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SCATHA Atlas Data Base, Volume II

Editors:

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FOR THE COMMANDER

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A study of the plasma environment encountered by the P78-2 Spacecraft Charging At High Altitudes (SCATHA) satellite during its operation between March 1979 and June 1980 was conducted and reported in the SCATHA Environmental Atlas (AFGL-TR-84-0002). Summary plots of much of the data used in the Atlas are presented in two volumes. The first volume contains magnetic field data and spacecraft frame potential data. The second volume contains low and medium energy range electron and ion data, medium energy range ion composition data and high energy electron data. The data are presented in 24-hour plots.

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4. INTRODUCTION

The P78-2 SCATHA satellite was launched on 30 January 1979 and inserted into a 5.3×7.8 RE (RE = 1 Earth radius), low inclination (7.9°) orbit with an easterly drift rate of about 5° per day. The satellite is spin stabilized at approximately 1 rpm with the spin axis of the satellite located in the orbital plane of the satellite and normal to the Earth-sun line. Because of the drift and eccentricity of the orbit, the satellite passes through each altitude at varying local times (LT) and varying magnetic latitudes.

The SCATHA Atlas was prepared in 1983 [5] in order to specify those aspects of the space environment in the near-geosynchronous region that contribute to spacecraft charging. The key data for the Atlas were the magnetic field data, the common mode of the electric field experiment and particle data from four instruments, covering the energy range from approximately 10 eV to 2 MeV for electrons and ions from approximately 100 eV to 30 keV for singly ionized Oxygen and Hydrogen.

The Atlas data were taken mainly during 1979 and the first part of 1980. To accomplish the statistical studies in the Atlas, survey plots of much of the data were produced. The survey plots are presented here in two volumes. In the first volume we present the magnetometer data and the common mode electric field data. In the second volume we present the particle data. All data are plotted against Universal Time. Some of the data plots are annotated rather completely with ephemeris, others have only Universal Time. The magnetometer data is the most completely annotated and is presented for the greatest number of days. It can be used to provide ephemeris for most of the other data.

The volumes are organized in the following way. For each data set we give 1) a brief description of the instrument from which the data were collected; 2) calendar on which the days that data presented are marked; 3) description of the format in which the data are presented; 4) the data, presented in chronological order, one day per page.

(Received for publication 1 September 1989)

[5] Mullen, E.G. and Gussenhoven, M.S. (1983) *SCATHA Environmental Atlas*, AFGL-TR-83-0002, 169 pp. **ADA131456**

5. LOW ENERGY PLASMA DATA BASE, SC9

5.1 Instrument Description

The University of California, San Diego Charged Particle Experiment, built and operated under the direction of E.C. Whipple, is similar to that flown on the ATS 6 satellite [6]. It consists of an array of five electrostatic analyzers: three to measure ions and two to measure electrons. The analyzers are configured as two pairs of electron and ion sensors, each mounted in a separate rotating assembly, and a single ion detector mounted with a fixed look direction relative to the satellite. The two rotating assemblies sweep out pitch angles in the spin plane of the satellite and in an orthogonal plane containing the spin axis, respectively. The fixed ion detector also samples in the spin plane. One pair of detectors measures particles with energies from 1 eV to 81 keV. The other three detectors cover an energy range from 0.1 eV to 2 keV. All sensors have an energy resolution of 20% and return a 64-point spectrum over their energy ranges in 16 s. The experiment is normally operated to complete an energy scan and then dwell between 2 and 128 s at a fixed energy.

5.2 Description of Data Presentation: SC9 Low Energy Plasma

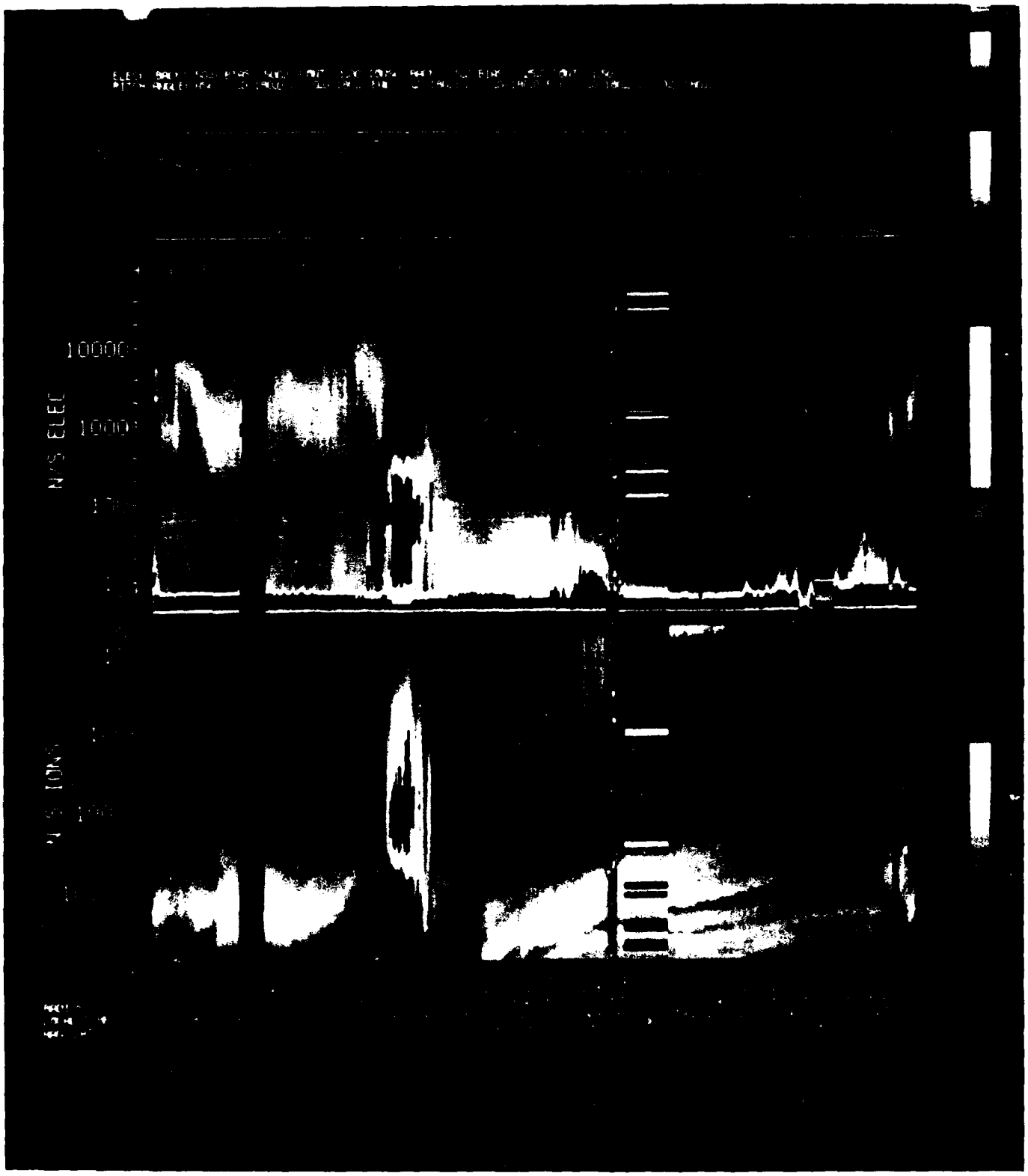
In each Figure the SC9 data are presented in a spectrogram format as a function of Universal Time for a 24-hour period. The particle flux is presented in grey-scale as a function of energy (vertical axis) in eV. The energy scale is logarithmic. Electron data are plotted in the top panel with energy increasing upward. The ion data are in the bottom panel with energy increasing downward. In addition to UT, the ephemeris include the distance of the satellite from the center of the Earth in RE (Earth radius), Local Time, and the Magnetic Latitude of the satellite.

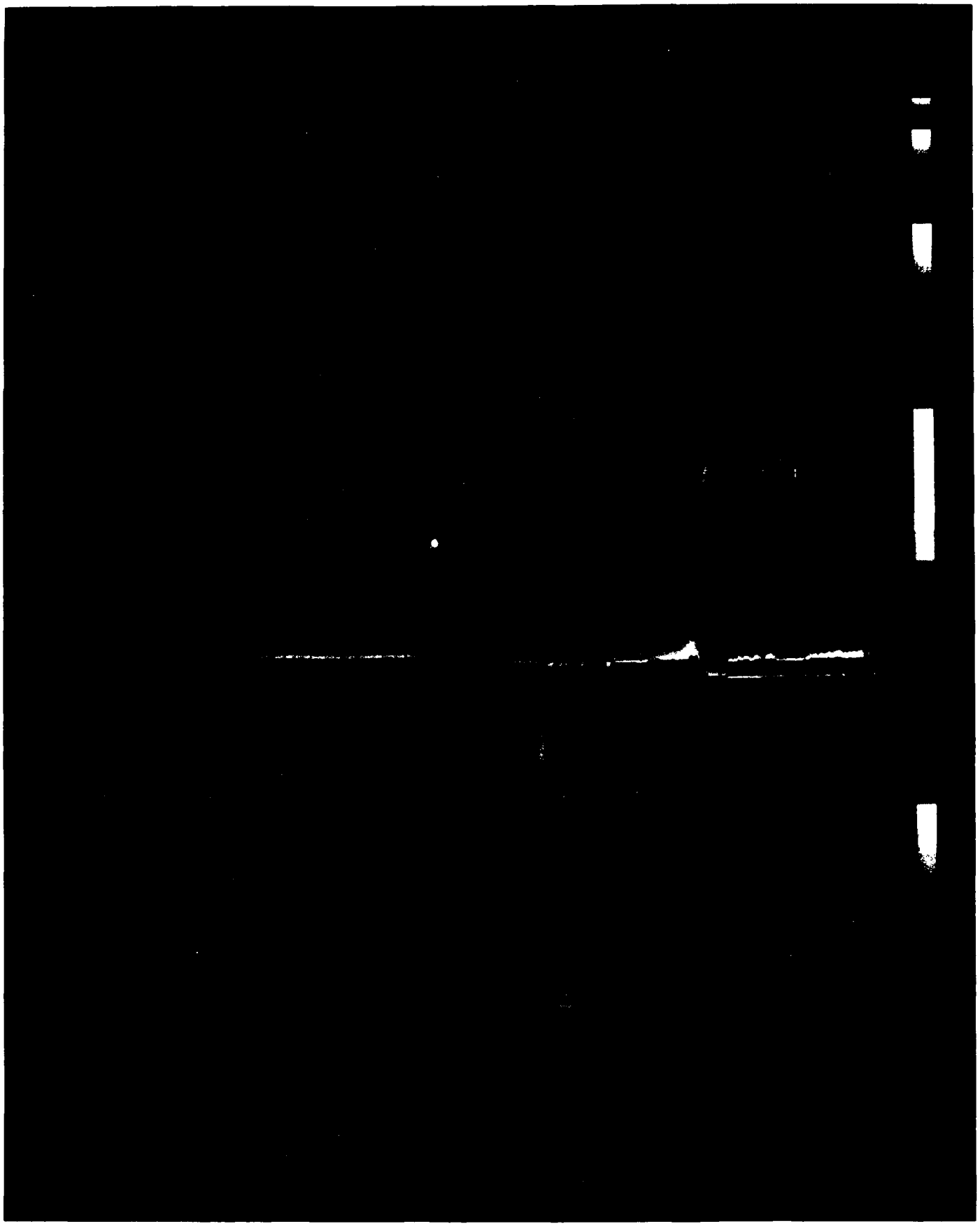
[6] Mauk, B.H., and McIlwain, C.E. (1975) ATS-6 UCSD auroral particles experiment, *IEEE Trans. Aerosp. Electron. Syst.*, *AES-11*:1125.

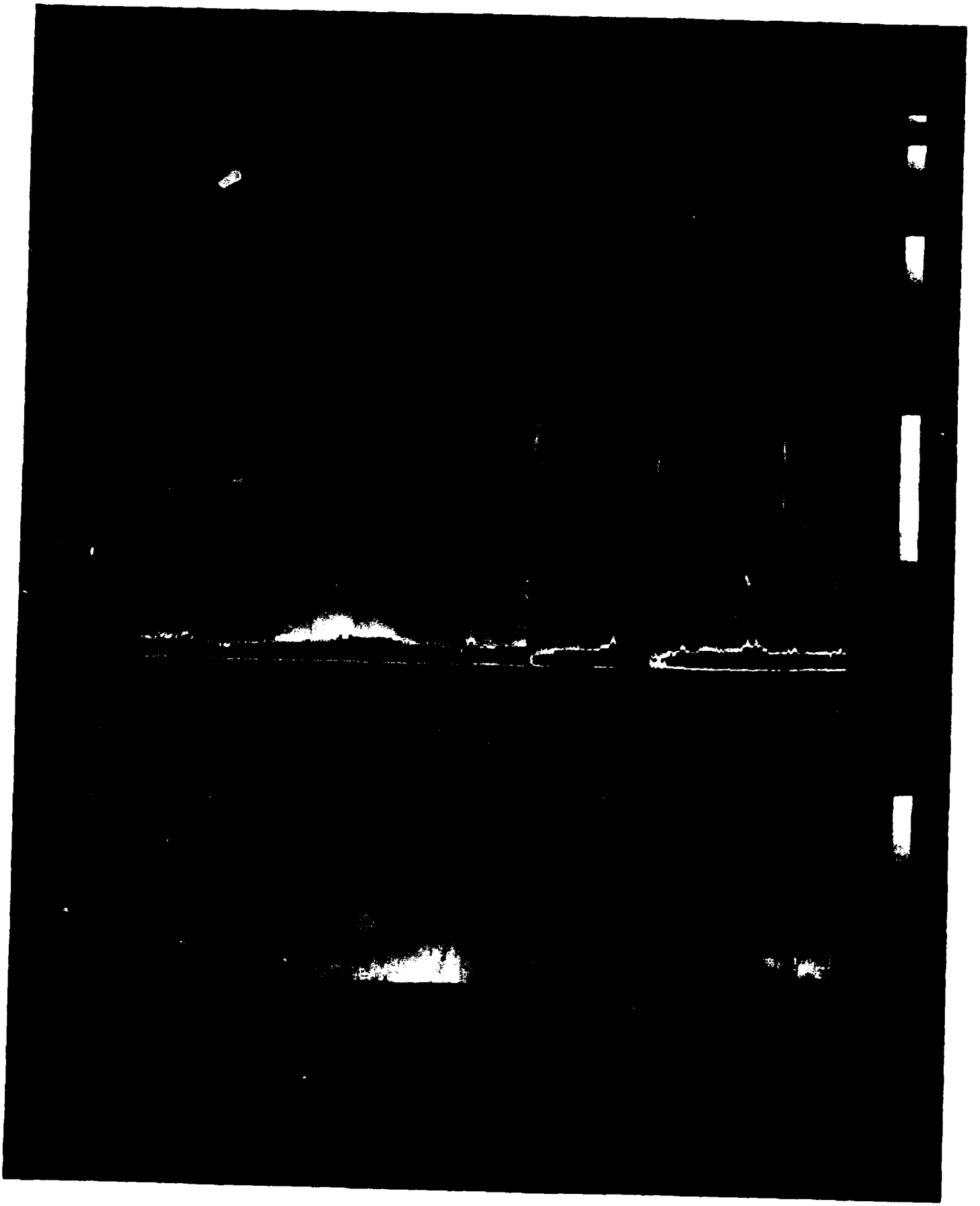
5.3 Calendar of Days for which SC9 Low Energy Plasma Data are Presented

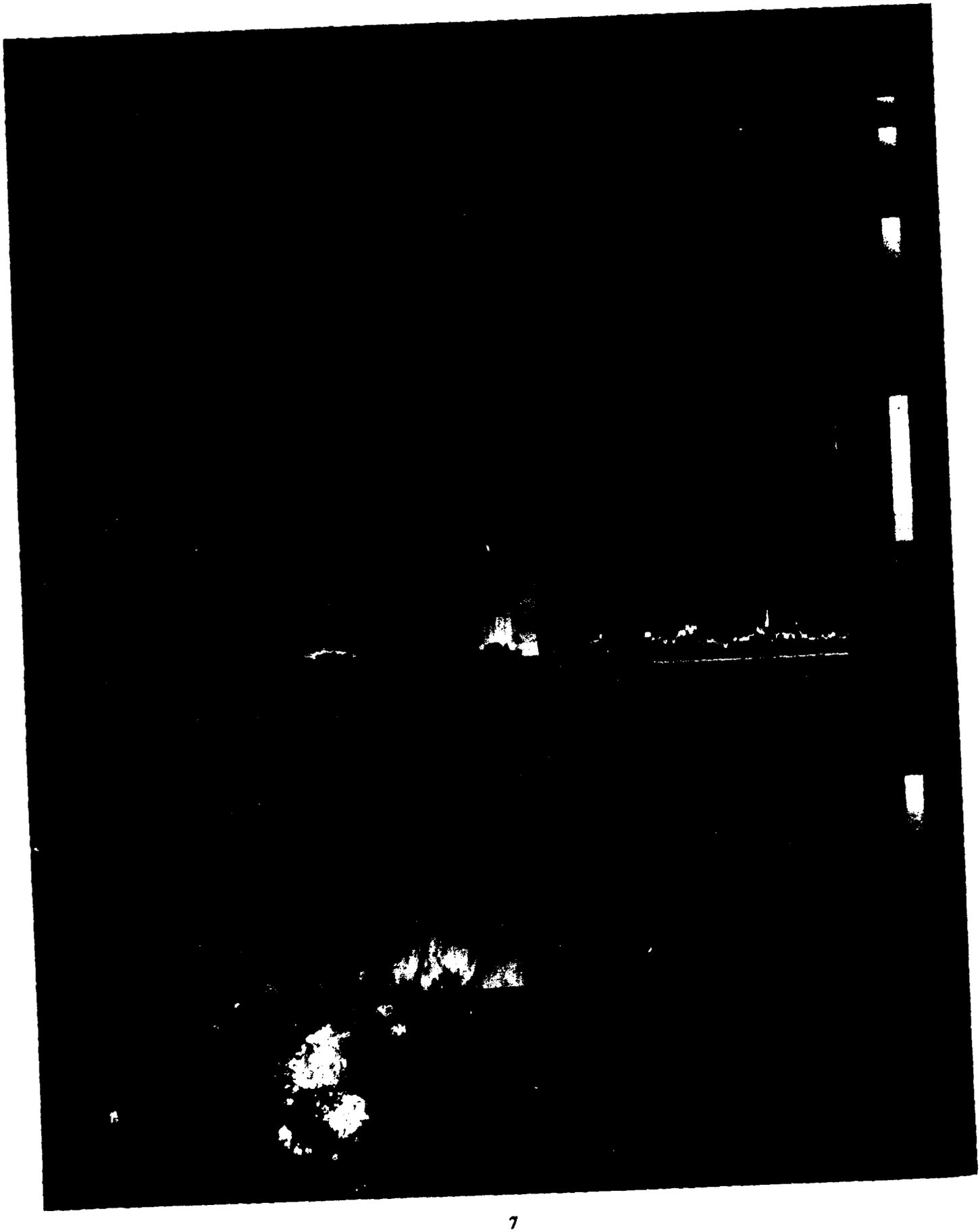
1979											1980		1981		
DAY	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	DAY
1			121											091	1
2														092	2
3		093													3
4		094				216					004				4
5		095		156				278				036			5
6				157								037			6
7			127	158	188			280	311				066		7
8								281							8
9				160				282							9
10															10
11							254					042			11
12											012		071		12
13		103				225			317				072		13
14						226							073		14
15				166					319			046			15
16												047	075		16
17	076			168						351			076		17
18		108	138				261				018		077		18
19					200		262								19
20		110				232							079		20
21	080	111		172			264							111	21
22														112	22
23										357			082	113	23
24		114	144						328						24
25		115	145		206				329	359					25
26			146										085		26
27				178					331	361	027		086		27
28	087						271	301			028		087		28
29	088		149	180		241	272			363			088		29
30		120					273						089		30
31													090		31

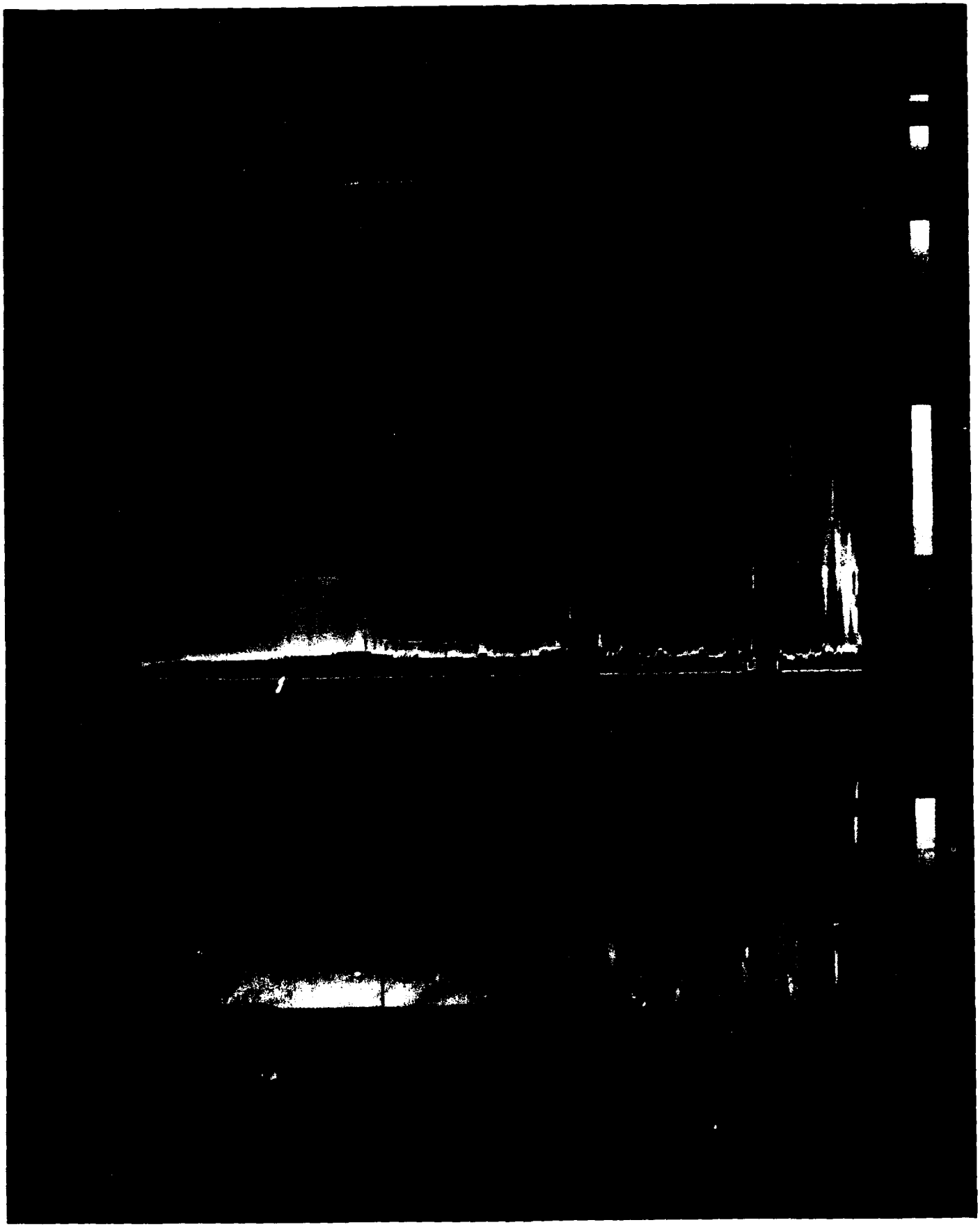
5.4 Data Presentation; SC9 Low Energy Plasma

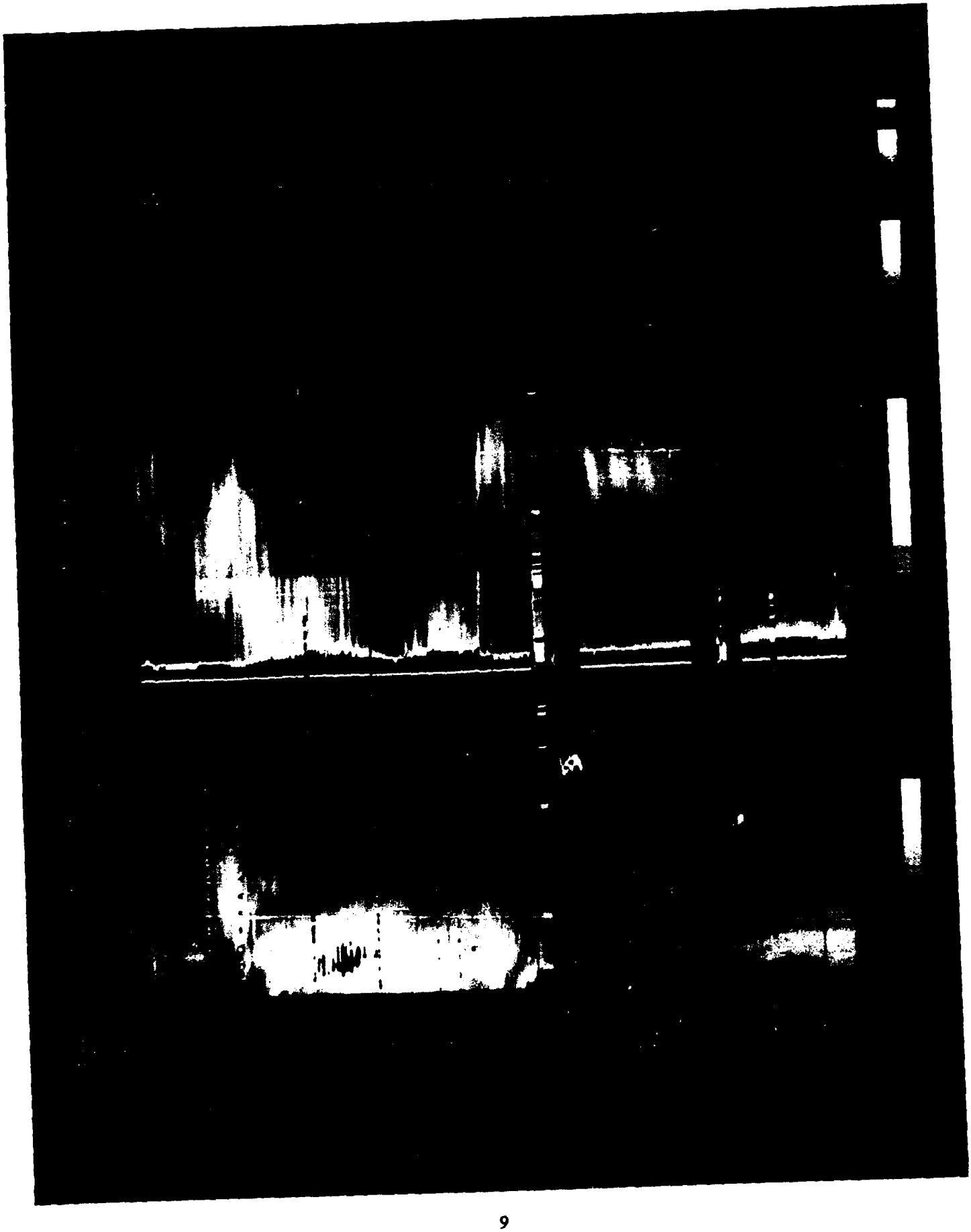


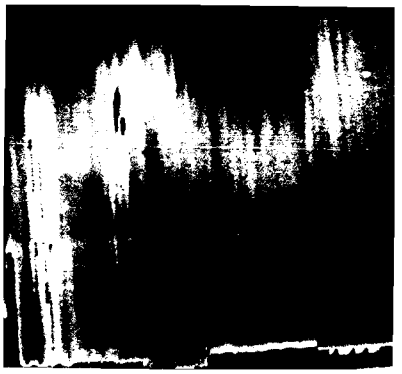


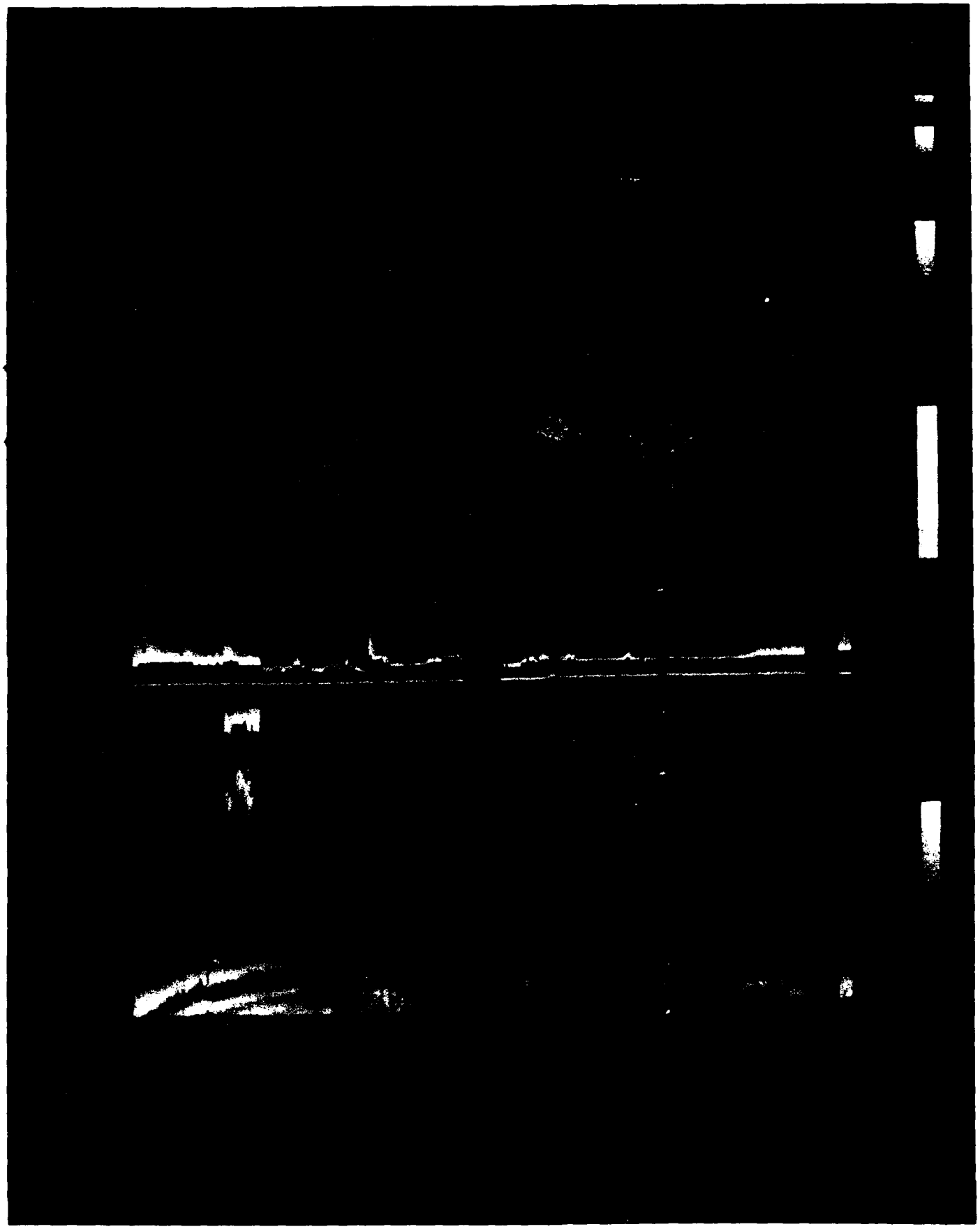


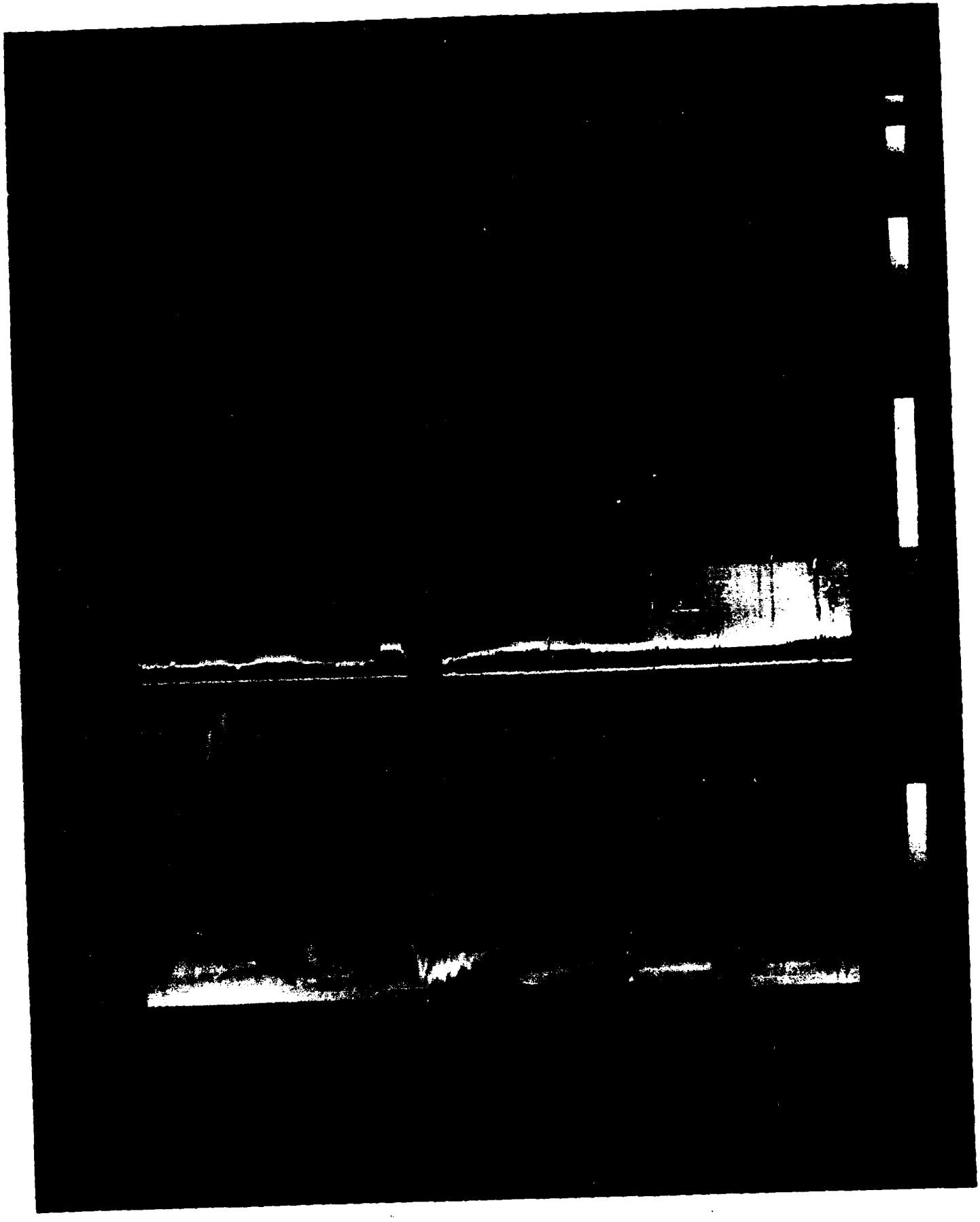


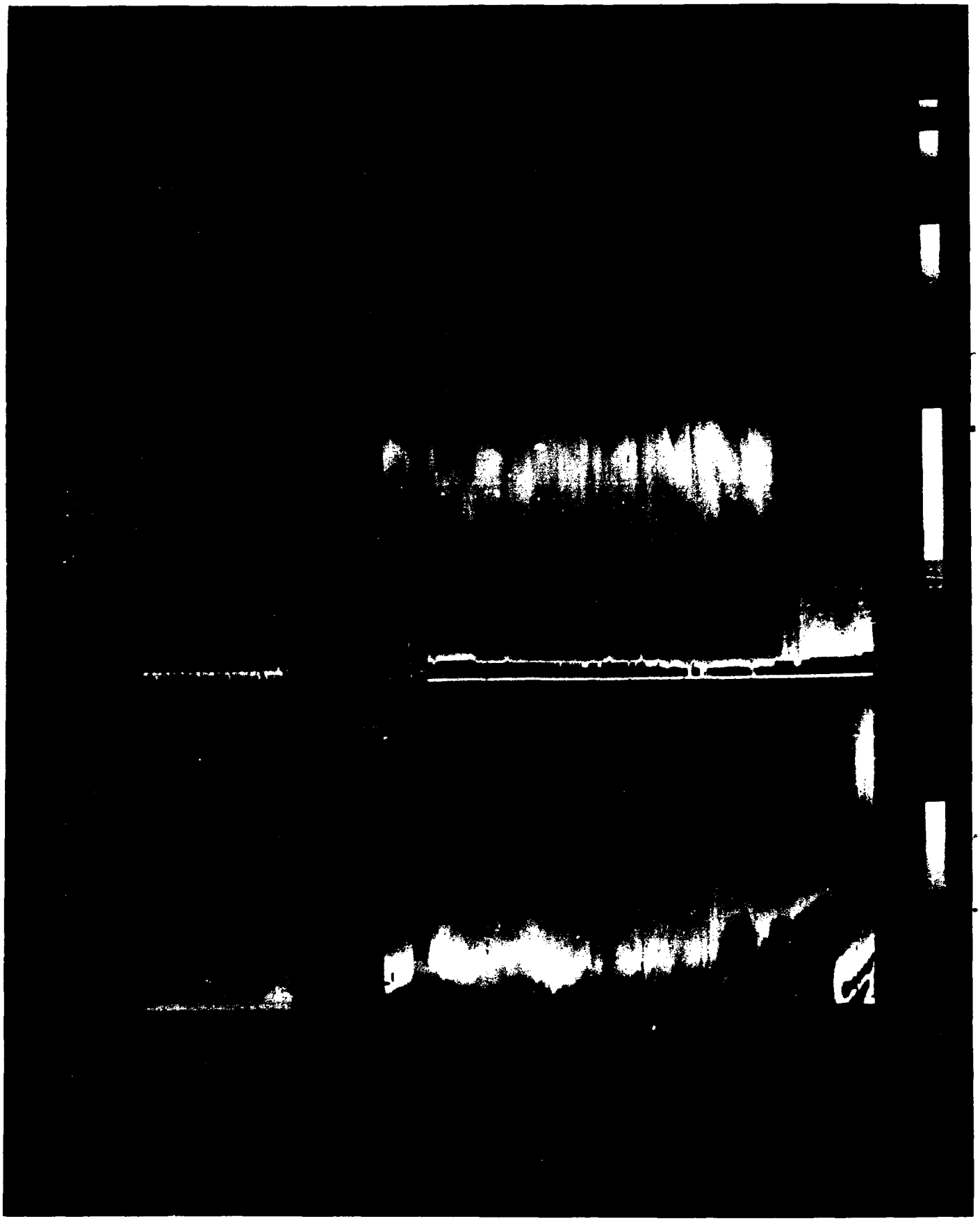


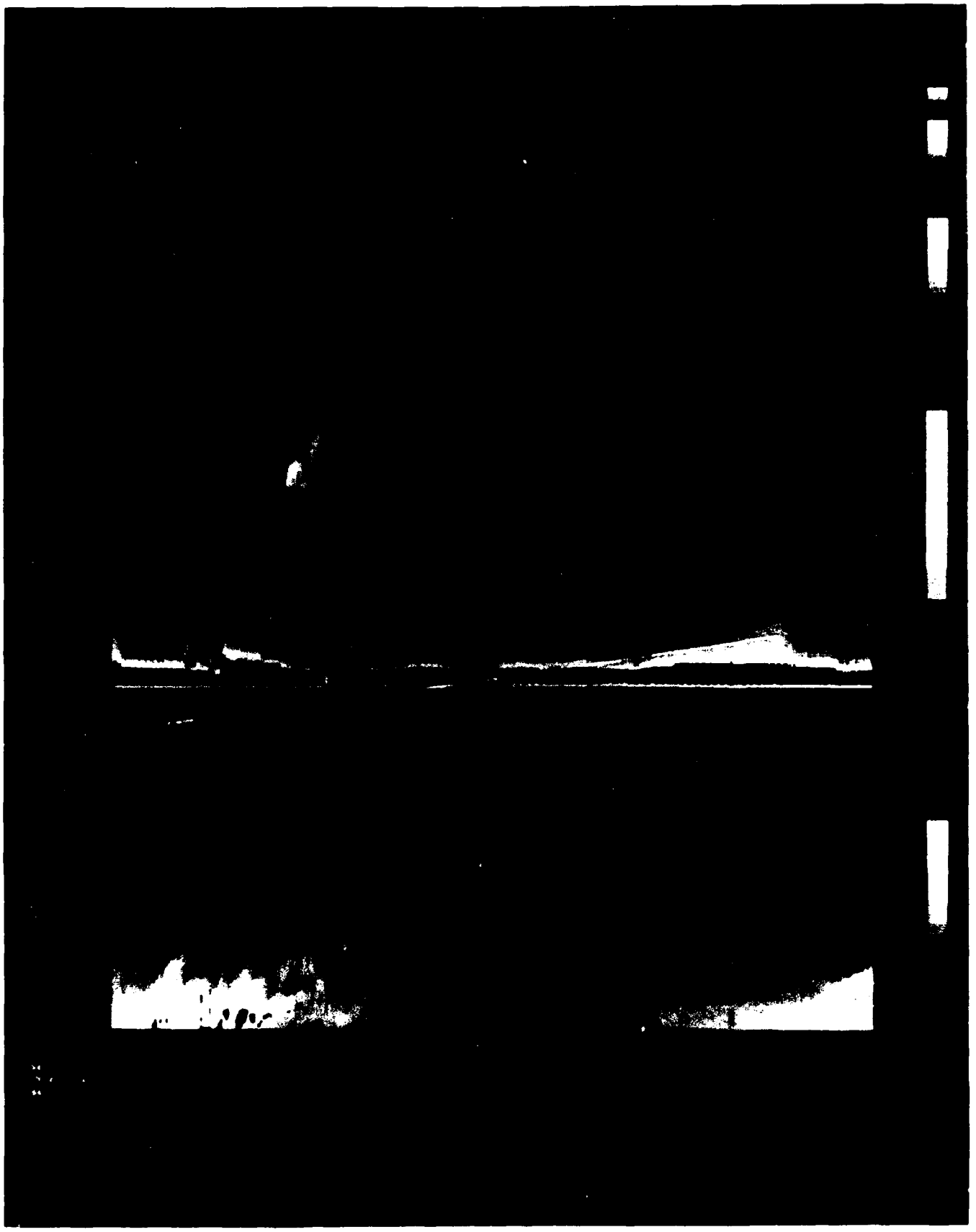


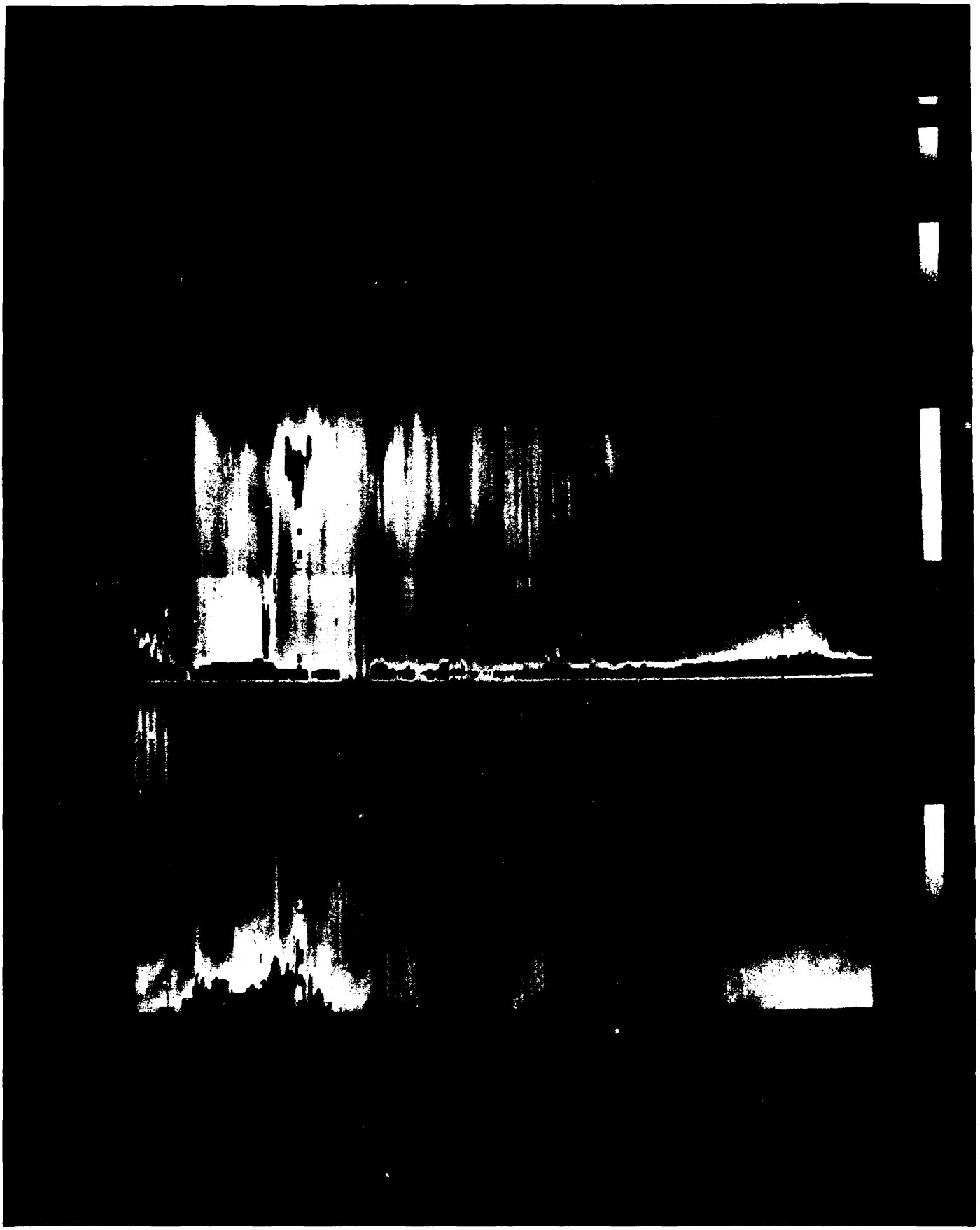


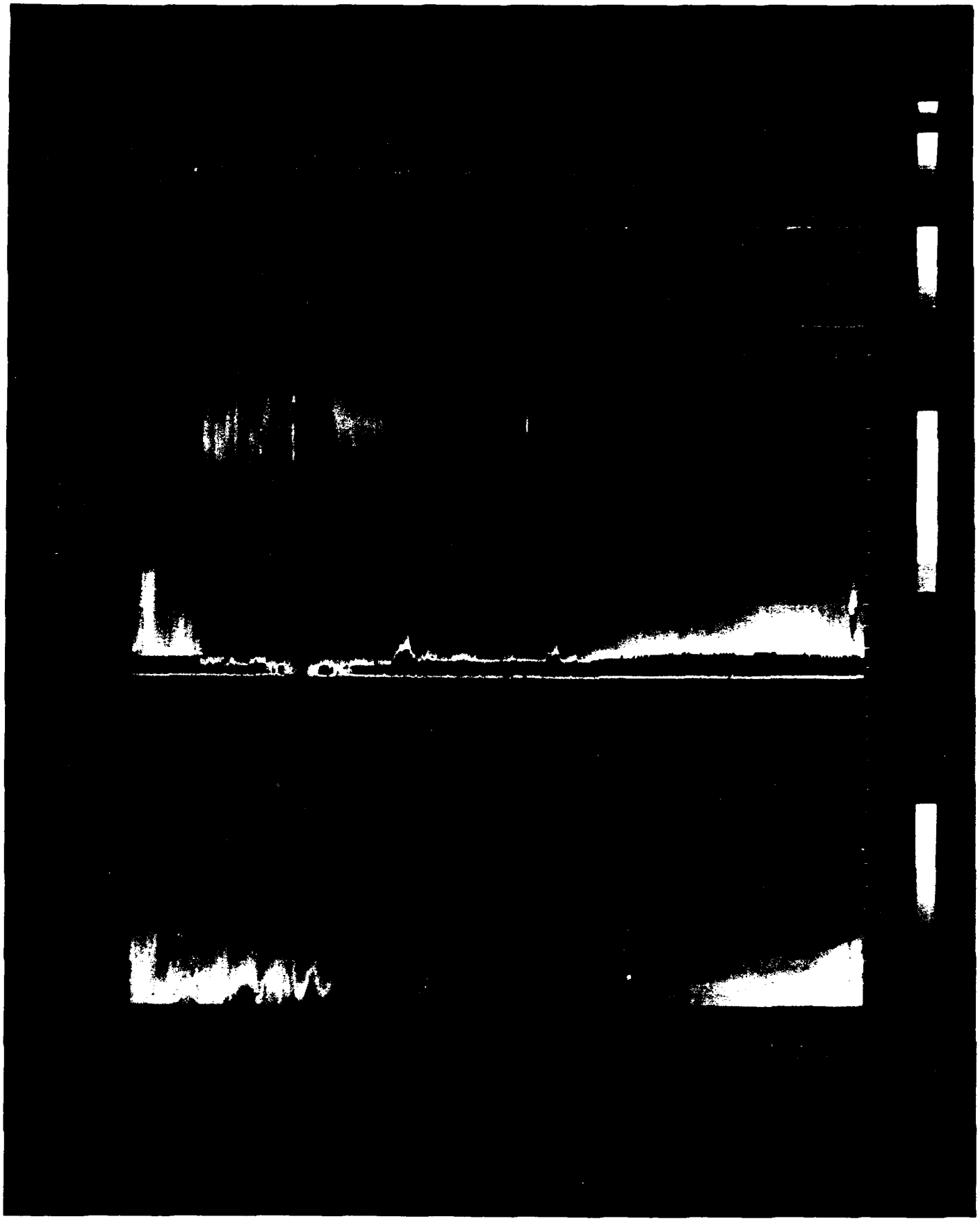


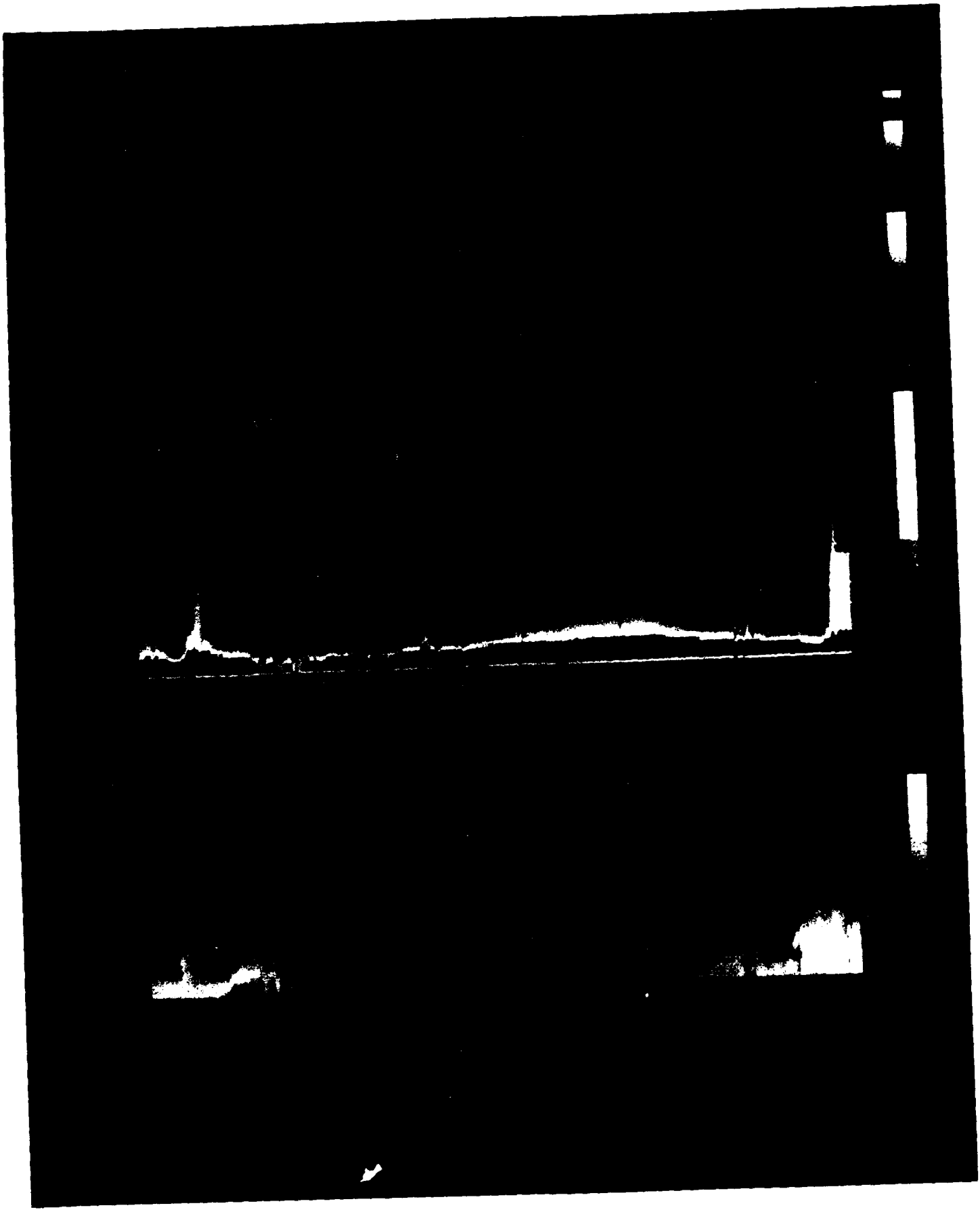


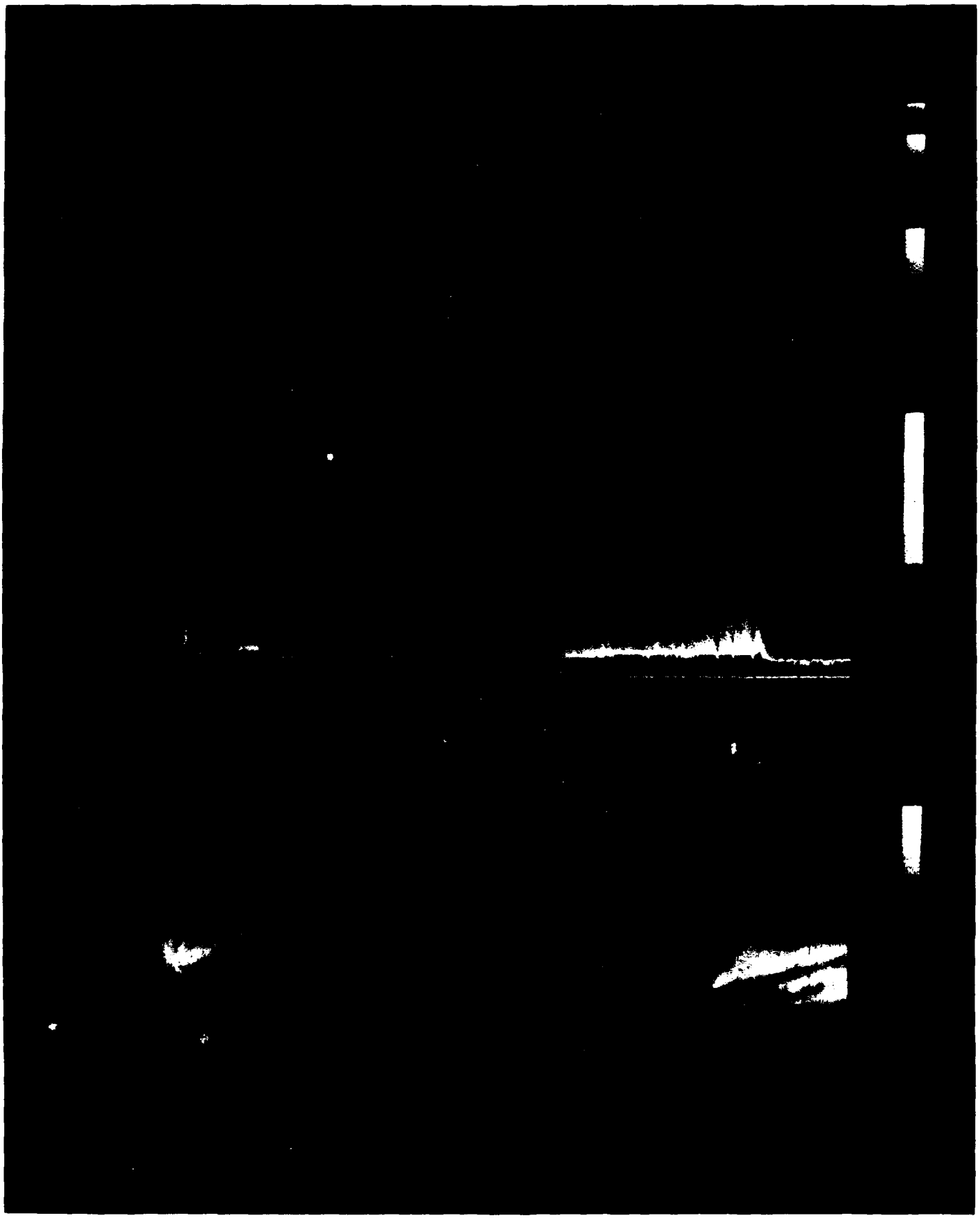


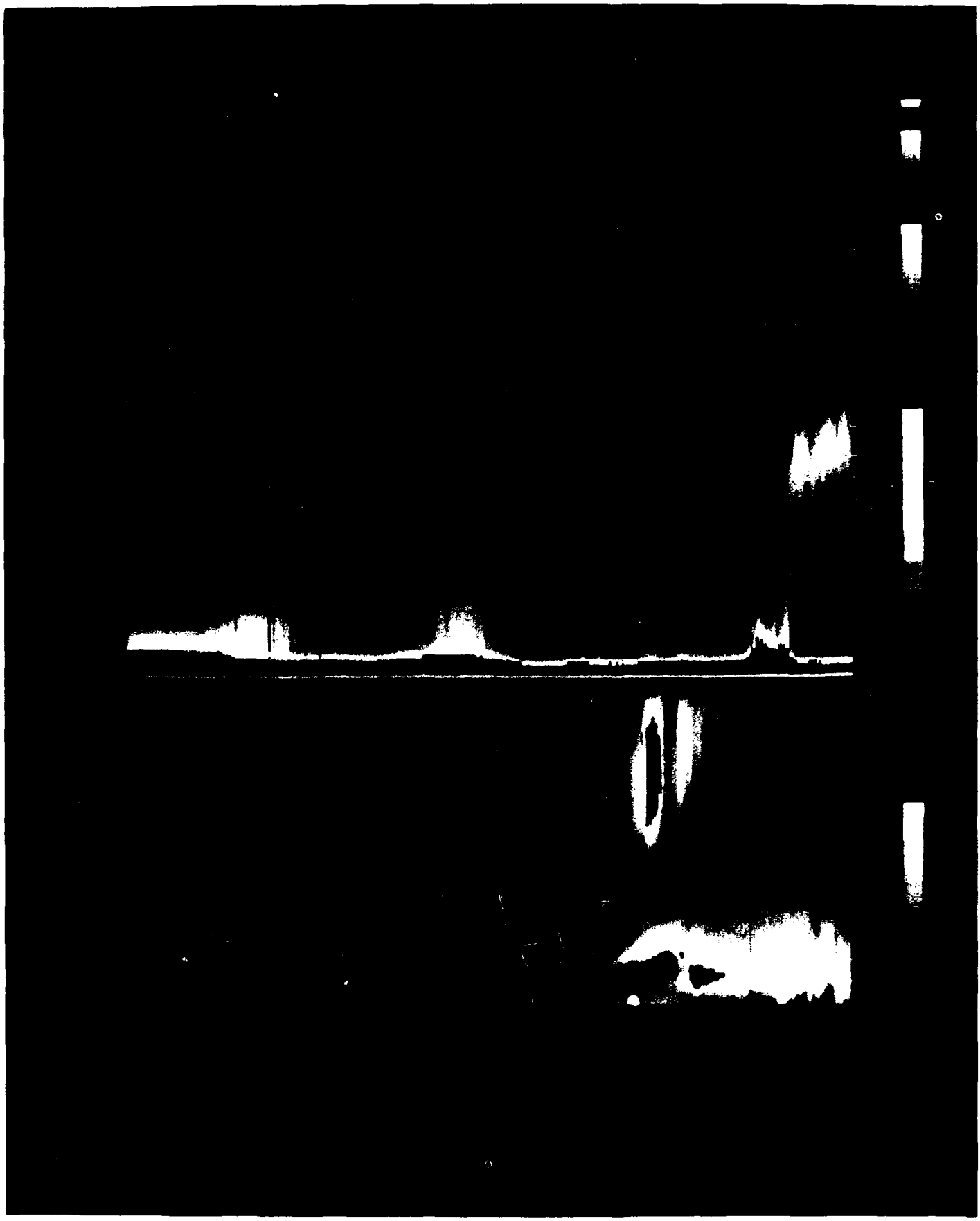


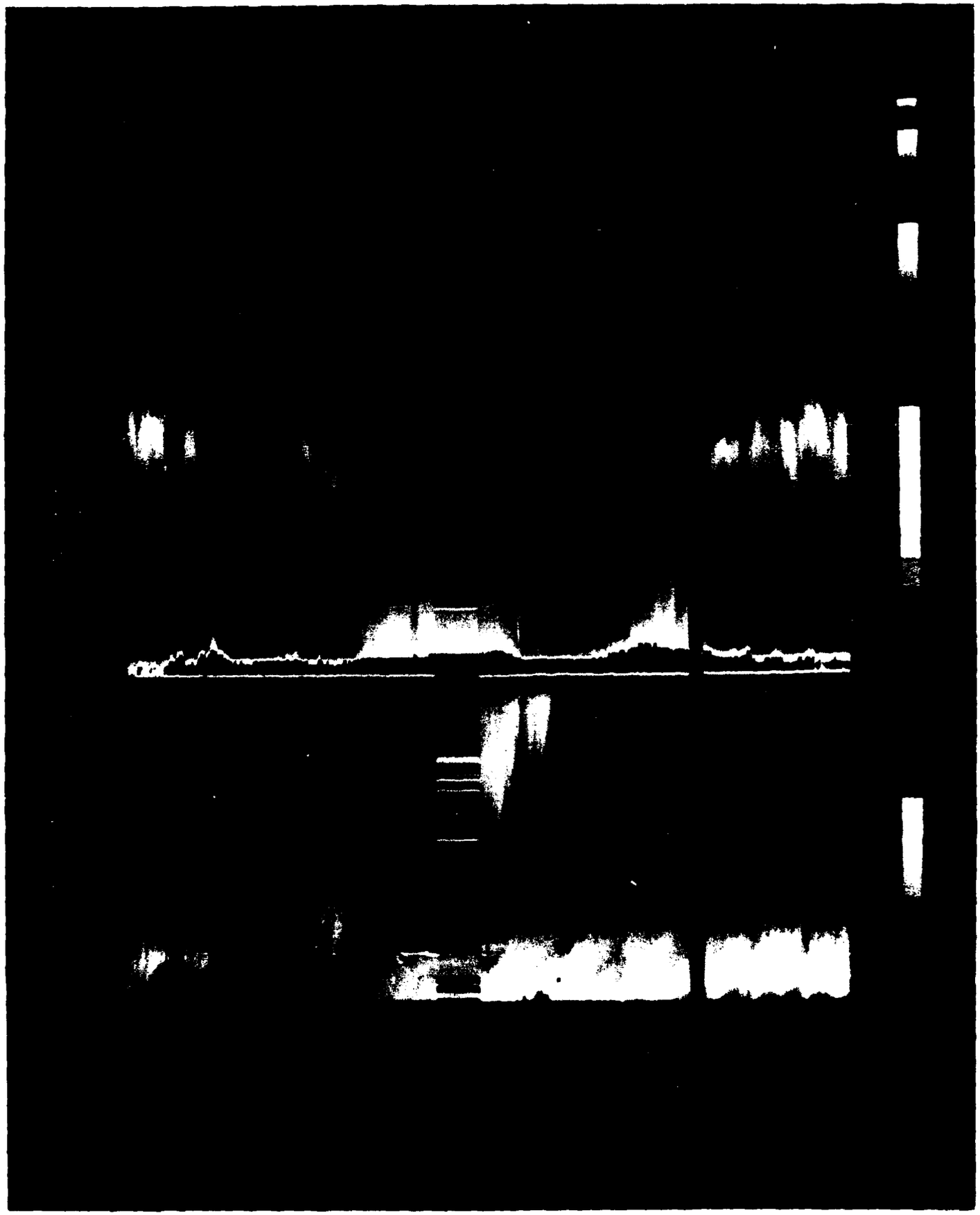


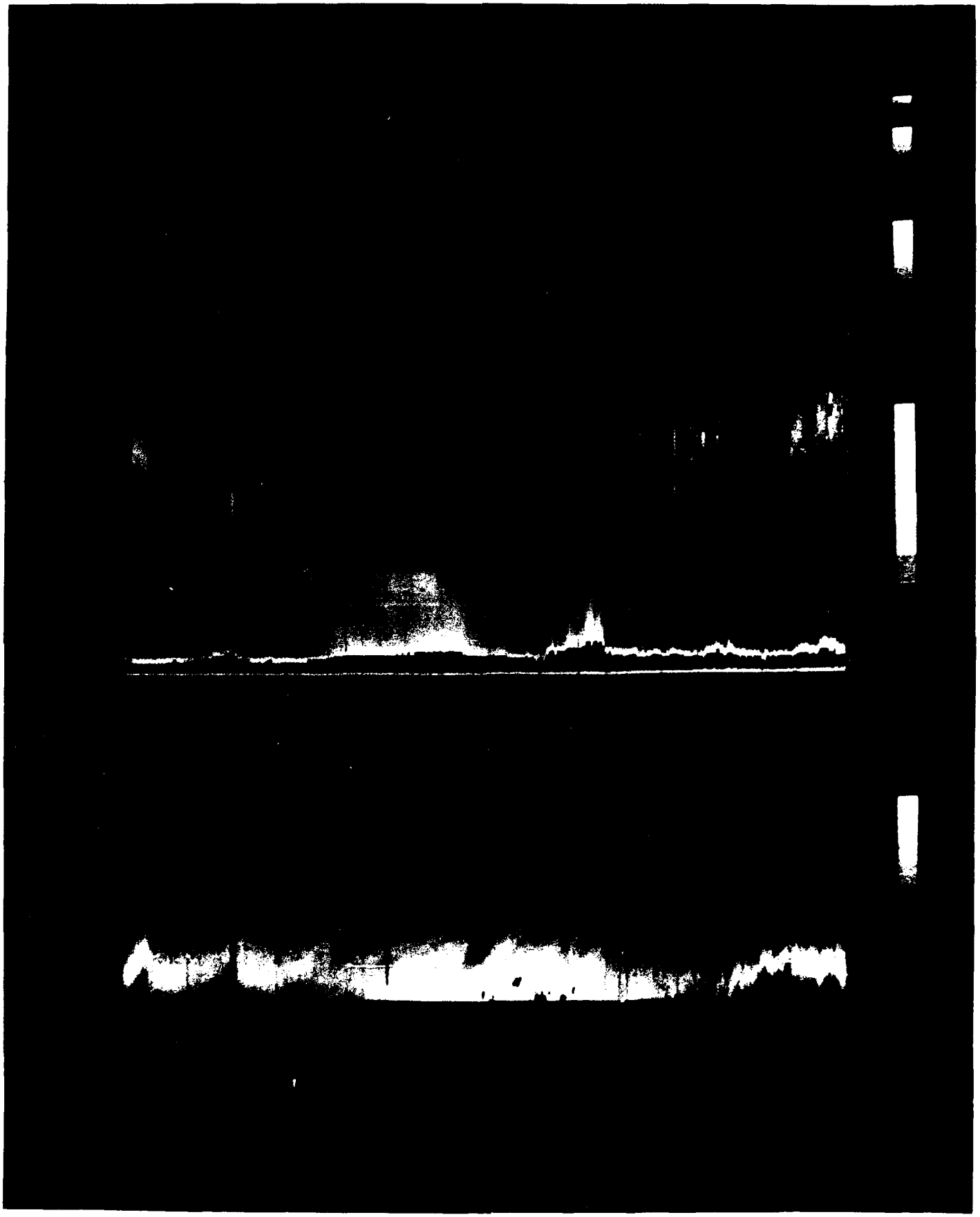


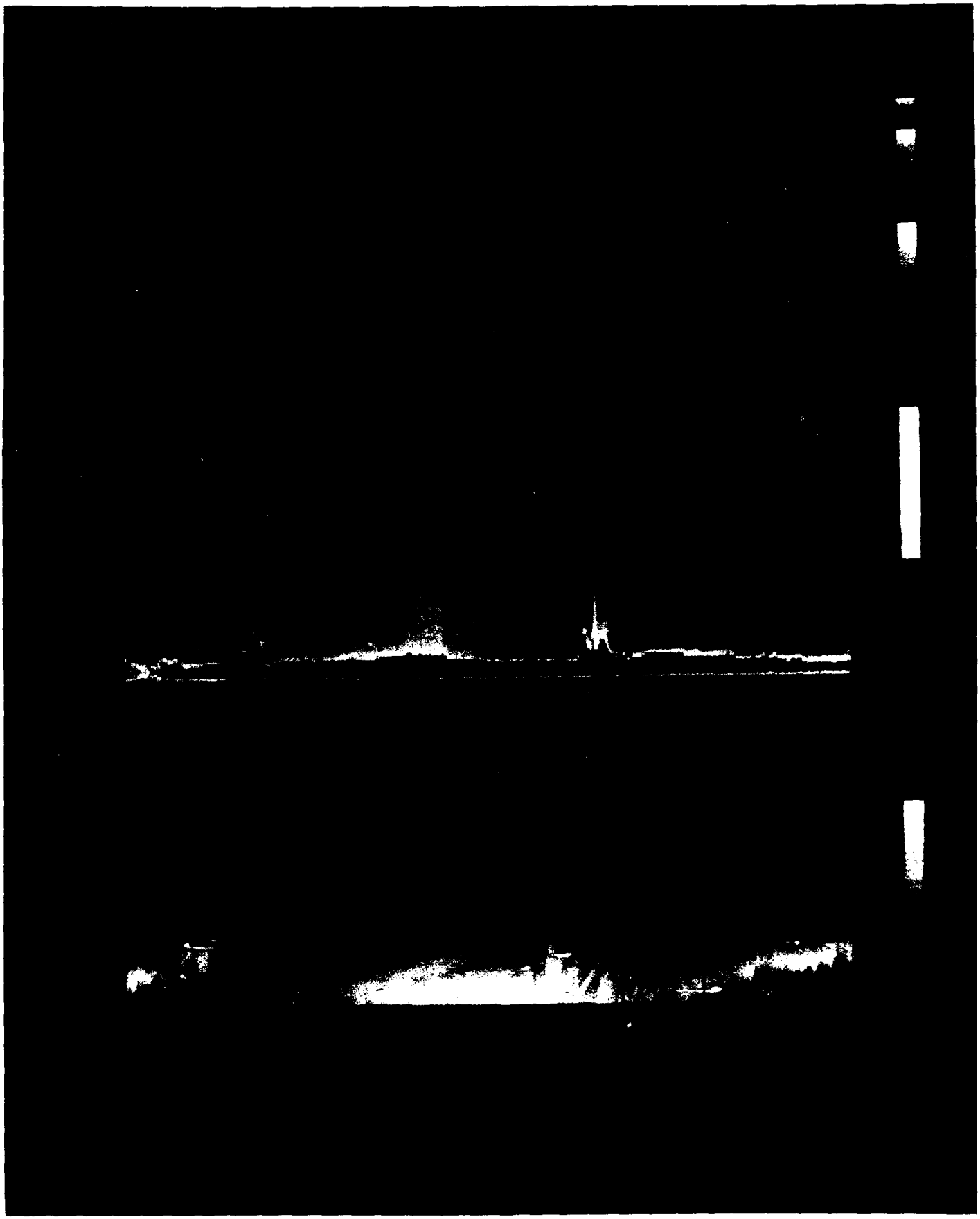


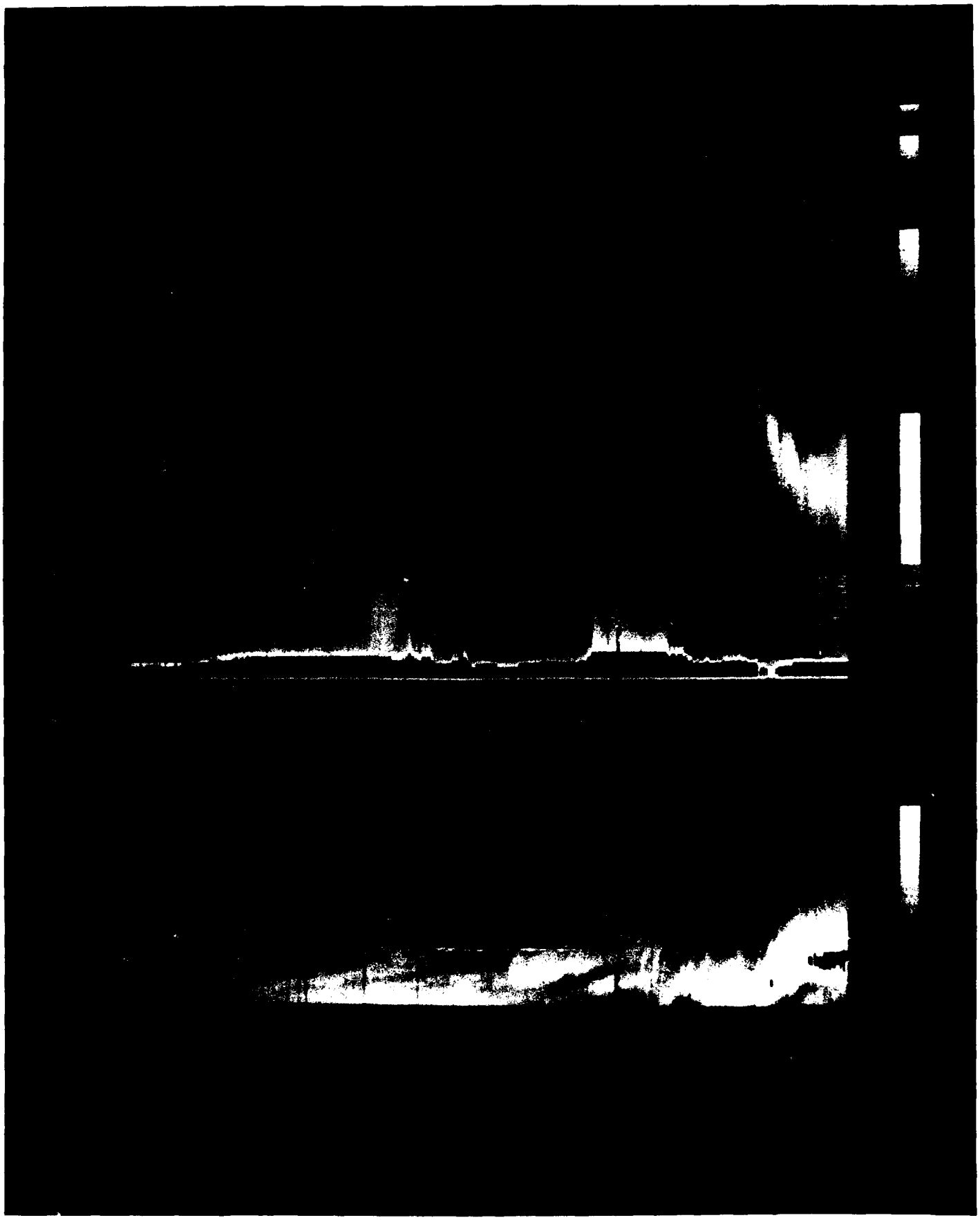


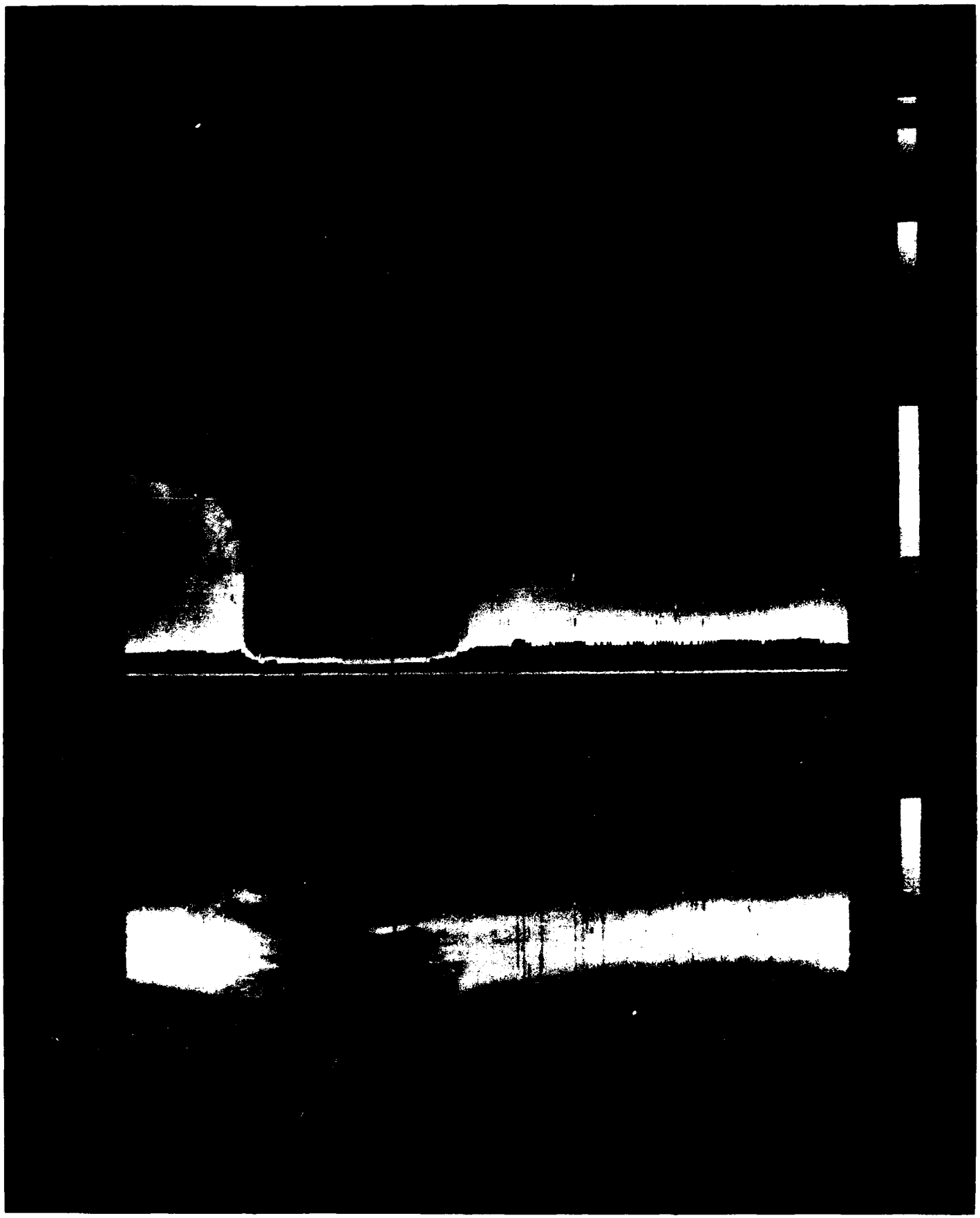


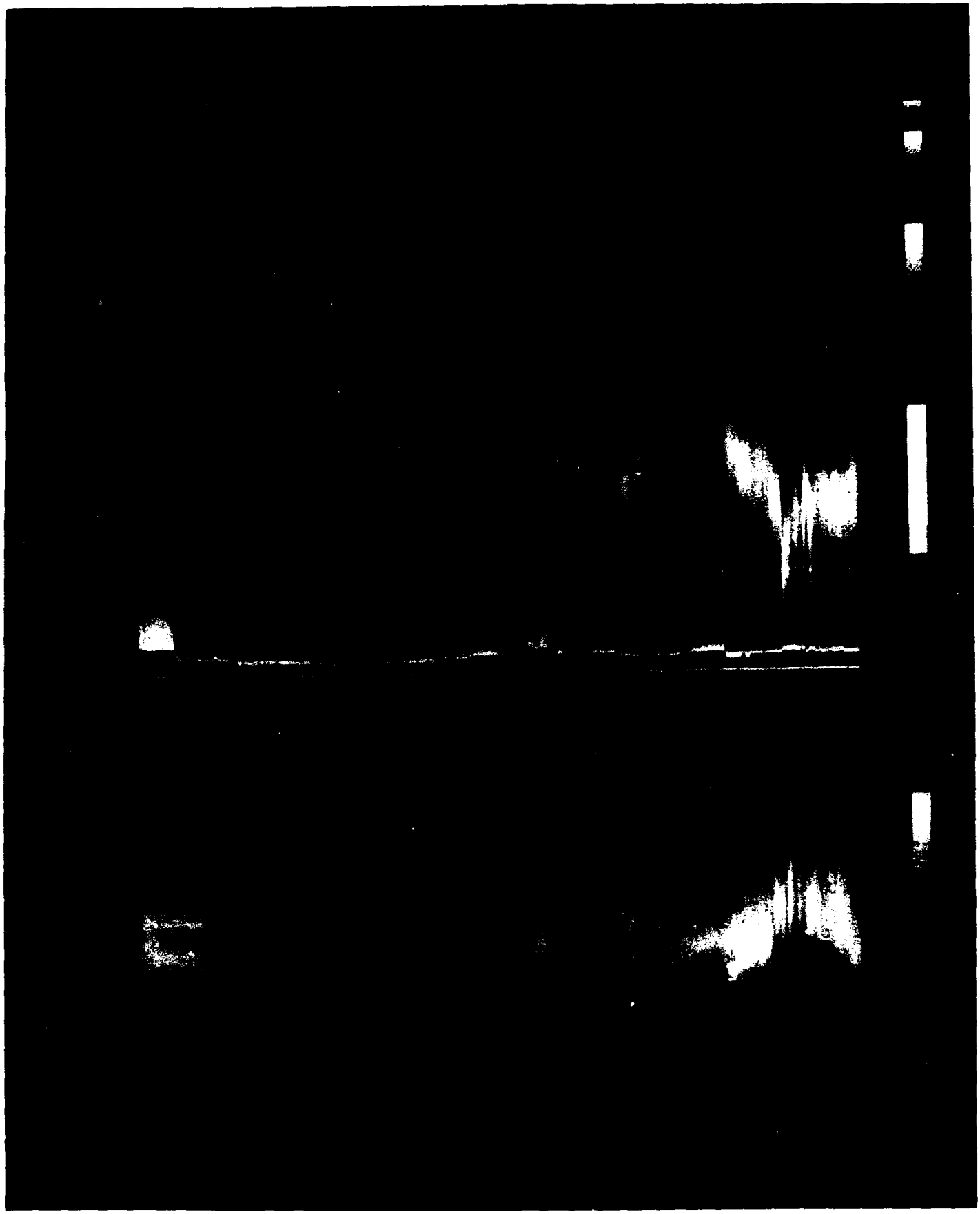


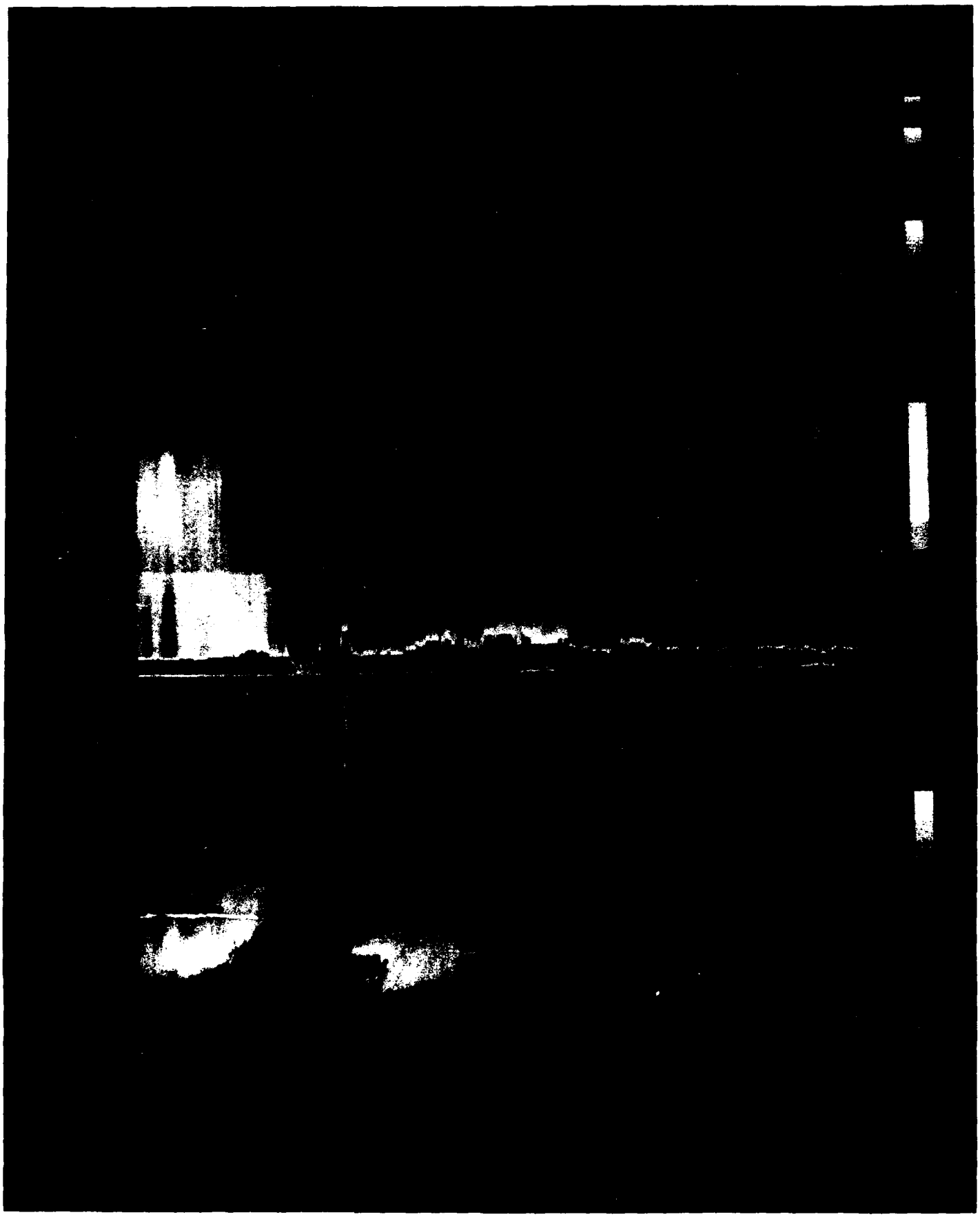


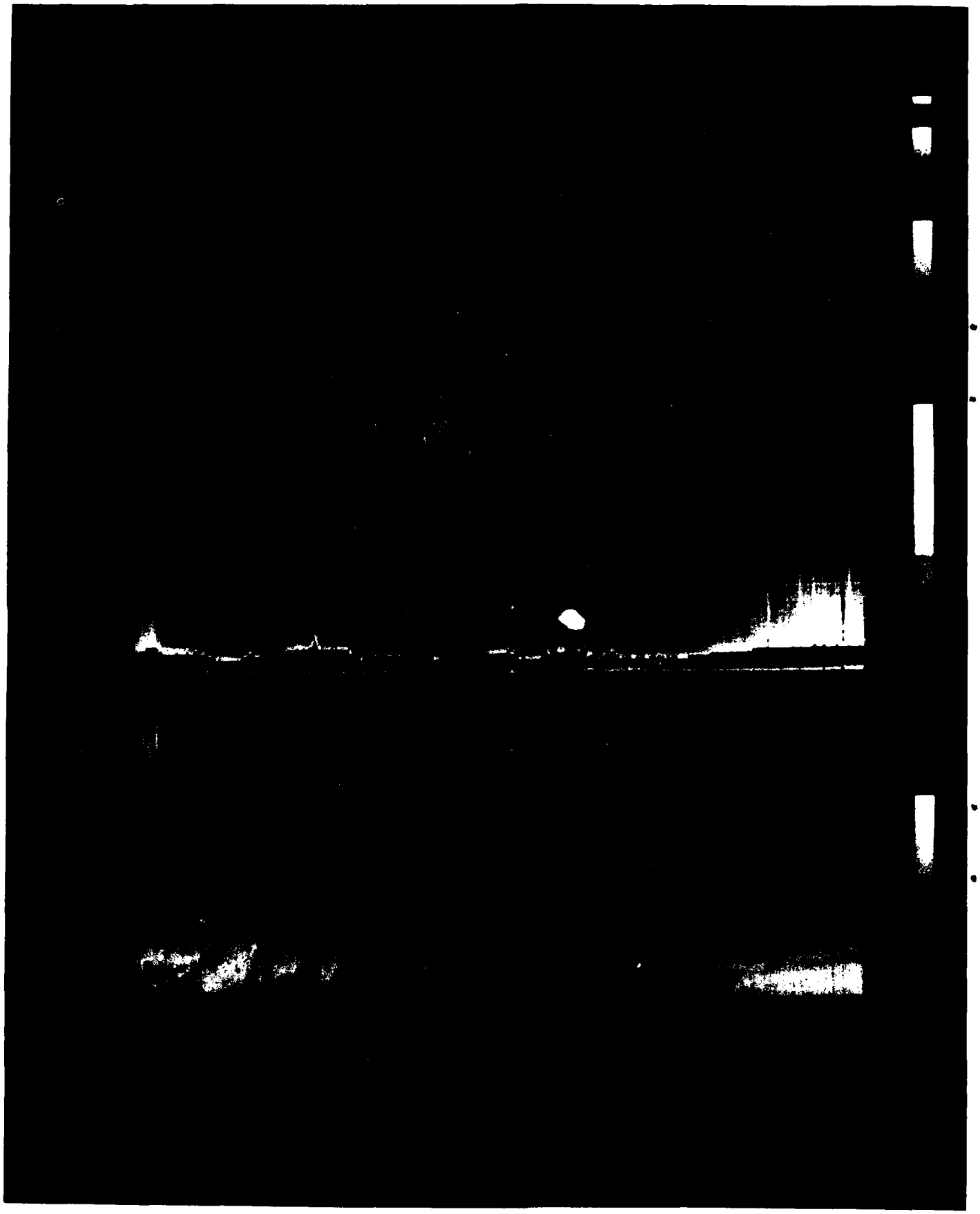


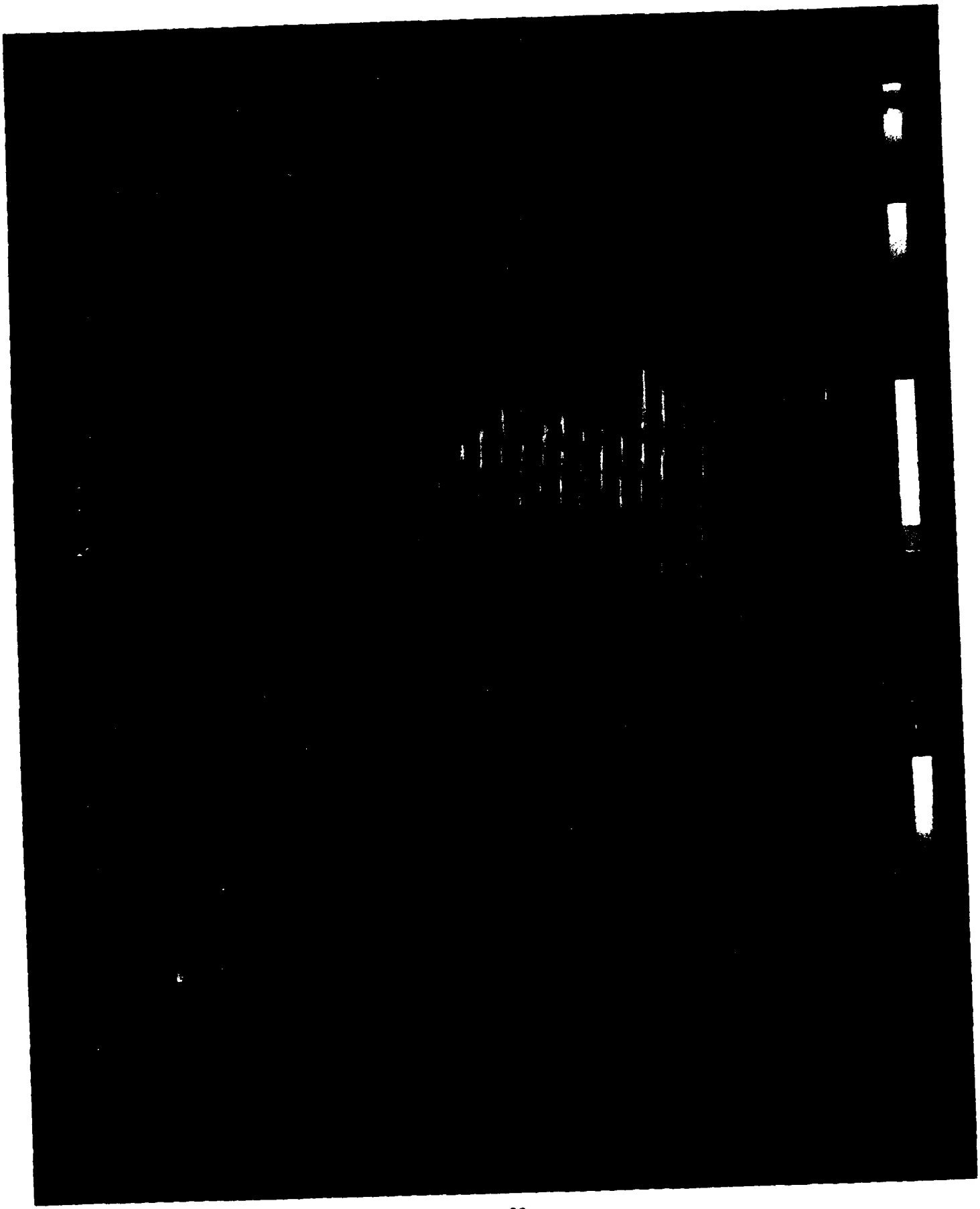


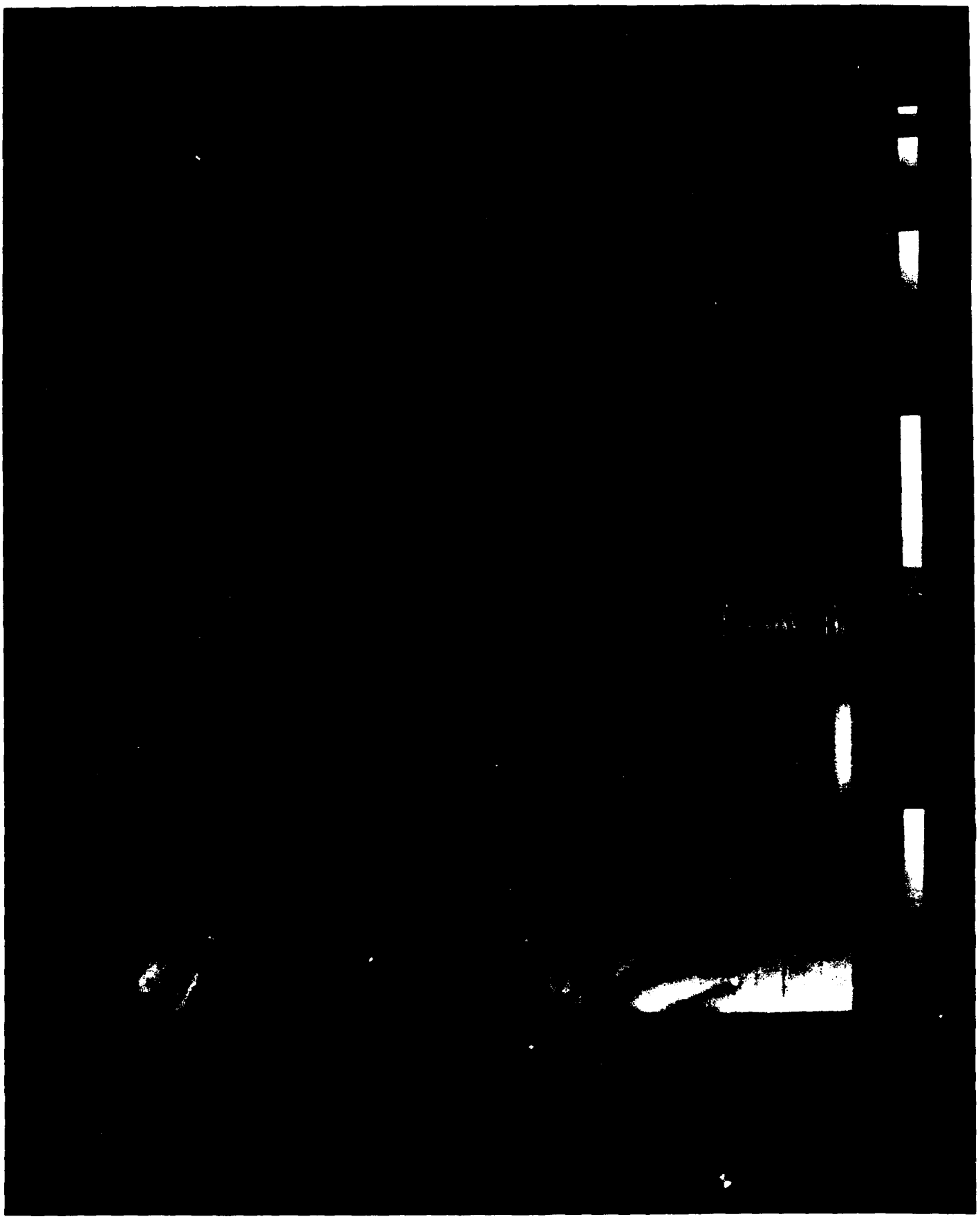


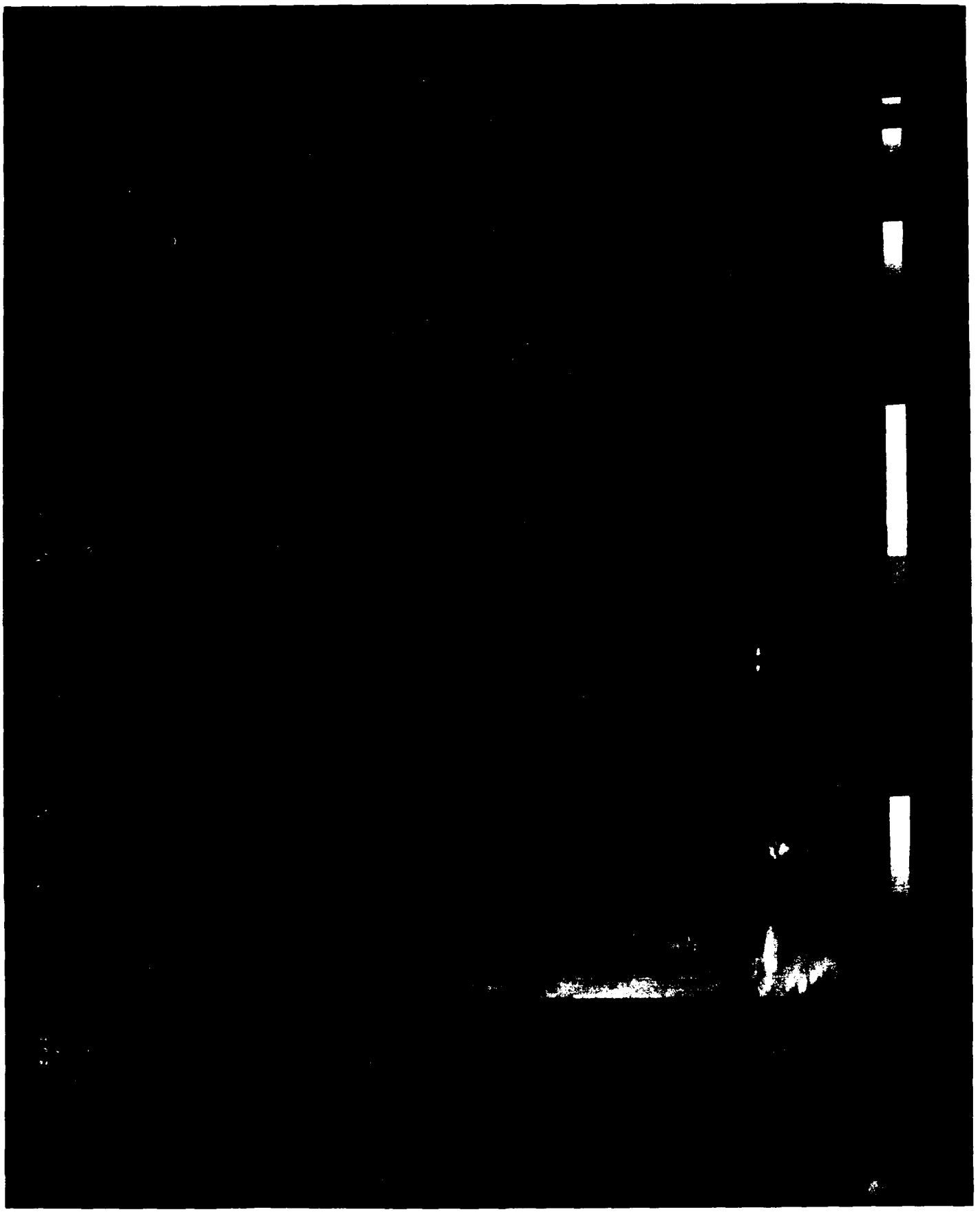


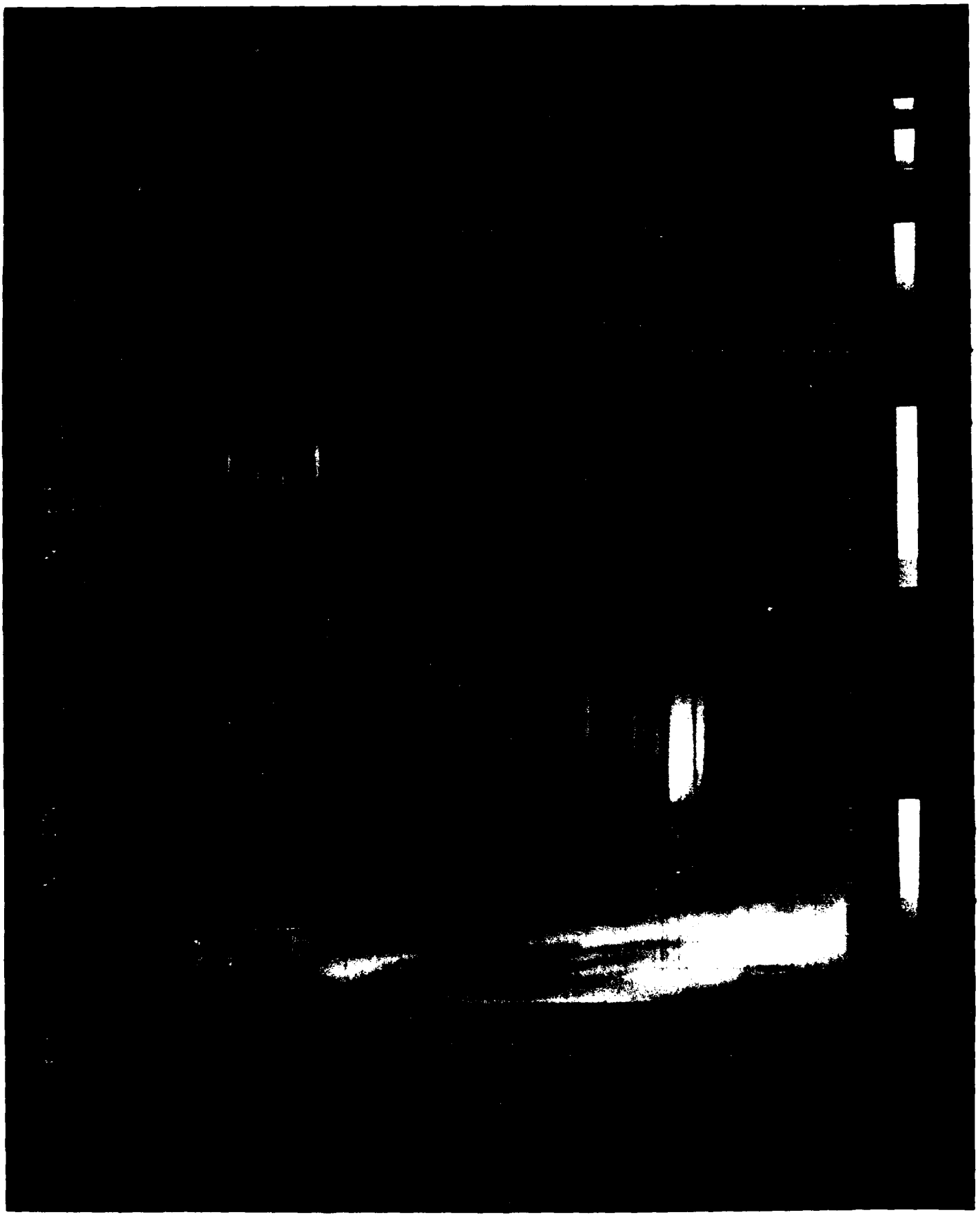


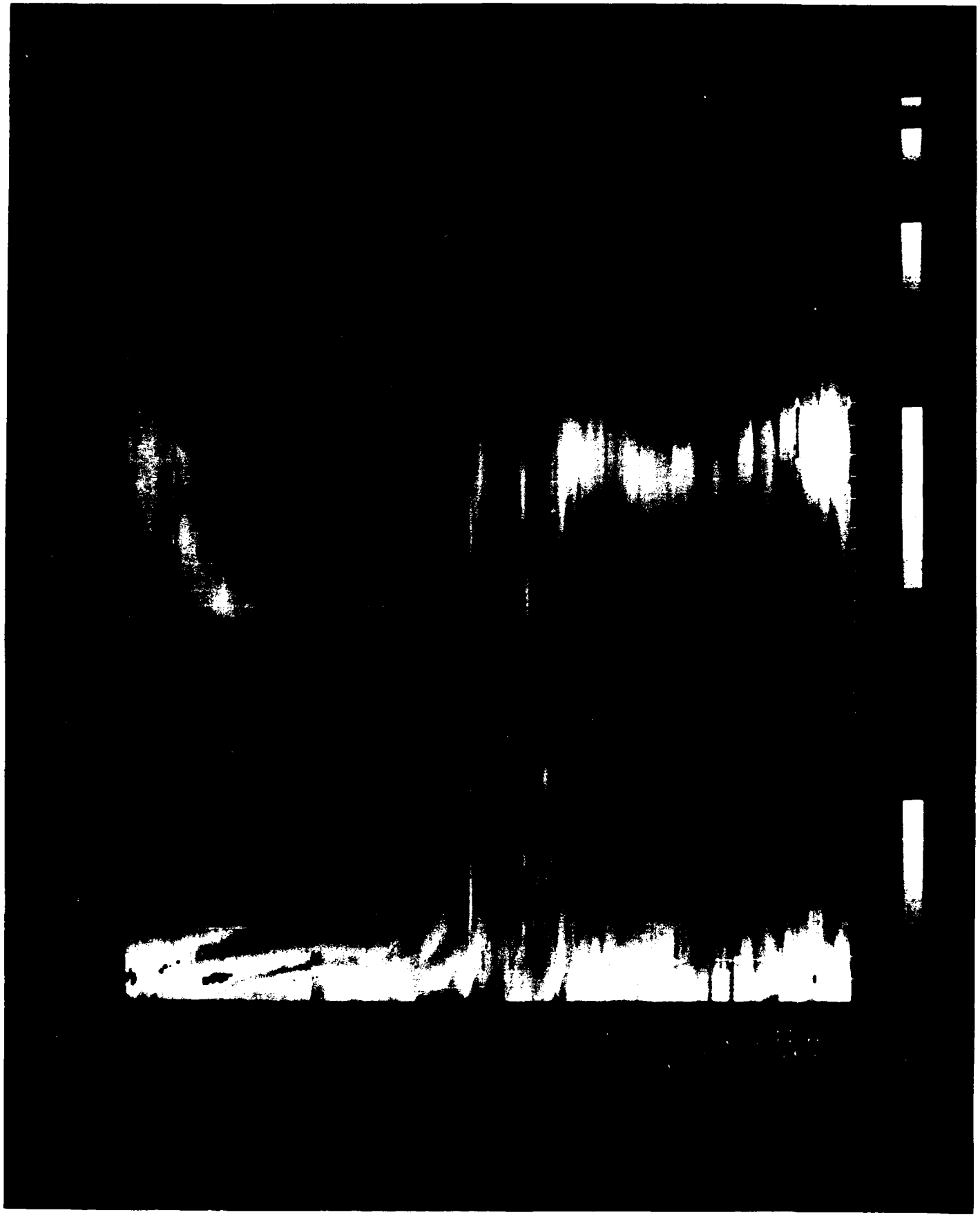


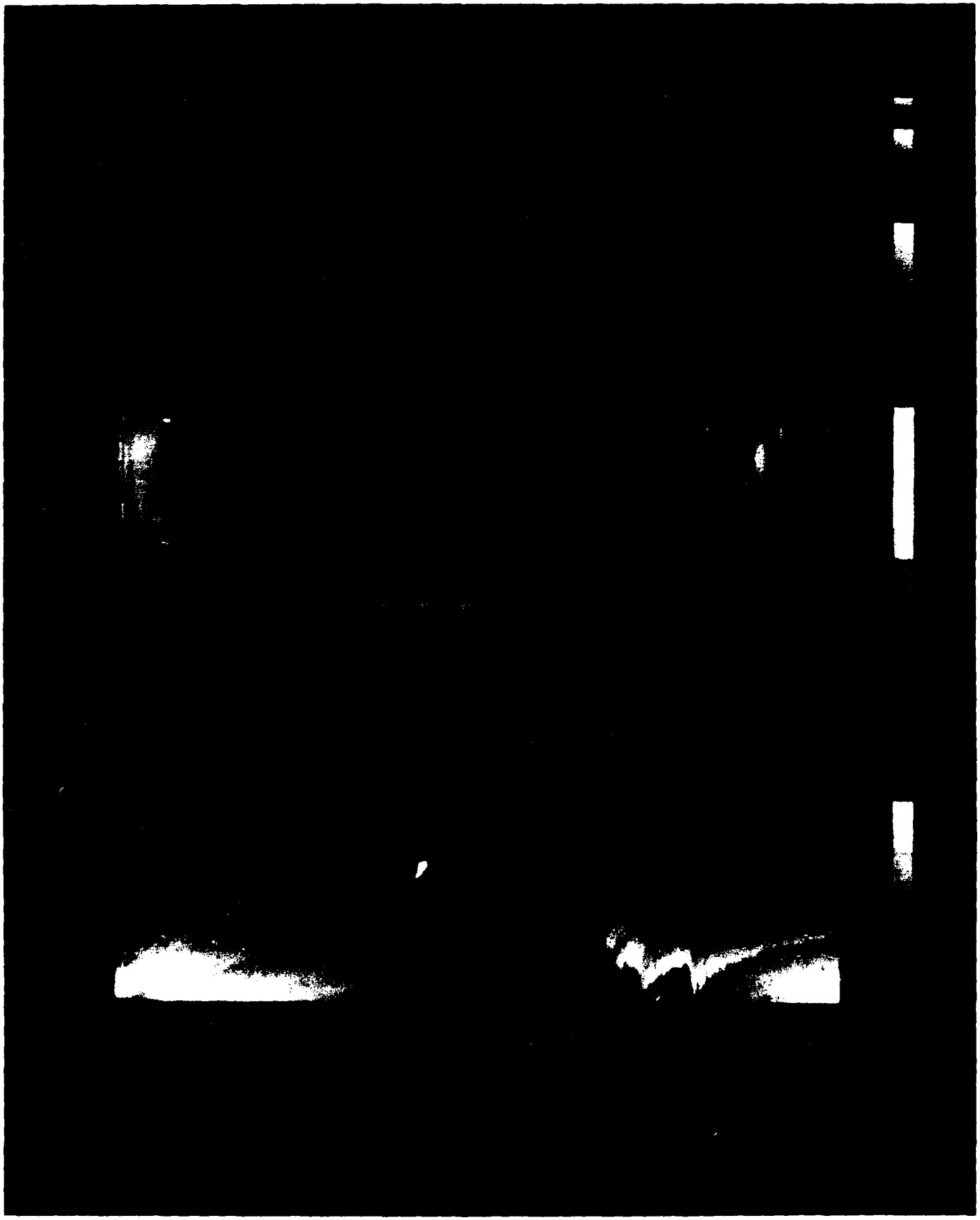


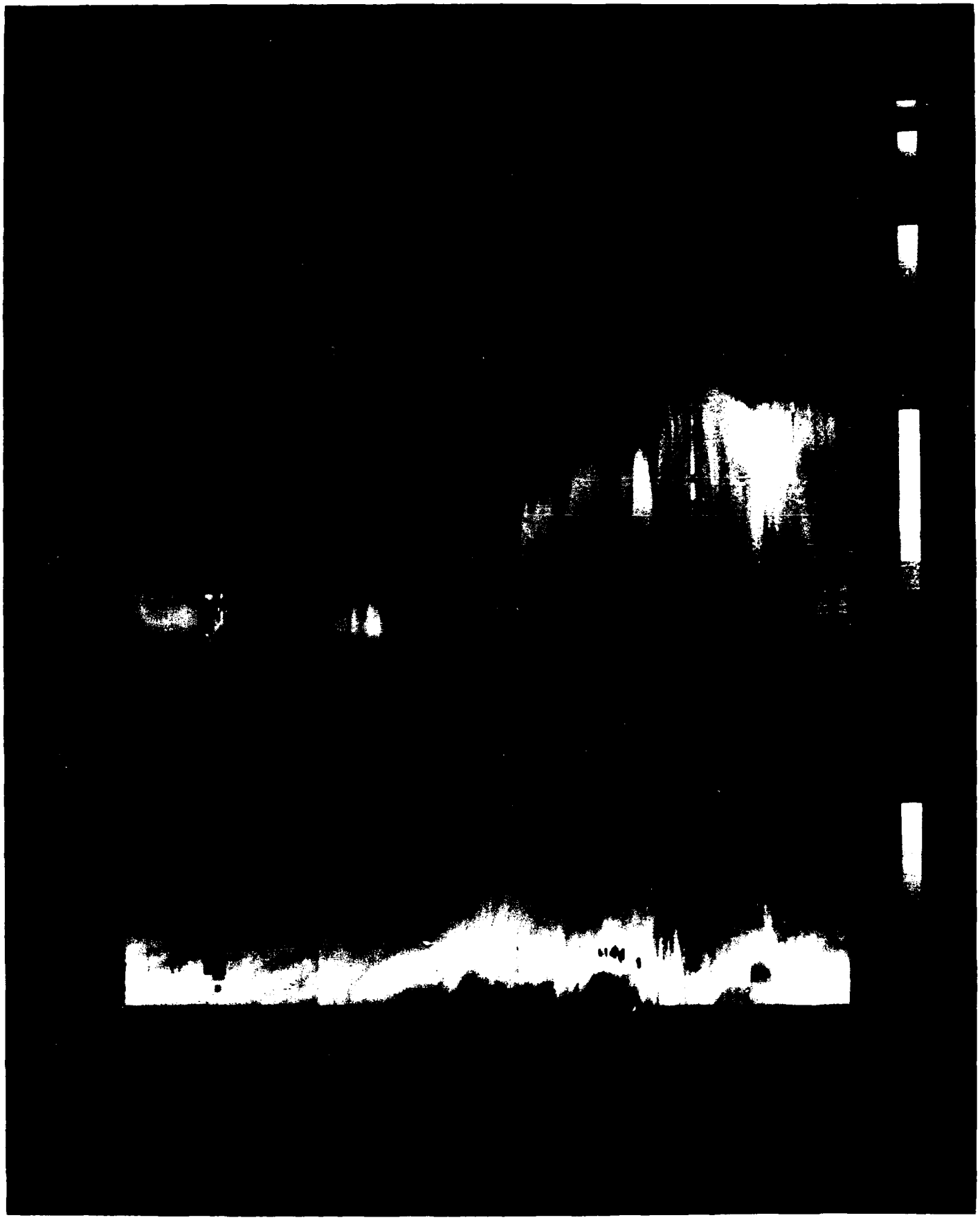


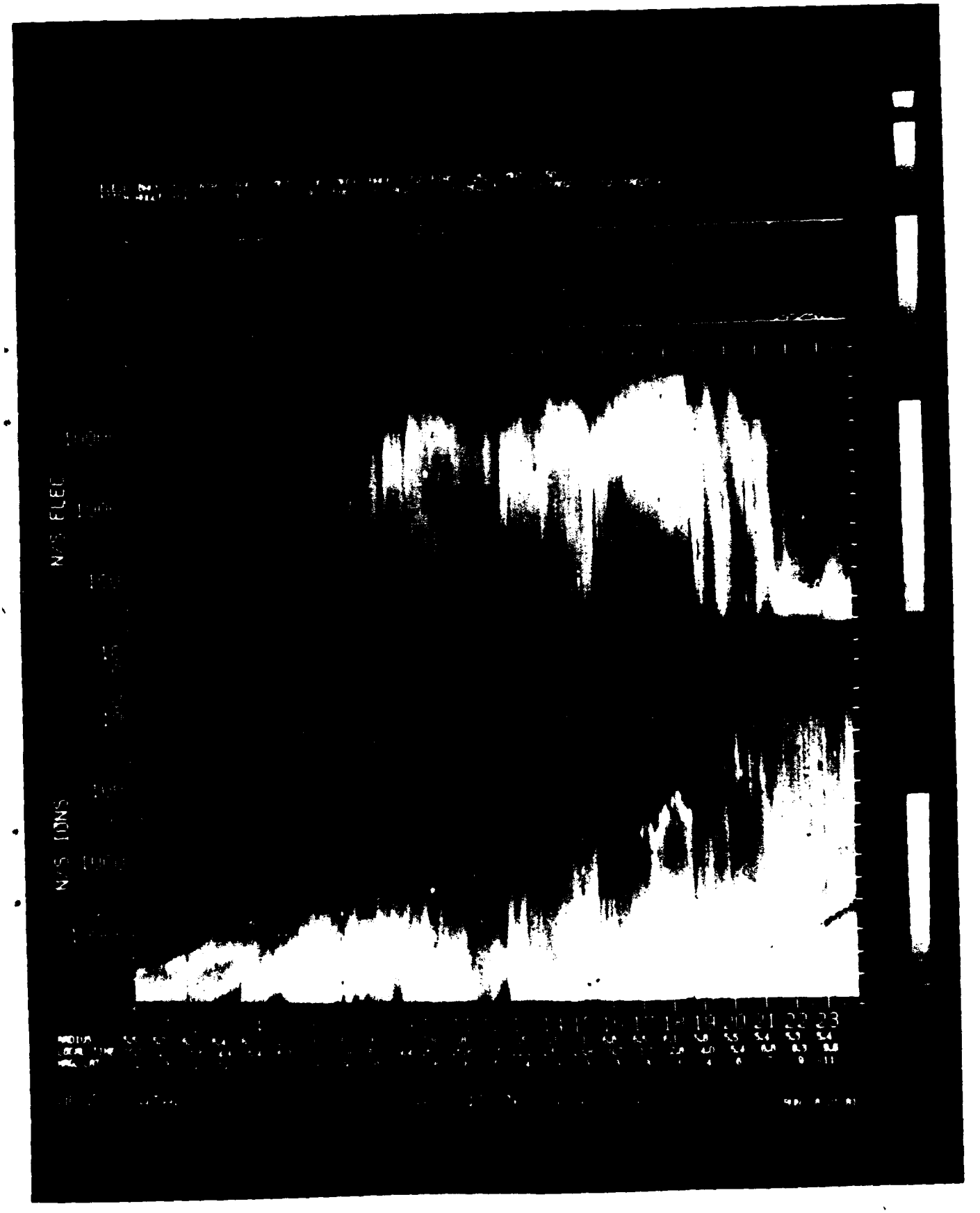








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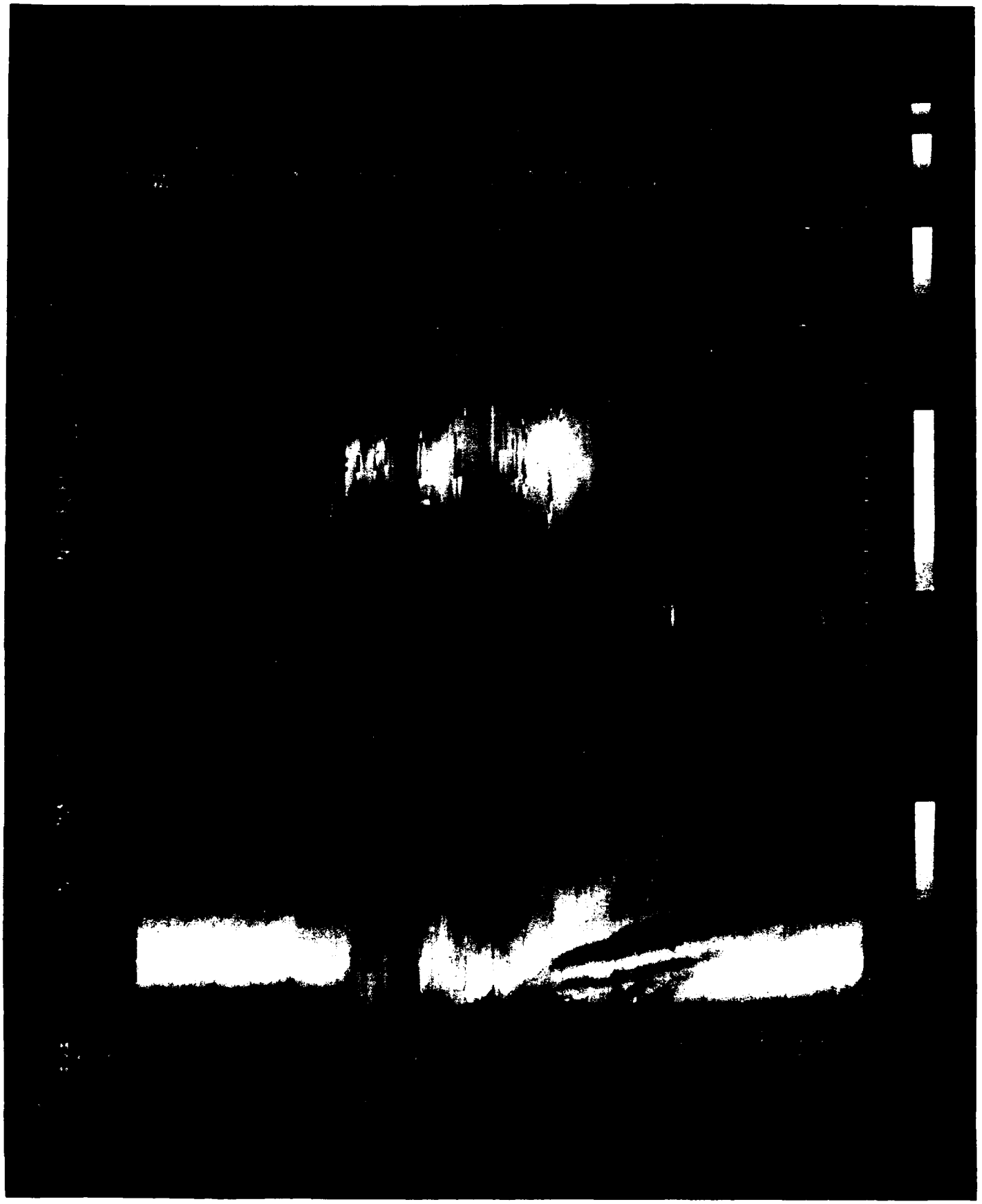
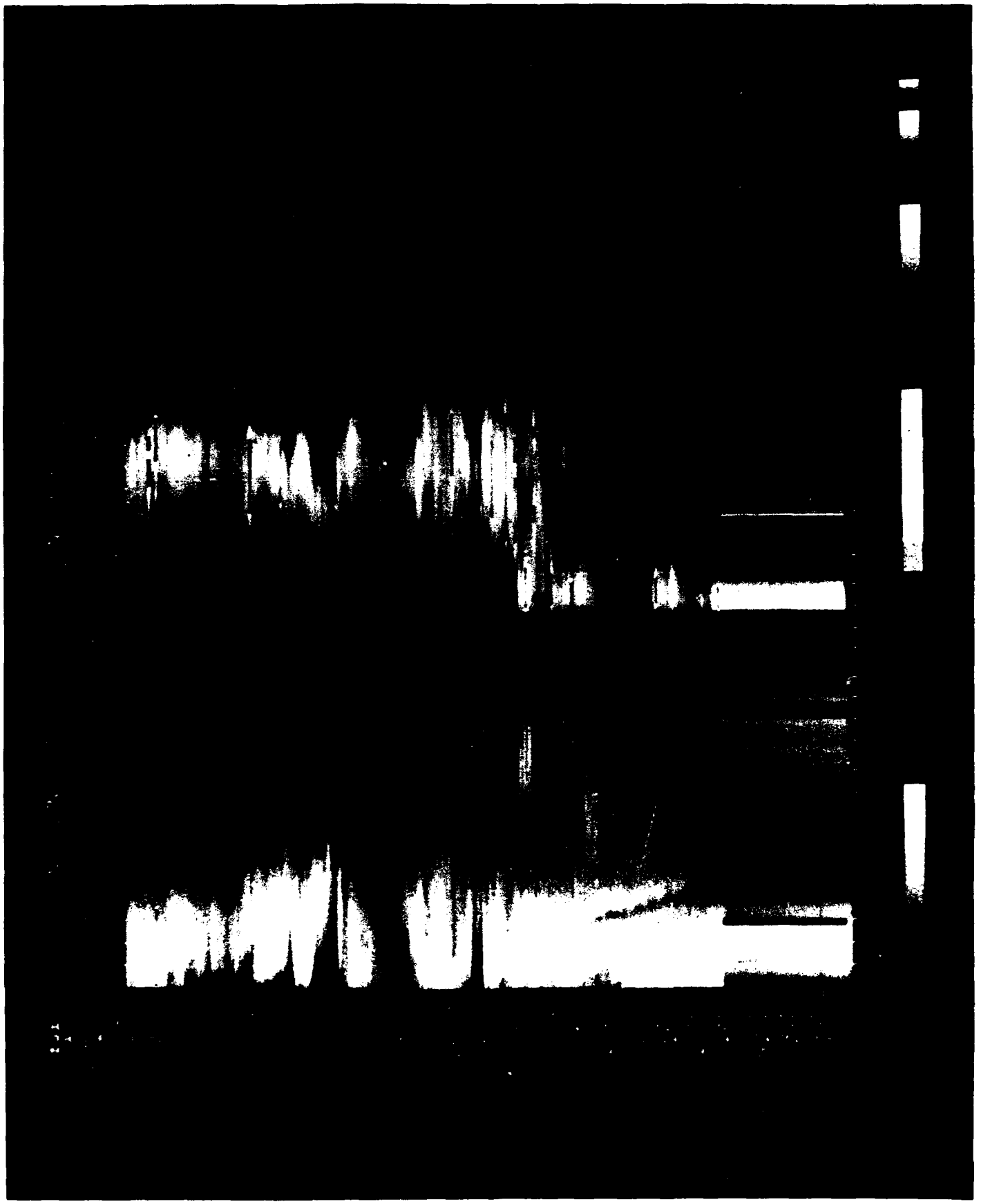
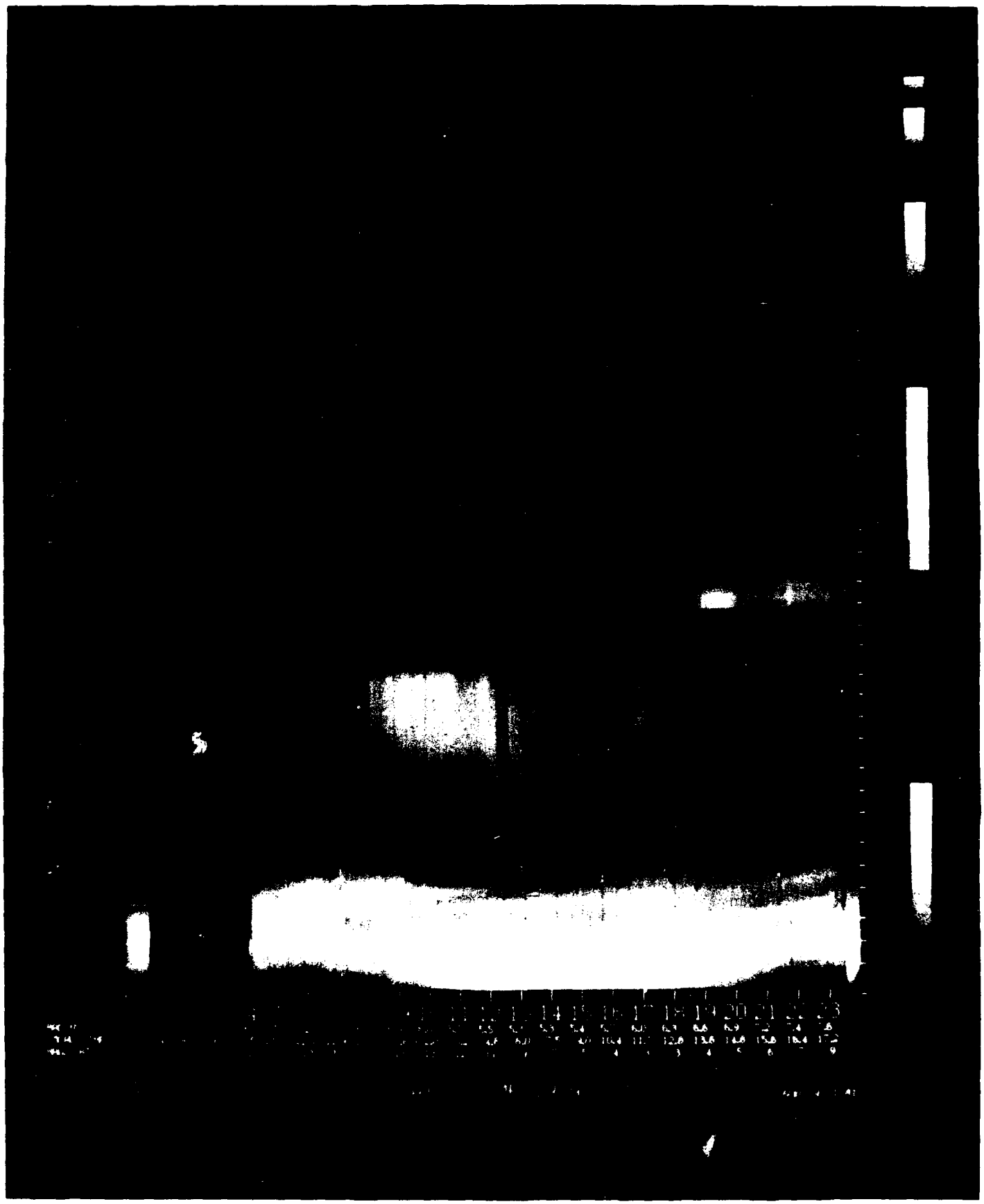
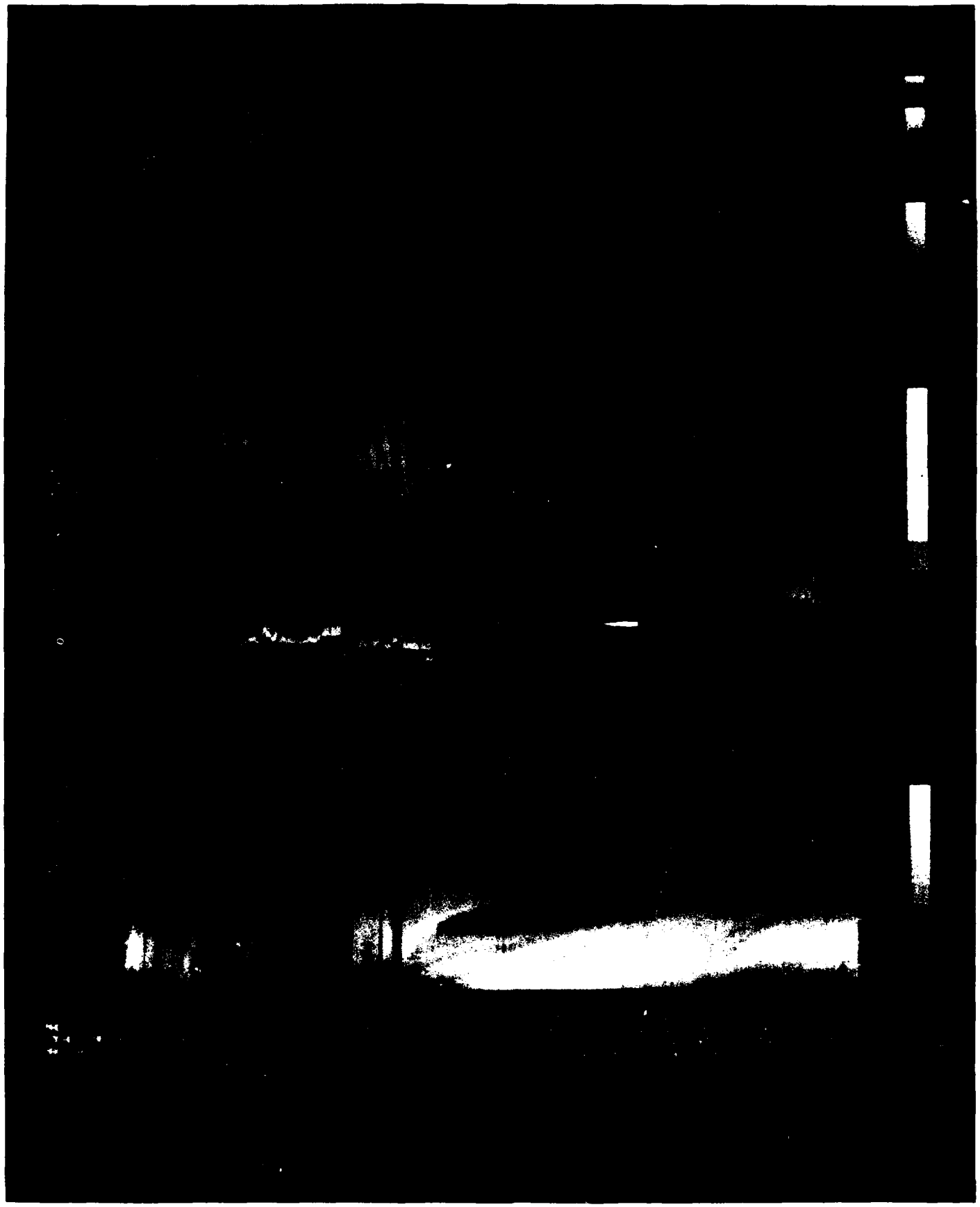
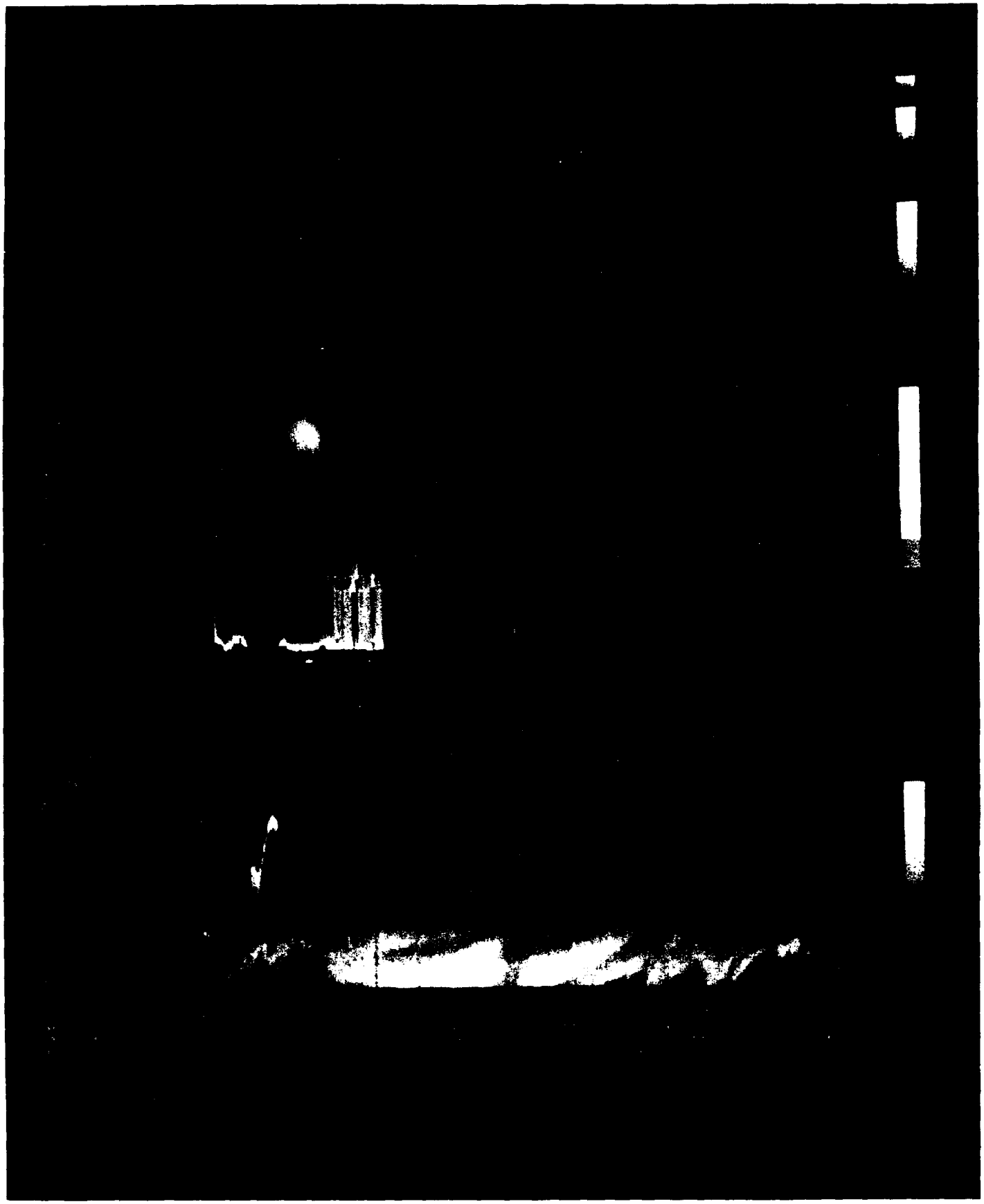
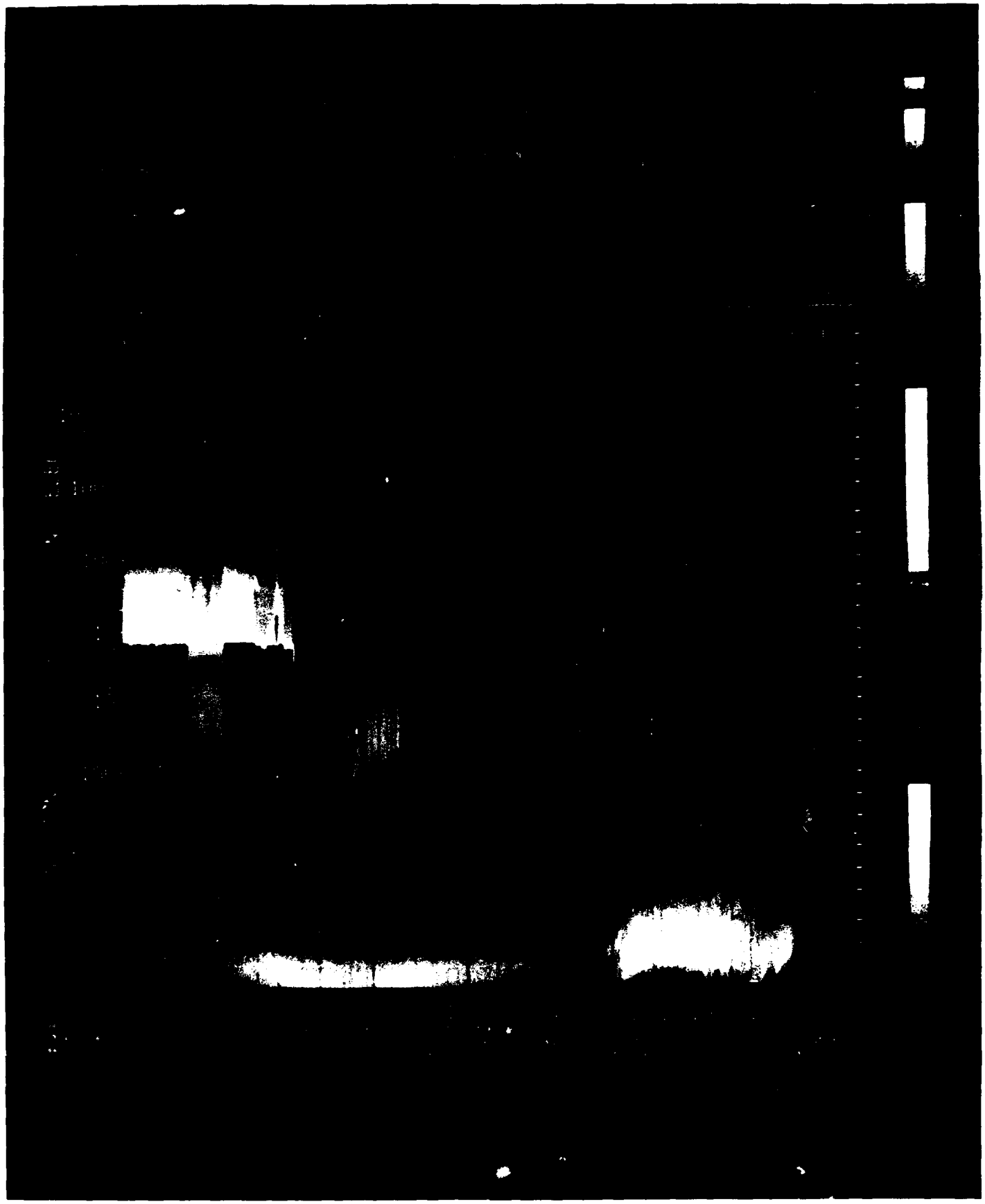


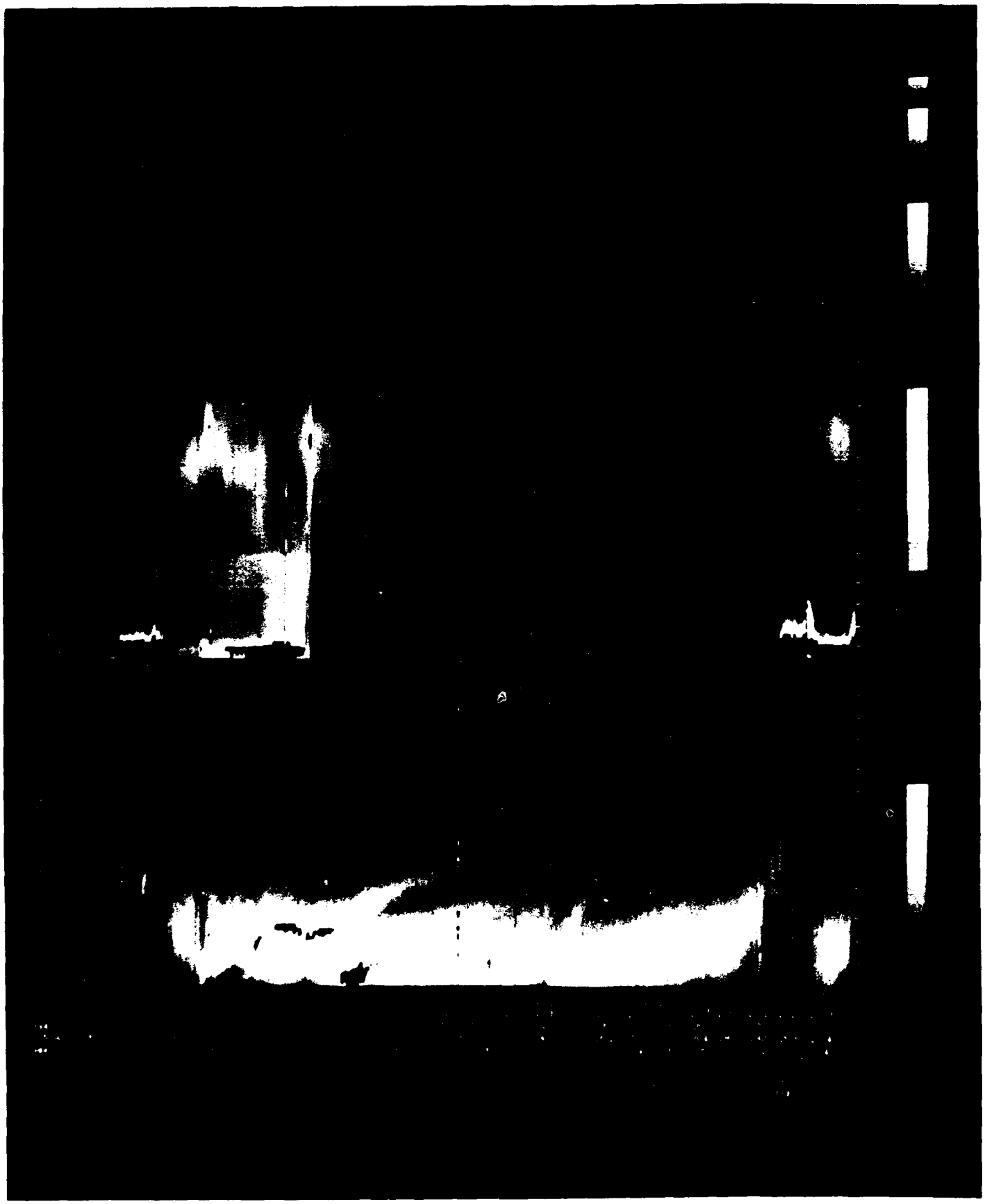


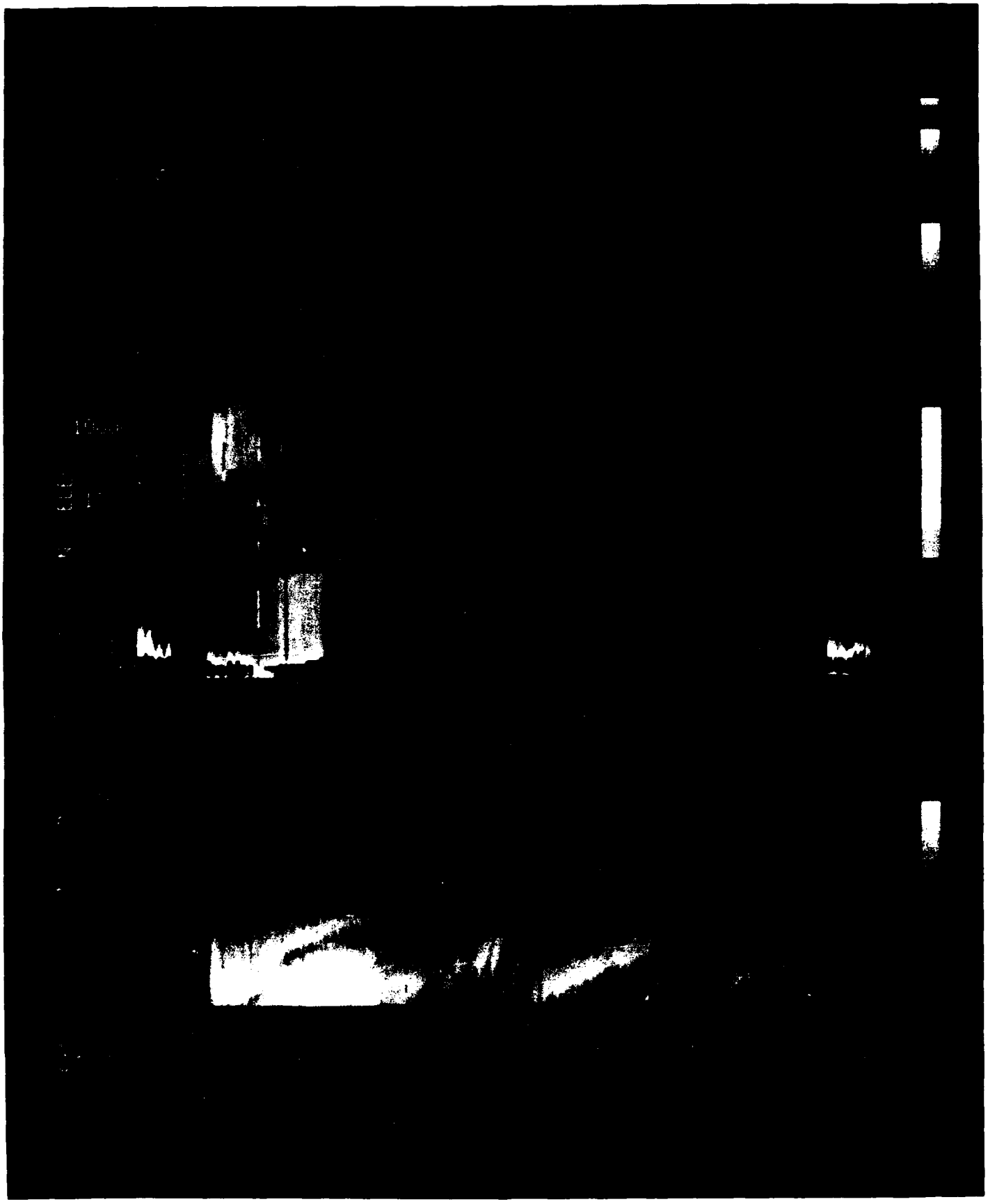


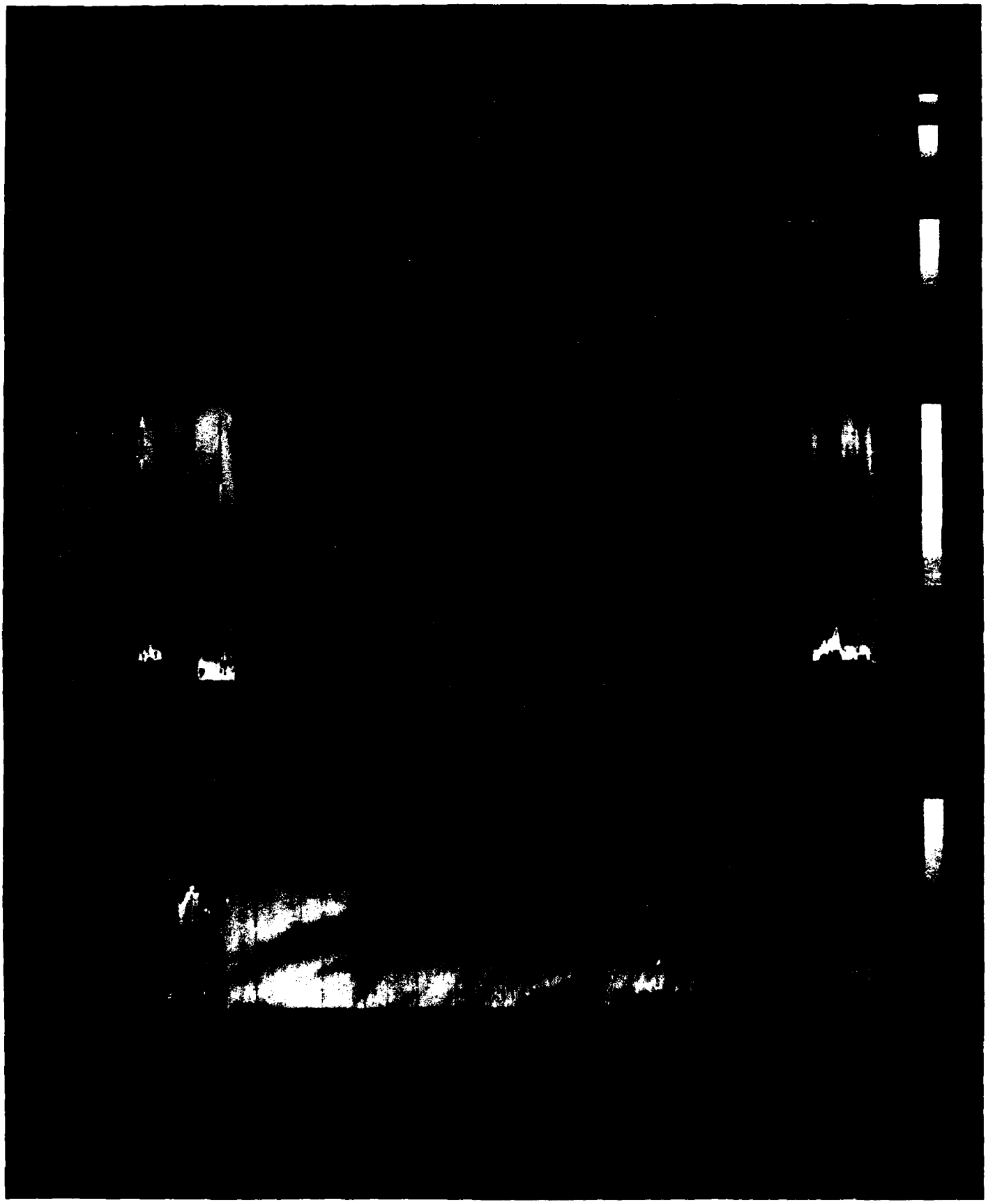


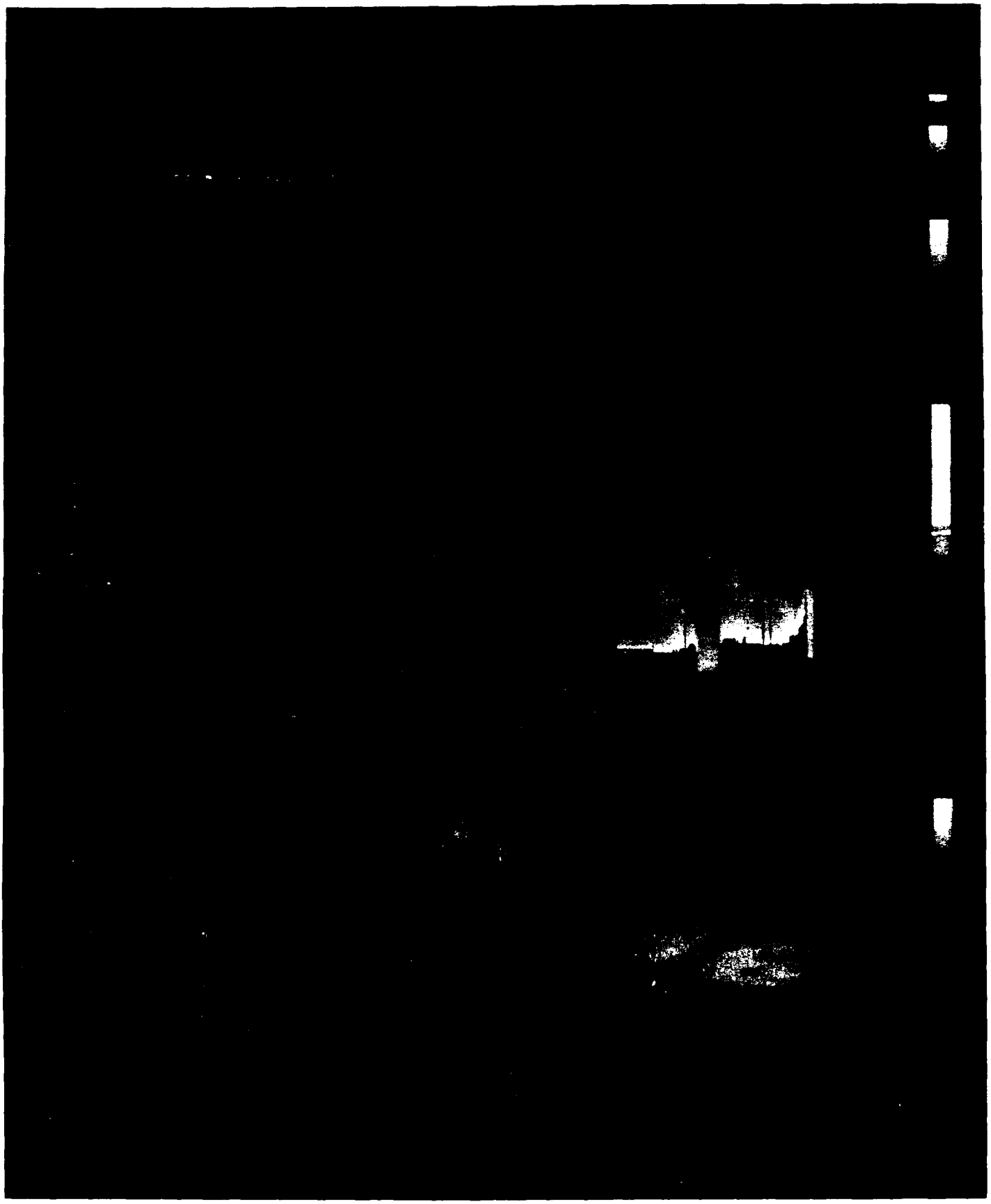


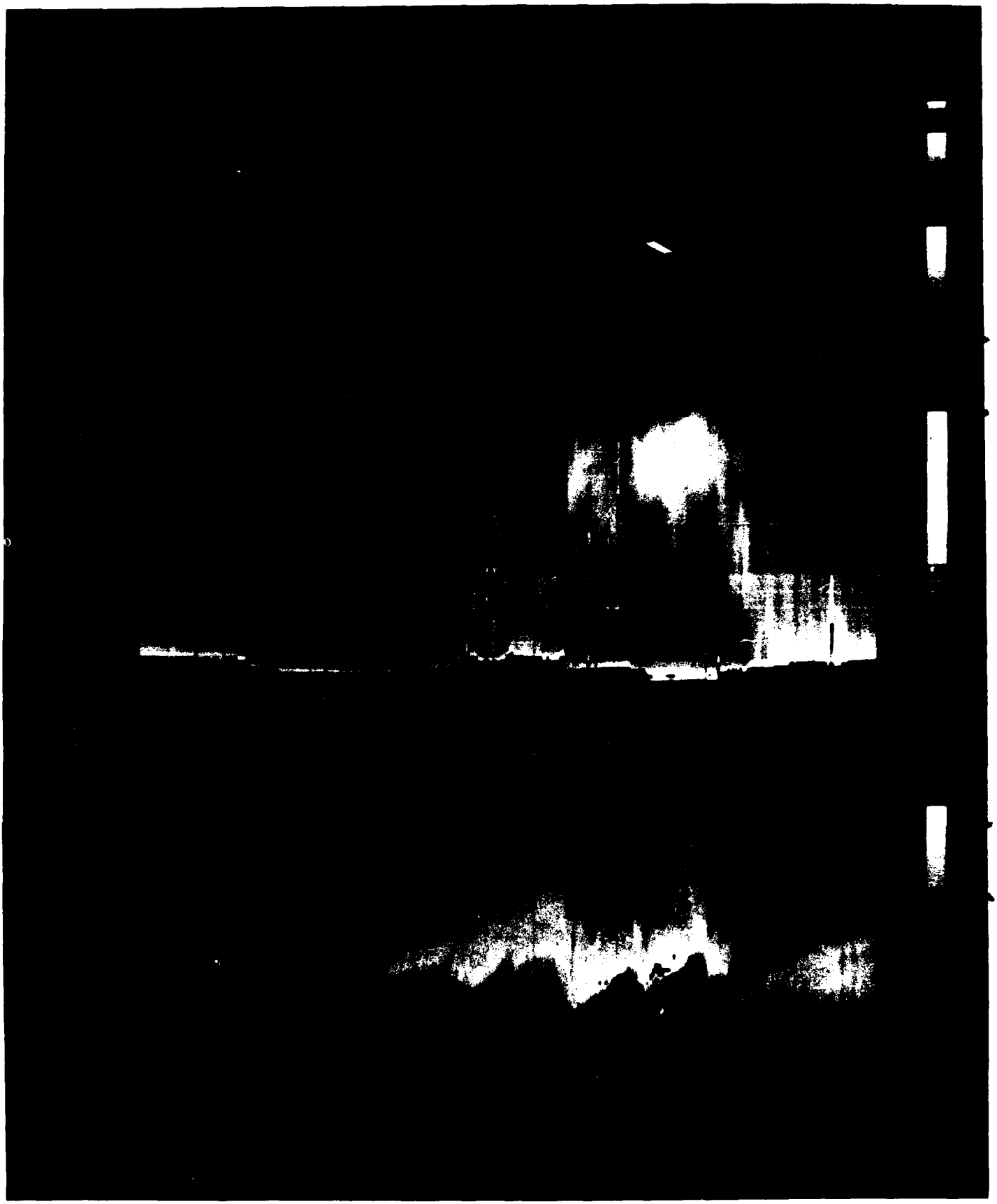


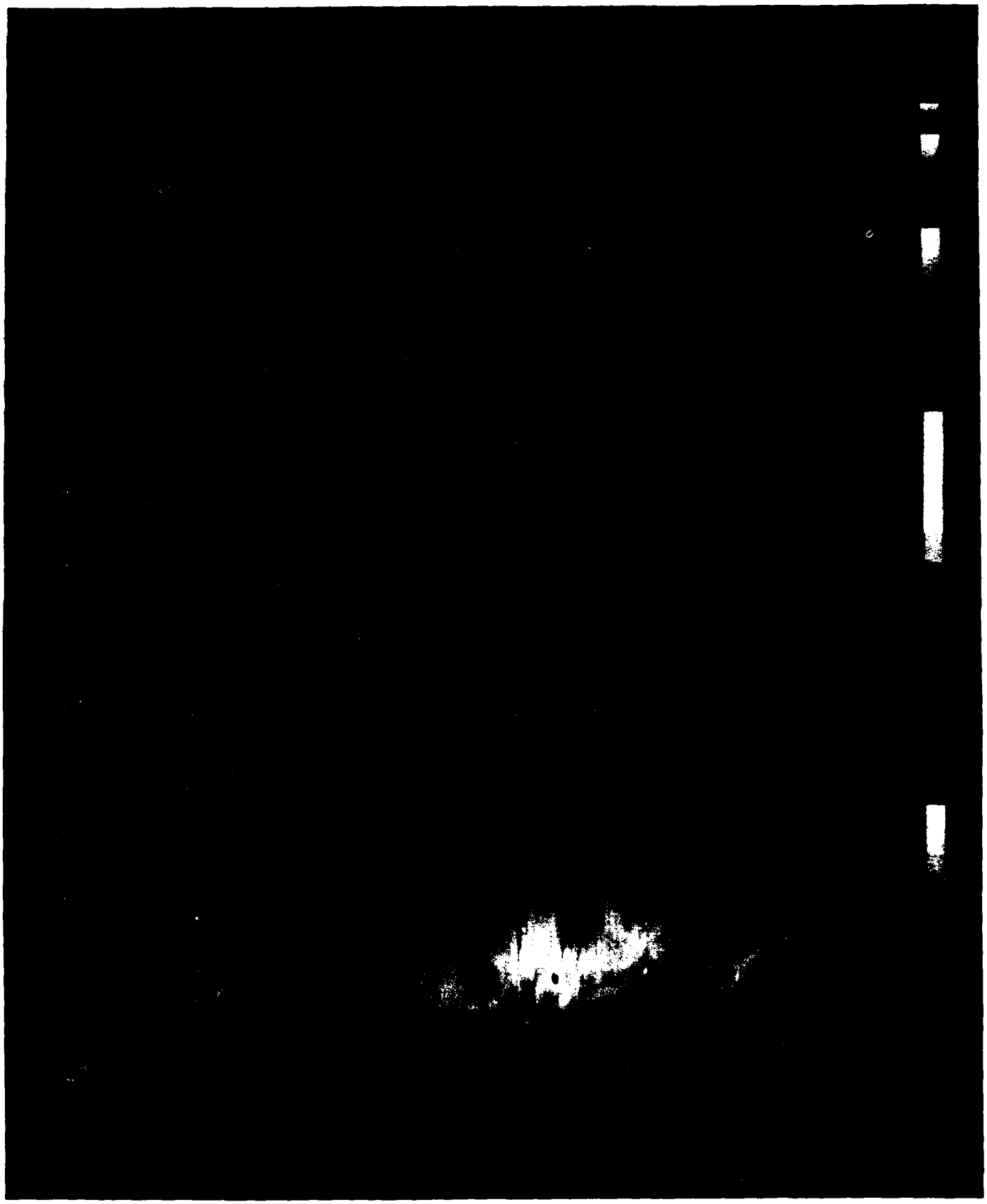


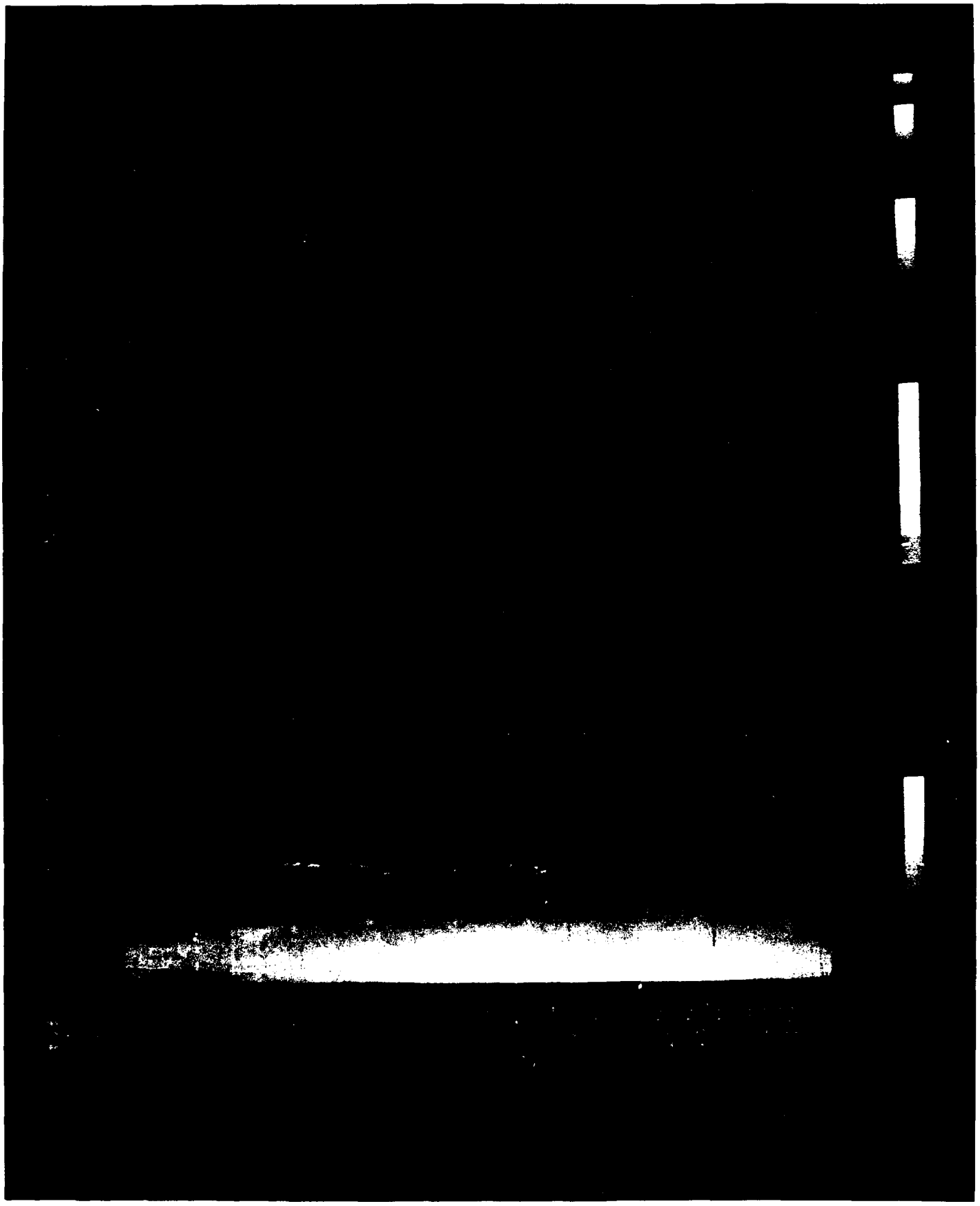


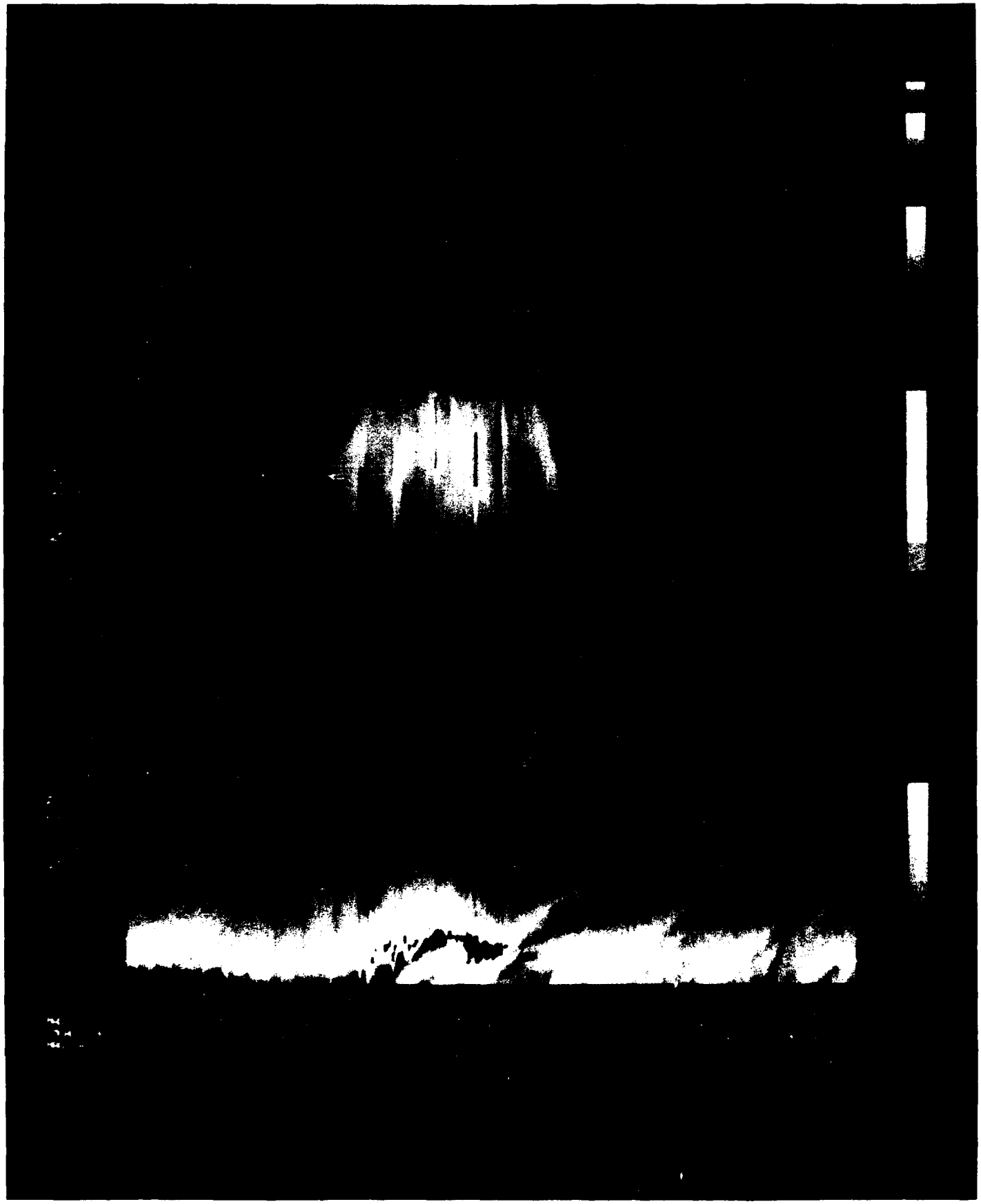


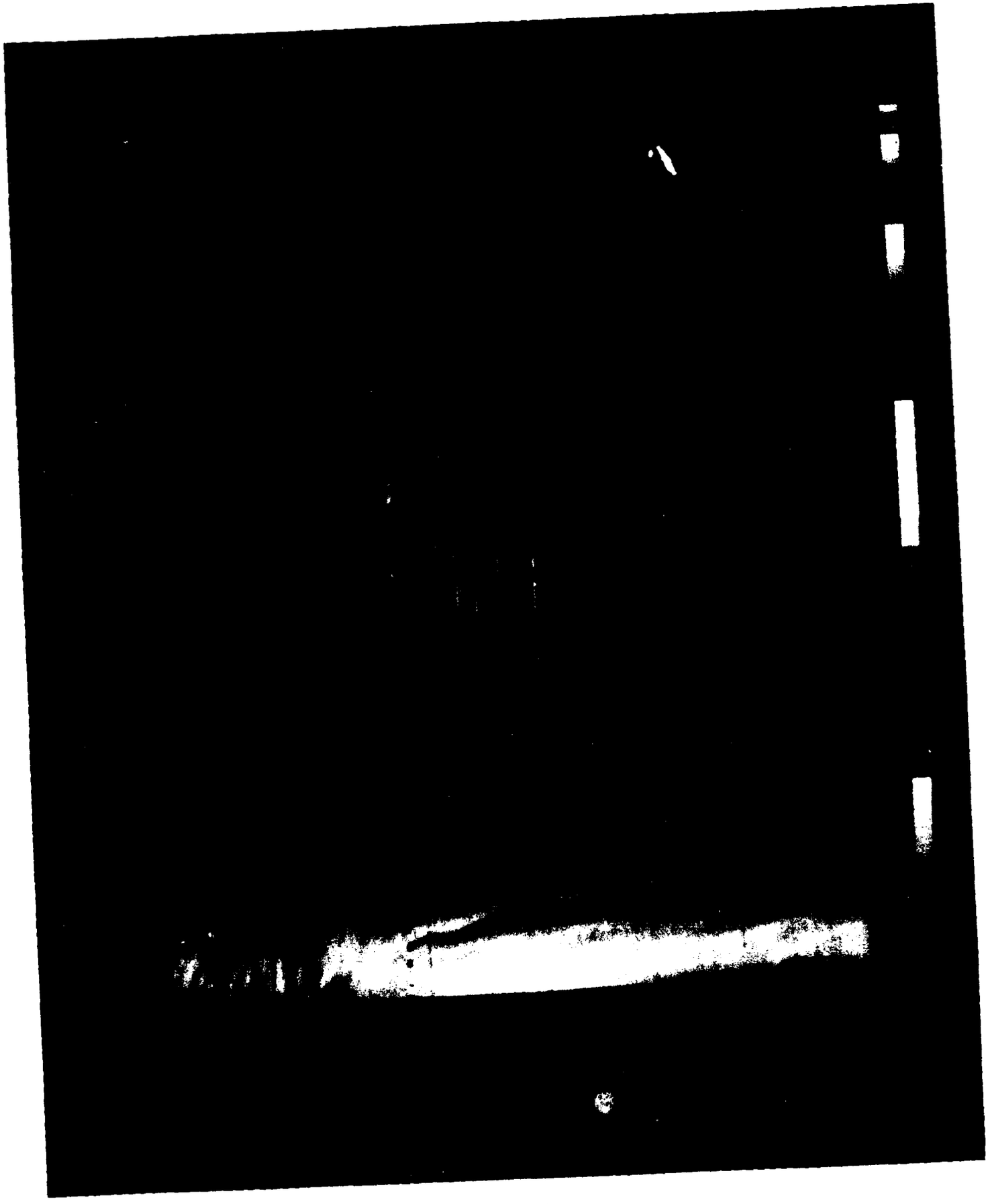


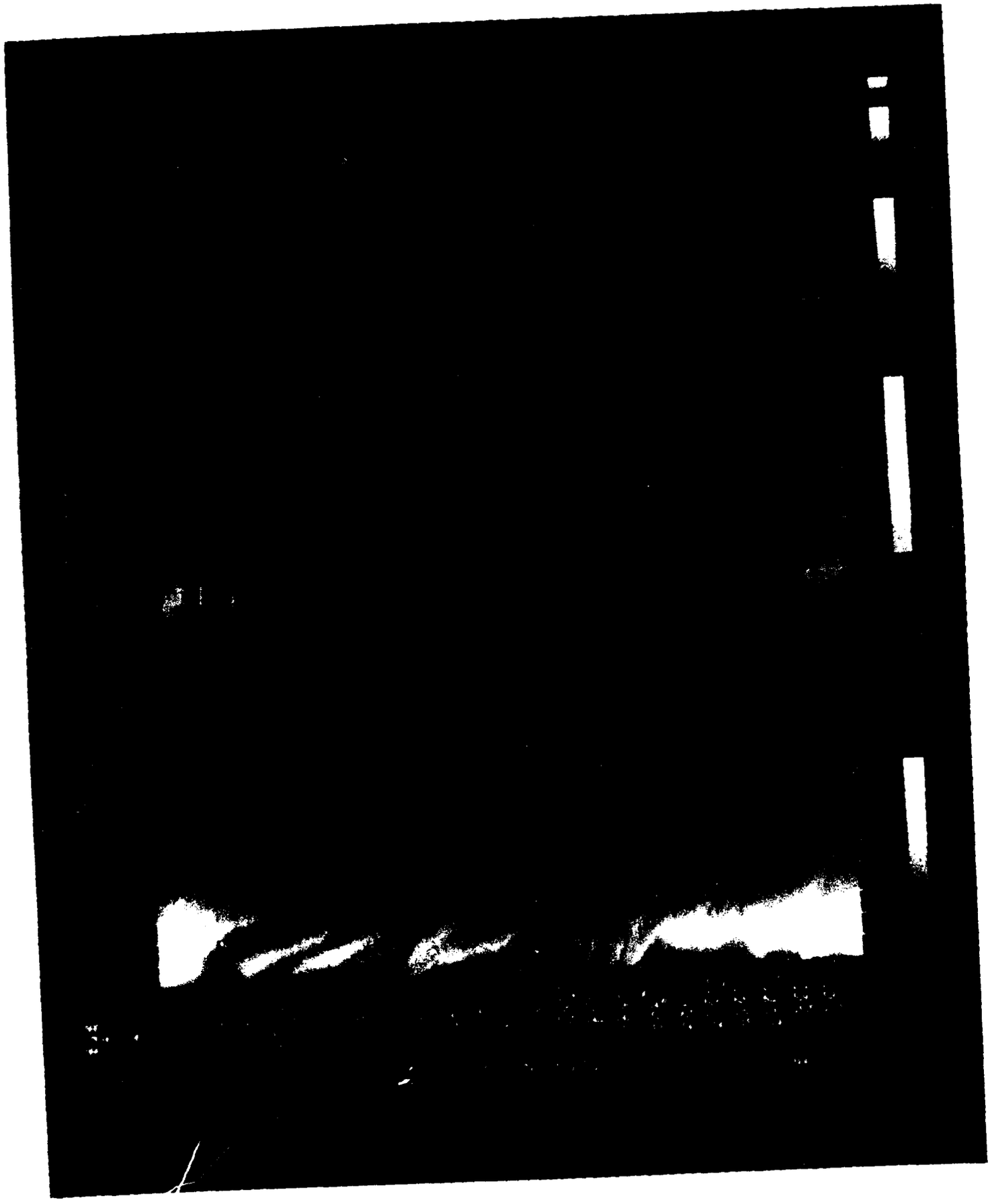


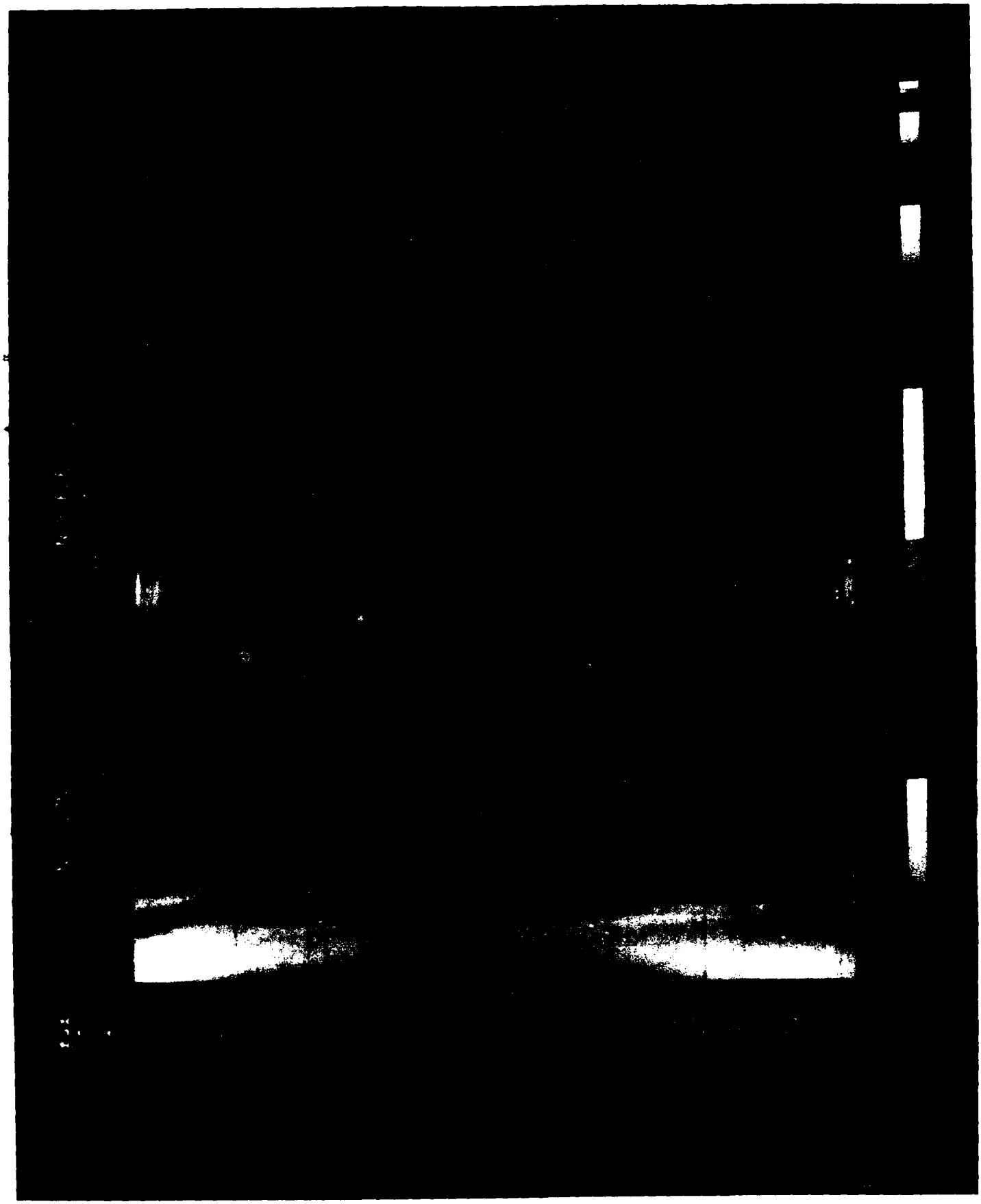


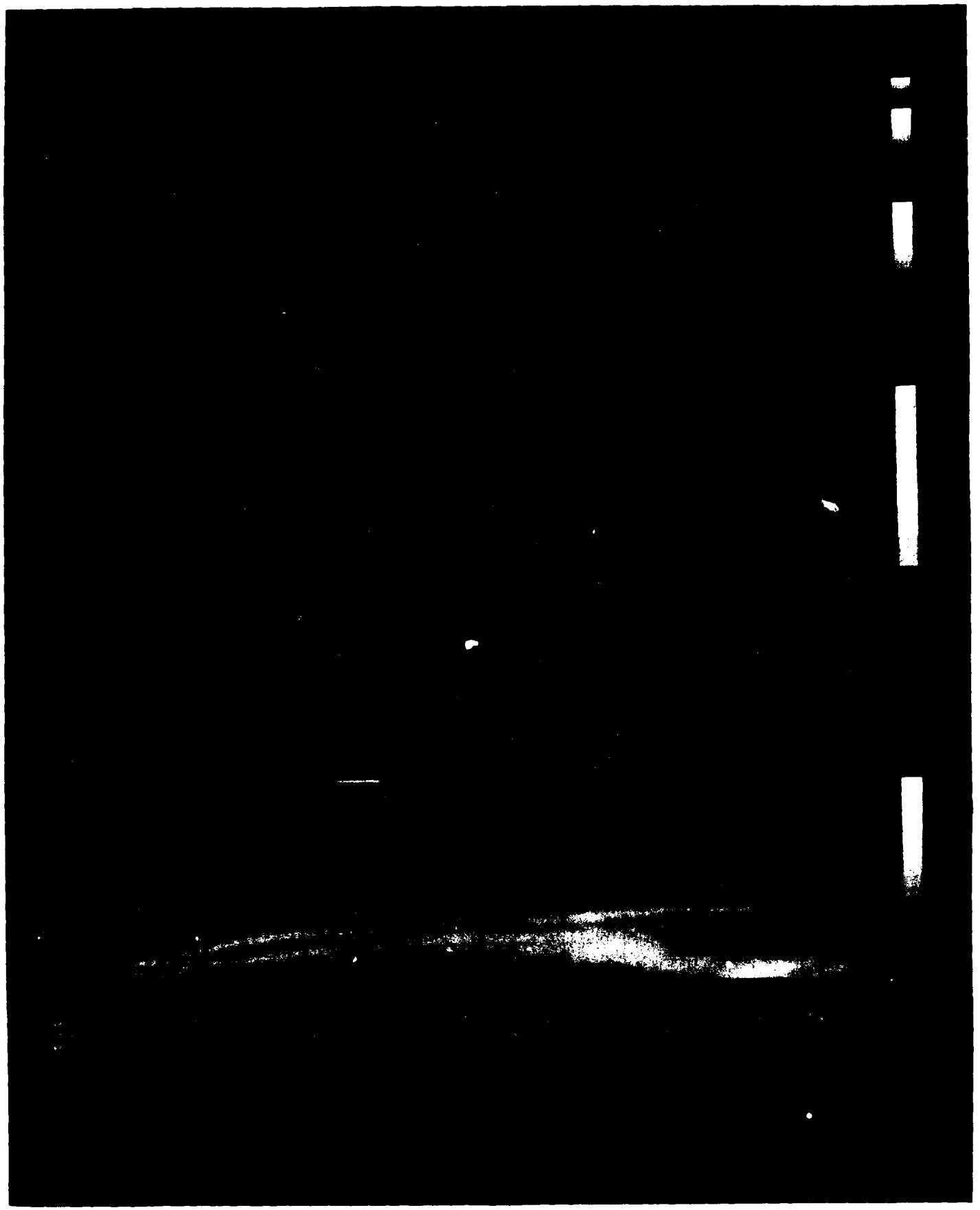


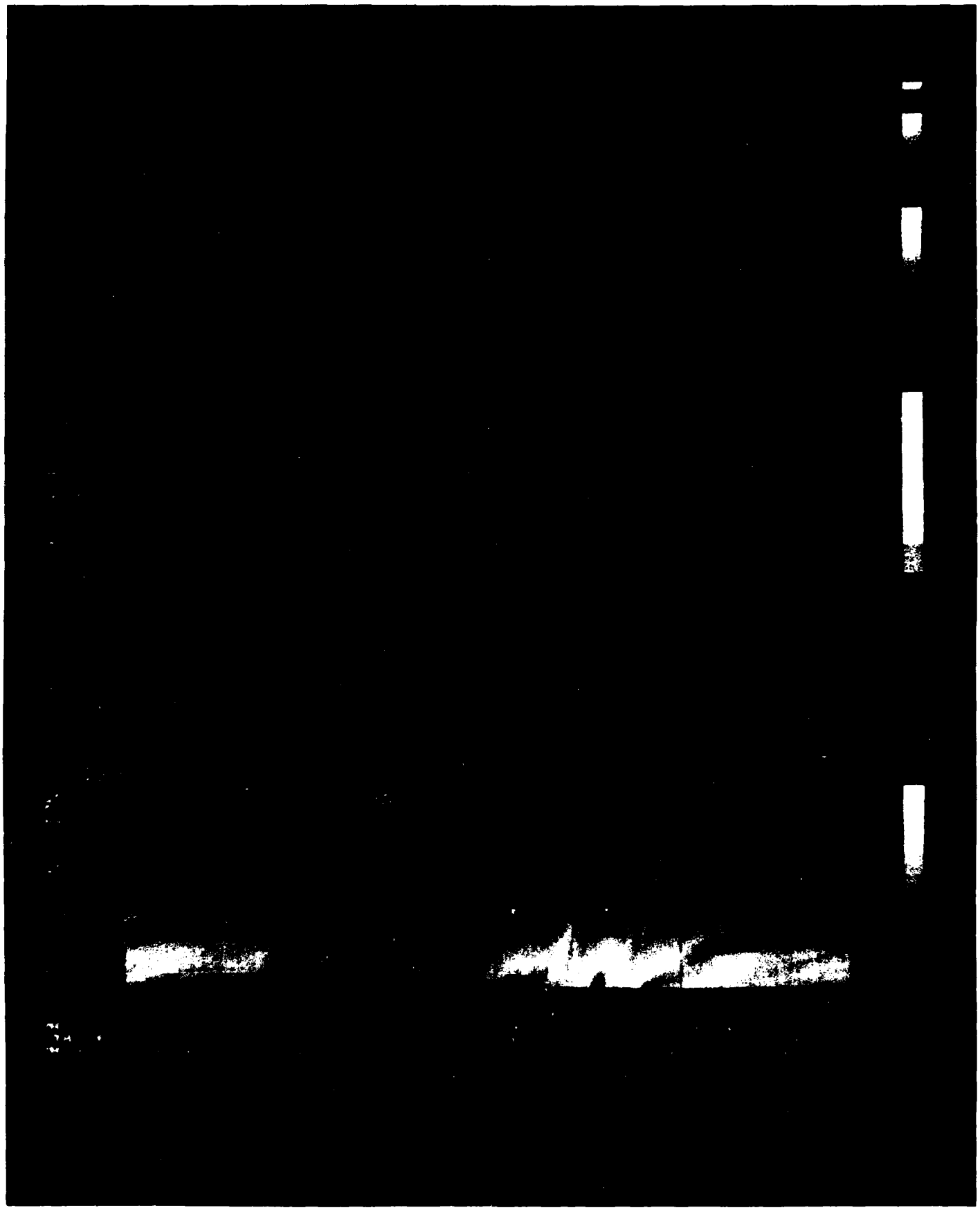


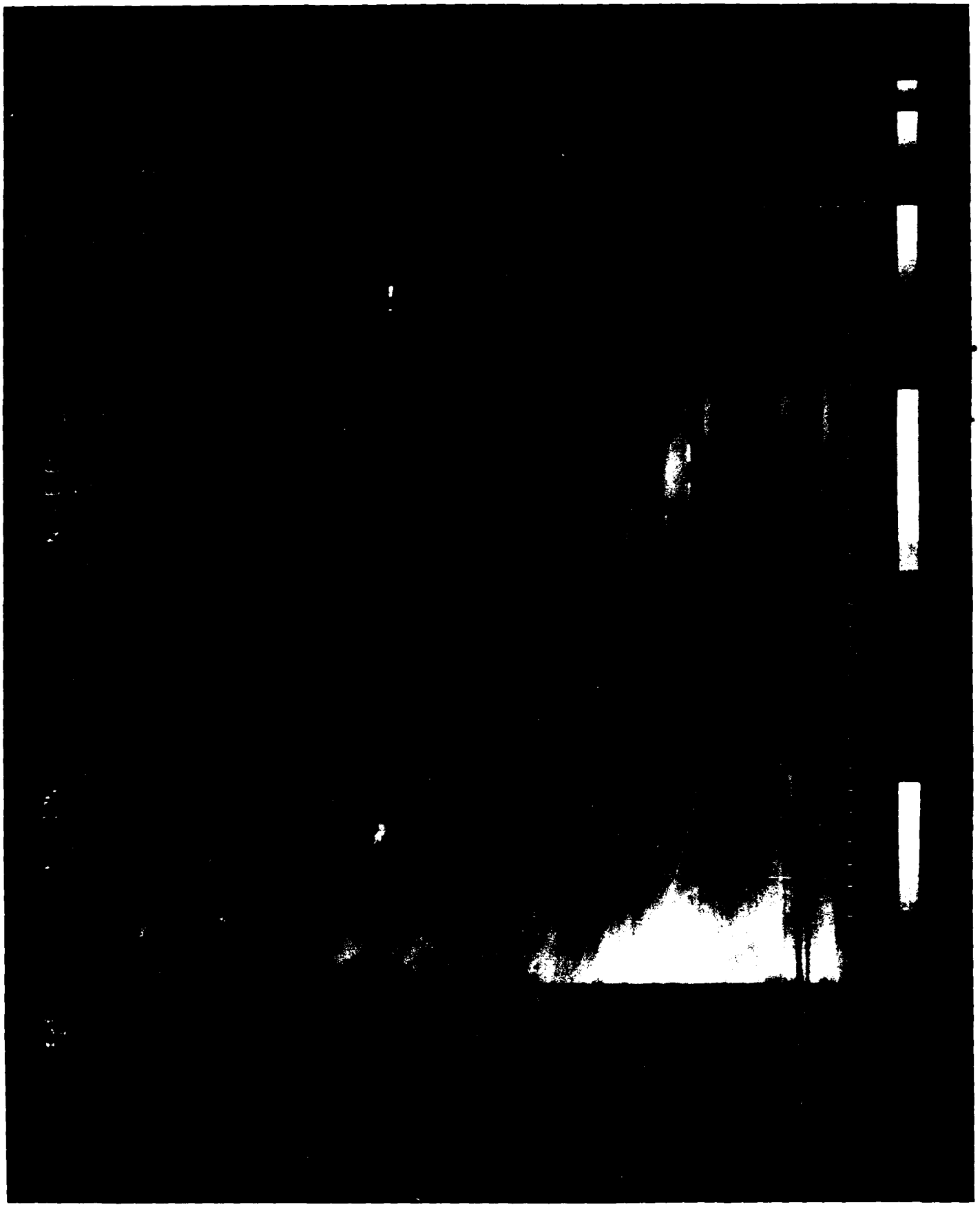


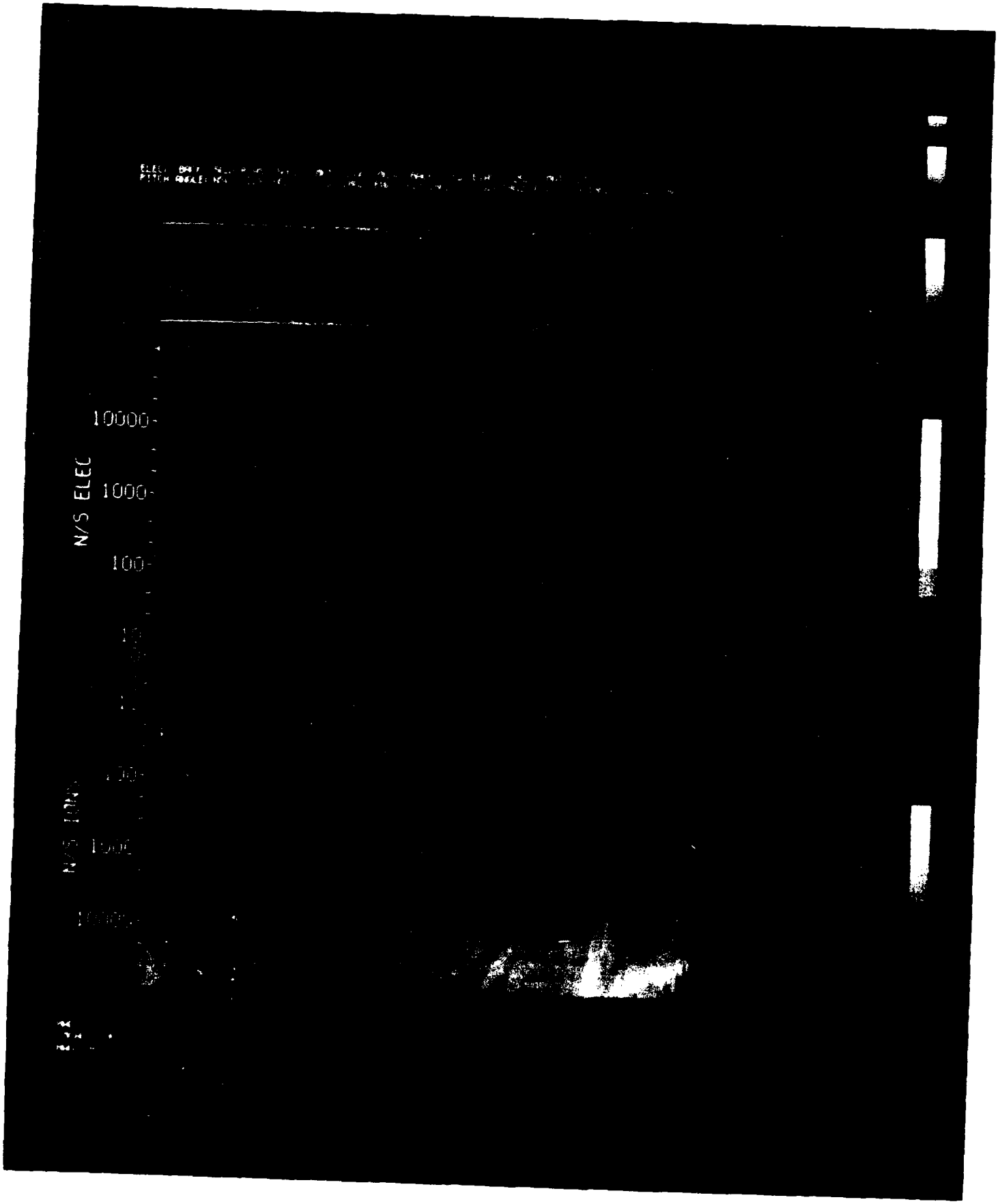


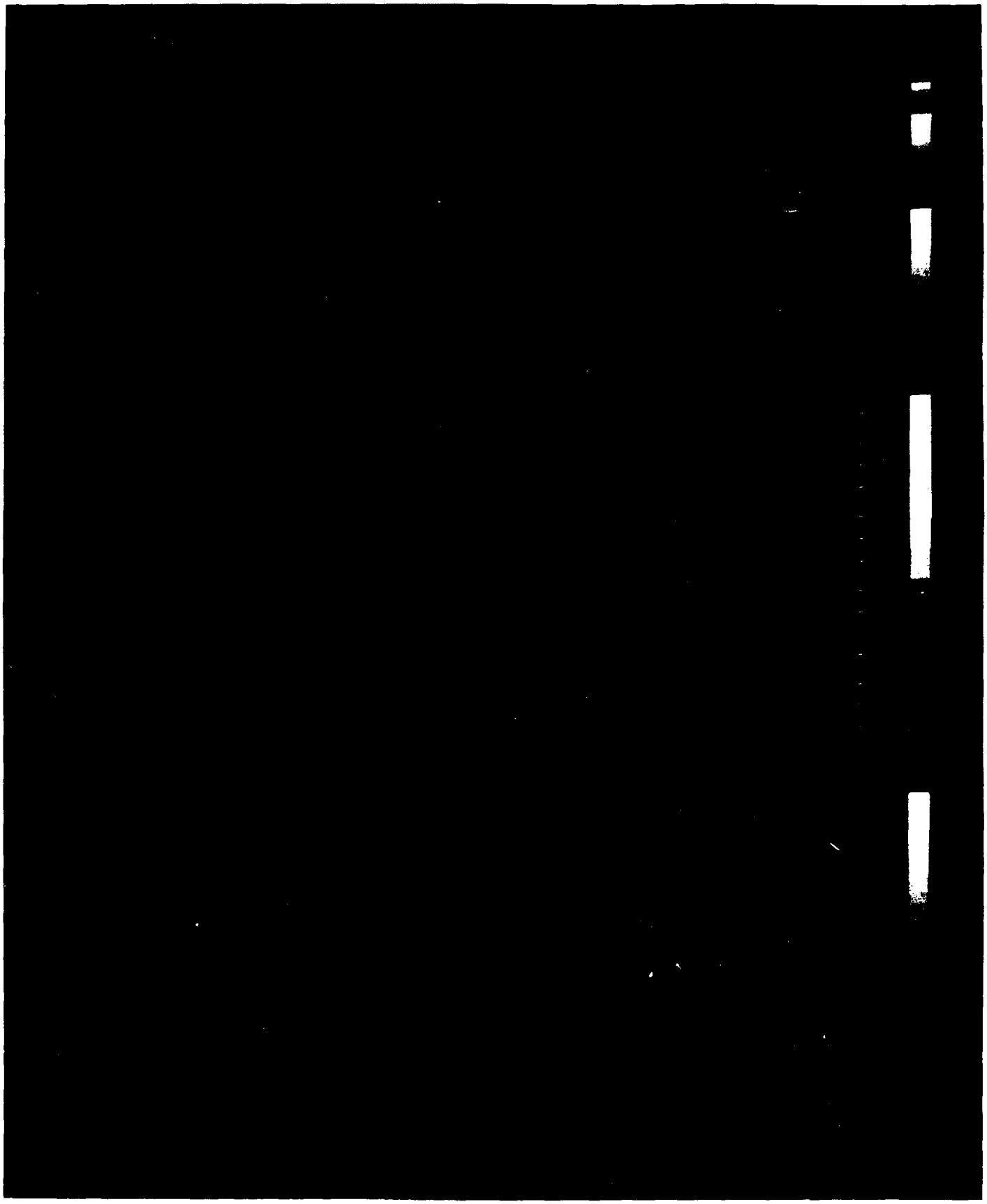


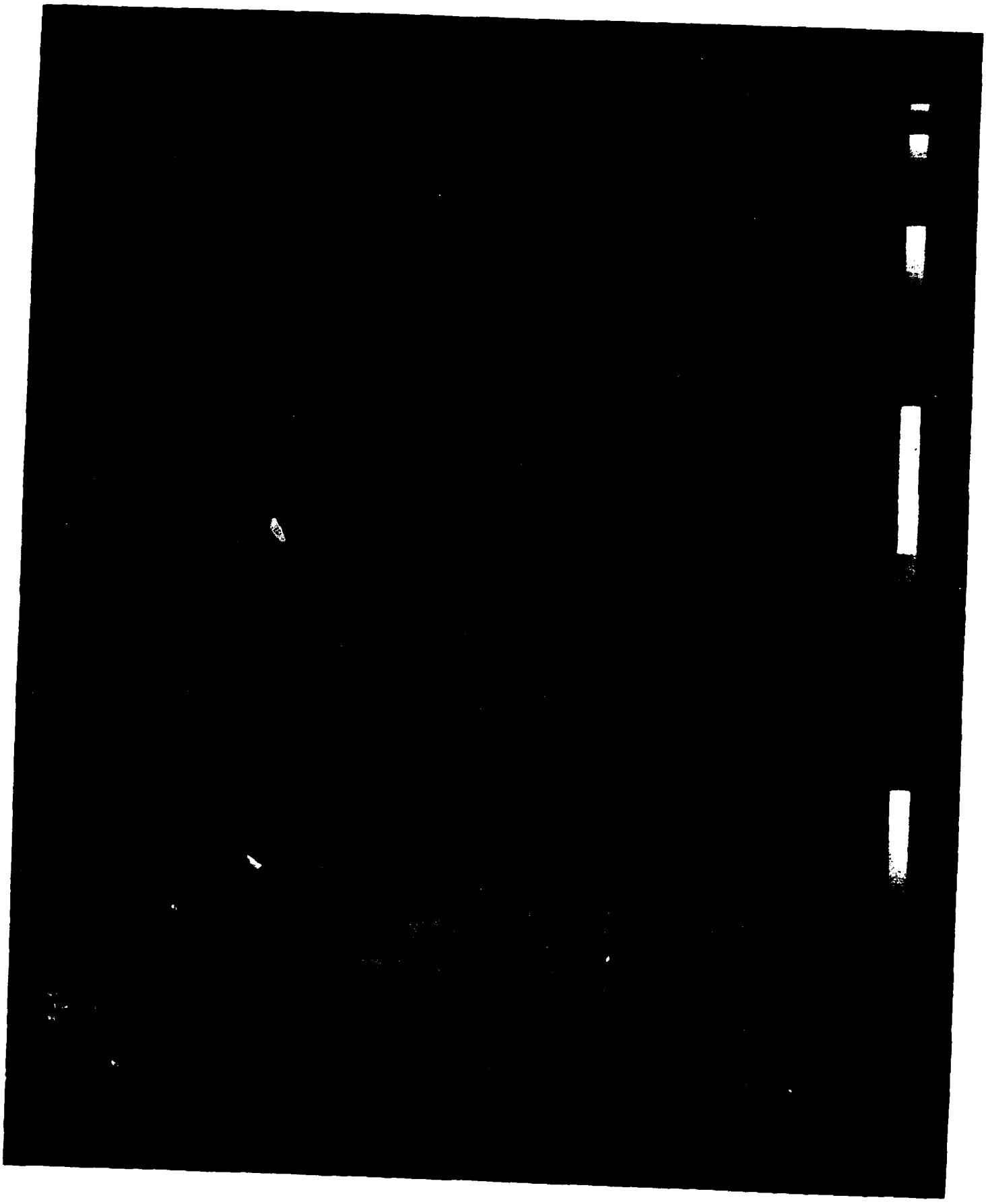


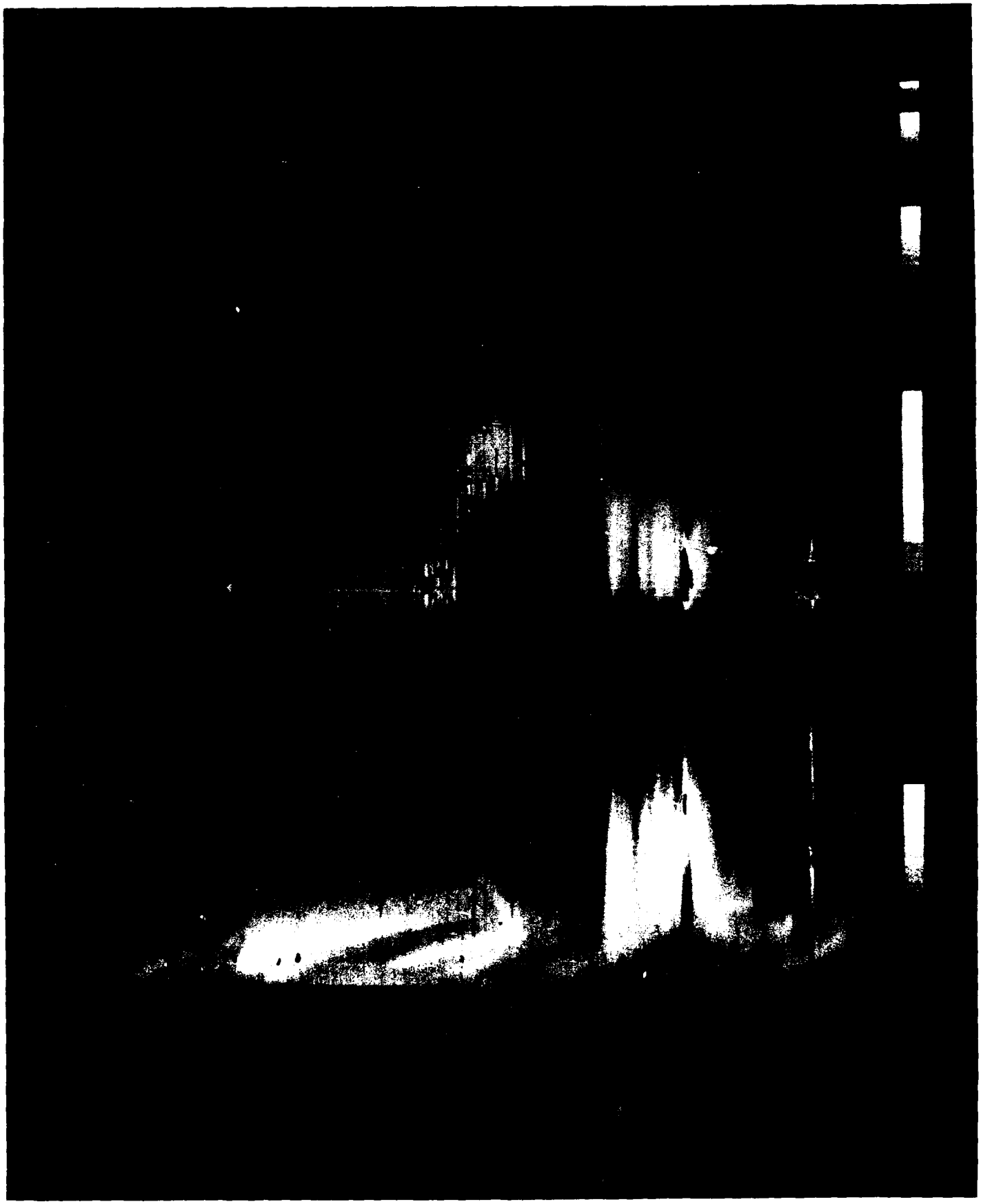


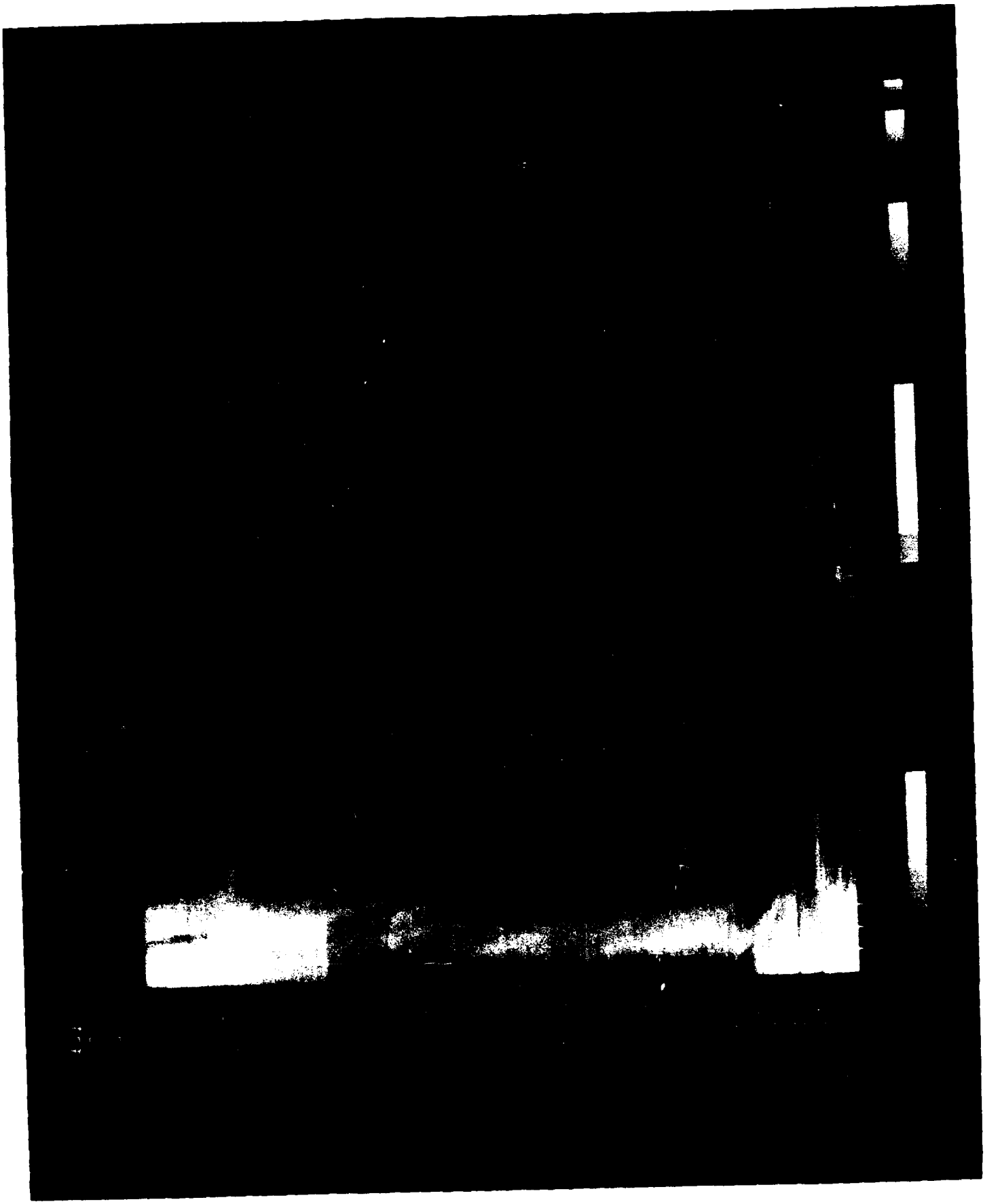


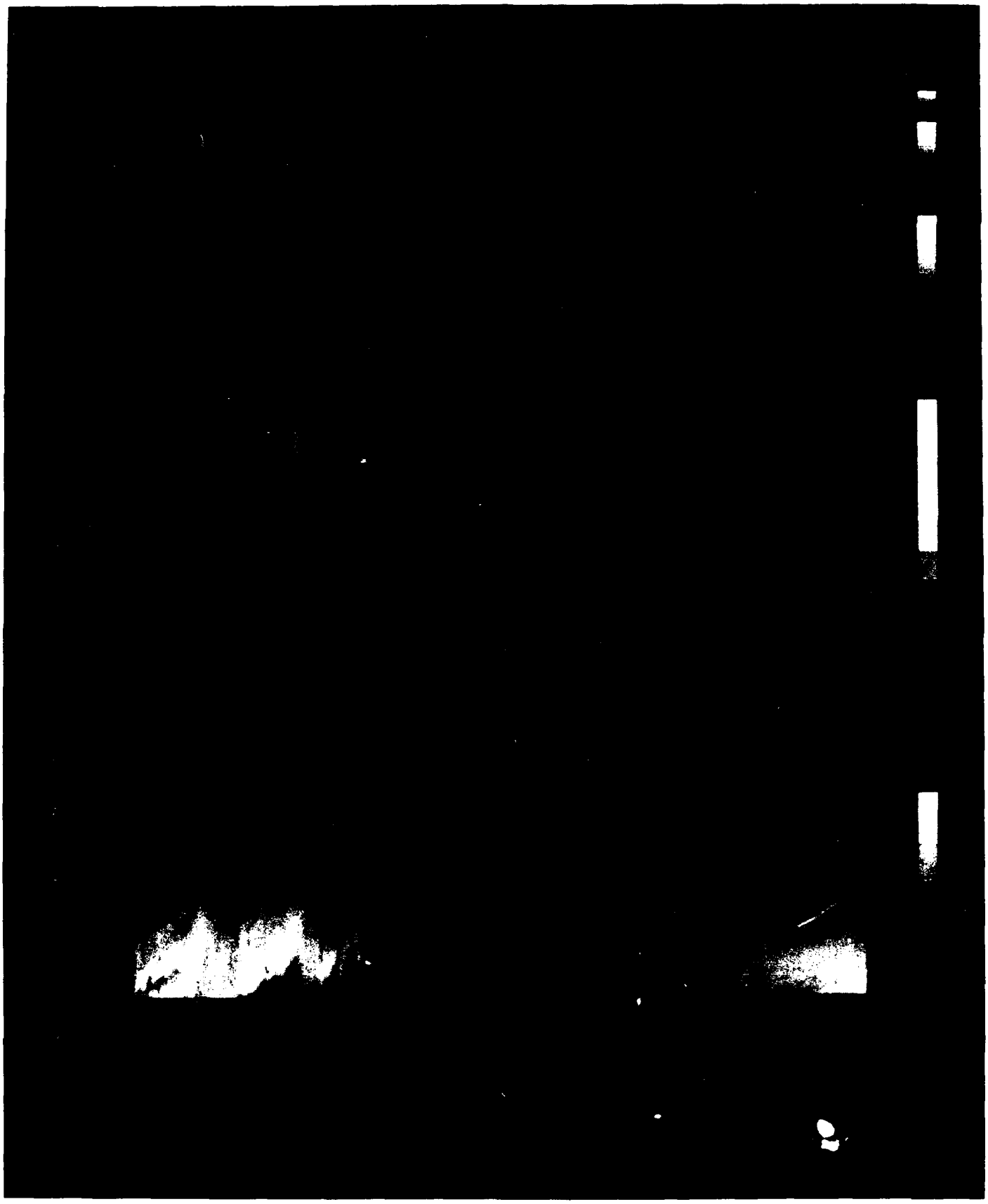

10000
1000
100
N/S ELEC

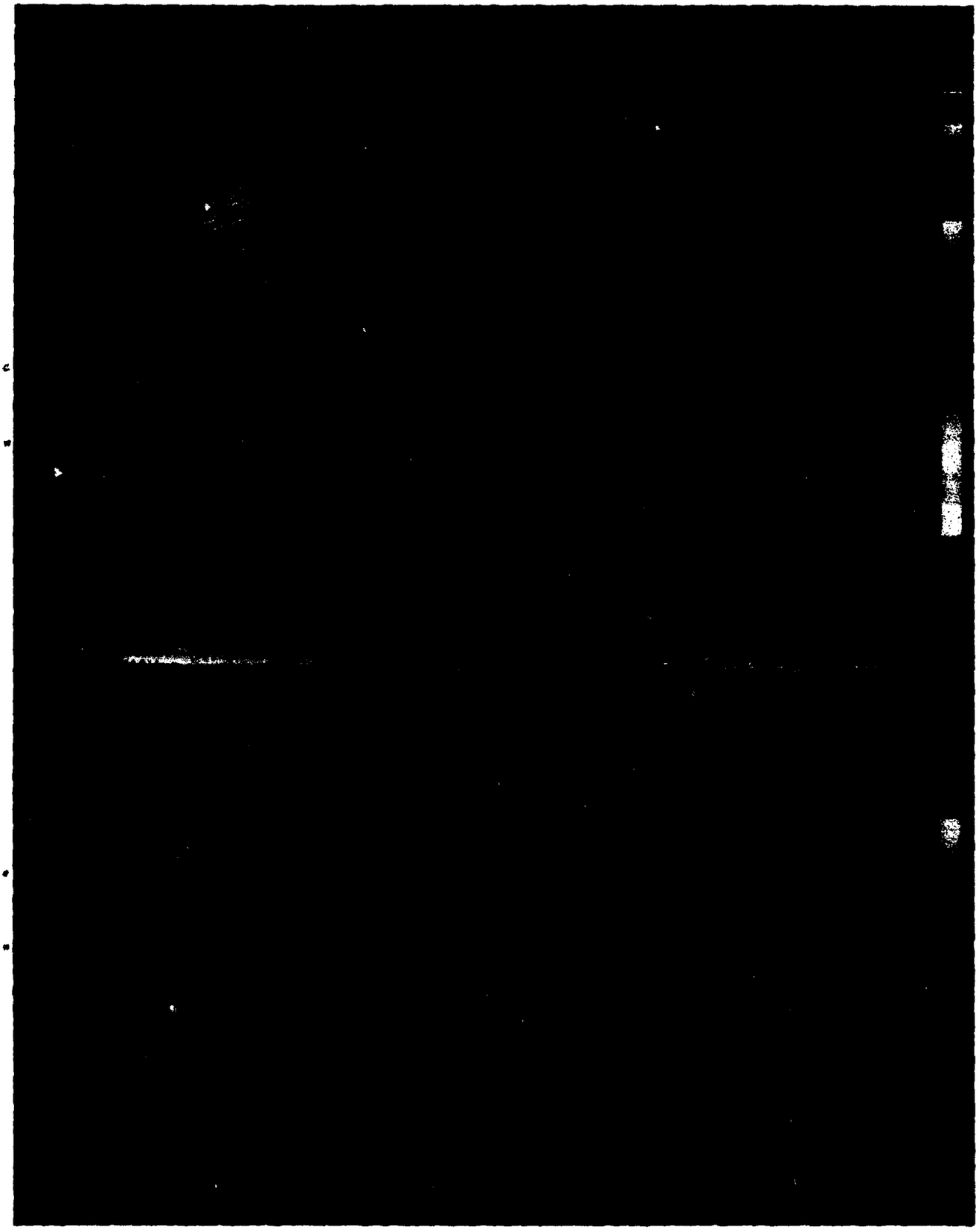


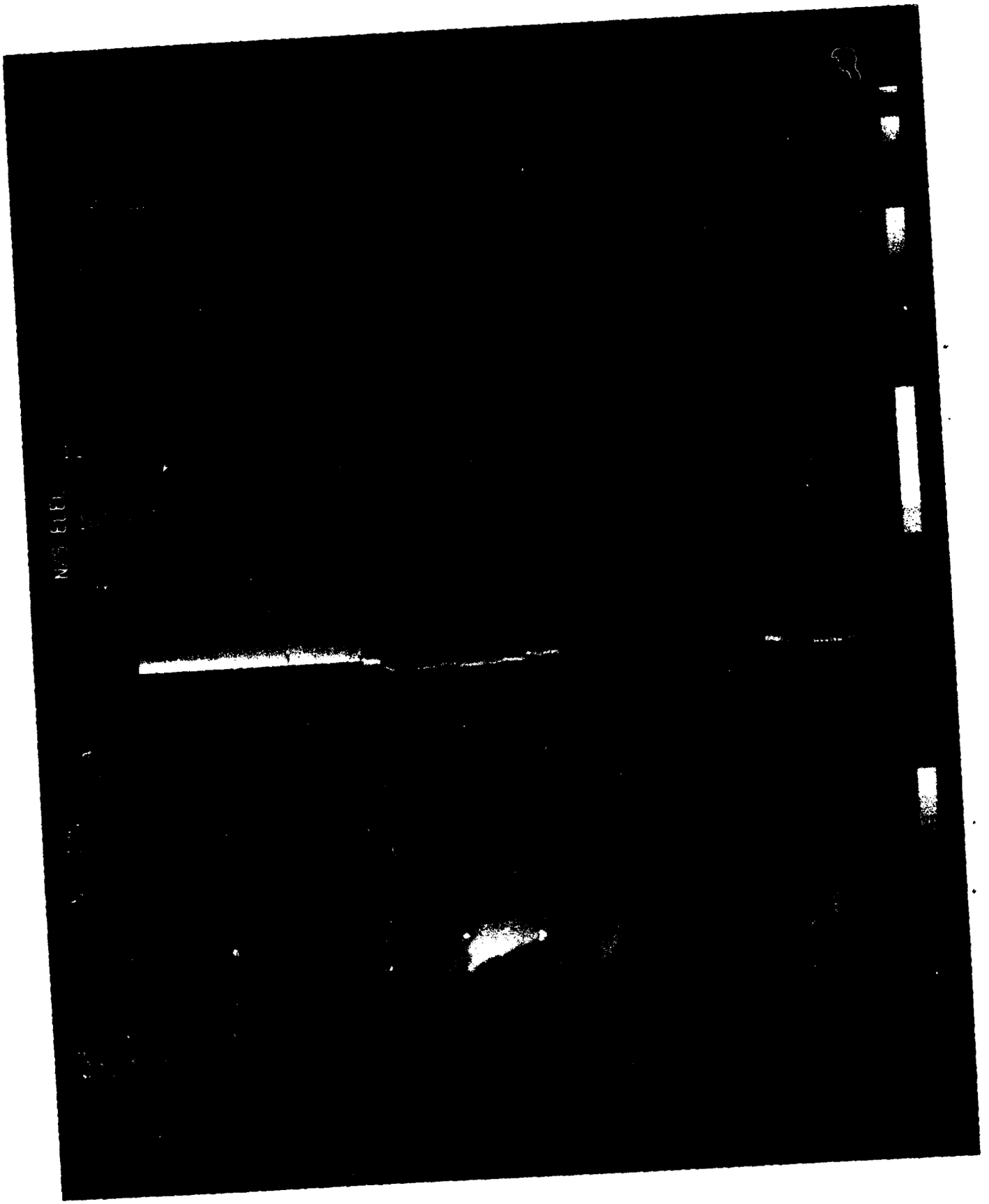


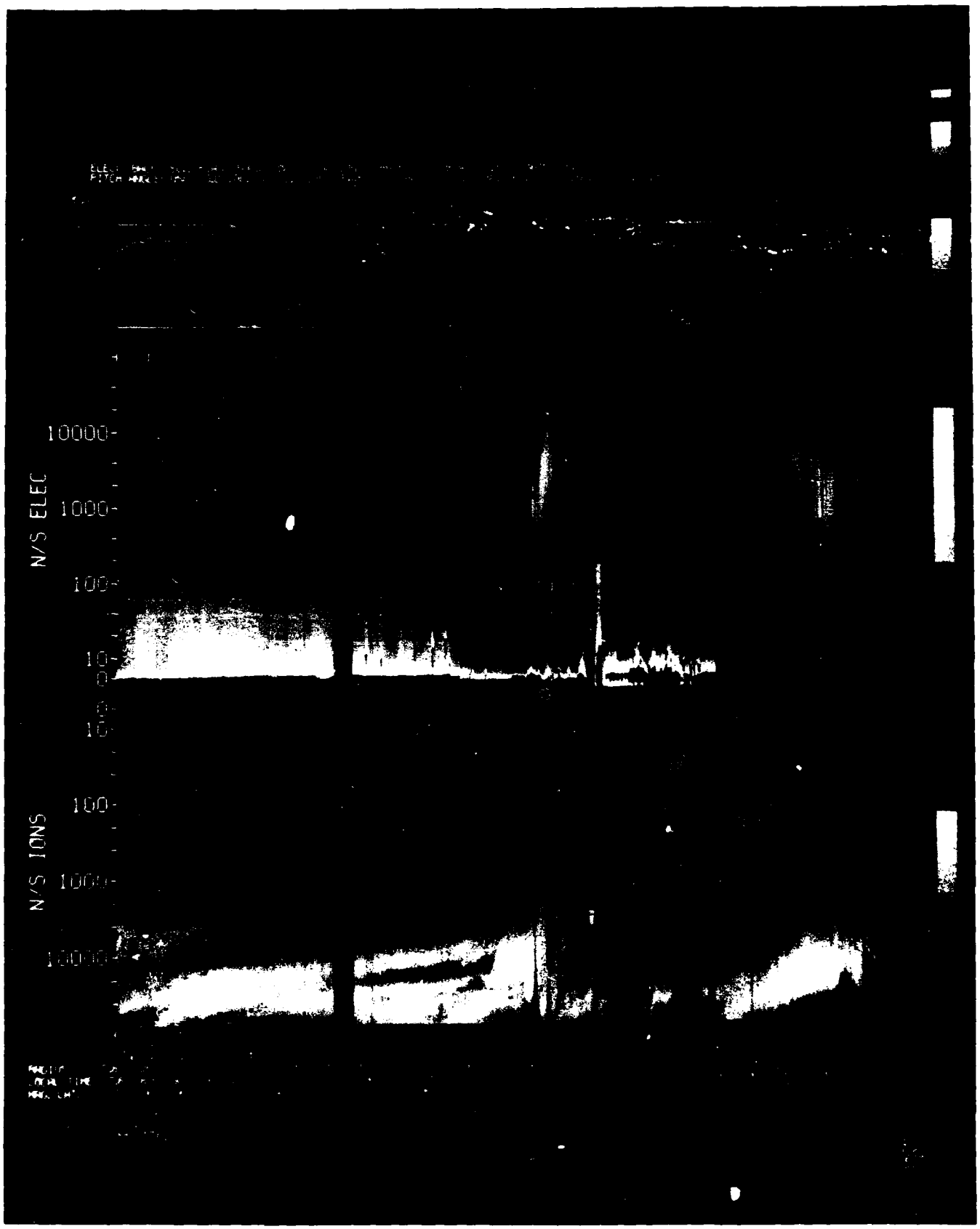








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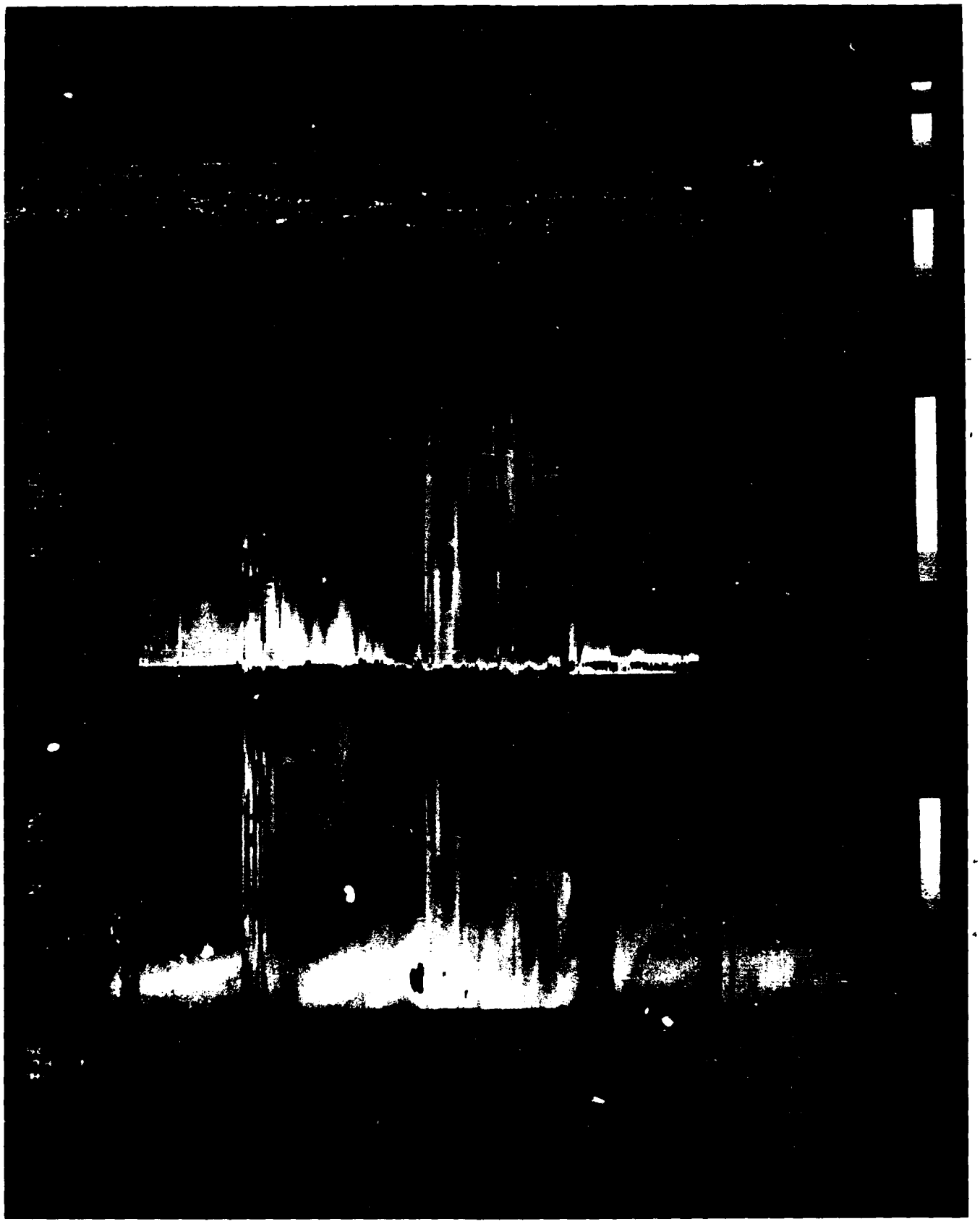
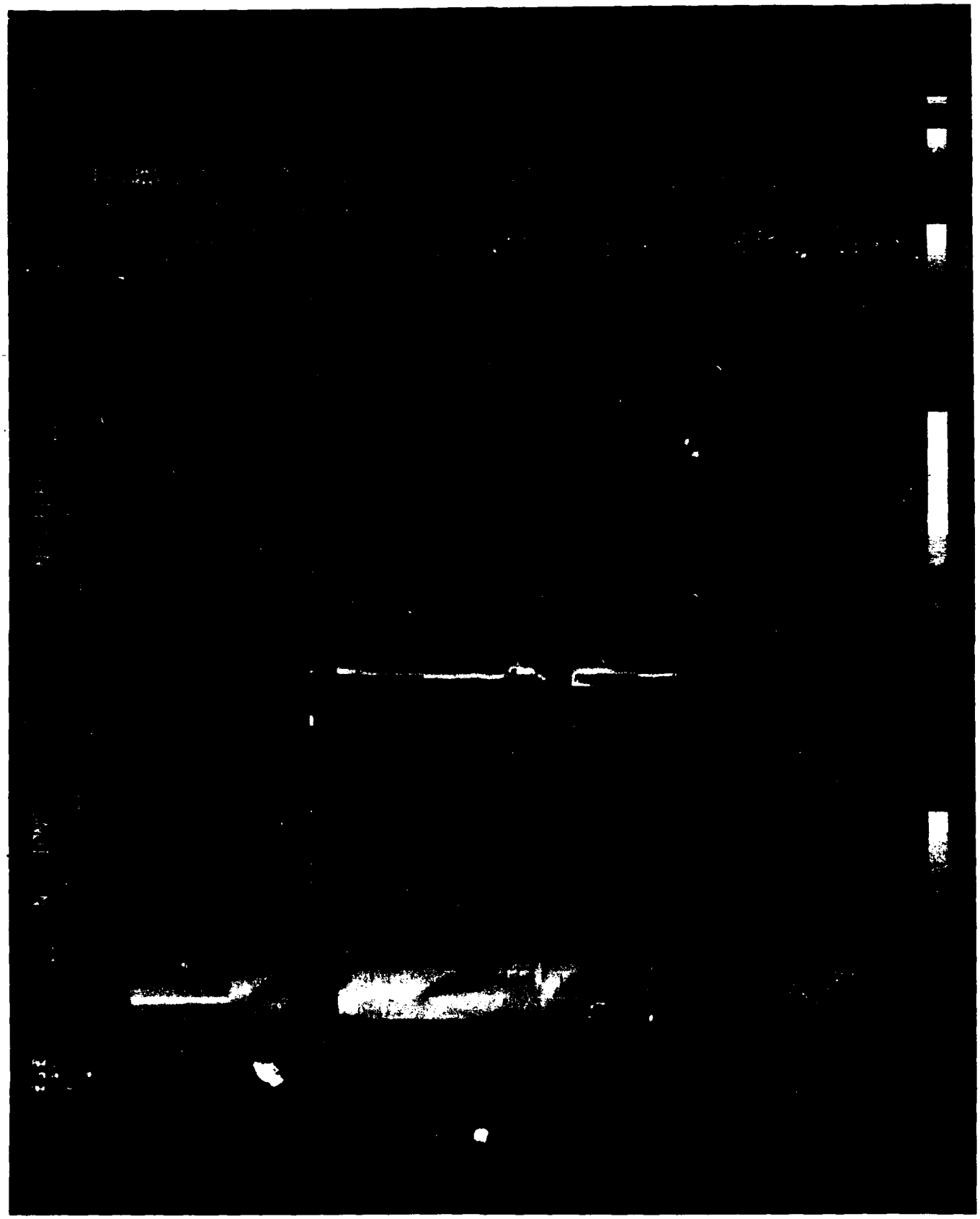
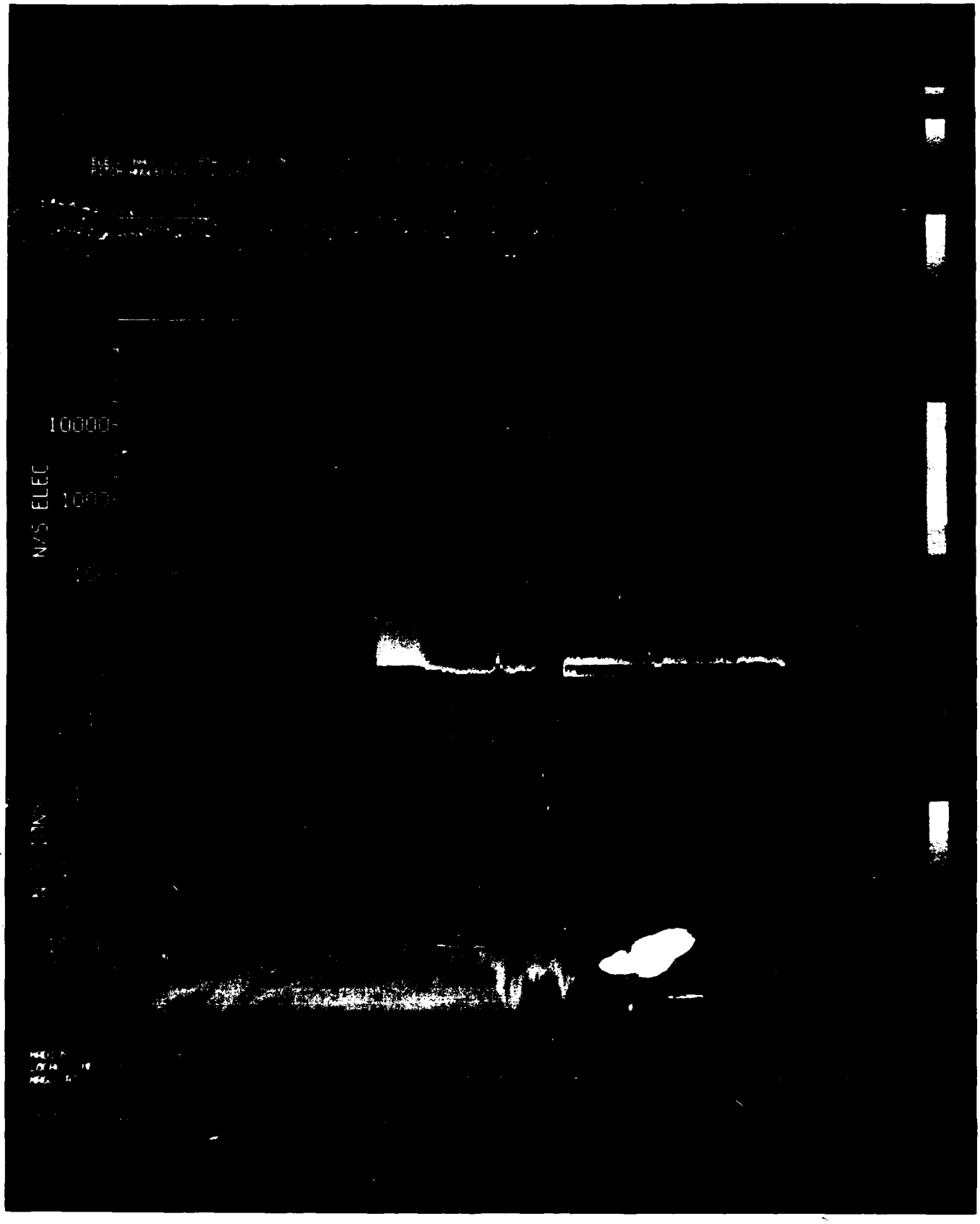
10000
1000
100
10
0
N/S IONS
100
1000
10000



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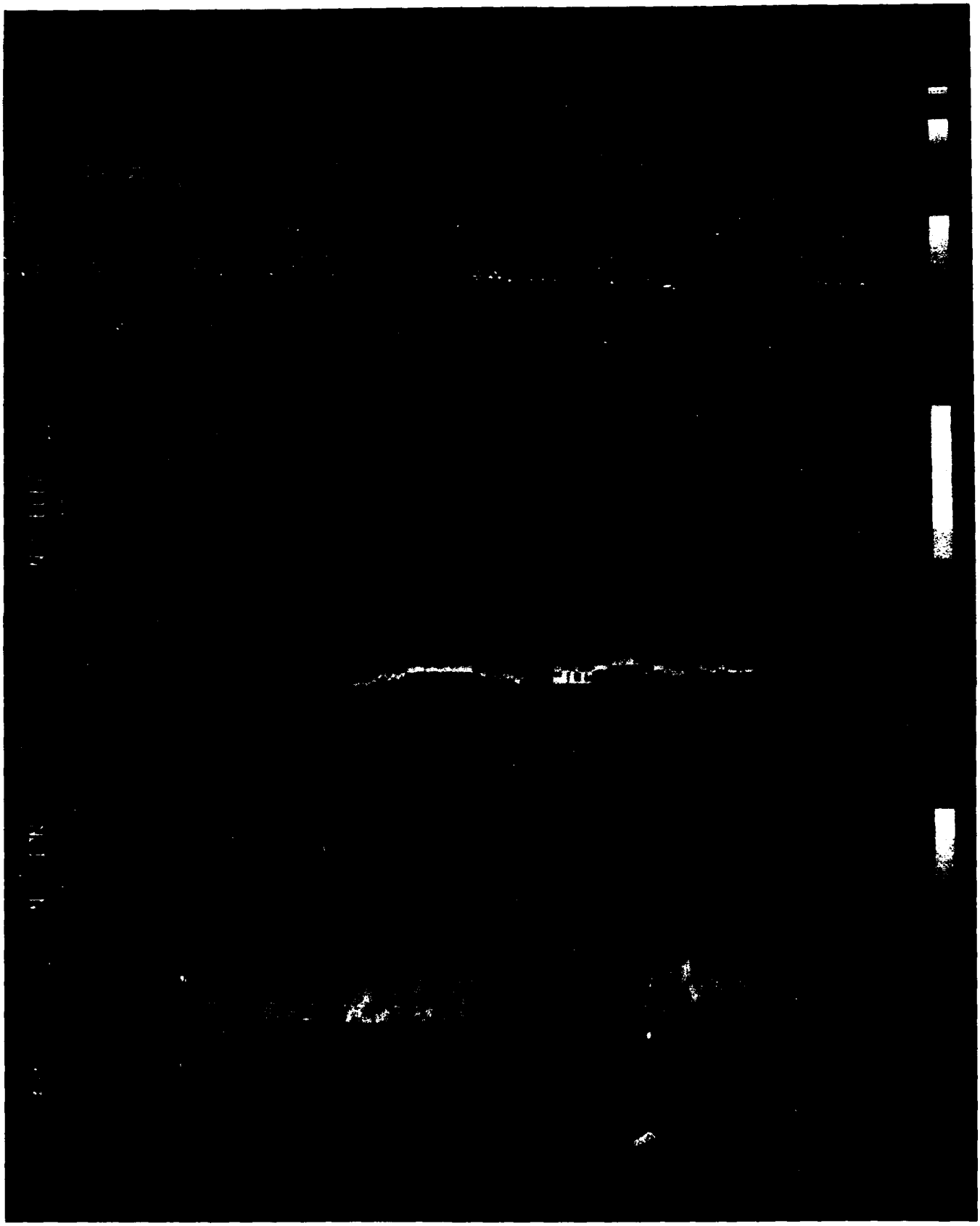
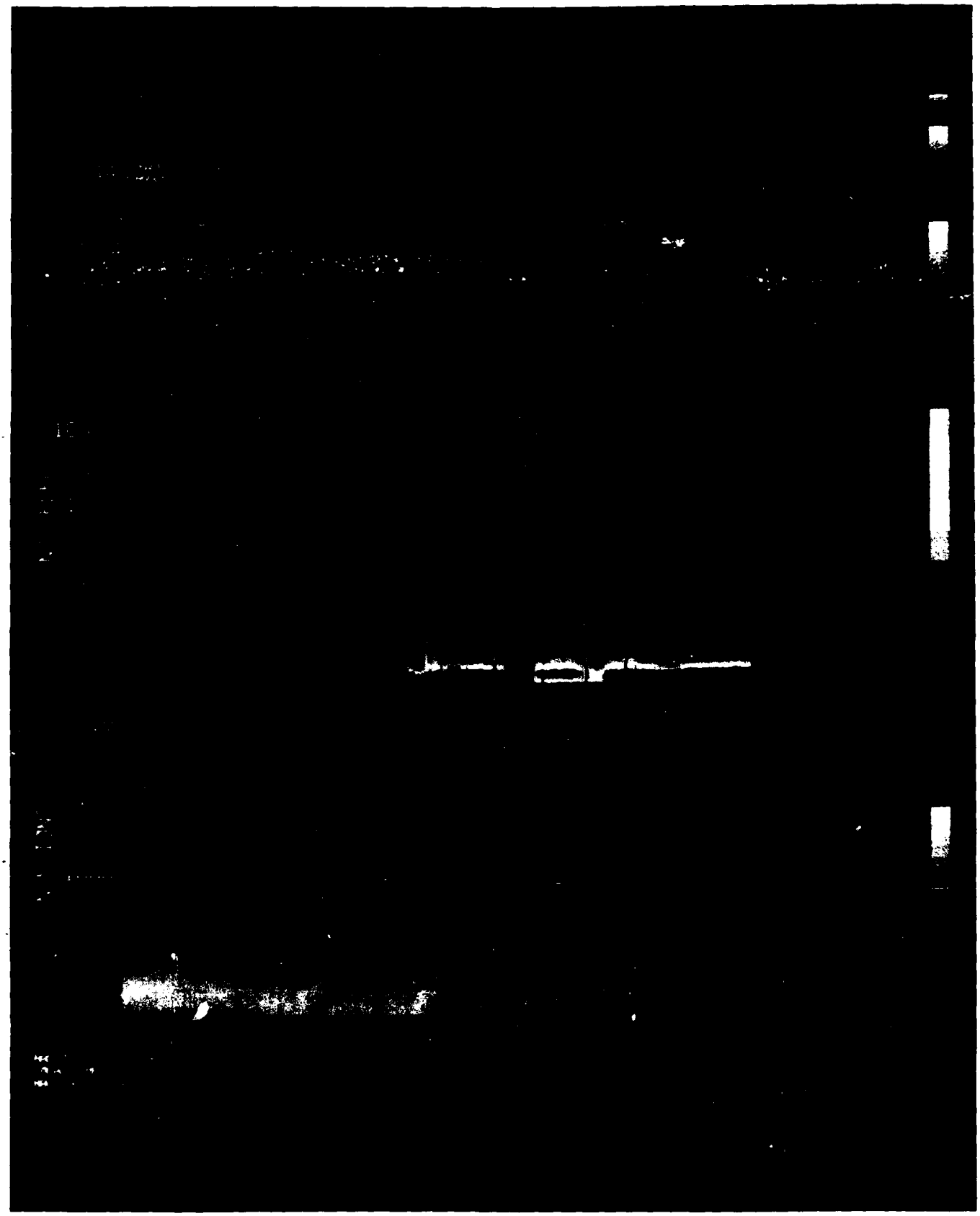
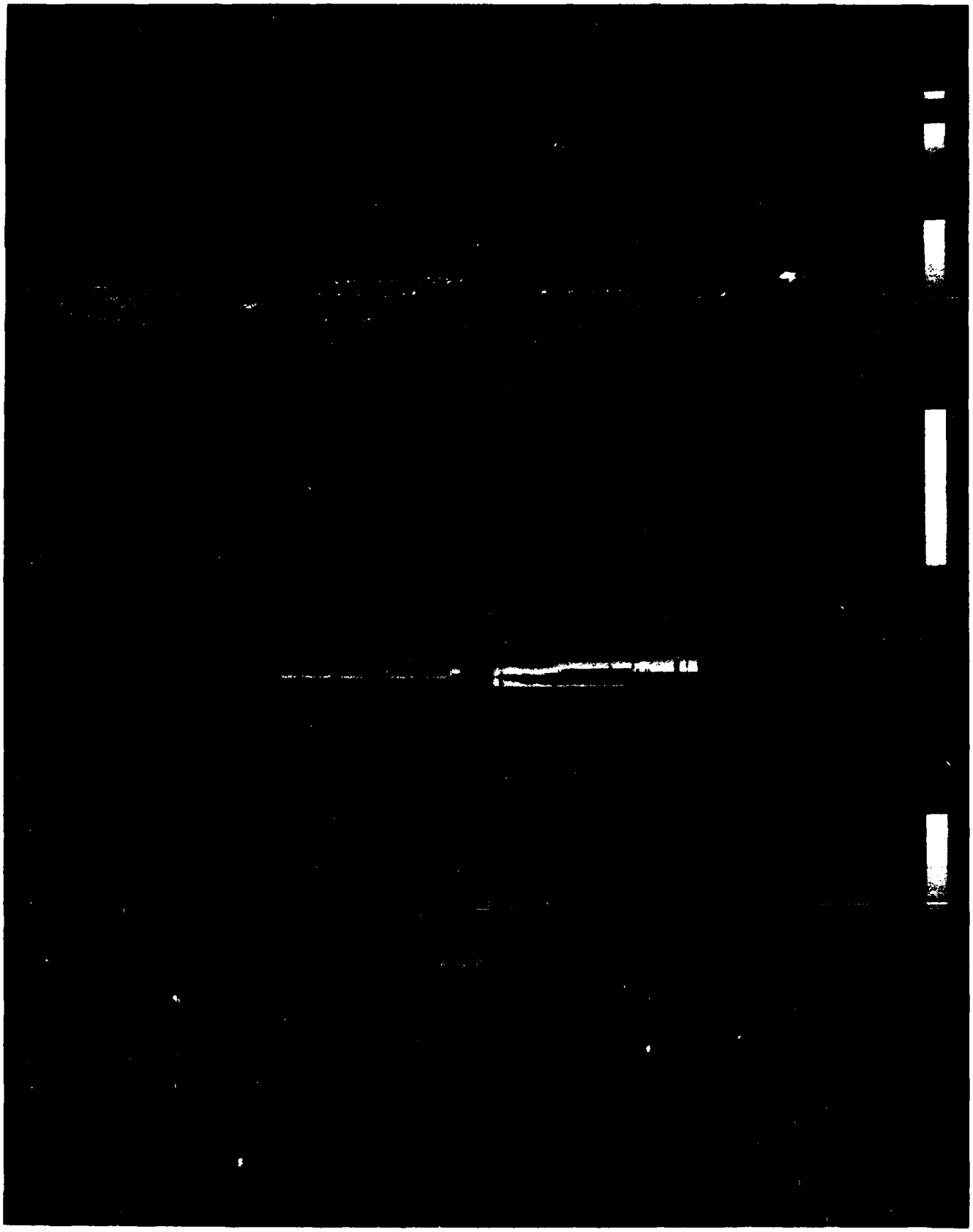
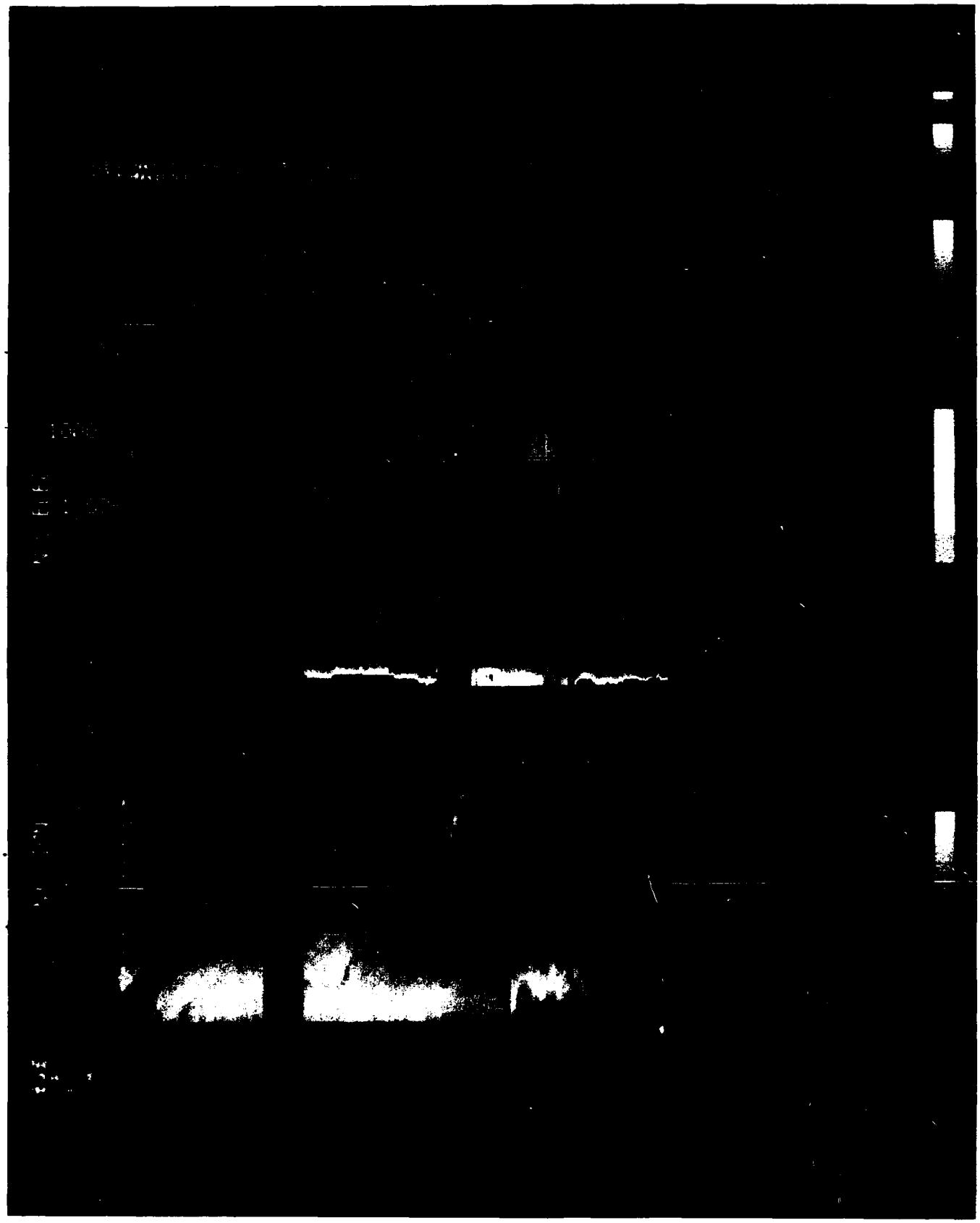
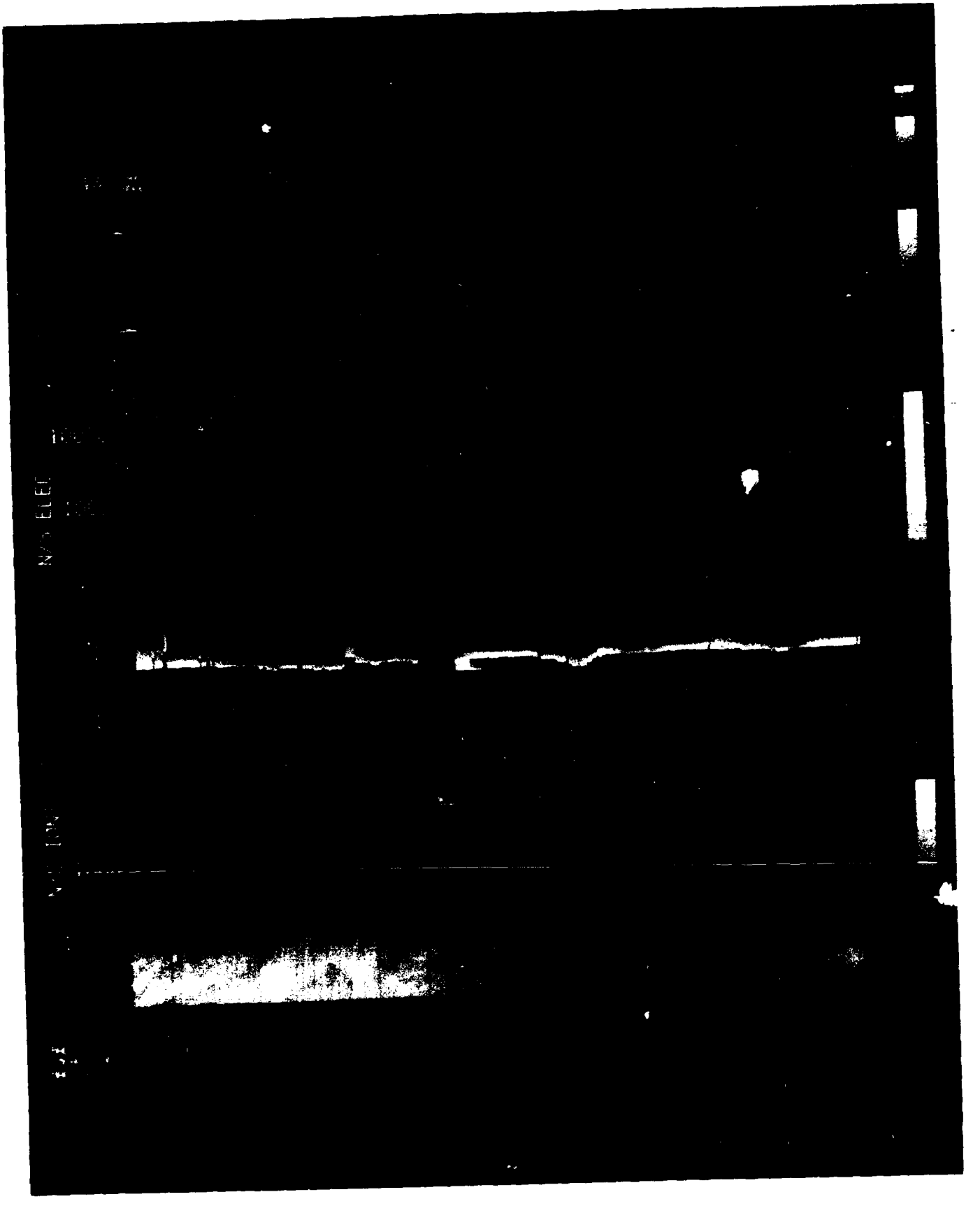
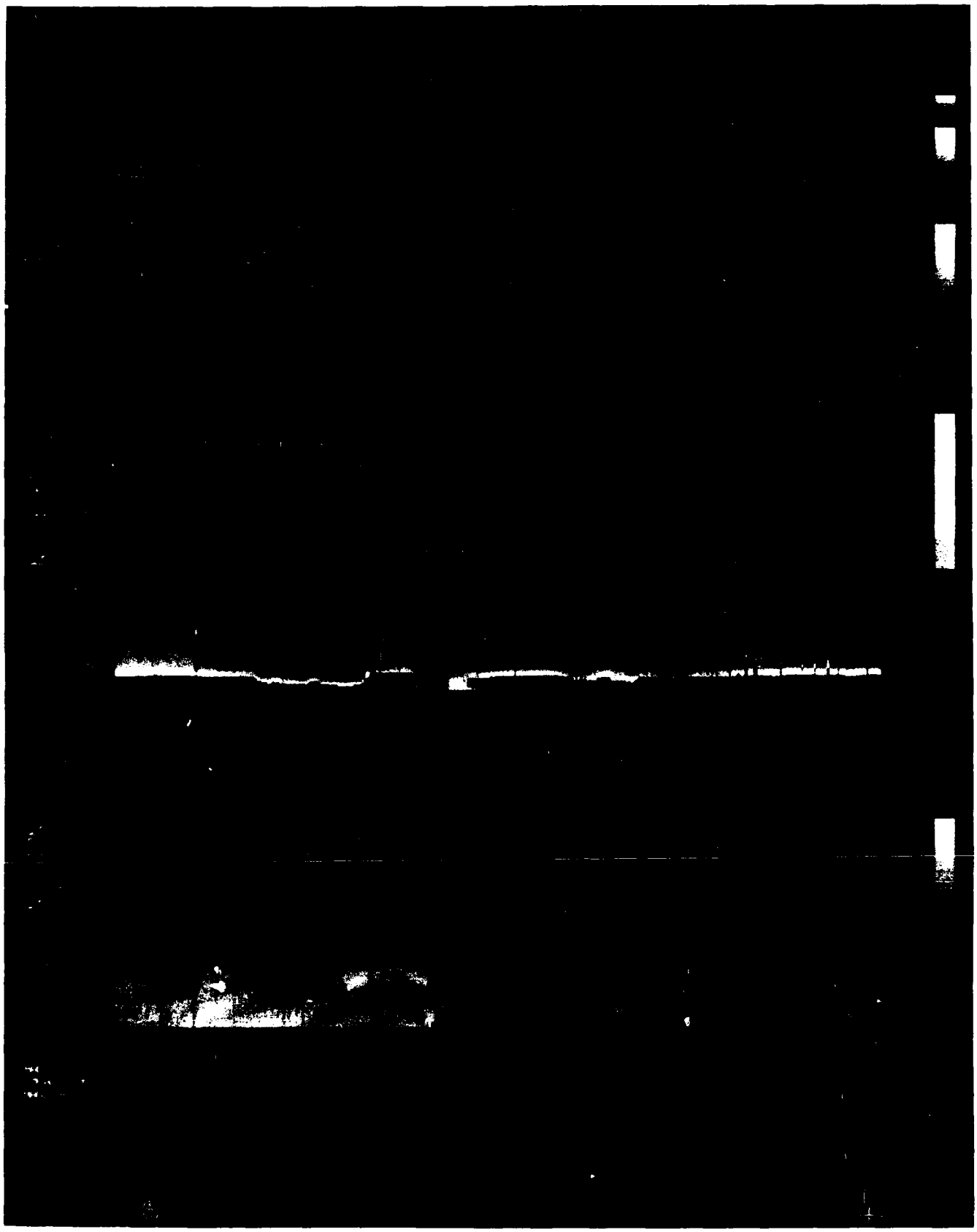


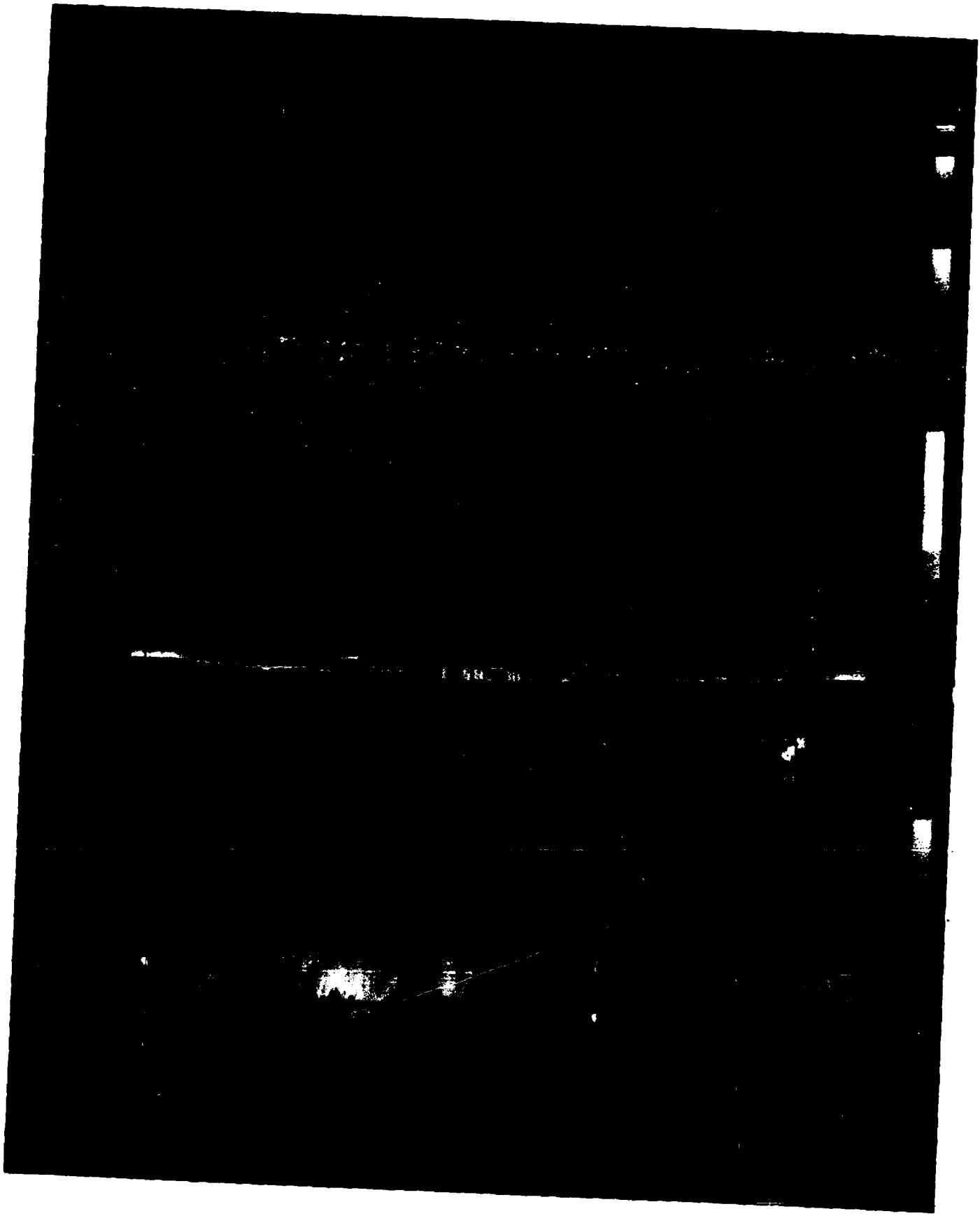


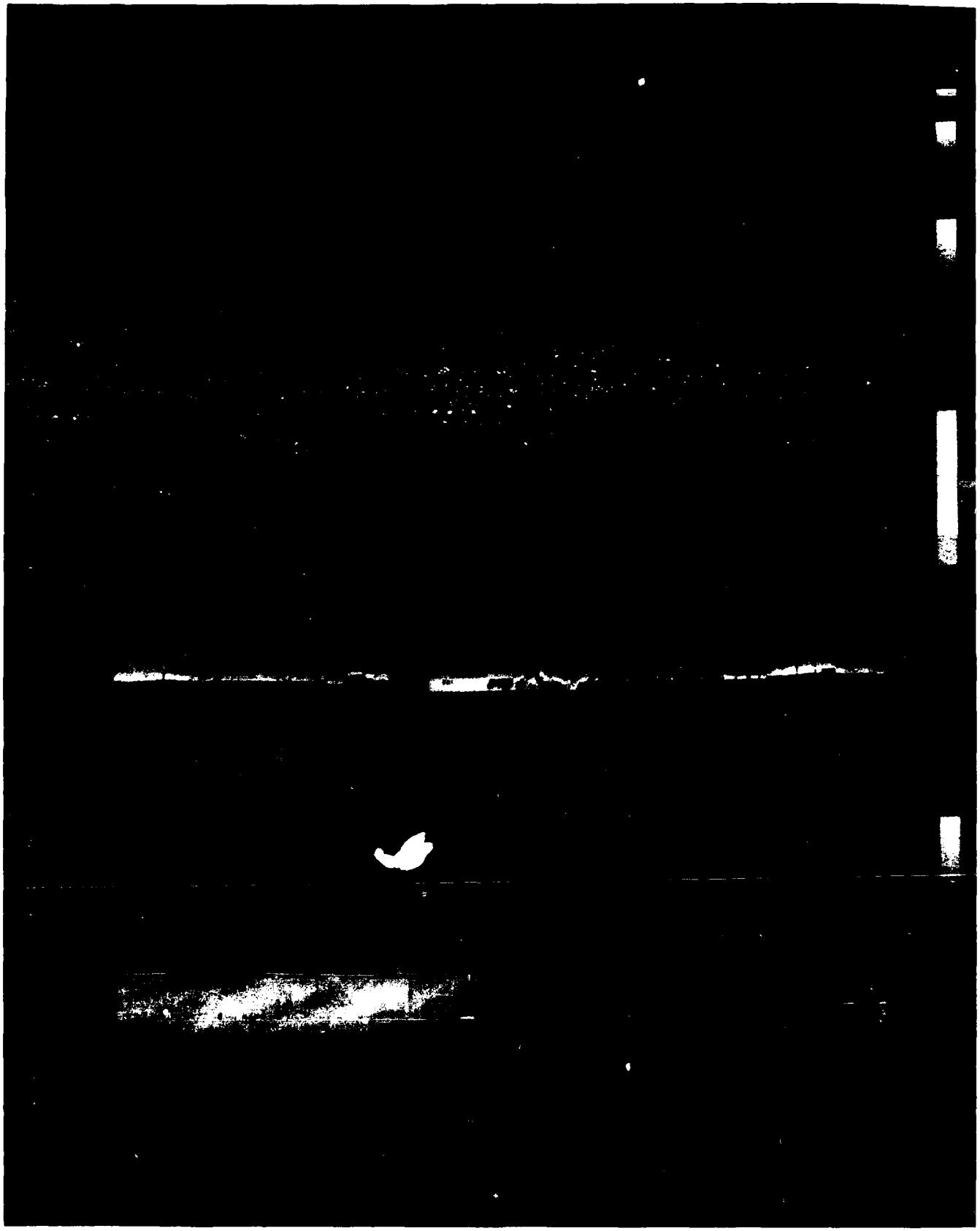


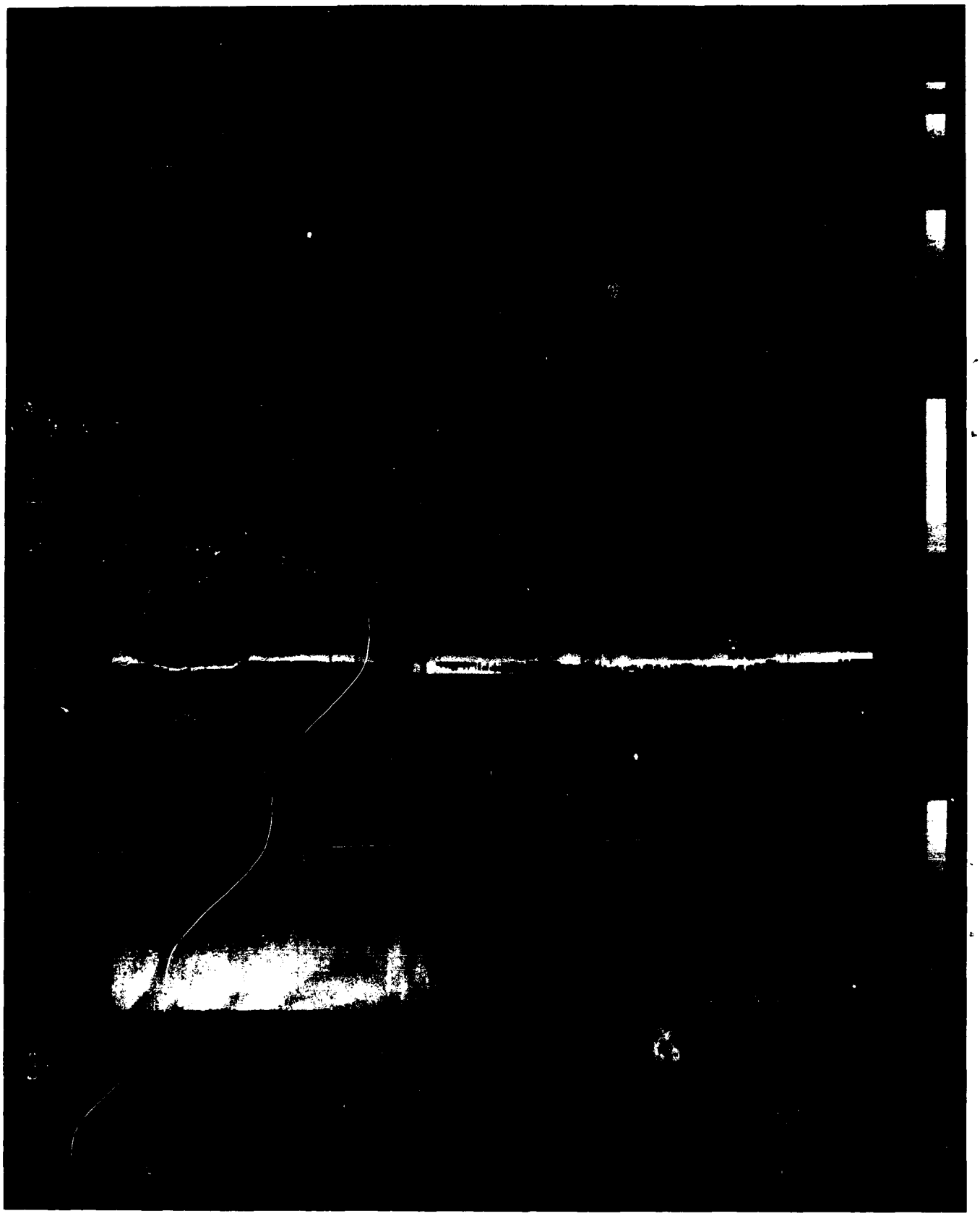


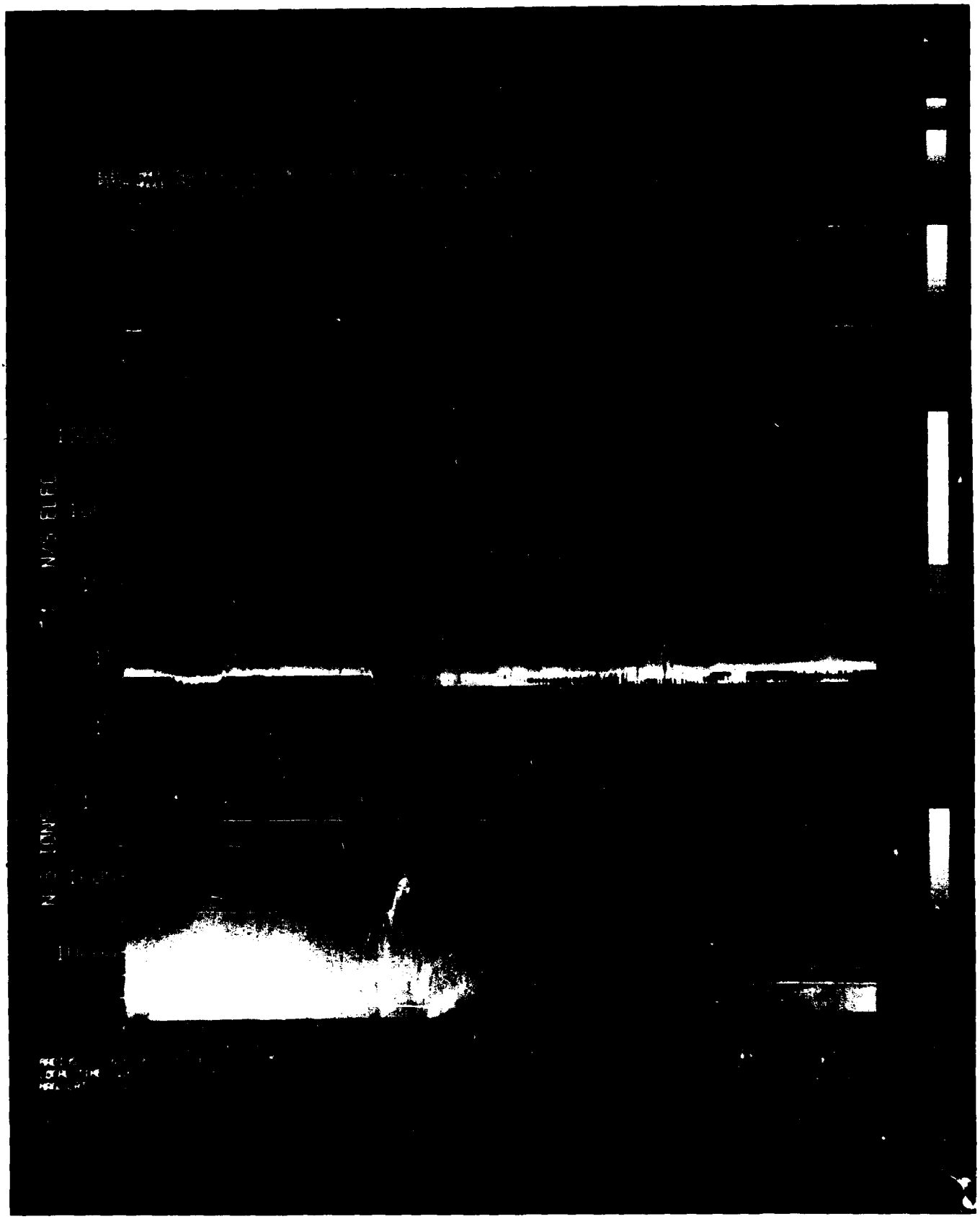






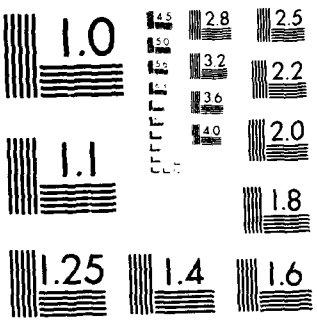




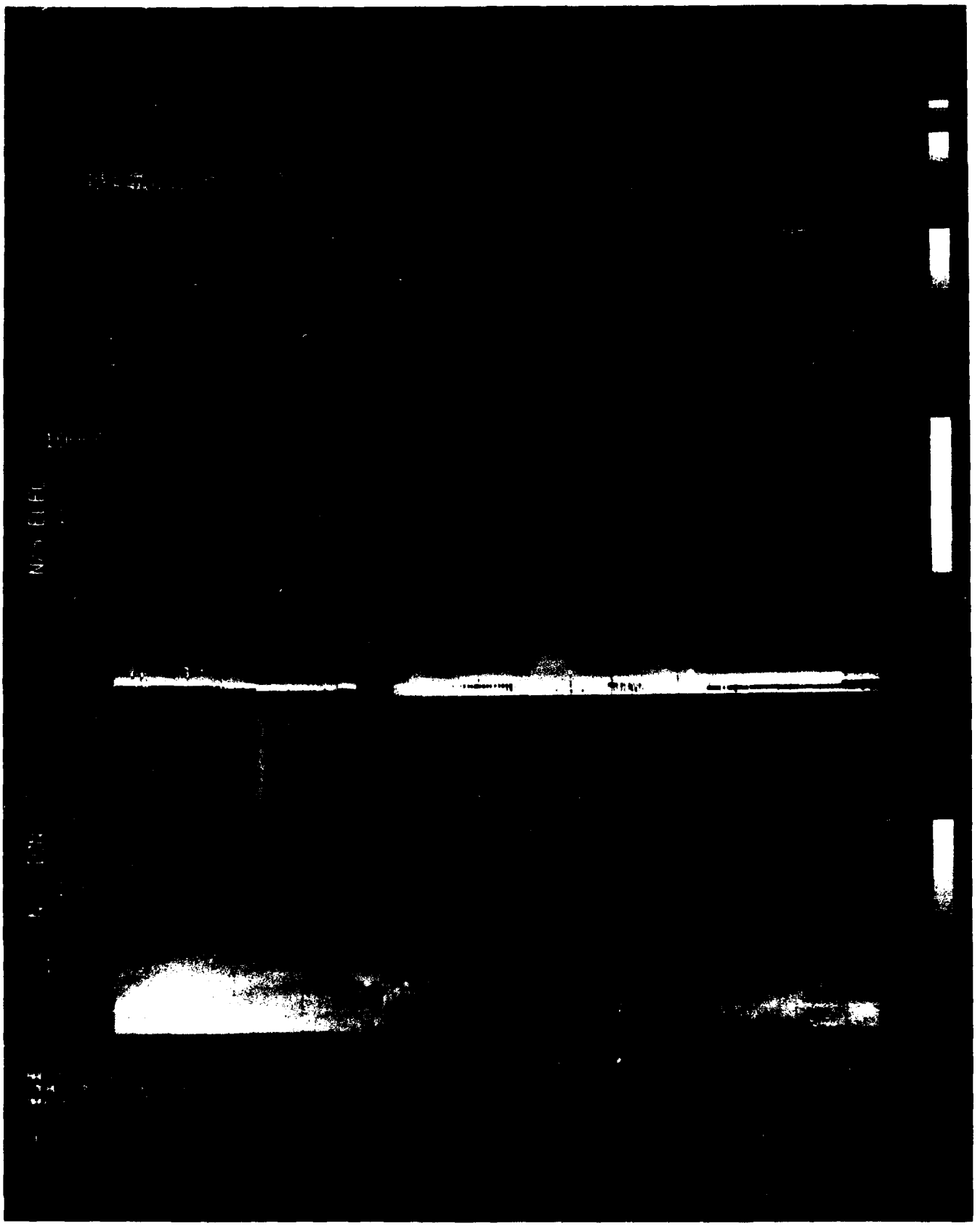


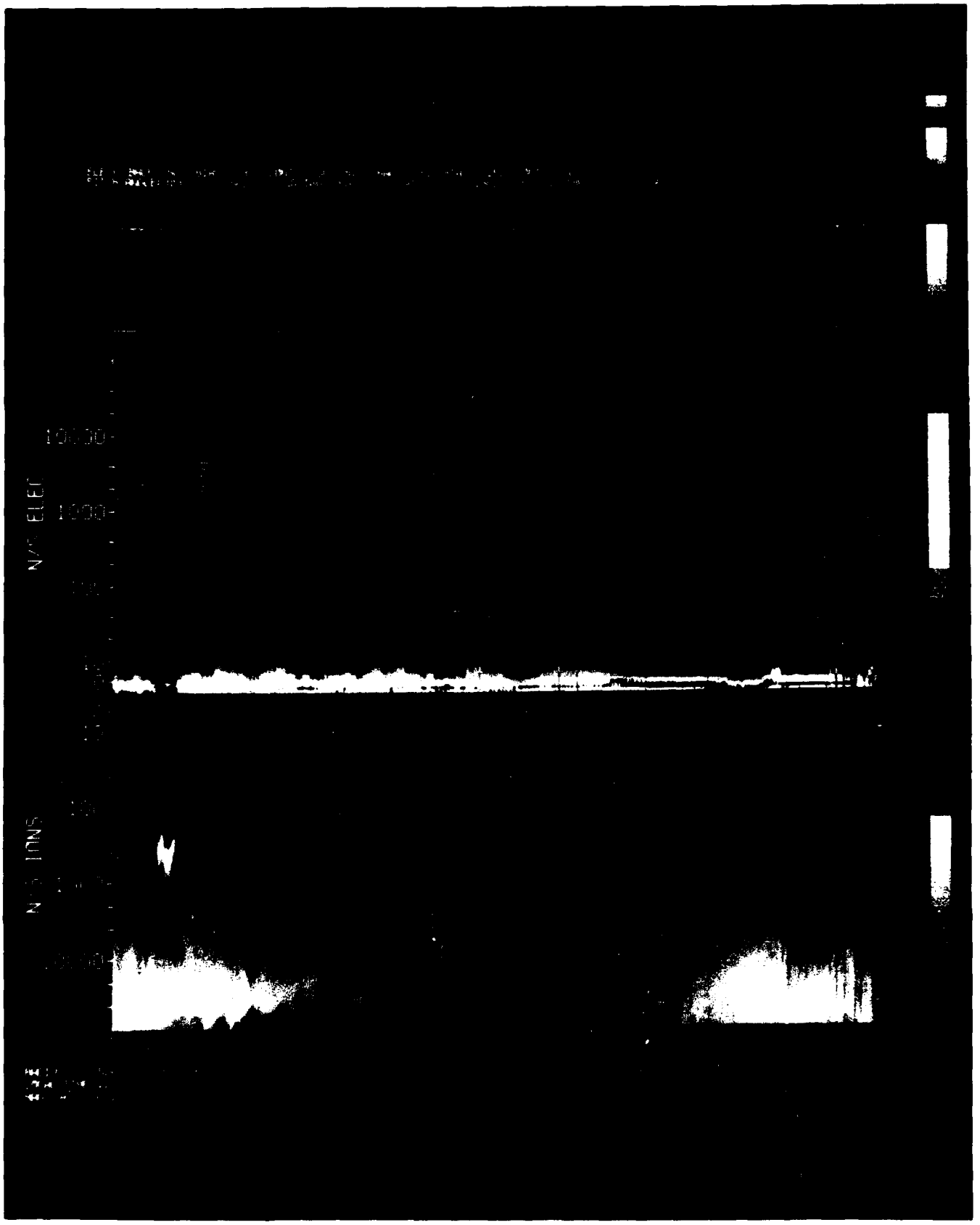
AD-A214 205 SCATHA (SPACECRAFT CHARGING AT HIGH ALTITUDES) ATLAS 2/3
DATA BASE VOLUME 2(U) GEOPHYSICS LAB (AFSC) HANSCOM AFB
MA E G MULLEN ET AL. 01 SEP 89 GL-TR-89-0249(2)

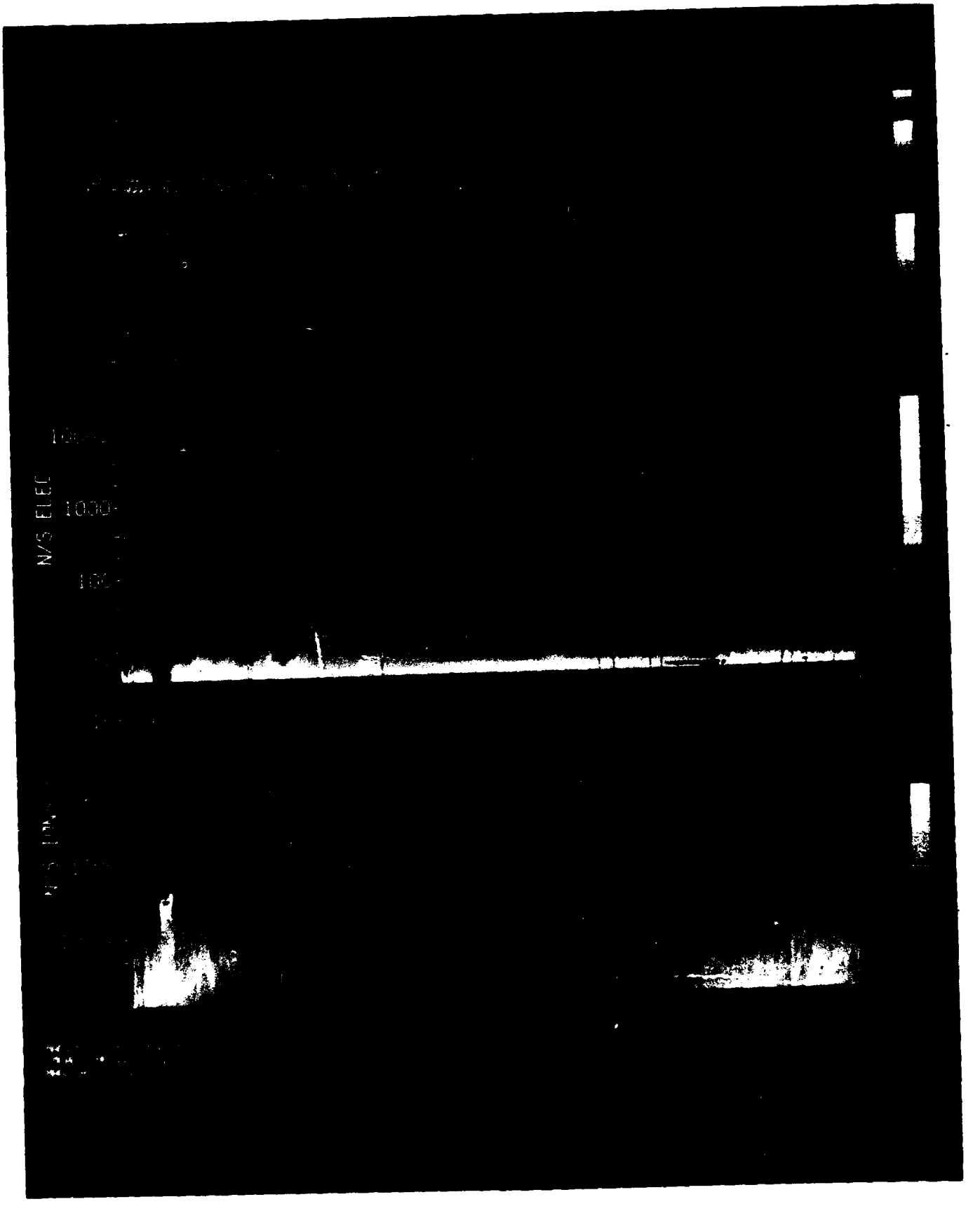
UNCLASSIFIED F/G 22/5 NL

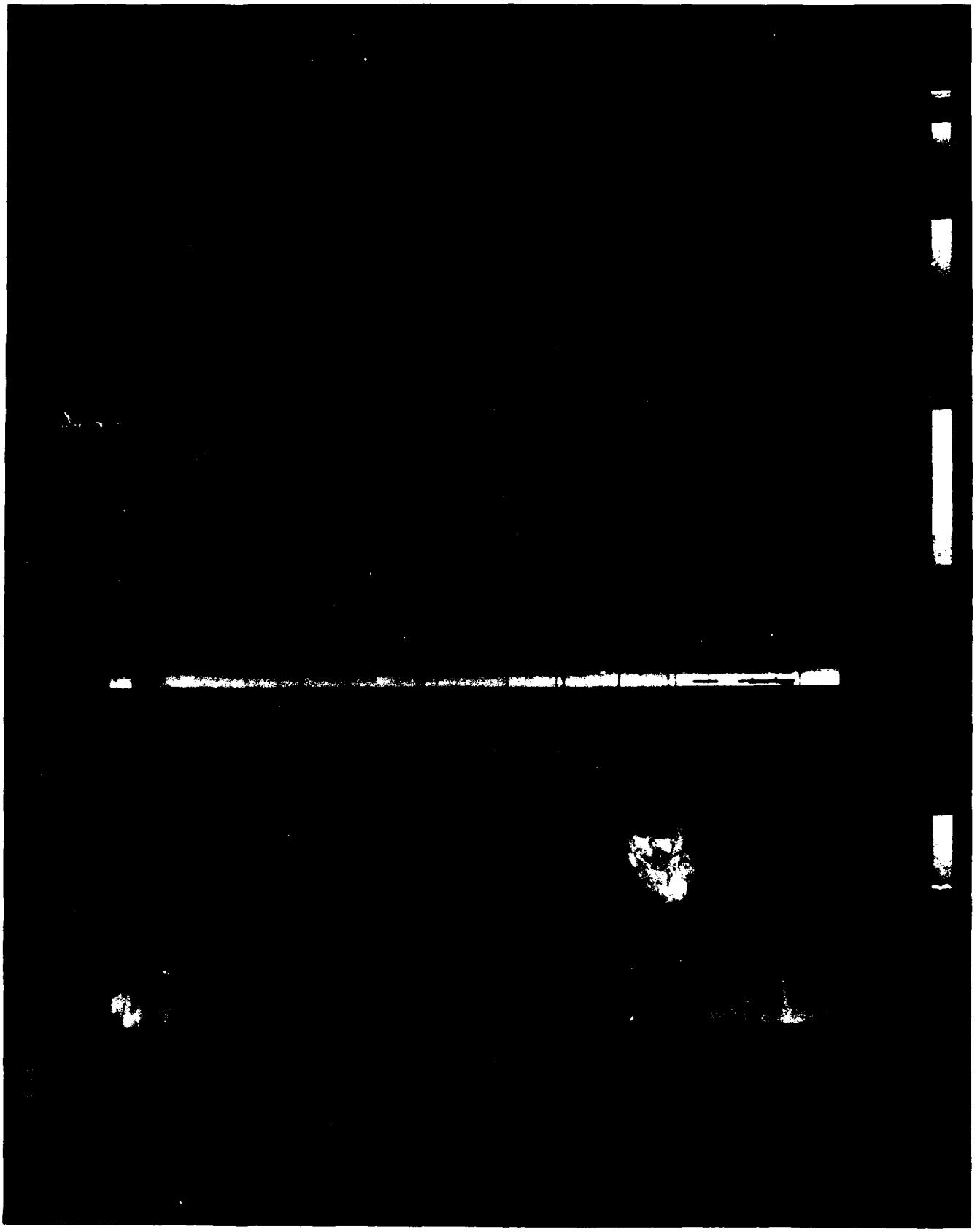


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A




10000
1000
N/C ELEC
N/C IONS


N/S ELEC
1000



6. MIDDLE ENERGY ION COMPOSITION DATA BASE, SC8

6.1 Instrument Description

The Lockheed Energetic Ion Composition Experiment, built and operated under the direction of R.G. Johnson, measures ions with energies per unit change (keV/q) from 100 eV/q to 32 keV/q in 24 logarithmically-spaced energy steps and with masses 1 to 160 AMU. The instrument consists of three ion mass spectrometer heads (CXAs), each consisting of a Wien velocity filter in series with an electrostatic analyzer and a channel electron multiplier sensor. Each detector measures in eight energy-per-unit charge steps and has a resolution of 5° FWHM. The instrument operates in two modes. One mode (sweep mode) sweeps in mass per unit charge, acquiring a full mass (32 point) and energy (24 point) spectrum every 16 s. The other mode (locked mode) samples one particular mass and obtains a complete (24 point) energy spectrum every 1/2 s. In normal operation the detectors alternate between a sweep and a lock mode every 64 s. Background samples are periodically taken over the whole mass range. A complete description of the instrument is given in Kaye, et al. [7]

The data base used in the SCATHA Atlas are 1−h averages of differential energy flux for mass 1 (H^+) and mass 16 (O^+) in each of 24 different energy steps. The fluxes were provided on magnetic tape by Dr. R.G. Johnson of Lockheed, in units of $keV\ (cm^2\ s\ sr\ keV)^{-1}$ The data include both negative and positive values due to background subtractions, and the negative values were included in the statistical calculations. No pitch angle discrimination was made in the data set, and a 1−h average consists of the total data available in that 1−h time span.

6.2 Description of Data Presentation: SC8 Low Energy Plasma

In each Figure H^+ and O^+ differential energy flux is plotted for 24 different energies as a function of Universal Time (UT) for a 24−hour period. The points represent 1−hr averages of the data. The oxygen fluxes (O^+) are plotted with +'s and the hydrogen fluxes (H^+) are plotted with X's. Missing data points indicate values are below the lower plotting limits.

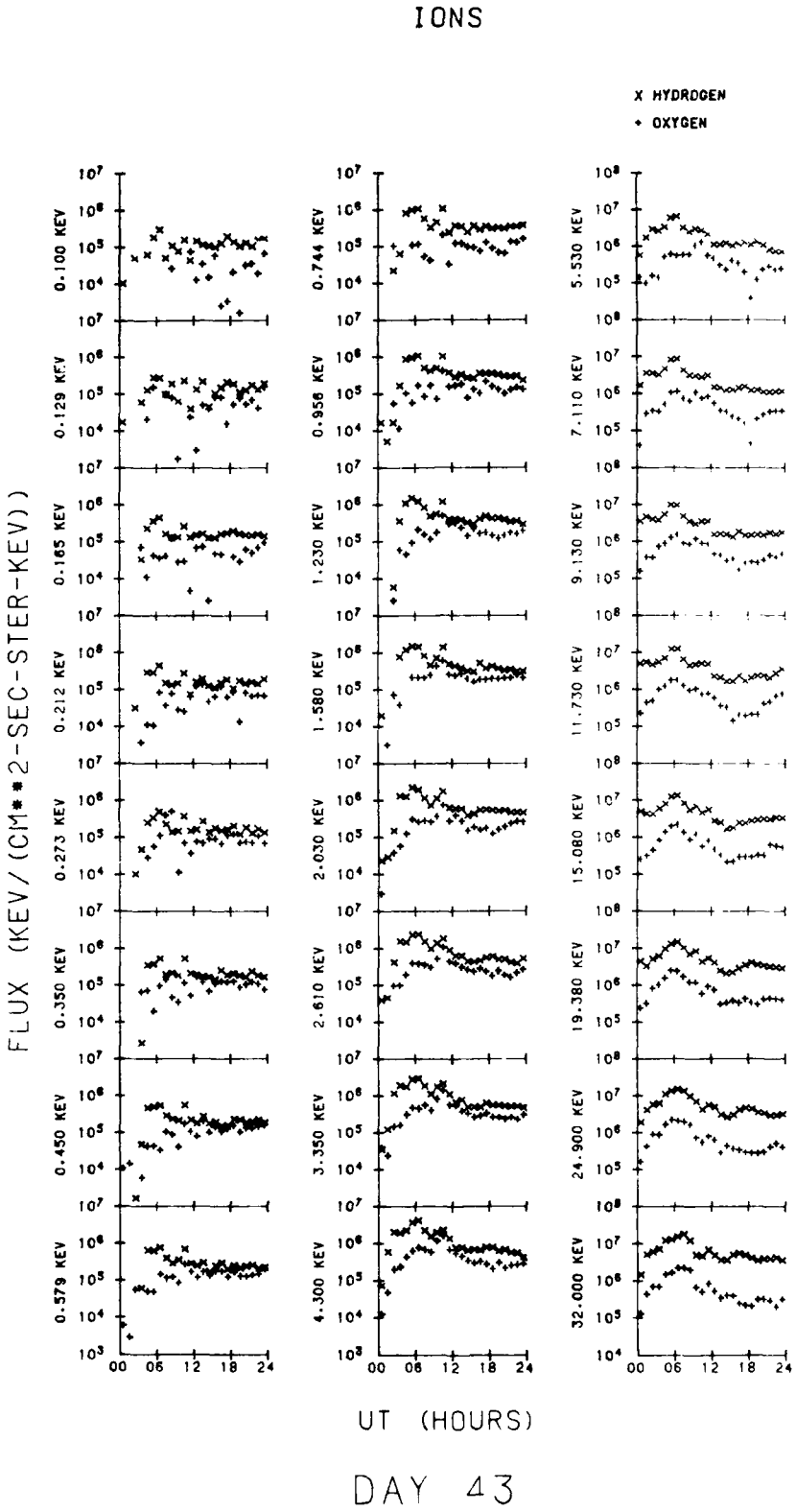
[7]Kaye, S.M., Johnson, R.G., Sharp, R.D., and Shelley, E.G. (1981) Observations of transient H^+ and O^+ bursts in the equatorial magnetosphere, *J.Geophys. Res.*, *86*:1335.

6.3 Calendar of Days for which SC3 Ion Composition Data are Presented

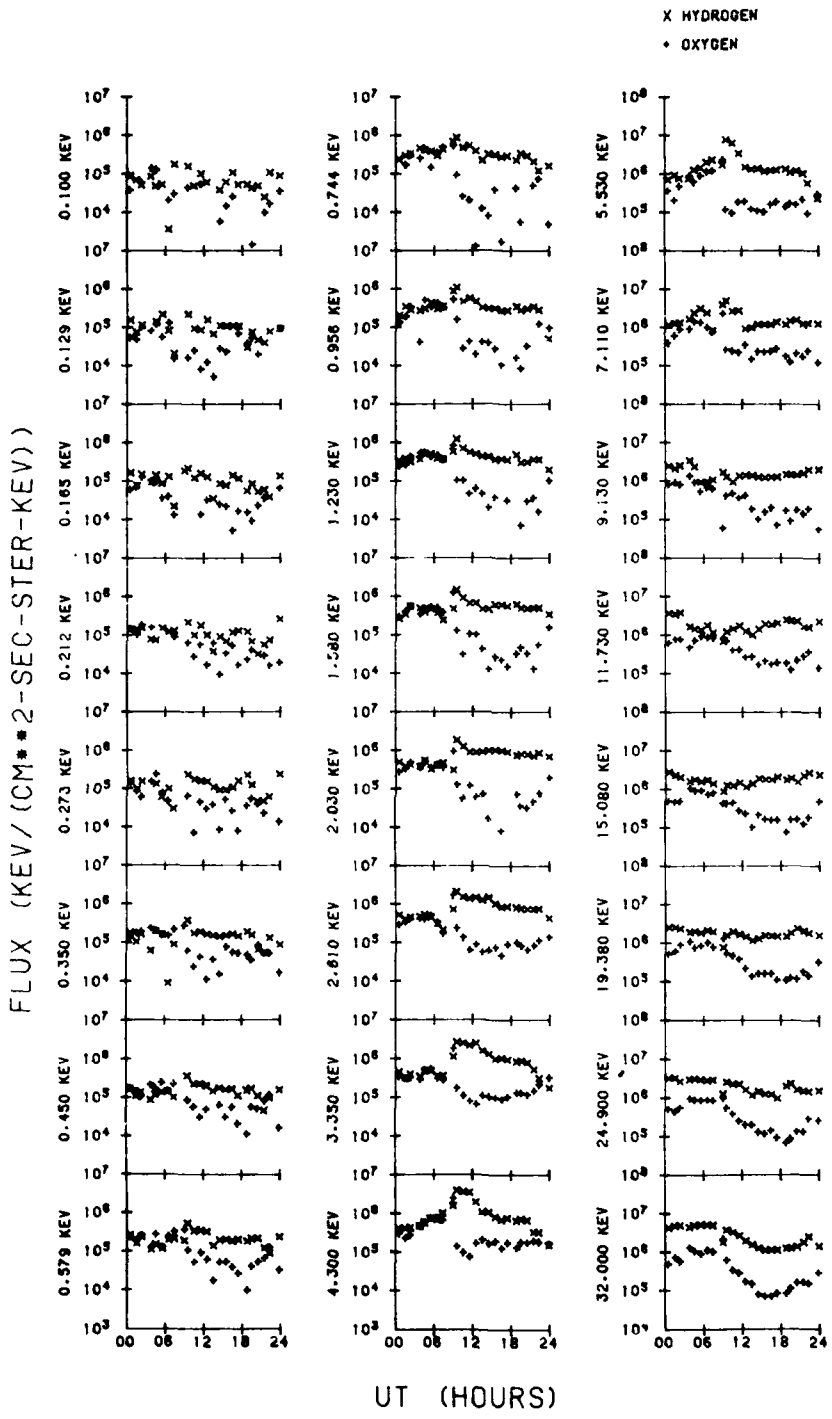
1979

DAY	FEB	MAR	APR	MAY	JUN	JUL	AUG	DAY
1					152			1
2				122				2
3			093	123				3
4			094	124			216	4
5			095	125	156			5
6				126	157		218	6
7					158	188		7
8				128				8
9				129				9
10								10
11								11
12	043							12
13	044		103		164	194	225	13
14	045		104				226	14
15	046						227	15
16	047				167			16
17					168			17
18		077	108	138			230	18
19						200		19
20			110				232	20
21	052	080	111	141			233	21
22	053	081	112				234	22
23			113					23
24			114					24
25			115	145		206		25
26			116	146		207		26
27			117		178	208		27
28	059	087	118					28
29		088	119	149	180	210	241	29
30		089	120	150				30
31						212		31

6.4 Data Presentation; SC3 Ion Composition Data

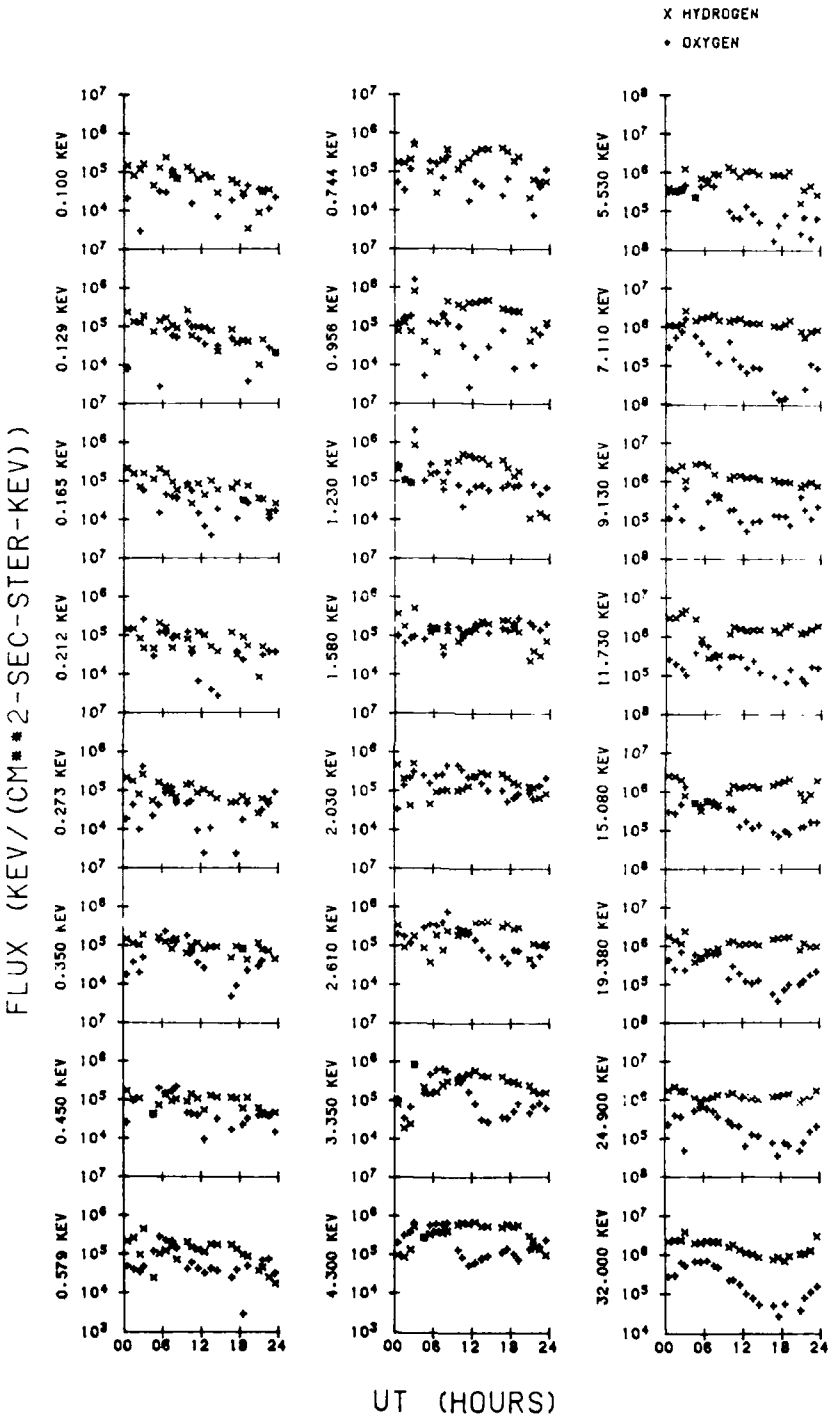


IONS


X HYDROGEN
+ OXYGEN
FLUX (KEV/(CM**2-SEC-STER-KEV))
0.100 KEV
0.129 KEV
0.165 KEV
0.212 KEV
0.273 KEV
0.350 KEV
0.450 KEV
0.579 KEV
0.744 KEV
0.956 KEV
1.230 KEV
1.580 KEV
2.030 KEV
2.610 KEV
3.350 KEV
4.300 KEV
5.530 KEV
7.110 KEV
9.130 KEV
11.730 KEV
15.080 KEV
19.380 KEV
24.900 KEV
32.000 KEV
00 06 12 18 24
UT (HOURS)

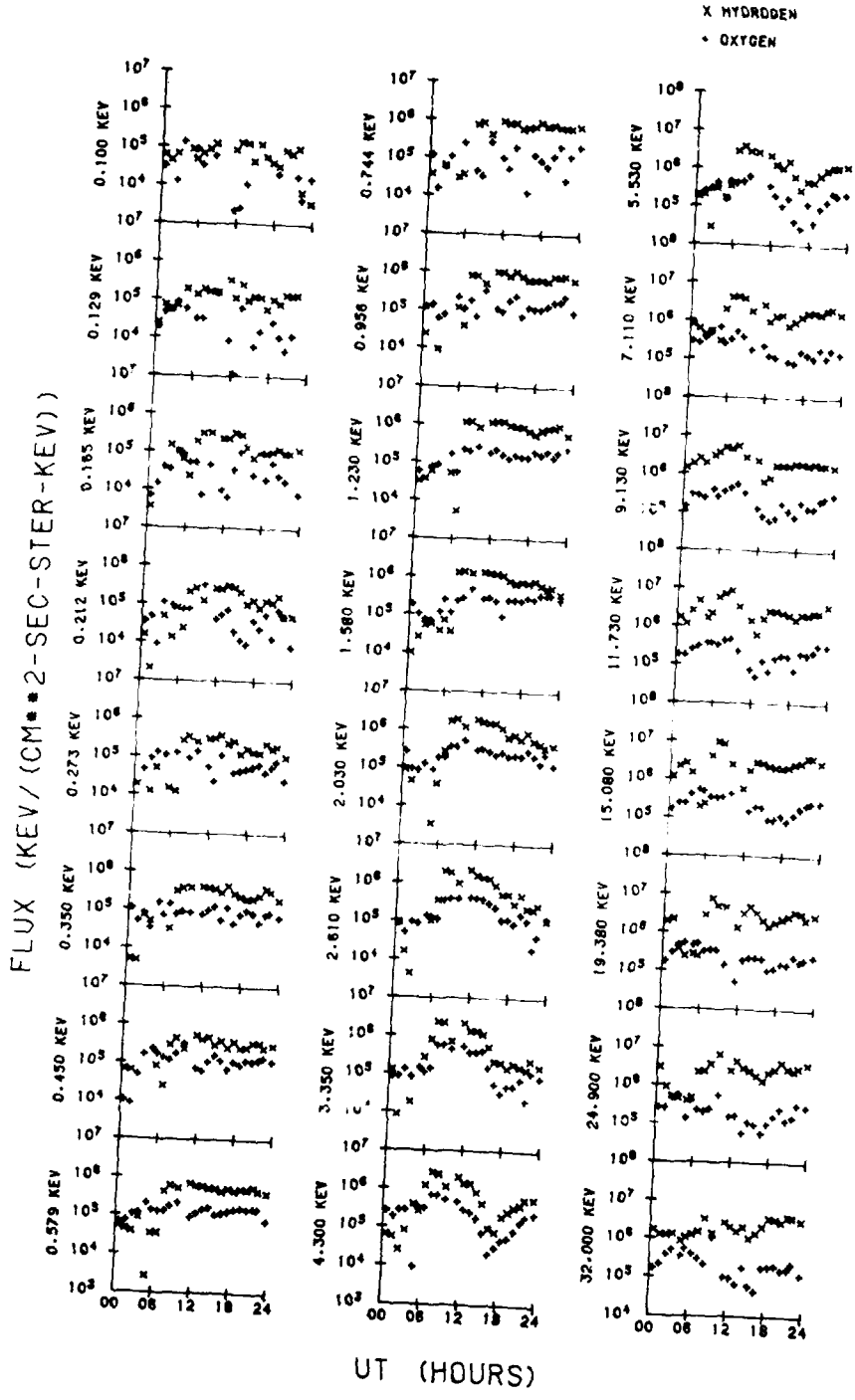
DAY 44

IONS


X HYDROGEN
• OXYGEN
FLUX (KEV/(CM**2-SEC-STER-KEV))
0.100 KEV
0.129 KEV
0.165 KEV
0.212 KEV
0.273 KEV
0.350 KEV
0.450 KEV
0.579 KEV
0.744 KEV
0.956 KEV
1.230 KEV
1.580 KEV
2.030 KEV
2.610 KEV
3.350 KEV
4.300 KEV
5.530 KEV
7.110 KEV
9.130 KEV
11.730 KEV
15.080 KEV
19.380 KEV
24.900 KEV
32.000 KEV
00 06 12 18 24
UT (HOURS)

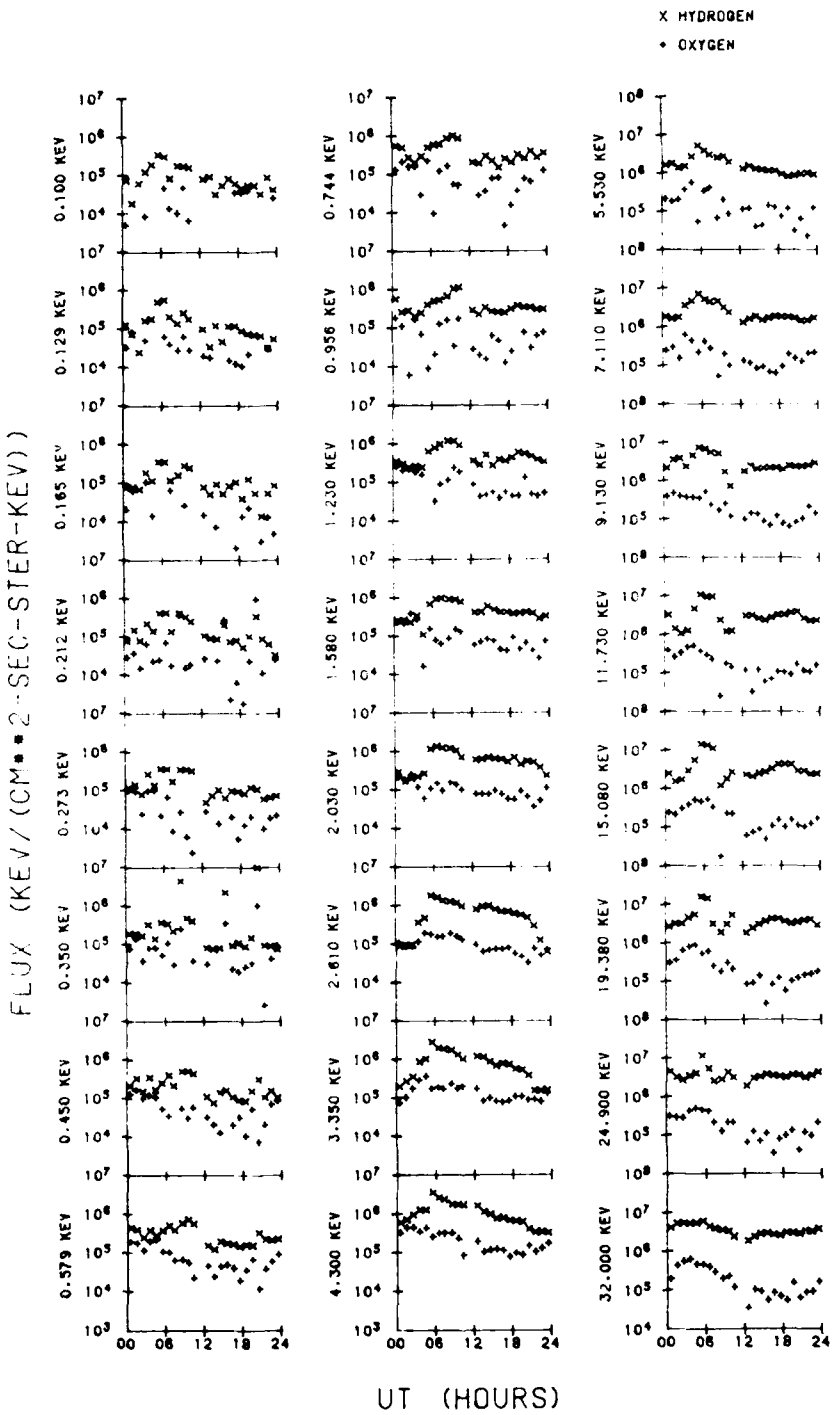
DAY 45

IONS


X HYDROGEN
+ OXYGEN
FLUX (KEV/(CM**2-SEC-STER-KEV))
0.100 KEV
0.129 KEV
0.165 KEV
0.212 KEV
0.273 KEV
0.350 KEV
0.450 KEV
0.579 KEV
0.744 KEV
0.956 KEV
1.230 KEV
1.580 KEV
2.030 KEV
2.610 KEV
3.350 KEV
4.300 KEV
5.530 KEV
7.110 KEV
9.130 KEV
11.730 KEV
15.080 KEV
19.380 KEV
24.900 KEV
32.000 KEV
00 06 12 18 24
UT (HOURS)

DAY 46

IONS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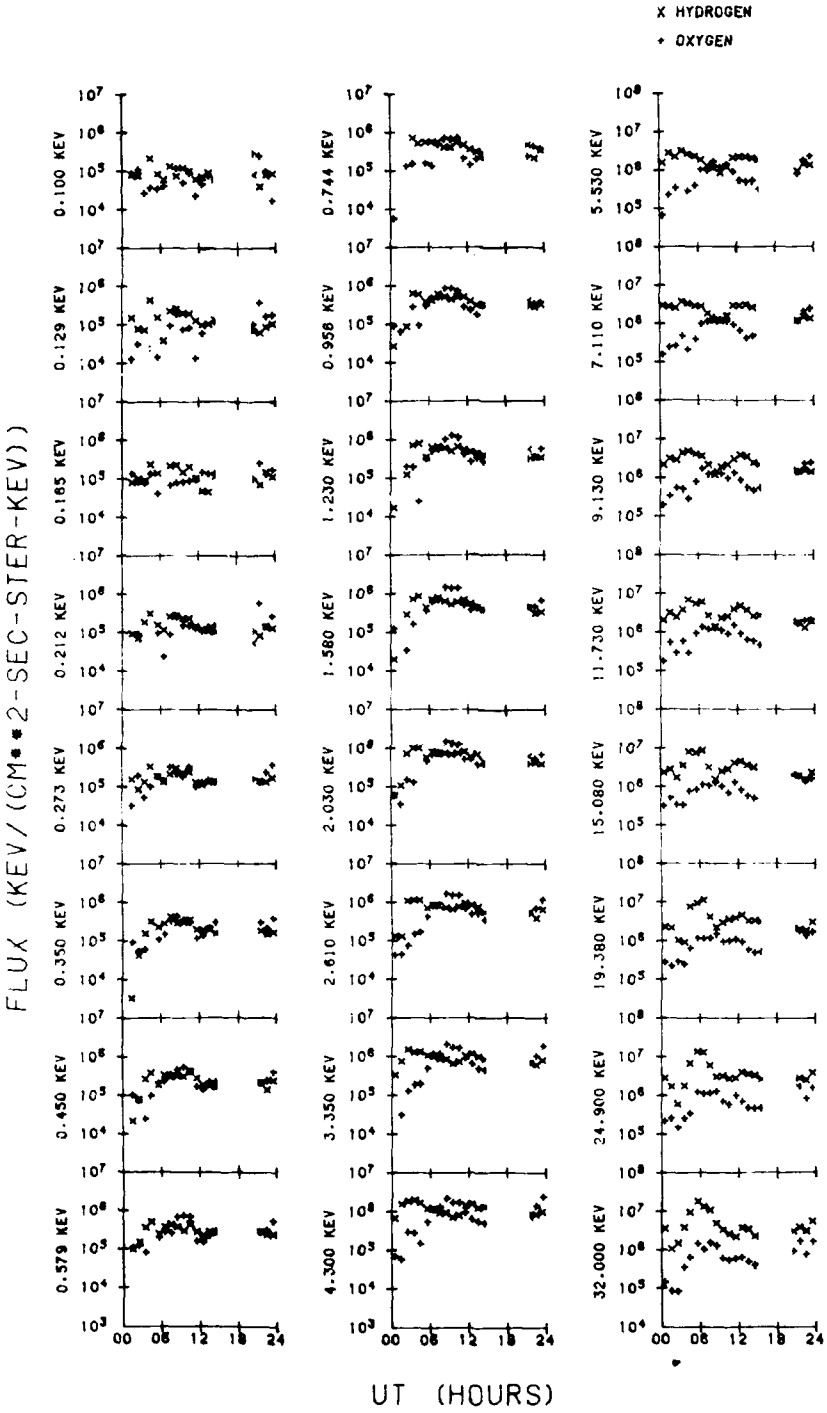
UT (HOURS)

DAY 47

IONS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UT (HOURS)

DAY 52

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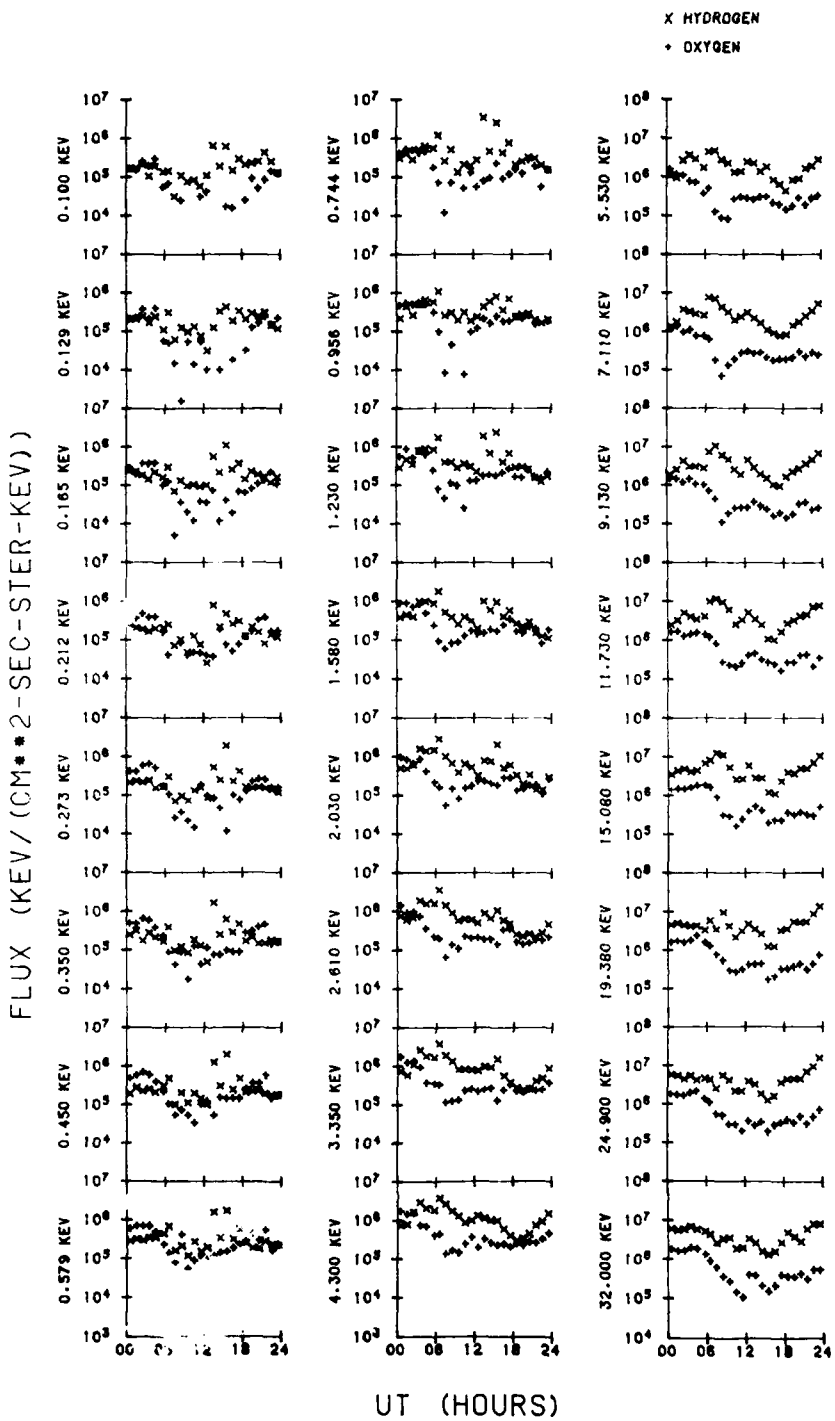
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UT (HOURS)

DAY 53

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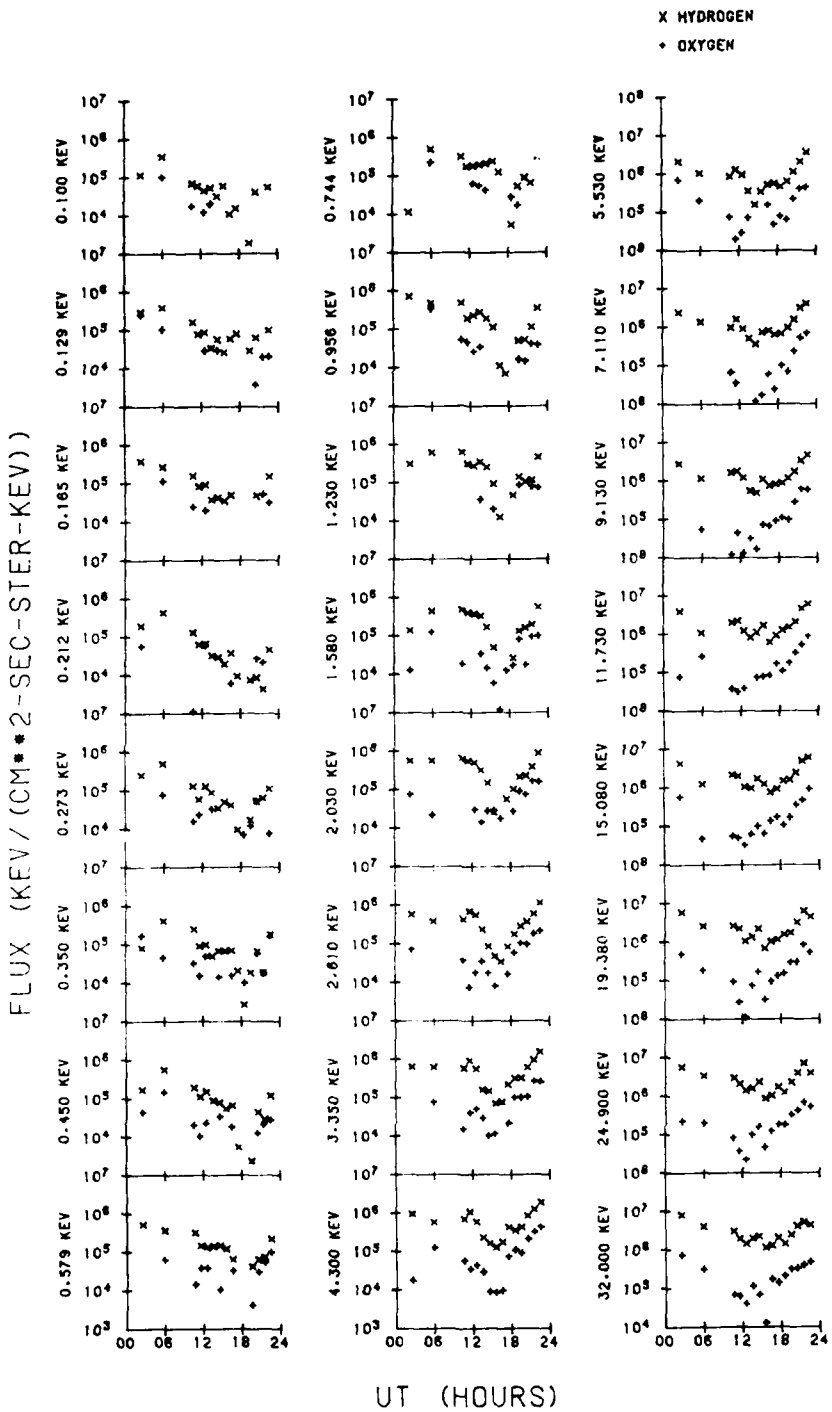
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UT (HOURS)

DAY 59

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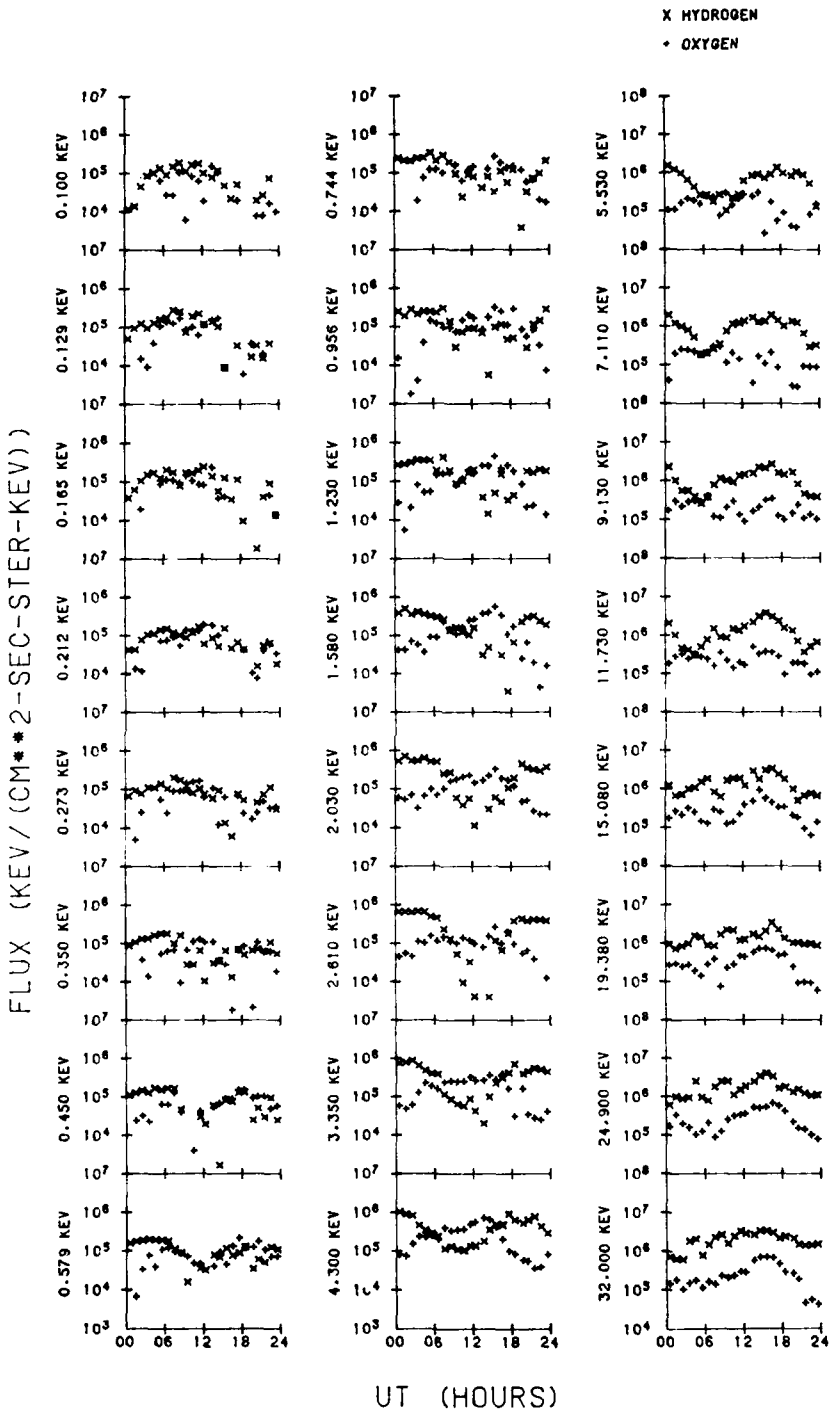
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UT (HOURS)

DAY 77

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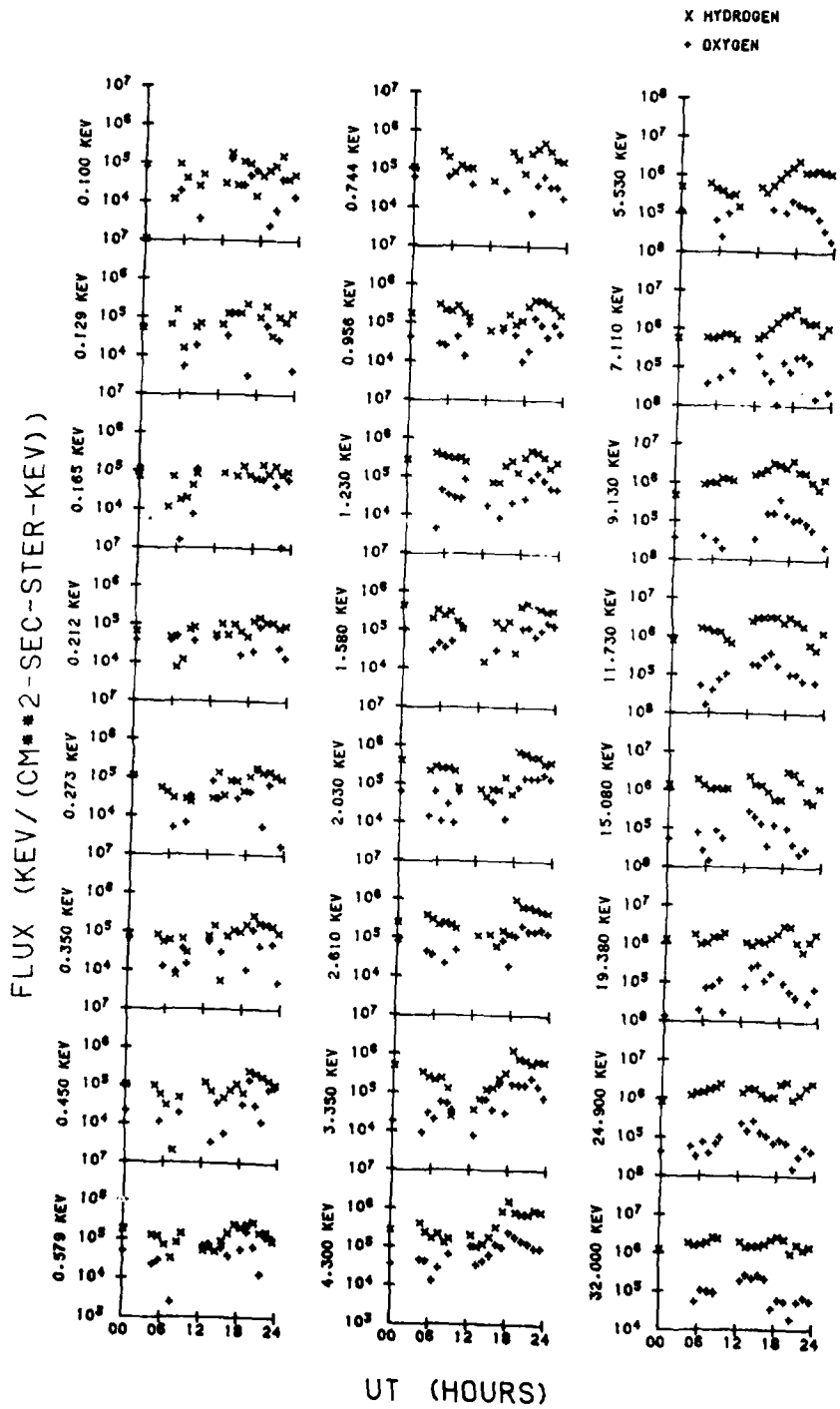
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UT (HOURS)

DAY 80

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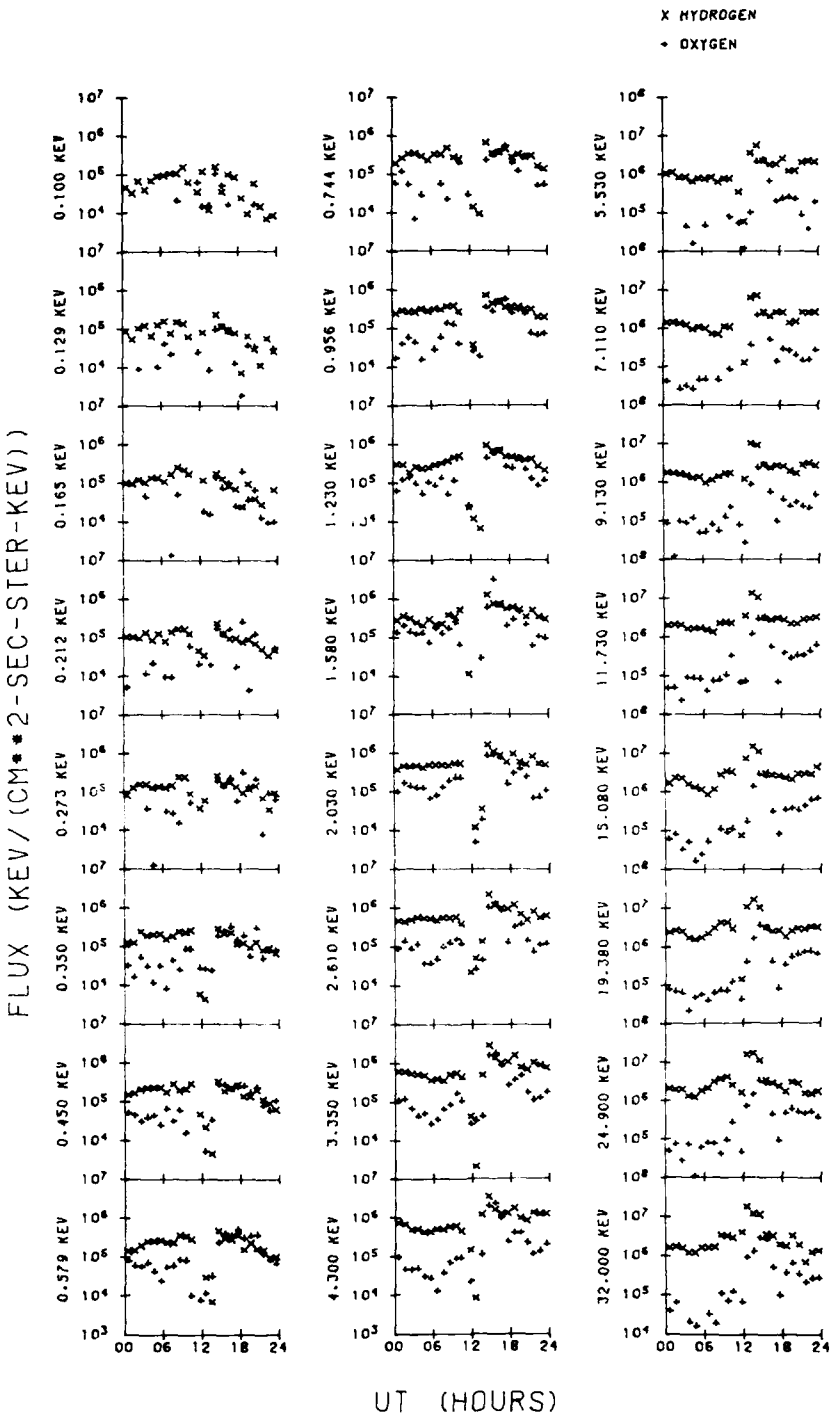
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UT (HOURS)

DAY 81

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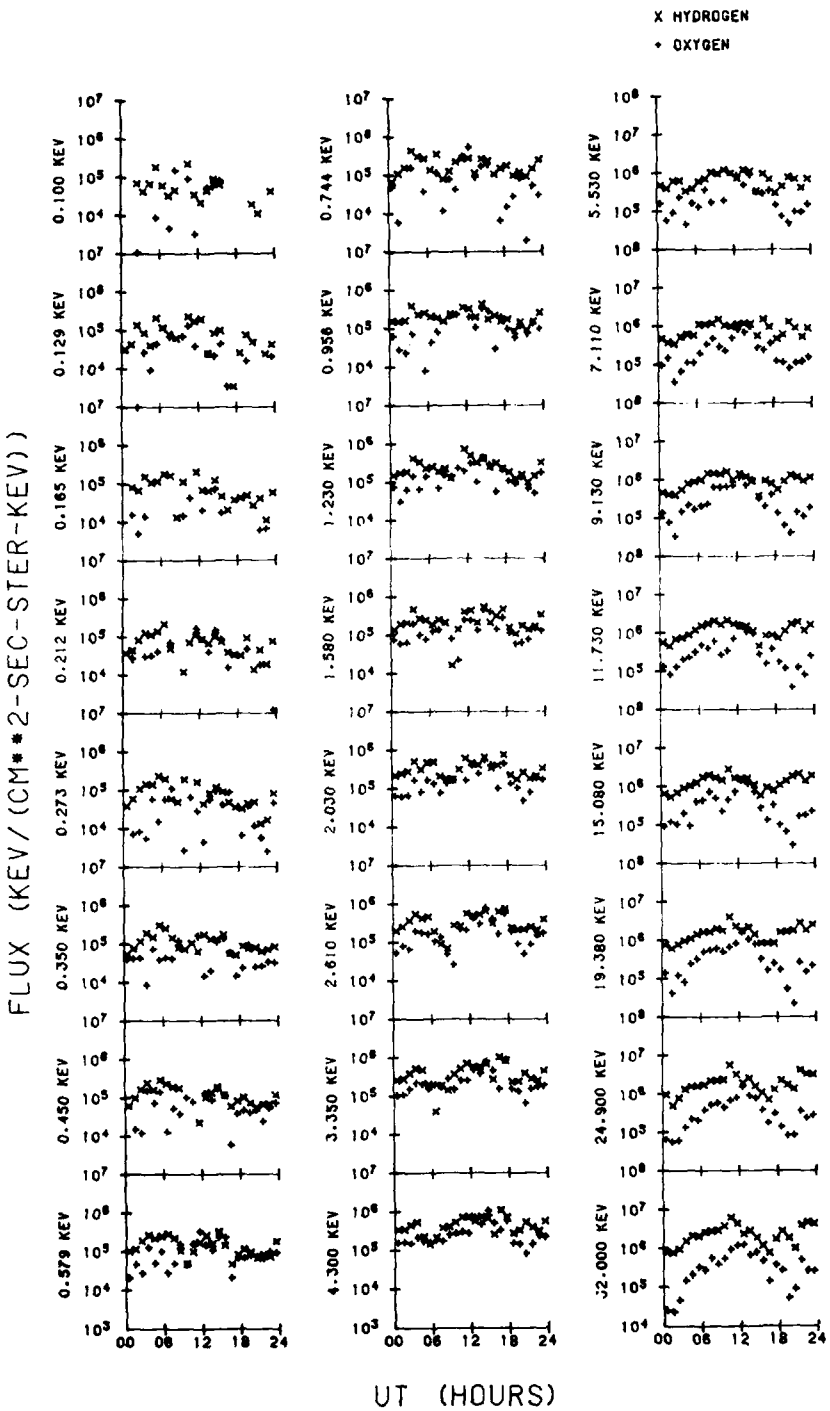
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UT (HOURS)

DAY 87

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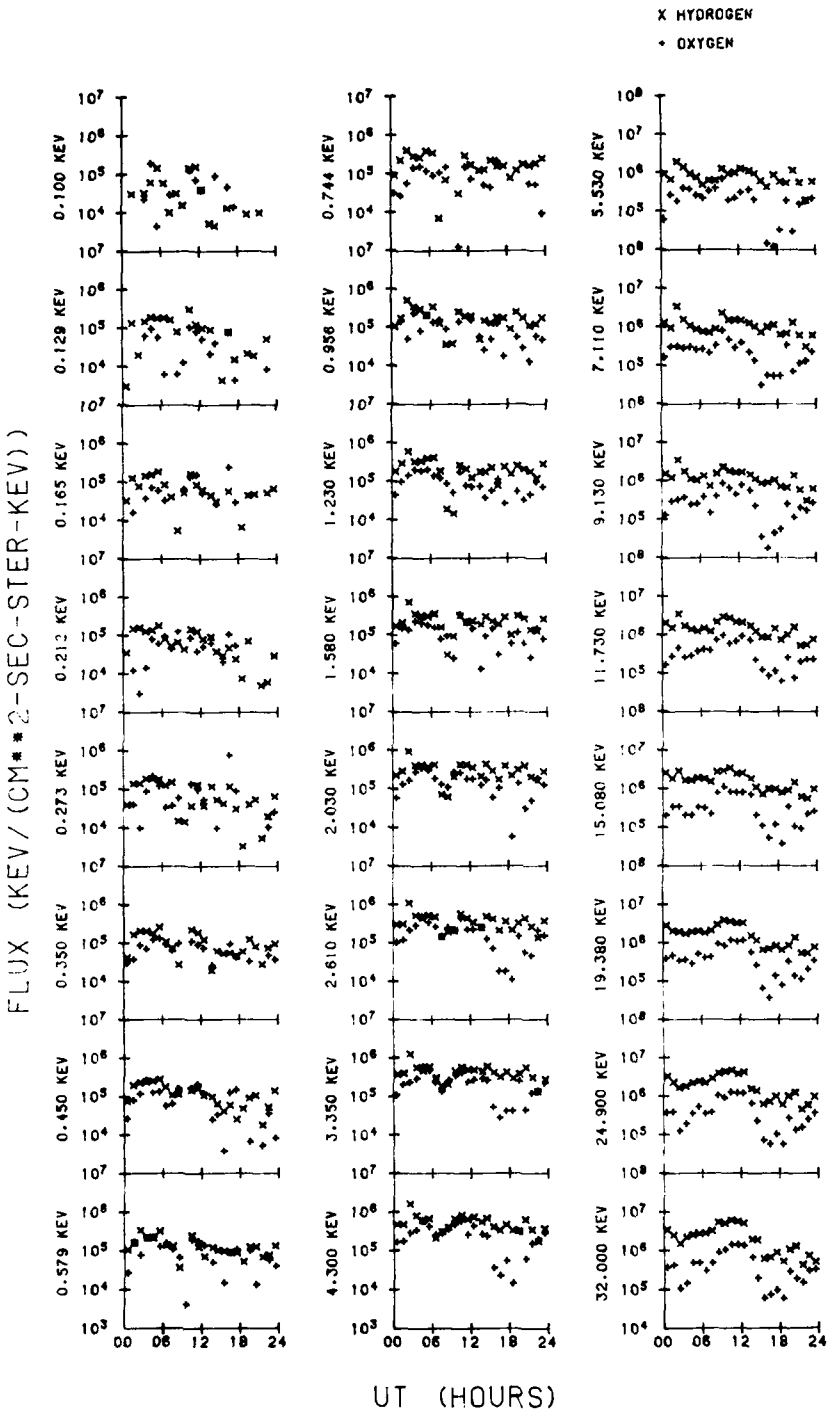
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UT (HOURS)

DAY 88

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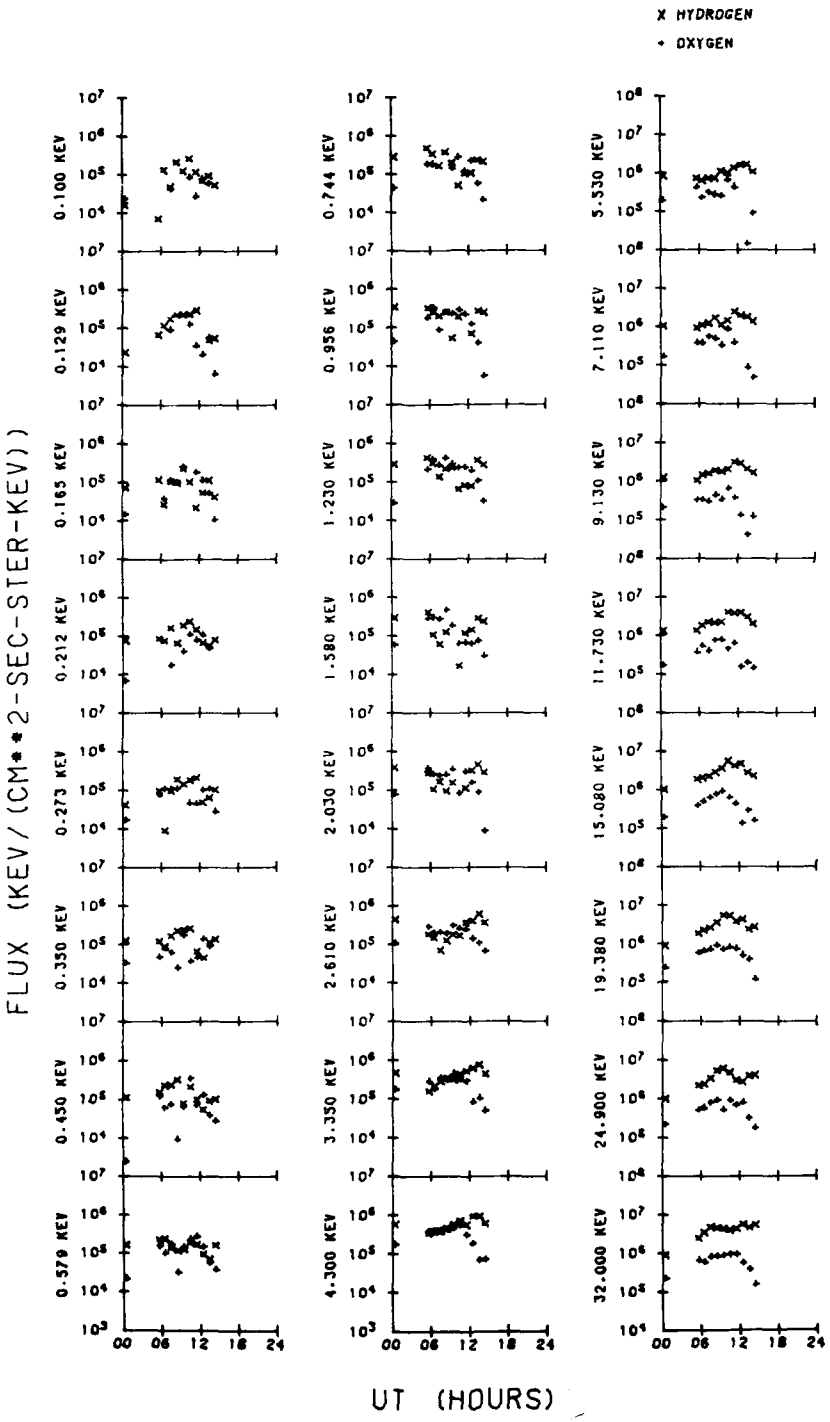
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UT (HOURS)

DAY 89

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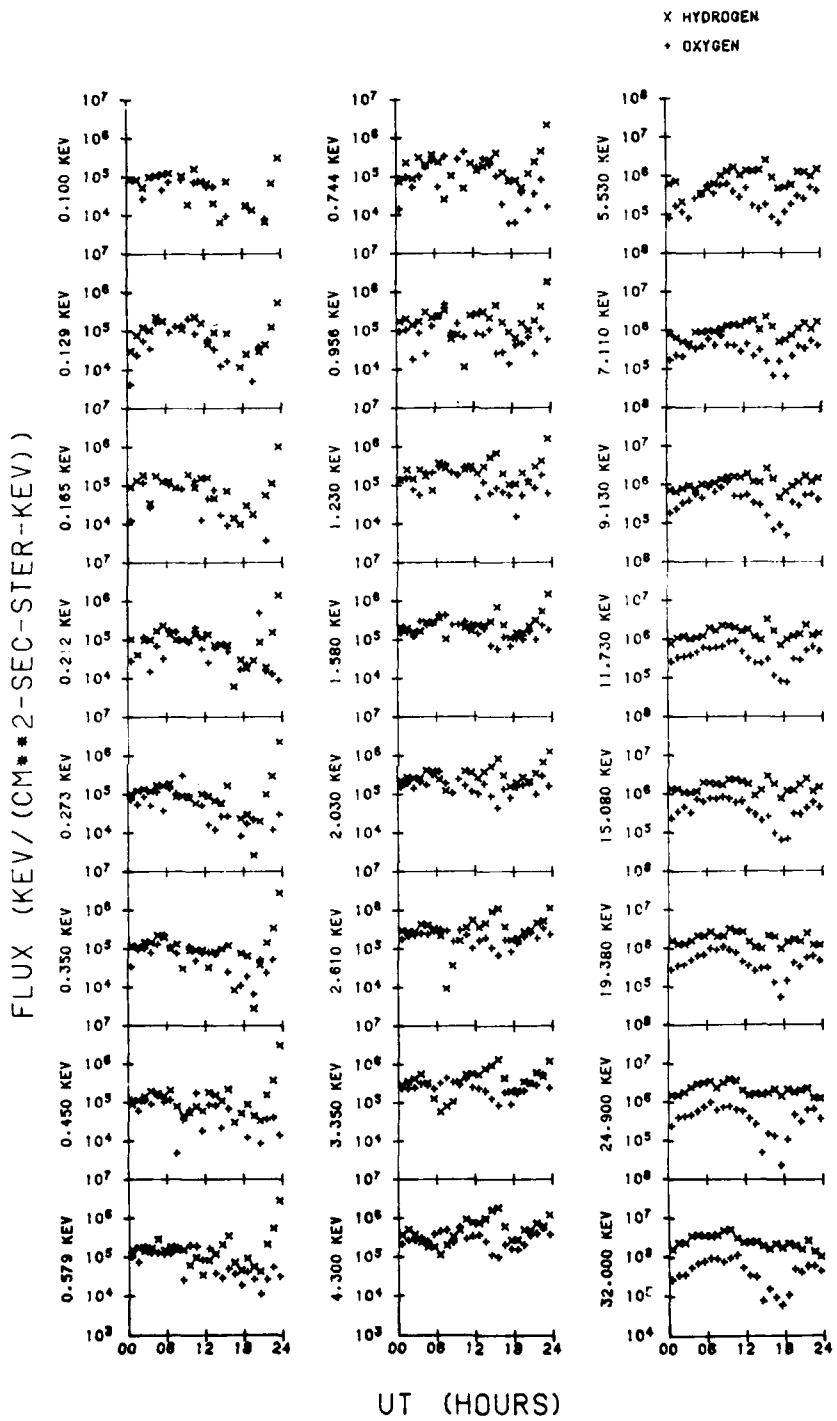
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UT (HOURS)

DAY 93

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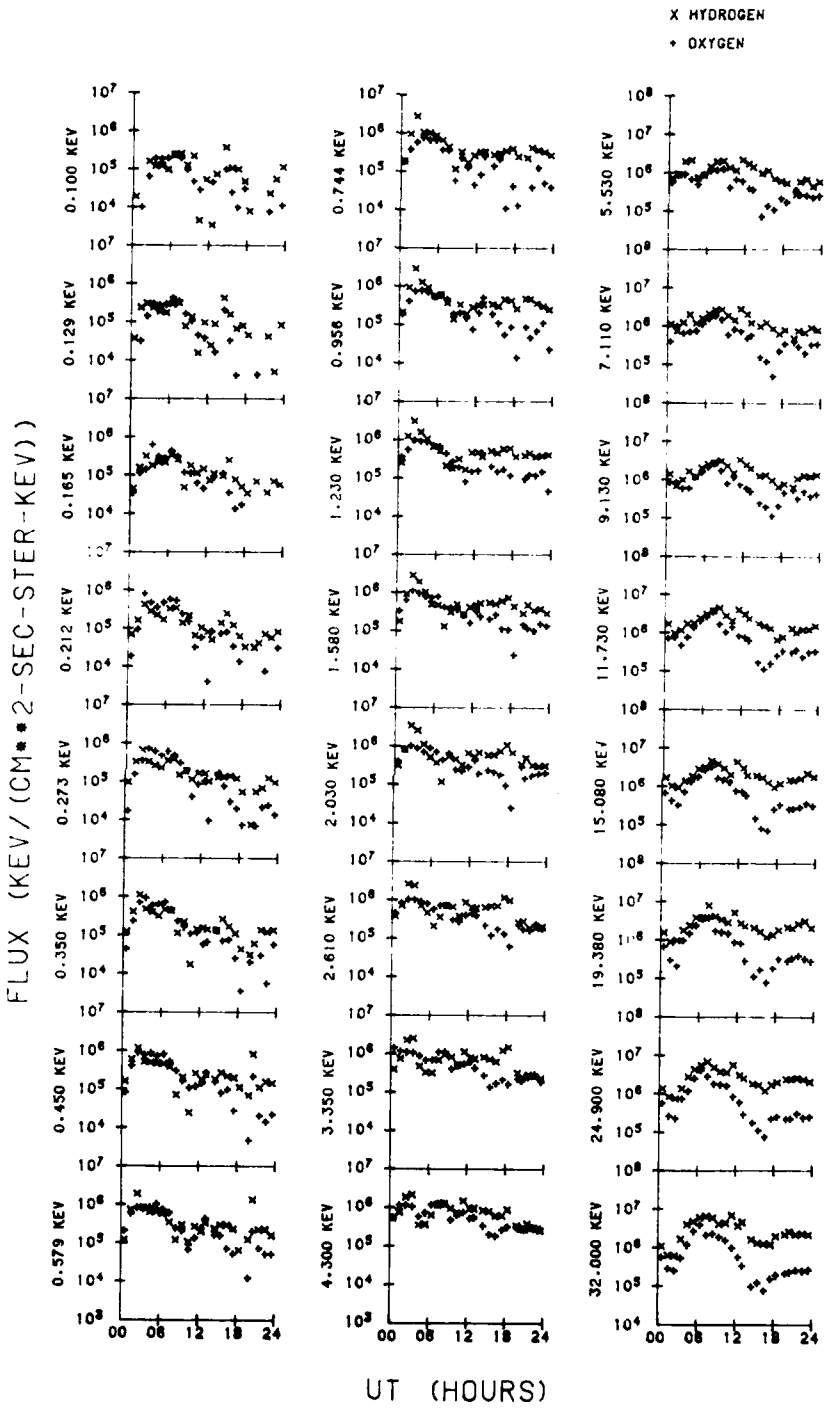
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UT (HOURS)

DAY 94

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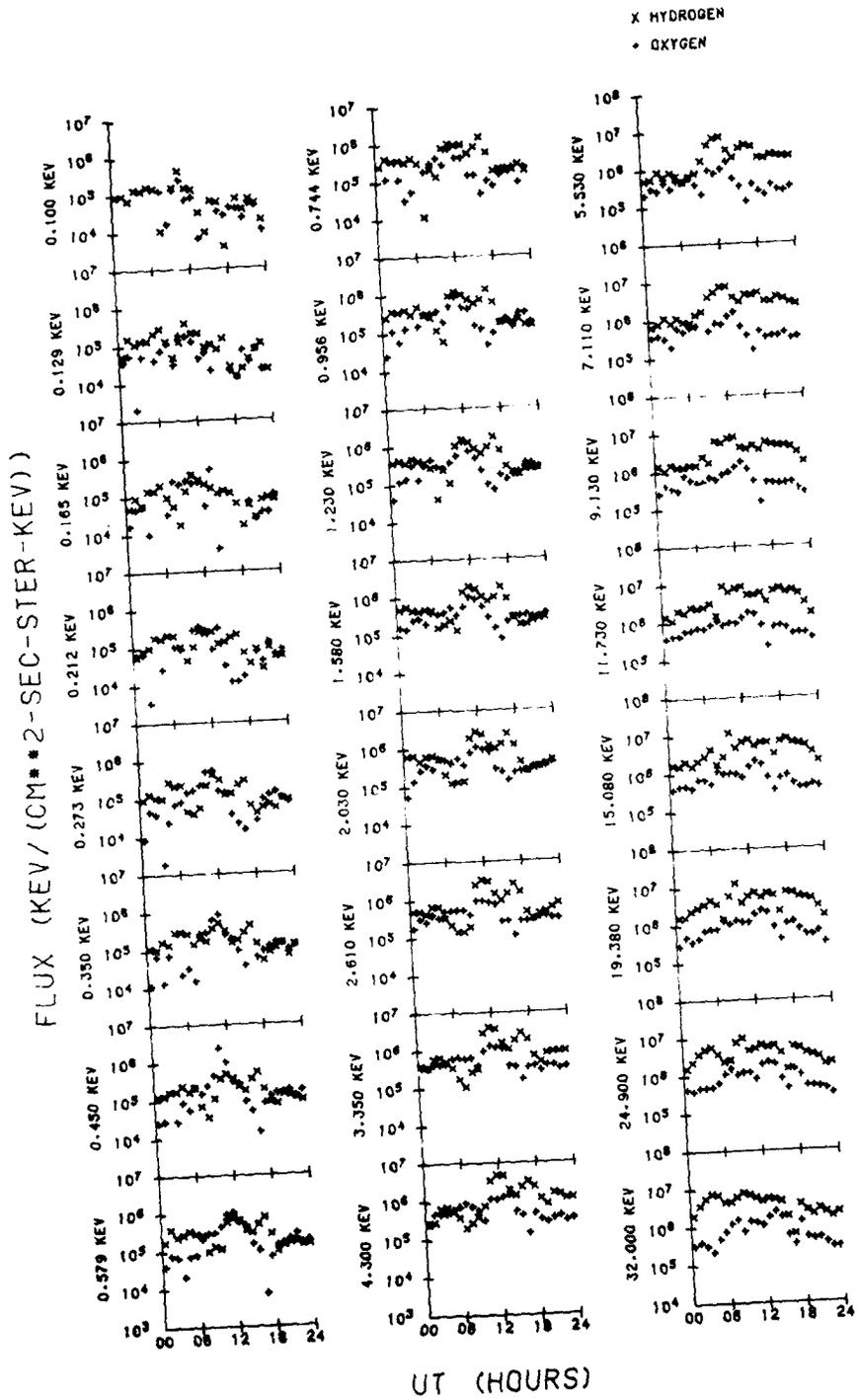
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UT (HOURS)

DAY 95

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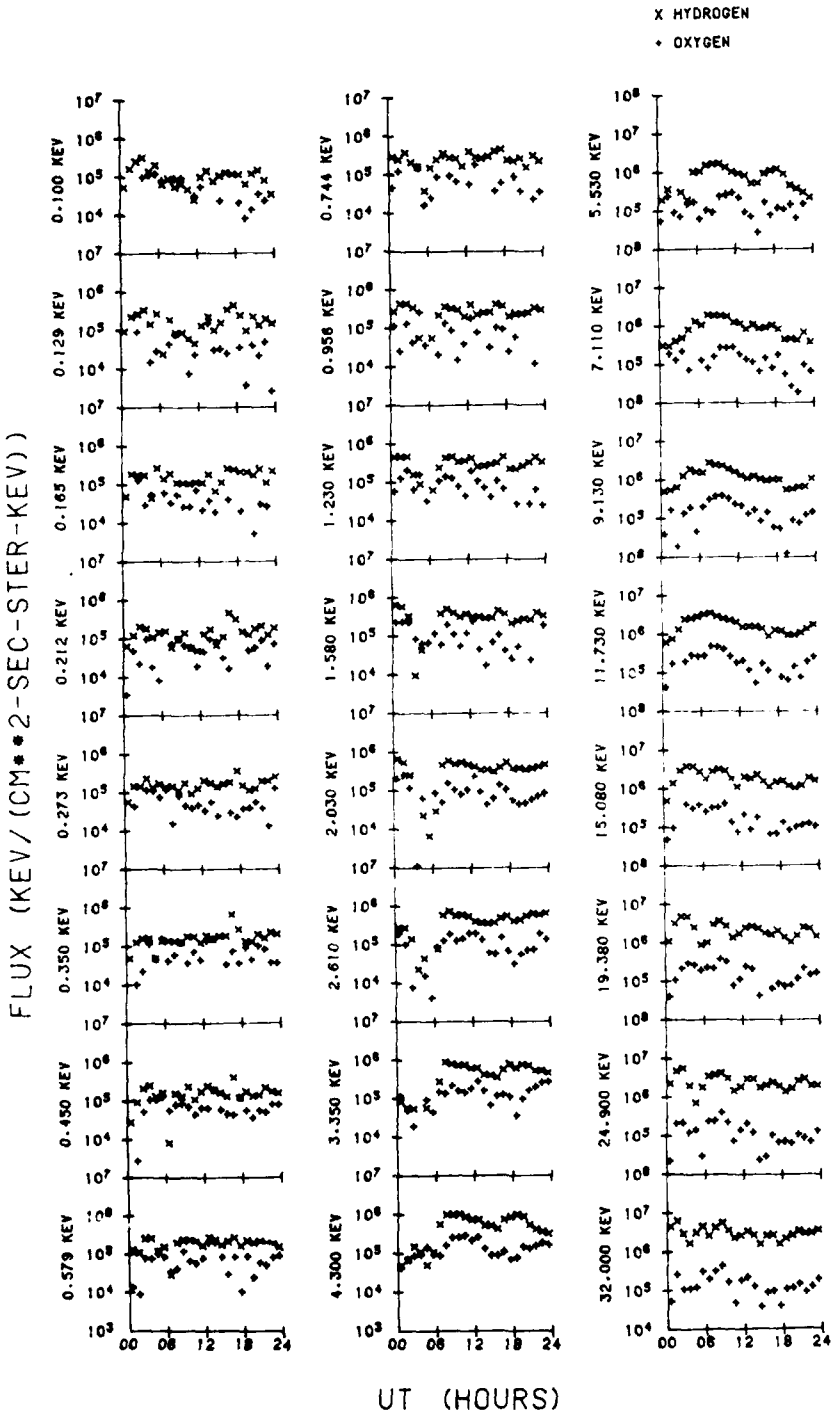
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UT (HOURS)

DAY 103

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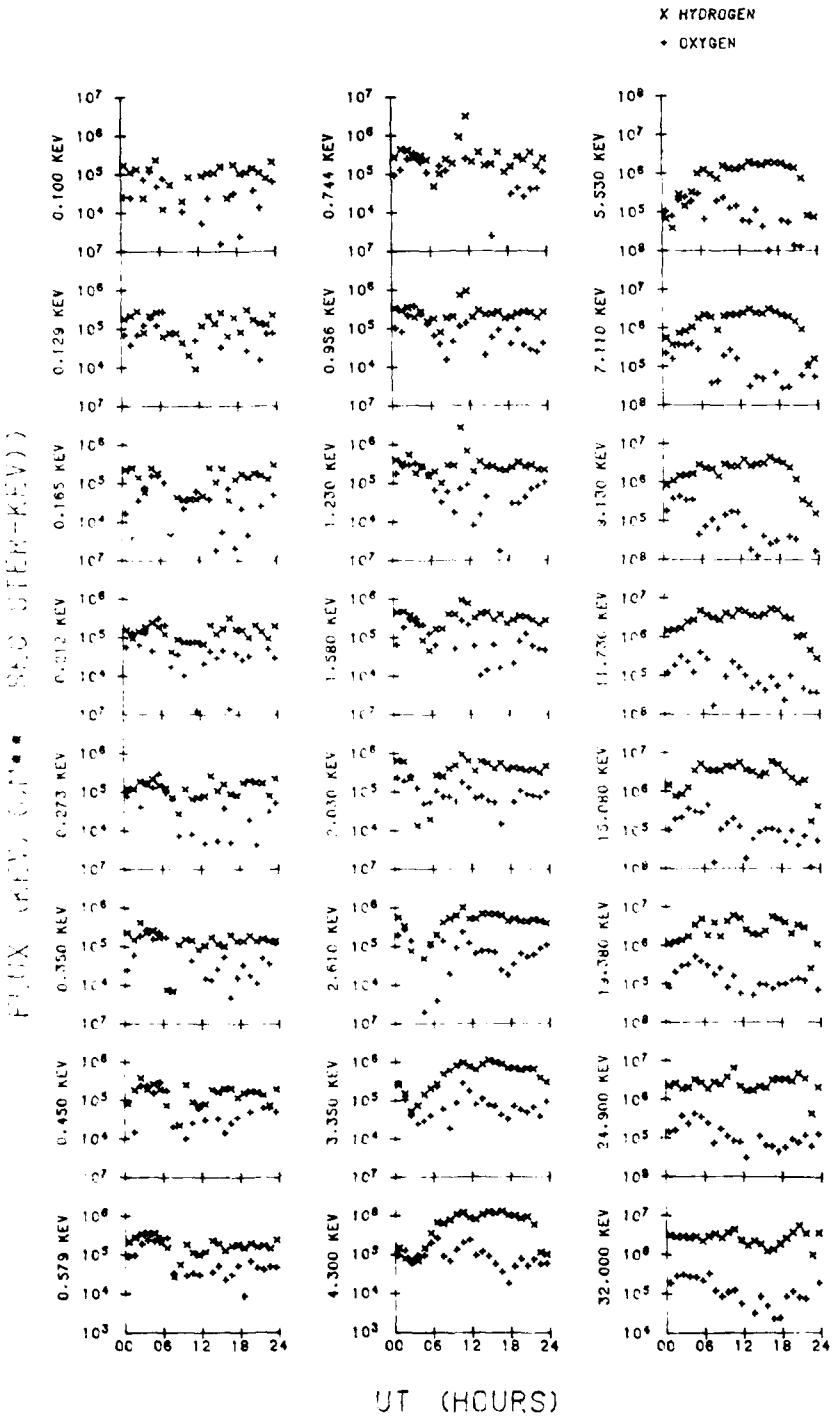
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UT (HOURS)

DAY 104

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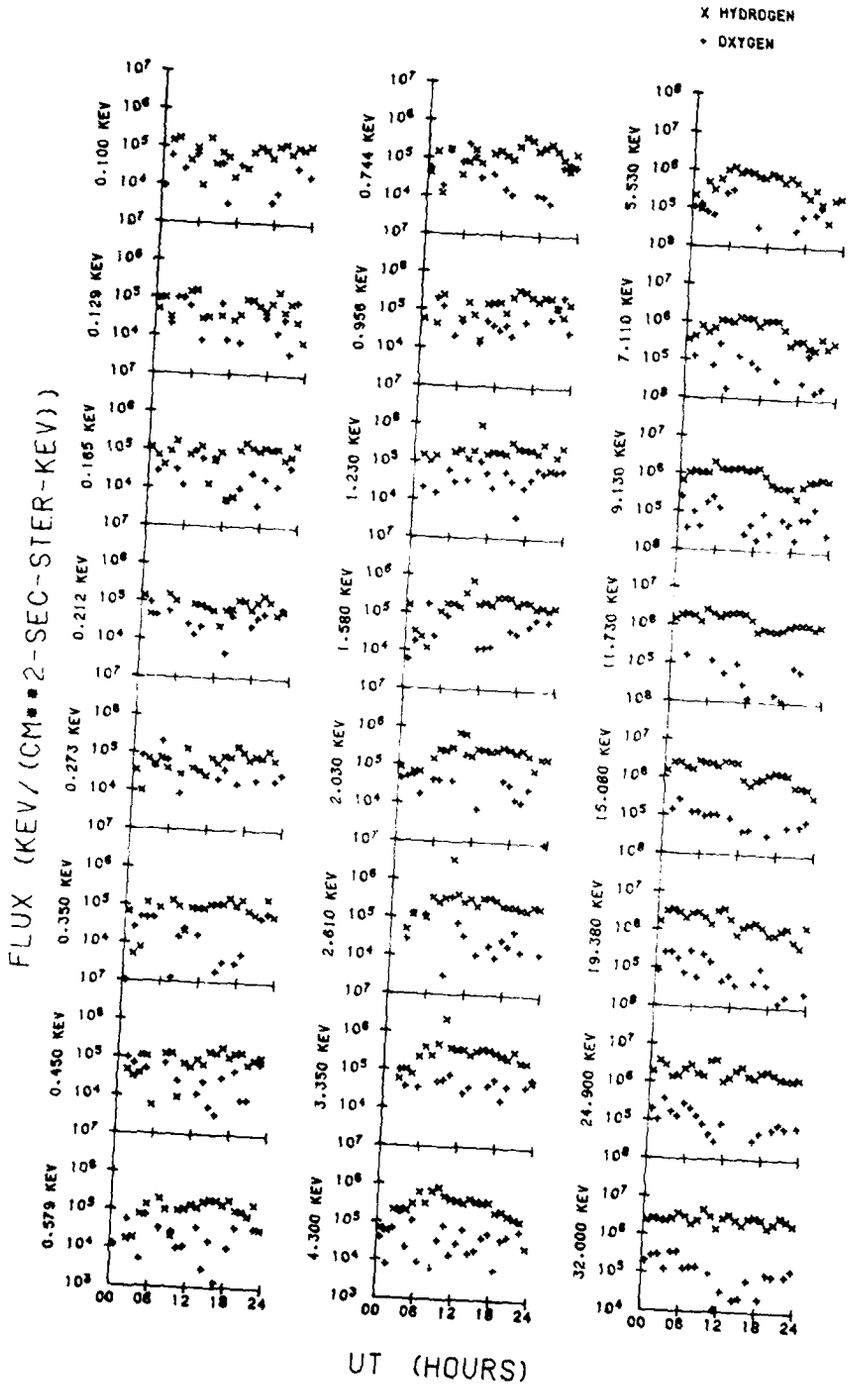
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UT (HOURS)

DAY 108

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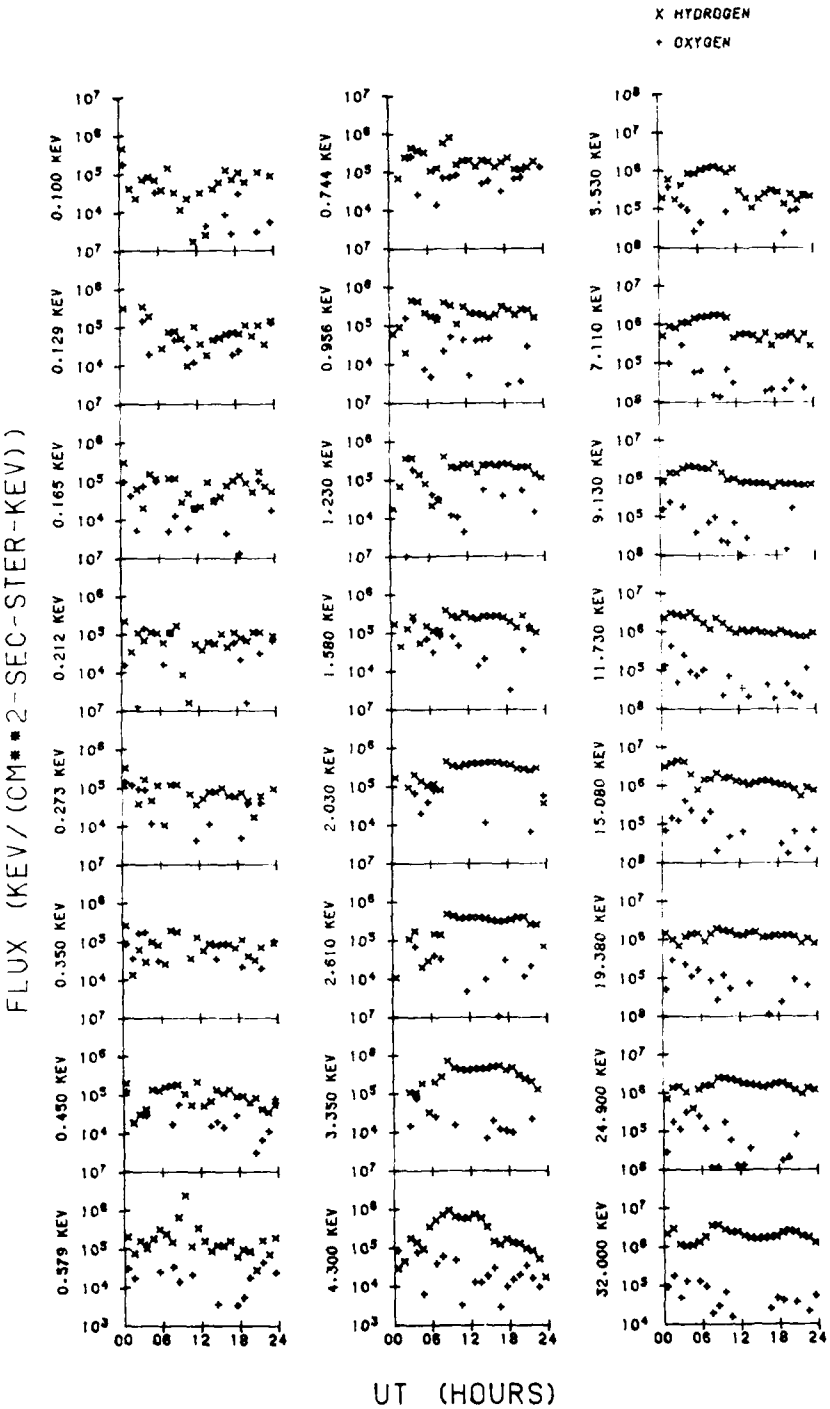
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UT (HOURS)

DAY 110

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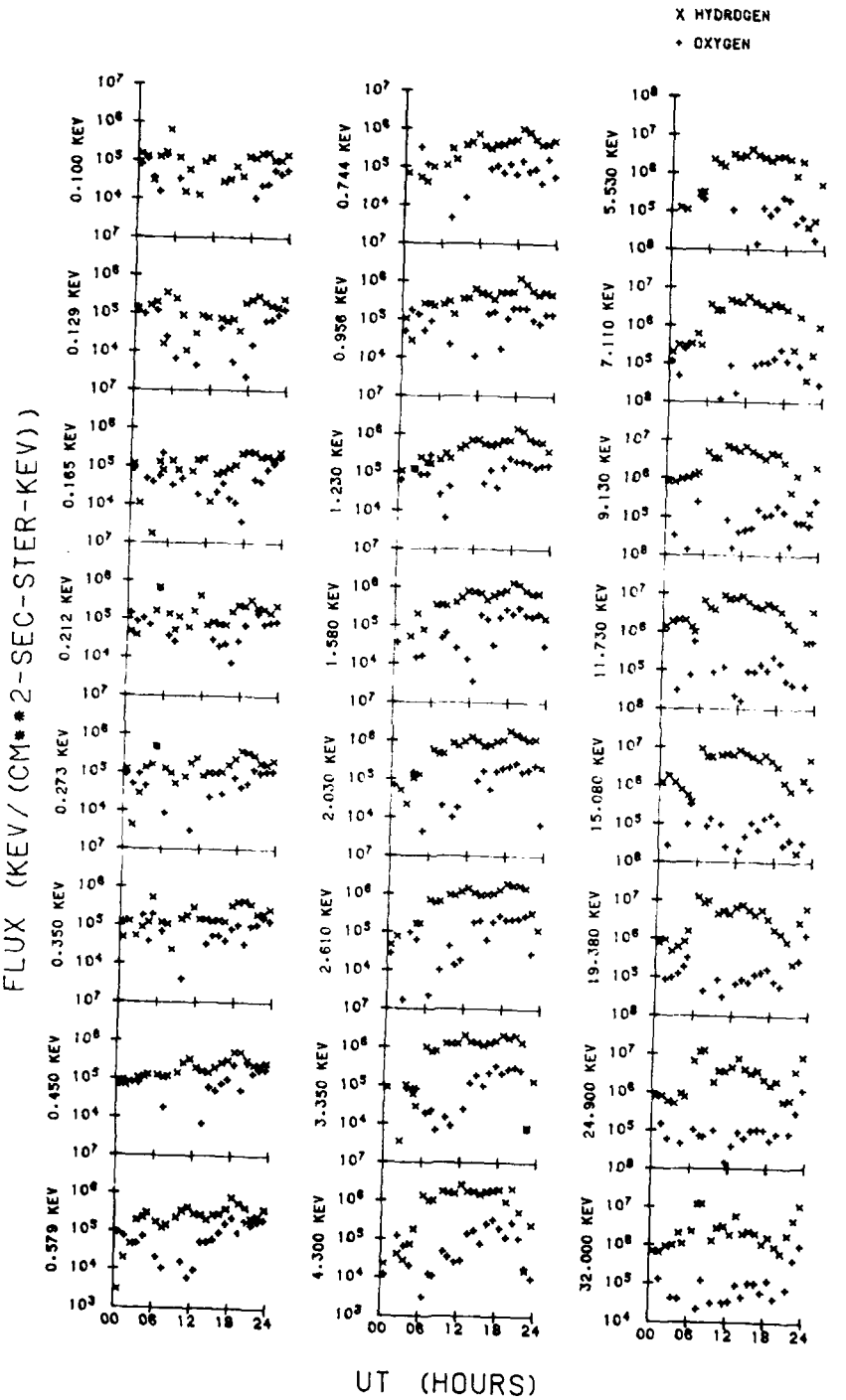
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UT (HOURS)

DAY 111

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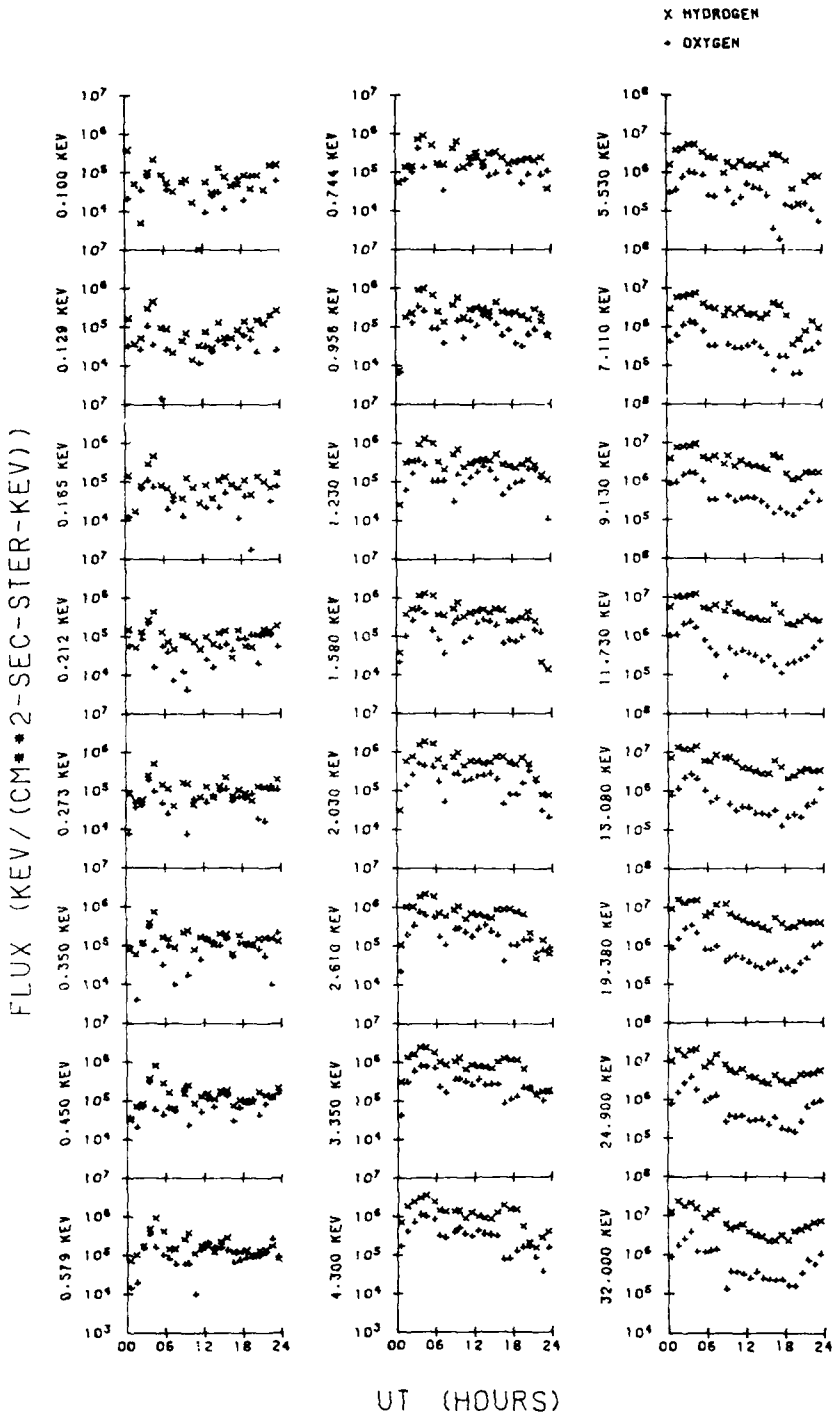
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UT (HOURS)

DAY 112

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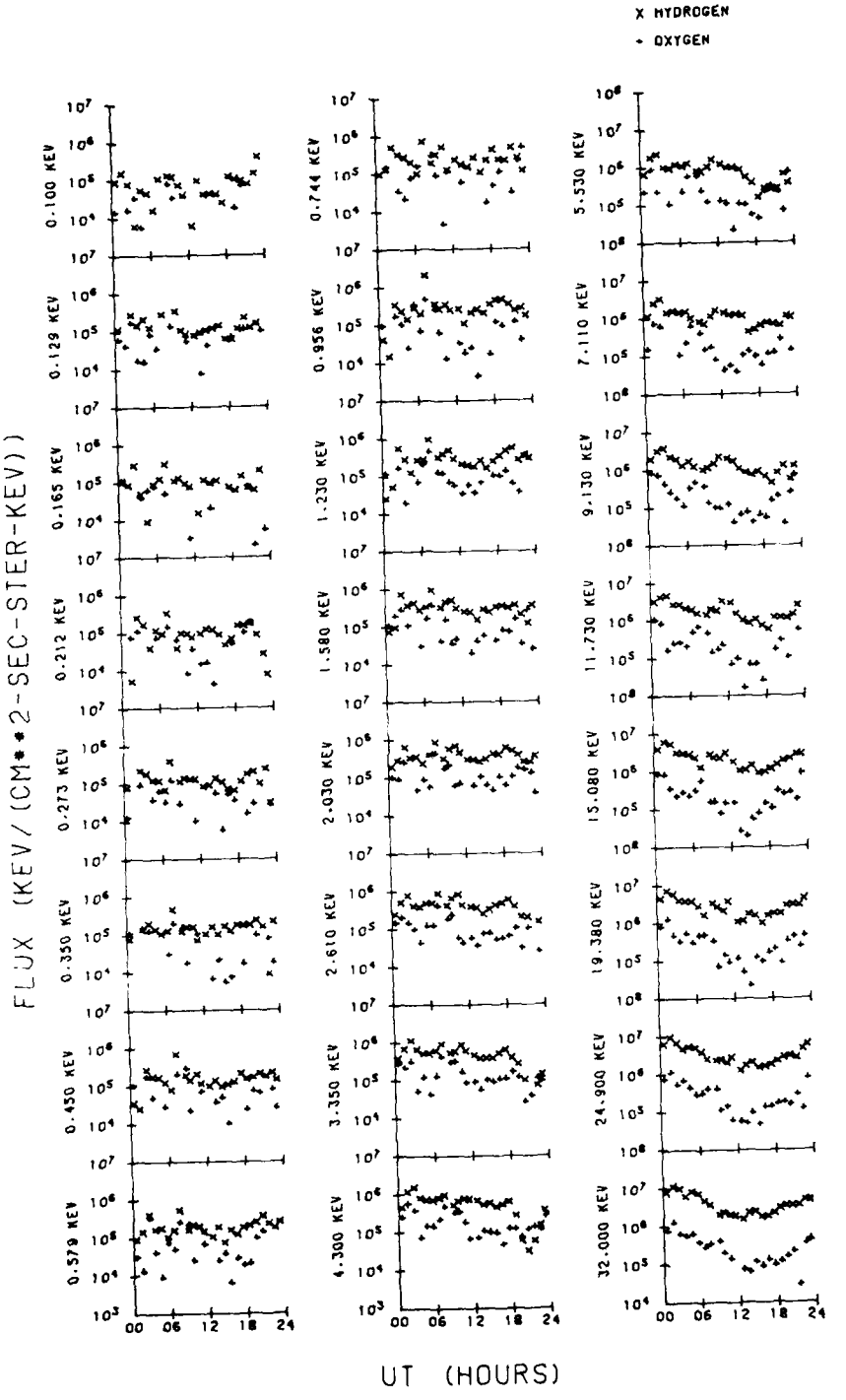
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UT (HOURS)

DAY 113

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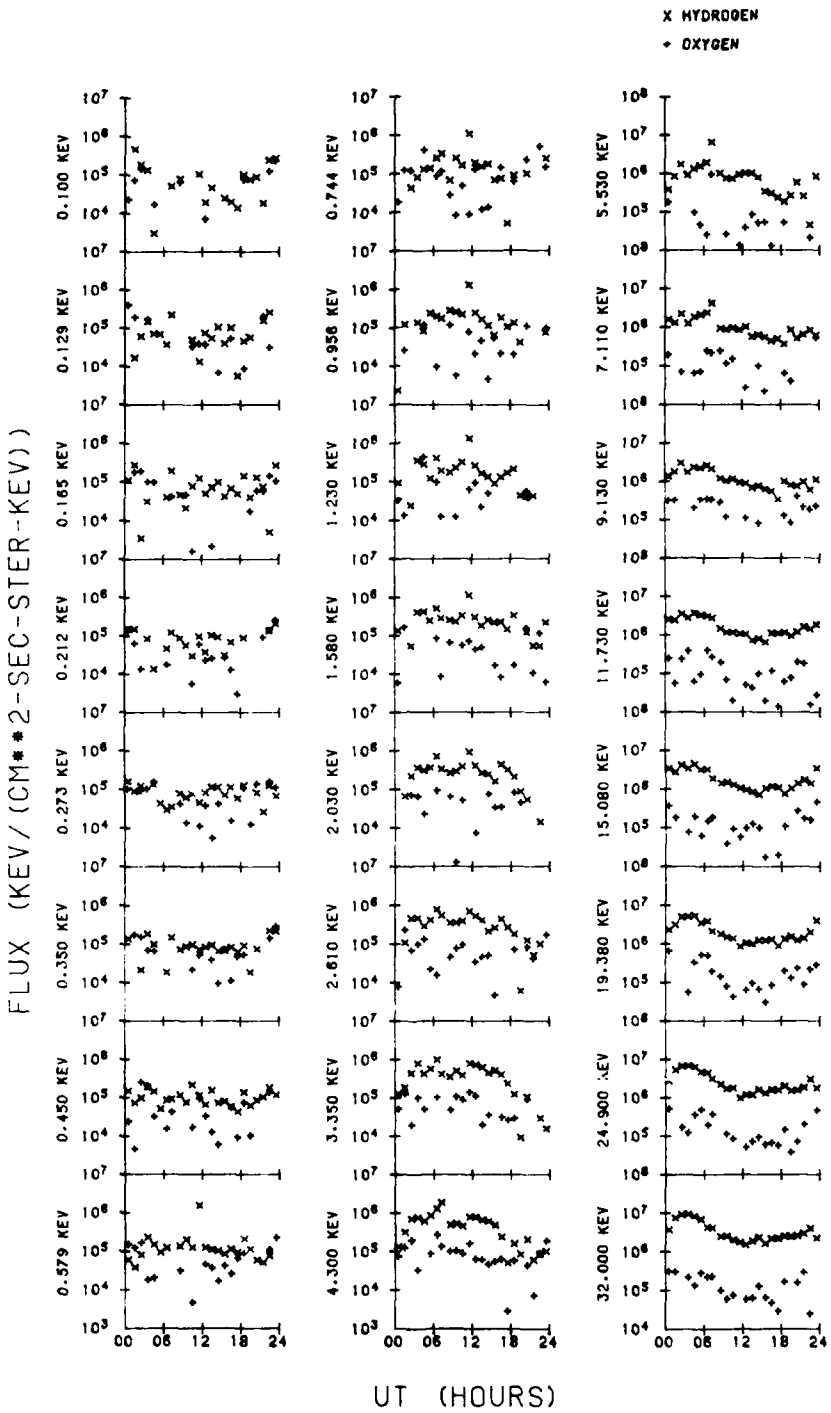
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UT (HOURS)

DAY 114

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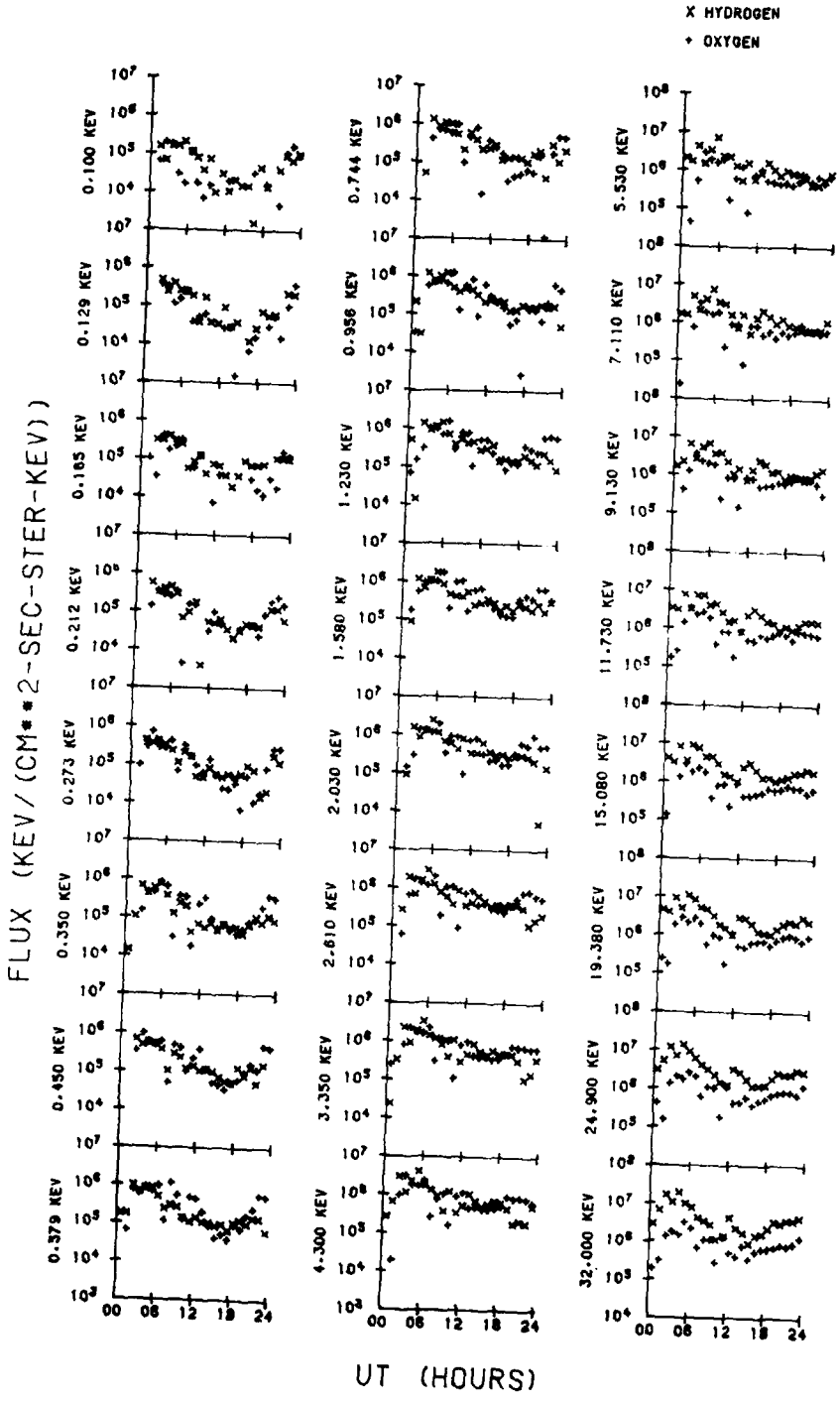
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DAY 115

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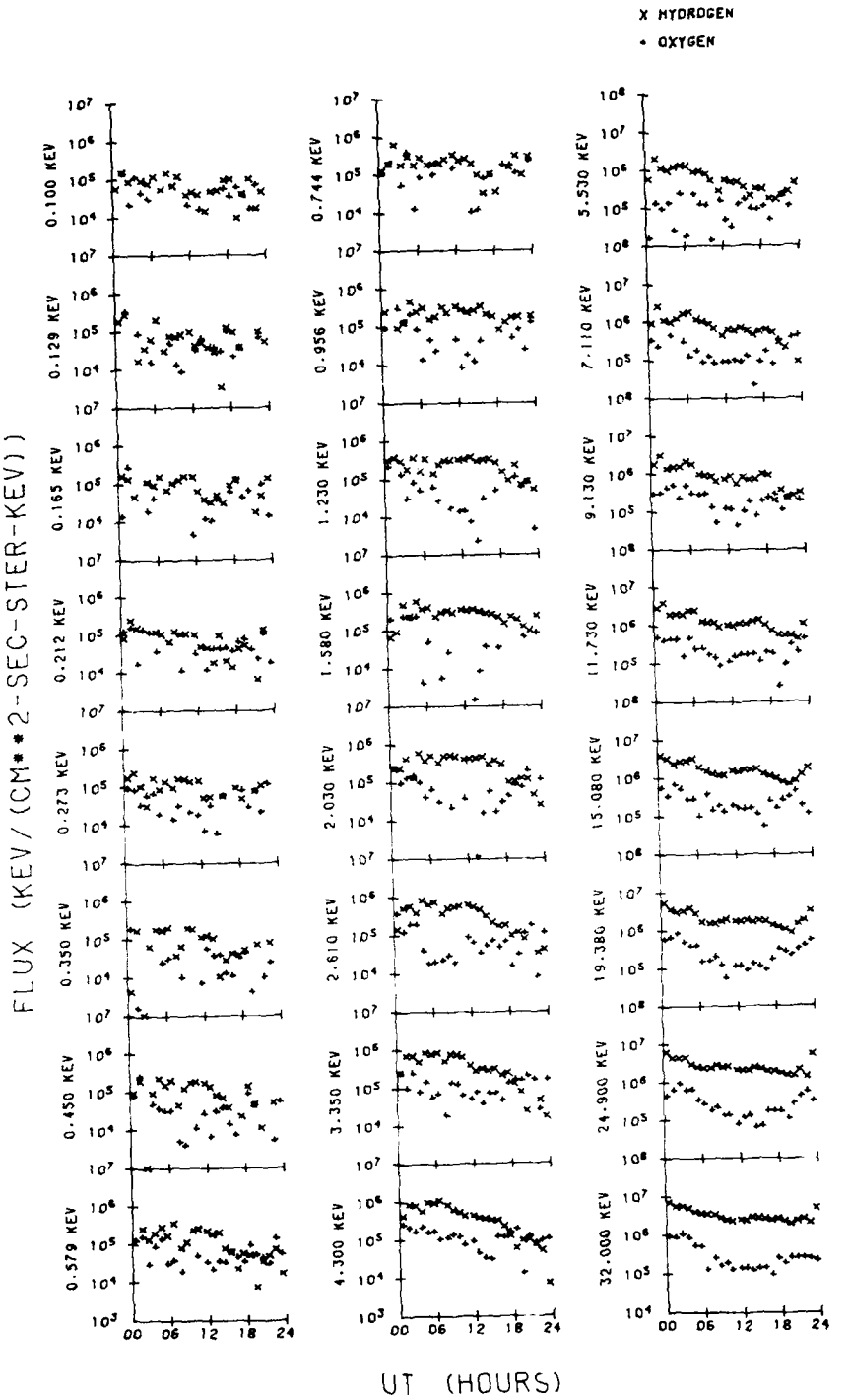
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DAY 116

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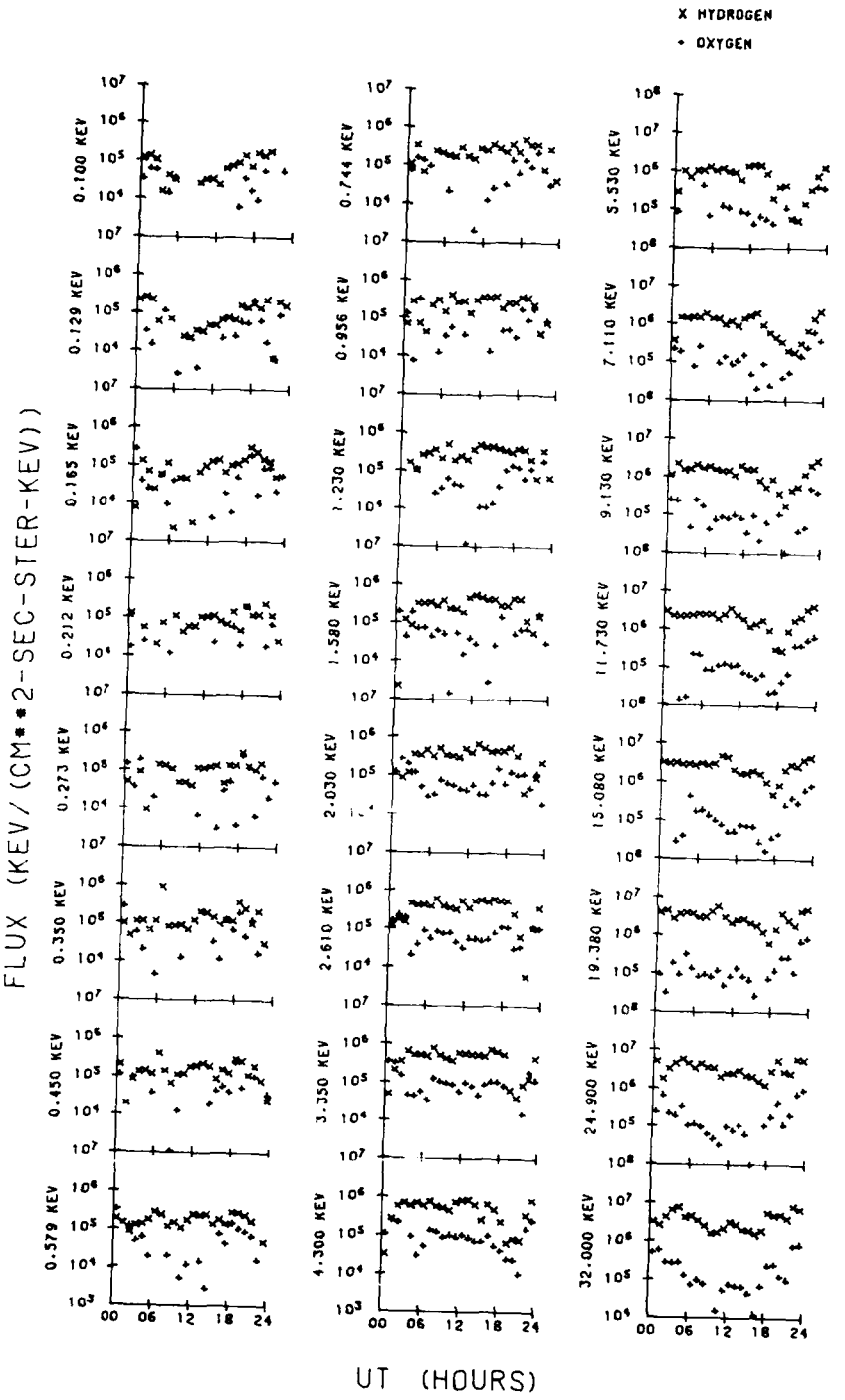
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FLUX (KEV/(CM**2-SEC-STER-KEV))
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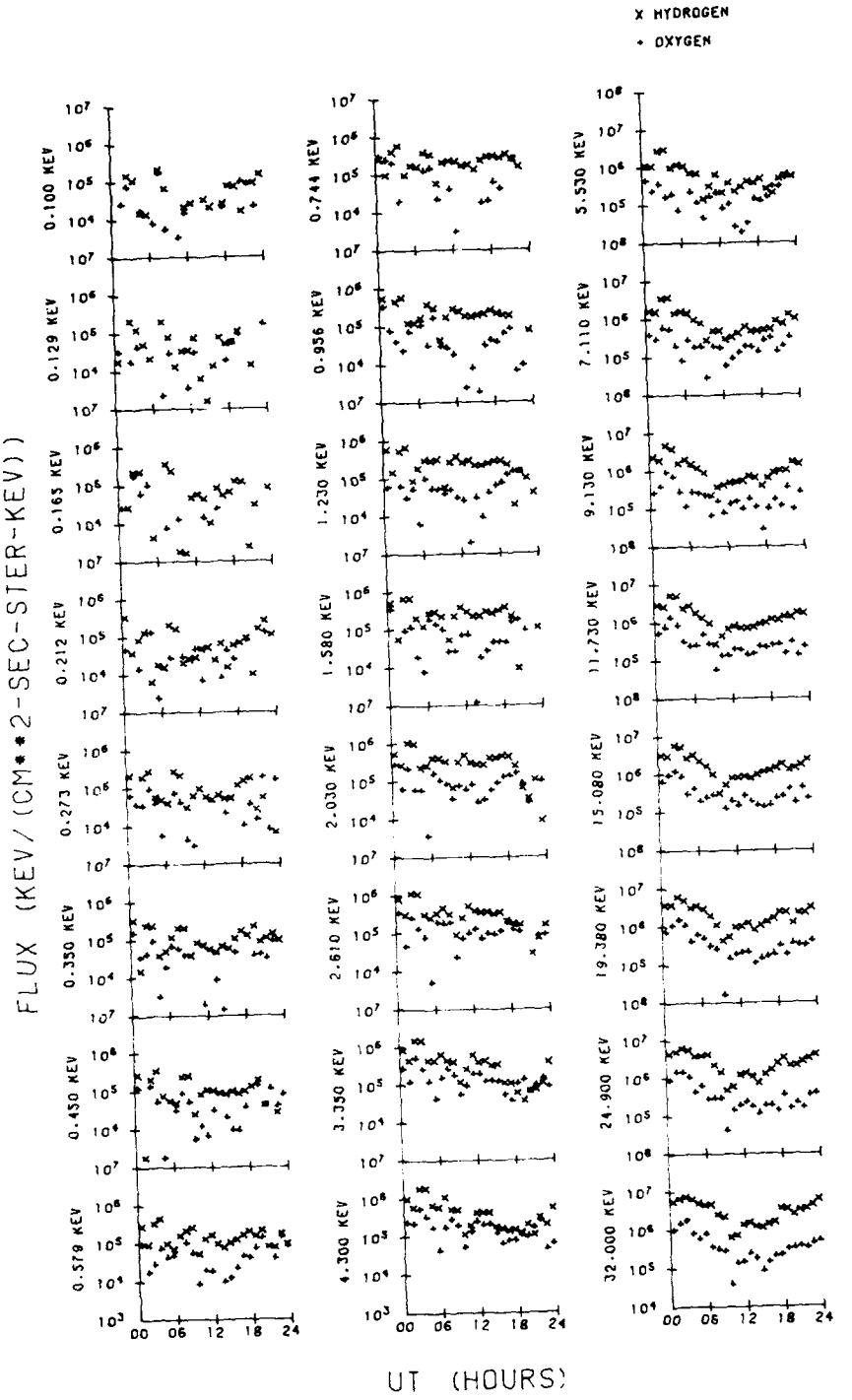
UT (HOURS)

DAY 117

IONS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00 06 12 18 24
UT (HOURS)

DAY 118

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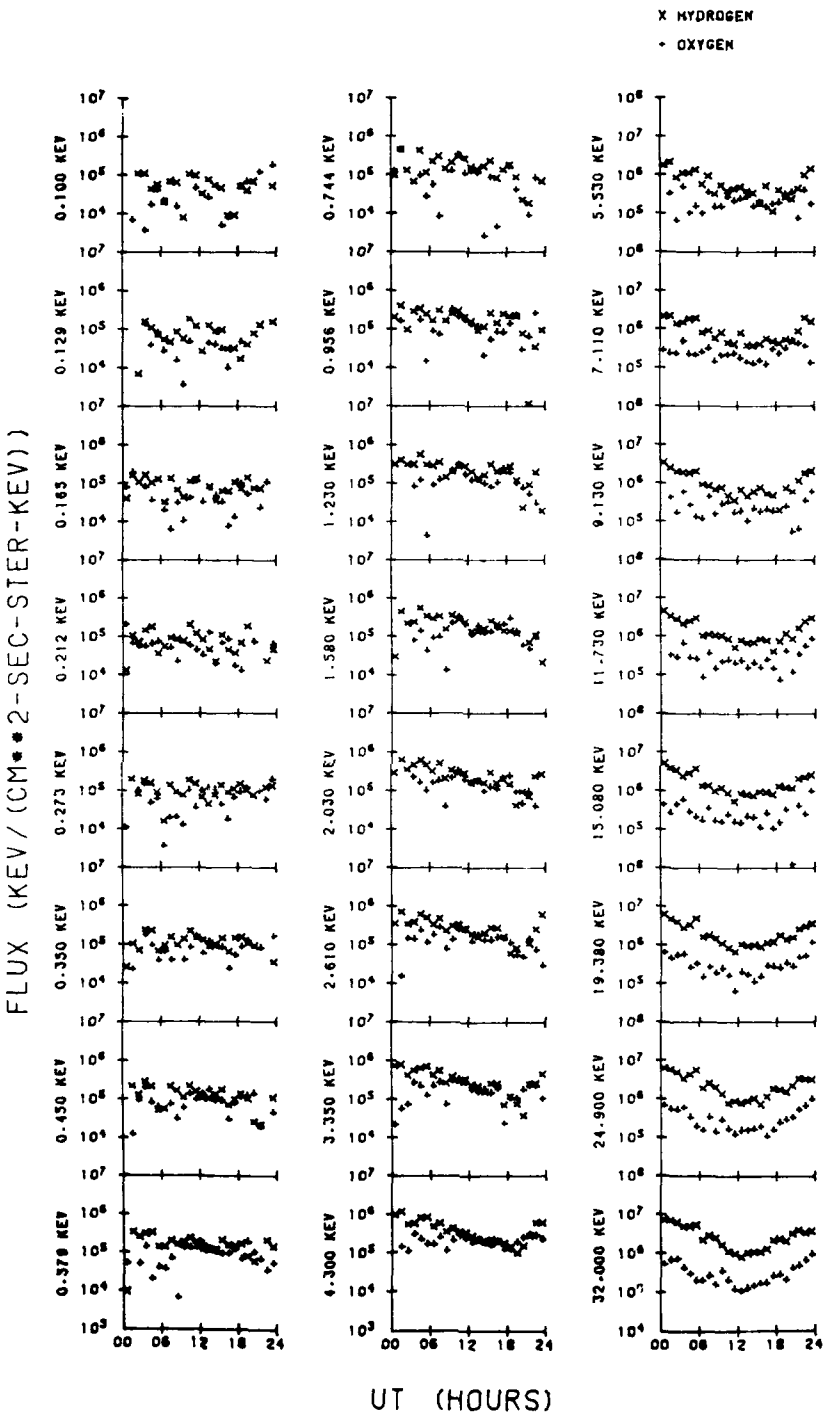
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UT (HOURS)

DAY 119

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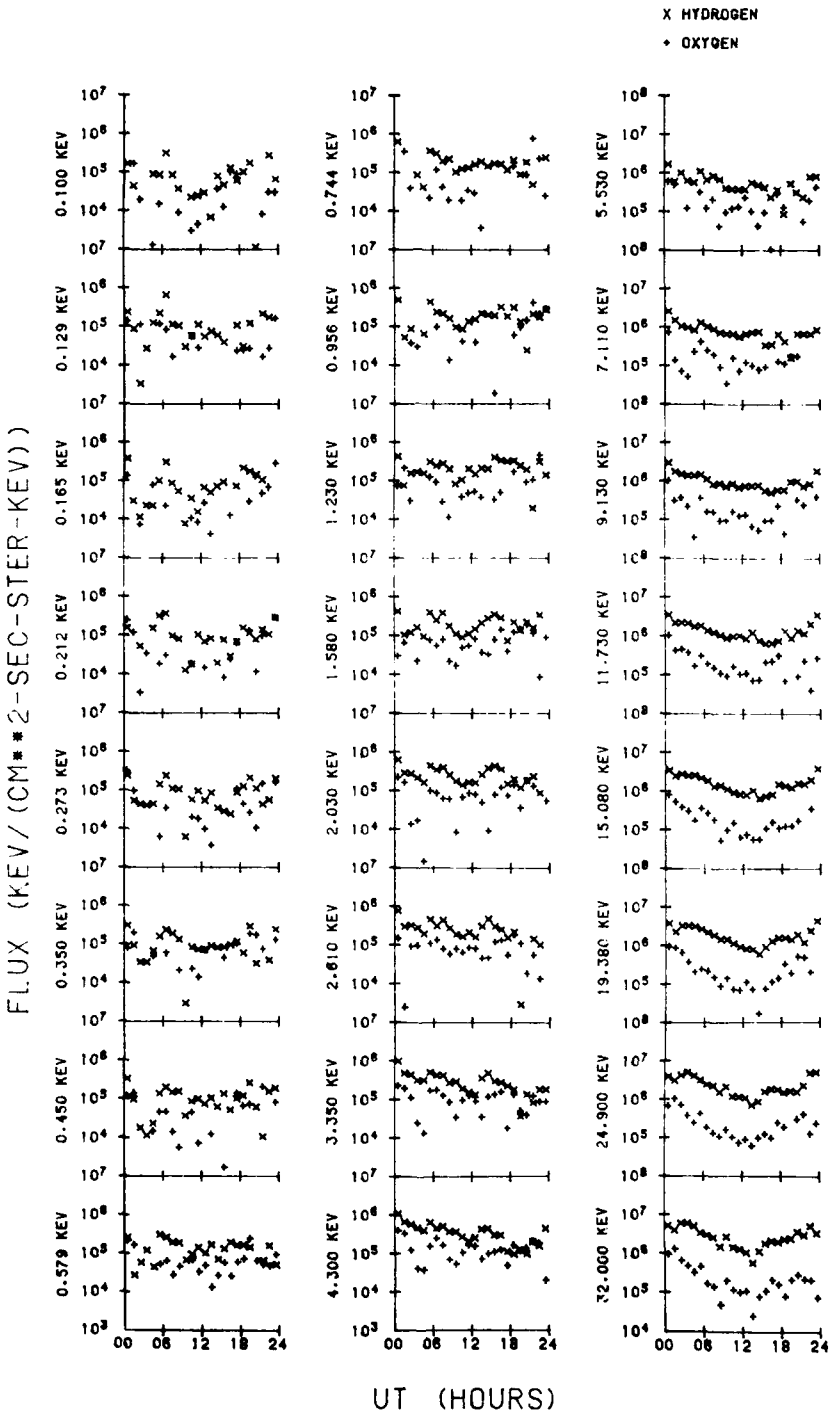
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UT (HOURS)

DAY 120

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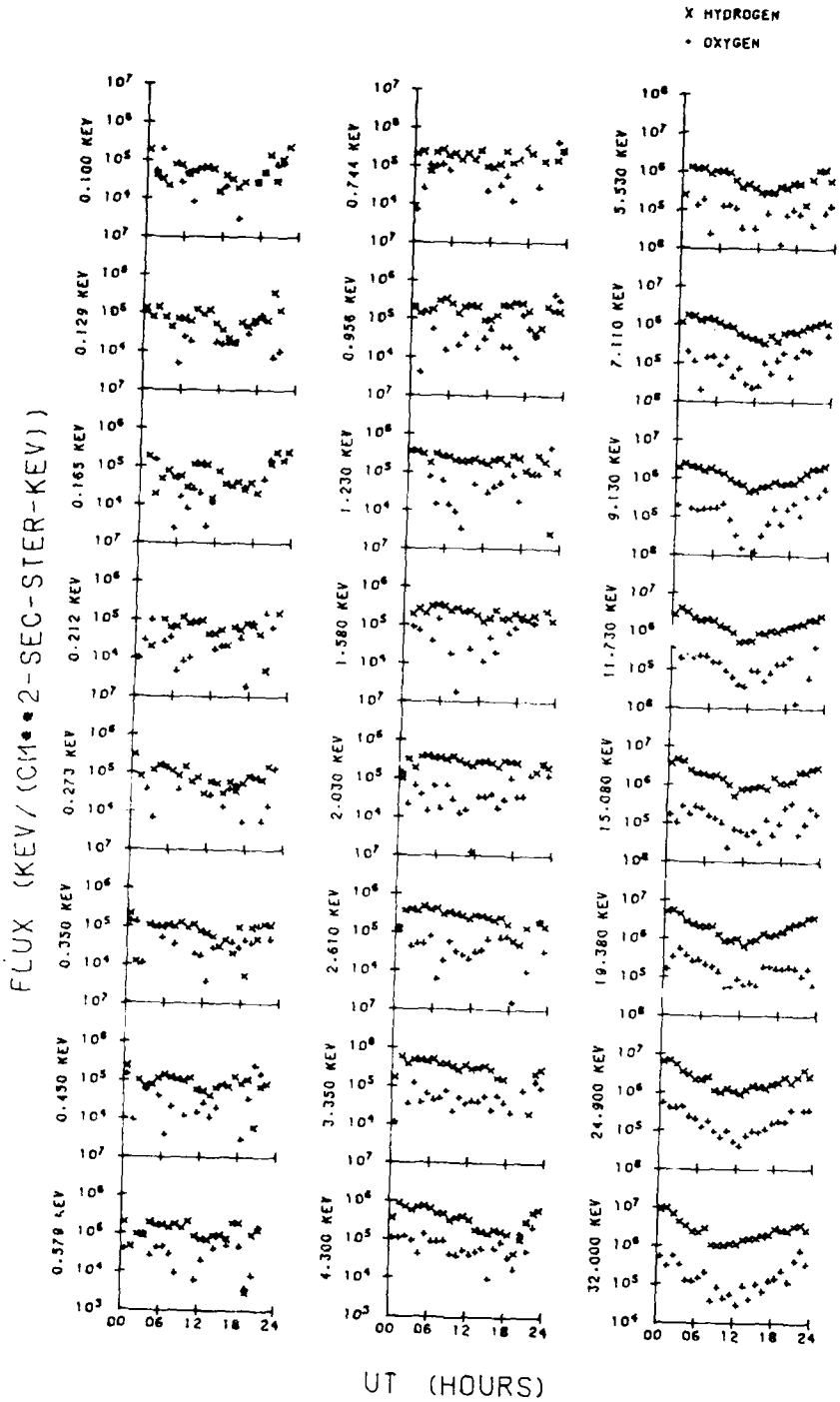
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UT (HOURS)

DAY 122

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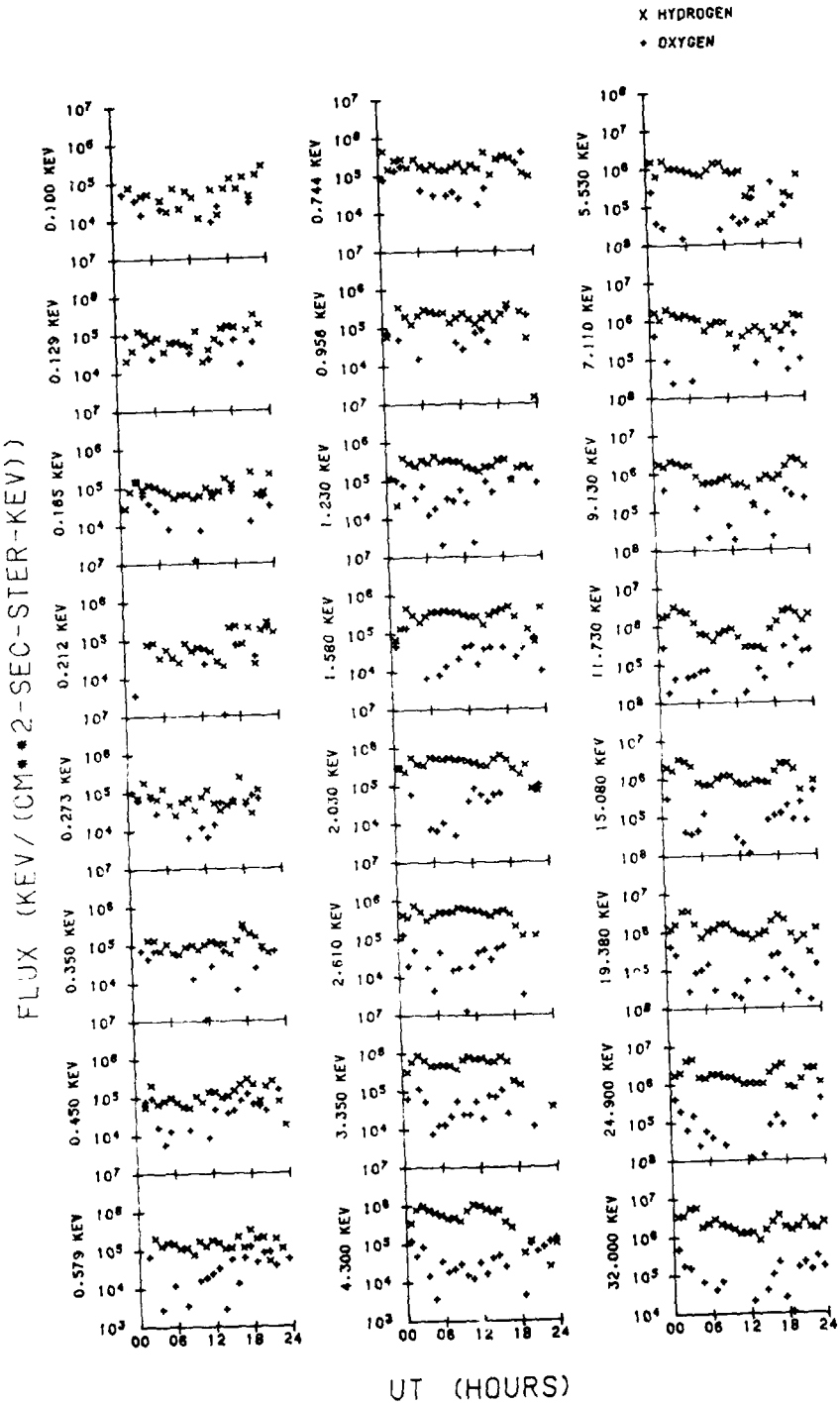
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UT (HOURS)

DAY 123

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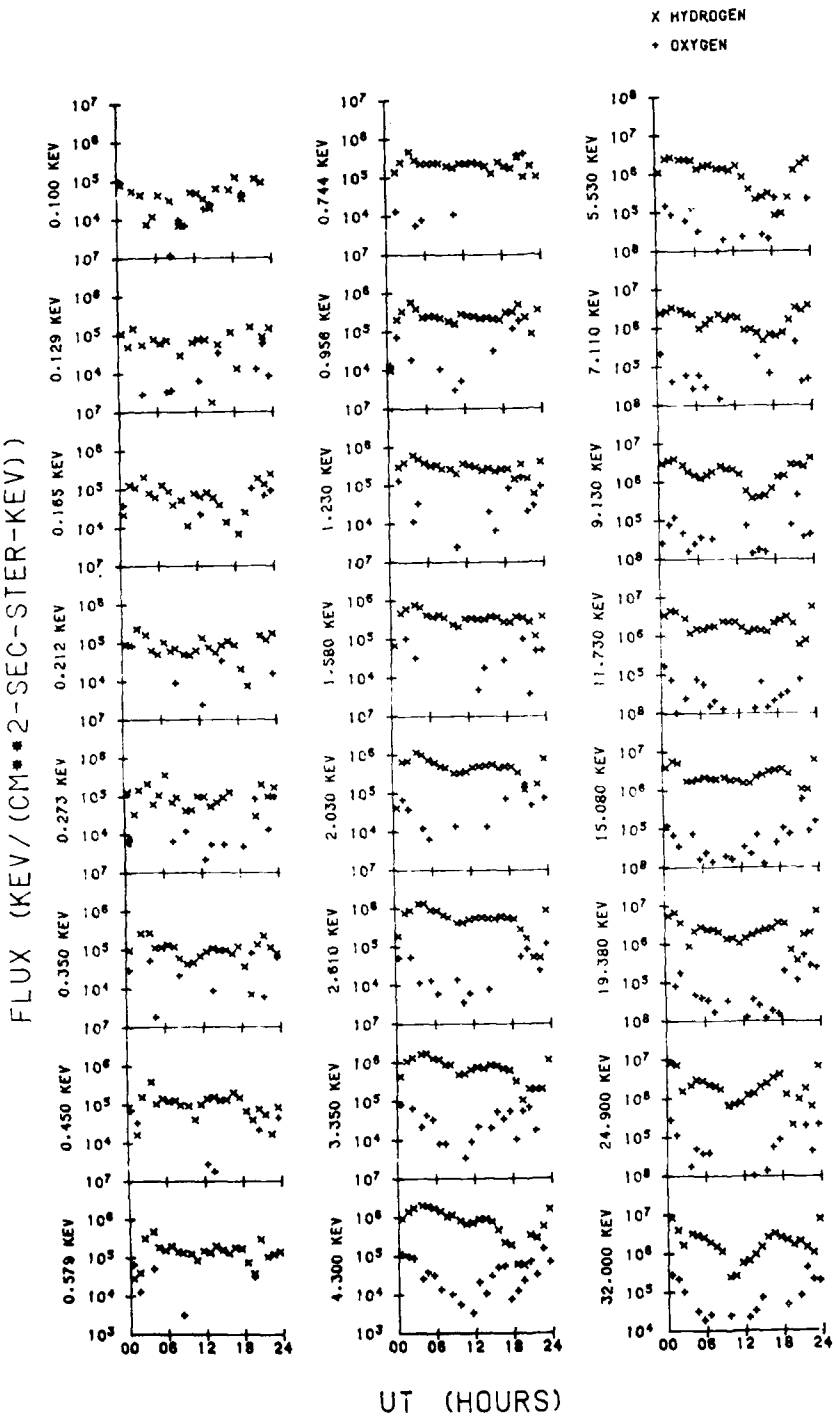
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UT (HOURS)

DAY 124

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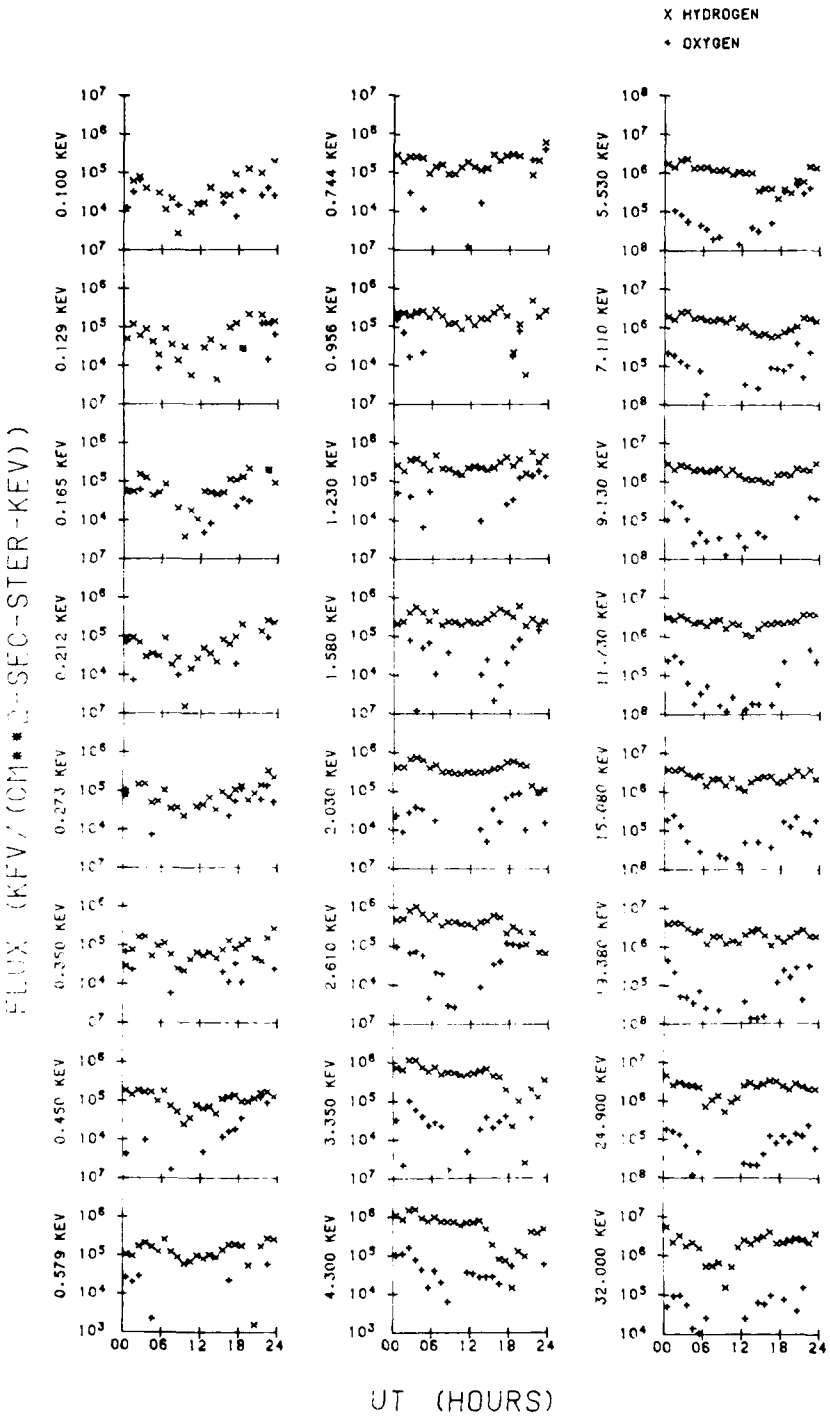
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UT (HOURS)

DAY 125

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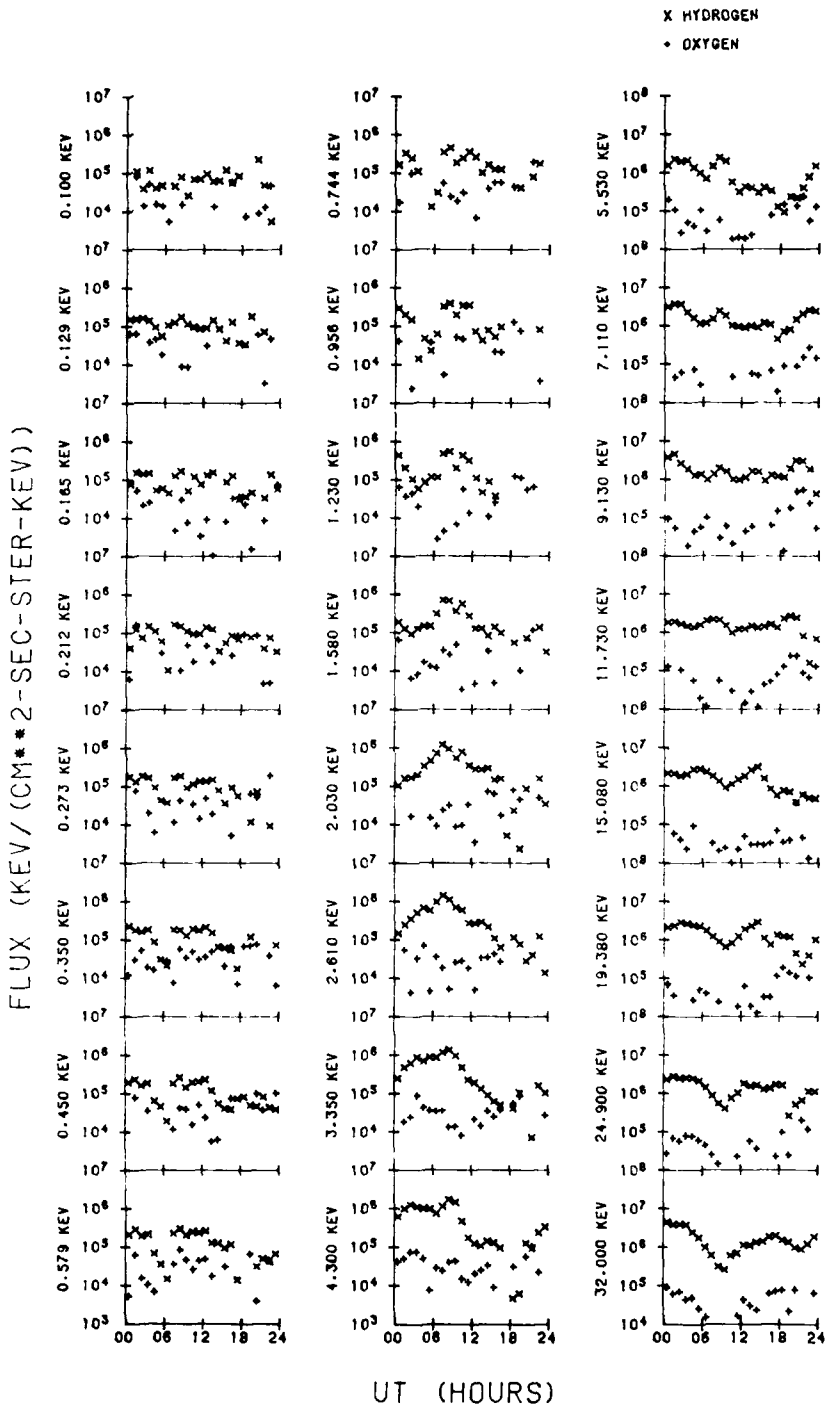
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UT (HOURS)

DAY 126

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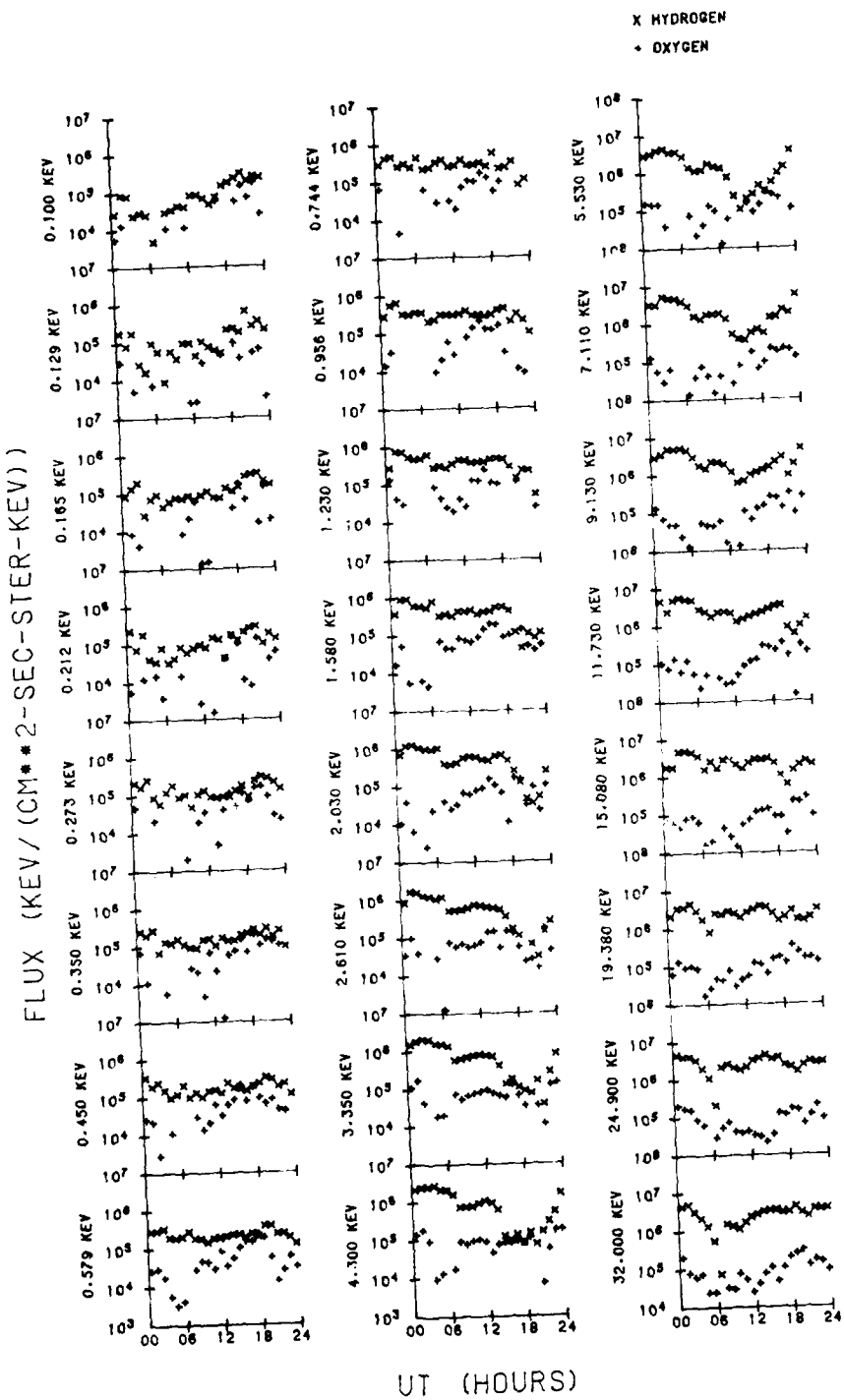
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UT (HOURS)

DAY 128

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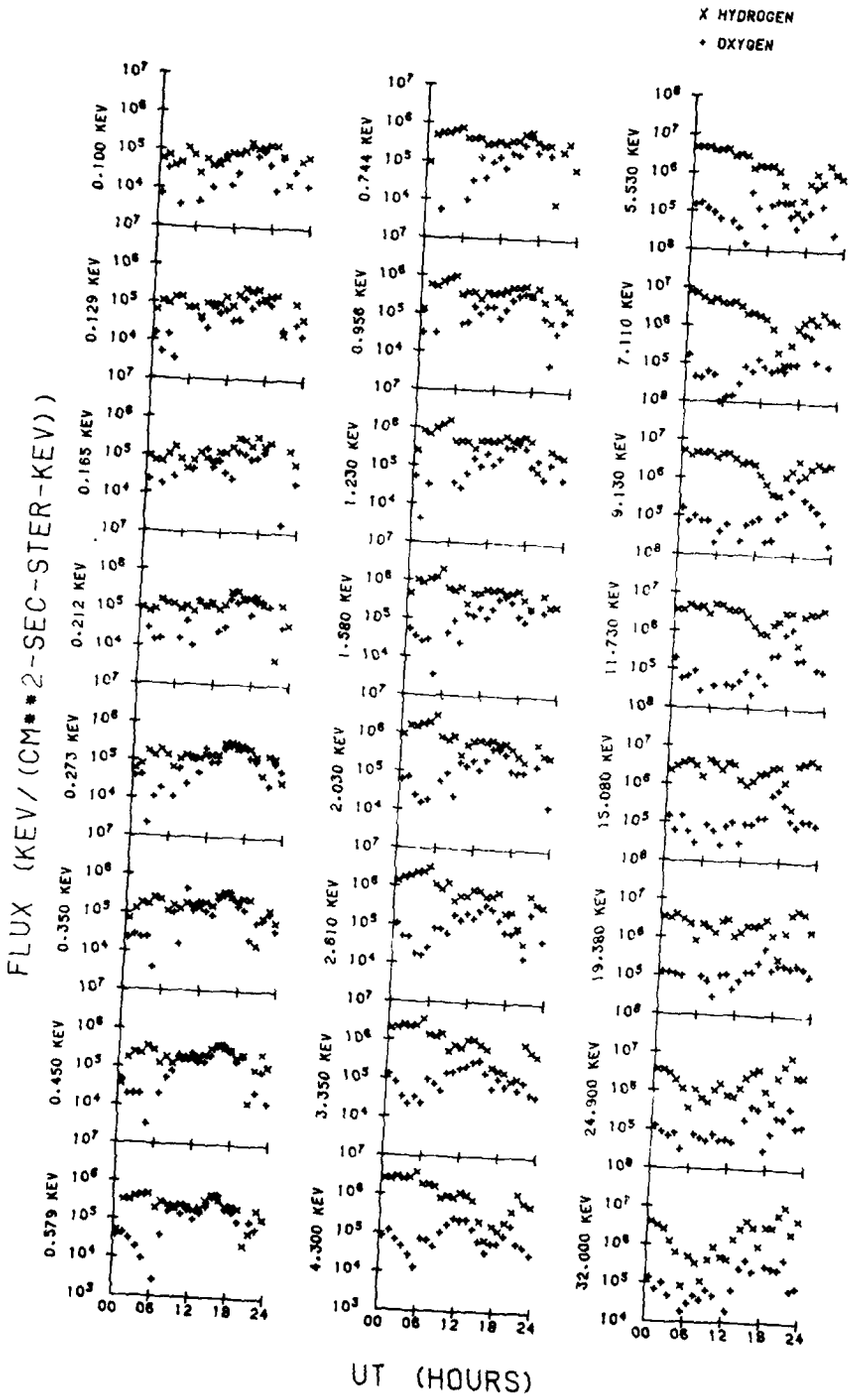
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UT (HOURS)

DAY 129

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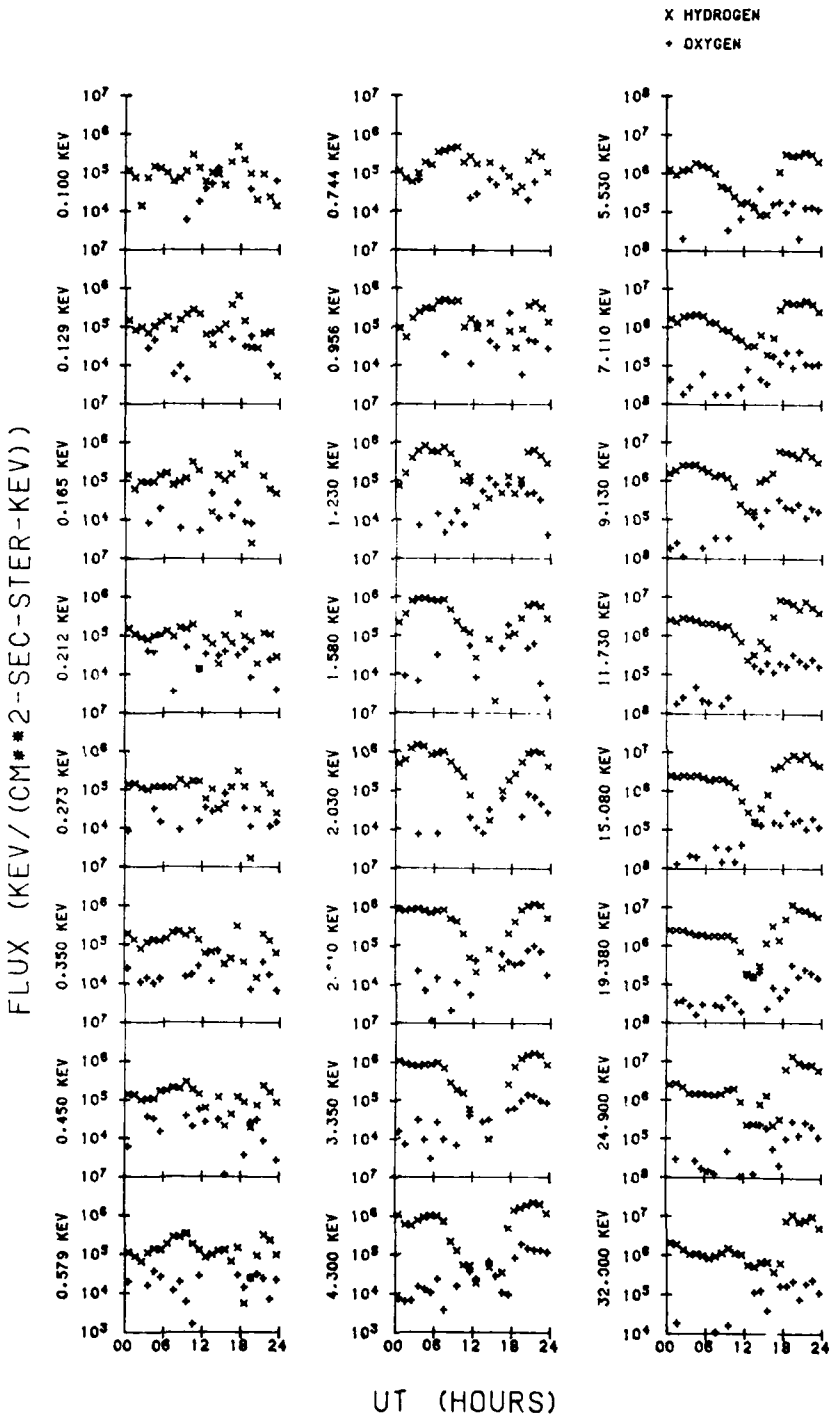
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UT (HOURS)

DAY 138

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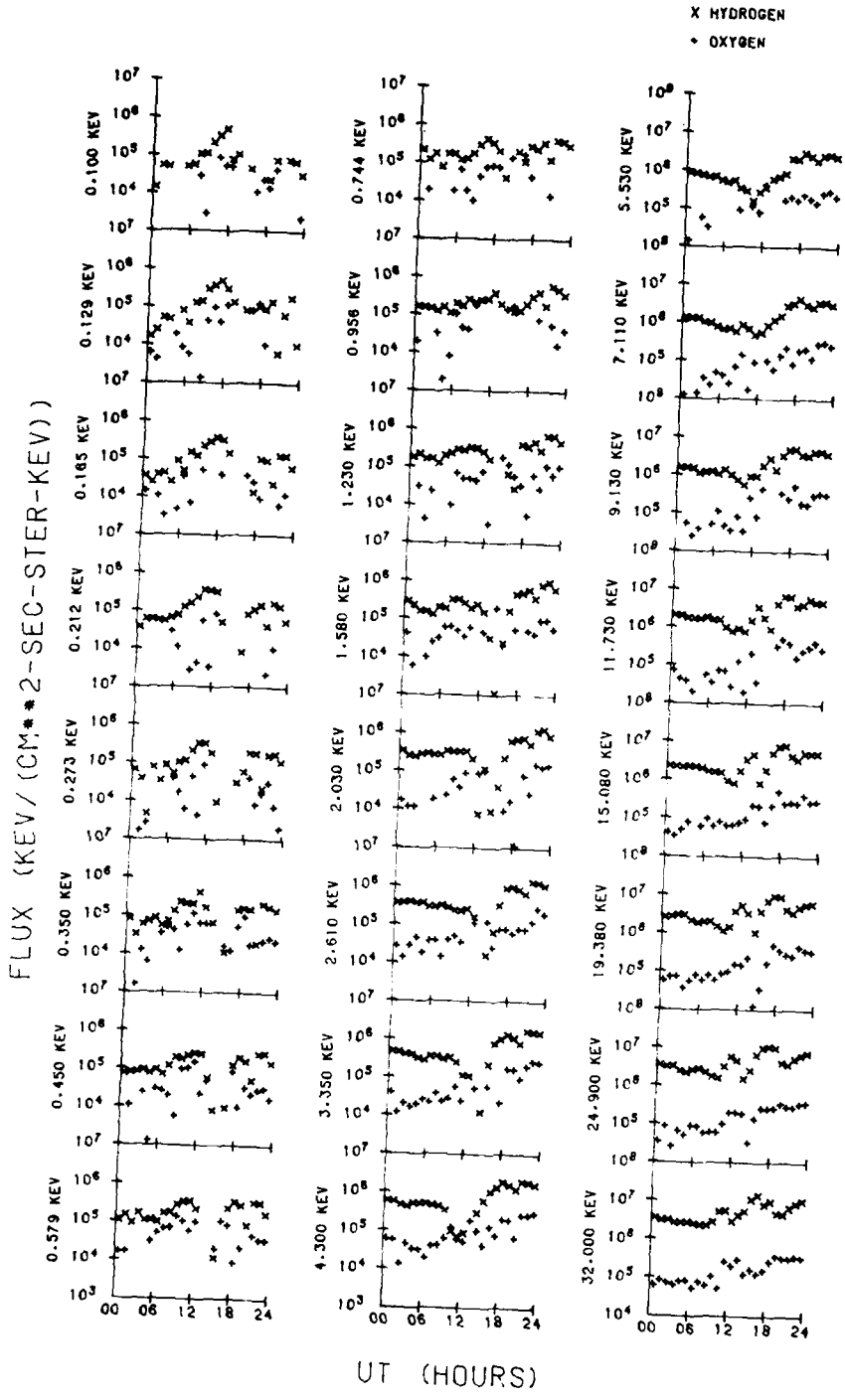
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UT (HOURS)

DAY 141

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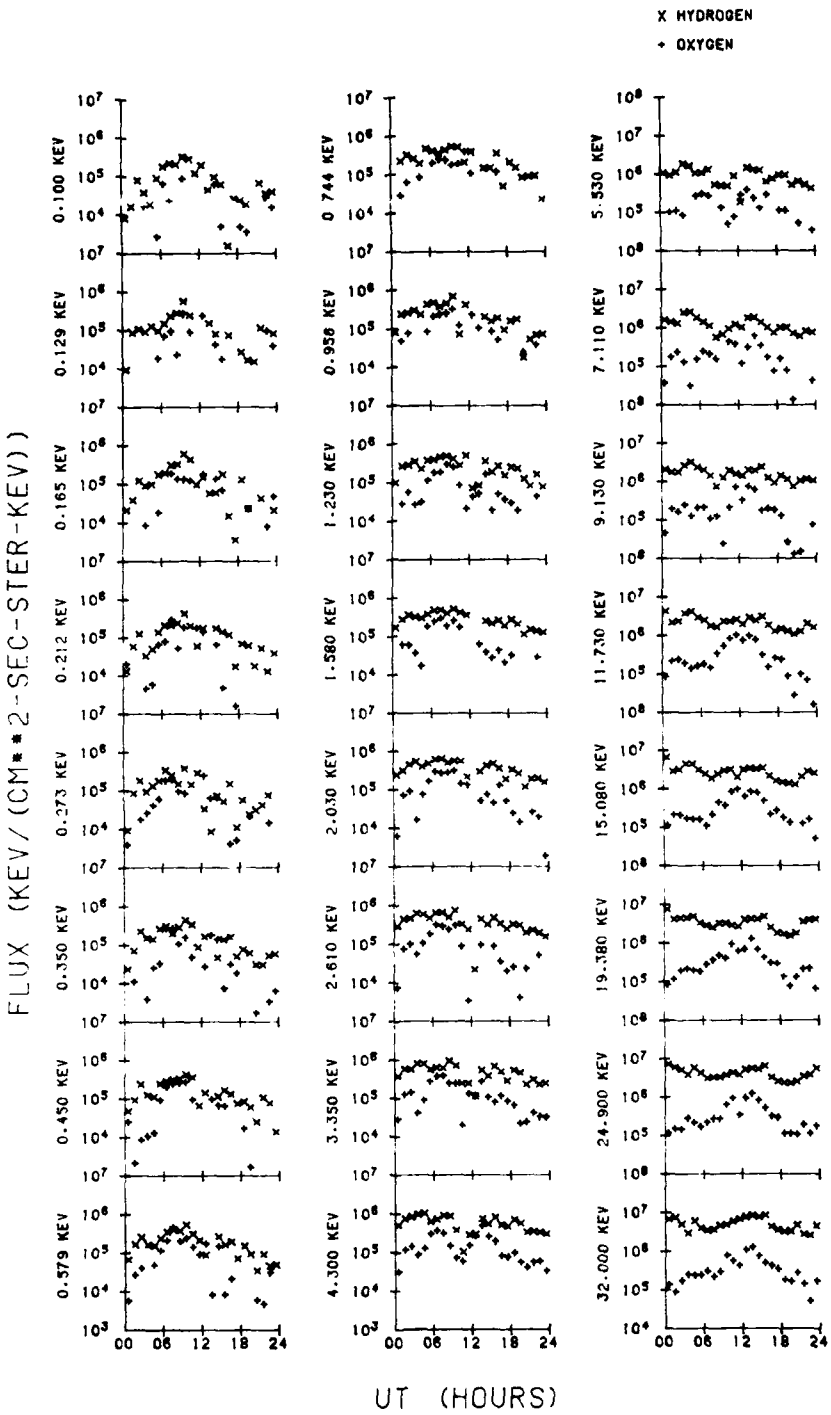
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00 06 12 18 24
UT (HOURS)

DAY 145

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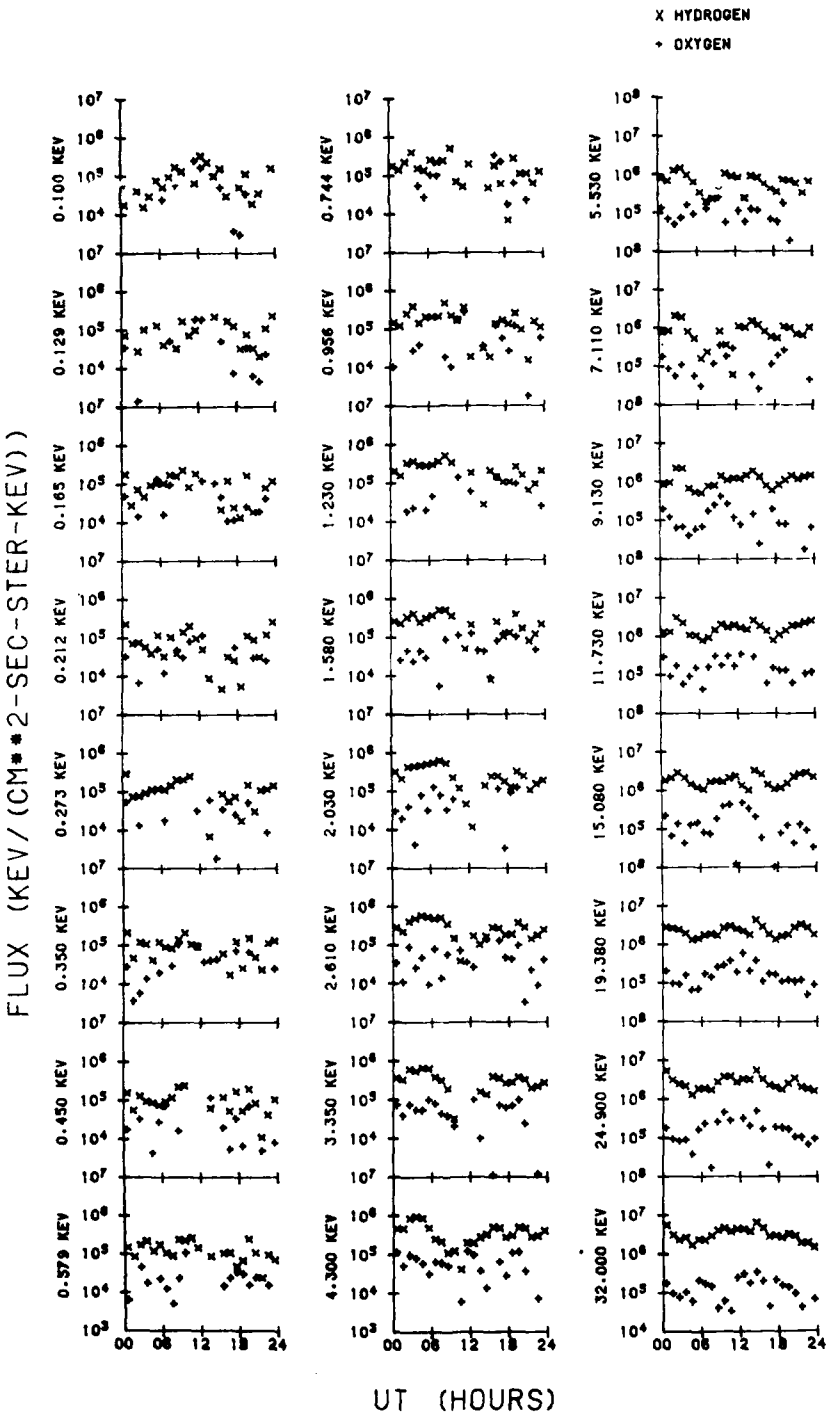
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UT (HOURS)

DAY 146

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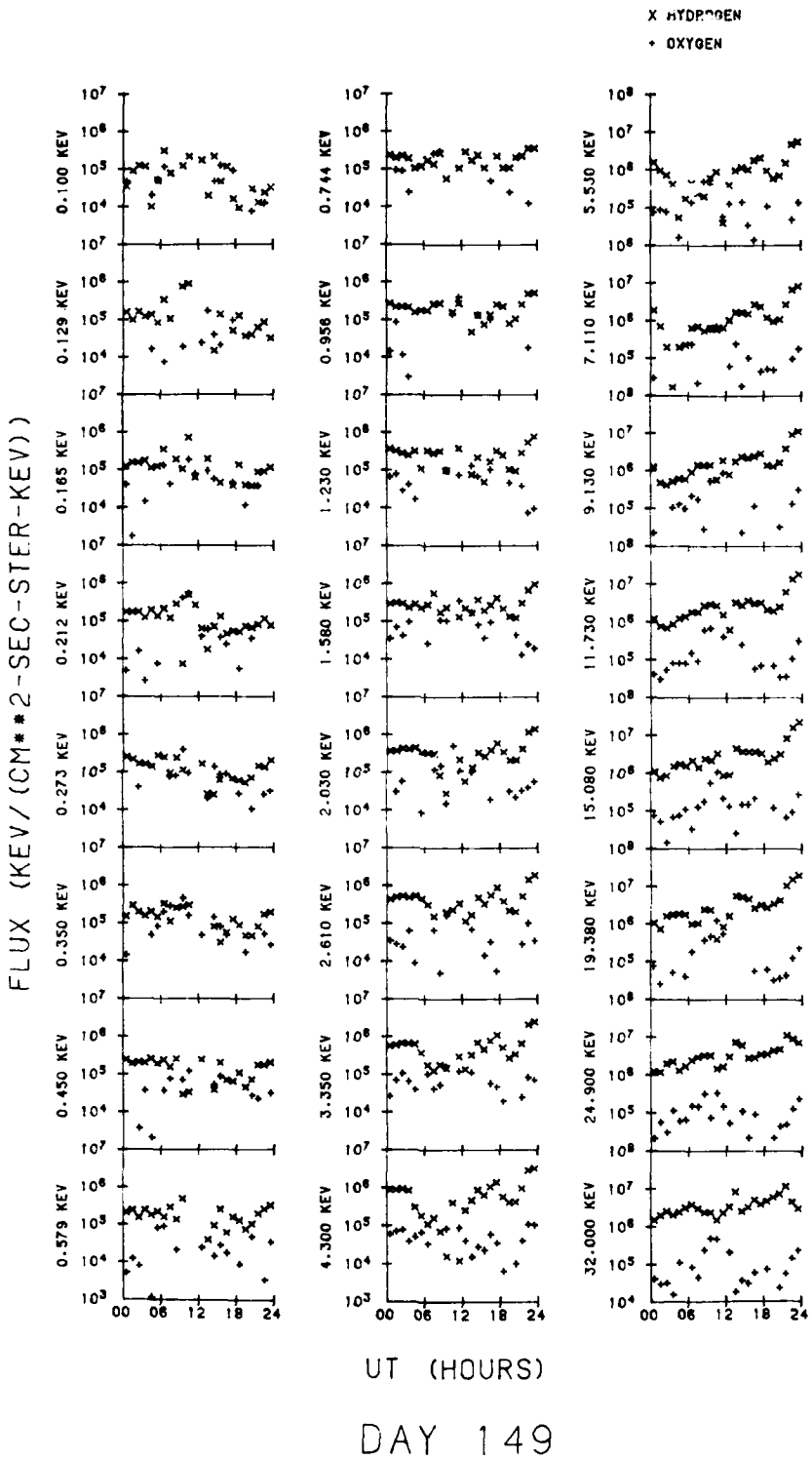
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UT (HOURS)

DAY 149

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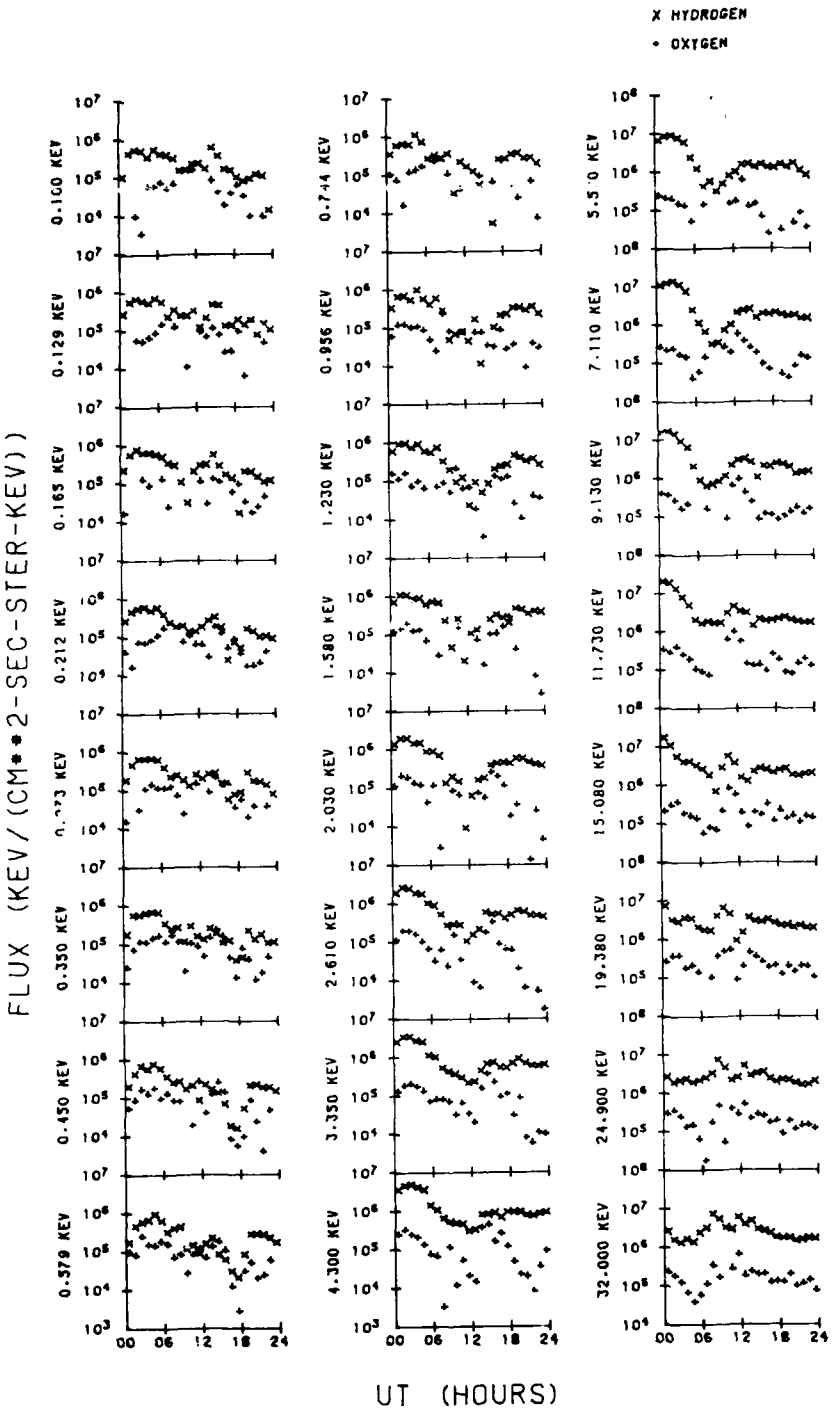
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UT (HOURS)

DAY 150

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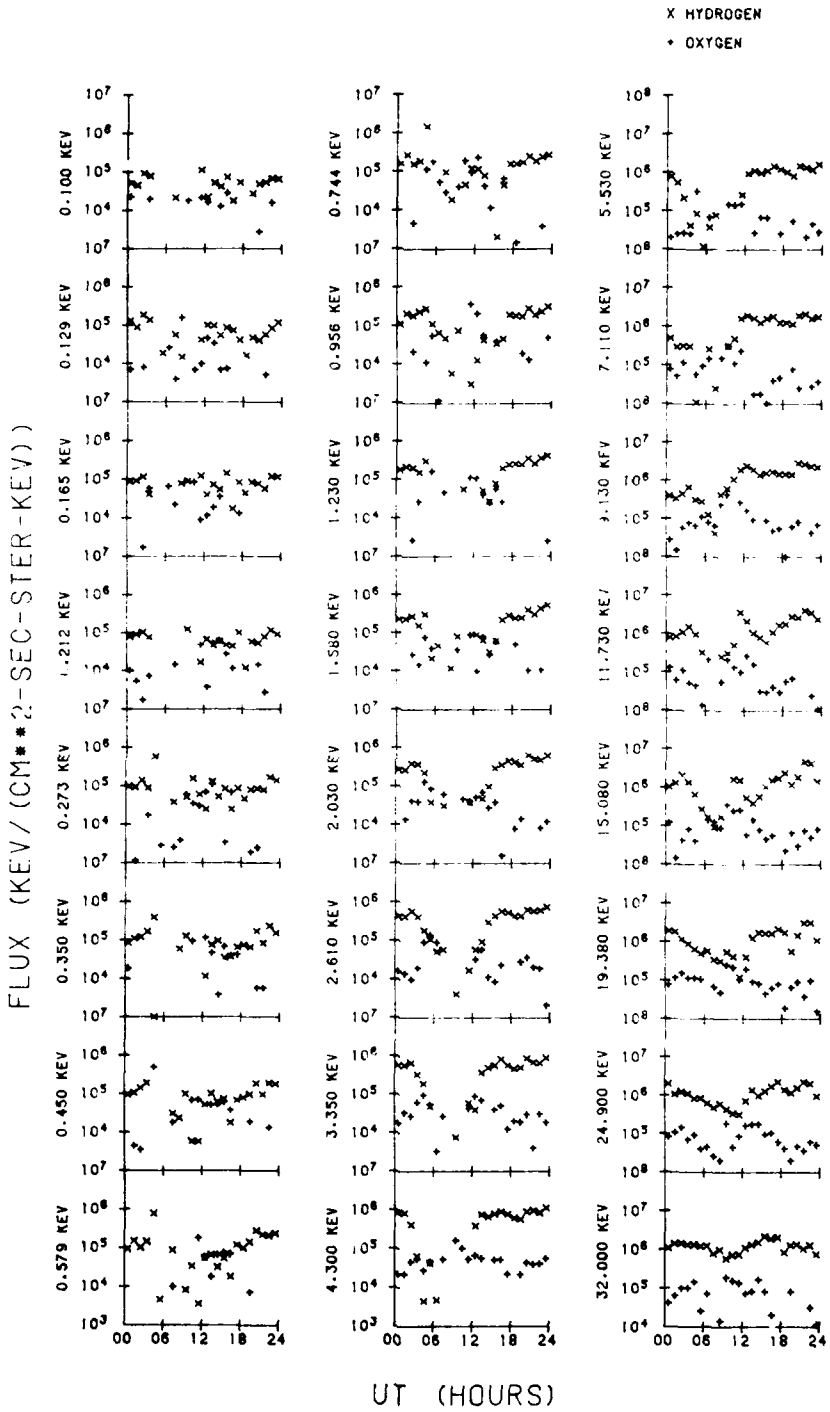
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UT (HOURS)

DAY 152

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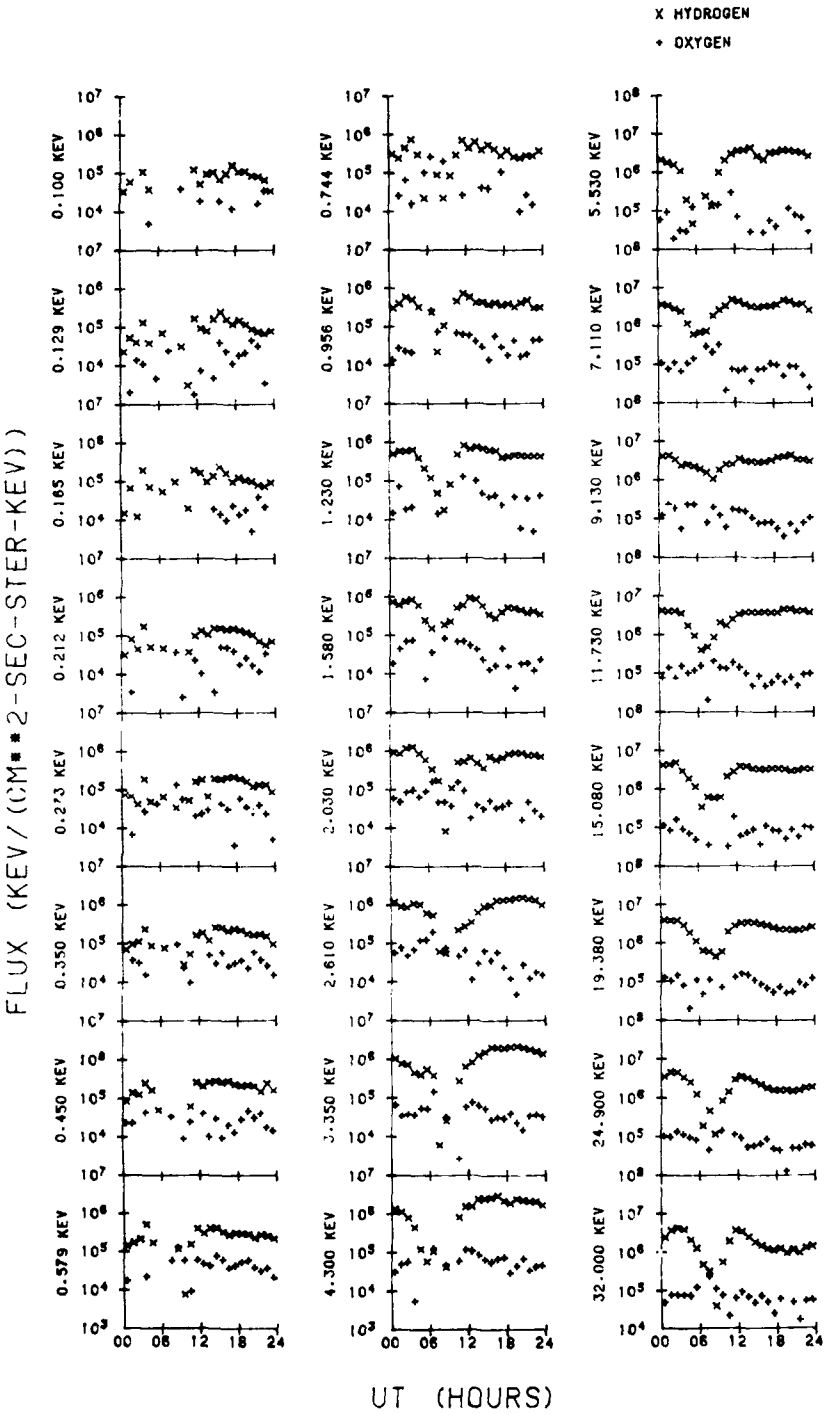
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UT (HOURS)

DAY 156

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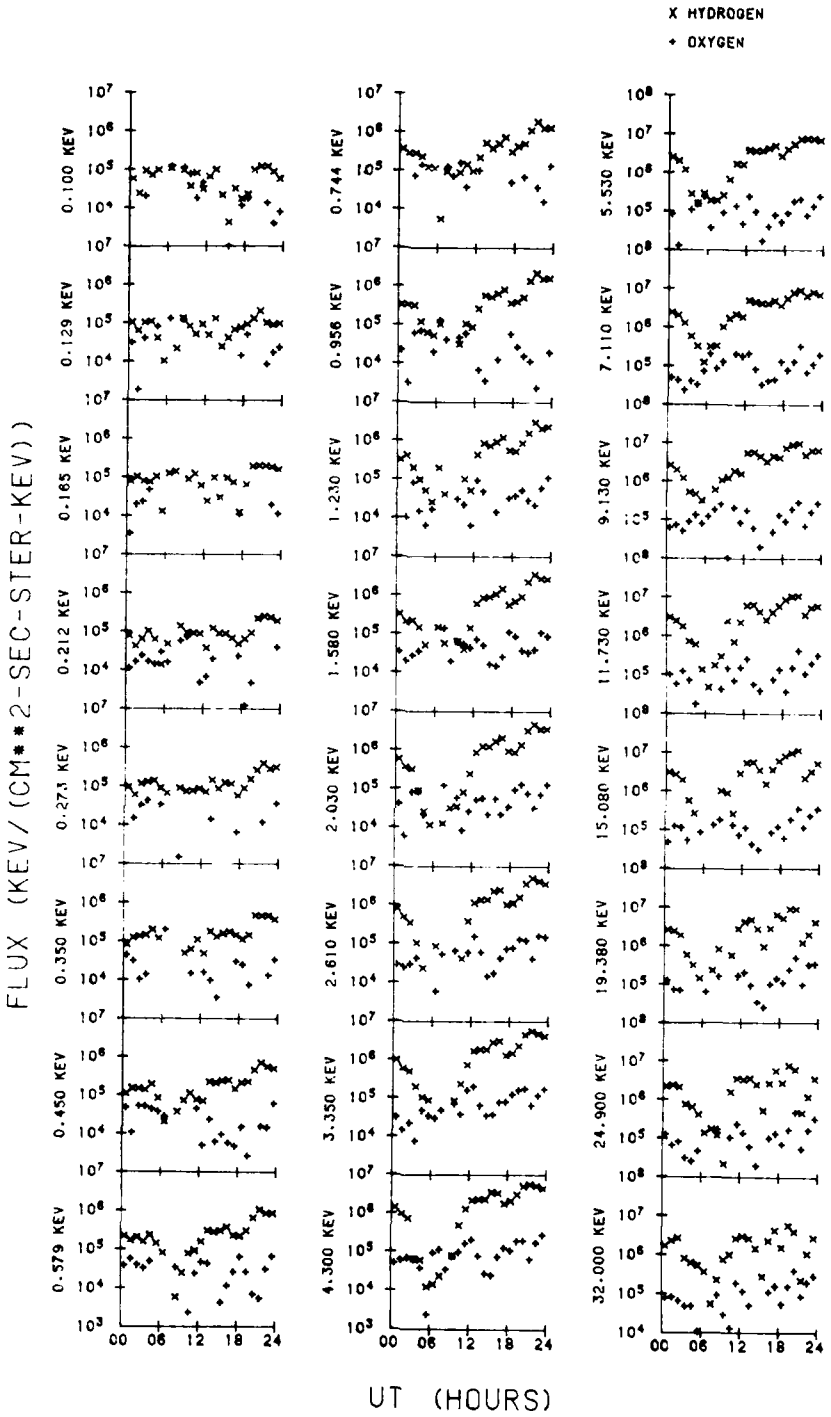
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UT (HOURS)

DAY 157

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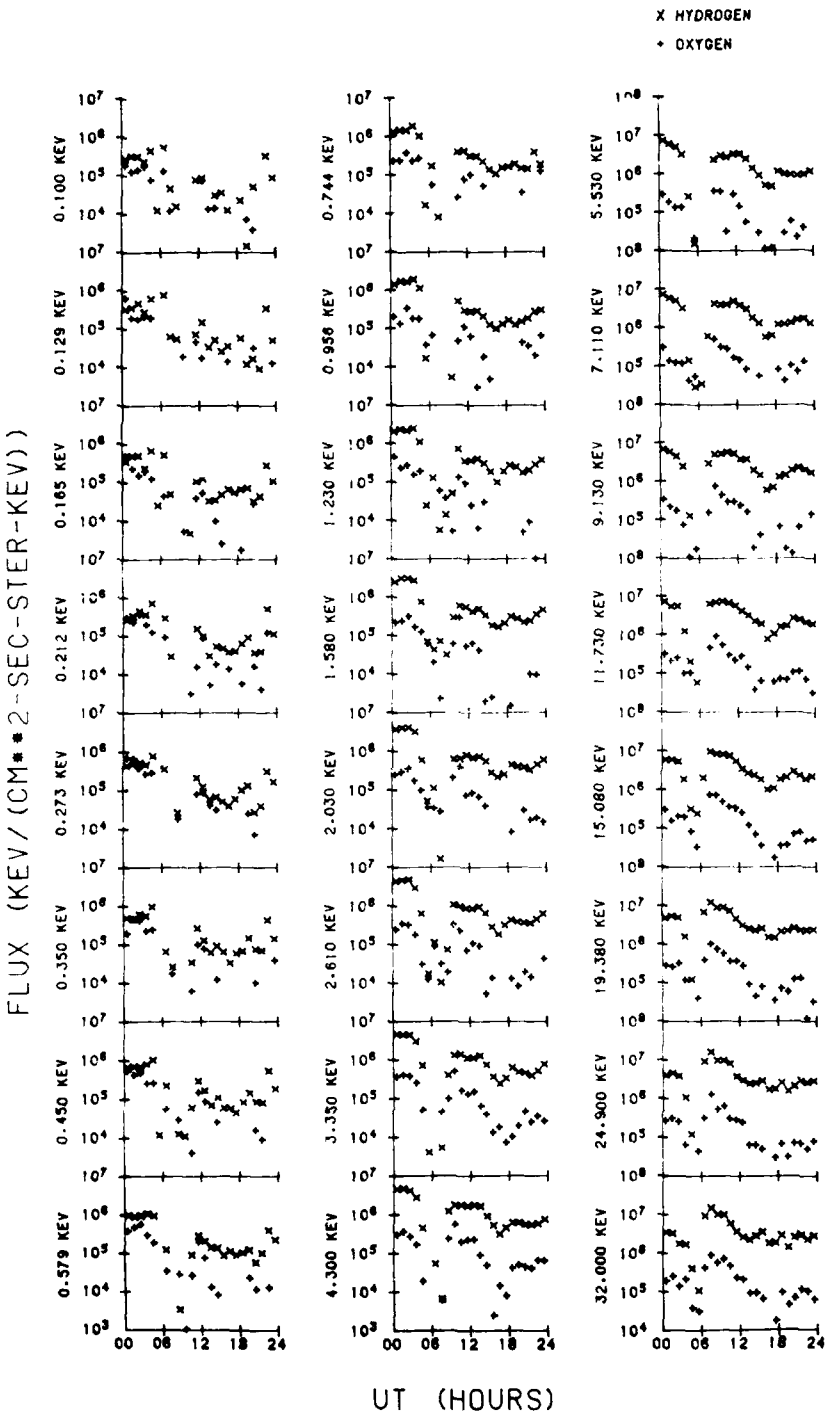
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UT (HOURS)

DAY 158

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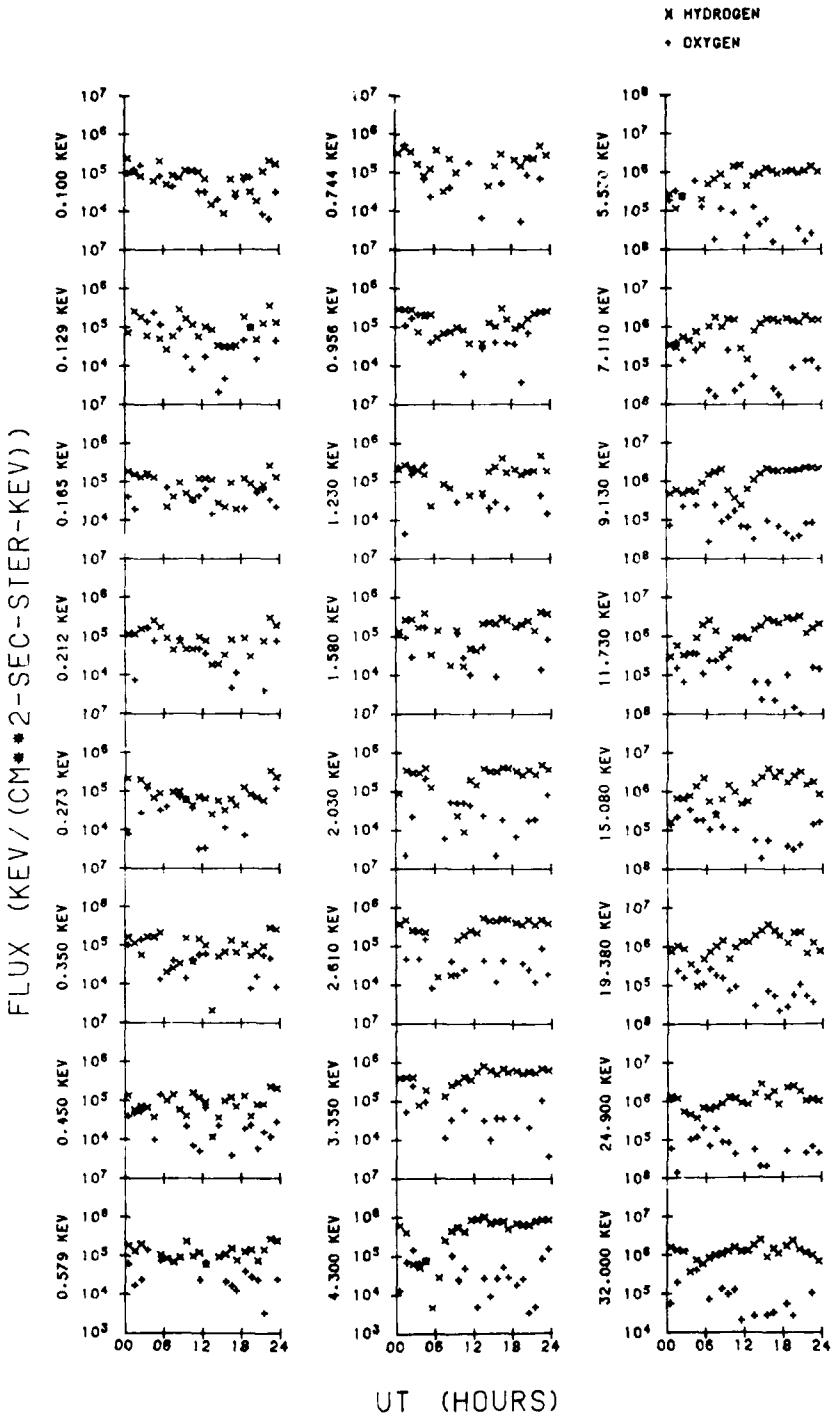
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UT (HOURS)

DAY 164

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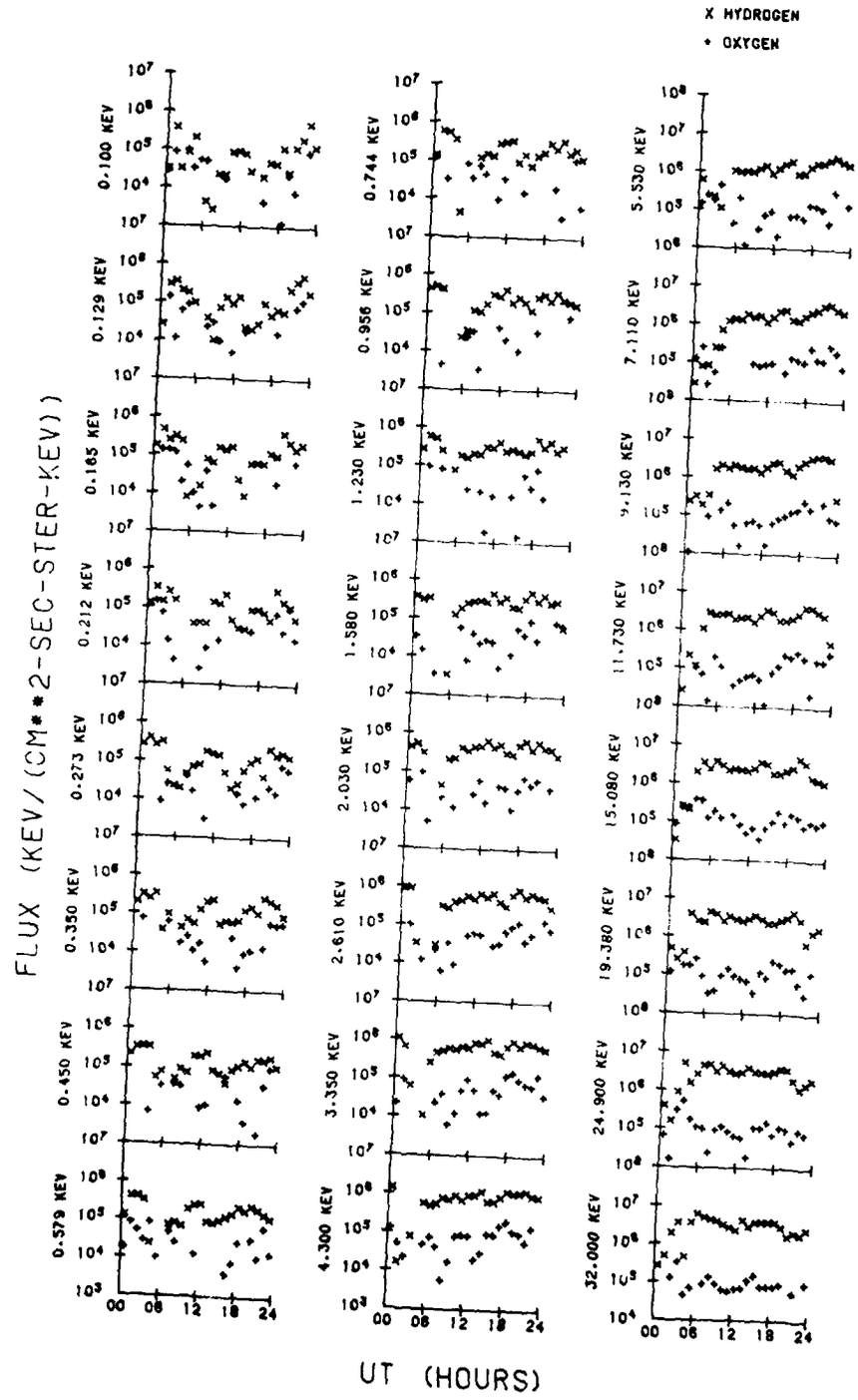
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UT (HOURS)

DAY 167

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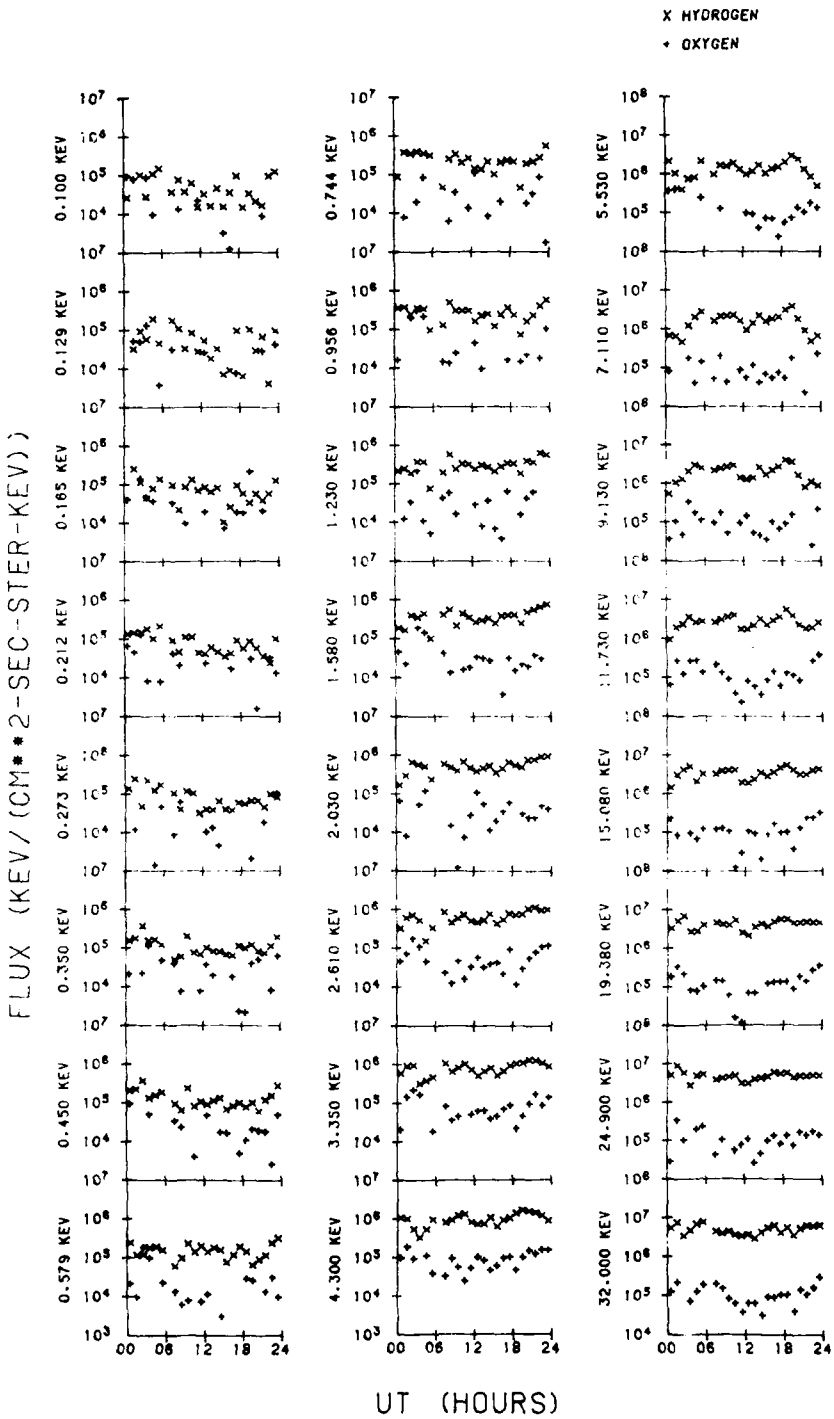
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DAY 168

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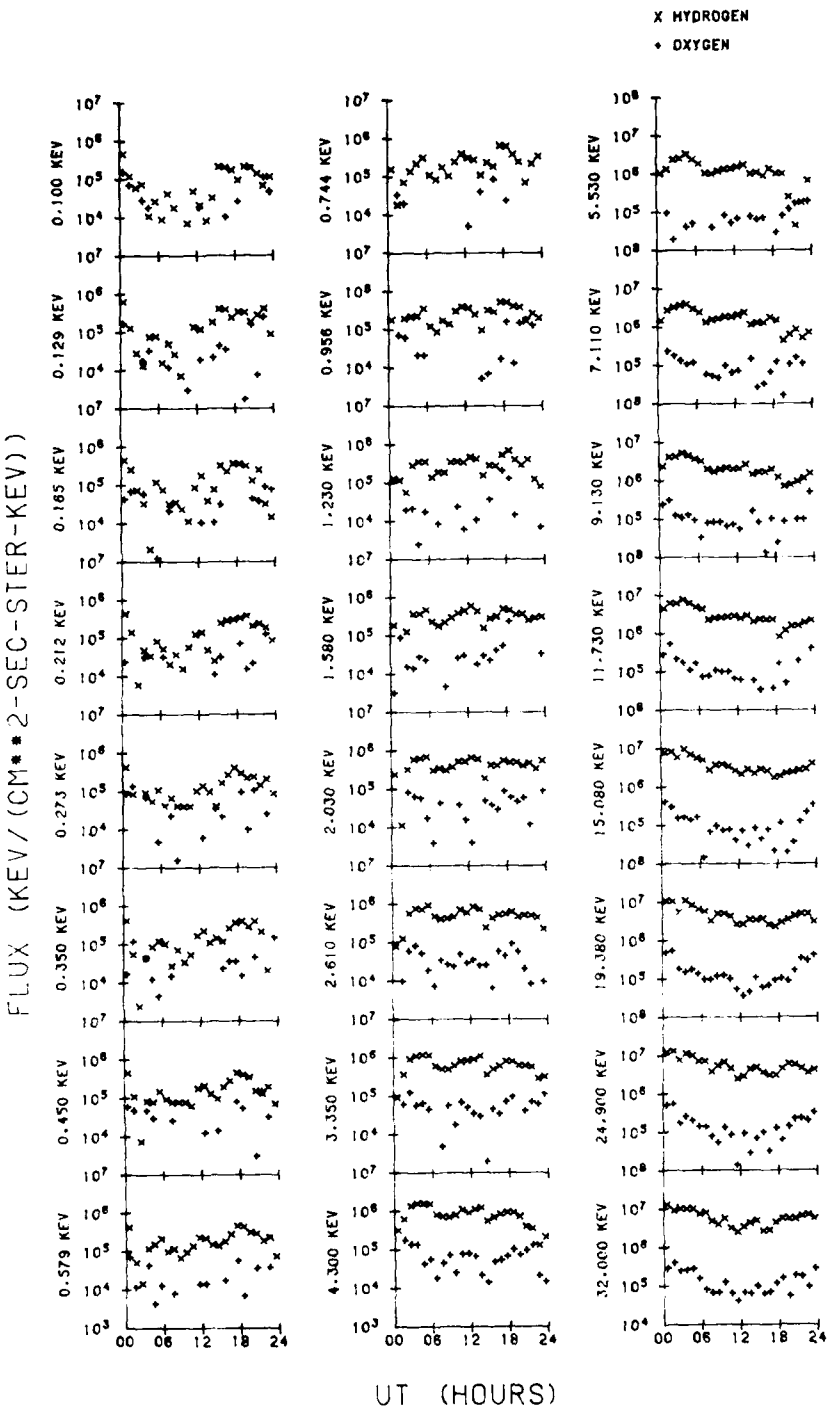
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DAY 178

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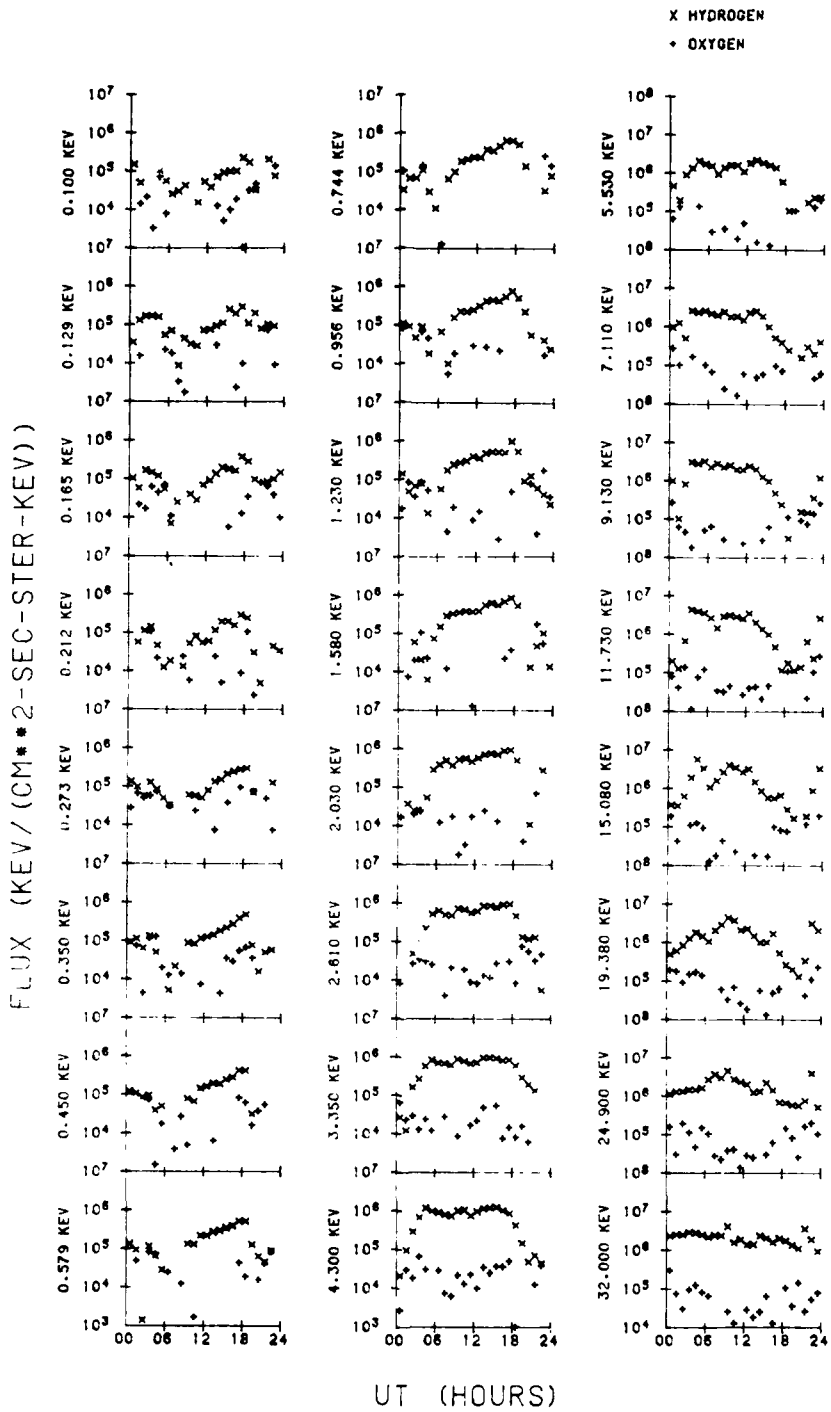
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DAY 180

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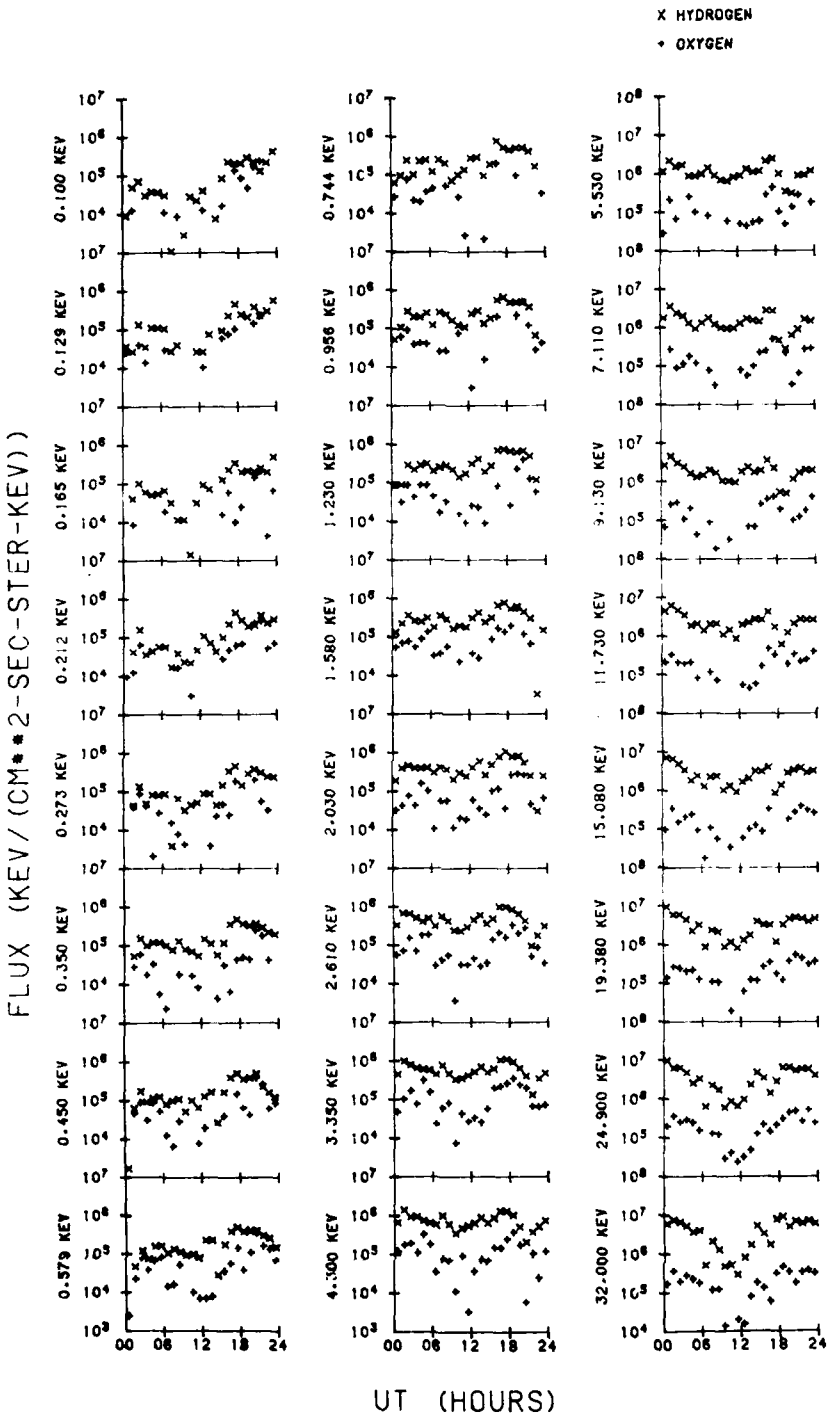
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DAY 188

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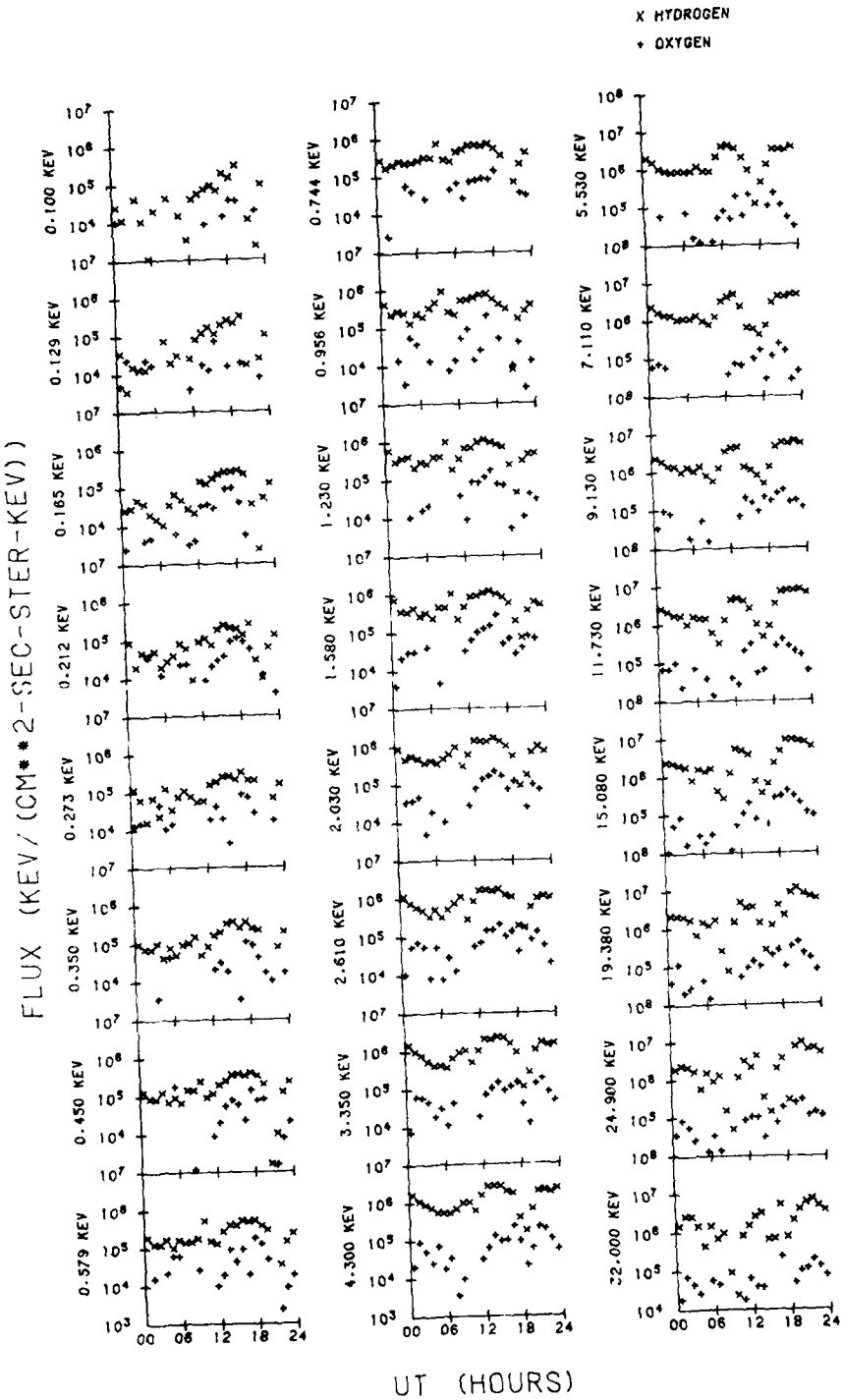
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DAY 194

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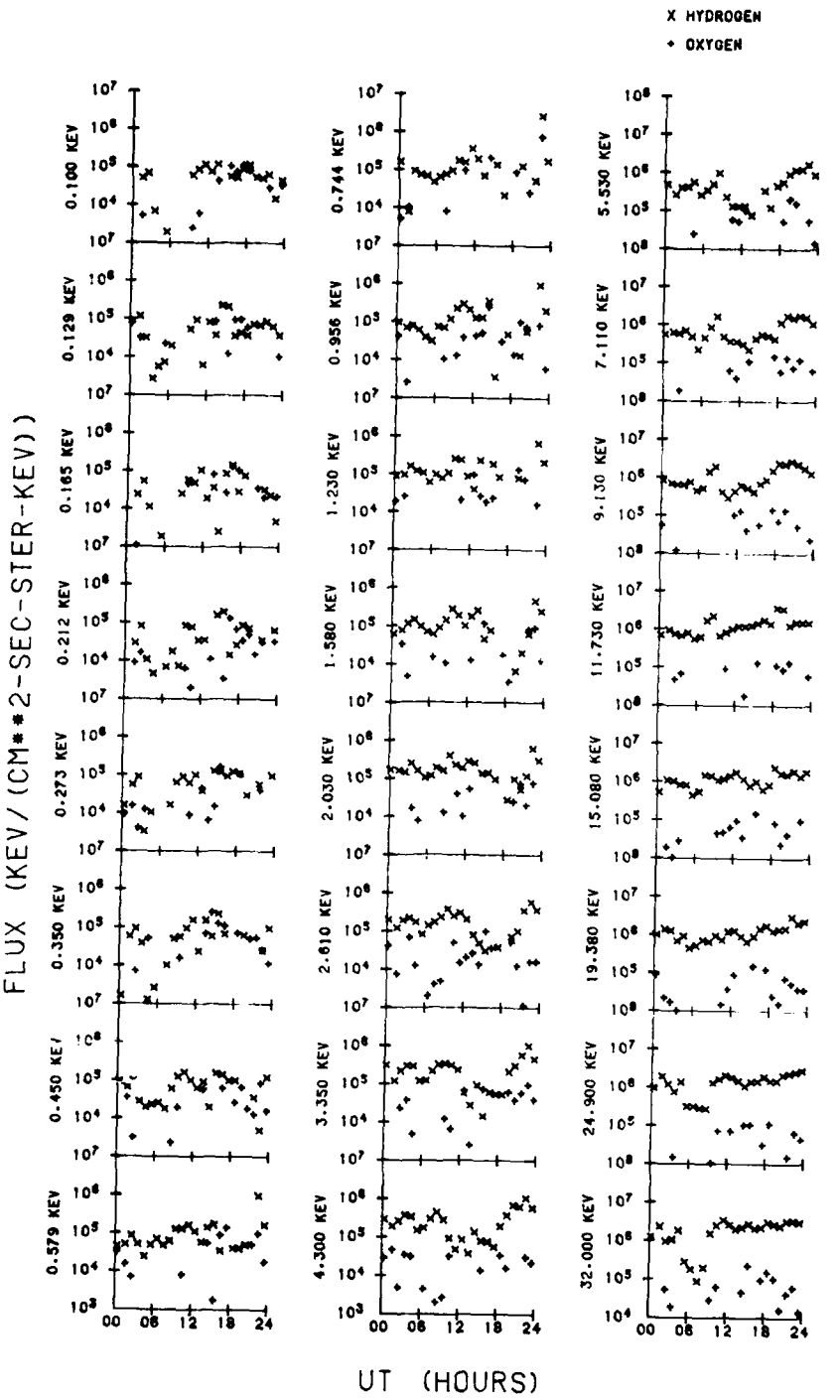
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DAY 200

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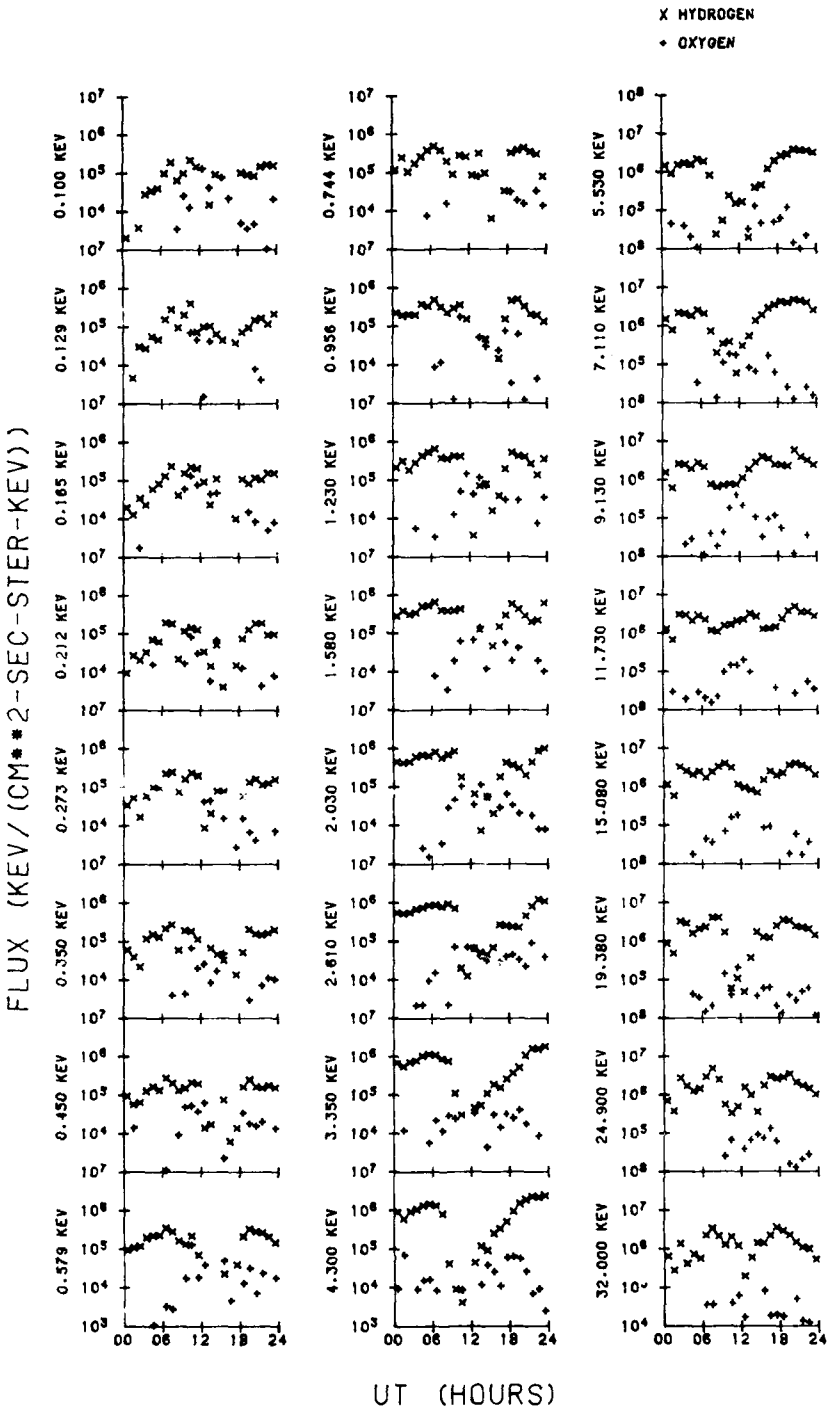
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DAY 206

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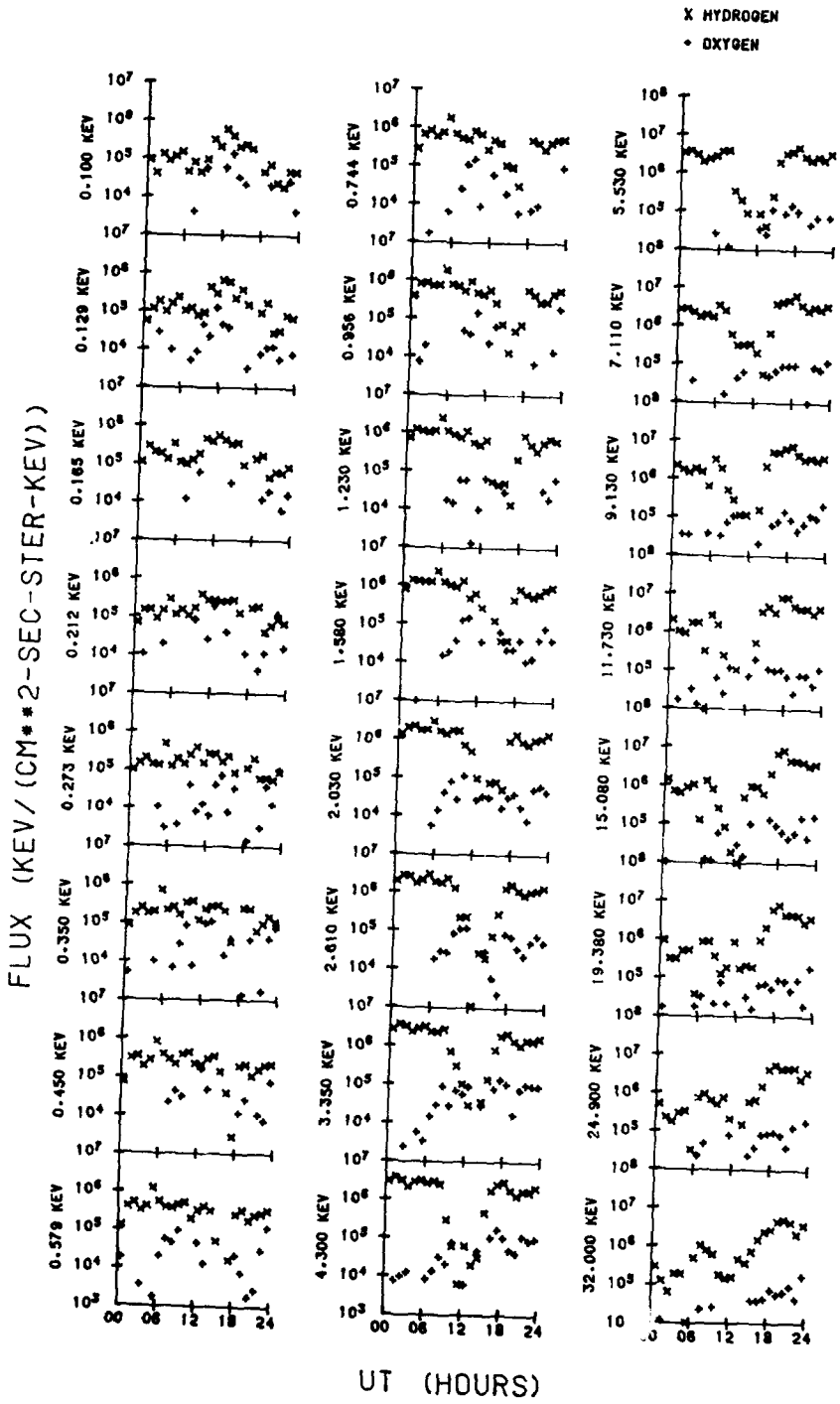
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UT (HOURS)

DAY 207

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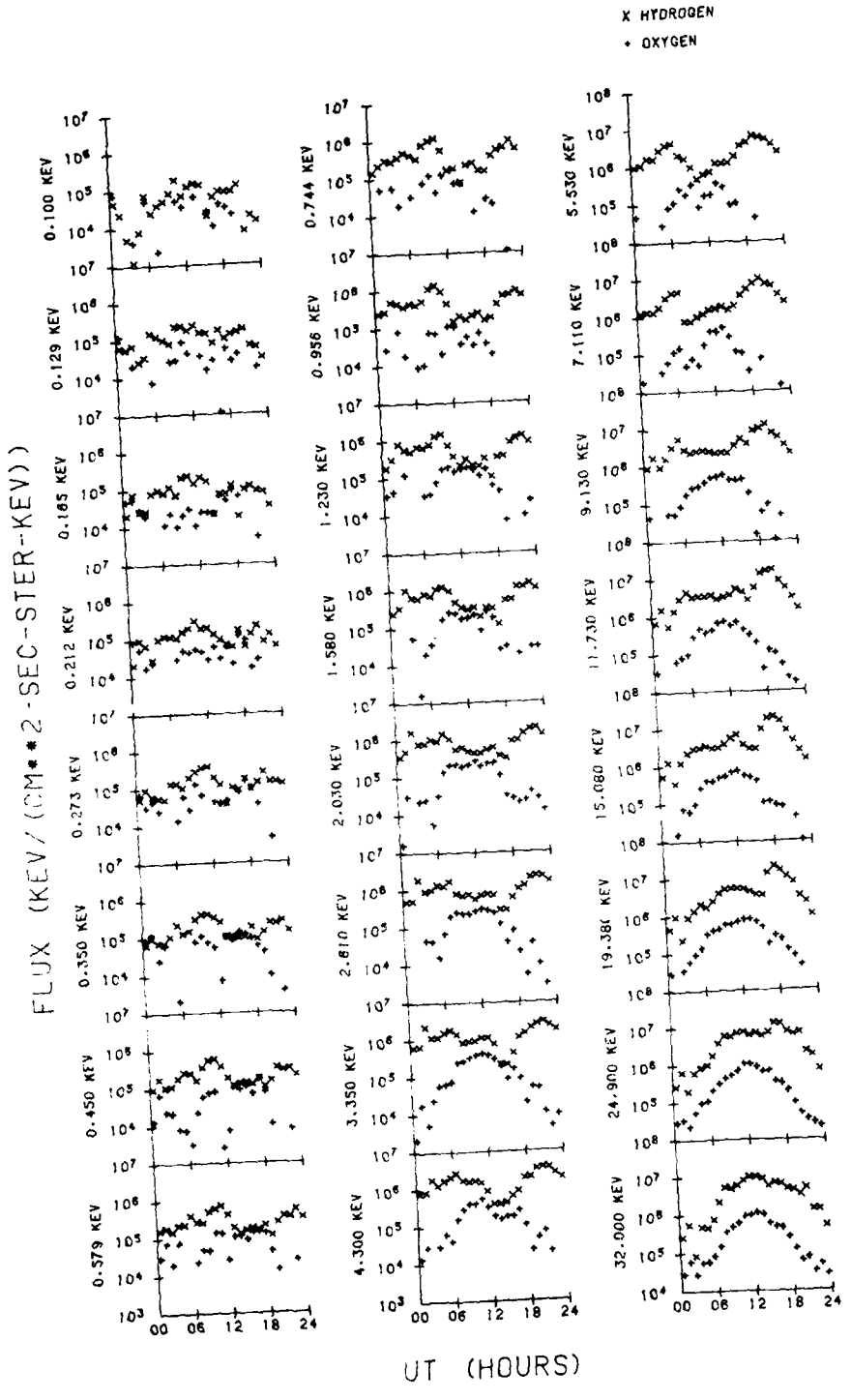
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DAY 208

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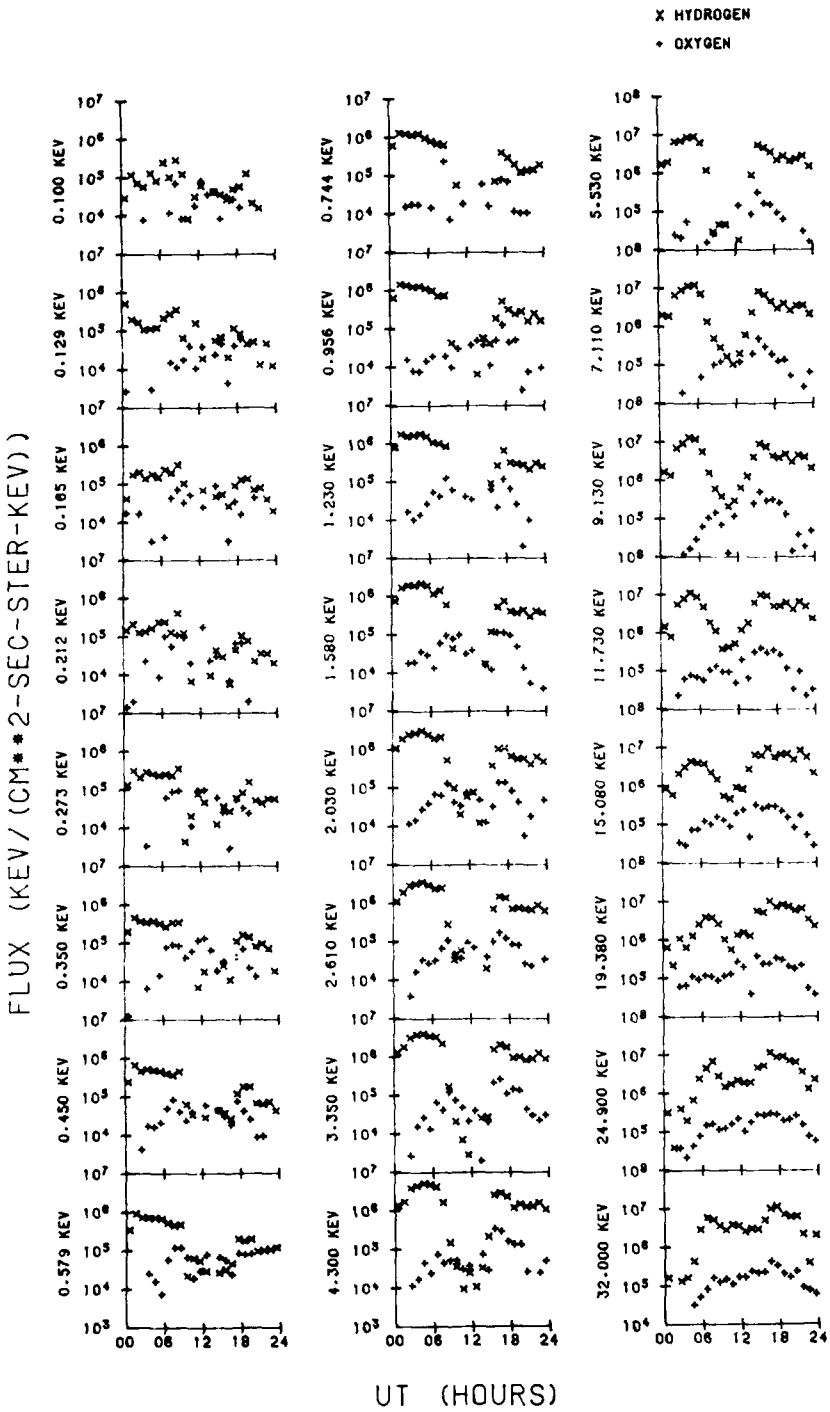
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DAY 210

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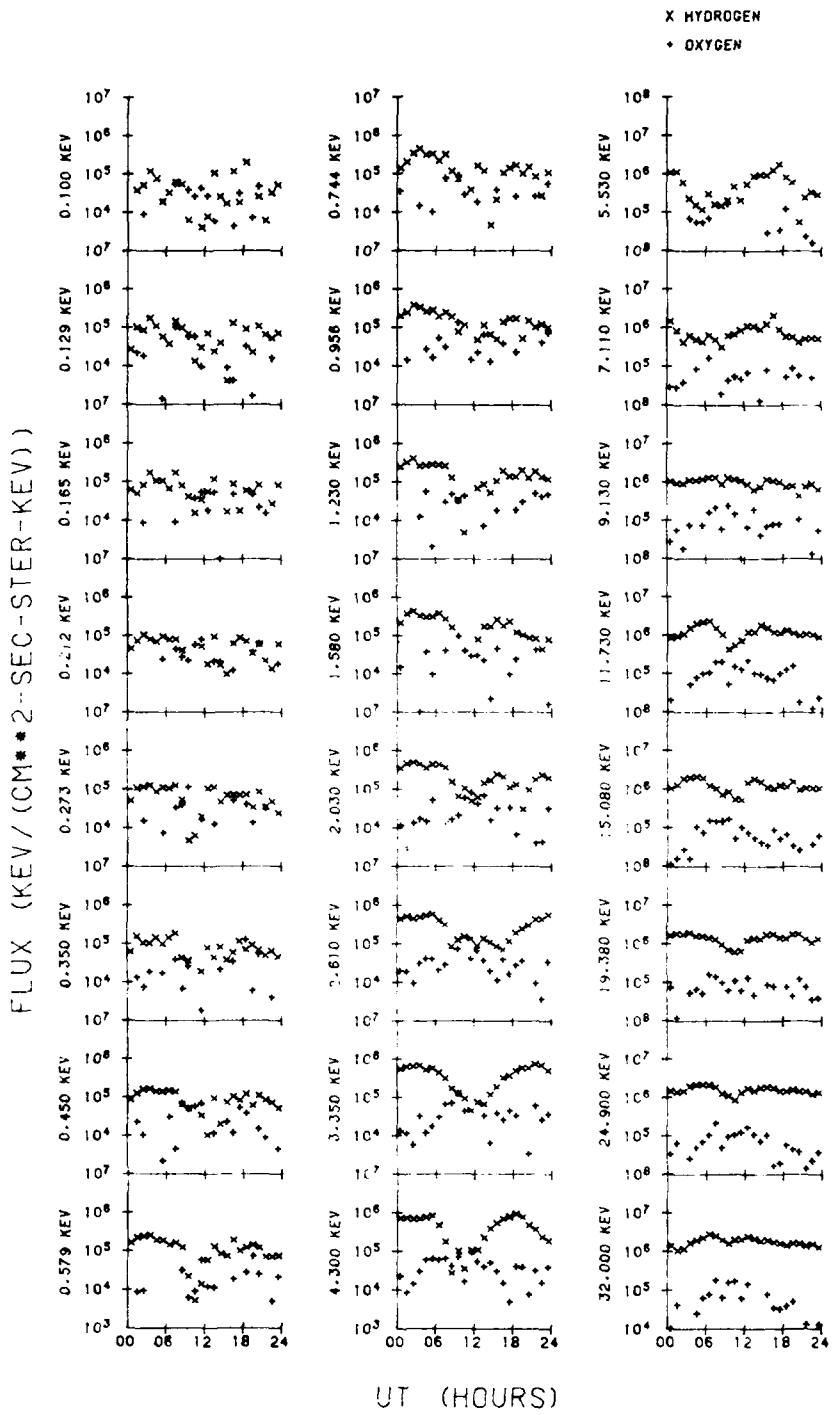
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DAY 212

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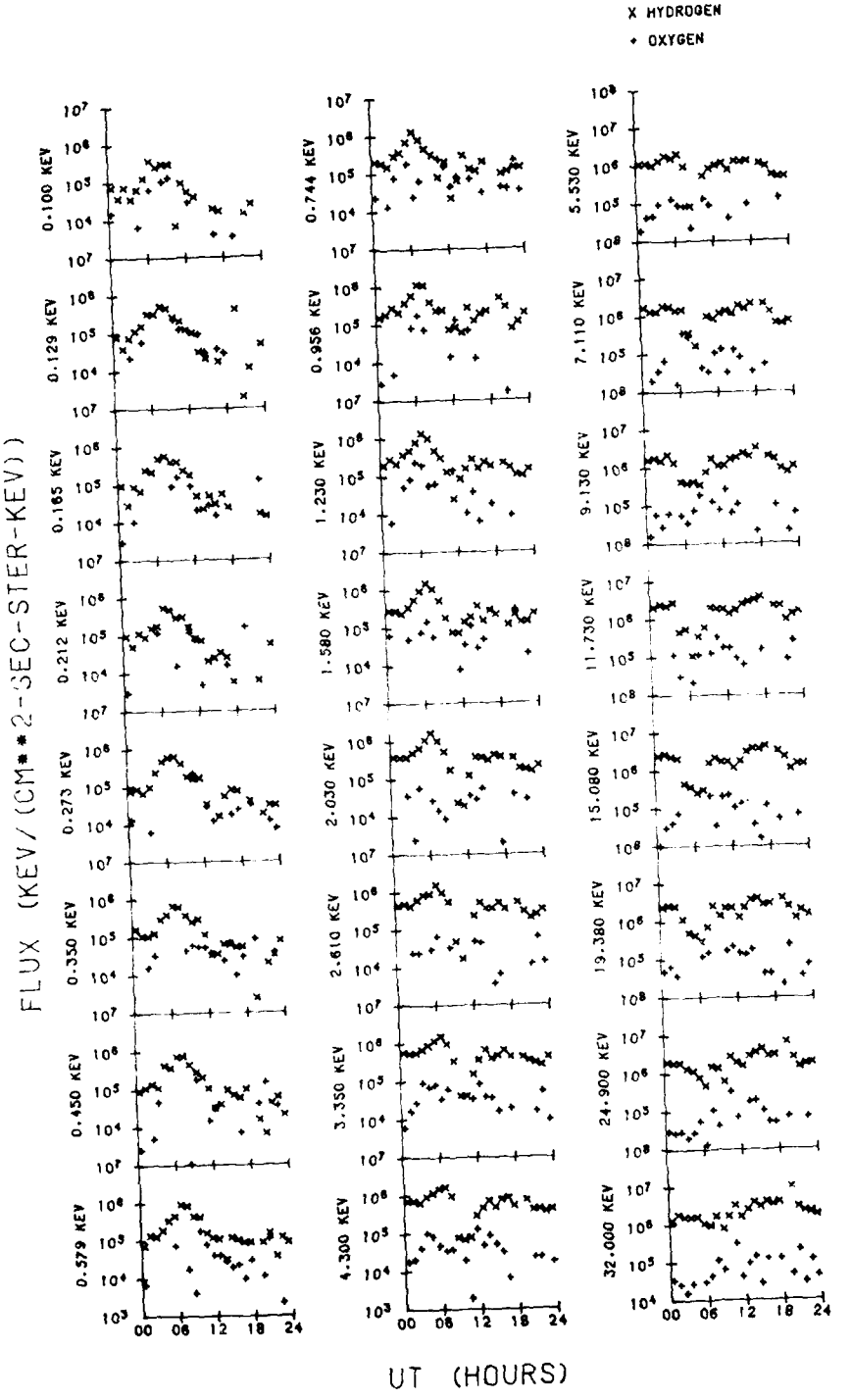
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UT (HOURS)

DAY 216

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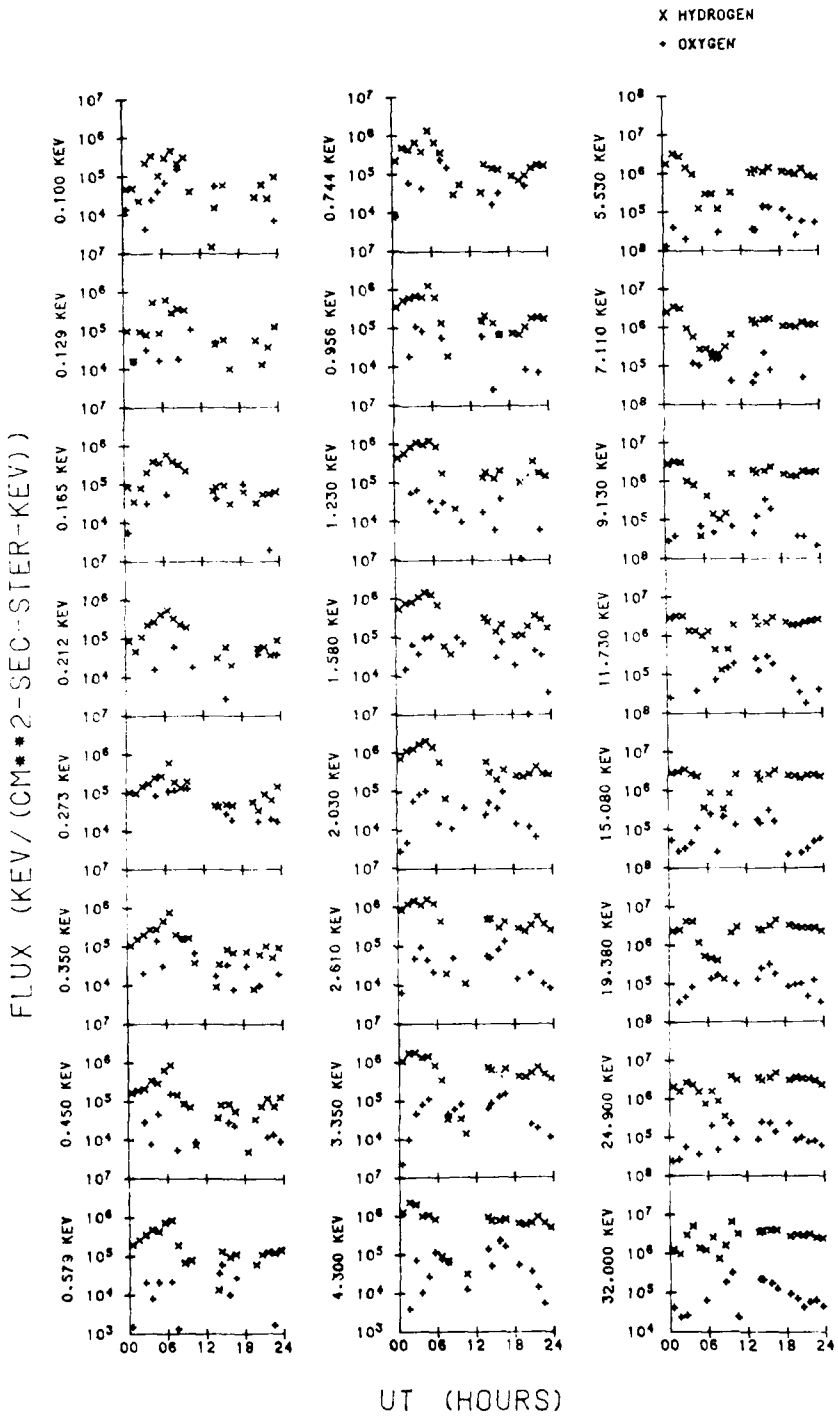
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UT (HOURS)

DAY 218

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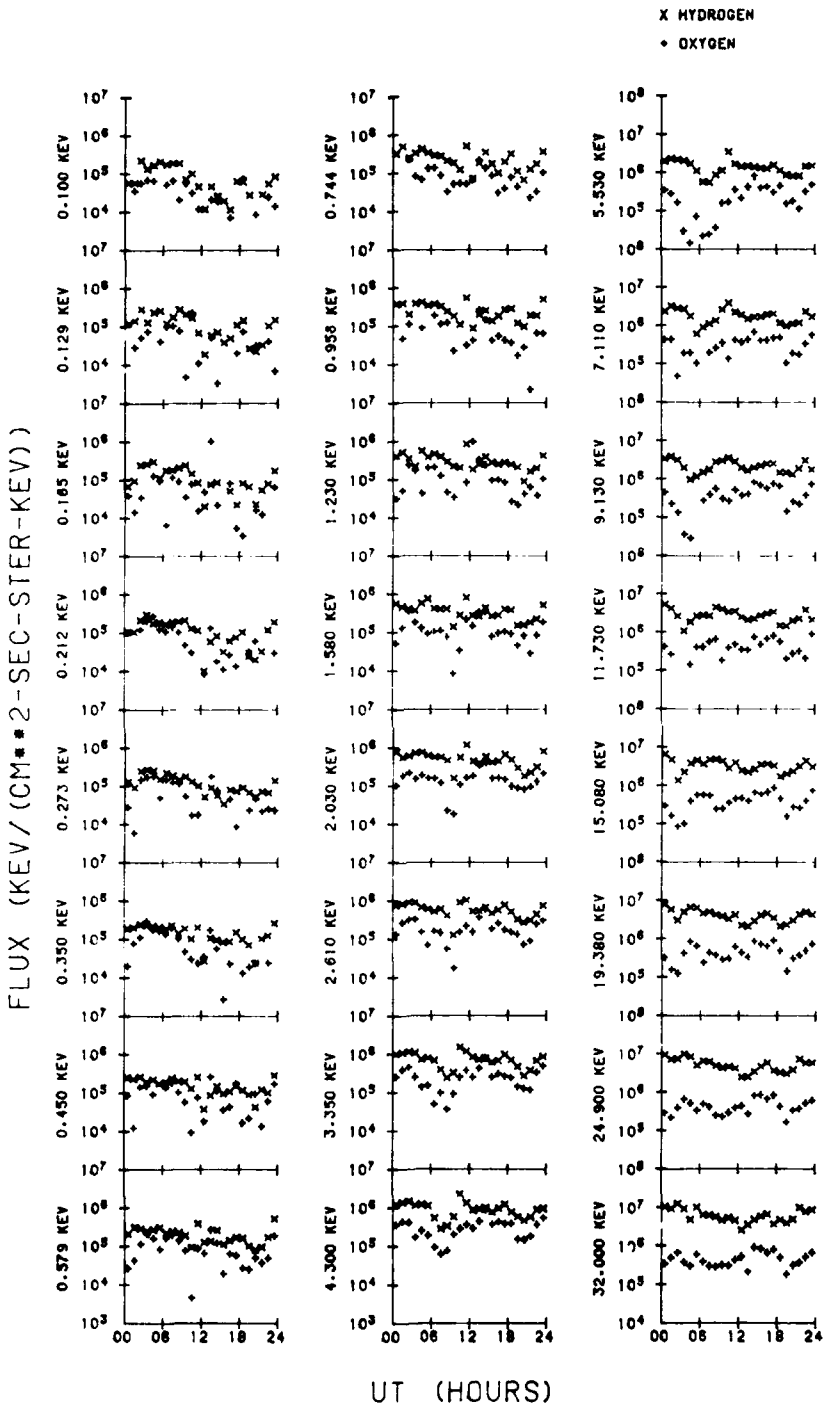
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UT (HOURS)

DAY 225

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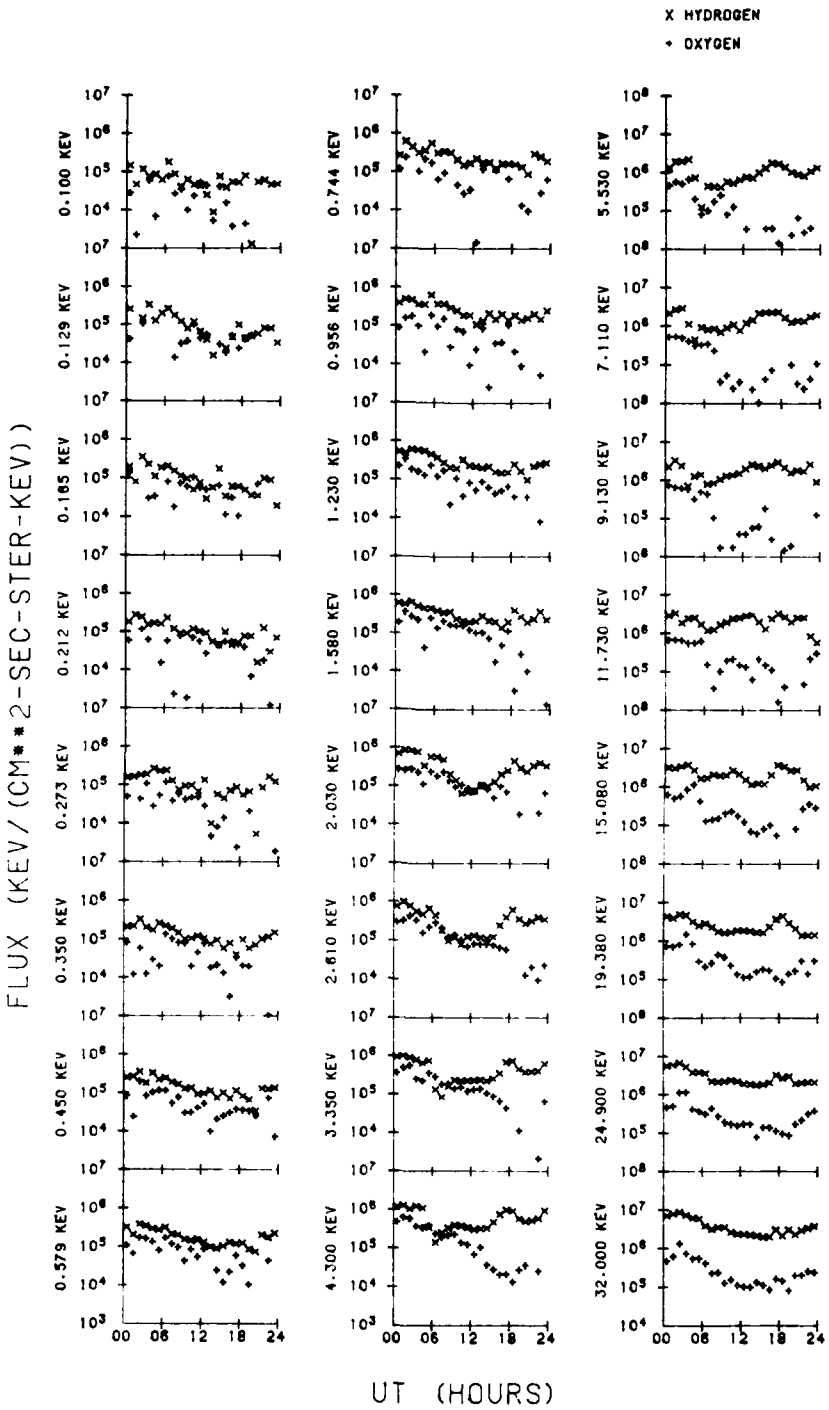
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UT (HOURS)

DAY 226

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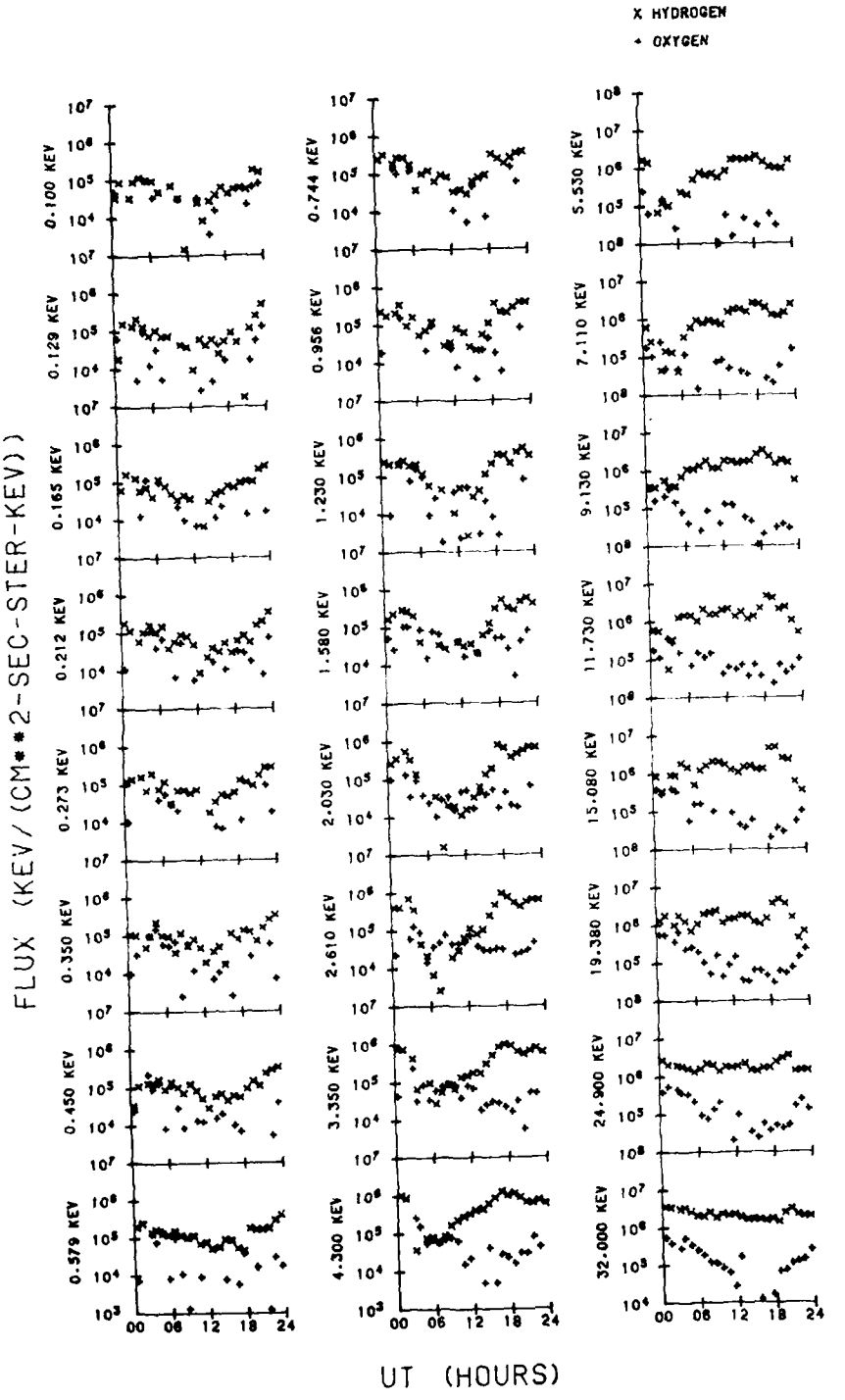
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UT (HOURS)

DAY 227

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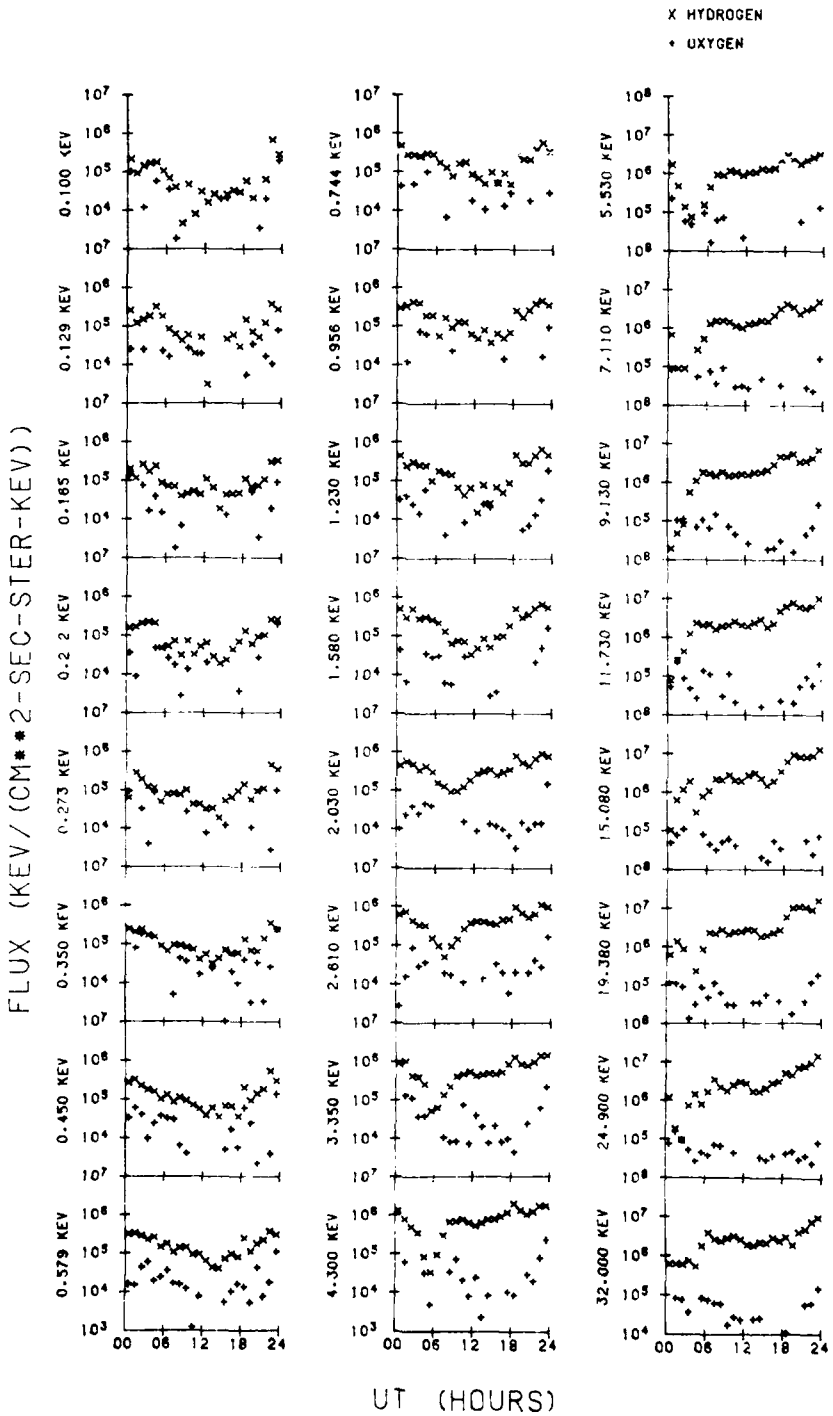
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UT (HOURS)

DAY 230

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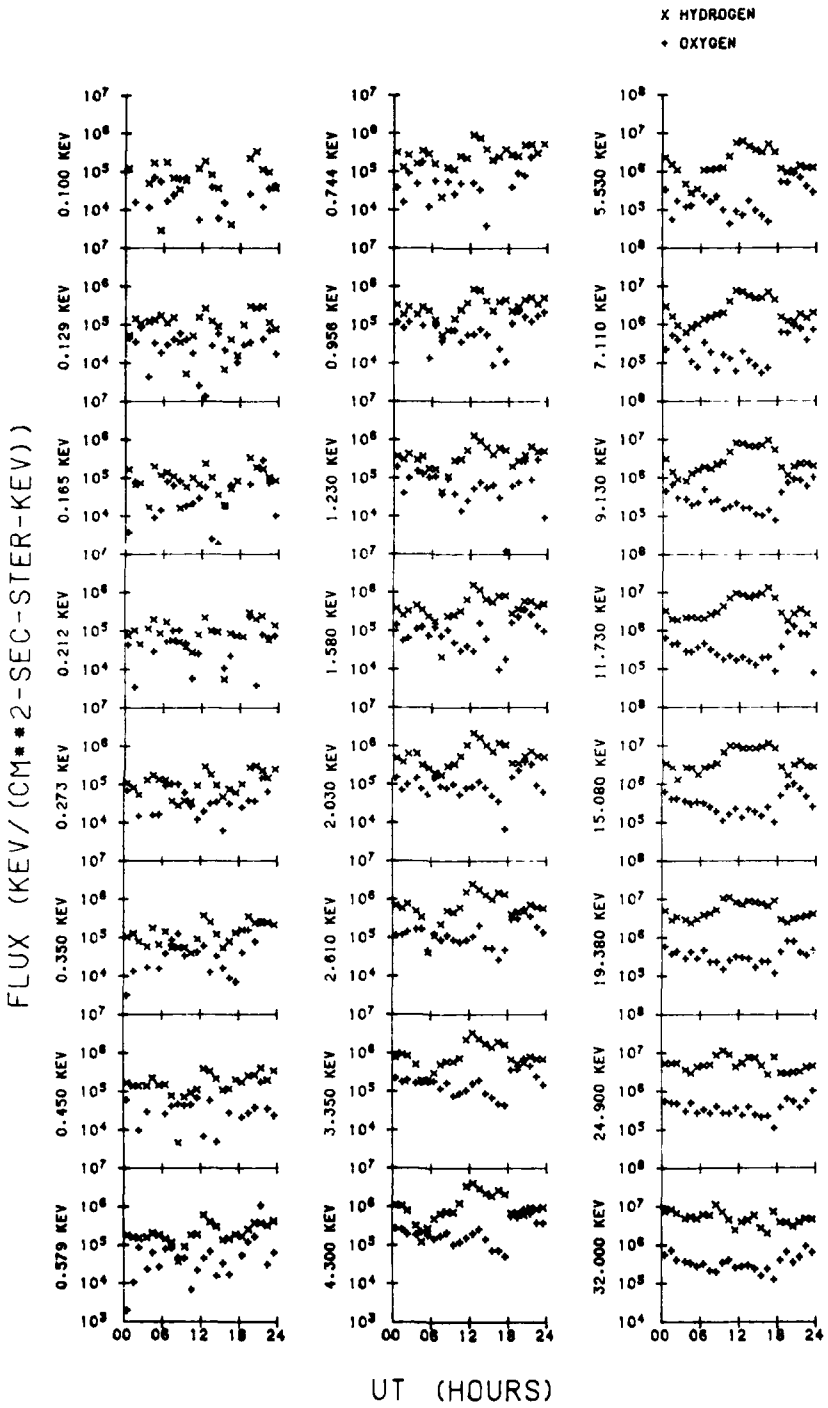
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UT (HOURS)

DAY 232

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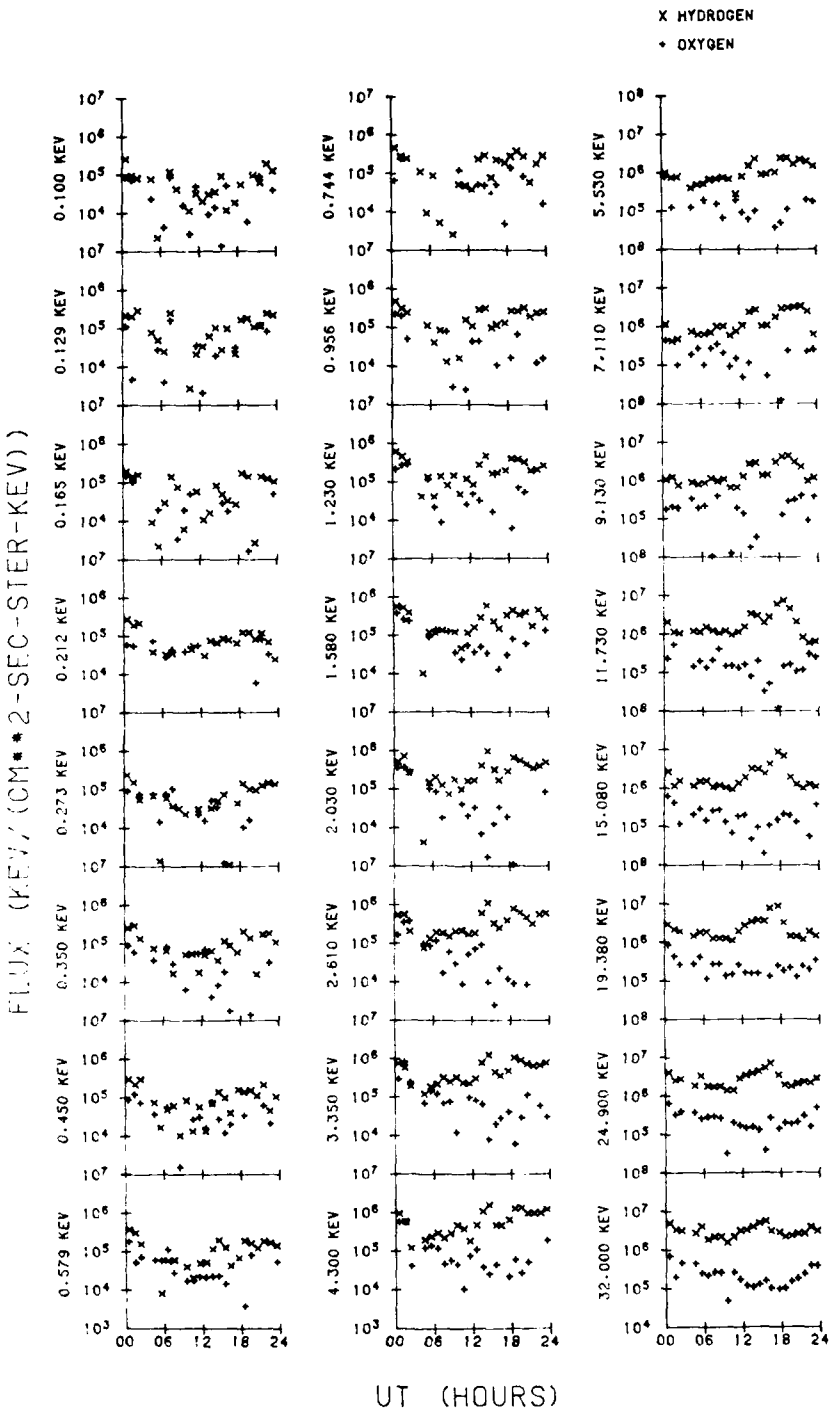
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DAY 233

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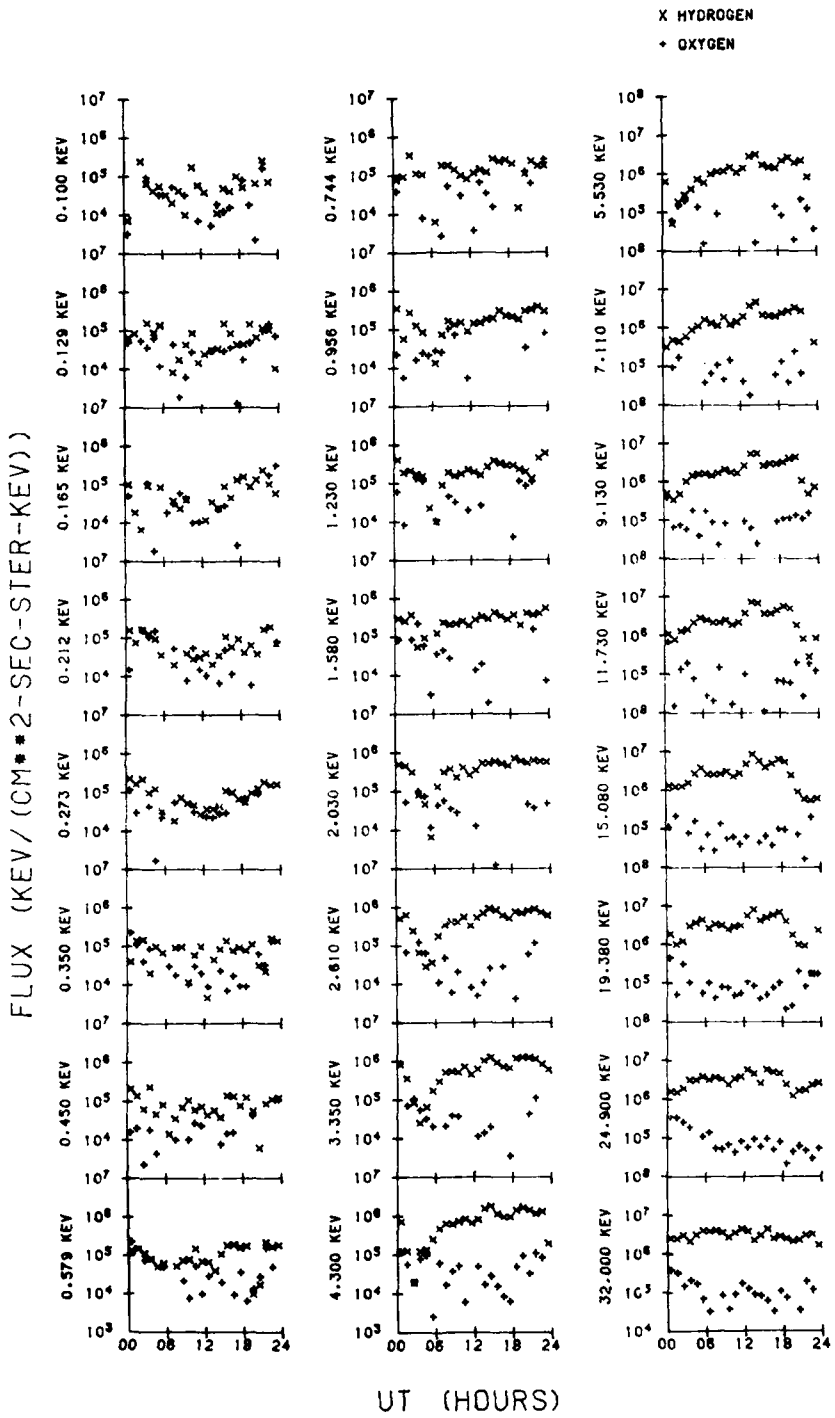
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DAY 234

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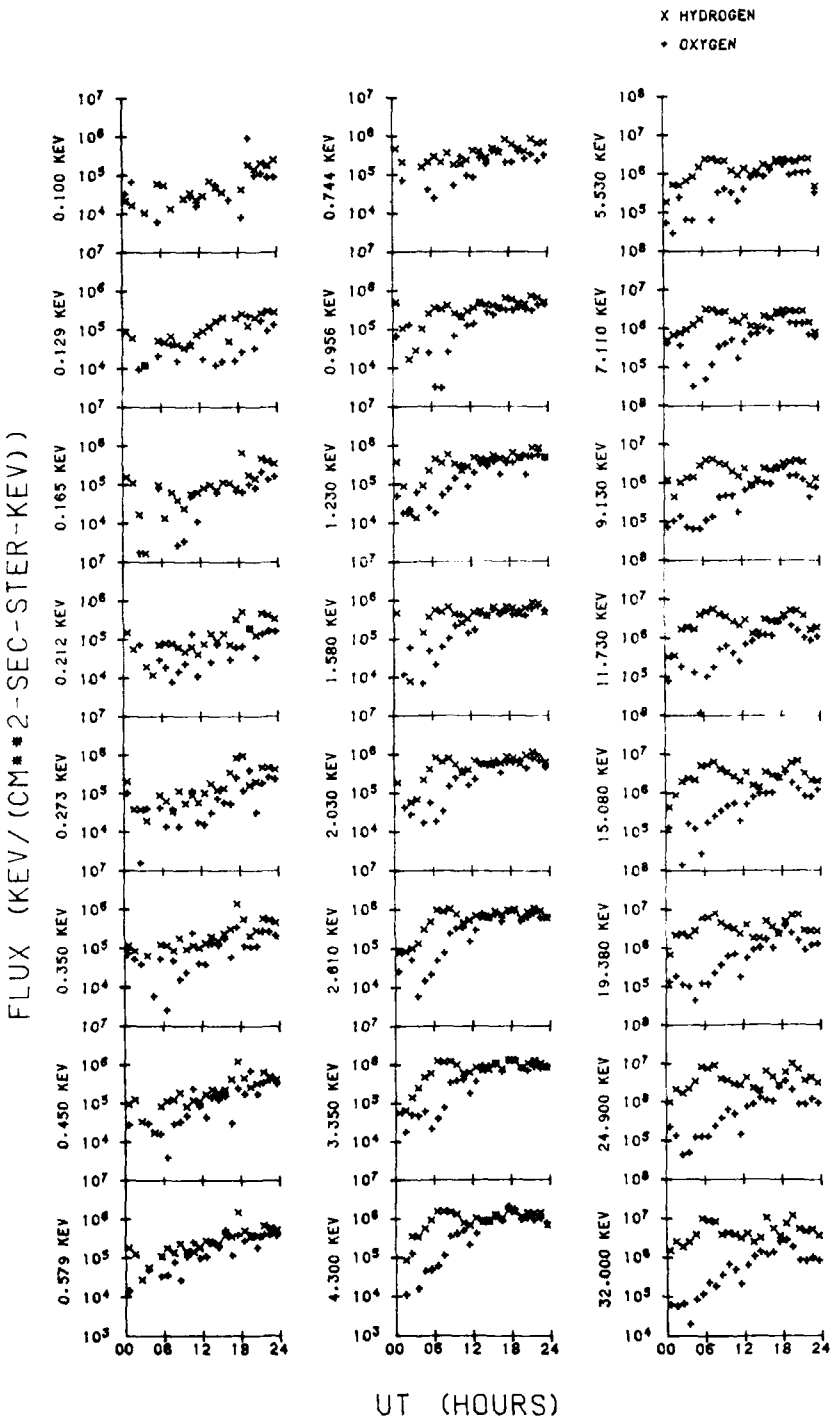
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DAY 241

7. MIDDLE ENERGY ELECTRON AND ION DATA BASE, SC5

7.1 Instrument Description

The Air Force Geophysics Laboratory SC5 Rapid Scan Particle Detector, built and operated under the direction of D.A. Hardy, measures fluxes of electrons and ions in the energy ranges from 50 eV to 1 MeV and from 50 eV to 7 MeV, respectively. These energies are the central energies of the channels. A complete spectrum is returned for the entire energy range in each 1 s interval, but the energy resolution is low, nearly 100%. The instrument consists of two sets of detectors. One set is mounted with the look direction oriented parallel to the spin axis, and the other set perpendicular to the spin axis. Each set of detectors consists of two cylindrical plate electrostatic analyzers (ESA) with spiraltron electron multipliers and two silicon surface barrier solid-state detector telescopes.

The two low- (high-) energy ESAs measure the electron and ion fluxes in four contiguous channels that range from 100 eV to 1.7 keV and from 1.7 to 60 keV, respectively. Both sets of ESAs also measure a background channel with zero voltage on the deflection plate. The low-energy ESAs have geometric factors of 1×10^{-4} cm^2 sr for both ions and electrons. The high-energy ESAs have geometric factors of 3×10^{-5} cm^2 sr for electrons and 3×10^{-4} cm^2 sr for ions. The solid state spectrometers (SSSs) make both anticoincident and coincident measurements. Here we use only the anticoincidence channels that measure particles between 70 and 400 keV. The electron SSSs use a 0.1 mil aluminum foil to absorb light and protons below 250 keV and have a 3×10^{-4} $m-$thick front detector. The proton SSSs use a sweeping magnet to eliminate electrons below about 200 keV and have an 6×10^{-6} $m-$thick front detector with 120 mg/cm^2 of aluminum for a light shield. The front detectors, in anticoincidence with the rear detectors, measure the particle fluxes over the energies studied. A full description of the instrument and its calibration can be found in Hanser, et al. [8]

7.2 Description of Data Presentation; SC5 Middle Energy Electrons and Ions

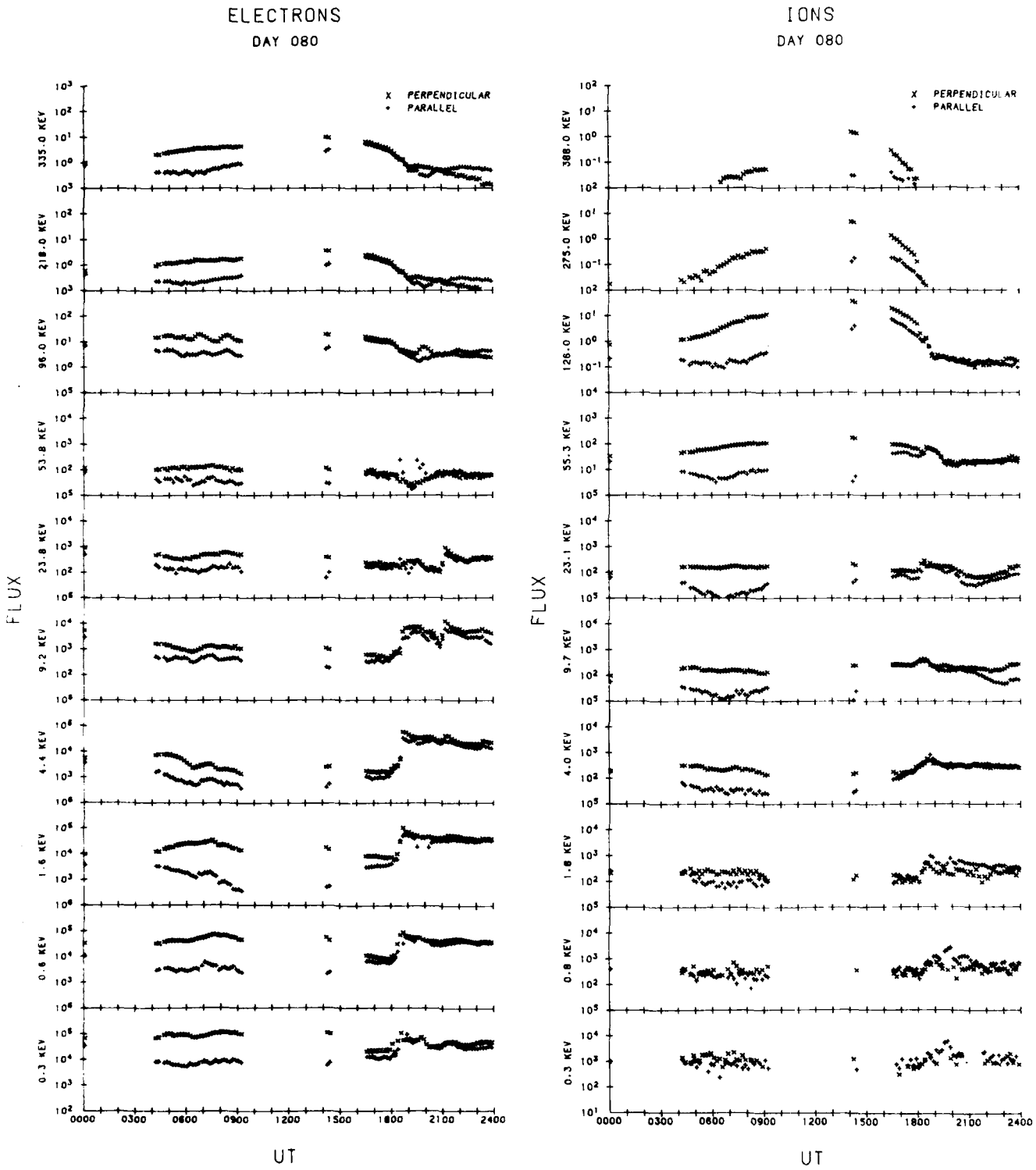
In each Figure are plotted ten minute averages of the number flux in $(cm^2\ s\ sr\ eV)^{-1}$ of electrons (left hand panel) and ions (right hand panel) for selected energies as a function of Universal Time for a 24-hour period. The number flux scale is logarithmic. The detectors used to create these averages are those perpendicular to the satellite spin axis. In each plot the averages are performed for fluxes that are most parallel $(+'s)$ and perpendicular $(X's)$ to the magnetic field. The satellite spin axis is such that fluxes within 15° of the field line are usually measured. Data gaps occur when the detectors were operated in single energy, high data rate modes, or turned off during beam operations.

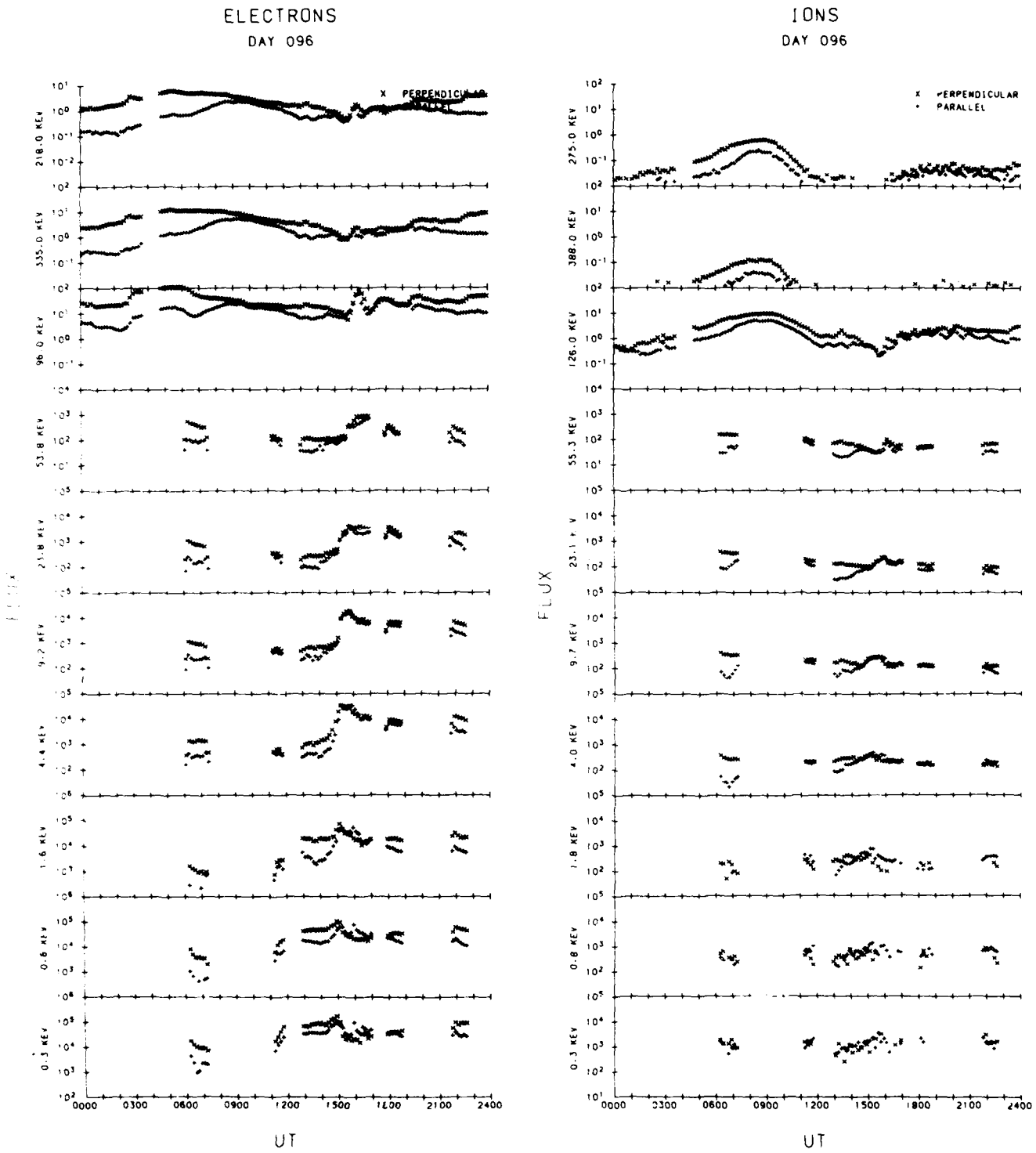
[8] Hanser, F.A., Hardy, D.A. and Sellers, B. (1979) *Calibration of the Rapid Scan Particle Detector Mounted in the SCATHA Satellite*, AFGL-TR-79-167, AD A082382.

7.3 Calendar of Days for which SC5 Middle Energy Electron and Ion Data are Presented

1979											1980		
DAY	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	DAY
1			121										1
2			122										2
3													3
4													4
5				156								036	5
6		096						279					6
7			127										7
8													8
9													9
10													10
11												042	11
12													12
13													13
14													14
15				166		227							15
16													16
17													17
18											018		18
19													19
20		110											20
21	080	111											21
22		112	142					295					22
23		113								357			23
24		114											24
25		115								359			25
26		116						299					26
27		117						300					27
28		118					271						28
29		119		180		241				363			29
30		120				242							30
31													31

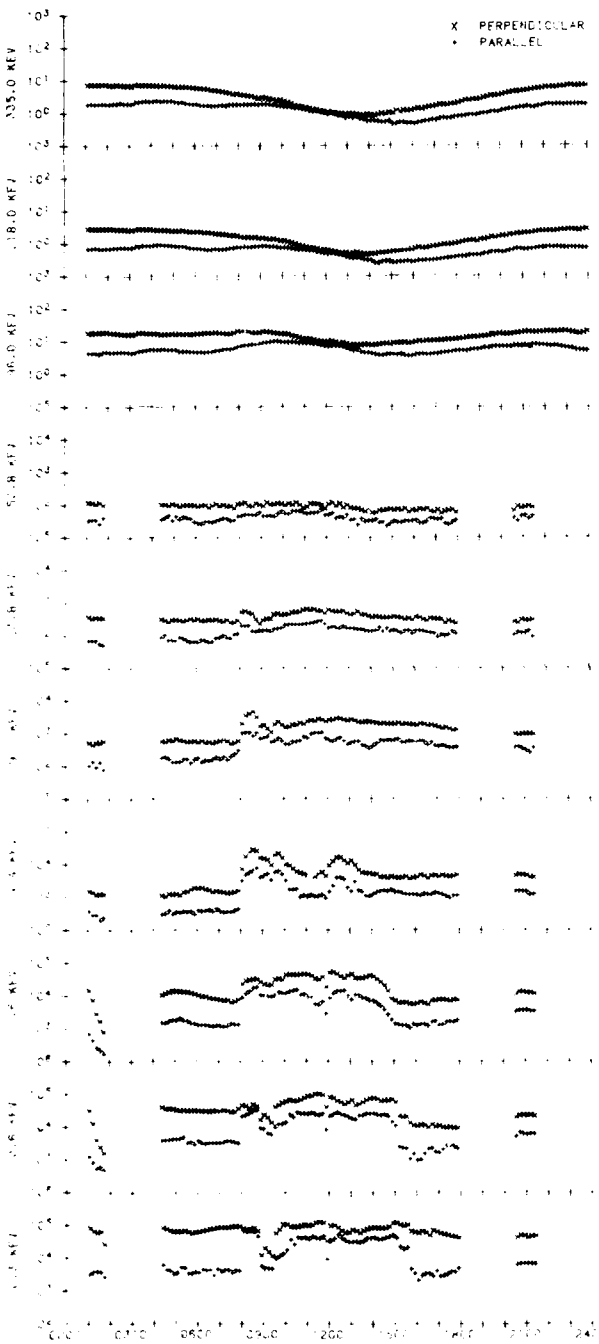
7.4 Data Presentation; SC5 Middle Energy Electron and Ion Data




ELECTRONS
DAY 096
X PERPENDICULAR
PARALLEL
218.0 KEV
335.0 KEV
96.0 KEV
53.8 KEV
21.8 KEV
9.2 KEV
4.4 KEV
1.6 KEV
0.6 KEV
0.3 KEV
FLUX
UT
IONS
DAY 096
X PERPENDICULAR
PARALLEL
275.0 KEV
388.0 KEV
126.0 KEV
55.3 KEV
23.1 KEV
9.7 KEV
4.0 KEV
1.8 KEV
0.8 KEV
0.3 KEV
FLUX
UT

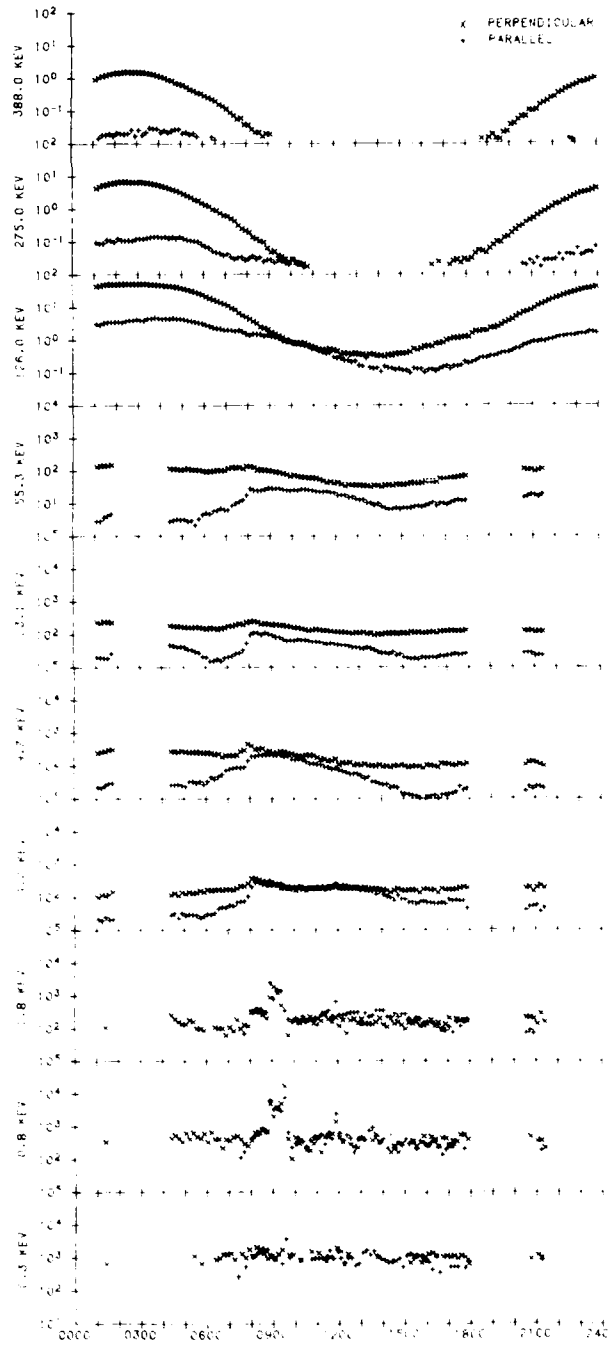
ELECTRONS

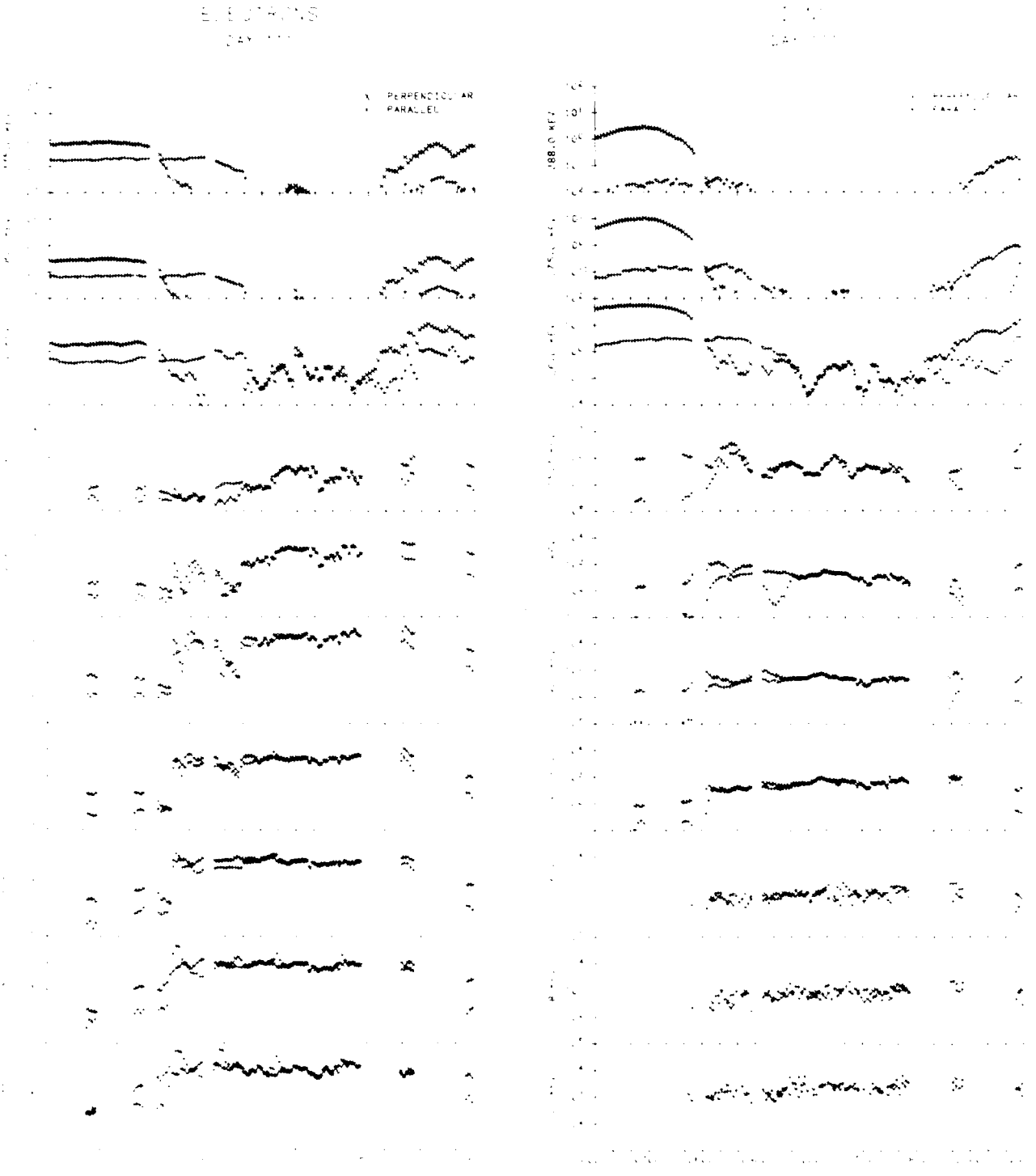
DAY 110

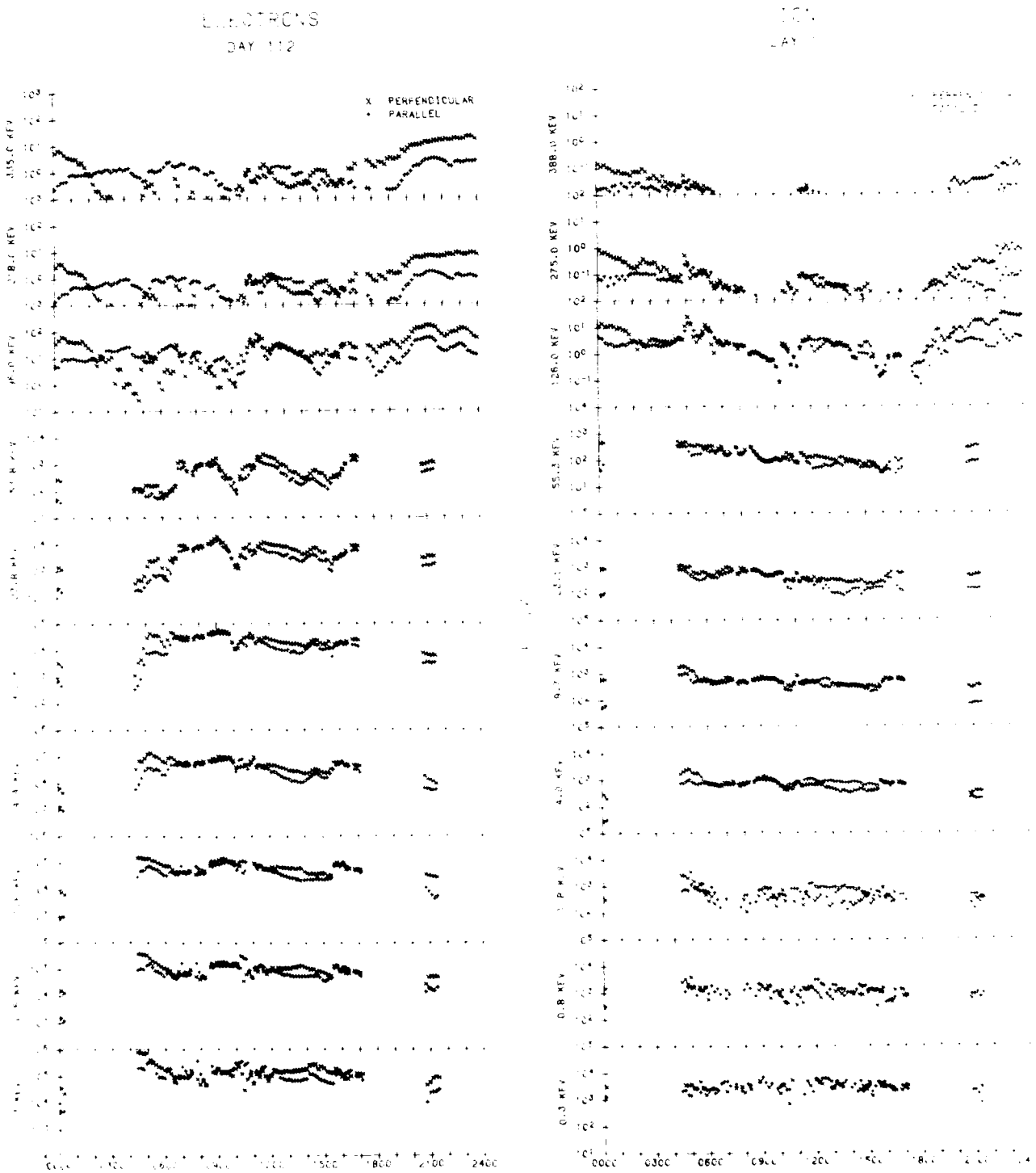


IONS

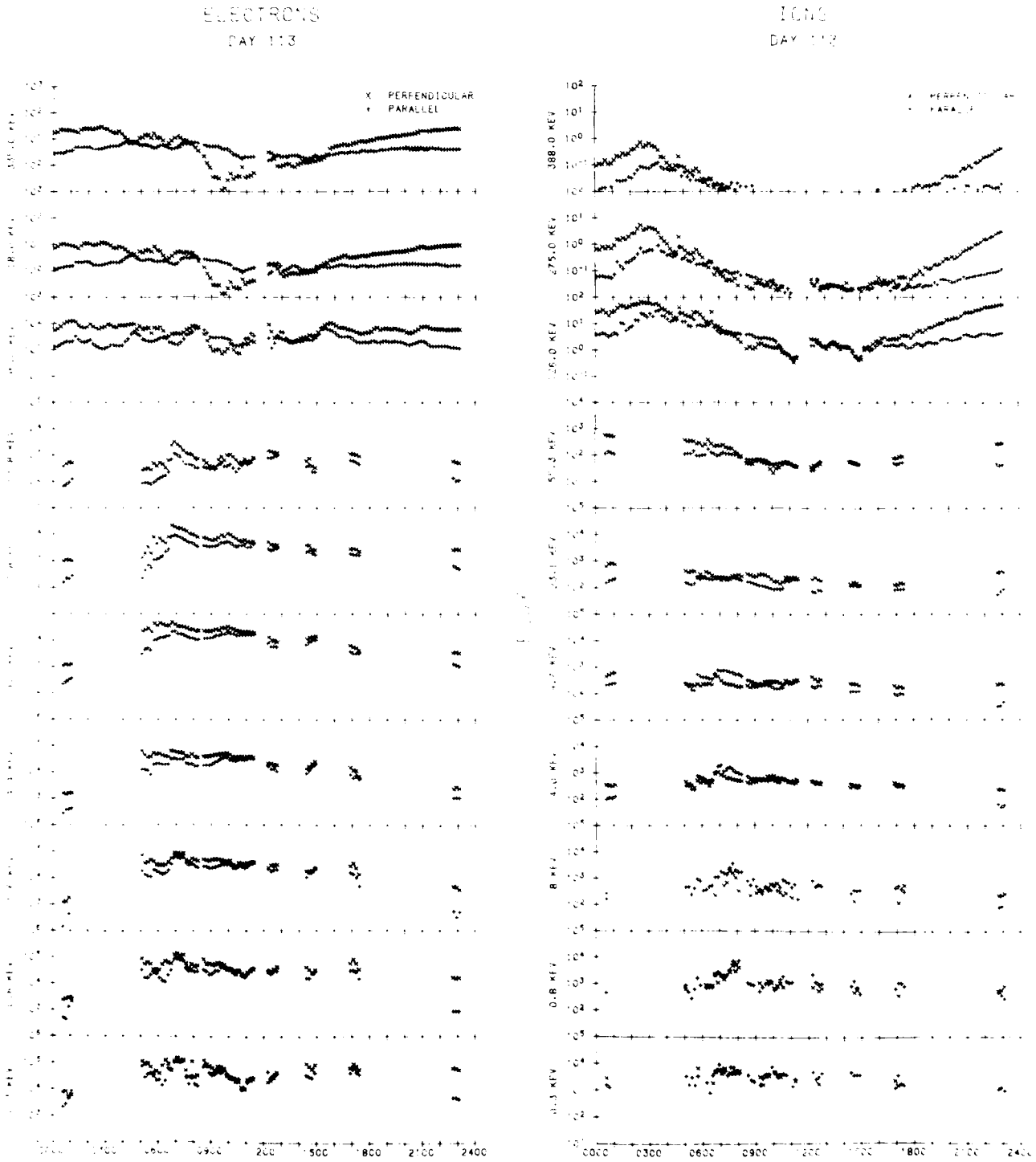
DAY 110

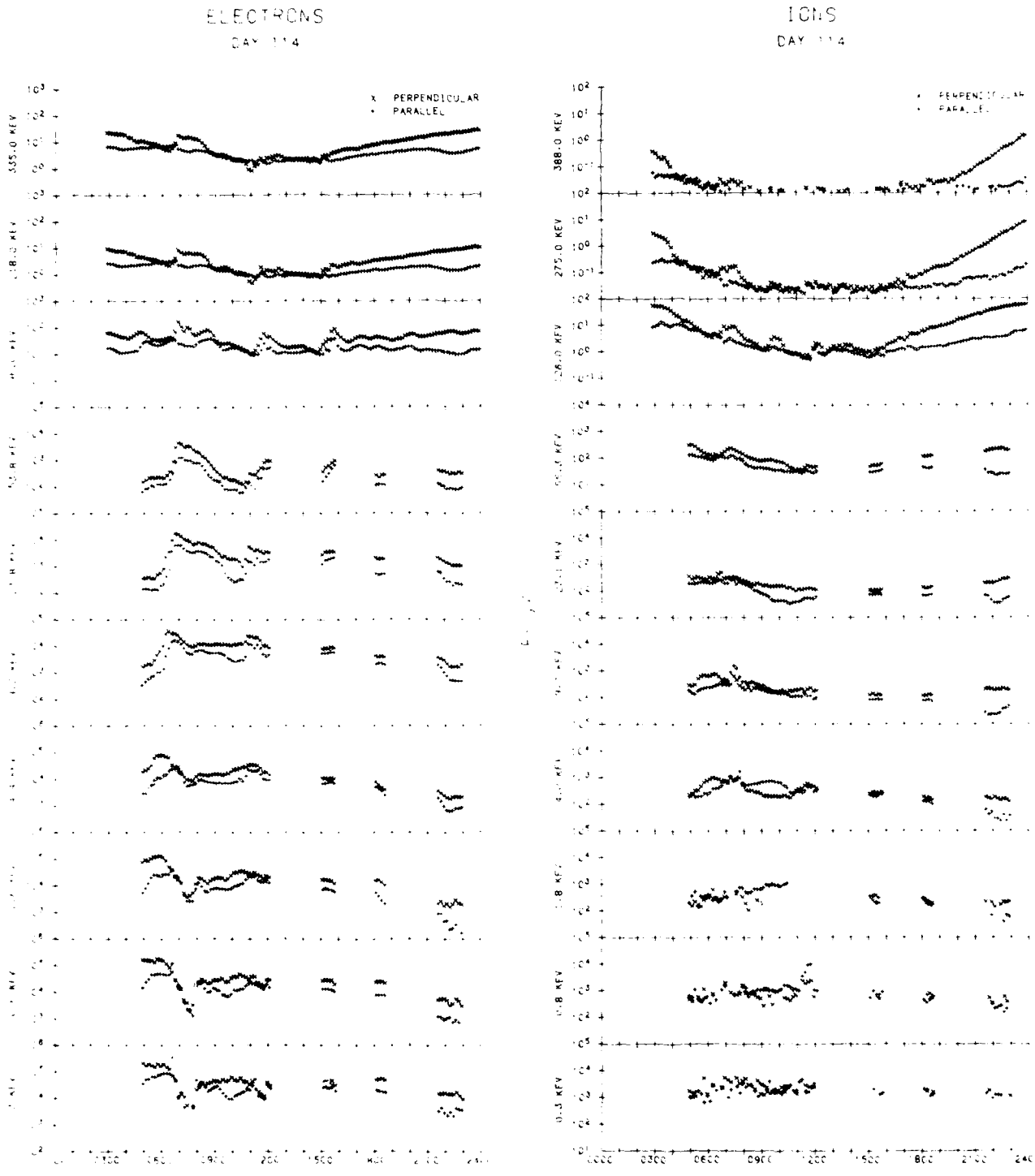



PERPENDICULAR
PARALLEL



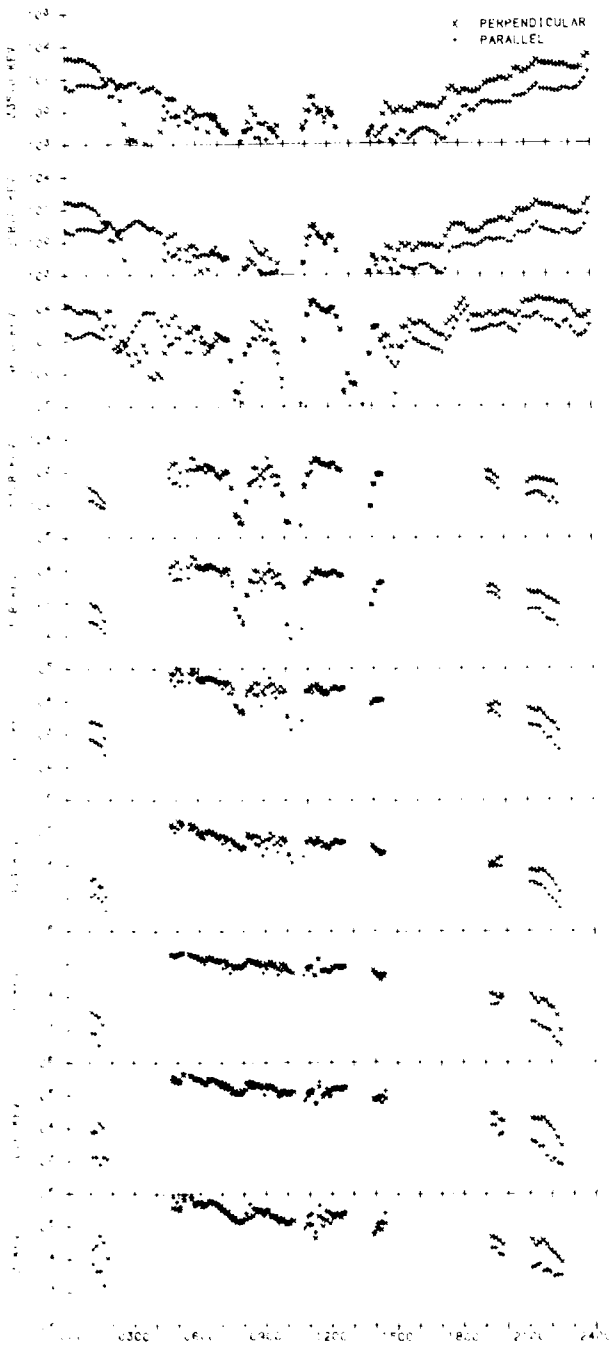
DAY 112
X PERPENDICULAR
• PARALLEL
388.0 KEV
275.0 KEV
126.0 KEV
55.3 KEV
0.8 KEV
0.3 KEV
0000
0300
0600
0900
1200
1500
1800
2100
2400


ELECTRONS
DAY 113
X PERPENDICULAR
+ PARALLEL
IONS
388.0 KEV
275.0 KEV
0.8 KEV
0300
0600
0900
1800
2400


ELECTRONS
DAY 114
X PERPENDICULAR
+ PARALLEL
535.0 KEV
388.0 KEV
ICNS
DAY 114
388.0 KEV
275.0 KEV

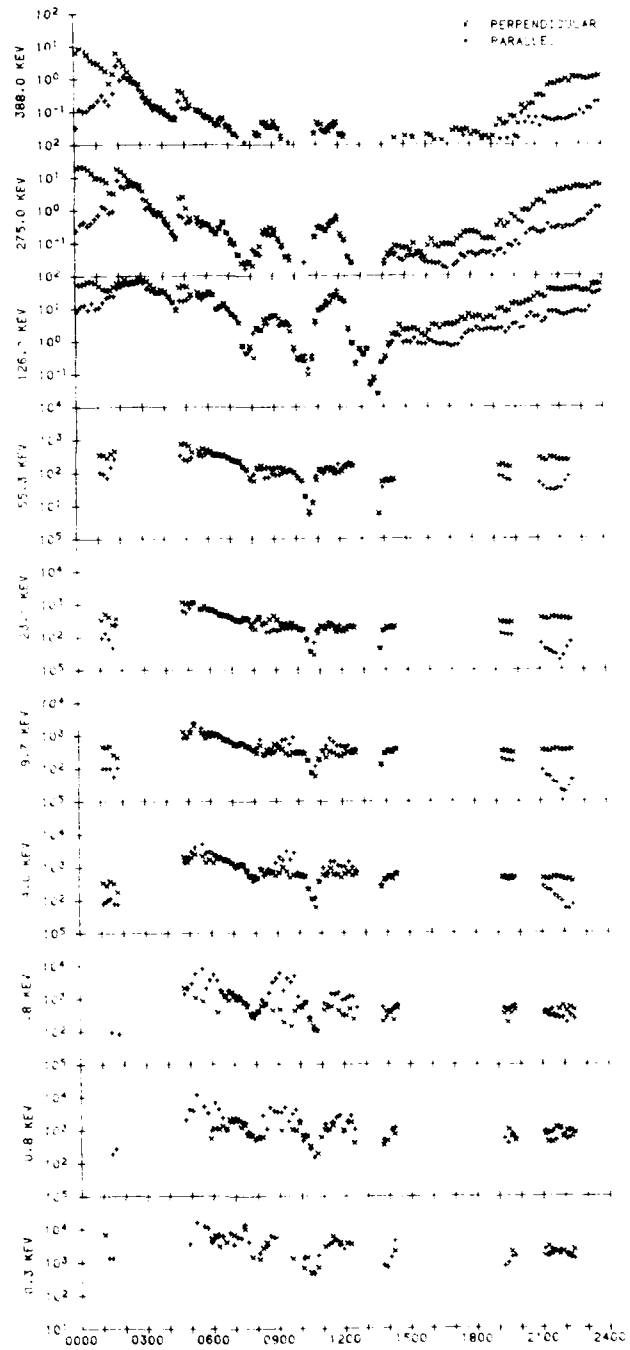
ELECTRONS

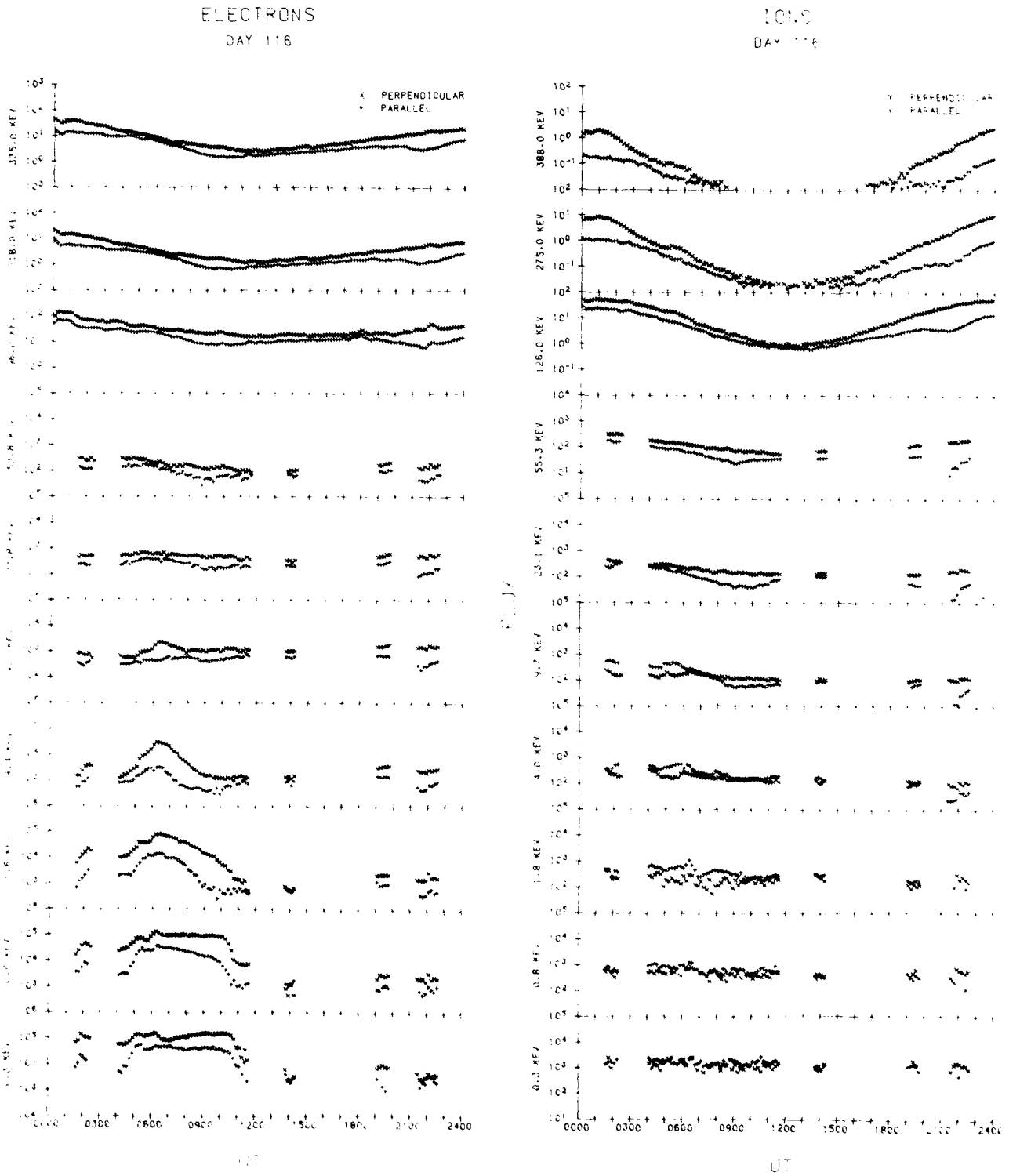
DAY 115

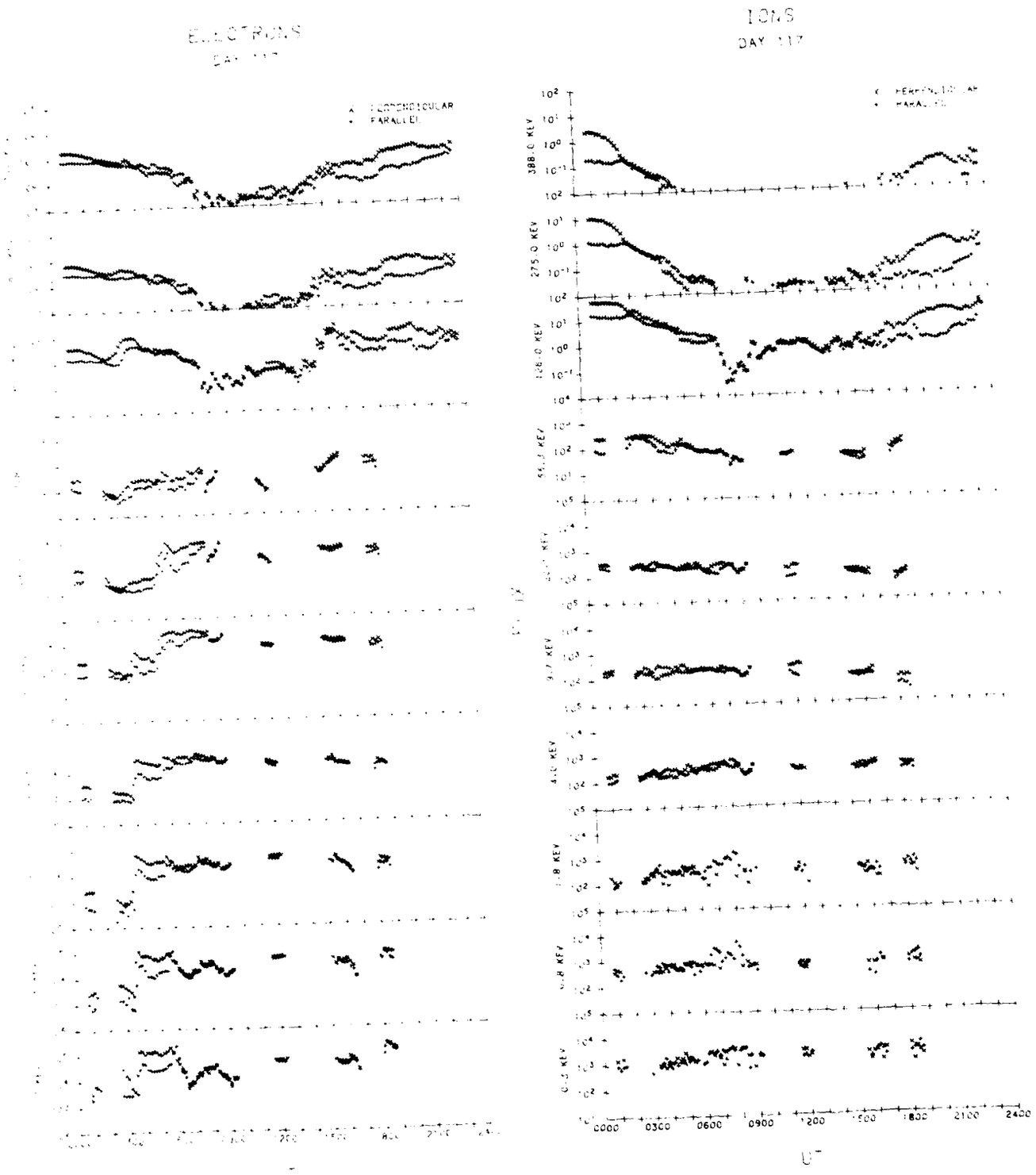


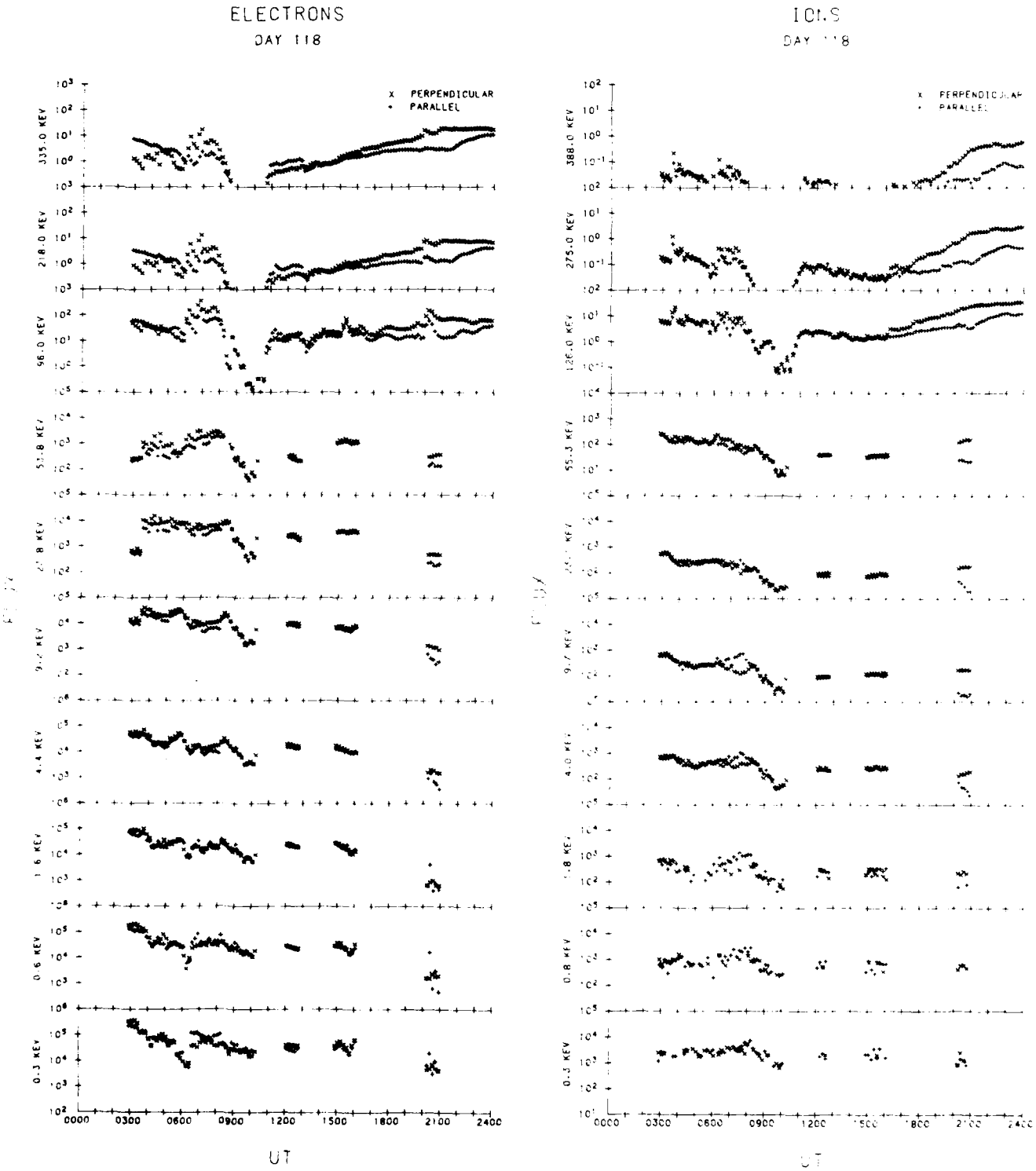
IONS

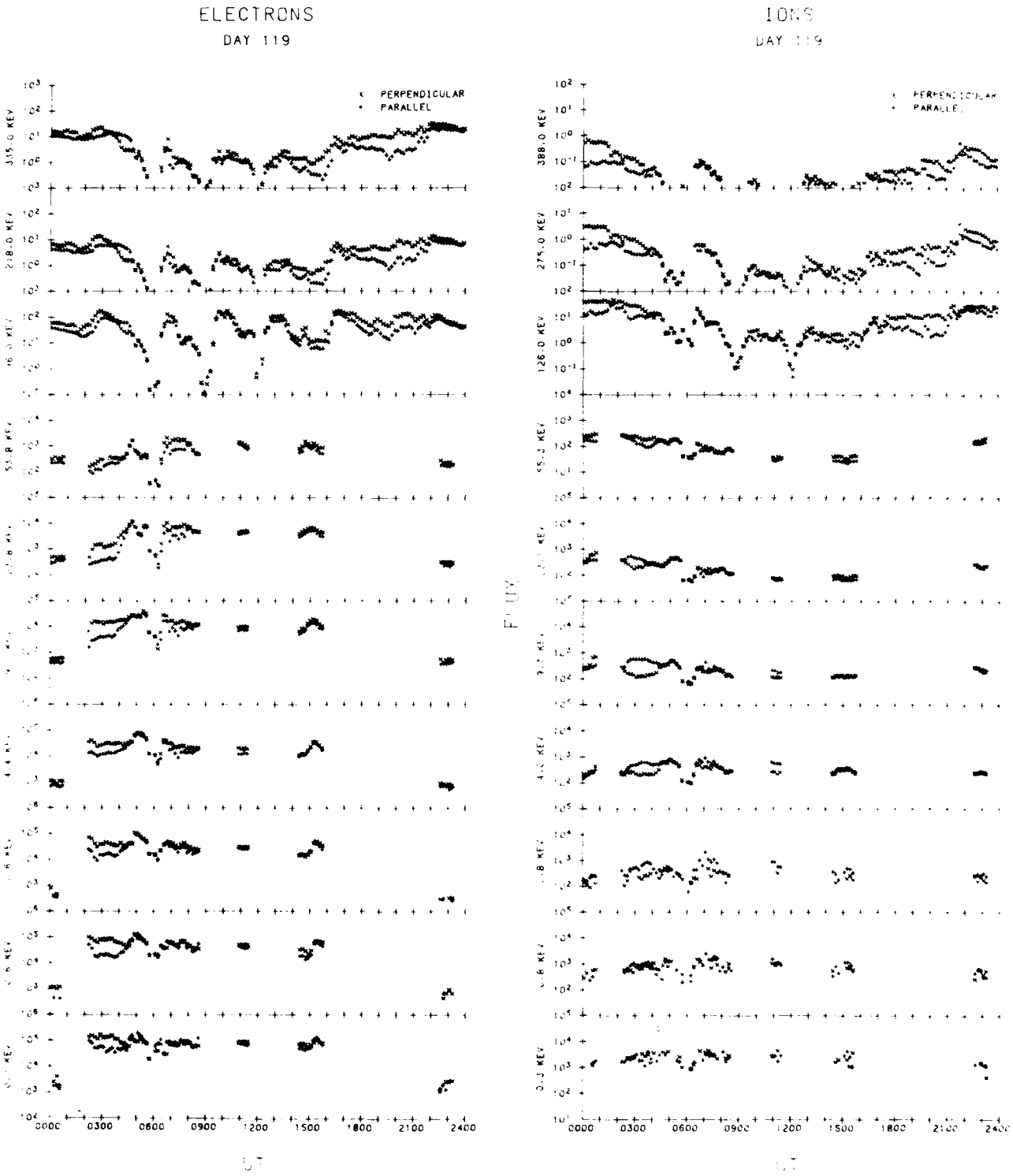
DAY 115

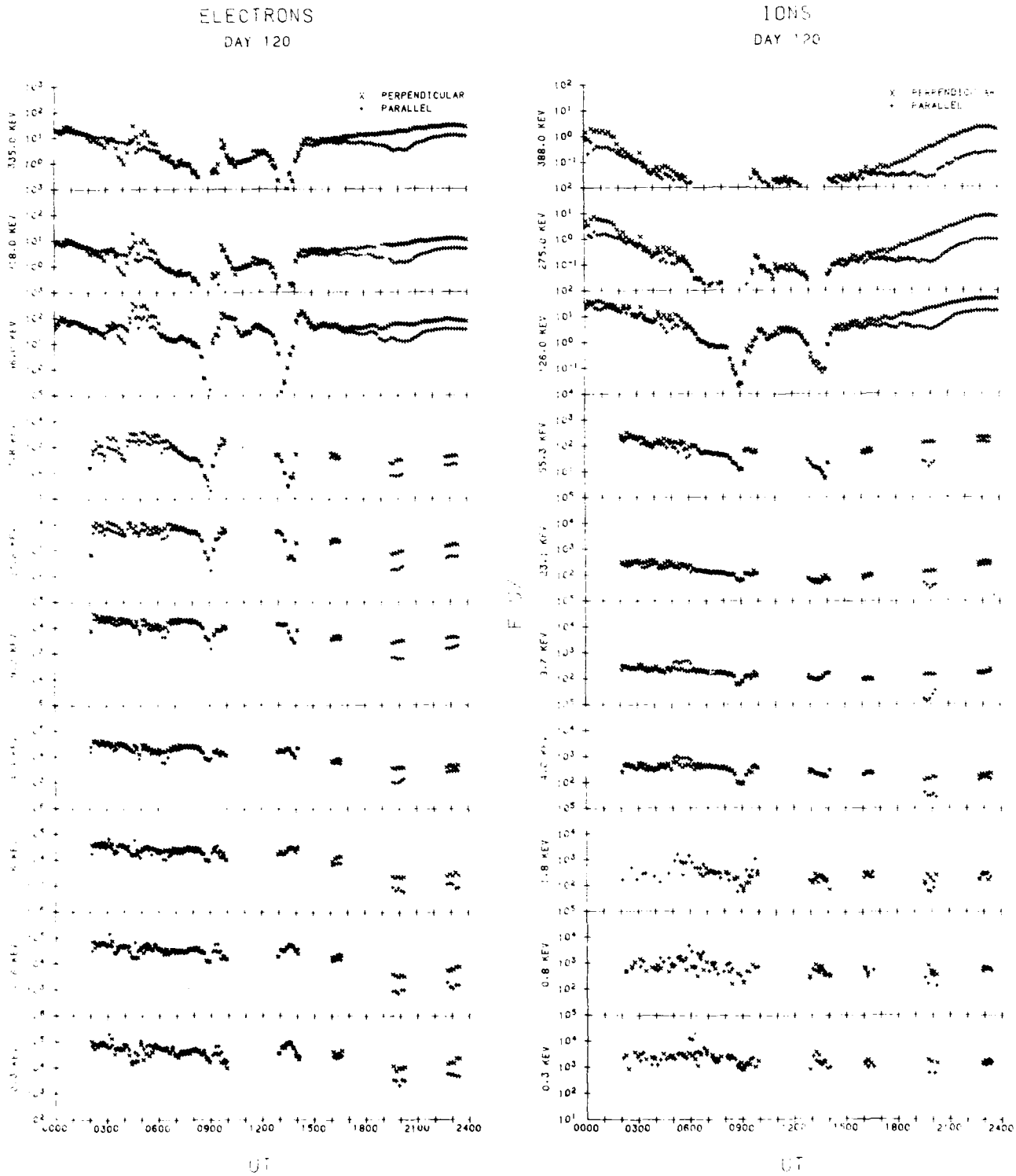


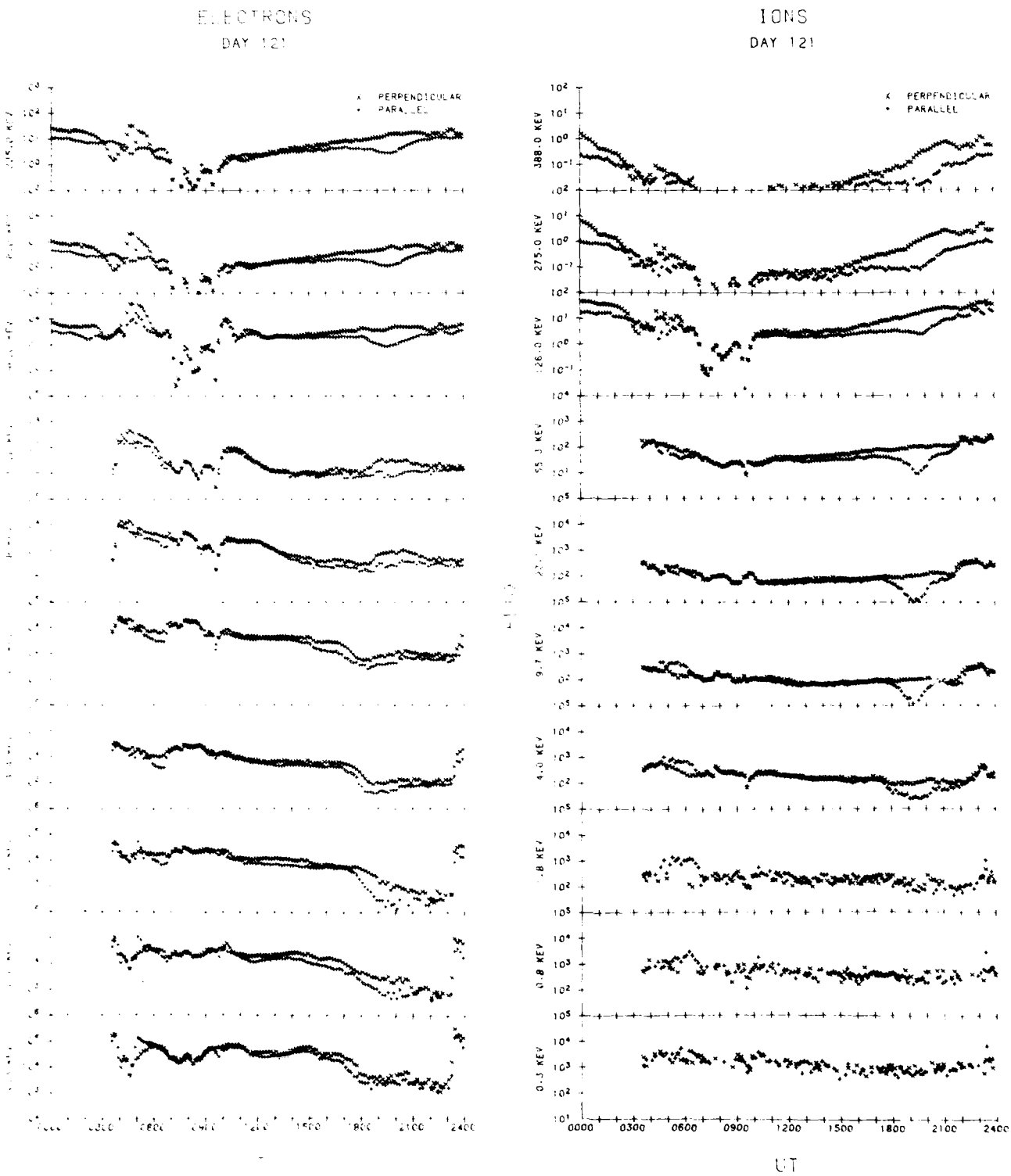

ELECTRONS
DAY 116
PERPENDICULAR
PARALLEL
IONS
388.0 KEV
275.0 KEV
126.0 KEV
55.3 KEV
4.0 KEV
0.3 KEV
0000
0300
0600
0900
1200
1500
1800
2400
UT

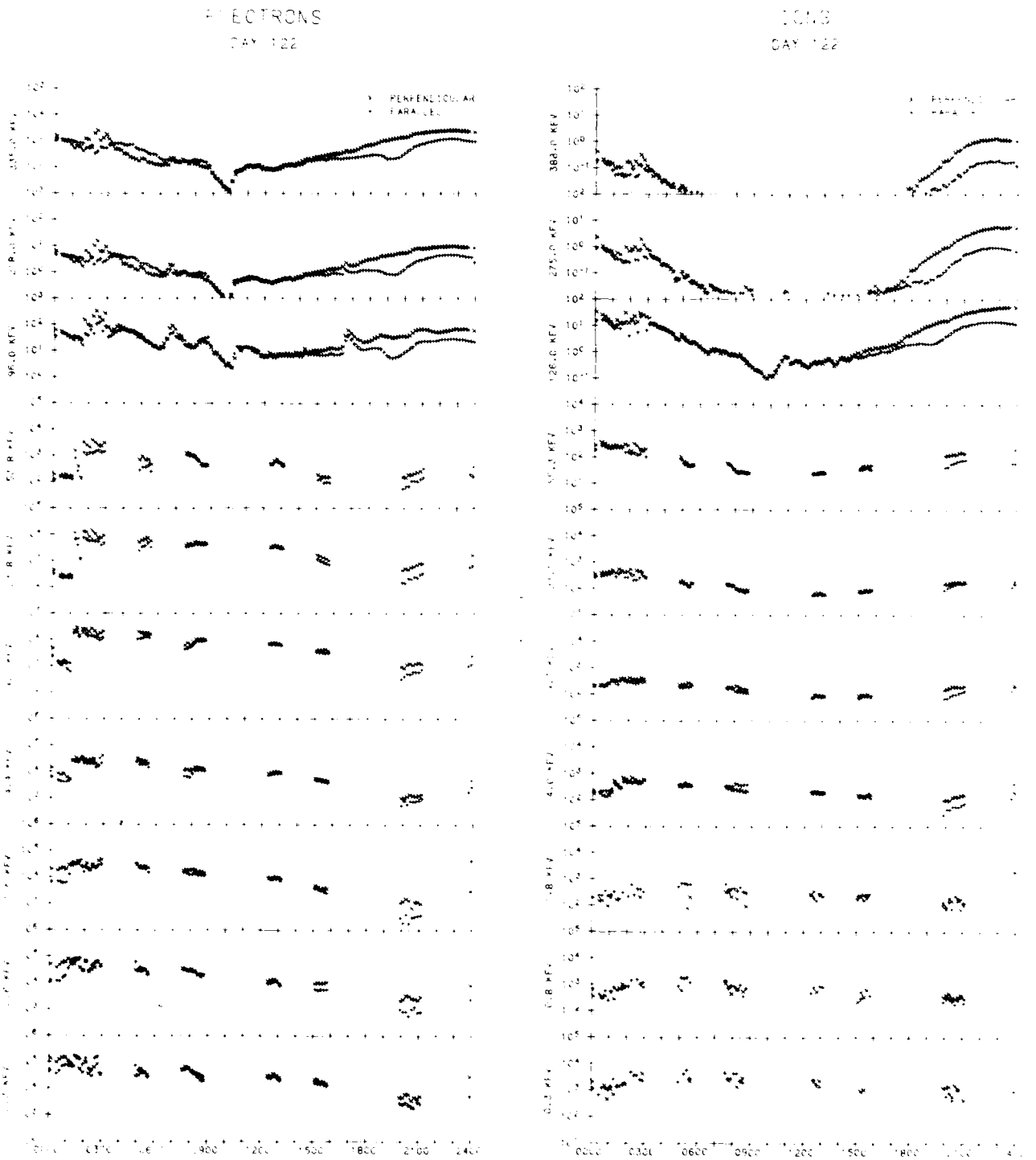

ELECTRONS
PERPENDICULAR
PARALLEL
IONS
388.0 KEV
275.0 KEV
0000
0300
0600
0900
1200
1500
1800
2100
2400
UT

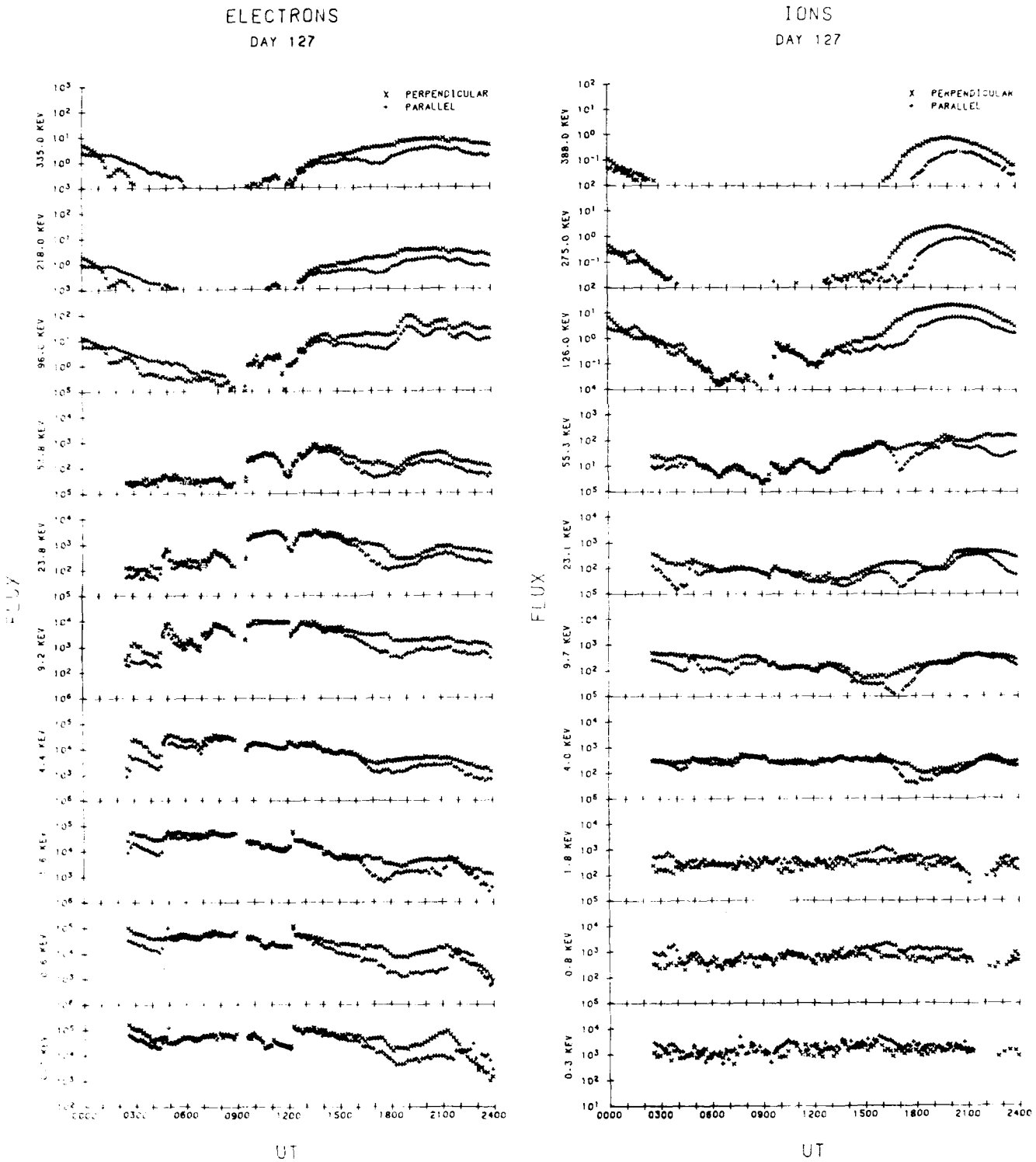

ELECTRONS
DAY 118
X PERPENDICULAR
• PARALLEL
335.0 KEV
218.0 KEV
56.0 KEV
0.6 KEV
0.3 KEV
0000
0300
0600
0900
1200
1500
1800
2100
2400
UT
388.0 KEV
275.0 KEV
126.0 KEV
55.3 KEV
4.0 KEV
0.8 KEV
0.5 KEV
UT

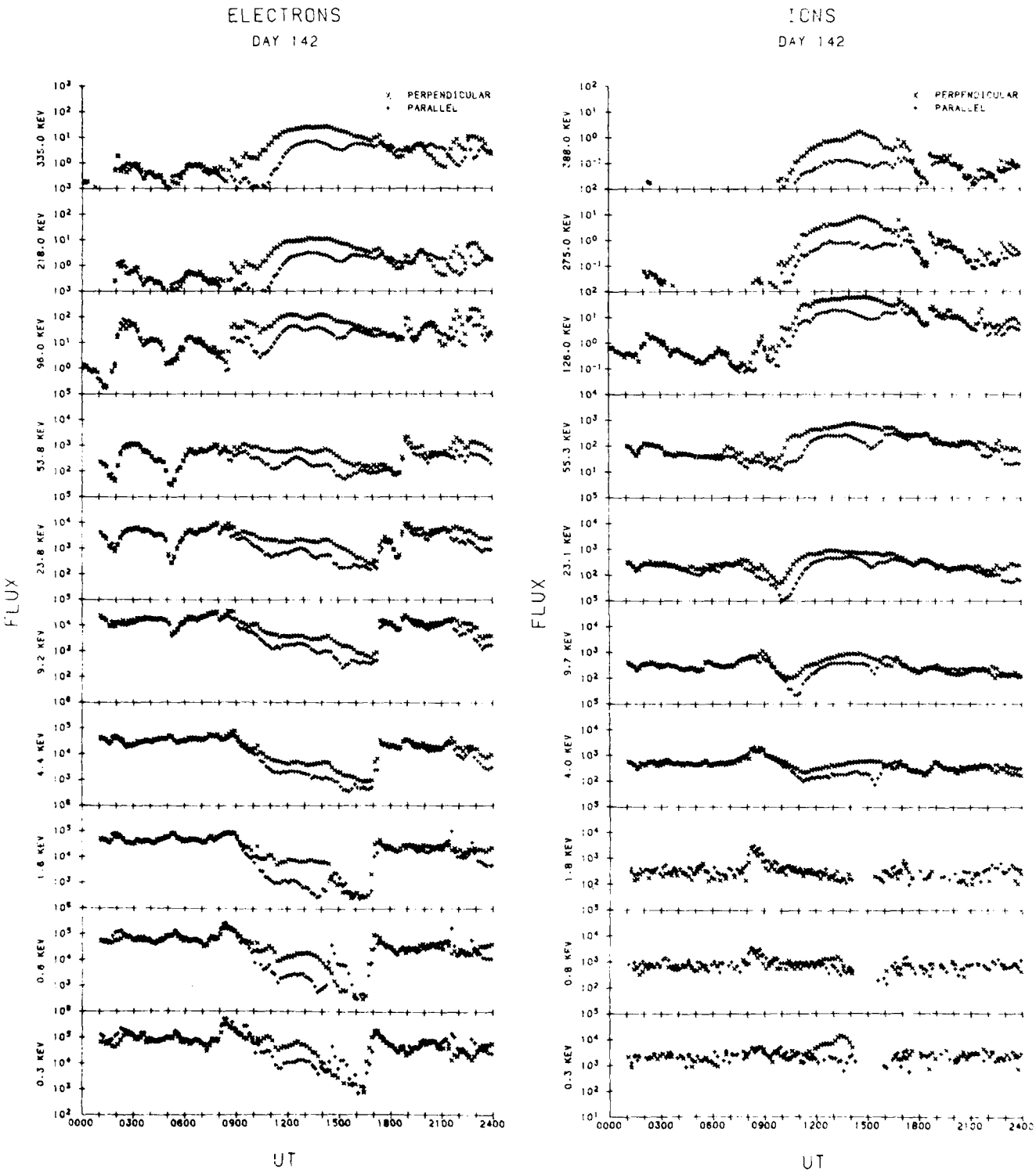

ELECTRONS
DAY 119
PERPENDICULAR
PARALLEL
0000
0300
0600
0900
1200
1500
1800
2100
2400
UT
IONS
DAY 119
PERPENDICULAR
PARALLEL
388.0 KEV
275.0 KEV
126.0 KEV
0000
0300
0600
0900
1200
1500
1800
2100
2400
UT


ELECTRONS
DAY 120
X PERPENDICULAR
+ PARALLEL
0000 0300 0600 0900 1200 1500 1800 2100 2400
UT
IONS
DAY 120
X PERPENDICULAR
+ PARALLEL
388.0 KEV
275.0 KEV
126.0 KEV
0.8 KEV
0.3 KEV
0000 0300 0600 0900 1200 1500 1800 2100 2400
UT


ELECTRONS
DAY 121
IONS
DAY 121
X PERPENDICULAR
+ PARALLEL
388.0 KEV
275.0 KEV
126.0 KEV
55.3 KEV
9.7 KEV
4.0 KEV
0.8 KEV
0.3 KEV
0000
0300
0600
0900
1200
1500
1800
2100
2400
UT


ELECTRONS
DAY 122
PERPENDICULAR
PARALLEL
ION
DAY 122


ELECTRONS
DAY 127
X PERPENDICULAR
+ PARALLEL
335.0 KEV
218.0 KEV
23.8 KEV
9.2 KEV
4.4 KEV
FLUX
UT
IONS
DAY 127
X PERPENDICULAR
+ PARALLEL
388.0 KEV
275.0 KEV
126.0 KEV
55.3 KEV
23.1 KEV
9.7 KEV
4.0 KEV
1.8 KEV
0.8 KEV
0.3 KEV
FLUX
0000
0300
0600
0900
1200
1500
1800
2100
2400
UT


ELECTRONS
DAY 142
PERPENDICULAR
PARALLEL
335.0 KEV
218.0 KEV
96.0 KEV
53.8 KEV
23.8 KEV
9.2 KEV
4.4 KEV
1.6 KEV
0.6 KEV
0.3 KEV
FLUX
0000 0300 0600 0900 1200 1500 1800 2100 2400
UT
IONS
DAY 142
PERPENDICULAR
PARALLEL
288.0 KEV
275.0 KEV
126.0 KEV
55.3 KEV
23.1 KEV
9.7 KEV
4.0 KEV
1.8 KEV
0.8 KEV
0.3 KEV
FLUX
0000 0300 0600 0900 1200 1500 1800 2100 2400
UT

AD-A214 205 SCATHA (SPACECRAFT CHARGING AT HIGH ALTITUDES) ATLAS DATA BASE VOLUME 2(U) GEOPHYSICS LAB (AFSC) HANSCOM AFB MA E C MULLEN ET AL. 01 SEP 89 GL-TR-89-0249(2) 3/3

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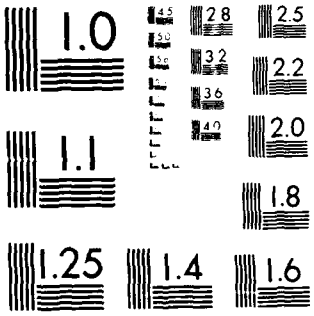
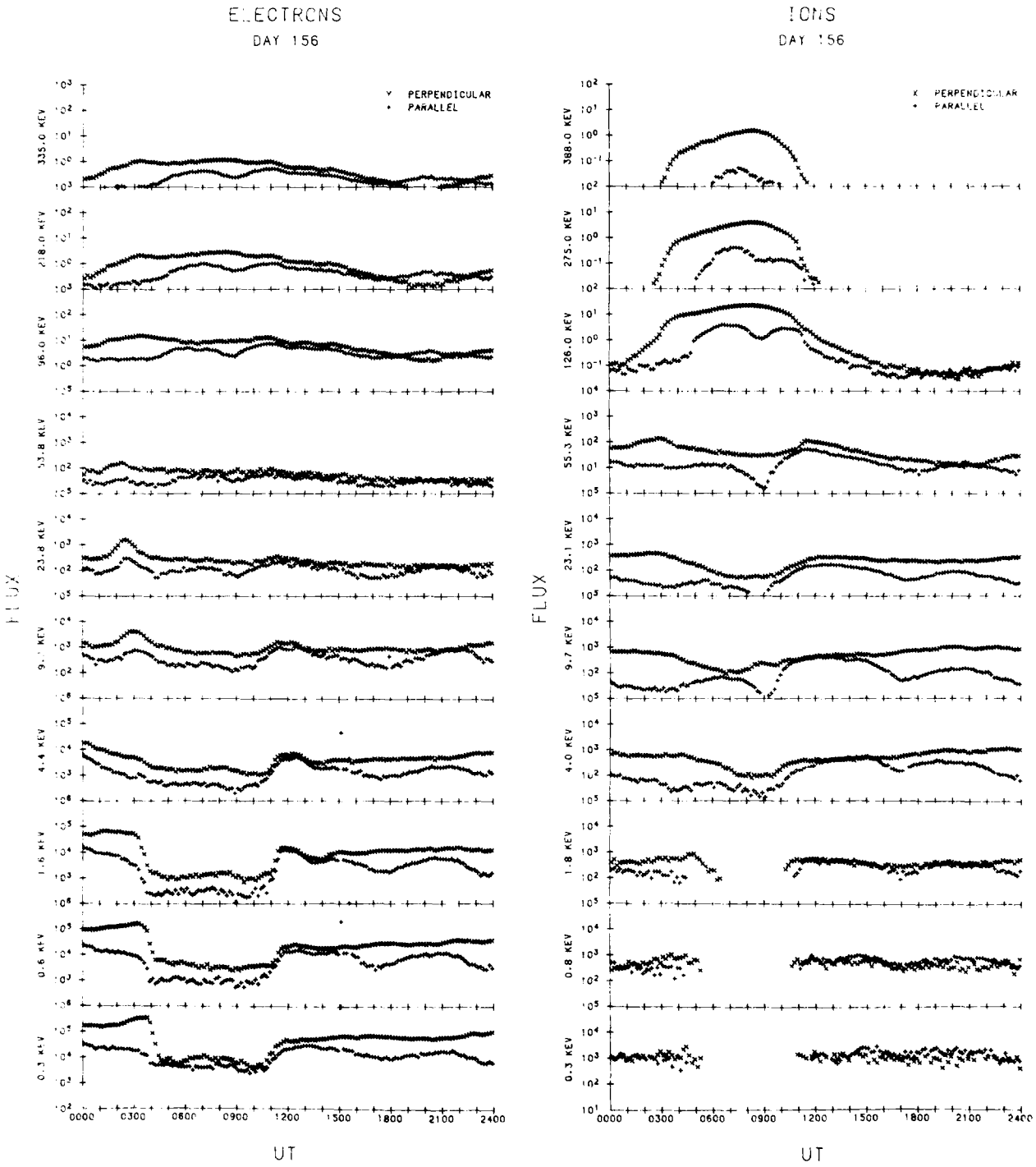
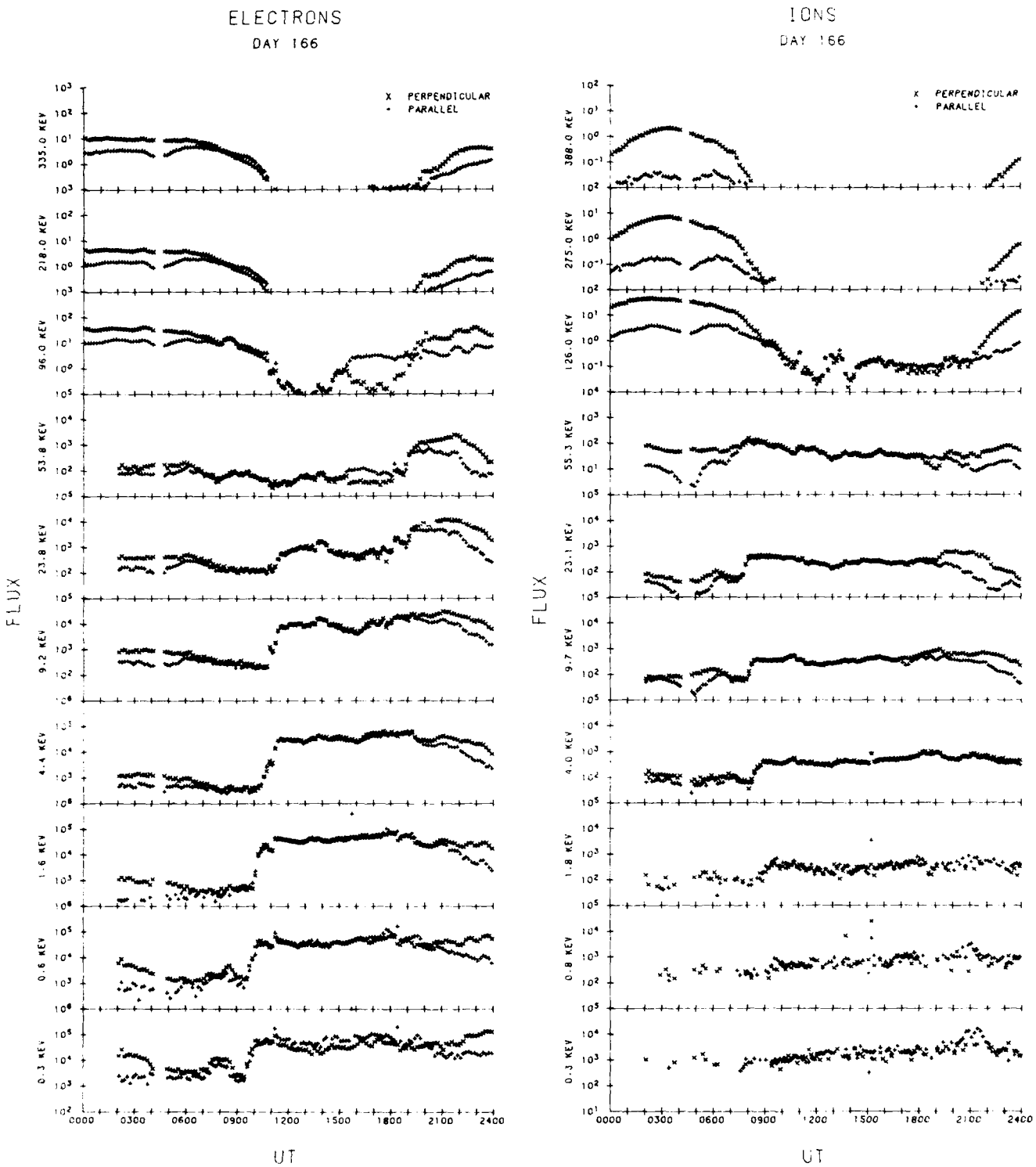
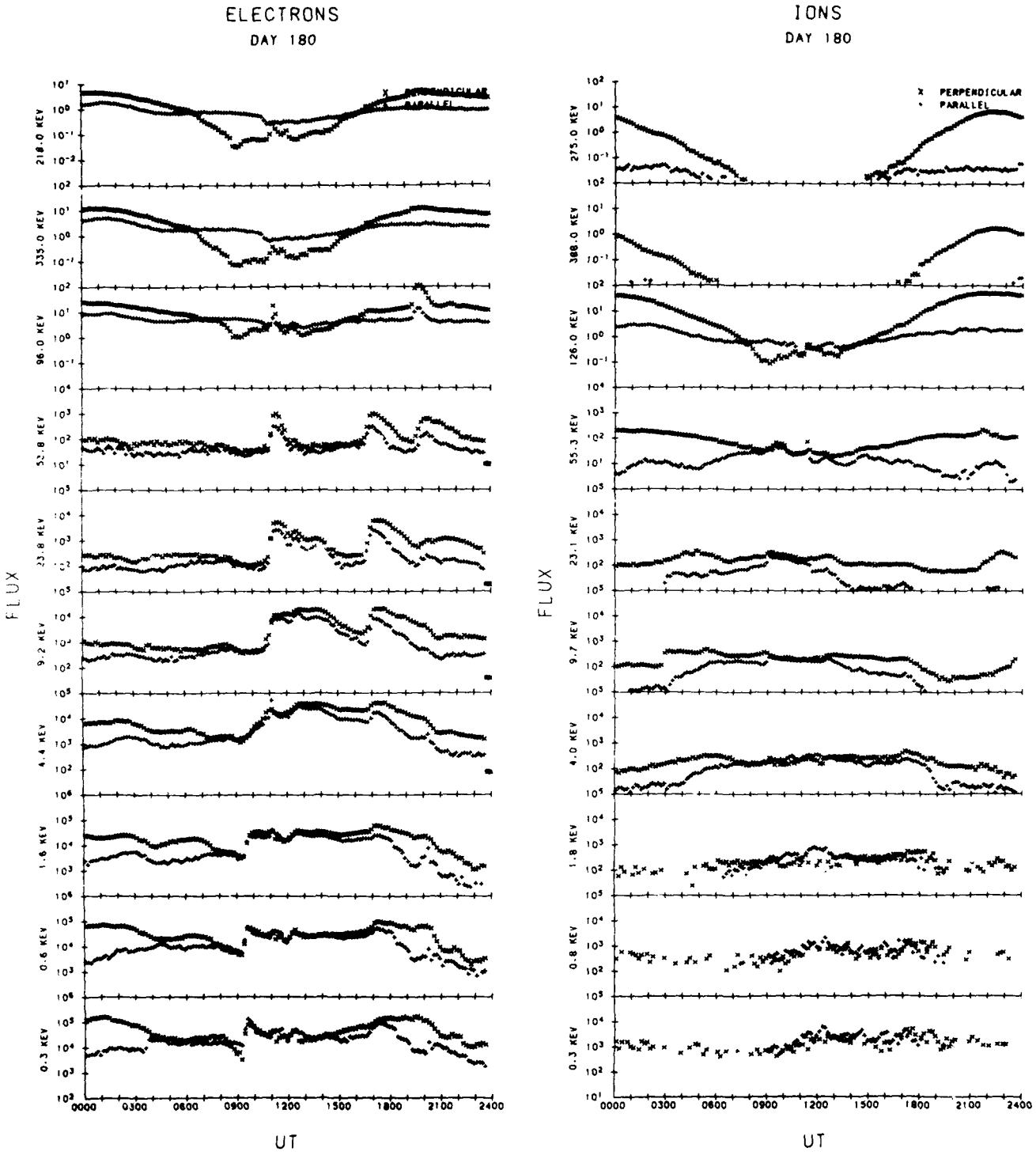
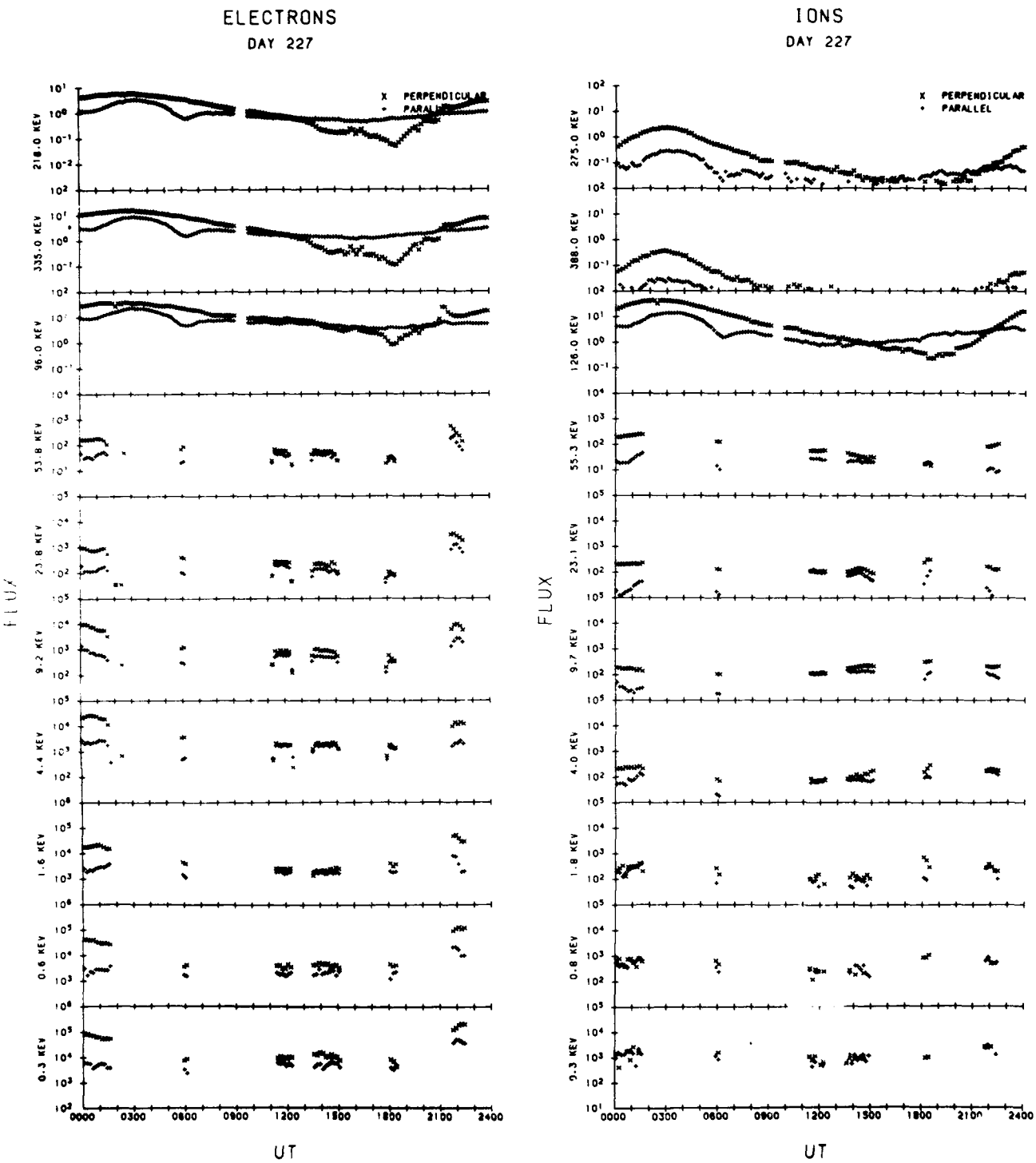


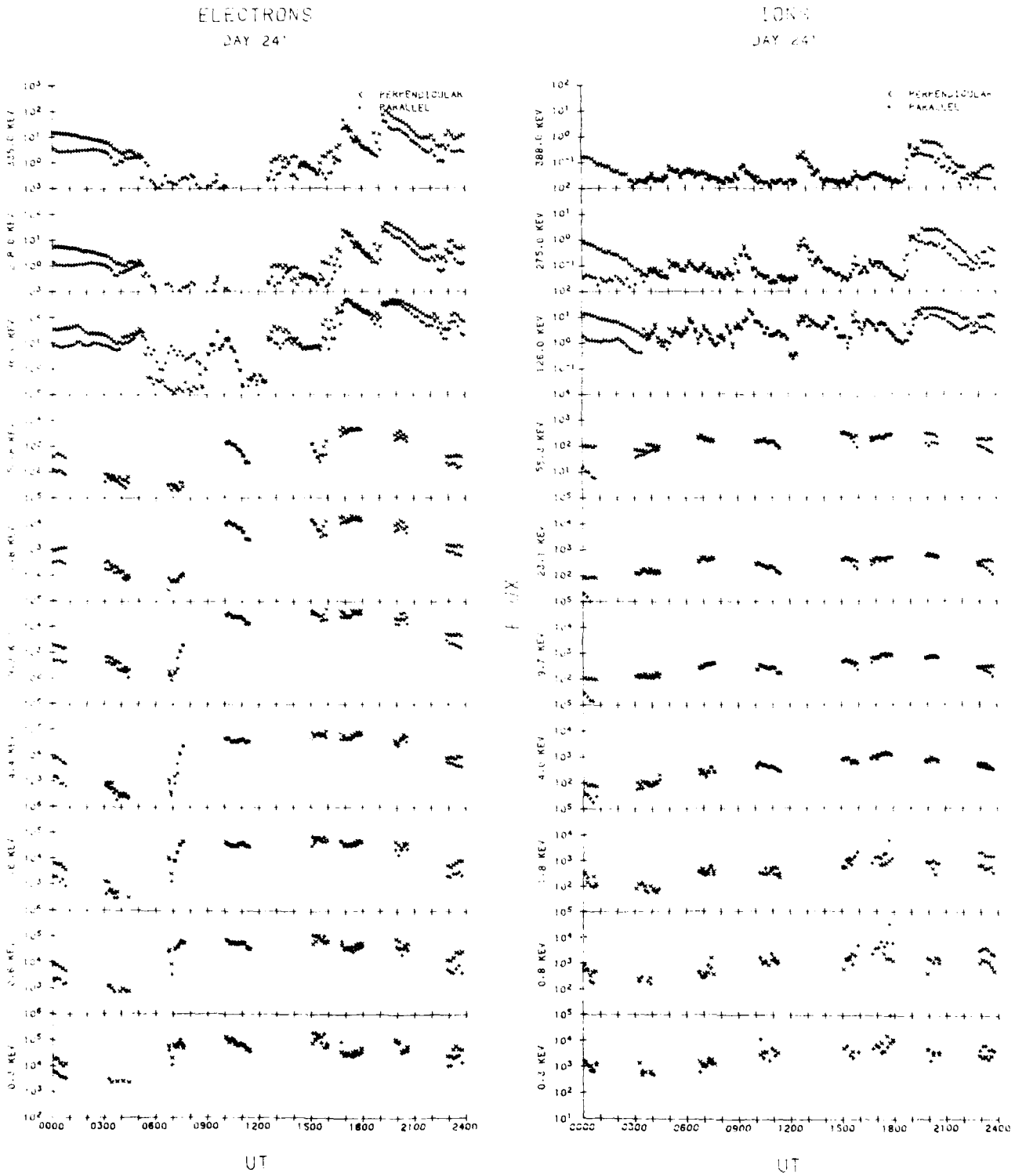
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

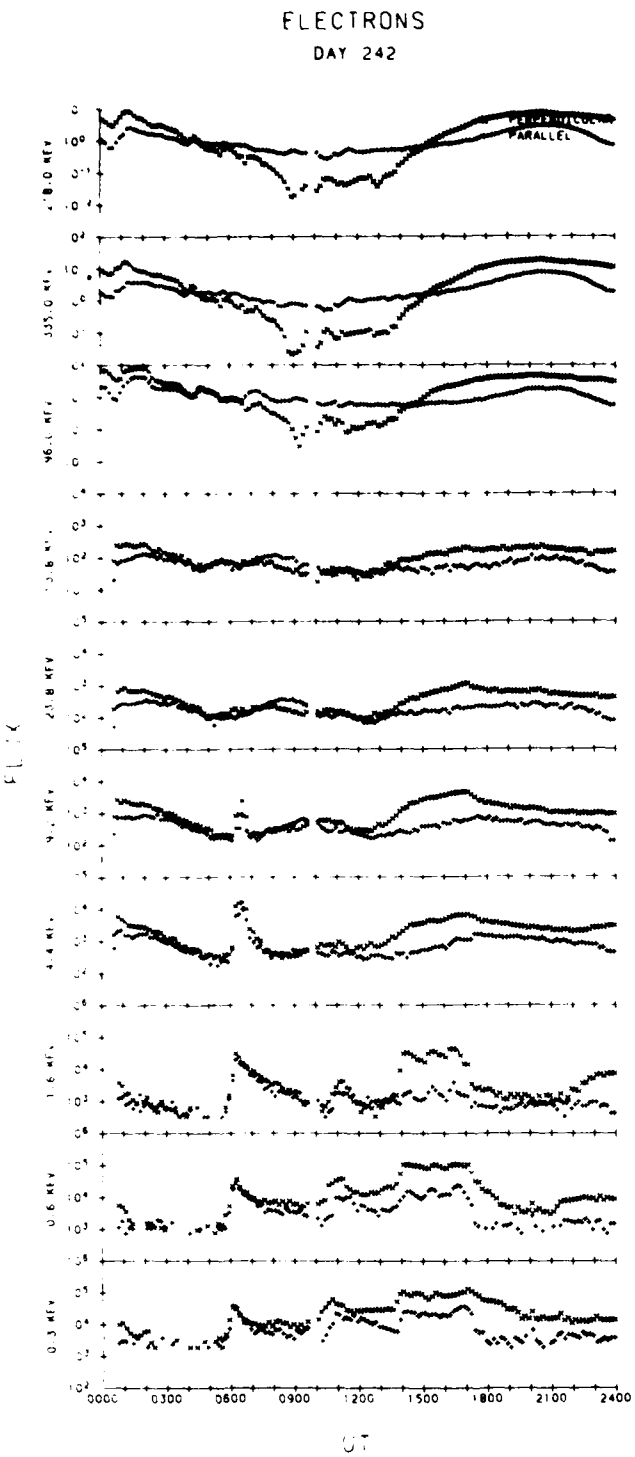

ELECTRONS
DAY 156
PERPENDICULAR
PARALLEL
335.0 KEV
218.0 KEV
96.0 KEV
23.8 KEV
4.4 KEV
1.6 KEV
0.6 KEV
0.3 KEV
FLUX
0000
0300
0600
0900
1200
1500
1800
2100
2400
UT
IONS
DAY 156
PERPENDICULAR
PARALLEL
388.0 KEV
275.0 KEV
126.0 KEV
55.3 KEV
23.1 KEV
9.7 KEV
4.0 KEV
1.8 KEV
0.8 KEV
0.3 KEV
FLUX
0000
0300
0600
0900
1200
1500
1800
2100
2400
UT

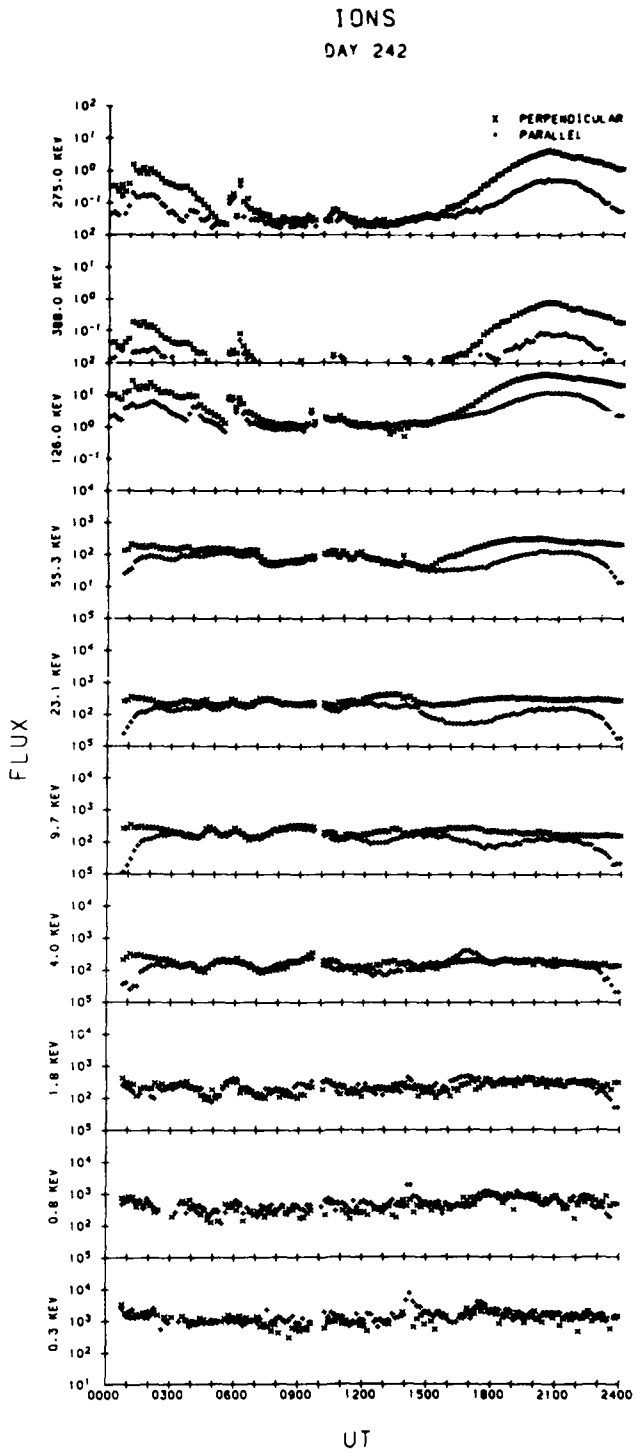

ELECTRONS
DAY 166
X PERPENDICULAR
• PARALLEL
335.0 KEV
218.0 KEV
96.0 KEV
53.8 KEV
23.8 KEV
9.2 KEV
4.4 KEV
1.6 KEV
0.6 KEV
0.3 KEV
FLUX
0000 0300 0600 0900 1200 1500 1800 2100 2400
UT
IONS
DAY 166
X PERPENDICULAR
• PARALLEL
388.0 KEV
275.0 KEV
126.0 KEV
55.3 KEV
23.1 KEV
9.7 KEV
4.0 KEV
1.8 KEV
0.8 KEV
0.3 KEV
FLUX
0000 0300 0600 0900 1200 1500 1800 2100 2400
UT

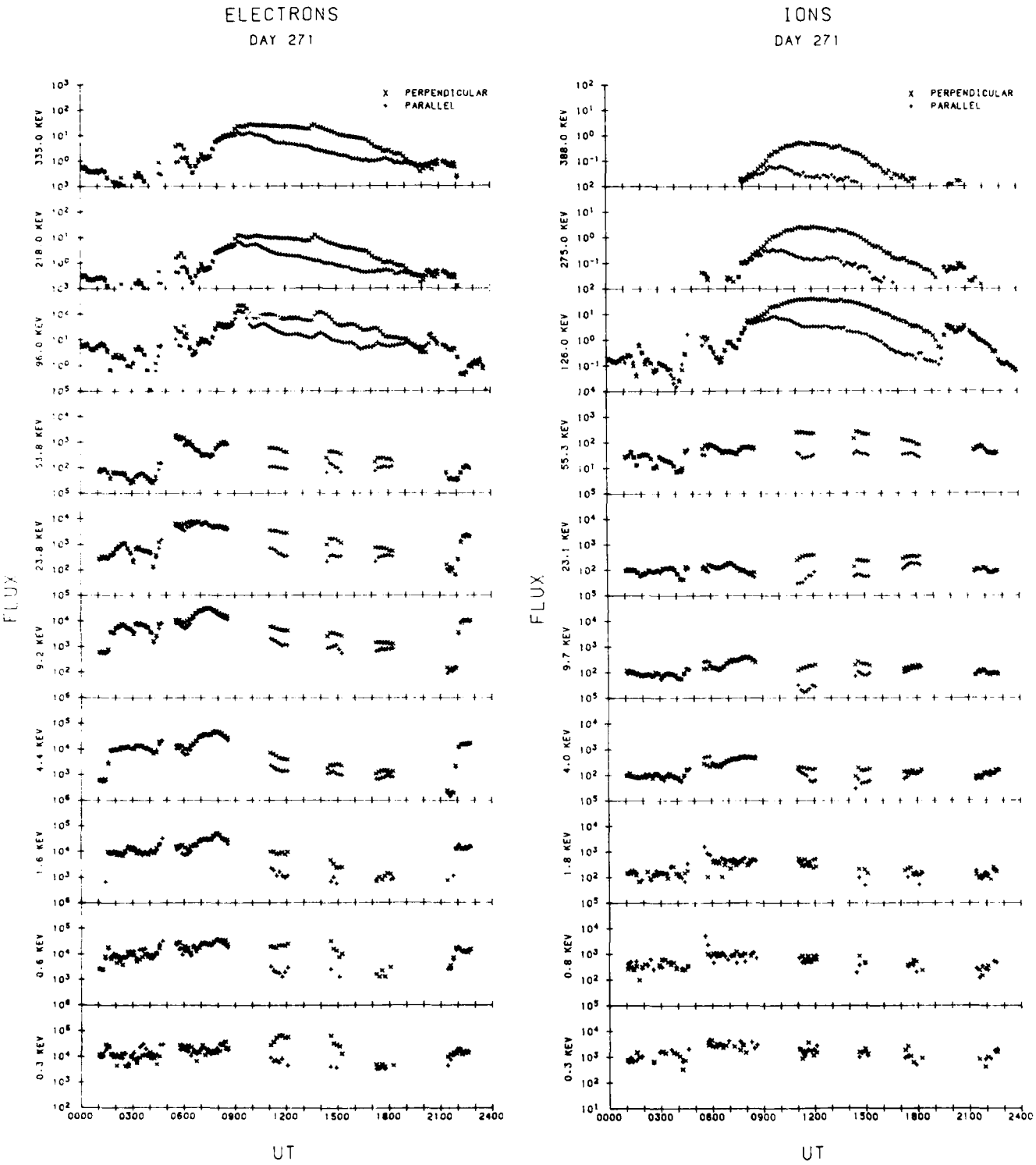

ELECTRONS
DAY 180
IONS
DAY 180
X PERPENDICULAR
• PARALLEL
FLUX
UT
0000
0300
0600
0900
1200
1500
1800
2100
2400
218.0 KEV
335.0 KEV
96.0 KEV
52.8 KEV
23.8 KEV
9.2 KEV
4.4 KEV
1.6 KEV
0.6 KEV
0.3 KEV
275.0 KEV
388.0 KEV
126.0 KEV
55.3 KEV
23.1 KEV
9.7 KEV
4.0 KEV
1.8 KEV
0.8 KEV
0.3 KEV

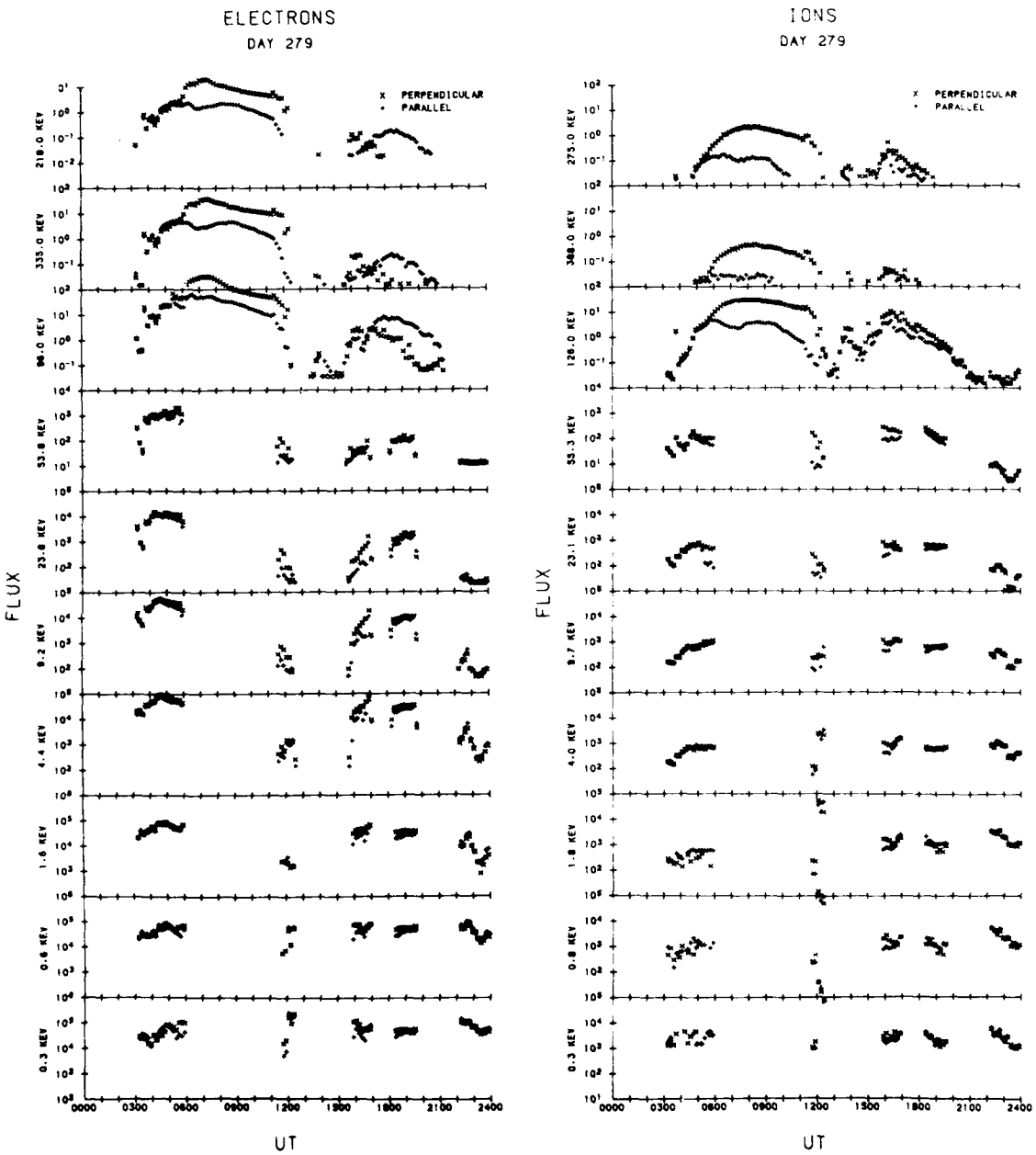

ELECTRONS
DAY 227
IONS
DAY 227
X PERPENDICULAR
PARALLEL
FLUX
UT
218.0 KEV
335.0 KEV
96.0 KEV
53.8 KEV
23.8 KEV
9.2 KEV
4.4 KEV
1.6 KEV
0.6 KEV
0.3 KEV
275.0 KEV
388.0 KEV
126.0 KEV
55.3 KEV
23.1 KEV
9.7 KEV
4.0 KEV
1.8 KEV
0.8 KEV
0.3 KEV
0000
0300
0600
0900
1200
1500
1800
2100
2400

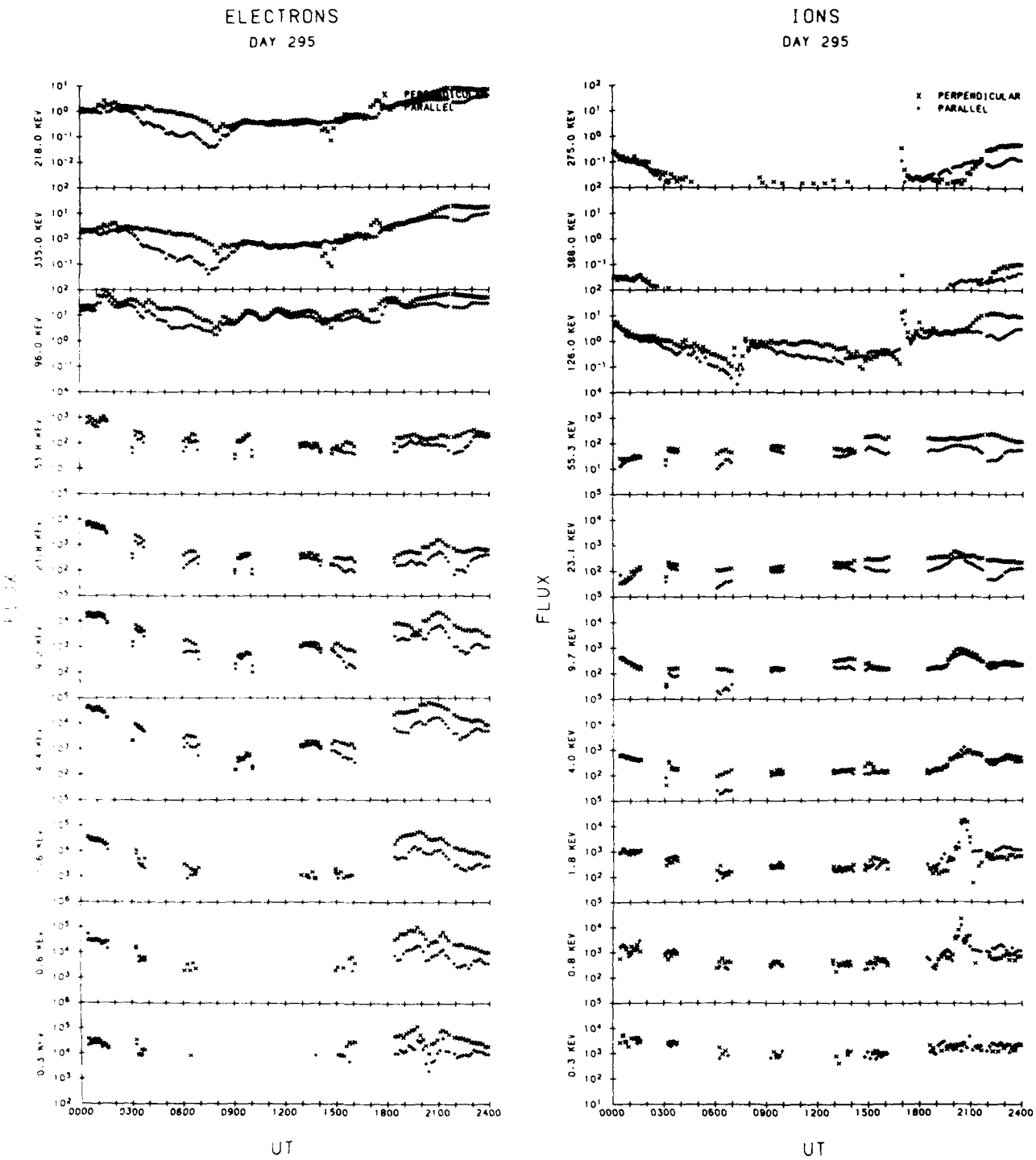

ELECTRONS
DAY 24
PERPENDICULAR
PARALLEL
UT
IONS
DAY 24
PERPENDICULAR
PARALLEL
UT

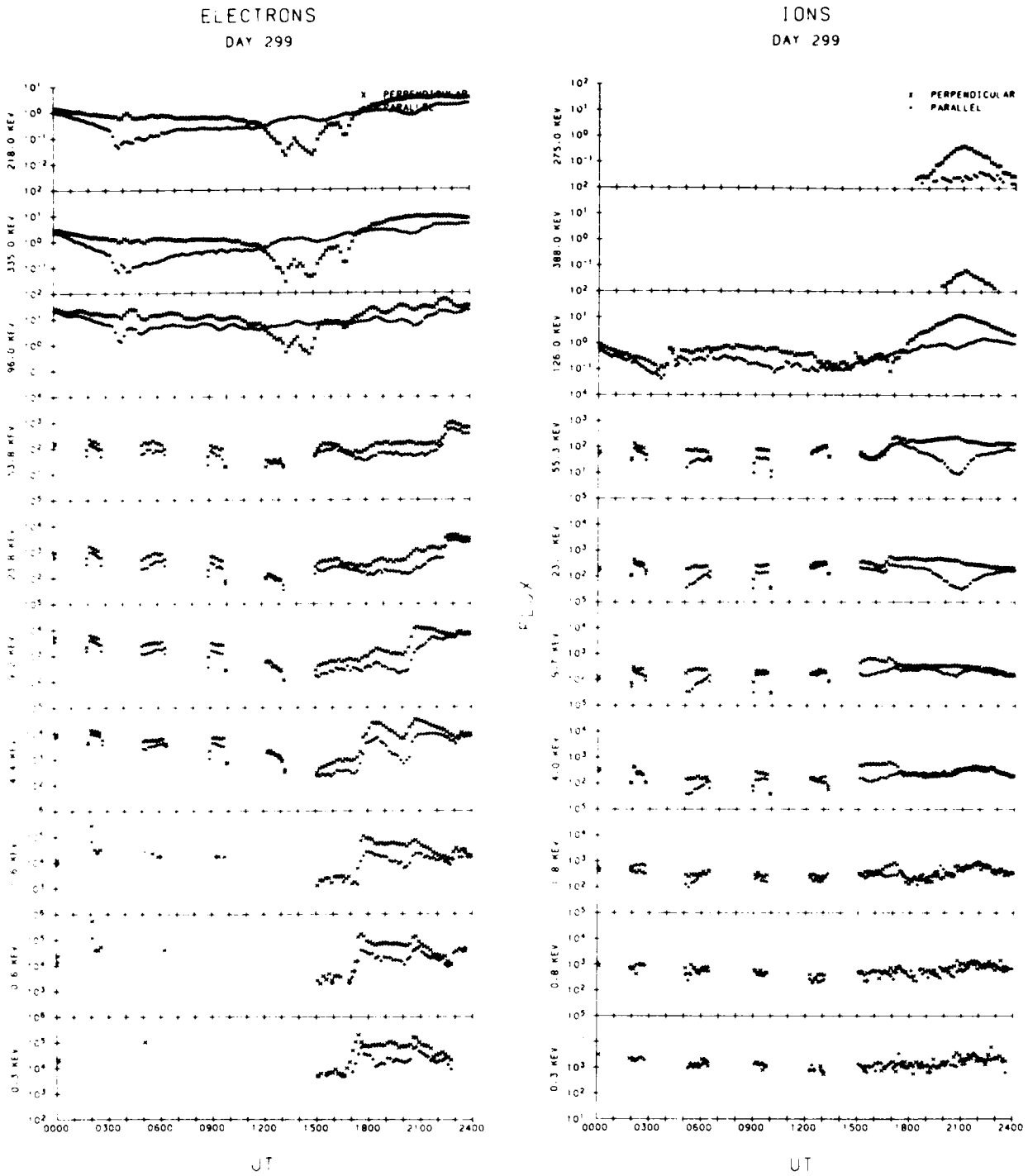

ELECTRONS
DAY 242
PARALLEL
FLUX
UT
0000
0300
0600
0900
1200
1500
1800
2100
2400

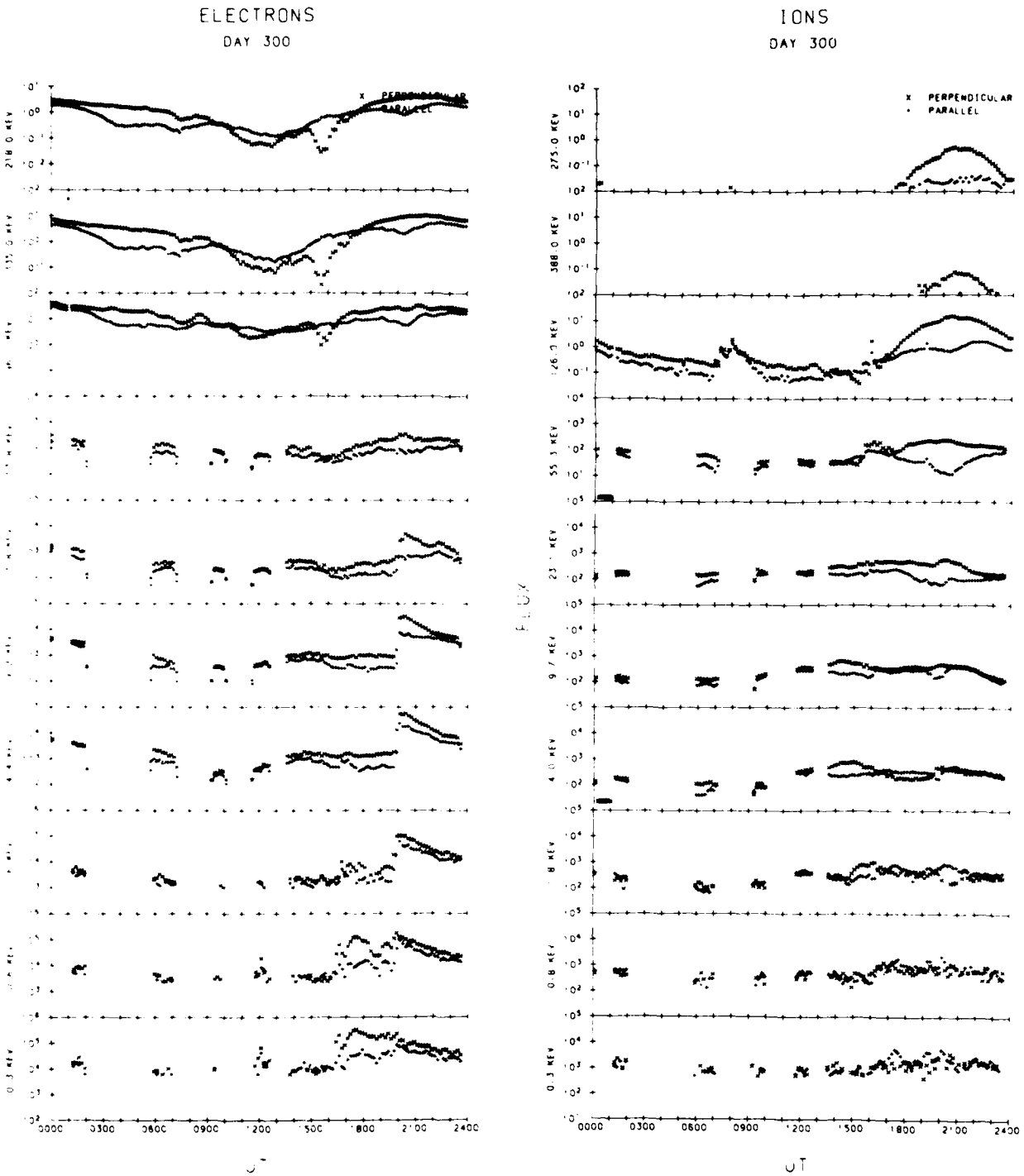

IONS
DAY 242
PERPENDICULAR
PARALLEL
275.0 KEV
388.0 KEV
126.0 KEV
55.3 KEV
23.1 KEV
9.7 KEV
4.0 KEV
1.8 KEV
0.8 KEV
0.3 KEV
FLUX
UT
0000
0300
0600
0900
1200
1500
1800
2100
2400

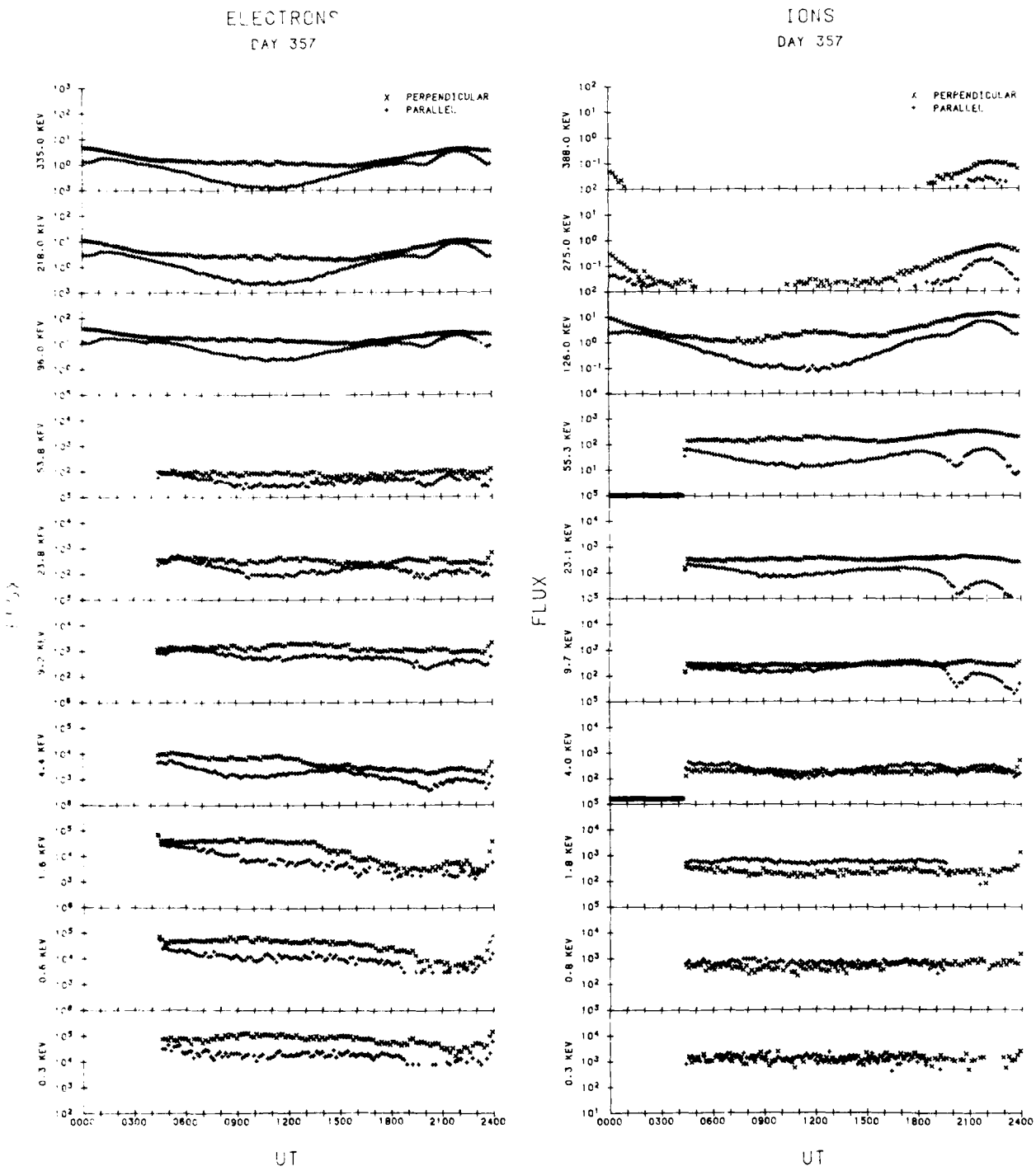

ELECTRONS
DAY 271
IONS
DAY 271
X PERPENDICULAR
+ PARALLEL
FLUX
UT
335.0 KEV
218.0 KEV
96.0 KEV
51.8 KEV
23.8 KEV
9.2 KEV
4.4 KEV
1.6 KEV
0.6 KEV
0.3 KEV
388.0 KEV
275.0 KEV
126.0 KEV
55.3 KEV
23.1 KEV
9.7 KEV
4.0 KEV
1.8 KEV
0.8 KEV
0.3 KEV
0000
0300
0600
0900
1200
1500
1800
2100
2400

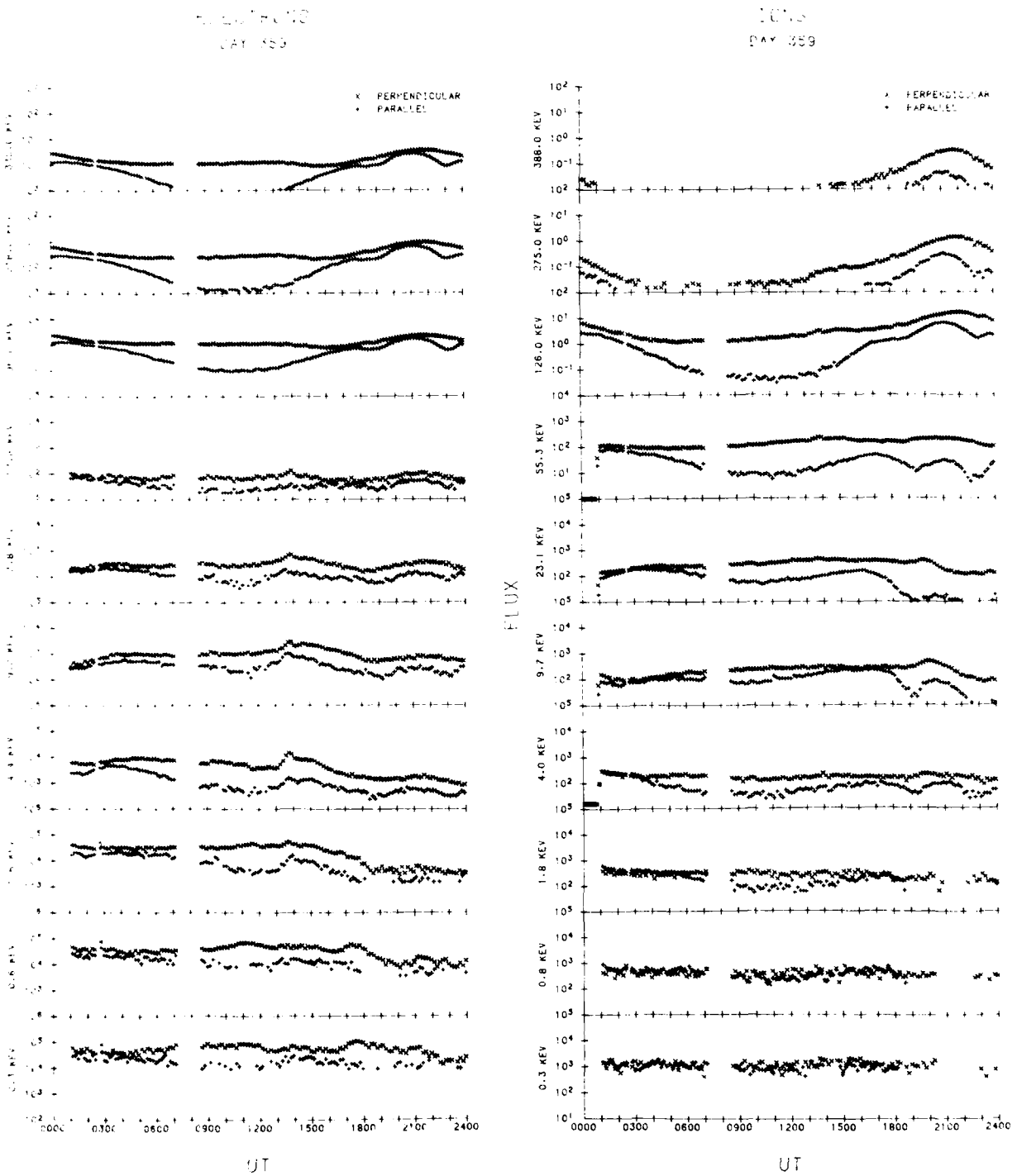

ELECTRONS
DAY 279
X PERPENDICULAR
+ PARALLEL
FLUX
UT
IONS
DAY 279
X PERPENDICULAR
+ PARALLEL
FLUX
UT

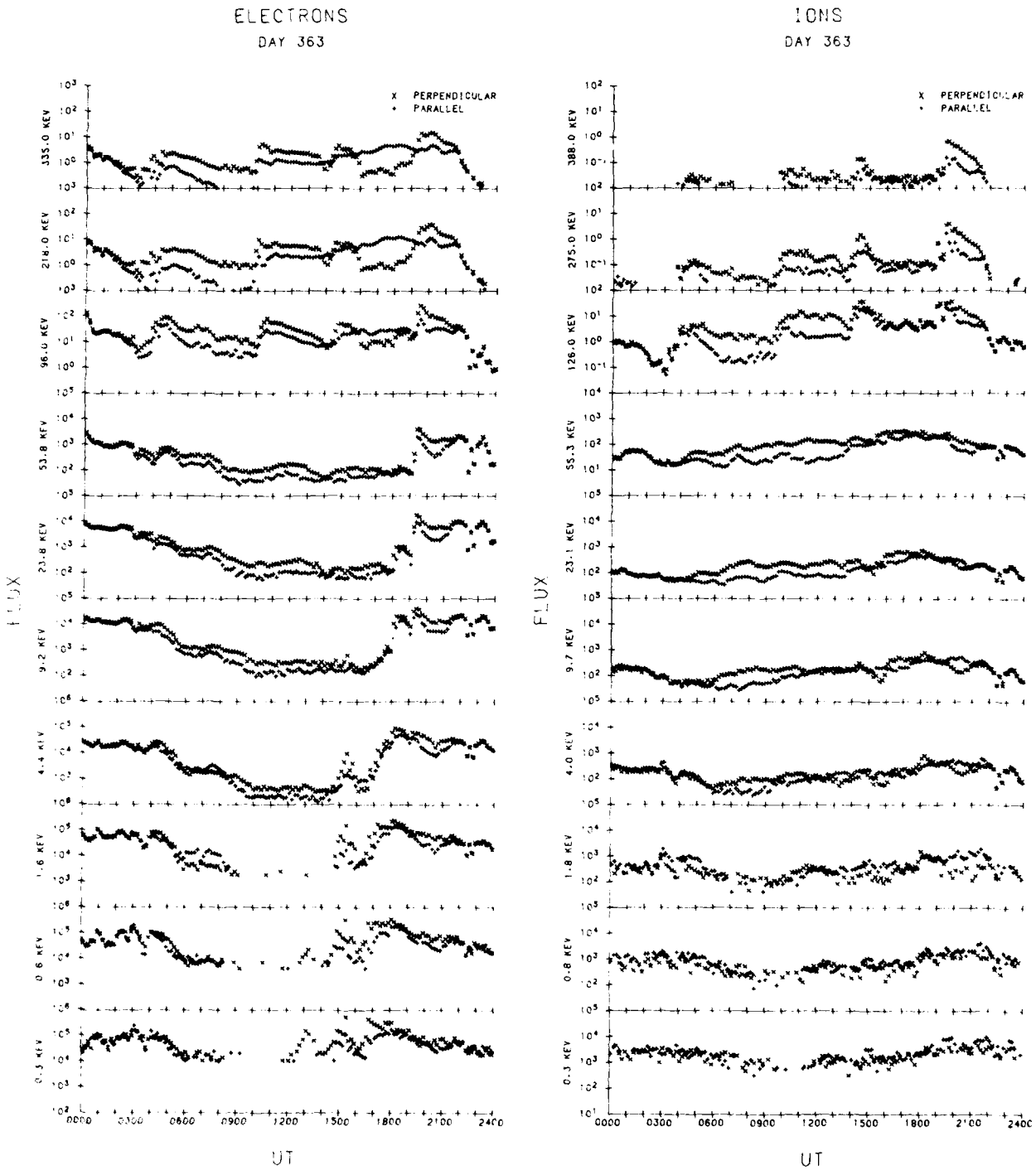

ELECTRONS
DAY 295
IONS
DAY 295
X PERPENDICULAR
• PARALLEL
FLUX
UT
0000
0300
0600
0900
1200
1500
1800
2100
2400

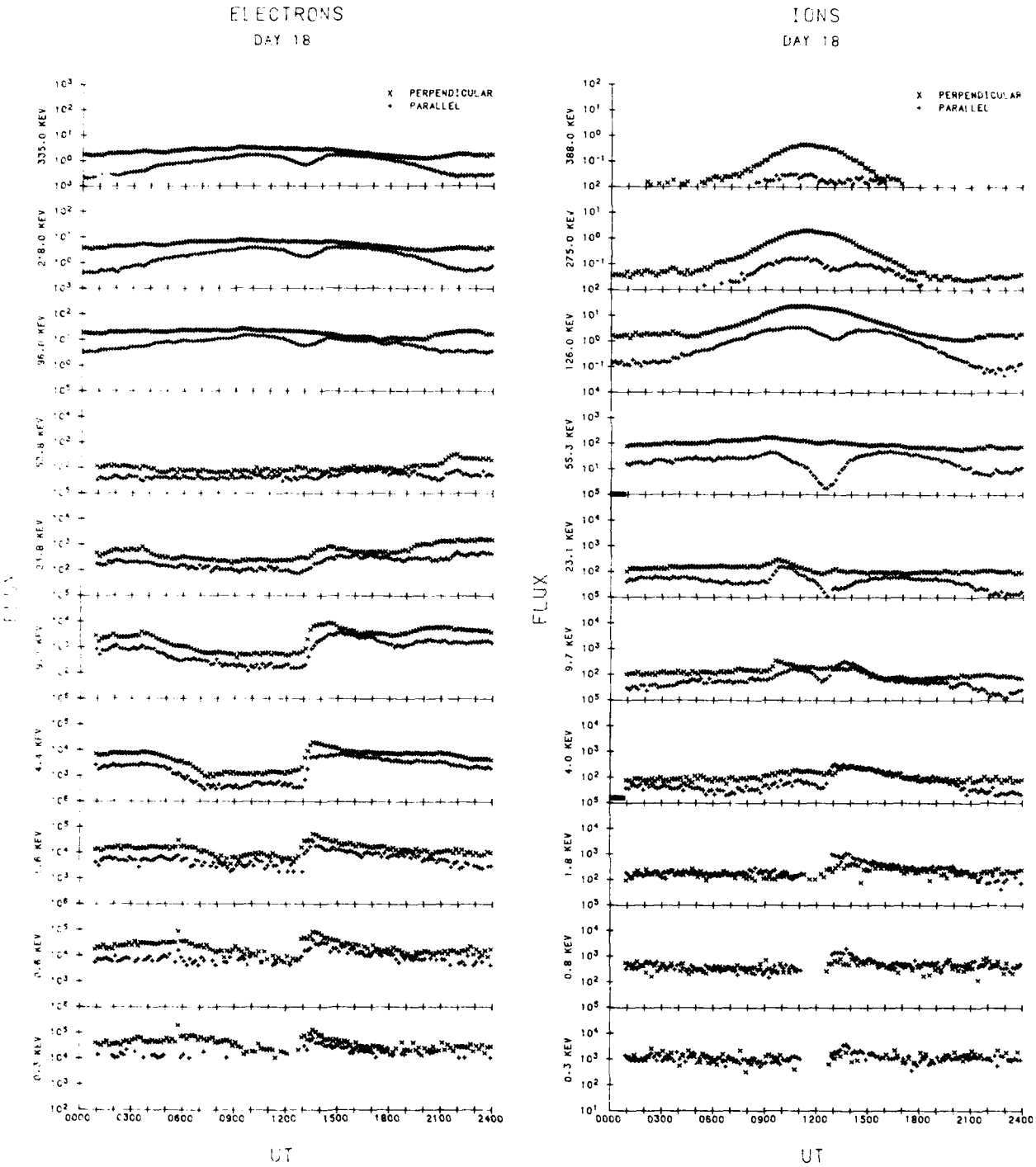

ELECTRONS
DAY 299
IONS
DAY 299
PERPENDICULAR
PARALLEL
218.0 KEV
335.0 KEV
96.0 KEV
275.0 KEV
388.0 KEV
126.0 KEV
55.3 KEV
4.0 KEV
0.8 KEV
0.3 KEV
0000
0300
0600
0900
1200
1500
1800
2100
2400
UT

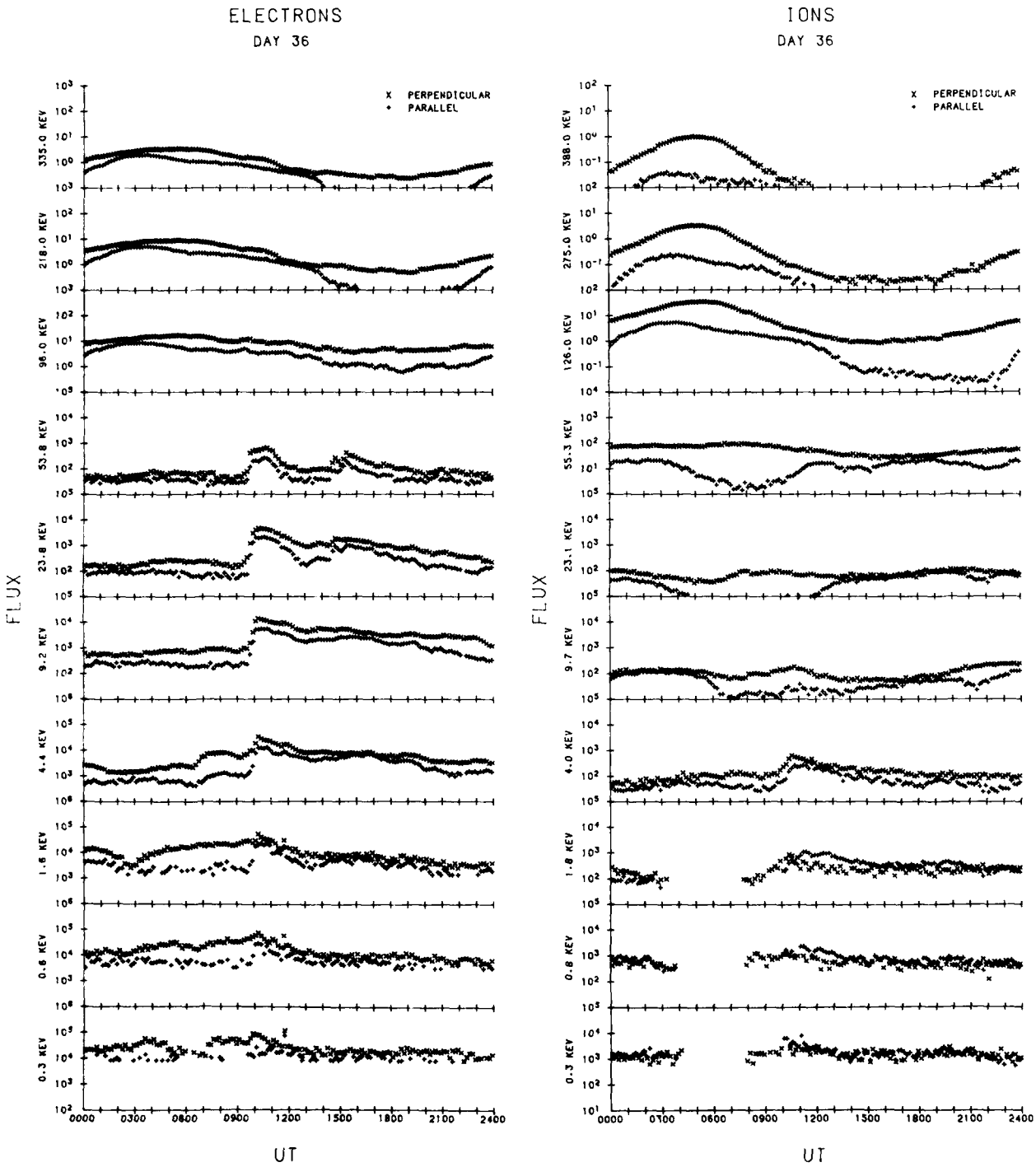

ELECTRONS
DAY 300
IONS
DAY 300
X PERPENDICULAR
PARALLEL
FLUX
UT
UT


ELECTRONS
DAY 357
IONS
DAY 357
X PERPENDICULAR
+ PARALLEL
FLUX
UT
UT


DAY 359
DAY 359
X PERPENDICULAR
+ PARALLEL
X PERPENDICULAR
+ PARALLEL
386.0 KEV
275.0 KEV
126.0 KEV
55.3 KEV
23.1 KEV
9.7 KEV
4.0 KEV
1.8 KEV
0.8 KEV
0.3 KEV
FLUX
0000
0300
0600
0900
1200
1500
1800
2100
2400
UT
UT


ELECTRONS
DAY 363
X PERPENDICULAR
+ PARALLEL
335.0 KEV
218.0 KEV
96.0 KEV
53.8 KEV
23.8 KEV
9.2 KEV
4.4 KEV
1.6 KEV
0.6 KEV
0.3 KEV
FLUX
0000 0300 0600 0900 1200 1500 1800 2100 2400
UT
IONS
DAY 363
X PERPENDICULAR
+ PARALLEL
388.0 KEV
275.0 KEV
126.0 KEV
55.3 KEV
23.1 KEV
9.7 KEV
4.0 KEV
1.8 KEV
0.8 KEV
0.3 KEV
FLUX
0000 0300 0600 0900 1200 1500 1800 2100 2400
UT


ELECTRONS
DAY 18
X PERPENDICULAR
+ PARALLEL
335.0 KEV
278.0 KEV
96.0 KEV
21.8 KEV
4.4 KEV
1.6 KEV
0.8 KEV
0.3 KEV
0000 0300 0600 0900 1200 1500 1800 2100 2400
UT
IONS
DAY 18
X PERPENDICULAR
+ PARALLEL
388.0 KEV
275.0 KEV
126.0 KEV
55.3 KEV
23.1 KEV
9.7 KEV
4.0 KEV
1.8 KEV
0.8 KEV
0.3 KEV
FLUX
0000 0300 0600 0900 1200 1500 1800 2100 2400
UT


ELECTRONS
DAY 36
X PERPENDICULAR
+ PARALLEL
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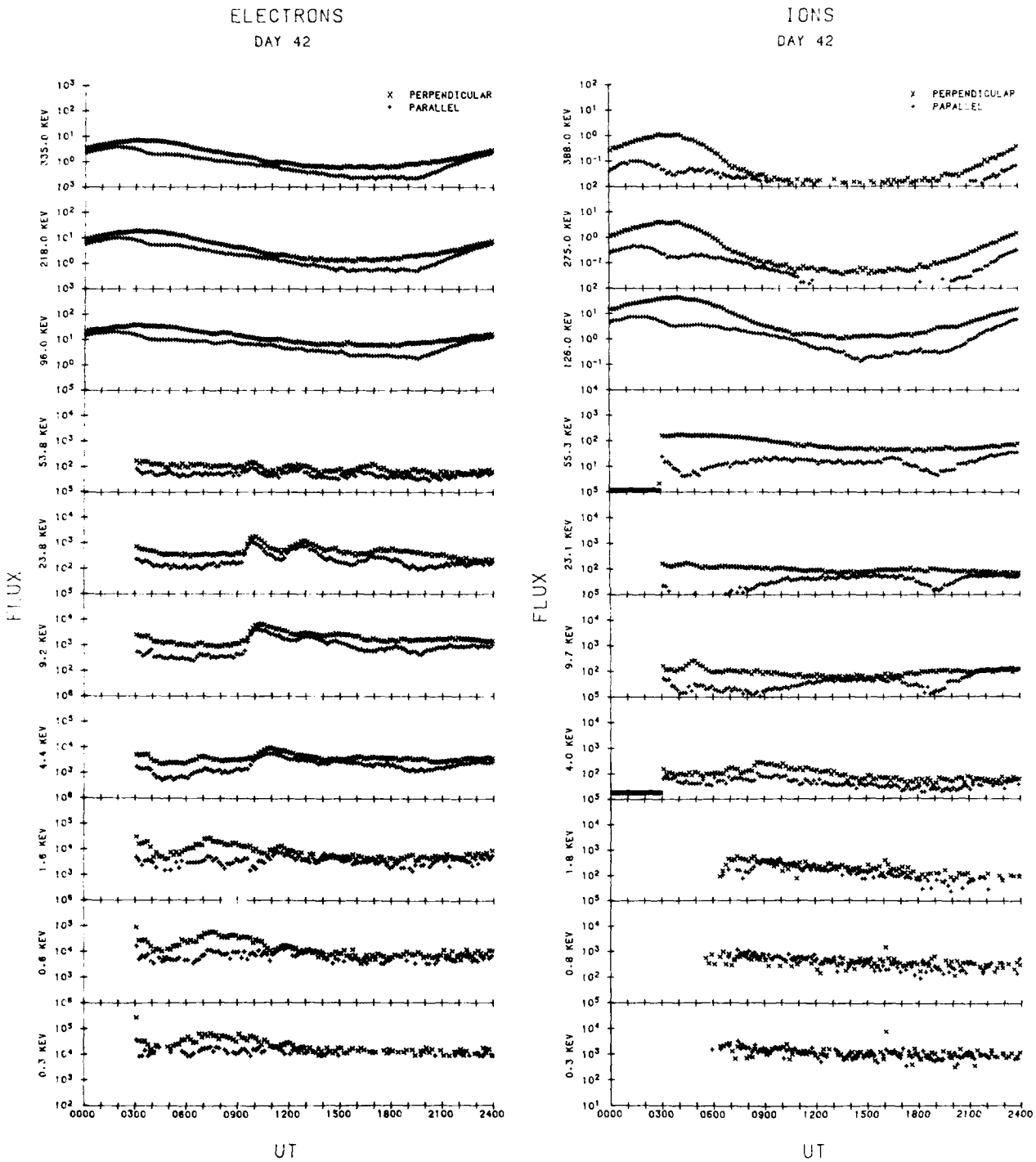
218.0 KEV
96.0 KEV
53.8 KEV
23.8 KEV
9.2 KEV
4.4 KEV
1.6 KEV
0.6 KEV
0.3 KEV
FLUX
0000 0300 0600 0900 1200 1500 1800 2100 2400
UT
IONS
DAY 36
X PERPENDICULAR
+ PARALLEL
388.0 KEV
275.0 KEV
126.0 KEV
55.3 KEV
23.1 KEV
9.7 KEV
4.0 KEV
1.8 KEV
0.8 KEV
0.3 KEV
FLUX
0000 0300 0600 0900 1200 1500 1800 2100 2400
UT


ELECTRONS
DAY 42
X PERPENDICULAR
+ PARALLEL
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218.0 KEV
96.0 KEV
53.8 KEV
23.8 KEV
9.2 KEV
4.4 KEV
1.6 KEV
0.6 KEV
0.3 KEV
FLUX
0000 0300 0600 0900 1200 1500 1800 2100 2400
UT
IONS
DAY 42
X PERPENDICULAR
+ PARALLEL
388.0 KEV
275.0 KEV
126.0 KEV
55.3 KEV
23.1 KEV
9.7 KEV
4.0 KEV
1.8 KEV
0.8 KEV
0.3 KEV
FLUX
0000 0300 0600 0900 1200 1500 1800 2100 2400
UT

8. HIGH ENERGY ELECTRON DATA BASE, SC3

8.1 Instrument Description

The Lockheed SC3 High Energy Particle Spectrometer was built and operated under the direction of J.B. Reagan. The instrument is a solid-state spectrometer consisting of a long, narrow collimator that defines the 3° field-of-view, a solid-state stack of silicon detectors to stop the high-energy electrons and measure their total energy loss, an active anticoincidence collimator operating on high-energy particles that penetrate the detector stack, a plastic scintillator detector viewed by a photomultiplier tube to sense and reject energetic particles and Bremsstrahlung that penetrate the shielding walls, and associated control electronics. The sensors were energy calibrated prior to launch with several radioactive sources, and a weak source was flown on the instrument to monitor any changes in calibrations. The instrument has a 3° (FWHM) pitch angle resolution and a directional geometric factor of approximately 3×10^{-3} cm^2 sr.

On orbit the instrument was programmable to operate in eight different modes, plus a hardwired mode. One of the programmable modes (ELEC2) plus the hardwire mode (BACKUP) collected electron data. However, only the ELEC2 mode data are given here for electrons over the energy range of interest. Characteristics of the SC3 spectrometer in this mode are given in Reagan, et al. [9] The dwell time in each mode was programmable at 8, 16, 32, or 64 s. This represents approximately 1/8 to 1 full spin. Data were received on computer tapes from Lockheed as 64−s averages of differential electron fluxes in electrons/(cm^2 s sr keV) within energy ranges of 634−1026, 1026 − 1419, 1419 − 2610 and 2603 − 4970 keV. The 64−s averages were calculated for whatever pitch angles the data were collected over and therefore some pitch angle scatter appears in the data set. The data were edited to remove spurious values.

8.2 Description of Data Presentation; SC3 High Energy Electrons

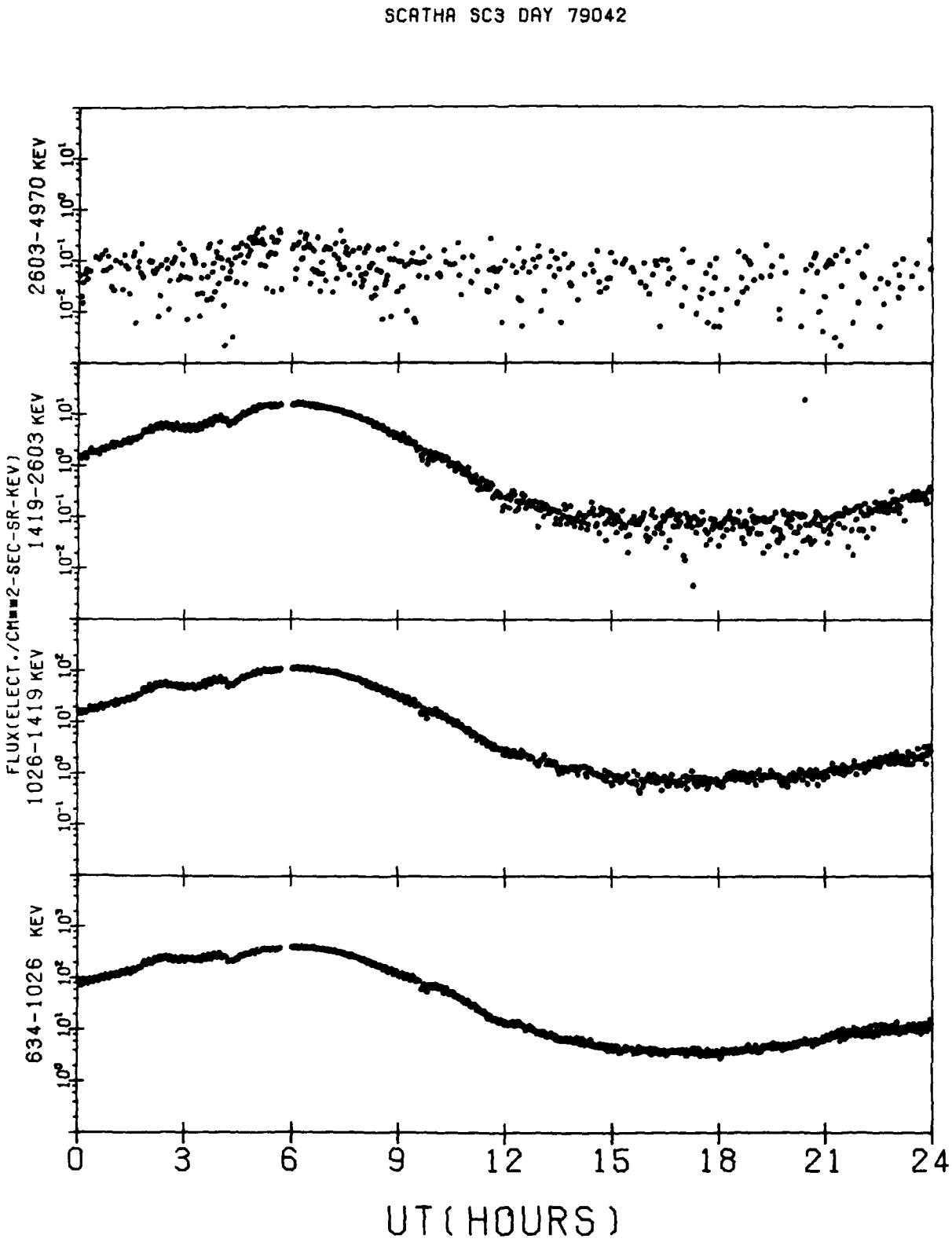
In each Figure the differential number flux of electrons for four energy ranges is plotted as a function of Universal Time (UT) for a 24−hour period. The number flux scale is logarithmic. At times the instrument is recording at background levels and these have not been edited out of the data.

[9] Reagan, J.B., Nightingale, R.W., Gaines, E.E., Imhof, W.L, and Stassinopoulus, E.G. (1981) Outer zone energetic electron spectral measurements, *J. Spacecraft Rockets, 18*:83.

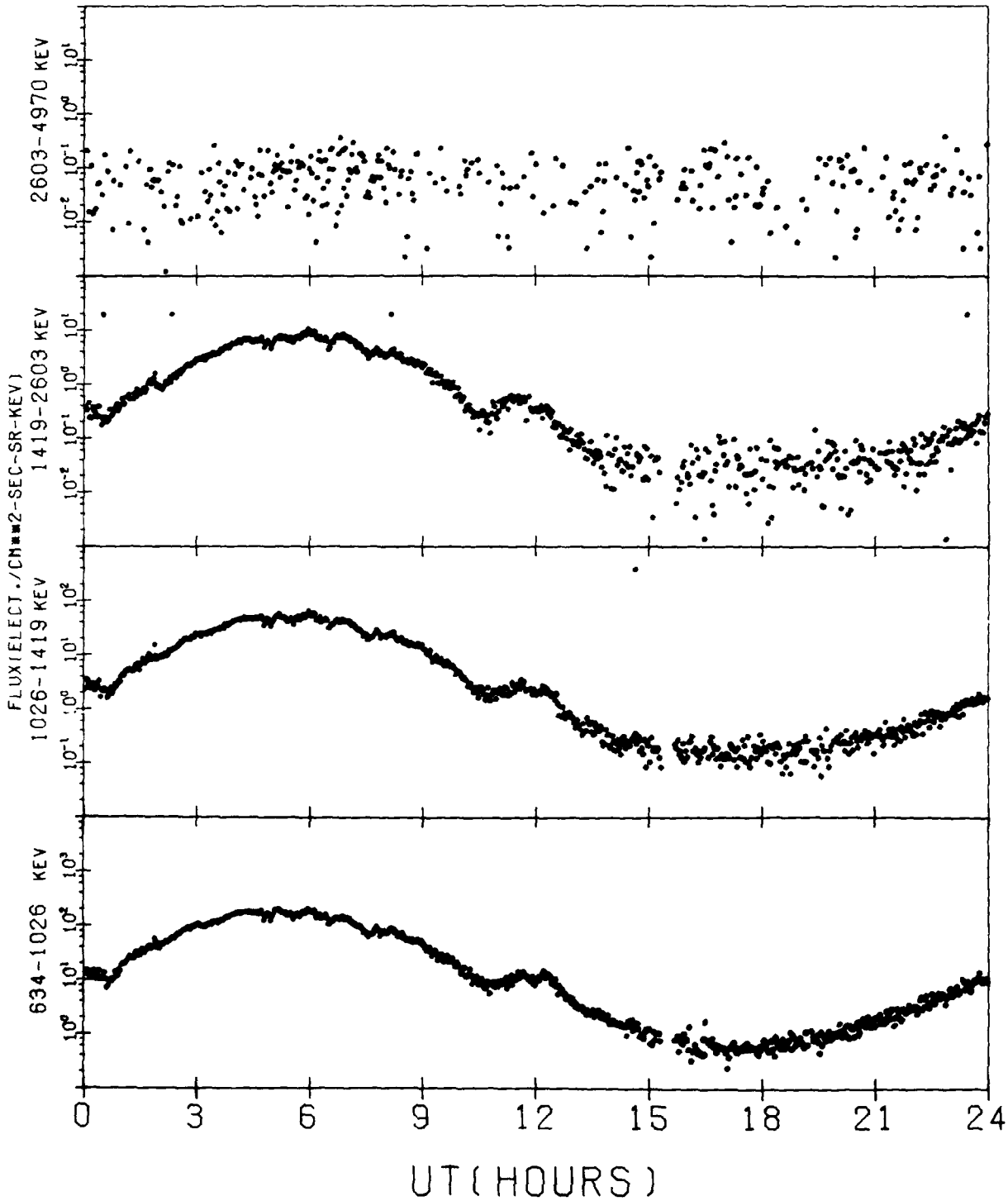
8.3 Calendar of Days for which the SC3 High Energy Electron Data are Presented

1979												1980		
DAY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	DAY
1				121										1
2														2
3			093											3
4			094									004		4
5			095		156				278				036	5
6					157				279				037	6
7				127	158	188			280		341			7
8									281					8
9					160				282					9
10														10
11	042												042	11
12	043											012		12
13	044		103				225			317				13
14	045						226							14
15	046				166					319			046	15
16	047												047	16
17											351			17
18			108	138				261				018		18
19						200		262						19
20			110				232							20
21	052	080	111		172			264						21
22	053			142										22
23														23
24			114	144						328				24
25			115	145		206				329	359			25
26				146										26
27											361	027		27
28		087						271	301			028		28
29		088		149	180		241	272			363			29
30			120					273						30
31														31

8.4 Data Presentation; SC3 High Energy Electron Data



SCATHA SC3 DAY 79043



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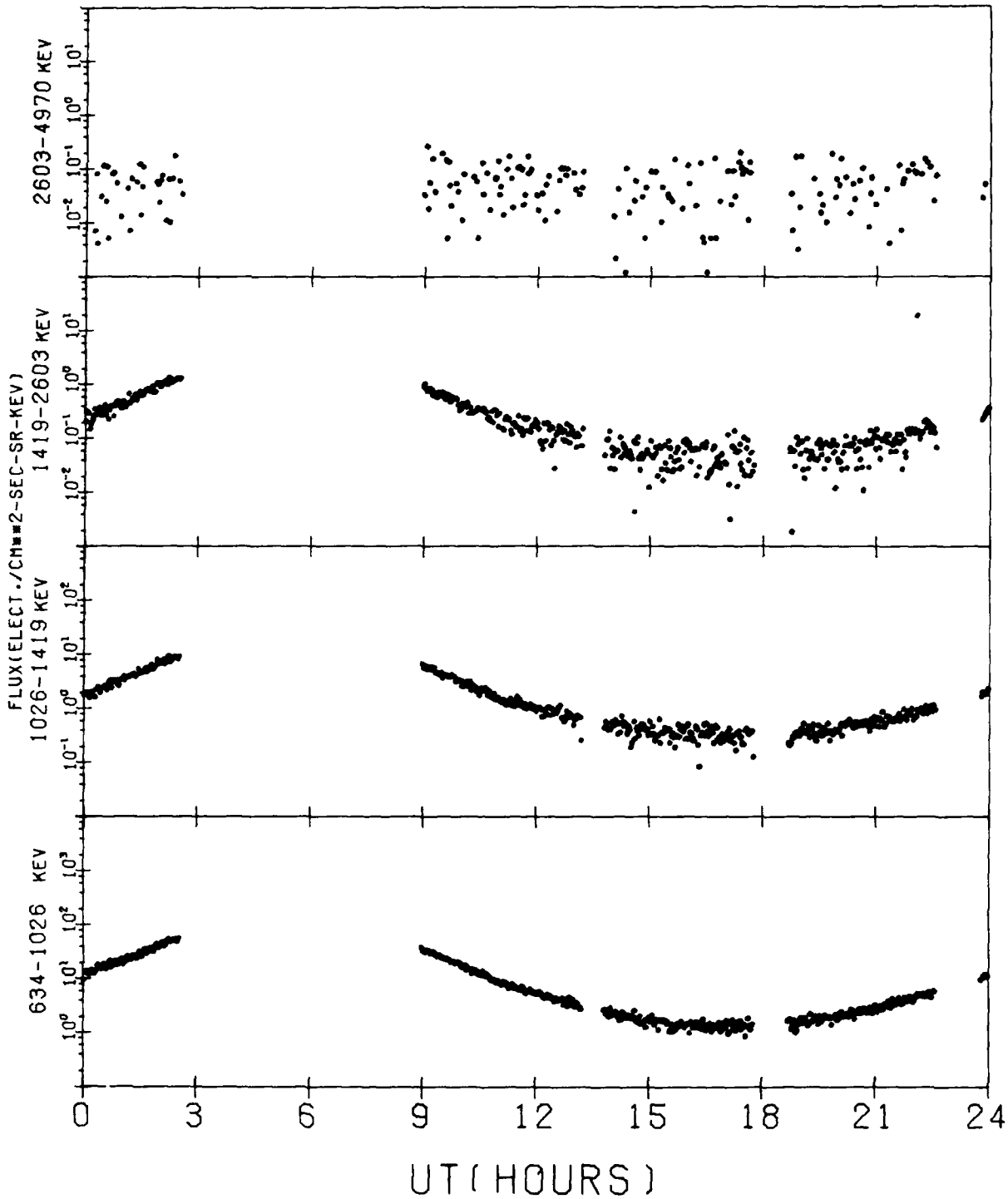

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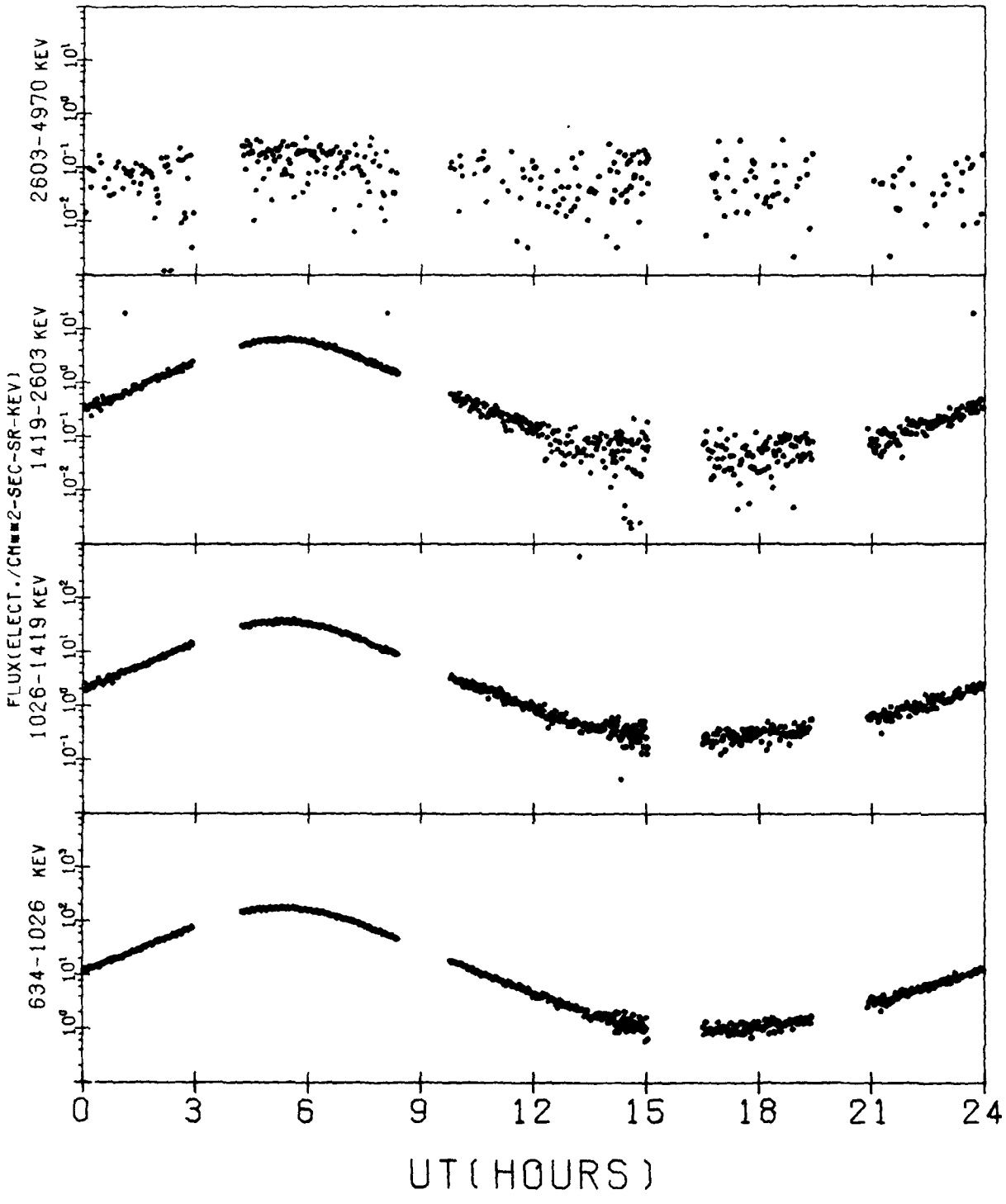

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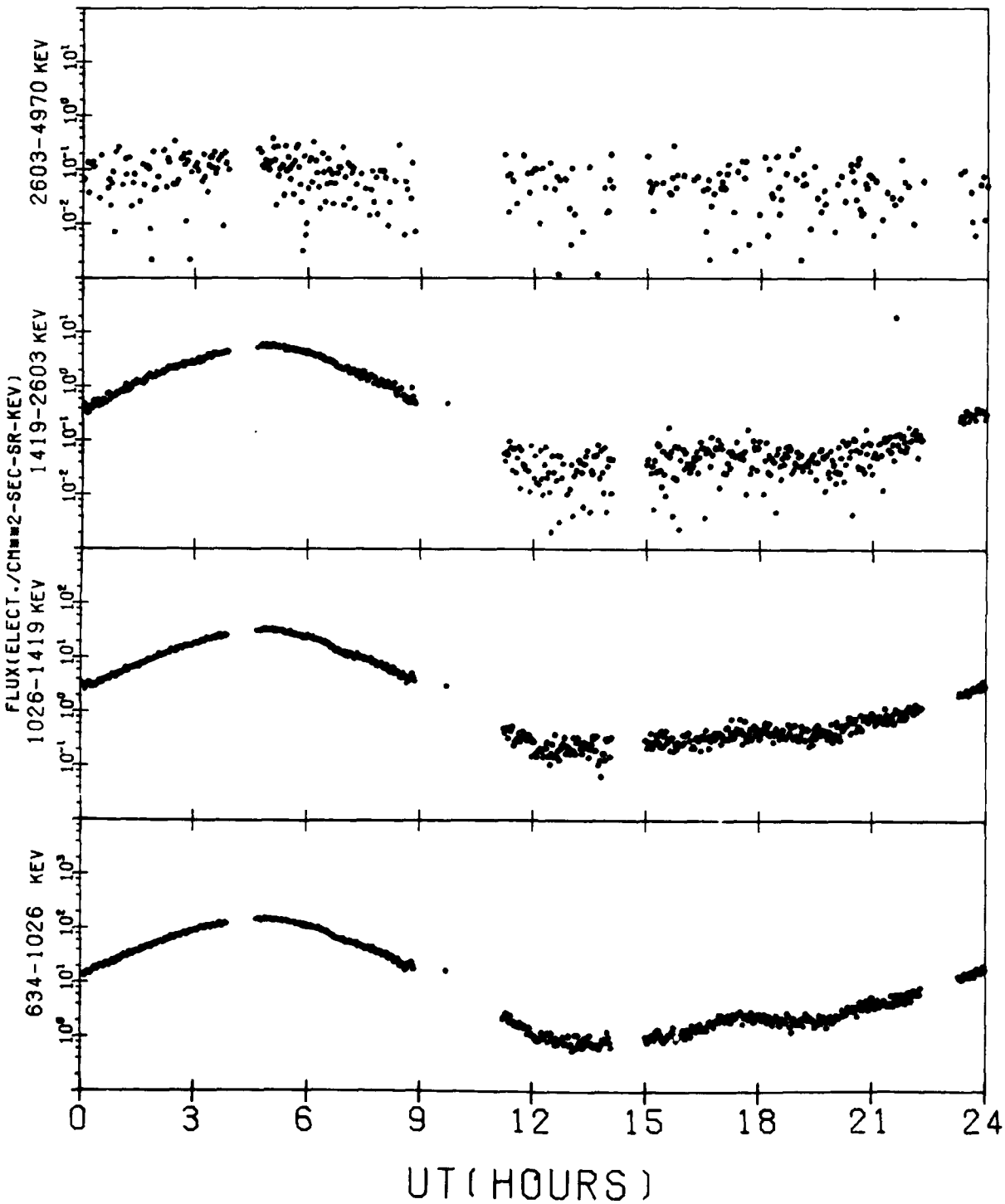

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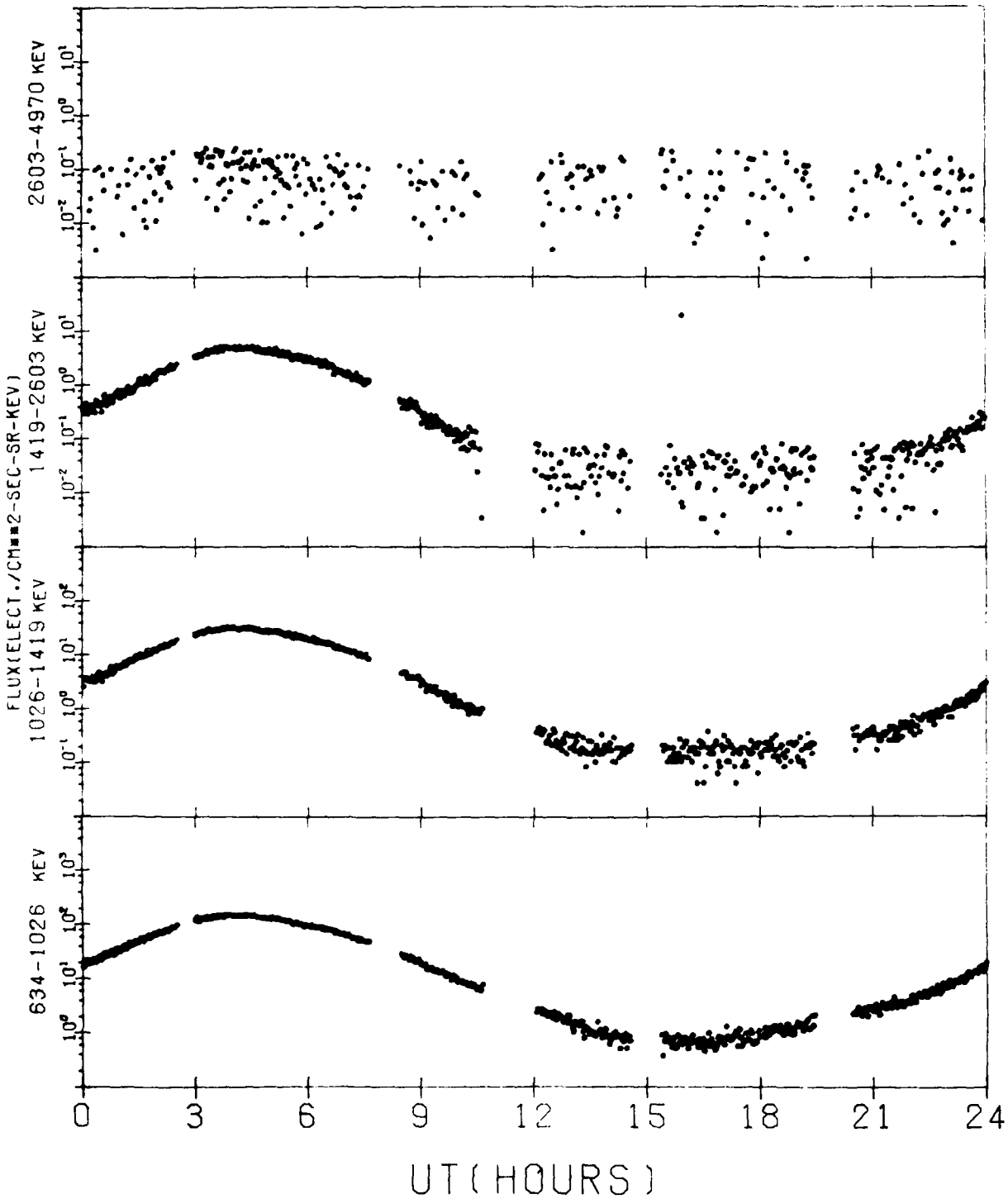

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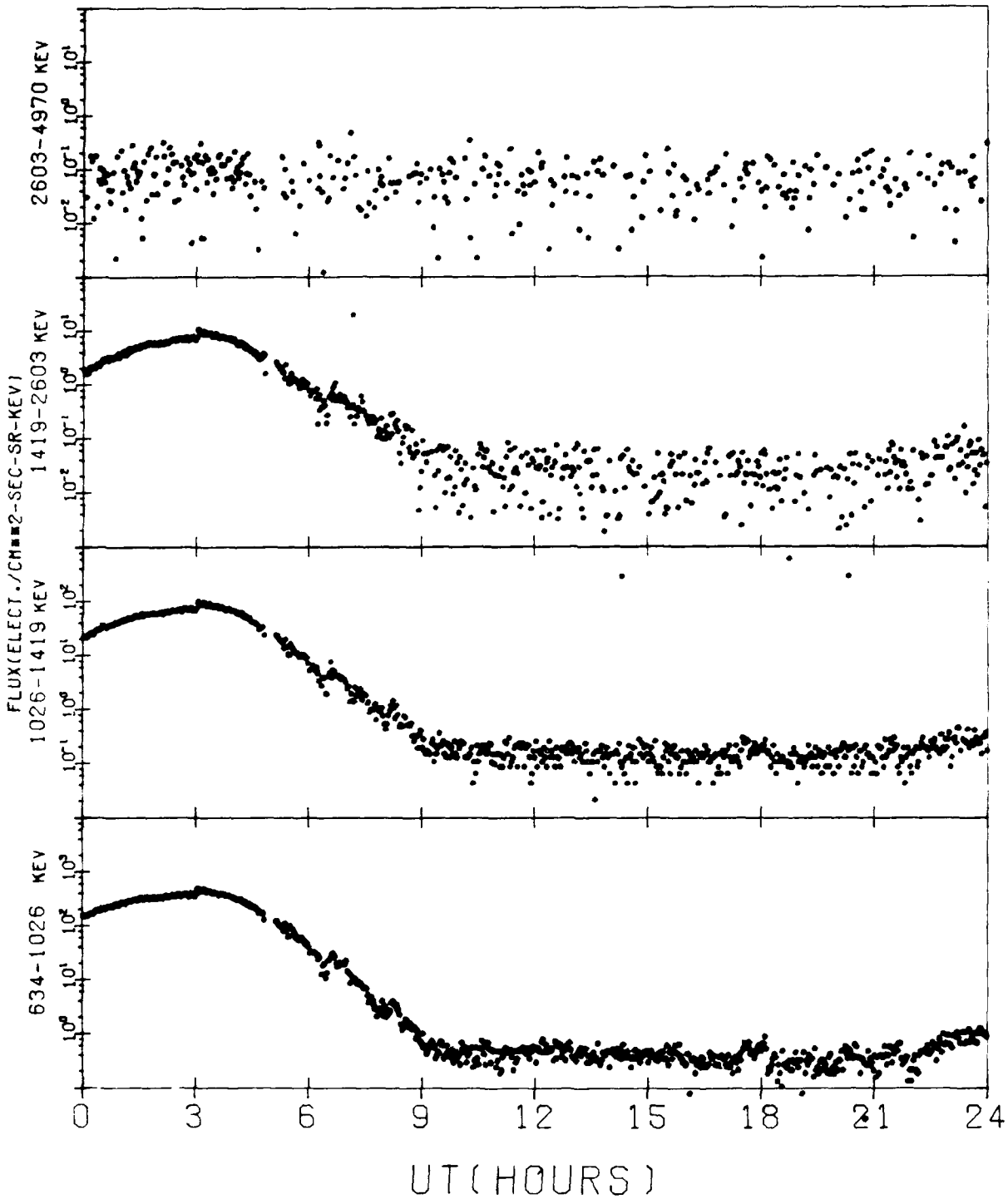

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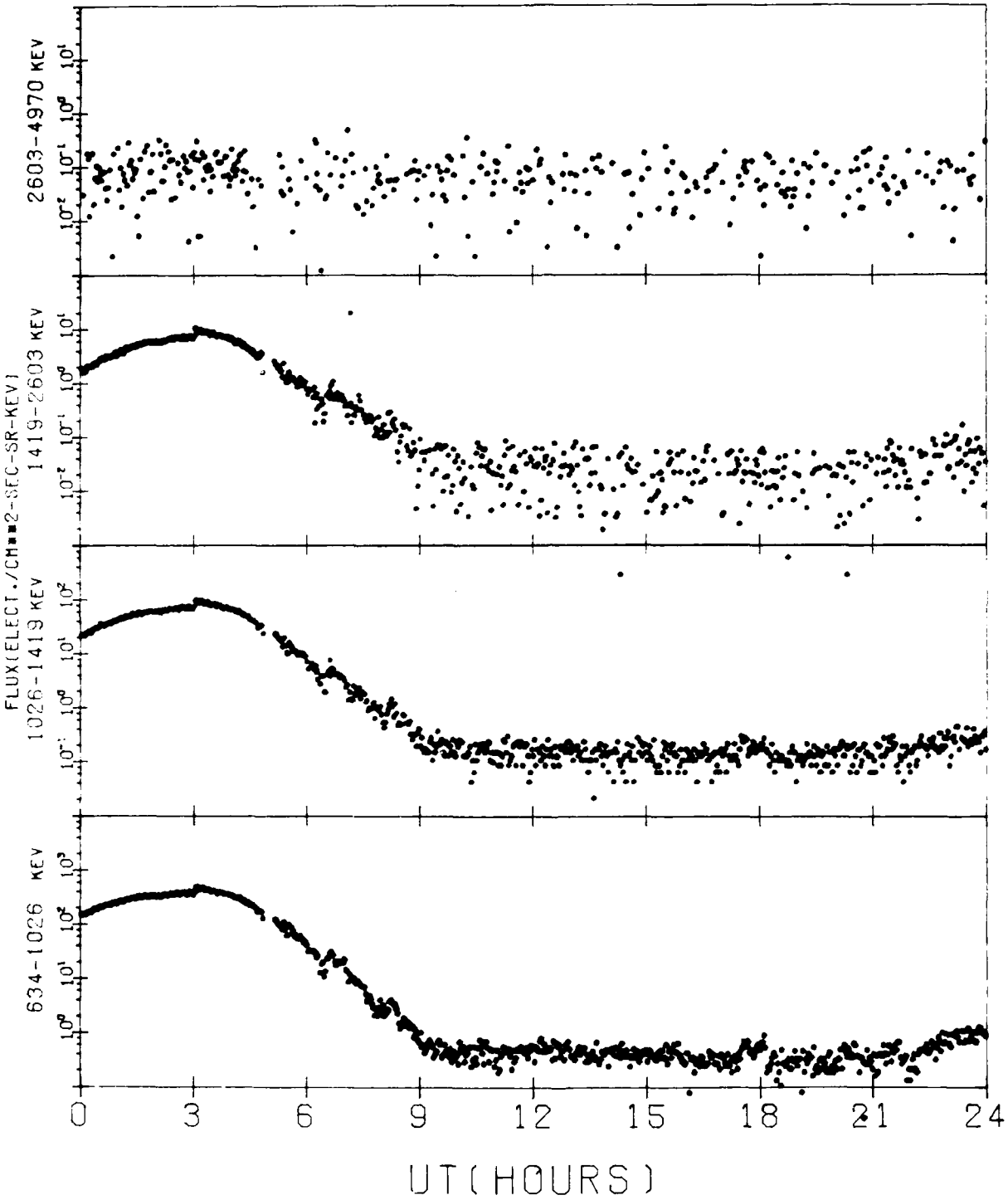

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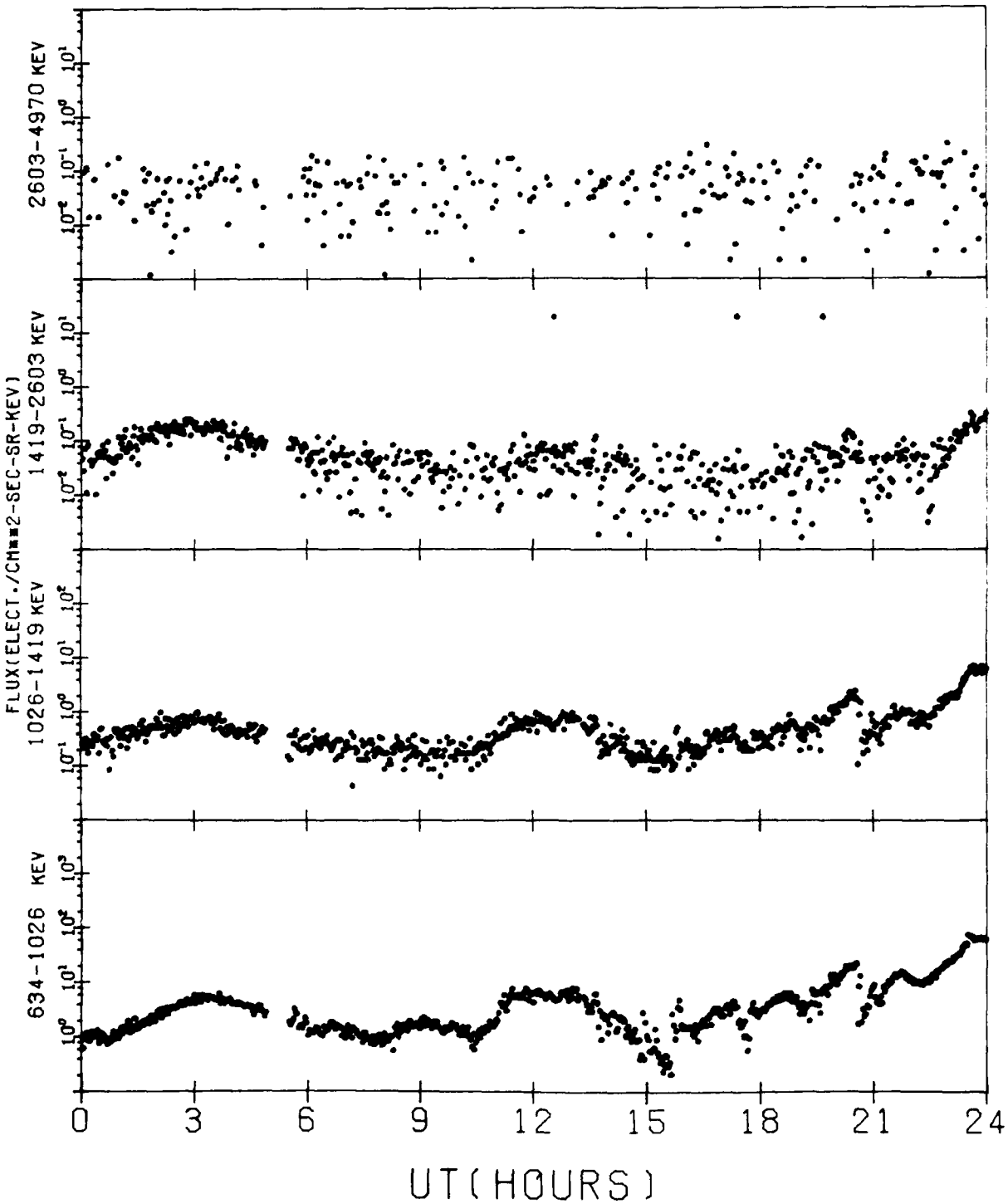

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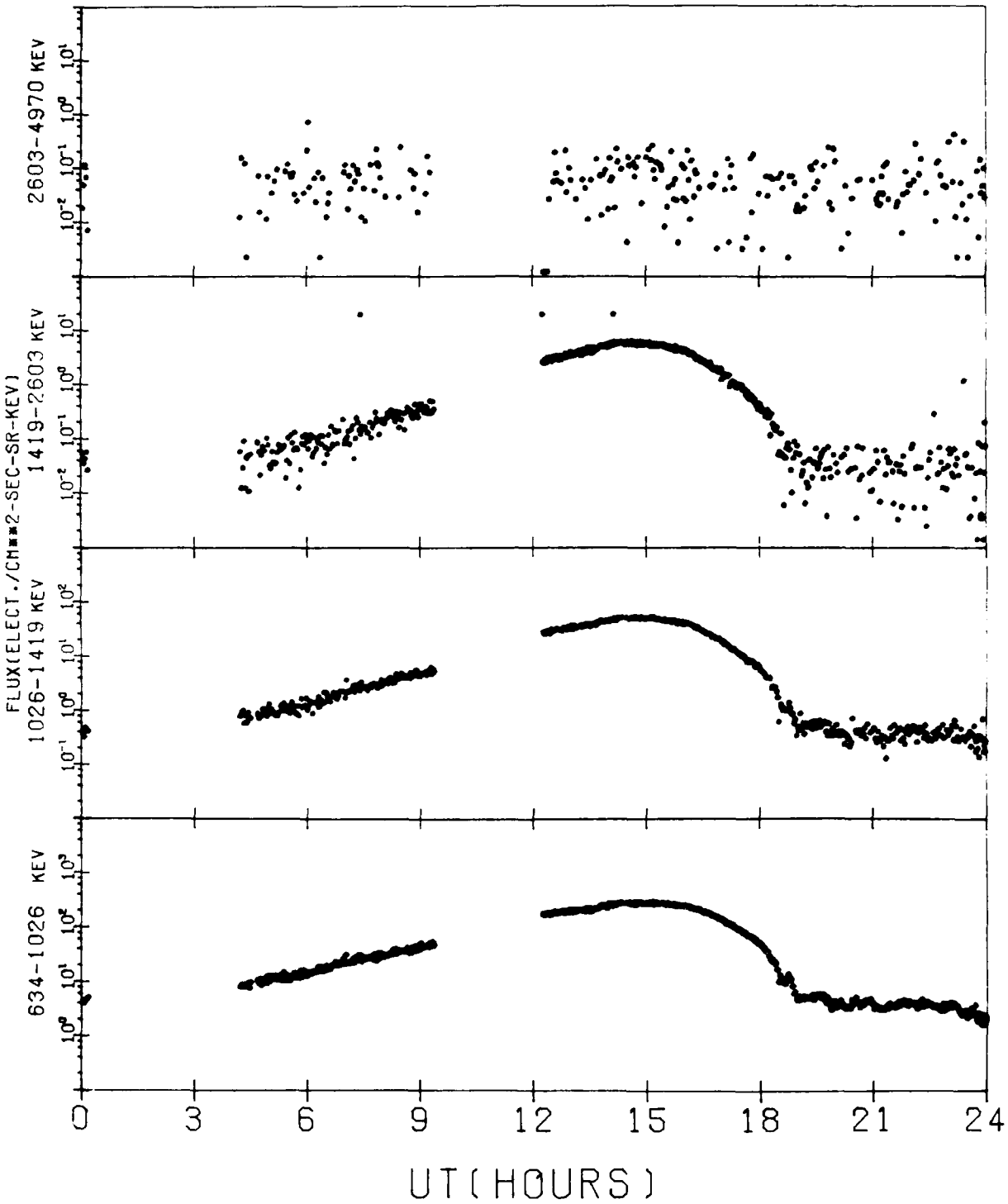

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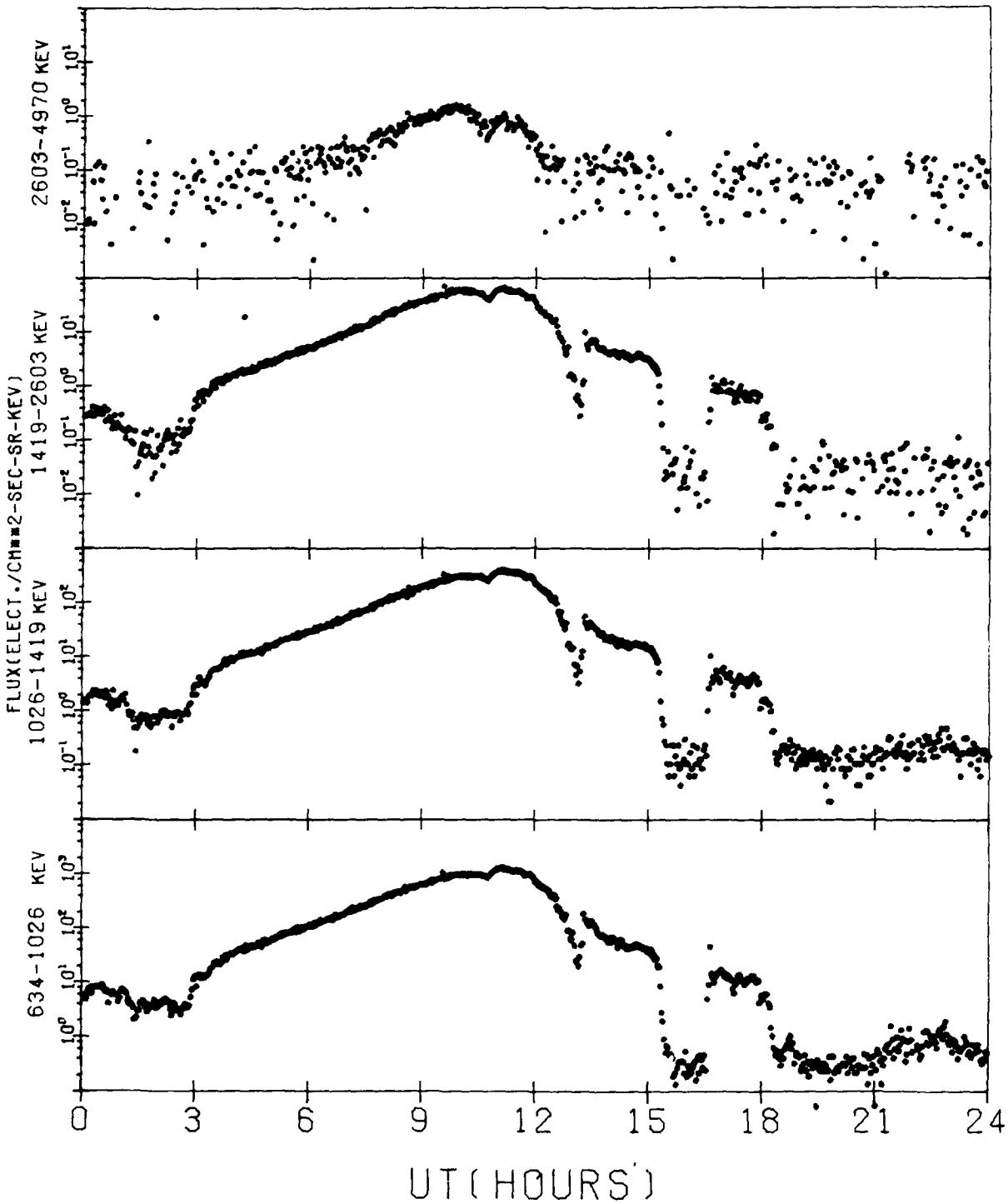

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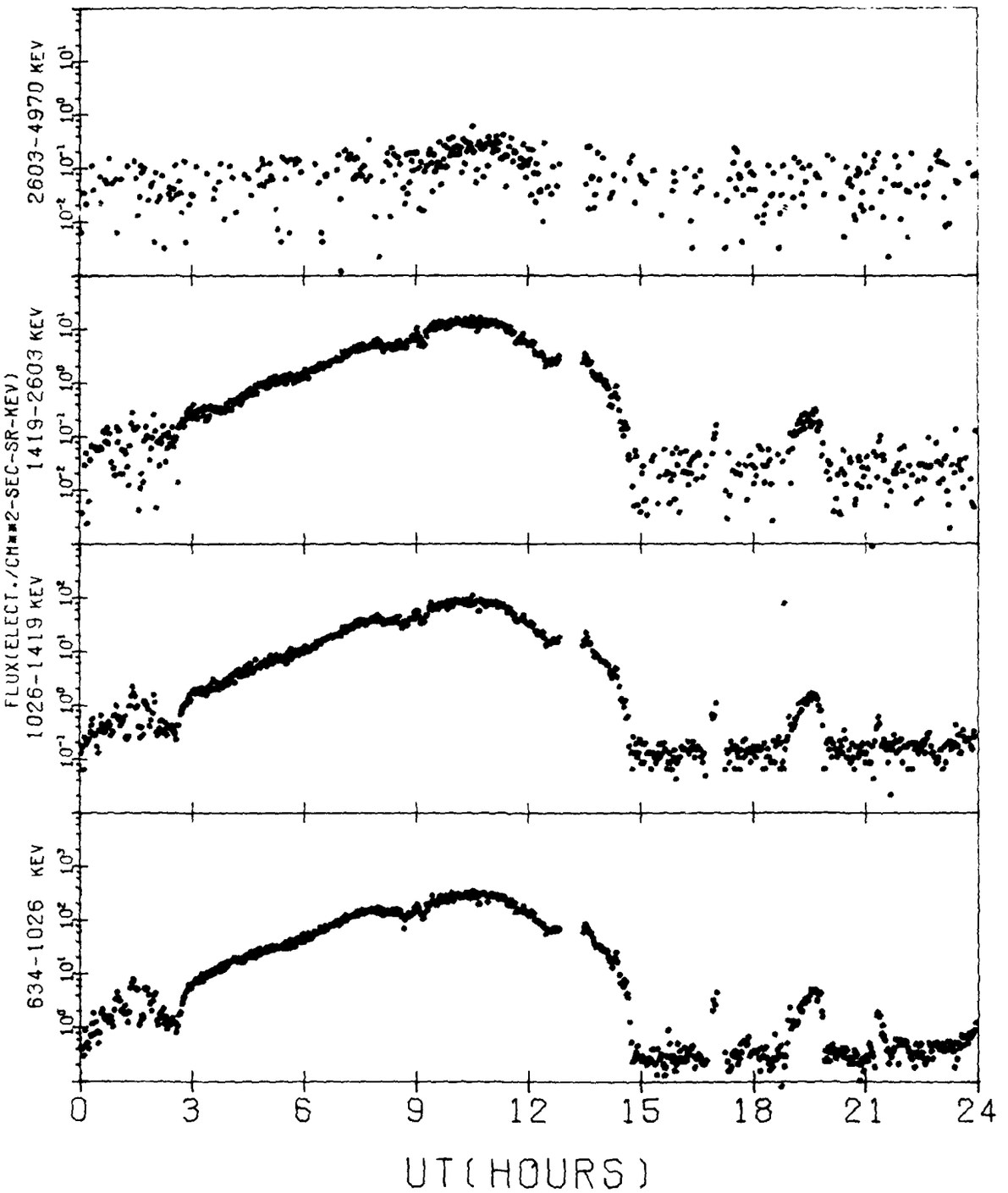

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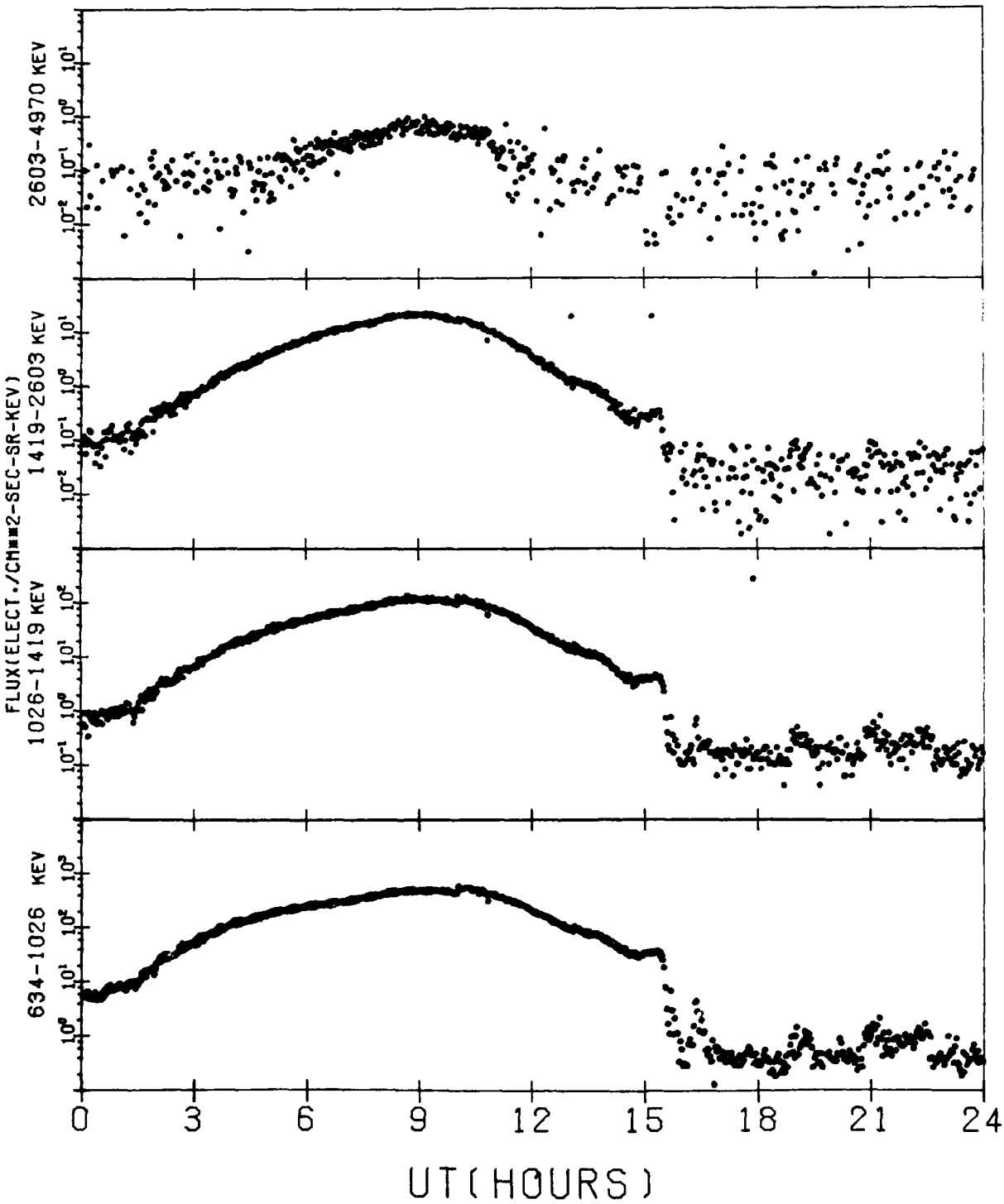

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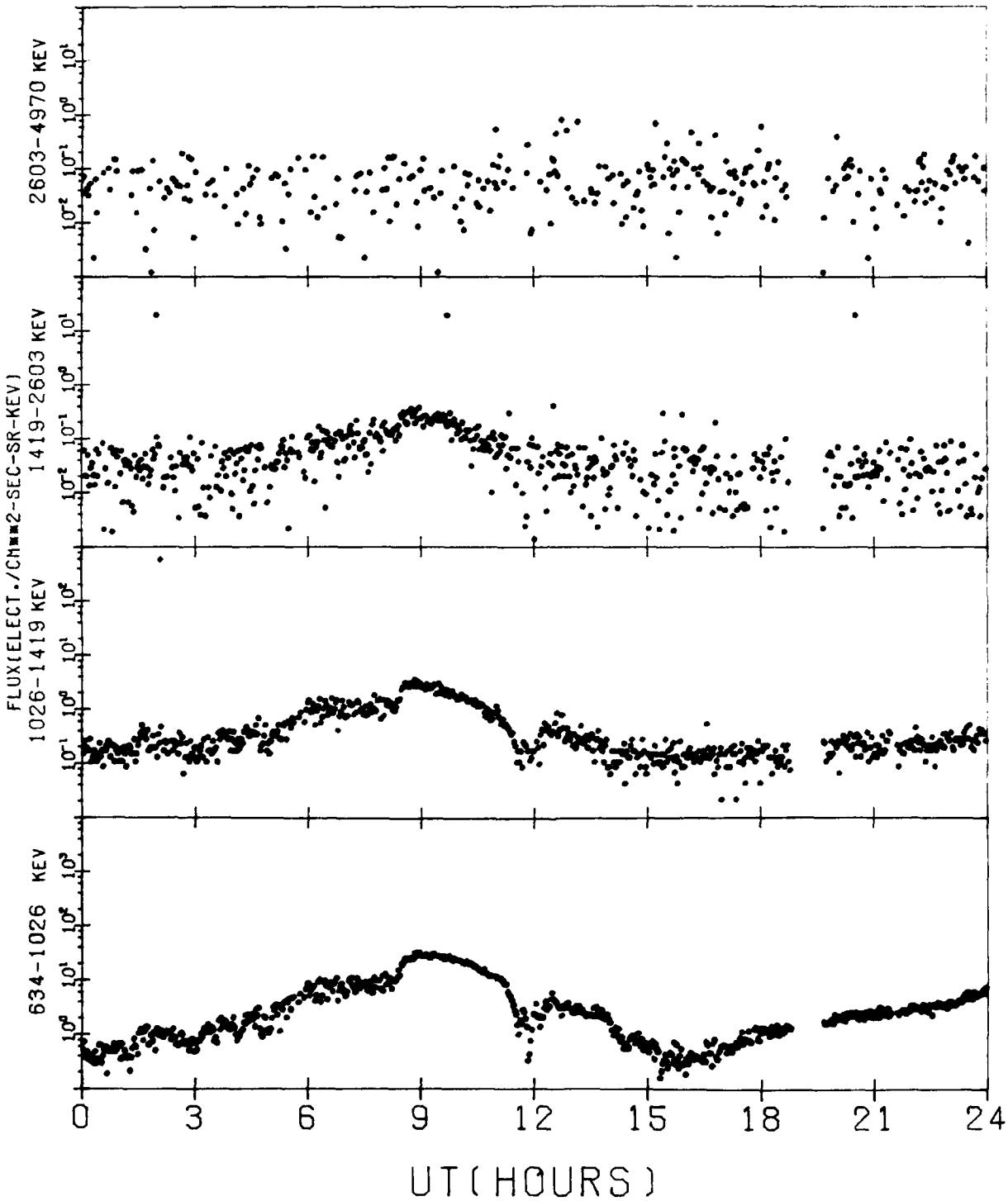

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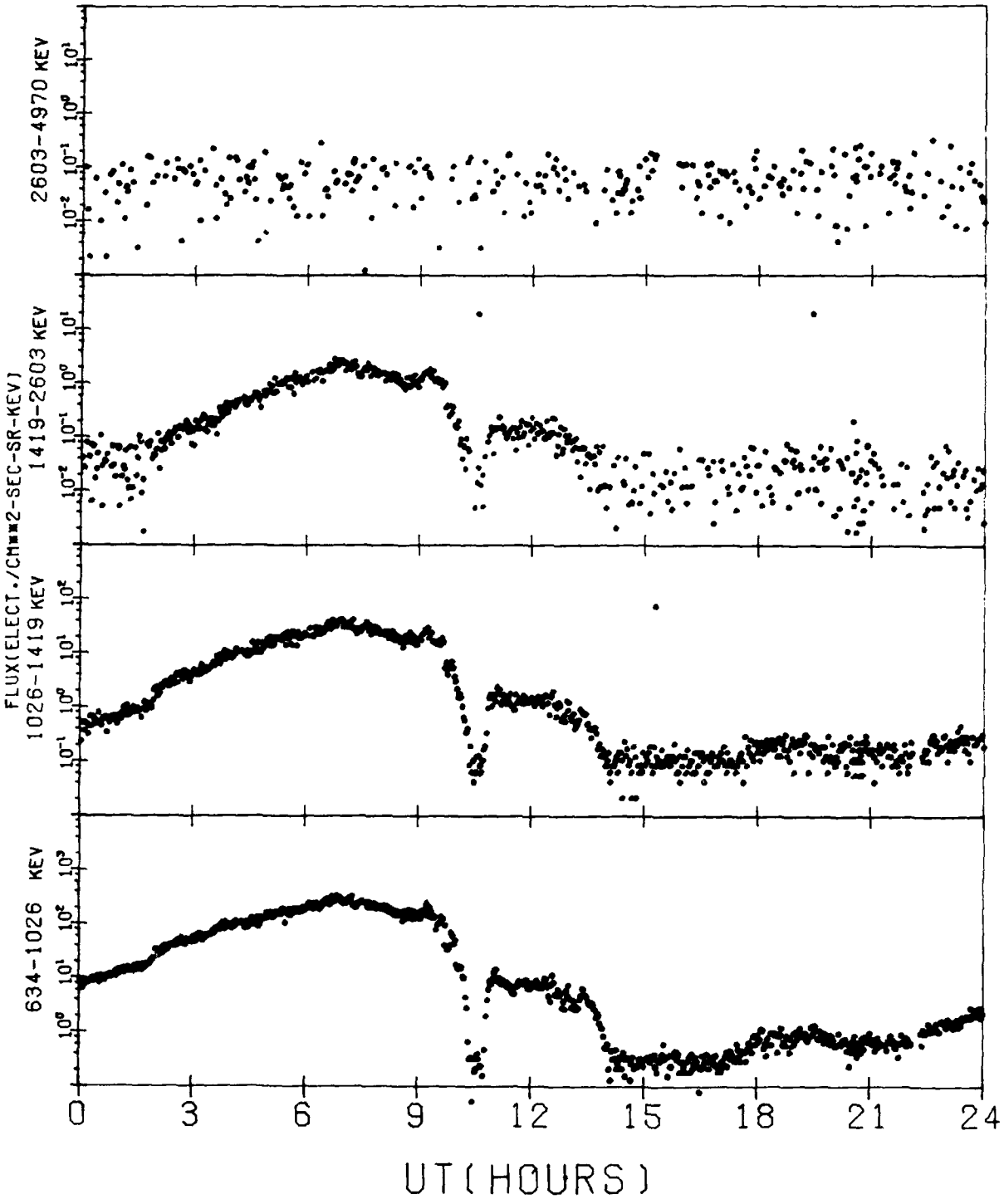

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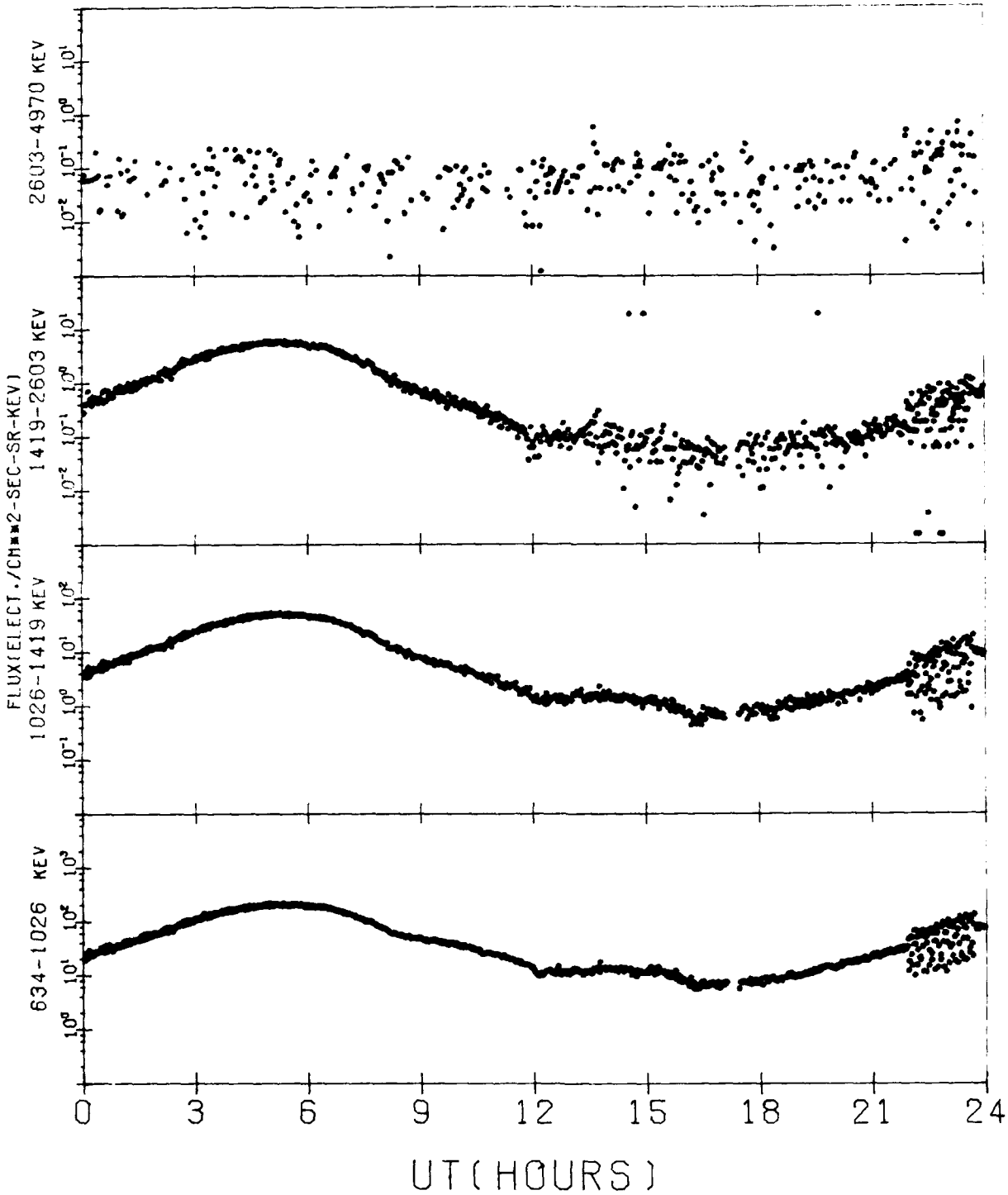

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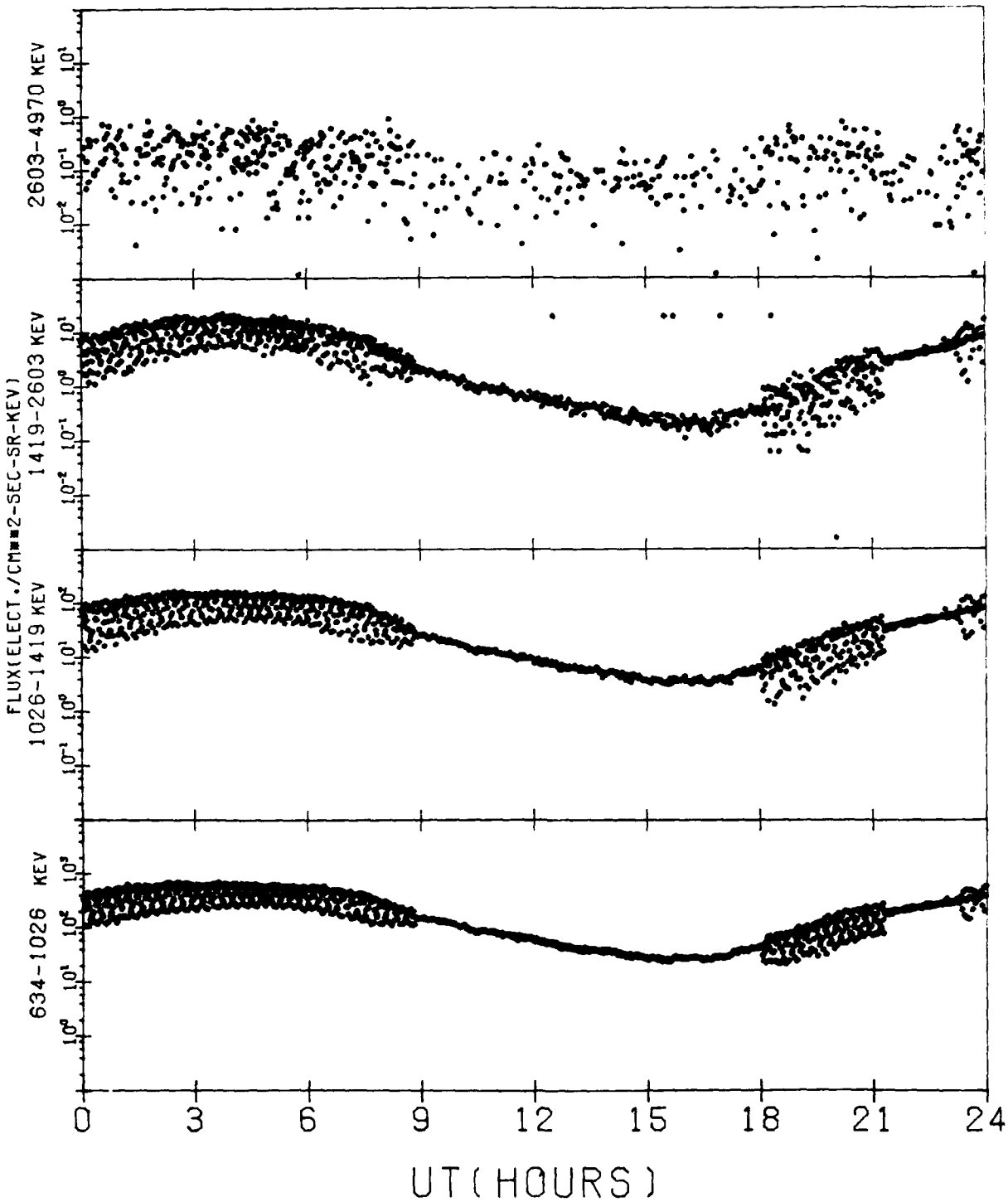

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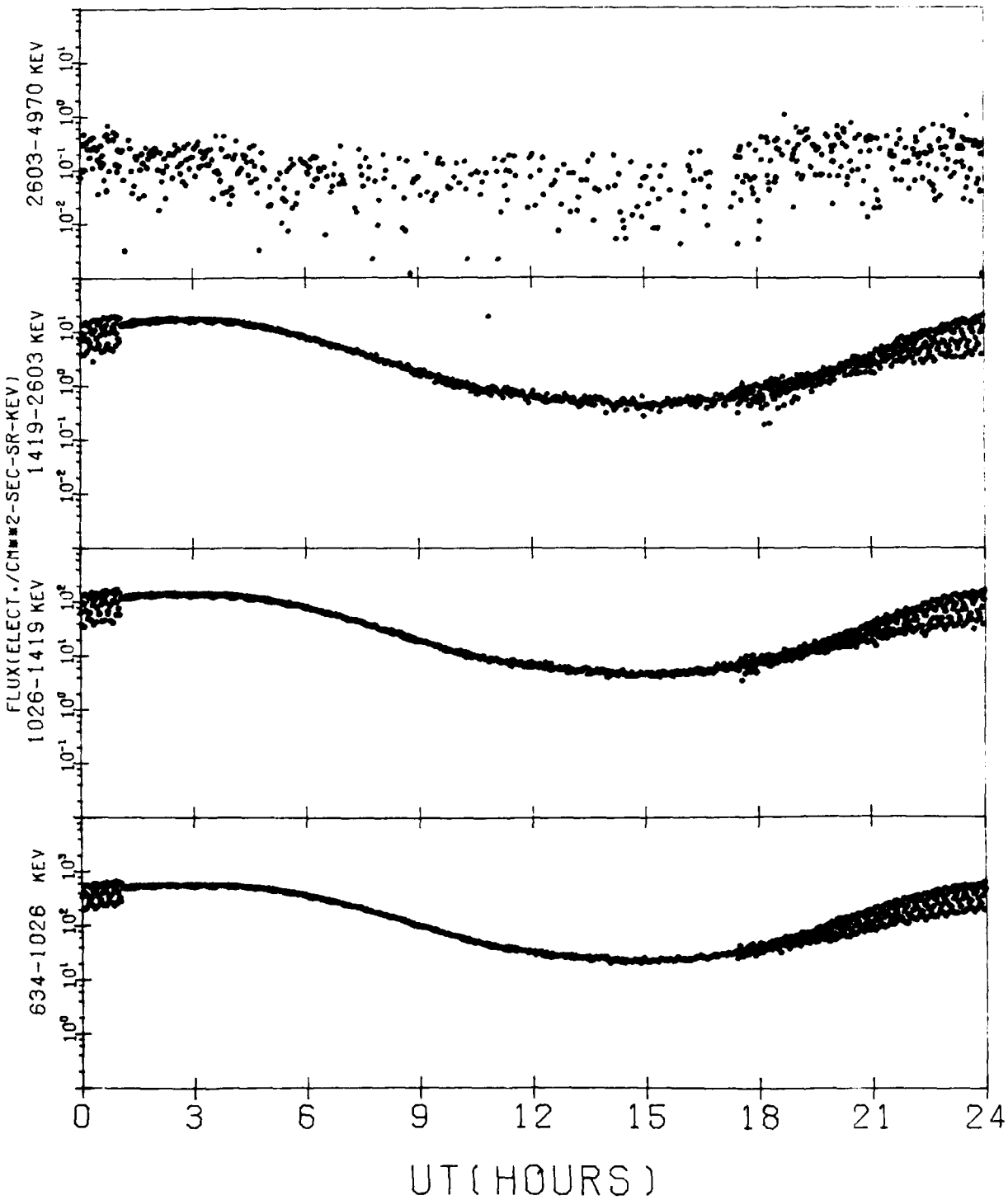

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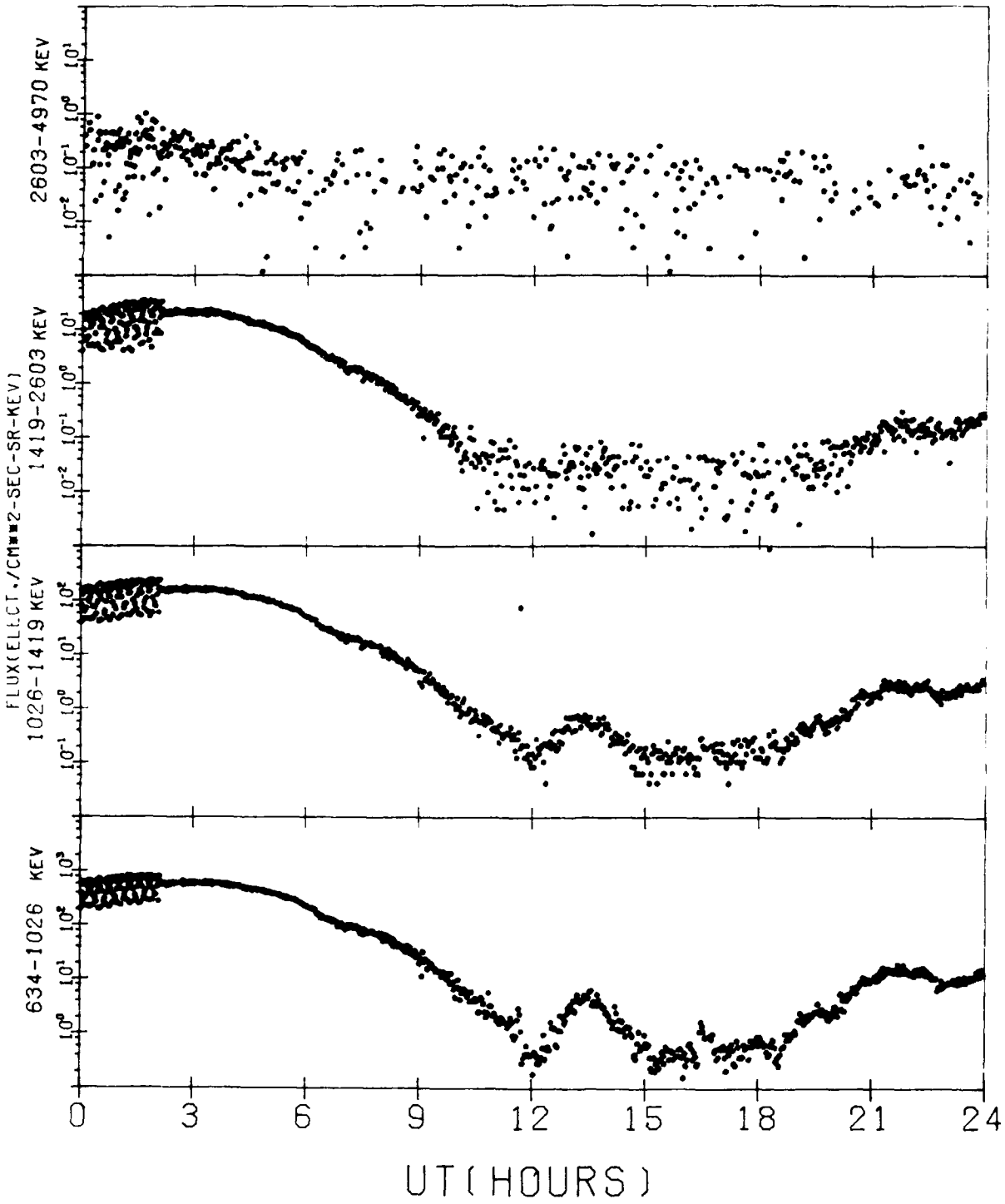

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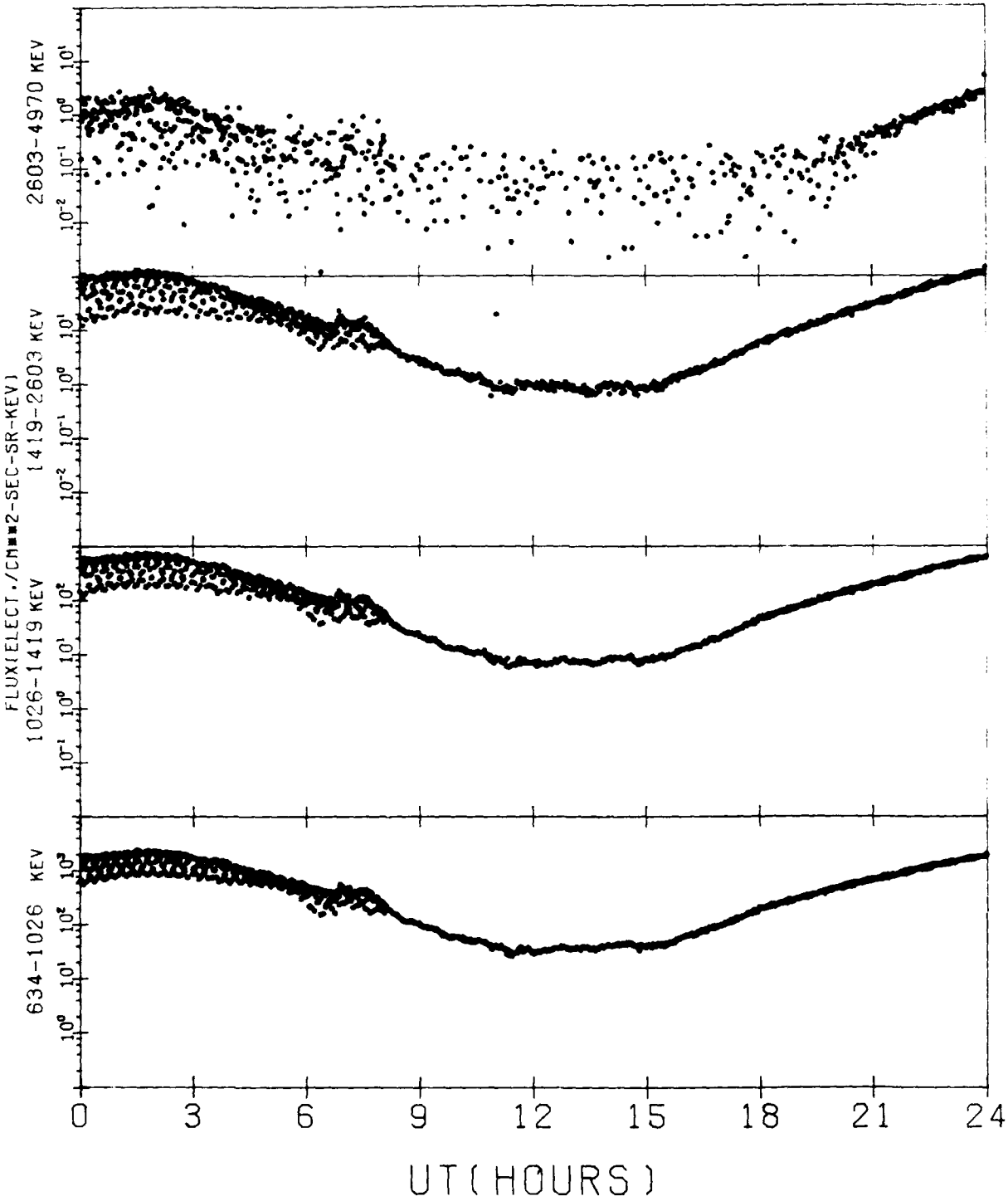

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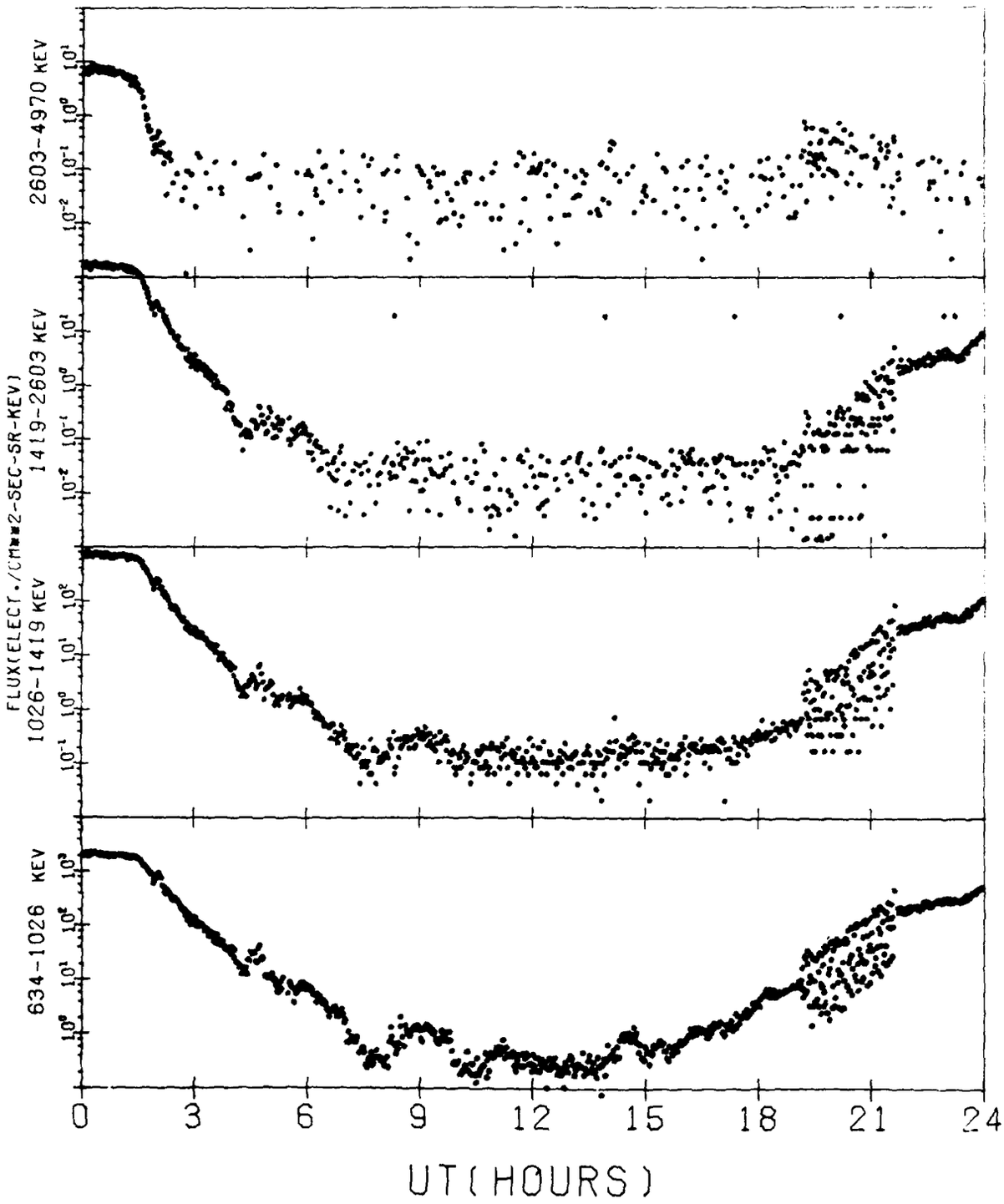

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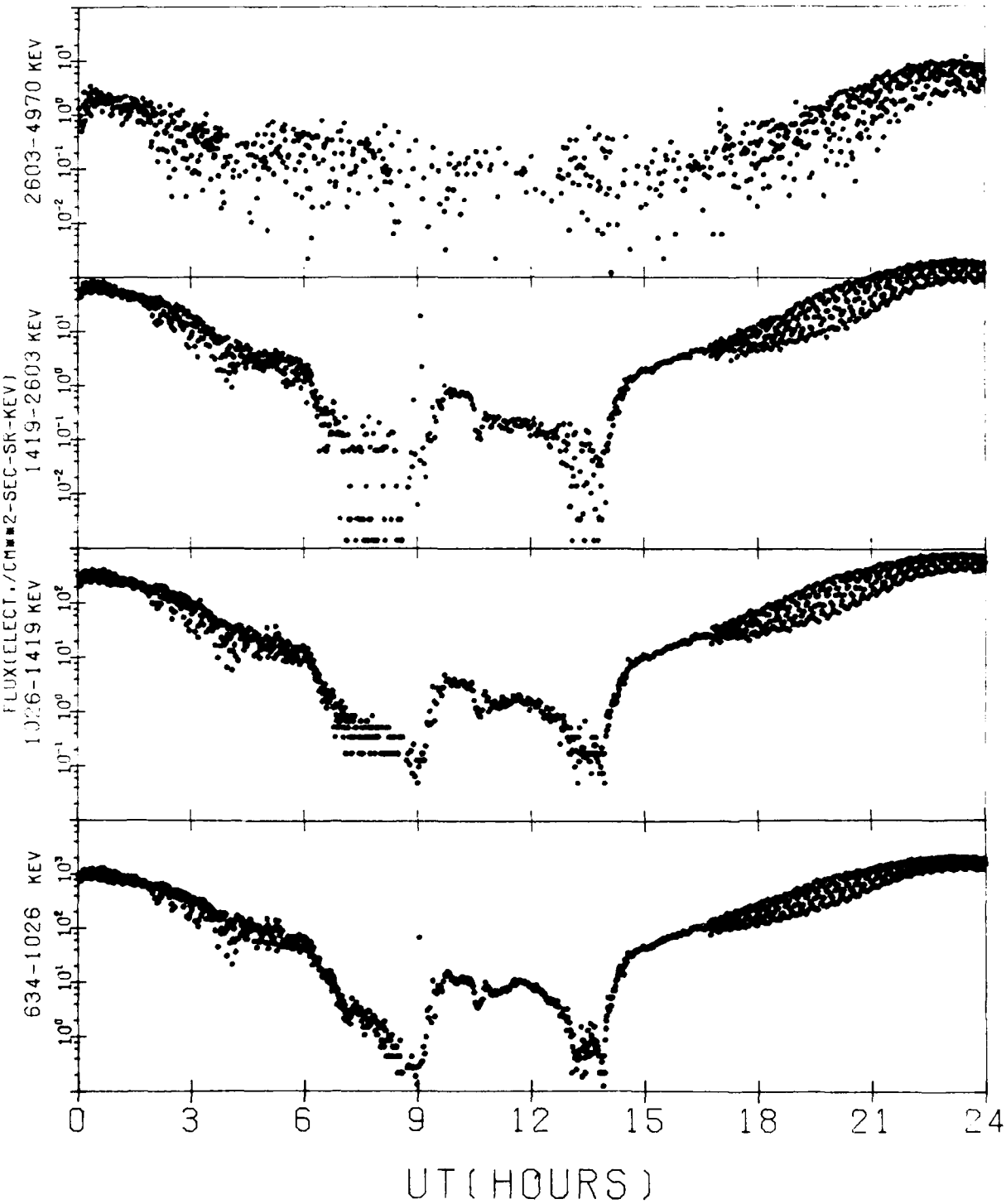

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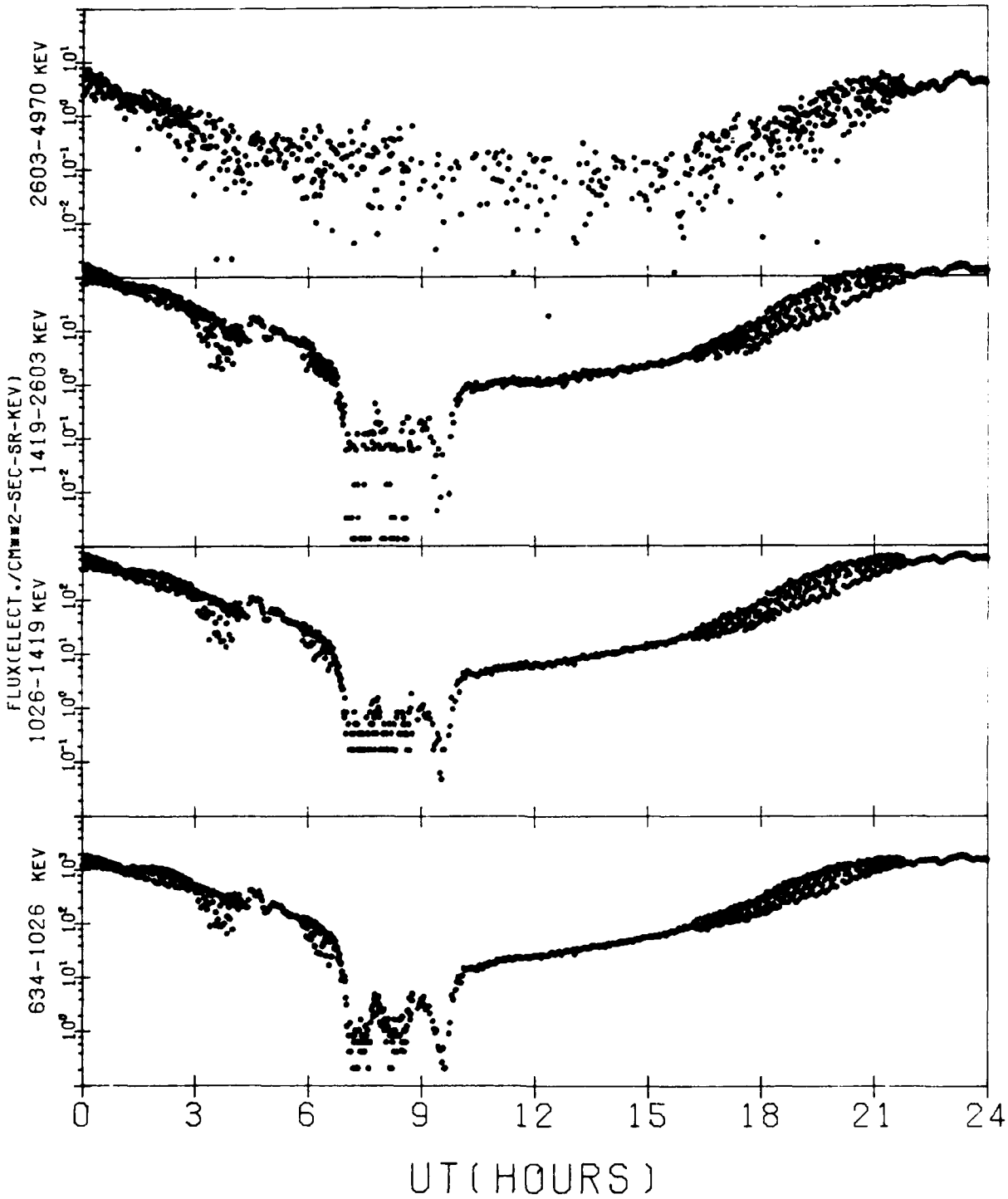

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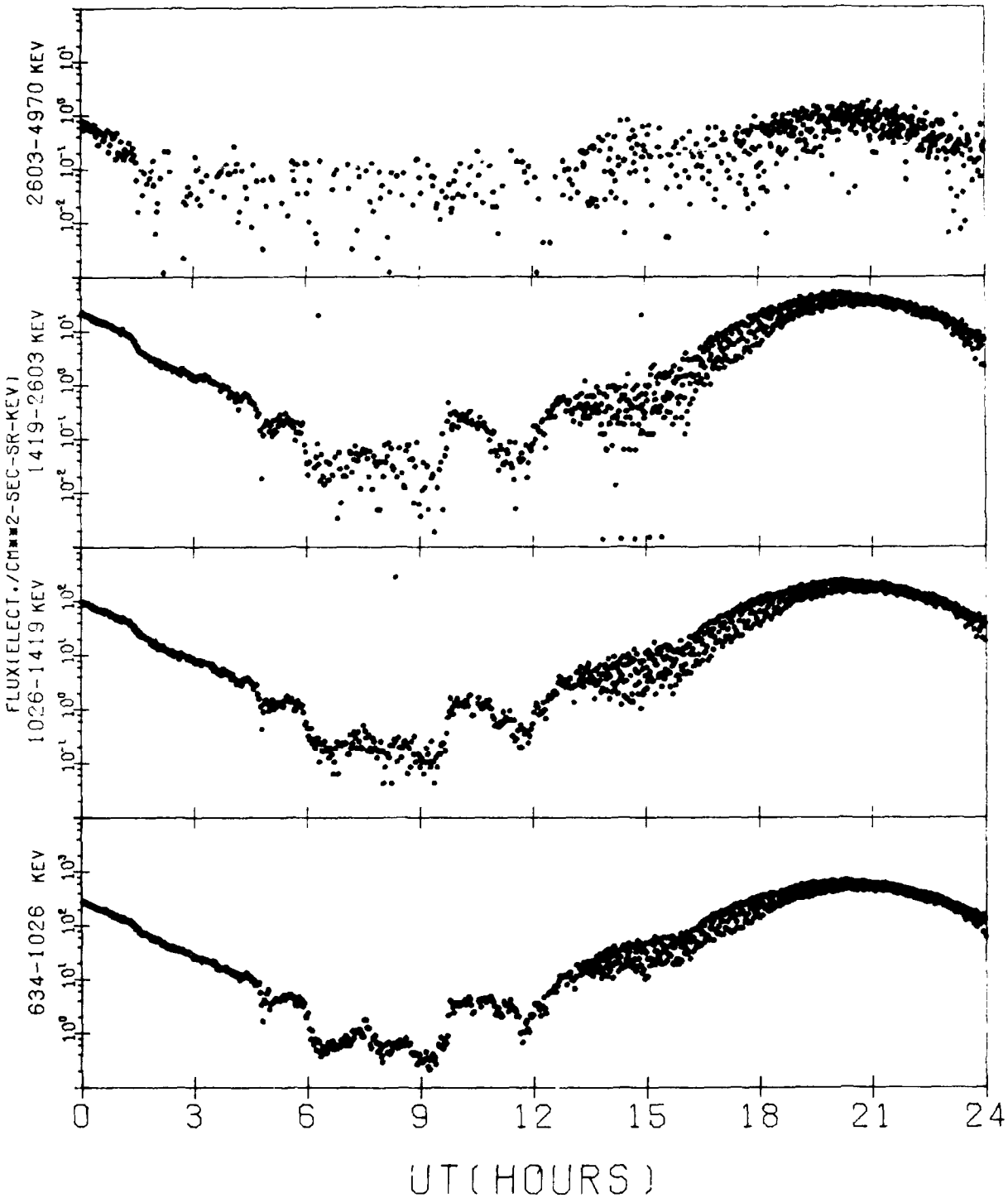

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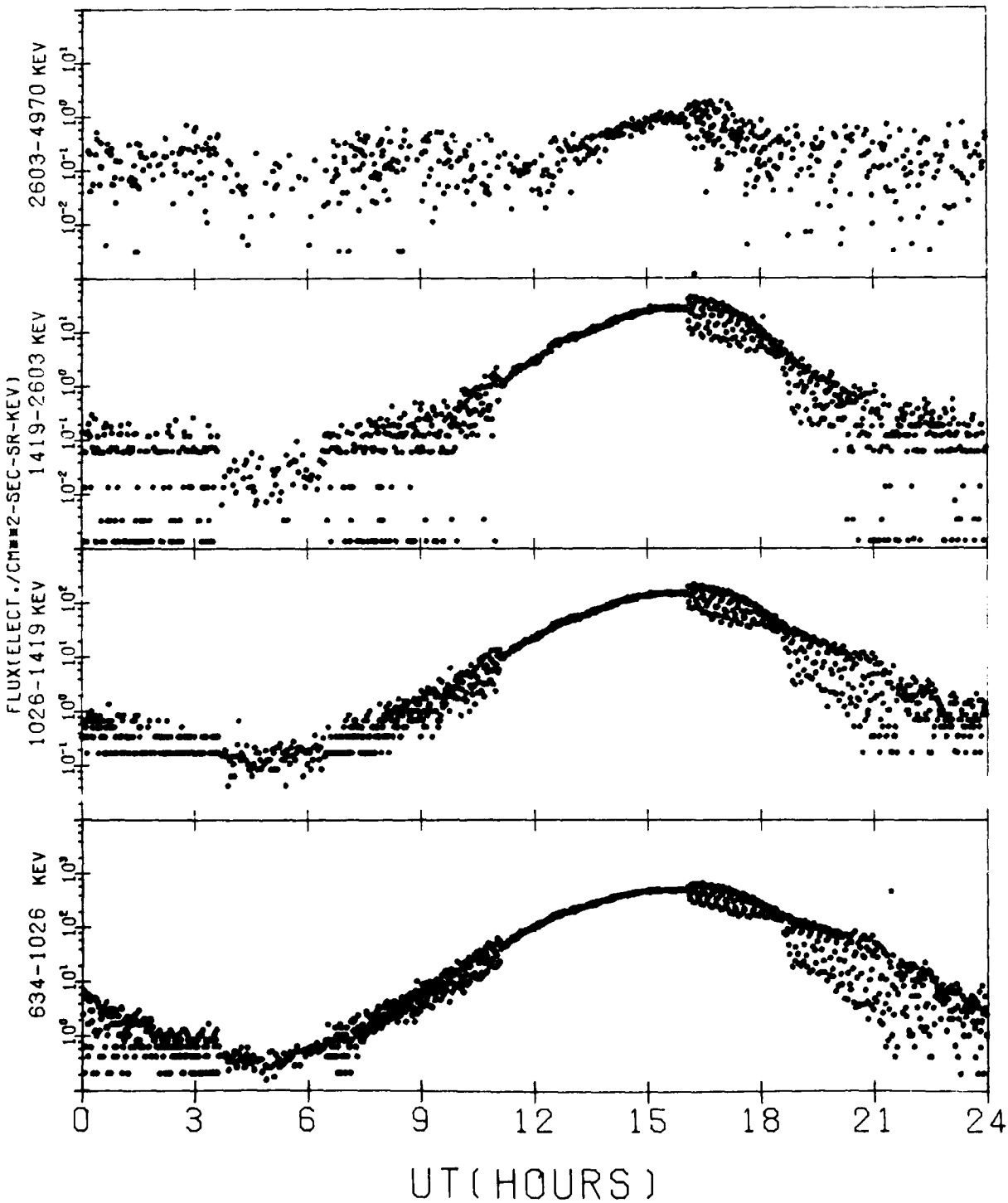

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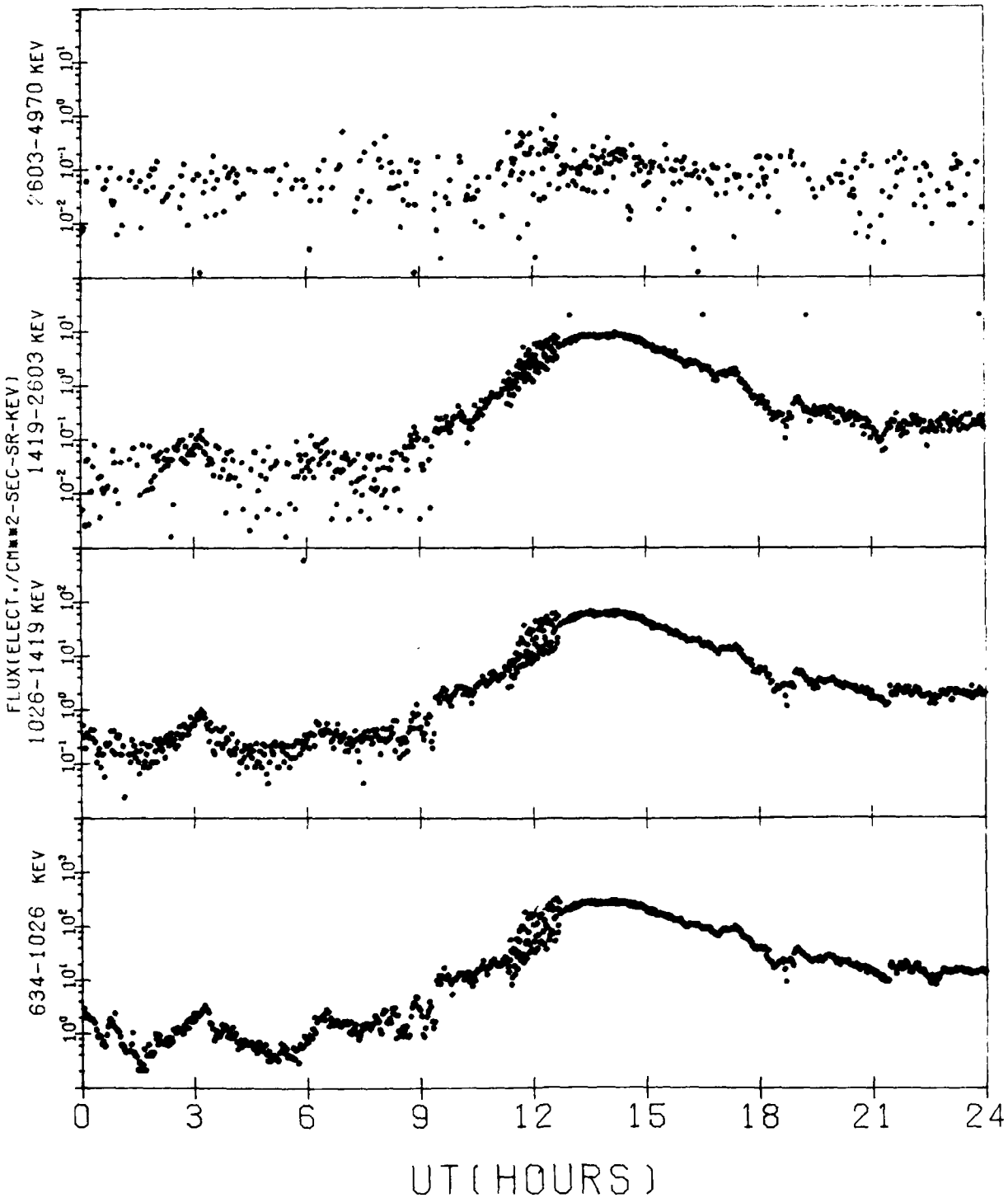

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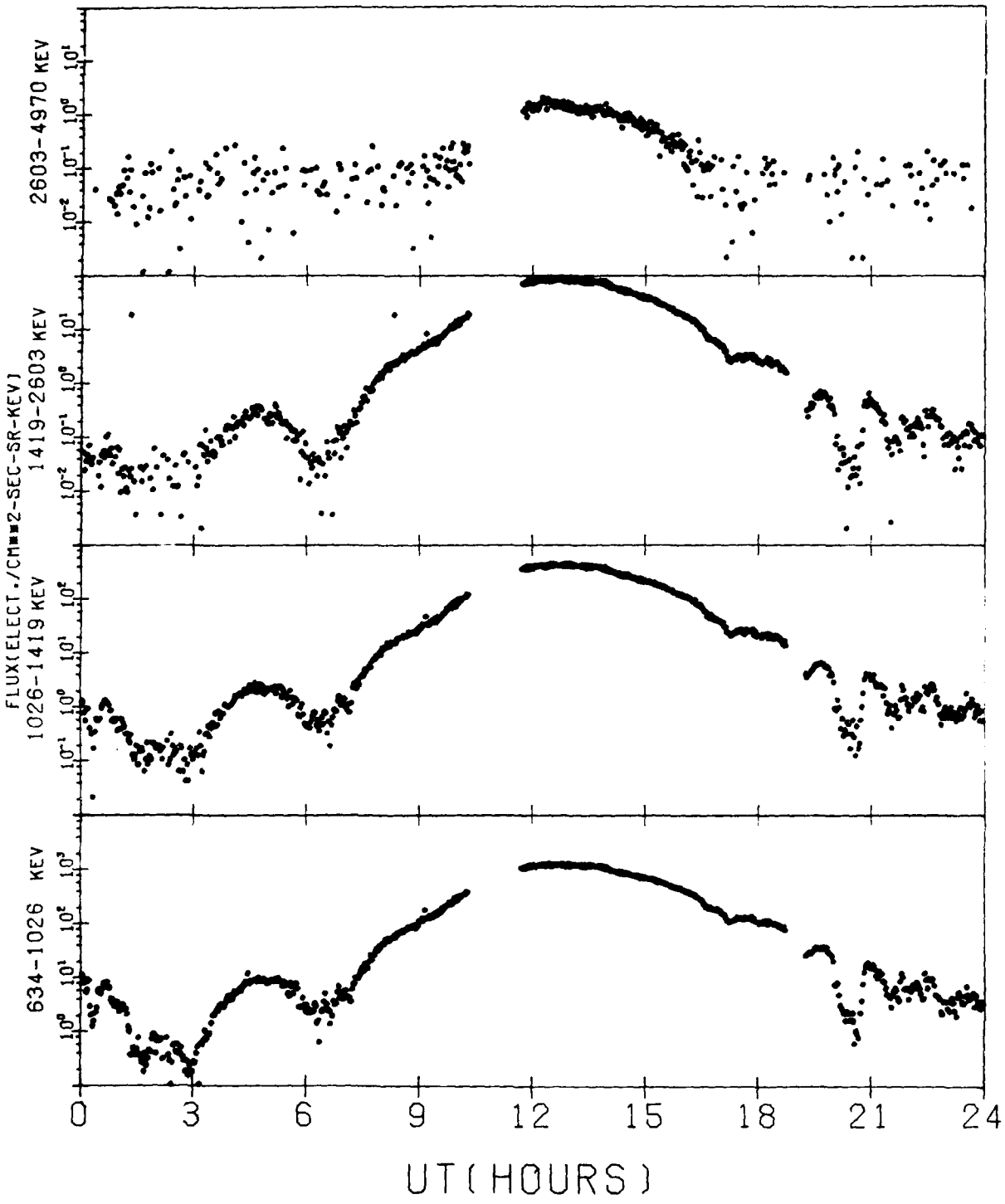

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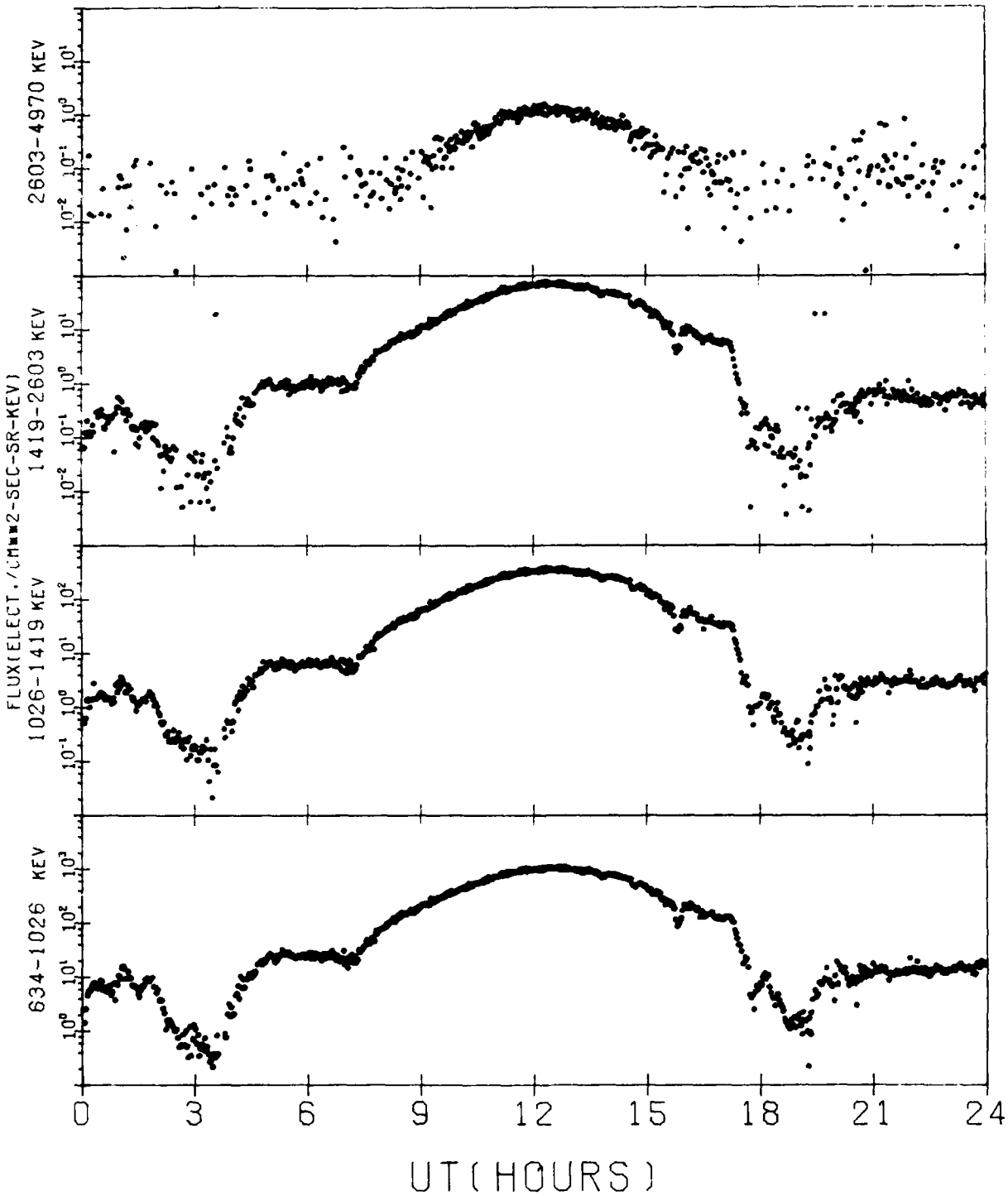

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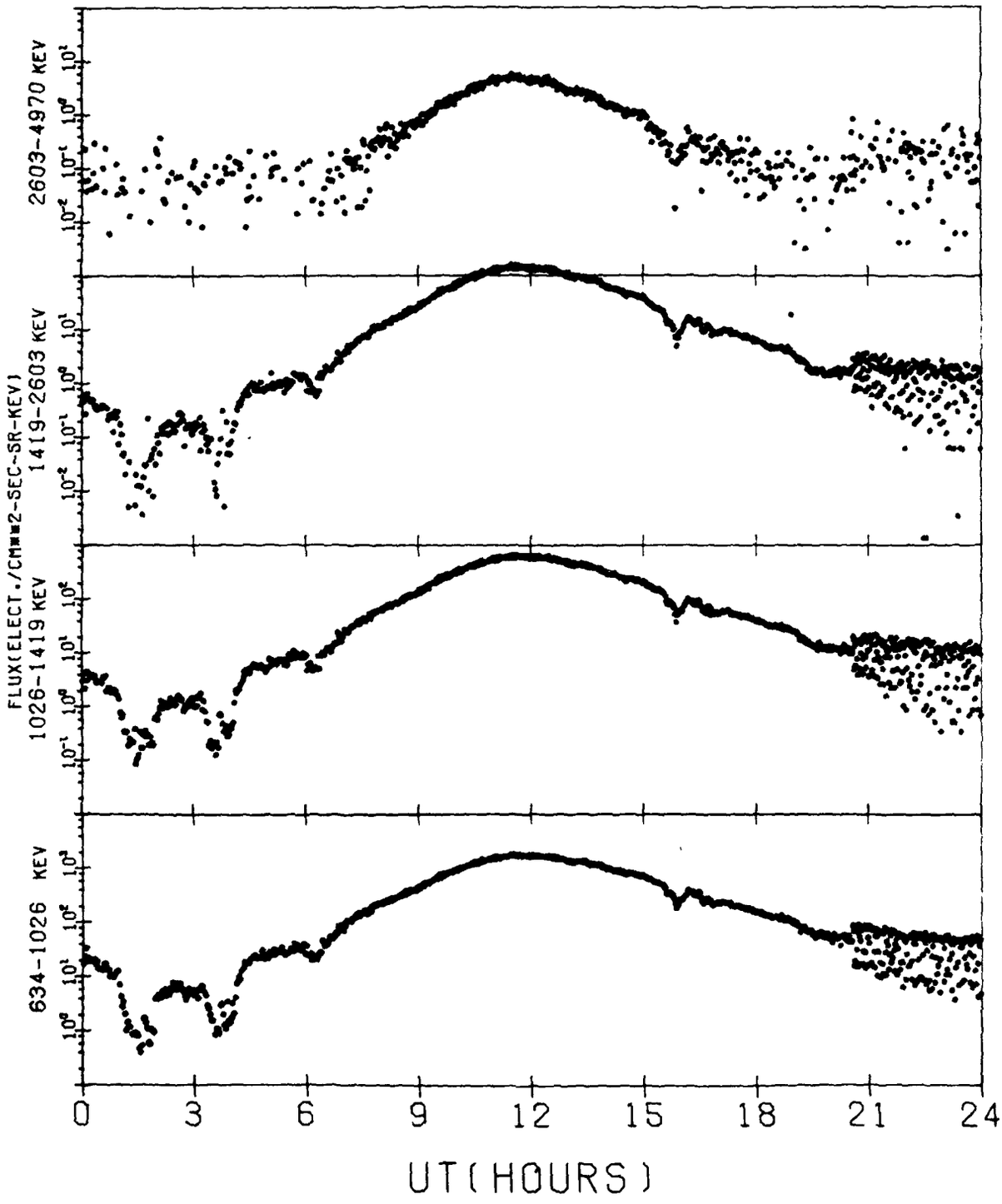

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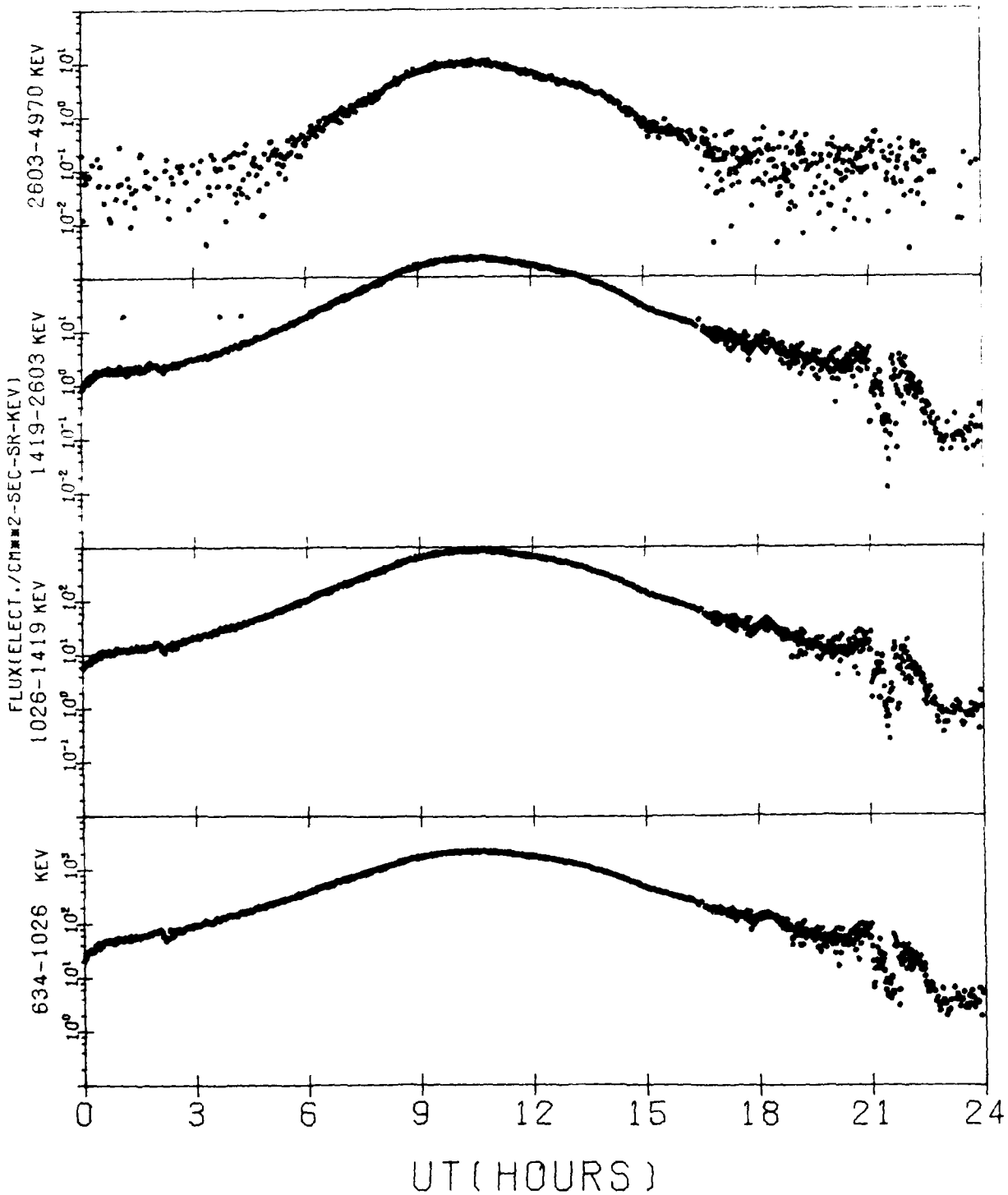

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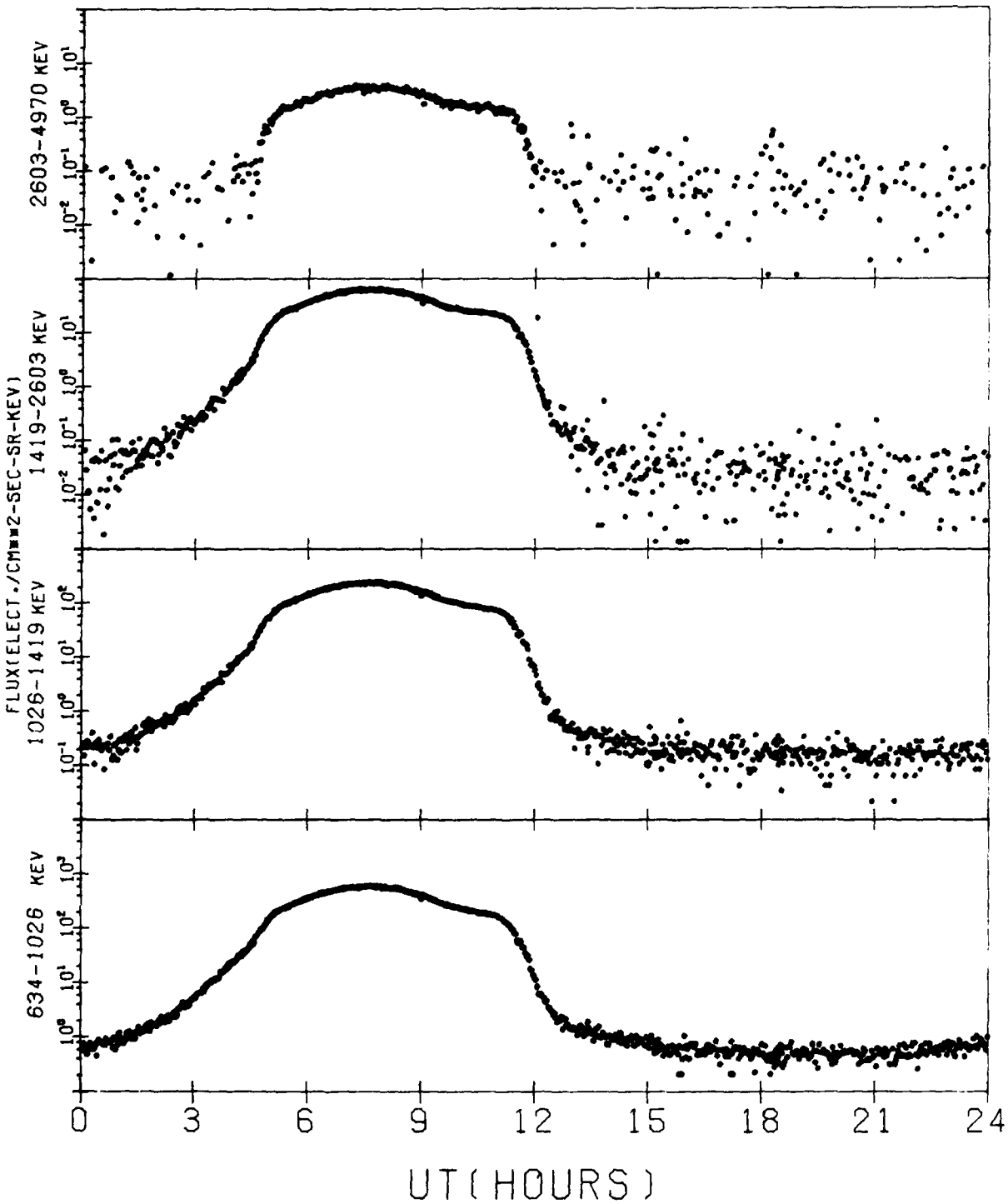

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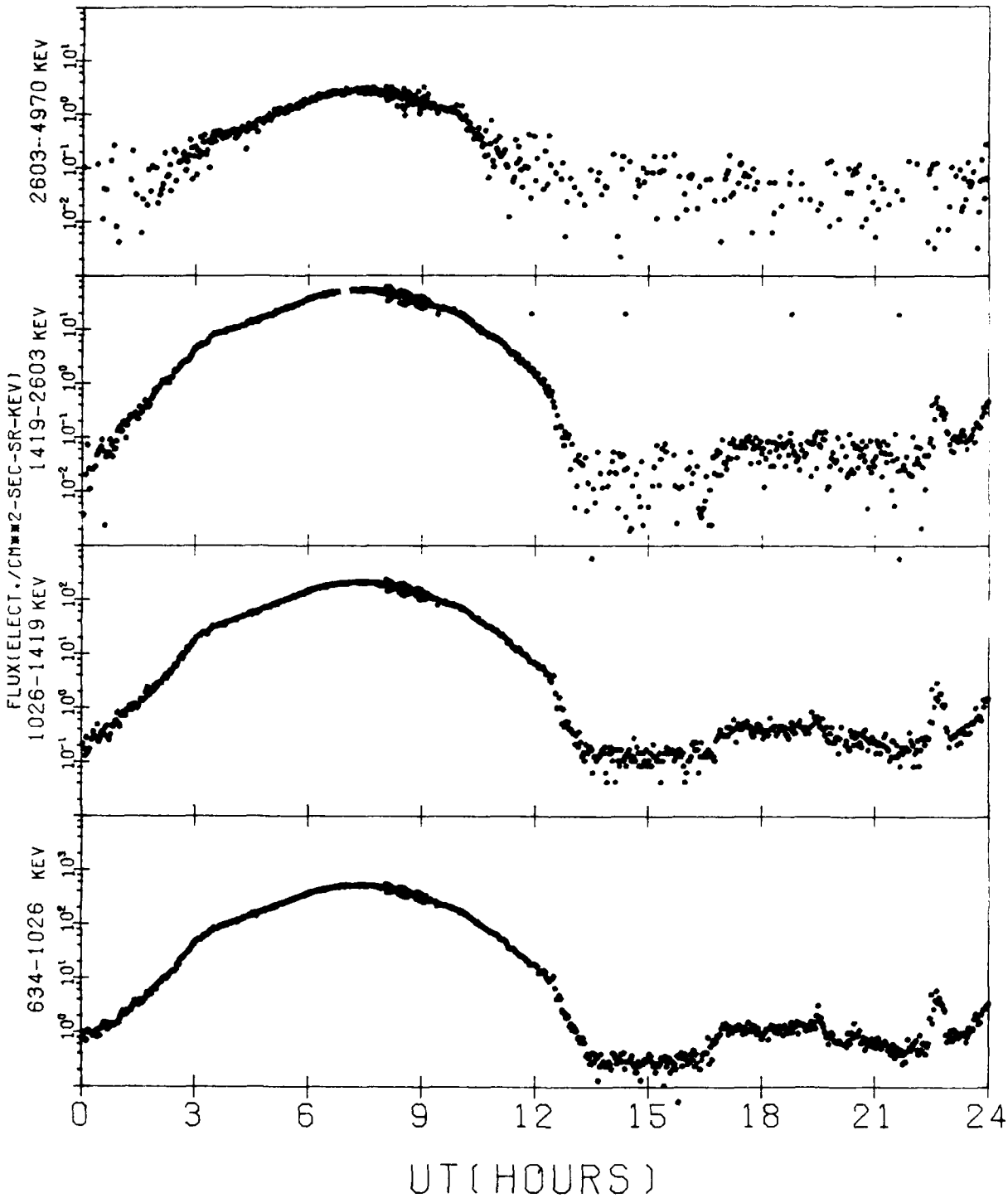

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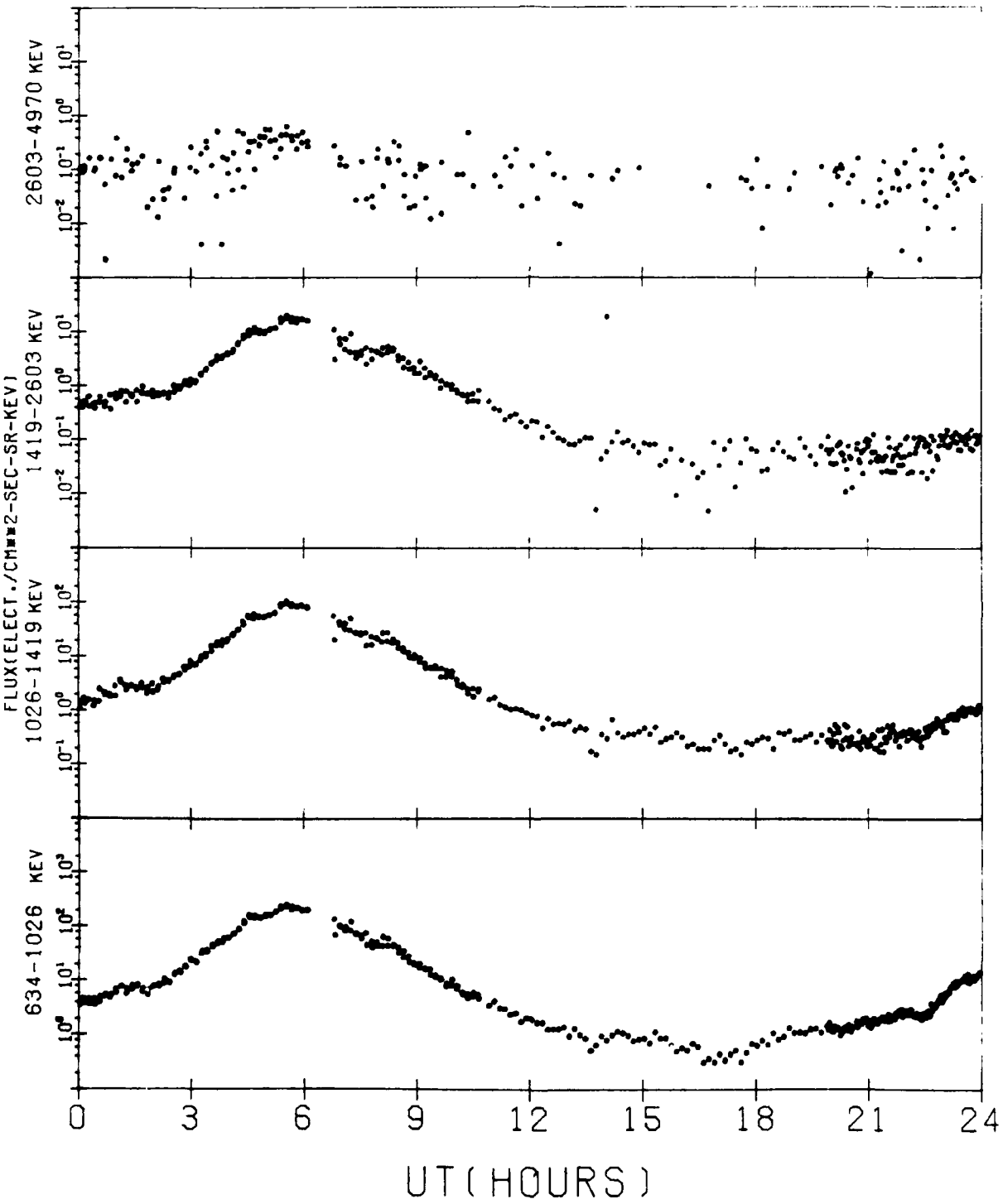

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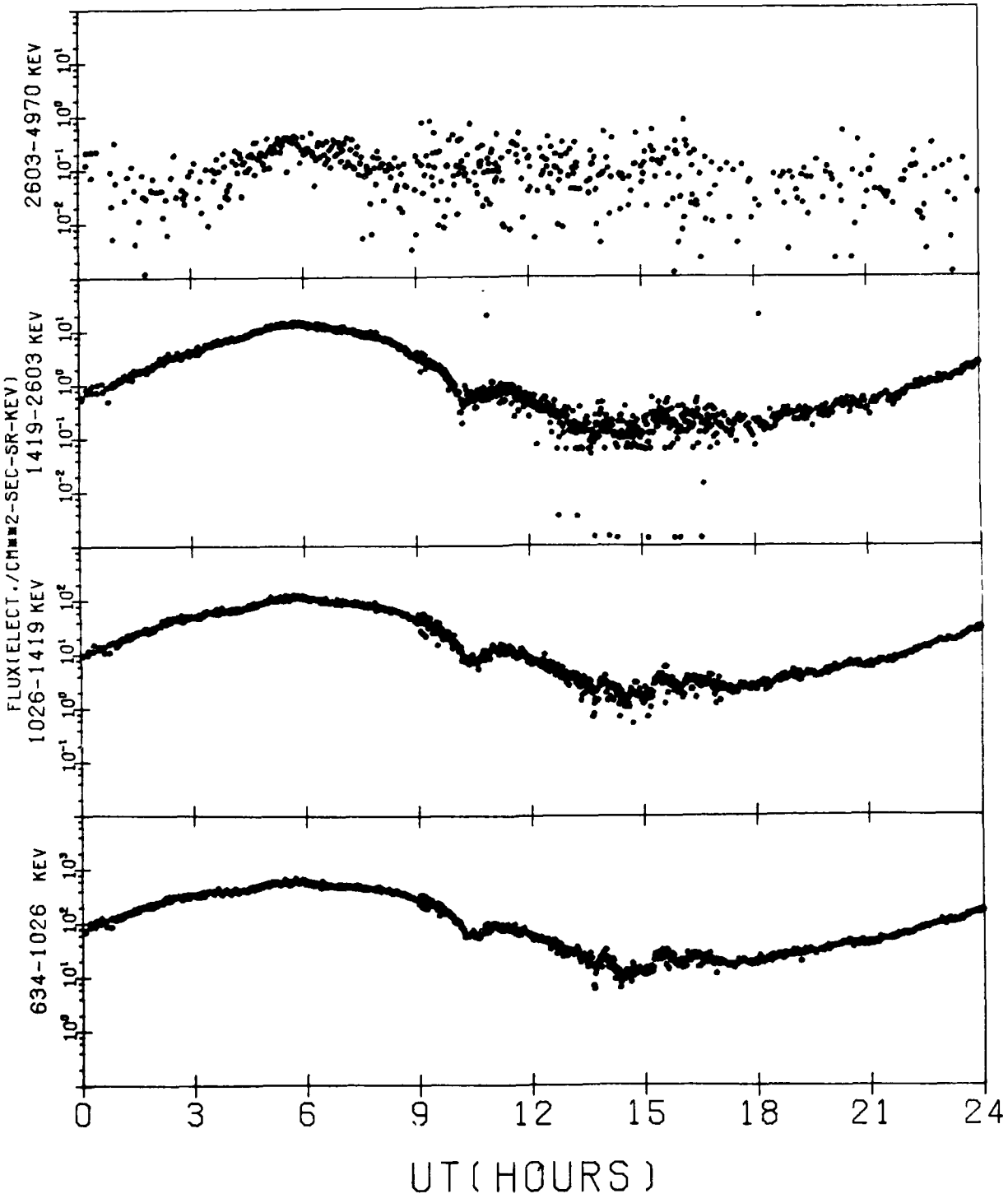

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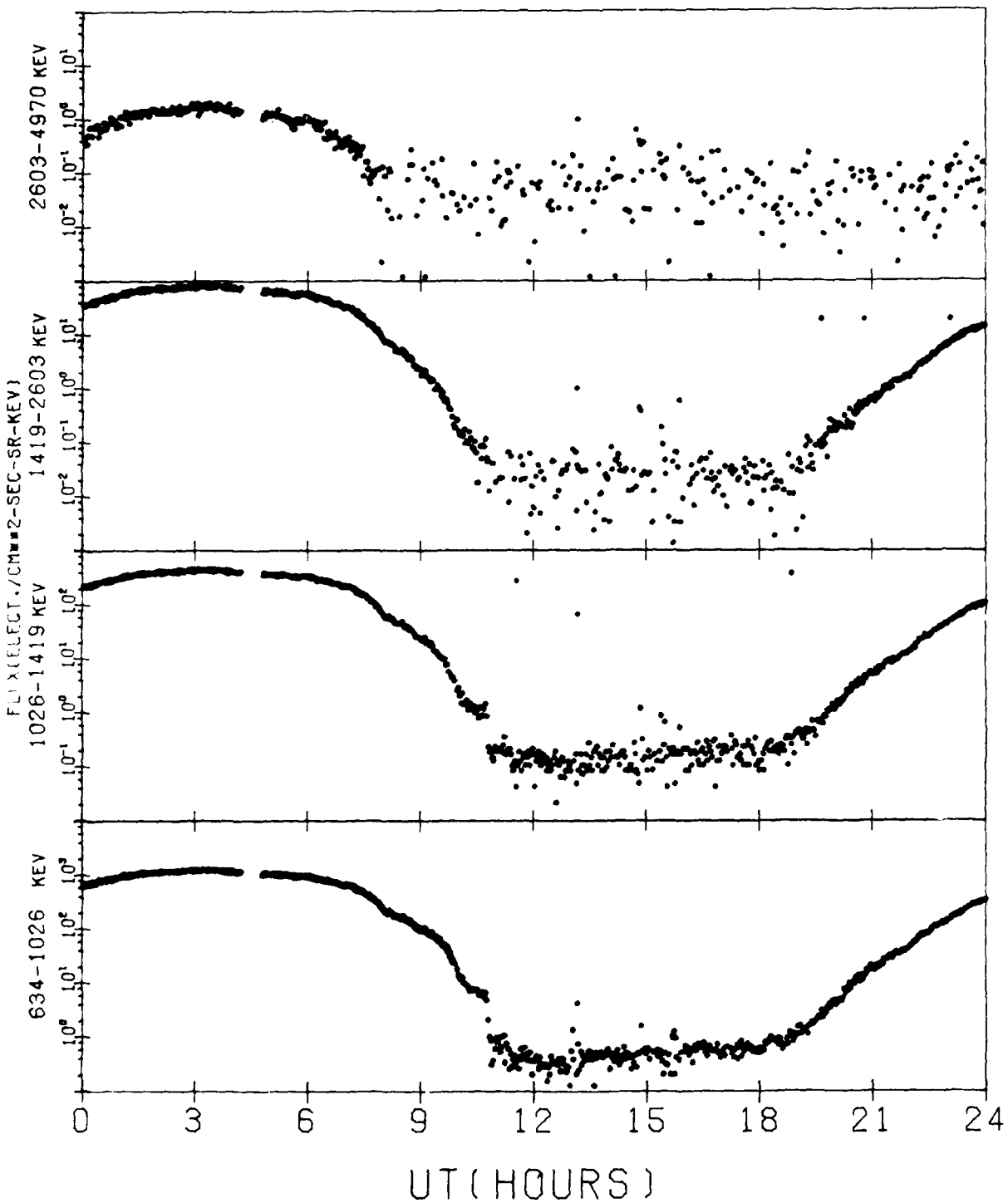

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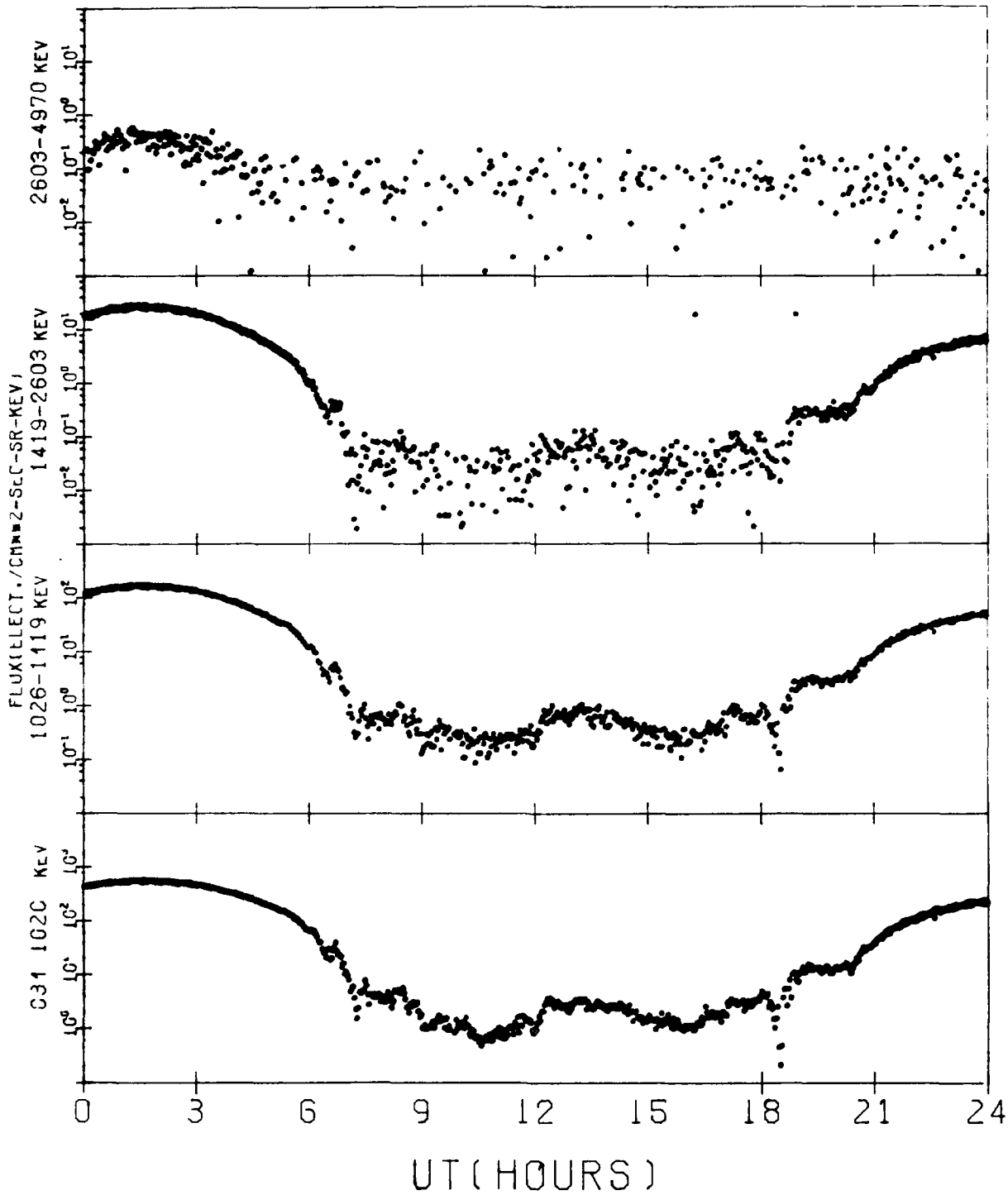

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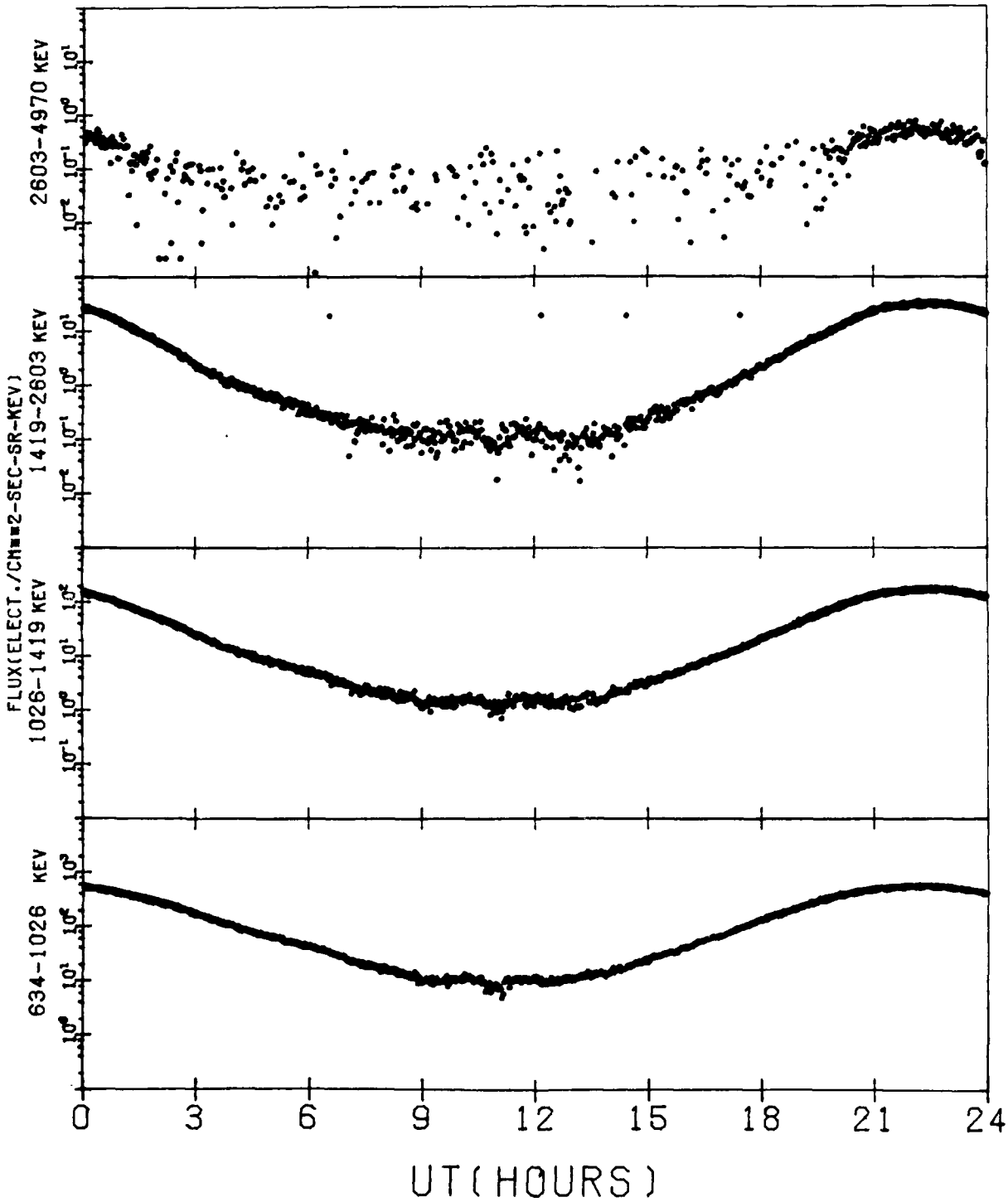

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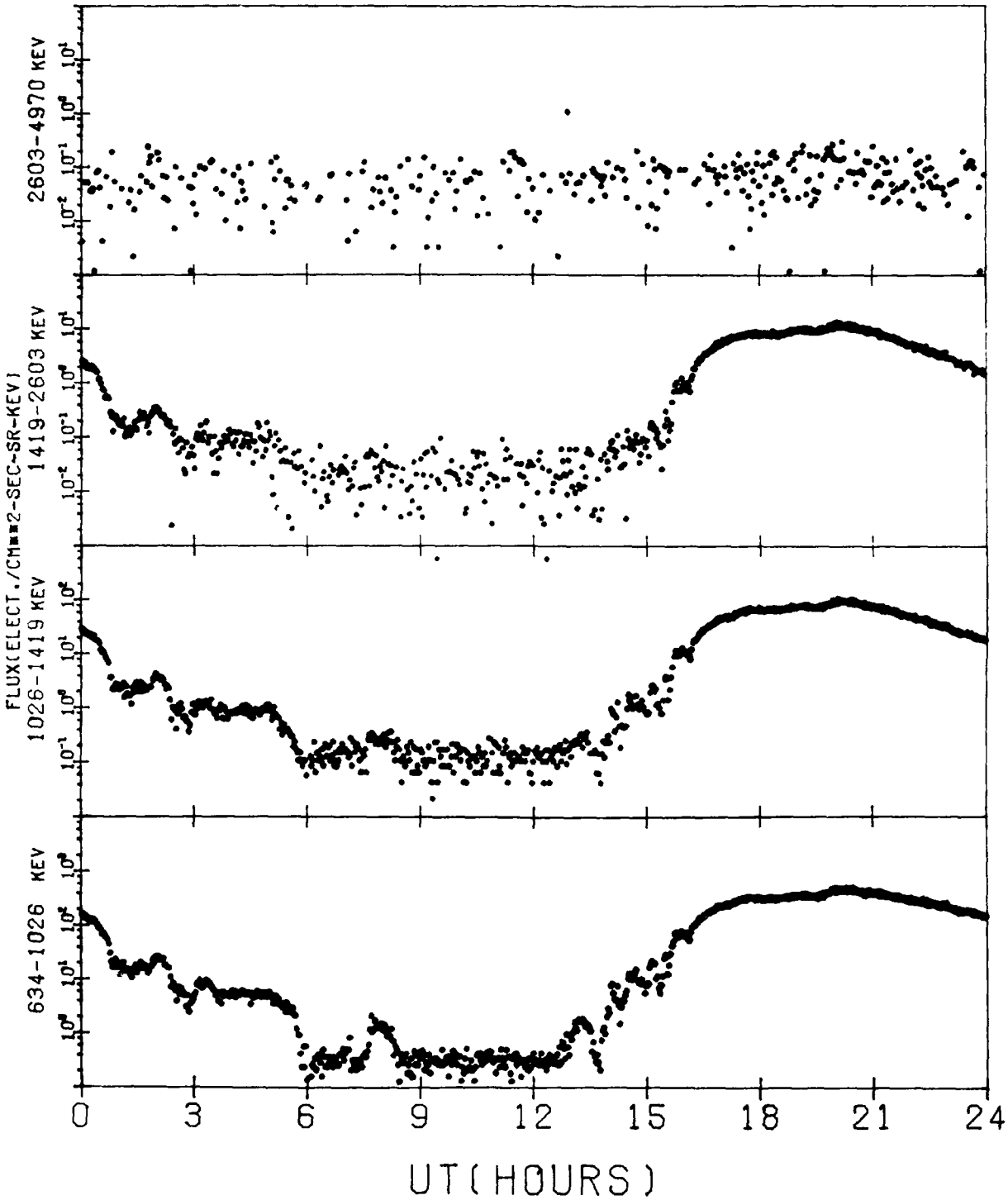

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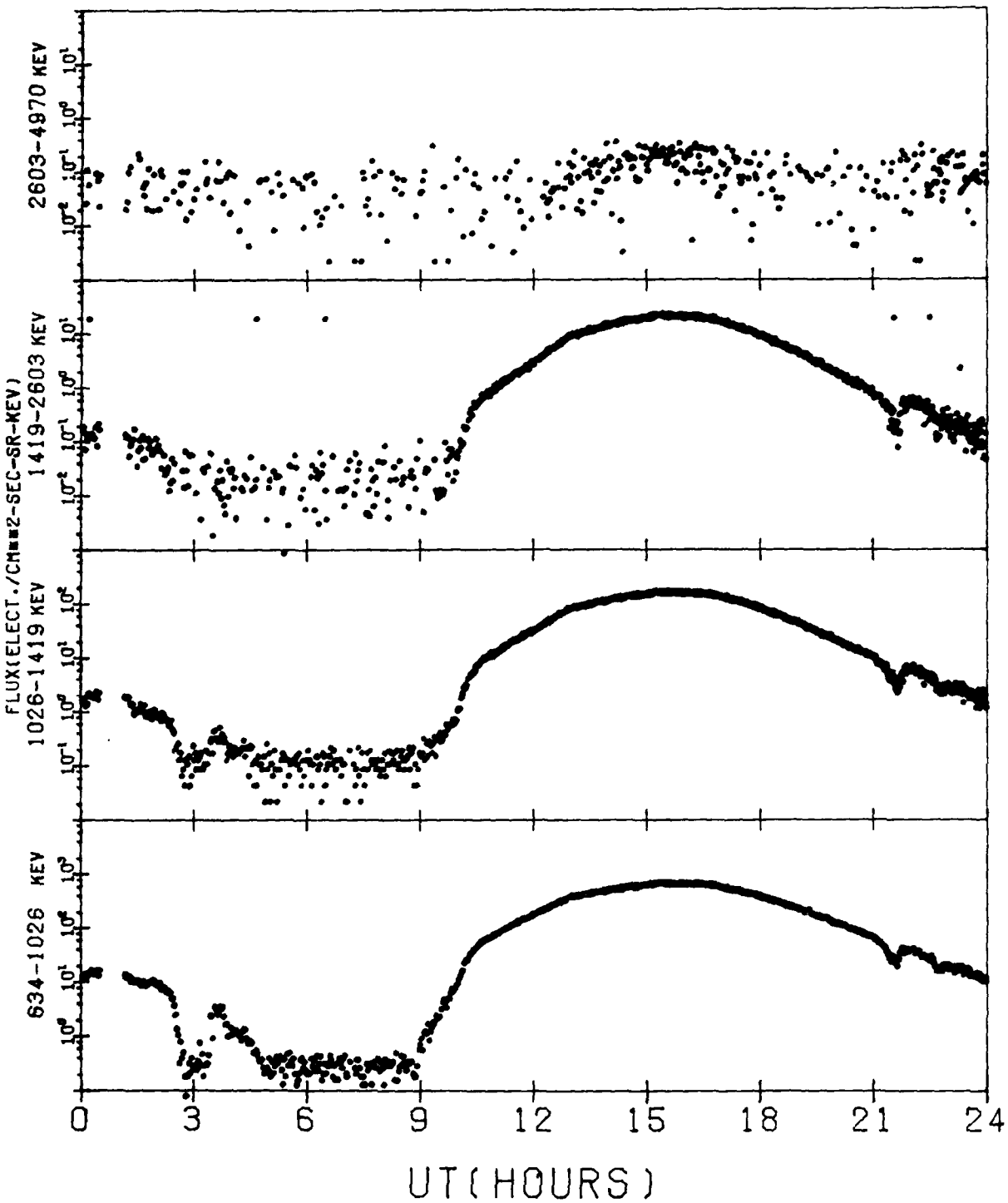

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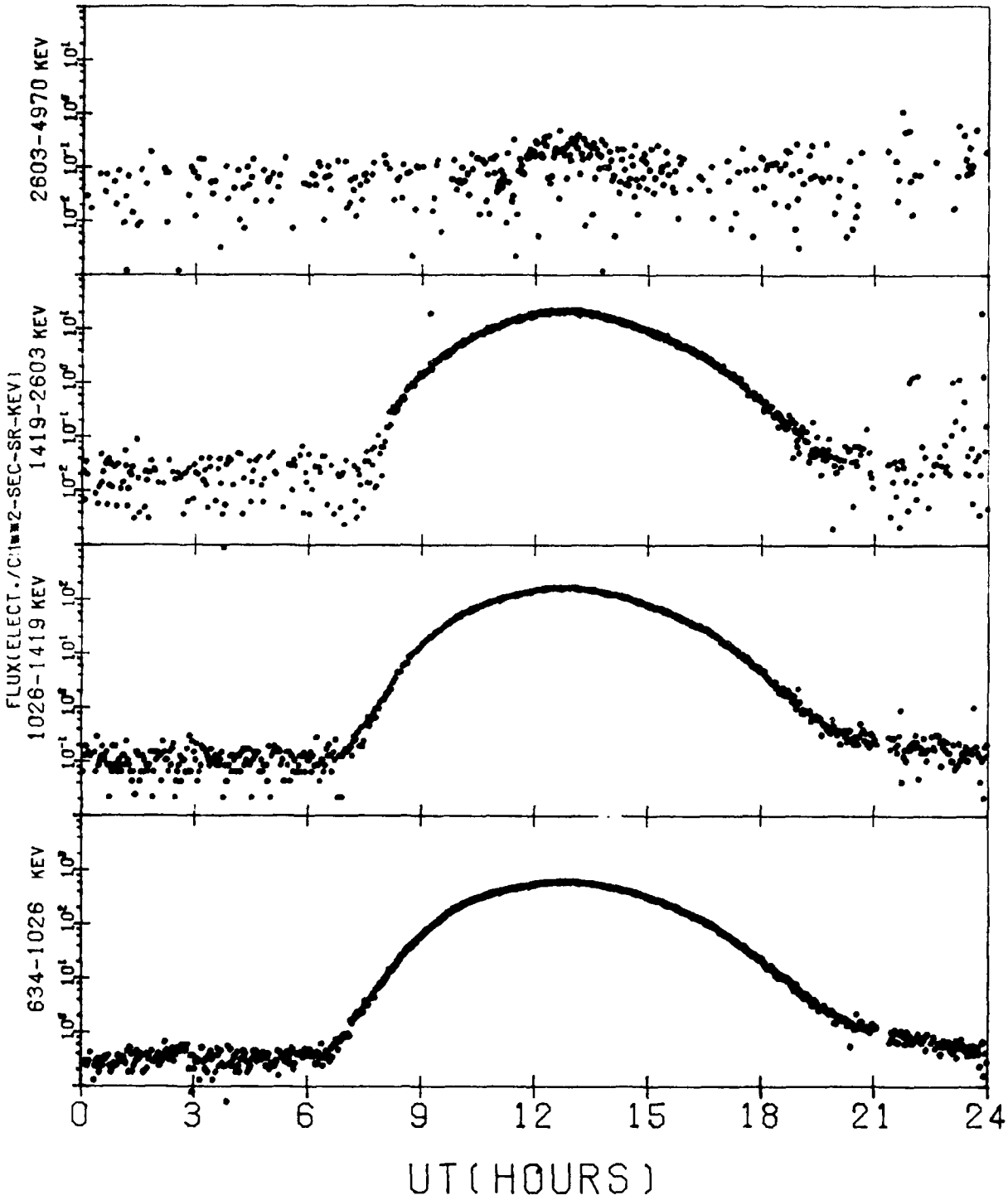

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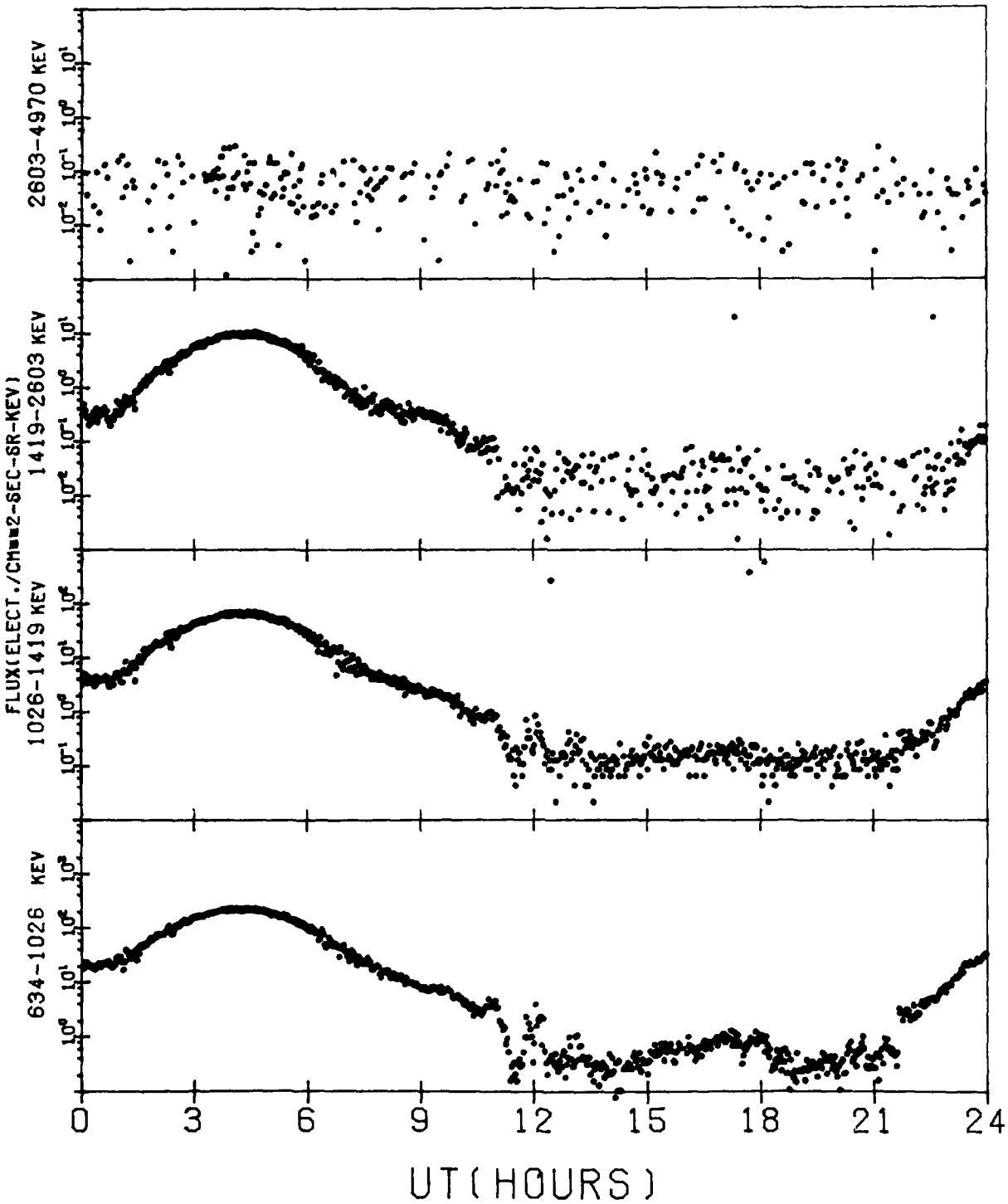

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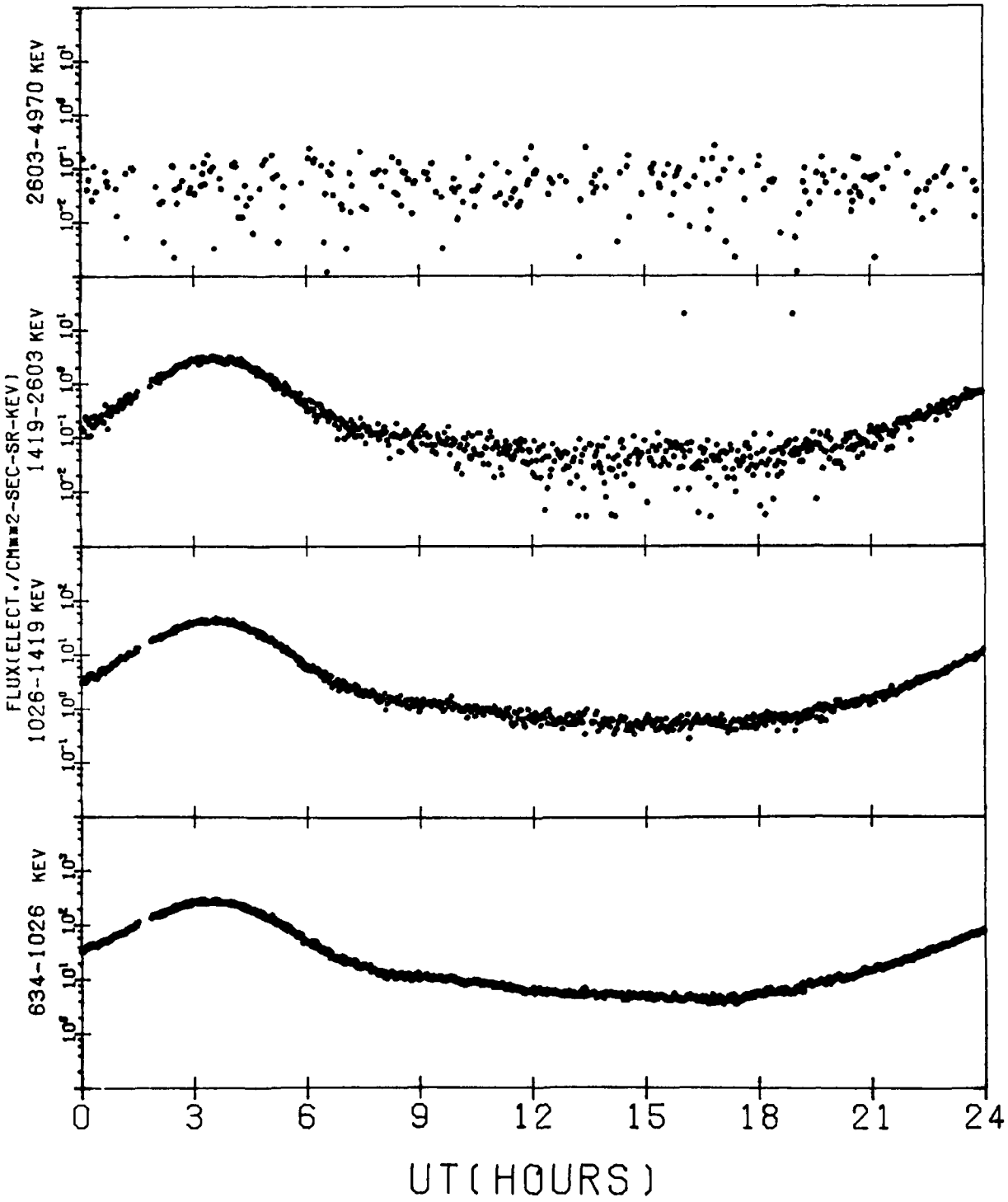

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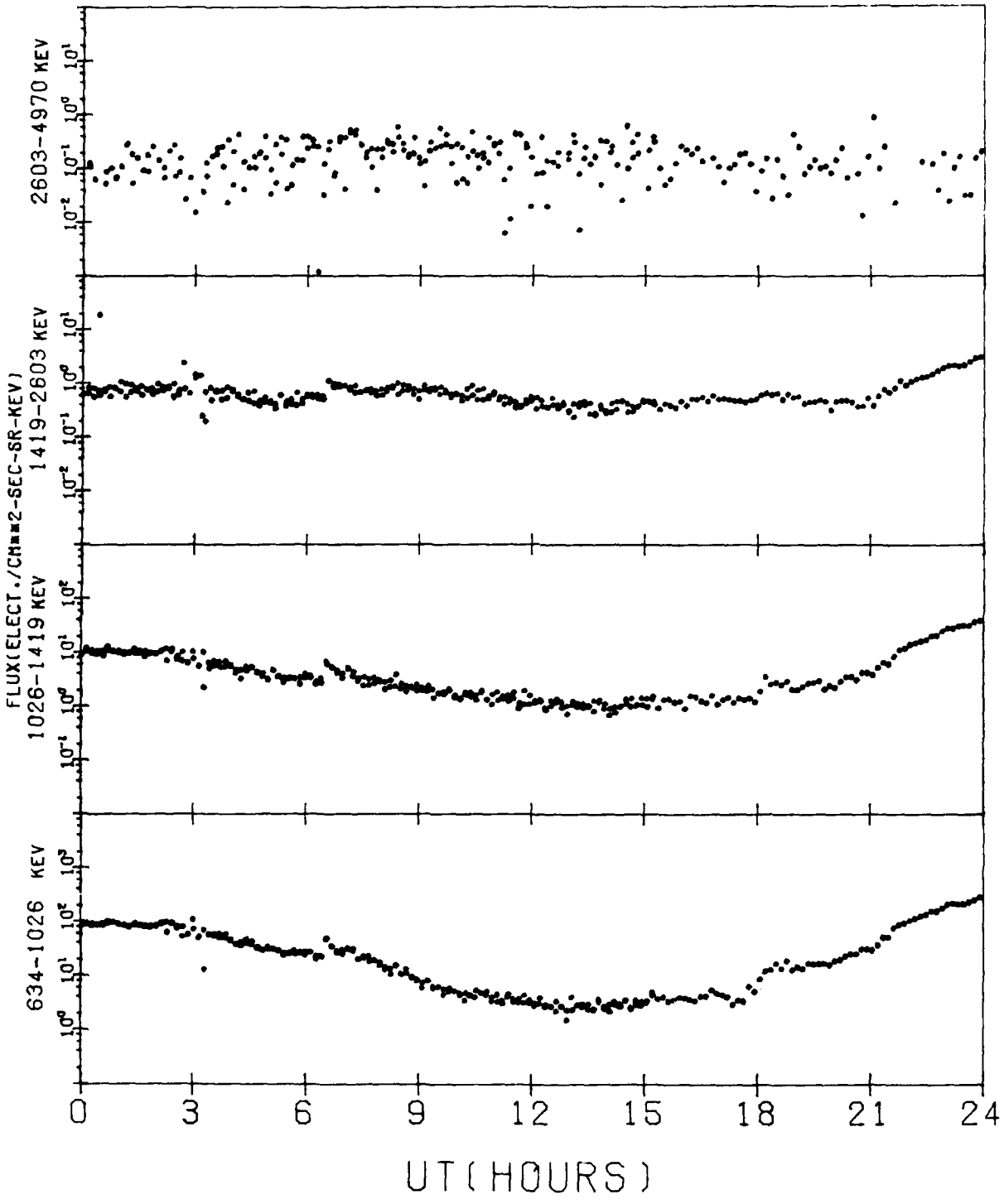

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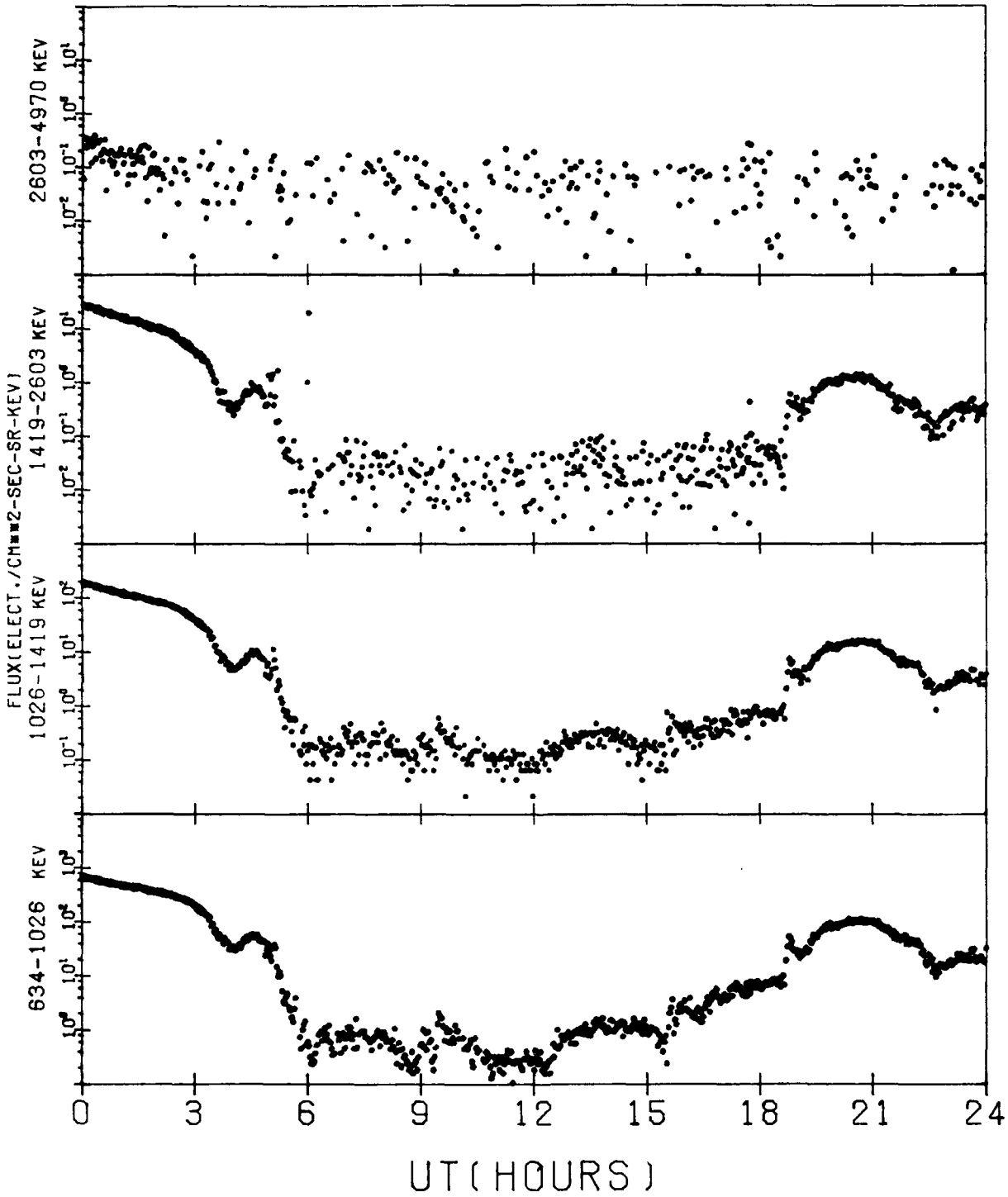

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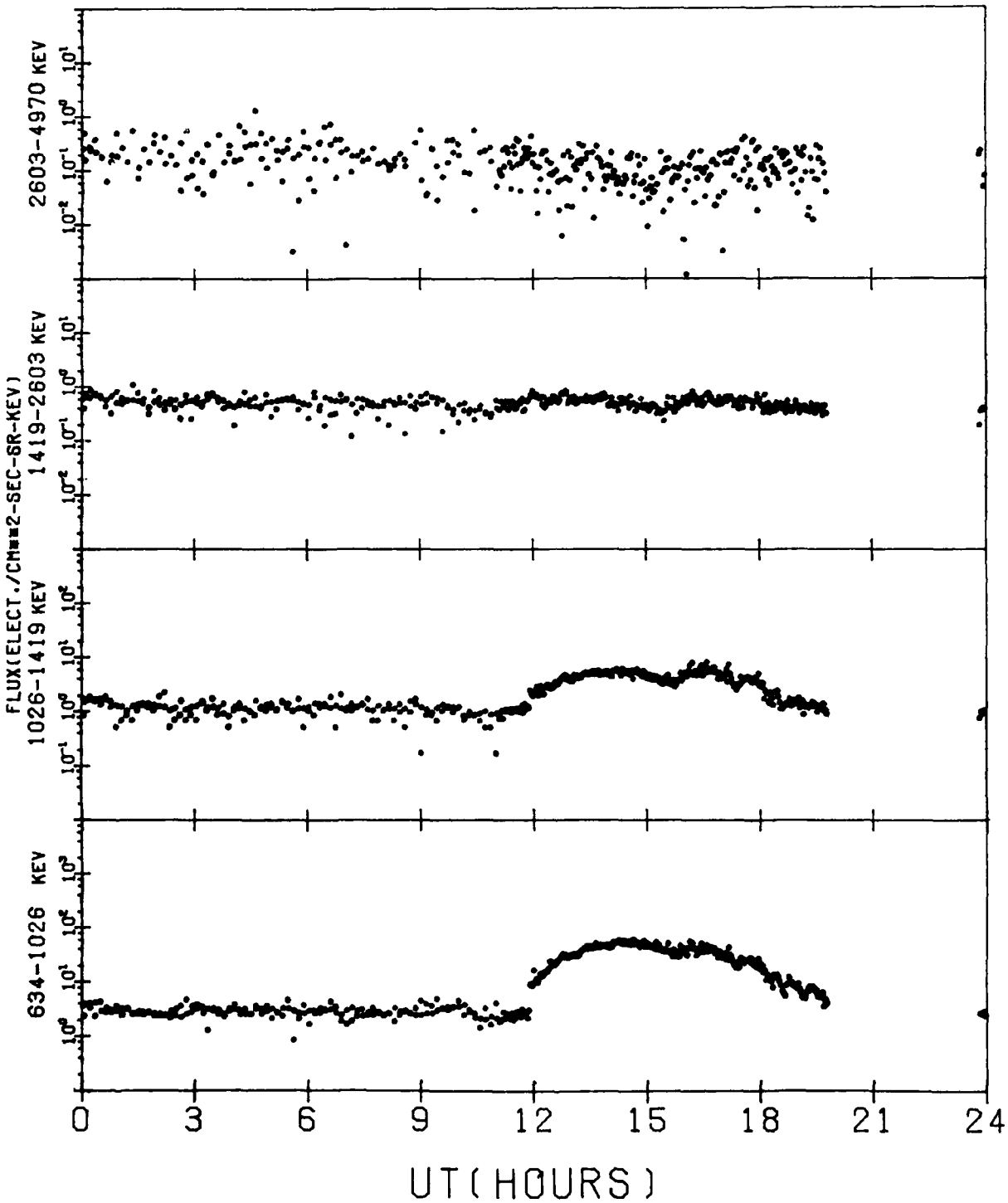

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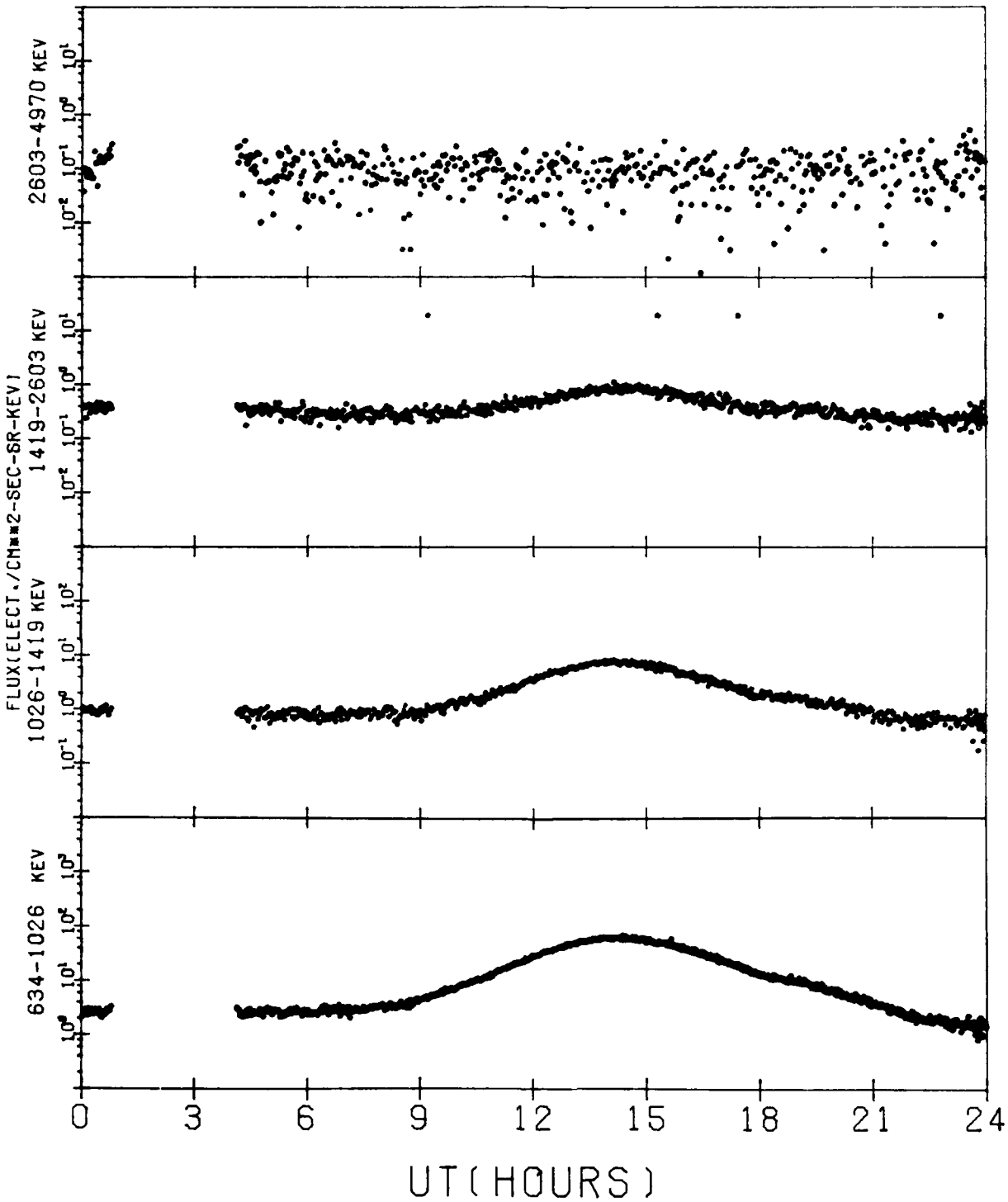

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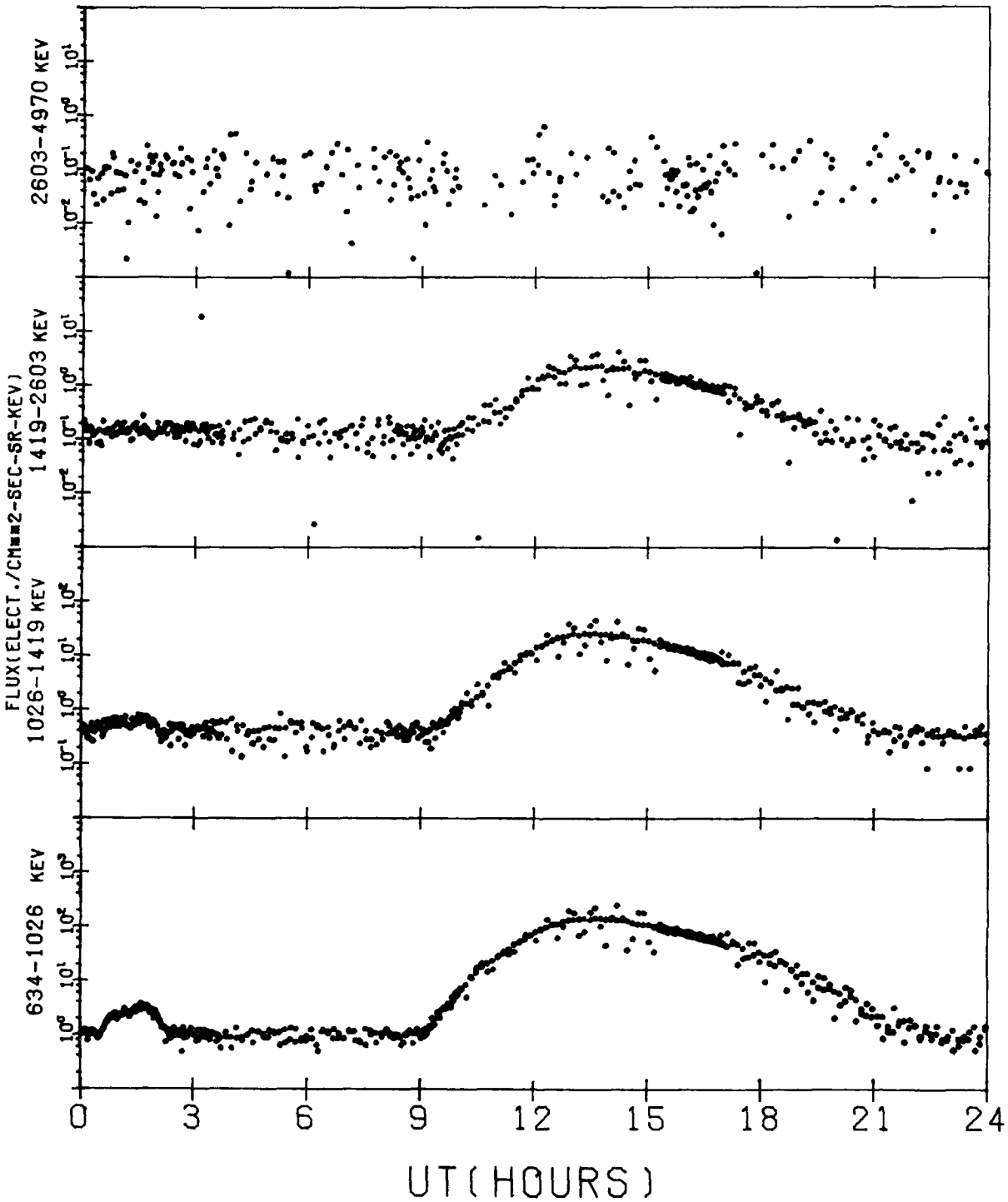

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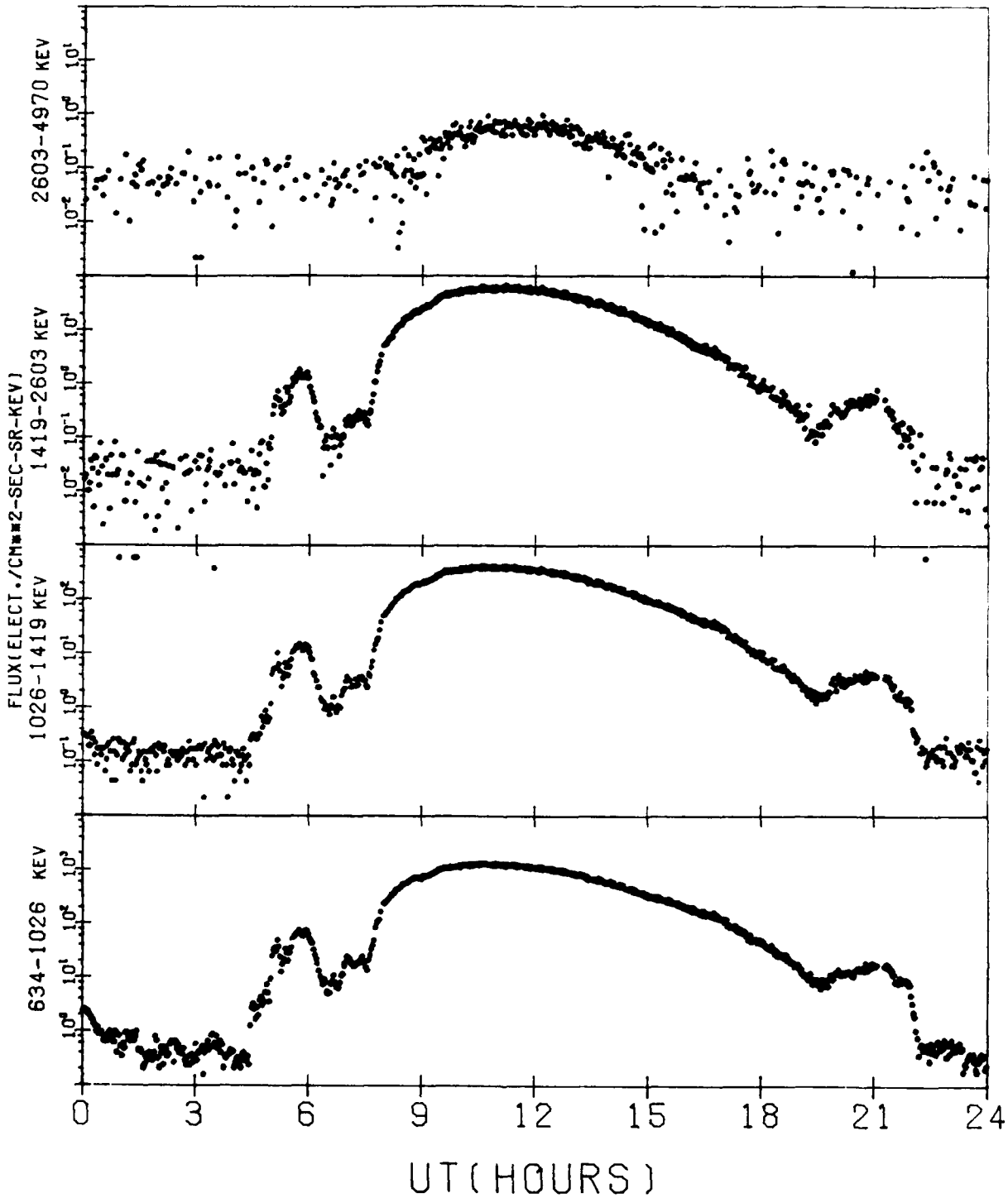

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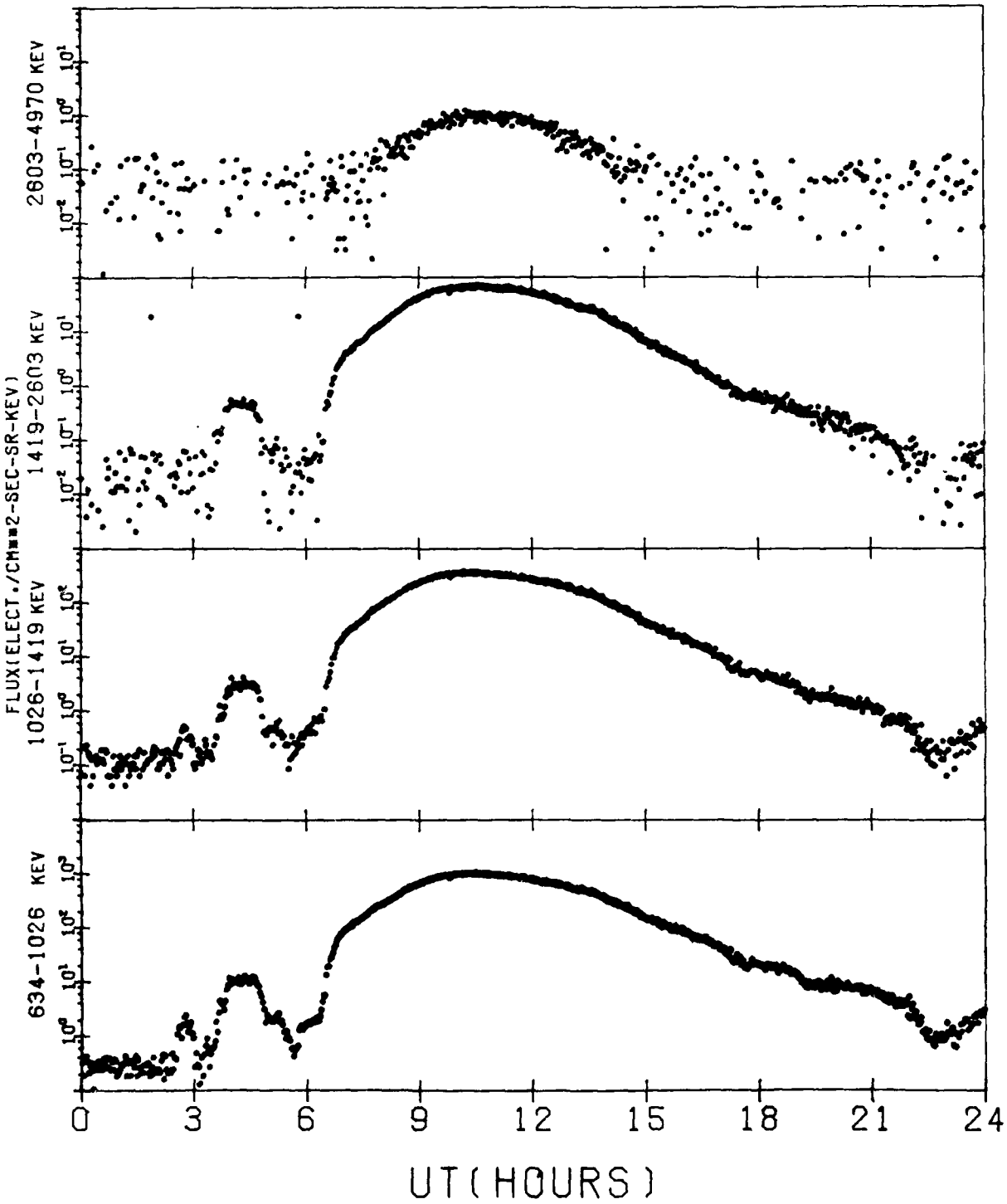

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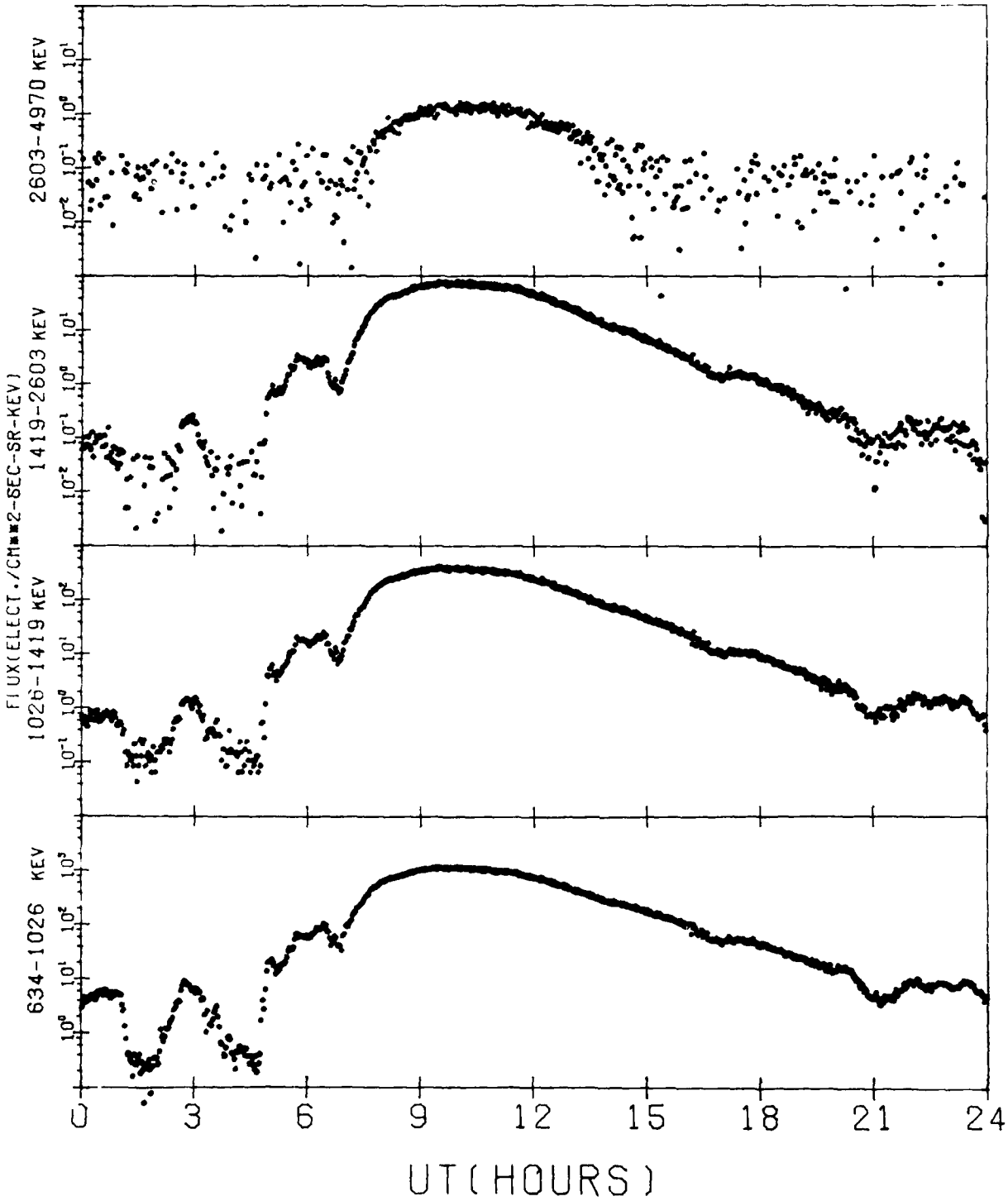

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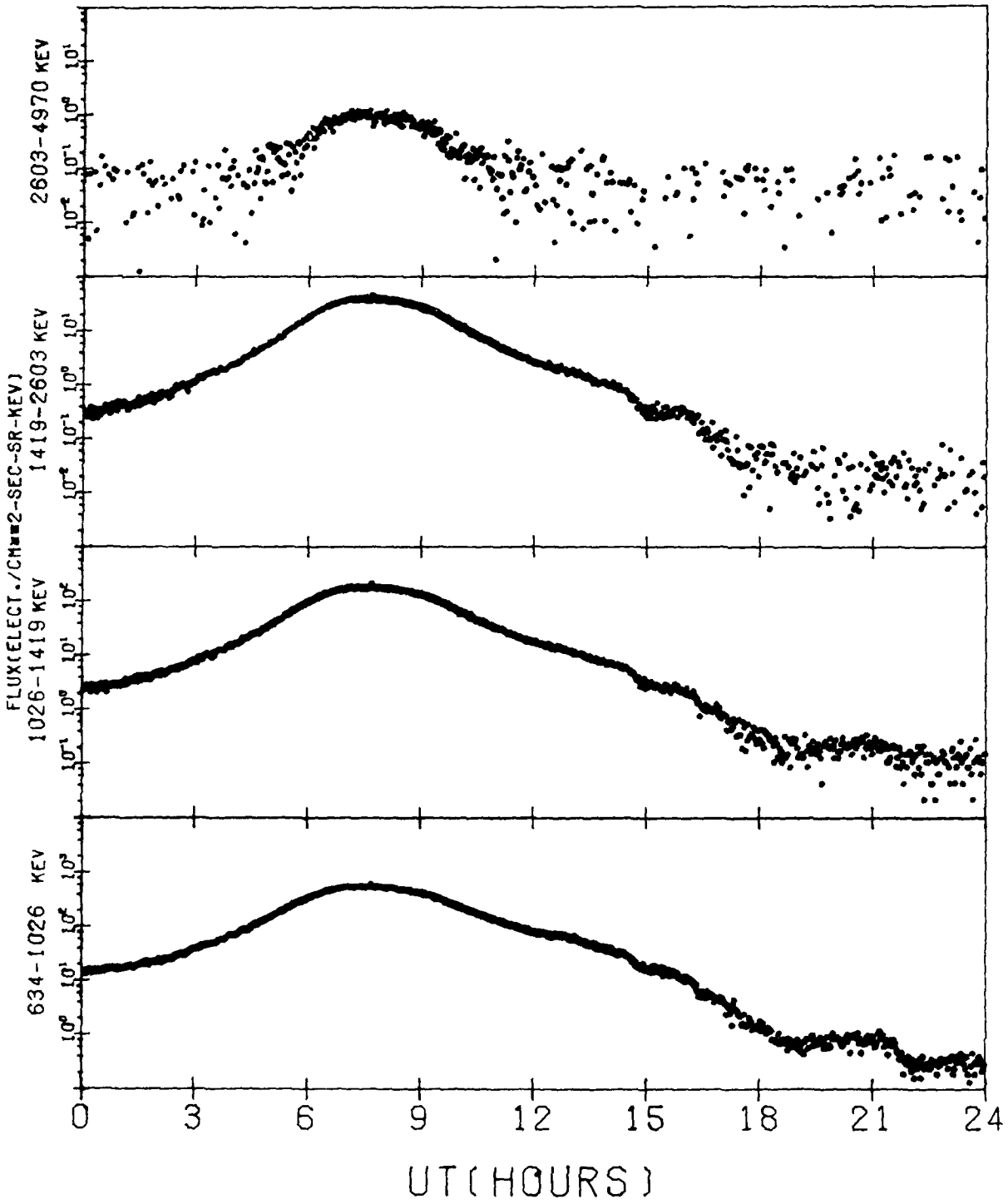

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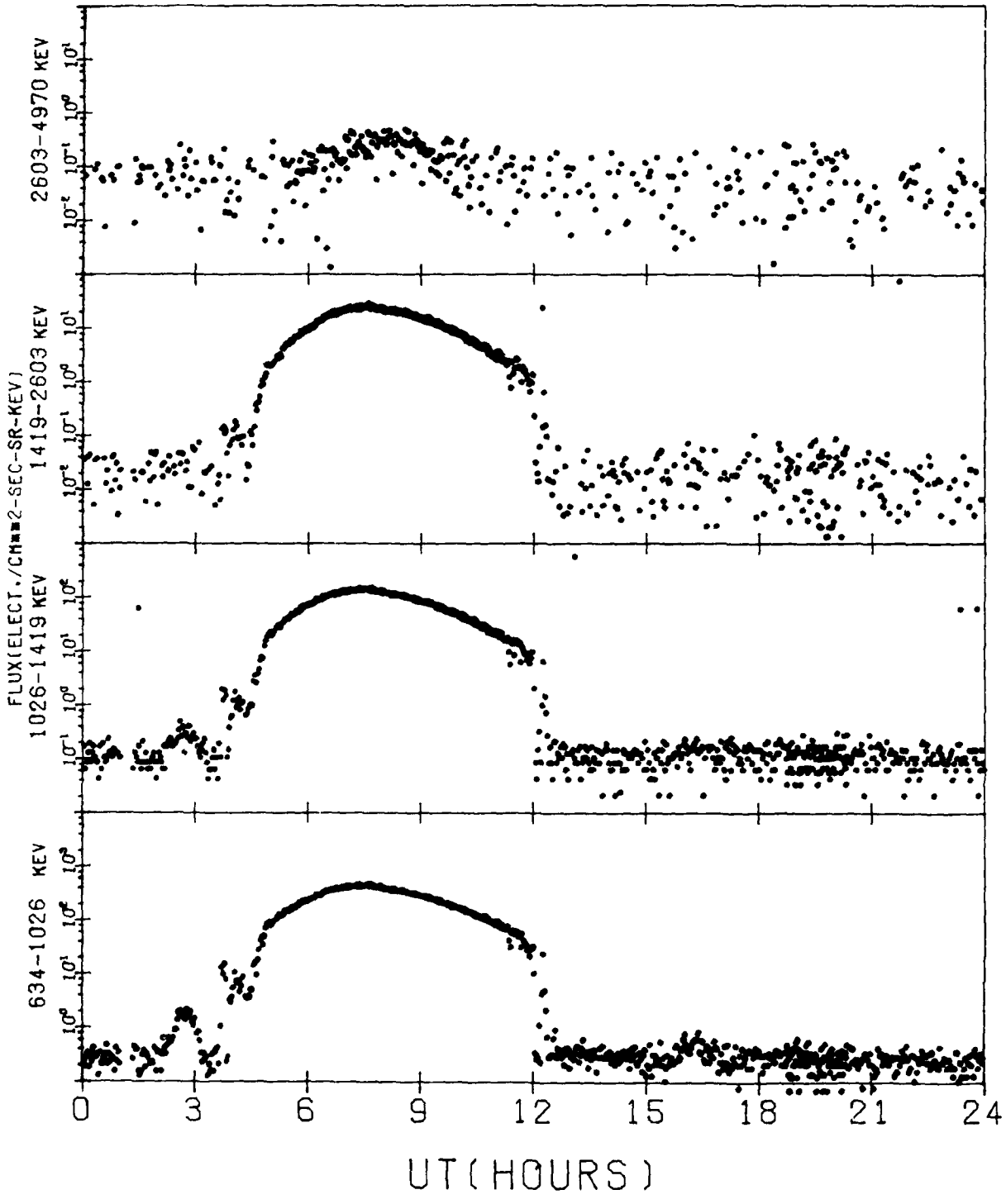

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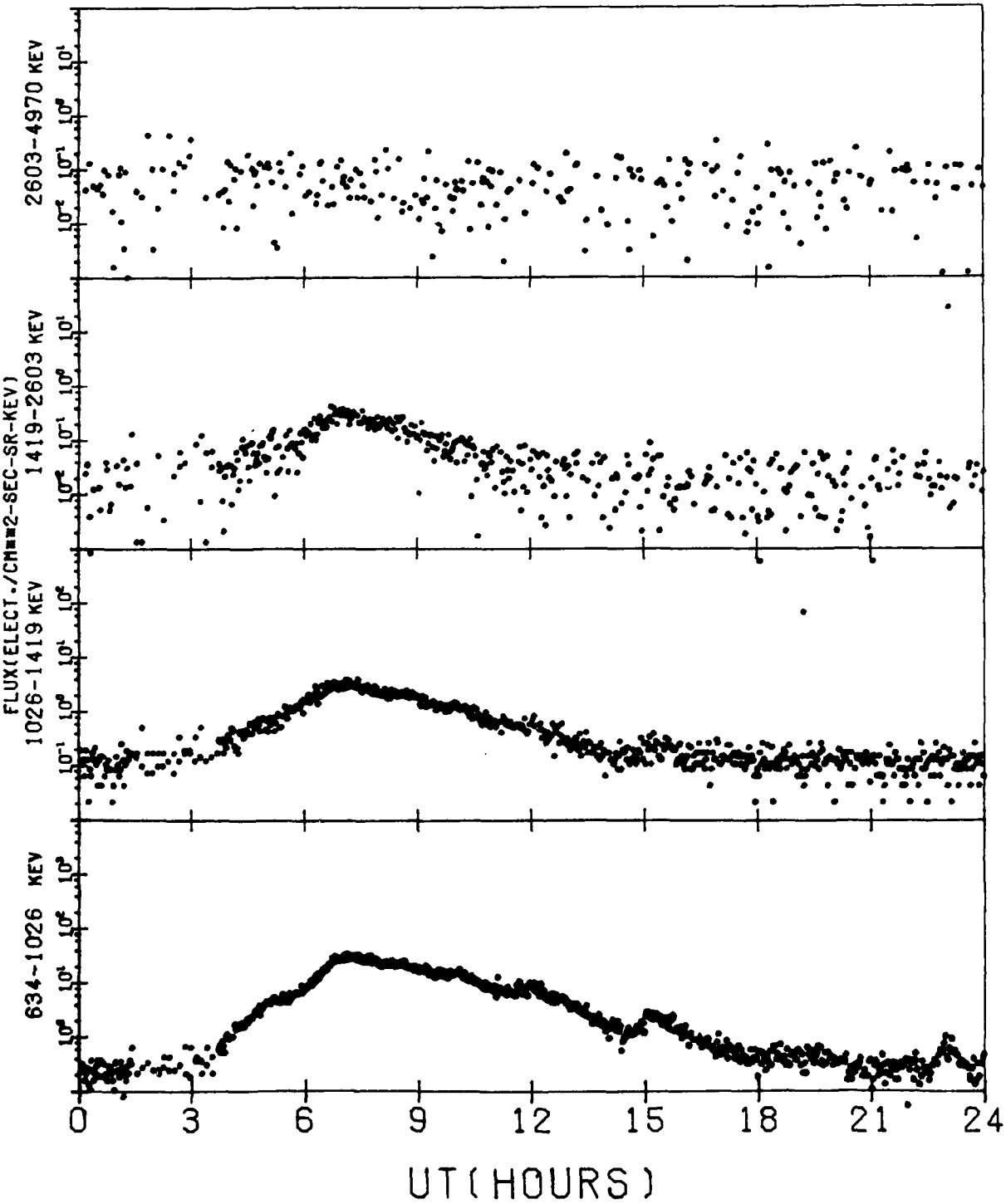

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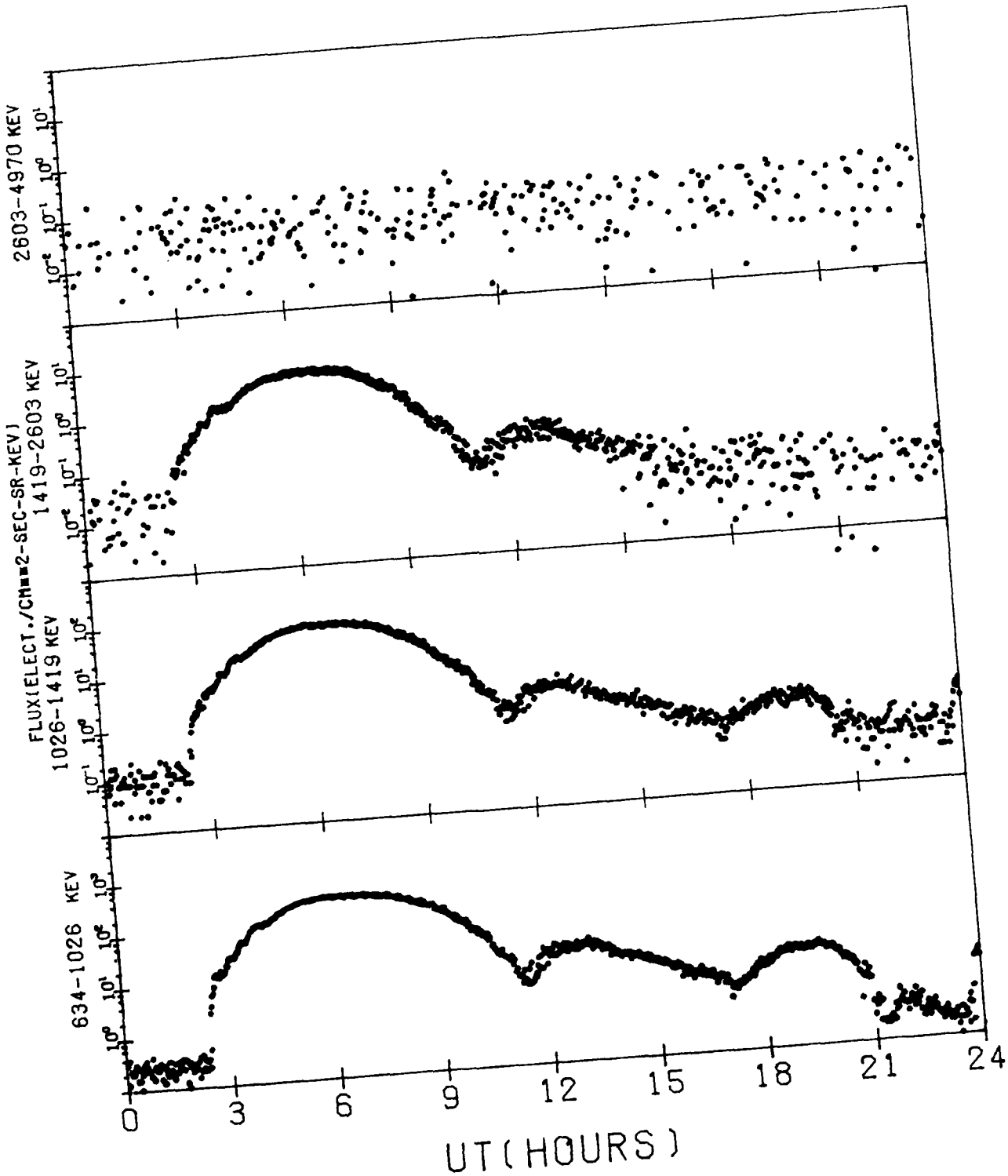

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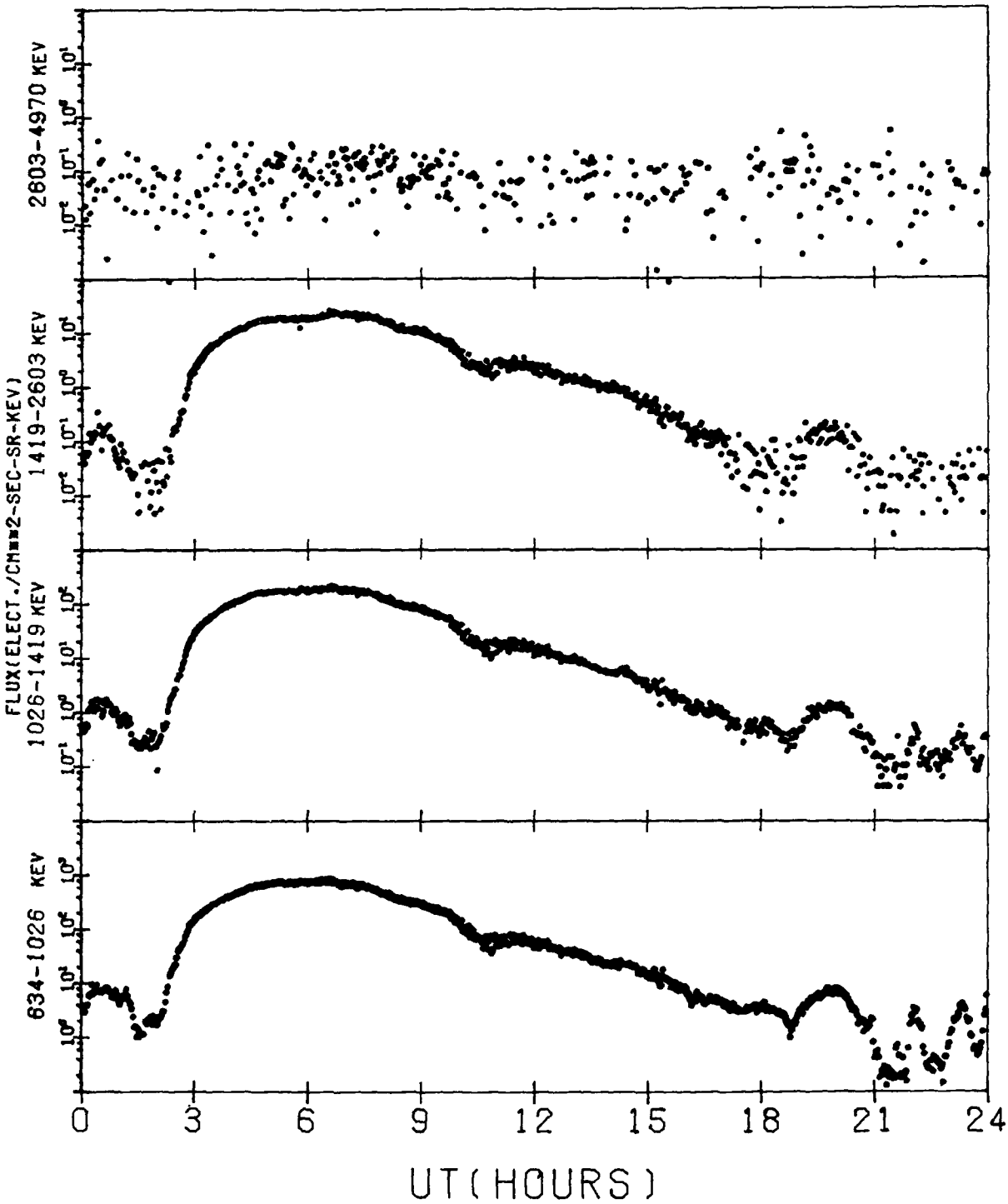

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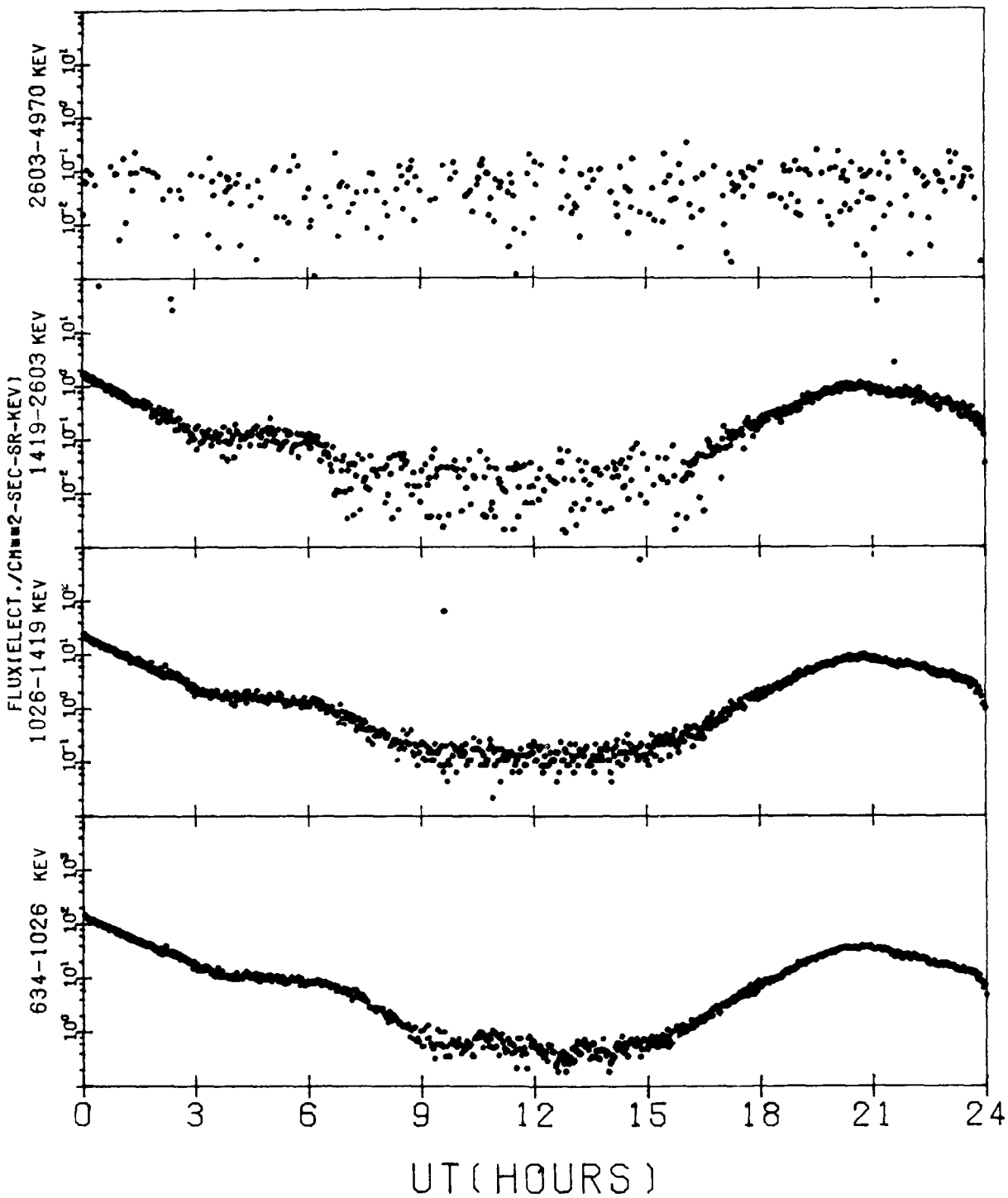

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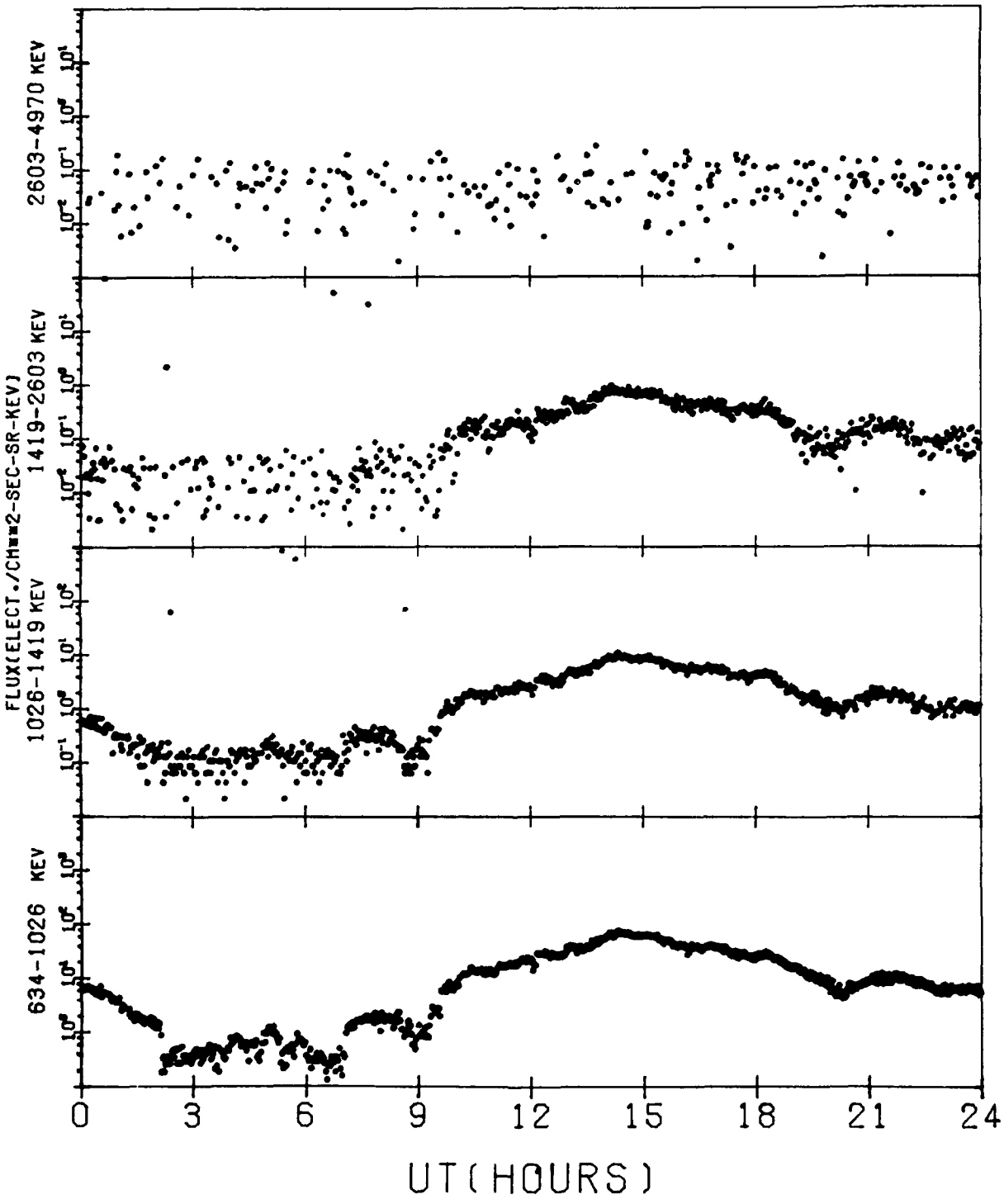

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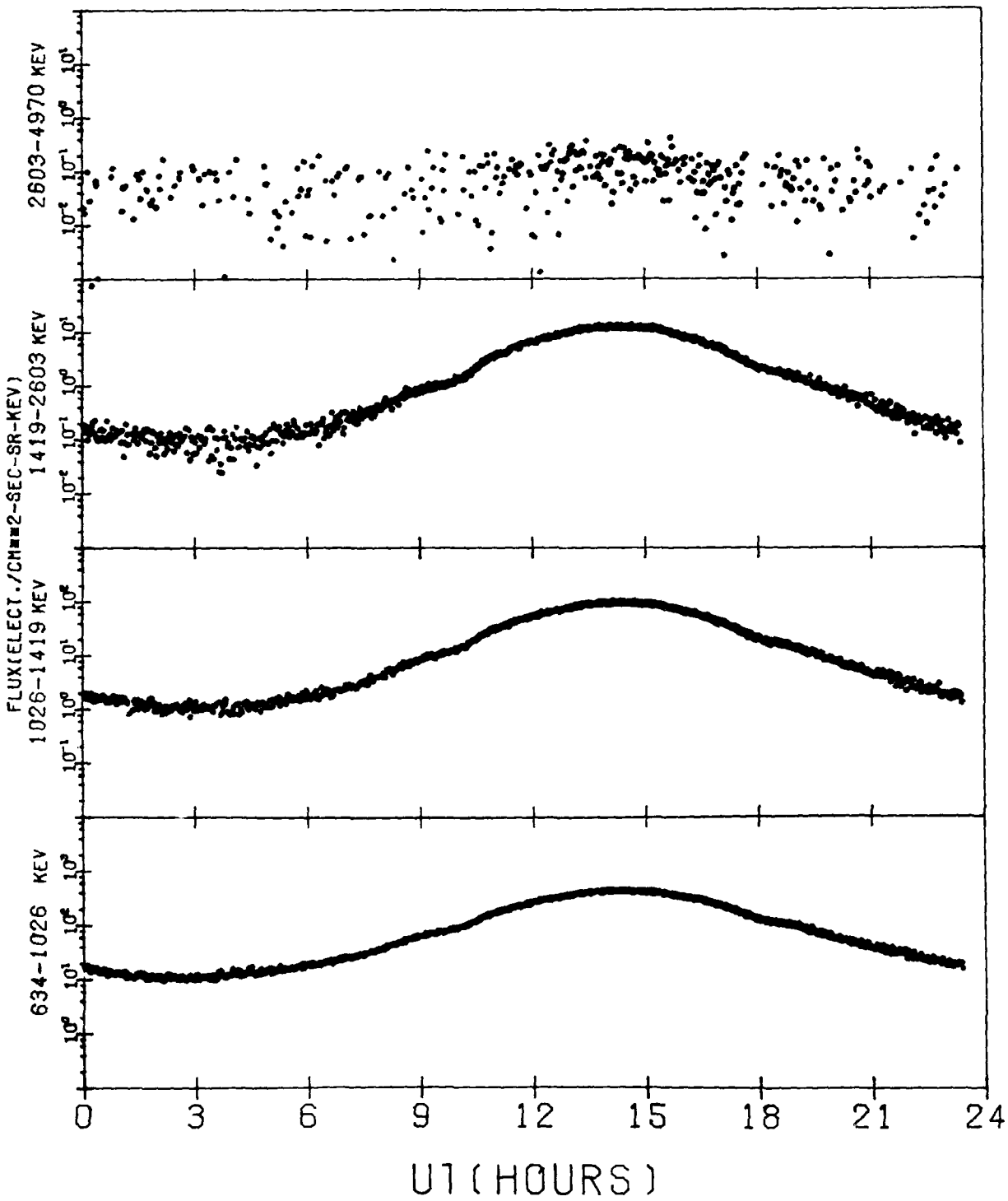

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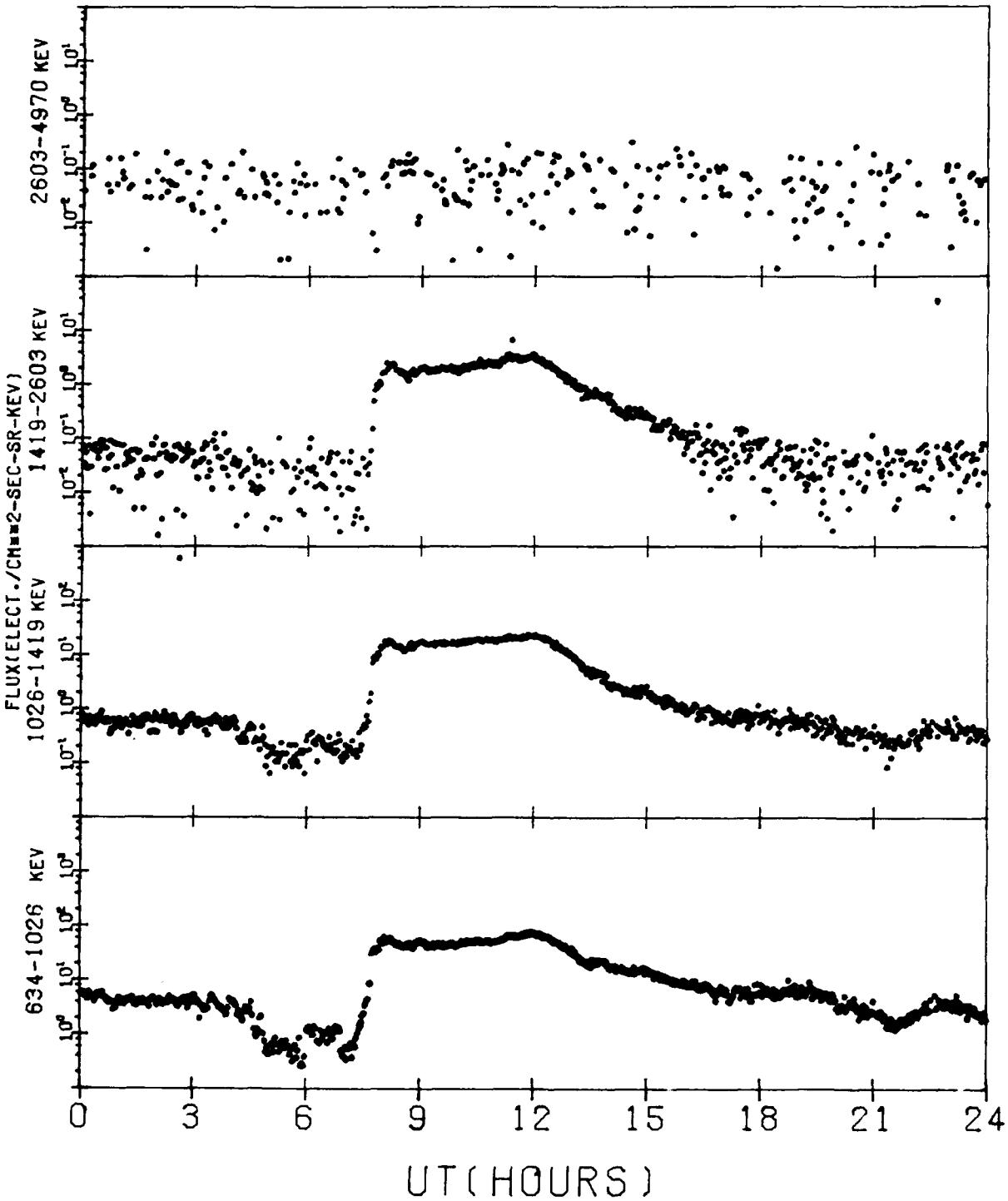

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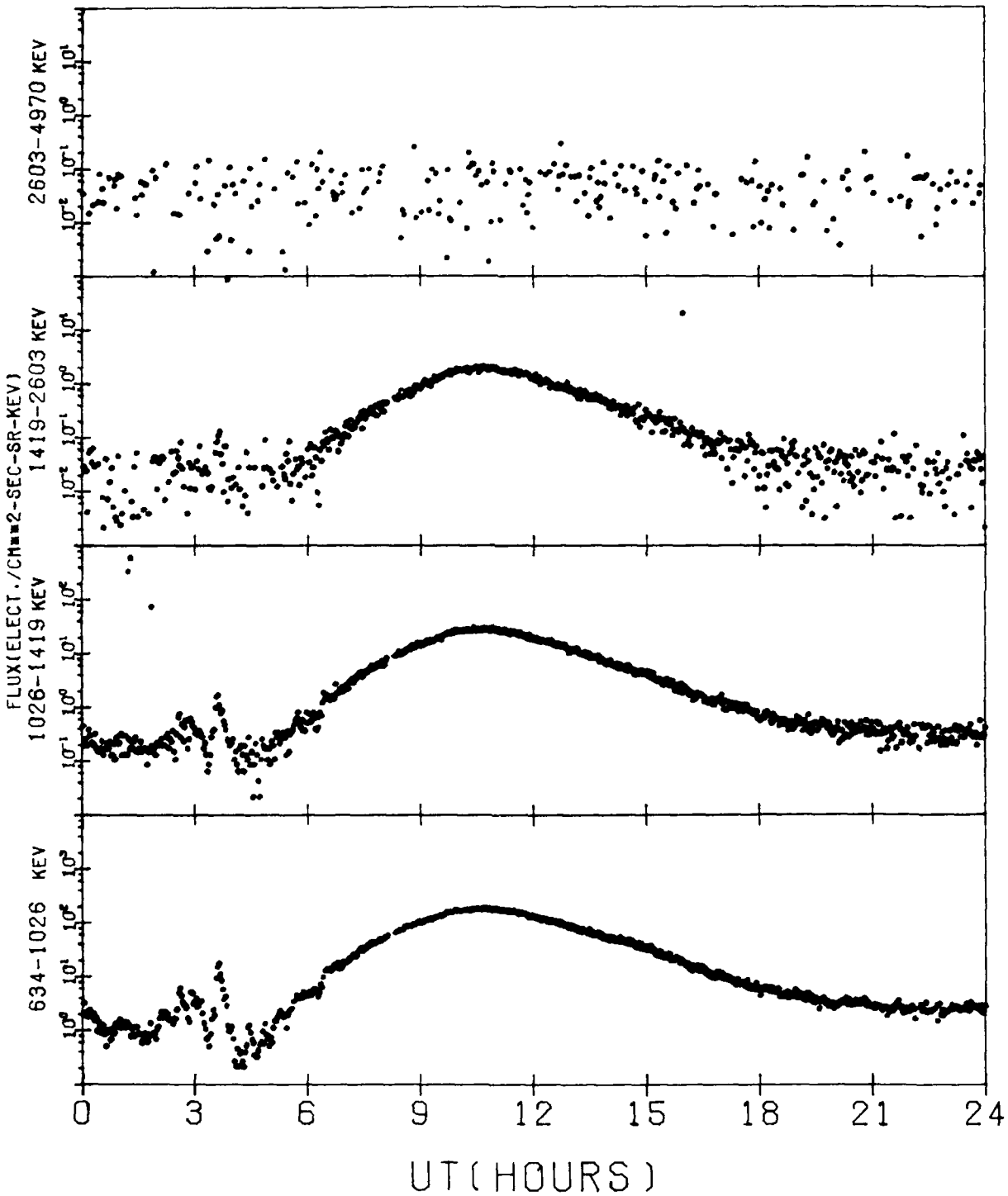

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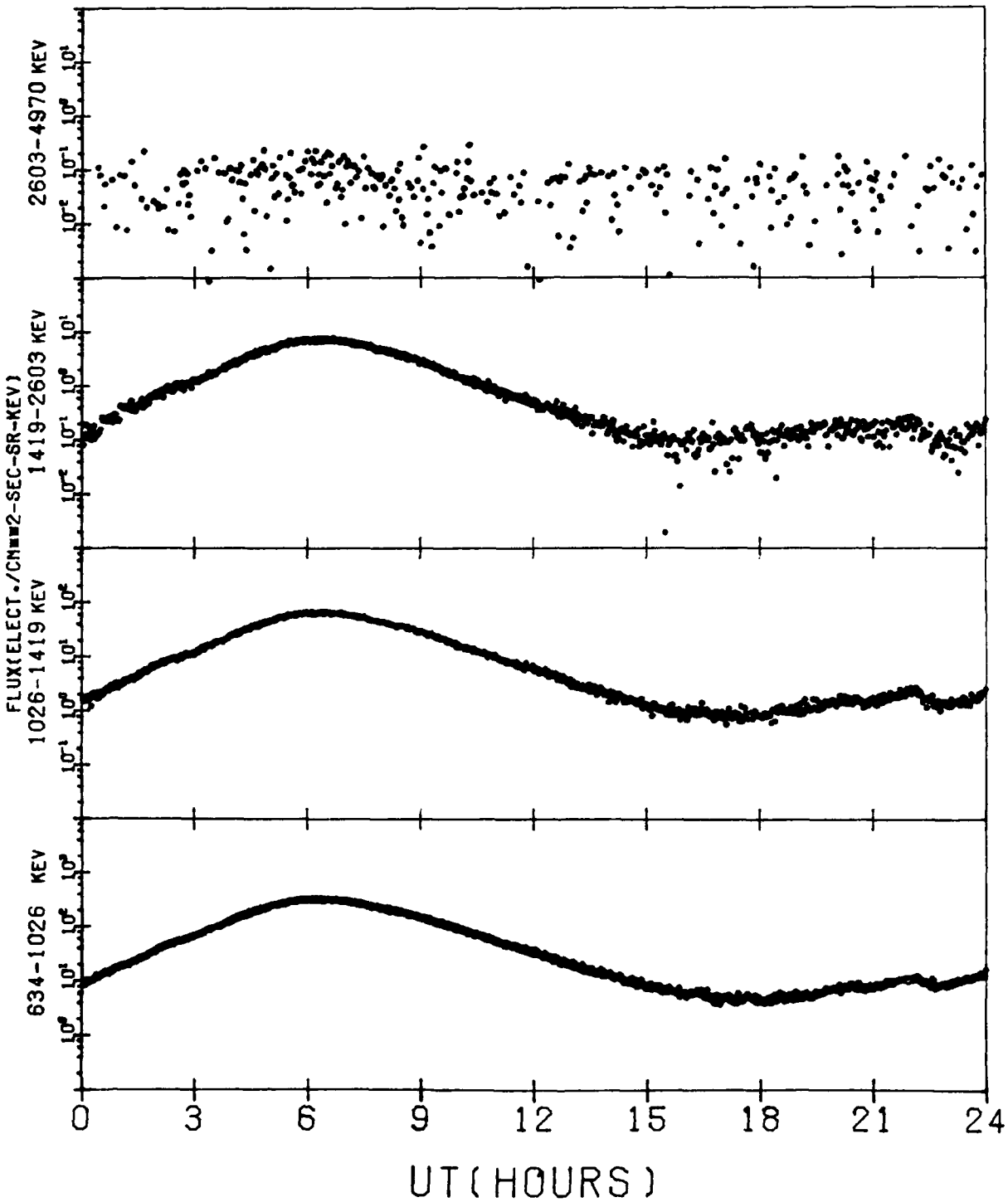

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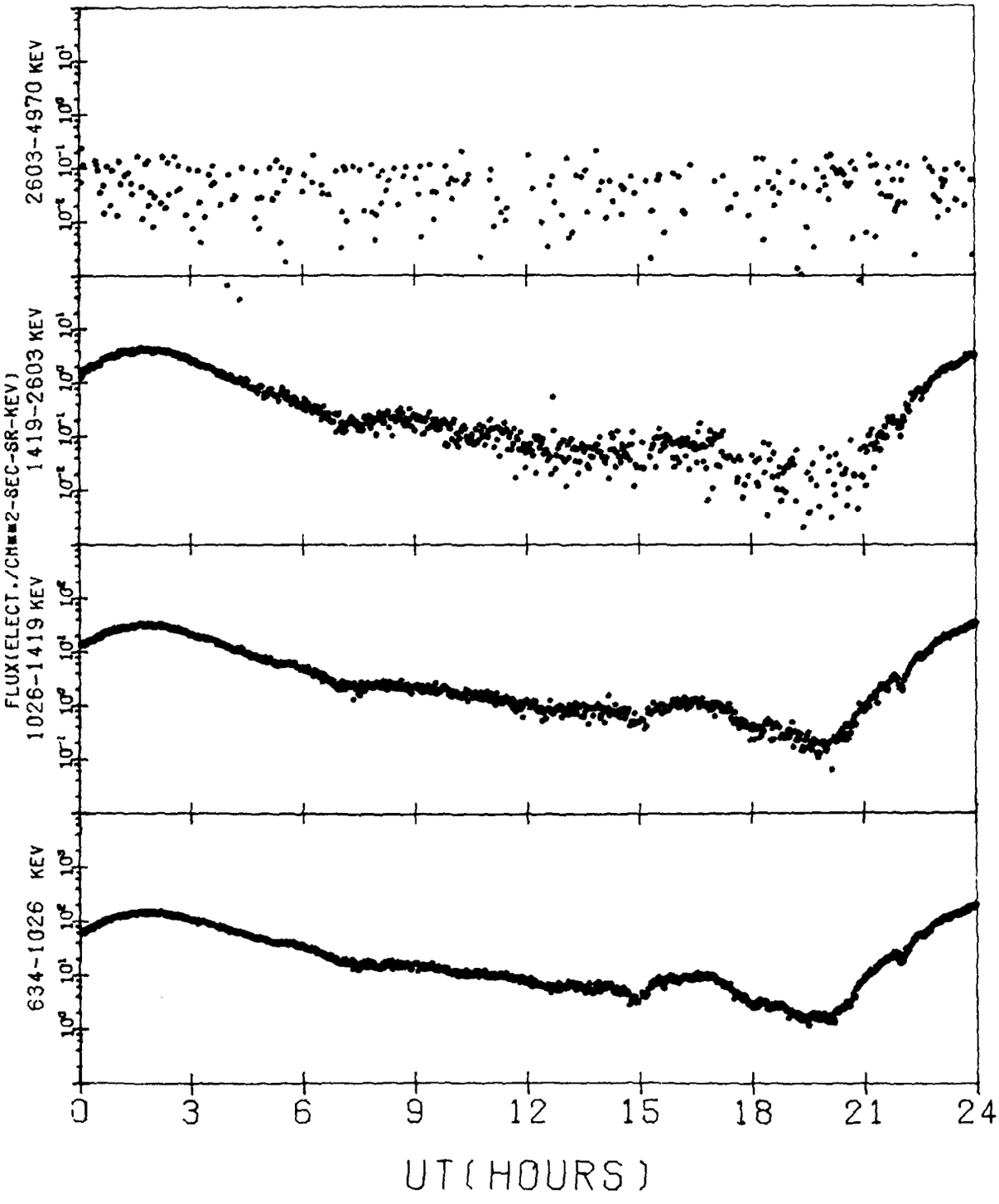

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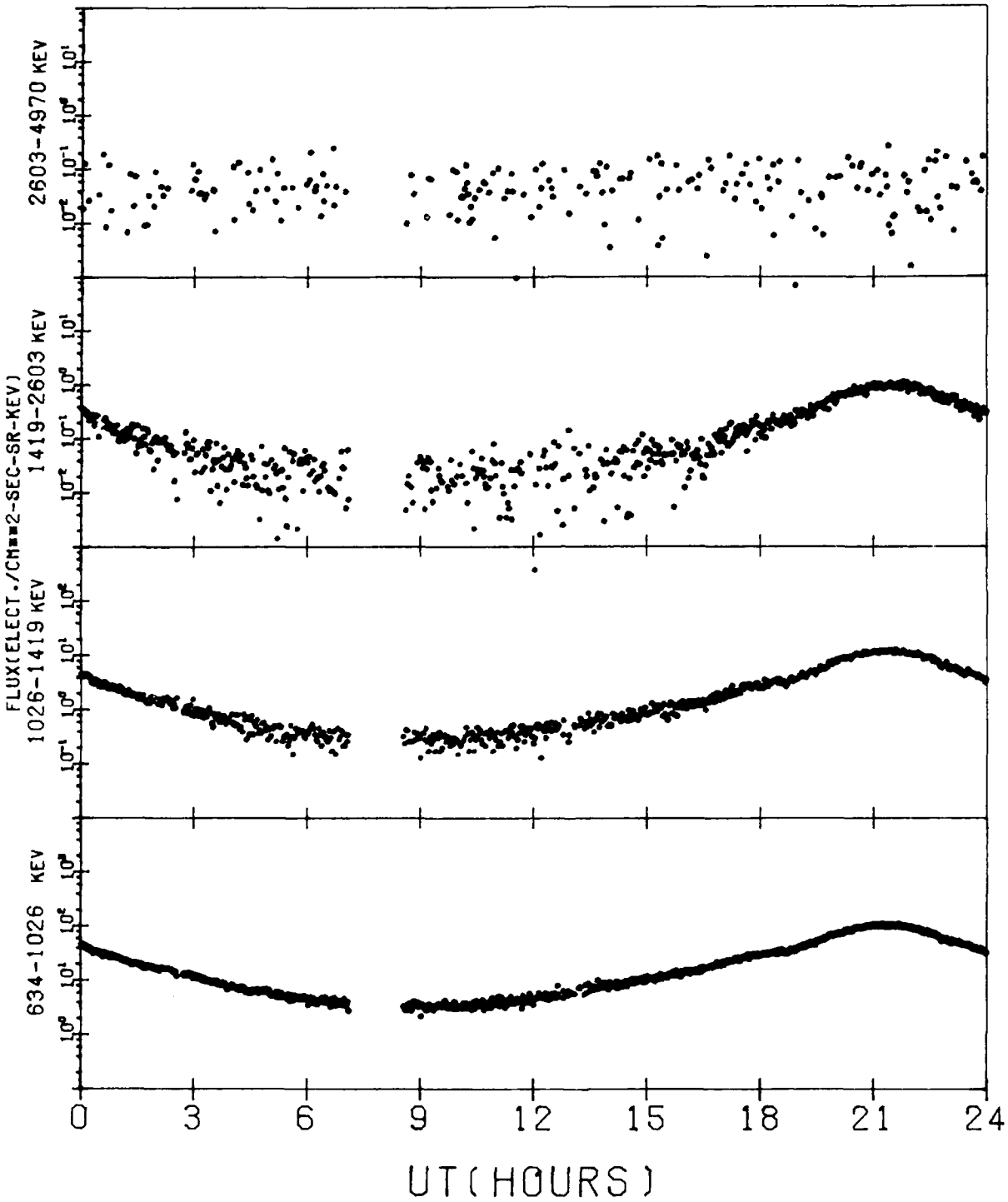

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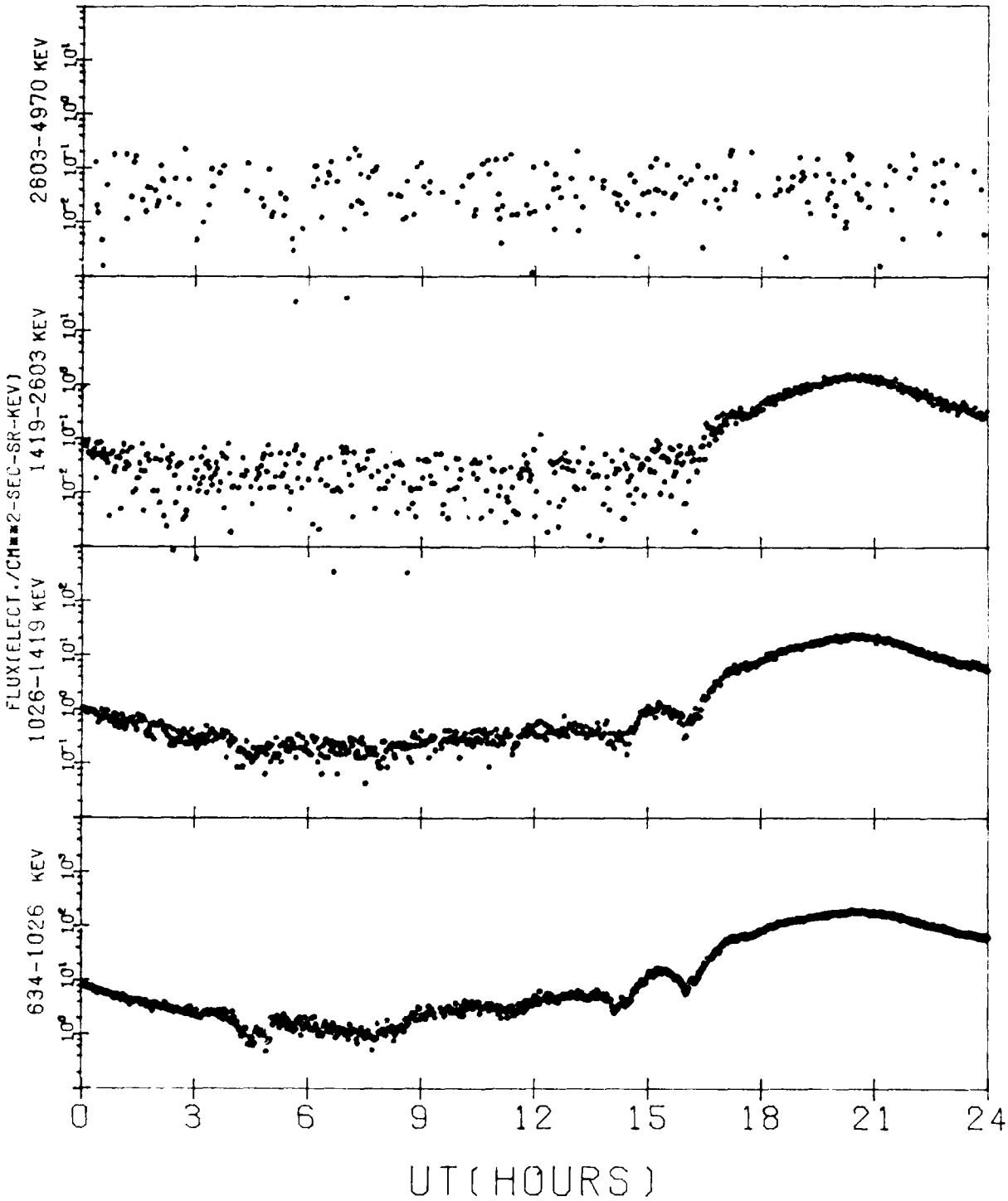

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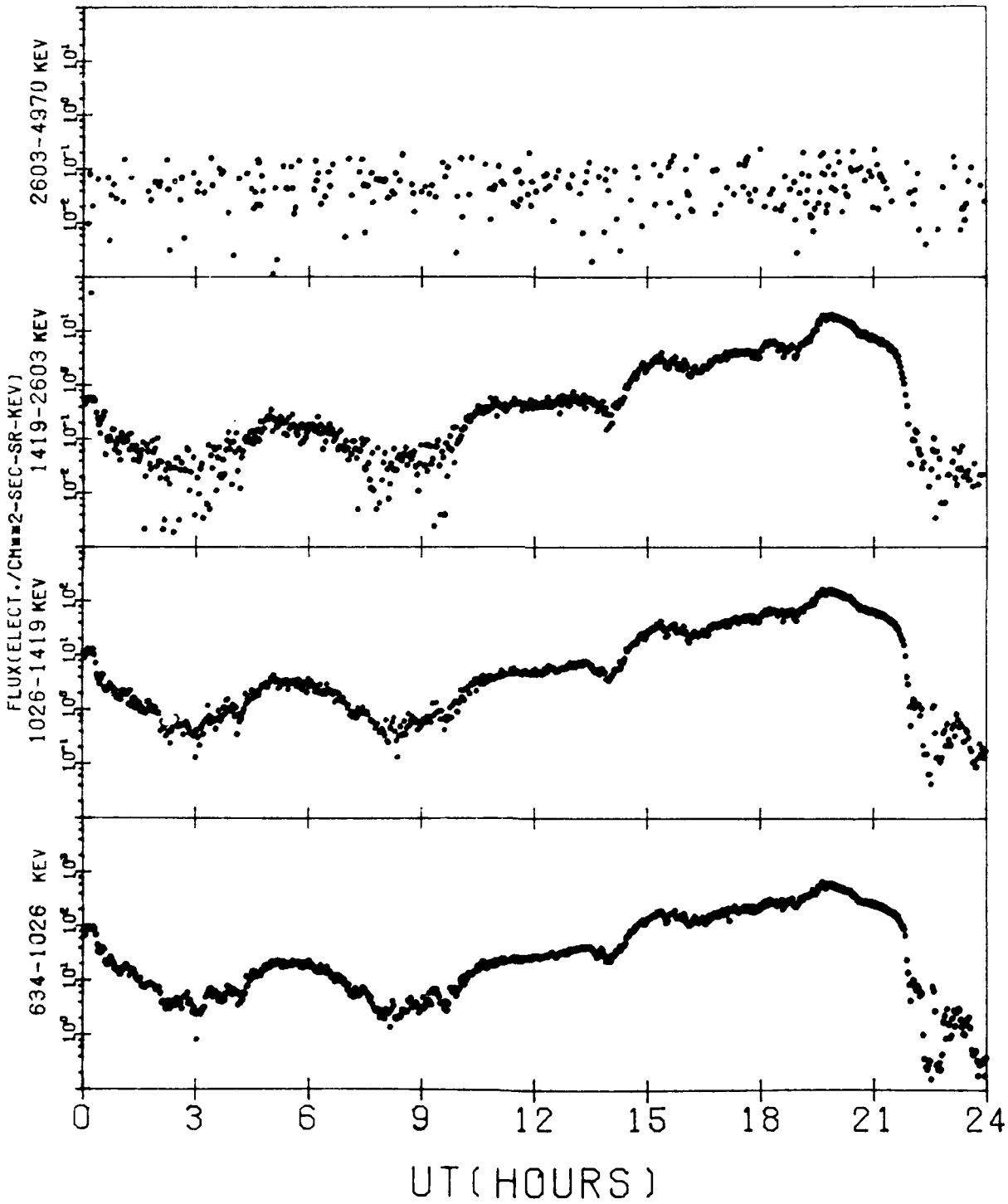

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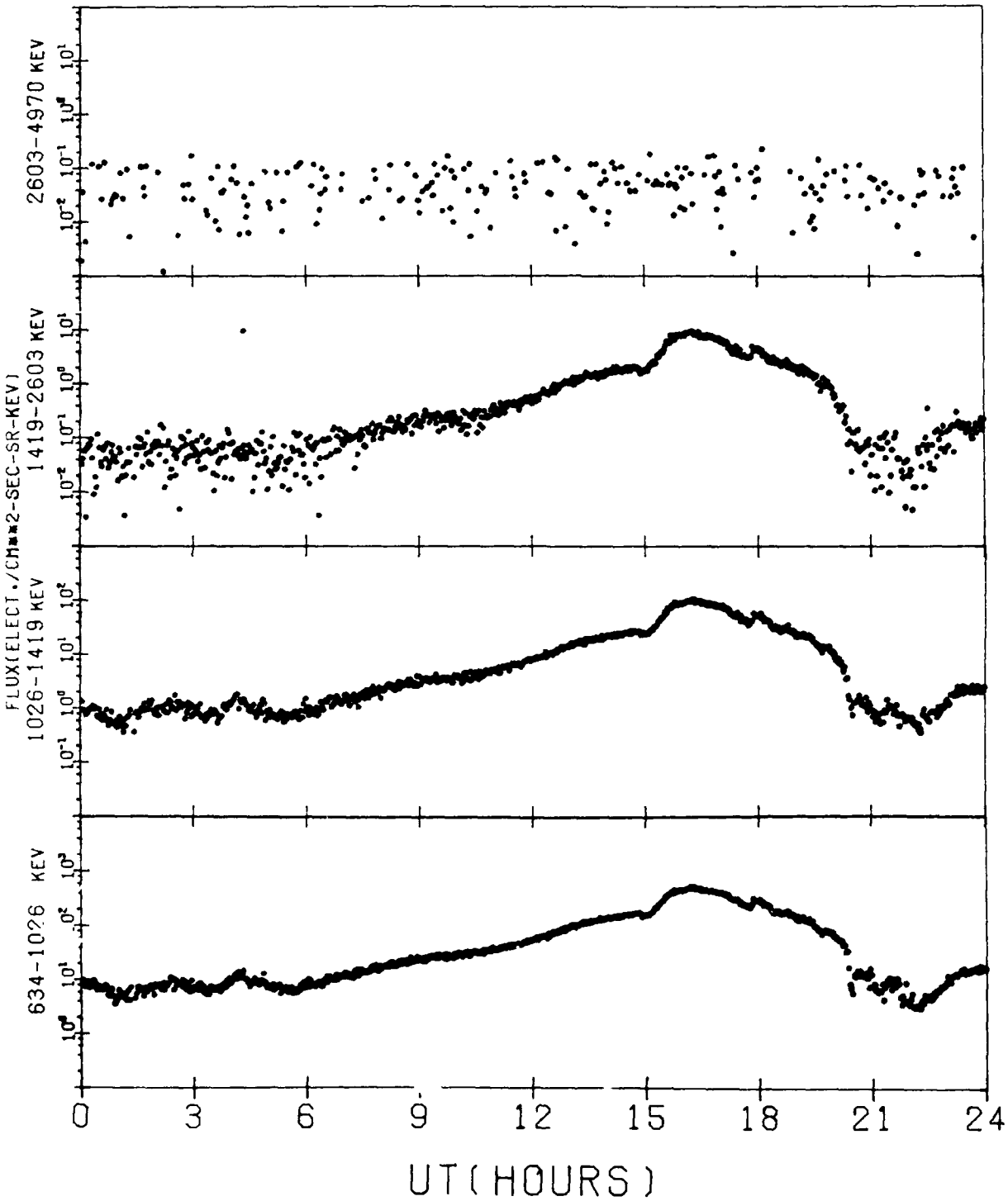

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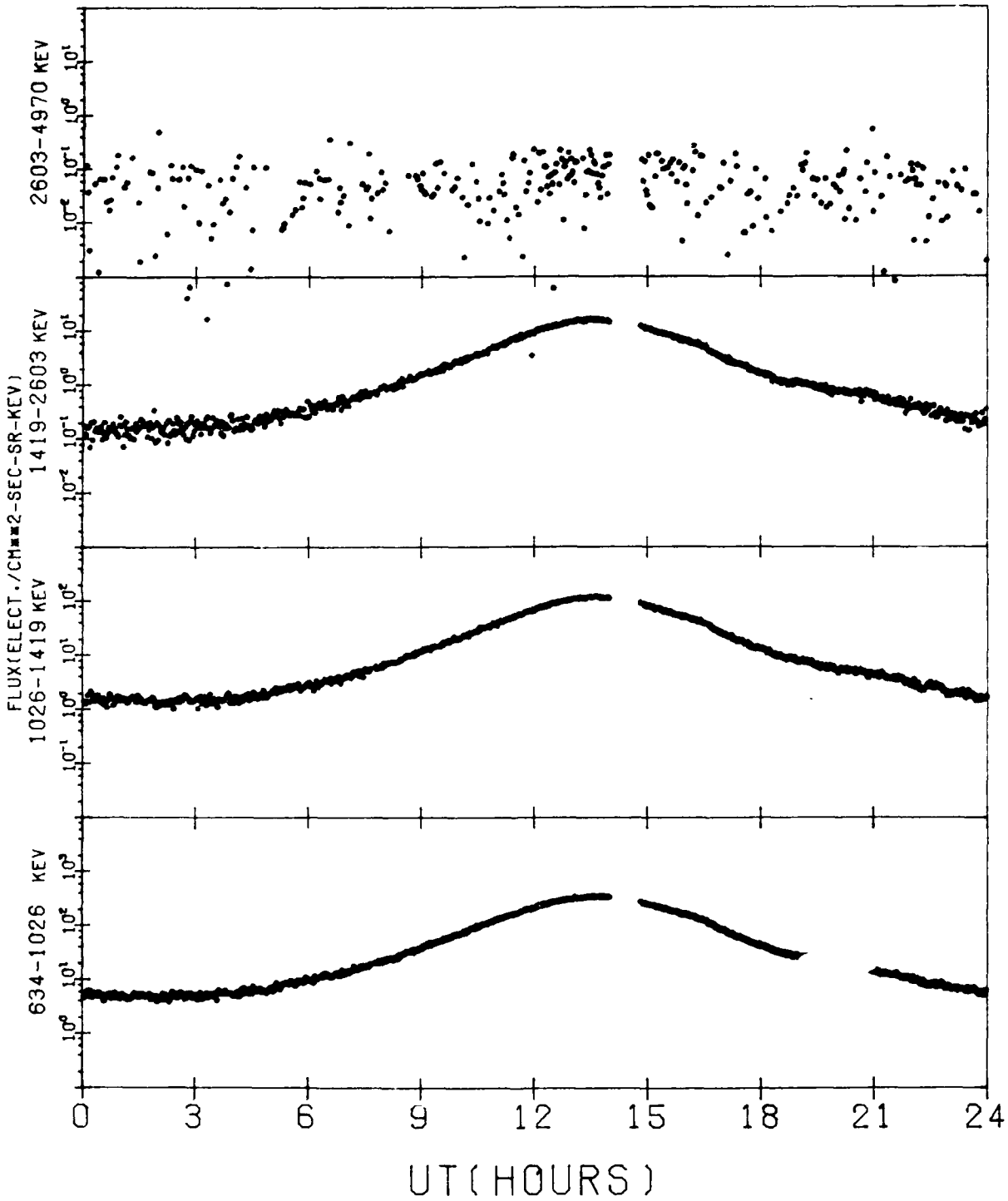

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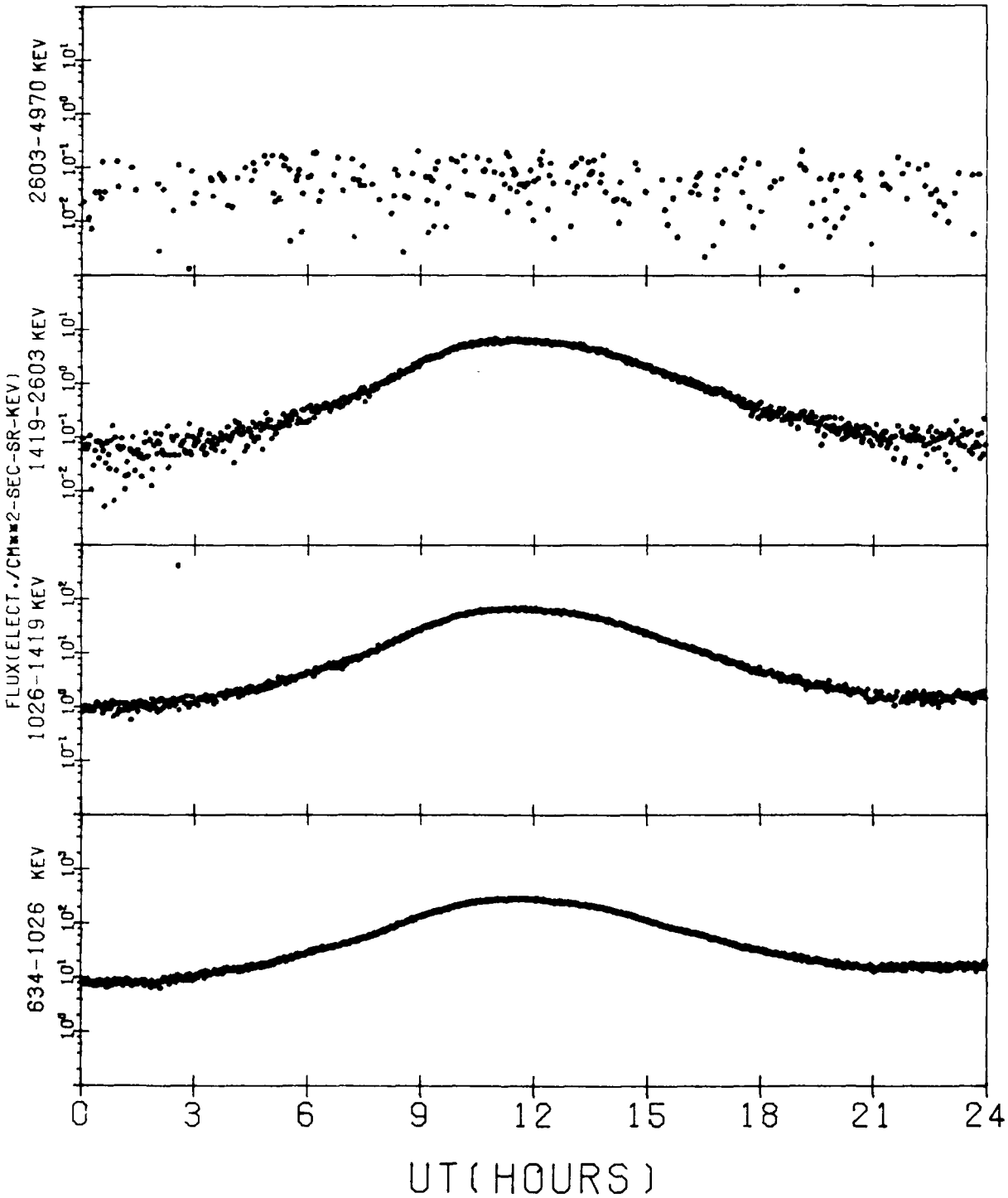

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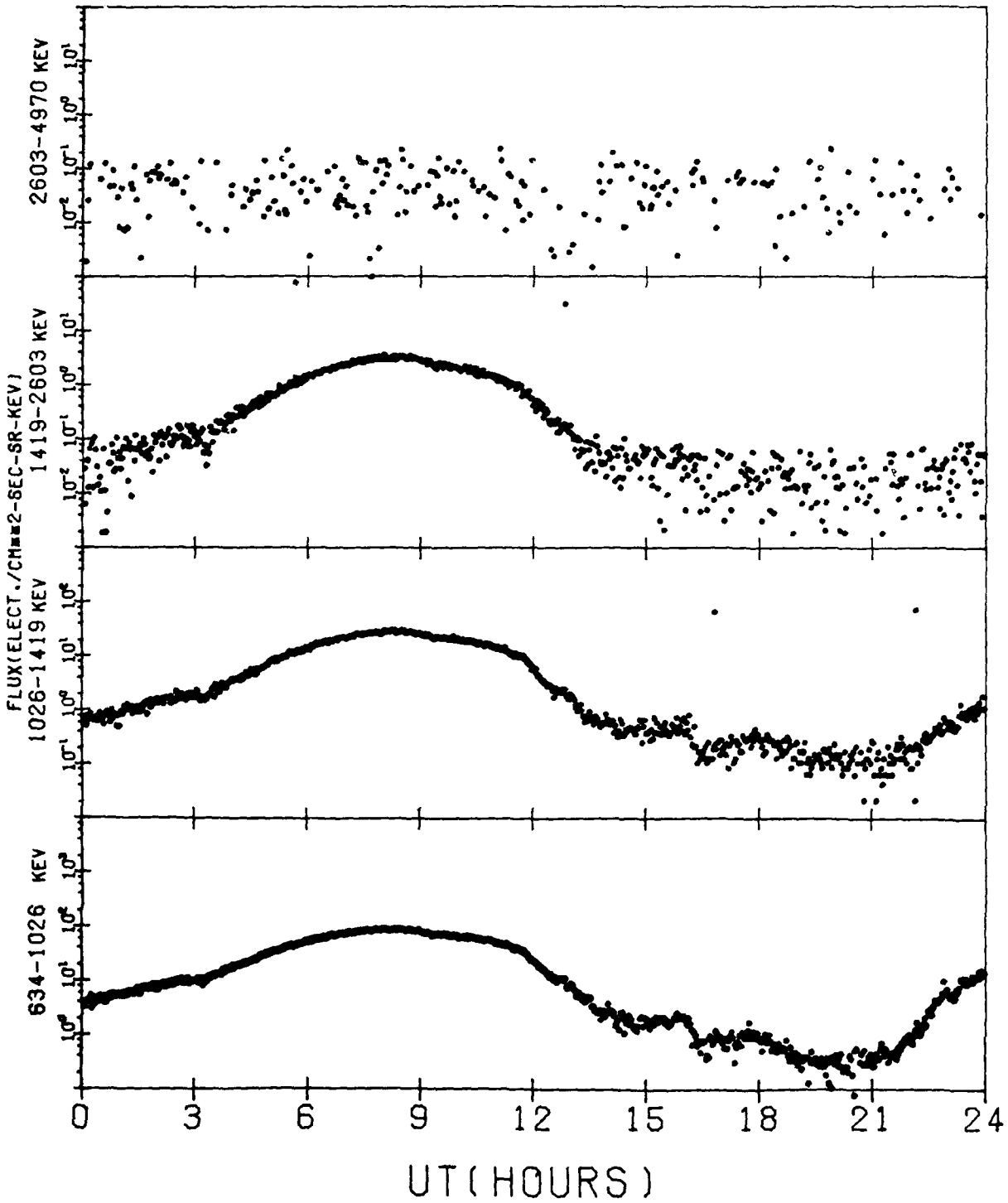

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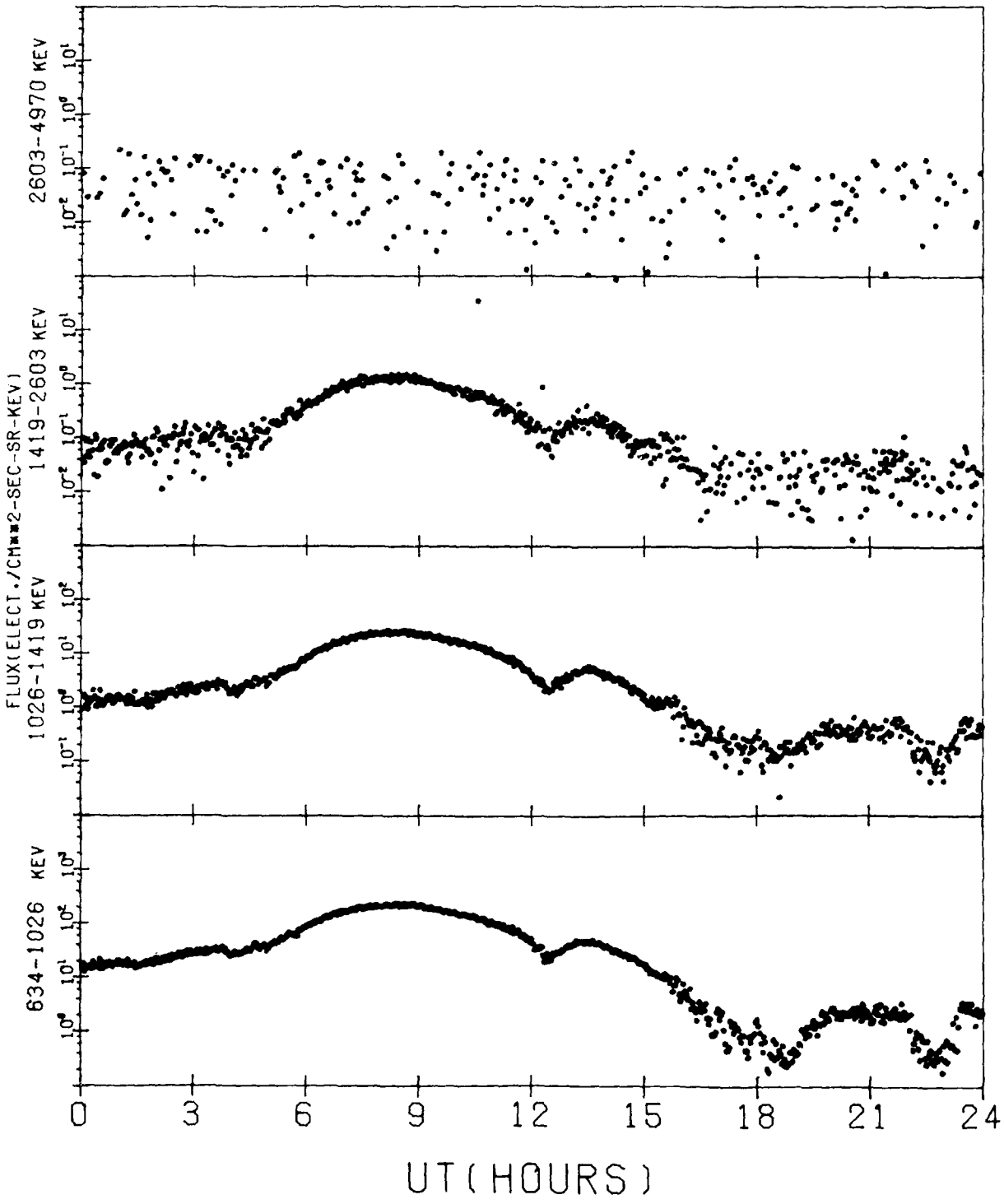

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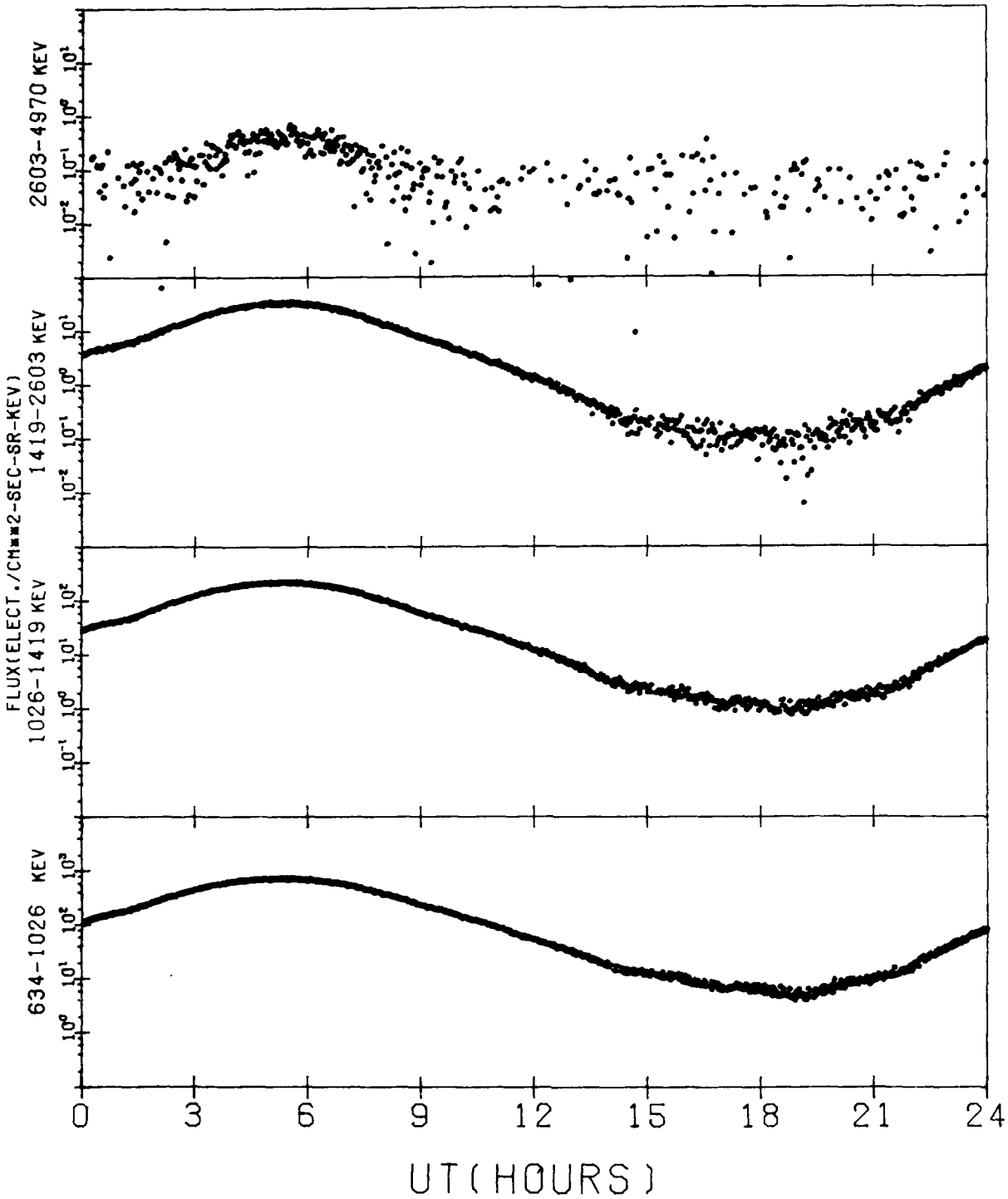

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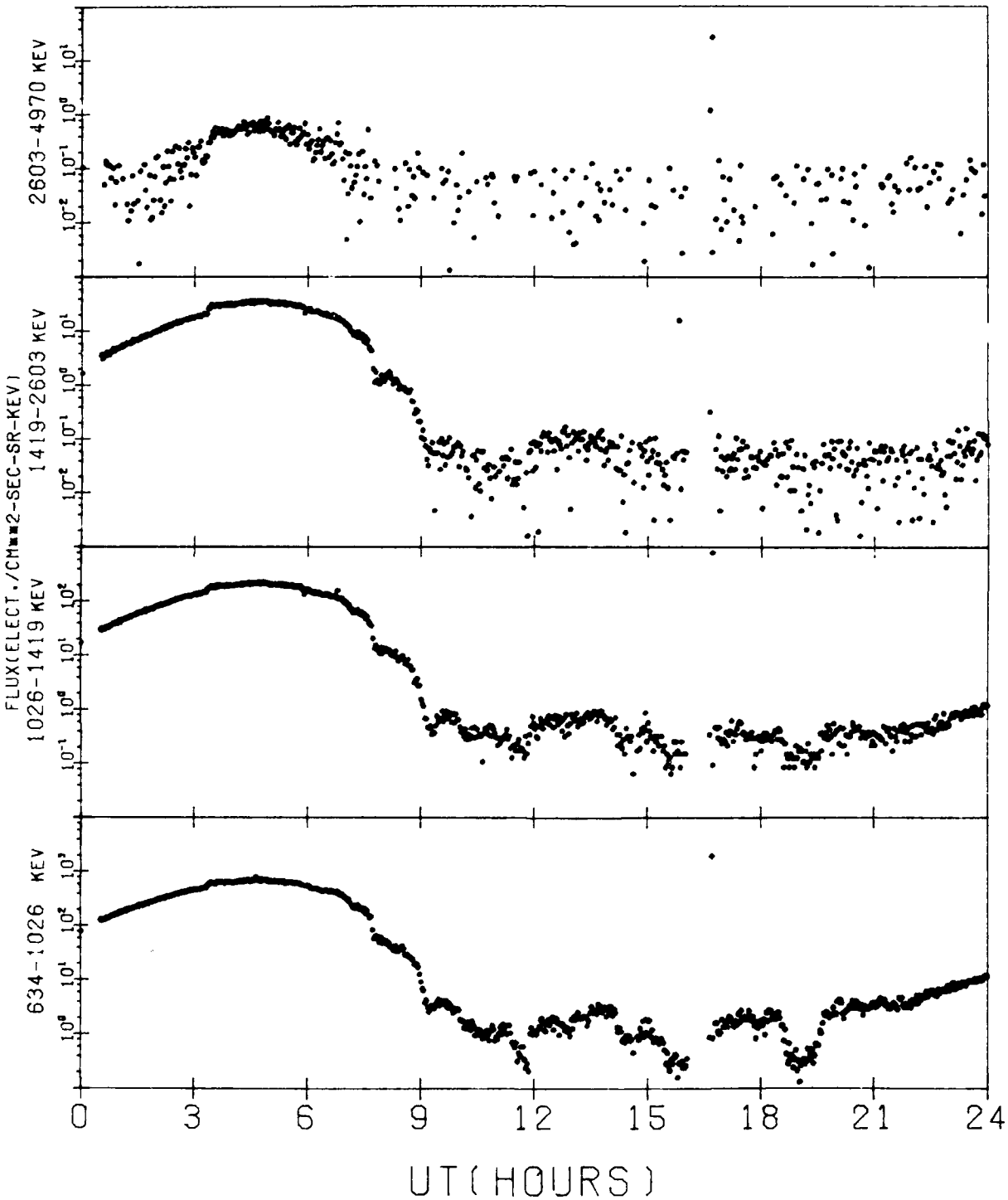

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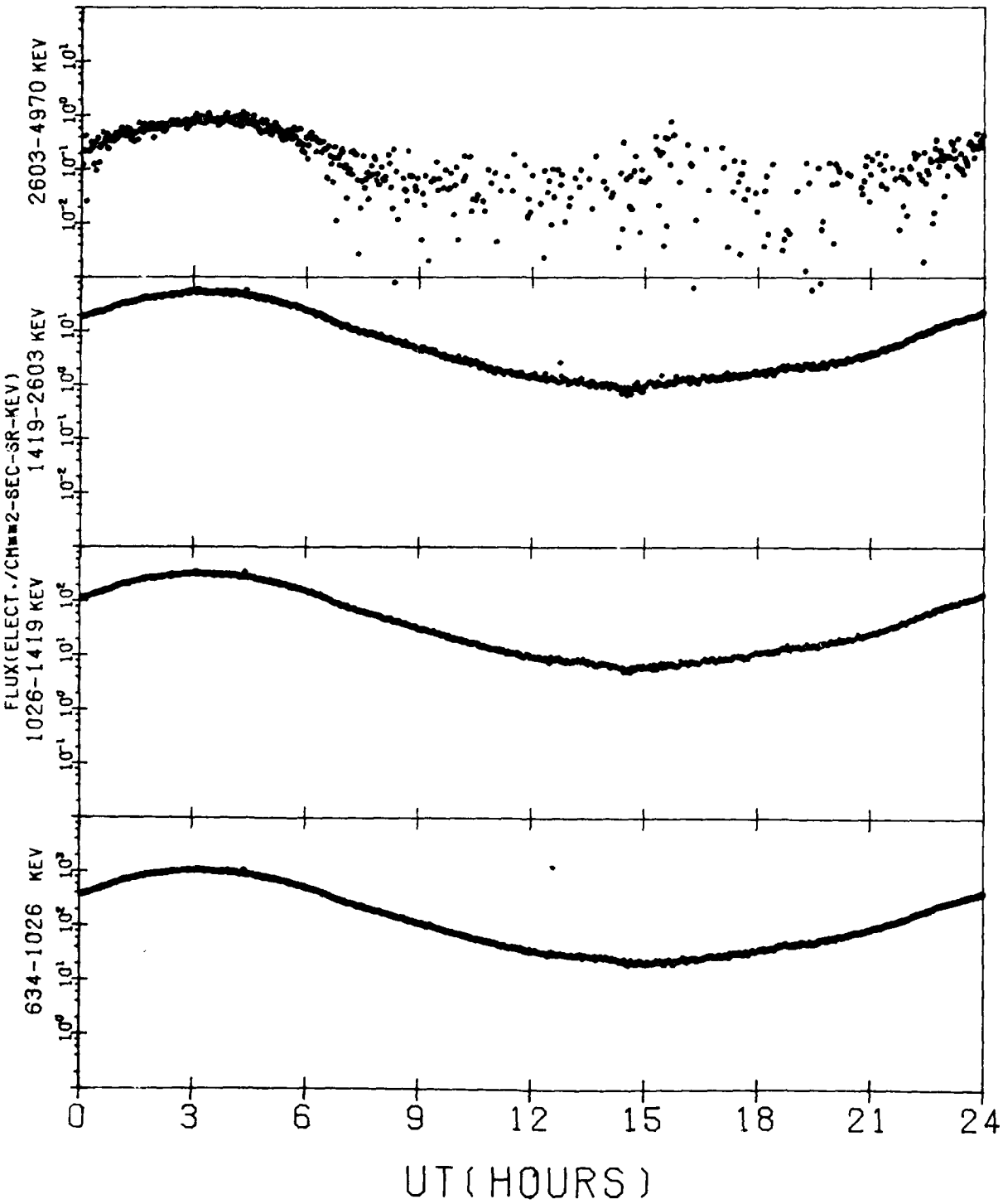

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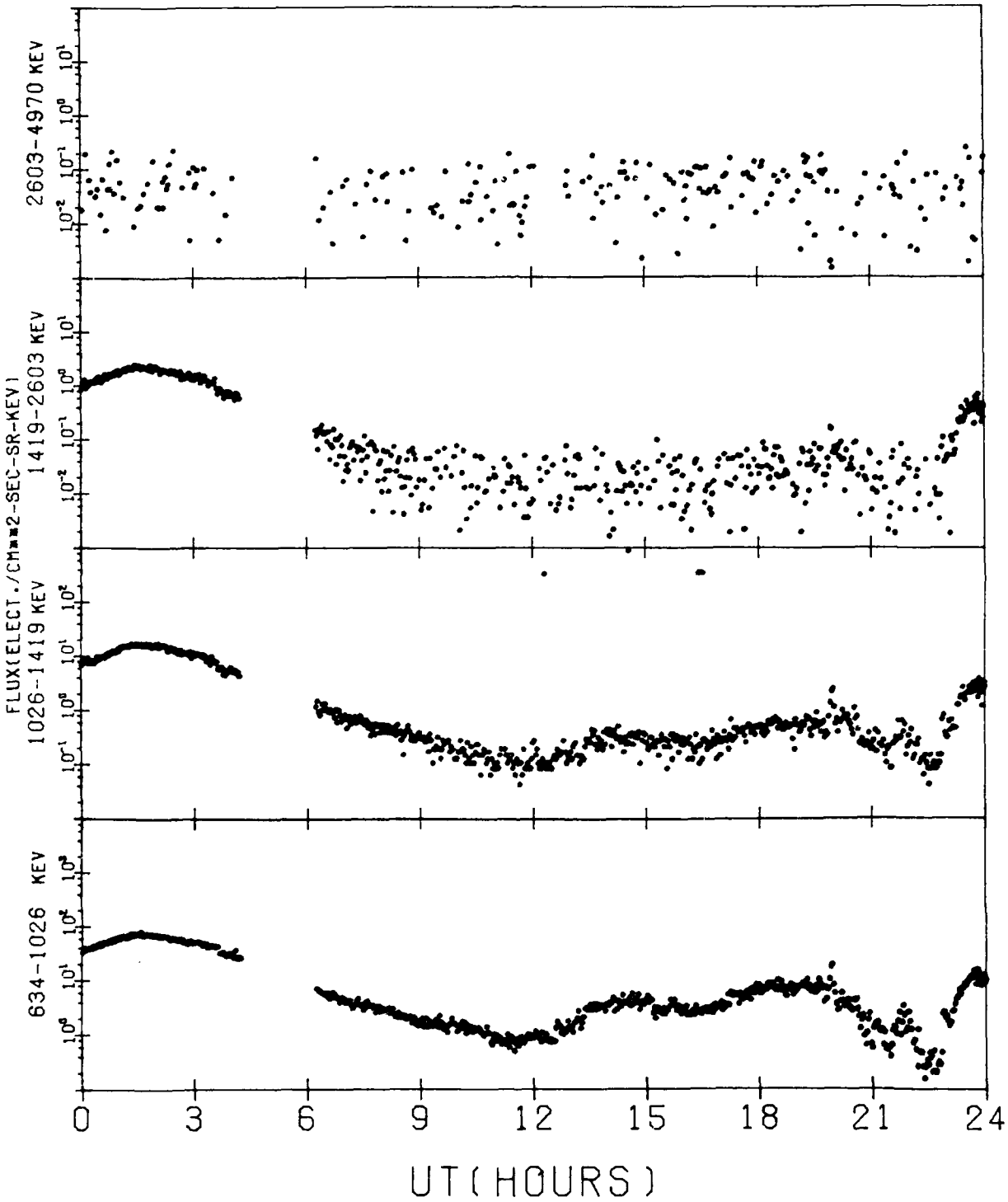

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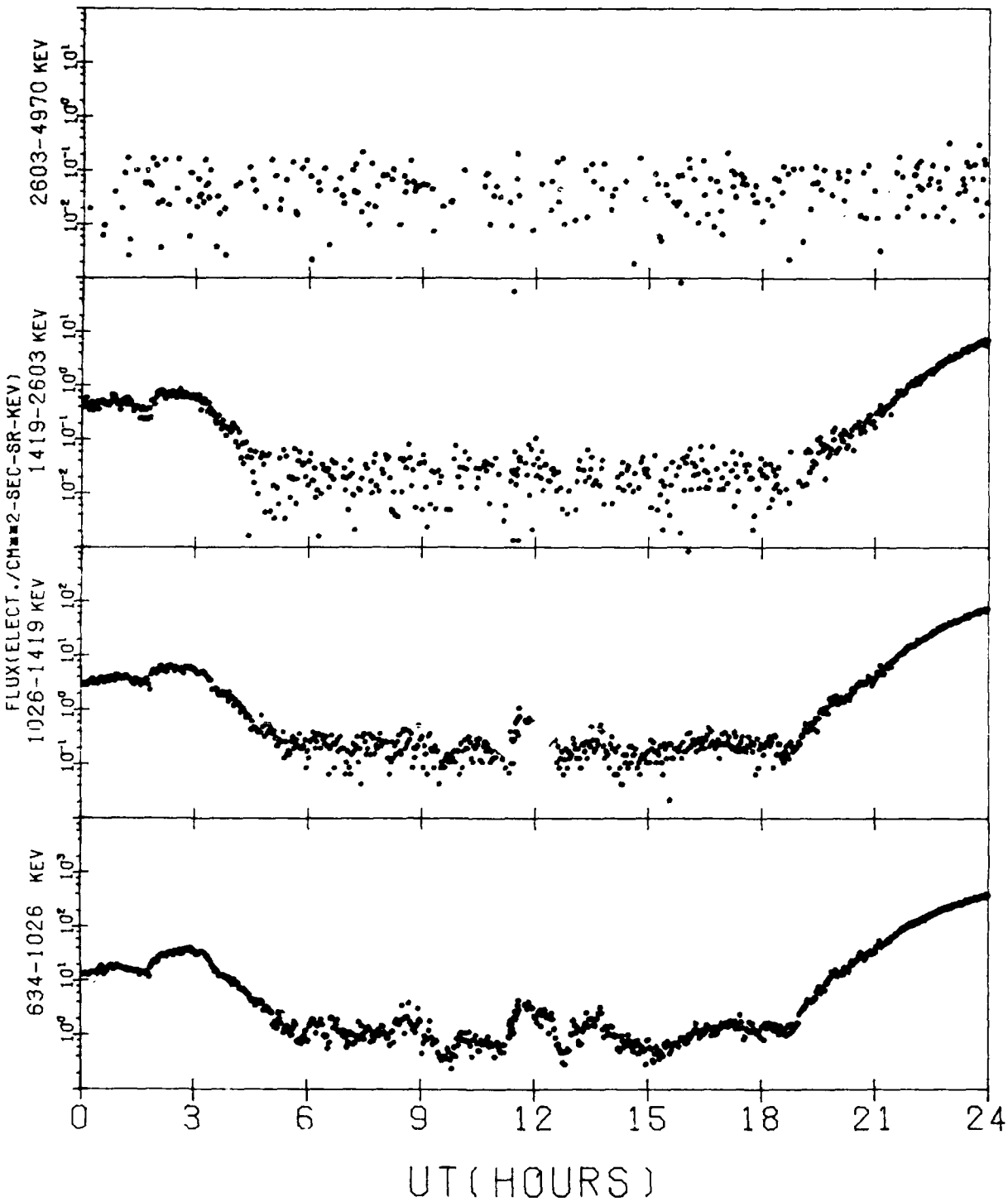

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