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Coordinated Ionospheric and Magnetospheric Observations from the ISIS 2 Satellite by the ISIS 2 Experimenters

(NASA-TM-81121) COORDINATED IONOSPHERIC AND MAGNETOSPHERIC OBSERVATIONS FROM THE ISIS 2 SATELLITE BY THE ISIS 2 EXPERIMENTERS. VOLUME 1: OPTICAL AURORAL IMAGES AND RELATED DIRECT MEASUREMENTS (NASA) 208 p N80-33997 Unclas G3/46 35380

Volume 1

Optical Auroral Images and Related Direct Measurements

July 19

COORDINATED IONOSPHERIC AND MAGNETOSPHERIC

OBSERVATIONS FROM THE ISIS 2 SATELLITE

BY THE ISIS 2 EXPERIMENTERS

VOLUME 1

OPTICAL AURORAL IMAGES AND RELATED DIRECT MEASUREMENTS

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University of Calgary, Alberta, Canada

July 1980

The Experimenters are grateful to the National Space Science Data Center, Greenbelt, Maryland for making this publication possible.

This Data Book is dedicated

to the memory of John H. Chapman,

through whose efforts the Alouette-ISIS

satellite program became a reality.

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I. INTRODUCTION

ISIS 2 is the fourth and final satellite launched in the Alouette/ISIS series. In this International Satellites for Ionospheric Studies program, Canada provided the spacecraft and the USA provided the launch capability, tracking, and data acquisition. Satellite instruments and data processing support were provided by both countries. During the course of the program these countries contributed telemetry support and collaborative data analysis: Australia, Finland, France, India, Japan, New Zealand, Norway, and the United Kingdom.

Alouette 1 won recognition mainly through the success of the topside sounder, but subsequent evolution led to a highly coordinated ISIS 2 satellite, having the capability for both direct measurements and remote sensing. Launched on April 1, 1971, into a near-circular near-polar orbit at 1400 km, it was essentially an observatory-type satellite with the potential of making fundamental measurements of both the ionosphere and magnetosphere, thereby yielding important information on the coupling processes between these regions.

At the time the program was planned, no provision was made for the generation or presentation of uniform and coordinated data sets, as this concept did not emerge until much later. This work has been done, for a selected number of passes, by the ISIS Experimenters Committee, and this publication is the result of their coordinated efforts.

The purpose of this work is to provide at the end of the data acquisition phase of the ISIS program, a representative set of data from ISIS 2 covering a range of operating modes and geophysical conditions. The data presented here show the typical values and range of ionospheric and magnetospheric characteristics, as viewed from 1400 km with the ISIS 2 instruments. For any scientist using ISIS data, this book should give a useful background and helpful perspective as to what is available. For others, this publication should be helpful in providing typical and extreme values of ionospheric and magnetospheric parameters, or may even provide research material. Anyone making serious quantitative use of these data may wish to contact the experimenters themselves. Original data from the instruments have been deposited in the National Space Science Data Center (NSSDC), NASA/GSFC, Greenbelt, Maryland 20771.

The overall publication comprises seven data sets in four volumes. The definition of each data set depends partly on geophysical parameters and partly on satellite operating mode. Preceding the data set is a description of the organizational parameters and a review of the objectives and general characteristics of the data set. The data are shown as a selection from 12 different data formats. Each data set has a different selection of formats, but uniformity of a given format selection is preserved throughout each data set. A description of how to interpret each format is given in the introductory sections. Most of the data that are plotted linearly in time are on one of two possible scales, corresponding to either 12 min/page or 20 min/page. Thus easy comparison of data is made possible. To summarize, each data set consists of a selected number of passes, each comprising a format combination that is most appropriate for the particular data set. Following this introduction is a list of ISIS 2 experimenters, with addresses and telephone numbers, then a brief description of the ISIS 2 satellite, followed by more detailed instrument descriptions, format descriptions, data set descriptions, and the data themselves. At the end of Volume 1 is a bibliography of ISIS 2 published papers. This bibliography was produced from a computerized technical reference file at the National Space Science Data Center. Comprehensive bibliographies for the other satellites of the Alouette-ISIS program also are available from NSSDC.

II. LIST OF ISIS 2 EXPERIMENTERS (as of 1980)

Communications Research Centre - Department of Communications P.O. Box 11490, Station "H", Ottawa, Ontario, Canada K2H 8S2

H. G. James - Topside sounder, VLF, Cosmic Noise (613-596-9279)
D. Muldrew - Topside sounder (613-596-9101)
J. H. Whitteker - " " "
J.D.R. Boulding - Satellite controller (613-596-9539)

Goddard Space Flight Center, Greenbelt, MD, USA 20771

L. H. Brace - Cylindrical electrostatic probe, Code 961 (301-344-8575)
E. J. Maier - Retarding potential analyzer, Code 963 (301-344-8912)
C. Freeman - Data analyst (301-344-6374)

National Research Council - Herzberg Institute of Astrophysics, Ottawa, Ontario, Canada K1A OR6 (613-992-2734)

I. B. McDiarmid, J. R. Burrows, D. D. Wallis, M. D. Wilson } Energetic Particle Detector and Fluxgate Magnetometer

University of Calgary, Physics Department, Calgary, Alberta, Canada T2N 1N4 (403-284-6340)

C. D. Anger, L. L. Cogger, J. S. Murphree } Auroral Scanning Photometer

University of Texas at Dallas, Center for Space Sciences, MS F02.2, P.O. Box 688, Richardson, TX, USA 75080

W. J. Heikkila, J. D. Winningham, D. M. Klumpar } Soft Particle Spectrometer (214-690-2835)

J. H. Hoffman - Ion Mass Spectrometer (214-690-2840)
W. H. Dodson - " " " "

York University, Centre for Research in Experimental Space Science, 4700 Keele Street, Downsview (Toronto), Ontario, Canada M3J 1P3 (416-667-3221)

G. G. Shepherd - Red Line Photometer
F. W. Thirkettle - Data Analyst

III. SATELLITE DESCRIPTION

ISIS 2 (Figure 1) was launched from the Western Test Range, California on April 1, 1971 (Franklin and Maclean, 1969; Daniels, 1971). The orbital parameters are: apogee 1423 km, perigee 1356 km, inclination 88.16°, and period 113.55 min. ISIS 2 carries 12 instruments (Figure 2), 10 of which are described in detail below. The other two are the Beacon experiment for measuring ionospheric irregularities and the Cosmic Noise experiment for measuring the cosmic or natural background noise level.

The satellite is an approximate oblate spheroid with a height of 119 cm, a diameter of 127 cm, and a weight of 260 kg. Its attitude is controlled by torquing coils and is measured by a 6-probe fluxgate magnetometer and a solar aspect sensor. The spin rate varies between about 2.5 and 3.5 rpm and can be changed by about 0.10 - 0.15 rpm/orbit. The spin axis is normally kept in the orbital plane (orbit-aligned) or at right angles to the orbital plane (cartwheel). For the orbit-aligned configuration the attitude can be changed by 2.0° - 2.5°/orbit and in the cartwheel configuration, by about 0.5°/orbit. The spacecraft contains about 11,000 solar cells and 3 Ni-Cd batteries. It was capable of operating for about 9 hours/day at launch and presently (1980) is capable of operating for about 2.5 hours/day. It has 3 telemetry transmitters at 136.08, 136.59, and 401.75 MHz and a tracking beacon at 136.41 MHz. Data are telemetered to several ground stations situated around the world. The spacecraft has a tape recorder and clock, but these failed in 1971 and 1974, respectively.

IV. INSTRUMENT DESCRIPTION AND DATA PROCESSING

AURORAL SCANNING PHOTOMETER (ASP)

The ISIS 2 dual wavelength auroral scanning photometer (Anger et al, 1973) is designed to map the distribution of auroral and airglow emissions at 5577Å and 3914Å over the portion of the dark Earth visible to the spacecraft.

Franklin, C. A., and M. A. Maclean, The design of swept-frequency topside sounders, Proc. IEEE, 57, 897-929, June 1969.

Daniels, F., The ISIS-II spacecraft, Communications Research Centre Report No. 1218, Department of Communications, Ottawa, March 1971.

Anger, C. D., T. Fancott, J. McNally, and H. S. Kerr, ISIS 2 scanning auroral photometer, App. Optics, 12, 1753-1766, Aug. 1973.

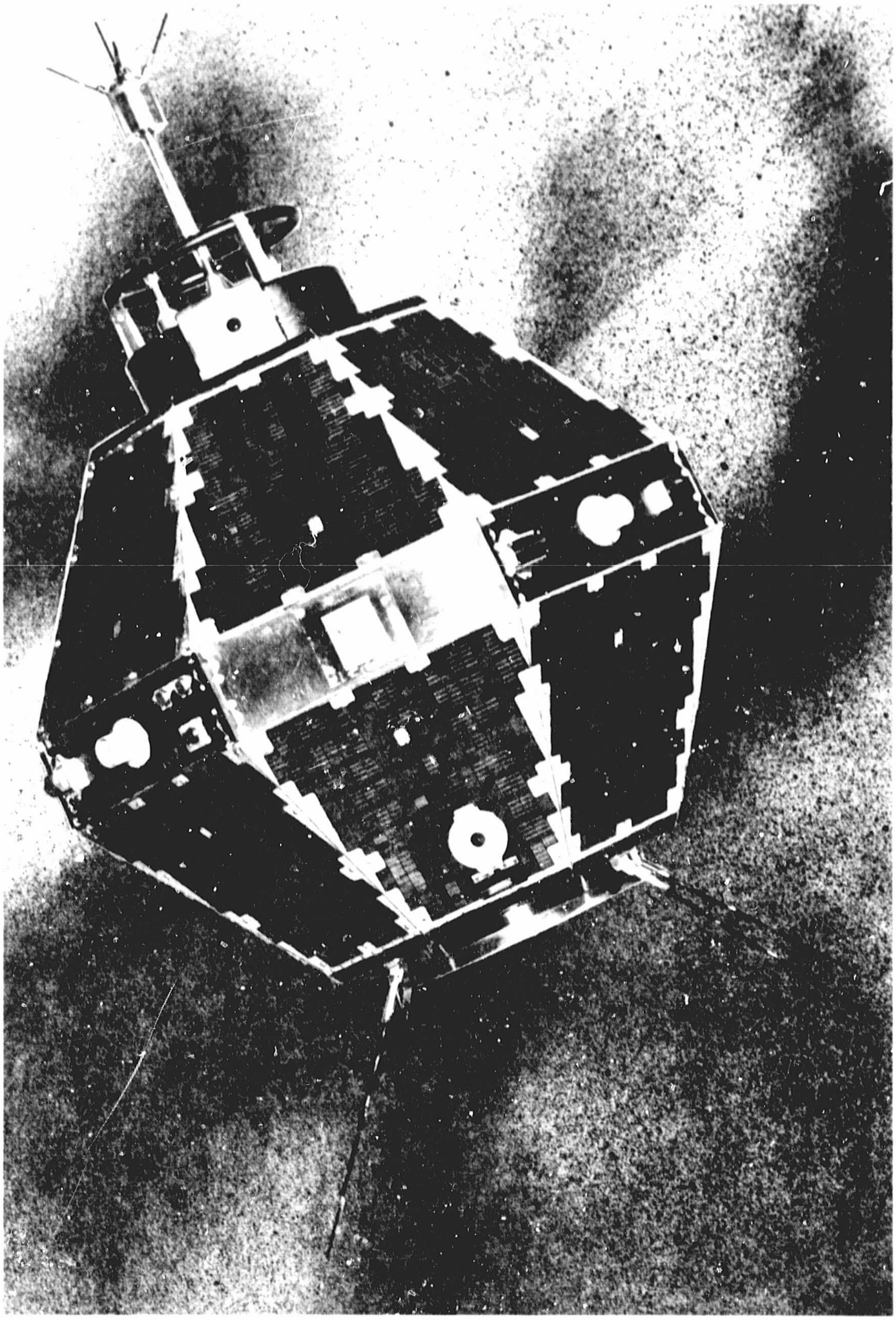


Figure 1. ISIS 2 Spacecraft.

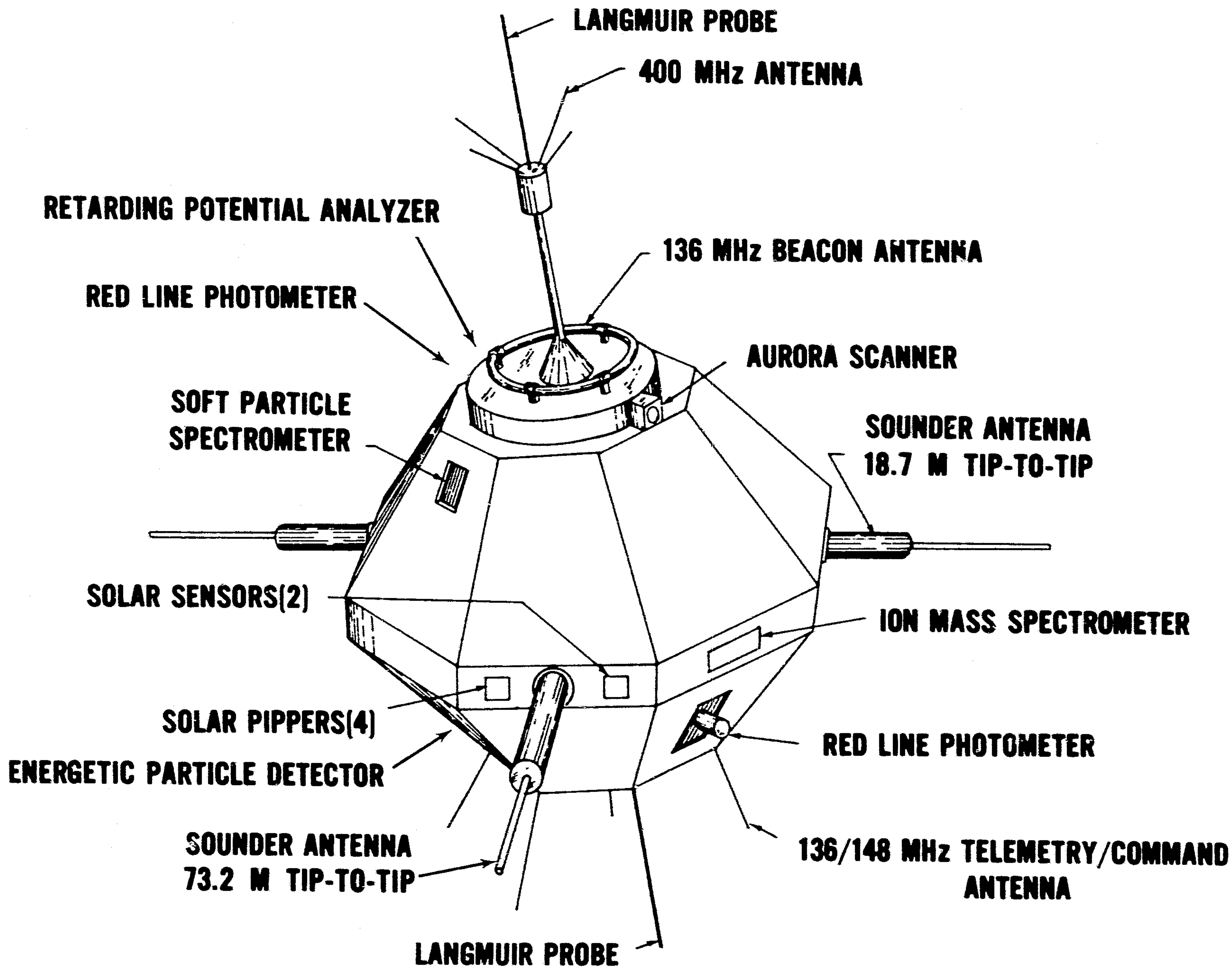


Figure 2. ISIS 2 Instrumentation.

Meaningful optical observations are possible at angles between the viewing direction of the instrument and the Sun direction of >60° and <120° due to a two-stage baffle system which shields the optics. The optical system consists of two separate barrels which are 180° apart so that only one barrel can look at the Earth at a time. The light from each of the barrels passes through its own interference filter (5581 ± 9Å or 3914 ± 13Å), lens, and mirror, and then is focused at a common point on a single-image dissector photomultiplier tube. This tube is similar to an ordinary photomultiplier tube except that an electrostatic imaging system and aperture are interposed between the cathode and first dynode. At any instant, only those photoelectrons from a small region of the cathode can pass through the aperture and be multiplied. This region is scanned across the photocathode by a magnetic scanning coil, thus generating a 13-element linear scan which is oriented at 90° to the direction of motion produced by rotational motion of the spacecraft (see Figure 3). The instantaneous field of view of each of these elements is 0.4° x 0.4°, resulting in an average output of one photoelectron pulse for ~250 rayleighs (R) from each point viewed, and hence a signal to noise ratio of one. The spatial resolution at 100 km directly under the spacecraft is ~8 km for each element.

Each photoelectron passing through the imaging electron optics and aperture of the image dissector tube is multiplied by about 10^7 by the dynode chain. The resulting output pulse is amplified by a pulse preamplifier, which produces standard pulses suitable for driving high-speed digital logic. Pulses from the preamplifier are accumulated in a digital logarithmic accumulator, the seven-bit output of which is transferred to a buffer and shifted out in standard PCM format at 630 words per second. As one frame of data consists of the 13 elements in a scan plus a frame synchronization word, there are 45 frames of data output per second.

The photometer scans the Earth by a combination of the rotational and translational motions of the spacecraft together with the internal electronic scanning performed by the image dissector (see Figure 3). The spacecraft spin axis and orbital plane remain essentially fixed in space as the spacecraft orbits the Earth, and, therefore, each rotation of the spacecraft results in the scanning of a strip, which, for the orbit-aligned mode of the spacecraft, is at right angles to the orbital plane. The width of the strip (5°) is chosen so that it will just join onto the strip scanned during the previous rotation. The image dissector repetitively scans at high speed across the narrow dimension of each strip, dividing it into 13 separately resolved regions (0.4° x 0.4°). Similar strips are scanned at each of the two wavelengths, although they differ in time by half the rotation period.

RED LINE PHOTOMETER (RLP)

The RLP (Shepherd et al, 1973) was designed to measure the emission of 6300Å aurora and airglow from the F-region of the Earth's ionosphere. It has two optical inputs, 180° apart and at 90° to the satellite spin axis. One input is characterized by a 10Å bandwidth filter and the other by an 88Å bandpass. They have roughly equal responses to white light, but the responses to

Shepherd, G. G., T. Fancott, J. McNally, and H. S. Kerr, The ISIS-II atomic oxygen red line photometer, Appl. Opt. 12, 1767 (1973).

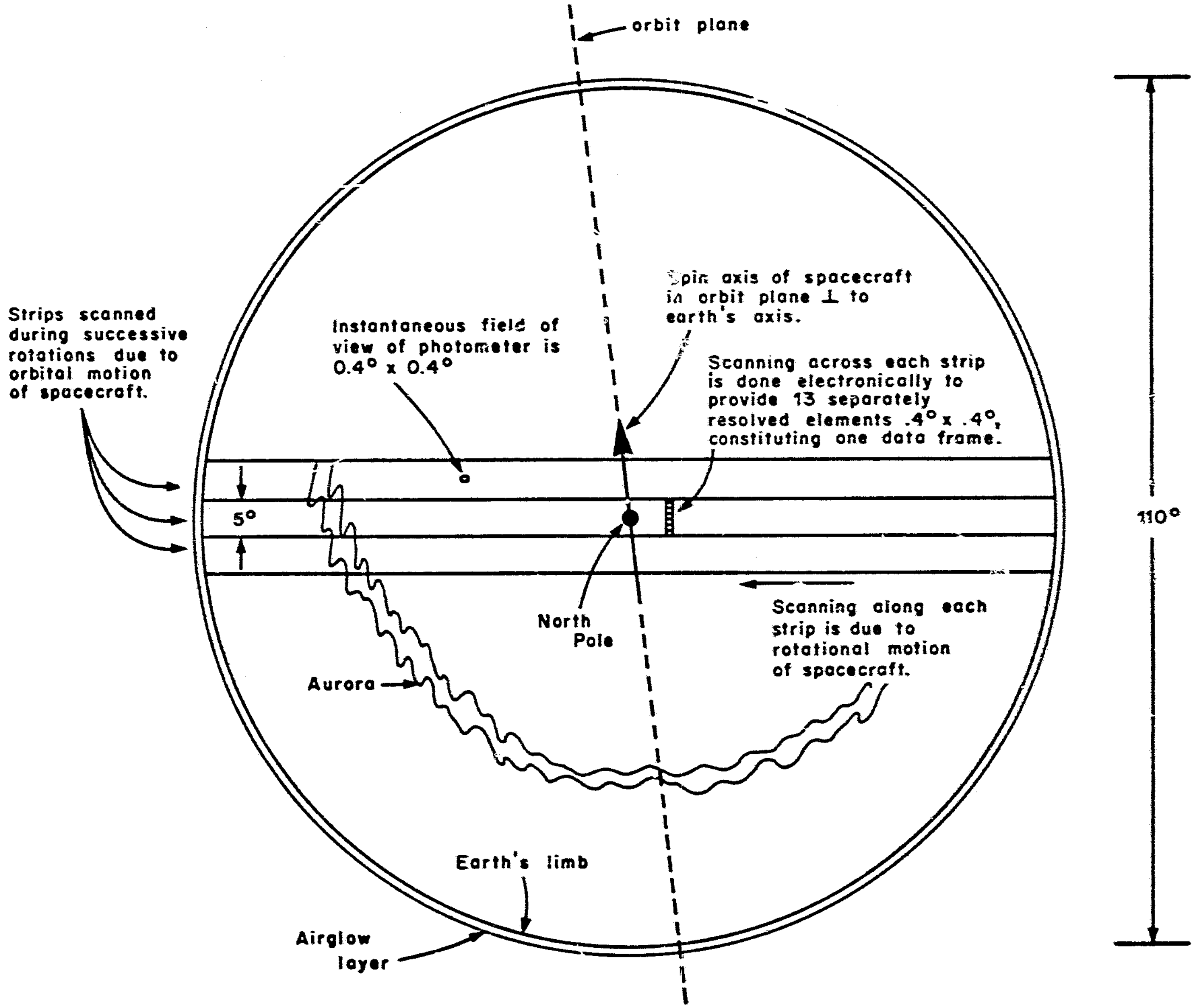


Figure 3. The Earth as it would appear from the spacecraft 1400 km above the pole, with scanning pattern of photometer superimposed.

6300Å emission are in the ratio of 9:1. The field of view of both is 2.5° in diameter. These optical inputs enter the same telescope system, and the intensities are summed onto one photomultiplier detector. As one input views the Earth the other views the dark sky, allowing the signals to be separated. Corrections for the starlight background intensity are made in data analysis. Intensities are measured at a rate of 30 samples/sec.

With the satellite spin axis in the plane of the orbit, the Earth scans caused by satellite rotation (19-second period, normally) form a raster-like scan pattern, generating two pictures per orbit; one as seen through the 10Å filter, the other by the 88Å filter. These pictures are combined to eliminate the white light background, leaving the 6300Å intensities. These intensity values are contoured in "spin coordinates," and then transformed to magnetic invariant coordinates using the method of Boyd (1977). The details are described under Format 8.

When the spin axis is perpendicular to the orbit plane (cartwheel configuration), the RLP scans repeatedly along the satellite track. The output in this case is presented as intensity along the spacecraft track as a function of spacecraft time. The details are described under Format 1.

SWEPT-FREQUENCY SOUNDER

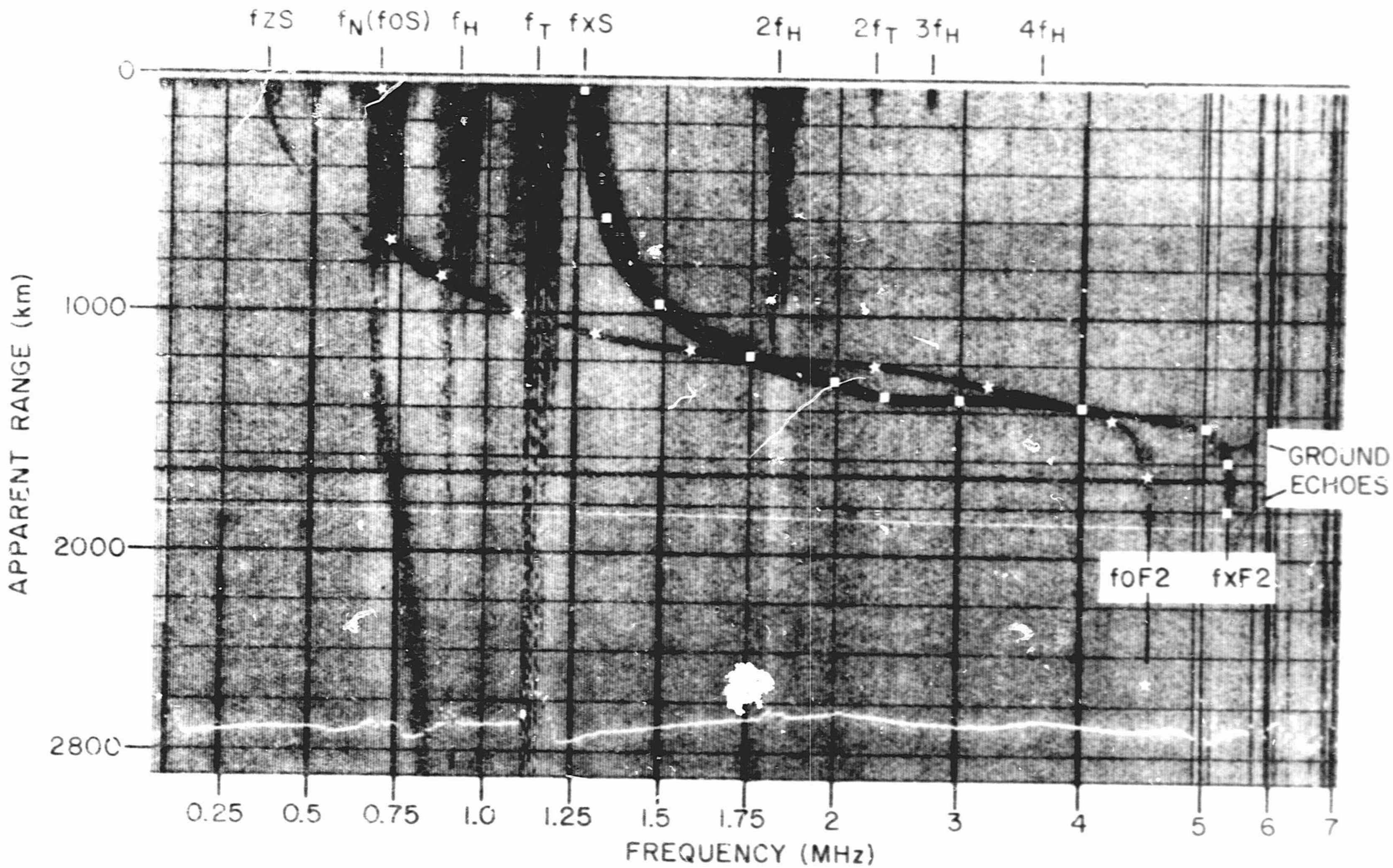
The sounder is essentially a radar, operating between 0.1 and 20 MHz, which transmits pulses approximately 100 μs in duration, and then listens for reflected signals. The pulses are repeated at the rate of 45 per second, as the frequency is gradually swept through its range. The received signal is displayed in the form of an ionogram, in which the density of the display at any point depends on the signal level.

An ionogram is shown in Figure 4. In a well-behaved (horizontally stratified) ionosphere, there will be at most two echoes for a given frequency. For each echo, the time delay is determined by the electron density (N) as a function of altitude (h). The delay-time scale is marked in units of distance (apparent range), corresponding to a signal propagating at the speed of light. In a plasma, the signal travels more slowly than this, and the delay time depends on an integral of group refractive index along the path. The ionogram provides apparent range as a function of frequency, and with this information, the integral can be inverted to give the vertical electron density profile N(h). A procedure for this inversion is described by Jackson (1969).

The trace in the lower portion of the ionogram represents the automatic gain control (AGC) voltage. Zero voltage is given by the horizontal line that is designated 2800 km apparent range, and the maximum AGC voltage of 5 volts is shown by the 2400 km apparent range marker. The AGC voltage can be used as a measure of the background noise level at the satellite.

Boyd, J. S., Invariant geomagnetic coordinates for epoch 1977.25, Planet. Space Sci. 25, 411 (1977).

Jackson, J. E., The reduction of topside ionograms to electron-density profiles. Proc. IEEE, 57, 960-976, June 1969.


fZS
f_N(foS)
f_H
f_T
fxS
$2f_H$
$2f_T$
$3f_H$
$4f_H$
GROUND ECHOES
foF2
fxF2
0
1000
2000
2800
APPARENT RANGE (km)
0.25
0.5
0.75
1.0
1.25
1.5
1.75
2
3
4
5
6
7
FREQUENCY (MHz)

The sounder is described in more detail by Franklin and Maclean (1969). In the same issue of Proc. IEEE, there are several other articles on topside sounding. A short review on topside sounding is given by Jackson et al (1980).

CYLINDRICAL ELECTROSTATIC PROBE (CEP)

The CEP is a Langmuir probe instrument which measures the electron density (N_e) and temperature (T_e) of the ionospheric plasma. The instrument consists of a pair of thin wire collectors projecting from the spacecraft spin axis at both ends. The two collectors are operated independently in a time-shared fashion by a common electronic unit which applies an appropriate voltage waveform and measures the resulting volt-ampere characteristics of the collectors. Details of similar instruments used on the Alouette 2 and Explorer 31 satellites are discussed elsewhere (Findlay and Brace, 1969).

A typical CEP plot of N_e and T_e is shown in Figure 5. The plot format reflects the details of the instrument design. Points are shown at 6-second intervals, reflecting the repetition rate of the sweep voltage waveform. Each collector is assigned to the electronics during alternate 30-second intervals, thus alternate groups of five measurements are derived from different probes. Owing to damage of one of the probes at launch, which introduced a spin modulated error in its N_e measurement, only one probe is employed for N_e measurements. Both probes are capable of good T_e measurements, although wake effects on one or the other may cause slight disagreement in their T_e measurements at certain points in the orbit. This will be evident as an offset in alternate groups of five T_e points in the plots. The T_e values are given either by solid points or by question marks (?) in the case of poor curves caused by ionospheric irregularities, as discussed later.

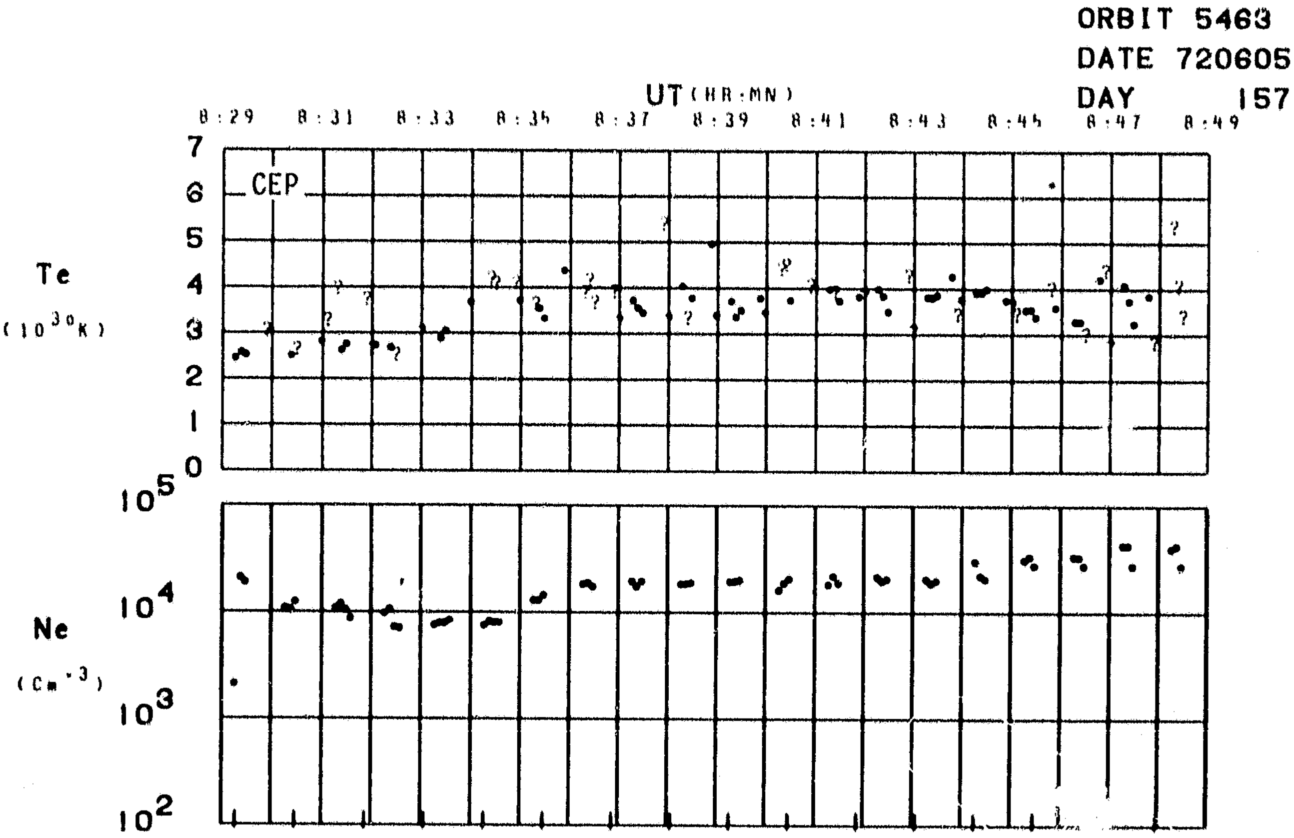
The N_e measurements are made in the range of about 10^2 to $10^5/cm^3$. The lower limit arises from electrostatic shielding by the spacecraft sheath which grows out over the collectors at very low densities.

The T_e measurements can be made when N_e exceeds about $200/cm^3$ when the collectors are not in sunlight. When in sunlight, photoelectrons leaving the collectors prevent a proper ion current reference to be established until N_e exceeds about $10^3/cm^3$. T_e may be resolved between 500°K and 15,000°K when the above N_e conditions are attained.

Franklin, C. A. and M. A. Maclean, The design of swept-frequency topside sounders, Proc. IEEE, 57, 897-929, June 1969.

Jackson, J. E., E. R. Schmerling, and J. H. Whitteker, Mini-review on topside sounding, IEEE Transactions on Antennas and Propagation, Vol. AP-28, No. 2, 284-288, March 1980.

Findlay, J. A. and L. H. Brace, Cylindrical electrostatic probes employed on Alouette 2 and Explorer 31 satellites, Proc. IEEE, 57, 1054-1056, June 1969.



LAT	42	45	50	54	57	61	66	69	73	77	81	85	87	86	82	78
LONG	-155	-155	-155	-155	-155	-154	-154	-154	-153	-151	-147	-136	-84	-7	5	9
LT	22:10	22:11	22:12	22:13	22:15	22:17	22:20	22:23	22:28	22:36	22:54	23:37	3:07	8:17	9:09	9:27
DIP	73	75	77	78	80	81	83	84	85	86	88	88	88	88	86	85
DIPLAT	59	62	66	68	71	74	77	79	81	84	86	88	88	86	84	82
L	2.1	2.4	2.8	3.3	4.0	4.9	6.7	9.1	13.1	20.3	37.5	64.3	80.9	59.8	32.7	19.6
INVLAT	46	49	53	56	59	63	67	70	73	77	80	82	83	82	79	76
ZA	110	107	103	100	96	93	89	86	82	70	75	72	68	65	61	58

Figure 5. Example of CEP data.

The main sources of error in N_e are wake effects and inadequacies of the theory for the conversion of electron current to density. Comparisons with the sounder and the other direct measurements on ISIS 2 show that the errors seldom exceed a factor of two, even when wake effects are ignored. Thus we have not eliminated N_e data on the basis of spacecraft orientation.

The main source of error in T_e arises from the irregular structure of the high-latitude ionosphere which introduces distortions in the volt-ampere characteristics. When a solid point is employed to plot T_e, the error is probably less than 10 percent. Larger errors may be expected when question marks are used. No T_e value is plotted if the plasma is so structured as to distort the curve beyond recognition to the curve fitting program. In general, question mark symbols should be used only when solid T_e points are not available, and then only as an estimate of T_e.

ENERGETIC PARTICLE DETECTOR (EPD)

The EPD instrument was designed to provide directional flux measurements of electrons (from 0.15 keV to 2 MeV) and positive ions (from 2 keV to 20 MeV with some gaps). A diversity of sensors are used. A stepped electrostatic analyzer provides an 8-point electron spectrum ($0.15 < E < 10$ keV) and an 8-point positive ion spectrum ($2.0 < E < 26$ keV), each once per second. However, only three of these electron differential channels are displayed in the normal EPD format. Geiger counters and solid state detectors provide integral flux measurement at 12 different threshold energies starting at $E >$ 22 keV for electrons and $E > 150$ keV for protons. Only three of these integral channels are included in Format 3, averaged to one second time resolution. The instrumental time resolution is ~1/4 second. The energy bandpass ($\Delta E/E$) of the electrostatic analyzer is 30 percent for electrons and 15 percent for positive ions.

All of the sensors but one have the axis of their fields of view fixed in the same direction in the plane perpendicular to the spacecraft's spin axis. One geiger counter axis is along the spin axis. The fields of view of the integral detectors are conical. The electrostatic analyzer differential spectrometer has a rectangular field of view defined by a collimator with half angles 1.5° x 1.7°.

The electron differential channels are unaffected by positive ion fluxes but do give spurious counts due to solar ultraviolet light when viewing the Sun. The integral channels respond to both electrons and protons in general at different threshold energies. In Format 3, channel I(210) has had the positive ion flux removed. The $I_{\parallel}(40)$ channel includes both electron ($E > 40$ keV) and positive ions ($E > 150$ keV) fluxes. The latter flux is negligible except during solar proton events. Both I(40) and $I_{\parallel}(40)$ also sometimes have spurious Sun counts.

The gain of the differential spectrometers' channeltron detector decreased quickly between April and October 1974 and should be regarded as quantitatively inaccurate after April 1974. The geiger counter, $I_{\parallel}(40)$, failed in June 1973.

The instrumentation and detector characteristics are more fully described by Venkataranqan et al, 1975. Some relevant EPD detector characteristics are tabulated below.

Detector	Type	Energy Threshold keV	Geometric Factor cm^2 ster	Collimator Half-Angle
I(210)	solid state	[illegible] 210	8.15×10^{-3}	7.0°
I(40)	solid state	e^- 40 p^+ 150	7.84×10^{-3}	6.8°
$I_{\parallel}(40)$	geiger	e^- 40 p^+ 600	1.03×10^{-3}	5.6°
I(22)	geiger	e^- 22 p^+ 240	8.83×10^{-4}	5.5°
Ip(750)	solid state	$750 < p^+ < 4000$	4.9×10^{-2}	11.3°

ION MASS SPECTROMETER (IMS)

The ion mass spectrometer (Hoffman et al, 1974) is a magnetic sector type mass spectrometer with two electron multiplier detectors located on two different radii within the sector. The incoming ions are accelerated by a potential that makes a complete sweep in 1 second such that the mass range 1 to 9 AMU is sampled on one channel and, simultaneously, the mass range 8 to 64 AMU is sampled on the other channel. Thus the mass spectrum from 1 to 64 AMU is sampled each second. The output current from the electron multipliers is then converted to an ion concentration using conversion constants determined by in-flight calibration using the electron density obtained from the topside sounder also located on the ISIS satellite.

The ion concentration is given in number of ions per cubic centimeter of the five dominant ions found at 1400 km, each plotted as a function of time in 20-minute segments. Each data point has been obtained by curve fitting the spacecraft spin-modulated cartwheel data and determining the maxima and time of maxima of the fitted curve. Thus the absence of data for a given ion may indicate that a good curve fit was not possible; this generally occurs at concentrations less than 10 ions/cm^3.

Venkatarangan, P., J. R. Burrows, and I. B. McDiarmid, On the angular distributions of electrons in 'inverted V' substructures, J. Geophys. Res. 80, 66-72, Jan. 1975.

Hoffman, J. H., W. H. Dodson, C. R. Lippincott, and H. D. Hammack, Initial ion composition results from the ISIS 2 satellite, J. Geophys. Res. 79, 4246, 1974.

RETARDING POTENTIAL ANALYZER (RPA)

The retarding potential analyzer (Kayser et al, 1978) is a planar multigrid instrument designed to measure ionospheric density and temperature parameters over the range 10 to 10^6 ions/cm^3 and 500-10,000° K, respectively. This is accomplished by performing an electrostatic retardation of the ions flowing into the instrument at the spacecraft velocity when the instrument is oriented in the nearly forward direction. The instrument is mounted in the equatorial plane of the spacecraft, with the sensor normal directed radially outward. Thus the viewing angle scans a variety of directions as the spacecraft rotates at the nominal 3-rpm spin rate. In the cartwheel mode, in which the spacecraft spin axis is perpendicular to the orbit plane, the sensor scans the full angle range 0° to 360° between the sensor normal and the velocity vector every (nominally) 20 seconds. In the orbit aligned mode, in which the spacecraft spin axis is in the orbit plane, the sensor cannot scan the forward direction at all latitudes. In particular, at high latitudes, the sensor normal is almost perpendicular to the velocity vector, thus precluding data collection when the optical instruments are obtaining "spin scan" images. Thus only the cartwheel data sets contain results from the RPA.

Plasma analysis is performed by applying programmed voltages to the various grids within the ion trap and measuring the current transmitted to the collector as a function of the applied potentials (Moss and Hyman, 1968). The resulting current voltage (I-V) response is fitted to a predicted response to provide the estimates of the ambient parameters. Results presented in this data book are based on the assumptions that the ions present in significant concentrations (>1 percent of the total) may be H^+, He^+, and O^+, all assumed to be at a common temperature T. Useful data are obtained only when the sensor normal is within 35° of the spacecraft velocity vector. The combination of the 3-second instrument program cycle and the 20-second spacecraft spin period yields a limit of 1 or 2 plasma analyses per 20-second interval. This nominal rate of 3 per minute may not be attained for several reasons. (1) Operation of the sounder transmitter sometimes perturbs the local plasma, yielding non-geophysical results. (2) Photoemission effects within the instrument sometimes preclude analysis of the I-V curve when the Sun is within the field of view of the instrument. This is most significant in regions of low plasma density. (3) Highly structured plasma often cannot be analyzed if the local plasma variations are fast on the 1-second time scale on the instrument. This is usually the reason for the apparent data gaps in the auroral zone. (4) Extreme spacecraft potentials are sometimes encountered, exceeding the range of the applied sweep voltages. For all of these cases, appropriate tests are used to delete, or correct, data points before analysis and to select results based on the quality of their fit to the theoretical I-V curve.

Kayser, S. E., E. J. Maier, and L. H. Brace, Quiet time plasma irregularities at 1400 km in the cleft region, J. Geophys. Res. 83, 2533, 1978.

Moss, S. J., and E. Hyman, Minimum variance technique for the analysis of ionospheric data acquired in satellite retarding potential analyzer experiments, J. Geophys. Res. 73, 4315, 1968.

SOFT PARTICLE SPECTROMETER (SPS)

The ISIS 2 Soft Particle Spectrometers measure the fluxes and energy spectra of electrons and positive ions over the energy range from 5 eV to approximately 15 keV.

There are two independent electrostatic analyzers (SPS's) on the ISIS 2 satellite, each of which is capable of measuring electrons and/or positive ions in either an energy step dwell mode or a spectral sweep mode. Each of the spectrometers, referred to as "top beam" and "bottom beam," are mounted looking in identical directions perpendicular to the satellite spin axis. The top detector is normally operated in an electron sweep mode and as such has a geometric factor of 4.95×10^{-4} cm^2 ster and an energy bandpass ($\Delta E/E$) of 24.7 percent with center energies from 13.15 keV to 5.5 eV in 38 levels. The bottom detector is normally operated in a positive ion sweep mode and in this mode has a geometric factor of 1.27×10^{-3} cm^2 ster and an energy bandpass ($\Delta E/E$) of 35.5 percent with center energies from 14.675 keV to 5.0 eV in 39 levels. Both spectrometers have rectangular fields of view with a full width of 5 degrees by 25 degrees for the top beam (electron mode) and 10 degrees by 25 degrees for the top beam (ion mode) and the bottom beam in both electron and ion modes. In both cases the long dimension of the field of view is parallel to the spin axis and the short dimension is in the equatorial plane. A similar instrument flown on ISIS 1 is described by Heikkila et al (1970).

VERY LOW FREQUENCY RECEIVER (VLF)

The center of the VLF instrument is a broadband receiver covering the frequency range from 50 Hz to 30 kHz (Franklin et al, 1960). A receiving antenna connects to the receiver through a protective low pass filter. Normally, the antenna is the 73.2-m dipole shared with the topside sounder. Also, the receiver input can be connected instead to the spacecraft torquing coils used for attitude adjustment; however, the torquing coils have not produced meaningful data. VLF emissions are observed over a wide amplitude range and consequently the receiver has been designed with a dynamic range of 68 dB, most of which is achieved by use of automatic gain control (AGC).

Output from the receiver directly modulates an FM telemetry transmitter and has a dynamic range of 3 dB above the AGC threshold. The AGC is sampled 60 times per second and telemetered to ground via the PCM data channel. The receiver threshold is 20 μV across an input impedance of 16 kΩ.

On ISIS 2 the VLF experiment also includes an exciter connected to the short (18.7 m) sounder dipole. It sweeps logarithmically from 15 to 0.05 kHz

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Heikkila, W. J., J. B. Smith, J. Tarstrup, and J. D. Winningham, The soft particle spectrometer in the ISIS 1 satellite, Rev. Sci. Instr. 41, 1393, 1970.

Franklin, C. A., T. Nishizaki, and W. E. Mather, A wideband VLF Receiver for the Alouette II and ISIS-A satellites, DRTE Technical Memorandum 522, Department of National Defence, Ottawa, Canada, May 1960.

once every 5 or 10 seconds. In addition, the short-dipole impedance can be measured by recording the amplitude and phase of the current drawn by the dipole in response to the VLF exciter. These data are telemetered via the PCM system.

TRIAXIAL FLUXGATE MAGNETOMETER

The orthogonal set of magnetometers (McDiarmid et al, 1978) is mounted in the body of the spacecraft with one component oriented along the spin axis (designated the z-magnetometer) and the other two in the plane perpendicular to the spin axis (designated x-y plane). The x-and z-magnetometers each have two ranges, ± 60,000 nT (± 600 milligauss) and ± 20,000 nT. The former range has digitization steps of 480 nT while the latter has 160 nT. The y-magnetometer has only the ± 60,000 nT range. All components are sampled at the rate of 1 sample/sec. There is no in-flight calibration capability. There is an induced field due to the surrounding spacecraft mass and wiring harness which is of the order of 1 percent of the external field. This field and some other periodic sources of interference from spacecraft equipment are removed in the data processing.

In this data book, only data from the axial (z) component are presented since its processing is more straightforward than for the spinning components. Only data sets in which the spin axis is nearly perpendicular to the orbit plane (i.e., cartwheel) have magnetometer measurements included, since it is desirable to use the higher sensitivity (± 20,000 nT) range. In cartwheel, the axial component is aligned approximately in the East-West direction when crossing the auroral ovals.

V. DATA FORMAT DESCRIPTIONS

The data most appropriate, and available, for a particular study are presented in formats selected from the following list. A format may contain data from a single instrument or from several instruments. A description of the information provided by each instrument is provided in this section. The following table specifies what instrument and quantities are plotted in each format. Unless otherwise specified all quantities plotted are profiles along the spacecraft track.

McDiarmid, I. B., J. R. Burrows, and M. D. Wilson, Comparison of magnetic field perturbation at high latitudes with charged particle and IMF measurements, J. Geophys. Res. 83, 681, 1978.

Format Number	Instrument	Quantity Plotted
1	Auroral Scanning Photometer	5577Å, 3914Å intensity
	Red Line Photometer	6300Å intensity
	Soft Particle Spectrometer	Electron energy flux
2	Topside Sounder	Electron density contours at different altitudes
	Magnetometer	Magnetic field deviation
3	Energetic Particle Detector	Electron and proton flux/energy
4	Cylindrical Electrostatic Probe	Electron density and temperature
	Ion Mass Spectrometer	Concentration of H^+, He^+, O^{++}, N^+, O^+
5	Retarding Potential Analyzer	Concentration of H^+, O^+, He^+ and ion temperature
6	Soft Particle Spectrometer	Electron and positive ion spectrograms
7	Auroral Scanning Photometer	Grey-scale two dimension co-ordinate transform of 5577Å, 3914Å intensities and the 5577Å/3914Å ratio
8	Red Line Photometer	Contour plot of 6300Å intensity
9	Auroral Scanning Photometer	5577Å E and F region latitude profiles
	Red Line Photometer	6300Å latitude profile
10	Cylindrical Electrostatic Probe	Electron density and temperature
	Topside Sounder	Electron density contours at different altitudes
11	VLF	VLF spectra
12	Auroral Scanning Photometer	Height profiles of 5577Å slant intensity

FORMAT 1 (ASP, RLP and SPS)

The sample of Format 1 shown in Figure 6 has been retouched for clarity, but it corresponds to the direct computer plot reproduced in the ISIS 2 data book. This format contains a combination of Soft Particle Spectrometer (SPS) electron data and optical data from the Auroral Scanning Photometer (ASP) and Red Line Photometer (RLP). A minimum-time-delay algorithm is used, in which the time delay between the satellite crossing of a particular field line and the optical viewing of the emission from the foot of the field line is minimized. This delay can be kept to within one-half of a spin period, by selecting optical data from the most appropriate spin for a given latitude range, and splicing it together to form a continuous sequence. For this data set the satellite has its spin axis perpendicular to the orbit plane and the optical scans are repeatedly along the spacecraft track. Thus, there is adequate redundancy for the above procedure.

The electron data and optical data are then plotted as a function of Universal Time, corresponding to the time of the spacecraft motion (the time of the SPS measurement), which will be somewhat different from the optical viewing time as described above. The start time is shown at the lower left and minute values are given on the horizontal axis. The atomic oxygen 6300Å emission intensity from the RLP and the atomic oxygen 5577Å and N_2^+ 3914Å emission intensities from the ASP are plotted in kR on a logarithmic scale at the bottom. These intensities have not been corrected for airglow background or albedo. The SPS electron energy fluxes have been integrated over four energy bands as shown on Figure 6: 5 -60 eV, 60 -300 eV, .3 -1. keV, 1 -15 keV and plotted on vertically separated scales, with the ordinate labeled in units of the logarithm of the energy flux in erg cm^{-2} sr^{-1} sec^{-1}.

The modulation that appears on these fluxes results from the rotation of the spacecraft. The detectors look outward in the equatorial planes, sweeping through a pitch angle coverage shown by the sawtooth at the top of the plot. A downward sawtooth corresponds to downward-going particles.

At the top of Figure 6 the following geophysical quantities are indicated along the horizontal axis: INVL - invariant latitude, INVT - invariant time, SDEP - local solar depression angle at the location of the viewed emission, CDEP - solar depression angle at the magnetic conjugate point to the viewed emission.

The 5577Å and 3914Å data plotted are derived from the slow-speed PCM data link, the same as used for the 6300Å data, but not the same as the high speed data link employed for the high-resolution ASP photos. To achieve this reduced data rate the intensity across a 13-element scan is averaged into essentially a single value by filtering. Because of this, the PCM data should be used with caution when accurate intensities are desired. Optical observations from satellites (and rockets) include in addition to the real emission intensity, a variable contribution from ground scattering. In principle this contamination can be quantitatively removed using the method of Hays and Anger (1978) assuming

Hays, P. B. and C. D. Anger, Influence of ground scattering on satellite auroral observations, Appl. Opt. 17, 1898-1904, June, 1978.

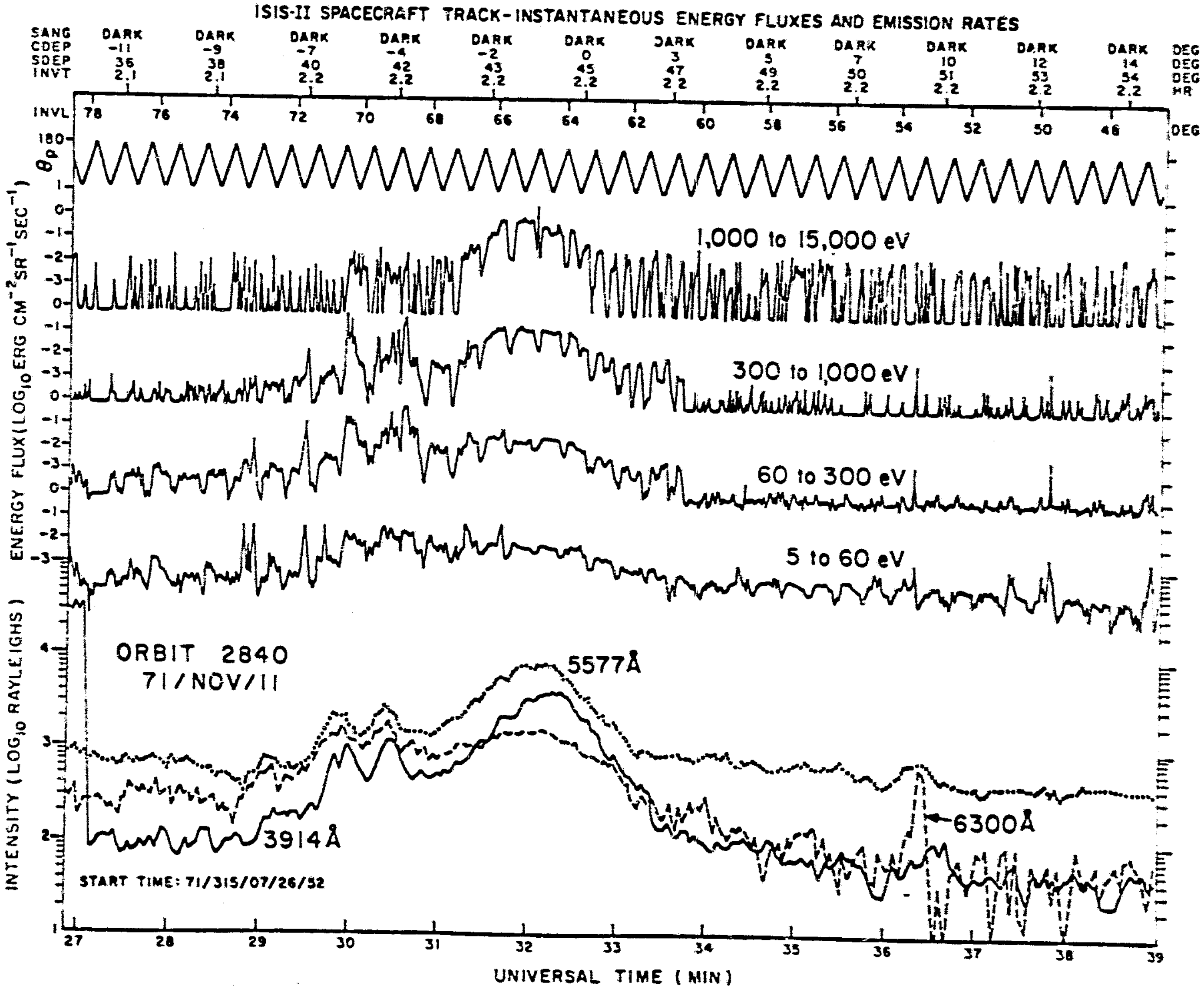

Figure 6. Example of Format 1 (Optical data and SPS).

the altitude of the emission and the spectral albedo of the surface are known. Practical experience has shown that the factor by which to divide an observed intensity (5577Å or 3914Å) varies from 2 for a large-scale, reasonably uniform region to 1 (i.e., no correction) for thin discrete arcs (Murphree et al, 1978). This correction factor is not as serious for the 6300Å emission because of its higher altitude and consequently lower susceptibility to contamination.

FORMAT 2, TOP (MAGNETOMETER)

The axial magnetometer plot is Format 2, combined on the same page with the sounder isodensity height profile plot. They have a common abscissa labeled in minutes of Universal Time. The orbit number and Universal Time at the beginning of the plot appear at the bottom. The ordinate is in units of nanoteslas (nT). The quantity plotted is the residual deviation of the filtered axial component from the GSFC 06/74* model field computed in the direction of the inferred spacecraft spin axis orientation. The residual baseline is offset from zero by an amount of the order of 400 to 1000 nT, in different orbits, depending on field contributions from electrical subsystems in the spacecraft. The offset from these sources remains unchanged for the duration of any plot. The data are low pass filtered with a 9-point filter and plotted at 1 point/sec. The principal source of noise is the digitization step size. After filtering, the typical RMS noise from this source is ~40 nT. Where deviations exceed the statistical fluctuations, negative-trending deviations correspond to Birkeland currents flowing into the ionosphere and positive-trending deviations correspond to Birkeland currents flowing out of the ionosphere.

FORMAT 2, BOTTOM (SOUNDER)

For each chosen value of electron density, the altitude at which that density was observed to occur is plotted as a function of UT. The values chosen for these plots are powers p of 10 such that 4p is integral, e.g., p= 3.0, 3.25, 3.5, 3.75, 4.0, etc. Units are cm^{-3}. Data points are indicated by * symbols on the contours for integral powers of 10, and by + symbols on the others. All the symbols in a vertical line represent the density information obtained from one ionogram.

The broken line at the top of the plot represents the position of the spacecraft (for ISIS 2 this line is straight and horizontal). The broken line at the bottom represents the lowest altitude from which density information was obtained. In favorable cases, this will be close to the peak of the F layer, but it can be any distance above the peak.

The altitudes are obtained under the assumption that the radio propagation from the topside sounder was vertical. At high latitudes, the propagation is more likely to be along the magnetic field. When this occurs, the altitudes shown are too low. At very high latitudes, the difference is small, but close to 60° magnetic latitude, it can amount to 50 km.

Murphree, J. S., I. W. H. Robertson, C. D. Anger, and L. L. Cogger, Rocket observations of auroral albedo over snow, Appl. Opt. 17, 1849-1850, June 1978.

*Cain, J. C., private communication, 1974.

The usual sampling rate for the topside sounder is about 4 per minute. On many passes, two consecutive samples are taken, then two missed. This mode was chosen on most cartwheel passes to provide the ion probes with interference-free intervals. Where data points are missing at irregular intervals, it is because some ionogram traces were too weak or too irregular to be scaled properly.

FORMAT 3 (EPD)

With two exceptions, the traces represent electron fluxes as a function of time. Those labeled D are differential channels while those labeled I are integral channels. The number in parentheses indicates the detected energy (keV) for the differential channels or the threshold energy for the integral detectors. Units are designated by R for 'counts per second' and I for 'electrons cm^{-2} sec^{-1} $ster^{-1}$ keV^{-1}'.

All of the above vertical scales are logarithmic.

The bottom trace, $\bar{E}$, indicates the average energy (keV) computed from the complete electrostatic analyzer energy range (0.15 to 9.6 keV); it does not include the integral detectors. The vertical scale is linear.

The top trace, I(22)/I(40), shows the ratio of geiger counter flux (electrons E > 22 keV and protons E > 240 keV) to the solid state detector flux (electrons E > 40 keV and protons E > 150 keV). Since the electron fluxes are normally greater than the positive ion fluxes, the ratio normally exceeds unity. However, when the proton flux between 150 and 240 keV predominates, the ratio is less than unity.

Shown across the bottom of each plot are the Universal Time (minutes), Invariant Latitude (degrees), magnetic local time (hours), B - the intensity of the magnetic field measured at the spacecraft (gauss), and Theta z - the angle between the spacecraft spin axis and the local magnetic field vector (degrees). Theta z (θ_z) is defined to be zero in both hemispheres for downward-coming field-aligned particles.

Detector $I_{\parallel}(40)$ thus looks at θ_z to the local magnetic field while all other detectors execute pitch angle scans from $90°-\theta_z$ to $90°+\theta_z$. Consequently, fluxes are often modulated at twice the spin frequency for anisotropic fluxes or at the spin frequency in regions of isotropic precipitation. The nominal spacecraft spin frequency is 3 rpm.

The integral channels record a small component of background counts due to penetrating electron flux (e.g., outer zone electrons near invariant latitude of 60°) or due to penetrating proton flux in the inner zone and during solar flare events, over the polar cap. At other places, the penetrating background counts are negligible relative to the directional flux entering the collimator.

FORMAT 4, TOP (CEP)

CEP measurements of electron density, N_e, and temperature, T_e, are plotted independently. T_e is plotted either as a point or a question mark (?) depending upon the quality of fit of the exponential portion of the volt-ampere characteristic, as described in the CEP instrument description. T_e measurements of highest reliability are plotted as points, and those of lower reliability are plotted with question marks. If the plasma is highly structured or too low in density, no T_e measurement will be made.

The values of N_e are plotted as solid points. The points come in groups of five during alternate 30-second intervals as discussed in the instrument description.

Universal Time is given at 2-minute intervals and is represented by vertical lines at 1-minute intervals.

FORMAT 4, BOTTOM (IMS)

The date and time of the start of the frame are given in the upper left hand corner. The date is given in day, month, year, and Julian day in brackets. The time is given in hours, minutes, seconds, and second of day. The orbit number is given in the upper right hand corner and is the orbit number of the start of the data frame. The orbit is incremented on the north-bound crossing of the geographic equator. The orbital data at the bottom of the plot has been interpolated to an even 2-minute point on the plot. The description and units of the orbital data are given below:

	Description	Units
UT	Universal Time	HH:MM
LAST	Local apparent solar time	HH:MM
MLT	Magnetic local time	HH:MM
DLAT	Dip latitude	Degrees
INVL	Invariant latitude	Degrees
GLAT	Geodetic latitude	Degrees
GLNG	Geodetic longitude	Degrees
SZEN	Solar Zenith Angle	Degrees
ALT	Height above the geoid	Kilometers

The ion species are identified as follows:

Symbol	Species	Mass	Units
H	H^+	1	cm^{-3}
+	He^+	4	cm^{-3}
Δ	O^{++}	8	cm^{-3}
N	N^+	14	cm^{-3}
O	O^+	16	cm^{-3}

FORMAT 5 (RPA)

Geophysical parameters deduced from the RPA as described in the instrument section are plotted on two graphs using the standard 20-min. abscissa. The lower frame shows the H^+ (symbol H) and O^+ (symbol O) densities plotted against a logarithmic ordinate scale. The density grid shown is usually over the range 10 to 10^5 cm^{-3}, but occasionally is truncated if there are no data to allow more space for an extended scale on the second plot. The upper frame shows the ion temperature on a linear scale (symbol T) and the He^+ density (symbol 4) on a logarithmic scale. The temperature scale is usually 0° to 5000°K, but occasionally may be truncated at the lower limit (if no data are present) to permit extension of the upper limit. The scale factor in the plot (degrees/cm) is constant, regardless of scale truncation.

Universal Time is used for the standard 20-min. long linear abscissa, with a vertical line every 2 minutes. Additional abscissa values are shown to identify the local time, magnetic local time, dip latitude, invariant latitude, geodetic latitude, geodetic longitude, solar zenith angle, and altitude of the spacecraft as defined under Format 4, IMS.

FORMAT 6 (SPS)

Data from these instruments are displayed as energy versus time grey-shaded spectrograms where the plotted grey-scale intensity is proportional to the log of the instrument count rate at each energy level. Due to the operational characteristics of the instrument, the count rate at a particular energy, and thus the grey-scale intensity, is an indicator of the directional energy flux per unit energy at the measured energy. In the mode of operation for data presented here, one complete electron spectrum and one complete positive ion spectrum are obtained each second.

The upper and center panels of the plot contain the electron and positive ion spectrograms, respectively. The vertical scales are logarithmic in energy from 1 eV to over 10^4 eV. The lower panel contains pitch angle information and average energies. The pitch angle denotes the instrument look direction such that 0° refers to downward-moving particles, 90° to locally mirroring particles, and 180° refers to particles coming from below the spacecraft. Note that the range of pitch angles sampled by the detectors, which look radial to the spacecraft spin axis, depends upon the angle between the spacecraft spin axis and the local magnetic field. This angle is denoted by θ_z and appears along the upper edge of the electron spectrogram. For θ_z=90° the spin axis is perpendicular to the magnetic field, and all pitch angles from 0° to 180° are sampled each half spin period. The average energies in the lower panel are computed once each second for electrons and for positive ions and represent the average energy per particle over the range 5 eV to approximately 15 keV. The horizontal axis is time ordered with the beginning Universal Time printed at the lower left hand corner. Each succeeding minute of Universal Time is indicated along each horizontal axis. Geographic latitude, geographic longitude, and local time are given at the bottom of the plots for the first and last data points. The quantities called "ECAL" are calibration indicators for internal use. The spacecraft location in Magnetic Local Time and Invariant Latitude at 1-minute intervals appears along the top horizontal axis. Orbit number and satellite altitude also are shown above the plots.

FORMAT 7 (ASP)

Because of the large dynamic range of the Auroral Scanning Photometer (ASP), it is necessary to use a grey-scale representation and a sequence of varying upper and lower intensity limits to display the data. An example of the plotted data is shown in Figure 7. The data are plotted on an electrostatic dot matrix plotter and arranged in three independent rows with the leftmost picture in each row containing the coordinate system. There is, in addition, header information at the top of the page giving basic information about the pass and how the data were transformed. In all cases, the coordinates are corrected geomagnetic latitude (CGL) (Hakura, 1965) and time (see Murphree and Anger, 1980, for a description of the transform procedure). This magnetic coordinate system is denoted by the "M" in the lower left-hand corner of each coordinate picture. The accompanying "V" indicates that the intensity data have been corrected for look direction, i.e., van Rhijn effect. However, the data are not corrected for ground scattering and thus real intensity levels will be less depending on the spectral albedo of the surface under the auroral emissions. Latitudes are labeled in general every 10° and the Magnetic Local Time (MLT) every 6 hours. The geomagnetic pole is represented by a " + ".

The spacecraft track projected down to 100 km along magnetic field lines is given by the sequence of triangles, the approximate orbital motion being defined as the direction of the apex of the triangle. The triangles represent the position of the spacecraft exactly on the minute, the particular minute being derivable from the sequence of triangle shapes as follows. The basic shape

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Hakura, Y., Tables and maps of geomagnetic coordinates corrected by the higher order spherical harmonic terms, Rep. Ionosph. Space Res., Japan, 19, 121, 1965.

Murphree, J. S., and C. D. Anger, An observation of the instantaneous optical auroral distribution, Can. J. Phys., 58, No. 2, 214-223, Feb. 1980.

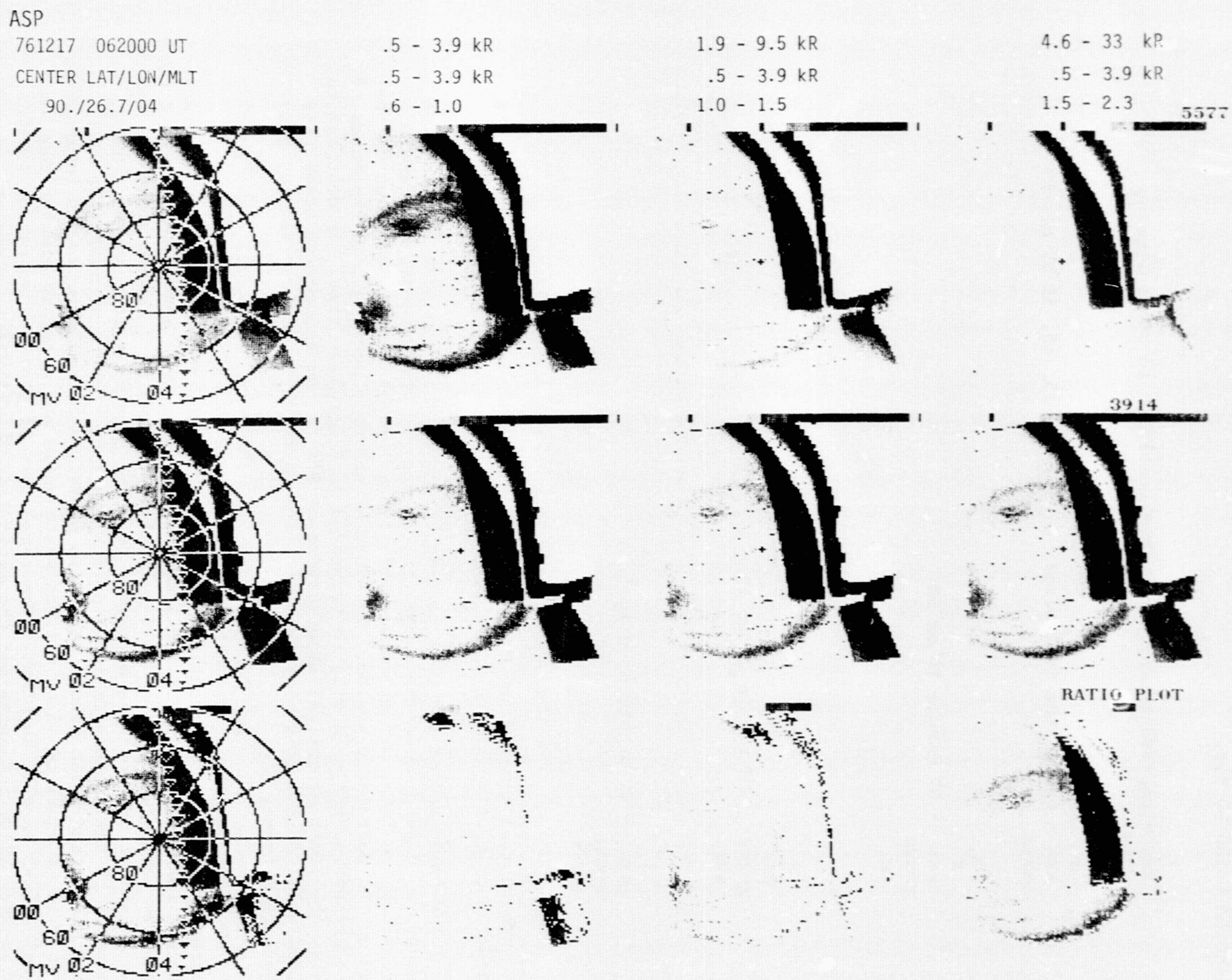


Figure 7. Example of Format 7 (ASP).

consists of filled (or a blank, depending on the surrounding background) blocks denoted below by "x":

```
  x
 xxx - represents any minute not specified in the following


  x
 xxx - one of the following:  5, 15, 25, 35, 45, 55 UT minute
xxxxx


  x
 xxx  - UT minute 10 or 50
xxxxx
  x



  x
 xxx
xxxxx  - UT minute 20 or 40
 xxx


  x
 xxx  - UT minute 0 or 30
xxxxx
xxxxx
```

The actual time values can be obtained by noting the start time in the header and identifying the first time symbol in the coordinate picture.

The start and/or end of a pass may or may not be apparent in the given transform, depending on the range (in degrees) to which it was desired to transform the data, but the spacecraft track indication will continue to the end of the coordinate system. If start or end does occur within the range of the transform, the data will be truncated in a straight line. In contrast to this, the limit of optical observations at 90° to the spacecraft track (its limbs) will form a pair of irregular lines parallel to and equidistant from the spacecraft track.

The data appearing in each picture in each row are a grey-scale representation of the intensity for the appropriate wavelength. Each picture element is represented by a 3 x 3 square matrix of dots and anywhere from 0 (at or below the bottom of the desired intensity range) to 9 (at or above the top of the range) of the dots are blackened so as to provide a grey scale. For example, if the picture is labeled .6 - .95 (the numbers representing kR for intensities and ratio values for ratio plots), then any points with intensities less than or equal to .6 kR will be white while any elements greater than or equal to .95 kR will be black. The three rows of pictures represent 5577Å intensity, 3914Å intensity and the ratio I(5577Å)/I(3914Å), respectively. In general, the 5577Å data are displayed in the three rightmost pictures of the first row with three different intensity ranges (in kR), e.g., .5 - 3.9, 1.9 - 9.5, 4.6 - 33, while 3914Å uses a single range for all three pictures, this range being the same as that for the lowest 5577Å range. The picture onto which the coordinate system is overlayed has a range equal to the entire range of intensities covered by all of the pictures in the row. For example, in the above 5577Å ranges, the coordinate picture would contain .5 - 33 as the kR range.

In the pass shown in Figure 7, the 5577Å and 3914Å data illustrate the northern hemisphere polar cap on 761217 at 0620 UT. The satellite track is basically from 16 MLT to 5 MLT as the data show well-defined auroral emissions in the evening (16 - 21 MLT) and morning (00 - 07 MLT) sectors. The midnight sector of the auroral emissions was beyond the limb on this pass as indicated by the irregular boundary of the data in that MLT sector. The dayside is contaminated by scattered sunlight as is illustrated by the high intensity, regular feature in both wavelengths. This is a common feature because of the difficulty in combining the correct satellite altitude with both time of year and UT to optimize dayside viewing conditions. Such features are usually easily distinguished from auroral emissions because they are aligned with the spacecraft track rather than with the magnetic coordinate system.

Because of contrast problems, it is necessary to approach the ratio in a different manner. Each of the three pictures in the ratio plot row represents different ratio ranges which are always chosen to be: 0.6 - 1.0, 1.0 - 1.5, 1.5 - 2.3. The ratio for each element (i.e., position in the coordinate system) in each picture is calculated. If it falls within the specified range as given above, then the 3914Å intensity at the point is plotted based upon the 3914Å intensity thresholds in the same column of the previous row (this is why all 3914Å thresholds are identical). The result is three pictures which show where 3914Å emissions are observed (and their intensity) for the three ratio ranges. The composite (i.e., the leftmost picture with the superimposed coordinate grid) then should be similar to the composite 3914Å given in the previous row. Any missing points in the composite picture will correspond to ratio values outside the range 0.6 - 2.3.

FORMAT 8 (RLP)

In this format the isointensity contours of atomic oxygen 6300Å emission are shown, obtained with the Red Line Photometer (RLP) and plotted in a polar invariant projection. The perimeter corresponds to 50° invariant, and dashed circles indicate 60°, 70°, and 80° invariant. Invariant noon is at the top and morning (06 h) on the right. The intensities corresponding to the contours selected are listed on the upper right, and the contours themselves are labeled in units of tens of rayleighs (25 = 250R). The orbit number, date, day number, and Universal Time for the first and last spins of the pass are given on the upper left. The hatched line shows the track of the spacecraft traced down to the 250 km level, the height assumed for the altitude of emission; each hatch mark indicates one rotation (spin) of the spacecraft, and every tenth spin is labeled. The spin axis is nearly parallel to the orbit plane. The Universal Times that correspond to each spin number are given on the far right-hand side.

The intensities given are not corrected for albedo and so over regions of widespread emission they may be too large by a factor of two. If the label at the top reads "6300 angstrom intensity" then a correction for white light background has been applied. If it reads "10 angstrom bandpass intensity" then there has been difficulty with white light subtraction in part of the picture and the 10Å channel data are shown uncorrected. The intensities shown for these cases will be less accurate than for the others.

The example shown in Figure 8 illustrates some aspects of the data and some of the peculiarities. The features discussed below correspond to contours that have been labeled, A → G.

A. These contours arise from sunlight scattered from the Earth. They can be recognized by their proximity to noon and by their steep gradient.

B. These linear contours are caused by scattering in the RLP baffle system, and the steep gradient is caused by one critical baffle element. When the solar illumination leaves this element the baffle scattering falls rapidly and the auroral contours become visible.

C. These linear contours, having a steep gradient, are generated by the passage of the spacecraft from sunlight into darkness, with the cessation of baffle scattering. These contours are perpendicular to the spacecraft track, and the rectangular pattern of B/C normally can be recognized readily.

D. Dayside auroral contours. The morning extension of the dayside auroral contours are evident here, extending from the region of baffle scattering. When baffle scattering is not present this pattern is normally roughly symmetric about noon.

E. Night auroral contours. These contours define the region of brighter nightside aurora.

F. Equatorward auroral boundary. These contours define the equatorward boundary of 6300Å aurora. The termination after midnight is caused by the scans reaching the "edge" of the Earth; i.e., the limb.

G. Poleward auroral boundary. These contours define the poleward auroral boundary and normally form a near-circular region in the polar cap.

FORMAT 9 (ASP AND RLP)

This format provides latitude profiles of airglow emission rate at 5577Å and 6300Å obtained from the ASP and RLP. In the cartwheel mode of operation, the fields of view of the photometer sweep along the path of the orbit to provide data over a large range of latitudes but a very small range of longitudes. Pole-to-pole coverage can be achieved in a time interval of about 30 minutes.

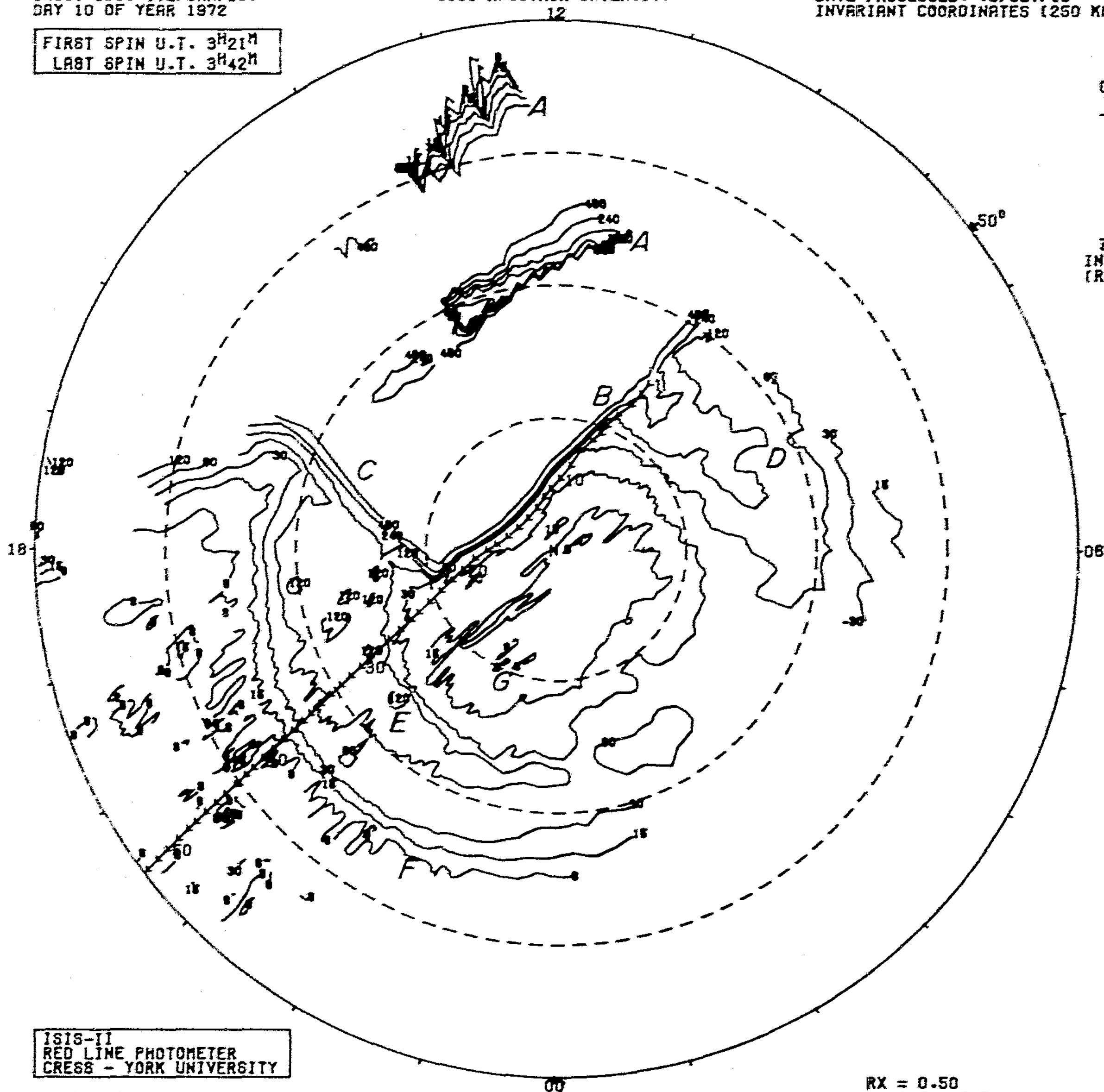
The latitude profiles are based on airglow limb data which result in a measurement at the leading and trailing limb for each limb. This ensures that the data are free from cloud and ground albedo effects and contamination by other sources of light. It also permits the separation of the 5577Å airglow into the E- and F-region components (see Format 12), both of which are plotted. The maximum of the E region airglow is defined to occur at 95 km for the 5577Å data and the F region is then referenced to that level. The emission rates given correspond to what would be observed in the zenith from below at the location of the airglow limbs. The plots therefore represent the vertical

ORBIT 3598 [72/JAN/10]
DAY 10 OF YEAR 1972

FIRST SPIN U.T. 3^H21^M
LAST SPIN U.T. 3^H42^M

6300 ANGSTROM INTENSITY

DATE PROCESSED: 79/OCT/18
INVARIANT COORDINATES [250 KM.]



CONTOURS PLOTTED
80
150
300
600
1200
2400
4800
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	032159	76.3
2	032223	77.3
3	032247	78.3
4	032311	79.3
5	032335	80.2
6	032353	80.9
7	032417	82.0
8	032441	82.9
9	032505	83.6
10	032529	84.0
11	032553	84.2
12	032611	84.3
13	032635	84.3
14	032659	84.3
15	032723	84.3
16	032747	84.3
17	032811	84.2
18	032829	83.9
19	032853	83.5
20	032917	82.8
21	032941	81.9
22	033005	80.8
23	033029	79.8
24	033053	78.8
25	033111	78.1
26	033135	77.1
27	033159	76.0
28	033223	75.0
29	033247	73.9
30	03 305	73.1
31	03 329	72.1
32	033353	71.0
33	033417	69.9
34	033441	68.8
35	033505	67.7
36	033523	66.9
37	033547	65.8
38	033611	64.7
39	033635	63.6
40	033659	62.5
41	033723	61.3
42	033741	60.5
43	033805	59.4
44	033829	58.3
45	033853	57.2
46	033917	56.0
47	033941	54.9
48	033959	54.1
49	034023	53.0
50	034047	51.9
51	034111	50.8
52	034135	49.7
53	034159	48.6
54	034217	47.7
55	034241	46.7

ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

HRT Y00254
FILE 37

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

Figure 8. Example of Format 8 (RLP) with the events A through G.

emission rate in rayleighs as a function of geographic latitude. The points are not independent due to the fact that the optical viewing path in the atmosphere is longer than the spatial sample interval which is determined by the orbital speed of the satellite. As a consequence the plots correspond to a running mean of the emission rate.

In practice, the latitude range is restricted to low and mid-latitudes due to the presence of aurora at higher latitudes. The difference between leading and trailing limb values when they overlap in the plot is due either to the small difference in longitude or to temporal variation in the airglow.

FORMAT 10, TOP (CEP)

See Format 4 (Top) description. The latitude, longitude, local time, dip angle, dip latitude, L value, invariant latitude, and solar zenith angle are given below the graphs.

FORMAT 10, BOTTOM (SOUNDER)

See Format 2 (Bottom) description.

FORMAT 11 (VLF)

VLF data published herewith are presented in the conventional amplitude-frequency-time display wherein signal corresponds to the dark parts of the display. These data are from routine 35-mm records having the frequency axis across the film and the time along the film. This data book has room only for interesting excerpts of the receiver film record. In data set C of Volume 4 the VLF film has been printed at 2X magnification to illustrate the details of a variety of typical phenomena observed by ISIS 2. In the other data sets, film is printed at 1X magnification. The VLF receiver was off during the majority of the passes. Excerpts of the VLF record for receiver-on passes have been chosen to show the highlights of those passes. In many cases, the VLF exciter was on and its periodic frequency downsweeps can be seen.

The example of the data format given in Figure 9 shows the frequency axis running linearly from 0 to 21 kHz, and the Universal Time axis running linearly from 06:41:10 to 06:41:39 (hours:minutes:seconds). Both the frequency and time limits are to be associated with the extremes of the film. In the example given, the broad diffuse patches are a natural emission, VLF hiss. The record also contains four instances of the received exciter signal. Two of these are on the fast duty cycle, at 06:41:15 and 06:41:21, and two on the slow cycle, at 06:41:23 and 06:41:34.

FORMAT 12 (ASP)

This format provides examples of the 5577Å airglow limb profiles obtained during a pass. The selection was made to demonstrate the variation of the two components of the airglow. The vertical axis gives the tangential height. In all cases the reference height of 95 km has been arbitrarily assigned to the maximum of the E- region airglow response. The slant intensity in kilorayleighs (kR) is plotted along the horizontal axis. The profiles, obviously broadened by the finite field of view of the instrument, do not give information about the detailed vertical distribution; they merely demonstrate the resolution of the main components.

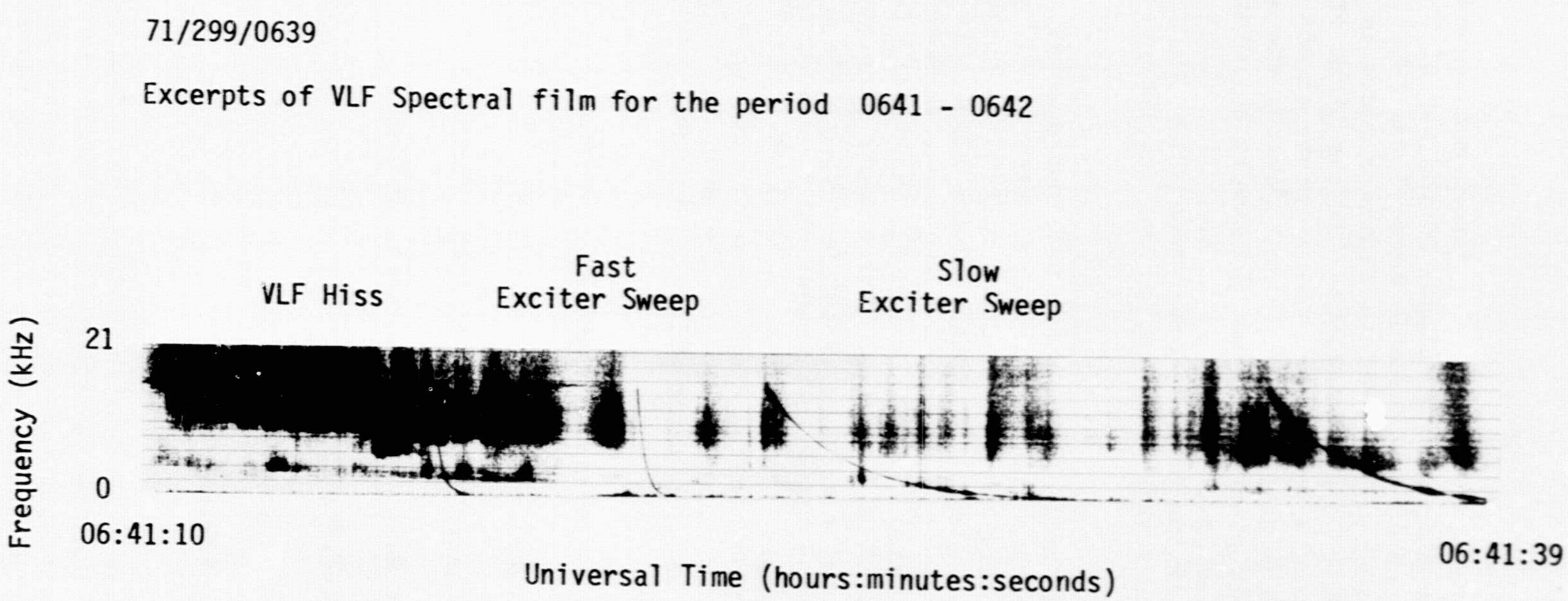


Figure 9. Example of Format 11 (VLF).

VI. GEOPHYSICAL DATA SET: OPTICAL AURORAL IMAGES AND RELATED MEASUREMENTS

DATA SET DESCRIPTION

The two-dimensional optical imaging and direct measurement data set has been chosen to illustrate the two-dimensional morphology of the aurora under varying magnetic conditions at all Magnetic Local Times (MLT). The ISIS 2 satellite is capable of being placed in two distinct modes as it orbits the Earth. First, the satellite spin axis may lie in the plane of the orbit such that instruments perpendicular to the spin axis rotate at 90° to the orbital motion. This is called the orbit-aligned mode. Second, the spin axis may be perpendicular to the orbit plane such that the resulting rotation of the instrument view directions is confined within the orbit plane. This is called the cartwheel mode. It is the orbit-aligned mode which is of interest here, as in this mode side-to-side scanning of the optical instruments is produced by the satellite rotation.

In the orbit-aligned mode, the two optical instruments, the Auroral Scanning Photometer (ASP) and the Red Line Photometer (RLP), sweep out fixed angular strips perpendicular to the direction of orbital motion of the satellite (see Figure 3 in the Instrument description of the ASP). These strips can be combined during data processing to provide grey-scale geomagnetic transforms (ASP) and contour plots (RLP), both of which illustrate the full remote sensing capabilities of the optical instruments. This remote sensing capability poses strict constraints first of all upon viewing conditions and also upon coordination with other satellite instruments which make direct (i.e., along the satellite path) measurements. This latter constraint occurs because some instruments (e.g., ion mass spectrometer, retarding potential analyzer) require measurements to be made in the direction of the velocity of the satellite. Therefore, in this data set, only the following instruments (in the order of presentation for each pass) are used:

1. Auroral Scanning Photometer, Format 7
2. Red Line Photometer, Format 8
3. Energetic Particle Detector, Format 3
4. Soft Particle Spectrometer, Format 6
5. Cylindrical Electrostatic Probe, Format 10

   Topside Sounder, Format 10
6. VLF, Format 11

The constraint on viewing conditions limits this data set to periods when a significant fraction of the high latitude auroral region is dark. The data set pass list (Table 1) specifies the dates when the selected passes were acquired. The majority are from December and January and all the passes are taken over the northern hemisphere.

The data set consists of 33 independent passes which are grouped together by the MLT at which the satellite trajectory projected to 100 km crosses the observed auroral distribution. Note that a given pass may occur in more than one MLT bin if good viewing conditions exist both northbound and southbound across the aurora. The data are organized according to the individual data formats described in the previous section. The basic unifying parameter between the data formats is Universal Time (UT). By relating UT for a particular feature in the data formats of the instruments making direct measurements to the spacecraft track shown in the ASP and RLP formats (see appropriate format description for the technique), the location of features can be specified. In addition to UT, several of the formats give other information such as invariant latitude, geographic latitude, etc. The data set itself, however, is organized in terms of corrected geomagnetic time (Murphree and Anger, op. cit., p. 24).

Magnetic Local Time has been divided into 8 bins occupying 3 hours, starting with 0-3 MLT. The requirement that the satellite track fall within the appropriate MLT bin results in at least some direct measurements being made at all Magnetic Local Times in addition to optical coverage of at least 2 hours MLT on each side on the satellite track. Within each bin the passes selected are ordered from lowest to highest Kp, which is assumed to define the general level of magnetic activity. Because of viewing condition restrictions, ground telemetry support, and orbit plane locations, there are a varying number of passes within each MLT bin. In addition to this, highly disturbed periods of magnetic activity are difficult to find, resulting in the range of Kp's for all MLT bins being 0+ to 5+. Higher Kp values are to be covered in a data set devoted entirely to large storm occurrences. It should be pointed out that on an individual pass basis there is not a strict relationship between Kp and the auroral distribution observed. Thus, the order of passes in a given MLT bin from lowest to highest Kp does not guarantee a "standard" view of the growth and decay of a substorm or other magnetic activity.

Several of the passes which are included in the data set deserve special attention in that they display interesting optical features. The 730113 1145UT pass in MLT bin 3-6 illustrates several interesting features of auroral morphology during a magnetically disturbed period (Kp = 4-). The satellite track occurs at ~5 MLT where the morning aurora is quite well defined. The 'typical' view of morning aurora, especially during and after magnetically disturbed periods, would be a very patchy, wide, auroral distribution. This pass clearly shows, however, that the midnight sector can display recovery phase characteristics while morning aurora are quite well defined. In addition, there are significant regions of very low 5577Å/3914Å ratio (<1.) throughout the diffuse auroral oval which do not appear to be related to specific features and are independent of local time.

The 741214 1044 UT pass in MLT bin 12-15 displays an impressive Sun-aligned arc which extends for well over 2000 km from the nightside almost to the "gap" region on the dayside. The auroral distribution intensity (baffle scattering is apparent in the 5577Å data on the afternoon half of the transform at low intensities) is <4 kR everywhere and is dominated by diffuse aurora. In contrast to this pass where a large-scale discrete feature is seen in the polar cap, the 741203 0931 UT in MLT bin 12-15 is of interest due to the high "background" of emissions in all three optical wavelengths over the polar cap.

The widespread diffuse emissions are not due to scattered sunlight, but represent a low-level uniform precipitation of particles over the entire polar ionosphere.

Passes 720208 0629 UT, 720206 0515 UT, and 720210 0358 UT in the 15-18 MLT bin illustrate the rather frequent observation of detached arcs (Moshupi et al, 1979) in the afternoon/evening sector. Detached arcs normally are of low intensity and may be related to an even rarer optical emission feature located equatorward of the diffuse equatorward boundary - patches (pass 720116 0325 UT in the 18-21 MLT bin).

The 711222 0445 UT pass in the 21-24 MLT bin illustrates a classic spiral in the midnight sector during the recovery phase of a substorm. Although intensities are fairly low (< 9 kR), the poleward expansion has reached 80° CGL from 22 to 24 MLT as the effects of the substorm can be seen in the bridging arc system almost all the way to 17 MLT. The morning aurora is typical of late recovery phase in that it is very patchy and widespread.

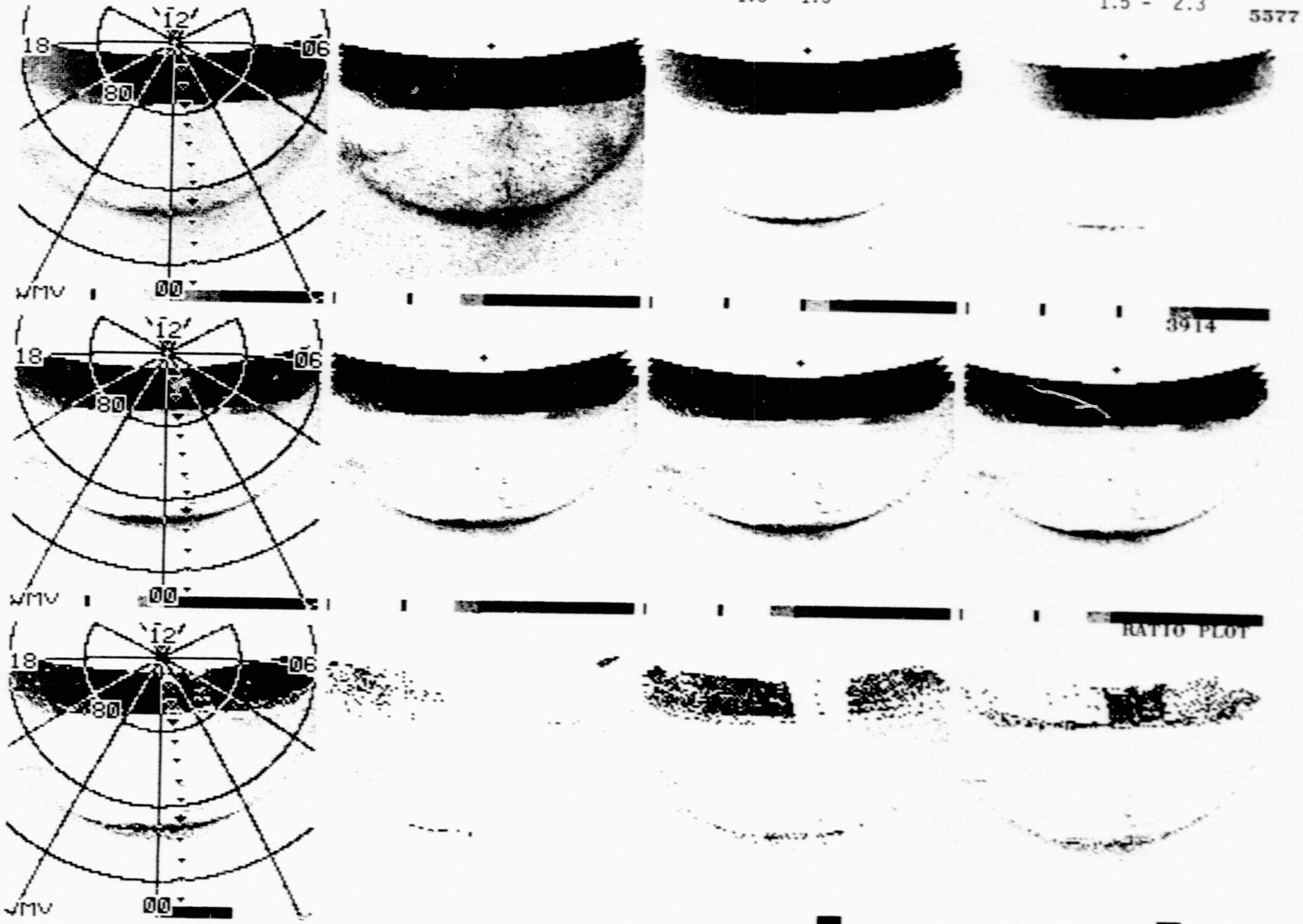
Moshupi, M. C., C. D. Anger, J. S. Murphree, D. D. Wallis, and L. H. Brace, Characteristics of trough region auroral patches and detached arcs observed by ISIS 2, J. Geophys. Res. 84, 1333-1346, Apr. 1979.

Table 1 Data Set Pass List

MLT BIN	DATE	TIME	Kp	PAGE
0-3	721012	0442	1	37
	721011	0559	4+	42
	730224	0749	5+	49
3-6	730131	0412	2	53
	730204	0448	2+	57
	730125	0412	3	61
	730113	1145	4-	65
6-9	751213	1227	0+	69
	751209	2113	1+	73
9-12	711215	0400	1-	77
	751213	1032	1-	81
	751203	0953	3	85
	731223	0058	4	88
	751129	0721	5-	92
12-15	741214	1044	1+	96
	730204	0455	2+	100
	741203	0931	3-	103
	741214	0851	3+	107
15-18	720208	0629	1	111
	720206	0321	2-	116
	720206	0515	2-	121
	720210	0358	3-	126
	731231	1140	3-	131
	740101	1218	4-	135
18-21	720110	0325	1	140
	720109	0248	2	144
	720116	0325	3+	149
	720111	0214	4+	154
21-24	711215	0408	1-	159
	711215	0600	1-	163
	721012	0636	1	167
	711227	0212	2	171
	711227	0406	2+	176
	711222	0445	3+	181
	720111	0019	4+	185

ASP
721012/0444 UT (715/88)
CENTER LAT/LON/MLT :
75./354.3/00

.5 - 3.9 kR	1.9 - 9.5 kR	4.6 - 33.0 kR
.5 - 3.9 kR	.5 - 3.9 kR	.5 - 3.9 kR
.6 - 1.0	1.0 - 1.5	1.5 - 2.3

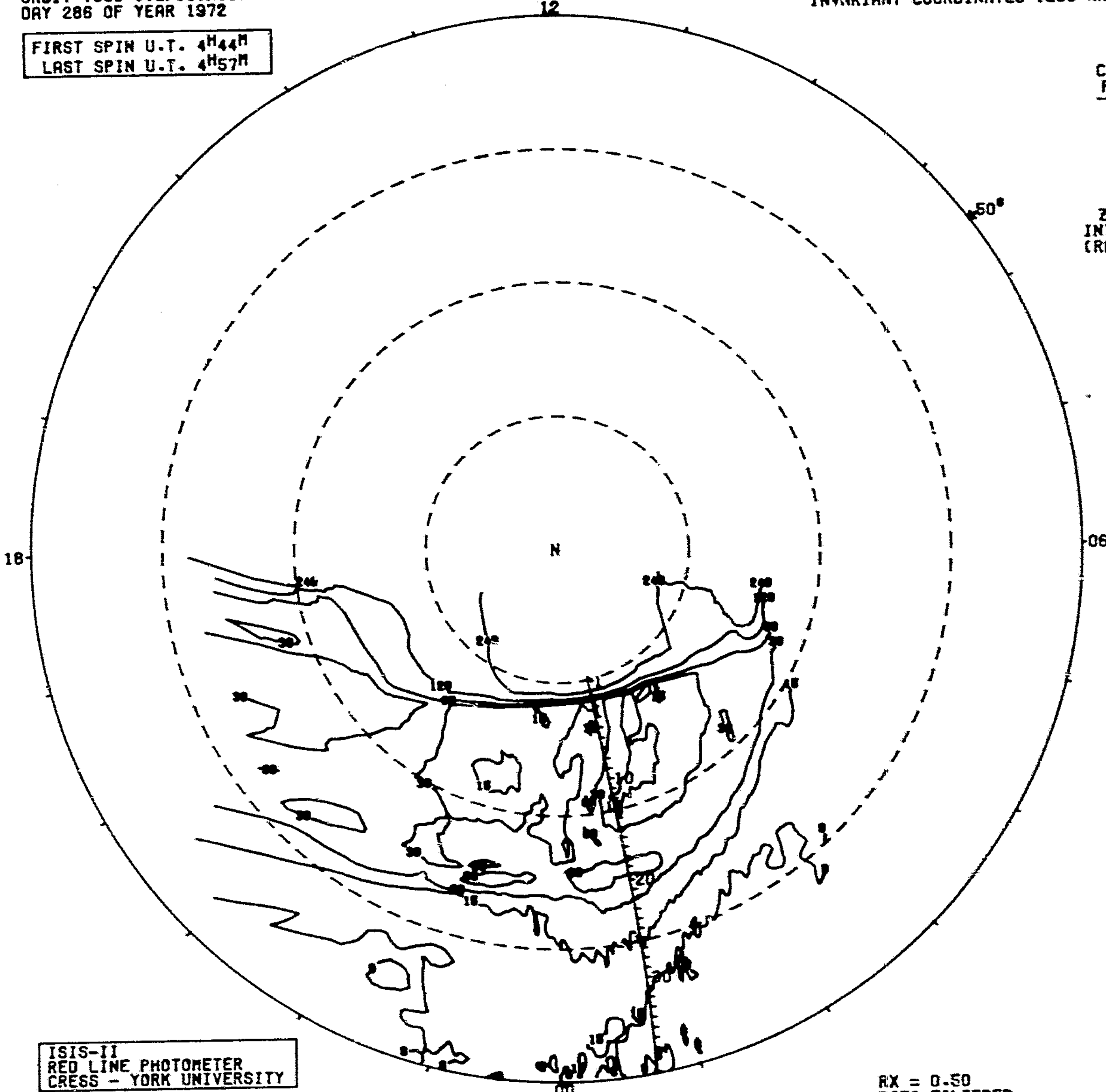


ORBIT 7095 (72/OCT/12)
DAY 286 OF YEAR 1972

FIRST SPIN U.T. 4^H44^M
LAST SPIN U.T. 4^H57^M

10 ANGSTROM BANDPASS INTENSITY

DATE PROCESSED: 80/JAN/16
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

80
150
300
600
1200
2400
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

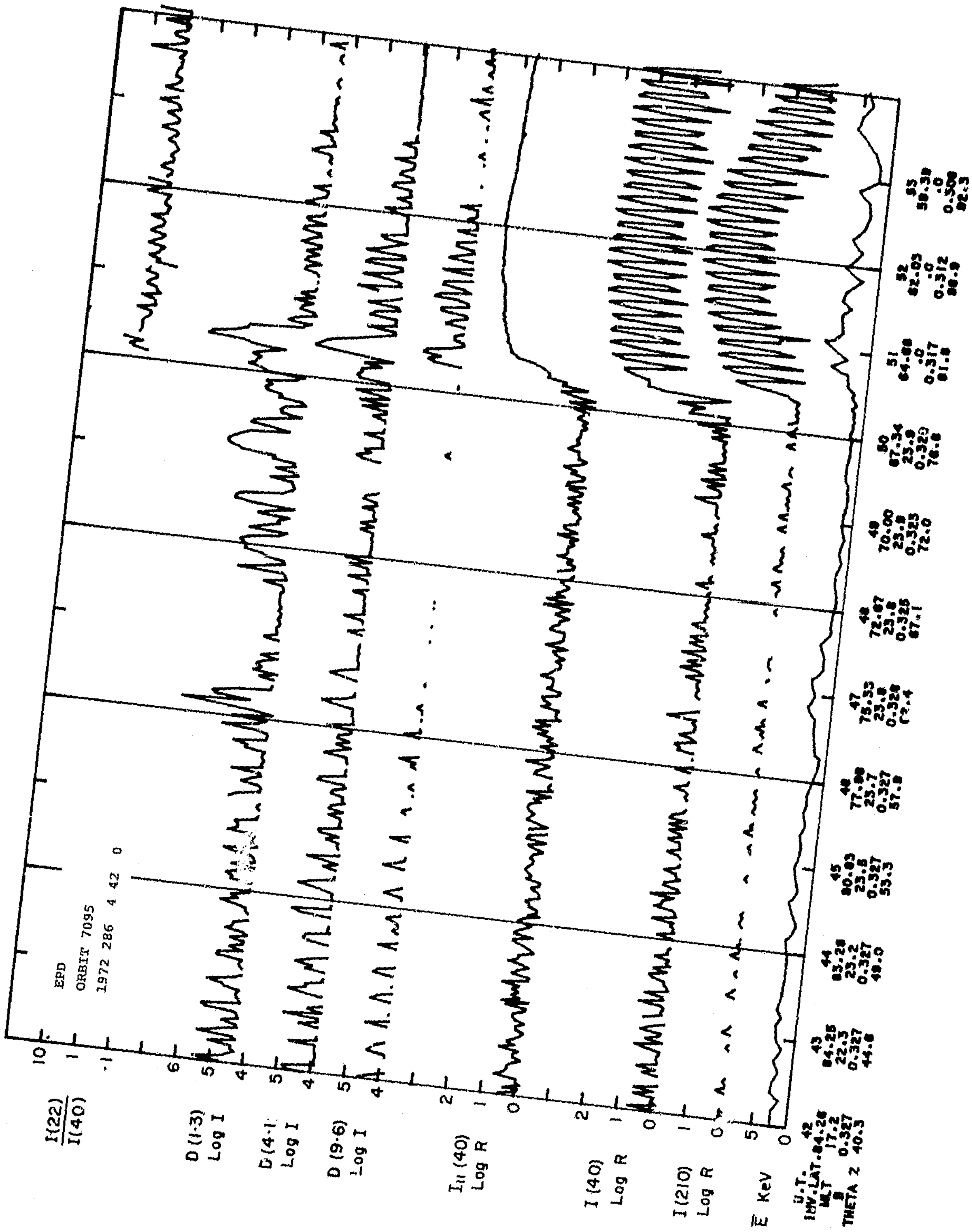
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	044459	80.7
2	044523	79.5
3	044541	78.7
4	044559	78.0
5	044617	77.2
6	044635	76.5
7	044653	75.6
8	044711	74.9
9	044729	74.1
10	044747	73.2
11	044805	72.5
12	044823	71.7
13	044841	70.9
14	044859	70.1
15	044917	69.3
16	044935	68.5
17	044953	67.7
18	045011	66.9
19	045029	66.1
20	045053	65.0
21	045111	64.2
22	045129	63.4
23	045147	62.6
24	045205	61.8
25	045223	61.0
26	045241	60.2
27	045259	59.4
28	045317	58.7
29	045335	57.9
30	045353	57.1
31	045411	56.3
32	045429	55.5
33	045447	54.8
34	045505	54.0
35	045523	53.2
36	045541	52.4
37	045559	51.7
38	045617	50.9
39	045641	49.9
40	045659	49.2
41	045717	48.4
42	045735	47.7
43	045753	47.0

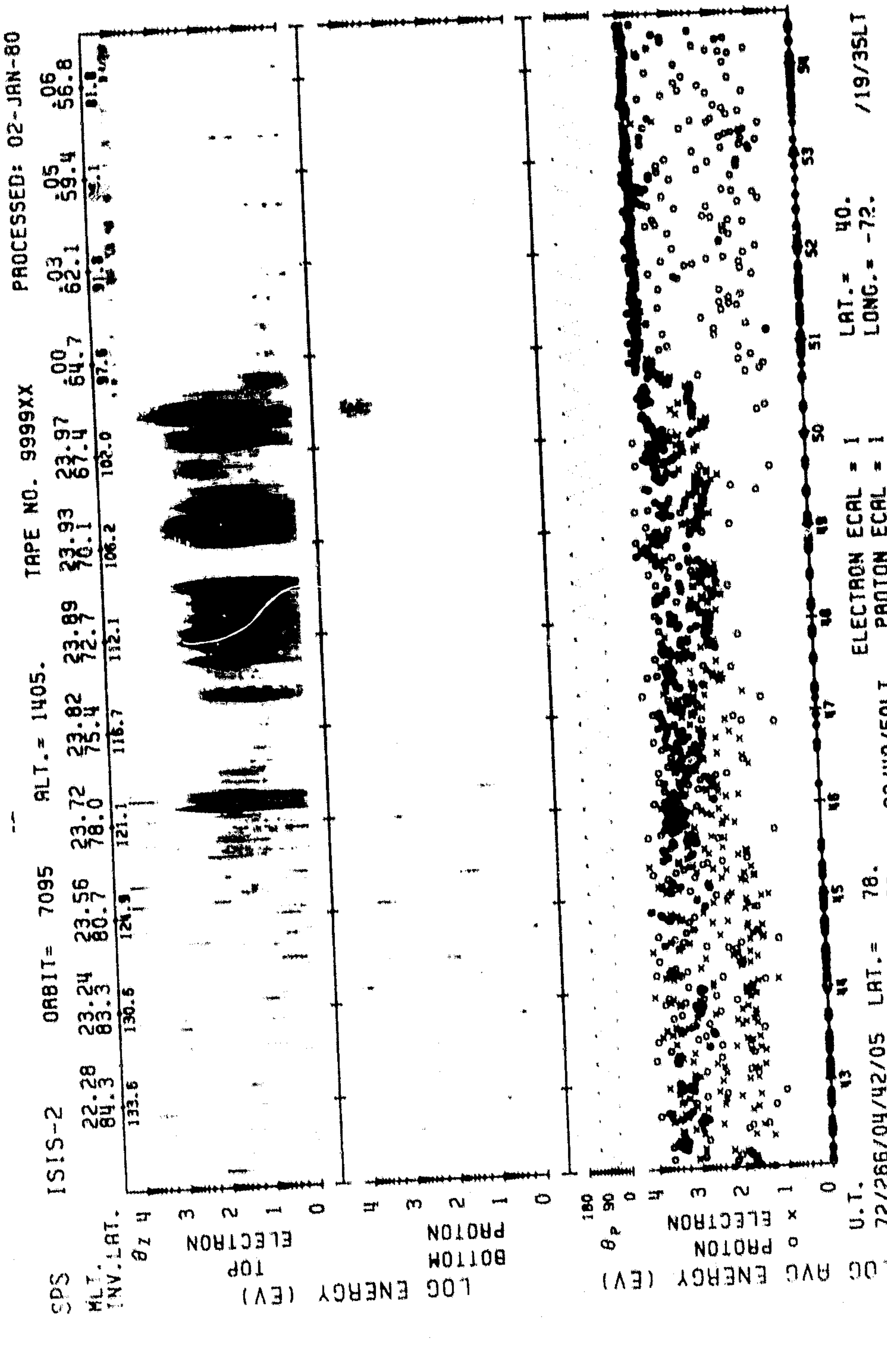
ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

HRT Y00481
FILE 47

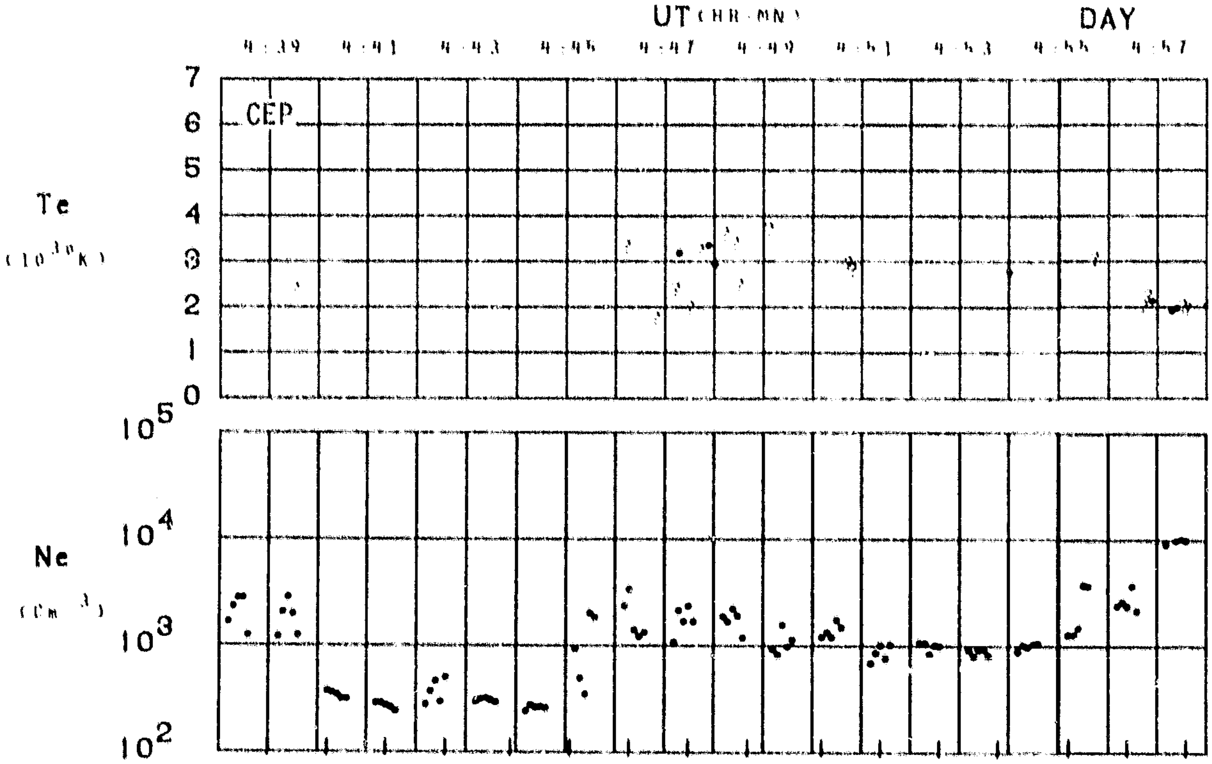
SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

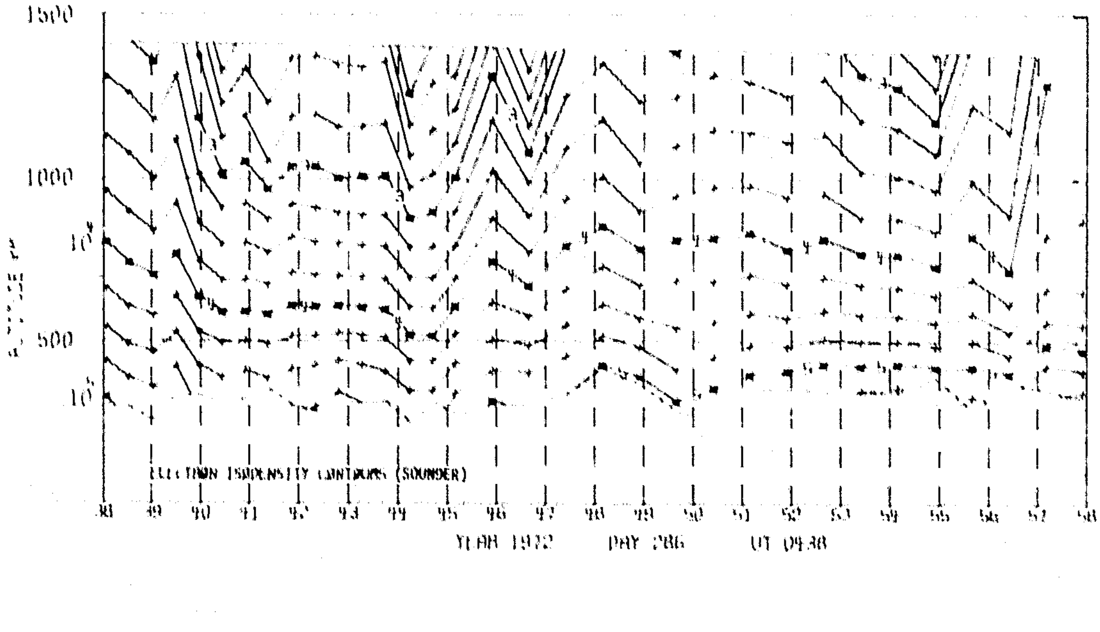

EPD
ORBIT 7095
1972 286 4 42 0
I(22)/I(40)
D (1-3) Log I
D (4-1) Log I
D (9-6) Log I
I∥ (40) Log R
I (40) Log R
I (210) Log R
Ē KeV
U.T.
INV.LAT.
MLT
B
THETA Z


SPS
ISIS-2
ORBIT= 7095
ALT.= 1405.
TAPE NO. 9999XX
PROCESSED: 02-JAN-80
MLT.
INV.LAT.
LOG ENERGY (EV)
TOP ELECTRON
BOTTOM PROTON
LOG AVG ENERGY (EV)
o PROTON
x ELECTRON
U.T.
72/266/04/42/05
LAT.= 78.
LONG.= -76.
23/49/50LT
ELECTRON ECAL = 1
PROTON ECAL = 1
LAT.= 40.
LONG.= -72.
/19/35LT

ORBIT 7095
DATE 721012
DAY 286



LAT	87	84	80	76	72	69	65	61	57	52	49	45	41	37	33	29
LONG	-115	-85	-78	-75	-73	-72	-72	-72	-72	-71	-71	-71	-72	-72	-72	-72
LT	21:10	23:11	23:40	23:54	0:02	0:06	0:09	0:12	0:14	0:15	0:17	0:18	0:19	0:20	0:20	0:21
DIP	88	89	88	87	86	84	83	81	79	77	75	72	70	67	64	60
DIPLAT	86	88	86	84	82	79	76	73	70	65	62	58	54	49	45	41
L	78.4	101.3	99.5	101.9	77.2	35.7	20.5	13.2	9.3	6.5	5.1	4.1	3.4	2.9	2.5	2.2
INVLAT	83	84	84	84	83	80	77	74	70	66	63	60	57	53	50	47
ZA	99	102	106	110	114	118	122	126	129	134	138	142	145	150	153	157



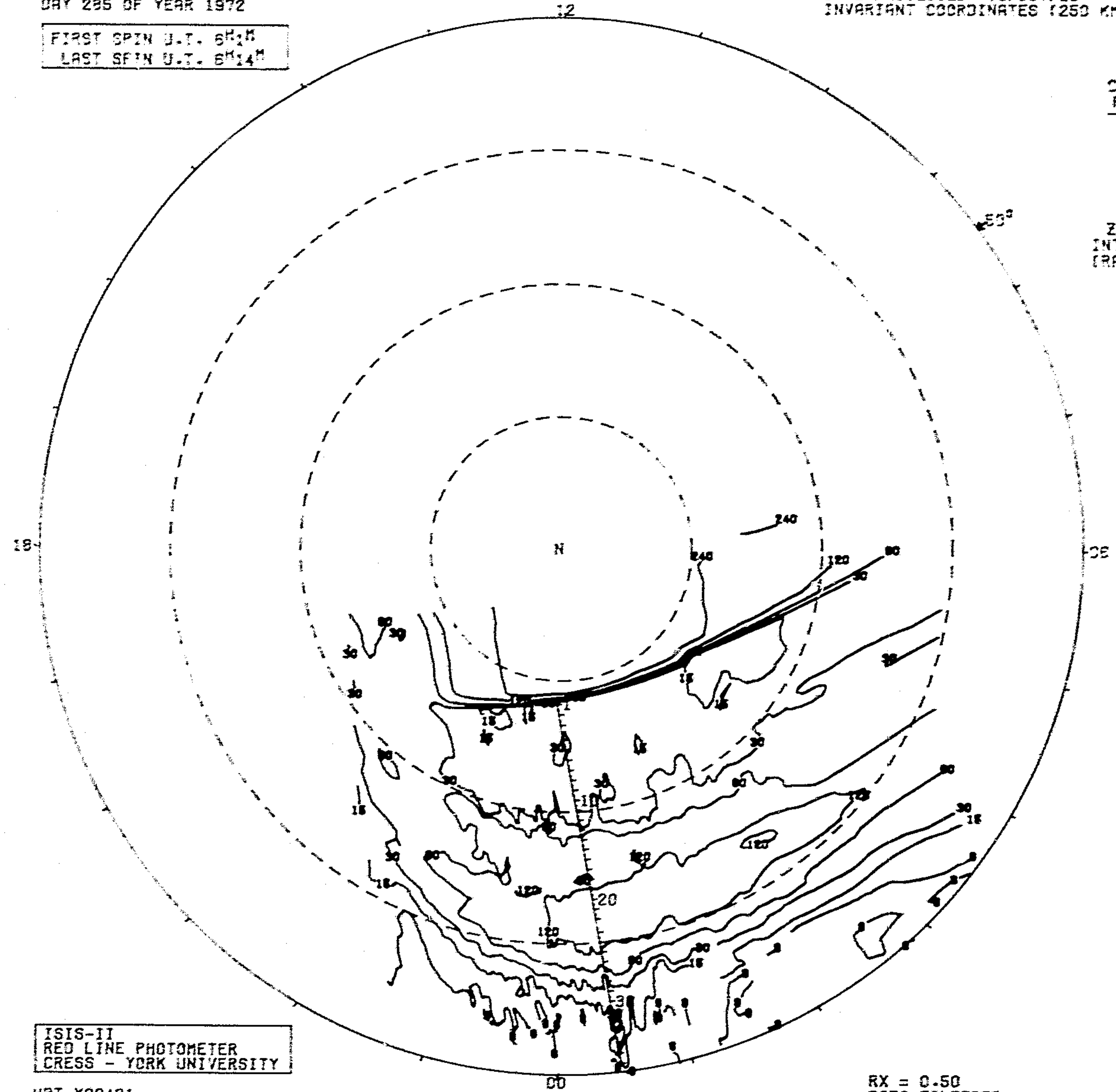

ASP
721011/0601 UT (715/31)
CENTER LAT/LON/MLT :
75./332.5/00
.5 - 3.9 kR
.5 - 3.9 kR
.5 - .8
1.9 - 9.5 kR
.5 - 3.9 kR
.8 - 1.4
4.6 - 33.0 kR
.5 - 3.9 kR
1.4 - 2.3
5577
3914
RATIO PLOT

ORBIT 7083 (72/OCT/11)
DAY 285 OF YEAR 1972

FIRST SPIN U.T. 6H1M
LAST SPIN U.T. 6H14M

6300 ANGSTROM INTENSITY

DATE PROCESSED: 79/OCT/25
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

80
150
300
600
1200
2400
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

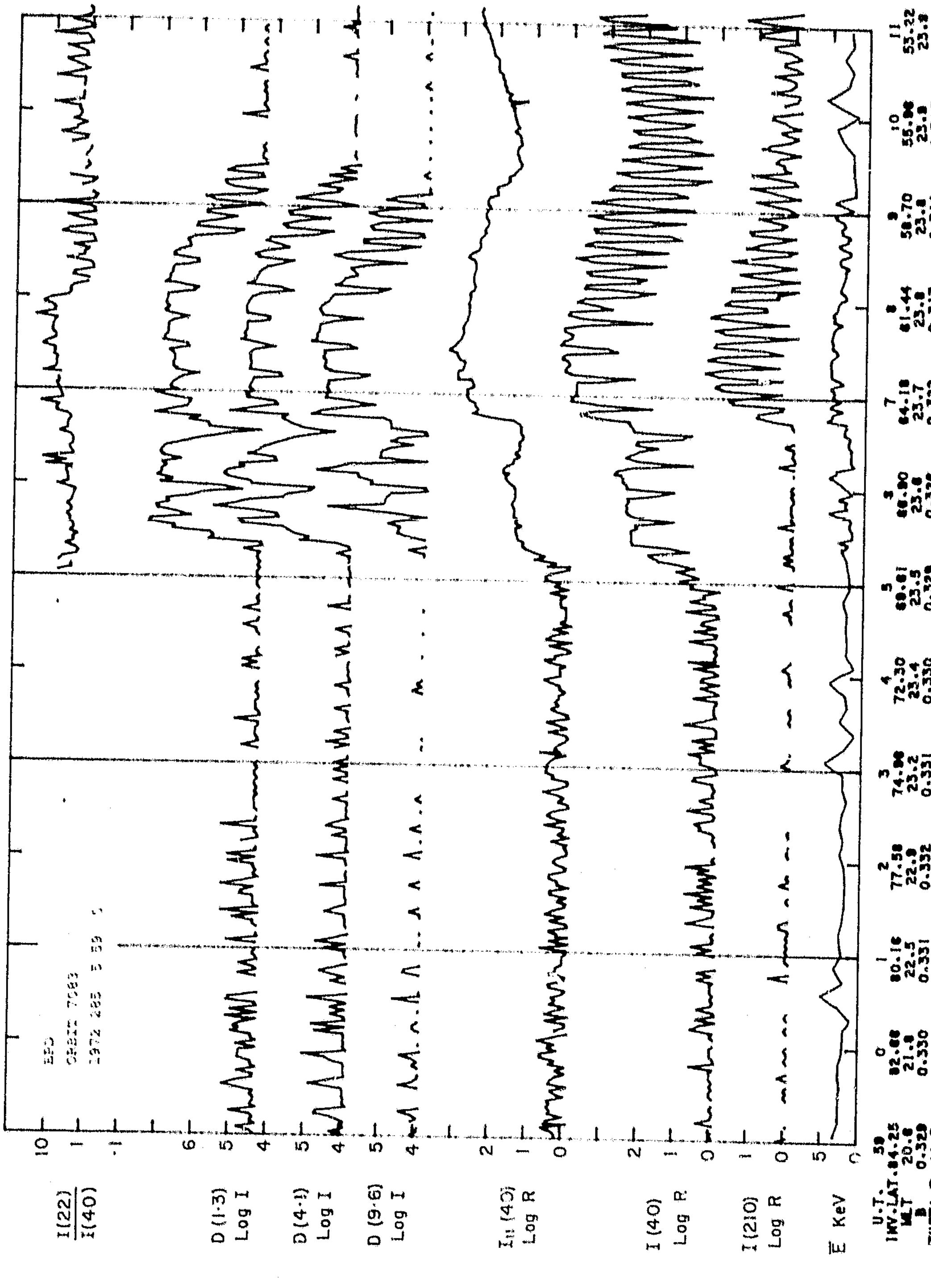
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	060127	79.0
2	060145	78.2
3	060203	77.5
4	060227	76.4
5	060245	75.6
6	060303	74.9
7	060321	74.0
8	060339	73.2
9	060357	72.4
10	060415	71.6
11	060433	70.8
12	060451	70.0
13	060509	69.2
14	060527	68.4
15	060545	67.6
16	060603	66.8
17	060621	66.0
18	060639	65.1
19	060657	64.3
20	060715	63.5
21	060733	62.7
22	060751	61.9
23	060815	60.8
24	060833	59.9
25	060851	59.1
26	060909	58.3
27	060927	57.5
28	060945	56.6
29	061003	55.8
30	061021	55.0
31	061039	54.2
32	061057	53.4
33	061115	52.5
34	061133	51.7
35	061151	50.9
36	061209	50.1
37	061227	49.3
38	061245	48.5
39	061303	47.7
40	061321	46.9
41	061339	46.1
42	061357	45.3
43	061415	44.5

ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

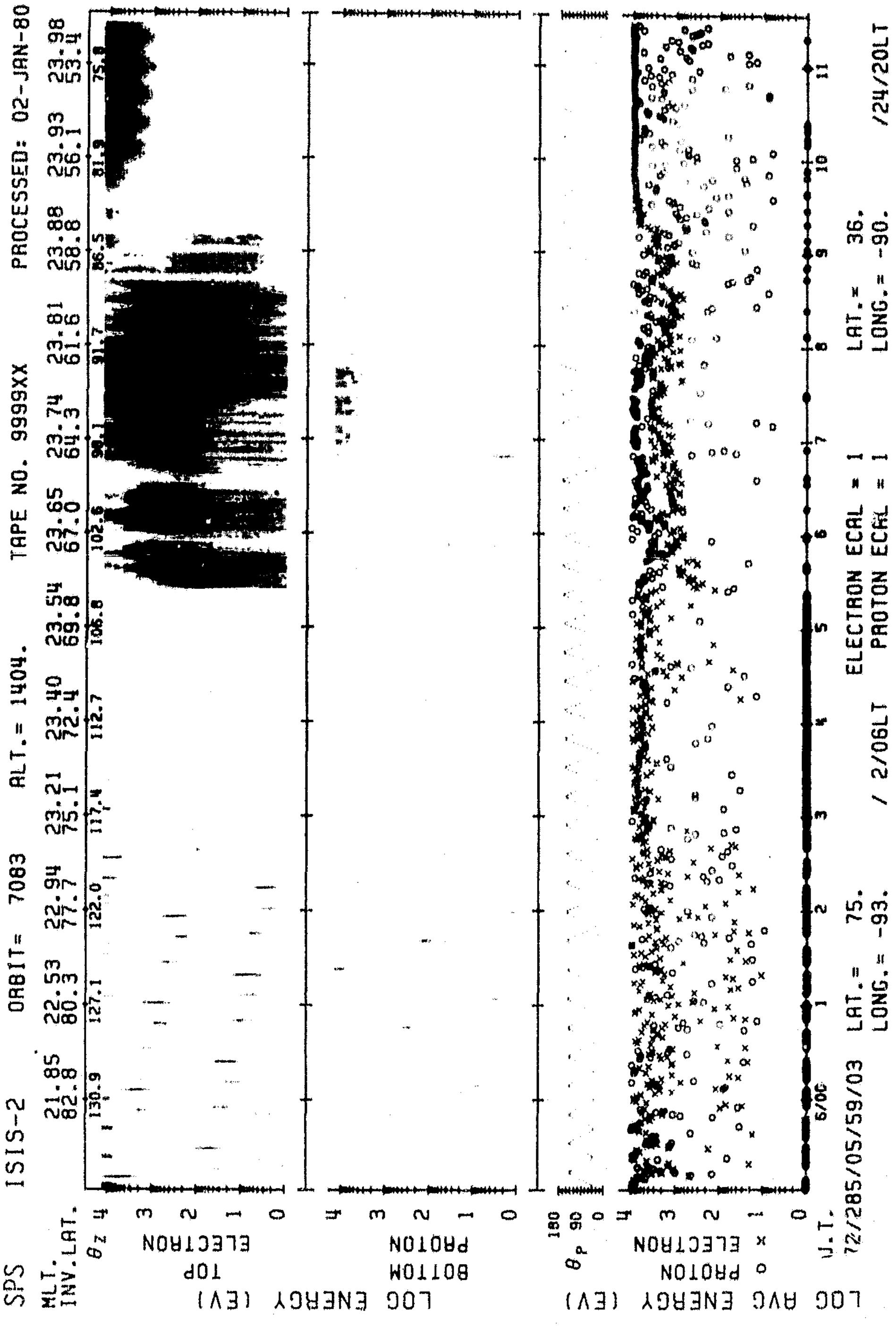
HRT Y00481
FILE 12

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

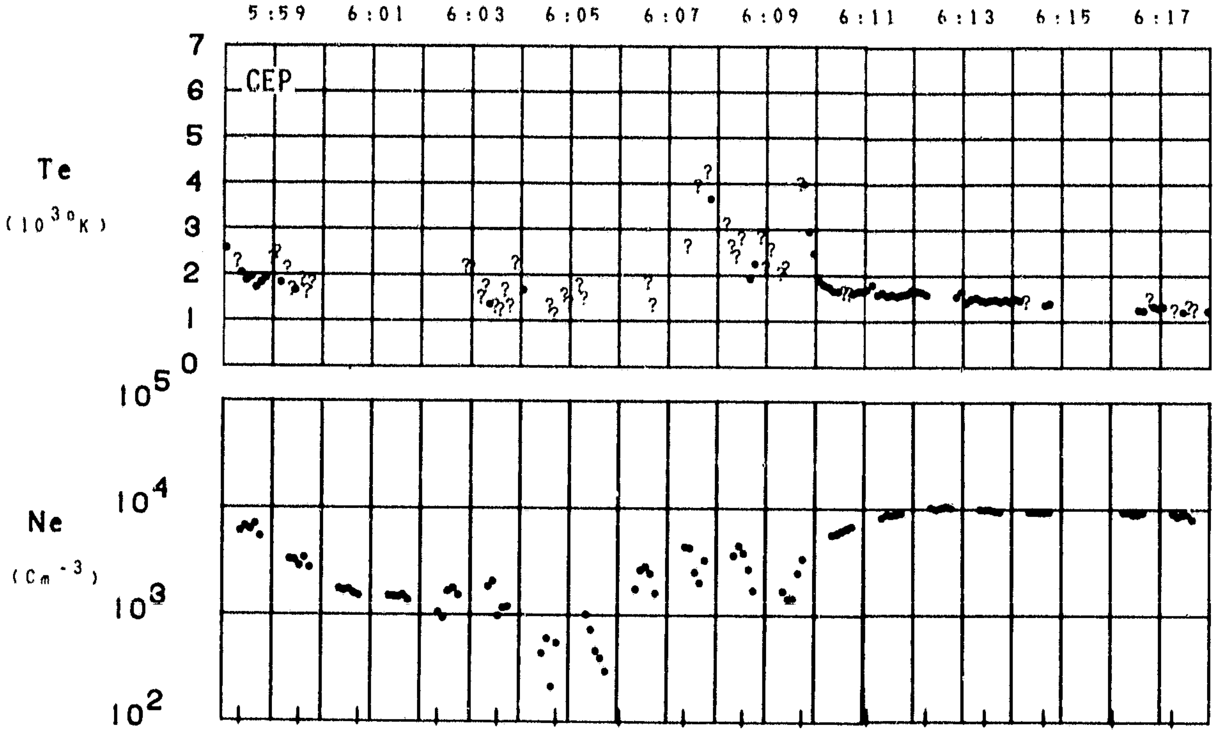


I(22)/I(40)
D (1·3) Log I
D (4·1) Log I
D (9·6) Log I
Log R
I (40) Log R
I (210) Log R
Ē KeV
U.T.
INV.LAT.
MLT
B
THETA Z


ISIS-2
ORBIT= 7083
ALT.= 1404.
TAPE NO. 9999XX
PROCESSED: 02-JAN-80
SPS
MLT.
INV.LAT.
LOG ENERGY (EV)
TOP
ELECTRON
BOTTOM
PROTON
LOG AVG ENERGY (EV)
x ELECTRON
o PROTON
U.T.
72/285/05/59/03
LAT.= 75.
LONG.= -93.
/ 2/06LT
ELECTRON ECAL = 1
PROTON ECAL = 1
LAT.= 36.
LONG.= -90.
/24/20LT

ORBIT 7083
DATE 721011
DAY 285

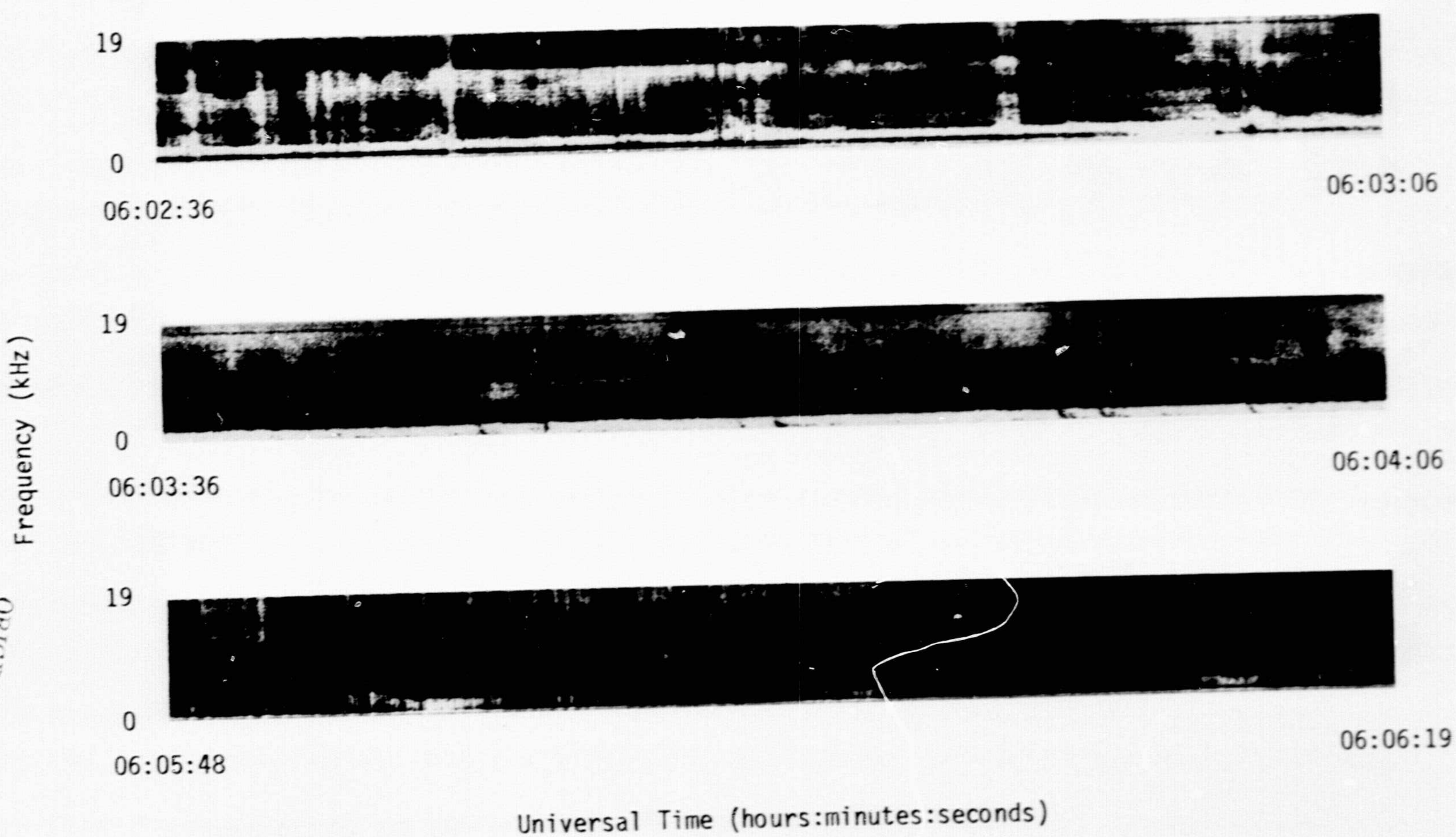
UT (HR:MN)



LAT	77	73	69	64	61	57	53	48	45	41	37	33	29	25	21	17
LONG	-93	-91	-91	-90	-90	-89	-89	-89	-89	-89	-90	-90	-90	-90	-90	-90
LT	23:57	0:04	0:09	0:14	0:16	0:18	0:20	0:21	0:22	0:23	0:24	0:24	0:25	0:26	0:26	0:27
DIP	88	87	86	84	82	80	78	75	73	70	67	63	60	56	51	46
DIPLAT	87	85	82	78	75	71	67	63	58	54	49	45	41	37	32	28
L	102.4	80.6	39.6	18.8	12.4	8.8	6.4	4.9	4.0	3.3	2.8	2.4	2.1	1.9	1.7	1.6
INVLAT	84	83	80	76	73	70	66	63	59	56	53	49	46	43	40	37
ZA	109	113	117	122	126	129	133	137	141	145	149	153	156	160	164	167

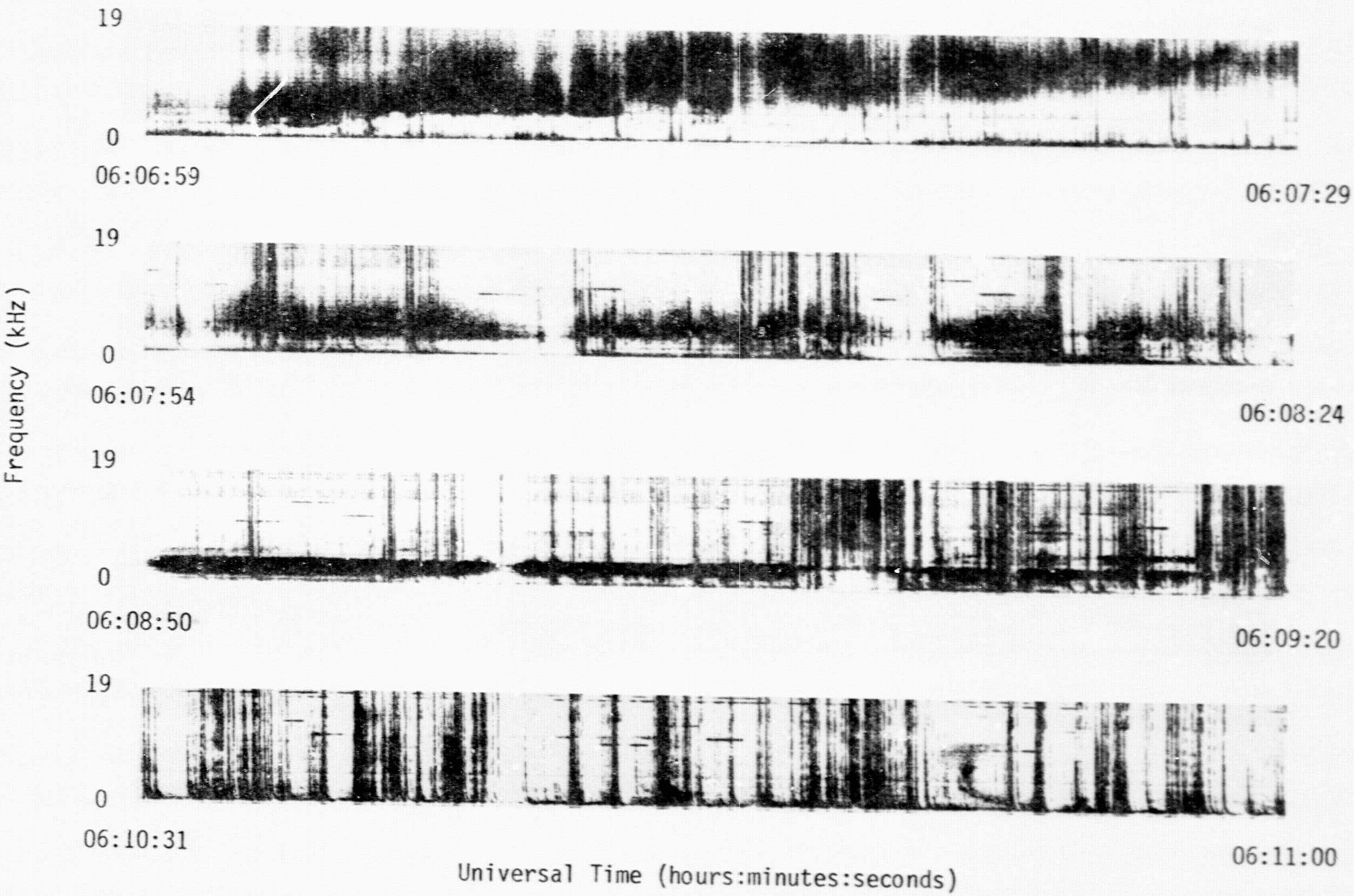
72/285/0559

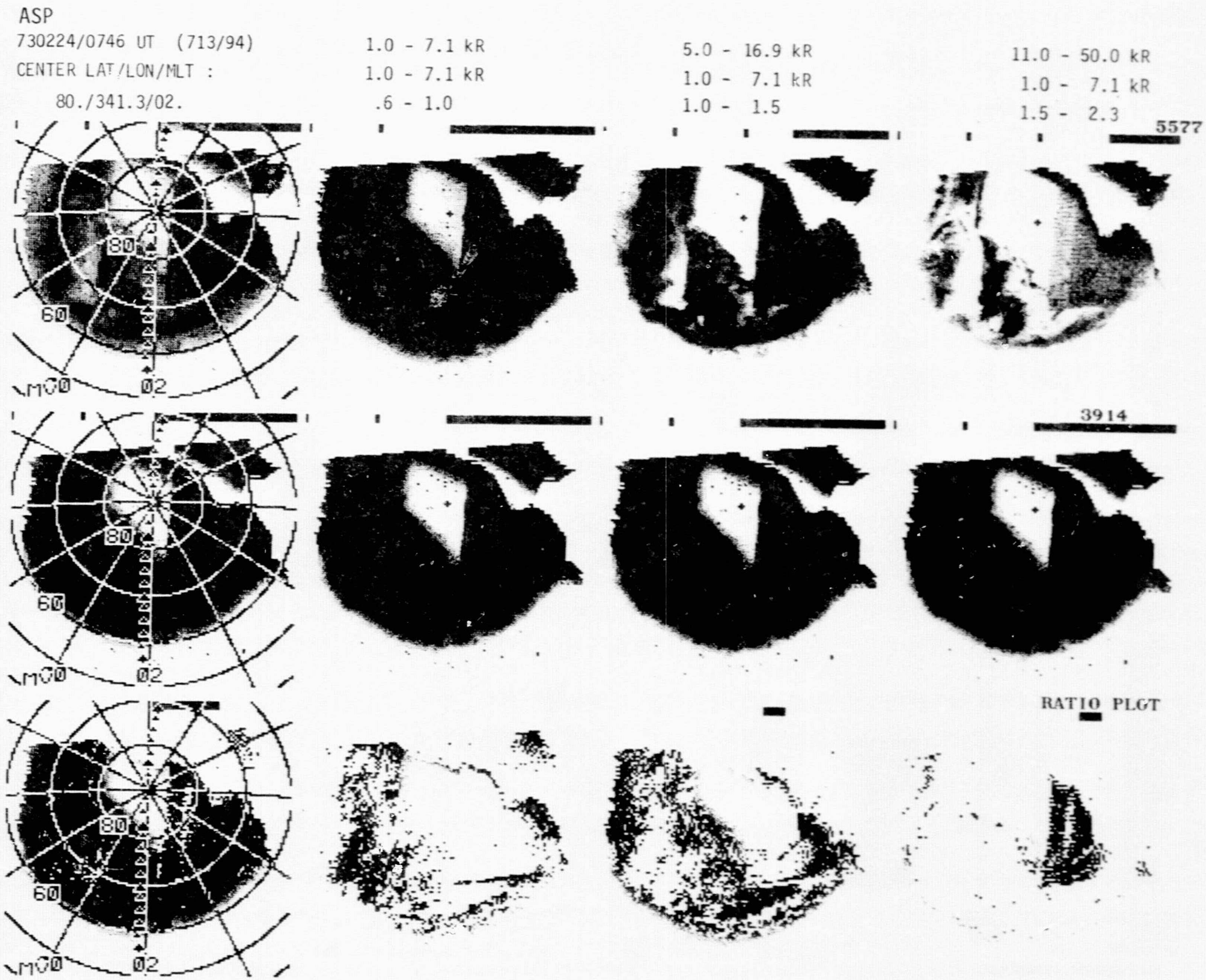
Excerpts of VLF Spectral film for the period 0602 - 0611



72/285/0559

Excerpts of VLF Spectral film for the period 0602 - 0611





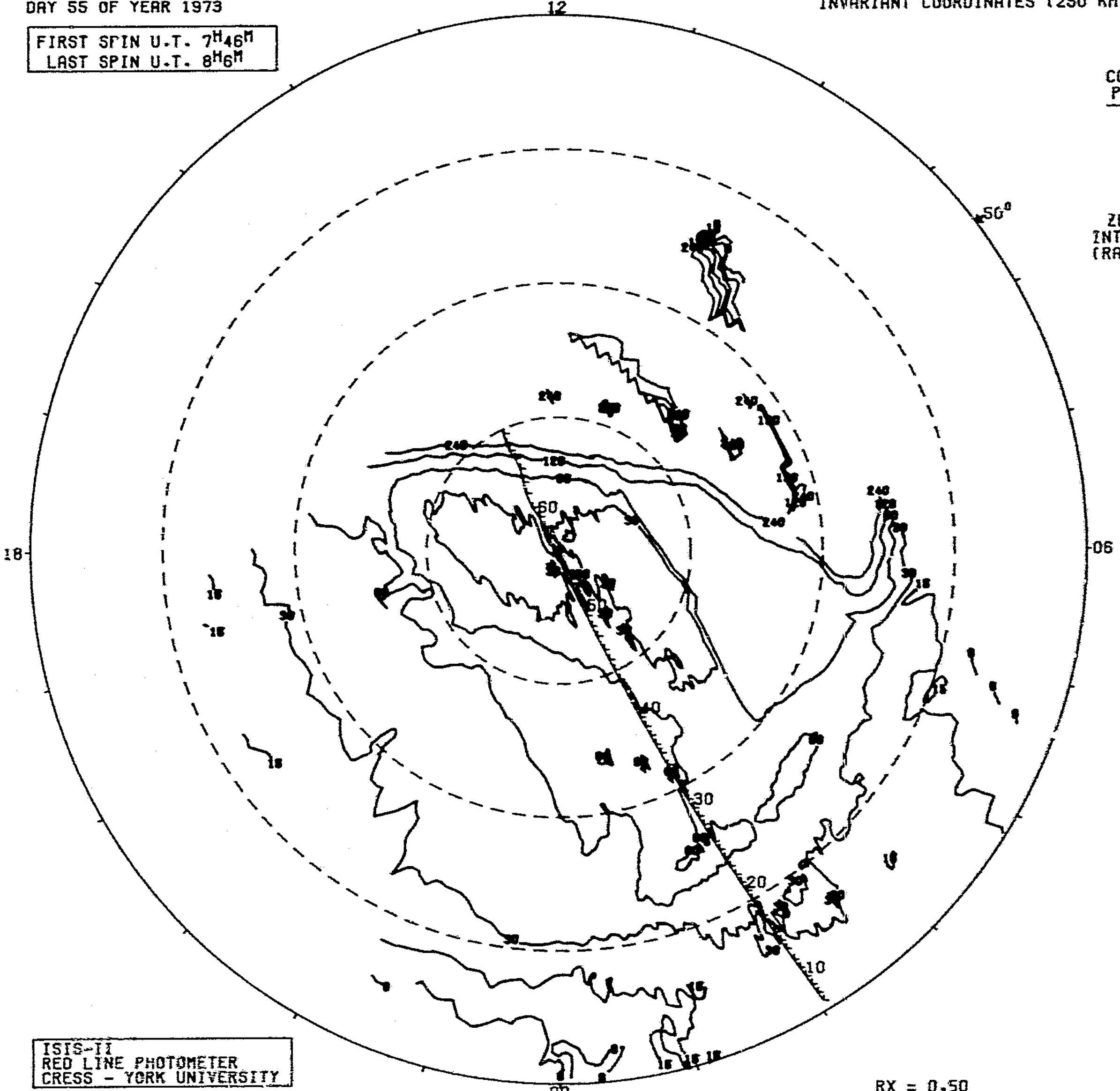
ASP
730224/0746 UT (713/94)
CENTER LAT/LON/MLT :
80./341.3/02.
1.0 - 7.1 kR
1.0 - 7.1 kR
.6 - 1.0
5.0 - 16.9 kR
1.0 - 7.1 kR
1.0 - 1.5
11.0 - 50.0 kR
1.0 - 7.1 kR
1.5 - 2.3
5577
3914
RATIO PLGT
80
60
MLT
00
02

ORBIT 8807 (73/FEB/24)
DAY 55 OF YEAR 1973

FIRST SPIN U.T. $7^{H}46^{M}$
LAST SPIN U.T. $8^{H}6^{M}$

10 ANGSTROM BANDPASS INTENSITY

DATE PROCESSED: 79/OCT/25
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

80
150
300
600
1200
2400
ZENITHAL INTENSITIES (RAYLEIGHS)

ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

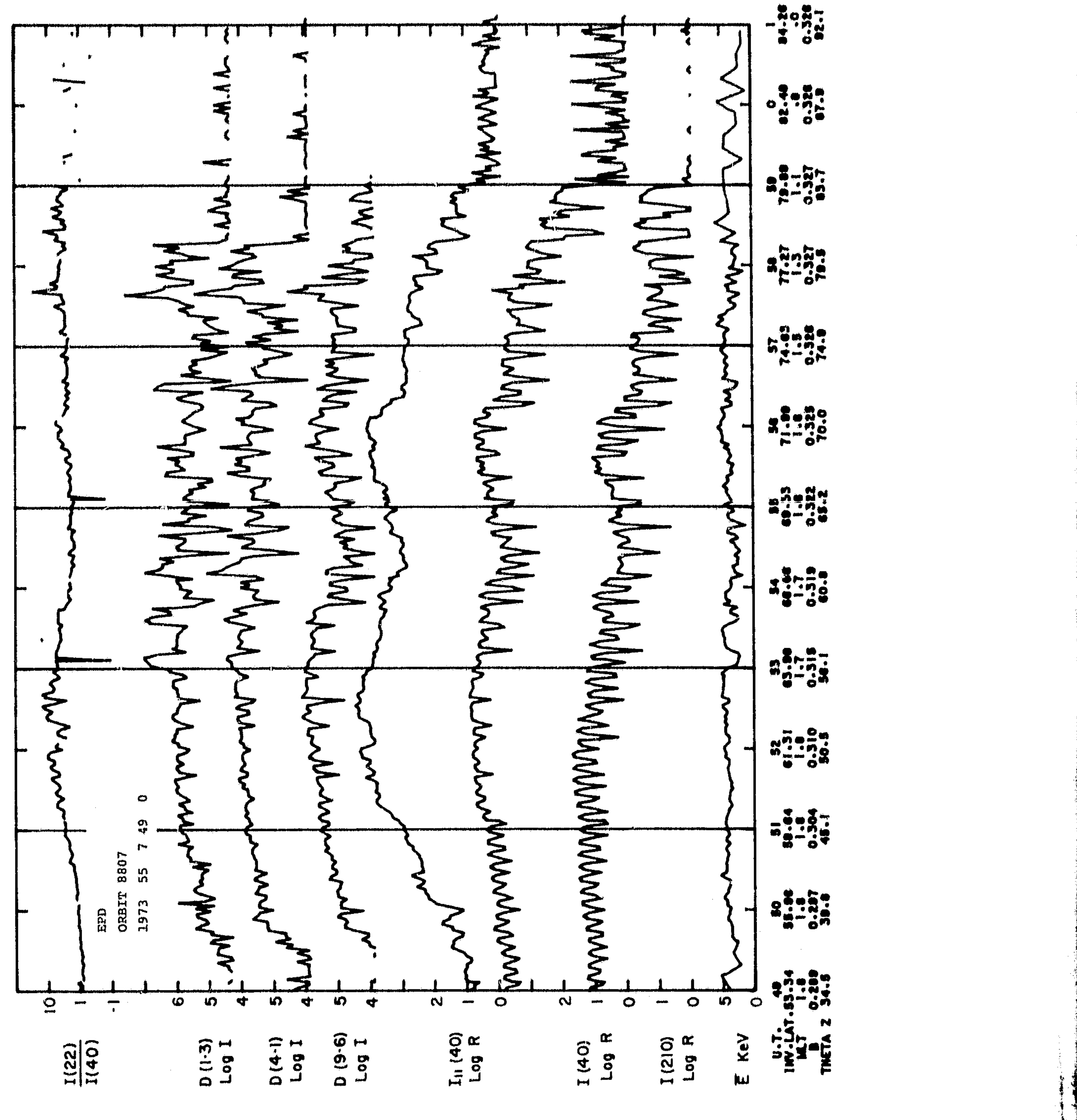
HRT Y00481
FILE 14

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

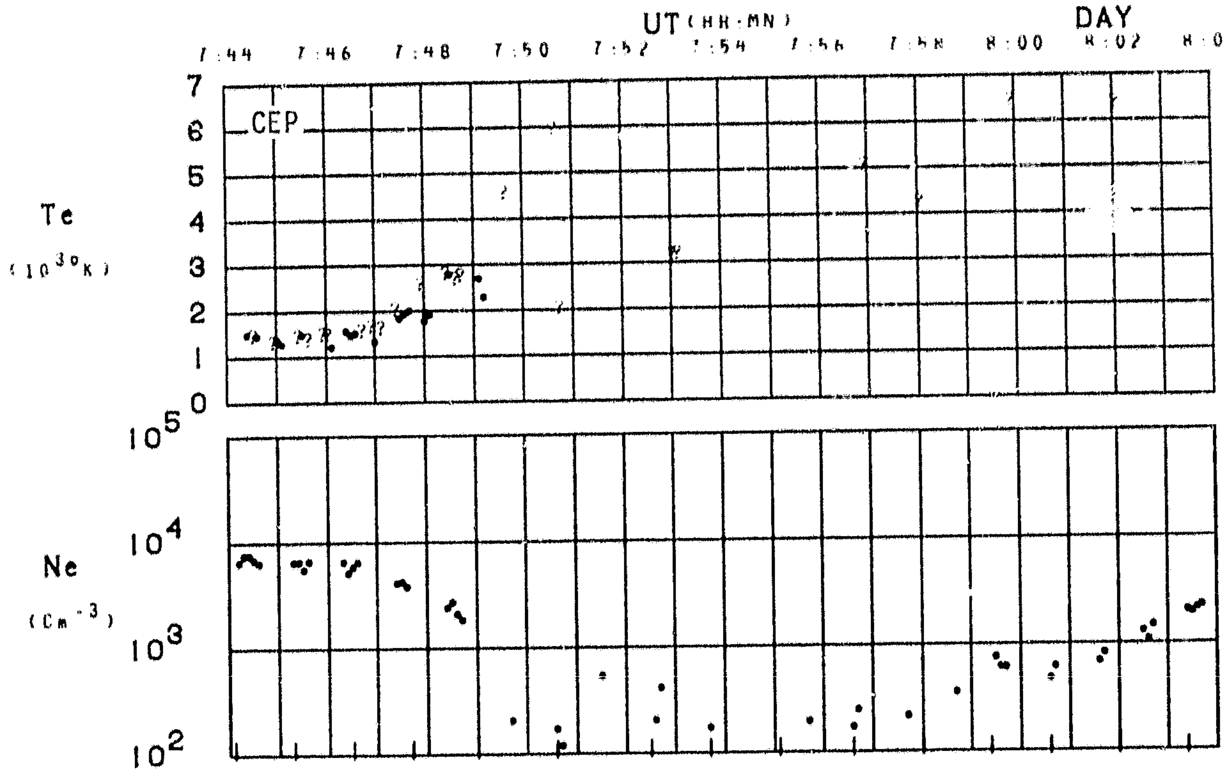
SPACECRAFT INFORMATION

SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	074618	46.4
2	074636	47.1
3	074654	47.9
4	074712	48.7
5	074730	49.4
6	074748	50.2
7	074806	51.0
8	074824	51.8
9	074842	52.6
10	074900	53.3
11	074918	54.1
12	074942	55.2
13	075000	56.0
14	075018	56.8
15	075036	57.6
16	075054	58.4
17	075112	59.2
18	075130	60.0
19	075148	60.8
20	075206	61.6
21	075224	62.4
22	075242	63.2
23	075300	64.0
24	075318	64.8
25	075336	65.6
26	075354	66.4
27	075412	67.2
28	075430	68.0
29	075448	68.8
30	075506	69.6
31	075524	70.4
32	075542	71.2
33	075600	72.0
34	075618	72.8
35	075642	73.8
36	075700	74.6
37	075718	75.4
38	075736	76.2
39	075754	77.0
40	075812	77.8
41	075830	78.5
42	075848	79.3
43	075906	80.2
44	075924	81.0
45	075942	81.7
46	080000	82.5
47	080024	83.5
48	080042	84.0
49	080100	84.3
50	080118	84.3
51	080136	84.3
52	080154	84.3
53	080212	84.2
54	080230	84.2
55	080248	84.3
56	080306	84.3
57	080324	84.2
58	080342	84.2
59	080400	84.3
60	080418	84.3
61	080442	84.4
62	080500	84.3
63	080518	83.9
64	080536	83.2
65	080554	82.3
66	080612	81.4
67	080630	80.5

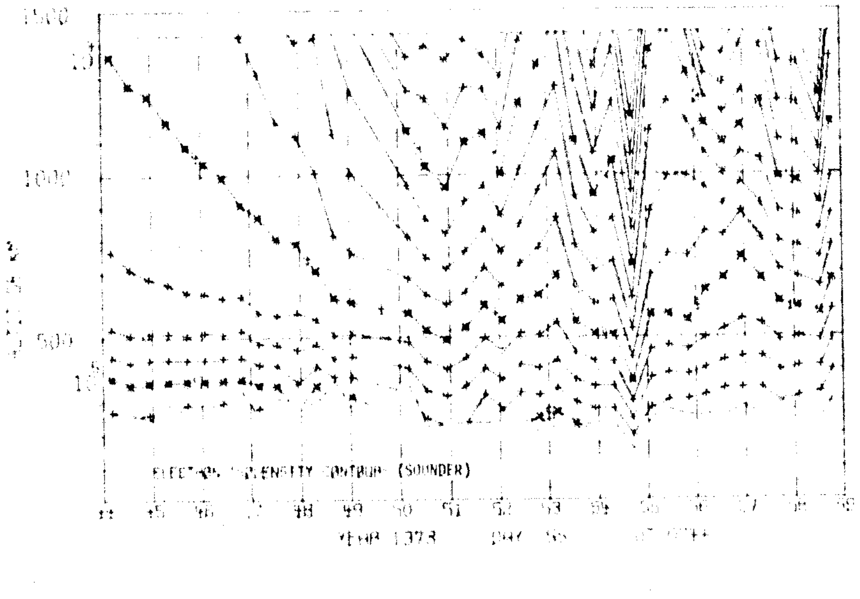


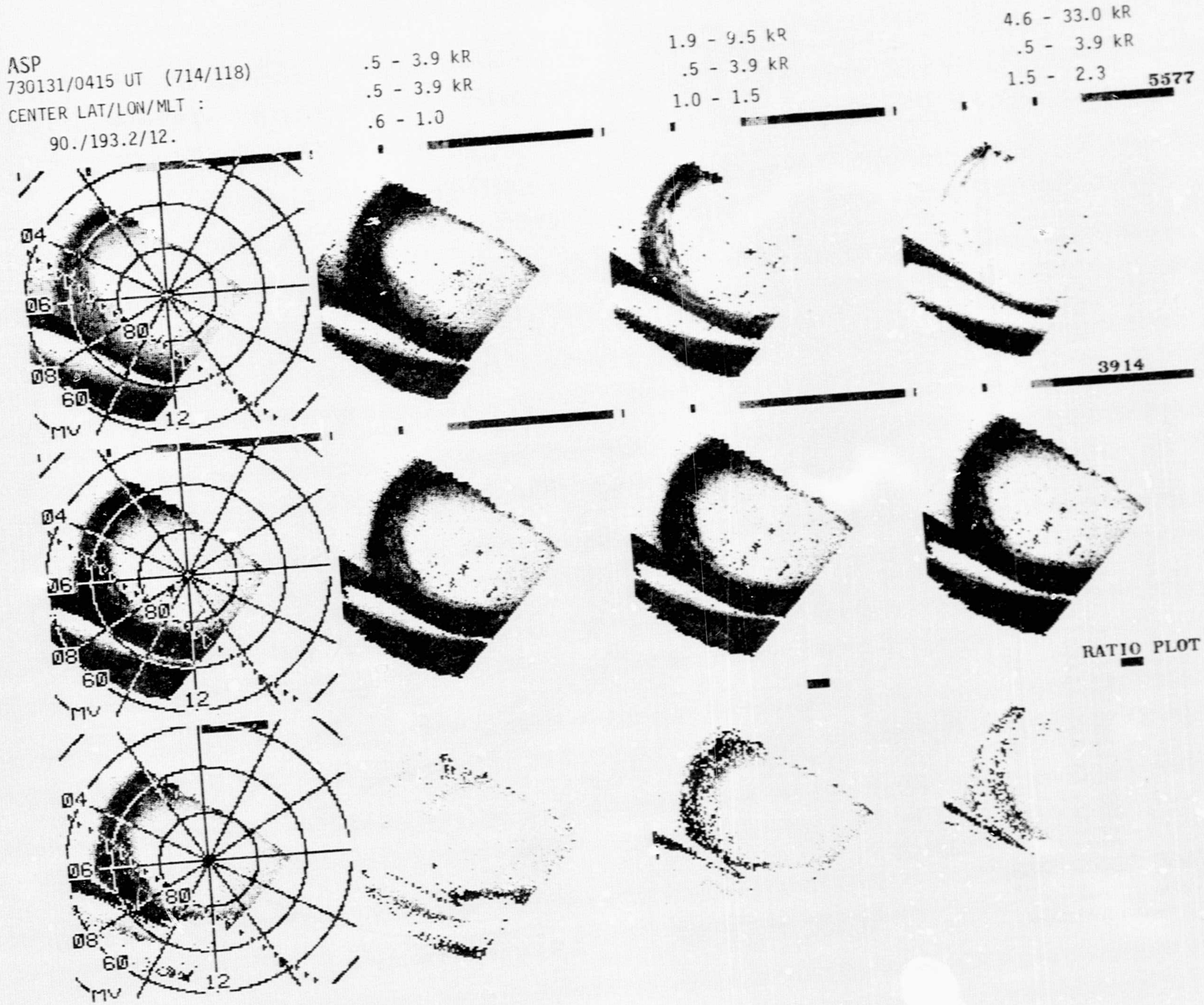
EPD
ORBIT 8807
1973 55 7 49 0
I(22) / I(40)
D (1-3) Log I
D (4-1) Log I
D (9-6) Log I
I11 (40) Log R
I (40) Log R
I (210) Log R
E KeV
U.T.
INV.LAT.
MLT
B
THETA Z

ORBIT 8807
DATE 730224
DAY 55



LAT	21	25	29	32	37	42	48	51	56	60	65	69	73	77	82
LONG	-86	-87	-87	-87	-87	-87	-87	-87	-87	-87	-87	-86	-85	-83	-79
LT	1:43	1:43	1:44	1:45	1:45	1:46	1:48	1:49	1:51	1:53	1:56	1:59	2:04	2:13	2:33
DIP	52	56	60	63	67	71	75	77	79	82	84	86	87	88	89
DIPLAT	33	37	41	45	49	55	62	66	70	75	78	82	84	86	89
L	1.8	1.9	2.1	2.4	2.8	3.5	4.7	6.0	8.2	12.[illegible]	20.6	40.5	85.9	100.0	99.[illegible]
INVLAT	41	43	46	49	53	57	62	65	69	73	77	80	83	84	84
ZA	152	150	148	146	143	139	135	132	128	124	120	116	113	109	105



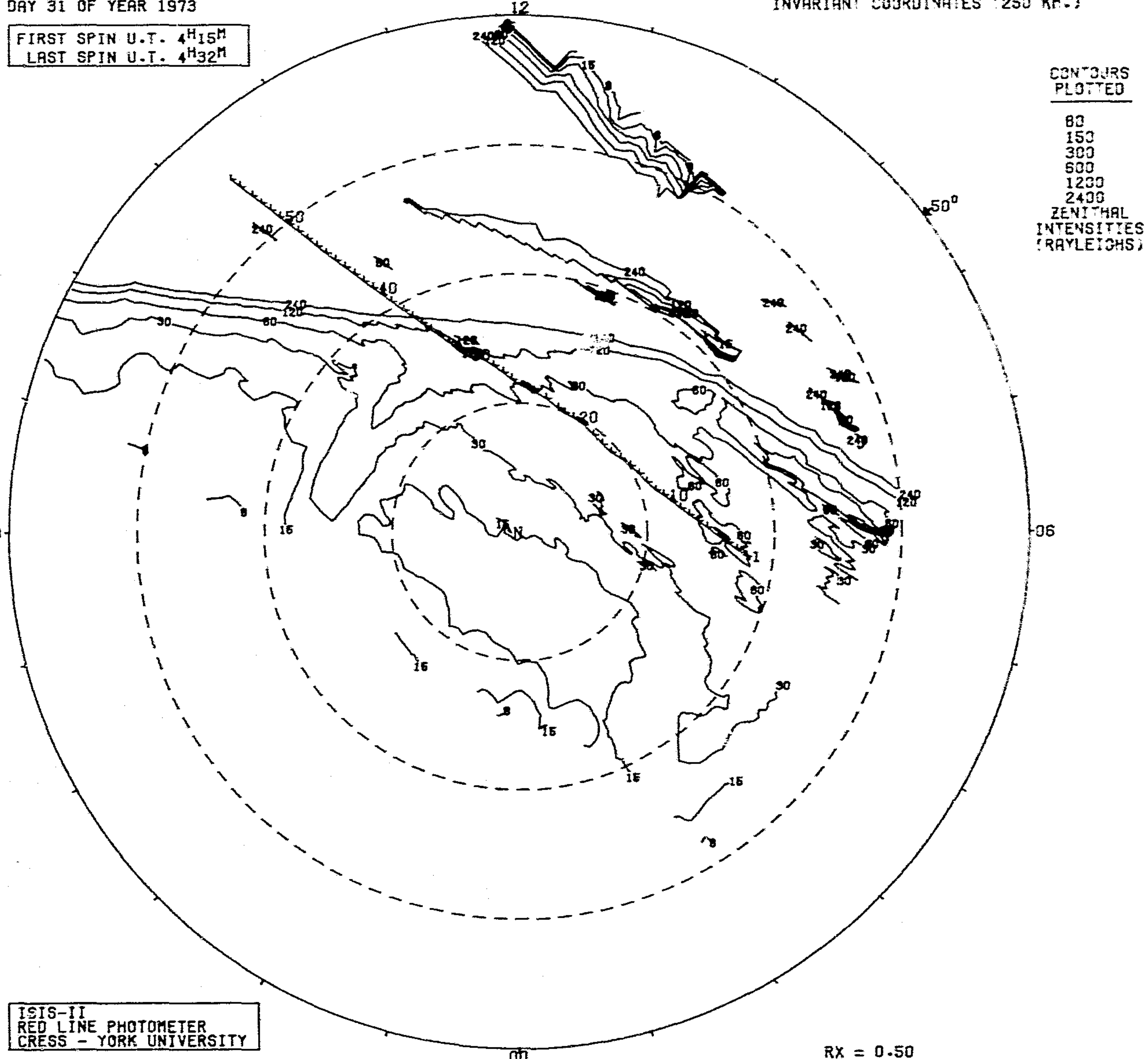

ASP
730131/0415 UT (714/118)
CENTER LAT/LON/MLT :
90./193.2/12.
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT
04
06
08
60
80
12
MV

ORBIT 8501 (73/JAN/31)
DAY 31 OF YEAR 1973

FIRST SPIN U.T. $4^{H}15^{M}$
LAST SPIN U.T. $4^{H}32^{M}$

10 ANGSTROM BANDPASS INTENSITY

DATE PROCESSED: 79/OCT/29
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

60
150
300
600
1200
2400
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

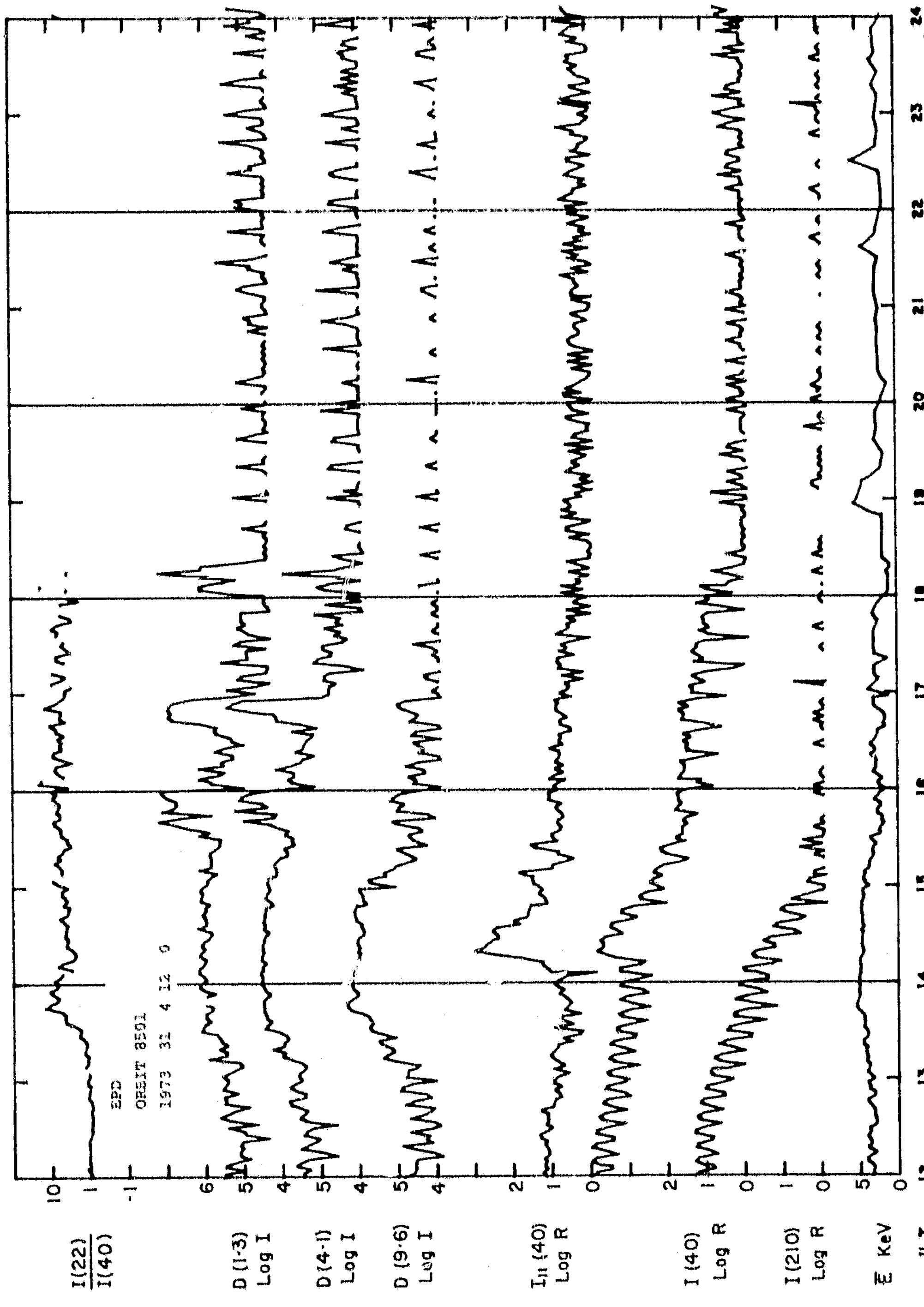
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	041548	71.9
2	041606	72.7
3	041624	73.5
4	041642	74.2
5	041706	75.2
6	041724	75.9
7	041742	76.6
8	041800	77.2
9	041818	77.9
10	041836	78.5
11	041854	79.0
12	041912	79.5
13	041930	80.0
14	041948	80.4
15	042006	80.7
16	042024	80.9
17	042042	81.1
18	042100	81.1
19	042118	81.1
20	042136	81.0
21	042154	80.8
22	042212	80.5
23	042236	80.0
24	042254	79.5
25	042312	79.0
26	042330	78.4
27	042348	77.8
28	042406	77.2
29	042424	76.5
30	042442	75.8
31	042500	75.1
32	042518	74.3
33	042536	73.6
34	042554	72.8
35	042612	72.0
36	042630	71.2
37	042648	70.4
38	042712	69.3
39	042730	68.5
40	042748	67.6
41	042806	66.8
42	042824	65.9
43	042842	65.1
44	042900	64.2
45	042918	63.4
46	042936	62.5
47	042954	61.7
48	043012	60.8
49	043030	60.0
50	043048	59.1
51	043106	58.3
52	043124	57.4
53	043142	56.6
54	043206	55.4
55	043224	54.6

ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

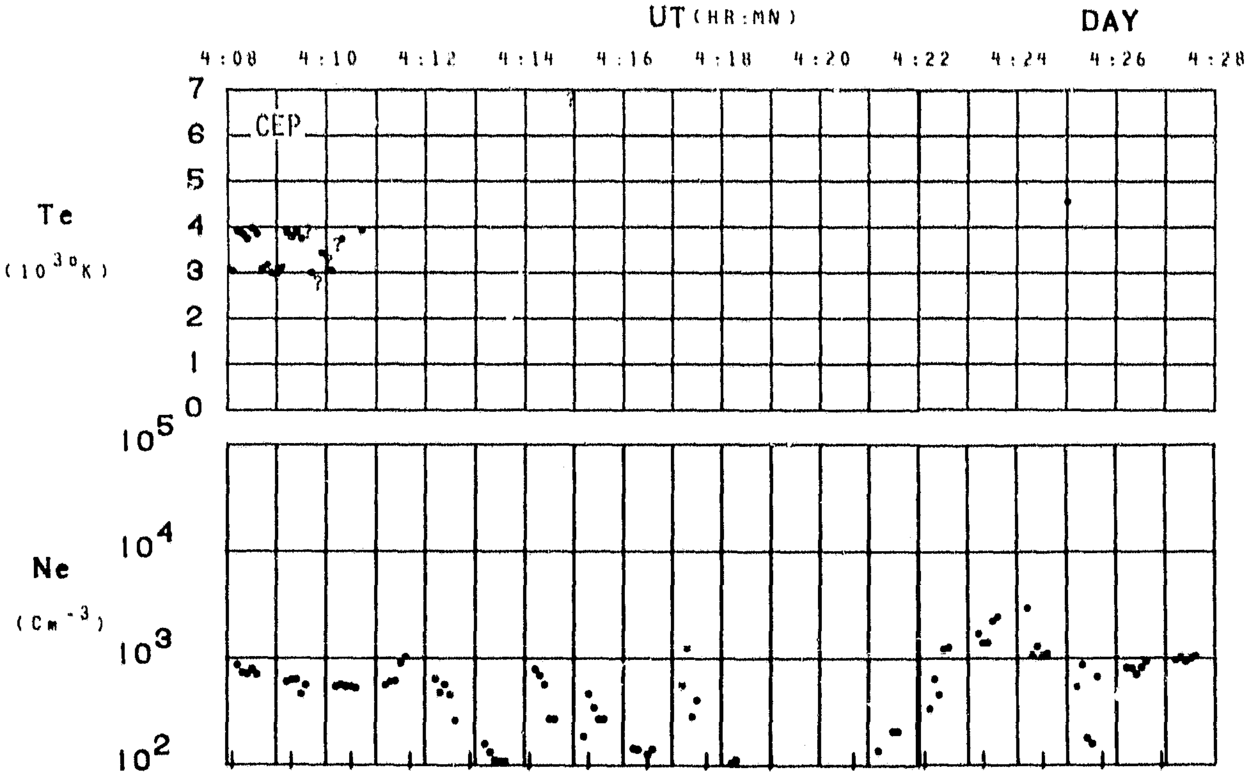
HRT Y00481
FILE 17

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

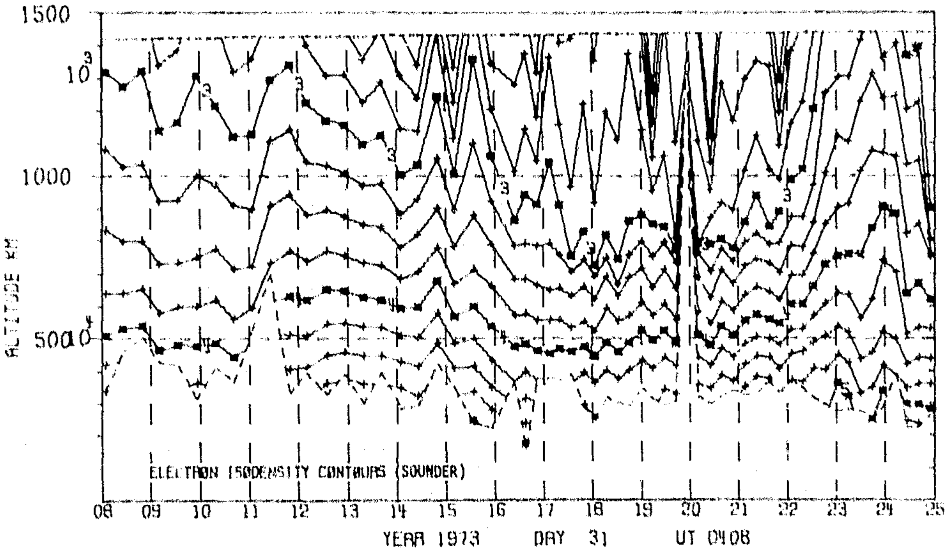
RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

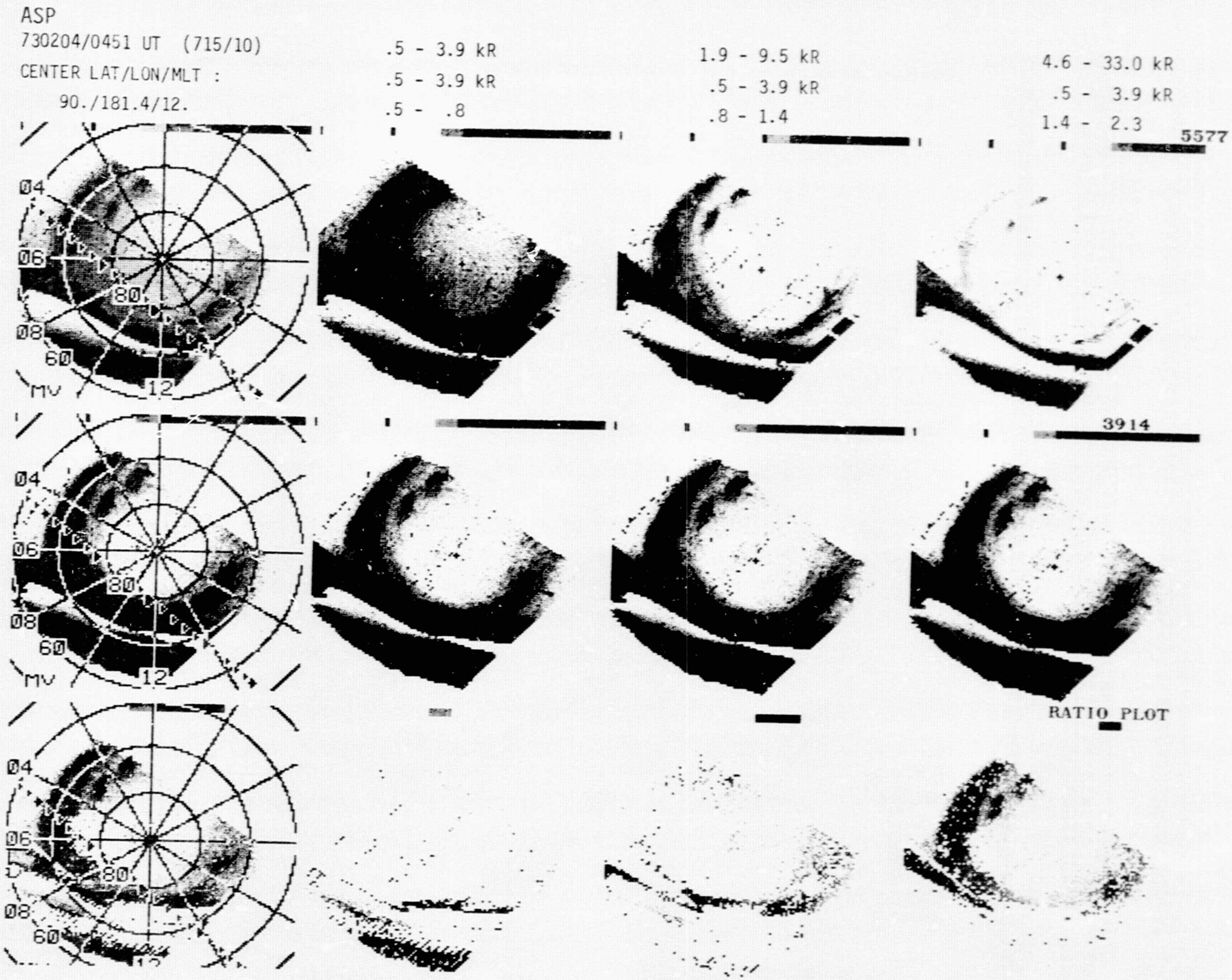

EPD
ORBIT 8591
1973 31 4 12 9
I(22)/I(40)
D (1-3) Log I
D (4-1) Log I
D (9-6) Log I
I⊥ (40) Log R
I (40) Log R
I (210) Log R
Ē KeV
U.T.
INV.LAT.
MLT
B
THETA Z

ORBIT 8501
DATE 730131
DAY 31



LAT	46	50	54	57	61	65	69	72	76	80	85	88	85	81	78	74
LONG	-4	-4	4	-3	-3	-3	-2	-2	0	2	14	95	149	157	160	162
LT	3:38	3:39	3:40	3:42	3:44	3:46	3:49	3:54	4:01	4:15	5:04	10:28	14:06	14:39	14:56	15:04
DIP	62	65	68	71	73	75	77	79	81	83	85	87	86	85	83	80
DIPLAT	43	47	51	55	59	62	66	70	73	77	81	84	83	80	76	71
L	2.5	2.9	3.4	4.2	5.2	6.8	9.1	12.7	18.6	28.4	41.4	37.3	26.6	17.8	12.1	8.6
INVLAT	50	53	57	60	64	67	70	73	76	79	81	80	78	76	73	70
ZA	126	125	124	122	121	119	117	115	113	111	108	105	103	100	98	96



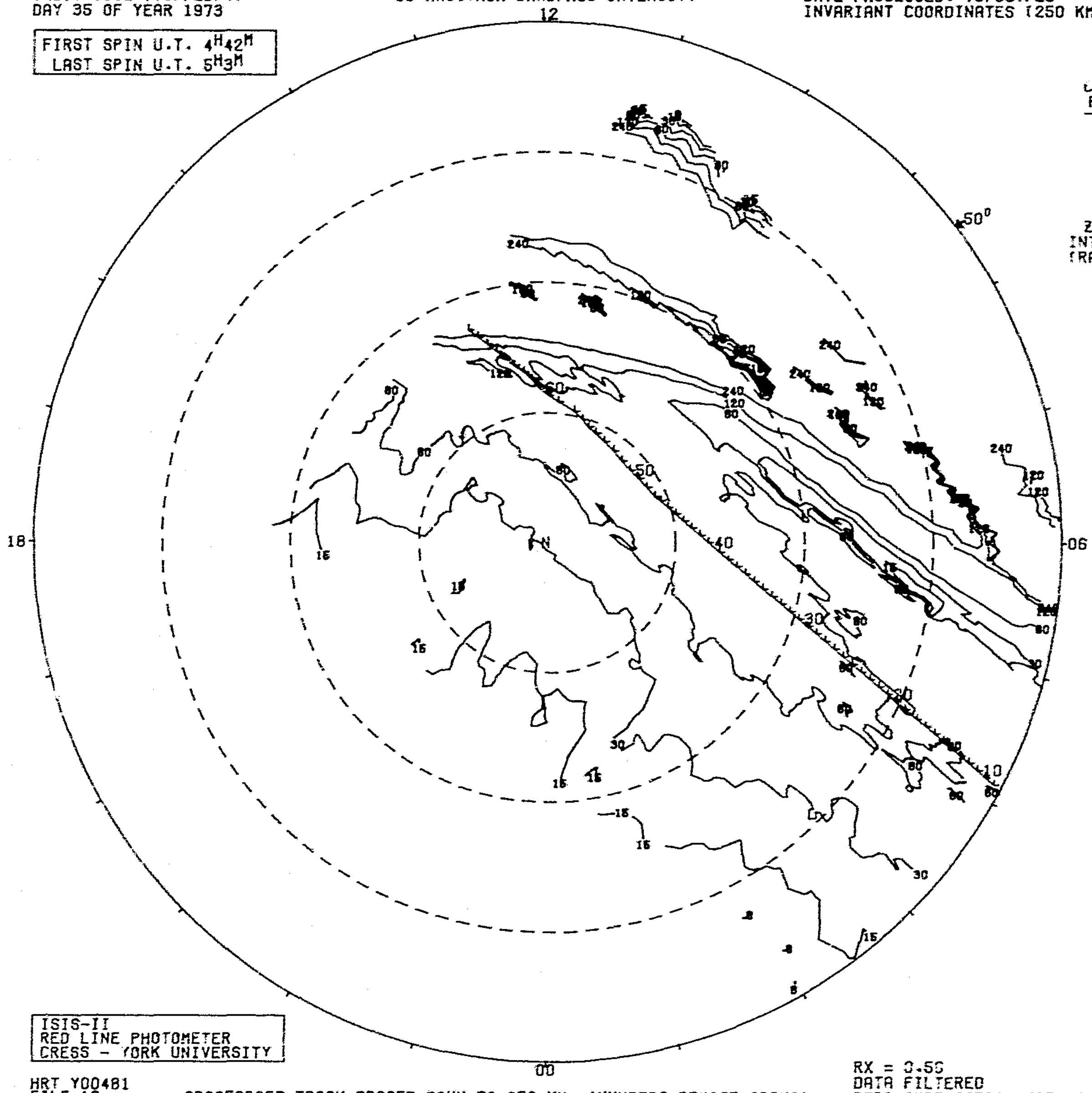

ASP
730204/0451 UT (715/10)
CENTER LAT/LON/MLT :
90./181.4/12.
.5 - 3.9 kR
.5 - 3.9 kR
.5 - .8
1.9 - 9.5 kR
.5 - 3.9 kR
.8 - 1.4
4.6 - 33.0 kR
.5 - 3.9 kR
1.4 - 2.3
5577
3914
RATIO PLOT
04
06
80
08
60
MV
12

ORBIT 8552 (73/FEB/4)
DAY 35 OF YEAR 1973

10 ANGSTROM BANDPASS INTENSITY

DATE PROCESSED: 79/OCT/29
INVARIANT COORDINATES (250 KM.)

FIRST SPIN U.T. $4^H 42^M$
LAST SPIN U.T. $5^H 3^M$



CONTOURS PLOTTED

80
150
300
600
1200
2400
ZENITHAL INTENSITIES (RAYLEIGHS)

ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

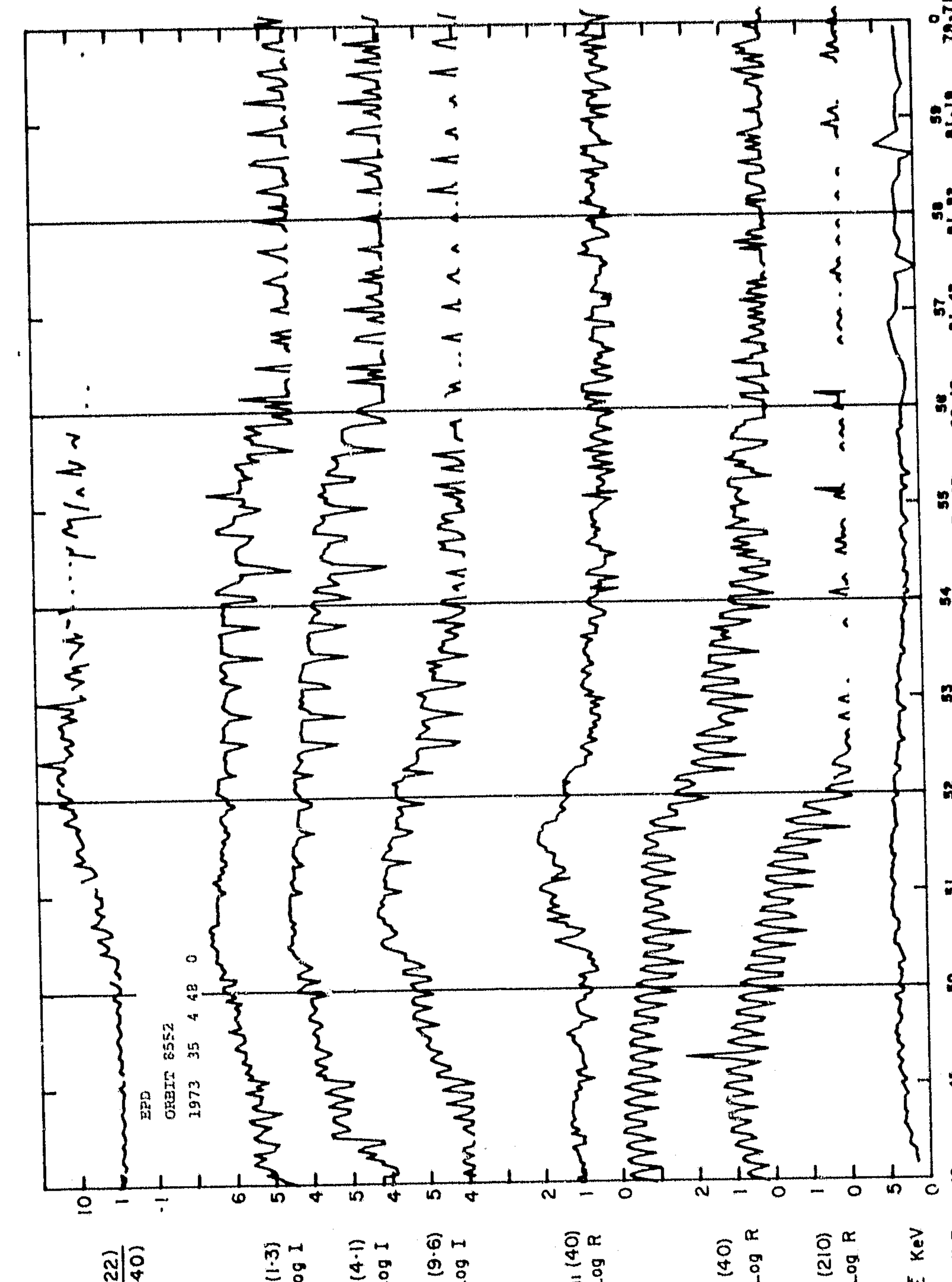
HRT Y00481
FILE 16

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

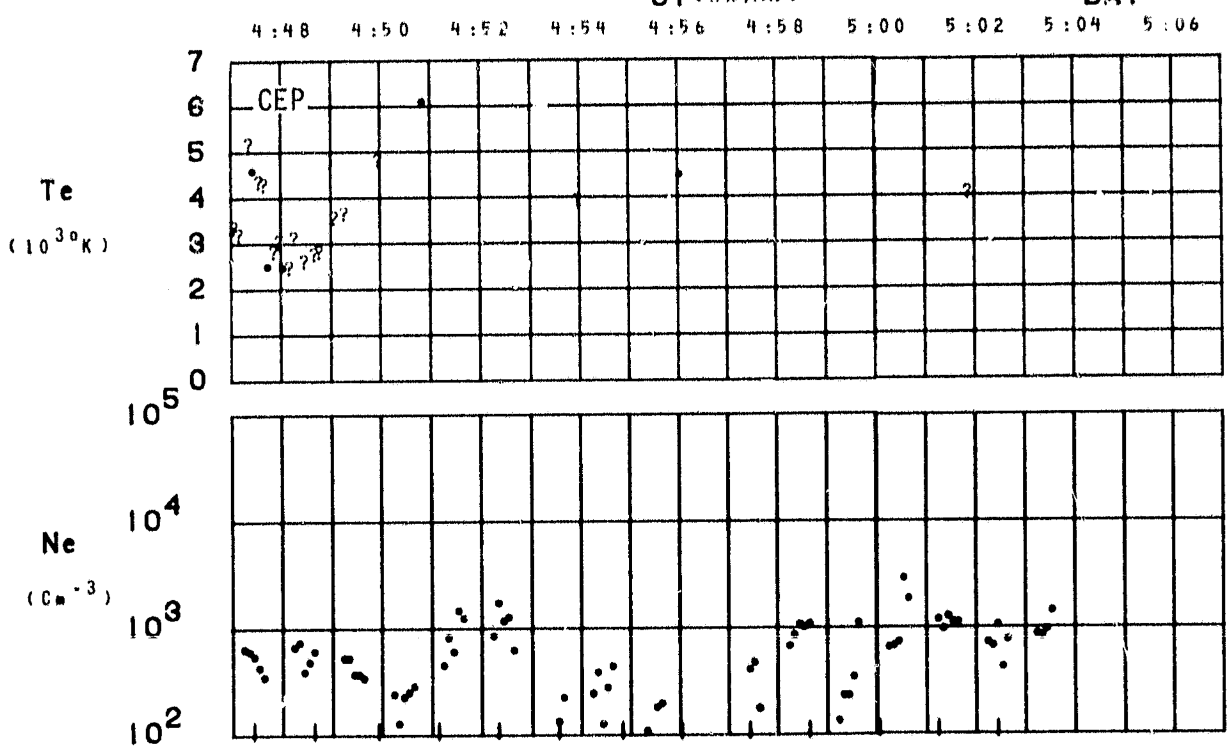
RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

SPACECRAFT INFORMATION

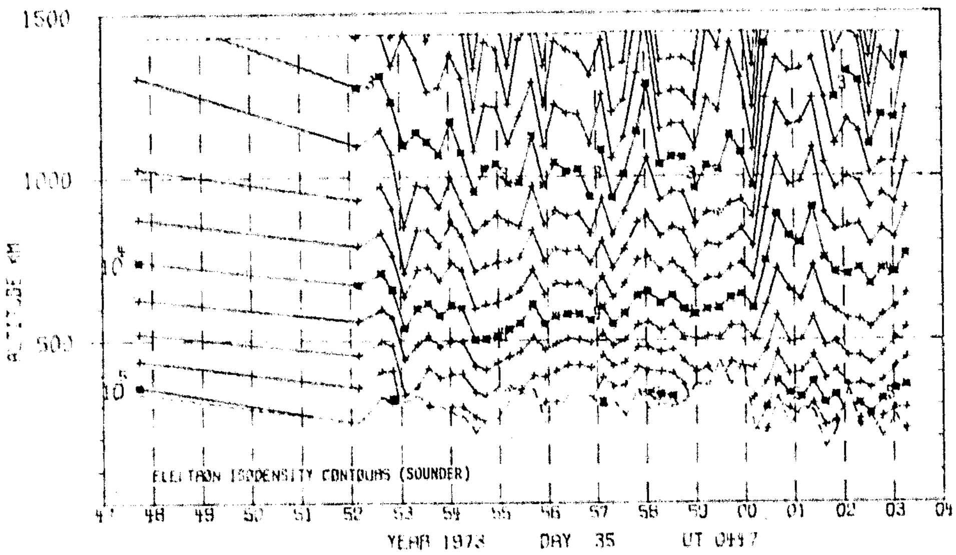
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	044238	45.1
2	044256	45.9
3	044314	46.7
4	044332	47.5
5	044350	48.4
6	044408	49.2
7	044426	50.0
8	044444	50.9
9	044502	51.7
10	044520	52.5
11	044538	53.4
12	044556	54.2
13	044614	55.0
14	044632	55.9
15	044650	56.7
16	044708	57.6
17	044726	58.4
18	044750	59.5
19	044808	60.3
20	044826	61.2
21	044844	62.0
22	044902	62.9
23	044920	63.7
24	044938	64.5
25	044956	65.3
26	045014	66.2
27	045032	67.0
28	045050	67.8
29	045108	68.6
30	045126	69.4
31	045144	70.2
32	045202	71.0
33	045220	71.8
34	045238	72.6
35	045256	73.3
36	045314	74.1
37	045332	74.8
38	045350	75.6
39	045408	76.3
40	045432	77.2
41	045450	77.9
42	045508	78.5
43	045526	79.1
44	045544	79.7
45	045602	80.2
46	045620	80.7
47	045638	81.0
48	045656	81.4
49	045714	81.6
50	045732	81.8
51	045750	81.8
52	045808	81.8
53	045826	81.7
54	045844	81.5
55	045902	81.2
56	045920	80.8
57	045938	80.3
58	050002	79.7
59	050020	79.1
60	050038	78.5
61	050056	77.8
62	050114	77.1
63	050132	76.4
64	050150	75.7
65	050208	75.0
66	050226	74.2
67	050244	73.5
68	050302	72.7

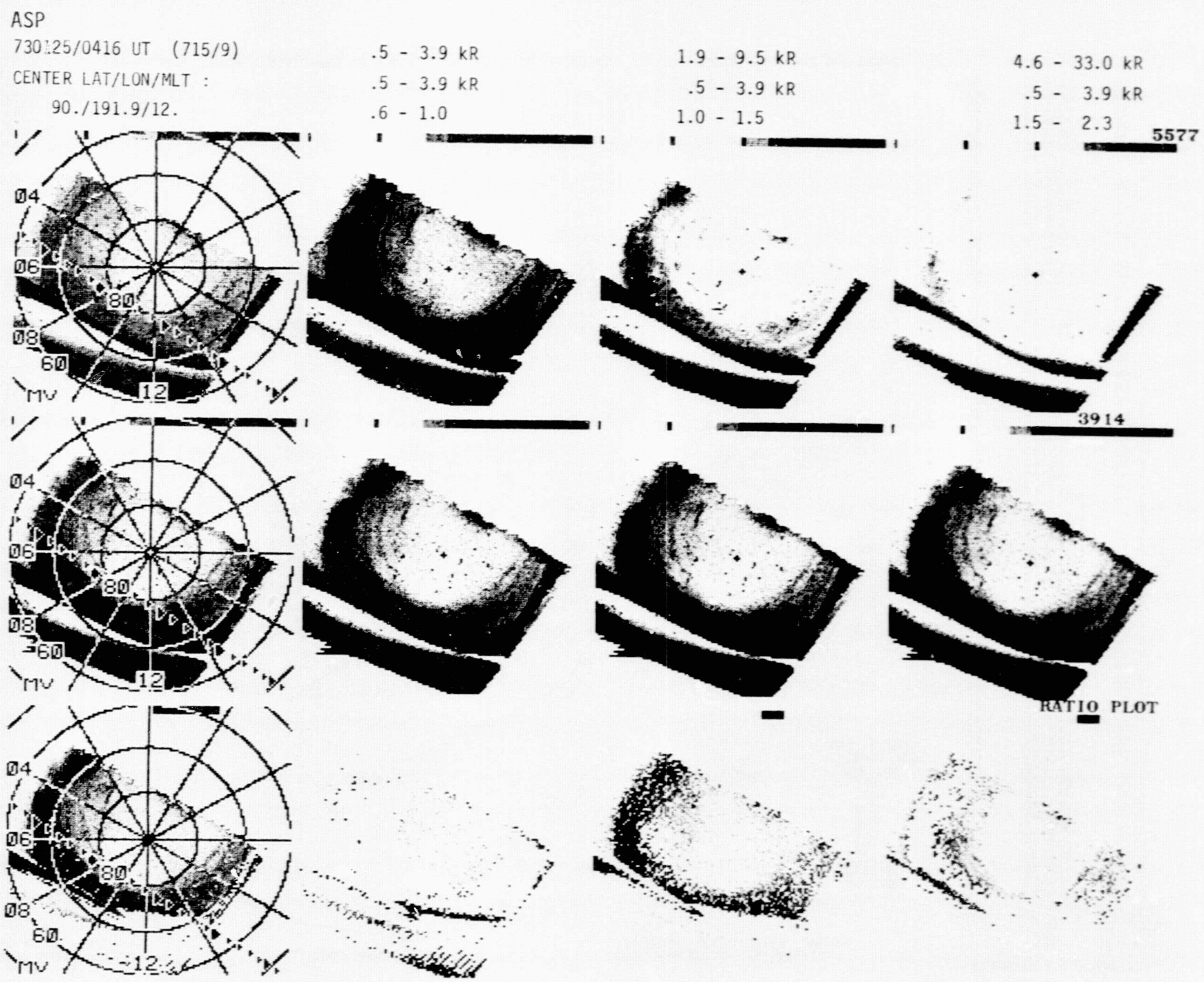

EPD
ORBIT 8552
1973 35 4 48 0
I(22)/I(40)
D (1·3) Log I
D (4·1) Log I
D (9·6) Log I
I⊥ (40) Log R
I (40) Log R
I (210) Log R
E KeV
U.T.
INV.LAT.
MLT
B
THETA Z

ORBIT 8552
DATE 730204
DAY 35



LAT	52	56	60	64	68	72	76	79	84	87	86	83	79
LONG	-18	-17	-17	-17	-17	-16	-14	-12	-6	23	120	139	145
LT	3:21	3:22	3:24	3:27	3:30	3:34	3:41	3:52	4:18	6:17	12:49	14:05	14:30
DIP	68	71	73	75	78	79	81	83	85	86	87	85	84
DIPLAT	51	55	59	63	66	70	74	77	80	83	84	81	78
L	3.6	4.5	5.7	7.5	10.2	14.6	22.6	34.4	48.1	46.1	31.0	20.2	13.5
INVLAT	58	61	65	68	71	74	77	80	81	81	79	77	74
ZA	126	124	122	120	118	116	113	111	108	106	103	100	98




ASP
730125/0416 UT (715/9)
CENTER LAT/LON/MLT :
90./191.9/12.
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT
04
06
08
60
80
12
MV

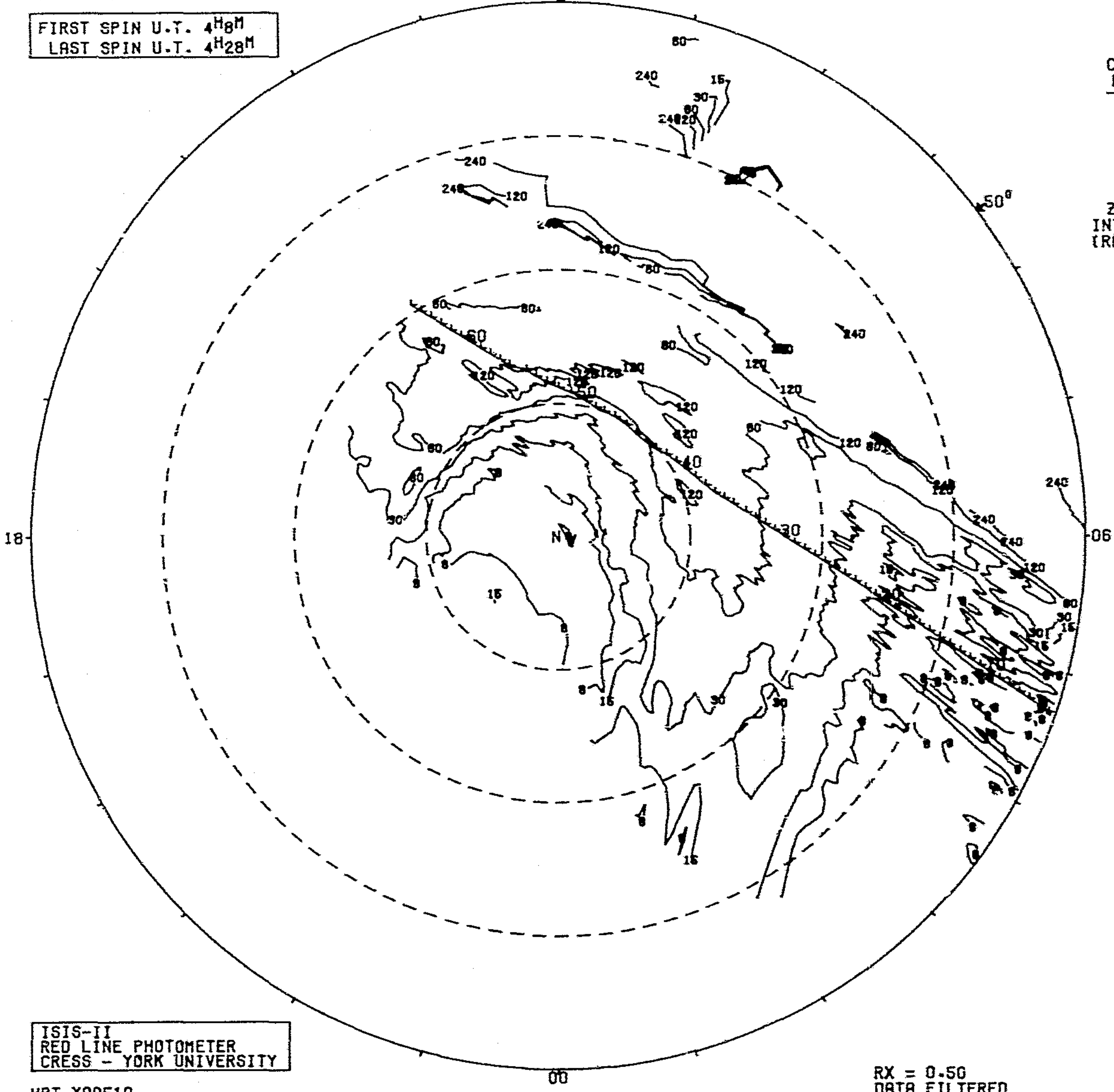
ORBIT 8425 (73/JAN/25)
DAY 25 OF YEAR 1973

FIRST SPIN U.T. $4^{H}8^{M}$
LAST SPIN U.T. $4^{H}28^{M}$

6300 ANGSTROM INTENSITY

DATE PROCESSED: 79/OCT/11
INVARIANT COORDINATES (250 KM.)

CONTOURS PLOTTED
80
150
300
600
1200
2400
ZENITHAL INTENSITIES (RAYLEIGHS)



ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

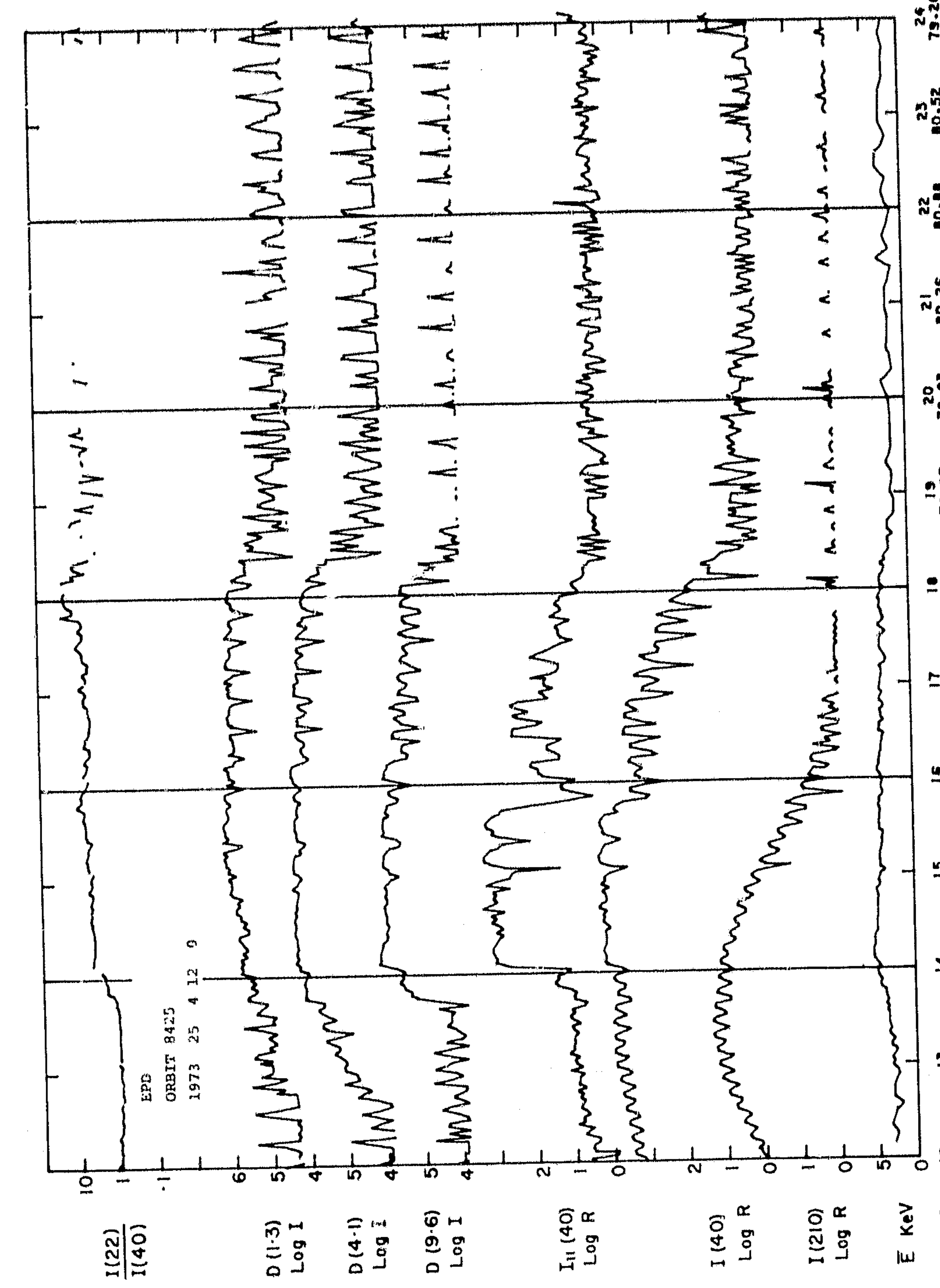
HRT Y00510
FILE 59

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

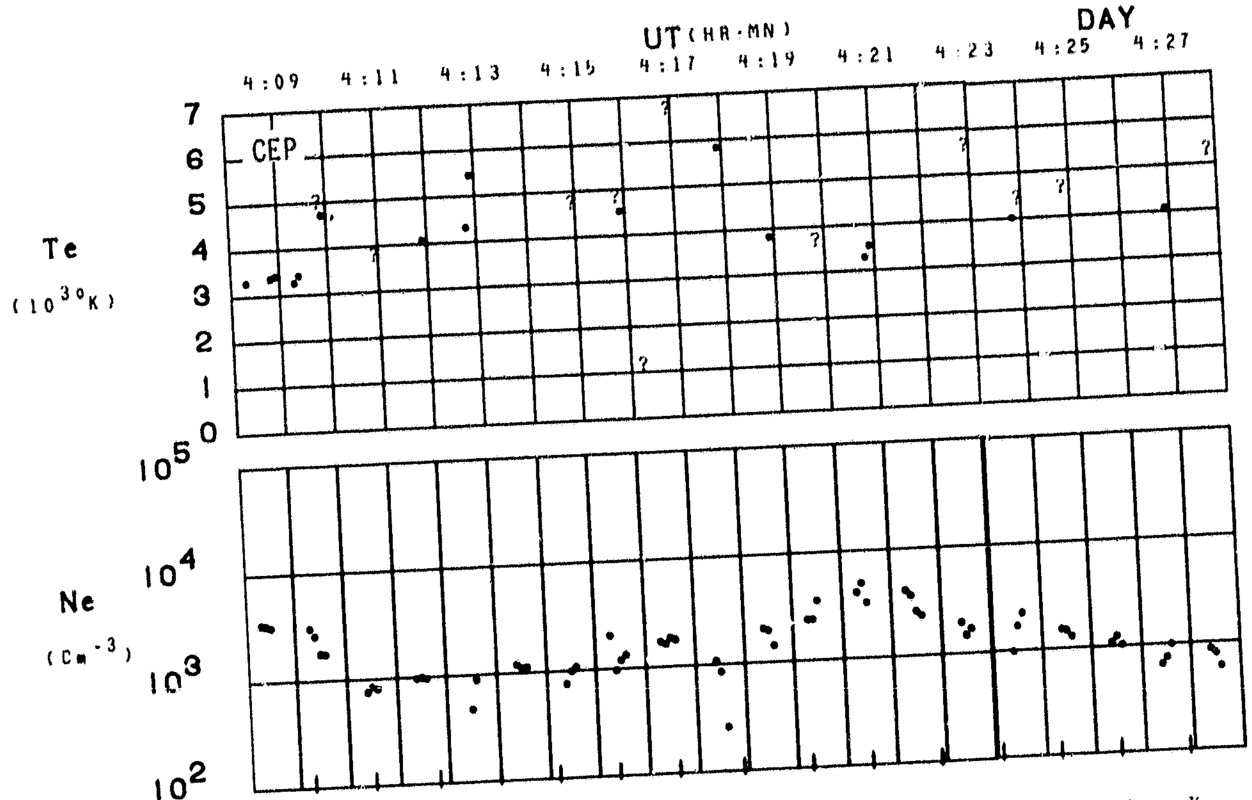
RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

SPACECRAFT INFORMATION

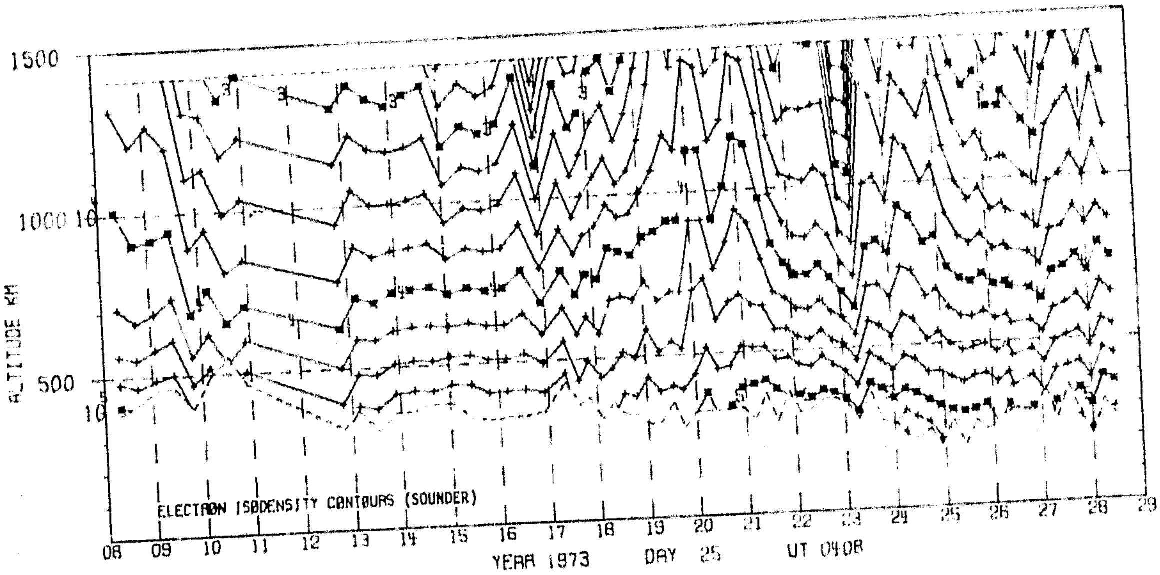
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	040842	49.0
2	040906	50.1
3	040924	51.0
4	040942	51.8
5	041000	52.7
6	041018	53.5
7	041036	54.4
8	041054	55.2
9	041112	56.1
10	041130	56.9
11	041148	57.8
12	041206	58.6
13	041224	59.4
14	041242	60.3
15	041300	61.1
16	041318	62.0
17	041342	63.1
18	041400	63.9
19	041418	64.8
20	041436	65.6
21	041454	66.4
22	041512	67.2
23	041530	68.1
24	041548	68.9
25	041606	69.7
26	041624	70.5
27	041642	71.3
28	041700	72.0
29	041718	72.8
30	041736	73.6
31	041754	74.3
32	041812	75.0
33	041830	75.7
34	041854	76.6
35	041912	77.3
36	041930	77.9
37	041948	78.5
38	042006	79.0
39	042024	79.5
40	042042	79.9
41	042100	80.3
42	042118	80.5
43	042136	80.7
44	042154	80.9
45	042212	80.9
46	042230	80.8
47	042248	80.7
48	042306	80.4
49	042324	80.1
50	042348	79.6
51	042406	79.1
52	042424	78.6
53	042442	78.0
54	042500	77.4
55	042518	76.7
56	042536	76.0
57	042554	75.3
58	042612	74.6
59	042630	73.8
60	042648	73.1
61	042706	72.3
62	042724	71.5
63	042742	70.7
64	042800	69.9
65	042818	69.1

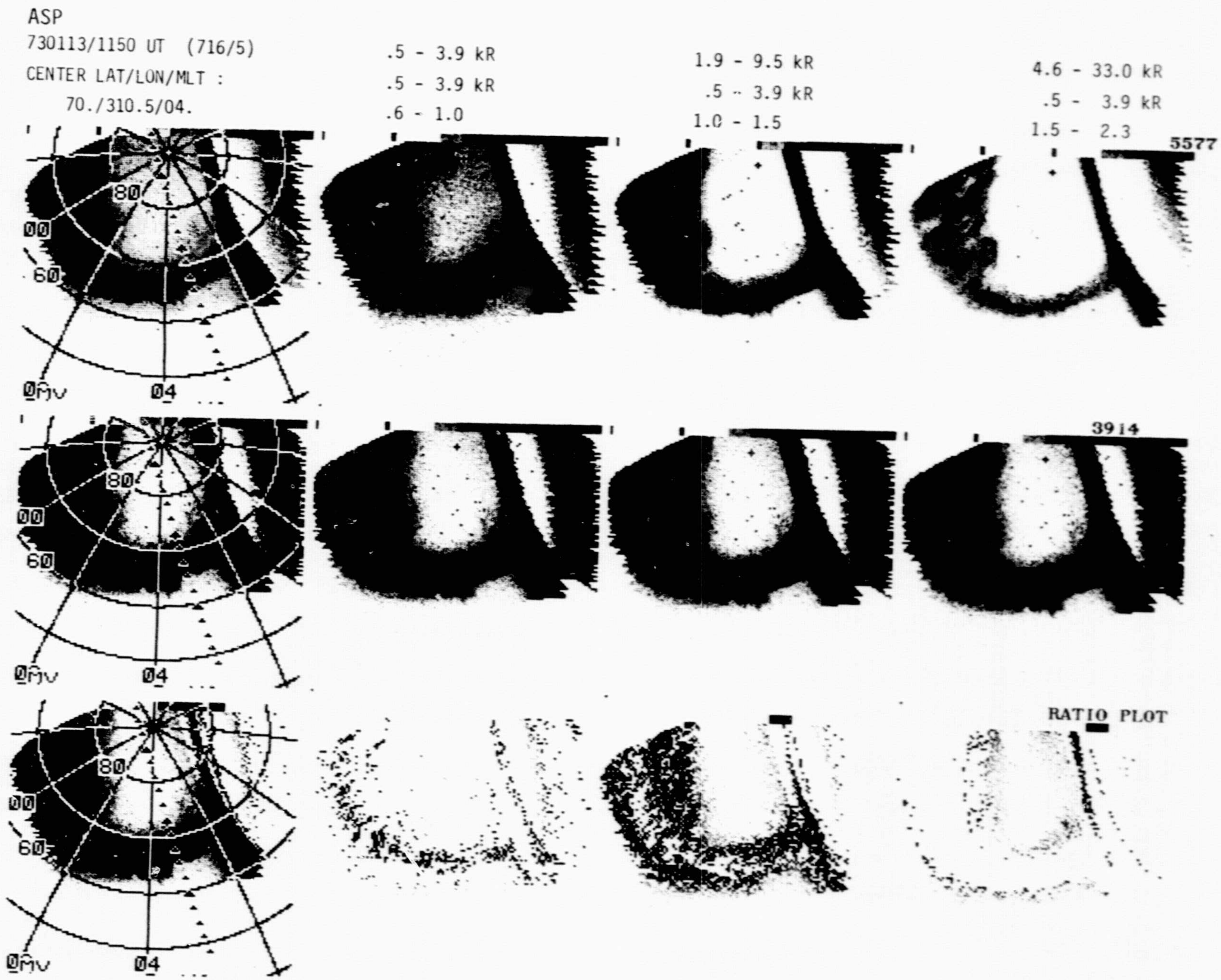

EPD
ORBIT 8425
1973 25 4 12 9
I(22)/I(40)
D(1·3) Log I
D(4·1) Log I
D(9·6) Log I
I∥(40) Log R
I(40) Log R
I(210) Log R
Ē KeV
U.T.
INV.LAT.
MLT
B
THETA Z

ORBIT 8425
DATE 730125
DAY 25



LAT	47	51	55	59	63	66	70	74	78	82	86	87	84	81	76
LONG	2	2	2	2	2	3	3	5	7	12	29	115	157	164	168
LT	4:07	4:08	4:09	4:11	4:13	4:16	4:19	4:25	4:36	4:56	6:08	11:50	14:40	15:11	15:27
DIP	62	66	69	71	74	76	78	80	82	84	86	87	86	84	82
DIPLAT	44	48	52	56	60	63	67	71	75	79	82	84	83	79	74
L	2.5	2.9	3.5	4.3	5.4	7.0	9.4	13.7	21.3	30.9	39.7	36.2	26.3	17.7	11.5
INVLAT	50	54	57	61	64	67	70	74	77	79	80	80	78	76	72
ZA	122	122	121	120	118	117	116	114	112	110	108	106	104	103	100



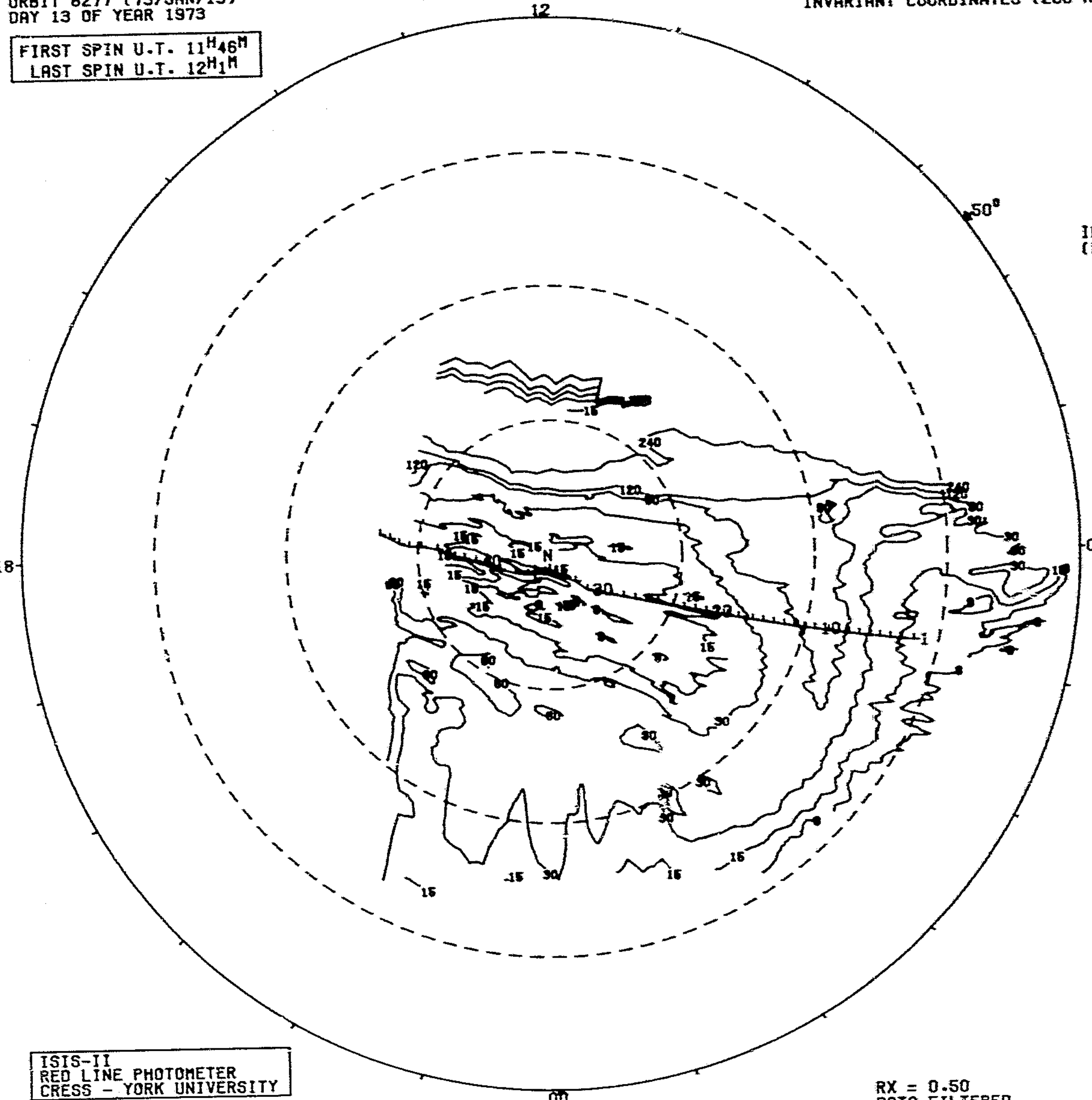

ASP
730113/1150 UT (716/5)
CENTER LAT/LON/MLT :
70./310.5/04.
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT
80
00
60
ØMV
Ø4

ORBIT 8277 (73/JAN/13)
DAY 13 OF YEAR 1973

FIRST SPIN U.T. 11^H46^M
LAST SPIN U.T. 12^H1^M

6300 ANGSTROM INTENSITY

DATE PROCESSED: 79/OCT/11
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

80
150
300
600
1200
2400
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

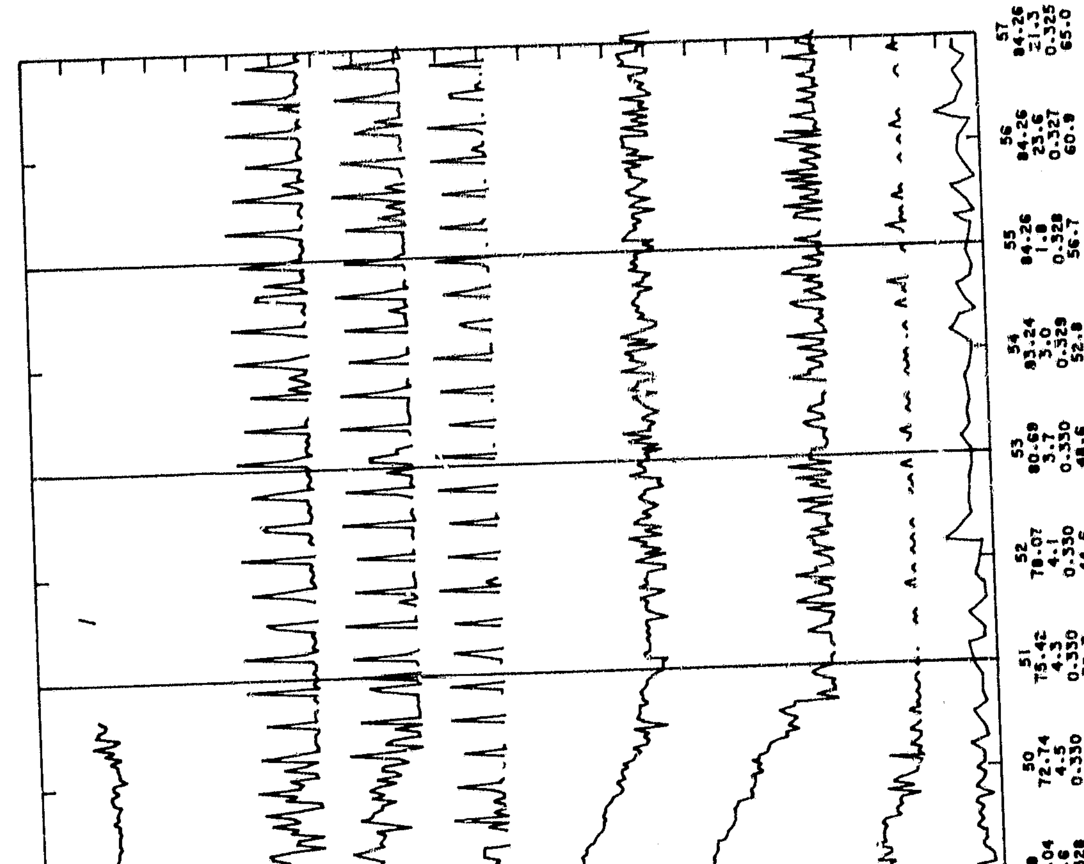
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	114600	61.8
2	114624	62.9
3	114642	63.8
4	114700	64.6
5	114718	65.4
6	114736	66.2
7	114754	67.0
8	114812	67.9
9	114830	68.7
10	114854	69.8
11	114912	70.6
12	114930	71.4
13	114948	72.2
14	115006	73.0
15	115024	73.8
16	115042	74.6
17	115106	75.7
18	115124	76.5
19	115142	77.3
20	115200	78.1
21	115218	78.8
22	115236	79.5
23	115254	80.4
24	115318	81.6
25	115336	82.4
26	115354	83.1
27	115412	83.5
28	115430	83.9
29	115448	84.2
30	115506	84.3
31	115530	84.3
32	115548	84.3
33	115606	84.3
34	115624	84.2
35	115642	84.2
36	115700	84.3
37	115718	84.3
38	115742	84.3
39	115800	94.3
40	115818	84.1
41	115836	83.7
42	115854	83.3
43	115912	82.7
44	115930	82.0
45	115954	80.9
46	120012	80.0
47	120030	79.2
48	120048	78.5
49	120106	77.8

ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

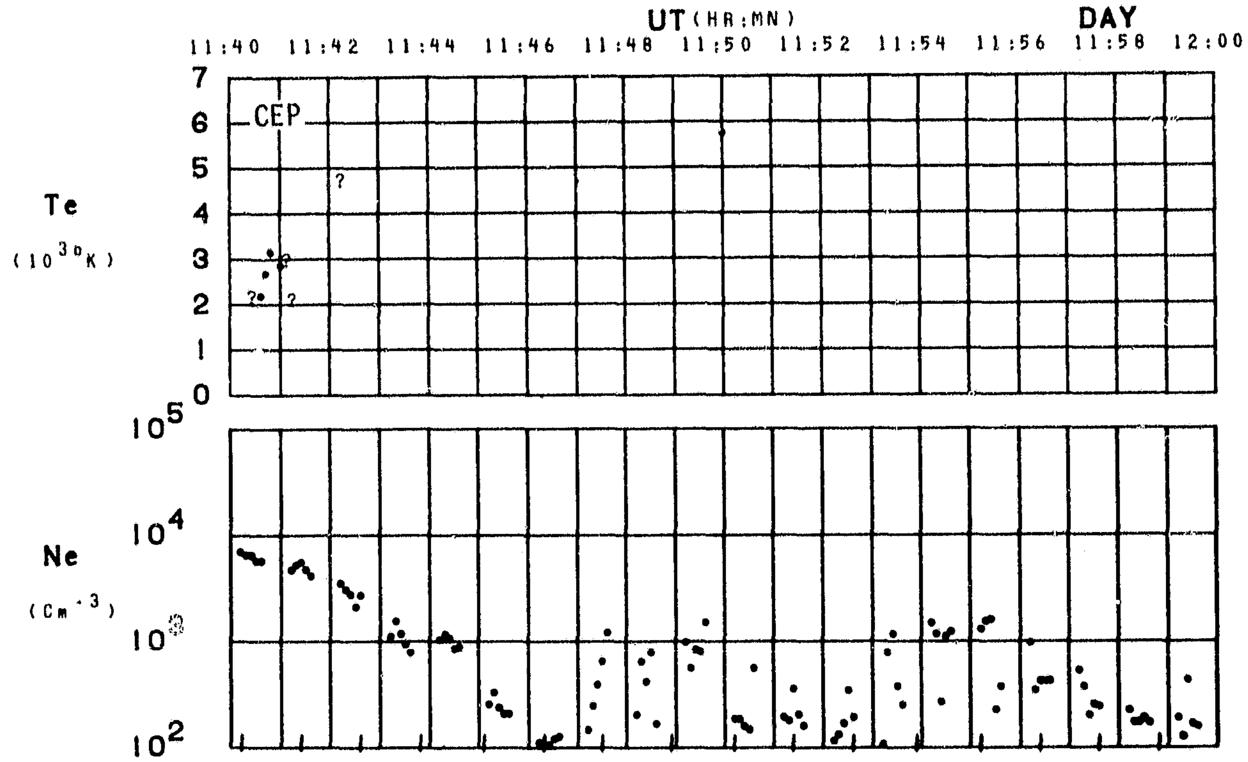
HRT Y00510
FILE 18

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

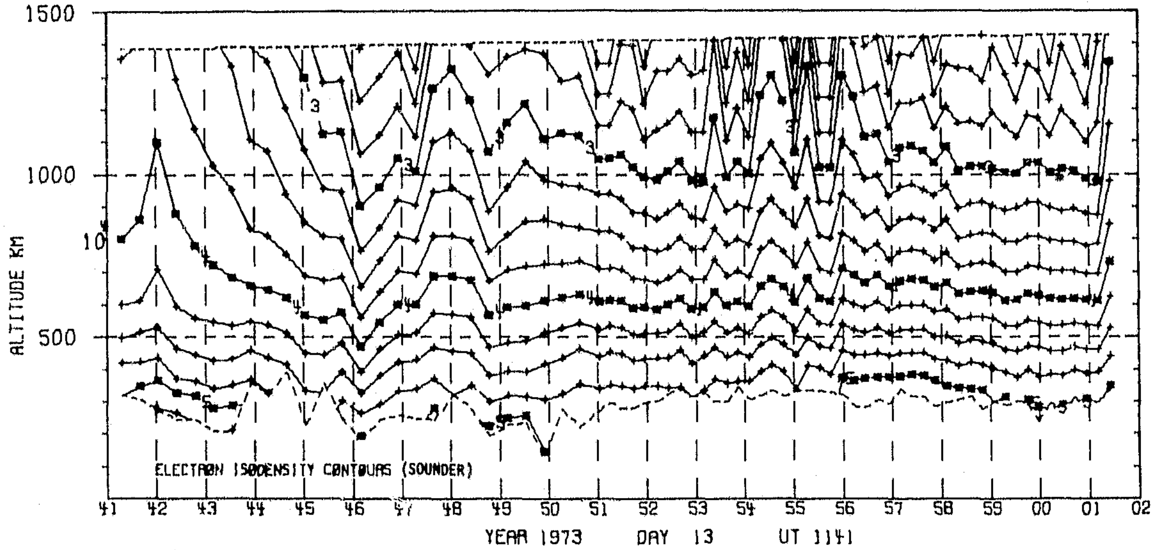
RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

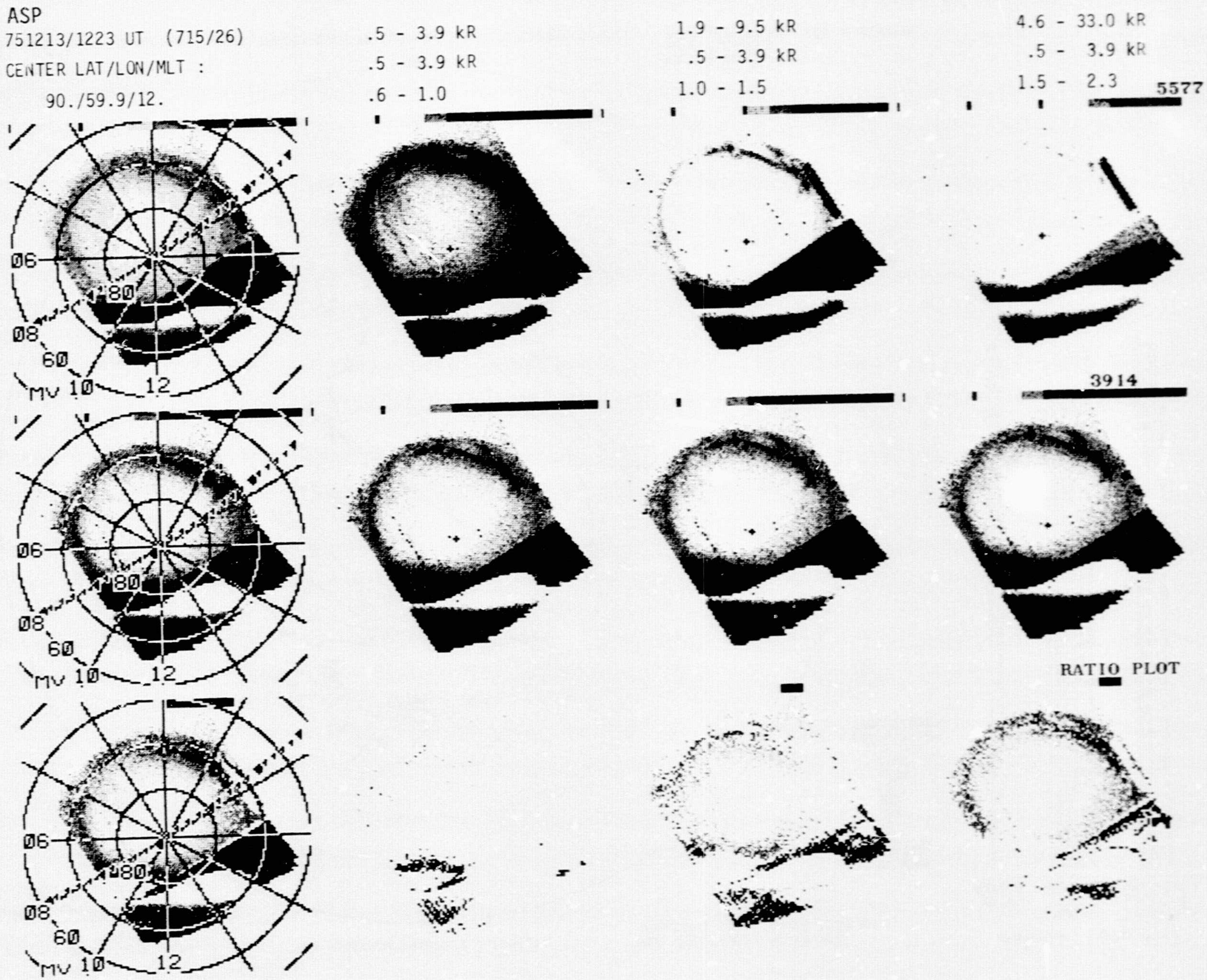

EPD
ORBIT 8277
1973 13 11 45 0
I(22)/I(40)
D(1·3) Log I
D(4·1) Log I
D(9·6) Log I
I∥(40) Log R
I(40) Log R
I(210) Log R
E KeV
U.T.
INV-LAT.
MLT
B
THETA Z

ORBIT 8277
DATE 730113
DAY 13



LAT	29	33	37	41	45	49	53	57	61	65	69	73	77	81	84	87
LONG	-97	-97	-97	-98	-98	-98	-98	-98	-97	-97	-97	-96	-94	-90	-84	-43
LT	5:00	5:01	5:02	5:02	5:03	5:04	5:06	5:07	5:09	5:12	5:15	5:20	5:28	5:43	6:11	8:57
DIP	59	63	66	69	72	75	77	80	82	84	85	87	88	89	88	87
DIPLAT	40	44	49	53	57	62	66	71	75	78	81	84	87	89	87	85
L	2.1	2.3	2.7	3.2	3.8	4.7	6.0	8.4	12.1	18.4	30.3	68.7	102.1	99.3	102.3	76.5
INVLAT	46	49	52	55	59	62	65	69	73	76	79	83	84	84	84	83
ZA	112	113	114	114	114	114	115	114	114	114	113	113	112	111	110	110





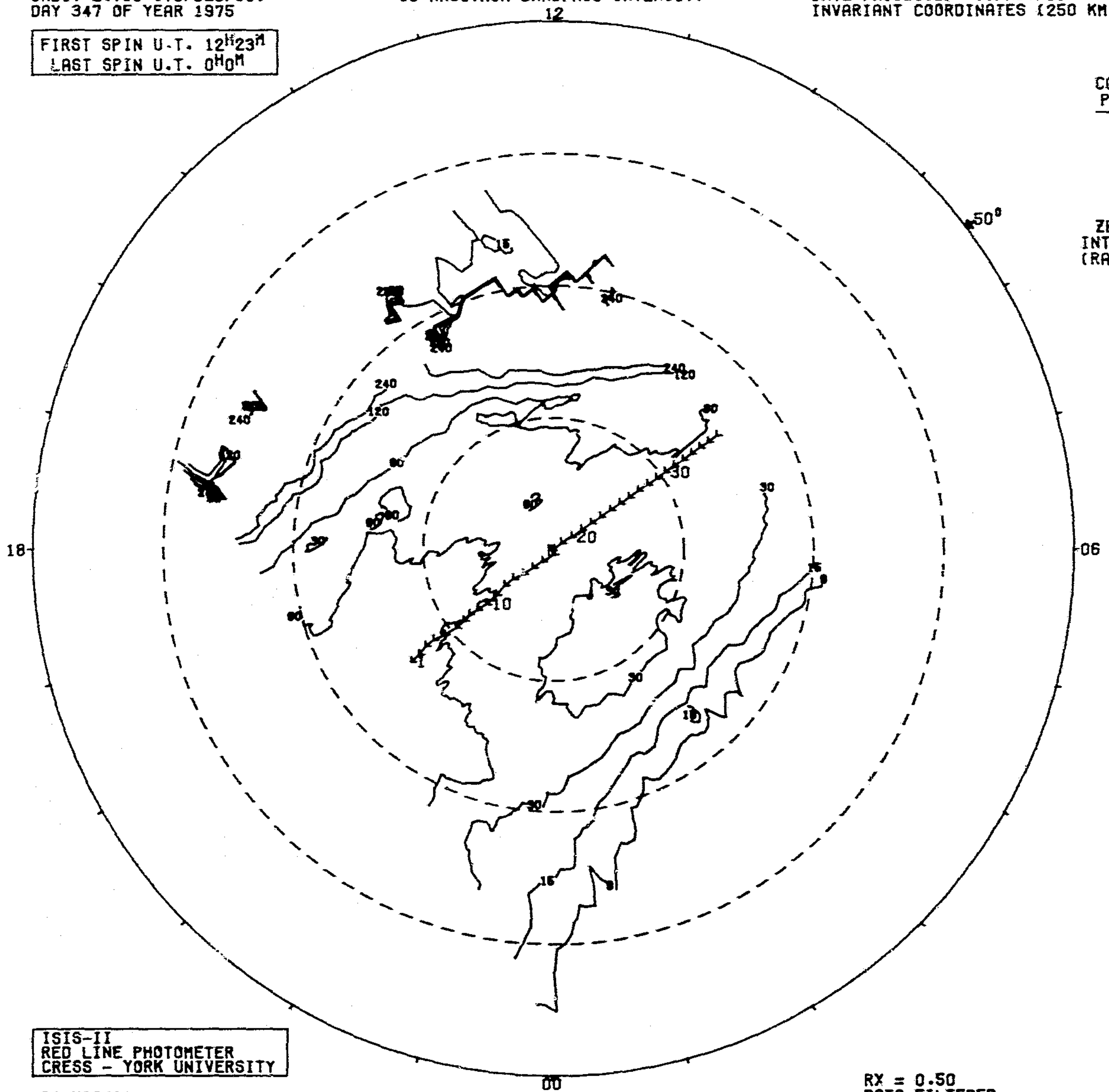
ASP
751213/1223 UT (715/26)
CENTER LAT/LON/MLT :
90./59.9/12.
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT
06
08
60
80
MV 10
12

ORBIT 21756 (75/DEC/13)
DAY 347 OF YEAR 1975

FIRST SPIN U.T. 12H23M
LAST SPIN U.T. 0H0M

10 ANGSTROM BANDPASS INTENSITY

DATE PROCESSED: 79/NOV/05
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

80
150
300
600
1200
2400
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

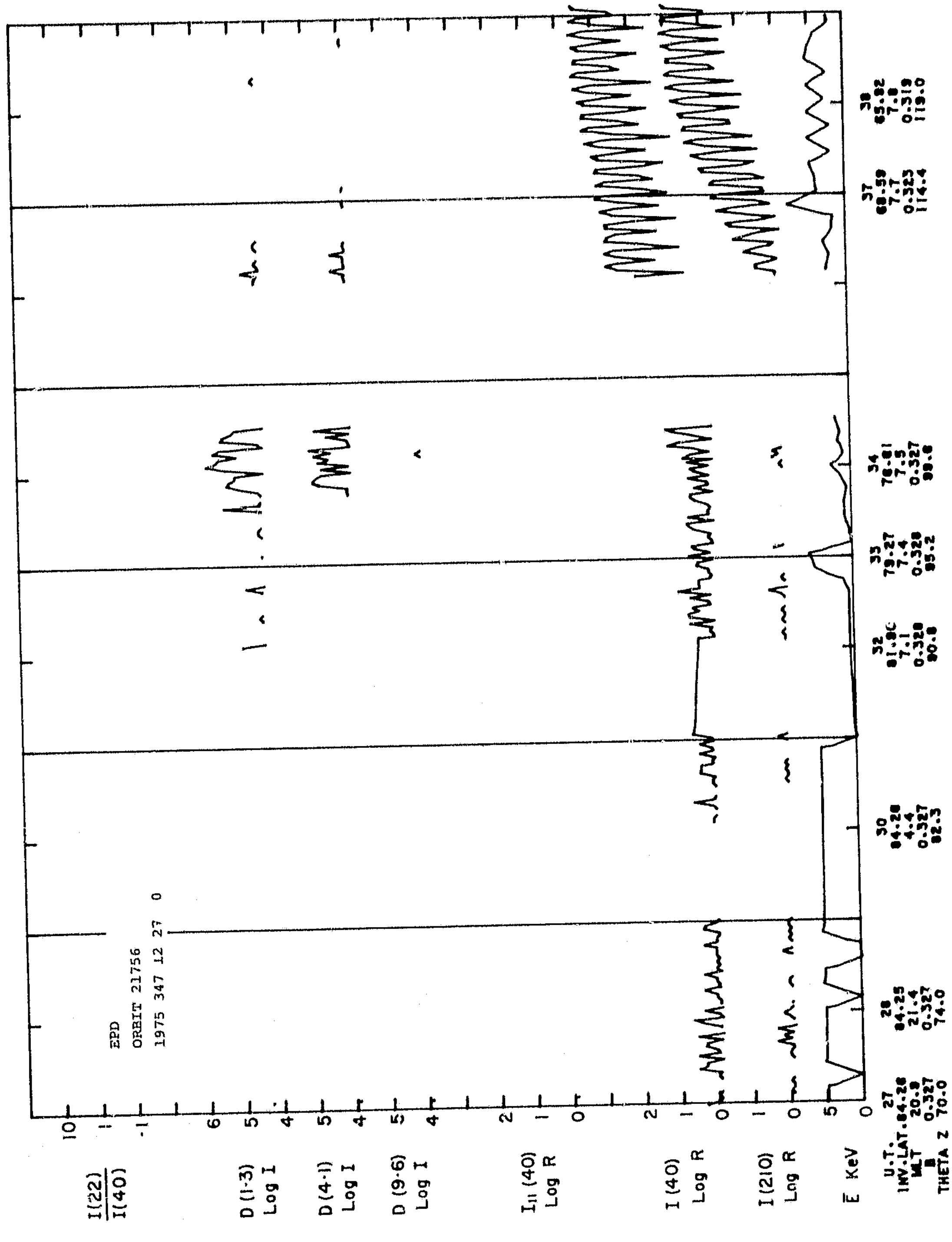
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	122354	76.7
2	122412	77.5
3	122430	78.3
4	122448	79.1
5	122506	79.9
6	122524	80.6
7	122542	81.4
8	122560	82.2
9	122618	83.1
10	122636	83.7
11	122654	84.2
12	122712	84.4
13	122730	84.4
14	122748	84.3
15	122806	84.3
16	122824	84.2
17	122842	84.2
18	122860	84.3
19	122918	84.2
20	122936	84.2
21	122954	84.2
22	123012	84.3
23	123030	84.4
24	123048	84.4
25	123106	84.2
26	123124	83.7
27	123142	83.0
28	123160	82.0
29	123218	81.1
30	123236	80.2
31	123254	79.6
32	123312	78.8
33	123330	78.0
34	123348	77.2
35	123406	76.4
36	123424	75.6
37	0	0.0
38	0	0.0
39	0	0.0
40	0	0.0
41	0	0.0

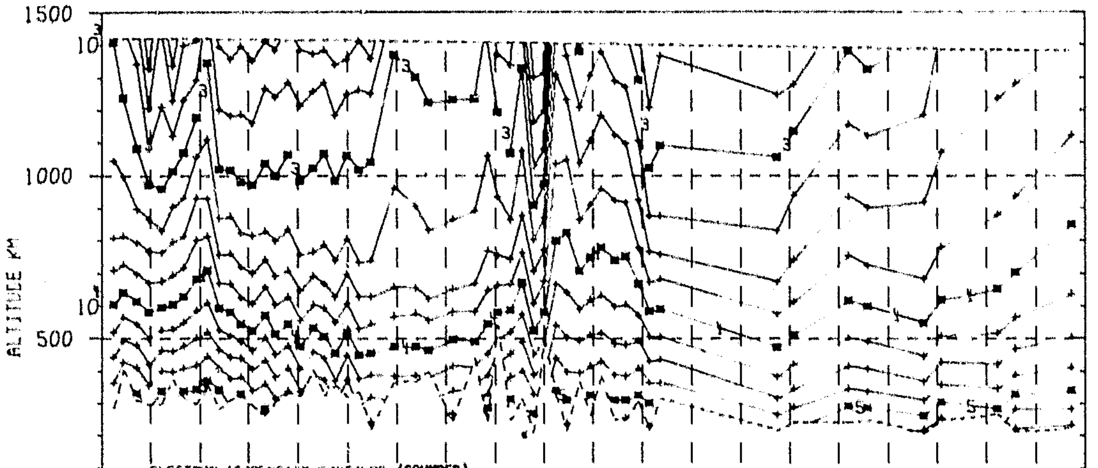
ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

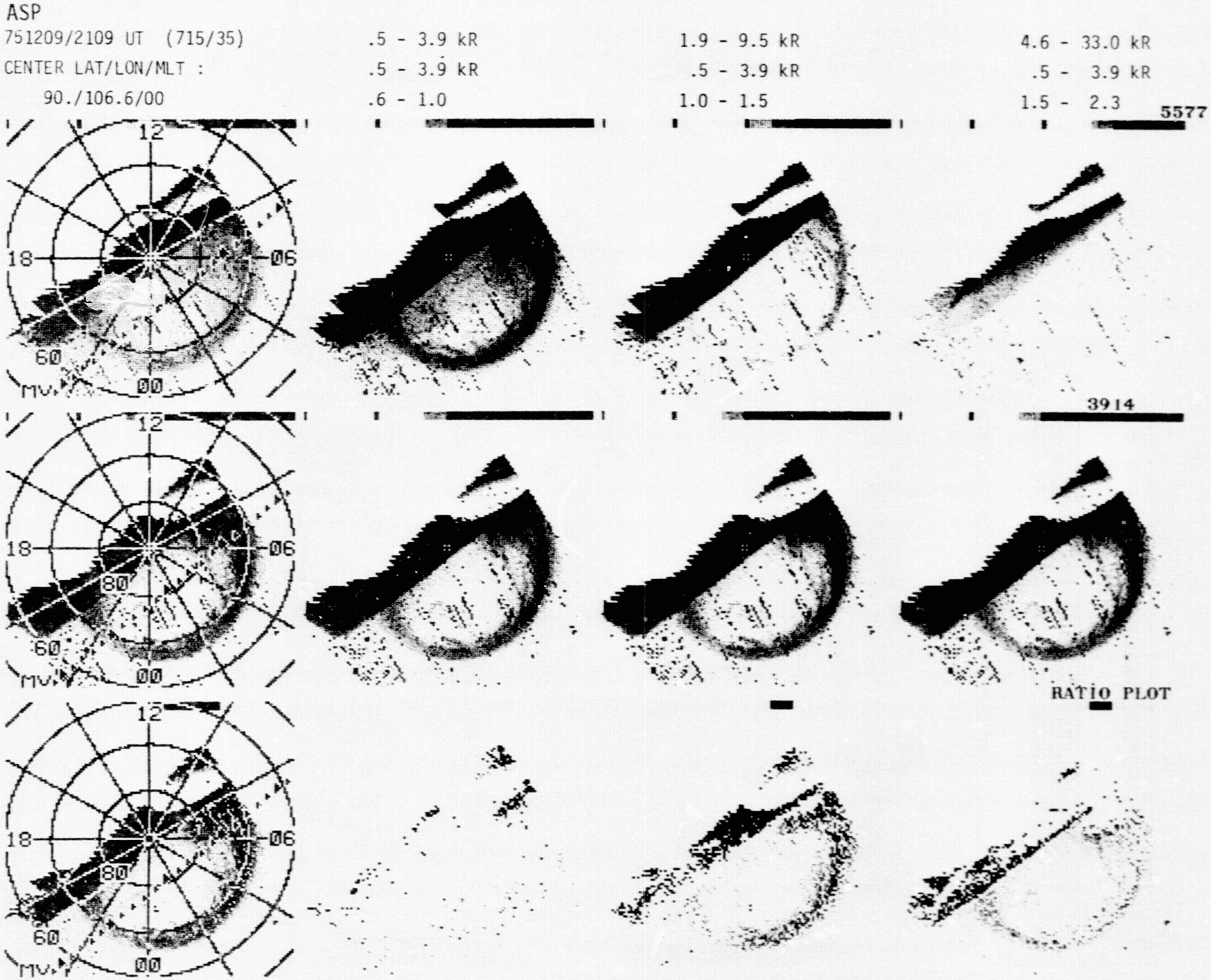
HRT Y00481
FILE 20

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED


EPD
ORBIT 21756
1975 347 12 27 0
I(22)/I(40)
D(1-3) Log I
D(4-1) Log I
D(9-6) Log I
I∥(40) Log R
I(40) Log R
I(210) Log R
Ē KeV
U.T.
INV.LAT.
MLT
B
THETA Z


1500
1000
500
ALTITUDE KM
ELECTRON ISODENSITY CONTOURS (SOUNDER)
23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43
YEAR 1975 DAY 347

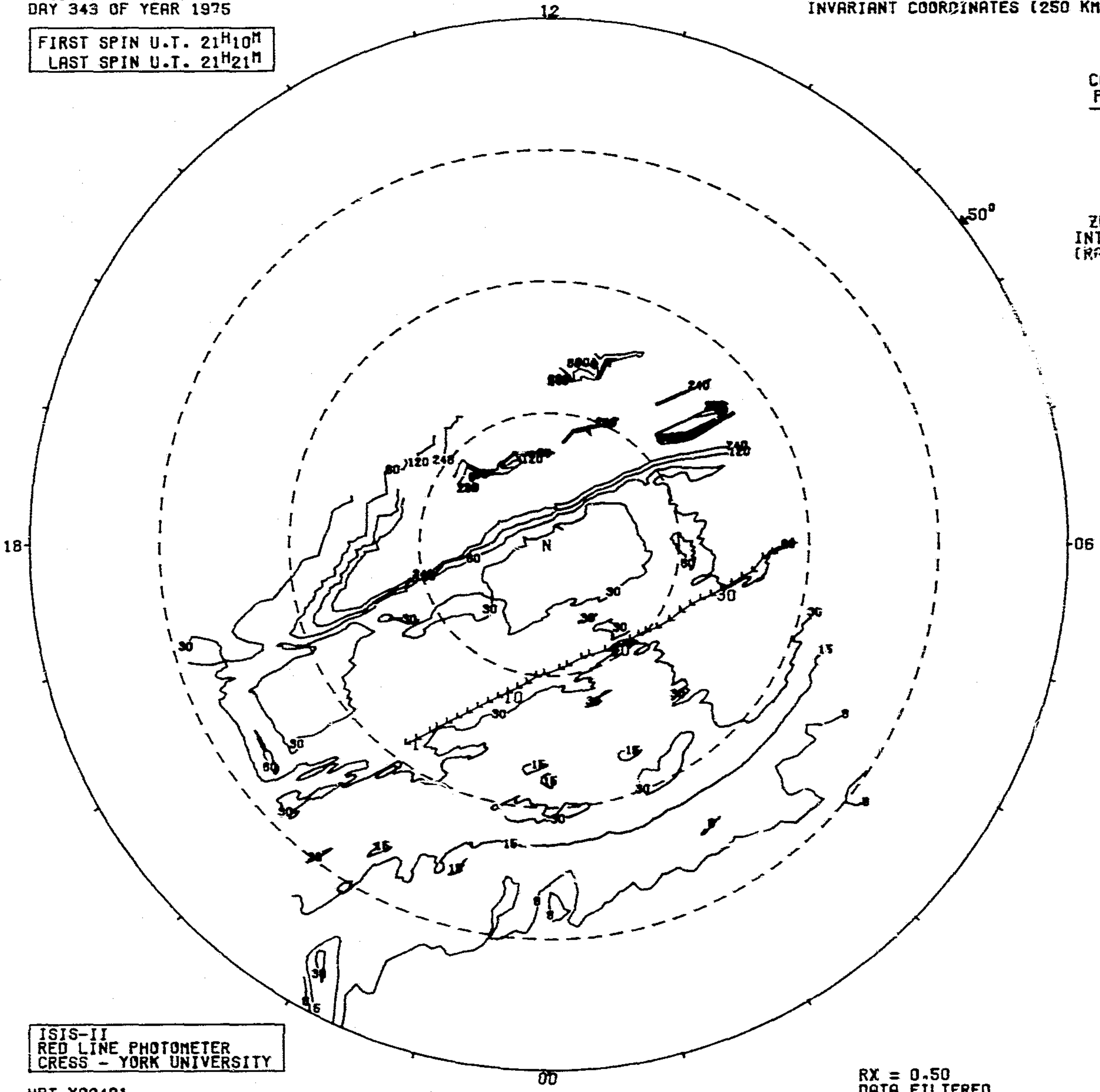

ASP
751209/2109 UT (715/35)
CENTER LAT/LON/MLT :
90./106.6/00
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT
12
18
06
00
60
80
MLT

ORBIT 21710 (75/DEC/9)
DAY 343 OF YEAR 1975

FIRST SPIN U.T. $21^{H}10^{M}$
LAST SPIN U.T. $21^{H}21^{M}$

10 ANGSTROM BANDPASS INTENSITY

DATE PROCESSED: 79/NOV/05
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

80
150
300
600
1200
2400
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

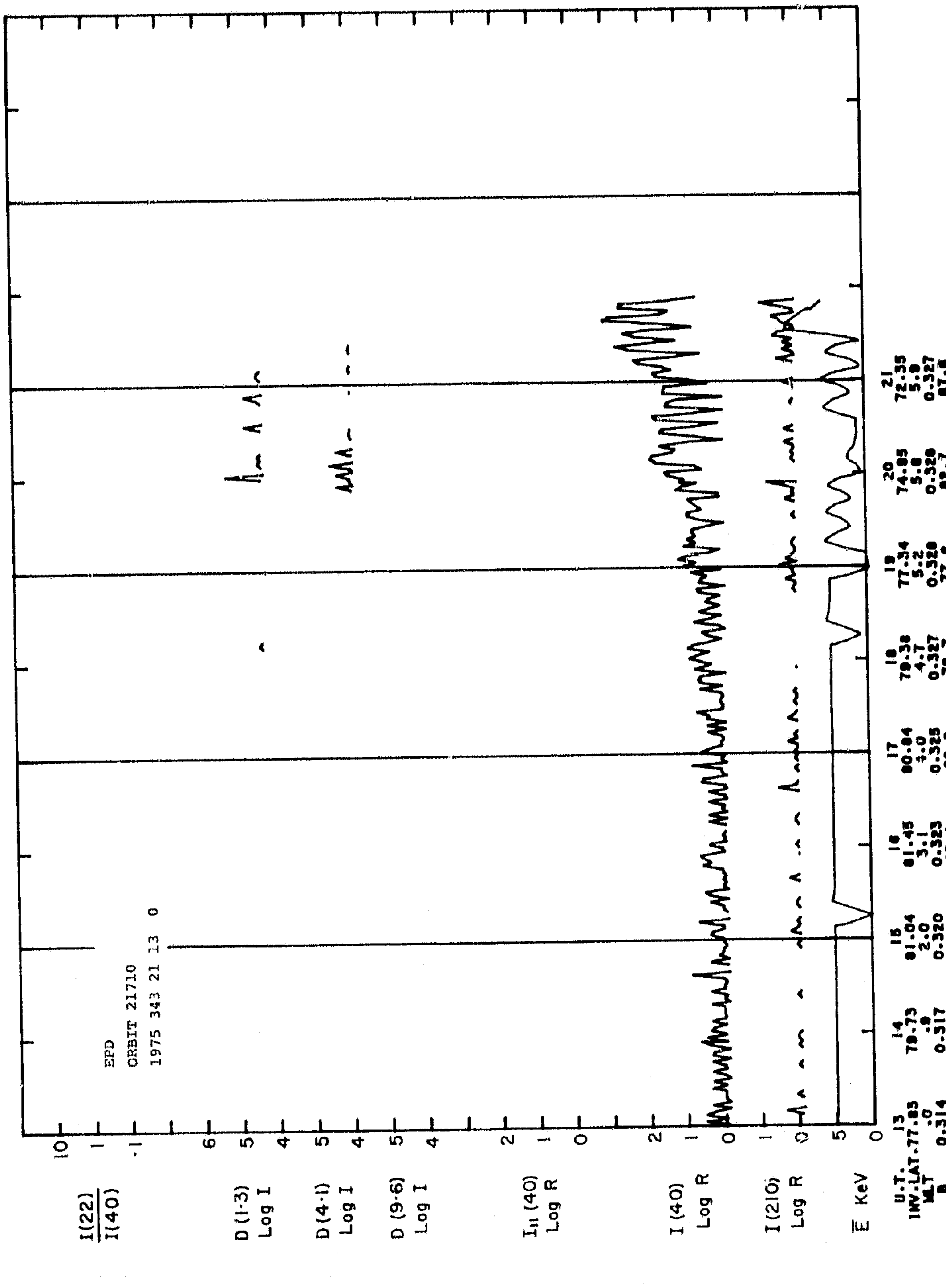
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	211013	71.0
2	211031	71.8
3	211055	72.8
4	211107	73.3
5	211125	74.1
6	211143	74.8
7	211201	75.6
8	211219	76.3
9	211237	77.0
10	211255	77.6
11	211313	78.3
12	211331	78.8
13	211349	79.4
14	211413	80.1
15	211425	80.4
16	211449	80.9
17	211501	81.0
18	211525	81.3
19	211537	81.4
20	211601	81.5
21	211619	81.4
22	211637	81.2
23	211655	80.9
24	211713	80.6
25	211731	80.2
26	211749	79.7
27	211807	79.2
28	211825	78.6
29	211843	78.0
30	211901	77.3
31	211919	76.7
32	211937	75.9
33	211955	75.2
34	212013	74.4
35	212031	73.7
36	212049	72.9
37	212107	72.1
38	212125	71.3

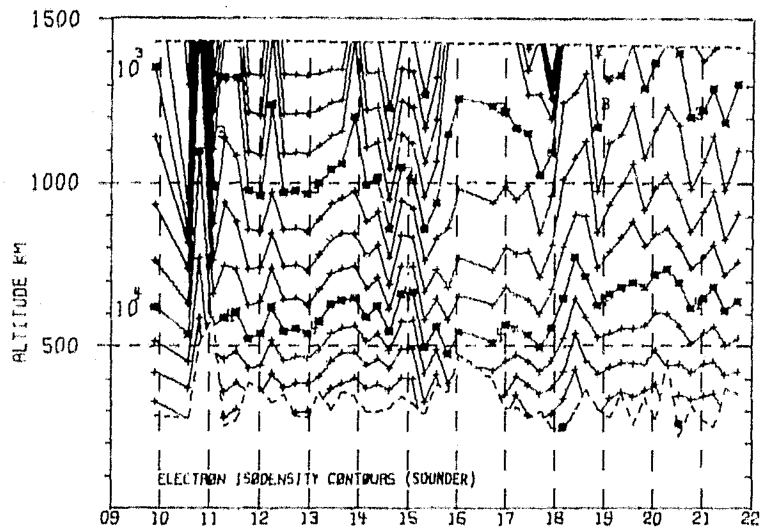
ISIS-II RED LINE PHOTOMETER CRESS - YORK UNIVERSITY

HRT Y00481
FILE 21

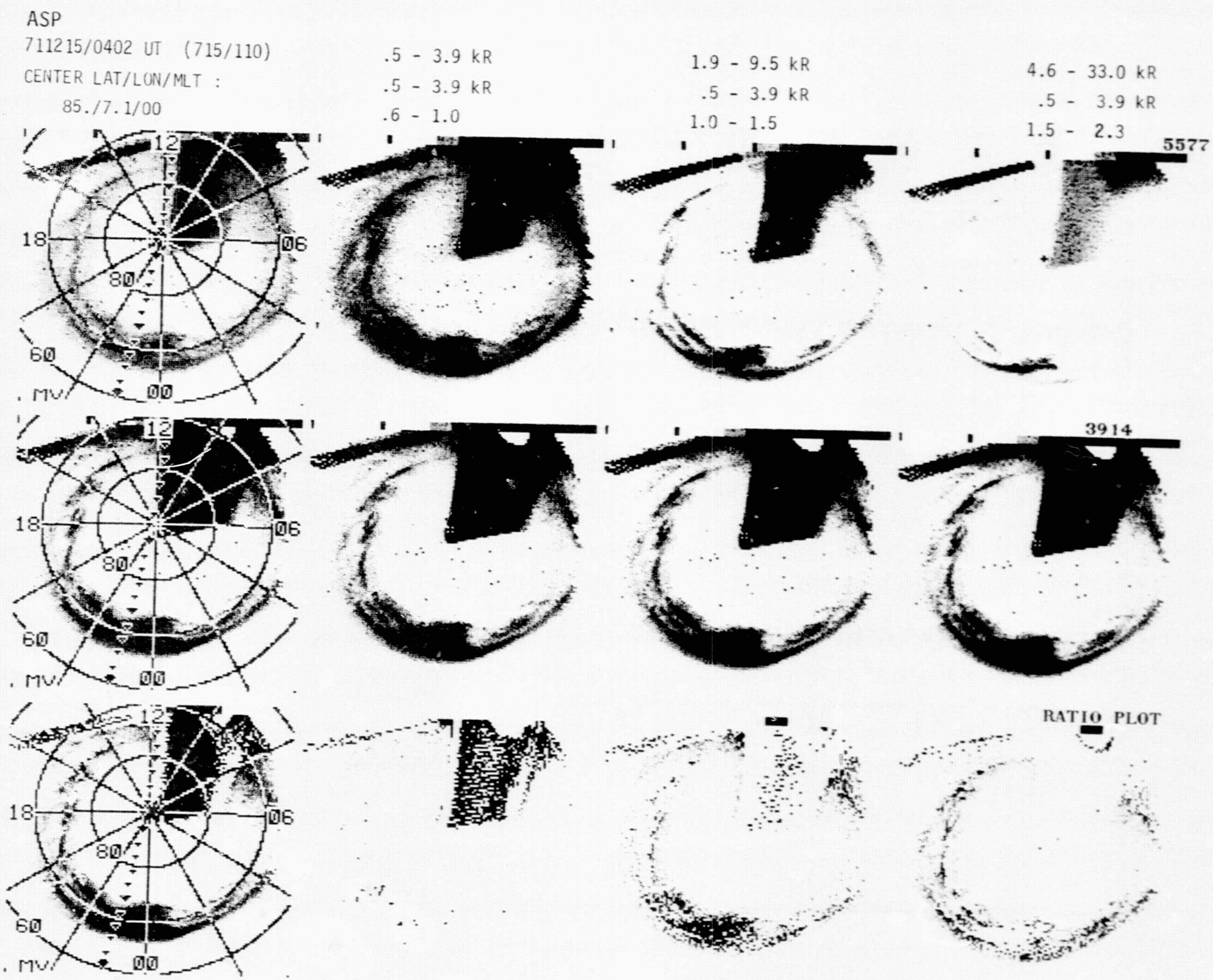
SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

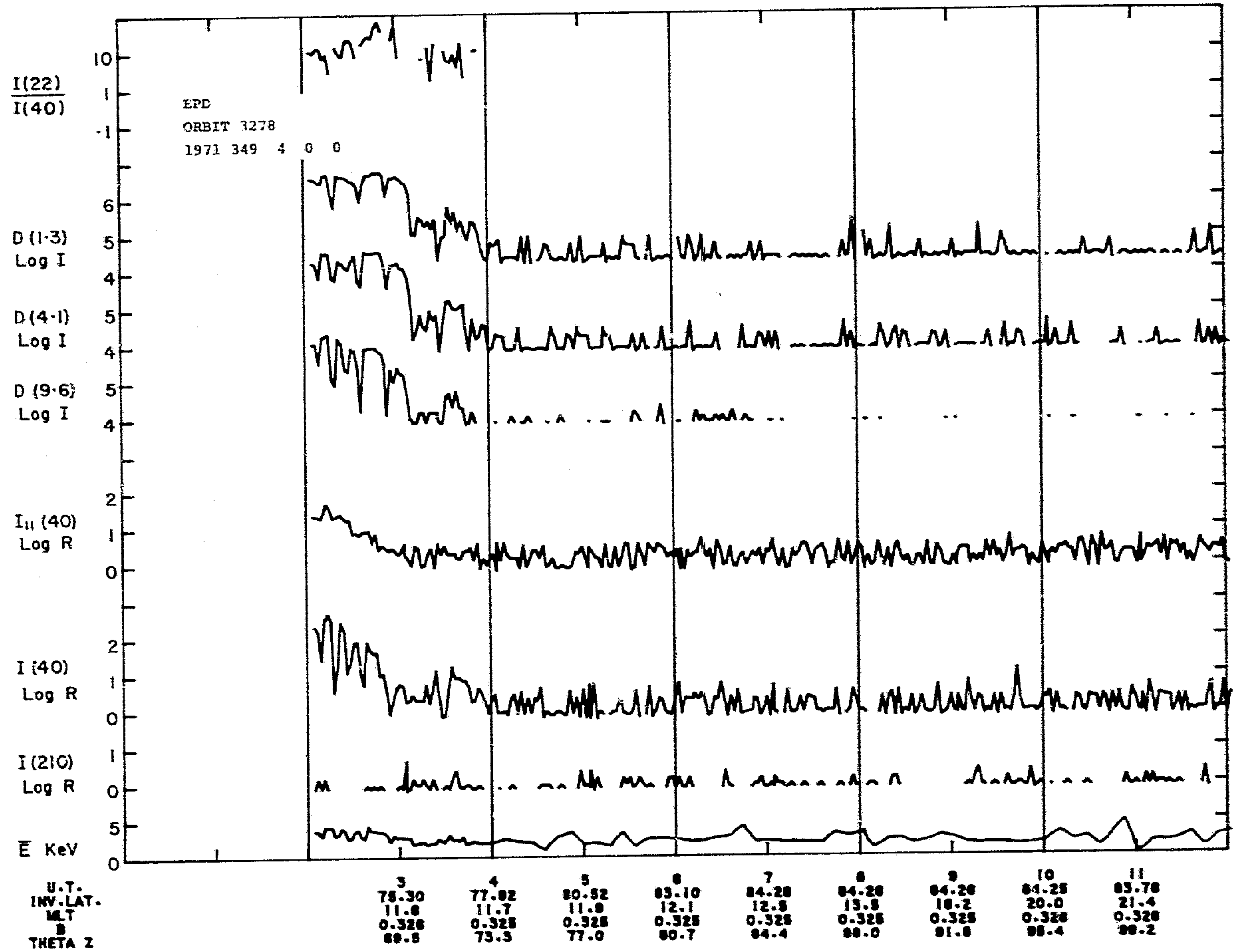
RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED


EPD
ORBIT 21710
1975 343 21 13 0
I(22) / I(40)
D (1·3) Log I
D (4·1) Log I
D (9·6) Log I
I₁₁ (40) Log R
I (40) Log R
I (210) Log R
Ē KeV
U.T.
INV.LAT.
MLT
B
THETA Z

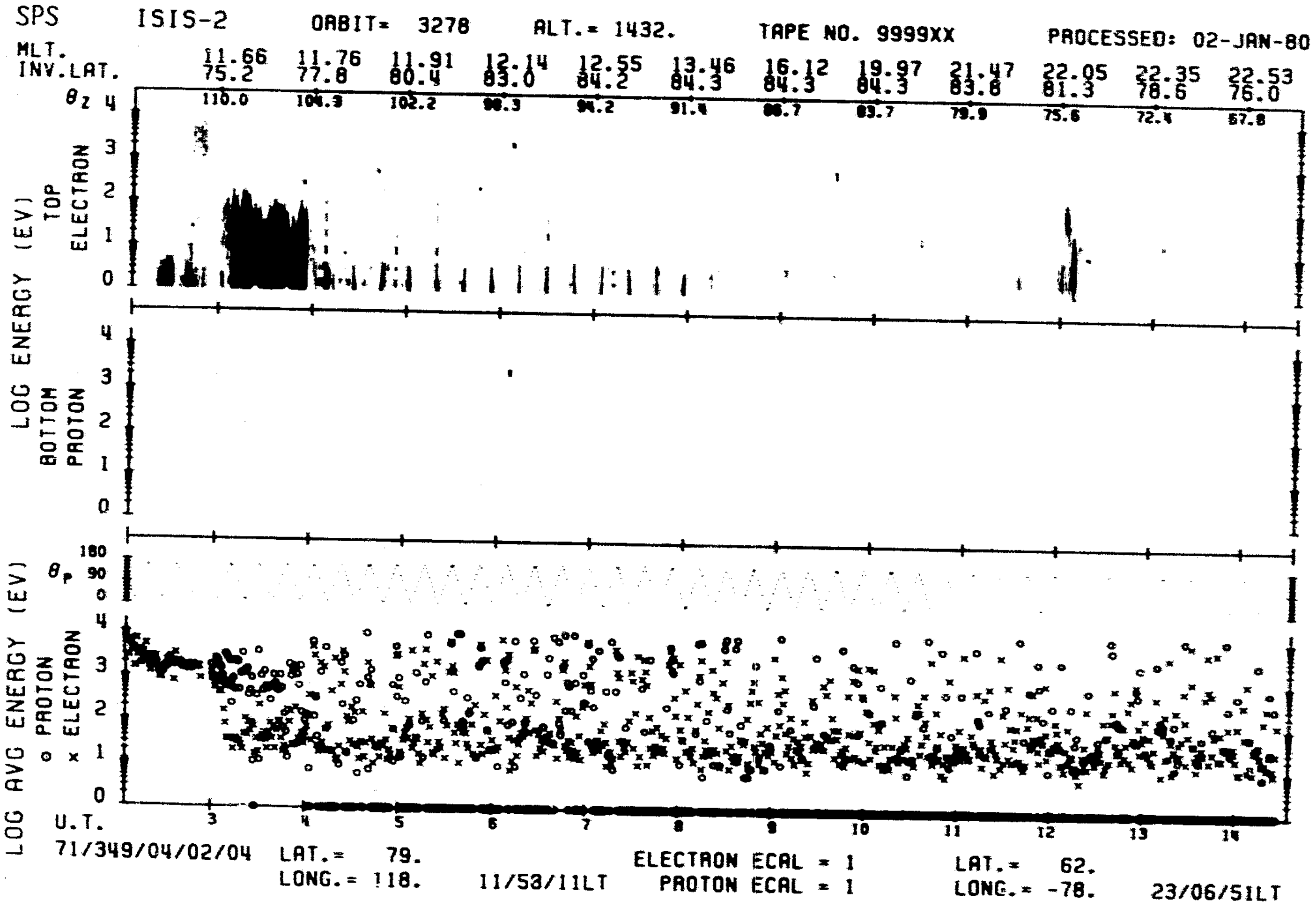


1500
1000
500
ALTITUDE KM
10^3
10^4
ELECTRON ISODENSITY CONTOURS (SOUNDER)
09 10 11 12 13 14 15 16 17 18 19 20 21 22
YEAR 1975 DAY 343 UT 2109

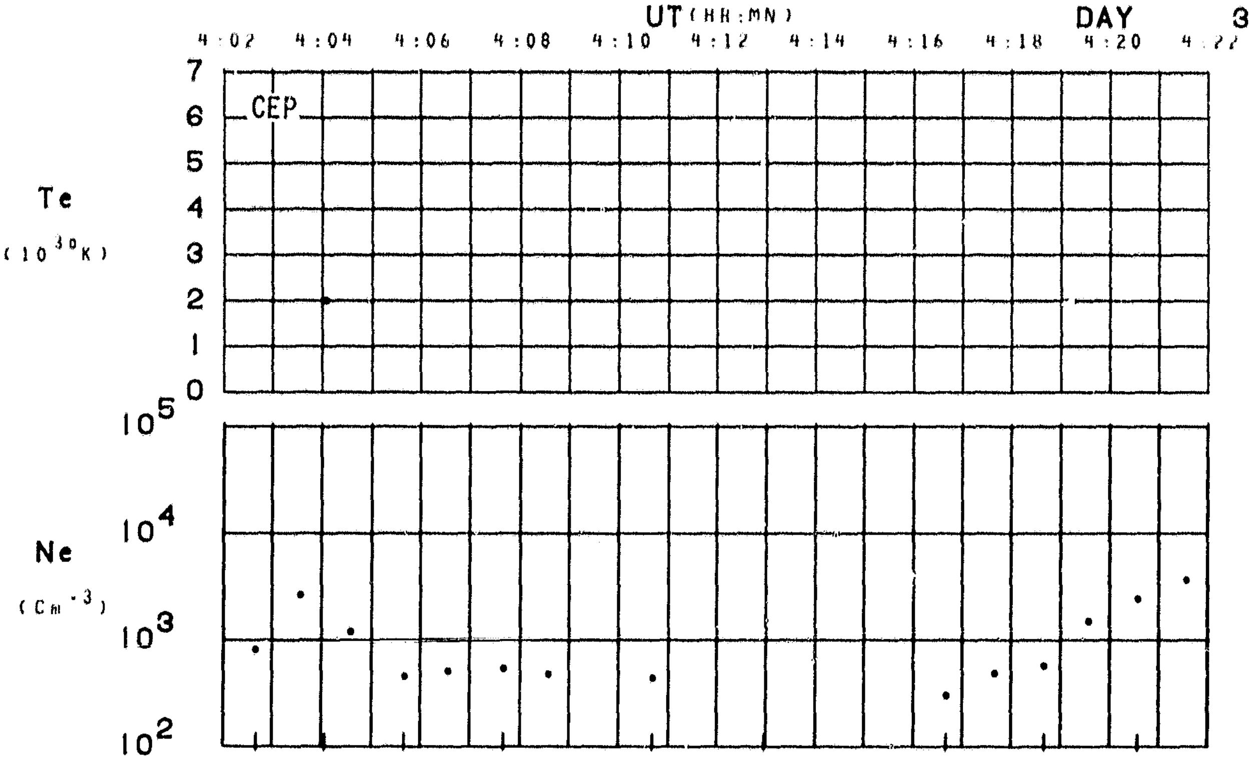

ASP
711215/0402 UT (715/110)
CENTER LAT/LON/MLT :
85./7.1/00
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT
12
18
06
80
60
00
MV



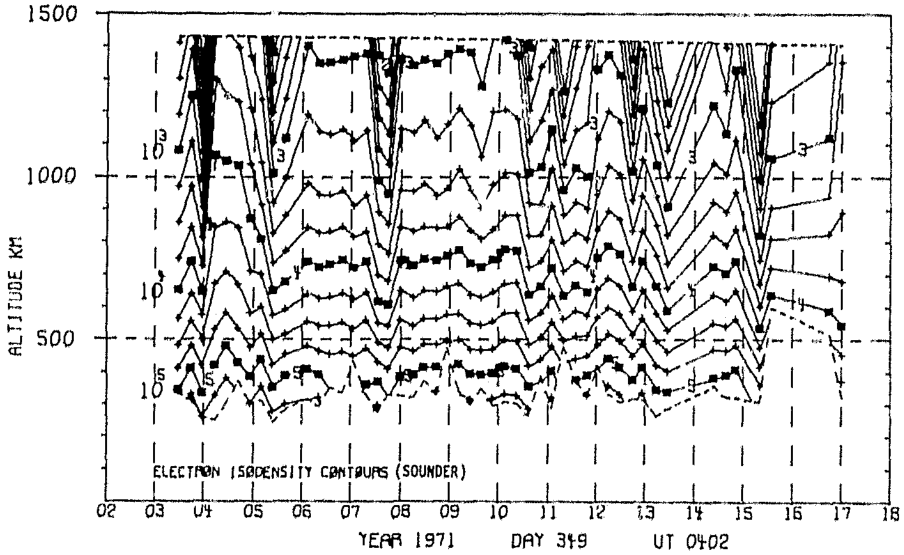
EPD
ORBIT 3278
1971 349 4 0 0
I(22)/I(40)
D (1·3) Log I
D (4·1) Log I
D (9·6) Log I
I∥ (40) Log R
I (40) Log R
I (210) Log R
Ē KeV
U.T.
INV.LAT.
MLT
B
THETA Z
3 78.30 11.6 0.326 69.5
4 77.82 11.7 0.325 73.3
5 80.52 11.8 0.325 77.0
6 83.10 12.1 0.325 80.7
7 84.28 12.5 0.325 84.4
8 84.28 13.5 0.325 88.0
9 84.28 16.2 0.325 91.6
10 84.25 20.0 0.328 95.4
11 83.78 21.4 0.326 99.2

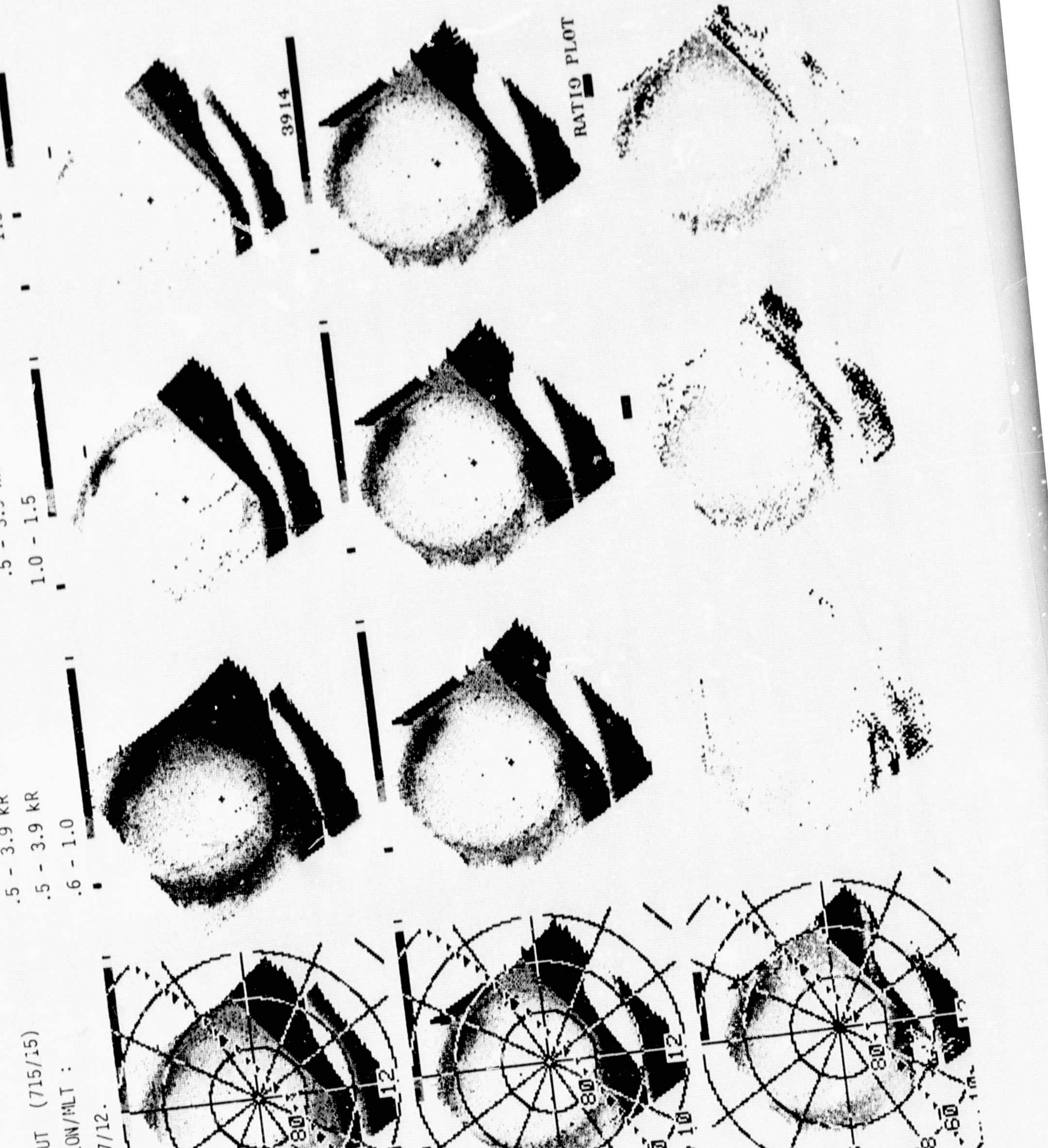

SPS
ISIS-2
ORBIT= 3278
ALT.= 1432.
TAPE NO. 9999XX
PROCESSED: 02-JAN-80
MLT.
INV.LAT.
11.66 75.2
11.76 77.8
11.91 80.4
12.14 83.0
12.55 84.2
13.46 84.3
16.12 84.3
19.97 84.3
21.47 83.8
22.05 81.3
22.35 78.6
22.53 76.0
110.0
104.3
102.2
98.3
94.2
91.4
86.7
83.7
79.9
75.6
72.4
67.8
LOG ENERGY (EV)
TOP ELECTRON
BOTTOM PROTON
LOG AVG ENERGY (EV)
o PROTON
x ELECTRON
U.T.
71/349/04/02/04
LAT.= 79.
LONG.= 118.
11/53/11LT
ELECTRON ECAL = 1
PROTON ECAL = 1
LAT.= 62.
LONG.= -78.
23/06/51LT

ORBIT 3278
DATE 711215
DAY 349



LAT	80	84	87	83	73	66	55	48	42
LONG	119	129	-152	-88	-80	-78	-77	-77	-77
LT	12:06	12:45	18:01	22:20	22:55	23:03	23:10	23:12	23:14
DIP	85	86	88	89	87	84	79	75	71
DIPLAT	80	83	86	88	84	79	68	62	56
L	13.9	23.5	57.4	101.7	93.1	25.7	7.7	5.0	3.7
INVLAT	74	78	82	84	84	78	68	63	58
ZA	103	108	113	119	128	135	147	153	158



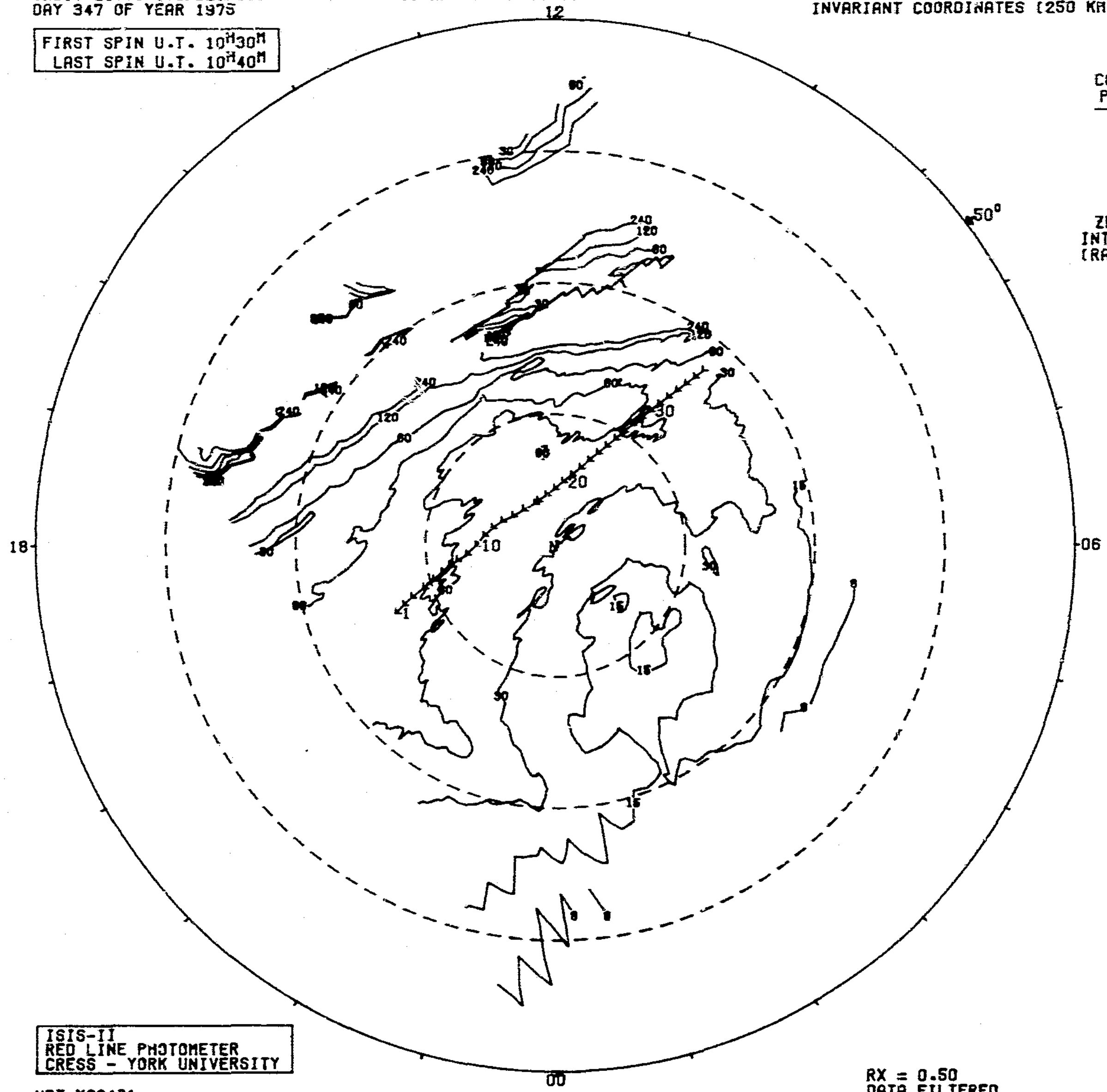

ASP
751213/1030 UT (715/15)
CENTER LAT/LON/MLT :
90./84.7/12.
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT

ORBIT 21755 (75/DEC/13)
DAY 347 OF YEAR 1975

10 ANGSTROM BANDPASS INTENSITY

DATE PROCESSED: 79/NOV/05
INVARIANT COORDINATES (250 KM.)

FIRST SPIN U.T. $10^{H}30^{M}$
LAST SPIN U.T. $10^{H}40^{M}$



CONTOURS PLOTTED

80
150
300
600
1200
2400
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

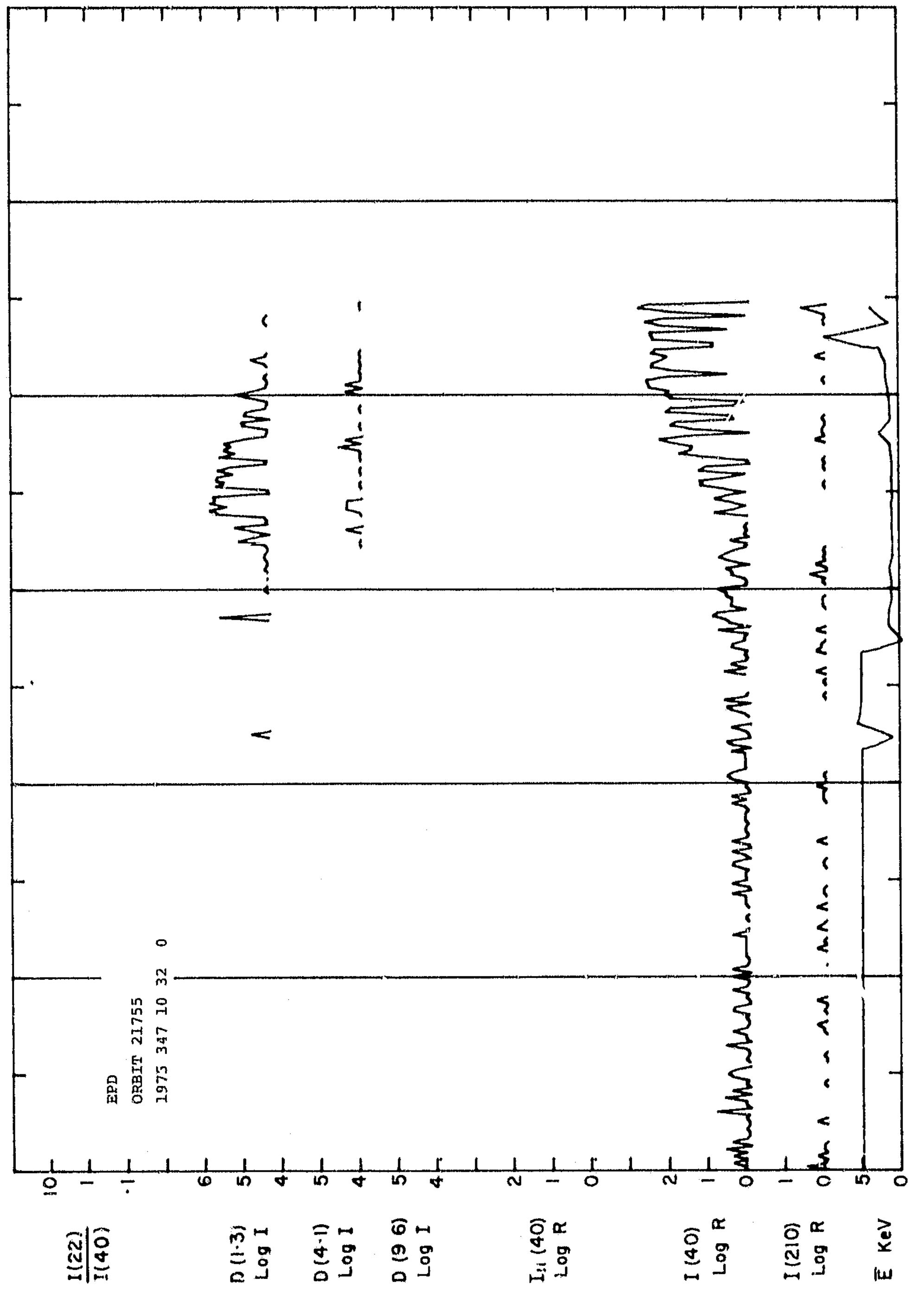
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	103001	76.9
2	103019	77.7
3	103037	78.5
4	103101	79.6
5	103119	80.4
6	103137	81.1
7	103155	81.9
8	103213	82.8
9	103231	83.6
10	103249	84.1
11	103307	84.3
12	103325	84.4
13	103343	84.3
14	103401	84.3
15	103419	84.2
16	103437	84.2
17	103455	84.3
18	103513	84.3
19	103531	84.4
20	103549	84.4
21	103607	84.2
22	103625	83.7
23	103643	83.0
24	103701	82.0
25	103719	81.2
26	103737	80.4
27	103755	79.7
28	103813	78.9
29	103831	78.1
30	103849	77.3
31	103907	76.5
32	103925	75.7
33	103943	74.9
34	104001	74.1
35	104019	73.3
36	104037	72.5

ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

HRT Y00481
FILE 22

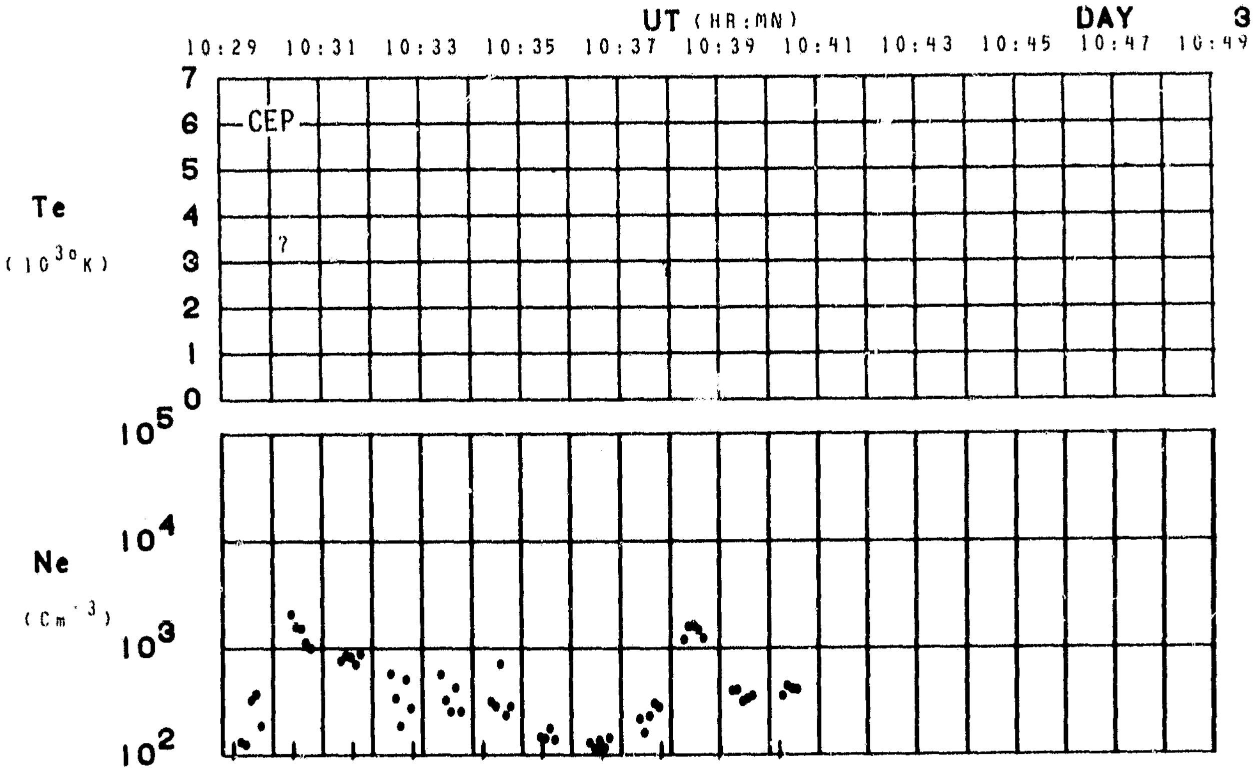
SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

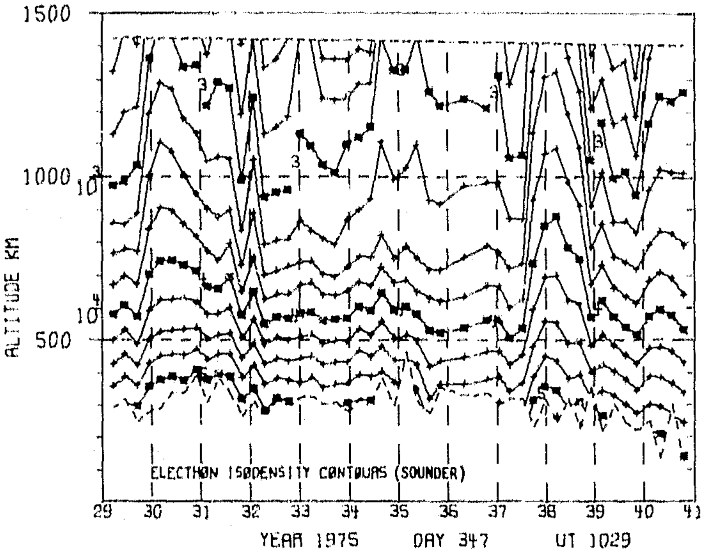


EPD
ORBIT 21755
1975 347 10 32 0
I(22) / I(40)
D(1-3) Log I
D(4-1) Log I
D(9 6) Log I
I∥(40) Log R
I(40) Log R
I(210) Log R
E KeV
U.T. 32 33 34 35 36 37 38 39 40
INV.LAT. 82.23 84.27 84.25 84.26 84.24 82.00 79.45 76.80 74.11
MLT 18.8 18.4 17.6 15.7 12.5 10.8 9.7 9.3 9.0
B 0.327 0.328 0.325 0.324 0.322 0.321 0.319 0.317 0.314
THETA Z 65.3 68.7 74.2 78.8 83.1 87.7 92.3 96.7 101.4

ORBIT21755
DATE 751213
DAY 347

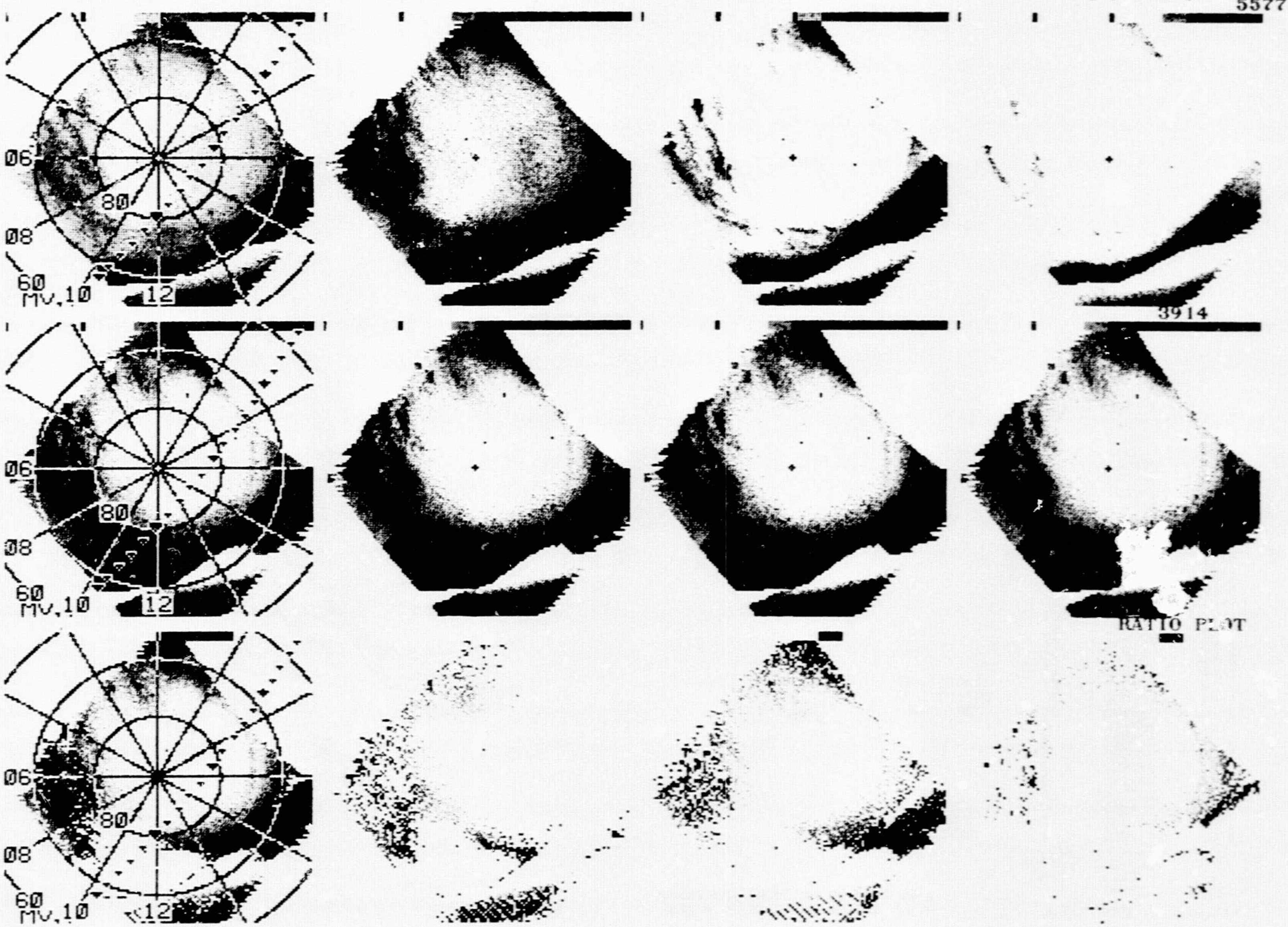


LAT	80	83	87	87	83	79	76	72	68	64
LONG	151	156	-176	-89	-57	-51	-48	-47	-46	-45
LT	20:40	21:04	22:52	4:39	6:51	7:16	7:28	7:35	7:39	7:42
DIP	84	86	87	88	87	85	84	82	81	79
DIPLAT	78	82	85	86	84	81	78	75	72	69
L	14.4	23.2	42.2	94.5	99.3	103.5	71.9	33.0	19.2	12.5
INVLAT	74	78	81	84	84	84	83	79	76	73
ZA	119	117	115	113	111	109	107	105	102	100



ASP
751203/0954 UT (716/2)
CENTER LAT/LON/MLT :
90./92.4/12.

.5 - 3.9 kR	1.9 - 9.5 kR	4.6 - 33.0 kR
.5 - 3.9 kR	.5 - 3.9 kR	.5 - 3.9 kR
.6 - 1.0	1.0 - 1.5	1.5 - 2.3

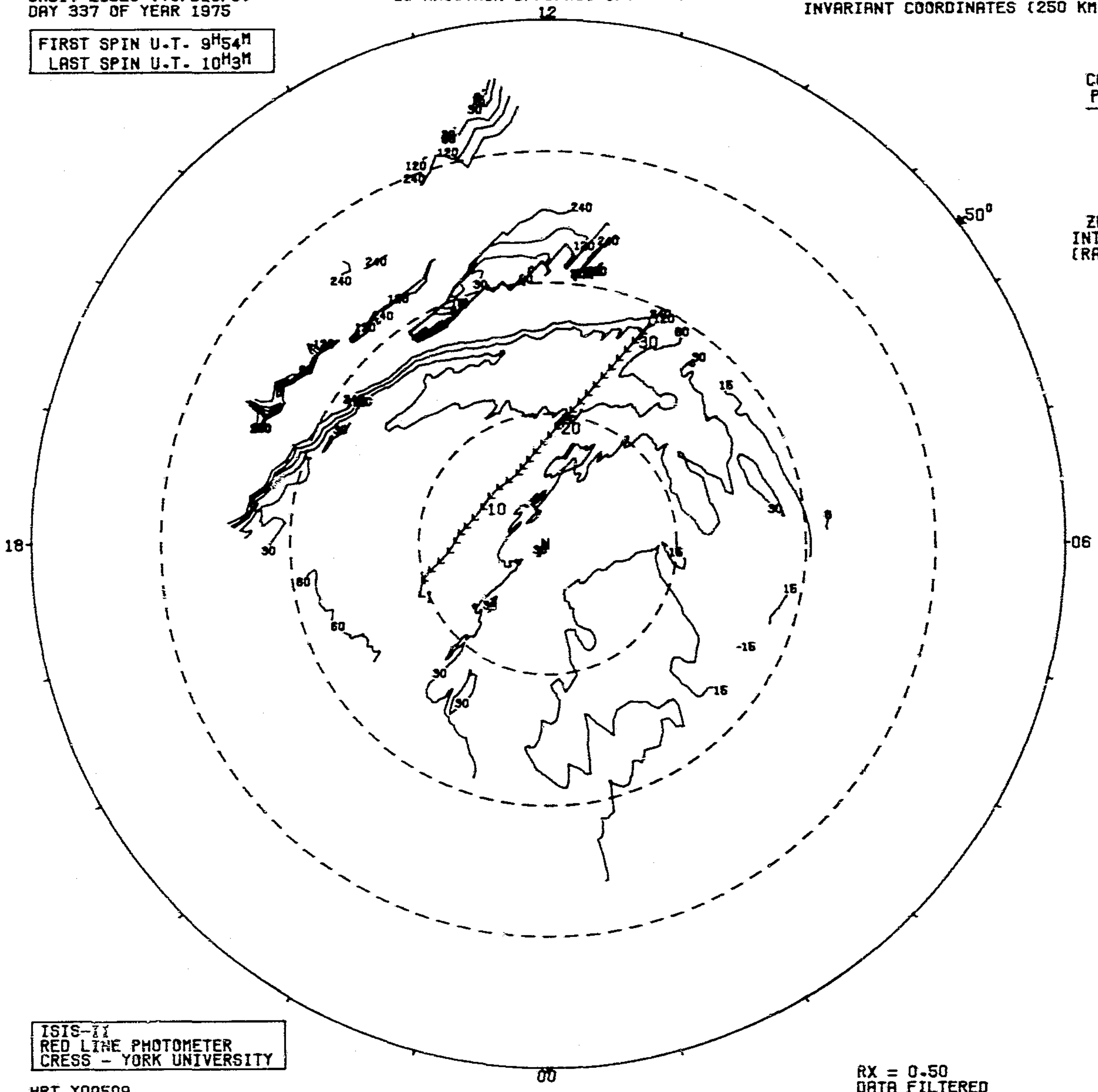


ORBIT 21528 (75/DEC/3)
DAY 337 OF YEAR 1975

FIRST SPIN U.T. $9^{H}54^{M}$
LAST SPIN U.T. $10^{H}3^{M}$

10 ANGSTROM BANDPASS INTENSITY

DATE PROCESSED: 79/OCT/17
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

80
150
300
600
1200
2400
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	095410	79.4
2	095428	80.1
3	095446	80.8
4	095504	81.6
5	095522	82.4
6	095540	83.0
7	095558	83.4
8	095616	83.8
9	095634	84.0
10	095652	84.2
11	095710	84.3
12	095728	84.4
13	095746	84.4
14	095804	84.2
15	095822	83.9
16	095840	83.4
17	095858	82.7
18	095916	82.1
19	095934	81.4
20	095952	80.8
21	100010	80.0
22	100028	79.3
23	100046	78.5
24	100104	77.7
25	100122	77.0
26	100140	76.2
27	100158	75.4
28	100216	74.5
29	100234	73.7
30	100252	72.9
31	100310	72.1
32	100328	71.2

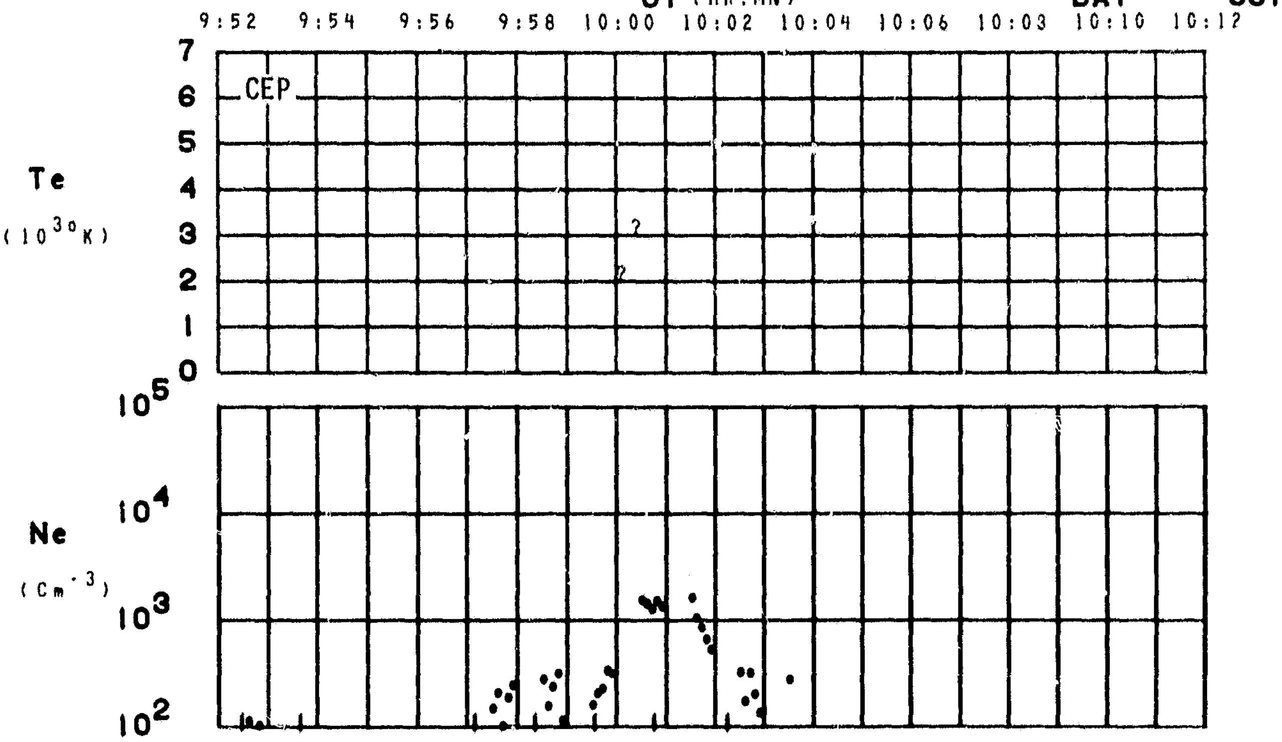
ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

HRT Y00509
FILE 51

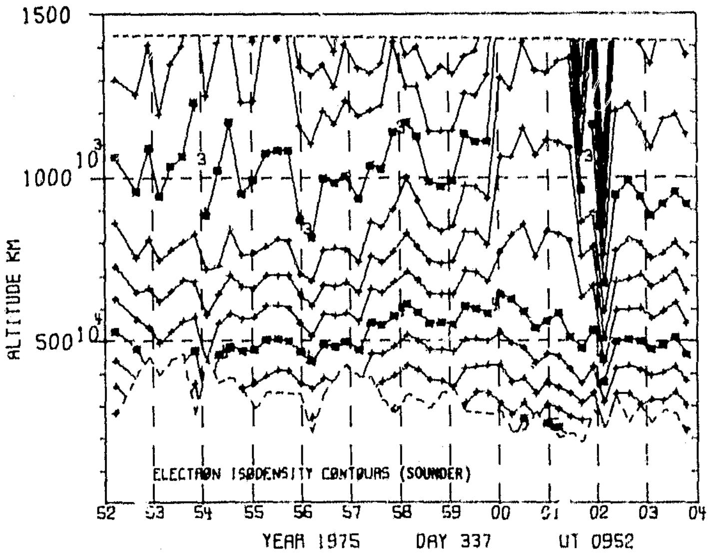
SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

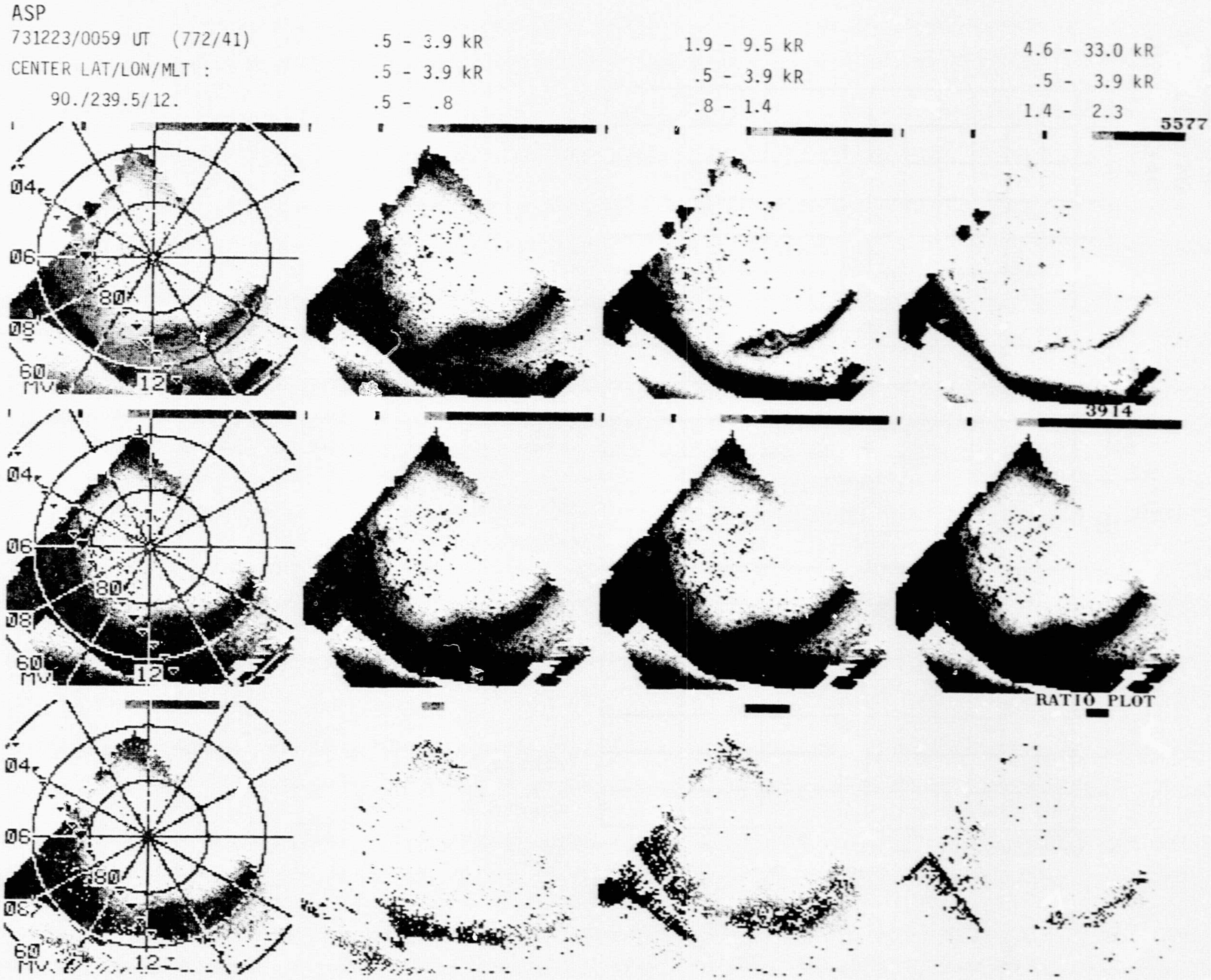
RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

ORBIT 21628
DATE 751203
DAY 337



LAT	79	82	85	82	78	74	69
LONG	171	175	-43	-33	-29	-27	-25
LT	21:26	21:47	7:15	7:54	8:13	8:22	8:28
DIP	83	85	87	85	83	81	79
DIPLAT	77	81	84	81	77	74	69
L	14.6	23.4	101.9	88.0	45.0	25.2	14.1
INVLAT	74	78	84	83	81	78	74
ZA	120	118	110	108	105	102	99



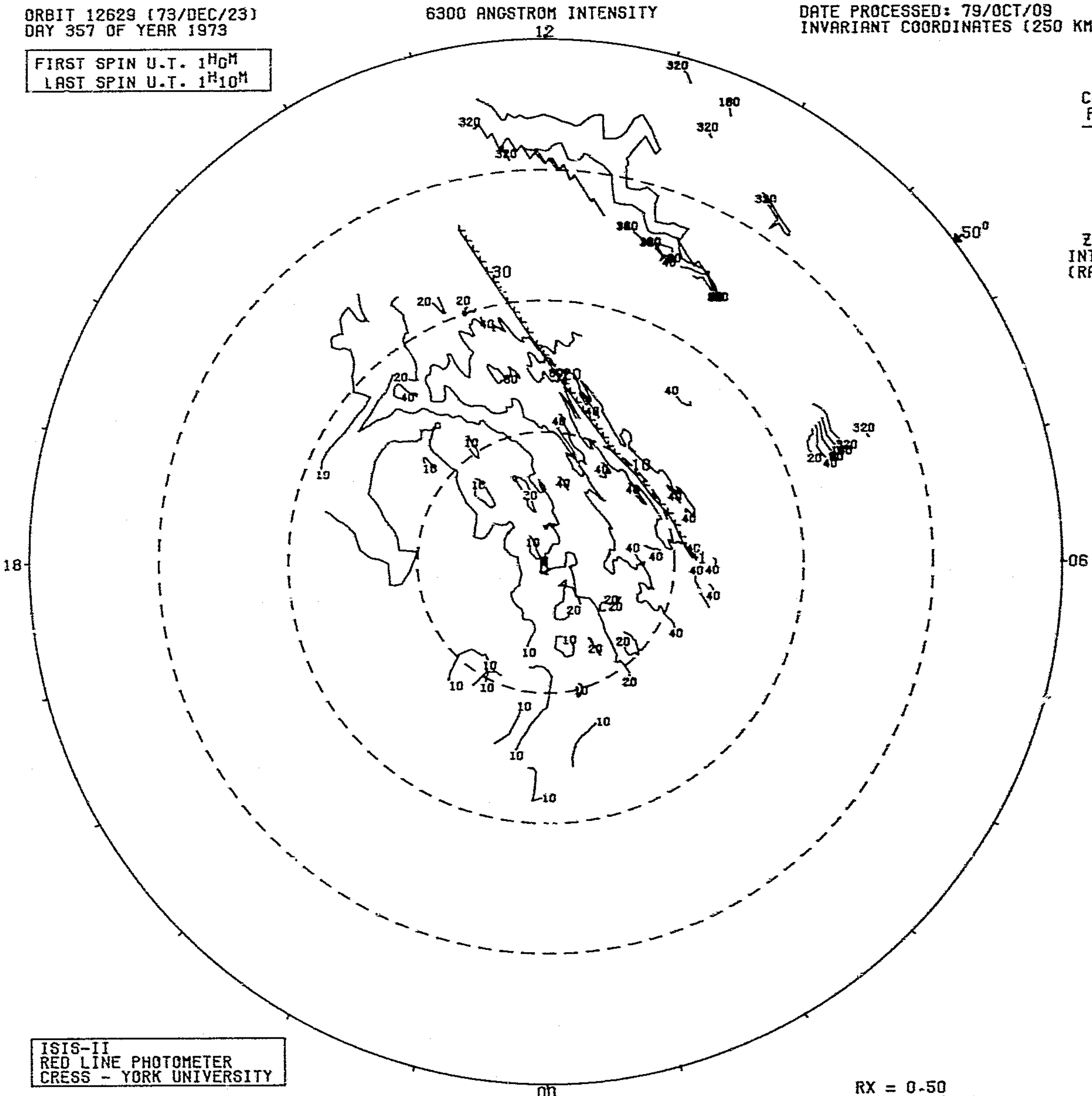

ASP
731223/0059 UT (772/41)
CENTER LAT/LON/MLT :
90./239.5/12.
.5 - 3.9 kR
.5 - 3.9 kR
.5 - .8
1.9 - 9.5 kR
.5 - 3.9 kR
.8 - 1.4
4.6 - 33.0 kR
.5 - 3.9 kR
1.4 - 2.3
5577
3914
RATIO PLOT
04
06
08
60
MV
80
12
087

ORBIT 12629 (73/DEC/23)
DAY 357 OF YEAR 1973

FIRST SPIN U.T. $1^{H}6^{M}$
LAST SPIN U.T. $1^{H}10^{M}$

6300 ANGSTROM INTENSITY

DATE PROCESSED: 79/OCT/09
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

100
200
400
800
1600
3200
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

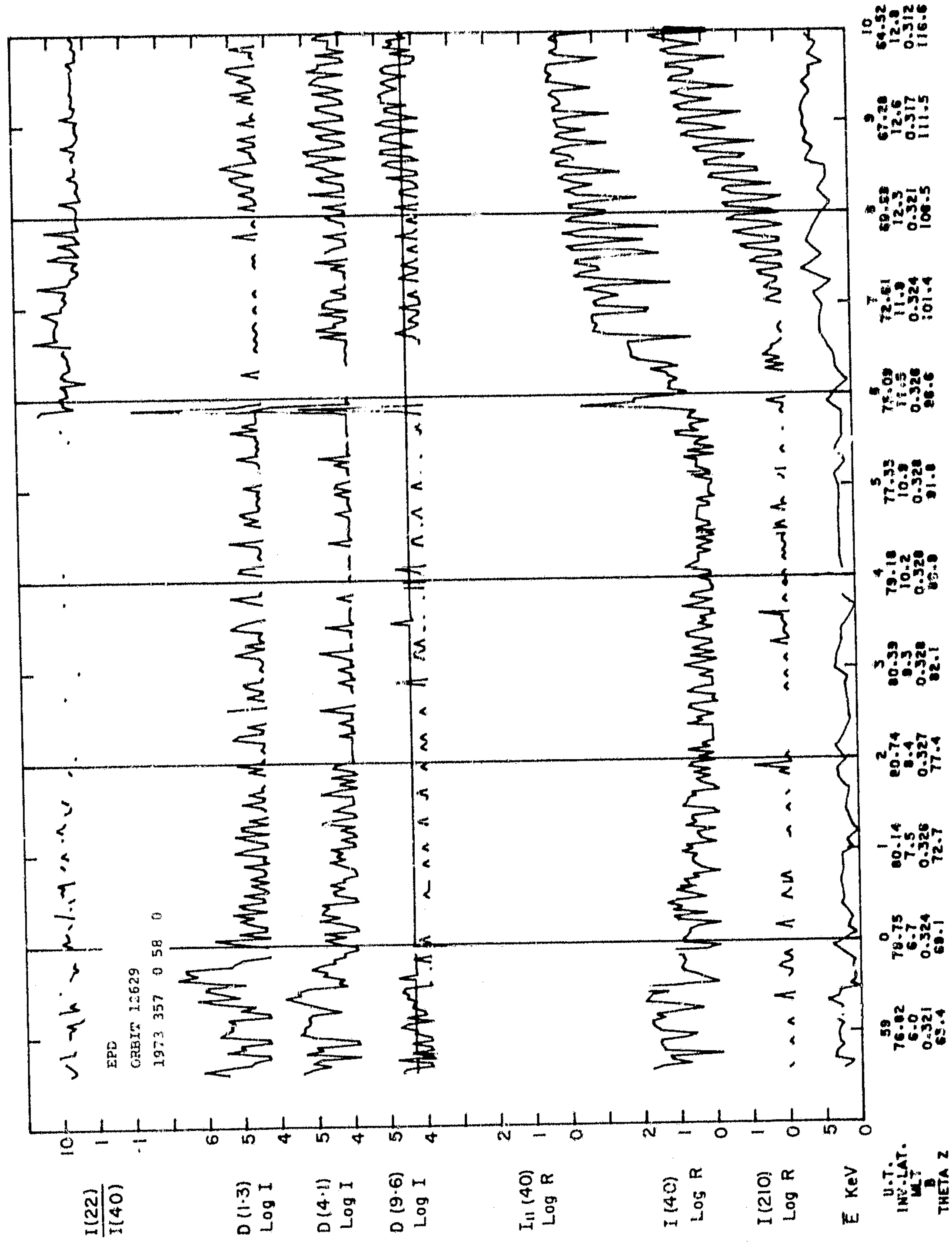
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	010018	79.2
2	010036	79.7
3	010054	80.0
4	010112	80.3
5	010130	80.5
6	010148	80.7
7	010206	80.8
8	010230	80.7
9	010248	80.5
10	010306	80.3
11	010324	80.0
12	010342	79.7
13	010360	79.2
14	010418	78.7
15	010436	78.2
16	010454	77.6
17	010512	76.9
18	010530	76.3
19	010548	75.6
20	010606	74.9
21	010624	74.2
22	010642	73.4
23	010660	72.7
24	010724	71.6
25	010742	70.8
26	010760	70.0
27	010818	69.2
28	010836	68.4
29	010854	67.6
30	010912	66.8
31	010930	66.0
32	010948	65.1
33	011006	64.3
34	011024	63.5

ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

HRT Y00504
FILE 11

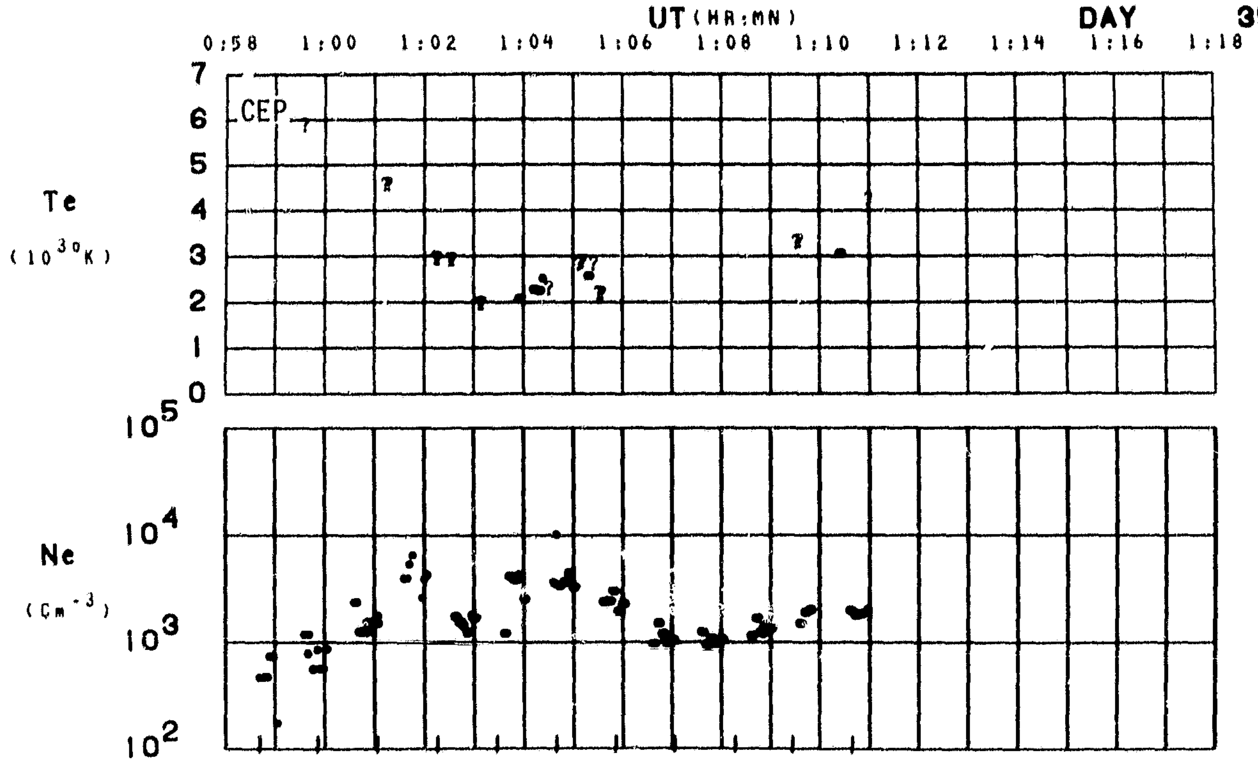
SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

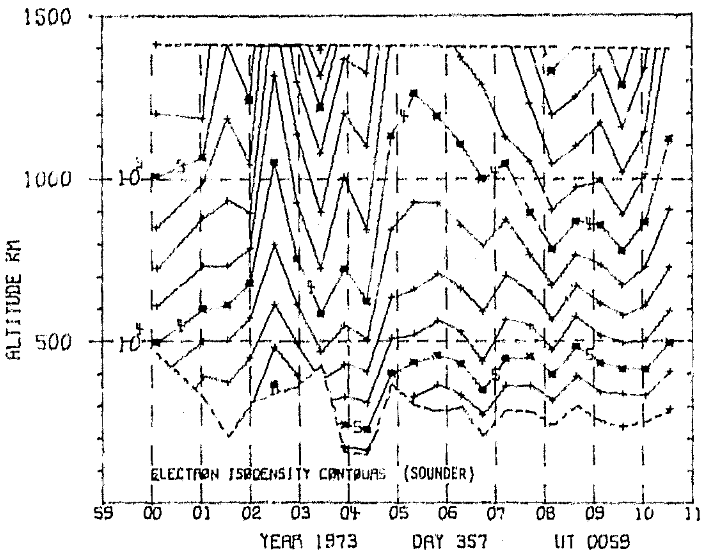


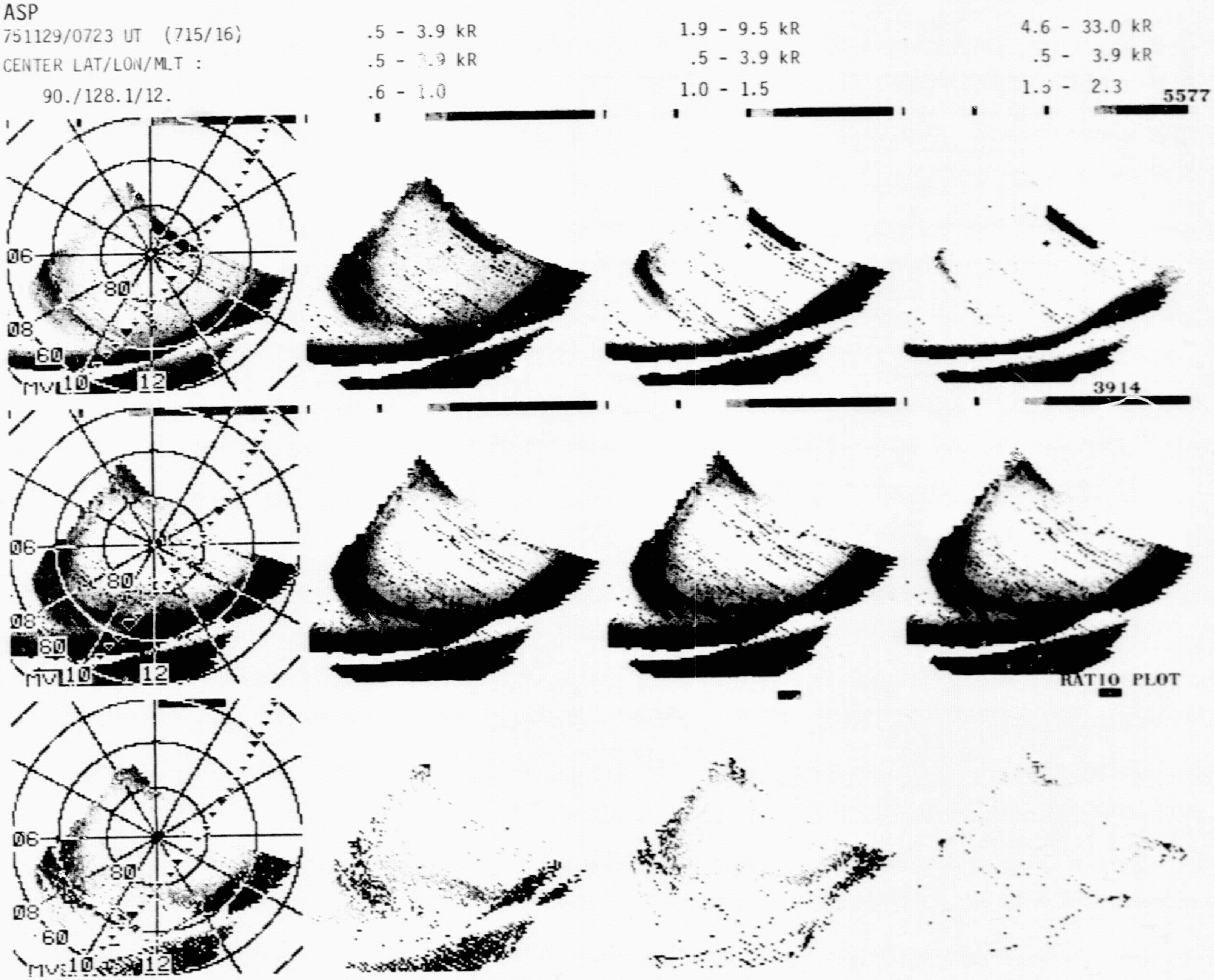
I(22)/I(40)
D(1·3) Log I
D(4·1) Log I
D(9·6) Log I
I∥(40) Log R
I(40) Log R
I(210) Log R
Ē KeV
U.T.
INV.LAT.
MLT
B
THETA Z
EPD
ORBIT 12629
1973 357 0 58 0
59 76.82 6.0 0.321 65.4
0 78.75 6.7 0.324 68.1
1 80.14 7.5 0.326 72.7
2 80.74 8.4 0.327 77.4
3 80.39 9.3 0.328 82.1
4 79.18 10.2 0.328
5 77.35 10.8 0.328 91.8
6 11.5 0.326 96.6
7 72.61 11.9 0.324 101.4
8 69.58 12.3 0.321 106.5
9 67.28 12.6 0.317 111.5
10 64.52 12.8 0.312 116.6

ORBIT 12629
DATE 731223
DAY 357



LAT	80	83	87	87	84	80	76	72	69	65	61
LONG	39	45	71	160	-169	-163	-160	-159	-158	-158	-157
LT	3:37	4:04	5:48	11:45	13:45	14:10	14:23	14:30	14:35	14:38	14:40
DIP	83	85	86	87	86	85	83	80	78	76	73
DIPLAT	77	80	83	84	83	80	76	72	67	63	59
L	17.4	25.1	34.5	38.7	32.8	23.3	15.8	11.0	8.0	6.1	4.8
INVLAT	76	78	80	80	79	78	75	72	69	66	62
ZA	118	116	113	110	108	105	102	99	96	93	90





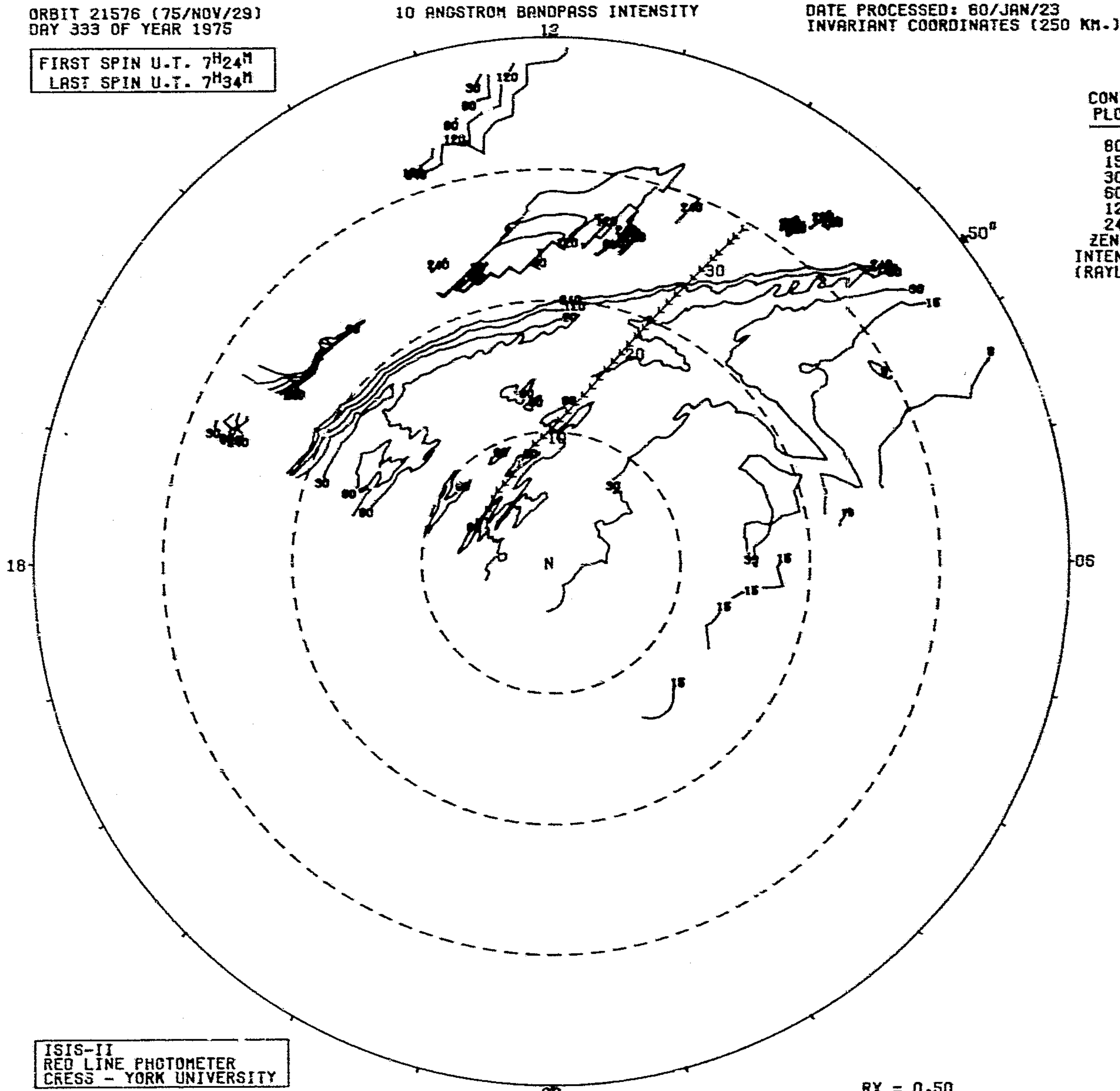
ASP
751129/0723 UT (715/16)
CENTER LAT/LON/MLT :
90./128.1/12.
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT
06
08
80
60
10
12
MV

ORBIT 21576 (75/NOV/29)
DAY 333 OF YEAR 1975

10 ANGSTROM BANDPASS INTENSITY

DATE PROCESSED: 80/JAN/23
INVARIANT COORDINATES (250 KM.)

FIRST SPIN U.T. $7^{H}24^{M}$
LAST SPIN U.T. $7^{H}34^{M}$



CONTOURS PLOTTED

80
150
300
600
1200
2400
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

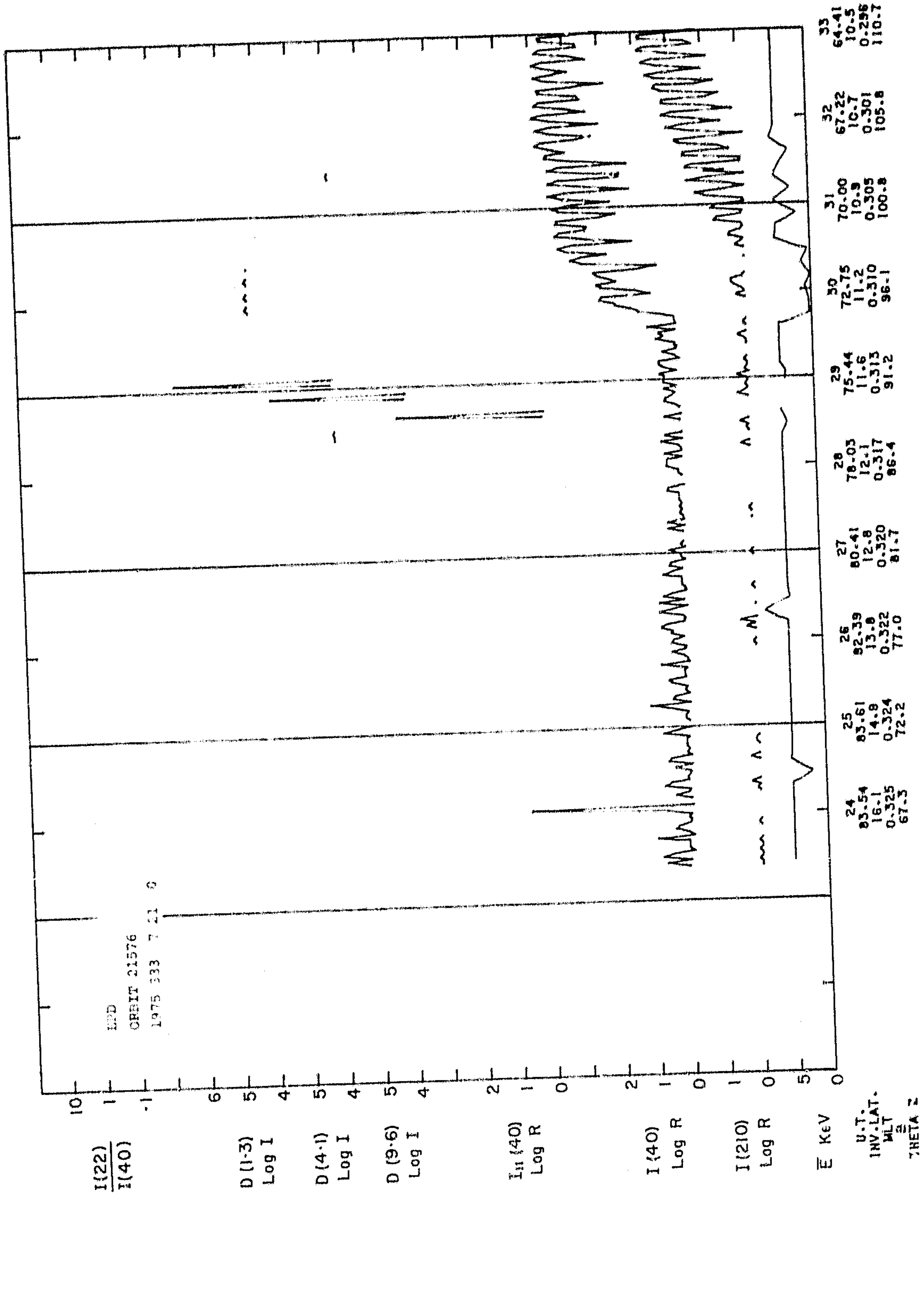
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	072405	83.6
2	072423	83.7
3	072441	83.7
4	072459	83.6
5	072517	83.4
6	072535	83.1
7	072553	82.6
8	072611	82.1
9	072629	81.5
10	072647	80.9
11	072705	80.2
12	072723	79.5
13	072741	78.8
14	072759	78.1
15	072817	77.3
16	072835	76.5
17	072853	75.8
18	072911	75.0
19	072929	74.2
20	072947	73.3
21	073005	72.5
22	073023	71.7
23	073041	70.9
24	073059	70.1
25	073117	69.2
26	073135	68.4
27	073153	67.5
28	073211	66.7
29	073229	65.9
30	073247	65.0
31	073311	63.9
32	073323	63.3
33	073347	62.2
34	073359	61.6
35	073417	60.8

ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

HRT Y00255
FILE 68

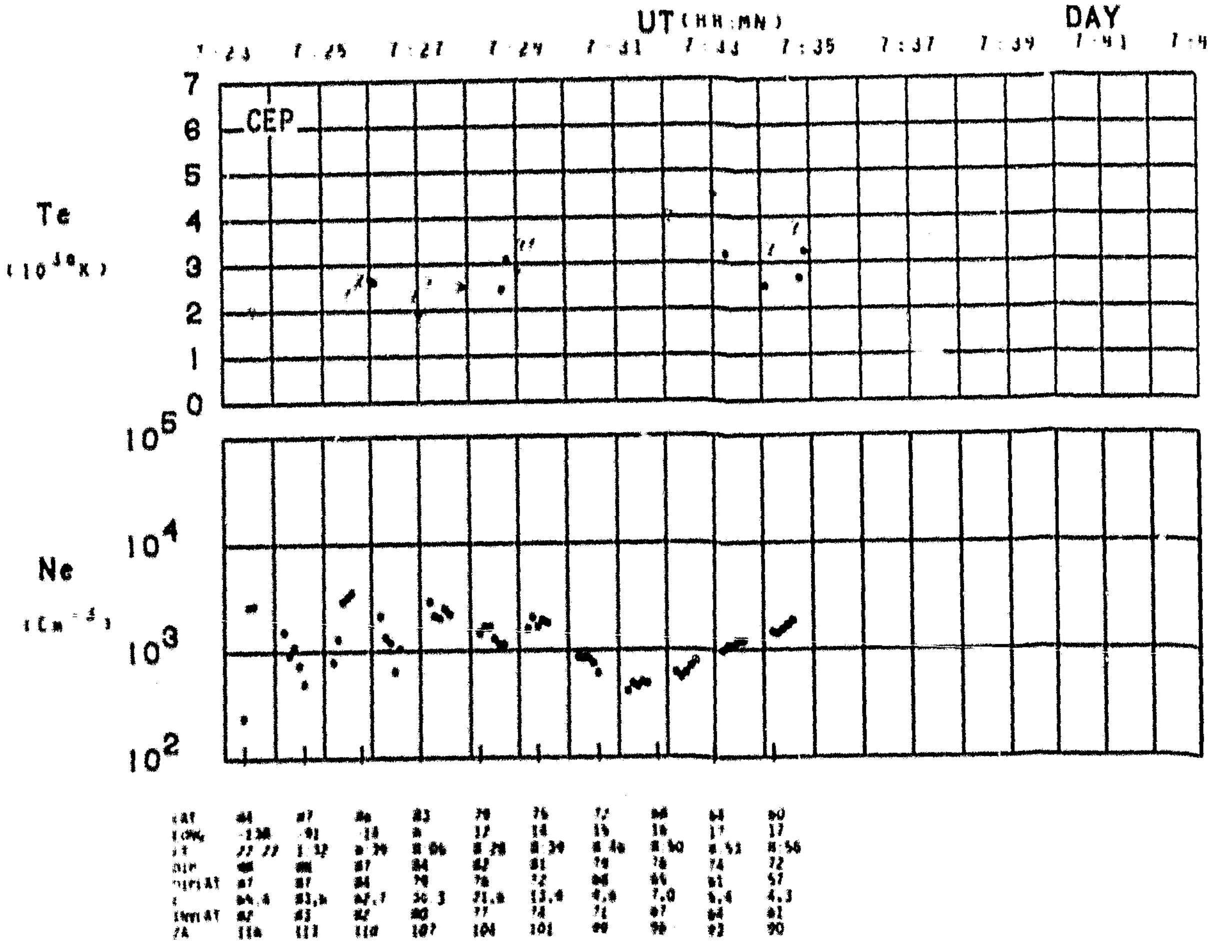
SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

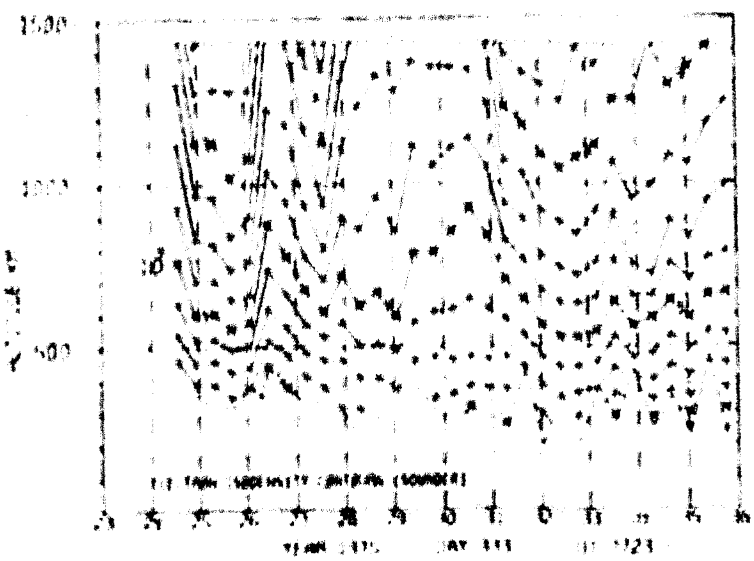
RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

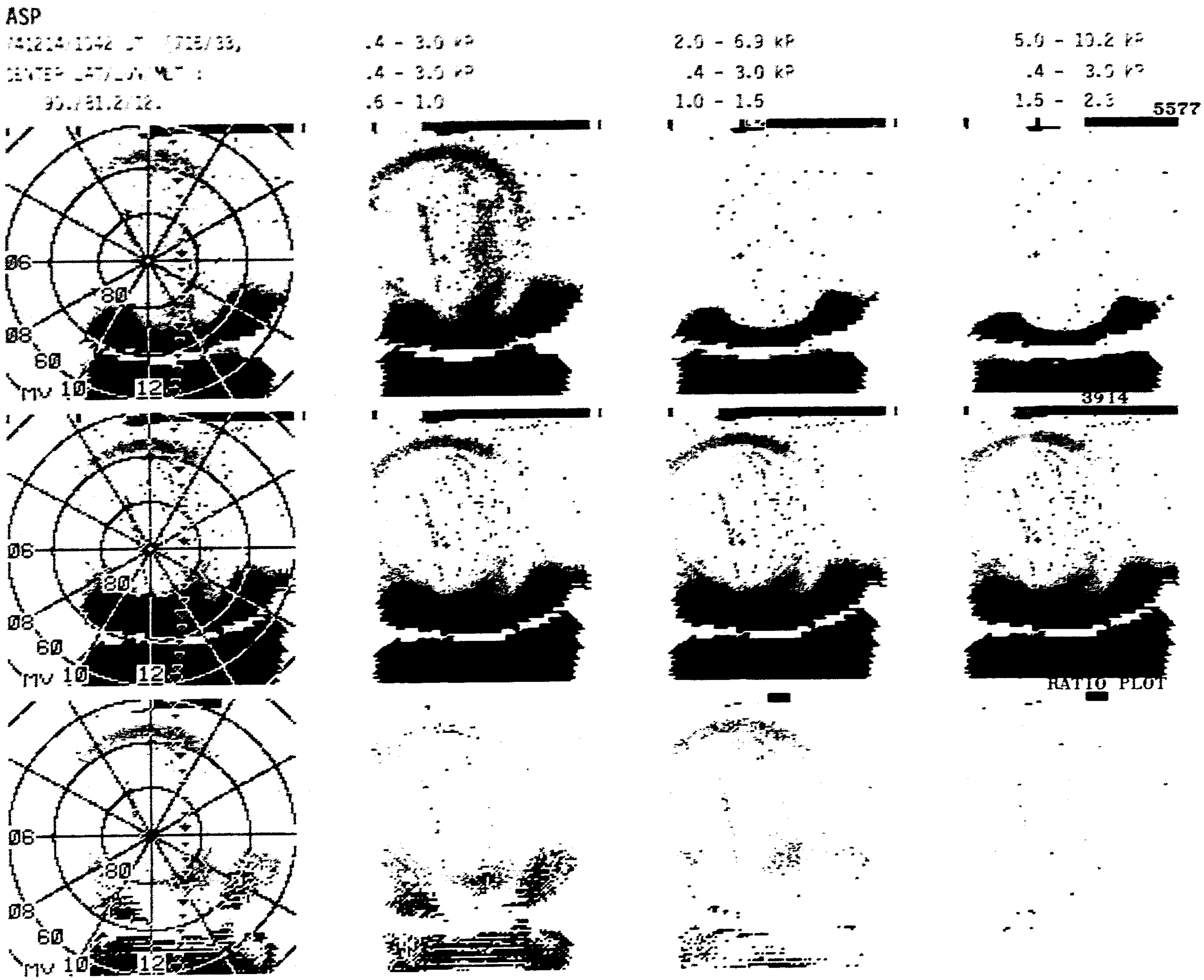


I(22)/I(40)
D(1-3) Log I
D(4·1) Log I
D(9·6) Log I
I11(40) Log R
I(40) Log R
I(210) Log R
Ē KeV
U.T.
INV.LAT.
MLT
THETA Z
ORBIT 21576
1975 333 7 21 0
24 83.54 16.1 0.325 67.3
25 83.61 14.8 0.324 72.2
26 82.39 13.8 0.322 77.0
27 80.41 12.8 0.320 81.7
28 78.03 12.1 0.317 86.4
29 75.44 11.6 0.313 91.2
30 72.75 11.2 0.310 96.1
31 70.00 10.9 0.305 100.8
32 67.22 10.7 0.301 105.8
33 64.41 10.5 0.296 110.7

ORBIT21576
DATE 751129
DAY 333





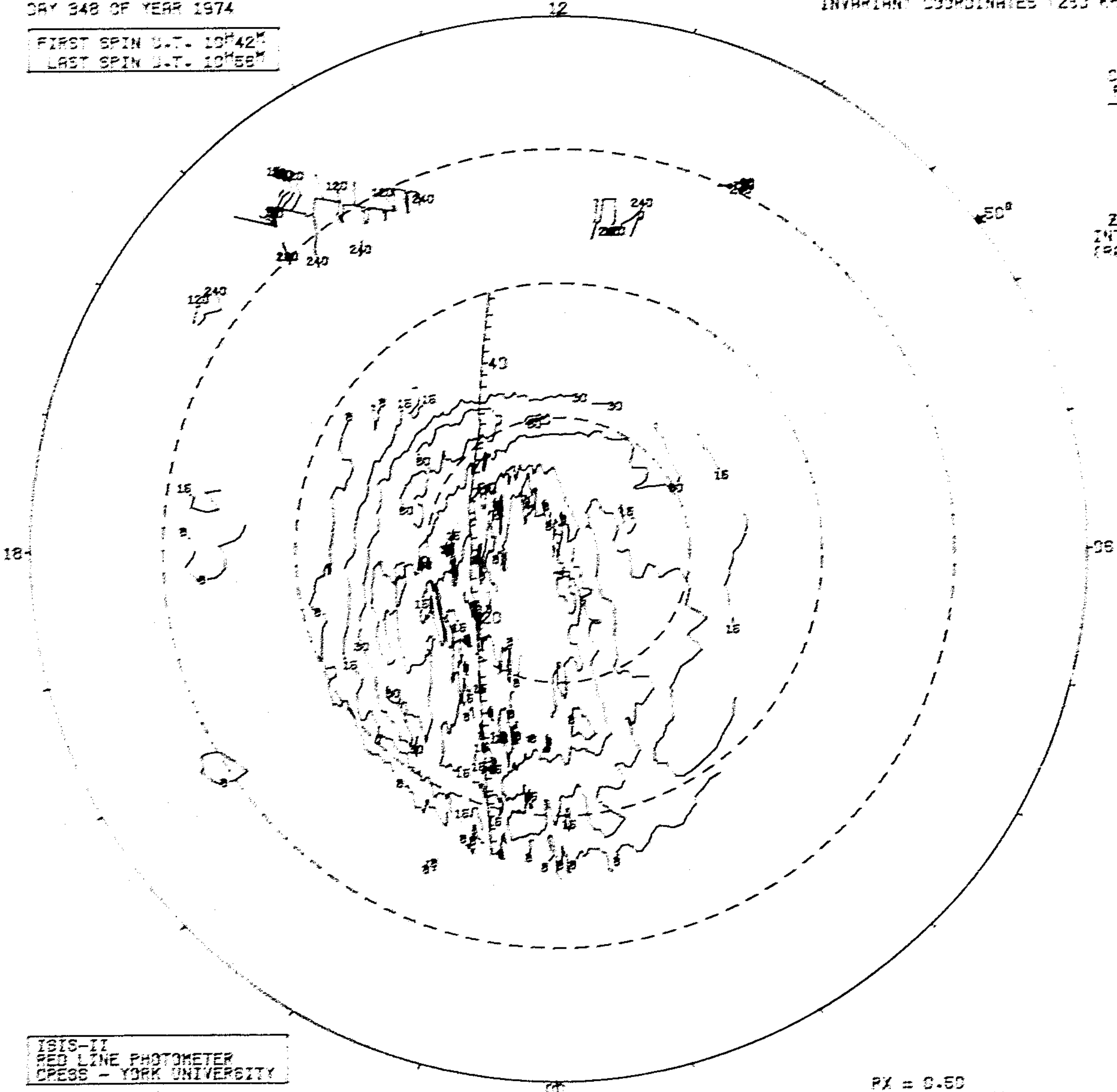

ASP
.4 - 3.0 kP
.4 - 3.0 kP
.6 - 1.0
2.0 - 6.9 kP
.4 - 3.0 kP
1.0 - 1.5
5.0 - 10.2 kP
.4 - 3.0 kP
1.5 - 2.3
5577
3914
RATIO PLOT
06
08
80
60
MV 10
12

ORBIT 17144 (74/DEC/14)
DAY 348 OF YEAR 1974

FIRST SPIN U.T. 10H42M
LAST SPIN U.T. 10H58M

6300 ANGSTROM INTENSITY

DATE PROCESSED: 79/OCT/18
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

80
150
300
600
1200
2400
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

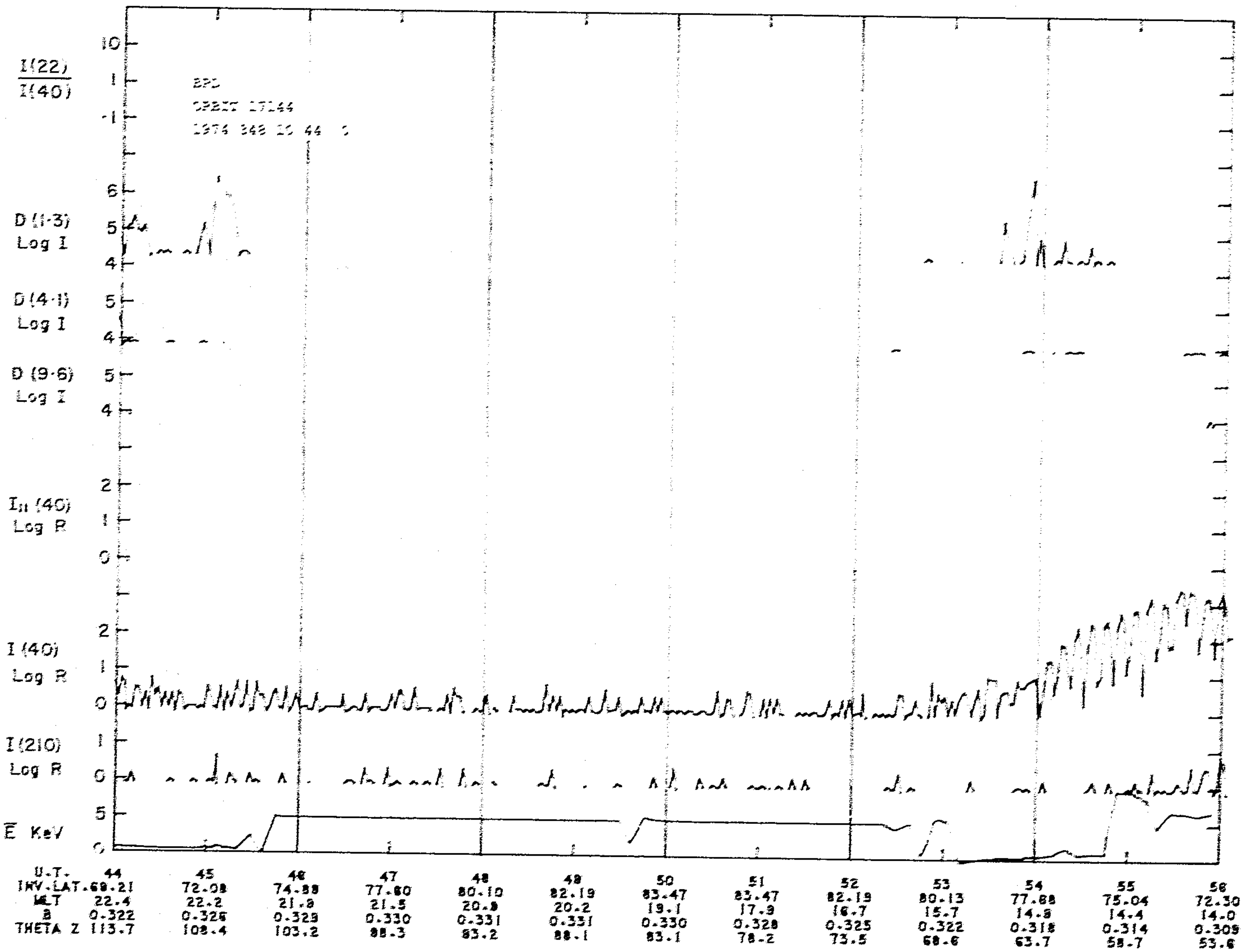
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	104254	66.0
2	104312	66.9
3	104330	67.8
4	104348	68.6
5	104406	69.5
6	104424	70.4
7	104442	71.2
8	104506	72.4
9	104524	73.2
10	104542	74.1
11	104600	74.9
12	104618	75.7
13	104636	76.5
14	104654	77.3
15	104712	78.1
16	104736	79.1
17	104754	79.9
18	104812	80.6
19	104830	81.2
20	104848	81.8
21	104906	82.4
22	104924	82.9
23	104942	83.2
24	105006	83.5
25	105024	83.6
26	105042	83.6
27	105100	83.5
28	105118	83.2
29	105136	82.9
30	105154	82.4
31	105218	81.6
32	105236	81.0
33	105254	80.4
34	105312	79.8
35	105330	78.9
36	105348	78.2
37	105406	77.4
38	105430	76.4
39	105448	75.6
40	105506	74.8
41	105524	74.0
42	105542	73.1
43	105600	72.3
44	105618	71.5
45	105642	70.4

ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

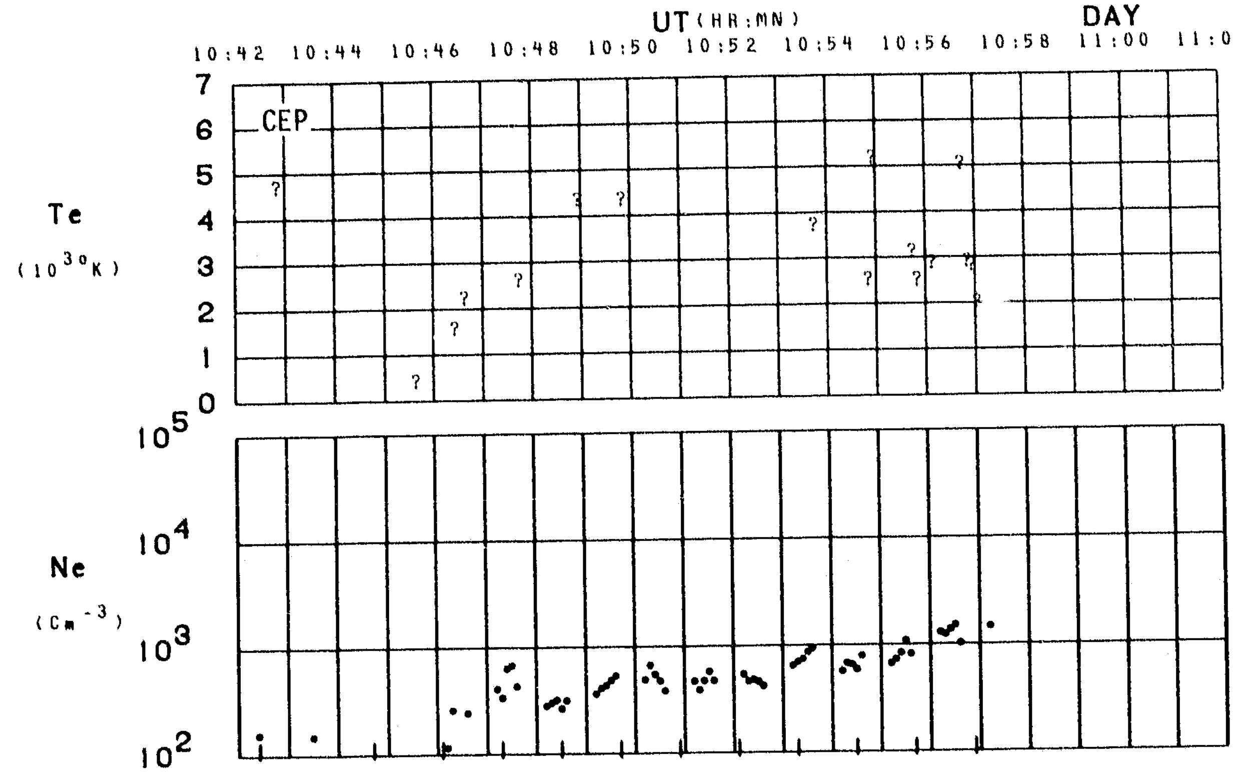
HRT Y00253
FILE 51

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

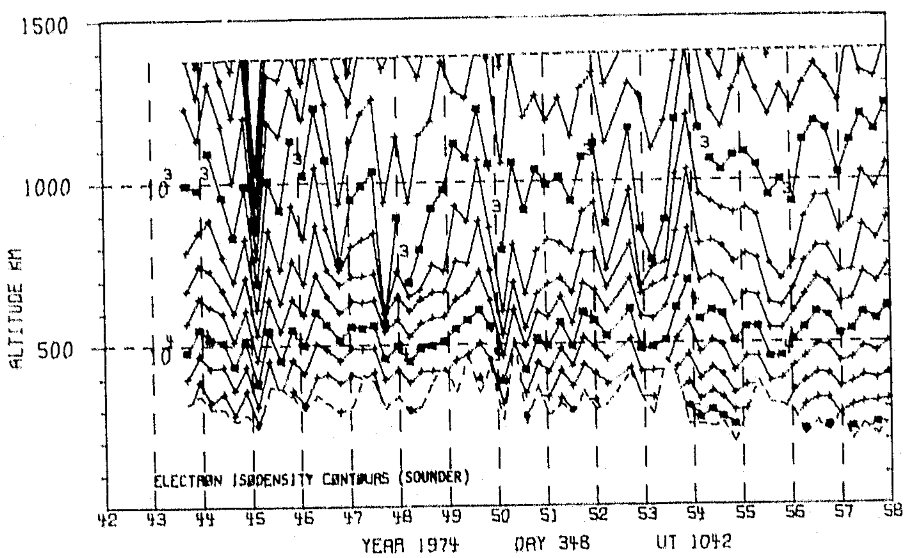
PX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

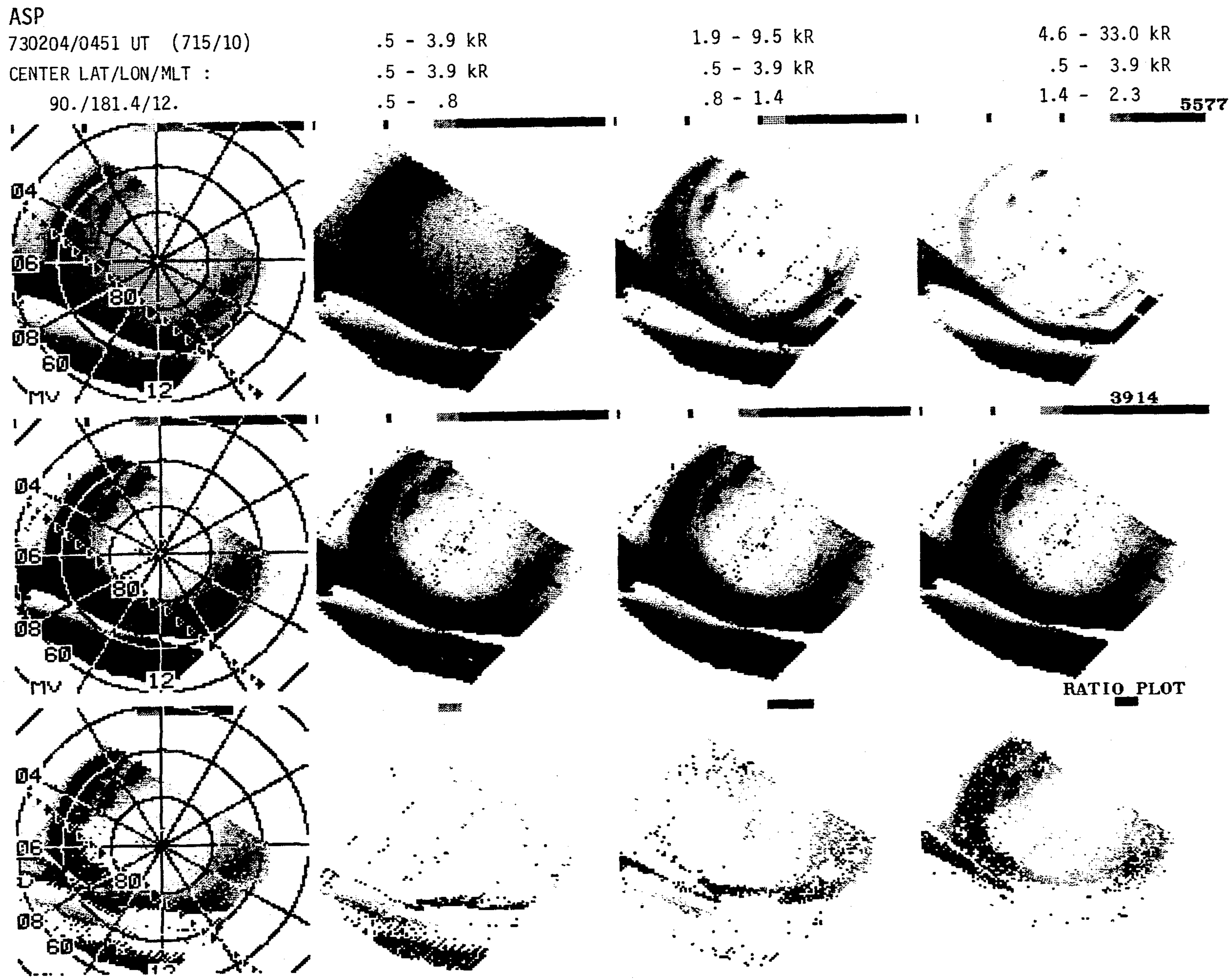

I(22)/I(40)
D (1·3) Log I
D (4·1) Log I
D (9·6) Log I
I∥ (40) Log R
I (40) Log R
I (210) Log R
Ē KeV
U.T. 44 45 46 47 48 49 50 51 52 53 54 55 56
INV.LAT. 69.21 72.08 74.88 77.60 80.10 82.19 83.47 83.47 82.19 80.13 77.88 75.04 72.30
MLT 22.4 22.2 21.9 21.5 20.9 20.2 19.1 17.9 16.7 15.7 14.8 14.4 14.0
B 0.322 0.326 0.329 0.330 0.331 0.331 0.330 0.328 0.325 0.322 0.318 0.314 0.309
THETA Z 113.7 108.4 103.2 98.3 93.2 88.1 83.1 78.2 73.5 68.6 63.7 58.7 53.6

ORBIT 17144
DATE 741214
DAY 348

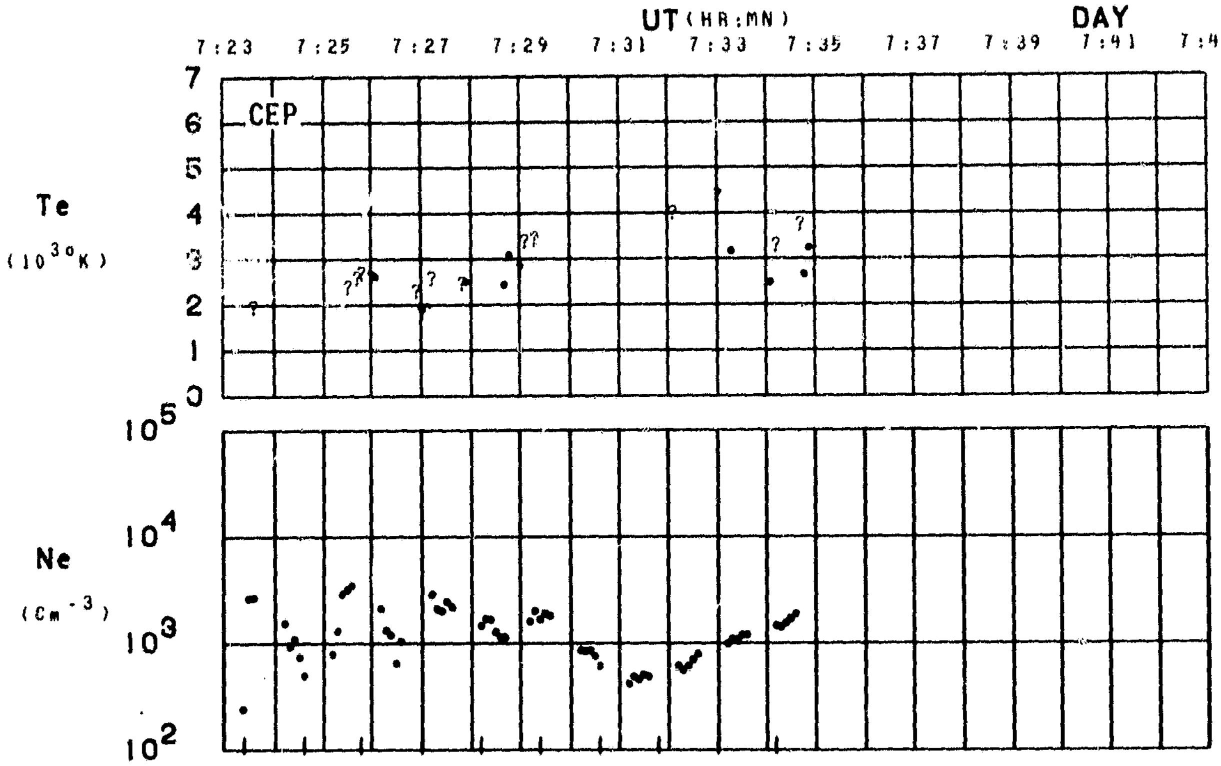


LAT	64	71	76	79	83	87	87	84	80	77	73	69
LONG	-161	-160	-159	-156	-150	-129	-40	-7	0	3	5	5
LT	0:01	0:07	0:15	0:27	0:50	2:15	8:15	10:29	11:00	11:13	11:21	11:26
DIP	75	80	82	85	87	88	87	85	83	81	79	77
DIPLAT	62	70	75	80	84	87	85	81	77	73	70	66
L	5.4	9.7	15.3	24.6	43.0	71.9	78.6	51.8	29.6	18.0	11.9	8.4
INVLAT	64	71	75	78	81	83	83	82	79	76	73	69
ZA	138	131	127	123	119	116	111	108	104	100	96	92

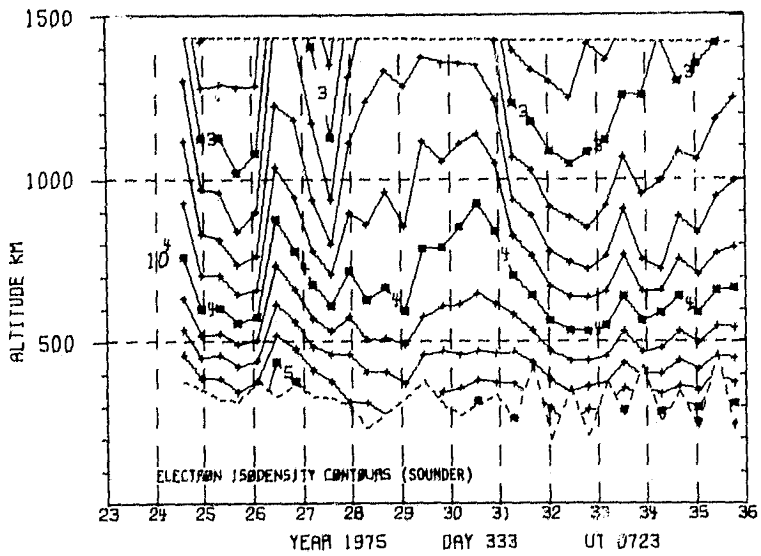


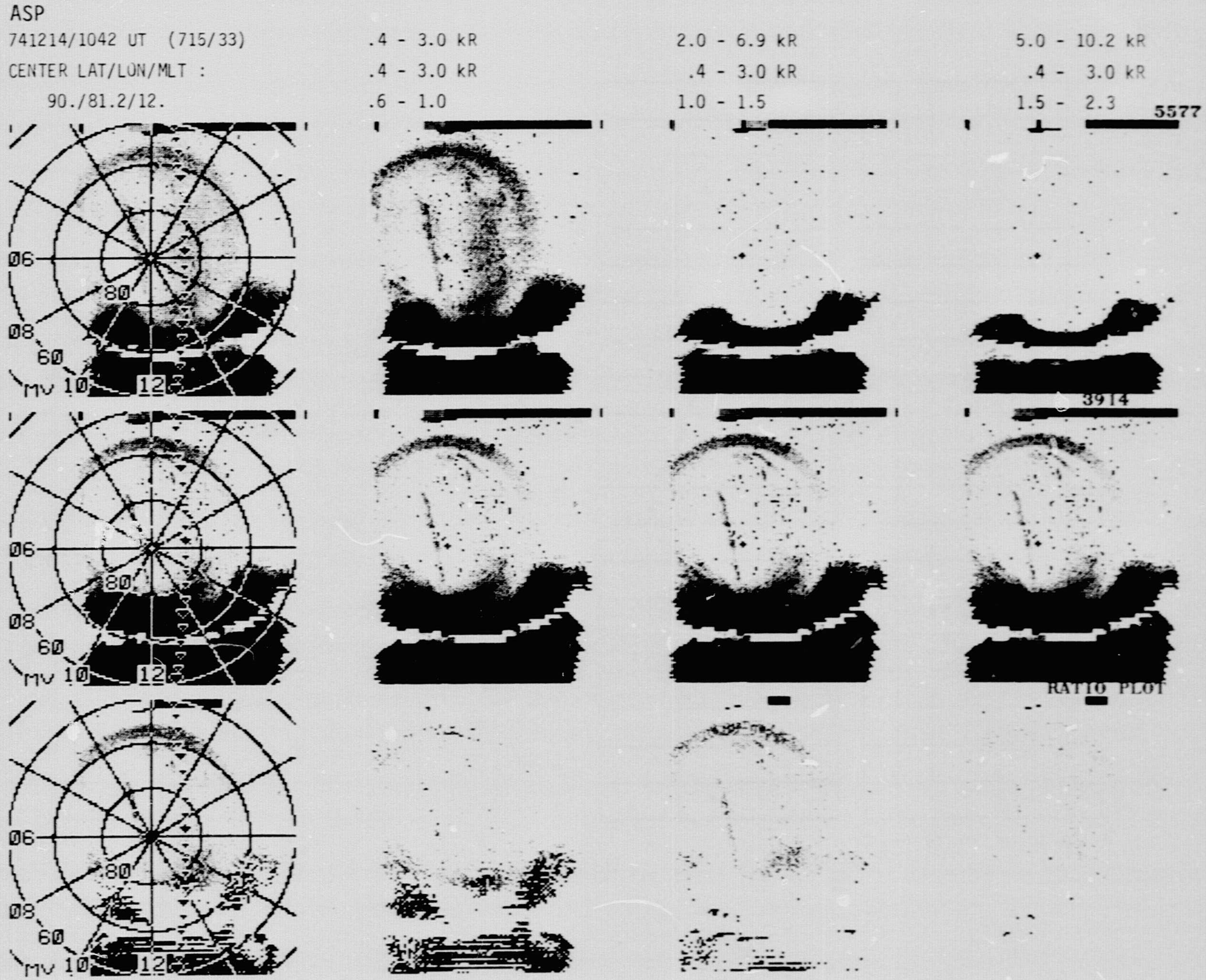

ASP
730204/0451 UT (715/10)
CENTER LAT/LON/MLT :
90./181.4/12.
.5 - 3.9 kR
.5 - 3.9 kR
.5 - .8
1.9 - 9.5 kR
.5 - 3.9 kR
.8 - 1.4
4.6 - 33.0 kR
.5 - 3.9 kR
1.4 - 2.3
5577
3914
RATIO PLOT
04
06
80
08
60
12
MV

ORBIT21576
DATE 751129
DAY 333



LAT	84	87	86	83	79	75	72	68	64	60
LONG	-138	-91	-14	6	12	14	15	16	17	17
LT	22:22	1:32	6;39	8;05	8:28	8:39	8:46	8;50	8;53	8:56
DIP	88	88	87	84	82	81	79	76	74	72
DIPLAT	87	87	84	79	76	72	68	65	61	57
L	65.4	83.6	62.7	36.3	21.6	13.9	9.6	7.0	5.4	4.3
INVLAT	82	83	82	80	77	74	71	67	64	61
ZA	116	113	110	107	104	101	99	96	93	90



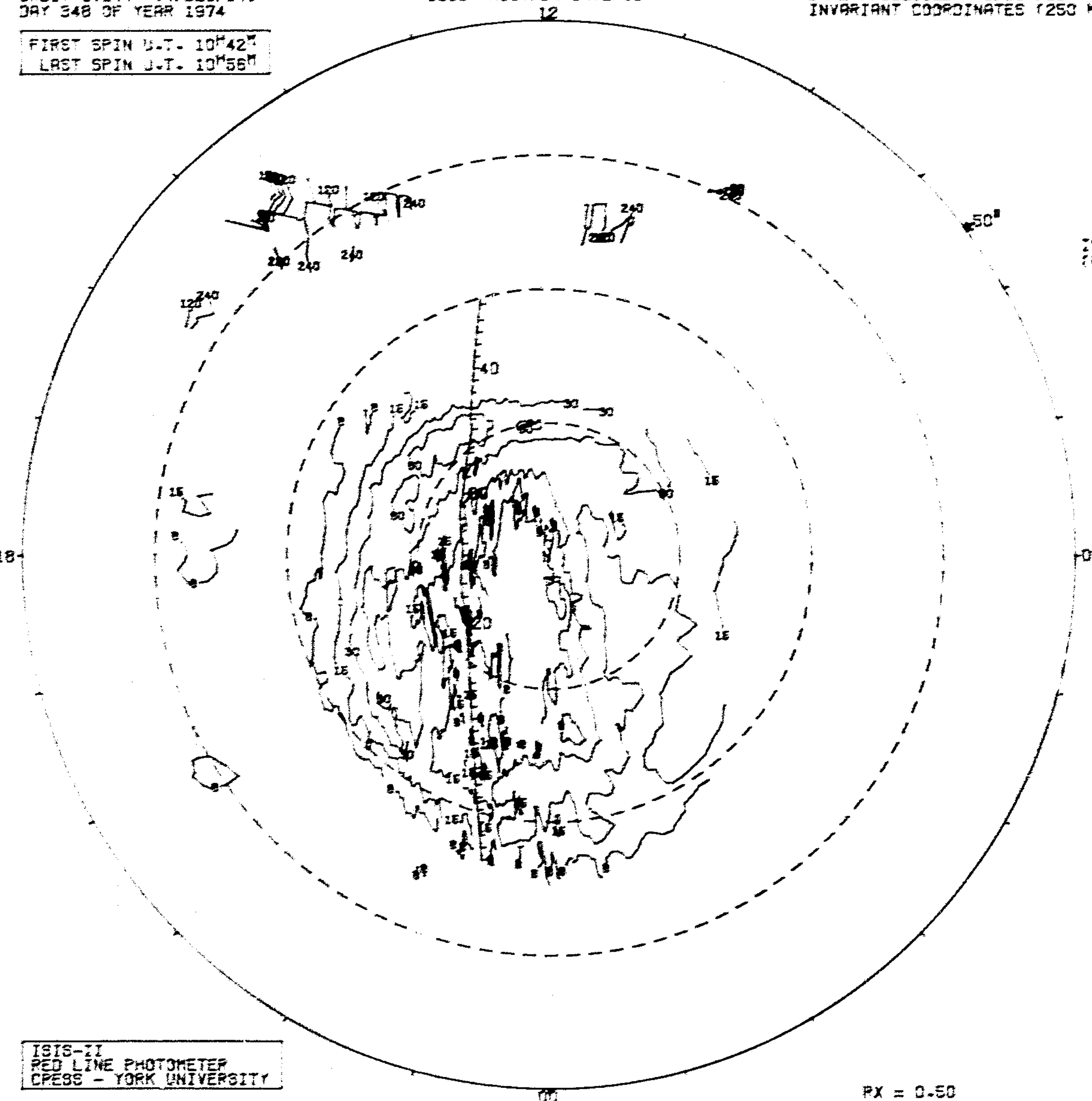

ASP
741214/1042 UT (715/33)
CENTER LAT/LON/MLT :
90./81.2/12.
.4 - 3.0 kR
.4 - 3.0 kR
.6 - 1.0
2.0 - 6.9 kR
.4 - 3.0 kR
1.0 - 1.5
5.0 - 10.2 kR
.4 - 3.0 kR
1.5 - 2.3
5577
3914
RATIO PLOT
06
08
60
80
MV 10
12

ORBIT 17144 (74/DEC/14)
DAY 348 OF YEAR 1974

FIRST SPIN U.T. 10H42M
LAST SPIN U.T. 10H56M

6300 ANGSTROM INTENSITY

DATE PROCESSED: 79/OCT/18
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

80
150
300
600
1200
2400
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

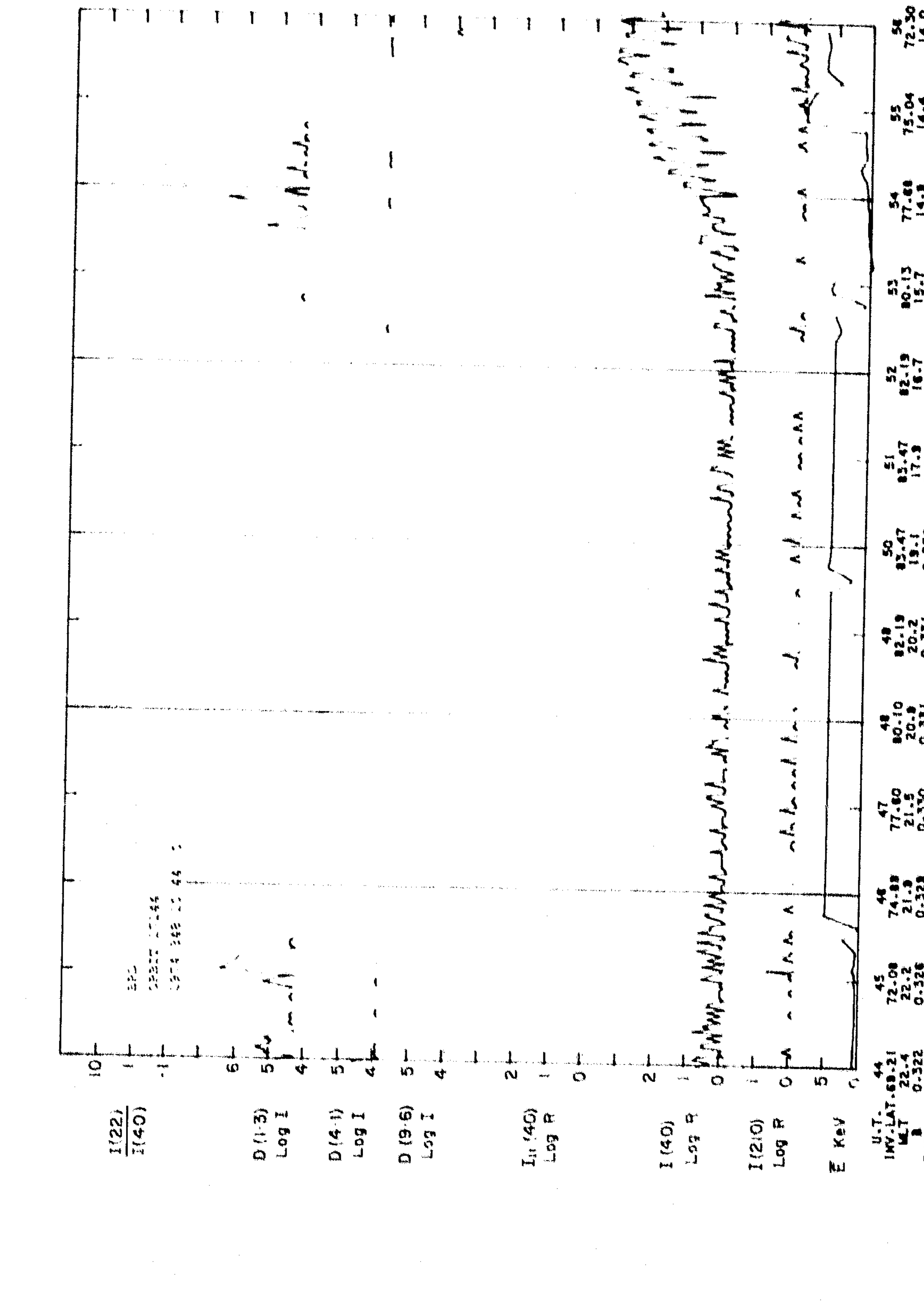
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	104254	66.0
2	104312	66.9
3	104330	67.8
4	104348	68.6
5	104406	69.5
6	104424	70.4
7	104442	71.2
8	104506	72.4
9	104524	73.2
10	104542	74.1
11	104600	74.9
12	104618	75.7
13	104636	76.5
14	104654	77.3
15	104712	78.1
16	104736	79.1
17	104754	79.9
18	104812	80.6
19	104830	81.2
20	104848	81.8
21	104906	82.4
22	104924	82.9
23	104942	83.2
24	105006	83.5
25	105024	83.6
26	105042	83.6
27	105100	83.5
28	105118	83.2
29	105136	82.9
30	105154	82.4
31	105218	81.6
32	105236	81.0
33	105254	80.4
34	105312	79.6
35	105330	78.9
36	105348	78.2
37	105406	77.4
38	105430	76.4
39	105448	75.6
40	105506	74.8
41	105524	74.0
42	105542	73.1
43	105600	72.3
44	105618	71.5
45	105642	70.4

ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

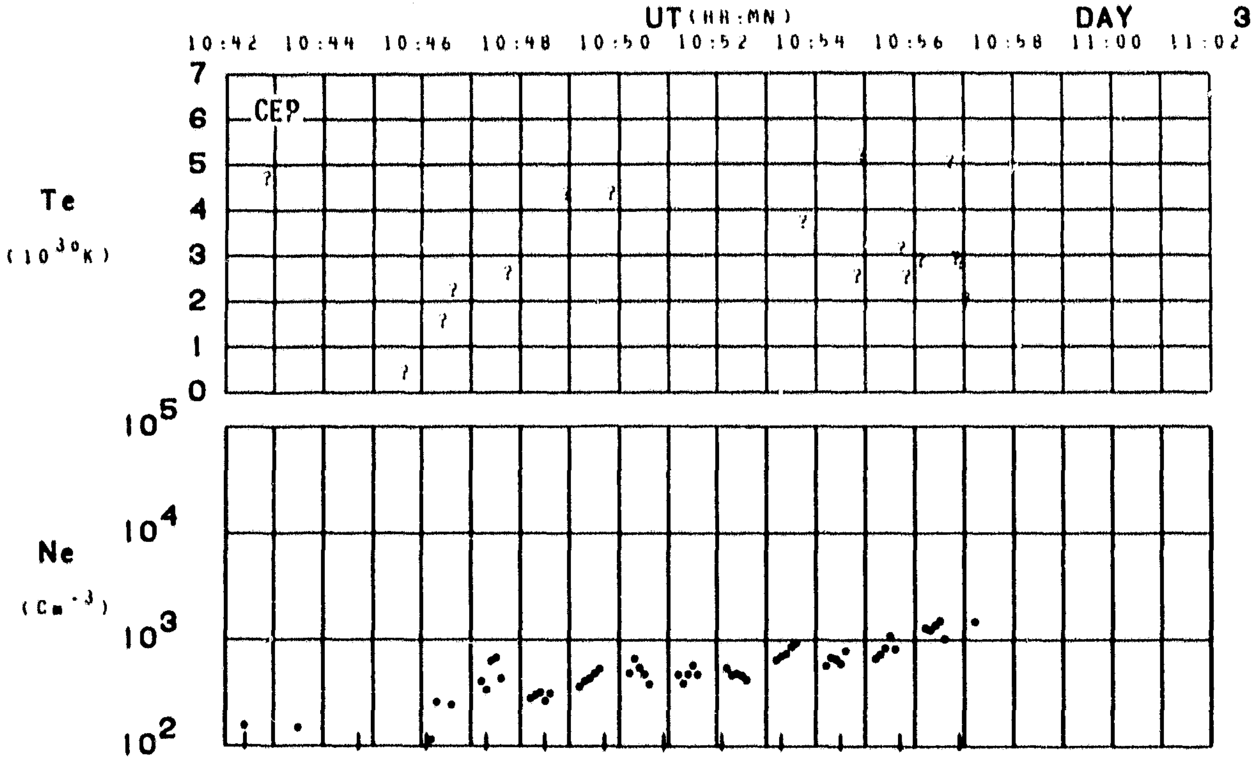
MRT Y03253
FILE 51

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

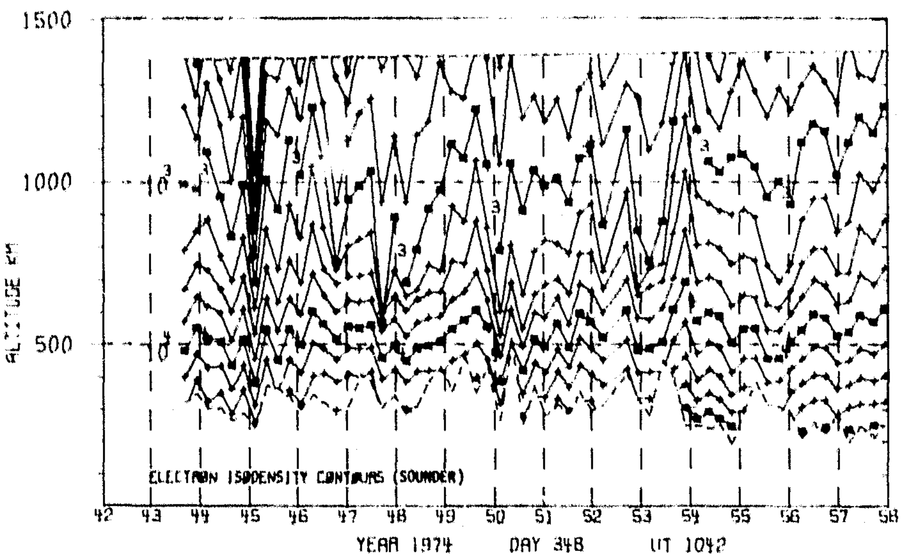
PX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

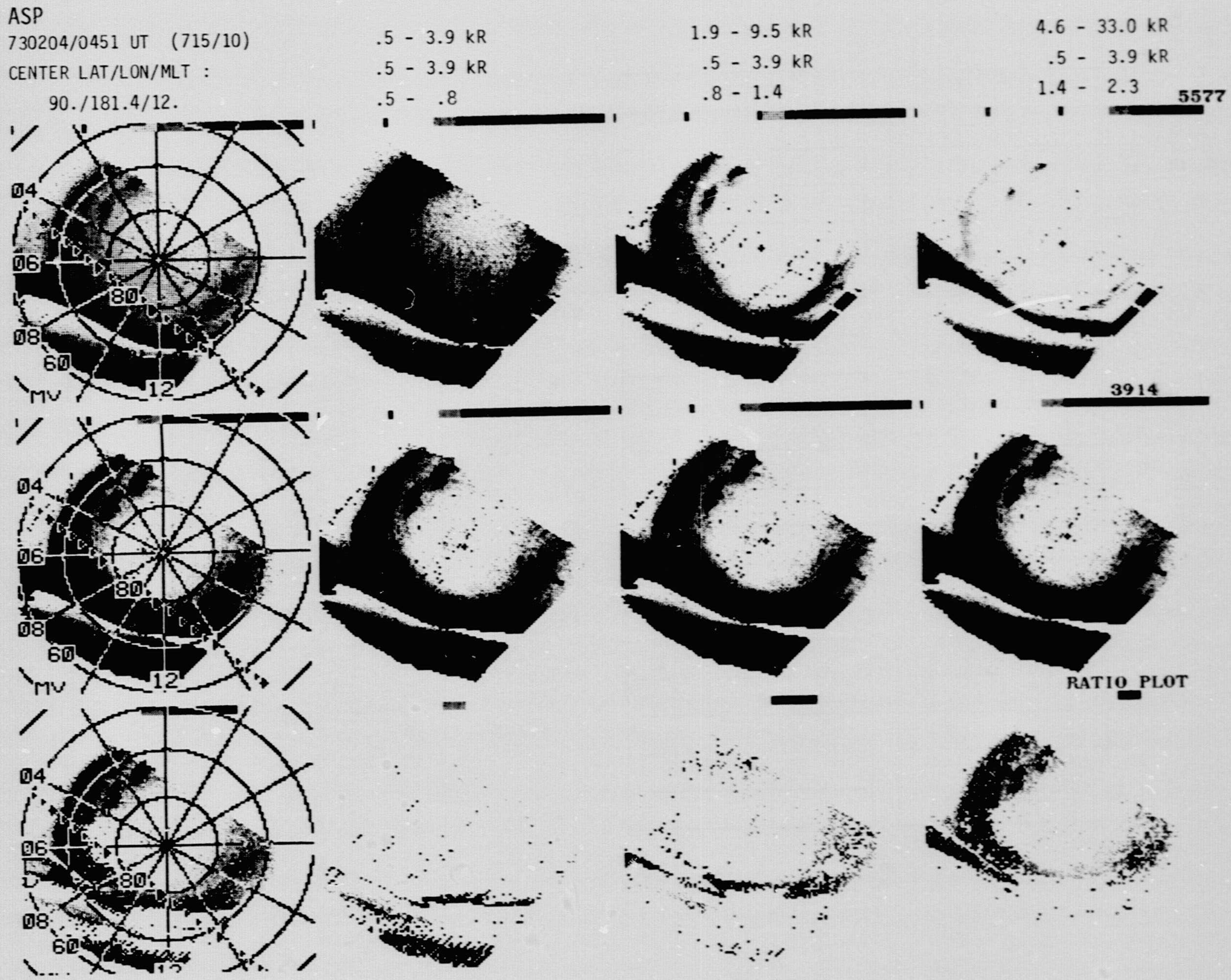

I(22)/I(40)
D(1·3) Log I
D(4·1) Log I
D(9·6) Log I
I(40) Log R
I(40) Log R
I(2:0) Log R
E KeV
U.T.
INV.LAT.
MLT
B
THETA Z

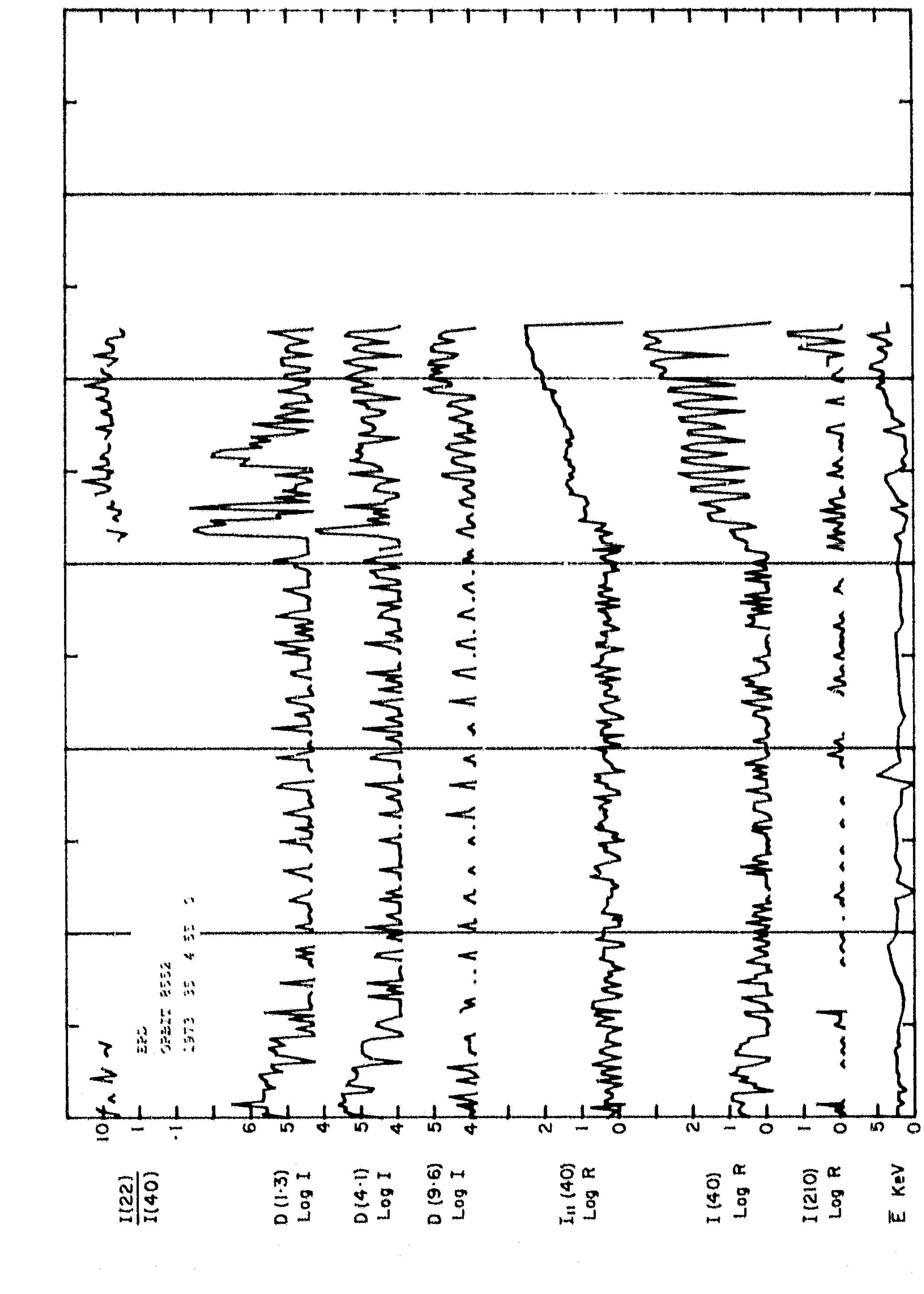
ORBIT 17144
DATE 741214
DAY 348



LAT	64	71	76	79	83	87	87	84	80	77	73	69
LONG	-161	-160	-159	-156	-150	-129	-40	-7	0	3	5	5
LT	0:01	0:07	0:15	0:27	0:50	2:15	8:15	10:29	11:00	11:13	11:21	11:26
DIP	75	80	82	85	87	88	87	85	83	81	79	77
DIPLAT	62	70	75	80	84	87	85	81	77	73	70	66
L	5.4	9.7	15.3	24.6	43.0	71.9	78.6	51.8	29.6	18.0	11.9	8.4
INVLAT	64	71	75	78	81	83	83	82	79	76	73	69
ZA	138	131	127	123	119	115	111	108	104	100	96	92

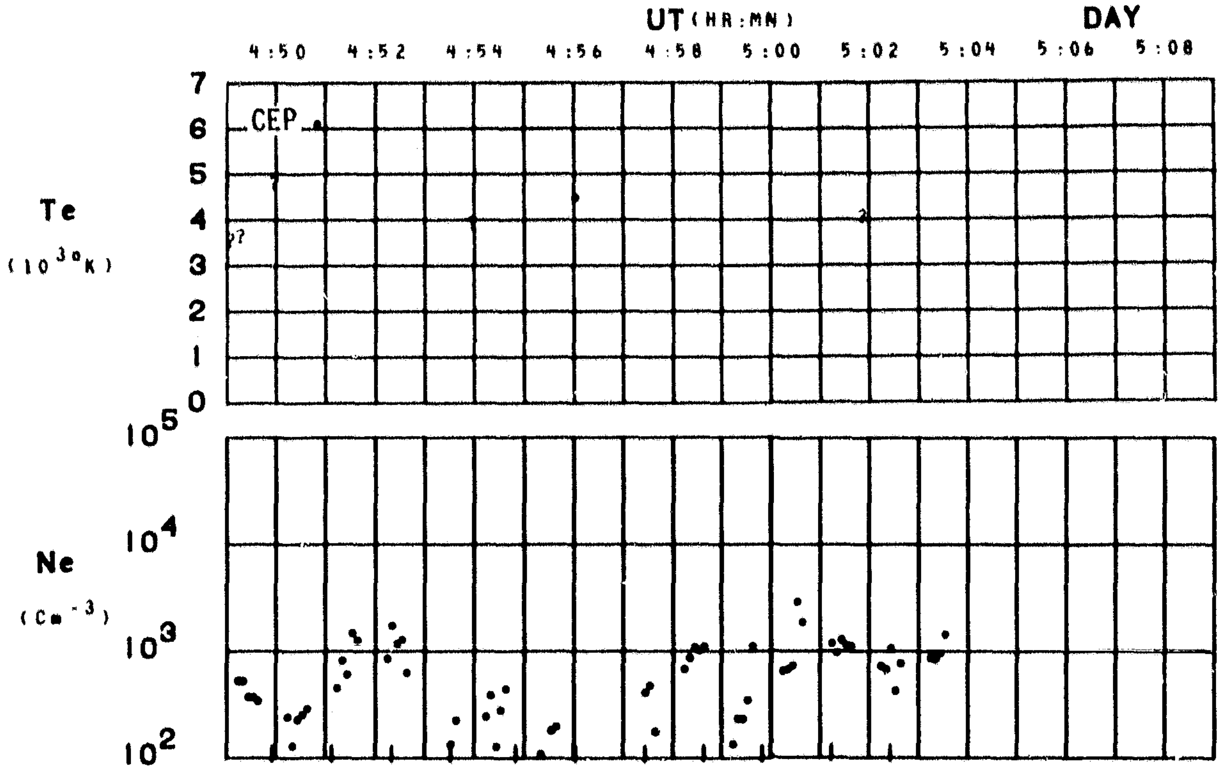



ASP
730204/0451 UT (715/10)
CENTER LAT/LON/MLT :
90./181.4/12.
.5 - 3.9 kR
.5 - 3.9 kR
.5 - .8
1.9 - 9.5 kR
.5 - 3.9 kR
.8 - 1.4
4.6 - 33.0 kR
.5 - 3.9 kR
1.4 - 2.3
5577
3914
RATIO PLOT
04
06
08
60
80
12
MV

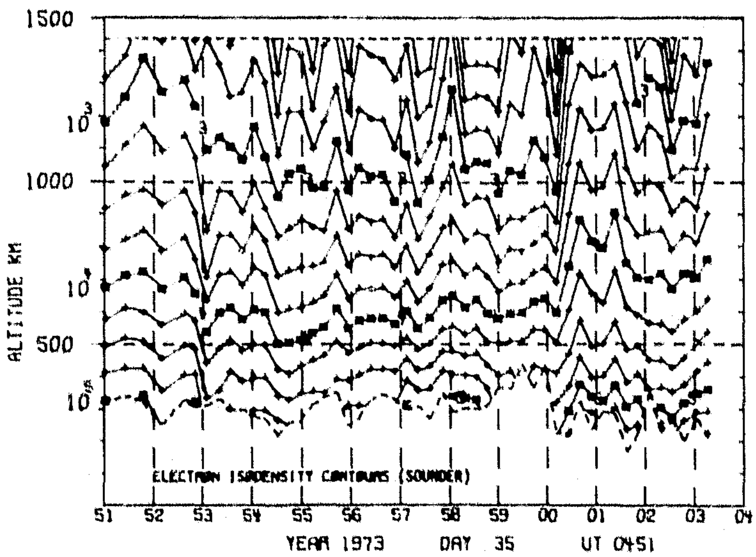


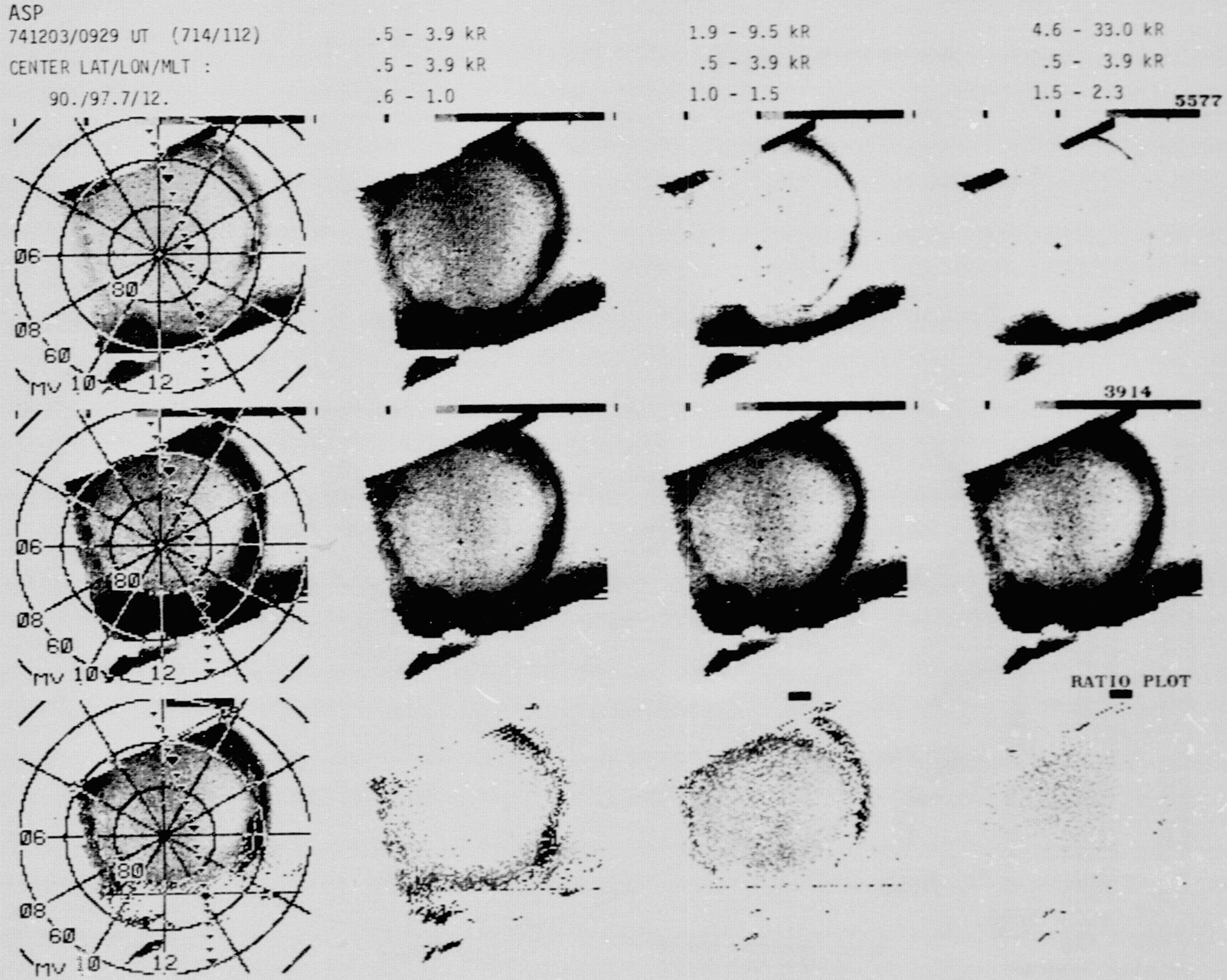
I(22) / I(40)
D (1·3) Log I
D (4·1) Log I
D (9·6) Log I
I (40) Log R
I (210) Log R
E KeV
U.T.
INV.LAT.
MLT
B
THETA Z

ORBIT 8552
DATE 730204
DAY 35



LAT	60	64	68	72	76	79	84	87	87	83	79
LONG	-17	-17	-17	-16	-14	-12	-6	23	109	139	145
LT	3:24	3:27	3:30	3:34	3:41	3:52	4:18	6:17	12:04	14:05	14:30
DIP	73	75	78	79	81	83	85	86	87	85	84
DIPLAT	59	63	66	70	74	77	80	83	84	81	78
L	5.7	7.5	10.2	14.6	22.6	34.4	48.1	46.1	33.2	10.2	13.5
INVLAT	65	68	71	74	77	80	81	81	80	77	74
ZA	122	120	118	116	113	111	108	106	103	100	98



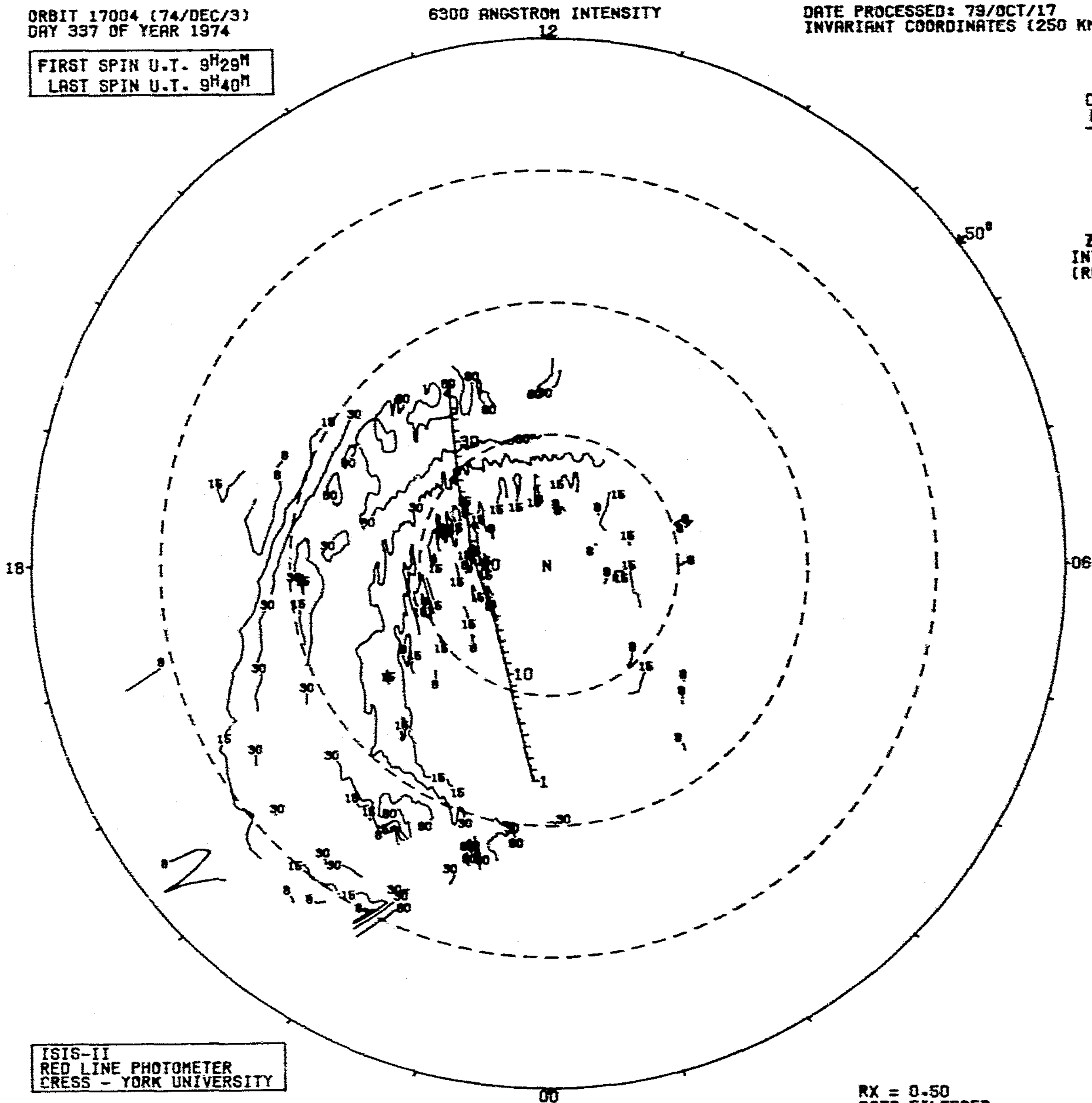

ASP
741203/0929 UT (714/112)
CENTER LAT/LON/MLT :
90./97.7/12.
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT
Ø6
80
Ø8
6Ø
MV 10
12

ORBIT 17004 (74/DEC/3)
DAY 337 OF YEAR 1974

FIRST SPIN U.T. 9H29M
LAST SPIN U.T. 9H40M

6300 ANGSTROM INTENSITY

DATE PROCESSED: 79/OCT/17
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

80
150
300
600
1200
2400
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

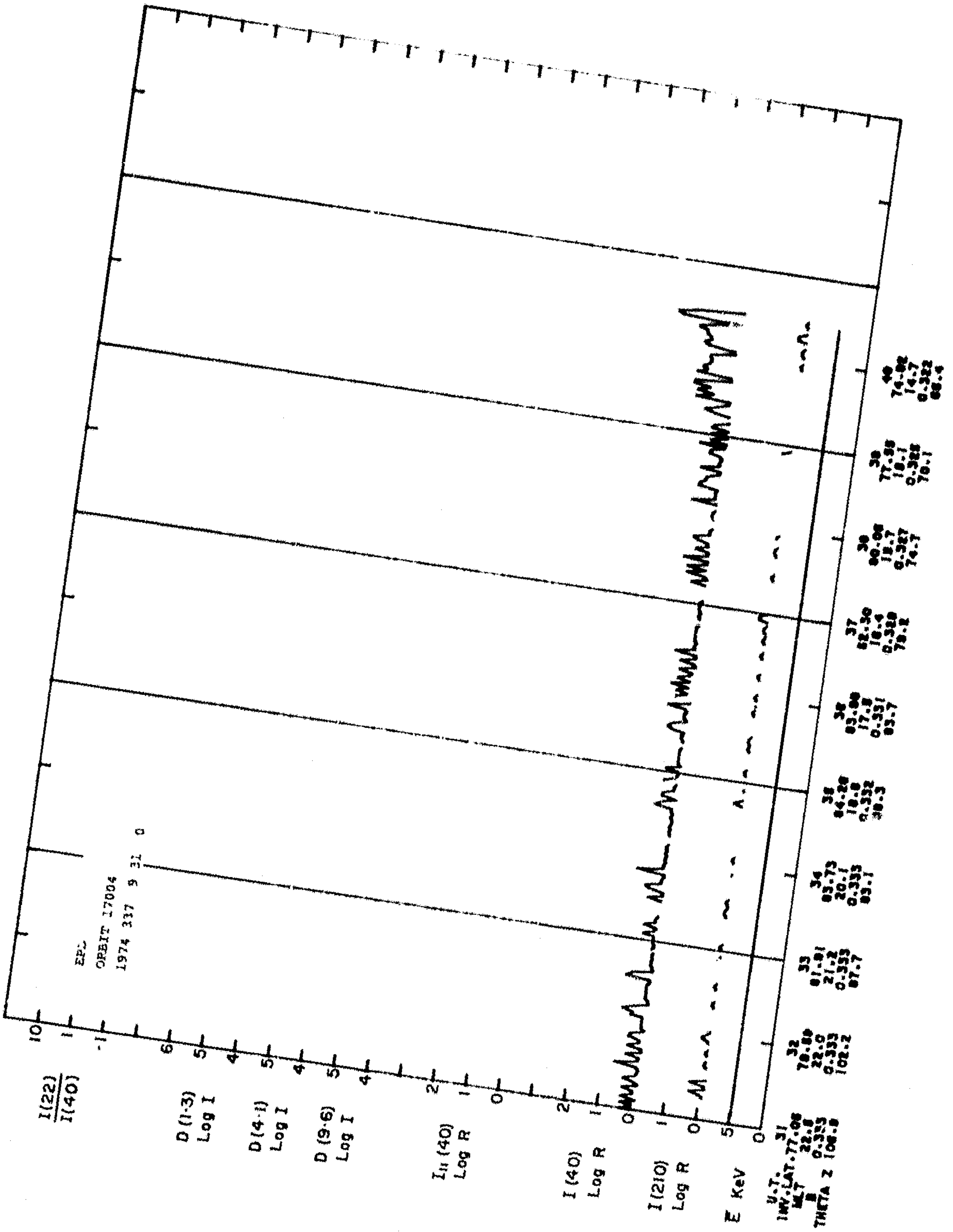
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	092930	73.0
2	092948	73.8
3	093006	74.6
4	093024	75.4
5	093042	76.2
6	093060	77.0
7	093124	78.0
8	093142	78.8
9	093160	79.6
10	093218	80.2
11	093236	80.9
12	093254	81.6
13	093312	82.3
14	093330	83.0
15	093354	83.6
16	093412	83.9
17	093430	84.1
18	093448	84.2
19	093506	84.3
20	093524	84.3
21	093542	84.2
22	093560	84.0
23	093624	83.5
24	093642	83.0
25	093660	82.3
26	093718	81.7
27	093736	81.0
28	093754	80.3
29	093812	79.6
30	093836	78.6
31	093854	77.9
32	093912	77.1
33	093930	76.3
34	093948	75.5
35	094006	74.7

ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

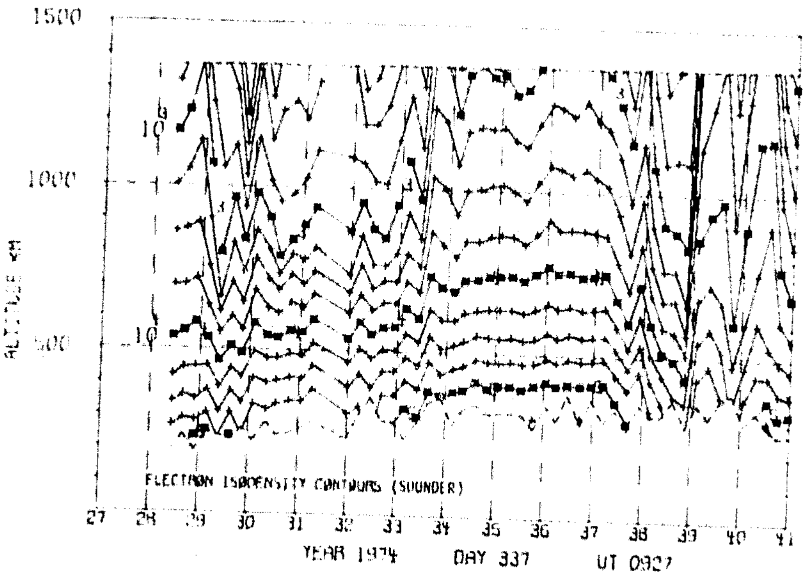
HRT Y00509
FILE 3

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

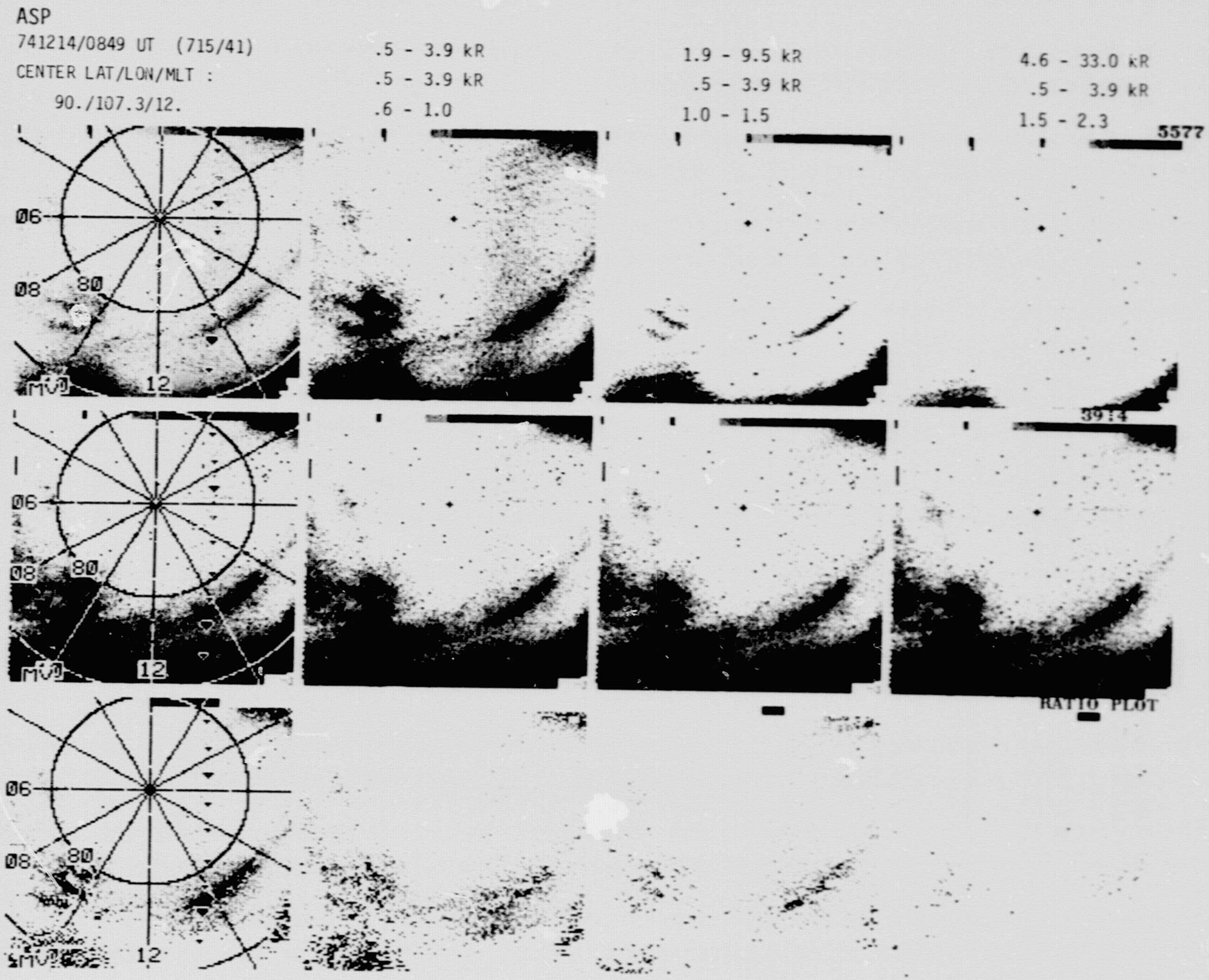
RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED



ORBIT 17004
1974 337 9 31 0
I(22)/I(40)
D (1·3) Log I
D (4·1) Log I
D (9·6) Log I
I11 (40) Log R
I (40) Log R
I (210) Log R
E KeV
U.T.
INV.LAT.
MLT
B
THETA Z



1500
1000
500
ALTITUDE KM
ELECTRON ISODENSITY CONTOURS (SOUNDER)
27
28
29
30
31
32
33
34
35
36
37
38
39
40
YEAR 1974
DAY 337
UT 0927



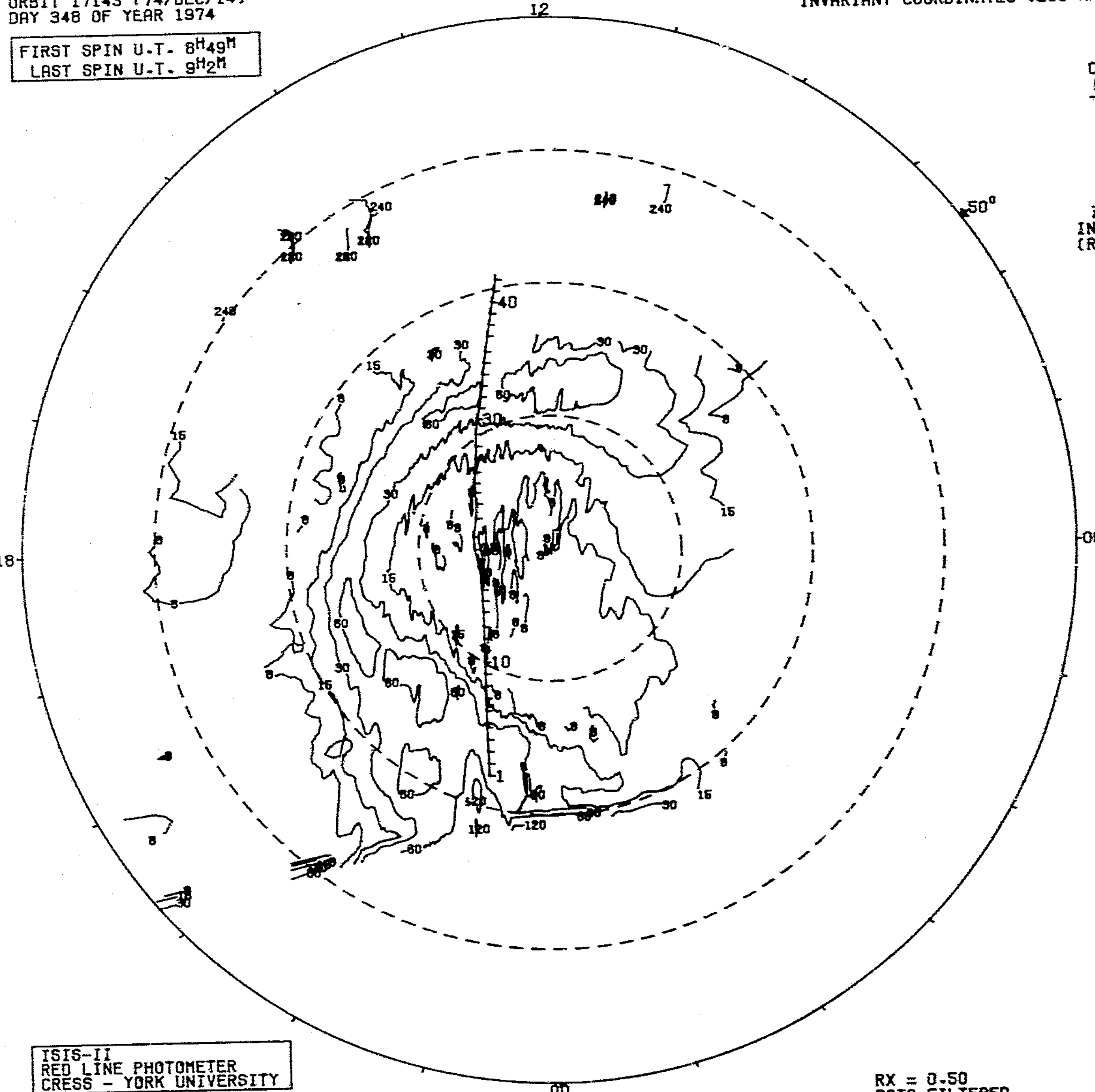
ASP
741214/0849 UT (715/41)
CENTER LAT/LON/MLT :
90./107.3/12.
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT
06
08
80
12
MV

ORBIT 17143 (74/DEC/14)
DAY 348 OF YEAR 1974

FIRST SPIN U.T. $8^{H}49^{M}$
LAST SPIN U.T. $9^{H}2^{M}$

6300 ANGSTROM INTENSITY

DATE PROCESSED: 79/OCT/17
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

80
150
300
600
1200
2400
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

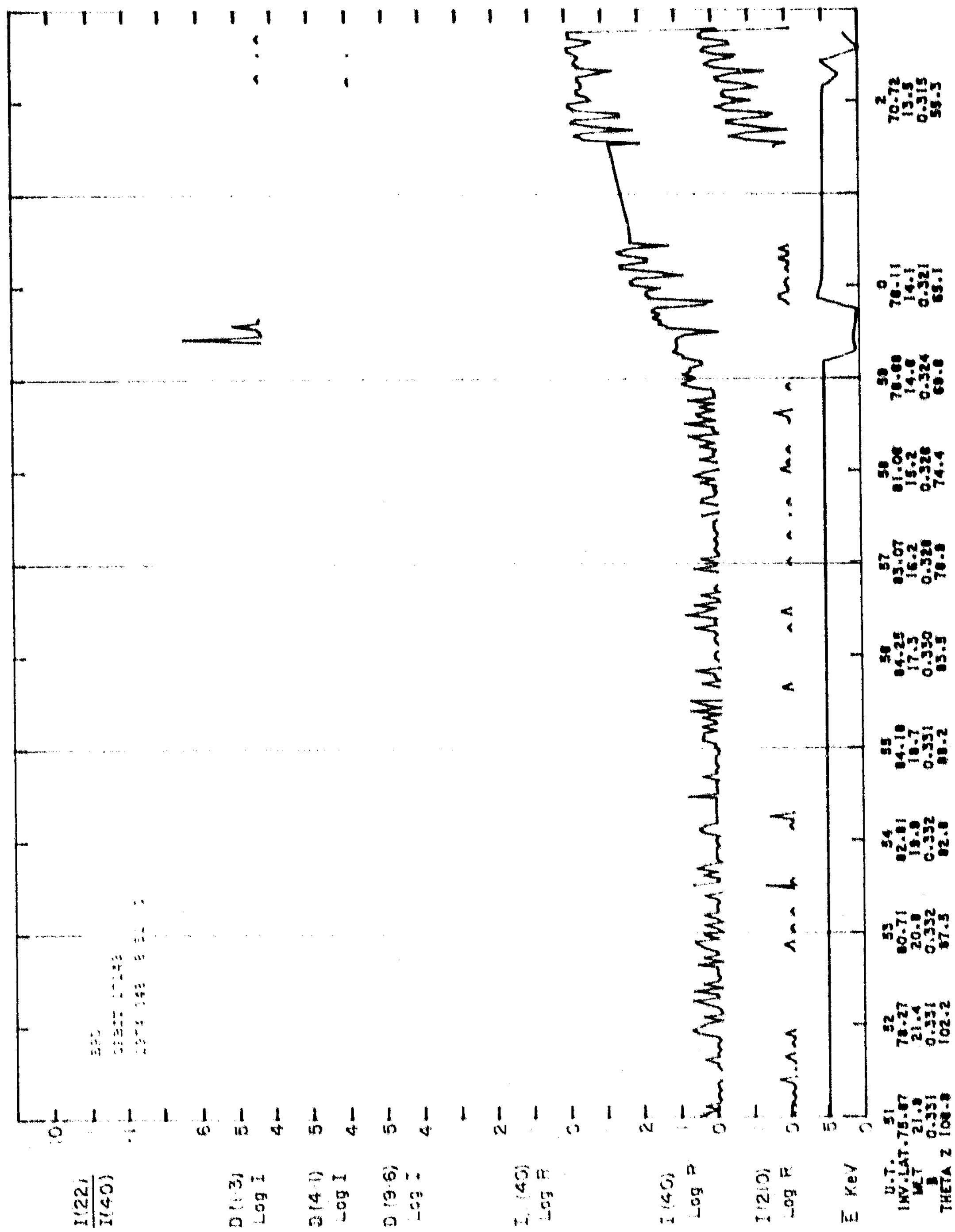
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	084936	71.9
2	084954	72.7
3	085012	73.5
4	085030	74.3
5	085048	75.1
6	085112	76.2
7	085130	77.0
8	085148	77.8
9	085206	78.5
10	085224	79.3
11	085242	80.0
12	085300	80.7
13	085318	81.4
14	085342	82.2
15	085400	82.8
16	085418	83.4
17	085436	83.8
18	085454	84.1
19	085512	84.3
20	085530	84.4
21	085548	84.3
22	085612	84.1
23	085630	83.8
24	085648	83.4
25	085706	82.9
26	085724	82.4
27	085742	81.7
28	085800	81.1
29	085818	80.4
30	085842	79.4
31	085900	78.7
32	085918	77.9
33	085936	77.2
34	085954	76.4
35	090012	75.6
36	090030	74.8
37	090054	73.7
38	090112	72.9
39	090130	72.1
40	090148	71.3
41	090206	70.4
42	090224	69.6

ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

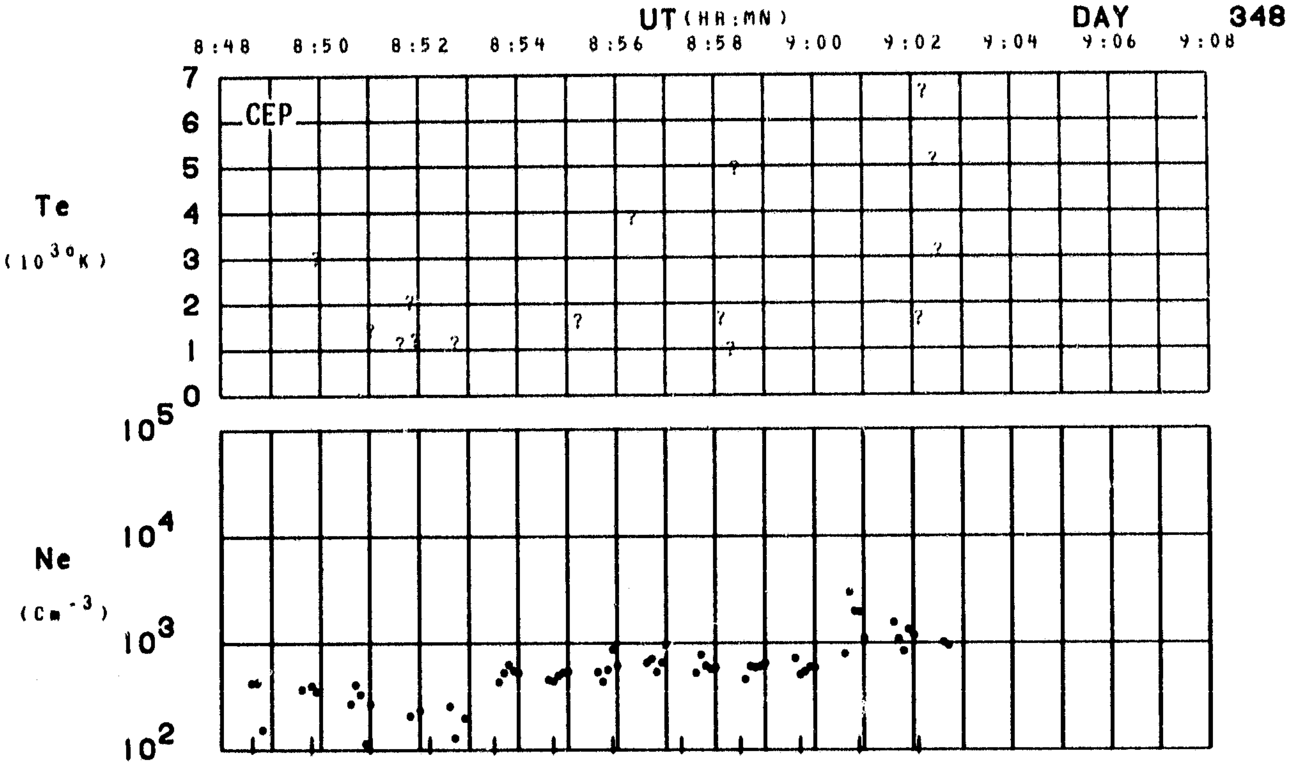
HRT Y00509
FILE 13

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

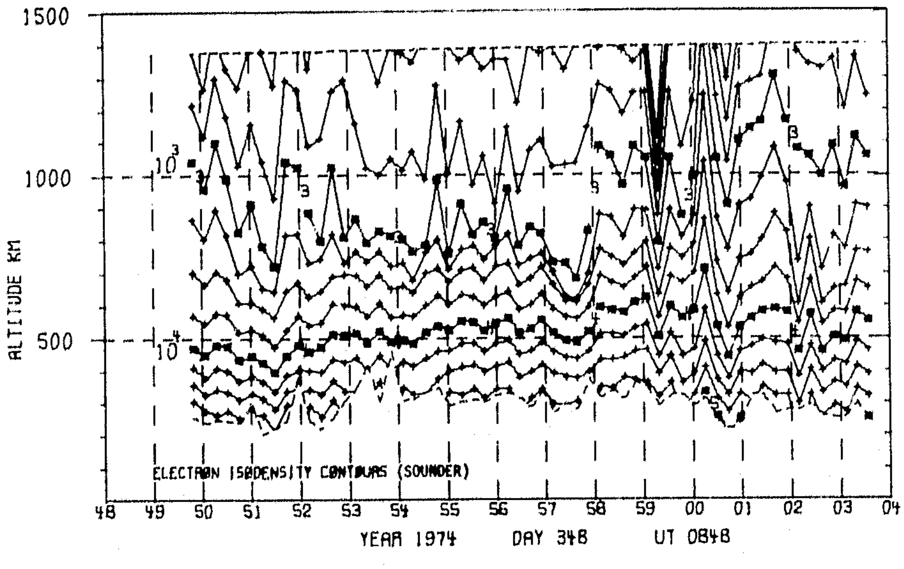
RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

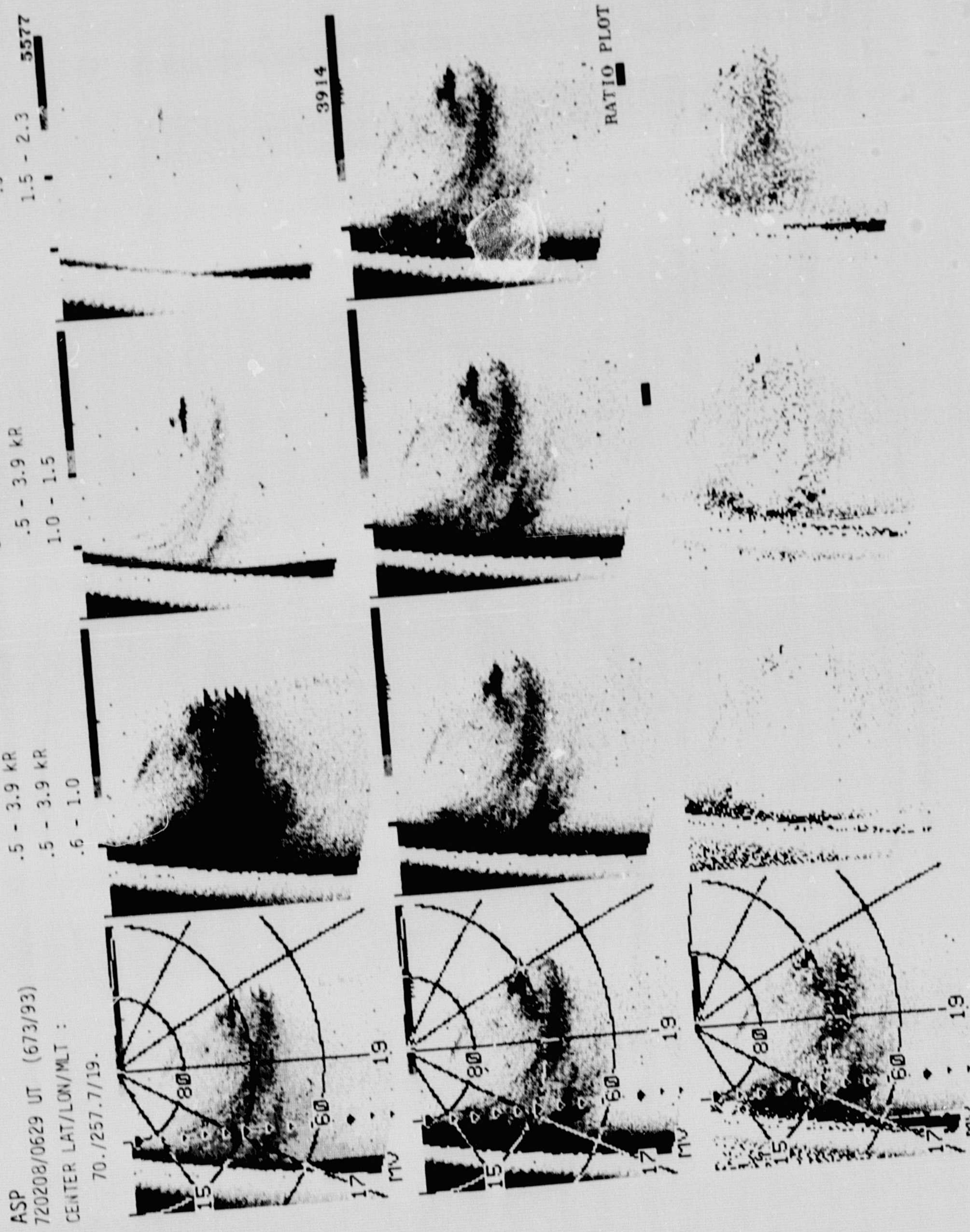


ORBIT17143
DATE 741214
DAY 348



LAT	63	67	71	75	79	83	86	87	84	80	76	73
LONG	-133	-132	-132	-130	-128	-122	-106	-10	23	29	32	33
LT	0:01	0:04	0:08	0:14	0:25	0:48	1:53	8:20	10:36	11:01	11:14	11:22
DIP	78	80	82	84	86	89	88	87	85	83	81	79
DIPLAT	68	72	76	79	83	88	87	84	80	77	73	70
L	7.9	11.0	16.3	26.4	49.4	88.8	101.5	59.4	32.4	19.4	12.7	8.9
INVLAT	69	72	75	78	81	83	84	82	79	76	73	70
ZA	139	135	131	127	123	119	116	111	107	104	100	96



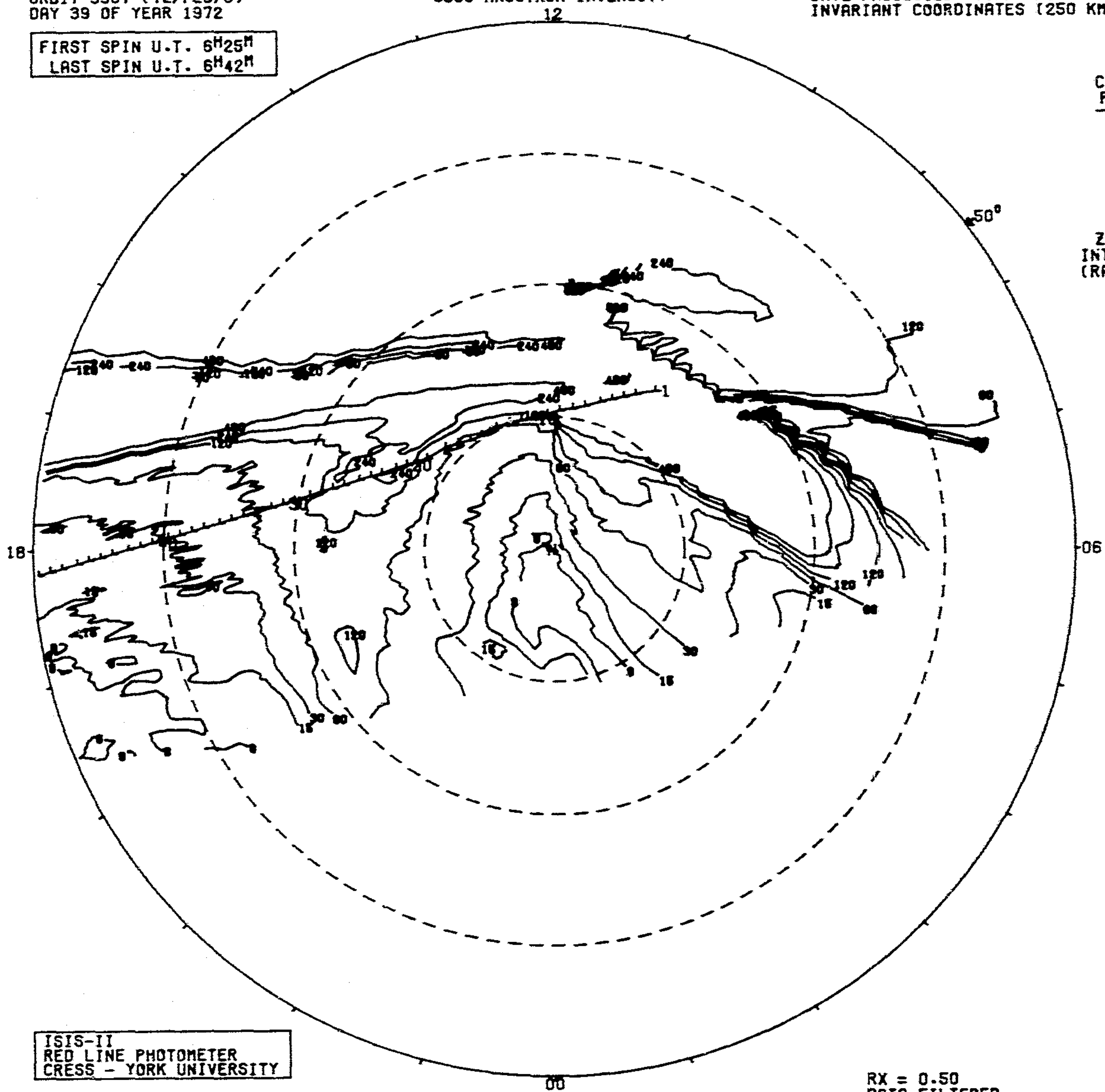

ASP
720208/0629 UT (673/93)
CENTER LAT/LON/MLT :
70./257.7/19.
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT
80
60
15
17
19
MV

ORBIT 3967 (72/FEB/8)
DAY 39 OF YEAR 1972

6300 ANGSTROM INTENSITY

DATE PROCESSED: 79/NOV/13
INVARIANT COORDINATES (250 KM.)

FIRST SPIN U.T. 6H25M
LAST SPIN U.T. 6H42M



CONTOURS PLOTTED

80
150
300
600
1200
2400
4800
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

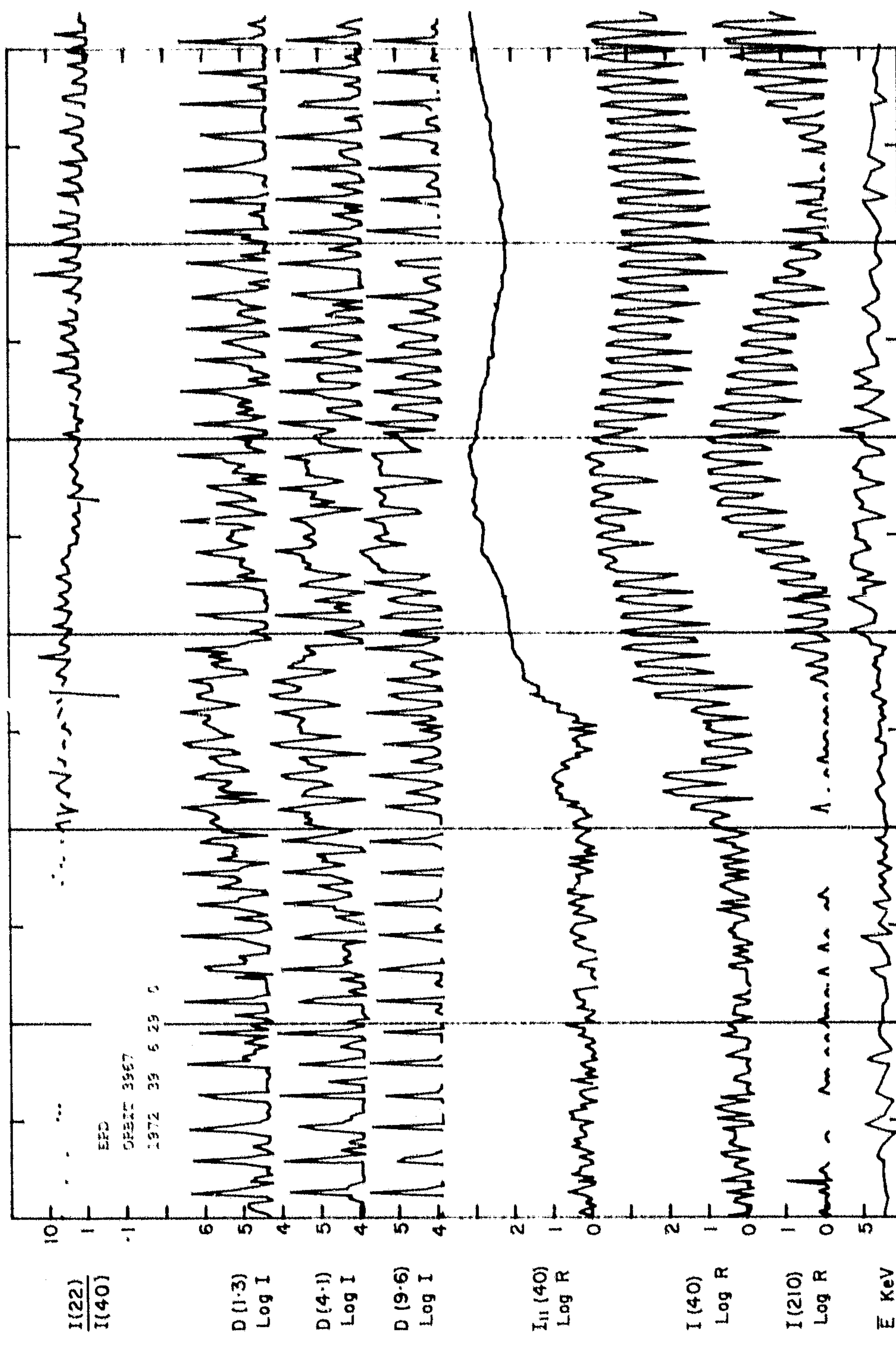
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	062546	76.0
2	062616	77.1
3	062634	77.7
4	062652	78.3
5	062710	78.8
6	062734	79.5
7	062752	79.8
8	062810	80.2
9	062828	80.4
10	062852	80.6
11	062910	80.6
12	062928	80.6
13	062946	80.4
14	063010	80.1
15	063028	79.8
16	063046	79.3
17	063104	78.8
18	063128	78.1
19	063146	77.5
20	063204	76.9
21	063222	76.2
22	063246	75.3
23	063304	74.5
24	063322	73.8
25	063346	72.7
26	063404	71.9
27	063422	71.1
28	063440	70.3
29	063504	69.2
30	063522	68.4
31	063540	67.5
32	063604	66.4
33	063622	65.5
34	063640	64.7
35	063658	63.8
36	063722	62.7
37	063740	61.8
38	063758	60.9
39	063816	60.1
40	063840	58.9
41	063858	58.1
42	063916	57.2
43	063940	56.1
44	063958	55.3
45	064016	54.4
46	064034	53.6
47	064058	52.5
48	064116	51.7
49	064134	50.8
50	064152	50.0
51	064216	48.9
52	064234	48.1

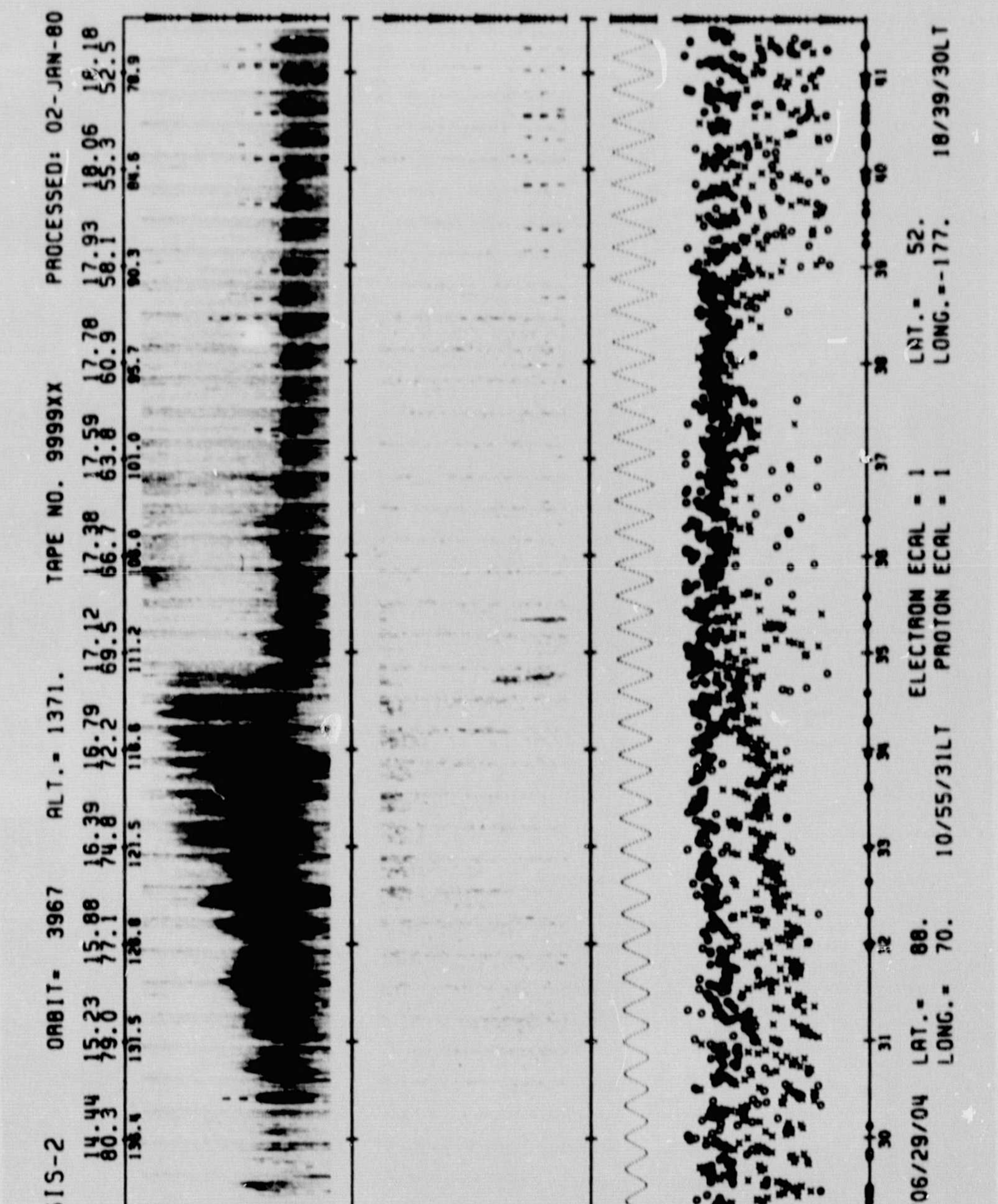
ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

HRT Y00481
FILE 27

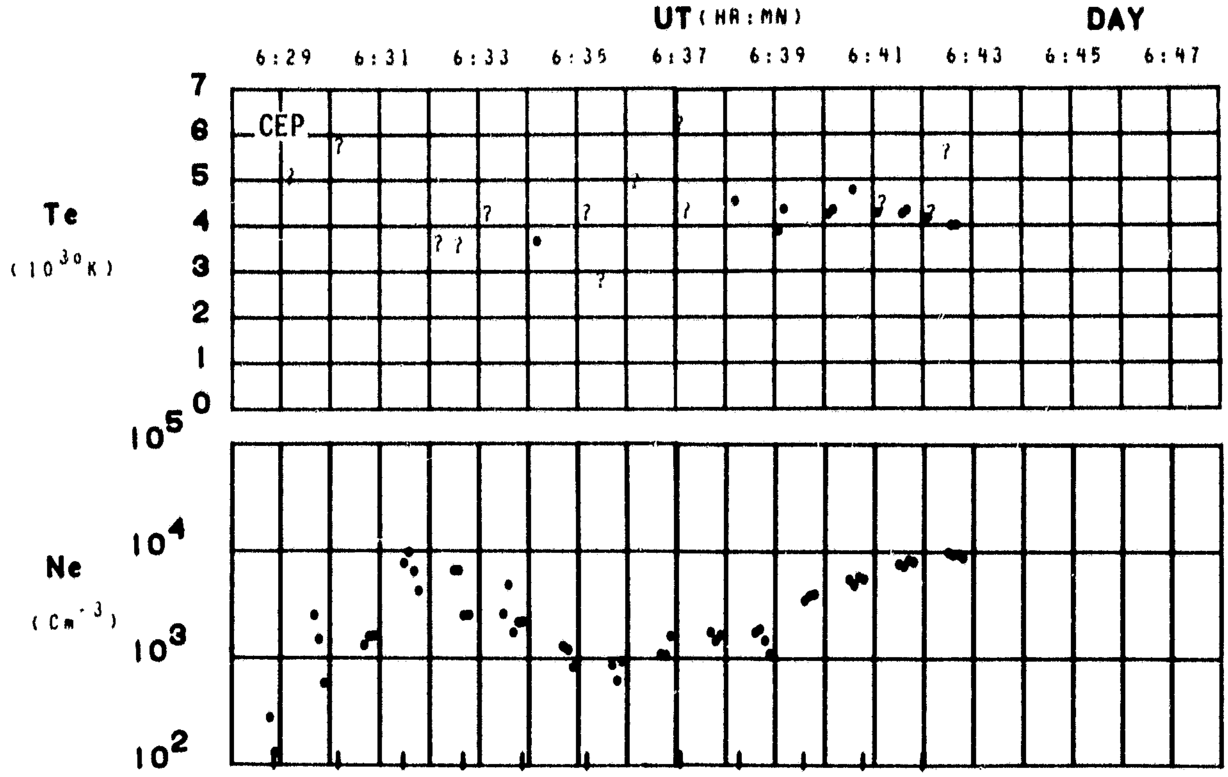
SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

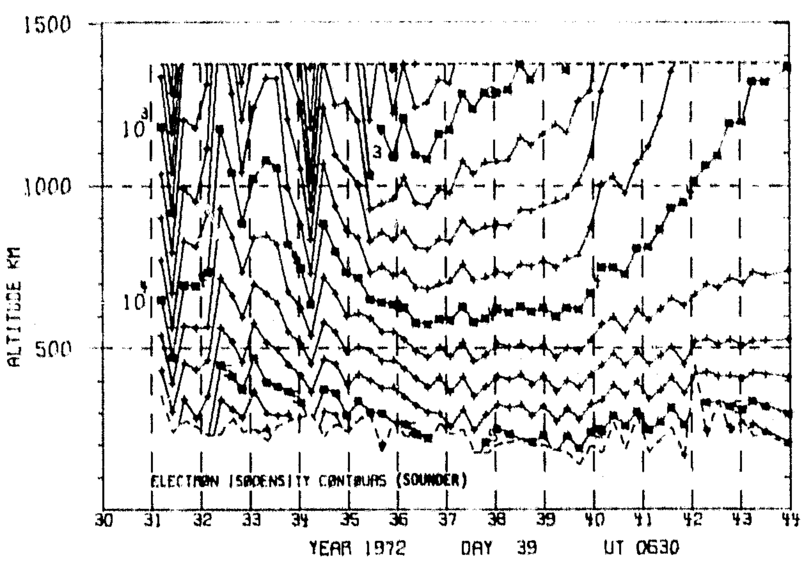

I(22)/I(40)
D (1·3) Log I
D (4·1) Log I
D (9·6) Log I
I₁₁ (40) Log R
I (40) Log R
I (210) Log R
Ē KeV
U.T.
INV.LAT.
MLT
B
THETA Z
ORBIT 3967
1972 33 6 29 0


SPS
ISIS-2
ORBIT= 3967
ALT.= 1371.
TAPE NO. 9999XX
PROCESSED: 02-JAN-80
MLT.
INV.LAT.
14.44 15.23 15.88 16.39 16.79 17.12 17.38 17.59 17.78 17.93 18.06 18.18
80.3 79.0 77.1 74.8 72.2 69.5 66.7 63.8 60.9 58.1 55.3 52.5
LOG ENERGY (EV)
TOP ELECTRON
BOTTOM PROTON
LOG AVG ENERGY (EV)
o PROTON
x ELECTRON
U.T.
72/039/06/29/04 LAT.= 88. LONG.= 70. 10/55/31LT
ELECTRON ECAL = 1
PROTON ECAL = 1
LAT.= 52. LONG.=-177. 18/39/30LT

ORBIT 3967
DATE 720208
DAY 39



LAT	87	86	83	79	75	71	65	61	57	53	49
LONG	57	154	172	177	-179	-178	-177	-177	-177	-176	-176
LT	10:05	16:32	17:47	18:09	18:20	18:26	18:32	18:35	18:37	18:38	18:40
DIP	86	87	85	83	81	78	74	72	69	66	63
DIPLAT	83	84	81	77	73	68	61	57	52	48	44
L	37.4	33.8	23.6	15.9	11.0	7.7	5.0	4.0	3.3	2.8	2.4
INVLAT	80	80	78	75	72	68	63	50	56	53	49
ZA	103	103	104	105	106	106	107	107	107	107	108

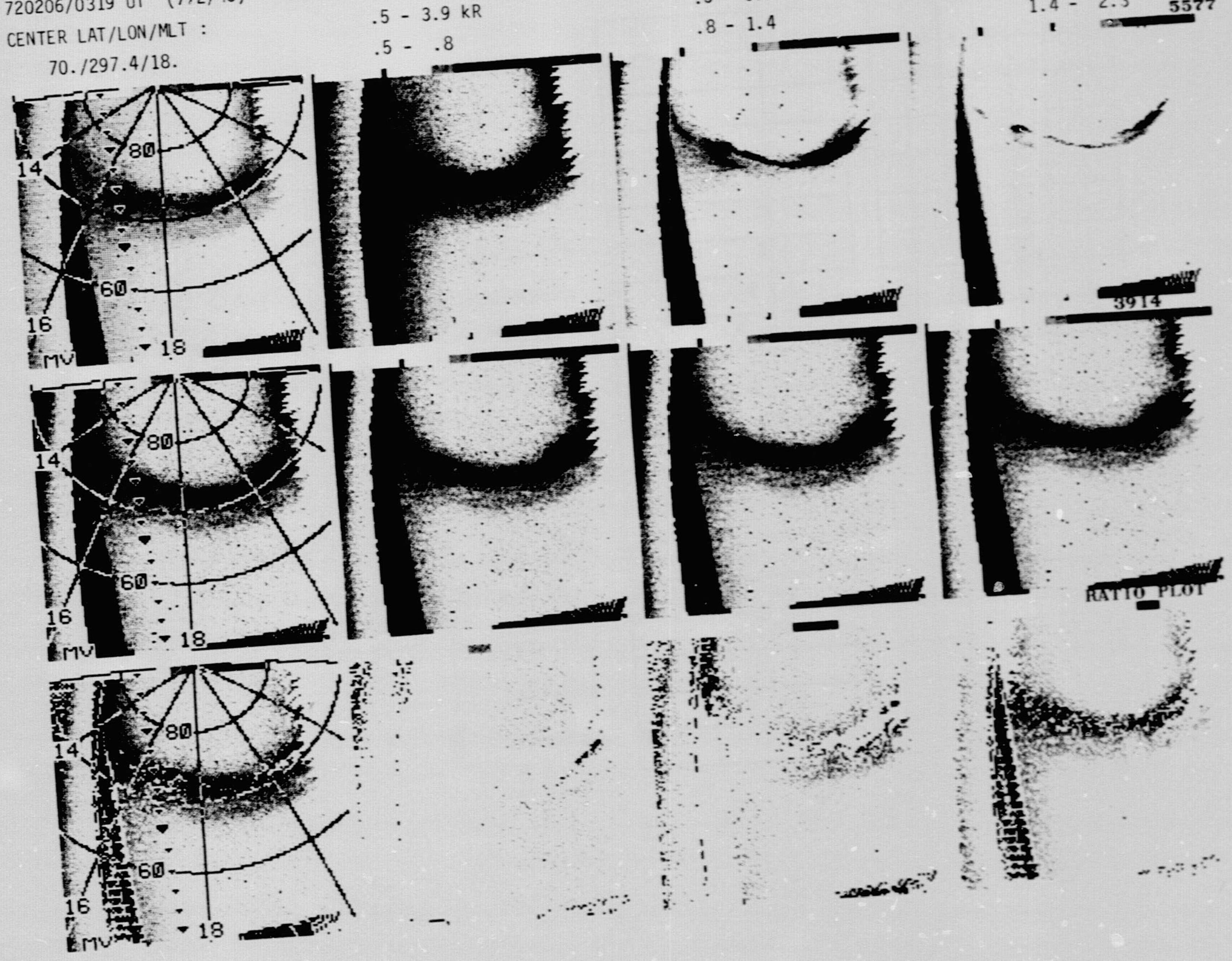


ASP
720206/0319 UT (772/45)
CENTER LAT/LON/MLT :
70./297.4/18.

.5 - 3.9 kR
.5 - 3.9 kR
.5 - .8

1.9 - 9.5 kR
.5 - 3.9 kR
.8 - 1.4

4.6 - 33.0 kR
.5 - 3.9 kR
1.4 - 2.3

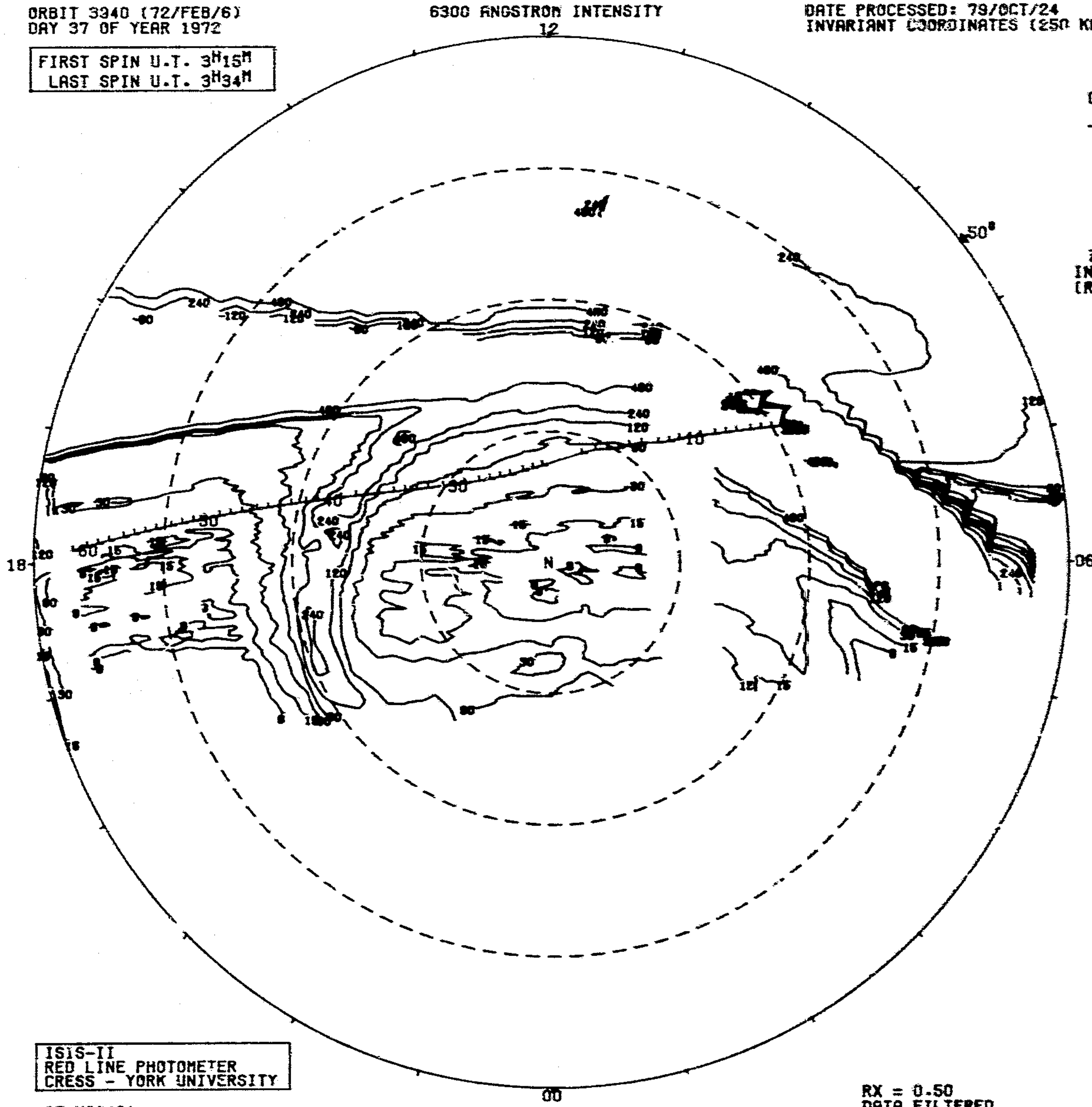


ORBIT 3340 (72/FEB/6)
DAY 37 OF YEAR 1972

FIRST SPIN U.T. $3^{H}15^{M}$
LAST SPIN U.T. $3^{H}34^{M}$

6300 ANGSTROM INTENSITY

DATE PROCESSED: 79/OCT/24
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

30
150
300
600
1200
2400
4800
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

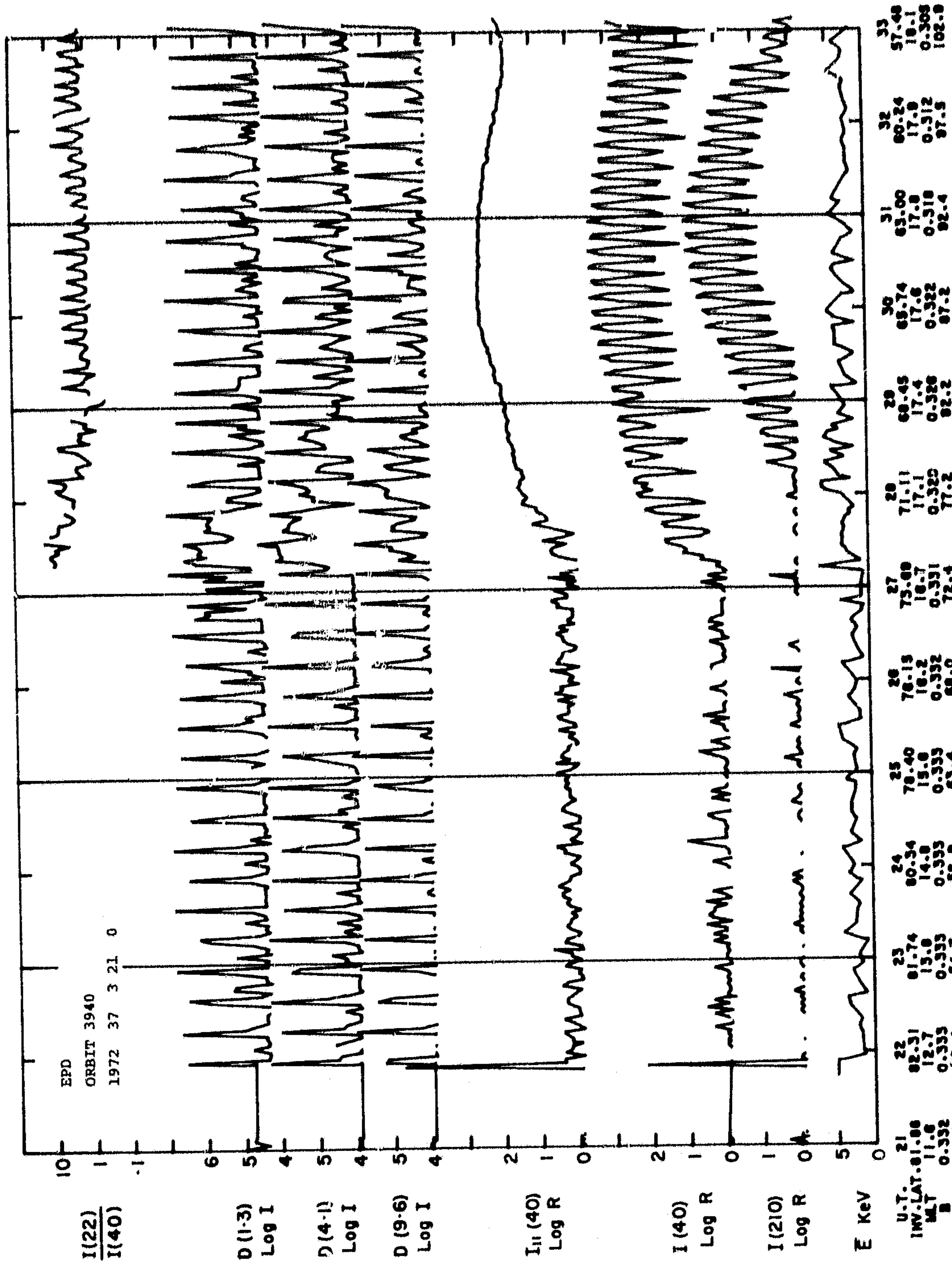
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	031513	69.6
2	031537	70.6
3	031555	71.4
4	031613	72.2
5	031637	73.2
6	031655	73.9
7	031713	74.7
8	031737	75.6
9	031755	76.3
10	031813	77.0
11	031831	77.7
12	031849	78.3
13	031913	79.2
14	031931	79.7
15	031949	80.3
15	032013	80.9
17	032031	81.4
18	032049	81.7
19	0	0.0
20	0	0.0
21	032149	82.3
22	032207	82.3
23	032225	82.2
24	032249	81.9
25	032307	81.6
26	032325	81.3
27	032343	80.8
28	032407	80.1
29	032425	79.6
30	032443	79.0
31	032507	78.2
32	032525	77.5
33	032543	76.8
34	032601	76.1
35	032625	75.1
36	032643	74.4
37	032701	73.7
38	032725	72.6
39	032743	71.9
40	032801	71.1
41	032819	70.3
42	032843	69.2
43	032901	68.4
44	032919	67.6
45	032937	66.8
46	033001	65.7
47	033019	64.9
48	033037	64.1
49	033101	63.0
50	033119	62.1
51	033137	61.3
52	033155	60.5
53	033219	59.4
54	033237	58.5
55	033255	57.7
56	033313	56.9
57	033337	55.8
58	033355	55.0
59	033413	54.1
60	033437	53.0

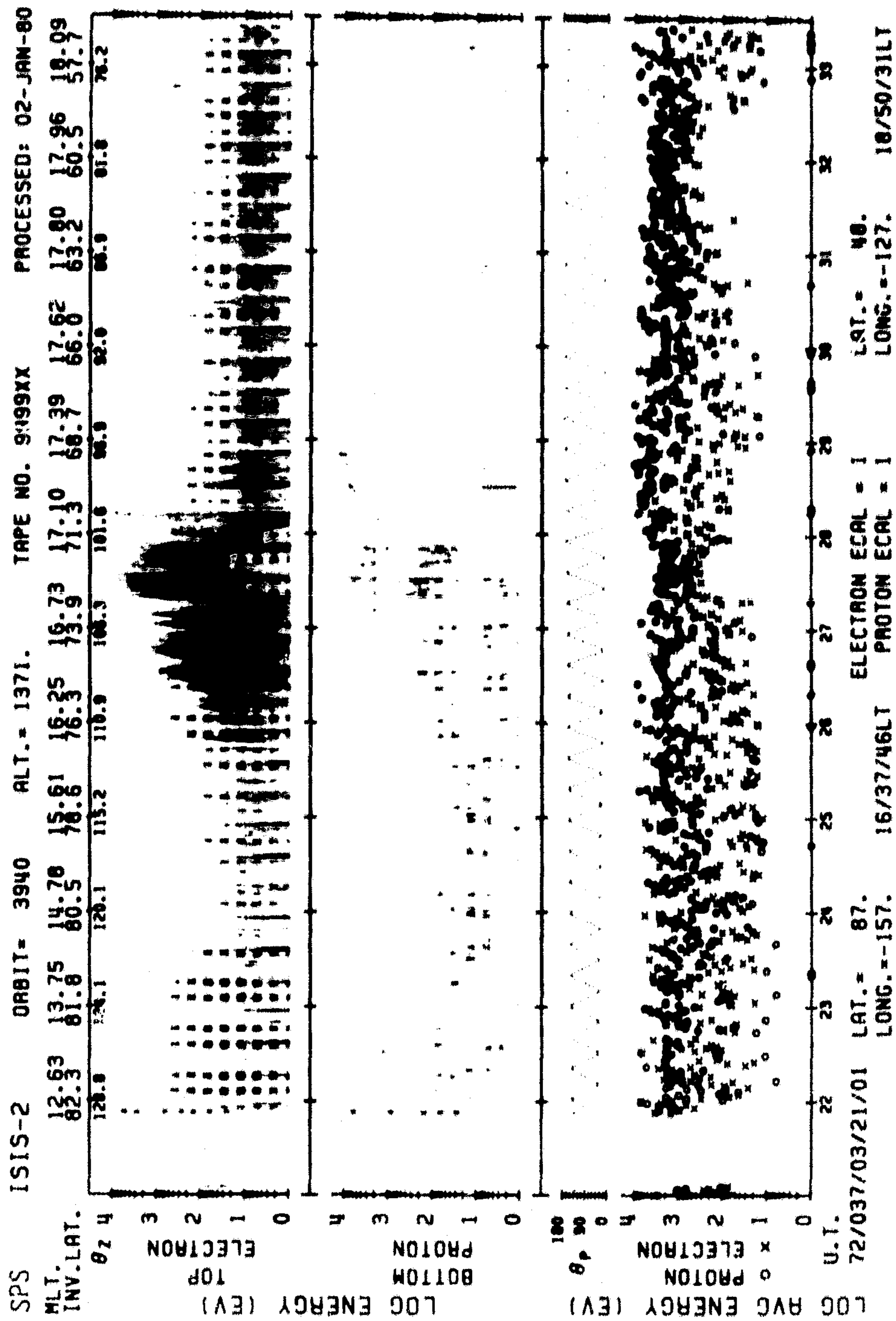
ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

HRT Y00481
FILE 10

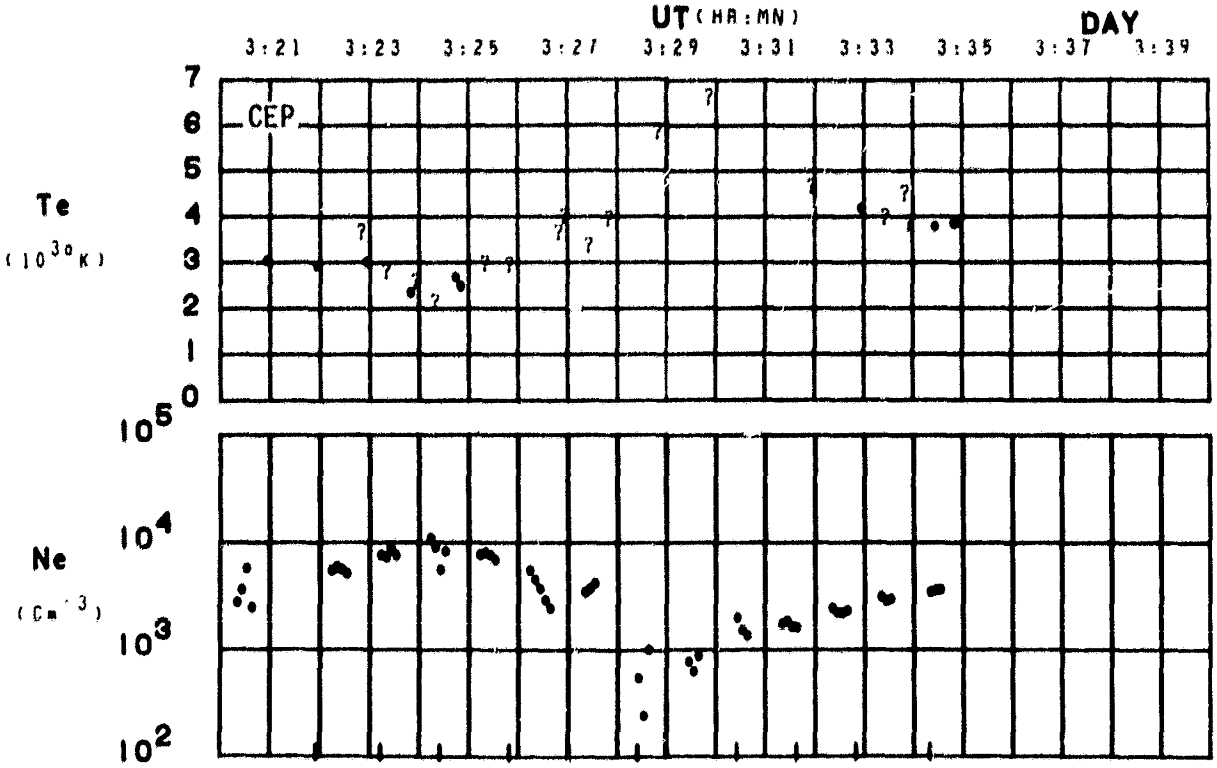
SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

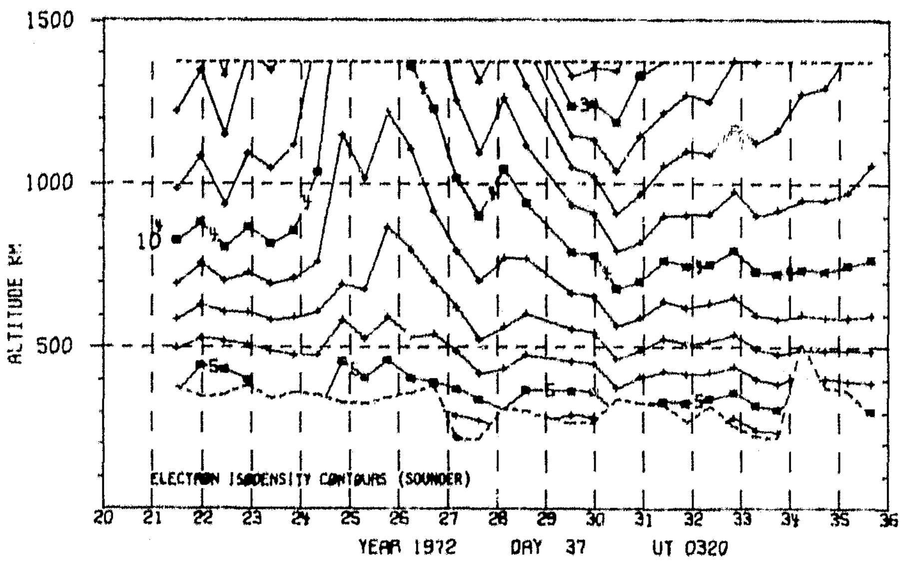

EPD
ORBIT 3940
1972 37 3 21 0
I(22)/I(40)
D (1-3) Log I
D (4-1) Log I
D (9-6) Log I
I∥ (40) Log R
I (40) Log R
I (210) Log R
E KeV
U.T.
INV-LAT.
MLT
B
THETA Z

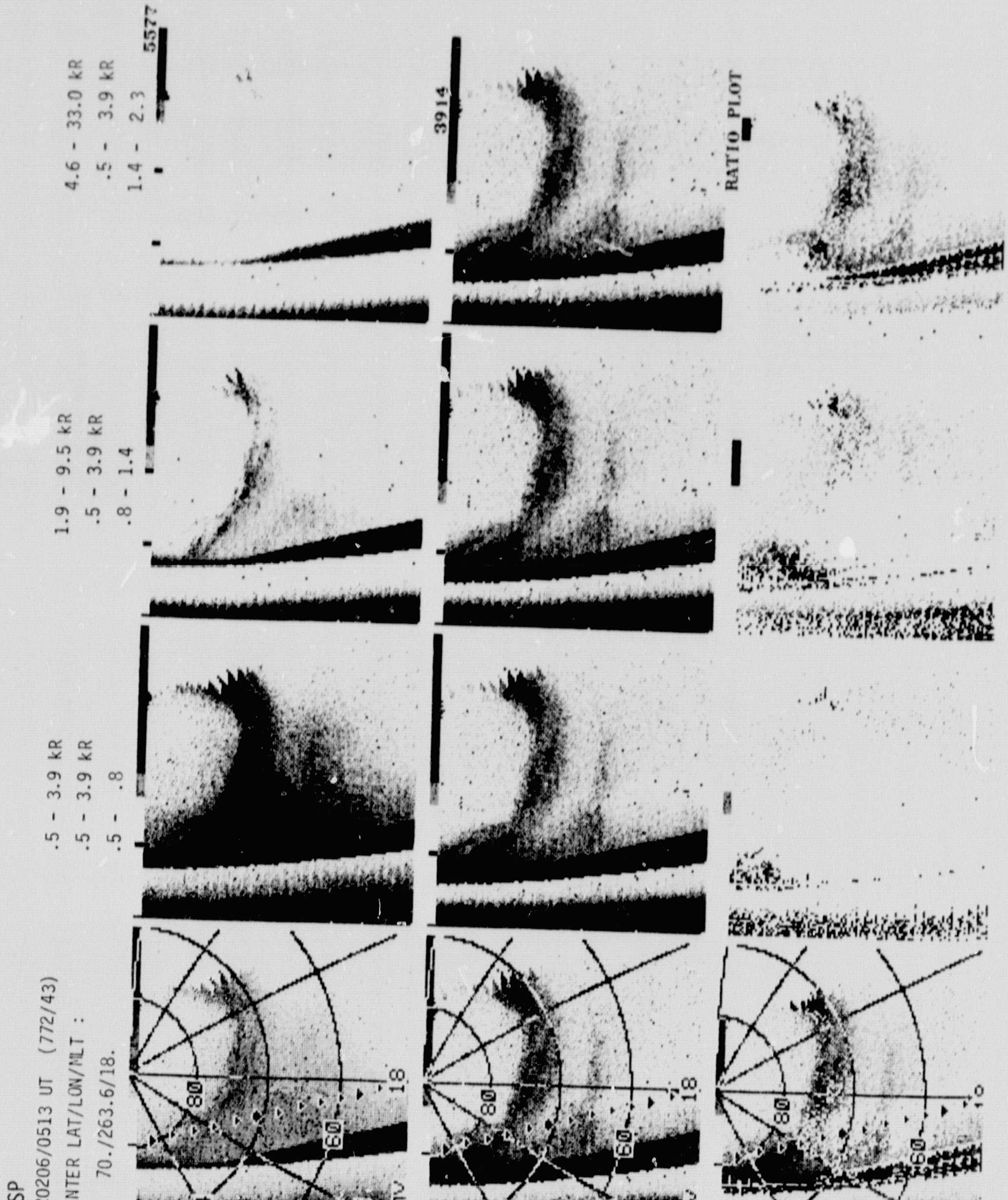

SPS
ISIS-2
ORBIT= 3940
ALT.= 1371.
TAPE NO.
PROCESSED: 02-JAN-80
MLT.
INV.LAT.
LOG ENERGY (EV)
TOP ELECTRON
BOTTOM PROTON
LOG AVG ENERGY (EV)
x ELECTRON
o PROTON
U.T.
72/037/03/21/01
LAT.= 87.
LONG.=-157.
16/37/46LT
ELECTRON ECAL = 1
PROTON ECAL = 1
LAT.= 48.
LONG.=-127.
18/50/31LT

ORBIT 3940
DATE 720206
DAY 37



LAT	84	80	76	72	68	63	57	53	49	45
LONG	-104	-133	-130	-128	-128	-127	-127	-127	-127	-127
LT	17:44	18:15	18:28	18:36	18:40	18:43	18:47	18:48	18:50	18:51
DIP	87	86	85	83	81	79	75	73	70	67
DIPLAT	85	83	80	77	73	69	63	59	55	50
L	55.9	45.9	30.6	18.6	12.6	8.6	5.4	4.3	3.6	2.9
INVLAT	82	81	79	76	73	70	64	61	57	53
ZA	105	106	107	107	108	109	109	109	110	110



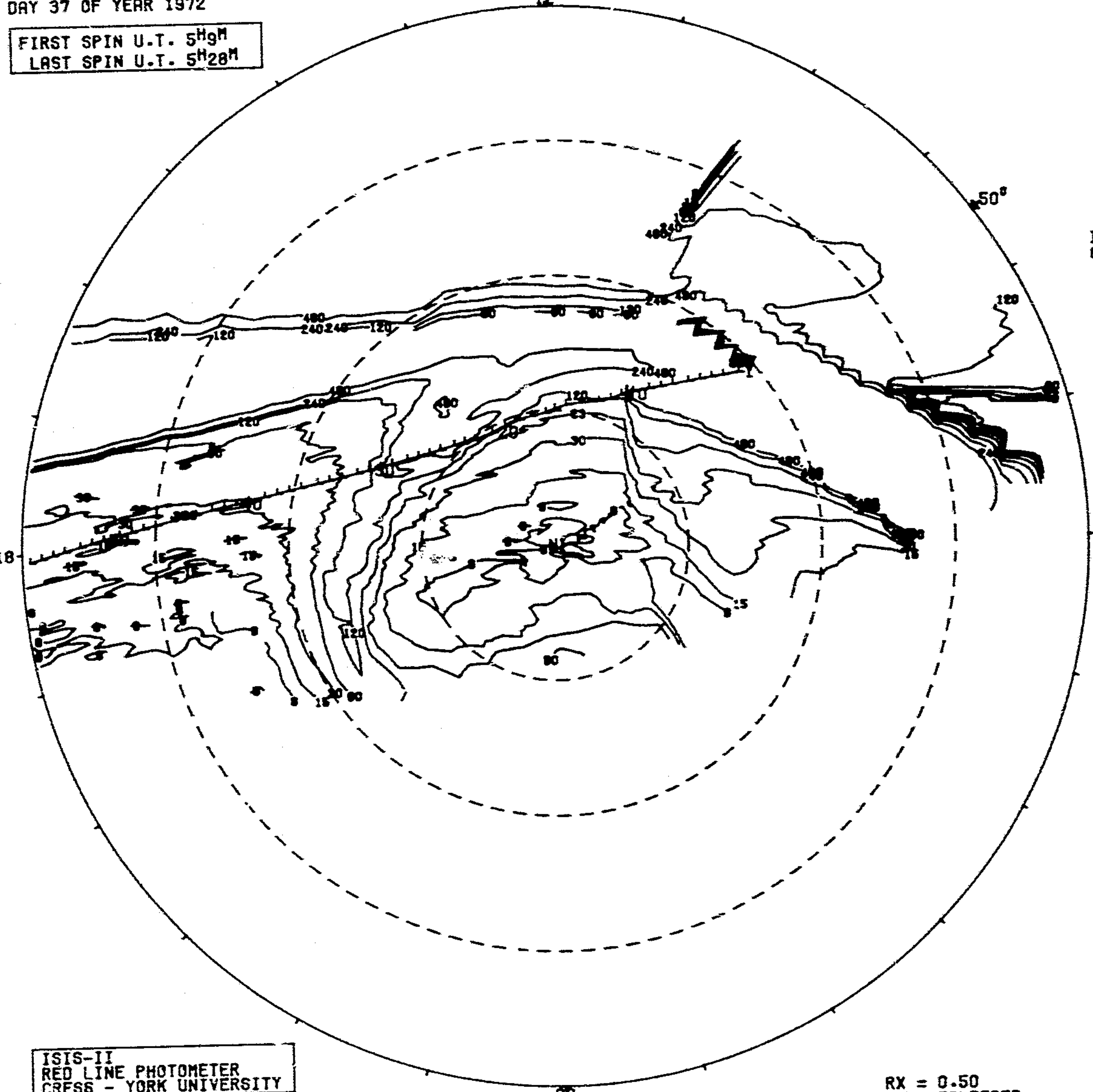

ASP
720206/0513 UT (772/43)
CENTER LAT/LON/MLT :
70./263.6/18.
.5 - 3.9 kR
.5 - 3.9 kR
.5 - .8
1.9 - 9.5 kR
.5 - 3.9 kR
.8 - 1.4
4.6 - 33.0 kR
.5 - 3.9 kR
1.4 - 2.3
5577
3914
RATIO PLOT
80
60
14
16
18
MV

ORBIT 3941 (72/FEB/6)
DAY 37 OF YEAR 1972

FIRST SPIN U.T. 5H9M
LAST SPIN U.T. 5H28M

6300 ANGSTROM INTENSITY

DATE PROCESSED: 79/NOV/05
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

80
150
300
600
1200
2400
4800
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

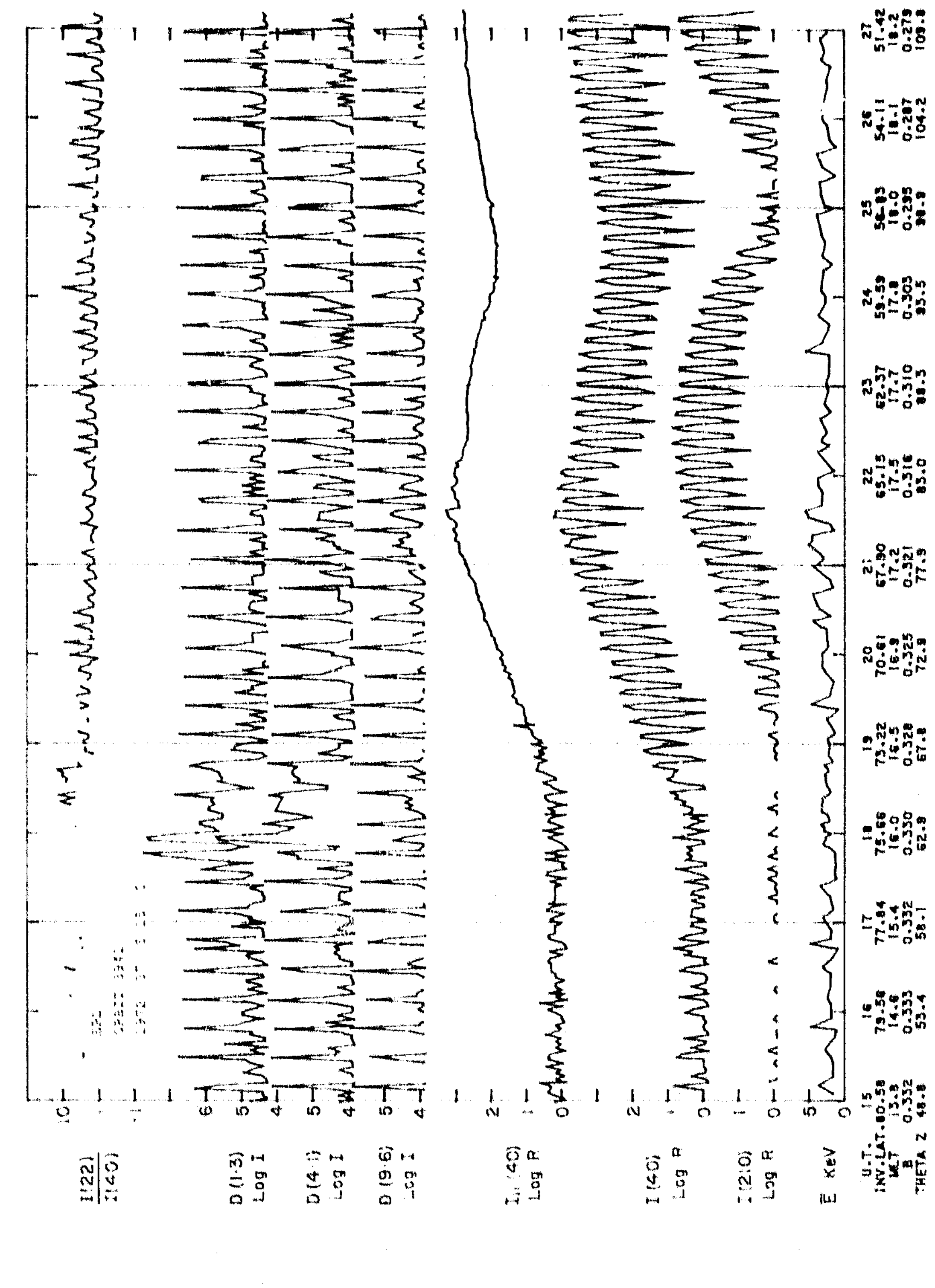
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	050906	71.5
2	050930	72.6
3	050948	73.3
4	051006	74.1
5	051024	74.8
6	051048	75.7
7	051106	76.4
8	051124	77.0
9	051148	77.9
10	051206	78.4
11	051224	79.0
12	051242	79.4
13	051306	79.9
14	051324	80.3
15	051342	80.5
16	051400	80.7
17	051424	80.8
18	051442	80.7
19	051500	80.6
20	051518	80.4
21	051542	80.0
22	051600	79.6
23	051616	79.1
24	051642	78.4
25	051700	77.8
26	051718	77.2
27	051736	76.6
28	051800	75.7
29	051818	75.0
30	051836	74.2
31	051854	73.5
32	051918	72.5
33	051936	71.7
34	051954	70.9
35	052018	69.8
36	052036	69.0
37	052054	68.2
38	052112	67.4
39	052136	66.3
40	052154	65.4
41	052212	64.6
42	052230	63.8
43	052254	62.7
44	052312	61.8
45	052330	61.0
46	052354	59.9
47	052412	59.0
48	052430	58.2
49	052448	57.4
50	052512	56.3
51	052530	55.5
52	052548	54.7
53	052612	53.6
54	052630	52.8
55	052648	52.0
56	052706	51.2
57	052730	50.1
58	052748	49.3
59	052806	48.5

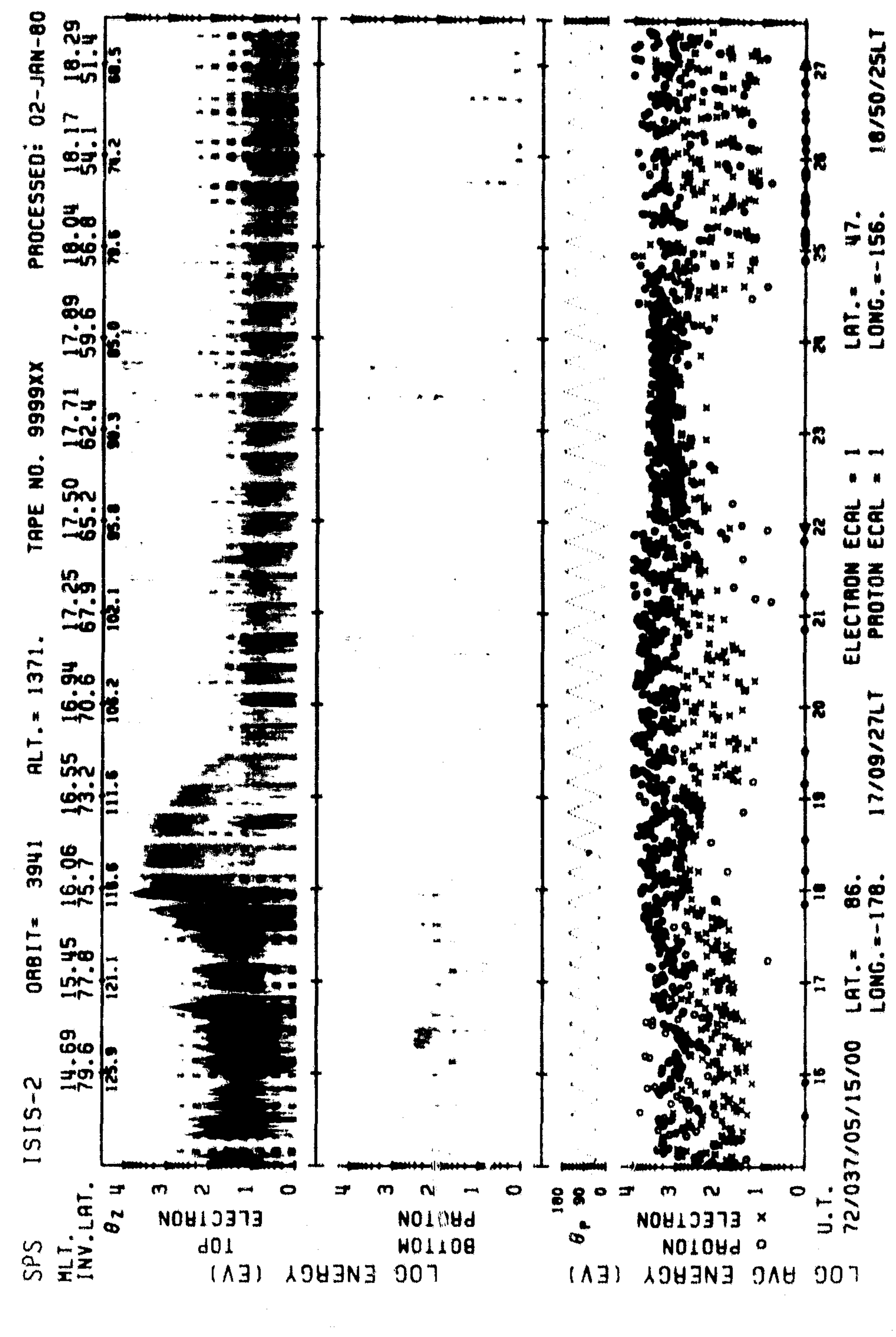
ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

HRT Y00481
FILE 18

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

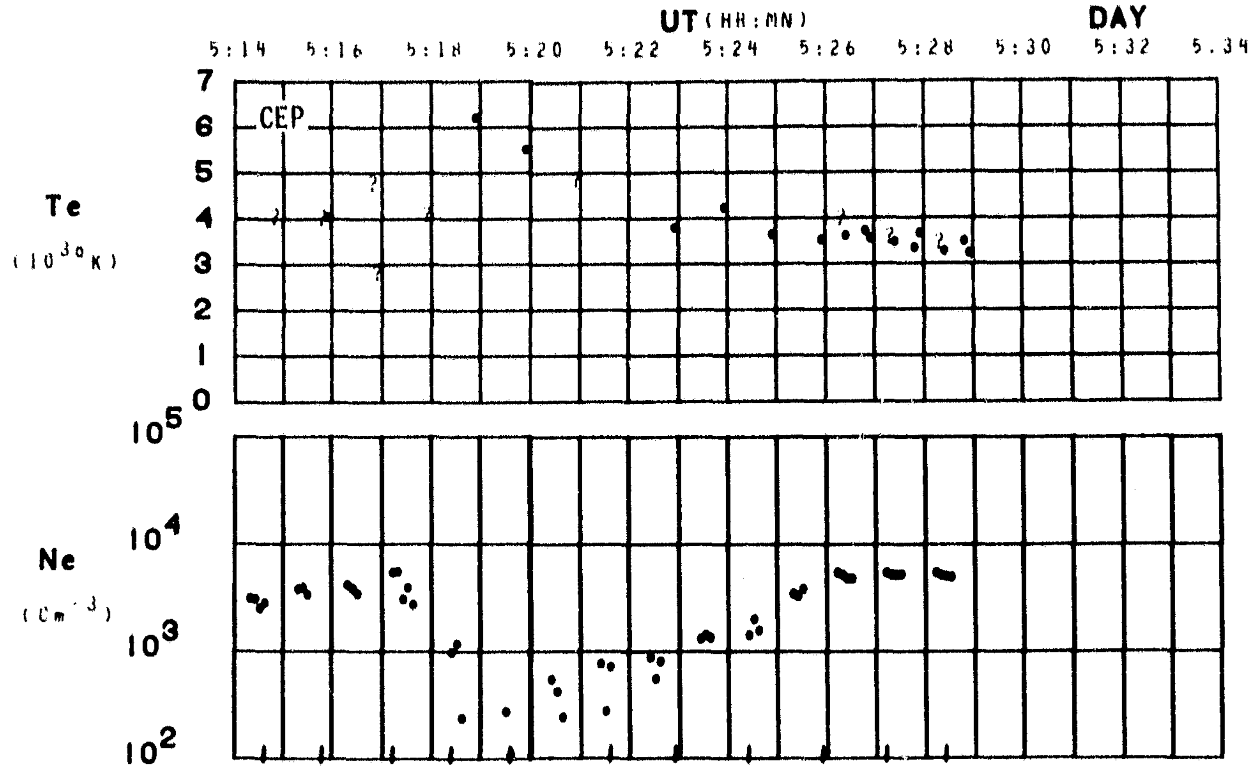
RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED


I(22)
I(40)
D(1.3)
Log I
D(4.1)
Log I
D(9.6)
Log I
Log R
I (40)
Log R
I (210)
Log R
E KeV
U.T.
INV.LAT.
MLT
B
THETA Z

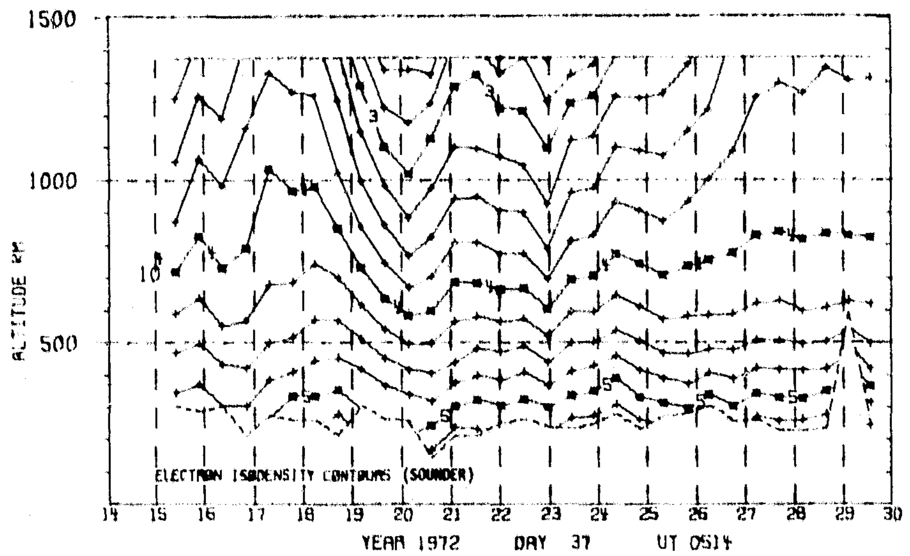


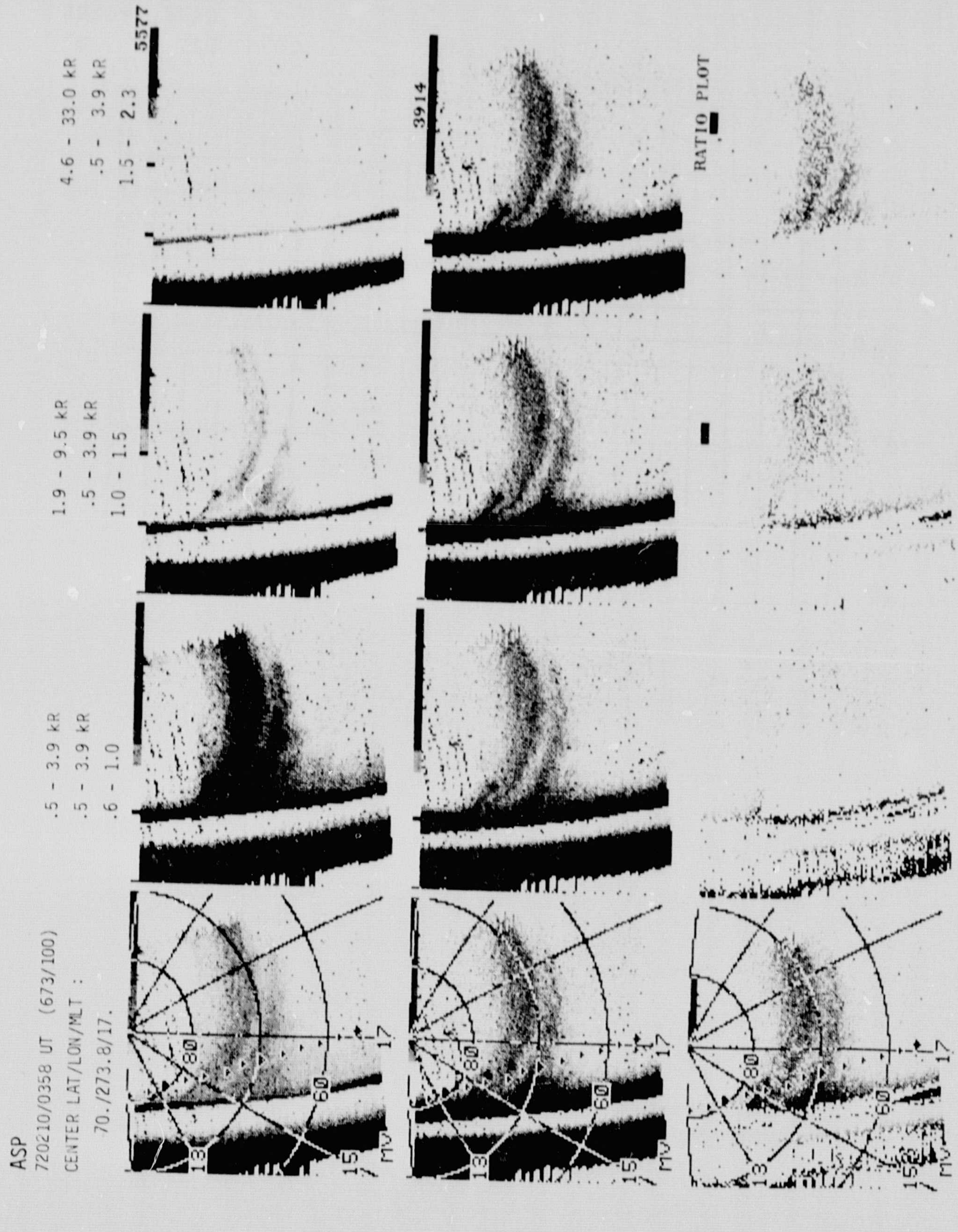
SPS
ISIS-2
ORBIT= 3941
ALT.= 1371.
TAPE NO. 9999XX
PROCESSED: 02-JAN-80
MLT.
INV.LAT.
14.69 79.6
15.45 77.8
16.06 75.7
16.55 73.2
16.94 70.6
17.25 67.9
17.50 65.2
17.71 62.4
17.89 59.6
18.04 56.8
18.17 54.1
18.29 51.4
TOP ELECTRON
BOTTOM PROTON
LOG ENERGY (EV)
× ELECTRON
○ PROTON
LOG AVG ENERGY (EV)
U.T.
72/037/05/15/00
LAT.= 86.
LONG.=-178.
17/09/27LT
ELECTRON ECAL = 1
PROTON ECAL = 1
LAT.= 47.
LONG.=-156.
18/50/25LT

ORBIT 3941
DATE 720206
DAY 37



LAT	87	83	79	75	71	65	61	56	51	47	43
LONG	166	-167	-160	-158	-157	-156	-155	-155	-155	-155	-155
LT	16:05	17:52	18:19	18:29	18:36	18:42	18:44	18:47	18:49	18:50	18:51
DIP	87	86	84	82	80	76	73	70	67	64	61
DIPLAT	84	83	79	75	71	64	59	54	49	45	42
L	38.6	32.1	21.1	14.4	10.1	6.2	4.7	3.7	2.9	2.5	2.2
INVLAT	80	79	77	74	71	66	62	58	54	50	47
ZA	104	105	106	107	107	108	109	109	109	110	110



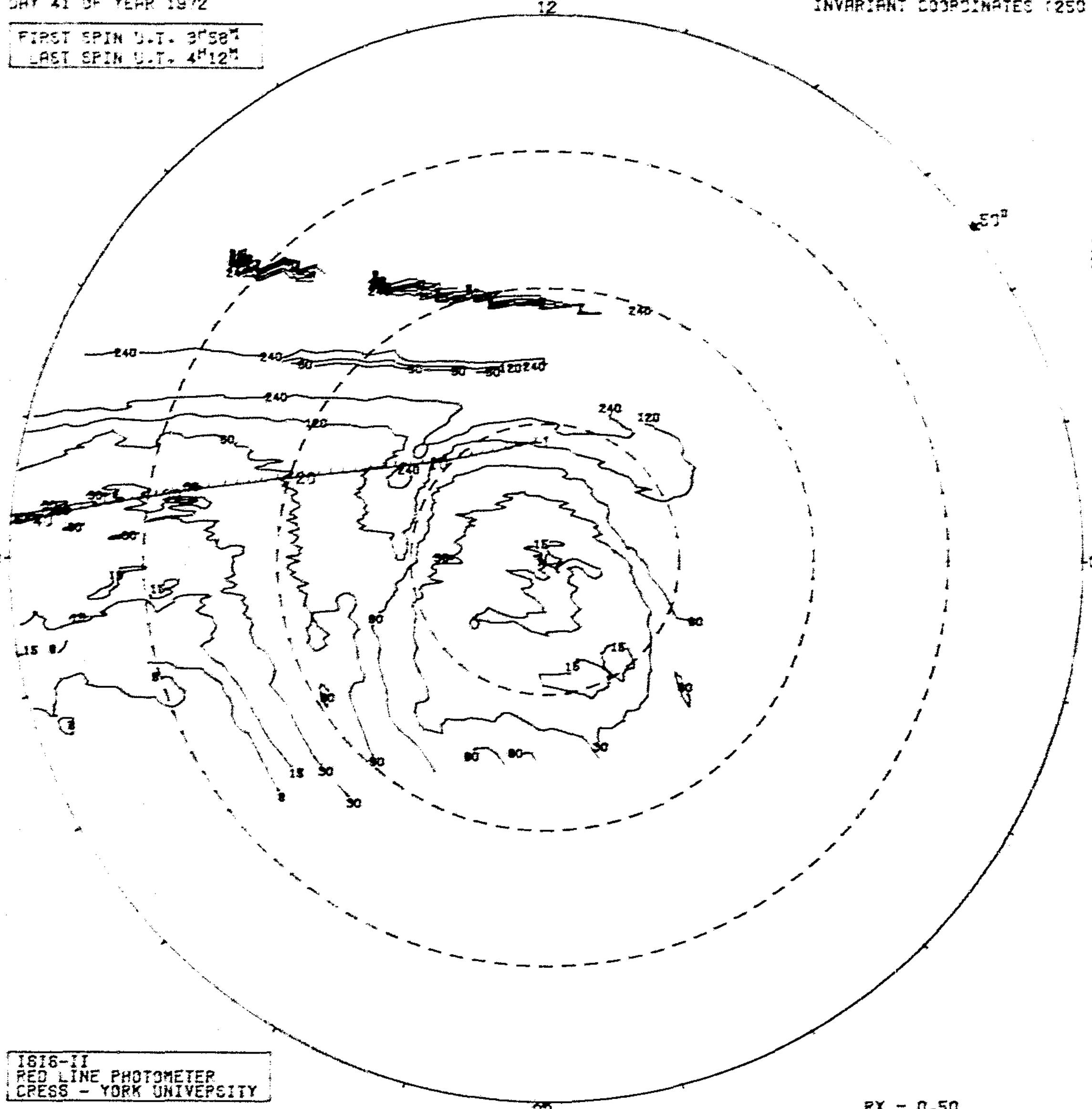

ASP
720210/0358 UT (673/100)
CENTER LAT/LON/MLT :
70./273.8/17.
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT
80
60
13
15
17
MV

ORBIT 3991 (72/FEB/10)
DAY 41 OF YEAR 1972

FIRST SPIN U.T. 3H58M
LAST SPIN U.T. 4H12M

5300 ANGSTROM INTENSITY

DATE PROCESSED: 79/OCT/22
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

80
150
300
600
1200
2400
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

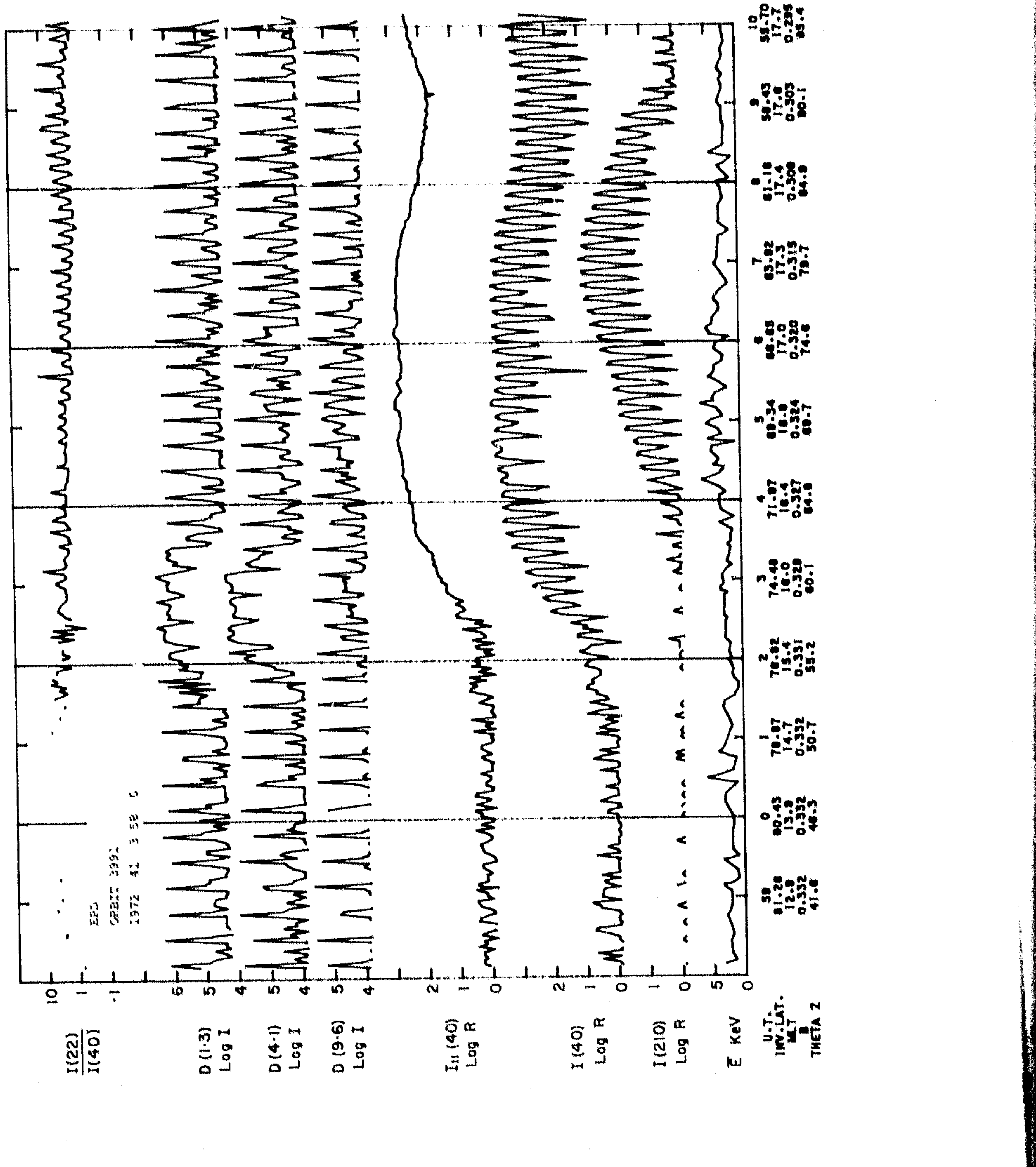
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	035838	81.3
2	035902	81.3
3	035920	81.1
4	035944	80.7
5	040002	80.4
6	040020	80.0
7	040038	79.5
8	040102	78.8
9	040120	78.2
10	040138	77.6
11	040156	77.0
12	040220	76.1
13	040238	75.4
14	040256	74.6
15	040320	73.7
16	040338	72.9
17	040356	72.1
18	040414	71.4
19	040438	70.3
20	040456	69.5
21	040514	68.7
22	040538	67.6
23	040556	66.8
24	040614	66.0
25	040632	65.2
26	040656	64.1
27	040714	63.3
28	040732	62.5
29	040750	61.6
30	040814	60.5
31	040832	59.7
32	040850	58.9
33	040914	57.8
34	040932	57.0
35	040950	56.2
36	041008	55.3
37	041032	54.3
38	041050	53.5
39	041108	52.6
40	041132	51.6
41	041150	50.8
42	041208	50.0
43	041226	49.2

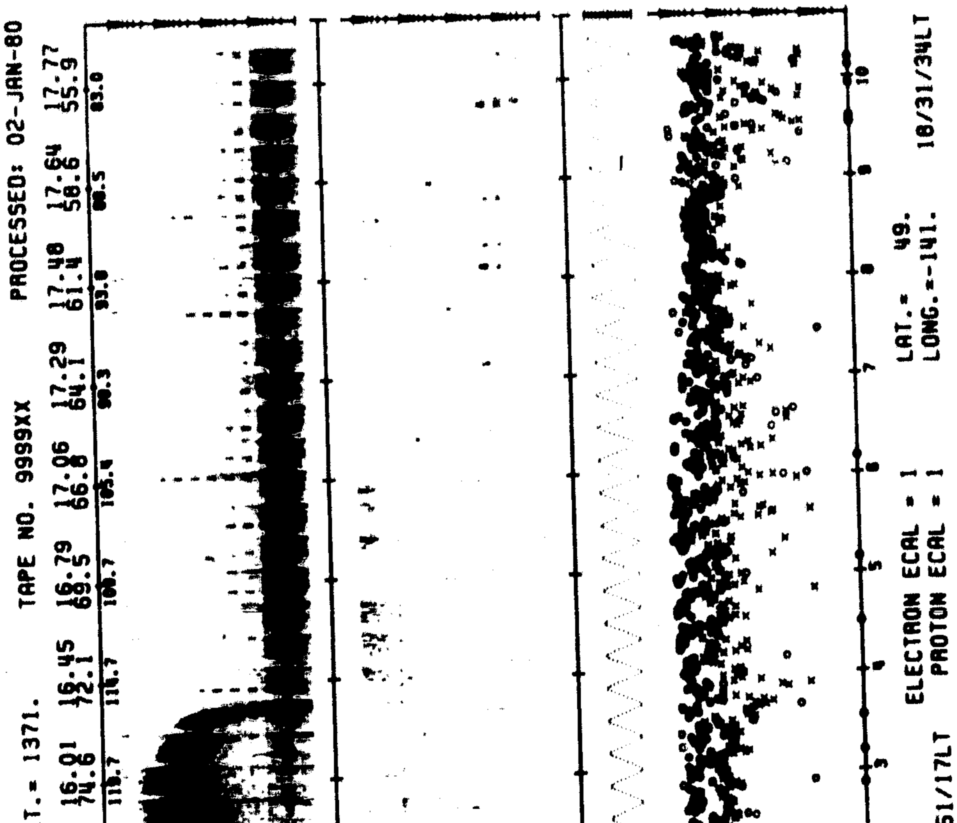
ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

HRT Y00511
FILE 58

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

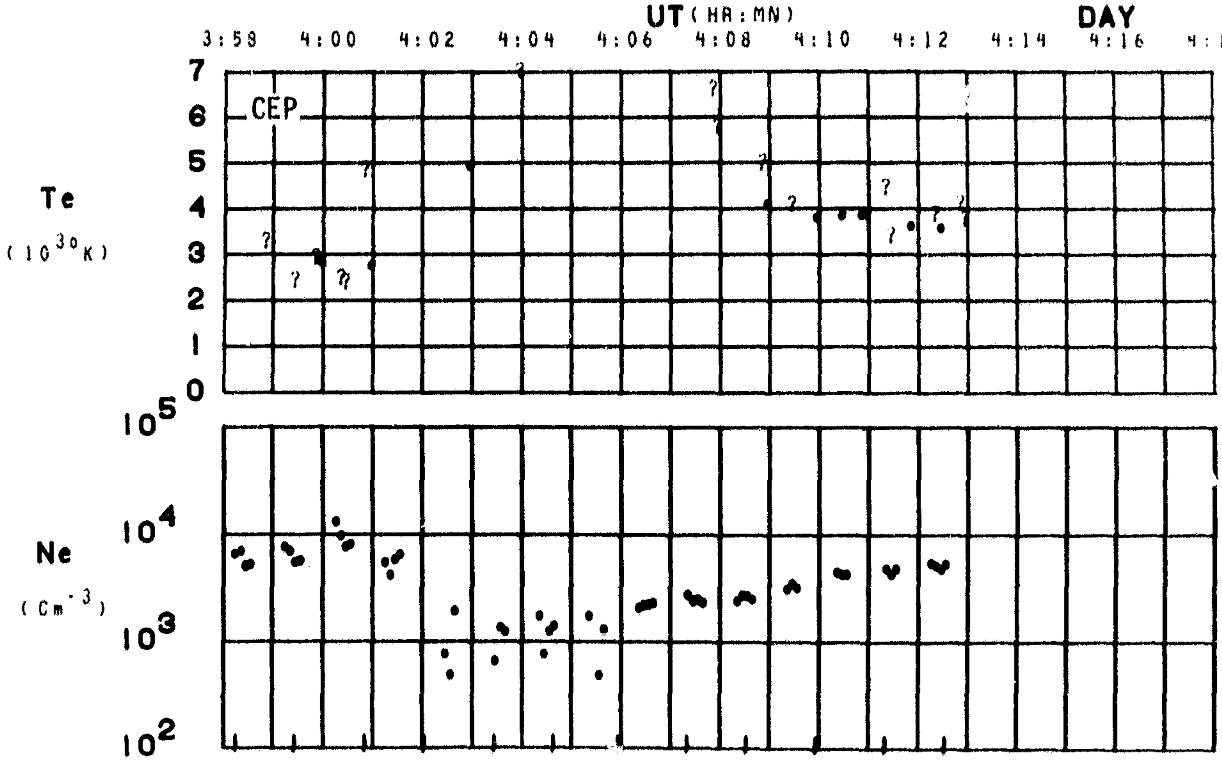
RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED


I(22)/I(40)
D(1·3) Log I
D(4·1) Log I
D(9·6) Log I
I∥(40) Log R
I(40) Log R
I(210) Log R
Ē KeV
U.T.
INV.LAT.
MLT
B
THETA 2
EPD
ORBIT 3391
1972 41 3 58 0

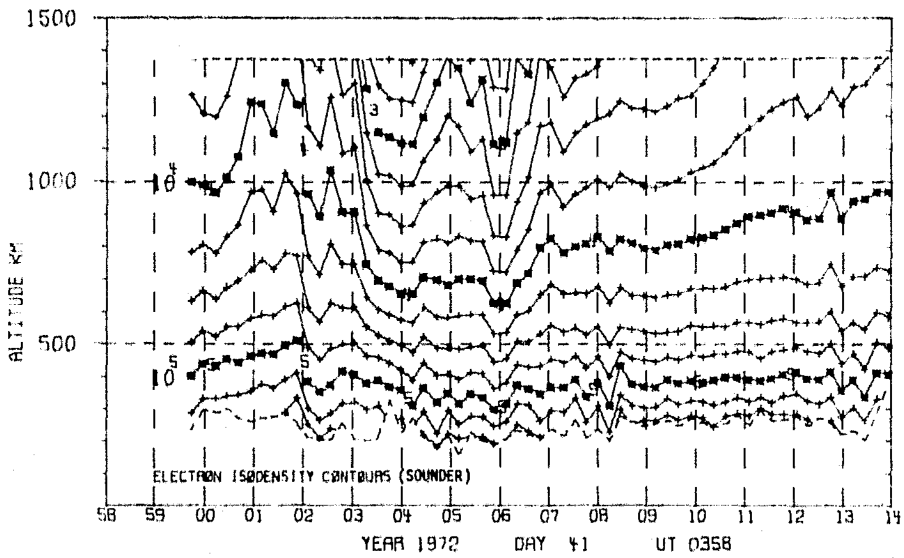


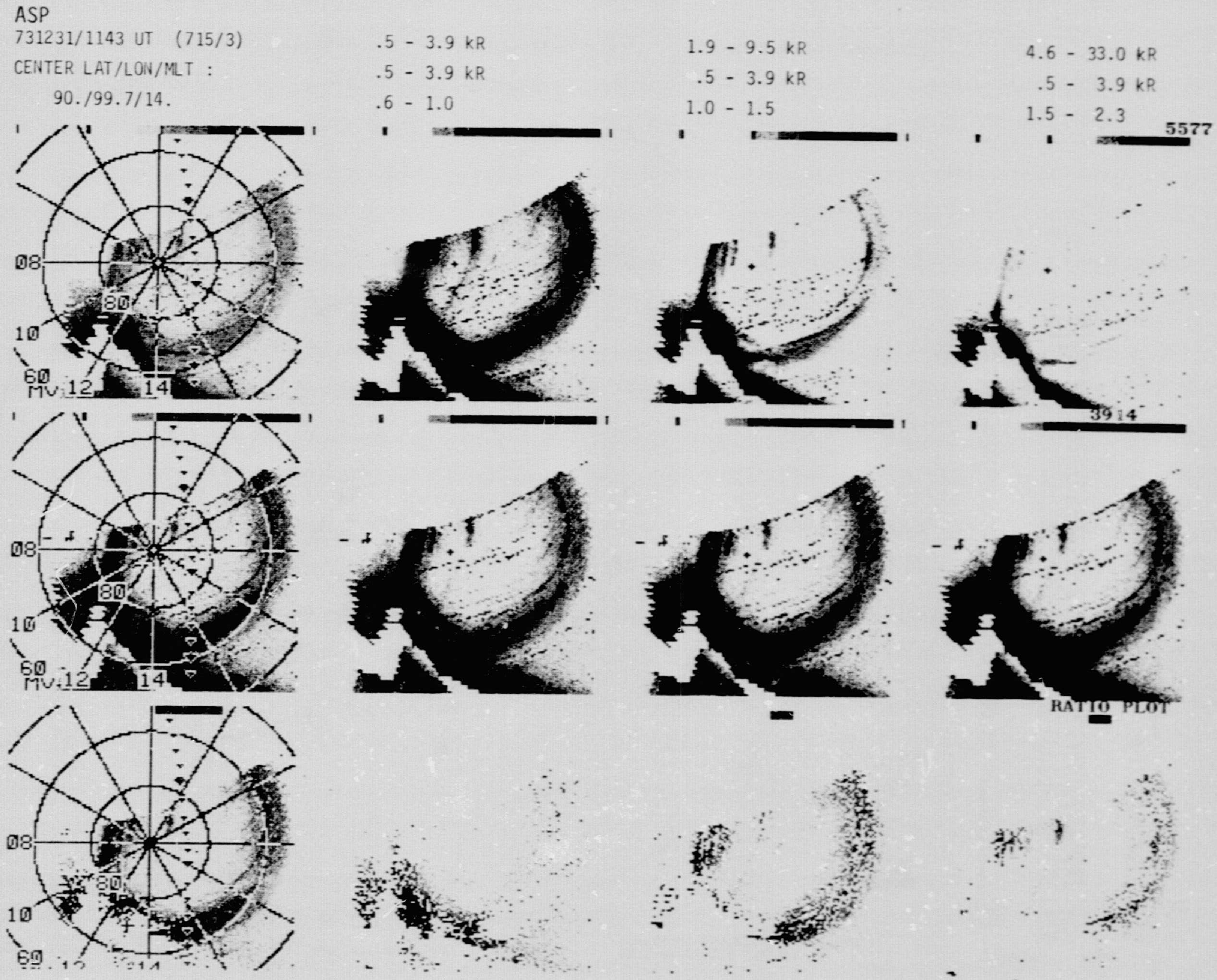
ISIS-2
ORBIT= 3991
ALT.= 1371.
TAPE NO. 9999XX
PROCESSED: 02-JAN-80
SPS
MLT.
INV.LAT.
TOP
ELECTRON
BOTTOM
PROTON
LOG ENERGY (EV)
x ELECTRON
o PROTON
LOG AVG ENERGY (EV)
U.T.
72/041/03/58/08
LAT.= 87.
LONG.=-178.
15/51/17LT
ELECTRON ECAL = 1
PROTON ECAL = 1
LAT.= 49.
LONG.=-141.
18/31/34LT

ORBIT 3991
DATE 720210
DAY 41



LAT	87	83	79	75	71	67	63	58	54	50	45	42
LONG	-173	-152	-146	-144	-142	-141	-141	-141	-141	-141	-141	-141
LT	16:10	17:34	18:0.	18:11	18:18	18:22	18:25	18:27	18:29	18:31	18:32	18:33
DIP	87	86	85	83	81	79	76	74	71	68	65	62
DIPLAT	85	83	80	77	73	69	65	60	56	52	47	43
L	43.2	41.0	28.4	19.0	12.3	8.8	6.5	4.9	3.9	3.2	2.7	2.3
INVLAT	81	81	79	76	73	70	66	63	59	55	52	48
ZA	103	103	104	104	105	105	105	106	106	106	106	105



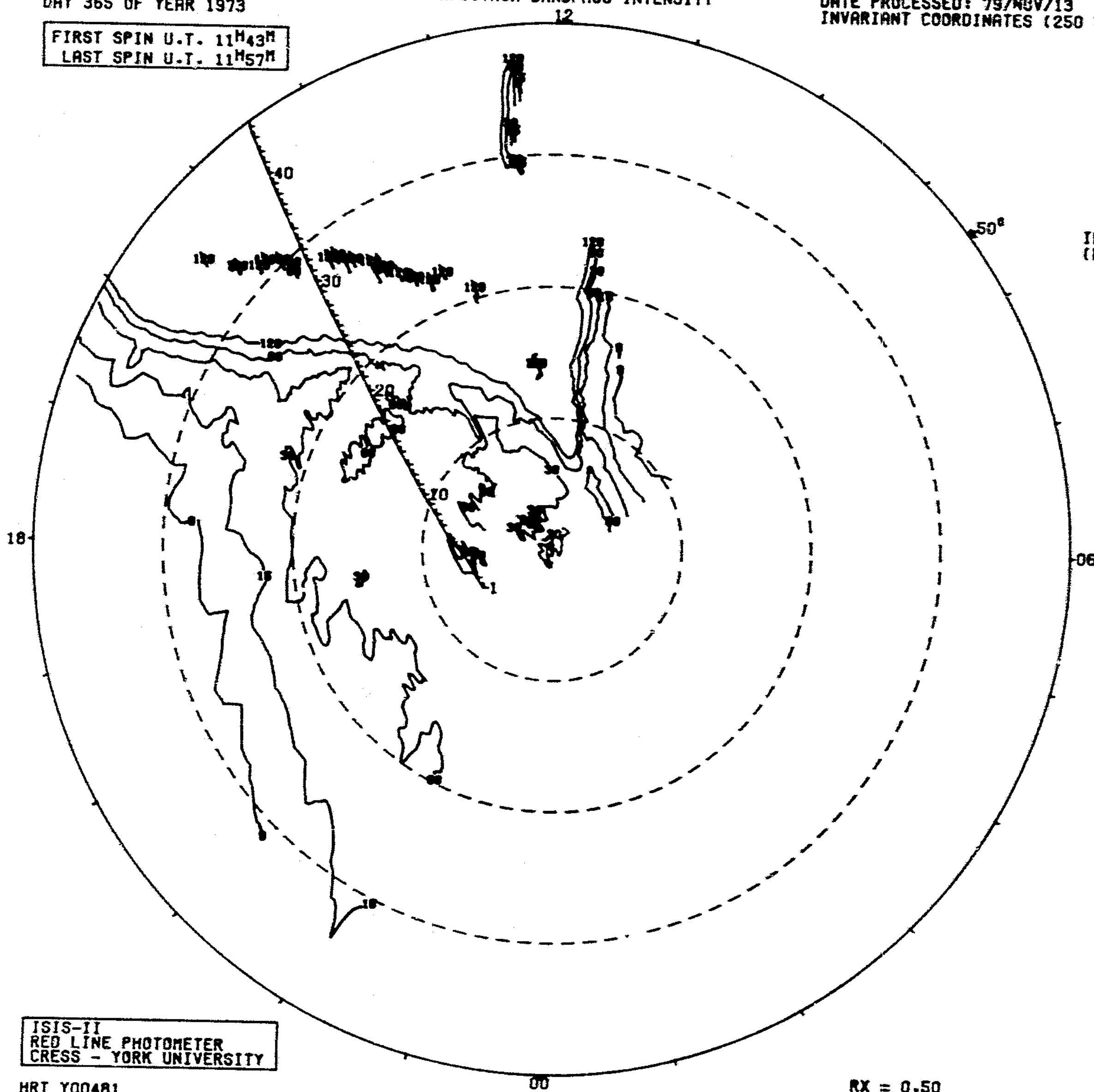

ASP
731231/1143 UT (715/3)
CENTER LAT/LON/MLT :
90./99.7/14.
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT
08
10
60
80
MV 12
14

ORBIT 12736 (73/DEC/31)
DAY 365 OF YEAR 1973

FIRST SPIN U.T. $11^{H}43^{M}$
LAST SPIN U.T. $11^{H}57^{M}$

10 ANGSTROM BANDPASS INTENSITY

DATE PROCESSED: 79/NOV/13
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

80
150
300
600
1200
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

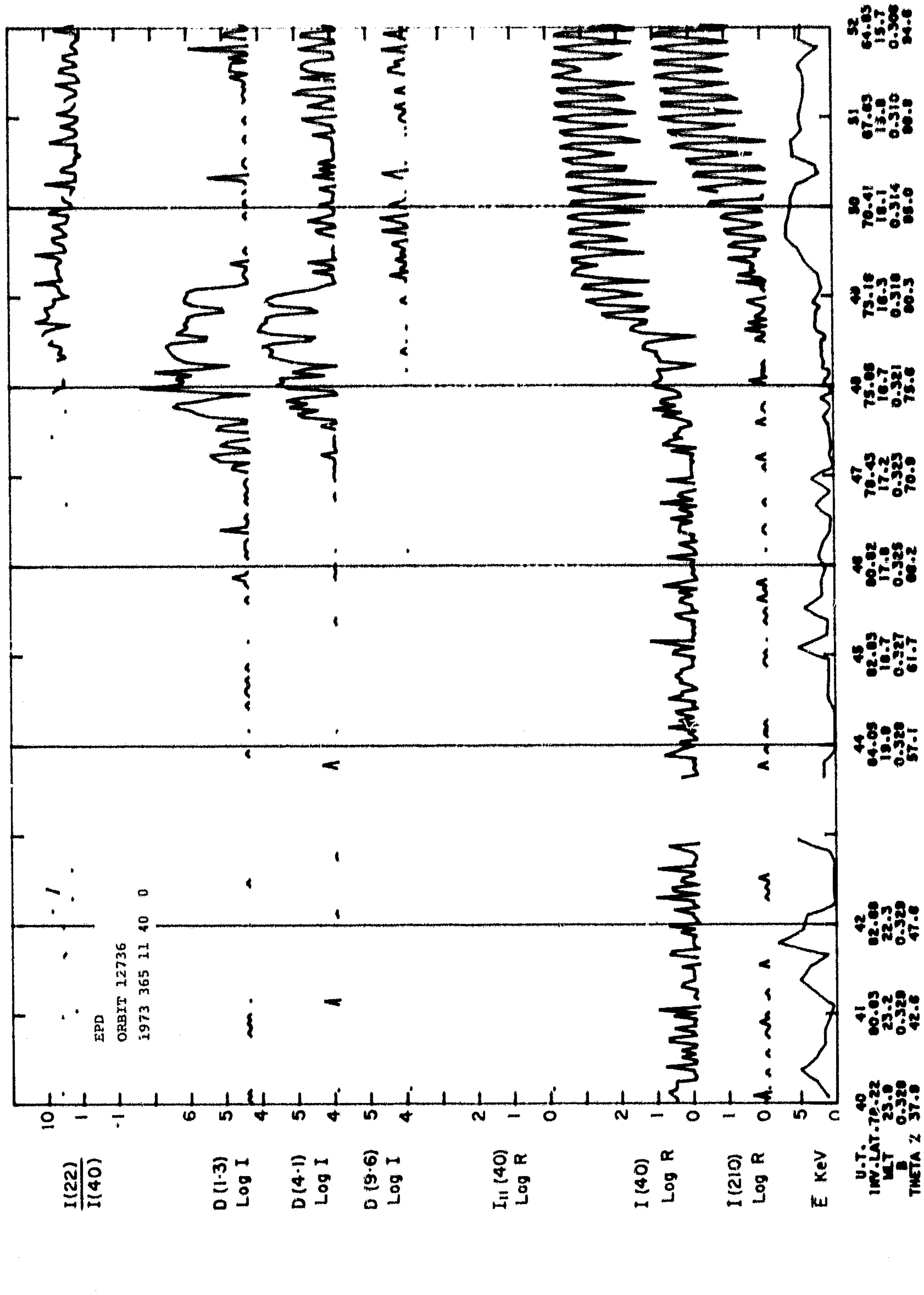
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	114340	84.2
2	114358	84.1
3	114416	83.9
4	114434	83.5
5	114452	83.1
6	114510	82.6
7	114534	81.8
8	114552	81.2
9	114610	80.5
10	114628	79.8
11	114646	79.1
12	114704	78.3
13	114722	77.5
14	114746	76.5
15	114804	75.7
16	114822	74.9
17	114840	74.1
18	114858	73.3
19	114916	72.5
20	114934	71.7
21	114958	70.6
22	115016	69.7
23	115034	68.9
24	115052	68.1
25	115110	67.2
26	115128	66.4
27	115146	65.5
28	115204	64.7
29	115228	63.6
30	115246	62.7
31	115304	61.9
32	115322	61.0
33	115340	60.2
34	115358	59.3
35	115416	58.5
36	115440	57.4
37	115458	56.5
38	115516	55.7
39	115534	54.8
40	115552	54.0
41	115610	53.1
42	115628	52.3
43	115652	51.2
44	115710	50.3
45	115728	49.5

ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

HRT Y00481
FILE 26

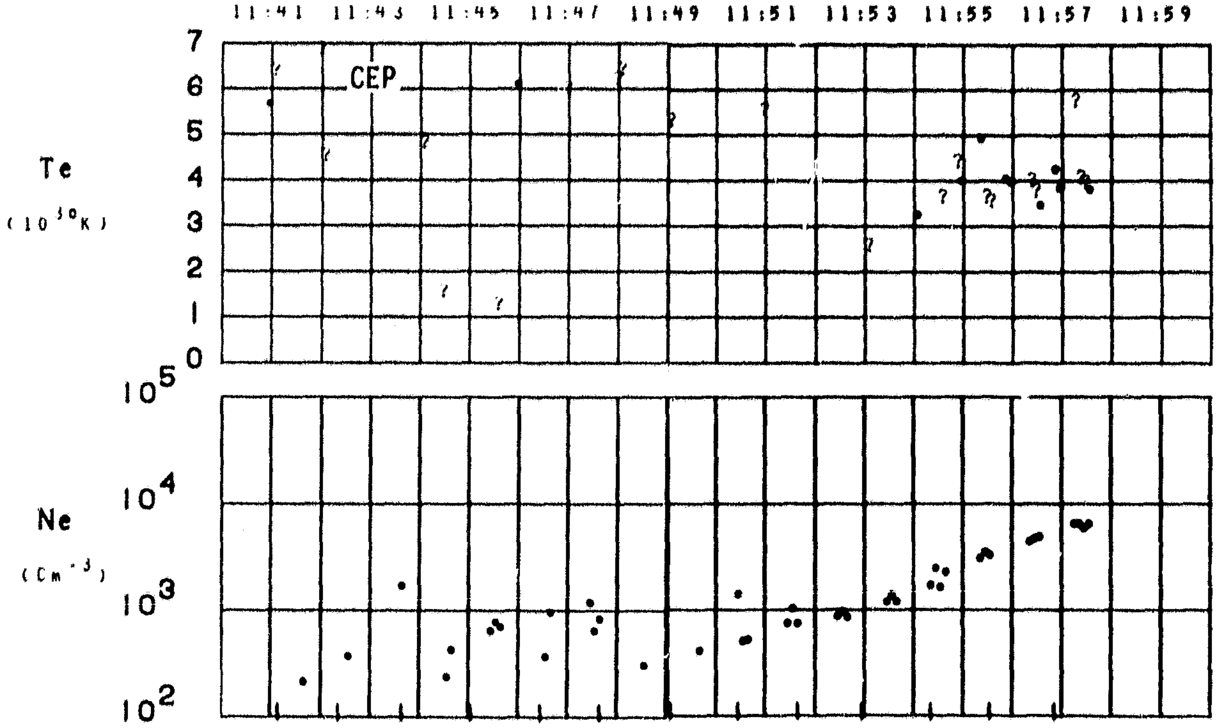
SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

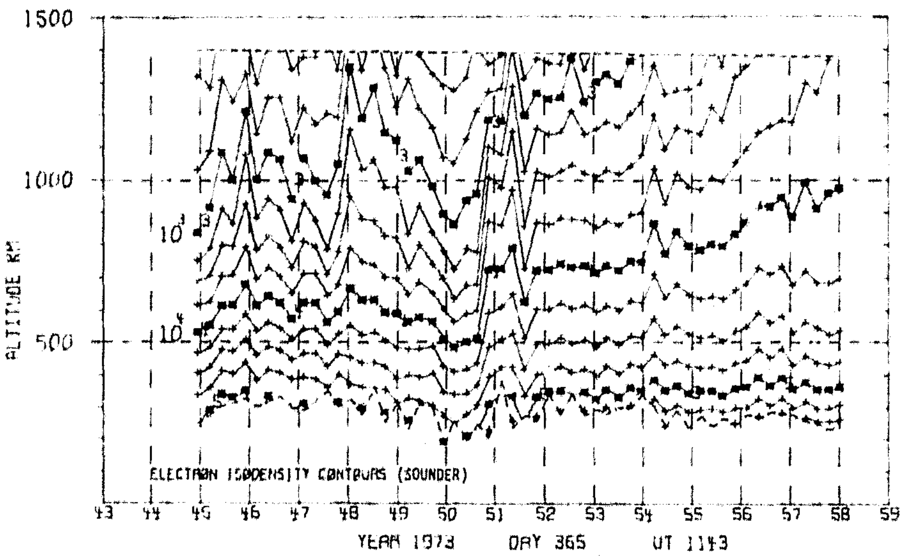


EPD
ORBIT 12736
1973 365 11 40 0
I(22)/I(40)
D(1·3) Log I
D(4·1) Log I
D(9·6) Log I
I‖(40) Log R
I(40) Log R
I(210) Log R
Ē KeV
U.T.
INV.LAT.
MLT
B
THETA Z

ORBIT 12736
DATE 731231
DAY 365



LAT	78	82	86	87	83	80	75	71	67	63	58	55	51
LONG	-132	-127	-112	-13	20	26	29	30	31	31	31	32	32
LT	2:48	3:08	4:11	10:46	13:05	13:28	13:42	13:49	13:53	13:56	13:59	14:00	14:02
DIP	86	89	88	87	84	83	81	78	76	74	71	68	65
DIPLAT	82	88	87	84	80	76	72	68	64	60	56	52	48
L	40.7	73.1	96.6	62.8	31.7	19.1	11.7	7.9	6.0	4.6	3.6	3.0	2.5
INVLAT	80	83	84	82	79	76	73	69	65	62	58	54	51
ZA	121	117	114	110	107	103	100	96	92	89	85	82	78



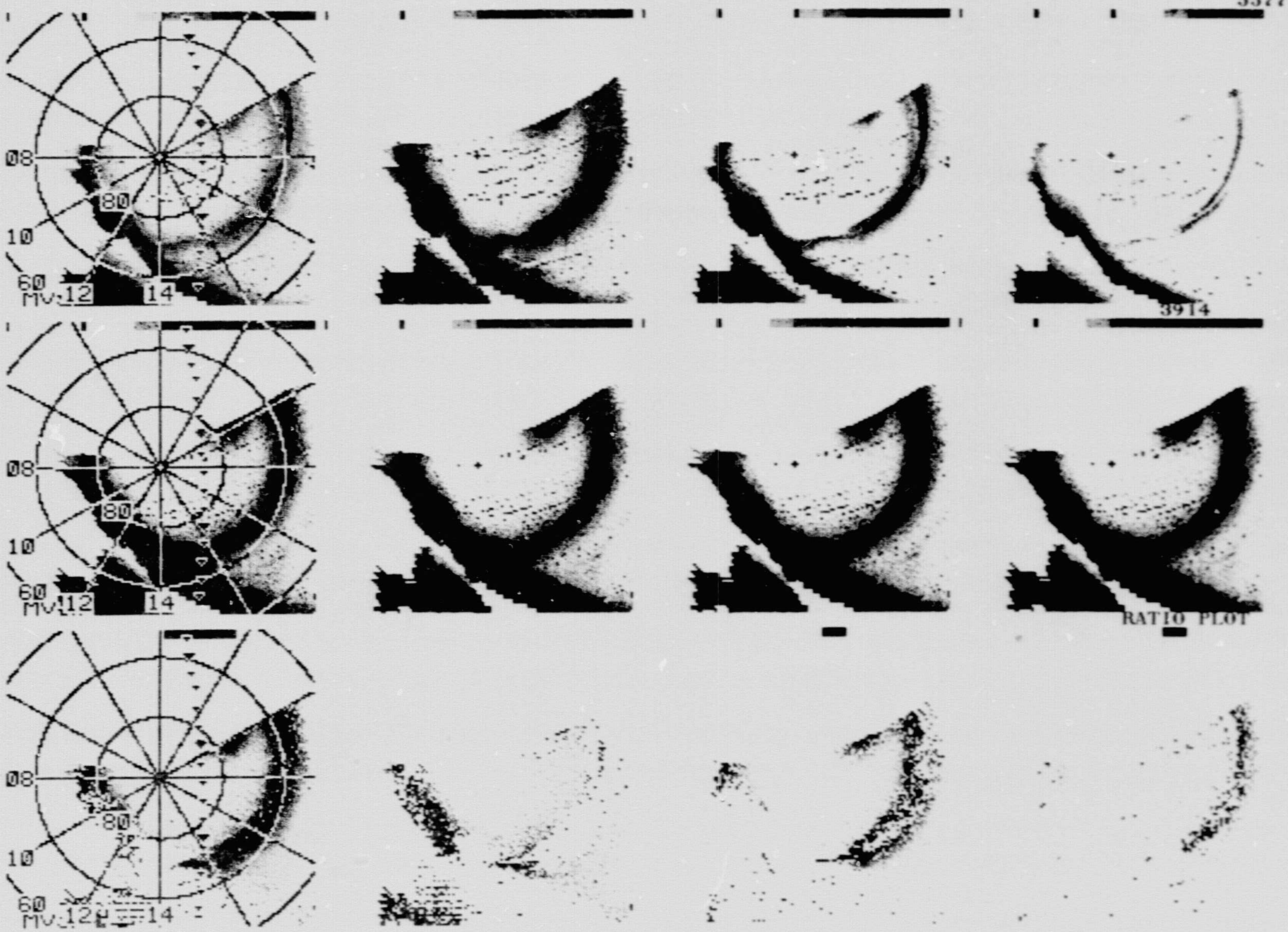
ASP

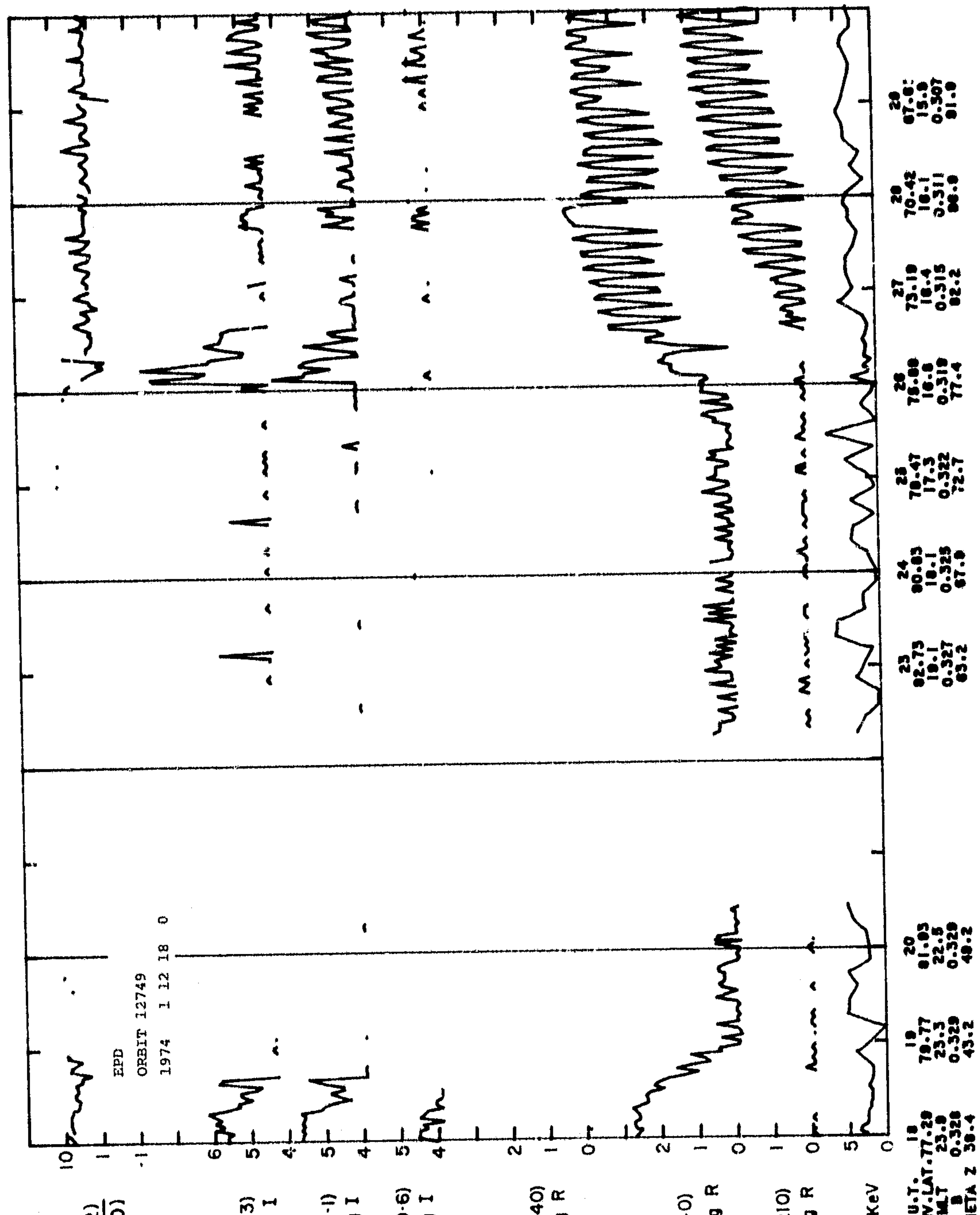
740101/1222 UT (715/4)

CENTER LAT/LON/MLT :

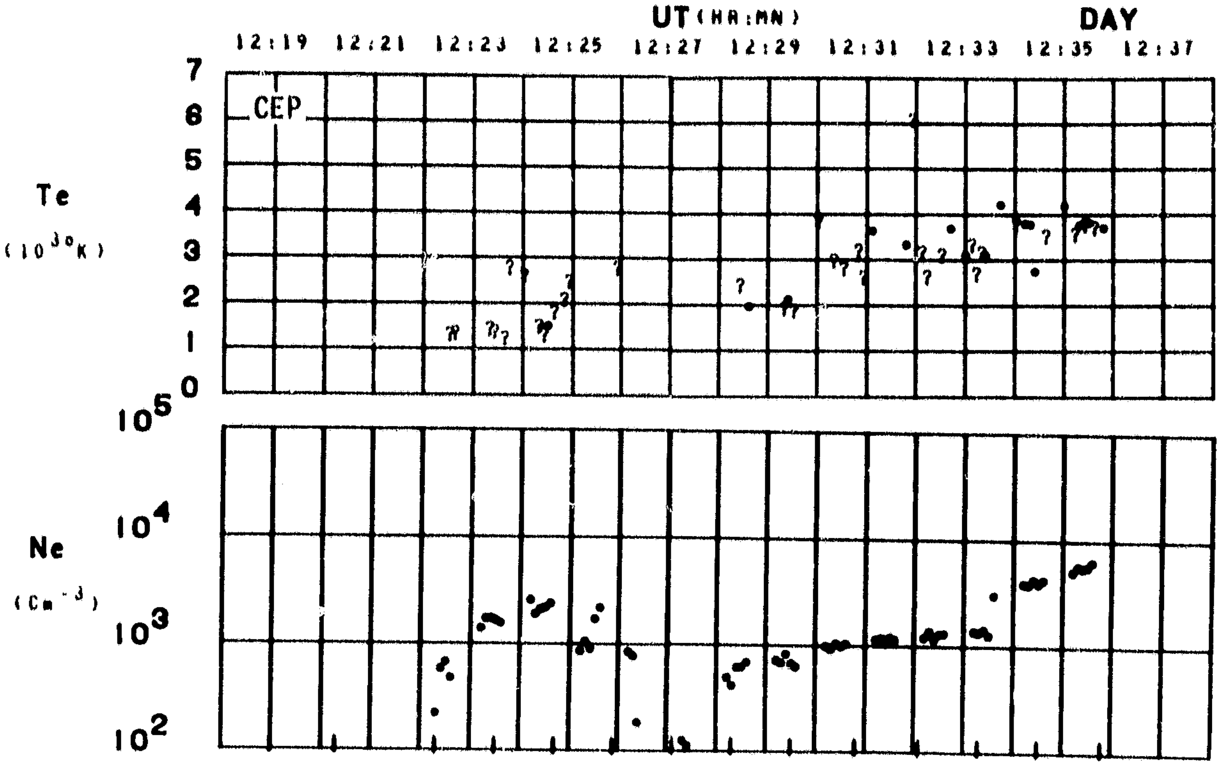
90./91.5/14.

	.5 - 3.9 kR	1.9 - 9.5 kR	4.6 - 33.0 kR
	.5 - 3.9 kR	.5 - 3.9 kR	.5 - 3.9 kR
	.6 - 1.0	1.0 - 1.5	1.5 - 2.3

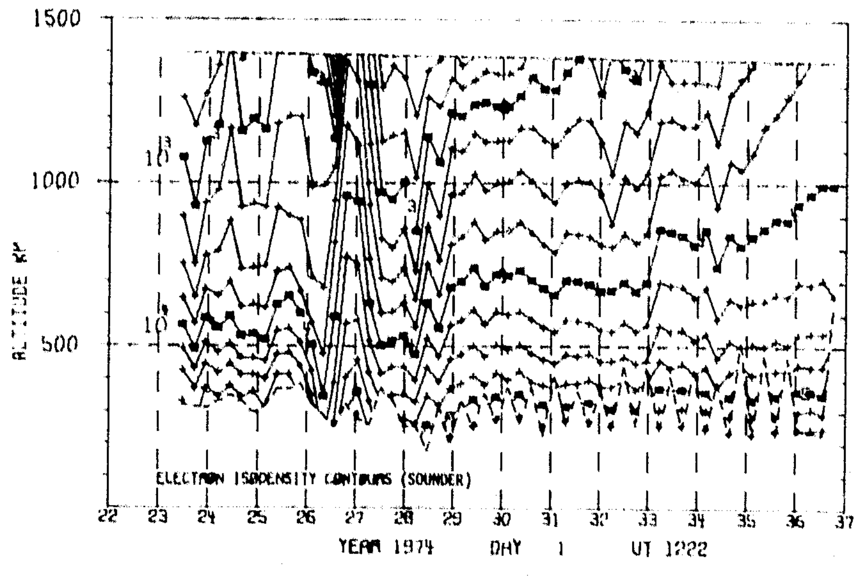



EPD
ORBIT 12749
1974 1 12 18 0
I(22)/I(40)
D (1·3) Log I
D (4·1) Log I
D (9·6) Log I
I‖ (40) Log R
I (40) Log R
I (210) Log R
Ē KeV
U.T.
INV.LAT.
MLT
B
THETA Z

ORBIT 12749
DATE 740101
DAY 1

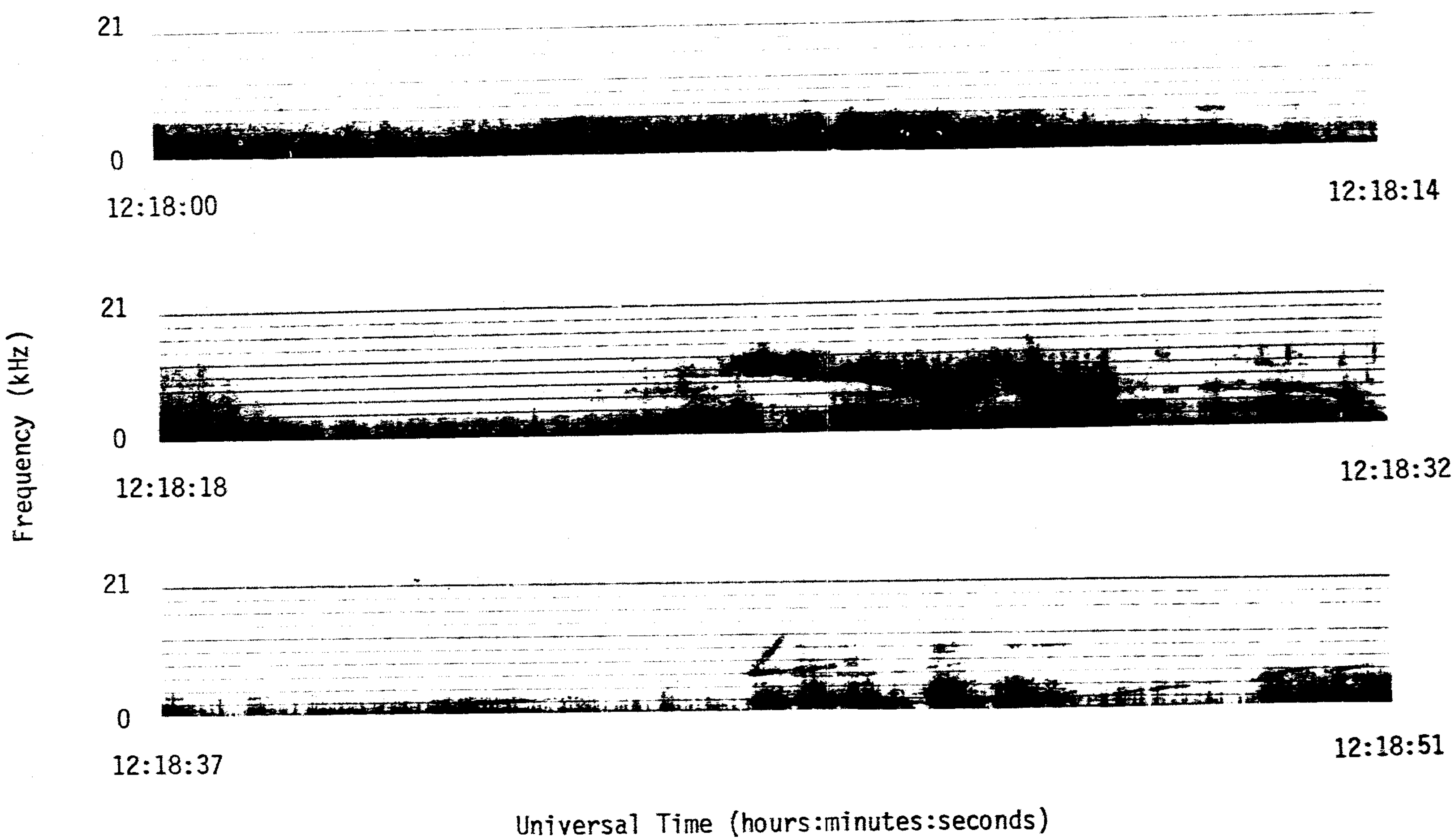


LAT	79	83	88	85	82	78	74	70	67	63	58	55	51	47
LONG	-142	-137	-67	3	12	16	18	20	20	21	21	21	21	21
LT	2:44	3:07	7:50	12:32	13:12	13:30	13:39	13:45	13:48	13:51	13:54	13:55	13:57	13:58
DIP	85	88	87	86	84	82	80	78	76	73	71	68	65	62
DIPLAT	81	87	85	82	78	74	71	67	63	59	55	51	47	43
L	31.5	58.2	81.7	50.4	28.7	17.6	11.7	8.3	6.2	4.7	3.7	3.1	2.6	2.3
INVLAT	79	82	83	81	79	76	72	69	66	62	58	55	52	48
ZA	120	117	112	108	105	102	98	95	92	88	85	81	78	74



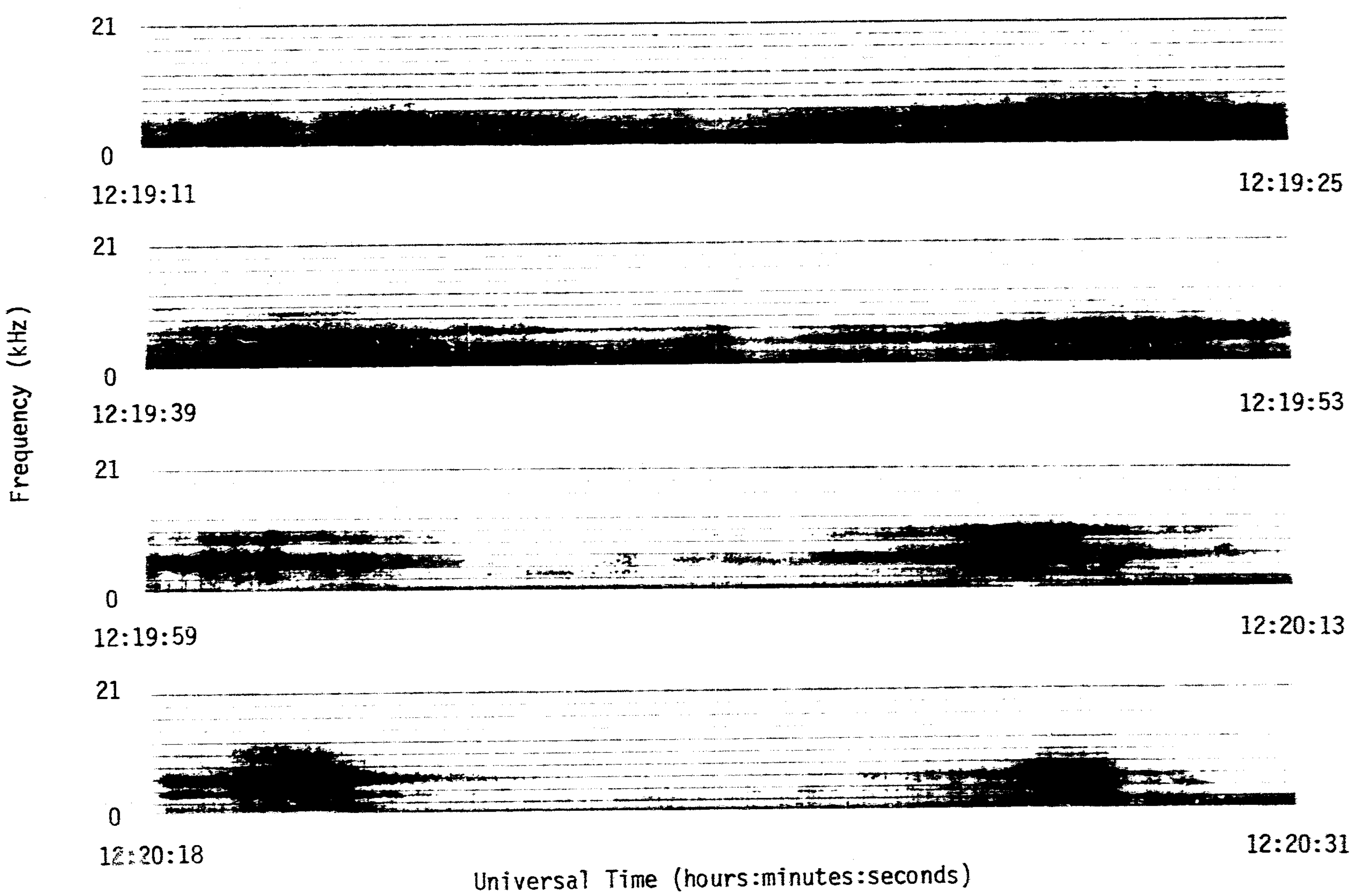
74/001/1218

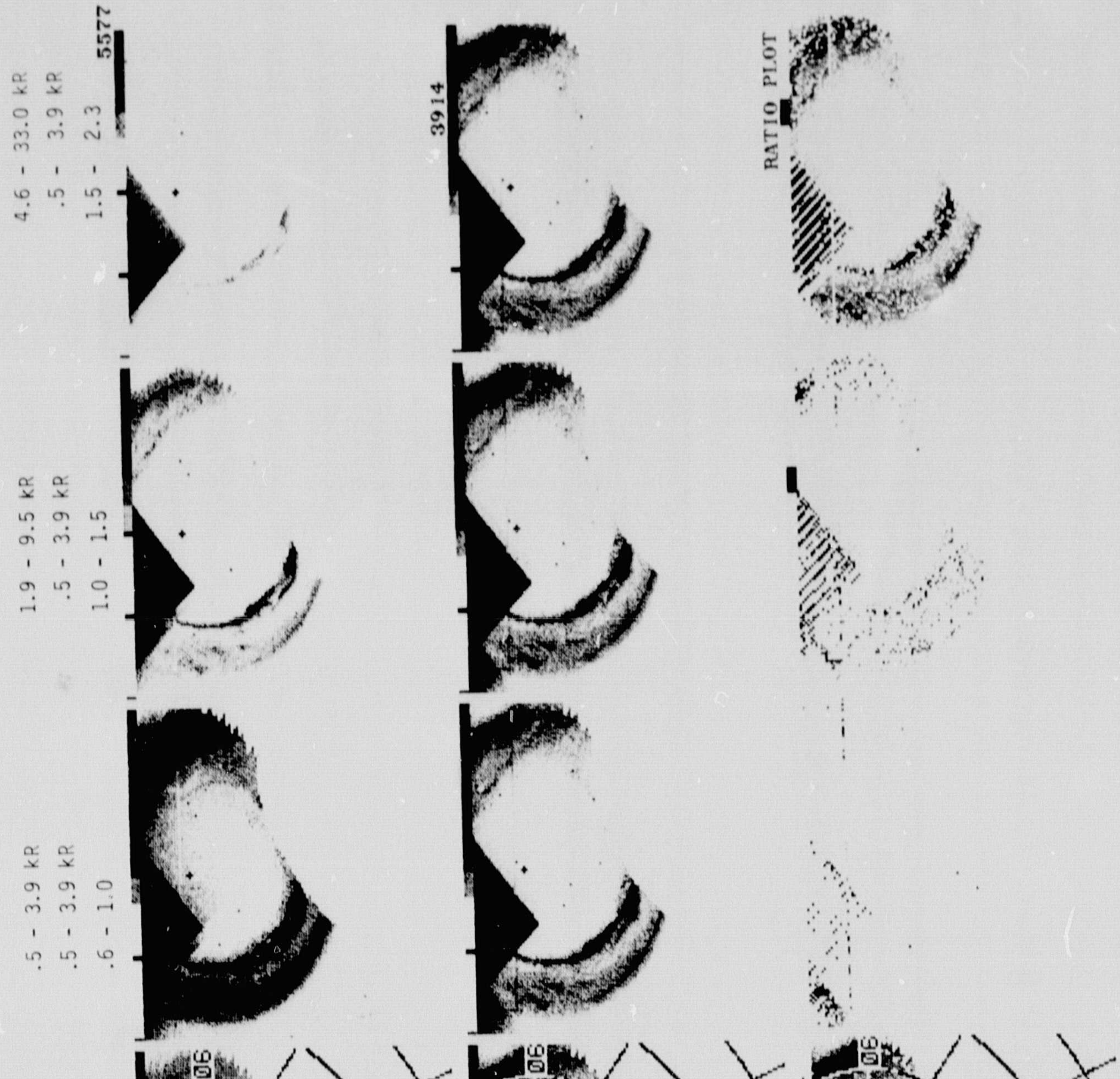
Excerpts of VLF Spectral film for the period 1218 - 1221



74/001/1218

Excerpts of VLF Spectral film for the period 1218 - 1221





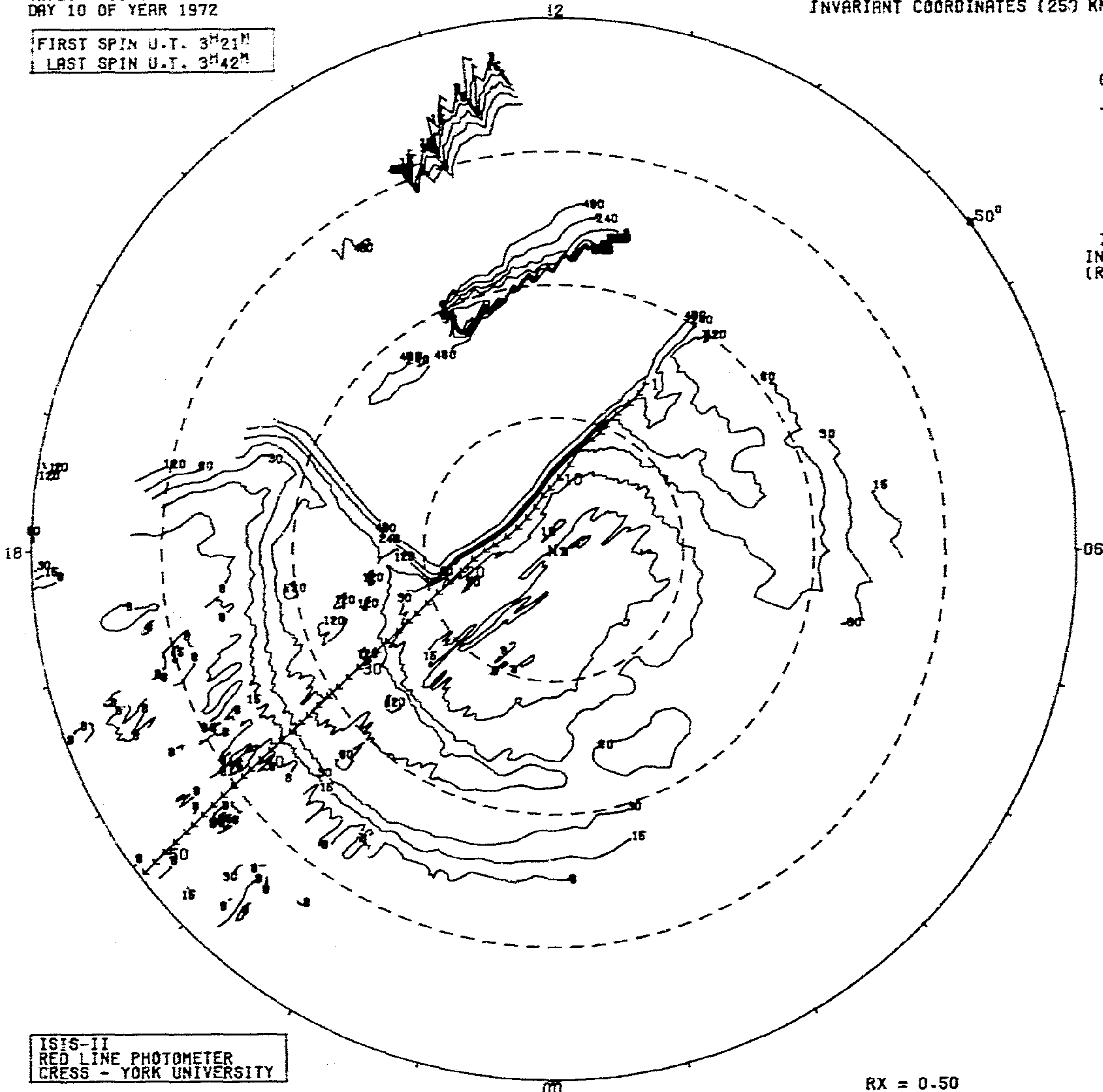
ASP
720110/0321 UT (715/107)
CENTER LAT/LON/MLT :
75./24.2/00
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT
06
12
18
00
80
60
MV

ORBIT 3598 (72/JAN/10)
DAY 10 OF YEAR 1972

FIRST SPIN U.T. $3^{H}21^{M}$
LAST SPIN U.T. $3^{H}42^{M}$

6300 ANGSTROM INTENSITY

DATE PROCESSED: 79/OCT/18
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

80
150
300
600
1200
2400
4800
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

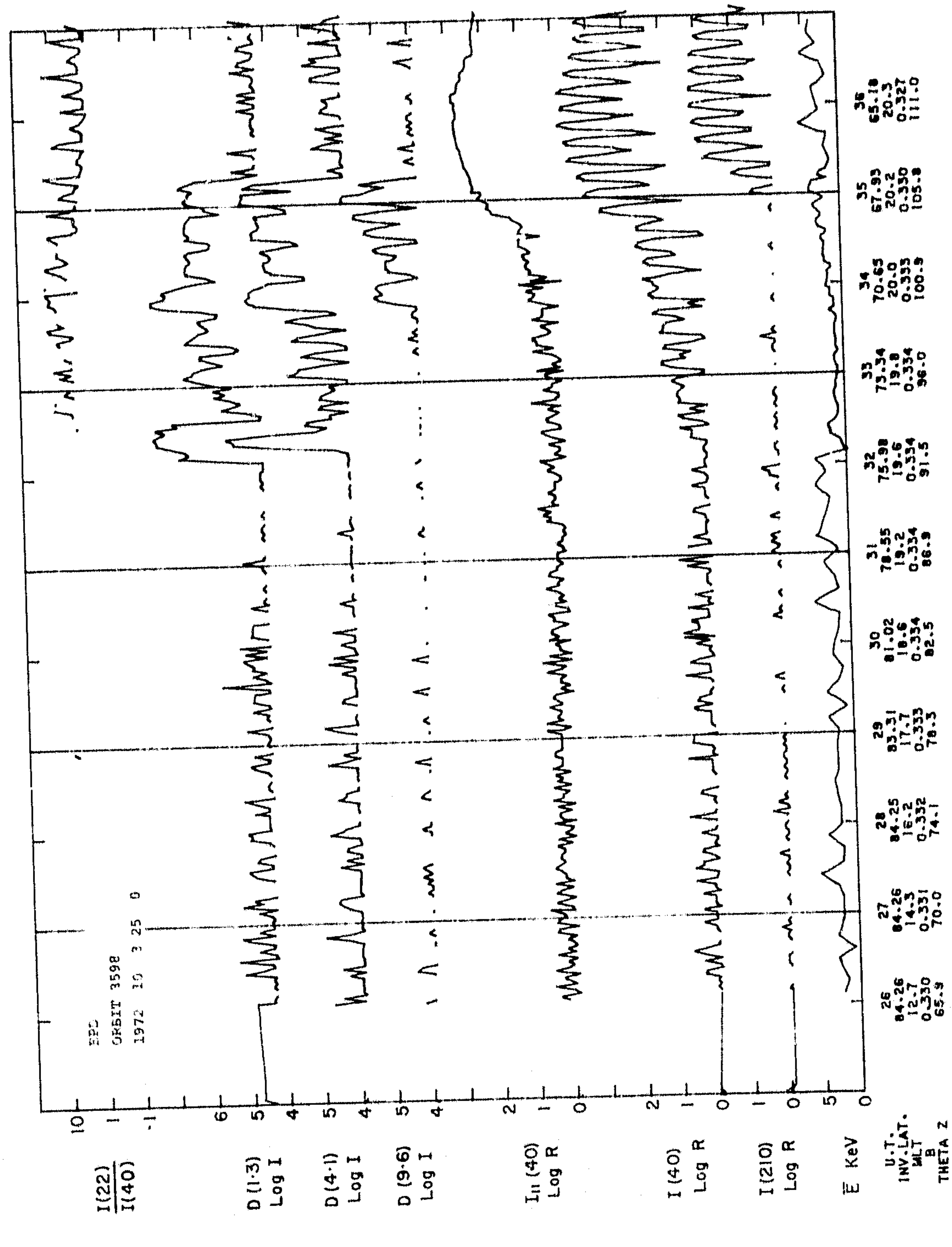
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	032159	76.3
2	032223	77.3
3	032247	78.3
4	032311	79.3
5	032335	80.2
6	032353	80.9
7	032417	82.0
8	032441	82.9
9	032505	83.6
10	032529	84.0
11	032553	84.2
12	032611	84.3
13	032635	84.3
14	032659	84.3
15	032723	84.3
16	032747	84.3
17	032811	84.2
18	032829	83.9
19	032853	83.5
20	032917	82.8
21	032941	81.9
22	033005	80.8
23	033029	79.8
24	033053	78.8
25	033111	78.1
26	033135	77.1
27	033159	76.0
28	033223	75.0
29	033247	73.9
30	033305	73.1
31	033329	72.1
32	033353	71.0
33	033417	69.9
34	033441	68.8
35	033505	67.7
36	033523	66.9
37	033547	65.8
38	033611	64.7
39	033635	63.6
40	033659	62.5
41	033723	61.3
42	033741	60.5
43	033805	59.4
44	033829	58.3
45	033853	57.2
46	033917	56.0
47	033941	54.9
48	033959	54.1
49	034023	53.0
50	034047	51.9
51	034111	50.8
52	034135	49.7
53	034159	48.6
54	034217	47.7
55	034241	46.7

ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

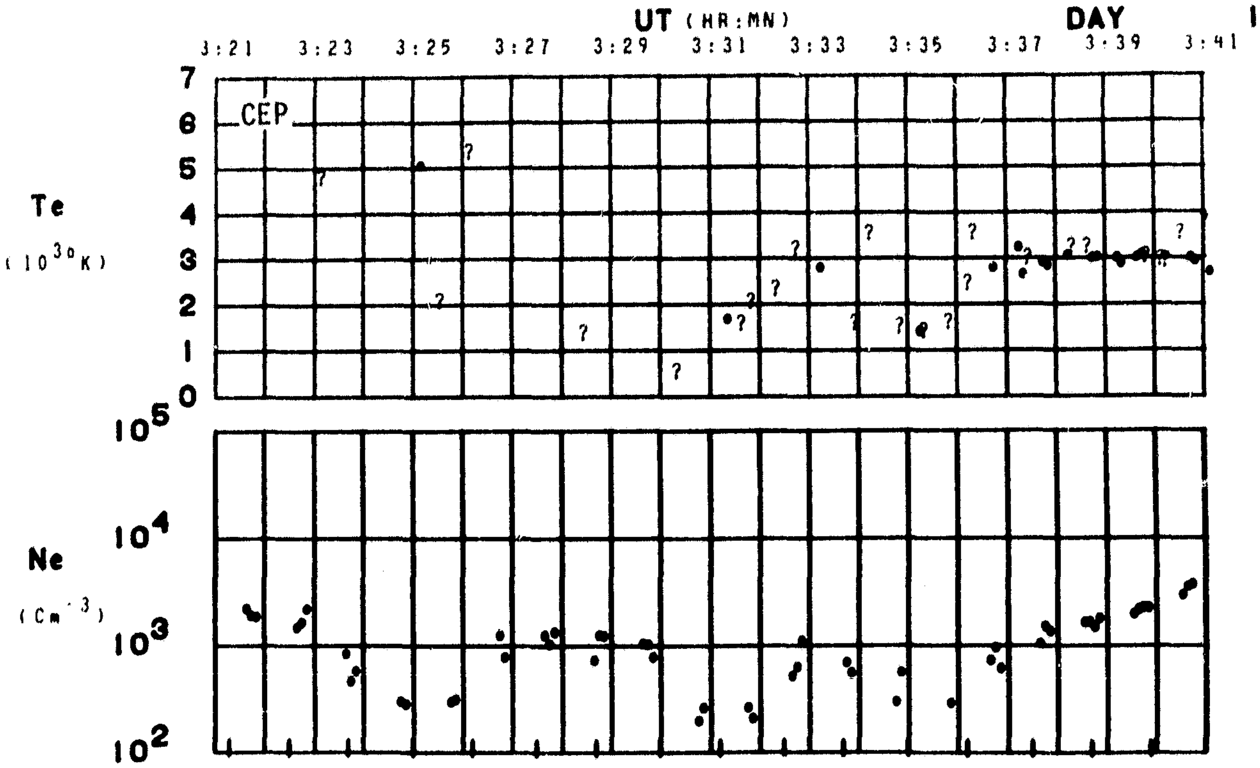
HRT Y00254
FILE 37

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

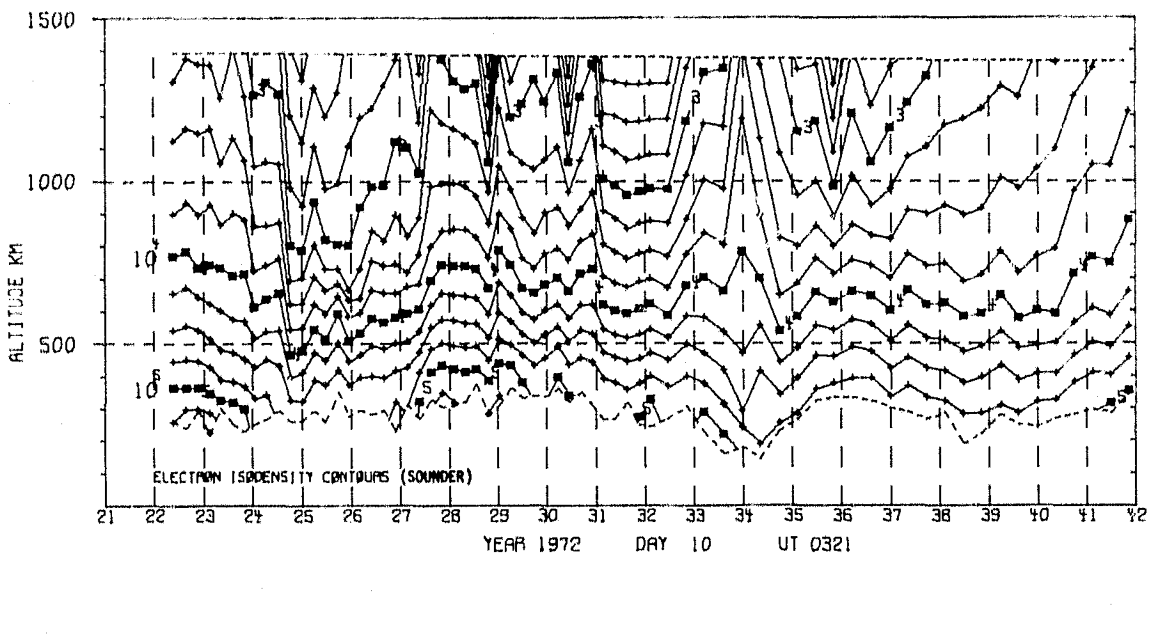
RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

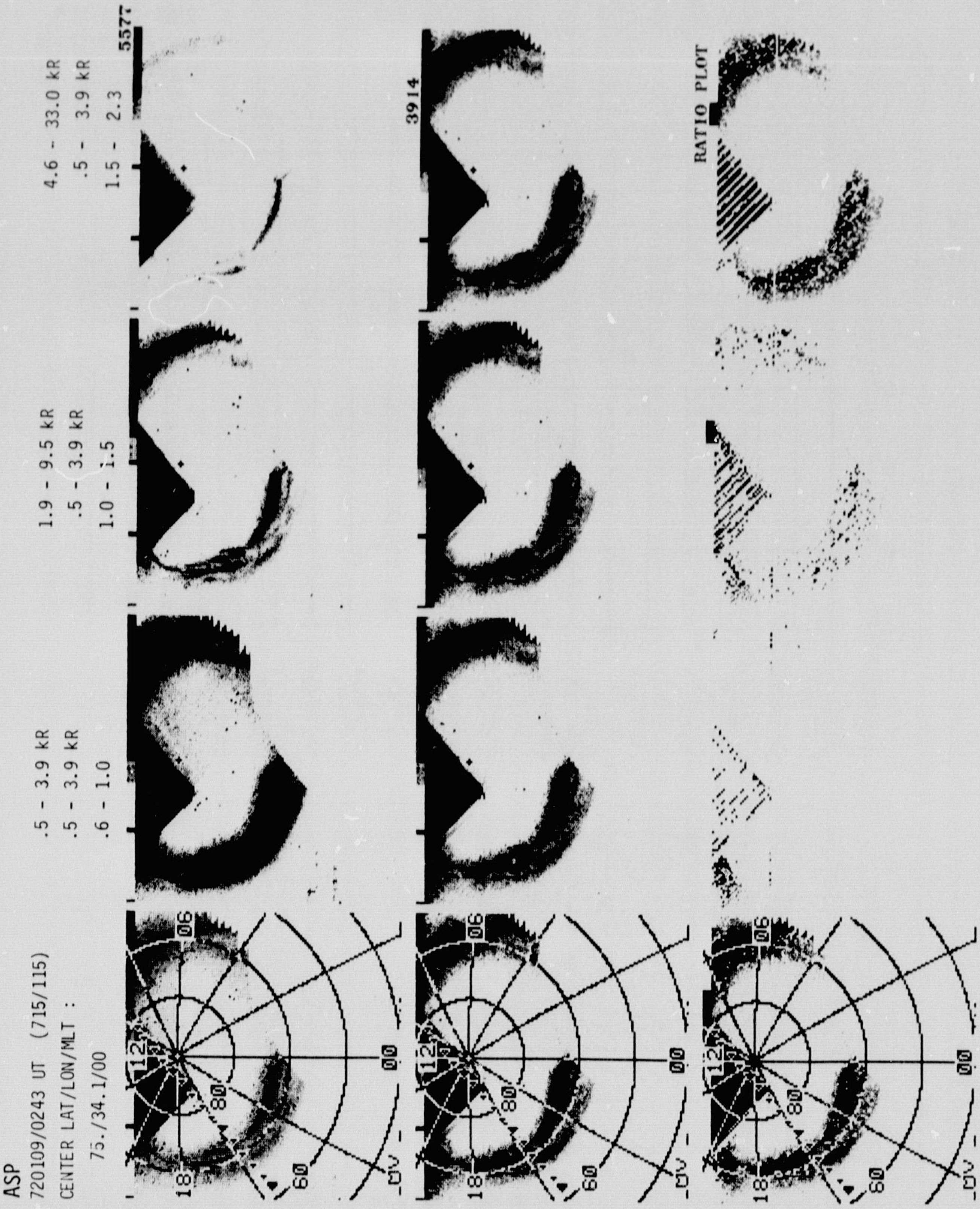

ORBIT 3598
1972 19 3 25 0
I(22) / I(40)
D(1.3) Log I
D(4.1) Log I
D(9.6) Log I
I∥(40) Log R
I(40) Log R
I(210) Log R
Ē KeV
U.T. INV.LAT. MLT B THETA Z
26 84.26 12.7 0.330 65.9
27 84.26 14.3 0.331 70.0
28 84.25 16.2 0.332 74.1
29 83.31 17.7 0.333 78.3
30 81.02 18.6 0.334 82.5
31 78.55 19.2 0.334 86.9
32 75.98 19.6 0.334 91.5
33 73.34 19.8 0.334 96.0
34 70.65 20.0 0.335 100.9
35 67.93 20.2 0.330 105.8
36 65.18 20.3 0.327 111.0

ORBIT 3598
DATE 720110
DAY 10



LAT	80	84	87	86	83	79	75	71	67	63	59	55	51	47	43	39
LONG	100	106	147	-125	-108	-102	-100	-98	-98	-97	-97	-97	-97	-97	-97	-97
LT	9:55	10:21	13.04	18:54	20:06	20:30	20:41	20:47	20:51	20:54	20:56	20:58	21:0C	21:01	21:02	21:03
DIP	85	86	87	88	89	89	87	86	85	83	81	79	76	74	71	68
DIPLAT	80	83	86	87	89	88	86	83	80	77	73	69	65	60	56	52
L	14.1	21.6	36.2	76.8	101.5	101.6	84.2	41.5	23.5	14.4	9.9	7.1	5.5	4.3	3.5	2.9
INVLAT	74	77	80	83	84	84	83	81	78	74	71	67	64	61	57	54
ZA	104	107	109	112	116	118	121	123	126	128	130	132	134	136	137	138



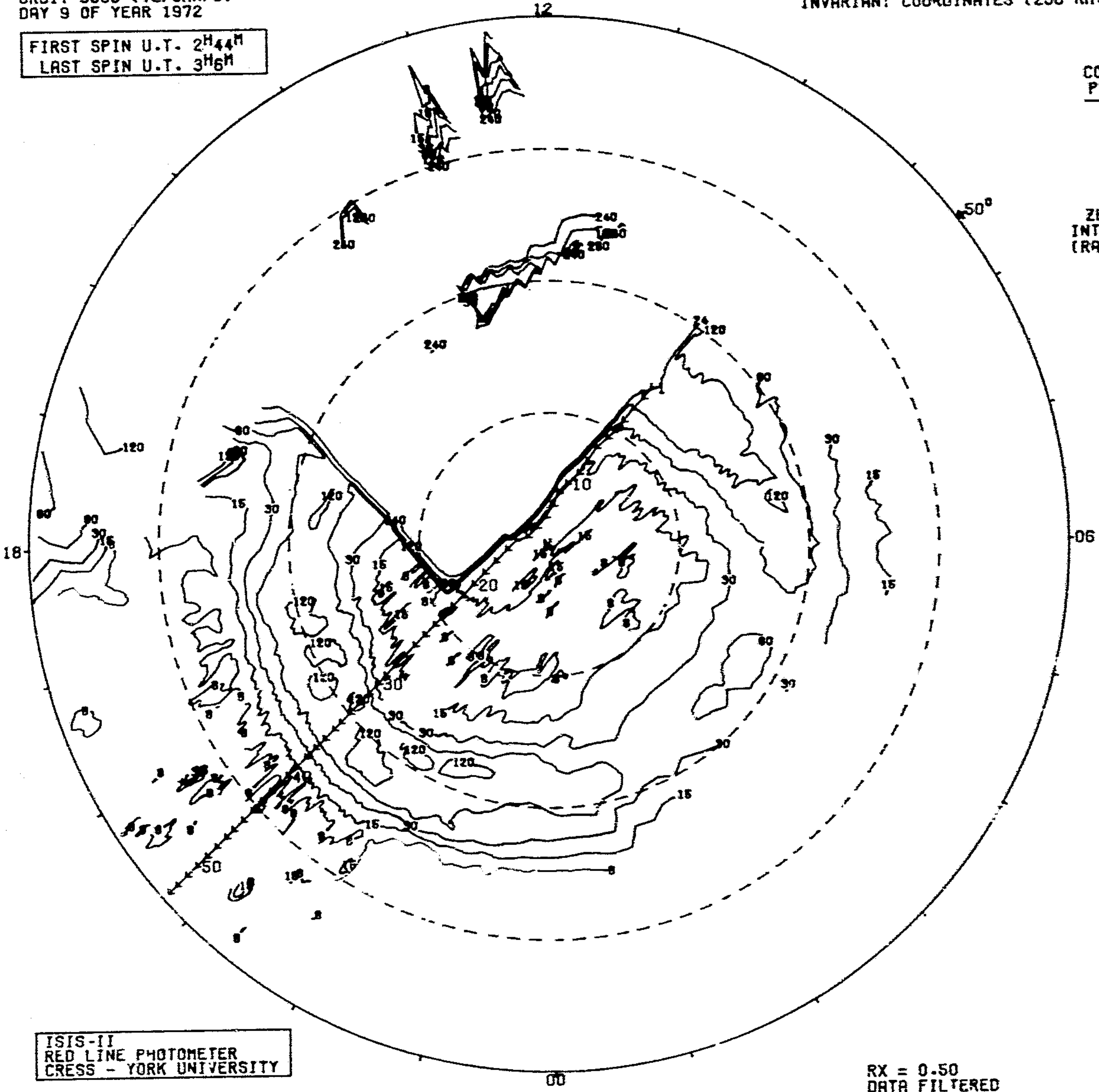

ASP
720109/0243 UT (715/115)
CENTER LAT/LON/MLT :
75./34.1/00
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT

ORBIT 3585 (72/JAN/9)
DAY 9 OF YEAR 1972

FIRST SPIN U.T. $2^{H}44^{M}$
LAST SPIN U.T. $3^{H}6^{M}$

6300 ANGSTROM INTENSITY

DATE PROCESSED: 80/JAN/23
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED
80
150
300
600
1200
2400
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

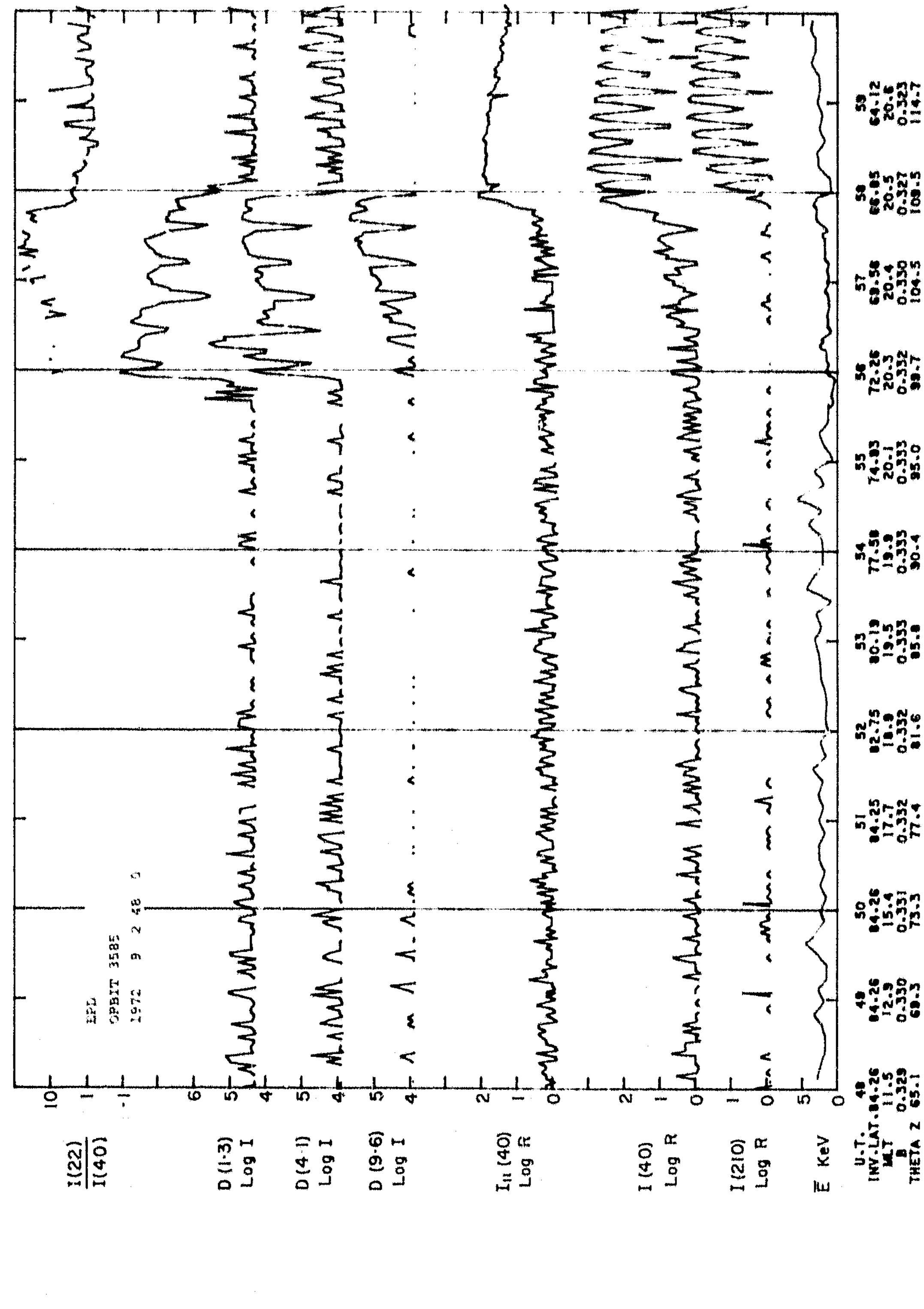
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	024416	76.4
2	024440	77.5
3	024504	78.5
4	024528	79.4
5	024546	80.1
6	024610	81.4
7	024634	82.5
8	024658	83.3
9	024722	83.8
10	024746	84.2
11	024804	84.3
12	024828	84.3
13	024852	84.3
14	024916	84.2
15	024940	84.2
16	025004	84.3
17	025022	84.3
18	025046	84.4
19	025110	84.1
20	025134	83.6
21	025158	82.8
22	025222	81.9
23	025240	81.1
24	025304	80.0
25	025328	78.9
26	025352	77.9
27	025416	76.9
28	025440	75.8
29	025504	74.8
30	025522	74.0
31	025546	72.9
32	025610	71.8
33	025634	70.7
34	025658	69.7
35	025716	68.8
36	025740	67.8
37	025804	65.7
38	025828	65.6
39	025852	64.5
40	025916	63.4
41	025934	62.6
42	025358	61 5
43	030022	60.4
44	030046	59.3
45	030110	58.2
46	030134	57.1
47	030152	56.3
48	030216	55.2
49	030240	54.1
50	030304	53.0
51	030328	51.9
52	030352	50.9
53	030410	50.1
54	030434	49.0
55	030458	47.9
56	030522	46.9
57	030546	45.8
58	030610	44.8
59	030628	44.0

ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

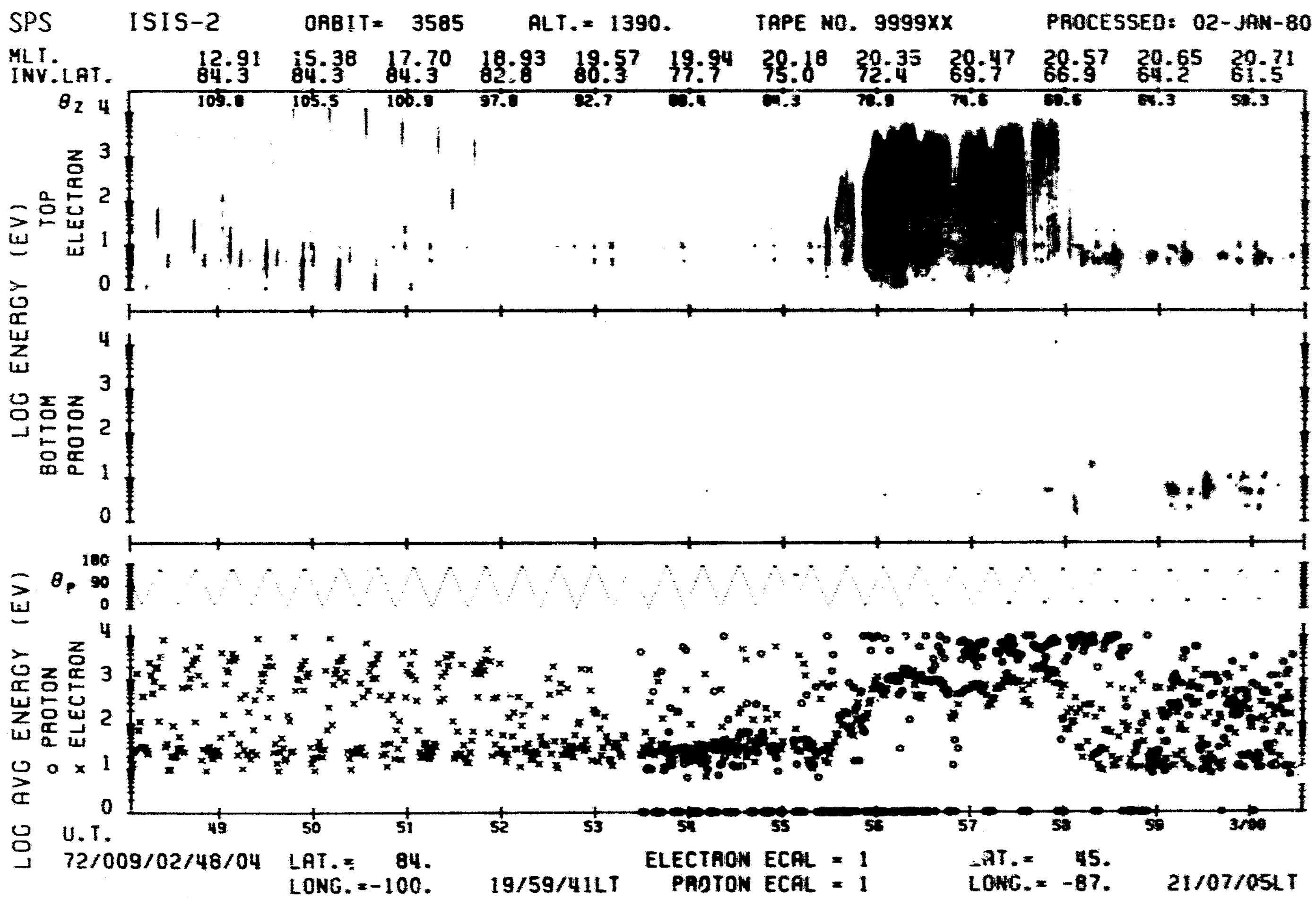
HRT YC0481
FILE 49

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

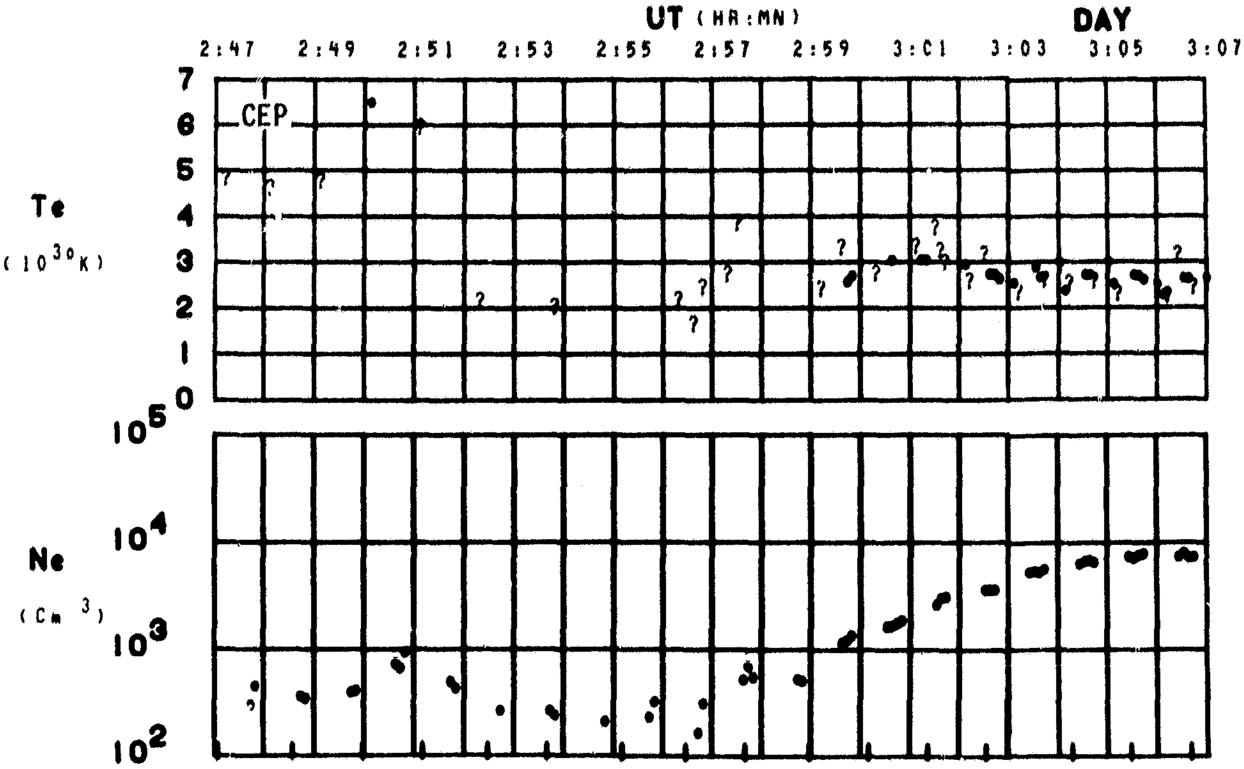
RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED



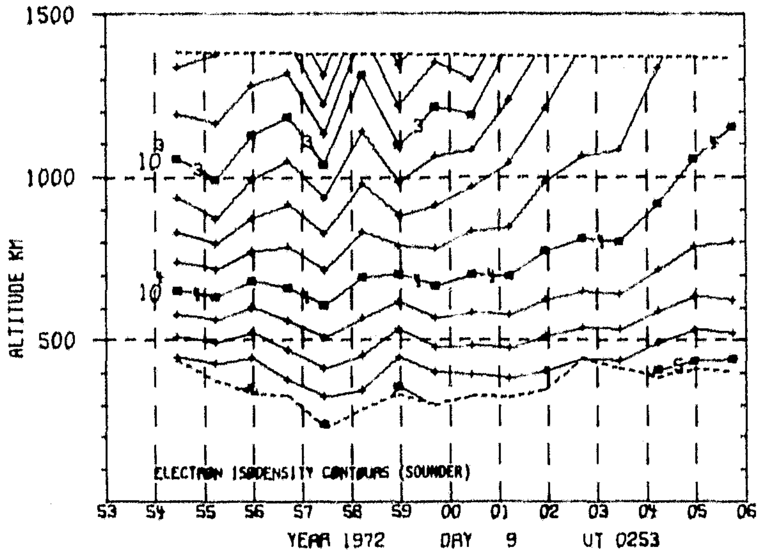
EPL
ORBIT 3585
1972 9 2 48 5
I(22)/I(40)
D (1·3) Log I
D (4·1) Log I
D (9·6) Log I
I‖ (40) Log R
I (40) Log R
I (210) Log R
Ē KeV
U.T.
INV.LAT.
MLT
B
THETA Z

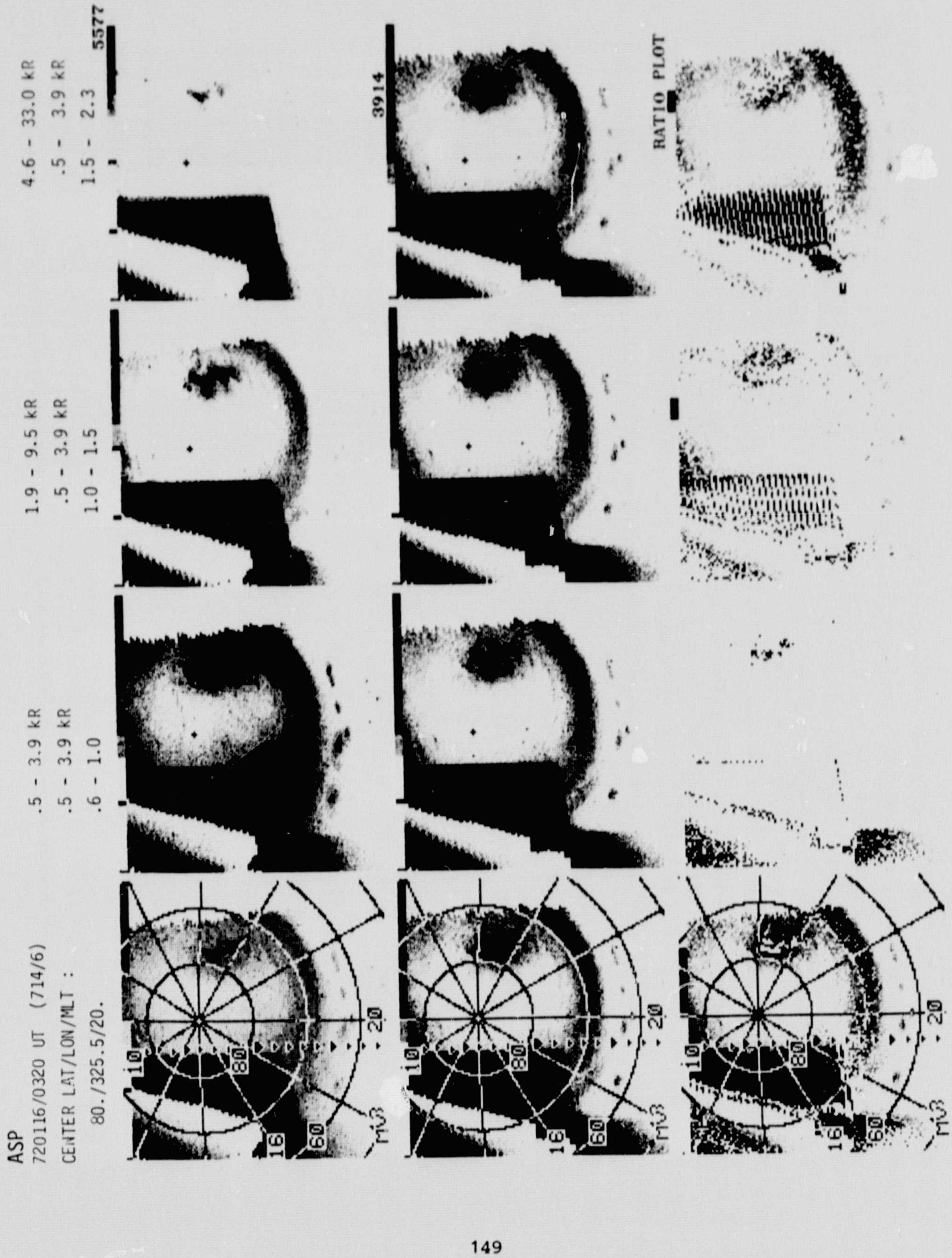

SPS ISIS-2 ORBIT= 3585 ALT.= 1390. TAPE NO. 9999XX PROCESSED: 02-JAN-80
MLT.
INV.LAT.
12.91 84.3
15.38 84.3
17.70 84.3
18.93 82.8
19.57 80.3
19.94 77.7
20.18 75.0
20.35 72.4
20.47 69.7
20.57 66.9
20.65 64.2
20.71 61.5
LOG ENERGY (EV)
TOP ELECTRON
BOTTOM PROTON
LOG AVG ENERGY (EV)
o PROTON
x ELECTRON
U.T.
49 50 51 52 53 54 55 56 57 58 59 3/00
72/009/02/48/04 LAT.= 84.
LONG.=-100.
19/59/41LT
ELECTRON ECAL = 1
PROTON ECAL = 1
LONG.= -87.
21/07/05LT

ORBIT 3585
DATE 720109
DAY 9



LAT	87	82	78	74	70	66	62	57	54	49	46	42	38	32	29	25
LONG	-119	-96	-91	-89	-88	-87	-86	-86	-86	-86	-86	-86	-86	-86	-87	-87
LT	18:40	20:16	20:38	20:47	20:53	20:57	21:00	21:02	21:04	21:05	21:06	21:07	21:08	21:09	21:10	21:11
DIP	88	89	89	87	86	85	82	80	78	76	73	71	68	63	60	56
DIPLAT	87	89	88	86	83	80	76	72	69	64	60	56	52	45	41	37
L	76.0	101.7	99.9	96.0	47.5	24.7	14.0	9.4	7.0	5.3	4.2	3.5	2.9	2.4	2.1	1.9
INVLAT	83	84	84	84	81	78	74	71	67	64	60	57	54	49	46	43
ZA	112	116	119	121	124	127	130	132	134	136	137	134	140	141	141	141





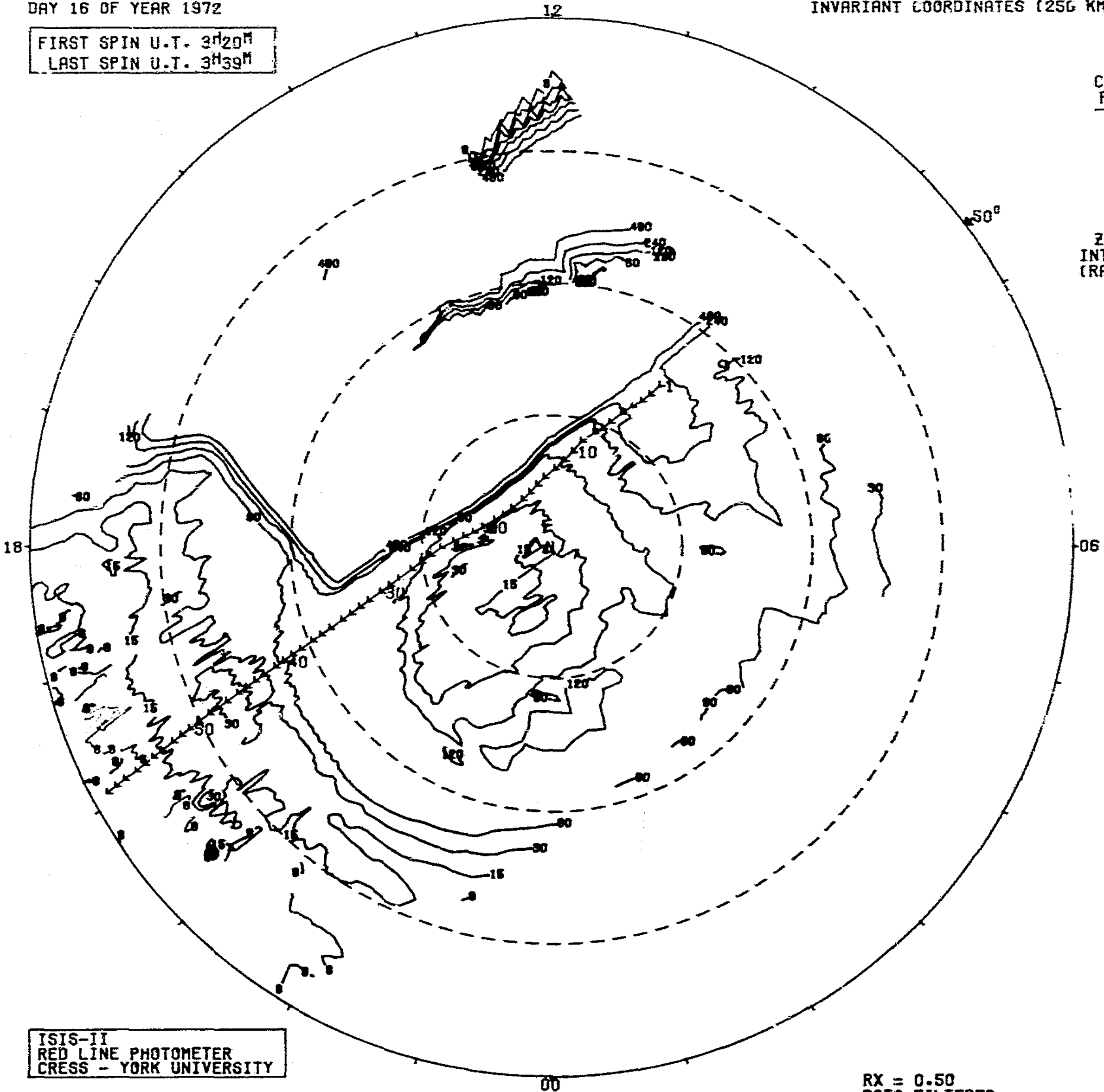
ORIGINAL PAGE IS
OF POOR QUALITY

ORBIT 3674 (72/JAN/16)
DAY 16 OF YEAR 1972

FIRST SPIN U.T. 3H20M
LAST SPIN U.T. 3H39M

6300 ANGSTROM INTENSITY

DATE PROCESSED: 79/OCT/22
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

80
150
300
600
1200
2400
4800

ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

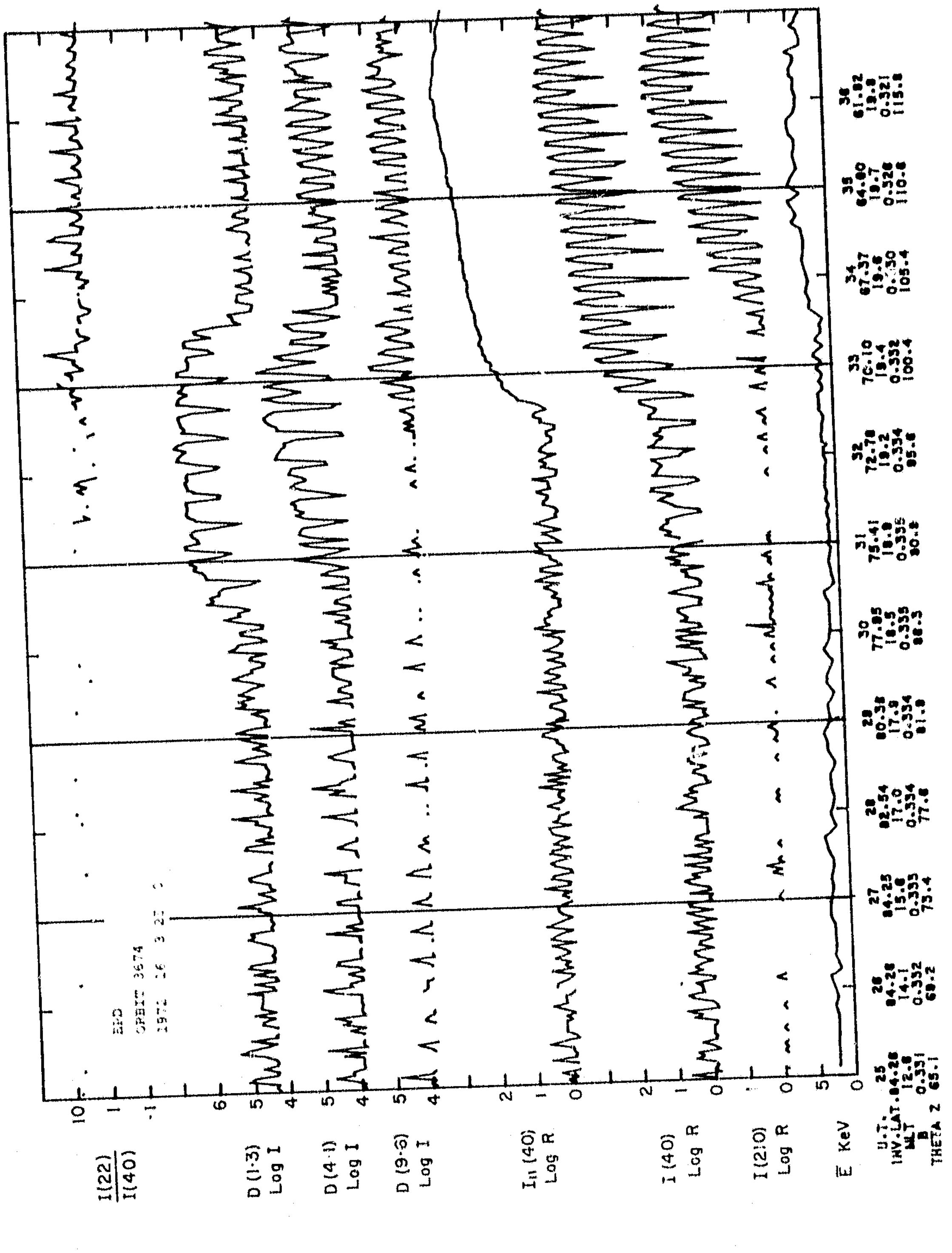
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	032059	76.0
2	032123	77.0
3	032141	77.7
4	032159	78.4
5	032217	79.1
6	032241	80.1
7	032259	80.8
8	032317	81.4
9	032341	82.3
10	032359	82.8
11	032417	83.4
12	032435	83.9
13	032459	84.3
14	032517	84.3
15	032535	84.3
16	032553	84.3
17	032617	84.3
18	032635	84.3
19	032653	84.3
20	032717	84.0
21	032735	83.5
22	032753	82.8
23	032811	82.1
24	032835	81.3
25	032853	80.6
26	032911	79.9
27	032929	79.2
28	032953	78.2
29	033011	77.5
30	033029	76.7
31	033053	75.7
32	033111	74.9
33	033129	74.2
34	033147	73.4
35	033211	72.3
36	033229	71.5
37	033247	70.7
38	033311	69.6
39	033329	68.8
40	033347	68.0
41	033405	67.1
42	033429	66.0
43	033447	65.2
44	033505	64.4
45	033523	63.5
46	033547	62.4
47	033605	61.6
48	033623	60.7
49	033647	59.6
50	033705	58.8
51	033723	57.9
52	033741	57.1
53	033805	56.0
54	033823	55.1
55	033841	54.3
56	033859	53.4
57	033923	52.3
58	033941	51.5
59	033959	50.7

ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

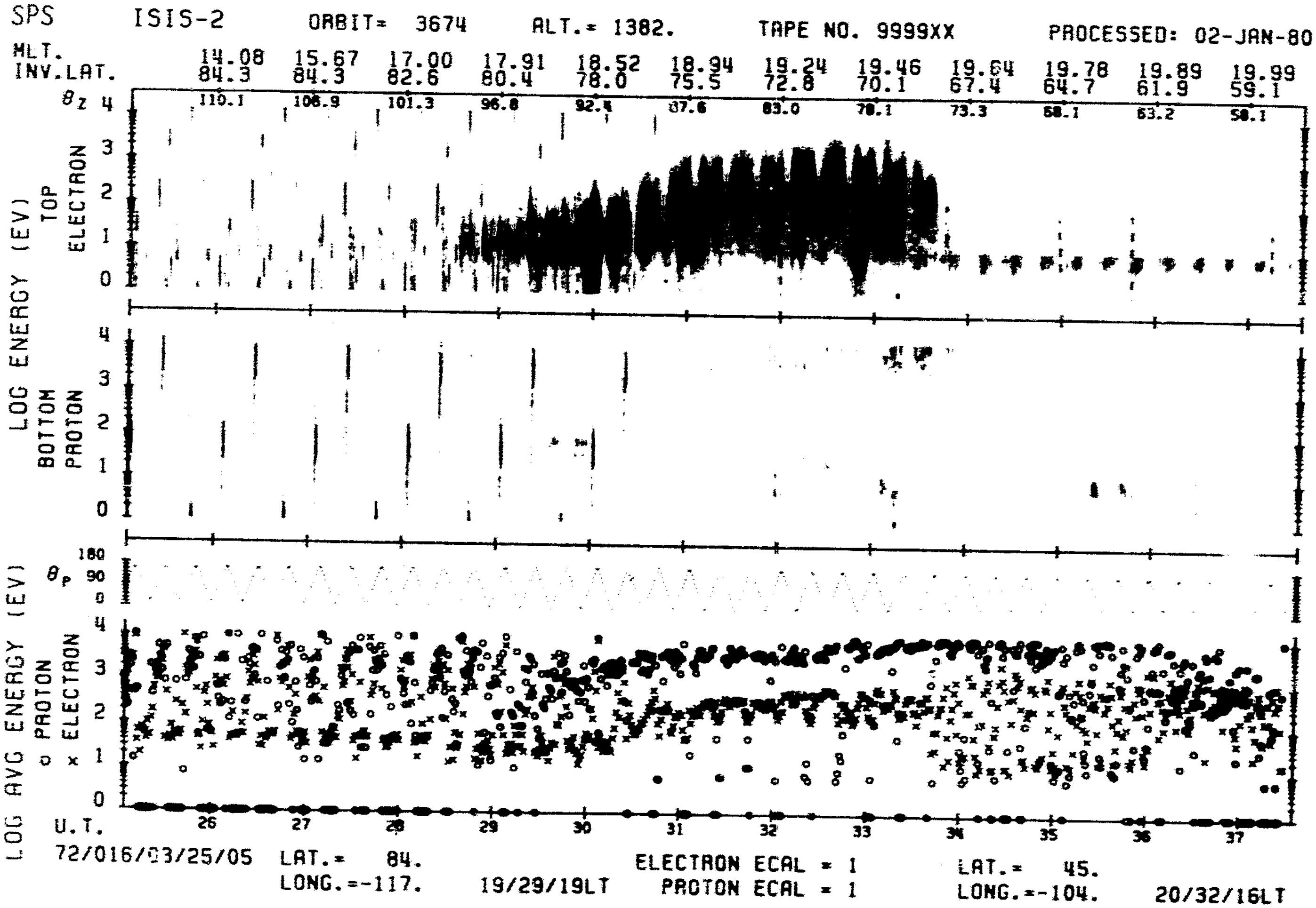
HRT Y00252
FILE 1

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

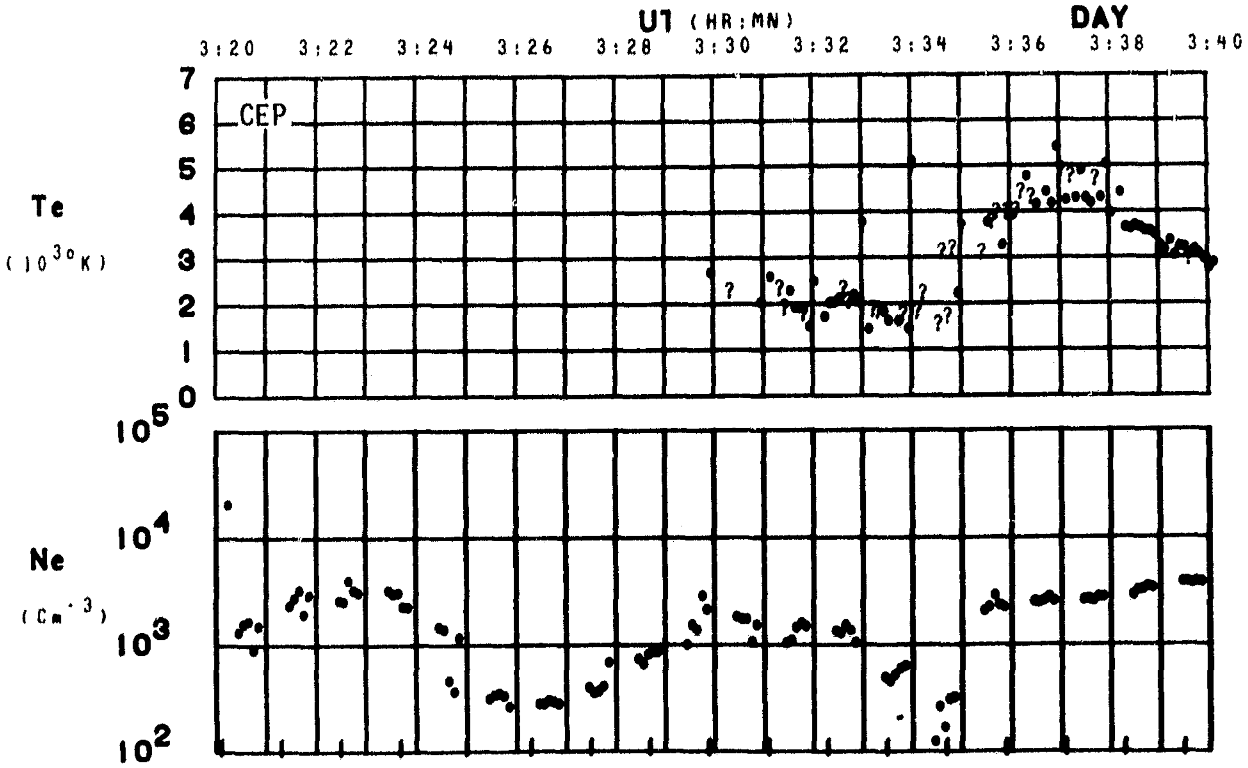


I(22)
I(40)
D (1·3)
Log I
D (4·1)
Log I
D (9·6)
Log I
I⊥ (40)
Log R
I (40)
Log R
I (210)
Log R
Ē KeV
U.T.
INV.LAT.
MLT
B
THETA Z
ORBIT 3674

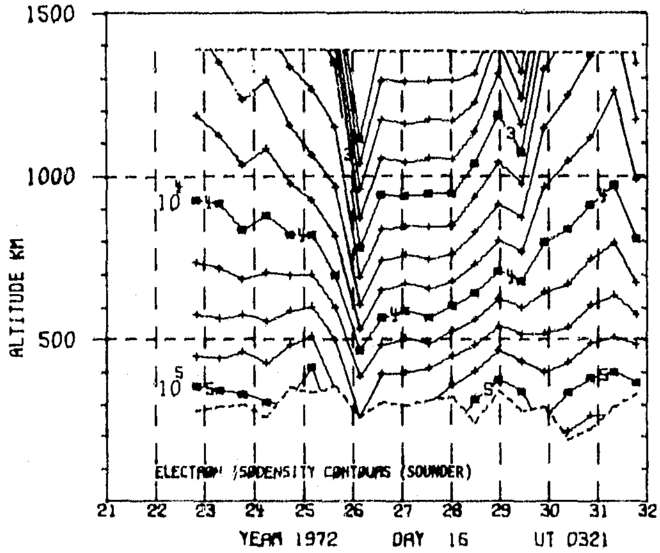


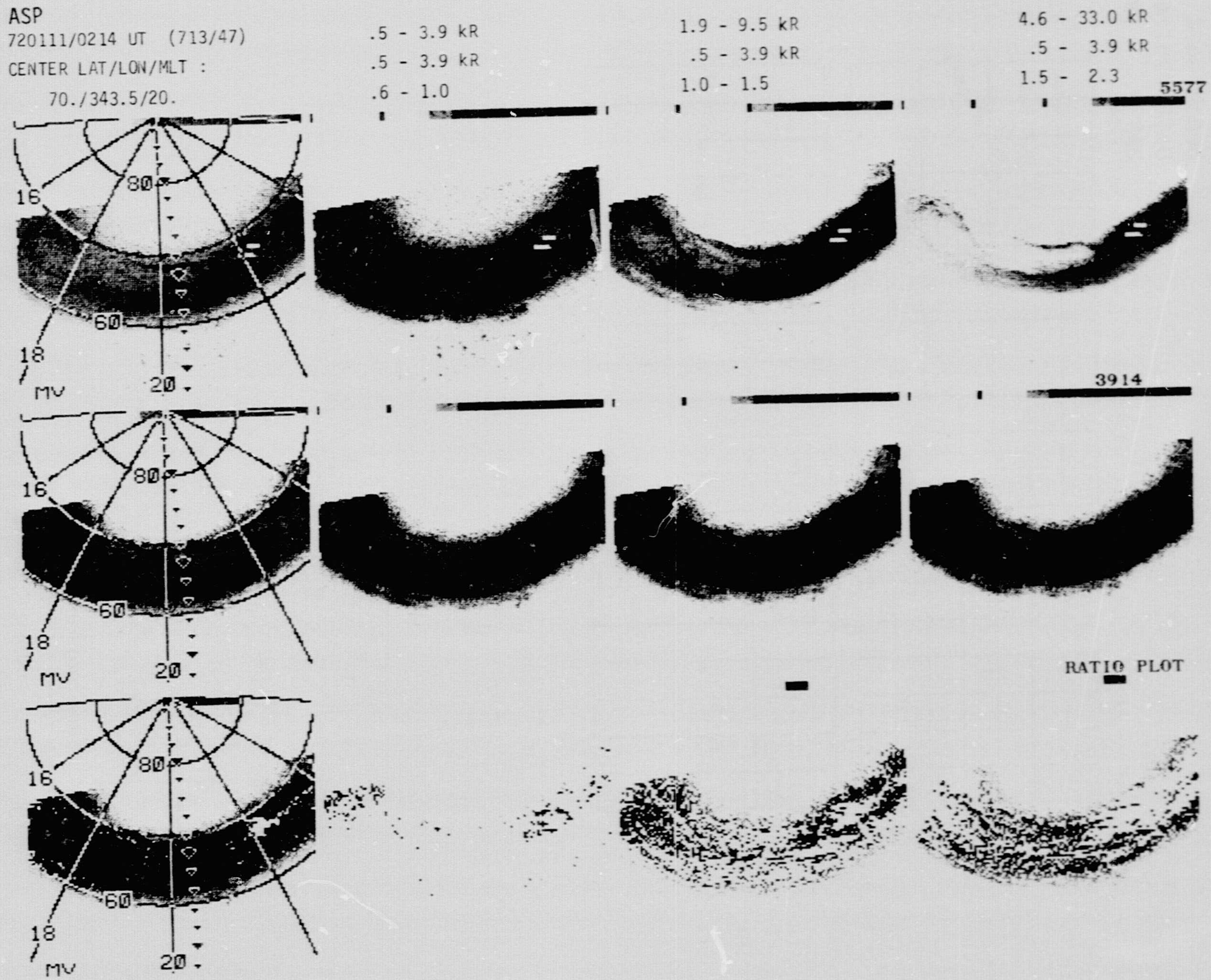
SPS
ISIS-2
ORBIT= 3674
ALT.= 1382.
TAPE NO. 9999XX
PROCESSED: 02-JAN-80
MLT.
INV.LAT.
14.08 15.67 17.00 17.91 18.52 18.94 19.24 19.46 19.64 19.78 19.89 19.99
84.3 84.3 82.6 80.4 78.0 75.5 72.8 70.1 67.4 64.7 61.9 59.1
LOG ENERGY (EV)
TOP ELECTRON
BOTTOM PROTON
LOG AVG ENERGY (EV)
o PROTON
x ELECTRON
U.T.
72/016/03/25/05
LAT.= 84.
LONG.=-117.
19/29/19LT
ELECTRON ECAL = 1
PROTON ECAL = 1
LAT.= 45.
LONG.=-104.
20/32/16LT

ORBIT 3674
DATE 720116
DAY 16



LAT	79	83	87	87	84	80	76	72	68	65	61	57	53	49	45	42	38
LONG	92	97	120	-158	-117	-110	-107	-105	-104	-104	-104	-103	-103	-103	-103	-103	-104
LT	9:20	9:41	11:16	16:41	19:26	19:56	20:09	20:16	20:20	20:23	20:26	20:28	20:29	20:30	20:32	20:32	20:38
DIP	84	85	87	88	88	88	87	86	85	83	81	79	77	74	72	69	66
DIPLAT	79	82	85	87	88	87	86	83	80	77	74	70	66	62	57	53	49
L	12.7	19.0	30.6	55.2	99.8	101.8	82.2	41.2	24.1	15.3	10.5	7.6	5.8	4.6	3.7	3.1	2.6
INVLAT	73	76	79	82	84	84	83	81	78	75	72	68	65	62	58	55	52
ZA	103	105	108	110	113	115	117	120	122	123	125	127	128	130	131	132	132



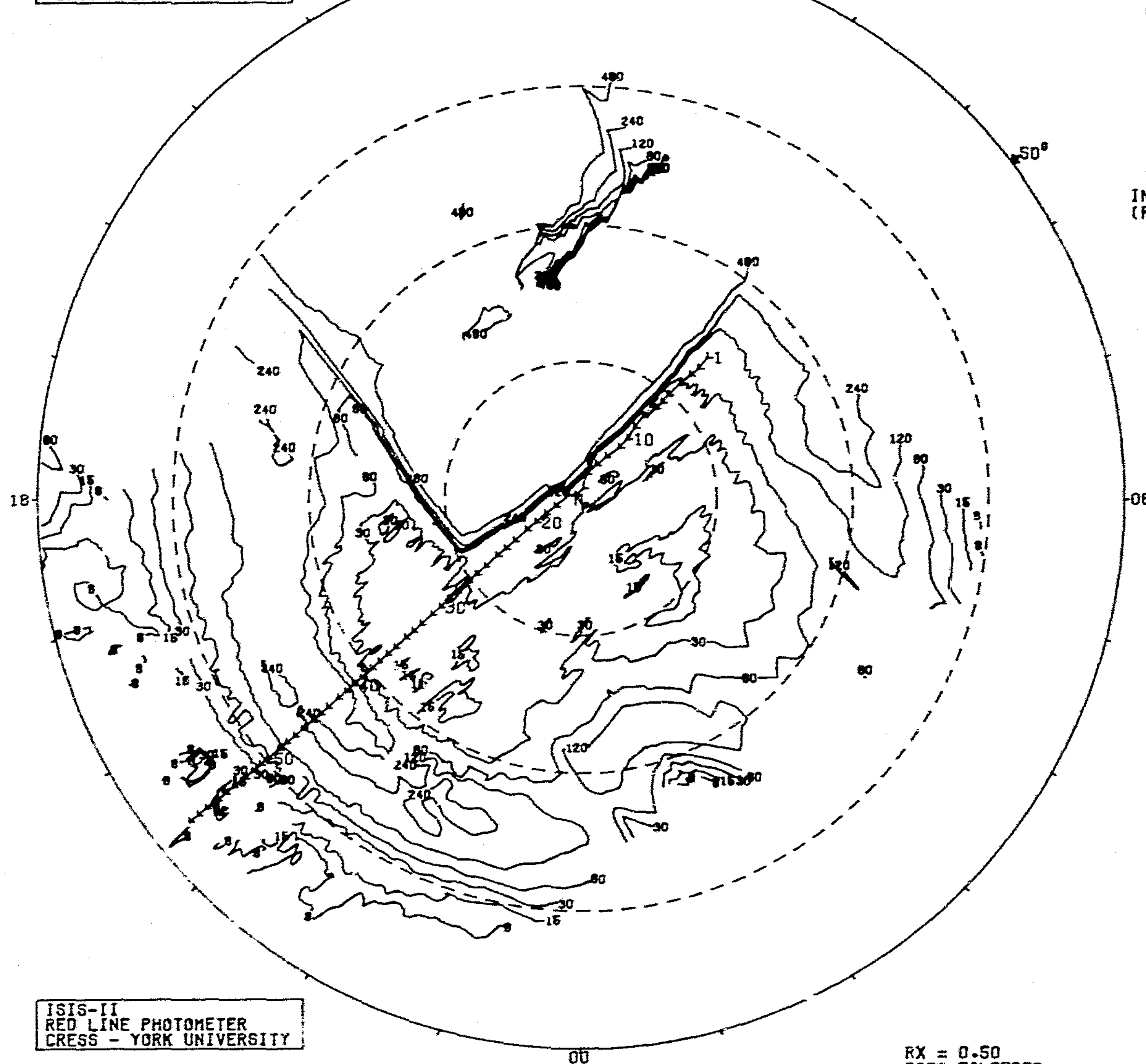

ASP
720111/0214 UT (713/47)
CENTER LAT/LON/MLT :
70./343.5/20.
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT
16
80
60
18
20
MV

ORBIT 3610 (72/JAN/11)
DAY 11 OF YEAR 1972

6300 ANGSTROM INTENSITY

DATE PROCESSED: 79/NOV/07
INVARIANT COORDINATES (250 KM.)

FIRST SPIN U.T. $2^{H}6^{M}$
LAST SPIN U.T. $2^{H}25^{M}$



CONTOURS PLOTTED

80
150
300
600
1200
2400
4800
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

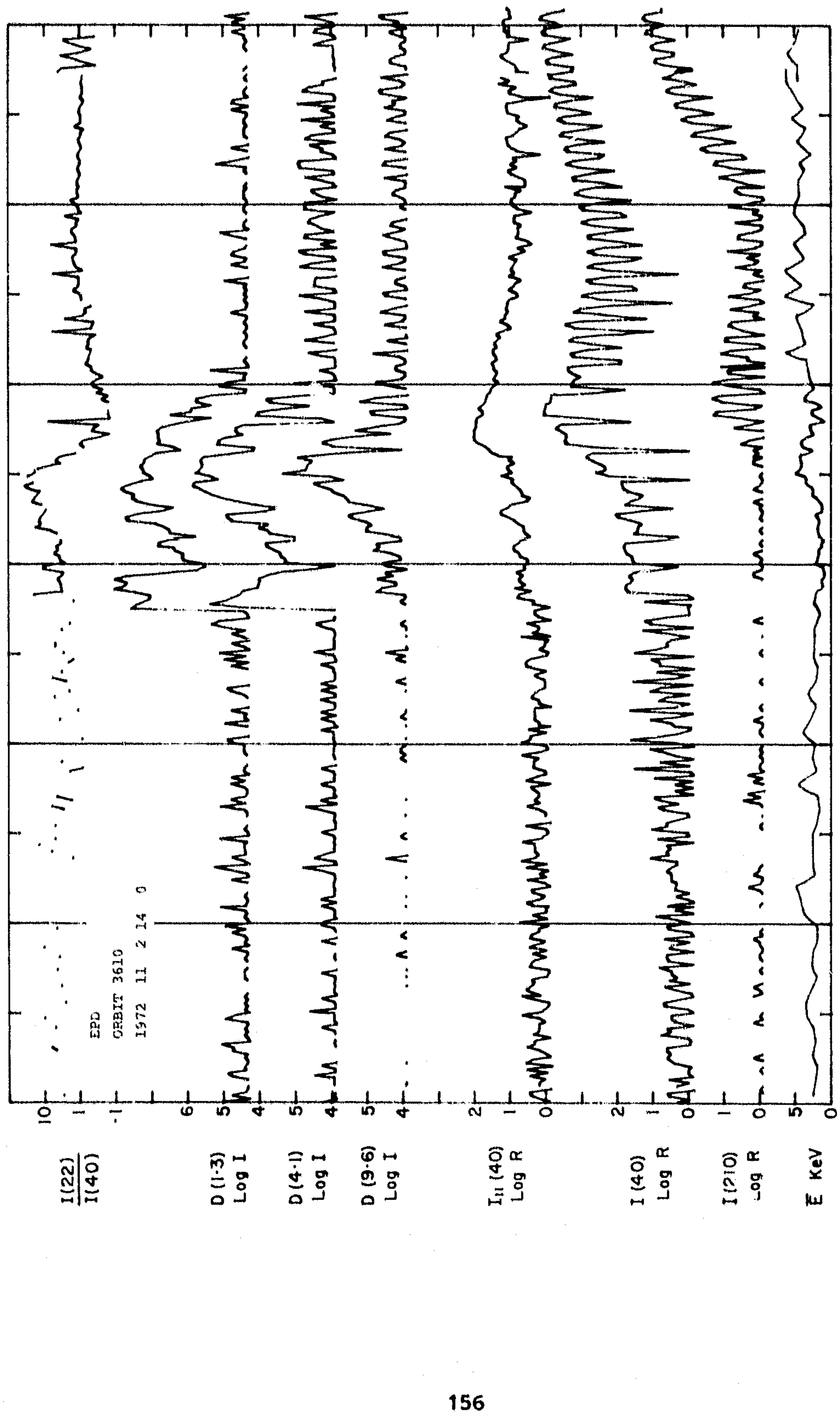
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	020611	76.7
2	020635	77.8
3	020653	78.6
4	020711	79.3
5	020735	80.2
6	020753	81.1
7	020811	82.1
8	020835	83.4
9	020853	83.9
10	020911	84.2
11	020929	84.3
12	020953	84.3
13	021011	84.3
14	021029	84.3
15	021053	84.3
16	021111	84.3
17	021129	84.2
18	021153	84.3
19	021211	84.3
20	021229	84.3
21	021247	84.4
22	021311	84.1
23	021329	83.7
24	021347	83.1
25	021411	82.1
26	021429	81.4
27	021447	80.6
28	021511	79.4
29	021529	78.6
30	021547	77.9
31	021605	77.1
32	021629	76.0
33	021647	75.2
34	021705	74.4
35	021729	73.4
36	021747	72.5
37	021805	71.7
38	021823	70.9
39	021847	69.9
40	021905	69.1
41	021923	68.2
42	021941	67.4
43	022005	56.4
44	022023	65.5
45	022041	64.7
46	022105	63.7
47	022123	62.9
48	022141	62.0
49	022159	61.2
50	022223	60.2
51	022241	59.4
52	022259	58.5
53	022317	57.7
54	022341	56.7
55	022359	55.9
56	022417	55.1
57	022441	54.0
58	022459	53.2
59	022517	52.4

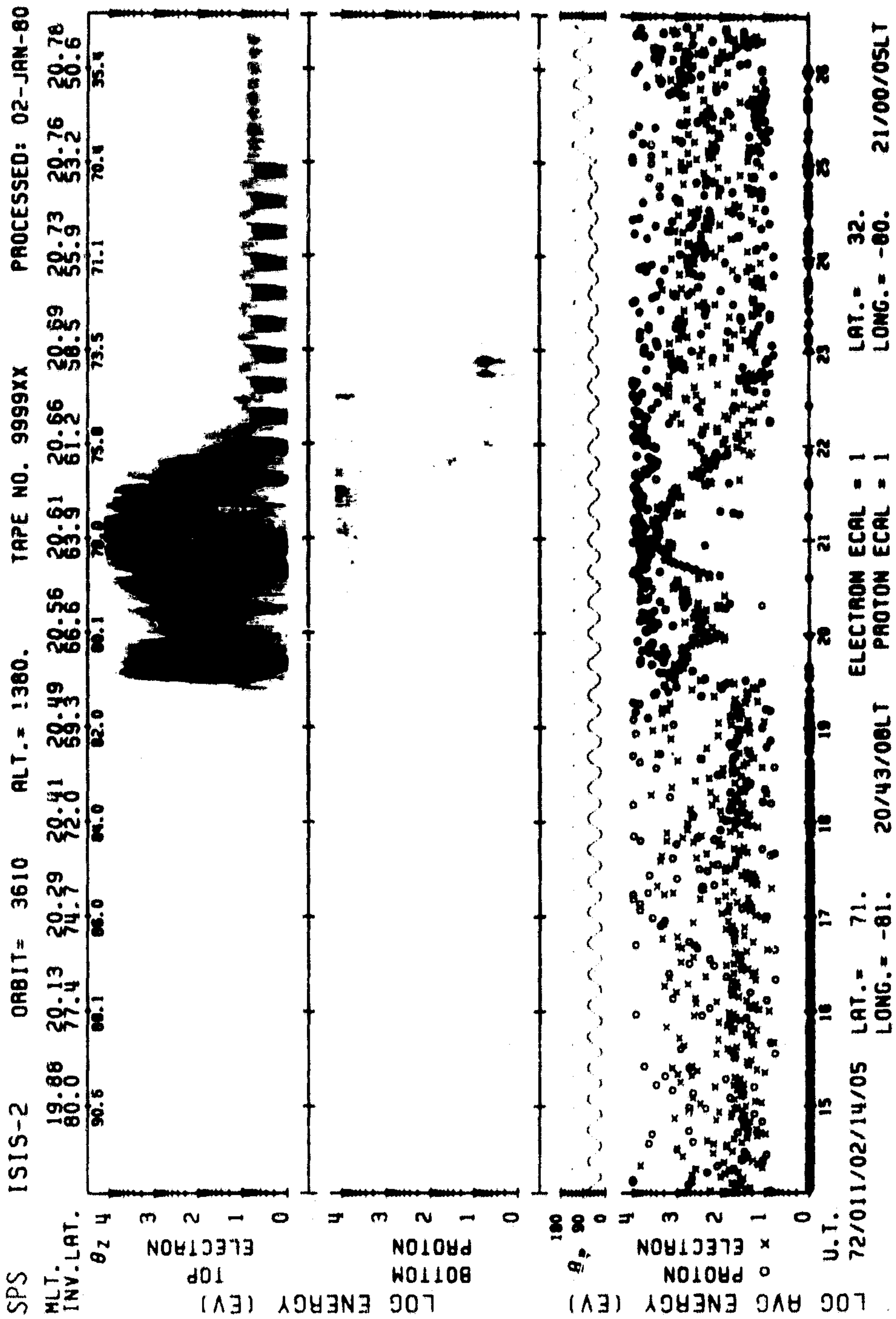
ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

HRT Y00481
FILE 24

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

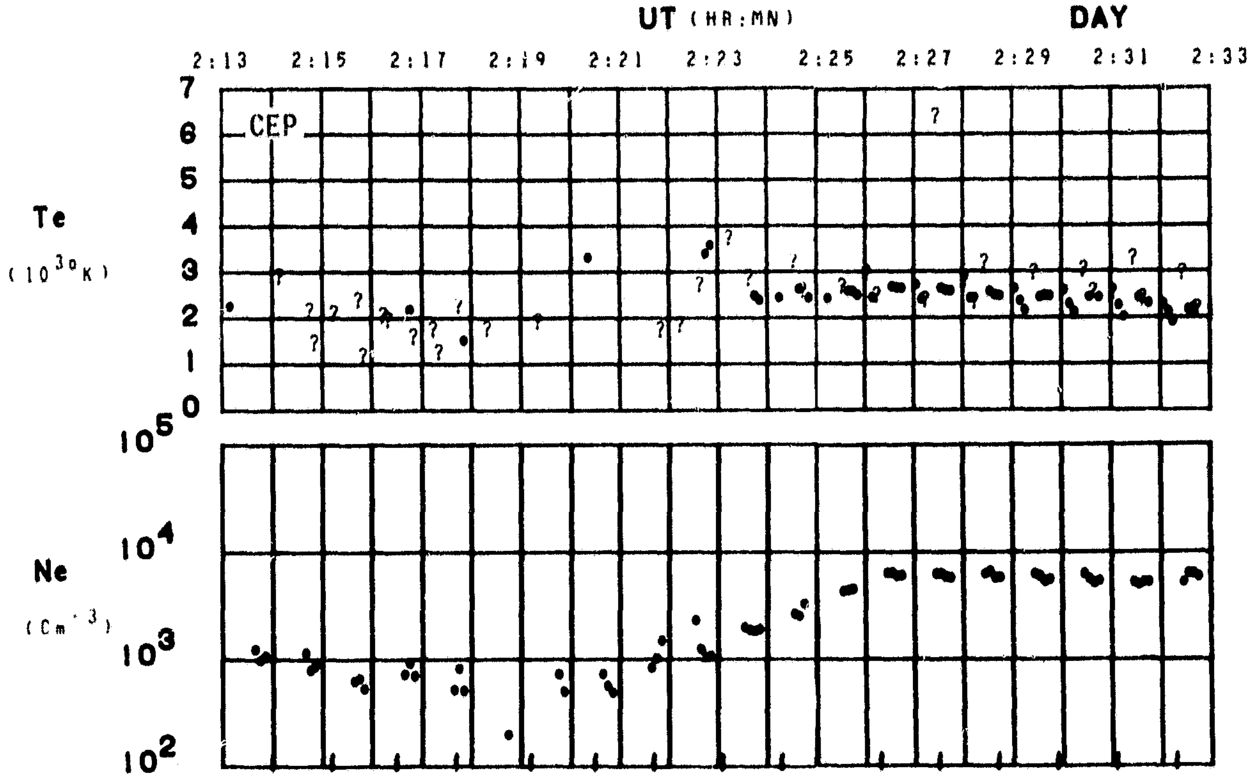
RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED


EPD
ORBIT 3610
1972 11 2 14 0
I(22)/I(40)
D (1·3) Log I
D (4·1) Log I
D (9·6) Log I
I (40) Log R
Ē KeV
U.T.
INV.LAT.
MLT
B
THETA Z

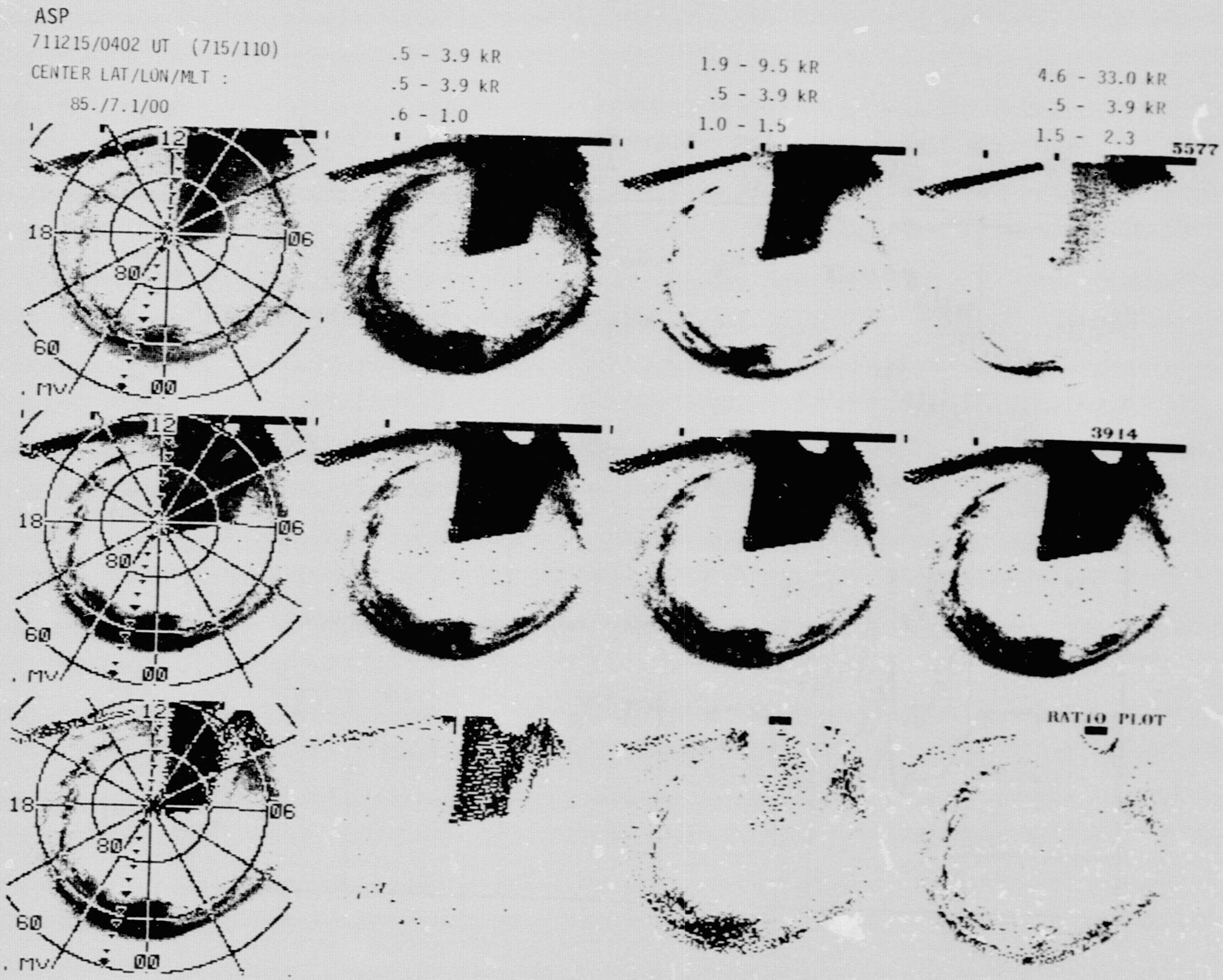


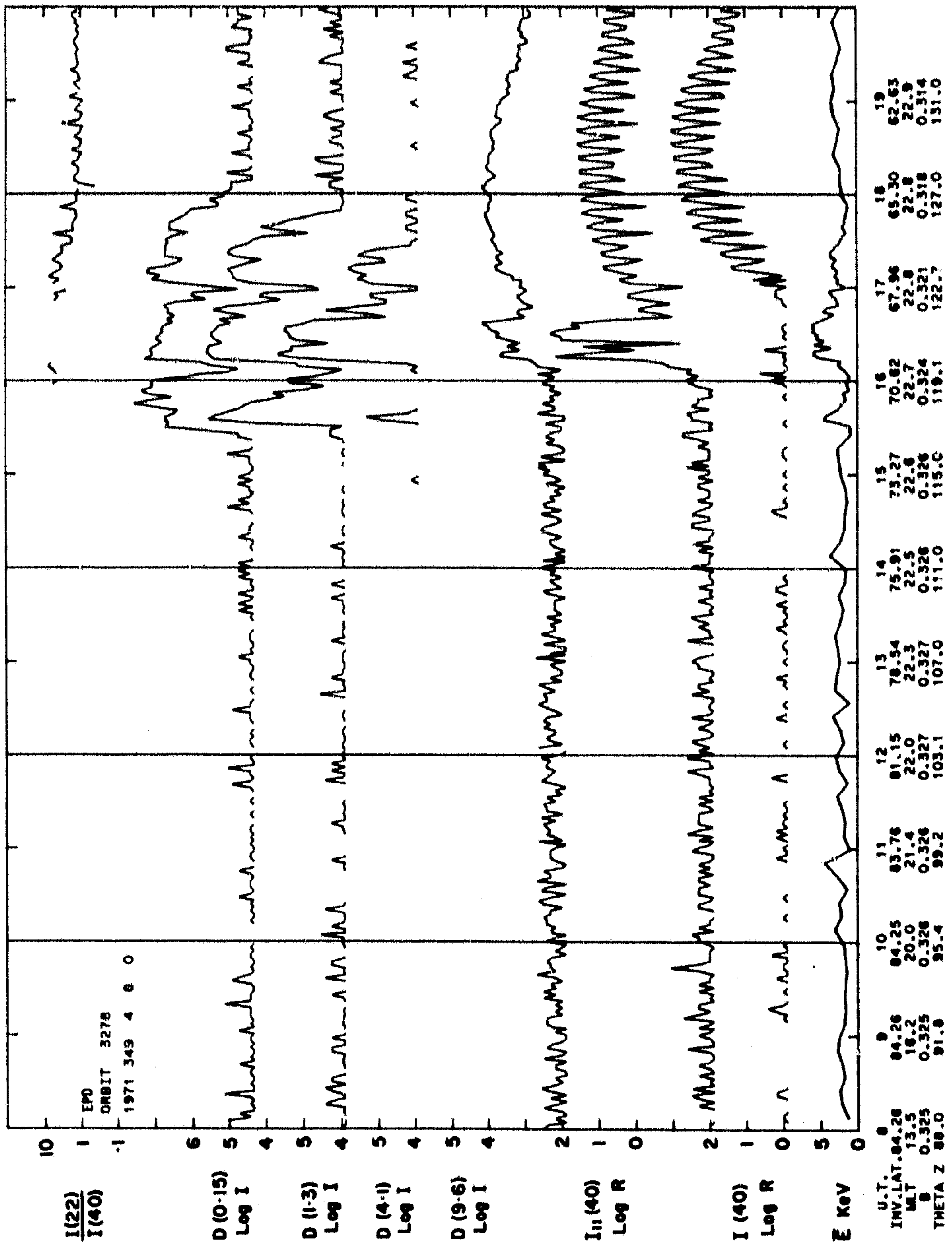
ISIS-2
ORBIT= 3610
ALT.= 1380.
TAPE NO. 9999XX
PROCESSED: 02-JAN-80
SPS
MLT.
INV.LAT.
19.88 80.0
20.13 77.4
20.29 74.7
20.41 72.0
20.49 69.3
20.56 66.6
20.61 63.9
20.66 61.2
20.69 58.5
20.73 55.9
20.76 53.2
20.78 50.6
LOG ENERGY (EV)
TOP ELECTRON
BOTTOM PROTON
LOG AVG ENERGY (EV)
× ELECTRON
○ PROTON
U.T.
72/011/02/14/05
LAT.= 71.
LONG.= -81.
20/43/08LT
ELECTRON ECAL = 1
PROTON ECAL = 1
LAT.= 32.
LONG.= -80.
21/00/05LT

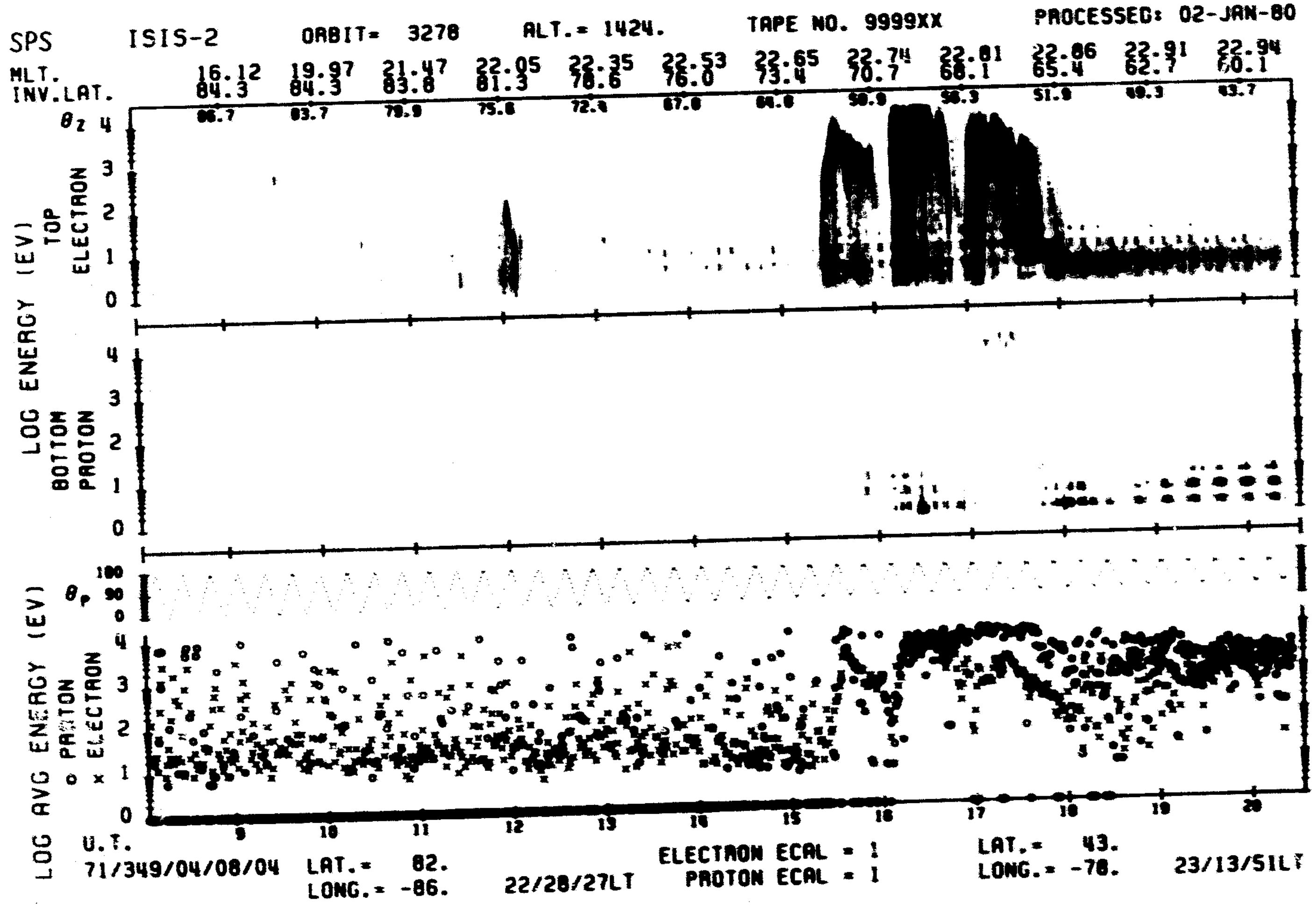
ORBIT 3610
DATE 720111
DAY 11



LAT	71	67	63	59	55	50	47	42	38	32	28	24	20	16	13
LONG	-80	-80	-79	-79	-79	-79	-79	-79	-79	-79	-79	-79	-80	-80	-80
LT	20:42	20:46	20:49	20:52	20:54	20:55	20:56	20:57	20:58	21:00	21:00	21:01	21:01	21:02	21:02
DIP	86	85	83	81	79	76	74	71	68	63	60	56	52	47	42
DIPLAT	83	80	77	74	69	65	61	56	52	45	41	37	33	29	25
L	60.7	29.7	17.2	11.5	7.6	5.7	4.5	3.6	3.1	2.4	2.1	1.9	1.7	1.6	1.5
INVLAT	82	79	76	72	68	65	62	58	55	49	46	43	40	28	35
ZA	123	125	127	129	132	134	135	137	137	138	139	139	138	137	136

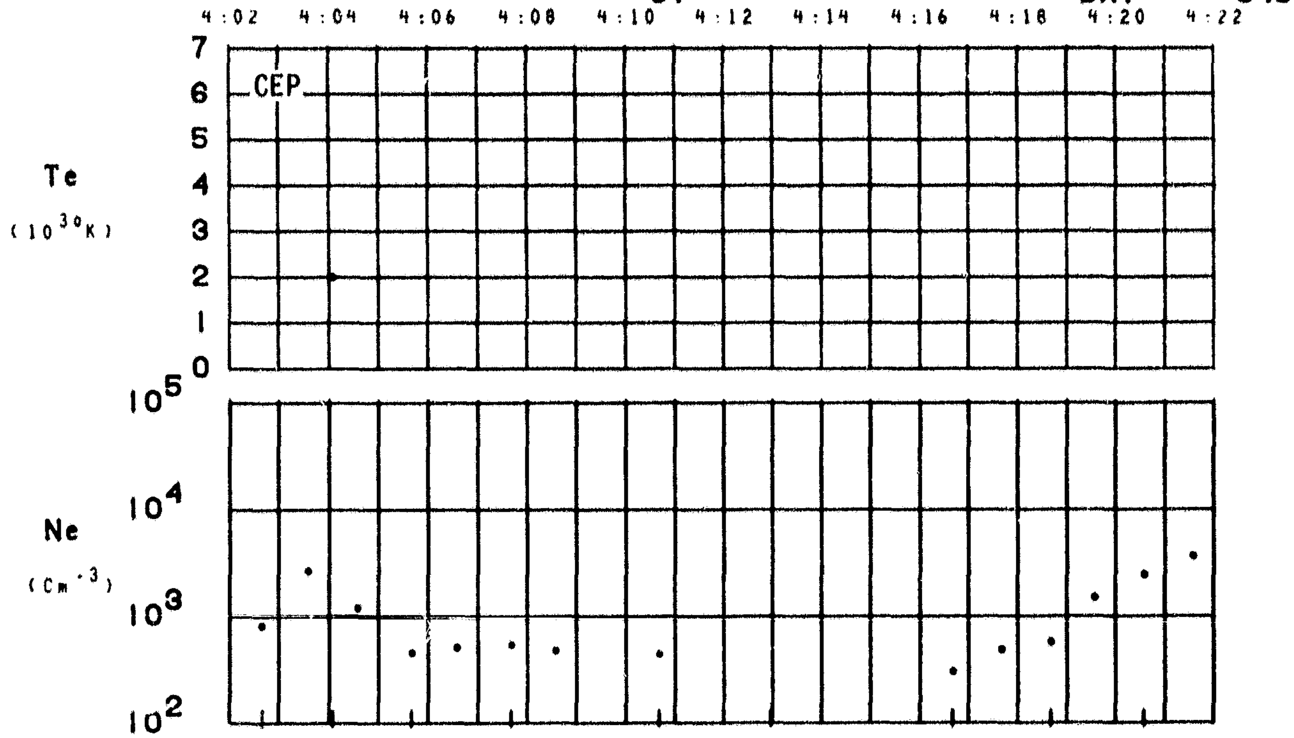

ASP
711215/0402 UT (715/110)
CENTER LAT/LON/MLT :
85./7.1/00
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT
12
18
06
80
60
00
. MV


EPD
ORBIT 3278
1971 349 4 8 0
I(22)/I(40)
D (0-15) Log I
D (1-3) Log I
D (4-1) Log I
D (9-6) Log I
I‖(40) Log R
I (40) Log R
E KeV
U.T.
INV.LAT.
MLT
B
THETA Z

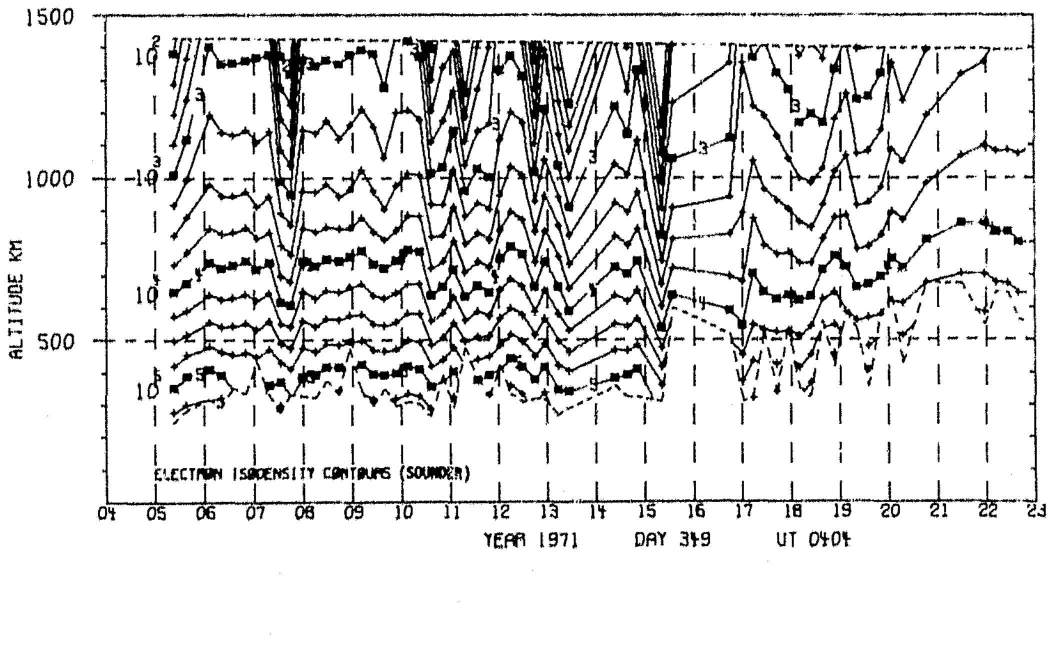


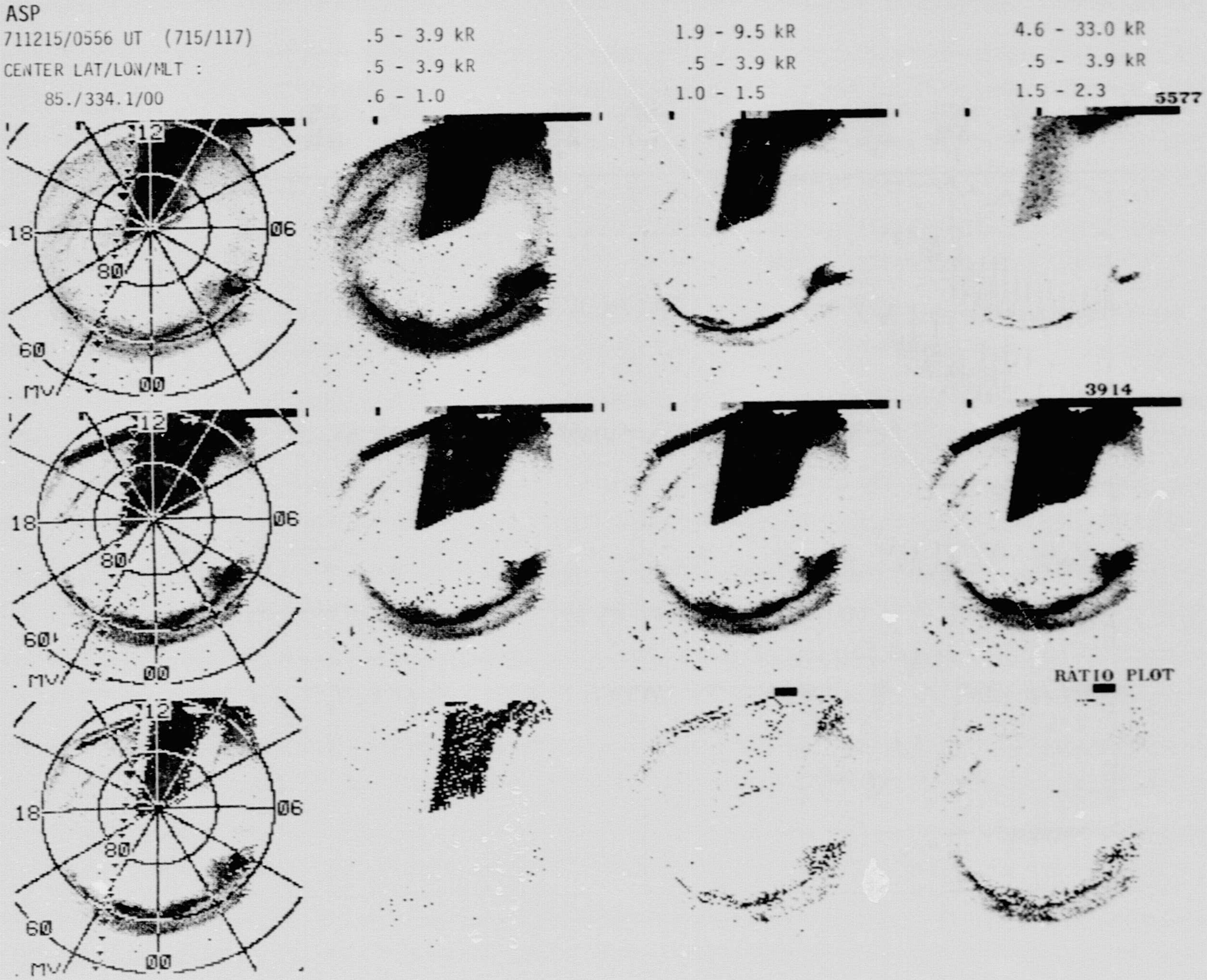
SPS
ISIS-2
ORBIT= 3278
ALT.= 1424.
TAPE NO. 9999XX
PROCESSED: 02-JAN-80
MLT.
INV.LAT.
16.12 84.3
19.97 84.3
21.47 83.8
22.05 81.3
22.35 78.6
22.53 76.0
22.65 73.4
22.74 70.7
22.81 68.1
22.86 65.4
22.91 62.7
22.94 60.1
θ_z
LOG ENERGY (EV)
TOP ELECTRON
BOTTOM PROTON
θ_p
LOG AVG ENERGY (EV)
o PROTON
x ELECTRON
U.T.
71/349/04/08/04
LAT.= 82.
LONG.= -86.
22/28/27LT
ELECTRON ECAL = 1
PROTON ECAL = 1
LAT.= 43.
LONG.= -78.
23/13/51LT

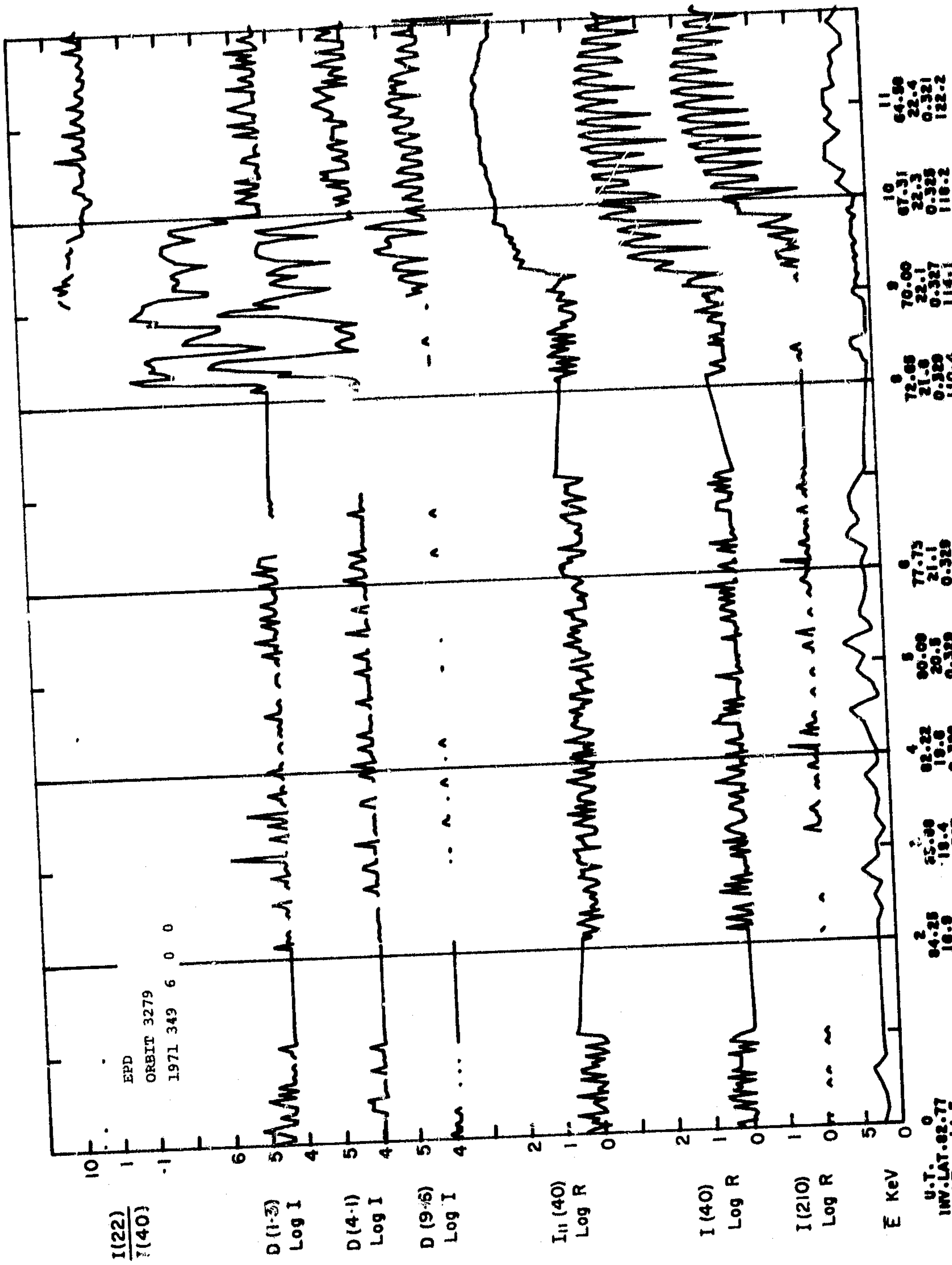
ORBIT 3278
DATE 711215
DAY 349

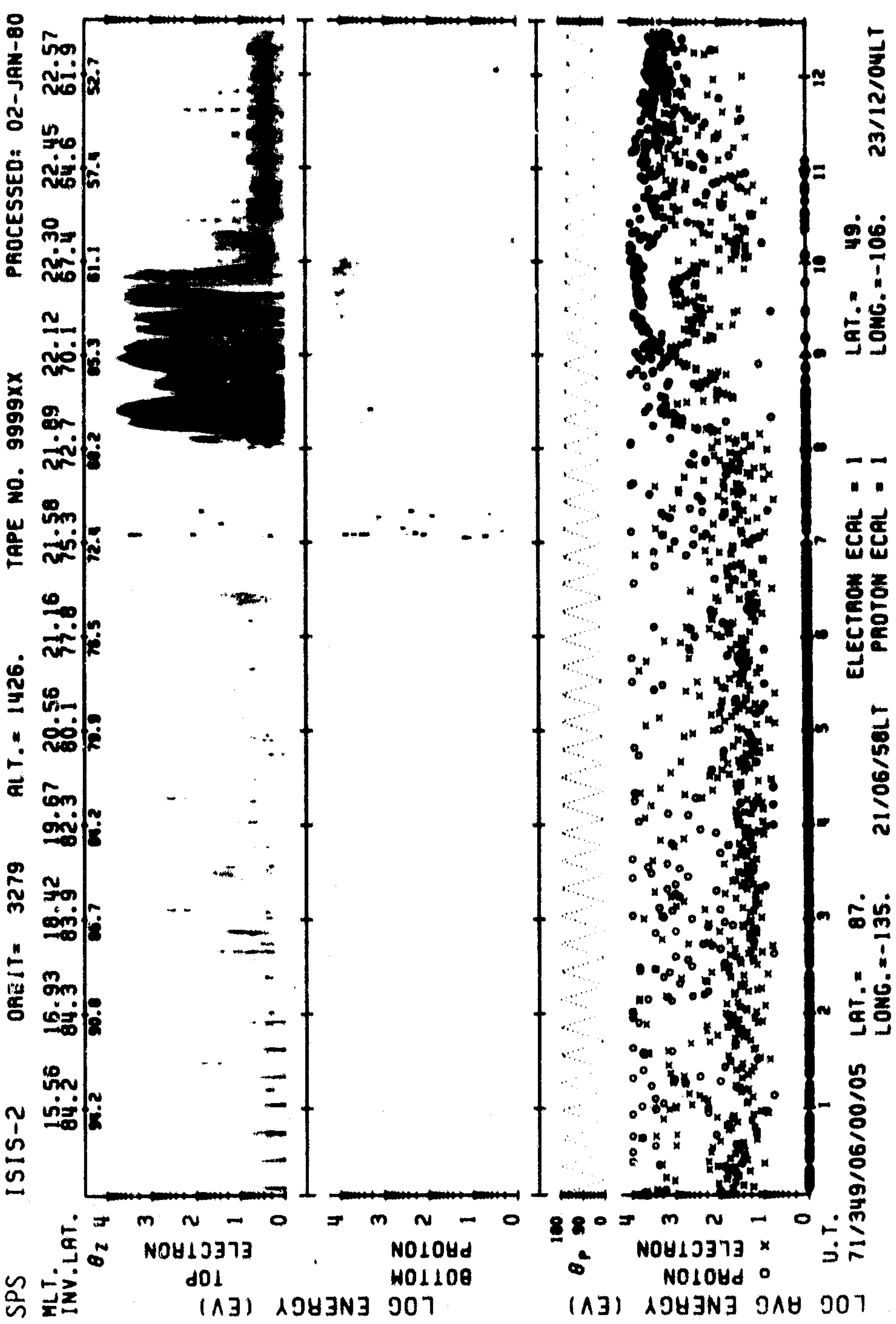


LAT	80	84	87	83	73	66	56	48	42
LONG	119	129	-152	-88	-80	-73	-77	-77	-77
LT	12:06	12:45	18:01	22:20	22:55	23:03	23:10	23:12	23:14
DIP	85	86	88	89	87	84	79	75	71
DIPLAT	80	83	86	88	84	79	68	62	56
L	13.9	23.5	57.4	101.7	93.1	25.7	7.7	5.0	3.7
INVLAT	74	78	82	84	84	78	68	63	58
ZA	103	108	113	119	128	135	147	153	158



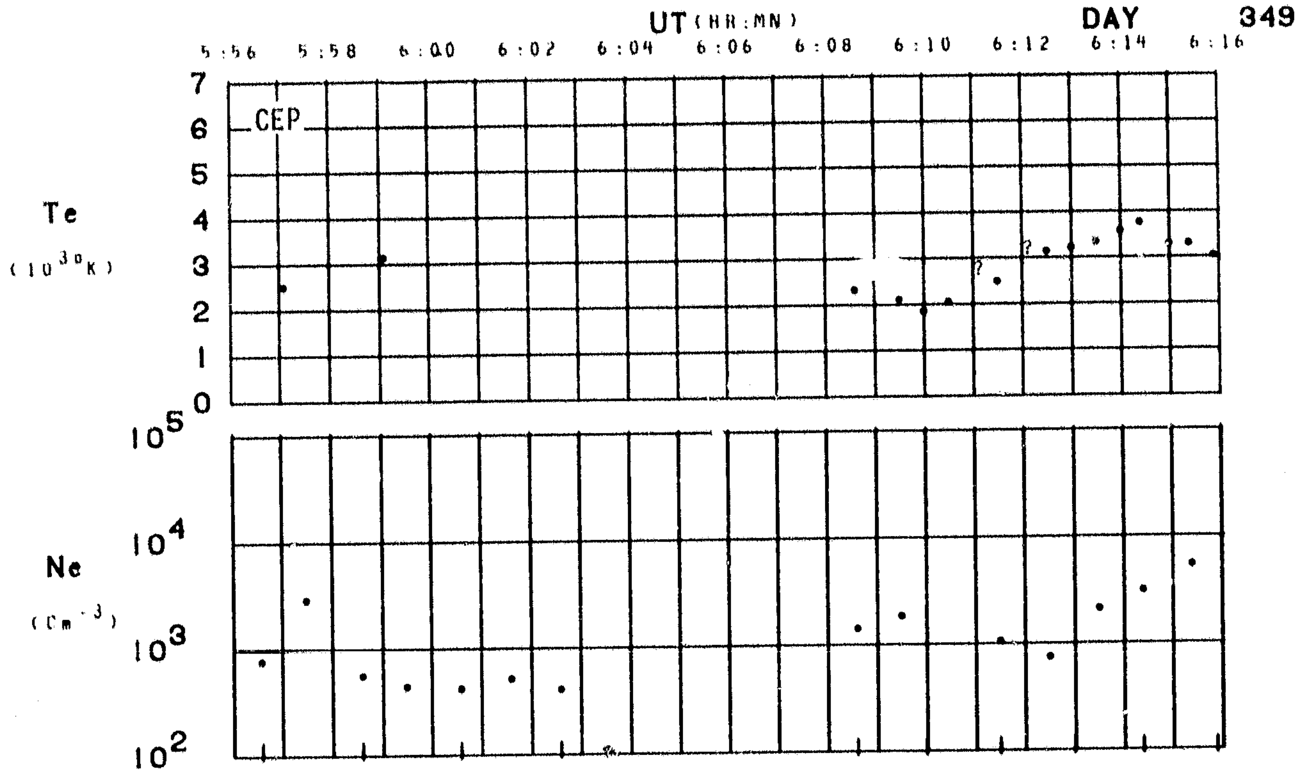

ASP
711215/0556 UT (715/117)
CENTER LAT/LON/MLT :
85./334.1/00
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT
12
18
06
80
60
00
MV


EPD
ORBIT 3279
1971 349 6 0 0
I(22) / I(40)
D(1·3) Log I
D(4·1) Log I
D(9·6) Log I
I⊥(40) Log R
I(40) Log R
I(210) Log R
Ē KeV
U.T.
INV.LAT.
MLT
B
THETA Z

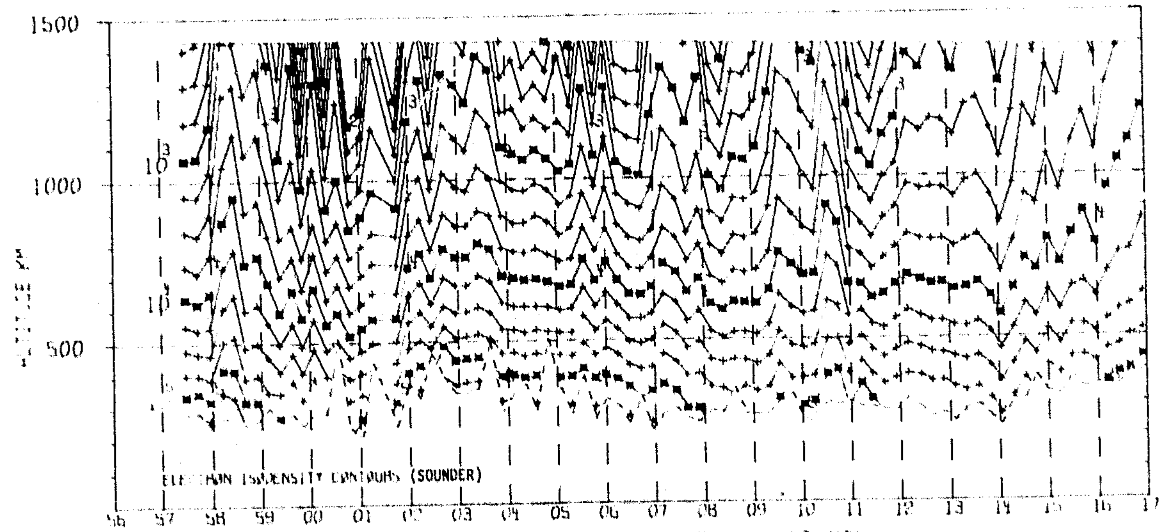


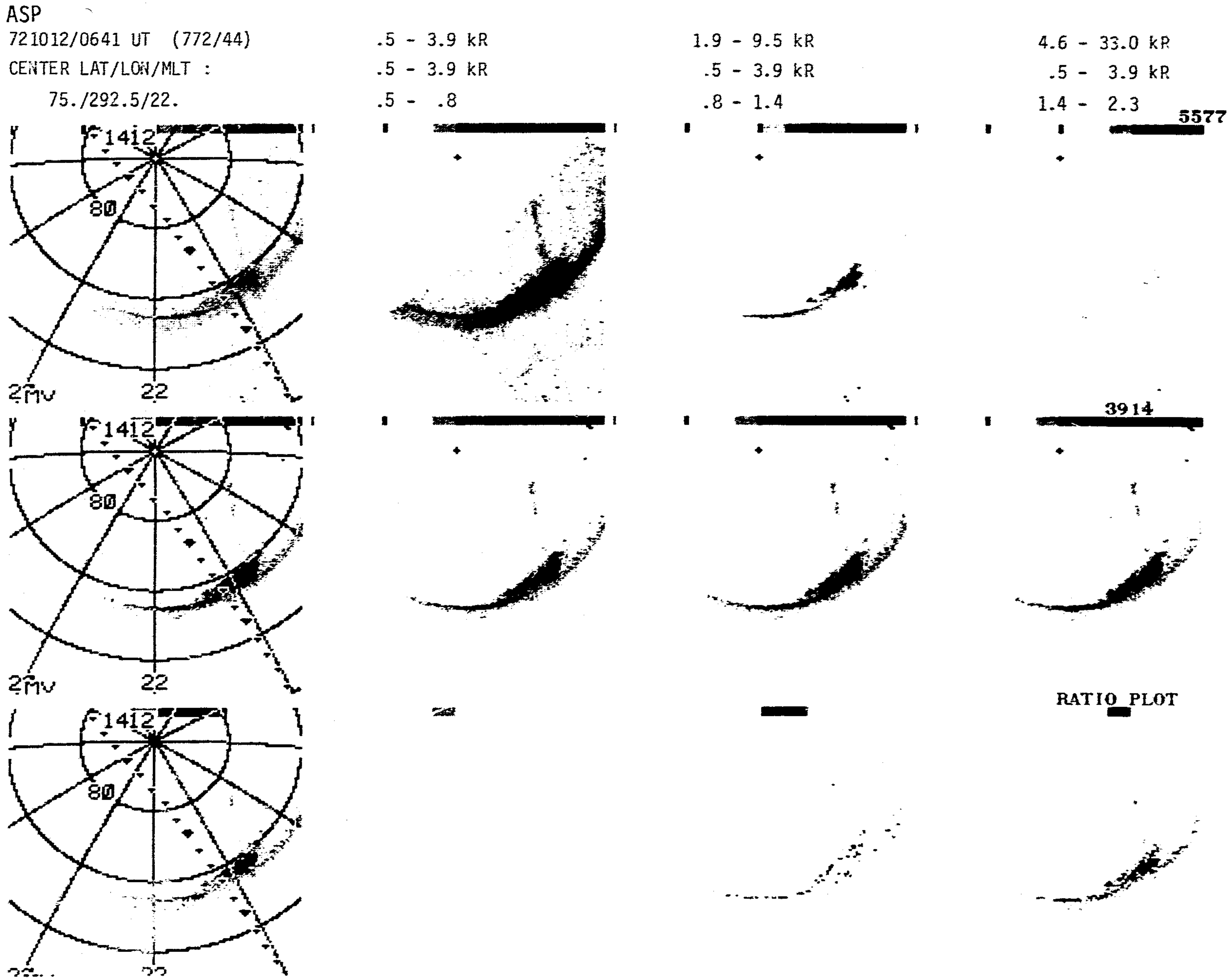
SPS
ISIS-2
ORBIT= 3279
ALT.= 1426.
TAPE NO. 9999XX
PROCESSED: 02-JAN-80
MLT.
INV.LAT.
LOG ENERGY (EV)
TOP ELECTRON
BOTTOM PROTON
LOG AVG ENERGY (EV)
o PROTON
x ELECTRON
U.T.
71/349/06/00/05
LAT.= 87.
LONG.=-135.
21/06/58LT
ELECTRON ECAL = 1
PROTON ECAL = 1
LAT.= 49.
LONG.=-106.
23/12/04LT

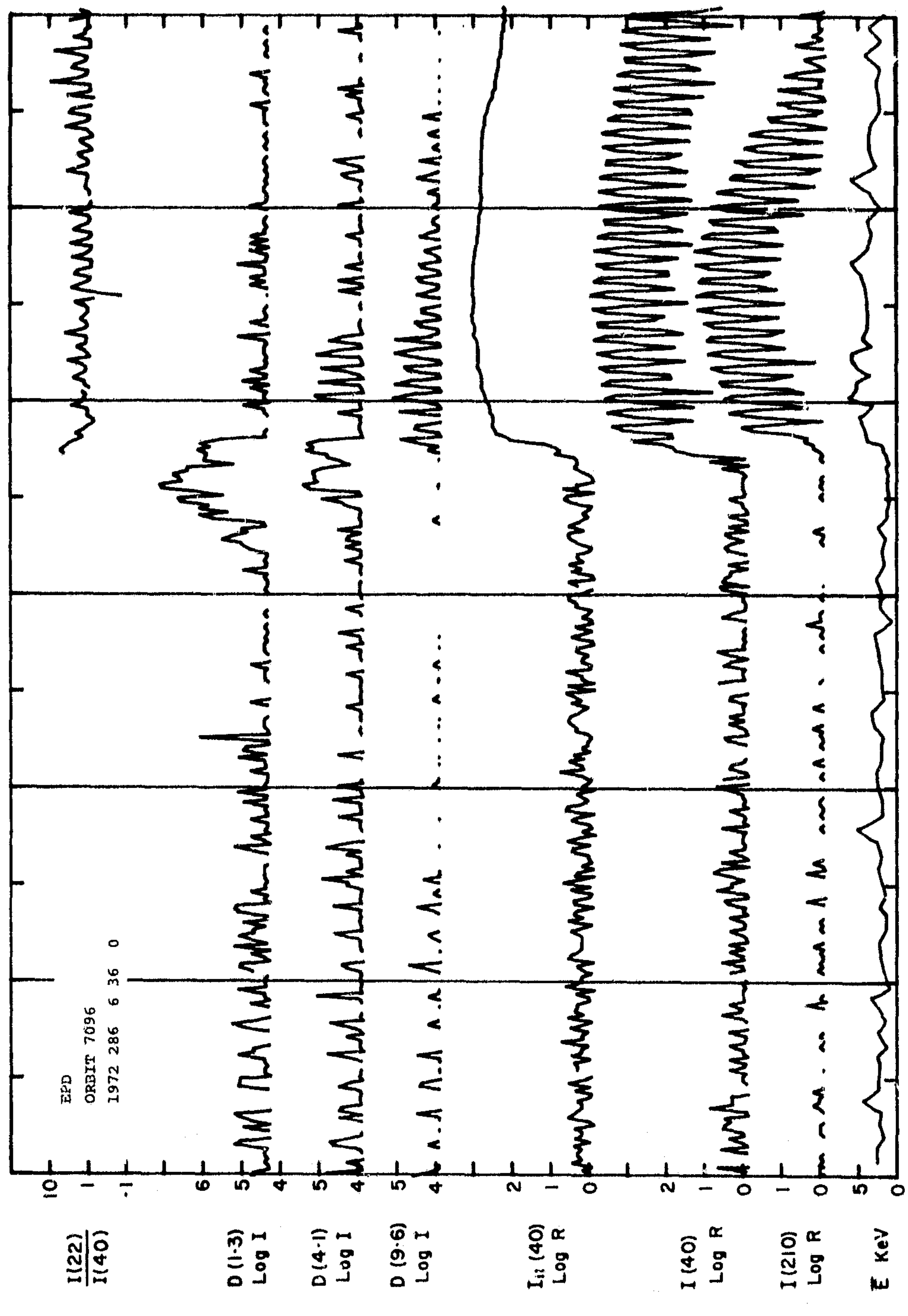
ORBIT 3279
DATE 711215
DAY 349

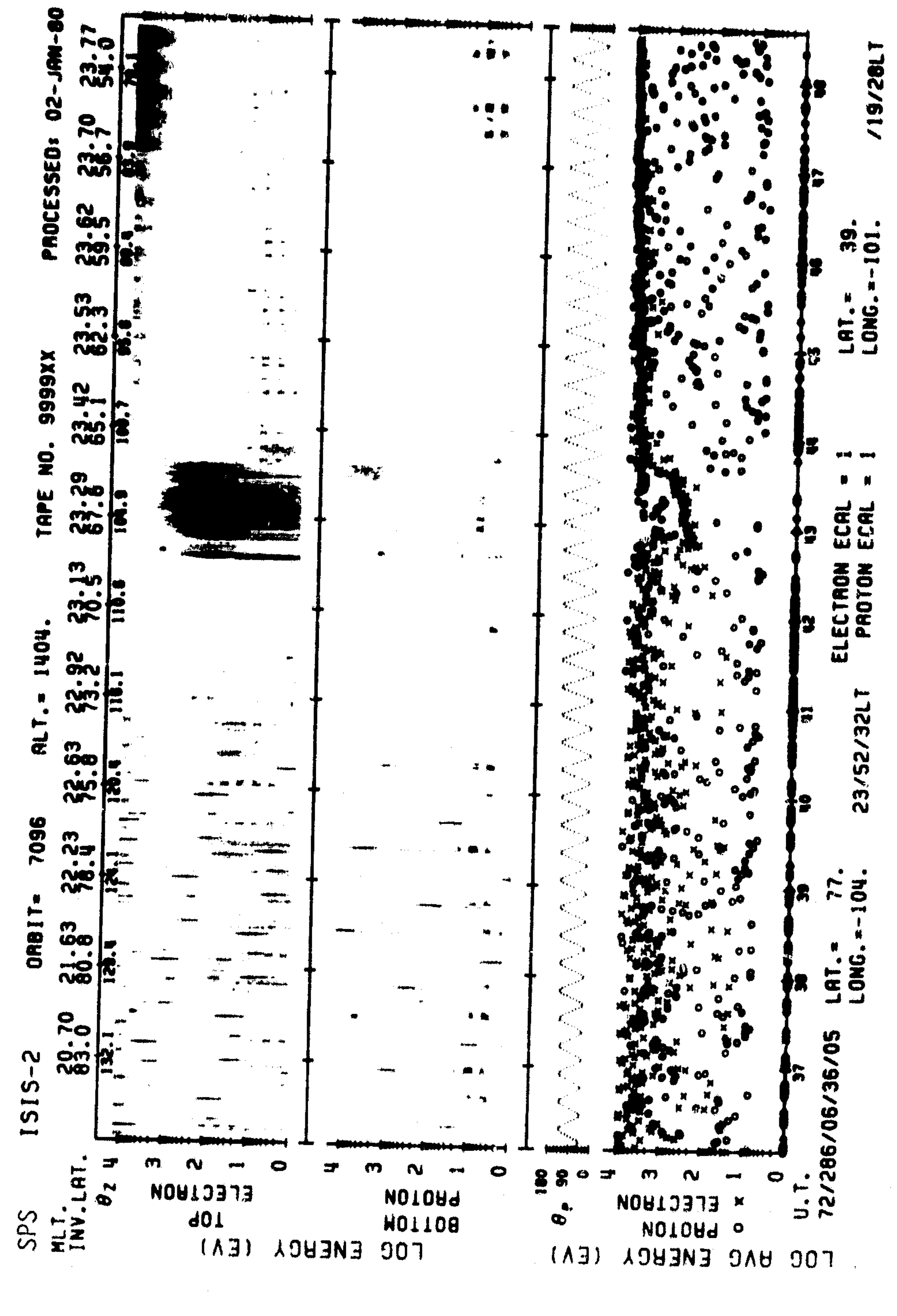


LAT	81	87	85	79	60	56	51	46	42	37
LONG	92	123	-122	-111	-106	-106	-106	-106	-106	-106
LT	12:10	14:18	21:55	22:41	23:07	23:09	23:11	23:12	23:13	23:14
DIP	85	87	88	88	80	78	75	72	69	65
DIPLAT	80	84	87	86	72	67	62	57	52	47
L	15.2	32.4	85.6	95.4	9.6	6.7	4.9	3.8	3.1	2.5
INVLAT	75	79	83	84	71	67	63	59	55	51
ZA	104	110	117	123	141	145	150	154	158	162



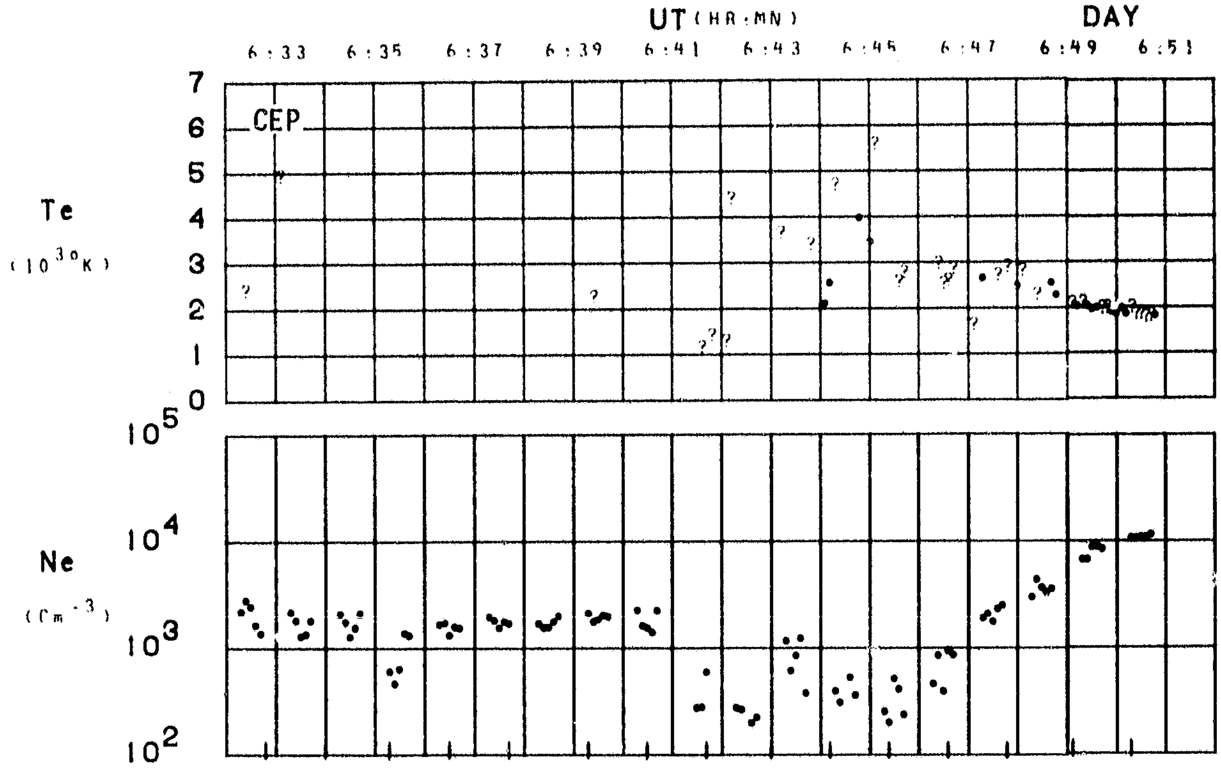

ASP
721012/0641 UT (772/44)
CENTER LAT/LON/MLT :
75./292.5/22.
.5 - 3.9 kR
.5 - 3.9 kR
.5 - .8
1.9 - 9.5 kR
.5 - 3.9 kR
.8 - 1.4
4.6 - 33.0 kR
.5 - 3.9 kR
1.4 - 2.3
5577
3914
RATIO PLOT
1412
80
22


EPD
ORBIT 7096
1972 286 6 36 0
I(22) / I(40)
D (1·3) Log I
D (4·1) Log I
D (9·6) Log I
I∥ (40) Log R
I (40) Log R
I (210) Log R
Ē KeV
U.T. 36 37 38 39 40 41 42 43 44 45 46 47
INV.LAT. 84.25 82.97 80.78 78.32 75.78 73.16 70.49 67.78 65.04 62.27 59.49 56.70
MLT 19.3 20.7 21.6 22.2 22.6 22.9 23.1 23.3 23.4 23.5 23.6 23.7
B 0.329 0.330 0.331 0.332 0.332 0.332 0.330 0.328 0.324 0.320 0.314 0.308
THETA Z 41.3 48.4 50.1 54.4 59.0 63.6 68.5 73.4 78.5 83.7 89.2 94.7

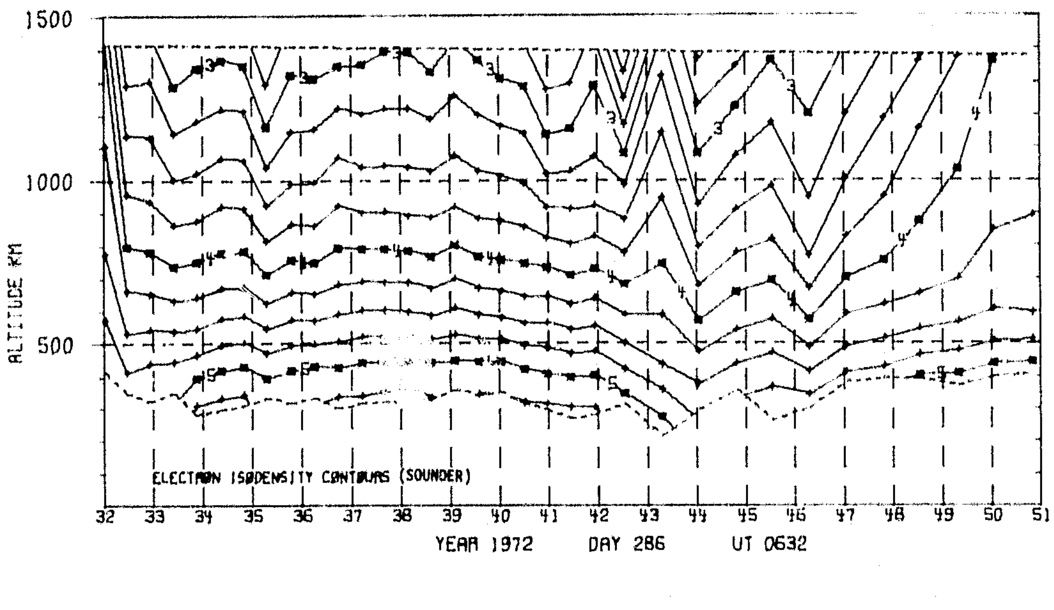


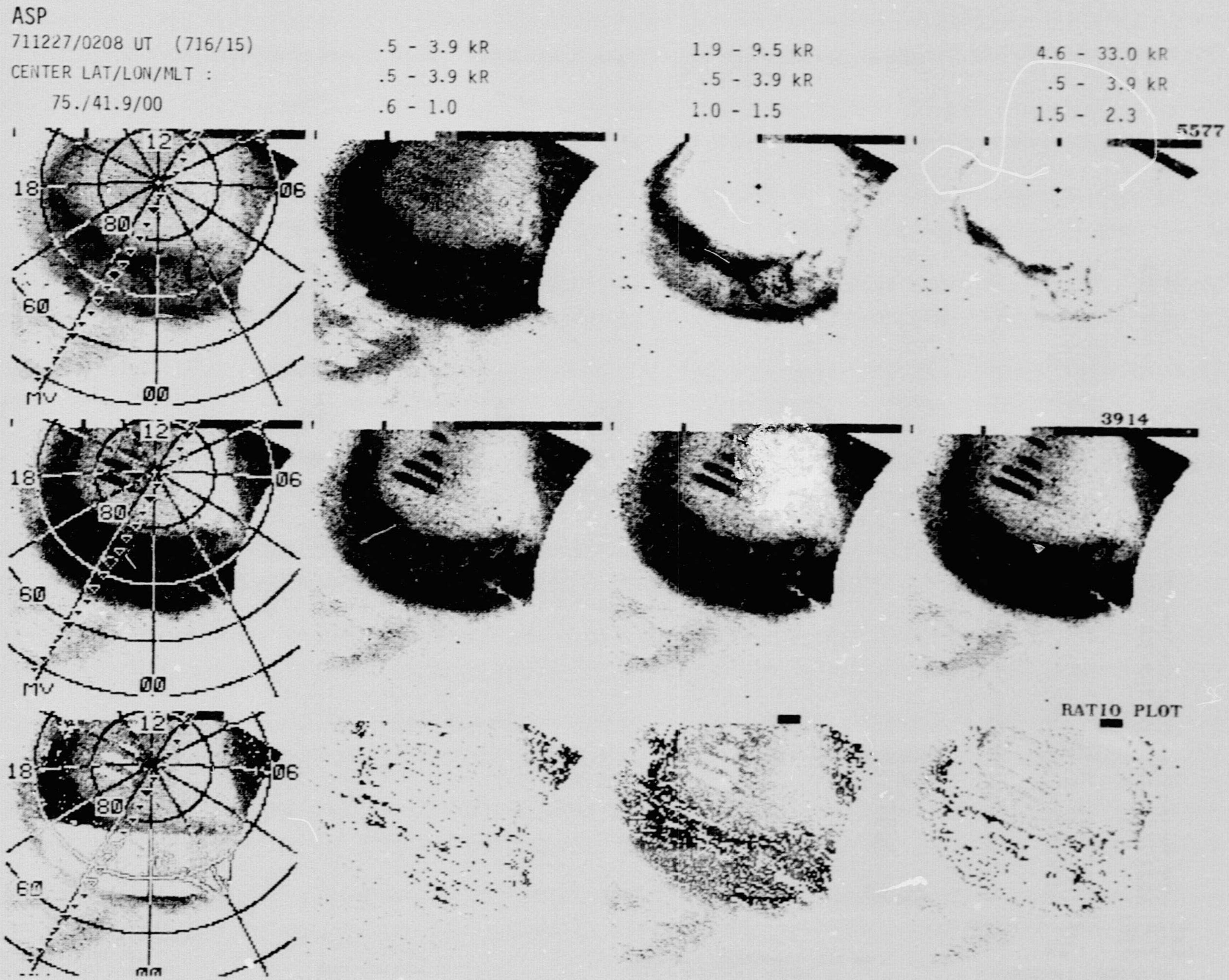
ORIGINAL PAGE IS
OF POOR QUALITY

ORBIT 7096
DATE 721012
DAY 286



LAT	87	83	79	76	72	67	63	59	55	51	48	44	40	36	32
LONG	-140	-112	-106	-103	-102	-101	-100	-100	-100	-100	-100	-100	-100	-100	-100
LT	21:23	23:15	23:43	23:55	0:02	0:07	0:10	0:12	0:14	0:15	0:17	0:18	0:19	0:19	0:20
DIP	88	89	88	87	86	84	83	81	78	76	74	71	68	65	61
DIPLAT	87	88	87	85	83	79	76	72	68	64	60	56	51	47	42
L	65.2	99.8	101.4	86.2	46.2	21.7	14.1	9.8	7.0	5.4	4.3	3.5	3.0	2.5	2.2
INVLAT	82	84	84	83	81	77	74	71	67	64	61	57	54	50	47
ZA	99	103	107	111	115	120	123	127	131	135	139	143	146	150	154



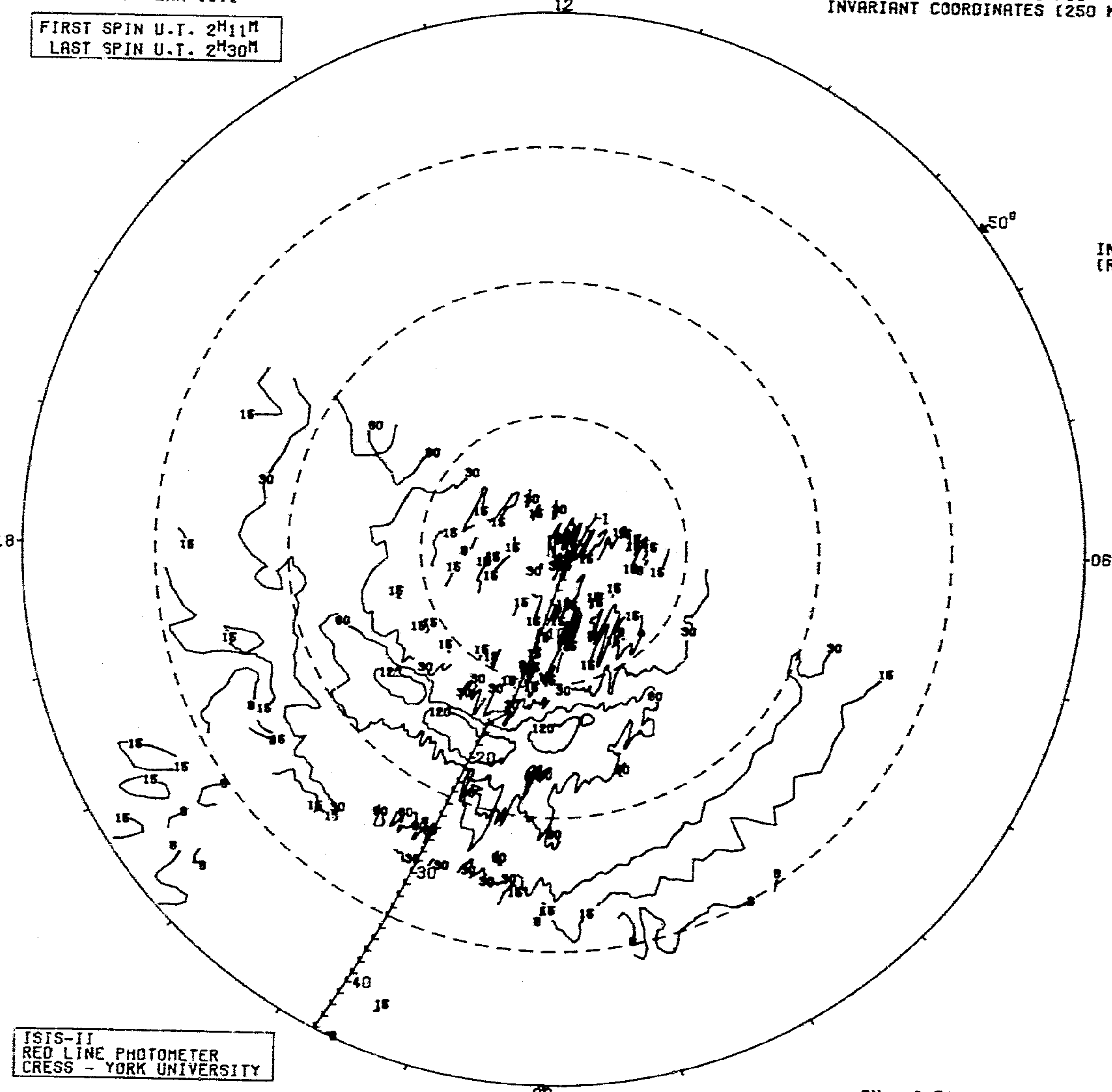

ASP
711227/0208 UT (716/15)
CENTER LAT/LON/MLT :
75./41.9/00
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT
12
18
06
80
60
00
MV

ORBIT 3420 (71/DEC/27)
DAY 361 OF YEAR 1971

FIRST SPIN U.T. 2H11M
LAST SPIN U.T. 2H30M

6300 ANGSTROM INTENSITY

DATE PROCESSED: 79/NOV/19
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

80
150
300
600
1200
2400
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

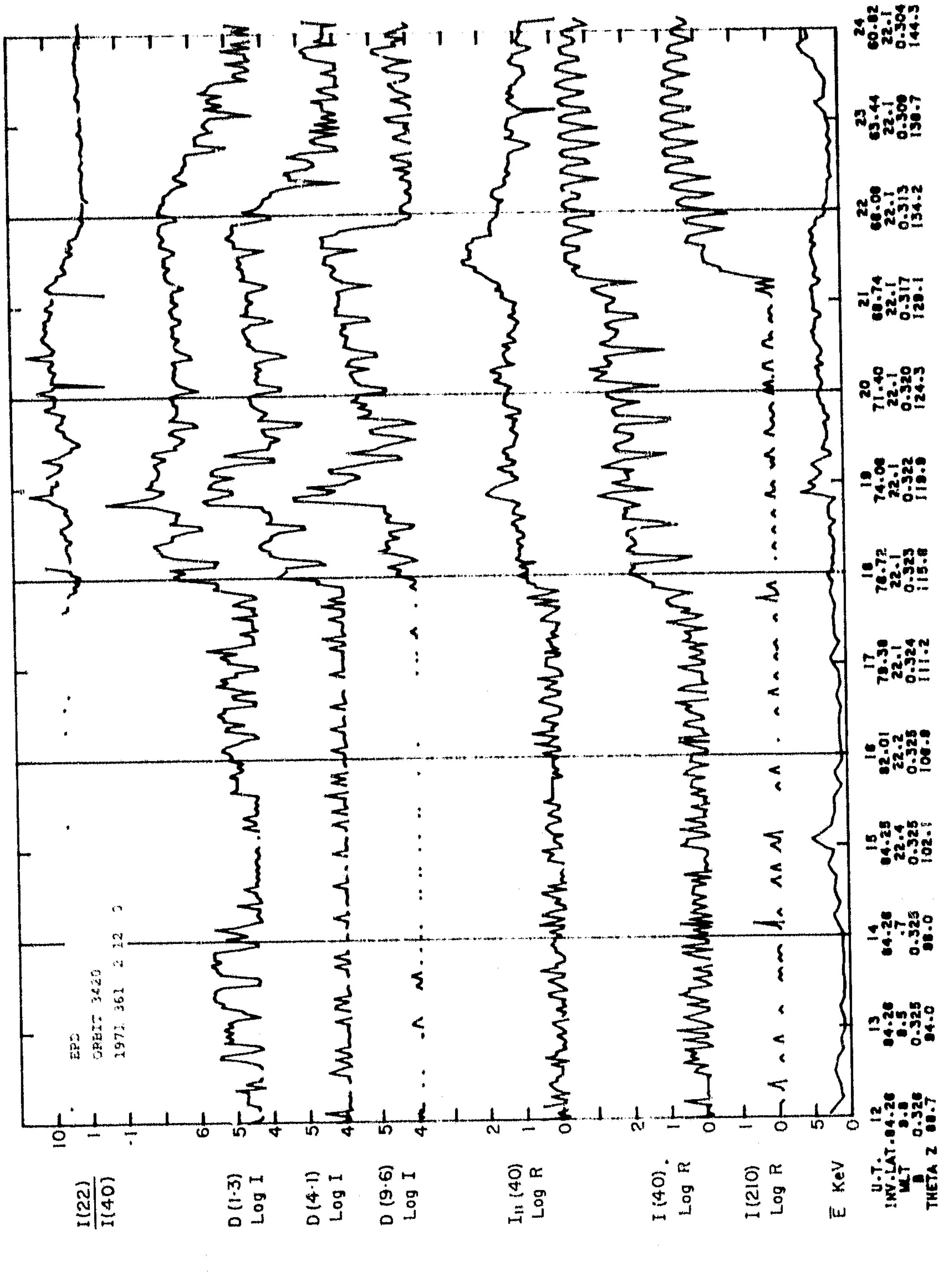
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	021144	84.3
2	021208	84.2
3	021232	84.2
4	021256	84.3
5	021320	84.2
6	021344	84.2
7	021402	84.3
8	021426	84.4
9	021450	84.4
10	021514	84.0
11	021538	83.2
12	021556	82.2
13	021620	81.1
14	021644	80.0
15	021708	79.0
16	021732	78.0
17	021756	76.9
18	021814	76.1
19	021838	75.1
20	021902	74.0
21	021926	72.9
22	021950	71.8
23	022008	71.1
24	022032	70.0
25	022056	68.9
26	022120	67.9
27	022144	66.8
28	022208	65.7
29	022226	64.9
30	022250	63.9
31	022314	62.8
32	022338	61.8
33	022402	60.7
34	022420	69.0
35	022444	58.9
36	022508	57.9
37	022532	56.9
38	022556	55.8
39	022620	54.8
40	022638	54.1
41	022702	53.1
42	022726	52.1
43	022750	51.1
44	022814	50.1
45	022832	49.4
46	022856	48.4
47	022920	47.5
48	022944	46.5
49	023008	45.6
50	023032	44.7

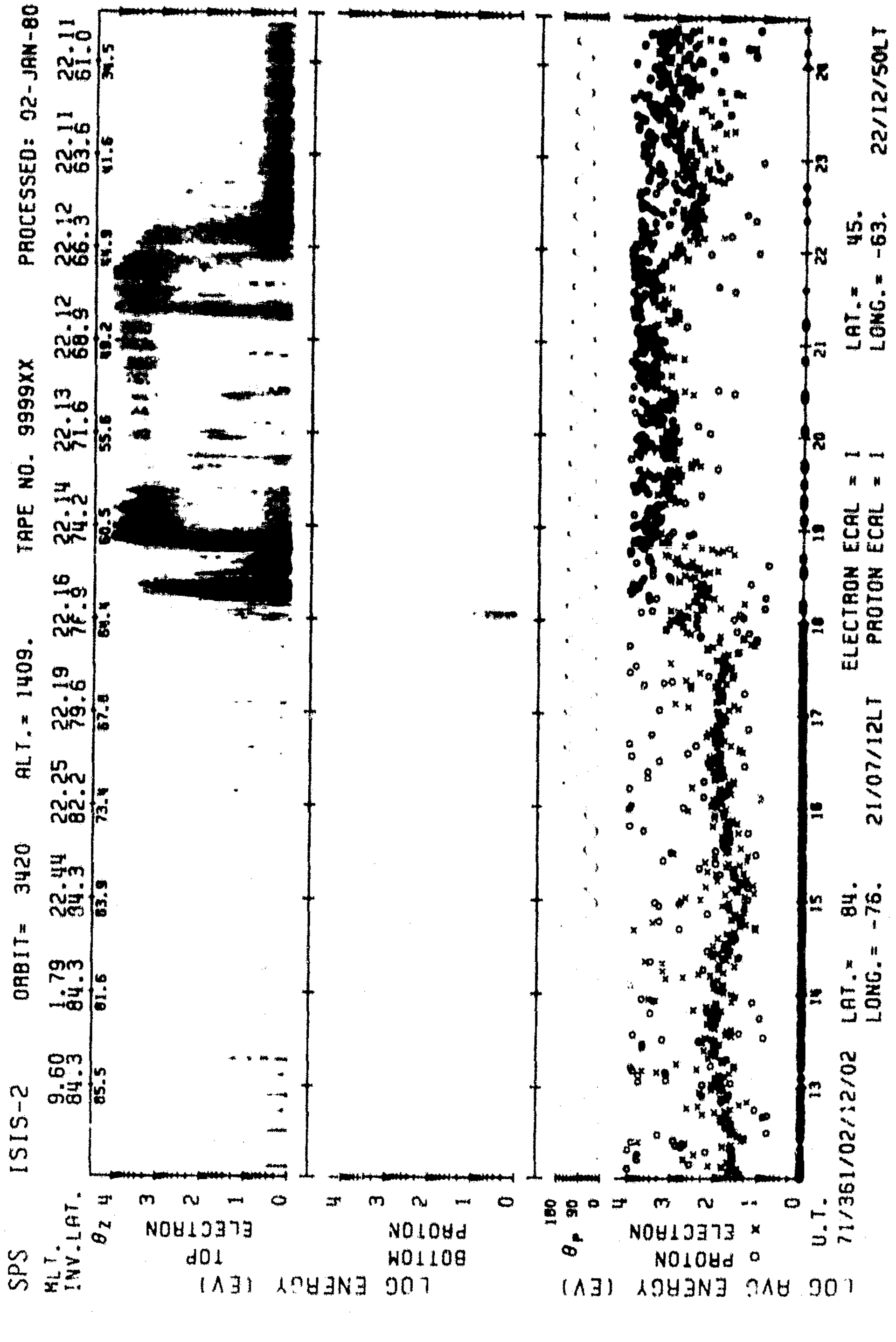
ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

HRT Y00498
FILE 62

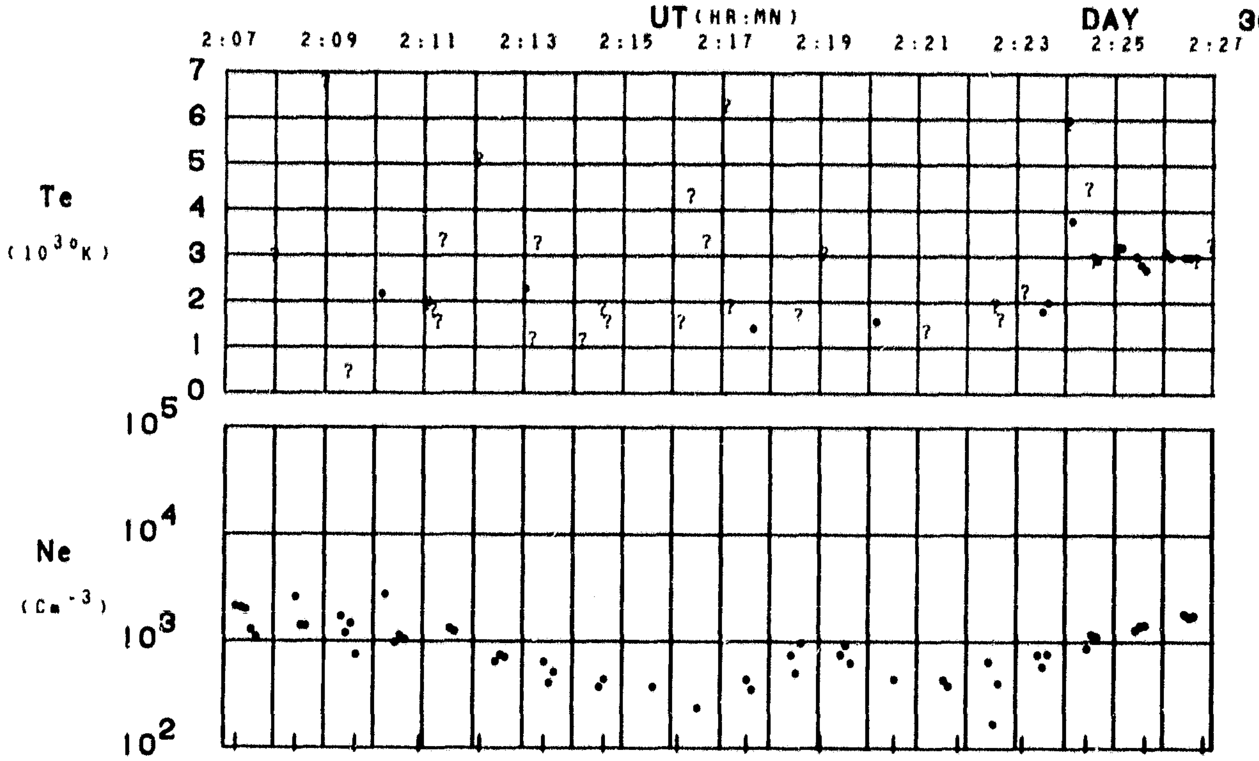
SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED

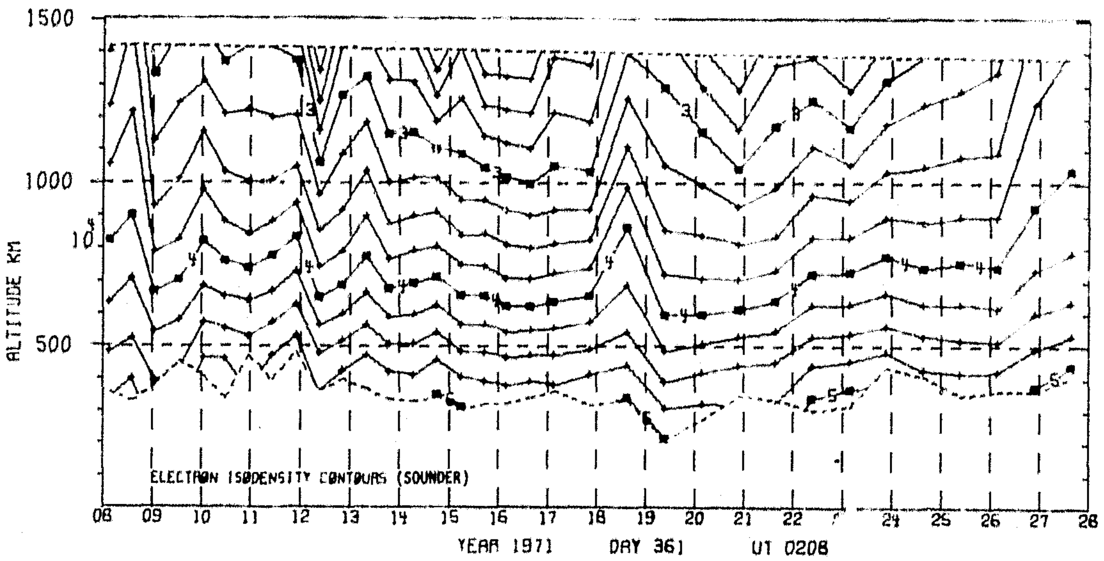

I(22)/I(40)
D(1·3) Log I
D(4·1) Log I
D(9·6) Log I
I(40) Log R
I(40) Log R
I(210) Log R
Ē KeV
U.T.
INV.LAT.
MLT
B
THETA Z

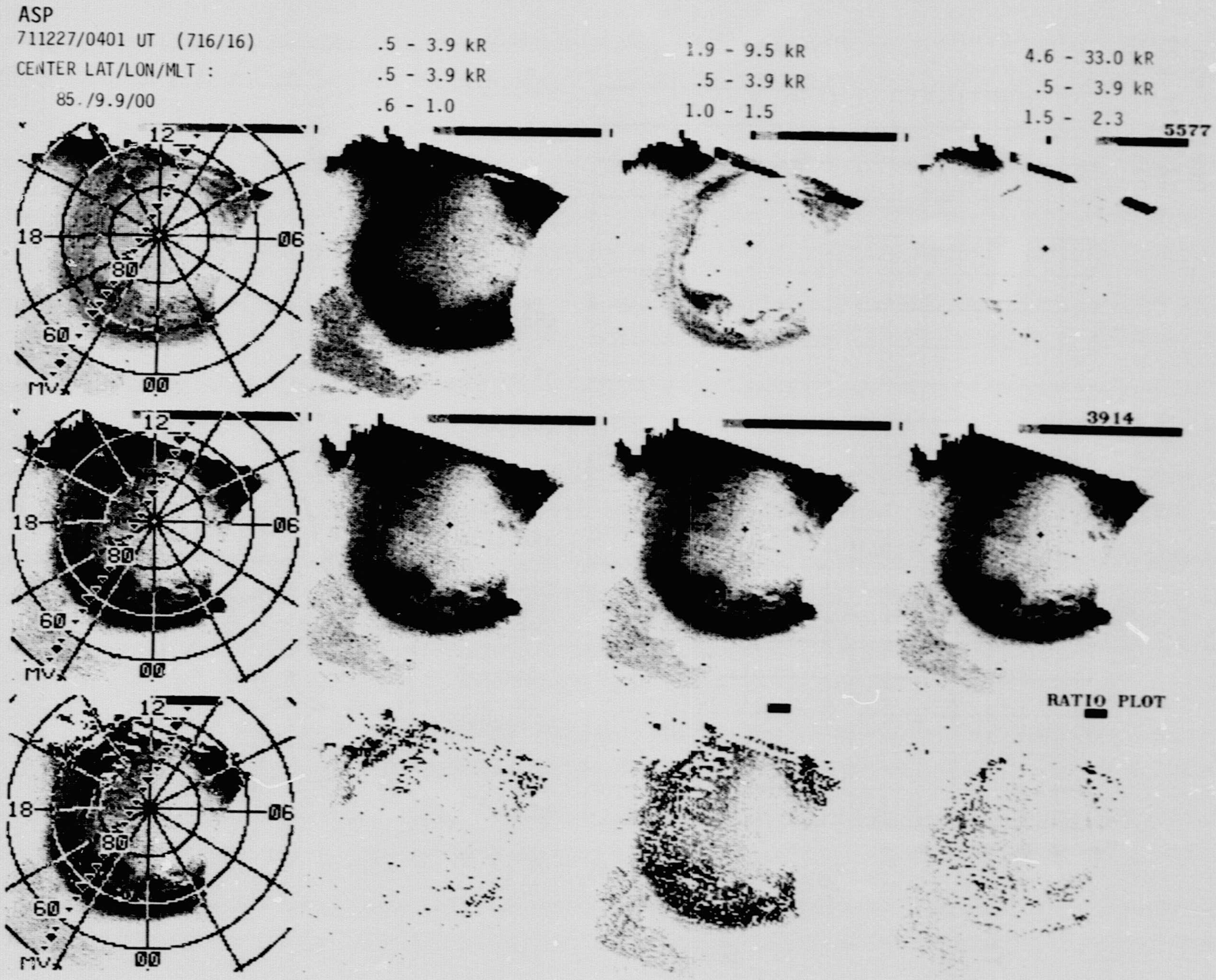

ISIS-2
ORBIT= 3420
ALT.= 1409.
TAPE NO. 9999XX
PROCESSED: 02-JAN-80
SPS
MLT.
INV.LAT.
LOG ENERGY (EV)
TOP ELECTRON
BOTTOM PROTON
LOG AVG ENERGY (EV)
x ELECTRON
o PROTON
U.T.
71/361/02/12/02
LAT.= 84.
LONG.= -76.
21/07/12LT
ELECTRON ECAL = 1
PROTON ECAL = 1
LAT.= 45.
LONG.= -63.
22/12/50LT

ORBIT 3420
DATE 711227
DAY 361



LAT	80	83	87	87	83	79	76	71	67	62	57	53	49	45	41	37
LONG	134	139	167	-99	-75	-68	-65	-64	-63	-63	-62	-62	-62	-62	-62	-62
LT	11:03	11:26	13:18	19:31	21:10	21:38	21:50	21:58	22:03	22:06	22:08	22:10	22:11	22:12	22:13	22:14
DIP	87	87	88	88	89	88	87	87	86	85	83	82	81	80	78	77
DIPLAT	84	86	87	88	88	87	86	84	82	80	78	76	74	71	68	66
L	13.5	21.3	36.5	98.1	99.4	99.5	103.9	46.8	23.0	13.1	8.5	6.3	4.9	3.9	3.3	2.8
INVLAT	74	77	80	84	84	84	84	81	77	73	69	66	63	59	56	53
ZA	103	107	110	114	117	[illegible]	124	128	132	136	140	143	146	149	151	153



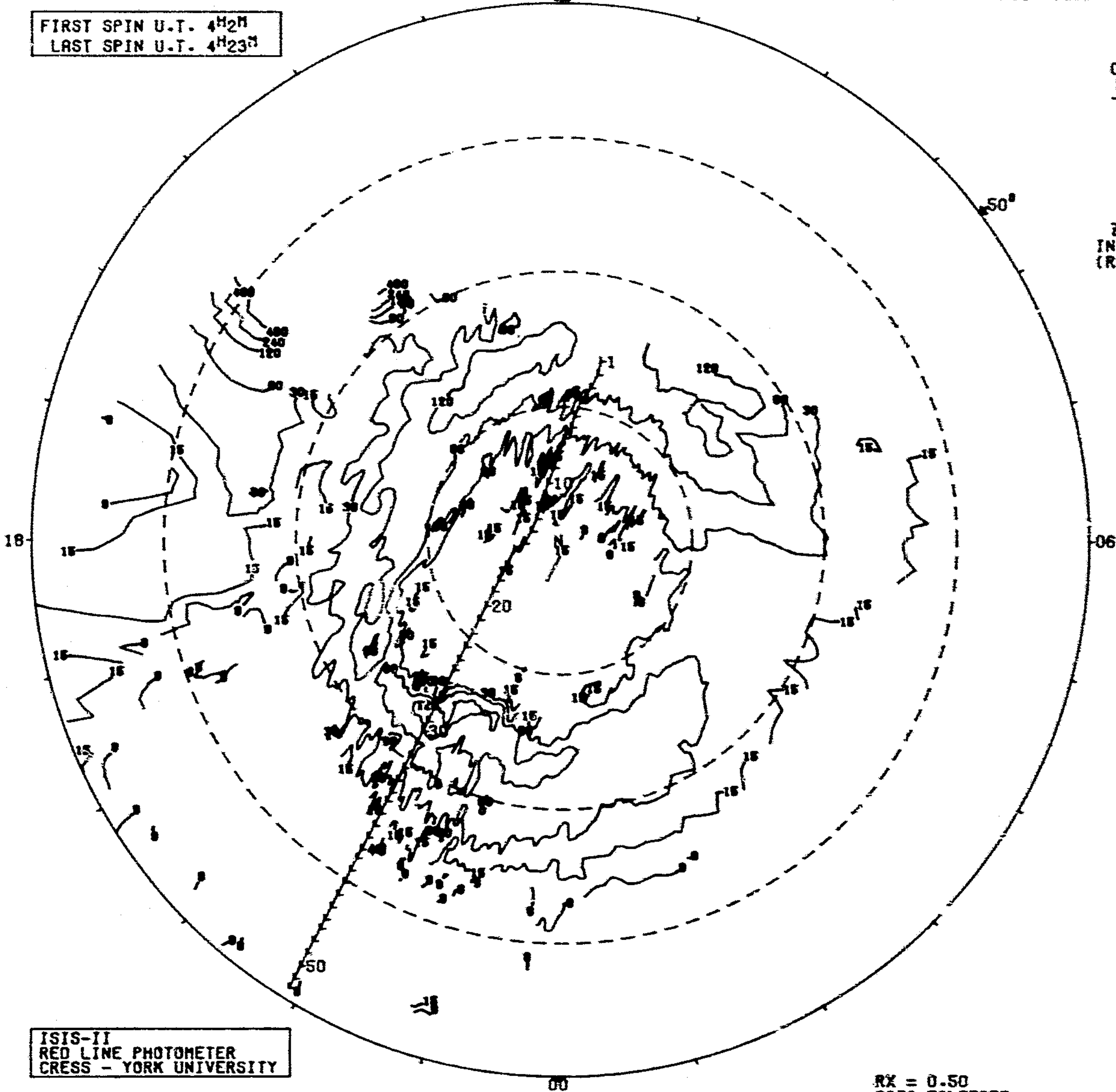

ASP
711227/0401 UT (716/16)
CENTER LAT/LON/MLT :
85./9.9/00
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT
12
18
06
00
80
60
MV

ORBIT 3421 (71/DEC/27)
DAY 361 OF YEAR 1971

FIRST SPIN U.T. $4^{H}2^{M}$
LAST SPIN U.T. $4^{H}23^{M}$

6300 ANGSTROM INTENSITY

DATE PROCESSED: 79/NOV/19
INVARIANT COORDINATES (250 KM.)



CONTOURS PLOTTED

80
150
300
600
1200
2400
4800
ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

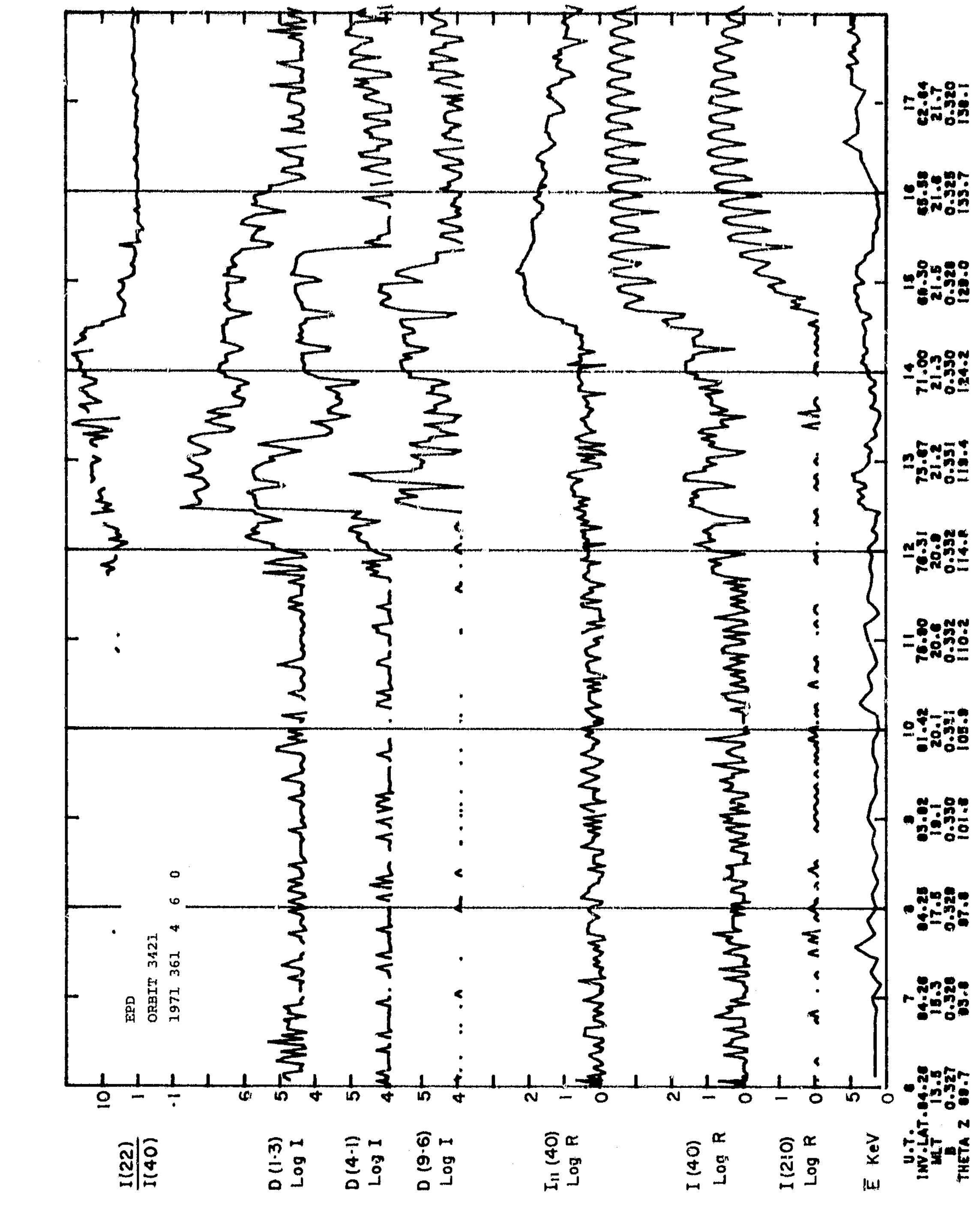
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	040204	77.0
2	040228	78.0
3	040252	79.0
4	040316	79.8
5	040340	80.8
6	040404	82.0
7	040428	83.2
8	040446	83.8
9	040510	84.2
10	040534	84.3
11	040558	84.3
12	040622	84.3
13	040640	84.3
14	040704	84.3
15	040728	84.3
16	040752	84.3
17	040816	84.2
18	040840	84.1
19	040858	83.9
20	040922	83.2
21	040946	82.1
22	041010	80.9
23	041034	79.9
24	041058	79.0
25	041116	78.2
26	041140	77.2
27	041204	76.1
28	041228	75.1
29	041252	74.0
30	041310	73.2
31	041334	72.2
32	041358	71.1
33	041422	70.0
34	041446	68.9
35	041510	67.9
36	041528	67.0
37	041552	65.9
38	041616	64.9
39	041640	63.8
40	041704	62.7
41	041722	61.8
42	041746	60.7
43	041810	59.6
44	041834	58.5
45	041858	57.4
46	041922	56.3
47	041940	55.5
48	042004	54.4
49	042028	53.3
50	042052	52.2
51	042116	51.1
52	042134	50.3
53	042158	49.2
54	042222	48.2
55	042246	47.1
56	042310	46.0
57	042334	45.0
58	042358	43.9

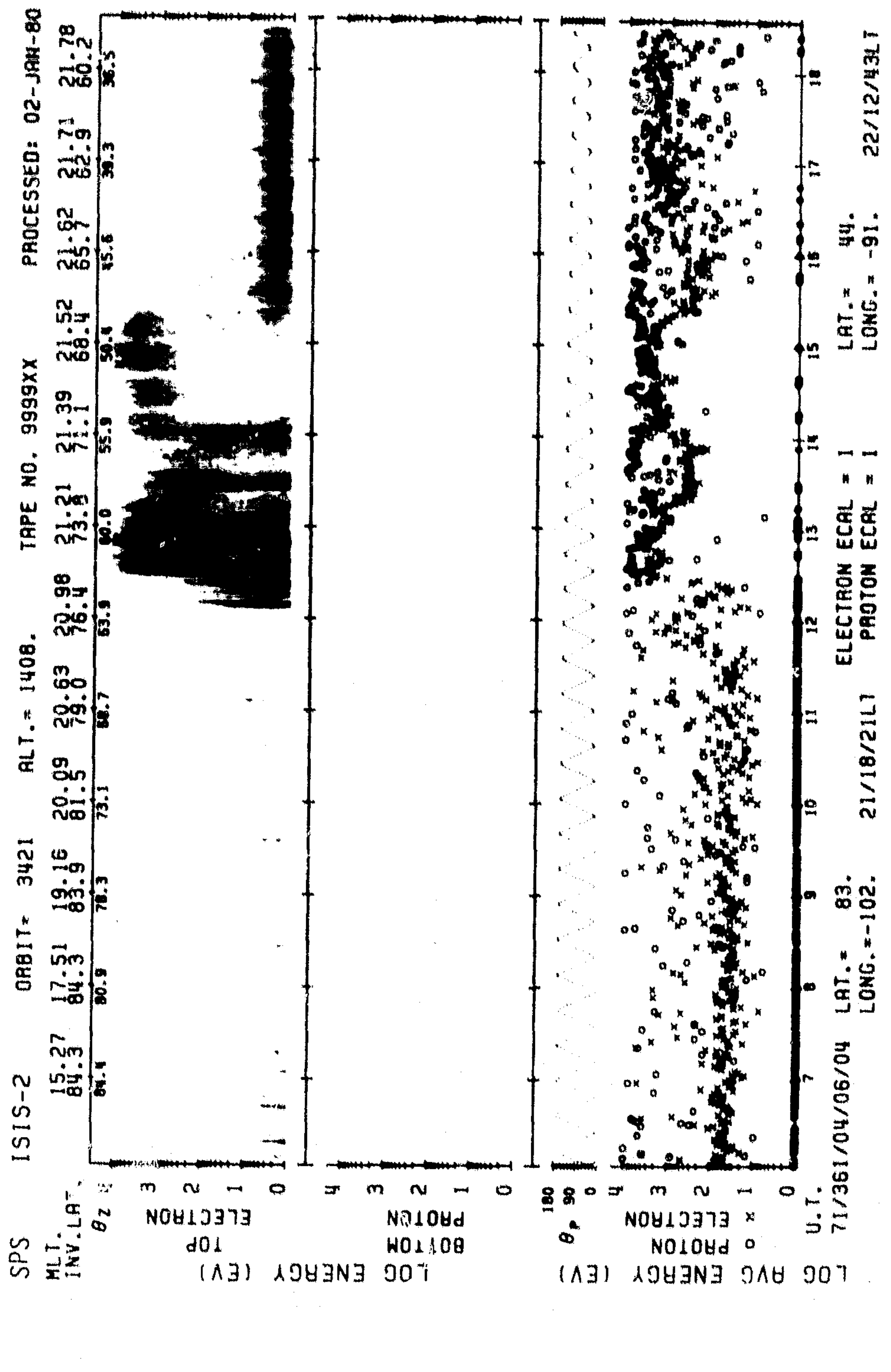
ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

HRT Y00498
FILE 45

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED


EPD
ORBIT 3421
1971 361 4 6 0
I(22)/I(40)
D (1-3) Log I
D (4-1) Log I
D (9-6) Log I
I_{11} (40) Log R
I (40) Log R
I (210) Log R
$\bar{E}$ KeV
U.T.
INV.LAT.
MLT
B
THETA Z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ISIS-2
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ALT.= 1408.
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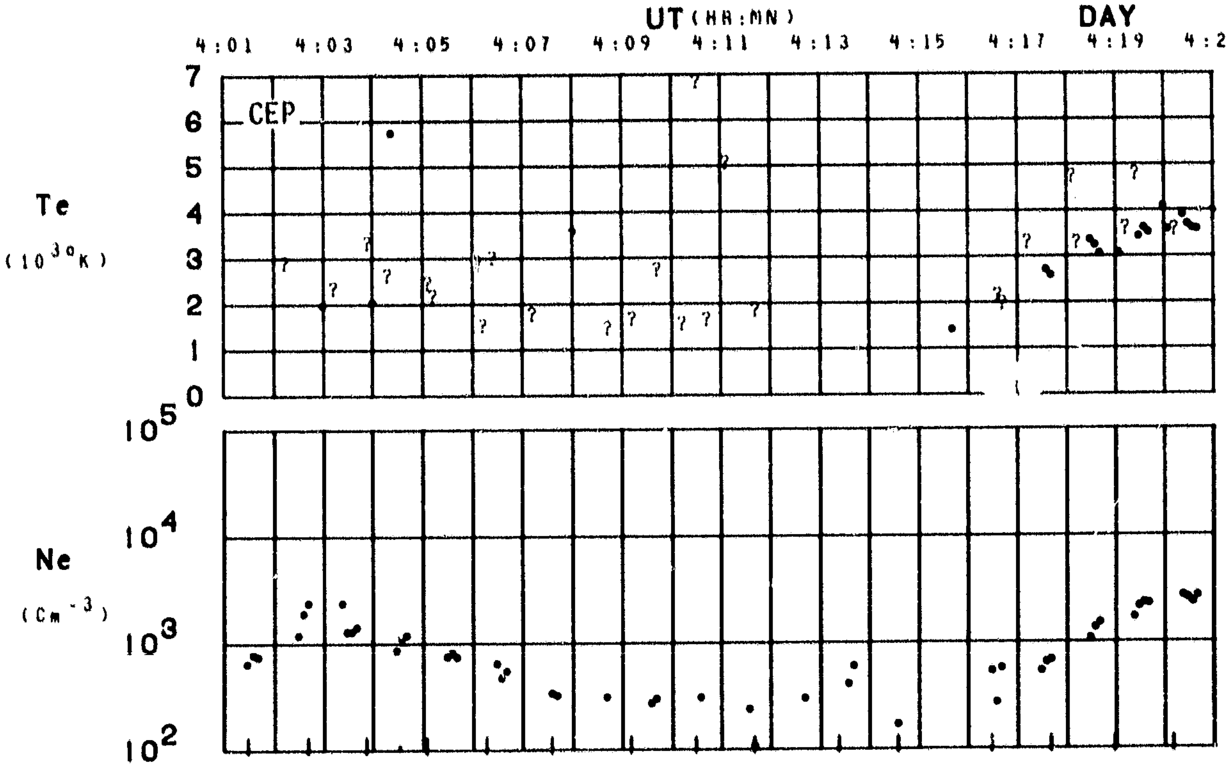
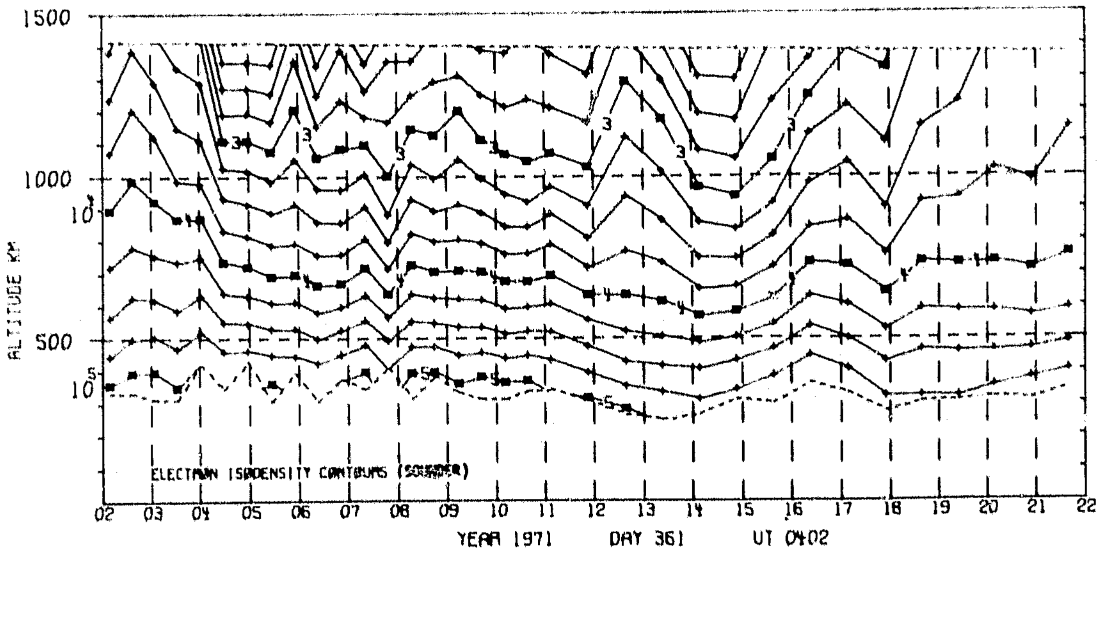
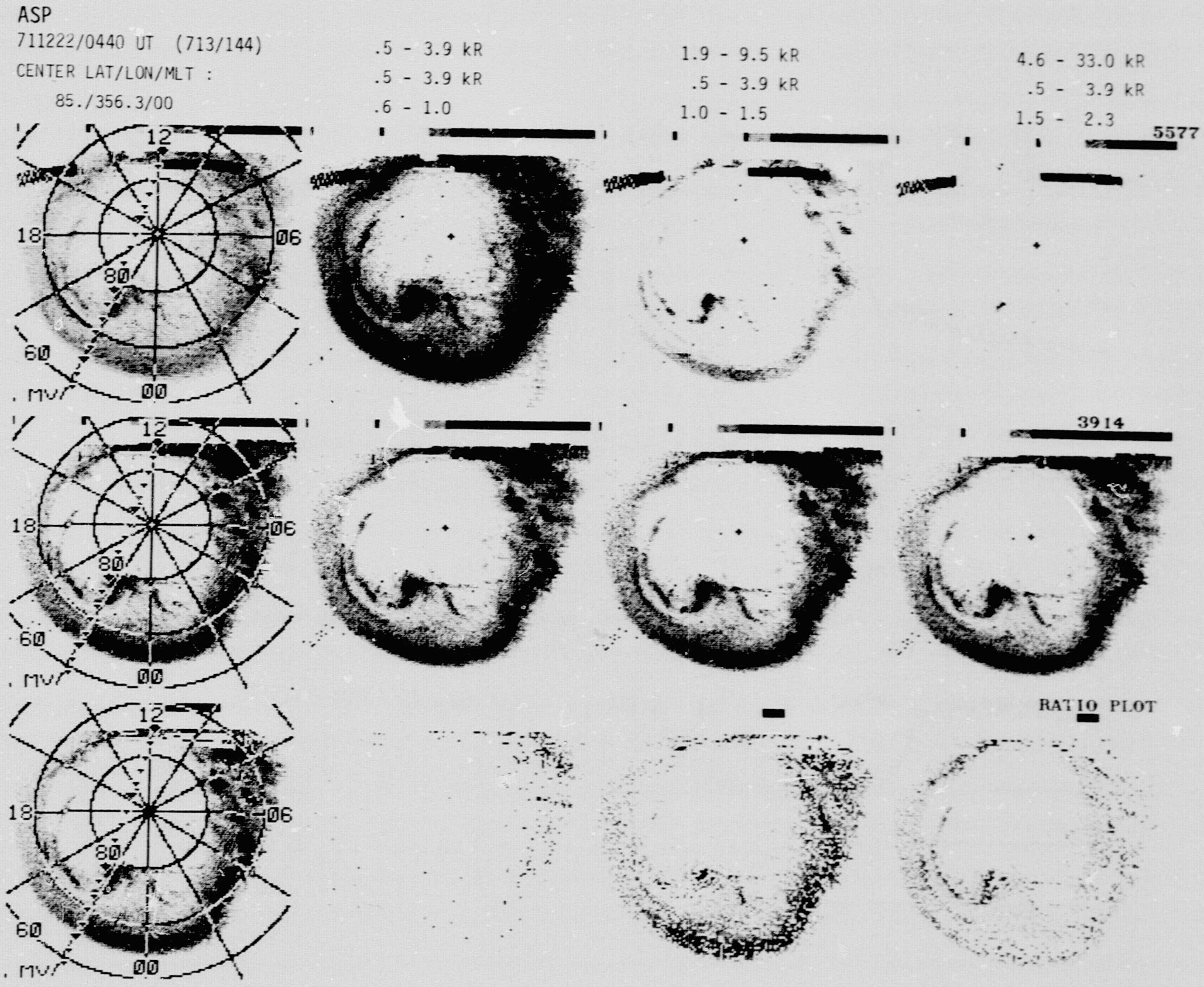
MLT.
INV.LAT.
TOP ELECTRON
BOTTOM PROTON
LOG ENERGY (EV)
o PROTON
x ELECTRON
LOG AVG ENERGY (EV)
U.T.
71/361/04/06/04
LAT.= 83.
LONG.=-102.
21/18/21LT
ELECTRON ECAL = 1
PROTON ECAL = 1
LAT.= 44.
LONG.= -91.
22/12/43LT

ORBIT 3421
DATE 711227
DAY 361



LAT	81	85	88	86	87	78	73	69	65	60	56	50	46	42	38
LONG	108	116	179	-112	-106	-95	-93	-92	-91	-91	-91	-91	-91	-91	-91
LT	11:13	11:49	16:02	20:33	21:23	21:43	21:55	22:00	22:03	22:07	22:08	22:11	22:12	22:13	22:14
DIP	87	88	88	89	-89	89	88	87	87	85	84	82	81	80	78
DIPLAT	85	86	87	88	89	89	87	86	84	82	80	76	74	71	68
L	15.8	25.1	44.2	96.1	99.9	100.6	81.0	33.9	20.4	11.3	8.1	5.3	4.3	3.5	2.9
INVLAT	75	78	81	84	84	84	83	80	77	72	69	64	61	57	54
ZA	105	108	112	115	119	122	127	130	133	138	141	145	148	150	152





ASP
711222/0440 UT (713/144)
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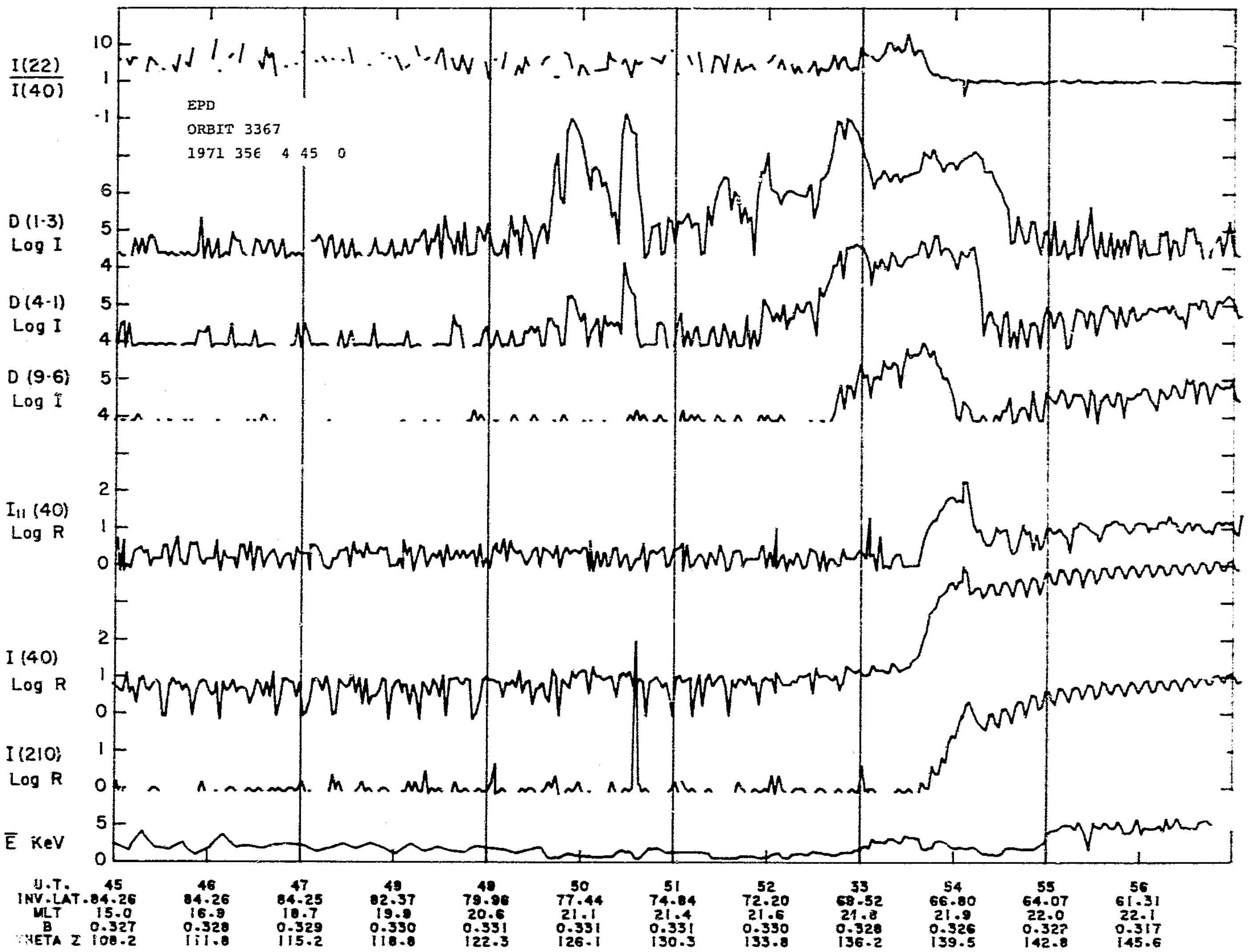
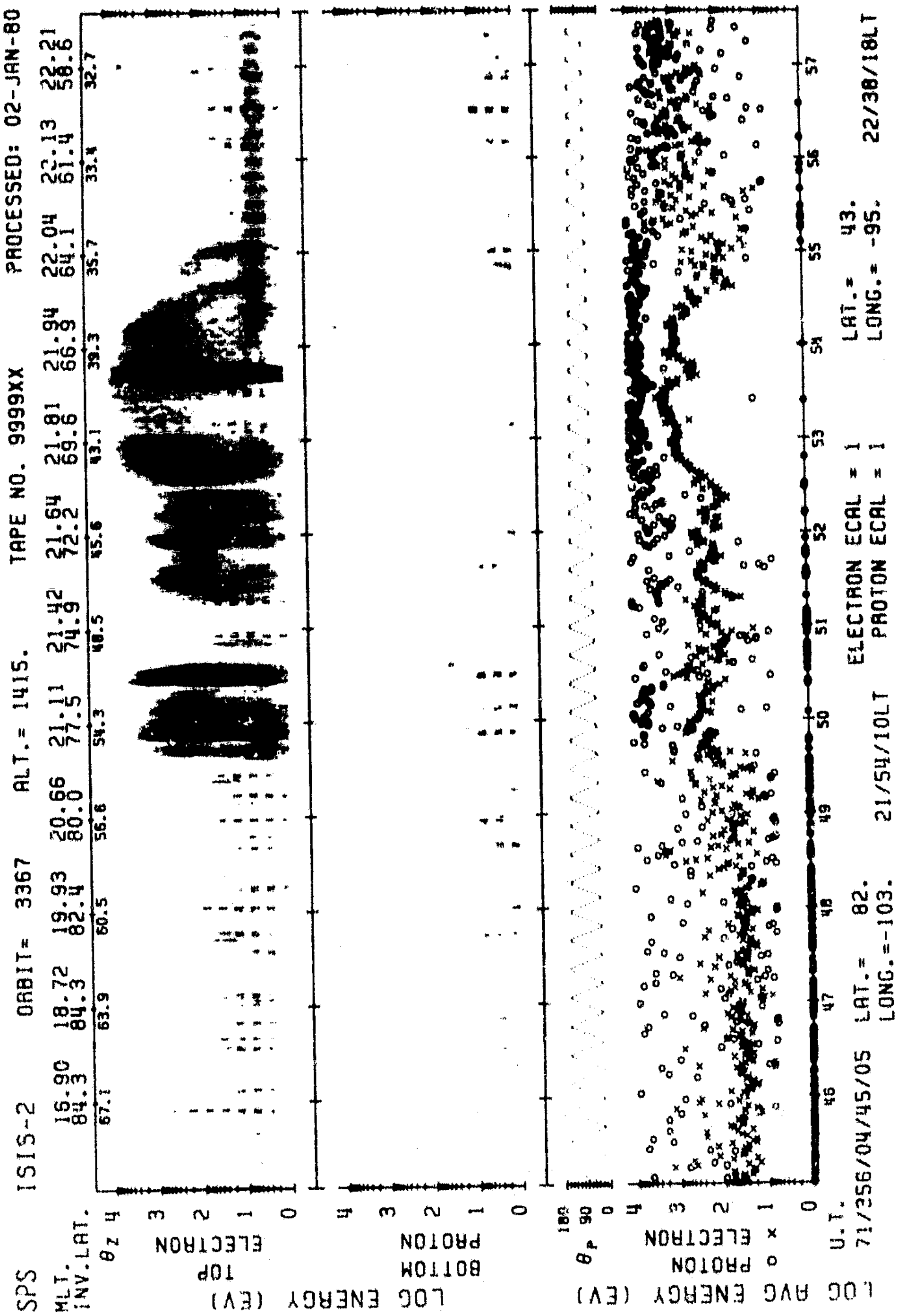
85./356.3/00
.5 - 3.9 kR
.5 - 3.9 kR
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT
12
18
06
00
80
60
MV/


I(22) / I(40)
D (1·3) Log I
D (4·1) Log I
D (9·6) Log I
I‖ (40) Log R
I (40) Log R
I (210) Log R
Ē KeV
EPD
ORBIT 3367
1971 356 4 45 0
U.T. 45 46 47 48 49 50 51 52 53 54 55 56
INV.LAT. 84.26 84.26 84.25 82.37 79.98 77.44 74.84 72.20 68.52 66.80 64.07 61.31
MLT 15.0 16.9 18.7 19.8 20.6 21.1 21.4 21.6 21.8 21.9 22.0 22.1
B 0.327 0.328 0.329 0.330 0.331 0.331 0.331 0.330 0.328 0.326 0.327 0.317
THETA Z 108.2 111.8 115.2 118.8 122.3 126.1 130.3 133.8 136.2 139.5 142.8 145.6



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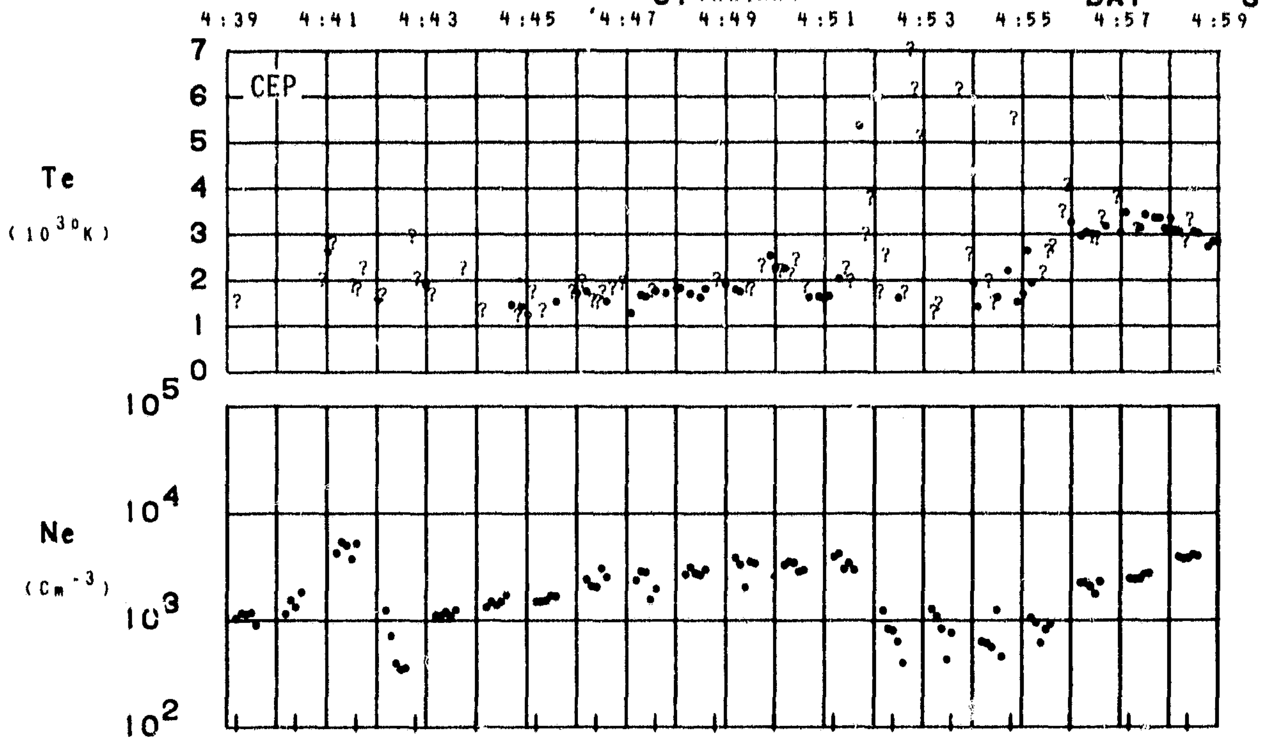
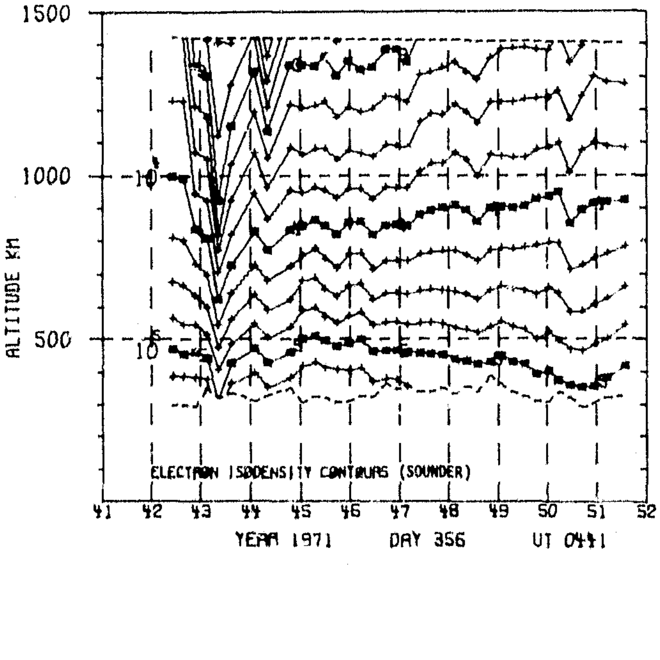
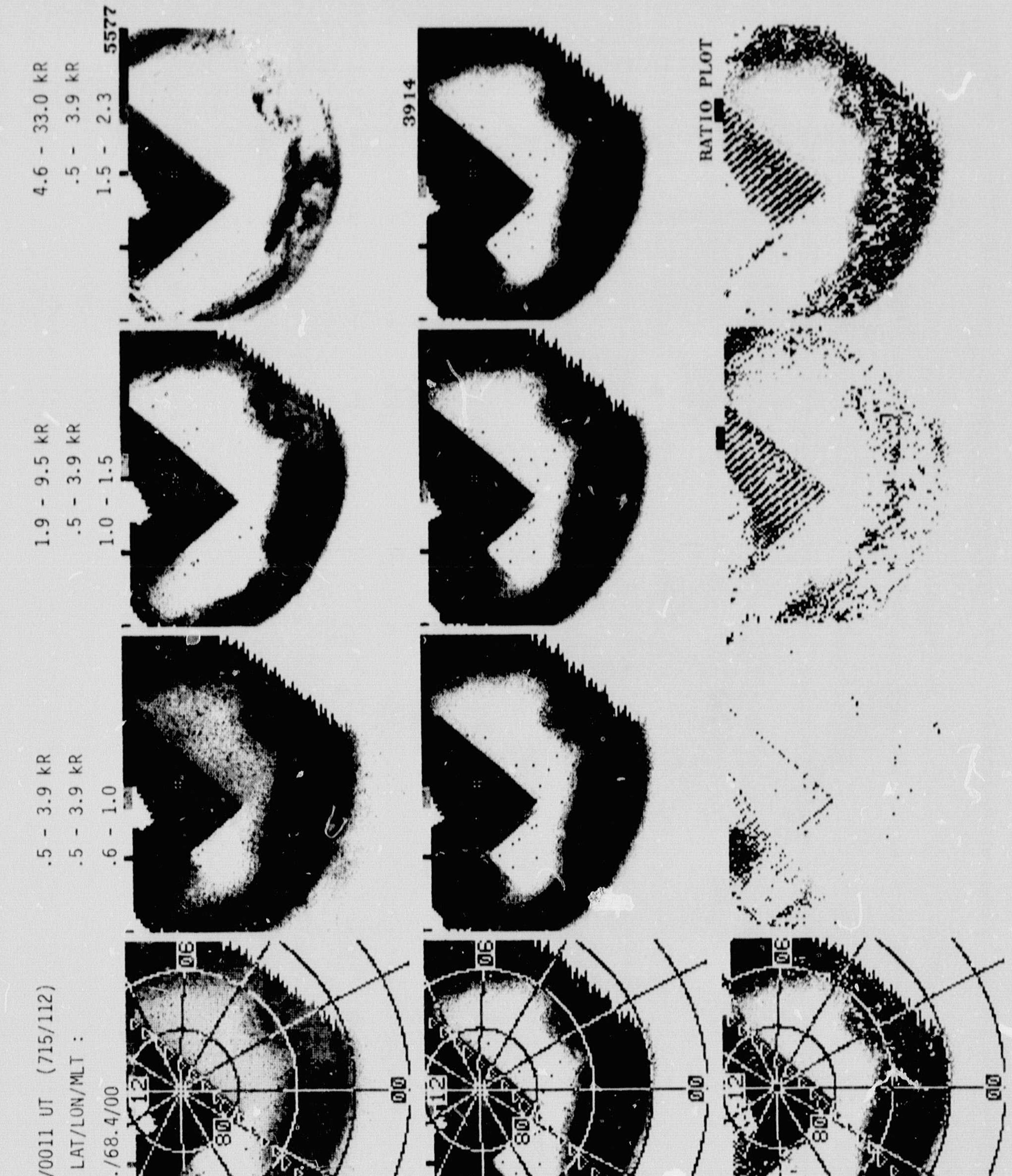
ORB[illegible] 367
DATE 711222
DAY 356



LAT	79	83	86	87	85	81	77	73	70	66	62	58	55	51	47	43	39
LONG	100	105	121	-154	-111	-102	-99	-97	-96	-95	-95	-95	-95	-95	-95	-95	-95
LT	11:24	11:45	12:48	18:25	21:18	21:55	22:11	22:19	22:24	22:28	22:31	22:33	22:34	22:36	22:37	22:38	22:39
DIP	87	87	88	88	89	-89	89	88	87	87	86	85	84	83	81	80	78
DIPLAT	84	85	87	88	88	89	88	87	86	84	83	81	79	76	74	71	68
L	12.1	18.0	28.9	53.7	99.8	99.5	103.0	76.2	36.8	21.3	13.8	9.6	7.1	5.5	4.4	3.6	3.0
INVLAT	73	76	79	82	84	84	84	83	80	77	74	71	67	64	61	58	54
ZA	102	106	110	113	117	120	124	127	131	134	138	141	144	147	150	153	156

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75./68.4/00
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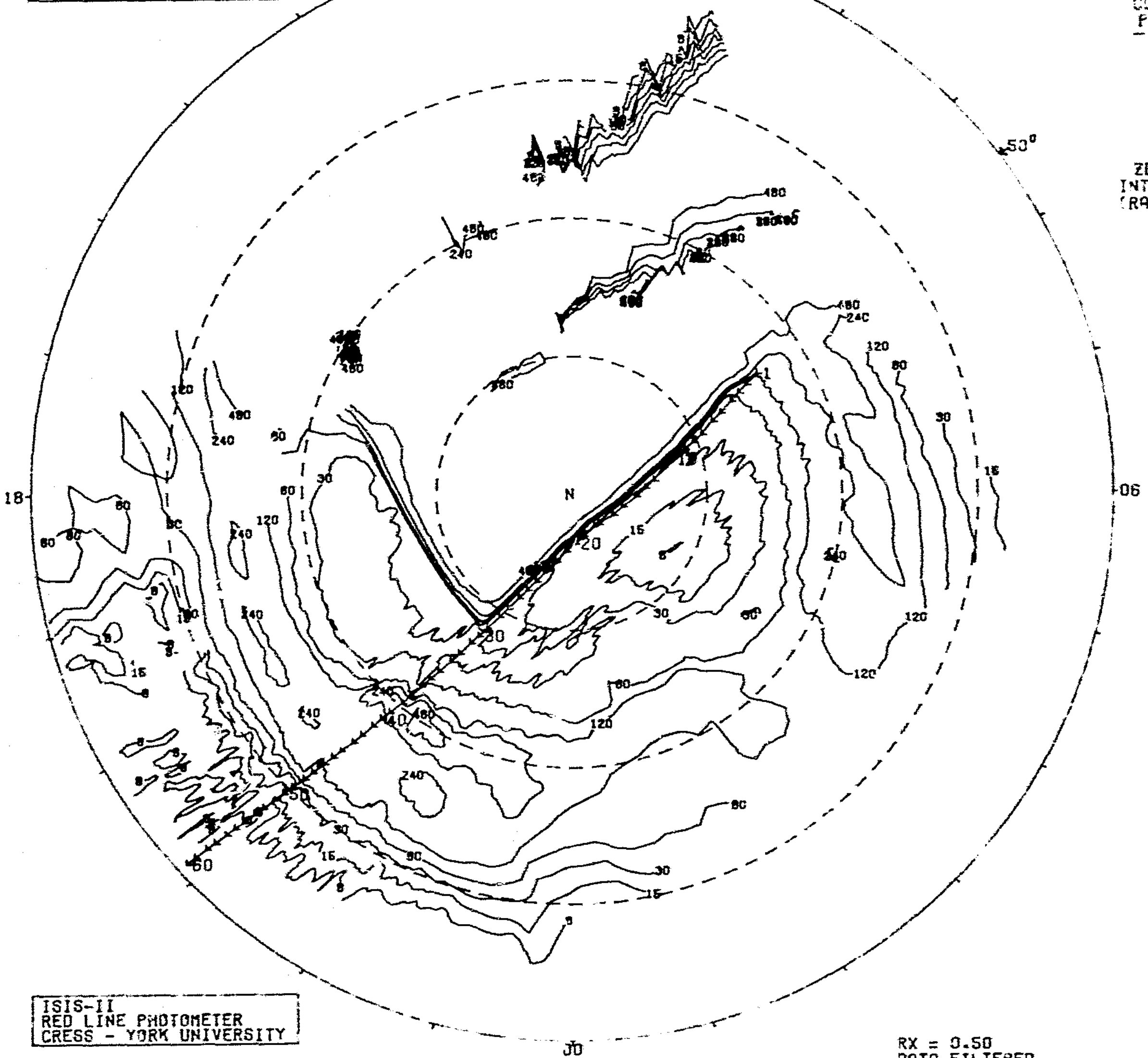
.6 - 1.0
1.9 - 9.5 kR
.5 - 3.9 kR
1.0 - 1.5
4.6 - 33.0 kR
.5 - 3.9 kR
1.5 - 2.3
5577
3914
RATIO PLOT

ORBIT 3609 (72/JAN/11)
DAY 11 OF YEAR 1972

FIRST SPIN U.T. 0H11M
LAST SPIN U.T. 0H32M

6300 ANGSTROM INTENSITY

DATE PROCESSED: 79/NOV/07
INVARIANT COORDINATES (350 KM.)



CONTOURS PLOTTED

80
150
300
600
1200
2400
4800

ZENITHAL INTENSITIES (RAYLEIGHS)

SPACECRAFT INFORMATION

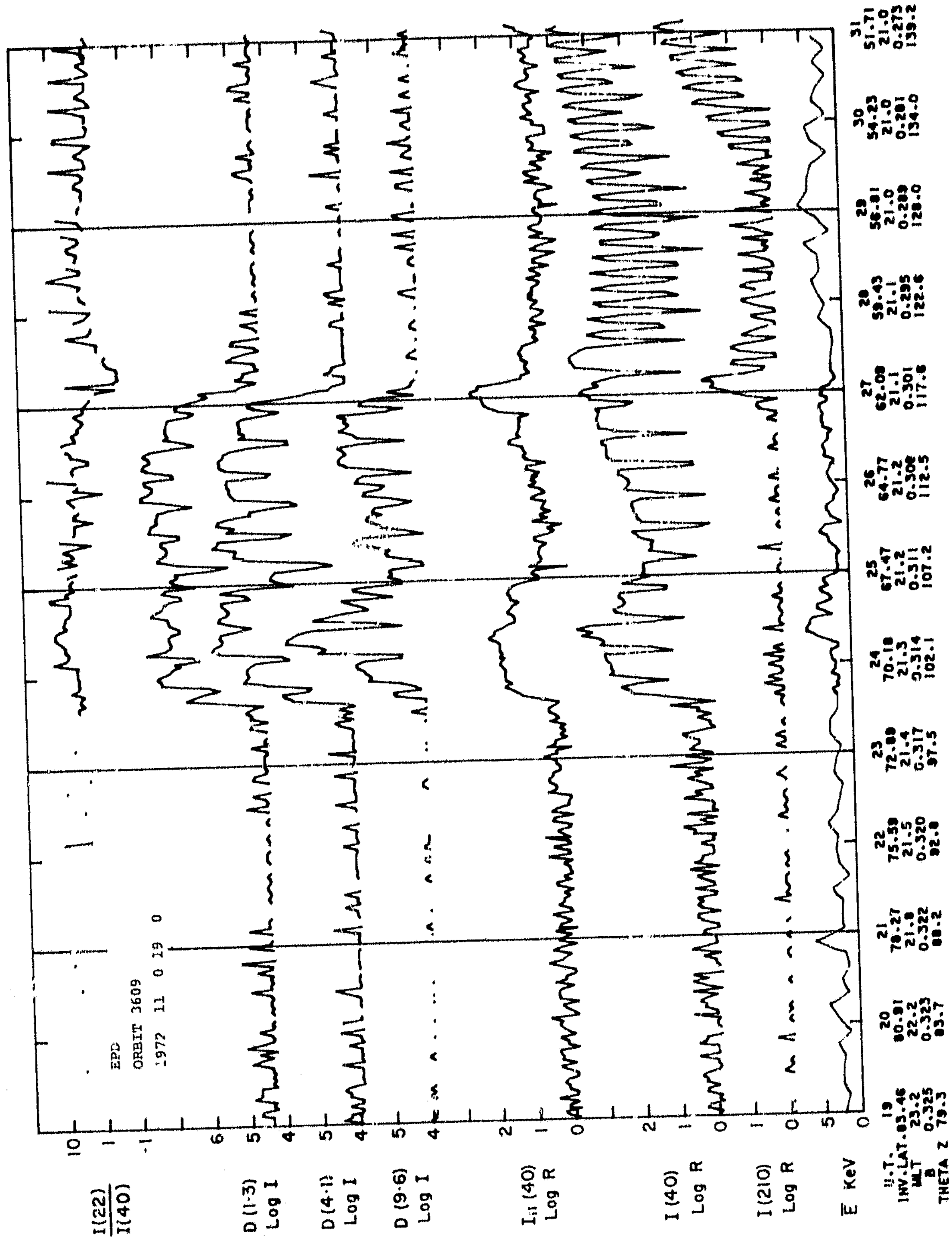
SPIN NUMBER	ORBIT TIME (HRMNSC)	INVARIANT LATITUDE (DEGREES)
1	01119	74.1
2	01143	75.2
3	01201	76.0
4	01219	76.9
5	01243	77.9
6	01301	78.7
7	01325	79.6
8	01343	80.5
9	01401	81.4
10	01425	82.8
11	01443	83.5
12	01507	84.0
13	01525	84.2
14	01543	84.2
15	01607	84.3
16	01625	84.3
17	01649	84.3
18	[illegible]	84.3
19	01731	84.3
20	01749	84.3
21	01807	84.2
22	01831	84.0
23	01849	83.7
24	01913	83.1
25	01931	82.4
26	01949	81.5
27	02013	80.2
28	02031	79.4
29	02055	78.5
30	02113	[illegible]
31	02131	76.9
32	02155	75.8
33	02213	75.0
34	02237	73.9
35	02255	73.1
36	02313	72.3
37	02337	71.2
38	02355	70.4
39	02419	69.3
40	02437	68.5
41	02455	67.7
42	02519	66.6
43	02537	65.8
44	02601	64.7
45	02619	63.9
46	02637	63.1
47	02701	62.1
48	02719	61.3
49	02743	60.2
50	02801	59.4
51	02819	58.6
52	02843	57.6
53	02901	56.8
54	02925	55.7
55	02943	55.0
56	03001	54.2
57	03025	53.2
58	03043	52.4
59	03107	51.4
60	03125	50.7
61	03143	49.9
62	03201	49.0
63	03225	48.2

ISIS-II
RED LINE PHOTOMETER
CRESS - YORK UNIVERSITY

HRI Y00481
FILE 23

SPACECRAFT TRACK TRACED DOWN TO 250 KM. (NUMBERS DENOTE SPINS)

RX = 0.50
DATA FILTERED
ZERO SUBTRACTION NOT PERFORMED



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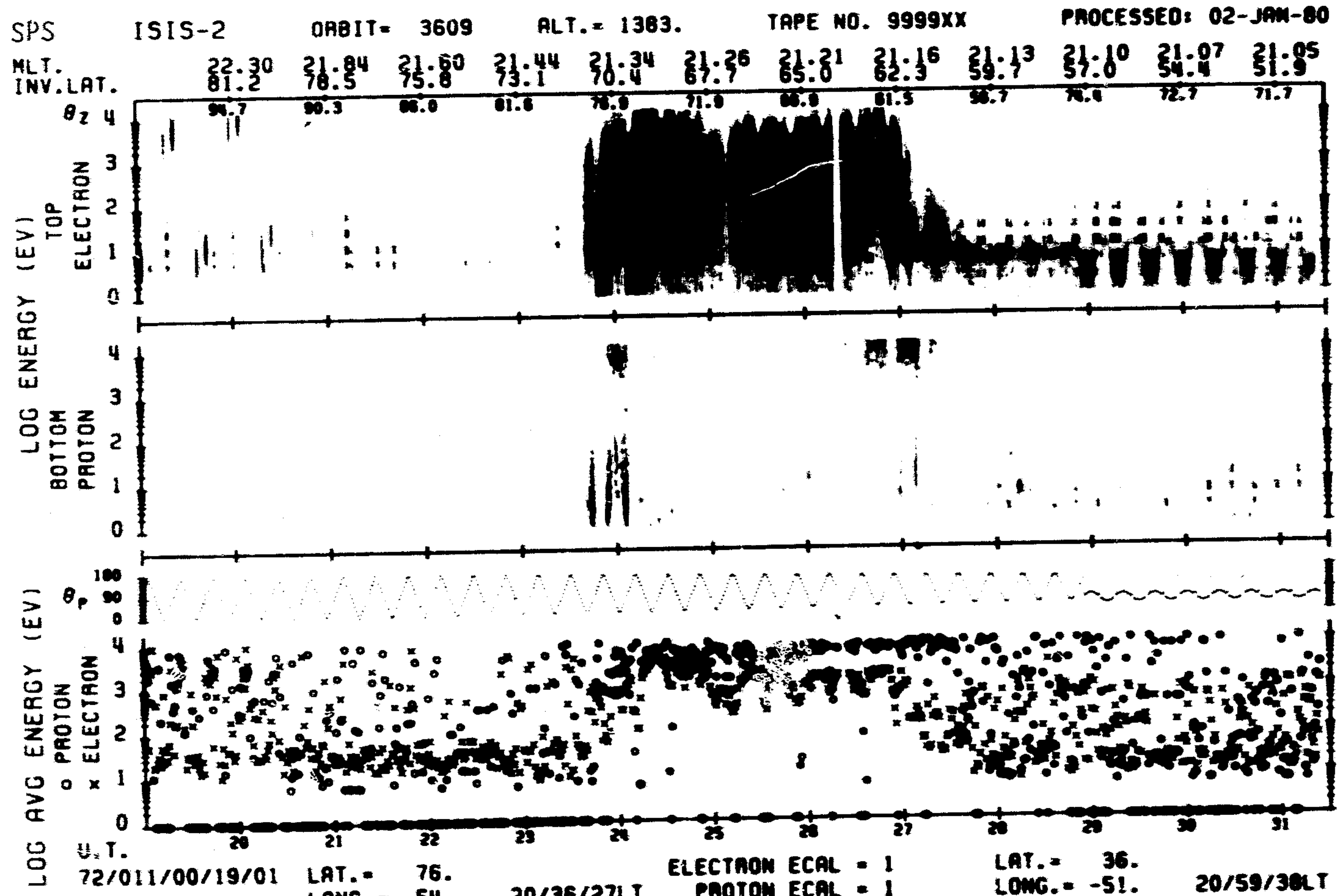
ORBIT 3609
1972 11 0 19 0
I(22)/I(40)
D(1-3) Log I
D(4-1) Log I
D(9-6) Log I
I‖(40) Log R
I(40) Log R
I(210) Log R
Ē KeV
U.T.
INV.LAT.
M.L.T
B
THETA Z



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INV.LAT. 81.2 78.5 75.8 73.1 70.4 67.7 65.0 62.3 59.7 57.0 54.4 51.9
θz
LOG ENERGY (EV)
TOP ELECTRON
BOTTOM PROTON
θp
LOG AVG ENERGY (EV)
o PROTON
x ELECTRON
U.T.
72/011/00/19/01 LAT.= 76. LONG.= -54. 20/36/27LT
ELECTRON ECAL = 1
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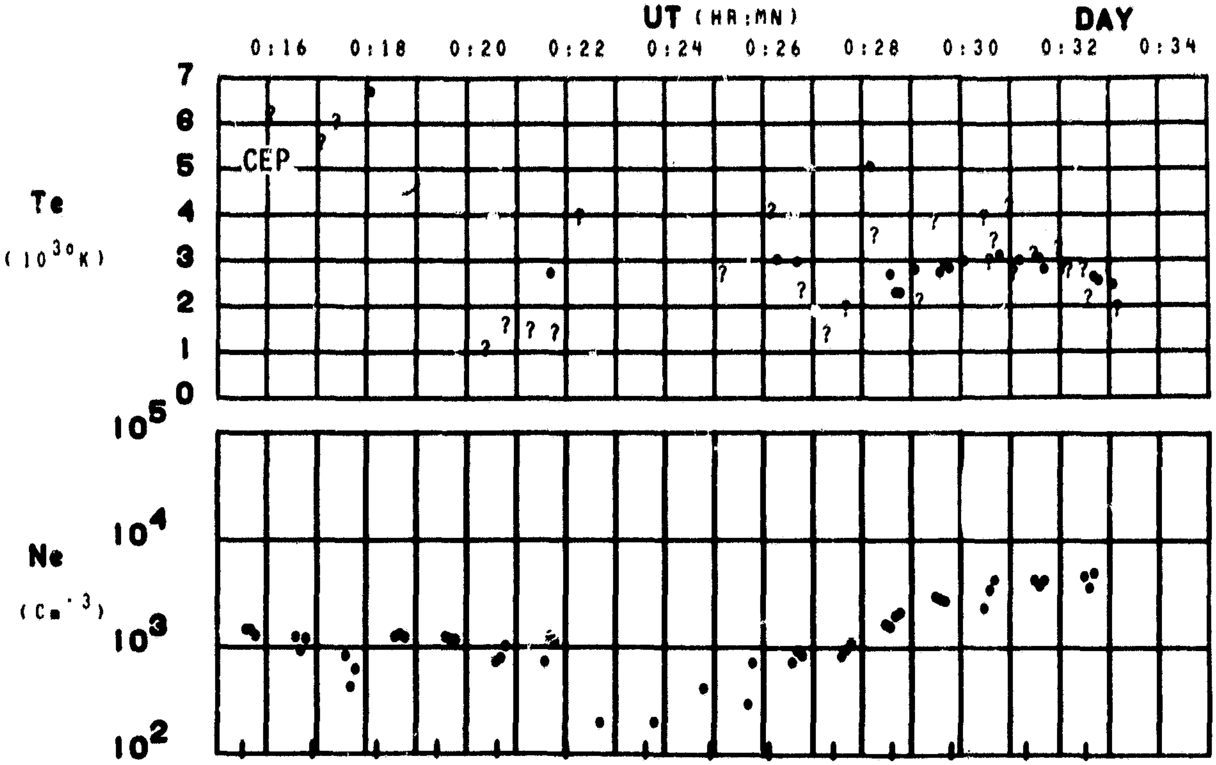
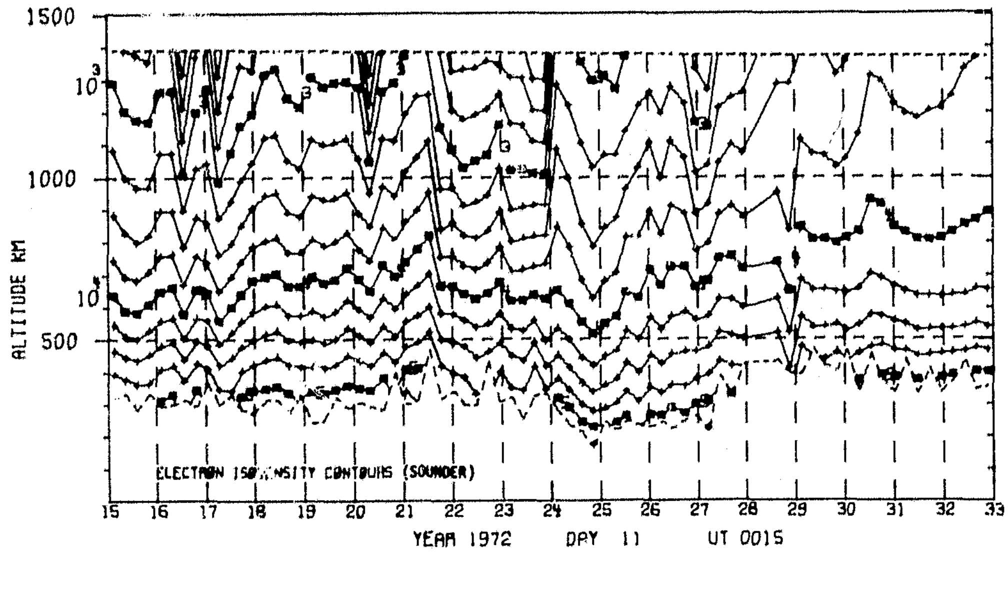
LAT.= 36. LONG.= -51. 20/59/38LT

ORBIT 3609
DATE 720111
DAY 11



LAT	86	82	78	74	70	66	61	56	53	48	45	41	36	32
LONG	-74	-59	-55	-53	-52	-51	-51	-50	-50	-50	-50	-50	-51	-51
LT	19:08	20:11	20:30	20:38	20:44	20:48	20:51	20:53	20:55	20:56	20:57	20:58	20:59	21:00
DIP	88	87	85	84	82	80	78	76	73	71	68	66	62	59
DIPLAT	87	85	81	78	76	72	68	64	60	56	52	49	44	40
L	98.3	99.9	97.1	61.2	28.3	16.1	9.7	6.9	5.4	4.3	3.5	3.0	2.5	2.2
INVLAT	84	84	84	82	79	75	71	67	64	60	57	54	50	48
ZA	112	116	118	121	123	126	129	131	133	135	136	137	138	139



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