-1	0.084	0.000	0.000	31.196	68.720
110.0	6.920%10	0.2442	-1	-1	-1	-1	0.139	0.000	0.000	33.963	65.898
115.0	6.445%10	0.2275	-1	-1	-1	-1	0.232	0.000	0.000	36.921	62.847
120.0	6.127%10	0.2163	300.0	300.0	300.0	1.0000	0.385	0.000	0.000	39.985	59.630
125.0	6.648%10	0.2346	344.6	370.6	344.6	1.0752	0.639	0.000	0.000	42.899	56.462
130.0	7.313%10	0.2581	388.0	439.9	388.0	1.1337	1.059	0.000	0.000	45.108	53.833
135.0	7.534%10	0.2659	428.6	506.4	428.6	1.1815	1.751	0.000	0.000	45.888	52.361
140.0	7.768%10	0.2742	464.7	568.4	464.7	1.2232	2.884	0.000	0.000	45.000	52.116
150.0	8.290%10	0.2926	521.7	677.3	521.7	1.2982	7.621	0.000	0.000	40.423	51.956
160.0	8.905%10	0.3143	562.1	769.5	562.1	1.3690	18.578	0.000	0.000	34.804	46.618
170.0	9.667%10	0.3412	591.1	850.4	591.1	1.4386	38.011	0.000	0.000	27.273	34.716
180.0	1.072%11	0.3785	612.8	924.0	614.6	1.5034	59.970	0.000	0.000	16.243	23.787
190.0	1.315%11	0.4641	629.5	992.5	637.8	1.5562	75.067	0.000	0.000	7.561	17.373
200.0	1.681%11	0.5932	642.8	1057.7	661.1	1.5999	82.614	0.000	0.000	3.284	14.101
210.0	2.029%11	0.7162	653.5	1120.3	684.3	1.6370	86.230	0.000	0.000	1.411	12.359
220.0	2.331%11	0.8225	662.3	1180.9	707.6	1.6689	88.317	0.000	0.000	0.605	11.078
230.0	2.564%11	0.9048	669.5	1240.0	730.8	1.6967	89.875	0.000	0.000	0.260	9.865
240.0	2.720%11	0.9601	675.5	1297.8	754.1	1.7211	91.267	0.000	0.000	0.111	8.622
260.0	2.833%11	0.9999	684.6	1410.6	800.6	1.7620	93.959	0.000	0.000	0.020	6.020
280.0	2.785%11	0.9830	690.9	1520.6	847.1	1.7952	96.607	0.000	0.000	0.004	3.389
300.0	2.638%11	0.9309	695.3	1628.7	893.6	1.8227	98.000	0.000	0.000	0.001	1.999
320.0	2.416%11	0.8527	698.4	1735.6	940.1	1.8461	98.087	0.000	0.000	0.000	1.913
340.0	2.151%11	0.7593	700.6	1841.5	986.7	1.8663	98.087	0.951	0.106	0.000	0.856
360.0	1.872%11	0.6607	702.2	1912.7	1033.4	1.8509	98.086	1.581	0.176	0.000	0.157
380.0	1.601%11	0.5650	703.4	1950.7	1080.4	1.8055	98.083	1.699	0.189	0.000	0.029
400.0	1.353%11	0.4775	704.3	1989.5	1128.3	1.7633	98.079	1.724	0.192	0.000	0.005
420.0	1.136%11	0.4008	704.9	2027.2	1177.7	1.7212	98.071	1.735	0.193	0.000	0.001
440.0	9.514%10	0.3358	705.4	2065.1	1229.7	1.6794	97.948	1.847	0.205	0.000	0.000
460.0	7.985%10	0.2818	705.8	2103.3	1284.1	1.6379	96.897	2.793	0.310	0.000	0.000
480.0	6.735%10	0.2377	706.1	2141.4	1340.2	1.5978	95.386	4.153	0.461	0.000	0.000
500.0	5.724%10	0.2020	706.4	2179.7	1397.1	1.5601	93.872	5.516	0.613	0.000	0.000
520.0	4.909%10	0.1733	706.6	2217.9	1454.3	1.5250	92.369	6.868	0.763	0.000	0.000
540.0	4.255%10	0.1502	706.7	2256.2	1511.7	1.4925	90.872	8.215	0.913	0.000	0.000
560.0	3.729%10	0.1316	706.8	2294.5	1569.1	1.4623	89.373	9.564	1.063	0.000	0.000
580.0	3.305%10	0.1167	706.9	2332.7	1626.5	1.4342	87.864	10.923	1.214	0.000	0.000
600.0	2.963%10	0.1046	707.0	2371.0	1683.9	1.4081	86.329	12.303	1.367	0.000	0.000
620.0	2.684%10	0.0947	707.1	2409.3	1741.3	1.3836	84.756	13.720	1.524	0.000	0.000
640.0	2.457%10	0.0867	707.2	2447.6	1798.7	1.3607	83.125	15.188	1.688	0.000	0.000
660.0	2.270%10	0.0801	707.2	2485.8	1856.2	1.3392	81.420	16.722	1.858	0.000	0.000
680.0	2.117%10	0.0747	707.3	2524.1	1913.6	1.3191	79.628	18.335	2.037	0.000	0.000
700.0	1.990%10	0.0702	707.3	2562.4	1971.0	1.3001	77.745	20.029	2.225	0.000	0.000
720.0	1.884%10	0.0665	707.3	2600.7	2028.4	1.2821	75.777	21.801	2.422	0.000	0.000
740.0	1.795%10	0.0634	707.4	2639.0	2085.8	1.2652	73.739	23.635	2.626	0.000	0.000
760.0	1.721%10	0.0608	707.4	2677.2	2143.3	1.2492	71.655	25.511	2.835	0.000	0.000
780.0	1.659%10	0.0586	707.4	2715.5	2200.7	1.2340	69.549	27.406	3.045	0.000	0.000
800.0	1.606%10	0.0567	707.4	2753.8	2258.1	1.2195	67.443	29.301	3.256	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -51.7 LONGI= 302.2 R= 10 MONTH= 6 HOUR= 8.2

CALCULATED VALUES: MLAT= -40.5 MLONG= 9.8
DIP= -48.0 MODIP= -46.8 MAGLA= -29.1 XHI= 90.0
SUNRISE: 8.2 L.T. SUNSET:15.8 L.T. SUN DEC.= 23.1
NMF2=1.43%11 NMF1= 0.00%-01 NME=3.31%10 NMD=4.00%08
HMF2=279.0 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.824%08	0.0020	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.099%08	0.0029	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.812%09	0.0127	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.178%10	0.0827	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.670%10	0.1874	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	3.285%10	0.2305	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	3.196%10	0.2243	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	2.620%10	0.1839	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	2.073%10	0.1455	291.5	291.5	291.5	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	1.834%10	0.1287	332.9	350.8	332.9	1.0539	0.084	0.000	0.000	36.294	63.621
130.0	1.925%10	0.1351	373.0	408.9	373.0	1.0962	0.161	0.000	0.000	40.716	59.123
135.0	2.227%10	0.1563	410.3	464.2	410.3	1.1312	0.307	0.000	0.000	43.939	55.754
140.0	2.599%10	0.1824	442.9	514.7	442.9	1.1621	0.584	0.000	0.000	45.000	54.416
150.0	3.419%10	0.2399	493.4	601.1	493.4	1.2183	2.074	0.000	0.000	41.880	56.046
160.0	3.662%10	0.2570	528.1	671.7	528.1	1.2719	6.909	0.000	0.000	36.631	56.461
170.0	3.943%10	0.2767	552.6	732.1	552.6	1.3248	19.661	0.000	0.000	30.703	49.636
180.0	4.279%10	0.3003	570.7	786.1	573.5	1.3709	41.885	0.000	0.000	21.641	36.474
190.0	4.704%10	0.3301	584.6	835.9	594.3	1.4066	63.787	0.000	0.000	10.559	25.653
200.0	5.320%10	0.3733	595.5	882.7	615.1	1.4351	76.967	0.000	0.000	4.137	18.896
210.0	6.796%10	0.4769	604.4	927.4	635.9	1.4584	83.288	0.000	0.000	1.545	15.167
220.0	8.671%10	0.6085	611.5	970.5	656.7	1.4778	86.496	0.000	0.000	0.573	12.931
230.0	1.044%11	0.7323	617.5	1012.4	677.6	1.4941	88.560	0.000	0.000	0.212	11.228
240.0	1.193%11	0.8374	622.4	1053.1	698.4	1.5080	90.243	0.000	0.000	0.079	9.679
260.0	1.379%11	0.9681	629.8	1132.4	740.0	1.5302	93.359	0.000	0.000	0.011	6.630
280.0	1.425%11	1.0000	634.9	1209.3	781.6	1.5471	96.398	0.000	0.000	0.001	3.600
300.0	1.396%11	0.9797	638.5	1284.7	823.3	1.5605	98.000	0.000	0.000	0.000	2.000
320.0	1.321%11	0.9269	641.0	1359.0	864.9	1.5713	98.100	0.000	0.000	0.000	1.900
340.0	1.212%11	0.8505	642.8	1432.6	906.4	1.5805	98.101	1.044	0.116	0.000	0.739
360.0	1.083%11	0.7603	644.2	1487.4	947.9	1.5692	98.099	1.620	0.180	0.000	0.101
380.0	9.488%10	0.6658	645.1	1524.1	988.9	1.5411	98.096	1.701	0.189	0.000	0.014
400.0	8.184%10	0.5743	645.8	1561.1	1029.1	1.5169	98.093	1.715	0.191	0.000	0.002
420.0	6.989%10	0.4904	646.4	1580.8	1067.6	1.4807	98.084	1.724	0.192	0.000	0.000
440.0	5.938%10	0.4167	646.8	1600.6	1103.4	1.4506	97.961	1.835	0.204	0.000	0.000
460.0	5.041%10	0.3537	647.1	1620.5	1136.6	1.4258	96.910	2.781	0.309	0.000	0.000
480.0	4.291%10	0.3011	647.3	1640.4	1168.0	1.4045	95.399	4.141	0.460	0.000	0.000
500.0	3.673%10	0.2578	647.5	1660.4	1198.5	1.3854	93.884	5.504	0.612	0.000	0.000
520.0	3.169%10	0.2224	647.7	1680.3	1228.7	1.3676	92.381	6.857	0.762	0.000	0.000
540.0	2.759%10	0.1936	647.8	1700.3	1258.7	1.3508	90.884	8.204	0.912	0.000	0.000
560.0	2.426%10	0.1703	647.9	1720.3	1288.7	1.3348	89.386	9.553	1.061	0.000	0.000
580.0	2.157%10	0.1513	648.0	1740.2	1318.7	1.3196	87.876	10.912	1.212	0.000	0.000
600.0	1.938%10	0.1360	648.1	1760.2	1348.7	1.3051	86.341	12.293	1.366	0.000	0.000
620.0	1.759%10	0.1234	648.2	1780.2	1378.7	1.2912	84.767	13.709	1.523	0.000	0.000
640.0	1.613%10	0.1132	648.2	1800.2	1408.7	1.2780	83.136	15.178	1.686	0.000	0.000
660.0	1.492%10	0.1047	648.2	1820.2	1438.6	1.2652	81.431	16.712	1.857	0.000	0.000
680.0	1.393%10	0.0978	648.3	1840.1	1468.6	1.2530	79.639	18.325	2.036	0.000	0.000
700.0	1.311%10	0.0920	648.3	1860.1	1498.6	1.2413	77.756	20.020	2.224	0.000	0.000
720.0	1.243%10	0.0872	648.3	1880.1	1528.5	1.2300	75.787	21.791	2.421	0.000	0.000
740.0	1.186%10	0.0832	648.4	1900.1	1558.5	1.2192	73.749	23.626	2.625	0.000	0.000
760.0	1.138%10	0.0798	648.4	1920.1	1588.5	1.2087	71.665	25.502	2.834	0.000	0.000
780.0	1.098%10	0.0770	648.4	1940.0	1618.4	1.1987	69.558	27.398	3.044	0.000	0.000
800.0	1.064%10	0.0746	648.4	1960.0	1648.4	1.1890	67.452	29.293	3.255	0.000	0.000

WE PUT 81= 3.0TO GET HST

INPUT: LATI= -51.7 LONGI= 302.2 R= 10 MONTH= 6 HOUR= 0.0

CALCULATED VALUES: MLAT= -40.5 MLONG= 9.8
DIP= -48.0 MODIP= -46.8 MAGLA= -29.1 XHI= 151.4
SUNRISE: 8.2 L.T. SUNSET:15.8 L.T. SUN DEC.= 23.1
NMF2=9.23%10 NMF1= 0.00%-01 NME=1.78%09 NMD=4.00%08
HMF2=281.6 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	4.901%05	5.3%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.453%08	0.0027	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.720%08	0.0051	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.742%09	0.0189	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.775%09	0.0192	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	1.775%09	0.0192	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	1.449%09	0.0157	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	9.430%08	0.0102	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	5.991%08	0.0065	286.0	286.0	286.0	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	4.211%08	0.0046	325.4	334.0	325.4	1.0265	0.084	0.000	0.000	36.294	63.621
130.0	3.480%08	0.0038	363.5	380.7	363.5	1.0474	0.161	0.000	0.000	40.716	59.123
135.0	3.420%08	0.0037	398.6	424.4	398.6	1.0649	0.307	0.000	0.000	43.939	55.754
140.0	3.897%08	0.0042	429.1	463.5	429.1	1.0803	0.584	0.000	0.000	45.000	54.416
150.0	6.479%08	0.0070	475.5	527.2	475.5	1.1087	2.075	0.000	0.000	41.880	56.044
160.0	1.080%09	0.0117	506.9	575.8	506.9	1.1360	6.912	0.000	0.000	36.631	56.457
170.0	1.668%09	0.0181	528.9	615.0	528.9	1.1629	19.672	0.000	0.000	30.703	49.625
180.0	1.031%10	0.1118	544.9	648.3	546.4	1.1865	41.907	0.000	0.000	21.641	36.451
190.0	1.801%10	0.1952	557.2	677.9	563.9	1.2021	63.821	0.000	0.000	10.559	25.620
200.0	2.761%10	0.2992	566.9	704.7	581.4	1.2122	77.006	0.000	0.000	4.137	18.857
210.0	3.907%10	0.4235	574.6	729.7	598.8	1.2186	83.329	0.000	0.000	1.545	15.125
220.0	5.145%10	0.5576	581.0	753.3	616.3	1.2223	86.537	0.000	0.000	0.573	12.890
230.0	6.354%10	0.6886	586.2	775.7	633.7	1.2240	88.599	0.000	0.000	0.212	11.188
240.0	7.417%10	0.8039	590.5	797.3	651.2	1.2243	90.280	0.000	0.000	0.079	9.641
260.0	8.816%10	0.9556	597.0	838.2	686.1	1.2217	93.390	0.000	0.000	0.011	6.599
280.0	9.225%10	0.9998	601.5	877.2	721.0	1.2166	96.417	0.000	0.000	0.001	3.582
300.0	9.086%10	0.9848	604.6	914.8	755.9	1.2102	98.000	0.000	0.000	0.000	2.000
320.0	8.650%10	0.9376	606.9	951.5	790.8	1.2033	98.071	0.628	0.070	0.000	1.231
340.0	7.992%10	0.8662	608.4	987.6	825.4	1.1964	98.030	1.621	0.180	0.000	0.169
360.0	7.197%10	0.7801	609.6	1023.2	859.7	1.1901	97.965	1.810	0.201	0.000	0.023
380.0	6.351%10	0.6884	610.4	1058.5	892.9	1.1854	97.860	1.923	0.214	0.000	0.003
400.0	5.519%10	0.5982	611.1	1093.6	923.6	1.1841	97.304	2.426	0.270	0.000	0.000
420.0	4.749%10	0.5147	611.5	1093.6	949.0	1.1524	93.968	5.429	0.603	0.000	0.000
440.0	4.063%10	0.4404	611.9	1093.6	966.5	1.1316	89.573	9.384	1.043	0.000	0.000
460.0	3.473%10	0.3764	612.2	1093.6	976.0	1.1205	85.227	13.296	1.477	0.000	0.000
480.0	2.975%10	0.3224	612.4	1093.6	980.3	1.1156	80.930	17.163	1.907	0.000	0.000
500.0	2.561%10	0.2776	612.6	1093.6	982.0	1.1137	76.642	21.022	2.336	0.000	0.000
520.0	2.221%10	0.2407	612.7	1093.7	982.7	1.1129	72.323	24.909	2.768	0.000	0.000
540.0	1.943%10	0.2106	612.8	1093.7	982.9	1.1126	67.944	28.851	3.206	0.000	0.000
560.0	1.716%10	0.1860	612.9	1093.7	983.1	1.1125	63.494	32.855	3.651	0.000	0.000
580.0	1.531%10	0.1660	613.0	1093.7	983.1	1.1125	58.994	36.905	4.101	0.000	0.000
600.0	1.380%10	0.1496	613.1	1093.7	983.1	1.1125	54.490	40.959	4.551	0.000	0.000
620.0	1.257%10	0.1362	613.1	1093.7	983.2	1.1125	50.050	44.955	4.995	0.000	0.000
640.0	1.155%10	0.1252	613.1	1093.7	983.2	1.1124	45.748	48.827	5.425	0.000	0.000
660.0	1.072%10	0.1162	613.2	1093.7	983.2	1.1124	41.648	52.517	5.835	0.000	0.000
680.0	1.002%10	0.1087	613.2	1093.7	983.2	1.1124	37.797	55.982	6.220	0.000	0.000
700.0	9.450%09	0.1024	613.2	1093.8	983.2	1.1124	34.223	59.199	6.578	0.000	0.000
720.0	8.971%09	0.0972	613.3	1093.8	983.2	1.1124	30.934	62.159	6.907	0.000	0.000
740.0	8.571%09	0.0929	613.3	1093.8	983.3	1.1124	27.929	64.864	7.207	0.000	0.000
760.0	8.235%09	0.0893	613.3	1093.8	983.3	1.1124	25.194	67.325	7.481	0.000	0.000
780.0	7.952%09	0.0862	613.3	1093.8	983.3	1.1124	22.714	69.557	7.729	0.000	0.000
800.0	7.714%09	0.0836	613.3	1093.8	983.3	1.1124	20.471	71.576	7.953	0.000	0.000

WE PUT R1= 3.0TO GET HST

INPUT: LATI= -51.7 LONGI= 302.2 R= 10 MONTH=12 HOUR=12.0

CALCULATED VALUES: MLAT= -40.5 MLONG= 9.8
DIP= -48.0 MODIP= -46.8 MAGLA= -29.1 XHI= 28.8
SUNRISE: 3.8 L.T. SUNSET:20.2 L.T. SUN DEC.= -22.9
NMF2=7.11%11 NMF1= 2.42% 11 NME=1.27%11 NMD=6.01%08
HMF2=307.7 HMF1=254.5 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.734%08	8.1%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	1.207%09	0.0017	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.251%10	0.0176	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	5.005%10	0.0704	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	9.804%10	0.1379	-1	-1	-1	-1	0.222	0.000	0.000	44.165	55.613
105.0	1.231%11	0.1732	-1	-1	-1	-1	0.322	0.000	0.000	41.891	57.787
110.0	1.267%11	0.1782	-1	-1	-1	-1	0.466	0.000	0.000	39.792	59.742
115.0	1.234%11	0.1736	-1	-1	-1	-1	0.674	0.000	0.000	37.926	61.400
120.0	1.215%11	0.1709	307.8	307.8	307.8	1.0000	0.973	0.000	0.000	36.383	62.645
125.0	1.266%11	0.1781	355.4	380.9	355.4	1.0718	1.397	0.000	0.000	35.215	63.388
130.0	1.286%11	0.1809	401.7	452.8	401.7	1.1271	1.992	0.000	0.000	34.358	63.650
135.0	1.292%11	0.1818	445.4	522.0	445.4	1.1719	2.806	0.000	0.000	33.684	63.511
140.0	1.299%11	0.1827	484.7	586.8	484.7	1.2106	3.879	0.000	0.000	33.097	63.025
150.0	1.313%11	0.1847	548.2	701.3	548.2	1.2794	6.785	0.000	0.000	32.022	61.193
160.0	1.330%11	0.1870	594.3	798.5	594.3	1.3436	10.186	0.000	0.000	31.000	58.814
170.0	1.349%11	0.1897	628.0	883.2	628.0	1.4064	13.415	0.000	0.000	29.997	56.588
180.0	1.370%11	0.1928	653.5	959.8	653.5	1.4687	16.465	0.000	0.000	28.910	54.624
190.0	1.396%11	0.1963	673.3	1030.6	675.6	1.5256	19.639	0.000	0.000	27.130	53.231
200.0	1.426%11	0.2006	689.1	1097.5	697.6	1.5731	23.189	0.000	0.000	22.712	54.099
210.0	1.463%11	0.2058	701.9	1161.3	719.7	1.6136	27.286	0.000	0.000	16.065	56.649
220.0	1.511%11	0.2126	712.4	1222.9	741.8	1.6486	32.070	0.000	0.000	10.593	57.337
230.0	1.578%11	0.2219	721.1	1282.6	763.9	1.6791	37.679	0.000	0.000	6.897	55.424
240.0	1.703%11	0.2395	728.3	1340.9	785.9	1.7061	44.264	0.000	0.000	4.482	51.255
260.0	3.208%11	0.4513	739.2	1453.9	830.1	1.7515	61.068	0.000	0.000	1.892	37.040
280.0	5.804%11	0.8164	746.8	1563.6	874.2	1.7885	83.427	0.000	0.000	0.798	15.775
300.0	7.036%11	0.9897	752.1	1671.0	918.4	1.8194	98.000	0.000	0.000	0.337	1.663
320.0	7.045%11	0.9909	755.9	1776.8	962.6	1.8459	98.986	0.000	0.000	0.142	0.872
340.0	6.690%11	0.9411	758.5	1881.5	1006.8	1.8688	99.004	0.000	0.000	0.060	0.936
360.0	6.098%11	0.8577	760.5	1952.2	1051.3	1.8569	99.003	0.511	0.057	0.025	0.404
380.0	5.367%11	0.7549	761.9	1990.3	1096.2	1.8156	99.000	0.737	0.082	0.011	0.171
400.0	4.593%11	0.6461	762.9	2029.2	1142.3	1.7764	98.996	0.834	0.093	0.005	0.072
420.0	3.850%11	0.5416	763.7	2068.6	1190.8	1.7372	98.988	0.882	0.098	0.002	0.030
440.0	3.184%11	0.4478	764.3	2108.2	1242.8	1.6963	98.864	1.010	0.112	0.001	0.013
460.0	2.614%11	0.3676	764.8	2148.0	1298.5	1.6543	97.803	1.972	0.219	0.000	0.005
480.0	2.143%11	0.3014	765.2	2187.9	1356.5	1.6129	96.278	3.348	0.372	0.000	0.002
500.0	1.763%11	0.2480	765.5	2227.8	1415.7	1.5737	94.749	4.725	0.525	0.000	0.001
520.0	1.461%11	0.2055	765.7	2267.8	1475.3	1.5371	93.232	6.090	0.677	0.000	0.000
540.0	1.223%11	0.1720	765.9	2307.7	1535.2	1.5032	91.722	7.450	0.828	0.000	0.000
560.0	1.036%11	0.1457	766.0	2347.7	1595.1	1.4718	90.209	8.812	0.979	0.000	0.000
580.0	8.893%10	0.1251	766.2	2387.7	1655.1	1.4426	88.685	10.183	1.131	0.000	0.000
600.0	7.738%10	0.1088	766.3	2427.6	1715.0	1.4155	87.137	11.577	1.286	0.000	0.000
620.0	6.824%10	0.0960	766.4	2467.6	1775.0	1.3902	85.548	13.007	1.445	0.000	0.000
640.0	6.098%10	0.0858	766.4	2507.6	1835.0	1.3666	83.902	14.488	1.610	0.000	0.000
660.0	5.517%10	0.0776	766.5	2547.6	1894.9	1.3444	82.181	16.037	1.782	0.000	0.000
680.0	5.049%10	0.0710	766.6	2587.6	1954.9	1.3236	80.373	17.665	1.963	0.000	0.000
700.0	4.670%10	0.0657	766.6	2627.5	2014.9	1.3041	78.472	19.375	2.153	0.000	0.000
720.0	4.362%10	0.0614	766.6	2667.5	2074.8	1.2857	76.485	21.163	2.351	0.000	0.000
740.0	4.110%10	0.0578	766.7	2707.5	2134.8	1.2683	74.429	23.014	2.557	0.000	0.000
760.0	3.902%10	0.0549	766.7	2747.5	2194.8	1.2518	72.325	24.908	2.768	0.000	0.000
780.0	3.730%10	0.0525	766.7	2787.4	2254.7	1.2363	70.199	26.821	2.980	0.000	0.000
800.0	3.588%10	0.0505	766.7	2827.4	2314.7	1.2215	68.074	28.734	3.193	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -51.7 LONGI= 302.2 R= 10 MONTH=12 HOUR= 3.8

CALCULATED VALUES: MLAT= -40.5 MLONG= 9.8
DIP= -48.0 MODIP= -46.8 MAGLA= -29.1 XHI= 90.0
SUNRISE: 3.8 L.T. SUNSET:20.2 L.T. SUN DEC.= -22.9
NMF2=4.44%11 NMF1= 0.00%-01 NME=2.94%10 NMD=4.00%08
HMF2=281.8 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.826%08	6.4%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.100%08	9.2%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.812%09	0.0041	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.133%10	0.0255	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.440%10	0.0550	-1	-1	-1	-1	0.001	0.000	0.000	5.910	94.089
105.0	2.927%10	0.0660	-1	-1	-1	-1	0.002	0.000	0.000	7.935	92.062
110.0	2.848%10	0.0642	-1	-1	-1	-1	0.004	0.000	0.000	10.632	89.364
115.0	2.360%10	0.0532	-1	-1	-1	-1	0.008	0.000	0.000	14.159	85.833
120.0	1.897%10	0.0427	294.7	294.7	294.7	1.0000	0.016	0.000	0.000	18.572	81.412
125.0	1.694%10	0.0382	337.4	355.0	337.4	1.0521	0.031	0.000	0.000	23.544	76.425
130.0	1.772%10	0.0399	378.8	413.9	378.8	1.0929	0.059	0.000	0.000	28.077	71.864
135.0	2.030%10	0.0457	417.3	470.1	417.3	1.1264	0.111	0.000	0.000	31.036	68.853
140.0	2.348%10	0.0529	451.2	521.6	451.2	1.1559	0.210	0.000	0.000	32.271	67.520
150.0	3.019%10	0.0680	504.1	609.6	504.1	1.2093	0.704	0.000	0.000	32.099	67.197
160.0	3.476%10	0.0783	540.9	681.6	540.9	1.2601	2.040	0.000	0.000	31.000	66.960
170.0	4.033%10	0.0909	567.1	743.0	567.1	1.3101	4.568	0.000	0.000	29.795	65.637
180.0	4.729%10	0.1066	586.5	797.6	587.7	1.3571	7.728	0.000	0.000	28.508	63.764
190.0	5.631%10	0.1269	601.4	847.6	608.0	1.3942	10.889	0.000	0.000	26.569	62.541
200.0	6.884%10	0.1551	613.2	894.6	628.2	1.4240	14.130	0.000	0.000	22.138	63.732
210.0	8.948%10	0.2016	622.7	939.3	648.5	1.4485	17.781	0.000	0.000	15.634	66.585
220.0	1.436%11	0.3236	630.5	982.2	668.7	1.4688	22.141	0.000	0.000	10.306	67.552
230.0	2.172%11	0.4893	636.8	1023.8	689.0	1.4859	27.474	0.000	0.000	6.709	65.816
240.0	2.933%11	0.6609	642.1	1064.2	709.2	1.5005	34.052	0.000	0.000	4.360	61.588
260.0	4.081%11	0.9195	650.1	1142.6	749.7	1.5240	52.250	0.000	0.000	1.840	45.910
280.0	4.436%11	0.9996	655.7	1218.5	790.2	1.5419	79.114	0.000	0.000	0.777	20.109
300.0	4.359%11	0.9822	659.6	1292.7	830.7	1.5561	98.000	0.000	0.000	0.328	1.672
320.0	4.111%11	0.9263	662.3	1365.8	871.2	1.5677	99.313	0.000	0.000	0.138	0.548
340.0	3.740%11	0.8427	664.3	1438.1	911.7	1.5775	99.338	0.000	0.000	0.058	0.603
360.0	3.300%11	0.7436	665.7	1491.4	952.0	1.5666	99.337	0.329	0.037	0.025	0.273
380.0	2.842%11	0.6404	666.7	1526.3	992.0	1.5387	99.334	0.486	0.054	0.010	0.115
400.0	2.404%11	0.5416	667.5	1561.5	1031.2	1.5143	99.330	0.555	0.062	0.004	0.049
420.0	2.009%11	0.4526	668.1	1581.2	1068.8	1.4794	99.322	0.590	0.066	0.002	0.021
440.0	1.668%11	0.3758	668.5	1601.1	1104.1	1.4501	99.197	0.714	0.079	0.001	0.009
460.0	1.383%11	0.3117	668.9	1621.0	1136.9	1.4257	98.133	1.677	0.186	0.000	0.004
480.0	1.151%11	0.2593	669.1	1640.9	1168.2	1.4046	96.602	3.056	0.340	0.000	0.002
500.0	9.634%10	0.2171	669.4	1660.9	1198.7	1.3855	95.069	4.437	0.493	0.000	0.001
520.0	8.137%10	0.1834	669.5	1680.9	1228.9	1.3677	93.547	5.807	0.645	0.000	0.000
540.0	6.947%10	0.1565	669.7	1700.9	1259.0	1.3510	92.031	7.172	0.797	0.000	0.000
560.0	6.000%10	0.1352	669.8	1720.9	1289.0	1.3350	90.514	8.538	0.949	0.000	0.000
580.0	5.246%10	0.1182	669.9	1740.9	1319.1	1.3198	88.985	9.914	1.102	0.000	0.000
600.0	4.643%10	0.1046	669.9	1760.9	1349.1	1.3053	87.431	11.312	1.257	0.000	0.000
620.0	4.159%10	0.0937	670.0	1780.9	1379.1	1.2914	85.837	12.747	1.416	0.000	0.000
640.0	3.769%10	0.0849	670.1	1800.9	1409.1	1.2781	84.185	14.233	1.581	0.000	0.000
660.0	3.452%10	0.0778	670.1	1820.9	1439.1	1.2653	82.458	15.788	1.754	0.000	0.000
680.0	3.194%10	0.0720	670.1	1840.9	1469.1	1.2531	80.644	17.421	1.936	0.000	0.000
700.0	2.982%10	0.0672	670.2	1860.9	1499.1	1.2414	78.737	19.137	2.126	0.000	0.000
720.0	2.807%10	0.0632	670.2	1880.9	1529.1	1.2301	76.744	20.931	2.326	0.000	0.000
740.0	2.662%10	0.0600	670.2	1900.9	1559.1	1.2192	74.680	22.788	2.532	0.000	0.000
760.0	2.542%10	0.0573	670.3	1920.9	1589.1	1.2088	72.569	24.688	2.743	0.000	0.000
780.0	2.442%10	0.0550	670.3	1940.9	1619.1	1.1988	70.436	26.608	2.956	0.000	0.000
800.0	2.358%10	0.0531	670.3	1960.9	1649.1	1.1891	68.303	28.527	3.170	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -51.7 LONGI= 302.2 R= 10 MONTH=12 HOUR= 0.0

CALCULATED VALUES: MLAT= -40.5 MLONG= 9.8
DIP= -48.0 MODIP= -46.8 MAGLA= -29.1 XHI= 105.4
SUNRISE: 3.8 L.T. SUNSET:20.2 L.T. SUN DEC.= -22.9
NMF2=5.33%11 NMF1= 0.00%-01 NME=1.78%09 NMD=4.00%08
HMF2=300.6 HMF1= 0.0 HME=105.1 HMD= 87.9

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	1.387%06	2.6%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.677%08	5.0%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.828%08	9.1%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.748%09	0.0033	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.775%09	0.0033	-1	-1	-1	-1	0.001	0.000	0.000	5.910	94.089
105.0	1.775%09	0.0033	-1	-1	-1	-1	0.002	0.000	0.000	7.936	92.062
110.0	1.467%09	0.0028	-1	-1	-1	-1	0.004	0.000	0.000	10.632	89.363
115.0	9.687%08	0.0018	-1	-1	-1	-1	0.008	0.000	0.000	14.159	85.832
120.0	6.258%08	0.0012	294.0	294.0	294.0	1.0000	0.016	0.000	0.000	18.573	81.411
125.0	4.472%08	8.4%-4	336.4	344.4	336.4	1.0239	0.031	0.000	0.000	23.546	76.424
130.0	3.748%08	7.0%-4	377.5	393.6	377.5	1.0426	0.059	0.000	0.000	28.079	71.862
135.0	3.720%08	7.0%-4	415.7	439.9	415.7	1.0580	0.111	0.000	0.000	31.037	68.851
140.0	4.255%08	8.0%-4	449.4	481.5	449.4	1.0716	0.210	0.000	0.000	32.272	67.518
150.0	6.992%08	0.0013	501.7	550.0	501.7	1.0962	0.705	0.000	0.000	32.100	67.195
160.0	1.136%09	0.0021	538.0	602.4	538.0	1.1196	2.042	0.000	0.000	31.000	66.958
170.0	1.760%09	0.0033	563.9	644.3	563.9	1.1426	4.570	0.000	0.000	29.785	65.644
180.0	4.671%09	0.0088	582.9	679.5	582.9	1.1656	7.732	0.000	0.000	28.432	63.835
190.0	1.106%10	0.0208	597.6	710.2	599.2	1.1854	10.895	0.000	0.000	26.086	63.018
200.0	2.455%10	0.0461	609.2	737.9	615.3	1.1992	14.137	0.000	0.000	20.207	65.656
210.0	5.082%10	0.0954	618.5	763.3	631.5	1.2087	17.790	0.000	0.000	12.192	70.018
220.0	9.506%10	0.1785	626.2	787.0	647.7	1.2151	22.152	0.000	0.000	6.630	71.218
230.0	1.576%11	0.2960	632.5	809.4	663.9	1.2192	27.487	0.000	0.000	3.537	68.976
240.0	2.347%11	0.4407	637.6	830.7	680.1	1.2215	34.066	0.000	0.000	1.882	64.051
260.0	3.956%11	0.7428	645.5	870.7	712.4	1.2222	52.267	0.000	0.000	0.533	47.201
280.0	5.026%11	0.9438	651.0	908.4	744.8	1.2197	79.130	0.000	0.000	0.151	20.720
300.0	5.325%11	1.0000	654.8	944.4	777.1	1.2152	98.000	0.000	0.000	0.043	1.957
320.0	5.213%11	0.9790	657.5	979.2	809.4	1.2098	99.285	0.000	0.000	0.012	0.703
340.0	4.892%11	0.9186	659.4	1013.3	841.5	1.2041	99.266	0.405	0.045	0.003	0.280
360.0	4.422%11	0.8303	660.8	1046.9	873.3	1.1987	99.201	0.647	0.072	0.001	0.079
380.0	3.874%11	0.7275	661.8	1080.1	904.2	1.1946	99.095	0.794	0.088	0.000	0.022
400.0	3.312%11	0.6219	662.6	1113.0	932.7	1.1933	98.531	1.316	0.146	0.000	0.006
420.0	2.781%11	0.5223	663.1	1113.8	956.6	1.1644	95.154	4.360	0.484	0.000	0.002
440.0	2.310%11	0.4338	663.6	1114.7	973.4	1.1451	90.703	8.367	0.930	0.000	0.001
460.0	1.908%11	0.3584	663.9	1115.5	983.2	1.1346	86.302	12.328	1.370	0.000	0.000
480.0	1.577%11	0.2961	664.2	1116.3	988.2	1.1296	81.951	16.244	1.805	0.000	0.000
500.0	1.308%11	0.2457	664.4	1117.2	991.0	1.1273	77.609	20.152	2.239	0.000	0.000
520.0	1.094%11	0.2054	664.6	1118.0	992.9	1.1261	73.235	24.088	2.676	0.000	0.000
540.0	9.238%10	0.1735	664.7	1118.9	994.3	1.1252	68.801	28.079	3.120	0.000	0.000
560.0	7.894%10	0.1482	664.8	1119.7	995.7	1.1246	64.296	32.134	3.570	0.000	0.000
580.0	6.831%10	0.1283	664.9	1120.5	997.0	1.1239	59.738	36.235	4.026	0.000	0.000
600.0	5.989%10	0.1125	665.0	1121.4	998.2	1.1234	55.177	40.340	4.482	0.000	0.000
620.0	5.318%10	0.0999	665.0	1122.2	999.5	1.1228	50.681	44.387	4.932	0.000	0.000
640.0	4.781%10	0.0898	665.1	1123.1	1000.8	1.1222	46.325	48.308	5.368	0.000	0.000
660.0	4.348%10	0.0817	665.1	1123.9	1002.0	1.1216	42.173	52.044	5.783	0.000	0.000
680.0	3.999%10	0.0751	665.2	1124.7	1003.3	1.1211	38.274	55.553	6.173	0.000	0.000
700.0	3.714%10	0.0697	665.2	1125.6	1004.5	1.1205	34.655	58.811	6.535	0.000	0.000
720.0	3.481%10	0.0654	665.2	1126.4	1005.8	1.1199	31.325	61.808	6.868	0.000	0.000
740.0	3.289%10	0.0618	665.3	1127.3	1007.1	1.1194	28.281	64.547	7.172	0.000	0.000
760.0	3.131%10	0.0588	665.3	1128.1	1008.3	1.1188	25.512	67.039	7.449	0.000	0.000
780.0	2.999%10	0.0563	665.3	1128.9	1009.6	1.1182	23.001	69.299	7.700	0.000	0.000
800.0	2.890%10	0.0543	665.3	1129.8	1010.8	1.1177	20.729	71.344	7.927	0.000	0.000

WE PUT B1= 4.5TO GET HST

INPUT: LATI= -51.7 LONGI= 302.2 R=100 MONTH= 3 HOUR=12.0

CALCULATED VALUES: MLAT= -40.5 MLONG= 9.8
DIP= -48.0 MODIP= -46.8 MAGLA= -29.1 XHI= 48.4
SUNRISE: 5.7 L.T. SUNSET:18.3 L.T. SUN DEC.= -3.3
NMF2=1.39%12 NMF1= 3.13% 11 NME=1.42%11 NMD=1.10%09
HMF2=308.4 HMF1=204.1 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	1.047%09	7.5%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.186%09	0.0016	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	2.115%10	0.0152	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	7.195%10	0.0516	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.212%11	0.0870	-1	-1	-1	-1	0.322	0.000	0.000	52.538	47.140
105.0	1.404%11	0.1007	-1	-1	-1	-1	0.488	0.000	0.000	51.642	47.870
110.0	1.423%11	0.1021	-1	-1	-1	-1	0.739	0.000	0.000	50.691	48.570
115.0	1.381%11	0.0991	-1	-1	-1	-1	1.118	0.000	0.000	49.587	49.295
120.0	1.361%11	0.0976	336.1	336.1	336.1	1.0000	1.690	0.000	0.000	48.130	50.180
125.0	1.419%11	0.1018	394.5	414.2	394.5	1.0499	2.552	0.000	0.000	46.068	51.380
130.0	1.428%11	0.1025	451.6	491.0	451.6	1.0872	3.844	0.000	0.000	43.337	52.819
135.0	1.435%11	0.1030	506.6	565.7	506.6	1.1166	5.771	0.000	0.000	40.201	54.028
140.0	1.444%11	0.1036	558.2	637.0	558.2	1.1412	8.609	0.000	0.000	37.000	54.391
150.0	1.469%11	0.1054	647.7	765.9	647.7	1.1824	18.448	0.000	0.000	31.049	50.502
160.0	1.511%11	0.1084	719.2	876.8	719.2	1.2191	35.534	0.000	0.000	25.777	38.689
170.0	1.579%11	0.1133	775.6	972.6	775.6	1.2540	56.596	0.000	0.000	20.552	22.852
180.0	1.707%11	0.1225	820.5	1056.9	820.5	1.2881	72.988	0.000	0.000	15.185	11.826
190.0	2.114%11	0.1517	856.8	1132.5	856.8	1.3218	81.759	0.000	0.000	10.780	7.462
200.0	3.004%11	0.2155	886.5	1201.6	886.5	1.3555	85.877	0.000	0.000	7.590	6.533
210.0	4.260%11	0.3057	911.0	1265.6	911.0	1.3892	88.060	0.000	0.000	5.338	6.602
220.0	6.175%11	0.4431	931.4	1325.3	931.4	1.4229	89.554	0.000	0.000	3.753	6.692
230.0	8.071%11	0.5791	948.4	1381.7	948.4	1.4569	90.823	0.000	0.000	2.639	6.538
240.0	9.750%11	0.6996	962.6	1435.3	962.6	1.4911	92.025	0.000	0.000	1.856	6.119
260.0	1.214%12	0.8714	984.2	1535.7	988.0	1.5543	94.409	0.000	0.000	0.917	4.673
280.0	1.339%12	0.9608	999.3	1629.6	1013.5	1.6079	96.763	0.000	0.000	0.454	2.783
300.0	1.389%12	0.9967	1009.9	1719.0	1039.0	1.6544	98.000	0.000	0.000	0.224	1.776
320.0	1.385%12	0.9936	1017.4	1805.3	1064.6	1.6957	98.077	0.000	0.000	0.111	1.812
340.0	1.331%12	0.9548	1022.7	1889.4	1090.3	1.7329	98.077	0.492	0.055	0.055	1.321
360.0	1.236%12	0.8869	1026.6	1949.4	1116.4	1.7461	98.075	1.120	0.124	0.027	0.653
380.0	1.115%12	0.7997	1029.5	1987.4	1143.6	1.7378	98.073	1.432	0.159	0.013	0.323
400.0	9.802%11	0.7033	1031.6	2026.2	1173.3	1.7270	98.069	1.588	0.176	0.007	0.160
420.0	8.451%11	0.6064	1033.2	2065.5	1208.1	1.7097	98.061	1.671	0.186	0.003	0.079
440.0	7.181%11	0.5152	1034.4	2105.0	1250.7	1.6830	97.938	1.820	0.202	0.002	0.039
460.0	6.044%11	0.4337	1035.3	2144.7	1301.2	1.6483	96.887	2.784	0.309	0.001	0.019
480.0	5.062%11	0.3632	1036.1	2184.4	1356.7	1.6101	95.376	4.153	0.461	0.000	0.010
500.0	4.237%11	0.3040	1036.7	2224.2	1414.8	1.5721	93.862	5.520	0.613	0.000	0.005
520.0	3.555%11	0.2551	1037.1	2264.1	1474.0	1.5360	92.359	6.875	0.764	0.000	0.002
540.0	3.000%11	0.2153	1037.5	2303.9	1533.5	1.5024	90.862	8.223	0.914	0.000	0.001
560.0	2.550%11	0.1830	1037.8	2343.7	1593.2	1.4711	89.364	9.572	1.064	0.000	0.001
580.0	2.188%11	0.1570	1038.1	2383.6	1652.9	1.4420	87.855	10.931	1.215	0.000	0.000
600.0	1.896%11	0.1360	1038.3	2423.4	1712.7	1.4150	86.321	12.311	1.368	0.000	0.000
620.0	1.660%11	0.1191	1038.4	2463.3	1772.5	1.3897	84.747	13.728	1.525	0.000	0.000
640.0	1.469%11	0.1054	1038.6	2503.1	1832.2	1.3662	83.116	15.196	1.688	0.000	0.000
660.0	1.314%11	0.0943	1038.7	2543.0	1892.0	1.3441	81.411	16.730	1.859	0.000	0.000
680.0	1.188%11	0.0852	1038.8	2582.8	1951.8	1.3233	79.620	18.342	2.038	0.000	0.000
700.0	1.084%11	0.0778	1038.9	2622.7	2011.6	1.3038	77.737	20.037	2.226	0.000	0.000
720.0	9.989%10	0.0717	1039.0	2662.5	2071.3	1.2854	75.769	21.808	2.423	0.000	0.000
740.0	9.282%10	0.0666	1039.1	2702.4	2131.1	1.2681	73.732	23.642	2.627	0.000	0.000
760.0	8.693%10	0.0624	1039.1	2742.2	2190.9	1.2516	71.647	25.517	2.835	0.000	0.000
780.0	8.200%10	0.0588	1039.2	2782.1	2250.7	1.2361	69.541	27.413	3.046	0.000	0.000
800.0	7.787%10	0.0559	1039.2	2821.9	2310.5	1.2214	67.436	29.308	3.256	0.000	0.000

WE PUT BI= 3.0TU GET HST

INPUT: LATI= -51.7 LONGI= 302.2 R=100 MONTH= 3 HOUR= 5.7

CALCULATED VALUES: MLAT= -40.5 MLONG= 9.8
DIP= -48.0 MODIP= -46.8 MAGLA= -29.1 XHI= 90.0
SUNRISE: 5.7 L.T. SUNSET:18.3 L.T. SUN DEC.= -3.3
NMF2=3.94%11 NMF1= 0.00%-01 NME=3.90%10 NMD=4.00%08
HMF2=336.1 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RO0+	RO1H+	RO1HE+	RO02+	RONO+
80.0	2.826%08	7.2%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.100%08	0.0010	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.818%09	0.0046	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.245%10	0.0316	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.024%10	0.0767	-1	-1	-1	-1	0.012	0.000	0.000	18.280	81.709
105.0	3.864%10	0.0981	-1	-1	-1	-1	0.019	0.000	0.000	21.000	78.981
110.0	3.776%10	0.0958	-1	-1	-1	-1	0.030	0.000	0.000	24.062	75.907
115.0	3.127%10	0.0794	-1	-1	-1	-1	0.049	0.000	0.000	27.391	72.560
120.0	2.514%10	0.0638	323.5	323.5	323.5	1.0000	0.079	0.000	0.000	30.722	69.199
125.0	2.247%10	0.0570	377.1	390.1	377.1	1.0345	0.127	0.000	0.000	33.556	66.317
130.0	2.348%10	0.0596	429.4	455.4	429.4	1.0606	0.205	0.000	0.000	35.464	64.331
135.0	2.682%10	0.0681	479.3	518.3	479.3	1.0814	0.330	0.000	0.000	36.497	63.174
140.0	3.093%10	0.0785	525.3	577.4	525.3	1.0990	0.530	0.000	0.000	37.000	62.470
150.0	4.040%10	0.1025	602.8	680.9	602.8	1.1294	1.364	0.000	0.000	37.333	61.303
160.0	4.383%10	0.1112	662.1	766.1	662.1	1.1571	3.437	0.000	0.000	36.738	59.825
170.0	4.769%10	0.1210	707.2	837.2	707.2	1.1838	8.184	0.000	0.000	32.734	59.082
180.0	5.210%10	0.1322	742.3	898.3	742.3	1.2102	17.092	0.000	0.000	24.187	58.721
190.0	5.719%10	0.1452	770.0	952.1	770.0	1.2364	28.794	0.000	0.000	16.193	55.013
200.0	6.320%10	0.1604	792.5	1000.5	792.5	1.2625	39.129	0.000	0.000	10.626	50.246
210.0	7.049%10	0.1789	810.8	1044.9	810.8	1.2886	46.642	0.000	0.000	6.952	46.406
220.0	7.977%10	0.2025	826.0	1086.0	826.0	1.3148	52.531	0.000	0.000	4.547	42.922
230.0	9.287%10	0.2357	838.6	1124.6	839.0	1.3404	57.951	0.000	0.000	2.973	39.076
240.0	1.195%11	0.3032	849.0	1161.0	851.7	1.3631	63.480	0.000	0.000	1.945	34.575
260.0	2.051%11	0.5205	864.9	1229.0	877.2	1.4009	75.747	0.000	0.000	0.832	23.422
280.0	2.912%11	0.7391	876.0	1292.0	902.8	1.4312	89.778	0.000	0.000	0.356	9.867
300.0	3.555%11	0.9022	883.8	1351.8	928.3	1.4562	98.000	0.000	0.000	0.152	1.848
320.0	3.878%11	0.9842	889.2	1409.3	953.8	1.4775	98.535	0.000	0.000	0.065	1.400
340.0	3.938%11	0.9994	893.1	1465.2	979.4	1.4960	98.545	0.000	0.000	0.028	1.428
360.0	3.856%11	0.9786	896.0	1506.3	1005.0	1.4989	98.543	0.739	0.082	0.012	0.624
380.0	3.670%11	0.9314	898.1	1533.8	1030.7	1.4881	98.540	1.069	0.119	0.005	0.267
400.0	3.406%11	0.8644	899.6	1561.5	1056.8	1.4776	98.537	1.212	0.135	0.002	0.114
420.0	3.093%11	0.7851	900.8	1581.2	1083.5	1.4593	98.528	1.280	0.142	0.001	0.049
440.0	2.761%11	0.7008	901.7	1601.1	1111.3	1.4407	98.405	1.417	0.157	0.000	0.021
460.0	2.433%11	0.6175	902.3	1621.0	1140.1	1.4218	97.349	2.378	0.264	0.000	0.009
480.0	2.126%11	0.5395	902.9	1640.9	1169.5	1.4031	95.830	3.749	0.417	0.000	0.004
500.0	1.848%11	0.4691	903.3	1660.9	1199.3	1.3849	94.309	5.120	0.569	0.000	0.002
520.0	1.606%11	0.4075	903.7	1680.9	1229.2	1.3675	92.799	6.480	0.720	0.000	0.001
540.0	1.397%11	0.3546	903.9	1700.9	1259.2	1.3508	91.296	7.834	0.870	0.000	0.000
560.0	1.221%11	0.3100	904.2	1720.9	1289.2	1.3349	89.790	9.189	1.021	0.000	0.000
580.0	1.074%11	0.2726	904.3	1740.9	1319.2	1.3197	88.273	10.554	1.173	0.000	0.000
600.0	9.514%10	0.2415	904.5	1760.9	1349.2	1.3052	86.732	11.941	1.327	0.000	0.000
620.0	8.498%10	0.2157	904.6	1780.9	1379.2	1.2913	85.151	13.364	1.485	0.000	0.000
640.0	7.656%10	0.1943	904.7	1800.9	1409.2	1.2780	83.512	14.839	1.649	0.000	0.000
660.0	6.959%10	0.1766	904.8	1820.9	1439.2	1.2652	81.799	16.381	1.820	0.000	0.000
680.0	6.380%10	0.1619	904.9	1840.9	1469.2	1.2530	79.999	18.001	2.000	0.000	0.000
700.0	5.899%10	0.1497	905.0	1860.9	1499.2	1.2413	78.108	19.703	2.189	0.000	0.000
720.0	5.498%10	0.1395	905.0	1880.9	1529.2	1.2300	76.130	21.483	2.387	0.000	0.000
740.0	5.162%10	0.1310	905.1	1900.9	1559.2	1.2192	74.083	23.325	2.592	0.000	0.000
760.0	4.880%10	0.1239	905.1	1920.9	1589.2	1.2087	71.989	25.210	2.801	0.000	0.000
780.0	4.643%10	0.1178	905.1	1940.9	1619.2	1.1987	69.873	27.114	3.013	0.000	0.000
800.0	4.442%10	0.1127	905.2	1960.9	1649.2	1.1890	67.758	29.018	3.224	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -51.7 LONGI= 302.2 R=100 MONTH= 3 HOUR= 0.0

CALCULATED VALUES: NLAT= -40.5 MLONG= 9.8
DIP= -48.0 MODIP= -46.8 MAGLA= -29.1 XHI= 125.0
SUNRISE: 5.7 L.T. SUNSET:18.3 L.T. SUN DEC.= -3.3
NMF2=4.28%11 NMF1= 0.00%-01 NME=3.20%09 NMD=4.00%08
HMF2=410.2 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	5.771%05	1.3%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.487%08	5.8%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.735%08	0.0011	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	2.511%09	0.0059	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.193%09	0.0075	-1	-1	-1	-1	0.012	0.000	0.000	18.280	81.709
105.0	3.201%09	0.0075	-1	-1	-1	-1	0.019	0.000	0.000	21.000	78.981
110.0	2.618%09	0.0061	-1	-1	-1	-1	0.030	0.000	0.000	24.062	75.907
115.0	1.707%09	0.0040	-1	-1	-1	-1	0.049	0.000	0.000	27.391	72.560
120.0	1.087%09	0.0025	321.9	321.9	321.9	1.0000	0.079	0.000	0.000	30.722	69.199
125.0	7.663%08	0.0018	374.9	378.7	374.9	1.0101	0.127	0.000	0.000	33.556	66.317
130.0	6.346%08	0.0015	426.5	434.1	426.5	1.0178	0.205	0.000	0.000	35.464	64.331
135.0	6.245%08	0.0015	475.9	487.2	475.9	1.0239	0.330	0.000	0.000	36.497	63.174
140.0	7.120%08	0.0017	521.2	536.3	521.2	1.0291	0.530	0.000	0.000	37.000	62.470
150.0	1.182%09	0.0028	597.2	619.9	597.2	1.0381	1.365	0.000	0.000	37.333	61.302
160.0	1.962%09	0.0046	655.0	685.3	655.0	1.0463	3.439	0.000	0.000	36.738	59.823
170.0	3.030%09	0.0071	698.8	736.7	698.8	1.0542	8.188	0.000	0.000	32.734	59.078
180.0	3.767%09	0.0088	732.7	778.2	732.7	1.0620	17.101	0.000	0.000	24.187	58.712
190.0	4.523%09	0.0106	759.6	812.6	759.6	1.0698	28.809	0.000	0.000	16.193	54.998
200.0	5.451%09	0.0127	781.2	841.8	781.2	1.0776	39.149	0.000	0.000	10.626	50.226
210.0	6.598%09	0.0154	798.9	867.1	798.9	1.0853	46.665	0.000	0.000	6.952	46.383
220.0	8.029%09	0.0188	813.5	889.3	813.5	1.0931	52.556	0.000	0.000	4.547	42.898
230.0	9.832%09	0.0230	825.6	908.9	825.6	1.1009	57.977	0.000	0.000	2.973	39.050
240.0	1.214%10	0.0284	835.6	926.5	835.6	1.1088	63.506	0.000	0.000	1.945	34.549
260.0	1.916%10	0.0448	851.0	957.0	851.8	1.1236	75.771	0.000	0.000	0.832	23.397
280.0	3.312%10	0.0774	861.6	982.8	867.3	1.1332	89.795	0.000	0.000	0.356	9.849
300.0	7.504%10	0.1754	869.1	1005.4	882.8	1.1389	98.000	0.000	0.000	0.152	1.848
320.0	1.527%11	0.3569	874.3	1025.8	898.3	1.1420	98.507	0.000	0.000	0.065	1.428
340.0	2.490%11	0.5822	878.1	1044.7	913.7	1.1435	98.473	0.761	0.085	0.028	0.653
360.0	3.386%11	0.7918	880.8	1062.6	928.9	1.1439	98.409	1.170	0.130	0.012	0.279
380.0	3.994%11	0.9338	882.8	1079.8	943.7	1.1442	98.303	1.415	0.157	0.005	0.119
400.0	4.252%11	0.9941	884.3	1096.4	957.3	1.1453	97.744	1.983	0.220	0.002	0.051
420.0	4.259%11	0.9958	885.4	1096.5	968.7	1.1320	94.393	5.026	0.558	0.001	0.022
440.0	4.117%11	0.9627	886.3	1096.7	976.5	1.1230	89.978	9.011	1.001	0.000	0.009
460.0	3.859%11	0.9024	886.9	1096.8	980.9	1.1182	85.613	12.945	1.438	0.000	0.004
480.0	3.524%11	0.8238	887.4	1096.9	983.0	1.1159	81.296	16.832	1.870	0.000	0.002
500.0	3.150%11	0.7364	887.9	1097.0	983.9	1.1150	76.989	20.710	2.301	0.000	0.001
520.0	2.772%11	0.6481	888.2	1097.2	984.4	1.1146	72.650	24.615	2.735	0.000	0.000
540.0	2.416%11	0.5648	888.5	1097.3	984.7	1.1144	68.251	28.574	3.175	0.000	0.000
560.0	2.095%11	0.4898	888.7	1097.4	984.9	1.1142	63.782	32.596	3.622	0.000	0.000
580.0	1.816%11	0.4247	888.8	1097.6	985.1	1.1141	59.261	36.665	4.074	0.000	0.000
600.0	1.580%11	0.3693	889.0	1097.7	985.3	1.1140	54.736	40.737	4.526	0.000	0.000
620.0	1.382%11	0.3232	889.1	1097.8	985.5	1.1139	50.276	44.751	4.972	0.000	0.000
640.0	1.219%11	0.2850	889.2	1098.0	985.7	1.1138	45.955	48.641	5.405	0.000	0.000
660.0	1.085%11	0.2537	889.3	1098.1	985.9	1.1138	41.836	52.347	5.816	0.000	0.000
680.0	9.754%10	0.2281	889.4	1098.2	986.1	1.1137	37.968	55.828	6.203	0.000	0.000
700.0	8.857%10	0.2071	889.4	1098.4	986.3	1.1136	34.378	59.060	6.562	0.000	0.000
720.0	8.123%10	0.1899	889.5	1098.5	986.5	1.1135	31.074	62.033	6.893	0.000	0.000
740.0	7.520%10	0.1758	889.5	1098.6	986.7	1.1134	28.055	64.750	7.194	0.000	0.000
760.0	7.024%10	0.1642	889.6	1098.7	986.9	1.1133	25.308	67.223	7.469	0.000	0.000
780.0	6.615%10	0.1547	889.6	1098.9	987.1	1.1132	22.817	69.464	7.718	0.000	0.000
800.0	6.277%10	0.1468	889.7	1099.0	987.3	1.1131	20.564	71.493	7.944	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -51.7 LONGI= 302.2 R=100 MONTH= 6 HOUR=12.0

CALCULATED VALUES: MLAT= -40.5 MLONG= 9.8
DIP= -48.0 MODIP= -46.8 MAGLA= -29.1 XHI= 74.8
SUNRISE: 8.2 L.T. SUNSET:15.8 L.T. SUN DEC.= 23.1
NMF2=8.27%11 NMF1= 0.00%-01 NME=8.93%10 NMD=4.00%08
HMF2=309.5 HMF1= 0.0 HME=109.8 HMD= 81.3

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	3.761%08	4.5%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	7.129%08	8.6%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	7.542%09	0.0091	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	3.251%10	0.0393	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	6.721%10	0.0813	-1	-1	-1	-1	0.050	0.000	0.000	28.639	71.310
105.0	8.656%10	0.1047	-1	-1	-1	-1	0.084	0.000	0.000	31.196	68.720
110.0	8.933%10	0.1081	-1	-1	-1	-1	0.139	0.000	0.000	33.963	65.898
115.0	8.321%10	0.1007	-1	-1	-1	-1	0.232	0.000	0.000	36.921	62.847
120.0	7.910%10	0.0957	331.4	331.4	331.4	1.0000	0.385	0.000	0.000	39.985	59.630
125.0	8.582%10	0.1038	388.1	408.1	388.1	1.0516	0.639	0.000	0.000	42.899	56.462
130.0	9.403%10	0.1137	443.3	483.4	443.3	1.0904	1.059	0.000	0.000	45.108	53.833
135.0	9.970%10	0.1206	496.5	556.6	496.5	1.1211	1.751	0.000	0.000	45.888	52.361
140.0	1.059%11	0.1280	546.0	626.2	546.0	1.1468	2.884	0.000	0.000	45.000	52.116
150.0	1.198%11	0.1450	631.0	751.3	631.0	1.1906	7.621	0.000	0.000	40.423	51.956
160.0	1.368%11	0.1654	697.8	858.1	697.8	1.2298	18.578	0.000	0.000	34.804	46.618
170.0	1.579%11	0.1909	749.8	950.2	749.8	1.2673	38.011	0.000	0.000	27.273	34.716
180.0	1.856%11	0.2245	790.8	1031.3	790.8	1.3041	59.970	0.000	0.000	16.243	23.787
190.0	2.269%11	0.2745	823.7	1104.3	823.7	1.3406	75.067	0.000	0.000	7.561	17.373
200.0	2.939%11	0.3555	850.5	1171.1	850.5	1.3770	82.614	0.000	0.000	3.284	14.101
210.0	3.687%11	0.4460	872.5	1233.2	872.5	1.4135	86.230	0.000	0.000	1.411	12.359
220.0	4.467%11	0.5404	890.8	1291.6	890.8	1.4500	88.317	0.000	0.000	0.605	11.078
230.0	5.242%11	0.6341	905.9	1346.9	906.0	1.4865	89.875	0.000	0.000	0.260	9.865
240.0	5.973%11	0.7225	918.6	1399.6	920.5	1.5204	91.267	0.000	0.000	0.111	8.622
260.0	7.179%11	0.8684	937.9	1499.1	949.5	1.5788	93.959	0.000	0.000	0.020	6.020
280.0	7.931%11	0.9594	951.4	1592.7	978.5	1.6277	96.607	0.000	0.000	0.004	3.389
300.0	8.239%11	0.9966	960.8	1682.3	1007.5	1.6698	98.000	0.000	0.000	0.001	1.999
320.0	8.228%11	0.9953	967.5	1769.1	1036.6	1.7067	98.087	0.000	0.000	0.000	1.913
340.0	7.949%11	0.9615	972.2	1854.0	1065.7	1.7397	98.087	0.951	0.106	0.000	0.856
360.0	7.445%11	0.9006	975.7	1914.1	1095.2	1.7477	98.086	1.581	0.176	0.000	0.157
380.0	6.786%11	0.8209	978.2	1951.4	1125.6	1.7336	98.083	1.699	0.189	0.000	0.029
400.0	6.044%11	0.7311	980.1	1989.5	1158.1	1.7179	98.079	1.724	0.192	0.000	0.005
420.0	5.285%11	0.6392	981.5	2027.2	1194.8	1.6966	98.071	1.735	0.193	0.000	0.001
440.0	4.558%11	0.5514	982.6	2065.1	1238.0	1.6681	97.948	1.847	0.205	0.000	0.000
460.0	3.896%11	0.4713	983.4	2103.3	1287.7	1.6333	96.897	2.793	0.310	0.000	0.000
480.0	3.315%11	0.4010	984.1	2141.4	1341.6	1.5961	95.386	4.153	0.461	0.000	0.000
500.0	2.817%11	0.3408	984.6	2179.7	1397.7	1.5595	93.872	5.516	0.613	0.000	0.000
520.0	2.400%11	0.2903	985.0	2217.9	1454.5	1.5248	92.369	6.868	0.763	0.000	0.000
540.0	2.054%11	0.2485	985.3	2256.2	1511.8	1.4924	90.872	8.215	0.913	0.000	0.000
560.0	1.770%11	0.2141	985.6	2294.5	1569.1	1.4623	89.373	9.564	1.063	0.000	0.000
580.0	1.538%11	0.1860	985.8	2332.7	1626.5	1.4342	87.864	10.923	1.214	0.000	0.000
600.0	1.348%11	0.1631	986.0	2371.0	1683.9	1.4080	86.329	12.303	1.367	0.000	0.000
620.0	1.193%11	0.1444	986.2	2409.3	1741.3	1.3836	84.756	13.720	1.524	0.000	0.000
640.0	1.067%11	0.1290	986.3	2447.6	1798.7	1.3607	83.125	15.188	1.688	0.000	0.000
660.0	9.629%10	0.1165	986.4	2485.8	1856.2	1.3392	81.420	16.722	1.858	0.000	0.000
680.0	8.774%10	0.1061	986.5	2524.1	1913.6	1.3191	79.628	18.335	2.037	0.000	0.000
700.0	8.067%10	0.0976	986.6	2562.4	1971.0	1.3000	77.745	20.029	2.225	0.000	0.000
720.0	7.481%10	0.0905	986.7	2600.7	2028.4	1.2821	75.777	21.801	2.422	0.000	0.000
740.0	6.991%10	0.0846	986.7	2639.0	2085.9	1.2652	73.739	23.635	2.626	0.000	0.000
760.0	6.582%10	0.0796	986.8	2677.2	2143.3	1.2491	71.655	25.511	2.835	0.000	0.000
780.0	6.238%10	0.0755	986.8	2715.5	2200.7	1.2339	69.549	27.406	3.045	0.000	0.000
800.0	5.948%10	0.0719	986.9	2753.8	2258.1	1.2195	67.443	29.301	3.256	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -51.7 LONGI= 302.2 R=100 MONTH= 6 HOUR= 8.2

CALCULATED VALUES: MLAT= -40.5 MLONG= 9.8
DIP= -48.0 MODIP= -46.8 MAGLA= -29.1 XHI= 90.0
SUNRISE: 8.2 L.T. SUNSET:15.8 L.T. SUN DEC.= 23.1
NMF2=3.95%11 NMF1= 0.00%-01 NME=4.27%10 NMD=4.00%08
HMF2=323.7 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.824%08	7.1%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.099%08	0.0010	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.817%09	0.0046	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.279%10	0.0324	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.230%10	0.0817	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	4.221%10	0.1068	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	4.126%10	0.1044	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	3.382%10	0.0856	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	2.676%10	0.0677	323.4	323.4	323.4	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	2.368%10	0.0599	377.0	389.9	377.0	1.0343	0.084	0.000	0.000	36.294	63.621
130.0	2.485%10	0.0629	429.2	455.1	429.2	1.0603	0.161	0.000	0.000	40.716	59.123
135.0	2.875%10	0.0727	479.2	518.0	479.2	1.0810	0.307	0.000	0.000	43.939	55.754
140.0	3.355%10	0.0849	525.2	577.0	525.2	1.0986	0.584	0.000	0.000	45.000	54.416
150.0	4.507%10	0.1140	602.6	680.3	602.6	1.1289	2.074	0.000	0.000	41.880	56.046
160.0	5.064%10	0.1281	661.8	765.4	661.8	1.1565	6.909	0.000	0.000	36.631	56.461
170.0	5.723%10	0.1448	706.9	836.3	706.9	1.1831	19.661	0.000	0.000	30.703	49.636
180.0	6.519%10	0.1650	741.9	897.2	741.9	1.2094	41.885	0.000	0.000	21.641	36.474
190.0	7.513%10	0.1901	769.6	950.8	769.6	1.2355	63.787	0.000	0.000	10.559	25.653
200.0	8.823%10	0.2233	792.0	999.1	792.0	1.2615	76.967	0.000	0.000	4.137	18.896
210.0	1.079%11	0.2730	810.4	1043.4	810.4	1.2875	83.288	0.000	0.000	1.545	15.167
220.0	1.413%11	0.3576	825.5	1084.4	825.5	1.3136	86.496	0.000	0.000	0.573	12.931
230.0	1.791%11	0.4532	838.0	1122.8	838.5	1.3391	88.560	0.000	0.000	0.212	11.228
240.0	2.185%11	0.5528	848.5	1159.1	851.2	1.3617	90.243	0.000	0.000	0.079	9.679
260.0	2.933%11	0.7423	864.4	1226.8	876.8	1.3992	93.359	0.000	0.000	0.011	6.630
280.0	3.510%11	0.8882	875.4	1289.6	902.4	1.4292	96.398	0.000	0.000	0.001	3.600
300.0	3.841%11	0.9721	883.2	1349.2	927.9	1.4540	98.000	0.000	0.000	0.000	2.000
320.0	3.950%11	0.9995	888.6	1406.4	953.5	1.4750	98.100	0.000	0.000	0.000	1.900
340.0	3.913%11	0.9901	892.5	1462.1	979.1	1.4933	98.101	1.044	0.116	0.000	0.739
360.0	3.766%11	0.9530	895.4	1503.7	1004.7	1.4966	98.099	1.620	0.180	0.000	0.101
380.0	3.531%11	0.8936	897.4	1532.3	1030.5	1.4869	98.096	1.701	0.189	0.000	0.014
400.0	3.236%11	0.8190	899.0	1561.1	1056.6	1.4775	98.093	1.715	0.191	0.000	0.002
420.0	2.910%11	0.7365	900.1	1580.8	1083.4	1.4591	98.084	1.724	0.192	0.000	0.000
440.0	2.579%11	0.6526	901.0	1600.6	1111.1	1.4405	97.961	1.835	0.204	0.000	0.000
460.0	2.261%11	0.5722	901.7	1620.5	1139.9	1.4216	96.910	2.781	0.309	0.000	0.000
480.0	1.970%11	0.4985	902.3	1640.4	1169.3	1.4029	95.399	4.141	0.460	0.000	0.000
500.0	1.711%11	0.4331	902.7	1660.4	1199.1	1.3847	93.884	5.504	0.612	0.000	0.000
520.0	1.487%11	0.3763	903.0	1680.3	1229.0	1.3673	92.381	6.857	0.762	0.000	0.000
540.0	1.296%11	0.3280	903.3	1700.3	1258.9	1.3506	90.884	8.204	0.912	0.000	0.000
560.0	1.135%11	0.2873	903.5	1720.3	1288.9	1.3347	89.386	9.553	1.061	0.000	0.000
580.0	1.001%11	0.2533	903.7	1740.2	1318.8	1.3195	87.876	10.912	1.212	0.000	0.000
600.0	8.895%10	0.2251	903.9	1760.2	1348.8	1.3050	86.341	12.293	1.366	0.000	0.000
620.0	7.969%10	0.2017	904.0	1780.2	1378.8	1.2912	84.767	13.709	1.523	0.000	0.000
640.0	7.201%10	0.1822	904.1	1800.2	1408.7	1.2779	83.136	15.178	1.686	0.000	0.000
660.0	6.563%10	0.1661	904.2	1820.2	1438.7	1.2651	81.431	16.712	1.857	0.000	0.000
680.0	6.032%10	0.1527	904.3	1840.1	1468.7	1.2529	79.639	18.325	2.036	0.000	0.000
700.0	5.590%10	0.1415	904.3	1860.1	1498.7	1.2412	77.756	20.020	2.224	0.000	0.000
720.0	5.220%10	0.1321	904.4	1880.1	1528.6	1.2299	75.787	21.791	2.421	0.000	0.000
740.0	4.909%10	0.1242	904.4	1900.1	1558.6	1.2191	73.749	23.626	2.625	0.000	0.000
760.0	4.648%10	0.1176	904.5	1920.1	1588.6	1.2087	71.665	25.502	2.834	0.000	0.000
780.0	4.428%10	0.1120	904.5	1940.0	1618.5	1.1986	69.558	27.398	3.044	0.000	0.000
800.0	4.241%10	0.1073	904.5	1960.0	1648.5	1.1890	67.452	29.293	3.255	0.000	0.000

WE PUT 01= 3.0TU GET HST

INPUT: LATI= -51.7 LONGI= 302.2 F=100 MONTH= 6 HOUR= 0.0

CALCULATED VALUES: GLAT= -40.5 MLONG= 9.8
DIP= -48.0 MODIP= -46.8 MAGLA= -29.1 XHI= 151.4
SUNRISE: 8.2 L.T. SUNSET:15.8 L.T. SUN DEC.= 23.1
NMF2=1.29%11 NMF1= 0.00%-01 NME=3.20%09 NMD=4.00%08
HMF2=319.8 HMF1= 0.0 HME=105.0 HMD= 88.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	4.901%05	3.8%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.453%08	0.0019	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.720%08	0.0037	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	2.503%09	0.0194	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.193%09	0.0248	-1	-1	-1	-1	0.003	0.000	0.000	17.568	82.429
105.0	3.201%09	0.0248	-1	-1	-1	-1	0.006	0.000	0.000	20.399	79.595
110.0	2.613%09	0.0203	-1	-1	-1	-1	0.012	0.000	0.000	23.675	76.313
115.0	1.700%09	0.0132	-1	-1	-1	-1	0.023	0.000	0.000	27.442	72.535
120.0	1.080%09	0.0084	318.2	318.2	318.2	1.0000	0.044	0.000	0.000	31.698	68.258
125.0	7.594%08	0.0059	369.8	374.2	369.8	1.0117	0.084	0.000	0.000	36.294	63.621
130.0	6.276%08	0.0049	420.1	428.8	420.1	1.0206	0.161	0.000	0.000	40.716	59.123
135.0	6.167%08	0.0048	467.9	481.0	467.9	1.0278	0.307	0.000	0.000	43.939	55.754
140.0	7.027%08	0.0055	511.7	529.0	511.7	1.0339	0.584	0.000	0.000	45.000	54.416
150.0	1.168%09	0.0091	584.3	610.4	584.3	1.0445	2.075	0.000	0.000	41.880	56.044
160.0	1.948%09	0.0151	638.9	673.6	638.9	1.0543	6.912	0.000	0.000	36.631	56.457
170.0	3.007%09	0.0233	679.9	723.3	679.9	1.0638	19.672	0.000	0.000	30.703	49.625
180.0	7.632%09	0.0592	711.4	763.5	711.4	1.0732	41.907	0.000	0.000	21.641	36.451
190.0	1.428%10	0.1108	736.3	797.0	736.3	1.0825	63.821	0.000	0.000	10.559	25.620
200.0	2.229%10	0.1730	756.2	825.6	756.2	1.0918	77.006	0.000	0.000	4.137	18.857
210.0	3.194%10	0.2479	772.5	850.6	772.5	1.1011	83.329	0.000	0.000	1.545	15.125
220.0	4.345%10	0.3373	785.9	872.6	785.9	1.1104	86.537	0.000	0.000	0.573	12.890
230.0	5.635%10	0.4374	797.0	892.4	797.0	1.1197	88.599	0.000	0.000	0.212	11.188
240.0	6.994%10	0.5429	806.2	910.3	806.4	1.1288	90.280	0.000	0.000	0.079	9.641
260.0	9.591%10	0.7444	820.2	941.7	825.0	1.1414	93.390	0.000	0.000	0.011	6.599
280.0	1.155%11	0.8967	830.0	968.8	843.6	1.1484	96.417	0.000	0.000	0.001	3.582
300.0	1.261%11	0.9787	836.8	992.9	862.2	1.1517	98.000	0.000	0.000	0.000	2.000
320.0	1.288%11	1.0000	841.6	1015.1	880.7	1.1526	98.071	0.628	0.070	0.000	1.231
340.0	1.273%11	0.9881	845.0	1035.9	899.2	1.1520	98.030	1.621	0.180	0.000	0.169
360.0	1.230%11	0.9546	847.5	1055.7	917.4	1.1508	97.965	1.810	0.201	0.000	0.023
380.0	1.164%11	0.9037	849.3	1074.9	935.1	1.1495	97.860	1.923	0.214	0.000	0.003
400.0	1.083%11	0.8404	850.7	1093.6	951.4	1.1495	97.304	2.426	0.270	0.000	0.000
420.0	9.921%10	0.7701	851.7	1093.6	964.9	1.1334	93.968	5.429	0.603	0.000	0.000
440.0	8.988%10	0.6976	852.5	1093.6	974.2	1.1226	89.573	9.384	1.043	0.000	0.000
460.0	8.075%10	0.6268	853.1	1093.6	979.3	1.1168	85.227	13.296	1.477	0.000	0.000
480.0	7.220%10	0.5604	853.6	1093.6	981.6	1.1142	80.930	17.163	1.907	0.000	0.000
500.0	6.440%10	0.4999	854.0	1093.6	982.5	1.1131	76.642	21.022	2.336	0.000	0.000
520.0	5.747%10	0.4461	854.3	1093.7	982.9	1.1127	72.323	24.909	2.768	0.000	0.000
540.0	5.140%10	0.3990	854.5	1093.7	983.0	1.1126	67.944	28.851	3.206	0.000	0.000
560.0	4.616%10	0.3583	854.7	1093.7	983.1	1.1125	63.494	32.855	3.651	0.000	0.000
580.0	4.168%10	0.3235	854.9	1093.7	983.1	1.1125	58.994	36.905	4.101	0.000	0.000
600.0	3.785%10	0.2938	855.0	1093.7	983.1	1.1125	54.490	40.959	4.551	0.000	0.000
620.0	3.461%10	0.2686	855.1	1093.7	983.2	1.1124	50.050	44.955	4.995	0.000	0.000
640.0	3.186%10	0.2473	855.2	1093.7	983.2	1.1124	45.748	48.827	5.425	0.000	0.000
660.0	2.954%10	0.2293	855.3	1093.7	983.2	1.1124	41.648	52.517	5.835	0.000	0.000
680.0	2.757%10	0.2140	855.4	1093.7	983.2	1.1124	37.797	55.982	6.220	0.000	0.000
700.0	2.590%10	0.2010	855.4	1093.8	983.2	1.1124	34.223	59.199	6.578	0.000	0.000
720.0	2.448%10	0.1900	855.5	1093.8	983.2	1.1124	30.934	62.159	6.907	0.000	0.000
740.0	2.327%10	0.1806	855.5	1093.8	983.3	1.1124	27.929	64.864	7.207	0.000	0.000
760.0	2.225%10	0.1727	855.5	1093.8	983.3	1.1124	25.194	67.325	7.481	0.000	0.000
780.0	2.137%10	0.1659	855.6	1093.8	983.3	1.1124	22.714	69.557	7.729	0.000	0.000
800.0	2.062%10	0.1601	855.6	1093.8	983.3	1.1124	20.471	71.576	7.953	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -51.7 LONGI= 302.2 R=100 MONTH=12 HOUR=12.0

CALCULATED VALUES: MLAT= -40.5 MLONG= 9.8
DIP= -48.0 MODIP= -46.8 MAGLA= -29.1 XHI= 28.8
SUNRISE: 3.8 L.T. SUNSET:20.2 L.T. SUN DEC.= -22.9
NMF2=1.14%12 NMF1= 3.51% 11 NME=1.64%11 NMD=1.29%09
HMF2=351.4 HMF1=278.6 HME=110.0 HMD= 81.0

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	1.229%09	0.0011	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.587%09	0.0023	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	2.489%10	0.0218	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	8.373%10	0.0733	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	1.399%11	0.1225	-1	-1	-1	-1	0.336	0.000	0.000	52.683	46.980
105.0	1.614%11	0.1413	-1	-1	-1	-1	0.482	0.000	0.000	48.029	51.489
110.0	1.635%11	0.1432	-1	-1	-1	-1	0.691	0.000	0.000	43.870	55.440
115.0	1.593%11	0.1394	-1	-1	-1	-1	0.989	0.000	0.000	40.249	58.762
120.0	1.569%11	0.1373	338.6	338.6	338.6	1.0000	1.415	0.000	0.000	37.244	61.341
125.0	1.635%11	0.1431	398.1	417.2	398.1	1.0480	2.024	0.000	0.000	34.870	63.106
130.0	1.651%11	0.1445	456.1	494.3	456.1	1.0838	2.887	0.000	0.000	32.992	64.120
135.0	1.658%11	0.1452	512.2	569.6	512.2	1.1120	4.107	0.000	0.000	31.415	64.479
140.0	1.666%11	0.1459	564.9	641.4	564.9	1.1354	5.809	0.000	0.000	30.000	64.191
150.0	1.683%11	0.1474	657.0	771.7	657.0	1.1746	11.251	0.000	0.000	27.434	61.315
160.0	1.703%11	0.1490	731.1	884.1	731.1	1.2092	19.962	0.000	0.000	25.085	54.954
170.0	1.724%11	0.1509	790.0	981.2	790.0	1.2420	30.669	0.000	0.000	22.784	46.547
180.0	1.749%11	0.1531	837.2	1066.7	837.2	1.2740	40.806	0.000	0.000	19.744	39.450
190.0	1.776%11	0.1555	875.5	1143.2	875.5	1.3057	49.733	0.000	0.000	13.584	36.683
200.0	1.808%11	0.1583	907.0	1212.9	907.0	1.3372	58.351	0.000	0.000	6.033	35.616
210.0	1.845%11	0.1615	933.0	1277.1	933.0	1.3688	67.504	0.000	0.000	2.127	30.369
220.0	1.889%11	0.1654	954.7	1337.1	954.7	1.4005	77.593	0.000	0.000	0.716	21.691
230.0	1.943%11	0.1701	972.8	1393.4	972.8	1.4324	88.069	0.000	0.000	0.239	11.691
240.0	2.012%11	0.1761	987.9	1446.7	987.9	1.4645	95.635	0.000	0.000	0.080	4.285
260.0	2.282%11	0.1997	1011.0	1546.2	1011.8	1.5282	98.527	0.000	0.000	0.009	1.464
280.0	3.778%11	0.3307	1027.1	1638.8	1034.6	1.5840	98.595	0.000	0.000	0.001	1.404
300.0	7.097%11	0.6213	1038.4	1726.6	1057.4	1.6329	98.596	0.709	0.079	0.000	0.616
320.0	9.927%11	0.8690	1046.3	1811.0	1080.3	1.6765	98.596	1.202	0.134	0.000	0.069
340.0	1.127%12	0.9867	1052.0	1893.2	1103.3	1.7160	98.594	1.258	0.140	0.000	0.008
360.0	1.138%12	0.9964	1056.2	1952.2	1126.7	1.7326	98.593	1.266	0.141	0.000	0.001
380.0	1.098%12	0.9616	1059.2	1990.3	1151.3	1.7287	98.590	1.269	0.141	0.000	0.000
400.0	1.024%12	0.8961	1061.4	2029.2	1178.7	1.7216	98.586	1.272	0.141	0.000	0.000
420.0	9.251%11	0.8099	1063.1	2068.6	1211.6	1.7074	98.578	1.280	0.142	0.000	0.000
440.0	8.152%11	0.7136	1064.5	2108.2	1252.9	1.6826	98.454	1.391	0.155	0.000	0.000
460.0	7.043%11	0.6165	1065.5	2148.0	1302.7	1.6488	97.398	2.342	0.260	0.000	0.000
480.0	6.001%11	0.5253	1066.2	2187.9	1358.2	1.6109	95.879	3.709	0.412	0.000	0.000
500.0	5.069%11	0.4438	1066.9	2227.8	1416.3	1.5730	94.357	5.079	0.564	0.000	0.000
520.0	4.267%11	0.3736	1067.4	2267.8	1475.6	1.5369	92.846	6.438	0.715	0.000	0.000
540.0	3.595%11	0.3147	1067.8	2307.7	1535.3	1.5031	91.342	7.793	0.866	0.000	0.000
560.0	3.041%11	0.2662	1068.1	2347.7	1595.1	1.4718	89.836	9.148	1.016	0.000	0.000
580.0	2.590%11	0.2267	1068.4	2387.7	1655.1	1.4426	88.318	10.514	1.168	0.000	0.000
600.0	2.225%11	0.1948	1068.6	2427.6	1715.0	1.4155	86.776	11.902	1.322	0.000	0.000
620.0	1.931%11	0.1690	1068.8	2467.6	1775.0	1.3902	85.194	13.326	1.481	0.000	0.000
640.0	1.694%11	0.1483	1068.9	2507.6	1834.9	1.3666	83.554	14.801	1.645	0.000	0.000
660.0	1.503%11	0.1315	1069.1	2547.6	1894.9	1.3444	81.841	16.344	1.816	0.000	0.000
680.0	1.348%11	0.1180	1069.2	2587.6	1954.9	1.3236	80.040	17.964	1.996	0.000	0.000
700.0	1.222%11	0.1069	1069.3	2627.5	2014.8	1.3041	78.147	19.668	2.185	0.000	0.000
720.0	1.119%11	0.0979	1069.4	2667.5	2074.8	1.2857	76.169	21.448	2.383	0.000	0.000
740.0	1.034%11	0.0905	1069.4	2707.5	2134.8	1.2683	74.121	23.292	2.588	0.000	0.000
760.0	9.642%10	0.0844	1069.5	2747.5	2194.7	1.2518	72.025	25.177	2.797	0.000	0.000
780.0	9.064%10	0.0793	1069.6	2787.4	2254.7	1.2363	69.908	27.083	3.009	0.000	0.000
800.0	8.583%10	0.0751	1069.6	2827.4	2314.7	1.2215	67.792	28.987	3.221	0.000	0.000

WE PUT B1= 3.0TO GET HST

INPUT: LATI= -51.7 LONGI= 302.2 R=100 MONTH=12 HOUR= 3.8

CALCULATED VALUES: MLAT= -40.5 MLONG= 9.8
DIP= -48.0 MODIP= -46.8 MAGLA= -29.1 XHI= 90.0
SUNRISE: 3.8 L.T. SUNSET:20.2 L.T. SUN DEC.= -22.9
NMF2=8.27%11 NMF1= 0.00%-01 NME=3.80%10 NMD=4.00%08
HMF2=355.5 HMF1= 0.0 HME=107.5 HMD= 84.5

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	2.826%08	3.4%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	4.100%08	5.0%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	1.818%09	0.0022	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	1.234%10	0.0149	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	2.964%10	0.0358	-1	-1	-1	-1	0.016	0.000	0.000	6.623	93.361
105.0	3.764%10	0.0455	-1	-1	-1	-1	0.025	0.000	0.000	8.541	91.434
110.0	3.677%10	0.0445	-1	-1	-1	-1	0.040	0.000	0.000	10.994	88.966
115.0	3.047%10	0.0368	-1	-1	-1	-1	0.064	0.000	0.000	14.085	85.852
120.0	2.449%10	0.0296	326.5	326.5	326.5	1.0000	0.101	0.000	0.000	17.829	82.070
125.0	2.187%10	0.0264	381.2	393.7	381.2	1.0326	0.159	0.000	0.000	21.966	77.875
130.0	2.288%10	0.0277	434.7	459.5	434.7	1.0572	0.252	0.000	0.000	25.782	73.966
135.0	2.621%10	0.0317	485.8	523.2	485.8	1.0768	0.397	0.000	0.000	28.494	71.110
140.0	3.032%10	0.0366	533.2	582.9	533.2	1.0933	0.623	0.000	0.000	30.000	69.377
150.0	3.928%10	0.0475	613.5	688.1	613.5	1.1216	1.498	0.000	0.000	31.126	67.376
160.0	4.289%10	0.0518	675.5	775.0	675.5	1.1473	3.368	0.000	0.000	31.531	65.101
170.0	4.695%10	0.0568	723.2	847.5	723.2	1.1720	6.679	0.000	0.000	31.688	61.633
180.0	5.154%10	0.0623	760.3	909.6	760.3	1.1963	11.436	0.000	0.000	30.852	57.711
190.0	5.676%10	0.0686	790.0	964.1	790.0	1.2204	17.669	0.000	0.000	25.763	56.569
200.0	6.275%10	0.0759	813.9	1012.9	813.9	1.2445	26.008	0.000	0.000	16.079	57.913
210.0	6.971%10	0.0843	833.6	1057.5	833.6	1.2686	37.565	0.000	0.000	8.607	53.827
220.0	7.794%10	0.0942	849.9	1098.6	849.9	1.2927	53.681	0.000	0.000	4.466	41.853
230.0	8.786%10	0.1062	863.4	1137.0	863.4	1.3169	74.390	0.000	0.000	2.307	23.303
240.0	1.003%11	0.1212	874.6	1173.1	875.0	1.3406	92.014	0.000	0.000	1.191	6.796
260.0	1.413%11	0.1708	891.7	1240.0	898.1	1.3807	99.365	0.000	0.000	0.317	0.318
280.0	2.981%11	0.3603	903.7	1301.7	921.2	1.4130	99.541	0.000	0.000	0.084	0.374
300.0	5.201%11	0.6287	912.0	1359.7	944.2	1.4400	99.544	0.063	0.007	0.023	0.364
320.0	7.096%11	0.8578	917.9	1415.4	967.3	1.4632	99.543	0.318	0.035	0.006	0.097
340.0	8.092%11	0.9782	922.1	1469.3	990.4	1.4835	99.542	0.387	0.043	0.002	0.026
360.0	8.265%11	0.9991	925.1	1508.9	1013.6	1.4886	99.541	0.407	0.045	0.000	0.007
380.0	8.050%11	0.9731	927.4	1535.1	1037.0	1.4803	99.538	0.414	0.046	0.000	0.002
400.0	7.580%11	0.9163	929.0	1561.5	1061.0	1.4718	99.534	0.419	0.047	0.000	0.000
420.0	6.927%11	0.8374	930.3	1581.2	1085.9	1.4561	99.526	0.427	0.047	0.000	0.000
440.0	6.174%11	0.7463	931.3	1601.1	1112.5	1.4392	99.401	0.539	0.060	0.000	0.000
460.0	5.395%11	0.6522	932.0	1621.0	1140.6	1.4212	98.334	1.499	0.167	0.000	0.000
480.0	4.648%11	0.5619	932.6	1640.9	1169.7	1.4028	96.800	2.880	0.320	0.000	0.000
500.0	3.969%11	0.4798	933.0	1660.9	1199.4	1.3848	95.264	4.262	0.474	0.000	0.000
520.0	3.375%11	0.4079	933.4	1680.9	1229.2	1.3674	93.739	5.635	0.626	0.000	0.000
540.0	2.869%11	0.3468	933.7	1700.9	1259.2	1.3508	92.220	7.002	0.778	0.000	0.000
560.0	2.448%11	0.2959	934.0	1720.9	1289.2	1.3349	90.699	8.371	0.930	0.000	0.000
580.0	2.101%11	0.2540	934.2	1740.9	1319.2	1.3197	89.167	9.750	1.083	0.000	0.000
600.0	1.818%11	0.2198	934.3	1760.9	1349.2	1.3051	87.610	11.151	1.239	0.000	0.000
620.0	1.588%11	0.1920	934.5	1780.9	1379.2	1.2913	86.013	12.588	1.399	0.000	0.000
640.0	1.402%11	0.1694	934.6	1800.9	1409.2	1.2780	84.358	14.078	1.564	0.000	0.000
660.0	1.250%11	0.1511	934.7	1820.9	1439.2	1.2652	82.627	15.635	1.737	0.000	0.000
680.0	1.126%11	0.1361	934.8	1840.9	1469.2	1.2530	80.809	17.272	1.919	0.000	0.000
700.0	1.025%11	0.1239	934.8	1860.9	1499.2	1.2413	78.898	18.992	2.110	0.000	0.000
720.0	9.423%10	0.1139	934.9	1880.9	1529.2	1.2300	76.901	20.789	2.310	0.000	0.000
740.0	8.741%10	0.1057	934.9	1900.9	1559.2	1.2192	74.833	22.650	2.517	0.000	0.000
760.0	8.176%10	0.0988	935.0	1920.9	1589.2	1.2087	72.718	24.554	2.728	0.000	0.000
780.0	7.706%10	0.0932	935.0	1940.9	1619.2	1.1987	70.580	26.478	2.942	0.000	0.000
800.0	7.315%10	0.0884	935.1	1960.9	1649.2	1.1890	68.443	28.401	3.156	0.000	0.000

WE PUT 81= 3.0TO GET HST

INPUT: LATI= -51.7 LONGI= 302.2 R=100 MONTH=12 HOUR= 0.0

CALCULATED VALUES: MLAT= -40.5 MLONG= 9.8
DIP= -48.0 MODIP= -46.8 MAGLA= -29.1 XHI= 105.4
SUNRISE: 3.8 L.T. SUNSET:20.2 L.T. SUN DEC.= -22.9
NMF2=9.12%11 NMF1= 0.00%-01 NME=3.20%09 NMD=4.00%08
HMF2=345.9 HMF1= 0.0 HME=105.1 HMD= 87.9

H	NE	N/NMAX	TN	TE	TI	TE/TI	RDO+	RDH+	RDHE+	RDO2+	RDNO+
80.0	1.387%06	1.5%-6	-1	-1	-1	-1	-1	-1	-1	-1	-1
85.0	2.677%08	2.9%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
90.0	4.828%08	5.3%-4	-1	-1	-1	-1	-1	-1	-1	-1	-1
95.0	2.558%09	0.0028	-1	-1	-1	-1	-1	-1	-1	-1	-1
100.0	3.194%09	0.0035	-1	-1	-1	-1	0.016	0.000	0.000	6.623	93.361
105.0	3.201%09	0.0035	-1	-1	-1	-1	0.025	0.000	0.000	8.541	91.434
110.0	2.645%09	0.0029	-1	-1	-1	-1	0.040	0.000	0.000	10.994	88.966
115.0	1.747%09	0.0019	-1	-1	-1	-1	0.064	0.000	0.000	14.085	85.852
120.0	1.128%09	0.0012	325.8	325.8	325.8	1.0000	0.101	0.000	0.000	17.829	82.070
125.0	8.063%08	8.8%-4	380.3	383.7	380.3	1.0090	0.160	0.000	0.000	21.966	77.875
130.0	6.759%08	7.4%-4	433.4	440.3	433.4	1.0157	0.252	0.000	0.000	25.782	73.966
135.0	6.708%08	7.4%-4	484.4	494.6	484.4	1.0211	0.397	0.000	0.000	28.494	71.109
140.0	7.673%08	8.4%-4	531.4	545.0	531.4	1.0256	0.623	0.000	0.000	30.000	69.377
150.0	1.261%09	0.0014	611.0	631.5	611.0	1.0335	1.499	0.000	0.000	31.125	67.376
160.0	2.048%09	0.0022	672.4	699.7	672.4	1.0405	3.369	0.000	0.000	31.523	65.108
170.0	3.174%09	0.0035	719.5	753.6	719.5	1.0474	6.682	0.000	0.000	31.631	61.688
180.0	5.457%09	0.0060	756.2	797.1	756.2	1.0541	11.440	0.000	0.000	30.463	58.096
190.0	8.981%09	0.0098	785.4	833.1	785.4	1.0607	17.675	0.000	0.000	24.037	58.288
200.0	1.482%10	0.0162	809.0	863.5	809.0	1.0674	26.016	0.000	0.000	12.998	60.985
210.0	2.459%10	0.0270	828.4	889.7	828.4	1.0740	37.577	0.000	0.000	5.759	56.664
220.0	4.120%10	0.0451	844.4	912.5	844.4	1.0807	53.695	0.000	0.000	2.450	43.855
230.0	7.023%10	0.0770	857.6	932.6	857.6	1.0874	74.407	0.000	0.000	1.036	24.556
240.0	1.206%11	0.1322	868.7	950.4	868.7	1.0941	92.029	0.000	0.000	0.438	7.533
260.0	2.841%11	0.3113	885.5	980.9	885.5	1.1077	99.254	0.000	0.000	0.078	0.667
280.0	5.062%11	0.5548	897.3	1006.3	897.9	1.1207	97.970	1.679	0.187	0.014	0.151
300.0	7.195%11	0.7885	905.5	1028.1	909.9	1.1300	95.560	3.969	0.441	0.002	0.027
320.0	8.594%11	0.9418	911.2	1047.5	921.8	1.1364	93.146	6.164	0.685	0.000	0.005
340.0	9.104%11	0.9977	915.4	1065.3	933.7	1.1409	90.774	8.302	0.922	0.000	0.001
360.0	9.041%11	0.9908	918.4	1081.9	945.5	1.1443	88.437	10.406	1.156	0.000	0.000
380.0	8.658%11	0.9488	920.6	1097.7	956.9	1.1472	86.124	12.488	1.388	0.000	0.000
400.0	8.027%11	0.8797	922.2	1113.0	967.6	1.1503	83.819	14.563	1.618	0.000	0.000
420.0	7.238%11	0.7932	923.4	1113.8	976.6	1.1405	81.500	16.650	1.850	0.000	0.000
440.0	6.378%11	0.6990	924.4	1114.7	983.2	1.1337	79.141	18.773	2.086	0.000	0.000
460.0	5.523%11	0.6053	925.1	1115.5	987.4	1.1297	76.705	20.966	2.330	0.000	0.000
480.0	4.725%11	0.5179	925.7	1116.3	990.0	1.1277	74.146	23.268	2.585	0.000	0.000
500.0	4.014%11	0.4399	926.1	1117.2	991.8	1.1265	71.414	25.727	2.859	0.000	0.000
520.0	3.401%11	0.3728	926.5	1118.0	993.2	1.1257	68.456	28.389	3.154	0.000	0.000
540.0	2.886%11	0.3163	926.8	1118.9	994.5	1.1250	65.232	31.292	3.477	0.000	0.000
560.0	2.460%11	0.2696	927.0	1119.7	995.8	1.1244	61.723	34.449	3.828	0.000	0.000
580.0	2.111%11	0.2313	927.2	1120.5	997.1	1.1238	57.954	37.842	4.205	0.000	0.000
600.0	1.827%11	0.2002	927.4	1121.4	998.4	1.1232	53.987	41.412	4.601	0.000	0.000
620.0	1.597%11	0.1750	927.5	1122.2	999.6	1.1226	49.918	45.074	5.008	0.000	0.000
640.0	1.410%11	0.1545	927.6	1123.1	1000.9	1.1221	45.857	48.729	5.414	0.000	0.000
660.0	1.258%11	0.1379	927.7	1123.9	1002.2	1.1215	41.900	52.290	5.810	0.000	0.000
680.0	1.135%11	0.1244	927.8	1124.7	1003.4	1.1209	38.126	55.687	6.187	0.000	0.000
700.0	1.034%11	0.1133	927.9	1125.6	1004.7	1.1203	34.584	58.875	6.542	0.000	0.000
720.0	9.506%10	0.1042	928.0	1126.4	1005.9	1.1198	31.300	61.830	6.870	0.000	0.000
740.0	8.821%10	0.0967	928.0	1127.3	1007.2	1.1192	28.283	64.545	7.172	0.000	0.000
760.0	8.254%10	0.0905	928.1	1128.1	1008.5	1.1186	25.529	67.024	7.447	0.000	0.000
780.0	7.782%10	0.0853	928.1	1128.9	1009.7	1.1181	23.026	69.277	7.697	0.000	0.000
800.0	7.388%10	0.0810	928.1	1129.8	1011.0	1.1175	20.757	71.319	7.924	0.000	0.000

WE PUT B1= 3.0TO GET HST

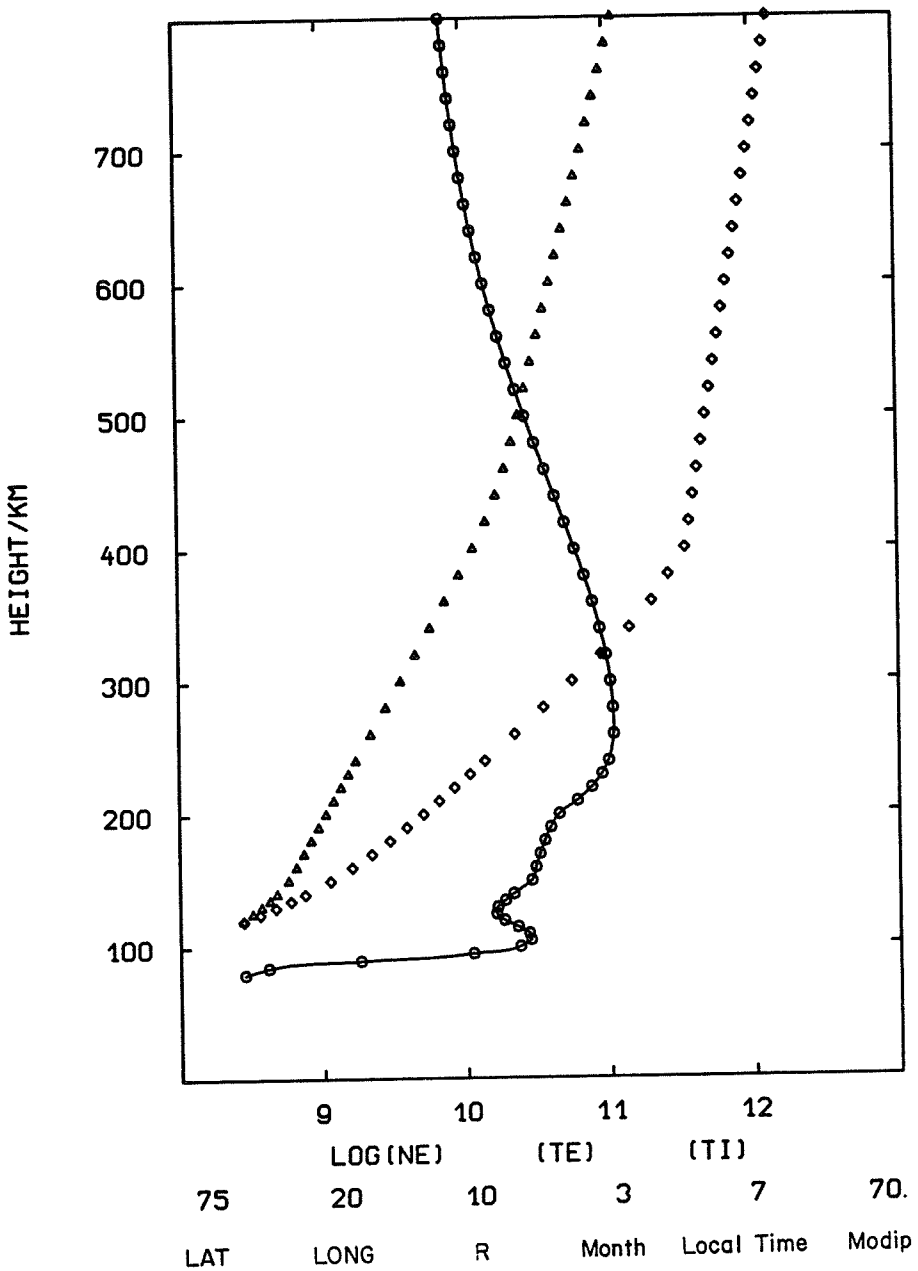
4.2 Figures

On each of the following 72 pages a pair of figures gives height profiles in the 80 to 800 km range for a total of six output parameters of the programs. Here too the peak values NMF2 and HMF2 were determined by the CCIR-method. The left-hand diagram shows the logarithm of electron density NE/m^{-3}, the electron temperature TE(K) and ion temperature TI(K) on linear scales. The numerical values given on the abscissa refer to log of electron density NE only (circles). As for the temperatures TE (diamonds) and TI (triangles) the numbers on the abscissa scale correspond to $(8 + 1.5 \frac{T}{1000K})$ so that the following identification table holds:

T(K)	300	500	700	1000	1500	2000	2500	3000
value	8.45	8.75	9.05	9.5	10.25	11	11.75	12.5

On the right-hand diagram the logarithms of ion percentage value are shown for O^+ (circles), O_2^+ (diamonds) and NO^+ (triangles). Light ions are the complement to 100%.

The geographic and time specifications are given in the lowest line under the diagram. From left to right the numerals represent: geographic latitude - geographic longitude - solar activity R - month - local hour - modip. The set covers a total of nine modip values namely - 70, - 50, - 30, - 10, 0, 10, 30, 50 and 70 . The longitude was chosen to be 20°E, for all of these examples. Eight pages for each value are subdivided according to solar activity (R = 10 and 100), month (March and June) and local hour (sunrise and 14h).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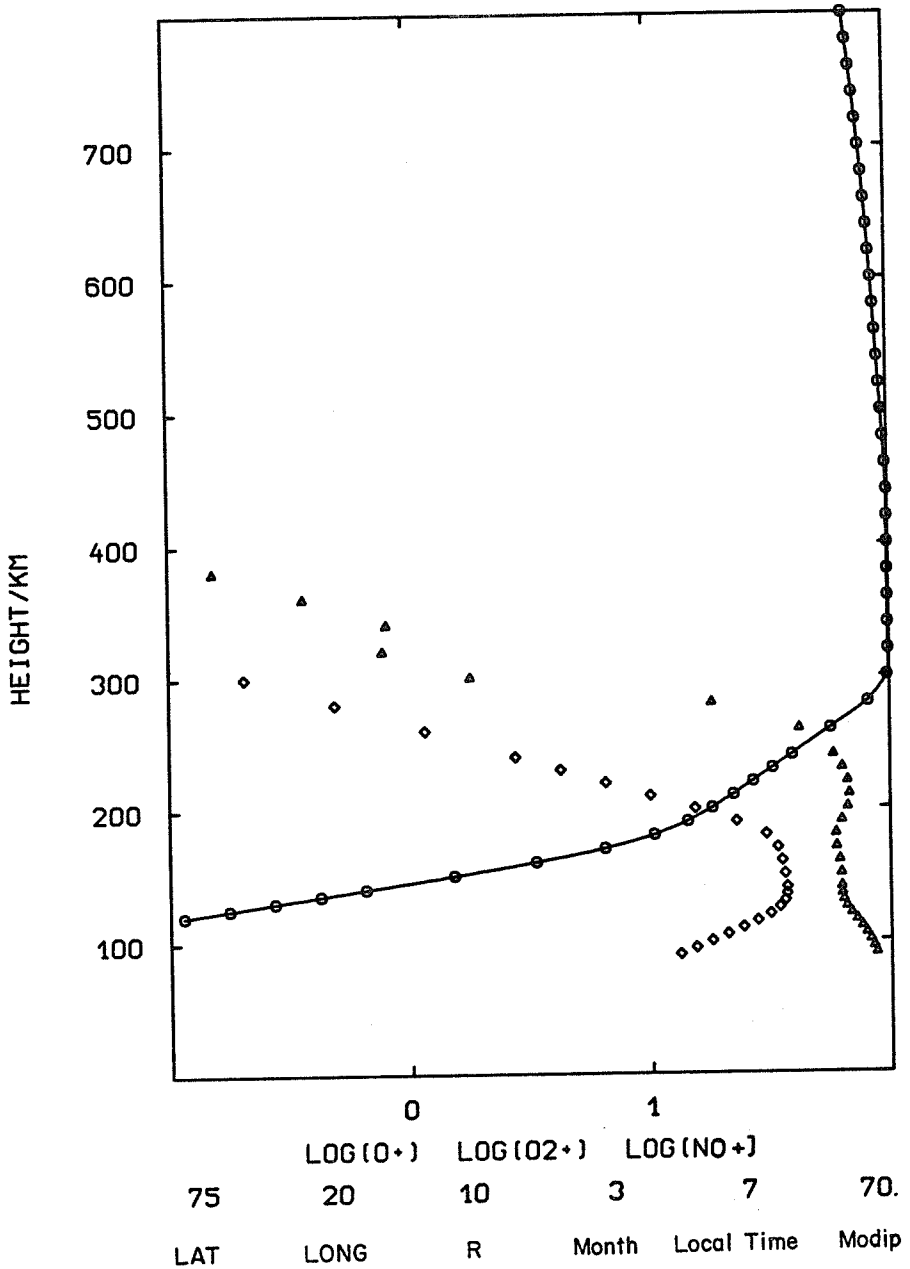
Local Time
Modip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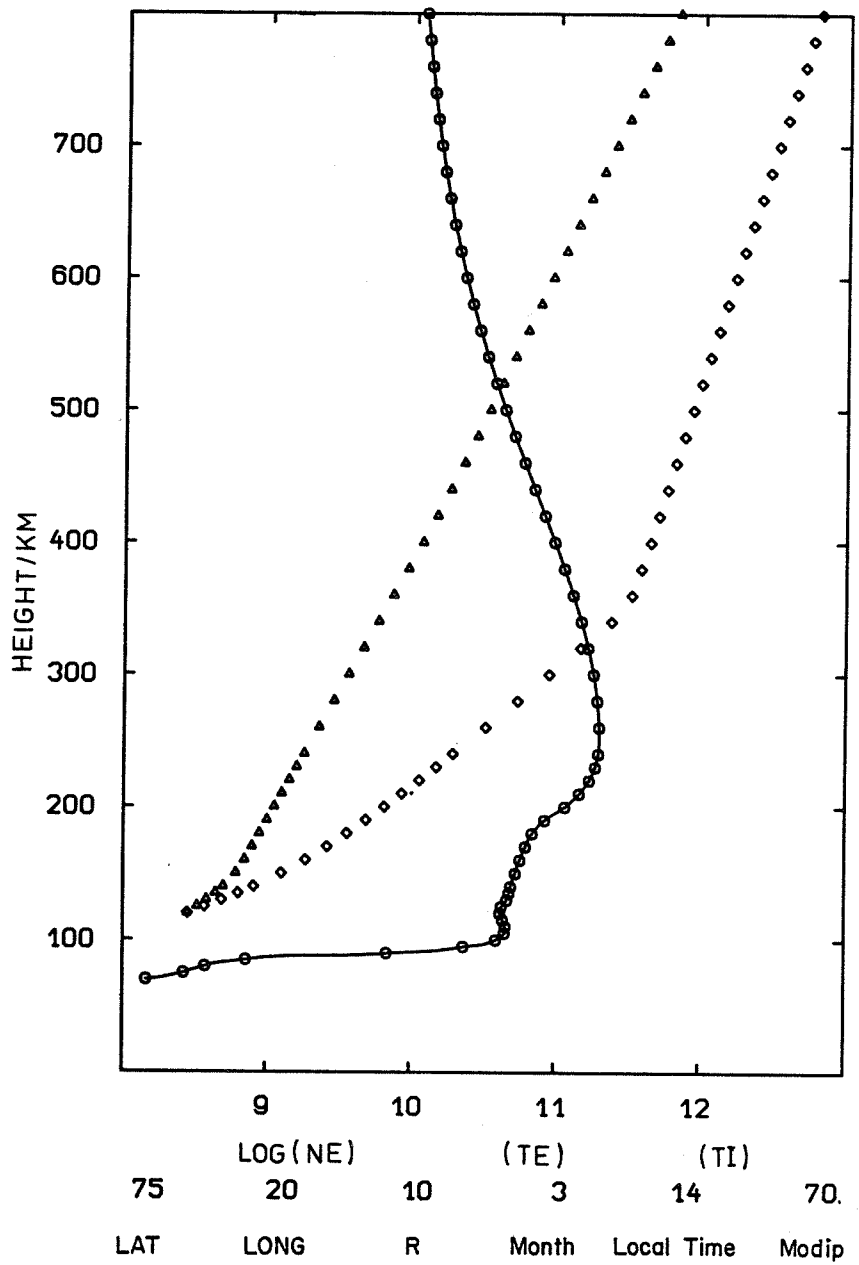
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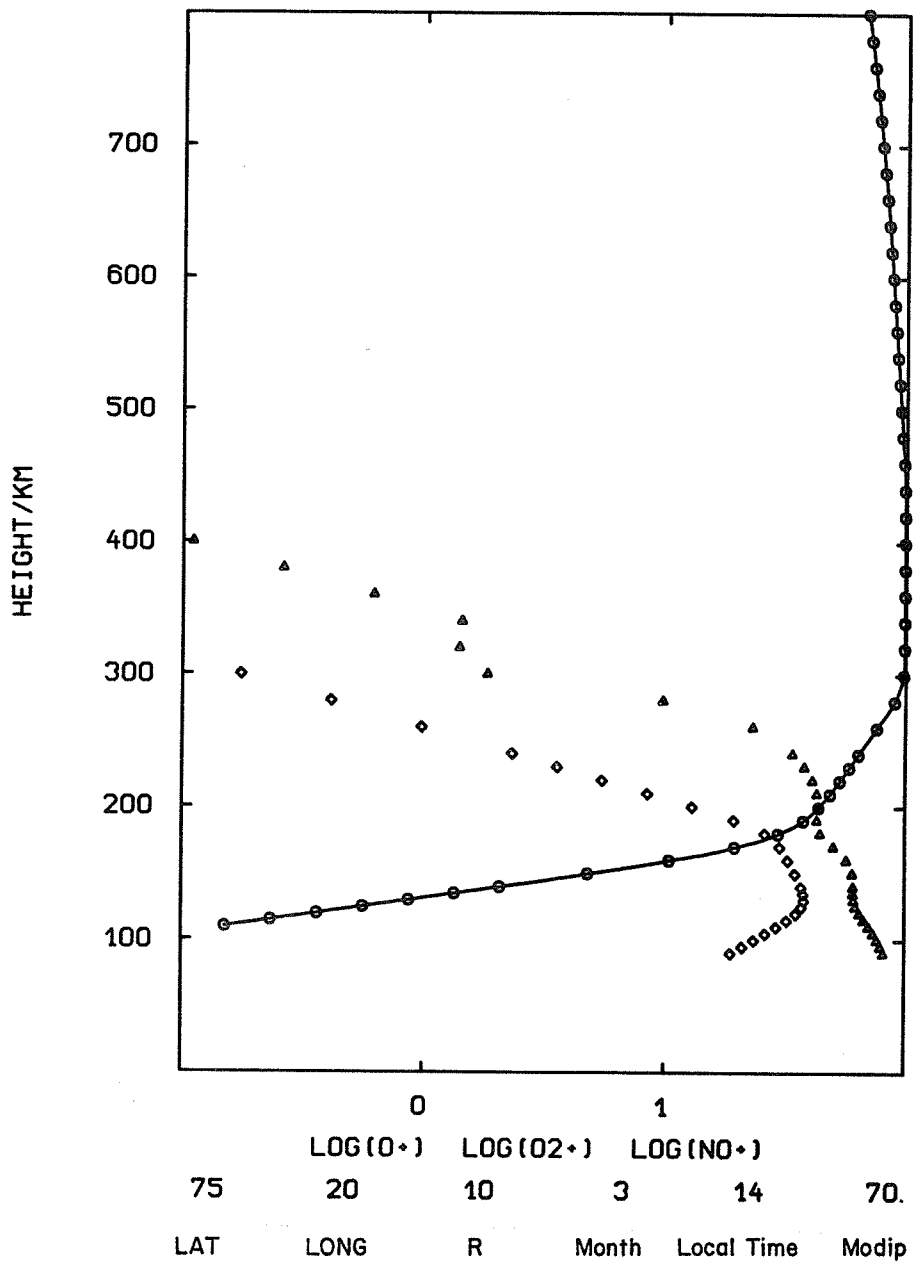
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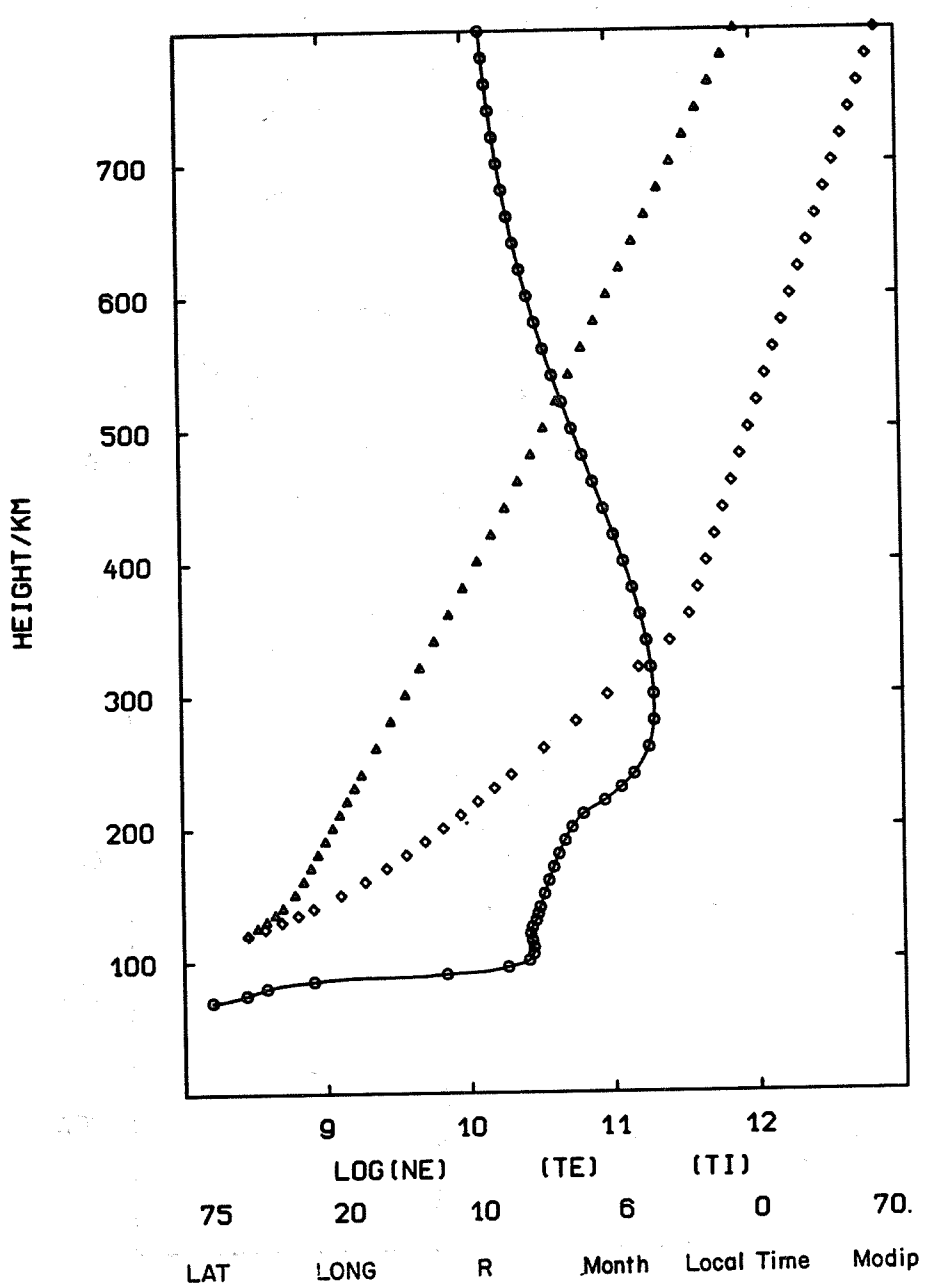
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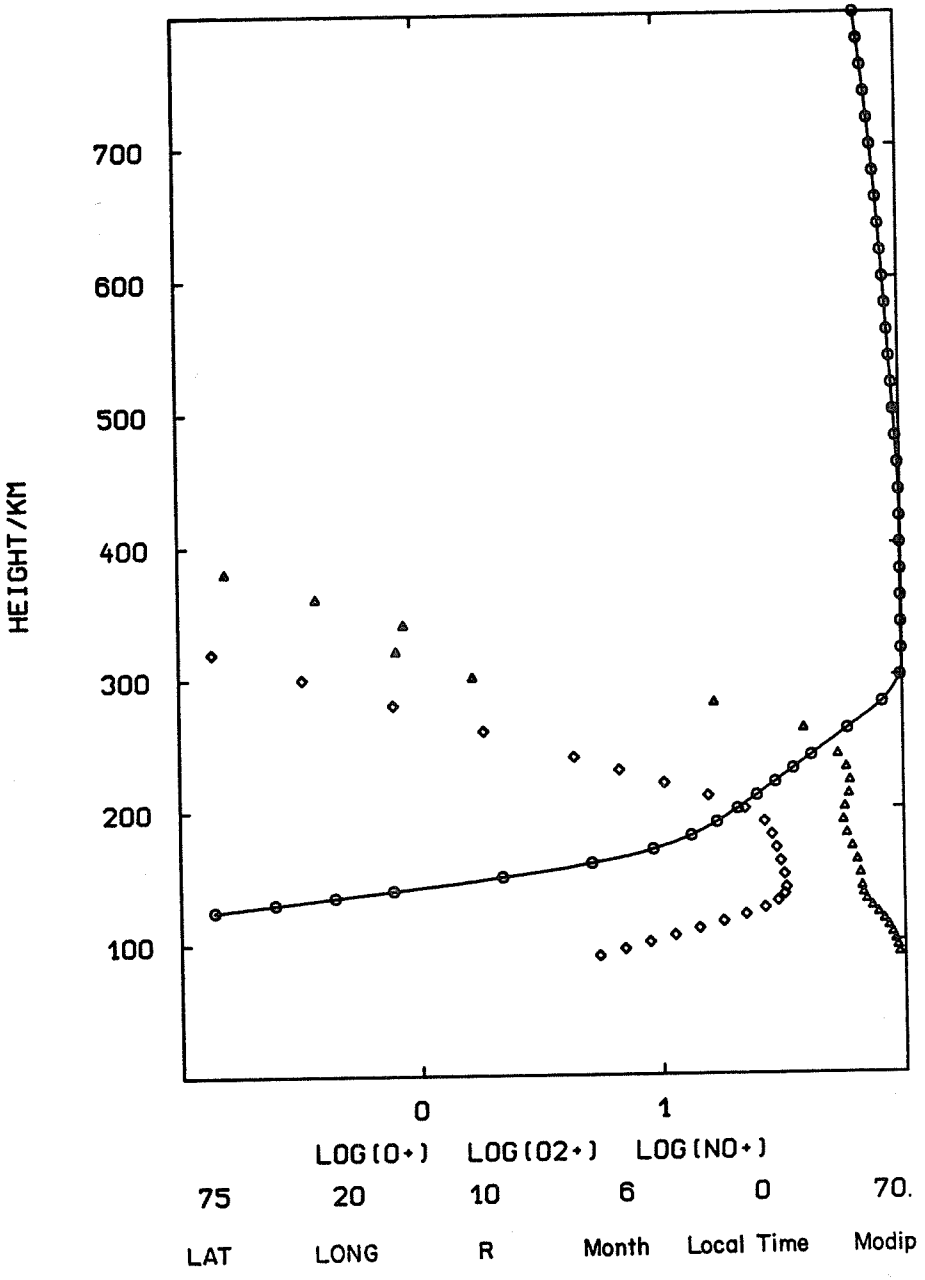
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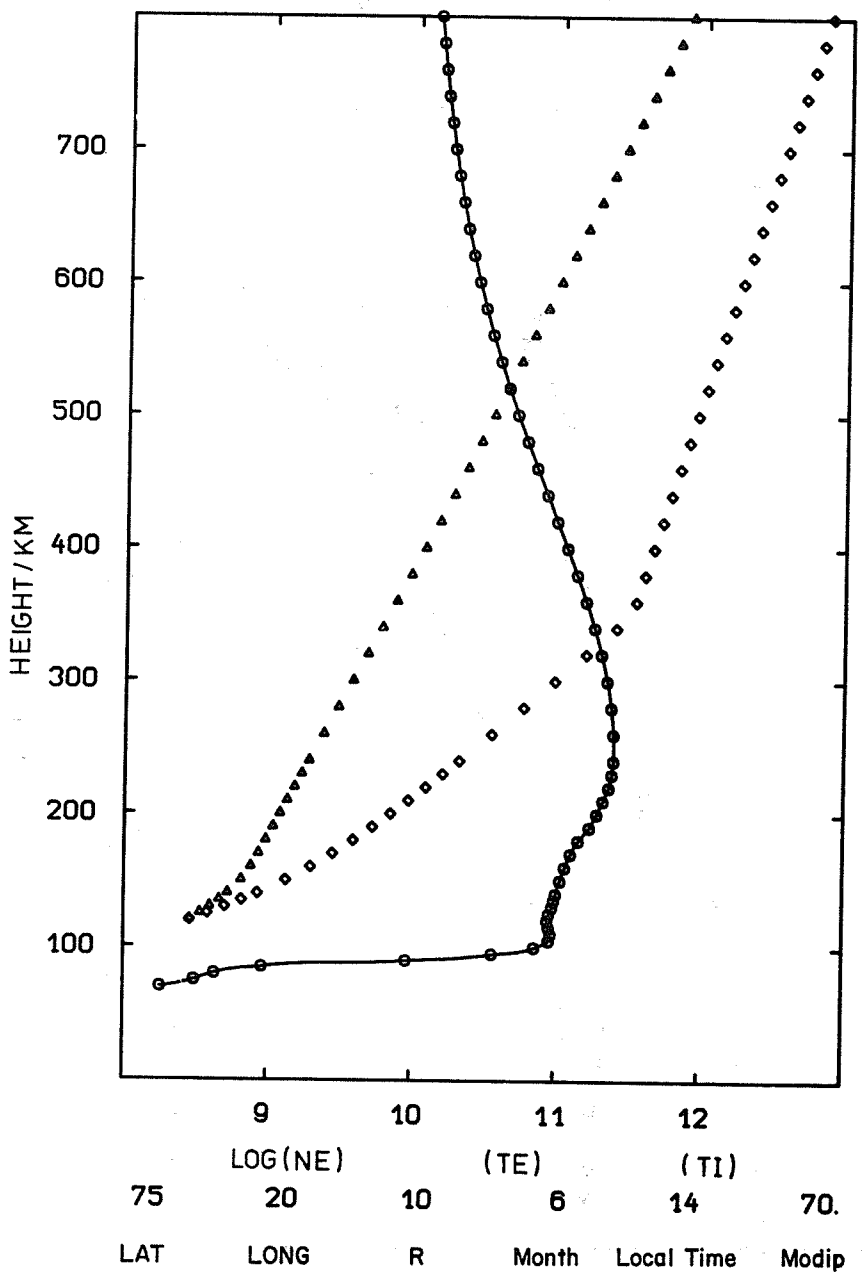
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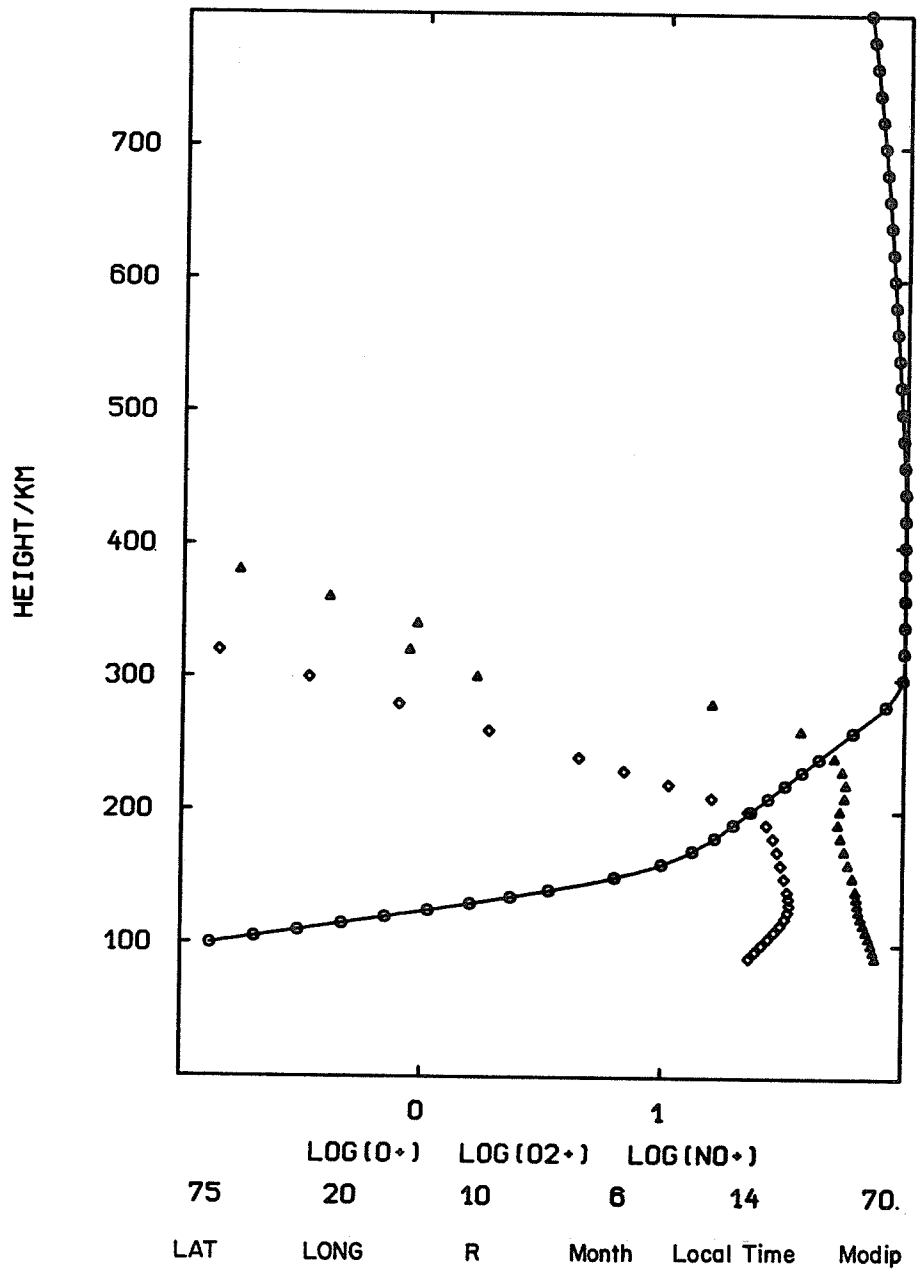
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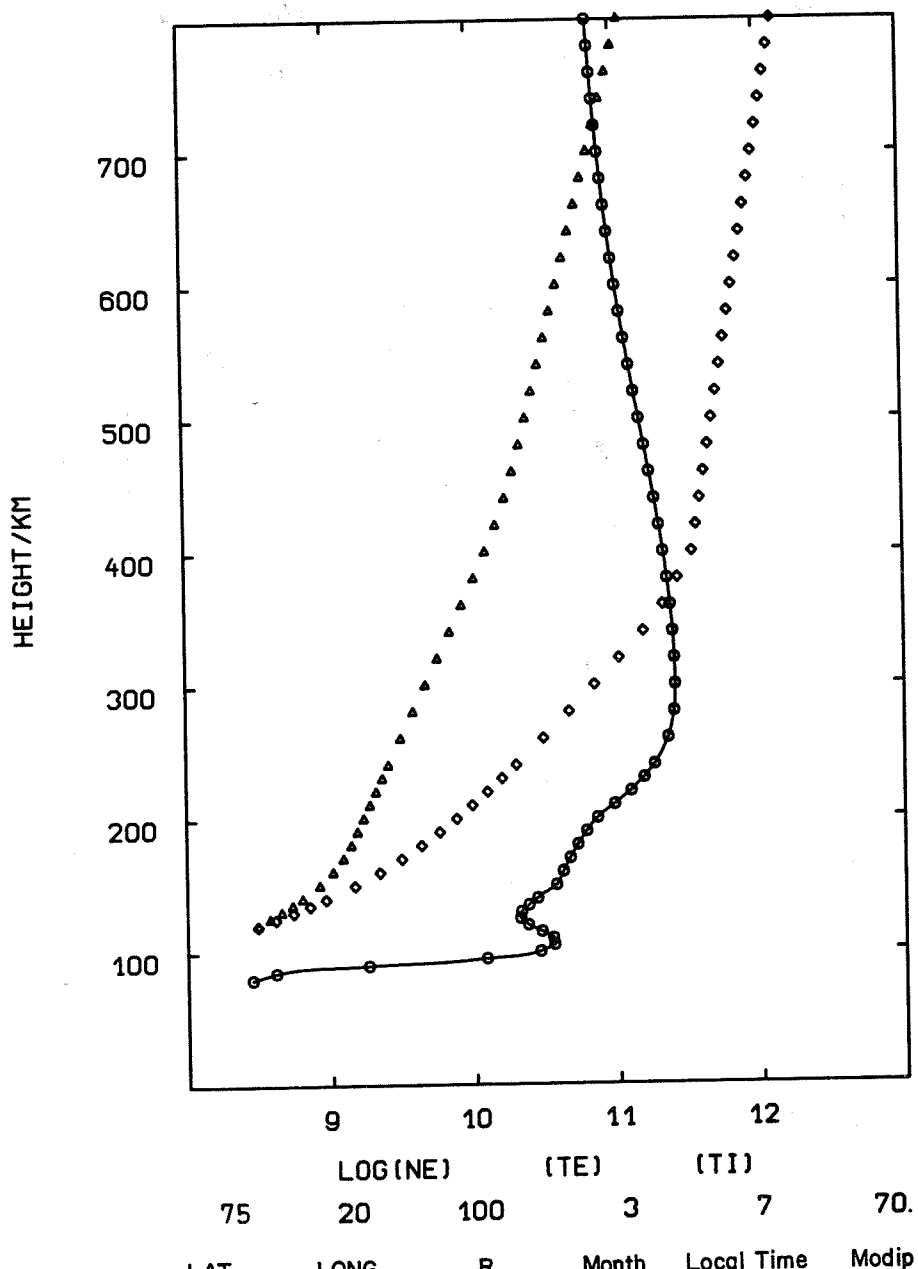
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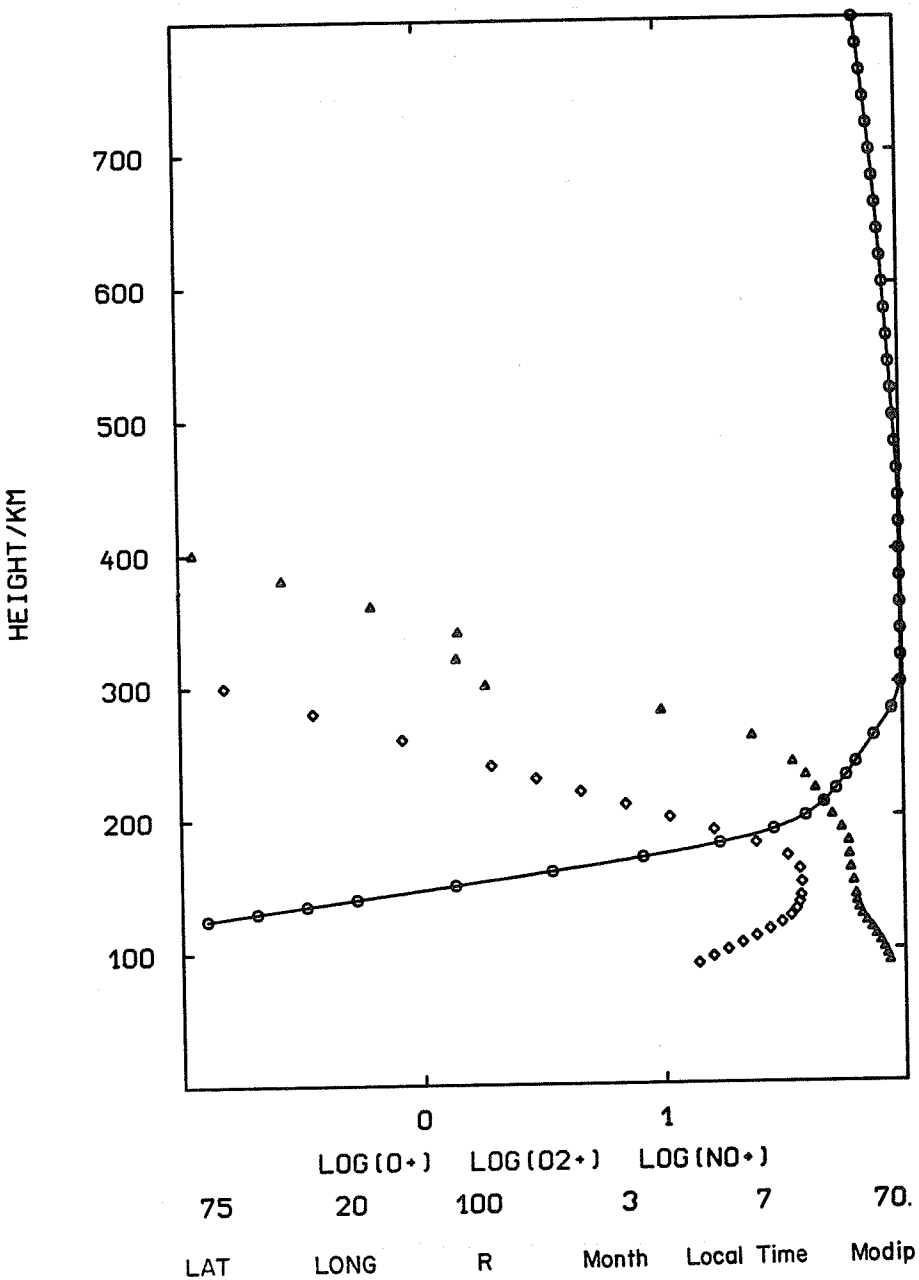
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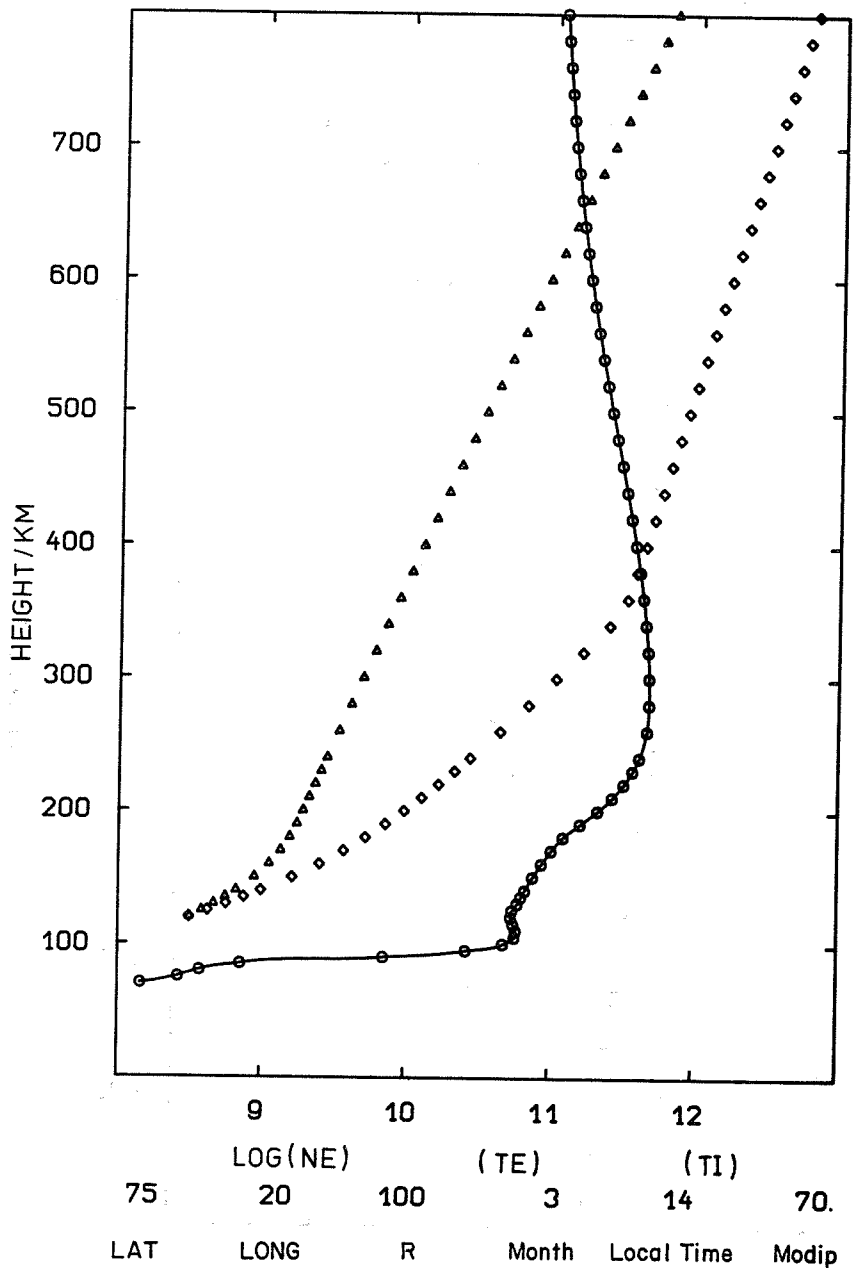
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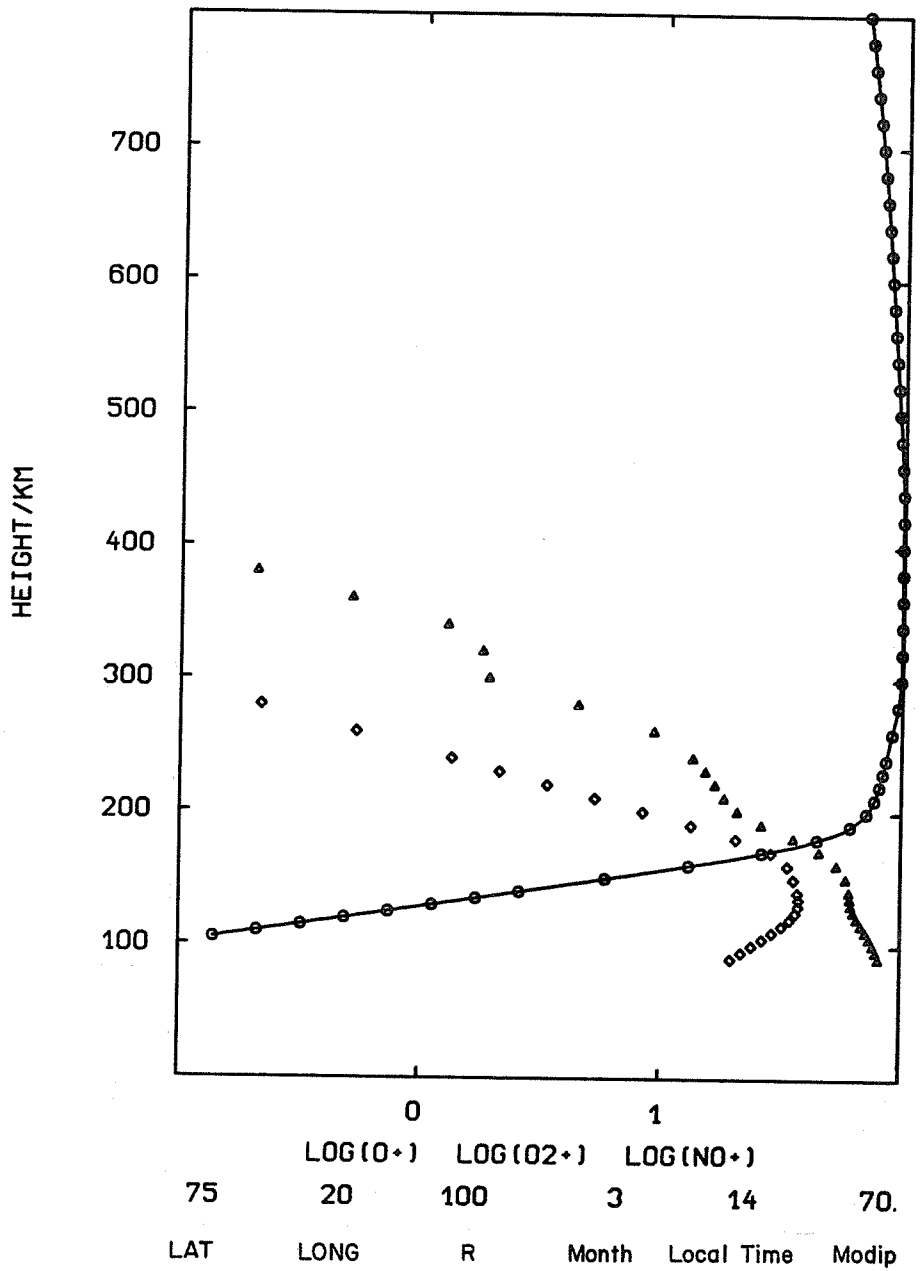
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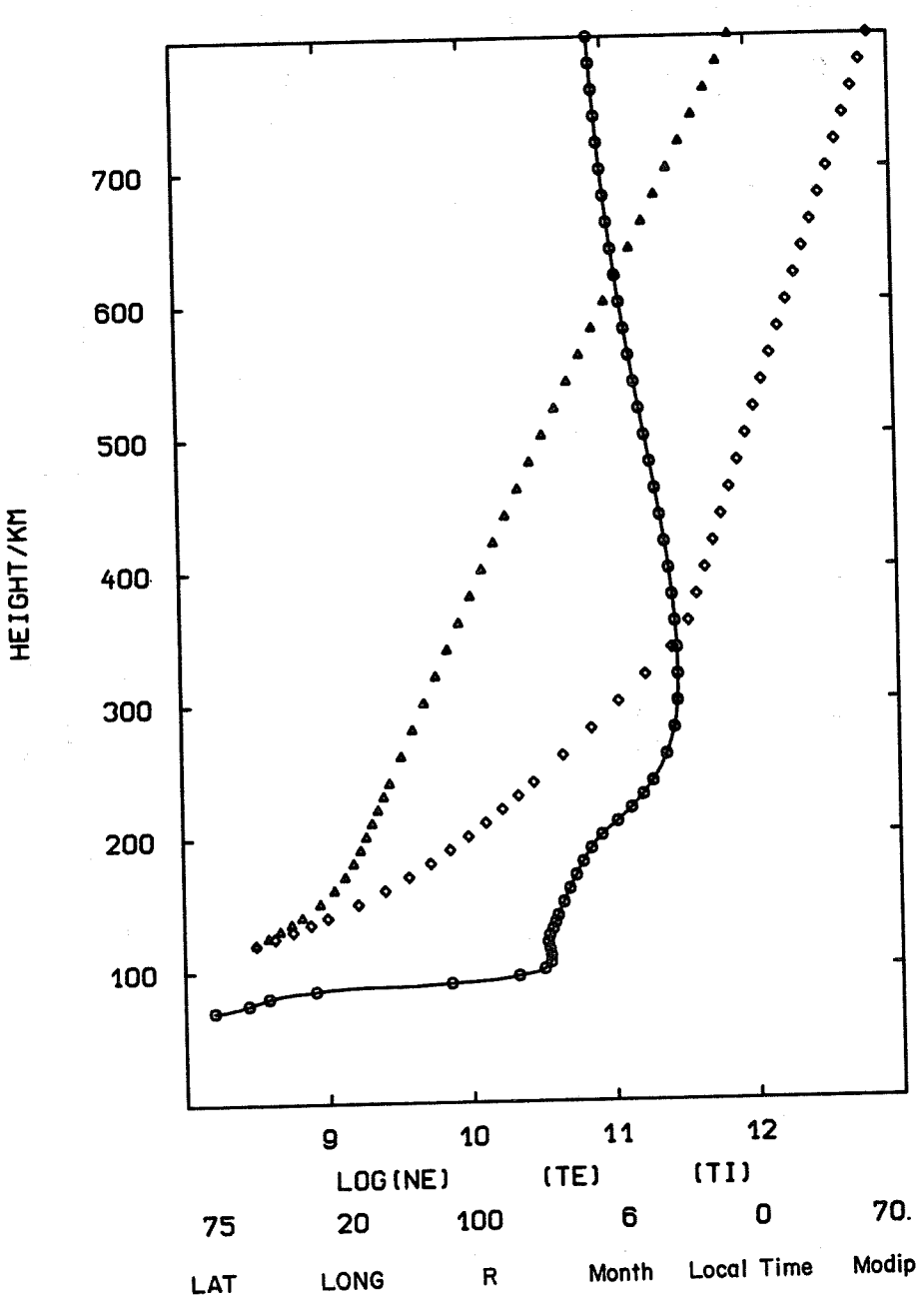
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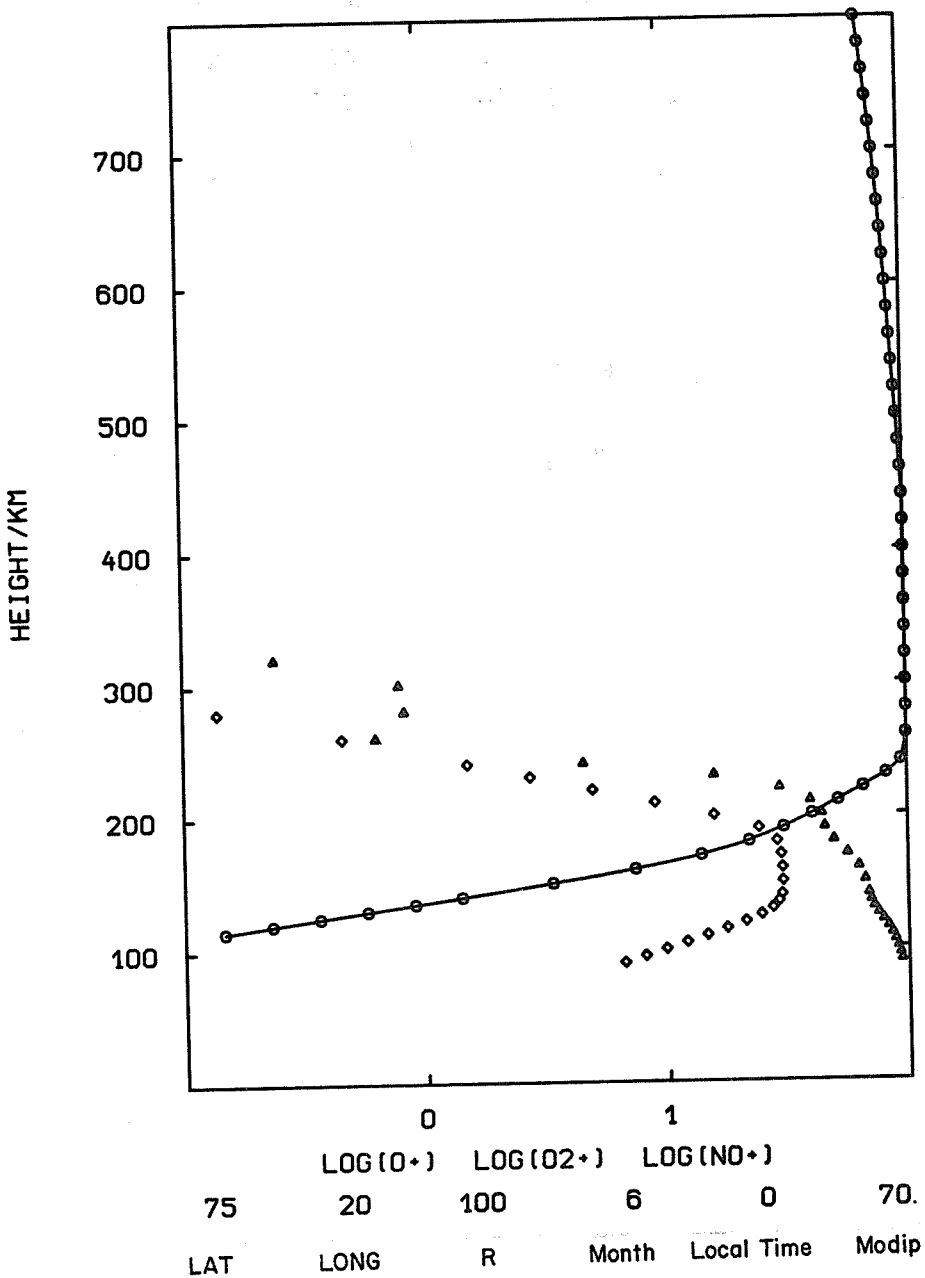
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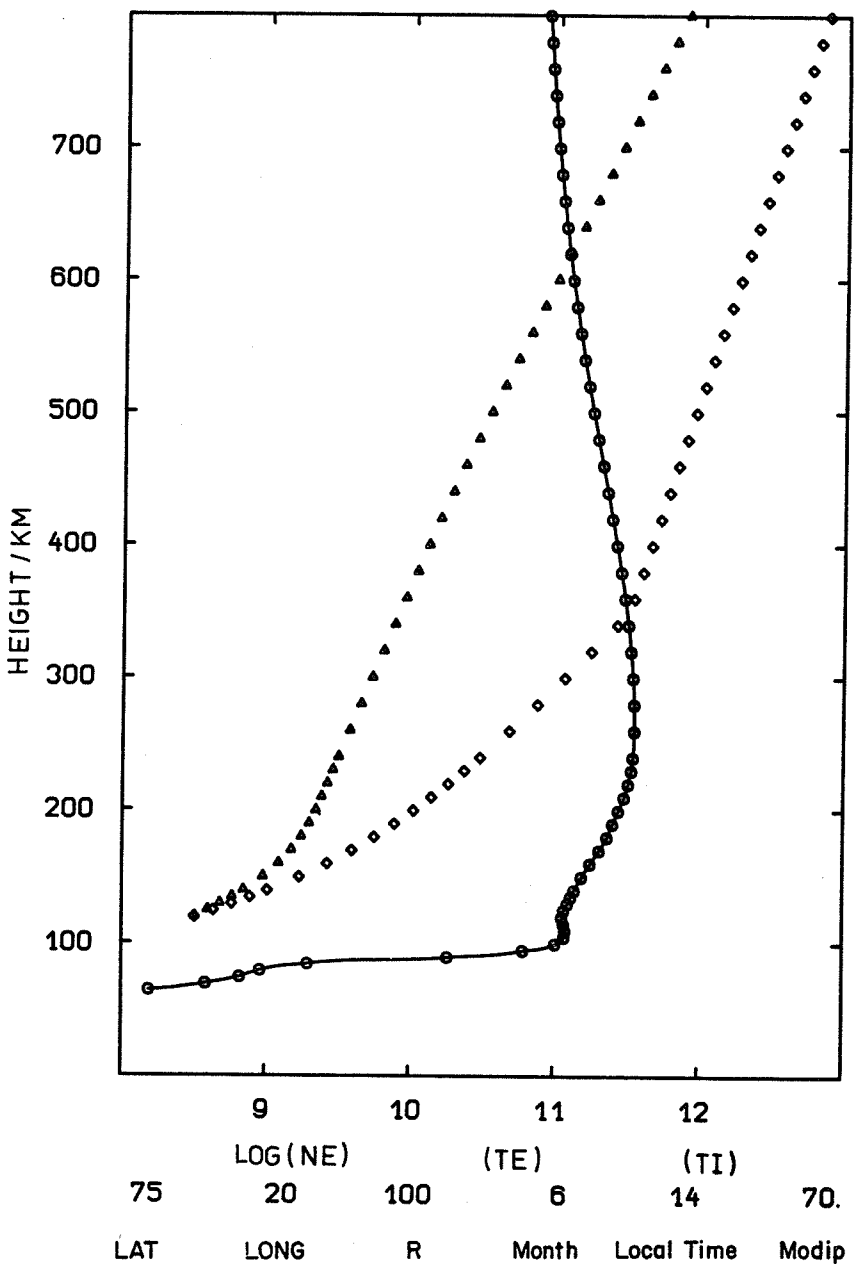
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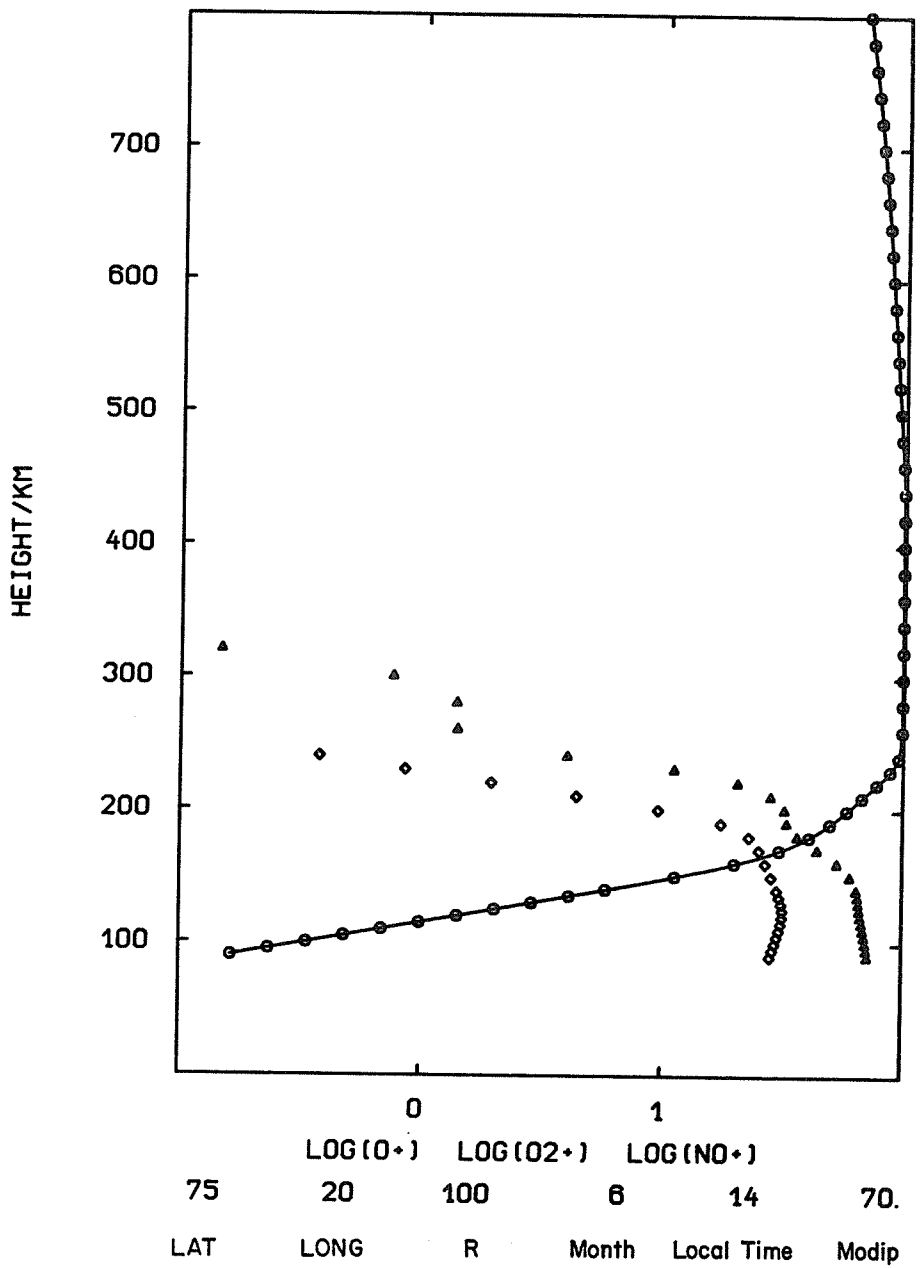
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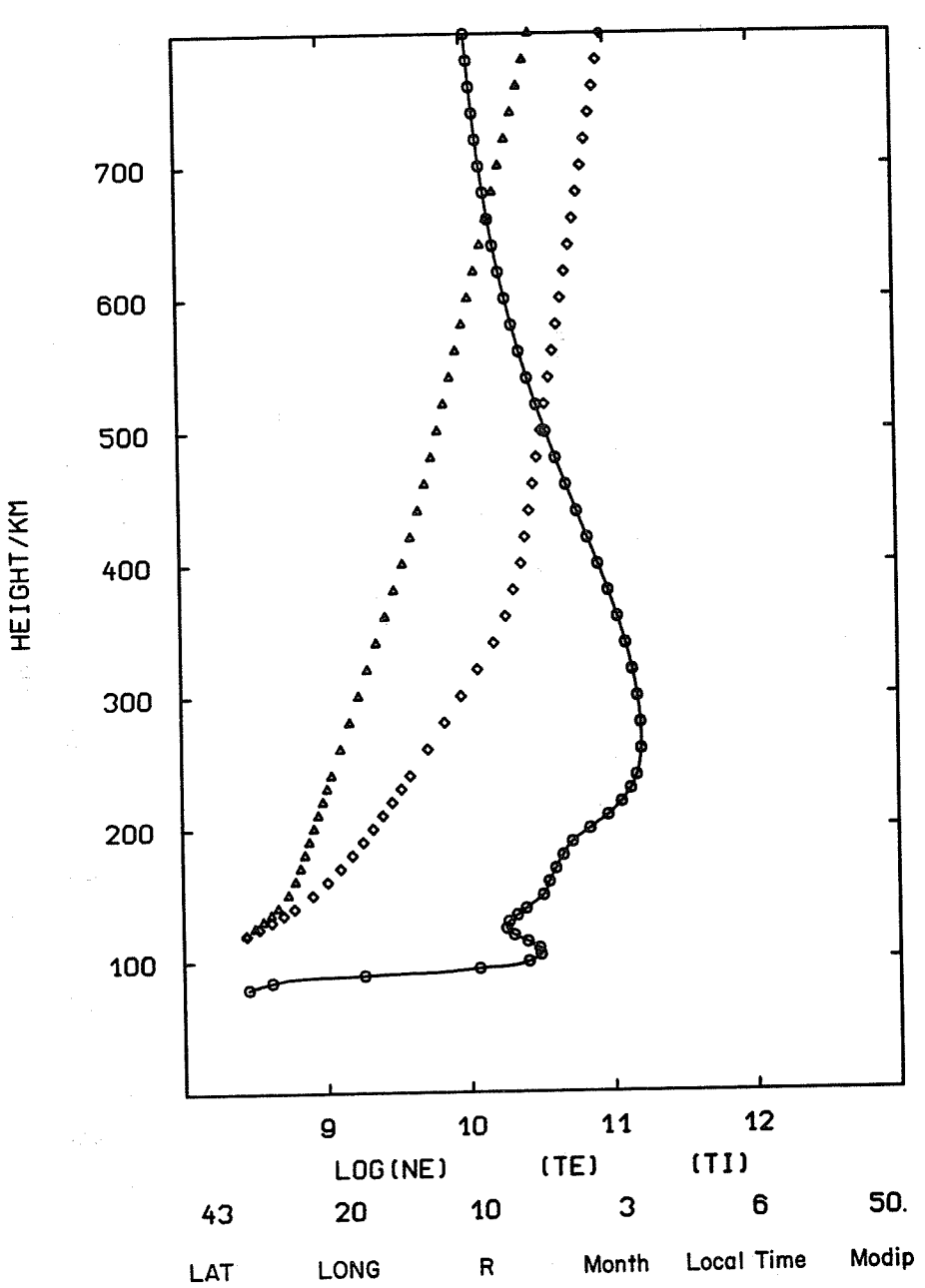
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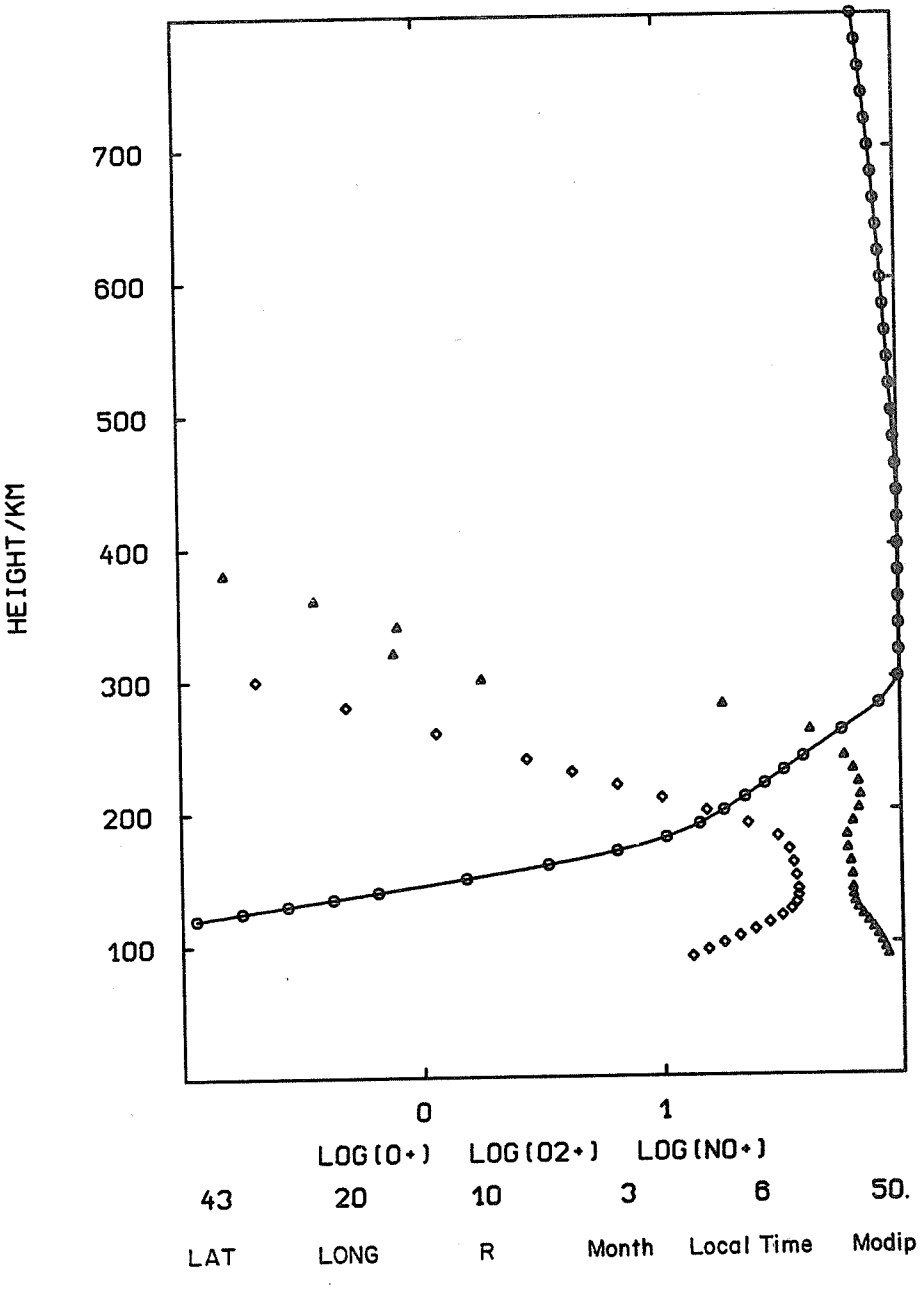
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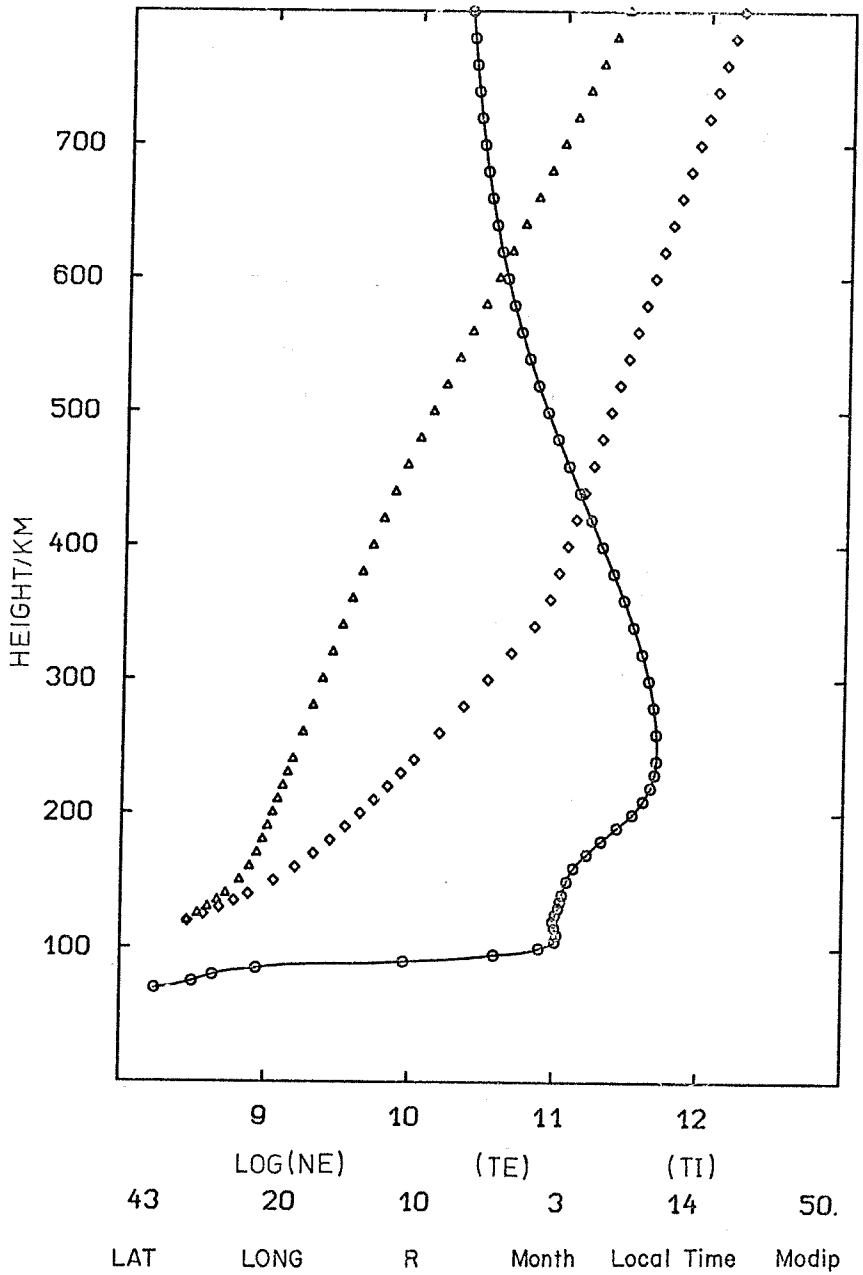
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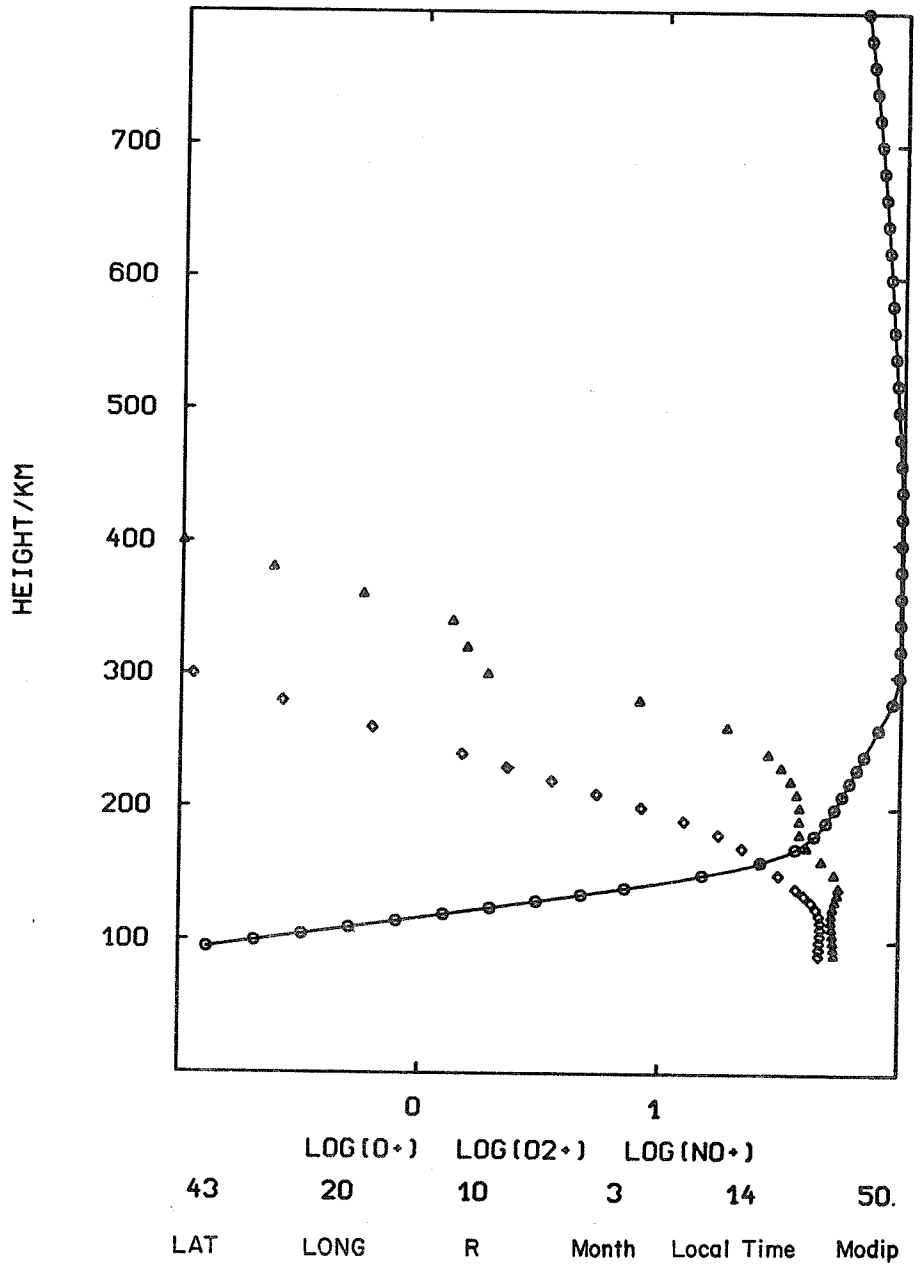
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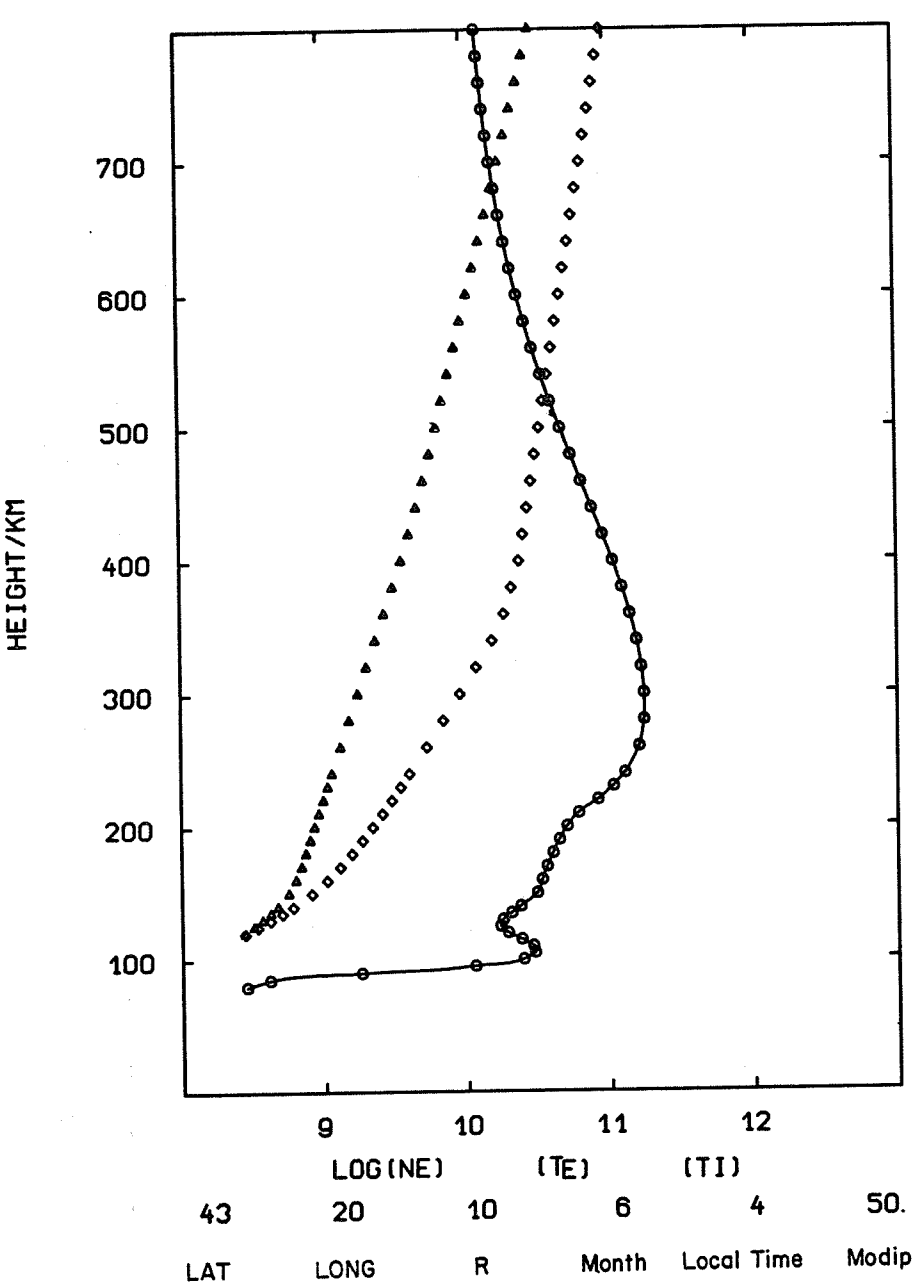
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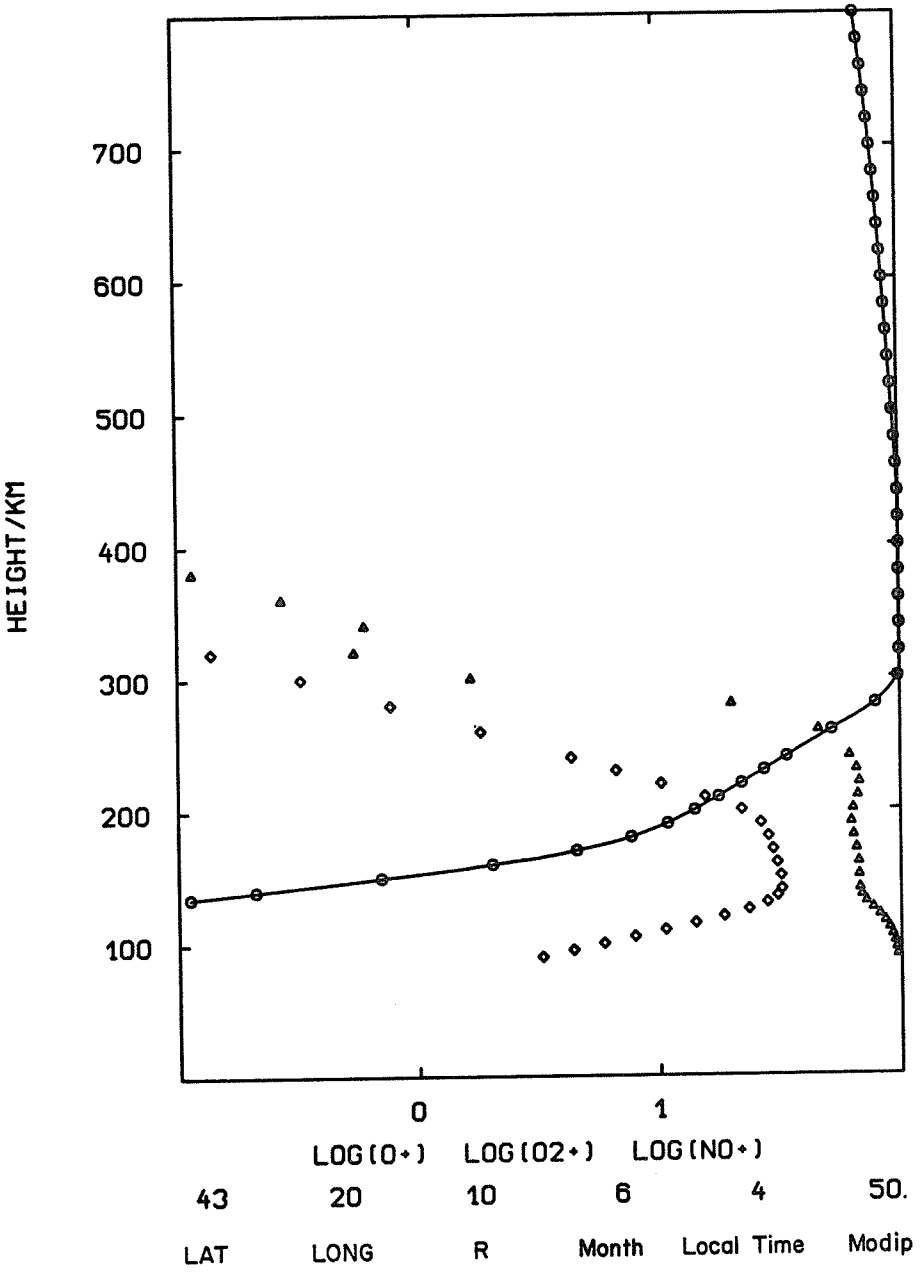
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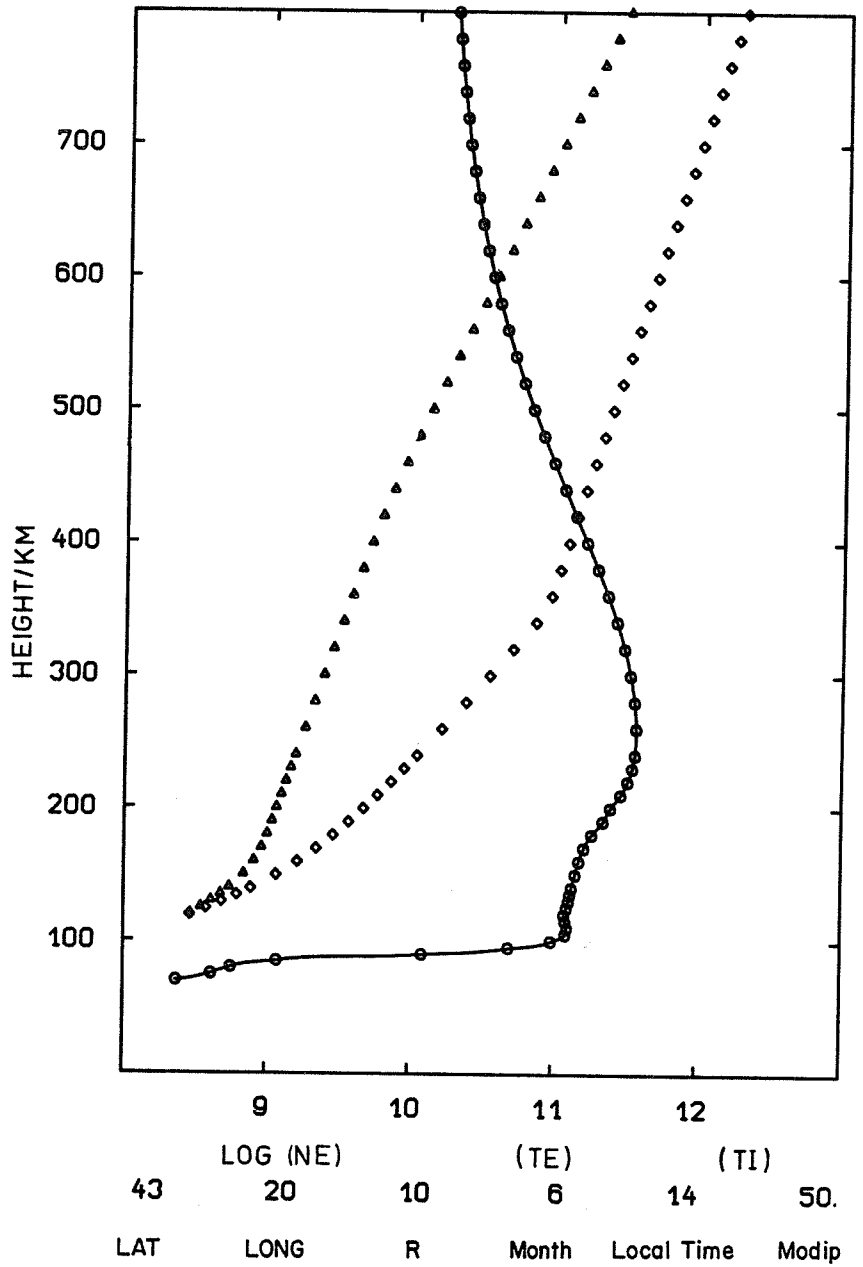
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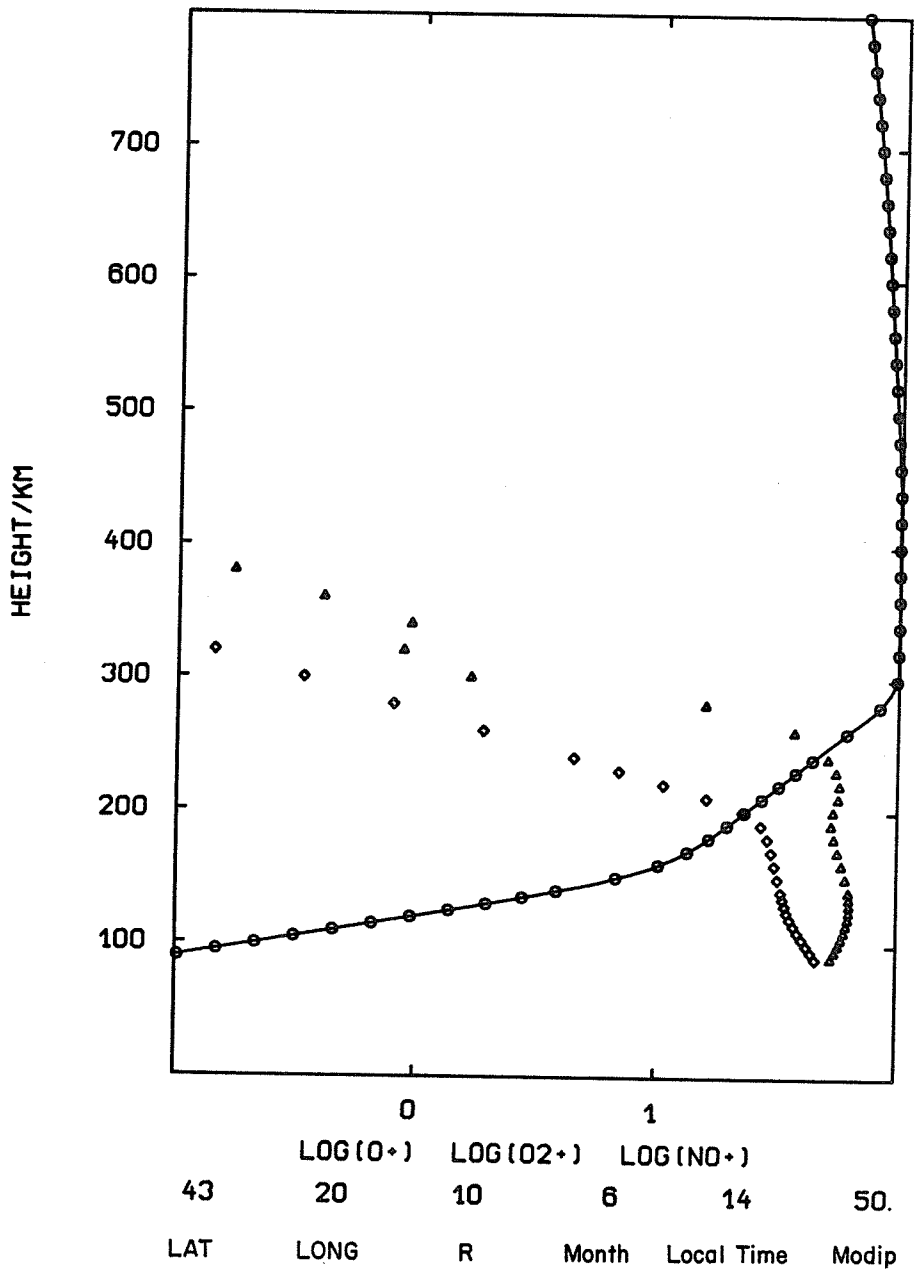
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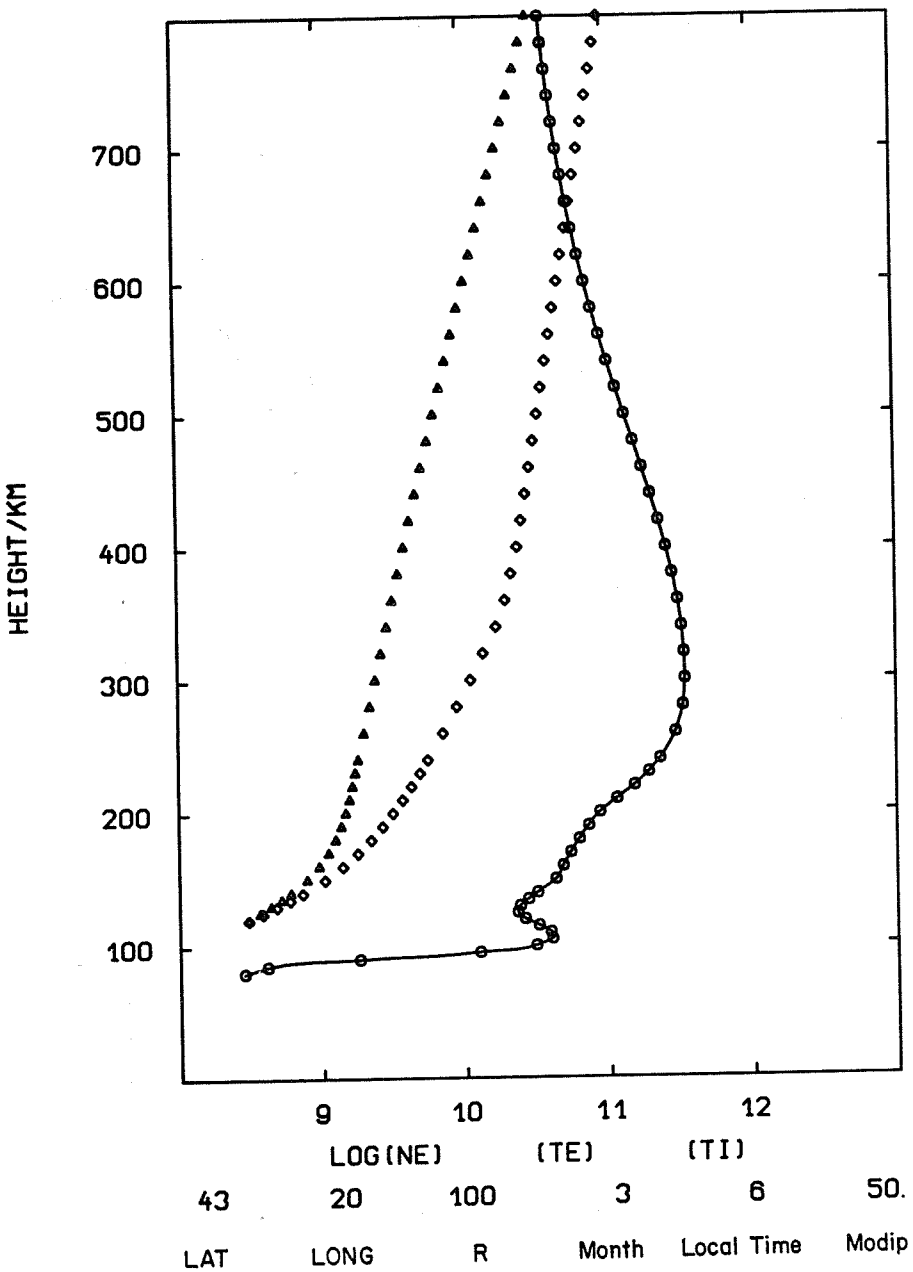
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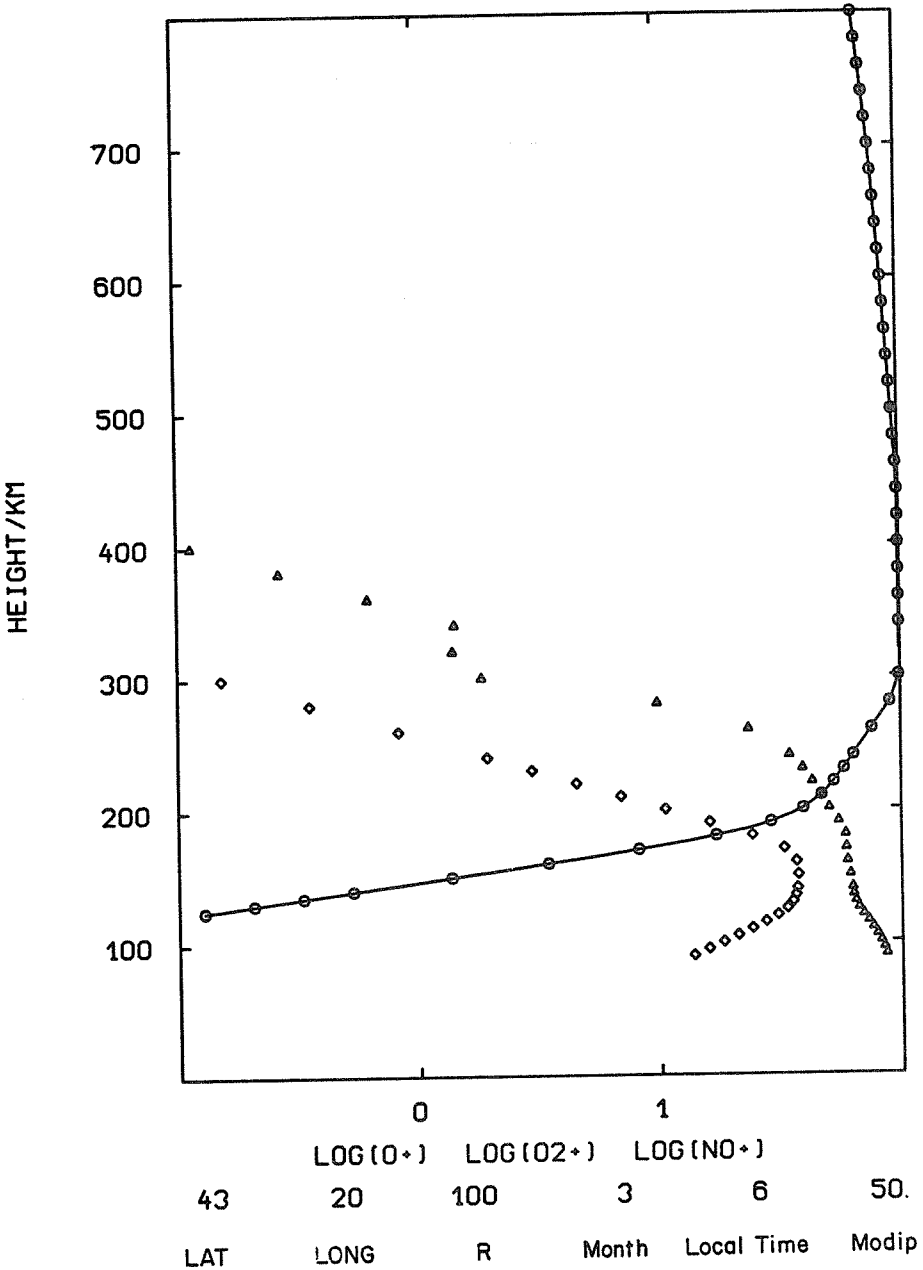
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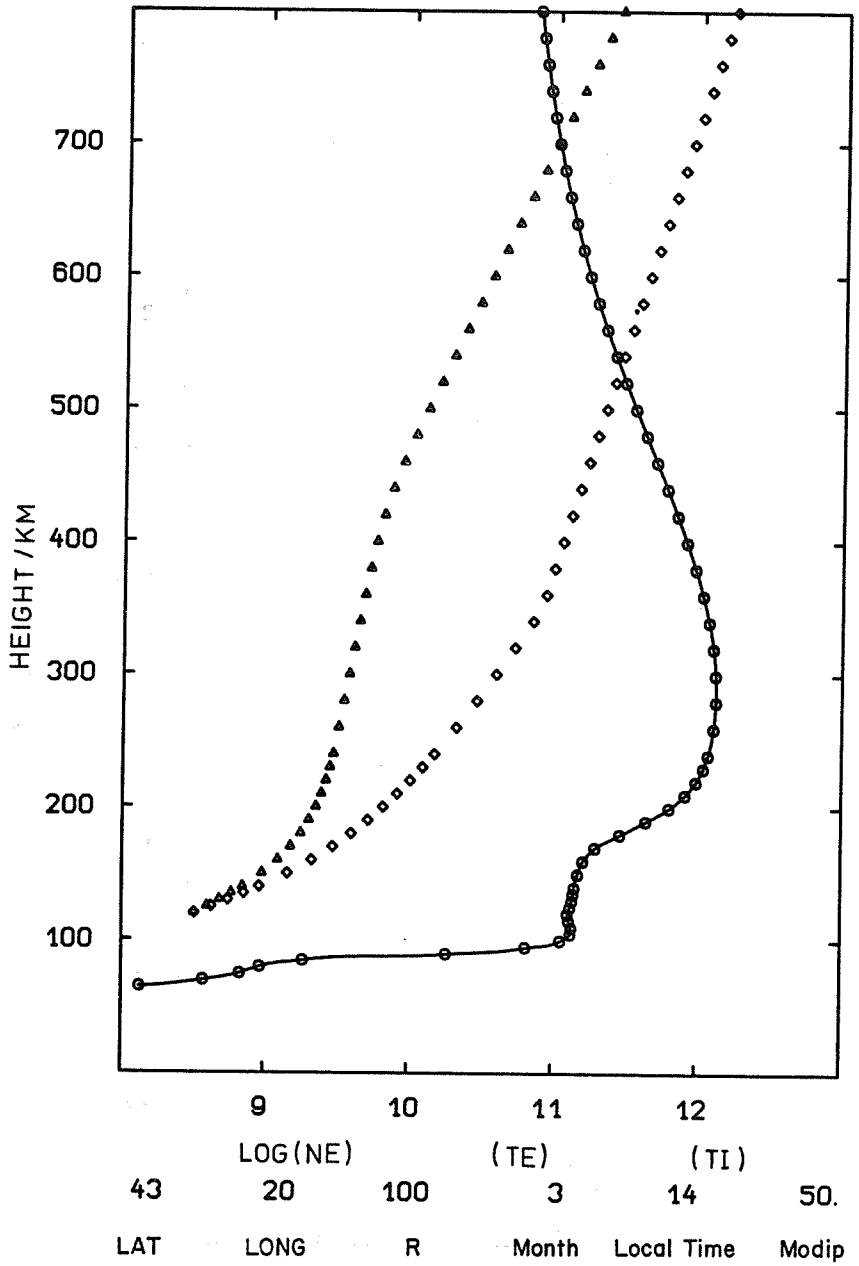
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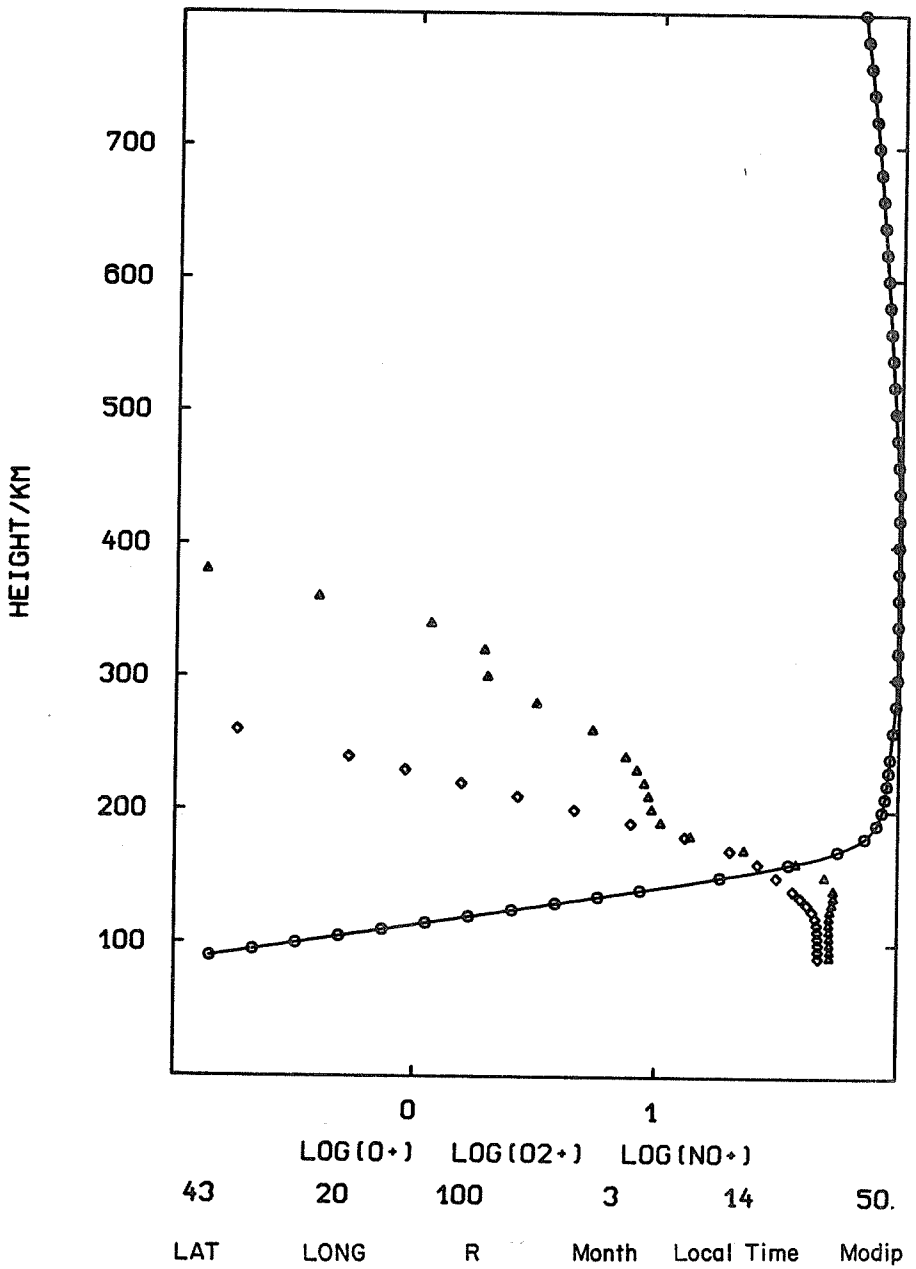
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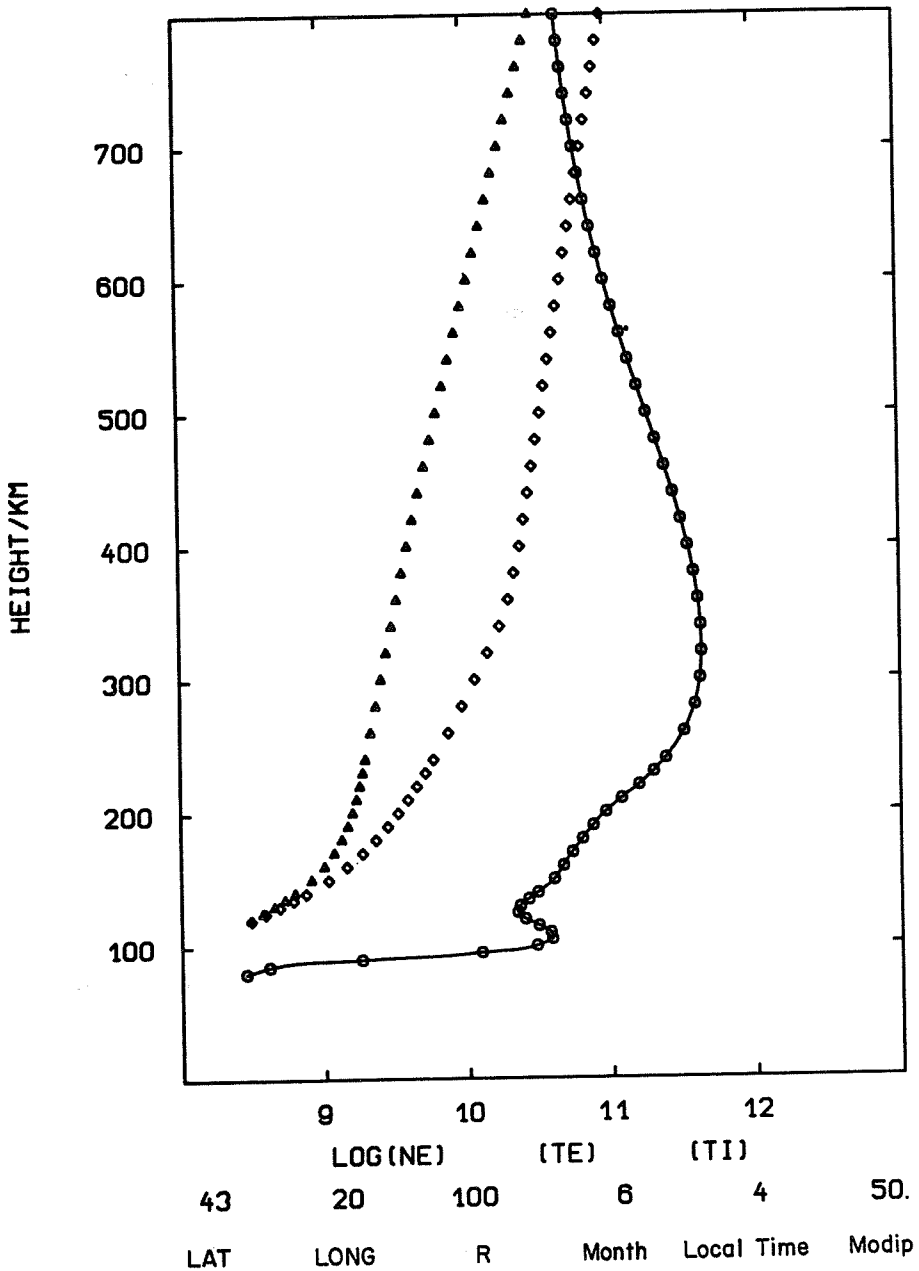
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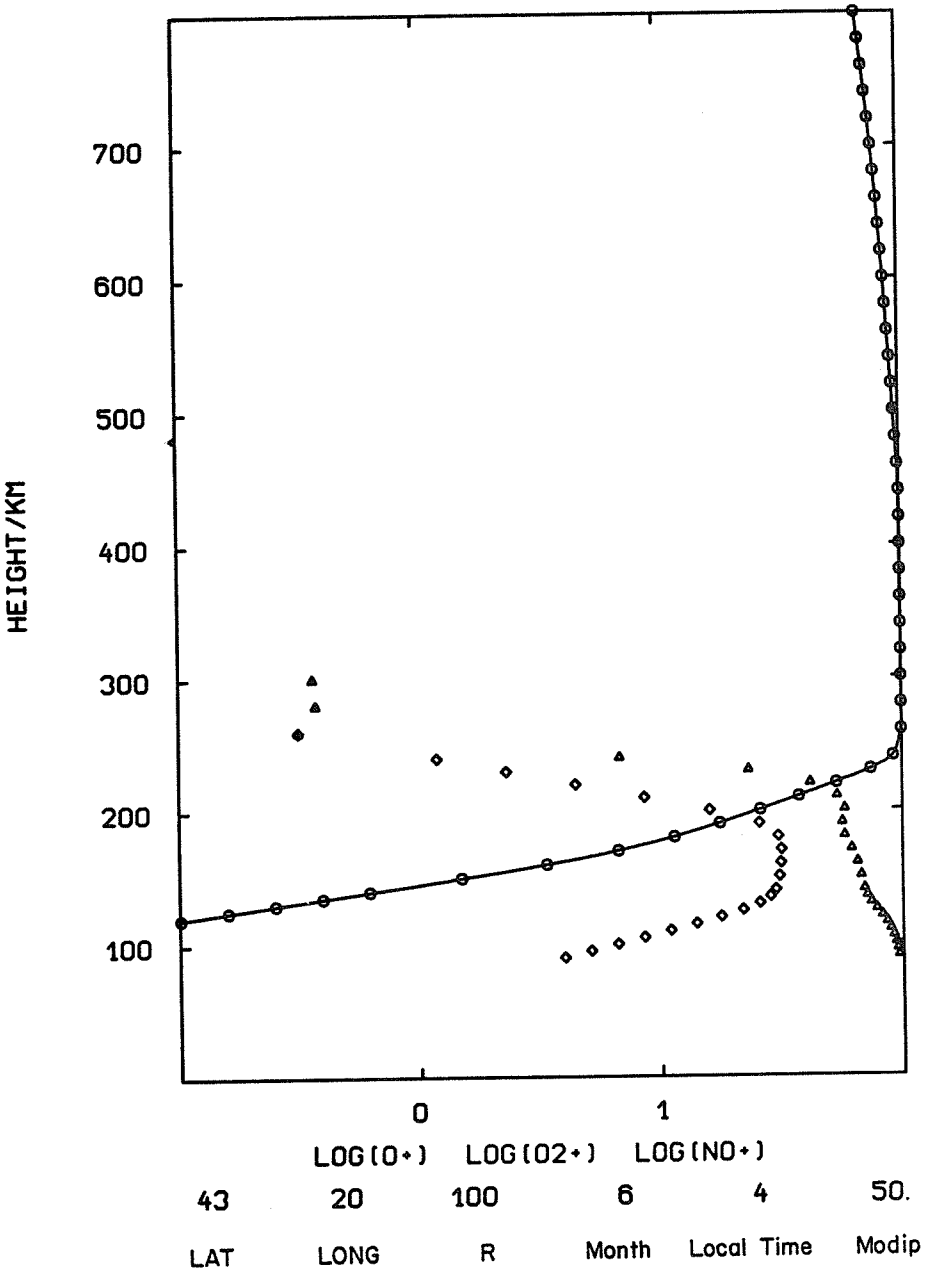
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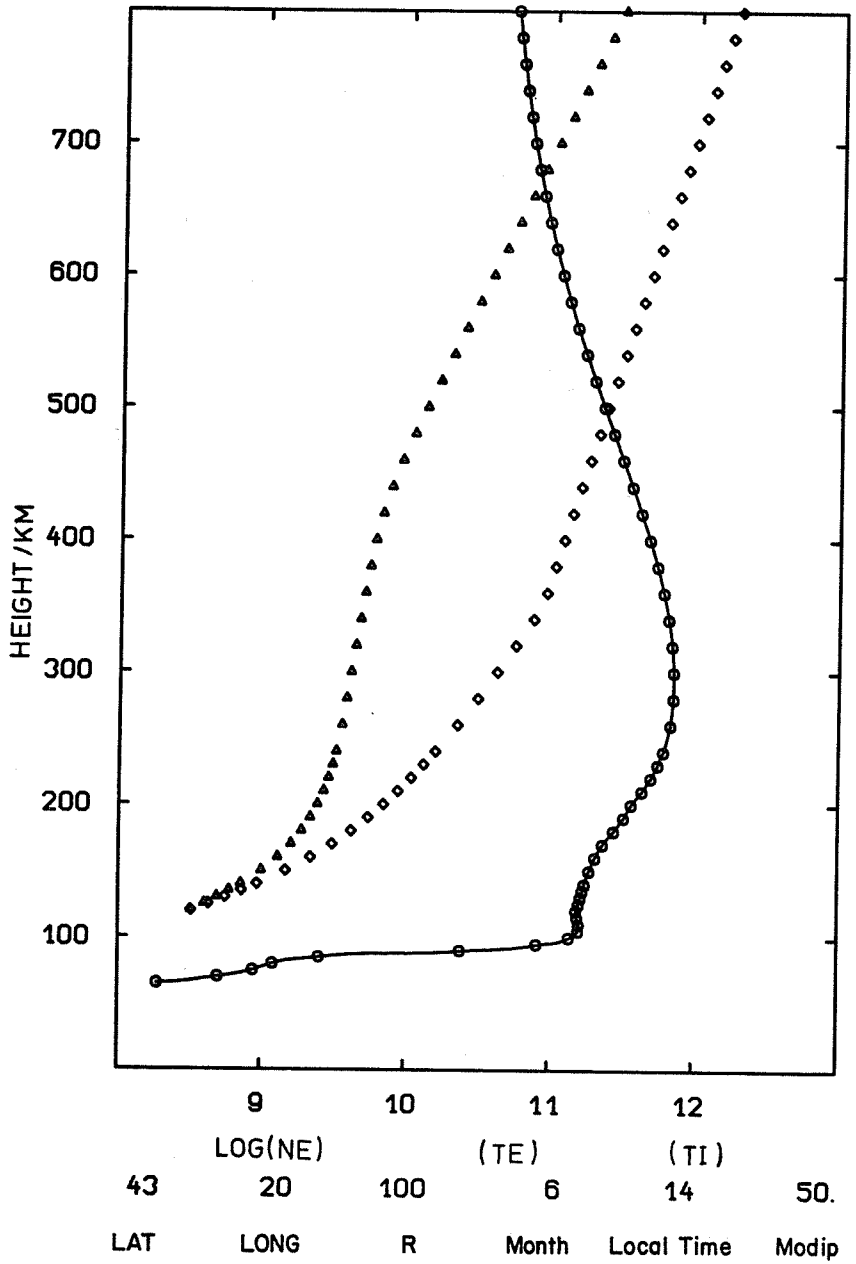
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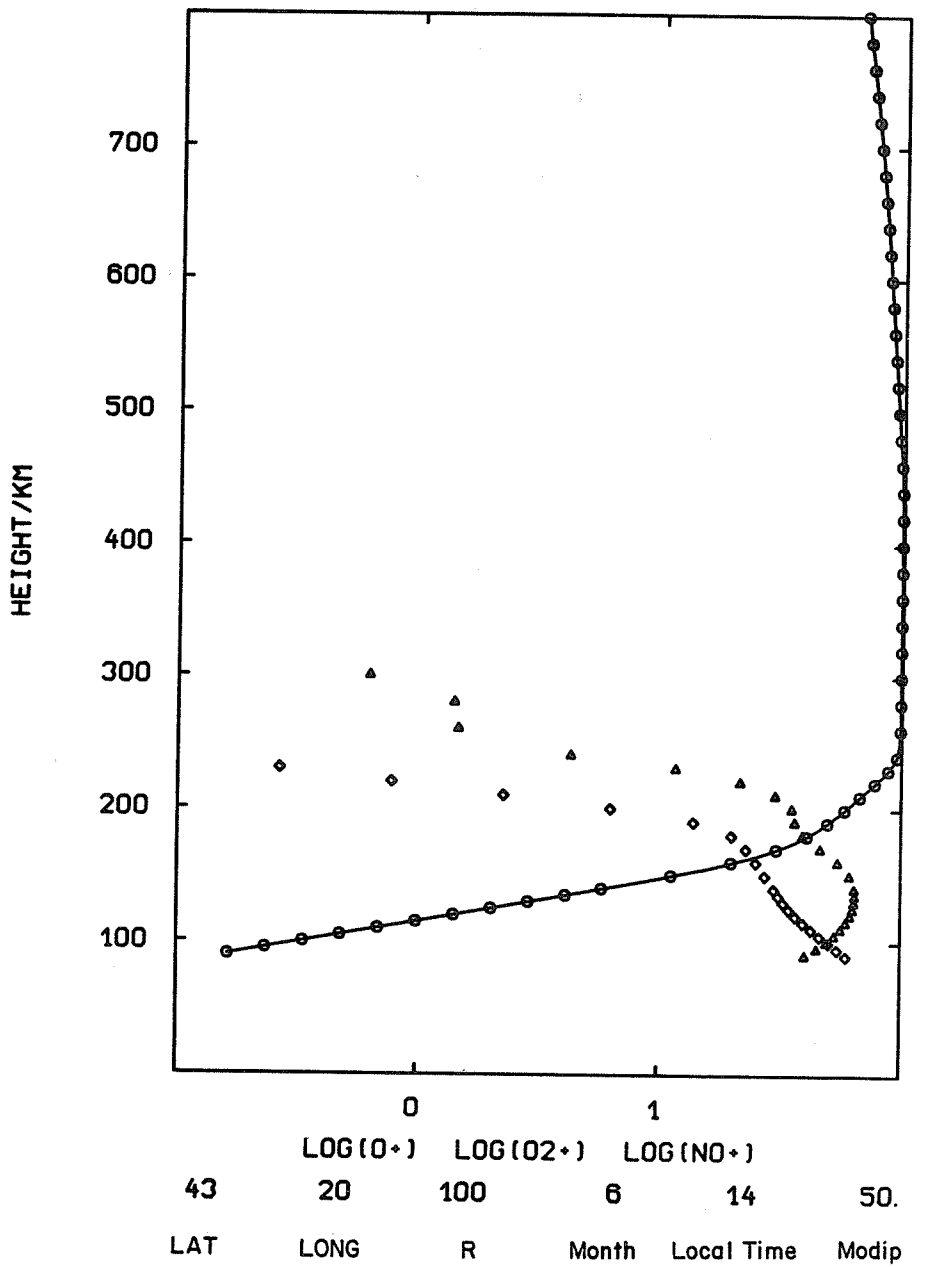
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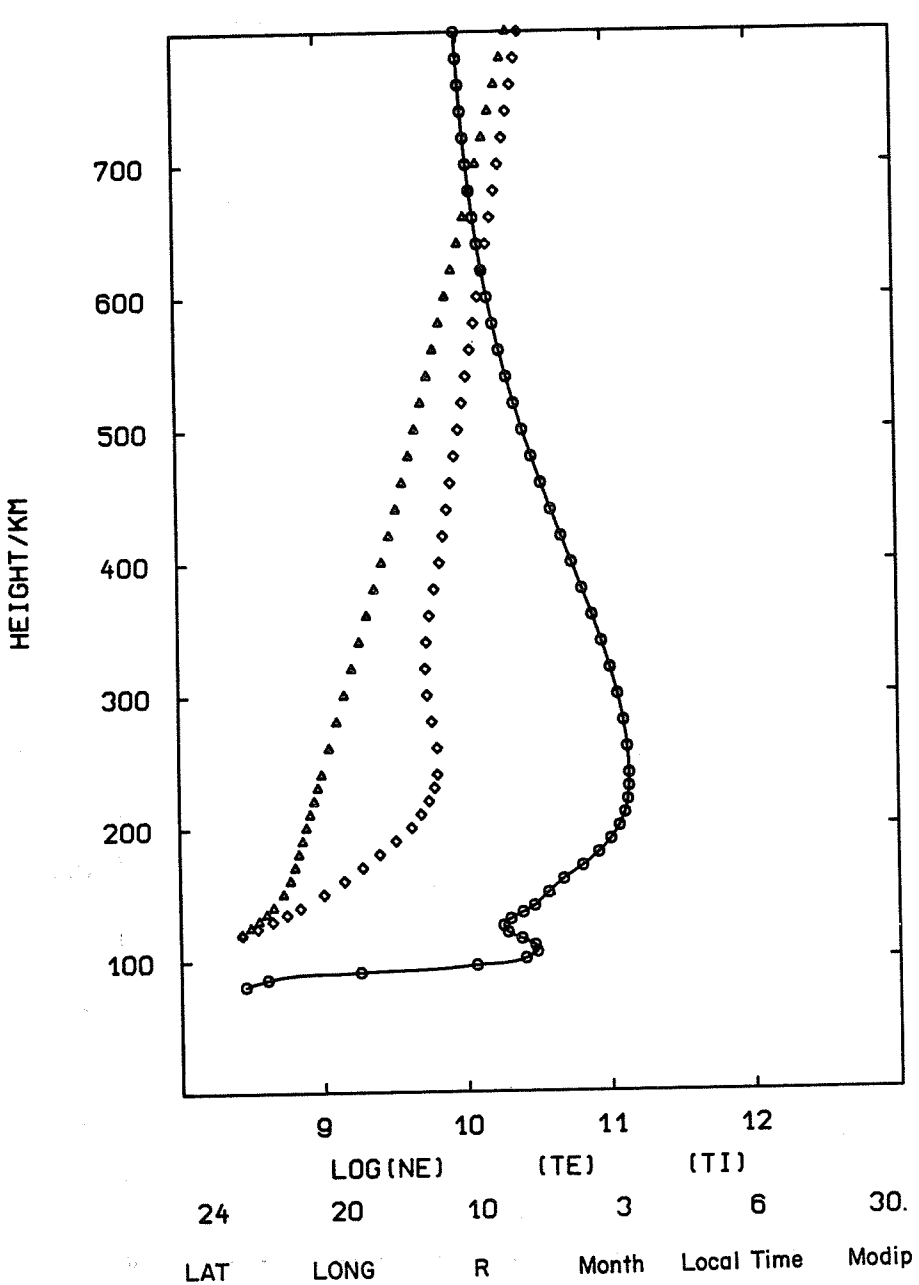
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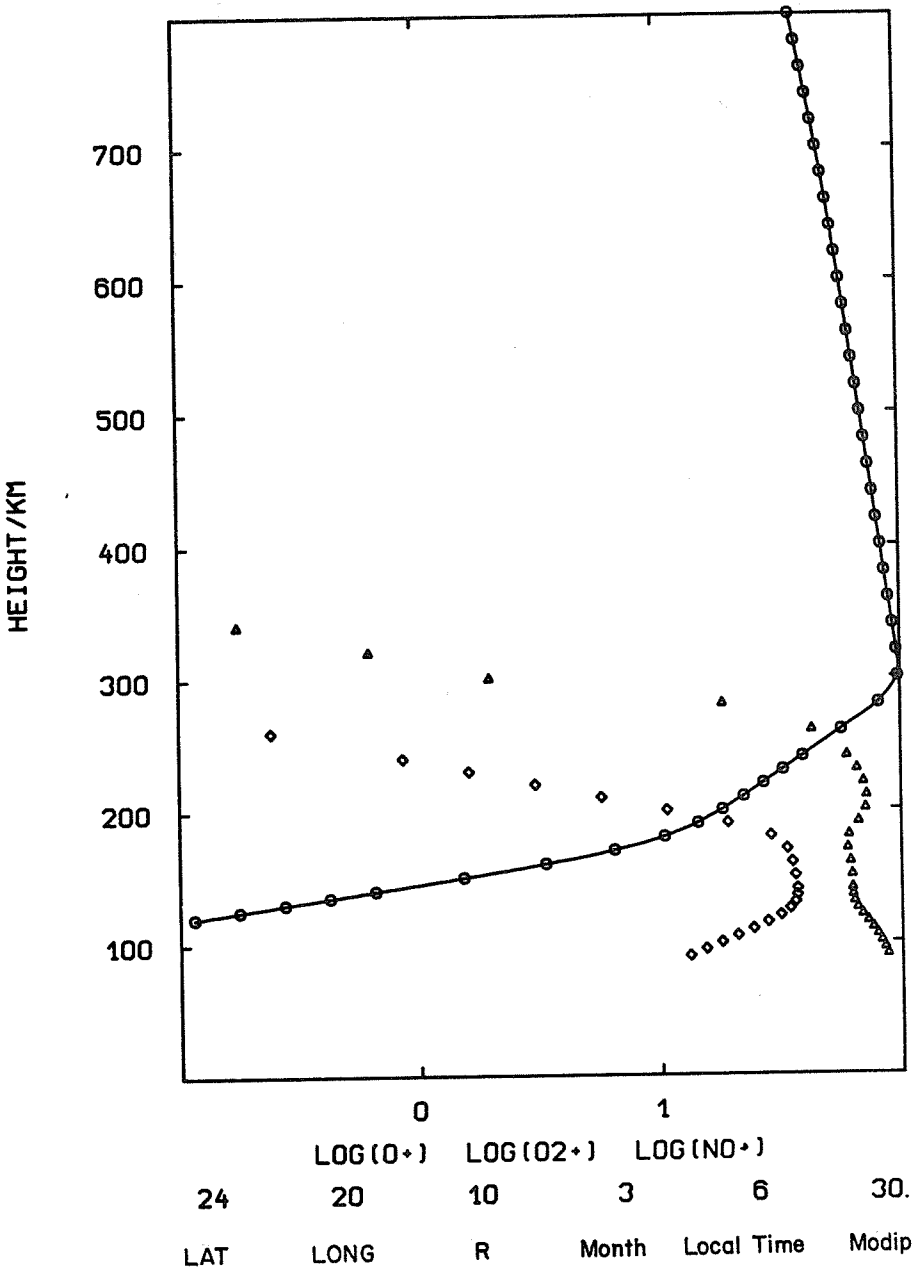
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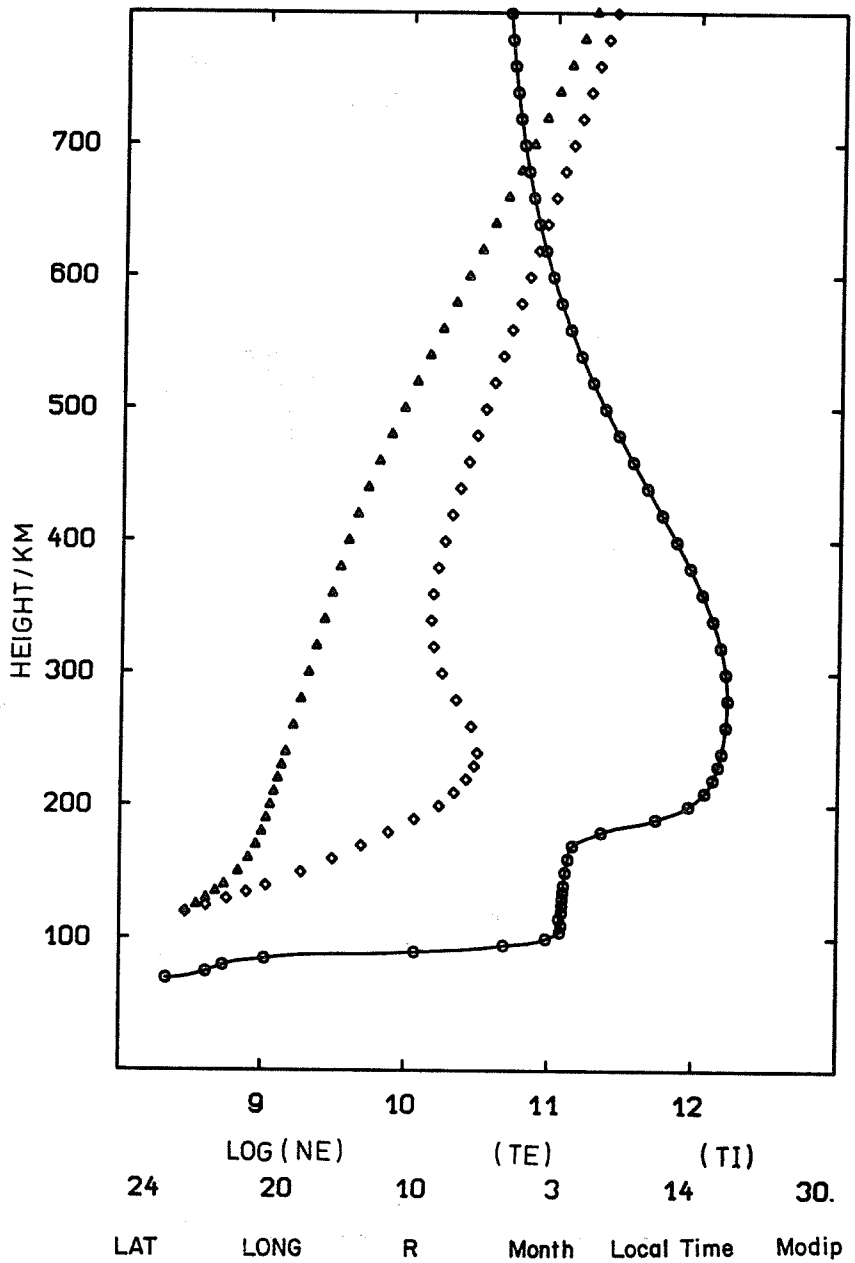
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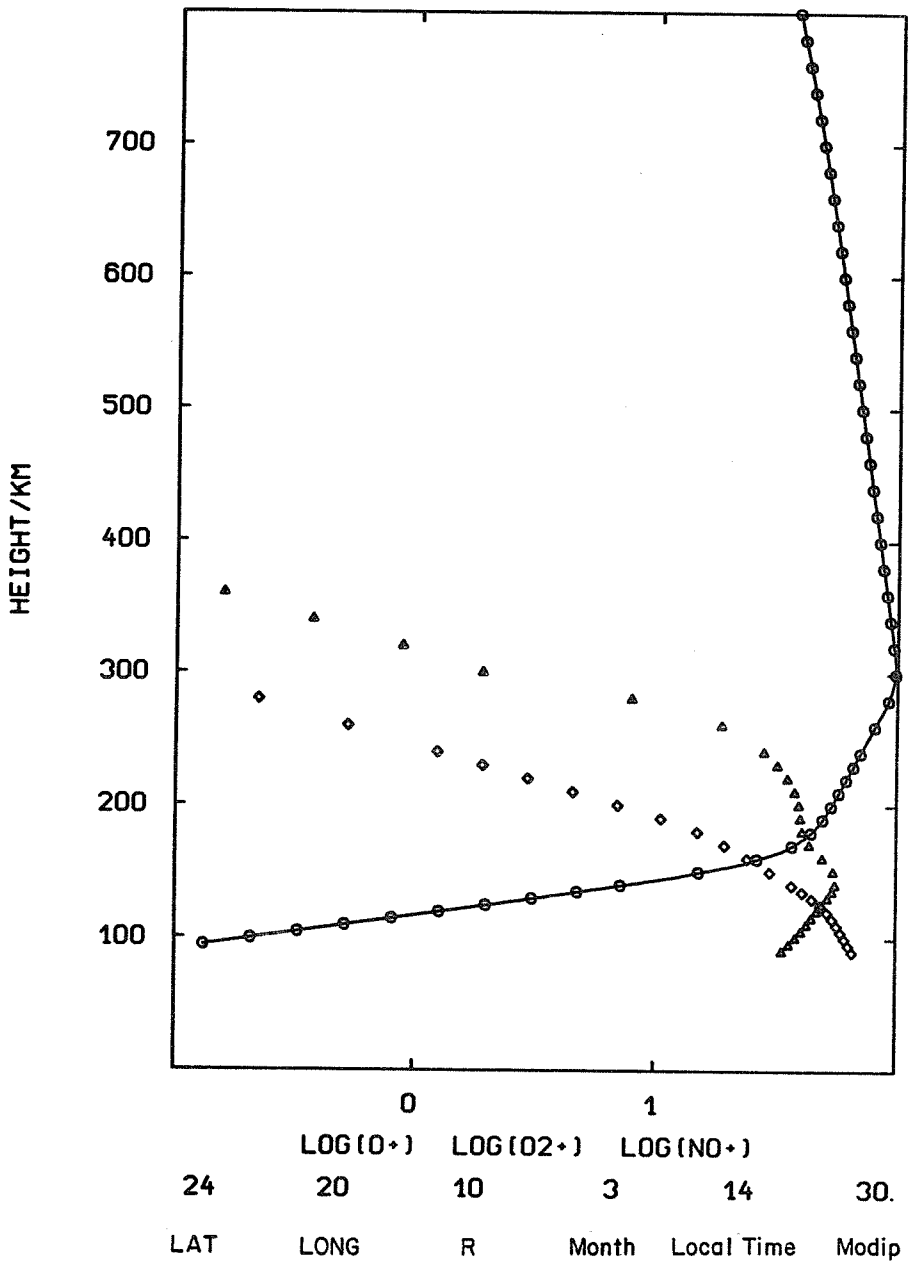
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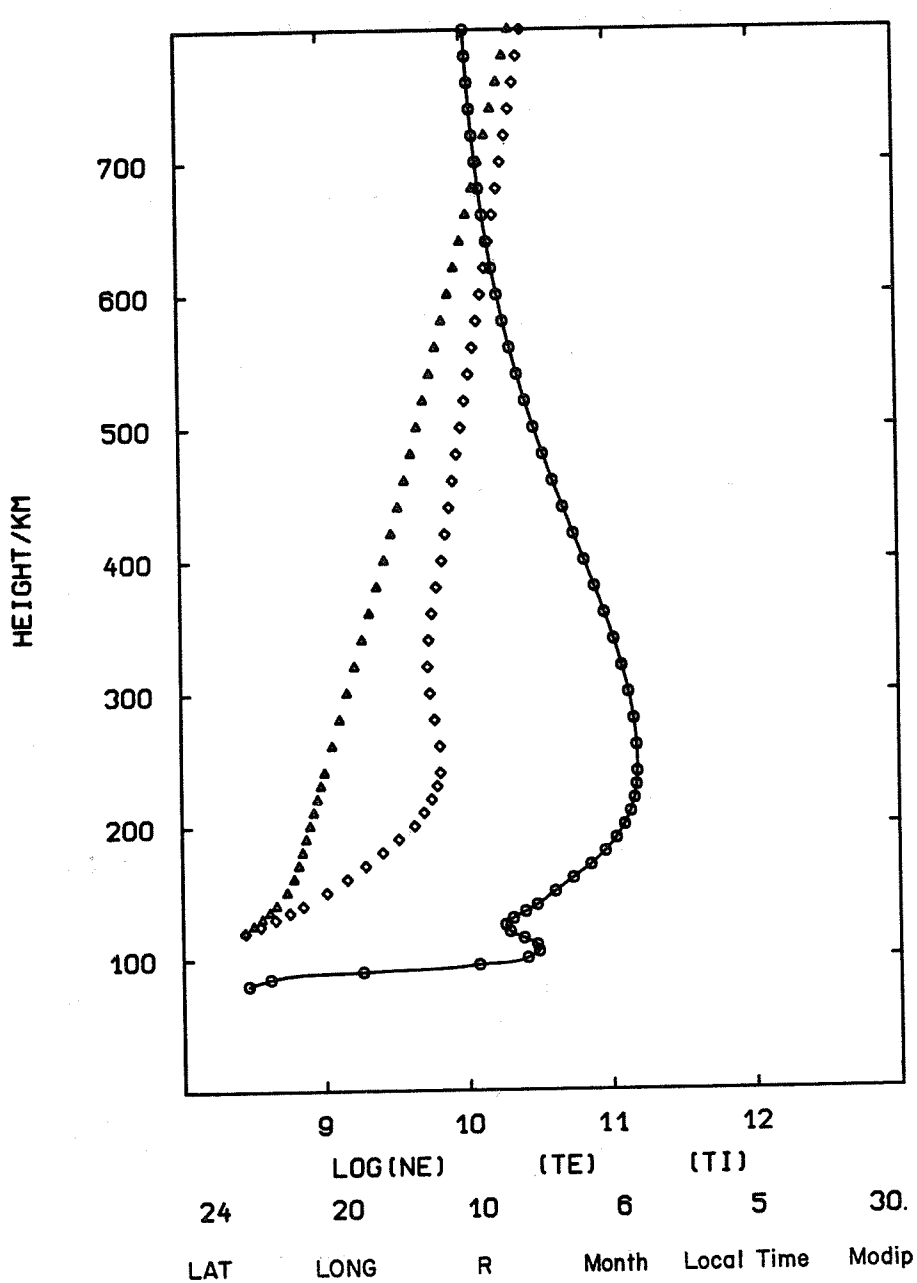
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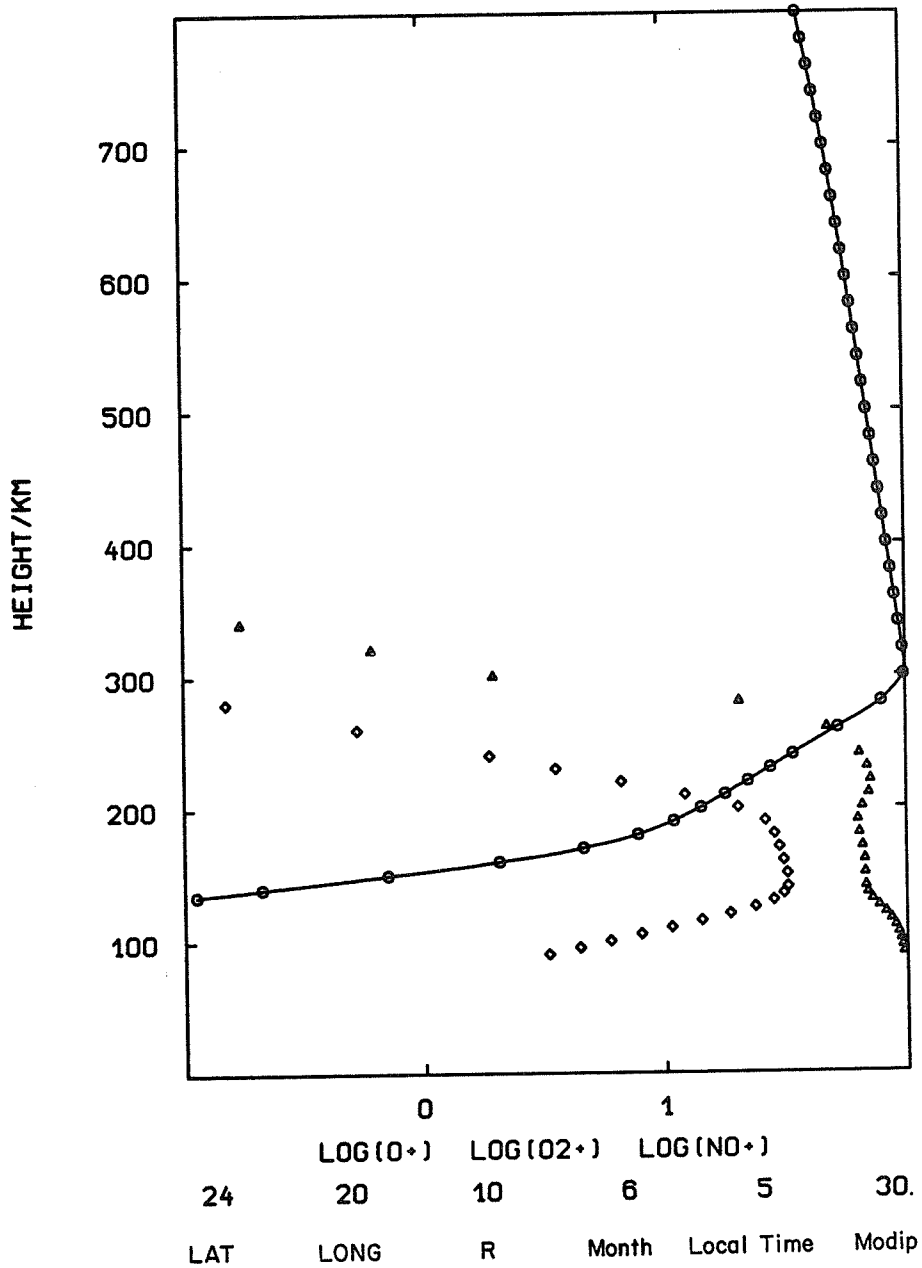
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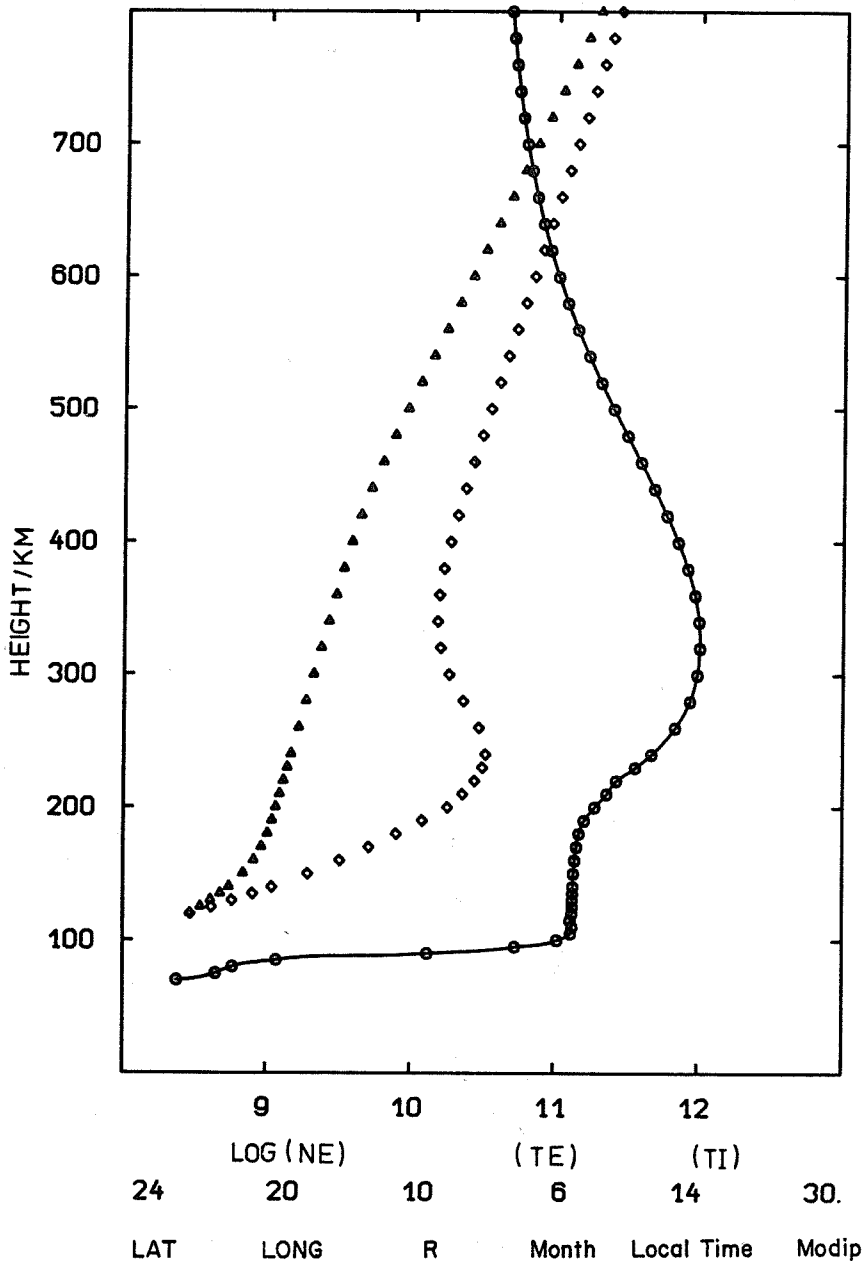
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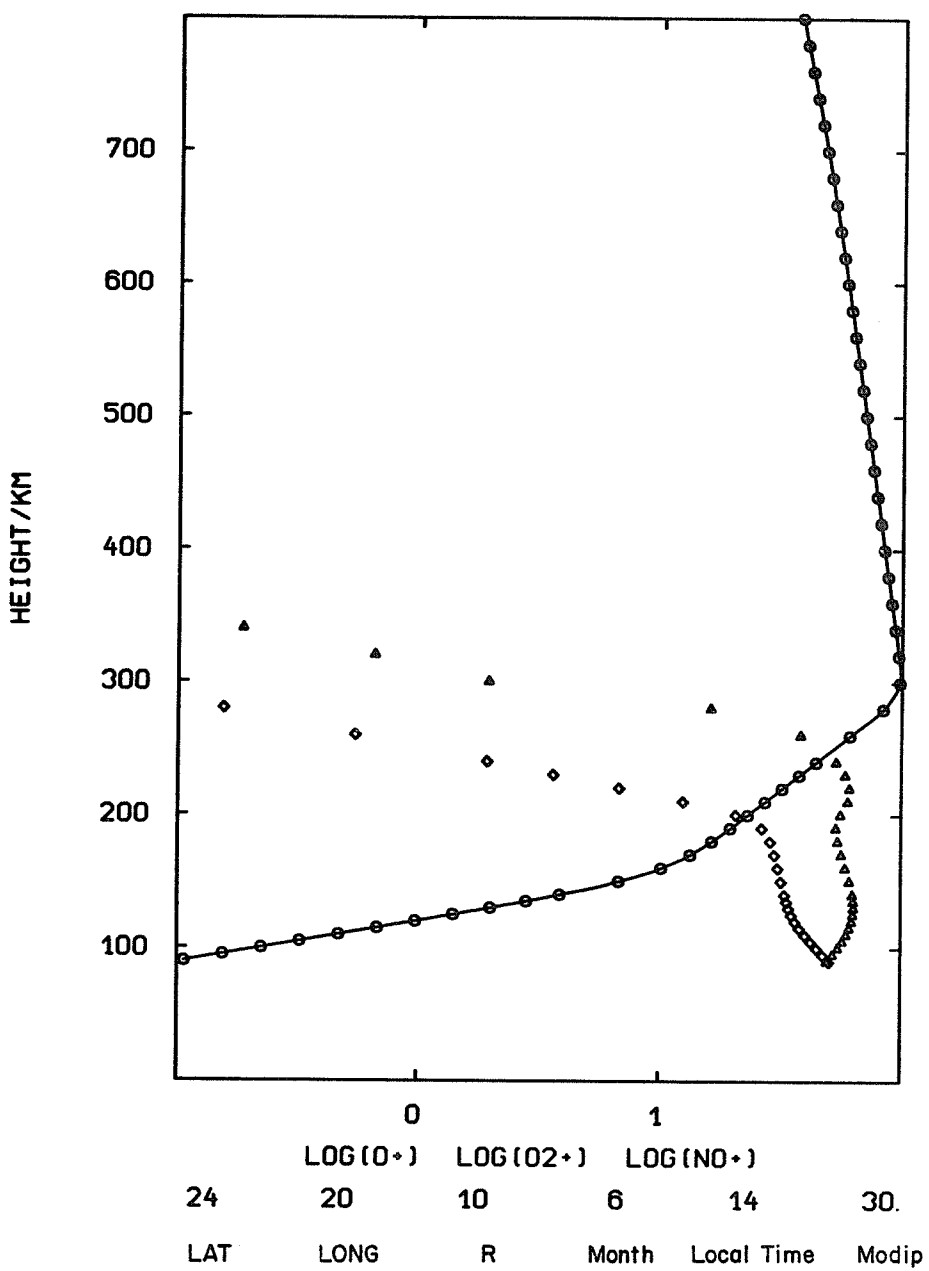
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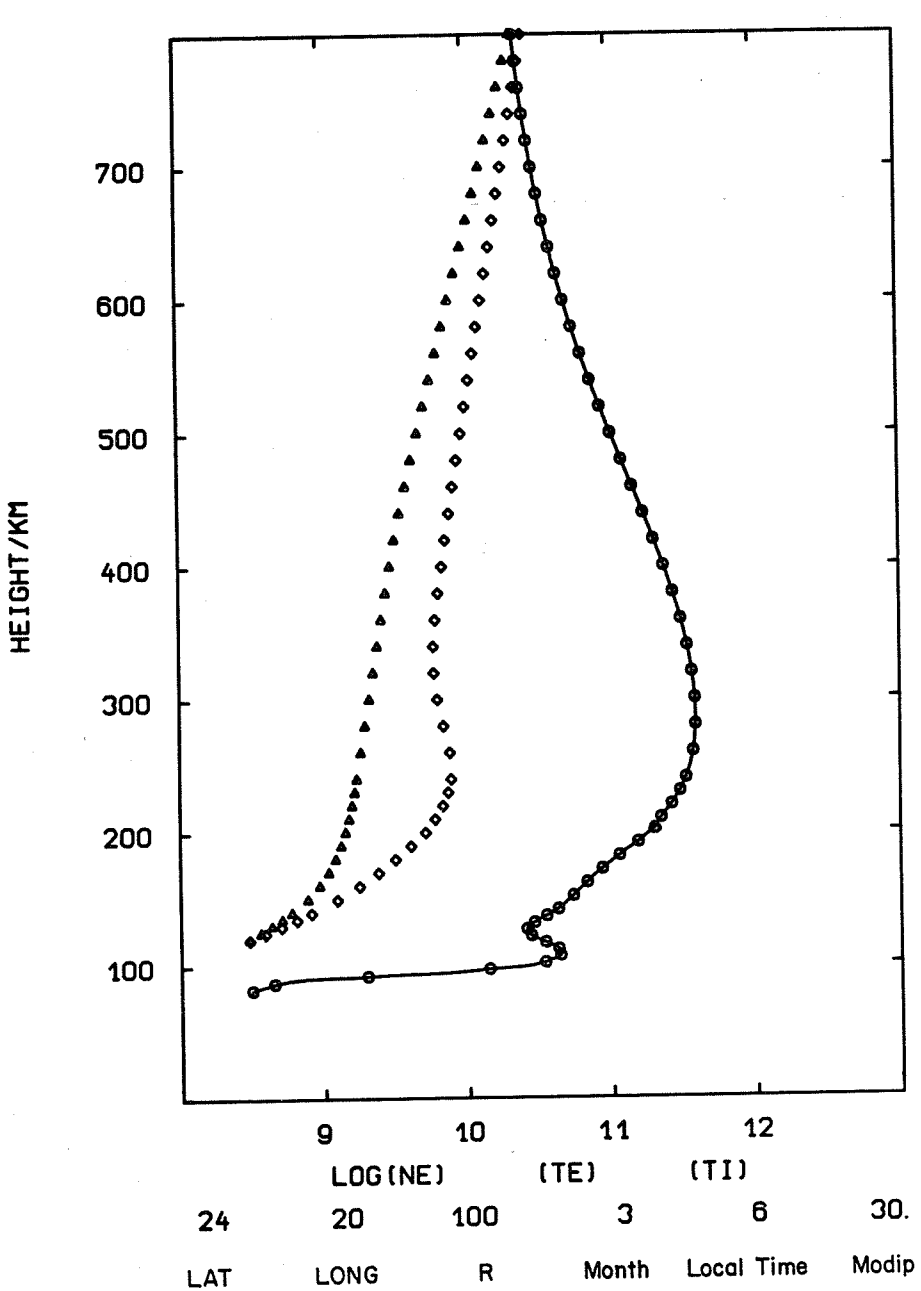
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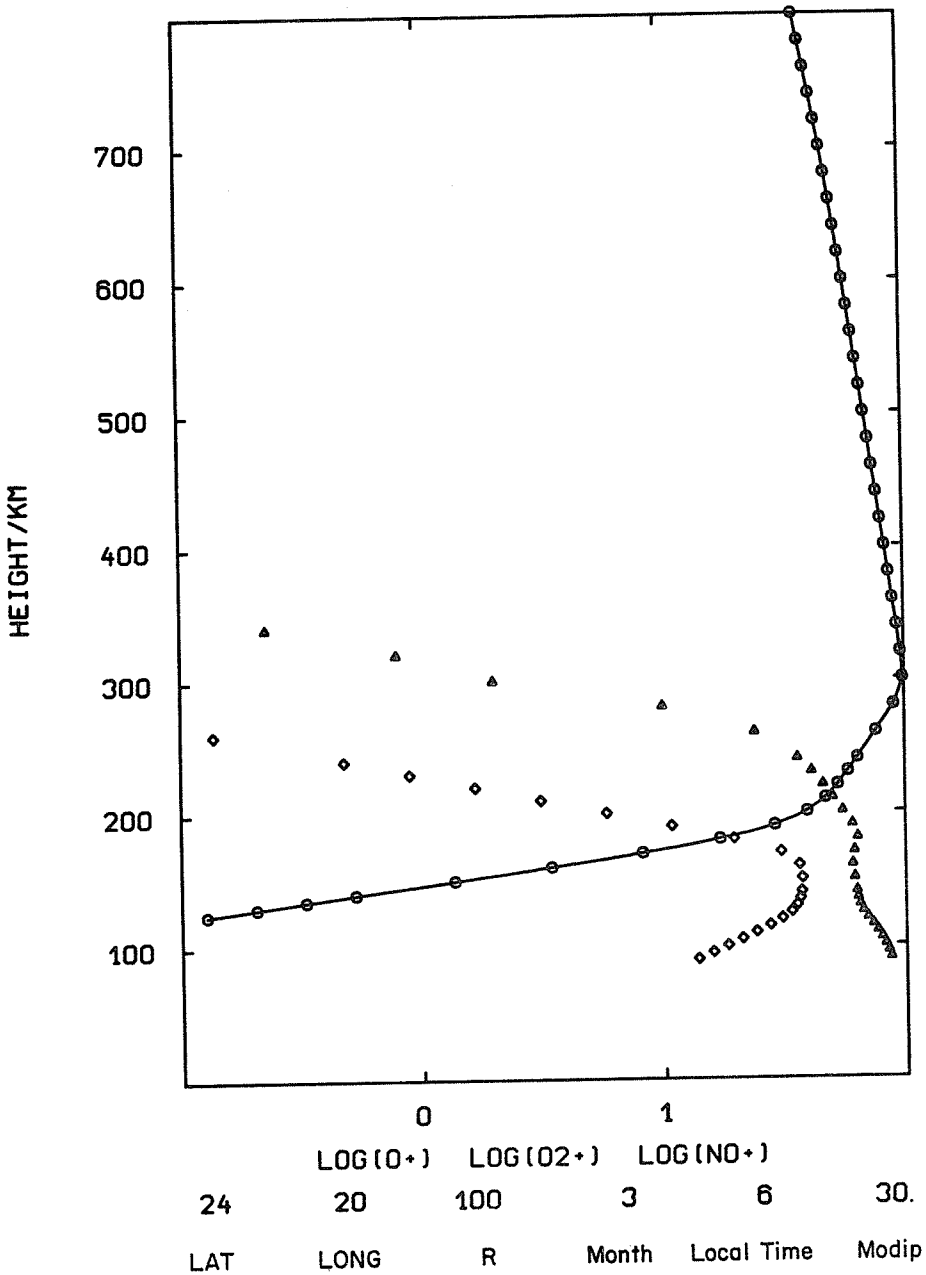
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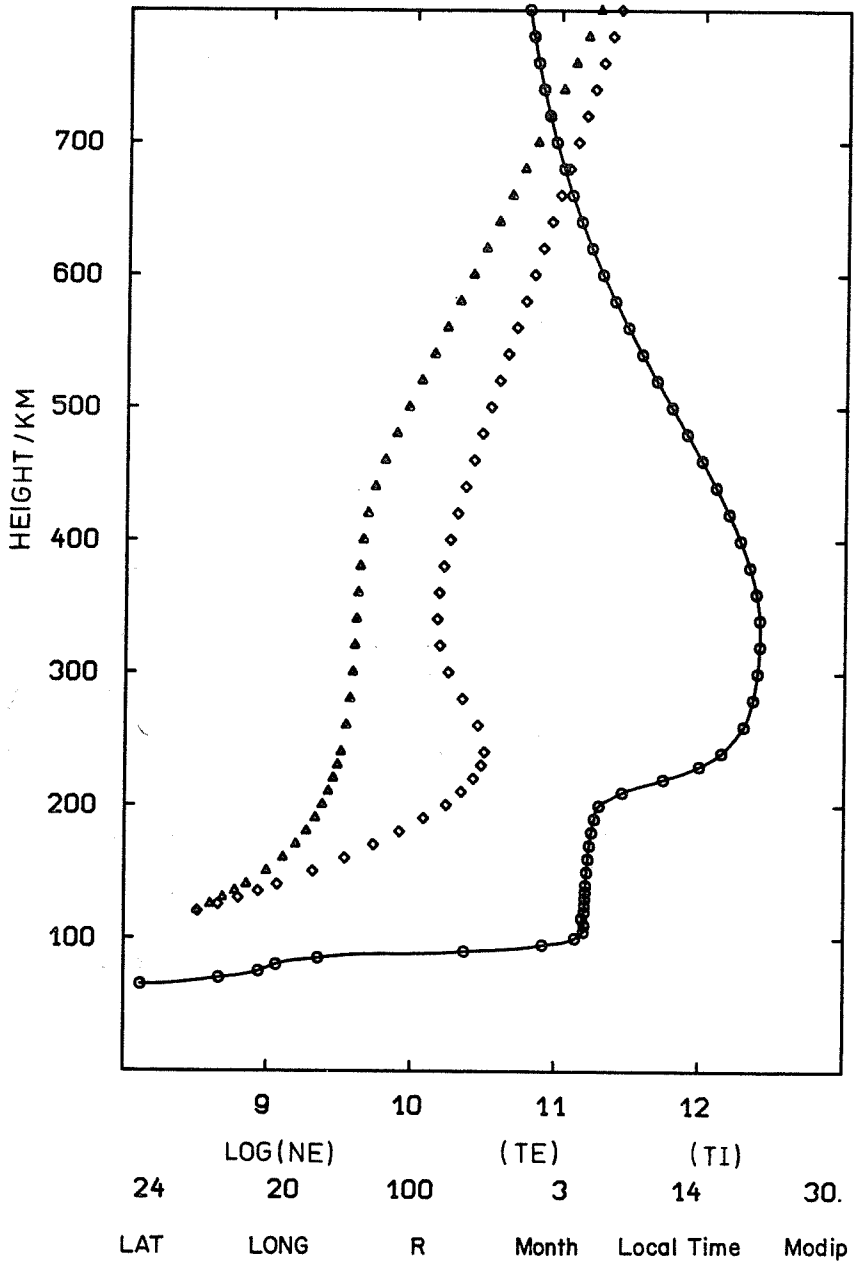
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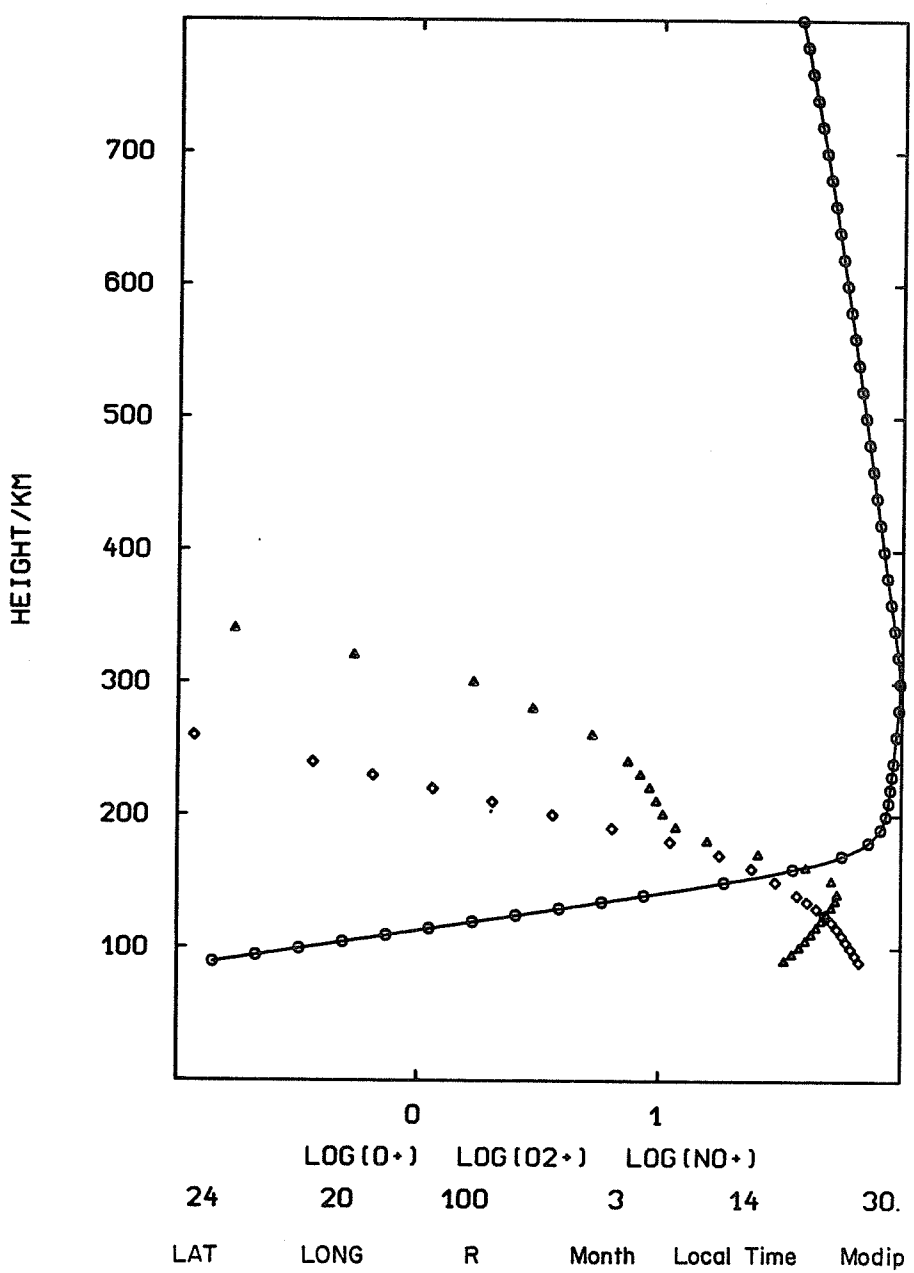
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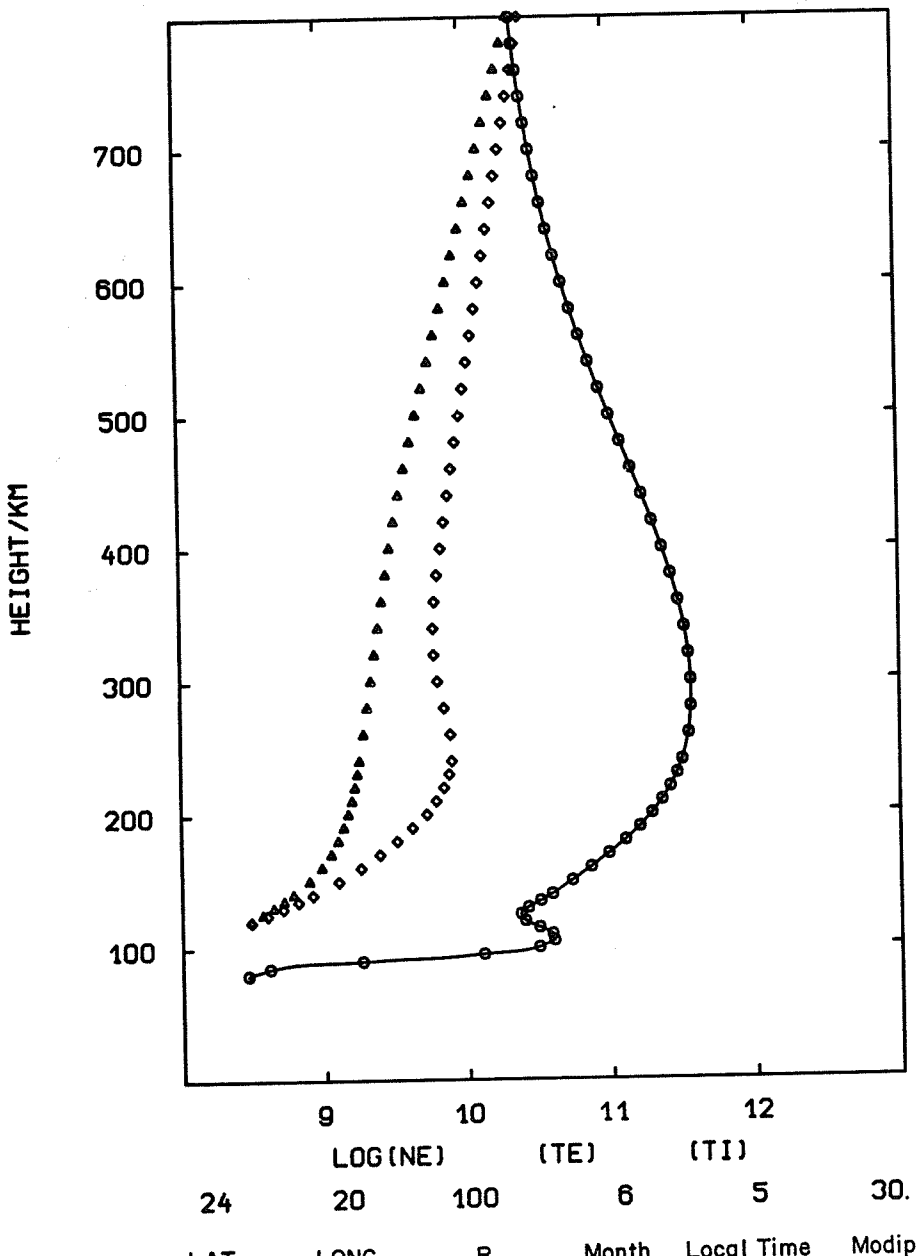
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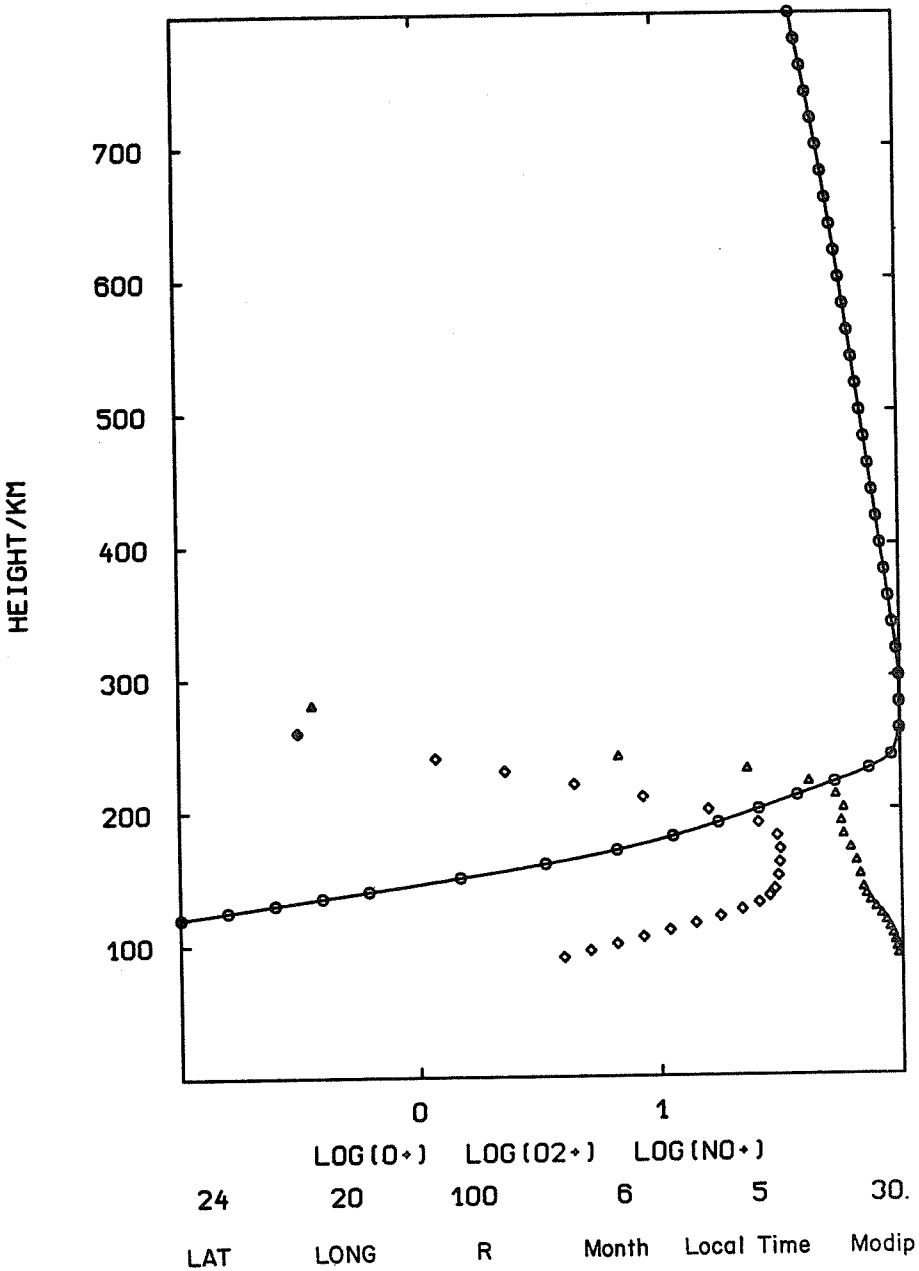
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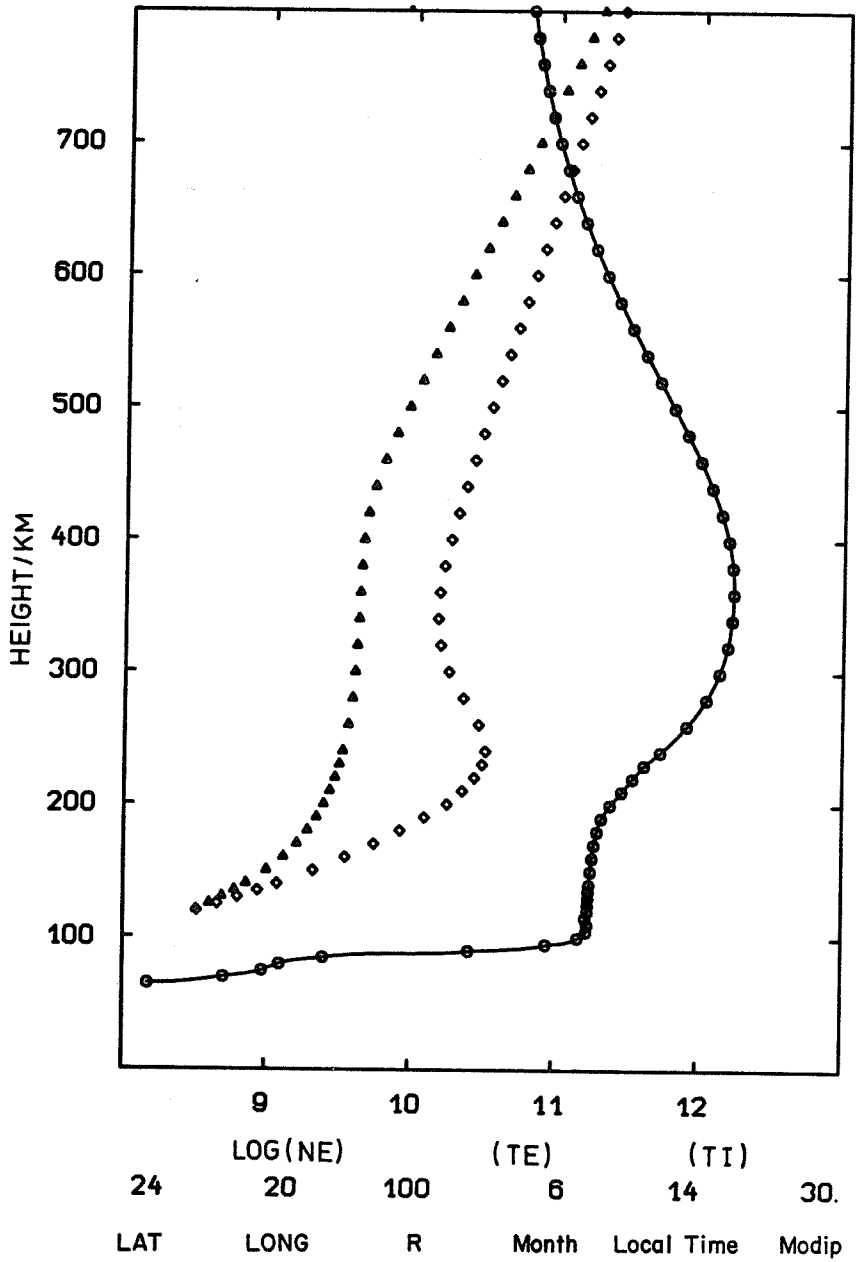
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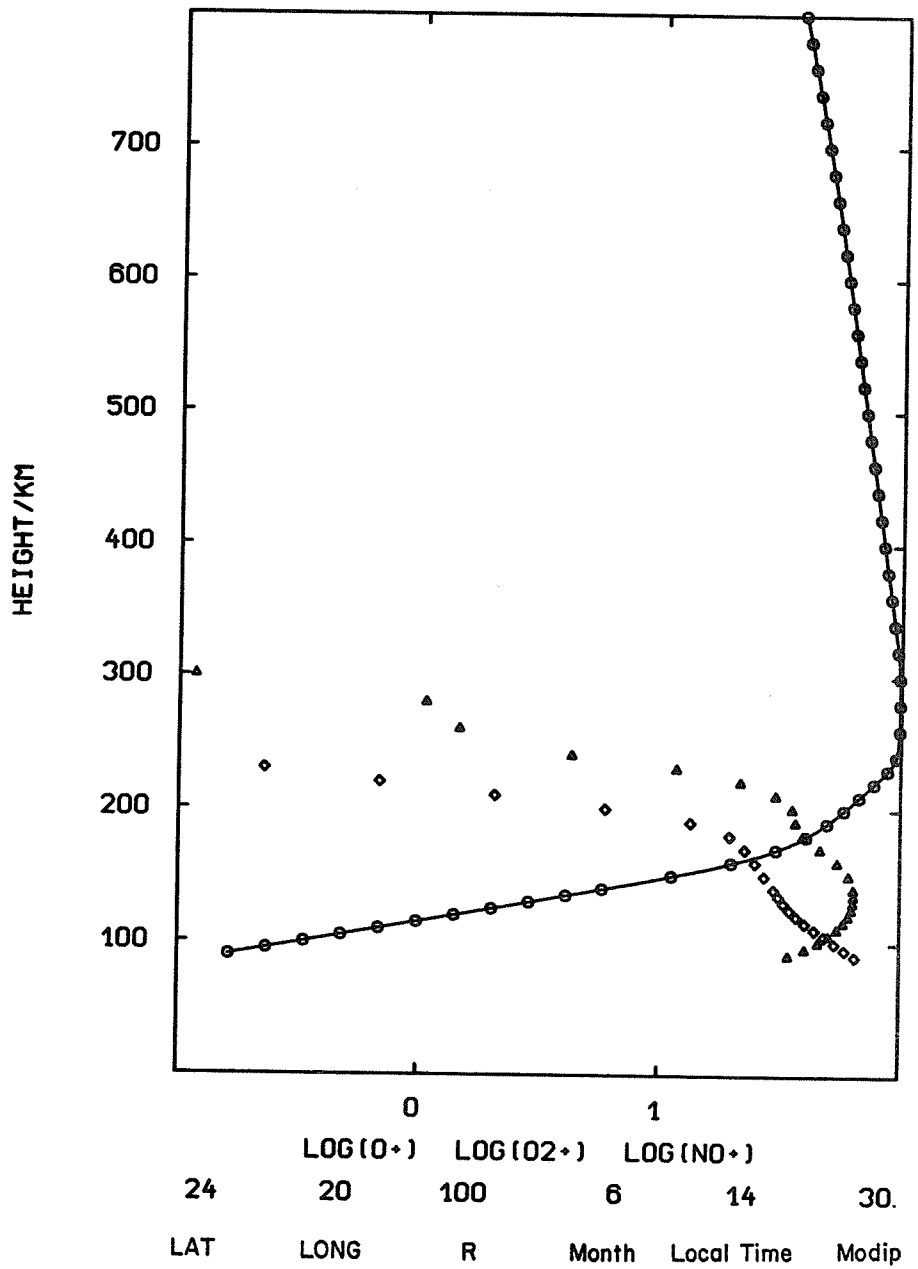
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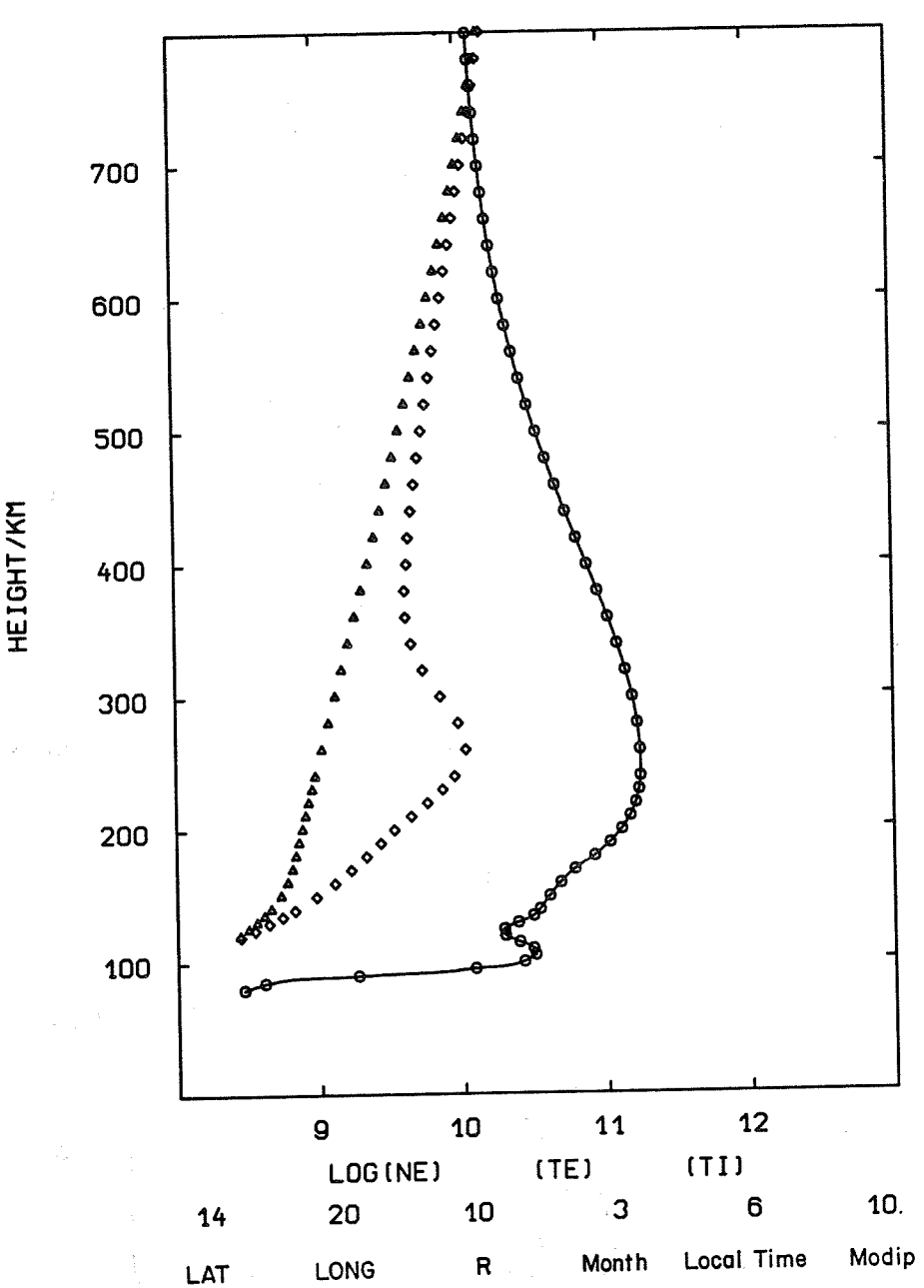
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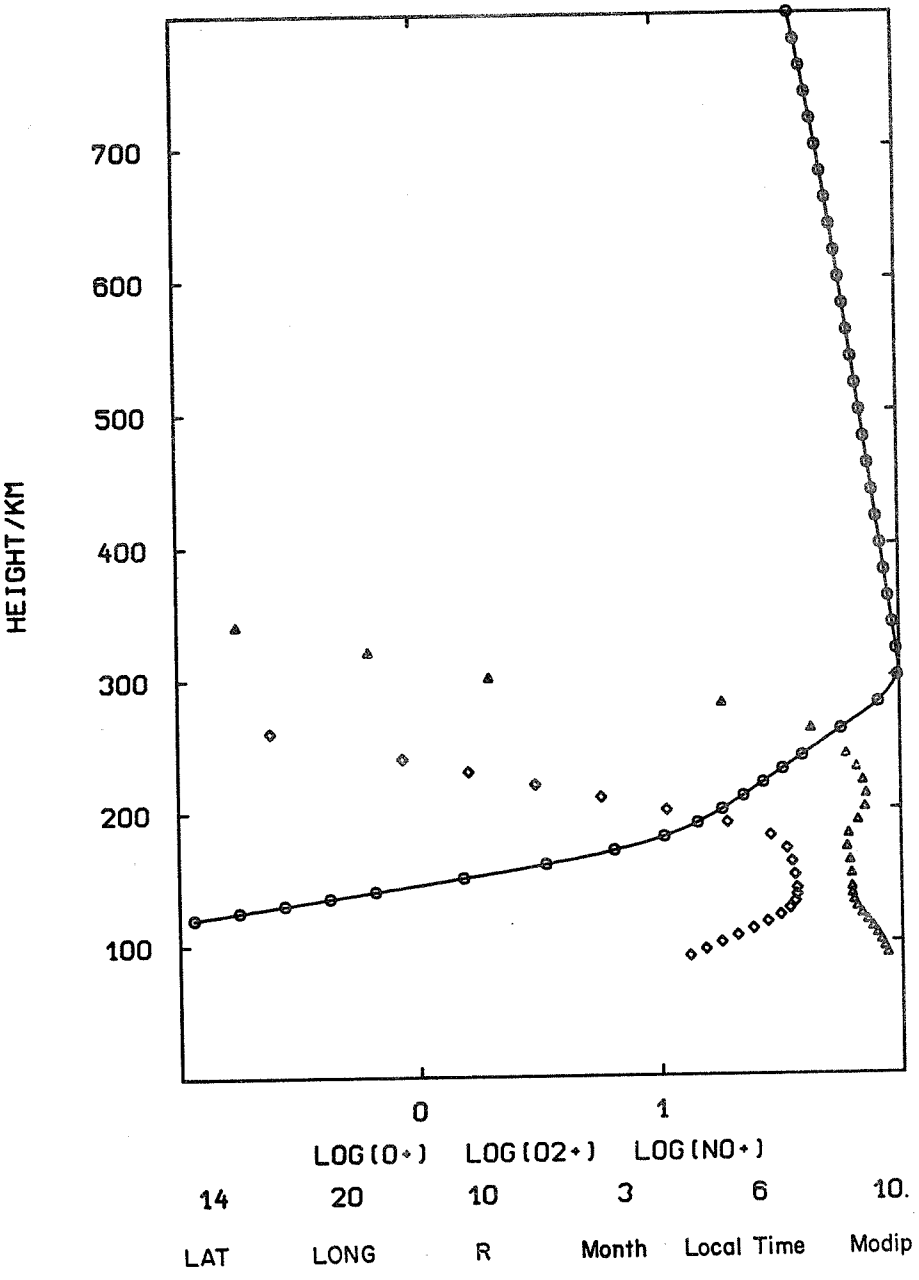
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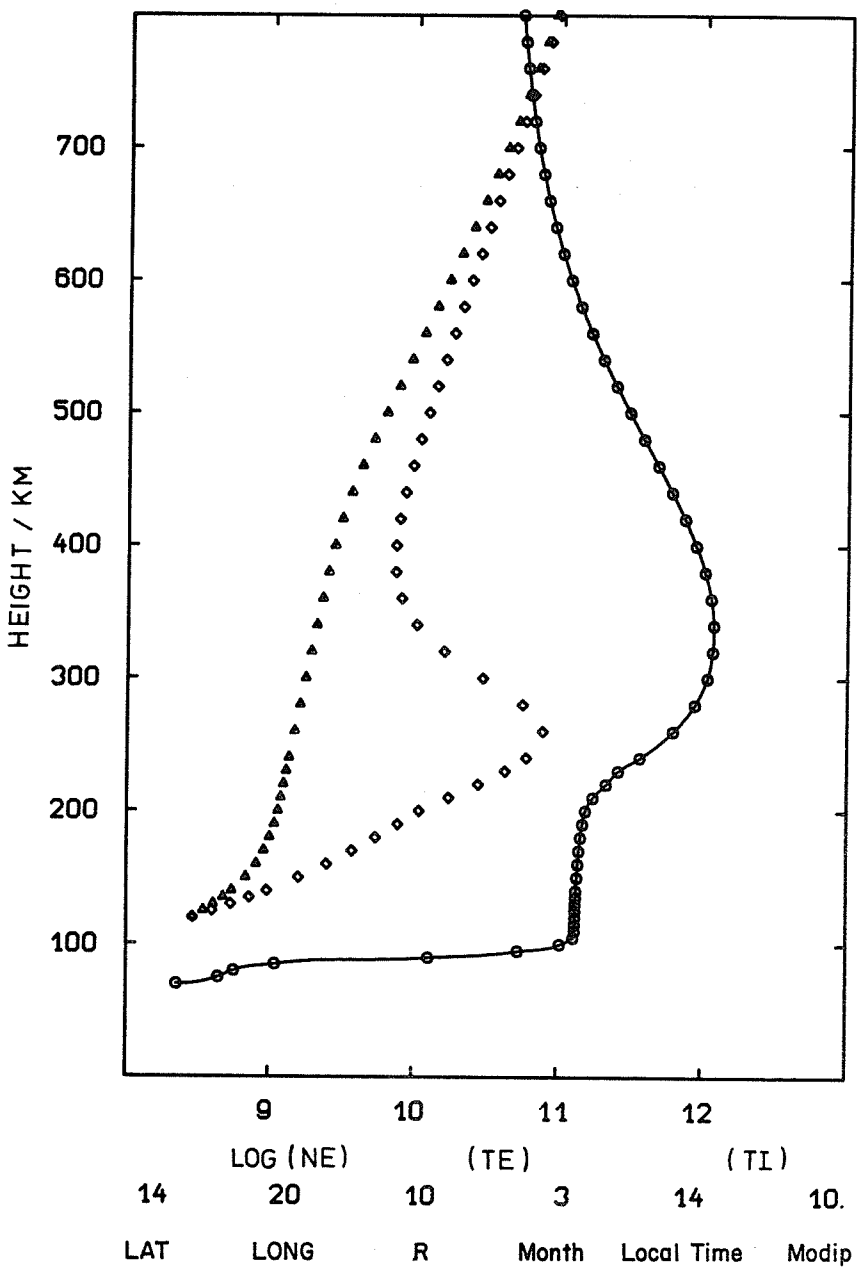
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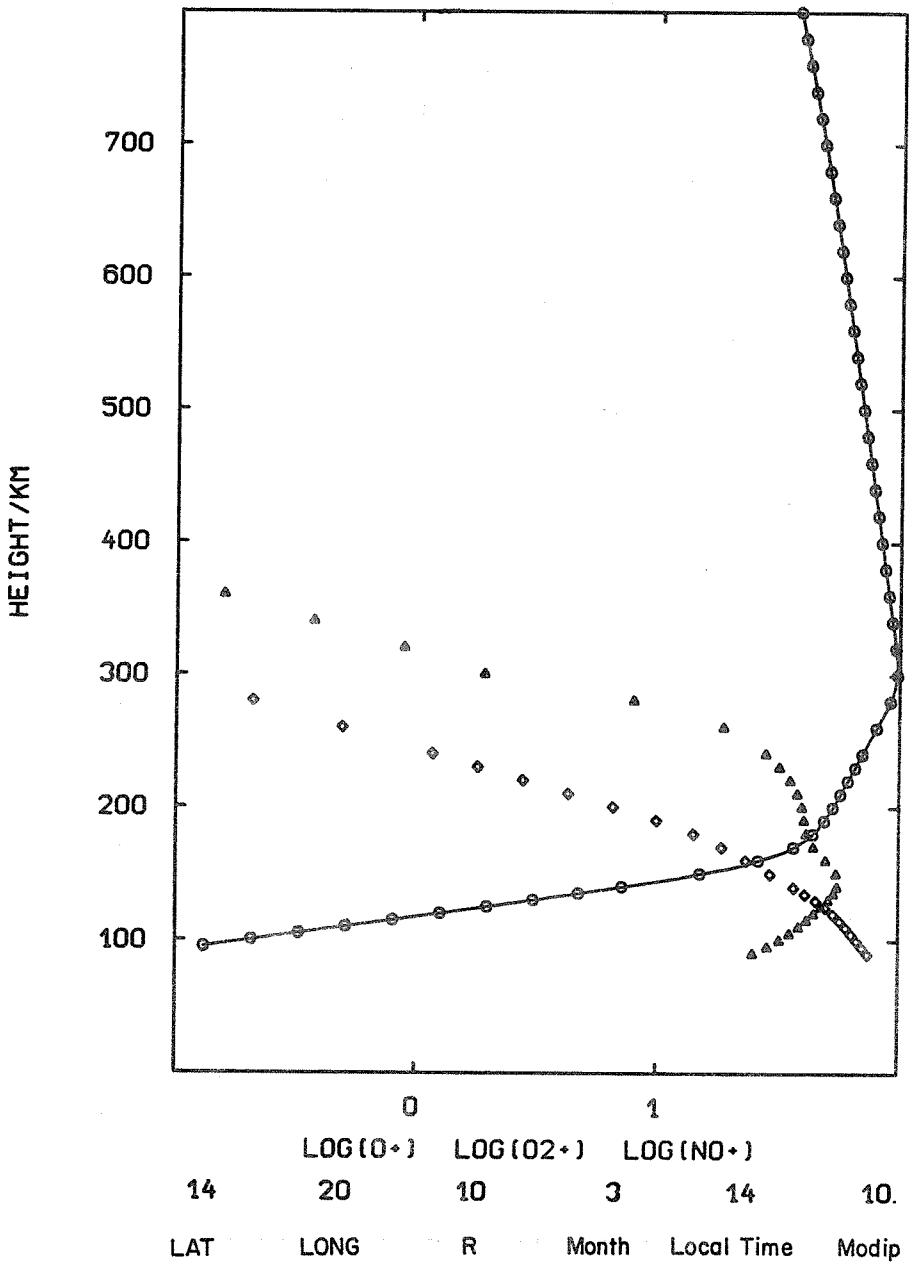
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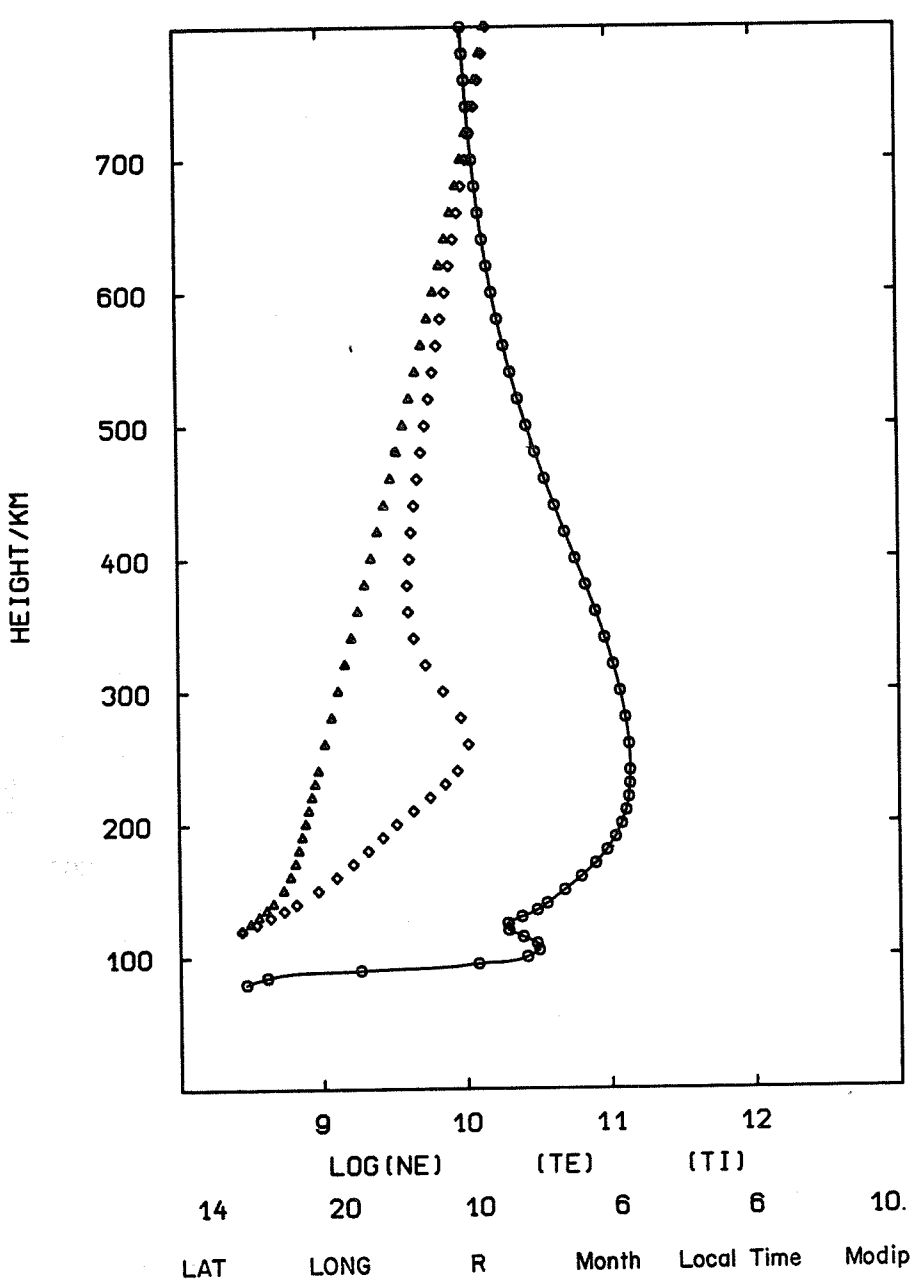
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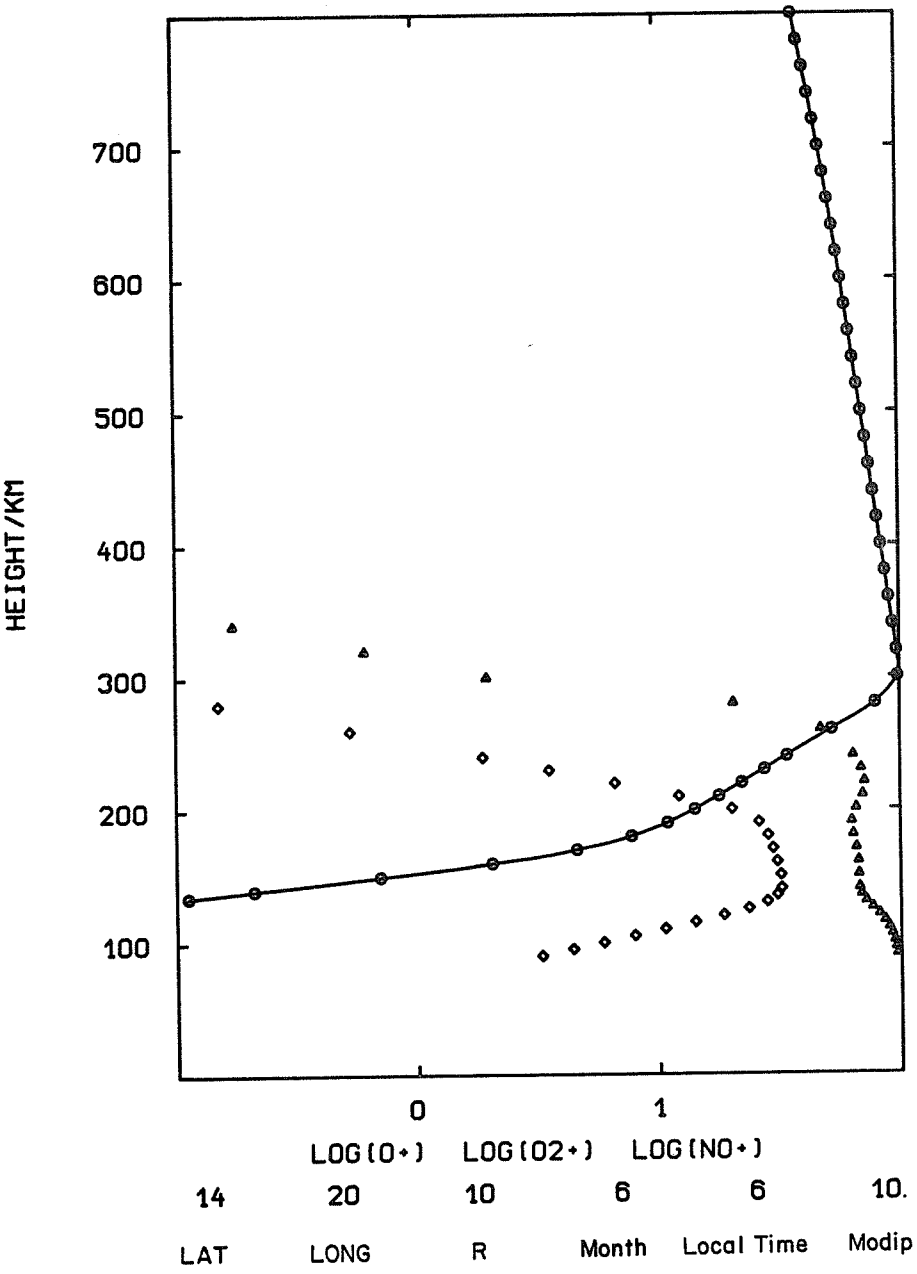
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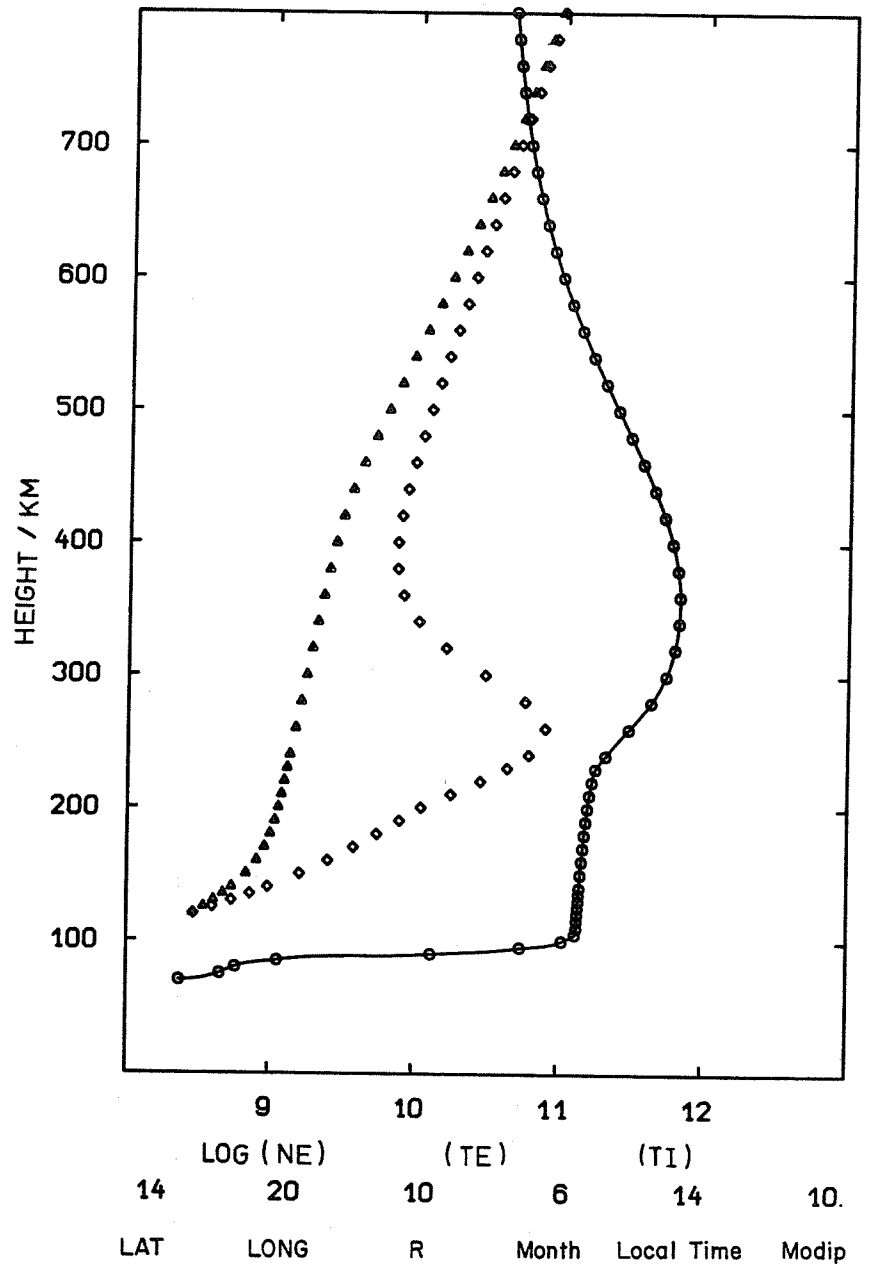
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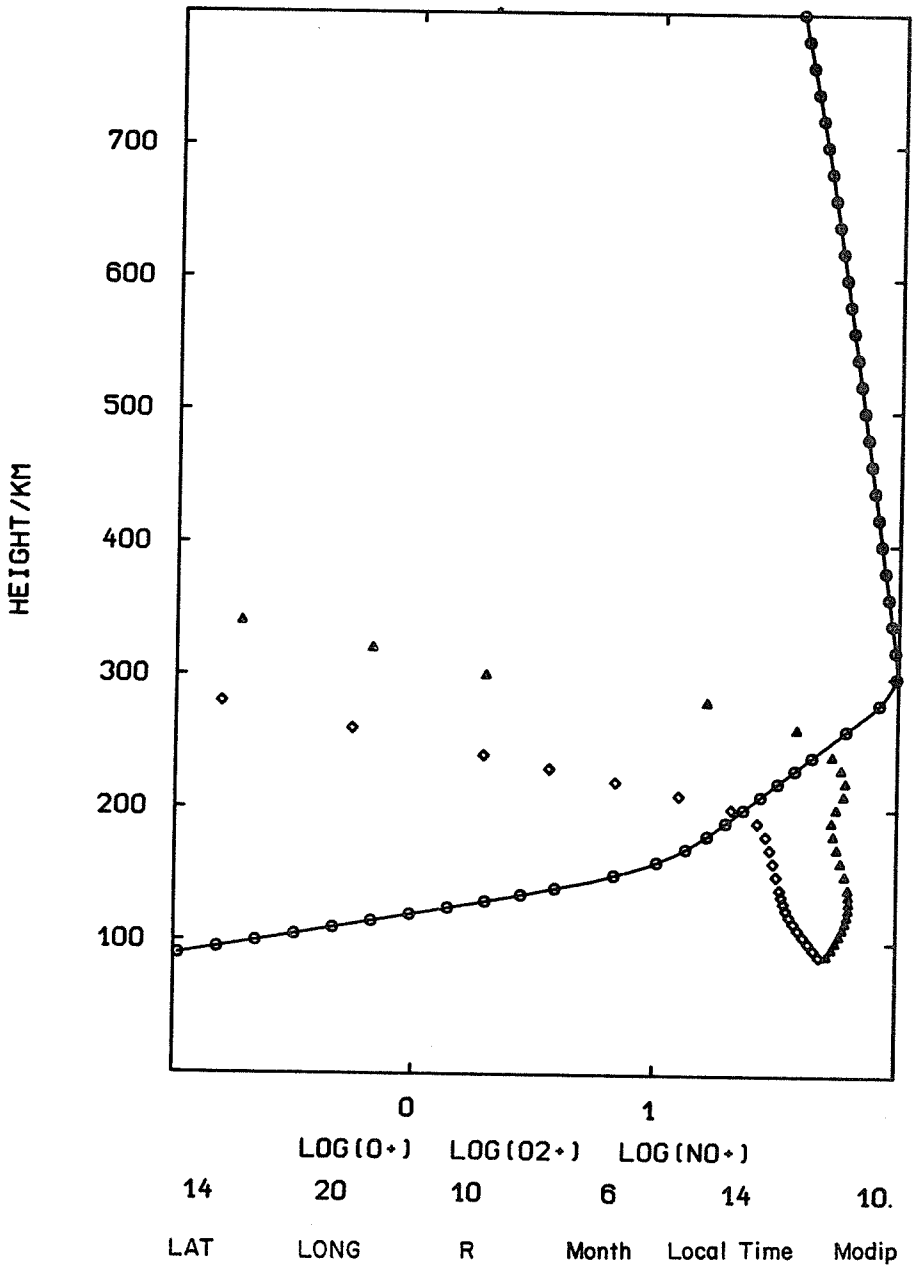
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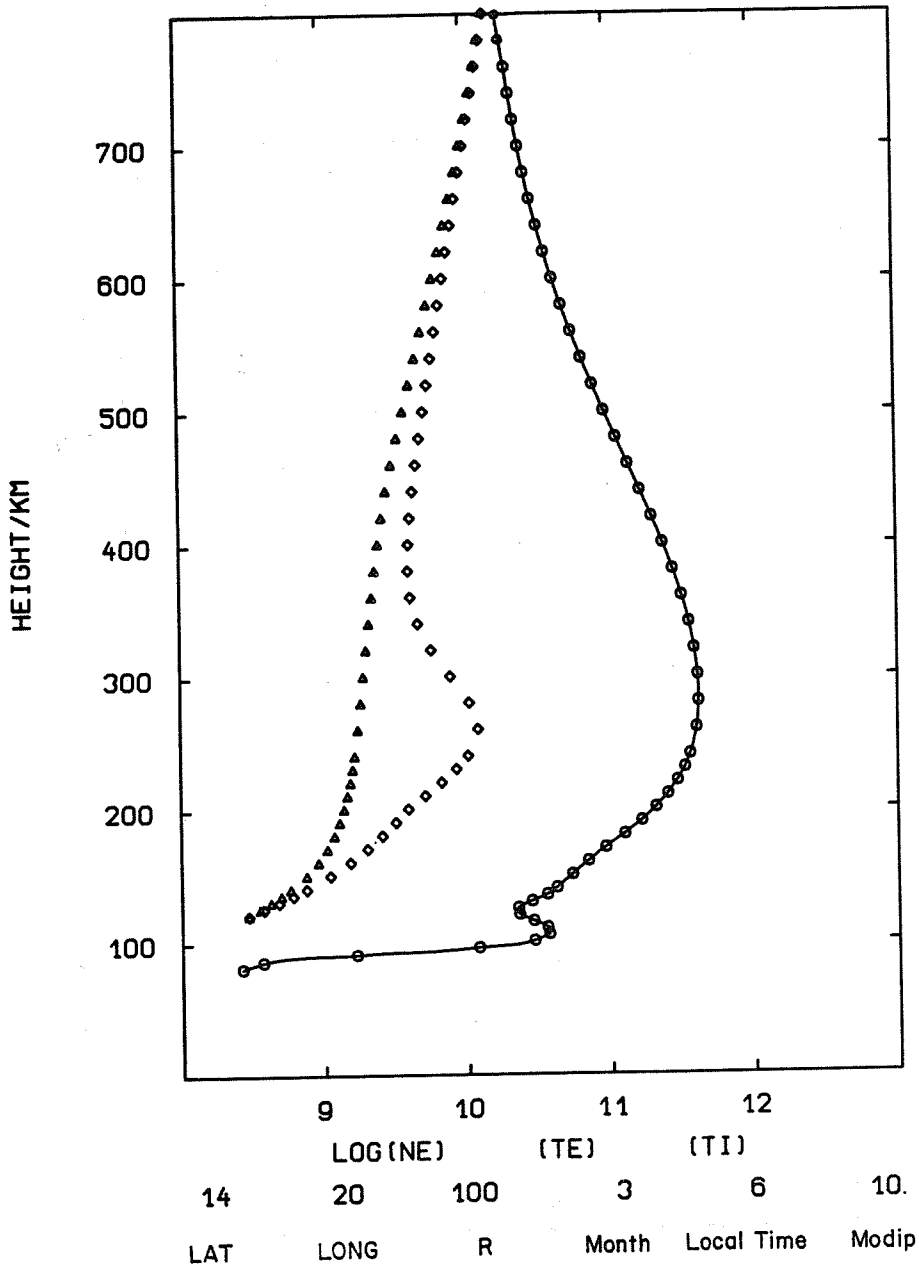
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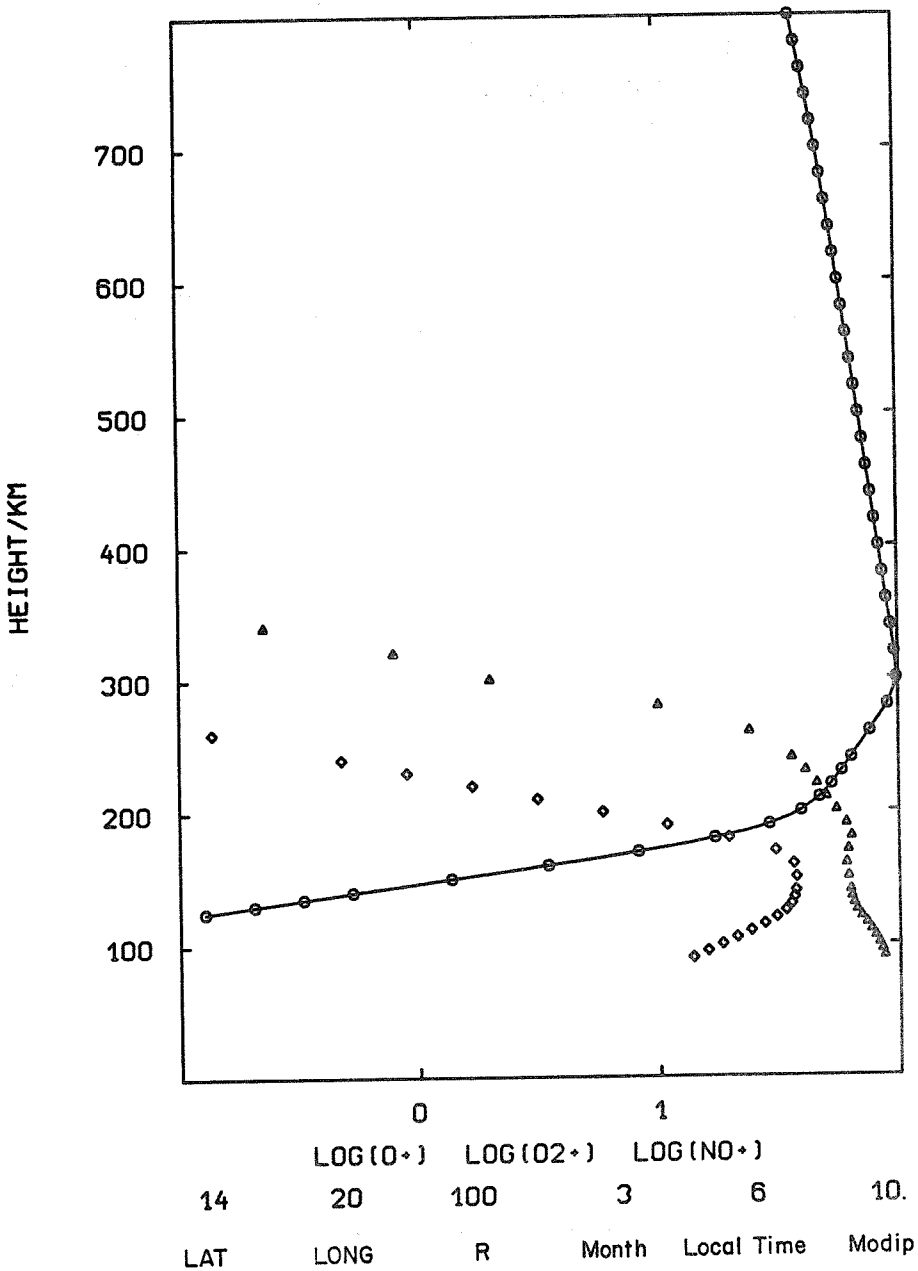
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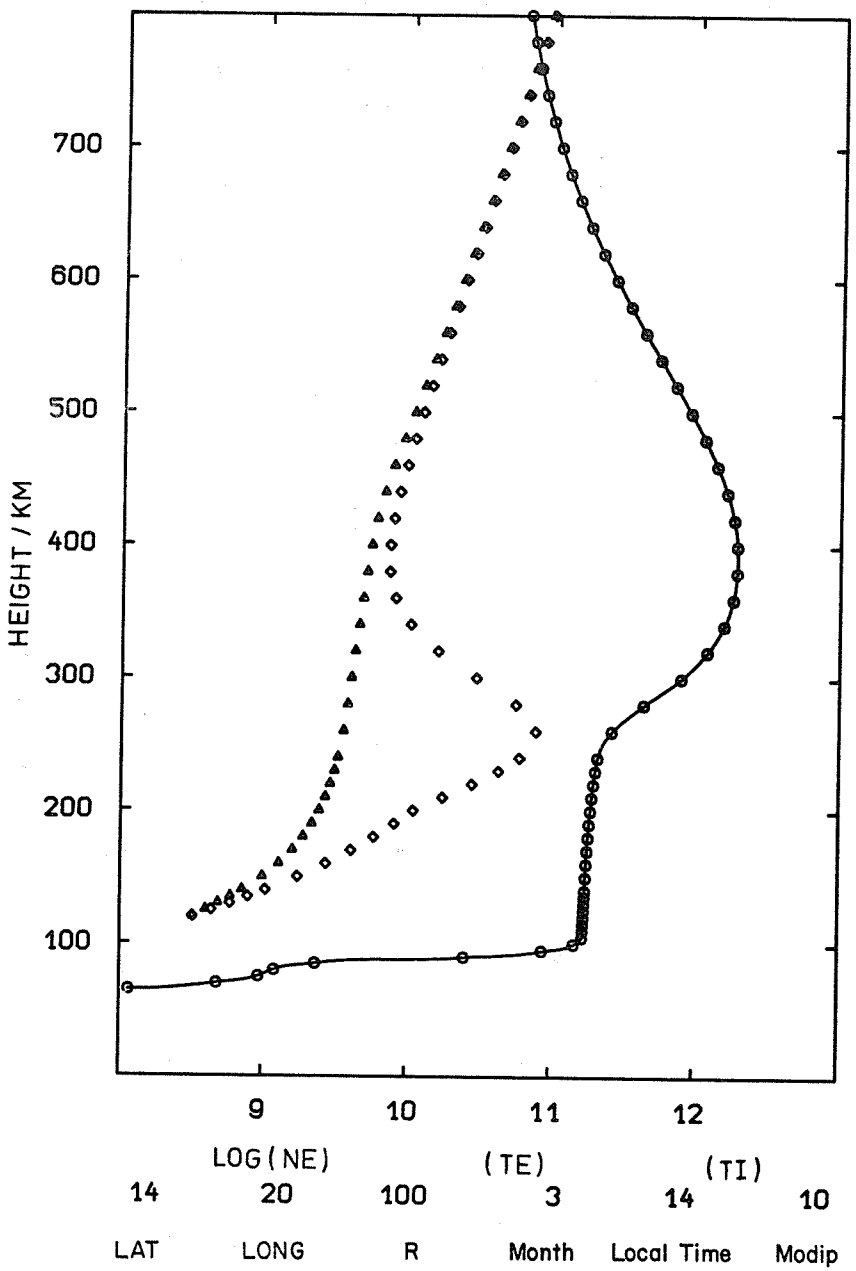
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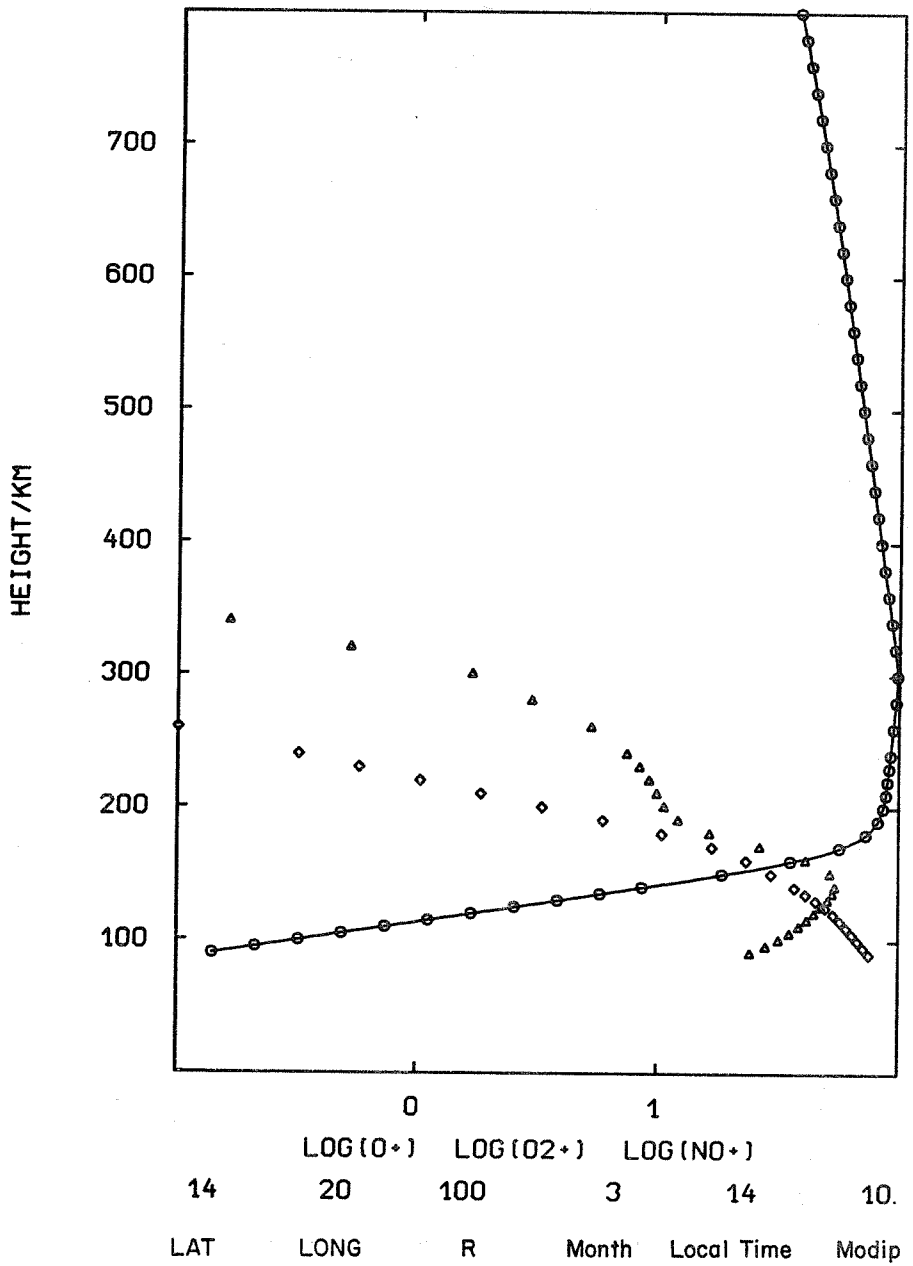
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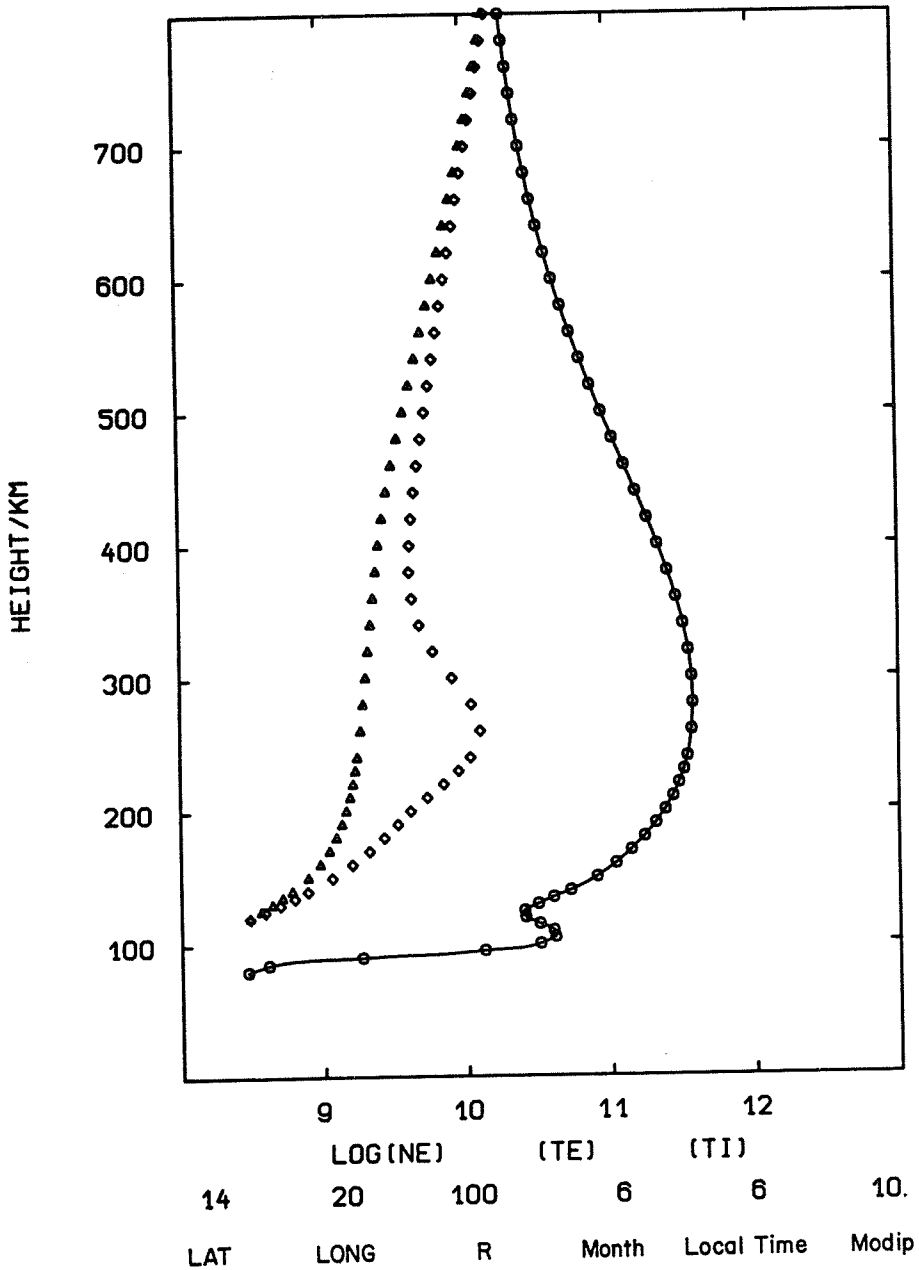
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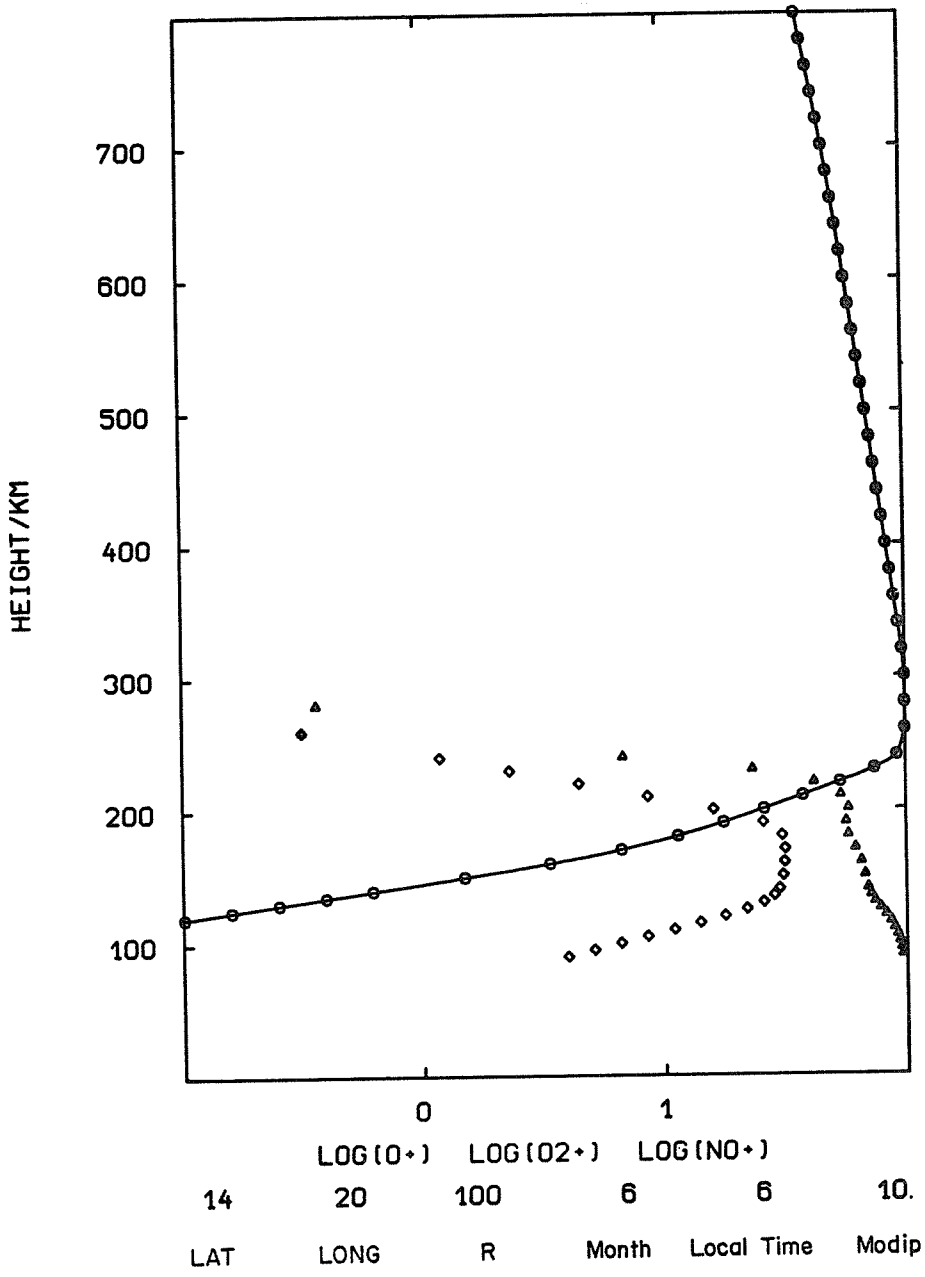
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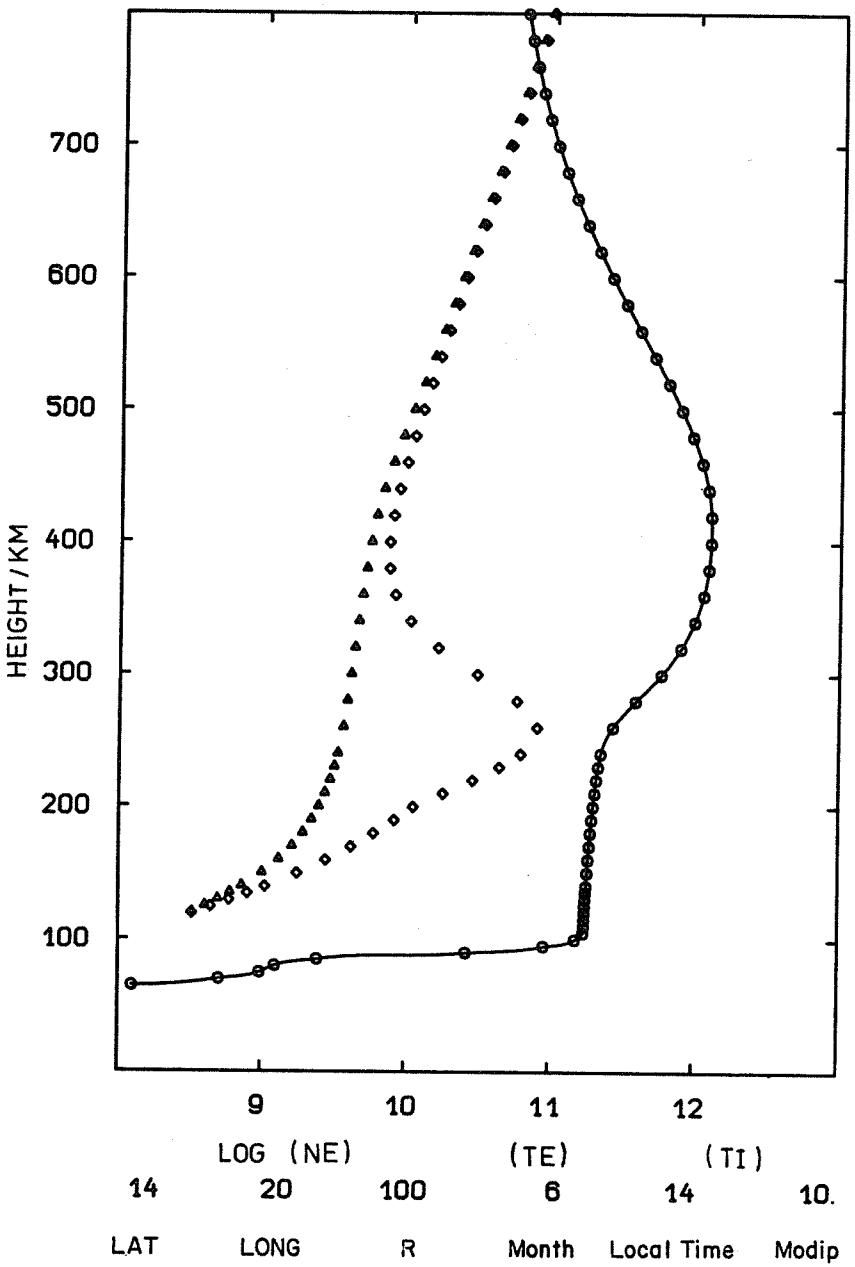
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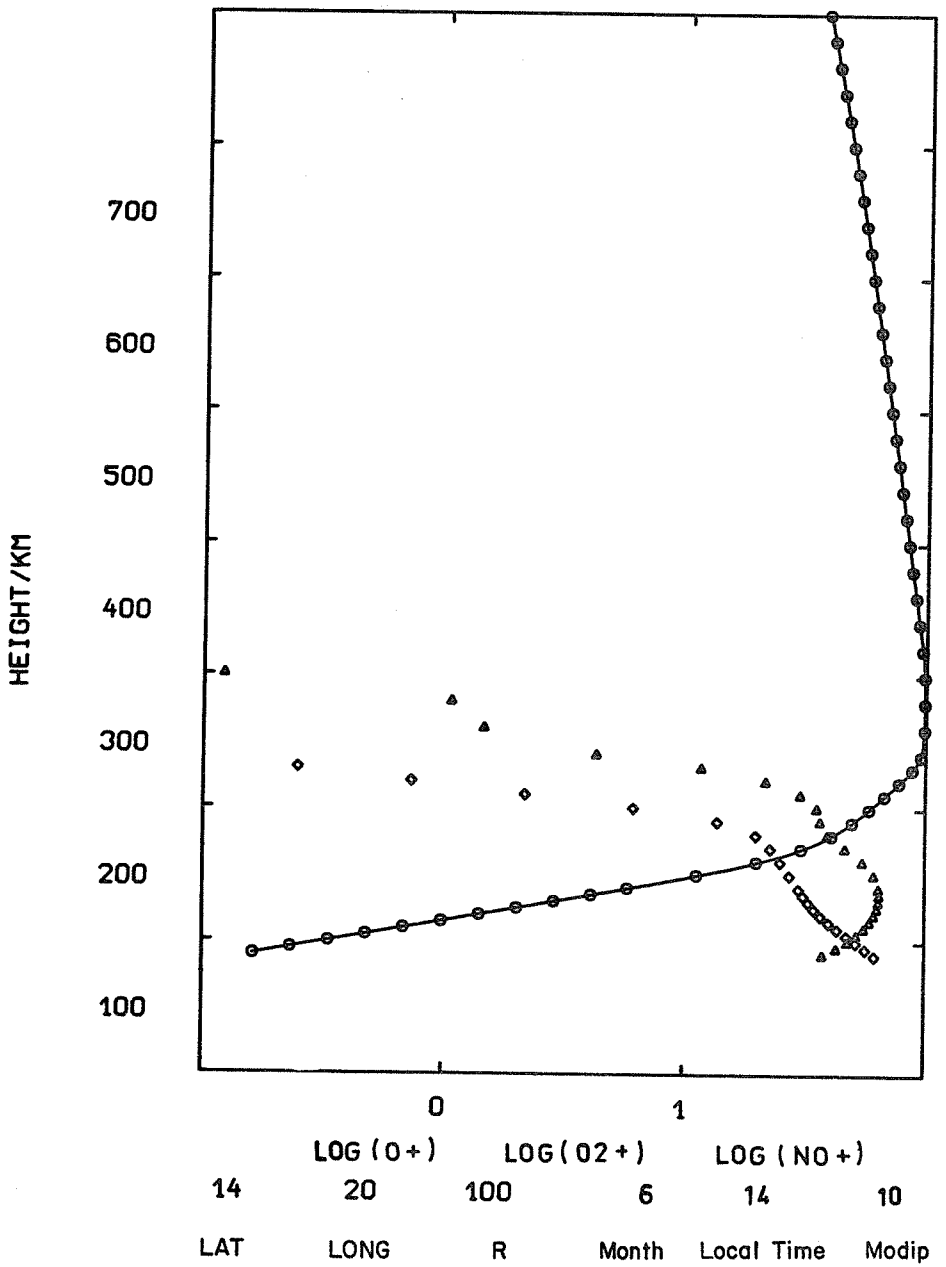
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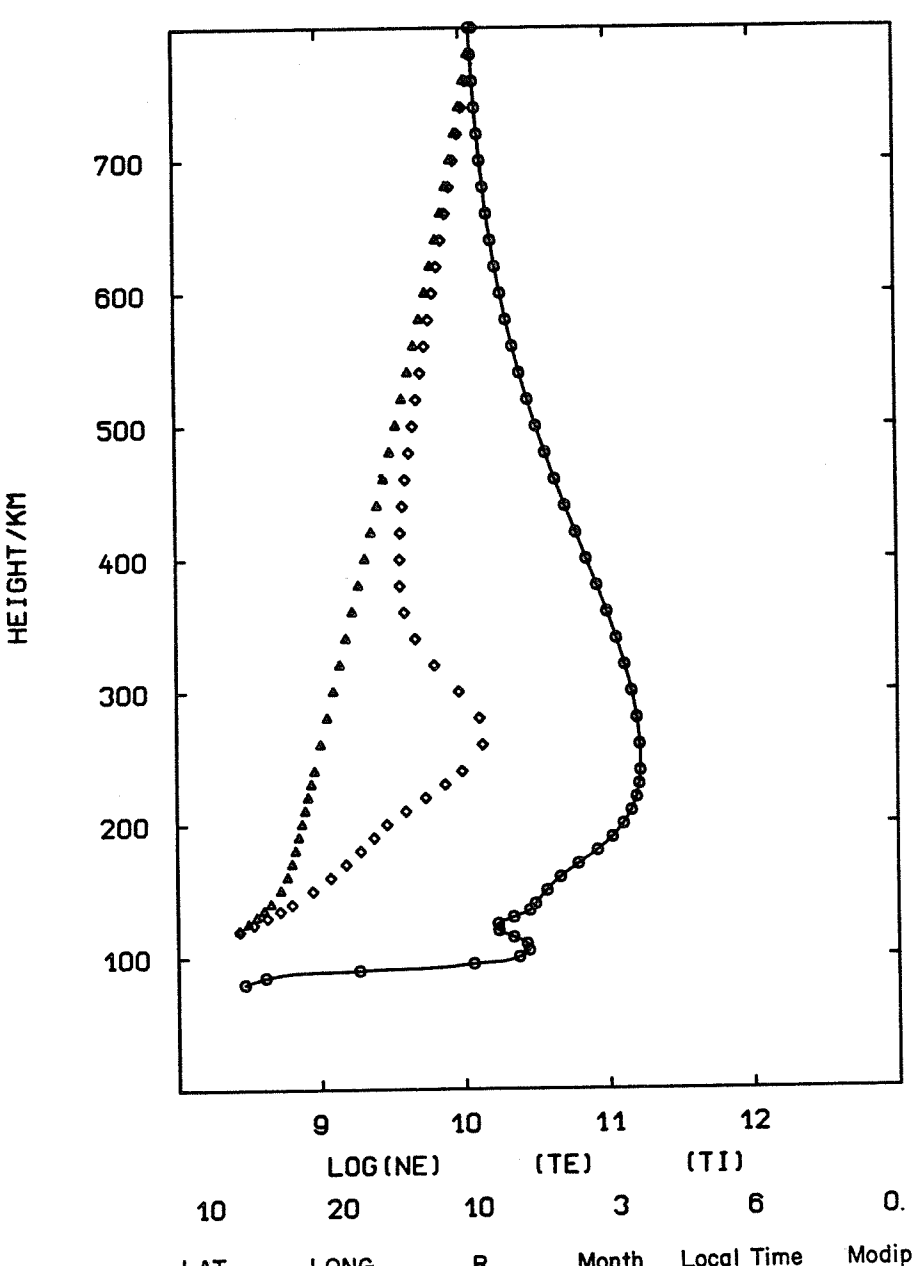
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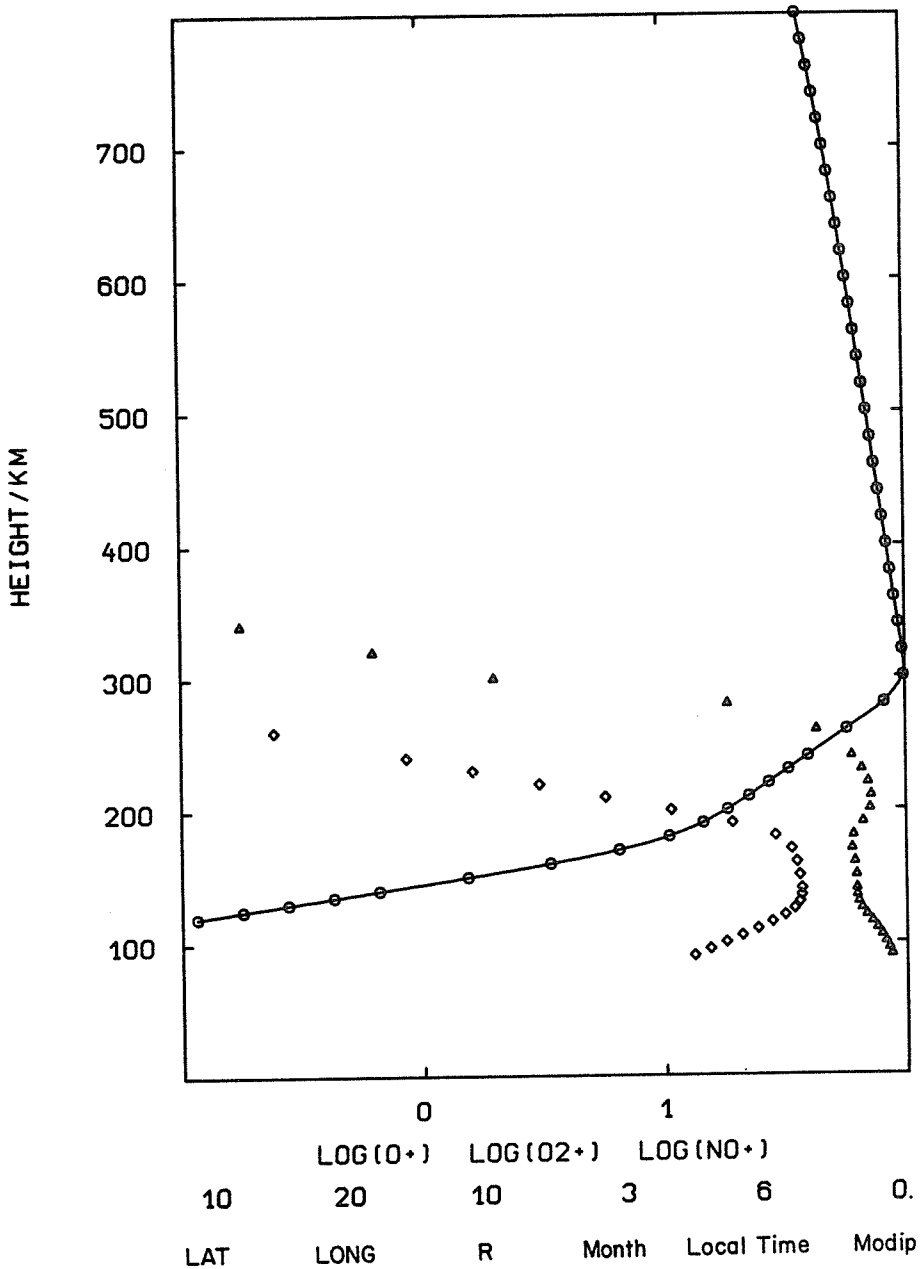
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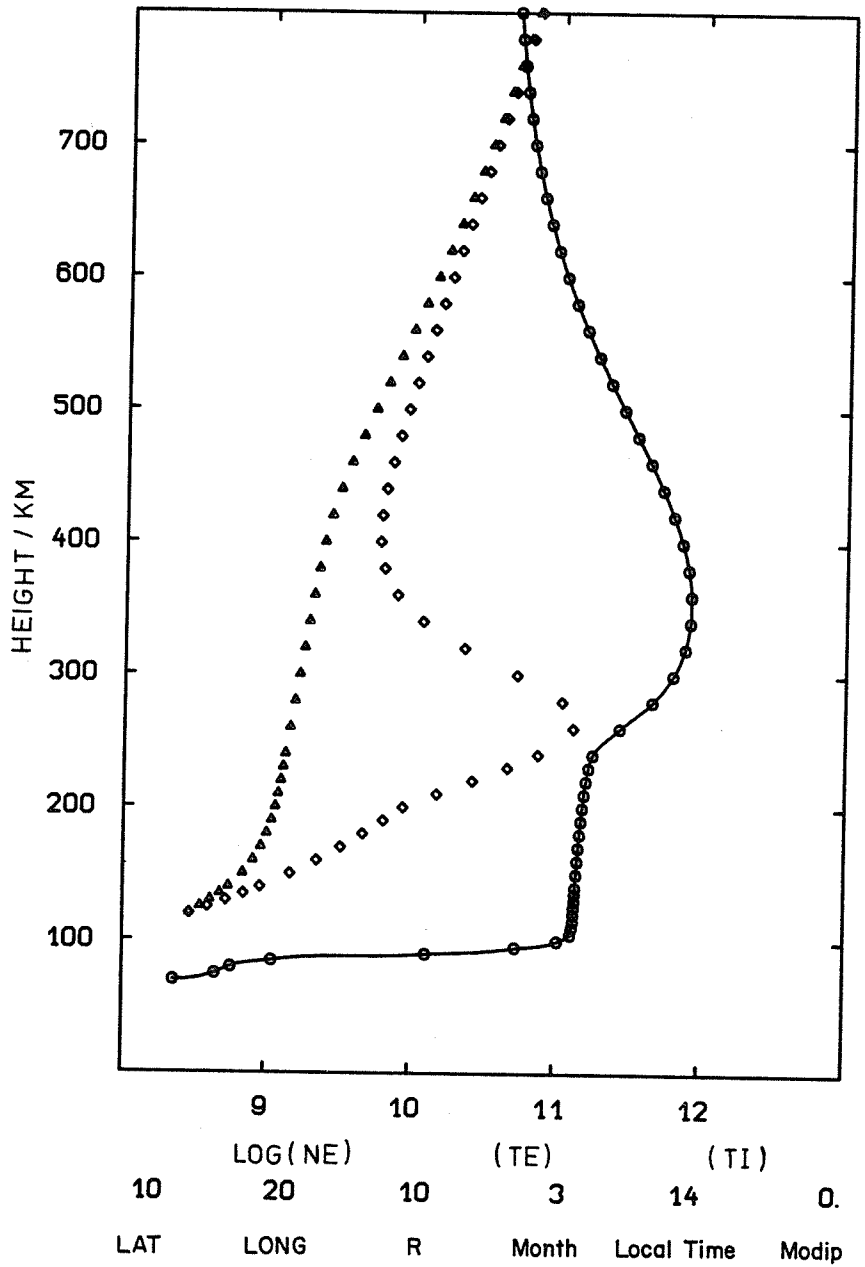
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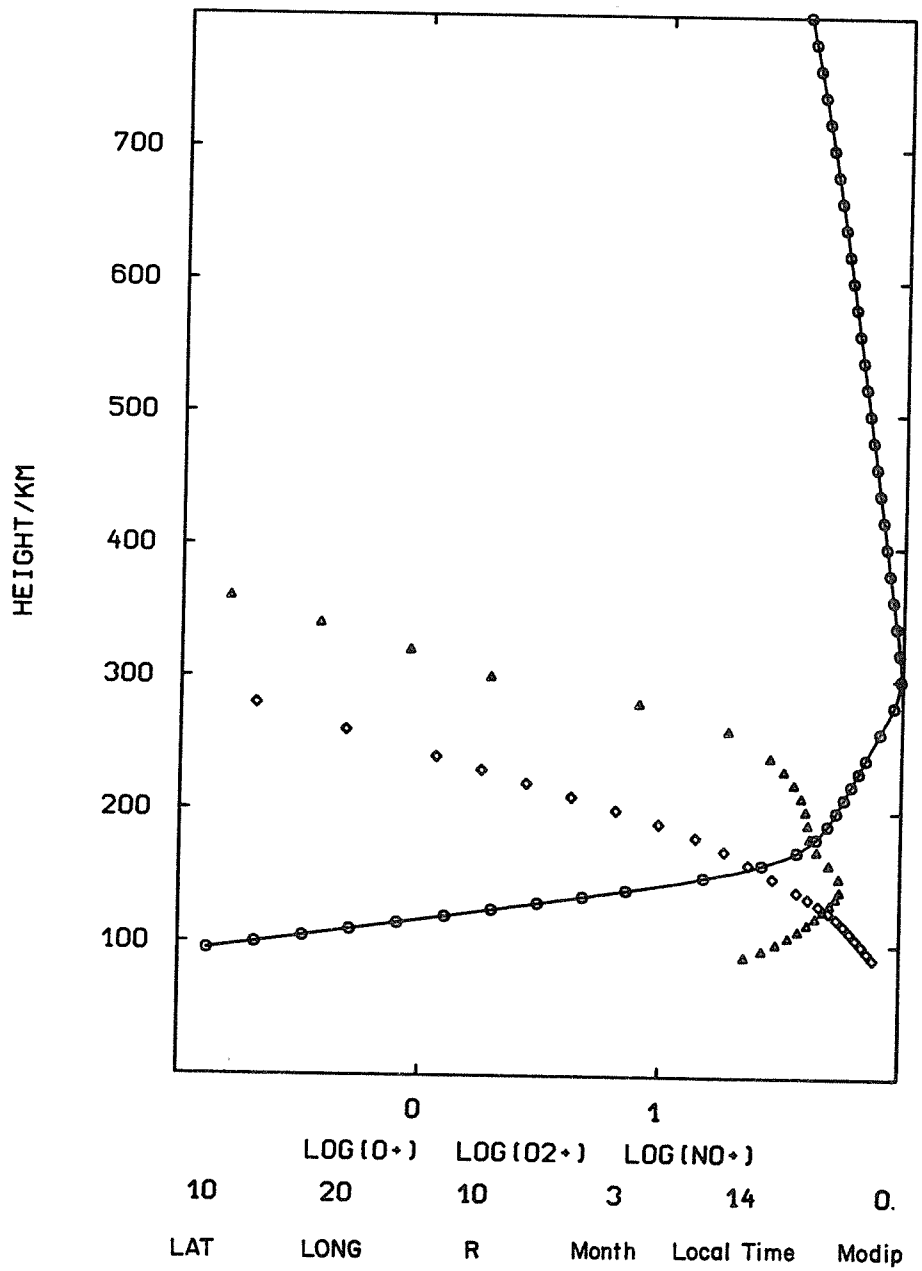
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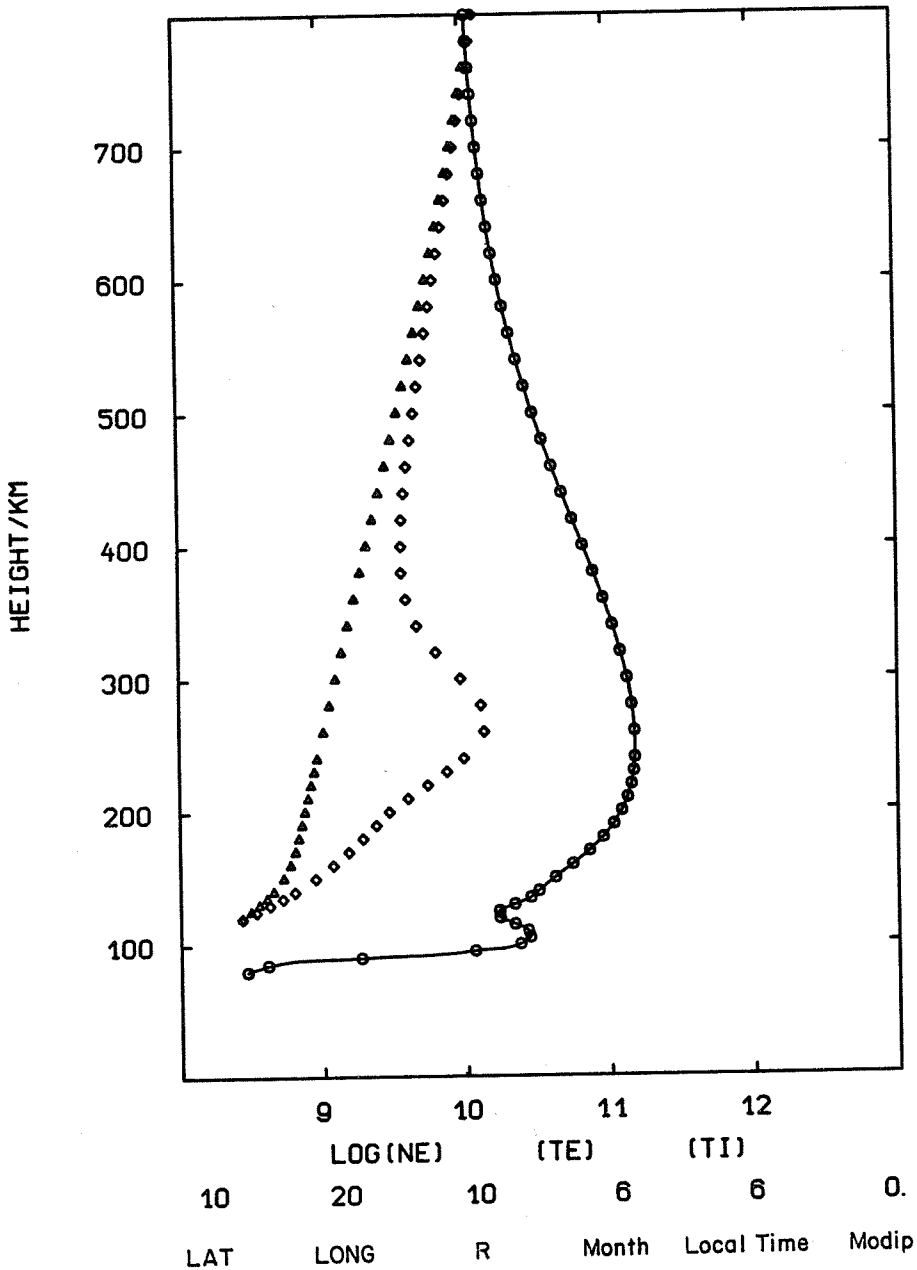
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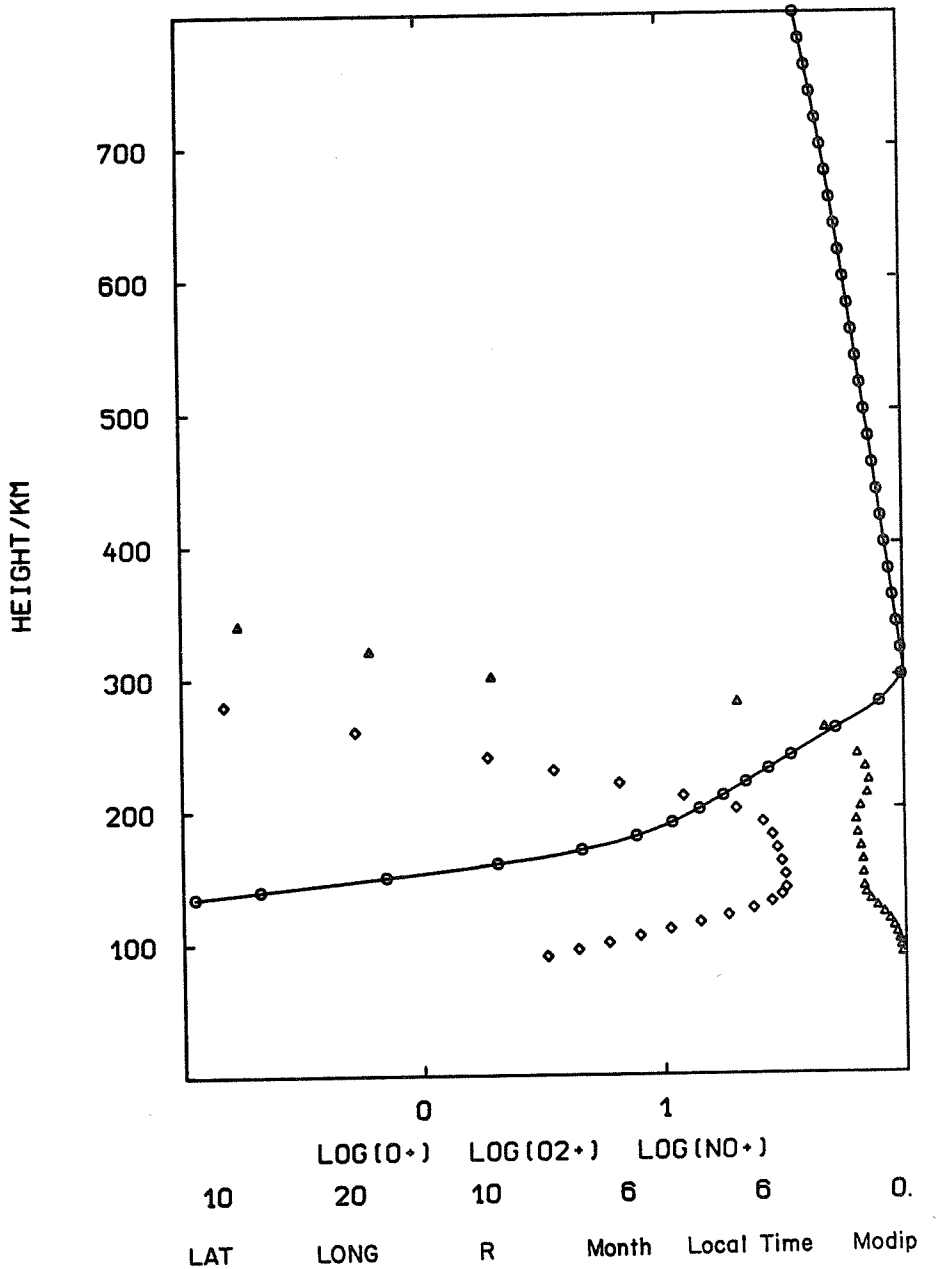
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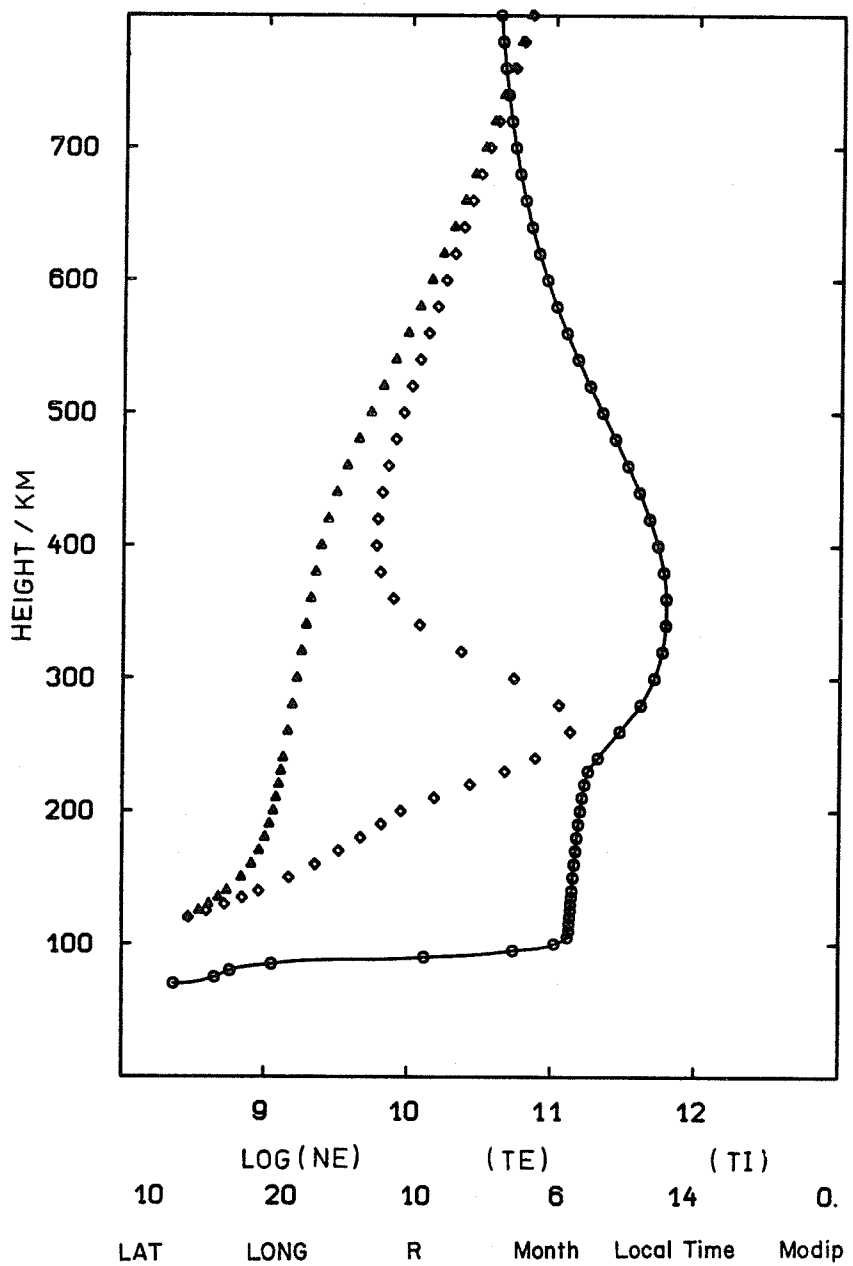
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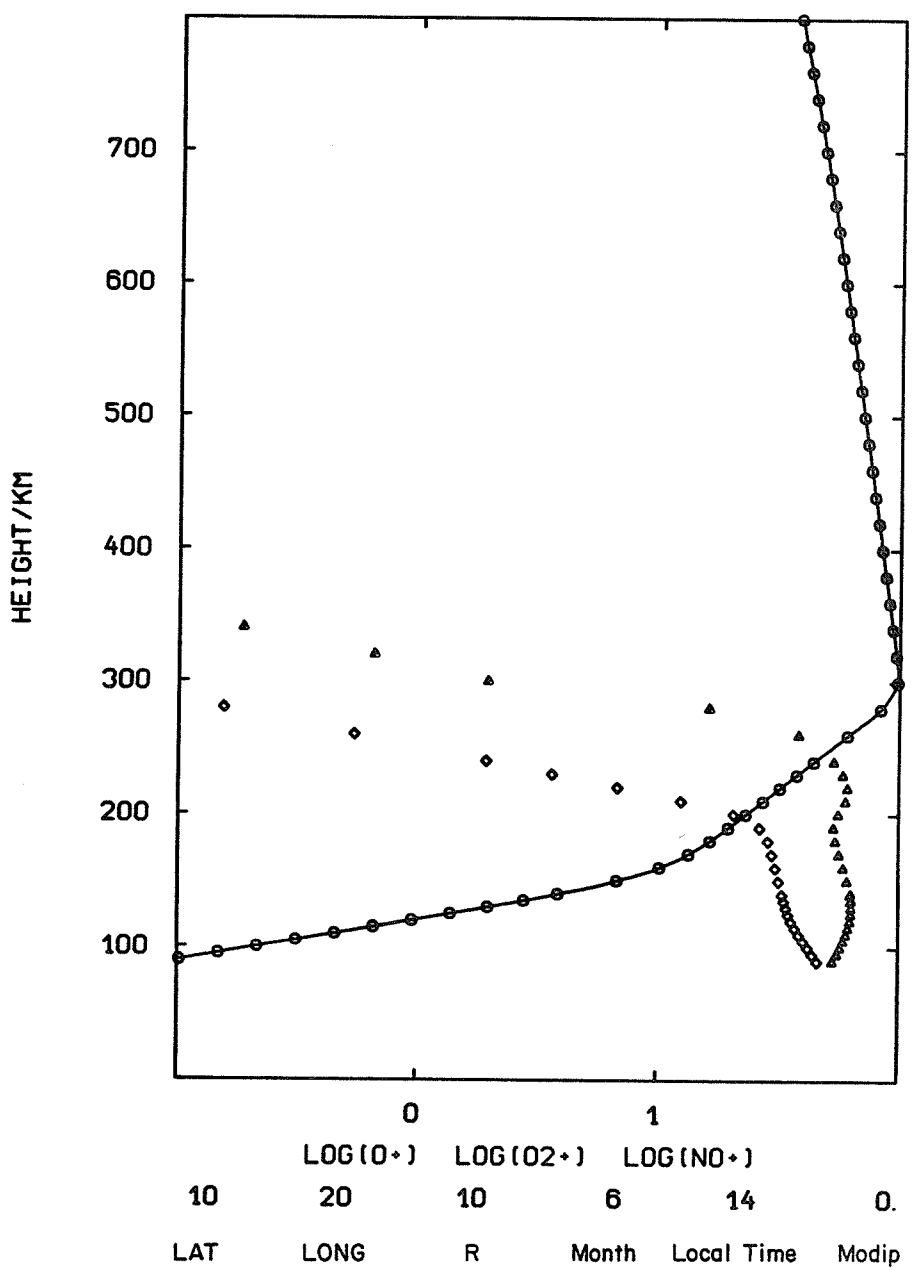
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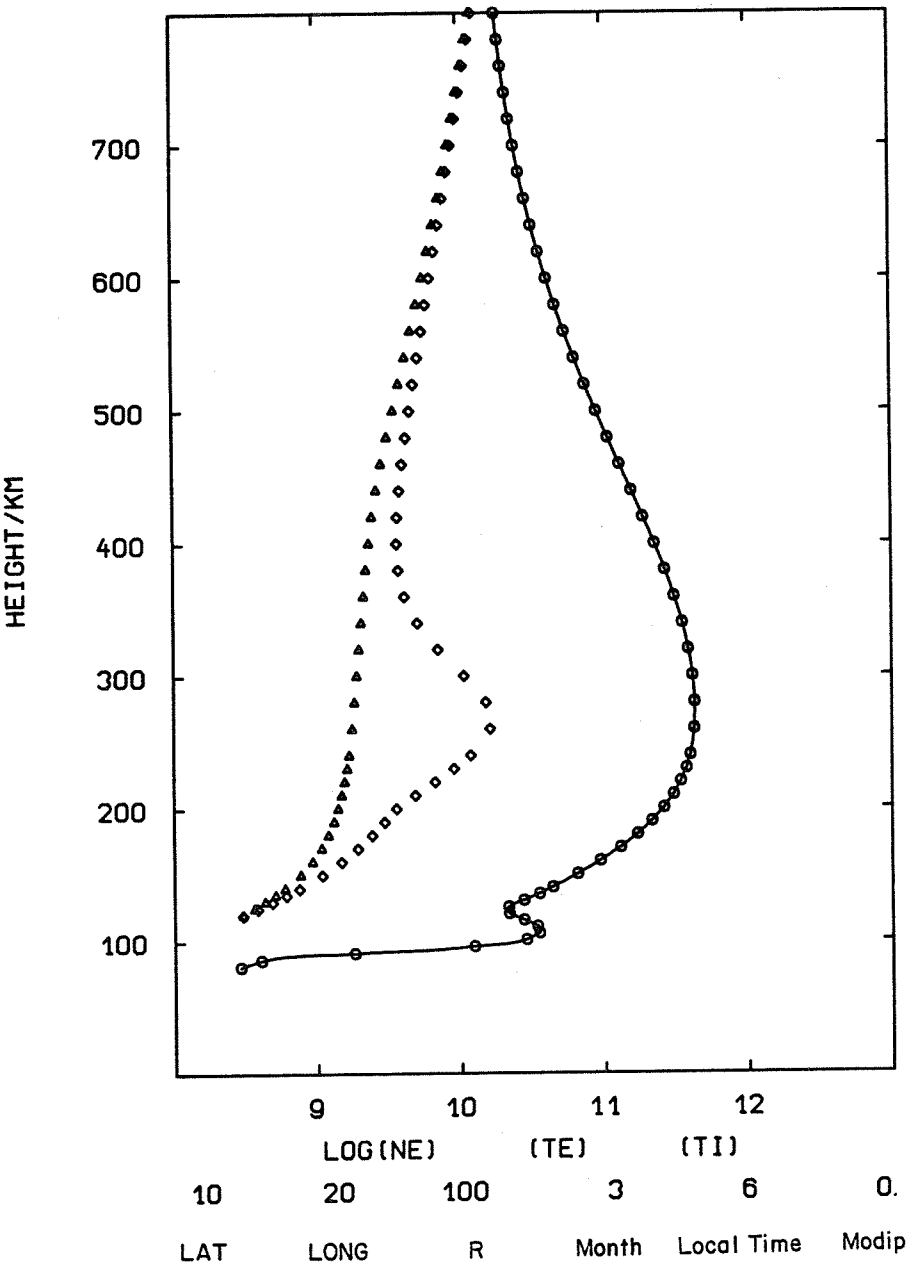
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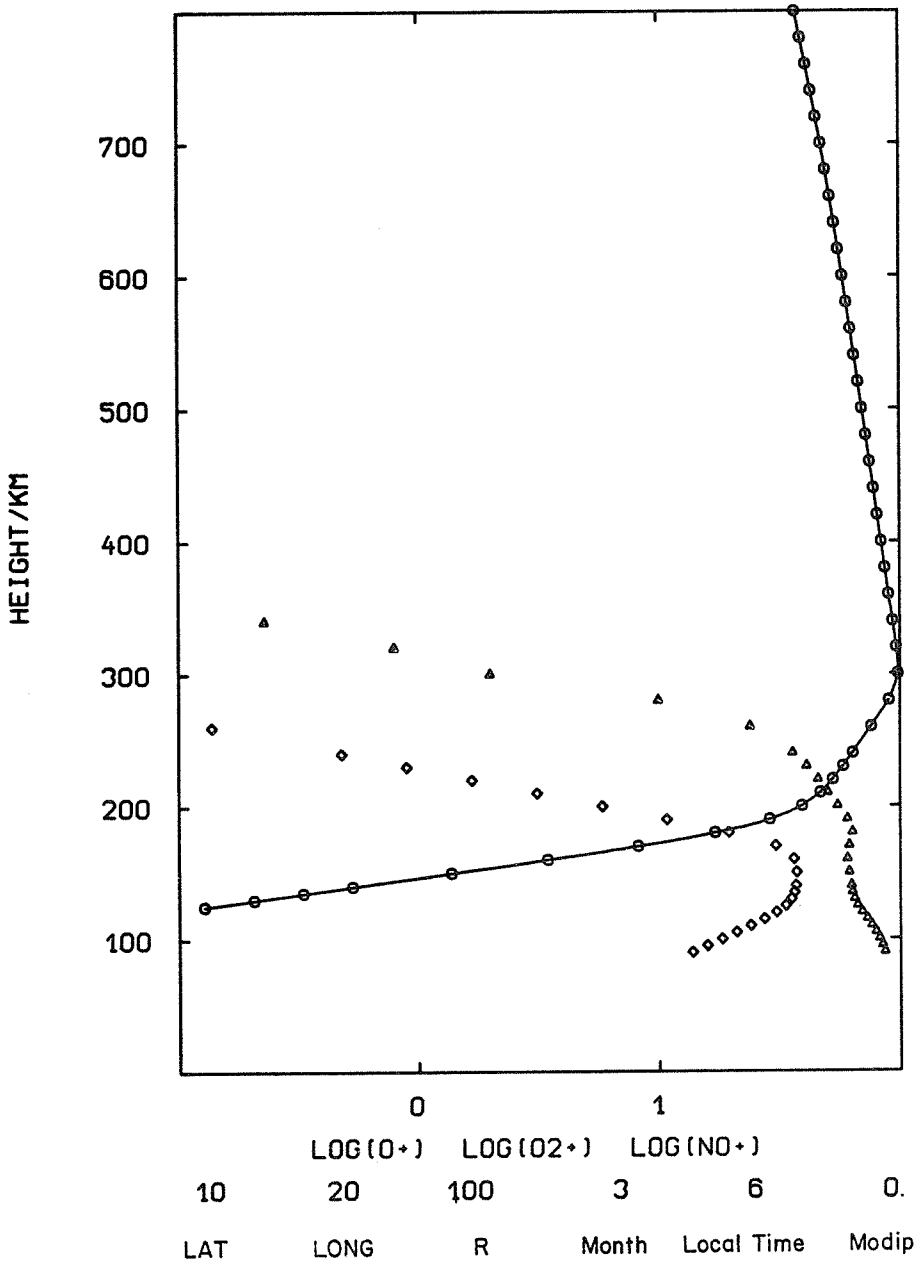
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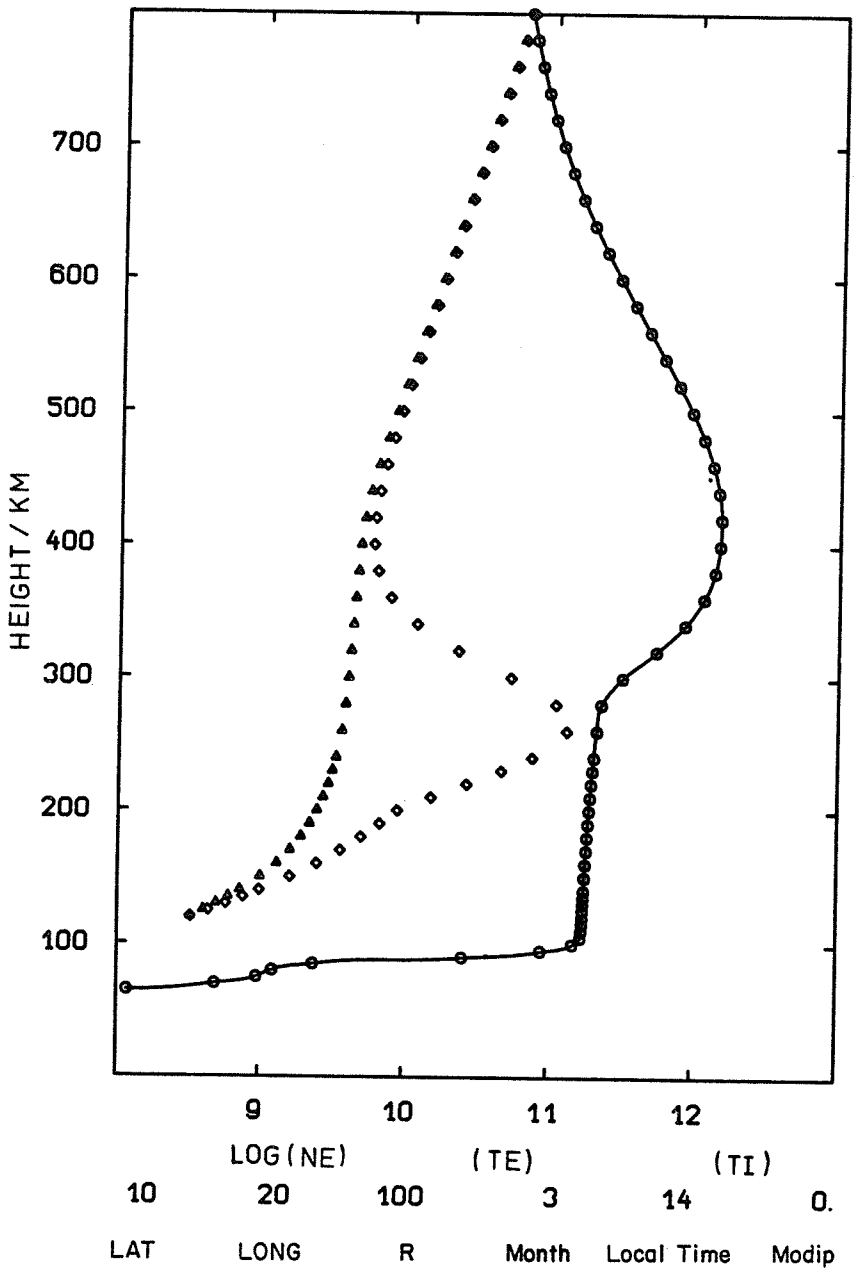
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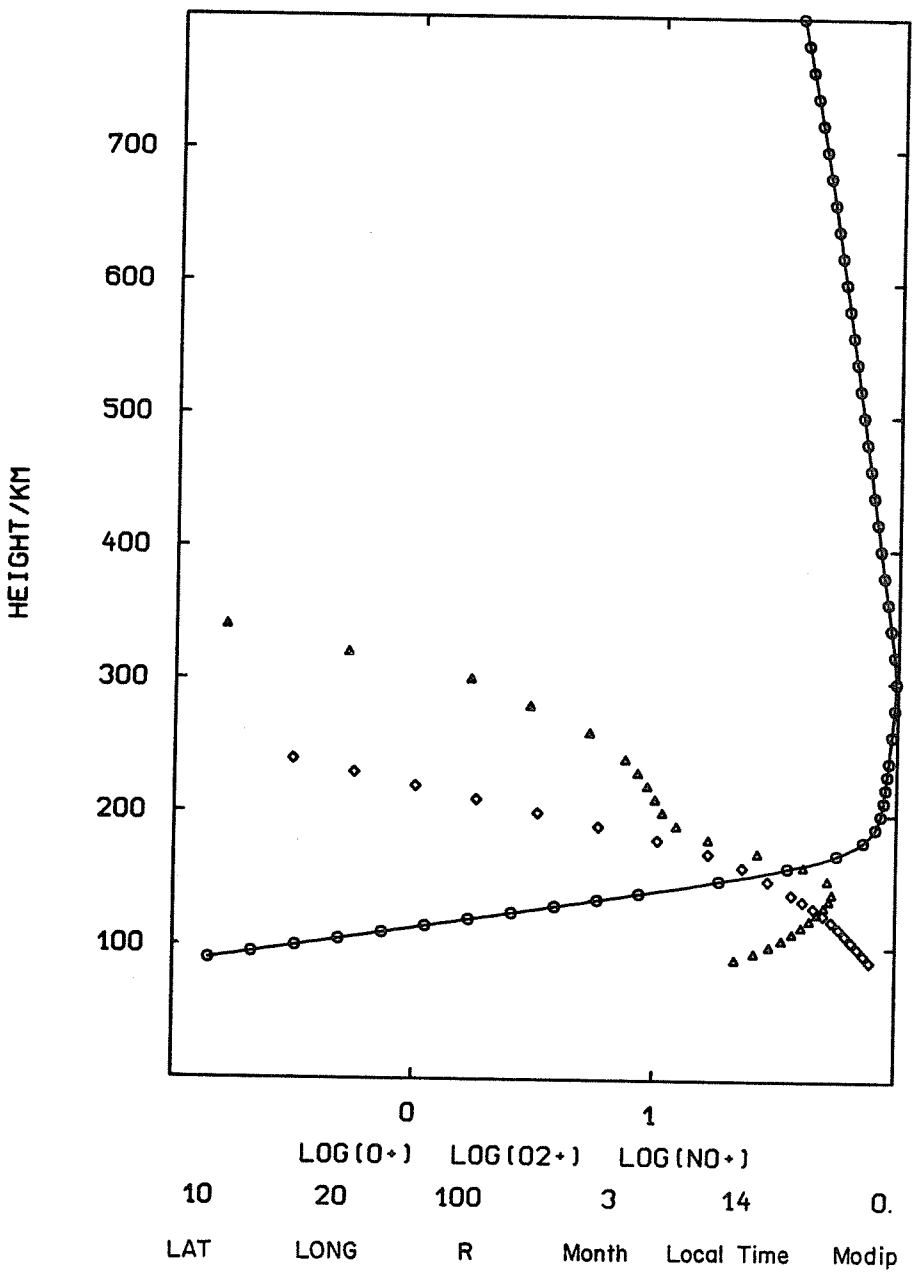
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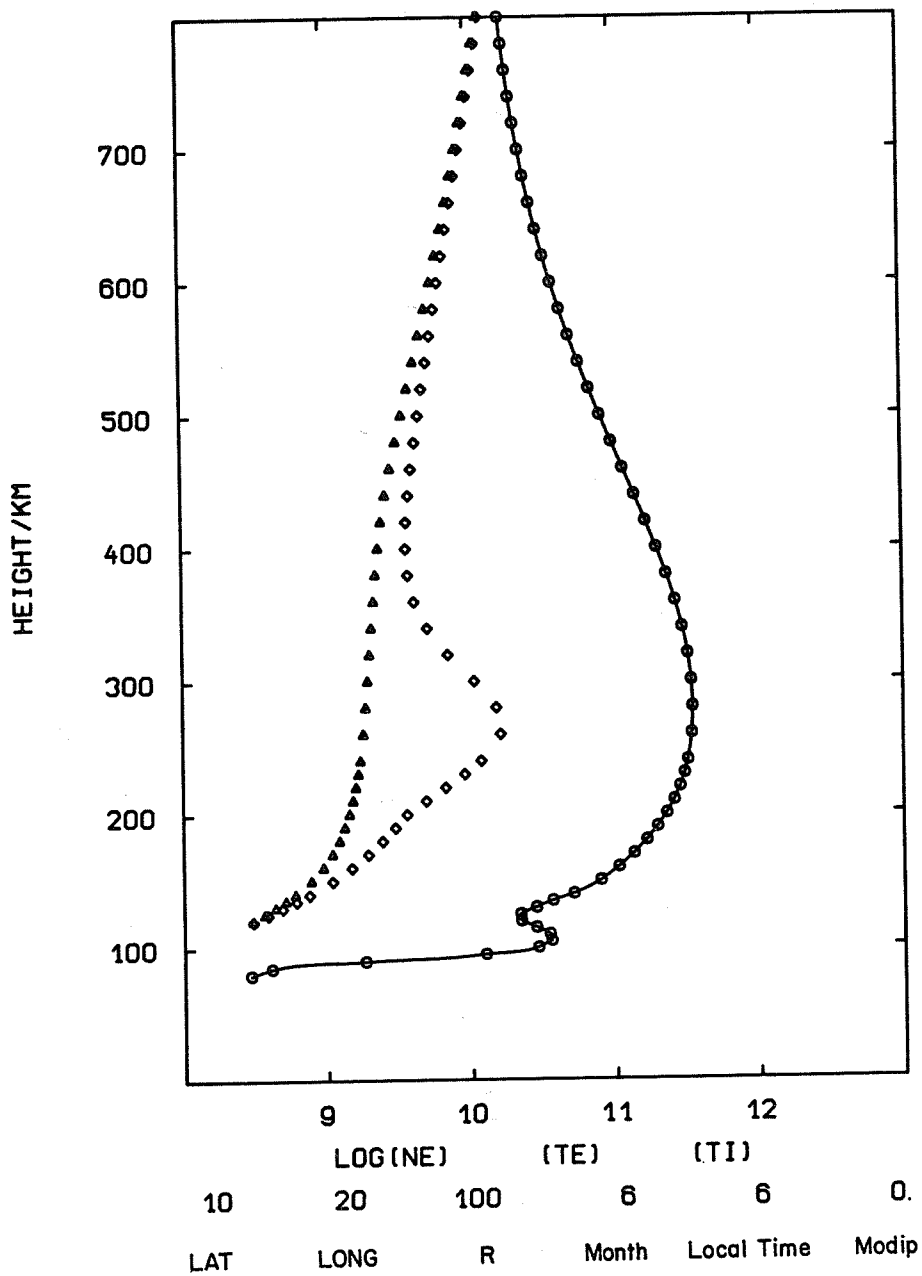
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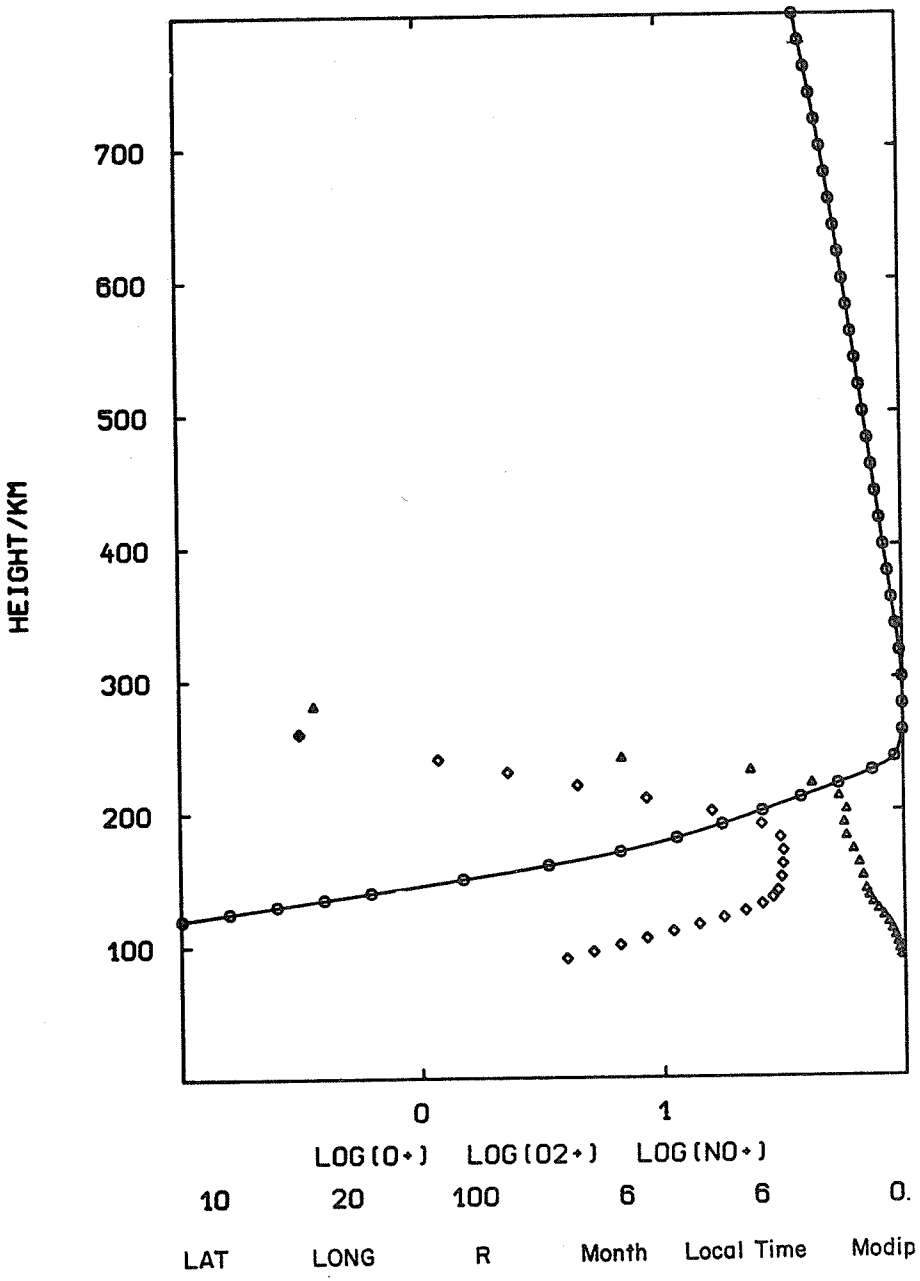
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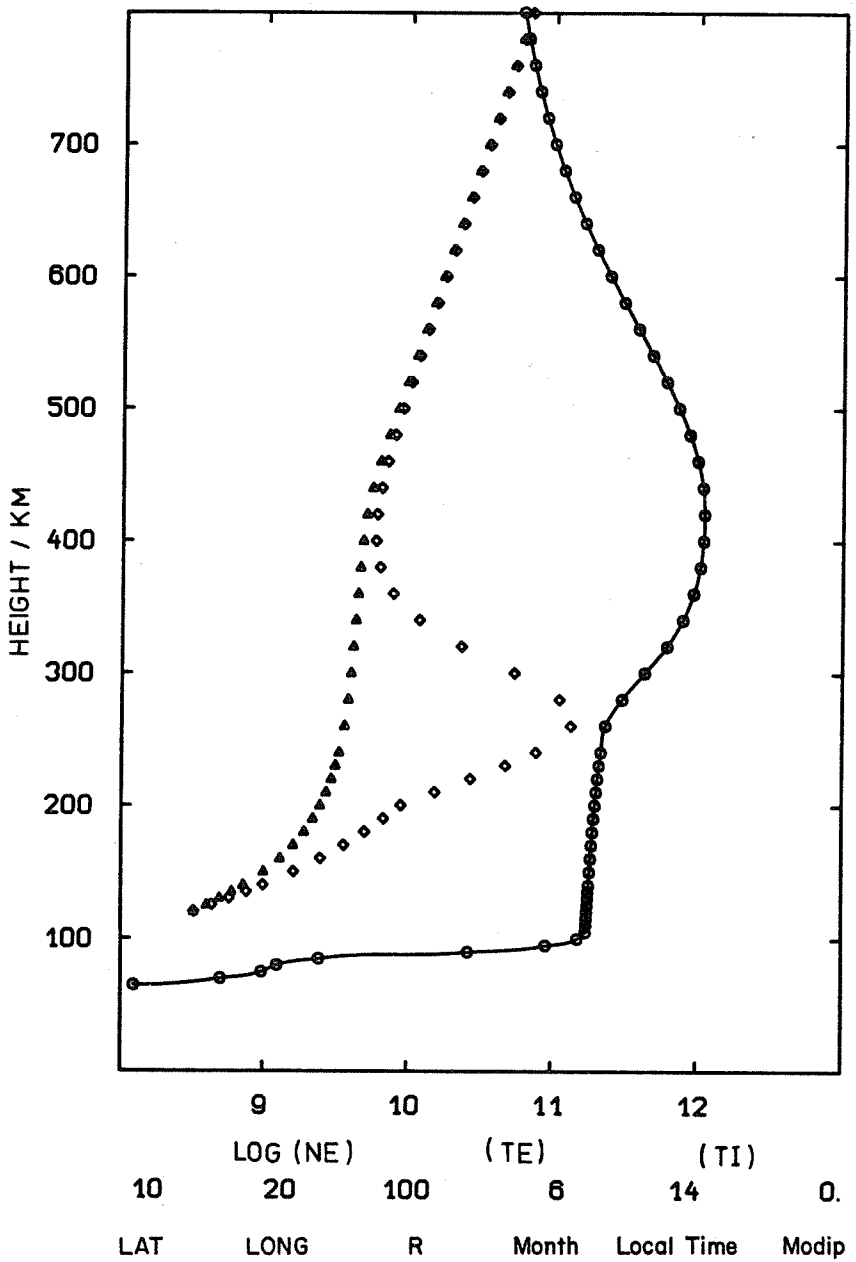
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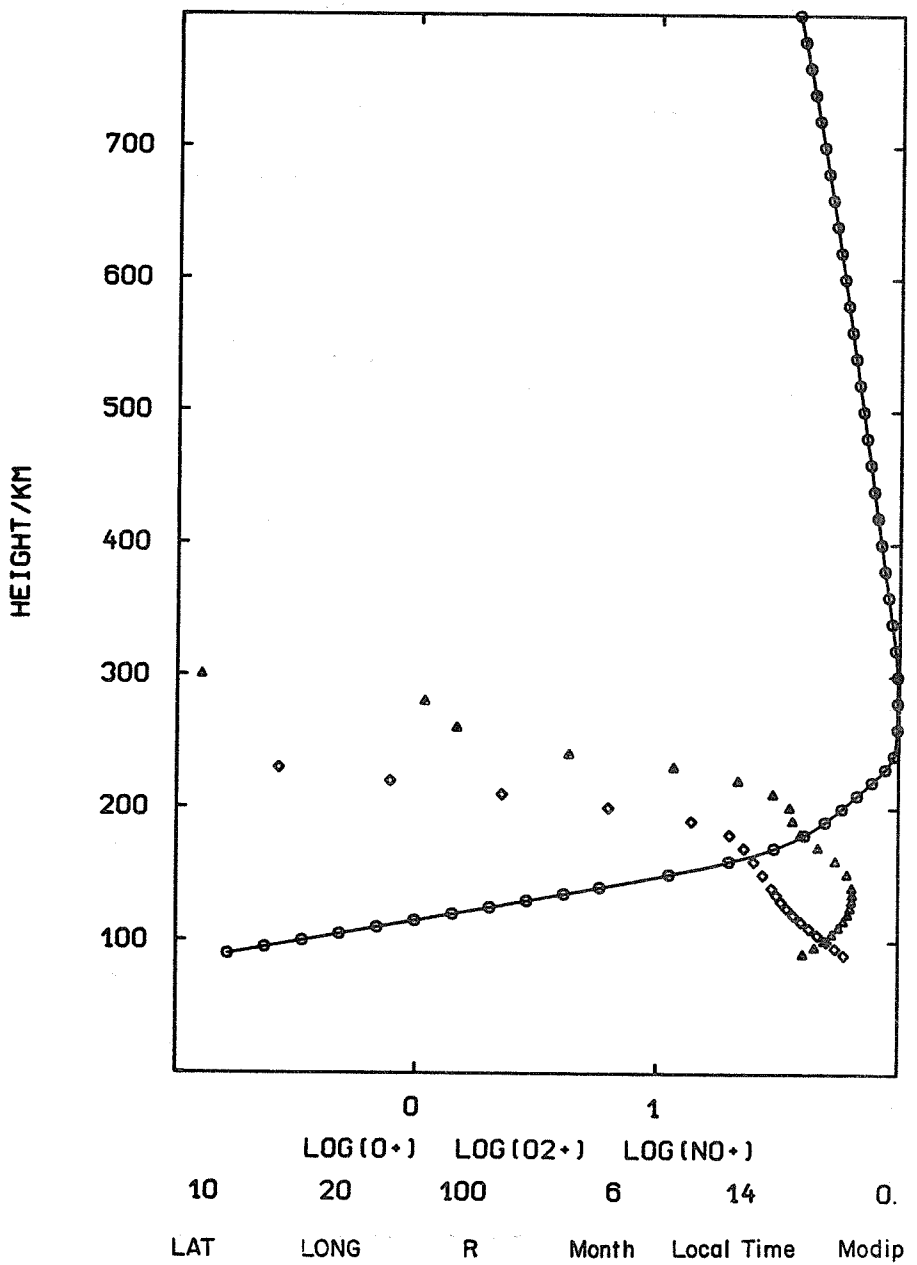
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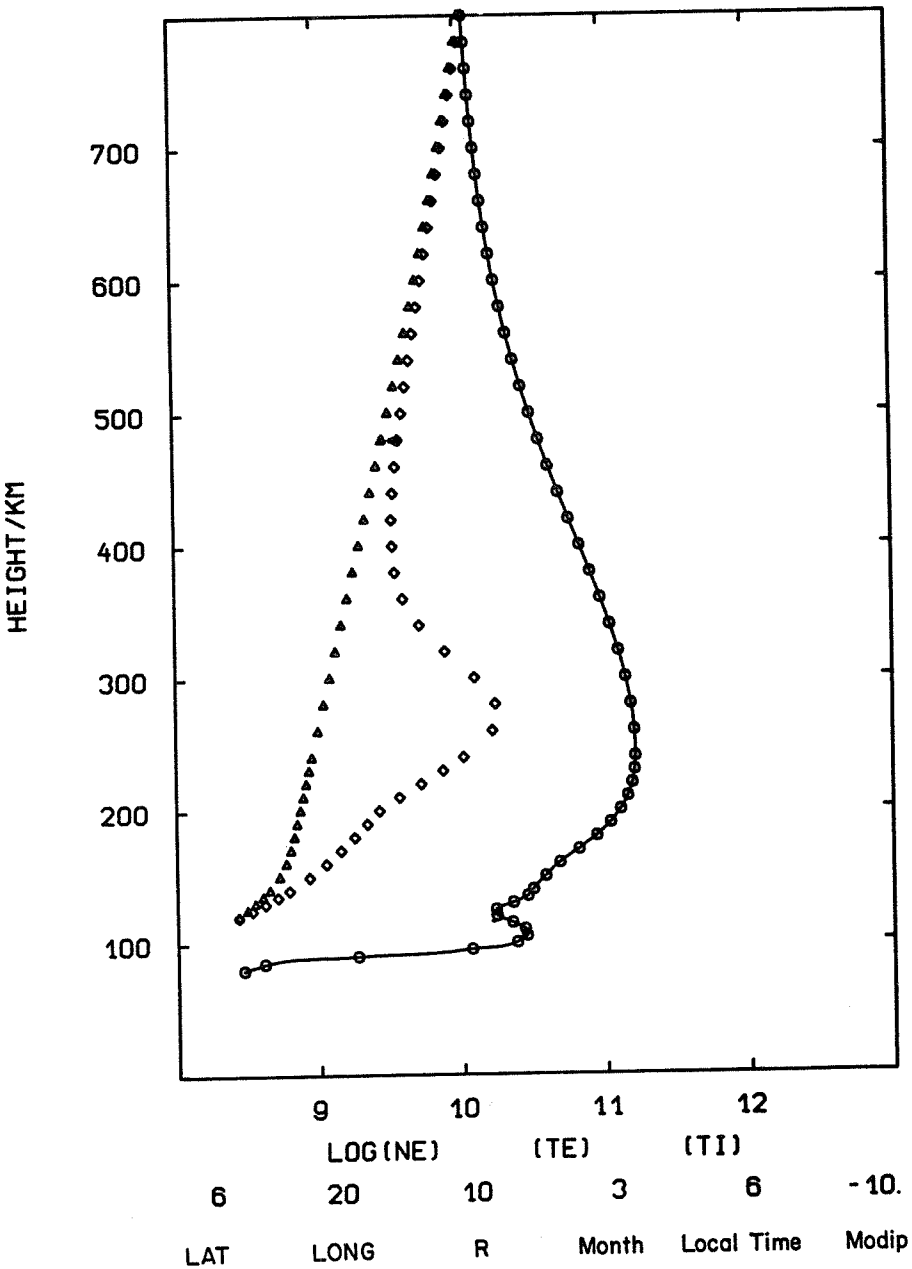
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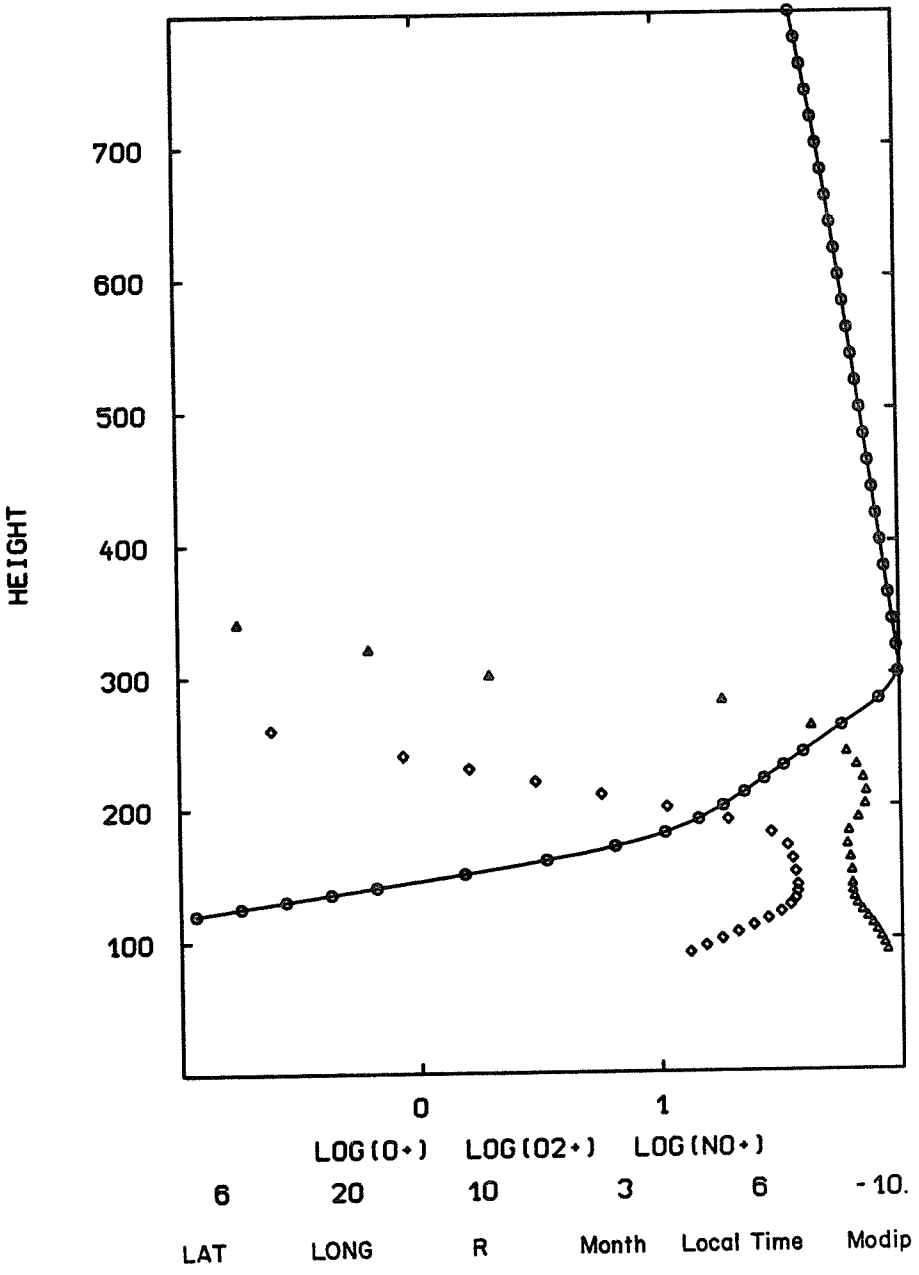
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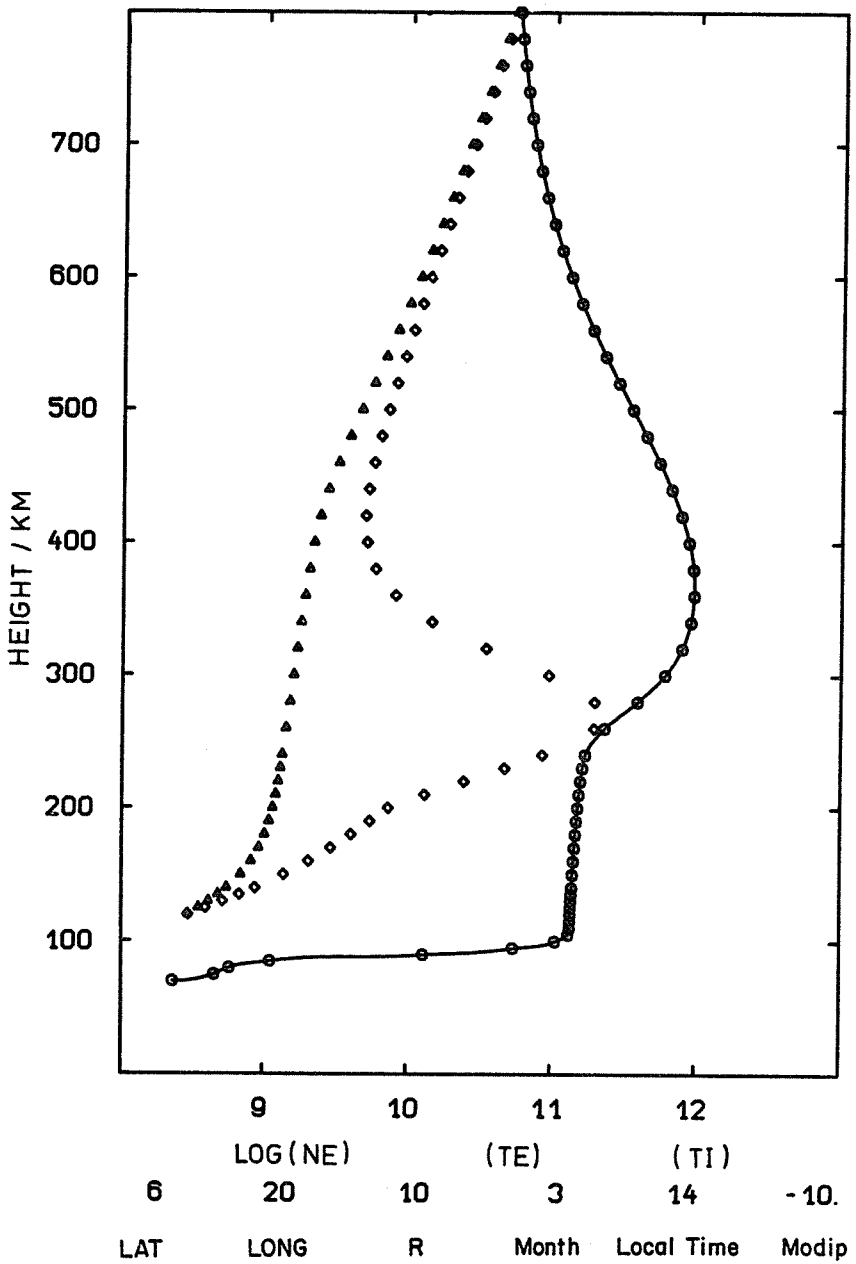
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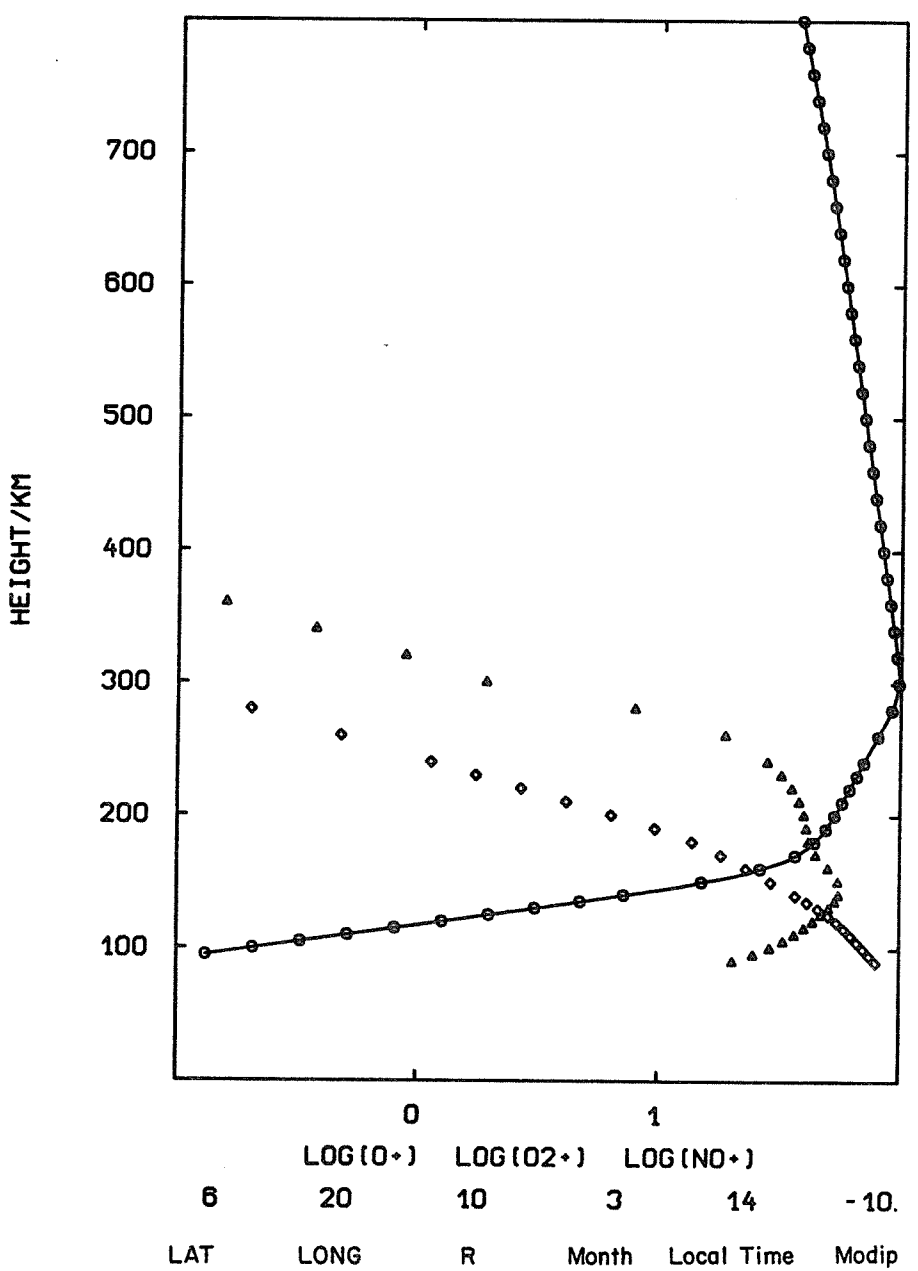
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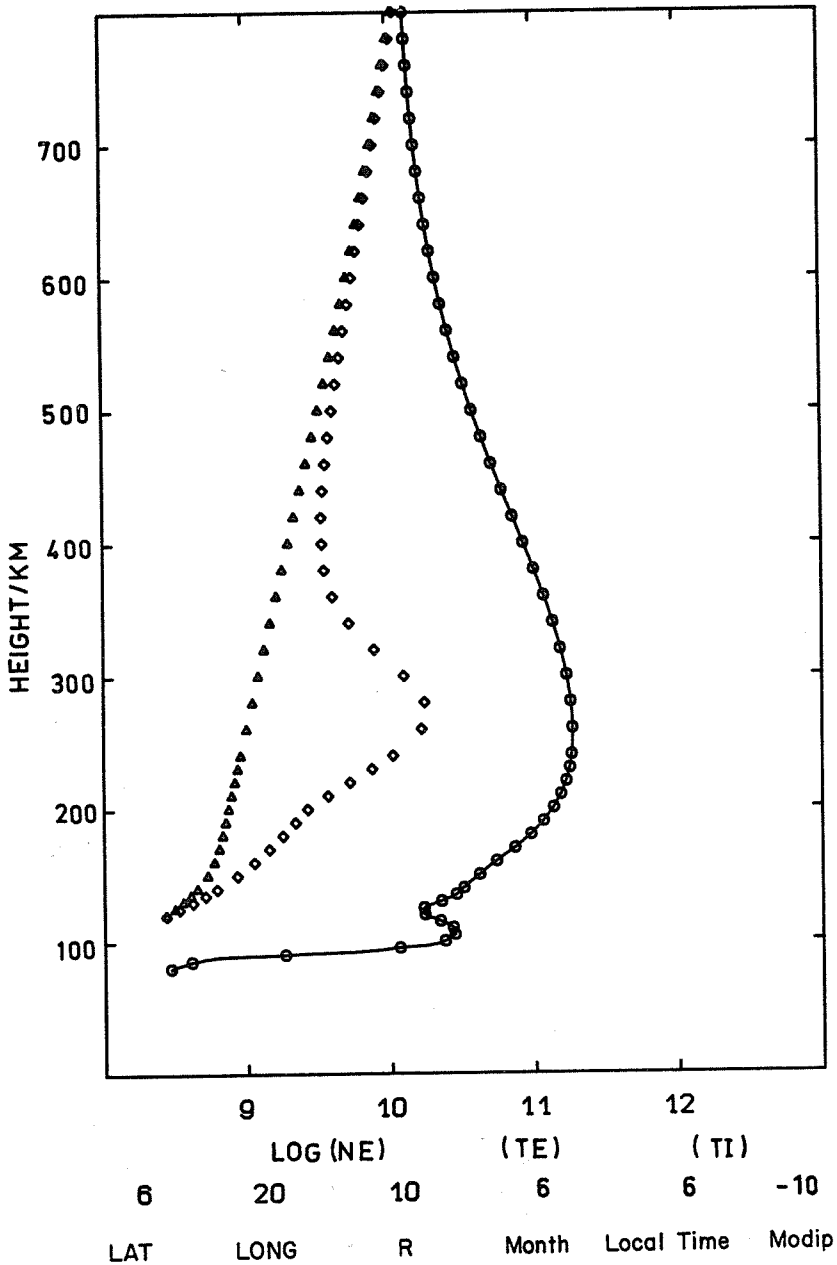
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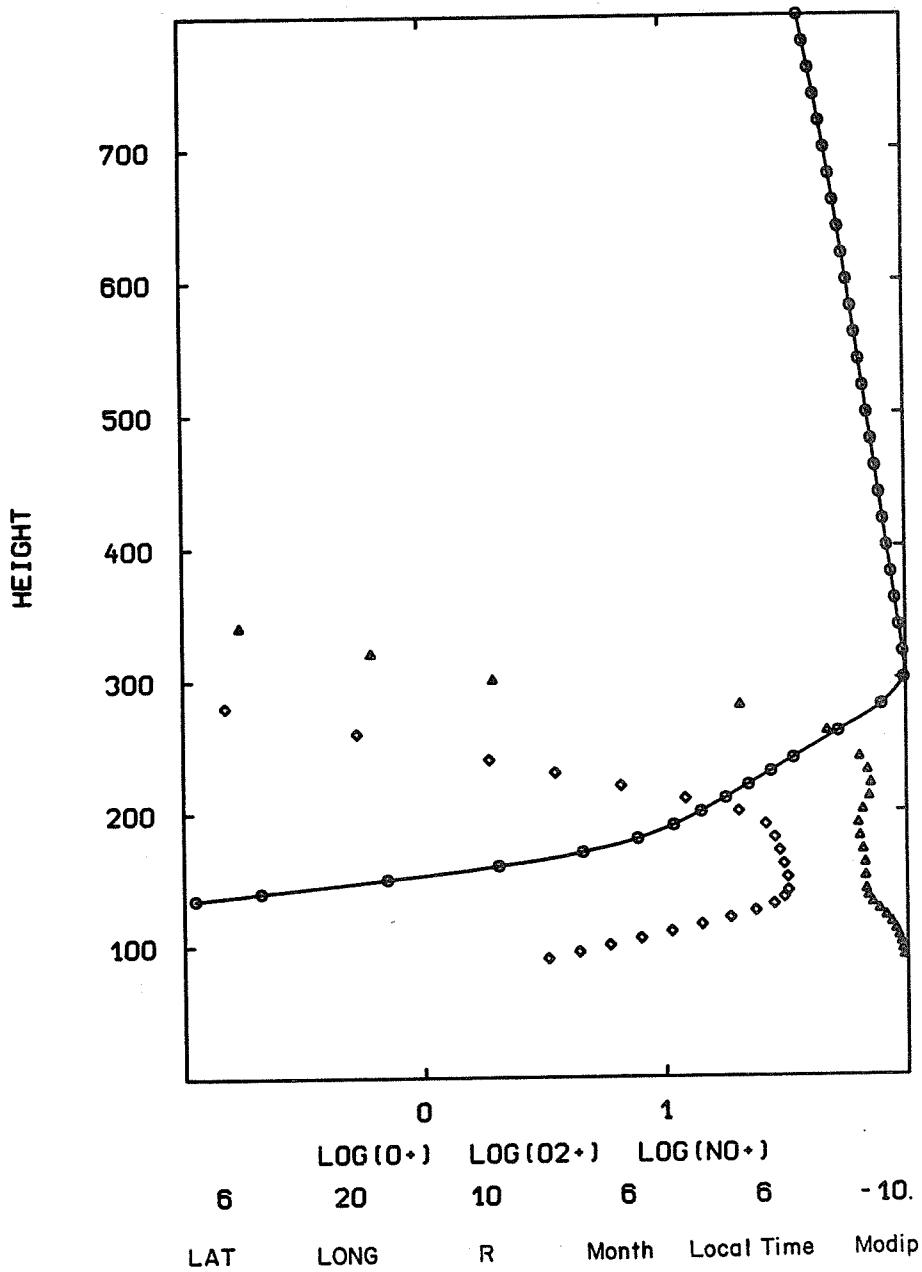
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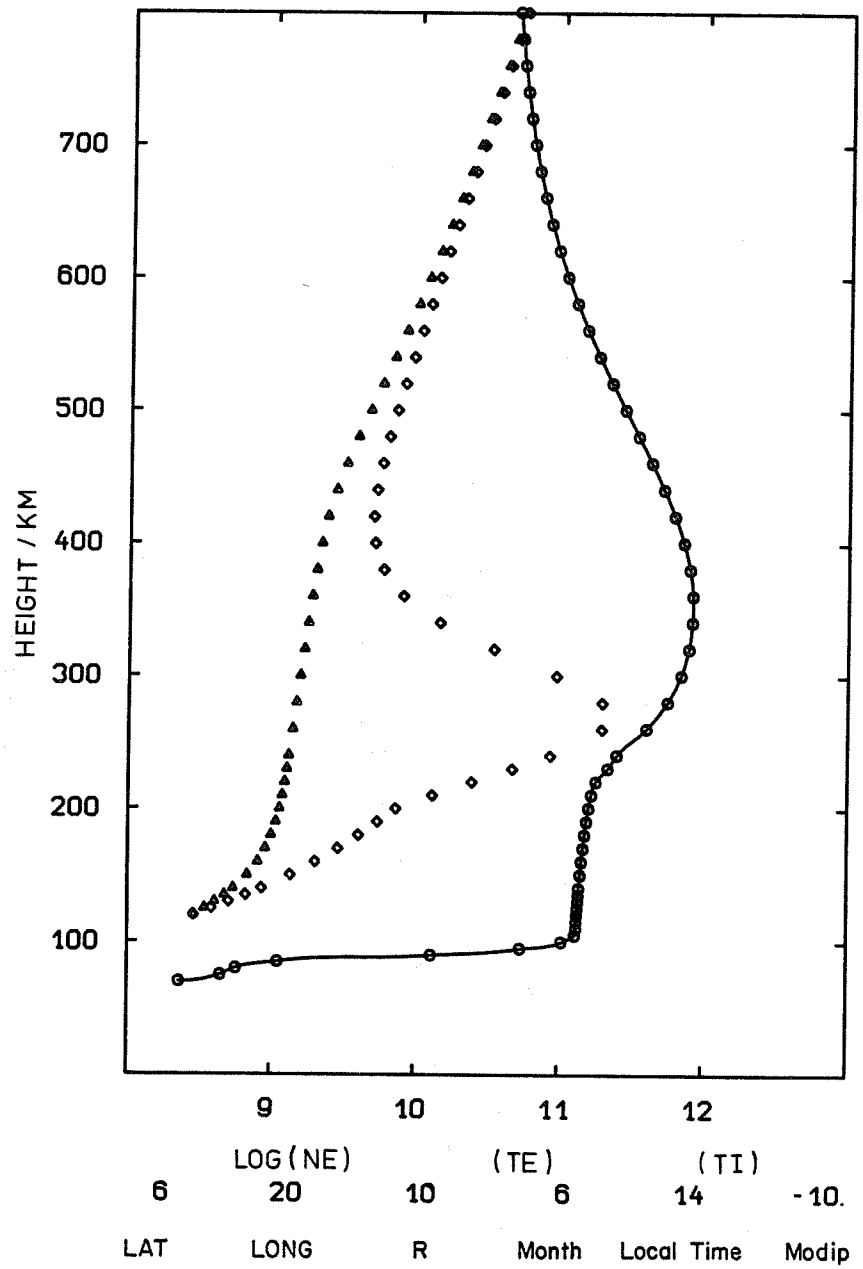
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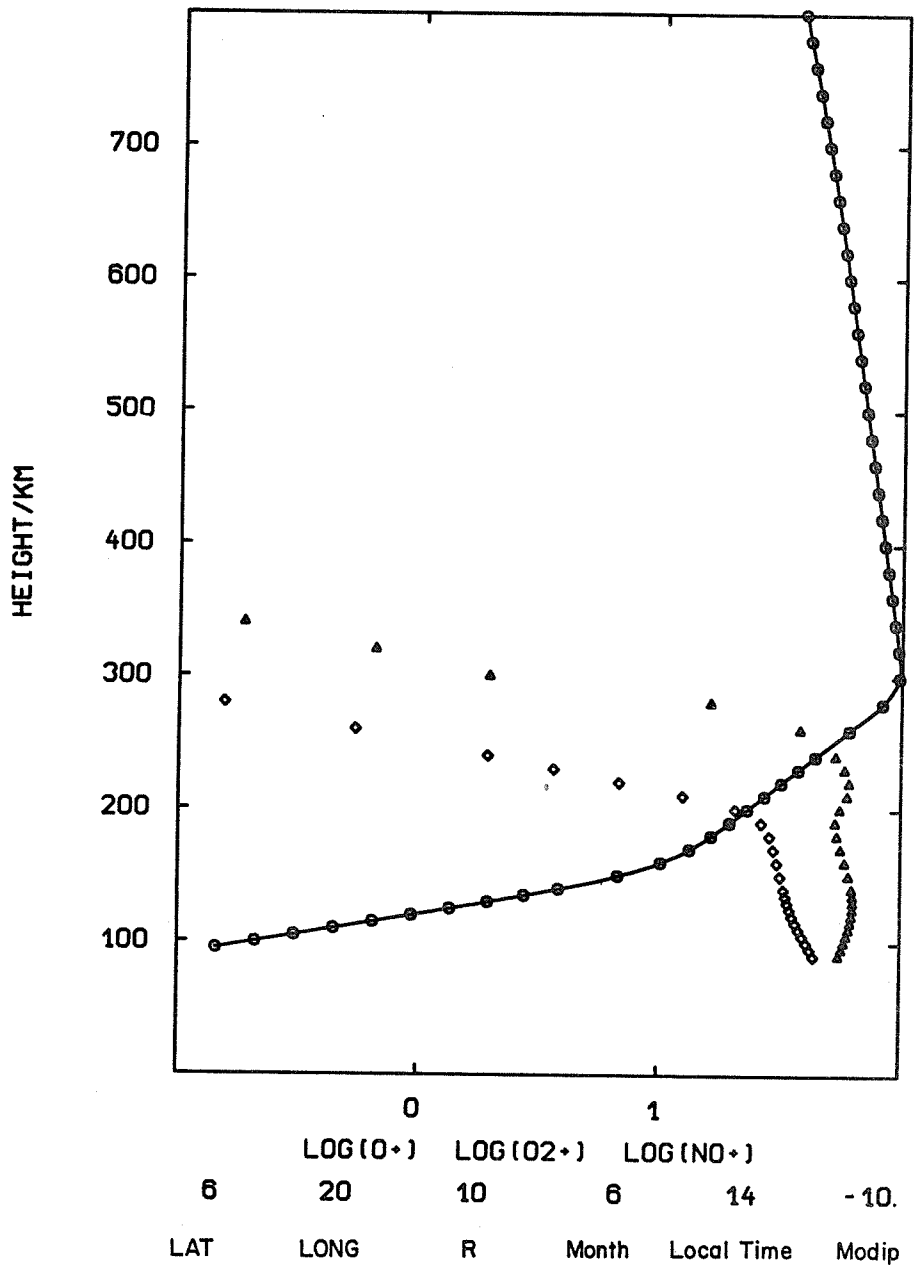
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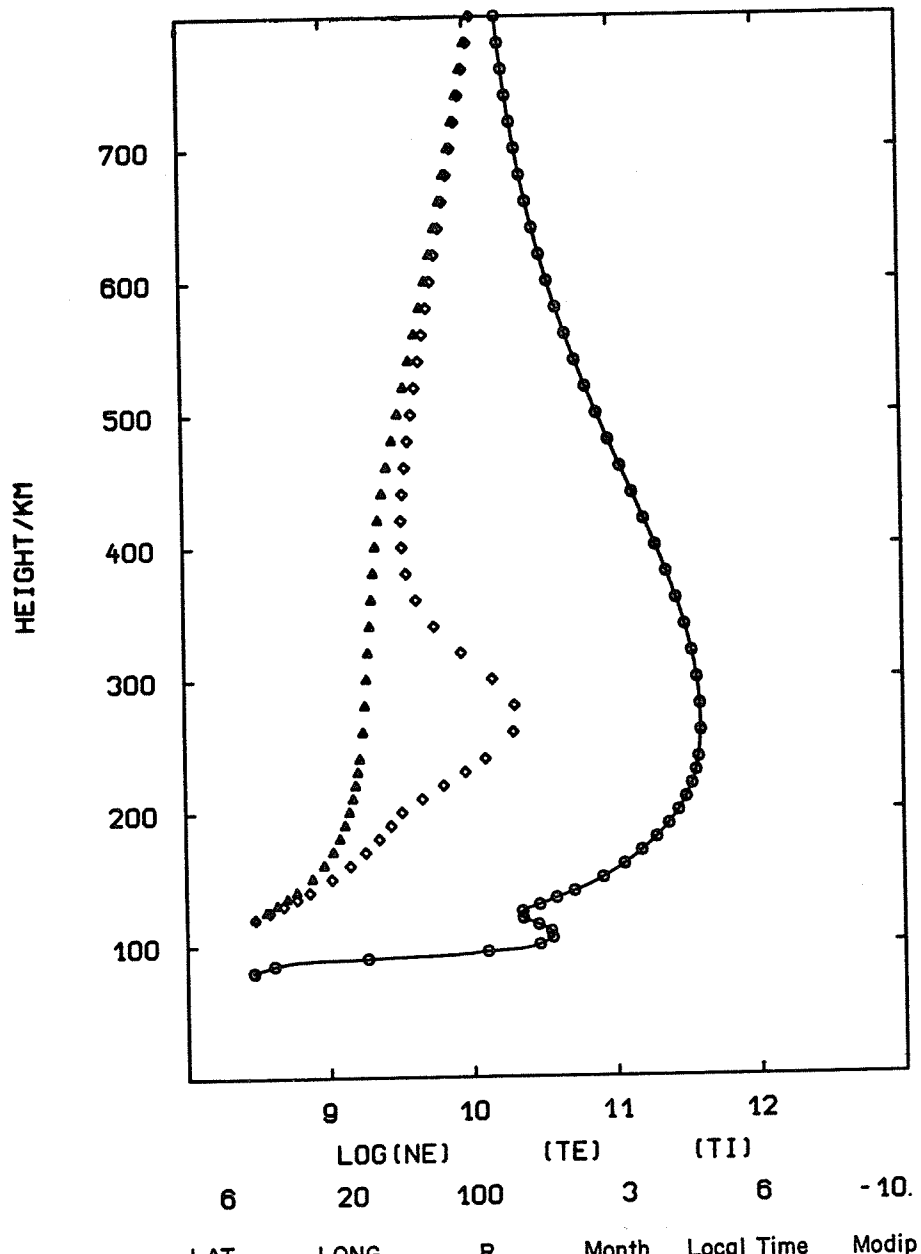
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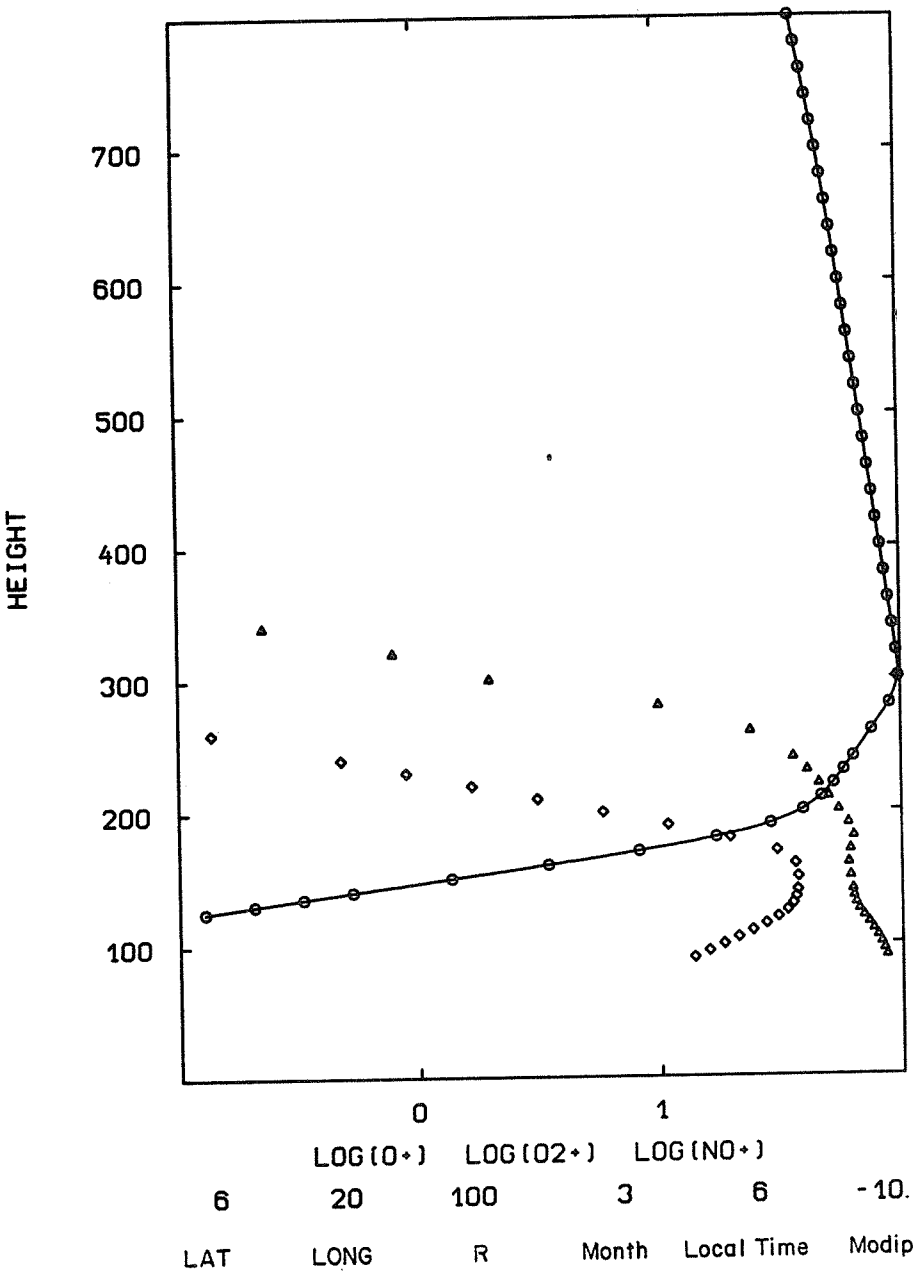
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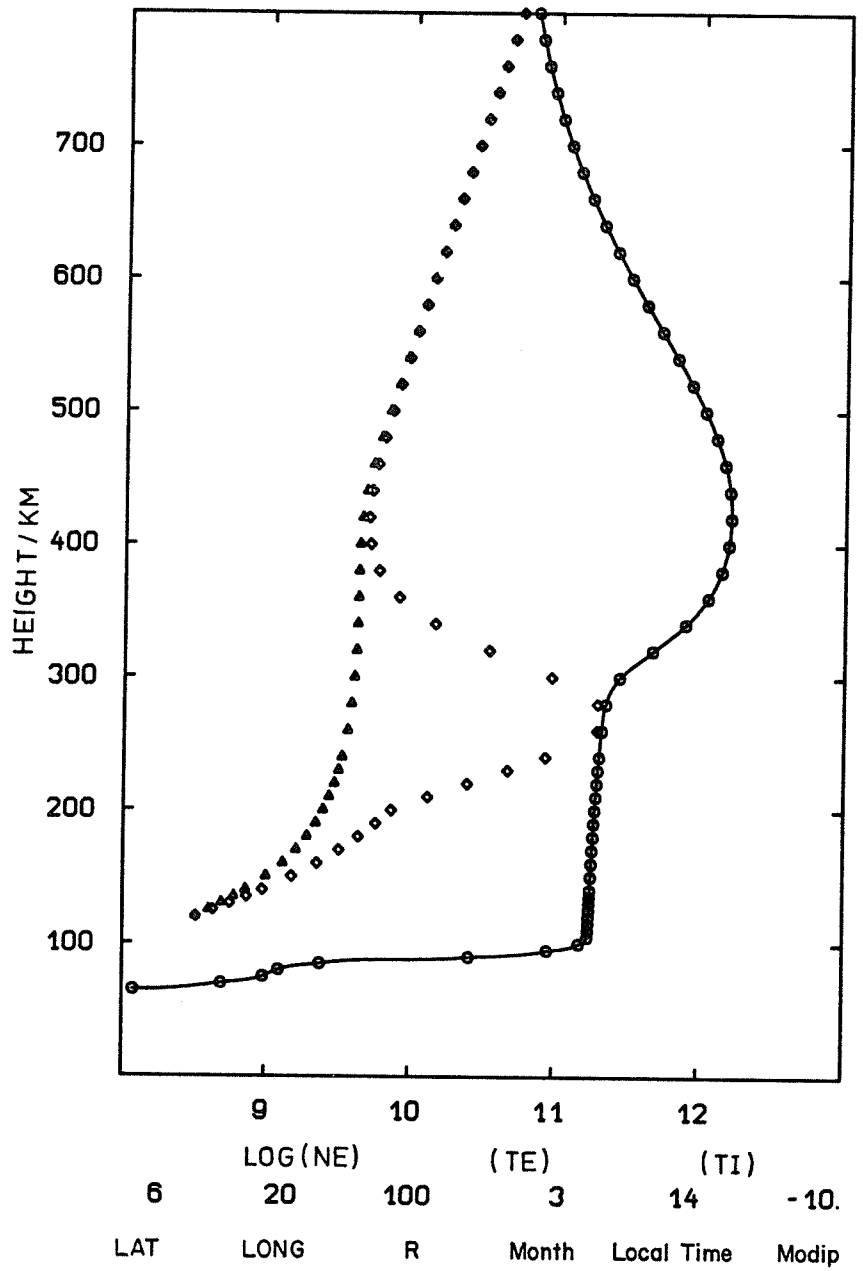
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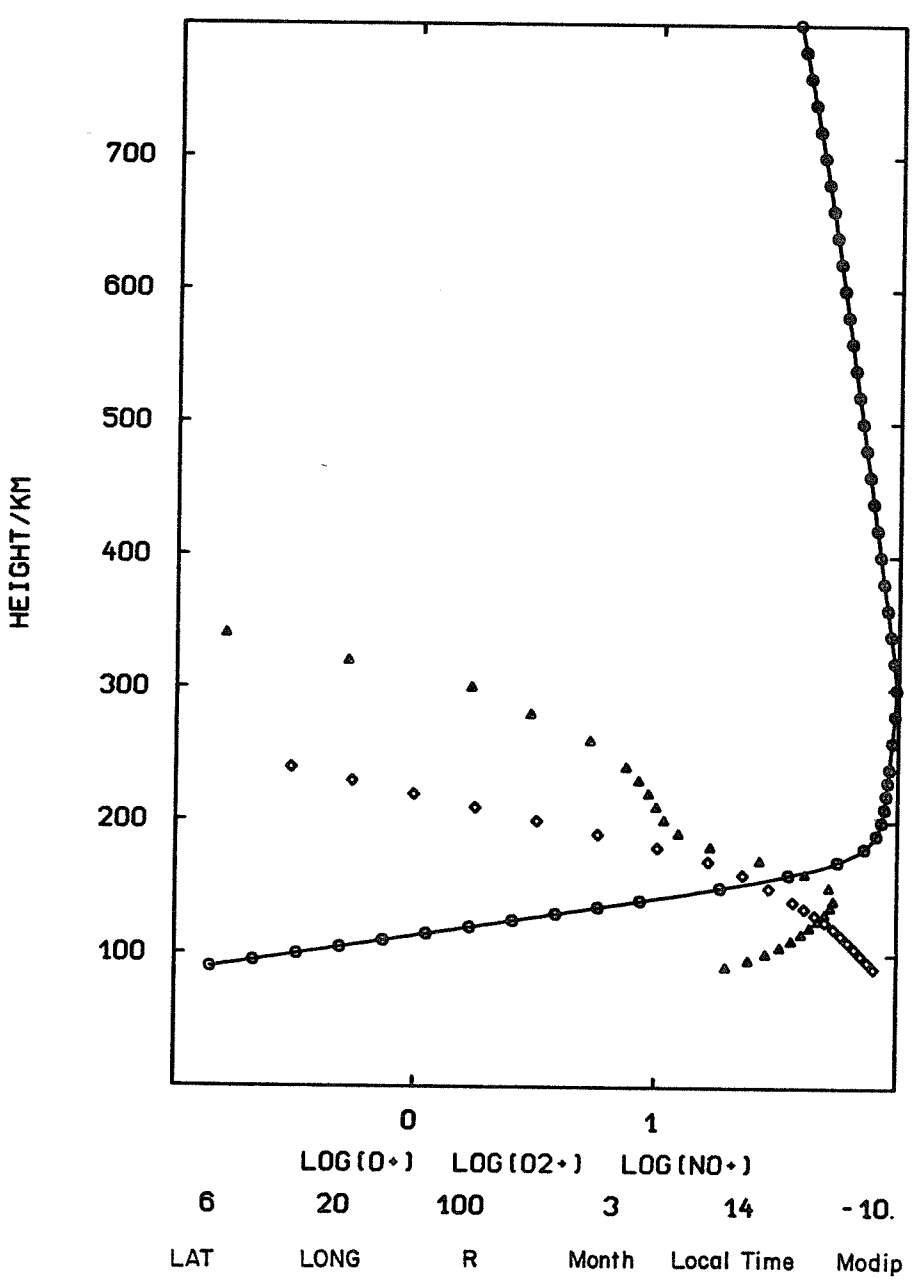
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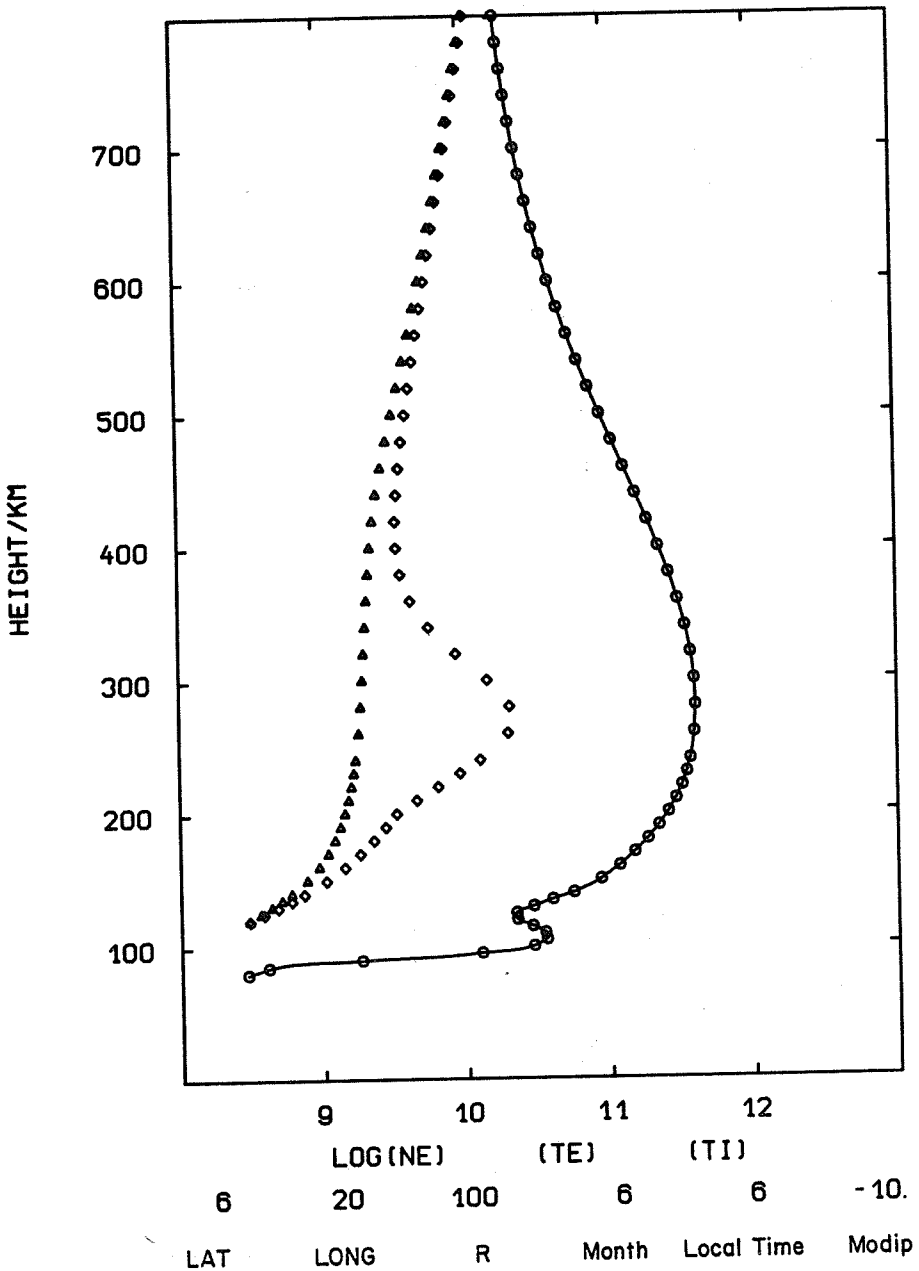
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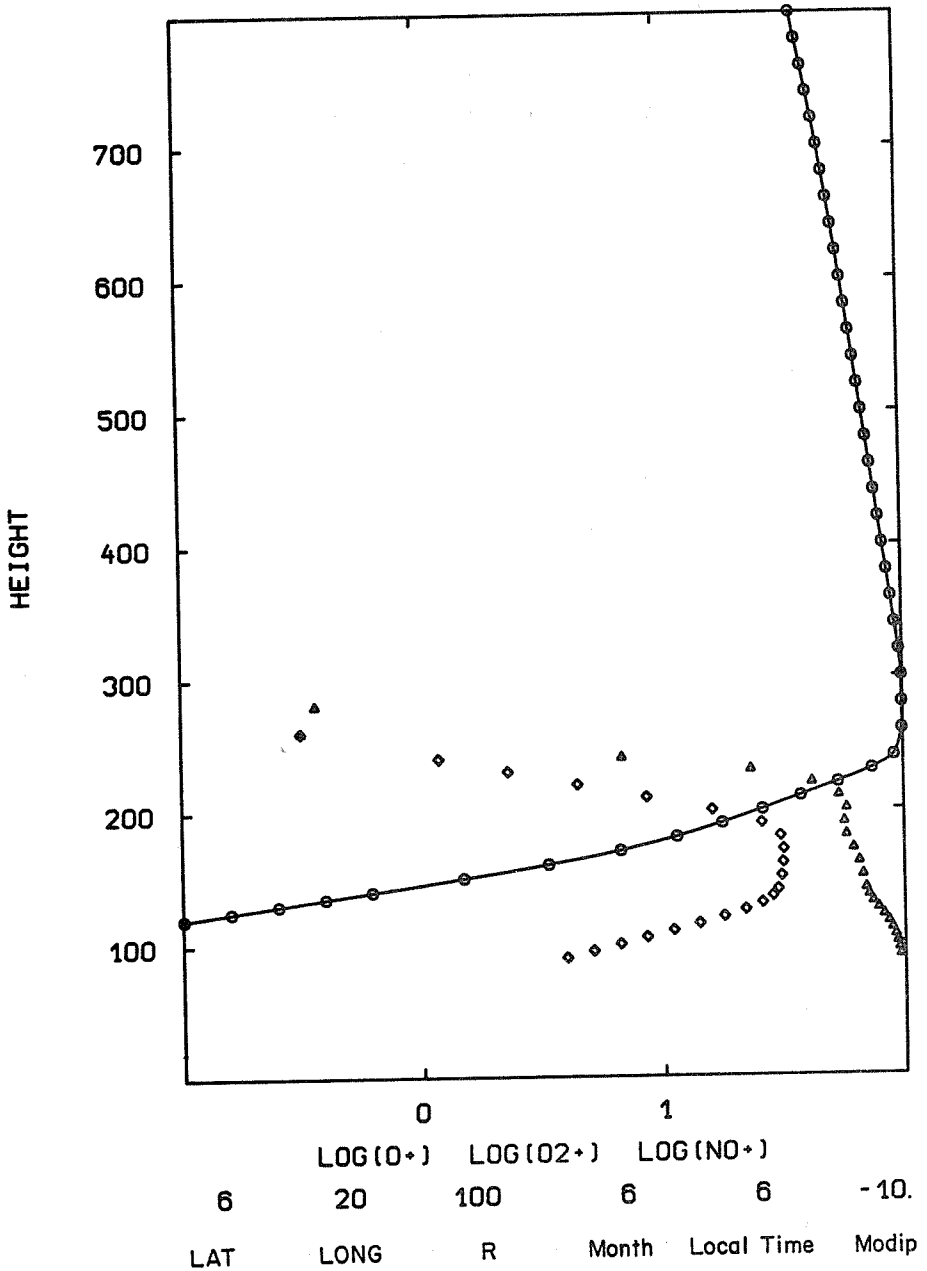
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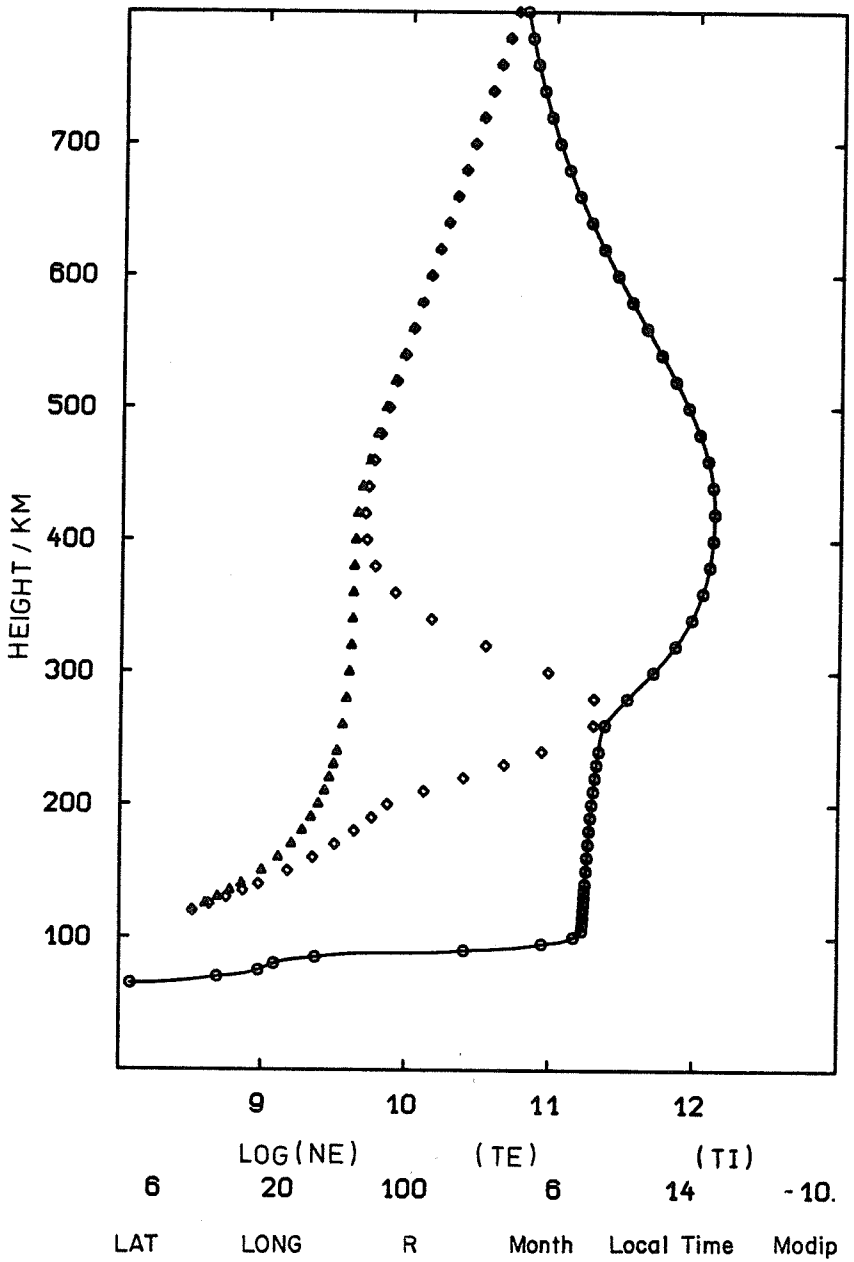
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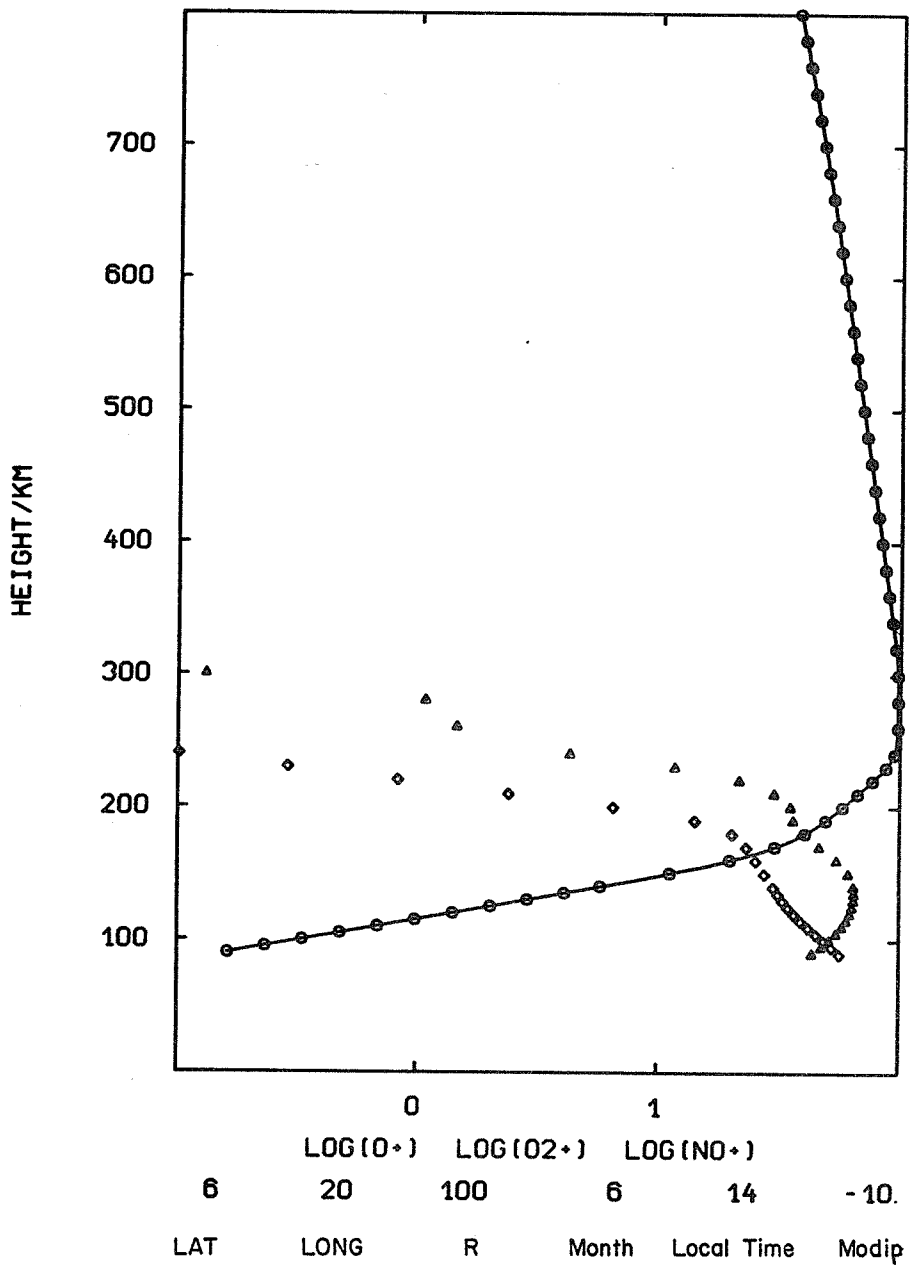
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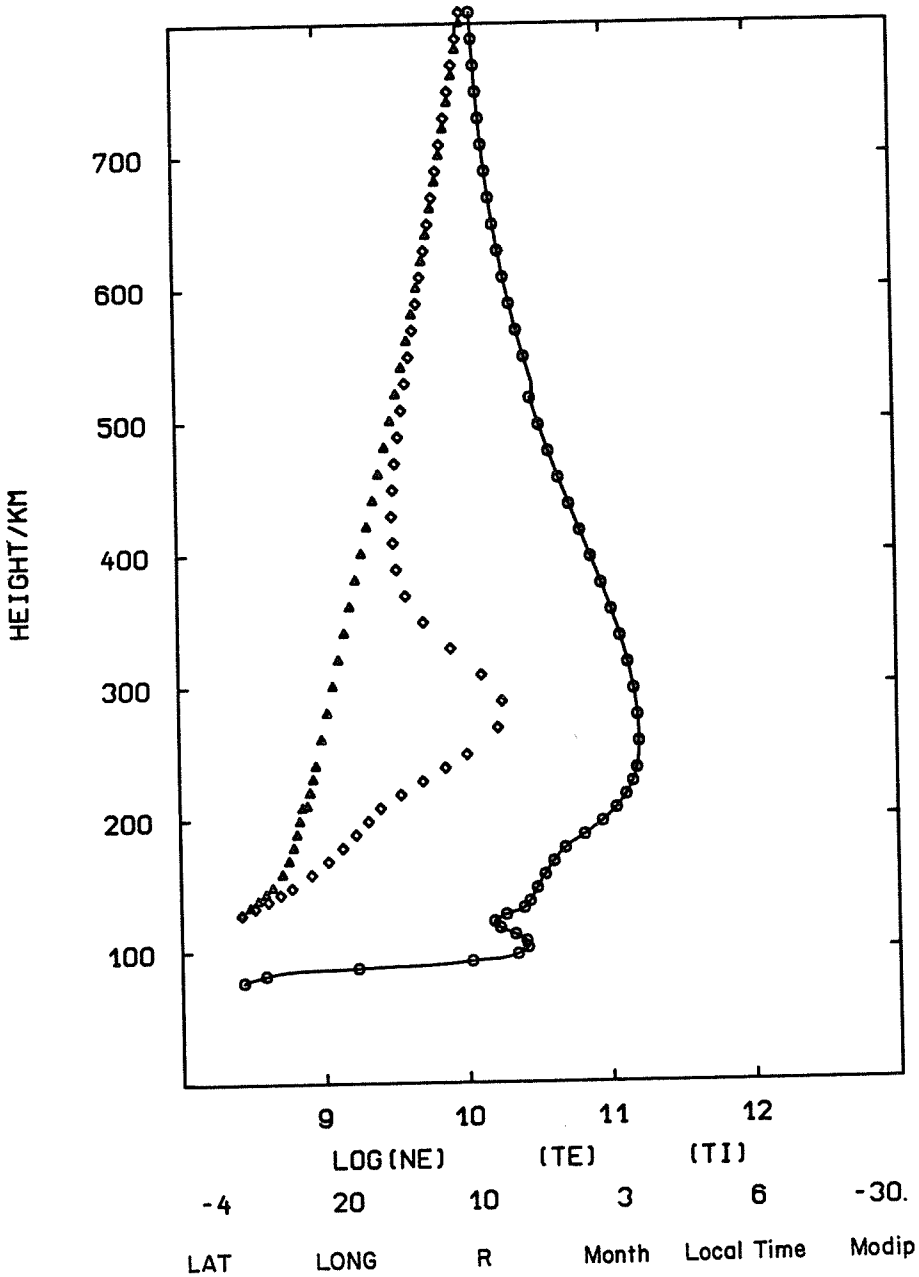
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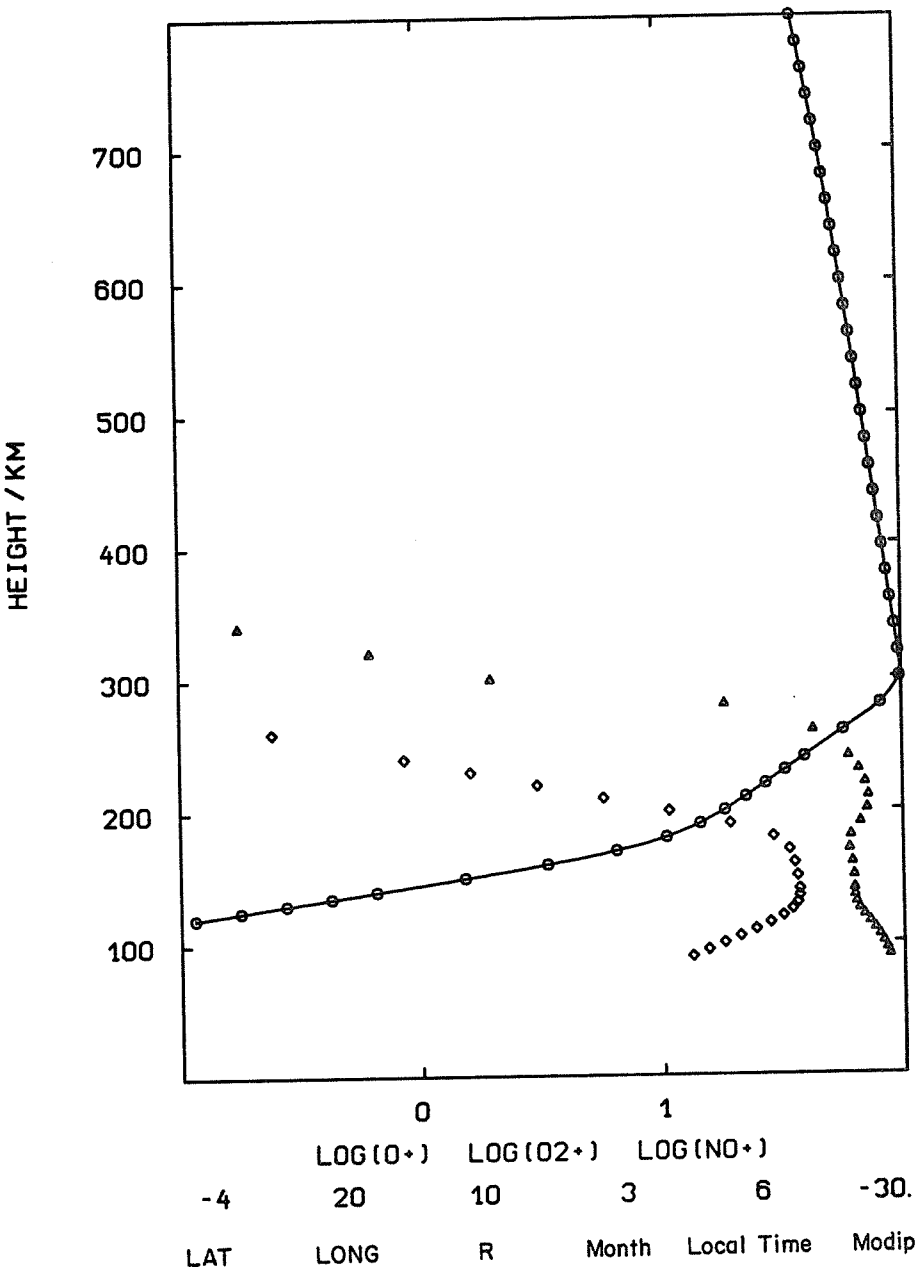
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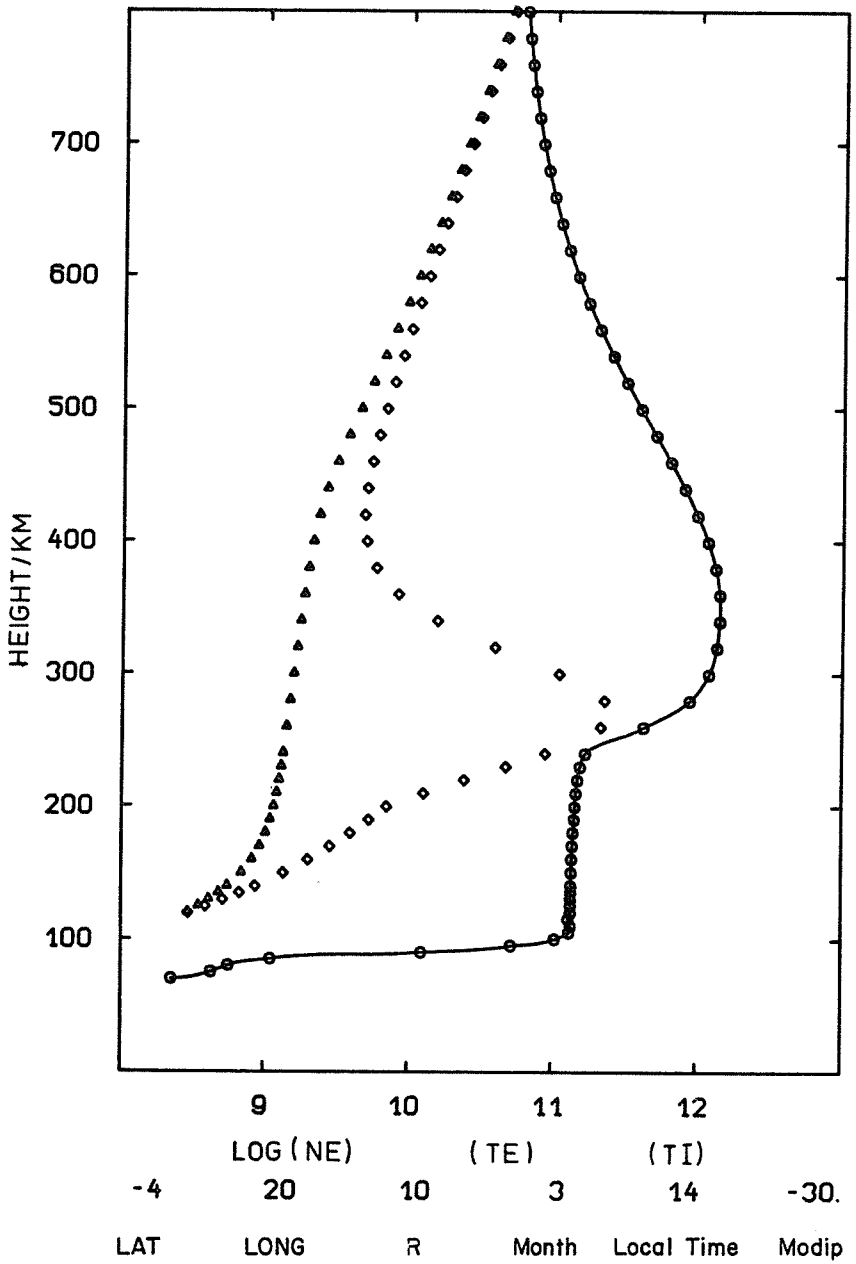
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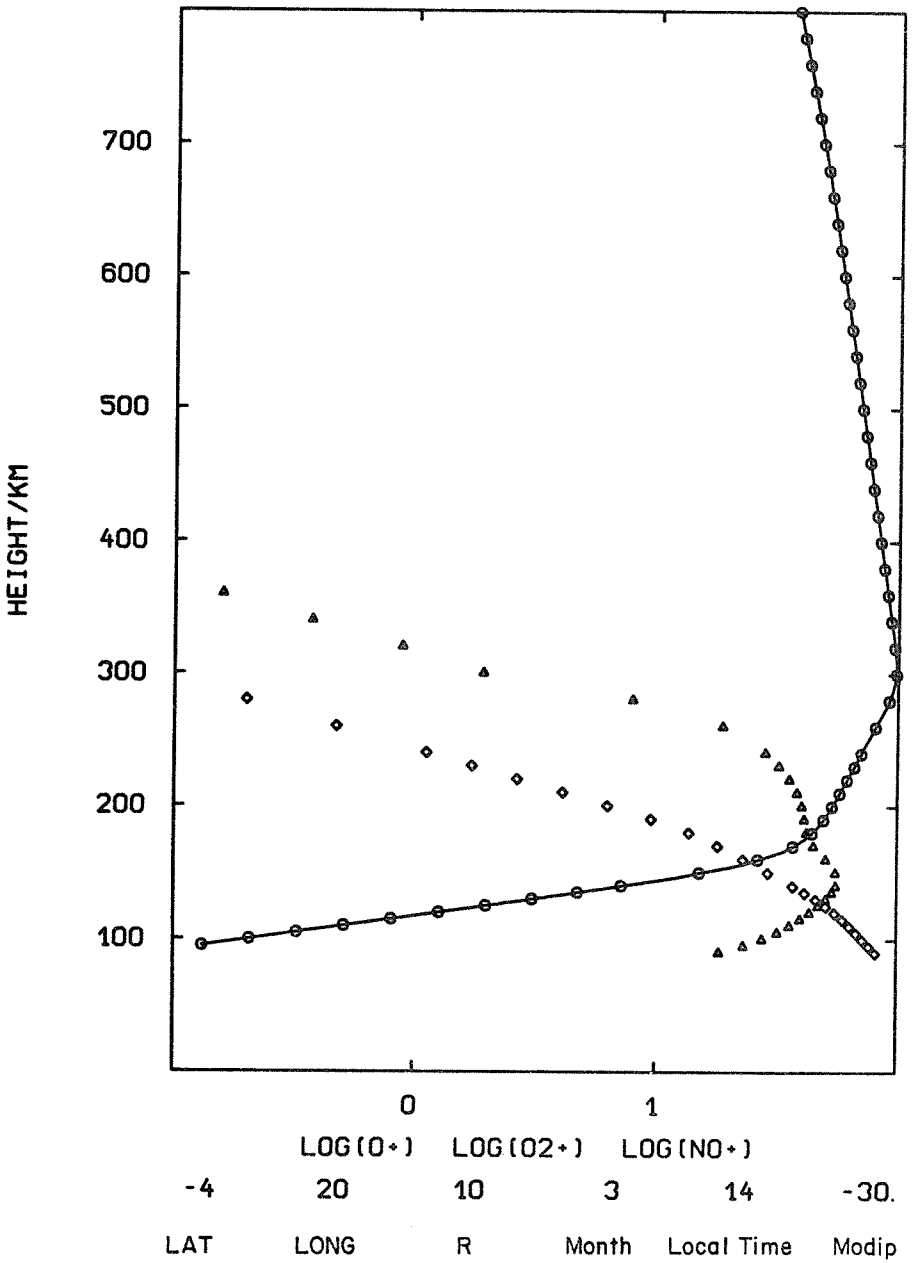
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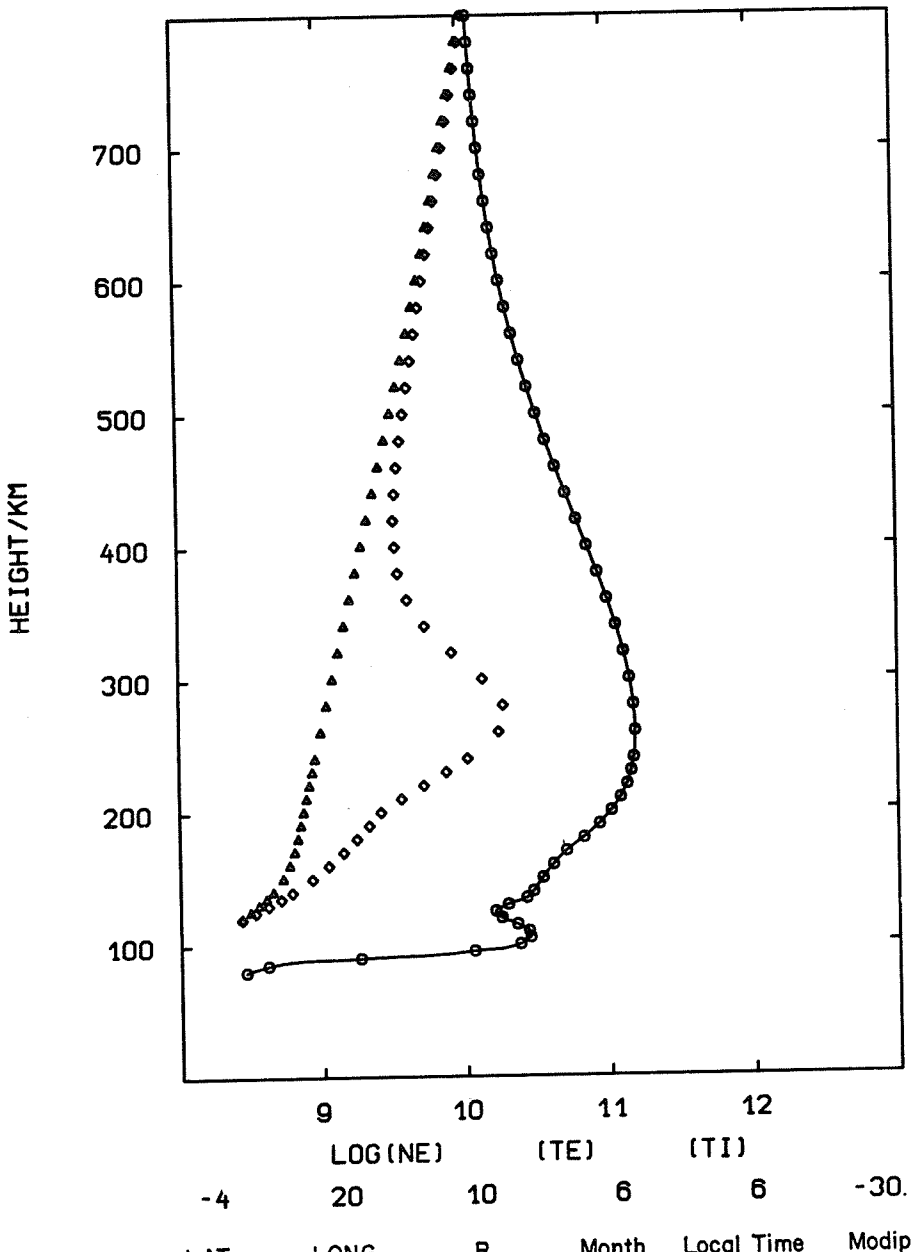
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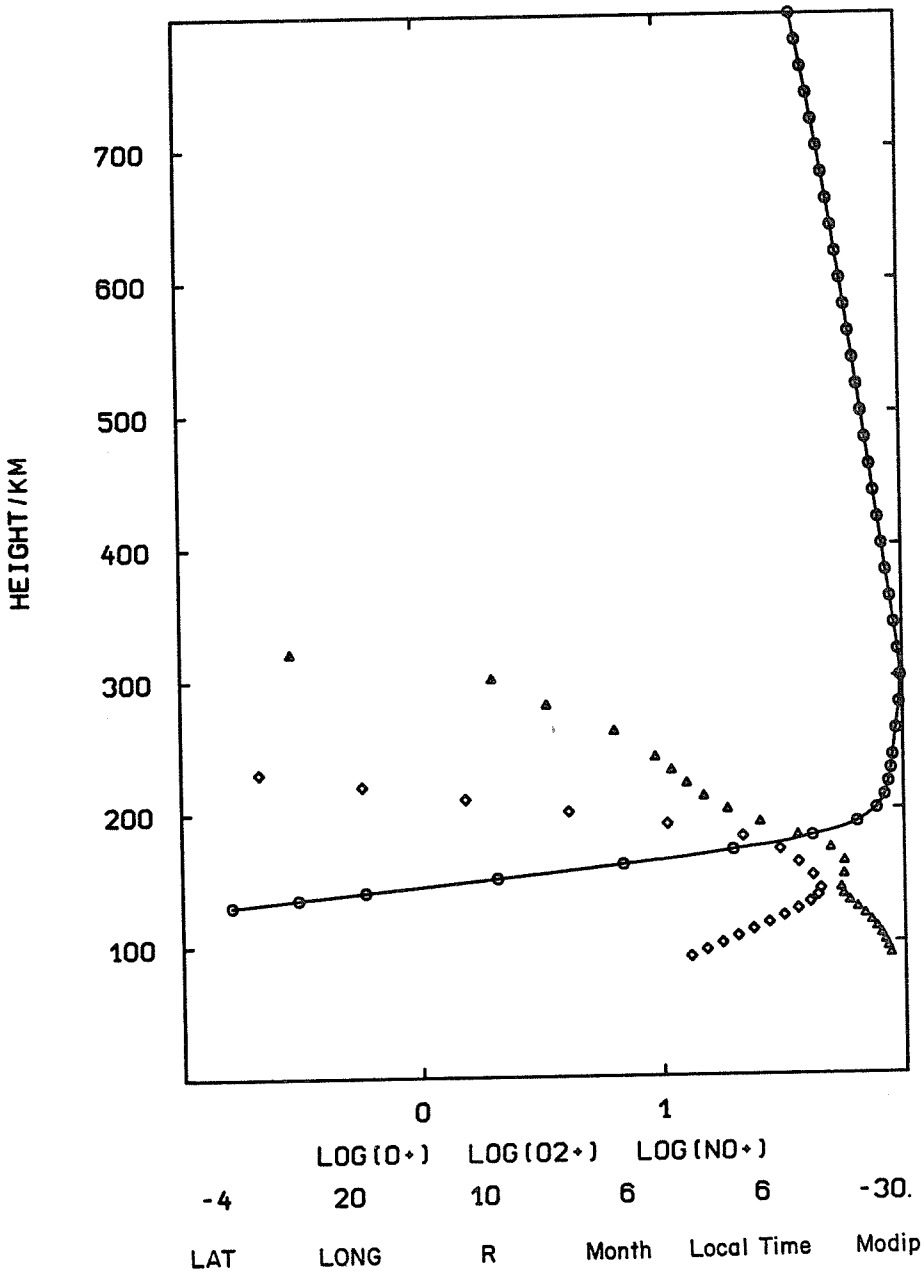
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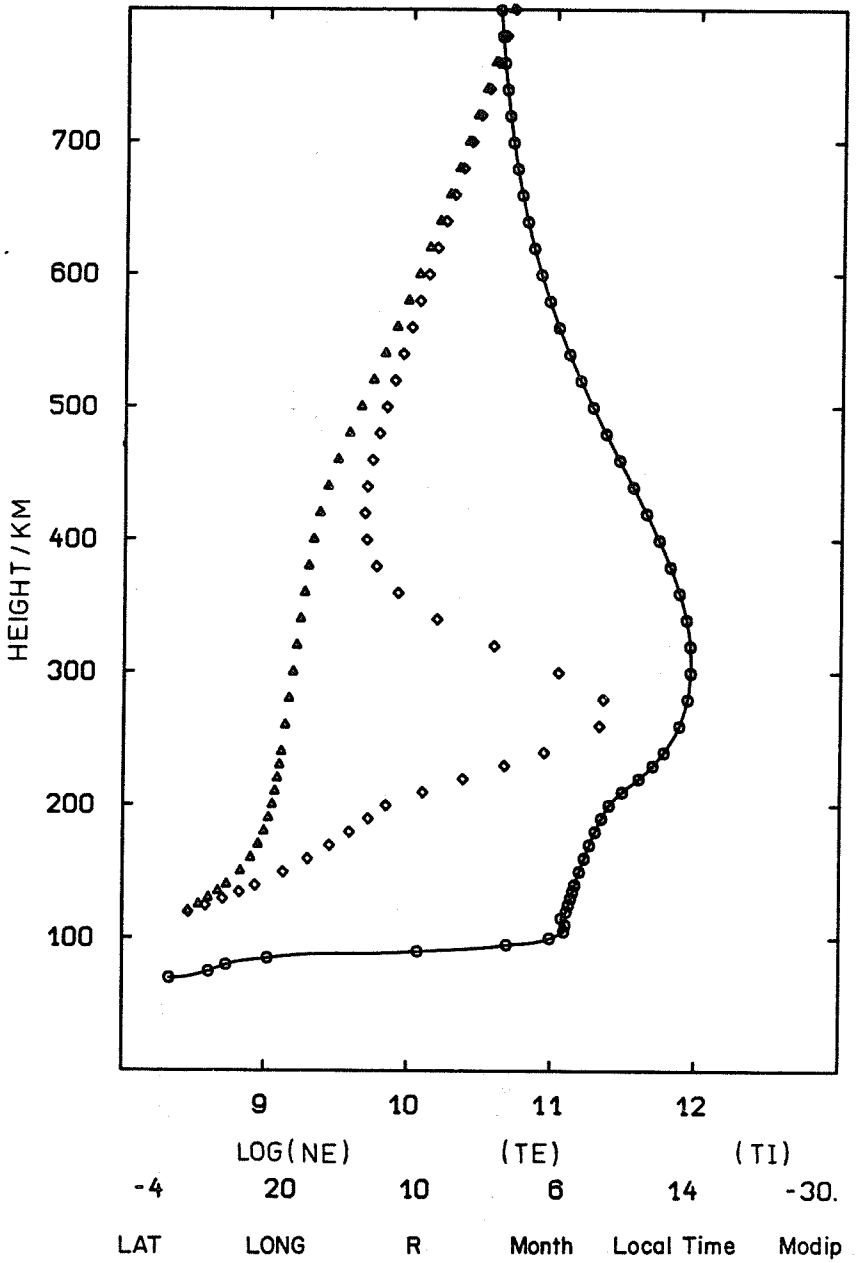
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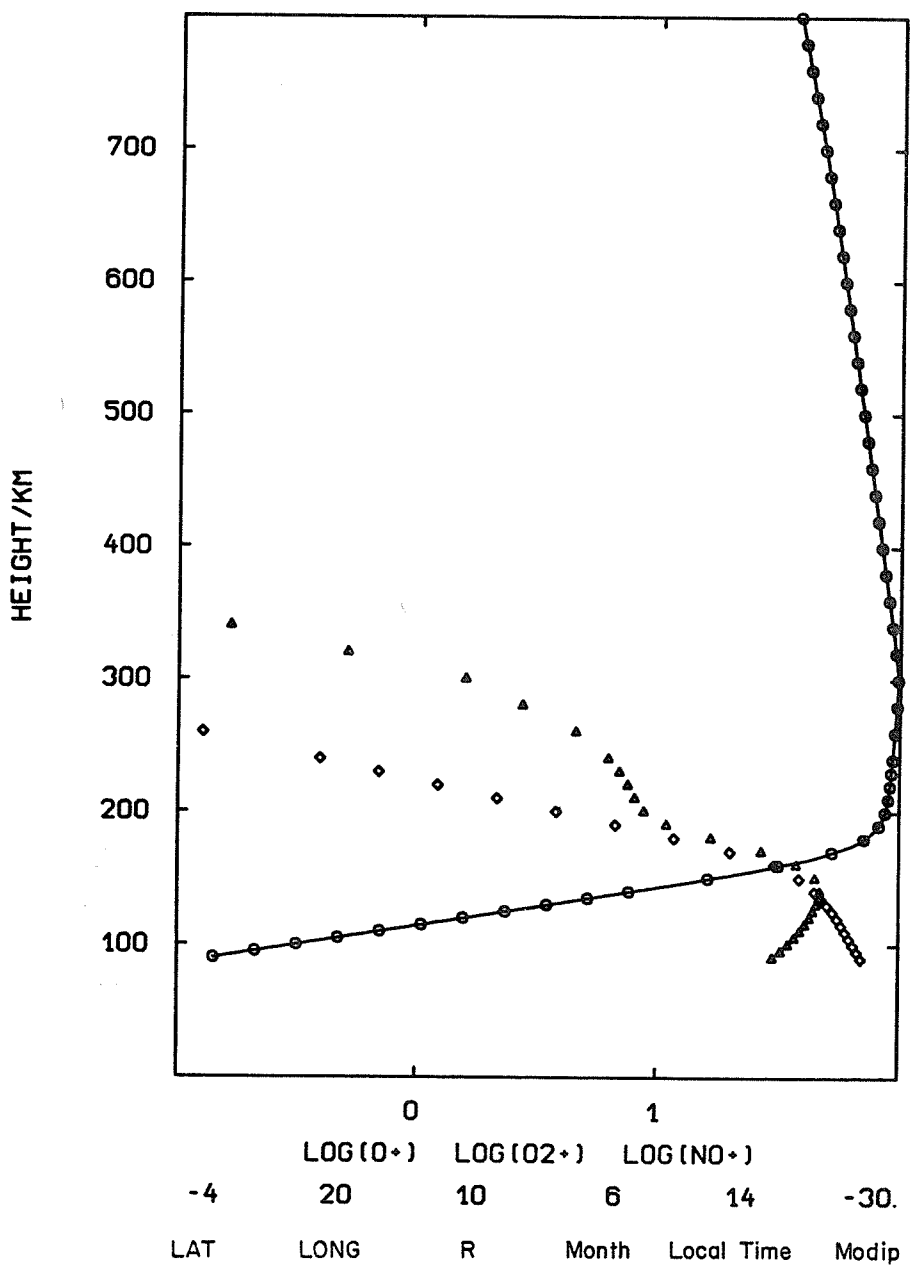
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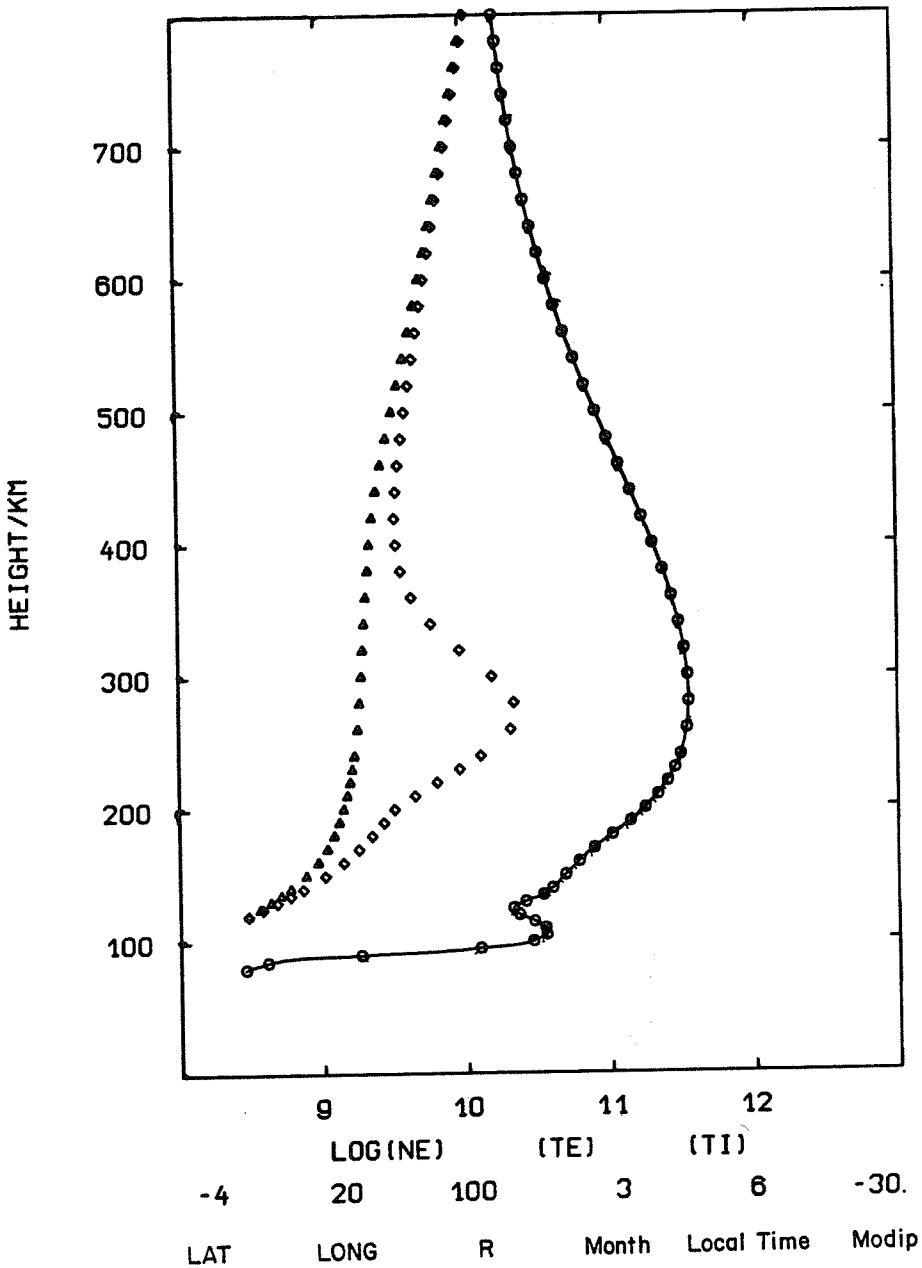
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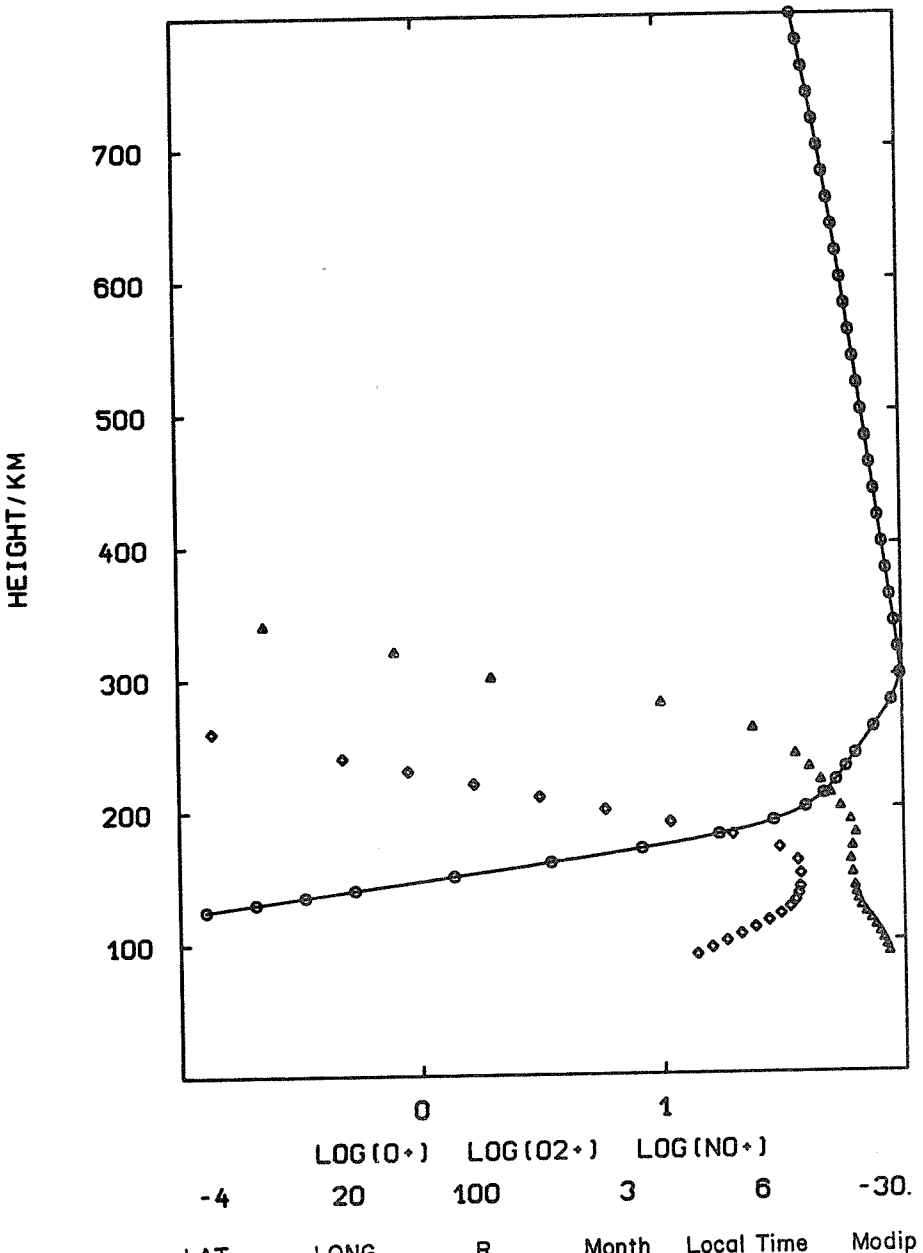
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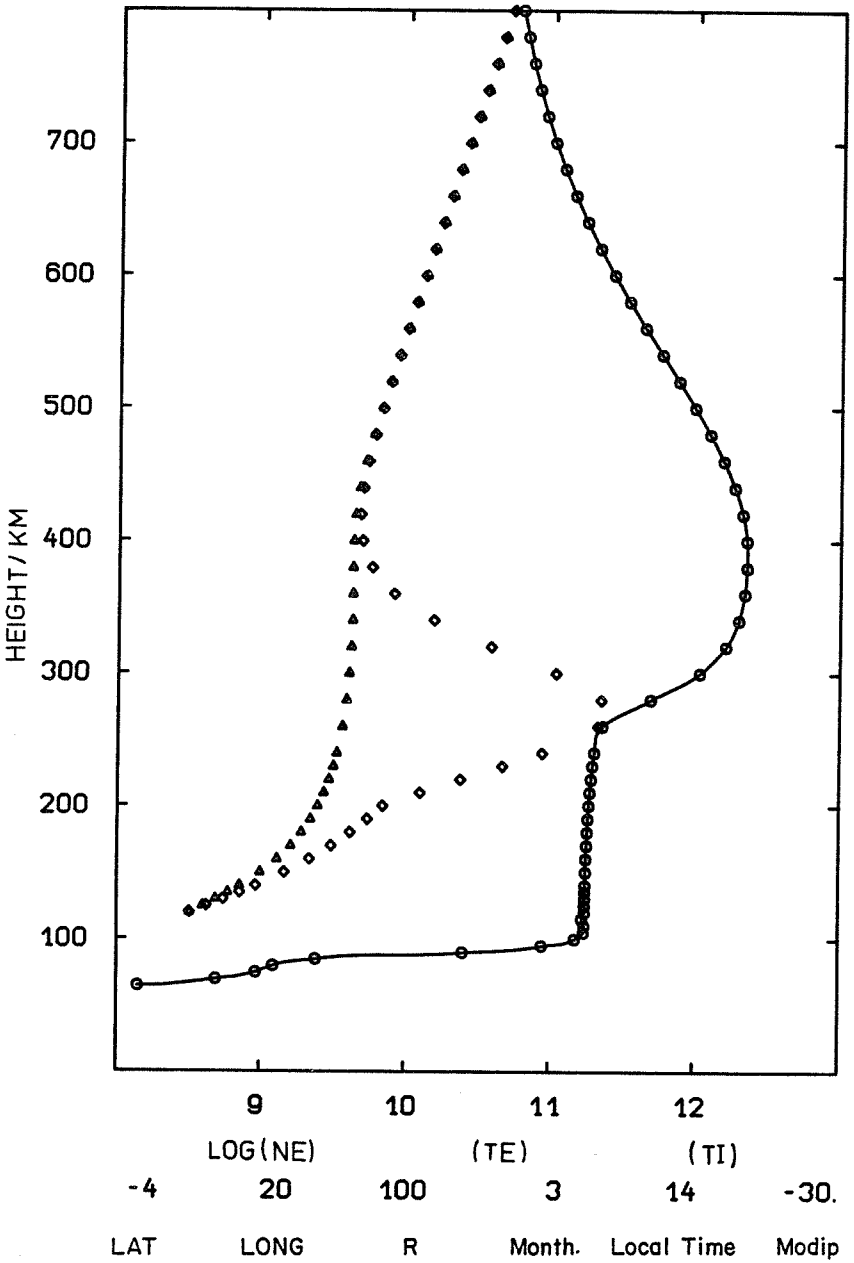
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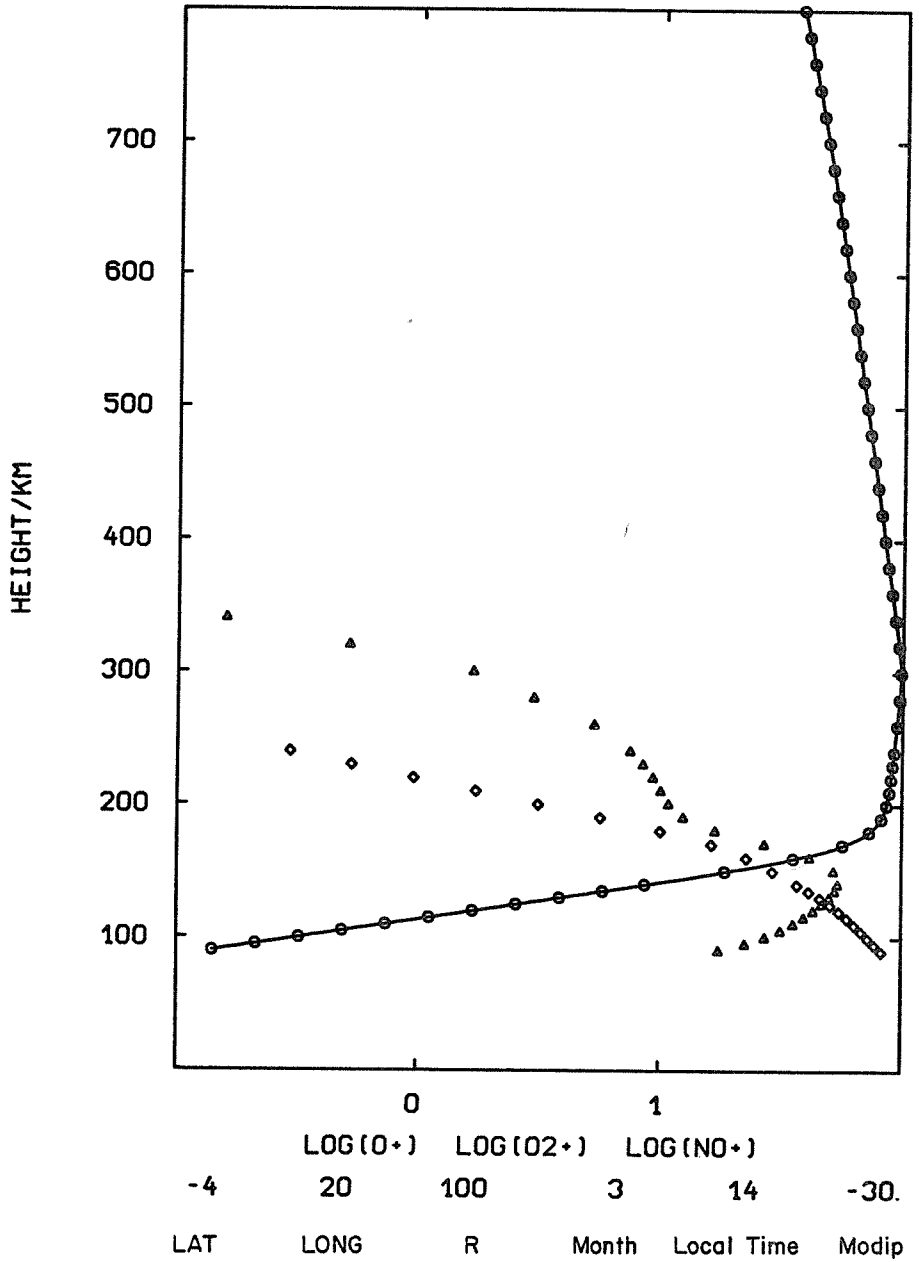
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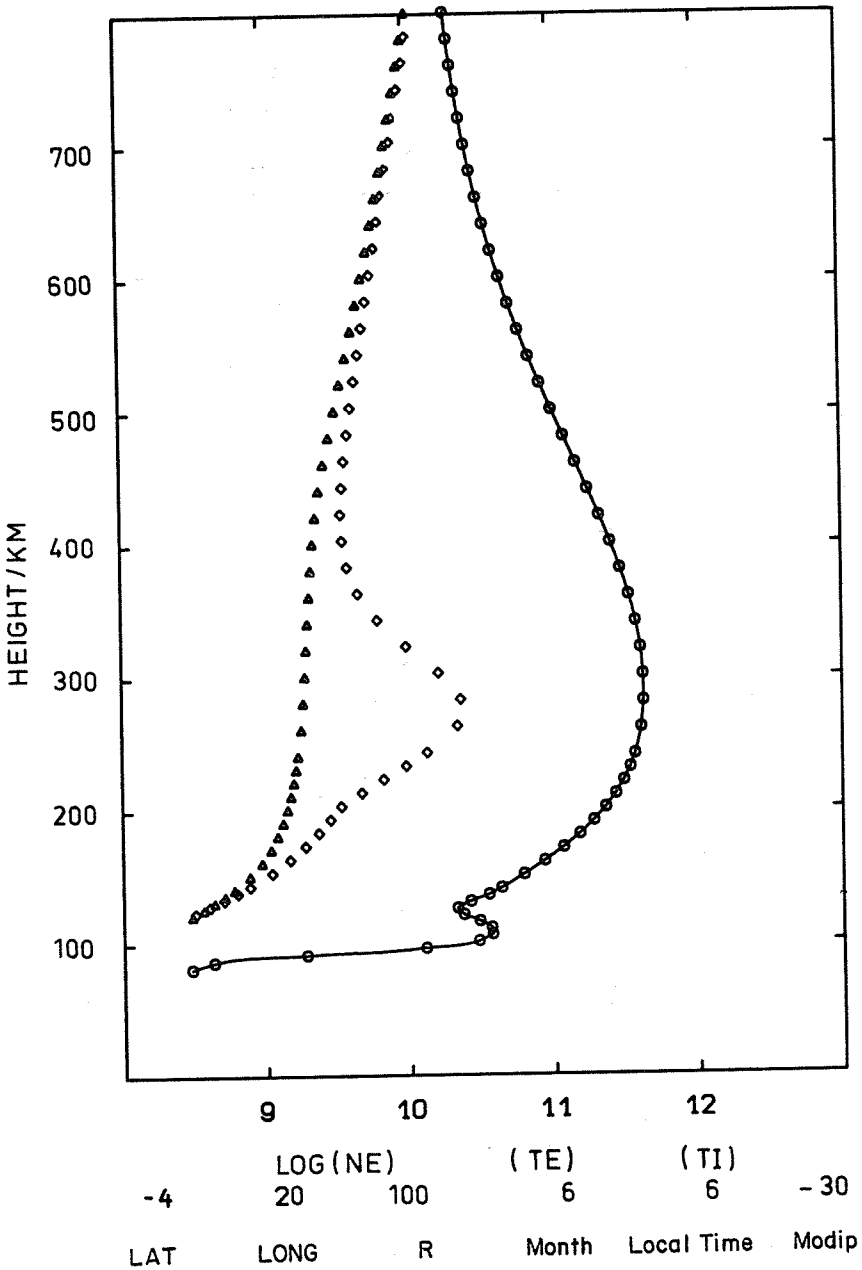
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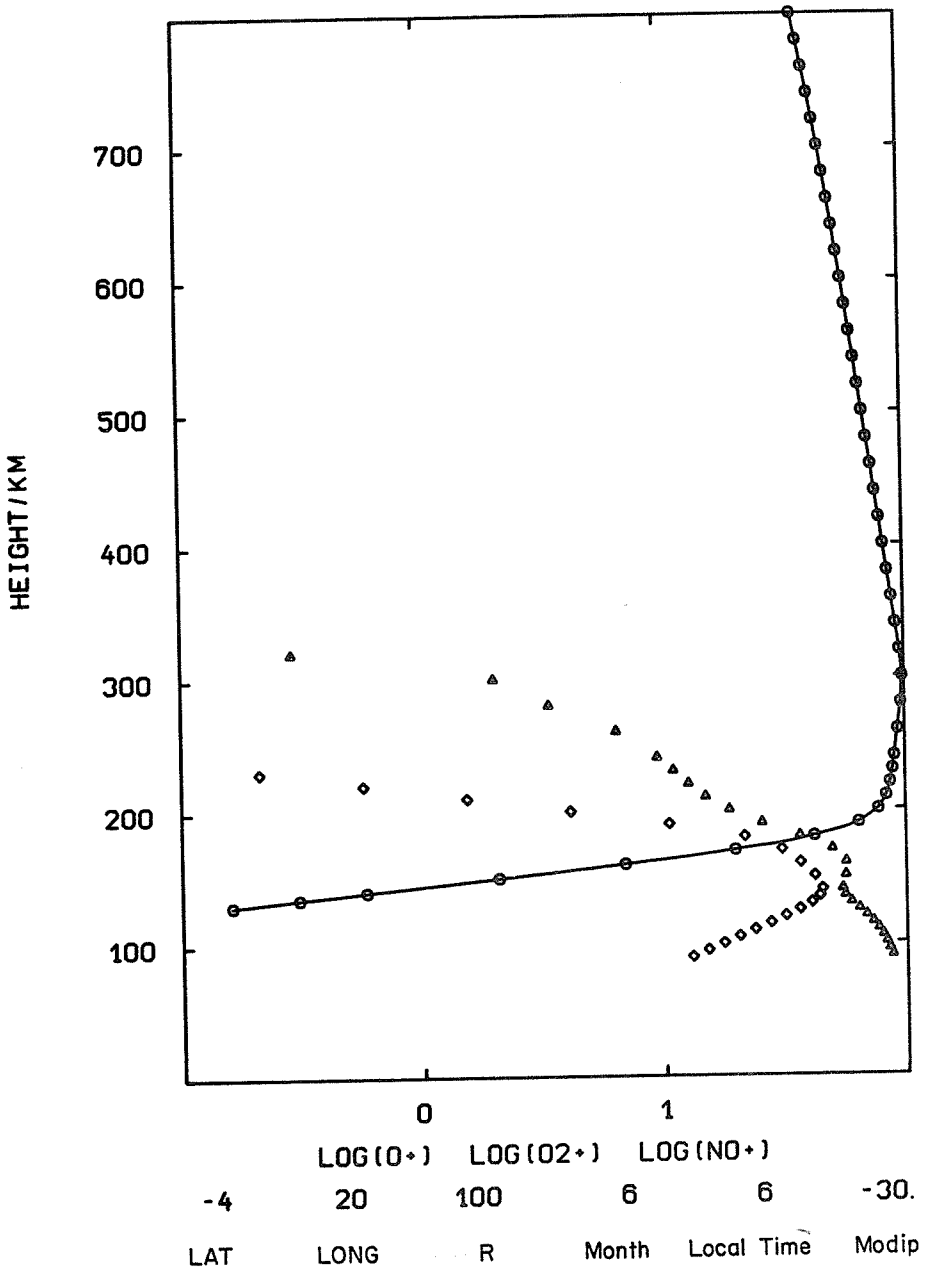
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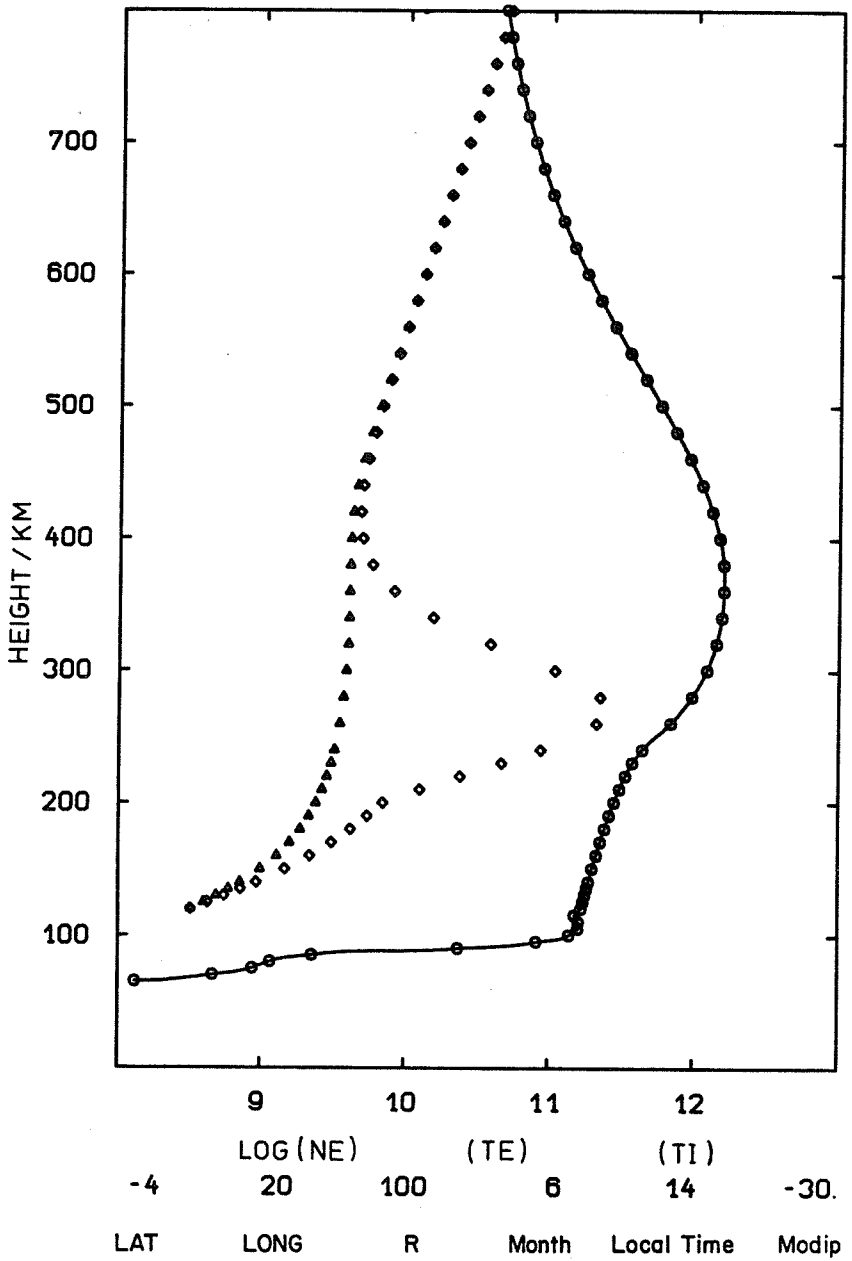
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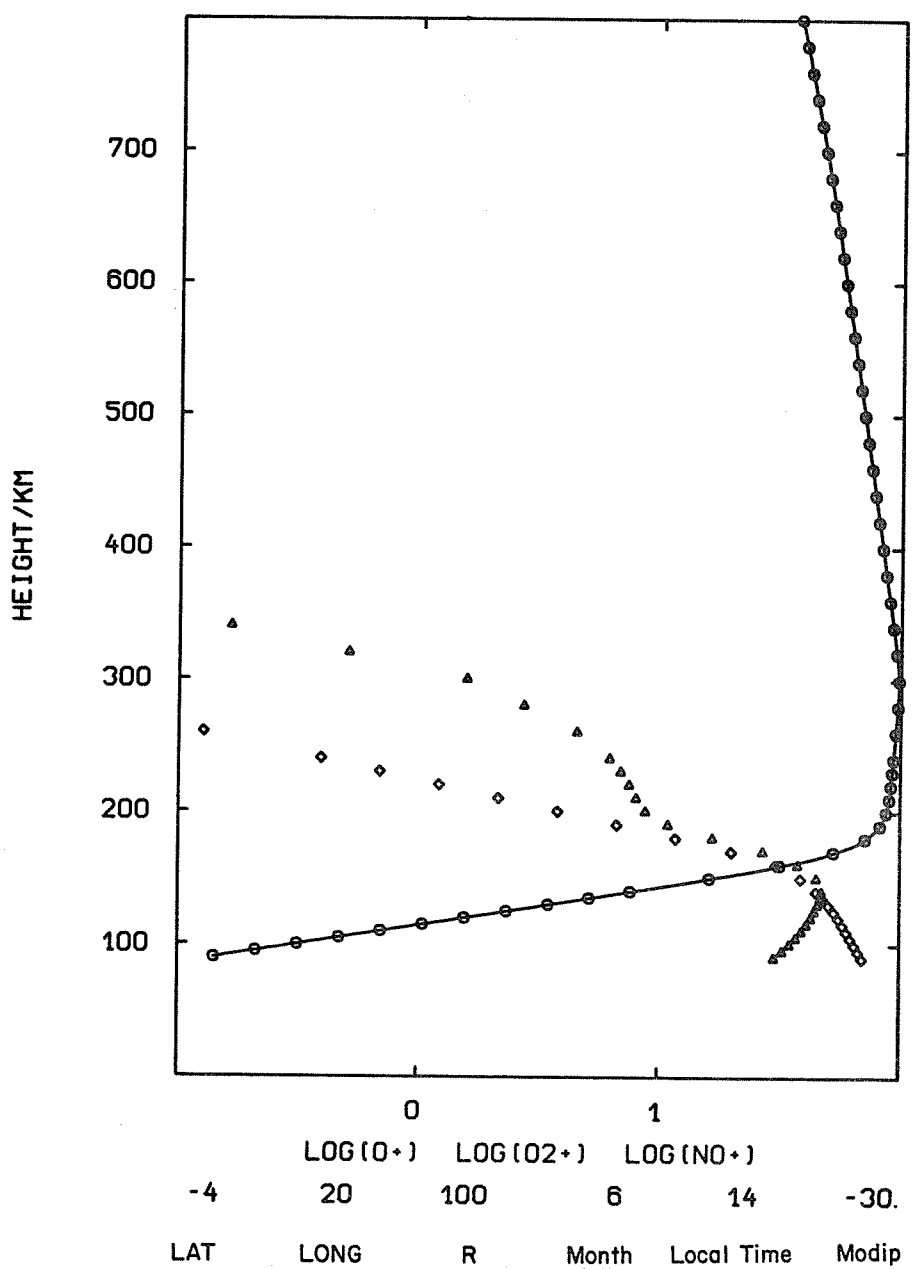
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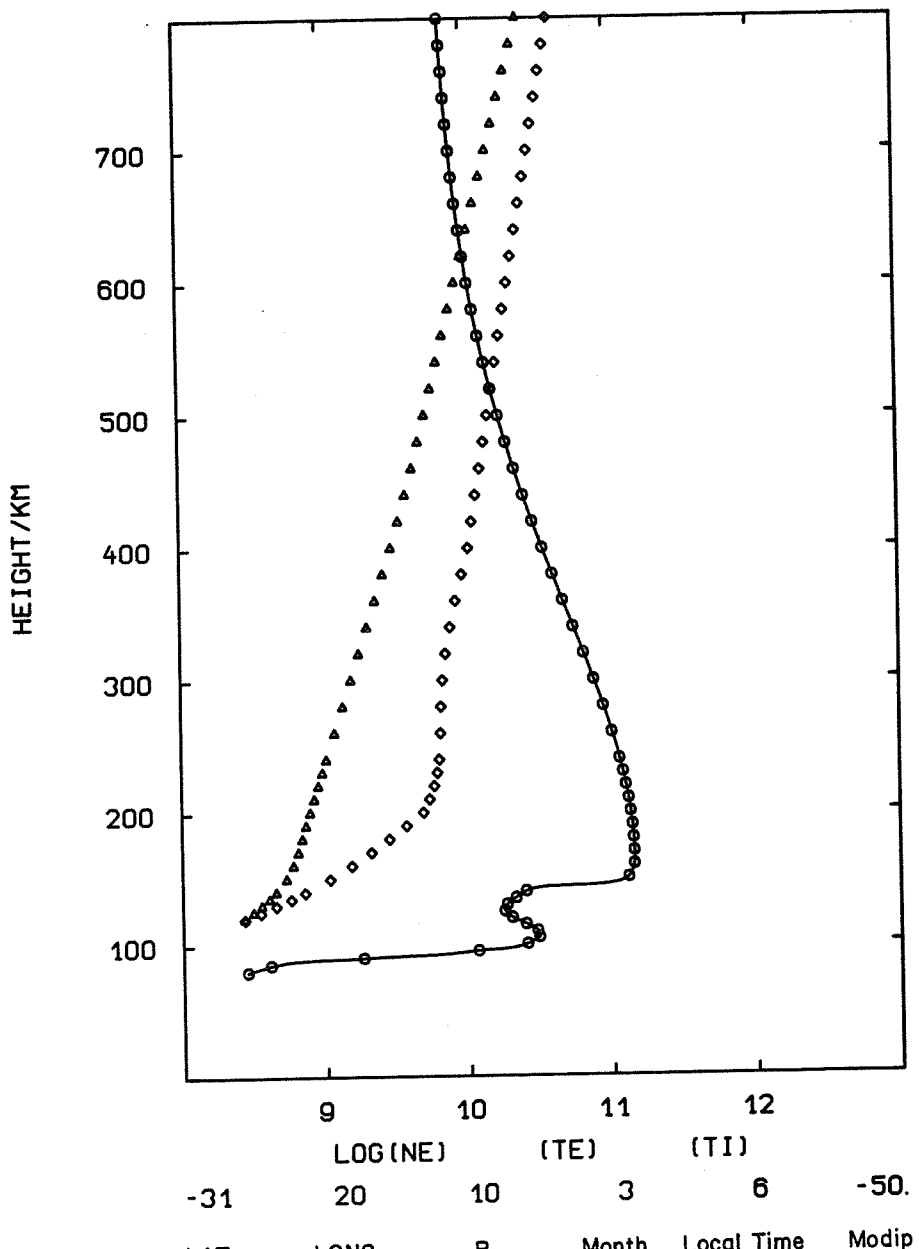
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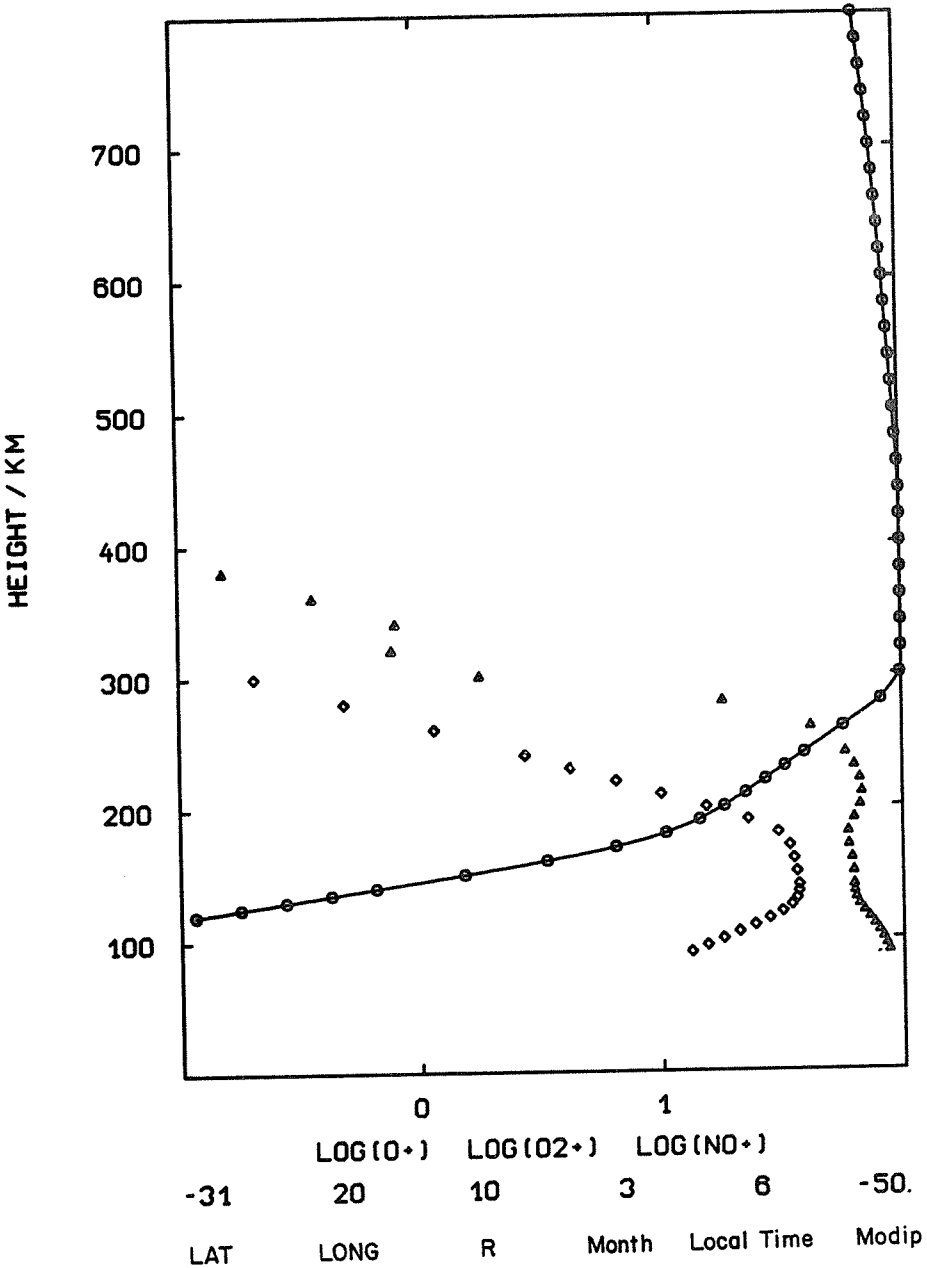
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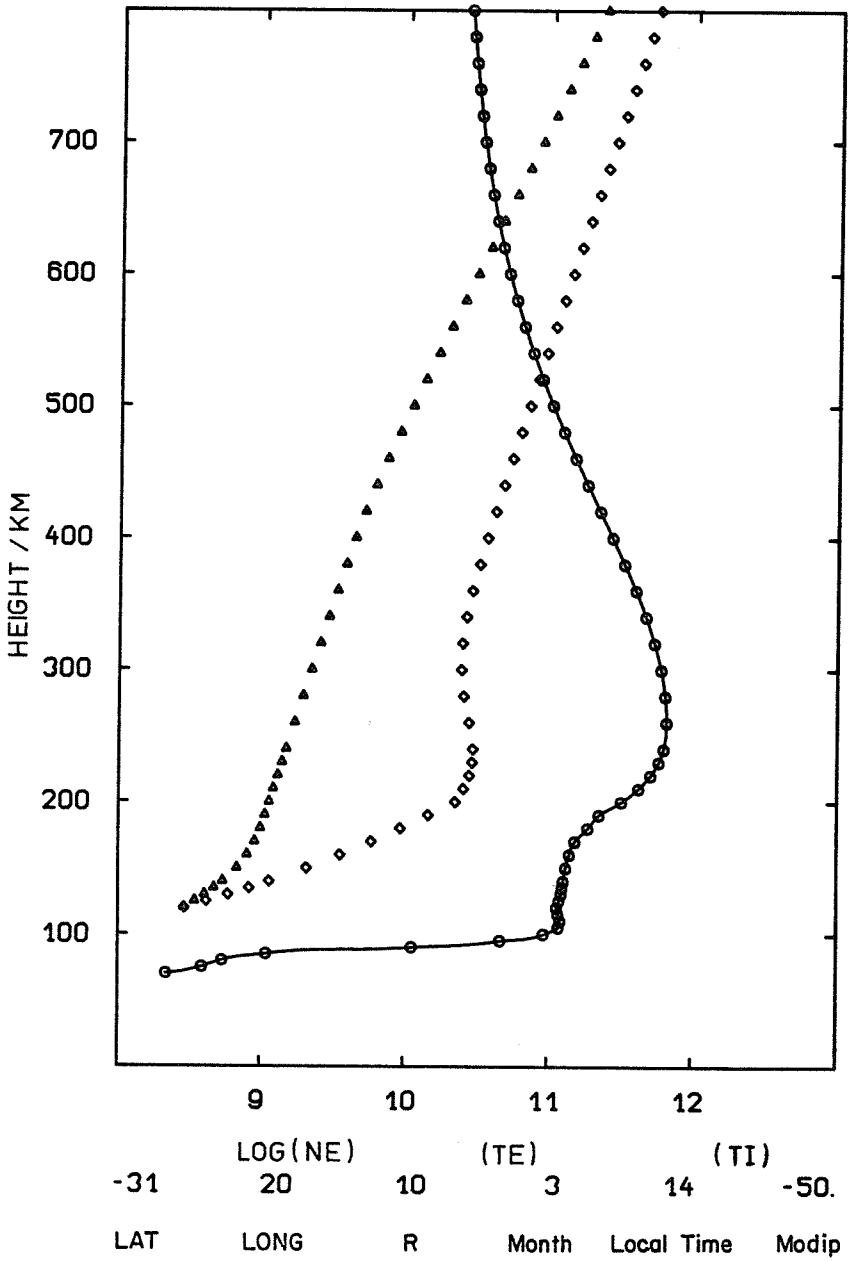
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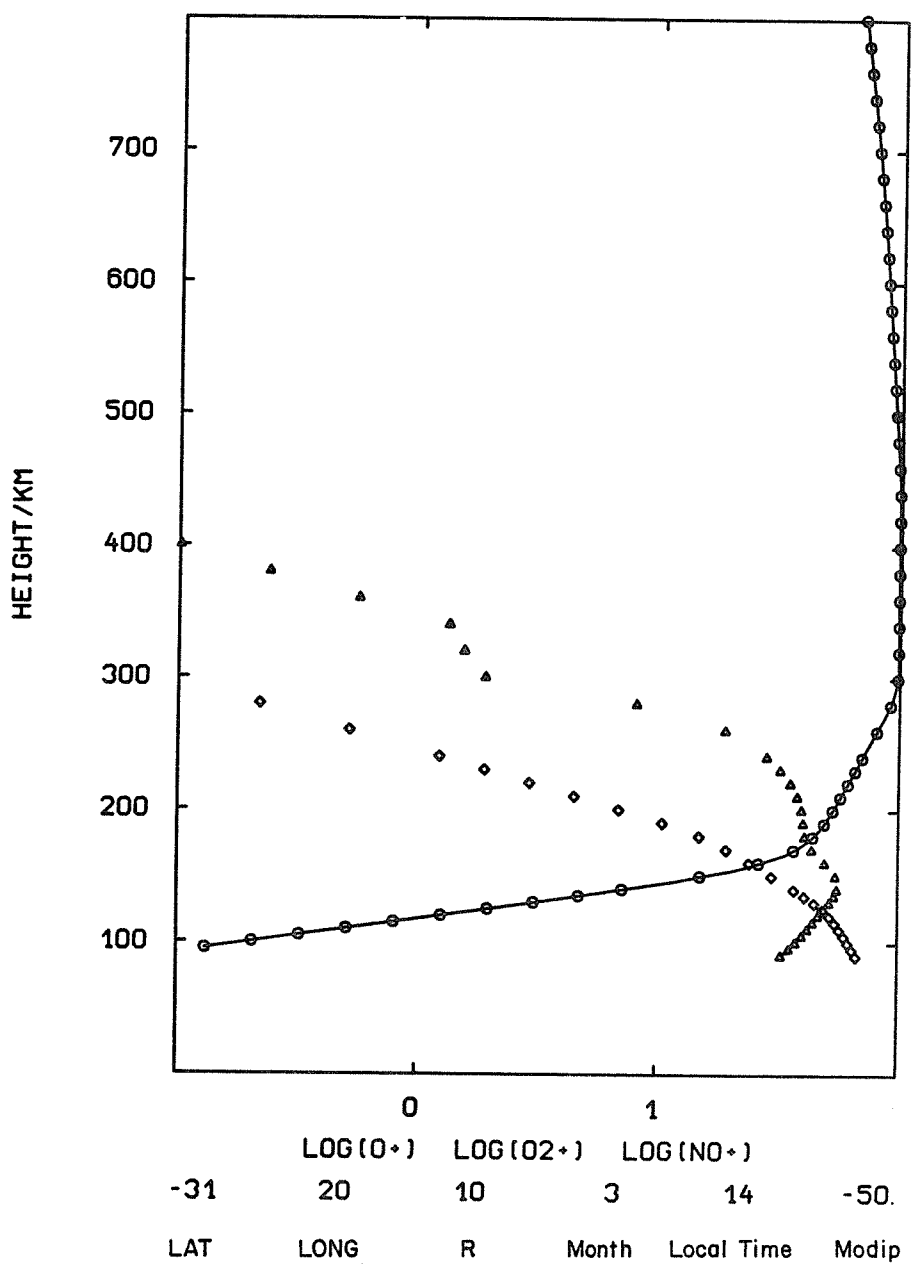
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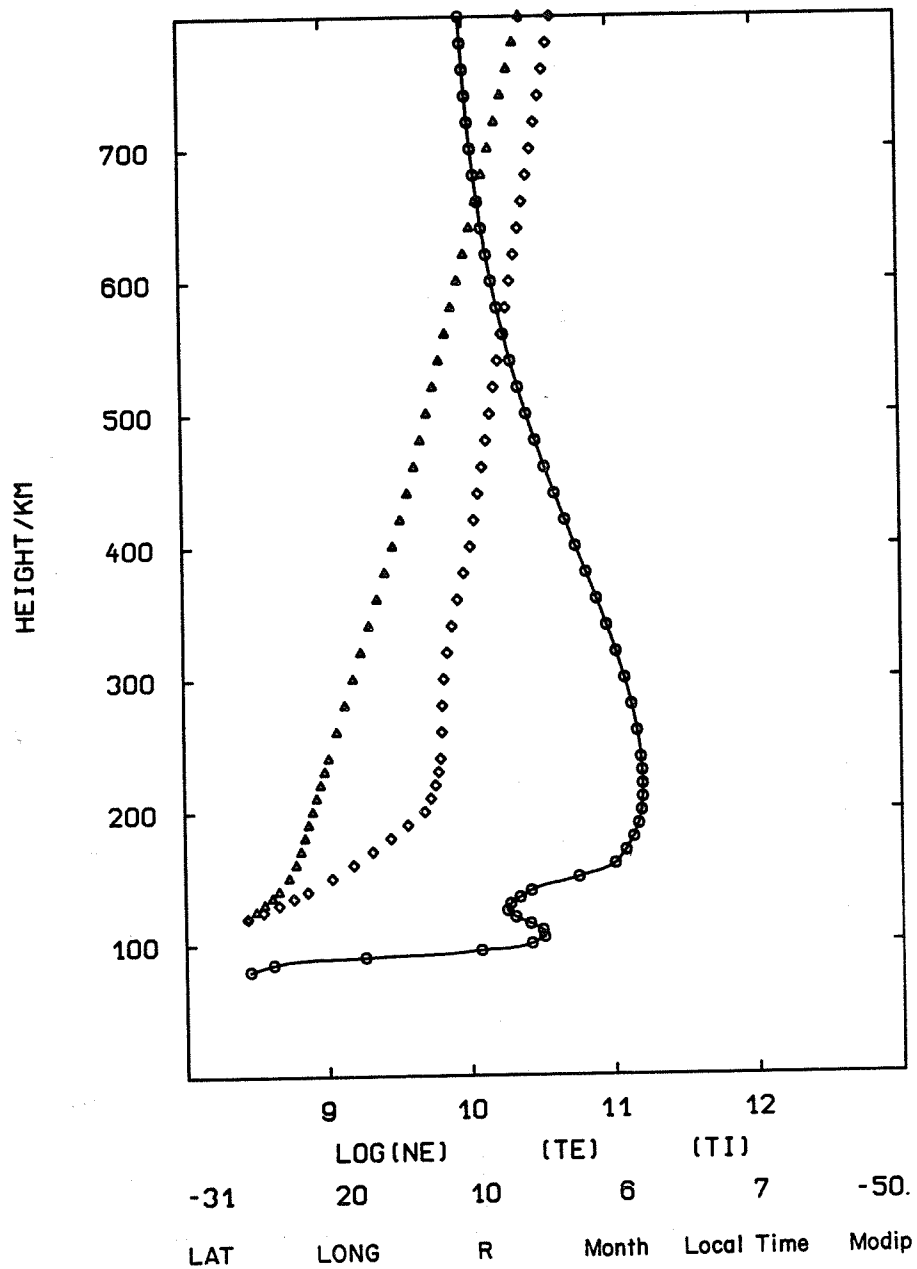
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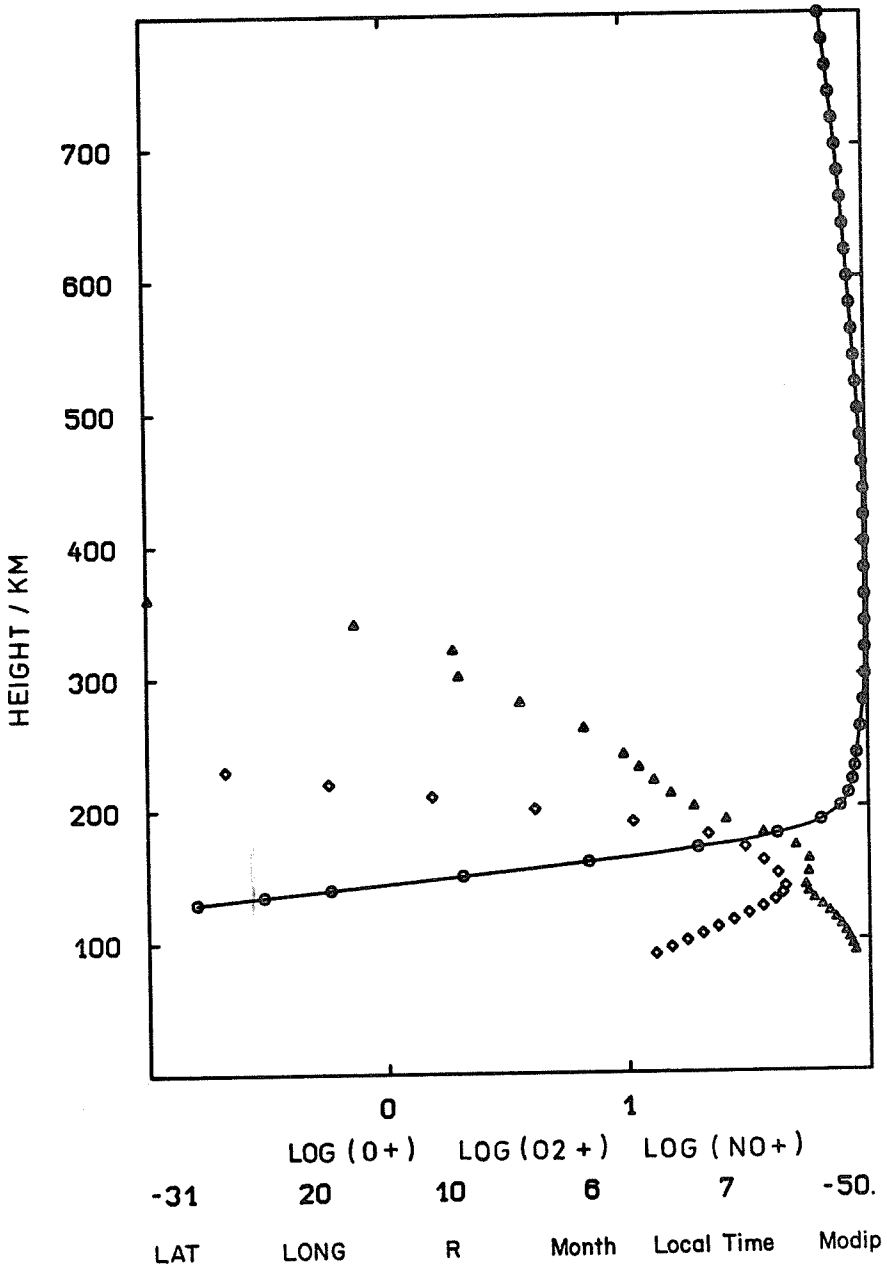
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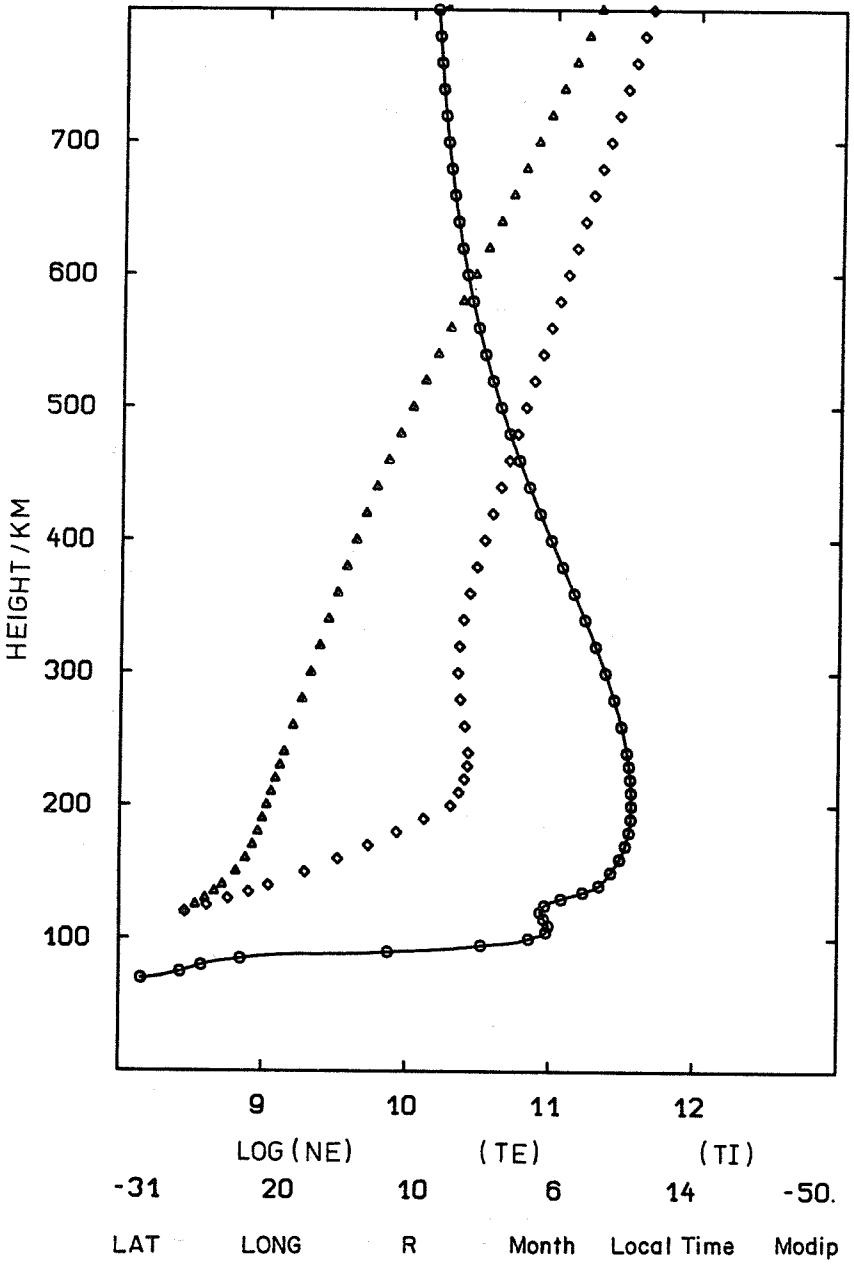
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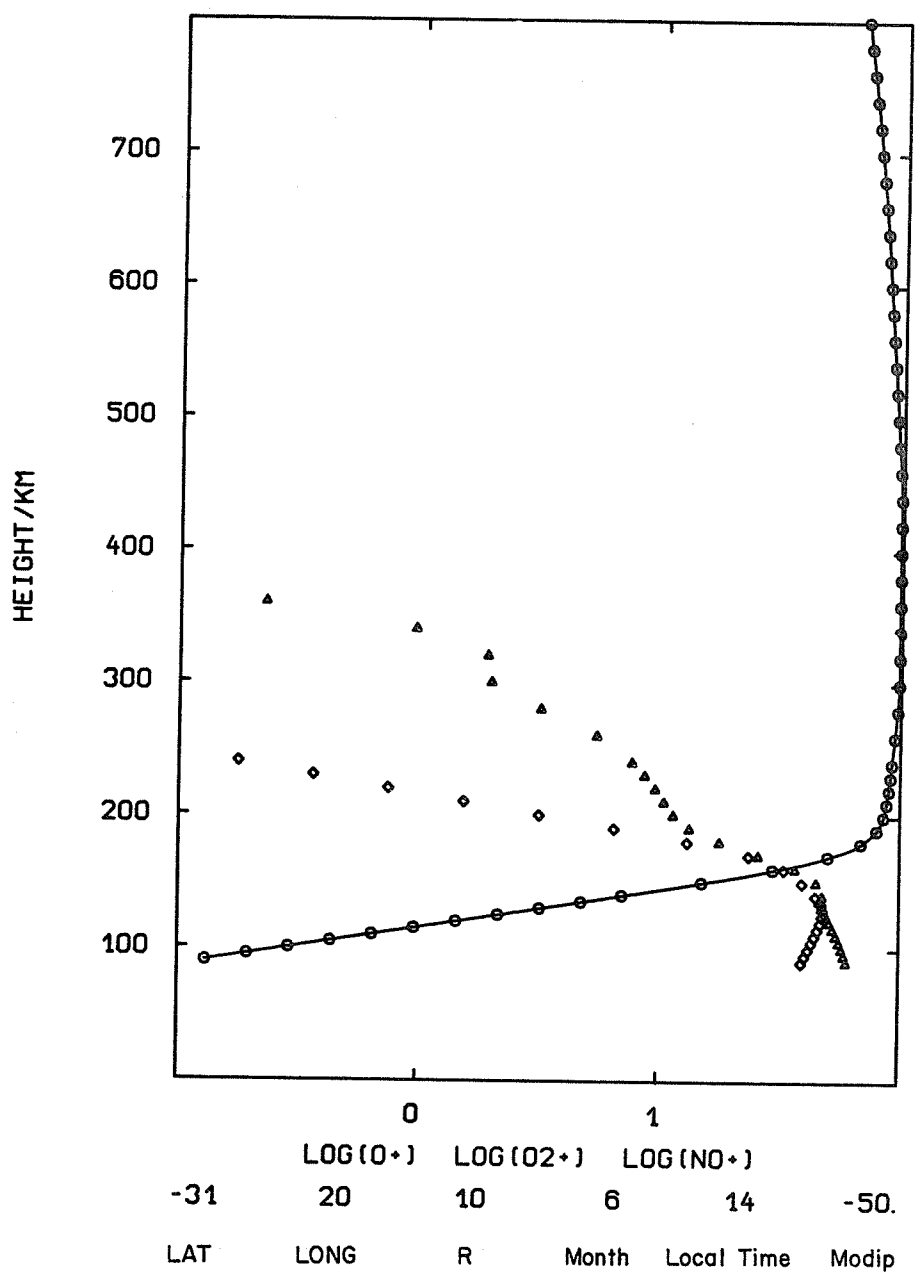
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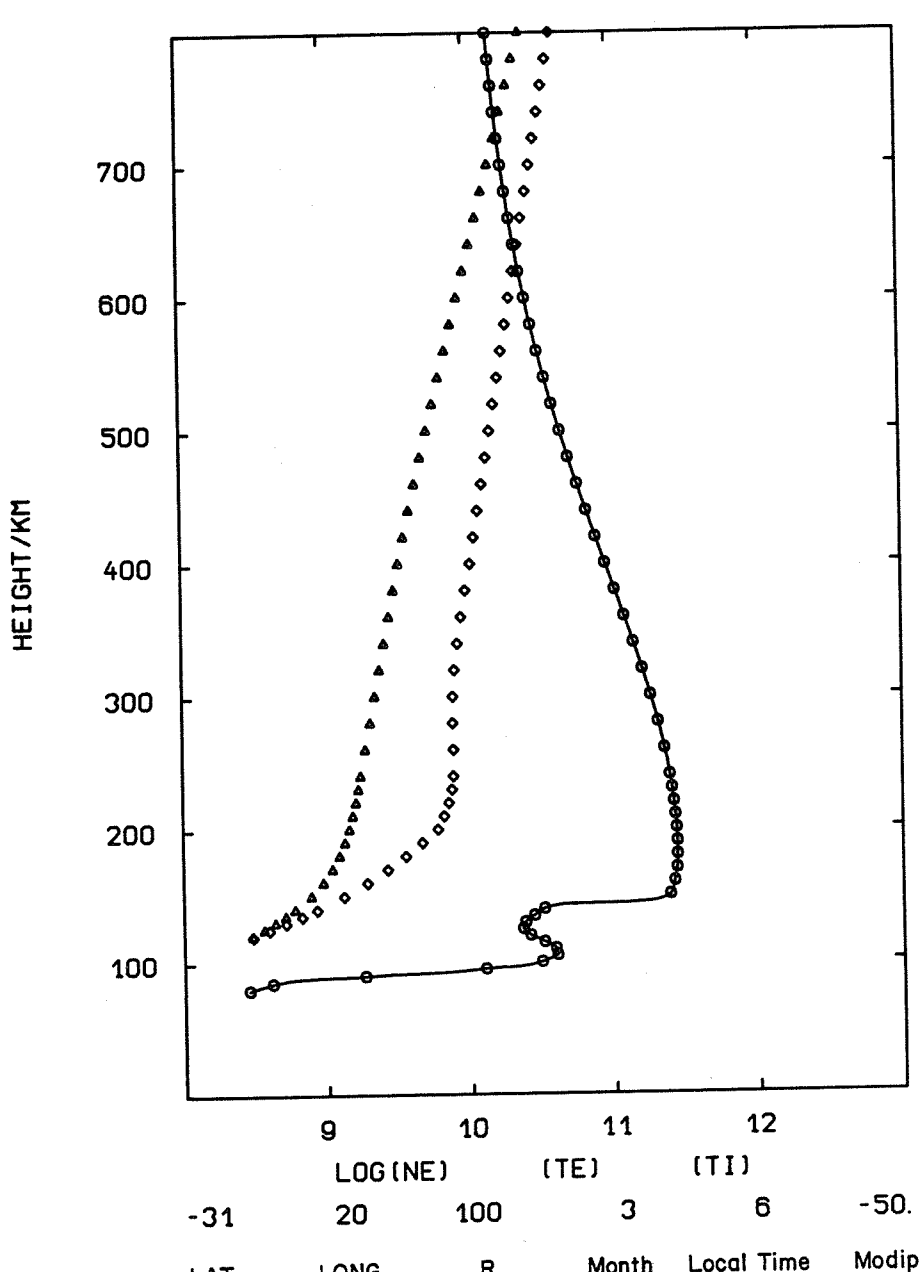
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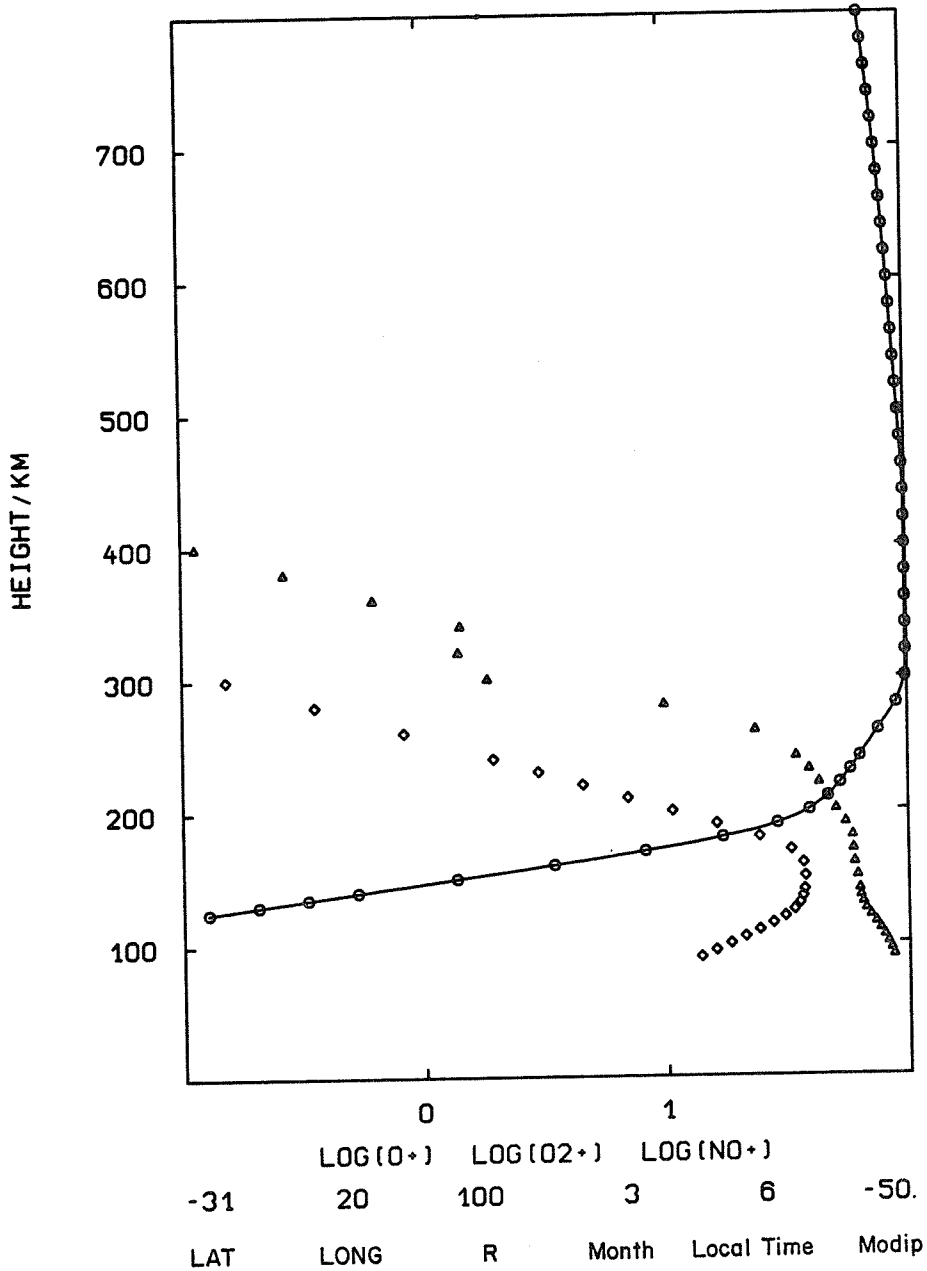
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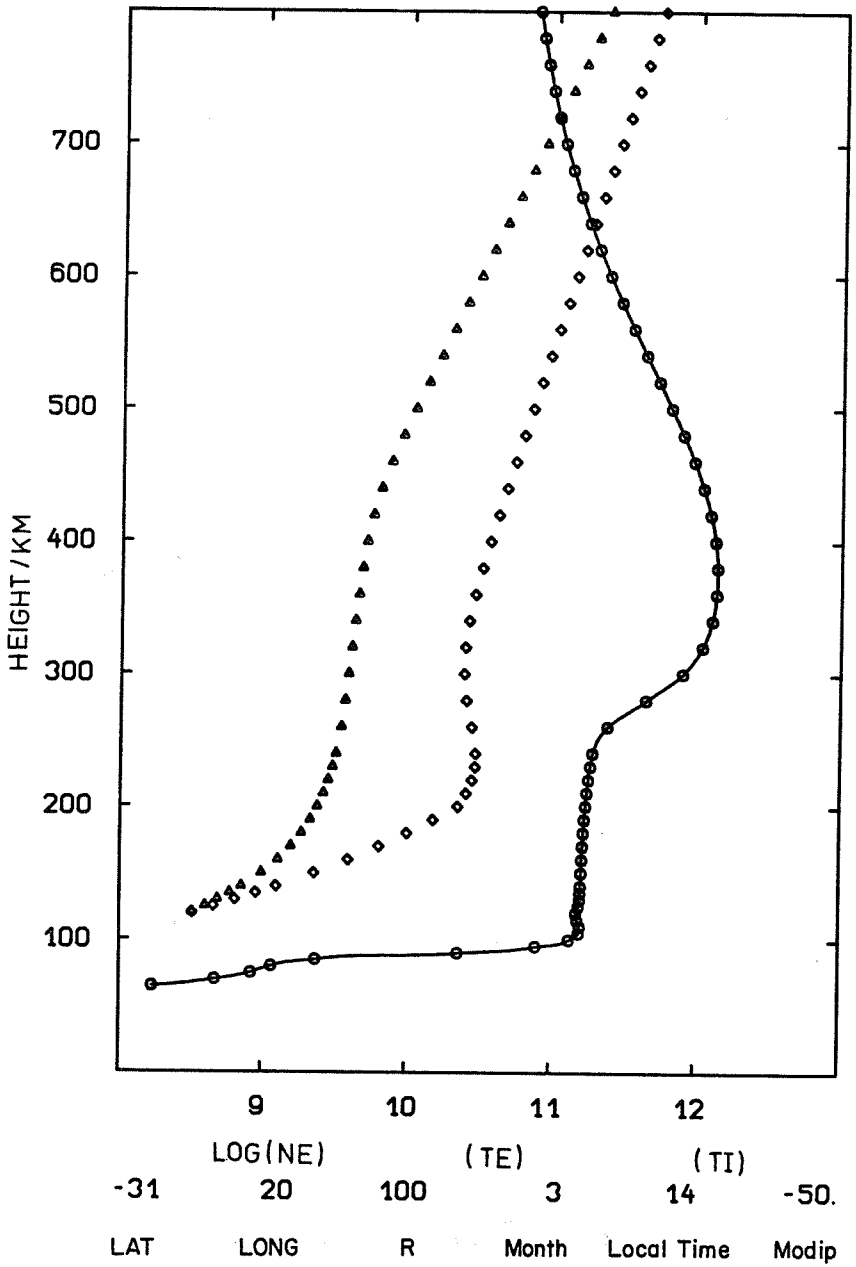
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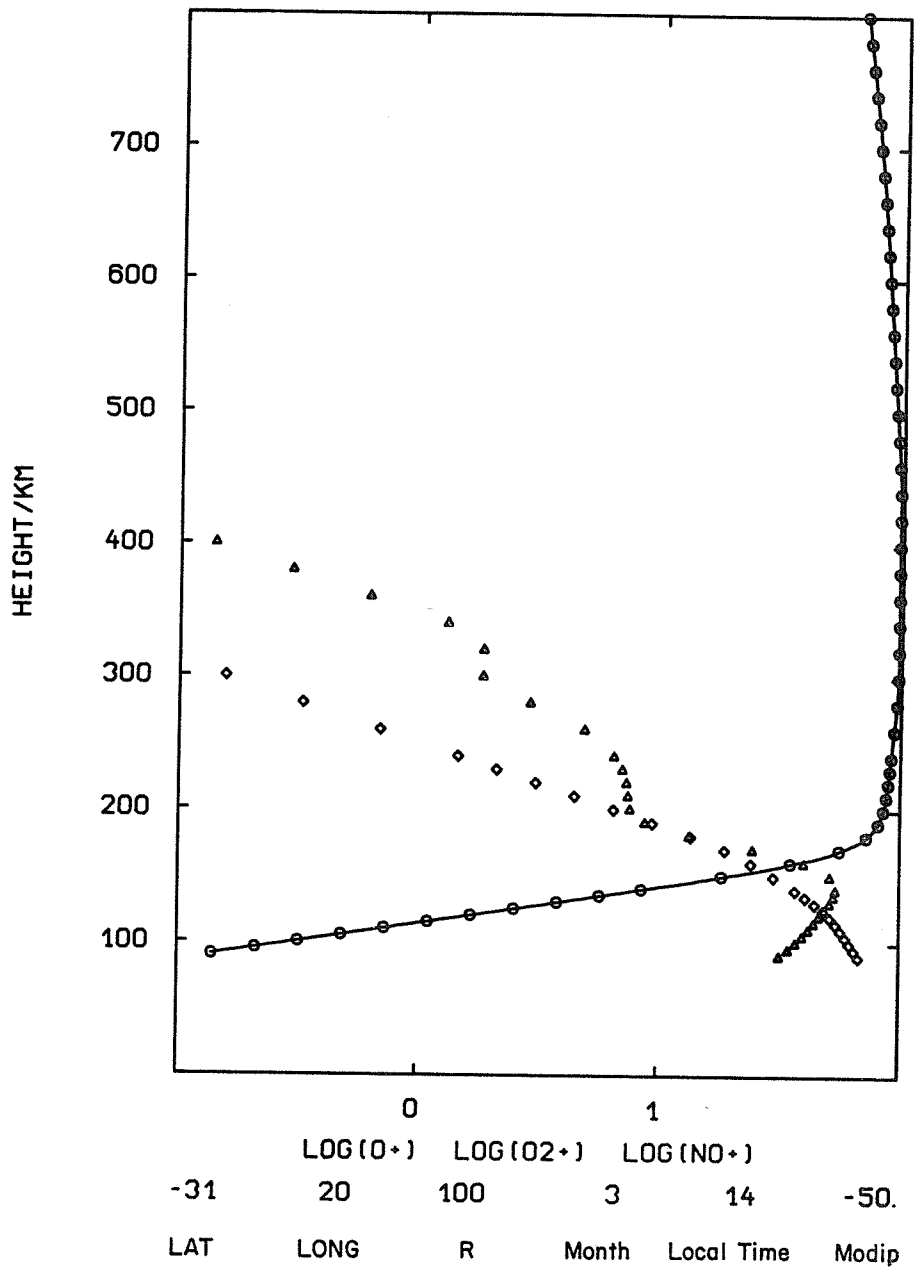
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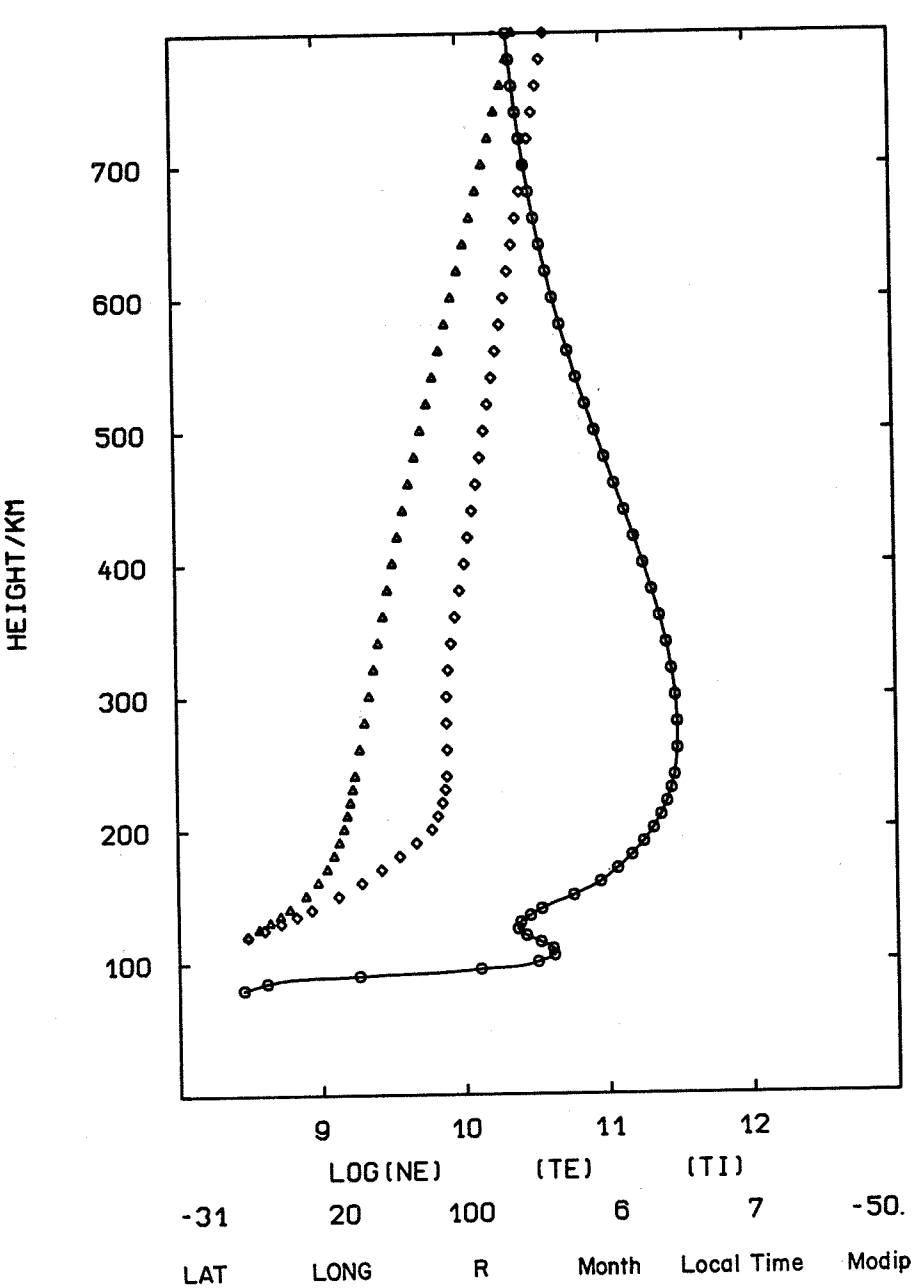
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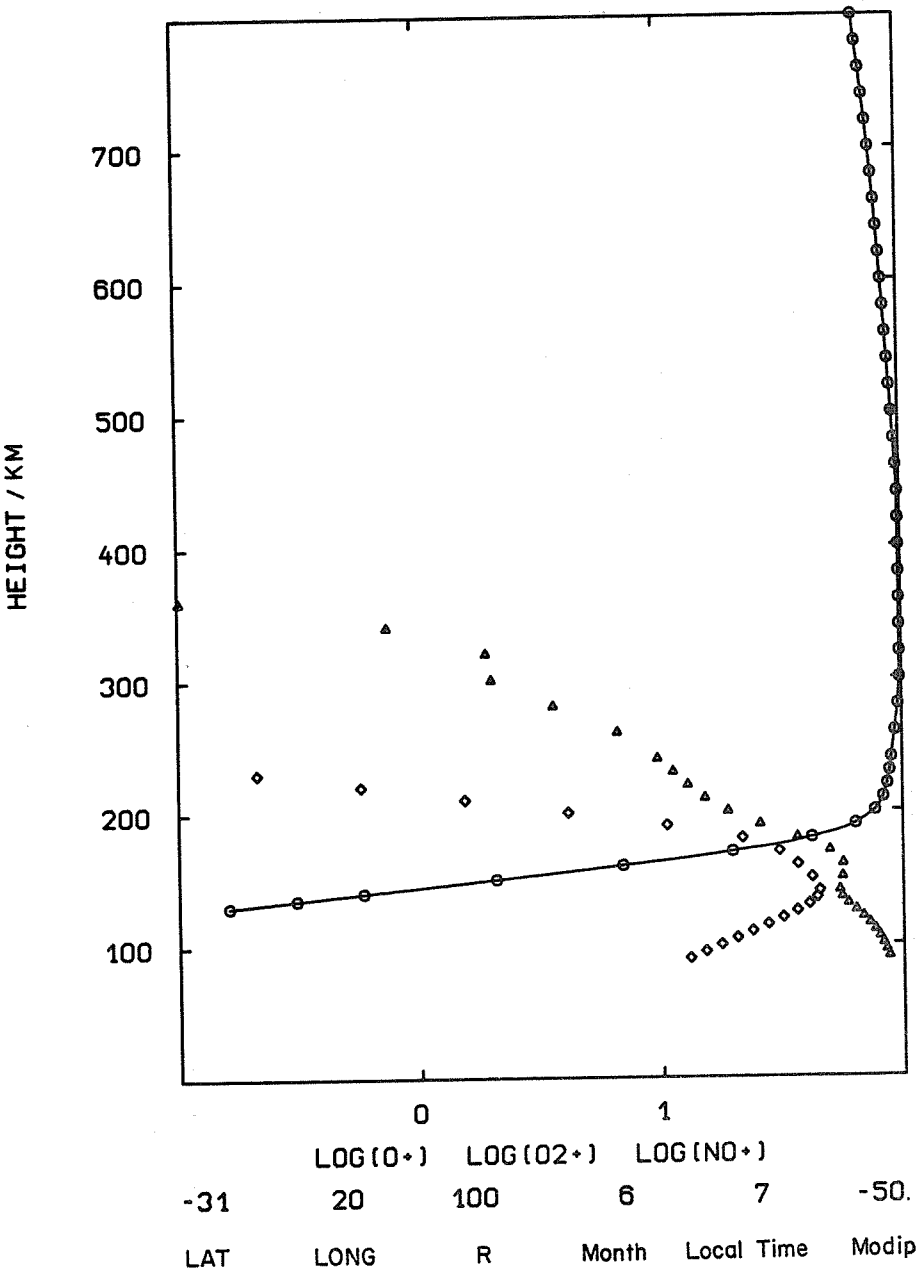
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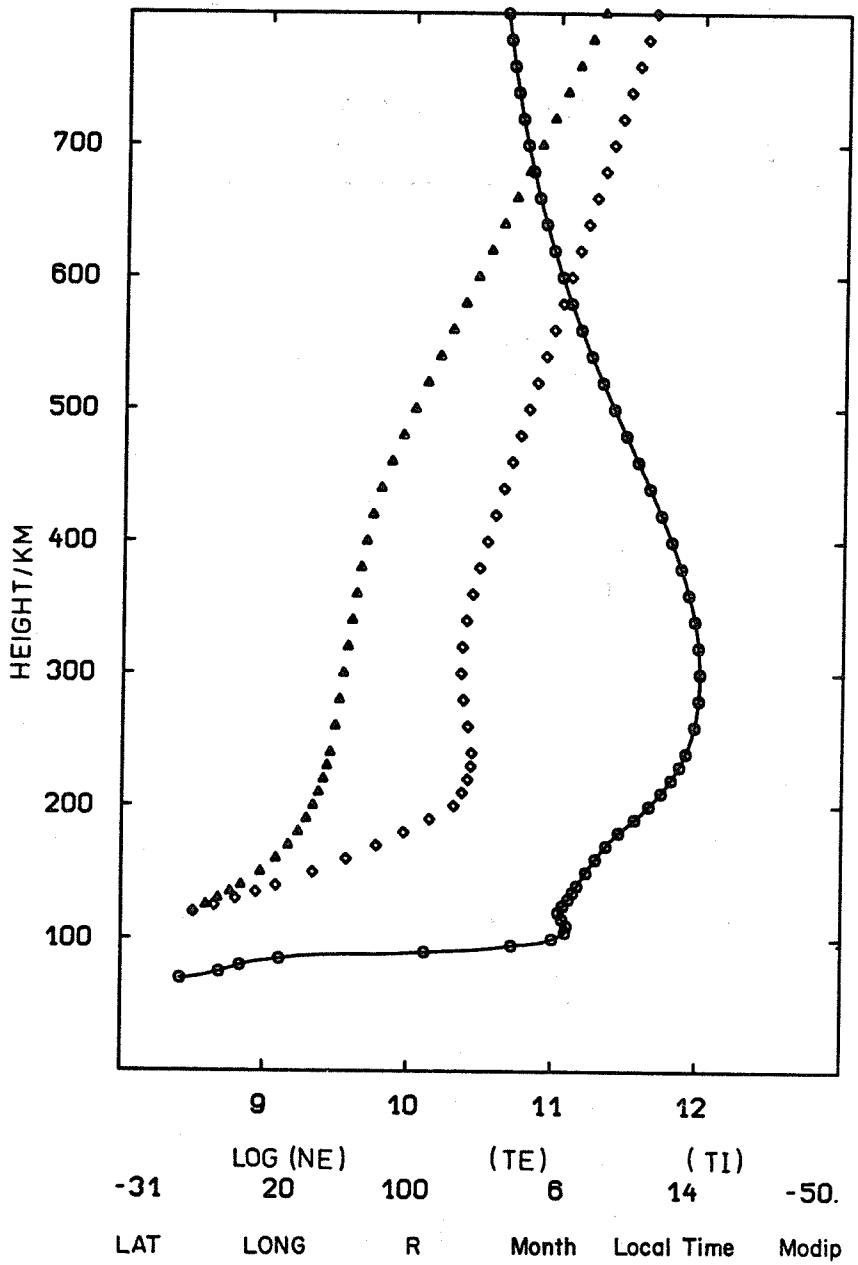
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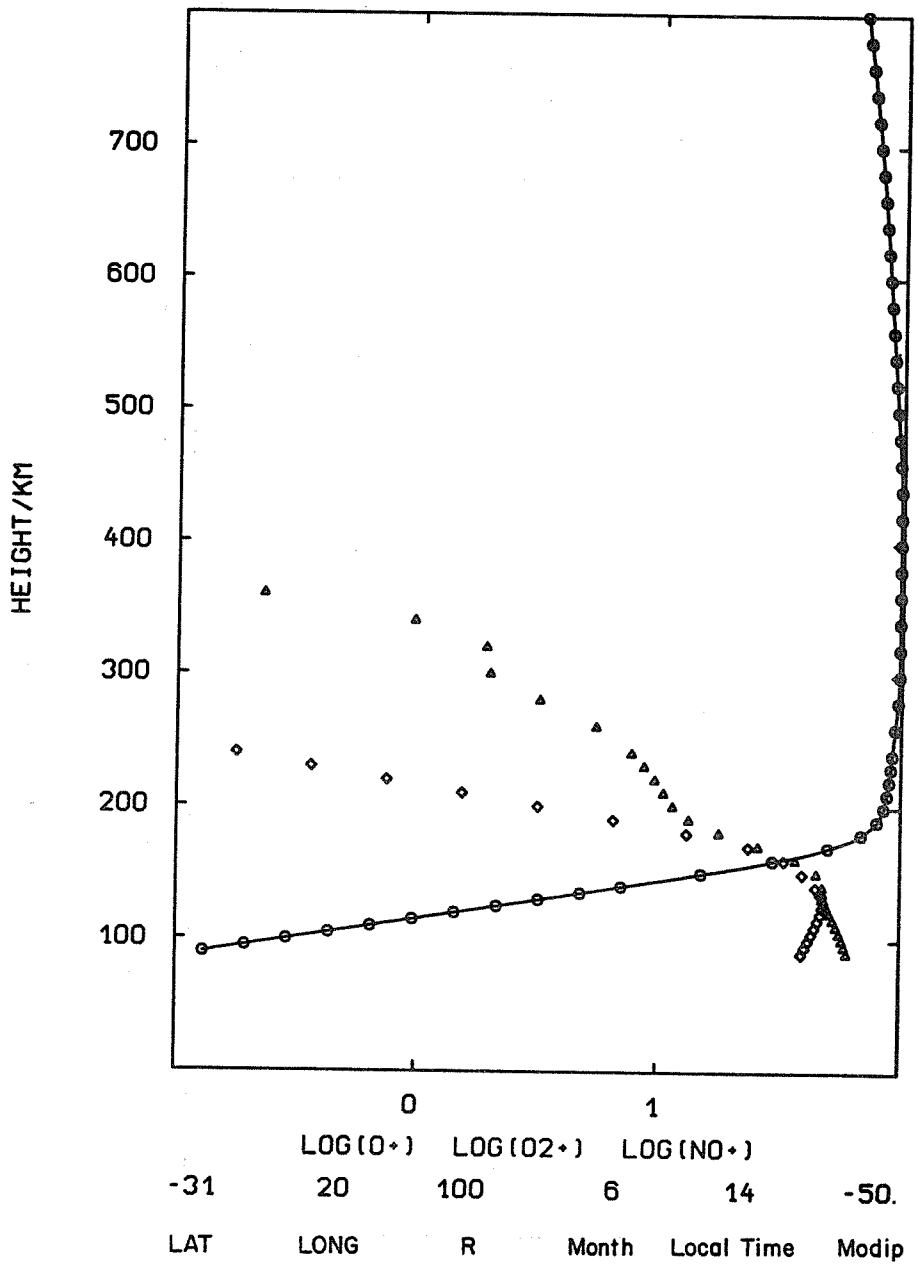
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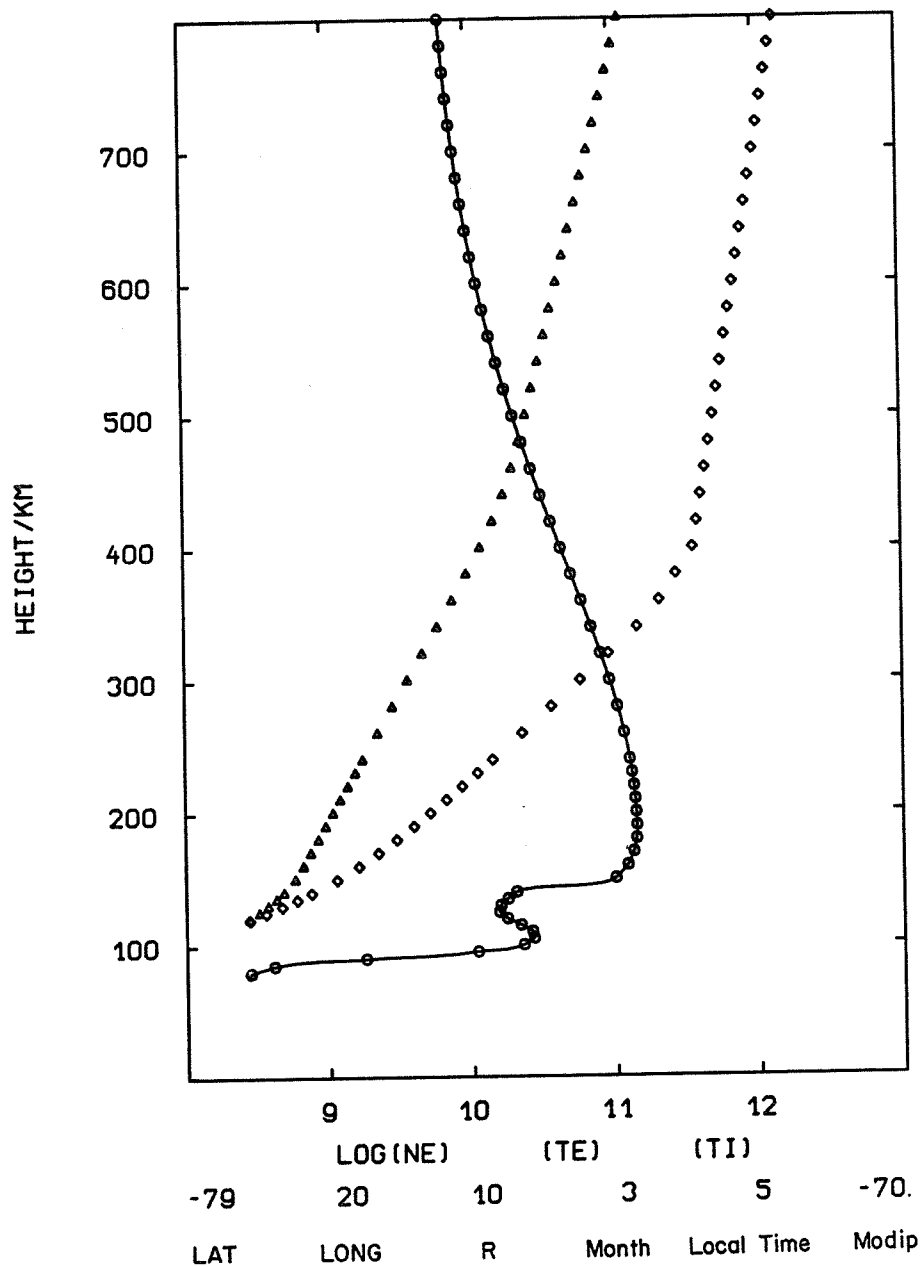
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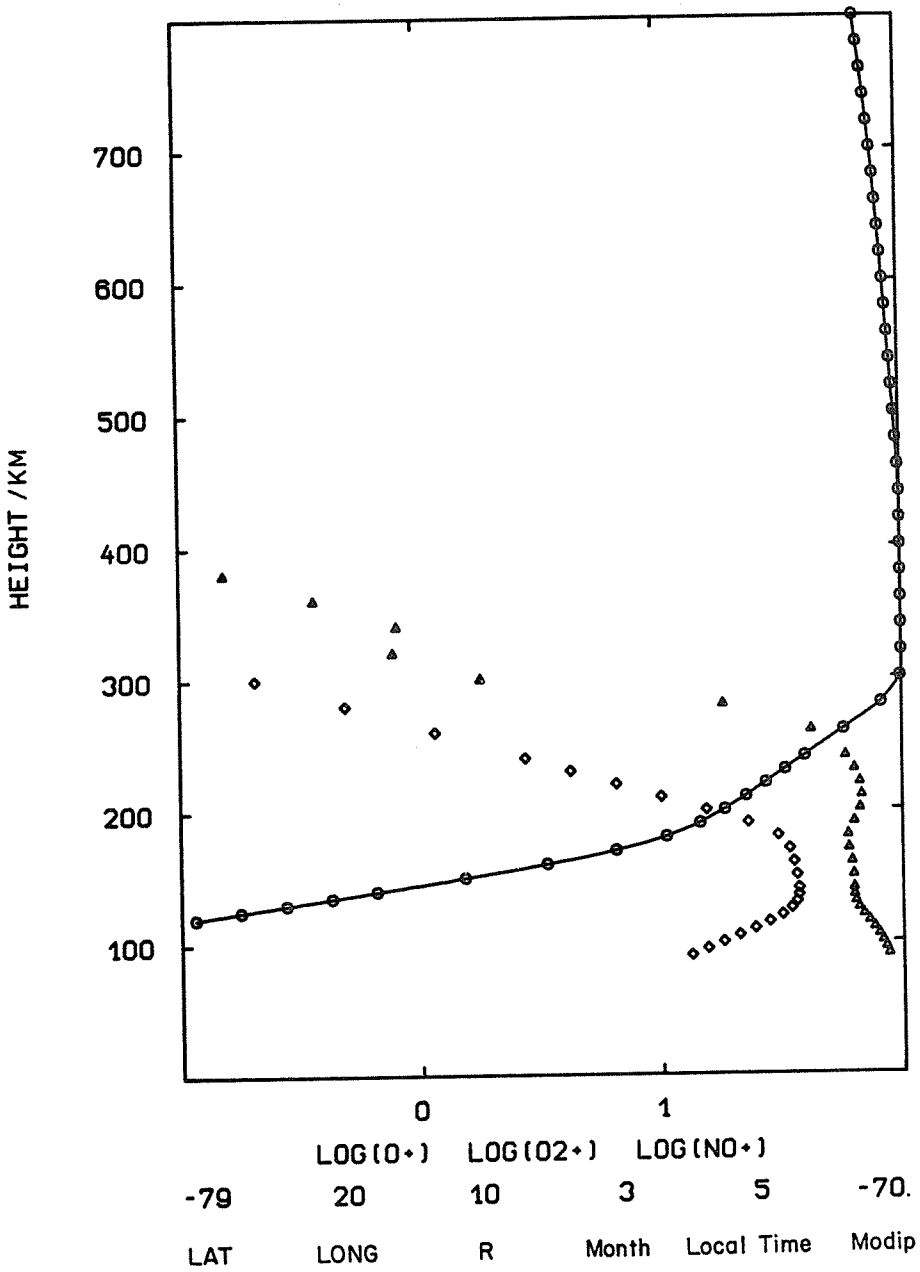
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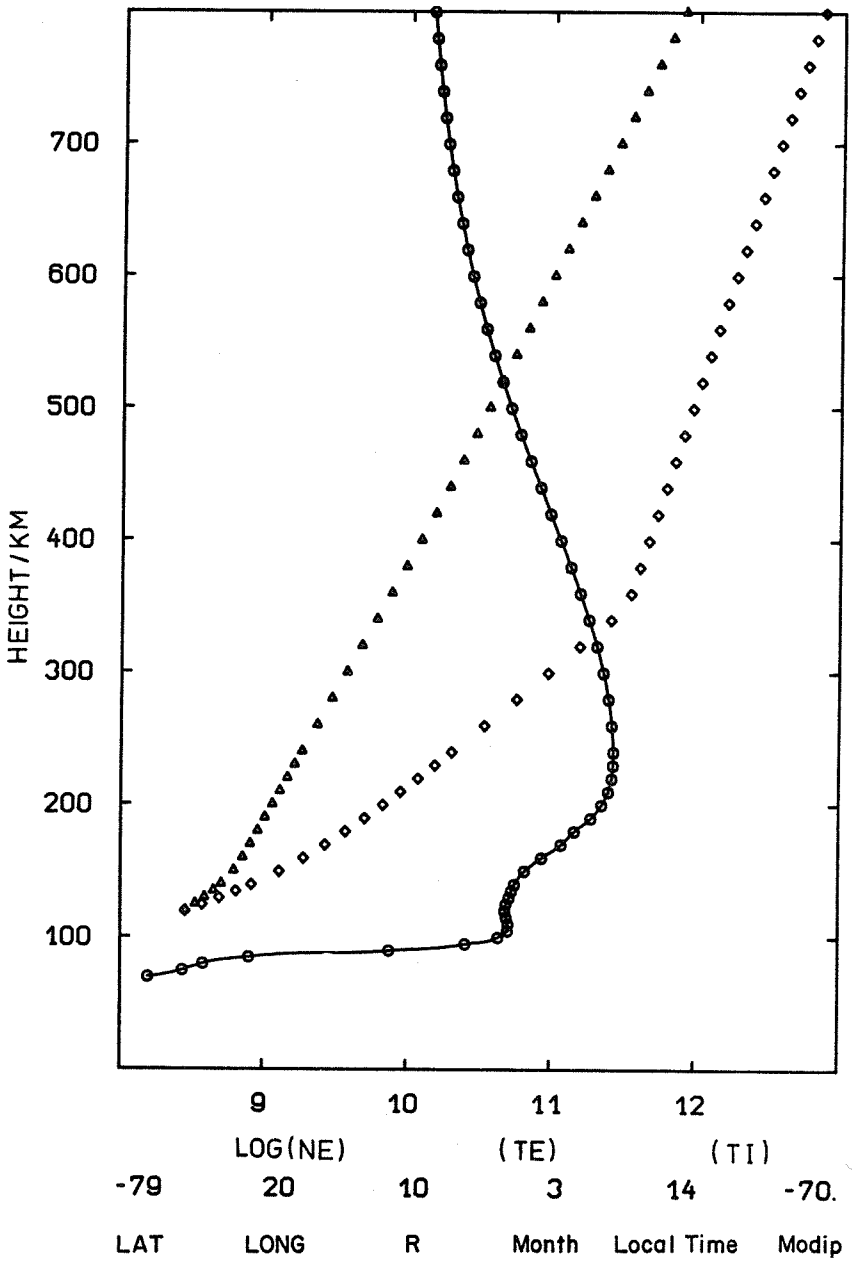
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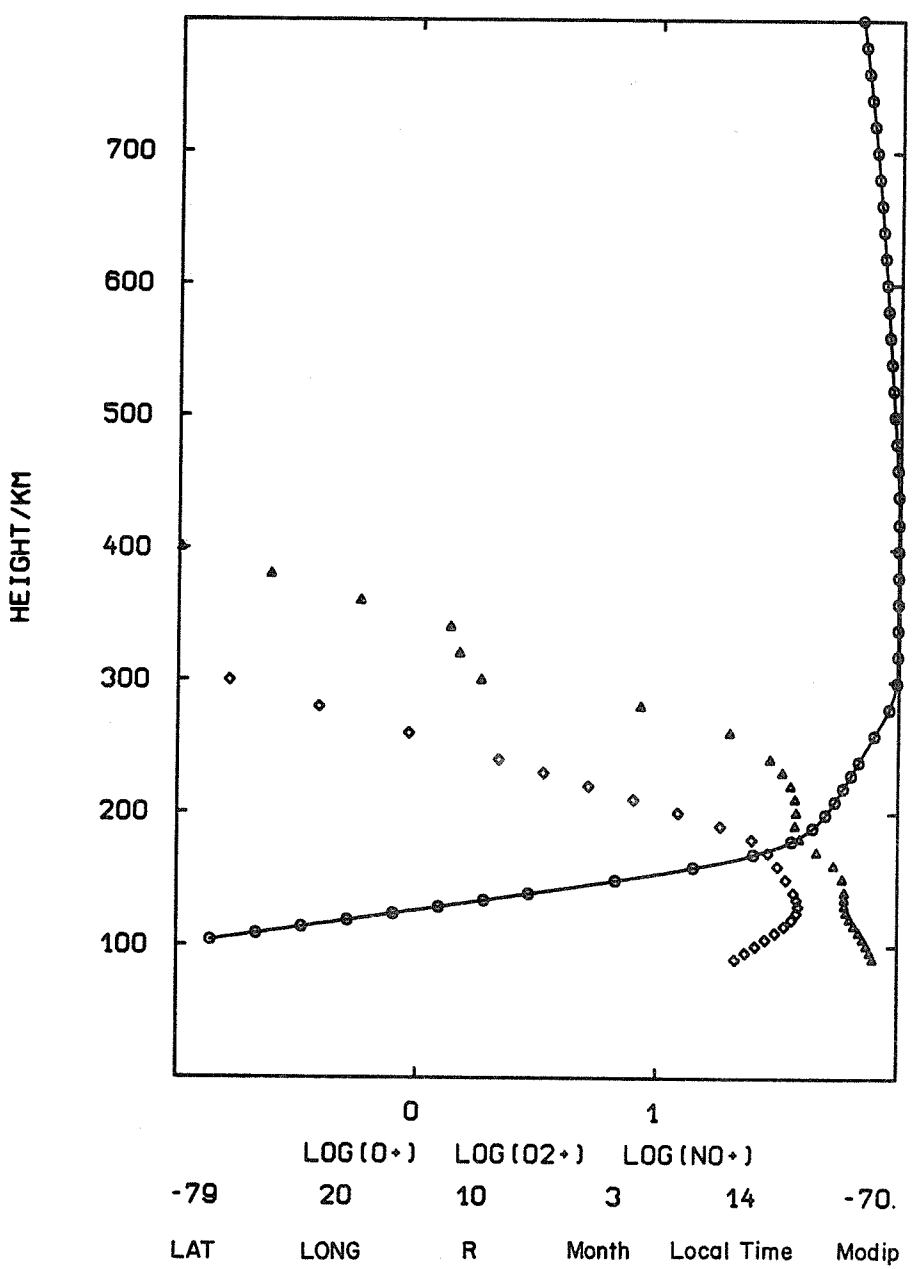
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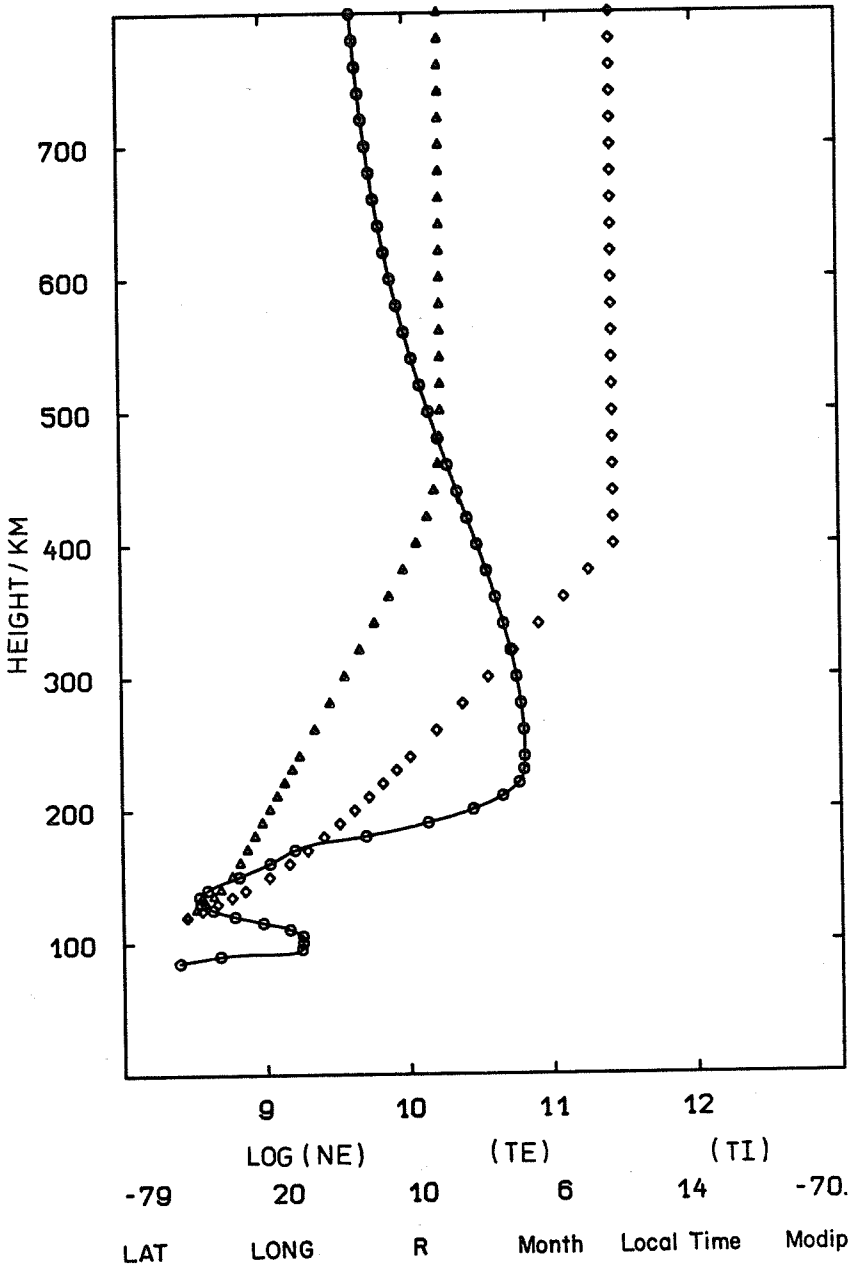
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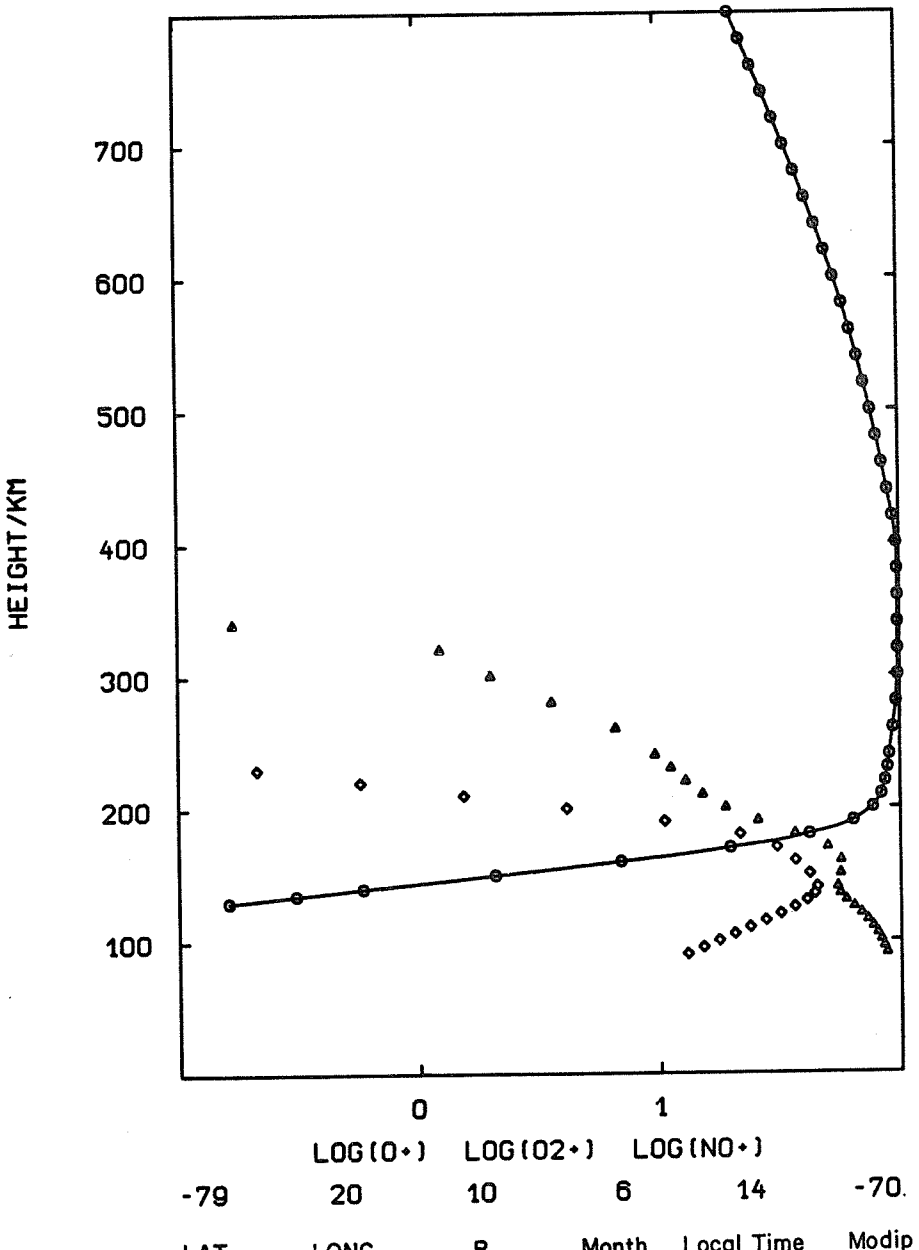
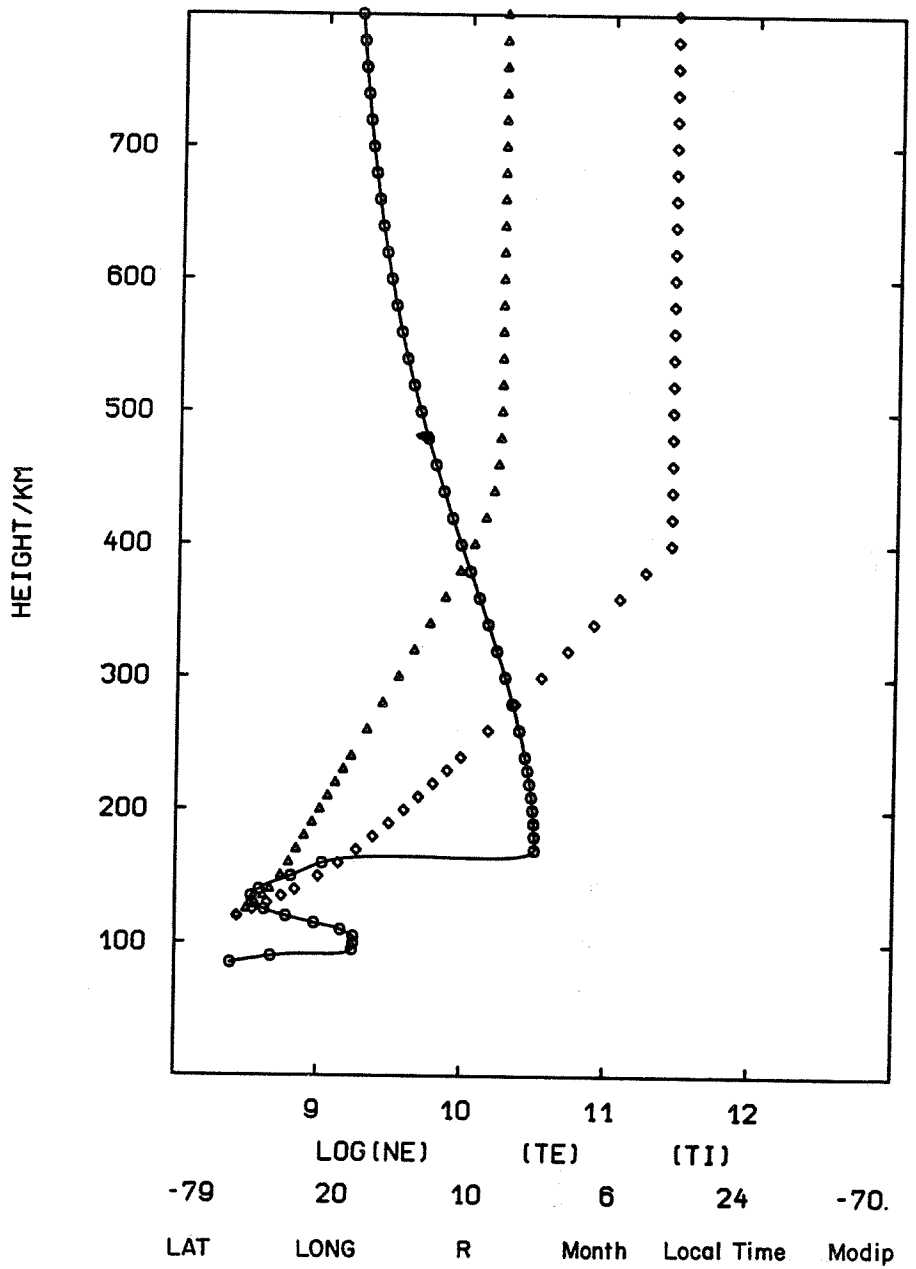
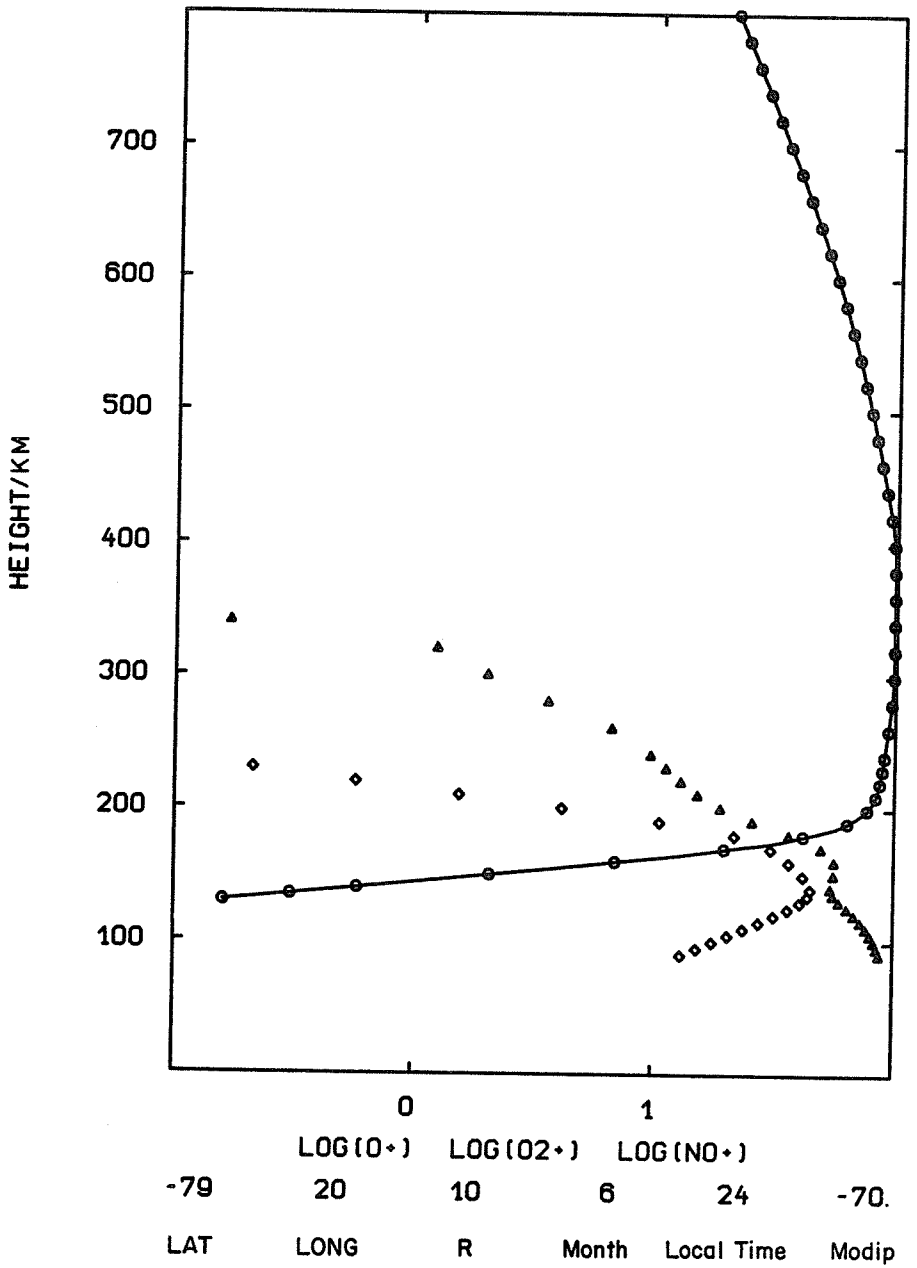

HEIGHT/KM
700
600
500
400
300
200
100
0
1
LOG(O+)
LOG(O2+)
LOG(NO+)
-79
20
10
6
14
-70.
LAT
LONG
R
Month
Local Time
Modip


HEIGHT/KM
700
600
500
400
300
200
100
9
10
11
12
LOG(NE)
(TE)
(TI)
-79
20
10
6
24
-70.
LAT
LONG
R
Month
Local Time
Modip


HEIGHT/KM
700
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0
1
LOG(O+)
LOG(O2+)
LOG(NO+)
-79
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24
-70.
LAT
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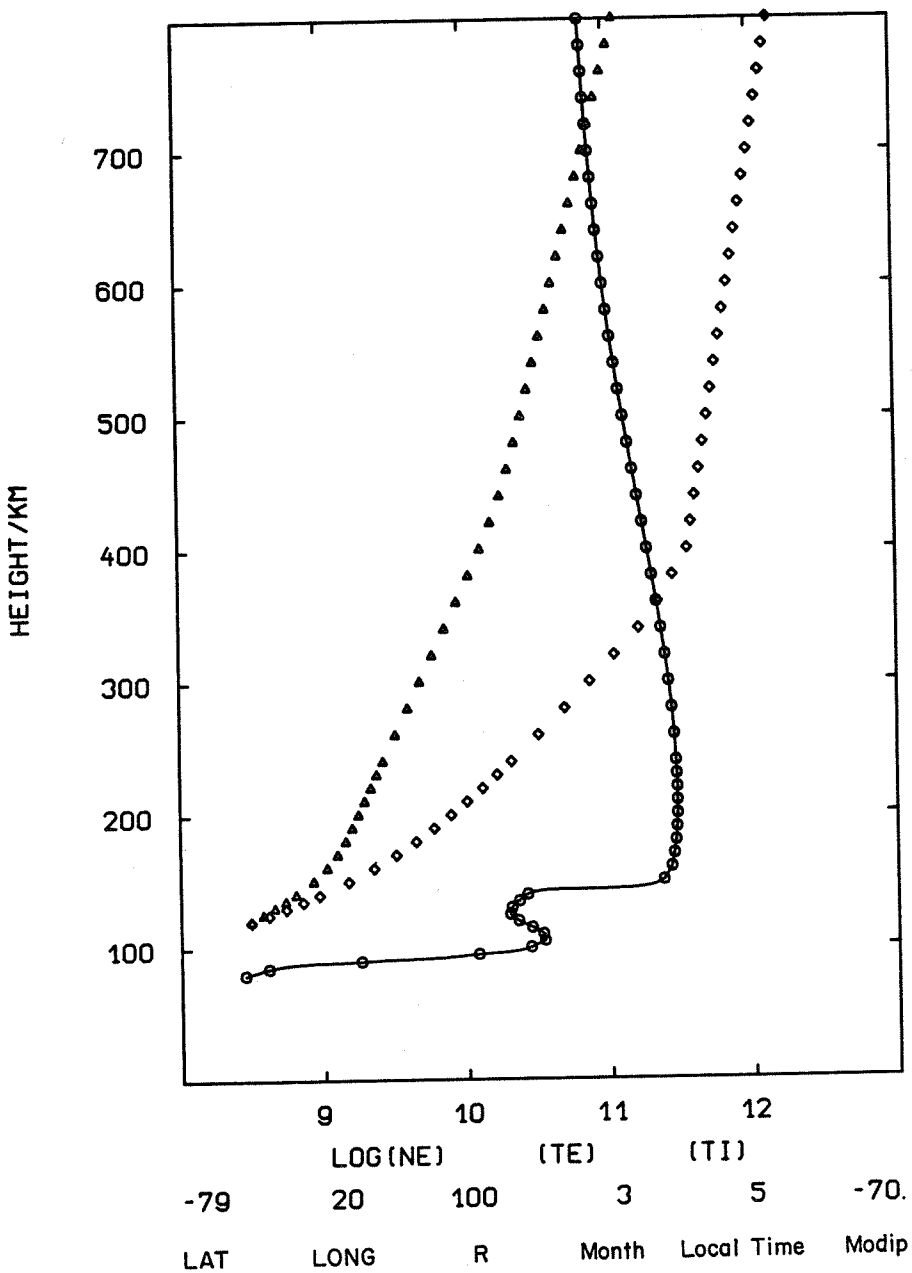
Month
Local Time
Modip


HEIGHT/KM
700
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LOG(NE)
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-79
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-70.
LAT
LONG
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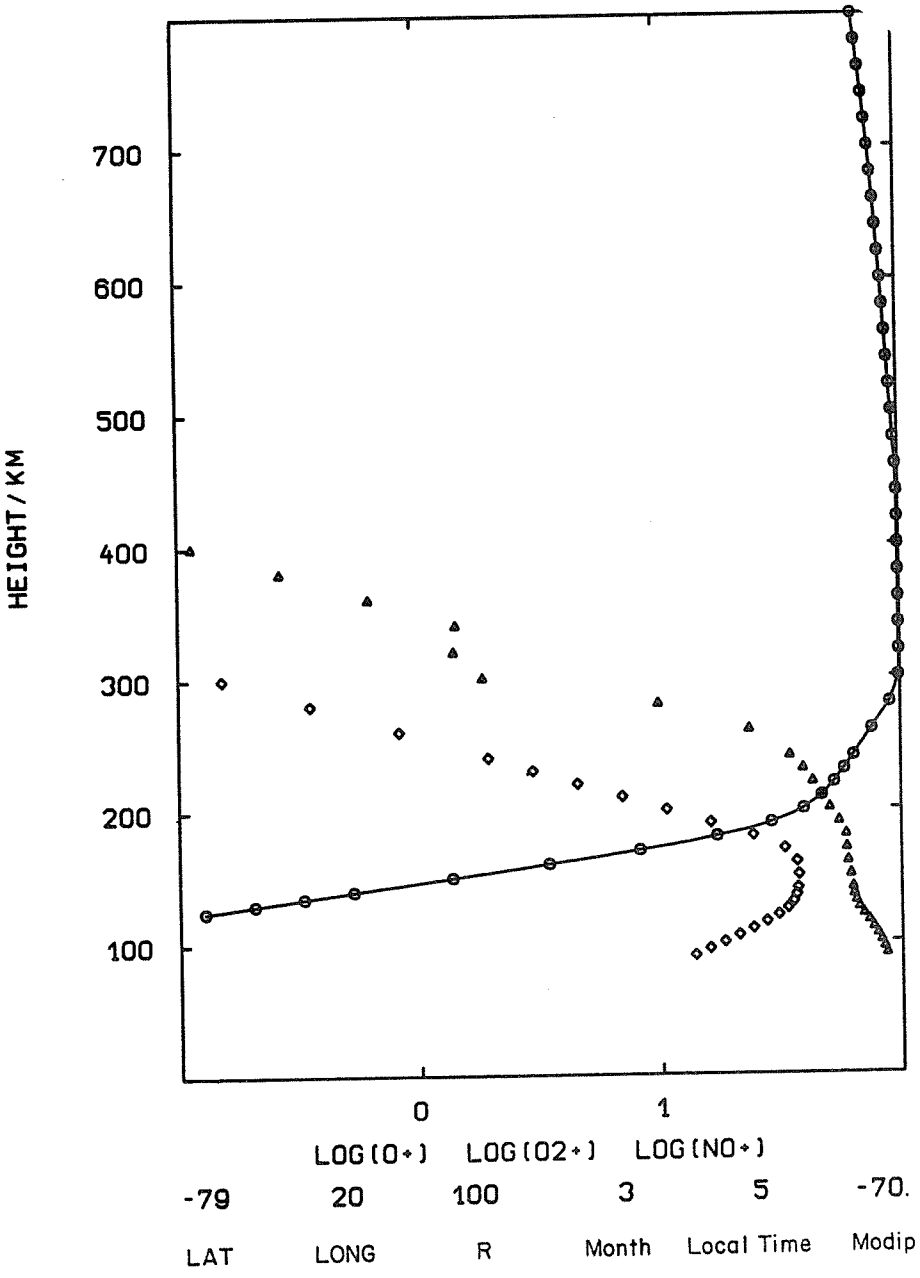
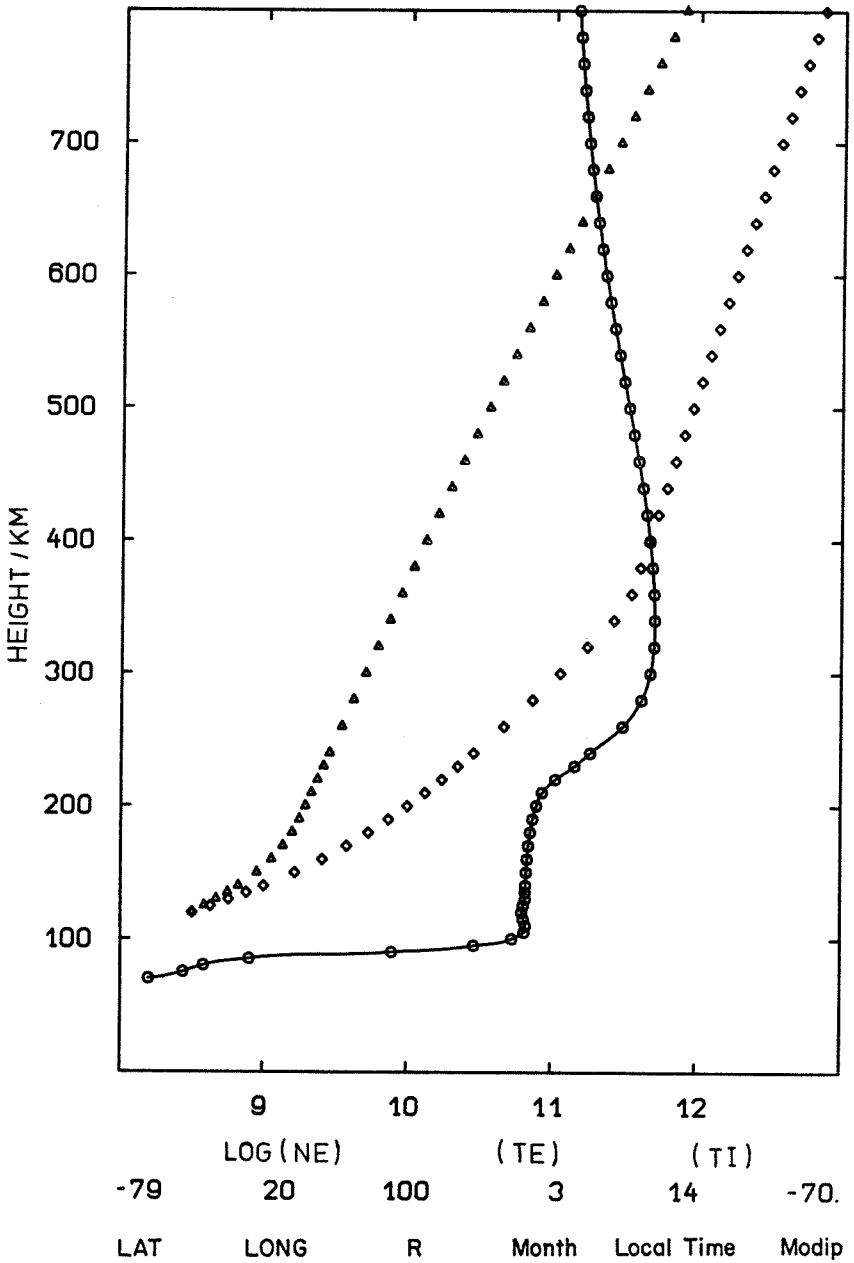
Month
Local Time
Modip


HEIGHT/KM
700
600
500
400
300
200
100
0
1
LOG(O+)
LOG(O2+)
LOG(NO+)
-79
20
100
3
5
-70.
LAT
LONG
R
Month
Local Time
Modip


HEIGHT/KM
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600
500
400
300
200
100
9
10
11
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LOG(NE)
(TE)
(TI)
-79
20
100
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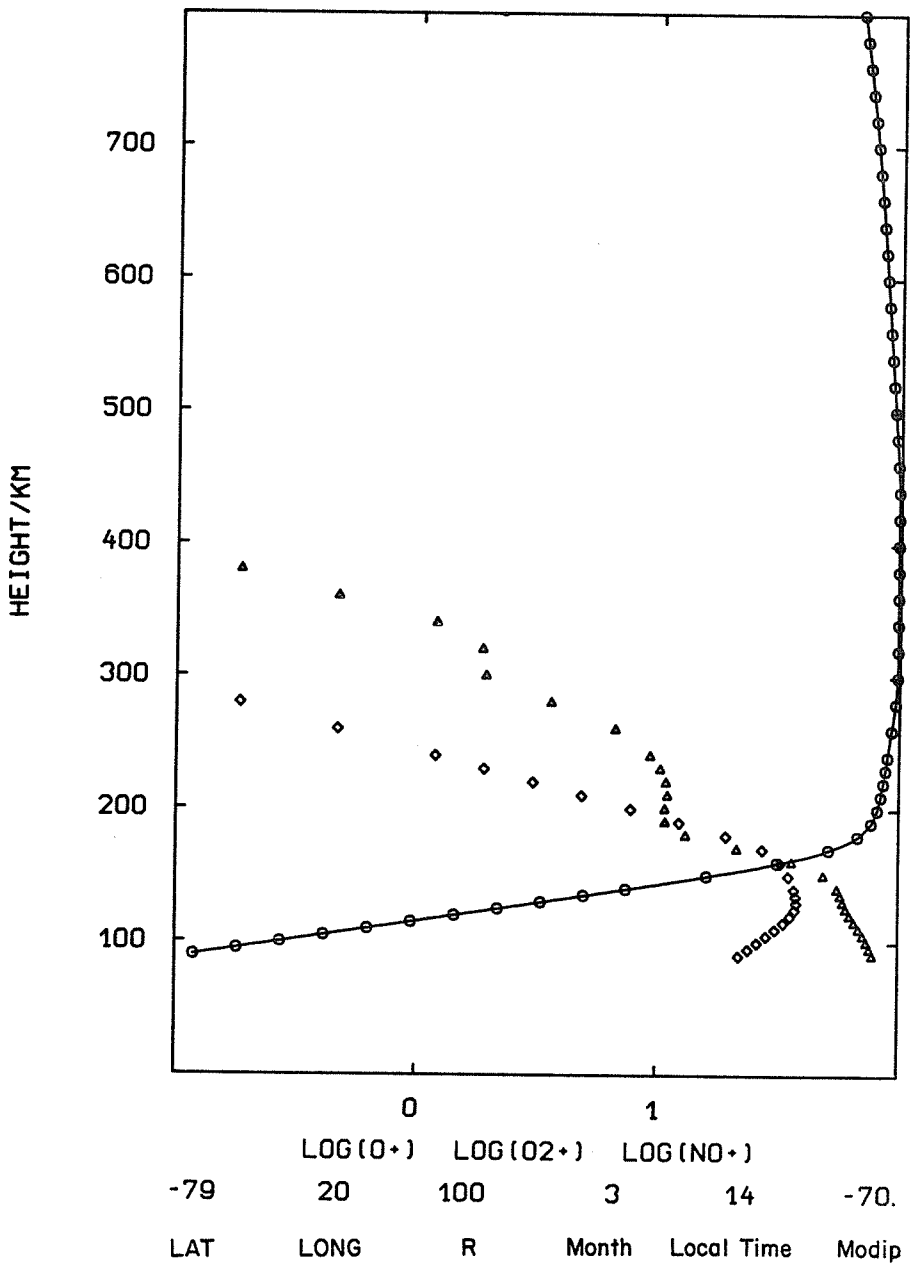
14
-70.
LAT
LONG
R
Month
Local Time
Modip


HEIGHT/KM
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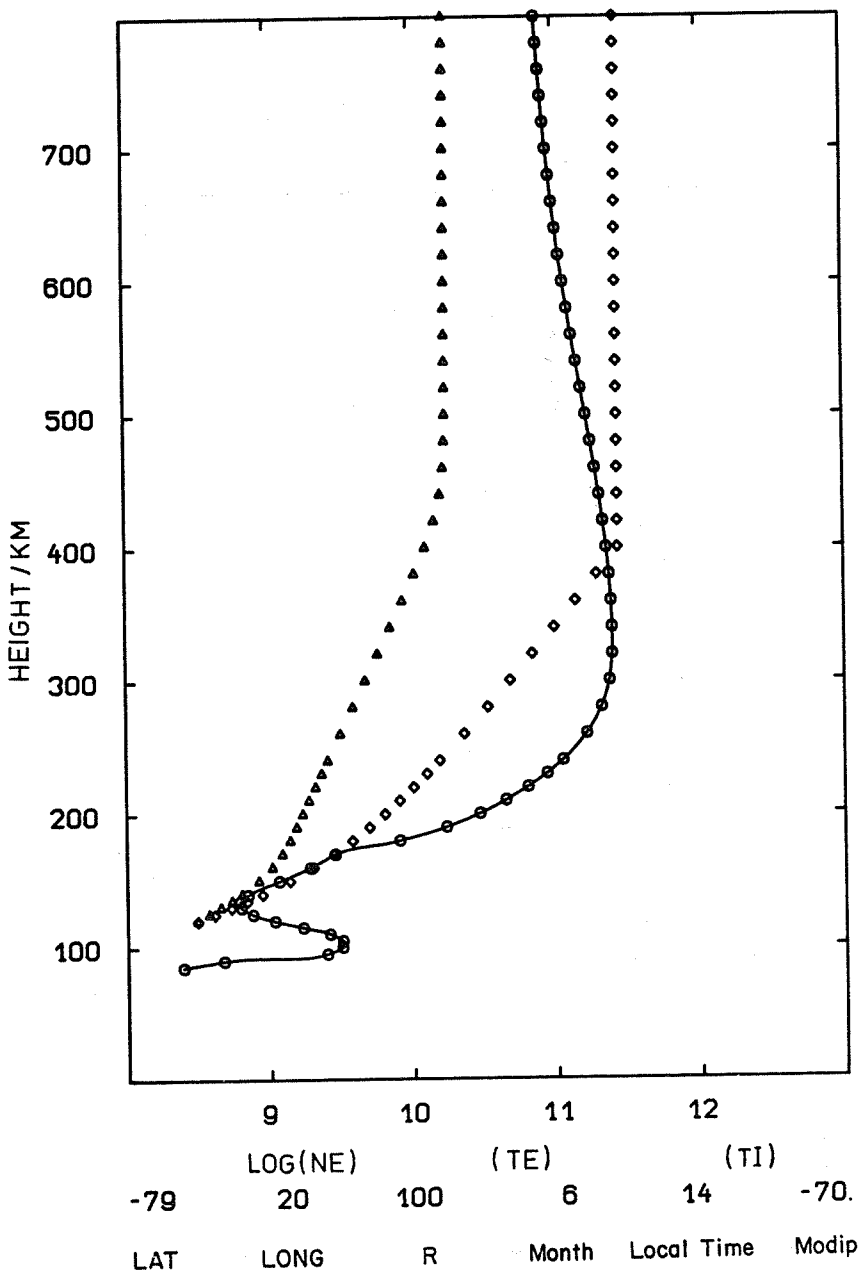
600
500
400
300
200
100
0
1
LOG(O+)
LOG(O2+)
LOG(NO+)
-79
20
100
3
14
-70.
LAT
LONG
R
Month
Local Time
Modip


HEIGHT/KM
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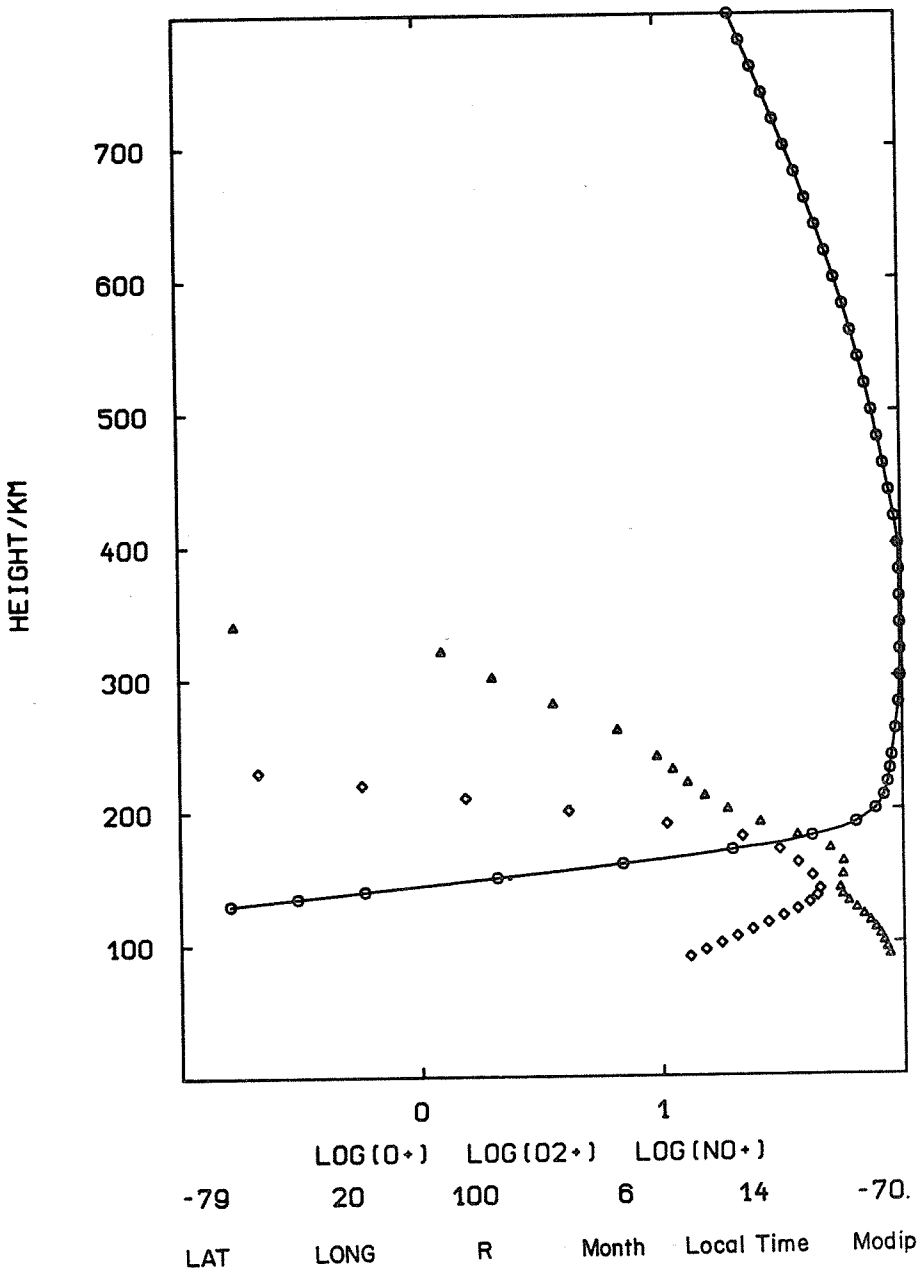
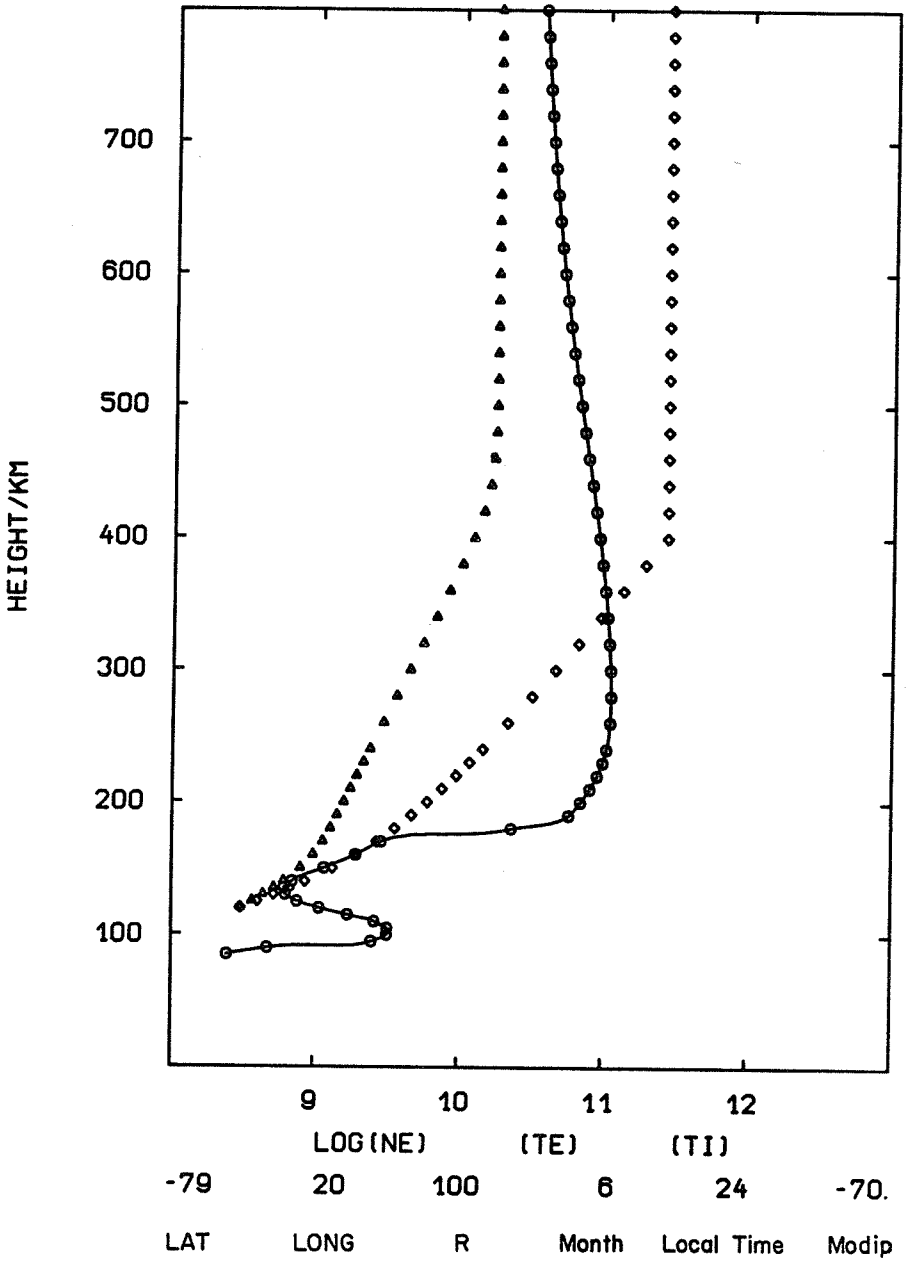
600
500
400
300
200
100
9
10
11
12
LOG(NE)
(TE)
(TI)
-79
20
100
6
14
-70.
LAT
LONG
R
Month
Local Time
Modip


HEIGHT/KM
700
600
500
400
300
200
100
0
1
LOG(O+)
LOG(O2+)
LOG(NO+)
-79
20
100
6
14
-70.
LAT
LONG
R
Month
Local Time
Modip


HEIGHT/KM
700
600
500
400
300
200
100
9
10
11
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LOG(NE)
(TE)
(TI)
-79
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-70.
LAT
LONG
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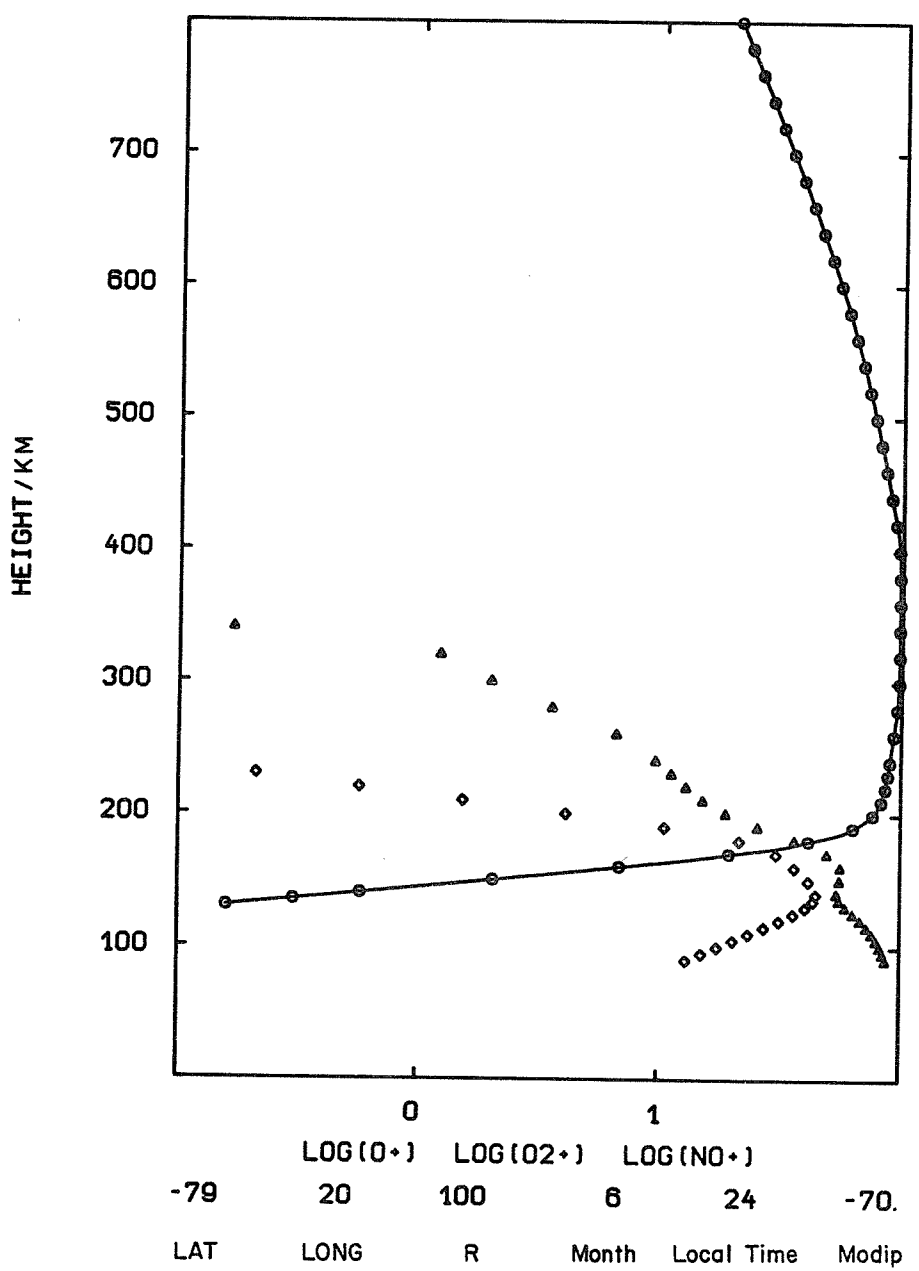
Month
Local Time
Modip


HEIGHT/KM
700
600
500
400
300
200
100
0
1
LOG(O+)
LOG(O2+)
LOG(NO+)
-79
20
100
6
24
-70.
LAT
LONG
R
Month
Local Time
Modip

5. FORTRAN PROGRAM

The FORTRAN program is reproduced in this section. The ALGOL programs as submitted by Dr. Rawer are available upon request to the World Data Center A for Solar-Terrestrial Physics. They have not been adapted to the WDC-A for STP computers.

```
C     IRIF07-A, DECEMBER 1980
C     INTERNATIONAL REFERENCE IONOSPHERE (IRI).
C     THIS PROGRAM PRODUCES HEIGHT PROFILES OF TEMPERATURE
C     AND DENSITY OF THE ELECTRONS AND IONS IN THE IONOSPHERE FOR
C     SPECIFIED LOCATION,TIME AND SOLAR ACTIVITY.
C     ADDRESS@ PROF.K.RAWER, HERRENSTR.43
C     D 7801  MARCH , F.R.G.
C     INPUT:
C     1.)  LATITUDE(F6.1),LONGITUDE(F6.1),SOLAR-ACTIVITY(R)(F6.1),
C     MONTH(F4.1),HOUR(F4.1,1X),XHI(F6.1),BEGIN,END,STEPWIDTH(OF THE
C     REQUIRED HEIGHT RANGE)(3(F6.1,1X)),KOBE(I1,1X),JNE,JNEMAX,
C     JTN,JTE,JTI,JTETI,JO,JHHE,JO2,JNO,JMAG(11I1)
C     2.) HMF2/KM AND NMF2/M-3 OR FOF2/MHZ (F5.1,E9.3)
C     IF HMF2 LESS 10.0 THEN THE CCIR VALUES FOR FOF2 AND HMF2
C     ARE TAKEN BY USE OF THE CCIR-TAPE FOR FOF2 AND M3000.
C     THE USER SHOULD ADAPT PROCEDURE CCIRCA TO HIS OWN
C     CCIR-TAPE.
C     KOBE=0 SHOULD BE USED FOR PRINTER OUTPUT AND KOBE=1 FOR
C     PUNCHER OR TAPE OUTPUT.THE TEN INPUT VARIABLES
C     (JNE...JNO) ARE SWITCHED (1=YES,0=NO) TO CHOOSE YOUR
C     PARAMETERS.JMAG=0 MEANS GEOGRAFIC JMAG=1 GEOMAGNETIC
C     LATITUDE AND LONGITUDE.
C
C-WDC-A   THIS PROGRAM HAS BEEN MODIFIED AT WDC-A TO BE MORE MACHINE
C-WDC-A   INDEPENDENT.
C-WDC-A   NOTE 1) INITIALIZATION OF VARIABLES IS NOT NECESSARY.
C-WDC-A   NOTE 2) THIS VERSION OF THE PROGRAM DOES NOT ALLOW YOU
C-WDC-A           TO CHOOSE WHICH PARAMETERS ARE OUTPUT. A FIXED OUTPUT
C-WDC-A           WAS USED TO ASSURE EXECUTION ON ANY MACHINE.
C-WDC-A   NOTE 3) YOU WILL HAVE TO OPEN YOUR CHANNEL NUMBERS, ON A
C-WDC-A           CONTROL DATA MACHINE THIS WOULD BE A PROGRAM CARD,ON
C-WDC-A           A DATA GENERAL THIS WOULD BE AN OPEN CARD, ETC. THE
C-WDC-A           CHANNEL VARIABLES SPECIFIED BY THE VARIABLES EGNR,AGNR
C-WDC-A           AND KONSOL CAN BE CHANGED TO ANY VALUE YOU LIKE,
C-WDC-A           SO LONG AS YOU REPLACE THOSE CHANGES IN YOUR CHANNEL
C-WDC-A           OPENING STATEMENT.
C-WDC-A           IN THIS VERSION:
C-WDC-A           EGNR = INTERACTIVE INPUT OF DATA AND OPTIONS
C-WDC-A           AGNR = OUTPUT- PRINTOUT OR DISK FILE
C-WDC-A           KONSOL = INTERACTIVE OUTPUT OF INFORMATIVE STATEMENTS
C-WDC-A           UNIT 15 = CCIR COEFFICIENTS
C-WDC-A    NOTE 4) THIS VERSION OF IRIF07 IS INTENDED TO USE THE CCIR
C-WDC-A           COEFFICIENTS PROVIDED WITH THIS PROGRAM TAPE.  THE READ
C-WDC-A           STATEMENTS IN CCIRCA MUST BE CHANGED IF YOU ARE USING
C-WDC-A           A DIFFERENT SET OF COEFFICIENTS.
C
C-WDC-A  OPEN CHANNELS FOR UNIVAC 1100 (WDC-A).
C
      DEFINE FILE 11(AREAD,,80)
      DEFINE FILE 12(APRINT,,80)
      DEFINE FILE 14(SDF,,80,80)
      DEFINE FILE 15(SDF,,80)
      INTEGER EGNR,AGNR,SMONTH,SHOUR,DAYNR,DDO(4)
     1,IIF(4),DO2(2)
      REAL LATI,LONGI,MO2(3),MO(5),LOGE,MONTH,MODIP,NMF2,
     2NDELO,NMF1,NME,NMD,K,MAGBR,
     1NHABR,NDEL,NDX,NEI,MM,MLAT,MLONG,NOBO2
      DIMENSION F(3),BOF(2,2,8),OUTF(50,12),JF(10),RIF(4),
     1PF10(12),PF30(12),HO(4),
     2PF20(4),HO2(2),CTNN(3),PG10(80),PG20(32),PG30(80)
      LOGICAL WINTER,SUMMER,SCHALT,EXT,NIGHT,F1REG,VALLEY,
     1IRDUPP,CCIREI,ANF,TEMP,TEVAL,TIMP
      COMMON/BLOCK1/HMF2,NMF2,HMF1/BLOCK2/BO,B1,C1,HZ,T,G(144),HST,STR
     4/BLOCK3/HDX,HME,
     1NME,HMD,NMD,HEF,D1,K,FP30,FP3U,FP1,FP2/BLOCK4/HB,HC,P9,P10,
     2P11,P12,IRDL,OW,AGNR,IRDUPP,P(8)/BLOCK5/ZX,TNX,ATN,CTN(3)/
     3BLOCK8/HS,TNHS,XSM(2),MM(3)/BLO10/BETA,ETA,DELTA,ZETA/
     XBLO11/MONTH,LATI/BLOCK6/NIGHT,E(4)
```

```
      EXTERNAL SSRSU,XE1,XE2,XE3,XE4,XE5,XE6,TEDER
C
C-WDC-A  THIS DATA STATEMENT IS NECESSARY IF ALL PARAMETERS ARE TO BE
C-WDC-A  OUTPUT. THE OPTION OF VARIOUS TYPES OF OUTPUT IS NOT
C-WDC-A  ACTIVE IN THIS VERSION, THUS ALL OUTPUT TYPES ARE SUPPLIED
C-WDC-A  BY MAKING ALL ELEMENTS OF THE ARRAY JF EQUAL 1.
C
      DATA JF /10*1/
      ALH=10.0
      LOGE=1/ALOG(ALH)
      UMR=0.01745329
      PHI=3.1415927
      CCIREI=.FALSE.
C     'COMMENT' FIRST SPECIFY YOUR COMPUTERS CHANNEL NUMBERS, E.G.
      EGNR=11
      AGNR=14
      KONSOL=12
C
C-WDC-A  IF YOU WISH TO READ MORE THAN ONE HOUR AT A TIME ADD AN
C-WDC-A  END OF FILE TEST BELOW. IF EOF TRUE THEN GO TO STATEMENT 999
C
2000  WRITE(KONSOL,2020)
      READ(EGNR,2005) LATI
      WRITE(KONSOL,2021)
      READ(EGNR,2005) LONGI
      WRITE(KONSOL,2022)
      READ(EGNR,2005) R
      WRITE(KONSOL,2023)
      READ(EGNR,2003) MONTH
      WRITE(KONSOL,2024)
      READ(EGNR,2003) HOUR
      WRITE(KONSOL,2025)
      READ(EGNR,2005) XHI
      WRITE(KONSOL,2026)
      READ(EGNR,2005) AH
      WRITE(KONSOL,2027)
      READ(EGNR,2005) EH
      WRITE(KONSOL,2028)
      READ(EGNR,2005) SH
      WRITE(KONSOL,2029)
      READ(EGNR,2009) KOBE
      WRITE(KONSOL,2030)
      READ(EGNR,2009) JMAG
      WRITE(KONSOL,2031)
      READ(EGNR,2011) HMF2
      WRITE(KONSOL,2032)
      READ(EGNR,2012) FOF2
2003  FORMAT(F4.1)
2005  FORMAT(F6.1)
2009  FORMAT(I1)
2011  FORMAT(F5.1)
2012  FORMAT(E9.3)
2020  FORMAT(/'          INPUT PARAMETERS.....',
     X     /,' LATITUDE ?')
2021  FORMAT(/,' LONGITUDE ?')
2022  FORMAT(/,' SUNSPOT ?')
2023  FORMAT(/,' MONTH ?')
2024  FORMAT(/,' HOUR ?')
2025  FORMAT(/,' SOLAR ZENITH ANGLE ',
     X     '(-10.0 TO HAVE PROGRAM CALCULATE IT) ?')
2026  FORMAT(/,' LOWER LIMIT ?')
2027  FORMAT(/,' UPPER LIMIT ?')
2028  FORMAT(/,' STEP WIDTH ?')
2029  FORMAT(/,' TYPE OF OUTPUT (0=PRINT,1=FILE) ?')
2030  FORMAT(/,' GEOMAGNETIC COORDINATES (0=NO,1=YES) ?')
2031  FORMAT(/,' HMF2 (0 TO HAVE PROGRAM CALCULATE IT) ?')
2032  FORMAT(/,' FOF2 (0 TO HAVE PROGRAM CALCULATE IT) ?')
      IOND=JF(8)+JF(9)+JF(10)+JF(7)
C
C     INPUT OF TRANSFORMATION COEFFICIENTS (PROCEDURE FIELDG) .................
C
      CALL KOEFFI(BOF)
      CALL KOEFFB(G)
C
C     CALCULATION OF XHI,SUNSET,SUNRISE,COV,XHIM ..............................
C
```

```
145.          IF(JMAG.LE.0) GOTO 888
146.          MLAT=LATI
147.          MLONG=LONGI
148.     888  CALL GGM(JMAG,LONGI,LATI,MLONG,MLAT)
149.          DAYNR=IFIX(MONTH)*30-15
150.          SUNDEC=-0.40915*COS(2.0*PHI/365.25*FLOAT(DAYNR+8))
151.          Z1=SIN(SUNDEC)*SIN(LATI*UMR)
152.          Z2=COS(SUNDEC)*COS(LATI*UMR)
153.          IF(ABS(Z2).GT.0.0) GOTO 120
154.          SAX=24.0
155.          IF(Z1.GE.0.0) SAX=0.0
156.          GOTO 140
157.     120  IF(ABS(Z1/Z2).LE.1.0) GOTO 510
158.          SAX=24.0
159.          IF((Z1+Z2).GE.0.0) SAX=0.0
160.          GOTO 140
161.     510  SAX=12.0-ACOS(-Z1/Z2)/(UMR*15.0)
162.     140  SUX=24.0-SAX
163.          XLSTA=15.0*(HOUR-12.0)
164.          COV=63.75+R*(0.728+R*0.00089)
165.          IF(XHI.GT.(-10.0)) GOTO 520
166.          COSXHI=SIN(LATI*UMR)*SIN(SUNDEC)+COS(LATI*UMR)*COS(SUNDEC)
167.         1*COS(XLSTA*UMR)
168.          XHI=ACOS(COSXHI)/UMR
169.          GOTO 503
170.     520  COSXHI=COS(XHI*UMR)
171.     503  XHI0=0.87+0.0061*ABS(LATI)
172.          XHI100=0.68+0.0089*ABS(LATI)
173.          XHIM=(XHI0+(XHI100-XHI0)*R/100.0)/UMR
174.          CALL FIELDG(LATI,LONGI,300.0,XMA,YMA,ZMA,BET,DIP,MODIP)
175.          MAGBR=ATAN(0.5*TAN(DIP*UMR))/UMR
176.          SUNDEC=SUNDEC/UMR
177.     C
178.     C    CLASSIFICATION OF DIFFERENT TIMES AND REGIONS ..........................
179.     C
180.          F1REG=.TRUE.
181.          VALLEY=.FALSE.
182.          SUMMER=.FALSE.
183.          WINTER=.FALSE.
184.          NIGHT=.FALSE.
185.          TEMP=.TRUE.
186.          TIMP=.TRUE.
187.          TEVAL=.FALSE.
188.          IF((MONTH.GT.10.0).OR.(MONTH.LT.3.0)) WINTER=.TRUE.
189.          IF((MONTH.GT.4.0).AND.(MONTH.LT.9.0)) SUMMER=.TRUE.
190.          EXT=SUMMER
191.          IF(LATI.GT.0.0)  GOTO 1111
192.          EXT=WINTER
193.          WINTER=SUMMER
194.     1111 SUMMER=EXT
195.          IF((HOUR.GT.SUX).OR.(HOUR.LT.SAX)) NIGHT=.TRUE.
196.          IF(XHI.GT.XHIM) F1REG=.FALSE.
197.          IF(NIGHT) F1REG=.FALSE.
198.          IF(WINTER) F1REG=.FALSE.
199.     C
200.     C    INPUT OF THE ION DENSITY PARAMETER ARRAYS PF10,PF20 AND PF30.....
201.     C
202.          IF(IOND.LT.1) GOTO 141
203.          IIF(1)=2
204.          IF(ABS(LATI).LT.30.0) IIF(1)=1
205.          IIF(2)=2
206.          IF(COV.LT.100.0) IIF(2)=1
207.          IIF(3)=3
208.          IF(WINTER) IIF(3)=4
209.          IF(SUMMER) IIF(3)=2
210.          IIF(4)=1
211.          IF(NIGHT) IIF(4)=2
212.          CALL KOEFP1(PG10)
213.          CALL KOEFP2 (PG20)
214.          CALL KOEFP3 (PG30)
215.          DO 6000 I=1, 4
216.          RIF(I)=FLOAT(IIF(I))
217.     6000 CONTINUE
218.          CALL SUFE (PG10,RIF,12,PF10)
219.          CALL SUFE(PG20,RIF,4,PF20)
220.          CALL SUFE(PG30,RIF,12,PF30)
```

```
C
C     CALCULATION OF ELECTRON DENSITY PARAMETERS.....................
C
141   DELL=4.32
      IF(ABS(MODIP).GE.18.0) DELL=1.0+EXP(-(ABS(MODIP)-30.0)/10.0)
      IF(.NOT.F1REG) GOTO 150
      C1=0.1244-(4.44E-4)*R+0.09/DELL
      FOF1=FOF1ED(MAGBR,R,COSXHI)
      NMF1=1.24E10*FOF1*FOF1
150   XHINON=XHIS(MONTH,12.0,LATI)
      FOE=FOEEDI(R,XHI,XHINON,LATI,HOUR,SUX,SAX)
      IF(HMF2.GE.10.0) GOTO 501
      CALL F2OUT(MODIP,LATI,LONGI,MAGBR,R,MONTH,HOUR,FOE,HMF2,FOF2)
      GOTO 502
501   IF(FOF2.GT.100.0) FOF2=SQRT(FOF2/1.24E+10)
502   NMF2=1.24E10*FOF2*FOF2
      NME=1.24E10*FOE*FOE
      NMD=XMDED(XHI,R,4.0E8)
7000  HME=HPOL(HOUR,110.0,105.0,SAX,SUX)
      HMD=HPOL(HOUR,81.0,88.0,SAX,SUX)
      SMONTH=IFIX(MONTH/3.0)
      IF(SMONTH.LT.1) SMONTH=4
      BO=XPOL(BOF,HOUR,SAX,SUX,DELL,SMONTH,R)
      COS2=COS(MLAT*UMR)
      COS2=COS2*COS2
      FLU=(COV-40.0)/30.0
      ETA=0.058798-0.0070305*COS2+FLU*(-0.014065+0.0069724*COS2)+
     1(0.0024287+0.0042810*COS2-0.00015280*FOF2)*FOF2
      ZETA=0.078922-0.0046702*COS2+FLU*(-0.019132+0.0076545*COS2)+
     1(0.0032513+0.0060290*COS2-0.00020872*FOF2)*FOF2
      BETA=-128.03+20.253*COS2+FLU*(-8.0755-0.65896*COS2)+(0.44041
     1+0.71458*COS2-0.042966*FOF2)*FOF2
      XXX=EP1ST(-94.45,BETA)
      XXXX=DEP1ST(-94.45,BETA)
      DELTA=(ETA*XXX-ZETA/2.0)/(ETA*XXXX+ZETA/400.0)
      B1=3.0
      F(1)=HPOL(HOUR,0.02+0.03/DELL,0.05,SAX,SUX)
      F(2)=HPOL(HOUR,4.6,4.5,SAX,SUX)
      F(3)=HPOL(HOUR,-11.5,-4.0,SAX,SUX)
      NDEL0=5.0
      IF(WINTER) NDEL0=10.0
      DNDH0=0.016
      IF(SUMMER) DNDH0=0.01
      NHABR=HPOL(HOUR,10.5/DELL,28.0,SAX,SUX)
      XXX=EPSTEP(45.0,67.0,-10.0,20.0,ABS(LATI))
      HBR=HPOL(HOUR,17.8/DELL,XXX,SAX,SUX)
      NDEL=HPOL(HOUR,NDEL0/DELL,81.0,SAX,SUX)
      DNDHBR=HPOL(HOUR,DNDH0/DELL,0.06,SAX,SUX)
      IF(NDEL.GT.1.0) VALLEY=.TRUE.
      IF(.NOT.VALLEY) GOTO 600
      CALL TAL(HME,NME,NHABR,NDEL,HBR,1.0,DNDHBR,EXT,E)
      IF(.NOT.EXT) GOTO 600
      WRITE(KONSOL,650)
650   FORMAT(1X,'NO ELECTRON DENSITY E-VALLEY,AS THE
     1 MODEL FUNCTION HAS A SECOND EXTREMUM IN THE VALLEY-REGION')
      VALLEY=.FALSE.
600   FP1=F(1)
      FP2=-FP1*FP1/2.0
      FP30=(-F(2)*FP2-FP1+1.0/F(2))/(F(2)*F(2))
      FP3U=(-F(3)*FP2-FP1-1.0/F(3))/(F(3)*F(3))
      HDX=HMD+F(2)
      X=HDX-HMD
      NDX=NMD*EXP(X*(FP1+X*(FP2+X*FP30)))
      DNDX=NDX*(FP1+X*(2.0*FP2+X*3.0*FP30))
      X=HME-HDX
      K=-DNDX*X/(NDX*ALOG(NDX/NME))
      D1=DNDX/(NDX*K*X**(K-1.0))
      IF(.NOT.VALLEY) HBR=0.0
      IF(F1REG) GOTO 700
      HMF1=0.0
      NMF1=0.0
      C1=0.0
700   HEF=HME+HBR
C
C     SEARCH FOR HMF1,HST,HEF,AND HA.................................
C
```

```
297.   7107  IF(.NOT.F1REG) NMF1=(NME+NMF2)/2.0
298.         H=0.0
299.   133   H=H+10.0
300.         IF(H.GT.(HMF2-HME)) GOTO 135
301.         CALL REGFA1(HMF2-10.0-H,HMF2,1.0,NMF1,XE2,SCHALT,HMF1)
302.         IF(SCHALT) GOTO 133
303.         GOTO 137
304.   135   WRITE(KONSOL,11)
305.   11    FORMAT(1H ,1X,' HMF1 IS
306.        1 NOT EVALUATED BY THE FUNCTION XE2')
307.         HMF1=HMF2
308.         C1=0.0
309.   137   IF(HMF1.GT.(HEF+10.0)) GOTO 380
310.         C1=0.0
311.         HMF1=HMF2
312.         WRITE(KONSOL,9)
313.   9     FORMAT(1H ,1X,' HEF GREATER AS HMF1')
314.   380   H=0.0
315.   125   H=H+3.0
316.         IF(H.GT.(HMF1-HME)) GOTO 900
317.         CALL REGFA1(HMF1,HME+H,1.0,NME,XE3,SCHALT,HST)
318.         STR=HST
319.         IF(SCHALT) GOTO 125
320.         GOTO 360
321.   900   B1=B1+0.5
322.         IF(B1.GE.10.0) GOTO 901
323.         H=0.0
324.         GOTO 133
325.   901   WRITE(KONSOL,100)
326.   100   FORMAT(1H ,1X,' HST IS NOT
327.        1EVALUATED BY THE FUNCTION XE3')
328.         HST=(HMF1+HME-HBR)/2.0
329.   360   HZ=(HST+HMF1)/2.0
330.         WRITE (KONSOL,902) B1
331.   902   FORMAT (1X,  'WE  PUT  B1=  ',  F3.1,  'TO GET HST')
332.         IF(HZ.GT.(HEF+10.0)) GOTO 950
333.         HST=(HMF1+HEF)/2.0
334.         HZ=(HST+HMF1)/2.0
335.   950   D=HZ-HST
336.         HEF=HME+HBR
337.         T=D*D/(HZ-HEF-D)
338.   C
339.   C     CALCULATION OF NEUTRAL TEMPERATURE PARAMETER.....................
340.   C
341.         HTA=90.0
342.         TNA=183.0
343.         ZX=125.0
344.         ANF=.TRUE.
345.         Z1=-180.0
346.    882  TUN=TUNCAL(COV,LATI,SUNDEC,Z1)
347.         TNX=371.6678+0.0518806*TUN-294.3505*EXP(-0.00216222*TUN)
348.         ATN=0.63662*(TUN-TNX)
349.         HDEL=ZX-HTA
350.         TDEL=TNX-TNA
351.         HD2=HDEL*HDEL
352.         CTN(1)=1.9*TDEL/HDEL
353.         CTN(3)=3.0*TDEL/(HD2*HD2)
354.         CTN(2)=CTN(3)*1.333333*HDEL-CTN(1)/HD2
355.         IF(.NOT.ANF) GOTO 881
356.         ANF=.FALSE.
357.         TX=TN(130.0,TNX,ATN,CTN)
358.         TNXN=TNX
359.         ATNN=ATN
360.         CTNN(1)=CTN(1)
361.         CTNN(2)=CTN(2)
362.         CTNN(3)=CTN(3)
363.         Z1=XLSTA
364.         GOTO 882
365.   C
366.   C     CALCULATION OF ELECTRON TEMPERATURE PARAMETER....................
367.   C
368.    881  HTA=120.0
369.         HOT=200.0
370.         HON=400.0
371.         IF(ABS(MLAT).GT.40.0) HOT=350.0
372.         HO=HOT
```

```
      IF(NIGHT) HO=HON
      HMAX=70.0*EXP((-1.4E-3)*MLAT*MLAT)+200.0
      CALL TELAT(MLAT,1600.0,700.0,0.5,0.47,0.024,0.0,F1N,F2N)
      TX=TN(HON,TNXN,ATNN,CTNN)
      TEN=TE(HON,F1N,F2N,HMAX,0.0,HON,0.0,0.0,0.0)
      DTEN=(TEN-TX)/(HON-HTA)
      CALL TELAT(MLAT,2325.0,725.0,1.0,3.4,-0.014,2.56E4,F1T,F2T)
      TX=TN(HO,TNXN,ATNN,CTNN)
      XXX=TE(HO,F1T,F2T,HMAX,2.0,HOT,0.0,0.0,0.0)
      XXXX=TE(HO,F1N,F2N,0.0,0.0,HON,TX,HTA,DTEN)
      TEO=HPOL(HOUR,XXX,XXXX,SAX,SUX)
      TX=TN(HO,TNX,ATN,CTN)
      QUO=(TEO-TX)/(HO-HTA)
C
C     CALCULATION OF ION TEMPERATURE PARAMETERS
C
887   XSM(1)=430.0
      MM(2)=HPOL(HOUR,3.0,0.0,SAX,SUX)
      Z1=EXP(-0.09*MLAT)
      YSM2=1240.0-1400.0*Z1/((1.0+Z1)*(1.0+Z1))
      X2=ABS(MLAT)
      X1=X2*(0.47+X2*0.024)*UMR
      X3=COS(X1)
      X4=YSM2
      TIN=1200.0-300.0*SIGN(1.0,X3)*SQRT(ABS(X3))
      YSM2=TIN
      IF(X4.GE.TIN) YSM2=HPOL(HOUR,X4,TIN,SAX,SUX)
      TX=TN(XSM(1),TNXN,ATNN,CTNN)
      XXX=TE(XSM(1),F1T,F2T,HMAX,2.0,HOT,0.0,0.0,0.0)
      XXXX=TE(XSM(1),F1N,F2N,0.0,0.0,HON,TX,HTA,DTEN)
      Z1=HPOL(HOUR,XXX,XXXX,SAX,SUX)
      Z2=TN(XSM(1),TNX,ATN,CTN)
      IF(YSM2.LE.Z2) YSM2=(Z1+Z2)/2.0
      CALL REGFA1(130.0,500.0,0.1,YSM2,TEDER,SCHALT,HS)
      IF(.NOT.SCHALT) GOTO 250
      HS=200.0
250   TNHS=TN(HS,TNX,ATN,CTN)
      MM(1)=DTNDH(HS,ATN,CTN)
      MM(3)=MM(2)
      XSM(2)=XSM(1)
C
C     SMOOTHING OF THE ION TEMPERATURE TO KEEP IT LESS THAN
C     THE ELECTRON TEMPERATURE AT HSM
C
      HSM=1000.0
      XXX=TE(HSM,F1T,F2T,HMAX,2.0,HOT,0.0,0.0,0.0)
      XXXX=TE(HSM,F1N,F2N,HMAX,0.0,HON,0.0,0.0,0.0)
      TESM=HPOL(HOUR,XXX,XXXX,SAX,SUX)
      IF(TESM.GE.TI(HSM)) GOTO 240
      XXX=DTEDH(HSM,F2T,HMAX,2.0,HOT,0.0,0.0)
      XXXX=DTEDH(HSM,F2N,HMAX,0.0,HON,0.0,0.0)
      MM(3)=HPOL(HOUR,XXX,XXXX,SAX,SUX)
      XSM(2)=(TESM-10.0-YSM2+MM(2)*XSM(1)-MM(3)*HSM)/(MM(2)-MM(3))
C
C     CALCULATION OF ION DENSITY PARAMETER.............................
C
240   IF(IOND.LT.1) GOTO 189
      Z1=0.0
      IF(XHI.LE.90.0) Z1=COSXHI
      HFIXO=300.0
      IF((IIF(2).EQ.2).AND.(IIF(3).EQ.2)) HFIXO=249.0
      MO(1)=EPSTEP(PF10(1),PF10(2),PF10(3),PF10(4),Z1)
      MO(2)=EPSTEP(PF10(5),PF10(6),PF10(7),PF10(8),Z1)
      MO(3)=0.0
      HO(1)=EPSTEP(PF10(9),PF10(10),PF10(11),PF10(12),Z1)
      HO(4)=PF20(1)
      MO(4)=PF20(2)
      MO(5)=PF20(3)
      DDO(1)=9
      DDO(2)=5
      DDO(3)=5
      DDO(4)=50
7100  HO(2)=290.0
      IF((IIF(2).EQ.2).AND.(IIF(3).EQ.2)) HO(2)=237.0
      HO(3)=(4.60517-MO(5)*(HO(4)-PF20(4)))/MO(4)+HO(4)
      IF(HO(2).LT.HO(3)) GOTO 7101
```

```
449.          MO(4)=MO(4)-0.001
450.          GOTO 7100
451.    7101  Z2=5.0
452.          X=HO(2)
453.          Z1=0.0
454.    7102  X=X+Z2
455.          Y=RPID(X,HFIXO,98.0,4,MO,DDO,HO)
456.          IF(Y.LE.Z1) GOTO 7103
457.          Z1=Y
458.          GOTO 7102
459.    7103  IF(Z2.LE.1.0) GOTO 7104
460.          X=X-Z2
461.          Z2=1.0
462.          GOTO 7102
463.    7104  HOO=X-0.5
464.          IF(XHI.GE.90.0) COSXHI=0.0
465.          DO 7105 I=2,4,2
466.          L=I/2
467.          HO2(L)=PF30(1+I)+PF30(2+I)*COSXHI
468.    7105  MO2(L+1)=PF30(7+I)+PF30(8+I)*COSXHI
469.          DO2(1)=5
470.          DO2(2)=5
471.          MO2(1)=PF30(7)+PF30(8)*COSXHI
472.    7106  Y=RPID(HOO,PF30(1),PF30(2),2,MO2,DO2,HO2)
473.          IF(Y.LE.0.1) GOTO 189
474.          MO2(3)=MO2(3)-0.02
475.          GOTO 7106
476.    C
477.    C     CALCULATION FOR THE REQUIRED HEIGHT RANGE.....................
478.    C
479.    189   HA=65.0
480.          IF(NIGHT) HA=80.0
481.          IF(AH.LT.HA) AH=HA
482.          IF(EH.GT.1000.0) EH=1000.0
483.          KOMB=JF(4)+JF(5)+JF(6)
484.          IF(((EH-AH)/SH+1.0).LT.50.0) GOTO 230
485.          EH=AH+49.0*SH
486.          WRITE(AGNR,190) EH
487.    190   FORMAT(1H ,1X,' TOO MANY HEIGHT STEPS,EH IS REDUCED
488.         1 TO ',F4.0)
489.    230   I=0
490.          X=EH
491.    300   I=I+1
492.          IN=1
493.          OUTF(I,IN)=X
494.          IF((JF(1)+JF(2)).LE.0) GOTO 330
495.          NEI=XE(X)
496.          IF(JF(1).LE.0) GOTO 340
497.          IN=IN+1
498.          OUTF(I,IN)=NEI
499.    340   IF(JF(2).LE.0) GOTO 330
500.          IN=IN+1
501.          OUTF(I,IN)=NEI/NMF2
502.    330   IF(KOMB.LE.0) GOTO 7108
503.          X1=TN(X,TNX,ATN,CTN)
504.          IF(X.GE.HTA) GOTO 7109
505.          Z2=-1.0
506.          TEH=-1.0
507.          GOTO 7110
508.    7109  TX=TN(X,TNXN,ATNN,CTNN)
509.          Z1=TE(X,F1N,F2N,HMAX,0.0,HON,TX,HTA,DTEN)
510.          Z2=X1
511.          IF(X.GE.HS) Z2=TI(X)
512.          IF(X.LT.HO) GOTO 7119
513.          XXX=TE(X,F1T,F2T,HMAX,2.0,HOT,0.0,0.0,0.0)
514.          TEH=HPOL(HOUR,XXX,Z1,SAX,SUX)
515.          GOTO 7110
516.    7119  TEH=TE(X,0.0,0.0,0.0,0.0,HO,X1,HTA,QUO)
517.    7110  IF(JF(3).LE.0) GOTO 7112
518.          IN=IN+1
519.          OUTF(I,IN)=X1
520.    7112  IF(JF(4).LE.0) GOTO 7113
521.          IN=IN+1
522.          OUTF(I,IN)=TEH
523.    7113  IF(JF(5).LE.0) GOTO 7120
524.          IN=IN+1
```

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525.          OUTF(I,IN)=Z2
526.    7120  IF(JF(6).LE.0) GOTO 7108
527.          IN=IN+1
528.          OUTF(I,IN)=SIGN(1.0,TEH)*TEH/Z2
529.    7108  IF(IOND.LE.0) GOTO 7118
530.          Z1=RPID(X,HFIX0,98.0,4,M0,DD0,H0)
531.          Z2=RPID(X,PF30(1),PF30(2),2,M02,D02,H02)
532.    C     FIRST COMPUTE NOB02, RATIO OF N0+TO02+
533.    C     AT HEIGHT HB. THEN THE SAME RATIO AT X
534.          Z1B= RPID (H00,HFIX0,98.0,4,M0,DD0,H0)
535.          Z2B= RPID (H00,PF30(1),PF30(2),2,M02,D02,H02)
536.          NOB02= (100.0-Z1B-Z2B)/Z2B
537.          IF(JF(7).LE.0) GOTO 7114
538.          IN=IN+1
539.          OUTF(I,IN)=Z1
540.    7114  IF(JF(8).LE.0) GOTO 7116
541.          IN=IN+1
542.          CALL RDHHE(X,H00,Z1,Z2,NOB02,10.0,OUTF(I,IN),OUTF(I,IN+1))
543.    7116  IF(JF(9).LE.0) GOTO 7117
544.          IN=IN+2
545.          OUTF(I,IN)=Z2
546.    7117  IF(JF(10).LE.0) GOTO 7118
547.          IN=IN+1
548.          OUTF(I,IN)=RDNO(X,H00,Z2,Z1,NOB02)
549.    7118  X=X-SH
550.          IF(X.GE.AH) GOTO 300
551.          IEI=I
552.    C
553.    C     OUTPUT ON THE SPECIFIED DEVICE.....................................
554.    C
555.          IF(KOBE.NE.1) GOTO 7020
556.          WRITE(AGNR,7030) (JF(I),I=1,10),IEI,LATI,LONGI,R,MONTH,HOUR
557.    7030  FORMAT(1X,10I1,2X,I3,2(2X,F6.1),2X,F5.1,2X,F4.1,2X,F5.2)
558.    7020  IF(KOBE.NE.0) GOTO 7041
559.          WRITE (AGNR,7051)
560.    7051  FORMAT (1X,'INPUT@')
561.          IF (JMAG.LT.1) GOTO 7053
562.          WRITE (AGNR,7052) MLAT,MLONG
563.    7052  FORMAT (1X,'MLAT=',F6.1,2X,'MLONG=',F6.1)
564.          GOTO 7055
565.    7053  WRITE (AGNR,7054) LATI,LONGI
566.    7054  FORMAT (1X,'LATI=',F6.1,2X,'LONGI=',F6.1)
567.    7055  WRITE(AGNR,7050) R,MONTH,HOUR
568.    7050  FORMAT(1X,'R=',F5.0,'  MONTH=',F4.1,'  HOUR=',F5.2)
569.          WRITE (AGNR,7061)
570.    7061  FORMAT (1X,'CALCULATED VALUES@')
571.          IF (JMAG.LT.1) GOTO 7063
572.          WRITE (AGNR,7062) LATI,LONGI
573.    7062  FORMAT (1X,'LATI=',F6.1,2X,'LONGI=',F6.1)
574.          GOTO 7065
575.    7063  WRITE (AGNR,7064)MLAT,MLONG
576.    7064  FORMAT (1X,'MLAT=',F6.1,2X,'MLONG=',F6.1)
577.    7065  WRITE(AGNR,7060) DIP,MODIP,MAGBR,XHI
578.    7060  FORMAT(1X,'DIP=',F6.1,'  MODIP=',F6.1,'  MAGLA=',F6.1,'  XHI=',
579.         XF6.1)
580.          WRITE(AGNR,7066) SAX,SUX,SUNDEC
581.    7066  FORMAT(1X,'SUNRISE',F4.1,'L.T.   SUNSET@',F4.1,'L.T.',5X,
582.         X'SUNDEC.=',F6.1)
583.          Z1=0.0
584.          IF(F1REG) Z1=HMF1
585.          Z2=0.0
586.          IF(F1REG) Z2=NMF1
587.          WRITE(AGNR,7070) NMF2,Z2,NME,NMD
588.    7070  FORMAT(1X,'NMF2=',E7.2,'  NMF1=',E7.2,'  NME=',E7.2,'  NMD=',E7.2)
589.          WRITE(AGNR,7080) HMF2,Z1,HME,HMD
590.    7080  FORMAT(1X,'HMF2=',F5.1,'  HMF1=',F5.1,'  HME=',F5.1,'  HMD=',F5.1)
591.          WRITE(AGNR,7998)
592.    7998  FORMAT(1HO,3X,1HH,9X,2HNE,7X,6HN/NMAX,5X,2HTN,7X,2HTE,7X,2HTI,
593.         16X,5HTE/TI,5X,4HRDO+,4X,4HRDH+,3X,5HRDHE+,3X,5HRDO2+,3X,5HRDNO+)
594.    7041  DO 7040 I=1,IEI
595.    7040  WRITE(AGNR,7999) (OUTF(I,L),L=1,IN)
596.    7999  FORMAT(1X,F6.1,3X,E10.4,3X,F6.4,3X,3(F6.1,3X),F7.4,5(3X,F5.1))
597.          IF(KOBE.EQ.1) WRITE(AGNR,35)
598.    35    FORMAT(1X,'111111')
599.    C
600.    C-WDC-A  ADD A 'GO TO 2000' IF YOU WISH TO READ THE DATA FOR MORE THAN
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      C-WDC-A  ONE HOUR TO A RUN.
      C
  999 STOP
      END


C     D.BILITZA,IPW FREIBURG,15.1.77 ******************************************
C     'COMMENT' D. BILITZA,H.THIEMANN,K.RAWER IPW FREIBURG,
C     AUG.79 **********************
C     IRI-PROCEDURES **************************************
C      FREF.@ K. RAWER, S. Z AMAKRISHNAN, D. BILITZA,
C     INTERNATIONAL REFERENCE IONOSPHERE 1978, U.R.S.I. BRUSSELS''
C     FOR CALCULATING ELECTRON DENSITY AND TEMPERATURE AND ION TEMPERATURE
C     AND RELATIVE  DENSITY IN THE HEIGHT RANGE 70 - 1000 KM.?
C     IRI-PROCEDURES
C     REF.@ K. RAWER, S. RAMAKRISHNAN, D. BILITZA'
C     TO CALCULATE ELECTRON DENSITY AND TEMPERATURE AND ION TEMPERATURE
C     AND RELATIVE DENSITY IN THE HEIGHT RANGE 70 - 1000 KM.
C     I. ELECTRON DENSITY ----------------------------------------------------


      FUNCTION EP1ST(X,BET)
      EP1ST=1.0/(1.0+EXP(-X/BET))
      RETURN
      END


      FUNCTION DEP1ST(X,BET)
      U=EXP(-X/BET)
      DEP1ST=U/(BET*(1.0+U)*(1.0+U))
      RETURN
      END


      FUNCTION XE1(H)
C       K.RAWER, S. RAMAKRISHNAN 1978. REPRESENTING ELECTRON DENSITY
C     PROFILE
C     FOR HEIGHTS  NOT GREATER 1000 KM AND NOT LESS HMF2
C     BY  HARMONIZED BENT-MODEL ADMITTING VARIABILITY OF
C     GLOBAL PARAMETERS@  ETA, ZETA, BETA, DELTA WITH GEOMAGNETIC LATITUDE
C     MLAT, SOLAR FLUXFLU AND CRITICAL FREQUENCY FOF2.
C     ALSO GLOBAL ARE PEAK-PARAMETERS NMF2,HMF2?
      REAL NMF2
      COMMON/BLOCK1/HMF2,NMF2,HMF1/BLO10/BETA,ETA,DELTA,ZETA
      X=(H-HMF2)/(1000.0-HMF2)*700.0+300.0-DELTA
      Y=(1000.0-HMF2)/700.0*(BETA*ETA*ALOG((1.0+EXP((X-394.50)/BETA))/
     1(1.0+EXP((-94.5-DELTA)/BETA)))+ZETA*(100.0*ALOG((1.0+EXP
     2((X-300.0)/100.0))/(1.0+EXP(-DELTA/100.0)))-X+300.0-DELTA))
      XE1=NMF2*EXP(-Y)
      RETURN
      END


      REAL FUNCTION XE2(H)
C     ELECTRON DENSITY FOR HEIGHTS LESS HMF2 AND NOT LESS HMF1
      REAL NMF2
      COMMON/BLOCK1/HMF2,NMF2,HMF1/BLOCK2/B0,B1,C1,HZ,T,G(144),HST,STR
      X=(HMF2-H)/B0
      IF(ABS(X).LT.1.0E-10) GOTO 100
      XE2=NMF2*EXP(-X**B1)/COSH(X)
      GOTO 200
  100 XE2=NMF2
  200 RETURN
      END


      REAL FUNCTION XE3(H)
C     ELECTRON DENSITY FOR HEIGHTS LESS HMF1 AND NOT LESS HZ
      REAL NMF2
      COMMON/BLOCK1/HMF2,NMF2,HMF1/BLOCK2/B0,B1,C1,HZ,T,G(144),HST,STR
      XE3=XE2(H)+NMF2*C1*SQRT(ABS(HMF1-H)/B0)
      RETURN
      END
```

```
      REAL FUNCTION XE4(H)
C     ELECTRON DENSITY FOR HEIGHTS LESS HZ AND NOT LESS HEF
      COMMON/BLOCK2/BO,B1,C1,HZ,T,G(144),HST,STR/BLOCK3/
     1HDX,HME,NME,HMD,NMD,HEF,D1,K,FP30,FP3U,FP1,FP2
      A=((STR/HST-1)*(H-HZ))/(HEF-HZ)+1
      XE4=XE3 (A*(HZ+T/2.0-SIGN(1.0,T)*SQRT(T*(HZ-H+T/4.0))))
      RETURN
      END


      REAL FUNCTION XE5(H)
C     ELECTRON DENSITY FOR HEIGHTS LESS HEF AND NOT LESS HME(VALLEY-REGION)
      REAL NME,NMD,K
      LOGICAL NIGHT
      COMMON/BLOCK3/HDX,HME,NME,HMD,NMD,HEF,D1,K,FP30,FP3U,FP1,
     1FP2/BLOCK6/NIGHT,E(4)
      T3=H-HME
      T1=T3*T3*(E(1)+T3*(E(2)+T3*(E(3)+T3*E(4))))
      IF(NIGHT) GOTO 100
      XE5=NME*(T1+1.0)
      GOTO 200
100   XE5=NME*EXP(T1)
200   RETURN
      END


      REAL FUNCTION XE6(H)
C     ELECTRON DENSITY FOR HEIGHTS LESS HME AND NOT LESS HA
      REAL NME,NMD,K
      COMMON/BLOCK3/HDX,HME,NME,HMD,NMD,HEF,D1,K,FP30,FP3U,FP1,FP2
      IF(H.GT.HDX) GOTO 100
      Z=H-HMD
      FP3=FP3U
      IF(Z.GT.0.0) FP3=FP30
      XE6=NMD*EXP(Z*(FP1+Z*(FP2+Z*FP3)))
      GOTO 200
100   Z=HME-H
      XE6=NME*EXP(-D1*Z**K)
200   RETURN
      END


      REAL FUNCTION XE(H)
C     ELECTRON DENSITY BETWEEN HA(KM) AND 1000 KM.FUNCTIONS NE1...6 ARE USED.
C     ELECTRON DENSITY BETWEEN HA(KM) AND 1000 KM
C     SUMMARIZING PROCEDURES  NE1....6?
      REAL NMF2,NME,NMD,K
      COMMON/BLOCK1/HMF2,NMF2,HMF1/BLOCK2/BO,B1,C1,
     1HZ,T,G(144),HST,STR/BLOCK3/HDX,H
     1ME,NME,HMD,NMD,HEF,D1,K,FP30,FP3U,FP1,FP2
      IF(H.LT.HMF2) GOTO 100
      XE=XE1(H)
      GOTO 200
100   IF(H.LT.HMF1) GOTO 300
      XE=XE2(H)
      GOTO 200
300   IF(H.LT.HZ) GOTO 400
      XE=XE3(H)
      GOTO 200
400   IF(H.LT.HEF) GOTO 500
      XE=XE4(H)
      GOTO 200
500   IF(H.LT.HME) GOTO 600
      XE=XE5(H)
      GOTO 200
600   XE=XE6(H)
200   RETURN
      END
C     II. ELECTRON TEMPERATURE ----------------------------------------------


      FUNCTION DTEDH(H,F2,HMAX,D,HO,DTNDH,A)
C     D.BILITZA,1.7.78,CALCULATES THE HEIGHT DERIVATE OF THE
C     ELECTRON TEMPERATURE MODEL PROCEDURE TE
      IF(H.LT.HO) GOTO 100
      Y=EXP(-0.03*(H-HMAX))
```

```
730.          F=1.0+Y
731.          DTEDH=D-F2*0.03*Y*(1.0-Y)/(F*F*F)
732.          RETURN
733.    100   DTEDH=DTNDH+A
734.          RETURN
735.          END


736.          SUBROUTINE TELAT(PHI,A,B,XN,P1,P2,C,F1,F2)
737.    C     D.BILITZA,1.7.78,CALCULATES THE TEMPERATURE MODEL PARTS F1 AND F2
738.    C     DEPENDING ON GEOMAGNETIC LATITUDE PHI
739.          XPHI=ABS(PHI)
740.          F=(P1+P2*XPHI)*XPHI
741.          F=F*0.01745329
742.          Y=COS(F)
743.          F1=A-B*SIGN(1.0,Y)*ABS(Y)**XN
744.          Y=EXP(-0.1*XPHI)
745.          F=1.0+Y
746.          F2=C*Y/(F*F)
747.          RETURN
748.          END


749.          FUNCTION TE(H,F1,F2,HMAX,D,HHO,TNH,HTA,A)
750.    C     D.BILITZA,1.7.78,MODEL FOR THE ELECTRON TEMPERATURE IN THE HEIGHT RANGE
751.    C     120-1000 KM.F1,F2 ARE THE LATITUDE DEPENDENT PARAMETERS CALCULATED BY
752.    C     TELAT.HMAX IS THE HEIGHT OF THE RELATIVE MAXIMUM,D THE TEMPERATURE
753.    C     HEIGHT GRADIENT,HHO THE INTERSECTION HEIGHT FOR THE EXTRAPOLATION TO THE
754.    C     CIRA 72 VALUES TNA AT HTA AND A,TNA ARE THE COEFFICIENTS FOR THE
755.    C     EXTRAPOLATION FUNCTION
756.          IF(H.LT.HHO) GOTO 10
757.          Y=EXP(-0.03*(H-HMAX))
758.          F=1.0+Y
759.          TE=F1+F2*Y/(F*F)+D*(H-700.0)
760.          RETURN
761.    10    TE=TNH+A*(H-HTA)
762.          RETURN
763.          END


764.    C     III.  ION TEMPERATURE ----------------------------------------------------
765.          FUNCTION TUNCAL(COV,XLATI,SD,SLSTA)
766.    C     CALCULATES THE EXOSPHERIC TEMPERATURE FOR COVINGTON-INDEX
767.    C     COV,LATITUDE XLATI,SOLARDEKLINATION SD AND LOCAL SOLAR TIME
768.    C     ANGLE SLSTA USING CIRA72-MODEL
769.          UMR=0.01745329
770.          TC=379.0+3.24*COV
771.          ETA=ABS(XLATI-SD)/2.0
772.          THETA=ABS(XLATI+SD)/2.0
773.          H1=COS(ETA*UMR)**2.2
774.          H2=SIN(THETA*UMR)**2.2
775.          TD=1.0+0.3*H1
776.          TN=1.0+0.3*H2
777.          A=(TD-TN)/TN
778.          TAU=SLSTA-37.0+6.0*SIN((SLSTA+43.0)*UMR)
779.          X=COS(TAU/2.0*UMR)
780.          TUNCAL=TC*TN*(1.0+A*SIGN(1.0,X)*ABS(X)**3.0)
781.          RETURN
782.          END


783.          REAL FUNCTION TN(X,TTNX,ATN,CCTN)
784.    C     D. BILITZA, 1978, NEUTRAL TEMPERATURE PROFILE
785.          DIMENSION CCTN(3)
786.          Z=X-125.0
787.          IF(Z.LE.0.0) GOTO 100
788.          Y=Z**2.5
789.          Y=(1.0+(4.5E-6)*Y)*Z
790.          YY=CCTN(1)/ATN
791.          Y=YY*Y
792.          Y=ATAN(Y)*ATN
793.          TN=TTNX+Y
794.          GOTO 200
795.    100   TN=TTNX+Z*(CCTN(1)+Z*Z*(CCTN(2)+Z*CCTN(3)))
796.    200   RETURN
797.          END
```

```
798.          FUNCTION DTNDH(H,ATN,CCTN)
799.    C     DERIVATIVE OF NEUTRAL TEMPERATURE
800.          DIMENSION CCTN(3)
801.          Z=H-125.0
802.          IF(Z.GT.0.0) GOTO 100
803.          DTNDH=CCTN(1)+Z*Z*(3.0*CCTN(2)+Z*4.0*CCTN(3))
804.          RETURN
805.    100   H1=CCTN(1)/ATN
806.          H2=Z**2.5
807.          H3=H1*Z*(1.0+(4.5E-6)*H2)
808.          DTNDH=ATN/(1.0+H3*H3)*H1*(1.0+(15.75E-6)*H2)
809.          RETURN
810.          END


811.          REAL FUNCTION TI(H)
812.    C     ION TEMPERATURE FOR HEIGHTS NOT GREATER 1000 KM AND NOT LESS HS
813.          REAL MM,G(2)
814.          COMMON/BLOCK8/HS,TNHS,XSM(2),MM(3)
815.          G(1)=20.0
816.          G(2)=50.0
817.          SUM=MM(1)*(H-HS)+TNHS
818.          DO 100 I=1,2
819.          A=H-XSM(I)
820.          IF((H-XSM(I)).LT.(100.0*G(I))) A=G(I)*ALOG(1.0+EXP((H-XSM(I))
821.         1/G(I)))
822.          B=HS-XSM(I)
823.          IF((HS-XSM(I)).LT.(100.0*G(I))) B=G(I)*ALOG(1.0+EXP((HS-XSM(I))
824.         1/G(I)))
825.    100   SUM=SUM+(MM(I+1)-MM(I))*(A-B)
826.          TI=SUM
827.          RETURN
828.          END

829.          REAL FUNCTION TEDER(H)
830.    C     THIS FUNCTION TOGETHER WITH THE SUBROUTINE REGFA1 IS USED TO FIND THE
831.    C     HEIGHT WHERE DIFFERENCE BETWEEN TN AND TI BEGINS
832.          REAL MM
833.          COMMON/BLOCK5/ZX,TNX,ATN,CTN(3)/BLOCK8/HS,TNHS,XSM(2),MM(3)
834.          TNH=TN(H,TNX,ATN,CTN)
835.          DTDX=DTNDH(H,ATN,CTN)
836.          TEDER=DTDX*(XSM(1)-H)+TNH
837.          RETURN
838.          END
839.    C     IV.  ION RELATIVE PRECENTAGE DENSITY


840.          REAL FUNCTION RPID (H, HO, NO, M, ST, ID, XS)
841.    C     THIS ANALYTIC FUNCTION IS USED TO REPRESENT THE RELATIVE
842.    C     PERCENTAGE DENSITY OF ATOMIC AND MOLECULAR OXYGEN IONS.
843.    C     THE M+1 HEIGHT GRADIENTS ST(M+1) ARE CONNECTED WITH EPSTEIN-
844.    C     STEP-FUNCTIONS AT THE STEP HEIGHTS XS(M) WITH TRANSITION
845.    C     THICKNESSES ID(M). RPID(HO,HO,NO,...)=NO.
846.    C     INSTEAD OF 88.0 YOU MUST USE THE HIGHEST ALLOWED ARGUMENT
847.    C     FOR EXP AT YOUR COMPUTER.
848.          REAL NO
849.          DIMENSION ID(4), ST(5), XS(4)
850.          SUM=(H-HO)*ST(1)
851.          DO 100  I=1,M
852.          A=H-XS(I)
853.          XI=FLOAT(ID(I))
854.          IF (A.LT.88.0*XI) A=XI*ALOG(1.0+EXP(A/XI))
855.          B=HO-XS(I)
856.    C
857.          IF (B.LT.88.0*XI) B=XI*ALOG(1.0+EXP(B/XI))
858.    100   SUM=SUM+(ST(I+1)-ST(I))*(A-B)
859.          SUM=NO*EXP(SUM)
860.          IF (SUM.LT.1.0E-10) SUM=0.0
861.          RPID=SUM
862.          RETURN
863.          END

864.          SUBROUTINE RDHHE (H,HB,RDOH,RDO2H,RNO,PEHE,RDH,RDHE)
865.    C     RAWER, OCT.79,H+ AND HE+ RELATIVE PERCENTAGE
866.    C     DENSITY FOR HEIGHTS NOT GREATER THAN 1000 KM.
867.    C     RNO IS THE RATIO OF NO+TO O2+DENSITY AT H=HB.
```

```
C       WHERE NO + PEAKS.
        IF (H-HB)100,100,200
100     RDH=0.0
        GOTO 300
200     RDH=(100.0-RDOH-(1.0+RNO)*RDO2H)*(1.0-PEHE/100.0)
300     RDHE=RDH*PEHE/(100.0-PEHE)
        RETURN
        END

        REAL FUNCTION RDNO(H,HB,RDO2H,RDOH,RNO)
C       D.BILTIZA, 1978. NO+RELATIVE PERCENTAGE
C       DENSITY FOR HEIGHTS NOT LESS THAN 100 KM.
        IF (H-HB) 100,100,200
100     Y=100.0-RDO2H-RDOH
        GOTO 300
200     Y=RNO*RDO2H
300     IF(Y.LT.0.0005) Y=0.0
        RDNO=Y
        RETURN
        END
C       END IRI-FUNCTIONS************************************************************


        REAL FUNCTION XMDED (XHI,R,XW)
C       BILITZA, 24.3.78, CALCULATES THE ELECTRON DENSITY OF
C       THE D REGION RELATIVE MAXIMUM. XHI IS THE SUN ZENITH ANGLE,
C       R THE ZUERICH SUNSPOT NUMBER AND XW THE DESIRED NIGHT VALUE
        Y=6.05+0.088*R
        YW=XW/1.0E8
        Z=(-0.1/(ALOG(YW/Y)))**0.3704
        SUXHI=ACOS(Z)
        IF (SUXHI.LT.1.0472) SUXHI=1.0472
        XXHI=XHI/57.2957795
        IF (XXHI.GT.SUXHI) GOTO 100
        X=COS(XXHI)
        XMDED=Y*1.0E8*EXP(-0.1/X**2.7)
        RETURN
100     XMDED=YW*1.0E8
        RETURN
        END

        REAL FUNCTION FOEEDI(R,XHI,XHIM,SLATI,ST,SU,SA)
C       BILITZA,17.5.1977,CALCULATES FOE BY THE EDINBURGH-METHOD.
C       INPUT@ COVINGTON-INDEX (COV), SOLAR ZENITH-ANGLE ACTUAL (XHI) AND FOR
C       MIDDAY (XHIM),LATITUDE (SLATI),SUNSET,AND SUNRISE (SU,SA/HOUR)
C       REF. KOURIS-MUGGLETON, CCIR DOC. 6/3/07 SEPT.73'
        XLATI=ABS(SLATI)
        COV=63.75+R*(0.728+0.00089*R)
        A=1.0+0.0094*(COV-66.0)
        SL=COS(XLATI*0.0174533)
        IF(XLATI.LT.32.0) GOTO 100
        SM=0.11-0.49*SL
        C=92.0+35.0*SL
        GOTO 400
100     SM=-1.93+1.92*SL
        C=23.0+116.0*SL
400     IF(XHIM.GT.89.0) XHIM=89.0
        B=COS(XHIM*0.0174533)**SM
        SP=1.31
        IF(XLATI.GT.12.0) SP=1.2
        DX=0.0
        IF(XHI.GT.73.0.AND.XHI.LE.90.0) DX=(6.27E-13)*(XHI-50.0)**8.0
        IF(ST.GT.SU) GOTO 300
        IF(ST.GT.SA) GOTO 600
        D=0.077**SP*EXP(-1.68*(SA-ST))
        GOTO 200
600     D=COS((XHI-DX)*0.0174533)**SP
        GOTO 200
300     D=0.077**SP*EXP(-1.01*(ST-SU))
200     FOE=A*B*C*D
        SP=1.0+0.0098*R
        SMIN=0.017*SP*SP
        IF(FOE.LT.SMIN) FOE=SMIN
        FOEEDI=(FOE)**0.25
        RETURN
        END
```

```
      REAL FUNCTION FOF1ED(YLATI,R,COSXHI)
C     D. BILITZA,CALCULATES FOF1 FOR DIP- LATITUDE YLATI,THE ZUERICH
C     SUNSPOT NUMBER R AND THE COSINUS OF THE SOLAR ZENITH ANGLE
C     COSXHI.
C     REF. E. D. DUCHARME E. A.,RADIO SCIENCE,8,837-839,1973
C     HOWEVER WITH MAGNETIC INSTEAD OF GEOMAGNETIC LATITUDE(EYFRIG,1979)
      XLATI=ABS(YLATI)
      FO=4.35+XLATI*(0.0058-(1.2E-4)*XLATI)
      F100=5.348+XLATI*(0.011-(2.3E-4)*XLATI)
      FS=FO+(F100-FO)*R/100.0
      XMUE=0.093+XLATI*(0.0046-(5.4E-5)*XLATI)+(3.0E-4)*R
      FOF1ED=FS*COSXHI**XMUE
      RETURN
      END


      REAL FUNCTION HMF2ED(XMAGBR,R,X,XM3)
C     D. BILITZA,CALCULATES HMF2 FOR THE MAGNETIC LATITUDE XMAGBR
C     AND THE ZUERICH SUNSPOT NUMBER R BY USING XM3 AND THE RATIO
C     X=FOF2/FOE.
C     REF. D. BILITZA ET. AL. TO BE PUBLISHED IN@ TELECOMM.J.'
      F1=(2.32E-3)*R+0.222
      F2=1.2-(1.16E-2)*EXP((2.39E-2)*R)
      F3=0.096*(R-25.0)/150.0
      DELM=F1*(1.0-R/150.0*EXP(-XMAGBR*XMAGBR/1600.0))/(X-F2)+F3
      HMF2ED=1490.0/(XM3+DELM)-176.0
      RETURN
      END


      SUBROUTINE REGFA1(X11,X22,EPS,FW,F,SCHALT,X)
C     REGULA-FALSI-PROCEDURE TO FIND X WITH F(X)-FW=0.X1,X2 ARE THE STARTING
C     VALUES.IF THE X-INTERVAL IS LESS EPS,THE PROCEDURE ENDS.
C     IF SIGN(1.0,F(X1)-FW)=SIGN(1.0,F(X2)-FW) SCHALT=TRUE.
      LOGICAL L1,LINKS,K,SCHALT
      SCHALT=.FALSE.
      X1=X11
      X2=X22
      F1=F(X1)-FW
      F2=F(X2)-FW
      IF(ABS(SIGN(1.0,F1)-SIGN(1.0,F2))-10E-10) 100,110,110
110    K=.FALSE.
      NG=2
200   X=(X1*F2-X2*F1)/(F2-F1)
      GOTO 400
300   L1=LINKS
      IF(LINKS) GOTO 500
      X=X1+FLOAT(NG-1)*(X2-X1)/FLOAT(NG)
      GOTO 400
500   X=X1+(X2-X1)/FLOAT(NG)
400   FX=F(X)-FW
      LINKS=SIGN(1.0,F1)*SIGN(1.0,FX).GT.0
      K=.NOT.K
      IF(LINKS) GOTO 600
      X2=X
      F2=FX
      GOTO 700
600   X1=X
      F1=FX
700   IF(ABS(X2-X1).LE.EPS) GOTO 800
      IF(K) GOTO 300
      IF((LINKS.AND.(.NOT.L1)).OR.(.NOT.LINKS.AND.L1)) NG=2*NG
      GOTO 200
100   X=0.0
      SCHALT=.TRUE.
800   RETURN
      END


      SUBROUTINE TAL(SHMAX,STMAX,SHABR,SDELTA,SHBR,STEO,SDTDHO,AUS6,SPT)
C     D. BILITZA,15.1.77,CALCULATION OF THE COEF. SPT(4) FOR A POLYNOM OF
C     5TH DEGREE (K1=1,K2=SPT(1),...,K5=SPT(4),WHICH FITS TO THE
C     VALLEY WITH THE PARAMETERS@ SHABR=HMIN-SHMAX,SDELTA IS THE
C     PERCENTAGE DEPTH,SHBR THE WIDTH,STEO THE UPPER FIXPOINT
C     NORMALISED TO STMAX AND SDTDHO IS THE LOGARITHMIC DEVIATION AT
C     THIS FIXPOINT.IF THERE IS A MINIMUM OR A SECOND MAXIMUM IN THE
```

```
      C     VALLEY REGION AUS6=.TRUE.
            DIMENSION SPT(4)
            LOGICAL AUS6
            X=SHABR
            Y=SHBR
            IF(SDELTA.LE.60.0) GOTO 100
            Z1=ALOG(1.0-SDELTA/100.0)/(X*X)
            Z2=ALOG(STEO)/(Y*Y)
            Z3=SDTDHO/(2.0*Y)
            GOTO 200
  100       Z1=-SDELTA/(X*X*100.0)
            Z2=(STEO-1.0)/(Y*Y)
            Z3=SDTDHO*STEO/(2.0*Y)
  200       Z4=X-Y
            SPT(4)=2.0*(Z1*(Y-2.0*X)*Y-Z2*(X-2.0*Y)*X+Z3*Z4*X)/(X*Y*Z4*Z4*Z4)
            SPT(3)=(Z1*(2.0*Y-3.0*X)+Z2*X)/(X*Z4*Z4)-(2.0*X+Y)*SPT(4)
            SPT(2)=-2.0*Z1/X-2.0*X*SPT(3)-3.0*X*X*SPT(4)
            SPT(1)=Z1-X*(SPT(2)+X*(SPT(3)+X*SPT(4)))
            AUS6=.FALSE.
            Z1=(4.0*SPT(3)+5.0*SPT(4)*X)/(10.0*SPT(4))
            Z2=Z1*Z1+2.0*SPT(1)/(5.0*SPT(4)*X)
            IF(Z2.LT.0.0) GOTO 300
            Z3=SQRT(Z2)
            Z2=-1.0*Z1+Z3
            IF(Z2.GT.0.0.AND.Z2.LT.Y) AUS6=.TRUE.
            Z2=-1.0*Z1-Z3
            IF(Z2.GT.0.0.AND.Z2.LT.Y) AUS6=.TRUE.
  300       RETURN
            END

            REAL FUNCTION XHIS(XMONTH,XHOUR,XLATI)
      C     CALCULATES THE SOLAR-ZENITH-ANGLE
            DAYNR=XMONTH*30.0-15.0
            SUNDEC=-0.40915*COS(1.7202E-2*(DAYNR+8.0))
            UMR=1.7453E-2
            COSXHI=SIN(XLATI*UMR)*SIN(SUNDEC) +COS(XLATI*UMR)*COS(SUNDEC)*
           1COS(2.6180E-1*(XHOUR-12.0))
            XHIS=ACOS(COSXHI)/UMR
            RETURN
            END

            SUBROUTINE GGM(ART,XLG,BG,XLM,BM)
      C     CALCULATES GEOMAGNETIC COORDINATES (XLM,BM) FROM GEOGRAFIC COORDINATES
      C     (XLG,BG) FOR ART=0 AND REVERSE FOR ART=1
            INTEGER ART
            ZPI=6.2831853
            FAKTOR=0.0174533
            CBG=11.4*FAKTOR
            CI=COS(CBG)
            SI=SIN(CBG)
            IF(ART.EQ.0) GOTO 10
            CBM=COS(BM*FAKTOR)
            SBM=SIN(BM*FAKTOR)
            CLM=COS(XLM*FAKTOR)
            SLM=SIN(XLM*FAKTOR)
            SBG=SBM*CI-CBM*CLM*SI
            BG=ASIN(SBG)
            CBG=COS(BG)
            SLG=(CBM*SLM)/CBG
            CLG=(SBM*SI+CBM*CLM*CI)/CBG
            XLG=ACOS(CLG)
            IF(SLG.LT.0.0) XLG=ZPI-ACOS(CLG)
            BG=BG/FAKTOR
            XLG=XLG/FAKTOR
            XLG=XLG-69.8
            IF(XLG.LT.0.0) XLG=XLG+360.0
            GOTO 20
   10       YLG=XLG+69.8
            CBG=COS(BG*FAKTOR)
            SBG=SIN(BG*FAKTOR)
            CLG=COS(YLG*FAKTOR)
            SLG=SIN(YLG*FAKTOR)
            SBM=SBG*CI+CBG*CLG*SI
            BM=ASIN(SBM)
            CBM=COS(BM)
            SLM=(CBG*SLG)/CBM
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1084.          CLM=(-SBG*SI+CBG*CLG*CI)/CBM
1085.          XLM=ACOS(CLM)
1086.          IF(SLM.LT.0.0) XLM=ZPI-ACOS(CLM)
1087.          BM=BM/FAKTOR
1088.          XLM=XLM/FAKTOR
1089.    20    RETURN
1090.          END


1091.          REAL FUNCTION SSRSU(HO)
1092.          REAL LATI,MONTH
1093.          COMMON/BL011/MONTH,LATI
1094.          SSRSU=XHIS(MONTH,HO,LATI)
1095.          RETURN
1096.          END


1097.          SUBROUTINE KOEFFB(FIELD)
1098.    C     TRANSFORMATION COEFFICIENTS G(1@144) VALID FOR 1973 FOR CALCULATING
1099.    C     THE MAGNETIC FIELD ACCORDING TO POGO 68/10
1100.          DIMENSION FIELD (144)
1101.          REAL FELD (144)
1102.          DATA (FELD(KK),KK=1,80)/0.0, 0.1506723,0.0101742, -0.0286519, 0.00 . 9
1103.         12606, -0.0130846, 0.0089594, -0.0136808,-0.0001508, -0.0093977,
1104.         2 0.0130650, 0.0020520, -0.0121956, -0.0023451, -0.0208555,
1105.         3 0.0068416,-0.0142659, -0.0093322, -0.0021364, -0.0078910,
1106.         4 0.0045586,  0.0128904, -0.0002951, -0.0237245,0.0289493,
1107.         5 0.0074605, -0.0105741, -0.0005116, -0.0105732, -0.0058542,
1108.         60.0033268, 0.0078164,0.0211234, 0.0099309, 0.0362792, -0.0201070,
1109.         7 -0.0046350, -0.0058722, 0.0011147, -0.0013949,
1110.         8 -0.0108838,  0.0322263, -0.0147390,  0.0031247, 0.0111986,
1111.         9 -0.0109394,0.0058112,  0.2739046, -0.0155682, -0.0253272,
1112.         1  0.0163782, 0.0205730,  0.0022081, 0.0112749,-0.0098427,
1113.         2 0.0072705, 0.0195189, -0.0081132, -0.0071889, -0.0579970,
1114.         3 -0.0856642, 0.1884260,-0.7391512, 0.1210288, -0.0241888,
1115.         4 -0.0052464, -0.0096312, -0.0044834, 0.0201764,  0.0258343,
1116.         50.0083033,  0.0077187,0.0586055,0.0102236, -0.0396107,
1117.         6 -0.0167860, -0.2019911, -0.5810815,0.0379916,  3.7508268/
1118.          DATA (FELD(KZ),KZ=81,144)/1.8133030,
1119.         7  -0.0564250, -0.0557352, 0.1335347, -0.0142641,
1120.         8 -0.1024618,0.0970994, -0.0751830,-0.1274948, 0.0402073,
1121.         9  0.0386290, 0.1883088,  0.1838960, -0.7848989,0.7591817,
1122.         1 -0.9302389,-0.8560960, 0.6633250, -4.6363869, -13.2599277,
1123.         2 0.1002136,  0.0855714,-0.0991981, -0.0765378,-0.0455264,
1124.         3  0.1169326, -0.2604067, 0.1800076, -0.2223685, -0.6347679,
1125.         40.5334222, -0.3459502,-0.1573697,  0.8589464, 1.7815990,
1126.         5-6.3347645, -3.1513653, -9.9927750,13.3327637, -35.4897308,
1127.         637.3466339, -0.5257398,  0.0571474, -0.5421217,  0.2404770,
1128.         7 -0.1747774,-0.3433644, 0.4829708,0.3935944, 0.4885033,
1129.         8  0.8488121, -0.7640999, -1.8884945, 3.2930784,-7.3497229,
1130.         9 0.1672821,-0.2306652, 10.5782146, 12.6031065, 8.6579742,
1131.         1 215.5209961, -27.1419220,22.3405762,1108.6394043/
1132.          K=0
1133.          DO 10 I=1,144
1134.          K=K+1
1135.    10    FIELD(K)=FELD(I)
1136.          RETURN
1137.          END


1138.          SUBROUTINE FIELDG(DLAT,DLONG,ALT,X,Y,Z,F,DIP,SMODIP)
1139.    C     THIS IS A SPECIAL VERSION OF THE POGO68/107
1140.    C     MAGNETIC FIELD LEGENDRE MODEL (IN GAUSS UNITS).
1141.    C     F IS TOTAL FIELD, Z THE (DOWNWARD) VERTICAL COMPONENT WHILE
1142.    C     X AND Y ARE COMPONENTS IN THE EQUATORIAL PLANE X TO ZERO LONGITUDE).
1143.    C     DIP=INCLINATION ANGLE/DEGREE. MODIP=RAWER'S MODFIED DIP.
1144.    C     REFERENCE@ METEOROLOGICAL   AND ASTRONOMICAL INFLUENCES ON
1145.    C     RADIO WAVE PROPAGATION. PERGAMON PRESS, 1963
1146.    C      INPUT@ DLAT, DLONG=GEOGRAPHIC COORDINATES/DEGREE, ALT=ALTITUDE/KM.
1147.    C     THE SET OF COEFFICIENTS IS GIVEN IN THE FOLLOWING PROCEDURE?
1148.          DIMENSION H(144),XI(3)
1149.          COMMON/BLOCK2/BO,B1,C1,HZ,T,G(144),HST,STR
1150.          RLAT=DLAT*0.0174533
1151.          CT=SIN(RLAT)
1152.          ST=COS(RLAT)
1153.          NMAX=11
```

```
1154.          D=SQRT(40680925.0-272336.0*CT*CT)
1155.          RLONG=DLONG*0.0174533
1156.          CP=COS(RLONG)
1157.          SP=SIN(RLONG)
1158.          ZZZ=(ALT+40408589.0/D)*CT/6371.2
1159.          RHO=(ALT+40680925.0/D)*ST/6371.2
1160.          XXX=RHO*CP
1161.          YYY=RHO*SP
1162.          RQ=1.0/(XXX*XXX+YYY*YYY+ZZZ*ZZZ)
1163.          XI(1)=XXX*RQ
1164.          XI(2)=YYY*RQ
1165.          XI(3)=ZZZ*RQ
1166.          IHMAX=NMAX*NMAX+1
1167.          LAST=IHMAX+NMAX+NMAX
1168.          IMAX=NMAX+NMAX-1
1169.          DO 100 I=IHMAX,LAST
1170.   100    H(I)=G(I)
1171.          DO 200 K=1,3,2
1172.          I=IMAX
1173.          IH=IHMAX
1174.   300    IL=IH-I
1175.          F1=2.0/FLOAT(I-K+2)
1176.          X1=XI(1)*F1
1177.          Y1=XI(2)*F1
1178.          Z1=XI(3)*(F1+F1)
1179.          I=I-2
1180.          IF((I-1).LT.0) GOTO 400
1181.          IF((I-1).EQ.0) GOTO 500
1182.          DO 600 M=3,I,2
1183.          H(IL+M+1)=G(IL+M+1)+Z1*H(IH+M+1)+X1*(H(IH+M+3)-H(IH+M-1))-Y1*
1184.         1(H(IH+M+2)+H(IH+M-2))
1185.          H(IL+M)=G(IL+M)+Z1*H(IH+M)+X1*(H(IH+M+2)-H(IH+M-2))+Y1*(H(IH+
1186.         1M+3)+H(IH+M-1))
1187.   600    CONTINUE
1188.   500    H(IL+2)=G(IL+2)+Z1*H(IH+2)+X1*H(IH+4)-Y1*(H(IH+3)+H(IH))
1189.          H(IL+1)=G(IL+1)+Z1*H(IH+1)+Y1*H(IH+4)+X1*(H(IH+3)-H(IH))
1190.   400    H(IL)=G(IL)+Z1*H(IH)+2.0*(X1*H(IH+1)+Y1*H(IH+2))
1191.   700    IH=IL
1192.          IF(I.GE.K) GOTO 300
1193.   200    CONTINUE
1194.          S=0.5*H(1)+2.0*(H(2)*XI(3)+H(3)*XI(1)+H(4)*XI(2))
1195.          XT=(RQ+RQ)*SQRT(RQ)
1196.          X=XT*(H(3)-S*XXX)
1197.          Y=XT*(H(4)-S*YYY)
1198.          Z=XT*(H(2)-S*ZZZ)
1199.          F=SQRT(X*X+Y*Y+Z*Z)
1200.          Z=-Z*CT-(Y*SP+X*CP)*ST
1201.          DIP=ASIN(Z/F)
1202.          SMODIP=ASIN(DIP/SQRT(DIP*DIP+ST))
1203.          DIP=DIP*57.2957795
1204.    9     SMODIP=SMODIP*57.2957795
1205.          RETURN
1206.          END


1207.          SUBROUTINE F2OUT(XMODIP,XLATI,XLONGI,XMAGBR,R,XMONTH,HOUR,FOE,
1208.         1XHMF2,FOF2)
1209.    C     D.BILITZA,20.8.78,CALCULATES XHMF2 AND NMF2 BY USING THE
1210.    C     CCIR-MAPS FOR FOF2 AND M3000.YOU HAVE TO ADJUST THE TAPE
1211.    C     READING PROCEDURE CCIRCA TO YOUR COMPUTER SYSTEM AND CCIR-TAPE
1212.          INTEGER QF(9),QM(7)
1213.          DIMENSION FF0(988)
1214.          REAL MM0(441)
1215.          DATA QF/11,11,8,4,1,0,0,0,0/,QM/6,7,5,2,1,0,0/
1216.          REWIND 15
1217.          LMONTH=IFIX(XMONTH)
1218.          CALL CCIRCA(R,LMONTH,FF0,MM0)
1219.          FOF2=GAMMA1(XMODIP,XLATI,XLONGI,.FALSE.,HOUR,6,QF,9,76,13,988,
1220.         1FF0)
1221.          XM3000=GAMMA1(XMODIP,XLATI,XLONGI,.FALSE.,HOUR,4,QM,7,49,9,441,
1222.         1MM0)
1223.          XHMF2=HMF2ED(XMAGBR,R,FOF2/FOE,XM3000)
1224.          RETURN
1225.          END
```

```
      REAL FUNCTION GAMMA1(SMODIP,SLAT,SLONG,UT,XHOUR,IHARM,NQ,K1,M,
     1MM,M3,SFE)
C     SHEIKH,4.3.77,CALCULATES FOF2 OR M3000 USING CCIR
C     NUMERICAL MAP COEFFICIENTS SFE(M,2*IHARM+1).
C     NQ(K1) IS AN INTEGER ARRAY GIVING NQ1,NQ2,NQ3,...AS HIGHEST
C     DEGREE OF LATITUDE FOR EACH LONGITUDE HARMONIC (IHARM).
C     M=1+NQ1+2(NQ2+1)+2(NQ3+1)+... .IF UT IS TRUE,THEN HOUR IS
C     TAKEN AS UNIVERSAL TIME,OTHERWISE IT IS ASSUMED AS LOCAL
C     TIME.
      DIMENSION NQ(K1),XSINX(13),COEF(100),C(12),S(12),SFE(M3)
      LOGICAL UT
      RD=57.2957795
      IF(UT) GOTO 100
      TIME=(15.0*XHOUR-180.0-SLONG)/RD
      GOTO 150
  100 TIME=(15.0*XHOUR-180.0)/RD
  150 S(1)=SIN(TIME)
      C(1)=COS(TIME)
      DO 250 I=2,IHARM
      C(I)=C(1)*C(I-1)-S(1)*S(I-1)
      S(I)=C(1)*S(I-1)+S(1)*C(I-1)
  250 CONTINUE
      DO 300 I=1,M
      COEF(I)=SFE((I-1)*MM+1)
      DO 300 J=1,IHARM
      COEF(I)=COEF(I)+SFE((I-1)*MM+2*J)*S(J)+SFE((I-1)*MM+2*J+1)*C(J)
  300 CONTINUE
      SUM=COEF(1)
      SS=SIN(SMODIP/RD)
      S3=SS
      XSINX(1)=1.0
      INDEX=NQ(1)
      DO 350 J=1,INDEX
      SUM=SUM+COEF(1+J)*SS
      XSINX(J+1)=SS
      SS=SS*S3
  350 CONTINUE
      XSINX(NQ(1)+2)=SS*S3
      NP=NQ(1)+1
      SS=COS(SLAT/RD)
      S3=SS
      DO 400 J=2,K1
      S0=SLONG*FLOAT(J-1)/RD
      S1=COS(S0)
      S2=SIN(S0)
      INDEX=NQ(J)+1
      DO 450 L=1,INDEX
      NP=NP+1
      SUM=SUM+COEF(NP)*XSINX(L)*SS*S1
      NP=NP+1
      SUM=SUM+COEF(NP)*XSINX(L)*SS*S2
  450 CONTINUE
      SS=SS*S3
  400 CONTINUE
      GAMMA1=SUM
      RETURN
      END


      SUBROUTINE CCIRCA(R,IMONTH,FOF2,SM3000)
C     THIS SUBROUTINE CALCULATES THE COEFFICIENTS ARRAYS FOF2(76,13) AND
C     SM3000(49,9) FOR SOLARACTIVITY (R) AND MONTH USING OUR SPECIAL CCIRFO-TAPE
      DIMENSION FOF2(988),SM3000(441),F2(13,76,2),FM3(9,49,2)
      DO 10 I=1,IMONTH
      READ(15,1)
    1 FORMAT( )
      READ(15,2) ((F2(L,M,1),M=1,76),L=1,13)
      READ(15,1)
      READ(15,2) ((F2(L,M,2),M=1,76),L=1,13)
      READ(15,1)
      READ(15,2) ((FM3(L,M,1),M=1,49),L=1,9)
      READ(15,1)
      READ(15,2) ((FM3(L,M,2),M=1,49),L=1,9)
    2 FORMAT(4(5X,E13.7))
   10 CONTINUE
      DO 20 I=1,76
```

```
      DO 20 J=1,13
      K=J+13*(I-1)
20    FOF2(K)=(F2(J,I,1)*(100.0-R)+F2(J,I,2)*R)/100.0
      DO 30 I=1,49
      DO 30 J=1,9
      K=J+9*(I-1)
30    SM3000(K)=(FM3(J,I,1)*(100.0-R)+FM3(J,I,2)*R)/100.0
      RETURN
      END


      SUBROUTINE KOEFFI(BOF)
C     COEFFICIENTS FOR BOTTOMSIDE F2 REGION ELECTRON DENSITY
      DIMENSION BOF(2,2,8)
      REAL FELD(32)
      DATA FELD/114.0,64.0,134.0,77.0,128.0,66.0,75.0,73.0,113.0,115.0,
     1150.0,116.0,138.0,123.0,94.0,132.0,72.0,84.0,83.0,89.0,75.0,85.0,
     257.0,76.0,102.0,100.0,120.0,110.0,107.0,103.0,76.0,86.0/
      L=0
      K=0
      DO 10 I=1,2
      DO 10 J=1,2
      DO 10 K=1,8
      L=L+1
10    BOF(I,J,K)=FELD(L)
      RETURN
      END


      SUBROUTINE  KOEFP1(PG10)
C     COEFFICIENTS PG10 FOR CALCULATING  O+ PROFILES
      DIMENSION PG10(80)
      REAL FELD (80)
      DATA FELD/-11.0,-11.0,4.0,-11.0,0.08018,
     160.13027,0.04216,0.25  ,-0.00686,0.00999,
     215.113,0.1 ,170.0,180.0,0.1175,0.15,-11.0,
     371.0 ,2.0,-11.0,0.069,0.161,0.254,0.18,0.0161,
     420.0216,0.03014,0.1,152.0,167.0,0.04916,
     580.17,-11.0,2.0,2.0,-11.0,0.072,0.092,0.014,0.21,
     630.01389,0.03863,0.05762,0.12,165.0,168.0,0.008,
     790.258,-11.0,1.0,3.0,-11.0,0.091,0.088,
     840.008,0.34,0.0067,0.0195,0.04,0.1,158.0,172.0,
     910.01,0.24,-11.0,2.0,3.0, -11.0,0.083,0.102,
     1050.045,0.03,0.00127,0.01,0.05,0.09,167.0,185.0,
     120.015,0.18/
      K=0
      DO 10 I=1,80
      K=K+1
10    PG10(K)=FELD(I)
      RETURN
      END


      SUBROUTINE KOEFP2(PG20)
C     COEFFICIENTS FOR CALCULATING O+ PROFILES ABOVE ITS PEAK
      DIMENSION PG20(32)
      REAL FELD(32)
      DATA FELD/1.0,-11.0,-11.0,1.0,695.0,-.000781,
     3-.00264,2177.0,1.0,-11.0,-11.0,2.0,570.0,
     1-.002,-.0052,1040.0,2.0,-11.0,-11.0,1.0,695.0,
     4-.000786,-.00165,3367.0,2.0,-11.0,-11.0,2.0,
     2575.0,-.00126,-.00524,1380.0/
      K=0
      DO 10 I=1,32
      K=K+1
10    PG20(K)=FELD(I)
      RETURN
      END


      SUBROUTINE  KOEFP3(PG30)
C     COEFFICIENTS FOR CALCULATING O2+ PROFILES
      DIMENSION PG30(80)
      REAL FELD(80)
      DATA FELD/-11.0,1.0,2.0,-11.0,160.0,31.0,130.0,
     9-10.0,198.0,0.0,0.05922,-0.07983,
```

```
1368.          1-0.00397,0.00085,-0.00313,0.0,-11.0,2.0,2.0,-11.0,
1369.          8140.0,30.0,130.0,-10.0,
1370.          2190.0,0.0,0.05107,-0.07964,0.00097,-0.01118,-0.02614,
1371.          7-0.09537,
1372.          3-11.0,1.0,3.0,-11.0,140.0,37.0,125.0,0.0,182.0,
1373.          60.0,0.0307,-0.04968,-0.00248,
1374.          4-0.02451,-0.00313,0.0,-11.0,2.0,3.0,-11.0,
1375.          5140.0,37.0,125.0,0.0,170.0,0.0,
1376.          50.02806,-0.04716,0.00066,-0.02763,-0.02247,-0.01919,
1377.          6-11.0,-11.0,4.0,-11.0,140.0,45.0,136.0,-9.0,
1378.          7181.0,-26.0,0.02994,-0.04879,
1379.          7-0.01396,0.00089,-0.09929,0.05589/
1380.           K=0
1381.           DO 10 I=1,80
1382.           K=K+1
1383.    10     PG30(K)=FELD(I)
1384.           RETURN
1385.           END


1386.           SUBROUTINE SUFE (FIELD,RFE,M,FE)
1387.    C      SPECIAL SUBROUTINE FOR CHOOSING THE DESIRED
1388.    C      ION DENSITY PARAMETER ARRAYS
1389.           DIMENSION RFE(4),FE(12),FIELD(80),EFE(4)
1390.           K=0
1391.      100  DO 101 I=1,4
1392.           K=K+1
1393.      101  EFE(I)=FIELD(K)
1394.           DO 111 I=1,M
1395.           K=K+1
1396.      111  FE(I)=FIELD(K)
1397.           DO 120 I=1,4
1398.           IF((EFE(I).GT.-10.0).AND.(RFE(I).NE.EFE(I))) GOTO 100
1399.      120  CONTINUE
1400.           RETURN
1401.           END


1402.           FUNCTION HPOL(XHOUR,TW,XNW,SA,SU)
1403.    C      D.BILITZA,1978 SPECIAL PROCEDURE FOR TIME-INTERPOLATION
1404.    C      USING EPSTEIN STEP FUNCTION OF ONE HOUR WIDTH (DAY/NIGHT FUNCTION).
1405.    C      TW,XNW ARE THE DAY AND NIGHT VALUE OF THE PARAMETER.
1406.    C      SA, SU ARE TIME (HOURS) OF SUNRISE AND SUNSET/HOUR
1407.           IF(ABS(SU-SA).GE.24.0) GOTO 100
1408.           HPOL=XNW+(TW-XNW)/(1.0+EXP(-(XHOUR-SA)/1.0))+(XNW-TW)
1409.          1/(1.0+EXP(-(XHOUR-SU)/1.0))
1410.           GOTO 200
1411.    100    HPOL=XNW
1412.           IF(SA.LT.1.0) HPOL=TW
1413.    200    RETURN
1414.           END


1415.           REAL FUNCTION XPOL(AA,XHOUR,SA,SU,DELL,IMONTH,R)
1416.    C      SPECIAL FUNCTION TO INTERPOLATE ARRAY AA(LATI,R,MONTH,HOUR)=
1417.    C      A(2,2,4,2) IN LATITUDE (LATI), SOLAR ACTIVITY (R) AND TIME (HOUR)
1418.           DIMENSION AA(2,2,8),SIPH(2),SIPL(2)
1419.           JMONTH=IMONTH*2
1420.           DO 10 ISR=1,2
1421.           DO 15 ISLAT=1,2
1422.    15     SIPH(ISLAT)=HPOL(XHOUR,AA(ISLAT,ISR,JMONTH-1),AA(ISLAT,ISR,
1423.          1JMONTH),SA,SU)
1424.           SIPL(ISR)=SIPH(1)+(SIPH(2)-SIPH(1))/DELL
1425.    10     CONTINUE
1426.           XPOL=SIPL(1)+(SIPL(2)-SIPL(1))/90.0*(R-10.0)
1427.           RETURN
1428.           END


1429.           FUNCTION EPSTEP(BE,AB,TH,FIX,COSI)
1430.    C      EPSTEIN STEP FUNCTION = TRANSITION WITH THICKNESS TH BETWEEN
1431.    C      BE AND AB CENTERED WHERE VARIABLE COSI EQUALS FIX
1432.           EPSTEP=AB+(BE-AB)/(1.0+EXP(-(COSI-FIX)/TH))
1433.           RETURN
1434.           END
```

5.1 Subroutine IONDEM

Subroutine IONDEM from *IRI 1978*, not available from WDC-A for STP.

```
      SUBROUTINE IONDEM(R,XMLAT,XMLONG,DIP,XLATI,HOUR,XMONTH,FOF2,HMF2)
C     SHEIKH,BILITZA, 25.8.78,CALCULATES THE HEIGHT AND DENSITY OF THE
C     F2-MAXIMUM BY USING THE CHING-CHIU-MODEL
C     (REF.CHIU,JATP,37, 1563-1570, 1975 AND PRIVATE COMMUNICATION)
      TMO=XMONTH
      IF(XMONTH.GT.11.0) TMO=0.0
      PHI=0.2618*HOUR
      RLATM=XMLAT*0.017453295
      RLAT=XLATI*0.017453295
      RLONGM=XMLONG*0.017453295
      DIPGM=DIP*0.017453295
      AMP=0.66
      ALF=1.0
      PI=3.141592654
      SDEC=0.39795*SIN(PI*(TMO-3.167)/6.0)
      DEC=ARSIN(SDEC)
      DELP=ABS(ABS(RLAT)-PI/2.0)
      IF(DELP.GT.1.0E-3) GOTO 100
      SEASN=RLAT*DEC
      IF(SEASN.LT.0.0) PHI=0.0
      IF(SEASN.GE.0.0) PHI=PI
  100 VAR=TVARF2(RLATM,RLONGM,DIPGM,PHI,DEC,TMO,R)
      ZALF=-4.5*ABS(RLATM)-PI
      ZBAR=240.0+0.75*R+0.83*R*COS(RLATM)*SIN(DEC)*SIN(RLATM)
      ZMAX=ZBAR+30.0*COS(PHI+ZALF)+10.0*COS(RLATM)*
     1COS(PI*(TMO-4.5)/3.0)
C     HMF2 NACH CHIU 1975
      HMAX=0.2*ZMAX+40.0
      HMF2=ZMAX
      FOF2=SQRT(AMP*VAR/0.124)
      RETURN
      END
      FUNCTION TVARF2(RLATM,RLONGM,DIPGM,PHI,DEC,TMO,R)
      PI=3.141592654
      PI3=PI/3.0
      SINLM=SIN(RLATM)
      RT3=-COS(PI3*TMO)+COS(PI3*TMO/2.0)
      RR=0.01*R
      ALAT=ABS(RLATM)
      AQ=COS(RLATM)
      REQ=1.0-0.2*RR+0.6*SQRT(RR)
      SD=SIN(DEC)*SIN(RLATM)
      FF=EXP(-ABS(X)**6.0)
      GG=1.0-FF
      CPD=COS(PHI-0.873)
      EF=COS(PHI+PI/4.0)
      EMF=EF*EF
      ADIUR=(0.9+0.32*SD)*(1.0+SD*EMF)
      BQ=COS(ALAT-0.2618)
      AQE=ABS(AQ)**8.0
      AQT=AQE*AQ*AQ
      AEQ=AQE*REQ*EXP(0.25*(1.0-CPD))
      VEQ=(1.0-0.4*AQT)*(1.0+AEQ*ABS(BQ)**12.0)*
     1(1.025+0.05*RT3)*(1.0+0.6*AQT*EMF)
      VDIUR=ADIUR*EXP(-1.1*(CPD+1.0))
      VLAT=EXP(3.0*COS(RLATM*(SIN(PHI)-1.0)/2.0))
      VLAT=VLAT*(1.2-0.5*AQ*AQ)
      RT1=12.0*RLATM+4.0*PI3
      RT2=TMO/2.0-3.0
      VLAT=VLAT*(1.0+0.05*RR*SINLM*SINLM*SINLM*COS(PI3*TMO/2.0))*
     1(1.0-0.15*EXP(-SQRT(RT1*RT1+RT2*RT2)))
      RFUNC=1.0+RR+0.204*RR*RR+0.03*RR*RR*RR
      IF(RR.LE.1.1) GOTO 100
      CQ=1.53*(1.0-AQ*AQ)
      RFUNC=2.39+CQ*(RFUNC-2.39)
  100 VUT=YONII(RLATM,PHI,TMO,DEC,R,RFUNC)
      XXLONG=1.0+0.1*AQ*AQ*AQ*COS(2.0*(RLONGM-7.0*PI/18.0))
      GM1=1.015+0.03*RT3
      SINLM2=SIN(RLATM/2.0)
      XML=ABS(DIPGM)-2.0*PI/9.0
      G=0.15-(1.0+RR)*SINLM2*SINLM2*EXP(-0.33*(TMO-6.0)
     1*(TMO-6.0))
      DDEL3=GM1*(1.0+G*EXP(-18.0*XML*XML))
C
C     CORRECTED ACCORDING TO THE PROGRAM RECIVED FROM CHIU
C
      RT1=PI*TMO/12.0
      RT2=SIN(RT1)
      RT3=COS(2.0*RT1)
      DEL3=SIN(RLONGM/2.0)
      G=COS(RLONGM/2.0-PI/20.0)
      GM1=ABS(G)**4.0
      SINLM=SIN(RLONGM)
      SINLM2=SQRT(ABS(SINLM))
      XML=DEC
      DEC=-23.5*PI/180.0
      IF(RLATM.GE.0.0) GOTO 200
      XLONGM=RT2*(0.5*DEL3-0.5*SINLM-ABS(DEL3)
     1**8.0)-(1.0+RT2)*RT3*SINLM/3INLM2*EXP(-4.0*DEL3*DEL3)
      POLER=2.5+2.0*RR+RT3*(0.5+(1.3+0.2*RR)*GM1)+(1.3+0.5
     1*RR)*COS(PHI-PI*(1.0+XLONGM))
      POLER=POLER*(1.0+0.4*(1.0-RT2*RT2)*EXP(-GM1*RT2))
      GOTO 300
  200 POLER=(2.0+1.2*RR)*W(1.2,RLATM,PHI, DEC)*(1.0+0.3*RT2)
  300 DEC=XML
      F2=VDIUR*VLAT*VUT*VEQ*RFUNC*XXLONG*DDEL3
      TVARF2=FF*POLER+GG*F2
      RETURN
      END
```

```
      FUNCTION YONII(RLATM,PHI,TMO,DEC,R,RFUNC)
      PI=3.141592654
      B=1.3+0.139*((R/100.0)**2.0)*(1.0+COS(RLATH-PI/4.0))
     1+0.0517*((R/100.0)**3.0)
      D13=1.0/RFUNC
      W1=PI/6.0
      W2=W1+W1
      DE=0.1778*((R/100.0)**2.0)
      ALAT=ABS(RLATM)
      SNX=SIN(ALAT-0.5235988)
      AE=0.2*(1.0-SNX)
      BLAT=ABS(ALAT-PI/9.0)
      SX=SIN(BLAT)
      FE=0.13-0.06*SX
      YAM=COS(RLATM+DEC)
      CPHG=COS(PHI)
      XTC=(SIGN(1.0,YAM)*ABS(YAM)**3.0)*((1.0-CPHG)**0.25)
      YTC=-(0.15+0.3*SIN(ALAT))*XTC
      T1=AE*(1.0+0.6*COS(W2*(TMO-4.0)))*COS(W1*(TMO-1.0))
      XXX=COS(PI*(TMO-2.0)/12.0)
      XXXX=COS(PI*(TMO-8.0)/12.0)
      T2=0.7*(1.0+0.085*(COS(RLATM-W1)*(SIGN(1.0,XXX)*ABS(XXX)**3.0)
     1+COS(RLATH+PI/4.0)*(ABS(XXXX)**2.0))+DE*COS(
     2W2*(TMO-4.3))/RFUNC)*W(B,RLATM,PHI,DEC)
      T3=FE*COS(W2*(TMO-4.5))+YTC
      T4=(T1+T3)*D13+T2
      IF(T4.LT.0.0) T4=0.0
      YONII=T4
      RETURN
      END

      FUNCTION W(B,XI,ETAS,DEC)
      P=XI+DEC*COS(ETAS)
      W=EXP(-B*(COS(P)-COS(XI)))
      RETURN
      END
```

Replace CALL F2OUT (MODIP, LATI, LONGI, MAGBR, R, MONTH, HOUR, FOE, HMF2, FOF2)

by IONDEM (R, MLAT, MLONG, DIP, LATI, HOUR, MONTH, FOF2, HMF2)

at the beginning of the program part

' CALCULATION OF ELECTRON DENSITY PARAMETERS '

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