AD A012509

AFCRL-TR-75-0185
ENVIRONMENTAL RESEARCH PAPERS, NO. 503

Tables of Asymptotic Directions and Vertical Cutoff Rigidities for a Five Degree by Fifteen Degree World Grid as Calculated Using the International Geomagnetic Reference Field for Epoch 1975.0

M. A. SHEA
D. F. SMART

DDC
RECEIVED
JUL 23 1975
B

3 April 1975

Approved for public release; distribution unlimited.

SPACE PHYSICS LABORATORY PROJECT 8600
AIR FORCE CAMBRIDGE RESEARCH LABORATORIES
HANSCOM AFB, MASSACHUSETTS 01731

AIR FORCE SYSTEMS COMMAND, USAF

Best
Available
Copy

Qualified requestors may obtain additional copies from the Defense Documentation Center. All others should apply to the National Technical Information Service.

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: AFCRL-TR-75-0185

2. GOVT ACCESSION NO.

3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and Subtitle): TABLES OF ASYMPTOTIC DIRECTIONS AND VERTICAL CUTOFF RIGIDITIES FOR A FIVE DEGREE BY FIFTEEN DEGREE WORLD GRID AS CALCULATED USING THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD FOR EPOCH 1975.0

5. TYPE OF REPORT & PERIOD COVERED

6. PERFORMING ORG. REPORT NUMBER: ERP No. 503

7. AUTHOR(s): M. A. Shea, D. F. Smart

8. CONTRACT OR GRANT NUMBER(s)

9. PERFORMING ORGANIZATION NAME AND ADDRESS: Air Force Cambridge Research Laboratories (PHE), Hanscom AFB, Massachusetts 01731

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: 860007[redacted] 681311, 61102F

11. CONTROLLING OFFICE NAME AND ADDRESS: Air Force Cambridge Research Laboratories (PHE), Hanscom AFB, Massachusetts 01731

12. REPORT DATE: 3 Apr[redacted]75

13. NUMBER OF PAGES: 166

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)

15. SECURITY CLASS. (of this report): Unclassified

15a. DECLASSIFICATION DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Cosmic radiation
Vertical cutoff rigidities
Geomagnetic field models
Asymptotic directions of approach

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Tables of asymptotic directions and vertical cutoff rigidities for a five degree by fifteen degree world grid are presented. These values were obtained by the integration of vertically incident cosmic-ray trajectories through the International Geomagnetic Reference Field with time derivatives applied so that the coefficients form a quiescent model of the geomagnetic field for Epoch 1975.0. The table of asymptotic directions contains the asymptotic latitudes and longitudes which specify the direction of approach,

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

20. Abstract (Cont)

from interplanetary space, of a cosmic-ray particle. These asymptotic directions are given for each grid point for specific rigidities above the main cone cutoff rigidity. The table of vertical cutoff rigidities contains the geographic coordinates and L value of each location together with the main cone cutoff rigidity, the Störmer cutoff rigidity, and the effective cutoff rigidity.

Preface

This is the fifth in a set of reports presenting, in tabular form, the results of utilizing high speed digital computers to calculate, by the trajectory-tracing method, the motion of charged particles in a mathematical simulation of the internal geomagnetic field. The principal results of these extensive calculations, which have been made over the past 15 years, have been the determination of the geomagnetic cutoff rigidity for specific locations on the earth and the determination of the asymptotic directions of the cosmic rays arriving at these locations from specific directions.

It is the intent of the authors to assemble these values in a group of reports so that they will be available to the scientific community both for analysis of scientific data and for comparison with other similar values that may become available by more sophisticated methods. The first four reports in this set presented various tables of asymptotic directions and cutoff rigidities for Epochs 1955 and 1960. This report contains tables of trajectory-derived asymptotic directions and vertical cutoff rigidities for a world grid as calculated employing a geomagnetic field model formed by the International Geomagnetic Reference Field coefficients with time derivatives appropriate for Epoch 1975.0.

AIR FORCE (1) JUNE 13, 1975--878

Contents

1. INTRODUCTION 7

2. COSMIC-RAY ASYMPTOTIC DIRECTIONS 8

3. VERTICAL CUTOFF RIGIDITIES 14

REFERENCES 17

APPENDIX A: Table of Asymptotic Directions for the World Grid as Calculated Utilizing the International Geomagnetic Reference Field for Epoch 1975.0 21

APPENDIX B: Table of Vertical Cutoff Rigidities for a World Grid Calculated Utilizing the International Geomagnetic Reference Field for Epoch 1975.0 155

Illustrations

1. Illustration of the Definition of the Asymptotic Direction of Approach 12

PRECEDING PAGE BLANK-NOT FILMED

Tables of Asymptotic Directions and Vertical Cutoff Rigidities for a Five Degree by Fifteen Degree World Grid as Calculated Using the International Geomagnetic Reference Field for Epoch 1975.0

1. INTRODUCTION

The knowledge of the asymptotic direction of a cosmic-ray particle and the cutoff rigidity of an observation point on the earth is often necessary and sometimes essential for a meaningful analysis of various problems in cosmic-ray physics. The asymptotic direction of a particle having a specific rigidity is the direction in interplanetary space from which the particle comes prior to its interaction with the earth's magnetic fields, and is a primary means of relating cosmic-ray intensity variations at the earth with the direction of these particles in interplanetary space.[1] The cutoff rigidity of a specific location on the earth is the rigidity below which cosmic rays are inaccessible to that location.[2,3]

Since both the asymptotic directions and the cutoff rigidities are a function of geographic location, zenith and azimuthal angles, and the calculation of these values involves considerable computational time, it is impractical to determine

(Received for publication 2 April 1975)

1. McCracken, K.G. (1962) The cosmic-ray flare effect. 1. Some new methods of analysis, J. Geophys. Res. 67:423.
2. Störmer, C. (1930) Periodische Elektronenbahen im Felde eines Elementarmagneten und ihre Anwendung auf Brüches Modellversuche und auf Eschenhagens Elementarwellen des Erdmagnetismus, Z. Astrophys. 1:237-274.
3. Rossi, B. (1940) System of units for nuclear and cosmic-ray phenomena, Phys. Rev. 57:660.

PRECEDING PAGE BLANK-NOT FILMED

the values for an unlimited number of locations and directions on the earth. During the past 15 years the use of high-speed digital computers has allowed a limited number of these calculations to be made, with most of these calculations being made for specific analyses and for specific cosmic-ray stations.[4-9]

We have been using the trajectory-tracing technique to compute the asymptotic directions of cosmic-ray particles and cutoff rigidities for several years. Many of these values have been published in various tables,[7-12] while the remaining majority of values have been utilized primarily in various analyses.[13-20] Throughout this work we have maintained a composite listing of all locations for which we have made these calculations. The purpose of this set of publications is to present, in tabular form, listings of asymptotic directions and cutoff rigidities calculated using the trajectory-tracing method. The first four publications in this set[21-24] contained the results of the extensive cutoff rigidity calculations made using the Finch and Leaton[25] (Epoch 1955.0) internal geomagnetic field model, as well as a smaller set of results obtained using the Jensen and Cain[26] (Epoch 1960.0) field coefficients. This report contains the asymptotic directions, in condensed form, for a world grid with grid points 5 degrees in latitude and 15 degrees in longitude as calculated utilizing the International Geomagnetic Reference Field[27] (IGRF) with time derivatives applied so that the coefficients for the field model are appropriate for a 1975.0 Epoch. These asymptotic directions are given in Appendix A, with a summary of the vertical cutoff rigidities for each of the world grid locations given in Appendix B.

2. COSMIC-RAY ASYMPTOTIC DIRECTIONS

In the various studies of cosmic radiation, it is often necessary to know the direction of particle motion in the interplanetary magnetic field near the earth in order to relate the intensity observations at a specific location, azimuth, and zenith angle on the earth to an interplanetary flux. With this purpose in mind, the concept of asymptotic directions of approach has been developed over the years by researchers such as Malmfors,[28] Brunberg,[29,30] Brunberg and Dattner,[31] and McCracken.[1] The asymptotic direction of approach defines the direction of a velocity vector in geocentric coordinates such that the direction of this vector is parallel to a radial from the earth's center. Accurate numerical calculations of the asymptotic directions of approach have long been advocated,[28,32,33] however, the earlier work was limited to dipolar field models because of the complexity

Due to the large number of references in the above text, refer to the list of references at the end of this report for specific information on references 4 thru 33.

of the problem.[30,34,35] The advent of high-speed digital computers made it possible to construct relatively accurate mathematical models of the geomagnetic field and to integrate the equation of charged particle motion in these magnetic field models. The standard method for representing the magnetic field is to define a magentic potential function U in terms of a spherical harmonic expansion. In spherical coordinates this function is:

$$U(r,\theta,\phi) = a \sum_{n=0}^{\infty} \sum_{m=0}^{n} \left(g_n^m \cos m\phi + h_n^m \sin m\phi\right) P_n^m(\cos\theta)\left(\frac{a}{r}\right)^{n+1}$$

where g_n^m and h_n^m are the Gauss coefficients, $P_n^m(\cos\theta)$ are the partially normalized Legendre functions, and a is the average radius of the earth. This method is described adequately by Chapman and Bartles[36] and is the method commonly used for constructing models of the geomagnetic field. The magnetic field vector, $\bar{B}$, may be computed at any point where the potential function is valid by obtaining the derivatives of the potential function:

$$\bar{B}_r = -\frac{\partial U(r,\theta,\phi)}{\partial r}$$

$$\bar{B}_\theta = -\frac{1}{r}\frac{\partial U(r,\theta,\phi)}{\partial \theta}$$

$$B_\phi = \frac{-1}{r\sin\theta}\frac{\partial U(r,\theta,\phi)}{\partial \phi} .$$

The equation for charged particle motion in a magnetic field, in vector form, is

$$\dot{\bar{R}} = \frac{e}{mc}\,\bar{R}\times\bar{B}.$$

In spherical coordinates this equation expands to the following differential equations:

34. Jory, F. S. (1956) Selected cosmic-ray orbits in the earth's magnetic field, Phys. Rev. 103:1068.

35. Lust, R. (1957) Impact zones for solar cosmic-ray particles, Phys. Rev. 105: 1827.

36. Chapman, S., and Bartels, J. (1951) Geomagnetism Vol. 2, Oxford Univ. Press, London.

$$\frac{dv_r}{dt} = \frac{e}{mc}\left(v_\theta B_\phi - v_\phi B_\theta\right) + \frac{v_\theta^2}{r} + \frac{v_\phi^2}{r}$$

$$\frac{dv_\theta}{dt} = \frac{e}{mc}\left(v_\phi B_r - v_r B_\phi\right) - \frac{v_r v_\theta}{r} + \frac{v_\theta^2}{r \tan\theta}$$

$$\frac{dv_\phi}{dt} = \frac{e}{mc}\left(v_r B_\theta - v_\theta B_r\right) - \frac{v_r v_\phi}{r} - \frac{v_\theta v_\phi}{r \tan\theta}$$

where,

$$\frac{dr}{dt} = v_r$$

$$\frac{d\theta}{dt} = \frac{v_\theta}{r}$$

$$\frac{d\phi}{dt} = \frac{v_\phi}{r \sin\theta} .$$

In these equations we use the following notation:

$\bar{R}$	position vector of a cosmic-ray particle
r	radial distance from the center of the earth
θ	co-latitude
ϕ	longitude measured eastward from the Greenwich meridian
v	magnitude of particle velocity
v_r, v_θ, v_ϕ	velocity components in r, θ, and ϕ directions
c	velocity of light
m	inertial mass of cosmic-ray particle, $m = m_o \left(1 - \frac{v^2}{c^2}\right)^{-\frac{1}{2}}$, where m_o is the rest mass
$\bar{B}$	vector magnetic induction in Gauss
e	cosmic-ray charge in esu.

Since the general equation of particle motion in a magnetic field does not have a solution in closed form, it is necessary to employ numerical methods to determine the trajectory of a charged particle in the geomagnetic field. With the advent of high-speed digital computers, it became possible to obtain an

accurate solution to this problem for a specified field model, rigidity, and initial conditions. A particular Gill[37] modification of the Runge Kutta iteration method, as adapted by McCracken,[1,38] became the standard method of tracing charged particle trajectories through the geomagnetic field. In this process, a knowledge of the position and velocity coordinates of one point on the trajectory is used, in conjunction with the differential equations, to give the coordinates of a subsequent point on the trajectory. Repeated application gives sufficient points to define the trajectory.

In the trajectory-tracing process we utilize the fact that the orbit of a negatively charged particle leaving outward from the earth from a specific location and direction is identical to the orbit of a positive particle of equal rigidity approaching the earth, and ultimately arriving at the same location in the same direction. Programs and methods that use the differential equation of motion to determine the trajectory of a charged particle in the geomagnetic field by using the numerical integration technique have been published several times and will not be repeated here.[7,8,38-40]

In practice we wish to integrate the trajectory utilizing the minimum number of calculations. This involves a compromise between choosing the largest step size to minimize computer time and the necessity of using a small step size in the Runge-Kutta process to keep the error within acceptable limits. For these calculations of the 1975 world grid, we replaced the library of step sizes provided in the original McCracken program[38] with a computed step size that is between 1/25 and 1/50 of the distance traveled during one gyration. In a uniform field the time required for one gyration is

$$\frac{33.33\ P}{B}\ \left(\frac{2\pi}{\beta c}\right),$$

---

37. Gill, S. (1951) A process for the step-by-step integration of differential equations in an automatic digital computing machine. Proc. Cambridge Phil. Soc. 47:96.

38. McCracken, K.G., Rao, U.R., and Shea, M.A. (1962) The trajectories of cosmic rays in a high degree simulation of the geomagnetic field. M.I.T. Tech. Rept No. 77, NYO-2670.

39. Shea, M.A., Smart, D.F., and McCracken, K.G. (1965) A study of vertically incident cosmic-ray trajectories using sixth-degree simulations of the geomagnetic field. AFCRL Environmental Research Papers No. 141, AFCRL-65-705.

40. Shea, M.A., Smart, D.F., McCracken, K.G., and Rao, U.R. (1968) Supplement to IQSY Instruction Manual No. 10, cosmic ray tables - asymptotic directions, variational coefficients and cutoff rigidities. AFCRL Spec. Reports No. 71, AFCRL-68-0030.

where P is in units of GV, e is in units of kr/sec, and β is the ratio between the particle velocity and the speed of light. If the distance traveled during a gyration is divided into 50 steps, then the step size, H, in units of time, is approximately

$$\frac{1.5 \cdot 10^{-5} P}{H\beta} \text{ seconds.}$$

Since the earth's magnetic field is not uniform, we recomputed the step length for each Runge Kutta iteration step. At each step the velocity of the particle was checked, and if the current value of β differed from the initial value by more than $1 \cdot 10^{-5}$, the integration was declared unacceptable and the trajectory recomputed with the previous step size, H, divided in half.

In the original work,[38] before the existence of the interplanetary magnetic field was verified, the orbit of a charged particle was traced through the geomagnetic field to a distance sufficiently far from the earth (selected as 25 earth radii by McCracken) that the effects of the geomagnetic field on the orbit became essentially insignificant. At this point the direction of motion of the particle was calculated in terms of the geocentric coordinate system as illustrated in Figure 1. The "asymptotic latitude", Λ, is given by

$$\tan \Lambda = \frac{-v_\theta \sin \theta + v_r \cos \theta}{\left[v_\phi^2 + (v_\theta \cos \theta + v_r \sin \theta)^2\right]^{1/2}}$$

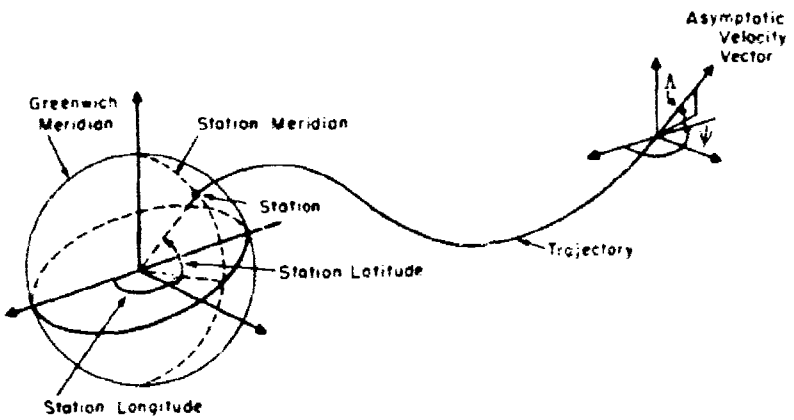

Figure 1. Illustration of the Definition of the Asymptotic Direction of Approach

and the "asymptotic longitude", ι, by

$$\iota = \theta - \arctan\left(\frac{v_\phi}{v_\theta \cos\theta + v_r \sin\theta}\right).$$

In light of the current knowledge of the magnetosphere and the magnetospheric tail, the original definition of the asymptotic direction of approach has been somewhat modified to mean the direction (in geocentric coordinates) of the velocity vector of the cosmic ray when it penetrates the magnetopause or at some arbitrary distance down the magnetospheric tail. For cosmic-ray trajectories with rigidities far above the cutoff rigidity, the computed asymptotic directions of approach at the position of the magnetopause obtained using a magnetospheric field model and those calculated using only an internal field are very similar. For cosmic-ray trajectories having rigidities 2 to 3 GV above the cutoff rigidity (or ~ 5 GV for the very high polar latitudes), significant differences occur between the asymptotic directions computed using only internal fields and those computed using magnetospheric models containing both the magnetic fields of internal origin and those due to currents on the magnetopause and the magnetospheric tail.[41] Near the cosmic-ray cutoff rigidity, the asymptotic directions of approach of cosmic rays with rigidities of only a few GV computed with an internal field, have relatively little correspondence to those calculated using magnetospheric models.

The asymptotic directions contained in Appendix A of this report are intended as a reference standard for Epoch 1975.0. These calculations were made using the International Geomagnetic Reference Field[27] model of the quiescent internal geomagnetic field with the time derivatives applied such that the coefficients were appropriate for describing the geomagentic field for Epoch 1975.0. The calculations were initiated at 20 km above the surface of an oblate earth where the radius of the earth $r_{(initial)}$ is given by

$$r_{(initial)} = \left\{\frac{1}{a}\, b\left[1 - \epsilon^2 \cos^2\lambda\right]^{-1/2} + 20.0\right\}.$$

In this equation b is the minimum (polar) radius of the earth (6356.9 km), ϵ is the eccentricity ($\epsilon^2 = 6.725 \times 10^{-3}$) and a is the average radius of the earth (6371.2 km). Calculations were continued to a distance of 25 earth radii, at which time the asymptotic directions of approach were computed. For a number of cosmic-ray

41. Gall, Ruth, Jiménez, J., and Orozco, A. (1969) Directions of approach of cosmic rays for high latitude stations, J. Geophys. Res. 74:3529.

studies these asymptotic directions are quite useful in ascertaining the amount of geomagnetic bending cosmic rays undergo before arriving at a specific location on the earth. These tables are limited to the vertical direction with 20 GV as the highest rigidity contained. Except for locations near the equator, higher rigidities have asymptotic directions for vertically incident particles that approach the vector radial.

In our research utilizing asymptotic directions of approach for cosmic-ray studies, we find that the asymptotic directions of vertically incident particles are a reasonable approximation to the entire asymptotic cone of acceptance except for rigidities $\gtrsim 10$ GV above the cosmic-ray cutoff rigidity of a specific location. At rigidities where the gyro radius of the particle is small compared to the radius of the earth, the trajectories of all other azimuths and zeniths angles are similar to the vertical trajectory with a phase angle displacement which accounts for the initial pitch angle. This is sometimes referred to as the focusing effect of the geomagnetic field.

The asymptotic directions of approach presented in Appendix A are at standardized intervals of 1 GV from a magnetic rigidity of either 10 or 20 GV (dependent upon location) down to near the main cone cutoff rigidity. Approximately 0.5 GV above the main cone cutoff rigidity, the geomagnetic bending is more extensive and asymptotic directions are given in 0.1 GV intervals. Very near the main cone cutoff rigidity, asymptotic directions are given at 0.01 GV intervals. This report does not include the asymptotic directions of the allowed trajectories in the penumbra; however, the results of the trajectory calculations at 0.01 GV intervals through the penumbra, including the asymptotic directions for the allowed rigidities, are contained on magnetic tape available through the World Data Centers.

3. VERTICAL CUTOFF RIGIDITIES

Cosmic ray cutoff rigidities are obtained by determining the "fate" (whether an individual rigidity has a trajectory accessible from infinity or is forbidden) of cosmic-ray trajectories over the entire rigidity spectrum. Starting at a rigidity high above the highest possible cutoff, cosmic-ray trajectories are calculated at discrete intervals, decreasing in rigidity until we are satisfied that the cutoff has been reached. As the calculations progress down through the rigidity spectrum, the results change from the easily allowed orbits to a complex structure of allowed, forbidden, and quasi-trapped orbits (loosely called penumbra), and finally to a set of rigidities where the trajectories all intersect the solid earth. As a result of these type of trajectory calculations, we can define three

distinct rigidities: the main cone cutoff, P(M), above which all rigidities are allowed, the Störmer cutoff, P(S), below which all rigidities are forbidden, and an effective cutoff rigidity, PC, which we have defined as

$$PC = P(M) - \left[\int_{P(S)}^{P(M)} dP \right]_{allowed} ,$$

thus allowing for the opacity of the penumbra. A detailed definition of these effective cutoffs has been published,[8] and the effect of different spectral slopes and coupling functions has been investigated by Dorman et al.[42] In the penumbral region of allowed and forbidden orbits, calculations were made at discrete 0.01 GV intervals in an effort to define the structure within this region.

There is an inherent hazard in using the trajectory-tracing method to determine the structure within the penumbra in that some of the allowed rigidities may not be found due to a systematic limitation resulting from performing the trajectory calculations at discrete intervals. In our work we have made the specific assumption that if a trajectory is accessible (or forbidden) at a rigidity P_i, then this result is applicable over the intervals between $P_i \pm \Delta P/2$ where ΔP is the size of the rigidity interval. However, we recognize that the penumbra consists of a very complex structure of allowed and forbidden bands, and this structure is most certainly finer than the 0.01 GV intervals employed. Consequently, calculations down the rigidity spectrum at finite discrete intervals might miss some of the allowed rigidities for a specific location and direction.

It is difficult to be assured that the lowest possible rigidity which may be allowed for a given location in a specific direction (that is, the Störmer cutoff value) has been precisely determined. We have found that for complex penumbra, extending the calculations to lower rigidities at smaller rigidity intervals, often results in an additional allowed rigidity considerably below the previous last allowed rigidity. This problem and the degree of confidence to which we feel we have located the lowest possible allowed rigidity is discussed in detail by Shea and Smart.[43]

42. Dorman, L. I., Gushchina, R. T., Shea, M. A., and Smart, D. F. (1972) Cosmic Rays Effective Cutoff Rigidities, Publishing House "Nauka", Moscow, USSR.

43. Shea, M. A., and Smart, D. F. (1974) Tables of asymptotic directions, cutoff rigidities, and reentrant albedo calculations for Palestine, Dallas, and Midland, Texas, AFCRL Special Reports No. 175, AFCRL-TR-74-0159.

The effect of the currents in the magnetosphere and the magnetospheric tail were not considered in these calculations. The work of Gall et al,[44] Smart et al,[45] and Smart and Shea[46] have shown that the inclusion of these currents and the magnetospheric tail results in a significant lowering of the cutoff values at locations for which the internal field vertical cutoff rigidity would be ≤ 0.5 GV, and therefore, care should be taken when using these tables for these locations. The effects of these external sources would result in slight decreases (~ 0.1 GV) for locations where the vertical cutoff rigidity calculated with the internal geomagnetic field model is between 0.5 and 2.0 GV. Little if any effect is found for locations where the vertical cutoff rigidity is higher than 2.0 GV.[47]

Vertical cutoff rigidities for each of the world grid locations are given in Appendix I. Each grid point is identified by the geographic coordinates, together with the L value calculated using the same field model utilized in the trajectory-tracing program (that is, the IGRF[27] model). All L values were calculated for an altitude of 20 km, consistent with the initializing of the trajectory-tracing technique. The various cutoff rigidity data for each location are in order of main cone cutoff rigidity, P(M), the Störmer cutoff rigidity, P(S), the width of the penumbra, and the effective cutoff rigidity, PC.* All rigidities are in GV.

---

44. Gall, R., Jiménez, E., and Camacho, L. (1968) Arrival of low-energy cosmic rays via the magnetospheric tail, J. Geophys. Res. 73:1593.

45. Smart, D. F., Shea, M. A., and Gall, Ruth (1969) The daily variation of trajectory-derived high-latitude cutoff rigidities in a model magnetosphere, J. Geophys. Res. 74:4731.

46. Smart, D. F., and Shea, M. A. (1972) Daily variation of electron and proton geomagnetic cutoffs calculated for Fort Churchill, Canada, J. Geophys. Res. 77:4595.

47. Shea, M. A., and Smart, D. F. (1971) Calculation of the magnitude of the daily variation of vertical cutoff rigidities and associated changes in the neutron monitor response for selected North American neutron monitors, 12th International Conf. on Cosmic Rays, Hobart, Conference Papers (University of Tasmania) 3:854.

* The abbreviations for the main cone cutoff rigidity, the Störmer cutoff rigidity, and the effective cutoff rigidity in this paper have been changed slightly to permit computerized headings in the tables. Earlier work used the abbreviations P_m, P_s, and P_c for the main cone, Störmer, and effective cutoff rigidities respectively.

References

1. McCracken, K.G. (1962) The cosmic-ray flare effect. 1. Some new methods of analysis, J. Geophys. Res. 67:423.
2. Störmer, C. (1930) Periodische Elektronenbahen im Felde eines Elementarmagneten und ihre Anwendung auf Brüches Modellversuche und auf Eschenhagens Elementarwellen des Erdmagnetismus, Z. Astrophys. 1:237-274.
3. Rossi, B. (1940) System of units for nuclear and cosmic-ray phenomena, Phys. Rev. 57:660.
4. Freon, A., and McCracken, K.G. (1962) A note on the vertical cutoff rigidities of cosmic rays in the geomagnetic field, J. Geophys. Res. 67:888.
5. Kodama, M. (1965) Trajectory-computed vertical threshold rigidities for 85 neutron monitor stations, Can. J. Phys. 43:836.
6. Kondo, I., and Kodama, M. (1965) Geographic distribution of vertical cosmic ray threshold rigidities, Proc. International Conf. Cosmic Rays 1:558.
7. McCracken, K.G., Rao, U.R., Fowler, B.C., Shea, M.A., and Smart, D.F. (1965) Cosmic ray tables (asymptotic directions, variational coefficients and cutoff rigidities), IQSY Instruction Manual No. 10.
8. Shea, M.A., Smart, D.F., and McCracken, K.G. (1965) A study of vertical cutoff rigidities using sixth degree simulations of the geomagnetic field, J. Geophys. Res. 70:4117.
9. Shea, M.A., Smart, D.F., and McCall, John R. (1968) A five degree by fifteen degree world grid of trajectory-determined vertical cutoff rigidities, Can. J. Phys. 46:S1098.
10. Shea, M.A., and Smart, D.F. (1966) Vertical cutoff rigidities in the south Atlantic, Space Research VI, ed. R.L. Smith-Rose, Spartan Books, Washington, D.C.:177.
11. Shea, M.A., and Smart, D.F. (1967) Worldwide trajectory-derived cutoff rigidities and their application to experimental measurements, J. Geophys. Res. 72:2021.

12. Shea, M.A. (1969) A comparison of theoretical and experimental cosmic-ray equators, J.Geophys.Res. 74:2407.

13. Kenney, J.F., Gauger, J., Shea, M.A., and Smart, D.F. (1966) Experimental evaluation of various rigidity models, J.Geophys.Res. 71:5635.

14. Carmichael, H., Bercovitch, M., Shea, M.A., Magidin, M., and Peterson, R.W. (1968) Attenuation of neutron monitor radiation in the atmosphere, Can.J.Phys. 46:S1006.

15. Carmichael, H., Bercovitch, M., Stelies, J.F., and Magidin, M. (1969) I. Cosmic-ray latitude survey in North America in summer, 1965, Can. J. Phys. 47:2037.

16. Carmichael, H., Shea, M.A., and Peterson, R.W. (1969) III. Cosmic-ray latitude survey in Western USA and Hawaii in summer, 1966, Can.J. Phys. 47:2057.

17. Coetzee, W.F., König, P.J., Maree, J.P., Stoker, P.H., van der Walt, A.J., and Vrekan, N.J. (1970) Cutoff rigidities and latitude dependence of muons at 307 g/cm^2 in inclined directions, Acta Physica, Academiae Scientiarum Hungaricae 29, Suppl. 2 (Proc. 11th International Conf. on Cosmic Rays, Budapest 1969):559.

18. Sporre, B., and Pomerantz, M.A. (1970) Time dependence of the position of the cosmic ray equator, Acta Physica Academiae Scientiarum Hungaricae 29, Suppl. 2 (Proc. 11th International Conf. on Cosmic Rays, Budapest 1969):545.

19. van der Walt, A.J., Stoker, P.H., Maree, J.P., and Coetzee, W.F. (1970) Latitude distributions of cosmic ray components at sea level and at airplane altitudes in the South Atlantic magnetic anomaly, Acta Physica, Academiae Scientiarum Hungaricae 29, Suppl. 2 (Proc. 11th International Conf. on Cosmic Rays, Budapest 1969):553.

20. Kent, D.W., and Pomerantz, M.A. (1971) Cosmic ray intensity variations in the lower atmosphere, J.Geophys.Res. 76:1652.

21. Shea, M.A., Smart, D.F., McCall, J.R., and Gumm, B.S. (1974) Tables of vertical cutoff rigidities for Epochs 1955 and 1960, AFCRL Environmental Research Papers No.493, AFCRL-TR-74-0550.

22. Shea, M.A., Smart, D.F., McCall, J.R., and Gumm, B.S. (1974) Tables of non-vertical cutoff rigidities for 76 various locations, AFCRL Environmental Research Papers No.497, AFCRL-TR-75-0008.

23. Shea, M.A., Smart, D.F., McCall, J.R., and Gumm, B.S. (1975) Tables of Asymptotic Directions and Vertical Cutoff Rigidities for a Five Degree by Fifteen Degree World Grid Using the Finch and Leaton Geomagnetic Field Model, AFCRL Environmental Research Papers No.498, AFCRL-TR-75-0042.

24. Shea, M.A., and Smart, D.F. (1975) Asymptotic directions and vertical cutoff rigidities for selected cosmic-ray stations as calculated using the Finch and Leaton geomagnetic field model, AFCRL Environmental Research Papers No.502, AFCRL-TR-75-0177.

25. Finch, H.P., and Leaton, B.R. (1957) The earth s main magnetic field-epoch 1955.0, Monthly Notices Roy.Astron.Soc., Geophys.Suppl. 7:314.

26. Jensen, D.C., and Cain, J.C. (1962) An interim geomagnetic field, (abstract), J.Geophys.Res. 67:3568.

27. IAGA Commission 2, Working Group 4 (1969) International Geomagnetic Reference Field 1965.0, J. Geophys. Res. 74:4407-4408.

28. Malmfors, Karl Gustav (1945) Determination of orbits in the field of a magnetic dipole with applications to the theory of the diurnal variation of cosmic radiation, Arkiv för Matematik Astronomie och Fysik 32A, No. 8.

29. Brunberg, Ernst-Ake (1953) Experimental determination of electron orbits in the field of a magnetic dipole, Part I, Tellus V:135.

30. Brunberg, E.-A. (1956) Cosmic rays in the terrestrial magnetic dipole field, Tellus VIII, -2.

31. Brunberg, Ernst-Ake and Dattner, Adam (1953) Experimental determination of electron orbits in the field of a magnetic dipole, Part II, Tellus V:269.

32. Lemaitre, G., and Vallarta, M. S. (1936) On the allowed cone of cosmic radiation, Phys. Rev. 50:493.

33. Vallarta, M. S. (1938) An outline of the theory of the allowed cone of cosmic radiation, Univ. of Toronto Studies, Appl. Math. Series, No. 3.

34. Jory, F. S. (1956) Selected cosmic-ray orbits in the earth's magnetic field, Phys. Rev. 103:1068.

35. Lust, R. (1957) Impact zones for solar cosmic-ray particles, Phys. Rev. 105: 1827.

36. Chapman, S., and Bartels, J. (1951) Geomagnetism Vol. 2, Oxford Univ. Press, London.

37. Gill, S. (1951) A process for the step-by-step integration of differential equations in an automatic digital computing machine, Proc. Cambridge Phil. Soc. 47:96.

38. McCracken, K. G., Rao, U. R., and Shea, M. A. (1962) The trajectories of cosmic rays in a high degree simulation of the geomagnetic field, M. I. T. Tech. Rept No. 77, NYO-2670.

39. Shea, M. A., Smart, D. F., and McCracken, K. G. (1965) A study of vertically incident cosmic-ray trajectories using sixth-degree simulations of the geomagnetic field, AFCRL Environmental Research Papers No. 141, AFCRL-65-705.

40. Shea, M. A., Smart, D. F., McCracken, K. G., and Rao, U. R. (1968) Supplement to IQSY Instruction Manual No. 10, cosmic ray tables - asymptotic directions, variational coefficients and cutoff rigidities, AFCRL Spec. Reports No. 71, AFCRL-68-0030.

41. Gall, Ruth, Jiménez, J., and Orozco, A. (1969) Directions of approach of cosmic rays for high latitude stations, J. Geophys. Res. 74:3529.

42. Dorman, L. I., Gushchina, R. T., Shea, M. A., and Smart, D. F. (1972) Cosmic Rays Effective Cutoff Rigidities, Publishing House "Nauka", Moscow, USSR.

43. Shea, M. A., and Smart, D. F. (1974) Tables of asymptotic directions, cutoff rigidities, and reentrant albedo calculations for Palestine, Dallas, and Midland, Texas, AFCRL Special Reports No. 175, AFCRL-TR-74-0159.

44. Gall, R., Jiménez, J., and Camacho, L. (1968) Arrival of low-energy cosmic rays via the magnetospheric tail, J. Geophys. Res. 73:1593.

45. Smart, D. F., Shea, M. A., and Gall, Ruth (1969) The daily variation of trajectory-derived high-latitude cutoff rigidities in a model magnetosphere. J. Geophys. Res. 74:4731.

46. Smart, D. F., and Shea, M. A. (1972) Daily variation of electron and proton geomagnetic cutoffs calculated for Fort Churchill, Canada. J. Geophys. Res. 77:4595.

47. Shea, M. A., and Smart, D. F. (1971) Calculation of the magnitude of the daily variation of vertical cutoff rigidities and associated changes in the neutron monitor response for selected North American neutron monitors. 12th International Conf. on Cosmic Rays, Hobart, Conference Papers (University of Tasmania) 3:854.

Appendix A

Table of Asymptotic Directions for the World Grid as Calculated Utilizing the International Geomagnetic Reference Field for Epoch 1975.0

Table A1 lists the asymptotic directions for world grid locations with grid points each 5 degrees in latitude and 15 degrees in longitude. The listings are arranged by latitude with six longitudes to a page, starting with the northern polar regions and decreasing in latitude to the southern polar regions.

The geographic coordinates are given across the top of each page with the appropriate rigidity and asymptotic directions given underneath the coordinates. Each listing continues with decreasing rigidity values until the first forbidden orbit is reached. These forbidden orbits are designated by either an "R" or an "F", representing reeantrant or failed-to-reach-a-solution respectively. The rigidities are in GV, and the asymptotic directions given in geocentric coordinates to the nearest degree with positive latitude in the northern hemisphere, negative latitude in the southern hemisphere, and longitudes measured east from the Greenwich meridian. Negative asymptotic longitudes indicate that the grid point is in the Western Hemisphere and the cosmic-ray trajectory did not cross the Greenwich meridian during its orbit from the interplanetary medium to its detection point. Asymptotic longitudes greater than 360° are indicative of the number of times the cosmic-ray particle crossed the Greenwich meridian during its trajectory as it circumscribed the earth.

TABLE A1

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 80.00 LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	69	42
9.00	69	44
8.00	68	47
7.00	67	50
6.00	64	51
5.00	63	48
4.00	62	52
3.00	60	52
2.00	55	55
1.90	54	55
1.80	54	55
1.70	54	56
1.60	52	56
1.50	52	56
1.40	51	57
1.30	50	56
1.20	49	56
1.10	49	58
1.00	47	58
.90	46	58
.80	44	59
.70	42	60
.60	40	60
.50	37	61
.40	34	63
.30	28	64
.20	20	66
.10	5	71
.09	2	72
.08	-1	74
.07	-5	74
.06	-10	77
.05	-15	80
.04	-22	63
.03	-32	93
.02	-13	197
.01	F	F

GEOGRAPHIC LAT. = 80.00 LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	68	56
9.00	67	58
8.00	67	60
7.00	65	63
6.00	62	62
5.00	61	61
4.00	60	64
3.00	57	64
2.00	51	67
1.90	51	68
1.80	51	66
1.70	50	68
1.60	49	68
1.50	48	67
1.40	47	69
1.30	46	68
1.20	45	69
1.10	44	69
1.00	42	69
.90	41	70
.80	39	71
.70	37	71
.60	34	72
.50	31	73
.40	27	75
.30	20	77
.20	11	81
.10	-9	94
.09	-13	98
.08	-17	100
.07	-21	109
.06	-26	118
.05	-27	147
.04	-3	410
.03	F	F

GEOGRAPHIC LAT. = 80.00 LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	68	69
9.00	66	71
8.00	65	73
7.00	63	75
6.00	61	74
5.00	59	73
4.00	58	76
3.00	54	76
2.00	49	78
1.90	48	78
1.80	48	78
1.70	47	79
1.60	45	79
1.50	45	79
1.40	44	80
1.30	43	80
1.20	41	81
1.10	40	81
1.00	39	81
.90	37	82
.80	35	83
.70	32	83
.60	29	84
.50	25	86
.40	21	88
.30	14	90
.20	3	96
.19	1	97
.18	-1	99
.17	-2	101
.16	-4	101
.15	-6	105
.14	-9	106
.13	-11	109
.12	-14	113
.11	-17	118
.10	-20	124
.09	-22	132
.08	-22	149
.07	-11	183
.06	25	445
.05	F	F

GEOGRAPHIC LAT. = 80.00 LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	65	82
9.00	65	84
8.00	64	86
7.00	62	87
6.00	59	86
5.00	58	85
4.00	56	88
3.00	53	88
2.00	46	90
1.90	46	89
1.80	45	90
1.70	44	91
1.60	43	90
1.50	43	91
1.40	41	91
1.30	40	91
1.20	38	92
1.10	37	92
1.00	36	93
.90	34	93
.80	31	94
.70	29	95
.60	25	96
.50	21	98
.40	16	100
.30	8	104
.20	-4	113
.19	-6	114
.18	-8	116
.17	-10	119
.16	-12	121
.15	-14	125
.14	-16	130
.13	-18	135
.12	-20	140
.11	-21	152
.10	-18	169
.09	-7	195
.08	F	F

GEOGRAPHIC LAT. = 80.00 LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	65	96
9.00	64	97
8.00	63	98
7.00	61	99
6.00	58	98
5.00	57	98
4.00	54	100
3.00	51	100
2.00	45	101
1.90	44	101
1.80	44	101
1.70	42	102
1.60	41	102
1.50	41	102
1.40	39	103
1.30	38	103
1.20	36	103
1.10	35	104
1.00	33	104
.90	31	105
.80	29	106
.70	26	106
.60	22	108
.50	18	110
.40	12	112
.30	4	117
.20	-9	128
.19	-11	132
.18	-13	134
.17	-15	138
.16	-17	140
.15	-19	146
.14	-20	154
.13	-21	161
.12	-19	175
.11	-13	194
.10	15	241
.09	-2	336
.08	F	F

GEOGRAPHIC LAT. = 80.00 LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	64	109
9.00	63	110
8.00	61	111
7.00	60	112
6.00	57	111
5.00	56	110
4.00	53	112
3.00	50	112
2.00	43	113
1.90	42	113
1.80	42	113
1.70	41	114
1.60	39	114
1.50	39	114
1.40	37	114
1.30	36	114
1.20	34	115
1.10	33	115
1.00	31	116
.90	29	116
.80	26	117
.70	23	118
.60	20	119
.50	15	121
.40	9	124
.30	0	130
.20	-14	144
.19	-15	147
.18	-17	152
.17	-19	156
.16	-20	162
.15	-21	168
.14	-21	170
.13	-18	192
.12	-11	210
.11	17	271
.10	2	887
.09	F	F

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 80.00 LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	63	123
9.00	62	123
8.00	60	124
7.00	59	124
6.00	57	124
5.00	55	123
4.00	52	124
3.00	48	124
2.00	42	125
1.90	41	125
1.80	40	125
1.70	39	125
1.60	38	125
1.50	37	125
1.40	36	126
1.30	34	126
1.20	33	126
1.10	31	127
1.00	29	127
.90	27	128
.80	24	128
.70	21	130
.60	17	131
.50	13	133
.40	6	136
.30	-3	142
.20	-17	159
.19	-19	162
.18	-20	168
.17	-22	173
.16	-22	181
.15	-23	188
.14	-19	203
.13	-13	219
.12	11	260
.11	31	489
.10	-13	3161
.09	F	F

GEOGRAPHIC LAT. = 80.00 LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	61	136
9.00	61	136
8.00	59	136
7.00	58	136
6.00	56	136
5.00	54	135
4.00	51	136
3.00	47	136
2.00	40	136
1.90	40	136
1.80	39	136
1.70	38	137
1.60	37	137
1.50	36	137
1.40	34	137
1.30	33	137
1.20	31	138
1.10	30	138
1.00	25	138
.90	25	139
.80	23	139
.70	19	146
.60	15	142
.50	10	144
.40	4	146
.30	-6	153
.20	-20	172
.19	-22	176
.18	-23	181
.17	-24	188
.16	-24	195
.15	-23	207
.14	-18	221
.13	-4	245
.12	-17	357
.11	-3	1086
.10	F	F

GEOGRAPHIC LAT. = 80.00 LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	60	147
9.00	59	147
8.00	58	148
7.00	57	148
6.00	55	148
5.00	52	147
4.00	58	147
3.00	46	147
2.00	39	147
1.90	38	147
1.80	38	147
1.70	37	148
1.60	35	147
1.50	35	147
1.40	33	148
1.30	32	148
1.20	30	148
1.10	28	148
1.00	26	149
.90	24	149
.80	21	150
.70	18	151
.60	14	152
.50	9	153
.40	2	157
.30	-7	163
.20	-22	182
.19	-24	187
.18	-25	192
.17	-26	199
.16	-26	207
.15	-24	219
.14	-18	235
.13	-2	259
.12	17	1118
.11	-18	627
.10	F	F

GEOGRAPHIC LAT. = 80.00 LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	59	158
9.00	59	158
8.00	58	159
7.00	56	159
6.00	54	159
5.00	52	158
4.00	49	158
3.00	45	157
2.00	39	157
1.90	38	157
1.80	37	157
1.70	36	156
1.60	35	157
1.50	34	157
1.40	32	158
1.30	31	158
1.20	29	158
1.10	28	158
1.00	26	158
.90	24	159
.80	21	159
.70	17	160
.60	14	161
.50	9	162
.40	2	165
.30	-6	171
.20	-23	188
.19	-25	194
.18	-26	199
.17	-27	205
.16	-28	213
.15	-27	225
.14	-23	238
.13	-11	257
.12	16	311
.11	8	485
.10	F	F

GEOGRAPHIC LAT. = 80.00 LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	59	168
9.00	58	168
8.00	58	169
7.00	56	170
6.00	54	169
5.00	51	167
4.00	49	166
3.00	45	167
2.00	39	167
1.90	38	166
1.80	37	166
1.70	36	167
1.60	35	167
1.50	34	167
1.40	33	167
1.30	32	167
1.20	30	167
1.10	29	167
1.00	26	167
.90	24	167
.80	22	168
.70	18	168
.60	15	169
.50	10	170
.40	3	172
.30	-6	177
.20	-21	190
.19	-23	193
.18	-25	198
.17	-27	201
.16	-29	208
.15	-30	216
.14	-30	228
.13	-27	241
.12	-16	262
.11	18	323
.10	-2	408
.09	F	F

GEOGRAPHIC LAT. = 80.00 LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	59	178
9.00	59	178
8.00	58	179
7.00	56	179
6.00	54	179
5.00	52	177
4.00	58	177
3.00	46	176
2.00	40	176
1.90	39	175
1.80	39	175
1.70	38	175
1.60	36	174
1.50	36	173
1.40	34	175
1.30	33	175
1.20	32	175
1.10	30	175
1.00	28	175
.90	26	175
.80	24	175
.70	21	176
.60	17	176
.50	13	177
.40	7	178
.30	-2	181
.20	-16	189
.19	-18	192
.18	-20	192
.17	-23	196
.16	-25	200
.15	-28	205
.14	-30	209
.13	-32	217
.12	-33	229
.11	-31	249
.10	-19	269
.09	-21	968
.08	-6	2300
.07	F	F

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 80.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	60	187
9.00	60	187
8.00	59	188
7.00	58	189
6.00	55	188
5.00	54	186
4.00	52	186
3.00	48	184
2.00	43	184
1.90	42	183
1.80	41	183
1.70	41	184
1.60	39	183
1.50	39	183
1.40	37	183
1.30	36	182
1.20	35	183
1.10	34	183
1.00	32	182
.90	30	182
.80	28	182
.70	25	182
.60	22	182
.50	18	182
.40	13	183
.30	5	184
.20	-7	188
.19	-9	188
.18	-11	190
.17	-13	190
.16	-15	192
.15	-18	193
.14	-20	195
.13	-23	198
.12	-27	202
.11	-30	208
.10	-34	216
.09	-38	225
.08	-35	252
.07	-18	367
.06	14	776
.05	F	F

GEOGRAPHIC
LAT. = 80.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	62	-161
9.00	62	-163
8.00	61	-163
7.00	60	-162
6.00	58	-163
5.00	56	-166
4.00	55	-165
3.00	52	-167
2.00	46	-168
1.90	46	-169
1.80	46	-169
1.70	45	-168
1.60	44	-169
1.50	43	-169
1.40	42	-169
1.30	41	-170
1.20	40	-170
1.10	39	-170
1.00	37	-170
.90	35	-171
.80	34	-171
.70	32	-171
.60	29	-171
.50	26	-171
.40	21	-172
.30	15	-172
.20	5	-171
.10	-16	-167
.09	-20	-165
.08	-23	-162
.07	-30	-160
.06	-37	-152
.05	-46	-136
.04	8	-92
.03	F	F

GEOGRAPHIC
LAT. = 80.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	65	-153
9.00	65	-153
8.00	64	-153
7.00	63	-153
6.00	61	-154
5.00	60	-156
4.00	58	-156
3.00	56	-158
2.00	52	-160
1.90	51	-160
1.80	51	-160
1.70	50	-160
1.60	49	-161
1.50	49	-161
1.40	48	-161
1.30	47	-162
1.20	46	-162
1.10	45	-162
1.00	44	-162
.90	43	-163
.80	41	-163
.70	39	-164
.60	37	-164
.50	35	-165
.40	31	-166
.30	26	-166
.20	19	-168
.10	5	-170
.09	3	-171
.08	0	-170
.07	-3	-171
.06	-7	-171
.05	-12	-172
.04	-16	-174
.03	-26	-173
.02	-37	-174
.01	-54	-181

GEOGRAPHIC
LAT. = 80.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	68	-141
9.00	68	-142
8.00	67	-141
7.00	66	-142
6.00	65	-143
5.00	64	-145
4.00	63	-146
3.00	61	-148
2.00	58	-150
1.90	57	-150
1.80	57	-150
1.70	56	-151
1.60	56	-151
1.50	56	-151
1.40	55	-152
1.30	54	-152
1.20	53	-153
1.10	53	-153
1.00	52	-153
.90	51	-154
.80	50	-154
.70	48	-155
.60	47	-156
.50	45	-157
.40	42	-158
.30	39	-160
.20	34	-162
.10	25	-166
.09	24	-167
.08	22	-167
.07	20	-168
.06	19	-170
.05	16	-171
.04	13	-173
.03	10	-175
.02	8	-178
.01	5	-184

GEOGRAPHIC
LAT. = 80.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	72	-127
9.00	71	-128
8.00	71	-128
7.00	70	-129
6.00	69	-130
5.00	69	-132
4.00	68	-133
3.00	67	-135
2.00	64	-138
1.90	64	-138
1.80	64	-138
1.70	63	-139
1.60	63	-139
1.50	63	-139
1.40	62	-140
1.30	62	-140
1.20	61	-141
1.10	61	-141
1.00	60	-142
.90	60	-142
.80	59	-143
.70	58	-144
.60	57	-145
.50	56	-146
.40	54	-148
.30	52	-149
.20	49	-153
.10	43	-157
.09	43	-158
.08	42	-159
.07	41	-160
.06	39	-161
.05	39	-163
.04	37	-165
.03	36	-167
.02	36	-170
.01	35	-173

GEOGRAPHIC
LAT. = 80.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	75	-104
9.00	75	-110
8.00	74	-111
7.00	74	-112
6.00	74	-113
5.00	73	-114
4.00	73	-116
3.00	72	-117
2.00	71	-120
1.90	71	-120
1.80	70	-121
1.70	70	-121
1.60	70	-122
1.50	70	-122
1.40	70	-123
1.30	69	-123
1.20	69	-124
1.10	69	-124
1.00	69	-125
.90	68	-126
.80	68	-127
.70	67	-128
.60	67	-129
.50	66	-130
.40	65	-132
.30	64	-134
.20	62	-137
.10	60	-142
.09	59	-143
.08	59	-144
.07	59	-145
.06	58	-146
.05	58	-148
.04	58	-149
.03	57	-151
.02	57	-154
.01	57	-156

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 80.00 LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	77	-85
9.00	77	-87
8.00	77	-88
7.00	77	-89
6.00	77	-87
5.00	77	-87
4.00	77	-90
3.00	76	-91
2.00	76	-92
1.90	76	-92
1.80	76	-93
1.70	76	-93
1.60	76	-93
1.50	76	-94
1.40	76	-94
1.30	76	-94
1.20	76	-95
1.10	75	-96
1.00	75	-96
.90	75	-96
.80	75	-97
.70	75	-98
.60	75	-99
.50	75	-100
.40	74	-101
.30	74	-103
.20	74	-105
.10	73	-109
.09	73	-110
.08	73	-111
.07	73	-111
.06	73	-112
.05	73	-113
.04	73	-114
.03	73	-116
.02	73	-117
.01	73	-119

GEOGRAPHIC LAT. = 80.00 LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	74	-56
9.00	74	-57
8.00	74	-58
7.00	74	-59
6.00	74	-52
5.00	74	-53
4.00	74	-54
3.00	74	-53
2.00	73	-50
1.90	73	-50
1.80	73	-51
1.70	73	-50
1.60	73	-49
1.50	73	-50
1.40	73	-49
1.30	73	-50
1.20	73	-48
1.10	73	-49
1.00	73	-49
.90	73	-48
.80	73	-47
.70	73	-47
.60	73	-47
.50	73	-46
.40	73	-45
.30	73	-44
.20	73	-42
.10	73	-41
.09	73	-41
.08	73	-40
.07	73	-41
.06	73	-40
.05	73	-40
.04	73	-41
.03	73	-41
.02	73	-41
.01	73	-42

GEOGRAPHIC LAT. = 80.00 LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	77	-28
9.00	78	-28
8.00	78	-27
7.00	78	-22
6.00	77	-18
5.00	76	-21
4.00	77	-18
3.00	76	-18
2.00	75	-12
1.90	75	-13
1.80	75	-13
1.70	75	-11
1.60	74	-11
1.50	74	-11
1.40	74	-9
1.30	74	-10
1.20	74	-8
1.10	74	-8
1.00	73	-8
.90	73	-7
.80	73	-6
.70	72	-6
.60	72	-5
.50	71	-4
.40	70	-2
.30	69	-1
.20	67	0
.10	64	1
.09	63	1
.08	63	0
.07	62	0
.06	62	0
.05	61	-1
.04	60	-1
.03	59	-2
.02	58	-3
.01	58	-5

GEOGRAPHIC LAT. = 80.00 LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	75	-5
9.00	76	-4
8.00	76	-1
7.00	76	4
6.00	74	6
5.00	73	3
4.00	73	7
3.00	72	7
2.00	70	13
1.90	69	12
1.80	70	12
1.70	69	13
1.60	69	13
1.50	69	13
1.40	68	15
1.30	68	14
1.20	67	16
1.10	67	16
1.00	66	16
.90	66	16
.80	65	18
.70	64	18
.60	63	18
.50	62	19
.40	60	21
.30	58	21
.20	55	21
.10	50	21
.09	48	22
.08	48	21
.07	46	21
.06	46	20
.05	44	20
.04	43	19
.03	42	17
.02	39	16
.01	38	14

GEOGRAPHIC LAT. = 80.00 LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	73	13
9.00	73	15
8.00	73	18
7.00	72	22
6.00	71	24
5.00	70	21
4.00	69	25
3.00	67	25
2.00	64	30
1.90	64	29
1.80	64	29
1.70	64	30
1.60	63	30
1.50	63	30
1.40	62	31
1.30	61	31
1.20	61	32
1.10	60	32
1.00	59	32
.90	58	33
.80	58	34
.70	56	34
.60	55	34
.50	53	35
.40	51	36
.30	47	37
.20	43	37
.10	34	38
.09	33	37
.08	32	37
.07	30	37
.06	28	36
.05	26	36
.04	24	35
.03	21	34
.02	18	32
.01	15	29

GEOGRAPHIC LAT. = 80.00 LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	71	23
9.00	71	33
8.00	71	34
7.00	69	37
6.00	67	38
5.00	66	35
4.00	66	49
3.00	63	33
2.00	59	43
1.90	59	42
1.80	59	42
1.70	58	44
1.60	57	44
1.50	57	43
1.40	56	45
1.30	56	44
1.20	55	46
1.10	54	46
1.00	53	46
.90	52	46
.80	51	47
.70	49	47
.60	47	48
.50	44	49
.40	42	50
.30	37	51
.20	31	52
.10	19	53
.09	17	54
.08	16	53
.07	13	54
.06	10	54
.05	6	54
.04	3	53
.03	-2	52
.02	-10	52
.01	-17	48

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 75.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	57	37
9.00	57	38
8.00	57	41
7.00	55	44
6.00	52	45
5.00	49	43
4.00	49	46
3.00	44	46
2.00	38	50
1.90	37	50
1.80	36	50
1.70	36	51
1.60	34	52
1.50	33	52
1.40	33	53
1.30	31	53
1.20	30	54
1.10	28	54
1.00	26	55
.90	24	56
.80	22	57
.70	19	59
.60	15	61
.50	11	65
.40	5	69
.30	-2	76
.28	-13	94
.19	-14	99
.18	-15	104
.17	-15	109
.16	-15	116
.15	-15	121
.14	-11	135
.13	-4	149
.12	14	170
.11	-2	447
.10	6	531
.09	F	F

GEOGRAPHIC
LAT. = 75.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	56	51
9.00	56	52
8.00	55	55
7.00	53	57
6.00	51	58
5.00	47	56
4.00	46	59
3.00	41	59
2.00	34	64
1.90	33	64
1.80	32	63
1.70	32	65
1.60	30	66
1.50	29	65
1.40	28	67
1.30	26	67
1.20	25	68
1.10	23	68
1.00	20	70
.90	15	71
.80	16	73
.70	12	75
.60	8	78
.50	1	82
.40	-1	89
.30	-10	103
.28	-10	146
.19	-5	156
.18	1	168
.17	12	188
.16	15	243
.15	26	431
.14	54	466
.13	F	F

GEOGRAPHIC
LAT. = 75.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	55	64
9.00	55	66
8.00	54	68
7.00	51	70
6.00	48	71
5.00	44	69
4.00	44	72
3.00	39	72
2	31	77
1.90	30	77
1.80	29	77
1.70	29	78
1.60	26	79
1.50	25	79
1.40	24	80
1.30	22	80
1.20	21	82
1.10	19	82
1.00	16	84
.90	13	86
.80	11	88
.70	7	91
.60	2	95
.50	-3	101
.40	-9	111
.30	-13	134
.29	-13	137
.28	-13	142
.27	-12	147
.26	-11	153
.25	-8	160
.24	-5	167
.23	9	177
.22	7	191
.21	15	213
.20	2	267
.19	0	391
.18	14	1535
.17	F	F

GEOGRAPHIC
LAT. = 75.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	54	78
9.00	54	80
8.00	52	82
7.00	50	83
6.00	46	85
5.00	44	82
4.00	42	85
3.00	37	86
2.00	29	90
1.90	27	90
1.80	27	90
1.70	26	91
1.60	24	92
1.50	23	92
1.40	21	93
1.30	19	94
1.20	18	95
1.10	16	96
1.00	13	98
.90	10	100
.80	7	102
.70	3	106
.60	-2	111
.50	-7	118
.40	-12	132
.30	-11	166
.29	-9	172
.28	-6	180
.27	-2	188
.26	4	194
.25	10	214
.24	14	241
.23	-23	312
.22	12	400
.21	-5	418
.20	-5	2147
.19	F	F

GEOGRAPHIC
LAT. = 75.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	54	93
9.00	53	94
8.00	52	96
7.00	49	97
6.00	46	97
5.00	44	96
4.00	41	99
3.00	36	99
2.00	27	103
1.90	26	103
1.80	25	103
1.70	24	104
1.60	22	105
1.50	21	105
1.40	19	107
1.30	17	107
1.20	15	109
1.10	13	110
1.00	10	111
.90	7	113
.80	4	116
.70	-1	120
.60	-5	126
.50	-10	135
.40	-15	153
.30	-4	199
.29	1	209
.28	6	221
.27	12	241
.26	6	277
.25	-2	510
.24	R	R

GEOGRAPHIC
LAT. = 75.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	53	107
9.00	52	108
8.00	51	110
7.00	48	111
6.00	45	113
5.00	43	110
4.00	39	117
3.00	34	115
2.00	25	116
1.90	24	116
1.80	23	117
1.70	22	117
1.60	20	118
1.50	19	118
1.40	17	120
1.30	15	120
1.20	13	122
1.10	11	125
1.00	8	125
.90	5	127
.80	1	130
.70	-3	135
.60	-6	141
.50	-13	152
.40	-16	173
.30	5	235
.29	10	253
.28	6	286
.27	-21	567
.26	21	935
.25	-24	1361
.24	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 75.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	52	122
9.00	51	123
8.00	49	124
7.00	47	124
6.00	44	124
5.00	41	124
4.00	38	126
3.00	33	126
2.00	23	129
1.90	22	129
1.80	22	130
1.70	20	131
1.60	18	131
1.50	17	132
1.40	15	133
1.30	13	133
1.20	10	135
1.10	8	136
1.00	5	138
.90	2	140
.80	-2	144
.70	-6	148
.60	-11	156
.50	-16	166
.40	-18	193
.30	9	282
.29	-14	338
.28	2	518
.27	-8	669
.26	6	800
.25	10	2232
.24	F	F

GEOGRAPHIC
LAT. = 75.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	50	136
9.00	49	136
8.00	48	137
7.00	46	138
6.00	43	138
5.00	40	138
4.00	36	139
3.00	31	139
2.00	22	142
1.90	20	142
1.80	19	143
1.70	18	144
1.60	16	144
1.50	15	145
1.40	13	146
1.30	11	147
1.20	9	148
1.10	6	149
1.00	3	151
.90	-1	154
.80	-5	157
.70	-9	162
.60	-14	170
.50	-19	184
.40	-18	212
.39	-17	217
.38	-15	223
.37	-13	228
.36	-10	234
.35	-7	241
.34	-3	250
.33	2	261
.32	7	278
.31	6	307
.30	-3	547
.29	22	419
.28	4	857
.27	7	1582
.26	-7	4616
.25	F	F

GEOGRAPHIC
LAT. = 75.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	48	149
9.00	48	149
8.00	47	150
7.00	44	151
6.00	41	152
5.00	38	151
4.00	35	152
3.00	29	152
2.00	20	155
1.90	18	155
1.80	17	155
1.70	16	156
1.60	14	157
1.50	12	157
1.40	10	158
1.30	8	159
1.20	6	160
1.10	3	162
1.00	0	164
.90	-3	166
.80	-7	170
.70	-12	175
.60	-17	183
.50	-22	179
.40	-19	211
.39	-17	235
.38	-15	241
.37	-12	247
.36	-8	255
.35	-3	264
.34	2	274
.33	7	291
.32	6	321
.31	15	553
.30	4	530
.29	-2	622
.28	-7	1375
.27	6	1486
.26	F	F

GEOGRAPHIC
LAT. = 75.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	47	161
9.00	46	161
8.00	45	162
7.00	43	163
6.00	40	164
5.00	36	162
4.00	33	163
3.00	27	163
2.00	18	166
1.90	16	166
1.80	15	167
1.70	14	167
1.60	12	168
1.50	10	168
1.40	9	169
1.30	6	170
1.20	4	172
1.10	1	173
1.00	-2	175
.90	-6	177
.80	-9	181
.70	-15	186
.60	-20	195
.50	-24	211
.40	-20	243
.39	-17	249
.38	-15	255
.37	-12	261
.36	-7	269
.35	-3	278
.34	3	289
.33	8	308
.32	3	340
.31	3	444
.30	19	528
.29	-5	578
.28	12	1185
.27	F	F

GEOGRAPHIC
LAT. = 75.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	46	172
9.00	45	172
8.00	45	173
7.00	42	175
6.00	39	175
5.00	35	173
4.00	33	174
3.00	27	174
2.00	17	177
1.90	16	177
1.80	15	178
1.70	14	177
1.60	11	178
1.50	10	178
1.40	8	179
1.30	6	180
1.20	3	181
1.10	1	182
1.00	-3	184
.90	-6	186
.80	-10	190
.70	-15	195
.60	-21	202
.50	-26	217
.40	-24	247
.39	-22	252
.38	-20	257
.37	-18	262
.36	-14	269
.35	-10	276
.34	-6	283
.33	1	295
.32	8	312
.31	9	345
.30	-12	619
.29	9	491
.28	-13	570
.27	8	474
.26	5	1983
.25	F	F

GEOGRAPHIC
LAT. = 75.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	46	182
9.00	46	183
8.00	45	184
7.00	43	185
6.00	39	185
5.00	36	183
4.00	33	184
3.00	27	183
2.00	18	186
1.90	17	185
1.80	16	185
1.70	15	186
1.60	13	187
1.50	11	187
1.40	9	188
1.30	7	188
1.20	5	189
1.10	3	190
1.00	-1	191
.90	-4	193
.80	-8	195
.70	-13	199
.60	-19	205
.50	-25	216
.40	-29	238
.30	-2	298
.29	6	313
.28	12	348
.27	-6	458
.26	18	1115
.25	9	922
.24	16	458
.23	F	F

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 75.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	47	192
9.00	47	192
8.00	46	194
7.00	44	195
6.00	40	195
5.00	37	192
4.00	35	193
3.00	30	192
2.00	21	194
1.90	20	194
1.80	19	193
1.70	18	194
1.60	16	194
1.50	15	194
1.40	13	195
1.30	11	195
1.20	9	196
1.10	7	196
1.00	4	197
.90	1	198
.80	-2	200
.70	-7	202
.60	-12	206
.50	-19	212
.40	-27	225
.30	-29	259
.29	-28	264
.28	-26	270
.27	-22	278
.26	-18	285
.25	-10	296
.24	-1	308
.23	12	332
.22	-5	412
.21	25	487
.20	10	917
.19	F	F

GEOGRAPHIC
LAT. = 75.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
11.00	50	-158
10.00	50	-157
9.00	49	-156
8.00	46	-155
7.00	43	-156
6.00	41	-158
5.00	39	-157
4.00	34	-159
3.00	26	-158
2.00	25	-159
1.90	25	-159
1.80	24	-158
1.70	22	-158
1.60	21	-158
1.50	20	-158
1.40	19	-158
1.30	16	-157
1.20	14	-157
1.10	12	-157
1.00	9	-157
.90	6	-156
.80	2	-155
.70	-2	-153
.60	-5	-151
.50	-16	-145
.40	-27	-133
.30	-23	-85
.29	-25	-76
.28	-16	-63
.27	-1	-46
.26	19	-1
.25	-3	180
.24	9	120
.23	F	F

GEOGRAPHIC
LAT. = 75.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	53	-147
9.00	53	-146
8.00	52	-145
7.00	50	-145
6.00	47	-146
5.00	46	-148
4.00	44	-147
3.00	40	-149
2.00	33	-149
1.90	32	-150
1.80	32	-150
1.70	31	-149
1.60	30	-150
1.50	29	-150
1.40	28	-150
1.30	26	-150
1.20	25	-150
1.10	23	-150
1.00	22	-150
.90	19	-150
.80	17	-149
.70	14	-150
.60	10	-149
.50	6	-148
.40	-1	-147
.30	-9	-144
.20	-24	-135
.19	-26	-132
.18	-28	-131
.17	-31	-126
.16	-33	-123
.15	-35	-117
.14	-37	-111
.13	-38	-100
.12	-37	-88
.11	-31	-70
.10	-4	-48
.09	-12	637
.08	F	F

GEOGRAPHIC
LAT. = 75.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	57	-134
9.00	57	-134
8.00	56	-133
7.00	54	-133
6.00	52	-134
5.00	51	-136
4.00	49	-136
3.00	46	-137
2.00	41	-138
1.90	41	-139
1.80	40	-139
1.70	39	-139
1.60	38	-139
1.50	38	-139
1.40	37	-139
1.30	36	-140
1.20	35	-140
1.10	34	-140
1.00	32	-140
.90	31	-141
.80	29	-141
.70	27	-141
.60	24	-141
.50	21	-142
.40	16	-142
.30	10	-142
.20	0	-147
.10	-21	-137
.09	-25	-135
.08	-29	-133
.07	-34	-131
.06	-41	-125
.05	-49	-103
.04	-39	-46
.03	6	19
.02	F	F

GEOGRAPHIC
LAT. = 75.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	62	-119
9.00	61	-119
8.00	60	-119
7.00	59	-119
6.00	58	-120
5.00	57	-122
4.00	55	-121
3.00	53	-123
2.00	49	-125
1.90	49	-125
1.80	49	-125
1.70	48	-125
1.60	47	-126
1.50	47	-126
1.40	46	-126
1.30	46	-126
1.20	45	-126
1.10	44	-127
1.00	43	-127
.90	42	-127
.80	40	-128
.70	39	-129
.60	37	-129
.50	35	-129
.40	32	-131
.30	28	-132
.20	22	-133
.10	11	-136
.09	10	-137
.08	8	-138
.07	6	-139
.06	3	-140
.05	0	-141
.04	-4	-142
.03	-7	-145
.02	-11	-149
.01	-16	-155

GEOGRAPHIC
LAT. = 75.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	65	-100
9.00	65	-101
8.00	65	-101
7.00	64	-101
6.00	63	-102
5.00	62	-103
4.00	61	-103
3.00	59	-104
2.00	57	-106
1.90	57	-106
1.80	56	-106
1.70	56	-106
1.60	56	-107
1.50	55	-107
1.40	55	-107
1.30	54	-107
1.20	54	-108
1.10	53	-108
1.00	52	-108
.90	52	-109
.80	51	-109
.70	50	-110
.60	49	-110
.50	47	-111
.40	45	-112
.30	43	-113
.20	39	-115
.10	33	-119
.09	32	-120
.08	31	-121
.07	31	-122
.06	30	-123
.05	28	-124
.04	27	-125
.03	25	-127
.02	25	-130
.01	23	-133

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 75.00 LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	68	-78
9.00	68	-78
8.00	67	-79
7.00	67	-78
6.00	67	-78
5.00	65	-78
4.00	65	-79
3.00	64	-80
2.00	62	-80
1.90	62	-80
1.80	62	-81
1.70	61	-80
1.60	61	-80
1.50	61	-81
1.40	60	-81
1.30	60	-81
1.20	60	-81
1.10	59	-81
1.00	59	-82
.90	58	-82
.80	58	-82
.70	57	-82
.60	56	-83
.50	55	-83
.40	54	-84
.30	52	-85
.20	50	-86
.10	46	-89
.09	45	-90
.08	45	-91
.07	44	-91
.06	44	-92
.05	43	-93
.04	42	-94
.03	41	-95
.02	41	-97
.01	40	-100

GEOGRAPHIC LAT. = 75.00 LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	68	-53
9.00	68	-54
8.00	67	-53
7.00	67	-52
6.00	66	-50
5.00	66	-51
4.00	66	-51
3.00	65	-51
2.00	65	-49
1.90	65	-50
1.80	65	-50
1.70	65	-50
1.60	62	-49
1.50	62	-50
1.40	62	-49
1.30	61	-50
1.20	61	-49
1.10	61	-49
1.00	60	-49
.90	60	-49
.80	59	-49
.70	59	-49
.60	57	-49
.50	56	-49
.40	55	-49
.30	54	-49
.20	51	-49
.10	47	-51
.09	46	-51
.08	46	-52
.07	45	-52
.06	44	-53
.05	43	-53
.04	43	-55
.03	42	-56
.02	41	-57
.01	40	-59

GEOGRAPHIC LAT. = 75.00 LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	67	-29
9.00	67	-30
8.00	68	-29
7.00	67	-26
6.00	66	-23
5.00	64	-25
4.00	65	-24
3.00	62	-24
2.00	60	-21
1.90	60	-21
1.80	60	-22
1.70	60	-21
1.60	59	-20
1.50	59	-21
1.40	58	-20
1.30	58	-20
1.20	57	-19
1.10	57	-20
1.00	56	-19
.90	55	-19
.80	55	-18
.70	53	-18
.60	52	-18
.50	51	-17
.40	49	-17
.30	47	-17
.20	43	-17
.10	37	-17
.09	36	-17
.08	35	-18
.07	34	-18
.06	32	-18
.05	31	-19
.04	30	-20
.03	28	-21
.02	25	-23
.01	24	-25

GEOGRAPHIC LAT. = 75.00 LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	65	-9
9.00	65	-9
8.00	65	-7
7.00	65	-4
6.00	62	-1
5.00	61	-4
4.00	61	-2
3.00	58	-2
2.00	55	2
1.90	54	2
1.80	54	1
1.70	54	2
1.60	53	3
1.50	53	2
1.40	52	4
1.30	51	3
1.20	51	4
1.10	50	4
1.00	49	4
.90	46	5
.80	47	6
.70	45	6
.60	43	6
.50	41	7
.40	39	8
.30	35	9
.20	30	10
.10	20	11
.09	18	10
.08	16	11
.07	14	11
.06	11	11
.05	9	10
.04	6	10
.03	2	9
.02	-2	7
.01	-8	3

GEOGRAPHIC LAT. = 75.00 LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	62	8
9.00	62	9
8.00	62	11
7.00	61	15
6.00	59	16
5.00	56	14
4.00	56	16
3.00	53	17
2.00	49	21
1.90	48	20
1.80	48	20
1.70	48	21
1.60	46	22
1.50	46	21
1.40	45	22
1.30	44	22
1.20	43	23
1.10	42	23
1.00	41	23
.90	39	24
.80	38	25
.70	36	26
.60	33	26
.50	31	27
.40	27	29
.30	22	31
.20	14	33
.10	-2	40
.09	-4	40
.08	-8	44
.07	-11	45
.06	-15	46
.05	-21	51
.04	-29	61
.03	-37	74
.02	-54	262
.01	F	F

GEOGRAPHIC LAT. = 75.00 LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	59	23
9.00	60	24
8.00	59	27
7.00	58	30
6.00	55	31
5.00	53	29
4.00	52	32
3.00	48	32
2.00	43	36
1.90	42	36
1.80	42	36
1.70	41	37
1.60	40	38
1.50	39	37
1.40	39	35
1.30	37	38
1.20	36	39
1.10	35	39
1.00	33	40
.90	31	41
.80	29	42
.70	27	43
.60	24	45
.50	20	46
.40	16	48
.30	9	52
.20	-2	59
.19	-3	61
.18	-5	63
.17	-6	64
.16	-8	66
.15	-10	68
.14	-12	70
.13	-14	73
.12	-16	77
.11	-18	83
.10	-20	91
.09	-21	101
.08	-20	116
.07	7	160
.06	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 70.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	45	36
9.00	45	37
8.00	45	39
7.00	43	43
6.00	39	45
5.00	35	43
4.00	34	45
3.00	27	47
2.00	20	53
1.90	18	54
1.80	17	54
1.70	16	55
1.60	15	57
1.50	12	57
1.40	12	58
1.30	9	68
1.20	8	61
1.10	5	64
1.00	3	67
.90	0	70
.80	-3	74
.70	-6	79
.60	-9	88
.50	-11	102
.40	-7	128
.39	-5	132
.38	-3	136
.37	-1	142
.36	2	148
.35	5	153
.34	10	162
.33	15	174
.32	19	189
.31	18	214
.30	-14	262
.29	-9	642
.28	-3	673
.27	7	1607
.26	13	1171
.25	F	F

GEOGRAPHIC
LAT. = 70.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	44	50
9.00	44	51
8.00	43	53
7.00	41	56
6.00	36	58
5.00	32	57
4.00	31	59
3.00	24	62
2.00	16	69
1.90	13	70
1.80	12	70
1.70	12	71
1.60	10	73
1.50	7	74
1.40	7	75
1.30	4	78
1.20	3	79
1.10	-1	83
1.00	-3	87
.90	-6	91
.80	-8	98
.70	-10	106
.60	-11	121
.50	-4	146
.40	13	230
.39	-21	283
.38	-1	324
.37	*	527
.36	-8	899
.35	-6	559
.34	-10	1743
.33	F	F

GEOGRAPHIC
LAT. = 70.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	43	64
9.00	43	65
8.00	42	67
7.00	39	70
6.00	34	71
5.00	31	70
4.00	29	73
3.00	21	76
2.00	12	83
1.90	10	84
1.80	9	85
1.70	8	86
1.60	6	88
1.50	4	90
1.40	3	91
1.30	0	95
1.20	-1	97
1.10	-5	101
1.00	-7	106
.90	-9	113
.80	-11	122
.70	-11	134
.60	-6	156
.50	13	206
.49	14	219
.48	12	237
.47	4	256
.46	-13	363
.45	15	585
.44	-1	543
.43	-18	1000
.42	1	427
.41	-3	396
.40	F	F

GEOGRAPHIC
LAT. = 70.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	43	78
9.00	42	79
8.00	41	81
7.00	38	84
6.00	33	85
5.00	30	84
4.00	27	87
3.00	20	89
2.00	10	98
1.90	7	99
1.80	6	99
1.70	6	101
1.60	3	103
1.50	1	105
1.40	0	107
1.30	-3	110
1.20	-4	114
1.10	-7	118
1.00	-10	125
.90	-12	133
.80	-12	144
.70	-9	161
.68	2	192
.59	5	198
.58	7	203
.57	8	209
.56	10	216
.55	12	230
.54	11	241
.53	7	257
.52	-15	297
.51	21	855
.50	9	459
.49	18	1171
.48	R	?

GEOGRAPHIC
LAT. = 70.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	43	93
9.00	42	94
8.00	40	96
7.00	37	98
6.00	32	98
5.00	29	98
4.00	26	101
3.00	19	104
2.00	7	112
1.90	5	113
1.80	5	114
1.70	3	116
1.60	1	118
1.50	-1	119
1.40	-3	122
1.30	-5	126
1.20	-7	130
1.10	-9	134
1.00	-12	142
.90	-13	151
.80	-12	165
.70	-7	188
.60	9	233
.59	10	243
.58	9	253
.57	6	269
.56	-11	302
.55	1	608
.54	-7	364
.53	0	513
.52	-8	628
.51	-2	704
.50	-16	2461
.49	-11	1074
.48	F	F

GEOGRAPHIC
LAT. = 70.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	42	108
9.00	41	109
8.00	39	110
7.00	36	112
6.00	31	113
5.00	28	112
4.00	24	115
3.00	17	118
2.00	5	126
1.90	4	127
1.80	3	128
1.70	1	130
1.60	-2	132
1.50	-3	134
1.40	-5	137
1.30	-8	141
1.20	-10	145
1.10	-12	151
1.00	-14	159
.90	-15	169
.80	-13	184
.70	-5	211
.69	-3	214
.68	-2	217
.67	-1	221
.66	1	226
.65	4	233
.64	6	239
.63	7	245
.62	8	254
.61	8	267
.60	3	286
.59	-6	310
.58	-18	370
.57	-10	356
.56	3	611
.55	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 70.00 LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	40	123
9.00	39	124
8.00	38	125
7.00	35	127
6.00	30	127
5.00	27	127
4.00	23	130
3.00	15	132
2.00	3	140
1.90	1	141
1.80	0	143
1.70	-1	145
1.60	-4	147
1.50	-6	149
1.40	-8	152
1.30	-10	156
1.20	-13	161
1.10	-15	167
1.00	-17	176
.90	-17	188
.80	-14	205
.70	-2	236
.60	-20	635
.59	1	374
.58	-19	680
.57	6	384
.56	3	415
.55	-5	1125
.54	4	422
.53	3	2904
.52	-1	4864
.51	F	F

GEOGRAPHIC LAT. = 70.00 LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	35	138
9.00	37	138
8.00	36	140
7.00	33	141
6.00	29	142
5.00	25	142
4.00	21	144
3.00	13	147
2.00	0	155
1.90	-2	156
1.80	-3	157
1.70	-5	160
1.60	-7	162
1.50	-9	164
1.40	-11	168
1.30	-14	172
1.20	-16	177
1.10	-15	184
1.00	-19	194
.90	-19	208
.80	-13	228
.70	3	266
.60	5	597
.59	-12	646
.58	-3	1067
.57	-16	1380
.56	-15	620
.55	-9	634
.54	F	F

GEOGRAPHIC LAT. = 70.00 LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	36	152
9.00	35	152
8.00	34	153
7.00	31	155
6.00	26	156
5.00	22	156
4.00	18	158
3.00	10	160
2.00	-3	169
1.90	-5	171
1.80	-7	172
1.70	-8	174
1.60	-11	177
1.50	-13	179
1.40	-15	183
1.30	-18	188
1.20	-19	194
1.10	-21	202
1.00	-22	213
.90	-19	229
.80	-11	252
.70	6	312
.69	4	328
.68	-3	349
.67	-13	398
.66	-13	597
.65	-10	725
.64	R	R

GEOGRAPHIC LAT. = 70.00 LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	34	165
9.00	33	165
8.00	32	166
7.00	29	168
6.00	24	169
5.00	19	168
4.00	16	170
3.00	7	173
2.00	-6	182
1.90	-9	184
1.80	-10	185
1.70	-11	187
1.60	-14	190
1.50	-16	193
1.40	-18	197
1.30	-21	203
1.20	-22	209
1.10	-24	218
1.00	-24	231
.90	-20	248
.80	-8	274
.70	-6	379
.69	-4	624
.68	9	485
.67	-17	589
.66	-13	535
.65	-2	626
.64	10	465
.63	-5	657
.62	6	1124
.61	-7	598
.60	-8	2907
.59	R	R

GEOGRAPHIC LAT. = 70.00 LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	32	176
9.00	32	176
8.00	31	177
7.00	28	180
6.00	23	181
5.00	17	180
4.00	15	182
3.00	5	184
2.00	-8	193
1.90	-10	194
1.80	-12	196
1.70	-13	198
1.60	-16	201
1.50	-18	204
1.40	-20	207
1.30	-23	213
1.20	-24	219
1.10	-26	228
1.00	-26	241
.90	-22	258
.80	-9	284
.79	-8	286
.78	-6	298
.77	-4	295
.76	-1	300
.75	3	308
.74	5	314
.73	7	321
.72	8	329
.71	8	343
.70	3	370
.69	-6	448
.68	8	474
.67	6	516
.66	23	448
.65	R	R

GEOGRAPHIC LAT. = 70.00 LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	32	186
9.00	32	187
8.00	31	188
7.00	28	190
6.00	23	191
5.00	17	190
4.00	15	192
3.00	6	193
2.00	-7	201
1.90	-10	202
1.80	-11	203
1.70	-12	205
1.60	-15	208
1.50	-18	210
1.40	-19	213
1.30	-23	218
1.20	-24	223
1.10	-27	231
1.00	-28	242
.90	-27	257
.80	-19	277
.70	1	313
.69	5	321
.68	8	330
.67	9	337
.66	10	349
.65	8	373
.64	-6	448
.63	-4	675
.62	12	474
.61	-10	1356
.60	11	800
.59	19	811
.58	9	475
.57	5	1944
.56	14	1179
.55	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 70.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	34	196
9.00	33	196
8.00	32	198
7.00	30	200
6.00	24	201
5.00	20	199
4.00	17	200
3.00	9	201
2.00	-3	207
1.90	-6	208
1.80	-7	208
1.70	-8	210
1.60	-11	212
1.50	-13	213
1.40	-15	215
1.30	-19	218
1.20	-21	222
1.10	-24	227
1.00	-27	234
.90	-30	244
.80	-29	258
.70	-24	279
.60	-2	316
.59	3	323
.58	5	329
.57	9	338
.56	13	356
.55	10	380
.54	-1	414
.53	8	555
.52	-4	556
.51	-22	714
.50	-14	608
.49	1	1103
.48	14	831
.47	6	2380
.46	F	F

GEOGRAPHIC
LAT. = 70.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
11.00	37	-154
1.00	36	-153
9.00	35	-152
7.00	33	-150
5.00	24	-150
3.00	24	-152
4.00	22	-151
3.00	14	-151
2.00	4	-147
1.90	1	-147
1.80	0	-147
1.70	0	-146
1.60	-3	-144
1.50	-5	-144
1.40	-7	-143
1.30	-10	-141
1.20	-12	-139
1.10	-15	-137
1.00	-19	-134
.90	-23	-129
.80	-27	-122
.70	-31	-111
.60	-31	-93
.50	-20	-62
.49	-17	-58
.48	-15	-55
.47	-10	-48
.46	-7	-44
.45	-2	-37
.44	4	-28
.43	10	-18
.42	15	2
.41	12	33
.40	-20	341
.39	10	429
.38	R	R

GEOGRAPHIC
LAT. = 70.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	41	-143
9.00	41	-142
8.00	40	-141
7.00	37	-140
6.00	33	-140
5.00	30	-142
4.00	28	-141
3.00	22	-142
2.00	12	-140
1.90	11	-140
1.80	10	-140
1.70	9	-139
1.60	7	-139
1.50	6	-139
1.40	4	-138
1.30	1	-138
1.20	-1	-137
1.10	-3	-136
1.00	-6	-135
.90	-10	-133
.80	-13	-131
.70	-19	-127
.60	-24	-121
.50	-30	-110
.40	-33	-89
.30	-8	-37
.29	1	-27
.28	12	-11
.27	19	22
.26	1	863
.25	10	219
.24	-	142
.23	14	791
.22	F	F

GEOGRAPHIC
LAT. = 70.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	46	-130
9.00	46	-129
8.00	44	-128
7.00	42	-128
6.00	39	-129
5.00	37	-131
4.00	35	-129
3.00	30	-131
2.00	22	-130
1.90	22	-131
1.80	21	-131
1.70	20	-130
1.60	18	-130
1.50	18	-131
1.40	16	-130
1.30	14	-130
1.20	12	-130
1.10	11	-130
1.00	9	-129
.90	6	-129
.80	3	-128
.70	-1	-127
.60	-5	-126
.50	-11	-123
.40	-18	-119
.30	-29	-108
.20	-35	-69
.19	-33	-60
.18	-29	-51
.17	-21	-39
.16	-6	-25
.15	21	6
.14	-18	374
.13	-2	236
.12	F	F

GEOGRAPHIC
LAT. = 70.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	51	-114
9.00	50	-114
8.00	49	-114
7.00	48	-113
6.00	45	-114
5.00	44	-116
4.00	42	-115
3.00	39	-116
2.00	33	-117
1.90	32	-117
1.80	32	-117
1.70	31	-117
1.60	30	-117
1.50	29	-117
1.40	28	-117
1.30	27	-118
1.20	25	-118
1.10	24	-118
1.00	22	-118
.90	21	-118
.80	18	-117
.70	16	-118
.60	13	-118
.50	9	-117
.40	4	-117
.30	-4	-116
.20	-15	-112
.19	-17	-111
.18	-19	-110
.17	-21	-110
.16	-23	-109
.15	-25	-107
.14	-28	-104
.13	-31	-102
.12	-33	-101
.11	-36	-97
.10	-40	-87
.09	-43	-77
.08	-44	-61
.07	-34	-31
.06	19	376
.05	F	F

GEOGRAPHIC
LAT. = 70.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	55	-96
9.00	55	-96
8.00	54	-96
7.00	53	-96
6.00	51	-96
5.00	50	-97
4.00	48	-97
3.00	46	-98
2.00	41	-99
1.90	41	-99
1.80	41	-99
1.70	40	-99
1.60	39	-99
1.50	39	-99
1.40	38	-99
1.30	37	-100
1.20	36	-100
1.10	35	-100
1.00	34	-100
.90	32	-100
.80	31	-100
.70	29	-101
.60	27	-101
.50	24	-101
.40	21	-101
.30	16	-102
.20	9	-102
.10	-5	-104
.09	-7	-104
.08	-10	-103
.07	-13	-104
.06	-17	-104
.05	-21	-105
.04	-28	-104
.03	-35	-105
.02	-45	253
.01	-60	246

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 70.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	58	-74
9.00	57	-75
8.00	57	-75
7.00	56	-74
6.00	55	-74
5.00	54	-74
4.00	53	-75
3.00	50	-75
2.00	47	-75
1.90	46	-75
1.80	46	-75
1.70	46	-75
1.60	45	-75
1.50	45	-76
1.40	44	-75
1.30	43	-76
1.20	42	-75
1.10	42	-76
1.00	41	-76
.90	40	-76
.80	39	-76
.70	37	-76
.60	35	-76
.50	33	-76
.40	31	-77
.30	27	-77
.20	22	-78
.10	13	-80
.09	12	-81
.08	9	-81
.07	8	-82
.06	6	-82
.05	4	-84
.04	0	-84
.03	-2	-87
.02	-6	-89
.01	-8	-94

GEOGRAPHIC
LAT. = 70.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	55	-51
9.00	56	-52
8.00	53	-51
7.00	54	-50
6.00	56	-48
5.00	54	-50
4.00	54	-49
3.00	51	-50
2.00	45	-48
1.90	47	-48
1.80	47	-49
1.70	47	-48
1.60	46	-48
1.50	46	-48
1.40	45	-49
1.30	44	-48
1.20	44	-47
1.10	43	-48
1.00	42	-48
.90	41	-48
.80	40	-47
.70	38	-47
.60	37	-47
.50	35	-47
.40	32	-47
.30	23	-47
.20	24	-47
.10	14	-48
.09	12	-48
.08	11	-48
.07	9	-49
.06	7	-49
.05	5	-50
.04	2	-51
.03	0	-53
.02	-5	-55
.01	-8	-59

GEOGRAPHIC
LAT. = 70.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	56	-29
9.00	57	-30
8.00	57	-29
7.00	56	-26
6.00	54	-24
5.00	52	-26
4.00	52	-25
3.00	48	-25
2.00	45	-22
1.90	44	-22
1.80	44	-23
1.70	44	-22
1.60	42	-21
1.50	42	-22
1.40	41	-21
1.30	40	-21
1.20	40	-20
1.10	39	-21
1.00	37	-20
.90	36	-20
.80	35	-20
.70	33	-19
.60	31	-19
.50	28	-18
.40	25	-17
.30	21	-16
.20	14	-15
.10	1	-12
.09	-1	-11
.08	-3	-12
.07	-6	-11
.06	-10	-10
.05	-13	-10
.04	-18	-10
.03	-26	-7
.02	-33	-8
.01	-46	-10

GEOGRAPHIC
LAT. = 70.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	54	-10
9.00	54	-10
8.00	54	-8
7.00	53	-5
6.00	50	-3
5.00	46	-5
4.00	48	-4
3.00	43	-3
2.00	39	1
1.90	38	1
1.80	37	360
1.70	37	1
1.60	36	2
1.50	35	1
1.40	35	2
1.30	33	2
1.20	32	3
1.10	31	3
1.00	29	4
.90	27	4
.80	26	5
.70	23	7
.60	21	7
.50	17	9
.40	13	11
.30	7	14
.20	-2	19
.10	-21	38
.09	-23	42
.08	-26	53
.07	-27	65
.06	-24	84
.05	-24	247
.04	F	F

GEOGRAPHIC
LAT. = 70.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	50	7
9.00	51	7
8.00	51	9
7.00	50	12
6.00	46	15
5.00	43	13
4.00	43	15
3.00	37	16
2.00	32	20
1.90	31	20
1.80	30	20
1.70	30	20
1.60	28	22
1.50	27	21
1.40	27	22
1.30	24	23
1.20	24	24
1.10	22	24
1.00	19	26
.90	17	27
.80	15	28
.70	13	30
.60	9	32
.50	5	35
.40	-1	40
.30	-8	49
.20	-16	70
.19	-17	75
.18	-16	80
.17	-16	86
.16	-15	93
.15	-11	103
.14	-4	115
.13	9	135
.12	24	206
.11	8	440
.10	F	F

GEOGRAPHIC
LAT. = 70.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	47	22
9.00	48	23
8.00	48	25
7.00	46	28
6.00	42	30
5.00	38	29
4.00	37	31
3.00	32	32
2.00	26	37
1.90	24	38
1.80	23	37
1.70	23	38
1.60	21	40
1.50	19	40
1.40	19	41
1.30	16	42
1.20	15	43
1.10	13	44
1.00	10	46
.90	8	48
.80	5	50
.70	2	54
.60	-2	58
.50	-6	65
.40	-11	77
.30	-12	103
.29	-11	106
.28	-9	111
.27	-8	116
.26	-5	122
.25	-1	129
.24	4	139
.23	10	149
.22	20	168
.21	28	208
.20	-9	278
.19	23	1031
.18	-8	1293
.17	F	F

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 65.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	33	38
9.00	33	38
8.00	32	40
7.00	30	44
6.00	25	47
5.00	20	47
4.00	18	49
3.00	9	55
2.00	1	65
1.90	-1	68
1.80	-3	70
1.70	-4	72
1.60	-4	74
1.50	-7	79
1.40	-8	82
1.30	-9	87
1.20	-10	92
1.10	-11	101
1.00	-9	110
.90	-6	123
.80	2	144
.70	16	190
.69	17	204
.68	14	215
.67	5	235
.66	-27	280
.65	-7	874
.64	-8	524
.63	11	821
.62	R	R

GEOGRAPHIC
LAT. = 65.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	31	52
9.00	31	53
8.00	30	55
7.00	29	58
6.00	23	62
5.00	17	62
4.00	15	65
3.00	5	71
2.00	-3	85
1.90	-5	88
1.80	-7	91
1.70	-8	94
1.60	-8	97
1.50	-10	103
1.40	-10	108
1.30	-10	115
1.20	-9	124
1.10	-6	137
1.00	0	152
.90	11	180
.89	13	185
.88	14	192
.87	16	201
.86	16	210
.85	15	219
.84	12	228
.83	8	237
.82	0	250
.81	-16	274
.80	-1	806
.79	13	522
.78	-2	441
.77	R	R

GEOGRAPHIC
LAT. = 65.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	31	66
9.00	30	67
8.00	29	69
7.00	26	72
6.00	21	75
5.00	15	76
4.00	13	79
3.00	3	87
2.00	-6	103
1.90	-8	107
1.80	-10	111
1.70	-10	114
1.60	-10	119
1.50	-11	127
1.40	-10	132
1.30	-9	143
1.20	-5	155
1.10	3	175
1.00	12	205
.90	-13	328
.89	5	360
.88	7	448
.87	19	430
.86	-18	654
.85	-2	691
.84	7	478
.83	2	739
.82	R	R

GEOGRAPHIC
LAT. = 65.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	30	80
9.00	30	81
8.00	28	85
7.00	25	87
6.00	19	89
5.00	14	90
4.00	11	94
3.00	2	101
2.00	-8	121
1.90	-10	125
1.80	-11	129
1.70	-11	133
1.60	-11	139
1.50	-11	148
1.40	-9	155
1.30	-6	169
1.20	0	183
1.10	11	216
1.09	11	220
1.08	12	224
1.07	12	229
1.06	12	233
1.05	11	239
1.04	10	246
1.03	7	255
1.02	1	268
1.01	-12	289
1.00	-21	356
.99	15	499
.98	17	475
.97	1	957
.96	-3	612
.95	R	R

GEOGRAPHIC
LAT. = 65.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	30	95
9.00	29	96
8.00	28	98
7.00	24	101
6.00	18	103
5.00	13	104
4.00	10	109
3.00	0	116
2.90	0	117
2.80	-1	119
2.70	-2	121
2.60	-3	123
2.50	-5	125
2.40	-7	127
2.30	-8	129
2.20	-8	130
2.10	-9	133
2.00	-10	137
1.90	-12	142
1.80	-13	146
1.70	-12	151
1.60	-13	158
1.50	-12	168
1.40	-9	176
1.30	-4	193
1.20	3	211
1.10	7	264
1.09	4	272
1.08	-1	281
1.07	-7	293
1.06	-17	312
1.05	-21	363
1.04	12	487
1.03	4	380
1.02	7	413
1.01	23	463
1.00	R	R

GEOGRAPHIC
LAT. = 65.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	36	110
9.00	28	111
8.00	26	113
7.00	23	116
6.00	17	118
5.00	12	119
4.00	8	124
3.00	-1	131
2.90	-2	132
2.80	-3	134
2.70	-4	136
2.60	-6	138
2.50	-8	140
2.40	-9	142
2.30	-10	144
2.20	-10	146
2.10	-11	149
2.00	-13	154
1.90	-14	159
1.80	-14	163
1.70	-14	168
1.60	-14	177
1.50	-12	187
1.40	-9	197
1.30	-2	216
1.20	5	240
1.10	-21	368
1.09	25	817
1.08	22	442
1.07	5	498
1.06	6	449
1.05	10	488
1.04	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 65.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	28	126
9.00	27	127
8.00	25	129
7.00	21	131
6.00	16	133
5.00	11	134
4.00	6	139
3.00	-4	147
2.90	-15	171
1.90	-17	176
1.80	-16	181
1.70	-16	187
1.60	-16	197
1.50	-13	207
1.40	-9	220
1.30	0	242
1.20	6	279
1.19	5	288
1.18	3	298
1.17	-2	311
1.16	-10	330
1.15	-19	367
1.14	4	788
1.13	-5	556
1.12	11	492
1.11	7	388
1.10	17	408
1.09	19	417
1.08	R	R

GEOGRAPHIC
LAT. = 65.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	26	141
9.00	24	142
8.00	23	144
7.00	19	146
6.00	15	148
5.00	8	150
4.00	3	154
3.00	-7	163
2.90	-5	164
2.80	-3	166
2.70	-10	168
2.60	-12	170
2.50	-13	173
2.40	-15	175
2.30	-16	178
2.20	-16	181
2.10	-17	184
2.00	-18	189
1.90	-13	196
1.80	-13	202
1.70	-14	208
1.60	-17	219
1.50	-12	231
1.40	-7	246
1.30	4	277
1.20	-16	381
1.19	10	467
1.18	-15	582
1.17	17	585
1.16	16	534
1.15	23	428
1.14	R	R

GEOGRAPHIC
LAT. = 65.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	22	156
9.00	21	156
8.00	20	158
7.00	17	161
6.00	11	163
5.00	4	165
4.00	0	169
3.00	-11	179
2.90	-12	180
2.80	-13	182
2.70	-14	184
2.60	-15	187
2.50	-17	190
2.40	-19	193
2.30	-20	196
2.20	-20	199
2.10	-21	203
2.00	-22	209
1.90	-22	216
1.80	-21	224
1.70	-19	231
1.60	-16	244
1.50	-9	259
1.40	-1	279
1.39	0	282
1.38	1	285
1.37	3	289
1.36	4	294
1.35	5	300
1.34	6	307
1.33	6	314
1.32	5	323
1.31	3	333
1.30	-1	346
1.29	-7	362
1.28	-13	390
1.27	17	461
1.26	-10	517
1.25	R	R

GEOGRAPHIC
LAT. = 65.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	19	169
9.00	18	170
8.00	17	171
7.00	14	174
6.00	8	177
5.00	0	178
4.00	-4	183
3.00	-16	194
2.90	-16	195
2.80	-16	197
2.70	-17	199
2.60	-19	202
2.50	-21	206
2.40	-23	210
2.30	-24	213
2.20	-23	217
2.10	-23	221
2.00	-24	227
1.90	-24	236
1.80	-21	245
1.70	-18	253
1.60	-14	267
1.50	-2	288
1.40	6	317
1.39	8	322
1.38	6	329
1.37	6	337
1.36	4	348
1.35	1	363
1.34	-6	387
1.33	4	454
1.32	0	479
1.31	4	486
1.30	23	439
1.29	9	535
1.28	0	679
1.27	R	R

GEOGRAPHIC
LAT. = 65.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	17	181
9.00	17	181
8.00	16	183
7.00	13	186
6.00	6	189
5.00	-2	190
4.00	-6	194
3.00	-18	206
2.90	-19	207
2.80	-19	209
2.70	-20	211
2.60	-21	214
2.50	-23	218
2.40	-25	222
2.30	-26	227
2.20	-26	230
2.10	-26	234
2.00	-26	240
1.90	-26	250
1.80	-23	260
1.70	-19	268
1.60	-14	281
1.50	0	305
1.40	8	337
1.39	8	343
1.38	7	351
1.37	6	361
1.36	3	375
1.35	-3	397
1.34	-1	454
1.33	-9	524
1.32	8	423
1.31	16	438
1.30	-3	632
1.29	-4	514
1.28	R	R

GEOGRAPHIC
LAT. = 65.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	17	191
9.00	16	191
8.00	16	193
7.00	12	196
6.00	5	199
5.00	-3	200
4.00	-6	204
3.00	-19	214
2.90	-19	215
2.80	-19	216
2.70	-20	218
2.60	-21	221
2.50	-24	225
2.40	-26	229
2.30	-27	232
2.20	-27	236
2.10	-27	239
2.00	-28	244
1.90	-28	253
1.80	-27	262
1.70	-24	269
1.60	-21	280
1.50	-10	298
1.40	0	315
1.38	6	385
1.29	-1	411
1.28	6	483
1.27	1	758
1.26	28	447
1.25	13	554
1.24	-3	1238
1.23	16	523
1.22	-18	578
1.21	4	852
1.20	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 65.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	19	200
9.00	16	201
8.00	18	203
7.00	14	206
6.00	7	208
5.00	0	208
4.00	-3	211
3.00	-15	218
2.00	-27	240
1.90	-29	247
1.80	-30	253
1.70	-29	258
1.60	-29	266
1.50	-26	279
1.40	-21	288
1.30	-12	307
1.20	3	329
1.19	4	332
1.18	6	336
1.17	8	341
1.16	10	348
1.15	12	357
1.14	13	369
1.13	11	385
1.12	4	409
1.11	-4	462
1.10	3	619
1.09	11	498
1.08	-1	575
1.07	21	495
1.06	R	R

GEOGRAPHIC
LAT. = 65.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	23	-150
9.00	22	-149
8.00	21	-147
7.00	15	-145
6.00	12	-144
5.00	6	-145
4.00	5	-142
3.00	-4	-139
2.00	-21	-125
1.90	-24	-122
1.80	-26	-119
1.70	-27	-116
1.60	-29	-111
1.50	-31	-104
1.40	-31	-99
1.30	-31	-87
1.20	-29	-78
1.10	-22	-61
1.00	-9	-40
.90	14	6
.89	15	23
.88	12	39
.87	5	61
.86	-4	99
.85	-3	267
.84	4	160
.83	15	174
.82	-3	617
.81	-25	327
.80	-4	415
.79	-16	354
.78	2	454
.77	-10	392
.76	6	147
.75	R	R

GEOGRAPHIC
LAT. = 65.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	28	-139
9.00	28	-138
8.00	28	-137
7.00	23	-135
6.00	17	-134
5.00	13	-136
4.00	11	-134
3.00	2	-133
2.00	-11	-126
1.90	-14	-125
1.80	-15	-124
1.70	-16	-122
1.60	-19	-120
1.50	-21	-118
1.40	-23	-115
1.30	-26	-111
1.20	-28	-106
1.10	-31	-99
1.00	-33	-89
.90	-32	-77
.80	-27	-59
.70	-12	-35
.69	-8	-30
.68	-5	-27
.67	-2	-24
.66	0	-20
.65	5	-14
.64	10	-5
.63	15	4
.62	17	14
.61	13	29
.60	9	65
.59	-12	395
.58	8	212
.57	13	501
.56	R	R

GEOGRAPHIC
LAT. = 65.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	34	-126
9.00	33	-126
8.00	32	-124
7.00	29	-123
6.00	25	-123
5.00	22	-125
4.00	19	-125
3.00	12	-124
2.00	2	-120
1.90	0	-121
1.80	-1	-121
1.70	-2	-119
1.60	-5	-118
1.50	-6	-118
1.40	-8	-117
1.30	-11	-116
1.20	-13	-114
1.10	-16	-112
1.00	-20	-110
.90	-23	-106
.80	-27	-100
.70	-31	-91
.60	-34	-77
.50	-30	-53
.40	2	-10
.39	10	0
.38	17	11
.37	22	40
.36	-3	105
.35	2	200
.34	23	439
.33	8	539
.32	-1	162
.31	F	F

GEOGRAPHIC
LAT. = 65.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	40	-113
9.00	39	-111
8.00	38	-110
7.00	35	-109
6.00	32	-110
5.00	30	-111
4.00	27	-113
3.00	22	-111
2.00	14	-103
1.90	13	-110
1.80	12	-110
1.70	11	-109
1.60	9	-109
1.50	8	-109
1.40	6	-108
1.30	5	-108
1.20	3	-107
1.10	1	-107
1.00	-2	-107
.90	-5	-105
.80	-8	-104
.70	-12	-102
.60	-17	-99
.50	-23	-94
.40	-30	-83
.30	-35	-59
.29	-35	-55
.28	-34	-50
.27	-33	-45
.26	-31	-39
.25	-28	-33
.24	-24	-25
.23	-18	-19
.22	-9	-10
.21	4	2
.20	23	25
.19	-13	102
.18	-3	672
.17	-17	238
.16	F	F

GEOGRAPHIC
LAT. = 65.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	45	-93
9.00	44	-93
8.00	43	-92
7.00	41	-92
6.00	39	-92
5.00	37	-93
4.00	35	-92
3.00	31	-93
2.00	24	-93
1.90	23	-93
1.80	23	-93
1.70	22	-93
1.60	21	-93
1.50	20	-93
1.40	18	-92
1.30	17	-93
1.20	16	-92
1.10	14	-92
1.00	12	-92
.90	10	-92
.80	8	-91
.70	5	-91
.60	1	-90
.50	-3	-89
.40	-9	-87
.30	-17	-82
.20	-30	-71
.19	-32	-66
.18	-34	-65
.17	-35	-68
.16	-37	-95
.15	-38	-49
.14	-39	-43
.13	-38	-34
.12	-33	-19
.11	-25	-5
.10	1	17
.09	-10	581
.08	F	F

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 85.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	47	-72
9.00	47	-72
8.00	46	-72
7.00	45	-71
6.00	43	-71
5.00	41	-72
4.00	39	-71
3.00	36	-72
2.00	31	-71
1.90	30	-71
1.80	30	-71
1.70	29	-71
1.60	28	-71
1.50	27	-71
1.40	26	-70
1.30	25	-71
1.20	24	-70
1.10	23	-70
1.00	21	-70
.90	19	-70
.80	17	-69
.70	15	-69
.60	12	-69
.50	9	-68
.40	4	-67
.30	-2	-66
.20	-12	-62
.10	-35	-46
.09	-37	-39
.08	-40	-34
.07	-42	-18
.06	-39	9
.05	1	167
.04	F	F

GEOGRAPHIC
LAT. = 65.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	48	-50
9.00	48	-50
8.00	48	-50
7.00	47	-48
6.00	44	-47
5.00	42	-48
4.00	41	-47
3.00	37	-47
2.00	32	-45
1.90	31	-46
1.80	31	-46
1.70	30	-45
1.60	29	-45
1.50	28	-45
1.40	26	-44
1.30	26	-45
1.20	25	-44
1.10	24	-44
1.00	22	-44
.90	21	-43
.80	19	-43
.70	17	-42
.60	14	-41
.50	11	-40
.40	6	-39
.30	0	-37
.20	-10	-33
.10	-23	-15
.09	-32	-12
.08	-35	-6
.07	-37	8
.06	-37	23
.05	-3	70
.04	-3	285
.03	F	F

GEOGRAPHIC
LAT. = 65.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	46	-28
9.00	46	-29
8.00	46	-28
7.00	45	-25
6.00	42	-23
5.00	39	-24
4.00	39	-24
3.00	34	-23
2.00	29	-20
1.90	27	-20
1.80	27	-20
1.70	27	-20
1.60	25	-19
1.50	24	-19
1.40	24	-18
1.30	22	-18
1.20	21	-17
1.10	19	-17
1.00	17	-16
.90	15	-15
.80	13	-14
.70	11	-13
.60	7	-11
.50	4	-9
.40	-1	-6
.30	-8	-1
.20	-19	12
.19	-20	14
.18	-21	18
.17	-22	19
.16	-23	23
.15	-24	28
.14	-25	33
.13	-24	42
.12	-24	49
.11	-19	62
.10	-5	80
.09	37	131
.08	-4	232
.07	F	F

GEOGRAPHIC
LAT. = 65.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	42	-9
9.00	43	-9
8.00	43	-8
7.00	42	-9
6.00	38	-2
5.00	34	-3
4.00	34	-3
3.00	28	-1
2.00	22	4
1.90	20	4
1.80	19	4
1.70	19	4
1.60	18	6
1.50	16	6
1.40	16	6
1.30	13	8
1.20	13	9
1.10	10	10
1.00	8	11
.90	6	13
.80	3	15
.70	0	18
.60	-3	22
.50	-8	27
.40	-13	36
.30	-17	54
.29	-17	57
.28	-16	61
.27	-16	64
.26	-15	68
.25	-14	73
.24	-12	77
.23	-10	84
.22	-7	89
.21	-1	97
.20	6	107
.19	18	123
.18	30	158
.17	4	664
.16	20	777
.15	F	F

GEOGRAPHIC
LAT. = 65.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	39	8
9.00	39	8
8.00	39	10
7.00	36	13
6.00	34	16
5.00	29	15
4.00	28	16
3.00	21	19
2.00	14	25
1.90	12	26
1.80	11	27
1.70	10	27
1.60	9	29
1.50	7	30
1.40	6	31
1.30	4	33
1.20	3	34
1.10	-1	37
1.00	-2	40
.90	-5	44
.80	-8	48
.70	-10	53
.60	-12	63
.50	-12	79
.40	-3	107
.39	0	112
.38	2	116
.37	6	122
.36	10	129
.35	14	137
.34	20	149
.33	24	167
.32	20	194
.31	-25	256
.30	1	312
.29	3	454
.28	6	494
.27	F	F

GEOGRAPHIC
LAT. = 65.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	35	23
9.00	35	24
8.00	35	26
7.00	34	29
6.00	29	32
5.00	24	32
4.00	23	33
3.00	14	38
2.00	7	46
1.90	5	48
1.80	3	49
1.70	2	49
1.60	2	52
1.50	-2	54
1.40	-2	56
1.30	-4	59
1.20	-6	62
1.10	-8	67
1.00	-9	73
.90	-11	79
.80	-11	90
.70	-8	105
.60	2	129
.50	15	203
.49	3	229
.48	-8	341
.47	8	313
.46	22	442
.45	-18	964
.44	6	570
.43	13	441
.42	3	1002
.41	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 60.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	20	42
9.00	20	42
8.00	19	44
7.00	18	48
6.00	12	53
5.00	4	57
4.00	2	60
3.00	-8	74
2.90	-8	75
2.80	-8	76
2.70	-8	78
2.60	-8	80
2.50	-8	83
2.40	-10	87
2.30	-11	92
2.20	-11	96
2.10	-11	99
2.00	-9	102
1.90	-9	108
1.80	-8	117
1.70	-4	126
1.60	0	133
1.50	9	148
1.40	16	174
1.30	14	213
1.29	10	222
1.28	4	234
1.27	-7	250
1.26	-26	290
1.25	1	676
1.24	-14	387
1.23	-4	649
1.22	9	384
1.21	R	R

GEOGRAPHIC
LAT. = 60.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	18	56
9.00	18	57
8.00	17	59
7.00	15	63
6.00	9	69
5.00	1	73
4.00	-1	78
3.00	-10	95
2.90	-10	97
2.80	-10	99
2.70	-9	100
2.60	-9	103
2.50	-10	107
2.40	-10	112
2.30	-11	119
2.20	-9	124
2.10	-7	129
2.00	-5	136
1.90	-3	142
1.80	2	156
1.70	11	174
1.60	15	193
1.50	-4	256
1.49	-18	277
1.48	-13	352
1.47	-14	673
1.46	-10	334
1.45	4	351
1.44	15	408
1.43	3	681
1.42	R	R

GEOGRAPHIC
LAT. = 60.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	17	70
9.00	17	71
8.00	16	74
7.00	15	78
6.00	7	84
5.00	-1	88
4.00	-3	94
3.00	-11	115
2.90	-11	117
2.80	-10	119
2.70	-10	121
2.60	-10	125
2.50	-10	130
2.40	-10	136
2.30	-9	144
2.20	-6	151
2.10	-2	157
2.00	0	164
1.90	5	177
1.80	13	202
1.70	5	249
1.69	1	255
1.68	-3	262
1.67	-9	271
1.66	-16	282
1.65	-24	299
1.64	-26	337
1.63	R	R

GEOGRAPHIC
LAT. = 60.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	17	84
9.00	17	86
8.00	15	89
7.00	12	93
6.00	5	98
5.00	-2	103
4.00	-4	110
3.00	-12	132
2.90	-11	134
2.80	-11	137
2.70	-11	140
2.60	-10	145
2.50	-10	151
2.40	-9	158
2.30	-6	167
2.20	-3	174
2.10	1	182
2.00	4	193
1.90	10	214
1.80	0	268
1.79	-6	278
1.78	-15	292
1.77	-25	315
1.76	-14	367
1.75	-4	534
1.74	-4	367
1.73	-2	334
1.72	20	501
1.71	-6	922
1.70	-2	404
1.69	21	446
1.68	13	404
1.67	12	408
1.66	R	R

GEOGRAPHIC
LAT. = 60.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	17	99
9.00	16	101
8.00	14	104
7.00	11	108
6.00	4	113
5.00	-3	118
4.00	-6	126
3.00	-13	149
2.90	-12	152
2.80	-12	155
2.70	-12	159
2.60	-11	164
2.50	-11	171
2.40	-9	180
2.30	-5	188
2.20	-1	197
2.10	3	206
2.00	7	222
1.90	8	259
1.80	-5	367
1.79	14	533
1.78	14	444
1.77	8	364
1.76	0	1263
1.75	-1	523
1.74	R	R

GEOGRAPHIC
LAT. = 60.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	16	115
9.00	15	116
8.00	13	119
7.00	9	123
6.00	2	128
5.00	-4	133
4.00	-8	142
3.00	-14	167
2.90	-14	169
2.80	-13	173
2.70	-13	178
2.60	-13	184
2.50	-12	192
2.40	-8	201
2.30	-4	210
2.20	0	220
2.10	4	232
2.00	7	256
1.90	-22	391
1.89	22	438
1.88	4	733
1.87	2	764
1.86	24	418
1.85	10	373
1.84	8	367
1.83	8	429
1.82	12	418
1.81	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 60.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	15	131
9.00	13	132
8.00	11	135
7.00	7	139
6.00	9	144
5.00	-6	149
4.00	-16	159
3.00	-16	185
2.90	-16	189
2.80	-15	193
2.70	-15	198
2.60	14	205
2.50	-12	214
2.40	-8	224
2.30	-3	235
2.20	2	247
2.10	5	265
2.00	-1	309
1.99	-5	318
1.98	-10	338
1.97	-16	348
1.96	-17	383
1.95	1	463
1.94	8	788
1.93	7	374
1.92	9	461
1.91	22	415
1.90	9	767
1.89	-4	567
1.88	R	R

GEOGRAPHIC
LAT. = 60.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	12	147
9.00	10	148
8.00	9	151
7.00	5	155
6.00	-1	160
5.00	-10	166
4.00	-14	176
3.00	-13	207
2.90	-17	210
2.80	-17	215
2.70	16	221
2.60	-15	228
2.50	-10	239
2.40	-2	251
2.30	1	266
2.20	5	286
2.10	0	321
2.09	-7	328
2.08	-9	335
2.07	-8	345
2.06	-12	359
2.05	-15	381
2.04	0	425
2.03	0	477
2.02	14	512
2.01	16	487
2.00	10	535
1.99	11	591
1.98	9	791
1.97	-8	410
1.96	6	477
1.95	R	R

GEOGRAPHIC
LAT. = 60.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	8	162
9.00	7	163
8.00	5	166
7.00	1	170
6.00	-4	176
5.00	-14	183
4.00	-18	194
3.00	-19	231
2.90	-18	235
2.80	-16	240
2.70	-15	246
2.60	-12	255
2.50	-7	268
2.40	1	286
2.30	6	317
2.20	-13	395
2.19	-6	422
2.18	15	531
2.17	-7	514
2.16	-23	611
2.15	-8	542
2.14	19	419
2.13	0	404
2.12	-9	513
2.11	20	441
2.10	-1	607
2.09	15	539
2.08	-1	663
2.07	-21	654
2.06	R	R

GEOGRAPHIC
LAT. = 60.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	4	176
9.00	3	177
8.00	2	180
7.00	-2	184
6.00	-9	191
5.00	-19	199
4.00	-21	212
3.00	-19	255
2.90	-16	260
2.80	-14	265
2.70	-11	272
2.60	-7	282
2.50	0	299
2.40	7	333
2.30	0	493
2.29	7	402
2.28	9	404
2.27	15	579
2.26	13	559
2.25	12	763
2.24	18	496
2.23	11	520
2.22	25	431
2.21	27	453
2.20	R	R

GEOGRAPHIC
LAT. = 60.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	1	188
9.00	0	189
8.00	-1	192
7.00	-4	196
6.00	-12	203
5.00	-22	213
4.00	-24	225
3.90	-24	227
3.80	-25	230
3.70	-25	233
3.60	-26	237
3.50	-27	242
3.40	-27	248
3.30	-26	254
3.20	-24	268
3.10	-22	266
3.00	-19	272
2.90	-15	277
2.80	-12	283
2.70	-9	289
2.60	-5	299
2.50	2	317
2.40	8	361
2.39	6	378
2.38	3	381
2.37	-1	395
2.36	-5	417
2.35	2	463
2.34	7	628
2.33	11	566
2.32	16	473
2.31	21	479
2.30	5	694
2.29	8	597
2.28	-21	622
2.27	23	440
2.26	26	468
2.25	R	R

GEOGRAPHIC
LAT. = 60.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	1	198
9.00	0	199
8.00	-1	201
7.00	-4	206
6.00	-12	213
5.00	-23	221
4.00	-25	232
3.00	-24	275
2.90	-21	280
2.80	-18	284
2.70	-16	290
2.60	-12	297
2.50	-6	309
2.40	4	378
2.30	8	385
2.20	21	447
2.19	2	623
2.18	17	529
2.17	24	458
2.16	7	528
2.15	22	483
2.14	R	R

TABLE A. (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 60.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	3	287
9.00	3	288
8.00	2	2[illegible]
7.00	-1	214
6.00	-10	228
5.00	-20	225
4.00	-23	233
3.00	-30	266
2.90	-29	269
2.80	-28	273
2.70	-27	276
2.60	-25	282
2.50	-23	290
2.40	-18	301
2.30	-9	314
2.20	2	329
2.10	9	344
2.00	12	379
1.99	11	386
1.90	17	393
1.97	8	403
1.96	4	416
1.95	-1	437
1.94	8	483
1.93	6	725
1.92	4	502
1.91	14	463
1.90	-5	607
1.89	-15	586
1.88	-18	651
1.87	-13	655
1.86	R	R

GEOGRAPHIC
LAT. = 60.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	8	-144
9.00	7	-144
8.00	6	-142
7.00	3	-138
6.00	-5	-134
5.00	-14	-132
4.00	-17	-127
3.00	-39	-108
2.90	-30	-106
2.80	-23	-104
2.70	-30	-101
2.60	-33	-95
2.50	-31	-91
2.40	-32	-86
2.30	-30	-76
2.20	-28	-70
2.10	-25	-65
2.00	-22	-58
1.99	-16	-46
1.90	-9	-29
1.80	3	-9
1.70	14	33
1.69	13	44
1.60	1	60
1.57	0	86
1.56	13	199
1.55	8	884
1.54	3	126
1.53	17	1[illegible]
1.52	-13	211
1.51	R	R

GEOGRAPHIC
LAT. = 60.00
LONG. = 215.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	14	-135
9.00	14	-134
8.00	12	-132
7.00	9	-129
6.00	2	-127
5.00	-5	-127
4.00	-8	-123
3.00	-21	-115
2.90	-21	-114
2.80	-21	-113
2.70	-22	-111
2.60	-24	-109
2.50	-26	-106
2.40	-28	-103
2.30	-30	-100
2.20	-30	-97
2.10	-30	-85
2.00	-31	-93
1.90	-33	-87
1.80	-32	-79
1.70	-31	-70
1.69	-29	-61
1.60	-24	-48
1.60	-17	-38
1.57	-2	-13
1.20	16	15
1.19	17	28
1.18	18	28
1.17	18	38
1.16	16	53
1.15	7	76
1.14	1	161
1.13	-4	364
1.12	-5	183
1.11	-8	224
1.10	5	208
1.09	R	R

GEOGRAPHIC
LAT. = 60.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	21	-123
9.00	21	-122
8.00	19	-120
7.00	16	-118
6.00	10	-117
5.00	5	-119
4.00	2	-116
3.00	-8	-113
2.00	-21	-102
1.90	-24	-100
1.80	-25	-98
1.70	-28	-95
1.60	-29	-91
1.50	-31	-86
1.40	-31	-8[illegible]
1.30	-33	-7[illegible]
1.20	-33	-66
1.10	-31	-[illegible]
1.00	-25	-38
.90	-11	-20
.80	17	18
.79	19	24
.78	20	32
.77	21	45
.76	17	69
.75	-7	129
.74	-4	343
.73	22	441
.72	-5	213
.71	-5	384
.70	-6	906
.69	4	429
.68	-12	3[illegible]
.67	-10	1074
.66	-9	901
.65	R	R

GEOGRAPHIC
LAT. = 60.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	28	-108
9.00	27	-107
8.00	26	-106
7.00	22	-105
6.00	18	-105
5.00	14	-106
4.00	11	-104
3.00	4	-104
2.00	-7	-98
1.90	-9	-98
1.80	-10	-98
1.70	-11	-98
1.60	-14	-95
1.50	-16	-96
1.40	-17	-92
1.30	-20	-90
1.20	-22	-87
1.10	-25	-84
1.00	-28	-78
.90	-31	-71
.80	-33	-62
.70	-32	-46
.60	-29	-25
.50	6	9
.49	10	15
.48	16	23
.47	23	37
.46	25	55
.45	10	99
.44	-19	234
.43	2	791
.42	R	R

GEOGRAPHIC
LAT. = 60.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	33	-90
9.00	33	-90
8.00	31	-89
7.00	29	-88
6.00	25	-88
5.00	23	-89
4.00	20	-83
3.00	14	-83
2.00	5	-85
1.99	6	-85
1.80	3	-85
1.70	2	-84
1.60	0	-84
1.50	-1	-84
1.40	-3	-82
1.30	-5	-87
1.20	-7	-88
1.10	-9	-79
1.00	-12	-78
.90	-15	-76
.80	-19	-73
.70	-23	-68
.60	-27	-62
.50	-31	-58
.40	-32	-28
.30	-3	14
.29	5	21
.28	15	32
.27	26	59
.26	23	98
.25	-6	696
.24	-11	1394
.23	-6	1856
.22	0	3288
.21	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1979.0)

GEOGRAPHIC
LAT. = 60.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	37	-70
9.00	36	-70
8.00	35	-69
7.00	34	-68
6.00	30	-67
5.00	28	-66
4.00	25	-67
3.00	21	-67
2.00	13	-65
1.90	12	-65
1.80	11	-65
1.70	10	-64
1.60	9	-64
1.50	8	-64
1.40	6	-63
1.30	4	-63
1.20	3	-62
1.10	1	-61
1.00	-1	-60
.90	-4	-59
.80	-7	-57
.70	-11	-55
.60	-15	-52
.50	-20	-47
.40	-25	-38
.30	-30	-19
.29	-31	-16
.28	-30	-12
.27	-30	-9
.26	-29	-5
.25	-28	0
.24	-26	5
.23	-23	11
.22	-20	17
.21	-14	23
.20	-5	32
.19	7	42
.18	27	63
.17	-8	198
.16	R	R

GEOGRAPHIC
LAT. = 60.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	37	-48
9.00	37	-48
8.00	36	-48
7.00	35	-46
6.00	32	-44
5.00	28	-45
4.00	25	-44
3.00	22	-44
2.00	15	-40
1.90	14	-40
1.80	13	-40
1.70	13	-40
1.60	11	-39
1.50	10	-39
1.40	[illegible]	-38
1.30	7	-37
1.20	5	-36
1.10	3	-36
1.00	1	-35
.90	-1	-33
.80	-4	-31
.70	-7	-29
.60	-11	-26
.50	-16	-20
.40	-21	-12
.30	-25	6
.20	-6	53
.19	5	62
.18	19	77
.17	33	122
.16	7	1359
.15	6	231
.14	12	4057
.13	F	F

GEOGRAPHIC
LAT. = 60.00
LONG. = 300.0

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	35	-27
9.00	35	-27
8.00	35	-26
7.00	34	-23
6.00	30	-21
5.00	26	-22
4.00	25	-21
3.00	18	-19
2.00	12	-14
1.90	10	-13
1.80	9	-13
1.70	9	-13
1.60	7	-11
1.50	5	-11
1.40	4	-10
1.30	2	-8
1.20	1	-7
1.10	-2	-6
1.00	-4	-3
.90	-7	-1
.80	-9	2
.70	-12	7
.60	-15	13
.50	-18	23
.40	-18	41
.30	-1	78
.29	4	82
.28	10	89
.27	17	99
.26	26	115
.25	29	151
.24	12	332
.23	12	362
.22	-17	343
.21	-3	2766
.20	F	F

GEOGRAPHIC
LAT. = 60.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	31	-7
9.00	31	-7
8.00	31	-6
7.00	30	-3
6.00	26	1
5.00	20	1
4.00	19	1
3.00	11	5
2.00	5	12
1.90	3	14
1.80	0	15
1.70	0	15
1.60	-1	17
1.50	-4	20
1.40	-4	21
1.30	-6	24
1.20	-8	26
1.10	-10	30
1.00	-12	35
.90	-13	40
.80	-15	49
.70	-14	59
.60	-10	75
.50	6	104
.49	8	107
.48	12	114
.47	16	119
.46	19	126
.45	24	138
.44	25	149
.43	23	174
.42	9	197
.41	-20	342
.40	0	293
.39	R	R

GEOGRAPHIC
LAT. = 60.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	26	11
9.00	26	11
8.00	26	12
7.00	25	16
6.00	21	20
5.00	14	21
4.00	13	22
3.00	4	29
2.00	-3	40
1.90	-5	43
1.80	-6	46
1.70	-8	47
1.60	-8	50
1.50	-11	55
1.40	-11	58
1.30	-12	63
1.20	-12	70
1.10	-12	79
1.00	-9	87
.90	-3	101
.80	8	124
.70	15	198
.69	7	211
.68	-6	231
.67	4	396
.66	1	575
.65	8	400
.64	R	R

GEOGRAPHIC
LAT. = 60.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	22	27
9.00	22	27
8.00	22	29
7.00	21	32
6.00	18	37
5.00	8	48
4.00	7	42
3.00	-3	52
2.00	-9	70
1.90	-10	74
1.80	-11	80
1.70	-11	84
1.60	-10	88
1.50	-10	96
1.40	-7	106
1.30	-4	114
1.20	5	131
1.10	14	153
1.00	9	218
.99	1	229
.98	-17	256
.97	9	484
.96	-18	314
.95	-4	488
.94	-19	649
.93	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 55.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	6	49
9.00	6	50
8.00	6	52
7.00	5	57
6.00	-1	65
5.00	-9	75
4.00	-10	86
3.90	-10	87
3.80	-9	89
3.70	-9	91
3.60	-9	94
3.50	-10	97
3.40	-10	101
3.30	-10	106
3.20	-9	111
3.10	-8	116
3.00	-6	122
2.90	-3	127
2.80	0	132
2.70	3	137
2.60	6	143
2.50	8	151
2.40	13	165
2.30	17	193
2.20	-27	291
2.19	-13	590
2.18	-5	493
2.17	-8	526
2.16	18	365
2.15	28	461
2.14	-9	369
2.13	19	483
2.12	-5	750
2.11	5	681
2.10	R	R

GEOGRAPHIC
LAT. = 55.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	5	64
9.00	4	65
8.00	4	68
7.00	2	73
6.00	-3	82
5.00	-11	95
4.00	-10	109
3.80	4	158
3.90	3	167
3.80	13	177
3.70	16	190
3.60	16	206
3.50	6	237
3.49	3	242
3.48	-1	246
3.47	-5	255
3.46	-11	264
3.45	-19	277
3.44	-25	299
3.43	-13	351
3.42	1	479
3.41	15	462
3.40	-3	357
3.39	3	658
3.38	-3	697
3.37	13	924
3.36	-15	559
3.35	R	R

GEOGRAPHIC
LAT. = 55.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	4	78
9.00	3	80
8.00	3	83
7.00	1	89
6.00	-5	99
5.00	-12	113
4.00	-9	129
3.90	-9	131
3.80	-8	134
3.70	-8	138
3.60	-7	142
3.50	-6	147
3.40	-5	154
3.30	-2	161
3.20	2	170
3.10	7	181
3.00	12	195
2.90	15	212
2.80	11	236
2.70	-13	274
2.69	-18	282
2.68	-22	292
2.67	-26	307
2.66	-26	331
2.65	0	373
2.64	3	719
2.63	R	R

GEOGRAPHIC
LAT. = 55.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	4	93
9.00	3	95
8.00	2	98
7.00	-1	105
6.00	-7	115
5.00	-13	130
4.00	-9	148
3.90	-8	151
3.80	-8	154
3.70	-7	159
3.60	-6	164
3.50	-5	170
3.40	-2	178
3.30	2	187
3.20	7	199
3.10	12	215
3.00	12	236
2.90	-1	268
2.89	-4	273
2.88	-8	278
2.87	-12	284
2.86	-16	291
2.85	-21	300
2.84	-25	312
2.83	-27	330
2.82	-18	358
2.81	23	457
2.80	14	1133
2.79	R	R

GEOGRAPHIC
LAT. = 55.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	3	106
9.00	2	110
8.00	1	114
7.00	-2	121
6.00	-9	131
5.00	-14	147
4.00	-9	167
3.90	-9	171
3.80	-8	175
3.70	-7	180
3.60	-6	186
3.50	-3	194
3.40	0	203
3.30	5	215
3.20	9	231
3.10	10	254
3.00	-8	292
2.90	2	377
2.89	9	513
2.88	-2	340
2.87	-14	346
2.86	-6	598
2.85	19	509
2.84	3	351
2.83	4	749
2.82	5	410
2.81	3	548
2.80	3	612
2.79	R	R

GEOGRAPHIC
LAT. = 55.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	2	124
9.00	1	126
8.00	0	130
7.00	-4	137
6.00	-11	148
5.00	-15	165
4.00	-10	187
3.90	-10	192
3.80	-9	197
3.70	-7	203
3.60	-5	210
3.50	-2	219
3.40	3	231
3.30	7	247
3.20	7	271
3.10	-12	315
3.09	-17	323
3.08	-21	334
3.07	-24	350
3.06	-19	374
3.05	15	416
3.04	15	498
3.03	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 55.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	0	140
9.00	-1	143
8.00	-3	147
7.00	-7	154
6.00	-14	165
5.00	-17	184
4.90	-17	186
4.80	-17	188
4.70	-16	190
4.60	-15	192
4.50	-15	194
4.40	-14	196
4.30	-13	199
4.20	-13	202
4.10	-12	205
4.00	-11	209
3.90	-10	214
3.80	-9	220
3.70	-6	227
3.60	-3	236
3.50	1	248
3.40	5	264
3.30	6	289
3.29	5	293
3.28	4	296
3.27	3	300
3.26	1	304
3.25	-1	309
3.24	-3	314
3.23	-6	320
3.22	-9	327
3.21	-13	335
3.20	-17	346
3.19	-20	361
3.18	-18	383
3.17	7	420
3.16	19	441
3.15	R	R

GEOGRAPHIC
LAT. = 55.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
11.00	-3	157
9.00	-4	159
8.00	-6	163
7.00	-10	171
6.00	-17	183
5.00	-20	204
4.90	-11	234
4.80	-3	239
4.70	-7	246
4.60	-4	255
4.50	0	266
4.40	4	283
4.30	4	312
4.20	3	316
4.10	2	321
4.00	0	326
3.90	-2	332
3.80	-3	338
3.70	-5	346
3.60	-11	356
3.50	-15	370
3.40	-15	390
3.30	-1	423
3.29	14	779
3.28	R	R

GEOGRAPHIC
LAT. = 55.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-8	174
9.00	-9	176
8.00	-10	180
7.00	-13	188
6.00	-20	202
5.00	-22	227
4.90	-21	230
4.80	-20	233
4.70	-18	237
4.60	-17	239
4.50	-16	243
4.40	-14	246
4.30	-13	249
4.20	-11	253
4.10	-9	257
4.00	-8	262
3.90	-5	269
3.80	-3	277
3.70	1	289
3.60	4	308
3.50	1	345
3.49	-1	351
3.48	-4	359
3.47	-6	368
3.46	-9	380
3.45	-11	397
3.44	-5	425
3.43	-17	578
3.42	R	R

GEOGRAPHIC
LAT. = 55.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-12	189
9.00	-13	192
8.00	-14	196
7.00	-17	204
6.00	-23	219
5.00	-22	250
4.90	-21	254
4.80	-19	258
4.70	-17	261
4.60	-15	265
4.50	-13	269
4.40	-10	273
4.30	-8	277
4.20	-6	282
4.10	-4	287
4.00	-1	293
3.90	1	302
3.80	4	315
3.70	5	335
3.60	-3	384
3.59	-5	395
3.58	-7	410
3.57	-4	434
3.56	19	493
3.55	9	614
3.54	R	R

GEOGRAPHIC
LAT. = 55.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-16	202
9.00	-16	204
8.00	-17	208
7.00	-19	216
6.00	-25	232
5.00	-24	266
4.90	-22	271
4.80	-19	275
4.70	-17	279
4.60	-14	283
4.50	-11	287
4.40	-8	291
4.30	-5	296
4.20	-3	301
4.10	0	307
4.00	2	315
3.90	5	324
3.80	7	339
3.70	5	366
3.69	5	371
3.68	4	375
3.67	3	381
3.66	1	387
3.65	0	394
3.64	-2	403
3.63	-3	414
3.62	-4	431
3.61	1	457
3.60	6	565
3.59	15	759
3.58	R	R

GEOGRAPHIC
LAT. = 55.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-18	211
9.00	-17	213
8.00	-17	217
7.00	-17	224
6.00	-26	239
5.00	-28	271
4.00	-5	309
3.90	-2	315
3.80	1	323
3.70	5	334
3.60	9	353
3.50	5	398
3.49	3	408
3.48	1	419
3.47	-2	436
3.46	0	465
3.45	3	1062
3.44	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 55.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-13	217
9.00	-14	219
8.00	-15	222
7.00	-17	229
6.00	-25	241
5.00	-32	265
4.90	-32	268
4.80	-31	271
4.70	-30	274
4.60	-29	278
4.50	-28	279
4.40	-27	282
4.30	-25	284
4.20	-24	286
4.10	-22	289
4.00	-21	292
3.90	-19	295
3.80	-18	299
3.70	-16	304
3.60	-12	311
3.50	-8	320
3.40	0	332
3.30	9	352
3.20	11	401
3.19	8	411
3.18	4	423
3.17	-1	441
3.16	-3	473
3.15	-3	632
3.14	R	R

GEOGRAPHIC
LAT. = 55.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-4	-136
9.00	-4	-135
8.00	-3	-132
7.00	-12	-127
6.00	-21	-118
5.00	-31	-104
4.00	-30	-86
3.90	-30	-85
3.80	-30	-82
3.70	-29	-78
3.60	-29	-74
3.50	-28	-68
3.40	-27	-61
3.30	-26	-54
3.20	-19	-46
3.10	-12	-37
3.00	-4	-29
2.90	3	-19
2.80	3	-8
2.70	14	8
2.60	14	40
2.59	13	45
2.58	12	51
2.57	10	59
2.56	7	68
2.55	3	80
2.54	-1	98
2.53	-1	133
2.52	-7	235
2.51	-2	380
2.50	8	904
2.49	3	168
2.48	R	R

GEOGRAPHIC
LAT. = 55.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-1	-128
9.00	-1	-127
8.00	-2	-125
7.00	-6	-120
6.00	-14	-115
5.00	-24	-109
4.00	-27	-101
3.00	-32	-67
2.90	-31	-64
2.80	-29	-61
2.70	-28	-57
2.60	-26	-52
2.50	-23	-44
2.40	-17	-34
2.30	-8	-22
2.20	4	-9
2.10	13	6
2.00	18	36
1.99	18	41
1.98	18	48
1.97	16	55
1.96	14	65
1.95	9	78
1.94	2	97
1.93	-5	139
1.92	16	852
1.91	-8	568
1.90	0	158
1.89	-12	651
1.88	2	499
1.87	-2	1102
1.86	R	R

GEOGRAPHIC
LAT. = 55.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	7	-118
9.00	6	-117
8.00	5	-115
7.00	1	-111
6.00	-6	-106
5.00	-14	-107
4.00	-17	-102
3.00	-29	-89
2.90	-29	-87
2.80	-29	-86
2.70	-29	-83
2.60	-30	-79
2.50	-32	-75
2.40	-33	-69
2.30	-34	-64
2.20	-33	-61
2.10	-31	-57
2.00	-30	-50
1.90	-28	-40
1.80	-22	-30
1.70	-16	-24
1.60	-8	-12
1.50	12	11
1.40	21	58
1.39	19	66
1.38	15	78
1.37	9	93
1.36	-3	121
1.35	-8	237
1.34	2	270
1.33	-17	279
1.32	-4	398
1.31	-15	280
1.30	R	R

GEOGRAPHIC
LAT. = 55.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	15	-104
9.00	14	-103
8.00	13	-102
7.00	9	-99
6.00	3	-98
5.00	-3	-98
4.00	-6	-95
3.00	-16	-90
2.80	-28	-73
1.90	-30	-69
1.80	-31	-66
1.70	-31	-63
1.60	-32	-56
1.50	-33	-49
1.40	-31	-43
1.30	-29	-31
1.20	-23	-21
1.10	-12	-6
1.00	8	15
.90	6	112
.89	-2	538
.88	-10	250
.87	3	328
.86	1	210
.85	-10	361
.84	R	R

GEOGRAPHIC
LAT. = 55.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	21	-87
9.00	20	-87
8.00	19	-85
7.00	16	-84
6.00	11	-83
5.00	7	-84
4.00	4	-81
3.00	-4	-79
2.80	-15	-71
1.90	-18	-70
1.80	-19	-69
1.70	-20	-67
1.60	-22	-64
1.50	-24	-62
1.40	-25	-59
1.30	-26	-54
1.20	-29	-50
1.10	-30	-43
1.00	-31	-34
.90	-29	-23
.80	-24	-9
.70	-9	11
.60	27	62
.59	28	77
.58	24	95
.57	1	134
.56	10	426
.55	-9	214
.54	-25	672
.53	-3	394
.52	15	896
.51	17	1169
.50	9	1199
.49	F	F

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 55.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	25	-68
9.00	24	-67
8.00	24	-66
7.00	21	-64
6.00	17	-63
5.00	13	-64
4.00	11	-62
3.00	4	-61
2.00	-6	-55
1.90	-8	-54
1.80	-9	-54
1.70	-10	-52
1.60	-12	-50
1.50	-14	-50
1.40	-15	-47
1.30	18	-45
1.20	19	-43
1.10	-21	-40
1.00	-24	-35
.90	-26	-29
.80	-27	-21
.70	-27	-9
.60	-23	8
.50	-5	33
.49	-1	36
.48	2	39
.47	7	44
.46	12	49
.45	18	57
.44	23	65
.43	28	68
.42	29	103
.41	18	148
.40	-1	216
.39	-18	352
.38	-9	354
.37	8	821
.36	-10	2036
.35	R	R

GEOGRAPHIC
LAT. = 55.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	26	-46
9.00	26	-46
8.00	25	-45
7.00	23	-43
6.00	19	-41
5.00	15	-41
4.00	13	-40
3.00	6	-37
2.00	-2	-31
1.90	-5	-30
1.80	-6	-29
1.70	-6	-28
1.60	-8	-26
1.50	-10	-25
1.40	-11	-23
1.30	-14	-21
1.20	-15	-18
1.10	-17	-15
1.00	-20	-10
.90	-21	-5
.80	-23	3
.70	-23	13
.60	-19	28
.50	-5	51
.49	-1	55
.48	1	57
.47	4	62
.46	9	66
.45	13	71
.44	18	78
.43	23	86
.42	29	101
.41	30	118
.40	16	154
.39	8	310
.38	2	526
.37	R	R

GEOGRAPHIC
LAT. = 55.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	23	-24
9.00	23	-24
8.00	23	-23
7.00	22	-20
6.00	18	-17
5.00	12	-16
4.00	10	-15
3.00	2	-10
2.00	-5	-2
1.90	-7	1
1.80	-9	2
1.70	-10	3
1.60	-11	5
1.50	-13	9
1.40	-14	11
1.30	-15	15
1.20	-16	19
1.10	-18	25
1.00	-18	32
.90	-17	41
.80	-13	53
.70	-4	69
.60	17	101
.59	21	108
.58	25	118
.57	27	128
.56	27	138
.55	23	158
.54	1	190
.53	-5	297
.52	-7	230
.51	-11	316
.50	7	600
.49	5	.465
.48	-10	676
.47	-8	260
.46	-11	3686
.45	F	F

GEOGRAPHIC
LAT. = 55.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	19	-3
9.00	19	-3
8.00	19	-2
7.00	18	1
6.00	13	6
5.00	6	8
4.00	4	10
3.00	-5	19
2.00	-11	33
1.90	-12	37
1.80	-14	42
1.70	-14	45
1.60	-13	48
1.50	-14	55
1.40	-13	61
1.30	-11	68
1.20	-7	78
1.10	-2	90
1.00	9	106
.90	23	146
.89	24	154
.88	23	165
.87	18	181
.86	5	202
.85	-22	240
.84	2	461
.83	-7	554
.82	-12	715
.81	-4	1002
.80	R	R

GEOGRAPHIC
LAT. = 55.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	14	16
9.00	13	16
8.00	14	17
7.00	13	21
6.00	8	27
5.00	-1	32
4.00	-3	35
3.00	-11	51
2.90	-11	52
2.80	-11	53
2.70	-11	55
2.60	-10	57
2.50	-11	60
2.40	-12	64
2.30	-12	69
2.20	-12	74
2.10	-11	77
2.00	-10	80
1.90	-9	85
1.80	-6	95
1.70	-1	105
1.60	4	112
1.50	10	127
1.40	22	163
1.30	0	219
1.29	-13	237
1.28	-24	295
1.27	16	440
1.26	-13	292
1.25	11	452
1.24	-14	694
1.23	R	R

GEOGRAPHIC
LAT. = 55.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	9	33
9.00	9	34
8.00	9	35
7.00	8	40
6.00	3	47
5.00	-6	54
4.00	-8	61
3.00	-12	86
2.90	-11	89
2.80	-10	92
2.70	-9	94
2.60	-8	97
2.50	-7	101
2.40	-5	108
2.30	-3	117
2.20	3	128
2.10	10	139
2.00	15	158
1.90	18	168
1.80	7	221
1.79	-2	233
1.78	-15	252
1.77	-25	304
1.76	8	888
1.75	-12	360
1.74	2	390
1.73	-12	335
1.72	21	428
1.71	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 50.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-6	61
9.00	-7	64
8.00	-6	67
7.00	-6	74
6.00	-9	87
5.00	-10	113
4.90	-9	117
4.80	-7	120
4.70	-6	124
4.60	-3	128
4.50	-1	131
4.40	2	135
4.30	4	139
4.20	7	143
4.10	9	148
4.00	12	153
3.90	14	159
3.80	15	166
3.70	17	176
3.60	17	189
3.50	13	211
3.49	12	214
3.48	11	217
3.47	9	221
3.46	7	225
3.45	5	229
3.44	3	233
3.43	0	238
3.42	-4	244
3.41	-9	252
3.40	-14	261
3.39	-21	275
3.38	-25	300
3.37	-4	355
3.36	2	435
3.35	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-8	78
9.00	-9	80
8.00	-8	85
7.00	-8	93
6.00	-10	108
5.00	-5	140
4.90	-3	145
4.80	0	149
4.70	3	155
4.60	6	160
4.50	10	166
4.40	13	173
4.30	16	181
4.20	13	191
4.10	14	203
4.00	14	217
3.90	4	237
3.80	-21	278
3.79	-23	288
3.78	-27	303
3.77	-24	324
3.76	-5	358
3.75	12	529
3.74	-1	602
3.73	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-8	93
9.00	-9	96
8.00	-8	101
7.00	-8	110
6.00	-10	128
5.00	-1	165
4.90	2	171
4.80	6	177
4.70	9	184
4.60	13	192
4.50	15	202
4.40	16	214
4.30	13	229
4.20	4	249
4.10	-21	285
4.09	-24	293
4.08	-27	303
4.07	-28	317
4.06	-24	336
4.05	-7	363
4.04	3	699
4.03	13	470
4.02	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-9	108
9.00	-9	112
8.00	-9	118
7.00	-9	127
6.00	-11	147
5.90	-10	150
5.80	-10	153
5.70	-10	157
5.60	-9	160
5.50	-8	164
5.40	-7	168
5.30	-5	173
5.20	-3	178
5.10	0	183
5.00	3	189
4.90	7	196
4.80	10	204
4.70	13	214
4.60	14	226
4.50	12	241
4.40	4	260
4.30	-19	294
4.29	-22	300
4.28	-25	308
4.27	-27	319
4.26	-27	333
4.25	-27	351
4.24	-2	376
4.23	11	513
4.22	12	518
4.21	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-9	124
9.00	-9	128
8.00	-9	135
7.00	-10	146
6.00	-11	168
5.90	-11	171
5.80	-10	174
5.70	-9	178
5.60	-8	182
5.50	-7	187
5.40	-5	192
5.30	-2	197
5.20	0	203
5.10	3	209
5.00	7	217
4.90	10	226
4.80	12	237
4.70	11	251
4.60	5	270
4.50	-14	299
4.49	-17	303
4.48	-19	309
4.47	-22	315
4.46	-25	324
4.45	-27	334
4.44	-26	348
4.43	-19	366
4.42	2	390
4.41	3	650
4.40	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-11	141
9.00	-11	145
8.00	-11	152
7.00	-12	165
6.00	-12	189
5.90	-11	193
5.80	-10	197
5.70	-9	201
5.60	-7	206
5.50	-5	211
5.40	-3	217
5.30	0	223
5.20	3	231
5.10	7	239
5.00	9	250
4.90	9	264
4.80	4	283
4.70	-12	312
4.69	-15	316
4.68	-17	322
4.67	-20	328
4.66	-23	335
4.65	-24	345
4.64	-24	357
4.63	-20	373
4.62	-6	393
4.61	31	444
4.60	11	430
4.59	1	511
4.58	R	R

TABLE 41 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 50.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-13	150
9.00	-13	163
8.00	-13	171
7.00	-14	184
6.00	-13	212
5.90	-12	216
5.80	-10	220
5.70	-8	225
5.60	-6	231
5.50	-3	237
5.40	0	244
5.30	3	252
5.20	6	263
5.10	7	276
5.00	5	294
4.90	-8	323
4.89	-10	327
4.88	-12	332
4.87	-15	337
4.86	-17	344
4.85	-20	351
4.84	-21	361
4.83	-21	374
4.82	-16	390
4.81	1	411
4.80	23	489
4.79	20	469
4.78	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	LONG
11.10	-16	177
10.00	-16	182
9.00	-16	190
8.00	-17	204
7.00	-13	234
6.90	-12	239
6.80	-10	244
6.70	-7	250
6.60	-4	257
6.50	-1	265
6.40	2	275
6.30	5	287
6.20	6	305
6.10	-2	332
6.09	-4	336
6.08	-6	343
6.07	-9	345
6.06	-10	351
6.05	-13	357
6.04	-15	365
6.03	-16	375
6.02	-17	387
6.01	-12	404
6.00	3	427
5.99	16	514
5.98	-9	514
5.97	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-20	196
9.00	-20	202
8.00	-19	210
7.00	-19	225
6.90	-18	227
6.80	-18	230
6.70	-18	232
6.60	-18	235
6.50	-17	238
6.40	-17	241
6.30	-16	245
6.20	-15	249
6.10	-14	254
6.00	-12	259
5.90	-10	264
5.80	-8	271
5.70	-4	278
5.60	-1	287
5.50	3	299
5.40	6	316
5.30	2	343
5.29	1	347
5.28	0	351
5.27	-2	355
5.26	-3	361
5.25	-5	367
5.24	-8	374
5.23	-10	382
5.22	-11	393
5.21	-11	407
5.20	-5	427
5.19	17	465
5.18	7	582
5.17	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-25	215
9.00	-24	222
8.00	-22	230
7.00	-20	245
6.00	-10	262
5.90	-8	288
5.80	-4	296
5.70	0	306
5.60	4	319
5.50	7	339
5.40	0	379
5.39	-2	385
5.38	-4	394
5.37	-6	404
5.36	-6	418
5.15	-4	438
5.14	12	475
5.33	5	546
5.32	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-28	229
9.00	-27	235
8.00	-24	245
7.00	-21	259
6.00	-11	295
5.90	-8	301
5.80	-4	309
5.70	0	319
5.60	5	332
5.50	9	353
5.40	3	396
5.33	1	404
5.36	-1	413
5.37	-3	426
5.36	-3	445
5.35	6	479
5.34	-2	639
5.33	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-30	235
9.00	-29	242
8.00	-27	250
7.00	-24	263
6.90	-24	265
6.80	-24	267
6.70	-24	269
6.60	-23	272
6.50	-23	274
6.40	-22	277
6.30	-22	281
6.20	-21	285
6.10	-20	289
6.00	-18	293
5.90	-16	298
5.80	-13	304
5.70	-10	310
5.60	-6	318
5.50	-1	327
5.40	6	340
5.30	11	360
5.28	7	402
5.19	5	489
5.18	3	418
5.17	0	429
5.16	-2	444
5.15	-2	469
5.14	14	542
5.13	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 50.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-28	237
9.00	-28	242
8.00	-27	248
7.00	-27	253
6.00	-27	283
5.90	-26	287
5.80	-25	291
5.70	-24	296
5.60	-22	301
5.50	-20	306
5.40	-16	312
5.30	-12	318
5.20	-7	326
5.10	0	334
5.00	7	346
4.90	14	363
4.80	13	395
4.79	12	408
4.78	11	405
4.77	9	411
4.76	7	418
4.75	4	426
4.74	1	435
4.73	-3	448
4.72	-4	467
4.71	3	502
4.70	16	762
4.69	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-24	-122
9.00	-24	-119
8.00	-24	-114
7.00	-26	-105
6.00	-30	-87
5.00	-23	-49
4.90	-20	-44
4.80	-15	-40
4.70	-12	-35
4.60	-7	-30
4.50	-2	-25
4.40	2	-19
4.30	7	-13
4.20	11	-4
4.10	14	7
4.00	15	22
3.90	13	45
3.85	9	63
3.84	7	68
3.83	5	74
3.82	3	80
3.81	1	88
3.80	-1	98
3.79	-2	111
3.78	-1	132
3.77	7	175
3.76	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-18	-118
9.00	-17	-116
8.00	-18	-112
7.00	-20	-106
6.00	-28	-94
5.00	-24	-71
4.90	-34	-68
4.80	-33	-66
4.70	-33	-63
4.60	-32	-61
4.50	-31	-58
4.40	-29	-56
4.30	-26	-54
4.20	-27	-52
4.10	-25	-50
4.00	-24	-47
3.90	-22	-44
3.80	-20	-40
3.70	-18	-36
3.60	-15	-30
3.50	-11	-22
3.40	-4	-13
3.30	6	0
3.20	18	23
3.19	19	27
3.18	20	31
3.17	20	35
3.16	21	40
3.15	21	46
3.14	20	52
3.13	19	59
3.12	18	67
3.11	13	76
3.10	8	88
3.09	1	103
3.08	-6	131
3.07	-10	279
3.06	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-8	-110
9.00	-9	-109
8.00	-10	-106
7.00	-13	-101
6.00	-21	-94
5.00	-31	-84
4.00	-31	-72
3.90	-31	-69
3.80	-31	-66
3.70	-32	-63
3.60	-32	-59
3.50	-32	-54
3.40	-32	-49
3.30	-31	-43
3.20	-29	-38
3.10	-26	-32
3.00	-22	-28
2.90	-18	-24
2.80	-15	-20
2.70	-11	-15
2.60	-6	-8
2.50	2	3
2.40	16	24
2.35	23	46
2.34	23	53
2.33	23	60
2.32	21	69
2.31	18	79
2.30	12	91
2.29	4	108
2.28	-7	137
2.27	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	0	-99
9.00	0	-98
8.00	-2	-95
7.00	-5	-92
6.00	-12	-87
5.00	-20	-84
4.00	-23	-78
3.00	-32	-57
2.90	-32	-55
2.80	-32	-53
2.70	-31	-49
2.60	-31	-45
2.50	-31	-39
2.40	-30	-32
2.30	-28	-25
2.20	-24	-20
2.10	-21	-16
2.00	-17	-9
1.90	-8	3
1.80	7	17
1.70	20	36
1.60	19	91
1.59	12	105
1.58	-1	129
1.57	3	218
1.56	-5	325
1.55	9	208
1.54	-8	608
1.53	-16	251
1.52	-1	552
1.51	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	8	-83
9.00	7	-82
8.00	6	-81
7.00	3	-78
6.00	-4	-75
5.00	-10	-74
4.00	-13	-70
3.00	-23	-61
2.00	-30	-35
1.90	-30	-29
1.80	-30	-23
1.70	-28	-19
1.60	-25	-10
1.50	-20	9
1.40	-14	7
1.30	-1	22
1.20	15	48
1.10	-7	149
1.09	2	292
1.08	-15	227
1.07	9	162
1.06	-21	381
1.05	2	818
1.04	-12	307
1.03	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 50.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	13	-64
9.00	12	-64
8.00	11	-62
7.00	9	-60
6.00	3	-57
5.00	-2	-57
4.00	-5	-54
3.00	-14	-48
2.00	-23	-32
1.90	-25	-28
1.80	-26	-25
1.70	-26	-22
1.60	-27	-17
1.50	-27	-11
1.40	-26	-6
1.30	-24	4
1.20	-20	11
1.10	-13	23
1.00	0	38
.90	22	66
.89	25	72
.88	27	79
.87	29	86
.86	29	94
.85	28	103
.84	24	117
.83	12	139
.82	-17	197
.81	-3	278
.80	-4	243
.79	8	479
.78	-13	265
.77	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	LONG
13.00	14	-42
3.00	14	-42
3.00	13	-41
7.10	11	-38
6.00	7	-35
5.00	0	-34
4.00	-2	-31
3.00	-11	-25
2.00	-18	-10
1.90	-20	-6
1.80	-21	-3
1.70	-21	-1
1.60	-21	4
1.50	-22	10
1.40	-21	14
1.30	-20	23
1.20	-17	29
1.10	-12	41
1.00	-2	54
.90	15	75
.80	6	166
.79	-21	222
.78	-2	506
.77	-2	200
.76	3	240
.75	4	254
.74	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	12	-19
9.00	11	-19
8.00	11	-18
7.00	10	-15
6.00	5	-10
5.00	-2	-7
4.00	-4	-5
3.00	-13	7
2.90	-13	7
2.80	-13	8
2.70	-13	9
2.60	-13	11
2.50	-14	14
2.40	-15	17
2.30	-17	20
2.20	-17	23
2.10	-17	24
2.00	-16	27
1.90	-17	32
1.80	-17	38
1.70	-16	42
1.60	-14	47
1.50	-12	56
1.40	-7	64
1.30	[illegible]	74
1.20	[illegible]	91
1.10	25	123
1.09	26	130
1.08	26	139
1.07	25	147
1.06	23	156
1.05	19	164
1.04	14	172
1.03	7	182
1.02	-5	197
1.01	-22	235
1.00	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	6	3
9.00	6	3
8.00	6	5
7.00	6	9
6.00	1	15
5.00	-7	22
4.00	-9	27
3.00	-15	48
2.90	-15	50
2.80	-14	51
2.70	-13	53
2.60	-13	55
2.50	-12	59
2.40	-12	64
2.30	-11	71
2.20	-8	78
2.10	-4	83
2.00	-1	87
1.90	2	94
1.80	9	109
1.70	21	132
1.60	23	161
1.59	22	164
1.58	21	168
1.57	19	173
1.56	17	178
1.55	14	185
1.54	10	193
1.53	3	203
1.52	-9	219
1.51	-24	258
1.50	4	610
1.49	13	367
1.48	-17	335
1.47	5	421
1.46	4	455
1.45	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	1	24
9.00	0	25
8.00	1	27
7.00	0	31
6.00	-4	40
5.00	-12	53
4.00	-12	64
3.00	-4	101
2.90	0	107
2.80	4	113
2.70	8	118
2.60	11	124
2.50	14	133
2.40	18	140
2.30	18	185
2.29	17	190
2.28	14	197
2.27	10	205
2.26	5	214
2.25	-4	226
2.24	-16	243
2.23	-25	288
2.22	-2	528
2.21	-18	340
2.20	-10	277
2.19	-5	562
2.18	-13	337
2.17	R	R

GEOGRAPHIC
LAT. = 50.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-4	44
9.00	-4	45
8.00	-4	48
7.00	-4	53
6.00	-7	64
5.00	-13	84
4.00	-4	106
3.90	-3	109
3.80	-2	111
3.70	0	115
3.60	1	119
3.50	3	125
3.40	6	132
3.30	9	142
3.20	15	157
3.10	19	181
3.09	19	184
3.08	19	188
3.07	18	191
3.06	18	196
3.05	17	200
3.04	15	205
3.03	13	210
3.02	10	215
3.01	6	222
3.00	1	229
2.99	-5	237
2.98	-13	248
2.97	-23	267
2.96	-24	309
2.95	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 45.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	11	57
19.00	9	58
18.00	6	59
17.00	3	61
16.00	0	63
15.00	-4	65
14.00	-7	67
13.00	-10	70
12.00	-13	74
11.00	-15	79
10.00	-15	84
9.00	-13	90
8.00	-10	97
7.00	-6	108
6.00	1	124
5.90	2	130
5.80	4	143
5.70	6	149
5.60	8	156
5.50	11	165
5.40	14	176
5.30	16	191
5.20	14	214
5.10	-12	259
5.00	-4	393
4.99	-9	358
4.98	-1	343
4.97	19	424
4.96	24	463
4.95	4	536
4.94	R	R

GEOGRAPHIC
LAT. = 45.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	3	71
19.00	0	73
18.00	4	74
17.00	1	76
16.00	-2	78
15.00	-5	80
14.00	-8	83
13.00	-12	87
12.00	-14	91
11.00	-15	96
10.00	-15	102
9.00	-12	109
8.00	-9	118
7.00	-2	132
6.00	8	167
5.90	10	174
5.80	12	182
5.70	14	193
5.60	14	208
5.50	10	231
5.49	8	234
5.48	7	237
5.47	5	240
5.46		244
5.45	1	248
5.44	-1	252
5.43	-4	257
5.42	-8	263
5.41	-12	269
5.40	-17	278
5.39	-22	289
5.38	-26	308
5.37	-21	339
5.36	R	R

GEOGRAPHIC
LAT. = 45.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	7	86
19.00	5	87
18.00	2	89
17.00	-1	91
16.00	-4	95
15.00	-7	96
14.00	-10	99
13.00	-13	103
12.00	-14	107
11.00	-15	113
10.00	-14	119
9.00	-11	127
8.00	-6	136
7.00	0	153
6.00	11	199
5.90	12	210
5.80	12	225
5.70	6	247
5.69	4	250
5.68	3	253
5.67	1	257
5.66	-1	260
5.65	-3	264
5.64	-6	269
5.63	-9	274
5.62	-13	280
5.61	-17	288
5.60	-21	297
5.59	-25	311
5.58	-25	332
5.57	-8	368
5.56	R	R

GEOGRAPHIC
LAT. = 45.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	6	101
19.00	3	102
18.00	1	104
17.00	2	106
16.00	-5	108
15.00	-8	111
14.00	-11	114
13.00	-13	118
12.00	-15	123
11.00	-15	129
10.00	-14	136
9.00	-10	144
8.00	-6	155
7.00	1	174
6.90	2	177
6.80	2	180
6.70	3	184
6.60	5	188
6.50	6	193
6.40	7	198
6.30	8	205
6.20	10	213
6.10	10	223
6.00	10	237
5.90	5	257
5.90	-14	294
5.79	-17	301
5.78	-21	310
5.77	-24	322
5.76	-25	339
5.75	-16	366
5.74	27	494
5.73	R	R

GEOGRAPHIC
LAT. = 45.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	4	116
19.00	2	118
18.00	-1	120
17.00	-4	122
16.00	-7	124
15.00	-10	127
14.00	-12	131
13.00	-14	135
12.00	-16	141
11.00	-16	147
10.00	-14	154
9.00	-10	163
8.00	-5	175
7.00	2	198
6.90	3	202
6.80	4	206
6.70	5	211
6.60	6	217
6.50	7	224
6.40	8	232
6.30	8	243
6.20	7	257
6.10	0	278
6.00	-20	323
5.99	-22	334
5.98	-23	348
5.97	-18	369
5.96	6	402
5.95	4	461
5.94	R	R

GEOGRAPHIC
LAT. = 45.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	3	132
19.00	0	134
18.00	-3	136
17.00	-6	138
16.00	-9	141
15.00	-11	144
14.00	-14	148
13.00	-16	153
12.00	-17	159
11.00	-17	166
10.00	-14	174
9.00	-10	184
8.00	-4	198
7.90	-4	200
7.80	-3	202
7.70	-2	204
7.60	-2	207
7.50	-1	209
7.40	0	212
7.30	1	215
7.20	1	219
7.10	2	223
7.00	3	227
6.90	4	233
6.80	5	239
6.70	6	246
6.60	6	256
6.50	6	268
6.40	2	284
6.30	-10	312
6.29	-11	316
6.28	-13	321
6.27	-16	327
6.26	-18	334
6.25	-20	342
6.24	-21	353
6.23	-20	367
6.22	-13	386
6.21	10	416
6.20	8	478
6.19	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 45.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	1	148
19.00	-1	150
18.00	-4	152
17.00	-7	154
16.00	-11	157
15.00	-14	161
14.00	-16	165
13.00	-18	171
12.00	-19	177
11.00	-18	185
10.00	-15	194
9.00	-10	205
8.00	-4	222
7.90	-3	224
7.80	-3	226
7.70	-2	229
7.60	-1	232
7.50	0	235
7.40	1	239
7.30	2	243
7.20	2	248
7.10	3	253
7.00	4	259
6.90	5	267
6.80	4	277
6.70	3	289
6.60	-2	307
6.50	-14	341
6.49	-15	347
6.48	-17	354
6.47	-18	362
6.46	-17	373
6.45	-15	386
6.44	-7	404
6.43	16	434
6.42	14	552
6.41	R	R

GEOGRAPHIC
LAT. = 45.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	0	164
19.00	-3	166
18.00	-6	168
17.00	-9	171
16.00	-13	174
15.00	-16	178
14.00	-19	183
13.00	-21	189
12.00	-22	197
11.00	-20	206
10.00	-17	216
9.00	-10	228
8.00	-3	247
7.00	3	236
6.90	2	308
6.80	-2	325
6.70	-12	357
6.69	-13	362
6.68	-14	368
6.67	-14	375
6.66	-14	383
6.65	-12	393
6.64	-5	406
6.63	1	424
6.62	22	458
6.61	R	R

GEOGRAPHIC
LAT. = 45.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-1	180
19.00	-5	182
18.00	-8	185
17.00	-12	187
16.00	-15	191
15.00	-18	195
14.00	-22	201
13.00	-25	208
12.00	-25	217
11.00	-23	228
10.00	-17	240
9.00	-9	254
8.00	0	277
7.90	1	280
7.80	2	284
7.70	3	288
7.60	3	293
7.50	4	299
7.40	4	306
7.30	3	314
7.20	2	324
7.10	-1	339
7.00	-7	361
6.95	-10	381
6.94	-11	386
6.93	-11	392
6.92	-10	399
6.91	-9	408
6.90	-5	418
6.89	0	431
6.88	11	450
6.87	24	498
6.86	R	R

GEOGRAPHIC
LAT. = 45.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-3	195
19.00	-6	197
18.00	-10	199
17.00	-14	202
16.00	-18	206
15.00	-22	210
14.00	-26	217
13.00	-29	225
12.00	-29	236
11.00	-25	249
10.00	-17	263
9.00	-5	280
8.00	5	311
7.90	5	316
7.80	6	322
7.70	5	329
7.60	4	337
7.50	2	348
7.40	-2	363
7.30	-7	387
7.29	-6	391
7.28	-8	395
7.27	-8	399
7.26	-8	403
7.25	-8	409
7.24	-7	414
7.23	-6	421
7.22	-4	429
7.21	0	439
7.20	6	451
7.19	15	470
7.18	21	513
7.17	R	R

GEOGRAPHIC
LAT. = 45.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-4	208
19.00	-8	210
18.00	-11	212
17.00	-16	214
16.00	-20	218
15.00	-24	222
14.00	-28	229
13.00	-31	237
12.00	-32	248
11.00	-28	262
10.00	-19	277
9.00	-5	294
8.00	7	325
7.90	7	331
7.80	7	337
7.70	7	345
7.60	6	354
7.50	3	365
7.40	-1	381
7.30	-5	408
7.29	-5	413
7.28	-5	417
7.27	-5	422
7.26	-5	428
7.25	-3	434
7.24	-2	442
7.23	2	451
7.22	6	463
7.21	13	481
7.20	19	517
7.19	R	R

GEOGRAPHIC
LAT. = 45.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-5	218
19.00	-8	220
18.00	-12	222
17.00	-16	224
16.00	-20	227
15.00	-25	231
14.00	-29	236
13.00	-32	243
12.00	-34	253
11.00	-32	265
10.00	-26	279
9.00	-15	292
8.00	-1	311
7.90	0	314
7.80	1	317
7.70	2	320
7.60	4	324
7.50	5	328
7.40	6	333
7.30	7	338
7.20	8	345
7.10	8	353
7.00	8	364
6.90	6	378
6.80	3	399
6.79	2	402
6.78	1	406
6.77	1	409
6.76	0	413
6.75	0	417
6.74	-1	422
6.73	-1	427
6.72	-1	433
6.71	-1	440
6.70	0	449
6.69	1	460
6.68	5	475
6.67	11	500
6.66	2	576
6.65	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 45.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-4	228
19.00	-8	229
18.00	-11	231
17.00	-15	232
16.00	-19	234
15.00	-23	237
14.00	-27	241
13.00	-31	246
12.00	-34	253
11.00	-35	263
10.00	-32	273
9.00	-27	284
8.00	-18	296
7.80	-8	316
6.90	-6	319
6.80	-5	322
6.70	-3	326
6.60	-1	331
6.50	1	337
6.40	4	343
6.30	7	352
6.20	9	364
6.10	11	381
6.00	9	413
5.99	8	418
5.98	7	424
5.97	6	430
5.96	4	438
5.95	2	447
5.94	1	468
5.93	1	478
5.92	4	511
5.91	2	872
5.90	3	750
5.89	R	R

GEOGRAPHIC
LAT. = 45.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-1	-123
19.00	-6	-122
18.00	-9	-121
17.00	-13	-120
16.00	-17	-118
15.00	-20	-117
14.00	-24	-114
13.00	-25	-111
12.00	-32	-107
11.00	-34	-101
10.00	-34	-94
9.00	-33	-87
8.00	-29	-78
7.00	-25	-64
6.90	-24	-62
6.80	-23	-60
6.70	-23	-58
6.60	-22	-55
6.50	-21	-52
6.40	-20	-49
6.30	-19	-46
6.20	-17	-42
6.10	-15	-38
6.00	-13	-34
5.90	-10	-28
5.80	-6	-22
5.70	-2	-15
5.60	4	-6
5.50	11	6
5.40	17	27
5.30	12	72
5.29	9	80
5.28	5	90
5.27	1	104
5.26	-3	125
5.25	1	172
5.24	-7	304
5.23	R	R

GEOGRAPHIC
LAT. = 45.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-1	-113
19.00	-4	-112
18.00	-7	-112
17.00	-10	-111
16.00	-13	-110
15.00	-17	-109
14.00	-20	-108
13.00	-23	-107
12.00	-27	-105
11.00	-29	-102
10.00	-30	-98
9.00	-31	-94
8.00	-30	-88
7.00	-30	-77
6.00	-29	-54
5.00	0	-6
4.90	7	2
4.80	15	13
4.70	21	32
4.60	18	64
4.59	16	69
4.58	14	74
4.57	12	79
4.56	9	85
4.55	5	92
4.54	1	101
4.53	-3	112
4.52	-7	128
4.51	-5	158
4.50	-10	280
4.49	-17	246
4.48	R	R

GEOGRAPHIC
LAT. = 45.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	2	-102
19.00	0	-102
18.00	-3	-102
17.00	-6	-101
16.00	-8	-101
15.00	-11	-101
14.00	-14	-100
13.00	-17	-100
12.00	-20	-99
11.00	-22	-98
10.00	-23	-97
9.00	-24	-94
8.00	-24	-90
7.00	-26	-82
6.00	-31	-66
5.00	-30	-36
4.90	-28	-33
4.80	-26	-30
4.70	-24	-27
4.60	-21	-24
4.50	-19	-21
4.40	-16	-19
4.30	-13	-16
4.20	-10	-13
4.10	-8	-10
4.00	-5	-7
3.90	-1	-2
3.80	3	3
3.70	8	11
3.60	14	23
3.50	21	44
3.40	10	101
3.39	4	114
3.38	-4	133
3.37	-7	176
3.36	-6	323
3.35	-5	329
3.34	R	R

GEOGRAPHIC
LAT. = 45.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	6	-90
19.00	4	-90
18.00	2	-89
17.00	0	-89
16.00	-3	-90
15.00	-5	-90
14.00	-7	-90
13.00	-10	-90
12.00	-12	-90
11.00	-13	-90
10.00	-15	-89
9.00	-15	-88
8.00	-16	-85
7.00	-19	-79
6.00	-26	-69
5.00	-33	-54
4.00	-30	-37
3.90	-29	-35
3.80	-28	-31
3.70	-28	-27
3.60	-26	-23
3.50	-24	-17
3.40	-22	-12
3.30	-17	-5
3.20	-12	1
3.10	-5	8
3.00	3	14
2.90	11	22
2.80	18	32
2.70	23	48
2.60	23	81
2.59	22	86
2.58	20	92
2.57	17	99
2.56	13	108
2.55	7	118
2.54	-1	132
2.53	-10	158
2.52	6	278
2.51	R	R

GEOGRAPHIC
LAT. = 45.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	12	-75
19.00	10	-75
18.00	8	-75
17.00	6	-75
16.00	4	-75
15.00	2	-75
14.00	0	-76
13.00	-2	-76
12.00	-4	-76
11.00	-5	-77
10.00	-6	-76
9.00	-7	-75
8.00	-8	-73
7.00	-11	-68
6.00	-18	-62
5.00	-26	-55
4.00	-27	-46
3.00	-28	-18
2.90	-27	-13
2.80	-25	-11
2.70	-23	-7
2.60	-21	-2
2.50	-18	5
2.40	-12	13
2.30	-3	21
2.20	6	29
2.10	14	39
2.00	23	57
1.99	24	60
1.98	25	63
1.97	26	67
1.96	27	71
1.95	27	77
1.94	27	83
1.93	27	90
1.92	25	98
1.91	21	108
1.90	15	120
1.89	4	139
1.88	-12	164
1.87	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 45.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	17	-57
19.00	15	-57
18.00	13	-57
17.00	12	-57
16.00	10	-57
15.00	8	-57
14.00	6	-57
13.00	4	-58
12.00	2	-58
11.00	1	-58
10.00	0	-59
9.00	-1	-58
8.00	-2	-56
7.00	-4	-52
6.00	-10	-47
5.00	-18	-43
4.00	-20	-37
3.00	-27	-18
2.90	-27	-17
2.80	-26	-15
2.70	-26	-12
2.60	-25	-9
2.50	-25	-4
2.40	-25	2
2.30	-23	7
2.20	-21	12
2.10	-18	15
2.00	-15	21
1.90	-9	29
1.80	1	40
1.70	10	50
1.60	21	66
1.50	15	136
1.49	3	151
1.48	-14	180
1.47	18	381
1.46	15	398
1.45	11	184
1.44	-22	276
1.43	2	182
1.42	9	212
1.41	9	239
1.40	6	231
1.39	R	R

GEOGRAPHIC
LAT. = 45.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	20	-36
19.00	19	-36
18.00	17	-36
17.00	15	-35
16.00	13	-35
15.00	11	-35
14.00	9	-35
13.00	6	-36
12.00	5	-36
11.00	3	-36
10.00	2	-37
9.00	1	-36
8.00	1	-35
7.00	-1	-31
6.00	-6	-26
5.00	-13	-21
4.00	15	-16
3.00	-22	2
2.90	-22	4
2.80	-22	3
2.70	-21	7
2.60	-21	10
2.50	-21	14
2.40	-20	19
2.30	-20	25
2.20	-18	29
2.10	-15	32
2.00	-13	36
1.90	-9	44
1.80	-2	54
1.70	6	63
1.60	14	73
1.50	27	186
1.40	-18	237
1.39	-11	362
1.38	-2	371
1.37	-13	300
1.36	-5	213
1.35	-3	392
1.34	1	327
1.33	8	231
1.32	8	264
1.31	R	R

GEOGRAPHIC
LAT = 45.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	21	-15
19.00	19	-14
18.00	17	-13
17.00	15	-13
16.00	12	-12
15.00	10	-12
14.00	7	-12
13.00	5	-12
12.00	3	-12
11.00	1	-12
10.00	0	-12
9.00	-1	-12
8.00	-1	-10
7.00	-1	-6
6.00	-6	1
5.00	-14	9
4.00	-15	16
3.00	-16	42
2.90	-15	44
2.80	-14	46
2.70	-13	49
2.60	-11	51
2.50	-10	56
2.40	-8	62
2.30	-3	71
2.20	3	80
2.10	10	87
2.00	15	95
1.90	21	111
1.80	22	156
1.79	19	165
1.78	13	174
1.77	5	186
1.76	-8	202
1.75	-22	237
1.74	12	597
1.73	-7	323
1.72	2	239
1.71	-7	299
1.70	0	235
1.69	3	247
1.68	12	402
1.67	23	440
1.66	-12	389
1.65	R	R

GEOGRAPHIC
LAT. = 45.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	19	6
19.00	17	7
18.00	15	8
17.00	12	9
16.00	10	10
15.00	7	10
14.00	4	11
13.00	1	12
12.00	-2	12
11.00	-4	13
10.00	-5	14
9.00	-6	15
8.00	-5	17
7.00	-5	21
6.00	-8	31
5.00	-15	47
4.00	-11	62
3.90	-10	64
3.80	-10	65
3.70	-9	68
3.60	-8	71
3.50	-7	74
3.40	-6	79
3.30	-4	85
3.20	-3	92
3.10	4	100
3.00	10	110
2.90	16	121
2.80	22	135
2.70	24	151
2.60	19	171
2.50	-2	200
2.49	-7	216
2.48	-13	226
2.47	-20	242
2.46	-22	274
2.45	14	536
2.44	12	1146
2.43	12	1141
2.42	6	527
2.41	-8	267
2.40	11	399
2.39	R	R

GEOGRAPHIC
LAT. = 45.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	17	25
19.00	14	26
18.00	12	27
17.00	9	28
16.00	6	29
15.00	3	31
14.00	-1	32
13.00	-4	33
12.00	-7	35
11.00	-9	37
10.00	-11	39
9.00	-11	41
8.00	-10	45
7.00	-9	51
6.00	-10	64
5.00	-9	92
4.90	-7	96
4.80	-5	100
4.70	-3	104
4.60	0	108
4.50	3	112
4.40	6	117
4.30	9	121
4.20	13	126
4.10	15	132
4.00	18	138
3.90	19	145
3.80	20	154
3.70	20	165
3.60	17	182
3.50	4	211
3.49	1	216
3.48	-2	221
3.47	-6	227
3.46	-11	235
3.45	-16	246
3.44	-21	262
3.43	-22	291
3.42	[illegible]	408
3.41	2	499
3.40	R	R

GEOGRAPHIC
LAT. = 45.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	14	41
19.00	11	43
18.00	8	44
17.00	5	45
16.00	2	47
15.00	-1	49
14.00	-4	51
13.00	-8	53
12.00	-11	56
11.00	-13	59
10.00	-14	63
9.00	-13	67
8.00	-11	72
7.00	-9	81
6.00	-7	99
5.90	-6	102
5.80	-6	106
5.70	-5	109
5.60	-4	113
5.50	-2	117
5.40	-1	122
5.30	2	128
5.20	4	134
5.10	8	141
5.00	12	150
4.90	17	162
4.80	20	179
4.70	16	284
4.60	-15	258
4.59	-22	262
4.58	-27	288
4.57	-22	313
4.56	20	884
4.55	-8	402
4.54	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 40.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	5	63
19.00	2	65
18.00	-1	68
17.00	-4	71
16.00	-8	74
15.00	-11	79
14.00	-14	84
13.00	-16	91
12.00	-16	99
11.00	-14	110
10.00	-6	122
9.00	6	137
8.90	18	164
7.90	19	166
7.80	20	173
7.70	20	178
7.60	19	184
7.50	18	191
7.40	16	198
7.30	13	208
7.20	7	219
7.10	-3	234
7.00	-19	263
6.99	-21	268
6.98	-22	273
6.97	-24	281
6.96	-25	289
6.95	-24	300
6.94	-21	314
6.93	-13	333
6.92	7	367
6.91	R	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
23.00	3	78
22.00	0	81
21.00	-3	84
20.00	-6	87
19.00	-10	91
18.00	-13	95
17.00	-15	102
16.00	-16	109
15.00	-15	119
14.00	-13	130
13.00	-1	144
12.00	13	164
11.90	15	167
11.80	16	170
11.70	17	174
11.60	18	178
11.50	19	182
11.40	20	187
11.30	20	192
11.20	19	198
11.10	14	204
11.00	16	212
10.90	12	220
10.80	4	230
10.70	-3	243
10.60	-17	264
10.59	-19	267
10.58	-21	270
10.57	-23	274
10.56	-24	279
10.55	-26	284
10.54	-27	291
10.53	-27	298
10.52	-27	307
10.51	-24	318
10.50	-19	331
10.49	-9	347
10.48	12	378
10.47	R	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	1	94
19.00	-2	96
18.00	-5	99
17.00	-8	103
16.00	-11	107
15.00	-14	112
14.00	-16	119
13.00	-16	127
12.00	-14	137
11.00	-8	149
10.00	3	164
9.00	16	189
8.90	17	193
8.80	18	197
8.70	19	202
8.60	18	207
8.50	18	213
8.40	16	219
8.30	14	226
8.20	10	234
8.10	4	244
8.00	-5	256
7.90	-19	275
7.80	-24	332
7.79	-18	363
7.78	-7	358
7.77	13	383
7.76	2	424
7.75	-14	519
7.74	R	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-1	109
19.00	-4	112
18.00	-7	115
17.00	-9	119
16.00	-12	123
15.00	-15	129
14.00	-16	136
13.00	-16	145
12.00	-13	156
11.00	-6	169
10.00	6	186
9.00	16	217
8.90	16	222
8.80	16	227
8.70	14	233
8.60	12	240
8.50	5	247
8.40	3	256
8.30	-5	267
8.20	-17	283
8.10	-29	320
8.09	-28	327
8.08	-27	335
8.07	-24	343
8.06	-19	353
8.05	-10	365
8.04	6	381
8.03	27	424
8.02	0	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-5	126
19.00	-5	128
18.00	-8	132
17.00	-11	136
16.00	-14	141
15.00	-16	147
14.00	-17	155
13.00	-16	165
12.00	-12	177
11.00	-3	191
10.00	10	213
9.90	11	216
9.80	12	219
9.70	13	223
9.60	14	226
9.50	12	231
9.40	14	235
9.30	14	240
9.20	13	246
9.10	11	252
9.00	8	259
8.90	4	262
8.80	-2	277
8.70	-11	289
8.60	-24	310
8.50	-17	366
8.49	-9	376
8.48	4	388
8.47	25	413
8.46	-15	615
8.45	-2	533
8.44	0	483
8.43	R	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-5	142
19.00	-8	145
18.00	-11	149
17.00	-13	154
16.00	-16	159
15.00	-18	166
14.00	-18	175
13.00	-16	186
12.00	-10	200
11.00	1	217
10.00	12	248
9.90	12	252
9.80	12	258
9.70	11	263
9.60	9	270
9.50	6	277
9.40	1	286
9.30	-6	296
9.20	-16	311
9.10	-27	338
9.09	-27	343
9.08	-27	348
9.07	-27	353
9.06	-26	359
9.05	-23	365
9.04	-20	372
9.03	-15	380
9.02	-6	389
9.01	6	399
9.00	24	418
8.99	14	485
8.98	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 40.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-7	159
19.00	-10	162
18.00	-13	166
17.00	-16	171
16.00	-18	177
15.00	-20	185
14.00	-20	195
13.00	-17	207
12.00	-9	222
11.00	3	243
10.90	5	246
10.80	6	249
10.70	7	252
10.60	8	256
10.50	9	260
10.40	10	264
10.30	10	269
10.20	10	274
10.10	9	280
10.00	7	287
9.90	4	295
9.80	0	304
9.70	-7	315
9.60	17	331
9.50	-25	363
9.49	-24	368
9.48	-23	374
9.47	-21	379
9.46	-17	386
9.45	-13	393
9.44	-5	400
9.43	5	409
9.42	20	422
9.41	34	457
9.40	3	592
9.39	-1	503
9.38	R	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-3	175
19.00	-11	178
18.00	-14	182
17.00	-18	186
16.00	-20	194
15.00	-22	203
14.00	-22	213
13.00	-19	227
12.00	-10	244
11.00	5	269
10.90	6	273
10.80	7	277
10.70	8	282
10.60	9	287
10.50	9	292
10.40	9	299
10.30	6	306
10.20	3	315
10.10	-2	325
10.00	-9	338
9.90	-13	360
9.80	-10	406
9.79	-4	414
9.78	5	422
9.77	17	433
9.76	32	456
9.75	8	511
9.74	1	475
9.73	11	418
9.72	R	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-9	190
19.00	-12	194
18.00	-16	198
17.00	-20	203
16.00	-23	209
15.00	-25	219
14.00	-25	232
13.00	-21	247
12.00	-10	267
11.00	7	308
10.90	8	305
10.80	9	312
10.70	8	319
10.60	6	329
10.50	3	339
10.40	-4	354
10.30	-13	376
10.20	-6	423
[illegible]	0	431
[illegible]	9	441
[illegible]	.	456
10.16		486
10.15	-25	571
10.14	1	483
10.13	10	438
10.12	R	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-10	204
19.00	-14	208
18.00	-18	212
17.00	-22	217
16.00	-25	224
15.00	-28	234
14.00	-29	247
13.00	-24	264
12.00	-10	286
11.90	-8	288
11.80	-6	291
11.70	-4	294
11.60	-2	297
11.50	0	301
11.40	3	304
11.30	5	309
11.20	7	314
11.10	9	320
11.00	10	327
10.90	10	336
10.80	9	346
10.70	5	359
10.60	-3	377
10.50	-11	411
10.49	-11	416
10.48	-10	422
10.47	-8	429
10.46	-5	437
10.45	0	447
10.44	8	458
10.43	20	477
10.42	24	517
10.41	1	560
10.40	-2	506
10.39	8	458
10.38	R	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-11	216
19.00	-14	219
18.00	-19	223
17.00	-23	228
16.00	-27	235
15.00	-30	244
14.00	-32	257
13.00	-28	273
12.00	-16	294
11.00	8	327
10.90	11	333
10.80	12	340
10.70	13	349
10.60	12	360
10.50	8	375
10.40	-1	395
10.30	-7	439
10.29	-5	447
10.28	-2	456
10.27	5	468
10.26	14	486
10.25	22	523
10.24	-11	630
10.23	R	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-11	226
19.00	-15	229
18.00	-19	232
17.00	-23	238
16.00	-27	242
15.00	-31	255
14.00	-34	260
13.00	-33	275
12.00	-26	293
11.00	-7	314
10.90	-5	316
10.80	-2	319
10.70	0	322
10.60	3	326
10.50	6	330
10.40	9	334
10.30	11	340
10.20	13	346
10.10	15	354
10.00	15	363
9.90	13	375
9.80	8	390
9.70	-1	412
9.69	-2	415
9.68	-3	418
9.67	-4	422
9.66	-5	426
9.65	-6	430
9.64	-7	435
9.63	-7	441
9.62	-6	447
9.61	-5	454
9.60	-3	463
9.59	1	474
9.58	8	489
9.57	17	514
9.56	-5	580
9.55	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 40.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-11	235
19.00	-14	237
18.00	-18	240
17.00	-22	243
16.00	-26	248
15.00	-30	254
14.00	-34	262
13.00	-36	273
12.00	-33	286
11.00	-24	304
10.00	-6	322
9.90	-4	324
9.80	-2	327
9.70	1	329
9.60	3	332
9.50	6	336
9.40	8	339
9.30	10	343
9.20	12	348
9.10	14	353
9.00	15	360
8.90	16	367
8.80	15	376
8.70	13	387
8.60	8	401
8.50	1	421
8.40	-4	462
8.39	-3	469
8.38	-1	478
8.37	3	490
8.36	9	506
8.35	15	534
8.34	-16	689
8.33	R	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-10	-116
19.00	-13	-114
18.00	-17	-112
17.00	-21	-109
16.00	-25	-106
15.00	-29	-102
14.00	-33	-96
13.00	-36	-88
12.00	-37	-78
11.00	-34	-65
10.00	-26	-52
9.00	-11	-38
8.00	3	-19
7.90	5	-16
7.80	7	-13
7.70	8	-9
7.60	10	-5
7.50	11	0
7.40	13	5
7.30	14	12
7.20	14	20
7.10	14	30
7.00	13	44
6.90	8	64
6.80	0	105
6.79	-1	114
6.78	-1	124
6.77	0	138
6.76	3	159
6.75	8	206
6.74	R	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	9	-106
19.00	-12	-105
18.00	-15	-103
17.00	-19	-101
16.00	-22	-99
15.00	-26	-96
14.00	-30	-93
13.00	-34	-88
12.00	-36	-81
11.00	-37	-73
10.00	-35	-63
9.00	-30	-54
8.00	-23	-43
7.00	-12	-27
6.90	-11	-25
6.80	-9	-22
6.70	-8	-19
6.60	-6	-16
6.50	-4	-12
6.40	-1	-8
6.30	2	-3
6.20	5	3
6.10	9	11
6.00	14	22
5.90	18	37
5.80	18	64
5.79	18	68
5.78	17	72
5.77	16	76
5.76	15	82
5.75	13	87
5.74	10	94
5.73	7	101
5.72	4	111
5.71	-1	123
5.70	-5	143
5.69	-3	182
5.68	-13	284
5.67	R	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-7	-95
19.00	-9	-94
18.00	-12	-93
17.00	-15	-92
16.00	-19	-91
15.00	-22	-89
14.00	-26	-87
13.00	-29	-85
12.00	-32	-81
11.00	-34	-77
10.00	-35	-71
9.00	-34	-65
8.00	-31	-57
7.00	-28	-45
6.00	-20	-19
5.90	-18	-15
5.80	-15	-11
5.70	-12	-7
5.60	-8	-2
5.50	-3	4
5.40	3	11
5.30	10	19
5.20	18	32
5.10	25	53
5.00	15	95
4.99	12	102
4.98	7	110
4.97	1	120
4.96	-6	134
4.95	-11	158
4.94	9	226
4.93	-13	249
4.92	-16	223
4.91	-1	226
4.90	11	174
4.89	2	172
4.88	6	359
4.87	-9	393
4.86	-10	329
4.85	R	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-3	-83
19.00	-5	-83
18.00	-8	-82
17.00	-11	-82
16.00	-14	-81
15.00	-17	-80
14.00	-20	-79
13.00	-23	-78
12.00	-25	-77
11.00	-28	-75
10.00	-29	-72
9.00	-29	-69
8.00	-29	-63
7.00	-29	-54
6.00	-30	-34
5.00	-16	0
4.90	-12	3
4.80	-8	7
4.70	-3	11
4.60	2	15
4.50	8	19
4.40	13	25
4.30	18	32
4.20	22	40
4.10	25	53
4.00	26	78
3.90	18	96
3.89	16	100
3.88	14	103
3.87	12	108
3.86	9	112
3.85	6	117
3.84	3	123
3.83	-1	131
3.82	-6	140
3.81	-10	154
3.80	-11	176
3.79	4	224
3.78	-2	252
3.77	R	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	2	-69
19.00	0	-69
18.00	-2	-69
17.00	-5	-68
16.00	-7	-68
15.00	-10	-67
14.00	-13	-67
13.00	-15	-67
12.00	-17	-66
11.00	-19	-66
10.00	-21	-65
9.00	-21	-63
8.00	-22	-59
7.00	-23	-52
6.00	-28	-33
5.00	-30	-17
4.00	-17	3
3.90	-16	6
3.80	-13	9
3.70	-11	13
3.60	-7	18
3.50	-2	29
3.40	5	33
3.30	14	46
3.20	25	62
3.10	26	100
3.00	21	451
2.99	6	193
2.98	3	218
2.97	1	151
2.96	9	470
2.95	-2	373
2.94	12	203
2.93	14	173
2.92	15	199
2.91	12	221
2.90	6	433
2.89	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 40.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	8	-52
19.00	6	-52
18.00	4	-51
17.00	1	-51
16.00	-1	-51
15.00	-3	-51
14.00	-6	-50
13.00	-8	-50
12.00	-10	-50
11.00	-12	-50
10.00	-13	-49
9.00	-14	-48
8.00	-15	-46
7.00	-16	-42
6.00	-21	-30
5.00	-27	-16
4.00	-24	-3
3.90	-24	-1
3.80	-23	1
3.70	-22	5
3.60	-21	8
3.50	-20	12
3.40	-18	17
3.30	-15	23
3.20	-12	28
3.10	-7	33
3.00	-1	38
2.90	4	43
2.80	10	48
2.70	15	55
2.60	21	66
2.50	27	87
2.40	18	143
2.39	2	155
2.38	-10	172
2.37	-16	217
2.36	3	404
2.35	-28	271
2.34	11	184
2.33	-18	360
2.32	2	179
2.31	11	222
2.30	R	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.30	12	-32
19.00	10	-31
18.00	9	-31
17.00	6	-30
16.00	3	-30
15.00	1	-29
14.00	-2	-29
13.00	-4	-28
12.00	-7	-28
11.00	-9	-28
10.00	-10	-27
9.00	-11	-27
8.00	-11	-25
7.00	-12	-20
6.00	-16	-11
5.00	-22	3
4.00	-20	14
3.80	-4	52
3.30	0	56
3.50	5	60
3.70	9	65
3.60	13	71
3.50	13	82
3.40	26	103
3.30	14	157
3.29	6	166
3.28	-3	178
3.27	-15	199
3.26	-11	259
3.25	-25	344
3.24	-3	251
3.23	5	213
3.22	-4	317
3.21	-5	264
3.20	21	412
3.19	10	230
3.18	8	214
3.17	10	234
3.16	R	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	14	-10
19.00	11	-9
18.00	9	-8
17.00	7	-7
16.00	4	-6
15.00	1	-5
14.00	-2	-4
13.00	-5	-3
12.00	-7	-2
11.00	-10	-1
10.00	-11	0
9.00	-12	1
8.00	-11	3
7.00	-11	8
6.00	-13	18
5.00	-17	37
4.00	-9	55
3.90	-8	57
3.80	-7	59
3.70	-5	61
3.60	-4	65
3.50	-2	69
3.40	1	75
3.30	4	82
3.20	10	91
3.10	17	103
3.00	24	122
2.90	24	150
2.85	15	170
2.84	12	174
2.83	9	179
2.82	5	184
2.81	0	189
2.80	-6	196
2.79	-12	205
2.78	-18	217
2.77	-22	236
2.76	-15	271
2.75	R	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	13	11
19.00	10	12
18.00	8	14
17.00	5	15
16.00	2	17
15.00	-2	19
14.00	-5	21
13.00	-8	23
12.00	-11	25
11.00	-13	28
10.00	-15	31
9.00	-15	34
8.00	-13	37
7.00	-11	43
6.00	-10	58
5.00	-3	90
4.90	0	95
4.80	3	100
4.70	7	105
4.60	11	112
4.50	15	118
4.40	19	127
4.30	22	137
4.20	24	149
4.10	22	163
4.00	15	180
3.90	-1	203
3.89	-3	206
3.88	-6	210
3.87	-8	214
3.86	-11	218
3.85	-14	224
3.84	-17	230
3.83	-20	239
3.82	-22	250
3.81	-21	266
3.80	-16	289
3.79	4	337
3.78	-3	508
3.77	-10	362
3.76	R	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	10	30
19.00	7	32
18.00	5	34
17.00	1	36
16.00	-2	38
15.00	-5	41
14.00	-9	44
13.00	-12	48
12.00	-15	52
11.00	-16	58
10.00	-16	64
9.00	-13	70
8.00	-9	77
7.00	-4	87
6.00	4	112
5.90	5	116
5.80	7	121
5.70	9	127
5.60	11	135
5.50	14	144
5.40	17	156
5.30	18	174
5.20	12	202
5.19	10	206
5.18	8	210
5.17	5	215
5.16	2	220
5.15	-2	226
5.14	-6	233
5.13	-12	242
5.12	-18	255
5.11	-24	277
5.10	-14	323
5.09	20	479
5.08	R	R

GEOGRAPHIC
LAT. = 40.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	7	47
19.00	4	49
18.00	1	52
17.00	-2	54
16.00	-5	57
15.00	-9	61
14.00	-12	65
13.00	-15	73
12.00	-17	77
11.00	-16	86
10.00	-12	95
9.00	-5	108
8.00	5	113
7.90	6	120
7.80	7	122
7.70	8	124
7.60	9	126
7.50	10	128
7.40	11	131
7.30	12	133
7.20	13	136
7.10	14	140
7.00	14	143
6.90	15	147
6.80	16	152
6.70	17	157
6.60	17	164
6.50	17	172
6.40	16	181
6.30	14	194
6.20	7	211
6.10	-9	242
6.03	-11	248
6.08	-14	254
6.07	-17	262
6.06	-20	272
6.05	-22	286
6.04	-20	308
6.03	-4	348
6.02	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 35.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	0	71
19.00	-3	75
18.00	-6	78
17.00	-9	83
16.00	-12	89
15.00	-14	97
14.00	-15	107
13.00	-13	119
12.00	-4	136
11.00	14	163
10.10	-1	238
10.00	-24	266
9.99	-27	271
9.98	-29	278
9.97	-30	287
9.96	-30	297
9.95	-27	310
9.94	-19	326
9.93	-1	347
9.92	11	437
9.91	-8	534
9.90	15	468
9.89	R	R

GEOGRAPHIC
LAT. = 35.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-2	87
19.00	-5	91
18.00	-4	95
17.00	-11	101
16.00	-13	107
15.00	-15	116
14.00	-14	127
13.00	-10	141
12.00	3	161
11.90	4	163
11.80	5	166
11.70	5	169
11.60	10	172
11.50	12	176
11.40	14	179
11.30	16	184
11.20	17	189
11.10	20	195
11.00	21	202
10.90	20	210
10.80	13	219
10.70	14	230
10.60	4	243
10.50	-13	261
10.49	-15	263
10.48	-18	266
10.47	-23	269
10.46	-23	273
10.45	-25	277
10.44	-26	283
10.43	-33	289
10.42	-31	297
10.41	-32	306
10.40	-30	318
10.33	-24	331
10.38	-11	347
10.37	15	375
10.36	R	R

GEOGRAPHIC
LAT. = 35.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-4	103
19.00	-7	107
18.00	-10	112
17.00	-12	118
16.00	-14	125
15.00	-15	134
14.00	-13	146
13.00	-6	162
12.00	8	185
11.90	10	188
11.80	12	192
11.70	14	196
11.60	16	200
11.50	17	206
11.40	18	211
11.30	19	218
11.20	18	226
11.10	16	235
11.00	10	246
10.90	0	258
10.80	-17	277
10.79	-19	280
10.78	-22	283
10.77	-24	287
10.76	-26	291
10.75	-28	296
10.74	-30	301
10.73	-32	308
10.72	-32	317
10.71	-31	327
10.70	-26	338
10.69	-17	351
10.68	0	367
10.67	28	412
10.66	R	R

GEOGRAPHIC
LAT. = 35.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-6	120
19.00	-8	124
18.00	-11	129
17.00	-13	136
16.00	-15	144
15.00	-15	154
14.00	-12	167
13.00	-3	185
12.90	-2	187
12.80	0	189
12.70	1	191
12.60	3	194
12.50	4	196
12.40	6	199
12.30	8	202
12.20	9	206
12.10	11	210
12.00	13	214
11.90	14	219
11.80	15	224
11.70	16	230
11.60	16	237
11.50	14	245
11.40	11	255
11.30	4	266
11.20	-8	280
11.10	-27	307
11.09	-29	312
11.08	-30	317
11.07	-31	324
11.06	-31	332
11.05	-29	341
11.04	-25	352
11.03	-17	363
11.02	-2	376
11.01	25	403
11.00	R	R

GEOGRAPHIC
LAT. = 35.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-8	137
19.00	-10	142
18.00	-13	148
17.00	-15	155
16.00	-16	164
15.00	-15	176
14.00	-10	191
13.00	2	212
12.90	3	215
12.80	5	218
12.70	7	221
12.60	8	225
12.50	10	229
12.40	11	234
12.30	13	239
12.20	13	245
12.10	13	252
12.00	12	260
11.90	9	269
11.80	4	280
11.70	-7	293
11.60	-24	317
11.59	-25	321
11.58	-27	326
11.57	-28	331
11.56	-29	337
11.55	-30	344
11.54	-29	352
11.53	-26	361
11.52	-20	371
11.51	-9	382
11.50	9	396
11.49	34	437
11.48	R	R

GEOGRAPHIC
LAT. = 35.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-10	155
19.00	-13	161
18.00	-15	167
17.00	-17	175
16.00	-17	185
15.00	-15	199
14.00	-7	217
13.00	8	246
12.90	9	250
12.80	10	256
12.70	11	262
12.60	11	269
12.50	10	277
12.40	7	286
12.30	1	298
12.20	-9	313
12.10	-25	342
12.09	-26	346
12.08	-27	352
12.07	-27	359
12.06	-26	366
12.05	-23	374
12.04	-19	383
12.03	-10	393
12.02	5	404
12.01	28	425
12.00	-22	538
11.99	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 35.00 LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-12	173
19.00	-15	178
18.00	-17	185
17.00	-19	194
16.00	-19	205
15.00	-15	220
14.00	-6	241
13.90	-4	243
13.80	-3	246
13.70	-1	249
13.60	1	252
13.50	2	256
13.40	4	259
13.30	6	264
13.20	7	268
13.10	8	274
13.00	9	280
12.90	9	288
12.80	8	296
12.70	4	307
12.60	-2	320
12.50	-14	340
12.40	-20	386
12.39	-17	394
12.38	-11	403
12.37	0	413
12.36	17	426
12.35	36	463
12.34	38	547
12.33	R	R

GEOGRAPHIC LAT. = 35.00 LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-13	188
19.00	-15	194
18.00	-19	201
17.00	-21	210
16.00	-21	222
15.00	-17	238
14.00	-7	260
13.90	-5	263
13.80	-4	266
13.70	-2	270
13.60	0	273
13.50	2	277
13.40	4	282
13.30	5	287
13.20	7	292
13.10	8	299
13.00	9	307
12.90	7	317
12.80	5	330
12.70	-5	347
12.60	-16	377
12.59	-17	382
12.58	-17	387
12.57	-17	394
12.56	-15	401
12.55	-12	409
12.54	-7	418
12.53	2	428
12.52	16	443
12.51	32	476
12.50	22	758
12.49	-1	452
12.48	3	R

GEOGRAPHIC LAT. = 35.00 LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-14	202
19.00	-18	208
18.00	-21	215
17.00	-23	224
16.00	-24	237
15.00	-21	254
14.00	-10	277
13.90	-8	280
13.80	-6	283
13.70	-4	286
13.60	-2	290
13.50	0	294
13.40	2	299
13.30	4	304
13.20	6	310
13.10	8	318
13.00	8	327
12.90	7	339
12.80	3	354
12.70	-6	379
12.69	-7	382
12.68	-8	386
12.67	-9	390
12.66	-10	395
12.65	-11	400
12.64	-11	406
12.63	-11	413
12.62	-9	421
12.61	-6	431
12.60	1	443
12.59	12	459
12.58	26	494
12.57	R	R

GEOGRAPHIC LAT. = 35.00 LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-15	215
19.00	-19	220
18.00	-22	227
17.00	-25	236
16.00	-27	248
15.00	-25	265
14.00	-15	288
13.90	-13	291
13.80	-12	294
13.70	-10	297
13.60	-7	300
13.50	-5	304
13.40	-2	308
13.30	0	312
13.20	3	317
13.10	6	323
13.00	8	331
12.90	10	340
12.80	10	352
12.70	8	369
12.60	-1	395
12.59	-2	399
12.58	-3	403
12.57	-5	408
12.56	-6	414
12.55	-6	420
12.54	-7	427
12.53	-6	436
12.52	-4	447
12.51	2	461
12.50	12	483
12.49	16	540
12.48	R	R

GEOGRAPHIC LAT. = 35.00 LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-15	225
19.00	-19	230
18.00	-23	236
17.00	-27	244
16.00	-29	256
15.00	-29	271
14.00	-22	291
13.90	-21	294
13.80	-20	296
13.70	-18	299
13.60	-17	301
13.50	-15	304
13.40	-13	307
13.30	-10	310
13.20	-8	313
13.10	-5	317
13.00	-2	321
12.90	1	325
12.80	4	330
12.70	7	337
12.60	10	344
12.50	13	354
12.40	14	367
12.30	11	386
12.20	0	417
12.19	-1	422
12.18	-3	428
12.17	-4	435
12.16	-5	443
12.15	-4	453
12.14	-2	466
12.13	4	485
12.12	15	523
12.11	R	R

GEOGRAPHIC LAT. = 35.00 LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-16	234
19.00	-19	239
18.00	-23	244
17.00	-27	251
16.00	-30	260
15.00	-32	273
14.00	-29	290
13.00	-17	312
12.90	-15	315
12.80	-13	317
12.70	-11	320
12.60	-8	323
12.50	-5	326
12.40	-2	330
12.30	1	334
12.20	4	338
12.10	8	344
12.00	11	350
11.90	14	358
11.80	16	369
11.70	16	384
11.60	10	406
11.50	-4	450
11.49	-5	460
11.48	-4	471
11.47	-1	488
11.46	7	515
11.45	-18	692
11.44	-5	616
11.43	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 35.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-16	243
19.00	-19	247
18.00	-22	251
17.00	-27	256
16.00	-30	264
15.00	-33	274
14.00	-33	288
13.00	-28	306
12.00	-17	327
11.90	-10	329
11.80	-7	332
11.70	-4	335
11.60	-1	338
11.50	2	342
11.40	5	346
11.30	9	350
11.20	12	356
11.10	16	363
11.00	18	372
10.90	19	383
10.80	17	399
10.70	9	422
10.69	8	425
10.68	6	428
10.67	5	431
10.66	3	435
10.65	1	439
10.64	0	444
10.63	-2	449
10.62	-4	455
10.61	-5	463
10.60	-6	472
10.59	-5	484
10.58	-2	501
10.57	8	529
10.56	R	R

GEOGRAPHIC
LAT. = 35.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.10	-16	-108
19.00	-19	-105
19.00	-23	-101
17.00	-26	-97
16.00	-30	-91
15.00	-33	-83
14.00	-35	-77
13.00	-34	-68
12.00	-27	-41
11.90	-3	-23
11.80	-7	-21
11.70	-4	-18
11.60	-1	-16
11.50	2	-13
11.40	5	-10
11.30	9	-6
11.20	11	-2
11.10	14	3
11.00	17	9
10.90	20	16
10.80	21	25
10.70	21	36
10.70	17	51
10.60	9	72
10.50	-6	112
10.49	-7	120
10.48	-7	131
10.47	-4	144
10.46	2	164
10.45	13	205
10.44	R	R

GEOGRAPHIC
LAT. = 35.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-15	-98
19.00	-18	-95
18.00	-22	-93
17.00	-25	-89
16.00	-29	-85
15.00	-33	-79
14.00	-36	-71
13.00	-37	-60
12.00	-35	-47
11.00	-27	-33
10.00	-11	-18
9.00	12	4
8.90	14	8
8.80	17	12
8.70	19	17
8.60	20	23
8.50	21	30
8.40	22	39
8.30	20	49
8.20	17	61
8.10	11	78
8.00	0	103
7.99	-2	107
7.98	-3	111
7.97	-4	116
7.96	-5	122
7.95	-6	129
7.94	-6	137
7.93	-6	147
7.92	-3	159
7.91	2	178
7.90	10	215
7.89	R	R

GEOGRAPHIC
LAT. = 35.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-14	-87
19.00	-17	-85
18.00	-20	-83
17.00	-23	-81
16.00	-27	-77
15.00	-31	-73
14.00	-34	-68
13.00	-37	-61
12.00	-37	-51
11.00	-35	-41
10.00	-29	-30
9.00	-19	-20
8.00	-5	-7
7.90	-4	-6
7.80	-2	-4
7.70	-1	-2
7.60	1	0
7.50	3	3
7.40	5	5
7.30	6	8
7.20	8	11
7.10	11	15
7.00	13	20
6.90	15	25
6.80	17	31
6.70	20	40
6.60	21	51
6.50	21	66
6.40	16	90
6.39	15	93
6.38	13	97
6.37	12	100
6.36	10	104
6.35	8	109
6.34	6	114
6.33	3	120
6.32	0	127
6.31	-3	135
6.30	-6	146
6.29	-8	163
6.28	-5	191
6.27	-22	349
6.26	-21	294
6.25	R	R

GEOGRAPHIC
LAT. = 35.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-11	-76
19.00	-13	-74
18.00	-16	-73
17.00	-20	-71
16.00	-23	-69
15.00	-27	-66
14.00	-30	-63
13.00	-33	-59
12.00	-35	-54
11.00	-36	-47
10.00	-35	-40
9.00	-32	-32
8.00	-26	-24
7.00	-18	-11
6.90	-17	-9
6.80	-16	-7
6.70	-15	-5
6.60	-13	-2
6.50	-12	1
6.40	-10	4
6.30	-8	7
6.20	-5	10
6.10	-2	15
6.00	1	19
5.90	6	25
5.80	11	31
5.70	17	41
5.60	23	54
5.50	27	76
5.40	12	119
5.39	7	126
5.38	1	134
5.37	-6	145
5.36	-13	162
5.35	-11	197
5.34	R	R

GEOGRAPHIC
LAT. = 35.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-6	-62
19.00	-9	-61
18.00	-11	-60
17.00	-14	-59
16.00	-17	-58
15.00	-20	-56
14.00	-23	-54
13.00	-27	-52
12.00	-29	-50
11.00	-31	-46
10.00	-32	-43
9.00	-31	-38
8.00	-29	-32
7.00	-27	-21
6.00	-21	0
5.00	-20	3
5	-19	6
5.70	-17	10
5.60	-14	14
5.50	-12	17
5.40	-8	21
5.30	-4	26
5.20	1	30
5.10	6	36
5.00	13	42
4.90	20	50
4.80	27	62
4.70	30	81
4.60	22	110
4.50	-17	173
4.40	-5	160
4.39	16	513
4.38	9	485
4.37	18	183
4.36	0	158
4.35	-4	264
4.34	12	160
4.33	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 35.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	0	-46
19.00	-3	-46
18.00	-5	-45
17.00	-8	-44
16.00	-11	-42
15.00	-13	-41
14.00	-16	-40
13.00	-19	-39
12.00	-22	-37
11.00	-24	-35
10.00	-25	-33
9.00	-25	-31
8.00	-25	-27
7.00	-24	-19
6.00	-24	-2
5.00	-14	26
4.90	-12	29
4.80	-9	32
4.70	-5	35
4.60	-2	38
4.50	2	41
4.40	6	44
4.30	9	48
4.20	13	51
4.10	17	56
4.00	20	62
3.90	24	69
3.80	27	80
3.70	28	96
3.60	21	124
3.50	-15	215
3.49	-17	391
3.48	-25	317
3.47	6	604
3.46	1	576
3.45	8	228
3.44	-2	178
3.43	R	R

GEOGRAPHIC
LAT. = 35.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	5	-27
19.00	2	-26
18.00	0	-25
17.00	-3	-23
16.00	-5	-22
15.00	-8	-21
14.00	-11	-19
13.00	-14	-18
12.00	-17	-16
11.00	-19	-14
10.00	-20	-13
9.00	-20	-11
8.00	-20	-7
7.00	-19	-1
6.00	-19	13
5.00	-14	39
4.90	12	68
4.80	15	72
4.70	16	77
4.60	21	84
4.50	24	94
4.40	26	110
4.30	21	139
4.20	20	143
4.10	19	147
4.00	15	152
3.90	12	157
3.80	5	163
3.70	3	170
3.60	-3	178
3.50	-10	190
3.49	-18	209
3.48	-14	250
3.47	-17	298
3.46	2	R

GEOGRAPHIC
LAT. = 35.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	7	-5
19.00	5	-4
18.00	2	-2
17.00	-1	0
16.00	-3	2
15.00	-7	4
14.00	-10	6
13.00	-13	9
12.00	-15	12
11.00	-17	15
10.00	-18	18
9.00	-18	21
8.00	-16	25
7.00	-14	31
6.00	-11	46
5.90	-11	49
5.80	-10	51
5.70	-10	54
5.60	-9	57
5.50	-8	60
5.40	-7	64
5.30	-5	67
5.20	-3	72
5.10	-1	76
5.00	2	81
4.90	6	86
4.80	10	92
4.70	14	99
4.60	19	107
4.50	23	118
4.40	26	131
4.30	24	149
4.20	14	170
4.10	-12	204
4.09	-15	210
4.08	-19	218
4.07	-21	229
4.06	-21	244
4.05	-18	266
4.04	2	306
4.03	11	394
4.02	-11	350
4.01	0	468
4.00	R	R

GEOGRAPHIC
LAT. = 35.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	7	17
19.00	4	19
18.00	2	21
17.00	-2	23
16.00	-5	26
15.00	-8	30
14.00	-12	33
13.00	-15	38
12.00	-17	44
11.00	-17	51
10.00	-16	58
9.00	-12	65
8.00	-6	72
7.00	0	82
6.90	1	84
6.80	2	85
6.70	3	87
6.60	3	89
6.50	4	91
6.40	5	94
6.30	6	97
6.20	7	100
6.10	8	104
6.00	10	109
5.90	12	114
5.80	13	123
5.70	15	128
5.60	17	138
5.50	19	152
5.40	17	173
5.30	0	210
5.29	-3	216
5.28	-8	224
5.27	-13	234
5.26	-18	248
5.25	-21	273
5.24	-4	331
5.23	R	R

GEOGRAPHIC
LAT. = 35.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	5	37
19.00	2	39
18.00	-1	42
17.00	-4	45
16.00	-8	49
15.00	-11	54
14.00	-14	60
13.00	-16	68
12.00	-16	78
11.00	-12	89
10.00	-3	103
9.00	11	121
8.90	13	123
8.80	14	125
8.70	16	128
8.60	17	131
8.50	19	134
8.40	20	138
8.30	21	141
8.20	22	145
8.10	22	150
8.00	22	155
7.90	22	160
7.80	21	167
7.70	19	173
7.60	17	181
7.50	12	190
7.40	6	200
7.30	-3	215
7.20	-17	241
7.19	-19	245
7.18	-20	250
7.17	-21	256
7.16	-22	263
7.15	-22	271
7.14	-21	281
7.13	-18	294
7.12	-12	311
7.11	1	339
7.10	-7	538
7.09	5	485
7.08	-11	649
7.07	-3	412
7.06	R	R

GEOGRAPHIC
LAT. = 35.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	2	55
19.00	-1	58
18.00	-4	61
17.00	-7	65
16.00	-10	70
15.00	-13	75
14.00	-15	83
13.00	-16	95
12.00	-12	109
11.00	0	126
10.90	2	129
10.80	4	131
10.70	5	133
10.60	7	136
10.50	9	139
10.40	12	142
10.30	14	145
10.20	16	148
10.10	18	153
10.00	20	157
9.90	22	163
9.80	23	169
9.70	23	176
9.60	23	185
9.50	20	194
9.40	15	205
9.30	5	218
9.20	-12	237
9.10	-24	300
9.09	-17	315
9.08	-1	330
9.07	7	428
9.06	11	391
9.05	-25	527
9.04	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 30.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-3	80
19.00	-6	85
18.00	-8	90
17.00	-11	98
16.00	-13	107
15.00	-12	119
14.00	-8	136
13.00	6	161
12.90	8	165
12.80	11	169
12.70	13	174
12.60	15	179
12.50	17	186
12.40	19	193
12.30	20	203
12.20	18	215
12.10	12	229
12.00	-2	249
11.99	-4	251
11.98	-7	254
11.97	-10	257
11.96	-13	261
11.95	-16	264
11.94	-19	269
11.93	-22	275
11.92	-26	287
11.91	-29	291
11.90	-30	303
11.89	-28	319
11.88	-18	340
11.87	14	378
11.86	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-3	97
19.00	-8	102
18.00	-10	109
17.00	-12	117
16.00	-13	127
15.00	-11	141
14.00	-3	161
13.90	-1	163
13.80	0	166
13.70	2	168
13.60	3	171
13.50	5	175
13.40	7	178
13.30	9	182
13.20	11	186
13.10	13	191
13.00	15	197
12.90	17	204
12.80	19	212
12.70	17	222
12.60	14	235
12.50	5	250
12.40	-14	273
12.39	-17	277
12.38	-20	281
12.37	-23	286
12.36	-26	293
12.35	-29	301
12.34	-30	311
12.33	-30	324
12.32	-24	341
12.31	-7	362
12.30	29	438
12.29	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-7	114
19.00	-5	120
18.00	-11	127
17.00	-12	136
16.00	-12	147
15.00	-8	163
14.00	3	186
13.90	4	189
13.80	6	193
13.70	8	197
13.60	10	201
13.50	12	206
13.40	13	211
13.30	15	218
13.20	15	225
13.10	15	234
13.00	13	245
12.90	6	259
12.80	-8	277
12.79	-10	280
12.78	-12	283
12.77	-14	286
12.76	-17	289
12.75	-19	293
12.74	-22	297
12.73	-25	302
12.72	-27	309
12.71	-29	317
12.70	-30	327
12.69	-29	339
12.68	-22	354
12.67	-6	372
12.66	29	417
12.65	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-8	132
19.00	-10	138
18.00	-12	146
17.00	-13	156
16.00	-11	169
15.00	-5	187
14.90	-4	189
14.80	-3	191
14.70	-2	194
14.60	-1	196
14.50	0	199
14.40	2	202
14.30	3	205
14.20	5	209
14.10	6	213
14.00	8	217
13.90	10	222
13.80	11	227
13.70	12	233
13.60	13	241
13.50	12	249
13.40	10	260
13.30	4	273
13.20	-8	291
13.10	-28	334
13.09	-28	344
13.08	-26	356
13.07	-19	369
13.06	-7	386
13.05	30	424
13.04	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-10	151
19.00	-11	156
18.00	-13	167
17.00	-13	178
16.00	-10	193
15.00	-1	216
14.90	0	219
14.80	1	222
14.70	3	226
14.60	4	229
14.50	6	234
14.40	7	238
14.30	9	244
14.20	10	250
14.10	10	257
14.00	10	266
13.90	7	277
13.80	1	290
13.70	-11	310
13.69	-12	312
13.68	-14	315
13.67	-16	319
13.66	-18	322
13.65	-20	326
13.64	-22	331
13.63	-24	336
13.62	-25	342
13.61	-26	350
13.60	-26	359
13.59	-23	369
13.58	-17	381
13.57	-4	395
13.56	23	420
13.55	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.10	-12	170
19.10	-14	178
18.30	-15	188
17.10	-14	202
16.30	-9	220
15.30	-8	222
15.30	-7	225
15.70	-6	227
15.60	-5	230
15.50	-3	233
15.40	-2	236
15.30	-1	239
15.20	1	243
15.10	2	247
15.00	4	251
14.90	5	256
14.80	6	261
14.70	7	267
14.60	8	275
14.50	7	284
14.40	5	295
14.30	-1	310
14.20	-13	332
14.19	-15	335
14.18	-16	339
14.17	-18	343
14.16	-19	348
14.15	-21	353
14.14	-22	359
14.13	-22	366
14.12	-22	374
14.11	-19	384
14.10	-13	395
14.09	-2	408
14.08	20	429
14.07	-9	515
14.06	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 30.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-14	188
19.00	-16	197
18.00	-17	208
17.00	-15	223
16.00	-8	244
15.90	-7	246
15.80	-6	249
15.70	-5	252
15.60	-3	255
15.50	-2	259
15.40	0	263
15.30	1	267
15.20	3	272
15.10	4	277
15.00	5	284
14.90	6	291
14.80	6	300
14.70	4	311
14.60	-1	326
14.50	-11	350
14.49	-12	354
14.48	-14	357
14.47	-15	362
14.46	-16	366
14.45	-17	372
14.44	-17	378
14.43	-17	385
14.42	-16	394
14.41	-12	403
14.40	-5	415
14.39	0	430
14.38	29	461
14.37	13	712
14.36	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	LONG
21.00	-16	203
19.00	-19	212
18.00	-19	223
17.00	-17	238
16.00	-11	260
15.90	-10	262
15.80	-8	265
15.70	-7	268
15.60	-6	272
15.50	-4	275
15.40	-3	279
15.30	-1	284
15.20	1	289
15.10	2	294
15.00	4	301
14.90	5	308
14.80	5	318
14.70	4	330
14.60	-1	348
14.50	-10	377
14.49	-11	382
14.48	-11	387
14.47	-12	393
14.46	-12	400
14.45	-10	408
14.44	-7	418
14.43	-2	430
14.42	9	447
14.41	25	480
14.40	10	559
14.39	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-17	216
19.00	-19	224
18.00	-21	235
17.00	-21	250
16.00	-16	270
15.90	-15	273
15.80	-14	276
15.70	-12	278
15.60	-11	281
15.50	-10	285
15.40	-8	288
15.30	-6	292
15.20	-5	296
15.10	-3	300
15.00	-1	305
14.90	2	311
14.80	4	318
14.70	5	327
14.60	6	337
14.50	5	352
14.40	1	374
14.39	0	377
14.38	-1	380
14.37	-1	383
14.36	-2	387
14.35	-3	391
14.34	-4	396
14.33	-5	401
14.32	-6	407
14.31	-6	414
14.30	-6	422
14.29	-4	432
14.28	0	444
14.27	7	463
14.26	19	508
14.25	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-18	227
19.00	-21	234
18.00	-23	244
17.00	-24	258
16.00	-21	277
15.00	-9	305
14.90	-7	309
14.80	-5	313
14.70	-2	318
14.60	1	323
14.50	3	330
14.40	6	338
14.30	8	348
14.20	9	362
14.10	7	383
14.00	-1	424
13.99	-2	432
13.98	-2	442
13.97	-1	455
13.96	3	473
13.95	11	507
13.94	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-18	236
19.00	-21	242
18.00	-24	251
17.00	-26	263
16.00	-26	279
15.00	-19	302
14.90	-17	304
14.80	-16	307
14.70	-14	310
14.60	-12	314
14.50	-10	317
14.40	-8	321
14.30	-5	325
14.20	-2	329
14.10	1	335
14.00	4	341
13.90	7	348
13.80	11	358
13.70	13	371
13.60	12	391
13.50	4	428
13.49	2	434
13.48	1	441
13.47	-1	451
13.46	-1	462
13.45	0	479
13.44	4	508
13.43	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-19	244
19.00	-22	250
18.00	-25	257
17.00	-28	267
16.00	-29	280
15.00	-26	298
14.00	-13	323
13.90	-11	326
13.80	-8	330
13.70	-6	333
13.60	-3	337
13.50	0	342
13.40	4	347
13.30	8	353
13.20	11	361
13.10	15	372
13.00	17	386
12.90	14	408
12.89	14	411
12.88	13	414
12.87	12	418
12.86	11	421
12.85	10	425
12.84	8	429
12.83	7	434
12.82	5	440
12.81	3	446
12.80	1	453
12.79	-1	462
12.78	-3	479
12.77	-3	492
12.76	2	524
12.75	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 30.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-19	257
19.00	-22	257
18.00	-26	263
17.00	-29	271
16.00	-31	282
15.00	-30	297
14.00	-24	316
13.00	-5	342
12.90	-2	346
12.80	2	350
12.70	5	354
12.60	9	360
12.50	13	367
12.40	17	375
12.30	19	387
12.20	20	404
12.10	13	431
12.09	11	435
12.04	9	439
12.07	8	443
12.06	5	448
12.05	3	454
12.04	0	460
12.03	-2	469
12.02	-5	479
12.01	-6	494
12.00	-4	517
11.99	10	576
11.98	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	LONG
21.00	-20	-99
19.00	-23	-95
18.00	-26	-89
17.00	-29	-82
16.00	-32	-73
15.00	-33	-61
14.00	-33	-45
13.00	-28	-26
12.90	-19	-24
12.80	-17	-21
12.70	-14	-19
12.60	-12	-17
12.50	-9	-14
12.40	-7	-12
12.30	-4	-9
12.20	-1	-6
12.10	1	-2
12.00	6	2
11.90	10	6
11.80	14	12
11.70	15	19
11.60	21	28
11.50	23	41
11.40	22	59
11.30	10	86
11.29	9	90
11.28	6	94
11.27	3	99
11.26	1	104
11.25	-2	111
11.24	-5	119
11.23	-3	129
11.22	-3	143
11.21	-6	165
11.20	10	213
11.19	-12	285
11.18	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-20	-89
19.00	-23	-85
18.00	-26	-80
17.00	-29	-75
16.00	-32	-67
15.00	-34	-57
14.00	-34	-44
13.00	-28	-28
12.00	-13	-10
11.90	-11	-8
11.80	-9	-6
11.70	-6	-4
11.60	-3	-1
11.50	0	-1
11.40	3	4
11.30	6	7
11.20	10	10
11.10	13	14
11.00	17	19
10.90	21	25
10.80	24	33
10.70	26	44
10.60	26	58
10.50	20	77
10.40	2	106
10.39	0	110
10.38	-3	115
10.37	-6	121
10.36	-9	129
10.35	-11	138
10.34	-12	151
10.33	-8	170
10.32	8	205
10.31	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-19	-78
19.00	-22	-75
18.00	-25	-71
17.00	-29	-66
16.00	-32	-60
15.00	-35	-52
14.00	-36	-42
13.00	-34	-29
12.00	-26	-15
11.00	-10	0
10.00	16	21
9.90	21	27
9.80	24	33
9.70	26	40
9.60	26	48
9.50	26	55
9.40	26	71
9.10	19	87
9.20	4	108
9.19	1	111
9.15	-1	114
9.17	-3	118
9.16	-5	122
9.15	-8	127
9.14	-10	132
9.13	-12	139
9.12	-13	147
9.11	-13	157
9.10	-10	171
9.09	-7	190
9.08	14	229
9.07	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-17	-68
19.00	-20	-64
18.00	-23	-61
17.00	-26	-58
16.00	-30	-53
15.00	-33	-47
14.00	-35	-40
13.00	-36	-31
12.00	-34	-20
11.00	-27	-9
10.00	-15	2
9.00	4	15
8.00	24	44
7.90	26	50
7.80	27	57
7.70	27	65
7.60	26	75
7.50	22	87
7.40	15	102
7.30	2	123
7.29	0	127
7.28	-2	130
7.27	-4	134
7.26	-6	138
7.25	-8	143
7.24	-10	149
7.23	-12	157
7.22	-12	166
7.21	-11	178
7.20	-7	194
7.19	4	220
7.18	-22	324
7.17	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-13	-54
19.00	-16	-52
18.00	-19	-50
17.00	-22	-47
16.00	-25	-44
15.00	-28	-41
14.00	-31	-36
13.00	-33	-30
12.00	-34	-23
11.00	-33	-15
10.00	-29	-7
9.00	-22	1
8.00	-12	10
7.00	2	29
6.90	4	28
6.80	6	30
6.70	8	34
6.60	11	37
6.50	14	42
6.40	17	47
6.30	20	54
6.20	23	63
6.10	26	75
6.00	26	92
5.90	17	120
5.89	15	123
5.88	13	127
5.87	10	131
5.86	7	136
5.85	3	141
5.84	-1	147
5.83	-6	154
5.82	-11	164
5.81	-15	179
5.80	-14	204
5.79	8	264
5.78	-15	371
5.77	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 30.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-7	-39
19.00	-10	-38
18.00	-12	-36
17.00	-15	-34
16.00	-18	-31
15.00	-21	-29
14.00	-24	-25
13.00	-27	-22
12.00	-29	-17
11.00	-30	-12
10.00	-29	-7
9.00	-26	-1
8.00	-22	5
7.00	-15	15
6.00	-1	39
5.90	1	42
5.80	5	47
5.70	8	52
5.60	12	58
5.50	17	65
5.40	23	75
5.30	27	90
5.20	27	113
5.10	7	159
5.00	-12	221
4.99	-31	302
4.98	9	169
4.97	-5	179
4.96	-16	307
4.95	4	353
4.94	5	166
4.93	-3	276
4.92	10	178
4.91	-17	379
4.90	7	194
4.89	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-2	-21
19.00	-4	-19
18.00	-7	-17
17.00	-9	-15
16.00	-12	-12
15.00	-15	-10
14.00	-19	-6
13.00	-21	-3
12.00	-23	1
11.00	-24	6
10.00	-24	11
9.00	-22	15
8.00	-18	20
7.00	-13	28
6.00	-4	47
5.80	27	118
5.70	21	145
5.59	18	149
5.58	17	152
5.67	14	156
5.66	12	160
5.65	9	164
5.64	5	168
5.63	0	174
5.62	-5	180
5.61	-10	188
5.60	-16	199
5.59	-20	216
5.58	-19	248
5.57	-14	403
5.56	-23	306
5.55	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	2	1
19.00	0	3
18.00	-3	5
17.00	-6	8
16.00	-9	12
15.00	-12	15
14.00	-15	20
13.00	-17	25
12.00	-19	31
11.00	-19	38
10.00	-17	45
9.00	-12	51
8.00	-6	58
7.00	2	67
6.90	2	69
6.80	3	71
6.70	4	72
6.60	5	74
6.50	6	77
6.40	7	79
6.30	9	82
6.20	10	86
6.10	12	90
6.00	13	96
5.90	15	100
5.80	17	106
5.70	19	115
5.60	21	126
5.50	21	141
5.40	16	164
5.30	-10	211
5.29	-15	222
5.28	-18	239
5.27	-17	269
5.26	11	769
5.25	-8	396
5.24	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	3	23
19.00	0	26
18.00	-3	29
17.00	-6	33
16.00	-9	37
15.00	-12	43
14.00	-15	50
13.00	-16	58
12.00	-15	69
11.00	-10	82
10.00	2	96
9.00	18	110
8.00	20	164
7.90	17	171
7.80	13	179
7.70	6	189
7.60	-3	201
7.59	-14	221
7.49	-15	224
7.48	-17	227
7.47	-18	230
7.46	-19	234
7.45	-20	239
7.44	-20	244
7.43	-21	250
7.42	-21	257
7.41	-20	265
7.40	-17	274
7.39	-14	286
7.38	-7	302
7.37	3	328
7.36	12	493
7.35	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	1	44
19.00	-1	47
18.00	-4	51
17.00	-8	56
16.00	-11	62
15.00	-13	70
14.00	-15	80
13.00	-13	94
12.00	-4	112
11.90	-3	114
11.80	-1	116
11.70	0	119
11.60	2	121
11.50	4	124
11.40	6	127
11.30	8	130
11.20	11	133
11.10	13	137
11.00	16	141
10.90	18	146
10.80	20	152
10.70	22	159
10.60	23	167
10.50	23	177
10.40	20	189
10.30	13	203
10.20	-2	221
10.19	-4	224
10.18	-6	227
10.17	-9	229
10.16	-11	233
10.15	-14	236
10.14	-17	241
10.13	-20	246
10.12	-23	252
10.11	-25	260
10.10	-27	270
10.09	-26	283
10.08	-22	299
10.07	-8	323
10.06	11	404
10.05	R	R

GEOGRAPHIC
LAT. = 30.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-1	62
19.00	-4	67
18.00	-7	72
17.00	-9	78
16.00	-12	85
15.00	-14	96
14.00	-12	109
13.00	-6	128
12.90	-3	131
12.80	-2	133
12.70	0	136
12.60	2	138
12.50	3	141
12.40	6	145
12.30	8	148
12.20	10	152
12.10	13	157
12.00	15	162
11.90	18	168
11.80	20	175
11.70	21	184
11.60	21	194
11.50	18	208
11.40	8	225
11.30	-15	252
11.29	-19	257
11.28	-22	263
11.27	-26	271
11.26	-28	281
11.25	-29	294
11.24	-25	313
11.23	-9	339
11.22	8	535
11.21	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 25.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-4	89
19.00	-6	95
18.00	-8	102
17.00	-10	112
16.00	-9	126
15.00	-5	145
14.90	-4	147
14.80	-3	149
14.70	-2	152
14.60	-1	155
14.50	0	158
14.40	2	161
14.30	4	165
14.20	5	169
14.10	7	173
14.00	9	178
13.90	11	184
13.80	13	190
13.70	15	199
13.60	16	209
13.50	15	221
13.40	9	238
13.30	-8	265
13.29	-11	269
13.28	-14	273
13.27	-17	279
13.26	-21	286
13.25	-25	294
13.24	-27	306
13.23	-27	323
13.22	-19	347
13.21	19	397
13.20	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	LONG
23.00	-5	107
22.00	-7	114
21.00	-3	123
20.00	-4	134
19.00	-7	149
18.00	1	173
17.90	2	176
17.80	3	180
17.70	5	184
17.60	7	188
17.50	9	193
17.40	10	198
17.30	12	204
17.20	13	212
17.10	14	221
17.00	15	233
16.90	5	248
16.80	-4	270
16.79	-6	273
16.78	-8	276
16.77	-11	279
16.76	-14	283
16.75	-17	288
16.74	-20	294
16.73	-23	301
16.72	-25	309
16.71	-27	321
16.70	-26	336
16.69	-16	357
16.68	12	392
16.67	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-7	125
19.00	-8	133
18.00	-9	143
17.00	-9	156
16.00	-5	174
15.90	-4	176
15.80	-3	179
15.70	-2	181
15.60	-1	184
15.50	0	187
15.40	1	190
15.30	2	193
15.20	4	197
15.10	5	201
15.00	6	205
14.90	8	210
14.80	9	215
14.70	11	222
14.60	11	230
14.50	11	239
14.40	9	251
14.30	3	267
14.20	-11	291
14.19	-13	295
14.18	-16	299
14.17	-18	303
14.16	-21	309
14.15	-23	316
14.14	-25	324
14.13	-26	335
14.12	-25	348
14.11	-18	366
14.10	4	392
14.09	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-8	145
19.90	-9	153
18.00	-10	164
17.90	-8	179
16.00	-7	201
15.90	-1	204
15.80	1	207
15.70	2	211
15.60	3	214
15.50	4	218
15.40	6	223
15.30	7	228
15.20	8	234
15.10	9	241
15.00	9	249
14.90	8	259
14.80	5	272
14.70	-4	290
14.60	-20	324
14.59	-22	331
14.58	-24	338
14.57	-24	348
14.56	-23	360
14.55	-17	375
14.54	-1	395
14.53	31	454
14.52	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-10	165
19.00	-11	175
18.00	-10	188
17.00	-7	206
16.90	-6	208
16.80	-5	210
16.70	-5	213
16.60	-4	216
16.50	-3	219
16.40	-2	222
16.30	-1	225
16.20	0	228
16.10	1	232
16.00	2	235
15.90	4	241
15.80	5	247
15.70	6	253
15.60	6	260
15.50	6	269
15.40	5	279
15.30	1	294
15.20	-9	315
15.19	-10	317
15.18	-11	321
15.17	-13	324
15.16	-14	328
15.15	-16	332
15.14	-18	337
15.13	-19	343
15.12	-20	349
15.11	-21	357
15.10	-21	367
15.09	-18	379
15.08	-10	393
15.07	7	413
15.06	25	485
15.05	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-11	186
19.00	-12	197
18.00	-11	213
17.00	-5	236
16.90	-4	239
16.80	-3	242
16.70	-2	246
16.60	-1	250
16.50	0	254
16.40	1	259
16.30	3	264
16.20	3	270
16.10	4	278
16.00	4	287
15.90	3	298
15.80	-1	313
15.70	-18	337
15.69	-11	341
15.68	-13	345
15.67	-14	349
15.66	-15	354
15.65	-16	360
15.64	-17	366
15.63	-17	374
15.62	-16	383
15.61	-13	394
15.60	-6	407
15.59	9	426
15.58	29	482
15.57	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 25.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-18	205
19.00	-14	217
18.00	-12	234
17.00	-4	261
16.90	-3	264
16.80	-2	269
16.70	-1	273
16.60	0	278
16.50	1	284
16.40	2	291
16.30	3	300
16.20	2	310
16.10	0	324
16.00	-5	348
15.90	-12	389
15.89	-11	398
15.88	-8	404
15.87	-2	421
15.86	18	448
15.85	24	487
15.84	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-15	219
19.00	-16	231
18.00	-14	248
17.00	-9	274
16.90	-5	277
16.80	-5	281
16.70	-4	286
16.60	-3	290
16.50	-1	296
16.40	0	302
16.30	1	309
16.20	2	318
16.10	2	330
16.00	0	346
15.90	-4	372
15.89	-5	376
15.88	-6	380
15.87	-5	385
15.86	-7	390
15.85	-7	396
15.84	-7	403
15.83	-6	411
15.82	-4	421
15.81	1	434
15.80	3	453
15.79	21	495
15.78	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-17	230
19.00	-18	241
18.00	-18	256
17.00	-13	279
16.90	-12	282
16.80	-11	285
16.70	-10	288
16.60	-9	292
16.50	-8	296
16.40	-6	300
16.30	-5	305
16.20	-3	310
16.10	-1	316
16.00	1	324
15.90	2	333
15.80	4	344
15.70	4	360
15.60	1	387
15.59	0	391
15.58	0	395
15.57	-1	400
15.56	-1	405
15.55	-1	411
15.54	-1	419
15.53	-1	427
15.52	1	438
15.51	4	453
15.50	10	476
15.49	8	551
15.48	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-18	238
19.00	-20	248
18.00	-21	262
17.00	-19	281
16.90	-18	283
16.80	-18	286
16.70	-17	288
16.60	-16	291
16.50	-15	294
16.40	-14	297
16.30	-13	300
16.20	-12	303
16.10	-10	307
16.00	-9	311
15.90	-7	315
15.80	-5	320
15.70	-3	326
15.60	0	332
15.50	2	340
15.40	5	350
15.30	7	363
15.20	8	382
15.10	4	418
15.09	4	424
15.08	3	431
15.07	3	440
15.06	3	451
15.05	3	467
15.04	6	492
15.03	1	578
15.02	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-19	246
19.00	-21	255
18.00	-23	266
17.00	-23	282
16.00	-18	304
15.90	-17	307
15.80	-15	310
15.70	-14	313
15.60	-12	316
15.50	-11	320
15.40	-9	324
15.30	-7	328
15.20	-4	333
15.10	-2	338
15.00	1	345
14.90	4	352
14.80	8	362
14.70	10	375
14.60	12	394
14.50	7	431
14.49	6	438
14.48	5	445
14.47	4	454
14.46	2	466
14.45	1	484
14.44	2	514
14.43	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-20	253
19.00	-22	261
18.00	-24	270
17.00	-25	283
16.00	-23	301
15.00	-13	326
14.90	-11	330
14.80	-9	333
14.70	-7	337
14.60	-4	341
14.50	-2	346
14.40	2	351
14.30	5	357
14.20	8	365
14.10	12	375
14.00	15	389
13.90	15	412
13.89	15	415
13.88	14	418
13.87	14	421
13.86	13	425
13.85	12	429
13.84	11	433
13.83	10	438
13.82	8	444
13.81	7	450
13.80	5	458
13.79	2	467
13.78	0	479
13.77	-2	497
13.76	0	532
13.75	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 25.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-21	261
19.00	-23	268
18.00	-26	276
17.00	-27	287
16.00	-27	301
15.00	-21	321
14.90	-20	323
14.80	-19	325
14.70	-18	328
14.60	-16	330
14.50	-15	333
14.40	-13	336
14.30	-11	339
14.20	-9	342
14.10	-7	345
14.00	-4	349
13.90	-1	353
13.80	2	358
13.70	5	363
13.60	9	369
13.50	13	377
13.40	17	388
13.30	19	403
13.20	17	427
13.19	17	430
13.18	16	434
13.17	15	437
13.16	13	441
13.15	12	446
13.14	10	451
13.13	8	456
13.12	5	462
13.11	3	470
13.10	-1	479
13.09	-4	492
13.08	-6	512
13.07	8	551
13.06	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-22	-89
19.00	-24	-81
18.00	-27	-76
17.00	-28	-67
16.00	-28	-54
15.00	-26	-38
14.00	-16	-17
13.90	-14	-15
13.80	-12	-12
13.70	-10	-10
13.60	-7	-7
13.50	-5	-4
13.40	-2	0
13.30	1	3
13.20	5	7
13.10	9	12
13.00	12	18
12.90	16	26
12.80	20	35
12.70	23	49
12.60	22	70
12.50	7	105
12.49	4	111
12.48	1	117
12.47	-3	125
12.46	-7	136
12.45	-10	152
12.44	-7	179
12.43	-3	296
12.42	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-22	-79
19.00	-25	-73
18.00	-28	-67
17.00	-30	-59
16.00	-31	-48
15.00	-30	-34
14.00	-23	-16
13.00	-4	5
12.90	-1	8
12.80	2	11
12.70	5	15
12.60	9	19
12.50	13	23
12.40	17	29
12.30	22	35
12.20	25	46
12.10	27	60
12.00	24	81
11.90	7	111
11.89	4	116
11.88	0	121
11.87	-4	127
11.86	-8	135
11.85	-12	146
11.84	-14	151
11.83	-8	187
11.82	11	263
11.81	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-27	-67
19.00	-25	-65
18.00	-28	-57
17.00	-31	-50
16.00	-32	-41
15.00	-32	-29
14.00	-28	-14
13.00	-16	2
12.90	10	25
12.80	14	28
12.70	18	33
12.60	22	38
12.50	26	45
12.40	29	54
12.30	31	67
12.20	28	94
12.10	15	106
12.00	13	108
11.90	11	111
11.89	8	114
11.88	5	117
11.87	2	121
11.86	-2	125
11.85	-5	129
11.84	-9	135
11.83	-13	142
11.82	-16	151
11.81	-17	165
11.80	-12	183
11.79	7	214
11.78	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-21	-56
19.00	-24	-52
18.00	-27	-48
17.00	-29	-42
16.00	-32	-34
15.00	-33	-25
14.00	-32	-13
13.00	-26	0
12.00	-12	15
11.00	15	34
10.90	18	37
10.80	22	41
10.70	25	46
10.60	29	52
10.50	32	59
10.40	33	69
10.30	32	82
10.20	26	97
10.10	11	114
10.00	-16	146
9.90	-12	238
9.89	17	172
9.88	-9	188
9.87	-17	306
9.86	14	417
9.85	21	181
9.84	16	141
9.83	8	124
9.82	2	120
9.81	-4	127
9.80	-9	146
9.79	9	183
9.78	0	333
9.77	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-18	-45
19.00	-20	-47
18.00	-23	-38
17.00	-26	-33
16.00	-29	-28
15.00	-31	-21
14.00	-32	-12
13.00	-30	-2
12.00	-25	9
11.00	-13	20
10.00	6	33
9.00	31	63
8.90	32	69
8.80	33	77
8.70	31	86
8.60	28	96
8.50	21	108
8.40	10	121
8.30	-9	142
8.20	-3	207
8.19	10	227
8.18	10	273
8.17	-8	452
8.16	-28	268
8.15	12	228
8.14	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 25.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-12	-31
19.00	-15	-28
18.00	-17	-25
17.00	-20	-22
16.00	-23	-18
15.00	-25	-12
14.00	-27	-6
13.00	-28	1
12.00	-27	10
11.00	-23	18
10.00	-14	27
9.00	-2	35
8.80	14	48
7.90	16	50
7.80	18	52
7.70	20	55
7.60	21	58
7.50	23	61
7.40	25	65
7.30	26	69
7.20	27	74
7.10	28	80
7.00	29	87
6.90	28	96
6.80	26	107
6.70	21	120
6.60	10	136
6.50	-10	166
6.49	-13	172
6.48	-15	179
6.47	-17	187
6.46	-17	198
6.45	-14	213
6.44	-5	234
6.43	9	283
6.42	18	377
6.41	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.30	-6	-14
19.00	-9	-11
18.00	-11	-8
17.00	-14	-5
16.00	-16	-1
15.00	-19	4
14.00	-21	10
13.00	-22	16
12.00	-22	24
11.00	-19	32
10.00	-15	40
9.00	-5	48
8.00	7	57
7.00	20	76
6.90	21	79
6.80	23	83
6.70	24	88
6.60	25	93
6.50	26	100
6.40	26	108
6.30	25	118
6.20	22	130
6.10	14	147
6.00	-4	174
5.99	-6	178
5.98	-9	184
5.97	-12	190
5.96	-15	197
5.95	-17	207
5.94	-17	221
5.93	-14	240
5.92	-1	275
5.91	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-2	7
19.00	-4	10
18.00	-6	14
17.00	-9	18
16.00	-12	23
15.00	-14	29
14.00	-16	36
13.00	-17	44
12.00	-15	55
11.00	-9	66
10.00	2	80
9.00	18	97
8.90	19	99
8.80	21	102
8.70	22	105
8.60	23	108
8.50	24	111
8.40	25	115
8.30	26	118
8.20	26	123
8.10	26	127
8.00	26	132
7.90	25	137
7.80	23	143
7.70	21	149
7.60	17	156
7.50	12	163
7.40	6	172
7.30	-3	184
7.28	-15	205
7.19	-16	208
7.18	-17	211
7.17	-18	215
7.16	-19	219
7.15	-19	224
7.14	-19	229
7.13	-19	236
7.12	-18	243
7.11	-16	251
7.10	-13	261
7.09	-7	274
7.08	0	293
7.07	4	333
7.06	-1	396
7.05	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	0	29
19.00	-2	33
18.00	-5	38
17.00	-8	43
16.00	-10	49
15.00	-13	58
14.00	-13	68
13.00	-11	82
12.00	-2	101
11.00	18	133
10.50	21	173
10.40	16	186
10.30	5	203
10.20	-17	234
10.19	-20	240
10.18	-22	247
10.17	-24	256
10.16	-24	268
10.15	-21	284
10.14	-11	306
10.13	10	359
10.12	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	0	50
19.00	-3	55
18.00	-6	61
17.00	-8	67
16.00	-11	76
15.00	-12	86
14.00	-9	104
13.00	1	127
12.90	3	131
12.80	5	134
12.70	7	138
12.60	9	142
12.50	12	147
12.40	14	153
12.30	17	159
12.20	19	166
12.10	20	178
12.00	20	191
11.90	14	208
11.80	-3	233
11.79	-6	237
11.78	-9	241
11.77	-13	246
11.76	-16	252
11.75	-20	259
11.74	-24	269
11.73	-27	282
11.72	-25	302
11.71	-11	334
11.70	R	R

GEOGRAPHIC
LAT. = 25.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-2	70
19.00	-4	75
18.00	-7	82
17.00	-9	90
16.00	-11	102
15.00	-9	117
14.00	-2	140
13.90	0	143
13.80	1	146
13.70	3	149
13.60	5	153
13.50	7	156
13.40	10	162
13.30	12	168
13.20	14	175
13.10	17	183
13.00	18	193
12.90	17	206
12.80	12	224
12.70	-5	250
12.69	-8	254
12.68	-12	259
12.67	-16	264
12.66	-20	271
12.65	-24	280
12.64	-27	293
12.63	-27	311
12.62	-18	338
12.61	21	429
12.60	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = 20.00 LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-2	96
19.00	-4	103
18.00	-6	113
17.00	-6	125
16.00	-4	144
15.90	-4	146
15.80	-3	148
15.70	-3	151
15.60	-2	154
15.50	-1	157
15.40	0	160
15.30	1	163
15.20	2	167
15.10	3	171
15.00	4	175
14.90	6	180
14.80	7	186
14.70	9	192
14.60	11	200
14.50	12	210
14.40	11	223
14.30	8	240
14.20	-5	268
14.19	-8	272
14.18	-10	277
14.17	-13	282
14.16	-17	289
14.15	-20	297
14.14	-23	309
14.13	-24	325
14.12	-19	350
14.11	15	402
14.10	R	R

GEOGRAPHIC LAT. = 20.00 LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-4	115
20.00	-5	124
19.00	-6	135
18.00	-5	150
17.00	-1	173
16.90	0	176
16.80	1	179
16.70	2	183
16.60	3	187
16.50	5	192
16.40	6	197
16.30	7	202
16.20	8	209
16.10	9	217
16.00	10	227
15.90	9	240
15.80	4	257
15.70	-10	286
15.69	-13	291
15.68	-15	295
15.67	-19	303
15.66	-21	311
15.65	-23	322
15.64	-23	336
15.63	-19	356
15.62	2	390
15.61	R	R

GEOGRAPHIC LAT. = 20.00 LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-5	135
19.00	-6	145
18.00	-6	157
17.00	-3	175
16.90	-3	178
16.80	-3	180
16.70	-2	183
16.60	-1	185
16.50	-1	188
16.40	0	191
16.30	1	195
16.20	2	198
16.10	3	202
16.00	4	207
15.90	5	212
15.80	6	217
15.70	7	223
15.60	7	231
15.50	7	240
15.40	6	252
15.30	2	267
15.20	-8	291
15.19	-10	295
15.18	-11	299
15.17	-13	303
15.16	-15	308
15.15	-17	314
15.14	-19	320
15.13	-21	329
15.12	-22	340
15.11	-21	354
15.10	-14	373
15.09	10	406
15.08	R	R

GEOGRAPHIC LAT. = 20.00 LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-6	156
19.00	-6	166
18.00	-5	181
17.00	-2	204
16.90	-1	207
16.80	0	210
16.70	1	214
16.60	1	218
16.50	2	222
16.40	3	227
16.30	4	232
16.20	4	238
16.10	5	246
16.00	5	254
15.90	4	265
15.80	0	279
15.70	-7	301
15.69	-9	304
15.68	-10	307
15.67	-11	311
15.66	-13	315
15.65	-14	319
15.64	-16	324
15.63	-17	330
15.62	-19	337
15.61	-19	345
15.60	-19	355
15.59	-17	369
15.58	-10	386
15.57	10	414
15.56	R	R

GEOGRAPHIC LAT. = 20.00 LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-7	178
19.00	-7	191
18.00	-5	209
17.90	-5	211
17.80	-5	214
17.70	-4	218
17.60	-4	219
17.50	-3	222
17.40	-2	225
17.30	-2	229
17.20	-1	233
17.10	0	237
17.00	0	241
16.90	1	246
16.80	2	252
16.70	2	259
16.60	2	266
16.50	2	276
16.49	0	288
16.30	-4	306
16.20	-14	337
16.19	-15	343
16.18	-16	349
16.17	-16	356
16.16	-16	364
16.15	-15	374
16.14	-12	387
16.13	-3	405
16.12	19	437
16.1.	R	R

GEOGRAPHIC LAT. = 20.00 LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-9	200
19.00	-8	216
18.00	-5	239
17.90	-5	242
17.80	-4	246
17.70	-3	250
17.60	-3	254
17.50	-2	258
17.40	-1	264
17.30	-1	269
17.20	0	276
17.10	0	284
17.00	0	294
16.90	-2	307
16.80	-5	326
16.70	-12	362
16.69	-12	368
16.68	-12	376
16.67	-11	386
16.66	-9	395
16.65	-4	409
16.64	8	430
16.63	24	486
16.62	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 20.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-10	219
19.00	-10	236
19.00	-6	264
17.90	-5	267
17.80	-4	272
17.70	-4	276
17.60	-3	282
17.50	-2	288
17.40	-2	295
17.30	-1	304
17.20	-1	315
17.10	-3	330
17.00	-6	353
16.99	-6	356
16.98	-7	360
16.97	-7	364
16.96	-8	368
16.95	-8	373
16.94	-8	378
16.93	-8	384
16.92	-8	391
16.91	-6	400
16.90	-4	410
16.89	1	424
16.88	11	445
16.87	20	498
16.86	R	R

GEOGRAPHIC
LAT. = 20.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-12	233
19.00	-12	249
19.00	-9	275
17.90	-5	278
17.80	-7	282
17.70	-6	286
17.60	-6	291
17.50	-5	296
17.40	-4	302
17.30	-1	309
17.20	-2	317
17.10	-1	326
17.00	-1	342
16.90	-3	363
16.80	-2	408
16.79	-1	417
16.78	2	428
16.77	7	443
16.76	14	469
16.75	-5	561
16.74	R	R

GEOGRAPHIC
LAT. = 20.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-14	242
19.00	-15	256
18.00	-13	277
17.90	-12	280
17.80	-12	283
17.70	-11	286
17.60	-11	290
17.50	-10	293
17.40	-9	297
17.30	-8	301
17.20	-7	306
17.10	-6	312
17.00	-4	318
16.90	-3	325
16.80	-2	333
16.70	0	344
16.60	1	359
16.50	2	382
16.49	2	385
16.48	2	389
16.47	2	393
16.46	2	397
16.45	2	402
16.44	2	407
16.43	2	413
16.42	3	420
16.41	3	429
16.40	5	440
16.39	7	455
16.38	11	479
16.37	4	547
16.36	R	R

GEOGRAPHIC
LAT. = 20.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-16	249
19.00	-17	261
18.00	-17	278
17.00	-12	306
16.90	-11	309
16.80	-10	313
16.70	-8	318
16.60	-7	323
16.50	-5	328
16.40	-3	335
16.30	-1	343
16.20	1	352
16.10	4	365
16.00	6	384
15.90	7	419
15.89	7	425
15.88	7	432
15.87	7	440
15.86	7	451
15.85	7	465
15.84	7	488
15.83	3	543
15.82	R	R

GEOGRAPHIC
LAT. = 20.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-17	255
19.00	-19	266
18.00	-20	280
17.00	-17	300
16.90	-17	303
16.80	-16	305
16.70	-15	308
16.60	-15	311
16.50	-14	314
16.40	-12	318
16.30	-11	321
16.20	-10	325
16.10	-8	329
16.00	-6	334
15.90	-4	339
15.80	-2	346
15.70	1	353
15.60	3	362
15.50	6	373
15.40	9	389
15.30	11	410
15.29	10	422
15.28	10	426
15.27	10	432
15.26	9	438
15.25	9	445
15.24	8	453
15.23	7	464
15.22	5	479
15.21	3	502
15.20	0	562
15.19	R	R

GEOGRAPHIC
LAT. = 20.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
19.00	-21	272
18.00	-22	283
17.00	-21	299
16.00	-15	323
15.90	-13	326
15.80	-12	329
15.70	-11	332
15.60	-9	336
15.50	-7	340
15.40	-5	344
15.30	-3	349
15.20	0	355
15.10	2	361
15.00	6	369
14.90	9	379
14.80	12	392
14.70	14	414
14.60	9	458
14.59	7	466
14.58	4	477
14.57	1	492
14.56	-2	517
14.55	1	597
14.54	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 20.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-20	271
19.00	-22	279
18.00	-24	289
17.00	-23	302
16.00	-20	321
15.00	-7	348
14.90	-5	351
14.80	-3	355
14.70	0	360
14.60	3	365
14.50	6	371
14.40	9	379
14.30	13	388
14.20	16	401
14.10	18	421
14.00	11	457
13.99	9	46[illegible]
13.98	7	470
13.97	4	479
13.96	1	490
13.95	-3	505
13.94	-6	532
13.93	0	641
13.92	R	R

GEOGRAPHIC
LAT. = 20.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-22	-80
13.10	-24	-72
13.30	-25	-63
17.30	-26	-51
16.00	-23	-36
15.00	-15	-15
14.30	-13	-13
14.90	-12	-10
14.70	-10	-7
14.60	-9	-4
14.50	-[illegible]	-1
14.40	-4	2
14.30	-1	6
14.20	2	10
14.10	[illegible]	15
14.00	4	21
13.90	13	27
13.80	17	36
13.70	20	48
13.60	22	65
13.50	17	93
13.49	15	97
13.48	14	101
13.47	12	106
13.46	9	111
13.45	7	117
13.44	3	124
13.43	-1	132
13.42	-5	144
13.41	-10	161
13.40	-7	193
13.39	R	R

GEOGRAPHIC
LAT. = 20.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-23	-65
19.00	-25	-62
18.00	-27	-53
17.00	-28	-43
16.00	-26	-29
15.00	-20	-11
14.00	-2	13
13.90	1	16
13.80	4	20
13.70	7	24
13.60	11	28
13.50	15	34
13.40	19	41
13.30	23	51
13.20	26	65
13.10	25	85
13.00	10	116
12.99	7	121
12.98	4	126
12.97	0	132
12.96	-5	139
12.95	-10	149
12.94	-14	164
12.93	-13	188
12.92	11	245
12.91	R	R

GEOGRAPHIC
LAT. = 20.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-23	-57
19.00	-26	-51
18.00	-28	-43
17.00	-29	-34
16.00	-28	-22
15.00	-23	-7
14.00	-11	12
13.90	-9	14
13.80	-7	16
13.70	-4	19
13.60	-2	21
13.50	1	24
13.40	4	27
13.30	7	33
13.20	11	34
13.10	15	38
13.00	19	43
12.90	23	50
12.80	27	59
12.70	30	71
12.60	29	89
12.50	18	112
12.49	16	115
12.48	13	118
12.47	11	121
12.46	8	124
12.45	4	128
12.44	0	132
12.43	-4	137
12.42	-8	143
12.41	-13	150
12.40	-17	161
12.39	-18	176
12.38	-11	196
12.37	15	245
12.36	R	R

GEOGRAPHIC
LAT. = 20.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-23	-46
19.00	-25	-40
18.00	-27	-34
17.00	-29	-26
16.00	-29	-15
15.00	-26	-3
14.00	-19	12
13.00	-1	30
12.90	2	32
12.80	5	35
12.70	8	37
12.60	12	40
12.50	15	44
12.40	19	47
12.30	23	52
12.20	27	58
12.10	30	66
12.00	33	77
11.90	32	91
11.80	25	108
11.70	6	129
11.60	-12	197
11.59	7	219
11.58	1	280
11.57	-25	366
11.56	7	191
11.55	11	176
11.54	-10	200
11.53	-9	273
11.52	-8	229
11.51	25	168
11.50	12	135
11.49	5	120
11.48	1	117
11.47	-5	126
11.46	R	R

GEOGRAPHIC
LAT. = 20.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-20	-35
19.00	-23	-30
18.00	-25	-25
17.00	-27	-18
16.00	-28	-10
15.00	-27	0
14.00	-24	12
13.00	-15	25
12.00	4	41
11.90	7	43
11.80	10	45
11.70	13	47
11.60	16	50
11.50	19	53
11.40	22	56
11.30	26	60
11.20	29	65
11.10	32	72
11.00	34	80
10.90	35	90
10.80	32	102
10.70	24	115
10.60	9	129
10.50	-17	153
10.40	23	189
10.30	20	150
10.20	-10	126
10.19	-12	133
10.18	-13	140
10.17	-11	147
10.16	-7	154
10.15	-2	159
10.14	4	164
10.13	9	169
10.12	14	172
10.11	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 20.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-15	-22
19.00	-18	-18
18.00	-20	-14
17.00	-22	-9
16.00	-24	-2
15.00	-24	6
14.00	-24	15
13.00	-20	26
12.00	-11	38
11.90	-10	39
11.80	-9	40
11.70	-7	41
11.60	-6	43
11.50	-4	44
11.40	-3	45
11.30	-1	46
11.20	1	48
11.10	3	49
11.00	5	51
10.90	7	52
10.80	9	54
10.70	12	56
10.60	14	58
10.50	17	60
10.40	19	62
10.30	22	65
10.20	24	68
10.10	27	71
10.00	29	75
9.90	32	80
9.80	33	86
9.70	34	93
9.60	34	101
9.50	31	109
9.40	27	119
9.30	19	128
9.20	6	138
9.10	-12	153
9.00	-19	195
8.90	-8	218
8.80	9	223
8.70	2	120
8.60	-7	166
8.50	10	229
8.40	16	218
8.39	14	213
8.38	11	216
8.37	7	220
8.36	1	226
8.35	-8	234
8.34	-20	245
8.33	-31	271
8.32	-2	333
8.31	1	345
8.30	R	R

GEOGRAPHIC
LAT. = 20.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-9	-6
19.00	-11	-3
18.00	-13	1
17.00	-15	6
16.00	-17	12
15.00	-19	19
14.00	-19	28
13.00	-17	38
12.00	-11	49
11.00	0	67
10.90	5	80
10.80	23	124
10.70	24	131
10.60	22	139
10.50	19	147
10.40	9	156
10.30	-7	168
10.20	-21	193
10.10	10	270
10.00	3	303
9.90	2	462
9.89	17	409
9.88	22	501
9.87	-7	243
9.86	7	257
9.85	R	R

GEOGRAPHIC
LAT. = 20.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-3	13
19.00	-6	17
18.00	-8	22
17.00	-10	28
16.00	-12	34
15.00	-13	43
14.00	-13	53
13.00	-10	66
12.00	-1	83
11.00	16	108
10.90	18	112
10.80	20	117
10.70	22	122
10.60	24	128
10.50	25	134
10.40	25	143
10.30	23	152
10.20	20	162
10.10	13	175
10.00	0	191
9.90	-19	221
9.89	-20	227
9.88	-22	234
9.87	-22	242
9.86	-21	253
9.85	-17	266
9.84	-10	283
9.83	3	312
9.82	1	478
9.81	R	R

GEOGRAPHIC
LAT. = 20.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	0	35
19.00	-3	40
18.00	-5	46
17.00	-7	53
16.00	-9	61
15.00	-10	73
14.00	-8	88
13.00	1	111
12.90	2	114
12.80	4	117
12.70	6	120
12.60	8	124
12.50	10	129
12.40	12	133
12.30	14	139
12.20	17	146
12.10	19	154
12.00	20	164
11.90	19	176
11.80	15	193
11.70	1	217
11.69	-1	221
11.68	-4	224
11.67	-7	229
11.66	-10	233
11.65	-13	239
11.64	-17	246
11.63	-20	255
11.62	-23	267
11.61	-23	285
11.60	-15	314
11.59	3	461
11.58	R	R

GEOGRAPHIC
LAT. = 20.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	0	56
19.00	-2	62
18.00	-5	69
17.00	-7	78
16.00	-8	89
15.00	-8	105
14.00	0	130
13.90	1	134
13.80	3	138
13.70	4	142
13.60	6	146
13.50	9	152
13.40	11	158
13.30	13	165
13.20	15	174
13.10	17	185
13.00	16	201
12.90	8	223
12.89	7	226
12.88	5	229
12.87	3	232
12.86	1	236
12.85	-2	240
12.84	-4	244
12.83	-6	249
12.82	-11	255
12.81	-15	262
12.80	-20	272
12.79	-24	285
12.78	-25	306
12.77	-12	343
12.76	R	R

GEOGRAPHIC
LAT. = 20.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-1	76
19.00	-3	83
18.00	-5	91
17.00	-7	102
16.00	-7	116
15.00	-3	133
14.90	-2	142
14.80	-1	145
14.70	0	149
14.60	1	152
14.50	3	156
14.40	5	160
14.30	6	165
14.20	8	171
14.10	10	178
14.00	12	186
13.90	14	196
13.80	14	210
13.70	9	229
13.60	-8	261
13.59	-11	268
13.58	-15	275
13.57	-19	284
13.56	-23	296
13.55	-25	315
13.54	-18	345
13.53	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 15.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	0	100
19.00	-1	109
18.00	-3	120
17.00	-3	134
16.00	-1	150
15.90	-1	161
15.80	0	164
15.70	1	168
15.60	1	172
15.50	2	176
15.40	3	181
15.30	4	187
15.20	5	194
15.10	6	201
15.00	7	211
14.90	7	223
14.80	5	241
14.70	-4	270
14.69	-6	274
14.68	-8	279
14.67	-10	285
14.66	-13	292
14.65	-16	300
14.64	-19	312
14.63	-21	328
14.62	-17	[illegible]
14.61	17	416
14.60	R	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-1	121
19.00	-2	130
18.00	-3	143
17.00	-2	161
16.90	-2	164
16.80	-1	166
16.70	-1	169
16.60	-1	172
16.50	0	175
16.40	0	178
16.30	1	181
16.20	1	185
16.10	2	189
16.00	3	194
15.90	3	199
15.80	4	205
15.70	5	212
15.60	5	220
15.50	6	231
15.40	4	244
15.30	0	264
15.20	-13	302
15.19	-15	310
15.18	-17	313
15.17	-19	331
15.16	-18	348
15.15	-11	374
15.14	24	467
15.13	R	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-2	141
19.00	-2	152
18.00	-2	168
17.00	0	191
16.90	0	195
16.80	1	198
16.70	1	202
16.60	2	206
16.50	2	211
16.40	3	216
16.30	3	222
16.20	3	229
16.10	3	236
16.00	3	248
15.90	1	262
15.80	-4	283
15.70	-16	327
15.69	-17	337
15.68	-17	349
15.67	-14	366
15.66	-3	393
15.65	-15	544
15.64	R	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-2	163
19.00	-3	176
18.00	-2	195
17.90	-2	197
17.80	-2	200
17.70	-2	202
17.60	-1	205
17.50	-1	208
17.40	-1	212
17.30	0	215
17.20	0	219
17.10	0	224
17.00	1	228
16.90	1	234
16.80	1	240
16.70	1	247
16.60	1	256
16.50	0	267
16.40	-3	281
16.30	-8	304
16.29	-9	307
16.28	-10	310
16.27	-11	314
16.26	-12	318
16.25	-13	323
16.24	-14	328
16.23	-14	335
16.22	-15	342
16.21	-15	351
16.20	-15	361
16.19	-12	376
16.18	-3	397
16.17	21	443
16.16	R	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-4	187
19.00	-4	202
18.00	-3	227
17.90	-3	231
17.80	-2	235
17.70	-2	239
17.60	-2	244
17.50	-2	249
17.40	-2	255
17.30	-2	262
17.20	-2	270
17.10	-2	280
17.00	-4	293
16.90	-7	313
16.80	-12	353
16.79	-12	360
16.78	-12	369
16.77	-10	380
16.76	-6	394
16.75	4	416
16.74	23	474
16.73	R	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-6	210
19.00	-6	230
18.90	-6	232
18.80	-6	235
18.70	-5	238
18.60	-5	241
18.50	-5	244
18.40	-5	248
18.30	-5	252
18.20	-5	256
18.10	-4	261
18.00	-4	266
17.90	-4	272
17.80	-4	279
17.70	-4	287
17.60	-4	297
17.50	-5	311
17.40	-7	332
17.30	-8	375
17.29	-7	383
17.28	-5	393
17.27	-1	406
17.26	6	425
17.25	20	467
17.24	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 15.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-7	230
19.00	-7	252
18.90	-7	255
18.80	-7	258
18.70	-7	261
18.60	-7	265
18.50	-7	269
18.40	-6	273
18.30	-6	278
18.20	-6	283
18.10	-6	289
18.00	-5	297
17.90	-5	305
17.80	-5	316
17.70	-6	331
17.60	-6	355
17.59	-6	358
17.58	-6	362
17.57	-6	365
17.56	-6	370
17.55	-6	374
17.54	-5	380
17.53	-5	386
17.52	-4	393
17.51	-2	401
17.50	1	412
17.49	6	426
17.48	13	450
17.47	11	515
17.46	R	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-3	243
19.00	-4	263
18.90	-4	266
18.80	-4	269
18.70	-4	272
18.60	-4	275
18.50	-4	279
18.40	-4	283
18.30	-5	287
18.20	-5	292
18.10	-7	297
18.00	-7	303
17.90	-6	309
17.80	-6	318
17.70	-5	328
17.60	-3	341
17.50	-4	360
17.40	-1	398
17.39	1	404
17.38	2	412
17.37	4	421
17.36	9	434
17.35	12	453
17.34	15	489
17.33	R	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-11	251
19.00	-12	268
18.00	-10	297
17.90	-10	301
17.80	-9	306
17.70	-8	311
17.60	-6	317
17.50	-7	323
17.40	-6	331
17.30	-4	341
17.20	-3	354
17.10	-1	373
17.00	4	407
16.99	5	413
16.98	6	420
16.97	7	428
16.96	9	439
16.95	11	453
16.94	12	475
16.93	6	525
16.92	R	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-13	257
19.00	-14	271
18.00	-13	293
17.90	-13	295
17.80	-13	298
17.70	-12	301
17.60	-12	305
17.50	-11	309
17.40	-11	312
17.30	-10	317
17.20	-9	322
17.10	-8	327
17.00	-7	333
16.90	-5	340
16.80	-4	349
16.70	-1	359
16.60	1	374
16.50	5	396
16.49	5	399
16.48	6	403
16.47	6	406
16.46	7	410
16.45	7	415
16.44	8	420
16.43	9	426
16.42	9	432
16.41	10	440
16.40	10	451
16.39	11	464
16.38	10	484
16.37	3	526
16.36	R	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-14	263
19.00	-16	275
18.00	-16	292
17.00	-12	318
16.90	-11	322
16.80	-10	325
16.70	-9	330
16.60	-8	334
16.50	-7	340
16.40	-5	345
16.30	-3	352
16.20	-1	360
16.10	2	371
16.00	5	384
15.90	9	405
15.89	9	408
15.88	9	411
15.87	10	415
15.86	10	418
15.85	10	422
15.84	11	427
15.83	11	432
15.82	11	438
15.81	11	444
15.80	11	452
15.79	11	462
15.78	9	475
15.77	7	494
15.76	1	529
15.75	R	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-16	271
19.00	-18	281
18.00	-18	295
17.00	-15	315
16.90	-15	317
16.80	-14	320
16.70	-13	322
16.60	-13	325
16.50	-12	328
16.40	-11	332
16.30	-10	335
16.20	-8	339
16.10	-7	343
16.00	-5	348
15.90	-4	353
15.80	-2	359
15.70	1	366
15.60	3	374
15.50	7	385
15.40	10	399
15.30	13	422
15.29	13	425
15.28	13	429
15.27	13	433
15.26	13	437
15.25	13	442
15.24	12	447
15.23	12	453
15.22	11	460
15.21	10	469
15.20	8	479
15.19	5	493
15.18	1	516
15.17	-3	574
15.16	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 15.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-19	279
19.00	-20	289
18.00	-20	301
17.00	-18	317
16.00	-11	340
15.90	-10	344
15.80	-8	347
15.70	-7	350
15.60	-5	354
15.50	-3	359
15.40	-1	363
15.30	1	369
15.20	4	375
15.10	7	382
15.00	10	392
14.90	13	405
14.80	16	424
14.70	13	459
14.69	12	465
14.68	10	472
14.67	8	479
14.66	5	489
14.65	1	502
14.64	-4	523
14.63	-4	569
14.62	R	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	LONG
21.00	-20	-71
21.00	-22	-62
21.00	-22	-51
21.00	-20	-37
15.00	-15	-18
15.90	-14	-16
15.80	-13	-13
15.70	-12	-11
15.60	-11	-8
15.50	-9	-5
15.40	-8	-2
15.30	-6	1
15.20	-4	5
15.10	-2	9
15.00	1	13
14.90	3	18
14.80	6	23
14.70	8	29
14.60	13	37
14.50	16	48
14.40	13	63
14.30	13	86
14.29	13	89
14.28	16	92
14.27	17	96
14.26	16	100
14.25	15	104
14.24	14	109
14.23	12	114
14.22	8	119
14.21	6	126
14.20	3	134
14.19	-1	144
14.18	-6	159
14.17	-13	184
14.16	9	259
14.15	R	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-22	-59
19.00	-23	-51
18.00	-24	-41
17.00	-23	-29
16.00	-18	-12
15.00	-5	12
14.90	-3	15
14.80	-1	18
14.70	2	22
14.60	4	26
14.50	7	30
14.40	11	36
14.30	14	42
14.20	18	50
14.10	22	61
14.00	24	76
13.90	21	100
13.89	20	103
13.88	19	106
13.87	18	110
13.86	16	114
13.85	14	118
13.84	11	122
13.83	9	127
13.82	5	132
13.81	1	138
13.80	-3	146
13.79	-8	156
13.78	-13	171
13.77	-13	196
13.76	9	267
13.75	R	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-23	-47
19.00	-24	-40
18.00	-25	-31
17.00	-24	-19
16.00	-20	-5
15.00	-10	14
14.90	-9	16
14.80	-7	19
14.70	-5	21
14.60	-3	24
14.50	0	27
14.40	2	30
14.30	5	33
14.20	8	37
14.10	11	41
14.00	15	46
13.90	19	52
13.80	22	60
13.70	26	70
13.60	28	84
13.50	25	104
13.40	7	133
13.39	4	137
13.38	0	142
13.37	-4	147
13.36	-9	154
13.35	-13	163
13.34	-17	176
13.33	-16	196
13.32	1	231
13.31	R	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-22	-36
19.00	-24	-29
18.00	-25	-21
17.00	-24	-11
16.00	-22	1
15.00	-15	17
14.00	2	37
13.90	5	40
13.80	7	43
13.70	10	46
13.60	14	50
13.50	17	54
13.40	21	59
13.30	25	65
13.20	28	74
13.10	31	85
13.00	30	99
12.90	23	118
12.80	2	142
12.79	-2	145
12.78	-5	149
12.77	-9	154
12.76	-13	159
12.75	-17	167
12.74	-20	176
12.73	-20	190
12.72	-13	208
12.71	7	235
12.70	R	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-20	-25
19.00	-22	-19
18.00	-23	-12
17.00	-24	-4
16.00	-22	7
15.00	-18	19
14.00	-9	34
13.00	12	55
12.90	16	58
12.80	19	62
12.70	22	66
12.60	25	71
12.50	29	78
12.40	31	85
12.30	33	95
12.20	31	108
12.10	25	123
12.00	18	139
11.90	-18	167
11.80	-1	212
11.70	3	125
11.69	2	121
11.68	1	120
11.67	0	122
11.66	-3	126
11.65	-7	131
11.64	-11	136
11.63	-13	143
11.62	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 15.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-16	-14
19.00	-18	-9
18.00	-19	-3
17.00	-20	4
16.00	-20	13
15.00	-19	23
14.00	-14	35
13.00	-3	50
12.00	18	72
11.90	21	75
11.80	24	79
11.70	27	84
11.60	29	90
11.50	31	97
11.40	32	105
11.30	31	114
11.20	28	126
11.10	20	137
11.00	5	151
10.90	-17	172
10.80	16	273
10.70	-6	290
10.69	4	132
10.50	-7	135
10.40	-9	130
10.30	1	108
10.20	18	137
10.10	6	230
10.00	-35	295
9.90	-10	140
9.80	-7	103
9.70	3	86
9.60	9	80
9.59	10	79
9.58	11	79
9.57	11	79
9.56	12	80
9.55	12	80
9.54	13	80
9.53	13	81
9.52	14	81
9.51	14	82
9.50	15	82
9.49	15	83
9.48	R	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-10	1
19.00	-12	5
18.00	-13	11
17.00	-14	17
16.00	-15	25
15.00	-15	34
14.00	-12	46
13.00	-5	60
12.00	10	79
11.90	12	82
11.80	14	85
11.70	16	88
11.60	18	91
11.50	20	95
11.40	23	99
11.30	25	104
11.20	26	110
11.10	27	117
11.00	26	125
10.90	26	134
10.80	23	145
10.70	15	157
10.60	2	171
10.50	-17	197
10.49	-19	201
10.48	-21	207
10.47	-22	213
10.46	-22	221
10.45	-20	230
10.44	-17	241
10.43	-10	255
10.42	1	274
10.41	5	318
10.40	2	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-4	19
19.00	-5	24
18.00	-7	30
17.00	-9	37
16.00	-10	45
15.00	-9	56
14.00	-7	70
13.00	2	90
12.90	3	92
12.80	4	95
12.70	6	98
12.60	7	101
12.50	9	104
12.40	11	108
12.30	13	112
12.20	15	116
12.10	17	122
12.00	19	128
11.90	20	135
11.80	21	143
11.70	21	153
11.60	18	166
11.50	11	183
11.48	-5	208
11.39	-7	212
11.38	-10	216
11.37	-12	221
11.36	-15	227
11.35	-18	235
11.34	-20	244
11.33	-21	256
11.32	-18	274
11.31	-9	301
11.30	-1	427
11.29	-9	373
11.28	R	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	0	40
19.00	-2	46
18.00	-4	53
17.00	-5	61
16.00	-6	72
15.00	-6	86
14.00	-1	109
13.90	0	111
13.80	1	115
13.70	2	118
13.60	4	122
13.50	5	126
13.40	7	130
13.30	9	135
13.20	11	141
13.10	12	147
13.00	14	156
12.90	16	166
12.80	16	179
12.70	12	197
12.60	-1	227
12.59	-4	232
12.58	-7	237
12.57	-10	243
12.56	-13	251
12.55	-17	261
12.54	-20	276
12.53	-21	298
12.52	-6	343
12.51	R	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	2	61
19.00	0	67
18.00	-2	75
17.00	-4	86
16.00	-5	100
15.00	-3	121
14.90	-3	124
14.80	-2	126
14.70	-1	130
14.60	0	133
14.50	1	137
14.40	2	141
14.30	3	145
14.20	5	150
14.10	6	156
14.00	8	163
13.90	10	171
13.80	12	181
13.70	13	194
13.60	11	213
13.50	-2	247
13.49	-5	252
13.48	-8	258
13.47	-12	268
13.46	-16	278
13.45	-20	290
13.44	-22	313
13.43	-7	359
13.42	R	R

GEOGRAPHIC
LAT. = 15.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	1	81
19.00	-1	88
18.00	-2	97
17.00	-4	110
16.00	-4	127
15.90	-4	130
15.80	-3	132
15.70	-3	135
15.60	-3	137
15.50	-2	140
15.40	-2	143
15.30	-1	147
15.20	0	150
15.10	1	154
15.00	2	158
14.90	3	163
14.80	4	168
14.70	5	174
14.60	7	181
14.50	9	190
14.40	10	201
14.30	10	216
14.20	5	239
14.19	4	241
14.18	3	245
14.17	2	248
14.16	1	252
14.15	-1	256
14.14	-3	261
14.13	-6	266
14.12	-9	272
14.11	-12	279
14.10	-16	288
14.09	-20	301
14.08	-22	321
14.07	-16	356
14.06	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 10.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	4	101
19.00	3	110
18.00	1	121
17.00	0	137
16.00	0	161
15.90	0	165
15.80	0	169
15.70	0	173
15.60	1	177
15.50	1	182
15.40	2	188
15.30	2	195
15.20	3	203
15.10	3	213
15.00	3	226
14.90	2	245
14.80	-6	280
14.79	-8	286
14.78	-10	293
14.77	-12	302
14.76	-15	313
14.75	-17	329
14.74	-19	354
14.73	15	421
14.72	R	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	1	122
19.00	2	132
18.00	1	145
17.00	0	164
16.90	0	167
16.80	0	169
16.70	0	172
16.60	0	175
16.50	0	179
16.40	0	182
16.30	1	186
16.20	1	190
16.10	1	195
16.00	1	200
15.90	1	207
15.80	1	214
15.70	1	222
15.60	1	233
15.50	0	247
15.40	-3	269
15.39	-4	277
15.38	-4	275
15.37	-5	278
15.36	-5	282
15.35	-7	286
15.34	-8	291
15.33	-9	296
15.32	-10	302
15.31	-12	309
15.30	-13	318
15.29	-15	330
15.28	-15	345
15.27	-11	370
15.26	17	433
15.25	R	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	2	143
19.00	1	154
18.00	1	170
17.00	0	196
16.90	0	200
16.80	0	204
16.70	0	208
16.60	0	213
16.50	0	219
16.40	0	225
16.30	0	233
16.20	-1	242
16.10	-2	253
16.00	-4	269
15.90	-8	296
15.89	-9	300
15.88	-10	304
15.87	-11	309
15.86	-11	314
15.85	-12	321
15.84	-13	328
15.83	-13	338
15.82	-13	350
15.81	-11	367
15.80	-2	394
15.79	R	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	2	165
19.00	1	179
18.00	0	199
17.90	-1	202
17.80	-1	205
17.70	-1	208
17.60	-1	211
17.50	-1	214
17.40	-1	218
17.30	-1	222
17.20	-2	227
17.10	-2	232
17.00	-2	238
16.90	-2	245
16.80	-3	253
16.70	-4	263
16.60	-5	277
16.50	-8	297
16.40	-12	337
16.39	-12	344
16.38	-11	353
16.37	-10	365
16.36	-6	380
16.35	2	404
16.34	13	486
16.33	R	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	8	190
19.00	-2	207
18.00	-4	235
17.90	-4	239
17.80	-4	243
17.70	-4	249
17.60	-5	254
17.50	-5	261
17.40	-6	269
17.30	-6	279
17.20	8	292
17.10	-9	312
17.00	-10	349
16.99	-9	356
16.98	-9	363
16.97	-7	373
16.96	-4	385
16.95	1	401
16.94	11	433
16.93	R	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-3	214
19.00	-5	235
18.90	-5	238
18.80	-5	241
18.70	-5	244
18.60	-6	248
18.50	-6	252
18.40	-6	256
18.30	-7	260
18.20	-7	266
18.10	-7	272
18.00	-8	278
17.90	-8	287
17.80	-8	297
17.70	-9	310
17.60	-9	331
17.50	-6	370
17.49	-5	377
17.48	-3	386
17.47	0	397
17.46	4	411
17.45	12	435
17.44	18	508
17.43	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 10.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-5	234
19.00	-7	258
18.90	-7	261
18.80	-8	265
18.70	-8	269
18.60	-8	273
18.50	-9	278
18.40	-9	283
18.30	-9	290
18.20	-9	297
18.10	-9	305
18.00	-10	316
17.90	-9	331
17.80	-8	354
17.79	-7	357
17.78	-7	361
17.77	-6	364
17.76	-6	368
17.75	-5	373
17.74	-4	378
17.73	-3	383
17.72	-1	390
17.71	1	398
17.70	4	407
17.69	7	420
17.68	13	439
17.67	18	478
17.66	R	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
23.00	-6	247
19.00	-9	270
19.90	-8	273
19.80	-8	276
19.70	-8	280
19.60	-8	284
19.50	-8	288
19.40	-10	293
19.30	-10	298
19.20	-10	304
19.10	-10	312
19.00	-10	320
18.90	-10	331
18.80	-9	345
18.70	-6	366
18.69	-5	369
18.68	-5	372
18.67	-4	376
18.66	-3	379
18.65	-2	383
18.64	-1	387
18.63	0	392
18.62	1	396
18.61	3	404
18.60	6	411
18.59	8	421
18.58	11	433
18.57	15	451
18.56	15	466
18.55	4	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-8	256
19.00	-9	275
18.90	-10	277
18.80	-10	280
18.70	-10	282
18.60	-10	285
18.50	-10	288
18.40	-10	292
18.30	-10	296
18.20	-11	300
18.10	-11	304
18.00	-11	309
17.90	-10	314
17.80	-10	321
17.70	-10	328
17.60	-9	337
17.50	-8	348
17.40	-6	363
17.30	-1	387
17.29	0	390
17.28	1	394
17.27	2	398
17.26	3	402
17.25	5	407
17.24	6	412
17.23	8	419
17.22	10	426
17.21	12	436
17.20	14	449
17.19	16	469
17.18	9	505
17.17	R	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-9	262
19.00	-11	278
18.00	-11	302
17.90	-11	305
17.80	-11	309
17.70	-11	313
17.60	-11	317
17.50	-11	322
17.40	-10	327
17.30	-10	333
17.20	-9	340
17.10	-7	348
17.00	-6	359
16.90	-3	372
16.80	2	392
16.70	12	434
16.69	13	442
16.68	14	452
16.67	15	466
16.66	13	488
16.65	0	530
16.64	R	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-11	269
19.00	-12	282
18.00	-12	301
17.90	-12	303
17.80	-12	306
17.70	-12	308
17.60	-12	311
17.50	-12	314
17.40	-11	317
17.30	-11	321
17.20	-11	325
17.10	-10	329
17.00	-9	333
16.90	-9	338
16.80	-8	344
16.70	-7	350
16.60	-5	358
16.50	-3	367
16.40	0	378
16.30	3	394
16.20	10	421
16.19	10	425
16.18	11	430
16.17	12	435
16.16	13	441
16.15	13	448
16.14	14	456
16.13	14	467
16.12	13	481
16.11	9	502
16.10	-4	546
16.09	R	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-13	277
19.00	-14	289
18.00	-13	304
17.00	-11	320
16.90	-10	331
16.80	-9	338
16.70	-8	343
16.50	-7	347
16.40	-6	352
16.30	-4	357
16.20	-3	364
16.10	-1	371
16.00	1	380
15.90	4	392
15.80	8	408
15.70	13	437
15.69	13	442
15.68	13	447
15.67	13	452
15.66	13	459
15.65	13	467
15.64	12	476
15.63	10	489
15.62	5	506
15.61	-2	537
15.60	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 10.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-16	287
19.00	-16	297
18.00	-15	311
17.00	-12	330
16.90	-12	332
16.80	-11	335
16.70	-11	338
16.60	-10	340
16.50	-9	343
16.40	-8	347
16.30	-7	350
16.20	-6	354
16.10	-5	358
16.00	-3	362
15.90	-2	368
15.80	0	373
15.70	3	380
15.60	5	388
15.50	8	398
15.40	11	412
15.30	14	433
15.29	14	436
15.28	14	440
15.27	14	443
15.26	14	447
15.25	14	451
15.24	14	455
15.23	14	460
15.22	13	466
15.21	12	472
15.20	11	480
15.19	9	489
15.18	5	501
15.17	1	518
15.16	-5	548
15.15	R	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-13	-63
19.00	-14	-53
18.00	-17	-41
17.00	-13	-25
16.00	-7	0
15.90	-6	3
15.80	-4	7
15.70	-2	11
15.60	0	15
15.50	2	20
15.40	4	26
15.30	7	32
15.20	10	40
15.10	13	50
15.00	16	64
14.90	19	86
14.80	7	128
14.79	6	136
14.78	2	146
14.77	-2	159
14.76	-7	180
14.75	-6	228
14.74	R	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-19	-51
19.00	-20	-42
18.00	-19	-31
17.00	-16	-16
16.00	-9	4
15.90	-8	7
15.80	-7	9
15.70	-5	12
15.60	-4	15
15.50	-2	19
15.40	0	22
15.30	2	26
15.20	5	31
15.10	7	36
15.00	10	41
14.90	13	48
14.80	17	57
14.70	20	69
14.60	22	86
14.50	17	113
14.49	16	117
14.48	14	121
14.47	12	126
14.46	10	131
14.45	7	136
14.44	4	143
14.43	0	150
14.42	-5	160
14.41	-10	174
14.40	-12	198
14.39	4	262
14.38	R	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-20	-40
19.00	-21	-31
18.00	-20	-21
17.00	-18	-8
16.00	-11	10
15.00	4	36
14.90	7	40
14.80	10	45
14.70	13	50
14.60	16	56
14.50	19	63
14.40	23	73
14.30	25	86
14.20	24	104
14.10	12	132
14.09	9	136
14.08	7	140
14.07	3	145
14.06	0	150
14.05	-4	157
14.04	-9	165
14.03	-13	176
14.02	-16	193
14.01	-10	222
14.00	-11	399
13.99	R	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-20	-28
19.00	-21	-20
18.00	-20	-11
17.00	-19	1
16.00	-14	15
15.00	-2	35
14.90	0	38
14.80	2	40
14.70	4	43
14.60	7	46
14.50	9	50
14.40	12	54
14.30	15	58
14.20	18	63
14.10	21	70
14.00	25	78
13.90	27	88
13.80	27	102
13.70	23	120
13.60	6	145
13.59	3	149
13.58	0	152
13.57	-3	157
13.56	-7	162
13.55	-11	168
13.54	-15	176
13.53	-18	187
13.52	-18	202
13.51	-10	225
13.50	11	276
13.49	R	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-15	-17
19.00	-19	-18
18.00	-19	-2
17.00	-18	8
16.00	-15	20
15.00	-7	36
14.00	10	58
13.90	13	62
13.80	15	65
13.70	18	69
13.60	21	74
13.50	24	80
13.40	27	87
13.30	29	96
13.20	29	108
13.10	26	122
13.00	16	140
12.90	-8	165
12.89	-11	170
12.88	-14	175
12.87	-17	181
12.86	-20	189
12.85	-21	200
12.84	-18	214
12.83	-9	232
12.82	18	264
12.81	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 10.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-15	-6
19.00	-16	8
18.00	-17	7
17.00	-16	15
16.00	-14	25
15.00	-10	30
14.00	0	55
13.90	1	57
13.80	3	59
13.70	5	61
13.60	6	63
13.50	8	66
13.40	10	69
13.30	12	71
13.20	15	75
13.10	17	78
13.00	20	82
12.90	22	87
12.80	24	92
12.70	26	99
12.60	28	107
12.50	28	117
12.40	26	128
12.30	20	142
12.20	6	159
12.10	-17	190
12.09	-19	198
12.08	-21	204
12.07	-21	213
12.06	-18	225
12.05	-11	241
12.04	3	266
12.03	-6	335
12.02	R	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
23.00	-4	7
22.00	-13	12
21.00	-11	19
20.00	-11	26
19.00	-11	36
18.00	-3	48
17.00	-2	63
16.00	11	86
15.90	13	89
15.80	15	93
15.70	16	97
15.60	18	101
15.50	20	106
15.40	22	112
15.30	23	120
15.20	24	128
15.10	23	138
15.00	19	150
14.90	12	166
14.80	-4	188
14.79	-6	191
14.78	-8	195
14.77	-11	199
14.76	-13	203
14.75	-16	209
14.74	-15	216
14.73	-13	224
14.72	-13	235
14.71	-17	249
14.70	-11	268
14.69	5	304
14.68	R	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-3	24
19.00	-4	29
18.00	-5	36
17.00	-6	44
16.00	-8	54
15.00	-4	68
14.00	1	87
13.90	2	89
13.80	3	92
13.70	4	95
13.60	5	98
13.50	6	101
13.40	7	104
13.30	9	108
13.20	10	112
13.10	12	117
13.00	13	122
12.90	15	128
12.80	16	135
12.70	17	143
12.60	17	153
12.50	15	166
12.40	10	184
12.30	-4	214
12.29	-6	218
12.28	-9	224
12.27	-11	230
12.26	-14	238
12.25	-16	248
12.24	-18	262
12.23	-16	291
12.22	-5	324
12.21	R	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	2	43
19.00	0	50
18.00	-1	57
17.00	-2	67
16.00	-3	79
15.00	-2	97
14.90	-1	100
14.80	-1	102
14.70	-1	105
14.60	0	107
14.50	0	110
14.40	1	113
14.30	2	117
14.20	3	120
14.10	4	124
14.00	5	129
13.90	6	133
13.80	7	139
13.70	8	145
13.60	10	153
13.50	11	162
13.40	12	174
13.30	11	190
13.20	5	214
13.19	4	216
13.18	3	222
13.17	1	226
13.16	0	230
13.15	-3	235
13.14	-5	241
13.13	-8	248
13.12	-11	257
13.11	-15	269
13.10	-18	286
13.09	-17	317
13.08	R	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	4	63
19.00	3	70
18.00	1	79
17.00	-1	90
16.00	-2	106
15.00	-1	131
14.90	0	134
14.80	0	138
14.70	1	142
14.60	2	147
14.50	3	152
14.40	4	158
14.30	5	165
14.20	7	174
14.10	8	185
14.00	9	199
13.90	7	221
13.89	6	224
13.88	6	227
13.87	5	230
13.86	4	234
13.85	3	238
13.84	2	242
13.83	0	247
13.82	-2	252
13.81	-5	259
13.80	-8	266
13.79	-11	276
13.78	-16	289
13.77	-19	318
13.76	-13	393
13.75	R	R

GEOGRAPHIC
LAT. = 10.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	4	82
19.00	3	90
18.00	1	99
17.00	0	112
16.00	-1	132
15.90	-1	134
15.80	-1	137
15.70	-1	140
15.60	-1	143
15.50	-1	146
15.40	-1	149
15.30	0	153
15.20	0	157
15.10	1	162
15.00	1	167
14.90	2	173
14.80	3	180
14.70	4	188
14.60	5	199
14.50	6	212
14.40	5	233
14.30	-6	272
14.29	-8	280
14.28	-11	289
14.27	-15	301
14.26	-18	319
14.25	-16	353
14.24	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 5.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	8	98
19.00	7	107
18.00	6	117
17.00	4	132
16.00	1	153
15.90	1	156
15.80	1	159
15.70	0	163
15.60	0	166
15.50	0	170
15.40	0	175
15.30	-1	180
15.20	-1	185
15.10	-1	192
15.00	-1	199
14.90	-1	208
14.80	-1	220
14.70	-1	236
14.60	-2	263
14.59	-3	267
14.58	-3	271
14.57	-4	276
14.56	-5	282
14.55	-6	288
14.54	-8	296
14.53	-9	305
14.52	-11	318
14.51	-13	336
14.50	-11	369
14.49	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	7	118
20.00	6	128
19.00	5	140
18.00	3	157
17.00	0	186
16.90	0	191
16.80	-1	196
16.70	-1	201
16.60	-2	207
16.50	-2	215
16.40	-2	224
16.30	-3	235
16.20	-4	251
16.10	-5	277
16.09	-6	281
16.08	-7	285
16.07	-7	289
16.06	-8	295
16.05	-8	301
16.04	-9	306
16.03	-10	316
16.02	-10	327
16.01	-11	341
16.00	-9	363
15.99	5	412
15.98	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	7	139
19.00	6	150
18.00	4	165
17.00	1	187
16.90	1	190
16.80	1	193
16.70	0	196
16.60	0	200
16.50	-1	204
16.40	-1	208
16.30	-2	214
16.20	-2	219
16.10	-3	226
16.00	-4	234
15.90	-5	243
15.80	-6	256
15.70	-8	274
15.60	-10	307
15.59	-10	312
15.58	-10	318
15.57	-10	326
15.56	-10	334
15.55	-9	345
15.54	-8	361
15.53	-3	384
15.52	16	449
15.51	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	6	162
19.00	5	175
18.00	2	193
17.90	2	195
17.80	1	197
17.70	1	200
17.60	1	203
17.50	0	205
17.40	0	208
17.30	-1	212
17.20	-1	215
17.10	-2	219
17.00	-3	224
16.90	-3	229
16.80	-4	234
16.70	-5	240
16.60	-6	248
16.50	-7	257
16.40	-9	269
16.39	-10	265
16.38	-11	312
16.37	-11	316
16.36	-10	321
16.35	-10	326
16.34	-10	331
16.33	-9	338
16.32	-9	345
16.31	-7	355
16.30	-5	367
16.29	-2	384
16.28	7	413
16.27	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	4	186
19.00	2	202
18.00	-3	226
17.90	-3	229
17.80	-4	233
17.70	-5	237
17.60	-6	241
17.50	-6	246
17.40	-7	252
17.30	-8	258
17.20	-9	266
17.10	-10	275
17.00	-11	268
16.90	-12	305
16.80	-10	336
16.79	-9	340
16.78	-8	345
16.77	-7	351
16.76	-6	358
16.75	-5	367
16.74	-2	377
16.73	1	391
16.72	7	412
16.71	15	467
16.70	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	1	219
19.00	-2	229
18.00	-3	231
18.00	-3	234
18.70	-4	237
18.60	-5	240
18.50	-5	243
18.40	-6	246
18.30	-7	250
18.20	-8	254
18.10	-8	258
18.00	-9	263
17.90	-10	269
17.80	-11	276
17.70	-12	284
17.60	-13	294
17.50	-13	307
17.40	-12	325
17.38	-6	358
17.29	-5	363
17.28	-4	369
17.27	-2	376
17.26	1	385
17.25	4	396
17.24	8	411
17.23	14	437
17.22	-1	528
17.21	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 5.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-1	230
19.00	-6	251
18.96	-6	254
18.80	-7	257
18.70	-7	261
18.60	-8	264
18.50	-9	268
18.40	-10	272
18.30	-11	277
18.20	-11	283
18.10	-12	289
18.00	-13	296
17.90	-14	305
17.80	-14	316
17.70	-13	332
17.60	-9	355
17.59	-8	358
17.58	-7	361
17.57	-6	365
17.56	-5	369
17.55	-4	374
17.54	-2	379
17.53	0	385
17.52	2	391
17.51	5	399
17.50	9	410
17.49	13	425
17.48	17	449
17.47	2	516
17.46	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	LONG
21.00	-5	245
19.00	-7	266
18.90	-7	268
18.80	-8	271
18.70	-9	275
18.60	-9	278
18.50	-10	282
18.40	-11	286
18.30	-11	290
18.20	-12	296
18.10	-13	301
18.00	-13	308
17.90	-14	316
17.80	-14	326
17.70	-13	339
17.60	-10	357
17.50	0	388
17.49	2	393
17.48	4	399
17.47	7	405
17.46	10	413
17.45	13	423
17.44	17	438
17.43	19	460
17.42	5	511
17.41	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-4	255
19.00	-7	273
18.90	-7	275
18.80	-8	278
18.70	-8	280
18.60	-9	283
18.50	-9	286
18.40	-10	289
18.30	-10	293
18.20	-11	297
18.10	-12	301
18.00	-12	305
17.90	-13	311
17.80	-13	316
17.70	-13	323
17.60	-13	331
17.50	-13	341
17.40	-11	353
17.30	-7	371
17.20	3	400
17.19	5	404
17.18	7	409
17.17	9	415
17.16	12	422
17.15	15	430
17.14	18	442
17.13	19	458
17.12	16	480
17.11	-12	563
17.10	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-5	263
19.00	-7	278
18.00	-11	302
17.90	-11	306
17.80	-11	309
17.70	-12	313
17.60	-12	318
17.50	-12	323
17.40	-12	328
17.30	-12	334
17.20	-12	342
17.10	-11	350
17.00	-9	361
16.90	-6	375
16.80	1	396
16.79	2	399
16.78	3	402
16.77	4	405
16.76	5	408
16.75	7	412
16.74	9	417
16.73	10	422
16.72	12	427
16.71	15	434
16.70	17	442
16.69	18	453
16.68	19	468
16.67	15	490
16.66	-4	534
16.65	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-7	271
19.00	-8	285
18.00	-10	304
17.90	-10	307
17.80	-10	309
17.70	-10	312
17.60	-10	315
17.50	-10	318
17.40	-10	322
17.30	-10	326
17.20	-10	330
17.10	-10	334
17.00	-10	339
16.90	-10	345
16.80	-9	352
16.70	-8	363
16.60	-7	369
16.50	-4	381
16.40	1	397
16.30	10	425
16.29	11	429
16.28	13	434
16.27	14	440
16.26	16	446
16.25	17	454
16.24	18	454
16.23	17	477
16.22	14	495
16.21	2	526
16.20	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-9	281
19.00	-10	293
18.00	-10	310
17.00	-9	337
16.90	-8	341
16.80	-8	345
16.70	-7	350
16.60	-7	355
16.50	-6	361
16.40	-5	367
16.30	-3	375
16.20	-1	385
16.10	2	398
16.00	7	416
15.90	14	451
15.89	15	457
15.88	15	464
15.87	15	473
15.86	15	484
15.85	12	499
15.84	5	521
15.83	-10	575
15.82	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 5.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-12	292
19.00	-12	303
18.00	-11	318
17.00	-8	340
16.90	-8	343
16.80	-7	346
16.70	-7	349
16.60	-6	353
16.50	-5	357
16.40	-4	361
16.30	-3	366
16.20	-2	372
16.10	-1	378
16.00	1	385
15.90	3	394
15.80	6	405
15.70	9	420
15.60	13	446
15.59	14	450
15.58	14	454
15.57	14	458
15.56	14	464
15.55	14	469
15.54	14	476
15.53	13	484
15.52	11	494
15.51	8	507
15.50	2	526
15.49	-7	562
15.48	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-14	-5.
19.00	-14	-47
18.00	-13	-33
17.00	-9	-15
16.90	-9	-12
16.80	-8	-10
16.70	-8	-7
16.60	-7	-4
16.50	-6	-1
16.40	-5	2
16.30	-4	5
16.20	-3	9
16.10	-2	13
16.00	-1	18
15.90	1	23
15.80	3	28
15.70	5	35
15.60	7	43
15.58	10	53
15.40	13	67
15.30	15	87
15.20	11	128
15.19	9	136
15.18	6	145
15.17	3	156
15.16	-3	173
15.15	-8	203
15.14	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-16	-45
19.00	-15	-36
18.00	-14	-24
17.00	-11	-7
16.00	-2	18
15.90	-1	22
15.80	1	26
15.70	2	30
15.60	4	35
15.50	7	40
15.40	9	46
15.30	12	54
15.20	14	63
15.10	17	76
15.00	18	95
14.90	13	127
14.89	11	131
14.88	9	137
14.87	7	143
14.86	3	150
14.85	0	159
14.84	-5	171
14.83	-9	190
14.82	-9	226
14.81	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-17	-34
19.00	-16	-25
18.00	-15	-13
17.00	-12	1
16.00	-4	22
15.90	-3	25
15.80	-1	27
15.70	0	30
15.60	2	34
15.50	4	37
15.40	6	41
15.30	8	46
15.20	10	51
15.10	13	56
15.00	15	63
14.90	18	72
14.80	21	83
14.70	21	99
14.60	17	122
14.59	16	125
14.58	15	128
14.57	13	132
14.56	12	136
14.55	10	140
14.54	7	144
14.53	5	149
14.52	2	155
14.51	-2	161
14.50	-6	170
14.49	-10	181
14.48	-13	198
14.47	-10	228
14.46	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-17	-22
19.00	-17	-14
18.00	-15	-4
17.00	-12	9
16.00	-6	26
15.90	-5	28
15.80	-4	30
15.70	-2	33
15.60	-1	35
15.50	0	38
15.40	2	40
15.30	3	43
15.20	5	47
15.10	7	50
15.00	9	54
14.90	12	58
14.80	14	63
14.70	17	69
14.60	19	75
14.50	22	84
14.40	24	95
14.30	23	109
14.20	18	129
14.10	-1	161
14.09	-4	166
14.08	-8	173
14.07	-12	181
14.06	-15	192
14.05	-16	207
14.04	-11	232
14.03	6	299
14.02	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-13	-11
19.00	-16	-4
18.00	-15	5
17.00	-12	16
16.00	-7	31
15.00	3	50
14.90	5	53
14.80	7	56
14.70	9	59
14.60	11	62
14.50	13	66
14.40	15	70
14.30	17	75
14.20	20	80
14.10	22	87
14.00	24	95
13.90	25	104
13.80	24	117
13.70	20	133
13.60	6	155
13.59	4	158
13.58	2	161
13.57	0	164
13.56	-3	168
13.55	-6	172
13.54	-9	177
13.53	-12	183
13.52	-15	191
13.51	-17	200
13.50	-18	214
13.49	-14	232
13.48	0	263
13.47	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 5.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-13	-1
19.00	-13	6
18.00	-13	14
17.00	-11	23
16.00	-8	35
15.00	-1	51
14.00	13	76
13.90	15	80
13.80	17	84
13.70	19	88
13.60	20	94
13.50	22	100
13.40	23	108
13.30	24	117
13.20	23	128
13.10	18	142
13.00	6	161
12.90	-13	195
12.89	-16	202
12.88	-17	210
12.87	-18	221
12.86	-16	236
12.85	-8	258
12.84	6	305
12.83	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-3	11
19.00	-3	17
18.00	-3	25
17.00	-7	33
16.00	-6	44
15.00	-1	59
14.00	7	80
13.90	9	83
13.80	10	86
13.70	11	89
13.60	12	93
13.50	14	97
13.40	15	101
13.30	17	106
13.20	13	112
13.10	14	119
13.00	20	127
12.90	19	137
12.80	17	149
12.70	11	165
12.60	-1	188
12.59	-3	191
12.58	-5	195
12.57	-7	199
12.56	-9	204
12.55	-11	210
12.54	-13	216
12.53	-15	224
12.52	-15	235
12.51	-16	249
12.50	-12	270
12.49	0	311
12.45	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-1	27
19.00	-2	33
18.00	-2	40
17.00	-2	49
16.00	-2	61
15.00	1	77
14.00	7	102
13.90	7	106
13.80	8	110
13.70	9	114
13.60	10	119
13.50	11	125
13.40	12	131
13.30	13	139
13.20	13	148
13.10	13	159
13.00	10	174
12.90	4	197
12.89	2	200
12.88	1	204
12.87	0	207
12.86	-2	212
12.85	-3	216
12.84	-5	221
12.83	-7	227
12.82	-9	235
12.81	-12	244
12.80	-14	256
12.79	-15	273
12.78	-12	302
12.77	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	4	44
19.00	3	51
18.00	2	59
17.00	1	70
16.00	1	83
15.00	1	104
14.90	2	106
14.80	2	109
14.70	2	112
14.60	2	116
14.50	3	119
14.40	3	123
14.30	4	127
14.20	4	132
14.10	5	137
14.00	6	143
13.90	7	150
13.80	7	159
13.70	8	170
13.60	8	184
13.50	6	206
13.49	5	209
13.48	5	212
13.47	4	215
13.46	3	219
13.45	2	223
13.44	1	227
13.43	0	232
13.42	-2	238
13.41	-4	244
13.40	-6	252
13.39	-9	262
13.38	-12	275
13.37	-16	296
13.36	-13	339
13.35	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	7	62
19.00	6	70
18.00	5	78
17.00	3	90
16.00	1	106
15.00	0	131
14.90	0	135
14.80	0	139
14.70	1	143
14.60	1	148
14.50	1	154
14.40	2	160
14.30	3	168
14.20	4	177
14.10	5	189
14.00	5	205
13.90	3	232
13.89	3	236
13.88	2	240
13.87	1	245
13.86	0	250
13.85	-2	256
13.84	-4	264
13.83	-7	273
13.82	-10	284
13.81	-15	302
13.80	-17	334
13.79	R	R

GEOGRAPHIC
LAT. = 5.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	8	80
19.00	7	87
18.00	6	97
17.00	4	110
16.00	1	127
15.90	1	130
15.80	1	132
15.70	1	135
15.60	0	137
15.50	0	140
15.40	0	144
15.30	0	147
15.20	0	151
15.10	0	155
15.00	0	159
14.90	0	164
14.80	0	170
14.70	0	176
14.60	1	184
14.50	1	193
14.40	2	205
14.30	2	222
14.20	1	251
14.19	0	255
14.18	-1	26[illegible]
14.17	-2	265
14.16	-3	271
14.15	-5	279
14.14	-7	288
14.13	-10	299
14.12	-14	316
14.11	-16	347
14.10	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 0.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	12	92
19.00	11	100
18.00	10	109
17.00	9	121
16.00	6	138
15.00	0	166
14.90	-1	170
14.80	-1	175
14.70	-2	180
14.60	-3	186
14.50	-3	193
14.40	-4	201
14.30	-4	211
14.20	-4	225
14.10	-4	245
14.00	-4	285
13.99	-5	292
13.98	-5	301
13.97	-7	312
13.96	-9	328
13.95	-11	356
13.94	19	457
13.93	R	R

GEOGRAPHIC
LAT. = 0.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	LONG
21.00	12	111
19.30	11	120
19.00	10	130
17.00	5	144
16.80	4	164
16.70	4	167
16.60	3	170
16.70	2	173
16.50	2	176
16.50	1	179
16.40	0	183
16.30	-1	187
16.20	-2	192
16.10	-3	197
16.00	-4	203
15.90	-5	210
14.80	-6	219
14.70	-6	230
14.60	-7	244
14.50	-7	267
14.49	-7	270
14.48	-7	273
14.47	-7	277
14.46	-7	281
14.45	-7	285
14.44	-6	290
14.43	-6	296
14.42	-6	302
14.41	-6	310
14.40	-7	319
14.39	-7	331
14.35	-7	349
14.37	-5	360
14.36	R	R

GEOGRAPHIC
LAT. = 0.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	11	132
19.00	11	141
18.00	9	153
17.00	7	170
16.00	0	196
15.90	-1	200
15.80	-2	204
15.70	-3	209
15.60	-4	214
15.50	-5	220
15.40	-7	227
15.30	-8	236
15.20	-9	247
15.10	-10	262
15.00	-10	286
14.99	-10	289
14.98	-10	293
14.97	-9	297
14.96	-9	301
14.95	-9	306
14.94	-8	311
14.93	-8	317
14.92	-7	325
14.91	-6	334
14.90	-5	345
14.89	-4	361
14.88	0	388
14.87	12	499
14.86	R	R

GEOGRAPHIC
LAT. = 0.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	11	154
19.00	10	165
18.00	7	179
17.00	2	200
16.90	2	202
16.80	1	205
16.70	0	209
16.60	-1	212
16.50	-2	216
16.40	-3	220
16.30	-5	225
16.20	-6	230
16.10	-7	236
16.00	-9	243
15.90	-10	251
15.80	-12	262
15.70	-13	277
15.60	-12	299
15.59	-12	302
15.58	-12	306
15.57	-11	309
15.56	-11	313
15.55	-10	318
15.54	-10	322
15.53	-9	328
15.52	-8	334
15.51	-6	341
15.50	-5	350
15.49	-2	361
15.48	1	377
15.47	5	403
15.46	8	502
15.45	R	R

GEOGRAPHIC
LAT. = 0.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	10	177
19.00	7	198
18.00	3	208
17.90	2	210
17.80	1	212
17.70	1	215
17.60	0	217
17.50	-1	220
17.40	-2	223
17.30	-3	226
17.20	-4	230
17.10	-5	234
17.00	-7	238
16.90	-8	243
16.80	-10	248
16.70	-11	255
16.60	-13	262
16.50	-14	271
16.40	-15	284
16.30	-15	300
16.20	-11	328
16.19	-10	332
16.18	-9	336
16.17	-8	341
16.16	-6	346
16.15	-5	353
16.14	-3	360
16.13	0	369
16.12	3	382
16.11	7	399
16.10	12	433
16.09	R	R

GEOGRAPHIC
LAT. = 0.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	7	200
19.00	3	215
18.00	-4	237
17.90	-5	240
17.80	-6	244
17.70	-7	247
17.60	-9	251
17.50	-10	256
17.40	-11	261
17.30	-13	266
17.20	-14	273
17.10	-16	281
17.00	-17	291
16.90	-17	303
16.80	-15	322
16.70	-7	352
16.69	-5	357
16.68	-3	362
16.67	-1	368
16.66	1	375
16.65	4	383
16.64	8	395
16.63	12	411
16.62	15	440
16.61	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 0.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	5	221
19.00	0	237
18.00	-9	263
17.90	-10	267
17.80	-12	271
17.70	-13	276
17.60	-14	282
17.50	-16	289
17.40	-17	296
17.30	-18	306
17.20	-18	319
17.10	-15	336
17.00	-7	363
16.99	-5	366
16.98	-3	371
16.97	-1	375
16.96	2	381
16.95	5	387
16.94	8	395
16.93	12	405
16.92	16	419
16.91	19	442
16.90	7	495
16.89	R	R

GEOGRAPHIC
LAT. = 0.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	3	237
20.00	-2	253
19.00	-11	281
18.90	-12	285
18.80	-13	289
18.70	-15	295
18.60	-16	301
18.50	-17	308
18.40	-18	316
18.30	-18	327
18.20	-17	340
18.10	-12	360
18.00	4	393
17.99	7	399
17.98	11	405
17.97	14	414
17.96	19	426
17.95	21	443
17.94	19	473
17.93	R	R

GEOGRAPHIC
LAT. = 0.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	1	249
19.00	-3	265
18.00	-10	289
17.90	-11	292
17.80	-12	296
17.70	-13	300
17.60	-14	305
17.50	-15	310
17.40	-16	316
17.30	-17	323
17.20	-17	332
17.10	-17	342
17.00	-15	355
16.90	-9	373
16.80	7	404
16.79	10	409
16.78	13	416
16.77	16	423
16.76	20	433
16.75	23	446
16.74	22	467
16.73	8	502
16.72	R	R

GEOGRAPHIC
LAT. = 0.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-1	260
19.00	-3	273
18.00	-8	294
17.90	-9	296
17.80	-9	299
17.70	-10	302
17.60	-11	306
17.50	-12	309
17.40	-13	314
17.30	-13	318
17.20	-14	323
17.10	-15	329
17.00	-15	335
16.90	-15	343
16.80	-15	352
16.70	-13	364
16.60	-9	379
16.50	1	401
16.49	3	404
16.48	5	407
16.47	7	411
16.46	9	415
16.45	12	419
16.44	14	425
16.43	17	431
16.42	20	439
16.41	22	450
16.40	23	464
16.39	20	484
16.38	1	519
16.37	R	R

GEOGRAPHIC
LAT. = 0.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-3	270
19.00	-4	283
18.00	-7	300
17.90	-7	303
17.80	-8	305
17.70	-8	308
17.60	-9	310
17.50	-9	313
17.40	-9	316
17.30	-10	320
17.20	-10	323
17.10	-11	327
17.00	-11	332
16.90	-12	336
16.80	-12	342
16.70	-12	348
16.60	-12	355
16.50	-11	364
16.40	-10	374
16.30	-6	388
16.20	1	407
16.10	10	445
16.09	20	453
16.08	22	463
16.07	21	477
16.06	18	495
16.05	3	523
16.04	R	R

GEOGRAPHIC
LAT. = 0.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-5	282
19.00	-6	294
18.00	-7	310
17.00	-8	337
16.90	-8	341
16.80	-8	345
16.70	-9	349
16.60	-8	354
16.50	-8	360
16.40	-8	367
16.30	-7	375
16.20	-5	384
16.10	-3	396
16.00	2	413
15.90	13	441
15.89	14	445
15.88	15	451
15.87	17	457
15.86	18	464
15.85	19	472
15.84	19	483
15.83	16	497
15.82	10	516
15.81	-8	553
15.80	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 0.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-8	294
19.00	-8	305
18.00	-7	321
17.00	-6	344
16.90	-6	347
16.80	-6	351
16.70	-6	354
16.60	-5	358
16.50	-5	363
16.40	-5	368
16.30	-4	373
16.20	-3	380
16.10	-2	387
16.00	0	396
15.90	2	407
15.80	6	423
15.70	12	448
15.69	13	452
15.68	14	456
15.67	14	461
15.66	15	466
15.65	15	472
15.64	16	479
15.63	15	488
15.62	14	498
15.61	10	512
15.60	3	532
15.59	-10	575
15.58	R	R

GEOGRAPHIC
LAT. = 0.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-10	-54
20.00	-9	-44
19.00	-9	-30
18.00	-6	-9
17.00	-6	-7
16.90	-6	-4
16.80	-5	-1
16.70	-5	2
16.60	-4	6
16.50	-4	10
16.40	-3	14
16.30	-2	18
16.20	-1	23
16.10	1	29
16.00	2	36
15.90	4	43
15.80	6	53
15.70	9	65
15.60	12	83
15.59	14	117
15.58	14	122
15.57	13	129
15.56	12	136
15.55	10	145
15.54	7	156
15.53	2	171
15.52	-5	195
15.51	-5	281
15.50	R	R

GEOGRAPHIC
LAT. = 0.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-12	-42
19.00	-11	-32
18.00	-10	-20
17.00	-6	-2
16.90	-6	0
16.80	-5	3
16.70	-5	5
16.60	-4	8
16.50	-4	11
16.40	-3	14
16.30	-2	17
16.20	-1	20
16.10	0	24
16.00	1	28
15.90	2	32
15.80	4	37
15.70	5	43
15.60	7	50
15.50	9	57
15.40	11	67
15.30	14	80
15.20	15	99
15.10	11	135
15.09	9	141
15.08	7	147
15.07	5	155
15.06	1	165
15.05	-3	178
15.04	-8	199
15.03	-7	248
15.02	R	R

GEOGRAPHIC
LAT. = 0.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-13	-30
19.00	-12	-21
18.00	-10	-9
17.00	-7	6
16.00	1	30
15.90	2	33
15.80	3	37
15.70	5	41
15.60	6	45
15.50	8	50
15.40	10	55
15.30	12	62
15.20	14	69
15.10	16	79
15.00	17	92
14.90	17	109
14.80	10	139
14.79	9	143
14.78	7	148
14.77	5	154
14.76	2	160
14.75	-1	168
14.74	-5	177
14.73	-8	190
14.72	-11	211
14.71	-5	255
14.70	R	R

GEOGRAPHIC
LAT. = 0.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-13	-19
19.00	-12	-10
18.00	-10	0
17.00	-7	14
16.00	0	33
15.90	1	36
15.80	2	39
15.70	3	43
15.60	4	44
15.50	6	48
15.40	7	51
15.30	9	55
15.20	11	68
15.10	13	65
15.00	14	70
14.90	16	77
14.80	18	86
14.70	20	96
14.60	20	110
14.50	16	129
14.40	1	162
14.39	-1	167
14.38	-4	173
14.37	-7	181
14.36	-10	191
14.35	-13	205
14.34	-12	226
14.33	-1	270
14.32	R	I

GEOGRAPHIC
LAT. = 0.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-12	-8
19.00	-12	0
18.00	-10	10
17.00	-7	21
16.00	-1	37
15.00	10	63
14.90	12	67
14.80	13	71
14.70	15	75
14.60	17	81
14.50	18	87
14.40	20	95
14.30	21	104
14.20	21	115
14.10	18	130
14.00	9	151
13.99	8	154
13.98	6	157
13.97	4	160
13.96	2	163
13.95	0	167
13.94	-2	171
13.93	-4	176
13.92	-7	181
13.91	-9	188
13.90	-12	196
13.89	-14	206
13.88	-14	221
13.87	-11	243
13.86	3	291
13.85	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = 0.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-10	3
19.00	-9	10
18.00	-8	18
17.00	-6	28
16.00	-2	42
15.00	6	61
14.90	7	63
14.80	8	66
14.70	9	69
14.60	11	72
14.50	12	76
14.40	13	79
14.30	15	83
14.20	16	88
14.10	18	93
14.00	19	99
13.90	20	106
13.80	20	115
13.70	19	125
13.60	17	138
13.50	16	155
13.48	-5	164
13.39	-7	189
13.38	-9	194
13.37	-11	201
13.36	-13	208
13.35	-15	219
13.34	-14	232
13.33	-11	252
13.32	-1	288
13.31	R	R

GEOGRAPHIC
LAT. = 0.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-5	14
21.00	-3	20
19.00	-4	28
17.00	-3	37
15.00	0	50
15.00	4	66
14.00	13	95
13.90	14	99
13.80	15	104
13.70	17	109
13.60	16	116
13.50	16	123
13.40	16	132
13.30	15	143
13.20	11	157
13.10	4	176
13.00	-11	217
12.99	-12	226
12.98	-13	237
12.97	-15	251
12.96	-16	274
12.95	-1	325
12.94	R	R

GEOGRAPHIC
LAT. = 0.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	1	28
19.00	1	34
18.00	1	42
17.00	2	52
16.00	3	64
15.00	5	82
14.90	5	84
14.80	5	86
14.70	6	89
14.60	6	92
14.50	6	95
14.40	7	98
14.30	7	101
14.20	8	104
14.10	8	108
14.00	9	113
13.90	9	117
13.80	10	123
13.70	10	129
13.60	10	136
13.50	10	144
13.40	10	155
13.30	8	169
13.20	4	189
13.10	-6	229
13.09	-8	237
13.08	-9	247
13.07	-11	260
13.06	-12	280
13.05	-9	319
13.04	R	R

GEOGRAPHIC
LAT. = 0.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	7	44
19.00	6	50
18.00	6	59
17.00	5	69
16.00	4	83
15.00	4	103
14.90	4	106
14.80	4	109
14.70	4	112
14.60	4	115
14.50	4	119
14.40	4	123
14.30	4	127
14.20	4	132
14.10	4	138
14.00	4	144
13.90	4	151
13.80	4	160
13.70	4	172
13.60	4	187
13.50	3	212
13.49	2	215
13.48	2	219
13.47	1	223
13.46	0	228
13.45	0	233
13.44	-1	239
13.43	-3	246
13.42	-4	255
13.41	-7	266
13.40	-10	281
13.39	-13	307
13.38	0	368
13.37	R	R

GEOGRAPHIC
LAT. = 0.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	10	59
19.00	10	66
18.00	9	75
17.00	7	86
16.00	5	106
15.00	2	123
14.90	2	126
14.80	1	129
14.70	1	133
14.60	1	137
14.50	0	141
14.40	0	146
14.30	0	151
14.20	0	158
14.10	0	165
14.00	0	174
13.90	1	185
13.80	2	200
13.70	2	224
13.69	2	227
13.68	2	231
13.67	2	235
13.66	2	240
13.65	1	245
13.64	0	250
13.63	-1	257
13.62	-2	265
13.61	-4	274
13.60	-7	287
13.59	-12	306
13.55	-16	346
13.57	R	R

GEOGRAPHIC
LAT. = 0.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	12	75
19.00	11	82
18.00	10	91
17.00	8	102
16.00	6	117
15.00	1	141
14.90	1	145
14.80	0	148
14.70	0	152
14.60	-1	156
14.50	-1	161
14.40	-2	167
14.30	-2	173
14.20	-2	180
14.10	-2	189
14.00	-2	201
13.90	-1	216
13.80	0	241
13.79	0	245
13.78	0	249
13.77	0	253
13.76	0	258
13.75	-1	263
13.74	-1	270
13.73	-3	277
13.72	-4	286
13.71	-7	298
13.70	-10	315
13.69	-14	345
13.68	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -5.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	15	84
19.00	15	91
18.00	15	99
17.00	14	109
16.00	12	122
15.00	8	140
14.90	7	142
14.80	6	145
14.70	6	147
14.60	5	150
14.50	4	153
14.40	3	156
14.30	2	159
14.20	1	163
14.10	0	167
14.00	-2	171
13.90	-3	176
13.80	-4	182
13.70	-5	189
13.60	-7	197
13.50	-7	207
13.40	-8	220
13.30	-6	239
13.20	-3	274
13.19	-2	289
13.18	-2	287
13.17	-2	296
13.16	-3	306
13.15	-5	321
13.14	-8	344
13.13	-6	399
13.12	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	15	102
19.00	15	109
18.00	15	116
17.00	14	128
16.00	12	143
15.00	6	164
14.90	5	166
14.80	4	169
14.70	3	172
14.60	2	176
14.50	1	179
14.40	-1	134
14.30	-2	188
14.20	-4	193
14.10	-5	199
14.00	-7	206
13.90	-9	214
13.80	-10	224
13.70	-10	238
13.60	-9	259
13.50	-4	300
13.45	-4	308
13.49	-3	318
13.47	-9	330
13.46	-4	349
13.45	-5	383
13.44	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	15	121
19.00	15	129
18.00	15	139
17.00	13	151
16.00	10	168
15.00	0	194
14.90	-1	198
14.80	-3	202
14.70	-4	207
14.60	-6	213
14.50	-8	219
14.40	-10	227
14.30	-12	236
14.20	-13	249
14.10	-13	266
14.00	-9	297
13.99	-8	301
13.98	-7	307
13.97	-6	313
13.96	-5	319
13.95	-4	328
13.94	-2	339
13.93	-1	353
13.92	0	376
13.91	5	433
13.90	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	15	142
19.00	15	151
18.00	14	162
17.00	11	177
16.00	4	198
15.90	3	201
15.80	1	204
15.70	0	207
15.60	-1	210
15.50	-3	214
15.40	-5	218
15.30	-6	223
15.20	-8	228
15.10	-10	235
15.00	-12	242
14.90	-14	252
14.80	-16	264
14.70	-16	281
14.60	-11	310
14.59	-10	315
14.58	-9	319
14.57	-7	325
14.56	-6	331
14.55	-4	338
14.54	-2	347
14.53	1	358
14.52	4	374
14.51	6	401
14.50	4	532
14.49	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	15	165
19.00	14	175
18.00	11	188
17.00	5	203
16.90	4	208
16.80	3	211
16.70	2	213
16.60	1	216
16.50	-1	218
16.40	-2	221
16.30	-3	225
16.20	-5	228
16.10	-7	232
16.00	-9	236
15.90	-11	241
15.80	-13	247
15.70	-15	254
15.60	-17	262
15.50	-18	273
15.40	-18	287
15.30	-16	307
15.20	-4	344
15.19	-2	351
15.18	1	358
15.17	4	360
15.16	7	381
15.15	10	402
15.14	18	447
15.13	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	14	187
19.00	11	199
18.00	6	213
17.00	-4	235
16.90	-5	238
16.80	-7	242
16.70	-8	245
16.60	-10	249
16.50	-12	254
16.40	-14	259
16.30	-16	265
16.20	-18	272
16.10	-20	280
16.00	-21	291
15.90	-20	306
15.80	-15	327
15.70	2	366
15.69	5	373
15.68	8	383
15.67	12	396
15.66	15	416
15.65	12	457
15.64	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -5.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	12	208
19.00	8	220
18.00	2	236
17.00	-11	263
16.90	-13	267
16.80	-15	271
16.70	-17	277
16.60	-19	283
16.50	-20	290
16.40	-22	300
16.30	-22	311
16.20	-20	327
16.10	-12	350
16.09	-10	353
16.08	-9	356
16.07	-7	359
16.06	-5	363
16.05	-2	367
16.04	0	371
16.03	3	376
16.02	7	382
16.01	10	390
16.00	14	400
15.99	18	414
15.98	28	436
15.97	7	483
15.96	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	1	225
19.00	5	238
18.00	-1	255
17.90	-2	257
17.80	-3	259
17.70	-4	262
17.60	-5	264
17.50	-7	267
17.40	-9	270
17.30	-13	273
17.20	-11	277
17.10	-13	280
17.00	-15	285
16.90	-17	290
16.80	-19	295
16.70	-20	302
16.60	-22	310
16.50	-23	320
16.40	-22	333
16.30	-17	350
16.20	-4	375
16.19	-2	378
16.18	1	382
16.17	4	386
16.16	7	391
16.15	11	397
16.14	15	404
16.13	19	414
16.12	23	428
16.11	24	449
16.10	8	489
16.09	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	7	240
19.00	4	252
18.00	-2	269
17.00	-14	297
16.90	-16	301
16.80	-18	306
16.70	-19	312
16.60	-21	319
16.50	-22	327
16.40	-22	338
16.30	-20	350
16.20	-14	367
16.10	2	392
16.09	5	396
16.08	8	400
16.07	11	404
16.06	15	410
16.05	18	416
16.04	22	425
16.03	26	438
16.02	28	456
16.01	16	484
16.00	6	607
15.99	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	5	252
19.00	3	264
18.00	-2	280
17.00	-11	304
16.90	-12	308
16.80	-14	312
16.70	-15	316
16.60	-16	321
16.50	-18	327
16.40	-19	333
16.30	-20	341
16.20	-19	351
16.10	-18	362
16.00	-13	377
15.90	0	398
15.89	2	401
15.88	4	404
15.87	6	407
15.86	9	411
15.85	12	415
15.84	15	419
15.83	18	425
15.82	22	432
15.81	25	441
15.80	27	454
15.79	26	471
15.78	14	496
15.77	-18	565
15.76	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	2	265
19.00	1	276
18.00	-2	291
17.00	-9	314
16.90	-9	317
16.80	-10	320
16.70	-11	324
16.60	-12	328
16.50	-13	332
16.40	-14	337
16.30	-15	343
16.20	-16	350
16.10	-16	358
16.00	-15	367
15.90	-13	379
15.80	-7	393
15.70	5	415
15.69	7	[illegible]
15.68	10	[illegible]
15.67	12	435
15.66	14	429
15.65	17	434
15.64	20	440
15.63	23	447
15.62	25	456
15.61	26	467
15.60	24	482
15.59	15	503
15.58	-11	538
15.57	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-1	279
19.00	-2	290
18.00	-3	304
17.00	-7	327
16.90	-7	330
16.80	-8	333
16.70	-8	336
16.60	-9	340
16.50	-9	344
16.40	-10	349
16.30	-10	354
16.20	-11	360
16.10	-11	367
16.00	-11	374
15.90	-10	384
15.80	-7	396
15.70	-1	411
15.60	12	437
15.59	14	441
15.58	15	445
15.57	17	450
15.56	19	456
15.55	21	463
15.54	23	472
15.53	23	482
15.52	20	496
15.51	12	515
15.50	-8	547
15.49	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -5.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-4	293
19.00	-4	304
18.00	-4	318
17.00	-5	339
16.90	-5	342
16.80	-5	345
16.70	-6	349
16.60	-6	352
16.50	-6	356
16.40	-6	360
16.30	-6	365
16.20	-6	370
16.10	-6	376
16.00	-6	383
15.90	-5	391
15.80	-3	400
15.70	0	413
15.60	5	438
15.50	16	462
15.49	17	468
15.48	18	474
15.47	18	481
15.46	18	490
15.45	17	501
15.44	13	516
15.43	4	537
15.42	-15	567
15.41	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-5	-54
19.00	-5	-44
18.00	-5	-30
17.00	-4	-11
16.90	-4	-8
16.80	-4	-5
16.70	-4	-2
16.60	-3	1
16.50	-3	4
16.40	-3	8
16.30	-3	12
16.20	-3	16
16.10	-2	21
16.00	-2	26
15.90	-1	32
15.80	0	39
15.70	1	47
15.60	3	58
15.50	5	71
15.40	11	92
15.30	14	136
15.29	13	145
15.28	11	156
15.27	6	170
15.26	-2	192
15.25	-12	250
15.24	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-8	-42
19.00	-7	-32
18.00	-6	-19
17.00	-3	-2
16.90	-3	1
16.80	-3	3
16.70	-2	5
16.60	-2	8
16.50	-2	11
16.40	-1	14
16.30	-1	17
16.20	0	20
16.10	0	24
16.00	1	28
15.90	2	33
15.80	2	38
15.70	3	43
15.60	4	50
15.50	6	58
15.40	8	67
15.30	10	79
15.20	12	97
15.10	12	128
15.09	12	133
15.08	11	139
15.07	10	145
15.06	8	152
15.05	6	161
15.04	3	173
15.03	-2	189
15.02	-7	217
15.01	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-9	-30
19.00	-8	-20
18.00	-6	-9
17.00	-3	7
16.00	2	32
15.90	3	35
15.80	4	39
15.70	5	43
15.60	6	47
15.50	7	53
15.40	8	58
15.30	10	65
15.20	11	73
15.10	13	84
15.00	14	97
14.90	13	117
14.80	6	155
14.79	4	162
14.78	1	169
14.77	-1	179
14.76	-5	192
14.75	-8	213
14.74	-9	257
14.73	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-10	-18
19.00	-8	-9
18.00	-6	1
17.00	-3	15
16.00	3	36
15.90	4	38
15.80	4	41
15.70	5	44
15.60	6	48
15.50	7	51
15.40	9	55
15.30	10	60
15.20	11	65
15.10	12	70
15.00	14	77
14.90	15	85
14.80	16	95
14.70	16	107
14.60	14	125
14.50	5	154
14.49	4	158
14.48	2	163
14.47	0	169
14.46	-2	175
14.45	-4	183
14.44	-7	193
14.43	-9	207
14.42	-9	229
14.41	-3	276
14.40	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-9	-7
19.00	-8	1
18.00	-6	11
17.00	-2	23
16.00	3	48
15.90	4	42
15.80	4	44
15.70	5	47
15.60	6	49
15.50	7	52
15.40	8	55
15.30	9	58
15.20	10	61
15.10	11	65
15.00	12	69
14.90	13	73
14.80	14	78
14.70	15	84
14.60	16	91
14.50	17	99
14.40	17	109
14.30	16	121
14.20	12	138
14.18	2	165
14.09	0	169
14.08	-2	174
14.07	-4	179
14.06	-6	185
14.05	-8	192
14.04	-10	201
14.03	-11	213
14.02	-11	230
14.01	-6	258
14.00	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -5.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-7	4
19.00	-6	11
18.00	-4	19
17.00	-1	30
16.00	3	44
15.00	10	66
14.90	11	69
14.80	11	72
14.70	12	76
14.60	13	79
14.50	14	84
14.40	15	88
14.30	16	94
14.20	17	101
14.10	17	107
14.00	17	115
13.90	16	125
13.80	15	138
13.70	7	156
13.60	-5	167
13.59	-7	193
13.58	-8	199
13.57	-10	206
13.56	-11	215
13.55	-11	227
13.54	-10	244
13.53	-5	273
13.52	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-5	14
20.00	-2	21
19.00	-1	29
18.00	1	39
17.00	4	51
16.00	6	70
15.90	8	72
15.80	8	75
15.70	10	77
15.60	10	80
15.50	11	83
15.40	11	86
15.30	12	90
15.20	13	94
15.10	13	98
15.00	14	103
14.90	14	108
14.80	14	114
14.70	14	122
14.60	13	130
14.50	12	140
14.40	9	154
14.30	9	172
14.20	-7	210
14.19	-5	216
14.18	-3	225
14.17	-10	235
14.16	-10	249
14.15	-9	271
14.14	-4	318
14.13	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	3	27
19.00	4	33
18.00	4	41
17.00	5	51
16.00	6	63
15.00	8	82
14.90	8	84
14.80	8	86
14.70	8	89
14.60	8	92
14.50	9	95
14.40	9	98
14.30	9	101
14.20	9	105
14.10	9	109
14.00	9	113
13.90	9	118
13.80	9	124
13.70	8	130
13.60	8	138
13.50	7	147
13.40	6	158
13.30	3	173
13.28	-1	195
13.19	-1	201
13.18	-2	205
13.17	-2	209
13.16	-3	214
13.15	-4	219
13.14	-4	226
13.13	-5	233
13.12	-6	242
13.11	-7	253
13.10	-8	269
13.09	-9	287
13.08	4	410
13.07	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	9	41
19.00	9	47
18.00	9	55
17.00	9	65
16.00	8	78
15.00	7	97
14.90	7	100
14.80	6	102
14.70	6	105
14.60	6	108
14.50	6	111
14.40	5	114
14.30	5	118
14.20	4	122
14.10	4	126
14.00	4	131
13.90	3	137
13.80	2	143
13.70	2	151
13.60	1	160
13.50	1	171
13.40	1	187
13.30	0	213
13.29	0	217
13.28	0	221
13.27	0	226
13.26	0	231
13.25	-1	237
13.24	-1	244
13.23	-2	253
13.22	-3	264
13.21	-6	279
13.20	-10	302
13.19	-10	370
13.18	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	13	54
19.00	13	61
18.00	13	69
17.00	12	79
16.00	10	92
15.00	7	110
14.90	6	112
14.80	6	115
14.70	5	118
14.60	4	120
14.50	4	123
14.40	3	126
14.30	2	130
14.20	2	134
14.10	1	138
14.00	0	142
13.90	-1	148
13.80	-1	153
13.70	-2	160
13.60	-3	169
13.50	-3	179
13.40	-2	193
13.30	-1	213
13.20	1	253
13.19	0	263
13.18	-1	273
13.17	-4	286
13.16	-9	305
13.15	-16	346
13.14	R	R

GEOGRAPHIC
LAT. = -5.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	14	68
19.00	14	75
18.00	14	83
17.00	14	92
16.00	12	105
15.00	8	122
14.90	7	125
14.80	6	127
14.70	6	123
14.60	5	132
14.50	4	135
14.40	3	137
14.30	3	141
14.20	2	144
14.10	1	148
14.00	0	152
13.90	-1	156
13.80	-2	161
13.70	-3	167
13.60	-4	174
13.50	-5	182
13.40	-5	192
13.30	-5	205
13.20	-3	225
13.10	0	263
13.09	0	269
13.08	0	277
13.07	-1	287
13.06	-4	300
13.05	-8	319
13.04	-14	357
13.03	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -10.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	16	74
19.00	17	80
18.00	18	87
17.00	18	95
16.00	18	105
15.00	17	118
14.00	11	137
13.90	10	139
13.80	9	141
13.70	8	144
13.60	7	147
13.50	6	149
13.40	5	152
13.30	3	156
13.20	2	159
13.10	0	163
13.00	-2	167
12.90	-3	172
12.80	-5	178
12.70	-7	184
12.60	-9	192
12.50	-10	202
12.40	-11	215
12.30	-9	234
12.20	-2	268
12.19	-1	273
12.18	0	280
12.17	0	287
12.16	1	297
12.15	0	309
12.14	-3	326
12.13	-10	357
12.12	R	R

GEOGRAPHIC
LAT. = -10.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	16	91
19.00	17	97
18.00	15	104
17.00	19	112
16.00	18	123
15.00	16	137
14.00	10	157
13.90	9	159
13.80	7	162
13.70	6	165
13.60	5	168
13.50	3	171
13.40	2	174
13.30	0	178
13.20	-2	182
13.10	-4	187
13.00	-5	192
12.90	-8	199
12.80	-10	206
12.70	-12	216
12.60	-13	224
12.50	-12	246
12.40	-7	275
12.39	-6	280
12.38	-4	285
12.37	-3	291
12.36	-2	297
12.35	-1	305
12.34	0	315
12.33	0	328
12.32	-2	348
12.31	-6	388
12.30	R	R

GEOGRAPHIC
LAT. = -10.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	17	109
19.00	18	116
18.00	19	123
17.00	19	133
16.00	18	145
15.00	14	161
14.00	4	184
13.90	3	187
13.80	1	190
13.70	-1	194
13.60	-3	198
13.50	-4	203
13.40	-7	208
13.30	-10	215
13.20	-12	222
13.10	-15	232
13.00	-16	244
12.90	-19	262
12.80	-9	293
12.79	-8	297
12.78	-6	302
12.77	-5	308
12.76	-3	315
12.75	-1	323
12.74	1	334
12.73	2	348
12.72	1	371
12.71	1	427
12.70	R	R

GEOGRAPHIC
LAT. = -10.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	18	133
19.00	19	137
18.00	19	145
17.00	19	156
16.00	16	170
15.00	8	189
14.90	7	192
14.80	6	194
14.70	4	197
14.60	3	199
14.50	1	203
14.40	-1	206
14.30	-1	209
14.20	-5	213
14.10	-7	218
14.00	-9	223
13.90	-12	229
13.80	-15	236
13.70	-17	245
13.60	-19	257
13.50	-19	274
13.40	-13	300
13.39	-12	303
13.38	-10	307
13.37	-9	311
13.36	-7	316
13.35	-5	321
13.34	-3	327
13.33	-1	335
13.32	2	344
13.31	4	356
13.30	6	374
13.29	5	406
13.28	R	R

GEOGRAPHIC
LAT. = -10.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	19	151
19.00	19	159
18.00	19	169
17.00	16	182
16.00	10	198
15.00	-4	222
14.90	-6	226
14.80	-9	230
14.70	-11	234
14.60	-13	239
14.50	-16	246
14.40	-19	253
14.30	-21	262
14.20	-22	275
14.10	-20	292
14.00	-12	318
13.99	-10	321
13.98	-9	325
13.97	-7	329
13.96	-4	334
13.95	-2	340
13.94	1	346
13.93	4	354
13.92	7	364
13.91	9	377
13.90	11	399
13.89	6	446
13.88	R	R

GEOGRAPHIC
LAT. = -10.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	19	173
19.00	18	181
18.00	16	192
17.00	12	206
16.00	2	224
15.90	0	226
15.80	-2	229
15.70	-3	232
15.60	-5	234
15.50	-7	238
15.40	-9	241
15.30	-11	245
15.20	-14	249
15.10	-16	254
15.00	-19	260
14.90	-21	267
14.80	-23	276
14.70	-24	287
14.60	-23	303
14.50	-16	324
14.40	5	363
14.39	9	371
14.38	12	381
14.37	15	396
14.36	15	421
14.35	1	482
14.34	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -10.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	17	193
19.00	16	202
18.00	14	213
17.00	7	228
16.00	-6	249
15.90	-8	252
15.80	-10	255
15.70	-12	259
15.60	-15	263
15.50	-17	268
15.40	-20	273
15.30	-22	279
15.20	-24	287
15.10	-26	297
15.00	-25	310
14.90	-22	326
14.80	-18	340
14.79	-7	392
14.78	-5	356
14.77	-3	359
14.76	0	363
14.75	3	368
14.74	7	373
14.73	10	379
14.72	14	388
14.71	18	399
14.70	21	415
14.69	18	442
14.68	-9	526
14.67	R	R

GEOGRAPHIC
LAT. = -10.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	15	211
20.00	14	221
19.00	11	233
18.00	5	249
17.00	-13	273
16.90	-15	276
16.80	-17	281
16.70	-19	285
16.60	-22	291
16.50	-24	298
16.40	-26	306
16.30	-27	316
16.20	-26	329
16.10	-20	346
16.00	-4	378
15.90	-1	373
15.88	2	376
15.87	5	380
15.86	8	385
15.85	13	390
15.84	17	397
15.83	21	406
15.82	25	414
15.81	25	438
15.80	13	470
15.79	R	R

GEOGRAPHIC
LAT. = -10.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	13	228
19.00	11	237
18.00	8	249
17.00	1	265
16.00	-14	290
15.90	-17	294
15.80	-19	298
15.70	-21	303
15.60	-23	309
15.50	-25	316
15.40	-26	325
15.30	-26	336
15.20	-25	349
15.10	-15	366
15.00	5	390
14.99	9	393
14.98	12	397
14.97	16	402
14.96	20	409
14.95	24	417
14.94	28	428
14.93	29	444
14.92	22	467
14.91	-18	588
14.90	R	R

GEOGRAPHIC
LAT. = -10.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	10	242
19.00	9	252
18.00	6	263
17.00	0	279
16.00	-13	303
15.90	-15	307
15.80	-16	311
15.70	-18	315
15.60	-20	320
15.50	-22	326
15.40	-23	333
15.30	-24	342
15.20	-23	352
15.10	-20	365
15.00	-12	381
14.90	8	403
14.89	11	406
14.88	14	410
14.87	18	414
14.86	21	420
14.85	25	427
14.84	29	436
14.83	30	448
14.82	28	465
14.81	16	486
14.80	-20	535
14.79	R	R

GEOGRAPHIC
LAT. = -10.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	6	257
19.00	6	266
18.00	4	278
17.00	-1	294
16.00	-11	318
15.90	-12	322
15.80	-14	326
15.70	-15	330
15.60	-17	335
15.50	-18	341
15.40	-19	347
15.30	-20	355
15.20	-20	365
15.10	-17	376
15.00	-11	390
14.90	3	409
14.80	30	457
14.79	30	478
14.78	24	486
14.77	8	507
14.76	-21	561
14.75	18	588
14.74	R	R

GEOGRAPHIC
LAT. = -10.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	3	273
19.00	3	282
18.00	2	294
17.00	-2	311
16.00	-10	330
15.90	-11	342
15.80	-12	346
15.70	-13	351
15.60	-14	357
15.50	-15	363
15.40	-15	371
15.10	-14	388
15.20	-12	391
15.10	-7	405
15.00	5	424
14.99	7	426
14.98	9	429
14.97	11	432
14.96	13	435
14.95	16	439
14.94	18	443
14.93	21	448
14.92	23	454
14.91	25	460
14.90	27	469
14.89	27	480
14.88	24	494
14.87	15	518
14.86	-6	536
14.85	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -10.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	0	288
19.00	0	298
18.00	0	310
17.00	-2	328
16.00	-7	357
15.90	-8	361
15.83	-8	366
15.70	-9	371
15.60	-9	378
15.50	-9	385
15.40	-8	393
15.30	-7	404
15.20	-3	417
15.10	6	436
15.00	21	476
14.99	22	484
14.98	22	493
14.97	20	505
14.96	14	521
14.95	0	543
14.94	-15	617
14.93	R	R

GEOGRAPHIC
LAT. = -10.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-1	-57
19.00	-2	-48
18.00	-1	-36
17.00	-1	-19
16.00	-1	10
15.90	-1	14
15.80	-4	18
15.70	-4	24
15.60	-4	29
15.50	-4	36
15.40	-3	44
15.30	-2	53
15.20	1	65
15.10	6	81
15.00	14	109
14.99	15	113
14.98	15	118
14.97	16	123
14.96	17	129
14.95	17	137
14.94	16	146
14.93	14	157
14.92	10	171
14.91	0	192
14.90	-13	247
14.89	R	R

GEOGRAPHIC
LAT. = -10.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-4	-44
19.00	-3	-35
18.00	-2	-23
17.00	-1	-7
16.00	0	18
15.90	0	22
15.80	0	26
15.70	1	30
15.60	1	35
15.5	1	40
15.40	2	46
15.30	2	53
15.20	3	62
15.10	5	72
15.00	7	86
14.90	10	107
14.89	11	110
14.88	11	113
14.87	12	117
14.86	12	120
14.85	12	124
14.84	12	129
14.83	12	134
14.82	12	140
14.81	12	146
14.80	11	154
14.79	9	163
14.78	6	175
14.77	1	191
14.76	-7	220
14.75	R	R

GEOGRAPHIC
LAT. = -10.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-6	-31
19.00	-4	-22
18.00	-2	-12
17.00	0	3
16.00	3	26
15.90	3	29
15.80	4	32
15.70	4	36
15.60	4	40
15.50	5	44
15.40	5	48
15.30	6	54
15.20	7	60
15.10	7	67
15.00	8	75
14.90	9	86
14.80	10	100
14.70	10	121
14.60	5	165
14.59	3	173
14.58	1	184
14.57	-2	200
14.56	-6	225
14.55	-7	308
14.54	R	R

GEOGRAPHIC
LAT. = -10.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-6	-19
19.00	-5	-11
18.00	-2	-1
17.00	0	13
16.00	5	32
15.90	5	35
15.80	6	37
15.70	6	40
15.60	7	43
15.50	7	47
15.40	8	50
15.30	8	54
15.20	9	59
15.10	10	64
15.00	10	69
14.90	11	76
14.80	12	83
14.70	12	92
14.60	12	104
14.50	11	120
14.40	7	145
14.39	6	148
14.38	5	152
14.37	4	156
14.36	3	161
14.35	2	167
14.34	0	173
14.33	-1	181
14.32	-3	190
14.31	-5	202
14.30	-6	220
14.29	-6	253
14.28	R	R

GEOGRAPHIC
LAT. = -10.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-6	-7
19.00	-6	0
18.00	-2	9
17.00	1	21
16.00	6	38
15.00	12	66
14.90	12	70
14.80	13	75
14.70	14	80
14.60	14	86
14.50	14	93
14.40	14	102
14.30	13	112
14.20	11	125
14.10	7	144
14.00	-3	181
13.99	-5	188
13.98	-6	196
13.97	-7	206
13.96	-7	219
13.95	-6	239
13.94	-3	280
13.93	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -10.00 LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-5	3
19.00	-3	10
18.00	-1	18
17.00	2	29
16.00	6	43
15.00	11	65
14.90	12	68
14.80	13	71
14.70	13	74
14.60	14	78
14.50	14	82
14.40	15	87
14.30	15	92
14.20	15	98
14.10	15	105
14.00	14	113
13.90	13	122
13.80	10	134
13.70	5	150
13.60	-3	170
13.59	-4	182
13.58	-5	187
13.57	-6	193
13.56	-7	199
13.55	-8	206
13.54	-8	216
13.53	-8	228
13.52	-6	246
13.51	-3	277
13.50	R	R

GEOGRAPHIC LAT. = -10.00 LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	LONG
21.00	-1	13
19.00	0	20
18.00	2	27
17.00	4	37
16.00	7	49
15.00	11	68
14.90	11	70
14.80	12	72
14.70	12	75
14.60	12	78
14.50	13	81
14.40	13	84
14.30	13	88
14.20	13	92
14.10	13	96
14.00	13	100
13.90	13	105
13.80	13	111
13.70	12	118
13.60	11	126
13.50	9	135
13.40	7	147
13.30	2	163
13.20	-4	191
13.19	-5	195
13.18	-6	200
13.17	-6	205
13.16	-7	211
13.15	-7	219
13.14	-7	228
13.13	-7	240
13.12	-6	256
13.11	-4	283
13.10	5	426
13.09	R	R

GEOGRAPHIC LAT. = -10.00 LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	5	24
19.00	6	31
18.00	7	38
17.00	8	47
16.00	10	59
15.00	11	76
14.00	10	105
13.90	10	109
13.80	9	114
13.70	9	119
13.60	8	124
13.50	7	131
13.40	6	139
13.30	4	148
13.20	2	161
13.10	-1	178
13.00	-3	210
12.99	-4	215
12.98	-4	221
12.97	-4	228
12.96	-4	236
12.95	-4	246
12.94	-4	259
12.93	-5	280
12.92	-9	322
12.91	R	R

GEOGRAPHIC LAT. = -10.00 LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	10	36
19.00	11	42
18.00	12	50
17.00	12	59
16.00	12	71
15.00	11	88
14.00	7	114
13.90	6	117
13.80	5	122
13.70	4	126
13.60	3	131
13.50	2	137
13.40	1	143
13.30	0	151
13.20	-2	161
13.10	-3	173
13.00	-3	191
12.90	-1	224
12.89	0	229
12.88	0	235
12.87	0	243
12.86	0	251
12.85	0	262
12.84	-2	278
12.83	-7	302
12.82	-10	379
12.81	R	R

GEOGRAPHIC LAT. = -10.00 LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	14	48
19.00	15	54
18.00	15	61
17.00	16	70
16.00	15	81
15.00	13	96
14.00	7	118
13.90	6	121
13.80	5	124
13.70	4	128
13.60	3	133
13.50	2	135
13.40	0	140
13.30	-1	145
13.20	-2	151
13.10	-4	158
13.00	-5	166
12.90	-6	177
12.80	-6	193
12.70	3	211
12.60	2	256
12.59	2	264
12.58	1	275
12.57	-2	291
12.56	-9	315
12.55	-8	392
12.54	R	R

GEOGRAPHIC LAT. = -10.00 LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	16	60
19.00	16	66
18.00	17	72
17.00	18	81
16.00	17	91
15.00	15	105
14.00	9	124
13.90	9	126
13.80	8	129
13.70	7	131
13.60	6	134
13.50	5	137
13.40	3	140
13.30	2	144
13.20	0	148
13.10	-1	152
13.00	-3	157
12.90	-4	163
12.80	-6	163
12.70	-7	177
12.60	-8	187
12.50	-8	200
12.40	-6	218
12.30	0	258
12.29	1	266
12.28	2	267
12.27	2	269
12.26	2	270
12.25	1	288
12.24	-2	303
12.23	-9	326
12.22	-11	391
12.21	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -15.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	15	65
19.00	17	70
18.00	18	75
17.00	20	81
16.00	21	89
15.00	22	99
14.00	20	113
13.00	15	131
12.00	1	158
11.90	-1	162
11.80	-3	167
11.70	-6	172
11.60	-8	176
11.50	-10	185
11.40	-12	195
11.30	-13	207
11.20	-12	224
11.10	-4	251
11.09	-3	254
11.08	-2	259
11.07	-1	264
11.06	1	269
11.05	2	276
11.04	3	283
11.03	4	293
11.02	3	305
11.01	-1	322
11.00	-11	353
10.99	R	R

GEOGRAPHIC
LAT. = -15.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	15	81
19.00	17	85
18.00	19	90
17.00	20	97
16.00	22	105
15.00	22	115
14.00	21	123
13.00	15	147
12.90	14	149
12.80	13	151
12.70	12	154
12.60	11	156
12.50	9	159
12.40	5	161
12.30	6	164
12.20	4	168
12.10	2	171
12.00	0	175
11.90	-2	179
11.80	-5	183
11.70	-7	189
11.60	-10	195
11.50	-13	203
11.40	-15	213
11.30	-15	226
11.20	-13	246
11.10	-3	279
11.09	-2	284
11.08	0	291
11.07	1	298
11.06	3	307
11.05	3	319
11.04	1	337
11.03	-7	367
11.02	R	R

GEOGRAPHIC
LAT. = -15.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	16	98
19.00	18	105
18.00	20	109
17.00	21	116
16.00	23	124
15.00	23	136
14.00	20	150
13.00	11	170
12.90	10	173
12.80	8	175
12.70	7	178
12.60	5	181
12.50	3	184
12.40	1	187
12.30	-2	191
12.20	-4	195
12.10	-7	200
12.00	-10	206
11.90	-13	212
11.80	-16	220
11.70	-18	231
11.60	-18	246
11.50	-15	267
11.40	-1	306
11.39	1	315
11.38	3	325
11.37	4	338
11.36	3	357
11.35	-3	393
11.34	R	R

GEOGRAPHIC
LAT. = -15.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	18	117
19.00	20	122
18.00	22	123
17.00	23	137
16.00	23	147
15.00	21	160
14.00	15	177
13.00	0	201
12.90	-2	204
12.80	-5	208
12.70	-8	212
12.60	-11	217
12.50	-14	223
12.40	-17	230
12.30	-19	238
12.20	-21	250
12.10	-21	266
12.00	-19	290
11.99	-13	293
11.98	-12	296
11.97	-10	300
11.96	-8	304
11.95	-6	308
11.94	-4	313
11.93	-2	318
11.92	1	325
11.91	3	333
11.90	6	343
11.89	7	357
11.88	6	378
11.87	-1	423
11.86	R	R

GEOGRAPHIC
LAT. = -15.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	21	137
19.00	22	143
18.00	23	151
17.00	23	160
16.00	22	171
15.00	17	185
14.00	6	204
13.90	4	206
13.80	2	209
13.70	0	211
13.60	-2	214
13.50	-5	217
13.40	-7	220
13.30	-10	224
13.20	-13	229
13.10	-15	234
13.00	-18	240
12.90	-21	247
12.80	-23	257
12.70	-24	269
12.60	-22	286
12.50	-12	318
12.49	-10	313
12.48	-8	317
12.47	-6	321
12.46	-4	325
12.45	-1	329
12.44	1	335
12.43	4	341
12.42	7	349
12.41	9	360
12.40	11	374
12.39	9	397
12.38	0	449
12.37	R	R

GEOGRAPHIC
LAT. = -15.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	21	157
19.00	23	164
18.00	23	172
17.00	22	181
16.00	19	193
15.00	11	208
14.00	-5	229
13.90	-7	232
13.80	-10	235
13.70	-13	238
13.60	-15	242
13.50	-18	247
13.40	-21	253
13.30	-23	260
13.20	-26	268
13.10	-27	279
13.00	-25	293
12.90	-18	312
12.80	-1	340
12.79	2	345
12.78	5	350
12.77	8	356
12.76	11	364
12.75	13	374
12.74	15	388
12.73	13	404
12.72	2	451
12.71	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -15.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	21	177
19.00	22	184
18.00	22	192
17.00	20	202
16.00	15	215
15.00	5	230
14.90	-15	255
14.80	-10	259
14.70	-21	263
14.60	-23	269
14.50	-26	276
14.40	-28	284
14.30	-29	295
14.20	-27	308
14.10	-20	326
14.00	-3	349
13.90	-1	353
13.80	2	356
13.70	5	361
13.60	9	365
13.50	12	372
13.40	16	379
13.30	19	389
13.20	20	404
13.10	17	425
13.00	2	466
12.99	R	R

GEOGRAPHIC
LAT. = -15.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	13	196
19.00	20	203
19.00	13	212
17.00	17	223
16.00	11	236
15.00	-1	252
14.90	-3	254
14.80	-5	257
14.70	-7	259
14.60	-9	262
14.50	-12	264
14.40	-14	267
14.30	-17	271
14.20	-13	275
14.10	-22	279
14.00	-25	285
13.90	-27	291
13.80	-29	299
13.70	-30	309
13.60	-29	322
13.50	-23	337
13.40	-8	356
13.39	-6	359
13.38	-4	361
13.37	-1	364
13.36	2	367
13.35	5	370
13.34	8	374
13.33	12	378
13.32	16	384
13.31	20	391
13.30	23	400
13.29	25	412
13.28	24	430
13.27	12	458
13.26	R	R

GEOGRAPHIC
LAT. = -15.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	16	214
19.00	17	221
18.00	16	230
17.00	14	241
16.00	8	254
15.00	-6	272
14.90	-8	274
14.80	-10	276
14.70	-12	279
14.60	-14	282
14.50	-17	285
14.40	-19	289
14.30	-22	293
14.20	-24	297
14.10	-27	303
14.00	-29	310
13.90	-30	319
13.80	-30	329
13.70	-27	341
13.60	-19	356
13.50	-2	374
13.49	0	376
13.48	3	379
13.47	6	381
13.46	9	384
13.45	13	388
13.44	16	392
13.43	20	397
13.42	24	404
13.41	27	413
13.40	29	425
13.39	28	441
13.38	17	464
13.37	-15	512
13.36	R	R

GEOGRAPHIC
LAT. = -15.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	13	230
19.00	14	237
18.00	13	246
17.00	11	257
16.00	5	270
15.00	-7	283
14.90	-9	291
14.80	-11	294
14.70	-13	297
14.60	-15	300
14.50	-17	303
14.40	-20	307
14.30	-22	311
14.20	-24	317
14.10	-26	323
14.00	-28	330
13.90	-28	339
13.80	-27	349
13.70	-23	361
13.60	-13	375
13.50	7	394
13.49	10	396
13.48	13	399
13.47	16	402
13.46	20	406
13.45	23	411
13.44	27	417
13.43	30	425
13.42	32	436
13.41	31	450
13.40	24	468
13.39	2	491
13.38	-12	651
13.37	R	R

GEOGRAPHIC
LAT. = -15.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	9	247
19.00	10	254
18.00	10	263
17.00	8	274
16.00	3	288
15.00	-9	309
14.90	-11	312
14.80	-13	315
14.70	-15	319
14.60	-16	323
14.50	-18	327
14.40	-20	331
14.30	-22	337
14.20	-24	343
14.10	-24	351
14.00	-24	360
13.90	-22	371
13.80	-16	384
13.70	-3	399
13.60	24	426
13.59	28	431
13.58	31	438
13.57	33	447
13.56	33	459
13.55	29	473
13.54	17	489
13.53	-9	511
13.52	-36	673
13.51	3	482
13.50	R	R

GEOGRAPHIC
LAT. = -15.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	6	264
19.00	7	272
18.00	7	281
17.00	5	293
16.00	0	310
15.00	-11	336
14.90	-13	340
14.80	-14	344
14.70	-16	349
14.60	-17	354
14.50	-19	361
14.40	-19	368
14.30	-19	377
14.20	-16	388
14.10	-10	401
14.00	2	417
13.90	27	440
13.89	30	455
13.88	31	463
13.87	32	474
13.86	29	486
13.85	20	500
13.84	2	516
13.83	-23	553
13.82	3	570
13.81	4	499
13.80	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -15.00 LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	3	281
19.00	4	289
18.00	4	299
17.00	3	312
16.00	-1	331
15.90	-2	333
15.80	-2	336
15.70	-3	339
15.60	-4	341
15.50	-5	345
15.40	-6	348
15.30	-7	351
15.20	-8	355
15.10	-10	359
15.00	-11	364
14.90	-12	370
14.80	-13	376
14.70	-13	383
14.60	-13	391
14.50	-11	401
14.40	-7	414
14.30	3	430
14.20	22	460
14.19	24	465
14.18	25	471
14.17	27	478
14.16	27	487
14.15	25	498
14.14	20	511
14.13	9	526
14.12	-12	551
14.11	R	R

GEOGRAPHIC LAT. = -15.00 LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	0	-63
19.00	2	-55
18.00	2	-45
17.00	2	-31
16.00	0	-11
15.90	-1	-8
15.80	-1	-6
15.70	-2	-3
15.60	-2	0
15.50	-3	4
15.40	-4	7
15.30	-4	11
15.20	-5	16
15.10	-6	20
15.00	-6	26
14.90	-7	32
14.80	-7	39
14.70	-6	48
14.60	-4	58
14.50	0	72
14.40	8	91
14.30	20	132
14.29	21	140
14.28	19	150
14.27	16	162
14.26	9	177
14.25	-6	201
14.24	1	318
14.23	R	R

GEOGRAPHIC LAT. = -15.00 LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-2	-46
19.00	0	-40
18.00	1	-30
17.00	2	-17
16.00	2	3
15.90	2	5
15.80	2	8
15.70	1	11
15.60	1	14
15.50	1	17
15.40	0	21
15.30	0	25
15.20	0	29
15.10	-1	34
15.00	-1	39
14.90	-1	45
14.80	-1	52
14.70	0	60
14.60	1	70
14.50	3	83
14.40	8	102
14.30	14	140
14.29	14	147
14.28	14	155
14.27	12	165
14.26	9	177
14.25	4	194
14.24	-8	225
14.23	R	R

GEOGRAPHIC LAT. = -15.00 LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-3	-35
19.00	-1	-27
18.00	1	-17
17.00	3	-4
16.00	4	15
15.90	4	17
15.80	4	19
15.70	4	22
15.60	4	25
15.50	4	28
15.40	5	31
15.30	5	35
15.20	5	39
15.10	5	43
15.00	5	48
14.90	4	53
14.80	5	59
14.70	5	66
14.60	5	74
14.50	5	85
14.40	6	98
14.30	8	119
14.20	8	160
14.19	7	168
14.18	6	177
14.17	4	189
14.16	0	207
14.15	-6	240
14.14	R	R

GEOGRAPHIC LAT. = -15.00 LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-4	-22
19.00	-2	-14
18.00	0	-5
17.00	3	7
16.00	6	24
15.00	9	53
14.90	9	58
14.80	9	62
14.70	9	68
14.60	9	74
14.50	9	81
14.40	9	90
14.30	8	101
14.20	7	115
14.10	5	138
14.09	5	141
14.08	5	145
14.07	4	148
14.06	4	152
14.05	3	157
14.04	3	162
14.03	2	167
14.02	2	174
14.01	1	182
14.00	0	192
13.99	-1	205
13.98	-2	225
13.97	-9	265
13.96	R	R

GEOGRAPHIC LAT. = -15.00 LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-4	-10
19.00	-2	-3
18.00	1	6
17.00	4	17
16.00	8	32
15.00	12	56
14.90	12	59
14.80	12	63
14.70	13	67
14.60	13	72
14.50	13	77
14.40	13	82
14.30	12	89
14.20	12	96
14.10	11	105
14.00	9	117
13.99	6	132
13.88	1	157
13.79	0	161
13.78	-1	165
13.77	-1	169
13.76	-2	174
13.75	-3	180
13.74	-3	186
13.73	-4	194
13.72	-4	204
13.71	-4	217
13.70	-3	237
13.69	-3	279
13.68	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -15.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-3	1
19.00	-1	7
18.00	2	15
17.00	5	25
16.00	9	38
15.00	13	50
14.90	13	61
14.80	14	63
14.70	14	66
14.60	14	70
14.50	15	73
14.40	15	77
14.30	15	81
14.20	15	86
14.10	14	91
14.00	14	97
13.90	13	103
13.80	12	111
13.70	10	120
13.60	7	132
13.50	2	147
13.40	-4	174
13.39	-4	178
13.38	-5	183
13.37	-5	188
13.36	-6	194
13.35	-6	201
13.34	-6	209
13.33	-5	220
13.32	-4	234
13.31	-2	256
13.30	-4	305
13.29	R	R

GEOGRAPHIC
LAT. = -15.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	0	11
20.00	3	17
19.00	5	24
18.00	7	33
17.00	10	44
16.00	13	61
15.00	15	89
14.90	[illegible]	94
14.80	15	98
14.70	15	103
14.60	12	109
14.50	11	115
14.40	9	122
14.30	7	131
14.20	4	142
14.10	0	157
14.00	-5	182
13.90	-5	185
13.80	-6	189
13.77	-6	194
13.76	-6	199
13.75	-6	204
13.74	-6	211
13.73	-7	218
13.72	-4	228
13.71	-3	240
13.70	-1	258
13.69	-2	289
13.68	R	R

GEOGRAPHIC
LAT. = -15.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	5	21
19.00	7	26
18.00	9	33
17.00	11	42
16.00	13	53
15.00	14	68
14.00	13	92
13.90	13	95
13.80	12	98
13.70	12	102
13.60	11	106
13.50	10	111
13.48	9	115
13.39	8	121
13.20	6	127
13.10	4	134
13.00	2	143
12.90	-1	154
12.80	-3	170
12.70	-5	196
12.69	-5	200
12.68	-5	204
12.67	-4	209
12.66	-4	214
12.65	-3	220
12.64	-3	227
12.63	-2	235
12.62	-1	246
12.61	0	260
12.60	-1	283
12.59	-12	337
12.58	R	R

GEOGRAPHIC
LAT. = -15.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	11	31
19.00	12	37
18.00	13	43
17.00	15	51
16.00	16	62
15.00	16	76
14.00	13	96
13.90	12	99
13.80	12	102
13.70	11	105
13.60	10	108
13.50	9	111
13.40	8	115
13.30	7	119
13.20	5	123
13.10	4	128
13.00	2	133
12.90	0	140
12.80	-2	147
12.70	-4	157
12.60	-5	169
12.50	-6	186
12.40	-2	217
12.39	-1	221
12.38	-1	227
12.37	0	233
12.36	1	240
12.35	2	249
12.34	2	260
12.33	1	276
12.32	-5	301
12.31	-10	388
12.30	R	R

GEOGRAPHIC
LAT. = -15.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	14	41
19.00	15	46
18.00	17	52
17.00	18	60
16.00	19	69
15.00	18	82
14.00	15	99
13.80	6	124
12.90	5	128
12.80	3	132
12.70	1	136
12.60	-1	141
12.50	-3	147
12.40	-5	153
12.30	-7	161
12.20	-8	171
12.10	-9	185
12.00	-6	204
11.90	3	242
11.89	4	248
11.88	4	256
11.87	5	266
11.86	3	279
11.85	-2	298
11.84	-16	334
11.83	R	R

GEOGRAPHIC
LAT. = -15.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	15	52
19.00	17	57
18.00	18	62
17.00	19	69
16.00	20	77
15.00	20	88
14.00	18	105
13.00	12	122
12.90	11	125
12.80	10	127
12.70	8	130
12.60	7	133
12.50	5	136
12.40	4	140
12.30	2	143
12.20	0	147
12.10	-2	152
12.00	-4	157
11.90	-7	163
11.80	-9	171
11.70	-10	180
11.60	-11	192
11.50	-9	208
11.40	-3	235
11.39	-1	239
11.38	0	243
11.37	1	246
11.36	2	254
11.35	4	260
11.34	4	268
11.33	5	277
11.32	3	289
11.31	-1	305
11.30	-12	334
11.29	-5	474
11.28	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -20.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	12	57
19.00	14	60
18.00	17	64
17.00	19	69
16.00	21	75
15.00	23	83
14.00	25	93
13.00	24	106
12.00	20	123
11.00	6	147
10.00	-13	220
9.90	-3	246
9.89	-2	250
9.88	0	254
9.87	2	259
9.86	3	265
9.85	5	271
9.84	6	279
9.83	6	288
9.82	5	308
9.81	0	317
9.80	-14	346
9.79	-13	501
9.78	-14	369
9.77	R	R

GEOGRAPHIC
LAT. = -20.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	12	71
19.00	14	75
18.00	17	79
17.00	19	84
16.00	22	90
15.00	24	97
14.00	23	107
13.00	25	119
12.00	21	136
11.00	9	158
10.90	6	161
10.80	4	164
10.70	2	168
10.60	-1	171
10.50	-4	175
10.40	-7	180
10.30	-10	186
10.20	-13	193
10.10	-16	201
10.00	-17	212
9.90	-17	227
9.80	-11	249
9.70	4	292
9.69	5	301
9.68	5	312
9.67	2	328
9.66	-7	352
9.65	-9	424
9.64	18	441
9.63	R	R

GEOGRAPHIC
LAT. = -20.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	13	88
19.00	16	91
18.00	18	96
17.00	20	101
16.00	23	107
15.00	25	115
14.00	26	125
13.00	25	139
12.00	19	156
11.00	2	180
10.90	0	184
10.80	-3	187
10.70	-6	191
10.60	-9	196
10.50	-12	202
10.40	-16	209
10.30	-18	218
10.20	-20	229
10.10	-19	245
10.00	-12	268
9.90	5	318
9.89	6	330
9.88	3	346
9.87	-5	374
9.86	24	493
9.85	7	398
9.84	R	R

GEOGRAPHIC
LAT. = -20.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	16	106
19.00	18	110
18.00	21	114
17.00	23	120
16.00	25	127
15.00	27	136
14.00	26	148
13.00	23	162
12.00	12	181
11.90	10	183
11.80	8	185
11.70	6	188
11.60	4	190
11.50	1	193
11.40	-1	196
11.30	-4	199
11.20	-7	203
11.10	-10	207
11.00	-13	212
10.90	-16	218
10.80	-19	225
10.70	-22	234
10.60	-25	247
10.50	-23	263
10.40	-11	266
10.39	-10	289
10.38	-8	293
10.37	-6	296
10.36	-4	300
10.35	-2	304
10.34	0	309
10.33	3	315
10.32	5	322
10.31	7	330
10.30	8	341
10.23	7	356
10.28	1	380
10.27	-4	437
10.26	R	R

GEOGRAPHIC
LAT. = -20.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	19	124
19.00	21	128
18.00	24	134
17.00	25	140
16.00	27	148
15.00	27	158
14.00	24	170
13.00	17	185
12.00	1	204
11.90	-2	207
11.80	-4	209
11.70	-7	212
11.60	-10	216
11.50	-13	219
11.40	-16	224
11.30	-19	229
11.20	-21	235
11.10	-24	243
11.00	-25	253
10.90	-25	266
10.80	20	282
10.70	-8	305
10.69	-6	309
10.68	-4	312
10.67	-2	316
10.66	1	320
10.65	3	325
10.64	5	330
10.63	7	337
10.62	9	345
10.61	10	355
10.60	9	370
10.59	4	390
10.58	-4	434
10.57	R	R

GEOGRAPHIC
LAT. = -20.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	21	142
19.00	23	147
18.00	25	152
17.00	26	159
16.00	27	167
15.00	26	178
14.00	21	190
13.00	12	204
12.00	-7	222
11.90	-9	225
11.80	-12	228
11.70	-14	231
11.60	-17	235
11.50	-20	239
11.40	-23	245
11.30	-25	251
11.20	-27	258
11.10	-28	268
11.00	-26	288
10.90	-22	294
10.80	-11	313
10.70	9	346
10.69	11	353
10.68	12	361
10.67	13	371
10.66	12	385
10.65	7	404
10.64	-2	441
10.63	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -20.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	21	161
19.00	22	166
18.00	24	172
17.00	25	179
16.00	25	187
15.00	23	197
14.00	18	209
13.00	7	223
12.00	-13	242
11.90	-16	245
11.80	-18	249
11.70	-21	252
11.60	-24	257
11.50	-26	262
11.40	-28	269
11.30	-29	277
11.20	-30	286
11.10	-28	294
11.00	-22	311
10.90	-11	328
10.80	10	356
10.79	12	361
10.78	14	367
10.77	16	374
10.76	17	384
10.75	17	390
10.74	14	413
10.73	4	439
10.72	10	556
10.71	R	R

GEOGRAPHIC
LAT. = -20.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
23.00	14	188
22.00	21	185
21.00	23	191
20.00	24	199
19.00	23	208
18.00	20	218
17.00	15	230
16.00	8	244
15.00	-23	260
14.90	-26	273
14.80	-28	278
14.70	-30	284
14.60	-31	291
14.50	-32	300
14.40	-30	311
14.30	-25	323
14.20	-16	337
14.10	2	356
14.09	4	358
14.08	7	361
14.07	10	365
14.06	12	368
14.05	15	373
14.04	18	378
14.03	20	385
14.02	22	393
14.01	23	403
14.00	21	417
13.99	14	436
13.98	-2	468
13.97	R	R

GEOGRAPHIC
LAT. = -20.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	17	199
19.00	19	204
18.00	20	210
17.00	21	218
16.00	20	227
15.00	17	237
14.00	9	250
13.00	-6	265
12.00	-30	296
11.90	-33	302
11.80	-32	309
11.70	-32	318
11.60	-30	328
11.50	-25	340
11.40	-15	352
11.30	3	368
11.29	6	370
11.28	8	373
11.27	11	375
11.26	14	378
11.25	16	382
11.24	19	386
11.23	22	391
11.22	25	397
11.21	27	405
11.20	27	415
11.19	26	427
11.18	20	443
11.17	6	465
11.16	-8	537
11.15	R	R

GEOGRAPHIC
LAT. = -20.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	14	217
19.00	16	222
18.00	17	228
17.00	18	236
16.00	17	245
15.00	13	256
14.00	5	269
13.00	-11	285
12.90	-13	288
12.80	-15	290
12.70	-18	293
12.60	-20	296
12.50	-22	299
12.40	-25	303
12.30	-27	307
12.20	-29	312
12.10	-31	318
12.00	-32	325
11.90	-31	333
11.80	-30	342
11.70	-25	353
11.60	-17	364
11.50	-2	376
11.40	22	399
11.39	25	404
11.38	28	409
11.37	30	416
11.36	31	425
11.35	31	436
11.34	27	449
11.33	17	465
11.32	-4	487
11.31	-25	661
11.30	10	492
11.29	R	R

GEOGRAPHIC
LAT. = -20.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	10	235
19.00	12	240
18.00	13	247
17.00	14	255
16.00	13	264
15.00	9	276
14.00	0	291
13.00	-18	315
12.90	-20	317
12.80	-22	321
12.70	-24	325
12.60	-26	330
12.50	-28	336
12.40	-28	343
12.30	-28	351
12.20	-27	360
12.10	-23	370
12.00	-14	381
11.90	0	393
11.80	25	416
11.79	28	420
11.78	31	426
11.77	33	432
11.76	34	441
11.75	34	452
11.74	29	464
11.73	19	477
11.72	0	493
11.71	-28	539
11.70	2	714
11.69	-6	479
11.68	R	R

GEOGRAPHIC
LAT. = -20.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	7	254
19.00	9	259
18.00	10	267
17.00	10	275
16.00	9	286
15.00	5	300
14.00	-7	320
13.90	-8	322
13.80	-10	325
13.70	-12	329
13.60	-13	331
13.50	-15	335
13.40	-17	338
13.30	-19	343
13.20	-21	348
13.10	-23	354
13.00	-24	361
12.90	-24	368
12.80	-22	377
12.70	-18	388
12.60	-18	393
12.50	6	414
12.40	32	444
12.30	5	485
12.29	5	477
12.28	29	519
12.27	25	529
12.26	-18	474
12.25	-2	436
12.24	R	R

TABLE 41 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR NORMAL GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -20.00 LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	4	272
19.00	6	279
18.00	7	286
17.00	8	296
16.00	6	308
15.00	1	326
14.00	-11	353
13.90	-13	357
13.80	-14	362
13.70	-16	368
13.60	-17	374
13.50	-17	381
13.40	-17	389
13.30	-15	399
13.20	-10	410
13.00	20	445
12.90	9	517
12.89	-11	533
12.68	-21	577
12.47	-10	595
12.46	17	592
12.45	4	499
12.44	1	486
12.83	13	586
12.82	30	592
12.81	-9	518
12.80	-15	471
12.79	4	442
12.78	14	471
12.77	R	R

GEOGRAPHIC LAT. = -20.00 LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	2	-71
19.00	3	-64
18.00	5	-56
17.00	5	-45
16.00	5	-32
15.00	1	-11
14.90	3	-9
14.80	-1	-6
14.70	-2	-3
14.60	-3	0
14.50	-4	3
14.40	-5	7
14.30	-5	11
14.20	-4	15
14.10	-3	20
14.00	-10	26
13.90	-11	32
13.80	-11	40
13.70	-10	48
13.60	-7	59
13.50	-2	72
13.40	10	91
13.30	25	132
13.29	25	141
13.28	25	151
13.27	15	162
13.26	4	176
13.25	-6	196
13.24	-13	267
13.23	-2	R

GEOGRAPHIC LAT. = -20.00 LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	0	-55
19.00	2	-48
18.00	4	-40
17.00	5	-29
16.00	5	-14
15.00	3	8
14.90	2	11
14.80	1	14
14.70	1	17
14.60	0	21
14.50	-1	24
14.40	-2	29
14.30	-2	33
14.20	-3	39
14.10	-4	45
14.00	-4	52
13.90	-4	60
13.80	-3	70
13.70	0	84
13.60	7	102
13.50	17	140
13.49	17	147
13.48	17	155
13.47	16	165
13.46	13	178
13.45	5	194
13.44	-10	224
13.43	R	R

GEOGRAPHIC LAT. = -20.00 LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-2	-40
19.00	1	-33
18.00	3	-25
17.00	5	-14
16.00	7	1
15.00	6	23
14.90	6	26
14.80	5	30
14.70	5	33
14.60	5	37
14.50	4	41
14.40	4	46
14.30	3	51
14.20	2	56
14.10	2	63
14.00	2	71
13.90	2	80
13.40	2	92
13.70	6	110
13.60	8	140
13.59	9	144
13.58	9	150
13.57	10	156
13.56	10	163
13.55	10	172
13.54	9	182
13.53	6	197
13.52	0	219
13.51	-14	276
13.50	R	R

GEOGRAPHIC LAT. = -20.00 LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-3	-26
19.00	0	-19
18.00	3	-11
17.00	5	-1
16.00	6	13
15.00	10	35
14.90	10	38
14.80	10	41
14.70	10	44
14.60	9	48
14.50	9	52
14.40	9	56
14.30	8	61
14.20	8	67
14.10	7	73
14.00	7	80
13.90	6	88
13.80	5	99
13.70	4	113
13.60	3	135
13.59	3	138
13.58	3	141
13.57	3	144
13.56	3	148
13.55	3	152
13.54	3	157
13.53	3	162
13.52	3	168
13.51	3	175
13.50	3	184
13.49	3	195
13.48	2	209
13.47	0	233
13.46	-11	293
13.45	R	R

GEOGRAPHIC LAT. = -20.00 LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-3	-14
19.00	0	-7
18.00	3	0
17.00	6	10
16.00	10	23
15.00	13	43
14.90	13	45
14.80	13	48
14.70	13	51
14.60	13	54
14.50	13	58
14.40	13	62
14.30	13	66
14.20	13	70
14.10	12	75
14.00	12	80
13.90	11	87
13.80	10	94
13.70	8	103
13.60	6	113
13.50	3	124
13.49	-1	151
13.39	-1	154
13.38	-1	158
13.37	-2	162
13.36	-2	166
13.35	-2	171
13.34	-2	177
13.33	-2	183
13.32	-2	192
13.31	-1	200
13.30	0	211
13.29	1	224
13.28	0	254
13.27	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -20.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-2	-3
19.00	1	3
18.00	4	10
17.00	7	19
16.00	11	31
15.00	15	46
14.00	16	77
13.90	15	[illegible]
13.80	15	87
13.70	14	92
13.60	13	98
13.50	11	105
13.40	9	113
13.30	6	123
13.20	2	136
13.10	-3	158
13.00	-5	195
12.90	-4	202
12.80	-3	211
12.70	-1	223
12.60	1	239
12.59	2	268
12.54	25	455
12.53	R	R

GEOGRAPHIC
LAT. = -20.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	1	7
19.00	3	13
18.00	5	19
17.00	8	27
16.00	12	38
15.00	15	52
14.00	17	75
13.90	17	79
13.80	17	82
13.70	16	86
13.60	16	89
13.50	15	94
13.40	14	98
13.30	13	103
13.20	11	109
13.10	9	116
13.00	7	123
12.90	5	133
12.80	-1	145
12.70	-5	167
12.60	-7	196
12.59	-6	202
12.56	-5	208
12.57	-4	216
12.56	-2	225
12.55	0	237
12.54	2	254
12.53	1	285
12.52	4	R

GEOGRAPHIC
LAT. = -20.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	5	17
19.00	7	22
18.00	10	28
17.00	12	35
16.00	15	45
15.00	17	58
14.00	17	77
13.90	17	80
13.80	17	82
13.70	17	85
13.60	16	88
13.50	16	91
13.40	15	95
13.30	14	98
13.20	13	102
13.10	12	106
13.00	10	111
12.90	9	116
12.80	7	121
12.70	4	128
12.60	2	135
12.59	-2	145
12.49	-5	158
12.39	-7	177
12.29	-3	215
12.19	-2	222
12.18	0	229
12.17	1	239
12.16	3	252
12.15	3	271
12.14	-6	307
12.13	R	R

GEOGRAPHIC
LAT. = -20.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	10	26
19.00	12	30
18.00	14	36
17.00	16	43
16.00	18	52
15.00	19	64
14.00	19	80
13.00	13	105
12.90	11	108
12.80	10	112
12.70	8	116
12.60	7	120
12.50	5	125
12.40	2	130
12.30	0	136
12.20	-3	143
12.10	-6	152
12.00	-8	164
11.90	-9	181
11.80	-6	209
11.79	-3	213
11.78	-2	218
11.77	-1	223
11.76	1	229
11.75	3	236
11.74	4	244
11.73	5	255
11.72	5	270
11.71	-1	294
11.70	-20	357
11.69	R	R

GEOGRAPHIC
LAT. = -20.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	12	34
19.00	14	39
18.00	16	44
17.00	18	50
16.00	20	58
15.00	22	68
14.00	21	81
13.00	17	108
12.90	17	102
12.80	16	104
12.70	15	107
12.60	14	110
12.50	12	112
12.40	11	115
12.30	9	118
12.20	8	121
12.10	6	125
12.00	4	129
11.90	2	135
11.80	-1	138
11.70	-3	143
11.60	-6	150
11.50	-8	158
11.40	-11	168
11.30	-11	182
11.20	-8	203
11.10	5	243
11.09	6	251
11.08	7	261
11.07	7	273
11.06	2	298
11.05	-12	320
11.04	R	R

GEOGRAPHIC
LAT. = -20.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	13	44
19.00	15	48
18.00	17	53
17.00	19	58
16.00	21	65
15.00	23	73
14.00	24	84
13.00	22	99
12.00	15	119
11.90	13	122
11.80	12	124
11.70	10	127
11.60	9	130
11.50	7	133
11.40	5	136
11.30	3	140
11.20	0	144
11.10	-2	148
11.00	-5	154
10.90	-8	160
10.80	-11	167
10.70	-13	177
10.60	-13	189
10.50	-11	207
10.40	-1	235
10.39	1	239
10.38	3	244
10.37	4	250
10.36	6	256
10.35	7	264
10.34	8	273
10.33	6	289
10.32	1	302
10.31	-14	330
10.30	-13	404
10.29	-5	302
10.28	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR NORMAL GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -25.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	9	58
19.00	11	63
18.00	13	56
17.00	16	59
16.00	19	64
15.00	22	69
14.00	25	76
13.00	27	86
12.00	28	98
11.00	24	115
10.00	11	137
9.90	9	139
9.80	7	142
9.70	5	145
9.60	2	148
9.50	-1	152
9.40	-4	156
9.30	-7	161
9.20	-10	166
9.10	-13	173
9.00	-15	181
8.90	-17	192
8.80	-15	207
8.70	-8	228
8.60	8	267
8.59	9	275
8.58	9	284
8.57	6	296
8.56	-1	312
8.55	-17	338
8.54	34	469
8.53	2	352
8.52	-20	338
8.51	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	5	64
19.00	11	67
18.00	13	69
17.00	15	73
16.00	19	77
15.00	22	82
14.00	25	89
13.00	27	97
12.00	28	109
11.00	25	124
10.00	15	144
9.00	-7	173
8.90	-11	179
8.80	-14	185
8.70	-15	192
8.60	-16	202
8.50	-13	215
8.40	-14	232
8.30	-2	258
8.29	0	261
8.28	2	266
8.27	4	270
8.26	5	275
8.25	7	282
8.24	7	289
8.23	7	298
8.22	6	309
8.21	0	325
8.20	-11	346
8.19	-11	407
8.18	14	529
8.17	11	489
8.16	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	10	80
19.00	12	82
18.00	15	85
17.00	17	89
16.00	20	93
15.00	23	98
14.00	26	105
13.00	28	114
12.00	29	126
11.00	26	142
10.00	14	161
9.90	12	163
9.80	10	165
9.70	8	167
9.60	6	170
9.50	3	173
9.40	1	175
9.30	-2	179
9.20	-5	182
9.10	-8	186
9.00	-11	191
8.90	-14	196
8.80	-17	203
8.70	-20	211
8.60	-21	222
8.50	-19	236
8.40	-12	255
8.30	3	287
8.29	5	293
8.28	6	299
8.27	7	306
8.26	7	316
8.25	5	327
8.24	0	343
8.23	-11	369
8.22	16	450
8.21	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	13	96
19.00	15	99
18.00	18	102
17.00	20	106
16.00	23	111
15.00	26	116
14.00	29	124
13.00	30	134
12.00	29	147
11.00	22	162
10.00	7	180
9.90	4	183
9.80	2	185
9.70	0	187
9.60	-3	190
9.50	-6	193
9.40	-9	197
9.30	-12	200
9.20	-15	205
9.10	-18	210
9.00	-20	217
8.90	-22	225
8.80	-23	235
8.70	-21	245
8.60	-15	265
8.50	-2	289
8.49	-1	291
8.48	1	297
8.47	3	301
8.46	5	306
8.45	6	312
8.44	7	318
8.43	8	326
8.42	7	336
8.41	4	349
8.40	-3	368
8.39	-11	403
8.38	-19	564
8.37	23	406
8.36	24	406
8.35	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	16	111
19.00	18	115
18.00	21	119
17.00	23	123
16.00	26	128
15.00	28	134
14.00	30	142
13.00	30	152
12.00	27	165
11.00	18	178
10.00	2	194
9.90	0	196
9.80	-3	198
9.70	-5	201
9.60	-7	203
9.50	-10	206
9.40	-12	209
9.30	-15	213
9.20	-17	217
9.10	-20	222
9.00	-22	227
8.90	-23	234
8.80	-24	242
8.70	-23	252
8.60	-21	263
8.50	-15	278
8.40	-4	298
8.39	-3	301
8.38	-1	304
8.37	0	307
8.36	2	310
8.35	3	314
8.34	5	318
8.33	6	323
8.32	7	329
8.31	8	339
8.30	8	343
8.29	7	353
8.28	5	365
8.27	-1	383
8.26	-7	414
8.25	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	17	129
19.00	20	137
18.00	22	136
17.00	25	140
16.00	27	145
15.00	29	151
14.00	30	159
13.00	29	168
12.00	25	178
11.00	17	190
10.00	4	203
9.00	-15	223
8.90	-17	226
8.80	-19	229
8.70	-21	234
8.60	-22	238
8.50	-23	246
8.40	-24	250
8.30	-25	257
8.20	-26	266
8.10	-21	277
8.00	-17	289
7.90	-8	306
7.80	5	335
7.79	6	340
7.78	7	346
7.77	8	353
7.76	9	360
7.75	8	370
7.74	7	383
7.73	3	402
7.72	-2	437
7.71	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -25.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	17	147
19.00	19	150
18.00	22	153
17.00	24	158
16.00	26	163
15.00	28	169
14.00	29	176
13.00	27	185
12.00	24	194
11.00	16	204
10.00	4	215
9.00	-12	231
8.90	-13	233
8.80	-15	235
8.70	-17	238
8.60	-18	241
8.50	-20	245
8.40	-22	248
8.30	-23	253
8.20	-24	258
8.10	-25	264
8.00	-25	271
7.90	-25	279
7.80	-24	289
7.70	-20	300
7.60	-13	316
7.50	0	340
7.49	2	343
7.48	3	347
7.47	5	352
7.46	7	357
7.45	9	363
7.44	11	370
7.43	12	379
7.42	12	391
7.41	11	408
7.40	5	437
7.39	24	606
7.38	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	15	166
19.00	15	169
18.00	21	173
17.00	23	177
16.00	25	182
15.00	26	189
14.00	27	196
13.00	25	205
12.00	20	216
11.00	12	223
10.00	-1	234
9.00	-16	250
8.90	-19	253
8.80	-20	256
8.70	-21	259
8.60	-23	262
8.50	-24	266
8.40	-25	270
8.30	-26	276
8.20	-27	281
8.10	-27	288
8.00	-27	296
7.90	-25	306
7.80	-21	317
7.70	-13	332
7.60	0	353
7.59	2	356
7.58	4	360
7.57	6	363
7.56	8	366
7.55	11	373
7.54	13	379
7.53	15	386
7.52	17	394
7.51	17	400
7.50	15	426
7.49	7	455
7.48	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	14	185
19.00	16	188
18.00	19	192
17.00	21	197
16.00	23	202
15.00	24	209
14.00	24	216
13.00	21	225
12.00	15	234
11.00	6	243
10.00	-8	255
9.00	-23	275
8.90	-25	279
8.80	-26	283
8.70	-27	287
8.60	-28	292
8.50	-29	297
8.40	-29	303
8.30	-28	311
8.20	-26	319
8.10	-23	329
8.00	-17	340
7.90	-7	354
7.80	11	379
7.79	13	383
7.78	16	388
7.77	18	394
7.76	20	401
7.75	21	409
7.74	22	421
7.73	20	436
7.72	12	457
7.71	-7	504
7.70	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	11	204
19.00	14	207
18.00	16	211
17.00	18	216
16.00	20	222
15.00	21	229
14.00	20	236
13.00	17	245
12.00	10	255
11.00	-1	265
10.00	-16	279
9.00	-29	309
8.90	-30	314
8.80	-29	320
8.70	-29	327
8.60	-27	334
8.50	-23	342
8.40	-18	351
8.30	-10	361
8.20	2	375
8.10	21	402
8.09	23	407
8.08	24	413
8.07	26	421
8.06	26	430
8.05	24	441
8.04	20	455
8.03	9	475
8.02	-11	515
8.01	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	8	223
19.00	11	227
18.00	13	231
17.00	15	236
16.00	16	243
15.00	17	250
14.00	16	259
13.00	11	269
12.00	2	280
11.00	-12	294
10.00	-28	321
9.90	-29	325
9.80	-30	330
9.70	-30	335
9.60	-29	341
9.50	-28	347
9.40	-25	354
9.30	-21	361
9.20	-15	369
9.10	-7	378
9.00	6	389
8.90	23	409
8.80	12	479
8.79	-3	496
8.78	-16	544
8.77	10	556
8.76	4	492
8.75	-1	497
8.74	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	5	243
19.00	8	247
18.00	10	252
17.00	12	256
16.00	13	265
15.00	13	274
14.00	11	285
13.00	4	298
12.00	-9	314
11.00	-27	347
10.90	-27	353
10.80	-27	359
10.70	-26	366
10.60	-23	374
10.50	-18	382
10.40	-11	393
10.30	1	400
10.20	19	414
10.10	34	456
10.09	32	464
10.08	28	473
10.07	20	482
10.06	8	492
10.05	-10	506
10.04	-21	544
10.03	16	715
10.02	26	529
10.01	1	489
10.00	-12	506
9.99	6	528
9.98	-10	493
9.97	-2	457
9.96	13	479
9.95	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR NOMINAL GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -25.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	3	263
19.00	6	267
18.00	8	273
17.00	10	280
16.00	11	288
15.00	10	299
14.00	6	317
13.00	-4	339
12.00	-21	365
11.90	-22	371
11.80	-22	377
11.70	-21	385
11.60	-18	393
11.50	-13	402
11.40	-4	413
11.30	11	425
11.20	33	451
11.10	-24	549
11.09	22	600
11.08	-12	615
11.07	29	548
11.06	22	519
11.05	26	523
11.04	30	530
11.03	11	573
11.02	-19	493
11.01	-15	461
11.00	-1	440
10.99	9	423
10.98	12	411
10.97	13	405
10.96	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	1	-79
19.00	4	-74
18.00	6	-68
17.00	5	-60
16.00	4	-51
15.00	6	-38
14.00	1	-21
13.00	-1	6
12.90	-11	10
12.80	-12	15
12.70	-13	20
12.60	-14	26
12.50	-13	32
12.40	-12	40
12.30	-11	48
12.20	-9	58
12.10	-2	70
12.00	12	86
11.90	30	113
11.80	11	242
11.70	-10	126
11.63	-4	102
11.58	7	85
11.67	13	71
11.66	14	62
11.65	11	57
11.64	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	0	-62
19.00	2	-57
18.00	5	-50
17.00	7	-42
16.00	8	-31
15.00	6	-17
14.00	3	4
13.90	3	7
13.80	2	10
13.70	1	13
13.60	0	16
13.50	-2	19
13.40	-3	23
13.30	-4	27
13.20	-5	32
13.10	-6	37
13.00	-7	43
12.90	-8	56
12.80	-8	59
12.70	-6	68
12.68	-3	81
12.58	5	97
12.48	19	126
12.39	28	131
12.38	21	137
12.37	22	143
12.36	22	151
12.35	21	159
12.34	13	170
12.33	11	183
12.32	0	200
12.31	-20	237
12.30	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-2	-46
19.00	1	-40
18.00	4	-34
17.00	6	-25
16.00	9	-14
15.00	9	2
14.00	6	26
13.90	5	29
13.80	5	33
13.70	4	37
13.60	3	41
13.50	2	45
13.40	1	51
13.30	0	57
13.20	-1	63
13.10	-2	71
13.00	-2	81
12.90	-1	94
12.80	3	112
12.70	11	146
12.69	12	151
12.68	13	158
12.67	13	165
12.66	13	175
12.65	11	187
12.64	7	203
12.63	-6	230
12.62	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-2	-21
19.00	0	-26
18.00	3	-19
17.00	7	-10
16.00	10	1
15.00	12	17
14.00	10	43
13.90	10	47
13.80	9	51
13.70	6	55
13.60	7	60
13.50	6	65
13.40	5	72
13.30	4	79
13.20	3	87
13.10	1	96
13.00	0	112
12.90	1	136
12.89	2	137
12.88	2	140
12.87	2	144
12.86	1	147
12.85	3	152
12.84	4	156
12.83	4	162
12.82	5	168
12.81	6	175
12.80	6	184
12.79	7	195
12.78	6	211
12.77	2	239
12.76	-17	313
12.75	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-3	-18
19.00	0	-12
18.00	4	-6
17.00	7	2
16.00	11	13
15.00	15	29
14.00	15	54
13.90	15	58
13.80	14	62
13.70	14	66
13.60	13	71
13.50	12	76
13.40	10	81
13.30	9	88
13.20	7	95
13.10	4	105
13.00	1	117
12.90	-2	134
12.80	-2	164
12.79	-2	169
12.78	-1	175
12.77	-1	181
12.76	0	188
12.75	2	198
12.74	3	209
12.73	5	226
12.72	2	255
12.71	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -25.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-2	-6
19.00	1	-1
18.00	4	5
17.00	8	13
16.00	12	22
15.00	16	37
14.00	19	59
13.90	18	62
13.80	18	65
13.70	18	69
13.60	17	73
13.50	17	77
13.40	16	81
13.30	15	86
13.20	13	91
13.10	11	97
13.00	9	104
12.90	6	112
12.80	2	123
12.70	-3	136
12.60	-6	159
12.59	-7	162
12.58	-7	165
12.57	-7	169
12.56	-7	173
12.55	-6	177
12.54	-6	182
12.53	-5	188
12.52	-4	194
12.51	-2	202
12.50	0	212
12.49	3	225
12.48	5	243
12.47	1	270
12.46	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	LONG
21.00	0	3
19.00	1	8
18.00	6	14
17.00	10	21
16.00	14	30
15.00	17	42
14.00	20	61
13.90	20	63
13.80	20	66
13.70	20	69
13.60	20	71
13.50	20	74
13.40	19	78
13.30	19	81
13.20	18	85
13.10	17	89
13.00	16	93
12.90	14	98
12.80	12	103
12.70	10	109
12.60	7	115
12.59	6	123
12.58	-1	133
12.57	-5	147
12.56	-3	160
12.55	-3	171
12.54	-3	174
12.53	-3	178
12.52	-3	181
12.51	-3	185
12.50	-7	190
12.49	-6	195
12.48	-5	201
12.47	-3	207
12.46	-1	215
12.45	2	225
12.44	5	238
12.43	6	258
12.42	-4	297
12.41	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	4	12
19.00	6	17
18.00	9	22
17.00	12	28
16.00	16	36
15.00	19	47
14.00	21	63
13.00	18	88
12.90	18	91
12.80	17	94
12.70	15	98
12.60	14	102
12.50	12	106
12.40	10	111
12.30	8	116
12.20	5	122
12.10	1	129
12.00	-2	137
11.90	-6	148
11.80	-10	164
11.70	-8	191
11.69	-7	195
11.68	-6	199
11.67	-5	204
11.66	-3	210
11.65	-1	216
11.64	1	223
11.63	4	232
11.62	6	244
11.61	7	260
11.60	1	287
11.59	10	413
11.58	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	8	20
19.00	10	24
18.00	13	29
17.00	15	35
16.00	18	42
15.00	21	52
14.00	23	65
13.00	21	84
12.90	20	86
12.80	20	89
12.70	19	91
12.60	18	94
12.50	17	97
12.40	16	100
12.30	15	103
12.20	13	106
12.10	11	110
12.00	9	114
11.90	7	118
11.80	5	122
11.70	2	128
11.60	-1	134
11.50	-5	141
11.40	-8	150
11.30	-11	163
11.20	-11	181
11.10	-2	214
11.09	0	219
11.08	2	225
11.07	5	232
11.06	7	241
11.05	9	252
11.04	8	267
11.03	1	290
11.02	-24	350
11.01	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	10	28
19.00	12	32
18.00	14	36
17.00	17	41
16.00	20	47
15.00	22	55
14.00	24	66
13.00	24	80
12.00	19	100
11.90	18	103
11.80	17	105
11.70	15	108
11.60	14	111
11.50	12	114
11.40	10	117
11.30	8	120
11.20	6	124
11.10	3	128
11.00	1	132
10.90	-3	137
10.80	-6	143
10.70	-9	151
10.60	-12	160
10.50	-13	172
10.40	-12	190
10.30	-1	219
10.[illegible]	1	223
10.[illegible]	3	228
10.27	6	234
10.26	8	241
10.25	10	249
10.24	10	259
10.23	9	272
10.22	2	291
10.21	-19	325
10.20	R	R

GEOGRAPHIC
LAT. = -25.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	10	38
19.00	12	41
18.00	14	44
17.00	17	49
16.00	20	54
15.00	23	60
14.00	25	69
13.00	26	80
12.00	25	95
11.00	17	115
10.90	16	118
10.80	14	120
10.70	12	123
10.60	10	126
10.50	6	129
10.40	6	132
10.30	4	135
10.20	1	139
10.10	-2	143
10.00	-5	148
9.90	-8	154
9.80	-12	161
9.70	-14	170
9.60	-15	182
9.50	-13	198
9.40	-3	222
9.39	-1	225
9.38	0	229
9.37	2	233
9.36	4	237
9.35	6	243
9.34	8	248
9.33	10	255
9.32	10	264
9.31	10	275
9.30	6	288
9.29	-5	307
9.28	-26	352
9.27	2	440
9.26	11	459
9.25	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -30.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	4	45
19.00	7	47
18.00	9	49
17.00	12	52
16.00	15	55
15.00	18	59
14.00	22	64
13.00	26	70
12.00	29	79
11.00	30	90
10.00	28	106
9.00	16	126
8.90	15	128
8.80	13	130
8.70	11	133
8.60	8	135
8.50	6	138
8.40	3	141
8.30	0	144
8.20	-3	147
8.10	-6	151
8.00	-9	156
7.90	-12	161
7.80	-14	167
7.70	-16	175
7.60	-17	185
7.50	-15	198
7.40	-8	215
7.30	6	242
7.29	7	246
7.28	9	250
7.27	13	256
7.26	11	262
7.25	11	269
7.24	10	277
7.23	7	287
7.22	8	300
7.21	-12	317
7.20	-27	359
7.19	R	R

GEOGRAPHIC
LAT. = -30.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	4	58
19.00	6	60
18.00	9	62
17.00	12	65
16.00	15	67
15.00	18	71
14.00	22	75
13.00	25	81
12.00	29	89
11.00	31	99
10.00	30	113
9.00	23	130
8.00	6	150
7.90	3	152
7.80	1	155
7.70	-2	158
7.60	-5	161
7.50	-7	165
7.40	-10	169
7.30	-13	174
7.20	-15	180
7.10	-17	188
7.00	-17	196
6.90	-16	208
6.80	-12	222
6.70	-4	241
6.60	8	279
6.59	6	286
6.58	7	294
6.57	4	304
6.56	-1	316
6.55	-11	335
6.54	-22	375
6.53	R	R

GEOGRAPHIC
LAT. = -30.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	5	73
19.00	8	75
18.00	10	77
17.00	13	79
16.00	16	82
15.00	19	86
14.00	23	90
13.00	27	96
12.00	30	103
11.00	32	113
10.00	30	126
9.00	23	142
8.00	8	159
7.00	-15	191
6.90	-17	197
6.80	-18	204
6.70	-18	213
6.60	-17	224
6.50	-13	238
6.40	-5	257
6.30	6	296
6.29	6	303
6.28	5	312
6.27	2	322
6.26	-3	336
6.25	-11	359
6.24	-9	412
6.23	R	R

GEOGRAPHIC
LAT. = -30.00
LONG. = +5.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	8	88
19.00	11	90
18.00	13	92
17.00	16	95
16.00	19	98
15.00	22	101
14.00	26	106
13.00	29	112
12.00	31	119
11.00	32	129
10.00	29	141
9.00	22	155
8.00	8	169
7.90	6	171
7.80	5	173
7.70	3	175
7.60	1	177
7.50	-1	179
7.40	-3	181
7.30	-5	184
7.20	-7	187
7.10	-9	190
7.00	-11	193
6.90	-13	198
6.80	-15	202
6.70	-17	208
6.60	-18	215
6.50	-19	223
6.40	-18	233
6.30	-16	246
6.20	-18	264
6.10	1	296
6.09	2	302
6.08	3	308
6.07	4	315
6.06	4	325
6.05	3	336
6.04	-1	352
6.03	-7	380
6.02	23	492
6.01	R	R

GEOGRAPHIC
LAT. = -30.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	11	103
19.00	13	105
18.00	16	107
17.00	19	109
16.00	22	112
15.00	25	116
14.00	28	120
13.00	30	126
12.00	32	133
11.00	32	142
10.00	29	151
9.00	23	162
8.00	13	173
7.80	-1	199
6.90	-2	192
6.80	-4	195
6.70	-6	198
6.60	-8	202
6.50	-10	206
6.40	-12	211
6.30	-14	217
6.20	-17	225
6.10	-19	234
6.00	-19	248
5.90	-17	267
5.80	-6	302
5.79	-4	307
5.78	-2	314
5.77	0	322
5.76	3	332
5.75	5	347
5.74	4	369
5.73	-1	421
5.72	-1	500
5.71	3	673
5.70	R	R

GEOGRAPHIC
LAT. = -30.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	12	118
19.00	14	120
18.00	17	122
17.00	19	124
16.00	22	127
15.00	25	130
14.00	27	134
13.00	29	139
12.00	31	144
11.00	31	151
10.00	29	158
9.00	25	166
8.00	19	175
7.00	10	190
6.00	-12	227
5.90	-16	235
5.80	-20	247
5.70	-23	265
5.60	-18	295
5.59	-17	299
5.58	-15	304
5.57	-13	309
5.56	-10	315
5.55	-6	322
5.54	-2	330
5.53	2	340
5.52	7	355
5.51	10	380
5.50	1	457
5.49	-1	503
5.48	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -30.00 LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	11	135
19.00	13	137
18.00	16	139
17.00	18	141
16.00	21	143
15.00	24	146
14.00	26	150
13.00	28	154
12.00	29	159
11.00	29	164
10.00	28	170
9.00	25	177
8.00	20	185
7.00	13	200
6.00	-8	234
5.90	-12	240
5.80	-17	248
5.70	-22	260
5.60	-26	270
5.50	-22	308
5.49	-20	312
5.48	-18	316
5.47	-15	321
5.46	-12	326
5.45	-9	332
5.44	-4	339
5.43	1	347
5.42	7	358
5.41	13	375
5.40	15	407
5.39	R	R

GEOGRAPHIC LAT. = -30.00 LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
23.00	10	154
13.00	12	155
11.00	15	157
17.00	17	160
16.00	20	162
15.00	22	165
14.00	25	169
13.00	26	173
12.00	27	177
11.00	27	182
10.00	25	188
9.00	22	194
8.00	14	203
7.00	10	216
6.00	-13	255
5.90	-18	263
5.80	-23	273
5.70	-27	288
5.60	-26	312
5.50	-3	353
5.49	2	360
5.48	9	369
5.47	16	383
5.46	21	406
5.45	5	464
5.44	R	R

GEOGRAPHIC LAT. = -30.00 LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	8	173
19.00	10	175
18.00	13	177
17.00	16	179
16.00	18	182
15.00	21	185
14.00	23	189
13.00	24	193
12.00	25	198
11.00	24	203
10.00	22	208
9.00	18	214
8.00	13	223
7.00	5	240
6.90	4	243
6.80	2	245
6.70	0	249
6.60	-2	252
6.50	-4	256
6.40	-7	260
6.30	-10	265
6.20	-13	271
6.10	-18	278
6.00	-22	287
5.90	-26	300
5.80	-28	319
5.70	-17	349
5.69	-14	353
5.68	-11	357
5.67	-8	361
5.66	-3	366
5.65	2	372
5.64	8	379
5.63	15	389
5.62	22	404
5.61	24	433
5.60	-11	523
5.59	R	R

GEOGRAPHIC LAT. = -30.00 LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	6	193
19.00	8	195
18.00	11	197
17.00	14	199
16.00	16	202
15.00	19	206
14.00	21	210
13.00	22	215
12.00	22	220
11.00	21	225
10.00	18	231
9.00	13	237
8.00	7	246
7.00	-3	265
6.90	-5	268
6.80	-6	272
6.70	-8	275
6.60	-11	280
6.50	-13	285
6.40	-16	291
6.30	-20	298
6.20	-23	308
6.10	-25	321
6.00	-25	340
5.90	-13	367
5.89	-10	371
5.88	-7	375
5.87	-4	379
5.86	1	384
5.85	6	389
5.84	12	396
5.83	18	405
5.82	25	420
5.81	27	446
5.80	-2	500
5.79	-19	664
5.78	R	R

GEOGRAPHIC LAT. = -30.00 LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	4	213
19.00	6	215
18.00	9	218
17.00	11	221
16.00	14	224
15.00	16	228
14.00	18	233
13.00	19	239
12.00	18	245
11.00	16	251
10.00	11	258
9.00	5	265
8.00	-4	276
7.90	-4	278
7.80	-5	279
7.70	-6	281
7.60	-7	283
7.50	-9	285
7.40	-10	288
7.30	-11	291
7.20	-12	294
7.10	-14	297
7.00	-15	301
6.90	-17	306
6.80	-19	312
6.70	-21	318
6.60	-22	327
6.50	-23	337
6.40	-22	351
6.30	-16	371
6.20	7	402
6.19	11	407
6.18	16	414
6.17	21	422
6.16	26	435
6.15	28	454
6.14	18	486
6.13	11	794
6.12	R	R

GEOGRAPHIC LAT. = -30.00 LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	2	233
19.00	4	236
18.00	7	239
17.00	9	243
16.00	12	247
15.00	14	252
14.00	16	258
13.00	16	264
12.00	13	274
11.00	8	282
10.00	0	292
9.00	-11	304
8.00	-21	326
7.90	-22	329
7.80	-22	333
7.70	-23	338
7.60	-23	343
7.50	-23	349
7.40	-22	355
7.30	-20	363
7.20	-17	373
7.10	-11	384
7.00	1	400
6.90	22	430
6.89	24	436
6.88	27	444
6.87	28	453
6.86	28	465
6.85	24	481
6.84	11	501
6.83	-17	547
6.82	-4	67[illegible]
6.81	13	611
6.80	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -30.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	0	253
19.00	3	257
18.00	5	260
17.00	0	265
16.00	11	270
15.00	13	277
14.00	13	285
13.00	12	294
12.00	7	306
11.00	-3	320
10.00	-18	339
9.90	-19	342
9.80	-20	345
9.70	-22	349
9.60	-23	352
9.50	-23	356
9.40	-24	360
9.30	-24	365
9.20	-23	370
9.10	-22	375
9.00	-20	381
8.90	-17	387
8.80	-12	394
8.70	-6	401
8.60	3	410
8.50	15	422
8.40	30	445
8.30	1	511
8.20	25	563
8.10	9	432
8.09	13	431
8.08	18	434
8.07	22	443
8.06	22	459
8.05	11	488
8.04	-16	515
8.03	-14	578
8.02	R	R

GEOGRAPHIC
LAT. = -30.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-1	-87
19.00	1	-84
18.00	4	-79
17.00	7	-74
16.00	10	-68
15.00	11	-60
14.00	12	-50
13.00	9	-37
12.00	0	-20
11.00	-15	7
10.90	-17	11
10.80	-18	15
10.70	-19	20
10.60	-19	26
10.50	-19	32
10.40	-17	38
10.30	-14	46
10.20	-9	53
10.10	-2	62
10.00	3	72
9.90	25	89
9.80	31	130
9.70	-24	384
9.60	-15	145
9.59	-16	118
9.58	-9	99
9.57	1	85
9.56	8	73
9.55	12	64
9.54	13	57
9.53	13	53
9.52	13	53
9.51	15	55
9.50	18	60
9.49	23	68
9.48	R	R

GEOGRAPHIC
LAT. = -30.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-2	-69
19.00	0	-65
18.00	3	-60
17.00	6	-54
16.00	9	-47
15.00	11	-38
14.00	11	-25
13.00	8	-8
12.00	-5	18
11.90	-7	22
11.80	-8	26
11.70	-10	30
11.60	-11	36
11.50	-12	41
11.40	-12	48
11.30	-11	55
11.20	-9	64
11.10	-5	74
11.00	2	86
10.90	15	103
10.80	27	139
10.79	26	145
10.78	25	152
10.77	22	160
10.76	17	169
10.75	10	178
10.74	-2	191
10.73	-18	211
10.72	-7	281
10.71	R	R

GEOGRAPHIC
LAT. = -30.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-3	-52
19.00	0	-48
18.00	3	-43
17.00	6	-36
16.00	9	-28
15.00	11	-17
14.00	12	-2
13.00	7	20
12.90	6	23
12.80	5	26
12.70	4	29
12.60	3	33
12.50	1	37
12.40	0	41
12.30	-1	46
12.20	-3	51
12.10	-4	57
12.00	-5	64
11.90	-6	72
11.80	-5	82
11.70	-2	95
11.60	4	113
11.50	16	146
11.49	17	152
11.48	18	159
11.47	18	167
11.46	17	176
11.45	14	188
11.44	7	203
11.43	-7	228
11.42	1	346
11.41	R	R

GEOGRAPHIC
LAT. = -30.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-3	-36
19.00	0	-32
18.00	3	-26
17.00	6	-20
16.00	10	-11
15.00	13	1
14.00	14	18
13.00	10	46
12.90	9	50
12.80	7	54
12.70	6	58
12.60	4	64
12.50	3	70
12.40	1	77
12.30	-1	85
12.20	-2	95
12.10	-2	109
12.00	0	130
11.90	9	172
11.89	10	181
11.88	11	191
11.87	10	205
11.86	5	226
11.85	-13	271
11.84	R	R

GEOGRAPHIC
LAT. = -30.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-4	-22
19.00	0	-18
18.00	3	-12
17.00	7	-6
16.00	11	3
15.00	16	15
14.00	18	33
13.90	18	36
13.80	18	38
13.70	18	41
13.60	18	43
13.50	17	46
13.40	17	49
13.30	16	53
13.20	16	56
13.10	15	60
13.00	14	64
12.90	12	69
12.80	11	74
12.70	9	79
12.60	7	86
12.50	4	93
12.40	1	102
12.30	-2	114
12.20	-4	131
12.10	-3	160
12.09	-2	169
12.08	-1	178
12.07	1	176
12.06	2	182
12.05	4	190
12.04	6	201
12.03	8	215
12.02	7	236
12.01	-7	279
12.00	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -30.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-3	-19
19.00	0	-6
18.00	4	-1
17.00	8	6
16.00	13	14
15.00	17	25
14.00	21	42
13.00	18	72
12.90	17	76
12.80	16	80
12.70	14	85
12.60	12	90
12.50	9	96
12.40	6	103
12.30	2	111
12.20	-2	122
12.10	-7	137
12.00	-8	162
11.99	-8	166
11.98	-7	169
11.97	-7	174
11.96	-5	179
11.95	-4	184
11.94	-2	190
11.93	0	198
11.92	3	207
11.91	6	219
11.90	9	236
11.89	5	266
11.88	R	R

GEOGRAPHIC
LAT. = -30.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
23.00	-1	0
22.00	2	4
21.00	5	9
20.00	9	14
19.00	14	22
18.00	18	32
17.00	22	47
16.00	22	71
15.90	22	74
15.80	21	77
15.70	20	81
15.60	19	85
15.50	17	89
15.40	15	93
15.30	13	98
15.20	11	103
15.10	7	109
15.00	3	116
14.90	-1	125
14.80	-6	136
14.70	-10	153
14.60	-8	182
14.59	-7	187
14.58	-6	192
14.57	-4	198
14.56	-1	204
14.55	2	212
14.54	6	222
14.53	9	235
14.52	10	255
14.51	-5	293
14.50	-17	327
14.45	R	R

GEOGRAPHIC
LAT. = -30.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	2	8
19.00	5	12
18.00	8	16
17.00	11	22
16.00	15	28
15.00	19	37
14.00	23	50
13.00	24	69
12.00	15	99
11.90	13	103
11.80	11	108
11.70	8	113
11.60	4	118
11.50	0	125
11.40	-4	133
11.30	-9	143
11.20	-12	159
11.10	-10	185
11.09	-9	188
11.08	-7	192
11.07	-6	196
11.06	-4	201
11.05	-2	206
11.04	1	213
11.03	4	220
11.02	7	229
11.01	10	241
11.00	11	258
10.99	1	286
10.90	R	R

GEOGRAPHIC
LAT. = -10.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	5	16
19.00	7	19
18.00	10	23
17.00	14	28
16.00	17	33
15.00	21	41
14.00	24	51
13.00	26	66
12.00	22	88
11.90	21	90
11.80	20	93
11.70	19	96
11.60	17	99
11.50	15	103
11.40	13	106
11.30	11	110
11.20	9	113
11.10	6	118
11.00	2	123
10.90	-1	128
10.80	-5	135
10.70	-9	143
10.60	-13	155
10.50	-14	172
10.40	-6	198
10.39	-4	202
10.38	-2	206
10.37	0	211
10.36	3	216
10.35	5	222
10.34	8	229
10.33	11	238
10.32	12	250
10.31	18	266
10.30	-2	290
10.29	-19	375
10.28	R	R

GEOGRAPHIC
LAT. = -30.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	6	24
19.00	9	26
18.00	11	30
17.00	14	33
16.00	18	38
15.00	21	44
14.00	25	52
13.00	27	63
12.00	27	79
11.90	20	101
10.90	19	183
10.80	17	106
10.70	15	109
10.60	13	112
10.50	11	115
10.40	8	118
10.30	6	122
10.20	3	125
10.10	-1	130
10.00	-4	135
9.90	-8	141
9.80	-12	149
9.70	-14	159
9.60	-15	173
9.50	-10	193
9.40	8	228
9.39	10	234
9.38	12	242
9.37	13	251
9.36	12	263
9.35	6	279
9.34	-12	302
9.33	11	398
9.32	-17	304
9.31	R	R

GEOGRAPHIC
LAT. = -30.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	6	33
19.00	8	35
18.00	11	38
17.00	13	41
16.00	17	45
15.00	20	50
14.00	24	56
13.00	27	64
12.00	29	75
11.00	28	91
10.00	19	111
9.90	18	113
9.80	16	116
9.70	14	118
9.60	12	121
9.50	10	123
9.40	7	126
9.30	5	129
9.20	2	133
9.10	-2	137
9.00	-5	141
8.90	-8	146
8.80	-11	152
8.70	-14	160
8.60	-16	170
8.50	-15	183
8.40	-10	201
8.30	6	230
8.29	8	234
8.28	10	239
8.27	12	245
8.26	13	253
8.25	13	261
8.24	11	272
8.23	5	285
8.22	-9	303
8.21	-38	347
8.20	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -35.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	0	41
19.00	2	42
18.00	5	44
17.00	8	46
16.00	11	48
15.00	14	51
14.00	18	54
13.00	22	58
12.00	26	64
11.00	30	72
10.00	32	82
9.00	30	97
8.00	21	114
7.00	2	134
6.20	-14	170
6.10	-14	179
6.00	-13	191
5.90	-7	206
5.80	3	228
5.79	4	232
5.78	5	235
5.77	6	239
5.76	8	243
5.75	9	248
5.74	9	254
5.73	10	260
5.72	9	266
5.71	7	277
5.70	3	288
5.69	-5	303
5.68	-20	328
5.67	26	427
5.66	13	546
5.65	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	0	54
19.00	2	55
18.00	4	57
17.00	7	58
16.00	10	60
15.00	13	63
14.00	17	65
13.00	21	69
12.00	25	74
11.00	29	80
10.00	32	89
9.00	32	100
8.00	29	113
7.00	17	128
6.00	1	148
5.90	-1	151
5.80	-3	155
5.70	-5	159
5.60	-7	164
5.50	-9	169
5.40	-11	176
5.30	-13	185
5.20	-14	197
5.10	-12	215
5.00	-5	244
4.99	-2	248
4.98	-1	253
4.97	1	259
4.96	3	266
4.95	4	274
4.94	4	284
4.93	3	298
4.92	-2	318
4.91	-16	360
4.90	11	440
4.89	-2	744
4.88	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	1	68
19.00	3	69
18.00	6	70
17.00	8	72
16.00	11	74
15.00	15	76
14.00	18	79
13.00	22	82
12.00	26	86
11.00	30	92
10.00	32	100
9.00	32	109
8.00	29	120
7.00	22	132
6.00	11	148
5.90	9	151
5.80	8	153
5.70	6	156
5.60	4	159
5.50	2	163
5.40	0	167
5.30	-1	171
5.20	-5	177
5.10	-9	185
5.00	-12	194
4.90	-15	208
4.80	-15	230
4.79	-15	233
4.78	-14	236
4.77	-14	240
4.76	-13	243
4.75	-12	248
4.74	-11	252
4.73	-9	257
4.72	-7	263
4.71	-5	269
4.70	-3	277
4.69	0	286
4.68	2	299
4.67	3	317
4.66	-4	351
4.65	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	3	82
19.00	6	83
18.00	8	84
17.00	11	86
16.00	14	87
15.00	17	89
14.00	21	92
13.00	24	95
12.00	27	99
11.00	30	104
10.00	32	110
9.00	32	116
8.00	29	127
7.00	24	137
6.00	17	153
5.90	-7	196
4.90	-13	207
4.80	-18	224
4.70	-18	254
4.60	8	550
4.59	-30	640
4.58	14	400
4.57	1	364
4.56	10	441
4.55	-13	327
4.54	-9	399
4.53	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	5	95
19.00	8	96
18.00	10	97
17.00	13	98
16.00	15	100
15.00	18	102
14.00	21	104
13.00	24	106
12.00	27	109
11.00	29	113
10.00	30	118
9.00	30	123
8.00	29	130
7.00	26	139
6.00	22	157
5.90	21	160
5.80	20	163
5.70	19	166
5.60	17	169
5.50	16	173
5.40	13	177
5.30	11	182
5.20	7	187
5.10	3	192
5.00	-2	199
4.90	-8	207
4.80	-15	218
4.70	-22	236
4.60	-21	268
4.59	-19	273
4.58	-17	277
4.57	-15	283
4.56	-12	289
4.55	-9	296
4.54	-4	304
4.53	1	314
4.52	6	329
4.51	8	354
4.50	-5	424
4.49	14	731
4.48	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	5	109
19.00	7	110
18.00	10	111
17.00	12	112
16.00	14	113
15.00	17	114
14.00	20	116
13.00	22	118
12.00	24	120
11.00	26	122
10.00	27	126
9.00	27	129
8.00	26	135
7.00	26	145
6.00	25	164
5.90	25	166
5.80	24	169
5.70	23	172
5.60	22	176
5.50	21	179
5.40	19	183
5.30	17	186
5.20	14	190
5.10	11	194
5.00	7	199
4.90	3	203
4.80	-2	208
4.70	-7	214
4.60	-13	220
4.50	-19	229
4.40	-23	241
4.30	-25	257
4.20	-21	280
4.10	-2	316
4.09	1	322
4.08	4	330
4.07	7	343
4.06	9	353
4.05	9	372
4.04	1	409
4.03	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WO[illegible]RID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -35.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	3	125
19.00	6	126
18.00	8	127
17.00	10	128
16.00	12	129
15.00	15	130
14.00	17	131
13.00	19	133
12.00	21	134
11.00	22	136
10.00	23	139
9.00	23	142
8.00	23	147
7.00	24	157
6.00	25	175
5.00	14	203
4.90	11	206
4.80	8	209
4.70	5	212
4.60	2	215
4.50	-1	218
4.40	-4	221
4.30	-8	225
4.20	-11	230
4.10	-15	235
4.00	-18	243
3.90	-22	253
3.80	-25	270
3.70	-22	299
3.60	8	494
3.59	-6	737
3.58	23	485
3.57	-16	973
3.56	17	436
3.55	3	386
3.54	-6	556
3.53	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	2	144
19.00	4	145
18.00	6	145
17.00	9	146
16.00	11	147
15.00	13	148
14.00	15	150
13.00	17	151
12.00	19	152
11.00	20	154
10.00	21	157
9.00	21	160
8.00	21	165
7.00	22	175
6.00	23	193
5.00	13	218
4.00	-14	251
4.80	-14	259
4.50	-24	272
4.70	-27	295
4.60	-10	342
4.59	-4	350
4.58	4	361
4.57	14	379
4.56	19	417
4.55	6	528
4.54	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	0	163
19.00	2	164
18.00	4	165
17.00	7	166
16.00	9	167
15.00	12	168
14.00	14	170
13.00	16	171
12.00	18	173
11.00	19	175
10.00	19	177
9.00	19	180
8.00	18	186
7.00	19	197
6.00	20	216
5.00	6	240
4.90	4	243
4.80	1	245
4.70	-1	248
4.60	-4	250
4.50	-6	253
4.40	-9	257
4.30	-12	261
4.20	-15	266
4.10	-18	272
4.00	-22	281
3.90	-26	295
3.80	-26	318
3.78	-4	363
3.69	2	371
3.68	11	383
3.67	20	402
3.66	29	448
3.65	11	536
3.64	13	809
3.63	13	559
3.62	10	454
3.61	5	462
3.60	-9	607
3.59	4	441
3.58	6	506
3.57	-2	492
3.56	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-2	183
19.00	0	184
18.00	3	185
17.00	5	187
16.00	8	188
15.00	10	189
14.00	13	191
13.00	15	193
12.00	16	195
11.00	17	197
10.00	17	199
9.00	17	203
8.00	16	209
7.00	16	220
6.00	14	241
5.00	-6	270
4.90	-9	274
4.80	-12	277
4.70	-15	281
4.60	-18	286
4.58	-21	291
4.40	-24	298
4.30	-26	306
4.20	-27	317
4.10	-26	333
4.00	-17	356
3.99	-15	360
3.98	-13	363
3.97	-10	366
3.96	-7	370
3.95	-4	375
3.94	1	379
3.93	5	385
3.92	11	393
3.91	18	403
3.90	24	419
3.89	24	449
3.88	1	588
3.87	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-3	204
19.00	-1	205
18.00	1	207
17.00	4	208
16.00	7	210
15.00	9	212
14.00	12	214
13.00	14	216
12.00	16	219
11.00	16	222
10.00	16	225
9.00	15	229
8.00	13	235
7.00	11	247
6.00	6	271
5.00	-25	324
4.90	-27	336
4.80	-26	350
4.70	-18	368
4.60	1	389
4.59	4	392
4.58	7	395
4.57	11	399
4.56	14	403
4.55	18	408
4.54	23	415
4.53	26	423
4.52	29	435
4.51	29	451
4.50	20	473
4.49	-10	513
4.48	-18	621
4.47	13	552
4.46	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-5	225
19.00	-2	226
18.00	0	228
17.00	3	230
16.00	6	233
15.00	9	235
14.00	11	238
13.00	14	242
12.00	15	245
11.00	15	250
10.00	14	254
9.00	11	259
8.00	8	266
7.00	4	280
6.90	3	283
6.80	2	285
6.70	2	287
6.60	1	290
6.50	0	293
6.40	-1	297
6.30	-3	300
6.20	-4	304
6.10	-6	309
6.00	-9	314
5.90	-11	320
5.80	-14	327
5.70	-18	336
5.60	-21	348
5.50	-21	384
5.40	-15	386
5.30	14	420
5.20	0	504
5.19	18	437
5.18	21	459
5.17	-15	725
5.16	-16	593
5.15	9	450
5.14	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -35.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-5	245
19.00	-3	247
18.00	0	250
17.00	3	252
16.00	6	255
15.00	9	259
14.00	11	263
13.00	13	268
12.00	14	274
11.00	13	281
10.00	10	288
9.00	4	295
8.00	-2	305
7.00	-10	326
6.90	-11	330
6.80	-12	334
6.70	-13	338
6.60	-14	344
6.50	-15	350
6.40	-16	357
6.30	-16	367
6.20	-15	379
6.10	-11	396
6.00	3	420
5.99	6	424
5.98	8	428
5.97	11	432
5.96	15	437
5.95	18	443
5.94	22	451
5.93	26	462
5.92	27	477
5.91	23	498
5.90	1	531
5.89	-4	589
5.88	-1	539
5.87	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-6	-95
19.00	-5	-92
18.00	0	-90
17.00	3	-86
16.00	6	-82
15.00	9	-78
14.00	12	-72
13.00	13	-65
12.00	12	-56
11.00	9	-46
10.00	2	-35
9.00	-5	-21
8.00	-17	2
7.90	-17	6
7.80	-17	9
7.70	-17	14
7.60	-17	18
7.50	-16	24
7.40	-14	30
7.30	-12	36
7.20	-5	45
7.10	-3	54
7.00	6	68
6.90	20	91
6.85	27	110
6.84	27	122
6.83	26	131
6.82	23	141
6.81	16	154
6.80	5	169
6.79	-15	198
6.78	4	349
6.77	-13	279
6.76	-11	303
6.75	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-6	-76
19.00	-5	-73
18.00	0	-70
17.00	3	-66
16.00	6	-61
15.00	10	-55
14.00	12	-47
13.00	13	-38
12.00	11	-25
11.00	4	-10
10.00	-9	11
9.90	-10	14
9.80	-11	17
9.70	-12	21
9.60	-13	24
9.50	-14	28
9.40	-15	32
9.30	-15	37
9.20	-14	42
9.10	-13	47
9.00	-12	53
8.90	-9	59
8.80	-5	66
8.70	1	74
8.60	10	84
8.50	20	98
8.40	29	126
8.30	-10	189
8.20	-9	187
8.10	3	260
8.00	15	83
7.99	18	87
7.98	22	95
7.97	24	106
7.96	23	122
7.95	12	140
7.94	-10	161
7.93	-13	210
7.92	-36	329
7.91	19	252
7.90	-13	174
7.89	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-6	-58
19.00	-3	-55
18.00	0	-51
17.00	4	-47
16.00	7	-41
15.00	11	-34
14.00	13	-24
13.00	14	-11
12.00	10	6
11.00	-2	33
10.90	-3	36
10.80	-5	40
10.70	-6	45
10.60	-7	50
10.50	-8	55
10.40	-9	61
10.30	-8	69
10.20	-7	77
10.10	-4	87
10.00	2	99
9.90	11	116
9.80	22	148
9.79	22	154
9.78	22	160
9.77	21	167
9.76	19	175
9.75	15	184
9.74	8	195
9.73	-3	209
9.72	-18	234
9.71	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-6	-42
19.00	-3	-38
18.00	1	-34
17.00	4	-29
16.00	8	-23
15.00	13	-14
14.00	16	-3
13.00	16	14
12.00	10	39
11.90	9	42
11.80	8	46
11.70	6	50
11.60	4	54
11.50	3	59
11.40	1	64
11.30	-1	70
11.20	-3	77
11.10	-4	86
11.00	-5	96
10.90	-4	110
10.80	2	131
10.70	14	174
10.69	14	183
10.68	14	194
10.67	11	209
10.66	2	229
10.65	-20	279
10.64	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-6	-27
19.00	-2	-23
18.00	1	-19
17.00	6	-13
16.00	10	-7
15.00	15	2
14.00	19	15
13.00	20	35
12.90	20	37
12.80	20	40
12.70	19	43
12.60	19	46
12.50	18	49
12.40	17	52
12.30	15	56
12.20	14	60
12.10	12	64
12.00	11	69
11.90	8	73
11.80	6	79
11.70	3	86
11.60	0	93
11.50	-3	103
11.40	-6	116
11.30	-6	135
11.20	3	171
11.19	5	178
11.18	7	185
11.17	9	194
11.16	11	207
11.15	11	224
11.14	2	253
11.13	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -35.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-5	-14
19.00	-1	-10
18.00	2	-6
17.00	7	-1
16.00	12	6
15.00	17	14
14.00	22	27
13.00	24	40
12.90	24	50
12.80	23	53
12.70	23	56
12.60	22	59
12.50	21	63
12.40	20	66
12.30	19	70
12.20	17	74
12.10	15	78
12.00	13	83
11.90	10	88
11.80	7	94
11.70	3	101
11.60	-1	109
11.50	-6	120
11.40	-10	136
11.30	-8	162
11.29	-7	166
11.28	-6	171
11.27	-4	175
11.26	-2	180
11.25	0	186
11.24	3	194
11.23	7	202
11.22	10	214
11.21	13	230
11.20	8	256
11.19	-24	346
11.18	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-3	-4
19.00	0	0
18.00	4	4
17.00	8	8
16.00	13	14
15.00	18	22
14.00	23	34
13.00	26	52
12.00	20	81
11.90	18	85
11.80	16	89
11.70	14	94
11.60	10	99
11.50	7	104
11.40	3	111
11.30	-2	118
11.20	-8	129
11.10	-12	144
11.00	-11	168
10.99	-10	172
10.98	-9	176
10.97	-8	180
10.96	-6	184
10.95	-4	189
10.94	-1	195
10.93	2	201
10.92	6	209
10.91	10	219
10.90	15	232
10.89	12	253
10.88	-10	290
10.87	-10	308
10.86	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-1	5
19.00	2	8
18.00	6	11
17.00	9	15
16.00	14	21
15.00	18	28
14.00	23	37
13.00	27	52
12.00	25	74
11.90	25	77
11.80	24	80
11.70	23	83
11.60	21	87
11.50	19	90
11.40	17	94
11.30	15	97
11.20	12	101
11.10	9	106
11.00	6	111
10.90	2	116
10.80	-3	123
10.70	-8	132
10.60	-13	144
10.50	-14	162
10.40	-4	193
10.39	-2	197
10.38	1	203
10.37	5	209
10.36	8	216
10.35	12	225
10.34	14	237
10.33	13	254
10.32	0	280
10.31	16	396
10.30	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	1	12
19.00	4	15
18.00	7	18
17.00	11	21
16.00	15	26
15.00	19	32
14.00	23	39
13.00	27	51
12.00	29	67
11.00	22	91
10.90	20	94
10.80	18	97
10.70	16	100
10.60	14	104
10.50	11	107
10.40	8	111
10.30	4	115
10.20	0	120
10.10	-4	126
10.00	-8	133
9.90	-12	142
9.80	-15	155
9.70	-14	173
9.60	1	203
9.59	4	208
9.58	7	213
9.57	10	219
9.56	13	227
9.55	15	236
9.54	15	249
9.53	10	265
9.52	-9	289
9.51	29	409
9.50	-27	320
9.49	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	2	20
19.00	5	22
18.00	8	25
17.00	11	27
16.00	14	31
15.00	18	35
14.00	22	41
13.00	27	49
12.00	30	61
11.00	29	77
10.00	20	100
9.00	-9	135
8.90	-13	143
8.80	-16	152
8.70	-16	165
8.60	-11	183
8.50	5	210
8.40	-28	355
8.30	-9	223
8.29	1	218
8.28	6	218
8.27	10	220
8.26	6	241
8.25	-25	280
8.24	R	R

GEOGRAPHIC
LAT. = -35.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	1	29
19.00	4	31
18.00	6	33
17.00	9	35
16.00	13	38
15.00	16	41
14.00	20	46
13.00	24	51
12.00	28	59
11.00	31	70
10.00	30	85
9.00	21	105
8.90	20	107
8.80	18	109
8.70	16	111
8.60	14	114
8.50	12	118
8.40	9	119
8.30	6	121
8.20	4	124
8.10	1	127
8.00	-2	131
7.90	-6	138
7.80	-9	138
7.70	-12	145
7.60	-14	152
7.50	-16	160
7.40	-16	171
7.30	-12	184
7.20	-3	203
7.10	13	230
7.09	15	242
7.08	15	248
7.07	14	258
7.06	11	266
7.05	5	277
7.04	-7	291
7.03	-27	318
7.02	1	985
7.01	5	392
7.00	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -40.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-4	37
19.00	-2	39
18.00	0	40
17.00	3	41
16.00	6	43
15.00	10	45
14.00	13	47
13.00	18	49
12.00	22	53
11.00	26	57
10.00	30	64
9.00	33	73
8.00	32	85
7.00	25	97
6.00	14	112
5.90	13	114
5.80	11	117
5.70	10	119
5.60	8	122
5.50	7	124
5.40	5	128
5.30	3	132
5.20	0	136
5.10	-2	141
5.00	-5	148
4.90	-7	156
4.80	-10	167
4.70	-11	183
4.60	-7	211
4.59	-6	215
4.58	-5	220
4.57	-3	225
4.56	-2	231
4.55	1	237
4.54	3	245
4.53	5	256
4.52	6	269
4.51	3	298
4.50	-14	333
4.49	3	366
4.48	R	R

GEOGRAPHIC
LAT. = -40.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-5	50
19.00	-1	51
18.00	1	52
17.00	3	53
16.00	5	55
15.00	8	56
14.00	12	58
13.00	16	60
12.00	20	62
11.00	25	66
10.00	29	71
9.00	31	77
8.00	32	85
7.00	31	94
6.00	25	105
5.90	16	128
5.80	14	132
5.70	12	137
5.60	9	142
5.50	6	148
5.40	1	155
5.30	-4	164
5.20	-10	178
5.10	-15	199
5.00	-6	246
4.90	-3	256
4.80	1	268
4.70	5	285
4.60	2	315
4.59	17	457
4.58	R	R

GEOGRAPHIC
LAT. = -40.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-4	63
19.00	-2	64
18.00	1	65
17.00	4	66
16.00	6	67
15.00	10	68
14.00	13	70
13.00	17	71
12.00	20	74
11.00	24	76
10.00	27	80
9.00	30	85
8.00	31	90
7.00	30	97
6.00	27	107
5.00	23	130
4.90	21	134
4.80	20	138
4.70	18	143
4.60	16	148
4.50	12	154
4.40	8	160
4.30	2	168
4.20	-5	178
4.10	-13	191
4.00	-19	215
3.90	-4	267
3.89	0	277
3.88	4	292
3.87	6	315
3.86	-12	370
3.85	14	478
3.84	R	R

GEOGRAPHIC
LAT. = -40.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-2	76
19.00	0	77
18.00	1	77
17.00	4	78
16.00	8	79
15.00	11	80
14.00	14	81
13.00	17	82
12.00	20	84
11.00	23	86
10.00	26	89
9.00	27	92
8.00	28	96
7.00	27	102
6.00	27	112
5.00	26	136
4.90	25	142
4.80	24	147
4.70	22	151
4.60	20	155
4.50	16	161
4.40	12	167
4.30	7	172
4.20	1	179
4.10	-6	186
4.00	-13	196
3.90	-19	203
3.80	-21	229
3.70	-12	260
3.65	0	286
3.64	3	294
3.63	5	304
3.62	6	318
3.61	3	337
3.60	-9	375
3.59	-6	476
3.58	-1	382
3.57	R	R

GEOGRAPHIC
LAT. = -40.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-1	88
19.00	1	89
18.00	3	89
17.00	6	90
16.00	8	90
15.00	11	91
14.00	13	91
13.00	16	92
12.00	18	93
11.00	20	94
10.00	22	96
9.00	22	98
8.00	22	101
7.00	23	107
6.00	26	119
5.00	29	145
4.00	8	177
3.90	6	180
3.80	3	183
3.70	0	186
3.60	-3	191
3.50	-7	197
3.40	-11	205
3.30	-16	218
3.20	-21	244
3.10	4	327
3.09	3	376
3.08	22	461
3.07	22	429
3.06	8	517
3.05	-10	337
3.04	0	557
3.03	-11	615
3.02	-2	378
3.01	1	634
3.00	-10	616
2.99	R	R

GEOGRAPHIC
LAT. = -40.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-2	101
19.00	0	102
18.00	2	102
17.00	4	10[illegible]
16.00	6	103
15.00	8	103
14.00	10	103
13.00	12	103
12.00	13	104
11.00	15	105
10.00	16	106
9.00	16	109
8.00	17	111
7.00	19	117
6.00	25	126
5.00	30	147
4.00	24	154
3.90	23	165
3.80	21	169
3.70	20	172
3.60	18	176
3.50	16	181
3.40	13	187
3.30	8	195
3.20	1	203
3.10	-8	213
3.00	-18	229
2.90	-25	253
2.80	-11	298
2.79	-8	305
2.78	-3	313
2.77	2	323
2.76	7	337
2.75	9	360
2.74	-1	414
2.73	7	433
2.72	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -40.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-5	117
19.00	-3	117
18.00	-1	118
17.00	0	118
16.00	2	118
15.00	4	118
14.00	6	118
13.00	7	119
12.00	9	119
11.00	10	119
10.00	10	121
9.00	11	122
8.00	12	126
7.00	16	132
6.00	22	141
5.00	28	152
4.00	26	166
3.90	25	169
3.80	25	172
3.70	25	175
3.60	24	179
3.50	23	184
3.40	21	189
3.30	18	194
3.20	15	199
3.10	11	203
3.00	7	207
2.90	3	211
2.80	-1	216
2.70	-6	223
2.60	-13	234
2.50	-20	259
2.49	-24	258
2.48	-25	262
2.47	-26	266
2.46	-26	270
2.45	-26	276
2.44	-26	282
2.43	-25	288
2.42	-23	296
2.41	-20	384
2.40	-15	314
2.39	-8	326
2.38	4	344
2.37	14	384
2.36	5	525
2.35	R	R

GEOGRAPHIC
LAT. = -40.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-1	136
20.00	-6	136
19.00	-4	136
18.00	-2	136
17.00	0	137
16.00	1	137
15.00	3	137
14.00	5	137
13.00	5	137
12.00	7	138
11.00	8	139
10.00	8	141
9.00	10	145
8.00	13	150
7.00	20	158
6.00	24	167
5.00	23	181
4.00	23	183
3.90	23	186
3.80	23	190
3.70	23	194
3.60	22	198
3.50	21	202
3.40	19	206
3.30	17	209
3.20	15	212
3.10	12	215
3.00	9	218
2.90	6	223
2.80	2	229
2.70	-4	238
2.60	-14	251
2.50	-26	272
2.49	-24	313
2.48	-9	698
2.47	17	511
2.46	-1	596
2.45	4	421
2.44	7	407
2.43	21	464
2.42	22	504
2.41	13	473
2.40	6	858
2.39	R	R

GEOGRAPHIC
LAT. = -40.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-10	155
19.00	-8	156
18.00	-6	156
17.00	-4	156
16.00	-2	157
15.00	0	157
14.00	2	157
13.00	3	157
12.00	5	158
11.00	6	158
10.00	6	159
9.00	7	161
8.00	8	165
7.00	11	171
6.00	18	180
5.00	22	189
4.00	20	203
3.90	20	206
3.80	20	209
3.70	20	213
3.60	19	216
3.50	18	220
3.40	16	224
3.30	14	227
3.20	12	231
3.10	9	234
3.00	7	237
2.90	4	240
2.80	1	246
2.70	-4	253
2.60	-12	264
2.50	-23	282
2.40	-29	313
2.39	-28	317
2.38	-27	321
2.37	-26	326
2.36	-24	331
2.35	-22	335
2.34	-18	341
2.33	-19	346
2.32	-10	352
2.31	-4	358
2.30	3	366
2.29	11	377
2.28	20	395
2.27	21	433
2.26	-19	693
2.25	R	R

GEOGRAPHIC
LAT. = -40.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-11	176
19.00	-9	176
18.00	-7	177
17.00	-5	177
16.00	-1	178
15.00	-1	178
14.00	1	178
13.00	3	179
12.00	4	179
11.00	5	180
10.00	6	181
9.00	6	183
8.00	7	187
7.00	10	194
6.00	16	204
5.00	19	215
4.00	15	230
3.90	15	233
3.80	14	237
3.70	13	241
3.60	11	246
3.50	9	250
3.40	6	255
3.30	3	259
3.20	-1	263
3.10	-4	267
3.00	-8	272
2.90	-11	277
2.80	-16	286
2.70	-22	300
2.60	-27	330
2.50	26	421
2.49	-5	568
2.48	0	626
2.47	20	772
2.46	12	425
2.45	-13	1043
2.44	5	443
2.43	5	833
2.42	R	R

GEOGRAPHIC
LAT. = -40.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-12	197
19.00	-10	197
18.00	-8	198
17.00	-6	199
16.00	-3	200
15.00	-1	200
14.00	1	201
13.00	3	202
12.00	5	202
11.00	6	203
10.00	7	205
9.00	7	207
8.00	7	211
7.00	9	219
6.00	14	232
5.00	14	247
4.00	6	265
3.90	5	269
3.80	3	274
3.70	0	279
3.60	-3	286
3.50	-8	293
3.40	-13	302
3.30	-20	313
3.20	-25	327
3.10	-26	345
3.00	-17	368
2.90	15	407
2.80	21	416
2.70	27	431
2.60	28	455
2.50	3	501
2.49	-1	685
2.48	R	R

GEOGRAPHIC
LAT. = -40.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-12	218
19.00	-10	219
18.00	-8	220
17.00	-5	221
16.00	-3	222
15.00	0	223
14.00	2	224
13.00	5	226
12.00	7	227
11.00	8	228
10.00	8	230
9.00	8	233
8.00	8	238
7.00	8	247
6.00	11	263
5.00	5	288
4.90	3	290
4.80	1	293
4.70	-1	295
4.60	-3	298
4.50	-5	300
4.40	-6	303
4.30	-8	306
4.20	-10	310
4.10	-12	314
4.00	-14	320
3.90	-16	328
3.80	-19	339
3.70	-20	355
3.60	-15	383
3.50	29	469
3.49	-10	532
3.48	-1	538
3.47	0	588
3.46	13	538
3.45	18	494
3.44	3	494
3.43	7	457
3.42	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR HOMING GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -40.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-12	239
19.00	-10	240
18.00	-7	241
17.00	-5	243
16.00	-2	244
15.00	1	246
14.00	4	248
13.00	7	250
12.00	9	253
11.00	10	255
10.00	10	258
9.00	9	262
8.00	8	268
7.00	7	278
6.00	5	301
5.90	5	304
5.80	4	308
5.70	2	311
5.60	1	316
5.50	-1	320
5.40	-3	325
5.30	-6	330
5.20	-9	336
5.10	-13	343
5.00	-16	351
4.90	-19	361
4.80	-20	373
4.70	-17	388
4.60	-8	405
4.50	14	430
4.40	0	712
4.30	17	447
4.29	19	474
4.28	10	603
4.27	10	562
4.26	-15	569
4.25	-3	471
4.24	15	454
4.23	4	577
4.22	-17	718
4.21	3	467
4.20	-8	687
4.19	-2	641
4.18	-11	699
4.17	R	R

GEOGRAPHIC
LAT. = -40.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-12	-101
20.00	-1	-100
19.00	-9	-98
18.00	-4	-96
17.00	3	-94
16.00	1	-91
15.00	5	-88
14.00	4	-85
13.00	11	-81
12.00	12	-76
11.00	11	-71
10.00	9	-65
9.00	7	-58
8.00	7	-45
7.00	7	-43
6.90	1	-41
6.80	1	-38
6.70	0	-36
6.60	0	-33
6.50	-1	-29
6.40	-2	-26
6.30	-3	-22
6.20	-4	-17
6.10	-9	-12
6.00	-7	-5
5.90	-5	2
5.80	-13	11
5.70	-17	22
5.60	-12	38
5.50	-5	60
5.40	21	106
5.30	0	115
5.29	16	104
5.28	-7	169
5.27	-1	108
5.26	6	107
5.25	-11	166
5.24	3	173
5.23	R	R

GEOGRAPHIC
LAT. = -40.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-11	-82
19.00	-8	-80
18.00	-6	-78
17.00	-2	-75
16.00	1	-72
15.00	4	-69
14.00	5	-65
13.00	11	-59
12.00	13	-53
11.00	13	-46
10.00	10	-37
9.00	5	-24
8.00	-1	-16
7.00	-7	5
6.90	-8	8
6.80	-8	12
6.70	-8	17
6.60	-9	22
6.50	-9	28
6.40	-9	36
6.30	-8	45
6.20	-5	56
6.10	0	73
6.00	12	100
5.99	14	105
5.95	16	110
5.97	17	116
5.96	19	123
5.95	21	131
5.94	21	142
5.93	19	156
5.92	12	176
5.91	-9	211
5.90	R	R

GEOGRAPHIC
LAT. = -40.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-11	-64
19.00	-8	-61
18.00	-4	-59
17.00	-1	-56
16.00	3	-52
15.00	7	-47
14.00	10	-42
13.00	13	-34
12.00	15	-25
11.00	13	-13
10.00	7	2
9.90	-1	21
8.00	-9	51
7.00	-9	56
7.90	-8	61
7.80	-8	67
7.70	-4	74
7.60	-1	81
7.50	4	90
7.40	10	102
7.30	15	120
7.20	20	159
7.19	18	166
7.18	16	173
7.17	11	182
7.16	5	192
7.15	-4	206
7.14	-17	232
7.13	3	391
7.12	R	R

GEOGRAPHIC
LAT. = -40.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-10	-46
19.00	-7	-43
18.00	-3	-40
17.00	1	-37
16.00	5	-32
15.00	9	-27
14.00	14	-20
13.00	17	-10
12.00	18	4
11.00	13	24
10.00	3	44
9.90	-2	48
9.80	-4	63
9.70	-5	68
9.60	-6	74
9.50	-7	81
9.40	-6	89
9.30	-4	99
9.20	-1	112
9.10	7	129
9.00	17	160
8.99	19	164
8.98 | 18 | 170
8.97 | 18 | 177
8.96 | 17 | 184
8.95 | 15 | 193
8.94 | 11 | 203
8.93 | 4 | 217
8.92 | -9 | 236
8.91 | -23 | 293
8.90 | R | R

GEOGRAPHIC
LAT. = -40.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-9	-30
19.00	-5	-27
18.00	-2	-24
17.00	3	-20
16.00	7	-16
15.00	12	-9
14.00	17	-1
13.00	22	12
12.00	22	32
11.90	21	34
11.80	20	37
11.70	20	39
11.60	19	42
11.50	18	45
11.40	17	48
11.30	15	52
11.20	14	55
11.10	12	59
11.00	10	63
10.90	8	67
10.80	5	72
10.70	2	77
10.60	-1	83
10.50	-4	91
10.40	-6	100
10.30	-8	112
10.20	-6	130
10.10	3	158
10.09	5	162
10.08	6	167
10.07	8	172
10.06	11	179
10.05	13	186
10.04	14	196
10.03	15	209
10.02	11	226
10.01	-2	253
10.00	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -40.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-7	-17
19.00	-4	-14
18.00	0	-11
17.00	4	-7
16.00	9	-2
15.00	15	4
14.00	21	13
13.00	25	27
12.00	25	58
11.90	24	53
11.80	23	56
11.70	22	60
11.60	21	63
11.50	19	67
11.40	17	70
11.30	15	74
11.20	12	79
11.10	9	84
11.00	6	89
10.90	2	95
10.80	-3	103
10.70	-7	112
10.60	-11	126
10.50	-10	147
10.40	7	188
10.39	10	196
10.38	13	206
10.37	16	220
10.36	13	240
10.35	-9	275
10.34	-2	370
10.33	R	R

GEOGRAPHIC
LAT. = -40.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-6	-7
19.00	-2	-4
18.00	1	-1
17.00	6	3
16.00	11	7
15.00	15	13
14.00	22	22
13.00	27	35
12.00	29	56
11.90	29	59
11.80	27	61
11.70	26	64
11.60	25	67
11.50	24	71
11.40	22	76
11.30	21	77
11.20	19	81
11.10	16	85
11.00	13	89
10.90	10	94
10.80	6	99
10.70	1	105
10.60	-4	112
10.50	-9	121
10.40	-15	134
10.30	-13	155
10.20	4	192
10.19	8	199
10.18	12	207
10.17	16	218
10.16	17	233
10.15	10	255
10.14	-23	296
10.13	-14	289
10.12	R	R

GEOGRAPHIC
LAT. = -40.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-4	2
19.00	-1	4
18.00	3	7
17.00	7	10
16.00	11	14
15.00	16	19
14.00	22	27
13.00	27	37
12.00	30	54
11.00	24	79
10.00	-8	123
9.90	-13	133
9.80	-16	147
9.70	-11	170
9.69	-10	172
9.68	-8	175
9.67	-7	179
9.66	-4	182
9.65	-2	186
9.64	1	190
9.63	4	194
9.62	7	200
9.61	11	206
9.60	14	213
9.59	17	223
9.58	18	236
9.57	13	254
9.56	-8	279
9.55	R	R

GEOGRAPHIC
LAT. = -40.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-2	9
19.00	0	11
18.00	4	14
17.00	7	16
16.00	11	20
15.00	16	24
14.00	21	29
13.00	26	37
12.00	30	49
11.00	31	67
10.00	19	92
9.00	-16	143
8.90	-16	157
8.80	-8	178
8.70	16	217
8.69	18	225
8.68	19	235
8.67	16	248
8.66	6	264
8.65	-18	286
8.64	R	R

GEOGRAPHIC
LAT. = -40.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-2	17
19.00	0	19
18.00	3	21
17.00	7	23
16.00	10	25
15.00	14	29
14.00	19	33
13.00	24	38
12.00	28	46
11.00	32	58
10.00	31	74
9.00	19	96
8.00	-10	129
7.90	-13	135
7.80	-16	144
7.70	-16	154
7.60	-13	168
7.50	-3	187
7.40	16	220
7.30	-7	381
7.20	-4	707
7.10	-15	363
7.00	-7	323
6.99	-5	316
6.98	-14	498
6.97	-9	295
6.96	-22	266
6.95	-24	250
6.94	-23	243
6.93	-23	241
6.92	-23	244
6.91	-22	252
6.90	-19	269
6.89	-2	308
6.88	R	R

GEOGRAPHIC
LAT. = -40.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-3	26
19.00	-1	28
18.00	2	29
17.00	5	31
16.00	8	33
15.00	12	35
14.00	16	38
13.00	21	42
12.00	25	47
11.00	30	54
10.00	33	64
9.00	32	79
8.00	23	95
7.00	4	115
6.90	2	118
6.80	0	120
6.70	-3	124
6.60	-5	127
6.50	-8	131
6.40	-10	136
6.30	-12	141
6.20	-13	148
6.10	-13	156
6.00	-12	166
5.90	-9	179
5.80	-1	197
5.78	11	238
5.69	12	236
5.68	12	242
5.67	12	250
5.66	10	259
5.65	5	271
5.64	-4	286
5.63	-21	312
5.62	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -45.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-9	35
19.00	-7	36
18.00	-4	37
17.00	-1	38
16.00	2	39
15.00	5	40
14.00	9	41
13.00	13	42
12.00	17	44
11.00	22	47
10.00	26	50
9.00	29	55
8.00	31	61
7.00	30	66
6.00	27	78
5.00	22	98
4.90	21	102
4.80	19	106
4.70	18	110
4.60	16	115
4.50	13	121
4.40	10	128
4.30	5	136
4.20	-1	146
4.10	-8	160
4.00	-14	185
3.99	-14	189
3.98	-14	193
3.97	-13	197
3.96	-13	202
3.95	-11	207
3.94	-10	213
3.93	-7	220
3.92	-4	228
3.91	0	236
3.90	4	251
3.89	8	271
3.88	-2	309
3.87	-9	345
3.86	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
11.00	24	57
10.00	25	60
9.00	25	63
8.00	24	68
7.00	27	75
6.00	27	92
5.00	17	140
4.90	9	148
4.80	-2	157
4.70	-13	168
4.60	-15	187
4.50	-17	219
4.40	-21	356
4.30	-17	317
4.29	-7	492
4.28	-15	271
4.27	-25	359
4.26	-5	417
4.25	-16	276
4.24	-7	346
4.23	-22	295
4.22	-17	329
4.21	-2	399
4.20	-7	347
4.19	4	374
4.18	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	20	66
9.00	22	67
8.00	24	69
7.00	21	73
6.00	24	80
5.00	28	96
4.00	22	136
3.90	19	141
3.80	15	[illegible]
3.70	11	[illegible]
3.60	6	154
3.50	1	159
3.40	-2	163
3.30	-6	169
3.20	-9	176
3.10	-11	185
3.00	-15	201
2.90	-13	232
2.89	-12	237
2.88	-10	243
2.87	-8	250
2.86	-5	258
2.85	-2	269
2.84	2	283
2.83	1	308
2.82	-13	375
2.81	-18	1034
2.80	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	17	71
9.00	18	74
8.00	19	76
7.00	19	80
6.00	23	88
5.00	29	104
4.00	28	131
3.90	27	135
3.80	25	137
3.70	24	139
3.60	22	141
3.50	21	143
3.40	19	145
3.30	17	148
3.20	15	151
3.10	12	156
3.00	8	166
2.90	1	177
2.80	-10	194
2.79	-20	231
2.78	-23	237
2.77	-19	244
2.76	-16	252
2.75	-11	262
2.74	-7	274
2.73	0	290
2.72	6	319
2.71	5	641
2.70	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	10	82
9.00	11	82
8.00	11	85
7.00	12	89
6.00	18	97
5.00	26	109
4.00	30	121
3.90	23	129
3.80	18	136
3.70	12	173
3.60	6	178
3.50	0	184
3.40	-4	189
3.30	-9	197
3.20	-16	214
3.19	-17	267
3.18	-12	280
3.17	-5	297
3.16	5	328
3.15	-7	398
3.14	6	350
3.13	-16	335
3.12	6	424
3.11	7	444
3.10	-14	375
3.09	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	3	95
9.00	3	95
8.00	4	97
7.00	7	102
6.00	15	108
5.00	23	113
4.00	24	120
3.90	28	148
3.80	29	151
3.70	28	153
3.60	25	155
3.50	25	159
3.40	24	164
3.30	21	172
3.20	16	181
3.10	9	189
3.00	1	197
2.90	-5	204
2.80	-14	218
2.79	-19	220
2.78	-16	223
2.77	-18	226
2.76	-19	230
2.75	-21	234
2.74	-22	239
2.73	-21	244
2.72	-24	251
2.71	-24	259
2.70	-23	269
2.69	-20	288
2.68	-13	295
2.67	-5	317
2.66	0	374
2.65	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WOPLO GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -45.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-3	109
9.00	-3	111
8.00	-1	114
7.00	3	117
6.00	10	121
5.00	16	123
4.00	18	130
3.00	27	146
2.90	26	147
2.80	26	150
2.70	27	153
2.60	27	157
2.50	28	162
2.40	28	167
2.30	27	171
2.20	25	174
2.10	23	178
2.00	21	185
1.90	16	194
1.80	9	203
1.70	2	210
1.60	-8	224
1.50	-26	261
1.40	18	401
1.39	7	594
1.38	11	448
1.37	-1	407
1.36	-8	388
1.35	6	515
1.34	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
11.00	-6	129
10.00	-6	130
9.00	[illegible]	133
7.00	0	136
6.00	6	139
5.00	11	141
4.00	14	148
3.00	22	159
2.90	22	161
2.80	22	163
2.70	23	166
2.60	24	169
2.50	25	173
2.40	25	176
2.30	25	178
2.20	24	181
2.10	24	186
2.00	23	192
1.90	21	199
1.80	18	203
1.70	15	210
1.60	8	221
1.50	-1	238
1.40	-13	246
1.30	-25	292
1.29	-27	299
1.28	-25	306
1.27	-22	314
1.25	-17	324
1.25	-8	337
1.24	7	359
1.23	-3	475
1.22	12	433
1.21	-3	527
1.20	10	542
1.19	9	945
1.18	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-8	149
9.00	-7	151
8.00	-8	153
7.00	-2	157
6.00	4	160
5.00	8	162
4.00	12	169
3.00	18	181
2.90	19	183
2.80	19	185
2.70	20	188
2.60	21	191
2.50	22	194
2.40	22	197
2.30	21	199
2.20	21	202
2.10	20	208
2.00	19	214
1.90	17	219
1.80	14	224
1.70	11	232
1.60	3	242
1.50	-4	251
1.40	-18	270
1.30	-28	312
1.29	-27	318
1.28	-25	326
1.27	-21	335
1.26	-14	346
1.25	-1	362
1.24	21	402
1.23	3	840
1.22	9	408
1.21	8	842
1.20	-9	573
1.19	-5	534
1.18	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-8	171
9.00	-7	172
8.00	-6	175
7.00	-2	179
6.00	4	184
5.00	8	186
4.00	11	194
3.00	16	208
2.90	16	211
2.80	17	214
2.70	17	217
2.60	18	221
2.50	18	225
2.40	17	228
2.30	16	231
2.20	14	234
2.10	13	240
2.00	10	248
1.90	6	254
1.80	1	260
1.70	-5	271
1.60	-18	289
1.50	-26	313
1.40	21	461
1.39	17	512
1.38	14	429
1.37	2	448
1.36	1	976
1.35	-12	652
1.34	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-6	193
9.00	-6	195
8.00	-5	198
7.00	-2	203
6.00	4	209
5.00	9	214
4.00	11	223
3.00	13	244
2.90	12	246
2.80	12	250
2.70	11	254
2.60	10	260
2.50	8	266
2.40	5	271
2.30	2	275
2.20	-1	280
2.10	-5	289
2.00	-14	304
1.90	-23	326
1.80	-23	355
1.70	14	848
1.69	14	563
1.68	15	444
1.67	12	1198
1.66	-7	565
1.65	7	827
1.64	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-4	217
9.00	-3	218
8.00	-3	222
7.00	0	228
6.00	6	237
5.00	11	246
4.00	10	258
3.00	1	292
2.90	-1	296
2.80	-3	301
2.70	-6	308
2.60	-11	319
2.50	-17	336
2.40	-22	367
2.30	-3	402
2.20	3	495
2.19	0	667
2.18	12	443
2.17	-4	815
2.16	-2	578
2.15	7	473
2.14	-19	708
2.13	7	544
2.12	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -45.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	0	241
9.00	0	243
8.00	0	247
7.00	2	254
6.00	7	267
5.00	10	284
4.00	3	302
3.90	2	305
3.80	1	310
3.70	0	315
3.60	-2	322
3.50	-5	330
3.40	-10	340
3.30	-15	353
3.20	-18	371
3.10	-14	394
3.00	9	427
2.90	12	535
2.89	10	742
2.88	-14	562
2.87	-2	510
2.86	9	455
2.85	19	473
2.84	-8	735
2.83	4	571
2.82	2	470
2.81	9	601
2.80	3	536
2.79	4	562
2.78	-24	610
2.77	4	837
2.76	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	[illegible]	-93
9.00	5	-90
8.00	[illegible]	-86
7.00	5	-77
6.00	5	-61
5.00	3	-30
4.90	1	-26
4.80	-1	-22
4.70	-3	-18
4.60	-5	-14
4.50	-8	-10
4.40	-10	-5
4.30	-12	0
4.20	-13	6
4.10	-14	12
4.00	-14	21
3.90	-13	32
3.80	-9	48
3.70	[illegible]	76
3.69	9	80
3.68	11	85
3.67	14	91
3.66	18	99
3.65	22	109
3.64	25	124
3.63	23	146
3.62	2	184
3.61	13	454
3.60	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	9	-65
9.00	9	-61
8.00	7	-55
7.00	6	-45
6.00	6	-23
5.90	5	-19
5.80	5	-16
5.70	4	-11
5.60	3	-6
5.50	2	-1
5.40	0	6
5.30	-2	13
5.20	-5	21
5.10	-8	32
5.00	-9	45
4.90	-8	64
4.80	5	92
4.79	7	96
4.78	10	101
4.77	13	106
4.76	16	112
4.75	19	119
4.74	22	128
4.73	24	141
4.72	23	158
4.71	12	181
4.70	-22	239
4.69	-1	227
4.68	7	251
4.67	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	13	-34
9.00	11	-26
8.00	8	-18
7.00	4	-4
6.00	-1	29
5.80	-1	35
5.90	-2	43
5.70	-3	54
5.60	-3	67
5.50	-1	88
5.40	11	128
5.39	13	136
5.38	15	146
5.37	16	159
5.36	15	178
5.35	3	210
5.34	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-15	-50
19.00	-12	-48
18.00	-8	-46
17.00	-4	-43
16.00	0	-41
15.00	4	-37
14.00	8	-33
13.00	13	-27
12.00	16	-20
11.00	18	-10
10.00	16	3
9.00	10	18
8.00	1	36
7.90	0	38
7.80	-1	41
7.70	-1	43
7.60	-2	46
7.50	-3	49
7.40	-3	52
7.30	-4	55
7.20	-4	59
7.10	-4	63
7.00	-4	68
6.90	-4	73
6.80	-3	79
6.70	-2	87
6.60	0	96
6.50	4	109
6.40	9	128
6.30	15	167
6.29	14	175
6.28	13	184
6.27	10	195
6.26	5	209
6.25	-6	232
6.24	-17	307
6.23	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-13	-34
19.00	-9	-31
18.00	-6	-29
17.00	-2	-26
16.00	3	-23
15.00	8	-19
14.00	13	-14
13.00	19	-6
12.00	23	5
11.00	23	22
10.00	14	45
9.90	12	48
9.80	11	51
9.70	9	54
9.60	7	57
9.50	5	61
9.40	3	64
9.30	1	68
9.20	-1	73
9.10	-3	78
9.00	-5	84
8.90	-7	91
8.80	-7	99
8.70	-7	109
8.60	-4	121
8.50	1	138
8.40	12	165
8.39	13	169
8.38	14	174
8.37	15	179
8.36	16	185
8.35	16	192
8.34	15	200
8.33	13	210
8.32	8	223
8.31	-1	240
8.30	-20	274
8.29	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -45.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-11	-20
19.00	-7	-18
18.00	-3	-15
17.00	1	-12
16.00	6	-9
15.00	11	-5
14.00	17	1
13.00	23	10
12.00	27	25
11.00	25	47
10.90	24	50
10.80	23	53
10.70	21	56
10.60	20	59
10.50	18	62
10.40	16	65
10.30	13	69
10.20	11	73
10.10	8	77
10.00	4	81
9.90	1	87
9.80	-3	93
9.70	-7	100
9.60	-10	110
9.50	-12	123
9.40	-9	141
9.30	6	172
9.29	8	177
9.28	11	183
9.27	14	190
9.26	16	198
9.25	17	209
9.24	16	223
9.23	8	243
9.22	-19	279
9.21	4	366
9.20	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-9	-9
19.00	-6	-7
18.00	-2	-5
17.00	3	-2
16.00	7	1
15.00	13	6
14.00	13	11
13.00	25	20
12.00	30	34
11.00	23	56
10.90	27	59
10.80	26	62
10.70	25	65
10.60	23	68
10.50	21	71
10.40	19	74
10.30	17	78
10.20	14	81
10.10	10	85
10.00	7	89
9.90	3	94
9.80	-2	99
9.70	-7	106
9.60	-11	115
9.50	-14	127
9.40	-13	145
9.30	0	172
9.29	3	176
9.28	5	181
9.27	9	186
9.26	12	191
9.25	15	199
9.24	18	208
9.23	19	220
9.22	16	236
9.21	2	257
9.20	-33	319
9.19	-12	282
9.18	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-7	-1
19.00	-4	1
18.00	-1	3
17.00	3	6
16.00	8	9
15.00	13	12
14.00	19	17
13.00	25	24
12.00	30	35
11.00	32	53
10.00	21	79
9.00	-15	127
8.90	-16	140
8.80	-11	159
8.70	9	189
8.69	12	194
8.68	15	200
8.67	18	208
8.66	20	217
8.65	20	228
8.64	15	243
8.63	0	261
8.62	-33	303
8.61	-23	374
8.60	4	431
8.59	-14	288
8.58	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-6	7
19.00	-4	8
18.00	0	10
17.00	3	12
16.00	7	15
15.00	12	18
14.00	17	21
13.00	23	27
12.00	28	34
11.00	32	46
10.00	31	65
9.00	17	88
8.00	-15	133
7.90	-16	145
7.80	-11	160
7.70	2	181
7.60	18	234
7.50	-8	243
7.40	-11	246
7.39	7	478
7.38	-3	311
7.37	-1	545
7.36	-24	342
7.35	-22	238
7.34	-4	201
7.33	7	191
7.32	11	196
7.31	5	214
7.30	-22	247
7.29	9	412
7.28	12	402
7.27	3	384
7.26	-23	248
7.25	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-7	15
19.00	-4	16
18.00	-1	18
17.00	2	19
16.00	6	21
15.00	10	23
14.00	15	26
13.00	20	29
12.00	25	34
11.00	30	41
10.00	33	52
9.00	32	68
8.00	21	86
7.00	-2	109
6.90	-5	113
6.80	-7	117
6.70	-9	122
6.60	-11	127
6.50	-13	134
6.40	-13	142
6.30	-12	152
6.20	-8	165
6.10	1	184
6.00	14	216
5.99	15	224
5.98	15	231
5.97	14	240
5.96	11	258
5.95	10	253
5.94	2	266
5.93	-13	285
5.92	-28	348
5.91	R	R

GEOGRAPHIC
LAT. = -45.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-8	24
19.00	-5	25
18.00	-3	26
17.00	0	27
16.00	4	29
15.00	7	30
14.00	11	32
13.00	16	34
12.00	21	37
11.00	26	41
10.00	30	47
9.00	33	56
8.00	32	67
7.00	26	80
6.00	15	95
5.90	14	97
5.80	12	99
5.70	11	102
5.60	9	104
5.50	8	107
5.40	6	111
5.30	4	115
5.20	2	120
5.10	0	125
5.00	-3	132
4.90	-6	141
4.80	-8	153
4.70	-10	172
4.60	-3	206
4.59	-1	212
4.58	1	218
4.57	3	226
4.56	6	236
4.55	7	249
4.54	6	269
4.53	-9	306
4.52	13	593
4.51	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -50.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-13	33
19.00	-11	34
18.00	-8	34
17.00	-6	34
16.00	-3	35
15.00	0	35
14.00	4	36
13.00	8	36
12.00	12	37
11.00	16	38
10.00	20	39
9.00	23	41
8.00	25	43
7.00	25	47
6.00	24	53
5.00	26	69
4.90	27	71
4.80	27	74
4.70	27	78
4.60	28	82
4.50	28	86
4.40	27	91
4.30	27	96
4.20	25	102
4.10	23	108
4.00	19	114
3.90	14	121
3.80	8	129
3.70	1	137
3.60	-7	147
3.50	-13	162
3.40	-14	185
3.30	1	223
3.20	-6	338
3.19	-7	566
3.18	-4	511
3.17	-6	422
3.16	-22	271
3.15	-7	244
3.14	-1	258
3.13	-1	378
3.12	-13	330
3.11	-8	332
3.10	-23	280
3.09	-14	273
3.08	16	561
3.07	-14	320
3.06	R	R

GEOGRAPHIC
LAT. = -50.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-15	44
19.00	-11	45
18.00	-9	45
17.00	-6	45
16.00	-4	45
15.00	-1	46
14.00	2	46
13.00	6	46
12.00	9	46
11.00	13	46
10.00	16	46
9.00	19	47
8.00	19	49
7.00	19	50
6.00	19	55
5.00	24	68
4.90	30	102
4.80	29	106
4.70	27	110
4.60	25	114
4.50	23	114
4.40	19	121
4.30	15	124
4.20	14	127
4.10	11	130
4.00	9	133
3.90	5	139
3.80	2	146
3.70	-4	157
3.60	-12	178
3.59	-12	181
3.58	-13	185
3.57	-14	189
3.56	-14	193
3.55	-14	198
3.54	-14	203
3.53	-13	210
3.52	-12	218
3.51	-10	227
3.50	-6	238
3.49	0	254
3.48	5	280
3.47	-15	379
3.46	R	R

GEOGRAPHIC
LAT. = -50.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-13	56
19.00	-11	56
18.00	-9	56
17.00	-6	56
16.00	-4	56
15.00	-1	56
14.00	1	56
13.00	4	55
12.00	7	55
11.00	10	55
10.00	12	54
9.00	13	54
8.00	13	55
7.00	13	57
6.00	14	63
5.00	23	75
4.00	33	97
3.00	25	120
2.90	23	126
2.80	20	135
2.70	15	145
2.60	5	157
2.50	-7	172
2.40	-17	195
2.30	-11	235
2.29	-9	240
2.28	-6	246
2.27	-3	253
2.26	0	260
2.25	3	270
2.24	6	282
2.23	6	300
2.22	-3	329
2.21	19	510
2.20	4	591
2.19	R	R

GEOGRAPHIC
LAT. = -50.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-12	66
19.00	-11	66
18.00	-9	66
17.00	-7	66
16.00	-5	66
15.00	-2	65
14.00	0	65
13.00	2	64
12.00	4	63
11.00	5	63
10.00	6	62
9.00	7	62
8.00	6	63
7.00	6	66
6.00	10	73
5.00	22	82
4.00	30	92
3.00	30	115
2.90	30	121
2.80	29	128
2.70	27	135
2.60	24	140
2.50	20	144
2.40	17	147
2.30	14	150
2.20	11	157
2.10	3	171
2.00	-14	196
1.90	0	281
1.80	-19	312
1.79	-10	359
1.78	-22	336
1.77	15	871
1.76	4	446
1.75	-11	701
1.74	R	R

GEOGRAPHIC
LAT. = -50.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-14	77
19.00	-12	77
18.00	-11	76
17.00	-9	76
16.00	-8	75
15.00	-6	75
14.00	-4	74
13.00	-3	73
12.00	-2	72
11.00	-1	72
10.00	-1	72
9.00	-2	72
8.00	-2	74
7.00	0	78
6.00	7	83
5.00	18	88
4.00	21	90
3.00	30	111
2.90	31	114
2.80	32	116
2.70	31	115
2.60	30	119
2.50	29	121
2.40	29	125
2.30	29	132
2.20	29	140
2.10	26	149
2.00	21	155
1.90	18	158
1.80	14	166
1.70	3	182
1.60	-17	207
1.50	-20	242
1.49	-19	247
1.48	-18	254
1.47	-16	262
1.46	-11	273
1.45	-4	290
1.44	5	324
1.43	-10	650
1.42	1	448
1.41	-1	863
1.40	2	529
1.39	-18	629
1.38	R	R

GEOGRAPHIC
LAT. = -50.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-18	89
19.00	-16	88
18.00	-15	88
17.00	-14	87
16.00	-13	87
15.00	-12	86
14.00	-11	86
13.00	-10	85
12.00	-10	84
11.00	-10	84
10.00	-10	84
9.00	-10	86
8.00	-9	88
7.00	-5	92
6.00	3	95
5.00	9	95
4.00	10	99
3.00	23	108
2.90	23	108
2.80	23	109
2.70	23	111
2.60	23	113
2.50	25	116
2.40	27	120
2.30	29	123
2.20	30	126
2.10	29	127
2.00	29	130
1.90	30	136
1.80	30	144
1.70	29	150
1.60	26	154
1.50	23	165
1.40	16	176
1.30	9	186
1.20	-12	209
1.10	-23	261
1.09	-17	281
1.08	0	315
1.07	25	462
1.06	-15	348
1.05	4	484
1.04	-15	354
1.03	-5	561
1.02	-4	683
1.01	R	R

TABLE #1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -50.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-22	104
19.00	-22	104
18.00	-21	103
17.00	-20	103
16.00	-19	102
15.00	-18	102
14.00	-17	101
13.00	-17	101
12.00	-16	101
11.00	-16	101
10.00	-16	102
9.00	-15	103
8.00	-14	105
7.00	-9	108
6.00	-3	109
5.00	0	108
4.00	3	112
3.00	12	116
2.00	23	131
1.90	25	134
1.80	26	136
1.70	26	139
1.60	26	144
1.50	29	149
1.40	28	154
1.30	28	163
1.20	26	170
1.10	21	181
1.00	12	196
.90	-5	216
.80	-24	283
.79	-19	297
.78	-8	316
.77	9	399
.76	-18	368
.75	13	545
.74	12	522
.73	15	761
.72	-4	661
.71	9	480
.70	-18	1011
.69	7	399
.68	9	996
.67	18	1611
.66	R	R

GEOGRAPHIC
LAT. = -50.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-27	122
19.00	-26	122
18.00	-25	122
17.00	-24	122
16.00	-23	121
15.00	-23	121
14.00	-22	121
13.00	-21	120
12.00	-21	120
11.00	-20	121
10.00	-20	121
9.00	-19	123
8.00	-17	125
7.00	-13	127
6.00	-8	127
5.00	-6	127
4.00	-2	131
3.00	4	134
2.00	14	145
1.90	17	148
1.80	18	147
1.70	20	151
1.60	22	153
1.50	22	156
1.40	24	161
1.30	25	164
1.20	26	172
1.10	25	176
1.00	24	167
.90	20	199
.80	10	215
.70	-14	242
.60	1	454
.59	-2	726
.58	6	475
.57	15	498
.56	-1	748
.55	12	819
.54	17	3688
.53	F	F

GEOGRAPHIC
LAT. = -50.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
19.00	-29	143
18.00	-28	143
17.00	-27	143
16.00	-26	143
15.00	-25	142
14.00	-24	142
13.00	-23	142
12.00	-23	142
11.00	-22	142
10.00	-22	143
9.00	-21	144
8.00	-19	146
7.00	-16	148
6.00	-11	149
5.00	-9	149
4.00	-5	153
3.00	1	157
2.00	12	167
1.90	13	168
1.80	14	170
1.70	16	173
1.60	17	175
1.50	18	178
1.40	20	182
1.30	20	185
1.20	22	192
1.10	22	198
1.00	21	207
.90	17	218
.80	9	233
.70	-8	255
.60	8	371
.59	9	499
.58	-2	640
.57	-19	1064
.56	5	624
.55	14	43[illegible]
.54	-5	611
.53	12	1170
.52	F	F

GEOGRAPHIC
LAT. = -50.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-32	165
19.00	-30	165
18.00	-29	165
17.00	-28	165
16.00	-27	165
15.00	-26	165
14.00	-25	164
13.00	-24	164
12.00	-23	164
11.00	-22	164
10.00	-22	164
9.00	-21	166
8.00	-20	168
7.00	-18	171
6.00	-12	172
5.00	-9	173
4.00	-5	177
3.00	1	182
2.00	12	195
1.90	13	196
1.80	13	199
1.70	15	202
1.60	16	205
1.50	16	209
1.40	18	214
1.30	17	219
1.20	17	227
1.10	15	235
1.00	11	245
.90	3	259
.80	-15	284
.70	-2	377
.69	3	702
.68	-5	490
.67	2	505
.66	0	883
.65	0	570
.64	15	470
.63	4	887
.62	-2	1265
.61	R	R

GEOGRAPHIC
LAT. = -50.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-32	187
19.00	-31	187
18.00	-29	187
17.00	-28	187
16.00	-26	187
15.00	-25	187
14.00	-23	187
13.00	-22	187
12.00	-21	186
11.00	-20	186
10.00	-20	187
9.00	-20	188
8.00	-19	191
7.00	-15	194
6.00	-10	197
5.00	-6	198
4.00	-3	204
3.00	4	210
2.00	13	230
1.90	13	233
1.80	13	236
1.70	13	241
1.60	13	247
1.50	12	251
1.40	10	261
1.30	7	268
1.20	1	281
1.10	-8	296
1.00	-22	326
.99	-23	332
.98	-24	348
.97	-24	358
.96	-22	361
.95	-16	373
.94	-7	385
.93	6	399
.92	24	426
.91	14	551
.90	R	R

GEOGRAPHIC
LAT. = -50.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-31	209
19.00	-30	209
18.00	-28	209
17.00	-26	210
16.00	-25	210
15.00	-23	210
14.00	-21	209
13.00	-20	209
12.00	-18	209
11.00	-17	209
10.00	-17	209
9.00	-17	211
8.00	-16	213
7.00	-13	218
6.00	-7	222
5.00	-1	225
4.00	1	231
3.00	8	244
2.90	8	245
2.80	8	248
2.70	9	251
2.60	10	254
2.50	11	258
2.40	11	261
2.30	11	263
2.20	10	266
2.10	10	271
2.00	9	278
1.90	7	284
1.80	4	289
1.70	1	297
1.60	-5	311
1.50	-13	324
1.40	-20	352
1.30	26	445
1.29	28	497
1.28	5	694
1.27	12	541
1.26	16	496
1.25	-5	862
1.24	1	633
1.23	-16	687
1.22	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -50.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-30	230
19.00	-28	231
18.00	-26	231
17.00	-24	231
16.00	-22	232
15.00	-20	232
14.00	-18	232
13.00	-16	232
12.00	-14	232
11.00	-13	232
10.00	-12	232
9.00	-12	233
8.00	-12	236
7.00	-9	242
6.00	-2	249
5.00	4	254
4.00	5	263
3.00	9	287
2.90	8	289
2.80	7	292
2.70	7	296
2.60	6	302
2.50	4	310
2.40	1	318
2.30	-3	325
2.20	-7	332
2.10	-10	341
2.00	-15	360
1.90	-10	405
1.80	4	468
1.79	1	513
1.78	-13	565
1.77	6	491
1.76	1	479
1.75	-3	499
1.74	2	571
1.73	R	R

GEOGRAPHIC
LAT. = -50.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-25	-109
20.00	-25	-109
19.00	-24	-108
18.00	-21	-108
17.00	-19	-107
16.00	-18	-107
15.00	-16	-107
14.00	-14	-106
13.00	-13	-106
12.00	-10	-106
11.00	-9	-105
10.00	-7	-105
9.00	-7	-103
8.00	-6	-100
7.00	-4	-94
6.00	2	-85
5.90	1	-72
5.80	2	-69
5.70	2	-67
5.60	2	-54
5.50	2	-50
5.40	2	-46
5.30	2	-41
5.20	5	-35
5.10	4	-29
5.00	1	-22
4.90	-2	-15
4.80	-5	-9
4.70	-5	-2
4.60	-10	6
4.50	-12	17
4.40	-12	36
4.30	5	80
4.29	10	90
4.28	17	103
4.27	24	124
4.26	15	171
4.25	-5	235
4.24	11	185
4.23	-4	171
4.22	-2	172
4.21	2	201
4.20	3	356
4.19	-3	486
4.18	-9	157
4.17	R	R

GEOGRAPHIC
LAT. = -50.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-25	-90
19.00	-23	-89
18.00	-21	-88
17.00	-18	-87
16.00	-15	-86
15.00	-13	-85
14.00	-10	-85
13.00	-7	-84
12.00	-4	-83
11.00	-2	-82
10.00	-1	-81
9.00	3	-79
8.00	5	-75
7.00	1	-69
6.00	8	-56
5.00	11	-33
4.90	10	-30
4.80	10	-28
4.70	9	-25
4.60	8	-22
4.50	7	-20
4.40	5	-17
4.30	4	-15
4.20	3	-12
4.10	2	-9
4.00	1	-6
3.90	0	-2
3.80	-2	3
3.70	-3	9
3.60	-4	18
3.50	-6	30
3.40	-8	49
3.39	0	84
3.29	2	89
3.28	5	96
3.27	9	103
3.26	13	113
3.25	18	125
3.24	22	145
3.23	14	182
3.22	-10	322
3.21	R	R

GEOGRAPHIC
LAT. = -50.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-21	-71
19.00	-20	-69
18.00	-18	-68
17.00	-15	-67
16.00	-12	-66
15.00	-8	-65
14.00	-5	-63
13.00	-1	-61
12.00	2	-60
11.00	5	-57
10.00	7	-55
9.00	7	-52
8.00	7	-47
7.00	7	-40
6.00	10	-24
5.00	6	17
4.90	4	23
4.80	1	31
4.70	-2	39
4.60	-5	49
4.50	-7	61
4.40	-6	77
4.30	1	98
4.20	17	136
4.19	19	143
4.18	20	152
4.17	21	162
4.16	18	176
4.15	11	194
4.14	-9	224
4.13	R	R

GEOGRAPHIC
LAT. = -50.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-20	-52
19.00	-17	-51
18.00	-14	-50
17.00	-11	-48
16.00	-7	-47
15.00	-3	-45
14.00	1	-42
13.00	5	-40
12.00	9	-36
11.00	13	-32
10.00	15	-26
9.00	15	-20
8.00	13	-12
7.00	11	-3
6.00	9	19
5.90	9	23
5.80	8	27
5.70	8	32
5.60	7	37
5.50	5	44
5.40	4	52
5.30	1	62
5.20	-1	76
5.10	-3	96
5.00	4	135
4.99	6	142
4.98	9	150
4.97	11	161
4.96	13	176
4.95	12	199
4.94	-8	248
4.93	R	R

GEOGRAPHIC
LAT. = -50.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-17	-36
19.00	-14	-35
18.00	-11	-33
17.00	-7	-31
16.00	-3	-29
15.00	2	-27
14.00	7	-24
13.00	12	-20
12.00	17	-14
11.00	21	-6
10.00	22	6
9.00	19	13
8.00	11	34
7.00	3	54
6.90	3	56
6.80	2	59
6.70	1	62
6.60	1	66
6.50	0	70
6.40	0	75
6.30	-1	80
6.20	-1	87
6.10	-1	99
6.00	-1	185
5.90	0	120
5.80	5	145
5.79	5	149
5.78	6	153
5.77	7	158
5.76	8	163
5.75	9	169
5.74	10	176
5.73	10	184
5.72	10	195
5.71	9	209
5.70	3	231
5.69	-16	280
5.68	9	398
5.67	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -50.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-15	-22
19.00	-11	-21
18.00	-8	-19
17.00	-4	-17
16.00	1	-15
15.00	6	-12
14.00	12	-9
13.00	14	-4
12.00	24	4
11.00	28	16
10.00	26	34
9.00	13	57
8.90	11	60
8.80	9	63
8.70	7	66
8.60	5	69
8.50	3	72
8.40	0	76
8.30	-2	80
8.20	-4	85
8.10	-6	90
8.00	-7	95
7.90	-8	102
7.80	-9	110
7.70	-8	119
7.60	-5	131
7.50	0	145
7.40	10	160
7.30	12	221
7.29	7	233
7.28	-2	248
7.27	-10	275
7.26	-3	773
7.25	18	540
7.24	R	R

GEOGRAPHIC
LAT. = -50.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-13	-11
20.00	-9	-10
19.00	-6	-8
17.00	-2	-6
16.00	1	-4
15.00	4	-2
14.00	14	2
13.00	21	7
12.00	27	15
11.00	31	28
10.00	25	48
9.00	10	74
8.90	8	78
8.80	4	81
8.70	1	85
8.60	-2	90
8.50	-5	95
8.40	-8	101
8.30	-11	108
8.20	-12	117
8.10	-12	129
8.00	-7	144
7.90	4	166
7.89	5	169
7.88	8	172
7.87	10	176
7.86	11	180
7.85	13	184
7.84	15	189
7.83	17	195
7.82	18	202
7.81	18	211
7.80	17	221
7.79	12	234
7.78	2	250
7.77	-21	278
7.76	R	R

GEOGRAPHIC
LAT. = -50.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-11	-3
19.00	-8	-1
18.00	-5	0
17.00	-1	2
16.00	4	4
15.00	9	6
14.00	14	9
13.00	20	13
12.00	27	20
11.00	32	31
10.00	32	47
9.00	21	69
8.00	-6	101
7.90	-9	106
7.80	-12	113
7.70	-13	122
7.60	-13	132
7.50	-9	146
7.40	0	164
7.30	16	197
7.25	12	239
7.24	2	253
7.23	-19	276
7.22	6	566
7.21	3	331
7.20	2	344
7.19	R	R

GEOGRAPHIC
LAT. = -50.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-11	5
19.00	-8	6
18.00	-5	8
17.00	-1	9
16.00	3	10
15.00	8	12
14.00	13	14
13.00	18	18
12.00	24	22
11.00	30	29
10.00	33	40
9.00	32	56
8.00	20	74
7.00	-2	99
6.90	-5	103
6.80	-7	107
6.70	-9	112
6.60	-10	118
6.50	-11	125
6.40	-11	133
6.30	-9	144
6.20	-5	157
6.10	2	176
6.00	14	215
5.99	14	223
5.98	13	231
5.97	10	242
5.96	4	255
5.95	-9	275
5.94	-28	328
5.93	-6	352
5.92	24	439
5.91	R	R

GEOGRAPHIC
LAT. = -50.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-11	13
19.00	-8	14
18.00	-6	15
17.00	-2	16
16.00	1	17
15.00	5	18
14.00	10	20
13.00	15	22
12.00	20	25
11.00	25	28
10.00	30	34
9.00	33	43
8.00	31	55
7.00	24	68
6.00	13	84
5.90	12	87
5.80	10	89
5.70	9	92
5.60	7	96
5.50	6	100
5.40	4	104
5.30	2	109
5.20	0	115
5.10	-3	123
5.00	-5	133
4.90	-8	148
4.80	-7	172
4.79	-6	175
4.78	-6	179
4.77	-5	183
4.76	-4	187
4.75	-2	192
4.74	-1	197
4.73	1	204
4.72	3	212
4.71	6	221
4.70	8	234
4.69	8	252
4.68	-3	284
4.67	3	420
4.66	R	R

GEOGRAPHIC
LAT. = -50.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-12	23
19.00	-10	23
18.00	-7	24
17.00	-4	25
16.00	-1	25
15.00	3	26
14.00	7	27
13.00	11	28
12.00	15	30
11.00	20	31
10.00	25	34
9.00	28	38
8.00	30	44
7.00	29	51
6.00	26	61
5.00	22	83
4.90	21	87
4.80	20	91
4.70	18	96
4.60	16	102
4.50	14	108
4.40	10	116
4.30	4	125
4.20	-3	138
4.10	-10	157
4.00	-9	196
3.99	-7	203
3.98	-4	211
3.97	0	221
3.96	5	233
3.95	9	253
3.94	2	280
3.93	5	352
3.92	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -55.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-17	31
19.00	-15	31
18.00	-13	32
17.00	-10	32
16.00	-7	32
15.00	-4	31
14.00	-1	31
13.00	2	31
12.00	6	31
11.00	9	30
10.00	12	30
9.00	15	30
8.00	16	30
7.00	16	32
6.00	16	37
5.00	22	49
4.00	31	79
3.90	31	84
3.80	30	88
3.70	28	91
3.60	26	95
3.50	23	98
3.40	21	100
3.30	19	103
3.20	17	106
3.10	15	109
3.00	12	114
2.90	9	120
2.80	5	130
2.70	-3	145
2.60	-13	178
2.50	1	398
2.49	-11	298
2.48	1	347
2.47	-22	307
2.46	3	353
2.45	-24	307
2.44	R	R

GEOGRAPHIC
LAT. = -55.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	LONG
21.00	-14	42
19.00	-16	42
18.00	-14	42
17.00	-11	42
16.00	-9	41
15.00	-6	41
14.00	-1	40
13.00	0	40
12.00	3	39
11.00	5	38
10.00	4	38
9.00	3	37
8.00	4	37
7.00	1	38
6.00	3	43
5.00	13	53
4.00	31	71
3.90	29	80
3.80	27	95
3.70	27	102
3.60	25	111
3.50	20	121
3.40	11	131
3.30	3	142
3.20	-6	153
3.10	-11	165
3.00	-13	184
2.99	-13	187
2.98	-13	191
2.97	-13	194
2.96	-13	198
2.95	-12	203
2.94	-11	208
2.93	-10	215
2.92	-7	223
2.91	-4	234
2.90	1	248
1.99	5	273
1.38	-16	347
1.37	R	R

GEOGRAPHIC
LAT. = -55.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-18	52
19.00	-16	52
18.00	-14	52
17.00	-12	51
16.00	-10	51
15.00	-7	50
14.00	-5	49
13.00	-3	49
12.00	0	48
11.00	1	46
10.00	3	45
9.00	3	45
8.00	2	45
7.00	2	47
6.00	4	52
5.00	15	60
4.00	27	68
3.00	28	83
2.90	30	87
2.80	31	93
2.70	32	99
2.60	31	105
2.50	30	110
2.40	27	113
2.30	25	116
2.20	24	119
2.10	21	126
2.00	15	139
1.90	2	157
1.80	-13	179
1.70	-16	206
1.69	-15	210
1.68	-15	214
1.67	-14	218
1.66	-13	223
1.65	-11	230
1.64	-8	238
1.63	-4	249
1.62	1	265
1.61	5	297
1.60	7	380
1.59	8	516
1.58	-14	290
1.57	8	479
1.56	-21	315
1.55	R	R

GEOGRAPHIC
LAT. = -55.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-18	62
19.00	-17	61
18.00	-15	61
17.00	-13	60
16.00	-11	60
15.00	-10	59
14.00	-8	58
13.00	-6	57
12.00	-5	56
11.00	-4	54
10.00	-4	54
9.00	-5	53
8.00	-5	54
7.00	-5	58
6.00	0	63
5.00	12	67
4.00	18	68
3.00	26	83
2.90	28	85
2.80	30	88
2.70	30	90
2.60	30	91
2.50	30	92
2.40	25	94
2.30	29	97
2.20	30	103
2.10	31	111
2.00	31	120
1.90	28	125
1.80	25	128
1.70	21	135
1.60	15	151
1.59	1	166
1.50	-7	178
1.40	1	281
1.29	1	380
1.28	4	598
1.27	-23	554
1.26	-6	741
1.25	-18	581
1.24	12	556
1.23	-3	569
1.22	R	R

GEOGRAPHIC
LAT. = -55.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-21	72
19.00	-19	71
18.00	-18	70
17.00	-17	70
16.00	-16	69
15.00	-14	68
14.00	-13	67
13.00	-13	66
12.00	-12	65
11.00	-12	64
10.00	-13	64
9.00	-13	64
8.00	-13	66
7.00	-11	70
6.00	-4	74
5.00	5	73
4.00	6	73
3.00	19	83
2.00	28	99
1.90	28	101
1.80	30	107
1.70	32	114
1.60	31	119
1.50	30	123
1.40	29	136
1.30	25	143
1.20	18	157
1.10	5	171
1.00	-20	212
.99	-21	218
.98	-21	224
.97	-21	230
.96	-20	236
.95	-19	245
.94	-14	261
.93	0	294
.92	-11	523
.91	1	545
.90	1	433
.89	R	R

GEOGRAPHIC
LAT. = -55.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-25	83
19.00	-24	83
18.00	-23	82
17.00	-23	81
16.00	-22	80
15.00	-21	79
14.00	-21	79
13.00	-20	78
12.00	-20	77
11.00	-21	77
10.00	-21	77
9.00	-21	79
8.00	-20	81
7.00	-16	84
6.00	-10	85
5.00	-5	83
4.00	-4	85
3.00	6	87
2.00	15	97
1.90	18	99
1.80	21	101
1.70	21	101
1.60	22	104
1.50	26	103
1.40	27	110
1.30	29	116
1.20	30	121
1.10	31	131
1.00	30	139
.90	27	151
.80	19	169
.70	-5	196
.60	-1	657
.59	7	609
.58	15	847
.57	-8	651
.56	7	499
.55	10	431
.54	10	1890
.53	-6	1005
.52	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -55.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-31	98
19.00	-30	97
18.00	-30	97
17.00	-29	96
16.00	-29	96
15.00	-28	95
14.00	-28	94
13.00	-28	94
12.00	-28	94
11.00	-28	94
10.00	-28	95
9.00	-27	96
8.00	-25	98
7.00	-22	100
6.00	-17	99
5.00	-15	98
4.00	-12	101
3.00	-6	101
2.00	5	107
1.90	7	107
1.80	7	107
1.70	8	109
1.60	11	110
1.50	12	111
1.40	14	113
1.30	16	114
1.20	18	117
1.10	20	119
1.00	24	123
.90	26	129
.80	28	136
.70	30	147
.60	28	163
.50	16	187
.40	-28	260
.39	-11	305
.38	14	407
.37	-13	1033
.36	-4	597
.35	9	899
.34	4	2576
.33	F	F

GEOGRAPHIC
LAT. = -55.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-36	116
20.00	-36	116
19.00	-35	115
18.00	-35	115
17.00	-35	115
16.00	-34	115
15.00	-34	114
14.00	-34	114
13.00	-33	114
12.00	-33	114
11.00	-33	114
10.00	-33	115
9.00	-32	117
8.00	-30	118
7.00	-26	119
6.00	-23	118
5.00	-22	118
4.00	-19	121
3.00	-14	121
2.00	-4	124
1.90	-4	124
1.80	-3	126
1.70	-1	127
1.60	0	126
1.50	1	128
1.40	4	129
1.30	5	130
1.20	8	131
1.10	10	133
1.00	12	135
.90	15	137
.80	19	141
.70	21	146
.60	25	153
.50	28	166
.40	23	186
.30	-10	233
.29	-20	245
.28	-30	265
.27	-23	309
.26	-2	364
.25	19	886
.24	2	797
.23	-11	2469
.22	F	F

GEOGRAPHIC
LAT. = -55.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-40	137
19.00	-40	137
18.00	-39	137
17.00	-38	137
16.00	-38	137
15.00	-37	137
14.00	-37	136
13.00	-38	136
12.00	-36	136
11.00	-35	137
10.00	-35	137
9.00	-34	138
8.00	-32	140
7.00	-30	141
6.00	-27	141
5.00	-25	141
4.00	-21	143
3.00	-17	145
2.00	-9	148
1.90	-8	148
1.80	-7	149
1.70	-5	150
1.60	-5	150
1.50	-3	151
1.40	-1	152
1.30	0	153
1.20	2	154
1.10	4	156
1.00	6	158
.90	9	160
.80	12	163
.70	15	168
.60	19	174
.50	22	183
.40	23	201
.30	8	235
.29	3	240
.28	-3	247
.27	-10	254
.26	-20	266
.25	-31	289
.24	-28	338
.23	1	566
.22	8	612
.21	19	459
.20	R	R

GEOGRAPHIC
LAT. = -55.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-42	160
19.00	-41	160
18.00	-41	160
17.00	-40	160
16.00	-39	160
15.00	-38	160
14.00	-37	160
13.00	-37	160
12.00	-36	160
11.00	-35	160
10.00	-35	160
9.00	-34	161
8.00	-33	163
7.00	-31	165
6.00	-27	165
5.00	-25	165
4.00	-22	168
3.00	-17	170
2.00	-9	175
1.90	-8	175
1.80	-7	176
1.70	-5	177
1.60	-4	178
1.50	-3	179
1.40	-1	180
1.30	0	182
1.20	2	183
1.10	5	186
1.00	7	188
.90	9	192
.80	12	195
.70	15	201
.60	17	210
.50	18	224
.40	11	247
.39	10	250
.38	7	254
.37	5	258
.36	2	262
.35	-2	266
.34	-7	272
.33	-12	279
.32	-19	289
.31	-26	302
.30	-30	326
.29	-10	369
.28	14	418
.27	R	R

GEOGRAPHIC
LAT. = -55.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-43	183
19.00	-42	184
18.00	-40	184
17.00	-39	184
16.00	-38	184
15.00	-37	184
14.00	-36	183
13.00	-35	183
12.00	-34	183
11.00	-34	183
10.00	-33	183
9.00	-33	184
8.00	-32	186
7.00	-29	189
6.00	-25	190
5.00	-22	190
4.00	-19	194
3.00	-14	197
2.00	-4	204
1.90	-4	205
1.80	-3	206
1.70	-1	208
1.60	1	209
1.50	2	211
1.40	4	213
1.30	5	215
1.20	7	218
1.10	9	223
1.00	11	227
.90	12	233
.80	14	241
.70	13	252
.60	8	270
.50	-10	300
.49	-13	305
.48	-17	312
.47	-20	319
.46	-23	329
.45	-25	343
.44	-23	362
.43	-3	392
.42	-8	693
.41	15	792
.40	R	R

GEOGRAPHIC
LAT. = -55.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-41	206
19.00	-40	207
18.00	-39	207
17.00	-38	207
16.00	-36	207
15.00	-35	207
14.00	-33	206
13.00	-32	206
12.00	-31	206
11.00	-31	205
10.00	-30	206
9.00	-30	207
8.00	-29	209
7.00	-26	213
6.00	-21	215
5.00	-17	215
4.00	-15	220
3.00	-8	224
2.00	3	237
1.90	4	238
1.80	4	240
1.70	6	244
1.60	8	247
1.50	8	249
1.40	10	255
1.30	10	259
1.20	11	266
1.10	10	273
1.00	8	283
.90	3	297
.80	-8	321
.70	-18	380
.69	-11	396
.68	10	423
.67	4	732
.66	8	480
.65	9	474
.64	8	619
.63	-18	634
.62	8	629
.61	-5	928
.60	-16	3551
.59	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -55.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-39	228
19.00	-38	229
18.00	-36	229
17.00	-35	229
16.00	-33	229
15.00	-31	229
14.00	-30	229
13.00	-28	228
12.00	-27	228
11.00	-26	228
10.00	-26	228
9.00	-25	229
8.00	-25	231
7.00	-22	236
6.00	-16	239
5.00	-10	241
4.00	-8	246
3.00	0	254
2.00	9	270
1.90	9	282
1.80	9	285
1.70	8	291
1.60	8	299
1.50	6	306
1.40	3	318
1.30	-3	338
1.20	-10	350
1.10	-15	391
1.09	-13	398
1.08	-9	407
1.07	-3	420
1.06	11	439
1.05	27	495
1.04	18	571
1.03	6	511
1.02	-17	720
1.01	-20	606
1.00	-4	539
.99	R	R

GEOGRAPHIC
LAT. = -55.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
21.00	-37	-111
20.00	-35	-110
19.00	-33	-110
18.00	-31	-110
17.00	-29	-110
16.00	-27	-110
15.00	-25	-110
14.00	-23	-110
13.00	-21	-110
12.00	-22	-110
11.00	-20	-111
10.00	-20	-111
9.00	-18	-110
8.00	-18	-107
7.00	-16	-102
6.00	-10	-97
5.00	-8	-93
4.00	-5	-86
3.00	5	-69
2.90	7	-67
2.80	7	-65
2.70	8	-62
2.60	5	-58
2.50	4	-52
2.40	4	-47
2.30	4	-42
2.20	6	-38
2.10	5	-33
2.00	3	-24
1.90	-1	-11
1.80	-4	4
1.70	-11	20
1.60	-7	61
1.59	-3	70
1.58	3	81
1.57	12	47
1.56	24	125
1.55	-21	262
1.54	7	223
1.53	4	130
1.52	-1	171
1.51	-5	328
1.50	1	143
1.49	-14	358
1.48	R	R

GEOGRAPHIC
LAT. = -55.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-34	-91
19.00	-32	-90
18.00	-30	-90
17.00	-27	-89
16.00	-25	-89
15.00	-23	-89
14.00	-20	-89
13.00	-18	-89
12.00	-16	-89
11.00	-14	-89
10.00	-13	-89
9.00	-12	-88
8.00	-12	-85
7.00	-10	-80
6.00	-3	-73
5.00	6	-63
4.00	7	-54
3.90	7	-52
3.80	7	-50
3.70	8	-47
3.60	9	-44
3.50	9	-40
3.40	10	-36
3.30	11	-31
3.20	10	-27
3.10	9	-22
3.00	8	-18
2.90	6	-14
2.80	4	-10
2.70	3	-5
2.60	2	2
2.50	-1	13
2.40	-5	31
2.30	-8	61
2.29	-8	65
2.28	-7	70
2.27	-5	74
2.26	-4	79
2.25	-1	85
2.24	1	91
2.23	5	98
2.22	9	105
2.21	15	115
2.20	20	129
2.19	23	149
2.18	14	184
2.17	-7	520
2.16	R	R

GEOGRAPHIC
LAT. = -55.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-30	-72
19.00	-29	-71
18.00	-27	-70
17.00	[illegible]	-70
16.00	-23	-69
15.00	-17	[illegible]
14.00	-14	-68
13.00	-11	-68
12.00	-8	-68
11.00	-6	-67
10.00	-4	-66
9.00	-4	-65
8.00	-5	-63
7.00	-2	-57
6.00	4	-47
5.00	13	-30
4.00	10	-4
3.00	4	-7
2.90	9	-4
2.80	8	0
2.70	6	5
2.60	7	11
2.50	5	19
2.40	3	29
2.30	-1	43
2.20	-5	61
2.10	-2	96
2.09	0	103
2.08	2	108
2.07	5	114
2.06	6	122
2.05	12	133
2.04	16	142
2.03	20	159
2.02	17	185
2.01	-19	249
2.00	-10	341
2.99	R	R

GEOGRAPHIC
LAT. = -55.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-27	-54
19.00	-24	-53
18.00	-21	-52
17.00	-18	-51
16.00	-15	-51
15.00	-11	-50
14.00	-7	-49
13.00	-4	-48
12.00	0	-47
11.00	3	-45
10.00	6	-43
9.00	7	-41
8.00	7	-37
7.00	7	-32
6.00	11	-19
5.00	16	11
4.90	15	15
4.80	14	20
4.70	13	24
4.60	12	26
4.50	10	31
4.40	7	37
4.30	4	44
4.20	1	51
4.10	-2	58
4.00	-4	67
3.90	-5	77
3.80	-4	89
3.70	-1	104
3.60	6	129
3.59	8	133
3.58	9	137
3.57	10	142
3.56	12	148
3.55	13	154
3.54	15	162
3.53	15	172
3.52	15	185
3.51	11	203
3.50	-3	233
3.49	R	R

GEOGRAPHIC
LAT. = -55.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-23	-38
19.00	-20	-37
18.00	-17	-36
17.00	-13	-35
16.00	-9	-34
15.00	-5	-3
14.00	-1	-31
13.00	4	-29
12.00	9	-27
11.00	13	-24
10.00	16	-13
9.00	17	-14
8.00	17	-8
7.00	15	0
6.00	15	16
5.90	15	18
5.80	15	21
5.70	15	24
5.60	15	25
5.50	15	32
5.40	14	37
5.30	14	43
5.20	12	49
5.10	10	57
5.00	7	65
4.90	2	77
4.80	-2	92
4.70	-5	117
4.69	-5	121
4.68	-4	125
4.67	-4	129
4.66	-3	134
4.65	-2	133
4.64	0	145
4.63	2	152
4.62	5	160
4.61	8	170
4.60	12	184
4.59	14	206
4.58	-2	253
4.57	11	462
4.56	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -55.00 LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-20	-24
19.00	-16	-23
18.00	-13	-22
17.00	-9	-21
16.00	-5	-20
15.00	0	-19
14.00	5	-17
13.00	10	-14
12.00	16	-11
11.00	21	-6
10.00	25	2
9.00	25	12
8.00	21	24
7.00	15	36
6.90	14	38
6.80	14	40
6.70	13	41
6.60	13	43
6.50	12	45
6.40	12	47
6.30	11	49
6.20	11	52
6.10	10	55
6.00	10	58
5.90	9	62
5.80	8	67
5.70	7	72
5.60	5	78
5.50	3	86
5.40	1	95
5.30	-2	109
5.20	-4	138
5.10	4	178
5.09	6	186
5.08	9	199
5.07	10	219
5.06	8	257
5.05	10	547
5.04	R	R

GEOGRAPHIC LAT. = -55.00 LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-17	-13
19.00	-14	-12
18.00	-10	-11
17.00	-7	-10
16.00	-2	-9
15.00	1	-8
14.00	5	-6
13.00	14	-3
12.00	20	1
11.00	25	7
10.00	29	16
9.00	29	30
8.00	21	45
7.00	10	62
6.90	9	64
6.80	8	66
6.70	7	69
6.60	6	71
6.50	5	74
6.40	4	77
6.30	3	81
6.20	2	85
6.10	1	89
6.00	0	94
5.90	-1	101
5.80	-3	108
5.70	-4	119
5.60	-4	133
5.50	-2	155
5.49	-1	158
5.48	0	161
5.47	0	165
5.46	1	169
5.45	2	174
5.44	4	179
5.43	5	185
5.42	6	192
5.41	8	200
5.40	9	211
5.39	9	225
5.38	4	247
5.37	-17	298
5.36	18	524
5.35	R	R

GEOGRAPHIC LAT. = -55.00 LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-16	-4
19.00	-13	-1
18.00	-9	-3
17.00	-6	-2
16.00	-1	-1
15.00	3	1
14.00	8	2
13.00	14	4
12.00	20	7
11.00	26	13
10.00	30	21
9.00	31	32
8.00	25	47
7.00	14	63
6.90	13	64
6.80	12	66
6.70	11	68
6.60	10	71
6.50	9	73
6.40	7	75
6.30	6	78
6.20	5	81
6.10	4	85
6.00	3	89
5.90	1	93
5.80	0	99
5.70	-1	105
5.60	-3	113
5.50	-4	123
5.40	-5	136
5.30	-3	162
5.29	-2	165
5.28	-2	168
5.27	-1	172
5.26	0	177
5.25	2	182
5.24	3	188
5.23	5	194
5.22	6	202
5.21	8	212
5.20	9	226
5.19	6	246
5.18	-9	284
5.17	-3	346
5.16	R	R

GEOGRAPHIC LAT. = -55.00 LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-15	4
19.00	-12	4
18.00	-9	5
17.00	-6	6
16.00	-2	7
15.00	2	8
14.00	7	9
13.00	12	10
12.00	18	12
11.00	24	15
10.00	28	20
9.00	31	28
8.00	30	38
7.00	24	49
6.00	17	65
5.90	16	68
5.80	15	70
5.70	14	73
5.60	13	76
5.50	12	80
5.40	11	84
5.30	9	89
5.20	7	95
5.10	5	102
5.00	2	111
4.90	-2	123
4.80	-7	140
4.70	-6	173
4.69	-5	178
4.68	-3	184
4.67	-1	191
4.66	1	199
4.65	4	210
4.64	8	224
4.63	9	247
4.62	-11	296
4.61	-2	344
4.60	5	464
4.59	2	382
4.58	-12	254
4.57	-7	368
4.56	-16	335
4.55	R	R

GEOGRAPHIC LAT. = -55.00 LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-16	12
19.00	-13	13
18.00	-10	13
17.00	-7	14
16.00	-4	14
15.00	0	15
14.00	4	15
13.00	9	16
12.00	14	17
11.00	19	18
10.00	23	21
9.00	27	24
8.00	28	29
7.00	27	36
6.00	24	46
5.90	24	48
5.80	24	49
5.70	24	51
5.60	23	53
5.50	23	55
5.40	23	58
5.30	23	61
5.20	23	64
5.10	22	67
5.00	22	71
4.90	21	76
4.80	20	81
4.70	19	87
4.60	16	94
4.50	13	101
4.40	7	111
4.30	0	122
4.29	-8	140
4.18	-11	174
4.09	-10	179
4.08	-8	185
4.07	-5	192
4.06	-2	200
4.05	3	210
4.04	8	224
4.03	12	247
4.02	-7	292
4.01	-16	329
4.00	R	R

GEOGRAPHIC LAT. = -55.00 LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-16	21
19.00	-14	21
18.00	-12	22
17.00	-9	22
16.00	-6	22
15.00	-2	22
14.00	1	23
13.00	5	23
12.00	9	23
11.00	14	23
10.00	18	24
9.00	21	25
8.00	23	27
7.00	23	30
6.00	22	37
5.00	25	53
4.90	26	56
4.80	26	60
4.70	27	63
4.60	28	67
4.50	28	72
4.40	28	77
4.30	27	83
4.20	25	89
4.10	22	95
4.00	19	102
3.90	13	109
3.80	7	117
3.70	0	125
3.60	-8	136
3.50	-13	152
3.40	-11	176
3.30	7	218
3.29	10	225
3.28	12	235
3.27	12	248
3.26	8	265
3.25	-7	291
3.24	20	938
3.23	9	427
3.22	2	432
3.21	3	339
3.20	-10	351
3.19	9	375
3.18	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -60.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-22	29
19.00	-20	29
18.00	-17	29
17.00	-15	29
16.00	-12	28
15.00	-10	28
14.00	-7	27
13.00	-4	26
12.00	-1	25
11.00	2	24
10.00	4	22
9.00	5	21
8.00	5	21
7.00	5	22
6.00	5	27
5.00	14	36
4.00	29	51
3.00	27	69
2.90	28	74
2.80	28	81
2.70	27	90
2.60	24	100
2.50	18	109
2.40	10	118
2.30	4	125
2.20	-1	133
2.10	-6	145
2.00	-12	177
1.99	-11	183
1.98	-11	191
1.97	-9	201
1.96	-5	214
1.95	2	233
1.94	7	270
1.93	-3	352
1.92	-3	381
1.91	R	R

GEOGRAPHIC
LAT. = -60.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
11.00	-1	10
3.00	-1	29
1.00	-1	28
7.00	-2	30
6.00	-1	15
5.00	10	42
4.00	23	48
3.00	2.	60
2.90	27	64
2.80	29	68
2.70	31	74
2.60	32	79
2.50	31	84
2.40	30	87
2.30	29	89
2.20	27	92
2.10	26	98
2.00	2.	109
1.90	15	124
1.80	5	138
1.70	-4	149
1.60	-11	170
1.55	-12	208
1.54	-7	224
1.53	2	251
1.52	-13	377
1.51	24	433
1.50	-11	349
1.49	-22	288
1.48	13	198
1.47	2	R

GEOGRAPHIC
LAT. = -60.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-7	38
9.00	-8	37
8.00	-9	37
7.00	-9	40
6.00	-5	45
5.00	6	49
4.00	14	49
3.00	20	60
2.90	23	62
2.80	25	64
2.70	27	66
2.60	28	68
2.50	28	69
2.40	27	69
2.30	27	71
2.20	26	75
2.10	30	82
2.00	32	90
1.90	31	95
1.80	29	99
1.70	28	103
1.60	26	116
1.50	17	131
1.40	10	139
1.30	-3	161
1.20	1	255
1.10	-4	908
1.09	-6	646
1.08	-1	693
1.07	-11	441
1.06	-13	299
1.05	1	1864
1.04	8	406
1.03	3	877
1.02	R	R

GEOGRAPHIC
LAT. = -60.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-14	46
9.00	-15	46
8.00	-16	47
7.00	-15	51
6.00	-10	55
5.00	1	56
4.00	4	54
3.00	14	63
2.90	17	70
2.80	20	77
2.70	22	74
2.60	24	77
2.50	29	86
2.40	32	93
2.30	31	99
2.20	31	103
2.10	30	116
2.00	27	127
1.90	17	141
1.80	5	158
.90	-10	197
.89	-18	210
.88	-16	232
.87	2	276
.86	4	363
.85	-7	528
.84	15	561
.83	12	423
.82	4	646
.81	R	R

GEOGRAPHIC
LAT. = -60.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-23	56
9.00	-24	57
8.00	-24	60
7.00	-21	63
6.00	-14	65
5.00	-7	63
4.00	-8	61
3.00	4	66
2.90	12	72
2.80	13	74
2.70	17	72
2.60	20	77
2.50	19	78
2.40	21	82
2.30	26	85
2.20	25	87
2.10	30	94
2.00	30	99
1.90	32	108
.90	31	121
.89	27	135
.88	15	156
.87	-18	203
.86	-21	223
.85	-9	264
.84	-7	367
.83	15	517
.82	10	381
.81	R	R

GEOGRAPHIC
LAT. = -60.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-32	70
9.00	-32	72
8.00	-31	74
7.00	-27	77
6.00	-21	78
5.00	-19	73
4.00	-18	76
3.00	-18	75
2.00	-2	80
1.90	1	80
1.80	3	80
1.70	2	80
1.60	5	82
1.50	8	82
1.40	8	83
1.30	12	85
1.20	12	86
1.10	17	88
1.00	19	91
.90	22	94
.80	26	100
.70	29	106
.60	32	117
.50	31	138
.40	12	170
.39	7	177
.38	3	181
.37	-6	189
.36	-11	197
.35	-20	210
.34	-25	242
.33	7	313
.32	10	442
.31	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -60.00
LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-39	88
9.00	-38	90
8.00	-37	92
7.00	-33	93
6.00	-29	91
5.00	-29	89
4.00	-26	92
3.00	-22	95
2.00	-13	93
1.90	-12	92
1.80	-13	93
1.70	-11	94
1.60	-9	94
1.50	-9	95
1.40	-8	95
1.30	-8	94
1.20	-3	96
1.10	-2	96
1.00	1	96
.90	3	97
.80	6	99
.70	11	101
.60	15	104
.50	20	108
.40	27	117
.30	33	137
.20	9	190
.19	-4	201
.18	-22	221
.17	18	328
.16	-24	629
.15	-14	676
.14	F	F

GEOGRAPHIC
LAT. = -60.00
LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-44	109
9.00	-41	110
8.00	-41	112
7.00	-39	112
6.00	-37	110
5.00	-36	110
4.00	-33	112
3.00	-30	117
2.00	-24	112
1.90	-24	112
1.80	-23	113
1.70	-21	113
1.60	-21	113
1.50	-20	114
1.40	-19	113
1.30	-17	114
1.20	-16	114
1.10	-14	115
1.00	-12	115
.90	-10	116
.80	-5	116
.70	-5	117
.60	-1	118
.50	1	120
.40	6	122
.30	16	127
.20	24	140
.19	23	142
.18	31	144
.17	32	149
.16	33	153
.15	34	159
.14	35	164
.13	34	174
.12	31	185
.11	24	198
.10	6	216
.09	-24	365
.08	-11	3926
.07	F	F

GEOGRAPHIC
LAT. = -60.00
LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-47	132
9.00	-46	133
8.00	-45	134
7.00	-43	135
6.00	-41	134
5.00	-40	135
4.00	-37	136
3.00	-35	137
2.00	-29	138
1.90	-29	138
1.80	-28	139
1.70	-27	138
1.60	-26	139
1.50	-25	139
1.40	-24	139
1.30	-23	140
1.20	-22	140
1.10	-20	140
1.00	-19	141
.90	-17	141
.80	-15	142
.70	-12	143
.60	-10	144
.50	-6	145
.40	-1	147
.30	6	150
.20	16	158
.19	18	159
.18	19	161
.17	21	162
.16	22	163
.15	24	166
.14	26	169
.13	28	174
.12	30	178
.11	31	185
.10	33	190
.09	33	202
.08	26	221
.07	3	248
.06	6	721
.05	F	F

GEOGRAPHIC
LAT. = -60.00
LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-48	157
9.00	-47	158
8.00	-46	159
7.00	-45	160
6.00	-42	160
5.00	-41	161
4.00	-38	163
3.00	-35	164
2.00	-29	166
1.90	-29	166
1.80	-28	167
1.70	-27	167
1.60	-26	167
1.50	-25	168
1.40	-24	168
1.30	-23	169
1.20	-22	169
1.10	-20	170
1.00	-18	171
.90	-17	171
.80	-15	173
.70	-12	174
.60	-9	175
.50	-5	177
.40	0	180
.30	7	186
.20	18	198
.19	19	200
.18	20	203
.17	21	206
.16	22	210
.15	23	215
.14	24	220
.13	24	228
.12	22	237
.11	20	246
.10	9	264
.09	-37	319
.08	-12	611
.07	F	F

GEOGRAPHIC
LAT. = -60.00
LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-46	181
9.00	-46	182
8.00	-45	184
7.00	-43	186
6.00	-40	187
5.00	-38	187
4.00	-36	190
3.00	-32	191
2.00	-25	195
1.90	-24	195
1.80	-24	196
1.70	-22	196
1.60	-21	197
1.50	-20	198
1.40	-19	198
1.30	-17	199
1.20	-16	200
1.10	-14	201
1.00	-12	203
.90	-10	204
.80	-7	206
.70	-4	208
.60	0	212
.50	4	217
.40	9	224
.30	15	239
.20	5	283
.19	0	292
.18	-10	305
.17	-24	329
.16	6	406
.15	-24	1003
.14	0	2507
.13	F	F

GEOGRAPHIC
LAT. = -60.00
LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-43	205
9.00	-43	206
8.00	-42	208
7.00	-40	211
6.00	-36	212
5.00	-33	212
4.00	-31	219
3.00	-26	217
2.00	-16	223
1.90	-16	223
1.80	-15	225
1.70	-13	226
1.60	-12	227
1.50	-11	228
1.40	-9	229
1.30	-8	231
1.20	-5	232
1.10	-3	235
1.00	1	236
.90	1	241
.80	5	246
.70	7	252
.60	10	261
.50	11	276
.40	4	303
.30	1	307
.20	-1	312
.19	-4	317
.18	-7	323
.17	-11	331
.16	-16	341
.15	-20	354
.14	-21	374
.13	-6	409
.12	13	556
.11	4	751
.10	13	909
.09	3	911
.08	F	F

TABLE A1 (CONTD)

ASYMPTOTIC DIRECTIONS FOR NORTH GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -60.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.10	-38	227
9.00	-38	228
8.00	-37	230
7.00	-35	234
6.00	-30	236
5.00	-26	236
4.00	-24	240
3.00	-17	243
2.0,	-6	253
1.90	-5	254
1.80	-4	255
1.70	-3	258
1.60	0	261
1.50	0	261
1.40	3	265
1.30	4	268
1.20	6	273
1.10	7	278
1.00	9	284
.90	9	294
.80	8	307
.70	1	317
.60	-14	378
.59	-15	381
.58	-15	394
.57	-12	406
.56	-3	423
.55	28	463
.54	-4	572
.53	7	497
.52	4	960
.51	12	856
.50	-17	1020
.49	-2	1786
.48	-11	956
.47	F	F

GEOGRAPHIC
LAT. = -60.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
11.00	-32	-112
9.00	-32	-111
8.00	-31	-109
7.00	-29	-105
6.00	-23	-102
5.00	-17	-101
4.00	-15	-97
3.00	-9	-90
2.00	5	-73
1.90	7	-69
1.80	7	-67
1.70	7	-63
1.60	9	-57
1.50	9	-52
1.40	9	-45
1.30	9	-35
1.20	9	-25
1.10	0	-8
1.00	-17	23
.90	-11	26
.80	-11	30
.70	-11	34
.60	-11	39
.59	-11	47
.58	-9	57
.57	-5	71
.56	5	89
.55	21	118
.54	-24	254
.53	1	409
.52	9	136
.51	-7	180
.50	-12	246
.49	R	R

GEOGRAPHIC
LAT. = -60.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-26	-92
9.00	-24	-91
8.00	-24	-89
7.00	-22	-86
6.00	-15	-80
5.00	-7	-72
4.00	5	-71
3.00	6	-[illegible]
2.90	8	-58
2.80	6	-56
2.70	6	-54
2.60	7	-51
2.50	9	-47
2.40	10	-42
2.30	11	-38
2.20	11	-35
2.10	10	-32
2.00	10	-26
1.90	10	-17
1.80	7	-7
1.70	4	1
1.60	1	14
1.50	-7	42
1.40	-4	80
1.39	-1	87
1.38	2	95
1.37	7	106
1.36	15	123
1.35	21	163
1.34	13	358
1.33	10	438
1.32	-2	299
1.31	-15	231
1.30	-21	683
1.29	R	R

GEOGRAPHIC
LAT. = -60.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-16	-72
9.00	-16	-71
8.00	-15	-70
7.00	-13	-65
6.00	-7	-59
5.00	3	-52
4.00	6	-46
3.00	14	-17
2.90	13	-14
2.80	12	-11
2.70	11	-7
2.60	11	-3
2.50	10	3
2.40	9	13
2.30	9	26
2.20	-1	42
2.10	-5	58
2.00	-5	79
1.90	18	162
1.89	-2	225
1.88	-14	971
1.87	13	436
1.86	-18	279
1.85	[illegible]	236
1.84	-5	372
1.83	-21	300
1.82	R	R

GEOGRAPHIC
LAT. = 70.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-34	-54
19.00	-31	-55
18.00	-29	-51
17.00	-26	-51
16.00	-23	-53
15.00	-20	-53
14.00	-17	-52
13.00	-14	-51
12.00	-11	-53
11.00	-8	-53
10.00	-6	-52
9.00	-5	-52
8.00	-5	-50
7.00	-4	-46
6.00	1	-38
5.00	13	-24
4.90	14	-7
3.90	14	-6
3.80	14	-4
3.70	14	-1
3.60	14	2
3.50	14	6
3.40	14	11
3.30	13	18
3.20	12	26
3.10	10	36
3.00	5	48
2.90	-1	62
2.70	-4	101
2.60	7	137
2.59	9	143
2.58	12	150
2.57	14	159
2.56	16	171
2.55	16	188
2.54	8	215
2.53	15	392
2.52	[illegible]	498
2.51	4	399
2.50	-3	261
2.49	-6	373
2.48	-5	218
2.47	R	R

GEOGRAPHIC
LAT. = -60.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-29	-53
19.00	-26	-52
18.00	-24	-38
17.00	-20	-37
16.00	-17	-37
15.00	-13	-37
14.00	-9	-36
13.00	-5	-36
12.00	-2	-36
11.00	2	-35
10.00	5	-34
9.00	6	-32
8.00	6	-33
7.00	6	-25
6.00	10	-16
5.00	20	7
4.90	9	48
3.90	7	52
3.80	5	57
3.70	3	62
3.60	2	68
3.50	0	77
3.40	-2	83
3.30	-3	111
3.29	-3	114
3.28	-3	118
3.27	-2	122
3.26	-2	126
3.25	-1	131
3.24	0	136
3.23	1	143
3.22	4	151
3.21	6	160
3.20	9	174
3.19	12	193
3.18	6	232
3.17	-2	389
3.16	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -60.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-25	-25
19.00	-22	-25
18.00	-19	-25
17.00	-16	-24
16.00	-12	-24
15.00	-8	-23
14.00	-3	-23
13.00	1	-22
12.00	6	-21
11.00	10	-20
10.00	14	-17
9.00	16	-14
8.00	16	-10
7.00	15	-4
6.00	16	7
5.90	17	9
5.80	17	11
5.70	18	13
5.60	19	16
5.50	19	18
5.40	20	21
5.30	21	25
5.20	21	29
5.10	21	33
5.00	21	38
4.90	20	44
4.80	19	50
4.70	16	57
4.60	13	65
4.50	8	73
4.40	2	84
4.30	-4	97
4.20	-8	117
4.10	-1	151
4.09	1	156
4.08	3	161
4.07	6	168
4.06	9	176
4.05	13	184
4.04	15	199
4.03	14	218
4.02	8	250
4.01	-3	412
4.00	12	898
3.99	R	R

GEOGRAPHIC
LAT. = -60.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-22	-15
19.00	-19	-14
18.00	-15	-14
17.00	-13	-13
16.00	-9	-13
15.00	-4	-13
14.00	0	-12
13.00	5	-11
12.00	10	-10
11.00	15	-8
10.00	20	-5
9.00	22	-1
8.00	22	5
7.00	20	12
6.00	19	24
5.90	19	60
5.80	17	67
5.70	13	75
5.60	9	84
5.50	5	95
5.40	5	111
5.30	-3	139
5.20	-9	143
5.10	-8	148
5.00	-7	153
4.90	-5	159
4.80	-3	165
4.70	0	172
4.60	4	182
4.50	9	193
4.40	13	211
4.30	11	241
4.29	11	834
4.25	R	R

GEOGRAPHIC
LAT. = -60.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-21	-6
19.00	-18	-5
18.00	-15	-5
17.00	-11	-5
16.00	-7	-4
15.00	-3	-4
14.00	1	-4
13.00	6	-3
12.00	11	-2
11.00	17	-1
10.00	21	2
9.00	24	6
8.00	24	11
7.00	22	18
6.00	21	30
5.90	21	32
5.80	21	34
5.70	21	36
5.60	21	39
5.50	21	42
5.40	22	45
5.30	22	49
5.20	22	53
5.10	21	57
5.00	20	63
4.90	19	69
4.80	17	76
4.70	14	84
4.60	9	93
4.50	2	105
4.40	-6	122
4.30	-10	154
4.29	-9	159
4.28	-7	164
4.27	-5	171
4.26	-2	178
4.25	2	187
4.24	7	198
4.23	12	214
4.22	13	241
4.21	-20	323
4.20	R	R

GEOGRAPHIC
LAT. = -60.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-20	3
19.00	-17	3
18.00	-14	3
17.00	-11	3
16.00	-8	3
15.00	-4	4
14.00	0	4
13.00	5	4
12.00	10	4
11.00	14	5
10.00	19	6
9.00	22	8
8.00	23	12
7.00	22	17
6.00	21	26
5.90	24	51
5.80	25	56
5.70	24	61
5.60	24	66
5.50	22	73
5.40	20	80
5.30	16	88
5.20	10	96
5.10	3	107
5.00	-6	121
4.90	-12	143
4.80	3	192
4.70	5	220
4.60	-9	375
4.50	13	487
4.40	-2	219
4.30	-16	613
4.20	-5	225
4.10	-18	281
4.09	8	589
4.08	-11	295
4.07	R	R

GEOGRAPHIC
LAT. = -60.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-20	11
19.00	-16	11
18.00	-15	11
17.00	-12	11
16.00	-9	11
15.00	-6	11
14.00	-2	11
13.00	2	10
12.00	6	10
11.00	11	10
10.00	14	10
9.00	17	11
8.00	19	12
7.00	18	15
6.00	18	22
5.00	24	40
4.00	20	87
3.90	15	93
3.80	10	99
3.70	4	106
3.60	-1	113
3.50	-6	122
3.40	-9	133
3.30	-10	147
3.20	-7	168
3.10	8	213
3.09	10	223
3.08	10	237
3.07	7	257
3.06	-13	295
3.05	0	343
3.04	R	R

GEOGRAPHIC
LAT. = -60.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	LONG
20.00	-21	20
19.00	-19	20
18.00	-16	20
17.00	-14	20
16.00	-11	19
15.00	-8	19
14.00	-4	18
13.00	-1	18
12.00	3	17
11.00	6	16
10.00	9	15
9.00	11	15
8.00	12	15
7.00	12	17
6.00	12	22
5.00	19	35
4.00	31	63
3.90	30	66
3.80	29	70
3.70	28	73
3.60	26	76
3.50	25	78
3.40	23	81
3.30	21	83
3.20	20	86
3.10	18	90
3.00	16	95
2.90	13	103
2.80	8	114
2.70	-1	131
2.60	-12	165
2.59	-12	171
2.58	-11	179
2.57	-10	187
2.56	-7	197
2.55	-2	209
2.54	5	227
2.53	10	288
2.52	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -65.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-5	15
9.00	-5	14
8.00	-6	13
7.00	-7	15
6.00	-5	20
5.00	6	27
4.00	16	30
3.00	22	42
2.90	24	46
2.80	27	50
2.70	29	54
2.60	30	58
2.50	30	61
2.40	29	63
2.30	28	65
2.20	27	69
2.10	28	76
2.08	27	68
1.90	21	101
1.80	13	110
1.70	8	117
1.60	0	134
1.50	-4	212
1.49	7	242
1.48	-22	804
1.47	-11	290
1.46	-2	255
1.45	1	339
1.44	-22	272
1.43	-2	424
1.42	-24	297
1.41	-3	505
1.40	R	R

GEOGRAPHIC
LAT. = -65.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
11.00	-11	23
10.00	-11	21
9.00	-12	21
8.00	-13	24
7.00	-10	29
6.00	1	33
5.00	10	32
4.00	15	42
3.00	30	66
2.90	31	72
2.80	30	75
2.70	29	79
2.60	24	91
2.50	20	105
2.40	14	111
2.30	13	129
2.20	-11	163
2.19	-12	166
2.18	-12	168
2.17	-13	172
2.16	-13	176
2.15	-13	181
2.14	-13	188
2.13	-12	199
2.12	-7	216
2.11	4	251
2.10	R	R

GEOGRAPHIC
LAT. = -65.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
13.00	-17	30
12.00	-18	30
11.00	-19	30
10.00	-19	34
9.00	-14	36
8.00	-4	40
7.00	0	36
6.00	9	45
5.00	24	56
4.90	24	56
4.80	23	58
4.70	26	63
4.60	30	69
4.50	30	72
4.40	30	78
4.30	31	90
4.20	29	96
4.10	24	114
4.00	17	127
3.90	-2	153
3.89	-4	156
3.88	-7	162
3.87	-11	171
3.86	-15	184
3.85	-16	202
3.84	-10	223
3.83	1	248
3.82	7	265
3.81	2	407
3.80	-10	621
3.79	11	424
3.78	15	437
3.77	0	689
3.76	R	R

GEOGRAPHIC
LAT. = -65.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-24	39
9.00	-26	39
8.00	-26	41
7.00	-25	45
6.00	-19	48
5.00	-10	46
4.00	-10	44
3.00	1	49
2.00	11	52
1.90	10	53
1.80	12	56
1.70	17	53
1.60	18	55
1.50	18	60
1.40	23	65
1.30	24	66
1.20	27	72
1.10	28	76
1.00	32	86
.90	32	97
.80	29	113
.73	18	132
.60	-13	177
.59	-15	182
.58	-16	192
.57	-16	220
.56	7	293
.55	-15	568
.54	-19	344
.53	10	517
.52	8	750
.51	-4	667
.50	-8	363
.49	R	R

GEOGRAPHIC
LAT. = -65.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-33	49
9.00	-34	50
8.00	-34	53
7.00	-31	56
6.00	-24	57
5.00	-19	53
4.00	-21	54
3.00	-11	54
2.00	-5	57
1.90	-2	59
1.80	1	59
1.70	2	58
1.60	2	59
1.50	5	61
1.40	7	61
1.30	8	63
1.20	12	63
1.10	14	66
1.00	16	68
.90	20	71
.80	24	76
.70	29	84
.60	33	96
.50	31	115
.49	13	151
.39	7	157
.38	3	162
.37	-5	170
.36	-12	182
.35	-18	196
.34	-15	241
.33	2	351
.32	-3	718
.31	-4	673
.30	-14	669
.29	R	R

GEOGRAPHIC
LAT. = -65.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-41	62
9.00	-42	64
8.00	-40	67
7.00	-37	69
6.00	-32	65
5.00	-30	64
4.00	-30	67
3.00	-24	65
2.00	-17	64
1.90	-15	67
1.80	-14	66
1.70	-15	67
1.60	-12	68
1.50	-10	[illegible]
1.40	-10	66
1.30	-7	68
1.20	-7	68
1.10	-4	68
1.00	-1	69
.90	2	70
.80	5	71
.70	7	73
.60	12	76
.50	18	79
.40	25	87
.30	34	104
.20	18	158
.19	9	167
.18	-8	182
.17	-28	225
.16	9	531
.15	23	443
.14	F	F

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -65.00 LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-49	79
9.00	-49	82
8.00	-47	84
7.00	-43	84
6.00	-41	81
5.00	-41	79
4.00	-38	83
3.00	-36	81
2.00	-29	81
1.90	-29	80
1.80	-29	81
1.70	-28	82
1.60	-28	80
1.50	-27	81
1.40	-24	81
1.30	-24	81
1.20	-22	81
1.10	-21	81
1.00	-20	81
.90	-18	81
.80	-16	82
.70	-15	81
.60	-10	82
.50	-6	82
.40	-1	83
.30	6	85
.20	18	89
.19	19	91
.18	21	91
.17	23	93
.16	25	94
.15	27	96
.14	29	98
.13	32	100
.12	35	103
.11	38	110
.10	41	116
.09	43	127
.08	42	144
.07	31	170
.06	-8	316
.05	F	F

GEOGRAPHIC LAT. = -65.00 LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-55	101
9.00	-54	102
8.00	-52	103
7.00	-50	103
6.00	-48	101
5.00	-50	101
4.00	-46	102
3.00	-45	102
2.00	-41	101
1.90	-41	101
1.80	-40	102
1.70	-39	101
1.60	-39	101
1.50	-34	102
1.40	-37	101
1.30	-36	102
1.20	-36	101
1.10	-34	102
1.00	-33	102
.90	-32	102
.80	-31	101
.70	-29	102
.60	-27	101
.50	-24	101
.40	-21	101
.30	-17	101
.20	-10	101
.10	3	100
.09	6	101
.08	8	100
.07	11	101
.06	15	101
.05	15	100
.04	21	99
.03	26	98
.02	36	97
.01	48	98

GEOGRAPHIC LAT. = -65.00 LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-59	126
9.00	-58	127
8.00	-57	127
7.00	-56	127
6.00	-55	126
5.00	-55	127
4.00	-52	128
3.00	-51	129
2.00	-48	129
1.90	-47	129
1.80	-47	130
1.70	-46	129
1.60	-46	130
1.50	-45	130
1.40	-45	130
1.30	-44	130
1.20	-44	130
1.10	-43	130
1.00	-41	130
.90	-41	130
.80	-40	130
.70	-38	130
.60	-36	131
.50	-34	131
.40	-32	131
.30	-28	131
.20	-23	131
.10	-14	130
.09	-12	129
.08	-10	130
.07	-8	129
.06	-7	128
.05	-4	128
.04	-2	126
.03	2	125
.02	5	122
.01	9	119

GEOGRAPHIC LAT. = -65.00 LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-60	154
9.00	-60	154
8.00	-59	155
7.00	-58	156
6.00	-57	156
5.00	-56	157
4.00	-54	158
3.00	-52	160
2.00	-49	161
1.90	-49	162
1.80	-48	162
1.70	-48	162
1.60	-47	162
1.50	-46	163
1.40	-46	163
1.30	-45	163
1.20	-44	163
1.10	-43	164
1.00	-42	164
.90	-41	164
.80	-40	165
.70	-38	165
.60	-37	166
.50	-34	166
.40	-32	167
.30	-28	168
.20	-22	169
.10	-10	170
.09	-9	169
.08	-7	170
.07	-4	170
.06	-2	170
.05	1	170
.04	4	169
.03	10	169
.02	14	166
.01	21	162

GEOGRAPHIC LAT. = -65.00 LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-59	182
9.00	-58	182
8.00	-58	184
7.00	-57	185
6.00	-55	187
5.00	-54	187
4.00	-52	189
3.00	-49	190
2.00	-44	193
1.90	-44	193
1.80	-44	194
1.70	-43	194
1.60	-42	194
1.50	-41	195
1.40	-40	195
1.30	-39	196
1.20	-38	196
1.10	-37	197
1.00	-36	197
.90	-34	198
.80	-33	199
.70	-30	200
.60	-28	201
.50	-25	202
.40	-21	203
.30	-16	206
.20	-7	209
.10	10	219
.09	14	224
.08	17	227
.07	21	232
.06	25	236
.05	30	251
.04	30	279
.03	-3	436
.02	F	F

GEOGRAPHIC LAT. = -65.00 LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-55	207
9.00	-55	208
8.00	-54	210
7.00	-53	212
6.00	-50	214
5.00	-48	213
4.00	-46	216
3.00	-42	218
2.00	-36	221
1.90	-35	221
1.80	-35	222
1.70	-33	223
1.60	-32	223
1.50	-32	224
1.40	-31	224
1.30	-29	225
1.20	-27	225
1.10	-26	227
1.00	-24	228
.90	-22	229
.80	-19	230
.70	-17	232
.60	-13	234
.50	-9	237
.40	-3	242
.30	4	250
.20	14	271
.19	15	274
.18	15	280
.17	15	286
.16	14	293
.15	12	302
.14	6	314
13	-5	332
.12	-26	307
.11	1	996
.10	F	F

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -65.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-50	230
9.00	-50	231
8.00	-49	233
7.00	-47	236
6.00	-43	238
5.00	-40	237
4.00	-38	240
3.00	-33	241
2.80	-24	247
1.90	-23	247
1.80	-23	247
1.70	-21	249
1.60	-20	249
1.50	-19	250
1.40	-17	252
1.30	-16	252
1.20	-13	254
1.10	-11	256
1.00	-9	258
.90	-6	260
.80	-3	264
.70	0	268
.60	5	275
.50	9	285
.40	11	304
.30	-5	352
.29	-10	363
.28	-15	378
.27	-16	403
.26	25	473
.25	-8	625
.24	-7	1056
.23	8	541
.22	F	F

GEOGRAPHIC
LAT. = -65.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-44	-109
9.00	-43	-109
8.00	-43	-107
7.00	-40	-104
6.00	-36	-101
5.00	-31	-102
4.00	-23	-99
3.00	-22	-96
2.80	-12	-88
1.90	-10	-87
1.80	-9	-86
1.70	-3	-84
1.60	-5	-82
1.50	-4	-81
1.40	-2	-78
1.30	0	-76
1.20	2	-72
1.10	4	-69
1.00	7	-63
.90	9	-56
.80	10	-46
.70	10	-30
.60	2	-5
.59	1	-2
.58	0	3
.57	-1	8
.56	-4	12
.55	-6	18
.54	-9	27
.53	-10	34
.52	-11	43
.51	-10	61
.50	-4	78
.49	14	111
.48	-9	364
.47	-9	183
.46	R	R

GEOGRAPHIC
LAT. = -65.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-36	-91
9.00	-36	-90
8.00	-35	-89
7.00	-33	-85
6.00	-27	-82
5.00	-21	-82
4.00	-19	-79
3.00	-10	-73
2.00	1	-60
1.90	4	-57
1.80	5	-55
1.70	6	-52
1.60	8	-47
1.50	10	-43
1.40	10	-38
1.30	12	-30
1.20	11	-22
1.10	10	-9
1.00	5	9
.90	-5	39
.89	-6	44
.88	-7	48
.87	-8	52
.86	-8	57
.85	-8	64
.84	-7	75
.83	-3	90
.82	7	113
.81	22	161
.80	R	R

GEOGRAPHIC
LAT. = -65.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-27	-73
9.00	-27	-73
8.00	-27	-72
7.00	-25	-68
6.00	-19	-63
5.00	-11	-61
4.00	-8	-58
3.00	4	-47
2.90	4	-46
2.80	4	-45
2.70	5	-44
2.60	5	-41
2.50	7	-38
2.40	10	-35
2.30	11	-31
2.20	12	-23
2.10	12	-26
2.00	12	-23
1.90	14	-18
1.80	14	-7
1.70	13	-1
1.60	11	6
1.50	8	23
1.40	1	38
1.30	-5	68
1.20	-5	561
1.19	-1	496
1.18	-18	241
1.17	-18	723
1.16	7	415
1.15	-5	921
1.14	R	R

GEOGRAPHIC
LAT. = -65.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-18	-57
9.00	-17	-57
8.00	-17	-55
7.00	-16	-52
6.00	-10	-46
5.00	0	-41
4.00	4	-36
3.00	16	-14
2.90	16	-12
2.80	16	-9
2.70	15	-7
2.60	15	-4
2.50	15	0
2.40	16	7
2.30	16	16
2.20	13	26
2.10	9	35
2.00	6	42
1.90	3	55
1.80	-4	86
1.70	12	445
1.69	-22	321
1.68	-1	213
1.67	-3	270
1.66	-15	285
1.65	-14	230
1.64	0	439
1.63	13	478
1.62	9	576
1.61	R	R

GEOGRAPHIC
LAT. = -65.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-8	-42
9.00	-7	-42
8.00	-7	-40
7.00	-7	-37
6.00	-2	-30
5.00	10	-20
4.00	16	-9
3.00	19	28
2.90	16	36
2.80	13	43
2.70	9	49
2.60	7	56
2.50	4	63
2.40	1	75
2.30	-4	102
2.20	16	790
2.19	-12	579
2.18	-6	234
2.17	-18	346
2.16	-10	272
2.15	-1	517
2.14	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -65.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	1	-28
9.00	2	-28
8.00	2	-27
7.00	2	-23
6.00	5	-15
5.00	18	-1
4.00	21	23
3.90	20	25
3.80	19	27
3.70	19	29
3.60	18	32
3.50	18	35
3.40	17	40
3.30	17	45
3.20	15	3
3.10	12	64
3.00	6	77
2.90	-3	98
2.80	-5	138
2.79	-4	145
2.78	-1	153
2.77	3	162
2.76	7	173
2.75	12	190
2.74	16	216
2.73	-27	387
2.72	R	R

GEOGRAPHIC
LAT. = -65.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	6	-18
9.00	8	-17
8.00	6	-16
7.00	9	-12
6.00	10	-4
5.00	21	14
4.00	20	49
3.90	18	52
3.80	16	56
3.70	14	59
3.60	13	62
3.50	11	66
3.40	10	71
3.30	8	78
3.20	4	88
3.10	-1	104
3.00	-7	136
2.90	-6	141
2.80	-6	147
2.79	-5	154
2.78	-3	163
2.77	1	174
2.76	6	188
2.75	11	212
2.74	-5	271
2.73	R	R

GEOGRAPHIC
LAT. = -65.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	8	-10
9.00	10	-10
8.00	11	-8
7.00	10	-5
6.00	12	3
5.00	22	20
4.00	21	59
3.90	19	63
3.80	16	66
3.70	14	70
3.60	12	73
3.50	10	77
3.40	6	82
3.30	6	88
3.20	3	97
3.10	-2	111
3.00	-7	138
2.90	-4	361
2.89	10	509
2.88	-15	252
2.87	4	493
2.86	-23	383
2.85	-3	487
2.84	-6	388
2.83	R	R

GEOGRAPHIC
LAT. = -65.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	7	-4
9.00	9	-4
8.00	10	-3
7.00	9	-1
6.00	10	6
5.00	20	21
4.00	27	53
3.90	26	56
3.80	24	59
3.70	22	62
3.60	20	65
3.50	18	67
3.40	17	70
3.30	16	74
3.20	14	79
3.10	12	87
3.00	8	97
2.90	0	113
2.80	-9	145
2.70	6	418
2.69	0	237
2.68	-17	359
2.67	9	479
2.66	-15	367
2.65	-21	280
2.64	R	R

GEOGRAPHIC
LAT. = -65.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	4	2
9.00	6	1
8.00	6	1
7.00	5	3
6.00	6	9
5.00	16	21
4.00	29	41
3.90	29	43
3.80	28	45
3.70	28	47
3.60	27	49
3.50	26	51
3.40	25	53
3.30	24	55
3.20	24	58
3.10	24	63
3.00	23	69
2.90	22	78
2.80	18	88
2.70	11	102
2.60	-1	118
2.50	-11	144
2.40	3	[illegible]
2.39	7	206
2.38	11	218
2.37	13	235
2.36	6	263
2.35	-19	363
2.34	-5	326
2.33	R	R

GEOGRAPHIC
LAT. = -65.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	0	8
9.00	1	7
8.00	0	7
7.00	-1	8
6.00	1	14
5.00	11	22
4.00	25	33
3.00	26	58
2.90	27	56
2.80	29	63
2.70	28	71
2.60	26	79
2.50	22	86
2.40	18	92
2.30	14	98
2.20	11	102
2.10	7	113
2.00	-4	136
1.90	9	236
1.80	-12	308
1.70	0	463
1.65	-8	691
1.60	-13	838
1.67	12	1284
1.66	-6	1337
1.65	-1	931
1.64	6	1685
1.63	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -70.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-15	9
9.00	-16	8
8.00	-17	8
7.00	-18	10
6.00	-14	15
5.00	-3	19
4.00	4	17
3.00	11	26
2.00	27	45
1.90	28	48
1.80	27	50
1.70	27	55
1.60	30	66
1.50	28	76
1.40	25	81
1.30	19	103
1.20	9	114
1.10	-10	154
1.00	-20	302
.99	-8	721
.98	15	522
.97	0	524
.96	0	339
.95	-14	289
.94	-2	337
.93	-11	277
.92	R	R

GEOGRAPHIC
LAT. = -70.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-20	16
9.00	-21	15
8.00	-23	16
7.00	-23	19
6.00	-13	23
5.00	-3	25
4.00	-1	21
3.00	5	29
2.00	13	37
1.90	13	38
1.80	14	39
1.70	22	44
1.60	26	49
1.50	26	51
1.40	27	56
1.30	30	66
1.20	23	71
1.10	23	88
1.00	23	101
.90	11	120
.80	-12	170
.79	-13	186
.78	-1	219
.77	5	358
.76	-14	702
.75	-23	279
.74	14	400
.73	-1	1024
.72	-11	747
.71	17	783
.70	-12	350
.69	18	432
.68	-1	944
.67	-3	1018
.66	2	R

GEOGRAPHIC
LAT. = -70.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-27	23
9.00	-28	23
8.00	-29	24
7.00	-25	28
6.00	-23	32
5.00	-14	31
4.00	-13	27
3.00	-3	32
2.00	8	35
1.90	7	36
1.80	8	38
1.70	13	41
1.60	15	41
1.50	15	42
1.40	19	46
1.30	21	47
1.20	23	53
1.10	26	56
1.00	30	66
.90	31	76
.80	30	91
.70	22	111
.60	-5	150
.59	-7	155
.58	-9	158
.57	-13	171
.56	-14	199
.55	-2	232
.54	8	273
.53	-10	265
.52	1	524
.51	18	449
.50	6	464
.49	-19	693
.48	-15	641
.47	2	1037
.46	F	F

GEOGRAPHIC
LAT. = -70.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-34	31
9.00	-35	32
8.00	-36	34
7.00	-34	38
6.00	-28	40
5.00	-21	37
4.00	-23	35
3.00	-12	37
2.00	-6	35
1.90	-5	40
1.80	-2	41
1.70	1	40
1.60	0	40
1.50	2	43
1.40	6	43
1.30	6	44
1.20	11	46
1.10	12	48
1.00	16	49
.90	20	53
.80	23	57
.70	28	66
.60	31	77
.50	30	100
.40	6	142
.39	2	147
.38	-6	157
.37	-12	169
.36	-17	189
.35	2	254
.34	2	610
.33	22	411
.32	-4	337
.31	-13	327
.30	F	F

GEOGRAPHIC
LAT. = -70.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-42	41
9.00	-43	42
8.00	-43	45
7.00	-40	49
6.00	-34	43
5.00	-30	44
4.00	-32	45
3.00	-24	43
2.00	-19	46
1.90	-16	47
1.80	-14	45
1.70	-14	45
1.60	-14	46
1.50	-10	46
1.40	-10	46
1.30	-8	47
1.20	-6	46
1.10	-3	48
1.00	-2	49
.90	1	49
.80	5	51
.70	9	52
.60	14	55
.50	21	60
.40	28	69
.30	34	94
.29	35	98
.28	34	103
.27	33	108
.26	31	114
.25	29	119
.24	25	127
.23	19	135
.22	10	145
.21	-1	157
.20	-18	180
.19	16	419
.18	R	R

GEOGRAPHIC
LAT. = -70.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-50	52
9.00	-50	55
8.00	-49	58
7.00	-46	60
6.00	-42	58
5.00	-41	53
4.00	-41	57
3.00	-37	53
2.00	-30	55
1.90	-28	54
1.80	-29	53
1.70	-29	54
1.60	-26	55
1.50	-26	53
1.40	-25	55
1.30	-23	53
1.20	-23	55
1.10	-21	53
1.00	-18	54
.90	-16	54
.80	-15	54
.70	-12	55
.60	-8	55
.50	-4	55
.40	2	56
.30	10	59
.20	23	66
.19	25	68
.18	27	69
.17	29	70
.16	31	74
.15	34	76
.14	36	81
.13	38	88
.12	40	94
.11	41	107
.10	37	126
.09	23	148
.08	5	264
.07	F	F

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -70.00 LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-56	68
9.00	-57	70
8.00	-58	73
7.00	-53	73
6.00	-51	70
5.00	-52	67
4.00	-49	71
3.00	-48	68
2.00	-42	67
1.90	-43	66
1.80	-43	67
1.70	-41	68
1.60	-40	66
1.50	-41	66
1.40	-39	67
1.30	-38	66
1.20	-37	66
1.10	-37	66
1.00	-36	66
.90	-35	65
.80	-33	65
.70	-31	64
.60	-29	64
.50	-27	64
.40	-23	63
.30	-19	63
.20	-12	62
.10	2	60
.09	4	60
.08	7	60
.07	10	59
.06	14	59
.05	17	58
.04	23	58
.03	30	56
.02	41	55
.01	53	46

GEOGRAPHIC LAT. = -70.00 LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-63	88
9.00	-64	90
8.00	-62	91
7.00	-60	90
6.00	-60	86
5.00	-61	86
4.00	-58	89
3.00	-53	88
2.00	-55	85
1.90	-55	86
1.80	-55	87
1.70	-54	86
1.60	-54	85
1.50	-53	86
1.40	-53	85
1.30	-53	86
1.20	-52	84
1.10	-51	85
1.00	-50	85
.90	-50	84
.80	-43	83
.70	-46	84
.60	-47	83
.50	-45	82
.40	-43	82
.30	-41	81
.20	-37	79
.10	-32	75
.09	-30	75
.08	-30	74
.07	-29	73
.06	-27	73
.05	-26	71
.04	-25	70
.03	-24	68
.02	-22	66
.01	-21	63

GEOGRAPHIC LAT. = -70.00 LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-70	114
9.00	-69	116
8.00	-68	116
7.00	-67	114
6.00	-67	112
5.00	-68	115
4.00	-66	115
3.00	-66	116
2.00	-65	115
1.90	-64	116
1.80	-64	116
1.70	-64	115
1.60	-64	116
1.50	-63	116
1.40	-63	116
1.30	-62	116
1.20	-63	116
1.10	-62	116
1.00	-62	116
.90	-61	116
.80	-61	116
.70	-60	116
.60	-60	116
.50	-59	116
.40	-58	115
.30	-56	115
.20	-54	114
.10	-51	112
.09	-50	112
.08	-50	111
.07	-49	111
.06	-48	110
.05	-48	109
.04	-47	108
.03	-47	107
.02	-46	106
.01	-45	104

GEOGRAPHIC LAT. = -70.00 LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-72	149
9.00	-72	150
8.00	-71	149
7.00	-71	149
6.00	-71	150
5.00	-71	154
4.00	-70	153
3.00	-69	156
2.00	-68	159
1.90	-67	159
1.80	-67	159
1.70	-67	159
1.60	-66	160
1.50	-66	160
1.40	-66	161
1.30	-66	160
1.20	-65	162
1.10	-65	162
1.00	-64	162
.90	-64	162
.80	-63	163
.70	-63	163
.60	-62	164
.50	-61	165
.40	-59	166
.30	-58	166
.20	-55	166
.10	-51	166
.09	-50	166
.08	-50	165
.07	-49	165
.06	-48	165
.05	-47	164
.04	-46	164
.03	-45	162
.02	-44	161
.01	-42	159

GEOGRAPHIC LAT. = -70.00 LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-71	186
9.00	-71	186
8.00	-70	186
7.00	-70	188
6.00	-69	191
5.00	-68	193
4.00	-67	194
3.00	-65	196
2.00	-62	200
1.90	-62	200
1.80	-62	200
1.70	-61	201
1.60	-61	201
1.50	-61	201
1.40	-60	202
1.30	-59	202
1.20	-59	203
1.10	-58	203
1.00	-57	204
.90	-56	204
.80	-55	205
.70	-54	205
.60	-52	206
.50	-51	206
.40	-48	207
.30	-45	208
.20	-40	209
.10	-32	209
.09	-30	209
.08	-29	209
.07	-27	208
.06	-25	209
.05	-23	208
.04	-21	207
.03	-18	206
.02	-15	204
.01	-11	201

GEOGRAPHIC LAT. = -70.00 LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-67	216
9.00	-67	216
8.00	-66	217
7.00	-66	220
6.00	-64	223
5.00	-61	222
4.00	-60	225
3.00	-57	226
2.00	-53	229
1.90	-52	229
1.80	-52	229
1.70	-51	230
1.60	-50	230
1.50	-50	230
1.40	-48	231
1.30	-48	231
1.20	-47	231
1.10	-45	232
1.00	-44	233
.90	-43	233
.80	-41	234
.70	-39	235
.60	-37	236
.50	-34	237
.40	-30	238
.30	-24	240
.20	-16	243
.10	1	250
.09	4	251
.08	7	253
.07	11	255
.06	17	262
.05	23	268
.04	30	282
.03	28	334
.02	F	F

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -70.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-61	239
9.00	-61	239
8.00	-60	241
7.00	-59	244
6.00	-56	246
5.00	-53	245
4.00	-52	247
3.00	-48	248
2.00	-41	251
1.90	-40	251
1.80	-40	252
1.70	-39	253
1.60	-37	253
1.50	-37	253
1.40	-35	254
1.30	-34	254
1.20	-32	255
1.10	-31	256
1.00	-29	257
.90	-27	258
.80	-24	259
.70	-21	261
.60	-18	262
.50	-13	265
.40	-7	269
.30	1	276
.20	13	295
.19	14	299
.18	15	303
.17	16	309
.16	16	315
.15	15	324
.14	12	336
.13	4	353
.12	-15	387
.11	-28	598
.10	7	7621
.09	F	F

GEOGRAPHIC
LAT. = -70.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-54	-102
9.00	-54	-102
8.00	-53	-100
7.00	-51	-97
6.00	-47	-95
5.00	-44	-97
4.00	-42	-94
3.00	-37	-93
2.00	-35	-88
1.90	-27	-88
1.80	-26	-88
1.70	-26	-87
1.60	-24	-86
1.50	-22	-86
1.40	-20	-84
1.30	-18	-84
1.20	-15	-82
1.10	-15	-81
1.00	-12	-79
.90	-9	-77
.80	-5	-74
.70	-1	-70
.60	3	-65
.50	9	-55
.40	13	-37
.30	4	-355
.29	1	14
.28	-4	25
.27	-10	41
.26	-12	66
.25	23	138
.24	-12	180
.23	0	234
.22	-1	755
.21	F	F

GEOGRAPHIC
LAT. = -70.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-46	-85
9.00	-46	-85
8.00	-46	-84
7.00	-44	-81
6.00	-39	-78
5.00	-34	-79
4.00	-32	-78
3.00	-24	-75
2.00	-15	-68
1.90	-12	-67
1.80	-11	-67
1.70	-11	-66
1.60	-8	-64
1.50	-6	-63
1.40	-5	-61
1.30	-1	-58
1.20	0	-56
1.10	3	-53
1.00	6	-48
.90	9	-41
.80	12	-33
.70	14	-20
.60	11	2
.50	-5	49
.49	-7	57
.48	-8	70
.47	-8	91
.46	-4	114
.45	15	385
.44	5	503
.43	R	R

GEOGRAPHIC
LAT. = -70.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-36	-71
9.00	-35	-71
8.00	-37	-69
7.00	-36	-66
6.00	-30	-63
5.00	-23	-63
4.00	-21	-62
3.00	-11	-57
2.00	-1	-47
1.90	2	-44
1.80	4	-42
1.70	5	-41
1.60	6	-37
1.50	10	-33
1.40	10	-30
1.30	13	-23
1.20	14	-17
1.10	15	-5
1.00	14	7
.90	10	26
.80	-4	62
.70	-7	260
.69	12	867
.68	4	372
.67	13	413
.66	-15	288
.65	-15	1036
.64	9	420
.63	R	R

GEOGRAPHIC
LAT. = -70.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-29	-57
9.00	-29	-57
8.00	-29	-56
7.00	-28	-53
6.00	-22	-49
5.00	-13	-48
4.00	-11	-46
3.00	2	-37
2.00	12	-20
1.90	14	-15
1.80	16	-9
1.70	17	-4
1.60	16	1
1.50	17	12
1.40	15	23
1.30	12	35
1.20	2	60
1.19	1	62
1.18	1	63
1.17	0	66
1.16	-1	68
1.15	-1	71
1.14	-2	75
1.13	-3	80
1.12	-4	86
1.11	-5	95
1.10	-5	105
1.09	-3	119
1.08	2	136
1.07	13	163
1.06	2	233
1.05	R	R

GEOGRAPHIC
LAT. = -70.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-20	-45
9.00	-20	-45
8.00	-20	-44
7.00	-20	-41
6.00	-14	-36
5.00	-6	-33
4.00	0	-30
3.00	13	-16
2.90	14	-14
2.80	14	-13
2.70	14	-11
2.60	14	-9
2.50	15	-7
2.40	16	-2
2.30	19	3
2.20	20	10
2.10	20	15
2.00	18	20
1.90	18	25
1.80	17	37
1.70	10	54
1.60	4	67
1.50	-2	89
1.40	27	452
1.39	-12	291
1.38	-14	305
1.37	-3	391
1.36	4	500
1.35	10	411
1.34	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -70.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-13	-34
9.00	-13	-35
8.00	-13	-34
7.00	-13	-31
6.00	-8	-25
5.00	4	-19
4.00	18	-15
3.00	21	7
2.90	22	11
2.80	22	14
2.70	21	17
2.60	20	20
2.50	20	23
2.40	20	28
2.30	20	36
2.20	18	47
2.10	12	61
2.00	6	73
1.90	1	84
1.80	-4	107
1.79	-5	111
1.78	-5	117
1.77	-6	123
1.76	-5	131
1.75	-4	140
1.74	-1	153
1.73	5	171
1.72	13	207
1.71	3	361
1.70	1	446
1.69	-12	956
1.68	-17	251
1.67	-16	384
1.66	R	R

GEOGRAPHIC
LAT. = -70.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
11.00	-9	-25
10.00	-7	-26
9.00	-9	-25
8.00	-9	-22
7.00	-9	-22
6.00	-4	-16
5.00	3	-6
4.00	17	-1
3.00	24	25
2.90	25	31
2.80	24	37
2.70	23	42
2.60	20	46
2.50	18	50
2.40	17	55
2.30	15	64
2.20	10	78
2.10	-2	103
2.00	-2	158
1.99	1	168
1.98	6	180
1.97	12	197
1.96	13	226
1.95	-27	326
1.94	R	R

GEOGRAPHIC
LAT. = -70.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-5	-17
9.00	-5	-18
8.00	-5	-18
7.00	-6	-15
6.00	-2	-9
5.00	10	-1
4.00	20	8
3.00	25	33
2.90	26	40
2.80	25	47
2.70	23	54
2.60	20	59
2.50	17	64
2.40	15	69
2.30	13	76
2.20	8	89
2.10	-4	116
2.00	13	227
1.99	-2	389
1.98	-11	318
1.97	-9	226
1.96	15	452
1.95	-14	248
1.94	-2	399
1.93	-22	278
1.92	-3	515
1.91	R	R

GEOGRAPHIC
LAT. = -70.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-6	-11
9.00	-5	-12
8.00	-5	-12
7.00	-6	-9
6.00	-3	-3
5.00	9	5
4.00	20	12
3.00	25	33
2.90	27	38
2.80	27	45
2.70	27	51
2.60	25	57
2.50	22	61
2.40	20	64
2.30	19	69
2.20	16	79
2.10	9	95
2.00	-6	122
1.90	4	191
1.80	-3	314
1.79	0	487
1.78	-20	263
1.77	1	528
1.76	-10	317
1.75	13	401
1.74	R	R

GEOGRAPHIC
LAT. = -70.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-8	-4
9.00	-7	-6
8.00	-8	-6
7.00	-9	-4
6.00	-6	2
5.00	5	9
4.00	17	13
3.00	22	28
2.90	25	32
2.80	27	37
2.70	28	41
2.60	28	45
2.50	27	48
2.40	26	51
2.30	25	54
2.20	25	60
2.10	24	71
2.00	18	86
1.90	8	100
1.80	1	111
1.70	-4	127
1.65	-9	150
1.64	-9	150
1.63	-8	169
1.62	-5	182
1.61	2	203
1.60	10	249
1.59	26	451
1.58	-2	240
1.57	-25	292
1.56	11	368
1.55	R	R

GEOGRAPHIC
LAT. = -70.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-11	2
9.00	-11	1
8.00	-12	1
7.00	-13	3
6.00	-10	6
5.00	1	13
4.00	11	14
3.00	17	26
2.90	20	28
2.80	23	31
2.70	25	33
2.60	26	35
2.50	25	36
2.40	25	38
2.30	24	40
2.20	26	45
2.10	28	52
2.00	29	62
1.90	27	69
1.80	24	73
1.70	22	88
1.60	17	97
1.50	1	110
1.40	-7	138
1.30	-18	399
1.29	11	362
1.28	-12	316
1.27	13	377
1.26	-10	1972
1.25	-15	330
1.24	1	485
1.23	-12	366
1.22	20	464
1.21	7	843
1.20	-18	675
1.19	-2	695
1.18	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -75.00
LONG. = 0.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-38	22
19.00	-37	20
18.00	-35	19
17.00	-34	18
16.00	-32	16
15.00	-30	15
14.00	-29	13
13.00	-27	10
12.00	-26	8
11.00	-25	6
10.00	-26	4
9.00	-27	2
8.00	-28	3
7.00	-28	6
6.00	-24	11
5.00	-14	11
4.00	-11	7
3.00	-1	14
2.00	11	19
1.90	10	19
1.80	11	22
1.70	1[illegible]	25
1.60	19	27
1.50	19	29
1.40	22	34
1.30	25	39
1.20	26	44
1.10	28	54
1.00	29	67
.90	25	82
.80	13	106
.70	-11	173
.69	-8	184
.68	-3	200
.67	4	275
.66	1	375
.65	-11	389
.64	19	795
.63	-4	892
.62	1	433
.61	14	451
.59	-14	1848
.58	F	F

GEOGRAPHIC
LAT. = -75.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
11.00	-31	10
1.00	-32	9
9.00	-31	10
7.00	-31	14
6.00	-27	18
5.00	-1[illegible]	16
4.00	-18	13
3.00	-4	17
2.00	7	19
1.90	1	20
1.80	1	23
1.70	1	24
1.60	1	25
1.50	1	25
1.40	1[illegible]	28
1.30	1[illegible]	29
1.20	1[illegible]	34
1.10	21	36
1.00	2[illegible]	43
.90	2[illegible]	52
.80	3[illegible]	64
.70	27	80
.60	1[illegible]	111
.50	-5	301
.49	-17	260
.48	-1	356
.47	1[illegible]	482
.46	1[illegible]	805
.45	1	928
.44	11	5449
.43	-6	7440
.42	F	F

GEOGRAPHIC
LAT. = -75.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-36	16
9.00	-37	16
8.00	-38	15
7.00	-37	22
6.00	-32	25
5.00	-25	21
4.00	-26	19
3.00	-16	21
2.00	-9	22
1.90	-8	24
1.80	-5	25
1.70	-2	24
1.60	-3	24
1.50	-1	26
1.40	3	26
1.30	5	27
1.20	8	29
1.10	9	31
1.00	13	32
.90	17	36
.80	21	40
.70	25	48
.60	29	59
.50	30	82
.40	8	124
.39	5	129
.38	-3	140
.37	-9	150
.36	-14	170
.35	-1	225
.34	-9	299
.33	-12	639
.32	-22	675
.31	-2	1444
.30	-13	665
.29	F	F

GEOGRAPHIC
LAT. = -75.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-42	25
9.00	-44	25
8.00	-44	26
7.00	-42	30
6.00	-36	31
5.00	-32	27
4.00	-33	26
3.00	-25	26
2.00	-20	27
1.90	-18	28
1.80	-15	29
1.70	-14	27
1.60	-15	28
1.50	-11	29
1.40	-10	27
1.30	-9	30
1.20	-6	28
1.10	-4	31
1.00	-2	31
.90	1	31
.80	5	33
.70	10	36
.60	16	39
.50	23	45
.40	29	56
.30	31	89
.29	30	94
.28	28	100
.27	25	107
.26	20	115
.25	13	125
.24	5	133
.23	-9	151
.22	-18	164
.21	-5	283
.20	-13	591
.19	2	407
.18	F	F

GEOGRAPHIC
LAT. = -75.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-49	30
9.00	-50	32
8.00	-50	35
7.00	-48	39
6.00	-42	38
5.00	-40	32
4.00	-41	34
3.00	-35	31
2.00	-30	34
1.90	-28	34
1.80	-27	32
1.70	-27	32
1.60	-26	33
1.50	-23	32
1.40	-24	32
1.30	-21	33
1.20	-21	32
1.10	-18	32
1.00	-16	35
.90	-14	33
.80	-11	33
.70	-9	33
.60	-5	34
.50	1	35
.40	7	38
.30	17	43
.20	32	59
.19	34	65
.18	35	70
.17	36	76
.16	37	83
.15	36	93
.14	32	106
.13	22	123
.12	-5	148
.11	1	707
.10	-11	354
.09	F	F

GEOGRAPHIC
LAT. = -75.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-57	39
9.00	-57	42
8.00	-57	45
7.00	-54	47
6.00	-50	45
5.00	-49	39
4.00	-49	43
3.00	-46	39
2.00	-40	40
1.90	-39	39
1.80	-40	38
1.70	-40	39
1.60	-37	39
1.50	-37	37
1.40	-37	33
1.30	-35	37
1.20	-34	39
1.10	-33	37
1.00	-31	37
.90	-29	37
.80	-28	36
.70	-25	37
.60	-23	37
.50	-20	36
.40	-15	36
.30	-10	36
.20	0	36
.10	21	40
.09	25	43
.08	29	44
.07	36	51
.06	42	57
.05	50	74
.04	-2	127
.03	F	F

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -75.00 LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-64	58
9.00	-64	53
8.00	-63	56
7.00	-61	57
6.00	-58	53
5.00	-59	48
4.00	-58	53
3.00	-57	49
2.00	-52	48
1.90	-52	46
1.80	-53	47
1.70	-51	48
1.60	-50	46
1.50	-51	46
1.40	-49	47
1.30	-50	45
1.20	-48	46
1.10	-48	46
1.00	-47	44
.90	-46	44
.80	-45	44
.70	-43	42
.60	-42	42
.50	-40	42
.40	-37	41
.30	-33	39
.20	-28	37
.10	-18	34
.09	-18	32
.08	-15	32
.07	-13	31
.06	-12	30
.05	-10	28
.04	-6	27
.03	-3	25
.02	0	21
.01	2	16

GEOGRAPHIC LAT. = -75.00 LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-72	63
9.00	-71	67
8.00	-70	70
7.00	-68	69
6.00	-67	63
5.00	-63	60
4.00	-67	65
3.00	-67	62
2.00	-64	57
1.90	-65	57
1.80	-65	59
1.70	-64	58
1.60	-64	56
1.50	-64	58
1.40	-63	56
1.30	-63	57
1.20	-62	55
1.10	-62	56
1.00	-62	55
.90	-61	55
.80	-60	53
.70	-60	53
.60	-59	52
.50	-58	51
.40	-57	49
.30	-55	47
.20	-51	45
.10	-43	40
.09	-40	39
.08	-47	38
.07	-47	37
.06	-46	36
.05	-45	34
.04	-45	33
.03	-44	31
.02	-43	29
.01	-43	26

GEOGRAPHIC LAT. = -75.00 LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-79	34
9.00	-78	88
8.00	-77	89
7.00	-76	85
6.00	-76	78
5.00	-76	80
4.00	-76	82
3.00	-77	82
2.00	-77	74
1.90	-77	76
1.80	-77	78
1.70	-76	75
1.60	-77	74
1.50	-76	76
1.40	-77	73
1.30	-76	75
1.20	-77	72
1.10	-76	72
1.00	-76	72
.90	-76	71
.80	-76	69
.70	-76	70
.60	-76	67
.50	-76	66
.40	-75	65
.30	-75	63
.20	-75	59
.10	-74	53
.09	-74	53
.08	-74	52
.07	-74	51
.06	-74	49
.05	-74	48
.04	-74	46
.03	-74	45
.02	-74	43
.01	-74	40

GEOGRAPHIC LAT. = -75.00 LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-84	132
9.00	-83	134
8.00	-83	130
7.00	-83	123
6.00	-84	122
5.00	-85	140
4.00	-84	133
3.00	-84	146
2.00	-86	155
1.90	-85	159
1.80	-85	154
1.70	-86	155
1.60	-85	164
1.50	-85	159
1.40	-86	166
1.30	-85	164
1.20	-85	172
1.10	-86	171
1.00	-85	172
.90	-85	176
.80	-85	184
.70	-85	185
.60	-85	192
.50	-85	196
.40	-84	202
.30	-84	207
.20	-83	212
.10	-81	219
.09	-80	217
.08	-80	218
.07	-80	219
.06	-79	219
.05	-79	218
.04	-78	218
.03	-78	218
.02	-77	215
.01	-76	213

GEOGRAPHIC LAT. = -75.00 LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-82	208
9.00	-82	205
8.00	-82	203
7.00	-83	208
6.00	-82	228
5.00	-80	222
4.00	-81	222
3.00	-79	225
2.00	-77	234
1.90	-76	232
1.80	-77	232
1.70	-76	235
1.60	-75	234
1.50	-76	234
1.40	-75	236
1.30	-75	235
1.20	-74	237
1.10	-74	238
1.00	-73	238
.90	-72	239
.80	-71	239
.70	-71	240
.60	-70	241
.50	-68	241
.40	-67	242
.30	-64	242
.20	-61	242
.10	-56	241
.09	-55	241
.08	-54	241
.07	-53	240
.06	-51	240
.05	-51	238
.04	-49	237
.03	-47	236
.02	-46	234
.01	-44	231

GEOGRAPHIC LAT. = -75.00 LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-76	240
9.00	-76	239
8.00	-76	240
7.00	-76	245
6.00	-74	250
5.00	-72	247
4.00	-72	249
3.00	-69	250
2.00	-65	254
1.90	-65	252
1.80	-65	253
1.70	-64	254
1.60	-63	254
1.50	-63	254
1.40	-62	255
1.30	-61	254
1.20	-60	255
1.10	-59	256
1.00	-59	256
.90	-57	256
.80	-56	256
.70	-55	257
.60	-52	257
.50	-50	253
.40	-47	258
.30	-43	259
.20	-38	259
.10	-26	259
.09	-25	259
.08	-22	259
.07	-28	259
.06	-17	259
.05	-14	259
.04	-11	258
.03	-7	256
.02	-1	255
.01	4	258

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -75.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-69	259
9.00	-69	258
8.00	-69	260
7.00	-68	263
6.00	-65	265
5.00	-63	263
4.00	-62	265
3.00	-58	265
2.00	-53	268
1.90	-52	267
1.80	-52	267
1.70	-51	269
1.60	-50	268
1.50	-50	268
1.40	-48	269
1.30	-48	269
1.20	-46	269
1.10	-45	270
1.00	-44	270
.90	-42	271
.80	-40	271
.70	-38	272
.60	-35	273
.50	-31	274
.40	-27	275
.30	-20	277
.20	-10	281
.10	11	294
.09	15	300
.08	19	303
.07	24	315
.06	27	333
.05	-8	462
.04	F	F

GEOGRAPHIC
LAT. = -75.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
11.00	-62	-88
1.00	-62	-88
9.00	-62	-86
8.00	-60	-83
7.00	-57	-81
6.00	-54	-84
5.00	-53	-82
4.00	-48	-87
3.00	-41	-79
2.00	-40	-79
1.90	-39	-79
1.80	-39	-78
1.70	-36	-78
1.60	-35	-78
1.50	-34	-77
1.40	-33	-77
1.30	-31	-76
1.20	-30	-76
1.10	-29	-75
1.00	-25	-74
.90	-23	-72
.80	-19	-71
.70	-1	-70
.60	-11	-67
.50	-4	-62
.40	5	-54
.30	17	-28
.20	15	-22
.19	13	-15
.18	17	-7
.17	14	3
.16	3	19
.15	-7	45
.14	3	269
.13	13	196
.12	F	F

GEOGRAPHIC
LAT. = -75.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-54	-75
9.00	-54	-76
8.00	-54	-74
7.00	-53	-71
6.00	-48	-69
5.00	-44	-71
4.00	-43	-70
3.00	-37	-70
2.00	-29	-65
1.90	-27	-65
1.80	-26	-66
1.70	-26	-64
1.60	-23	-63
1.50	-22	-64
1.40	-21	-62
1.30	-18	-62
1.20	-16	-60
1.10	-14	-59
1.00	-11	-58
.90	-8	-56
.80	-5	-53
.70	0	-49
.60	5	-44
.50	11	-34
.40	16	-18
.30	8	28
.29	3	37
.28	-2	49
.27	-8	64
.26	-9	93
.25	-1	407
.24	13	544
.23	0	277
.22	R	R

GEOGRAPHIC
LAT. = -75.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-47	-64
9.00	-47	-65
8.00	-47	-63
7.00	-45	-60
6.00	-40	-58
5.00	-35	-59
4.00	-34	-59
3.00	-28	-57
2.00	-17	-51
1.90	-14	-50
1.80	-12	-51
1.70	-12	-50
1.60	-10	-46
1.50	-7	-47
1.40	-6	-46
1.30	-3	-45
1.20	-1	-42
1.10	2	-39
1.00	6	-35
.90	9	-30
.80	13	-23
.70	16	-13
.60	17	5
.50	9	37
.49	6	46
.48	4	48
.47	2	55
.46	-2	64
.45	-4	72
.44	-7	90
.43	-6	105
.42	14	158
.41	-14	377
.40	4	487
.39	15	434
.38	-3	239
.37	-5	240
.36	10	2616
.35	F	F

GEOGRAPHIC
LAT. = -75.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-56	320
19.00	-53	319
18.00	-51	318
17.00	-49	317
16.00	-47	316
15.00	-45	315
14.00	-44	313
13.00	-42	311
12.00	-40	309
11.00	-39	308
10.00	-39	306
9.00	-39	306
8.00	-40	307
7.00	-38	310
6.00	-33	313
5.00	-26	312
4.00	-25	312
3.00	-14	316
2.00	-5	323
1.90	-2	325
1.80	1	327
1.70	2	327
1.60	3	330
1.50	7	333
1.40	8	335
1.30	11	339
1.20	13	343
1.10	16	351
1.00	18	359
.90	18	11
.80	16	30
.70	4	61
.69	2	65
.68	0	71
.67	-3	81
.66	-6	90
.65	-6	97
.64	-6	106
.63	-3	126
.62	15	178
.61	-7	249
.60	15	388
.59	10	419
.58	R	R

GEOGRAPHIC
LAT. = -75.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-49	-31
19.00	-48	-31
18.00	-46	-32
17.00	-44	-33
16.00	-42	-34
15.00	-39	-36
14.00	-37	-37
13.00	-35	-39
12.00	-34	-41
11.00	-33	-43
10.00	-32	-44
9.00	-32	-45
8.00	-33	-44
7.00	-32	-41
6.00	-27	-37
5.00	-18	-32
4.00	-16	-32
3.00	-4	-31
2.00	6	-21
1.90	8	-18
1.80	12	-14
1.70	14	-12
1.60	14	-9
1.50	17	-5
1.40	19	3
1.30	19	9
1.20	20	21
1.10	18	34
1.00	12	51
.90	-1	85
.80	-10	271
.79	4	607
.78	3	530
.77	-5	259
.76	2	597
.75	6	421
.74	-1	968
.73	-9	1379
.72	-5	686
.71	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -75.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-45	-22
19.00	-43	-23
18.00	-41	-24
17.00	-39	-25
16.00	-37	-26
15.00	-35	-27
14.00	-32	-29
13.00	-30	-31
12.00	-28	-32
11.00	-27	-34
10.00	-26	-36
9.00	-26	-37
8.00	-27	-36
7.00	-26	-33
6.00	-21	-28
5.00	-11	-27
4.00	-8	-28
3.00	4	-19
2.00	15	-3
1.90	16	0
1.80	19	6
1.70	21	12
1.60	21	16
1.50	21	24
1.40	21	38
1.30	17	46
1.20	9	69
1.10	-1	93
1.09	-2	98
1.08	-4	105
1.07	-6	114
1.06	-7	126
1.05	-9	141
1.04	3	163
1.03	14	199
1.02	-15	320
1.01	-4	261
1.00	-3	216
.99	16	448
.98	2	586
.97	8	724
.96	R	R

GEOGRAPHIC
LAT. = -75.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
25.00	-42	-14
19.00	-40	-15
19.00	-38	-15
17.00	-36	-17
16.00	-33	-18
15.00	-31	-19
14.00	-29	-21
13.00	-26	-23
12.00	-24	-25
11.00	-21	-27
10.00	-22	-28
9.00	-22	-29
8.00	-23	-29
7.00	-23	-26
6.00	-15	-21
5.00	-7	-19
4.00	-5	-19
3.00	4	-8
2.90	11	-7
2.80	12	-7
2.70	12	-6
2.60	12	-5
2.50	12	-3
2.40	13	-1
2.30	16	3
2.20	19	7
2.10	21	11
2.00	21	13
1.90	21	16
1.80	22	23
1.70	24	33
1.60	22	41
1.50	20	48
1.40	15	67
1.30	4	85
1.29	4	86
1.28	3	88
1.27	3	90
1.26	2	93
1.25	1	96
1.24	0	99
1.23	-2	104
1.22	-4	110
1.21	-6	118
1.20	-7	127
1.19	-7	140
1.18	-3	156
1.17	3	180
1.16	12	232
1.15	R	R

GEOGRAPHIC
LAT. = -75.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-40	-6
19.00	-38	-7
18.00	-36	-8
17.00	-33	-9
16.00	-31	-10
15.00	-29	-12
14.00	-26	-14
13.00	-24	-15
12.00	-22	-17
11.00	-20	-20
10.00	-19	-21
9.00	-20	-23
8.00	-20	-22
7.00	-21	-19
6.00	-16	-14
5.00	-5	-11
4.00	0	-12
3.00	12	0
2.90	14	1
2.80	15	2
2.70	15	2
2.60	15	3
2.50	15	5
2.40	16	7
2.30	18	11
2.20	21	16
2.10	24	21
2.00	24	24
1.90	23	27
1.80	23	33
1.70	25	44
1.60	21	56
1.50	18	62
1.40	12	81
1.30	-4	110
1.29	-4	112
1.28	-5	115
1.27	-5	117
1.26	-6	120
1.25	-6	124
1.24	-7	128
1.23	-7	134
1.22	-7	143
1.21	-6	154
1.20	-1	173
1.19	10	209
1.18	R	R

GEOGRAPHIC
LAT. = -75.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-38	1
19.00	-36	0
18.00	-34	-1
17.00	-32	-2
16.00	-30	-3
15.00	-28	-5
14.00	-25	-7
13.00	-23	-9
12.00	-21	-11
11.00	-20	-13
10.00	-19	-15
9.00	-19	-16
8.00	-20	-16
7.00	-20	-15
6.00	-18	-8
5.00	-5	-5
4.00	1	-6
3.00	11	4
2.90	13	5
2.80	15	6
2.70	16	7
2.60	15	8
2.50	15	9
2.40	15	11
2.30	17	14
2.20	21	19
2.10	24	23
2.00	25	27
1.90	24	30
1.80	24	34
1.70	26	44
1.60	24	56
1.50	21	62
1.40	18	76
1.30	3	100
1.20	-6	127
1.19	-7	134
1.18	-8	145
1.17	-8	159
1.16	-2	180
1.15	12	225
1.14	R	R

GEOGRAPHIC
LAT. = -75.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-38	8
19.00	-38	7
18.00	-34	6
17.00	-32	5
16.00	-30	3
15.00	-28	2
14.00	-26	0
13.00	-24	-2
12.00	-22	-4
11.00	-21	-7
10.00	-20	-9
9.00	-20	-10
8.00	-22	-10
7.00	-22	-7
6.00	-18	-2
5.00	-7	0
4.00	-1	-2
3.00	6	8
2.00	23	25
1.90	23	26
1.80	23	30
1.70	26	37
1.60	27	46
1.50	26	51
1.40	25	61
1.30	19	79
1.20	13	90
1.10	-7	130
1.00	-12	270
.94	18	417
.98	-26	654
.97	-18	598
.96	-5	361
.95	-17	343
.94	-8	561
.93	3	731
.92	5	392
.91	-16	693
.90	-10	1052
.89	2	917
.88	5	2686
.87	R	R

GEOGRAPHIC
LAT. = -75.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
20.00	-38	15
19.00	-36	14
18.00	-34	13
17.00	-32	11
16.00	-31	10
15.00	-29	8
14.00	-27	6
13.00	-25	4
12.00	-24	2
11.00	-23	-1
10.00	-23	-3
9.00	-23	-4
8.00	-25	-4
7.00	-25	-1
6.00	-21	4
5.00	-10	5
4.00	-6	2
3.00	4	10
2.00	18	21
1.90	18	22
1.80	18	25
1.70	22	30
1.60	26	35
1.50	25	38
1.40	27	45
1.30	28	56
1.20	26	64
1.10	23	83
1.00	11	103
.90	-8	141
.89	-10	153
.88	-9	173
.87	1	203
.86	-8	291
.85	6	348
.84	-4	238
.83	-15	370
.82	-20	268
.81	-4	364
.80	1	[illegible]
.79	6	667
.78	-14	983
.77	-14	274
.76	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -80.00
LONG. = 5.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-37	358
9.00	-38	357
8.00	-39	358
7.00	-39	2
6.00	-33	6
5.00	-26	3
4.00	-26	0
3.00	-16	3
2.00	-9	4
1.90	-8	6
1.80	-5	7
1.70	-2	7
1.60	-2	7
1.50	0	9
1.40	4	10
1.30	4	11
1.20	9	13
1.10	10	16
1.00	14	18
.90	19	23
.80	22	29
.70	26	40
.60	28	56
.50	19	87
.49	18	91
.48	14	98
.47	11	101
.46	8	107
.45	2	116
.44	-1	121
.43	-8	136
.42	-11	151
.41	-8	183
.40	-17	599
.39	-1	319
.38	R	R

GEOGRAPHIC
LAT. = -80.00
LONG. = 15.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
11.00	-43	3
1.00	-42	2
1.00	-43	4
7.00	-42	6
6.00	-36	11
5.00	-30	7
4.00	-31	5
3.00	-21	6
2.00	-15	7
1.90	-1[illegible]	9
1.80	-11	10
1.70	-4	9
1.60	-10	9
1.50	-7	11
1.40	-4	10
1.30	-4	12
1.20	1	12
1.10	2	14
1.00	[illegible]	15
.90	[illegible]	17
.80	13	20
.70	19	26
.60	24	35
.50	28	49
.40	25	81
.39	22	86
.38	21	91
.37	16	98
.36	14	103
.35	1	109
.34	1	121
.33	-5	132
.32	-12	149
.31	-[illegible]	154
.30	-6	246
.29	R	R

GEOGRAPHIC
LAT. = -80.00
LONG. = 30.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-45	6
9.00	-46	7
8.00	-47	10
7.00	-45	14
6.00	-40	16
5.00	-35	11
4.00	-36	10
3.00	-28	10
2.00	-23	11
1.90	-21	12
1.80	-18	12
1.70	-17	11
1.60	-16	12
1.50	-14	13
1.40	-13	11
1.30	-12	11
1.20	-9	12
1.10	-7	14
1.00	-5	15
.90	-2	15
.80	2	17
.70	7	19
.60	13	23
.50	19	29
.40	27	41
.30	30	72
.29	28	79
.28	27	85
.27	24	92
.26	19	100
.25	12	109
.24	4	120
.23	-10	141
.22	-13	164
.21	6	1279
.20	-1	441
.19	-4	1361
.18	R	R

GEOGRAPHIC
LAT. = -80.00
LONG. = 45.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-50	12
9.00	-51	13
8.00	-51	16
7.00	-49	18
6.00	-44	20
5.00	-41	15
4.00	-41	17
3.00	-35	15
2.00	-31	15
1.90	-26	16
1.80	-26	14
1.70	-27	13
1.60	-26	15
1.50	-23	15
1.40	-23	14
1.30	-21	15
1.20	-20	14
1.10	-17	15
1.00	-15	16
.90	-13	16
.80	-4	16
.70	-7	16
.60	-2	17
.50	4	19
.40	11	23
.30	22	32
.29	33	45
.28	33	72
.27	31	83
.26	27	93
.25	18	107
.24	-1	128
.23	7	233
.22	2	1370
.21	F	F

GEOGRAPHIC
LAT. = -80.00
LONG. = 60.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-55	17
9.00	-56	18
8.00	-56	22
7.00	-54	25
6.00	-49	24
5.00	-47	18
4.00	-48	20
3.00	-43	17
2.00	-38	19
1.90	-36	18
1.80	-36	16
1.70	-36	17
1.60	-35	18
1.50	-33	16
1.40	-33	17
1.30	-30	17
1.20	-31	17
1.10	-28	16
1.00	-26	17
.90	-24	17
.80	-22	16
.70	-20	17
.60	-17	17
.50	-13	17
.40	-6	18
.30	2	19
.20	15	24
.19	17	25
.18	19	27
.17	21	29
.16	24	30
.15	26	34
.14	29	38
.13	32	41
.12	35	47
.11	38	57
.10	38	72
.09	33	94
.08	22	1137
.07	7	474
.06	F	F

GEOGRAPHIC
LAT. = -80.00
LONG. = 75.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-61	21
9.00	-62	23
8.00	-62	27
7.00	-59	32
6.00	-55	28
5.00	-54	21
4.00	-55	27
3.00	-52	23
2.00	-47	22
1.90	-45	20
1.80	-46	19
1.70	-46	20
1.60	-44	20
1.50	-43	18
1.40	-41	20
1.30	-41	19
1.20	-41	19
1.10	-40	17
1.00	-38	17
.90	-36	17
.80	-35	17
.70	-33	17
.60	-30	16
.50	-27	16
.40	-24	15
.30	-18	15
.20	-[illegible]	14
.19	10	16
.18	13	16
.08	17	10
.07	21	18
.06	28	21
.05	34	25
.04	46	37
.03	16	165
.02	F	F

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC LAT. = -80.00 LONG. = 90.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-67	25
9.00	-68	27
8.00	-67	32
7.00	-65	34
6.00	-62	38
5.00	-62	23
4.00	-62	26
3.00	-60	22
2.00	-55	22
1.90	-55	20
1.80	-56	20
1.70	-55	22
1.60	-53	20
1.50	-54	19
1.40	-53	21
1.30	-52	18
1.20	-51	20
1.10	-51	19
1.00	-50	17
.90	-49	17
.80	-48	17
.70	-46	16
.60	-44	15
.50	-42	14
.40	-39	14
.30	-35	12
.20	-29	10
.10	-19	6
.09	-17	6
.08	-15	5
.07	-13	4
.06	-11	3
.05	-8	2
.04	-4	0
.03	-1	350
.02	4	354
.01	9	348

GEOGRAPHIC LAT. = -80.00 LONG. = 105.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
13.00	-73	26
3.00	-74	29
1.00	-73	34
7.00	-71	35
6.00	-69	38
5.00	-69	23
4.00	-69	28
3.00	-68	22
2.00	-64	20
1.90	-64	18
1.80	-63	18
1.70	-64	20
1.60	-63	17
1.50	-64	17
1.40	-62	18
1.30	-63	16
1.20	-61	16
1.10	-61	16
1.00	-6.	15
.90	-60	14
.80	-59	14
.70	-58	13
.60	-57	11
.50	-55	
.40	-51	8
.30	-50	7
.20	-46	4
.10	-40	358
.09	-33	358
.08	-38	357
.07	-36	356
.06	-35	355
.05	-34	353
.04	-32	351
.03	-31	349
.02	-23	346
.01	-29	342

GEOGRAPHIC LAT. = -80.00 LONG. = 120.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-79	21
3.00	-79	25
8.00	-79	31
7.00	-77	32
6.00	-75	24
5.00	-76	14
4.00	-76	21
3.00	-75	13
2.00	-72	9
.90	-73	6
1.80	-73	8
1.70	-72	9
1.60	-72	5
1.50	-72	6
1.40	-71	5
1.30	-71	4
1.20	-70	3
1.10	-70	4
1.00	-70	3
.90	-69	2
	-68	0
	-68	359
.60	-66	358
.50	-65	357
.40	-64	354
.30	-62	351
.20	-59	348
.10	-54	342
.09	-54	342
.08	-53	340
.07	-52	340
.06	-51	338
.05	-50	337
.04	-49	335
.03	-48	332
.02	-47	330
.01	-46	326

GEOGRAPHIC LAT. = -80.00 LONG. = 135.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-83	356
9.00	-84	0
8.00	-83	9
7.00	-82	11
6.00	-80	1
5.00	-80	347
4.00	-80	355
3.00	-80	344
2.00	-76	340
1.90	-77	337
1.80	-77	339
1.70	-76	340
1.60	-76	336
1.50	-76	337
1.40	-75	337
1.30	-75	335
1.20	-74	334
1.10	-74	335
1.00	-74	334
.91	-73	333
.80	-72	331
.70	-71	330
.60	-70	329
.50	-69	328
.40	-67	326
.30	-65	323
.20	-62	320
.10	-57	315
.09	-56	314
.08	-56	313
.07	-55	312
.06	-53	311
.05	-53	310
.04	-51	306
.03	-50	306
.02	-49	303
.01	-48	299

GEOGRAPHIC LAT. = -80.00 LONG. = 150.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-82	313
9.00	-83	312
8.00	-83	318
7.00	-82	326
6.00	-80	323
5.00	-79	311
4.00	-79	316
3.00	-77	308
2.00	-74	309
1.90	-73	306
1.80	-74	307
1.70	-73	309
1.60	-72	307
1.50	-72	307
1.40	-71	307
1.30	-71	306
1.20	-70	306
1.10	-70	307
1.00	-69	306
.90	-68	305
.80	-67	305
.70	-66	304
.60	-65	304
.50	-63	303
.40	-61	302
.30	-58	300
.20	-54	299
.10	-46	296
.09	-45	295
.08	-44	294
.07	-43	294
.06	-41	293
.05	-40	291
.04	-38	290
.03	-36	288
.02	-35	285
.01	-32	281

GEOGRAPHIC LAT. = -80.00 LONG. = 165.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-78	295
9.00	-78	294
8.00	-78	297
7.00	-78	303
6.00	-75	304
5.00	-73	296
4.00	-73	299
3.00	-70	295
2.00	-66	297
1.90	-66	295
1.80	-66	295
1.70	-65	297
1.60	-64	296
1.50	-64	295
1.40	-63	296
1.30	-63	295
1.20	-61	296
1.10	-61	296
1.00	-60	296
.90	-59	295
.80	-57	296
.70	-56	295
.60	-54	295
.50	-51	295
.40	-49	295
.30	-44	294
.23	-39	294
.10	-27	293
.09	-25	292
.08	-23	292
.07	-21	291
.06	-19	291
.05	-15	290
.04	-12	289
.03	-8	287
.02	-2	285
.01	3	280

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -80.00
LONG. = 180.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-72	293
9.00	-72	292
8.00	-72	294
7.00	-71	299
6.00	-68	300
5.00	-66	294
4.00	-66	296
3.00	-62	294
2.00	-57	296
1.90	-56	295
1.80	-57	295
1.70	-56	296
1.60	-54	295
1.50	-54	295
1.40	-53	296
1.30	-52	295
1.20	-51	296
1.10	-50	295
1.00	-49	296
.90	-47	296
.80	-45	297
.70	-43	296
.60	-41	296
.50	-38	297
.40	-33	297
.30	-27	298
.20	-19	299
.10	0	303
.09	3	304
.08	7	306
.07	11	308
.06	17	313
.05	25	319
.04	34	331
.03	23	403
.02	F	F

GEOGRAPHIC
LAT. = -80.00
LONG. = 195.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
11.00	-66	-64
10.00	-66	-65
9.00	-66	-61
8.00	-65	-59
7.00	-61	-58
6.00	-59	-62
5.00	-55	-61
4.00	-54	-63
3.00	-49	-60
2.00	-47	-61
1.90	-47	-61
1.80	-46	-60
1.70	-44	-60
1.60	-44	-61
1.50	-42	-59
1.40	-41	-61
1.30	-39	-59
1.20	-39	-59
1.10	-37	-59
1.00	-35	-59
.90	-32	-58
.80	-29	-58
.70	-26	-57
.60	-22	-56
.50	-16	-54
.40	-9	-51
.30	5	-43
.20	7	-41
.19	8	-40
.18	10	-38
.17	13	-36
.16	15	-32
.15	18	-28
.14	20	-22
.13	23	-18
.12	24	-5
.11	27	7
.10	14	37
.09	-1	346
.08	F	F
.07		

GEOGRAPHIC
LAT. = -80.00
LONG. = 210.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-60	-59
9.00	-59	-60
8.00	-60	-58
7.00	-59	-55
6.00	-55	-53
5.00	-51	-57
4.00	-51	-56
3.00	-45	-57
2.00	-38	-54
1.90	-37	-54
1.80	-36	-55
1.70	-36	-54
1.60	-34	-53
1.50	-33	-54
1.40	-32	-53
1.30	-29	-53
1.20	-28	-52
1.10	-27	-52
1.00	-24	-51
.90	-21	-51
.80	-19	-50
.70	-15	-48
.60	-10	-46
.50	-5	-43
.40	2	-38
.30	12	-27
.20	21	-350
.19	19	19
.18	16	30
.17	9	44
.16	-5	69
.15	10	155
.14	-27	290
.13	0	1131
.12	F	F

GEOGRAPHIC
LAT. = -80.00
LONG. = 225.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-54	-53
9.00	-54	-54
8.00	-54	-52
7.00	-53	-49
6.00	-48	-47
5.00	-44	-50
4.00	-44	-53
3.00	-37	-50
2.00	-29	-46
1.90	-27	-46
1.80	-26	-47
1.70	-26	-46
1.60	-24	-45
1.50	-22	-46
1.40	-21	-44
1.30	-18	-44
1.20	-17	-43
1.10	-14	-42
1.00	-11	-41
.90	-8	-39
.80	-5	-37
.70	0	-33
.60	5	-29
.50	11	-21
.40	18	-6
.30	16	-329
.29	14	38
.28	11	46
.27	6	57
.26	-1	71
.25	-8	91
.24	0	141
.23	-10	204
.22	12	916
.21	-14	312
.20	R	R

GEOGRAPHIC
LAT. = -80.00
LONG. = 240.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-48	-47
9.00	-48	-48
8.00	-49	-46
7.00	-47	-43
6.00	-43	-40
5.00	-37	-43
4.00	-37	-43
3.00	-28	-43
2.00	-21	-38
1.90	-18	-37
1.80	-16	-38
1.70	-16	-38
1.60	-14	-36
1.50	-11	-36
1.40	-11	-35
1.30	-7	-33
1.20	-6	-32
1.10	-2	-30
1.00	1	-27
.90	5	-24
.80	9	-20
.70	12	-14
.60	17	-4
.50	20	15
.40	10	56
.39	6	63
.38	2	73
.37	-2	81
.36	-8	191
.35	-6	127
.34	17	193
.33	-5	361
.32	-20	320
.31	0	291
.30	18	810
.29	F	F

GEOGRAPHIC
LAT. = -80.00
LONG. = 255.00

RIG (GV)	ASYMPTOTIC LAT	ASYMPTOTIC LONG
10.00	-43	-41
9.00	-43	-41
8.00	-44	-40
7.00	-43	-37
6.00	-38	-34
5.00	-31	-36
4.00	-31	-37
3.00	-21	-35
2.00	-13	-30
1.90	-10	-29
1.80	-7	-28
1.70	-7	-23
1.60	-6	-27
1.50	-2	-25
1.40	-1	-24
1.30	2	-21
1.20	4	-20
1.10	9	-16
1.00	11	-12
.90	14	-7
.80	19	2
.70	21	14
.60	19	35
.50	1	88
.49	-1	86
.48	-5	98
.47	-7	115
.46	-6	130
.45	16	205
.44	-16	333
.43	18	798
.42	19	898
.41	-15	988
.40	7	458
.39	R	R

TABLE A1 (CONTINUED)

ASYMPTOTIC DIRECTIONS FOR WORLD GRID LOCATIONS
CALCULATED WITH THE INTERNATIONAL GEOMAGNETIC REFERENCE FIELD (EPOCH 1975.0)

GEOGRAPHIC
LAT. = -80.00
LONG. = 270.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-38	-35
9.00	-39	-35
8.00	-40	-34
7.00	-39	-31
6.00	-34	-28
5.00	-26	-29
4.00	-25	-38
3.00	-15	-27
2.00	-6	-22
1.90	-4	-20
1.80	0	-19
1.70	1	-19
1.60	1	-17
1.50	5	-14
1.40	8	-13
1.30	9	-10
1.20	13	-7
1.10	16	-1
1.00	18	-356
.90	21	13
.80	22	27
.70	18	50
.60	-1	92
.59	-3	98
.58	-4	104
.57	-7	120
.56	-4	146
.55	8	172
.54	-11	272
.53	-10	227
.52	4	454
.51	6	509
.50	5	816
.49	0	597
.48	R	R

GEOGRAPHIC
LAT. = -80.00
LONG. = 285.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-35	-29
9.00	-35	-30
8.00	-37	-29
7.00	-36	-25
6.00	-31	-22
5.00	-22	-23
4.00	-21	-24
3.00	-10	-20
2.00	-1	-15
1.90	0	-13
1.80	4	-11
1.70	7	-10
1.60	7	-9
1.50	10	-5
1.40	13	-3
1.30	14	0
1.20	13	6
1.10	20	12
1.00	22	-340
.90	23	33
.80	20	51
.70	6	85
.59	3	90
.58	1	94
.57	0	98
.56	-2	104
.55	-6	116
.54	-8	134
.53	-4	152
.52	1	169
.51	12	227
.50	-6	299
.49	-6	519
.48	R	R

GEOGRAPHIC
LAT. = -80.00
LONG. = 300.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-33	-23
9.00	-34	-24
8.00	-35	-23
7.00	-34	-20
6.00	-29	-16
5.00	-20	-17
4.00	-19	-19
3.00	-8	-14
2.00	2	-9
1.90	3	-7
1.80	6	-4
1.70	10	-3
1.60	10	-2
1.50	12	2
1.40	16	5
1.30	17	8
1.20	21	15
1.10	22	20
1.00	24	-329
.90	23	46
.80	17	66
.70	-1	105
.69	-5	116
.68	-8	128
.67	-8	134
.66	-7	145
.65	-2	167
.64	-27	322
.63	-2	278
.62	-1	339
.61	-9	377
.60	-7	343
.59	4	523
.58	8	467
.57	2	1616
.56	13	474
.55	R	R

GEOGRAPHIC
LAT. = -80.00
LONG. = 315.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-32	-18
9.00	-33	-19
8.00	-34	-18
7.00	-34	-15
6.00	-29	-10
5.00	-20	-12
4.00	-19	-14
3.00	-8	-9
2.00	2	-4
1.90	3	-3
1.80	6	0
1.70	10	2
1.60	10	2
1.50	12	6
1.40	17	9
1.30	17	12
1.20	22	19
1.10	22	23
1.00	25	-326
.90	25	49
.80	19	68
.70	4	100
.60	5	398
.59	4	897
.58	15	435
.57	-2	1273
.56	5	4032
.55	-7	3122
.54	-5	2797
.53	F	F

GEOGRAPHIC
LAT. = -80.00
LONG. = 330.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-33	-12
9.00	-34	-14
8.00	-35	-13
7.00	-34	-9
6.00	-29	-5
5.00	-21	-7
4.00	-20	-9
3.00	-9	-5
2.00	1	-1
1.90	1	1
1.80	4	3
1.70	8	4
1.60	3	4
1.50	10	7
1.40	15	10
1.30	15	12
1.20	20	18
1.10	21	22
1.00	24	30
.90	26	43
.80	25	59
.70	17	81
.60	-9	148
.59	-8	161
.58	11	224
.57	-9	310
.56	-2	529
.55	16	497
.54	2	374
.53	-9	370
.52	1	3094
.51	3	3294
.50	8	1858
.49	-16	3882
.48	R	R

GEOGRAPHIC
LAT. = -80.00
LONG. = 345.00

RIG (GV)	ASYMPTOTIC LAT	LONG
10.00	-34	-7
9.00	-35	-8
8.00	-37	-7
7.00	-36	-4
6.00	-31	0
5.00	-23	-2
4.00	-22	-5
3.00	-12	-1
2.00	-3	2
1.90	-3	3
1.80	0	5
1.70	4	6
1.60	4	6
1.50	5	8
1.40	10	10
1.30	11	11
1.20	16	16
1.10	17	18
1.00	21	24
.90	25	32
.80	27	43
.70	26	59
.60	16	88
.50	11	226
.49	-12	751
.48	-24	279
.47	-9	620
.46	-3	1881
.45	9	1218
.44	2	1861
.43	-5	2884
.42	-15	4986
.41	F	F

Appendix B

Table of Vertical Cutoff Rigidities for a World Grid as Calculated Utilizing the International Geomagnetic Reference Field for Epoch 1975.0

The table in this appendix summarizes the vertical cutoff rigidity values for a world grid with locations 5 degrees in latitude and 15 degrees in longitude. Each of these values has been determined by the trajectory-tracing technique utilizing the International Geomagnetic Reference Field[27] with time derivatives applied so that the coefficients of the model are appropriate for a 1975.0 Epoch.

The format of this table is:

Geographic Location:	The geographic coordinates of each grid point are given with the latitude as positive for the northern hemisphere and negative for the southern hemisphere, and the longitude in degrees East of Greenwich.
L value:	The L value, in Earth radii, calculated using the International Geomagnetic Reference Field[27] (Epoch 1975.0).
P(M):	The main cone cutoff rigidity (in GV) for this location.
P(S):	The Störmer cutoff rigidity (in GV) for this location.
Penumbral width:	The difference between the main cone cutoff rigidity and the Störmer cutoff rigidity (in GV).
PC:	The effective vertical cutoff rigidity (in GV) for this location.

PRECEDING PAGE BLANK-NOT FILMED

TABLE 31

SUMMARY OF VERTICAL CUTOFF RIGIDITIES FOR THE WORLD GRID
AS CALCULATED USING THE IGRF (EPOCH 1975.0) GEOMAGNETIC FIELD MODEL

IDENTIFICATION	GEOGRAPHIC LAT.	GEOGRAPHIC LONG.	L VALUE	P(M)	P(S)	PENUMBRAL WIDTH	PC
WORLD GRID	90.00	0.00	22.289	0.02	0.02	0.00	0.02
WORLD GRID	90.00	15.00	18.103	0.04	0.04	0.00	0.04
WORLD GRID	90.00	30.00	15.655	0.06	0.06	0.00	0.06
WORLD GRID	90.00	45.00	14.141	0.09	0.09	0.00	0.09
WORLD GRID	90.00	60.00	13.174	0.09	0.09	0.00	0.09
WORLD GRID	90.00	75.00	12.550	0.10	0.10	0.00	0.10
WORLD GRID	90.00	90.00	12.145	0.10	0.10	0.00	0.10
WORLD GRID	90.00	105.00	11.919	0.11	0.11	0.00	0.11
WORLD GRID	90.00	120.00	11.862	0.11	0.11	0.00	0.11
WORLD GRID	90.00	135.00	12.036	0.11	0.11	0.00	0.11
WORLD GRID	90.00	150.00	12.548	0.10	0.10	0.00	0.10
WORLD GRID	90.00	165.00	13.558	0.08	0.08	0.00	0.08
WORLD GRID	90.00	180.00	15.449	0.06	0.06	0.00	0.06
WORLD GRID	90.00	195.00	18.747	0.04	0.04	0.00	0.04
WORLD GRID	90.00	210.00	24.802				0.00
WORLD GRID	90.00	225.00	37.012				0.00
WORLD GRID	90.00	240.00	66.384				0.00
WORLD GRID	90.00	255.00	168.954				0.00
WORLD GRID	90.00	270.00	1166.328				0.00
WORLD GRID	90.00	285.00	2270.021				0.00
WORLD GRID	90.00	300.00	222.175				0.00
WORLD GRID	90.00	315.00	81.770				0.00
WORLD GRID	90.00	330.00	44.623				0.00
WORLD GRID	90.00	345.00	29.617				0.00
WORLD GRID	75.00	0.00	12.265	0.10	0.10	0.00	0.10
WORLD GRID	75.00	15.00	10.392	0.14	0.14	0.00	0.14
WORLD GRID	75.00	30.00	9.274	0.18	0.18	0.00	0.18
WORLD GRID	75.00	45.00	8.597	0.20	0.20	0.00	0.20
WORLD GRID	75.00	60.00	8.175	0.25	0.22	0.03	0.23
WORLD GRID	75.00	75.00	7.896	0.25	0.25	0.00	0.25
WORLD GRID	75.00	90.00	7.697	0.25	0.25	0.00	0.25
WORLD GRID	75.00	105.00	7.532	0.26	0.26	0.00	0.26
WORLD GRID	75.00	120.00	7.422	0.27	0.27	0.00	0.27
WORLD GRID	75.00	135.00	7.393	0.28	0.28	0.00	0.28
WORLD GRID	75.00	150.00	7.538	0.26	0.26	0.00	0.26
WORLD GRID	75.00	165.00	7.973	0.24	0.24	0.00	0.24
WORLD GRID	75.00	180.00	8.840	0.20	0.20	0.00	0.20
WORLD GRID	75.00	195.00	10.432	0.14	0.14	0.00	0.14
WORLD GRID	75.00	210.00	13.351	0.09	0.09	0.00	0.09
WORLD GRID	75.00	225.00	18.986	0.03	0.03	0.00	0.03
WORLD GRID	75.00	240.00	31.392				0.00
WORLD GRID	75.00	255.00	60.833				0.00
WORLD GRID	75.00	270.00	127.499				0.00
WORLD GRID	75.00	285.00	134.101				0.00
WORLD GRID	75.00	300.00	67.879				0.00
WORLD GRID	75.00	315.00	35.838				0.00
WORLD GRID	75.00	330.00	21.824	0.02	0.02	0.00	0.02
WORLD GRID	75.00	345.00	15.577	0.07	0.07	0.00	0.07
WORLD GRID	70.00	0.00	7.554	0.26	0.26	0.00	0.26
WORLD GRID	70.00	15.00	6.626	0.34	0.34	0.00	0.34
WORLD GRID	70.00	30.00	6.073	0.41	0.41	0.00	0.41
WORLD GRID	70.00	45.00	5.741	0.49	0.45	0.04	0.47
WORLD GRID	70.00	60.00	5.541	0.49	0.49	0.00	0.49
WORLD GRID	70.00	75.00	5.406	0.56	0.50	0.06	0.51
WORLD GRID	70.00	90.00	5.293	0.52	0.52	0.00	0.52
WORLD GRID	70.00	105.00	5.173	0.55	0.55	0.00	0.55
WORLD GRID	70.00	120.00	5.061	0.65	0.56	0.09	0.59
WORLD GRID	70.00	135.00	4.985	0.60	0.60	0.00	0.60
WORLD GRID	70.00	150.00	5.008	0.66	0.61	0.05	0.62
WORLD GRID	70.00	165.00	5.201	0.56	0.56	0.00	0.56
WORLD GRID	70.00	180.00	5.653	0.47	0.47	0.00	0.47
WORLD GRID	70.00	195.00	6.512	0.39	0.35	0.04	0.36
WORLD GRID	70.00	210.00	8.045	0.23	0.23	0.00	0.23
WORLD GRID	70.00	225.00	10.813	0.13	0.13	0.00	0.13
WORLD GRID	70.00	240.00	15.979	0.06	0.06	0.00	0.06
WORLD GRID	70.00	255.00	25.449				0.00
WORLD GRID	70.00	270.00	37.786				0.00
WORLD GRID	70.00	285.00	38.408				0.00
WORLD GRID	70.00	300.00	26.671				0.00
WORLD GRID	70.00	315.00	17.240	0.05	0.05	0.00	0.05
WORLD GRID	70.00	330.00	12.002	0.11	0.11	0.00	0.11
WORLD GRID	70.00	345.00	9.165	0.18	0.18	0.00	0.18

TABLE B1 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT.	GEOGRAPHIC LONG.	L VALUE	P(M)	P(S)	PENUMBRAL WIDTH	PC
WORLD GRID	65.00	0.00	5.181	0.63	0.57	0.06	0.58
WORLD GRID	65.00	15.00	4.597	0.78	0.71	0.07	0.72
WORLD GRID	65.00	30.00	4.295	0.83	0.78	0.05	0.80
WORLD GRID	65.00	45.00	4.116	0.96	0.88	0.08	0.89
WORLD GRID	65.00	60.00	4.087	1.01	0.91	0.10	0.93
WORLD GRID	65.00	75.00	3.929	1.05	0.93	0.12	0.97
WORLD GRID	65.00	90.00	3.860	1.09	0.98	0.11	1.01
WORLD GRID	65.00	105.00	3.776	1.15	0.99	0.16	1.03
WORLD GRID	65.00	120.00	3.683	1.26	0.99	0.27	1.12
WORLD GRID	65.00	135.00	3.605	1.28	1.15	0.13	1.19
WORLD GRID	65.00	150.00	3.591	1.29	1.16	0.13	1.20
WORLD GRID	65.00	165.00	3.687	1.21	1.10	0.11	1.13
WORLD GRID	65.00	180.00	3.956	1.07	0.91	0.16	0.95
WORLD GRID	65.00	195.00	4.465	0.76	0.73	0.03	0.74
WORLD GRID	65.00	210.00	5.355	0.57	0.50	0.07	0.53
WORLD GRID	65.00	225.00	6.862	0.32	0.32	0.00	0.32
WORLD GRID	65.00	240.00	9.404	0.17	0.17	0.00	0.17
WORLD GRID	65.00	255.00	13.349	0.09	0.09	0.00	0.09
WORLD GRID	65.00	270.00	17.489	0.05	0.05	0.00	0.05
WORLD GRID	65.00	285.00	17.729	0.04	0.04	0.00	0.04
WORLD GRID	65.00	300.00	13.856	0.08	0.08	0.00	0.08
WORLD GRID	65.00	315.00	9.974	0.16	0.16	0.00	0.16
WORLD GRID	65.00	330.00	7.455	0.28	0.28	0.00	0.28
WORLD GRID	65.00	345.00	5.974	0.42	0.42	0.00	0.42
WORLD GRID	60.00	0.00	3.698	1.22	1.08	0.14	1.14
WORLD GRID	60.00	15.00	3.399	1.43	1.28	0.15	1.34
WORLD GRID	60.00	30.00	3.223	1.64	1.36	0.28	1.46
WORLD GRID	60.00	45.00	3.117	1.67	1.45	0.22	1.57
WORLD GRID	60.00	60.00	3.047	1.75	1.46	0.29	1.61
WORLD GRID	60.00	75.00	2.993	1.92	1.53	0.29	1.67
WORLD GRID	60.00	90.00	2.940	1.89	1.60	0.29	1.73
WORLD GRID	60.00	105.00	2.882	1.95	1.72	0.24	1.82
WORLD GRID	60.00	120.00	2.814	2.07	1.81	0.26	1.95
WORLD GRID	60.00	135.00	2.752	2.21	1.91	0.30	2.05
WORLD GRID	60.00	150.00	2.731	2.25	1.84	0.42	2.05
WORLD GRID	60.00	165.00	2.790	2.15	1.72	0.43	1.99
WORLD GRID	60.00	180.00	2.967	1.87	1.60	0.27	1.75
WORLD GRID	60.00	195.00	3.296	1.52	1.27	0.25	1.40
WORLD GRID	60.00	210.00	3.856	1.10	0.90	0.20	1.00
WORLD GRID	60.00	225.00	4.750	0.66	0.64	0.02	0.65
WORLD GRID	60.00	240.00	6.140	0.43	0.39	0.04	0.40
WORLD GRID	60.00	255.00	8.101	0.22	0.22	0.00	0.22
WORLD GRID	60.00	270.00	9.979	0.17	0.15	0.02	0.16
WORLD GRID	60.00	285.00	10.158	0.14	0.14	0.00	0.14
WORLD GRID	60.00	300.00	8.437	0.21	0.21	0.00	0.21
WORLD GRID	60.00	315.00	6.469	0.40	0.37	0.03	0.38
WORLD GRID	60.00	330.00	5.068	0.65	0.56	0.09	0.59
WORLD GRID	60.00	345.00	4.287	0.94	0.82	0.12	0.86
WORLD GRID	55.00	0.00	2.828	2.11	1.80	0.31	1.94
WORLD GRID	55.00	15.00	2.643	2.36	1.99	0.37	2.28
WORLD GRID	55.00	30.00	2.533	2.64	2.34	0.30	2.47
WORLD GRID	55.00	45.00	2.465	2.80	2.30	0.50	2.61
WORLD GRID	55.00	60.00	2.413	2.80	2.37	0.43	2.60
WORLD GRID	55.00	75.00	2.367	3.04	2.16	0.88	2.70
WORLD GRID	55.00	90.00	2.325	3.16	2.56	0.60	2.85
WORLD GRID	55.00	105.00	2.284	3.29	2.65	0.64	2.92
WORLD GRID	55.00	120.00	2.230	3.43	2.76	0.67	3.12
WORLD GRID	55.00	135.00	2.193	3.55	2.91	0.64	3.31
WORLD GRID	55.00	150.00	2.178	3.59	3.03	0.56	3.35
WORLD GRID	55.00	165.00	2.223	3.45	2.77	0.68	3.15
WORLD GRID	55.00	180.00	2.350	3.15	2.70	0.45	2.88
WORLD GRID	55.00	195.00	2.579	2.49	1.96	0.53	2.22
WORLD GRID	55.00	210.00	2.958	1.87	1.61	0.26	1.75
WORLD GRID	55.00	225.00	3.509	1.31	1.21	0.10	1.23
WORLD GRID	55.00	240.00	4.332	0.85	0.76	0.09	0.78
WORLD GRID	55.00	255.00	5.420	0.58	0.58	0.00	0.58
WORLD GRID	55.00	270.00	6.436	0.36	0.36	0.00	0.36
WORLD GRID	55.00	285.00	6.585	0.38	0.35	0.03	0.36
WORLD GRID	55.00	300.00	5.694	0.46	0.46	0.00	0.46
WORLD GRID	55.00	315.00	4.352	0.91	0.73	0.00	0.75
WORLD GRID	55.00	330.00	3.606	1.24	1.04	0.20	1.13
WORLD GRID	55.00	345.00	3.142	1.72	1.41	0.31	1.59

TABLE B1 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT.	GEOGRAPHIC LONG.	L VALUE	B/W	R(S)	PENUMBRAL WIDTH	PC
WORLD GRID	50.00	0.00	2.263	3.35	2.98	0.39	3.21
WORLD GRID	50.00	15.00	2.146	3.74	3.20	0.54	3.54
WORLD GRID	50.00	30.00	2.369	4.03	3.45	0.58	3.61
WORLD GRID	50.00	45.00	2.019	4.22	3.40	0.82	3.47
WORLD GRID	50.00	60.00	1.976	4.41	3.48	0.93	4.14
WORLD GRID	50.00	75.00	1.933	4.59	3.67	0.92	4.27
WORLD GRID	50.00	90.00	1.897	4.79	3.37	0.82	4.36
WORLD GRID	50.00	105.00	1.869	4.95	3.71	1.27	4.37
WORLD GRID	50.00	120.00	1.841	5.18	3.84	1.34	4.68
WORLD GRID	50.00	135.00	1.813	5.33	4.19	1.15	4.93
WORLD GRID	50.00	150.00	1.837	5.34	4.33	1.01	4.92
WORLD GRID	50.00	165.00	1.845	5.14	4.00	1.14	4.67
WORLD GRID	50.00	180.00	1.945	4.70	3.86	0.84	4.27
WORLD GRID	50.00	195.00	2.113	3.77	3.39	0.68	3.38
WORLD GRID	50.00	210.00	2.367	3.37	2.81	0.76	2.81
WORLD GRID	50.00	225.00	2.738	2.28	1.65	0.63	2.03
WORLD GRID	50.00	240.00	3.239	1.52	1.37	0.15	1.41
WORLD GRID	50.00	255.00	3.892	1.34	0.93	0.11	0.95
WORLD GRID	50.00	270.00	4.598	0.78	0.72	0.06	0.73
WORLD GRID	50.00	285.00	4.542	0.75	0.68	0.07	0.69
WORLD GRID	50.00	300.00	4.134	1.31	0.97	0.14	0.89
WORLD GRID	50.00	315.00	3.436	1.46	1.25	0.21	1.34
WORLD GRID	50.00	330.00	2.825	2.18	1.75	0.43	1.98
WORLD GRID	50.00	345.00	2.460	2.95	2.42	0.54	2.65
WORLD GRID	45.00	0.00	1.857	4.95	.31	0.64	4.77
WORLD GRID	45.00	15.00	1.789	5.37	4.64	0.73	.12
WORLD GRID	45.00	30.00	1.751	5.57	4.82	0.75	5.36
WORLD GRID	45.00	45.00	1.733	5.74	4.93	0.81	5.51
WORLD GRID	45.00	60.00	1.655	5.95	4.78	1.17	5.73
WORLD GRID	45.00	75.00	1.623	6.20	5.33	0.87	5.90
WORLD GRID	45.00	90.00	1.592	6.43	5.24	1.15	6.11
WORLD GRID	45.00	105.00	1.574	6.62	5.51	1.11	6.29
WORLD GRID	45.00	120.00	1.560	6.87	5.81	1.06	6.57
WORLD GRID	45.00	135.00	1.547	7.18	6.13	1.05	6.86
WORLD GRID	45.00	150.00	1.548	7.70	5.75	1.44	6.66
WORLD GRID	45.00	165.00	1.565	6.65	5.46	1.20	6.33
WORLD GRID	45.00	180.00	1.567	6.90	5.74	0.86	6.59
WORLD GRID	45.00	195.00	1.795	5.24	4.33	0.91	4.85
WORLD GRID	45.00	210.00	1.973	4.49	3.40	1.09	4.08
WORLD GRID	45.00	225.00	2.213	3.35	2.79	0.56	3.16
WORLD GRID	45.00	240.00	2.538	2.62	2.22	0.30	2.37
WORLD GRID	45.00	255.00	2.949	1.88	1.58	0.30	1.74
WORLD GRID	45.00	270.00	3.453	1.49	1.23	0.23	1.32
WORLD GRID	45.00	285.00	3.479	1.32	1.12	0.20	1.22
WORLD GRID	45.00	300.00	3.174	1.66	1.40	0.26	1.49
WORLD GRID	45.00	315.00	2.676	2.40	1.91	0.49	2.21
WORLD GRID	45.00	330.00	2.259	3.41	2.89	0.52	3.16
WORLD GRID	45.00	345.00	2.008	4.25	3.53	0.72	4.20
WORLD GRID	40.00	0.00	1.516	6.92	6.03	0.89	6.75
WORLD GRID	40.00	15.00	1.491	7.48	6.18	1.30	7.27
WORLD GRID	40.00	30.00	1.442	7.75	6.00	1.75	7.48
WORLD GRID	40.00	45.00	1.470	8.03	6.14	1.89	7.70
WORLD GRID	40.00	60.00	1.438	8.44	8.09	0.35	8.19
WORLD GRID	40.00	75.00	1.398	8.99	8.61	0.38	8.73
WORLD GRID	40.00	90.00	1.370	9.39	7.79	1.60	9.14
WORLD GRID	40.00	105.00	1.361	9.73	7.71	2.02	9.29
WORLD GRID	40.00	120.00	1.358	10.13	6.90	3.23	9.49
WORLD GRID	40.00	135.00	1.355	10.39	7.63	2.76	9.89
WORLD GRID	40.00	150.00	1.364	10.24	8.75	1.49	9.74
WORLD GRID	40.00	165.00	1.399	9.56	7.84	1.72	9.45
WORLD GRID	40.00	180.00	1.469	8.34	6.46	1.88	7.96
WORLD GRID	40.00	195.00	1.569	6.75	5.45	1.30	6.46
WORLD GRID	40.00	210.00	1.696	5.68	4.67	1.01	5.41
WORLD GRID	40.00	225.00	1.857	4.86	3.71	1.15	4.55
WORLD GRID	40.00	240.00	2.067	3.78	3.28	0.50	3.61
WORLD GRID	40.00	255.00	2.337	2.90	2.51	0.39	2.76
WORLD GRID	40.00	270.00	2.617	2.31	1.90	0.41	2.37
WORLD GRID	40.00	285.00	2.735	2.17	1.75	0.42	1.93
WORLD GRID	40.00	300.00	2.540	2.76	2.19	0.57	2.42
WORLD GRID	40.00	315.00	2.159	3.77	3.13	0.64	3.41
WORLD GRID	40.00	330.00	1.868	5.19	4.30	0.79	4.82
WORLD GRID	40.00	345.00	1.648	6.33	5.27	0.76	5.92

TABLE 81 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT.	GEOGRAPHIC LONG.	L VALUE	P(M)	P(S)	PENUMBRAL WIDTH	PC
WORLD GRID	35.00	0.00	1.320	9.90	8.59	1.31	9.54
WORLD GRID	35.00	15.00	1.290	10.37	8.59	1.78	9.89
WORLD GRID	35.00	30.00	1.293	10.67	8.31	2.36	10.10
WORLD GRID	35.00	45.00	1.295	11.01	8.50	2.51	10.53
WORLD GRID	35.00	60.00	1.278	11.49	9.30	2.19	11.15
WORLD GRID	35.00	75.00	1.233	12.00	9.55	2.45	11.44
WORLD GRID	35.00	90.00	1.209	12.34	9.91	2.43	11.52
WORLD GRID	[illegible].00	105.00	1.206	12.49	10.12	2.37	11.71
WORLD GRID	35.00	120.00	1.211	12.58	10.49	2.09	11.93
WORLD GRID	35.00	135.00	1.216	12.49	10.95	1.54	12.04
WORLD GRID	35.00	150.00	1.229	12.12	10.56	1.56	11.55
WORLD GRID	35.00	165.00	1.264	11.44	9.51	1.93	10.60
WORLD GRID	35.00	180.00	1.324	10.57	7.93	2.64	9.49
WORLD GRID	35.00	195.00	1.403	9.45	7.72	1.73	8.97
WORLD GRID	35.00	210.00	1.494	7.90	6.40	1.50	7.55
WORLD GRID	35.00	225.00	1.602	6.26	5.61	0.65	6.12
WORLD GRID	35.00	240.00	1.748	5.35	4.80	0.55	5.21
WORLD GRID	35.00	255.00	1.921	4.34	3.83	0.51	4.25
WORLD GRID	35.00	270.00	2.123	3.44	2.77	0.67	3.19
WORLD GRID	35.00	285.00	2.234	3.29	2.60	0.69	2.89
WORLD GRID	35.00	300.00	2.122	4.01	3.24	0.77	3.58
WORLD GRID	35.00	315.00	1.851	5.24	4.49	0.75	4.98
WORLD GRID	35.00	330.00	1.583	7.07	5.85	1.22	6.80
WORLD GRID	35.00	345.00	1.407	9.05	7.50	1.55	8.70
WORLD GRID	30.00	0.00	1.186	11.87	10.47	1.40	11.30
WORLD GRID	30.00	15.00	1.164	12.30	10.81	1.49	11.71
WORLD GRID	30.00	30.00	1.168	12.66	10.93	1.73	12.13
WORLD GRID	30.00	45.00	1.164	13.05	11.38	1.67	12.67
WORLD GRID	30.00	60.00	1.146	13.56	12.05	1.51	13.34
WORLD GRID	30.00	75.00	1.113	14.87	14.87	0.00	14.87
WORLD GRID	30.00	90.00	1.093	14.37	14.37	0.00	14.37
WORLD GRID	30.00	105.00	1.094	14.40	14.40	0.00	14.40
WORLD GRID	30.00	120.00	1.105	14.26	14.26	0.00	14.26
WORLD GRID	30.00	135.00	1.115	13.95	13.95	0.00	13.95
WORLD GRID	30.00	150.00	1.131	13.44	13.44	0.00	13.44
WORLD GRID	30.00	165.00	1.163	12.76	11.83	0.93	12.72
WORLD GRID	30.00	180.00	1.215	11.99	10.70	1.29	11.65
WORLD GRID	30.00	195.00	1.278	11.19	9.42	1.77	10.48
WORLD GRID	30.00	210.00	1.344	10.32	7.38	2.94	9.63
WORLD GRID	30.00	225.00	1.416	9.08	7.05	2.03	8.78
WORLD GRID	30.00	240.00	1.508	7.18	6.39	0.79	7.00
WORLD GRID	30.00	255.00	1.631	5.78	5.35	0.43	5.60
WORLD GRID	30.00	270.00	1.781	4.90	4.14	0.76	4.44
WORLD GRID	30.00	285.00	1.885	4.76	3.61	1.15	4.07
WORLD GRID	30.00	300.00	1.824	5.25	4.20	1.05	4.87
WORLD GRID	30.00	315.00	1.618	7.36	5.75	1.61	6.98
WORLD GRID	30.00	330.00	1.378	10.06	8.68	1.38	9.67
WORLD GRID	30.00	345.00	1.243	11.22	9.60	1.62	10.66
WORLD GRID	25.00	0.00	1.092	13.21	12.29	0.92	13.18
WORLD GRID	25.00	15.00	1.073	13.68	12.69	0.99	13.64
WORLD GRID	25.00	30.00	1.067	14.10	14.10	0.00	14.10
WORLD GRID	25.00	45.00	1.070	14.53	14.53	0.00	14.53
WORLD GRID	25.00	60.00	1.056	15.86	15.86	0.00	15.86
WORLD GRID	25.00	75.00	1.028	15.58	15.58	0.00	15.58
WORLD GRID	25.00	90.00	1.011	15.85	15.85	0.00	15.85
WORLD GRID	25.00	105.00	1.014	15.79	15.79	0.00	15.79
WORLD GRID	25.00	120.00	1.028	15.49	15.49	0.00	15.49
WORLD GRID	25.00	135.00	1.041	15.03	15.03	0.00	15.03
WORLD GRID	25.00	150.00	1.059	14.44	14.44	0.00	14.44
WORLD GRID	25.00	165.00	1.088	13.76	13.76	0.00	13.76
WORLD GRID	25.00	180.00	1.132	13.07	13.07	0.00	13.07
WORLD GRID	25.00	195.00	1.182	12.43	12.43	0.00	12.43
WORLD GRID	25.00	210.00	1.229	11.82	11.76	0.06	11.81
WORLD GRID	25.00	225.00	1.278	11.07	10.10	0.97	10.90
WORLD GRID	25.00	240.00	1.340	9.78	8.66	1.12	9.74
WORLD GRID	25.00	255.00	1.424	8.15	7.87	0.28	7.89
WORLD GRID	25.00	270.00	1.538	6.42	5.46	0.96	6.08
WORLD GRID	25.00	285.00	1.636	5.92	4.62	1.30	5.44
WORLD GRID	25.00	300.00	1.609	7.06	5.25	1.81	6.56
WORLD GRID	25.00	315.00	1.434	10.13	7.87	2.26	9.65
WORLD GRID	25.00	330.00	1.238	11.71	10.54	1.17	11.47
WORLD GRID	25.00	345.00	1.134	12.61	11.70	0.91	12.46

TABLE B1 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT.	GEOGRAPHIC LONG.	L VALUE	P(M)	P(S)	PENUMBRAL WIDTH	PC
WORLD GRID	20.00	0.00	1.033	14.11	14.11	0.00	14.11
WORLD GRID	20.00	15.00	1.016	14.66	14.66	0.00	14.66
WORLD GRID	20.00	30.00	1.007	15.09	15.09	0.00	15.09
WORLD GRID	20.00	45.00	1.007	15.57	15.57	0.00	15.57
WORLD GRID	20.00	60.00	.995	16.12	16.12	0.00	16.12
WORLD GRID	20.00	75.00	.971	16.63	16.63	0.00	16.63
WORLD GRID	20.00	90.00	.957	16.87	16.87	0.00	16.87
WORLD GRID	20.00	105.00	.951	16.75	16.75	0.00	16.75
WORLD GRID	20.00	120.00	.975	16.37	16.37	0.00	16.37
WORLD GRID	20.00	135.00	.990	15.83	15.83	0.00	15.83
WORLD GRID	20.00	150.00	1.009	15.20	15.20	0.00	15.20
WORLD GRID	20.00	165.00	1.034	14.55	14.55	0.00	14.55
WORLD GRID	20.00	180.00	1.070	13.93	13.93	0.00	13.93
WORLD GRID	20.00	195.00	1.108	13.40	13.40	0.00	13.40
WORLD GRID	20.00	210.00	1.141	12.92	12.88	0.04	12.91
WORLD GRID	20.00	225.00	1.175	12.37	12.30	0.07	12.33
WORLD GRID	20.00	240.00	1.218	11.47	11.47	0.00	11.47
WORLD GRID	20.00	255.00	1.277	10.12	9.21	0.91	9.69
WORLD GRID	20.00	270.00	1.364	8.31	7.68	0.63	7.82
WORLD GRID	20.00	285.00	1.454	6.24	5.71	2.53	6.84
WORLD GRID	20.00	300.00	1.452	9.32	6.65	3.17	9.65
WORLD GRID	20.00	315.00	1.303	11.59	10.35	1.24	11.45
WORLD GRID	20.00	330.00	1.143	12.77	12.27	0.50	12.76
WORLD GRID	20.00	345.00	1.065	13.54	13.54	0.00	13.54
WORLD GRID	15.00	0.00	1.033	14.61	14.61	0.00	14.61
WORLD GRID	15.00	15.00	.986	15.14	15.14	0.00	15.14
WORLD GRID	15.00	30.00	.974	15.65	15.65	0.00	15.65
WORLD GRID	15.00	45.00	.969	16.17	16.17	0.00	16.17
WORLD GRID	15.00	60.00	.958	16.74	16.74	0.00	16.74
WORLD GRID	15.00	75.00	.937	17.25	17.25	0.00	17.25
WORLD GRID	15.00	90.00	.926	17.47	17.47	0.00	17.47
WORLD GRID	15.00	105.00	.929	17.34	17.34	0.00	17.34
WORLD GRID	15.00	120.00	.942	16.93	16.93	0.00	16.93
WORLD GRID	15.00	135.00	.966	16.37	16.37	0.00	16.37
WORLD GRID	15.00	150.00	.976	15.76	15.76	0.00	15.76
WORLD GRID	15.00	165.00	.997	15.17	15.17	0.00	15.17
WORLD GRID	15.00	180.00	1.024	14.63	14.63	0.00	14.63
WORLD GRID	15.00	195.00	1.052	14.16	14.16	0.00	14.16
WORLD GRID	15.00	210.00	1.076	13.76	13.76	0.00	13.76
WORLD GRID	15.00	225.00	1.108	13.32	13.26	0.06	13.30
WORLD GRID	15.00	240.00	1.130	12.71	12.24	0.43	12.62
WORLD GRID	15.00	255.00	1.171	11.63	11.09	0.54	11.27
WORLD GRID	15.00	270.00	1.238	9.43	9.49	0.00	9.49
WORLD GRID	15.00	285.00	1.320	10.41	7.83	2.58	8.46
WORLD GRID	15.00	300.00	1.335	11.25	9.63	1.56	10.71
WORLD GRID	15.00	315.00	1.210	12.52	12.52	0.00	12.52
WORLD GRID	15.00	330.00	1.084	13.43	13.43	0.00	13.43
WORLD GRID	15.00	345.00	1.027	14.07	14.07	0.00	14.07
WORLD GRID	10.00	0.00	.993	14.73	14.73	0.00	14.73
WORLD GRID	10.00	15.00	.977	15.26	15.26	0.00	15.26
WORLD GRID	10.00	30.00	.964	15.80	15.80	0.00	15.80
WORLD GRID	10.00	45.00	.955	16.34	16.34	0.00	16.34
WORLD GRID	10.00	60.00	.941	16.94	16.94	0.00	16.94
WORLD GRID	10.00	75.00	.924	17.44	17.44	0.00	17.44
WORLD GRID	10.00	90.00	.915	17.67	17.67	0.00	17.67
WORLD GRID	10.00	105.00	.917	17.56	17.56	0.00	17.56
WORLD GRID	10.00	120.00	.927	17.18	17.16	0.08	17.18
WORLD GRID	10.00	135.00	.942	16.65	16.65	0.00	16.65
WORLD GRID	10.00	150.00	.968	16.10	16.10	0.00	16.10
WORLD GRID	10.00	165.00	.974	15.61	15.61	0.00	15.61
WORLD GRID	10.00	180.00	.993	15.16	15.16	0.00	15.16
WORLD GRID	10.00	195.00	1.017	14.75	14.75	0.00	14.75
WORLD GRID	10.00	210.00	1.029	14.39	14.39	0.00	14.39
WORLD GRID	10.00	225.00	1.046	14.00	14.00	0.00	14.00
WORLD GRID	10.00	240.00	1.068	13.58	13.08	0.42	13.44
WORLD GRID	10.00	255.00	1.097	12.42	12.16	0.66	12.55
WORLD GRID	10.00	270.00	1.149	12.03	11.03	1.00	11.50
WORLD GRID	10.00	285.00	1.222	11.69	10.30	1.39	11.07
WORLD GRID	10.00	300.00	1.248	12.22	11.29	0.93	12.16
WORLD GRID	10.00	315.00	1.145	13.35	13.09	0.00	13.39
WORLD GRID	10.00	330.00	1.058	13.76	13.76	0.00	13.76
WORLD GRID	10.00	345.00	1.012	14.25	14.25	0.00	14.25

TABLE B1 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT.	GEOGRAPHIC LONG.	L VALUE	P(M)	P(S)	PENUMBRAL WIDTH	PC
WORLD GRID	5.00	0.00	1.005	14.50	14.50	0.00	14.50
WORLD GRID	5.00	15.00	.999	14.99	14.99	0.00	14.99
WORLD GRID	5.00	30.00	.974	15.52	15.52	0.00	15.52
WORLD GRID	5.00	45.00	.961	16.10	16.10	0.00	16.10
WORLD GRID	5.00	60.00	.946	16.71	16.71	0.00	16.71
WORLD GRID	5.00	75.00	.931	17.22	17.22	0.00	17.22
WORLD GRID	5.00	90.00	.923	17.47	17.47	0.00	17.47
WORLD GRID	5.00	105.00	.922	17.42	17.42	0.00	17.42
WORLD GRID	5.00	120.00	.929	17.11	17.11	0.00	17.11
WORLD GRID	5.00	135.00	.943	16.66	16.66	0.00	16.66
WORLD GRID	5.00	150.00	.958	16.21	16.21	0.00	16.21
WORLD GRID	5.00	165.00	.971	15.83	15.83	0.00	15.83
WORLD GRID	5.00	180.00	.977	15.49	15.49	0.00	15.49
WORLD GRID	5.00	195.00	.987	15.15	15.15	0.00	15.15
WORLD GRID	5.00	210.00	.999	14.82	14.82	0.00	14.82
WORLD GRID	5.00	225.00	1.012	14.47	14.47	0.00	14.47
WORLD GRID	5.00	240.00	1.027	14.33	14.33	0.00	14.33
WORLD GRID	5.00	255.00	1.048	13.48	12.69	0.59	13.41
WORLD GRID	5.00	270.00	1.057	12.44	11.98	0.86	12.67
WORLD GRID	5.00	285.00	1.150	12.69	11.52	0.97	12.48
WORLD GRID	5.00	300.00	1.102	12.78	12.78	0.00	12.78
WORLD GRID	5.00	315.00	1.132	13.36	13.36	0.00	13.36
WORLD GRID	5.00	330.00	1.037	13.50	13.50	0.00	13.80
WORLD GRID	5.00	345.00	1.017	14.11	14.11	0.00	14.11
WORLD GRID	0.00	0.00	1.035	13.94	13.94	0.00	13.94
WORLD GRID	0.00	15.00	1.021	14.37	14.37	0.00	14.37
WORLD GRID	0.00	30.00	1.006	14.87	14.87	0.00	14.87
WORLD GRID	0.00	45.00	.989	15.46	15.46	0.00	15.46
WORLD GRID	0.00	60.00	.971	16.10	16.10	0.00	16.10
WORLD GRID	0.00	75.00	.959	16.62	16.62	0.00	16.62
WORLD GRID	0.00	90.00	.951	16.90	16.90	0.00	16.90
WORLD GRID	0.00	105.00	.947	16.94	16.94	0.00	16.94
WORLD GRID	0.00	120.00	.959	16.73	16.73	0.00	16.73
WORLD GRID	0.00	135.00	.962	16.35	16.35	0.00	16.38
WORLD GRID	0.00	150.00	.977	16.05	16.05	0.00	16.05
WORLD GRID	0.00	165.00	.982	15.81	15.81	0.00	15.81
WORLD GRID	0.00	180.00	.977	15.59	15.59	0.00	15.59
WORLD GRID	0.00	195.00	.978	15.32	15.32	0.00	15.32
WORLD GRID	0.00	210.00	.985	15.03	15.03	0.00	15.03
WORLD GRID	0.00	225.00	.994	14.71	14.71	0.00	14.71
WORLD GRID	0.00	240.00	1.005	14.33	14.33	0.00	14.33
WORLD GRID	0.00	255.00	1.019	13.96	13.86	0.00	13.86
WORLD GRID	0.00	270.00	1.048	13.32	13.32	0.00	13.32
WORLD GRID	0.00	285.00	1.100	12.35	12.35	0.00	12.35
WORLD GRID	0.00	300.00	1.133	13.35	13.35	0.00	13.05
WORLD GRID	0.00	315.00	1.078	13.38	13.38	0.00	13.38
WORLD GRID	0.00	330.00	1.040	13.59	13.58	0.00	13.58
WORLD GRID	0.00	345.00	1.038	13.69	13.69	0.00	13.69
WORLD GRID	-5.00	0.00	1.084	13.13	13.13	0.00	13.13
WORLD GRID	-5.00	15.00	1.076	13.45	13.45	0.00	13.45
WORLD GRID	-5.00	30.00	1.068	13.91	13.91	0.00	13.91
WORLD GRID	-5.00	45.00	1.039	14.50	14.50	0.00	14.50
WORLD GRID	-5.00	60.00	1.018	15.14	15.14	0.00	15.14
WORLD GRID	-5.00	75.00	1.007	15.65	15.65	0.00	15.65
WORLD GRID	-5.00	90.00	1.000	15.37	15.37	0.00	15.37
WORLD GRID	-5.00	105.00	.992	16.10	16.10	0.00	16.10
WORLD GRID	-5.00	120.00	.990	16.08	16.08	0.00	16.08
WORLD GRID	-5.00	135.00	.999	15.77	15.77	0.00	15.77
WORLD GRID	-5.00	150.00	1.012	15.58	15.58	0.00	15.58
WORLD GRID	-5.00	165.00	1.010	15.50	15.50	0.00	15.50
WORLD GRID	-5.00	180.00	.993	15.42	15.42	0.00	15.42
WORLD GRID	-5.00	195.00	.986	15.25	15.25	0.00	15.25
WORLD GRID	-5.00	210.00	.987	15.02	15.02	0.00	15.02
WORLD GRID	-5.00	225.00	.992	14.74	14.74	0.00	14.74
WORLD GRID	-5.00	240.00	.998	14.41	14.41	0.00	14.41
WORLD GRID	-5.00	255.00	1.008	14.01	14.01	0.00	14.01
WORLD GRID	-5.00	270.00	1.028	13.53	13.53	0.00	13.53
WORLD GRID	-5.00	285.00	1.069	13.14	13.14	0.00	13.14
WORLD GRID	-5.00	300.00	1.108	13.28	13.28	0.00	13.88
WORLD GRID	-5.00	315.00	1.069	13.19	13.19	0.00	13.19
WORLD GRID	-5.00	330.00	1.356	13.15	13.15	0.00	13.15
WORLD GRID	-5.00	345.00	1.074	13.94	13.94	0.00	13.94

TABLE B1 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT.	GEOGRAPHIC LONG.	L VALUE	P(M)	P(S)	PENUMBRAL WIDTH	PC
WORLD GRID	-10.00	0.00	1.151	12.13	12.02	0.11	12.11
WORLD GRID	-10.00	15.00	1.152	12.31	12.31	0.00	12.31
WORLD GRID	-10.00	30.00	1.138	12.71	12.71	0.00	12.71
WORLD GRID	-10.00	45.00	1.115	13.29	13.29	0.00	13.29
WORLD GRID	-10.00	60.00	1.091	13.69	13.69	0.00	13.69
WORLD GRID	-10.00	75.00	1.080	14.35	14.35	0.00	14.35
WORLD GRID	-10.00	90.00	1.073	14.66	14.66	0.00	14.66
WORLD GRID	-10.00	105.00	1.061	14.90	14.90	0.00	14.90
WORLD GRID	-10.00	120.00	1.053	14.91	14.91	0.00	14.91
WORLD GRID	-10.00	135.00	1.059	14.80	14.80	0.00	14.80
WORLD GRID	-10.00	150.00	1.069	14.75	14.72	0.03	14.74
WORLD GRID	-10.00	165.00	1.058	14.86	14.80	0.06	14.84
WORLD GRID	-10.00	180.00	1.039	14.94	14.94	0.00	14.94
WORLD GRID	-10.00	195.00	1.312	14.90	14.90	0.00	14.90
WORLD GRID	-10.00	210.00	1.307	14.76	14.76	0.00	14.76
WORLD GRID	-10.00	225.00	1.306	14.55	14.55	0.00	14.55
WORLD GRID	-10.00	240.00	1.307	14.29	14.29	0.00	14.29
WORLD GRID	-10.00	255.00	1.311	13.94	13.94	0.00	13.94
WORLD GRID	-10.00	270.00	1.324	13.51	13.51	0.00	13.51
WORLD GRID	-10.00	285.00	1.355	13.10	13.10	0.00	13.10
WORLD GRID	-10.00	300.00	1.352	12.92	12.92	0.00	12.92
WORLD GRID	-10.00	315.00	1.372	12.82	12.82	0.00	12.82
WORLD GRID	-10.00	330.00	1.384	12.55	12.55	0.00	12.55
WORLD GRID	-10.00	345.00	1.124	12.22	11.43	0.79	12.28
WORLD GRID	-15.00	0.00	1.236	11.00	9.68	1.32	10.75
WORLD GRID	-15.00	15.00	1.251	11.03	9.66	1.37	10.91
WORLD GRID	-15.00	30.00	1.243	11.35	10.03	1.32	11.23
WORLD GRID	-15.00	45.00	1.216	11.87	10.57	1.30	11.69
WORLD GRID	-15.00	60.00	1.191	12.35	10.91	1.47	12.18
WORLD GRID	-15.00	75.00	1.183	12.72	11.77	0.95	12.70
WORLD GRID	-15.00	90.00	1.177	13.00	13.00	0.00	13.00
WORLD GRID	-15.00	105.00	1.160	13.47	12.44	0.83	13.25
WORLD GRID	-15.00	120.00	1.147	13.37	12.23	1.14	13.25
WORLD GRID	-15.00	135.00	1.148	13.38	12.26	1.12	13.32
WORLD GRID	-15.00	150.00	1.151	13.51	12.69	0.82	13.48
WORLD GRID	-15.00	165.00	1.138	13.81	13.77	0.04	13.78
WORLD GRID	-15.00	180.00	1.089	14.12	14.02	0.09	14.09
WORLD GRID	-15.00	195.00	1.059	14.24	14.24	0.00	14.24
WORLD GRID	-15.00	210.00	1.044	14.24	14.24	0.00	14.24
WORLD GRID	-15.00	225.00	1.036	14.15	14.15	0.00	14.15
WORLD GRID	-15.00	240.00	1.031	13.97	13.97	0.00	13.97
WORLD GRID	-15.00	255.00	1.030	13.69	13.69	0.00	13.69
WORLD GRID	-15.00	270.00	1.035	13.38	13.38	0.00	13.38
WORLD GRID	-15.00	285.00	1.055	12.89	12.89	0.00	12.89
WORLD GRID	-15.00	300.00	1.080	12.59	12.59	0.00	12.59
WORLD GRID	-15.00	315.00	1.358	12.31	12.31	0.00	12.31
WORLD GRID	-15.00	330.00	1.123	11.84	11.09	0.75	11.76
WORLD GRID	-15.00	345.00	1.187	11.29	10.03	1.26	11.15
WORLD GRID	-20.00	0.00	1.338	9.78	8.30	1.48	9.21
WORLD GRID	-20.00	15.00	1.374	9.64	7.21	2.43	9.86
WORLD GRID	-20.00	30.00	1.372	9.85	8.15	1.70	9.29
WORLD GRID	-20.00	45.00	1.348	10.27	8.43	1.84	9.70
WORLD GRID	-20.00	60.00	1.325	10.58	8.62	1.96	10.21
WORLD GRID	-20.00	75.00	1.322	10.64	7.98	2.66	10.25
WORLD GRID	-20.00	90.00	1.319	10.72	9.01	1.71	10.41
WORLD GRID	-20.00	105.00	1.301	10.98	8.44	2.54	10.65
WORLD GRID	-20.00	120.00	1.281	11.16	8.14	3.02	10.84
WORLD GRID	-20.00	135.00	1.274	11.30	8.95	2.35	10.62
WORLD GRID	-20.00	150.00	1.265	11.69	9.35	2.34	10.74
WORLD GRID	-20.00	165.00	1.231	12.25	10.84	1.41	11.93
WORLD GRID	-20.00	180.00	1.174	12.73	12.78	0.00	12.78
WORLD GRID	-20.00	195.00	1.129	13.24	13.12	0.12	13.19
WORLD GRID	-20.00	210.00	1.102	13.44	13.44	0.00	13.44
WORLD GRID	-20.00	225.00	1.083	13.51	13.51	0.00	13.51
WORLD GRID	-20.00	240.00	1.071	13.46	13.46	0.00	13.46
WORLD GRID	-20.00	255.00	1.062	13.28	13.28	0.00	13.28
WORLD GRID	-20.00	270.00	1.059	12.94	12.94	0.00	12.94
WORLD GRID	-20.00	285.00	1.071	12.53	12.53	0.00	12.53
WORLD GRID	-20.00	300.00	1.092	12.14	12.14	0.00	12.14
WORLD GRID	-20.00	315.00	1.116	11.70	11.21	0.49	11.65
WORLD GRID	-20.00	330.00	1.173	11.05	9.89	1.16	10.73
WORLD GRID	-20.00	345.00	1.263	10.23	8.67	1.62	9.78

TABLE B1 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT.	GEOGRAPHIC LONG.	L VALUE	P(H)	P(S)	PENUMBRAL WIDTH	PC
WORLD GRID	-25.00	0.00	1.455	8.52	6.27	2.25	7.55
WORLD GRID	-25.00	15.00	1.518	8.17	6.23	1.94	7.50
WORLD GRID	-25.00	30.00	1.532	8.22	6.32	1.90	7.72
WORLD GRID	-25.00	45.00	1.514	8.36	6.79	1.57	7.88
WORLD GRID	-25.00	60.00	1.498	8.26	6.70	1.56	7.86
WORLD GRID	-25.00	75.00	1.506	7.72	6.27	1.45	7.37
WORLD GRID	-25.00	90.00	1.514	7.33	5.76	1.63	7.08
WORLD GRID	-25.00	105.00	1.497	7.43	6.26	1.43	7.24
WORLD GRID	-25.00	120.00	1.471	7.71	6.73	0.98	7.43
WORLD GRID	-25.00	135.00	1.451	8.02	6.25	1.77	7.71
WORLD GRID	-25.00	150.00	1.426	8.75	6.70	2.05	8.47
WORLD GRID	-25.00	165.00	1.371	9.36	7.24	2.07	9.55
WORLD GRID	-25.00	180.00	1.294	10.97	8.67	2.30	10.22
WORLD GRID	-25.00	195.00	1.228	11.65	10.29	1.36	11.22
WORLD GRID	-25.00	210.00	1.184	12.31	11.22	1.09	12.91
WORLD GRID	-25.00	225.00	1.152	12.63	12.63	0.00	12.63
WORLD GRID	-25.00	240.00	1.128	12.76	12.76	0.00	12.76
WORLD GRID	-25.00	255.00	1.110	12.72	12.72	0.00	12.72
WORLD GRID	-25.00	270.00	1.098	12.47	12.43	0.04	12.46
WORLD GRID	-25.00	285.00	1.100	12.36	11.78	0.28	12.04
WORLD GRID	-25.00	300.00	1.120	11.59	11.06	0.53	11.53
WORLD GRID	-25.00	315.00	1.157	11.02	10.18	0.84	10.74
WORLD GRID	-25.00	330.00	1.235	10.21	8.86	1.35	9.63
WORLD GRID	-25.00	345.00	1.358	9.26	6.94	2.32	8.36
WORLD GRID	-30.00	0.00	1.587	7.29	5.28	1.92	6.36
WORLD GRID	-30.00	15.00	1.681	6.54	5.12	1.42	6.02
WORLD GRID	-30.00	30.00	1.718	6.24	5.05	1.19	5.86
WORLD GRID	-30.00	45.00	1.716	6.02	5.18	0.84	5.79
WORLD GRID	-30.00	60.00	1.720	5.71	4.91	0.80	5.42
WORLD GRID	-30.00	75.00	1.751	5.49	4.60	0.89	5.23
WORLD GRID	-30.00	90.00	1.782	5.40	4.70	0.70	5.18
WORLD GRID	-30.00	105.00	1.775	5.45	4.38	1.07	5.16
WORLD GRID	-30.00	120.00	1.742	5.60	4.44	1.16	5.19
WORLD GRID	-30.00	135.00	1.704	5.79	4.48	1.31	5.39
WORLD GRID	-30.00	150.00	1.658	6.13	4.96	1.17	5.89
WORLD GRID	-30.00	165.00	1.563	6.91	5.42	1.39	6.58
WORLD GRID	-30.00	180.00	1.456	8.03	6.45	1.58	7.39
WORLD GRID	-30.00	195.00	1.363	9.49	8.08	1.41	9.45
WORLD GRID	-30.00	210.00	1.295	10.72	8.20	2.52	9.43
WORLD GRID	-30.00	225.00	1.244	11.42	9.76	1.66	10.64
WORLD GRID	-30.00	240.00	1.205	11.85	11.85	0.00	11.85
WORLD GRID	-30.00	255.00	1.175	12.01	11.96	0.05	12.00
WORLD GRID	-30.00	270.00	1.151	11.99	11.84	0.05	11.98
WORLD GRID	-30.00	285.00	1.144	11.50	11.05	0.45	11.43
WORLD GRID	-30.00	300.00	1.163	10.99	10.31	0.68	10.75
WORLD GRID	-30.00	315.00	1.212	10.29	9.24	1.05	9.83
WORLD GRID	-30.00	330.00	1.309	9.32	7.46	1.86	8.39
WORLD GRID	-30.00	345.00	1.450	8.21	6.44	1.77	7.09
WORLD GRID	-35.00	0.00	1.735	5.66	4.50	1.16	5.24
WORLD GRID	-35.00	15.00	1.864	4.89	3.80	1.09	4.59
WORLD GRID	-35.00	30.00	1.933	4.66	3.89	0.77	4.45
WORLD GRID	-35.00	45.00	1.961	4.54	3.80	0.74	4.31
WORLD GRID	-35.00	60.00	2.001	4.43	3.49	1.00	4.07
WORLD GRID	-35.00	75.00	2.079	4.04	3.26	0.78	3.72
WORLD GRID	-35.00	90.00	2.157	3.54	2.90	0.64	3.35
WORLD GRID	-35.00	105.00	2.176	3.55	2.81	0.74	3.32
WORLD GRID	-35.00	120.00	2.138	3.57	3.01	0.56	3.37
WORLD GRID	-35.00	135.00	2.070	3.65	2.88	1.00	3.65
WORLD GRID	-35.00	150.00	1.969	4.47	3.43	1.04	4.10
WORLD GRID	-35.00	165.00	1.831	5.15	4.04	1.11	4.90
WORLD GRID	-35.00	180.00	1.678	5.88	4.63	1.25	5.65
WORLD GRID	-35.00	195.00	1.545	6.76	5.58	1.18	6.54
WORLD GRID	-35.00	210.00	1.446	7.90	5.48	2.42	7.88
WORLD GRID	-35.00	225.00	1.367	9.72	7.94	1.78	9.11
WORLD GRID	-35.00	240.00	1.308	10.65	8.39	2.26	9.58
WORLD GRID	-35.00	255.00	1.259	11.14	11.07	0.07	11.12
WORLD GRID	-35.00	270.00	1.221	11.19	11.14	0.05	11.16
WORLD GRID	-35.00	285.00	1.205	10.87	10.27	0.60	10.67
WORLD GRID	-35.00	300.00	1.222	10.31	9.48	0.83	9.98
WORLD GRID	-35.00	315.00	1.282	9.58	8.12	1.38	8.72
WORLD GRID	-35.00	330.00	1.399	8.25	6.86	1.39	7.16
WORLD GRID	-35.00	345.00	1.564	7.31	5.79	1.22	6.18

TABLE B1 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT.	GEOGRAPHIC LONG.	L VALUE	P(M)	P(S)	PENUMBRAL WIDTH	PC
WORLD GRID	-40.00	0.00	1.900	4.49	3.68	0.69	4.29
WORLD GRID	-40.00	15.00	2.070	4.05	3.33	0.72	3.74
WORLD GRID	-40.00	30.00	2.102	3.85	2.89	0.96	3.48
WORLD GRID	-40.00	45.00	2.259	3.58	2.79	0.79	3.21
WORLD GRID	-40.00	60.00	2.362	3.00	2.47	0.53	2.83
WORLD GRID	-40.00	75.00	2.524	2.73	2.17	0.56	2.43
WORLD GRID	-40.00	90.00	2.692	2.36	1.93	0.43	2.08
WORLD GRID	-40.00	105.00	2.774	2.12	1.89	0.23	2.08
WORLD GRID	-40.00	120.00	2.740	2.26	1.83	0.43	2.21
WORLD GRID	-40.00	135.00	2.620	2.43	2.01	0.42	2.21
WORLD GRID	-40.00	150.00	2.438	2.95	2.36	0.79	2.65
WORLD GRID	-40.00	165.00	2.210	3.43	3.03	0.40	3.24
WORLD GRID	-40.00	180.00	1.984	4.18	3.29	0.89	4.11
WORLD GRID	-40.00	195.00	1.792	5.14	4.16	0.98	4.76
WORLD GRID	-40.00	210.00	1.643	5.41	5.01	0.99	5.56
WORLD GRID	-40.00	225.00	1.538	7.03	5.51	1.52	6.65
WORLD GRID	-40.00	240.00	1.441	8.91	6.59	2.37	8.28
WORLD GRID	-40.00	255.00	1.368	10.01	8.18	1.83	9.75
WORLD GRID	-40.00	270.00	1.312	10.34	9.47	0.87	10.18
WORLD GRID	-40.00	285.00	1.285	10.13	9.29	0.84	9.77
WORLD GRID	-40.00	300.00	1.302	9.56	8.41	1.15	8.98
WORLD GRID	-40.00	315.00	1.371	8.65	7.26	1.39	7.61
WORLD GRID	-40.00	330.00	1.506	6.89	5.56	1.33	6.42
WORLD GRID	-40.00	345.00	1.695	5.63	4.67	0.96	5.31
WORLD GRID	-45.00	0.00	2.089	3.87	3.19	0.68	3.46
WORLD GRID	-45.00	15.00	2.304	3.19	2.58	0.61	2.96
WORLD GRID	-45.00	30.00	2.474	2.81	2.21	0.60	2.53
WORLD GRID	-45.00	45.00	2.627	2.62	2.06	0.56	2.38
WORLD GRID	-45.00	60.00	2.834	2.11	1.70	0.41	1.93
WORLD GRID	-45.00	75.00	3.140	1.75	1.41	0.35	1.53
WORLD GRID	-45.00	90.00	3.484	1.35	1.24	0.11	1.28
WORLD GRID	-45.00	105.00	3.794	1.19	1.10	0.09	1.12
WORLD GRID	-45.00	120.00	3.698	1.19	1.01	0.18	1.11
WORLD GRID	-45.00	135.00	3.489	1.35	1.19	0.16	1.25
WORLD GRID	-45.00	150.00	3.153	1.65	1.42	0.23	1.51
WORLD GRID	-45.00	165.00	2.773	2.13	1.92	0.21	2.04
WORLD GRID	-45.00	180.00	2.419	2.77	2.52	0.25	2.72
WORLD GRID	-45.00	195.00	2.131	3.61	3.00	0.61	3.33
WORLD GRID	-45.00	210.00	1.912	4.68	3.49	1.19	4.24
WORLD GRID	-45.00	225.00	1.745	5.35	4.46	0.85	4.93
WORLD GRID	-45.00	240.00	1.615	6.24	4.77	1.47	5.31
WORLD GRID	-45.00	255.00	1.589	8.33	5.97	2.33	7.03
WORLD GRID	-45.00	270.00	1.431	9.21	7.71	1.58	9.00
WORLD GRID	-45.00	285.00	1.392	9.19	7.87	1.32	9.76
WORLD GRID	-45.00	300.00	1.486	8.59	7.21	1.38	7.84
WORLD GRID	-45.00	315.00	1.485	7.26	5.86	1.40	6.91
WORLD GRID	-45.00	330.00	1.636	5.32	4.35	0.97	5.63
WORLD GRID	-45.00	345.00	1.858	4.52	3.87	0.65	4.32
WORLD GRID	-50.00	0.00	2.311	3.07	2.53	0.54	2.87
WORLD GRID	-50.00	15.00	2.580	2.57	2.19	0.38	2.37
WORLD GRID	-50.00	30.00	2.927	2.20	1.72	0.48	1.95
WORLD GRID	-50.00	45.00	3.098	1.75	1.47	0.28	1.60
WORLD GRID	-50.00	60.00	3.461	1.33	1.25	0.14	1.27
WORLD GRID	-50.00	75.00	4.816	1.02	0.98	0.12	0.94
WORLD GRID	-50.00	90.00	4.780	0.87	0.65	0.02	0.66
WORLD GRID	-50.00	105.00	5.244	0.54	0.54	0.00	0.54
WORLD GRID	-50.00	120.00	5.341	0.53	0.53	0.00	0.53
WORLD GRID	-50.00	135.00	4.960	0.62	0.59	0.03	0.60
WORLD GRID	-50.00	150.00	4.312	0.91	0.78	0.13	0.84
WORLD GRID	-50.00	165.00	3.635	1.23	1.12	0.11	1.15
WORLD GRID	-50.00	180.00	3.056	1.74	1.35	0.39	1.63
WORLD GRID	-50.00	195.00	2.689	2.38	1.97	0.41	2.24
WORLD GRID	-50.00	210.00	2.280	3.22	2.51	0.71	2.94
WORLD GRID	-50.00	225.00	2.034	4.14	3.30	0.84	3.76
WORLD GRID	-50.00	240.00	1.844	4.94	3.93	1.01	4.48
WORLD GRID	-50.00	255.00	1.695	5.64	5.05	0.63	5.57
WORLD GRID	-50.00	270.00	1.588	7.25	5.55	1.78	7.02
WORLD GRID	-50.00	285.00	1.534	7.77	6.07	1.78	7.57
WORLD GRID	-50.00	300.00	1.545	7.28	5.69	1.51	6.98
WORLD GRID	-50.00	315.00	1.632	5.92	5.03	0.89	5.68
WORLD GRID	-50.00	330.00	1.799	4.67	4.05	0.62	4.51
WORLD GRID	-50.00	345.00	2.037	3.33	3.24	0.69	3.58

TABLE B1 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT.	GEOGRAPHIC LONG.	L VALUE	P(M)	P(S)	PENUMBRAL WIDTH	PC
WORLD GRID	-55.00	0.00	2.584	2.45	1.53	0.52	2.23
WORLD GRID	-55.00	15.00	2.818	1.98	1.68	0.30	1.79
WORLD GRID	-55.00	30.00	3.260	1.50	1.30	0.26	1.42
WORLD GRID	-55.00	45.00	3.690	1.23	1.37	0.16	1.12
WORLD GRID	-55.00	60.00	4.316	0.90	0.85	0.05	0.47
WORLD GRID	-55.00	75.00	5.249	0.53	0.53	0.00	0.53
WORLD GRID	-55.00	90.00	6.667	0.34	0.34	0.00	0.34
WORLD GRID	-55.00	105.00	8.018	0.23	0.23	0.00	0.23
WORLD GRID	-55.00	120.00	8.446	0.21	0.21	0.00	0.21
WORLD GRID	-55.00	135.00	7.720	0.29	0.25	0.03	0.26
WORLD GRID	-55.00	150.00	6.351	0.41	0.37	0.04	0.38
WORLD GRID	-55.00	165.00	5.037	0.60	0.56	0.04	0.59
WORLD GRID	-55.00	180.00	4.023	1.00	0.87	0.13	0.98
WORLD GRID	-55.00	195.00	3.305	1.42	1.24	0.25	1.38
WORLD GRID	-55.00	210.00	2.794	2.17	1.71	0.46	1.88
WORLD GRID	-55.00	225.00	2.426	2.90	2.37	0.53	2.64
WORLD GRID	-55.00	240.00	2.151	3.68	3.02	0.58	3.38
WORLD GRID	-55.00	255.00	1.944	4.57	3.73	0.84	4.28
WORLD GRID	-55.00	270.00	1.800	5.05	4.51	0.54	4.96
WORLD GRID	-55.00	285.00	1.727	5.36	4.37	0.99	5.19
WORLD GRID	-55.00	300.00	1.734	5.17	4.60	0.57	5.02
WORLD GRID	-55.00	315.00	1.827	4.56	4.08	0.48	4.45
WORLD GRID	-55.00	330.00	2.039	4.01	3.26	0.75	3.67
WORLD GRID	-55.00	345.00	2.278	3.19	2.50	0.69	2.[illegible]
WORLD GRID	-60.00	0.00	2.931	1.92	1.68	0.24	1.78
WORLD GRID	-60.00	15.00	3.347	1.48	1.28	0.20	1.32
WORLD GRID	-60.00	30.00	3.835	1.03	1.03	0.00	1.03
WORLD GRID	-60.00	45.00	4.469	0.82	0.74	0.08	0.75
WORLD GRID	-60.00	60.00	5.511	0.55	0.46	0.09	0.49
WORLD GRID	-60.00	75.00	7.228	0.32	0.29	0.03	0.30
WORLD GRID	-60.00	90.00	10.825	0.15	0.15	0.00	0.15
WORLD GRID	-60.00	105.00	13.640	0.08	0.08	0.00	0.08
WORLD GRID	-60.00	120.00	12.832	0.06	0.06	0.00	0.06
WORLD GRID	-60.00	135.00	13.825	0.08	0.08	0.00	0.08
WORLD GRID	-60.00	150.00	10.343	0.14	0.14	0.00	0.14
WORLD GRID	-60.00	165.00	7.482	0.27	0.27	0.00	0.27
WORLD GRID	-60.00	180.00	5.578	0.48	0.48	0.00	0.48
WORLD GRID	-60.00	195.00	4.348	0.86	0.73	0.13	0.79
WORLD GRID	-60.00	210.00	3.529	1.38	1.09	0.21	1.18
WORLD GRID	-60.00	225.00	2.969	1.83	1.47	0.36	1.62
WORLD GRID	-60.00	240.00	2.371	2.48	1.93	0.50	2.23
WORLD GRID	-60.00	255.00	2.265	3.17	2.80	0.37	3.00
WORLD GRID	-60.00	270.00	2.095	4.08	3.23	0.77	3.77
WORLD GRID	-60.00	285.00	1.998	4.29	3.50	0.79	3.95
WORLD GRID	-60.00	300.00	1.996	4.21	3.65	0.56	3.97
WORLD GRID	-60.00	315.00	2.092	3.72	3.22	0.50	3.52
WORLD GRID	-60.00	330.00	2.287	3.05	2.64	0.41	2.88
WORLD GRID	-60.00	345.00	2.573	2.53	2.18	0.35	2.27
WORLD GRID	-65.00	0.00	3.397	1.41	1.23	0.18	1.30
WORLD GRID	-65.00	15.00	3.916	1.11	0.96	0.15	0.98
WORLD GRID	-65.00	30.00	4.592	0.77	0.69	0.08	0.72
WORLD GRID	-65.00	45.00	5.571	0.50	0.50	0.00	0.50
WORLD GRID	-65.00	60.00	7.185	0.30	0.30	0.00	0.30
WORLD GRID	-65.00	75.00	10.151	0.15	0.15	0.00	0.15
WORLD GRID	-65.00	90.00	15.497	0.06	0.06	0.00	0.06
WORLD GRID	-65.00	105.00	26.944				0.00
WORLD GRID	-65.00	120.00	37.364				0.00
WORLD GRID	-65.00	135.00	31.574				0.00
WORLD GRID	-65.00	150.00	19.468	0.03	0.03	0.00	0.03
WORLD GRID	-65.00	165.00	12.044	0.11	0.11	0.00	0.11
WORLD GRID	-65.00	180.00	8.109	0.23	0.23	0.00	0.23
WORLD GRID	-65.00	195.00	5.913	0.47	0.42	0.05	0.43
WORLD GRID	-65.00	210.00	4.591	0.81	0.64	0.13	0.71
WORLD GRID	-65.00	225.00	3.730	1.15	1.00	0.15	1.06
WORLD GRID	-65.00	240.00	3.168	1.62	1.37	0.25	1.51
WORLD GRID	-65.00	255.00	2.768	2.15	1.81	0.34	1.98
WORLD GRID	-65.00	270.00	2.514	2.73	2.04	0.69	2.53
WORLD GRID	-65.00	285.00	2.383	2.92	2.33	0.59	2.71
WORLD GRID	-65.00	300.00	2.368	2.84	2.62	0.22	2.72
WORLD GRID	-65.00	315.00	2.464	2.65	2.46	0.19	2.50
WORLD GRID	-65.00	330.00	2.678	2.34	1.85	0.49	2.18
WORLD GRID	-65.00	345.00	2.984	1.64	1.51	0.13	1.51

☆ U. S. GOVERNMENT PRINTING OFFICE: 1975--600-022--56

TABLE 81 (CONTINUED)

IDENTIFICATION	GEOGRAPHIC LAT.	GEOGRAPHIC LONG.	L VALUE	P(M)	P(S)	PENUMBRAL WIDTH	PC
WORLD GRID	-70.00	0.00	4.349	0.93	0.87	0.06	0.89
WORLD GRID	-70.00	15.00	4.742	0.67	0.63	0.04	0.64
WORLD GRID	-70.00	30.00	5.620	0.47	0.47	0.00	0.47
WORLD GRID	-70.00	45.00	7.833	0.31	0.31	0.00	0.31
WORLD GRID	-70.00	60.00	9.470	0.19	0.17	0.02	0.18
WORLD GRID	-70.00	75.00	14.317	0.08	0.08	0.00	0.08
WORLD GRID	-70.00	90.00	25.863				0.00
WORLD GRID	-70.00	105.00	61.722				0.00
WORLD GRID	-70.00	120.00	178.720				0.00
WORLD GRID	-70.00	135.00	123.228				0.00
WORLD GRID	-70.00	150.00	43.302				0.00
WORLD GRID	-70.00	165.00	20.596	0.03	0.03	0.00	0.03
WORLD GRID	-70.00	180.00	12.192	0.10	0.10	0.00	0.10
WORLD GRID	-70.00	195.00	8.264	0.22	0.22	0.00	0.22
WORLD GRID	-70.00	210.00	6.123	0.44	0.40	0.04	0.41
WORLD GRID	-70.00	225.00	4.833	0.64	0.64	0.00	0.64
WORLD GRID	-70.00	240.00	4.008	1.05	0.94	0.12	0.96
WORLD GRID	-70.00	255.00	3.469	1.35	1.19	0.16	1.24
WORLD GRID	-70.00	270.00	3.132	1.67	1.45	0.22	1.58
WORLD GRID	-70.00	285.00	2.954	1.95	1.62	0.33	1.75
WORLD GRID	-70.00	300.00	2.915	1.42	1.56	0.36	1.88
WORLD GRID	-70.00	315.00	3.135	1.75	1.61	0.14	1.67
WORLD GRID	-70.00	330.00	3.223	1.56	1.31	0.25	1.39
WORLD GRID	-70.00	345.00	3.567	1.19	1.05	0.14	1.14
WORLD GRID	-75.00	0.00	5.011	0.59	0.59	0.00	0.59
WORLD GRID	-75.00	15.00	5.523	0.43	0.43	0.00	0.43
WORLD GRID	-75.00	30.00	7.021	0.30	0.30	0.00	0.30
WORLD GRID	-75.00	45.00	8.920	0.19	0.19	0.00	0.19
WORLD GRID	-75.00	60.00	12.233	0.10	0.10	0.00	0.10
WORLD GRID	-75.00	75.00	18.851	0.04	0.04	0.00	0.04
WORLD GRID	-75.00	90.00	35.218				0.00
WORLD GRID	-75.00	105.00	95.612				0.00
WORLD GRID	-75.00	120.00	749.464				0.00
WORLD GRID	-75.00	135.00	479.782				0.00
WORLD GRID	-75.00	150.00	79.817				0.00
WORLD GRID	-75.00	165.00	31.810				0.00
WORLD GRID	-75.00	180.00	17.496	0.05	0.05	0.00	0.05
WORLD GRID	-75.00	195.00	11.382	0.12	0.12	0.00	0.12
WORLD GRID	-75.00	210.00	8.220	0.23	0.23	0.00	0.23
WORLD GRID	-75.00	225.00	6.386	0.36	0.36	0.00	0.36
WORLD GRID	-75.00	240.00	5.247	0.59	0.53	0.06	0.54
WORLD GRID	-75.00	255.00	4.522	0.72	0.72	0.00	0.72
WORLD GRID	-75.00	270.00	4.071	0.97	0.87	0.10	0.91
WORLD GRID	-75.00	285.00	3.829	1.16	0.96	0.20	1.02
WORLD GRID	-75.00	300.00	3.754	1.19	1.00	0.19	1.03
WORLD GRID	-75.00	315.00	3.833	1.15	1.00	0.15	1.05
WORLD GRID	-75.00	330.00	4.060	0.88	0.88	0.00	0.88
WORLD GRID	-75.00	345.00	4.444	0.77	0.75	0.02	0.76
WORLD GRID	-80.00	0.00	6.491	0.39	0.35	0.04	0.37
WORLD GRID	-80.00	15.00	7.448	0.30	0.27	0.03	0.28
WORLD GRID	-80.00	30.00	8.864	0.19	0.19	0.00	0.19
WORLD GRID	-80.00	45.00	11.018	0.13	0.13	0.00	0.13
WORLD GRID	-80.00	60.00	14.484	0.07	0.07	0.00	0.07
WORLD GRID	-80.00	75.00	20.459	0.03	0.03	0.00	0.03
WORLD GRID	-80.00	90.00	31.331				0.00
WORLD GRID	-80.00	105.00	51.845				0.00
WORLD GRID	-80.00	120.00	76.519				0.00
WORLD GRID	-80.00	135.00	90.172				0.00
WORLD GRID	-80.00	150.00	51.410				0.00
WORLD GRID	-80.00	165.00	31. 65				0.00
WORLD GRID	-80.00	180.00	20.334	0.03	0.03	0.00	0.03
WORLD GRID	-80.00	195.00	14.218	0.08	0.08	0.00	0.08
WORLD GRID	-80.00	210.00	10.658	0.13	0.13	0.00	0.13
WORLD GRID	-80.00	225.00	8.463	0.21	0.21	0.00	0.21
WORLD GRID	-80.00	240.00	7.058	0.30	0.30	0.00	0.30
WORLD GRID	-80.00	255.00	6.147	0.48	0.48	0.00	0.48
WORLD GRID	-80.00	270.00	5.571	0.49	0.47	0.02	0.48
WORLD GRID	-80.00	285.00	5.247	0.59	0.52	0.07	0.55
WORLD GRID	-80.00	300.00	5.123	0.56	0.56	0.00	0.56
WORLD GRID	-80.00	315.00	5.181	0.54	0.54	0.00	0.54
WORLD GRID	-80.00	330.00	5.415	0.49	0.49	0.00	0.49
WORLD GRID	-80.00	345.00	5.840	0.42	0.42	0.00	0.42