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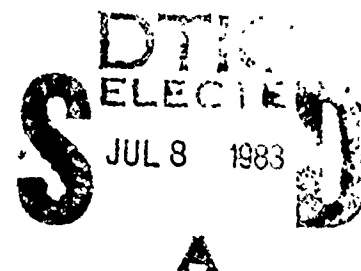
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1978 Diffuse Auroral Boundaries and a Derived Auroral Boundary Index

M.S. GUSSENHOVEN
D.A. HARDY
N. HEINEMANN
E. HOLEMAN

28 December 1982



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1978 Diffuse Auroral Boundaries and a Derived Auroral Boundary Index

1. INTRODUCTION

This report has two aims. First, to provide the scientific community a compilation of all equatorward boundaries of the auroral oval as determined from the SSJ/3 data on the DMSP/F2 satellite for the year 1978. Second, to review and extend the knowledge of the systematics of the position of the equatorward boundary with respect to geomagnetic activity and the degree to which the boundary determination can be done by computer. From this we are able to construct a new index of auroral activity.

The first of these aims is motivated by research that has shown the boundary to move in a consistent and systematic manner in response to geomagnetic activity as measured by Kp, the velocity of the solar wind, and the strength of the north-south component of the Interplanetary Magnetic Field.¹⁻⁷ This work has shown that the boundaries can be used as an indirect measure of the strength and orientation of the magnetospheric electric field when the assumption is made that the equatorward boundary maps to the zero energy Alfvén layer in the magnetic equatorial plane. Calculations of the total cross magnetospheric potential drop determined from the average location of the boundaries were found to be in reasonable

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(Due to the large number of references cited above, they will not be listed here.
See References, page 59.)

agreement with measurements of the average cross polar cap potential measured by probes.⁷ Since the location of the boundary appears to reflect large-scale processes taking place in the magnetospheric system, it should provide a valuable tool in the study of geomagnetic phenomena.

The second of these aims is motivated by the need of the Global Weather Central of the Air Force Weather Service for a means of specifying in near real time the global extent of electron precipitation and the level of geomagnetic activity. The present work contributes to fulfilling the need of GWC in three ways. First, the set of boundaries compiled for this report represents a significant portion of the data set used to derive the systematics of the boundary location. Knowledge of these systematics has been used to extrapolate the global position of the boundary based on a single point determination of the boundary made in near real time from DMSP satellite data.⁸ Second, the computer-chosen boundaries and the algorithm used in their selection represent an extension of work previously done for GWC on techniques for automatically determining the location of the boundary in near real time using the raw data from the SSJ/3 sensor on the DMSP satellites.⁹ Lastly, the report shows how the boundary measurements made at different local times can be normalized to magnetic midnight to produce a new index of geomagnetic activity which correlates well with Kp. This new index will be directly available from the DMSP SSJ/4 data.

The report is divided into seven sections, including two appendices. Section 1 describes the instrumentation which provided the data used in this study. Section 2 deals with the format of the data used in the hand determination of the boundaries, the method used in the hand selection of the boundaries and the sources of error or ambiguity in these determinations. Section 3 describes the computer algorithm used to choose the boundaries. Section 4 provides an analysis of the discrepancies between the hand and computer techniques. Section 5 describes the process by which the auroral activity index was produced. Appendix A gives plots of the equivalent midnight boundary from the hand determined data set by month for 1978; the Auroral Boundary Index for one year. Appendix B gives a complete listing of both boundary data sets for 1978.

8. Hardy, D. A., and Holeman, E. (1983) The Global Auroral Boundary Code for the Global Weather Central of the Air Weather Service (to be published).
9. Hardy, D. A., and MacKean, R. (1980) An Algorithm for Determining the Boundary of Auroral Precipitation Using Data from the SSJ/3 Sensor, AFGL-TR-80-0028, AD A084482.

2. INSTRUMENTATION

DMSP/F2, a three-axis stabilized satellite, was launched into a near sun-synchronous, circular orbit at an altitude of 840 km in June 1977. Its orbital period was 101 min; the nominal inclination, 98.75° . At launch the orbit was centered near the 0700-1900 meridian but was subject to a very slow precession toward later local times. Due to the offset between the Earth spin axis and magnetic axis, the orbit had significant diurnal and seasonal variations in the magnetic local time-magnetic latitude frame of reference. Thus, equatorial auroral boundaries could be determined over a wider range of MLT than might be assumed from the restricted geographical local time locations of the orbit. Figure 1 shows the diurnal coverage

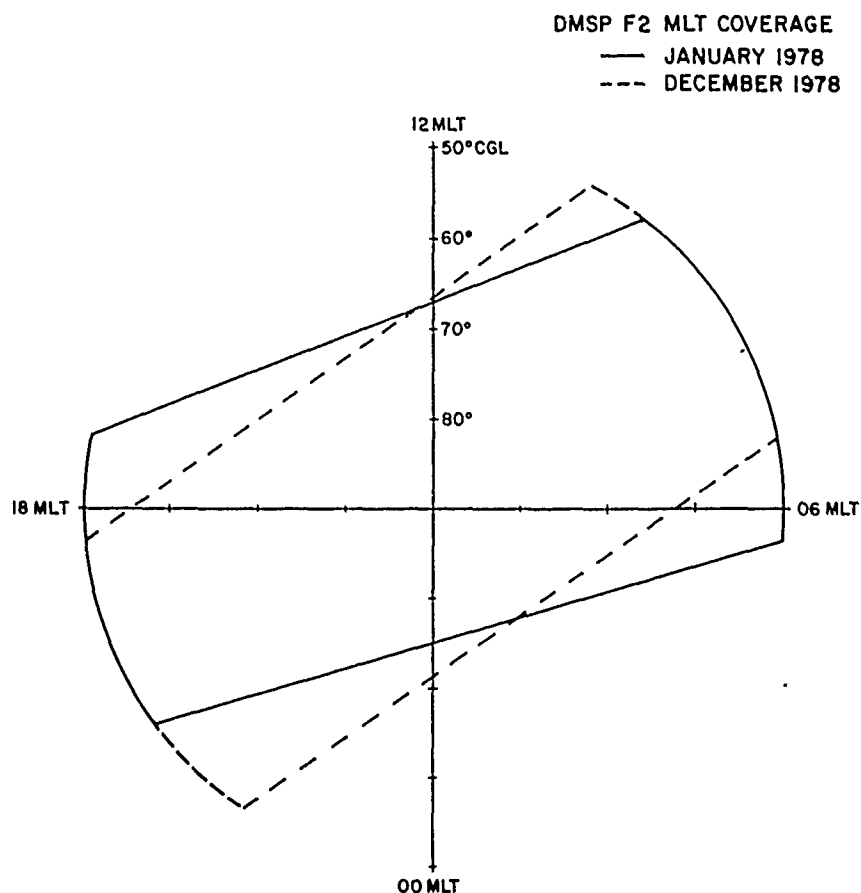


Figure 1. A Polar Plot in Magnetic Local Time—Magnetic Latitude Coordinates Showing the Diurnal Range of the DMSP/F2 Orbits in January 1978 (solid line), and in December 1978 (dashed line)

of DMSP/F2 in magnetic local time and magnetic latitude for January 1978 (solid line), and December 1978 (dashed line). Good coverage exists in the dawn and dusk sectors. Little coverage exists in the noon, post-noon and the midnight, post-midnight sectors. To extend the boundary statistics into these regions data from a later satellite, DMSP/F4, launched in April 1979 was also used. Identical particle detectors were flown on both satellites. It should also be noted that DMSP satellites are operational Air Force satellites. As such, except during periods of down-link transmissions, data are almost always being recorded. In 1980-1982, because of the failure of DMSP/F5 at launch, there is a break in the coverage, but DMSP/F6 was launched in late 1982.

The particle detector on DMSP/F2 consists of two curved plate electrostatic analyzers that measure the fluxes of electrons in 16 energy channels between 50 eV and 20 keV once per second. The apertures of the analyzers always face in the local zenith direction such that at auroral and polar cap latitudes they detect precipitating rather than backscattered and/or trapped electrons. One analyzer covers the energy range from 50 eV to 1 keV with a geometric factor of $4 \times 10^{-4} \text{ cm}^2 \text{ ster}$ and a $\Delta E/E$ of 13 percent. The other analyzer covers the energy range from 1 keV to 20 keV with a geometric factor of $10^{-3} \text{ cm}^2 \text{-ster}$ and a $\Delta E/E$ of 9 percent. The large geometric factors insure that the flux level for electrons in the diffuse aurora is well above the detector's sensitivity. A detailed description of the detector is given by Hardy et al.¹⁰

3. HAND SELECTION OF EQUATORWARD BOUNDARIES

An example of DMSP/F2 electron data, taken from a south polar pass on 18 May 1978, is given in Figure 2. For this pass $K_p = 1+$. Data are plotted as JTOT, the directional integral flux ($\text{cm}^2 \text{-sec-ster})^{-1}$ in the bottom panel; JETOT, the directional energy flux ($\text{keV/cm}^2 \text{-sec-ster}$) in the middle panel; and EAVE, the average energy in keV in the top panel. The scale for EAVE is linear. These quantities are plotted as functions of universal time in seconds of the day, the geographic and corrected geomagnetic latitudes and longitudes, and the magnetic local time of the satellite all projected to an altitude of 110 km.

Several features of the electron precipitation that pertain to the choice of auroral boundaries are illustrated in Figure 2. First, equatorward of the auroral precipitation there is a broad region over which there is a slight rise in JTOT with relatively large values of JETOT and EAVE. In Figure 2 these lie between

10. Hardy, D.A., Gussenhoven, M.S., and Huber, A. (1979) The Precipitating Electron Detectors (SSJ/3) for the Block 5D/Flights 2-5 DMSP Satellites: Calibration and Data Presentation, AFGL-TR-79-0210, AD A083135.

9480-9690 UT and between 10,620-10,800 UT. The increases are due to radiation belt particles that penetrate the detector casing and directly stimulate the channeltrons. Since they have nothing to do with the auroral precipitation, they must be differentiated from the auroral electrons when determining boundaries. Due to the difference in the size of channeltrons used in the two detectors, radiation belt contamination is largely limited to the energy channels of the 1 to 20 keV detector.

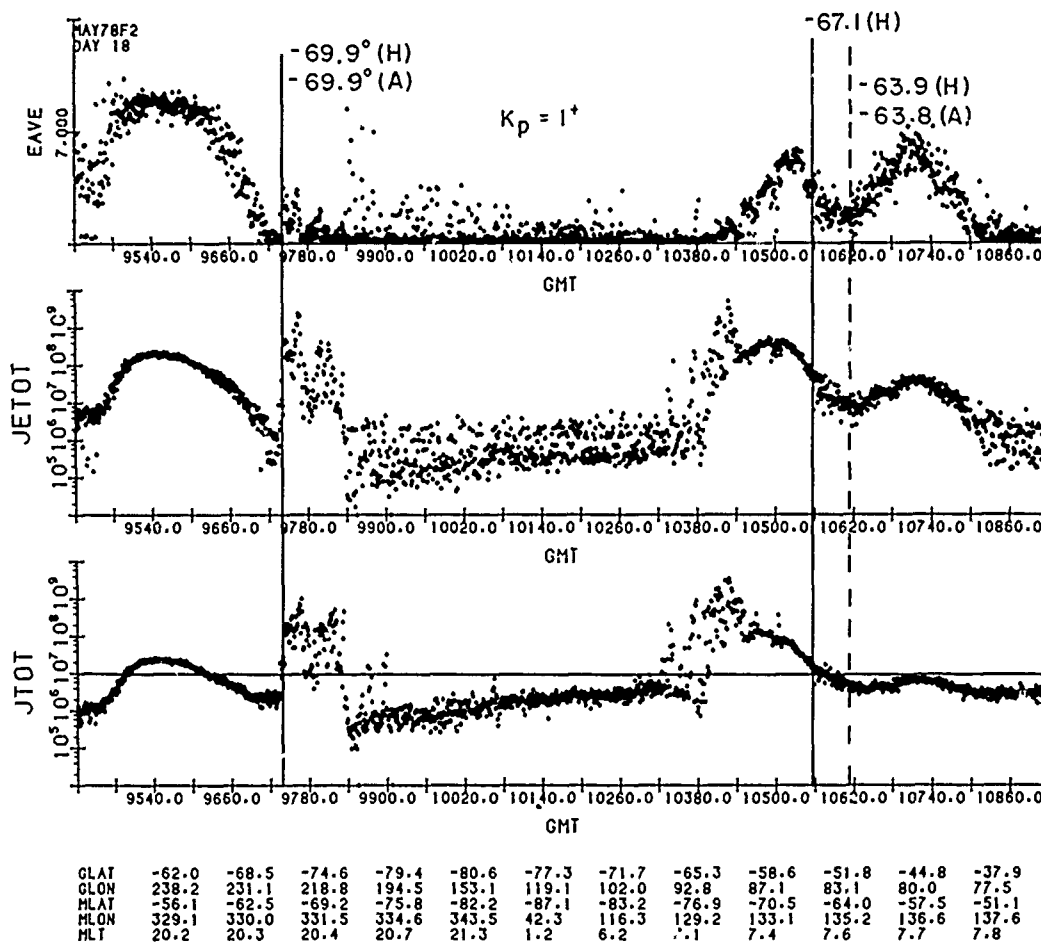


Figure 2. Integral Flux in $(\text{cm}^2\text{-ster-s})^{-1}$ (bottom panel), Energy Flux in $\text{keV} (\text{cm}^2\text{-ster-s})^{-1}$ (middle panel), and Average Energy in keV (top panel) of Precipitating Electrons Measured by the DMSP/F2 Satellite Passing Over the South Pole on 18 May 1978. These values are plotted as functions of universal time (in seconds), geographic and corrected geomagnetic latitudes and longitudes and the magnetic local time of the satellite all projected to an altitude of 100 km. Solid (dashed) vertical lines indicate 10^7 ("better") equatorward boundaries of precipitating auroral electrons chosen by hand (H). Algorithm-chosen boundaries (A) are indicated by a dot-dash line when they differ from the hand boundary by more than 0.3° CGL.

Second, we have found the condition $JTOT > 10^7 \text{ (cm}^2\text{-sec-ster)}^{-1}$, indicated in Figure 2 by the horizontal line (the 10^7 level) provides a useful "zero-order" criterion for selecting the equatorward boundaries of the oval. The solid, vertical lines drawn where the data points rise above the 10^7 level, going in the poleward direction, are referred to as 10^7 boundaries.

Third, the evening equatorward boundary is sharper than its morning side counterpart. On the morning side in Figure 2 JTOT rose from background to $10^7 \text{ (cm}^2\text{-sec-ster)}^{-1}$ over 3.2° latitude, whereas the evening side rise was nearly instantaneous. Generally, gradients in the electron flux with latitude are found near both equatorward boundaries. The gradient never extends more than a few degrees latitude in the evening sector, but can cover as much as 10° on the morning side where it is always perceptibly present. A dashed line on the morning side in Figure 2 is drawn at the point where JTOT rises noticeably above background, to include the flux gradient within the auroral boundary. This is referred to as a "better" boundary.

Because of the nearly instantaneous rise of the data on the evening side, most of the evening boundaries are 10^7 boundaries. Because of flux gradients on the morning side, morning boundaries are generally "better" boundaries. In Appendix B "better" boundaries (or 10^7 boundaries when the two are the same) are listed. This is the set of boundaries which has been used for various statistical studies.

The 10^7 boundary is quite precise, but the criteria used for choosing the "better" boundary are more subjective, and cause some ambiguity. On both morning and evening sides of the oval, the onset of electron precipitation can be obscured in various ways.

In the evening sector the principal ambiguity in choosing boundaries is caused by contamination of the low energy channels of the detector by photoelectrons. Gussenhoven et al⁶ discuss this problem in detail. In these data this contamination shows up as a high equatorward background level which can exceed a level of 0.5×10^7 on the JTOT scale. Although the choice of auroral boundaries is generally clear the ambiguity results from the fact that it is impossible to tell if, and how far, the aurora might extend below the JTOT level produced by the photoelectrons. Clearly, when the background level is close to or above the 10^7 level on the JTOT scale choosing a 10^7 boundary is impossible.

In the morning sector uncertainties in identifying the position of the boundary are more severe. There are three sources of uncertainty: (1) a much more gradual latitudinal onset of precipitation than is found in the evening, (2) overlap between regions of energetic electron precipitation and radiation belt contamination of corresponding energy channels, and (3) the existence of energetic plasma close to but detached from the boundary.

The gradual latitudinal onsets of precipitation with increasing latitude, are called ramps (Figure 2, morningside). Ramps may occur on both morning and evening sides of the north and south poles, but are less frequent and less extensive on the evening side. They occur nearly all the time on the morning side generally producing a lower boundary when compared to the evening side. Ramps cause severe problems in two different ways: (1) when they are combined with a high equatorward background (as discussed in the case of evening boundary ambiguities), and (2) when the morning side gradient extends into regions of radiation belt contamination. Even when not obscured there can be ambiguity in choosing where a gradual ramp begins. In choosing the morning boundaries it is almost always necessary to use changes in the average energy and the energy flux, as well as those in the number flux.

Overlap between the region of energetic electron precipitation in the auroral zone and the region of contamination of energy channels by radiation belt particles is shown in Figure 3, a pass over the south pole on 4 April 1978, for which $K_p = 5-$. On the morning side of the oval one can see that the rise in JTOT, JE1 O1 and EAVE, due to contamination, is contiguous to the region of auroral precipitation. When the radiation belt particles exhibit a characteristically smooth curve an attempt is made to determine the onset of auroral particle precipitation by drawing the boundary at the point where irregularity begins as was done in this example. In this case the morning boundary was drawn at -60.7° MLAT, but choices down to -56.6° (the 10^7 boundary) are defensible giving an uncertainty of 4.1° . However, when the radiation belt and particle signatures are both irregular there is even greater uncertainty in the boundary choice. Because of the sudden onset of auroral electron precipitation on the evening side, radiation belt particle contamination is rarely a problem, as Figure 3 also shows.

At lower K_p , as in Figure 2, radiation belt interference produces no problems since the aurora is contracted enough to leave the radiation belt particles clearly outside the oval. Radiation belt interference is most problematic at moderately high activity levels ($K_p = 3$ to 6). For these activities it is often the case that a clear separation between JTOT levels produced by auroral and radiation belt effects cannot be made. At very high K_p , the problems are again manageable since fluxes are so intense they appear to mask the effect of the radiation belt particles. An example of this type of occurrence is shown in Figure 4, a north pole pass on 28 August 1978, for which $K_p = 8$.

The third effect (detached energetic plasma) can be found in both morning and evening regions and an example is shown in Figure 5. This example shows a north pole pass on 21 January 1978, during a time of magnetospheric quiet ($K_p = 0$). On the evening side there are small regions of energetic electrons near to but detached

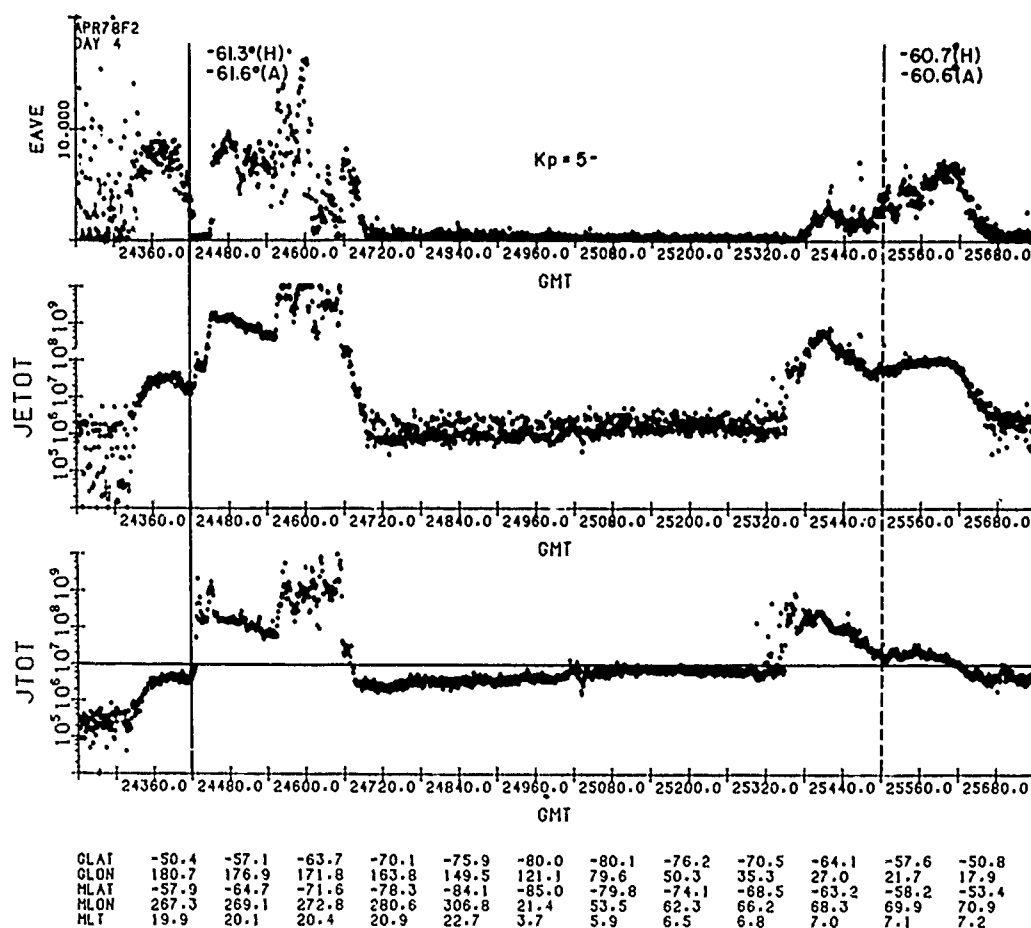


Figure 3. Precipitating Electron Data for a South Pole Pass on 4 April 1978. The format is the same as that in Figure 2

from the more poleward precipitation region. These can occur during active times, as well, and are ignored in selecting the boundaries. Ambiguity may result when these regions are very broad and/or very close to the auroral region. (Note that Figure 5 is also an example of high equatorward background from photoelectrons from the sunlit conjugate hemisphere, as discussed above.)

The final problem encountered in this data set is with those morning south pole equatorward boundaries which fall between 0900-1300 MLT. Electron precipitation patterns in the diffuse auroral region during these local times are observed to vary from a normal diffuse aurora to the complete disappearance of the diffuse aurora within detector sensitivity. In the latter instances only the magnetospheric cusp is encountered. An example of a pass with no dayside diffuse aurora is shown in

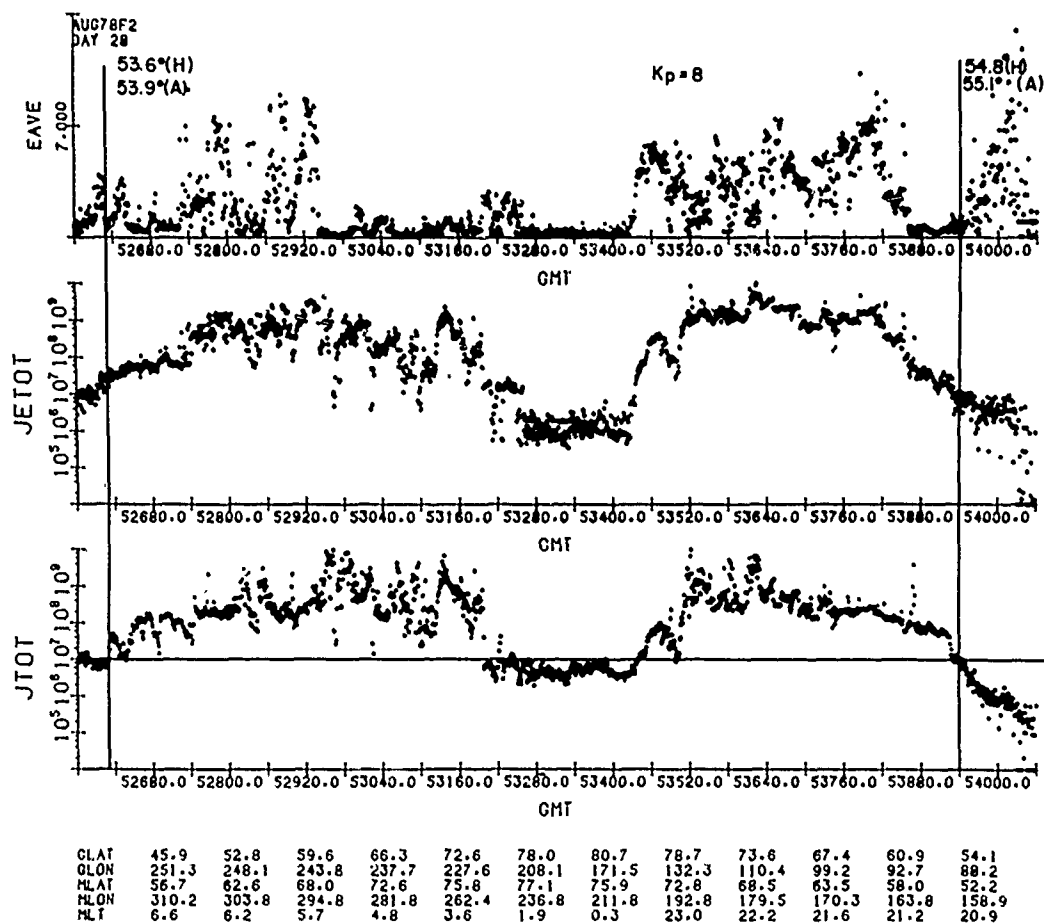


Figure 4. Precipitating Electron Data for a North Pole Pass on 28 August 1978. The format is the same as that in Figure 2

Figure 6, a south pole pass on 12 December 1978, for which $K_p = 2-$. For cases such as these no equatorward boundary is listed. Problems arise when the diffuse aurora is weak and irregular. As may be seen in Figure 1, DMSP/F2 is only in the pre-noon sector for a few passes per day, so any problems with the 1978 data sets should be minimal. The dynamics of the dayside diffuse auroral electron precipitation will be discussed in a forthcoming paper. For the time being, however, listed boundaries between 0900-1300 MLT should be treated judiciously, and we advise referencing the actual data to determine what is being measured in these instances.

The above effects produced greater than 1 degree uncertainty in the equatorial boundary only for a small percentage of the total cases. On the evening side

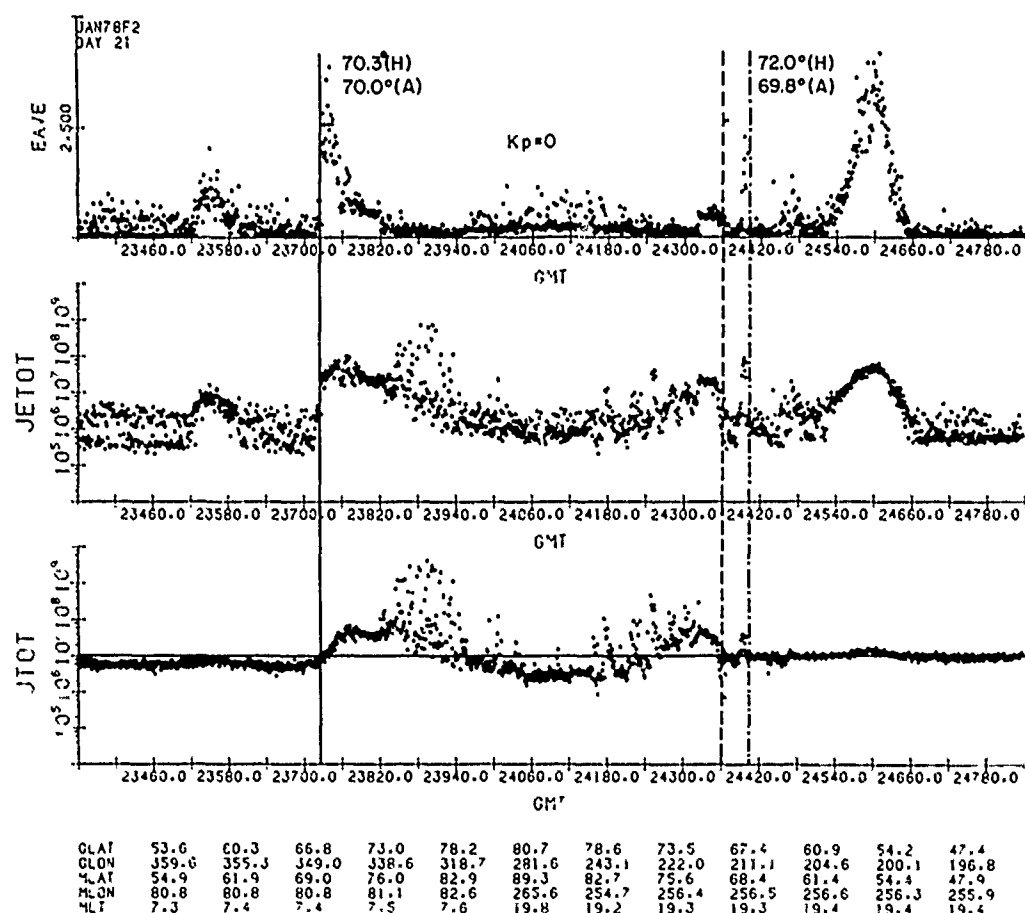


Figure 5. Precipitating Electron Data for a North Pole Pass on 21 January 1978. The format is the same as that in Figure 2

approximately 90 percent of boundaries were determined with no ambiguity; on the morning side, approximately 70 percent. After making more than 20,000 boundary determinations by hand, we feel that a high enough level of consistency has been reached to justify using the hand-chosen boundary set to verify the algorithm which has been developed to select boundaries automatically. In actuality, this verification turned out to be a two way process which has enabled us to decide which of several algorithm tests works best for determining morning and evening auroral boundaries (as discussed in Section 4), and to eliminate from the hand-chosen data set most of the glaring errors. As a result of this cross-verification, we have two data sets in which we have a high level of confidence.

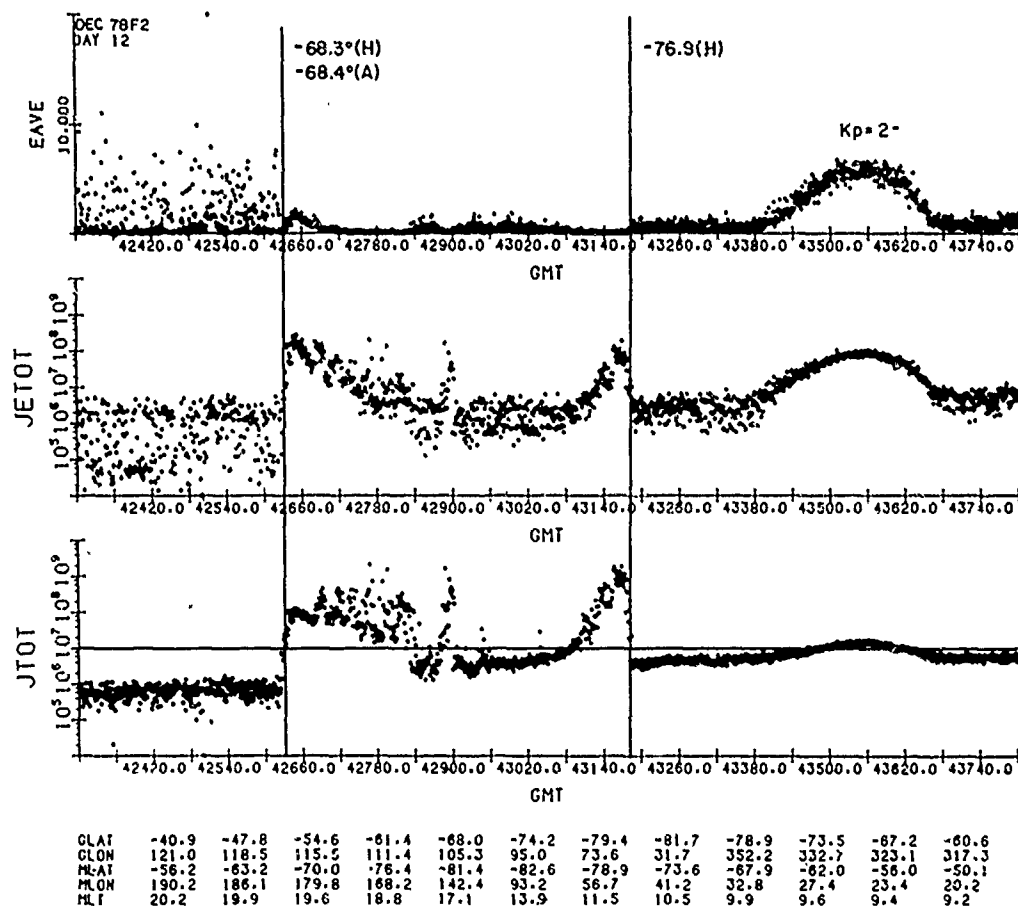


Figure 6. Precipitating Electron Data for a South Pole Pass on 12 December 1978. The format is the same as that in Figure 2

4. COMPUTER ALGORITHM FOR BOUNDARY SELECTION

In devising methods for choosing equatorward auroral boundaries by computer we made use of two factors that we found to be generally applicable in choosing the boundaries by hand; (1) on the evening side the electron precipitation begins (on the equatorward edge proceeding poleward) with increases in the flux at the lowest energies, often resulting in a gradual rise in average energy, and (2) on the morning side the precipitation onset is most reliably seen in the 1-10 keV energy range, resulting in an average energy rise which is rather abrupt. Thus, an increase over background in the energy range < 1 keV will be used to signal the evening boundary, and an increase over background in the keV electrons, used to signal the morning

boundary. The complexity of the tests used reflects the difficulty often encountered in determining that the signal is above background.

Photoelectron contamination is avoided in the low energy particle signal by eliminating counts from the two lowest energy channels. Contamination of the higher energy signal by radiation belt particles is more complex and requires tests that make use of the fact that the low energy detector (channels 9 to 16) has only $\sim 1/10$ the contamination of the high energy detectors (channels 1 to 8), and that the contamination in the high energy detector gives a uniform count signal in all channels.

In this section we will describe the preparation of the data base, the construction of test quantities from the data, and the application of the tests that produced the 1978 set of computer- (algorithm-) chosen equatorward boundaries. The DMSP test data for the SSJ/3 instrument are stored on a series of 6250 BPI tapes, each containing several months of raw data from either the F2 or F4 satellite. The data base is analyzed one month at a time for boundary information. The first step in this procedure is to run program DSFMPEP on a month's data with control parameters set to strip off all data with absolute magnetic latitude greater than 50° . Program STDKC3 then searches this intermediate file for boundary crossings. STDKC3 logically divides the file into quarter orbit segments by successive calls to subroutine SEARCE. For each call to SEARCE, information for up to 300 consecutive 4-sec data records is stored in the matrix ITST for subsequent analysis. For each quarter orbit, SEARCE determines whether the data are occurring in ascending or descending order of absolute geomagnetic latitude as a function of time. If the geomagnetic latitude is decreasing, the data are stored in inverse order beginning in location 300 so that STDKC3 always sees a quarter orbit file in order of increasing geomagnetic latitude.

The ITST matrix is preset to a value of -1, and the relative location in ITST for a particular 4-sec data record is calculated from the elapsed universal time since the beginning of the quarter orbit. Hence, time gaps are automatically embedded as a series of one or more lines of all minus ones. The end of a quarter orbit is defined to be where the data goes from one side of geomagnetic midnight (43,200 secs) to the other for the ascending latitude half of a polar pass and the 50° latitude boundary for the descending magnetic latitude half. The last valid position in the data file is marked for the next call and control returned to STDKC3.

The DMSP raw data file is a series of consecutive data records, each containing a time and ephemeris record and four consecutive 16-channel spectral observations seen by the SSJ/3 instrument. Each spectrum is acquired over approximately one second of elapsed universal time. For statistical purposes these four spectra are added together to form a unit data record and its information stored in one line of ITST. ITST is dimensioned as (300, 18) and the 18 words corresponding to the N'th ITST line are defined as follows:

ITST (N, 1) through ITST (N, 8) are the number of counts in consecutive energy channel pairs 1 + 2, 3 + 4,, 15 + 16 (the channel numbers increase with decreasing energy);

- ITST (N, 9): Counts in channel 8 (high energy detector, 985 eV channel);
- ITST (N, 10): Counts in channel 9 (low energy detector, 972 eV channel);
- ITST (N, 11): Universal time;
- ITST (N, 12): Geomagnetic latitude;
- ITST (N, 13): Magnetic local time;
- ITST (N, 14): 110 km latitude;
- ITST (N, 15): 110 km longitude;
- ITST (N, 16): Altitude;
- ITST (N, 17): Geographic latitude;
- ITST (N, 18): Geographic longitude.

STDKC3 analyzes the 300 record ITST quarter orbit file in sequential order until three of six defined pseudo statistical tests are satisfied. When this happens a successful boundary determination has been made. The universal time at which each test was satisfied along with its corresponding magnetic latitude and local time are recorded in the computer boundary file. The six test quantities are defined as follows:

JTST₁: low energy integral count signal omitting the two lowest energy channels.

$$JTST_1 = S_1 \sum_{i=9}^{14} N_i,$$

where N_i is the observed counts in channel i , and

$$S_1 = 0.1 \text{ (scale factor).}$$

JTST₂: 8-4-2-1 weighted (toward high energy) RMS variance of 1st four channel pairs.

$$JTST_2 = \frac{S_2}{\sqrt{1}} \left\{ \frac{1}{w} \sqrt{w \sum_{i=1}^4 w_i I_i^2 - \left(\sum_{i=1}^4 w_i I_i \right)^2} \right\},$$

where

$$w = \sum_{i=1}^4 w_i;$$

$$w_i = \{ 8, 4, 2, 1 \} \text{ weighting factors;}$$

I_i : counts in i 'th channel pair, 1+2, 3+4, and so on;

$$\bar{I} = \frac{\sum_{i=1}^4 w_i I_i}{w} ;$$

$$S_2 = 10 .$$

JTST₃: 1-2-4-8 weighted (toward low energy) rms variance in first four channel pairs. The definition is the same as for JTST₂, but with

$$w_i = \{1, 2, 4, 8\} ;$$

$$S_3 = 10 .$$

JTST₄: difference function between 5.5-20 keV counts and 1-3.5 keV counts.

$$JTST_4 = \frac{S_4 |I_1 + I_2 - I_3 - I_4|}{\sqrt{\max(I_1 + I_2, I_3 + I_4)}}$$

where

$$S_4 = 10 .$$

JTST₅: unweighted rms variance in 1st four channel pairs. The definition is the same as for JTST₂, but with

$$w_i = \{1, 1, 1, 1\} ;$$

$$S_5 = 10 .$$

JTST₆: ratio of counts in channel 8 to those in channel 9.

$$JTST_6 = S_6 \frac{N_8}{N_9} ;$$

$$S_6 = -10 .$$

Tests 2, 3 and 5 are of the form $S\sqrt{I} \sigma_p$ where σ_p is the normalized statistical variance ($\sigma_p = \frac{\sigma}{I}$). It was found empirically that this form gave a more reliable signal than either σ or σ_p alone.

$JTST_1$ is the sum of the counts in the six channels of the SSJ/3 sensor between 110 eV and 1000 eV. On the evening side of the oval counts in this energy range are normally observed first as the satellite passes the auroral oval boundary.⁹ The two lowest channels are excluded since they are often contaminated by conjugate photoelectrons. $JTST_2$ is the weighted rms variance of the four channel pairs in the energy range from 1 to 20 keV. These are the channels that are affected by penetrating particles from the radiation belts. Since these particles directly stimulate the channeltrons each of the eight channels should see the same number of counts within statistics such that the rms variance ($JTST_5$) is small when there is no other signal. If counts from auroral fluxes are present they should be highly non-uniform over this energy range and would act to increase the rms variance. The weighting for $JTST_2$ is toward the highest energy channels. $JTST_3$ is the same as $JTST_2$ except that the weighting is toward the 1 keV end of the range. $JTST_4$ is the absolute difference in the 4-sec sum of counts in the four channels between 5.5 and 20 keV and the four channels between 1 keV and 3.5 keV divided by the square root of whichever of these sums is greater. The idea again is that if auroral counts are present this difference will be larger than if only counts from penetrating particles are present. This test was not used to determine the final boundary but was retained since it is the same as the test developed by Hardy and MacKean for GWC. $JTST_5$ is the same as $JTST_2$ and $JTST_3$ except with no weighting. $JTST_6$ is the ratio of channels 8 to channel 9. Both these channels are at approximately 1 keV but channel 8 should see the effects of penetrating particles and channel 9 should not. Based on the difference in the geometric factors between channel 8 and 9 the ratio should be approximately 3 if both channels were measuring the same flux. If the ratio is much higher than this it means that channel 8 has significant counts due to penetrating electrons.

STDKC3 treats each of these six quantities as an independent statistic with an empirically determined normal, average, or threshold value when the satellite is at latitudes below the auroral boundary. When a statistic is above its threshold value for a sufficiently long time period, the boundary flag for that statistic is turned on. That time period was chosen as one 4-sec interval for $JTST_1$ and three 4-sec intervals for the remaining tests. STDKC3 scans the quarter orbit file from its beginning, setting the flag for each test until flags are on for $JTST_2$, $JTST_5$ and $JTST_6$ at the same time. STDKC3 retains the geomagnetic latitude and magnetic local time at which the flag for each test was set. Once the flags for $JTST_2$, $JTST_5$, and $JTST_6$ are set the boundary is chosen on the morning side of the oval at the point where the flag for $JTST_2$ was set and on the evening side of the oval at the point where $JTST_1$ was set.

Once a signal for a given test is turned on it is possible for its corresponding statistic to return to its threshold level or below. If $JTST_1$ and $JTST_5$ along with either $JTST_2$ or $JTST_3$ are below threshold for two consecutive 4-sec time intervals before the boundary search reaches a normal termination ($JTST_{2, 5, 6}$ on), all signals are turned off and the search resumed. Independent of that $JTST_5$ is turned off if its statistic is below threshold for five consecutive 4-sec time intervals.

The actual thresholds chosen for the six quantities were $T_c = \{12, 18, 16, 30, 18, -50\}$. These were chosen empirically using approximately 500 case histories before the procedure was applied to the entire DMSP data base to construct the final computer boundary file.

Time gaps in the data file had to be dealt with. One and two 4-sec time gaps were ignored since they could cause at most a 8-sec error in the boundary determination. However, if a longer time gap occurred, all flags were turned off. Also, if any of the six signals occurred immediately after a time gap longer than 8 sec, its boundary was flagged as questionable in the computer boundary file. The beginning of a quarter orbit file was logically treated as if it were occurring after a large time gap for the time gap logic. If the data were exhausted before all flags were set, the current status of each was written into the boundary file, and labelled as questionable. Also, the boundary latitudes were examined and labelled questionable if they were above 72° . A record was written for each of the quarter orbit files, and analyzed for completeness with all questionable data flagged.

5. ANALYSIS OF DIFFERENCES BETWEEN HAND-CHOSEN AND ALGORITHM-CHOSEN BOUNDARIES

Two methods of analyzing the hand- and algorithm-chosen sets of boundaries are given in this section. The first method relates each set separately to geomagnetic activity, as measured by Kp, by finding, for each local time sector, a linear relationship between Kp and the boundaries. We then compare the linear relationships of both sets, and the residual scatter found within each set. The second method looks directly at the differences between the two boundary choices, and analyzes the causes of the differences when they are found to be systematic and large.

Relationship of boundary sets to Kp. To relate the boundary sets to Kp, 24 1-hr bins in magnetic local time were created and individual boundaries assigned to a bin based on their MLT. Each boundary was tagged with the value of Kp at the time of the boundary crossing. Within each local time bin a linear regression was performed on the corrected geomagnetic latitudes (λ) of the boundaries vs Kp of the form:

$$\lambda = \alpha + \beta Kp .$$

(1)

Table 1 is a list of the results of the regression for those MLT bins in which there are sufficient data. In the table we give the range of the MLT bin, the number of boundaries in the bin used in the regression, the intercept (α) and the slope (β) of the regression line and the correlation coefficient (cc). The results from the hand-chosen and computer-chosen boundaries are listed separately. Hand-chosen boundaries using both F2 and F4 satellite data between September 1977 and February 1980 were used to obtain the regression equations. Computer-chosen boundaries used F2 satellite data from 1978, with selected values from 1979 and 1980 to complete the midnight sector statistics.

Comparing the regression equations from the hand- and computer-chosen boundaries one notes several systematic differences. On the morning side of the oval (MLT's between 0400 and 1200) the regressions on the hand boundaries give intercepts roughly 1° higher and slopes approximated $0.4^\circ/\text{Kp}$ more negative than the computer-chosen boundaries. On the evening side of the oval (MLT's between 1600 and 2400) the regressions on the hand boundaries give intercepts roughly 0.4° lower and slopes approximately the same as the computer-chosen boundaries results.

These differences reflect the limitations on the computer techniques. We attribute the differences on the morning side to the general problem the computer algorithm has in picking up the onset of morning side ramps and to the fact that this difficulty increases with increasing activity as the ramp region and the region of contamination by penetrating radiation more and more overlap. This problem results in computer boundaries higher than hand boundaries and a difference between the two that increases with activity. This leads to a higher average location for the computer boundaries at high Kp such that the slope of the regression curve is forced down and the intercept lowered. The evening side differences result from the threshold for the computer test being set at a high enough level to ensure that counts due to photoelectrons in the low energy channel would not trigger the test. This conservative approach results in the vast majority of computer boundaries being chosen at higher latitudes than the hand boundaries. Since the onset of precipitation on the evening side is normally abrupt at all levels of activity, on average, the difference between hand- and computer-chosen boundaries is the same resulting in the observed 0.4° offset but the same slopes.

Table 1. Regression Values for $\lambda = \alpha + \beta K_p$

Hand-chosen					Computer-chosen				
	Number	α	β	cc		Number	α	β	cc
04-05	267	67.7	-1.48	-0.57		112	67.4	-1.28	-0.52
05-06	1123	67.8	-1.87	-0.71		865	67.0	-1.57	-0.69
06-07	2462	68.2	-1.90	-0.74		1670	67.2	-1.51	-0.70
07-08	3159	68.9	-1.91	-0.76		1926	68.0	-1.52	-0.72
08-09	2159	69.3	-1.87	-0.73		1045	68.2	-1.45	-0.68
09-10	1178	69.5	-1.69	-0.66		441	68.5	-1.21	-0.62
10-11	864	69.5	-1.41	-0.57		220	69.0	-1.12	-0.60
11-12	513	70.1	-1.25	-0.52		27	67.3	-0.47	-0.37
16-17	204	71.6	-1.28	-0.66		123	72.0	-1.15	-0.63
17-18	526	71.1	-1.31	-0.69		341	72.0	-1.35	-0.75
18-19	997	71.2	-1.74	-0.82		652	71.6	-1.71	-0.80
19-20	2469	70.4	-1.83	-0.82		1537	70.7	-1.85	-0.85
20-21	3309	69.4	-1.89	-0.82		1934	69.8	-1.82	-0.83
21-22	3092	68.6	-1.86	-0.79		1513	69.1	-1.73	-0.81
22-23	1485	67.9	-1.78	-0.77		861	68.4	-1.52	-0.71
23-24	461	67.8	-2.07	-0.81		179	67.7	-1.64	-0.54

We next investigated the degree of scatter in the two data sets from their respective regression equations. This was done by subtracting the appropriate regression equation value from each boundary measurement and determining the frequency distribution of the residuals. In Table 2 are listed the percentages of this residual scatter within $\pm 1^\circ$, $\pm 2^\circ$, $\pm 3^\circ$ of zero for computer- and hand-chosen boundaries for morning and evening sides of the oval, both separately and together.

Table 2. Percentages of Residual Scatter

	Morning Side		Evening Side		Entire Oval	
	Computer	Hand	Computer	Hand	Computer	Hand
$\pm 1^\circ$	36%	30%	44%	40%	40%	36%
$\pm 2^\circ$	64%	56%	75%	70%	68%	65%
$\pm 3^\circ$	82%	76%	90%	86%	86%	82%

The spread in the unaccounted scatter for the computer- and hand-chosen boundaries is comparable, the computer boundary spread being approximately 5% narrower. This reflects a higher consistency in the computer-chosen over the hand-chosen boundaries. It is also the case that for both computer- and hand-chosen boundaries the spread is approximately 10° greater on the morning than on the evening side of the oval. Figures 7 and 8 are plots of the distribution of the residual scatter taken over the entire oval for the hand and computer boundaries, respectively. A bin size of 0.1° is used and the number normalized to 1000 cases. It is clear that the distributions are Gaussian. Based upon this and the results listed in Table 2 one can assign to the distributions a sigma of approximately 2° for both computer- and hand-chosen boundaries.

Direct comparison of hand- and computer-chosen boundaries. Distribution of differences between hand- and computer-chosen boundaries for the evening and morning sides of the oval, both separately and together, are shown in Figures 9 through 11. In addition, in Table 3 we show the percentage of the differences within $\pm 1^\circ$, $\pm 2^\circ$ and $\pm 3^\circ$ of zero for the three cases and a comparison to the earlier work of Hardy and MacKean.⁹

The figures and tables illustrate three points. First, all three distribution are strongly skewed towards negative values for the differences between computer- and hand-chosen boundaries. As discussed above, this arises due to the requirement of the computer algorithm for a clearer signal than that required by eye in order to consistently avoid the effects of background and noise in the selection

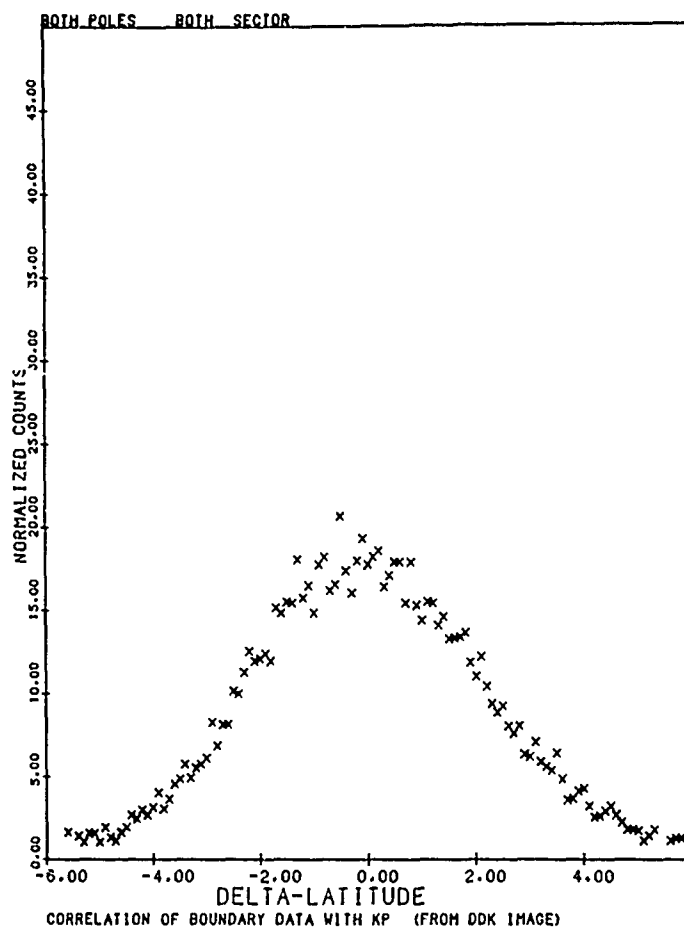


Figure 7. Distribution of the Residual Scatter in the Hand-chosen Boundary Set When Compared to Linear Regression Values Obtained From the Same Set. The distribution is accumulated in 0.1° bins and normalized to 1000 cases

process. Second, the distribution on the evening side of the oval is much narrower than on the morning side reflecting the more abrupt and therefore clearer onset of precipitation on the evening side. Lastly, the results are in very close agreement to those obtained by Hardy and MacKean⁹ which were derived using slightly different statistical tests.

We next analyze the source of differences between hand and computer boundaries that are greater than $\pm 3^\circ$ on the morning side and greater than $\pm 2^\circ$ on the evening side of the oval. The reasons for the larger differences between the hand-chosen and algorithm-chosen boundaries are given in Table 4. Morning and evening

sector discrepancies are listed separately because the number of cases differs. A discussion of these large differences in order of frequency of occurrence is given below.

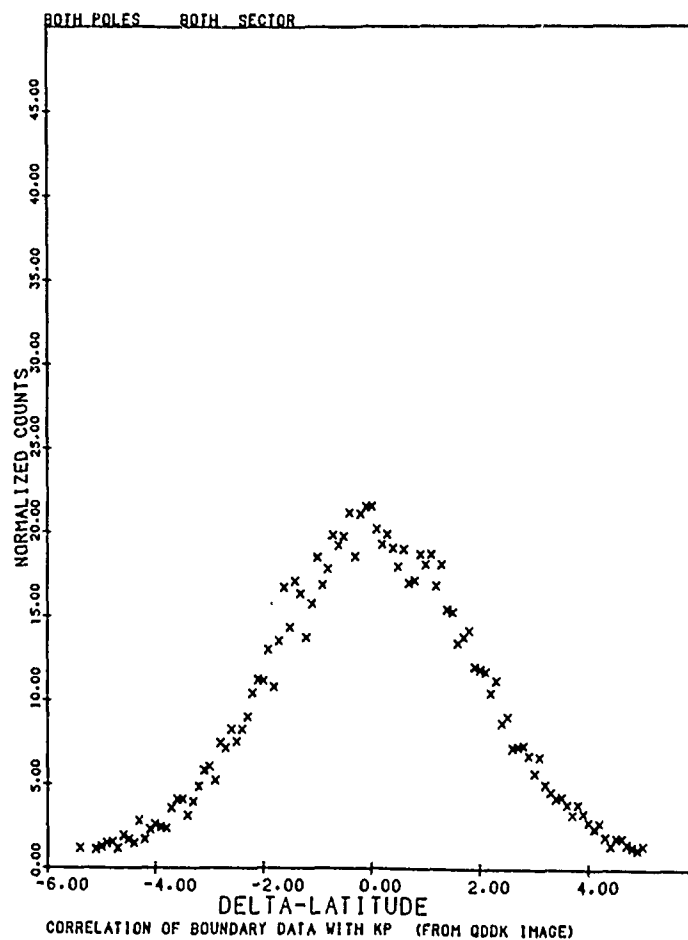


Figure 8. Distribution of the Residual Scatter in the Computer-chosen Boundary Set When Compared to Linear Regression Values Obtained From the Same Set. The distribution is accumulated in 0.1° bins and normalized to 1000 cases

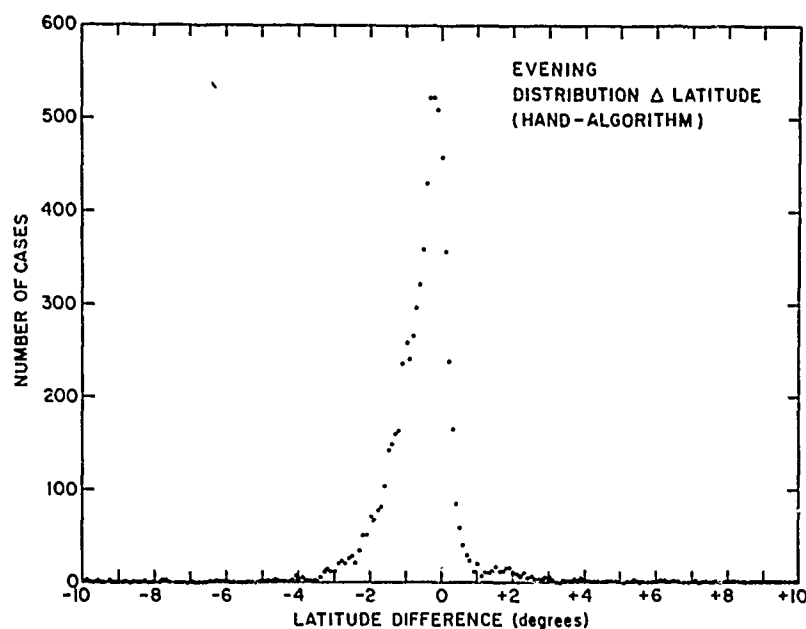


Figure 9. Distribution of the Differences Between Hand- and Computer-Chosen Boundaries ($\lambda_{II} - \lambda_A$) for the Evening Sector. The distribution is accumulated in 0.1° bins

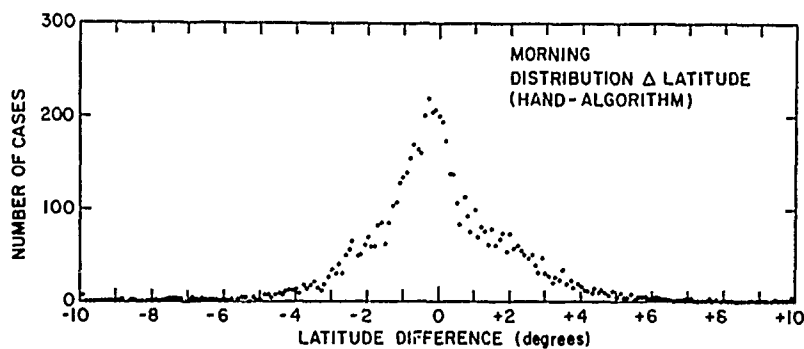


Figure 10. Same as Figure 9, for Morning Sector

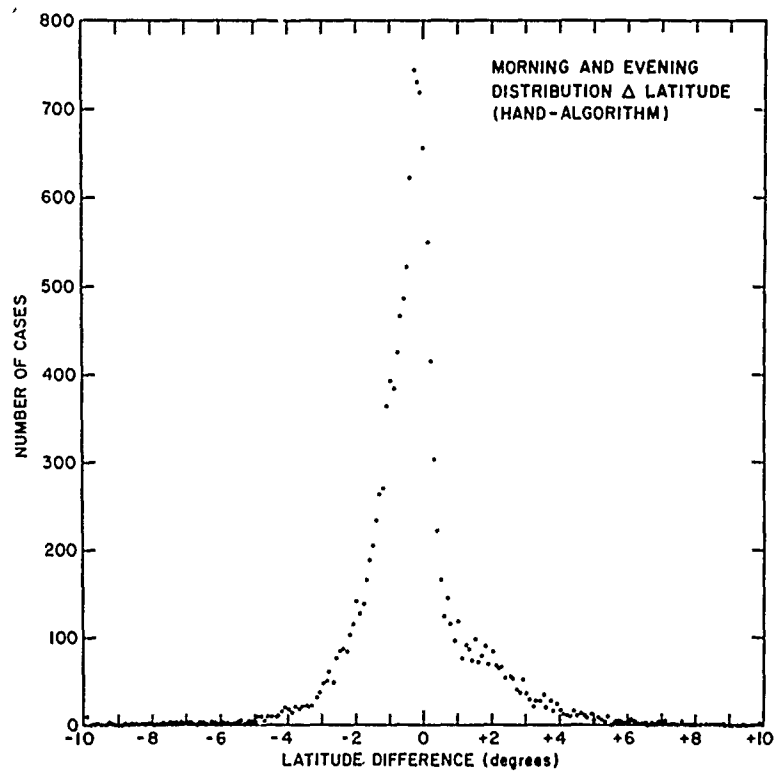


Figure 11. Same as Figure 9, for Evening and Morning Sectors Combined

Table 3. Percentages of Differences

	Evening	Morning	Composite	H-M Evening	H-M Morning
± 1°	74%	50%	63%	80%	50%
± 2°	93%	74%	84%	95%	67%
± 3°	98%	89%	94%	99%	82%

Table 4. Hand- vs Algorithm-Chosen Boundaries

Morning			Evening		
Morning Discrepancies ($> \pm 3^\circ$ CGM)			Evening Discrepancies ($> \pm 2^\circ$ CGM)		
Reason	Number	% of Total Morning Boundaries Discrepancies	Reason	Number	% of Total Evening Boundaries Discrepancies
Radiation Belt Interference	241	3.8 (34.7)	Evening Ramp	303	4.3 (64.3)
Irregularities Equatorward Edge	241	3.8 (34.7)	Irregularities Equatorward Edge	66	0.9 (14.0)
Spurs	71	1.1 (10.2)	Spurs	36	0.5 (7.6)
Magnetic Local Noon Criteria	54	0.8 (7.8)	Radiation Belt Interference	29	0.4 (6.2)
Morning Ramps	28	0.4 (4.0)	Poleward Boundary	18	0.3 (3.8)
Minor Problems	59	0.9 (8.5)	Minor Problems:	19	0.3 (4.0)
1. Ambiguous (34)			1. Ambiguous (12)		
2. Algorithm Failure (13)			2. Algorithm Failure (2)		
3. Poleward Boundary (11)			3. Hand Error (5)		
4. Hand Error (1)					
Total Number of Morning Discrepancies $> \pm 3^\circ$:			Total Number of Evening Discrepancies $> \pm 2^\circ$:		
% of Total Morning Boundaries with $> 3^\circ$ CGM Discrepancy:			% of Total Evening Boundaries with $> 2^\circ$ CGM Discrepancy:		
(6398 Morning Boundaries Measured)			(7030 Evening Boundaries Measured)		
694			471		
10.8%			6.7%		

Evening ramps refer to the gradual onsets of precipitation in the evening sector. They occur in less than half of the passes and usually extend for less than half a degree in CGL. The onset of the evening ramps is chosen as the "better" boundary for the hand-chosen data set, but the algorithm tends not to pick up the onset of these evening ramps making the algorithm boundary closer to the 10^7 level. Referring to Table 4, it is seen that evening ramps account for nearly 2/3 of the $> \pm 2^\circ$ CGL discrepancies. Actually, because in these cases the hand boundary is lower than the computer boundary they fall only in the negative direction. Since evening ramps are generally smaller than 2° , it is possible to deduce that the small regions of gradual onset of precipitation on the evening side are a major cause of the slightly lower hand-chosen evening boundary, and the negative skew seen in Figure 9.

Large irregularities on or near the equatorward edge of both the morning or evening auroral oval occur primarily under three conditions: (a) the occurrence of polar cap absorption events, (b) very low activity, and (c) abrupt changes in the activity. Polar cap absorption events have been, as much as possible, edited out of both data sets because they totally obscure the onset of auroral precipitation. Figure 5 illustrates ambiguous conditions on the evening-side equatorward edge of the aurora. The dashed line is the hand-chosen boundary, the dot-dash line the computer-chosen boundary. As was mentioned in Section 3, spurs are excluded from the hand-chosen data set because they may be produced by the precipitation of trapped electrons from prior activity. The algorithm usually picks the auroral boundary below the spur if it is broad enough, as was the case in this example. The net effect on the evening side of the $> \pm 2^\circ$ irregularities is not significant in the distribution of differences shown in Figure 9, as 30 of the algorithm boundaries were lower and 33 of the hand boundaries were lower. However, this category of discrepancies can account for some of the very large differences between the two data sets.

Irregularities in the equatorward edge of the aurora produce a quite different net effect on the morning side. First, they account for more than half the $> \pm 3^\circ$ CGL discrepancies on the morning side. Second, there is a distinct bias in that for more than 210 of these cases, the computer boundary is lower than the hand boundary. This category, then, accounts for many of the $> + 3^\circ$ CGL differences in the distribution shown in Figure 10.

Radiation belt particles interfere with both morning and evening auroral boundaries. This accounts for ~30 percent of the large discrepancies on the morning side. (On the evening side the problem is minor, 0.4 percent of the large discrepancies, either because the sharp increase due to auroral precipitation is visible through the radiation belt signature or the generally higher latitude of the onset of auroral precipitation on the evening side produces a boundary above the latitude of particle radiation.) Radiation belt particle interference is a major problem in determining

equatorward auroral boundaries both by hand and with the computer and was discussed thoroughly in the previous sections. Although every attempt was made in both data sets to exclude radiation belt particles effects, it was not always successful. The effect is that the hand chosen boundaries in 200 of 270 cases where radiation particle effects are important, are lower than those chosen by the algorithm. On the morning side then, this category of discrepancy accounts for many of the $> -3^\circ$ CGL differences in the distribution shown in Figure 10.

The category labelled Spurs, in Table 4, results from the triggering of the algorithm test too early by regions of enhancement which in these cases are clearly outside the auroral oval. This category accounts for many of the largest differences between the algorithm- and hand-chosen boundaries in the positive direction in Figures 9, 10 and 11. This is an algorithm failure which occurs for about 0.8 percent of the boundaries in the total data set.

The area of the aurora around noon local time is confusing, as was discussed earlier. Whereas, the method used to choose boundaries in this region by hand is fairly clearly defined and consistent, algorithm tests often fail to pick up the irregular conditions of the diffuse aurora. Instead the "cusp" boundary is chosen. An attempt has been made to edit out the algorithm "cusp" boundaries. The cases appear in the listing as the hand-chosen boundaries with no corresponding algorithm boundary. There are also instances in the noon sector where the algorithm chose boundaries which were not evident in the particle data. Because DMSP/F2 is in a dusk-dawn orbit this is not a major problem. If a satellite in a noon-midnight orbit is used to produce future Auroral Boundary Index values, further work on both the algorithm and hand selection of boundaries in the noon sector will be needed.

The remaining categories of large discrepancies between the two data sets are minor problems. The total number of boundaries in these additional cases accounts for less than 1 percent of the total boundary measurements. Morning ramps, which are a major problem in determining boundaries by hand, cause very few large discrepancies between the two data sets unlike their evening counterparts. Briefly, the other minor problems are: Poleward boundaries, the result of the algorithm tests being triggered very late (at or near the poleward edge of the aurora) because the gradient is very smooth; Ambiguous, where the reason for the discrepancy is a combination of two or more categories; Algorithm Failure, where the algorithm is wrong, but the reason is unclear; and Hand Errors, two of which were ephemeris interpolation errors, and the rest recording mistakes.

6. AURORAL BOUNDARY INDEX

A proposed Auroral Boundary Index was constructed in the following manner. First, using values of α and β from Table 1 a predicted Kp, called Kp', was calculated for each measured equatorward auroral boundary, λ_E , based on the relationship of λ and Kp shown in Eq. (1), using the following expression:

$$Kp' \equiv \frac{\lambda_E - \alpha_i}{\beta_i} . \quad (2)$$

Here α_i and β_i are the intercept and slope for the MLT zone in which the boundary was measured.

Second, using the Kp' calculated in Eq. (2), λ_{EM}' , the projection of λ_E to the midnight (23-24) MLT sector, was calculated using the expression:

$$\lambda_{EM}' = \alpha_M + \beta_M Kp' , \quad (3)$$

where α_M and β_M are the intercept and slope for 23-24 MLT zone. The last two columns in computer listing in Appendix B give the values of λ_{EM}' for the hand- and computer-chosen values of λ_E , respectively. Software has been developed to generate monthly plots of Kp', 3 hour averages of Kp' ($\overline{Kp}'$), and λ_{EM}' for both the hand- and algorithm-chosen boundaries. Additionally, the derived quantities are plotted using all points and using morning or evening boundaries separately. A sample set of plots of $\overline{Kp}'$ and λ_{EM}' for March 1978 is shown in Figures 12a-12l.

As the final part of the development of the index we have correlated Kp with $\overline{Kp}'$ for both hand- and algorithm-boundaries. The correlation was done using values of $\overline{Kp}'$ derived from the morning sector boundaries, evening sector boundaries, and all boundaries. Table 5 shows the correlations of Kp vs $\overline{Kp}'$ for each month in 1978. It is clear from Table 5 that correlations are best using only the evening boundaries (average of 0.84, hand and algorithm) and still quite good for the combined morning and evening boundary set (average of 0.84, hand, and 0.82, algorithm). The poorest correlations result when only morning boundaries are used (average of 0.77, hand, and 0.72, algorithm), a reflection of the morning problems. The lowest correlations generally occur in those months where there are very few active periods resulting in a restricted range for the data. Scatter plots of Kp vs of $\overline{Kp}'$ for March 1978, are given in Figures 13a-13f. Straight lines show the results of performing linear regressions on Kp vs $\overline{Kp}'$ and $\overline{Kp}'$ vs Kp.

In order to assess the consistency between the hand-chosen and algorithm-chosen data sets, monthly regressions of $\overline{Kp'}$ derived from the hand-chosen boundaries on $\overline{Kp'}$ derived from the algorithm-chosen boundaries were calculated. The results of these regressions for March 1978 are shown in Figure 14. Average correlation coefficients of $\overline{Kp'}$ (hand) vs $\overline{Kp'}$ (algorithm) are 0.97 for evening values, 0.91 for morning values and 0.96 for combined values.

Table 5. Correlations of Kp vs $\overline{Kp'}$

1979	Algorithm Kp' M/E	Algorithm Kp' Evening	Algorithm Kp' Morning	Hand Kp' M/E	Hand Kp' Evening	Hand Kp' Morning
Jan	0.87	0.86	0.80	0.89	0.86	0.85
Feb	0.74	0.78	0.64	0.77	0.77	0.66
Mar	0.81	0.84	0.73	0.83	0.84	0.75
Apr	0.81	0.83	0.70	0.84	0.84	0.76
May	0.85	0.87	0.77	0.88	0.87	0.84
Jun	0.78	0.81	0.67	0.77	0.80	0.66
Jul	0.76	0.78	0.68	0.79	0.79	0.73
Aug	0.86	0.87	0.83	0.89	0.89	0.83
Sep	0.87	0.89	0.76	0.89	0.90	0.83
Oct	0.78	0.81	0.66	0.80	0.82	0.73
Nov	0.85	0.86	0.74	0.87	0.87	0.81
Dec	0.83	0.84	0.73	0.86	0.86	0.79

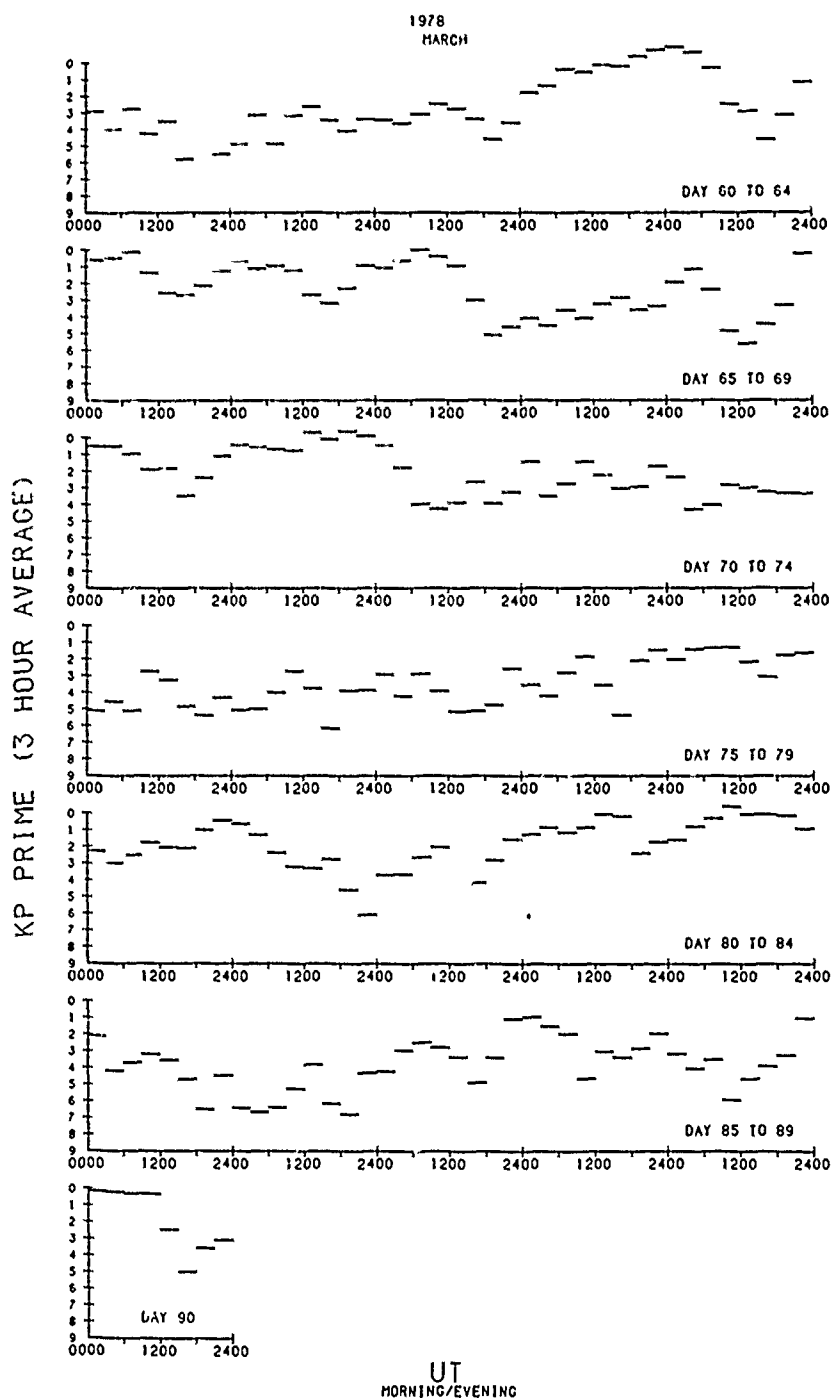


Figure 12a. Three-hour Average of K_p' Calculated From Hand-chosen Morning and Evening Equatorward Auroral Boundaries, Plotted as a Function of Universal Time for March 1978

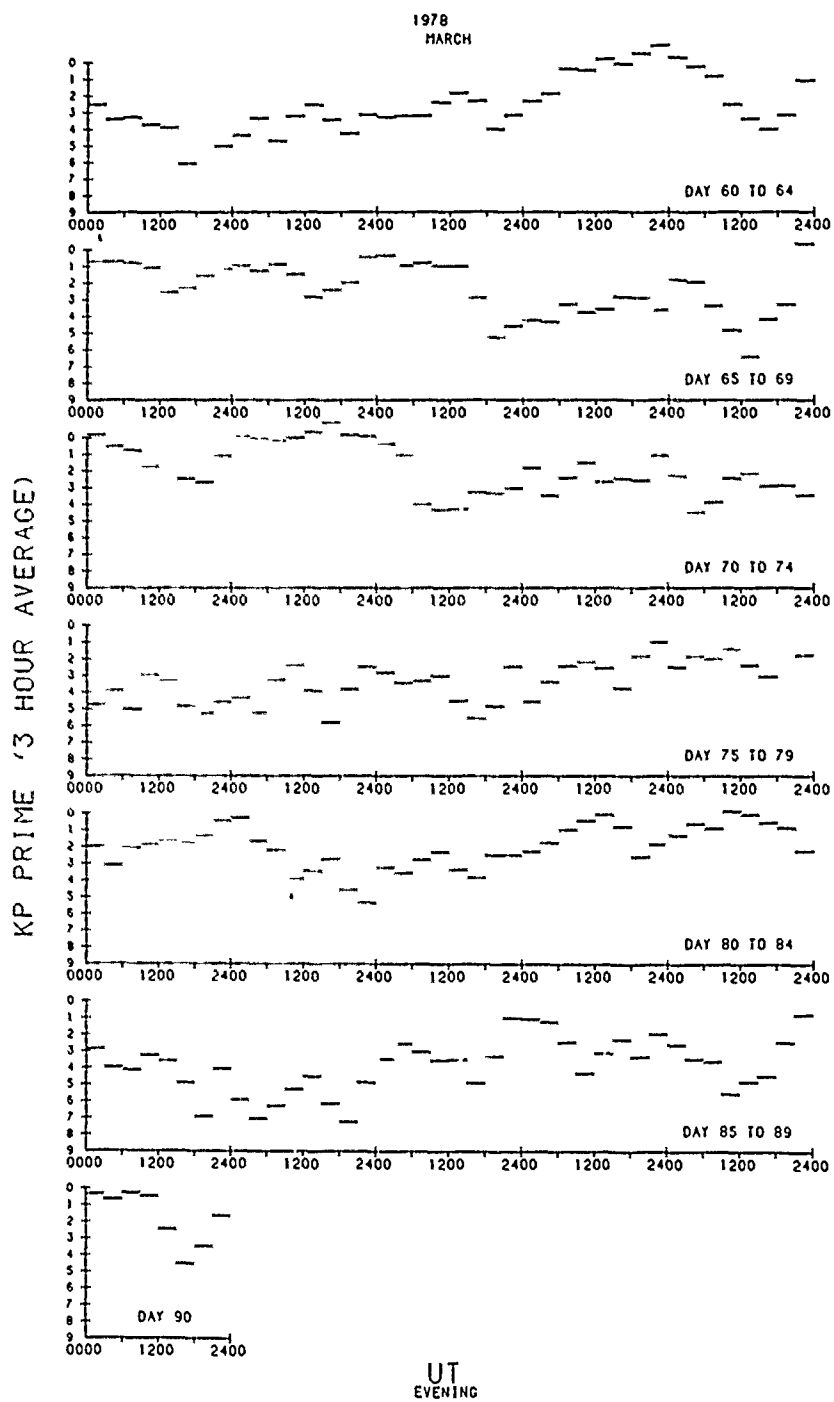


Figure 12b. Same as Figure 12a, Using Only Evening Boundaries

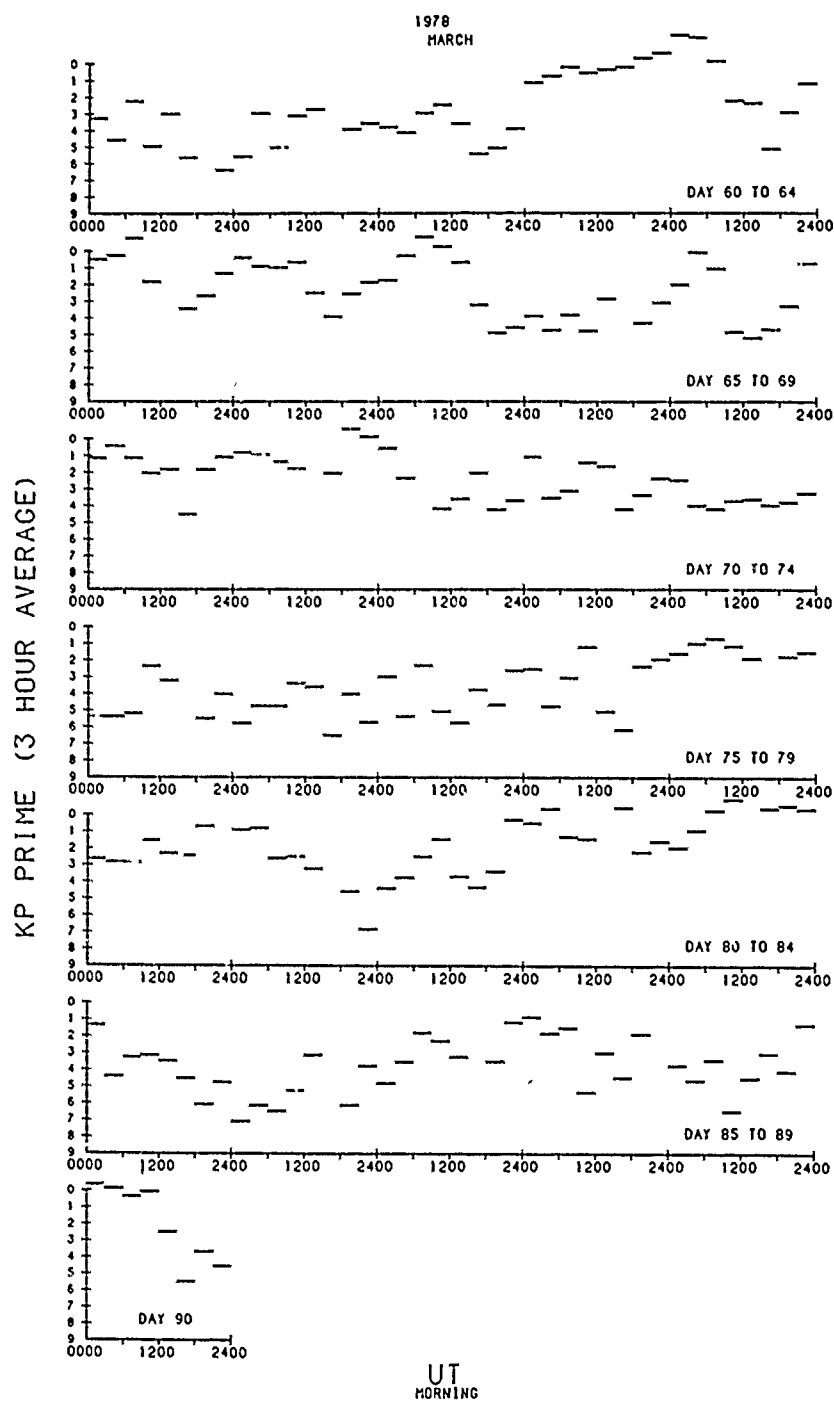


Figure 12c. Same as Figure 12a, Using Only Morning Boundaries

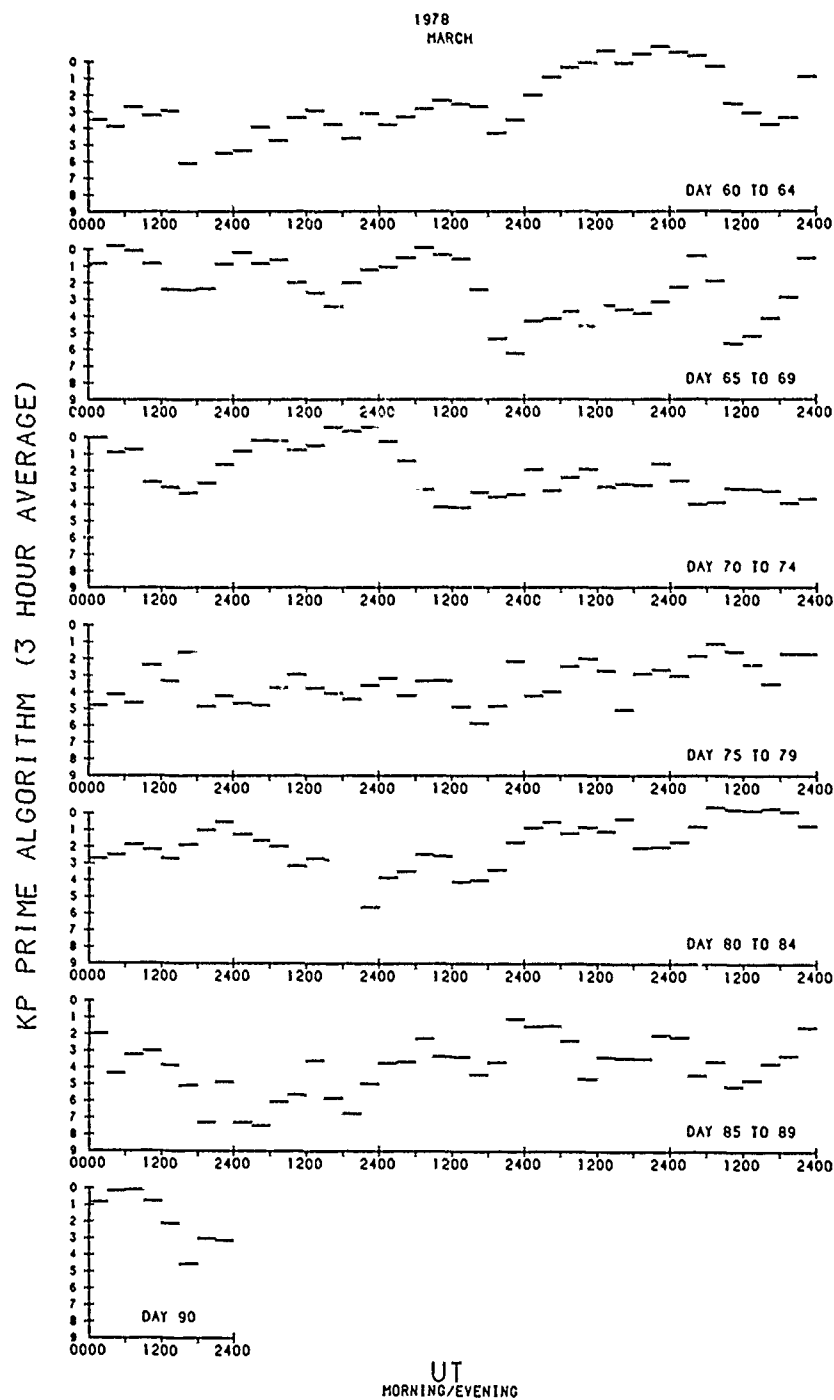


Figure 12d. Three-hour Average of K_p' Calculated From Algorithm-chosen Morning and Evening Equatorward Auroral Boundaries Plotted as a Function of Universal Time for March 1978

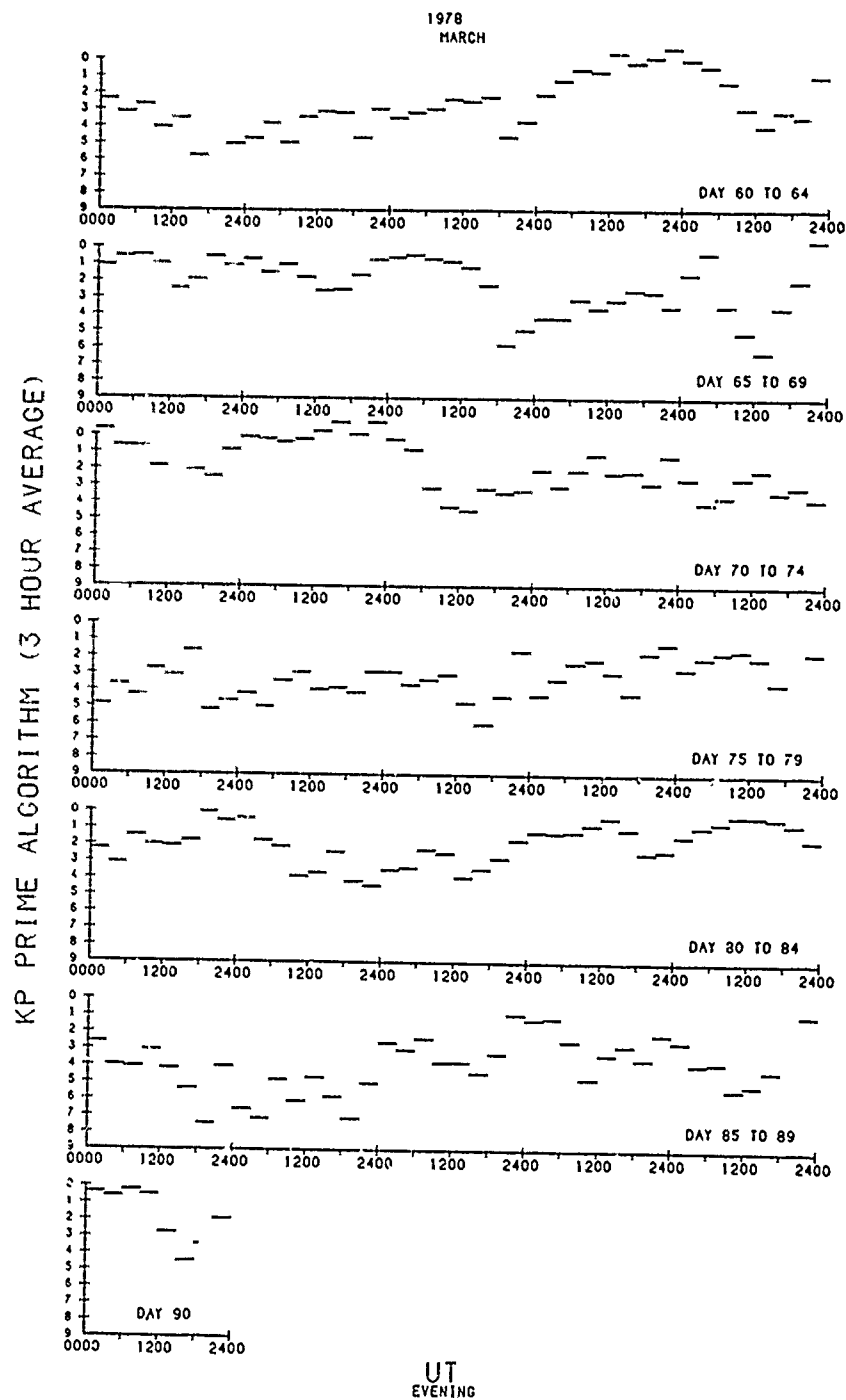


Figure 12e. Same as Figure 12d, Using Only Evening Boundaries

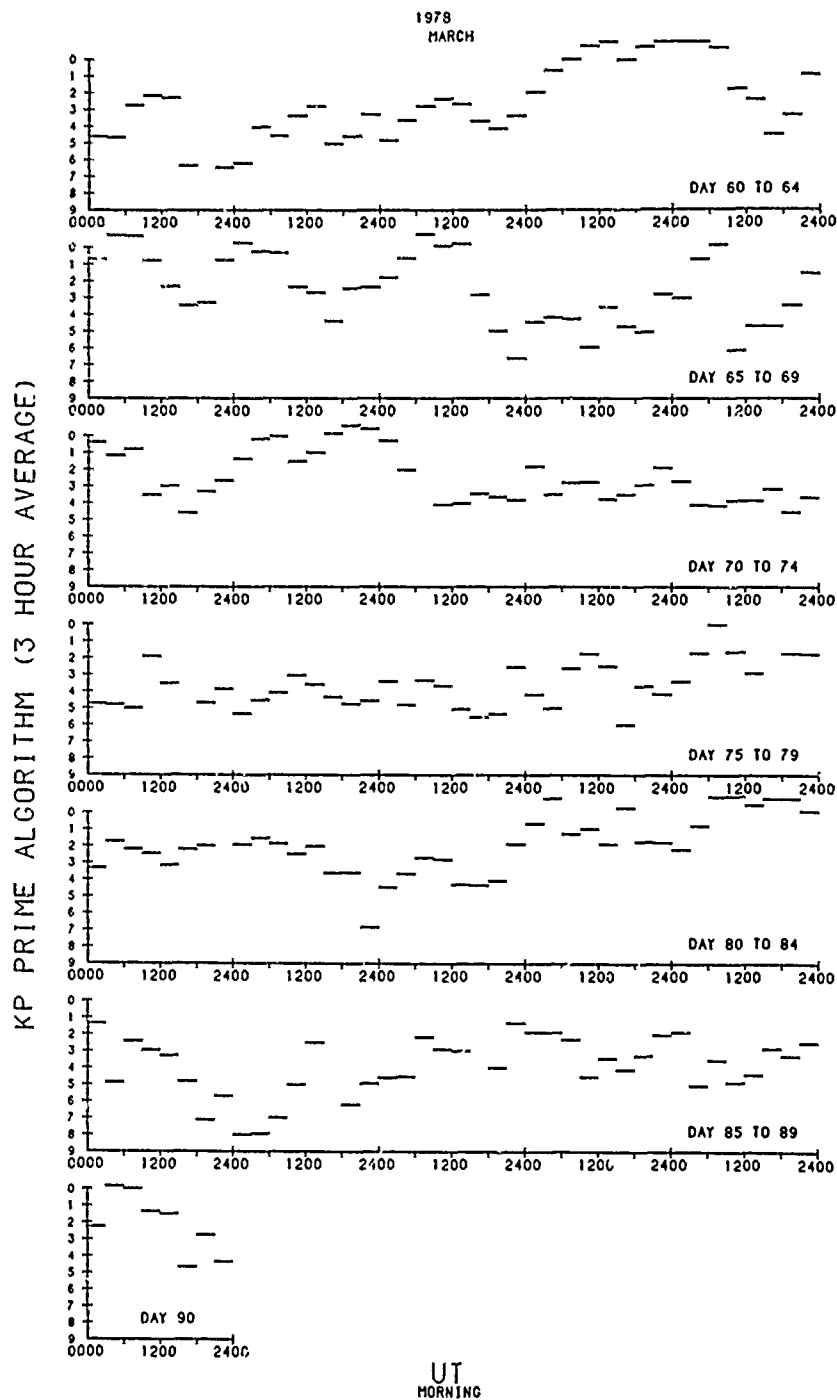


Figure 12f. Same as Figure 12d, Using Only Morning Boundaries

1978
MARCH

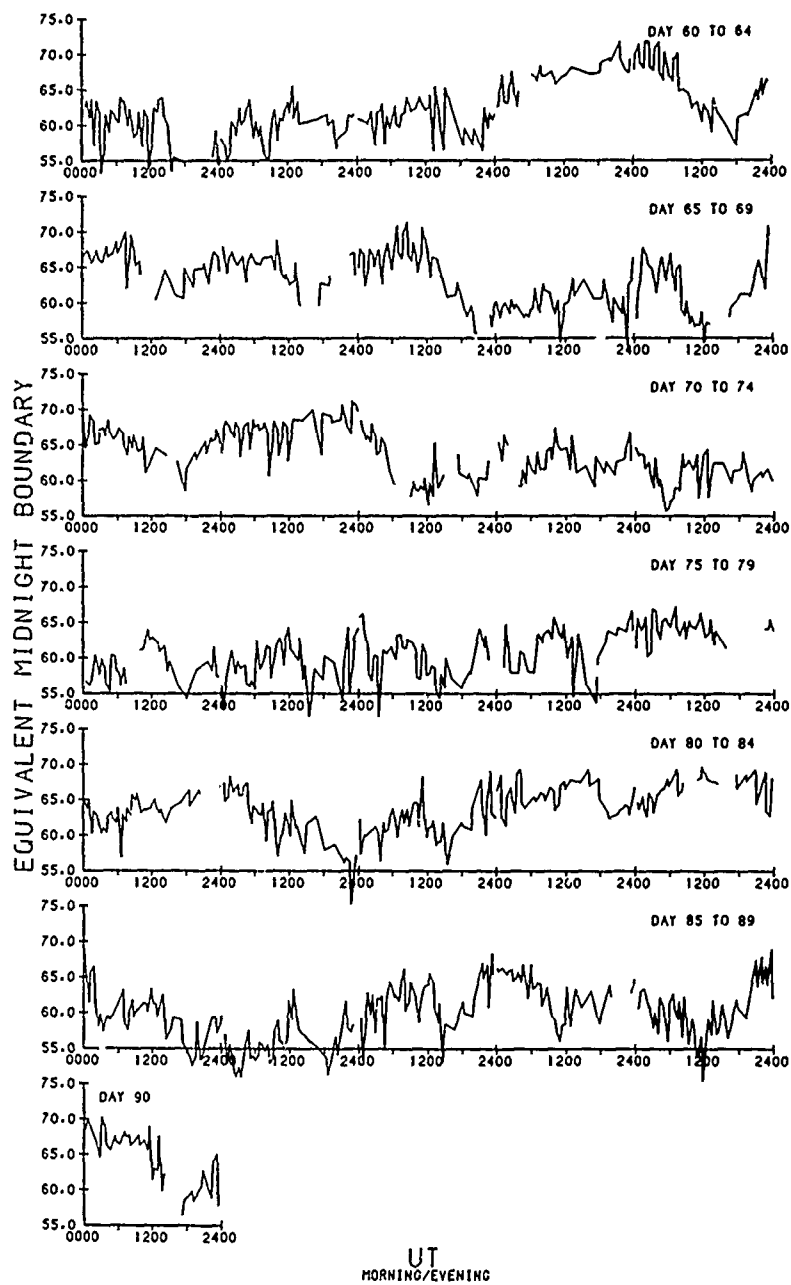


Figure 12g. Equivalent Midnight Boundary Calculated From Hand-chosen Morning and Evening Equatorward Auroral Boundaries, Plotted as a Function of Universal Time for March 1978

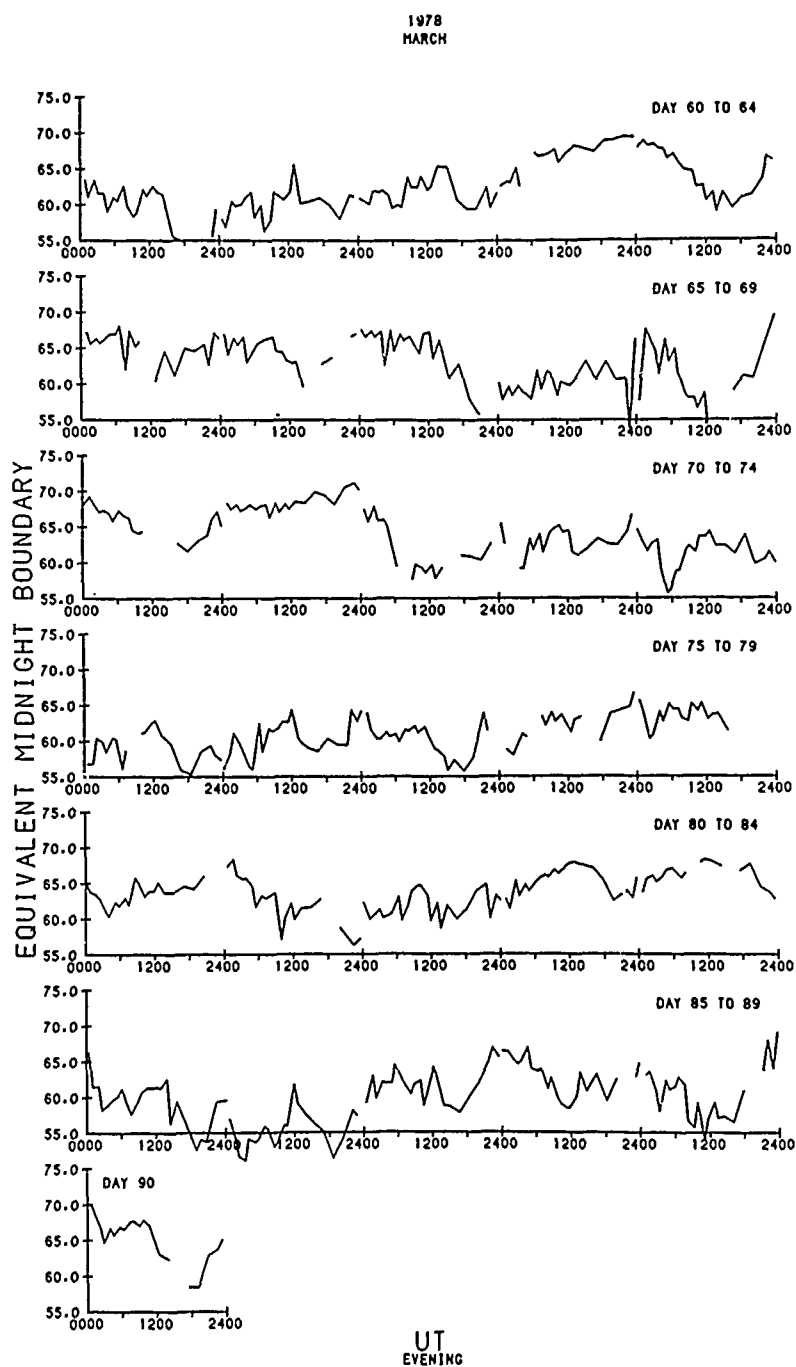


Figure 12h. Same as Figure 12g, Using Only Evening Boundaries

1978
MARCH

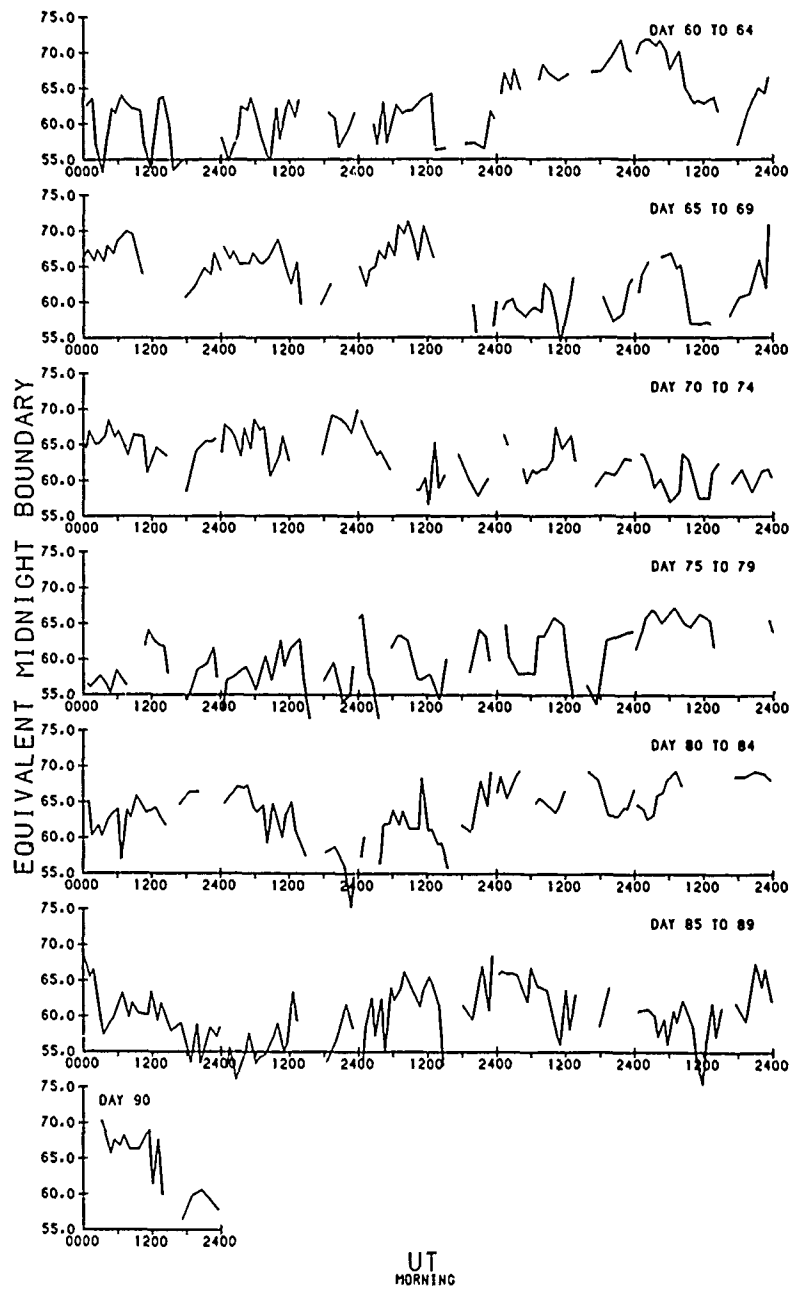


Figure 12i. Same as Figure 12g, Using Only Morning Boundaries

1978
MARCH

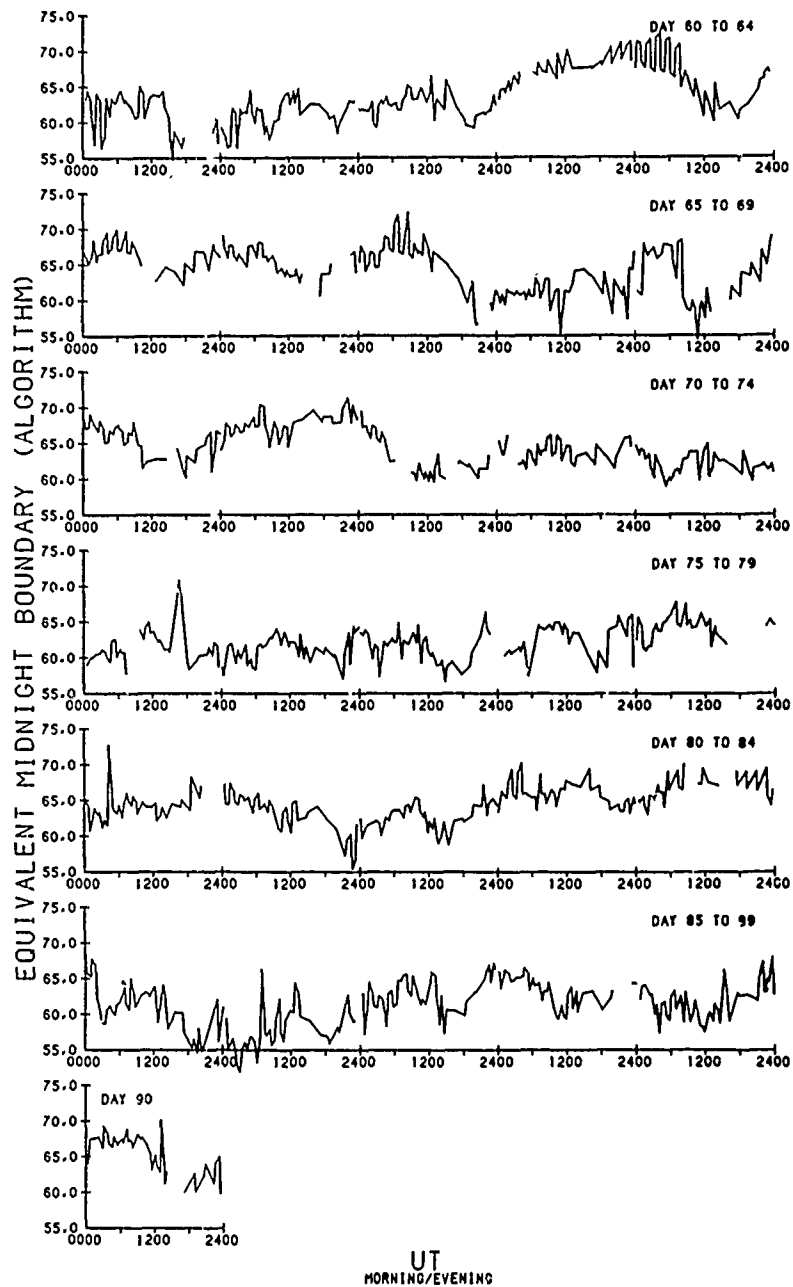


Figure 12j. Equivalent Midnight Boundary Calculated From Algorithm-chosen Morning and Evening Equatorward Auroral Boundaries, Plotted as a Function of Universal Time for March 1978

1978
MARCH

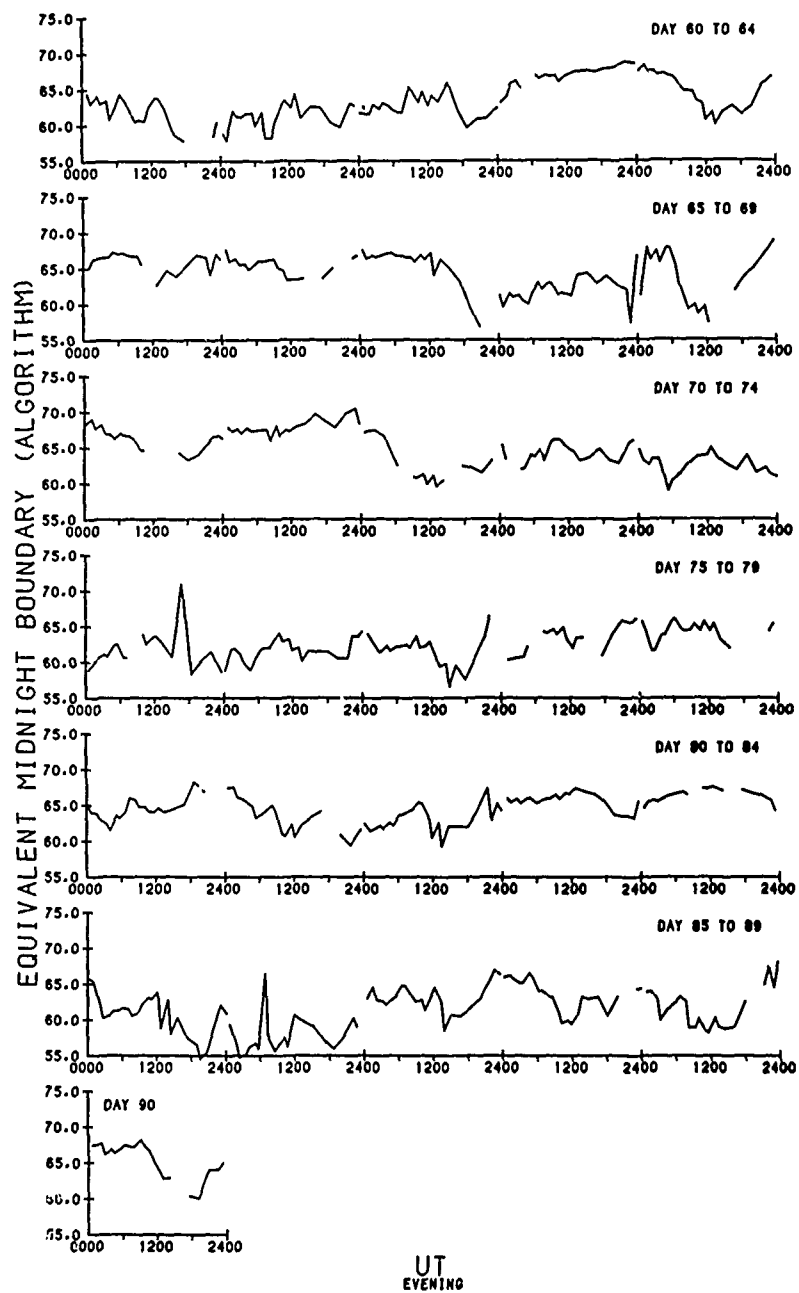


Figure 12k. Same as Figure 12j, Using Only Evening Boundaries

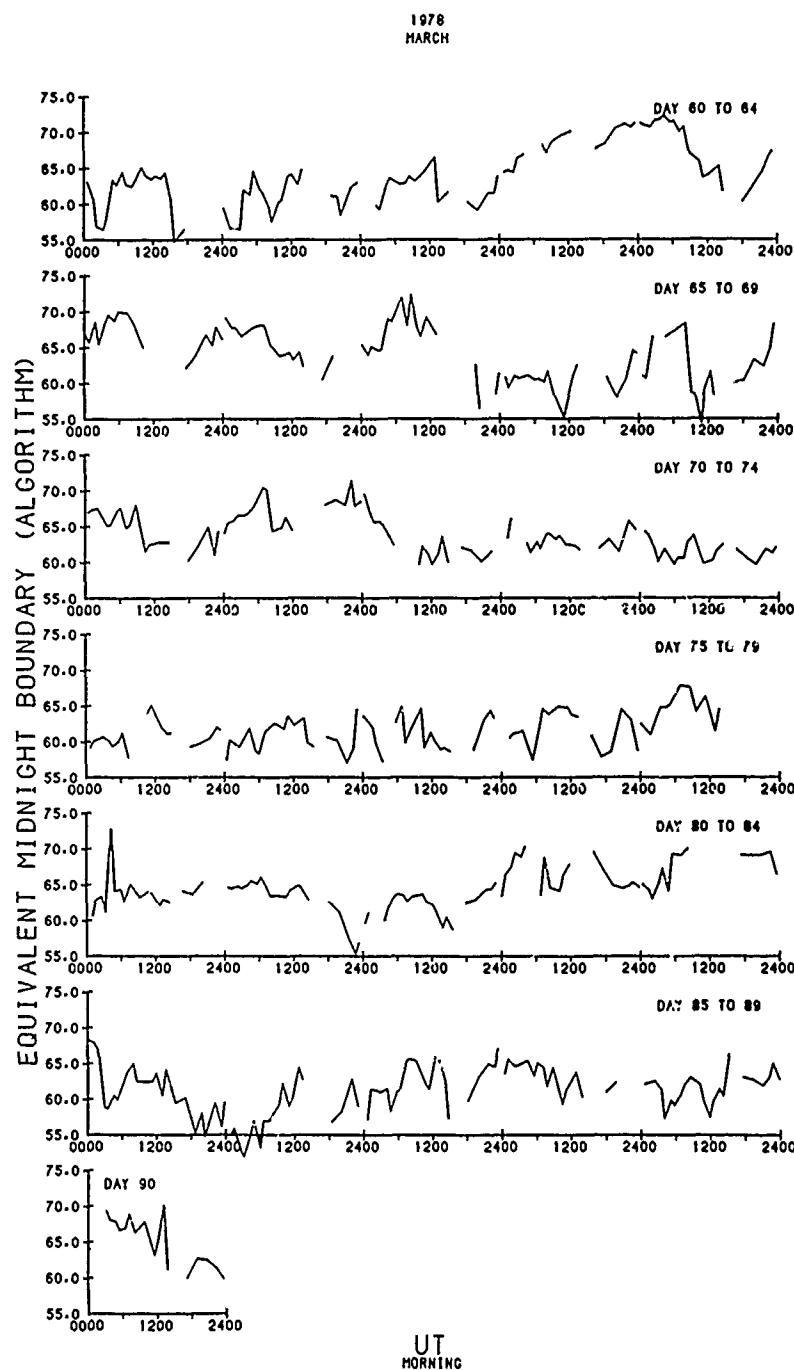


Figure 12l. Same as Figure 12j, Using Only Morning Boundaries

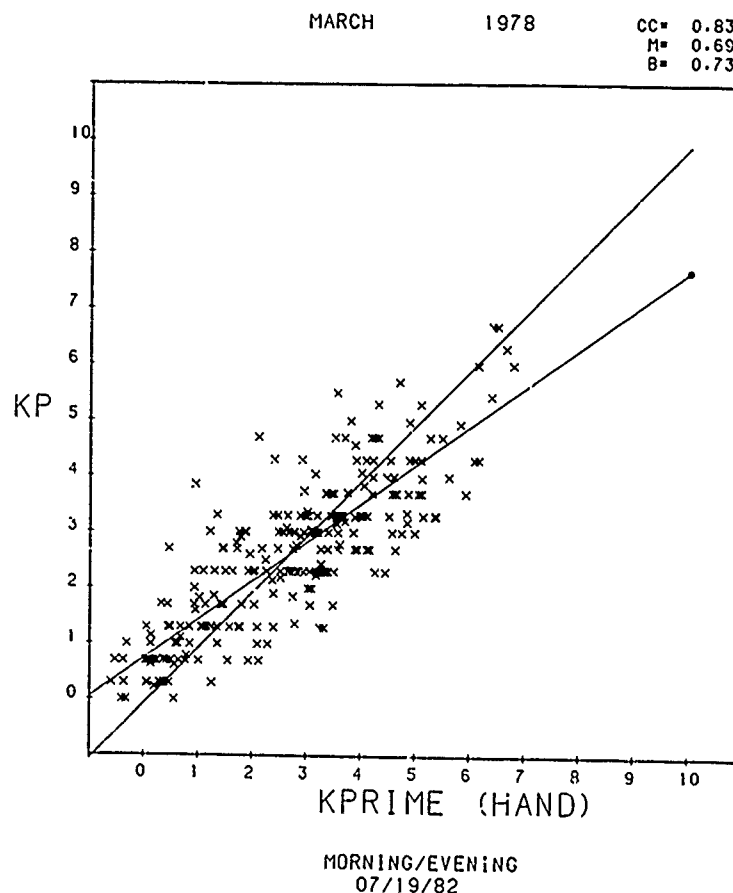
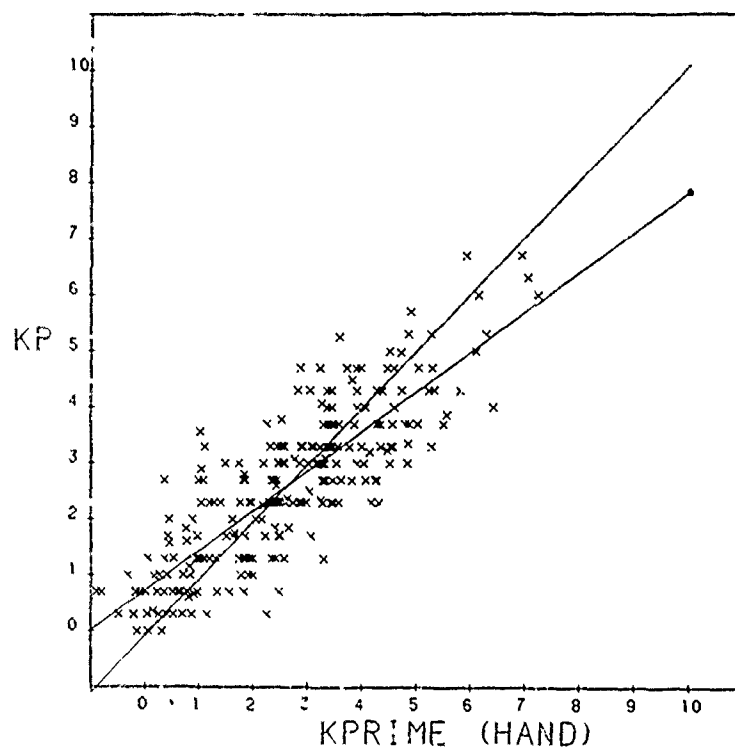


Figure 13a. Scatter Plot of the Values of Kp vs the Corresponding Three-hour Average Value of Kp' (labelled KPRIME) When Kp' is Calculated Using Hand-chosen Morning and Evening Equatorward Auroral Boundaries Obtained in March 1978. The result of performing a linear regression of Kp (Kp') vs Kp' (Kp) is shown by the straight line ending in a dot (not ending in a dot). The correlation coefficient, slope and intercept of the Kp vs Kp' line are shown in the upper right hand corner

MARCH

1978

CC= 0.84
M= 0.71
B= 0.72



EVENING
07/19/82

Figure 13b. Same as Figure 13a, Using Only Values of Kp'
Determined From Evening Boundaries

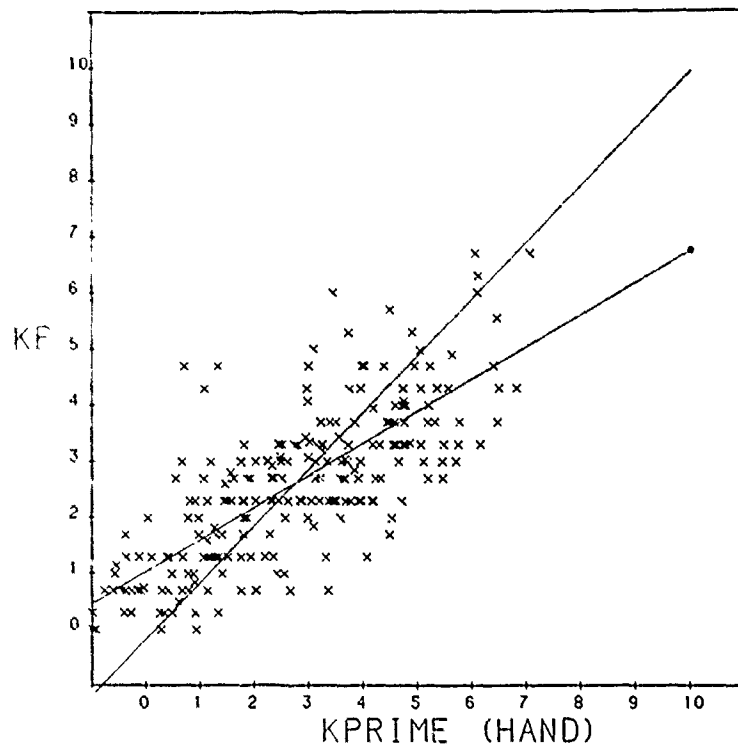
MARCH

1978

CC= 0.75

H= 0.57

B= 1.03



MORNING
07/19/82

Figure 13c. Same as Figure 13a, Using Only Values of Kp' Determined From Morning Boundaries

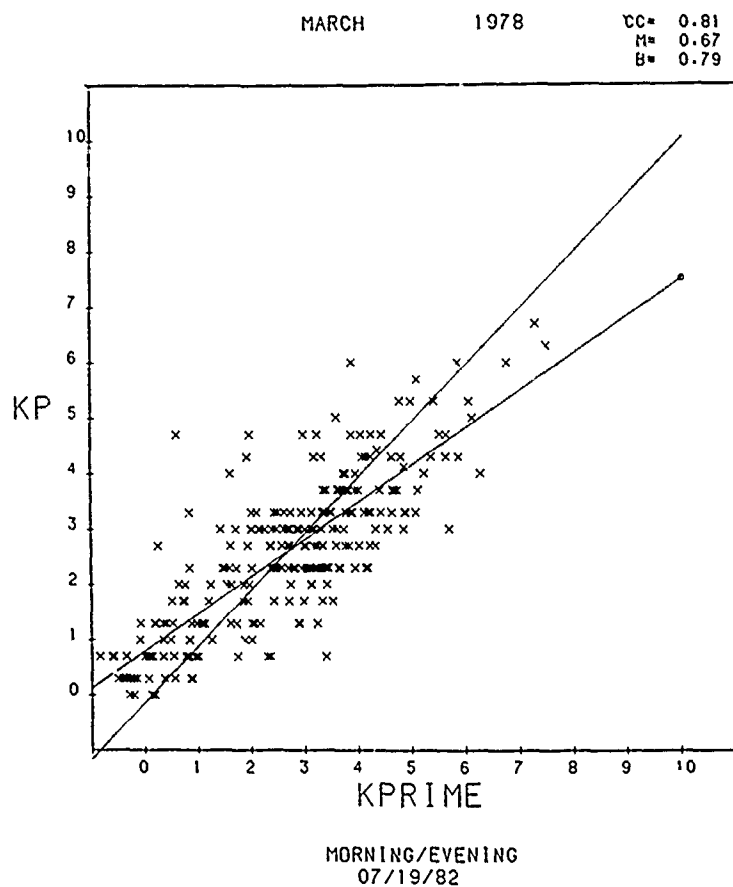
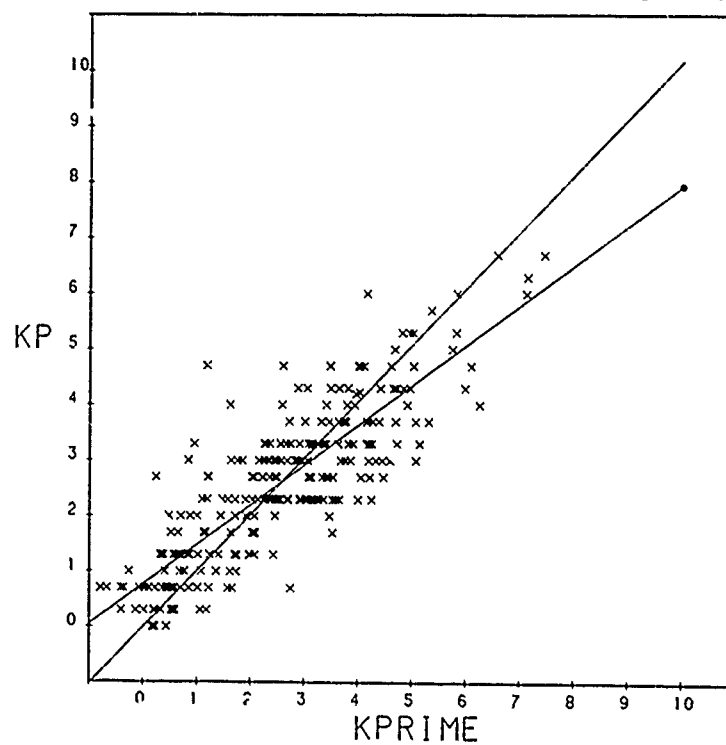


Figure 13d. Scatter Plot of the Values of Kp vs the Corresponding Three-hour Average Value of Kp' (labelled KPRIME) When Kp' is Calculated Using Computer-chosen Morning and Evening Equatorward Auroral Boundaries Obtained in March 1978. The result of performing a linear regression of Kp (Kp') vs Kp' (Kp) is shown by a straight line ending in a dot (not ending in a dot). The correlation coefficient, slope and intercept of the Kp vs Kp' line are shown in the upper right hand corner

MARCH

1978

CC= 0.84
H= 0.72
B= 0.76



EVENING
07/19/82

Figure 13e. Same as Figure 13d, Using Only Values of Kp'
Determined From Morning Boundaries

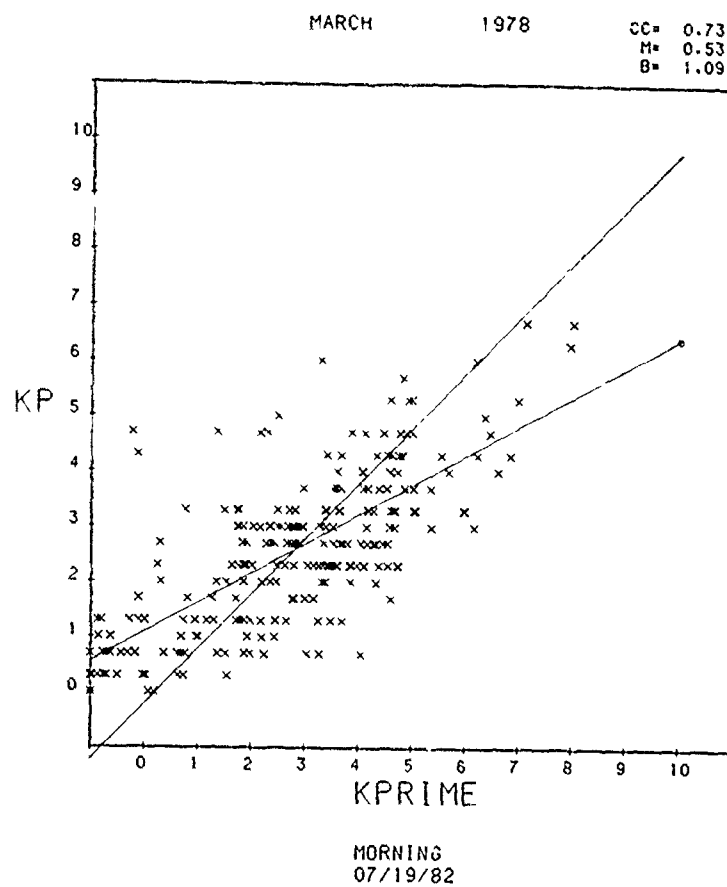


Figure 13f. Same as Figure 13d, Using Only Values of Kp' Determined From Morning Boundaries

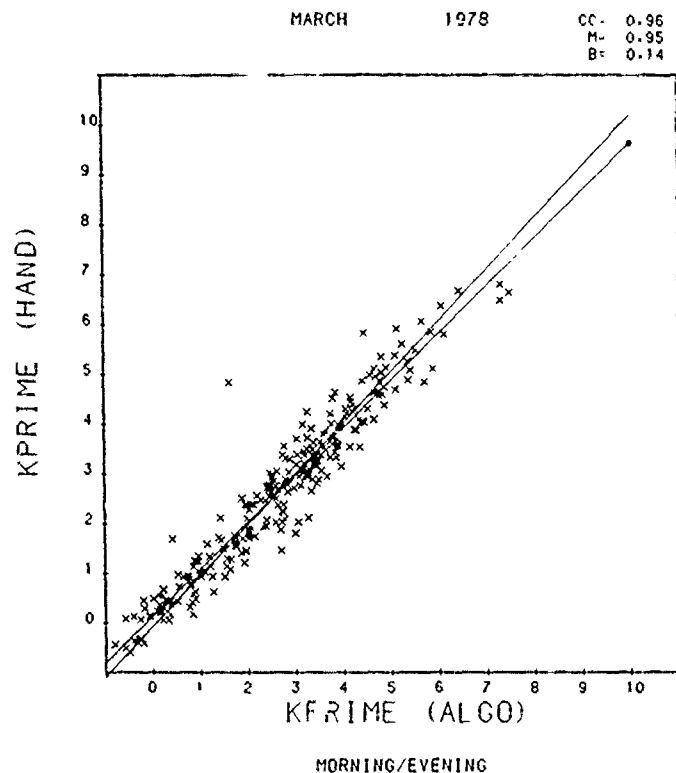


Figure 14. Scatter Plot of the Corresponding Values of Three-hour Averages of Kp' Calculated Using Hand-chosen [labelled KPRIME (HAND)] and Algorithm-chosen [labelled KPRIME (ALGO)] Morning and Evening Equatorward Boundaries Obtained in March 1978. The result of performing a linear regression of Kp' (hand) [Kp' (algorithm)] vs Kp' (algorithm) [Kp' (hand)] is shown by the straight line ending in a dot [not ending in a dot]. The correlation coefficient, slope and intercept of the Kp' (hand) vs Kp' (algorithm) line are shown in the upper right hand corner

7. DISCUSSION

Before making a comparison of the two sets of 1978 auroral equatorward boundaries, those laboriously done by hand and those done by a rather complex computer algorithm, we list the following overall conclusions:

- (a) The boundaries cannot be judged absolutely. There is a margin of ambiguity in all but the most abrupt and clean evening side rises of precipitating electron counts above background. In most cases the margin of ambiguity is small.

(b) The evening boundaries have a much smaller margin of ambiguity than the morning boundaries. Characteristically the morning electron precipitation onset is different from that of the evening, having long ramps and more irregularities. This may well reflect a difference in the dynamics of the plasma sheet at different local times and/or a difference in precipitation mechanisms. The evening boundaries also have higher correlation coefficients than the morning boundaries, when directly related to Kp.

(c) Contamination of the auroral electron signal by radiation belt particles presents the single greatest problem in choosing equatorward boundaries by both methods. Again, this is particularly true on the morning side. To avoid this problem on future DMSP flights additional shielding has been added to the detectors.

Since one of the objects of this study is an assessment of the algorithm developed by Hardy and Holeman⁸ for choosing boundaries we make the following additional conclusions from comparing the two boundary sets:

(d) Both hand- and computer-chosen boundary sets have approximately the same internal consistency. The spread in boundary values from the linear regression values are very similar (Figures 7 and 8).

(e) Although the two sets of boundaries result in different linear regressions (systematically differing slopes and intercepts) they correlate equally well with Kp (Table 1).

(f) The two boundary sets show similar discrepancies between morning and evening boundaries, the latter being more consistent both within and between boundary sets and having high correlation with Kp.

(g) When used as a predictor of Kp (using the three-hour averaged values of Kp') the accuracy of the two sets is indistinguishable when the evening boundaries are used, and is only slightly better for hand-chosen boundaries using morning and combined values (Table 5). This is clearly shown in Figure 14 in which the two predicted values agree with a correlation coefficient of 0.96.

We therefore conclude that the auroral equatorward boundaries selected by the algorithm described here may be used for both scientific and predictive purposes in place of the hand-chosen boundaries. The algorithm was developed and tested for dawn and dusk boundaries and is not applicable in the noon sector.

Finally, we use the auroral equatorward boundaries as a measure of auroral activity by indexing the activity with the boundary measurements. Using the algorithm for choosing boundaries at the site of the down-link data transmission without intermediate processing can give the index in near real time. The most direct index is simply the boundary itself, tagged by both universal and local time. The large offset of the auroral oval in magnetic coordinates toward higher latitudes at noon and lower latitudes at midnight, makes the use of multi-local time values of

the boundary difficult at best, and no doubt misleading to casual users. We therefore choose to scale each boundary to an equivalent midnight boundary by way of the derived $Kp = Kp'$. Kp' is not used as the index for two reasons: (a) the index is derived from boundaries, not from magnetic activity. The source of the index is obscured by using Kp' . (b) The boundary measurements have a finer time resolution, and one more appropriate to substorm activity than the 3-hr Kp interval. A finer Kp' resolution would again add confusion in interpretation.

Another choice remains. The equivalent midnight, λ_{EM}' used for the index can be derived from both morning and evening boundaries, or either morning or evening boundaries. Plots of the combined data (Figure 12g) have better time resolution, but contain a great deal of variation from point to point (oscillating from a morning to an evening equivalent boundary). These variations result either from the poorer quality of morning boundary choices and/or from a real difference in the particle dynamics between the two local time sectors. Because the evening boundary set has fewer and more controllable selection problems, is more internally consistent, and correlates more directly with Kp , we choose the equivalent midnight boundary obtained from the evening sector boundary set (Figure 12h) as the Auroral Boundary Index. To reiterate, the Auroral Boundary Index is the projected midnight equatorward auroral boundary found using an actual evening sector boundary and the statistically determined systematic local time variation of the oval. During periods of good data accumulation there will be one index value each 55 min. The Auroral Boundary Index is presented month by month for 1978 in Appendix A.

References

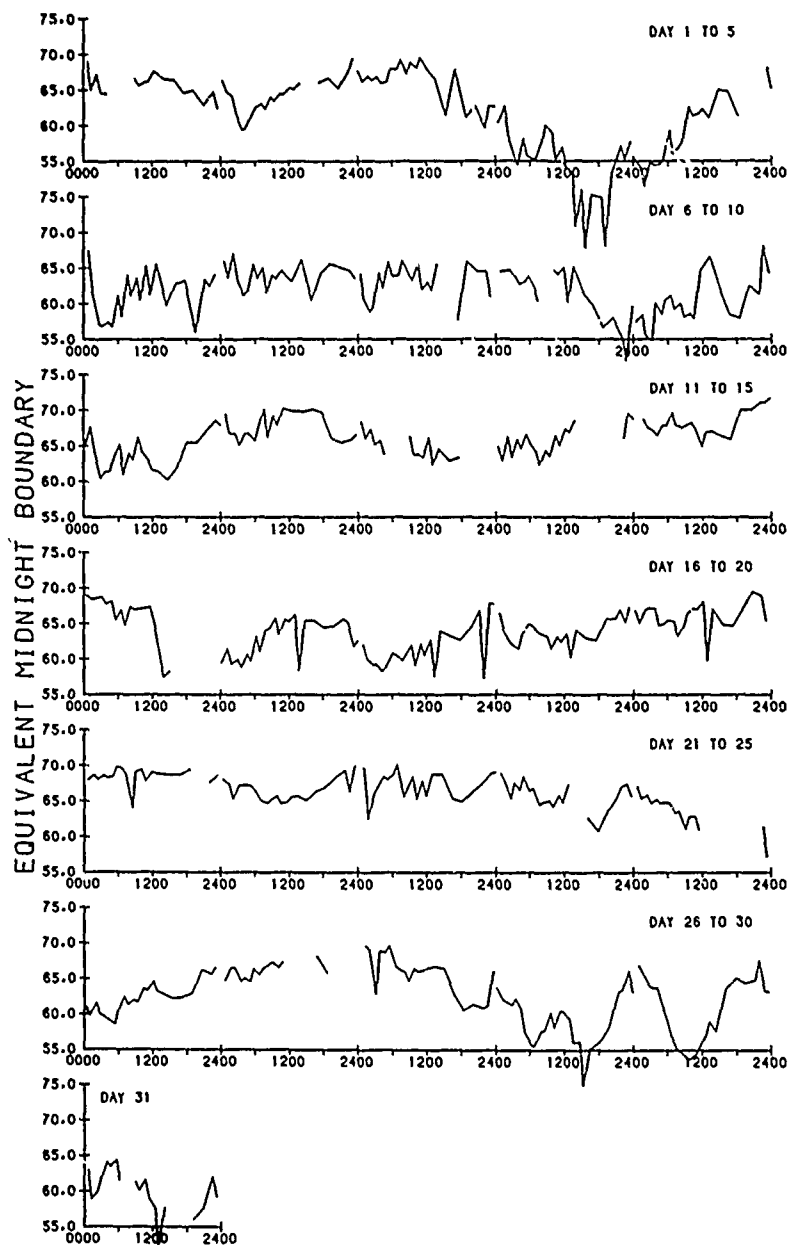
1. Lui, A.T.Y., Anger, C.D., and Akasofu, S.-I. (1975) The equatorward boundary of the diffuse aurora and auroral substorms as seen by the ISIS-2 auroral scanning photometer, J. Geophys. Res. 80:3603.
2. Meng, C.-I., Holzworth, R.H., and Akasofu, S.-I. (1977) Auroral circle delineating the poleward boundary of the quiet auroral oval, J. Geophys. Res. 82:164.
3. Kamide, Y., and Winningham, J.D. (1977) A statistical study of the 'instantaneous' nightside auroral oval. The equatorial boundary of electron precipitation as observed by the ISIS 1 and 2 satellites, J. Geophys. Res. 82:5573.
4. Sheehan, R.E., and Carovillano, R.L. (1978) Characteristics of the equatorward auroral boundary near midnight determined from DMSP images, J. Geophys. Res. 83:4749.
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6. Gussenhoven, M.D., Hardy, D.A., and Burke, W.J. (1981) DMSP/F2 electron observations of equatorward auroral boundaries and their relationship to magnetospheric electric fields, J. Geophys. Res. 86:768.
7. Hardy, D.A., Burke, W.J., Gussenhoven, M.S., Heinemann, N., and Holeman, E. (1981) DMSP/F2 electron observations of equatorward auroral boundaries and their relationship to the solar wind velocity and the north-south component of the interplanetary magnetic field, J. Geophys. Res. 86:9961.
8. Hardy, D.A., and Holeman, E. (1983) The Global Auroral Boundary Code for the Global Weather Central of the Air Weather Service (to be published).
9. Hardy, D.A. and MacKean, R. (1980) An Algorithm for Determining the Boundary of Auroral Precipitation Using Data from the SSJ/3 Sensor, AFGL-TR-80-0028, AD A084482.
10. Hardy, D.A., Gussenhoven, M.S., and Huber, A. (1979) The Precipitating Electron Detectors (SSJ/3) for the Block 5D/Flights 2-5 DMSP Satellites: Calibration and Data Presentation, AFGL-TR-79-0210, AD A083136.

Appendix A

Auroral Boundary Index

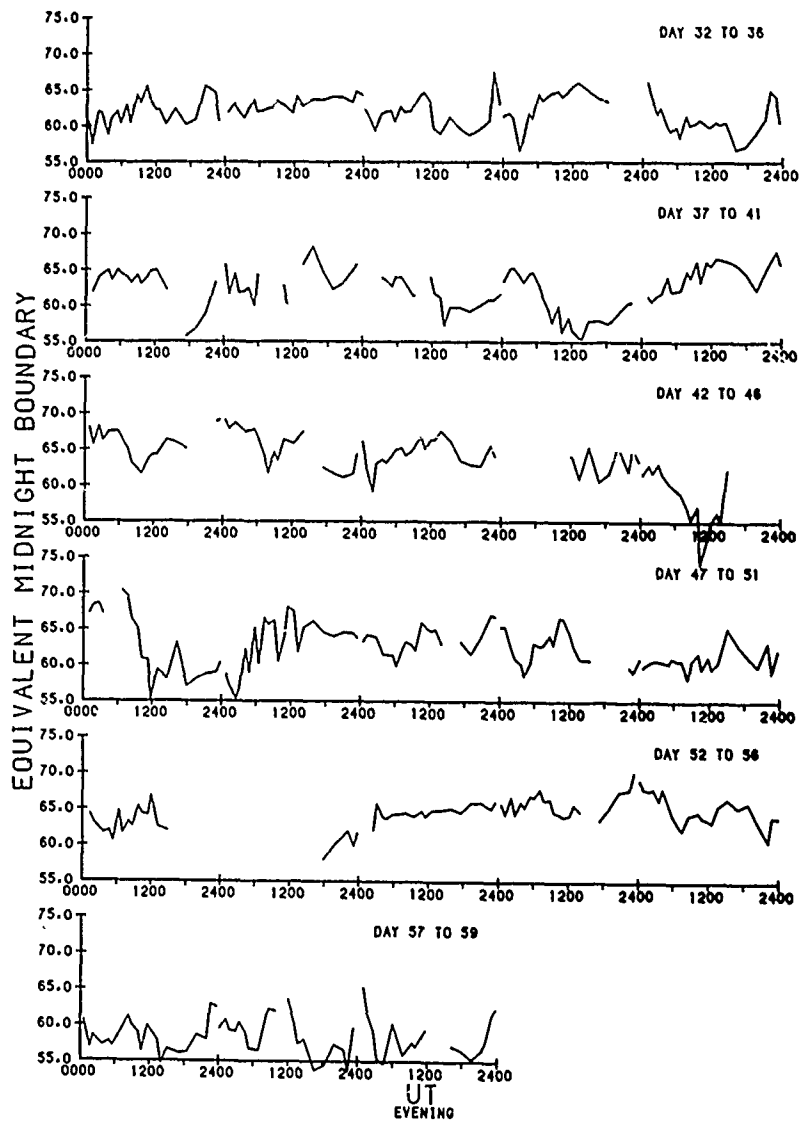
Each value of the Auroral Boundary Index is a projected midnight equatorward auroral boundary found using an actual evening sector boundary and the statistically determined systematic local time variation of the auroral oval. The Index is presented in the following pages as a function of universal time, by month, for 1978.

1978
JANUARY

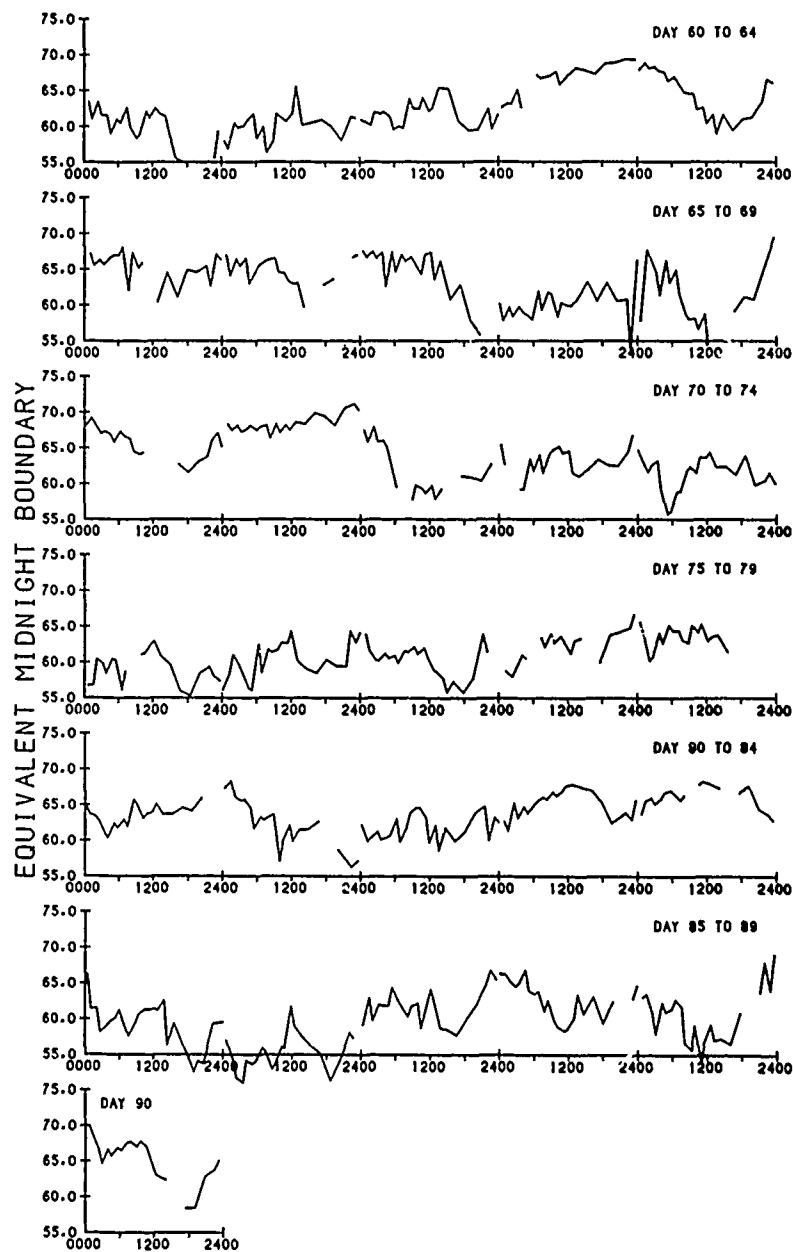


UT
EVENING

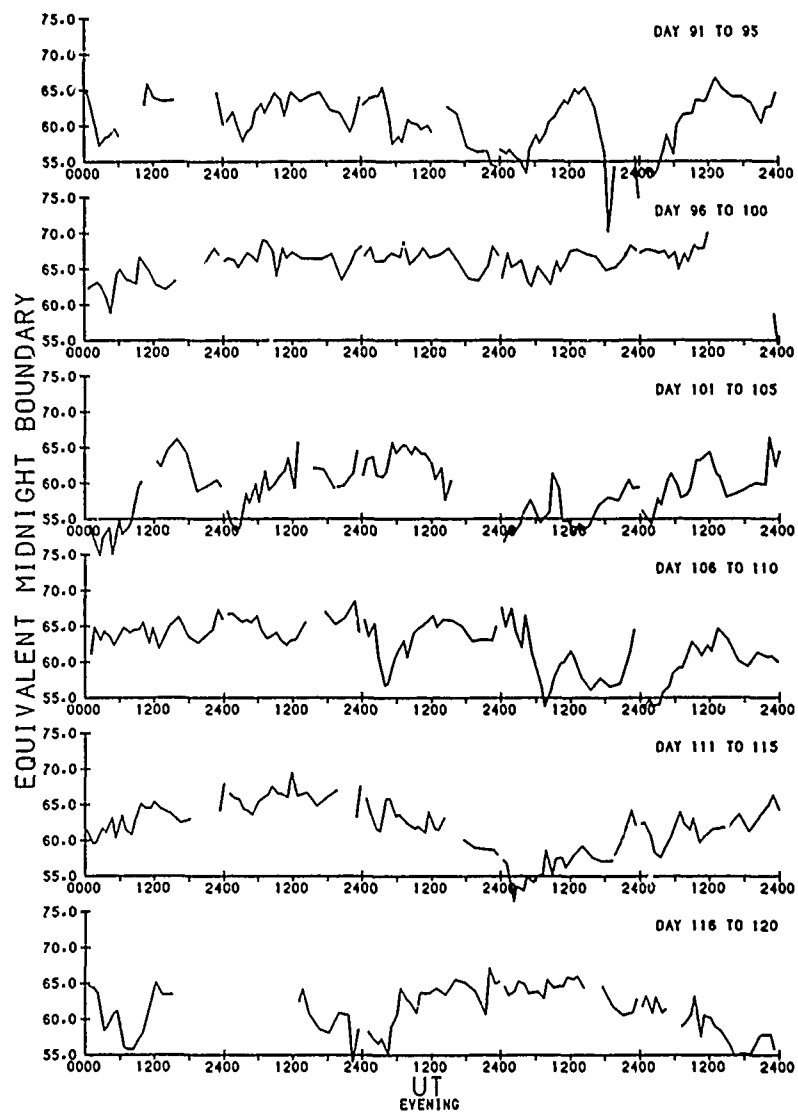
1978
FEBRUARY



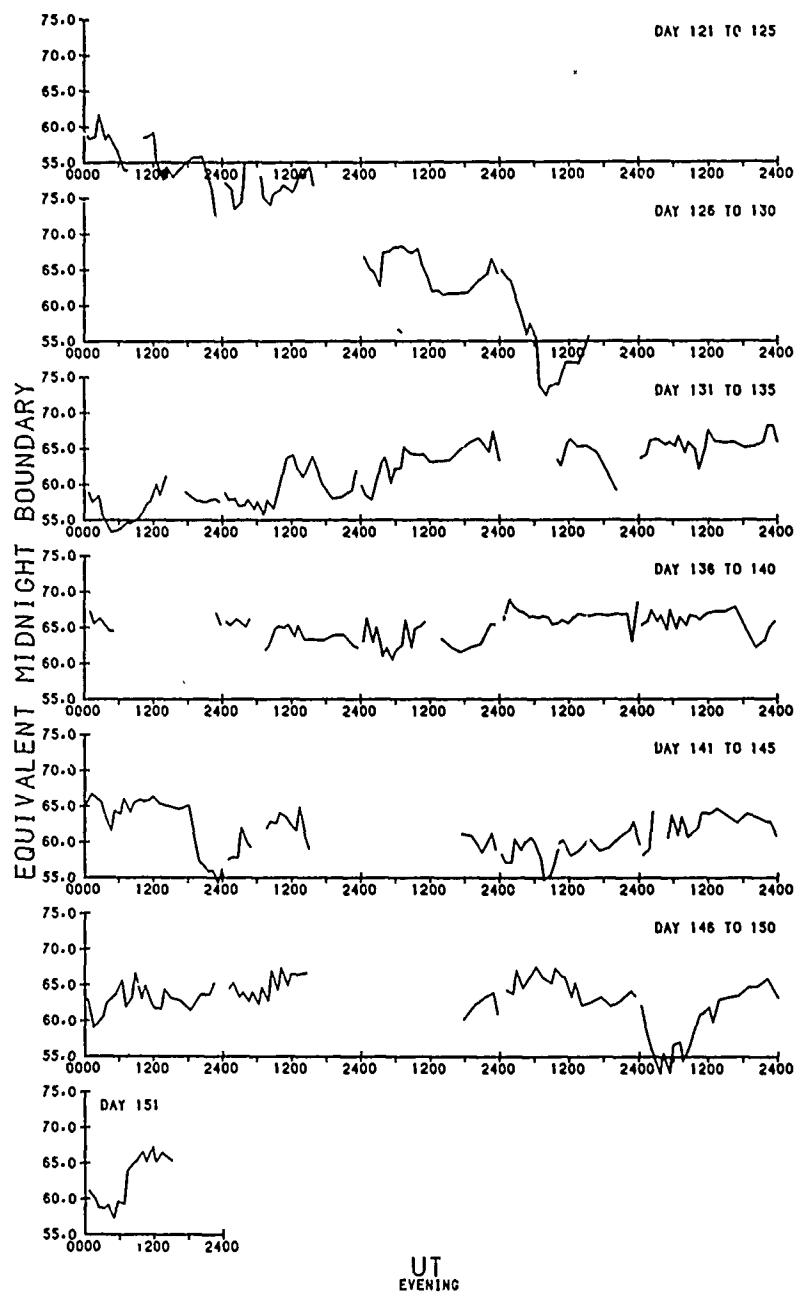
1978
MARCH



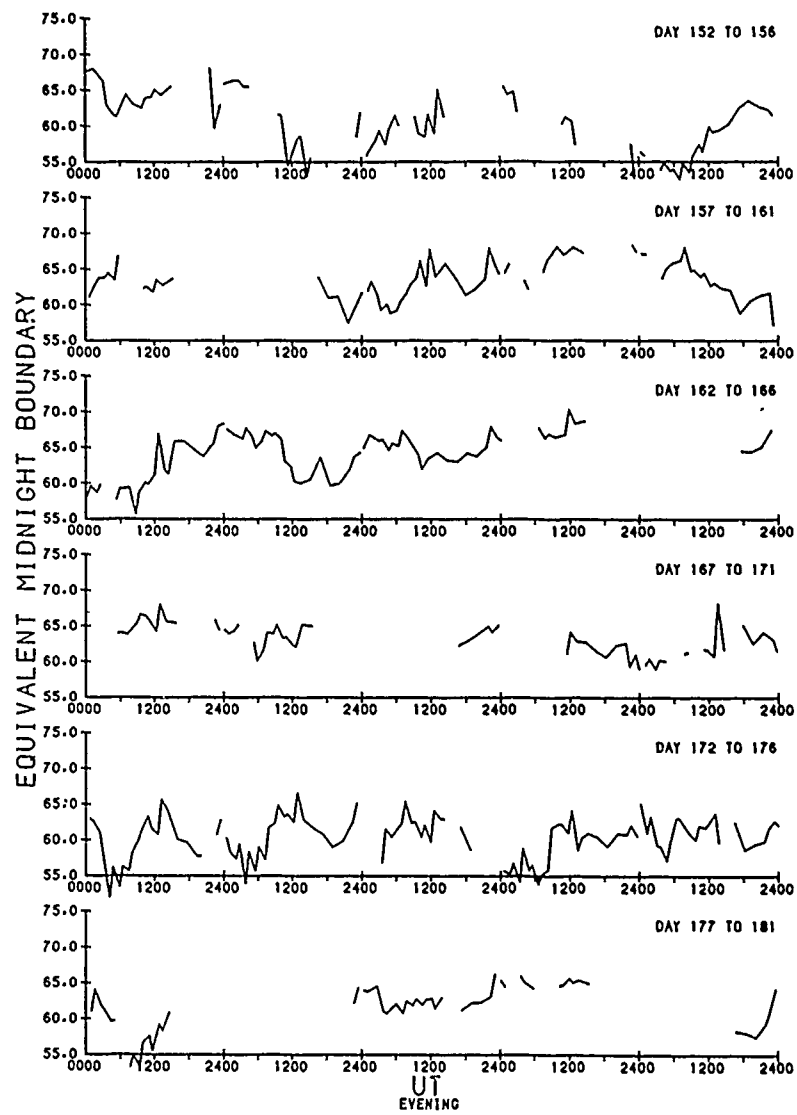
1978
APRIL



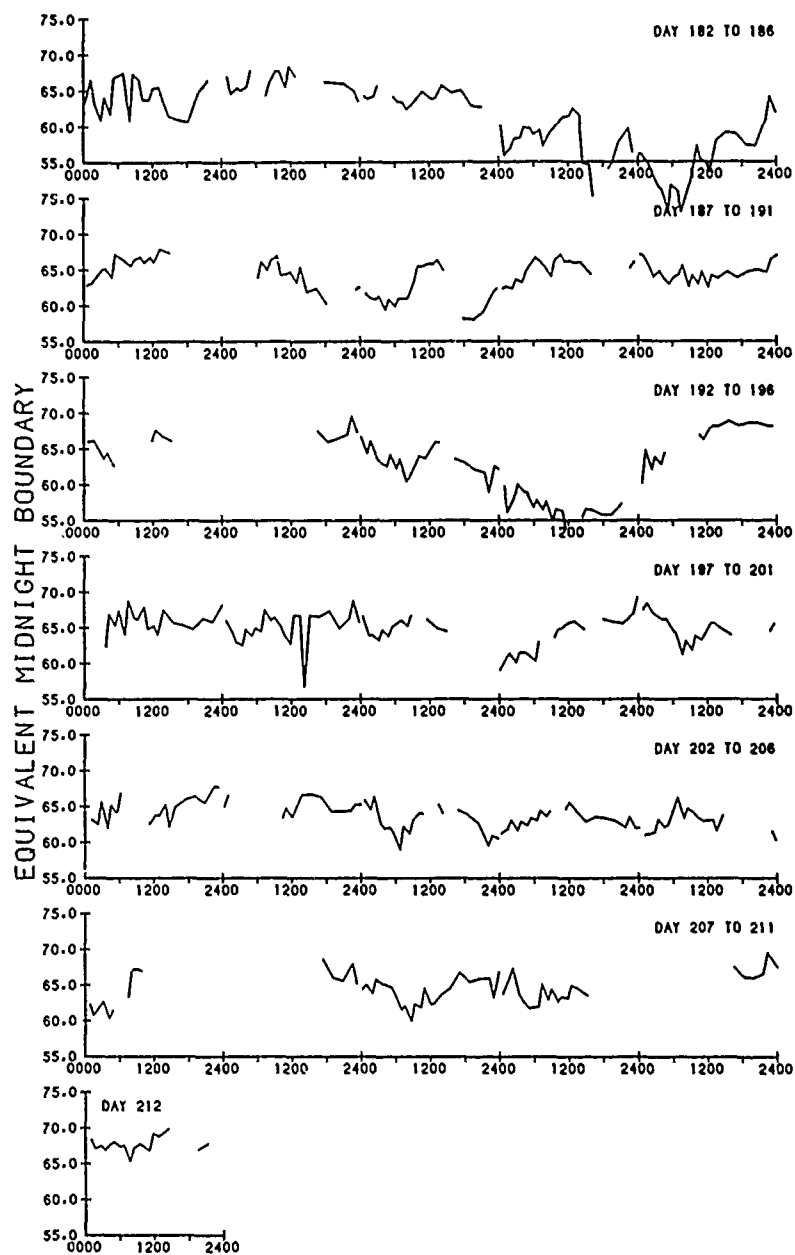
1978
MAY



1978
JUNE

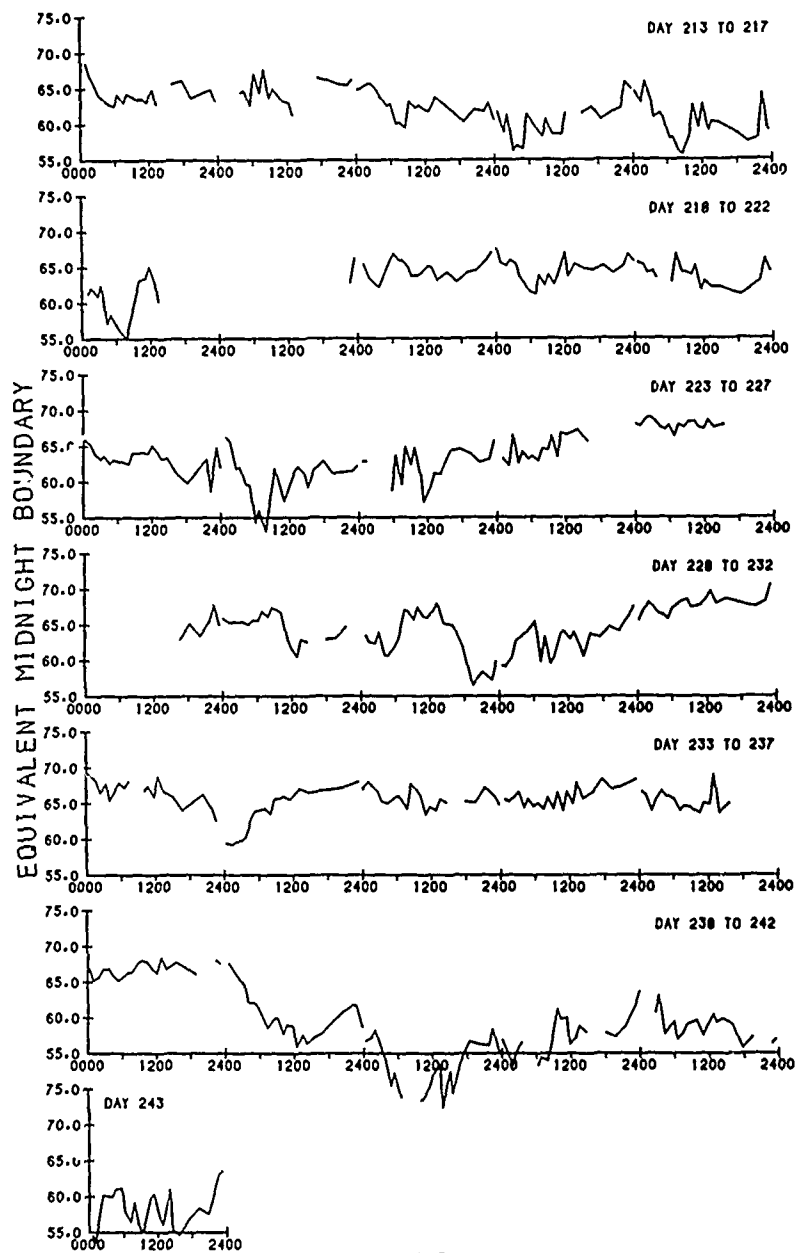


1978
JULY



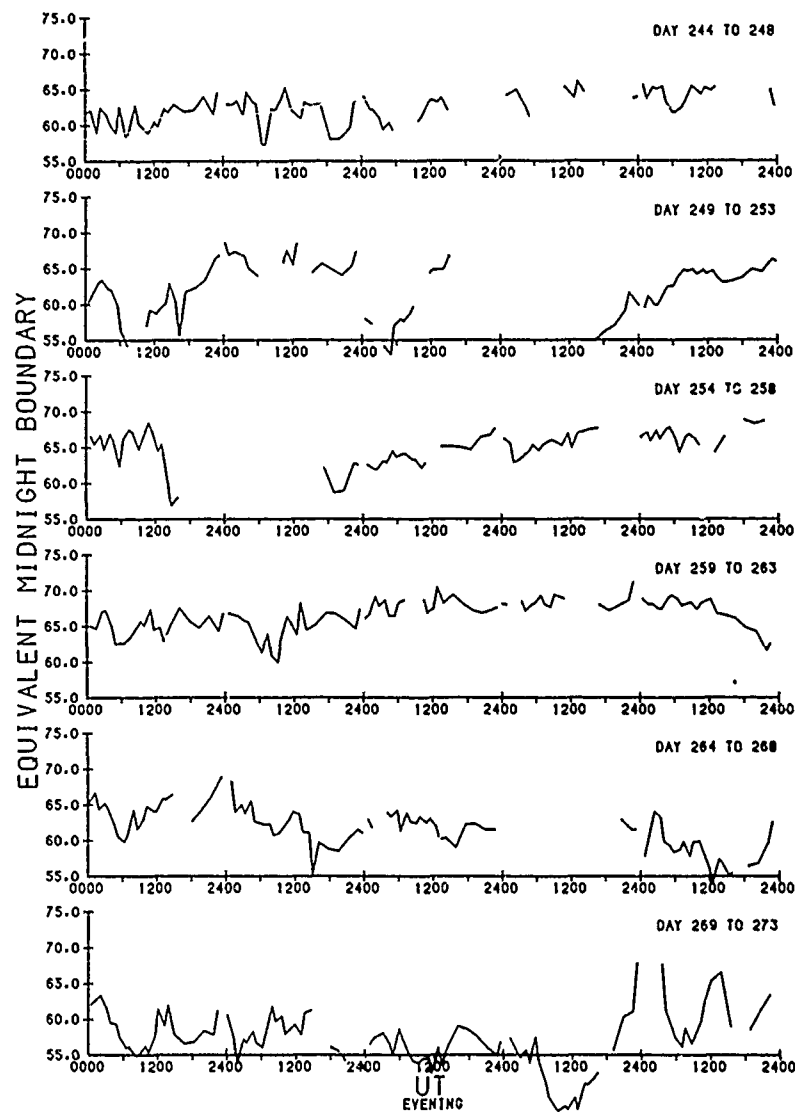
UT
EVENING

1978
AUGUST

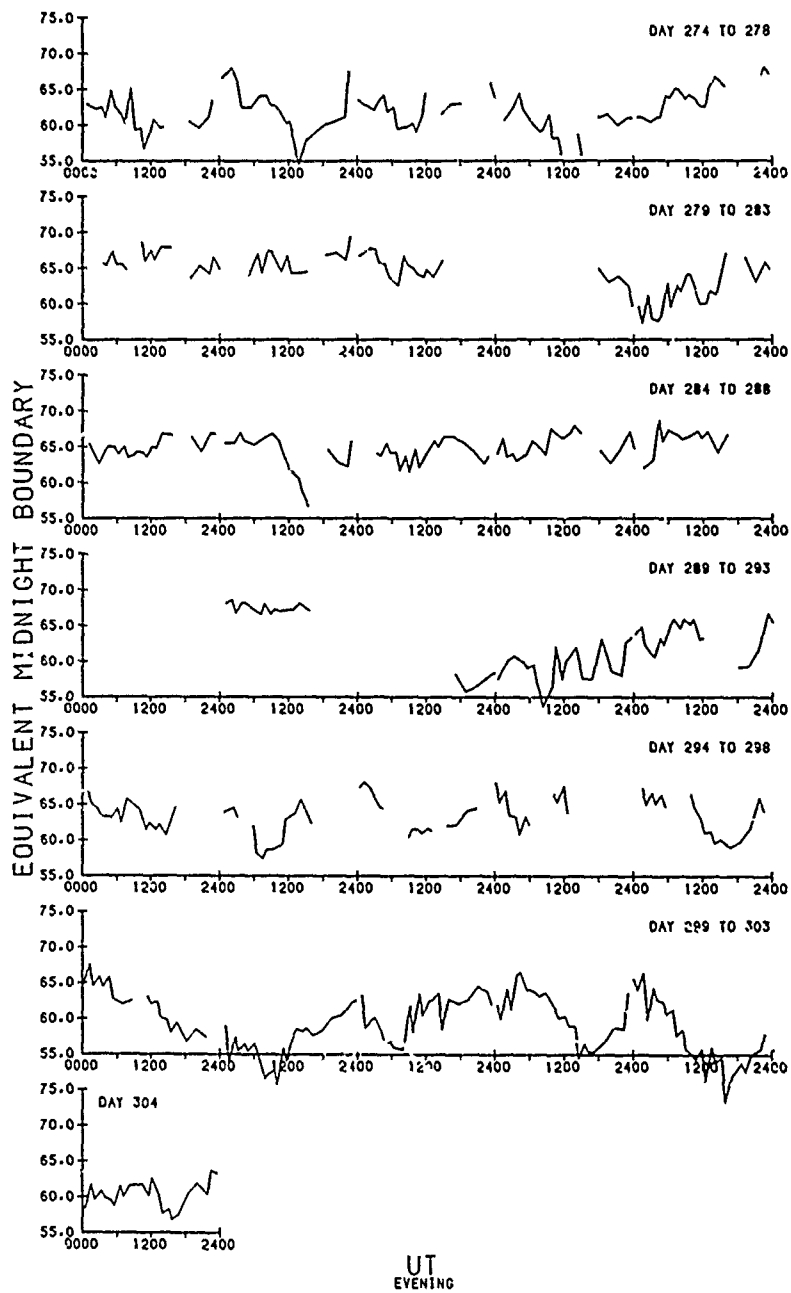


UT
EVENING

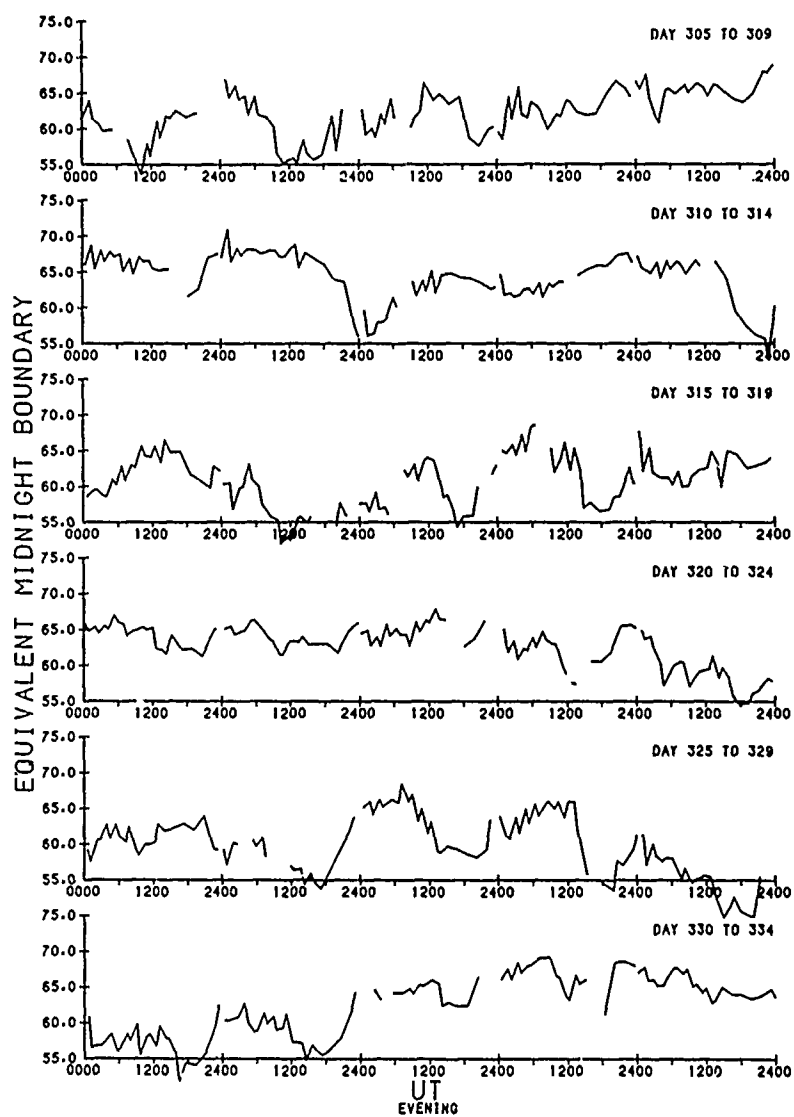
1978
SEPTEMBER



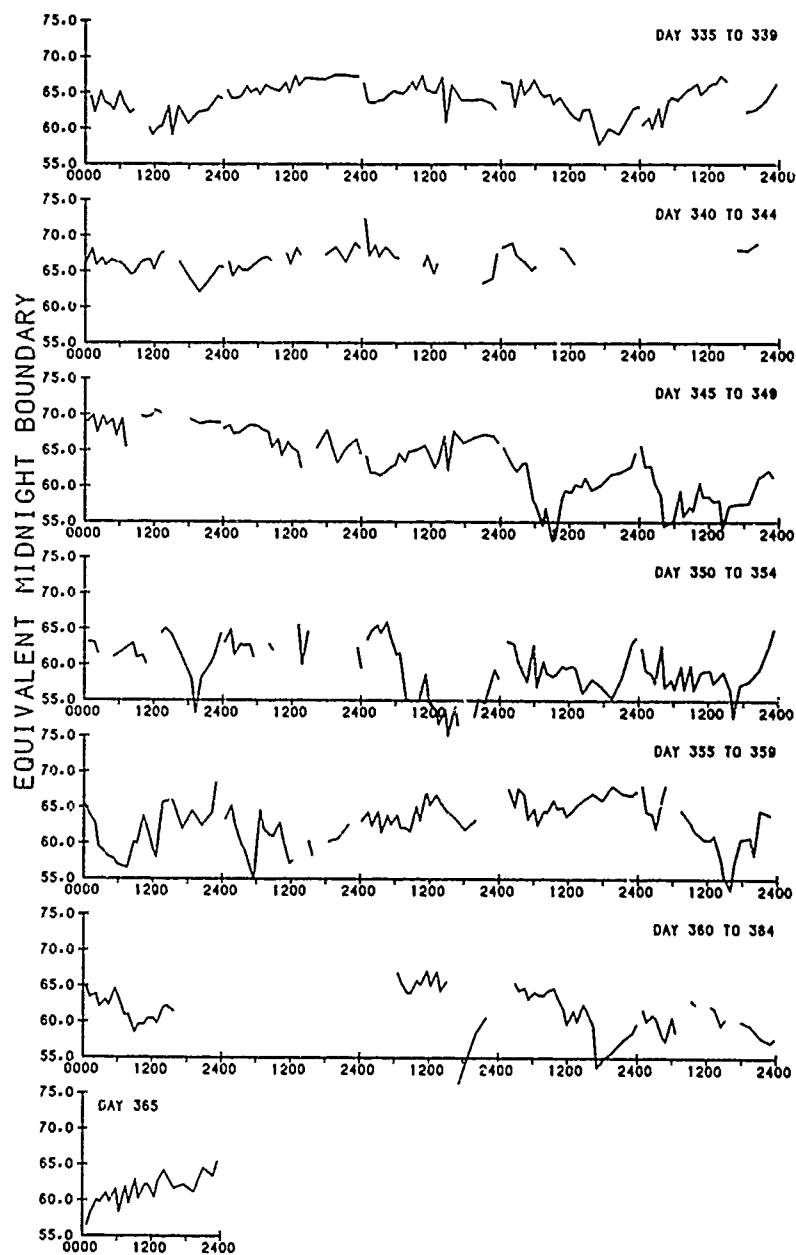
1978
OCTOBER



1978
NOVEMBER



1978
DECEMBER



UT
EVENING

Appendix B

1978 Auroral Boundary Listing

The following computer listing contains equatorward auroral boundary measurements made by hand and computer from DMSP/F2 precipitating electron particle data for the entire year of 1978. There are two sets of vertical columns on a page. A single set reads from left to right.

YR	= 1978
DA	= Julian Day
HDDK/HR, MN, SEC	= Exact universal time at which the hand-chosen boundary was measured.
PO	= Pole
HDDK/LT*	= Exact magnetic local time in hours at which the hand-chosen boundary was measured.
HDDK/LAT*	= Exact corrected geomagnetic latitude at which the hand-chosen boundary was measured.
CDDK/LT*	= Exact magnetic local time in hours at which the computer-chosen boundary was measured.
CDDK/LAT*	= Exact corrected geomagnetic latitude at which the computer-chosen boundary was measured.
DLAT*	= Computer-chosen boundary minus hand-chosen boundary.

MIDNIGHT/LATH* = Projection of the hand-chosen boundary (HDDK/LAT) measured in the given MLT (HDDK/LT) to the corrected geomagnetic latitude at which the boundary would occur in the midnight (23-24) magnetic local time bin, calculated as described in Section 5 of the preceding paper.

MIDNIGHT/LATC* = Same as MIDNIGHT/LATH except using CDDK/LAT and CDDK/LT.

*To read values in these columns correctly, multiply by 10^{-1} .

78

YR	DA	HDDK	HR	MIN	SEC	PO	HDJX	CDJX	DLAT	MIDNIGHT	LA, LATC	YR	DA	HDDK	HR	MIN	SEC	PO	HDJX	CDJX	DLAT	MIDNIGHT	LA, LATC
78	6	6	0	42	2	N	50	620	5	612	630	78	7	7	0	15	49	S	191	684	30	655	683
78	6	6	0	57	57	N	200	590	1	612	670	78	7	7	0	15	49	S	200	590	29	655	683
78	6	6	1	35	39	S	188	650	13	616	636	78	7	7	6	32	12	S	66	690	-16	687	675
78	6	6	1	51	30	S	65	608	10	597	618	78	7	7	7	11	51	S	76	711	-44	702	663
78	6	6	2	24	0	N	56	626	-5	628	633	78	7	7	7	23	30	S	196	679	7	650	658
78	6	6	2	41	16	N	187	623	-2	571	586	78	7	7	7	58	49	S	196	648	197	681	654
78	6	6	3	14	15	S	191	607	-1	564	587	78	7	7	8	12	7	S	72	597	-3	687	592
78	6	6	3	33	38	S	34	557	23	542	577	78	7	7	8	4	49	N	201	675	15	641	556
78	6	6	4	3	0	N	63	553	15	543	574	78	7	7	9	0	19	S	189	676	7	635	646
78	6	6	4	21	25	N	187	625	2	575	594	78	7	7	9	54	5	S	80	632	11	633	555
78	6	6	4	54	15	S	197	606	7	567	594	78	7	7	10	31	41	N	72	678	-7	666	667
78	6	6	5	11	30	S	65	625	-30	616	636	78	7	7	10	45	50	S	206	665	8	647	655
78	6	6	5	44	35	S	71	577	52	537	622	78	7	7	11	22	18	S	179	637	177	701	640
78	6	6	6	0	59	N	192	645	-2	611	620	78	7	7	11	34	41	S	91	657	15	631	660
78	6	6	6	34	39	S	199	619	3	582	602	78	7	7	12	11	58	S	64	646	-2	639	647
78	6	6	6	51	36	S	64	622	-2	613	623	78	7	7	12	27	55	N	209	651	2	631	636
78	6	6	7	26	45	N	196	670	3	619	632	78	7	7	13	5	29	S	165	689	163	597	8
78	6	6	7	40	43	N	195	655	-17	640	629	78	7	7	13	54	54	N	104	673	46	646	837
78	6	6	8	15	40	S	195	645	10	611	631	78	7	7	14	8	52	N	212	671	-39	661	625
78	6	6	8	31	39	S	73	622	17	605	633	78	7	7	15	52	21	N	209	627	10	605	626
78	6	6	9	22	0	N	201	655	-3	635	636	78	7	7	16	21	58	N	44	652	-51	643	605
78	6	6	9	56	42	S	189	651	25	605	639	78	7	7	17	21	58	N	214	654	-19	642	624
78	6	6	10	10	58	S	82	655	9	636	656	78	7	7	18	24	43	S	50	644	107	644	609
78	6	6	10	47	59	N	71	657	-4	643	662	78	7	7	19	4	59	N	44	673	-5	672	633
78	6	6	11	2	44	N	207	657	-4	654	649	78	7	7	19	14	48	N	217	666	13	656	666
78	6	6	11	59	0	S	178	670	-23	613	611	78	7	7	20	46	11	N	50	660	-14	658	652
78	6	6	12	44	29	N	93	667	18	622	653	78	7	7	20	57	43	N	217	662	8	651	657
78	6	6	13	22	2	S	211	666	6	655	633	78	7	7	21	52	22	S	88	648	219	670	638
78	6	6	14	12	0	N	167	668	-4	632	637	78	7	7	22	26	10	N	57	617	-6	610	615
78	6	6	14	28	1	N	52	635	51	632	659	78	7	7	22	41	17	N	213	657	6	646	650
78	6	6	16	9	1	N	207	621	30	629	658	78	7	7	23	21	50	S	177	684	22	635	660
78	6	6	17	38	31	N	47	631	-14	614	630	78	7	7	23	36	20	S	76	594	5	574	590
78	6	6	17	50	40	N	213	645	7	614	630	78	8	8	0	6	30	S	58	584	1	574	590
78	6	6	19	18	59	N	54	589	9	614	630	78	8	8	0	24	30	N	202	660	262	660	0
78	6	6	19	34	58	N	209	586	0	560	575	78	8	8	1	18	54	S	186	651	186	653	2
78	6	6	21	1	59	N	55	621	0	615	626	78	8	8	1	48	17	N	67	558	67	620	62
78	6	6	21	15	42	N	215	647	-6	635	630	78	8	8	2	6	57	S	57	590	57	594	4
78	6	6	21	58	1	S	168	683	-1	625	623	78	8	8	2	41	14	S	189	636	189	641	5
78	6	6	22	9	0	S	88	670	-24	653	636	78	8	8	3	0	9	S	190	631	190	636	5
78	6	6	22	43	1	N	58	610	16	603	631	78	8	8	3	46	0	S	63	543	62	611	68
78	6	6	22	58	59	N	211	652	4	540	644	78	8	8	3	46	0	N	186	583	186	666	3
78	7	7	0	41	12	N	201	677	7	659	664	78	8	8	4	22	0	S	197	655	197	658	3
78	7	7	1	19	14	S	187	677	13	636	652	78	8	8	4	37	9	S	63	641	63	636	-5
78	7	7	1	32	47	S	66	665	-39	661	617	78	8	8	5	12	56	N	69	659	69	648	-11
78	7	7	2	8	12	N	54	672	-30	670	648	78	8	8	5	26	0	N	190	687	190	686	-1
78	7	7	2	22	2	N	193	686	3	671	671	78	8	8	6	2	3	S	200	658	200	666	8
78	7	7	2	59	7	S	192	664	22	633	658	78	8	8	6	16	47	S	67	630	67	636	-12
78	7	7	3	17	46	S	59	678	-45	678	627	78	8	8	6	53	18	N	75	679	75	673	24
78	7	7	3	49	24	N	61	671	-35	666	627	78	8	8	7	43	24	N	195	670	195	675	5
78	7	7	4	3	39	N	186	669	13	611	632	78	8	8	7	55	54	S	198	668	198	697	9
78	7	7	4	38	43	S	198	651	46	618	676	78	8	8	7	55	54	S	71	678	71	655	-21
78	7	7	4	54	0	S	63	642	-36	634	665	78	8	8	8	47	45	N	200	661	200	670	9
78	7	7	5	30	50	N	70	678	-36	665	636	78	8	8	9	22	55	S	191	664	191	675	11

YR	DA	HR	MIN	SEC	PO	HDOK	LT	LAT	CDJK	DLAT	MIDNIGHT LATH, LATC	YR	DA	HR	MIN	SEC	PO	HDOK	LT	LAT	CDJK	DLAT	MIDNIGHT LATH, LATC
78	8	9	36	45	S	79	663	79	664	1	650	78	9	21	49	48	N	61	553	58	599	46	537
78	8	10	28	29	S	205	673	205	681	8	655	78	9	22	9	18	N	208	578	209	593	15	551
78	8	11	4	19	S	182	683	180	690	27	620	78	9	22	45	29	S	77	538	178	610	-1	520
78	8	11	16	32	S	92	690	92	695	5	620	78	9	23	3	29	S	59	584	77	544	6	514
78	8	11	55	29	N	64	688	65	665	-3	653	78	9	23	31	48	N	203	619	59	584	13	560
78	8	12	10	48	N	208	650	209	654	4	630	78	9	23	31	16	N	59	571	202	604	-15	596
78	8	12	47	17	S	170	673	168	687	14	618	78	10	0	26	47	S	70	563	184	627	2	545
78	8	13	37	0	N	56	634	56	634	0	629	78	10	0	44	34	S	70	563	184	627	2	545
78	8	13	52	0	N	211	665	211	667	2	655	78	10	1	14	19	N	57	599	57	599	0	591
78	8	17	2	44	N	49	602	49	603	1	573	78	10	1	33	21	N	192	621	192	623	2	584
78	8	17	17	48	N	208	602	210	628	26	577	78	10	2	6	45	S	188	609	188	609	0	555
78	8	18	47	8	N	45	656	48	638	-18	659	78	10	2	24	59	S	63	583	63	583	13	570
78	8	18	57	25	N	218	659	218	672	3	659	78	10	2	55	0	N	58	573	58	598	25	562
78	8	19	49	48	S	107	679	107	679	661	661	78	10	3	14	29	N	186	603	186	599	-4	548
78	8	20	29	33	N	47	673	50	655	-18	672	78	10	3	47	42	S	194	636	192	589	-47	601
78	8	20	40	29	N	217	657	218	664	7	646	78	10	4	4	28	S	63	609	63	607	-2	598
78	8	20	10	20	N	53	653	55	635	-18	650	78	10	4	36	15	N	65	570	65	613	43	556
78	8	22	23	50	N	214	657	214	662	5	646	78	10	4	53	44	N	188	634	188	650	16	585
78	8	23	4	20	S	177	668	175	680	12	610	78	10	5	27	45	S	199	639	199	638	-1	604
78	8	23	17	51	S	79	638	75	638	0	623	78	10	5	44	19	S	67	616	67	616	0	606
78	8	23	50	30	N	57	616	57	612	-4	609	78	10	6	17	34	N	73	587	73	618	31	567
78	9	0	6	20	N	184	684	206	683	0	645	78	10	6	33	37	N	193	645	193	645	0	611
78	9	1	0	58	S	69	597	69	609	22	574	78	10	7	7	29	S	198	628	198	628	-2	592
78	9	1	33	38	N	54	662	56	624	-38	660	78	10	7	23	58	S	70	625	70	643	18	609
78	9	1	48	28	N	192	682	192	682	0	645	78	10	8	0	0	N	78	656	76	646	-10	640
78	9	2	25	40	S	190	676	191	680	4	646	78	10	8	14	29	N	198	635	198	643	8	600
78	9	2	41	0	S	62	613	62	639	26	603	78	10	8	47	41	S	193	619	193	618	-1	582
78	9	3	14	46	N	58	655	58	646	-9	653	78	10	9	3	27	N	202	610	202	612	13	629
78	9	3	29	14	N	186	677	186	684	7	636	78	10	9	56	19	N	202	610	202	612	2	586
78	9	4	5	14	S	196	659	195	657	-2	627	78	10	10	29	1	S	187	629	187	633	4	579
78	9	4	21	0	S	63	620	63	624	4	610	78	10	10	43	58	S	85	647	86	673	26	627
78	9	4	56	21	N	67	629	67	632	-41	668	78	10	11	35	58	N	208	665	207	637	-28	646
78	9	5	9	31	N	189	673	189	683	10	632	78	10	13	17	15	N	212	675	211	669	-6	666
78	9	5	45	10	S	200	658	200	667	9	639	78	10	14	5	58	S	105	650	105	650	0	606
78	9	6	0	15	S	66	641	66	639	-2	633	78	10	14	45	2	N	209	642	209	644	2	621
78	9	6	36	31	N	74	655	74	636	-19	641	78	10	15	0	19	N	208	609	208	611	2	585
78	9	6	50	18	N	194	654	194	654	0	631	78	10	16	43	13	N	208	609	208	611	2	585
78	9	7	24	41	S	198	638	198	638	0	631	78	10	16	10	1	N	52	590	50	600	20	570
78	9	10	11	39	N	204	666	203	627	-39	647	78	10	18	25	19	N	209	604	210	612	8	579
78	9	10	47	40	S	182	681	184	660	-21	641	78	10	19	53	40	N	51	629	52	620	-9	625
78	9	11	0	19	S	87	666	88	668	2	648	78	10	20	6	30	N	214	638	214	640	2	625
78	9	11	52	58	N	209	659	209	665	-4	651	78	10	21	24	31	N	57	608	57	608	1	501
78	9	12	29	29	S	98	663	170	688	25	602	78	10	21	50	0	N	212	628	212	626	-2	613
78	9	12	41	18	S	98	663	97	655	-8	639	78	10	22	31	57	S	83	655	82	628	-4	681
78	9	13	20	19	N	56	655	58	634	-21	653	78	10	22	42	48	S	83	655	82	628	-4	681
78	9	13	34	58	N	211	662	211	665	3	651	78	10	23	15	18	N	59	590	57	619	27	636
78	9	15	17	40	N	209	637	209	639	2	616	78	10	23	32	13	N	208	662	208	662	0	643
78	9	16	45	21	N	49	602	49	601	-1	573	78	11	0	11	40	S	182	686	182	686	8	649
78	9	16	59	59	N	209	621	210	635	14	598	78	11	0	24	4	S	73	680	73	649	-31	668
78	9	18	28	19	N	208	592	209	598	6	566	78	11	1	0	1	N	53	679	55	634	-45	679
78	9	18	42	59	N	208	592	209	598	6	566	78	11	1	32	31	N	199	702	197	687	-15	676
78	9	20	8	44	N	57	564	55	599	33	552	78	11	1	52	1	S	188	683	188	682	-21	643
78	9	20	25	19	N	211	598	211	606	8	580	78	11	2	5	23	S	63	668	63	642	-26	663
78	9	20	25	19	N	211	598	211	606	8	580	78	11	2	40	58	N	56	667	56	653	-14	666

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YR		DA	HR	MIN	SEC	PO	HDDK	LT	LAT	CDCK	DLAT	LATH, LATH	MIDNIGHT	DLAT	LATH, LATH	MIDNIGHT		
78	13	17	20	0	0	N	46	630	45	630	-4	615	620	188	713	2	679	676
78	13	17	32	12	12	N	212	645	214	658	12	633	646	202	696	2	679	676
78	13	21	10	59	59	N	210	632	211	644	12	618	632	74	667	-27	683	663
78	13	22	40	12	12	N	178	672	175	673	1	616	620	193	720	4	696	692
78	13	23	34	50	50	S	76	680	77	626	26	592	619	199	706	1	679	675
78	14	0	5	46	0	N	58	599	57	610	11	591	614	76	687	-15	692	685
78	14	0	23	0	0	N	203	667	202	663	-4	646	645	198	707	5	676	677
78	14	1	0	47	0	S	185	670	185	670	32	628	664	198	707	5	676	677
78	14	1	15	0	0	S	68	647	68	637	-10	640	639	198	707	5	676	677
78	14	1	49	49	0	N	54	671	54	659	-12	670	665	191	705	7	666	682
78	14	2	3	59	0	N	192	691	192	690	-1	663	662	77	678	7	666	682
78	14	2	41	0	0	S	191	685	192	689	24	634	661	77	678	7	666	682
78	14	2	56	0	0	S	61	684	61	689	25	636	661	77	678	7	666	682
78	14	3	31	13	13	N	59	675	59	670	-5	675	677	204	697	-1	682	675
78	14	3	44	23	23	N	186	695	186	695	-1	659	660	180	712	4	673	673
78	14	4	21	24	24	S	197	676	198	688	12	646	660	66	663	20	674	710
78	14	4	35	30	30	S	62	652	62	650	-2	645	653	208	665	-1	648	648
78	14	5	12	1	1	N	68	670	68	668	-2	665	673	163	722	12	668	680
78	14	5	24	23	23	N	199	702	199	702	0	666	664	101	684	8	686	703
78	14	6	1	12	12	S	200	672	201	677	5	654	658	57	637	1	632	642
78	14	6	14	55	55	S	66	665	65	662	-30	659	666	212	679	0	670	665
78	14	7	5	34	34	N	75	689	75	689	5	641	650	213	679	11	665	671
78	14	7	40	50	50	S	194	671	194	676	5	641	650	42	662	-7	657	652
78	14	7	55	59	59	S	197	685	197	689	4	623	634	215	669	19	659	674
78	14	8	45	10	10	N	71	638	71	644	6	623	638	218	688	19	659	674
78	14	9	21	45	45	S	199	674	199	679	-4	642	644	43	670	-7	700	685
78	14	9	36	15	15	S	190	666	190	670	13	635	652	221	691	3	672	679
78	14	10	12	54	54	S	78	640	78	654	14	625	649	223	696	-2	700	690
78	14	10	26	58	58	N	205	682	205	683	1	655	654	224	698	7	689	700
78	14	11	3	51	51	S	180	689	179	697	8	651	649	222	707	2	711	704
78	14	11	16	38	38	S	89	648	88	656	8	628	647	172	699	-37	710	651
78	14	11	54	12	12	N	64	668	65	659	-9	663	662	85	692	11	665	688
78	14	12	9	22	22	N	210	632	210	635	3	673	671	214	719	-2	717	703
78	14	12	27	35	35	S	163	710	162	714	4	658	669	182	725	3	690	686
78	14	12	56	57	57	S	100	665	101	671	5	655	649	72	693	11	671	692
78	14	13	37	16	16	N	52	677	54	680	-17	677	666	53	679	27	649	685
78	14	13	49	35	35	N	214	692	214	691	-1	685	677	196	695	-15	685	666
78	14	17	3	59	59	N	41	688	41	673	5	665	675	190	683	-28	686	656
78	14	17	13	37	37	N	217	682	218	683	1	674	669	62	680	-11	688	686
78	14	22	21	58	58	N	215	671	215	671	0	671	658	55	711	15	698	720
78	14	23	4	48	48	S	172	722	172	720	-2	695	677	188	720	-1	698	680
78	14	23	15	42	42	S	81	666	82	663	17	648	678	197	709	5	678	679
78	14	23	50	6	6	N	55	640	55	639	-1	636	644	57	710	11	701	719
78	14	0	4	13	13	N	209	703	209	702	-1	668	680	65	692	-23	714	699
78	15	0	45	2	2	S	184	711	184	711	2	687	683	188	715	-2	682	674
78	15	1	46	14	14	N	195	712	195	712	-1	677	683	201	691	18	655	670
78	15	2	25	14	14	S	191	703	191	702	-1	677	673	62	706	-13	704	700
78	15	2	37	36	36	S	60	681	61	670	-11	677	675	73	727	-29	719	696
78	15	3	13	36	36	N	58	658	58	670	12	656	677	192	696	0	669	660
78	15	3	27	10	10	N	187	706	187	710	4	671	672	199	677	11	647	660
78	15	4	3	1	1	S	197	682	197	686	4	664	667	68	696	-2	693	701
78	15	4	18	9	9	S	60	685	59	684	19	664	667	76	703	-28	724	702
78	15	4	55	30	30	N	67	687	66	676	-11	683	681	197	701	5	675	676

YR	DA	HR	MIN	SLC	HDJK	PO	LT	LAT	CDJK	DLAT	MIDNIGHT LATH, LATC	DLAT	MIDNIGHT LATH, LATC	CDJK	LT	LAT	DLAT	MIDNIGHT LATH, LATC
78	19	1	16	47	S	186	681	649	186	681	649	186	681	186	681	649	186	681
78	19	1	31	0	S	186	687	650	186	687	650	186	687	186	687	650	186	687
78	19	2	4	49	N	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	2	20	29	N	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	2	56	14	S	191	653	651	191	653	651	191	653	191	653	651	191	653
78	19	3	11	46	S	191	653	651	191	653	651	191	653	191	653	651	191	653
78	19	4	1	8	N	186	659	659	186	659	659	186	659	186	659	659	186	659
78	19	4	36	36	S	186	659	659	186	659	659	186	659	186	659	659	186	659
78	19	4	52	53	S	186	659	659	186	659	659	186	659	186	659	659	186	659
78	19	5	26	21	N	190	678	678	190	678	678	190	678	190	678	678	190	678
78	19	5	40	44	N	190	678	678	190	678	678	190	678	190	678	678	190	678
78	19	6	16	38	S	200	667	667	200	667	667	200	667	200	667	667	200	667
78	19	6	31	22	S	187	642	642	187	642	642	187	642	187	642	642	187	642
78	19	7	8	29	N	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	7	21	20	N	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	7	56	48	S	186	659	659	186	659	659	186	659	186	659	659	186	659
78	19	8	11	7	S	186	659	659	186	659	659	186	659	186	659	659	186	659
78	19	9	2	35	N	200	667	667	200	667	667	200	667	200	667	667	200	667
78	19	9	37	16	S	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	9	51	39	S	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	10	28	1	N	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	10	43	47	N	205	652	652	205	652	652	205	652	205	652	652	205	652
78	19	11	13	21	S	179	677	677	179	677	677	179	677	179	677	677	179	677
78	19	11	32	47	S	186	659	659	186	659	659	186	659	186	659	659	186	659
78	19	12	25	15	N	209	655	655	209	655	655	209	655	209	655	655	209	655
78	19	12	25	15	N	209	655	655	209	655	655	209	655	209	655	655	209	655
78	19	13	13	33	S	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	13	51	34	N	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	14	7	7	N	210	653	653	210	653	653	210	653	210	653	653	210	653
78	19	15	49	16	N	210	653	653	210	653	653	210	653	210	653	653	210	653
78	19	17	18	7	N	210	653	653	210	653	653	210	653	210	653	653	210	653
78	19	17	31	8	N	211	640	640	211	640	640	211	640	211	640	640	211	640
78	19	19	1	59	N	211	640	640	211	640	640	211	640	211	640	640	211	640
78	19	19	12	15	N	217	666	666	217	666	666	217	666	217	666	666	217	666
78	19	20	43	45	N	218	668	668	218	668	668	218	668	218	668	668	218	668
78	19	20	54	51	N	218	668	668	218	668	668	218	668	218	668	668	218	668
78	19	21	49	31	S	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	22	23	2	N	189	659	659	189	659	659	189	659	189	659	659	189	659
78	19	22	38	27	N	213	663	663	213	663	663	213	663	213	663	663	213	663
78	19	23	19	59	S	175	708	708	175	708	708	175	708	175	708	708	175	708
78	19	23	32	59	S	175	708	708	175	708	708	175	708	175	708	708	175	708
78	20	0	5	47	N	205	685	685	205	685	685	205	685	205	685	685	205	685
78	20	0	21	2	N	205	685	685	205	685	685	205	685	205	685	685	205	685
78	20	1	12	43	S	186	659	659	186	659	659	186	659	186	659	659	186	659
78	20	2	2	32	N	192	697	697	192	697	697	192	697	192	697	697	192	697
78	20	2	40	44	S	192	697	697	192	697	697	192	697	192	697	697	192	697
78	20	3	53	29	S	192	697	697	192	697	697	192	697	192	697	697	192	697
78	20	3	53	29	S	192	697	697	192	697	697	192	697	192	697	697	192	697
78	20	3	42	49	S	197	707	707	197	707	707	197	707	197	707	707	197	707
78	20	4	20	5	S	197	707	707	197	707	707	197	707	197	707	707	197	707
78	20	4	31	16	S	197	707	707	197	707	707	197	707	197	707	707	197	707
78	20	5	11	22	S	197	707	707	197	707	707	197	707	197	707	707	197	707

YR	DA	HR	MM	SEC	PO	HDDK	LT	LAT	COOK	DLAT	LATH, LATH	MIDNIGHT	DLAT	LATH, LATH	MIDNIGHT
78	21	9	15	28	S	72	713	77	702	-11	704	701	1	683	677
78	21	9	56	48	N	72	729	73	689	-40	721	687	-12	712	696
78	21	10	7	46	N	204	703	204	695	-14	694	674	3	693	689
78	21	10	45	58	S	180	712	180	716	4	676	677	2	663	661
78	21	10	55	29	S	92	730	88	661	-69	721	553	-16	715	707
78	21	11	49	23	N	210	697	210	694	-3	690	680	-14	692	684
78	21	12	39	12	S	59	676	59	676	-7	691	690	0	699	690
78	21	13	18	58	N	53	683	53	683	2	689	683	26	697	691
78	21	13	31	2	N	214	695	214	697	-2	689	683	26	697	691
78	21	15	12	47	N	217	694	217	696	2	687	682	8	691	678
78	21	16	54	35	N	219	694	219	693	-1	687	679	8	707	721
78	21	18	36	38	N	221	693	221	692	-1	694	686	3	660	662
78	21	22	2	34	N	219	685	219	690	5	677	676	3	662	675
78	21	22	45	58	S	171	707	87	709	-1	697	707	-9	685	671
78	21	22	55	40	S	87	710	87	709	-5	687	688	4	680	678
78	21	23	33	25	N	51	686	51	681	0	688	681	0	675	685
78	21	23	45	47	N	210	695	210	695	2	680	677	-29	705	682
78	22	0	26	47	N	132	714	182	716	6	144	713	191	697	697
78	22	0	38	0	S	72	698	72	691	-2	688	689	-16	688	668
78	22	1	14	35	N	53	679	53	677	-2	679	684	-4	701	688
78	22	1	28	12	N	197	702	197	702	1	675	673	-2	689	697
78	22	2	6	36	S	199	691	190	697	6	653	668	-28	716	694
78	22	2	19	46	S	62	666	62	673	7	661	678	13	657	669
78	22	2	55	37	N	56	670	56	667	-3	669	674	8	660	667
78	22	3	8	58	N	187	707	187	706	-1	672	668	4	677	690
78	22	3	47	2	S	196	699	196	694	-5	672	665	-1	685	677
78	22	4	0	14	S	60	655	60	659	13	650	674	22	653	674
78	22	4	37	49	N	64	707	65	674	-33	705	679	84	686	684
78	22	4	49	11	N	188	707	188	707	0	672	669	67	708	716
78	22	5	26	36	S	201	687	201	690	3	670	669	208	694	677
78	22	5	39	37	S	63	672	63	685	13	667	691	172	698	671
78	22	6	17	44	N	73	680	73	697	17	668	695	95	679	696
78	22	6	29	59	N	192	686	192	689	3	658	661	213	698	684
78	22	7	6	22	S	199	680	199	682	2	651	655	216	696	688
78	22	7	18	59	S	68	689	67	700	11	686	708	213	664	661
78	22	7	58	48	N	76	703	75	701	-2	693	700	43	660	655
78	22	8	10	48	S	197	677	197	677	0	647	650	215	662	650
78	22	8	46	47	S	193	681	193	677	-4	652	650	47	654	651
78	22	8	59	36	S	75	680	75	672	-8	668	668	218	672	660
78	22	9	37	53	N	202	675	202	676	1	657	657	48	678	674
78	22	10	28	1	N	184	686	184	687	1	647	650	219	682	679
78	22	10	40	0	S	86	686	85	676	-10	670	670	162	732	704
78	22	11	33	22	N	207	667	207	667	0	648	649	90	692	659
78	22	12	10	36	S	171	695	171	697	1	654	649	50	683	683
78	22	12	20	36	S	99	690	99	689	-1	672	683	215	696	683
78	22	13	0	49	N	57	671	56	676	5	670	683	178	721	678
78	22	13	15	0	N	210	668	210	665	-3	658	652	76	675	672
78	22	14	56	59	N	211	662	213	677	15	651	664	52	681	669
78	22	16	27	59	N	41	671	44	648	-23	670	643	202	703	681
78	22	16	38	18	N	215	673	216	680	7	664	667	187	709	671
78	22	18	9	58	N	45	652	42	659	17	643	670	65	669	655
78	22	18	20	1	N	218	678	219	682	4	669	668	189	692	678
78	22	19	53	14	N	43	687	43	688	1	692	695	194	702	668

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YR	DA	HR	MIN	SEC	PO	HODK	LT	LAT	CDOP	DLAT	MIDNIGHT LATN, LATC	YR	DA	HR	MIN	SEC	PO	HODK	LT	LAT	CDOP	DLAT	MIDNIGHT LATN, LATC
78	34	3	58	41	S	52	625	62	629	4	616 630	78	35	7	37	57	S	68	635	68	634	-1	627 636
78	34	4	33	39	N	54	652	65	643	-9	645 646	78	35	7	37	57	S	68	635	68	634	-1	627 636
78	34	4	27	57	N	188	664	188	650	-14	621 614	78	35	7	37	57	S	68	635	68	634	-1	627 636
78	34	5	22	37	S	198	640	198	641	1	606 618	78	35	8	27	0	S	195	672	195	672	4	642 650
78	34	5	38	59	S	65	620	65	621	21	606 618	78	35	8	27	0	S	195	672	195	672	4	642 650
78	34	6	14	73	N	72	650	72	623	-22	626 621	78	35	8	27	0	S	195	672	195	672	4	642 650
78	34	6	28	18	N	192	659	192	661	2	627 636	78	35	9	32	28	S	201	667	201	667	-13	623 618
78	34	7	3	0	S	198	652	198	654	2	627 636	78	35	9	32	28	S	201	667	201	667	-13	623 618
78	34	7	18	36	S	69	629	69	626	-2	619 630	78	35	10	8	3	S	186	680	186	680	16	640 658
78	34	7	54	44	N	75	647	75	645	-2	620 627	78	35	10	8	3	S	186	680	186	680	16	640 658
78	34	8	9	1	N	156	653	156	654	5	620 634	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	8	43	36	S	193	660	193	659	-1	626 634	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	8	57	58	S	74	651	74	650	-11	626 634	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	9	49	41	N	201	661	201	665	4	626 634	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	10	25	19	S	184	685	184	685	0	626 634	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	10	38	19	S	83	682	83	682	-28	626 634	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	11	15	1	N	69	634	69	635	1	626 634	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	11	31	22	N	206	652	206	650	-2	632 633	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	12	6	36	S	176	660	176	664	4	597 609	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	12	18	40	S	95	671	95	670	29	649 697	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	12	55	12	N	62	683	60	623	40	570 624	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	13	14	33	N	206	613	206	619	6	589 605	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	13	50	56	S	111	684	105	659	-25	650 631	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	14	55	33	N	208	634	209	640	6	612 624	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	15	32	53	S	208	634	209	640	6	612 624	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	16	37	47	N	208	620	208	622	2	597 608	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	16	5	16	N	50	593	50	586	3	584 599	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	18	19	58	N	209	611	217	675	64	587 662	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	19	10	6	S	51	621	105	655	-2	615 623	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	19	48	18	N	211	611	152	619	5	595 606	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	20	2	19	N	53	643	55	625	-18	609 630	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	21	30	39	N	212	622	213	633	11	607 622	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	21	44	59	N	167	714	168	711	-3	675 664	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	22	26	34	S	86	669	83	640	-29	651 629	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	22	36	55	S	58	605	57	622	17	597 627	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	23	10	46	N	58	605	57	622	17	597 627	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	34	23	27	27	N	208	650	209	654	4	630 627	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	35	0	22	19	S	182	658	182	660	2	614 624	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	35	0	51	42	N	58	589	57	606	17	579 610	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	35	1	10	9	N	197	651	197	651	0	618 627	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	35	1	46	1	S	186	656	188	654	-2	611 618	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	35	2	2	13	S	65	599	65	596	-3	588 594	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	35	2	33	49	N	57	604	57	606	2	596 610	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	35	2	52	11	N	187	618	187	621	3	586 586	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	35	3	25	1	S	192	616	192	620	4	578 600	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	35	3	42	23	S	62	607	62	621	14	596 622	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	35	4	16	13	N	63	639	63	635	-4	631 637	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	35	4	31	8	N	187	661	187	661	0	610 621	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	35	5	5	52	S	198	644	198	644	0	610 621	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	35	5	23	0	S	66	596	65	622	26	594 623	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	35	5	57	13	N	71	643	71	626	-17	628 619	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	35	6	10	58	N	191	674	191	675	1	628 619	78	35	10	21	22	S	81	655	81	655	-2	636 644
78	35	6	46	30	S	199	666	199	665	-1	635 640	78	35	10	21	22	S	81	655	81	655	-2	636 644

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YR	DA	HR	MIN	SEC	PO	HODK	LT	LAT	CDK	DLAT	MIDNIGHT	LA-H, L, A, C	YR	DA	HR	MIN	SEC	PO	HODK	LT	LAT	CDK	DLAT	MIDNIGHT	LA-H, L, A, C
78	52	5	33	58	S	65	645	65	639	-6	638	641	78	52	5	33	58	S	65	645	65	639	-6	638	641
78	52	6	10	31	N	72	652	72	641	-11	638	635	78	52	6	10	31	N	72	652	72	641	-11	638	635
78	52	6	23	47	N	192	677	192	676	-1	647	650	78	52	6	23	47	N	192	677	192	676	-1	647	650
78	52	6	58	46	S	198	650	198	653	6	617	632	78	52	6	58	46	S	198	650	198	653	6	617	632
78	52	7	13	34	S	67	655	68	633	-22	649	635	78	52	7	13	34	S	67	655	68	633	-22	649	635
78	52	7	50	47	N	75	646	75	643	-3	631	637	78	52	7	50	47	N	75	646	75	643	-3	631	637
78	52	8	4	39	N	196	664	196	670	5	633	644	78	52	8	4	39	N	196	664	196	670	5	633	644
78	52	8	39	21	S	193	658	193	671	13	626	645	78	52	8	39	21	S	193	658	193	671	13	626	645
78	52	9	45	20	N	73	670	73	656	-14	637	651	78	52	9	45	20	N	73	670	73	656	-14	637	651
78	52	10	21	0	S	201	672	201	635	13	654	665	78	52	10	21	0	S	201	672	201	635	13	654	665
78	52	10	33	30	S	185	683	184	695	12	643	657	78	52	10	33	30	S	185	683	184	695	12	643	657
78	52	11	11	21	N	83	678	82	648	-30	661	638	78	52	11	11	21	N	83	678	82	648	-30	661	638
78	52	11	26	58	N	69	645	69	645	10	642	652	78	52	11	26	58	N	69	645	69	645	10	642	652
78	52	12	3	49	S	206	661	206	671	1	669	664	78	52	12	3	49	S	206	661	206	671	1	669	664
78	52	12	14	28	S	171	705	171	709	4	650	661	78	52	12	14	28	S	171	705	171	709	4	650	661
78	52	12	52	55	N	94	672	94	673	1	659	639	78	52	12	52	55	N	94	672	94	673	1	659	639
78	52	13	9	11	N	208	646	209	658	12	625	640	78	52	13	9	11	N	208	646	209	658	12	625	640
78	52	13	56	58	S	101	637	119	712	75	593	613	78	52	13	56	58	S	101	637	119	712	75	593	613
78	52	14	35	11	N	54	610	53	616	6	603	620	78	52	14	35	11	N	54	610	53	616	6	603	620
78	52	14	51	12	N	209	641	210	651	10	620	639	78	52	14	51	12	N	209	641	210	651	10	620	639
78	52	16	16	23	N	208	622	208	622	5	552	571	78	52	16	16	23	N	208	622	208	622	5	552	571
78	52	17	42	45	N	53	564	53	559	8	581	603	78	52	17	42	45	N	53	564	53	559	8	581	603
78	52	17	58	44	N	209	605	210	613	6	571	590	78	52	17	58	44	N	209	605	210	613	6	571	590
78	52	18	48	14	S	54	587	54	587	13	600	612	78	52	18	48	14	S	54	587	54	587	13	600	612
78	52	19	25	42	N	212	616	213	629	14	606	632	78	52	19	25	42	N	212	616	213	629	14	606	632
78	52	21	8	24	N	55	613	54	627	9	613	626	78	52	21	8	24	N	55	613	54	627	9	613	626
78	52	21	23	0	N	214	628	214	637	2	620	623	78	52	21	23	0	N	214	628	214	637	2	620	623
78	52	22	4	6	S	188	680	189	682	8	626	645	78	52	22	4	6	S	188	680	189	682	8	626	645
78	52	22	15	59	S	87	646	87	654	8	626	645	78	52	22	15	59	S	87	646	87	654	8	626	645
78	52	22	50	2	N	58	618	58	615	-3	512	619	78	52	22	50	2	N	58	618	58	615	-3	512	619
78	52	23	6	39	N	209	622	209	621	-1	599	607	78	52	23	6	39	N	209	622	209	621	-1	599	607
78	52	23	41	16	S	181	660	181	657	-3	616	621	78	52	23	41	16	S	181	660	181	657	-3	616	621
78	52	23	58	11	S	77	650	77	636	-14	636	630	78	52	23	58	11	S	77	650	77	636	-14	636	630
78	52	24	30	44	N	59	595	59	596	1	586	599	78	52	24	30	44	N	59	595	59	596	1	586	599
78	52	24	30	0	N	191	654	192	658	14	621	642	78	52	24	30	0	N	191	654	192	658	14	621	642
78	52	3	6	1	S	135	685	134	673	-13	658	647	78	52	3	6	1	S	135	685	134	673	-13	658	647
78	52	3	20	43	S	63	627	64	623	-29	675	653	78	52	3	20	43	S	63	627	64	623	-29	675	653
78	52	4	9	39	N	188	679	189	701	22	639	663	78	52	4	9	39	N	188	679	189	701	22	639	663
78	52	4	45	30	S	199	668	200	660	18	637	656	78	52	4	45	30	S	199	668	200	660	18	637	656
78	52	4	59	13	S	63	672	64	631	-21	647	654	78	52	4	59	13	S	63	672	64	631	-21	647	654
78	52	5	37	1	N	70	672	70	654	-13	660	654	78	52	5	37	1	N	70	672	70	654	-13	660	654
78	52	5	49	57	N	191	673	192	692	19	643	664	78	52	5	49	57	N	191	673	192	692	19	643	664
78	52	6	25	16	S	200	662	200	662	11	643	654	78	52	6	25	16	S	200	662	200	662	11	643	654
78	52	6	39	14	S	66	668	66	659	-9	663	663	78	52	6	39	14	S	66	668	66	659	-9	663	663
78	52	7	18	0	N	75	687	74	658	-49	676	632	78	52	7	18	0	N	75	687	74	658	-49	676	632
78	52	7	30	19	N	194	674	194	686	12	644	658	78	52	7	30	19	N	194	674	194	686	12	644	658
78	52	8	5	47	S	195	675	195	660	5	645	653	78	52	8	5	47	S	195	675	195	660	5	645	653
78	52	8	18	17	S	70	698	71	674	-24	668	671	78	52	8	18	17	S	70	698	71	674	-24	668	671
78	52	9	11	10	N	199	671	199	671	3	641	648	78	52	9	11	10	N	199	671	199	671	3	641	648
78	52	9	46	40	S	188	681	188	682	1	641	648	78	52	9	46	40	S	188	681	188	682	1	641	648
78	52	9	58	55	S	80	691	79	655	-35	676	651	78	52	9	58	55	S	80	691	79	655	-35	676	651

YR	DA	HR	MM	SEC	PO	HDQX	LT	LAT	CDQX	DLAT	MIDNIGHT LATH, LATH	YR	DA	HR	MM	SEC	PO	HDQX	LT	LAT	CDQX	DLAT	MIDNIGHT LATH, LATH
78	58	1	21	58	N	197	642	197	642	-1	606 318	78	59	4	8	21	N	197	642	197	642	-1	606 318
78	58	1	56	28	S	190	629	191	627	-2	593 606	78	59	4	27	19	N	189	602	189	602	-1	547 567
78	58	2	14	43	S	67	566	67	566	28	552 592	78	59	4	56	58	S	198	603	198	606	3	564 587
78	58	2	44	31	N	60	575	60	580	5	561 577	78	59	5	19	0	S	68	557	71	571	8	541 560
78	58	3	2	59	N	189	639	190	642	3	591 619	78	59	5	49	29	N	192	637	192	633	-4	602 611
78	58	3	37	0	S	195	639	196	646	7	604 623	78	59	6	6	28	S	192	637	192	633	-4	602 611
78	58	3	54	59	S	66	574	65	610	36	566 600	78	59	6	39	25	S	198	616	198	616	12	591 614
78	58	4	26	2	N	189	638	189	650	22	566 600	78	59	7	31	15	S	68	604	68	614	4	586 600
78	58	4	43	13	N	66	579	66	601	12	590 614	78	59	7	31	15	S	68	604	68	614	4	586 600
78	58	5	15	59	S	198	605	199	619	13	567 599	78	59	7	48	0	N	195	599	195	600	1	559 582
78	58	5	34	58	S	68	582	68	584	12	565 592	78	59	8	19	18	S	194	603	194	603	0	564 585
78	58	6	7	6	N	72	588	72	605	17	569 595	78	59	8	38	0	N	193	583	72	624	41	563 617
78	58	6	24	13	N	192	609	192	609	5	590 590	78	59	9	28	27	S	188	614	199	604	-10	576 586
78	58	6	56	1	S	197	604	197	609	5	565 590	78	59	10	0	40	S	188	622	188	623	-10	576 586
78	58	7	15	17	S	69	574	69	604	30	560 603	78	59	10	15	38	S	80	659	79	623	-34	616 630
78	58	7	48	16	N	75	606	75	640	34	583 642	78	59	10	52	30	N	71	632	71	637	-5	616 630
78	58	8	3	6	N	193	653	193	657	11	623 641	78	59	11	9	59	N	204	610	204	609	-1	586 596
78	58	8	37	46	S	73	643	73	647	4	628 642	78	59	11	43	21	S	179	653	28	619	-5	594 596
78	58	8	52	42	S	73	643	73	647	4	628 642	78	59	11	55	30	S	93	625	28	619	-5	594 596
78	58	9	44	46	S	230	641	201	644	3	620 628	78	59	12	32	54	N	207	510	64	600	-67	666 694
78	58	10	18	37	S	186	652	186	652	3	620 628	78	59	12	33	36	N	207	510	207	504	7	572 582
78	58	10	32	37	S	82	661	82	661	-3	638 638	78	59	16	15	44	N	207	597	55	542	-16	545 583
78	58	11	9	58	N	59	645	59	645	-3	638 638	78	59	17	41	5	N	54	588	209	600	9	565 588
78	58	11	25	53	N	206	649	206	649	-2	635 631	78	59	17	57	45	N	208	591	209	600	9	565 588
78	58	12	1	31	S	174	684	175	682	-2	635 631	78	59	19	23	44	N	56	565	56	568	3	553 570
78	58	12	12	58	S	94	673	94	670	26	657 605	78	59	19	40	18	N	209	590	210	586	5	553 578
78	58	12	49	32	N	63	580	62	606	26	657 605	78	59	21	4	44	N	60	544	60	552	8	528 546
78	58	13	8	29	S	207	625	207	625	0	602 611	78	59	21	23	0	N	211	585	211	585	17	578 610
78	58	13	43	30	S	168	652	169	644	-8	574 569	78	59	22	1	32	S	172	648	170	665	17	578 610
78	58	13	58	2	S	54	572	57	577	73	527 611	78	59	22	17	18	S	82	557	84	558	41	527 582
78	58	14	32	20	N	57	572	57	577	73	527 611	78	59	22	47	28	N	60	586	60	590	4	573 588
78	58	14	51	0	N	206	605	206	626	5	581 580	78	59	23	4	57	N	210	627	210	624	-3	612 614
78	58	16	33	59	N	205	566	206	582	16	538 572	78	59	23	43	0	S	181	666	180	679	13	623 642
78	58	17	58	40	N	53	564	54	559	-5	552 561	78	59	23	56	29	S	79	659	78	632	-27	645 635
78	58	18	15	34	N	207	572	207	576	4	544 566	78	59	0	30	32	N	58	630	53	626	-4	625 631
78	58	19	4	59	S	104	633	105	625	6	596 611	78	59	0	47	4	N	202	654	203	652	-8	634 644
78	58	19	40	51	N	56	562	57	555	-7	550 557	78	59	1	23	19	S	189	655	189	657	-37	636 605
78	58	19	57	22	N	210	592	210	583	-9	573 575	78	59	1	38	19	S	69	643	69	646	-12	571 588
78	58	21	22	30	N	60	563	57	605	42	548 609	78	59	2	10	31	N	60	584	60	584	1	634 641
78	58	21	40	27	N	210	585	211	553	8	566 584	78	59	2	28	13	S	192	665	192	665	1	634 641
78	58	22	17	41	S	175	621	175	621	0	536 557	78	59	3	3	27	S	194	649	194	654	5	616 630
78	58	22	33	44	S	82	586	84	614	22	560 600	78	59	3	3	27	S	66	548	66	568	20	532 584
78	58	23	4	0	N	61	568	61	575	7	554 571	78	59	3	51	48	N	64	579	64	582	3	566 579
78	58	23	22	45	S	208	619	208	620	1	596 606	78	59	4	8	47	S	189	659	189	659	13	615 635
78	58	24	0	23	S	182	677	182	677	19	572 602	78	59	4	42	47	S	198	626	198	630	4	590 599
78	58	0	15	40	S	75	591	76	610	13	572 602	78	59	4	59	18	S	65	630	65	632	2	621 634
78	58	0	46	26	N	59	595	59	604	9	586 608	78	59	5	34	26	N	70	631	70	633	2	615 636
78	58	1	3	48	N	201	671	201	670	-1	653 651	78	59	5	49	19	N	191	644	191	644	9	610 629
78	58	1	40	12	S	190	652	190	672	20	619 646	78	59	6	33	9	S	199	639	200	651	22	604 643
78	58	1	55	28	S	68	639	68	608	-31	631 607	78	59	6	38	38	S	67	647	67	642	-5	640 644
78	58	2	29	15	N	59	631	60	575	-56	626 571	78	59	7	15	28	N	74	647	74	634	-13	632 638
78	58	2	46	19	N	190	623	190	631	3	592 571	78	59	7	29	19	N	194	658	194	656	-2	626 632
78	58	3	18	40	S	194	594	194	605	15	554 590	78	59	8	3	13	S	195	634	195	637	13	599 624
78	58	3	38	43	S	66	553	61	594	141	537 701	78	59	8	19	1	S	71	638	71	631	-7	623 624

YR		DA	HR	MIN	SEC	PO	HDDK	LT	LAT	CDCK	DLAT	LATH	LATC	MIDNIGHT	DLAT	LATH	LATC	CDCK	LT	LAT	CDCK	DLAT	LATH	LATC	MIDNIGHT
78	62	78	62	22	51	38	S	176	559	173	670	11	596	610	28	676	715	73	715	73	715	28	676	715	
78	62	78	62	23	5	19	S	93	638	82	627	-11	617	615	-1	669	666	192	695	192	695	-1	669	666	
78	62	78	62	23	38	27	N	59	614	59	612	18	607	637	0	662	650	200	680	200	680	0	662	650	
78	62	78	62	23	55	31	N	207	637	207	639	2	616	623	-1	691	700	66	694	66	694	-1	691	700	
78	63	78	63	0	32	41	S	195	658	195	658	0	625	631	-2	701	707	75	708	75	708	-2	701	707	
78	63	78	63	0	46	38	S	74	666	74	666	-7	642	644	-4	647	647	196	673	196	673	-4	647	647	
78	63	78	63	1	22	0	N	56	671	56	671	-30	670	643	10	650	669	193	671	193	671	10	650	669	
78	63	78	63	1	36	58	N	197	603	197	603	3	632	641	0	644	645	201	663	201	663	0	644	645	
78	63	78	63	2	12	58	S	192	682	193	665	23	630	657	5	623	634	186	671	186	671	5	623	634	
78	63	78	63	2	27	36	S	66	654	66	641	-13	647	643	17	628	658	81	648	81	648	17	628	658	
78	63	78	63	3	3	32	N	59	676	59	659	-17	670	663	-5	632	636	82	665	82	665	-5	632	636	
78	63	78	63	3	17	18	N	190	680	191	630	10	651	66	-1	625	629	70	642	70	642	-1	625	629	
78	63	78	63	3	53	2	S	197	658	198	679	21	626	652	-2	604	607	205	645	205	645	-2	604	607	
78	63	78	63	4	7	44	S	64	654	64	654	10	647	668	4	628	641	92	654	92	654	4	628	641	
78	63	78	63	6	31	14	N	192	658	192	658	0	671	669	-5	615	617	208	637	208	637	-5	615	617	
78	63	78	63	7	13	52	S	199	694	199	693	-1	667	665	5	589	600	167	661	167	661	5	589	600	
78	63	78	63	7	27	11	S	68	667	68	677	10	662	683	6	637	652	107	673	107	673	6	637	652	
78	63	78	63	8	17	51	N	75	694	75	674	-20	662	671	-10	617	617	53	623	53	623	-10	617	617	
78	63	78	63	8	17	51	N	196	696	196	699	2	669	672	-3	616	623	107	673	107	673	-3	616	623	
78	63	78	63	8	54	27	S	192	697	192	697	6	670	668	-6	616	616	54	613	54	613	-6	616	616	
78	63	78	63	9	6	53	S	74	692	74	692	3	670	668	-6	616	616	54	613	54	613	-6	616	616	
78	63	78	63	9	58	51	N	202	692	202	699	-3	678	668	10	609	615	212	624	212	624	10	609	615	
78	63	78	63	10	35	29	S	183	695	183	698	3	668	690	18	571	581	51	599	51	599	18	571	581	
78	63	78	63	10	47	38	S	85	677	86	698	21	660	695	20	594	626	167	708	167	708	20	594	626	
78	63	78	63	11	40	19	N	208	685	208	686	3	666	668	1	609	615	51	599	51	599	1	609	615	
78	63	78	63	12	28	1	S	98	682	101	706	18	669	700	-3	616	623	107	673	107	673	-3	616	623	
78	63	78	63	13	21	43	N	213	689	213	689	-1	691	674	-13	643	644	214	627	214	627	-13	643	644	
78	63	78	63	15	3	38	N	216	685	216	689	4	677	675	22	635	656	54	639	54	639	22	635	656	
78	63	78	63	16	35	46	N	41	673	42	673	6	672	673	15	658	685	167	708	167	708	15	658	685	
78	63	78	63	16	45	31	N	218	681	218	687	6	672	673	13	641	667	89	673	89	673	13	641	667	
78	63	78	63	18	16	30	N	42	674	42	679	5	674	683	1	660	668	54	666	54	666	1	660	668	
78	63	78	63	18	27	13	N	221	687	221	685	-2	697	673	11	660	668	215	681	215	681	11	660	668	
78	63	78	63	20	0	58	N	44	688	43	695	-7	693	670	-7	660	668	182	696	182	696	-7	660	668	
78	63	78	63	20	9	29	N	223	688	222	687	-1	668	680	-7	660	668	182	696	182	696	-7	660	668	
78	63	78	63	21	43	16	N	45	705	46	700	-5	717	710	-7	666	667	78	678	78	678	-7	666	667	
78	63	78	63	21	52	19	N	222	692	222	693	1	692	687	-19	671	650	57	651	57	651	-19	671	650	
78	63	78	63	22	37	13	S	156	734	90	706	-3	673	706	-19	671	650	57	651	57	651	-19	671	650	
78	63	78	63	22	46	16	S	89	693	50	703	29	674	711	15	658	685	191	691	191	691	15	658	685	
78	63	78	63	23	23	30	N	54	674	50	699	0	692	685	-15	674	654	68	679	68	679	-15	674	654	
78	63	78	63	23	35	38	N	215	699	215	699	0	692	685	-15	674	654	68	679	68	679	-15	674	654	
78	64	78	64	0	17	0	S	183	712	183	712	2	678	675	-2	663	665	193	693	193	693	-2	663	665	
78	64	78	64	0	27	58	S	77	708	78	712	4	699	711	3	657	665	193	693	193	693	3	657	665	
78	64	78	64	1	6	20	N	53	710	54	700	-10	713	708	15	657	684	64	663	64	663	15	657	684	
78	64	78	64	1	18	25	N	203	703	203	705	2	688	683	6	679	696	64	663	64	663	6	679	696	
78	64	78	64	1	57	20	S	192	706	192	704	-2	680	674	3	664	666	190	695	190	695	3	664	666	
78	64	78	64	2	8	36	S	66	719	67	699	-20	718	707	8	669	673	202	694	202	694	8	669	673	
78	64	78	64	2	47	39	N	57	713	58	706	-7	717	714	5	685	687	63	681	63	681	5	685	687	
78	64	78	64	2	59	29	N	192	708	192	708	-4	683	673	5	685	687	63	681	63	681	5	685	687	
78	64	78	64	3	37	30	S	199	703	199	698	-5	677	669	3	670	700	191	700	191	700	3	670	700	
78	64	78	64	3	48	58	S	61	710	61	709	-1	709	717	6	688	697	201	697	201	697	6	688	697	
78	64	78	64	4	28	46	N	65	717	66	701	-3	716	723	10	700	697	75	699	75	699	10	700	697	
78	64	78	64	4	39	58	N	190	701	190	701	0	675	672	44	620	668	195	693	195	693	44	620	668	
78	64	78	64	5	16	44	S	201	690	202	689	9	553	653	-4	673	667	195	693	195	693	-4	673	667	
78	64	78	64	5	28	59	S	62	704	62	705	1	702	713											

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YR			DA			HDDK			HDDK			CDCK			MIDNIGHT			CDCK			MIDNIGHT		
YR	DA	HR	LT	LAT	PO	LT	LAT	PO	LT	LAT	PO	LT	LAT	PO	LT	LAT	PO	LT	LAT	PO	LT	LAT	PO
78	68	0 47	0	188	S	628	631	S	628	631	S	628	631	S	628	631	S	628	631	S	628	631	S
78	68	1 3 46	0	73	N	607	616	N	607	616	N	607	616	N	607	616	N	607	616	N	607	616	N
78	68	1 35 31	0	60	N	609	593	N	609	593	N	609	593	N	609	593	N	609	593	N	609	593	N
78	68	1 53 32	0	193	S	632	637	S	632	637	S	632	637	S	632	637	S	632	637	S	632	637	S
78	68	2 27 14	0	193	S	621	610	S	621	610	S	621	610	S	621	610	S	621	610	S	621	610	S
78	68	2 44 22	0	67	N	614	611	N	614	611	N	614	611	N	614	611	N	614	611	N	614	611	N
78	68	3 16 45	0	62	N	602	607	N	602	607	N	602	607	N	602	607	N	602	607	N	602	607	N
78	68	3 34 6	0	190	S	633	627	S	633	627	S	633	627	S	633	627	S	633	627	S	633	627	S
78	68	4 7 29	0	198	S	627	627	S	198	627	S	198	627	S	198	627	S	198	627	S	198	627	S
78	68	4 25 43	0	67	N	583	591	N	69	611	N	69	611	N	69	611	N	69	611	N	69	611	N
78	68	4 57 39	0	191	S	621	620	S	191	620	S	191	620	S	191	620	S	191	620	S	191	620	S
78	68	5 14 35	0	198	S	617	613	S	198	613	S	198	613	S	198	613	S	198	613	S	198	613	S
78	68	5 47 13	0	68	N	605	604	N	68	605	N	68	605	N	68	605	N	68	605	N	68	605	N
78	68	6 5 13	0	68	N	601	604	N	68	601	N	68	601	N	68	601	N	68	601	N	68	601	N
78	68	6 35 0	0	73	N	610	614	N	73	614	N	73	614	N	73	614	N	73	614	N	73	614	N
78	68	6 53 59	0	193	S	652	654	S	193	654	S	193	654	S	193	654	S	193	654	S	193	654	S
78	68	7 27 37	0	197	S	629	643	S	197	643	S	197	643	S	197	643	S	197	643	S	197	643	S
78	68	7 45 0	0	70	N	604	610	N	70	610	N	70	610	N	70	610	N	70	610	N	70	610	N
78	68	8 20 15	0	75	N	641	641	N	75	641	N	75	641	N	75	641	N	75	641	N	75	641	N
78	68	8 34 38	0	197	S	651	653	S	197	653	S	197	653	S	197	653	S	197	653	S	197	653	S
78	68	9 8 38	0	191	S	648	653	S	191	653	S	191	653	S	191	653	S	191	653	S	191	653	S
78	68	9 24 14	0	75	N	630	612	N	75	630	N	75	630	N	75	630	N	75	630	N	75	630	N
78	68	10 17 1	0	202	S	608	612	S	202	612	S	202	612	S	202	612	S	202	612	S	202	612	S
78	68	10 49 49	0	184	S	649	651	S	184	651	S	184	651	S	184	651	S	184	651	S	184	651	S
78	68	11 6 45	0	81	N	572	572	N	81	572	N	81	572	N	81	572	N	81	572	N	81	572	N
78	68	11 39 50	0	69	N	632	632	N	69	632	N	69	632	N	69	632	N	69	632	N	69	632	N
78	68	11 58 8	0	206	S	622	627	S	206	627	S	206	627	S	206	627	S	206	627	S	206	627	S
78	68	12 32 23	0	174	S	651	651	S	174	651	S	174	651	S	174	651	S	174	651	S	174	651	S
78	68	12 45 37	0	94	N	634	636	N	94	636	N	94	636	N	94	636	N	94	636	N	94	636	N
78	68	13 23 16	0	58	N	638	638	N	58	638	N	58	638	N	58	638	N	58	638	N	58	638	N
78	68	13 39 39	0	210	S	652	652	S	210	652	S	210	652	S	210	652	S	210	652	S	210	652	S
78	68	14 26 14	0	197	S	651	651	S	197	651	S	197	651	S	197	651	S	197	651	S	197	651	S
78	68	15 6 38	0	51	N	635	635	N	51	635	N	51	635	N	51	635	N	51	635	N	51	635	N
78	68	15 20 53	0	212	S	655	655	S	212	655	S	212	655	S	212	655	S	212	655	S	212	655	S
78	68	16 8 50	0	112	S	639	639	S	112	639	S	112	639	S	112	639	S	112	639	S	112	639	S
78	68	17 3 31	0	210	S	621	621	S	210	621	S	210	621	S	210	621	S	210	621	S	210	621	S
78	68	18 32 4	0	51	N	613	613	N	51	613	N	51	613	N	51	613	N	51	613	N	51	613	N
78	68	18 44 30	0	215	S	644	644	S	215	644	S	215	644	S	215	644	S	215	644	S	215	644	S
78	68	20 13 0	0	57	N	582	577	N	57	582	N	57	582	N	57	582	N	57	582	N	57	582	N
78	68	20 27 52	0	214	S	621	621	S	214	621	S	214	621	S	214	621	S	214	621	S	214	621	S
78	68	21 54 51	0	59	N	593	593	N	59	593	N	59	593	N	59	593	N	59	593	N	59	593	N
78	68	22 10 59	0	213	S	623	623	S	213	623	S	213	623	S	213	623	S	213	623	S	213	623	S
78	68	22 48 59	0	179	S	623	623	S	179	623	S	179	623	S	179	623	S	179	623	S	179	623	S
78	68	23 3 39	0	84	N	645	645	N	84	645	N	84	645	N	84	645	N	84	645	N	84	645	N
78	68	23 37 46	0	58	N	636	636	N	58	636	N	58	636	N	58	636	N	58	636	N	58	636	N
78	68	23 52 38	0	211	S	672	672	S	211	672	S	211	672	S	211	672	S	211	672	S	211	672	S
78	68	0 30 2	0	187	S	623	623	S	187	623	S	187	623	S	187	623	S	187	623	S	187	623	S
78	68	0 45 58	0	75	N	630	630	N	75	630	N	75	630	N	75	630	N	75	630	N	75	630	N
78	68	1 19 31	0	58	N	642	642	N	58	642	N	58	642	N	58	642	N	58	642	N	58	642	N
78	68	1 34 29	0	200	S	693	693	S	200	693	S	200	693	S	200	693	S	200	693	S	200	693	S
78	68	2 12 27	0	193	S	692	692	S	193	692	S	193	692	S	193	692	S	193	692	S	193	692	S
78	68	2 25 59	0	67	N	661	661	N	67	661	N	67	661	N	67	661	N	67	661	N	67	661	N
78	68	3 15 58	0	191	S	675	675	S	191	675	S	191	675	S	191	675	S	191	675	S	191	675	S
78	68	3 51 15	0	198	S	647	647	S	198	647	S	198	647	S	198	647	S	198	647	S	198	647	S

HDDK			CODK			MIDNIGHT			HDDK			CODK			MIDNIGHT		
YR	DA	HR MIN SEC	PO	LT	LAT	YR	DA	HR MIN SEC	PO	LT	LAT	YR	DA	HR MIN SEC	PO	LT	LAT
78	71	7 59 29	N	196	690	78	71	16 9 54	N	220	697	78	71	17 41 18	N	221	702
78	70	8 35 21	S	194	675	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	9 48 42	S	194	675	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	9 41 12	N	201	650	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	10 16 30	S	186	652	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	10 29 10	S	82	678	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	11 6 31	N	61	627	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	12 49 0	N	60	653	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	14 31 45	N	52	639	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	16 28 24	N	212	640	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	17 56 44	N	52	598	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	18 10 34	N	213	630	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	19 40 38	N	50	644	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	19 52 21	N	216	643	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	21 22 43	N	53	657	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	21 35 0	N	217	650	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	22 17 41	S	168	705	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	22 27 58	S	90	676	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	23 4 19	N	55	660	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	23 17 17	N	215	680	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	70	23 57 51	S	182	690	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	0 10 57	S	78	653	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	0 46 30	N	56	678	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	0 59 44	N	206	699	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	1 38 47	S	191	701	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	1 51 35	S	69	674	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	2 27 19	N	59	662	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	2 41 0	N	195	707	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	3 18 58	S	198	699	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	3 32 58	S	85	641	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	4 8 59	N	65	677	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	4 21 30	N	190	703	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	4 58 53	S	202	697	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	5 12 37	S	65	651	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	5 50 25	N	72	696	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	6 1 45	N	191	701	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	6 39 45	S	201	695	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	7 51 40	S	66	675	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	7 30 40	N	75	686	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	7 41 59	N	195	707	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	8 18 48	S	195	691	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	8 33 42	S	72	622	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	9 22 59	N	200	699	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	10 0 0	S	186	706	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	10 12 5	S	80	654	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	10 50 51	N	70	674	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	11 4 5	N	207	698	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	11 41 56	S	174	709	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	11 53 43	S	90	654	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	12 31 39	N	212	693	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	12 45 32	S	212	693	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	13 33 46	S	105	677	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	14 15 6	N	52	663	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702
78	71	14 27 23	N	216	691	78	71	17 41 18	N	220	697	78	71	17 41 18	N	221	702

YR	DA	HR	MIN	SEC	PO	HDDK	LT	LAT	DLAT	MIDNIGHT	LATH, LAT	DLAT	MIDNIGHT	LATH, LAT
78	75	11	22	38	N	69	647	69	648	1	640	551	15	570 598
78	75	11	38	30	N	206	646	207	651	5	625	634	16	590 615
78	75	12	14	3	S	174	680	174	687	7	629	637	85	518 594
78	75	12	26	21	S	94	653	93	652	-1	627	633	16	585 615
78	75	13	4	0	N	61	630	61	631	-9	621	622	22	570 606
78	75	13	20	49	N	208	631	209	641	10	609	625	6	603 615
78	75	13	56	44	S	168	662	163	678	16	591	617	5	595 596
78	75	14	7	23	S	106	654	104	645	-9	618	611	4	595 605
78	75	14	45	50	N	56	590	55	608	18	581	612	18	541 570
78	75	15	3	1	N	209	619	209	621	2	595	607	5	595 606
78	75	16	45	50	N	207	586	226	714	128	560	709	-3	643 636
78	75	18	11	13	N	55	557	53	589	32	544	592	29	550 591
78	75	18	27	53	N	209	590	210	592	12	553	611	38	590 644
78	75	19	17	40	S	106	645	106	645	0	585	597	6	628 635
78	75	19	54	34	N	56	594	56	594	0	585	602	-1	641 643
78	75	20	9	31	N	213	602	214	612	10	585	602	-32	657 636
78	75	21	36	23	N	59	602	59	601	-1	594	605	-34	663 631
78	75	21	52	13	N	213	610	215	625	15	592	615	-2	639 639
78	75	22	31	16	S	176	650	175	659	9	582	603	6	617 632
78	75	22	44	59	S	86	637	85	632	-5	616	620	30	578 620
78	75	23	17	17	N	62	587	60	616	29	574	616	18	568 598
78	75	23	36	8	N	208	599	208	598	-1	574	586	3	603 618
78	76	0	11	0	S	186	614	186	623	9	561	588	-2	613
78	76	0	29	34	S	76	551	76	585	32	528	575	41	518 573
78	76	0	58	39	N	62	583	51	603	20	570	602	68	576
78	76	1	17	58	N	199	621	200	631	10	584	616	191	646
78	76	1	52	30	S	193	645	193	642	-3	611	619	200	630
78	76	2	9	58	S	70	579	63	594	559	578	592	2	606 615
78	76	2	40	29	N	62	590	62	590	4	578	592	2	616 628
78	76	2	58	39	N	192	631	192	632	1	595	611	2	609 622
78	76	3	32	1	S	197	622	197	619	-3	585	599	3	599 621
78	76	3	49	59	S	67	593	67	593	17	581	618	7	632 650
78	76	4	22	12	N	67	601	67	618	17	530	618	-40	632 559
78	76	4	39	39	N	191	603	191	608	5	564	589	-1	616 625
78	76	5	11	19	S	199	600	200	611	11	560	598	-4	614 620
78	76	5	30	37	S	69	589	69	589	7	569	587	15	626 619
78	76	6	2	19	N	72	577	72	583	16	557	583	10	621 635
78	76	6	18	18	N	192	657	192	658	-19	625	616	1	611 621
78	76	6	52	0	S	199	622	199	622	20	585	619	63	573 646
78	76	7	9	59	S	69	599	69	614	15	588	614	80	655
78	76	7	44	15	N	75	621	75	625	4	604	614	73	601
78	76	7	58	59	N	196	651	196	653	-8	618	620	11	592
78	76	8	33	0	S	194	647	194	653	6	614	629	-3	620 622
78	76	8	50	17	S	72	590	73	633	43	571	626	13	608 629
78	76	9	40	13	N	200	639	201	653	19	618	640	24	579 612
78	76	10	14	30	N	187	669	187	666	-3	627	629	12	579 602
78	76	10	28	41	S	81	645	80	630	-16	626	618	8	589 607
78	76	11	4	20	N	71	608	71	612	34	590	636	-1	586 594
78	76	11	21	18	N	206	647	206	647	0	627	636	26	554 591
78	76	11	56	59	S	175	689	177	670	-19	643	616	29	544 591
78	76	12	9	39	S	91	643	91	645	2	614	623	7	577 596
78	76	12	3	45	N	206	626	208	635	9	604	620	0	558 586
78	76	13	39	19	S	167	655	167	657	1	597	602	-26	586
78	76	13	49	59	S	105	661	104	660	-1	628	633	2	573 594
78	76	13	49	59	S	105	661	104	660	-1	628	633	2	558 575
78	76	13	49	59	S	105	661	104	660	-1	628	633	-5	582

YR	DA	HR	MIN	SEC	PO	HDDK	LT	LAT	CDDK	LT	LAT	DLAT	MIDNIGHT	LATH, LATH	655
78	80	8	17	15	N	176	643	76	649	76	643	-6	628	644	655
78	80	8	30	28	N	197	686	197	684	-2	658	557	658	647	655
78	80	9	6	24	S	192	679	192	674	-5	650	568	650	647	655
78	80	9	19	48	S	75	671	75	638	-33	658	632	658	647	655
78	80	9	57	27	N	74	643	74	643	0	643	637	643	647	655
78	80	10	12	29	N	202	651	202	666	15	631	618	631	647	655
78	80	10	47	31	S	183	678	184	679	1	638	642	638	647	655
78	80	11	0	58	S	85	654	84	651	-3	640	640	640	647	655
78	80	11	53	38	S	208	659	208	652	-7	651	627	651	647	655
78	80	12	0	23	S	171	694	171	695	-22	642	642	642	647	655
78	80	12	41	25	S	97	666	95	642	-8	632	639	632	647	655
78	80	13	19	58	N	210	649	210	652	3	637	640	637	647	655
78	80	13	35	44	N	107	654	108	655	1	618	625	618	647	655
78	80	14	23	0	S	212	649	213	658	9	637	646	637	647	655
78	80	15	17	31	N	45	654	47	646	-8	645	641	645	647	655
78	80	16	47	39	N	215	657	216	644	-7	645	651	645	647	655
78	80	16	58	38	N	45	667	49	642	-25	664	656	664	647	655
78	80	18	30	45	N	217	653	223	690	37	641	684	641	647	655
78	80	20	12	38	N	49	657	52	647	-20	664	653	664	647	655
78	80	20	23	1	N	220	653	222	677	14	659	670	659	647	655
78	80	23	49	3	N	214	678	214	682	4	669	668	669	647	655
78	80	0	29	21	S	185	708	186	713	5	673	674	673	647	655
78	80	0	41	58	S	77	651	77	651	-10	648	646	648	647	655
78	80	1	16	50	N	59	657	60	642	-15	655	644	655	647	655
78	80	1	30	59	N	203	659	203	656	-3	683	675	683	647	655
78	80	2	22	39	S	195	689	195	690	1	661	662	661	647	655
78	80	2	58	52	N	69	670	69	645	-25	665	642	665	647	655
78	80	3	12	25	N	194	664	194	664	-34	671	644	671	647	655
78	80	3	49	0	S	200	674	200	674	-2	655	658	655	647	655
78	80	4	2	38	S	65	674	65	647	-27	669	650	669	647	655
78	80	4	40	1	N	68	678	68	652	-26	674	655	674	647	655
78	80	4	52	59	N	191	675	191	675	0	645	643	645	647	655
78	80	5	27	51	S	201	638	201	649	11	617	642	617	647	655
78	80	5	43	29	S	67	649	67	648	-1	642	641	642	647	655
78	80	6	19	59	N	73	650	73	665	15	636	661	636	647	655
78	80	6	33	20	N	193	664	193	663	-	633	638	633	647	655
78	80	7	8	28	S	199	660	199	668	8	628	642	628	647	655
78	80	7	23	19	S	68	652	69	643	-9	645	643	645	647	655
78	80	7	59	20	N	156	665	156	640	30	592	634	592	647	655
78	80	8	14	0	N	156	665	156	677	12	634	650	634	647	655
78	80	8	49	0	S	193	667	193	667	0	636	642	636	647	655
78	80	9	3	8	S	74	651	74	641	-20	648	635	648	647	655
78	80	9	56	59	N	201	656	201	625	29	571	611	571	611	655
78	80	10	29	24	S	187	645	187	643	-3	599	607	599	607	655
78	80	10	44	59	S	81	623	82	643	20	603	633	603	633	655
78	80	11	21	1	N	70	646	70	647	1	631	642	631	642	655
78	80	11	37	1	N	205	642	206	638	-4	621	632	621	632	655
78	80	12	11	46	S	177	651	177	651	0	596	605	596	605	655
78	80	12	24	6	S	95	672	95	663	-9	650	647	650	647	655
78	80	13	2	1	N	209	637	209	646	26	610	639	610	639	655
78	80	13	19	0	N	209	637	209	637	1	614	621	614	621	655
78	80	13	56	5	S	163	683	163	683	1	614	625	614	625	655

YR	DA	HR	MM	SEC	PO	HDOK	LT	LAT	CDOK	DLAT	MIDNIGHT LATH, LATIC	DLAT	MIDNIGHT LATH, LATIC	CDOK	LT	LAT	HDOK	LT	LAT	CDOK	DLAT	MIDNIGHT LATH, LATIC
78	82	21	20	16	N	50	679	58	637	-42	679 642	-1	655 636	191	684	59	191	684	59	191	-1	655 636
78	82	21	31	13	N	219	655	222	661	22	648 674	6	640 643	73	654	73	654	73	654	73	-6	640 643
78	82	22	12	59	S	173	662	172	681	15	601 630	3	627 635	62	639	62	639	62	639	62	-3	627 635
78	82	22	25	1	S	91	668	90	651	-7	645 645	3	660 657	198	698	198	698	198	698	198	-3	660 657
78	82	23	2	12	N	53	690	58	646	-44	691 652	9	651 656	63	633	63	633	63	633	63	3	651 656
78	82	23	15	13	N	214	645	216	665	20	632 652	3	632 652	63	649	63	649	63	649	63	9	632 652
78	82	23	54	1	N	184	668	184	681	13	626 644	3	659 673	65	668	65	668	65	668	65	3	659 673
78	83	0	7	0	S	81	680	80	644	-35	664 644	2	659 673	192	687	192	687	192	687	192	2	659 673
78	83	0	43	30	N	57	685	59	657	-28	686 663	-2	667 682	203	684	203	684	203	684	203	-2	667 682
78	83	0	53	10	N	204	647	207	679	32	627 659	3	680 692	67	639	67	639	67	639	67	-3	680 692
78	83	1	34	0	S	193	647	193	681	34	614 654	71	694	71	694	71	694	71	694	71	-3	694
78	83	1	48	38	S	72	668	72	678	10	655 675	192	684	192	684	192	684	192	684	192	-3	684
78	83	2	24	24	N	61	672	60	683	16	667 655	66	687	66	687	66	687	66	687	66	-10	687
78	83	2	38	28	N	196	682	196	687	5	653 659	75	704	75	704	75	704	75	704	75	13	704
78	83	3	14	45	S	198	663	194	680	17	632 653	194	685	194	685	194	685	194	685	194	3	685
78	83	3	28	17	S	65	690	66	683	-7	687 659	70	702	70	702	70	702	70	702	70	17	702
78	83	4	6	21	N	66	696	66	683	0	693 703	206	695	206	695	206	695	206	695	206	0	695
78	83	4	18	59	N	191	677	192	687	10	647 659	177	714	177	714	177	714	177	714	177	3	714
78	83	4	54	36	S	202	658	203	680	22	639 659	94	711	94	711	94	711	94	711	94	-12	698
78	83	5	8	30	S	65	681	192	681	2	650 654	64	676	64	676	64	676	64	676	64	2	680
78	83	5	59	6	N	192	679	201	674	1	655 655	211	688	211	688	211	688	211	688	211	2	688
78	83	6	34	59	S	501	673	68	634	-21	649 636	107	639	107	639	107	639	107	639	107	3	639
78	83	6	49	21	S	67	655	68	634	-21	649 636	215	685	215	685	215	685	215	685	215	3	685
78	83	7	26	59	N	75	669	75	630	-21	656 658	41	685	41	685	41	685	41	685	41	2	685
78	83	7	39	13	N	195	689	195	687	-2	661 659	219	676	219	676	219	676	219	676	219	3	676
78	83	8	15	29	S	196	686	196	687	-11	658 659	222	675	222	675	222	675	222	675	222	-3	677
78	83	8	29	9	N	72	662	72	651	0	668 655	44	685	44	685	44	685	44	685	44	2	685
78	83	9	20	5	N	200	685	200	685	0	668 655	222	675	222	675	222	675	222	675	222	-3	677
78	83	9	56	36	S	187	699	183	697	-2	663 659	48	685	48	685	48	685	48	685	48	-3	693
78	83	10	10	0	N	79	650	79	647	-3	636 642	219	656	219	656	219	656	219	656	219	16	645
78	83	10	47	14	N	72	658	71	668	10	644 664	52	689	52	689	52	689	52	689	52	-1	690
78	83	11	1	8	N	206	697	206	698	1	670 668	216	670	216	670	216	670	216	670	216	22	636
78	83	11	1	8	N	175	710	175	711	1	676 666	180	681	180	681	180	681	180	681	180	11	628
78	83	11	28	42	S	93	685	93	686	1	666 679	85	671	85	671	85	671	85	671	85	-25	681
78	83	11	49	30	N	212	687	212	688	1	679 674	56	683	56	683	56	683	56	683	56	-7	684
78	83	12	28	53	N	212	687	212	688	1	679 674	210	673	210	673	210	673	210	673	210	-3	684
78	83	12	42	35	S	101	652	101	652	0	675 659	190	680	190	680	190	680	190	680	190	32	615
78	83	13	31	41	N	216	683	216	683	0	675 659	75	681	75	681	75	681	75	681	75	13	655
78	83	14	24	24	N	41	688	41	688	0	693 635	60	665	60	665	60	665	60	665	60	-5	665
78	83	15	56	36	N	218	679	217	679	0	670 666	198	624	198	624	198	624	198	624	198	-1	615
78	83	16	6	20	N	42	679	44	669	-10	681 670	59	603	59	603	59	603	59	603	59	5	582
78	83	17	35	13	N	218	664	218	668	4	654 655	69	609	69	609	69	609	69	609	69	-11	598
78	83	17	48	45	N	51	637	51	643	6	633 647	56	598	56	598	56	598	56	598	56	2	574
78	83	19	19	53	N	217	638	218	649	11	625 637	192	626	192	626	192	626	192	626	192	1	590
78	83	19	31	49	N	55	635	55	635	4	636 644	200	626	200	626	200	626	200	626	200	8	595
78	83	21	1	29	N	218	647	218	647	0	635 635	68	606	68	606	68	606	68	606	68	4	591
78	83	21	14	12	N	118	692	168	691	-1	639 635	70	614	70	614	70	614	70	614	70	-6	597
78	83	21	57	1	S	168	692	168	691	-2	642 649	192	635	192	635	192	635	192	635	192	-2	602
78	83	22	7	40	N	5	642	5	642	2	641 653	201	631	201	631	201	631	201	631	201	-3	612
78	83	22	43	18	N	215	642	215	642	2	641 653	69	604	69	604	69	604	69	604	69	-4	632
78	83	22	57	47	N	181	694	181	694	2	657 655	74	643	74	643	74	643	74	643	74	-4	632
78	83	23	37	48	S	84	664	84	664	-29	668 646	197	627	197	627	197	627	197	627	197	13	576
78	83	23	49	38	S	59	650	59	650	-2	668 646	70	655	70	655	70	655	70	655	70	39	599
78	84	0	25	0	N	207	657	208	665	8	637 647											

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YR	DA	HDDK	HR	MIN	SEC	PO	HDDK		CDDK		DLAT	MIDNIGHT		YR	DA	HDDK	HR	MIN	SEC	PO	HDDK		CDDK		DLAT	MIDNIGHT	
							LT	LAT	LT	LAT		LT	LAT								LT	LAT	LT	LAT		LT	LAT
78	87	14	41	3	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	87	14	59	59	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	87	16	41	59	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	87	18	10	6	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	87	18	23	18	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	87	19	14	31	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	87	20	4	57	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	87	21	35	31	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	87	21	46	58	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	87	22	30	0	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	87	22	41	58	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	87	23	17	30	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	87	23	30	13	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	0	10	29	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	0	22	45	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	0	58	16	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	1	12	40	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	1	50	30	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	2	3	59	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	2	39	45	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	2	54	5	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	3	30	19	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	3	44	34	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	4	20	26	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	4	33	46	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	5	9	59	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	5	25	42	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	6	2	10	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	6	14	47	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	6	49	56	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	7	4	55	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	7	41	58	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	7	55	51	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	8	30	8	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	8	44	59	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	9	37	25	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	10	10	25	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	10	27	22	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	11	0	16	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	11	19	14	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	11	51	54	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	12	5	48	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	12	42	6	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	13	0	27	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	13	37	3	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	13	46	46	S	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	14	25	42	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	14	23	14	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	16	23	14	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	17	51	47	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	18	6	13	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	19	35	39	N	56	604	59	571	23	595	532	573	78	88	23	13	35	S	214	642	216	655	14	629	644	
78	88	19	47	29	N	56	604	59	571</																		

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YR	DA	HDDK	HR	MIN	SEC	PO	HDDK	LT	LAT	COCK	DLAT	MIDNIGHT	LA-TM-LATC	YR	DA	HDDK	HR	MIN	SEC	PO	HDDK	LT	LAT	COCK	DLAT	MIDNIGHT	LA-TM-LATC
78	97	23	12	12		S	89	669	60	660	-1	651	664	78	97	23	12	12		S	89	669	60	660	-1	651	664
78	97	23	47	34		N	59	661	216	669	0	661	675	78	97	23	47	34		N	59	661	216	669	0	661	675
78	97	0	0	54		N	215	689	159	708	4	668	670	78	97	0	0	54		N	215	689	159	708	4	668	670
78	98	0	41	29		S	109	704	79	663	-2	652	659	78	98	0	41	29		S	109	704	79	663	-2	652	659
78	98	0	54	12		S	79	665	63	641	-36	673	643	78	98	0	54	12		S	79	665	63	641	-36	673	643
78	98	1	29	38		N	61	677	205	639	7	640	677	78	98	1	29	38		N	61	677	205	639	7	640	677
78	98	1	43	14		N	205	695	199	699	10	661	670	78	98	1	43	14		N	205	695	199	699	10	661	670
78	98	2	21	28		S	198	689	72	630	-41	658	623	78	98	2	21	28		S	198	689	72	630	-41	658	623
78	98	2	34	52		S	71	671	66	653	15	651	674	78	98	2	34	52		S	71	671	66	653	15	651	674
78	98	3	10	12		N	196	689	196	704	15	651	674	78	98	3	10	12		N	196	689	196	704	15	651	674
78	98	3	24	23		S	203	679	203	636	-42	637	651	78	98	3	24	23		S	203	679	203	636	-42	637	651
78	98	4	1	19		S	66	690	68	648	3	672	673	78	98	4	1	19		S	66	690	68	648	3	672	673
78	98	4	14	19		S	192	699	193	702	3	672	673	78	98	4	14	19		S	192	699	193	702	3	672	673
78	98	5	4	19		S	204	687	204	690	-26	647	629	78	98	5	4	19		S	204	687	204	690	-26	647	629
78	98	5	41	29		S	67	654	68	628	27	634	672	78	98	5	41	29		S	67	654	68	628	27	634	672
78	98	5	55	30		S	74	648	75	675	4	667	656	78	98	5	55	30		S	74	648	75	675	4	667	656
78	98	6	32	0		S	194	694	194	698	-2	689	679	78	98	6	32	0		S	194	694	194	698	-2	689	679
78	98	6	44	41		S	201	703	201	701	-2	689	679	78	98	6	44	41		S	201	703	201	701	-2	689	679
78	98	7	21	53		S	69	661	69	654	-2	656	663	78	98	7	21	53		S	69	661	69	654	-2	656	663
78	98	8	13	0		S	78	669	76	667	-2	656	663	78	98	8	13	0		S	78	669	76	667	-2	656	663
78	98	8	25	30		N	198	685	198	705	20	657	675	78	98	8	25	30		N	198	685	198	705	20	657	675
78	98	10	6	20		N	203	687	204	700	13	670	678	78	98	10	6	20		N	203	687	204	700	13	670	678
78	98	10	43	38		S	183	713	183	714	1	679	675	78	98	10	43	38		S	183	713	183	714	1	679	675
78	98	10	54	19		S	88	709	86	681	-26	696	676	78	98	10	54	19		S	88	709	86	681	-26	696	676
78	98	11	47	45		N	202	683	210	694	11	656	680	78	98	11	47	45		N	202	683	210	694	11	656	680
78	98	12	24	59		S	174	684	36	661	-46	636	645	78	98	12	24	59		S	174	684	36	661	-46	636	645
78	98	12	35	1		S	102	707	58	607	12	669	676	78	98	12	35	1		S	102	707	58	607	12	669	676
78	98	13	15	53		N	214	678	215	690	0	679	673	78	98	13	15	53		N	214	678	215	690	0	679	673
78	98	13	29	30		N	218	687	218	687	0	679	673	78	98	13	29	30		N	218	687	218	687	0	679	673
78	98	15	10	53		N	47	651	45	671	20	642	673	78	98	15	10	53		N	47	651	45	671	20	642	673
78	98	15	42	18		N	218	689	218	671	0	659	658	78	98	15	42	18		N	218	689	218	671	0	659	658
78	98	16	53	22		N	51	640	51	640	0	636	645	78	98	16	53	22		N	51	640	51	640	0	636	645
78	98	18	24	36		N	218	649	219	652	3	637	640	78	98	18	24	36		N	218	649	219	652	3	637	640
78	98	18	36	3		N	56	626	56	625	-1	620	630	78	98	18	36	3		N	56	626	56	625	-1	620	630
78	98	20	6	6		N	219	646	221	659	13	633	650	78	98	20	6	6		N	219	646	221	659	13	633	650
78	98	20	18	30		N	56	657	58	643	-14	655	649	78	98	20	18	30		N	56	657	58	643	-14	655	649
78	98	21	48	43		N	230	659	231	720	61	655	720	78	98	21	48	43		N	230	659	231	720	61	655	720
78	98	22	1	0		N	173	713	173	713	0	681	659	78	98	22	1	0		N	173	713	173	713	0	681	659
78	98	22	44	8		S	91	679	91	674	-5	658	652	78	98	22	44	8		S	91	679	91	674	-5	658	652
78	98	22	54	29		S	58	669	59	659	-10	668	655	78	98	22	54	29		S	58	669	59	659	-10	668	655
78	98	23	30	39		N	217	678	219	691	13	669	677	78	98	23	30	39		N	217	678	219	691	13	669	677
78	98	23	43	48		S	189	678	188	667	15	638	659	78	98	23	43	48		S	189	678	188	667	15	638	659
78	99	0	35	52		S	82	703	80	634	-69	689	632	78	99	0	35	52		S	82	703	80	634	-69	689	632
78	99	1	12	38		N	60	682	61	671	-11	678	676	78	99	1	12	38		N	60	682	61	671	-11	678	676
78	99	1	26	15		N	207	688	207	691	3	671	670	78	99	1	26	15		N	207	688	207	691	3	671	670
78	99	2	4	14		S	197	681	197	689	8	652	661	78	99	2	4	14		S	197	681	197	689	8	652	661
78	99	2	17	22		S	72	686	73	668	-18	675	663	78	99	2	17	22		S	72	686	73	668	-18	675	663
78	99	2	54	39		N	63	703	64	677	-26	701	683	78	99	2	54	39		N	63	703	64	677	-26	701	683
78	99	3	7	23		N	202	679	203	681	2	662	661	78	99	3	7	23		N	202	679	203	681	2	662	661
78	99	3	44	23		S	67	680	67	680	0	676	666	78	99	3	44	23		S	67	680	67	680	0	676	666
78	99	3	57	43		S	193	663	193	679	16	632	652	78	99	3	57	43		S	193	663	193	679	16	632	652
78	99	4	48	21		N	193	663	193	679	16	632	652	78	99	4	48	21		N	193	663	193	679	16	632	652

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YR DA		HCDK		HDCX		CDDK		MIDNIGHT		MIDNIGHT	
YR	DA	LT	LAT	LT	LAT	LT	LAT	LT	LAT	LT	LAT
78	135	15	0 42	215	664	217	672	64	681	64	681
78	134	16	42 45	218	656	218	656	215	681	215	681
78	134	18	11 51	219	632	219	632	199	683	199	683
78	134	18	25 29	219	632	219	632	199	683	199	683
78	134	19	53 58	219	632	219	632	199	683	199	683
78	134	20	8 37	219	632	219	632	199	683	199	683
78	134	21	35 16	219	632	219	632	199	683	199	683
78	134	22	35 12	219	632	219	632	199	683	199	683
78	135	0	12 29	219	632	219	632	199	683	199	683
78	135	0	26 30	219	632	219	632	199	683	199	683
78	135	1	0 12	219	632	219	632	199	683	199	683
78	135	1	16 21	219	632	219	632	199	683	199	683
78	135	2	7 59	219	632	219	632	199	683	199	683
78	135	2	42 28	219	632	219	632	199	683	199	683
78	135	3	33 39	219	632	219	632	199	683	199	683
78	135	3	47 42	219	632	219	632	199	683	199	683
78	135	4	23 36	219	632	219	632	199	683	199	683
78	135	5	13 36	219	632	219	632	199	683	199	683
78	135	5	27 22	219	632	219	632	199	683	199	683
78	135	6	17 10	219	632	219	632	199	683	199	683
78	135	6	55 44	219	632	219	632	199	683	199	683
78	135	7	6 18	219	632	219	632	199	683	199	683
78	135	7	45 58	219	632	219	632	199	683	199	683
78	135	8	34 0	219	632	219	632	199	683	199	683
78	135	8	46 7	219	632	219	632	199	683	199	683
78	135	9	38 47	219	632	219	632	199	683	199	683
78	135	10	14 9	219	632	219	632	199	683	199	683
78	135	10	27 4	219	632	219	632	199	683	199	683
78	135	11	6 0	219	632	219	632	199	683	199	683
78	135	11	20 0	219	632	219	632	199	683	199	683
78	135	11	57 18	219	632	219	632	199	683	199	683
78	135	12	8 1	219	632	219	632	199	683	199	683
78	135	12	46 59	219	632	219	632	199	683	199	683
78	135	13	1 25	219	632	219	632	199	683	199	683
78	135	14	28 57	219	632	219	632	199	683	199	683
78	135	14	42 15	219	632	219	632	199	683	199	683
78	135	16	24 59	219	632	219	632	199	683	199	683
78	135	17	55 51	219	632	219	632	199	683	199	683
78	135	18	7 13	219	632	219	632	199	683	199	683
78	135	19	38 19	219	632	219	632	199	683	199	683
78	135	19	49 25	219	632	219	632	199	683	199	683
78	135	21	31 59	219	632	219	632	199	683	199	683
78	135	22	16 14	219	632	219	632	199	683	199	683
78	135	22	26 16	219	632	219	632	199	683	199	683
78	135	23	2 13	219	632	219	632	199	683	199	683
78	135	23	14 39	219	632	219	632	199	683	199	683
78	135	23	56 16	219	632	219	632	199	683	199	683
78	136	0	8 20	219	632	219	632	199	683	199	683

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YR	DA	HR	MIN	SEC	PO	HDDK	LT	LAT	COCK	DLAT	MIDNIGHT	LT	LAT	COCK	DLAT	MIDNIGHT	LT	LAT	COCK	DLAT	MIDNIGHT	
78	154	15	9	16	S	65	674	109	624	-47	590	65	674	109	624	3	594	610	620	3	594	
78	155	0	20	35	N	65	674	69	627	-47	590	65	674	69	627	-3	591	593	106	633	-3	591
78	155	0	35	1	N	217	665	413	669	4	655	217	665	413	669	4	632	645	55	640	4	632
78	155	1	12	59	S	198	674	198	675	-36	653	198	674	198	675	4	602	612	213	622	4	602
78	155	1	26	20	S	83	670	83	674	-36	653	83	670	83	674	11	634	655	51	649	11	634
78	155	2	2	19	N	67	682	206	662	-21	673	67	682	206	662	21	623	649	220	653	21	623
78	155	2	17	0	N	205	666	204	642	-4	647	205	666	204	642	-33	639	642	56	637	-33	639
78	155	3	7	25	S	75	658	75	650	-6	642	75	658	75	650	22	635	639	223	649	22	635
78	155	3	7	25	S	72	619	72	621	15	602	72	619	72	621	9	627	634	224	644	9	627
78	155	5	38	24	N	194	641	193	655	15	607	194	641	193	655	2	657	669	224	644	2	657
78	155	5	38	24	N	75	655	75	623	-12	619	75	655	75	623	3	622	623	222	624	3	622
78	155	10	40	54	N	203	626	204	641	15	604	203	626	204	641	4	615	627	184	663	4	615
78	155	11	14	44	S	184	657	184	659	2	613	184	657	184	659	-21	735	711	100	713	-21	735
78	155	11	29	0	S	86	638	86	638	0	617	86	638	86	638	0	634	644	67	642	0	634
78	155	12	4	21	N	69	612	69	618	6	602	69	612	69	618	5	611	626	218	631	5	611
78	155	12	22	25	N	207	628	208	632	4	506	207	628	208	632	-2	599	607	95	620	-2	599
78	155	12	56	35	S	177	643	176	651	6	574	177	643	176	651	0	601	610	70	618	0	601
78	155	13	11	32	S	93	594	93	594	29	554	93	594	93	594	2	637	641	203	659	2	637
78	155	15	29	28	N	58	556	56	622	26	597	58	556	56	622	16	653	655	191	662	16	653
78	155	22	18	9	N	69	569	69	562	13	605	69	569	69	562	-1	668	664	205	662	-1	668
78	155	22	36	42	N	219	592	215	593	-7	585	219	592	215	593	-14	635	619	78	643	-14	635
78	155	23	12	24	N	189	598	189	594	6	530	189	598	189	594	3	639	643	200	661	3	639
78	155	23	31	20	S	97	531	88	591	30	499	97	531	88	591	-2	645	644	205	662	-2	645
78	155	0	1	18	N	69	620	71	580	-40	610	69	620	71	580	-17	653	614	72	649	-17	653
78	156	0	20	29	S	192	593	193	592	-7	559	192	593	193	592	16	635	655	191	662	16	635
78	156	0	53	38	S	84	587	84	576	29	561	84	587	84	576	-1	668	664	205	664	-1	668
78	156	1	11	31	S	72	584	72	573	19	532	72	584	72	573	-5	649	652	68	650	-5	649
78	156	3	43	0	N	199	581	198	585	4	539	199	581	198	585	10	623	637	202	654	10	623
78	156	4	13	31	S	203	576	203	576	0	549	203	576	203	576	0	626	631	187	663	0	626
78	156	5	4	7	N	72	573	72	564	1	552	72	573	72	564	-12	635	632	83	642	-12	635
78	156	5	23	11	N	194	579	194	566	17	537	194	579	194	566	3	618	626	207	642	3	618
78	156	5	53	20	S	200	568	201	574	6	540	200	568	201	574	1	635	634	176	665	1	635
78	156	6	13	30	S	71	576	70	598	22	556	71	576	70	598	-19	616	596	92	625	-19	616
78	156	6	45	26	N	75	550	75	595	5	571	75	550	75	595	8	580	599	65	600	8	580
78	156	7	3	39	N	194	569	194	608	39	525	194	569	194	608	88	628	726	220	729	88	628
78	156	7	34	3	S	198	593	198	592	0	548	198	593	198	592	2	628	640	100	594	2	628
78	156	7	52	40	S	71	593	71	591	-2	574	71	593	71	591	15	637	651	215	654	15	637
78	156	8	26	15	N	77	603	77	614	11	585	77	603	77	614	3	625	638	215	654	3	625
78	156	8	43	59	N	198	578	198	596	18	535	198	578	198	596	2	637	651	215	654	2	637
78	156	9	14	43	S	194	577	194	599	2	557	194	577	194	599	3	625	638	215	654	3	625
78	156	9	33	29	S	75	576	75	576	20	556	75	576	75	576	2	637	651	215	654	2	637
78	156	10	5	22	N	76	570	76	598	28	545	76	570	76	598	2	637	651	215	654	2	637
78	156	10	24	30	N	202	599	202	607	8	574	202	599	202	607	9	592	613	221	675	9	592
78	156	10	56	17	S	188	616	197	622	6	564	188	616	197	622	25	610	641	222	650	25	610
78	156	11	13	57	S	81	574	83	605	31	546	81	574	83	605	1	545	556	65	561	1	545
78	156	11	46	23	N	71	599	71	607	18	570	71	599	71	607	14	612	625	223	636	14	612
78	156	12	5	18	N	207	622	207	628	6	559	207	622	207	628	26	556	594	65	596	26	556
78	156	12	39	29	S	177	656	177	660	4	591	177	656	177	660	32	575	614	222	625	32	575
78	156	12	53	29	S	92	617	93	619	2	582	92	617	93	619	31	546	587	94	618	31	546
78	156	13	29	14	N	63	615	62	635	20	605	63	615	62	635	4	593	607	68	608	4	593

YR	DA	HDDK	HR	MIN	SEC	PO	HDDK	LT	LAT	CDOK	DLAT	MIDNIGHT	DLAT	LAT	LATC
78 158	23 26 22	N	219	621	220	627	6	605	618	220	627	6	605	618	618
78 158	0 3 45	S	192	650	192	649	-1	617	626	192	649	-1	617	626	626
78 159	0 18 54	S	87	614	88	623	9	591	610	88	623	9	591	610	610
78 159	0 51 36	N	69	635	68	643	8	627	646	68	643	8	627	646	646
78 159	1 8 55	N	212	634	213	648	14	620	636	213	648	14	620	636	636
78 159	1 44 30	S	201	653	201	648	-5	633	631	201	648	-5	633	631	631
78 159	2 0 35	S	81	603	81	622	19	578	609	81	622	19	578	609	609
78 159	2 33 23	N	70	638	70	638	-4	638	633	70	638	-4	638	633	633
78 159	2 50 14	N	202	635	202	638	3	613	622	202	638	3	613	622	622
78 159	3 23 40	S	204	616	204	624	8	593	610	204	624	8	593	610	610
78 159	3 40 35	S	74	620	74	620	10	603	623	74	620	10	603	623	623
78 159	4 13 30	N	71	605	71	620	15	587	612	71	620	15	587	612	612
78 159	4 30 30	N	195	636	195	646	10	601	623	195	646	10	601	623	623
78 159	5 3 34	S	203	612	203	614	2	588	601	203	614	2	588	601	601
78 159	5 55 35	S	73	641	69	639	-1	626	634	69	639	-1	626	634	634
78 159	6 10 50	N	193	638	193	631	3	592	610	193	631	3	592	610	610
78 159	6 44 0	S	201	625	201	647	21	604	631	201	647	21	604	631	631
78 159	7 2 42	S	71	571	70	610	39	550	602	70	610	39	550	602	602
78 159	7 35 29	N	76	617	76	626	9	600	619	76	626	9	600	619	619
78 159	7 50 34	N	196	650	196	677	27	617	650	196	677	27	617	650	650
78 159	8 25 6	S	197	659	197	671	12	627	645	197	671	12	627	645	645
78 159	8 39 38	S	72	651	72	636	-15	637	630	72	636	-15	637	630	630
78 159	9 16 44	N	77	652	77	654	2	638	649	77	654	2	638	649	649
78 159	9 31 7	N	200	658	201	667	9	639	649	201	667	9	639	649	649
78 159	10 6 53	S	189	698	189	705	7	661	667	189	705	7	661	667	667
78 159	10 18 9	S	82	707	79	636	-71	663	630	79	636	-71	663	630	630
78 159	10 57 29	N	72	689	72	675	6	656	672	72	675	6	656	672	672
78 159	11 12 39	N	205	647	205	674	27	627	655	205	674	27	627	655	655
78 159	11 48 58	S	175	711	175	719	8	678	676	175	719	8	678	676	676
78 159	11 59 16	S	94	694	90	647	-47	677	626	90	647	-47	677	626	626
78 159	12 38 59	N	63	675	62	686	11	670	692	62	686	11	670	692	692
78 159	12 54 7	N	210	651	212	683	32	659	669	212	683	32	659	669	669
78 159	14 21 7	N	57	652	56	655	3	649	661	56	655	3	649	661	661
78 159	14 35 12	N	216	668	217	677	9	658	664	217	677	9	658	664	664
78 159	16 3 50	N	54	628	55	613	-10	623	622	55	613	-10	623	622	622
78 159	16 17 39	N	217	650	217	656	16	638	644	217	656	16	638	644	644
78 159	17 45 49	N	58	594	57	612	18	585	616	57	612	18	585	616	616
78 159	18 0 14	N	219	623	219	633	5	613	622	219	633	5	613	622	622
78 159	19 28 0	N	62	586	60	615	29	573	615	60	615	29	573	615	615
78 159	19 42 16	N	222	631	222	635	4	622	624	222	635	4	622	624	624
78 159	21 11 11	N	62	629	62	625	-4	626	626	62	625	-4	626	626	626
78 159	21 24 31	N	224	643	225	654	11	636	645	225	654	11	636	645	645
78 159	22 7 59	S	170	712	171	711	-1	680	656	171	711	-1	680	656	656
78 159	22 18 4	S	98	649	98	656	-7	622	638	98	656	-7	622	638	638
78 159	22 53 42	N	63	658	65	644	-14	652	647	65	644	-14	652	647	647
78 159	23 7 12	N	224	661	225	672	21	657	664	225	672	21	657	664	664
78 159	23 47 38	S	189	683	187	705	22	643	657	187	705	22	643	657	657
78 159	23 58 43	S	93	707	91	678	-25	633	668	91	678	-25	633	668	668
78 160	0 35 18	N	66	661	67	654	-7	655	658	67	654	-7	655	658	658
78 160	0 50 41	N	215	657	218	659	32	646	675	218	659	32	646	675	675
78 160	1 28 20	S	199	685	199	700	15	657	671	199	700	15	657	671	671
78 160	1 41 24	S	82	671	82	664	-7	654	656	82	664	-7	654	656	656
78 160	3 58 24	N	70	672	70	675	3	660	672	70	675	3	660	672	672

YR	DA	HR	MM	SEC	PO	HODX	LT	LAT	COXK	DLAT	MIDNIGHT	LATH	LATC	DLAT	LATH	LATC	COXK	DLAT	MIDNIGHT	LATH	LATC
78 174	1	0	49	3	N	217	623	197	629	197	629	197	629	197	629	197	629	197	629	197	629
78 174	1	3	47	3	S	196	560	196	560	196	560	196	560	196	560	196	560	196	560	196	560
78 174	1	3	59	9	S	85	633	85	633	85	633	85	633	85	633	85	633	85	633	85	633
78 174	3	17	59	9	N	71	617	71	617	71	617	71	617	71	617	71	617	71	617	71	617
78 174	3	35	59	9	N	199	608	199	608	199	608	199	608	199	608	199	608	199	608	199	608
78 174	4	9	0	0	S	204	637	204	637	204	637	204	637	204	637	204	637	204	637	204	637
78 174	4	25	25	5	N	72	650	72	650	72	650	72	650	72	650	72	650	72	650	72	650
78 174	5	0	40	0	N	194	639	194	639	194	639	194	639	194	639	194	639	194	639	194	639
78 174	6	3	53	3	S	67	663	67	663	67	663	67	663	67	663	67	663	67	663	67	663
78 174	6	41	49	6	N	74	678	74	678	74	678	74	678	74	678	74	678	74	678	74	678
78 174	6	54	58	6	N	194	556	194	556	194	556	194	556	194	556	194	556	194	556	194	556
78 174	7	30	0	0	S	200	672	200	672	200	672	200	672	200	672	200	672	200	672	200	672
78 174	7	43	57	7	S	69	680	69	680	69	680	69	680	69	680	69	680	69	680	69	680
78 174	8	22	35	8	N	76	681	76	681	76	681	76	681	76	681	76	681	76	681	76	681
78 174	8	35	30	9	N	197	686	197	686	197	686	197	686	197	686	197	686	197	686	197	686
78 174	9	9	58	0	S	194	688	194	688	194	688	194	688	194	688	194	688	194	688	194	688
78 174	10	0	19	0	S	74	693	74	693	74	693	74	693	74	693	74	693	74	693	74	693
78 174	10	17	1	1	N	202	627	202	627	202	627	202	627	202	627	202	627	202	627	202	627
78 174	10	51	8	0	S	186	664	186	664	186	664	186	664	186	664	186	664	186	664	186	664
78 174	11	8	0	0	S	80	562	80	562	80	562	80	562	80	562	80	562	80	562	80	562
78 174	11	40	0	0	N	72	584	72	584	72	584	72	584	72	584	72	584	72	584	72	584
78 174	11	59	0	0	N	206	521	206	521	206	521	206	521	206	521	206	521	206	521	206	521
78 174	12	33	58	0	S	174	688	174	688	174	688	174	688	174	688	174	688	174	688	174	688
78 174	12	46	45	0	S	92	628	92	628	92	628	92	628	92	628	92	628	92	628	92	628
78 174	13	22	57	0	N	63	618	63	618	63	618	63	618	63	618	63	618	63	618	63	618
78 174	13	40	0	0	N	211	643	211	643	211	643	211	643	211	643	211	643	211	643	211	643
78 174	14	27	20	0	S	106	643	106	643	106	643	106	643	106	643	106	643	106	643	106	643
78 174	14	27	20	0	S	57	597	57	597	57	597	57	597	57	597	57	597	57	597	57	597
78 174	16	49	0	0	N	216	632	216	632	216	632	216	632	216	632	216	632	216	632	216	632
78 174	17	3	53	0	N	60	584	60	584	60	584	60	584	60	584	60	584	60	584	60	584
78 174	18	31	29	0	N	218	604	218	604	218	604	218	604	218	604	218	604	218	604	218	604
78 174	20	13	0	0	N	65	565	65	565	65	565	65	565	65	565	65	565	65	565	65	565
78 174	23	36	57	0	N	70	597	70	597	70	597	70	597	70	597	70	597	70	597	70	597
78 174	23	55	59	0	N	216	594	216	594	216	594	216	594	216	594	216	594	216	594	216	594
78 175	0	29	59	0	S	196	597	196	597	196	597	196	597	196	597	196	597	196	597	196	597
78 175	0	48	22	0	S	85	569	85	569	85	569	85	569	85	569	85	569	85	569	85	569
78 175	1	18	19	0	N	71	582	71	582	71	582	71	582	71	582	71	582	71	582	71	582
78 175	1	38	55	0	S	207	580	207	580	207	580	207	580	207	580	207	580	207	580	207	580
78 175	2	10	26	0	S	202	593	202	593	202	593	202	593	202	593	202	593	202	593	202	593
78 175	3	0	30	0	N	71	610	71	610	71	610	71	610	71	610	71	610	71	610	71	610
78 175	3	18	36	0	S	139	584	139	584	139	584	139	584	139	584	139	584	139	584	139	584
78 175	3	51	12	0	S	204	612	204	612	204	612	204	612	204	612	204	612	204	612	204	612
78 175	4	7	24	0	S	72	649	72	649	72	649	72	649	72	649	72	649	72	649	72	649
78 175	4	42	21	0	S	71	628	71	628	71	628	71	628	71	628	71	628	71	628	71	628
78 175	4	59	23	0	S	194	588	194	588	194	588	194	588	194	588	194	588	194	588	194	588
78 175	5	30	35	0	S	202	591	202	591	202	591	202	591	202	591	202	591	202	591	202	591
78 175	5	49	0	0	S	70	606	70	606	70	606	70	606	70	606	70	606	70	606	70	606
78 175	6	21	20	0	N	194	581	194	581	194	581	194	581	194	581	194	581	194	581	194	581
78 175	6	40	0	0	N	194	581	194	581	194	581	194	581	194	581	194	581	194	581	194	581
78 175	7	10	41	0	S	199	592	199	592	199	592	199	592	199	592	199	592	199	592	199	592
78 175	7	30	29	0	S	71	589	71	589	71	589	71	589	71	589	71	589	71	589	71	589
78 175	8	2	45	0	N	76	553	76	553	76	553	76	553	76	553	76	553	76	553	76	553

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HDDK				COCK				MIDNIGHT				HDDK				COCK				MIDNIGHT														
YR	DA	HR	NN SEC	PO	LT	LAT	DLAT	LT	LAT	DLAT	LT	LAT	DLAT	LT	LAT	DLAT	LT	LAT	DLAT	LT	LAT	DLAT	LT	LAT	DLAT	LT	LAT	DLAT						
78	185	20	27	28	N	62	611	61	619	2	601	619	78	185	20	27	28	N	62	611	2	601	619	78	185	20	27	28	N	62	611	2	601	619
78	185	20	42	24	N	219	595	220	606	11	577	593	78	185	22	47	23	S	180	681	0	641	644	78	185	22	47	23	S	180	681	0	641	644
78	185	22	9	9	N	65	616	65	621	5	666	622	78	185	23	33	46	N	67	629	3	620	634	78	185	23	33	46	N	67	629	3	620	634
78	185	22	25	0	N	220	509	221	621	12	587	609	78	185	23	49	59	N	219	633	6	619	629	78	185	23	49	59	N	219	633	6	619	629
78	185	23	2	24	S	187	616	186	619	3	587	616	78	185	23	49	59	N	219	633	6	619	629	78	185	23	49	59	N	219	633	6	619	629
78	185	23	19	36	S	90	536	91	601	5	557	557	78	185	23	49	59	N	219	633	6	619	629	78	185	23	49	59	N	219	633	6	619	629
78	185	23	48	48	N	214	580	214	579	-1	560	571	78	185	23	49	59	N	219	633	6	619	629	78	185	23	49	59	N	219	633	6	619	629
78	185	0	9	30	N	197	599	197	602	3	559	584	78	185	0	41	59	S	87	638	2	628	637	78	185	0	41	59	S	87	638	2	628	637
78	186	0	42	48	S	84	519	84	526	3	559	584	78	186	0	42	48	S	84	519	3	559	584	78	186	0	42	48	S	84	519	3	559	584
78	186	1	29	59	N	72	554	72	551	-3	532	538	78	186	1	29	59	N	72	554	-3	532	538	78	186	1	29	59	N	72	554	-3	532	538
78	186	1	51	58	N	206	573	206	584	11	545	574	78	186	1	51	58	N	206	573	11	545	574	78	186	1	51	58	N	206	573	11	545	574
78	186	2	22	15	S	202	564	202	564	26	536	579	78	186	2	22	15	S	202	564	26	536	579	78	186	2	22	15	S	202	564	26	536	579
78	186	2	42	29	S	79	567	79	562	-5	546	550	78	186	2	42	29	S	79	567	-5	546	550	78	186	2	42	29	S	79	567	-5	546	550
78	186	3	11	45	N	72	559	71	587	28	537	577	78	186	3	11	45	N	72	559	28	537	577	78	186	3	11	45	N	72	559	28	537	577
78	186	3	33	0	N	198	560	198	569	9	515	555	78	186	3	33	0	N	198	560	9	515	555	78	186	3	33	0	N	198	560	9	515	555
78	186	4	1	45	S	202	543	202	542	0	513	537	78	186	4	1	45	S	202	543	0	513	537	78	186	4	1	45	S	202	543	0	513	537
78	186	4	23	37	S	74	548	74	542	-3	522	529	78	186	4	23	37	S	74	548	-3	522	529	78	186	4	23	37	S	74	548	-3	522	529
78	186	4	52	45	N	72	545	72	542	14	518	546	78	186	4	52	45	N	72	545	14	518	546	78	186	4	52	45	N	72	545	14	518	546
78	186	5	14	0	N	194	531	194	531	5	518	546	78	186	5	14	0	N	194	531	5	518	546	78	186	5	14	0	N	194	531	5	518	546
78	186	5	42	0	S	200	548	200	553	11	509	552	78	186	5	42	0	S	200	548	11	509	552	78	186	5	42	0	S	200	548	11	509	552
78	186	6	4	38	N	72	533	72	544	12	550	573	78	186	6	4	38	N	72	533	12	550	573	78	186	6	4	38	N	72	533	12	550	573
78	186	6	34	15	N	74	571	74	566	11	509	552	78	186	6	34	15	N	74	571	11	509	552	78	186	6	34	15	N	74	571	11	509	552
78	186	6	53	28	N	194	555	194	555	4	480	523	78	186	6	53	28	N	194	555	4	480	523	78	186	6	53	28	N	194	555	4	480	523
78	186	7	21	35	S	198	529	198	533	28	480	523	78	186	7	21	35	S	198	529	28	480	523	78	186	7	21	35	S	198	529	28	480	523
78	186	7	45	10	S	72	523	71	551	23	525	560	78	186	7	45	10	S	72	523	23	525	560	78	186	7	45	10	S	72	523	23	525	560
78	186	8	14	36	N	76	553	76	559	1	536	547	78	186	8	14	36	N	76	553	1	536	547	78	186	8	14	36	N	76	553	1	536	547
78	186	8	33	59	N	197	556	197	575	19	511	560	78	186	8	33	59	N	197	556	19	511	560	78	186	8	33	59	N	197	556	19	511	560
78	186	9	3	3	S	195	567	195	580	12	523	564	78	186	9	3	3	S	195	567	12	523	564	78	186	9	3	3	S	195	567	12	523	564
78	186	9	24	20	S	73	538	74	556	18	514	544	78	186	9	24	20	S	73	538	18	514	544	78	186	9	24	20	S	73	538	18	514	544
78	186	9	55	2	N	76	570	76	597	27	549	588	78	186	9	55	2	N	76	570	27	549	588	78	186	9	55	2	N	76	570	27	549	588
78	186	10	13	48	N	201	598	202	609	11	573	597	78	186	10	13	48	N	201	598	11	573	597	78	186	10	13	48	N	201	598	11	573	597
78	186	10	45	5	S	189	608	188	622	14	534	597	78	186	10	45	5	S	189	608	14	534	597	78	186	10	45	5	S	189	608	14	534	597
78	186	11	4	25	S	79	540	81	606	66	517	591	78	186	11	4	25	S	79	540	66	517	591	78	186	11	4	25	S	79	540	66	517	591
78	186	11	36	13	N	72	599	72	607	8	580	599	78	186	11	36	13	N	72	599	8	580	599	78	186	11	36	13	N	72	599	8	580	599
78	186	11	56	7	N	204	575	205	581	6	548	571	78	186	11	56	7	N	204	575	6	548	571	78	186	11	56	7	N	204	575	6	548	571
78	186	12	26	20	S	183	593	183	593	0	536	560	78	186	12	26	20	S	183	593	0	536	560	78	186	12	26	20	S	183	593	0	536	560
78	186	12	42	49	S	91	613	92	630	17	578	603	78	186	12	42	49	S	91	613	17	578	603	78	186	12	42	49	S	91	613	17	578	603
78	186	13	16	37	N	66	560	65	592	32	545	590	78	186	13	16	37	N	66	560	32	545	590	78	186	13	16	37	N	66	560	32	545	590
78	186	13	35	59	N	208	604	209	611	7	579	598	78	186	13	35	59	N	208	604	7	579	598	78	186	13	35	59	N	208	604	7	579	598
78	186	14	11	35	S	170	660	170	660	604	604	604	78	186	14	11	35	S	170	660	604	604	604	78	186	14	11	35	S	170	660	604	604	604
78	186	14	24	2	S	62	554	61	571	17	539	567	78	186	14	24	2	S	62	554	17	539	567	78	186	14	24	2	S	62	554	17	539	567
78	186	14	59	30	N	211	608	212	621	13	573	558	78	186	14	59	30	N	211	608	13	573	558	78	186	14	59	30	N	211	608	13	573	558
78	186	15	18	36	N	164	651	164	651	38	529	586	78	186	15	18	36	N	164	651	38	529	586	78	186	15	18	36	N	164	651	38	529	586
78	186	16	6	34	S	60	545	53	583	12	539	586	78	186	16	6	34	S	60	545	12	539	586	78	186	16	6	34	S	60	545	12	539	586
78	186	17	0	21	N	214	606	215	618	24	554	595	78	186	17	0	21	N	214	606	24	554	595	78	186	17	0	21	N	214	606	24	554	595
78	186	18	26	31	N	61	568	59	592	13	573	596	78	186	18	26	31	N	61	568	13	573	596	78	186	18	26	31	N	61	568	13	573	596
78	186	18	42	39	N	217	592	218	605	21	561	594	78	186	18	42	39	N	217	592	21	561	594	78	186	18	42	39	N	217	592	21	561	594
78	186	19	33	27																														

YR	DA	HDDK HR	MN	SEC	PO	HDDK LT	LAT	CODK LT	LAT	MIDNIGHT LAT	LAT	DA	YR
78	191	2	39	58	S	203	659	203	667	8	640	649	78
78	191	2	54	40	S	76	656	76	657	1	642	652	78
78	191	3	29	43	S	70	648	70	651	3	634	646	78
78	191	3	44	30	S	199	677	199	688	11	647	660	78
78	191	4	20	8	S	205	659	205	654	-5	640	637	78
78	191	4	34	52	S	70	653	70	659	6	639	654	78
78	191	5	10	35	N	72	642	72	652	10	637	647	78
78	191	5	25	7	N	194	661	194	674	13	635	648	78
78	191	6	0	1	S	203	657	204	664	7	637	646	78
78	191	6	14	40	S	68	657	58	647	-10	631	650	78
78	191	6	52	7	N	75	666	75	650	-16	633	645	78
78	191	7	4	58	N	194	674	194	687	13	634	659	78
78	191	7	40	30	S	200	674	200	675	1	636	656	78
78	191	7	54	0	S	59	674	70	649	-25	635	644	78
78	191	8	32	46	N	77	674	77	673	-1	632	669	78
78	191	8	46	0	N	198	658	198	661	3	636	636	78
78	191	9	20	49	S	194	672	194	671	-1	632	645	78
78	191	9	35	19	S	76	643	76	647	4	628	642	78
78	191	10	11	53	N	76	639	76	644	6	623	638	78
78	191	10	27	13	N	203	650	203	661	1	630	643	78
78	191	11	2	18	S	185	686	184	697	11	627	659	78
78	191	11	15	54	S	94	642	55	657	15	622	646	78
78	191	11	52	21	N	70	635	69	654	29	619	668	78
78	191	12	8	45	N	208	646	209	674	28	625	655	78
78	191	12	44	36	S	173	688	172	700	12	642	653	78
78	191	12	57	2	S	94	636	93	646	10	606	624	78
78	191	13	33	33	N	63	611	63	621	10	601	622	78
78	191	13	50	21	N	212	650	213	660	10	638	648	78
78	191	15	16	39	N	58	606	56	628	22	593	633	78
78	191	15	31	49	N	216	658	217	662	4	617	650	78
78	191	17	0	15	N	56	608	55	618	10	601	622	78
78	191	17	13	52	N	219	650	220	658	8	638	649	78
78	191	18	43	31	N	57	619	57	622	3	613	627	78
78	191	18	55	40	N	223	652	226	669	17	647	661	78
78	191	20	26	6	N	59	637	58	647	10	623	653	78
78	191	20	37	53	N	225	655	227	666	11	633	658	78
78	191	22	7	52	N	62	643	61	660	17	636	664	78
78	191	22	21	3	N	224	652	225	658	6	647	649	78
78	191	23	2	56	S	180	700	180	701	1	634	663	78
78	191	23	15	9	S	93	635	94	648	13	635	627	78
78	191	23	49	43	N	65	654	66	651	-3	637	654	78
78	191	0	3	47	N	222	672	221	669	-4	630	660	78
78	192	0	43	15	S	194	688	194	689	1	630	661	78
78	192	0	56	30	S	66	657	66	665	8	638	658	78
78	192	1	30	59	N	68	647	63	650	3	640	653	78
78	192	1	46	52	N	211	671	211	672	1	631	659	78
78	192	2	23	35	S	203	683	203	683	1	633	663	78
78	192	2	38	5	S	78	638	78	642	4	633	636	78
78	192	3	12	23	N	70	646	70	644	-2	631	638	78
78	192	3	28	0	N	200	656	200	674	18	636	655	78
78	192	4	3	12	S	205	663	203	672	9	642	653	78
78	192	4	18	0	S	71	649	71	655	6	635	650	78
78	192	4	53	54	N	71	357	72	645	-12	623	639	78
78	192	5	8	8	N	194	659	194	666	27	627	658	78

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YR	DA	HR	MN	SEC	PO	HDDK	LT	LAT	COCK	DLAT	MIDNIGHT	LATH, LATH	COCK	LT	LAT	COCK	DLAT	MIDNIGHT	LATH, LATH
78 217	78 217	5 33	27	0	N	71	607	72 609	72 609	2	582	582	197	590	197	590	197	590	584
78 217	78 217	6 23	0	N	74	613	75 616	75 616	3	598	608	199	610	199	610	199	610	572	598
78 217	78 217	6 55	15	S	201	605	202	605	0	581	593	78	592	78	592	78	592	573	635
78 217	78 217	7 14	0	S	201	605	202	605	0	581	593	78	592	78	592	78	592	573	635
78 217	78 217	7 47	11	N	77	598	77 622	77 622	24	576	615	201	640	201	640	201	640	624	624
78 217	78 217	8 35	14	N	197	599	197 600	197 600	1	559	582	193	663	193	663	193	663	642	642
78 217	78 217	8 54	53	S	198	597	198 600	198 600	7	557	586	80	657	80	657	80	657	642	642
78 217	78 217	9 26	29	N	74	568	74 582	74 582	14	544	585	74	651	74	651	74	651	646	646
78 217	78 217	9 44	30	N	202	607	202 629	202 629	22	583	614	182	689	182	689	182	689	651	651
78 217	78 217	10 17	38	S	191	658	192 659	192 659	1	528	634	90	653	90	653	90	653	630	630
78 217	78 217	10 34	1	N	80	599	81 622	81 622	23	574	609	62	647	62	647	62	647	645	645
78 217	78 217	11 8	7	N	75	615	75 624	75 624	8	599	617	210	641	210	641	210	641	628	628
78 217	78 217	11 25	29	N	206	618	206 621	206 621	6	595	610	175	663	175	663	175	663	625	625
78 217	78 217	11 59	30	S	182	669	183 665	183 665	-4	627	629	100	643	100	643	100	643	602	602
78 217	78 217	12 14	45	S	88	598	89 618	89 618	20	573	604	63	638	63	638	63	638	648	648
78 217	78 217	12 47	58	N	69	576	69 583	69 583	7	562	590	222	636	222	636	222	636	642	642
78 217	78 217	13 7	20	N	209	614	210 612	210 612	3	530	612	182	699	182	699	182	699	663	663
78 217	78 217	13 42	5	S	173	563	173 667	173 667	4	602	613	93	665	93	665	93	665	652	652
78 217	78 217	13 56	19	S	97	589	100 624	100 624	35	548	580	195	682	195	682	195	682	655	655
78 217	78 217	14 30	46	N	62	578	61 607	61 607	29	565	606	85	688	85	688	85	688	655	655
78 217	78 217	14 49	5	N	212	617	212 621	212 621	4	601	611	67	671	67	671	67	671	679	679
78 217	78 217	16 13	43	N	60	564	58 593	58 593	29	549	595	207	654	207	654	207	654	654	654
78 217	78 217	16 31	1	N	213	610	215 625	215 625	15	593	615	69	684	69	684	69	684	654	654
78 217	78 217	17 57	40	N	59	583	58 597	58 597	15	585	607	199	654	199	654	199	654	636	636
78 217	78 217	18 13	1	N	216	602	218 617	218 617	15	585	607	206	662	206	662	206	662	644	644
78 217	78 217	19 40	28	N	61	594	60 611	60 611	21	582	615	71	676	71	676	71	676	646	646
78 217	78 217	19 55	25	N	218	593	219 603	219 603	10	575	594	73	697	73	697	73	697	667	667
78 217	78 217	21 21	44	N	65	580	64 604	64 604	24	567	603	195	686	195	686	195	686	641	641
78 217	78 217	21 37	59	N	219	598	220 613	220 613	15	580	601	206	695	206	695	206	695	642	642
78 217	78 217	22 19	0	S	174	608	175 683	175 683	-5	632	632	67	696	67	696	67	696	642	642
78 217	78 217	22 32	39	S	92	576	93 594	93 594	10	532	554	77	697	77	697	77	697	649	649
78 217	78 217	23 4	30	N	66	621	66 627	66 627	16	612	628	196	687	196	687	196	687	659	659
78 217	78 217	23 21	4	N	218	607	220 625	220 625	18	590	614	202	677	202	677	202	677	659	659
78 217	78 217	23 59	4	S	189	666	189 666	189 666	18	629	629	196	687	196	687	196	687	659	659
78 218	78 218	0 13	59	S	88	609	89 637	89 637	23	585	626	200	668	200	668	200	668	643	643
78 218	78 218	0 47	4	N	66	651	68 627	68 627	-24	644	628	78	664	78	664	78	664	654	654
78 218	78 218	1 31	31	N	212	628	213 630	213 630	2	613	619	155	668	155	668	155	668	650	650
78 218	78 218	1 39	19	S	189	653	189 653	189 653	0	620	629	77	654	77	654	77	654	630	630
78 218	78 218	1 53	59	S	81	655	81 635	81 635	-24	640	644	77	657	77	657	77	657	630	630
78 218	78 218	2 29	36	N	67	682	69 641	69 641	-41	578	643	205	657	205	657	205	657	648	648
78 218	78 218	2 45	0	N	203	631	204 649	204 649	18	609	632	187	682	187	682	187	682	645	645
78 218	78 218	3 19	24	S	204	645	204 646	204 646	1	624	630	88	675	88	675	88	675	645	645
78 218	78 218	3 36	5	S	75	610	71 623	71 623	32	572	616	210	662	210	662	210	662	646	646
78 218	78 218	4 7	59	N	72	591	72 591	72 591	17	572	606	210	662	210	662	210	662	646	646
78 218	78 218	4 25	59	N	197	510	197 510	197 510	23	564	616	174	693	174	693	174	693	649	649
78 218	78 218	4 58	18	S	204	508	205 531	205 531	23	584	616	100	678	100	678	100	678	627	627
78 218	78 218	5 16	57	S	72	592	72 603	72 603	11	573	626	63	639	63	639	63	639	605	605
78 218	78 218	5 50	22	N	74	633	74 633	74 633	626	626	626	213	644	213	644	213	644	627	627
78 218	78 218	6 5	48	N	195	621	195 621	195 621	601	601	601	113	670	113	670	113	670	619	619
78 218	78 218	6 37	38	S	201	587	202 585	202 585	-2	561	575	60	589	60	589	60	589	615	615
78 218	78 218	6 57	15	S	72	537	72 537	72 537	567	567	567	217	654	217	654	217	654	642	642
78 218	78 218	7 29	20	N	77	572	77 598	77 598	26	551	589	55	599	55	599	55	599	619	619

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YR	DA	HDDK	HR	MIN	SEC	PO	HDDK	LT	LAT	COOK	LT	LAT	COOK	DLAT	MIDNIGHT	LAT	LATC
78	223	2	49	0	S	50	660	60	642	60	660	60	642	-27	641	596	596
78	223	2	59	10	N	203	651	203	660	203	660	203	660	9	631	596	592
78	223	3	31	28	S	205	656	205	665	205	665	205	665	8	626	581	581
78	223	3	50	1	S	71	636	71	644	71	644	71	644	19	546	587	587
78	223	4	24	7	N	72	633	72	642	72	642	72	642	11	564	595	595
78	223	4	39	19	N	197	659	197	660	197	660	197	660	27	564	603	603
78	223	5	14	20	S	206	651	206	650	206	650	206	650	8	609	626	626
78	223	5	30	1	S	71	636	71	644	71	644	71	644	24	531	580	580
78	223	5	43	5	N	75	654	75	662	75	662	75	662	-3	558	578	578
78	223	6	54	11	S	203	648	203	650	203	650	203	650	19	582	611	611
78	223	7	10	30	S	71	624	71	630	71	630	71	630	1	619	625	625
78	223	7	46	50	N	78	673	78	682	78	682	78	682	0	603	616	616
78	223	7	55	50	N	198	657	198	668	198	668	198	668	4	612	626	626
78	223	8	34	53	S	159	671	159	679	159	679	159	679	35	578	626	626
78	223	8	50	30	S	74	624	74	633	74	633	74	633	22	573	636	636
78	223	9	26	59	N	79	667	79	673	79	673	79	673	1	586	601	601
78	223	9	40	31	N	202	660	202	674	202	674	202	674	73	504	594	594
78	223	10	15	40	S	152	672	152	676	152	676	152	676	14	564	589	589
78	223	10	29	14	S	52	609	52	618	52	618	52	618	-6	613	612	612
78	223	11	7	0	N	75	659	75	670	75	670	75	670	-3	621	628	628
78	223	11	21	44	N	208	659	208	669	208	669	208	669	-2	581	581	581
78	223	11	57	44	S	101	659	101	668	101	668	101	668	-11	581	616	616
78	223	12	9	17	S	95	683	95	688	95	688	95	688	15	612	633	633
78	223	12	48	12	N	66	659	66	665	66	665	66	665	15	605	588	588
78	223	13	3	32	N	212	652	212	663	212	663	212	663	-29	630	610	610
78	223	13	40	26	S	171	682	171	683	171	683	171	683	14	616	633	633
78	223	13	49	31	S	112	698	112	699	112	699	112	699	20	585	618	618
78	223	14	29	45	N	61	622	61	633	61	633	61	633	-1	629	630	630
78	223	14	45	32	N	215	645	215	655	215	655	215	655	25	574	616	616
78	223	16	12	19	N	58	595	58	606	58	606	58	606	10	612	621	621
78	223	16	28	1	N	215	625	215	635	215	635	215	635	12	610	634	634
78	223	17	55	20	N	58	588	58	601	58	601	58	601	8	613	630	630
78	223	18	10	8	N	217	614	217	627	217	627	217	627	9	613	632	632
78	223	19	39	0	N	59	624	59	636	59	636	59	636	13	615	638	638
78	223	19	51	50	N	221	625	221	630	221	630	221	630	6	622	634	634
78	223	21	21	18	N	60	642	60	655	60	655	60	655	27	606	647	647
78	223	21	34	1	N	223	625	223	632	223	632	223	632	-3	631	638	638
78	223	22	15	19	S	177	653	177	662	177	662	177	662	11	628	640	640
78	223	22	27	42	S	58	655	58	665	58	665	58	665	-15	628	642	642
78	223	23	3	43	N	61	668	61	679	61	679	61	679	21	597	630	630
78	223	23	16	50	N	223	653	223	662	223	662	223	662	45	585	643	643
78	223	23	56	38	S	189	664	189	673	189	673	189	673	9	636	647	647
78	224	0	5	50	S	30	668	30	678	30	678	30	678	-18	638	648	648
78	224	0	45	30	N	64	675	64	684	64	684	64	684	1	616	636	636
78	224	0	59	22	N	213	672	213	683	213	683	213	683	15	595	644	644
78	224	1	37	53	S	158	683	158	693	158	693	158	693	11	648	658	658
78	224	1	51	16	S	91	663	91	673	91	673	91	673	-31	637	612	612
78	224	2	27	4	N	67	680	67	690	67	690	67	690	22	650	634	634
78	224	2	42	19	N	204	639	204	645	204	645	204	645	-22	624	649	649
78	224	3	16	56	S	75	654	75	664	75	664	75	664	-4	647	637	637
78	224	3	32	58	S	71	644	71	654	71	654	71	654	-32	639	614	614
78	224	4	7	11	N	157	631	157	641	157	641	157	641	7	625	642	642

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YR	DA	HDDK	HR	KN	SEC	PG	HDDK	LT	LAT	CDDK	LT	LAT	DLAT	MIDNIGHT	LATH	LATC
78	255	20 47	20	47	47	N	221	603	221	610	-5	590	7	590	592	592
78	255	22 15	22	15	48	N	224	635	224	638	-3	635	639	635	639	639
78	255	22 29	22	29	36	N	183	668	183	670	-2	626	633	626	633	633
78	255	23 10	23	10	24	S	95	652	94	632	-15	627	614	627	614	614
78	255	23 22	23	22	57	S	95	652	94	632	-15	627	614	627	614	614
78	255	23 57	23	57	27	N	66	649	68	624	-25	642	625	642	625	625
78	255	0 50	0	50	54	N	194	658	194	656	-2	626	632	626	632	632
78	255	1 30	1	30	30	S	85	600	85	617	-17	575	603	575	603	603
78	255	1 39	1	39	15	N	67	656	70	606	-50	600	597	600	597	597
78	255	1 55	1	55	35	N	208	641	202	643	-2	620	627	620	627	627
78	255	2 30	2	30	52	S	202	640	202	648	-2	619	631	619	631	631
78	255	2 45	2	45	59	S	78	655	78	632	-23	619	625	619	625	625
78	255	3 15	3	15	57	N	71	635	71	631	-4	619	624	619	624	624
78	255	3 36	3	36	14	N	201	651	202	661	10	631	643	631	643	643
78	255	4 11	4	11	19	S	207	649	208	661	12	629	643	629	643	643
78	255	4 27	4	27	20	S	75	621	75	633	-12	634	626	634	626	626
78	255	5 16	5	16	30	N	76	638	76	625	-12	623	618	623	618	618
78	255	5 15	5	15	43	N	193	675	193	677	-2	645	650	645	650	650
78	255	5 51	5	51	30	S	205	656	209	656	-4	636	639	636	639	639
78	255	6 16	6	16	6	S	73	657	74	641	-16	643	635	643	635	635
78	255	6 43	6	43	1	N	80	669	80	647	-22	651	637	651	637	637
78	255	6 55	6	55	59	N	199	671	200	668	-3	641	649	641	649	649
78	255	7 31	7	31	35	S	206	660	206	660	-3	641	649	641	649	649
78	255	7 46	7	46	10	S	75	654	76	628	-25	640	621	640	621	621
78	255	8 23	8	23	38	N	82	674	82	656	-18	657	647	657	647	647
78	255	8 26	8	26	58	N	203	653	202	664	11	633	646	633	646	646
78	255	9 11	9	11	38	S	201	653	201	655	-2	633	638	633	638	638
78	255	9 26	9	26	30	S	80	649	80	639	-10	629	628	629	628	628
78	255	10 18	10	18	12	N	208	642	209	728	86	621	704	621	704	704
78	255	10 52	10	52	44	S	194	660	194	666	6	628	641	628	641	641
78	255	11 6	11	6	44	S	89	656	90	684	28	637	776	637	776	776
78	255	13 26	13	26	0	N	66	671	69	644	-27	666	647	666	647	647
78	255	13 40	13	40	30	N	217	662	219	682	20	651	668	651	668	668
78	255	14 28	14	28	59	S	57	670	57	670	0	669	677	669	677	677
78	255	15 9	15	9	17	N	220	656	221	671	15	651	663	651	663	663
78	255	15 22	15	22	29	N	55	638	55	641	3	634	646	634	646	646
78	255	16 51	16	51	38	N	221	655	222	663	8	650	655	650	655	655
78	255	17 4	17	4	15	N	58	619	58	625	6	613	630	613	630	630
78	255	18 33	18	33	55	N	224	652	225	659	7	647	650	647	650	650
78	255	18 45	18	45	13	N	60	633	59	640	7	625	645	625	645	645
78	255	20 16	20	16	30	N	228	667	228	669	-2	652	661	652	661	661
78	255	21 58	21	58	59	N	61	658	62	652	-6	652	655	652	655	655
78	255	22 10	22	10	39	N	229	670	228	671	1	668	663	668	663	663
78	255	22 54	22	54	39	S	175	710	176	712	-2	676	667	676	667	667
78	255	23 3	23	3	56	S	101	699	96	646	-53	684	624	684	624	624
78	255	23 41	23	41	22	N	62	681	62	681	-2	681	671	681	671	671
78	255	23 53	23	53	50	N	191	690	224	678	671	671	671	671	671	671
78	255	0 34	0	34	39	S	89	694	191	689	-1	662	661	662	661	661
78	255	0 46	0	46	26	S	84	685	89	691	-3	679	687	679	687	687
78	255	1 22	1	22	59	N	212	665	84	687	2	681	693	681	693	693
78	255	1 37	1	37	21	N	201	649	212	666	1	655	653	655	653	653
78	255	2 13	2	13	59	S	201	651	201	651	2	629	634	629	634	634
78	255	2 27	2	27	40	S	79	693	79	670	-23	682	666	682	666	666

YR	DA	HODK	HR	MIN	SEC	PO	HODK	LT	LAT	COCK	LT	LAT	OLAT	MIDNIGHT	LAT	LATC	YR	DA	HODK	HR	MIN	SEC	PO	HODK	LT	LAT	COCK	LT	LAT	OLAT	MIDNIGHT	LAT	LATC				
78	258	8	51	57		S	78	652	78	661	78	661	-2	676	673	3	78	258	16	11	16	N	78	258	16	11	16	N	78	258	16	11	16	N			
78	258	9	30	15		N	82	645	83	671	83	671	-2	680	664	0	78	258	17	42	56	N	78	258	17	42	56	N	78	258	17	42	56	N			
78	258	9	42	37		N	86	679	206	681	206	681	-2	680	664	0	78	258	17	53	40	N	78	258	17	53	40	N	78	258	17	53	40	N			
78	258	10	18	49		S	196	683	196	687	196	687	-2	684	655	0	78	258	19	24	16	N	78	258	19	24	16	N	78	258	19	24	16	N			
78	258	10	31	12		S	87	691	86	672	86	672	-2	684	655	0	78	258	19	35	53	N	78	258	19	35	53	N	78	258	19	35	53	N			
78	258	12	50	40		N	71	661	71	669	71	669	-2	684	655	0	78	258	21	6	30	N	78	258	21	6	30	N	78	258	21	6	30	N			
78	258	13	6	2		N	216	655	216	663	216	663	-2	684	655	0	78	258	21	18	0	N	78	258	21	18	0	N	78	258	21	18	0	N			
78	258	13	45	14		S	63	646	63	640	63	640	-2	684	655	0	78	258	22	47	54	N	78	258	22	47	54	N	78	258	22	47	54	N			
78	258	14	32	57		N	220	668	222	682	222	682	-2	684	655	0	78	258	23	43	28	S	78	258	23	43	28	S	78	258	23	43	28	S			
78	258	14	47	16		N	51	679	55	650	55	650	-2	684	655	0	78	258	23	55	13	S	78	258	23	55	13	S	78	258	23	55	13	S			
78	258	16	17	59		N	52	664	49	685	49	685	-2	684	655	0	78	258	24	0	29	39	S	78	258	24	0	29	39	S	78	258	24	0	29	39	S
78	258	18	0	32		N	229	689	229	689	229	689	-2	684	655	0	78	258	24	19	19	N	78	258	24	19	19	N	78	258	24	19	19	N			
78	258	18	10	1		N	52	684	49	688	49	688	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	19	43	33		N	52	684	49	688	49	688	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	19	52	16		N	230	683	230	683	230	683	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	21	25	59		N	52	702	52	702	52	702	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	21	34	43		N	57	705	57	705	57	705	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	23	7	42		N	226	677	226	677	226	677	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	23	12	30		N	188	651	188	651	188	651	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	24	0	18		S	95	721	95	720	95	720	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	0	10	46		S	65	663	65	666	65	666	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	0	47	29		N	215	660	215	660	215	660	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	1	2	32		N	198	676	198	676	198	676	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	1	40	29		S	81	664	81	659	81	659	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	2	23	29		N	68	654	69	643	69	643	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	2	43	32		S	206	687	207	689	207	689	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	3	21	13		S	206	682	206	682	206	682	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	3	34	35		S	75	665	76	645	76	645	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	4	10	55		N	72	684	73	655	73	655	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	4	24	39		N	200	688	200	689	200	689	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	4	59	59		S	209	646	209	646	209	646	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	5	14	35		S	73	636	73	636	73	636	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	6	39	58		S	208	641	208	641	208	641	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	6	55	13		S	74	646	74	646	74	646	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	7	31	16		N	81	641	82	648	82	648	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	7	45	25		N	201	655	201	655	201	655	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	8	20	28		S	234	662	235	671	235	671	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	8	34	23		S	77	669	83	652	83	652	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	9	12	59		N	83	650	206	677	206	677	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	9	25	30		N	205	675	199	679	199	679	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	10	1	31		S	198	680	199	679	199	679	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	10	14	33		S	85	675	85	657	85	657	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	10	53	19		N	80	693	81	683	81	683	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	11	6	18		N	211	682	212	682	212	682	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	11	42	58		S	188	684	188	684	188	684	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	11	55	43		S	54	660	95	664	95	664	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	12	34	19		N	71	693	73	681	73	681	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	12	48	31		N	215	659	217	683	217	683	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	13	25	25		S	178	680	178	681	178	681	-2	684	655	0	78	258	24	43	28	S	78	258	24	43	28	S	78	258	24	43	28	S			
78	258	13																																			

HDDK	HR	MN	SEC	PO	HDDK		CDDK		MIDNIGHT		YR	DA	HDDK		HR	MN	SEC	PO	HDDK		CDDK	DLAT	LATH, LATH	MIDNIGHT	
					LT	LAT	LT	LAT	LT	LAT			LT	LAT					LT	LAT					LT
78 263	78 263	11 38	0	N	214	693	215	702	9	686	78 264	78 264	21 44	44	N	221	667	221	667	3	664	664	3	664	664
78 263	78 263	12 16	29	S	181	720	181	723	3	682	78 264	78 264	16 14	21	N	55	650	55	650	10	647	666	-1	647	655
78 263	78 263	12 26	3	S	103	704	103	702	-2	691	78 264	78 264	17 57	24	N	55	650	55	649	8	627	633	8	627	633
78 263	78 263	13 6	9	N	69	680	69	679	-1	676	78 264	78 264	18 9	29	N	221	635	222	633	4	630	644	4	630	644
78 263	78 263	13 19	59	N	219	677	221	701	24	668	78 264	78 264	19 39	11	N	59	635	59	639	20	643	661	20	643	661
78 263	78 263	14 48	39	N	60	664	61	651	-13	658	78 264	78 264	19 51	1	N	225	649	228	669	2	628	640	2	628	640
78 263	78 263	15 2	4	N	221	668	225	693	25	665	78 264	78 264	21 20	58	N	63	636	63	538	18	662	683	18	662	683
78 263	78 263	16 32	27	N	49	688	49	629	1	693	78 264	78 264	21 33	2	N	228	665	231	683	-44	693	651	-44	693	651
78 263	78 263	16 44	1	N	222	664	227	689	25	661	78 264	78 264	23 4	32	N	59	672	65	648	7	682	700	7	682	700
78 263	78 263	18 15	27	N	48	685	46	689	23	648	78 265	78 265	23 15	25	N	228	688	229	689	1	681	676	1	681	676
78 263	78 263	18 26	12	N	224	653	227	676	23	648	78 265	78 265	23 45	47	N	63	686	63	693	8	640	651	8	640	651
78 263	78 263	19 58	24	N	52	684	53	683	-1	685	78 265	78 265	0 58	51	N	218	663	219	690	3	686	701	3	686	701
78 263	78 263	20 8	30	N	225	649	226	650	-6	650	78 265	78 265	1 50	22	S	82	700	82	703	12	689	712	12	689	712
78 263	78 263	21 38	59	N	61	656	62	650	0	616	78 265	78 265	2 27	24	N	206	668	206	670	2	650	651	2	650	651
78 263	78 263	21 52	8	N	223	626	224	626	9	626	78 265	78 265	3 17	42	S	205	657	205	671	14	637	652	14	637	652
78 263	78 263	22 53	44	S	178	678	177	687	18	634	78 265	78 265	4 7	59	S	76	673	75	677	20	643	674	20	643	674
78 263	78 263	22 45	0	S	99	659	101	677	18	634	78 265	78 265	4 22	1	N	201	673	201	676	3	655	657	3	655	657
78 263	78 263	23 19	56	N	66	641	66	641		654	78 265	78 265	4 22	1	N	201	673	201	676	10	627	645	10	627	645
78 263	78 263	23 34	15	N	224	660	224	660		654	78 265	78 265	5 12	9	S	74	662	79	660		649	655		649	655
78 263	78 263	0 14	40	S	190	682	190	682	1	653	78 265	78 265	5 42	35	N	209	643	209	660	17	622	648	17	622	648
78 263	78 263	0 28	0	S	39	639	39	639	-6	669	78 265	78 265	6 2	15	N	82	651	82	656	5	632	647	5	632	647
78 263	78 263	1 2	39	N	65	674	65	668	78 265	78 265	6 37	19	S	76	628	63	202	654	11	622	637	11	622	637	
78 263	78 263	1 16	55	S	215	675	215	679	3	667	78 265	78 265	7 29	0	N	82	651	82	656	4	607	618	4	607	618
78 263	78 263	1 55	2	S	199	673	199	677	14	634	78 265	78 265	8 17	13	N	202	643	202	654	1	641	651	1	641	651
78 263	78 263	2 9	1	S	80	653	80	667	4	659	78 265	78 265	8 32	15	S	78	639	84	661	22	618	653	22	618	653
78 263	78 263	2 43	44	N	68	655	68	669	4	659	78 265	78 265	9 24	10	N	84	639	205	639	6	611	611	6	611	611
78 263	78 263	2 58	47	N	205	670	205	672	2	652	78 265	78 265	10 12	0	N	82	645	85	574	11	625	647	11	625	647
78 263	78 263	3 34	58	S	206	662	206	663	1	643	78 265	78 265	10 49	18	S	211	643	212	668	25	630	655	25	630	655
78 263	78 263	3 48	54	S	75	673	75	677	4	661	78 265	78 265	11 4	59	N	190	670	190	676	6	640	650	6	640	650
78 263	78 263	4 24	37	N	74	653	74	656	3	639	78 265	78 265	11 52	58	N	95	664	96	667	3	640	653	3	640	653
78 263	78 263	4 40	1	N	200	642	200	639	-3	621	78 265	78 265	12 30	20	N	75	644	75	637	-7	629	631	-7	629	631
78 263	78 263	5 13	59	S	209	628	209	627	-1	606	78 265	78 265	13 21	51	S	216	648	216	650	2	636	636	2	636	636
78 263	78 263	5 30	40	S	76	621	76	621	0	604	78 265	78 265	13 34	2	S	182	656	182	657	1	611	621	1	611	621
78 263	78 263	6 4	30	N	79	615	80	632	17	598	78 265	78 265	14 12	0	N	106	660	108	666	8	627	645	8	627	645
78 263	78 263	6 20	43	N	200	621	200	630	9	598	78 265	78 265	14 25	0	N	67	628	67	624	-4	619	625	-4	619	625
78 263	78 263	6 54	0	S	208	629	208	635	6	607	78 265	78 265	15 4	17	S	217	625	217	627	2	610	616	2	610	616
78 263	78 263	7 10	34	S	76	624	76	624	26	572	78 265	78 265	15 4	17	S	177	632	177	635	3	553	574	3	553	574
78 263	78 263	7 44	38	N	82	597	83	623	0	642	78 265	78 265	15 54	59	N	61	614	61	618	4	604	618	4	604	618
78 263	78 263	7 59	53	N	202	661	202	661	31	616	78 265	78 265	16 11	9	N	217	613	217	614	1	597	614	1	597	614
78 263	78 263	8 34	22	S	204	637	204	638	8	625	78 265	78 265	17 37	19	N	61	595	60	600	15	572	599	15	572	599
78 263	78 263	8 49	59	S	79	640	79	640	-3	640	78 265	78 265	17 53	8	N	218	605	219	613	8	588	603	8	588	603
78 263	78 263	9 26	40	N	93	559	94	556	-8	640	78 265	78 265	19 20	45	N	61	608	61	612	4	597	612	4	597	612
78 263	78 263	9 40	55	N	207	650	-27	671	21	630	78 265	78 265	19 35	19	N	220	599	221	610	11	585	598	11	585	598
78 263	78 263	10 16	6	S	197	677	197	677	0	637	78 265	78 265	20 27	15	S	209	643	209	643	-4	619	625	-4	619	625
78 263	78 263	10 28	59	S	87	680	86	637	-43	664	78 265	78 265	20 47	1	S	177	632	177	635	3	553	574	3	553	574
78 263	78 263	11 7	20	N	80	673	80	672	-1	656	78 265	78 265	21 3	19	N	61	614	61	618	4	604	618	4	604	618
78 263	78 263	11 22	0	N	212	653	213	664	11	641	78 265	78 265	21 11	9	N	217	613	217	614	1	597	614	1	597	614
78 263	78 263	11 57	41	S	198	680	198	682	2	640	78 265	78 265	22 4	5	N	61	595	60	600	15	572	599	15	572	599
78 263	78 263	12 9	41	S	98	579	98	580	1	658	78 265	78 265	22 48	59	N	70	688	71	690	8	588	603	8	588	603
78 263	78 263	12 48	59	N	70	688	71	677	-11	677	78 265	78 265	23 1	59	N	220	599	221	610	11	585	598	11	585	598
78 263	78 263	13 41	14	S	217	668	217	668	-48	657	78 265	78 265	23 17	21	S	177	632	177	635	3	553	574	3	553	574
78 263	78 263	13 50	49	S	173	698	173	673	3	630	78 265	78 265	24 1	1	N	63	628	108	627	-4	619	625	-4	619	625
78 263	78 263	14 31	3	N	62	667	61	675	3	661	78 265	78 265	24 17	21	N	223	614	223	614	13	602	616	13	602	616

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YR	DA	HR	MM	SEC	PO	HDDK	LT	LAT	QDDK	DLAT	MIDNIGHT	LA-H.A.	C	YR	DA	HR	MM	SEC	PO	HDDK	LT	LAT	QDDK	DLAT	MIDNIGHT	LA-H.A.	C
78	281	9	49	58	N	209	660	210	633	15	650	669	669	78	281	9	49	58	N	209	660	210	633	15	650	669	669
78	281	10	25	23	S	199	672	199	676	-34	642	660	660	78	281	10	25	23	S	199	672	199	676	-34	642	660	660
78	281	10	37	53	S	90	692	89	688	-5	661	667	667	78	281	10	37	53	S	90	692	89	688	-5	661	667	667
78	281	11	16	58	N	82	678	82	673	-5	661	667	667	78	281	11	16	58	N	82	678	82	673	-5	661	667	667
78	281	11	31	44	N	214	649	215	658	-1	637	643	643	78	281	11	31	44	N	214	649	215	658	-1	637	643	643
78	281	12	7	23	S	189	687	189	686	-1	637	643	643	78	281	12	7	23	S	189	687	189	686	-1	637	643	643
78	281	12	19	57	S	99	652	101	672	20	625	650	650	78	281	12	19	57	S	99	652	101	672	20	625	650	650
78	281	12	56	57	S	75	641	73	664	23	625	650	650	78	281	12	56	57	S	75	641	73	664	23	625	650	650
78	281	13	13	16	N	218	650	219	652	12	638	650	650	78	281	13	13	16	N	218	650	219	652	12	638	650	650
78	281	14	39	44	N	65	640	67	615	-23	632	615	615	78	281	14	39	44	N	65	640	67	615	-23	632	615	615
78	281	14	54	29	N	222	664	222	656	2	667	658	658	78	281	14	54	29	N	222	664	222	656	2	667	658	658
78	282	17	49	57	N	54	654	59	621	-43	663	626	626	78	282	17	49	57	N	54	654	59	621	-43	663	626	626
78	282	18	0	59	N	225	654	225	659	5	649	650	650	78	282	18	0	59	N	225	654	225	659	5	649	650	650
78	282	19	32	11	N	57	659	56	665	6	657	672	672	78	282	19	32	11	N	57	659	56	665	6	657	672	672
78	282	19	43	36	N	225	638	226	646	9	630	636	636	78	282	19	43	36	N	225	638	226	646	9	630	636	636
78	282	21	14	0	N	61	660	62	656	-4	654	663	663	78	282	21	14	0	N	61	660	62	656	-4	654	663	663
78	282	21	25	54	N	227	645	228	650	5	638	641	641	78	282	21	25	54	N	227	645	228	650	5	638	641	641
78	282	22	54	59	N	66	646	66	644	-2	632	647	647	78	282	22	54	59	N	66	646	66	644	-2	632	647	647
78	282	23	9	38	N	223	632	224	636	4	623	625	625	78	282	23	9	38	N	223	632	224	636	4	623	625	625
78	282	23	47	59	S	190	633	190	630	-13	630	614	614	78	282	23	47	59	S	190	633	190	630	-13	630	614	614
78	282	0	2	0	S	92	656	91	638	0	613	623	623	78	282	0	2	0	S	92	656	91	638	0	613	623	623
78	283	0	35	35	N	69	622	69	622	1	596	603	603	78	283	0	35	35	N	69	622	69	622	1	596	603	603
78	283	0	53	47	N	214	612	214	613	1	596	603	603	78	283	0	53	47	N	214	612	214	613	1	596	603	603
78	283	1	28	6	S	198	611	198	617	6	573	597	597	78	283	1	28	6	S	198	611	198	617	6	573	597	597
78	283	1	42	59	S	82	611	82	619	8	587	605	605	78	283	1	42	59	S	82	611	82	619	8	587	605	605
78	283	2	16	23	N	70	601	70	614	13	583	606	606	78	283	2	16	23	N	70	601	70	614	13	583	606	606
78	283	2	35	0	N	205	633	205	617	-16	611	603	603	78	283	2	35	0	N	205	633	205	617	-16	611	603	603
78	283	3	8	18	S	204	604	204	607	14	579	594	594	78	283	3	8	18	S	204	604	204	607	14	579	594	594
78	283	3	26	5	S	78	602	78	616	14	586	608	608	78	283	3	26	5	S	78	602	78	616	14	586	608	608
78	283	3	58	0	N	75	604	75	602	-2	586	593	593	78	283	3	58	0	N	75	604	75	602	-2	586	593	593
78	283	4	16	31	N	202	500	202	597	-3	575	595	595	78	283	4	16	31	N	202	500	202	597	-3	575	595	595
78	283	4	48	29	S	209	607	210	609	2	583	593	593	78	283	4	48	29	S	209	607	210	609	2	583	593	593
78	283	5	5	1	S	77	641	77	639	-2	626	633	633	78	283	5	5	1	S	77	641	77	639	-2	626	633	633
78	283	5	40	50	N	80	660	81	646	-14	641	636	636	78	283	5	40	50	N	80	660	81	646	-14	641	636	636
78	283	5	55	13	N	202	649	202	639	-10	629	623	623	78	283	5	55	13	N	202	649	202	639	-10	629	623	623
78	283	6	28	38	S	210	612	211	635	23	596	624	624	78	283	6	28	38	S	210	612	211	635	23	596	624	624
78	283	6	45	23	S	78	631	78	628	-3	615	621	621	78	283	6	45	23	S	78	631	78	628	-3	615	621	621
78	283	7	21	6	N	84	644	84	640	-4	624	629	629	78	283	7	21	6	N	84	644	84	640	-4	624	629	629
78	283	7	35	30	N	204	645	204	652	5	625	635	635	78	283	7	35	30	N	204	645	204	652	5	625	635	635
78	283	8	9	30	S	208	639	208	643	4	618	627	627	78	283	8	9	30	S	208	639	208	643	4	618	627	627
78	283	8	24	42	S	79	649	80	636	-23	635	613	613	78	283	8	24	42	S	79	649	80	636	-23	635	613	613
78	283	9	1	53	N	86	659	86	651	-2	640	642	642	78	283	9	1	53	N	86	659	86	651	-2	640	642	642
78	283	9	15	44	N	208	660	208	662	2	641	644	644	78	283	9	15	44	N	208	660	208	662	2	641	644	644
78	283	9	50	32	S	202	660	202	666	6	641	648	648	78	283	9	50	32	S	202	660	202	666	6	641	648	648
78	283	10	5	6	S	86	644	86	642	-24	624	626	626	78	283	10	5	6	S	86	644	86	642	-24	624	626	626
78	283	10	42	7	N	84	661	85	637	10	612	626	626	78	283	10	42	7	N	84	661	85	637	10	612	626	626
78	283	10	57	47	N	212	627	213	637	10	612	626	626	78	283	10	57	47	N	212	627	213	637	10	612	626	626
78	283	11	30	58	S	196	635	196	638	3	600	616	616	78	283	11	30	58	S	196	635	196	638	3	600	616	616
78	283	11	46	0	S	94	635	97	659	34	605	655	655	78	283	11	46	0	S	94	635	97	659	34	605	655	655
78	283	12	21	59	N	78	635	79	626	-9	619	619	619	78	283	12	21	59	N	78	635	79	626	-9	619	619	619
78	283	12	39	40	N	216	617	216	621	4	601	611	611	78	283	12	39	40	N	216	617	216	621	4	601	611	611
78	283	13	14	0	S	185	662	184	665	3	619	629	629	78	283	13	14	0	S	185	662	184	665	3	619	629	629
78	283	13	25	51	S	108	664	109	673	9	632	652	652	78	283	13	25	51	S	108	664	109	673	9	632	652	652
78	283	14	4	33	N	68	644	70	628	-16	637	621	621	78	283	14	4	33	N	68	644	70	628	-16	637	621	621

YR	DA	HR	MM	SEC	PO	HDDK	LT	LAT	COOK	DLAT	MIDNIGHT	DLAT	MIDNIGHT	DLAT	MIDNIGHT	DLAT	MIDNIGHT
YR	DA	HR	MM	SEC	PO	HDDK	LT	LAT	COOK	DLAT	MIDNIGHT	DLAT	MIDNIGHT	DLAT	MIDNIGHT	DLAT	MIDNIGHT
78	284	0	2	1	N	56	554	66	650	-4	617	559	559	559	559	559	559
78	285	0	55	48	S	193	684	192	651	-7	635	641	641	641	641	641	641
78	285	1	44	22	N	65	677	85	675	-11	610	689	689	689	689	689	689
78	285	2	36	0	S	202	673	202	681	-25	610	689	689	689	689	689	689
78	285	2	50	4	S	78	654	78	652	-2	640	647	647	647	647	647	647
78	285	3	24	36	N	72	644	72	647	3	629	642	642	642	642	642	642
78	285	3	39	38	N	204	685	204	685	-1	609	685	685	685	685	685	685
78	285	4	16	3	S	210	668	210	668	-16	658	650	650	650	650	650	650
78	285	4	29	46	S	76	671	77	655	-16	658	650	650	650	650	650	650
78	285	5	55	53	S	213	663	213	663	-4	652	654	654	654	654	654	654
78	285	6	9	57	S	76	663	77	654	-9	650	649	649	649	649	649	649
78	285	6	48	0	N	84	691	84	686	-5	676	681	681	681	681	681	681
78	285	7	0	3	N	203	665	211	675	4	661	662	662	662	662	662	662
78	285	7	36	5	S	78	670	78	666	-4	657	662	662	662	662	662	662
78	285	7	49	37	S	86	675	96	678	2	659	672	672	672	672	672	672
78	285	8	28	2	N	206	682	206	684	1	666	664	664	664	664	664	664
78	285	8	40	34	S	205	685	205	681	-4	668	681	681	681	681	681	681
78	285	9	16	43	S	84	685	84	684	-1	647	655	655	655	655	655	655
78	285	9	30	0	S	85	704	85	679	-25	690	673	673	673	673	673	673
78	285	10	9	5	N	211	667	212	669	2	657	656	656	656	656	656	656
78	285	10	21	54	S	197	674	197	674	3	641	648	648	648	648	648	648
78	285	10	57	14	S	95	710	92	676	-34	696	655	655	655	655	655	655
78	285	11	5	0	N	79	685	79	693	7	675	651	651	651	651	651	651
78	285	11	48	59	N	216	633	216	633	0	619	622	622	622	622	622	622
78	285	12	4	17	S	188	663	188	663	0	619	622	622	622	622	622	622
78	285	12	38	50	S	108	699	108	699	-11	618	616	616	616	616	616	616
78	285	12	50	2	S	72	634	72	623	-11	618	616	616	616	616	616	616
78	285	13	28	57	N	218	621	218	625	4	606	615	615	615	615	615	615
78	285	13	46	28	S	179	654	181	642	-12	588	607	607	607	607	607	607
78	285	14	21	32	S	64	633	64	633	0	625	635	635	635	635	635	635
78	285	15	12	6	N	216	585	216	591	5	557	582	582	582	582	582	582
78	285	15	29	31	N	58	639	58	639	-23	635	616	616	616	616	616	616
78	285	18	38	58	N	226	651	226	652	1	645	643	643	643	643	643	643
78	285	18	50	40	N	60	650	59	659	9	643	645	645	645	645	645	645
78	285	20	21	25	N	226	636	227	641	5	628	631	631	631	631	631	631
78	285	22	3	35	N	66	637	69	598	-39	629	597	597	597	597	597	597
78	285	22	16	34	N	225	631	226	639	8	622	629	629	629	629	629	629
78	285	22	58	11	S	130	694	179	700	6	657	652	652	652	652	652	652
78	285	23	9	0	S	99	667	97	643	-24	644	620	620	620	620	620	620
78	285	23	43	29	N	69	622	68	631	9	613	622	622	622	622	622	622
78	285	23	43	29	N	193	656	193	660	4	624	635	635	635	635	635	635
78	286	0	37	44	S	67	626	87	651	25	604	642	642	642	642	642	642
78	286	1	26	12	N	67	655	68	643	-12	649	646	646	646	646	646	646
78	286	2	18	8	S	201	650	201	650	9	519	638	638	638	638	638	638
78	286	3	16	53	N	71	635	71	644	4	641	646	646	646	646	646	646
78	286	3	23	13	S	204	660	204	664	-4	641	646	646	646	646	646	646
78	286	3	58	34	S	209	656	209	653	-3	636	656	656	656	656	656	656
78	286	4	13	37	S	77	641	77	644	3	626	638	638	638	638	638	638
78	286	4	48	33	N	78	646	78	652	6	631	647	647	647	647	647	647
78	286	5	3	9	N	202	672	202	650	-22	654	653	653	653	653	653	653
78	286	5	33	28	S	212	653	213	664	11	641	651	651	651	651	651	651
78	286	5	53	39	S	77	641	77	641	626	626	626	626	626	626	626	626

YR	DA	HR	MM	SEC	PO	HDDK	LT	LAT	CDCK	DLAT	LATH, LATH	MIDNIGHT	YR	DA	HR	MM	SEC	PO	HDDK	LT	LAT	CDCK	DLAT	LATH, LATH	MIDNIGHT
78	292	3	3	11	N	72	608	71	619	11	590	611	78	293	5	32	54	S	77	662	79	632	-30	649	625
78	292	3	21	16	N	203	630	203	634	4	608	619	78	293	6	10	30	N	83	684	83	676	-8	668	670
78	292	2	54	47	S	208	626	208	631	5	604	616	78	293	6	23	23	N	203	669	203	665	16	651	665
78	292	4	10	59	S	78	634	78	631	5	618	619	78	293	6	58	52	S	213	669	213	670	1	659	657
78	292	4	45	25	N	78	636	78	626	-10	621	619	78	293	7	13	34	S	79	642	86	655	-8	645	646
78	292	5	1	48	N	203	621	203	625	4	588	611	78	293	7	50	26	N	86	663	206	631	-34	646	616
78	292	5	34	15	S	78	647	212	619	11	591	609	78	293	8	3	48	N	208	677	208	671	-6	659	652
78	292	5	50	34	S	78	647	212	619	11	591	609	78	293	8	3	48	N	208	677	208	671	-6	659	652
78	292	6	25	30	N	83	606	204	620	11	592	603	78	293	8	39	12	S	82	679	82	647	-32	663	637
78	292	6	42	0	N	204	618	204	620	2	595	606	78	293	9	31	8	N	87	676	87	660	-16	659	652
78	292	7	13	44	S	210	589	75	705	122	570	592	78	293	9	44	26	N	210	652	210	670	8	651	657
78	292	7	32	54	S	80	586	75	705	122	570	592	78	293	10	19	49	S	201	677	201	673	-4	659	654
78	292	8	5	30	N	86	586	206	615	32	570	604	78	293	10	32	25	S	90	681	91	680	-1	661	670
78	292	8	23	53	N	206	585	206	574	5	571	585	78	293	11	17	58	N	83	695	84	672	-23	680	665
78	292	8	53	31	S	206	572	206	572	0	574	585	78	293	11	23	18	N	215	644	215	644	5	631	637
78	292	9	12	24	S	83	597	93	620	23	572	607	78	293	12	0	52	S	193	664	192	673	9	633	647
78	292	9	47	23	N	87	645	211	613	13	585	581	78	293	12	13	31	S	101	674	68	625	-24	642	626
78	292	10	4	11	N	210	585	211	590	5	566	581	78	293	14	34	18	N	66	649	221	644	7	629	634
78	292	10	36	10	S	200	642	201	613	-29	621	600	78	293	14	49	33	N	220	637	221	632	-22	651	634
78	292	10	50	55	S	91	648	90	623	-25	623	593	78	293	16	18	10	N	58	654	61	632	-22	651	634
78	292	11	26	43	N	84	616	24	604	-12	613	583	78	293	18	0	20	N	60	625	58	639	14	616	644
78	292	11	15	18	N	215	594	215	619	24	576	608	78	293	18	14	32	N	220	605	221	612	7	592	600
78	292	12	17	28	S	193	635	193	644	2	600	621	78	293	19	41	57	N	64	601	63	618	17	590	618
78	292	12	30	40	S	103	677	104	685	8	652	670	78	293	19	56	33	N	223	606	224	618	12	593	606
78	292	13	7	25	N	77	600	76	607	7	592	599	78	293	21	25	33	N	226	654	68	606	-48	647	605
78	292	13	25	27	N	219	640	627	607	7	592	599	78	293	21	38	28	N	226	654	68	606	-48	647	605
78	292	14	1	9	S	181	663	178	677	14	620	625	78	293	23	7	52	N	63	676	65	662	-14	671	666
78	292	14	52	27	N	63	650	58	608	-52	654	597	78	293	23	20	6	N	237	670	238	678	8	668	671
78	292	15	8	57	N	217	594	218	604	10	576	595	78	293	23	20	6	N	237	670	238	678	8	668	671
78	292	16	35	51	N	57	652	62	613	-39	649	613	78	294	0	13	12	S	93	673	91	647	-26	651	626
78	292	16	50	36	N	218	594	219	612	18	576	592	78	294	0	49	31	N	64	680	66	655	-25	676	659
78	292	18	18	22	N	58	636	60	625	-11	632	626	78	294	1	3	19	N	217	675	218	680	4	667	657
78	292	18	30	46	N	224	639	224	634	-5	631	623	78	294	1	41	41	S	197	680	197	681	1	651	654
78	292	20	0	53	N	61	643	24	606	-37	636	605	78	294	2	31	31	S	82	672	82	672	0	655	665
78	292	20	14	16	N	223	600	224	613	13	555	601	78	294	2	31	31	N	66	686	68	671	-25	693	676
78	292	21	41	10	N	68	602	69	597	-5	591	595	78	294	2	45	46	N	208	662	206	666	4	643	648
78	292	21	57	15	N	223	595	223	600	5	590	597	78	294	3	21	15	S	206	653	206	663	10	633	645
78	292	22	37	25	S	179	678	179	678	0	626	626	78	294	3	35	44	S	77	663	78	653	-20	650	637
78	292	22	48	13	S	192	672	192	666	-6	644	642	78	294	4	11	55	N	75	672	75	677	5	660	674
78	292	23	22	41	N	70	606	70	615	7	588	605	78	294	4	26	36	N	203	652	203	656	4	632	639
78	292	23	39	0	N	223	541	223	648	10	638	538	78	294	5	1	3	S	212	644	212	648	4	631	636
78	293	0	17	56	S	191	569	190	579	-40	638	552	78	294	5	15	13	S	78	650	78	650	0	636	645
78	293	0	30	31	S	91	579	93	539	-40	638	552	78	294	5	15	13	S	78	650	78	650	0	636	645
78	293	1	6	10	N	56	561	58	639	-23	655	640	78	294	6	6	21	N	82	659	82	587	-71	639	569
78	293	1	21	32	N	214	659	214	664	5	648	651	78	294	6	40	51	S	202	663	203	664	1	644	648
78	293	1	58	11	N	199	656	199	663	7	624	538	78	294	6	56	26	S	79	642	79	642	20	625	646
78	293	2	12	46	S	81	650	81	650	-1	632	641	78	294	7	23	6	N	86	657	86	632	-25	633	620
78	293	2	47	28	N	69	657	69	654	-3	651	650	78	294	7	46	19	S	205	684	205	684	9	657	664
78	293	3	3	58	N	204	633	204	637	4	611	621	78	294	8	21	52	N	209	672	209	670	-2	654	651
78	293	3	37	41	S	207	628	207	628	0	606	613	78	294	8	35	44	S	81	661	81	661	643	643	643
78	293	3	53	1	S	77	659	76	606	-5	645	597	78	294	9	13	59	N	27	676	87	666	-10	659	659
78	293	4	29	4	N	76	667	77	657	-	654	652	78	294	9	27	15	N	209	665	210	664	-1	646	651
78	293	4	43	43	S	203	653	203	643	-10	633	627	78	294	10	2	6	S	203	662	203	663	1	643	645
78	293	5	17	59	S	212	637	212	641	4	623	630	78	294	10	15	25	S	89	675	89	682	3	663	677

YR DA		HDDK		HDDK		CDDK		MIDNIGHT		MIDNIGHT		CDDK		HDDK		HDDK		CDDK		MIDNIGHT		MIDNIGHT	
YR	DA	HR	MIN	SEC	PO	LT	LAT	LT	LAT	DLAT	LATH, LATH	DLAT	LATH, LATH	LT	LAT	LT	LAT	DLAT	LATH, LATH	LT	LAT	DLAT	LATH, LATH
8	294	10	53	23	N	85	650	85	650	13	630	655	13	630	655	85	650	204	689	204	689	-2	664
8	294	11	9	25	N	85	650	85	650	13	630	655	13	630	655	85	650	204	689	204	689	-2	664
8	294	11	43	13	S	195	657	195	657	6	625	638	6	625	638	195	657	72	674	72	674	0	646
8	294	11	56	18	S	99	672	98	654	-18	650	635	-18	650	635	98	654	203	665	203	665	-3	645
8	294	12	34	11	S	78	650	78	643	-7	636	637	-7	636	637	78	643	211	653	211	653	5	639
8	294	12	51	0	S	184	629	183	629	14	622	629	14	622	629	183	629	211	653	211	653	-1	654
8	294	13	25	49	S	184	629	183	629	14	622	629	14	622	629	183	629	211	653	211	653	-1	654
8	294	13	37	51	S	108	654	109	660	6	619	615	6	619	615	108	654	211	653	211	653	-1	654
8	294	14	16	50	S	108	654	109	660	6	619	615	6	619	615	108	654	211	653	211	653	-1	654
8	294	14	33	3	N	219	622	220	629	-32	619	615	-32	619	615	219	622	213	630	213	630	4	616
8	294	15	59	17	N	82	626	83	619	-7	617	619	-7	617	619	82	626	213	630	213	630	4	616
8	294	16	13	42	N	233	651	230	626	-25	645	615	-25	645	615	233	651	213	630	213	630	4	616
8	294	22	47	19	N	224	630	224	631	12	621	627	12	621	627	224	630	213	630	213	630	4	616
8	294	23	3	55	N	138	657	138	657	6	613	627	6	613	627	138	657	213	630	213	630	4	616
8	294	23	43	0	S	91	602	92	624	22	564	595	22	564	595	91	602	213	630	213	630	4	616
8	294	23	57	47	S	91	602	92	624	22	564	595	22	564	595	91	602	213	630	213	630	4	616
8	294	0	28	0	S	70	595	70	595	0	576	586	0	576	586	70	595	213	630	213	630	4	616
8	294	0	46	34	N	217	651	217	651	-4	639	642	-4	639	642	217	651	213	630	213	630	4	616
8	294	1	24	4	S	196	667	196	667	-3	632	639	-3	632	639	196	667	213	630	213	630	4	616
8	294	1	39	36	S	83	600	83	600	-2	645	644	-2	645	644	83	600	213	630	213	630	4	616
8	294	2	12	7	N	69	637	69	637	-2	645	644	-2	645	644	69	637	213	630	213	630	4	616
8	294	2	28	22	N	207	654	207	654	9	632	643	9	632	643	207	654	213	630	213	630	4	616
8	294	3	4	3	S	204	652	205	661	9	632	643	9	632	643	204	652	213	630	213	630	4	616
8	294	3	4	3	S	204	652	205	661	9	632	643	9	632	643	204	652	213	630	213	630	4	616
8	294	5	49	52	N	203	641	203	641	-15	620	612	-15	620	612	203	641	213	630	213	630	4	616
8	294	5	49	52	N	203	641	203	641	-15	620	612	-15	620	612	203	641	213	630	213	630	4	616
8	294	6	22	35	S	211	500	212	608	8	562	598	8	562	598	211	500	213	630	213	630	4	616
8	294	6	22	35	S	211	500	212	608	8	562	598	8	562	598	211	500	213	630	213	630	4	616
8	294	6	39	30	S	79	637	78	644	9	624	638	9	624	638	79	637	213	630	213	630	4	616
8	294	7	15	47	N	85	653	85	653	9	624	638	9	624	638	85	653	213	630	213	630	4	616
8	294	7	31	16	N	205	599	205	607	8	574	594	8	574	594	205	599	213	630	213	630	4	616
8	294	8	2	59	S	209	610	209	610	0	530	541	0	530	541	209	610	213	630	213	630	4	616
8	294	8	18	59	S	80	650	81	650	0	634	647	0	634	647	80	650	213	630	213	630	4	616
8	294	8	56	9	N	37	653	37	653	3	634	647	3	634	647	37	653	213	630	213	630	4	616
8	294	9	11	31	N	208	611	208	611	5	567	603	5	567	603	208	611	213	630	213	630	4	616
8	294	9	11	31	N	208	611	208	611	5	567	603	5	567	603	208	611	213	630	213	630	4	616
8	294	10	43	29	S	204	512	204	512	1	528	600	1	528	600	204	512	213	630	213	630	4	616
8	294	10	43	29	S	204	512	204	512	1	528	600	1	528	600	204	512	213	630	213	630	4	616
8	294	10	35	36	N	86	599	86	599	16	607	635	16	607	635	86	599	213	630	213	630	4	616
8	294	10	52	36	N	213	611	213	611	9	595	610	9	595	610	213	611	213	630	213	630	4	616
8	294	11	25	52	S	196	660	196	660	0	628	635	0	628	635	196	660	213	630	213	630	4	616
8	294	11	25	52	S	196	660	196	660	0	628	635	0	628	635	196	660	213	630	213	630	4	616
8	294	11	39	45	N	98	650	98	650	-13	623	612	-13	623	612	98	650	213	630	213	630	4	616
8	294	12	15	54	N	81	621	80	641	20	598	630	20	598	630	81	621	213	630	213	630	4	616
8	294	12	32	55	N	219	647	219	647	3	635	635	3	635	635	219	647	213	630	213	630	4	616
8	294	13	8	37	S	184	679	183	679	8	638	649	8	638	649	184	679	213	630	213	630	4	616
8	294	13	20	53	S	106	644	106	644	1	603	611	1	603	611	106	644	213	630	213	630	4	616
8	294	13	59	21	N	69	660	69	660	-7	654	656	-7	654	656	69	660	213	630	213	630	4	616
8	294	14	14	8	N	222	561	223	660	8	651	651	8	651	651	222	561	213	630	213	630	4	616
8	294	15	51	0	N	65	512	65	512	-4	602	607	-4	602	607	65	512	213	630	213	630	4	616
8	294	15	51	0	N	65	512	65	512	-4	602	607	-4	602	607	65	512	213	630	213	630	4	616
8	294	0	14	22	N	221	632	222	645	13	625	635	13	625	635	221	632	213	630	213	630	4	616
8	294	0	27	56	N	221	632	222	645	13	625	635	13	625	635	221	632	213	630	213	630	4	616
8	294	1	7	53	S	193	707	193	707	-54	631	629	-54	631	629	193	707	213	630	213	630	4	616
8	294	1	20	11	S	85	670	85	670	0	553	634	0	553	634	85	670	213	630	213	630	4	616
8	294	1	56	19	N	65	623	65	623	-14	619	614	-14	619	614	65	623	213	630	213	630	4	616
8	294	2	10	23	N	210	581	211	690	9	672	616	9	672	616	210	581	213	630	213	630	4	616

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YR	DA	HDDK	HR	MN	SEC	PO	HDDK	LT	LAT	DLAT	MIDNIGHT	DLAT	LAT	DLAT	LATH, LATHC	MIDNIGHT
78	302	183	6	19	0	S	183	677	0	636	640	28	560	600	636	640
78	302	96	20	0	S	96	638	38	562	614	38	562	614	38	562	614
78	302	23	24	0	S	23	656	619	619	619	619	2	8	36	619	619
78	303	0	8	0	N	222	660	222	656	-2	656	656	656	656	656	656
78	303	0	46	55	S	193	671	193	671	-54	641	641	641	641	641	641
78	303	1	50	25	S	201	674	201	675	1	665	665	665	665	665	665
78	303	2	26	0	S	201	622	201	625	3	595	611	611	611	611	611
78	303	2	41	29	S	79	660	79	661	1	647	657	657	657	657	657
78	303	3	15	30	N	72	621	72	616	-5	614	608	608	608	608	608
78	303	3	32	0	N	204	663	204	645	-18	645	629	629	629	629	629
78	303	4	7	1	S	209	648	210	648	0	628	636	636	636	636	636
78	303	4	22	13	S	78	647	78	634	-13	632	628	628	628	628	628
78	303	4	56	59	N	79	628	79	606	-22	612	597	597	597	597	597
78	303	5	12	47	N	203	644	204	644	0	623	628	628	628	628	628
78	303	5	45	14	S	213	642	213	623	1	607	513	513	513	513	513
78	303	6	3	25	S	80	514	77	636	72	551	583	583	583	583	583
78	303	6	37	13	N	84	604	85	599	-5	579	583	583	583	583	583
78	303	6	53	11	N	205	635	205	634	-1	613	619	619	619	619	619
78	303	7	25	28	S	211	595	211	608	13	577	598	598	598	598	598
78	303	7	43	59	S	81	595	81	615	16	574	601	601	601	601	601
78	303	8	17	44	N	87	603	87	602	-1	578	586	586	586	586	586
78	303	8	34	20	N	208	609	208	609	0	535	596	596	596	596	596
78	303	9	5	29	S	207	585	207	600	15	559	588	588	588	588	588
78	303	9	24	39	S	34	581	34	613	32	554	599	599	599	599	599
78	303	10	15	22	N	212	571	212	592	11	554	574	574	574	574	574
78	303	10	45	56	S	202	571	202	572	1	543	563	563	563	563	563
78	303	11	5	1	S	90	578	92	610	-0	535	587	587	587	587	587
78	303	11	37	29	N	85	578	85	590	6	557	573	573	573	573	573
78	303	11	57	39	N	215	578	216	579	1	558	571	571	571	571	571
78	303	12	27	0	S	197	559	197	568	9	514	554	554	554	554	554
78	303	12	46	0	S	98	571	99	593	22	526	553	553	553	553	553
78	303	13	17	29	N	79	543	79	540	-3	520	526	526	526	526	526
78	303	13	29	29	N	217	580	217	590	10	560	581	581	581	581	581
78	303	14	9	57	S	190	592	187	610	28	540	572	572	572	572	572
78	303	14	26	47	S	107	589	114	657	59	521	562	562	562	562	562
78	303	15	0	30	N	72	548	72	546	-2	525	533	533	533	533	533
78	303	15	21	41	N	216	508	217	574	6	547	566	566	566	566	566
78	303	15	51	42	S	188	519	189	550	1	484	519	519	519	519	519
78	303	16	6	20	S	114	597	67	554	-5	544	549	549	549	549	549
78	303	16	43	21	N	67	559	67	554	15	520	552	552	552	552	552
78	303	17	2	59	N	215	544	216	559	3	534	552	552	552	552	552
78	303	18	27	17	N	65	554	66	557	6	536	559	559	559	559	559
78	303	18	45	11	N	218	560	219	566	11	526	544	544	544	544	544
78	303	19	22	33	S	172	615	169	626	5	564	564	564	564	564	564
78	303	20	9	47	N	69	557	68	562	5	542	557	557	557	557	557
78	303	20	27	7	N	221	563	221	575	6	550	560	560	560	560	560
78	303	21	51	44	N	72	566	71	570	4	559	559	559	559	559	559
78	303	22	9	45	N	222	576	223	592	17	558	579	579	579	579	579
78	303	22	47	14	S	185	629	185	629	0	579	594	594	594	594	594
78	303	23	2	59	S	94	578	94	570	-8	563	583	583	583	583	583
78	303	23	33	35	N	72	583	71	593	10	563	604	604	604	604	604
78	303	23	51	48	N	193	621	193	616	6	584	606	606	606	606	606
78	304	0	27	59	S	193	621	193	629	8	584	606	606	606	606	606

YR	DA	HR	MN	SEC	PO	HDDK	LT	LAT	CDCK	DLAT	"MIDNIGHT"	LATH.	LATC	CDCK	LT	LAT	DLAT	"MIDNIGHT"	LATH.	LATC
78 305	4 20 35	N	77	577	77	562	-15	597	550	597	550	597	550	88	677	88	677	-28	660	639
78 305	4 26 52	N	203	626	203	626	6	596	611	596	611	596	611	210	524	210	524	6	602	614
78 305	5 11 38	S	212	621	212	621	6	596	611	596	611	596	611	205	593	205	593	20	567	600
78 305	5 28 30	S	212	615	212	615	6	596	611	596	611	596	611	89	661	89	661	8	634	553
78 305	6 1 36	N	83	572	83	572	22	542	577	542	577	542	577	214	571	214	571	19	550	581
78 305	7 3 36	N	83	571	83	571	-19	537	598	537	598	537	598	199	590	199	590	5	555	582
78 305	7 43 46	N	87	622	87	622	-10	539	598	539	598	539	598	97	635	97	635	-34	646	610
78 305	7 59 46	N	207	608	207	608	1	584	596	584	596	584	596	82	572	82	572	44	544	602
78 305	8 31 15	S	208	597	208	597	8	572	593	572	593	572	593	217	587	217	587	8	559	579
78 305	8 49 0	S	83	613	83	613	10	599	610	599	610	599	610	193	592	193	592	0	551	575
78 305	9 41 22	N	211	578	211	578	14	537	569	537	569	537	569	107	639	107	639	-12	613	602
78 305	10 10 59	S	204	565	204	565	14	537	569	537	569	537	569	72	604	72	604	-11	587	595
78 305	10 30 52	S	88	586	88	586	64	537	569	537	569	537	569	218	592	218	592	-3	585	590
78 305	11 2 59	N	87	584	87	584	37	537	569	537	569	537	569	181	633	181	633	14	567	586
78 305	11 22 5	N	215	597	215	597	1	579	589	579	589	579	589	55	606	55	606	20	573	585
78 305	11 52 12	S	198	601	198	601	4	561	587	561	587	561	587	218	593	218	593	16	557	584
78 305	12 9 1	S	93	638	93	638	-17	608	591	608	591	608	591	64	583	64	583	11	558	580
78 305	12 44 59	N	79	621	79	621	5	604	615	604	615	604	615	220	602	220	602	18	584	599
78 305	13 2 48	N	219	626	219	626	0	611	615	611	615	611	615	62	620	62	620	2	608	620
78 305	13 26 29	S	107	636	107	636	17	538	587	538	587	538	587	225	627	225	627	-2	618	614
78 305	13 49 36	S	110	639	110	639	-20	532	587	532	587	532	587	166	656	166	656	7	570	586
78 305	14 27 29	N	69	624	69	624	4	633	625	633	625	633	625	117	657	117	657	7	605	606
78 305	14 44 33	N	220	627	220	627	11	619	628	619	628	619	628	67	615	67	615	-10	616	615
78 305	15 21 41	S	171	671	171	671	8	615	619	615	619	615	619	226	625	226	625	-8	625	615
78 305	16 26 1	N	222	634	222	634	12	626	636	626	636	626	636	66	648	66	648	-12	654	651
78 305	17 55 17	N	58	644	58	644	16	616	632	616	632	616	632	227	655	227	655		646	
78 305	18 5 1	N	223	626	223	626	16	616	632	616	632	616	632	188	651	188	651		615	
78 305	19 37 23	N	51	634	51	634	5	626	641	626	641	626	641	97	689	97	689		642	
78 305	19 49 52	N	226	631	226	631	8	627	629	627	629	627	629	68	635	68	635	-13	626	630
78 305	21 18 55	N	66	626	66	626		627	629	627	629	627	629	217	639	217	639	2	626	630
78 305	21 32 28	N	227	630	227	630	-22	620	599	620	599	620	599	186	641	186	641	7	591	612
78 305	23 0 26	N	68	625	68	625		619	619	619	619	619	619	84	639	84	639	-5	624	628
78 305	23 14 44	N	226	656	226	656	647	647	647	647	647	647	647	58	643	58	643	13	627	651
78 305	23 56 5	S	186	703	186	703	668	668	668	668	668	668	668	206	623	206	623	7	600	615
78 306	0 5 37	S	53	663	53	663	-33	622	550	622	550	622	550	203	621	203	621	9	588	607
78 306	0 42 46	N	66	652	66	652	-45	655	599	655	599	655	599	78	634	78	634	35	618	666
78 306	0 57 23	N	218	677	218	677	4	688	688	688	688	688	688	78	634	78	634	-18	619	609
78 306	1 35 44	S	197	674	197	674	9	634	656	634	656	634	656	203	642	203	642	-6	621	621
78 306	1 48 37	S	83	639	83	639	-70	619	605	619	605	619	605	211	622	211	622	19	607	620
78 306	2 39 31	N	207	678	207	678	0	660	658	660	658	660	658	78	645	78	645	-9	651	639
78 306	3 15 43	S	205	660	205	660	8	641	649	641	649	641	649	82	650	82	650	7	634	652
78 306	3 30 32	S	78	643	78	643	4	634	647	634	647	634	647	204	661	204	661	4	642	647
78 306	4 6 33	N	75	661	75	661	-20	659	657	659	657	659	657	213	630	213	630	17	616	635
78 306	4 20 35	N	205	684	205	684	8	645	653	645	653	645	653	86	700	86	700	-9	696	597
78 306	4 54 59	S	212	633	212	633	14	619	635	619	635	619	635	205	664	205	664		646	
78 306	5 10 37	N	78	649	78	649	1	635	645	635	645	635	645	211	632	211	632	-24	651	635
78 306	5 47 21	N	92	675	92	675	9	632	672	632	672	632	672	81	669	81	669	-13	649	645
78 306	6 0 43	N	204	664	204	664	-12	645	635	645	635	645	635	209	625	209	625	14	602	623
78 306	6 35 0	S	213	634	213	634	2	620	625	620	625	620	625	206	641	206	641	6	613	625
78 306	6 50 4	N	79	681	79	681	543	543	543	543	543	543	543	88	679	88	679	18	615	625
78 306	7 27 45	N	87	685	87	685	-6	647	651	647	651	647	651	87	685	87	685	0	615	625
78 306	7 41 27	N	206	647	206	647	17	627	635	627	635	627	635	98	636	98	636	9	626	636
78 306	8 14 59	S	210	630	210	630	7	620	636	620	636	620	636	215	639	215	639			
78 306	8 30 47	S	82	541	82	541														

HDDK										CDDK			MIDNIGHT			HDDK			CDDK			MIDNIGHT							
YR	DA	HR	MM	SEC	PO	LT	LAT	DLAT	LATH, LATC	YR	DA	HR	MM	SEC	PO	LT	LAT	DLAT	LATH, LATC	YR	DA	HR	MM	SEC	PO	LT	LAT	DLAT	LATH, LATC
78	307	11	20	56	S	196	690	-2	662	78	308	15	33	54	N	221	628	221	637	9	619	221	637	9	619	221	637	9	619
78	307	11	32	44	S	96	688	-22	669	78	308	17	2	32	N	57	652	60	634	-18	649	60	634	-18	649	60	634	-18	649
78	307	12	11	23	N	81	657	-13	638	78	308	17	15	31	N	222	630	224	644	14	621	224	644	14	621	224	644	14	621
78	307	12	26	42	N	219	660	20	649	78	308	18	45	57	N	56	666	60	635	-31	665	60	635	-31	665	60	635	-31	665
78	307	13	2	43	S	186	680	28	640	78	308	18	56	32	N	227	652	228	662	10	647	228	662	10	647	228	662	10	647
78	307	13	13	59	S	109	675	-23	649	78	308	20	28	14	N	58	672	63	637	-35	671	63	637	-35	671	63	637	-35	671
78	307	13	53	23	N	70	656	12	649	78	308	20	39	14	N	52	666	232	675	9	666	232	675	9	666	232	675	9	666
78	307	14	8	37	N	222	654	22	649	78	308	22	9	57	N	231	666	66	646	-30	671	66	646	-30	671	66	646	-30	671
78	307	15	50	51	N	222	641	2	634	78	308	22	21	23	N	229	659	230	667	8	645	230	667	8	645	230	667	8	645
78	307	17	19	59	N	58	645	-4	641	78	308	23	3	30	S	182	684	122	687	3	655	122	687	3	655	122	687	3	655
78	307	17	32	14	N	225	650	8	644	78	308	23	13	41	S	103	701	101	684	-17	687	101	684	-17	687	101	684	-17	687
78	307	19	0	1	N	56	668	37	554	78	308	23	50	34	N	66	653	66	657	4	646	66	657	4	646	66	657	4	646
78	307	19	15	51	N	222	601	15	587	78	309	0	4	21	N	224	668	224	673	5	655	224	673	5	655	224	673	5	655
78	307	20	41	55	N	70	561	-3	539	78	309	0	44	14	S	192	684	192	685	2	655	192	685	2	655	192	685	2	655
78	307	20	58	39	N	223	591	6	576	78	309	0	57	15	S	87	660	87	661	1	641	87	661	1	641	87	661	1	641
78	307	22	25	28	N	68	523	-26	614	78	309	1	47	0	N	213	683	213	681	-2	675	213	681	-2	675	213	681	-2	675
78	307	22	40	53	N	224	611	1	599	78	309	1	24	8	S	201	662	201	664	-2	643	201	664	-2	643	201	664	-2	643
78	307	23	19	35	S	187	643	8	602	78	309	2	28	1	S	79	674	79	649	-25	662	79	649	-25	662	79	649	-25	662
78	307	23	33	1	S	96	648	-4	620	78	309	3	13	19	N	71	647	71	625	-21	632	71	625	-21	632	71	625	-21	632
78	308	0	7	30	N	67	640	1	632	78	309	3	29	39	N	204	639	204	641	2	618	204	641	2	618	204	641	2	618
78	308	0	24	23	N	217	511	5	595	78	309	4	3	25	S	209	630	209	629	-1	608	209	629	-1	608	209	629	-1	608
78	308	0	39	38	S	195	622	14	585	78	309	4	19	58	S	79	624	79	631	-29	644	79	631	-29	644	79	631	-29	644
78	308	1	15	22	S	95	636	11	615	78	309	4	54	54	N	79	658	79	629	-29	644	79	629	-29	644	79	629	-29	644
78	308	1	50	25	N	65	678	-57	674	78	309	5	9	0	N	204	671	204	654	-17	653	204	654	-17	653	204	654	-17	653
78	308	2	5	10	N	209	663	-24	641	78	309	5	44	29	S	215	666	214	643	-23	656	214	643	-23	656	214	643	-23	656
78	308	2	40	33	S	202	635	11	613	78	309	5	58	46	S	78	659	80	636	-23	645	80	636	-23	645	80	636	-23	645
78	308	2	55	21	S	78	672	-1	660	78	309	6	35	48	N	95	659	85	641	-18	640	85	641	-18	640	85	641	-18	640
78	308	3	30	32	N	72	642	-33	627	78	309	6	45	15	N	205	667	205	680	-13	648	205	680	-13	648	205	680	-13	648
78	308	3	45	48	N	204	676	-18	658	78	309	7	24	21	S	213	663	213	670	7	652	213	670	7	652	213	670	7	652
78	308	4	20	44	S	210	634	20	620	78	309	7	39	1	S	90	650	80	652	2	630	80	652	2	630	80	652	2	630
78	308	4	36	0	S	78	658	-17	644	78	309	8	16	0	N	28	648	88	650	2	628	88	650	2	628	88	650	2	628
78	308	5	11	20	N	80	629	1	617	78	309	8	29	21	N	28	678	208	681	3	660	208	681	3	660	208	681	3	660
78	308	5	27	10	N	204	635	27	614	78	309	9	4	41	S	208	668	208	679	11	650	208	679	11	650	208	679	11	650
78	308	6	1	8	S	214	649	-26	637	78	309	9	17	23	S	85	692	85	649	-49	684	85	649	-49	684	85	649	-49	684
78	308	6	15	31	N	78	669	-28	656	78	309	10	10	23	N	213	689	213	677	-2	659	213	677	-2	659	213	677	-2	659
78	308	6	53	20	N	86	668	2	631	78	309	10	45	47	S	200	680	201	675	-5	663	201	675	-5	663	201	675	-5	663
78	308	7	5	53	S	205	651	2	631	78	309	13	57	29	N	93	670	94	683	-26	695	94	683	-26	695	94	683	-26	695
78	308	7	40	48	S	211	538	1	625	78	309	11	37	30	N	83	680	84	665	-15	664	84	665	-15	664	84	665	-15	664
78	308	7	55	16	N	81	647	-17	627	78	309	11	51	41	N	218	666	220	707	41	656	220	707	41	656	220	707	41	656
78	308	8	33	18	N	58	662	-6	644	78	309	12	27	21	S	101	675	189	694	19	645	189	694	19	645	189	694	19	645
78	308	8	48	11	N	209	522	-3	599	78	309	12	38	36	S	107	696	106	683	-13	679	106	683	-13	679	106	683	-13	679
78	308	9	20	49	S	207	628	-7	627	78	309	13	17	41	N	75	642	74	658	16	627	74	658	16	627	74	658	16	627
78	308	9	36	23	S	86	647	1	620	78	309	13	32	15	N	222	665	222	666	1	662	222	666	1	662	222	666	1	662
78	308	10	28	47	N	213	634	5	617	78	309	14	11	32	S	213	699	167	718	19	659	167	718	19	659	167	718	19	659
78	308	11	2	0	S	200	638	3	641	78	309	15	15	43	N	65	643	67	629	-13	634	67	629	-13	634	67	629	-13	634
78	308	11	16	14	S	95	665	23	618	78	309	15	15	21	N	223	656	224	651	5	651	224	651	5	651	224	651	5	651
78	308	11	53	29	N	83	639	-8	639	78	309	16	57	26	N	24	647	224	652	-35	641	224	652	-35	641	224	652	-35	641
78	308	12	9	36	N	218	651	2	639	78	309	18	28	17	N	56	663	60	628	-5	661	60	628	-5	661	60	628	-5	661
78	308	12	44	59	S	188	677	-3	636	78	309	18	39	21	N	225	643	228	665	-22	636	228	665	-22	636	228	665	-22	636
78	308	12	57	14	S	105	660	-20	627	78	309	20	1	43	N	58	671	62	638	-33	670	62	638	-33	670	62	638	-33	670
78	308	13	24	24	N	74	622	4	605	78	309	20	21	7	N	229	654	231	668	14	649	231	668	14	649	231	668	14	649
78	308	13	51	59	N	220	632	15	623	78	309	21	52	27	N	23	670	62	671	-2	668	62	671	-2	668	62	671	-2	668
78	308	14	29	52	S	168	706	24	599	78	309	22	2	51	N	63	673	62	681	1	680	62	681	1	680	62	681	1	680
78	308	15	16	55	N	68	600	66	624	78	309	22	2	51	N	63	673	62	681	1	680	62	681	1	680	62	681	1	680

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YR	DA	HDDK	HR	MIN	SEC	PO	HDDK	LT	LAT	CDDK	BLAT	MIDNIGHT	BLAT	MIDNIGHT	YR	DA	YR	DA	HR	MIN	SEC	PO	HDDK	LT	LAT	CDDK	BLAT	MIDNIGHT	
78	324	8	5	18		S	211	620	211	623	2	605	613	7	600	78	325	78	325	10	37	9	N	201	616	201	623	7	600
78	324	8	21	41		S	92	639	82	652	13	618	643	10	599	78	325	78	325	11	9	23	N	201	622	201	632	10	599
78	324	8	59	3		N	89	672	89	663	-9	655	655	-16	665	78	325	78	325	12	2	35	N	97	684	96	658	-8	657
78	324	9	14	15		N	210	590	210	592	2	571	583	82	682	78	325	78	325	12	2	35	N	97	684	96	658	-8	657
78	324	9	45	15		S	205	603	205	602	-1	578	590	21	603	78	325	78	325	12	18	31	N	219	619	218	630	11	603
78	324	10	1	59		S	88	632	88	635	30	614	638	12	624	78	325	78	325	12	52	18	S	190	660	189	670	10	628
78	324	10	38	33		N	88	649	88	661	12	629	653	13	643	78	325	78	325	13	4	23	S	108	681	106	654	-27	657
78	324	10	54	49		N	215	608	215	617	5	591	607	17	619	78	325	78	325	13	59	59	N	220	628	221	645	17	619
78	324	11	26	39		S	200	616	200	632	16	593	617	17	635	78	325	78	325	13	59	59	N	220	628	221	645	17	619
78	324	11	41	29		S	98	665	98	672	7	641	660	33	639	78	325	78	325	15	41	38	N	221	631	225	664	33	622
78	324	12	18	58		N	82	643	82	643	12	596	614	6	656	78	325	78	325	15	41	38	N	221	631	225	664	33	622
78	324	12	36	14		N	218	612	218	624	12	596	614	6	656	78	325	78	325	15	41	38	N	221	631	225	664	33	622
78	324	13	9	36		S	190	647	190	647	0	514	624	12	624	78	325	78	325	18	51	43	N	223	637	223	680	-4	593
78	324	13	23	2		S	105	646	105	667	21	606	623	19	623	78	325	78	325	18	51	43	N	223	637	223	680	-4	593
78	324	14	0	23		N	72	625	72	620	-5	609	612	19	623	78	325	78	325	19	5	13	N	224	629	226	680	-4	593
78	324	14	18	27		N	218	601	218	614	13	583	604	22	614	78	325	78	325	20	35	42	N	229	645	229	649	-3	640
78	324	14	18	27		N	218	601	218	614	13	583	604	22	614	78	325	78	325	20	35	42	N	229	645	229	649	-3	640
78	324	15	42	23		S	180	644	179	650	5	597	592	23	614	78	325	78	325	22	31	14	N	224	606	225	621	15	593
78	324	15	42	23		S	180	644	179	650	5	597	592	23	614	78	325	78	325	22	31	14	N	224	606	225	621	15	593
78	324	16	0	12		N	219	601	219	605	4	583	595	23	614	78	325	78	325	23	9	50	S	93	591	95	625	34	551
78	324	16	36	7		S	174	636	173	643	7	559	583	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	324	17	43	0		N	216	567	215	583	21	546	580	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	324	19	8	49		N	65	599	65	595	0	577	587	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	324	19	24	52		N	220	567	220	572	5	549	557	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	324	20	4	5		S	170	637	169	639	2	561	582	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	324	20	50	35		S	169	581	168	595	14	568	593	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	324	21	5	51		N	223	582	224	596	14	565	582	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	324	22	33	21		N	69	620	69	614	-6	510	614	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	324	22	49	20		N	223	597	223	603	6	583	590	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	324	23	42	35		S	158	629	158	626	7	579	601	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	324	23	42	35		S	158	629	158	626	7	579	601	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	0	13	59		N	70	597	69	613	16	576	613	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	0	32	24		N	216	609	216	609	0	592	595	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	1	7	16		S	195	614	195	630	16	576	609	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	1	24	45		S	83	591	83	608	17	565	593	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	1	55	10		N	69	588	69	611	22	576	611	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	2	14	11		N	207	628	207	634	6	606	619	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	2	48	14		S	202	629	202	635	10	607	623	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	3	5	0		N	78	615	78	640	22	601	634	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	3	38	19		N	72	636	72	638	2	621	632	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	4	28	11		S	203	648	203	655	7	628	638	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	4	45	33		S	210	623	210	634	11	608	623	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	4	45	33		S	210	623	210	634	11	608	623	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	5	19	7		N	81	611	81	617	6	587	609	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	5	19	7		N	81	611	81	617	6	587	609	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	6	8	14		S	204	648	204	661	13	628	643	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	6	25	9		S	214	626	214	626	0	611	615	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	6	59	20		N	86	600	86	600	0	575	584	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	7	15	23		S	206	626	206	628	2	604	613	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	7	15	23		S	206	626	206	628	2	604	613	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	8	5	8		S	82	623	82	631	14	601	619	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	8	40	35		N	89	628	89	635	7	605	624	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	8	56	20		S	210	610	210	615	5	593	605	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	9	28	8		N	207	609	207	616	7	585	603	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557
78	325	9	45	4		S	87	526	87	526	43	604	622	23	614	78	325	78	325	23	55	49	N	71	577	73	534	-23	557

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		HDDK		CDDK		MIDNIGHT		HDDK		CDDK		MIDNIGHT	
YR	DA	HR	MN	SEC	PO	LT	LAT	LT	LAT	LT	LAT	LT	LAT
78 331	8 38 20	N	89	664	3	646	660	78 332	11 56 4	N	219	668	2 558 657
78 331	8 52 26	N	209	631	-3	628	613	78 332	12 32 33	S	189	697	8 560 667
78 331	9 24 59	S	207	614	208	626	612	78 332	12 44 36	S	104	658	5 624 637
78 331	9 41 28	S	87	637	87	641	630	78 332	13 23 21	N	73	672	-17 660 650
78 331	10 33 58	S	214	610	214	620	610	78 332	13 37 55	N	232	659	5 655 656
78 331	11 6 25	S	201	634	201	643	627	78 332	14 14 55	S	179	677	18 624 647
78 331	11 21 53	S	94	635	96	667	627	78 332	15 3 32	N	222	642	5 668 632
78 331	11 58 42	S	83	656	83	665	653	78 332	15 20 31	N	222	636	4 623 625
78 331	12 16 0	S	218	620	218	620	610	78 332	17 2 27	N	222	632	-56 682 627
78 331	12 48 28	S	192	645	66	563	644	78 332	18 33 40	N	224	633	83 625 716
78 331	13 37 59	N	77	583	4	571	585	78 332	18 44 12	N	239	716	-58 688 630
78 331	13 57 58	N	218	590	218	594	576	78 332	20 15 54	N	231	664	4 664 669
78 331	14 29 44	S	187	623	186	610	625	78 332	20 52 12	N	231	664	2 561 662
78 331	14 43 21	S	115	650	8	594	625	78 332	0 31 59	S	189	698	-2 598 710
78 331	15 21 16	N	68	600	10	578	599	78 332	0 42 59	S	91	711	-9 668 668
78 331	15 39 47	N	218	588	10	569	589	78 332	1 19 59	N	64	673	0 676 670
78 331	16 14 53	S	173	638	173	648	589	78 332	1 33 48	N	214	684	9 561 669
78 331	16 26 26	S	119	623	549	583	583	78 332	2 12 17	S	198	689	-28 669 648
78 331	17 21 52	N	218	575	17	554	593	78 332	2 25 14	S	79	681	-21 670 658
78 331	18 43 9	N	63	599	28	565	593	78 332	3 1 29	N	68	675	-3 685 675
78 331	19 3 24	N	222	610	11	587	579	78 332	3 14 59	N	205	700	9 670 675
78 331	20 29 25	N	69	571	18	579	600	78 332	3 52 32	S	208	687	77 653
78 331	20 45 20	N	223	594	-45	636	589	78 332	4 5 36	S	76	682	-24 565 648
78 331	22 13 21	N	66	643	-1	616	614	78 332	4 42 45	N	204	696	7 680 681
78 331	22 27 5	S	226	626	226	625	614	78 332	4 55 32	N	204	703	5 681 680
78 331	23 7 59	S	182	682	160	701	608	78 332	5 32 35	S	216	689	9 655 655
78 331	23 20 51	S	95	626	96	634	612	78 332	5 46 0	S	78	668	-51 712 667
78 331	23 53 11	N	70	597	69	613	633	78 332	6 25 0	N	85	724	1 591 585
78 332	0 9 7	S	223	664	-21	651	662	78 332	6 35 33	N	205	701	-22 680 662
78 332	0 49 0	S	191	690	60	679	624	78 332	7 12 43	S	216	699	-23 698 684
78 332	1 2 32	S	86	641	-60	679	624	78 332	7 25 0	S	79	691	-6 691 681
78 332	1 37 47	S	67	623	18	646	653	78 332	8 5 9	N	89	711	-4 692 681
78 332	2 28 47	S	200	655	2	621	632	78 332	8 15 45	S	210	699	-18 700 692
78 332	2 43 52	S	78	638	-2	635	642	78 332	9 4 18	S	84	713	-5 718 724
78 332	3 17 59	N	70	649	6	633	641	78 332	9 45 58	N	89	729	3 567 656
78 332	3 33 40	S	203	653	203	659	637	78 332	9 57 19	N	213	676	-2 664 659
78 332	4 8 40	S	209	654	-20	642	630	78 332	10 32 57	S	203	679	-15 710 706
78 332	4 23 35	S	77	656	-9	643	643	78 332	10 44 29	S	94	706	-3 639 638
78 332	4 59 28	N	79	657	8	642	650	78 332	11 39 13	N	218	651	9 696 715
78 332	5 13 41	N	215	654	-27	642	617	78 332	12 13 58	S	194	654	1 652 662
78 332	5 48 38	S	79	656	-15	644	656	78 332	12 25 34	S	107	707	-18 668 643
78 332	6 3 33	S	86	650	26	665	657	78 332	13 5 33	N	76	665	14 654 665
78 332	6 40 59	N	206	657	13	642	654	78 332	13 20 3	S	222	670	1 661 657
78 332	6 53 58	S	214	654	-8	650	652	78 332	13 57 57	N	177	696	-14 661 626
78 332	7 28 35	S	80	668	5	648	654	78 332	14 48 28	N	224	665	7 613 619
78 332	7 42 59	S	89	671	-4	648	652	78 332	15 2 1	N	58	639	-44 692 650
78 332	8 21 7	N	209	667	-4	642	652	78 332	15 14 18	N	223	630	0 685 629
78 332	8 34 4	S	205	663	10	642	652	78 332	16 14 18	N	223	630	-19 690 675
78 332	9 8 58	S	209	661	-8	644	649	78 332	17 2 0	N	234	685	
78 332	9 23 17	S	86	662	-3	654	649	78 332	17 58 34	N	53	691	
78 332	10 15 0	S	214	664	15	652	665	78 332	20 52 53	S	163	685	
78 332	10 50 0	S	201	670	7	650	677	78 332	21 40 9	N	62	670	
78 332	11 3 57	S	94	656	-1	656	673	78 332					
78 332	11 42 14	N	84	684				78 332					

201

YR	DA	HR	MIN	SEC	PO	HOOK	LT	LAT	COCK	DLAT	MIDNIGHT	DLAT	LATH	LATC
78	341	11	48	11	S	99	697	57	685	-24	680	66	662	659
78	341	12	41	29	S	220	683	220	683	2	683	678	682	642
78	341	13	19	16	S	183	708	181	717	9	673	572	624	642
78	341	13	28	14	S	114	716	117	729	12	703	668	627	636
78	341	17	36	59	N	54	683	54	682	-1	684	689	652	656
78	341	17	46	54	N	226	675	227	679	4	673	672	657	652
78	341	19	20	0	N	53	694	54	691	-3	696	699	655	654
78	341	19	23	28	N	231	684	230	679	-5	684	679	682	675
78	341	21	1	8	N	61	674	61	676	2	689	681	681	677
78	341	21	11	33	N	229	666	232	685	20	663	686	661	669
78	341	22	43	1	N	63	682	65	672	-10	678	677	661	668
78	341	22	53	39	N	230	690	230	691	1	690	691	669	672
78	341	23	37	20	S	153	716	153	716	0	683	677	670	700
78	341	23	46	48	S	99	718	96	694	-24	706	689	658	653
78	342	0	24	30	N	64	682	64	687	5	676	693	639	704
78	342	0	35	4	N	224	719	221	696	-20	723	692	680	674
78	342	1	17	29	S	194	689	194	703	4	672	673	676	668
78	342	1	29	5	S	83	705	82	671	-38	696	664	679	674
78	342	2	6	49	N	54	706	55	688	-18	704	695	679	674
78	342	2	19	19	N	208	702	208	703	1	687	681	679	674
78	342	2	57	41	S	204	687	204	692	5	687	671	689	686
78	342	3	11	5	S	75	670	75	677	7	657	674	690	696
78	342	3	47	50	N	72	693	72	697	-1	698	695	690	689
78	342	4	37	55	S	214	688	214	687	-3	683	675	671	668
78	342	4	51	38	S	76	657	76	657	-1	655	673	671	668
78	342	5	28	31	N	82	685	82	685	11	670	694	692	703
78	342	5	40	58	N	202	686	202	685	-1	669	665	698	692
78	342	6	17	29	S	218	678	217	676	-2	669	663	698	692
78	342	6	30	39	S	76	661	73	727	45	659	728	695	677
78	342	7	10	1	N	89	711	89	710	-1	698	708	697	697
78	342	10	43	11	N	214	668	214	660	1	656	656	671	697
78	342	11	18	53	S	200	689	200	686	-3	673	655	693	688
78	342	11	31	12	S	96	688	96	685	-3	699	677	693	688
78	342	12	10	47	N	82	695	83	675	-20	680	669	670	675
78	342	12	24	51	N	218	656	218	668	10	647	665	662	675
78	342	13	12	34	S	106	673	107	682	9	646	665	669	672
78	342	15	47	45	N	223	671	223	672	1	659	664	669	672
78	342	20	54	47	N	226	641	226	642	-4	650	655	669	672
78	342	22	24	27	N	36	651	37	648	-3	644	651	669	672
78	342	22	37	31	N	226	647	227	662	15	641	653	669	672
78	342	23	19	46	S	181	709	180	719	10	674	680	669	672
78	342	23	29	46	S	99	699	95	659	-40	683	642	669	672
78	343	0	5	57	N	27	653	27	657	4	646	661	669	672
78	343	0	19	35	N	222	684	222	680	6	634	684	669	672
78	343	1	0	33	S	192	711	193	705	-6	686	675	669	672
78	343	1	12	21	S	85	635	85	635	0	669	680	669	672
78	343	1	48	57	N	64	694	67	658	-36	691	662	669	672
78	343	2	1	59	N	210	697	210	693	-2	690	681	669	672
78	343	2	40	30	S	202	690	202	693	3	674	672	669	672
78	343	2	53	20	S	75	686	76	643	-43	675	637	669	672
78	343	3	43	56	N	202	683	202	681	-2	666	661	669	672

				MIDNIGHT			
				LT	LAT	LAT	DLAT
78 348	8 45 12	N	88 642	89 629	-13	522 617	78 348
78 348	9 2 7	N	209 569	209 569	16	524 560	78 348
78 348	9 31 0	S	206 557	206 571	14	528 562	78 348
78 348	9 50 24	S	88 502	86 598	-4	577 582	78 348
78 348	10 24 28	N	88 611	88 612	1	587 598	78 348
78 348	10 41 57	S	213 600	213 606	6	582 597	78 348
78 348	11 13 36	S	200 617	200 622	5	594 608	78 348
78 348	11 29 48	S	94 631	93 597	-34	600 598	78 348
78 348	12 4 45	N	83 608	83 613	5	584 599	78 348
78 348	12 23 1	N	217 609	217 615	6	592 605	78 348
78 348	12 55 59	S	191 637	191 639	2	602 617	78 348
78 348	13 11 19	S	101 612	101 595	-7	536 552	78 348
78 348	13 45 58	N	74 592	73 620	28	573 612	78 348
78 348	14 4 35	N	218 616	218 622	6	600 612	78 348
78 348	14 40 22	S	176 659	174 679	10	612 627	78 348
78 348	14 52 16	S	111 623	113 644	21	643 576	78 348
78 348	15 30 6	N	64 620	64 624	4	610 635	78 348
78 348	15 46 31	N	218 611	218 615	4	595 605	78 348
78 348	17 13 20	N	60 612	61 603	-9	602 602	78 348
78 348	17 28 5	N	220 614	220 623	9	606 612	78 348
78 348	18 56 24	N	60 616	62 602	-14	606 601	78 348
78 348	19 9 30	N	223 626	224 636	10	616 635	78 348
78 348	20 39 19	N	61 642	63 633	-9	634 635	78 348
78 348	20 51 40	N	225 629	226 632	3	620 641	78 348
78 348	22 20 36	N	66 634	67 616	-18	626 616	78 348
78 348	22 34 23	N	225 636	225 637	1	628 627	78 348
78 348	23 15 48	S	181 685	130 691	6	646 593	78 348
78 348	23 26 4	S	101 707	101 705	-2	696 699	78 348
78 348	0 1 10	N	68 609	66 632	23	598 634	78 348
78 348	0 15 58	N	220 660	219 655	-5	656 643	78 348
78 348	0 55 44	S	131 660	191 674	14	628 648	78 348
78 348	1 9 58	S	84 652	84 643	-9	633 632	78 348
78 348	1 44 0	N	65 647	65 648	1	640 591	78 348
78 348	2 0 10	N	207 648	207 652	4	628 635	78 348
78 348	2 35 39	S	199 640	199 638	-2	606 616	78 348
78 348	2 51 47	S	76 629	76 636	9	613 632	78 348
78 348	3 24 30	N	69 618	69 615	-3	609 615	78 348
78 348	3 42 20	S	200 611	200 612	1	587 599	78 348
78 348	4 13 43	S	205 572	205 581	9	544 571	78 348
78 348	4 33 52	S	78 577	78 590	-1	572 580	78 348
78 348	5 4 58	N	202 577	202 590	3	550 570	78 348
78 348	5 23 30	N	211 580	211 580	7	552 572	78 348
78 348	5 53 47	S	81 594	80 607	13	568 592	78 348
78 348	6 13 30	S	85 604	85 630	26	579 619	78 348
78 348	6 46 19	N	205 617	205 601	-16	594 599	78 348
78 348	7 2 30	S	210 579	211 600	21	559 531	78 348
78 348	7 31 0	S	52 500	61 619	19	575 605	78 348
78 348	7 53 14	S	88 596	88 627	31	571 615	78 348
78 348	8 26 38	N	208 597	208 601	4	572 599	78 348
78 348	9 43 30	S	207 592	207 605	13	566 593	78 348
78 348	9 14 40	S	85 579	85 601	22	552 585	78 348
78 348	9 34 0	S	213 620	213 612	-8	605 602	78 348
78 348	10 24 46	S	202 610	201 629	19	596 614	78 348
78 348	10 56 0	S	202 610	201 629	19	596 614	78 348

YR	DA	HR	MIN	SEC	PO	HDDK	LT	LAT	CDDK	LT	LAT	MIDNIGHT	LT	LAT	CDDK	LT	LAT	MIDNIGHT
78	350	20	17	31	N	222	595	222	600	222	600	531	587	222	600	222	600	531
78	350	21	44	39	N	224	604	224	607	224	607	533	586	224	607	224	607	533
78	350	22	40	36	S	178	672	179	670	179	670	532	585	179	670	179	670	532
78	350	22	53	25	S	97	623	97	630	97	630	530	582	97	630	97	630	530
78	350	23	26	34	N	67	619	69	598	69	598	529	577	69	598	69	598	529
78	350	23	41	41	N	222	649	222	648	222	648	533	581	222	648	222	648	533
78	351	0	21	28	S	188	673	183	680	183	680	532	580	183	680	183	680	532
78	351	0	34	59	S	86	650	86	650	86	650	530	582	86	650	86	650	530
78	351	1	8	14	N	66	625	66	629	66	629	531	583	66	629	66	629	531
78	351	1	24	33	N	212	660	212	661	212	661	533	584	212	661	212	661	533
78	351	2	1	19	S	196	647	196	656	196	656	532	583	196	656	196	656	532
78	351	2	16	0	S	78	664	78	670	78	670	531	582	78	670	78	670	531
78	351	2	50	59	N	66	661	68	610	68	610	533	584	68	610	68	610	533
78	351	3	6	33	N	202	649	202	650	202	650	532	583	202	650	202	650	532
78	351	3	41	37	S	204	637	204	638	204	638	531	582	204	638	204	638	531
78	351	3	57	41	S	76	627	75	627	75	627	530	581	75	627	75	627	530
78	351	4	31	50	N	75	648	74	648	74	648	531	582	74	648	74	648	531
78	351	4	47	0	N	201	648	201	649	201	649	532	583	201	649	201	649	532
78	351	5	21	0	S	211	626	211	631	211	631	531	582	211	631	211	631	531
78	351	5	37	39	S	78	631	78	640	78	640	532	583	78	640	78	640	532
78	351	6	14	7	N	63	692	63	692	63	692	531	582	63	692	63	692	531
78	351	7	16	52	S	79	651	80	632	80	632	530	581	80	632	80	632	530
78	351	7	53	30	N	87	648	87	647	87	647	531	582	87	647	87	647	531
78	351	8	7	23	N	207	649	207	651	207	651	532	583	207	651	207	651	532
78	351	8	41	31	S	209	642	209	649	209	649	531	582	209	649	209	649	531
78	351	8	58	4	S	83	618	83	639	83	639	532	583	83	639	83	639	532
78	351	13	10	25	N	220	659	225	719	225	719	531	582	225	719	225	719	531
78	351	13	45	59	S	185	647	179	686	179	686	530	581	179	686	179	686	530
78	351	13	57	48	S	142	676	113	684	113	684	531	582	113	684	113	684	531
78	351	14	28	1	N	65	659	65	659	65	659	530	581	65	659	65	659	530
78	351	14	52	29	N	221	651	222	664	222	664	531	582	222	664	222	664	531
78	351	18	5	27	N	52	672	58	628	58	628	532	583	58	628	58	628	532
78	351	18	16	3	N	224	648	225	658	225	658	531	582	225	658	225	658	531
78	351	23	24	29	N	222	632	222	634	222	634	532	583	222	634	222	634	532
78	351	0	3	8	S	182	643	186	657	186	657	531	582	186	657	186	657	531
78	352	0	16	5	S	92	693	91	670	91	670	532	583	91	670	91	670	532
78	352	0	51	28	N	65	645	65	644	65	644	531	582	65	644	65	644	531
78	352	1	7	16	N	213	648	213	652	213	652	532	583	213	652	213	652	532
78	352	1	44	54	S	194	676	194	676	194	676	531	582	194	676	194	676	531
78	352	1	59	25	S	79	637	79	654	79	654	532	583	79	654	79	654	532
78	352	2	32	38	N	66	636	66	636	66	636	531	582	66	636	66	636	531
78	352	2	48	25	N	204	673	204	678	204	678	532	583	204	678	204	678	532
78	352	3	24	51	S	203	663	203	673	203	673	531	582	203	673	203	673	531
78	352	3	40	42	S	76	618	74	659	74	659	532	583	74	659	74	659	532
78	352	4	13	34	N	73	621	73	635	73	635	531	582	73	635	73	635	531
78	352	4	28	54	N	201	677	201	677	201	677	532	583	201	677	201	677	532
78	352	5	4	34	S	211	652	211	657	211	657	531	582	211	657	211	657	531
78	352	5	20	47	S	78	621	78	631	78	631	532	583	78	631	78	631	532
78	352	5	56	30	N	82	593	82	593	82	593	531	582	82	593	82	593	531
78	352	6	10	11	N	203	636	203	639	203	639	532	583	203	639	203	639	532
78	352	6	43	51	S	212	631	212	630	212	630	531	582	212	630	212	630	531
78	352	6	59	59	S	79	642	78	665	78	665	532	583	78	665	78	665	532
78	352	7	36	8	N	87	647	87	660	87	660	531	582	87	660	87	660	531

YR	DA	HR	MIN	SEC	PO	HDOK	LT	LAT	LOOK	LT	LAT	DLAT	MIDNIGHT	LA-T-H-LATC	YR	DA	HR	MIN	SEC	PO	HDOK	LT	LAT	DLAT	MIDNIGHT	LA-T-H-LATC	YR	DA	HR	MIN	SEC	PO	HDOK	LT	LAT	LOOK	LT	LAT	DLAT	MIDNIGHT	LA-T-H-LATC	YR	DA	HR	MIN	SEC	PO	HDOK	LT	LAT	DLAT	MIDNIGHT	LA-T-H-LATC	
78	353	9	46	31	S	203	611	205	622	11	587	608	11	587	608	78	353	12	51	43	S	194	613	194	616	3	575	596	78	353	12	51	43	S	194	613	194	616	3	575	596	78	353	12	51	43	S	194	613	194	616	3	575	596
78	353	10	3	35	S	87	623	87	623	22	601	635	22	601	635	78	353	13	7	21	S	102	631	102	631	13	584	609	78	353	13	7	21	S	102	631	102	631	13	584	609	78	353	13	7	21	S	102	631	102	631	13	584	609
78	353	10	38	37	N	214	615	214	621	6	599	611	6	599	611	78	353	13	41	27	N	76	550	75	551	31	586	591	78	353	13	41	27	N	76	550	75	551	31	586	591	78	353	13	41	27	N	76	550	75	551	31	586	591
78	353	10	55	22	S	199	631	198	643	12	595	620	12	595	620	78	353	14	35	28	S	182	633	182	633	10	586	600	78	353	14	35	28	S	182	633	182	633	10	586	600	78	353	14	35	28	S	182	633	182	633	10	586	600
78	353	11	28	6	S	95	633	95	643	10	602	620	10	602	620	78	353	14	48	58	N	224	607	224	607	2	594	596	78	353	14	48	58	N	224	607	224	607	2	594	596	78	353	14	48	58	N	224	607	224	607	2	594	596
78	353	11	43	44	S	82	601	81	615	14	575	601	14	575	601	78	353	15	25	0	N	113	646	113	646	37	587	593	78	353	15	25	0	N	113	646	113	646	37	587	593	78	353	15	25	0	N	113	646	113	646	37	587	593
78	353	12	18	31	N	217	615	217	620	5	594	610	5	594	610	78	353	15	44	0	N	216	595	216	595	17	594	595	78	353	15	44	0	N	216	595	216	595	17	594	595	78	353	15	44	0	N	216	595	216	595	17	594	595
78	353	12	36	55	N	190	630	189	640	10	594	610	10	594	610	78	353	16	16	35	S	183	595	181	602	17	527	568	78	353	16	16	35	S	183	595	181	602	17	527	568	78	353	16	16	35	S	183	595	181	602	17	527	568
78	353	13	10	0	S	105	620	105	625	45	612	651	45	612	651	78	353	16	25	27	N	218	591	219	600	9	572	591	78	353	16	25	27	N	218	591	219	600	9	572	591	78	353	16	25	27	N	218	591	219	600	9	572	591
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78	353	14	19	57	S	182	519	180	633	14	526	536	14	526	536	78	353	20	34	11	N	224	607	224	607	2	594	596	78	353	20	34	11	N	224	607	224	607	2	594	596	78	353	20	34	11	N	224	607	224	607	2	594	596
78	353	14	52	34	S	110	609	118	661	52	526	536	52	526	536	78	353	22	30	47	N	226	637	224	621	16	629	609	78	353	22	30	47	N	226	637	224	621	16	629	609	78	353	22	30	47	N	226	637	224	621	16	629	609
78	353	15	6	57	S	66	595	66	581	25	541	578	25	541	578	78	353	23	12	48	S	179	693	178	709	12	650	664	78	353	23	12	48	S	179	693	178	709	12	650	664	78	353	23	12	48	S	179	693	178	709	12	650	664
78	353	15	42	10	N	217	598	218	610	12	580	600	12	580	600	78	353	23	25	48	S	92	574	92	586	16	650	664	78	353	23	25	48	S	92	574	92	586	16	650	664	78	353	23	25	48	S	92	574	92	586	16	650	664
78	353	16	1	4	N	218	588	219	596	8	563	537	8	563	537	78	353	23	57	27	N	65	631	67	622	21	590	623	78	353	23	57	27	N	65	631	67	622	21	590	623	78	353	23	57	27	N	65	631	67	622	21	590	623
78	353	17	43	3	N	65	574	65	570	19	553	573	19	553	573	78	353	23	57	27	N	65	631	67	622	21	590	623	78	353	23	57	27	N	65	631	67	622	21	590	623	78	353	23	57	27	N	65	631	67	622	21	590	623
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78	353	23	29	38	S	193	578	183	681	3	633	644	3	633	644	78	353	23	57	27	N	65	631	67	622	21	590	623	78	353	23	57	27	N	65	631	67	622	21	590	623	78	353	23	57	27	N	65	631	67	622	21	590	623
78	353	23	41	36	S	96	667	96	666	1	644	651	1	644	651	78	353	23	57	27	N	65	631	67	622	21	590	623	78	353	23	57	27	N	65	631	67	622	21	590	623	78	353	23	57	27	N	65	631	67	622	21	590	623
78	354	0	14	36	N	69	591	69	591	80	616	616	80	616	616	78	354	23	57	27	N	65	631	67	622	21	590	623	78	354	23	57	27	N	65	631	67	622	21	590	623	78	354	23	57	27	N	65	631	67	622	21	590	623
78	354	0	32	6	N	217	636	217	640	4	622	629	4	622	629	78	354	23	57	27	N	65	631	67	622	21	590	623	78	354	23	57	27	N	65	631	67	622	21	590	623	78	354	23	57	27	N	65	631	67	622	21	590	623
78	354	1	8	51	S	193	629	193	640	11	593	618	11	593	618	78	354	23	57	27	N	65	631	67	622	21	590	623	78	354	23	57	27	N	65	631	67	622	21	590	623	78	354	23	57	27	N	65	631	67	622	21	590	623
78	354	1	24	48	S	93	628	93	628	82	587	587	82	587	587	78	354	23	57	27	N	65	631	67	622	21	590	623	78	354	23	57	27	N	65	631	67	622	21	590	623	78	354	23	57	27	N	65	631	67	622	21	590	623
78	354	1	55	48	N	68	591	68	591	9	569	589	9	569	589	78	354	23	57	27	N	65	631	67	622	21	590	623	78	354	23	57	27	N	65	631	67	622	21	590	623	78	354	23	57	27	N	65	631	67	622	21	590	623
78	354	2	15	29	N	205	611	205	611	205	611	611	205	611	611	78	354	23	57	27	N	65	631	67																														

YR	DA	HR	MIN	SEC	PO	HDDK	LT	LAT	CDXX	PLAT	LATH,LATC	YR	DA	HR	MIN	SEC	PO	HDDK	LT	LAT	CDXX	PLAT	LATH,LATC
78	355	16	53	32	N	57	629	56	656	6	650	78	357	1	21	12	N	213	655	213	658	3	643
78	355	17	6	35	N	21	629	23	635	6	622	78	357	1	58	20	S	195	657	196	659	2	625
78	355	18	35	2	N	61	611	59	623	12	621	78	357	2	12	45	S	79	661	79	664	-7	648
78	355	18	47	35	N	225	651	224	636	-15	625	78	357	2	45	30	N	68	601	68	597	-4	590
78	355	20	19	0	N	58	652	62	635	-27	637	78	357	3	2	45	N	203	663	203	649	-14	644
78	355	20	30	22	N	226	633	226	638	5	628	78	357	3	38	3	S	204	637	204	644	7	616
78	355	22	1	55	N	57	695	65	639	-50	637	78	357	3	55	21	S	77	597	74	643	-19	578
78	355	22	12	35	N	227	648	228	652	4	643	78	357	4	28	52	N	74	662	202	662	4	639
78	355	22	17	15	N	174	715	173	723	8	641	78	357	4	43	24	N	202	658	202	662	4	639
78	355	23	5	44	S	102	681	100	666	-15	637	78	357	5	18	10	S	211	640	212	657	17	627
78	355	23	42	29	N	63	671	69	609	-62	656	78	357	5	34	21	S	78	632	78	632	17	627
78	355	23	55	0	N	169	675	224	674	8	666	78	357	6	9	58	N	83	656	83	662	-4	648
78	356	0	35	35	S	87	659	86	637	-22	646	78	357	6	23	29	N	204	659	204	656	-3	640
78	356	1	23	44	N	63	665	66	624	-41	629	78	357	6	57	59	S	213	636	213	644	8	622
78	356	1	38	36	N	211	663	212	672	9	625	78	357	7	13	5	S	79	665	79	661	-4	652
78	356	2	15	40	S	197	658	197	662	4	626	78	357	7	50	24	N	87	658	87	651	-7	639
78	356	2	30	19	S	78	655	78	674	19	641	78	357	8	4	15	S	210	642	237	643	1	621
78	356	3	21	22	N	201	622	201	631	9	637	78	357	8	37	55	S	83	654	83	656	2	635
78	356	3	54	39	S	205	616	205	617	9	637	78	357	8	53	28	S	83	654	83	656	2	635
78	356	4	11	11	S	76	607	76	623	-13	627	78	357	9	44	20	N	211	662	211	674	12	651
78	356	4	44	36	N	202	589	202	615	13	630	78	357	10	19	3	S	204	652	203	667	15	632
78	356	5	2	36	N	210	570	211	612	26	633	78	357	10	33	16	S	90	669	90	656	-13	646
78	356	5	33	15	S	210	570	211	612	42	633	78	357	11	12	7	N	85	698	86	655	-33	684
78	356	5	53	58	S	81	557	81	557	49	633	78	357	11	24	49	N	217	681	217	680	-1	672
78	356	6	25	38	N	84	606	84	606	33	633	78	357	12	1	16	S	194	683	193	692	9	654
78	356	6	40	35	N	204	665	204	665	-13	646	78	357	12	13	13	S	102	689	100	674	-15	669
78	356	7	15	11	S	213	635	213	636	1	621	78	357	12	53	8	N	75	697	77	562	-35	697
78	356	7	30	0	S	79	673	83	647	-25	661	78	357	13	6	34	N	221	670	220	668	-2	688
78	356	8	7	39	N	89	656	89	656	3	637	78	357	13	44	33	S	178	599	176	707	8	659
78	356	8	21	48	N	208	633	208	638	5	611	78	357	13	53	31	S	116	698	111	669	-29	673
78	356	8	55	14	S	209	632	209	634	2	610	78	357	14	49	0	N	221	652	222	659	7	647
78	356	9	5	54	S	94	676	94	654	-24	659	78	357	16	31	4	N	221	642	222	644	2	635
78	356	10	2	19	N	212	642	212	634	-6	629	78	357	18	0	19	N	58	632	60	612	-20	637
78	356	10	35	45	S	203	628	203	639	11	606	78	357	18	13	18	N	222	628	222	631	3	619
78	356	10	50	48	S	92	662	91	652	-6	632	78	357	19	44	7	N	56	658	56	640	-28	667
78	356	11	26	30	N	66	601	66	601	24	612	78	357	19	54	52	N	226	640	226	640	0	633
78	356	11	45	11	N	216	550	216	613	23	571	78	357	21	25	4	N	63	645	63	645	681	560
78	356	12	19	43	S	196	614	196	618	4	576	78	357	21	36	12	N	60	635	64	656	-29	681
78	356	12	32	2	S	100	647	106	707	60	608	78	357	23	8	3	N	193	713	183	704	5	679
78	356	12	7	9	N	79	580	78	613	24	570	78	357	23	18	3	S	93	688	93	680	-8	665
78	356	13	7	47	N	218	618	219	624	5	602	78	357	23	44	4	S	93	688	93	680	-8	665
78	356	15	44	6	S	174	651	171	655	14	593	78	358	0	12	48	N	93	623	93	623	26	614
78	356	18	16	22	N	63	585	59	622	37	572	78	358	1	42	24	N	194	702	193	707	5	676
78	356	18	31	19	N	221	614	221	613	-1	622	78	358	1	54	35	S	81	686	81	689	2	670
78	356	19	58	58	N	65	589	63	600	19	577	78	358	2	30	59	N	61	687	61	689	-22	683
78	356	20	13	15	N	224	619	225	627	9	607	78	358	2	45	7	N	205	570	205	677	7	652
78	356	21	43	0	N	62	658	64	642	-16	632	78	358	3	22	31	S	203	633	203	701	-8	677
78	356	21	55	20	N	225	634	226	636	2	625	78	358	3	35	39	S	75	674	75	664	-10	632
78	356	23	22	59	N	68	615	223	629	11	635	78	358	4	11	50	N	72	674	72	678	4	682
78	356	23	38	7	N	188	673	187	692	19	632	78	358	4	25	20	N	211	664	212	678	11	688
78	357	0	18	11	S	89	652	89	651	-11	634	78	358	5	1	11	S	211	664	212	678	31	685
78	357	1	5	39	N	65	649	67	623	-26	624	78	358	5	16	2	S	76	664	75	694	30	651

YR	DA	HR	MO	SEC	PO	MOCK	LT	LAT	CDXA	DLAT	MIDNIGHT	LT	LAT	CDXA	DLAT	MIDNIGHT
78	360	12	0	19	N	81	655	217	632	-20	655	81	655	217	632	655
78	360	12	15	45	N	81	655	217	632	-20	655	81	655	217	632	655
78	360	12	49	0	S	192	633	105	667	33	637	192	633	105	667	637
78	360	13	2	42	S	192	633	105	667	33	637	192	633	105	667	637
78	360	13	40	57	N	72	552	73	639	-15	639	73	639	-15	639	639
78	360	14	33	37	N	219	634	219	637	4	637	219	637	4	637	637
78	360	14	33	37	N	176	676	176	680	4	680	176	680	4	680	680
78	360	15	22	39	S	65	612	65	614	2	614	65	614	2	614	614
78	360	15	36	59	N	215	629	215	632	3	632	215	632	3	632	632
78	360	15	36	59	N	204	685	204	688	3	688	204	688	3	688	688
78	362	7	12	44	S	214	655	214	658	7	658	214	658	7	658	658
78	362	7	27	52	S	80	640	80	643	18	643	80	643	18	643	643
78	362	8	3	50	N	87	543	87	546	24	546	87	546	24	546	546
78	362	8	17	37	N	207	660	207	663	33	663	207	663	33	663	663
78	362	8	52	40	S	209	660	209	663	27	663	209	663	27	663	663
78	362	9	6	57	S	83	664	83	667	-1	667	83	667	-1	667	667
78	362	9	46	0	N	88	709	88	712	20	712	88	712	20	712	712
78	362	9	58	6	N	212	668	212	671	20	671	212	671	20	671	671
78	362	10	33	31	S	202	670	202	673	-23	673	202	673	-23	673	673
78	362	10	33	31	S	93	701	93	704	5	704	93	704	5	704	704
78	362	11	38	50	N	217	660	217	663	26	663	217	663	26	663	663
78	362	12	15	17	S	192	680	192	683	12	683	192	683	12	683	683
78	362	12	25	21	S	100	655	100	658	26	658	100	658	26	658	658
78	362	13	6	58	N	74	691	74	694	-4	694	74	694	-4	694	694
78	362	13	20	31	N	221	672	221	675	4	675	221	675	4	675	675
78	362	13	20	31	N	173	709	173	712	20	712	173	712	20	712	712
78	362	13	53	26	S	115	686	115	689	-5	689	115	689	-5	689	689
78	362	14	8	1	N	62	674	62	677	-1	677	62	677	-1	677	677
78	362	14	49	13	N	222	660	222	663	3	663	222	663	3	663	663
78	362	15	2	40	N	176	608	176	611	5	611	176	611	5	611	611
78	362	17	22	12	S	66	533	66	536	12	536	66	536	12	536	536
78	362	18	10	58	N	217	555	217	558	2	558	217	558	2	558	558
78	362	18	29	28	N	66	563	66	566	-6	566	66	566	-6	566	566
78	362	19	54	48	N	222	538	222	541	3	541	222	541	3	541	541
78	362	20	10	25	S	103	594	103	597	20	597	103	597	20	597	597
78	362	21	4	8	S	70	567	70	570	-2	570	70	570	-2	570	570
78	362	21	36	31	N	224	617	224	620	5	620	224	620	5	620	620
78	362	21	52	24	N	67	620	67	623	5	623	67	623	5	623	623
78	362	23	19	40	N	224	617	224	620	5	620	224	620	5	620	620
78	362	23	34	7	N	185	692	185	695	13	695	185	695	13	695	695
78	363	0	14	59	S	87	679	87	682	-2	682	87	682	-2	682	682
78	363	0	29	10	S	67	612	67	615	16	615	67	615	16	615	615
78	363	1	0	49	N	87	612	87	615	16	615	87	615	16	615	615
78	363	2	13	22	N	66	642	66	645	-1	645	66	645	-1	645	645
78	363	2	59	1	N	204	572	204	575	7	575	204	575	7	575	575
78	363	3	25	29	S	203	663	203	666	4	666	203	666	4	666	666
78	363	3	51	11	S	76	621	76	624	-34	624	76	624	-34	624	624
78	363	4	25	15	N	73	658	73	661	0	661	73	661	0	661	661
78	363	4	39	44	N	201	666	201	669	10	669	201	669	10	669	669
78	363	5	14	58	S	211	645	211	648	10	648	211	648	10	648	648
78	363	5	29	50	S	76	664	76	667	12	667	76	667	12	667	667
78	363	6	6	14	N	82	667	82	670	3	670	82	670	3	670	670
78	363	6	20	0	N	203	661	203	664	3	664	203	664	3	664	664
78	363	6	55	3	S	213	650	213	653	9	653	213	653	9	653	653
78	363	7	10	13	S	79	651	79	654	9	654	79	654	9	654	654

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