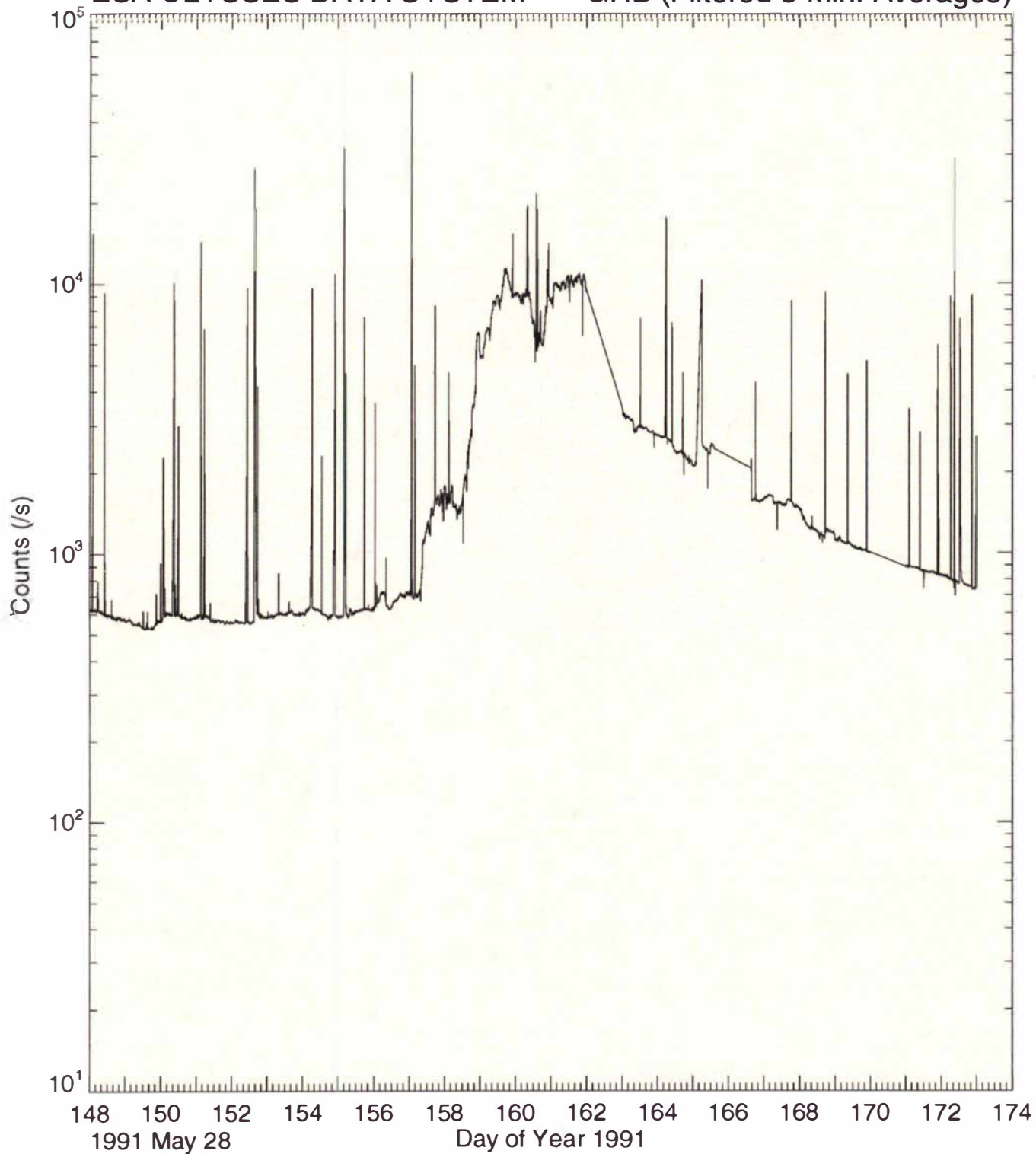


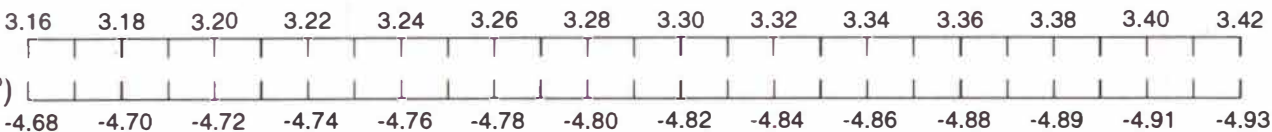
ESA ULYSSES DATA SYSTEM

GRB (Filtered 5 Min. Averages)



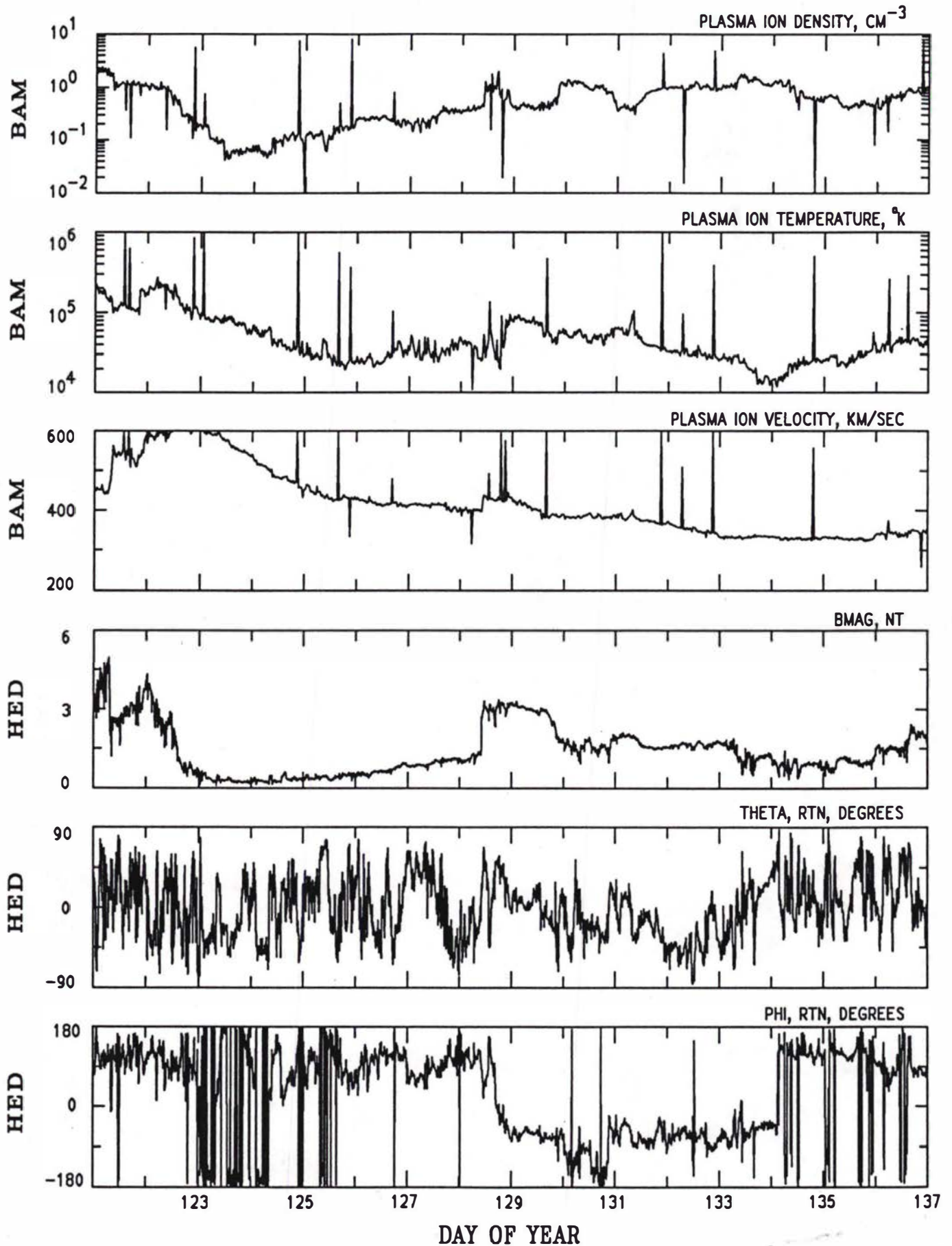
(AU)

Latitude (°)



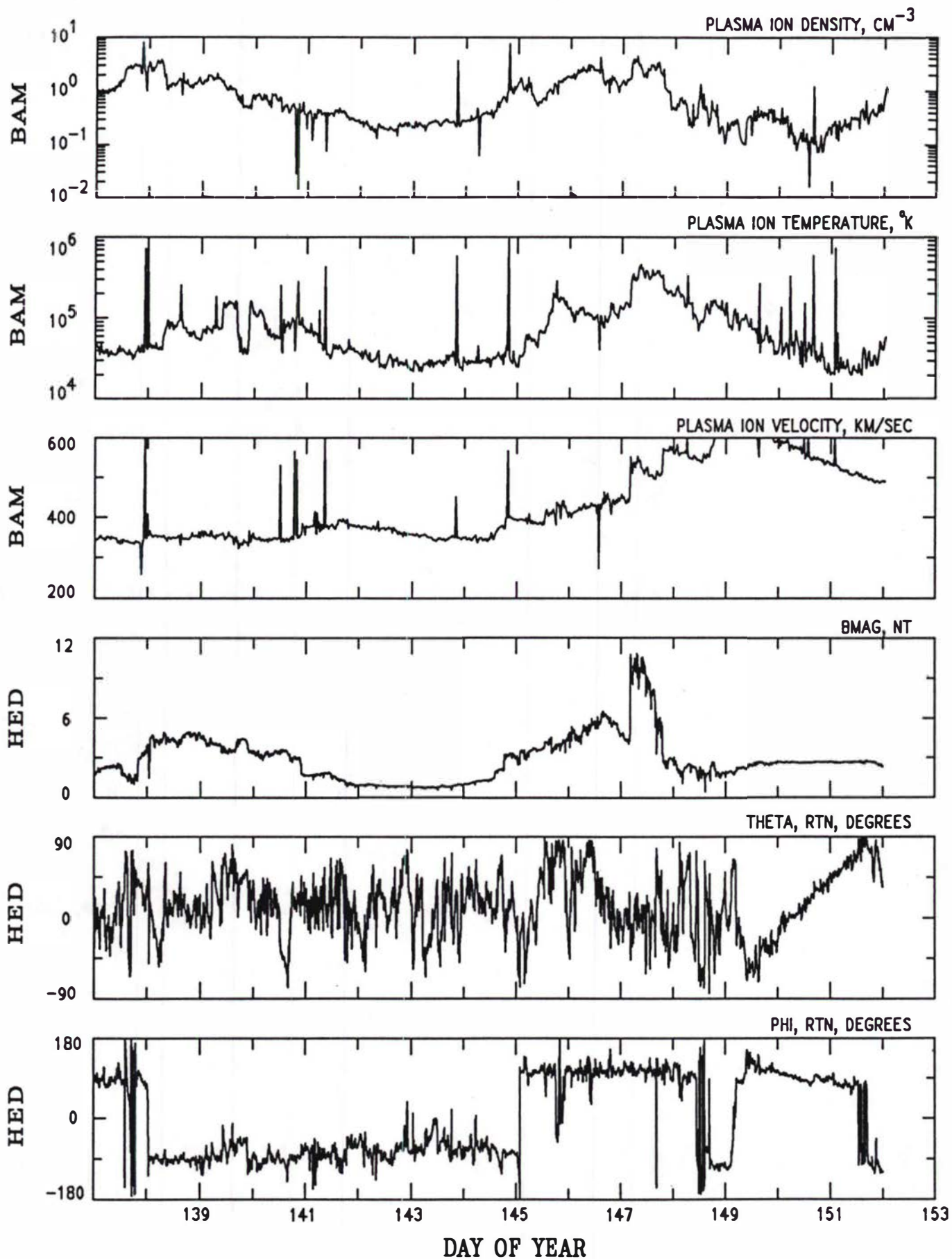
ULYSSES CDR - SOLAR WIND PLASMA AND MAGNETIC FIELD

91 121 MAY 1 00:00:00.000 - 91 137 MAY 17 00:00:00.000



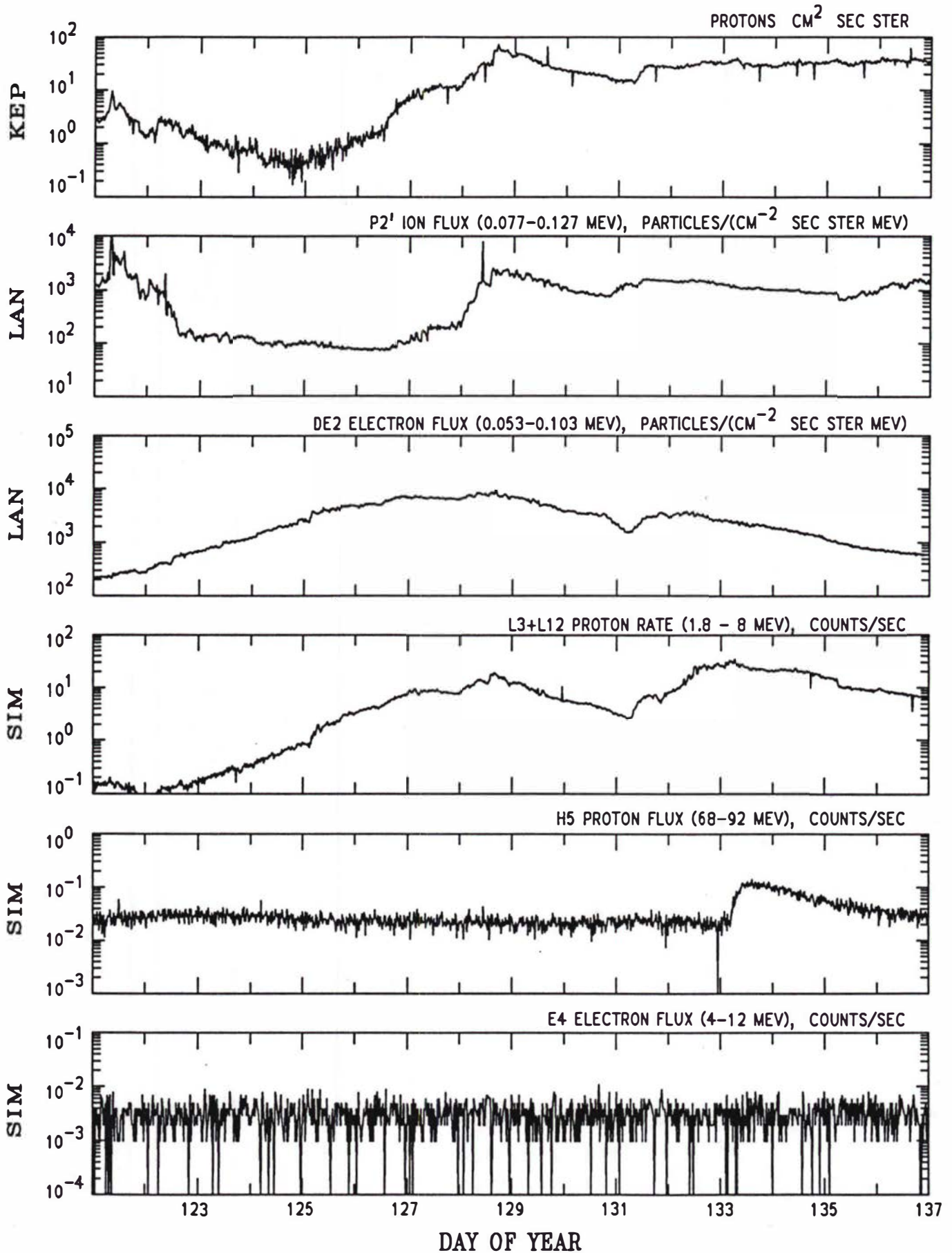
ULYSSES CDR - SOLAR WIND PLASMA AND MAGNETIC FIELD

91 137 MAY 17 00:00:00.000 - 91 153 JUN 2 00:00:00.000



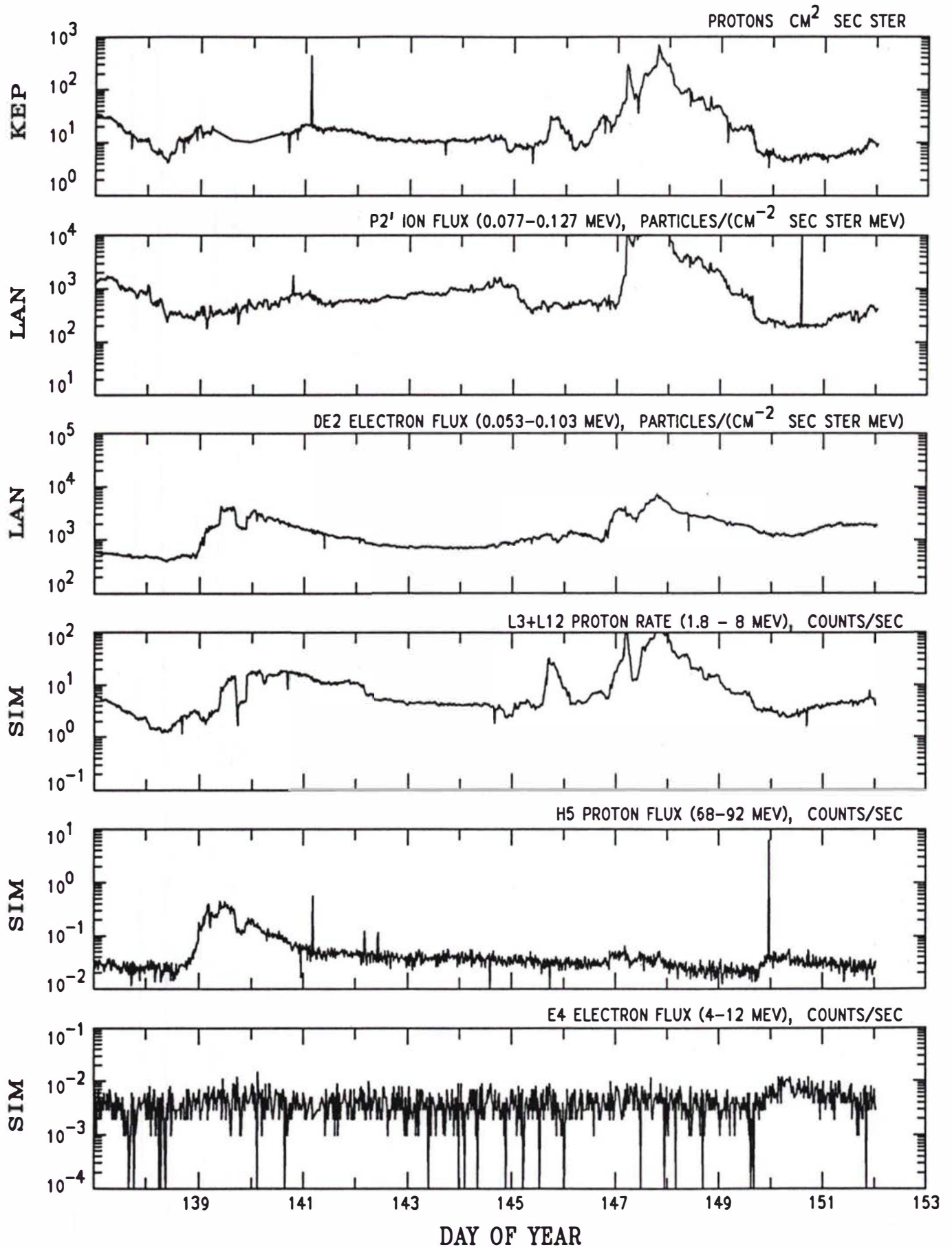
ULYSSES CDR - ENERGETIC PARTICLES, LOW ENERGY IONS AND COSMIC RAY

91 121 MAY 1 00:00:00.000 - 91 137 MAY 17 00:00:00.000



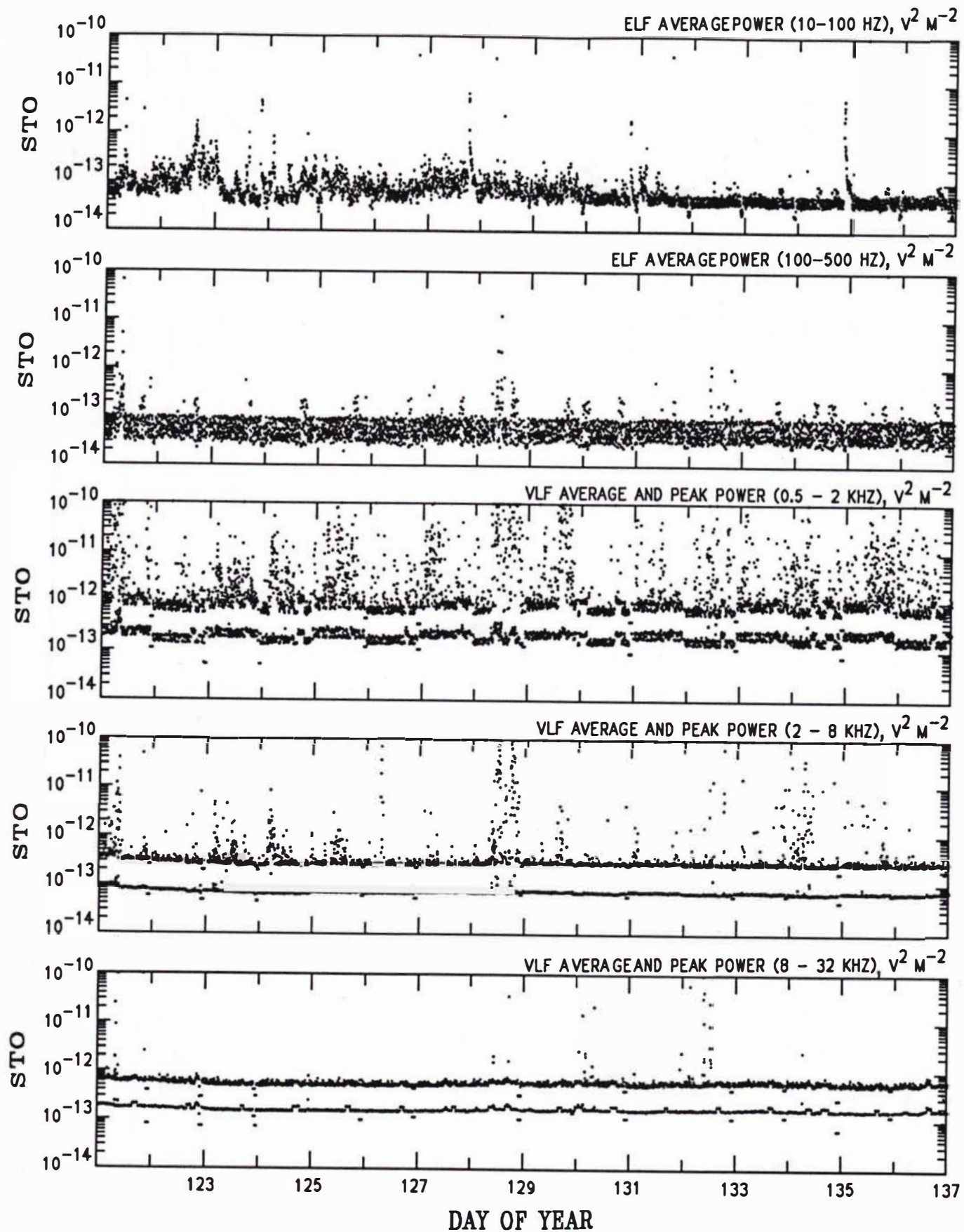
ULYSSES CDR - ENERGETIC PARTICLES, LOW ENERGY IONS AND COSMIC RAY

91 137 MAY 17 00:00:00.000 - 91 153 JUN 2 00:00:00.000



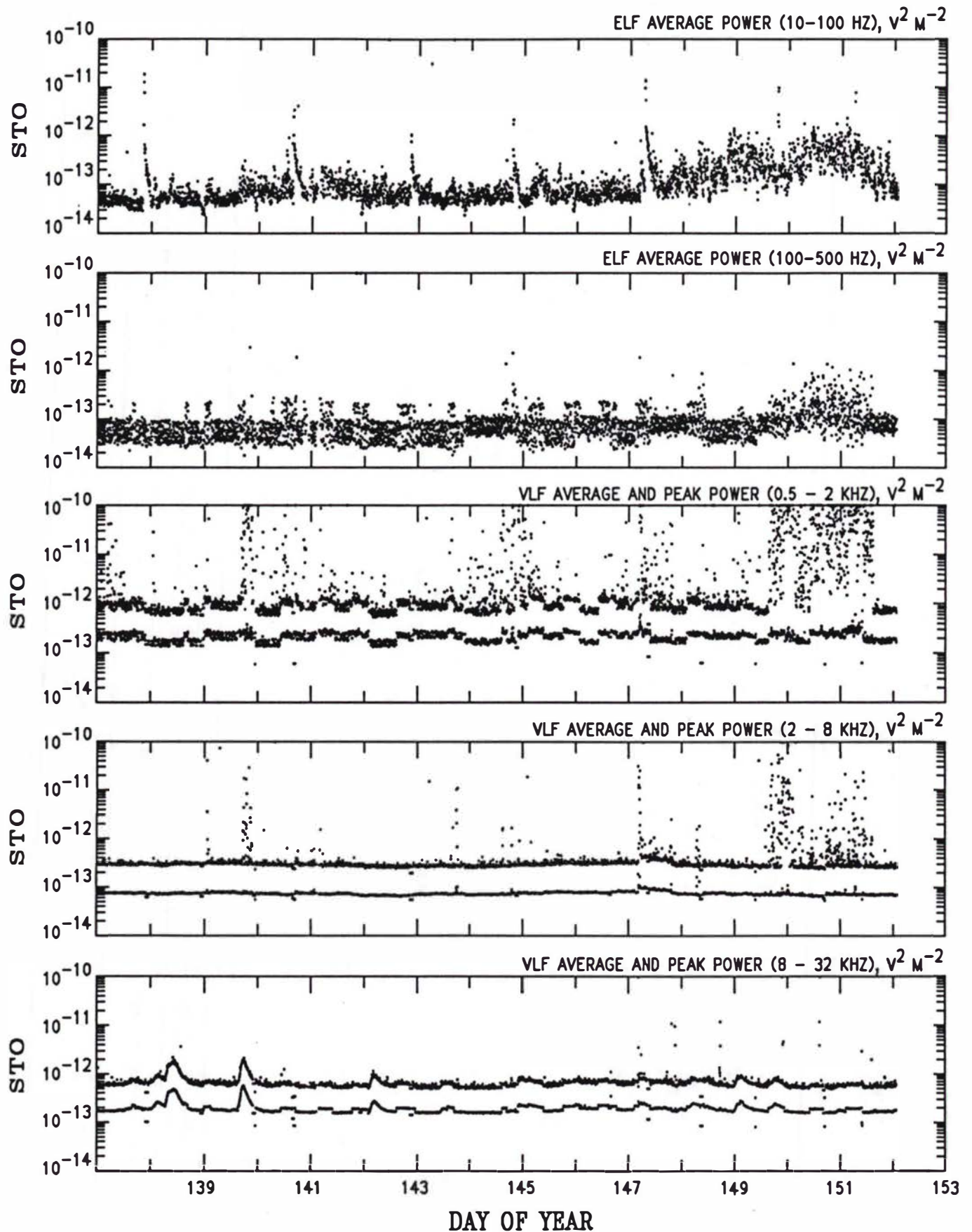
ULYSSES CDR - PLASMA WAVE

91 121 MAY 1 00:00:00.000 - 91 137 MAY 17 00:00:00.000



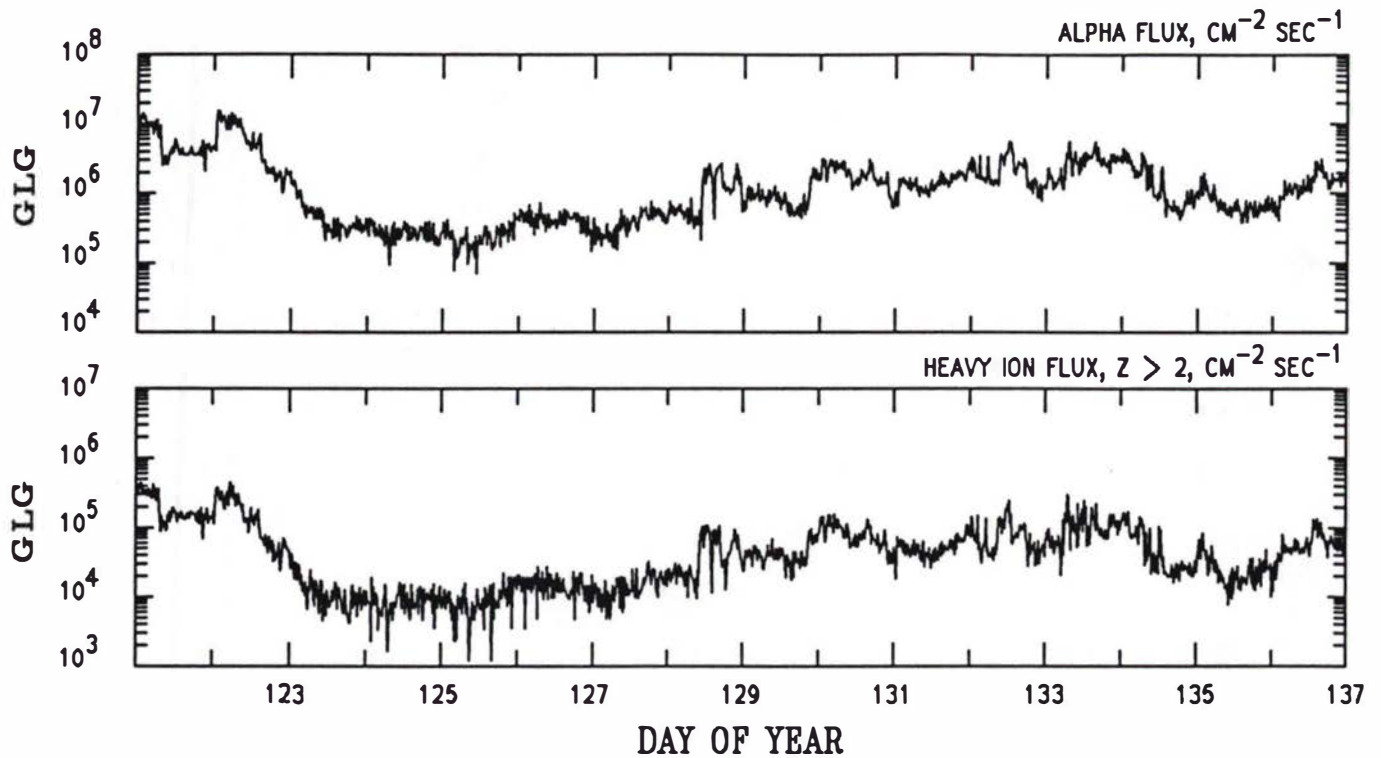
ULYSSES CDR - PLASMA WAVE

91 137 MAY 17 00:00:00.000 - 91 153 JUN 2 00:00:00.000



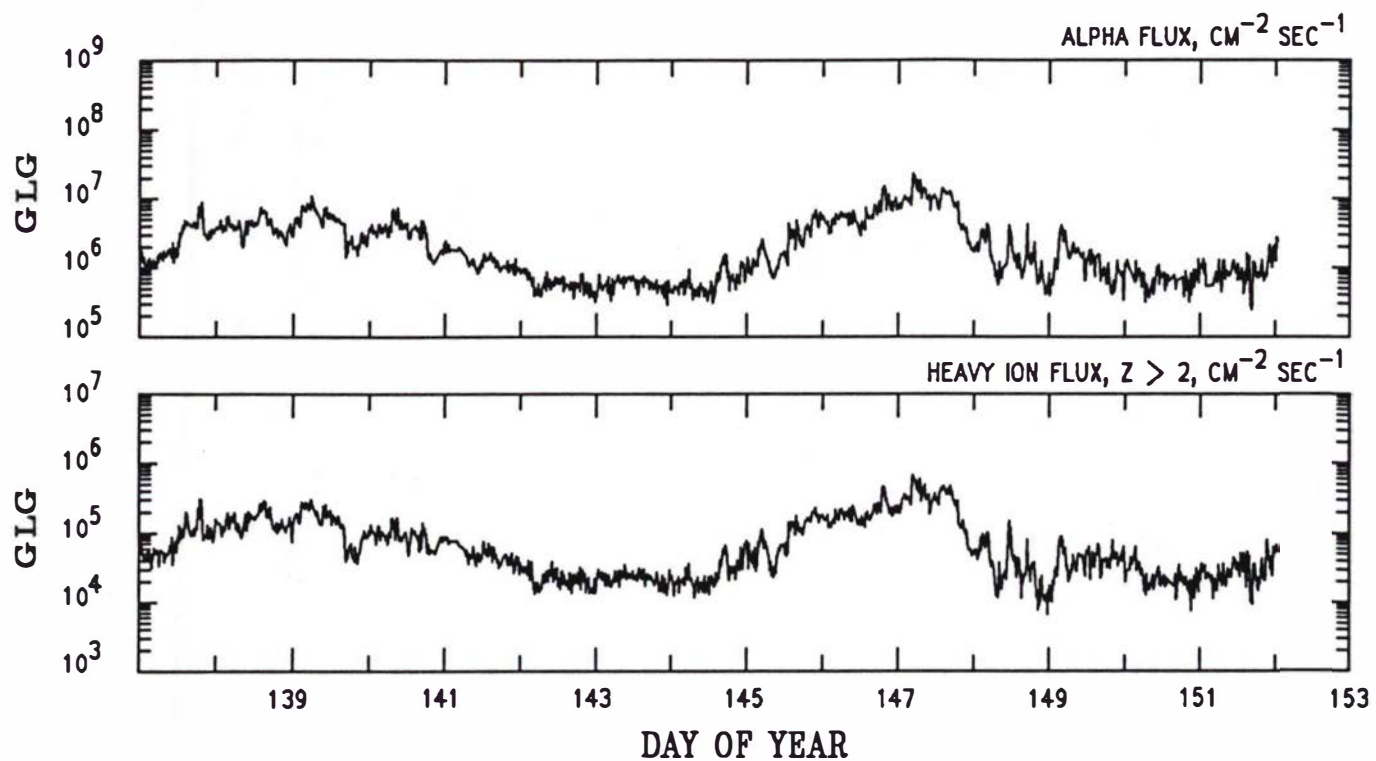
ULYSSES CDR - SOLAR WIND ION COMPOSITION

91 121 MAY 1 00:00:00.000 - 91 137 MAY 17 00:00:00.000



ULYSSES CDR - SOLAR WIND ION COMPOSITION

91 137 MAY 17 00:00:00.000 - 91 153 JUN 2 00:00:00.000



.91.121.00.07.14.061

HUS monthly long term thermal data

818

RET

E002 2ARADTMP S/C

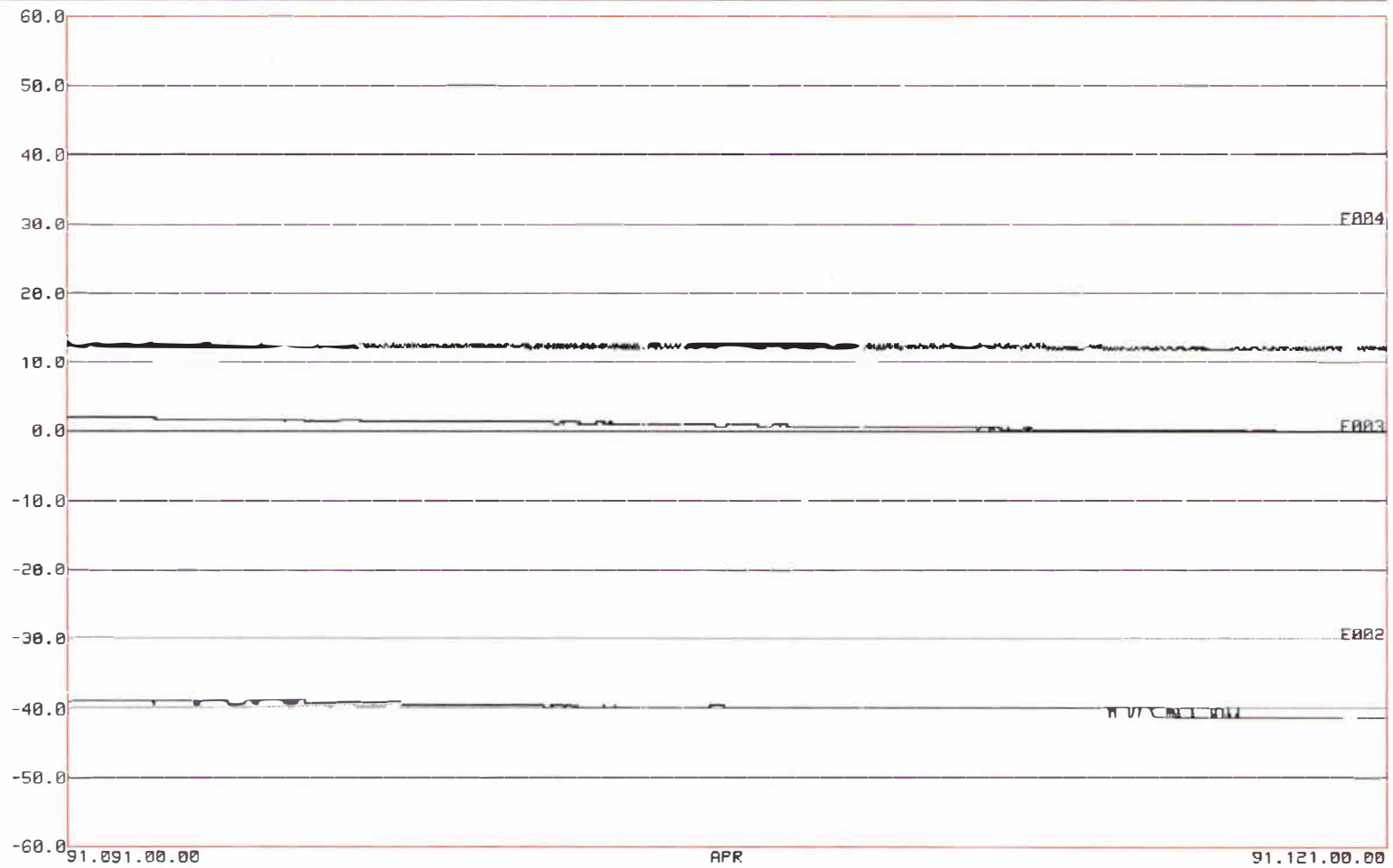
0.0

E003 2BSENTMP S/C

-41.3

E004 2ASENSTMP EX

12.36



From kouveliotou%batse.span@Sdsc.Edu Fri Nov 8 11:42:03 1991
Received: from Sdsc.Edu (m5.sdsc.edu) by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA16454; Fri, 8 Nov 91 11:42:01 PST
Received: from batse.span by Sdsc.Edu with VMSmail ;
Fri, 8 Nov 91 19:31:50 GMT
Date: Fri, 8 Nov 91 19:31:50 GMT
From: kouveliotou%batse.span@Sdsc.Edu
Message-Id: <911108193150.25000b7b@Sdsc.Edu>
Subject: do you ?
To: khurley@sunspot.ssl.berkeley.edu
X-St-Vmsmail-To: KEVIN
Status: R

From: SSL::SMTP%"MCGRUDC@ctrvax.Vanderbilt.Edu" 8-NOV-1991 09:53:00.72
To: "BATSE::KOUVELIOTOU"@ssl.msfc.nasa.gov
CC:
Subj: Re: List of Gamma-Ray Bursts

Date: Fri, 8 Nov 1991 09:54 CST
From: MCGRUDC@ctrvax.Vanderbilt.Edu
Subject: Re: List of Gamma-Ray Bursts
To: "BATSE::KOUVELIOTOU"@ssl.msfc.nasa.gov
Message-id: <398B74E22060A361@ctrvax.Vanderbilt.Edu>
X-VMS-To: IN%"BATSE::KOUVELIOTOU"@ssl.msfc.nasa.gov"

On TJD 8377, the Ulysses Spacecraft saw an apparent gamma-ray burst that was reasonably large, which BATSE did not see. The time of the detection was 29412 seconds. Unfortunately, I did not see it in VLF about 1500 or so seconds later, when it should have influenced the earth's ionosphere. I would like to know if it was about the horizon for my transmitters. Do you happen to have the right ascension and declination of this Ulysses event?

May 1 '91

Greetings,

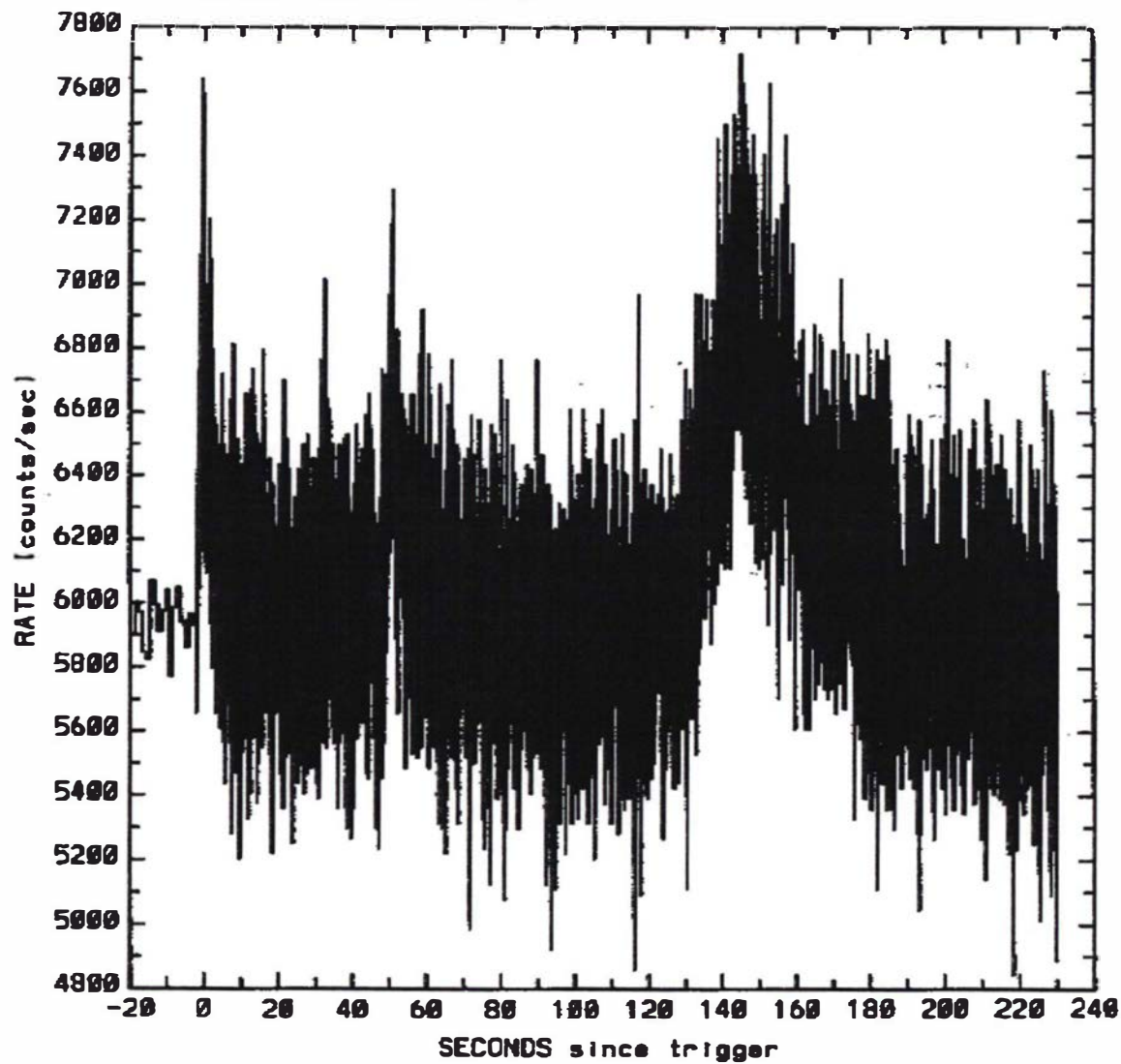
Charles

Replied Nov 9

CATSEARCH PROGRAM

BATSE BURST # 133
EVENT OF 1991 MAY 1 DAY OF YEAR=121
EVENT CROSSING TIME AT BATSE : 30014. S. OR 08:20:14.0
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 133.300 -.700
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 1/ 5/ 91 IS:
RA= 116.268 DEC= 22.926 DIST= 2.989 AU
BATSE-ULYSSES DISTANCE = 447164872. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=151.14 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-1306.31 SECS.
CROSSING TIME AT ULYSSES IS 28708. S. OR 07:58:27 +/- 155.16 SECONDS

DATA FOR K. HURLEY



2-JUN-1994 16:38:57

Created by MOPS 80
(Burst Display)
Version 2.28

Trigger # . 133

Trigger Time:
8377 / 38814.850Burst Data Type:
DISCSCDeadtime
Corrected: NBackground Data
Type: PREB + DISCLAMinimum Integ. Time:
0.064 secondsDetectors (7.0):
01010000Discriminators:
(1, 2)Quality Blank:
BDISP1

14 / 4 / 93

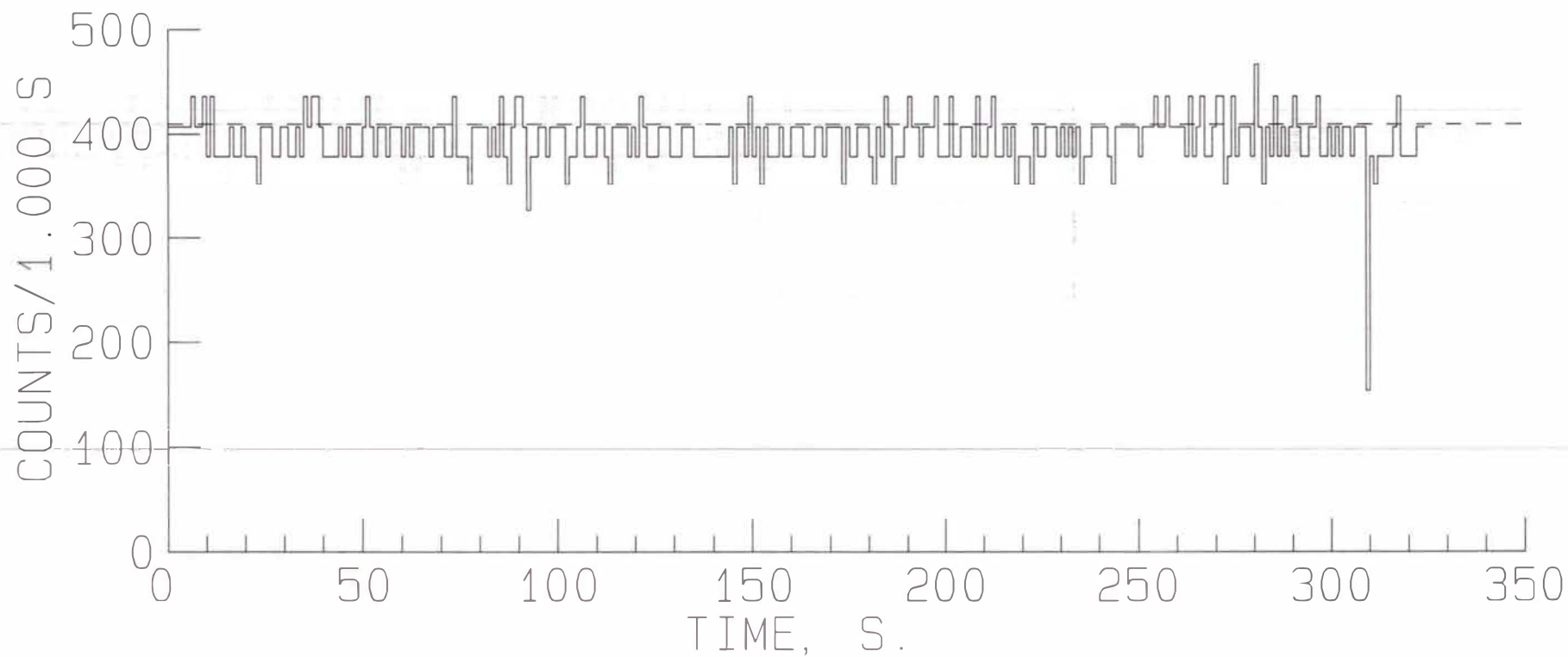
ULYSSES RT

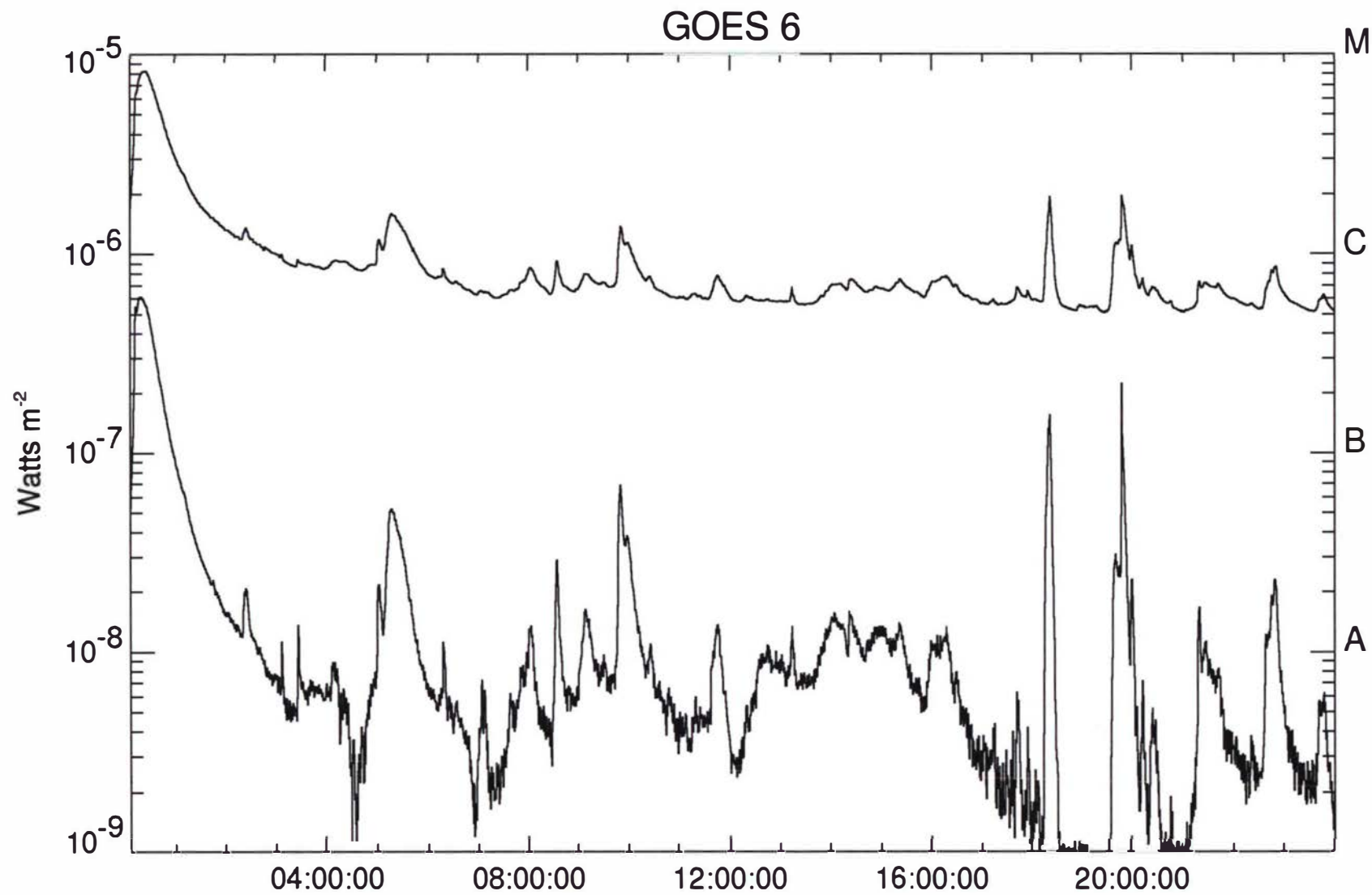
1 / 5 / 91 28548.861 s

0 - 0 keV

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS





Data Start: 91/05/01, 0006:20

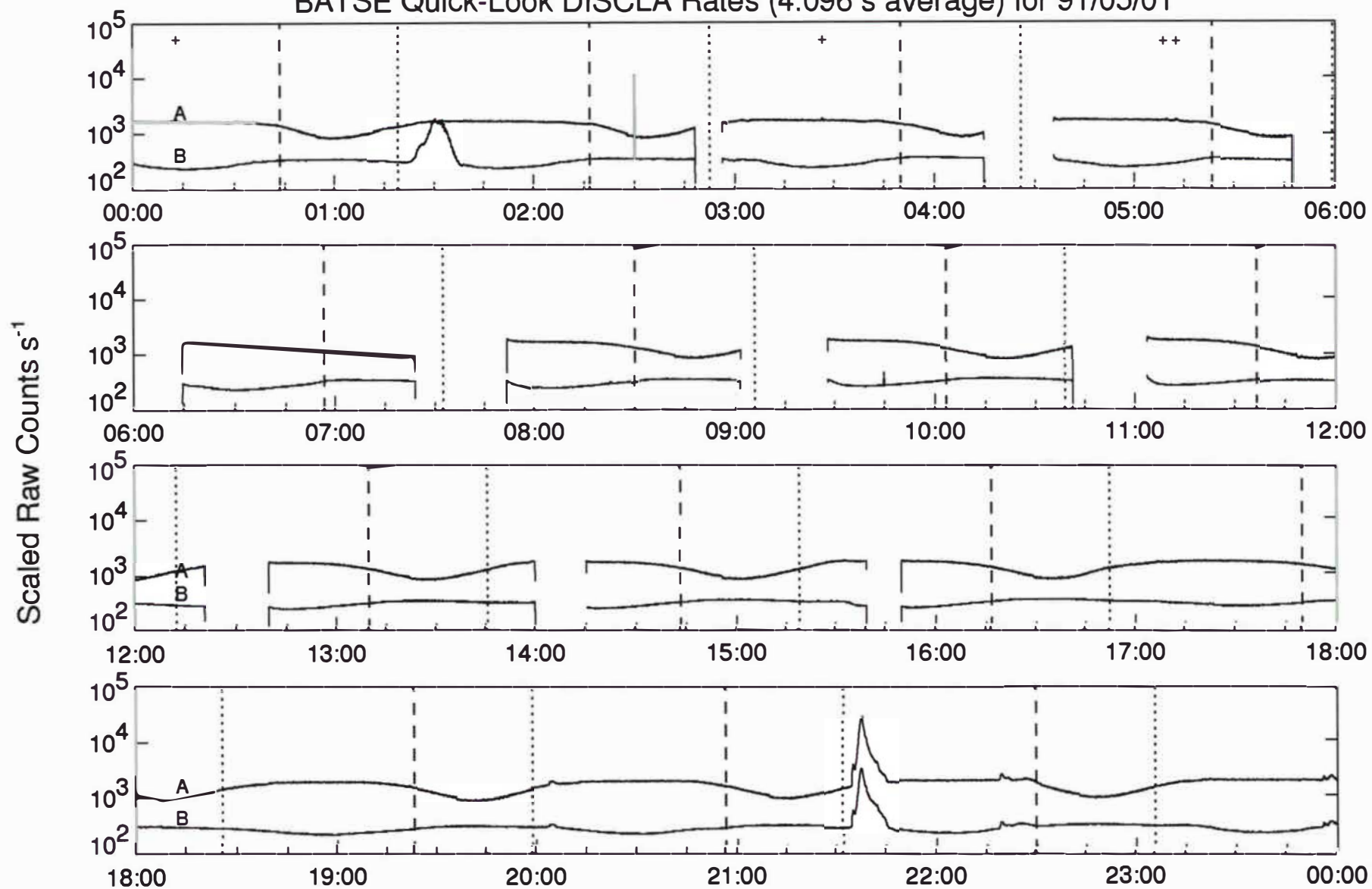
Plot created: 96/11/27, 0227

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/01

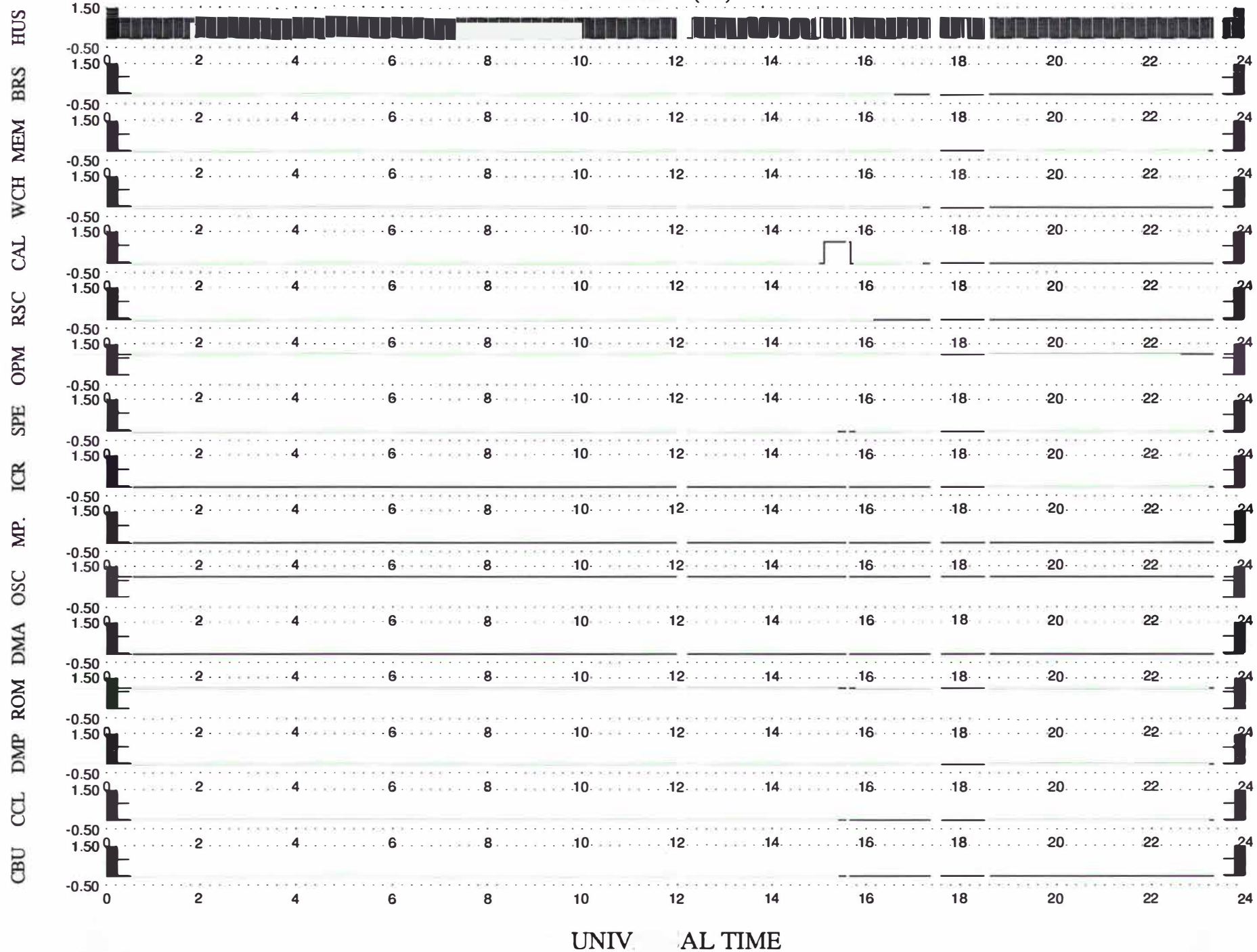


Current Time: 96/11/27, 0228 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

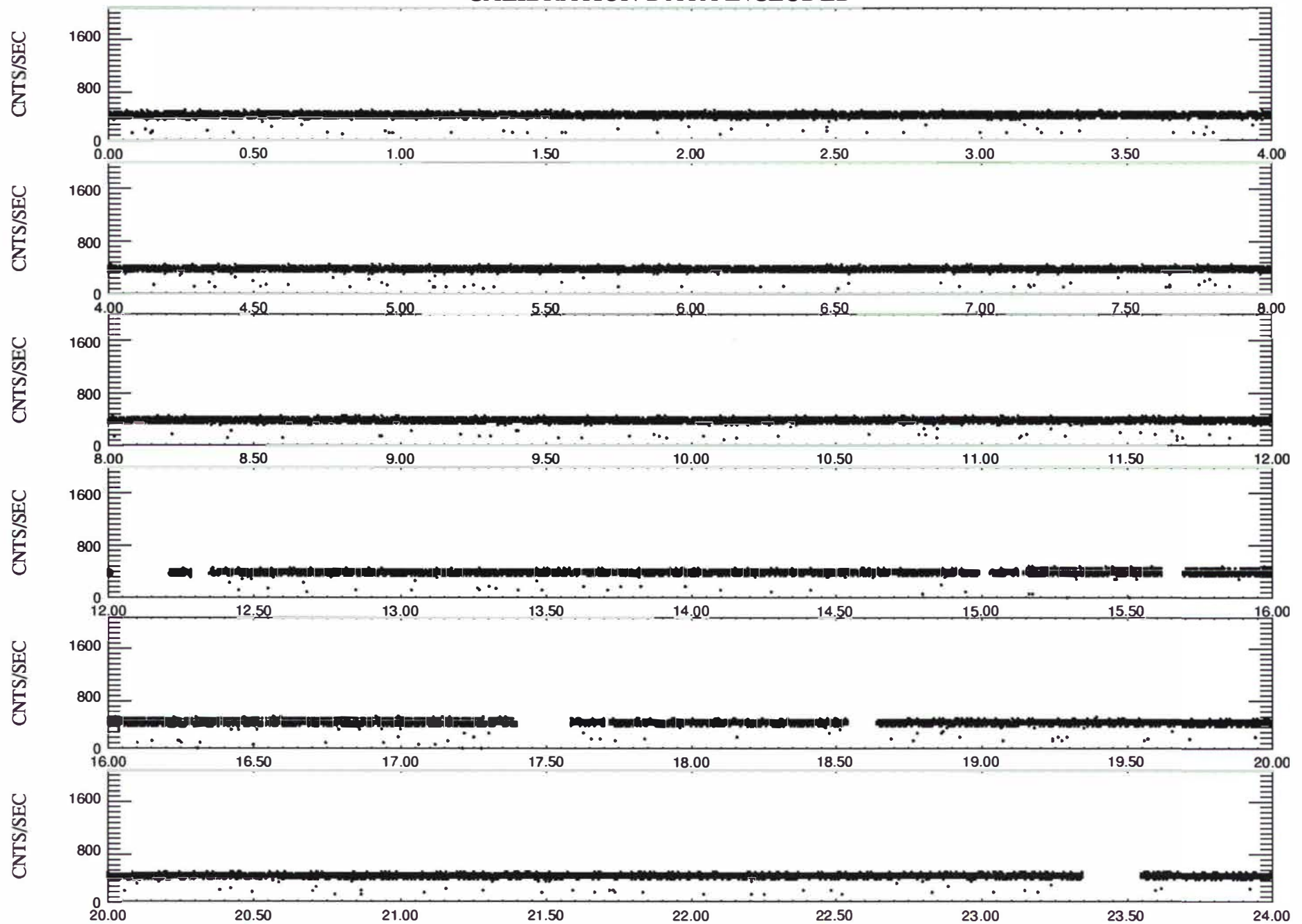
Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

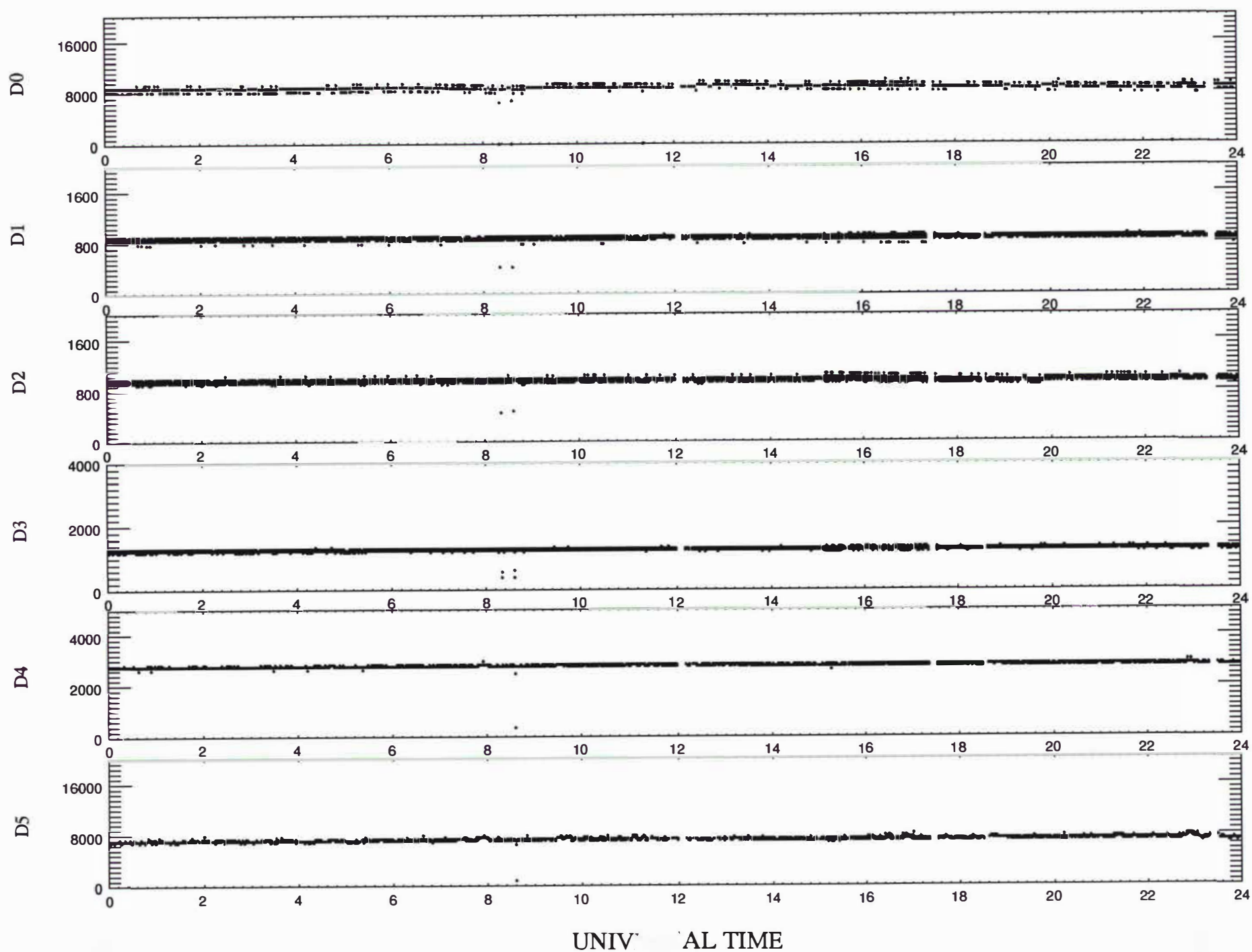
NO BURST (12)



CALIBRATION DATA INCLUDED



UNIV AL TIME



CATSEARCH PROGRAM

BATSE BURST # 138
EVENT OF 1991 MAY 2 DAY OF YEAR=122
EVENT CROSSING TIME AT BATSE : 40667. S. OR 11:17:47.3
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 114.480 -25.310
BATSE PEAK COUNTING RATE: 0000 C/S

130

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 2/ 5/ 91 IS:
RA= 116.583 DEC= 22.864 DIST= 3.012 AU
BATSE-ULYSSES DISTANCE = 450668504. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=131.78 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-1001.64 SECS.
CROSSING TIME AT ULYSSES IS 39666. S. OR 11:01:05.7 +/- 229.40 SECONDS

9 / 11 / 95

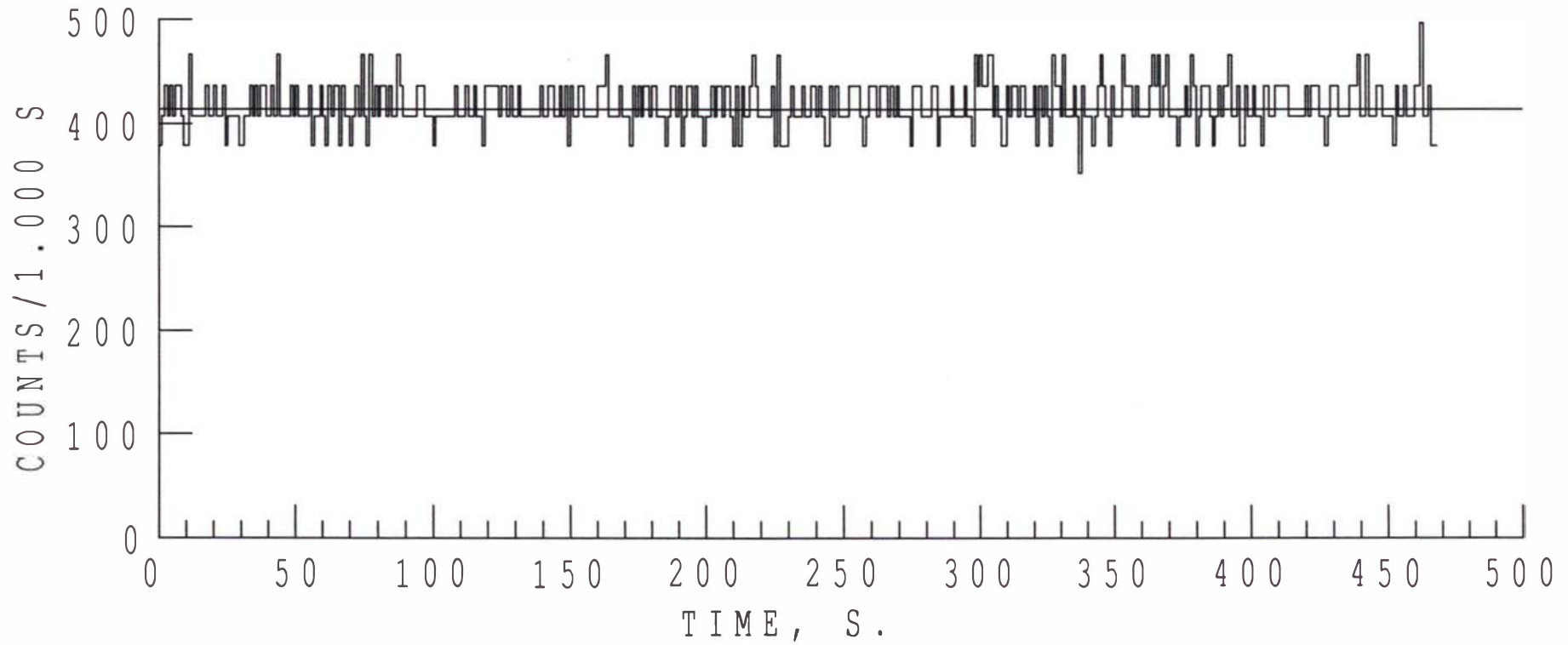
ULYSSES RT

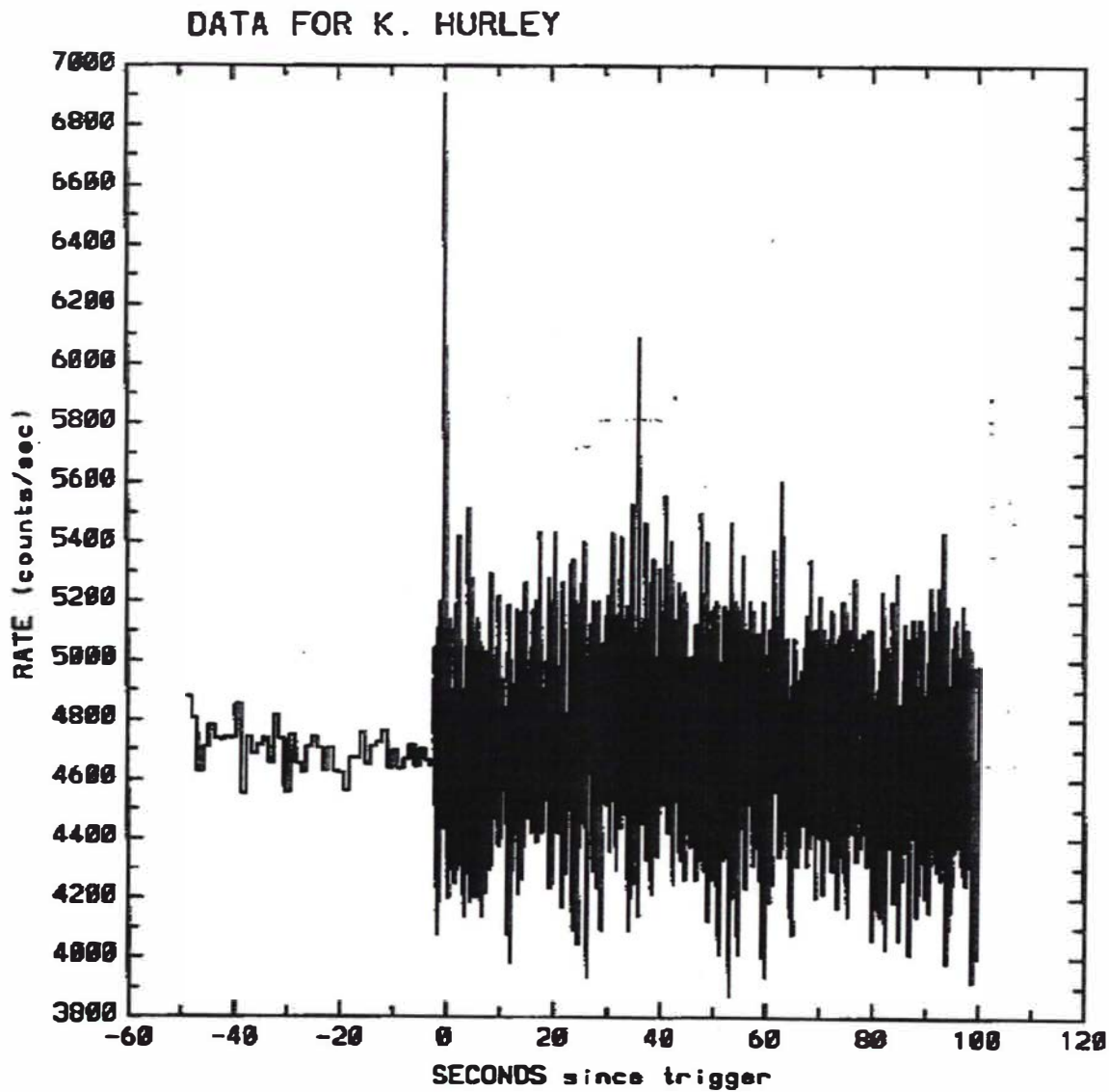
2 / 5 / 91 39420.527 s

0 - 0 keV

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS





23-MAY-1994 13:04:05

Created by MDPS 80
(Burst Display)
Version 2.20

Trigger # : 138

Trigger Time:
8378 / 48667.371

Burst Data Type:
DISCSC

Deadtime
Corrected: N

Background Data
Type: PREB + DISCLA

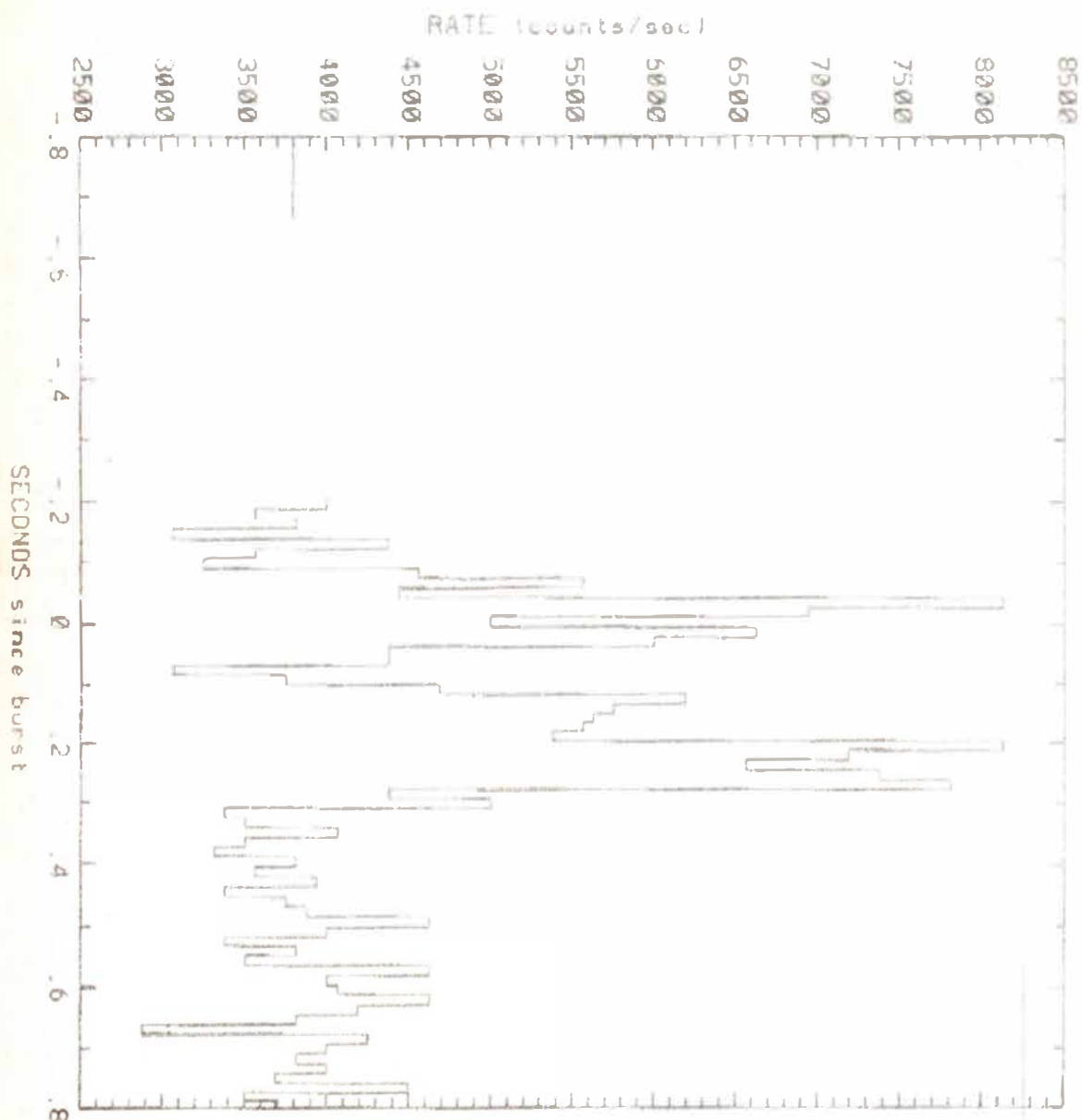
Minimum Integ. Time:
0.064 seconds

Detectors [7.0]:
00010001

Discriminators:
(1, 2)

Quality Mask:
B0ISP1

Burst No. 738



3-MAY-1991 14:48:08

Created by MOPS 80
(Burst Display)
Version 2.01Burst Number: 738
Burst Trigger Time:
8378 / 40049.437
Burst Data Type:
TIFMultiple Events
Ignored: 23Deadtime
Corrected: N
Background Data
Type: DISCLA
Minimum Integ. Time:
216000 seconds
Detectors (7.0):
00010001
Discriminators:
(2, 3)
Quality Mask:
801SP0

CATSEARCH PROGRAM

BATSE BURST # 142
EVENT OF 1991 MAY 2 DAY OF YEAR=122
EVENT CROSSING TIME AT BATSE : 81443. S. OR 22:37:23.3
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 56.900 -52.000
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 2/ 5/ 91 IS:
RA= 116.583 DEC= 22.864 DIST= 3.012 AU
BATSE-ULYSSES DISTANCE = 450668504. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 88.86 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 29.80 SECS.
CROSSING TIME AT ULYSSES IS 81473. S. OR 22:37:53 +/- 311.39 SECONDS

Trigger

Helio. corr. removed

Date: June 21 1997

BURST TRIANGULATION CHECKLIST

1. Ulysses Data

- ☒ Jim Schmidling's stat file correction applied?
- ☒ Final ephemeris used?
- ☒ Final, CDROM data used?
- ☒ Were data checked by Joe Springer for 0.5 s errors?
- ☒ If a 2 spacecraft triangulation, was Ulysses time corrected for aberration?
- ☒ Is the order of the data in CORREL such that a vernier is done on the data with the best time resolution?

2. BATSE Data

- ☒ 2.042 s subtracted for bursts prior to June 25 1992 and DISCSC programs prior to Version 2.16 (August 28 1992)?
- ☒ Does T_0 in data file agree with T_0 in plot?
- ☒ BATSE ephemeris for T_0 ?
- ☒ Error circle position and radius from public catalog used?
- ☐ If MER data were used, is a 30 ms systematic error included?

3. PVO Data

- ☐ Ephemeris of PVO used (not Venus)?
- ☐ 2000 coordinates used?
- ☐ Geocentric time used?

- ☒ ACCESS database updated?

DMSP - 2 s time res data only (RT data only)

Time at peak of event: May 2 81443 s DMSP 9

Feb 19 1st: DMSP8 42323 } 1st peak
2nd: DMSP9 42326 }

↑
Discrepancy - take DMSP9,
better S/N

Mar 10 DMSP 8 1st peak 46923 } Higher
3rd peak 46958 } S/N

DMSP 9 1st 46925
3rd 46959

DMSP 10 1st 46925.5 } Good
2nd 46941.5 } S/N,
3rd 46959.5 } Dr. - 8

May 3 DMSP 8 1st 25456
2nd 25500

DMSP 9 1st 25454
2nd 25500

June 1 DMSP 9 1st 69756
10 69757.5

Files are described - need to be sanitized before we can get them

On FAXes ① raw time is given. Subtract 1.9 s DMSP 8, 9;

S.S for DMSP 10 - #s above have already been converted

② $G = \gamma$ $P =$ particles - 2 detectors on each DMSP, several
energy ranges

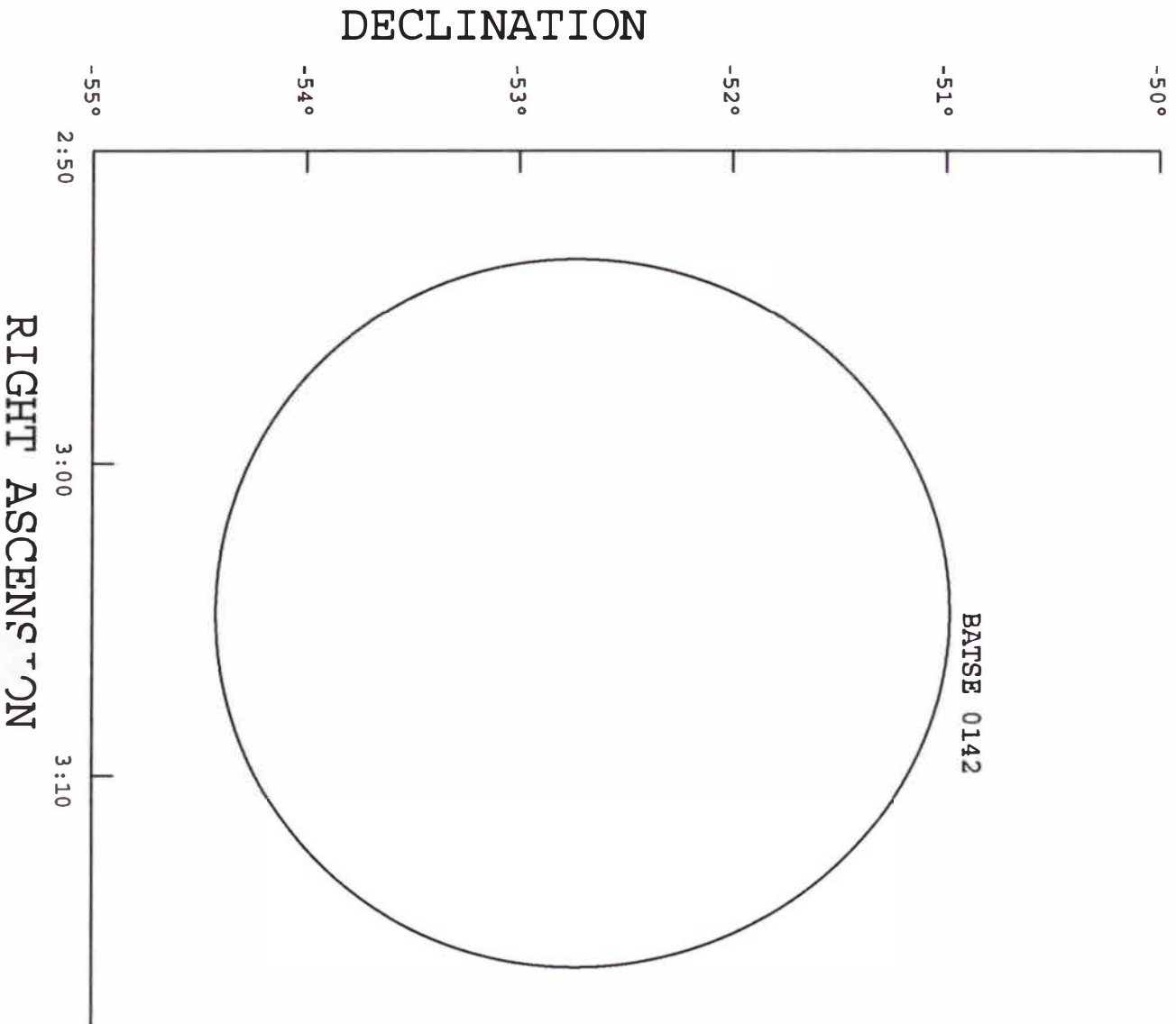
From @STAR.STANFORD.EDU:068486@ESSDP2.SPAN Fri Sep 27 14:20:24 1991
Received: from STAR.STANFORD.EDU by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA08894; Fri, 27 Sep 91 14:20:20 PDT
Message-Id: <9109272120.AA08894@sunspot.ssl.berkeley.edu>
Received: from ESSDP2 by STAR.STANFORD.EDU via MAIL-11 with DECnet;
Fri, 27 Sep 91 14:21:35-PST
Date: Fri 27 Sep 91 14:21:35-PST
From: 068486@ESSDP2.SPAN@STAR.STANFORD.EDU
Subject: 1991 MAY 3
To: KHURLEY@sunspot.ssl.berkeley.edu
Status: R

KEVIN,
PVO WAS TURNED OFF EARLY MAY SECOND, TURNED BACK ON LATE MAY THIRD. NO DATA AT THE TIME OF
RAY

N-M = CORRELATION BETWEEN SATELLITES N AND M
EARTH-N = EARTH AS SEEN FROM SATELLITE N
S=SUN E=ECLIPTIC G=GALACTIC EQUATOR
1 ULYSSES 2 BATSE

EVENT OF MAY 2, 1991 22:37

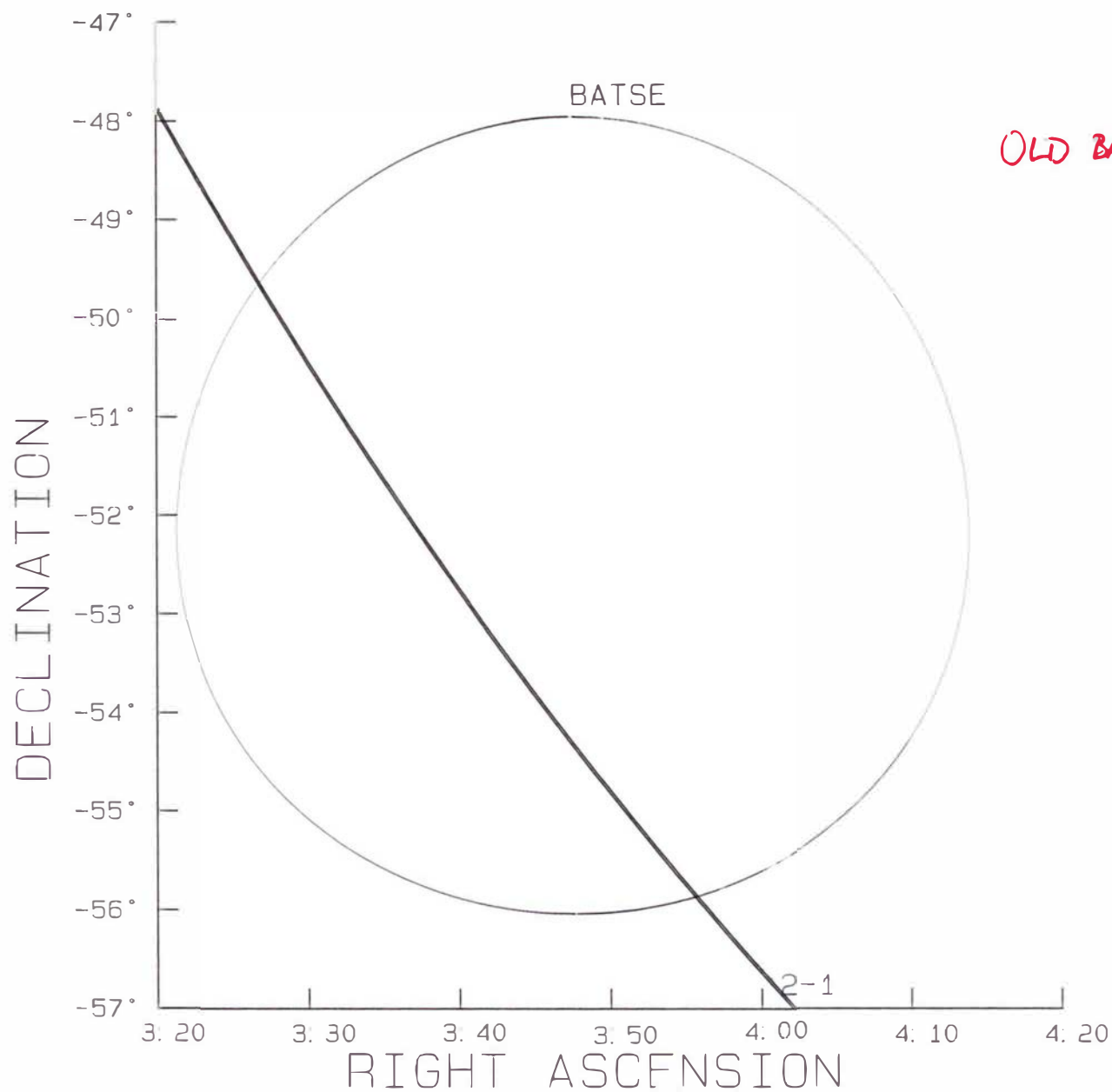
21/ 6/97



EVENT OF MAY 2, 1991 22:38

7/ 9/93

EARTH-N = EARTH AS SEEN FROM SATELLITE N
S=SUN E=ECLIPTIC G=GALACTIC EQUATOR
1 ULYSSES 2 BATSE



142

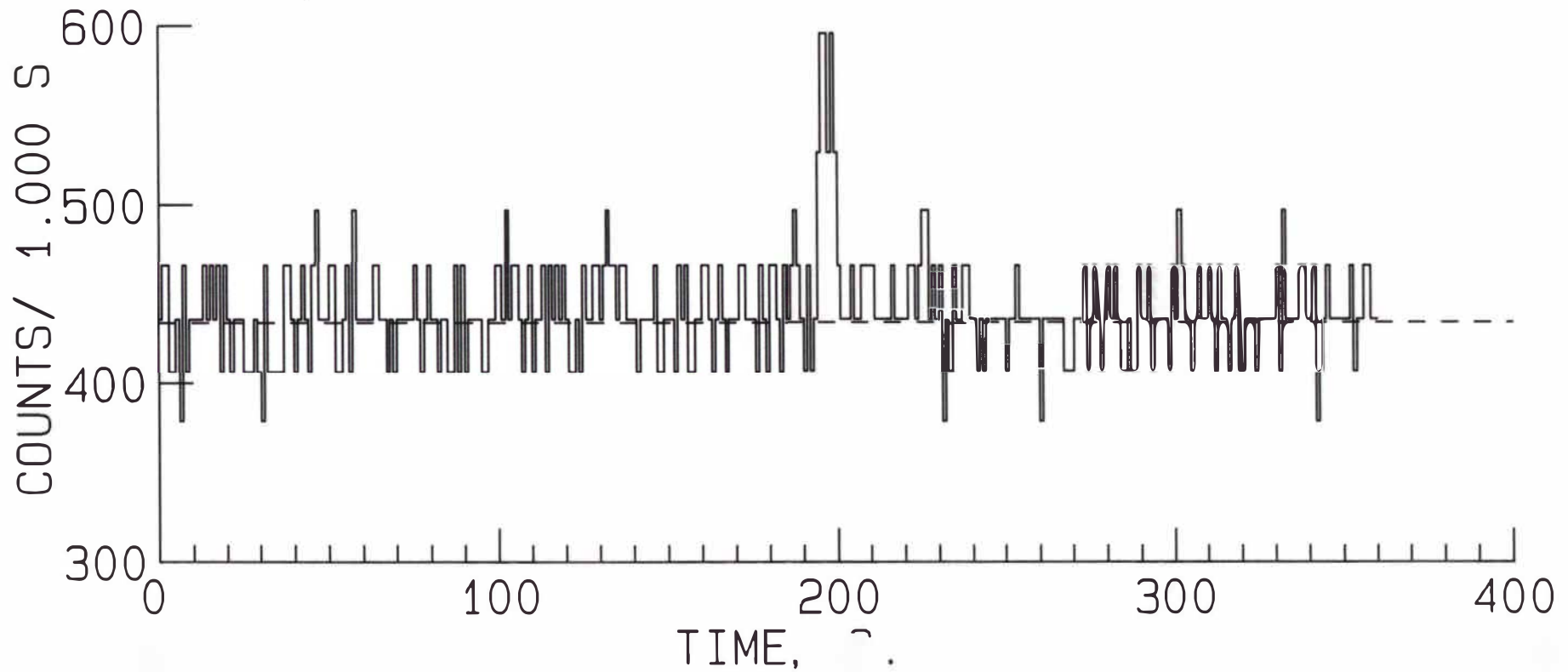
ULYSSES RT

21 / 6 / 97

2/ 5/91 81324.244 s

31- 224 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



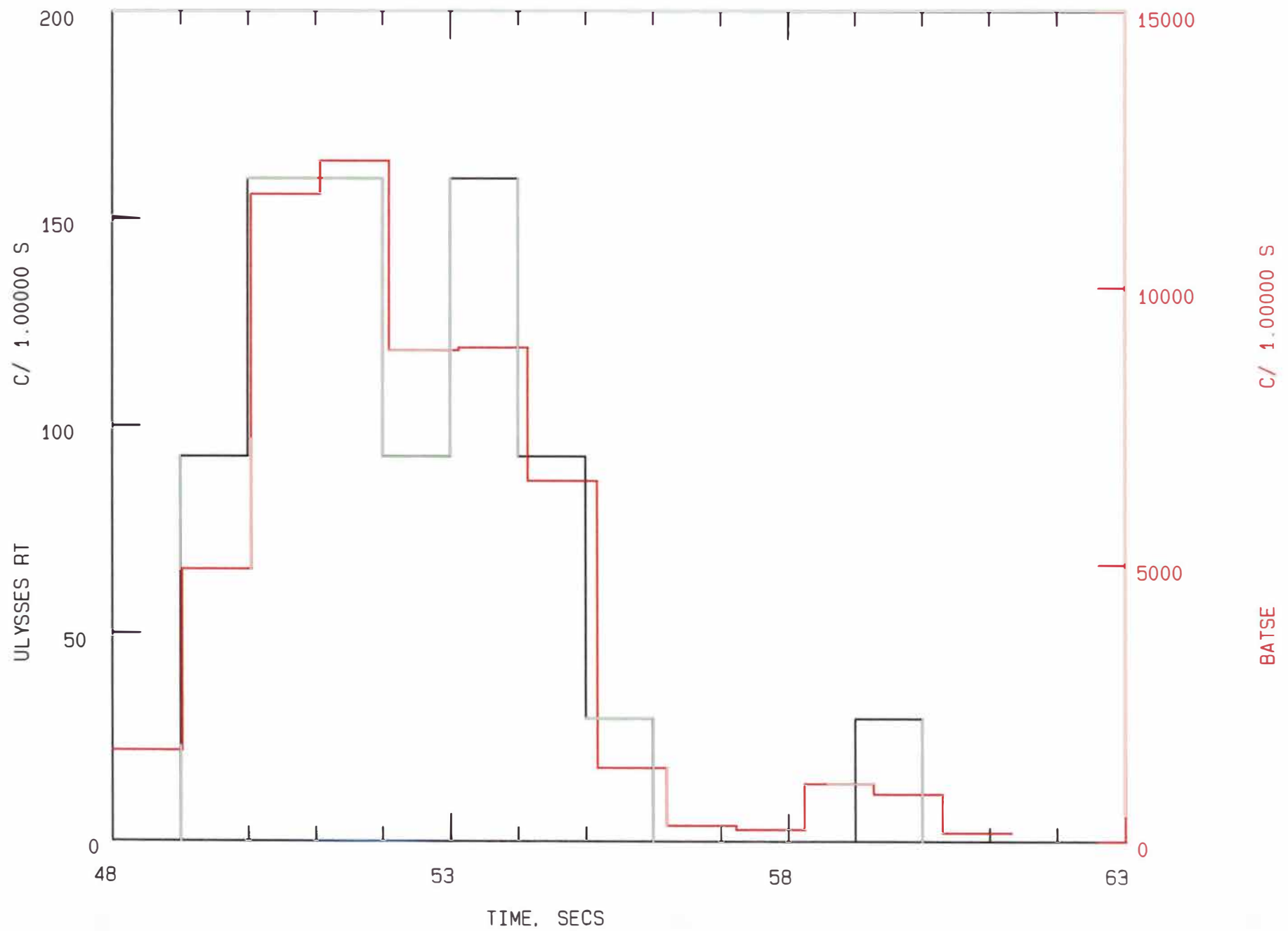
ULYSSES RT-BATSE

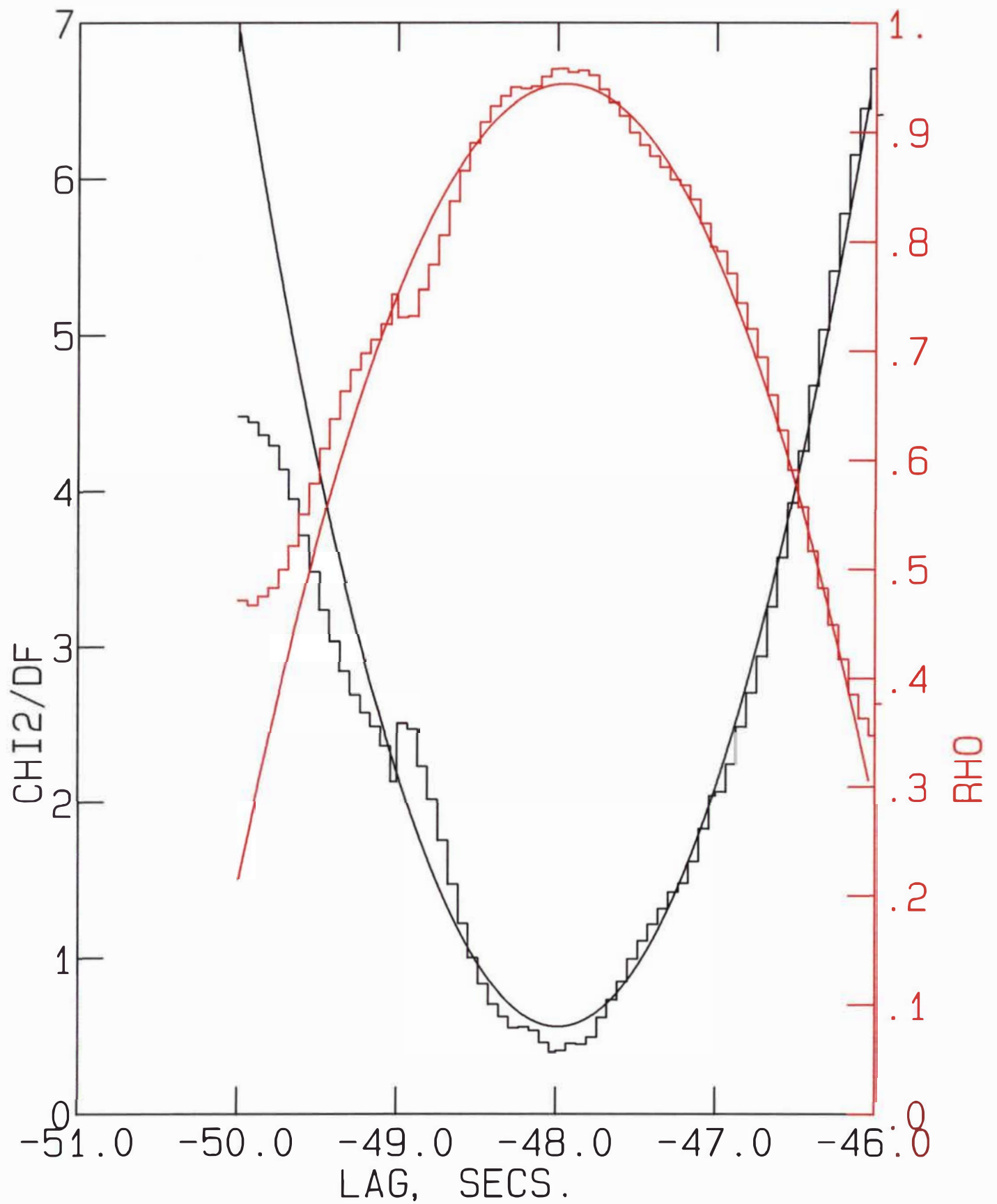
CORRELATION

2/ 5/91

81469.212

21/ 6/97

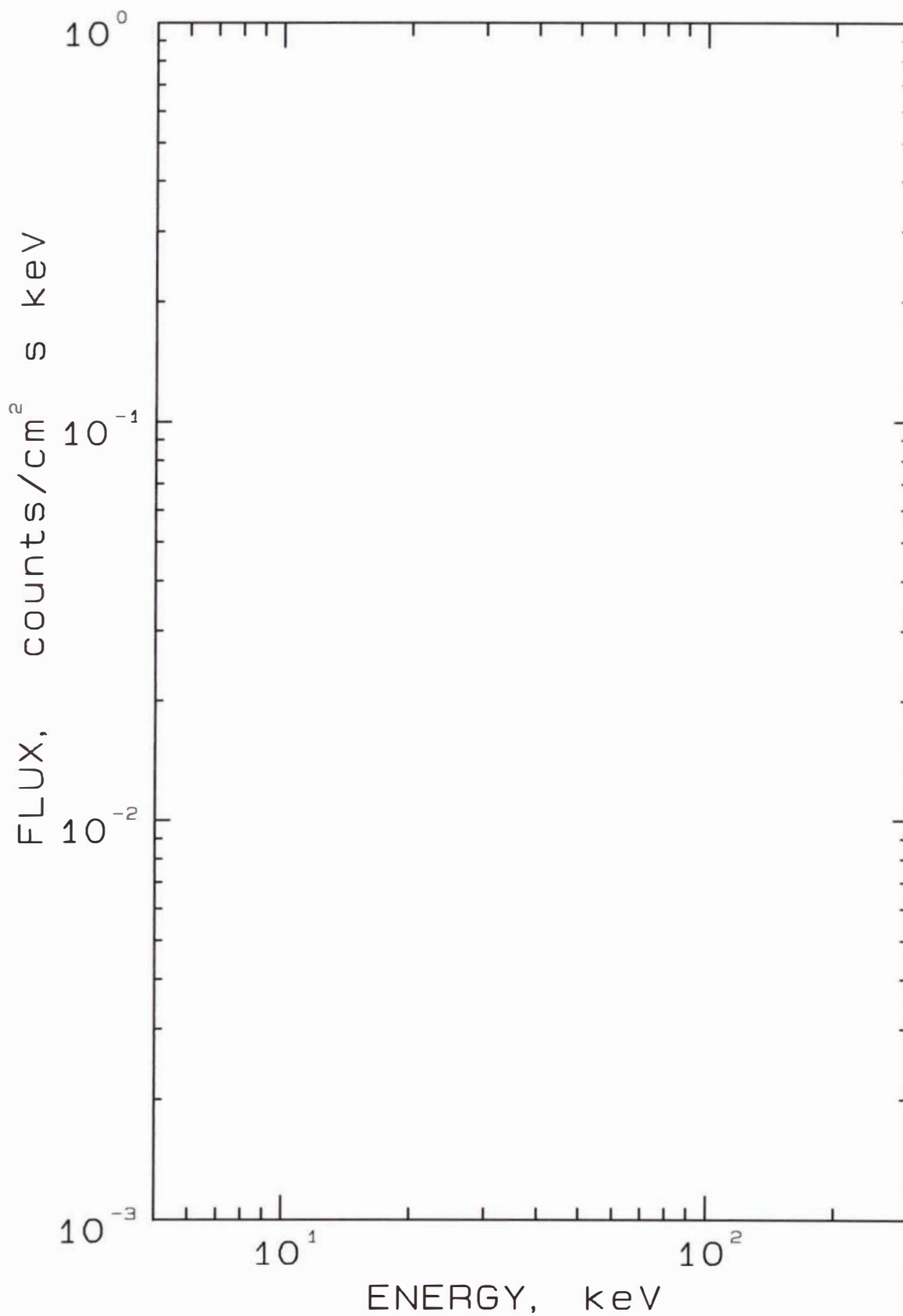




ULYSSES 02/05/91 81522.302

21/ 6/97

SPECTRUM INTEGRATED OVER 41.0 SECONDS, INTERVALS 2 TO 18



ULY_005 02/05/91 81522.302 BURST SPECTRAL COUNT RATES

7- 28 keV

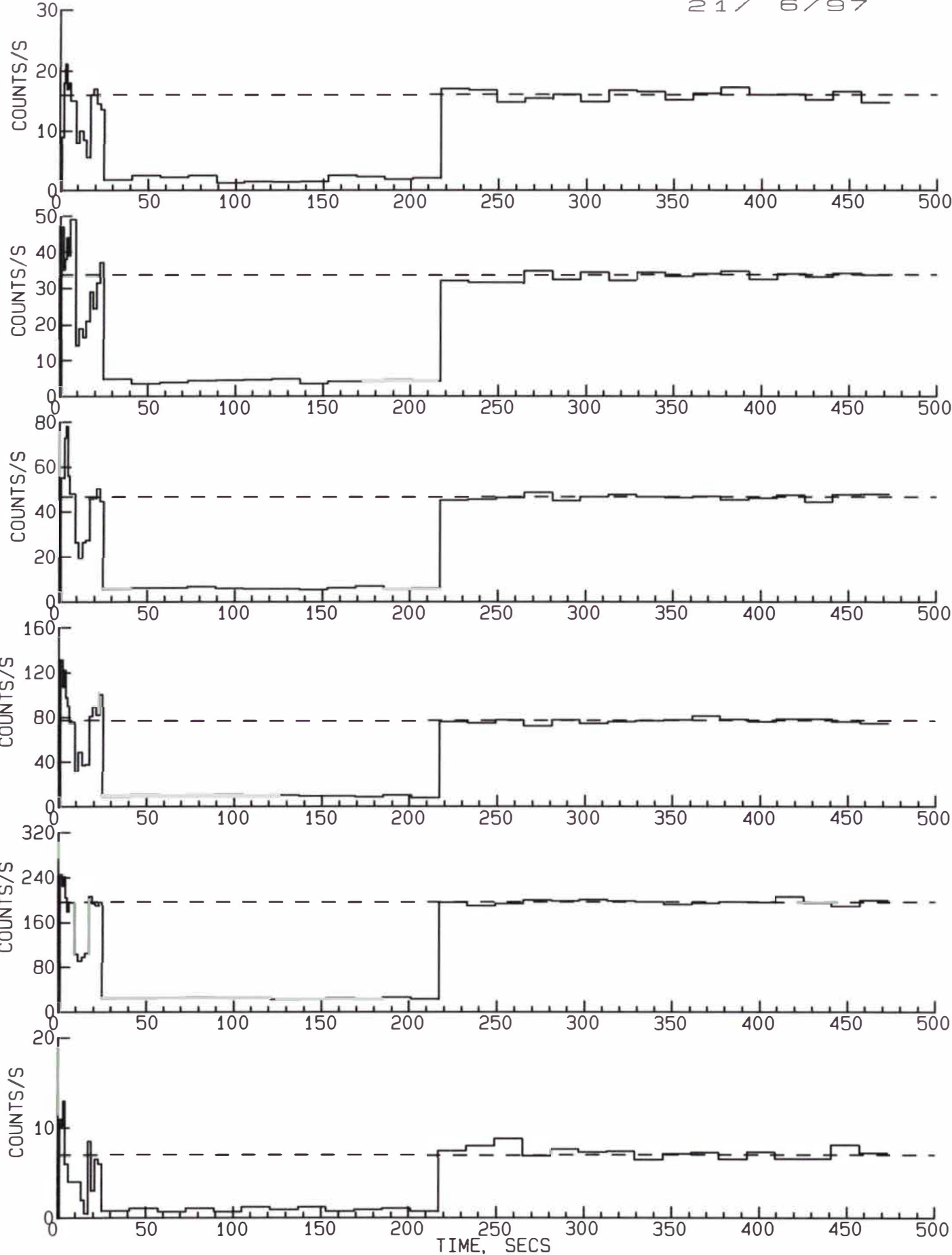
28- 70 keV

70-112 keV

112-154 keV

154-196 keV

196-224 keV



ULYSSES

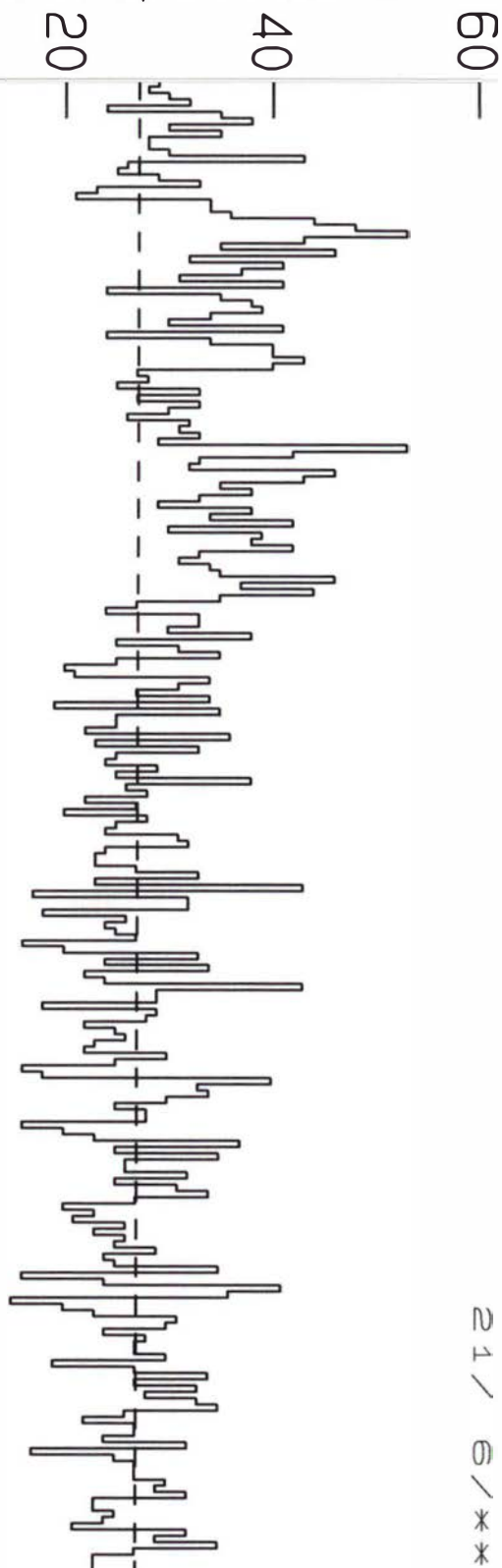
02/05/91

Ttrig=81520.196

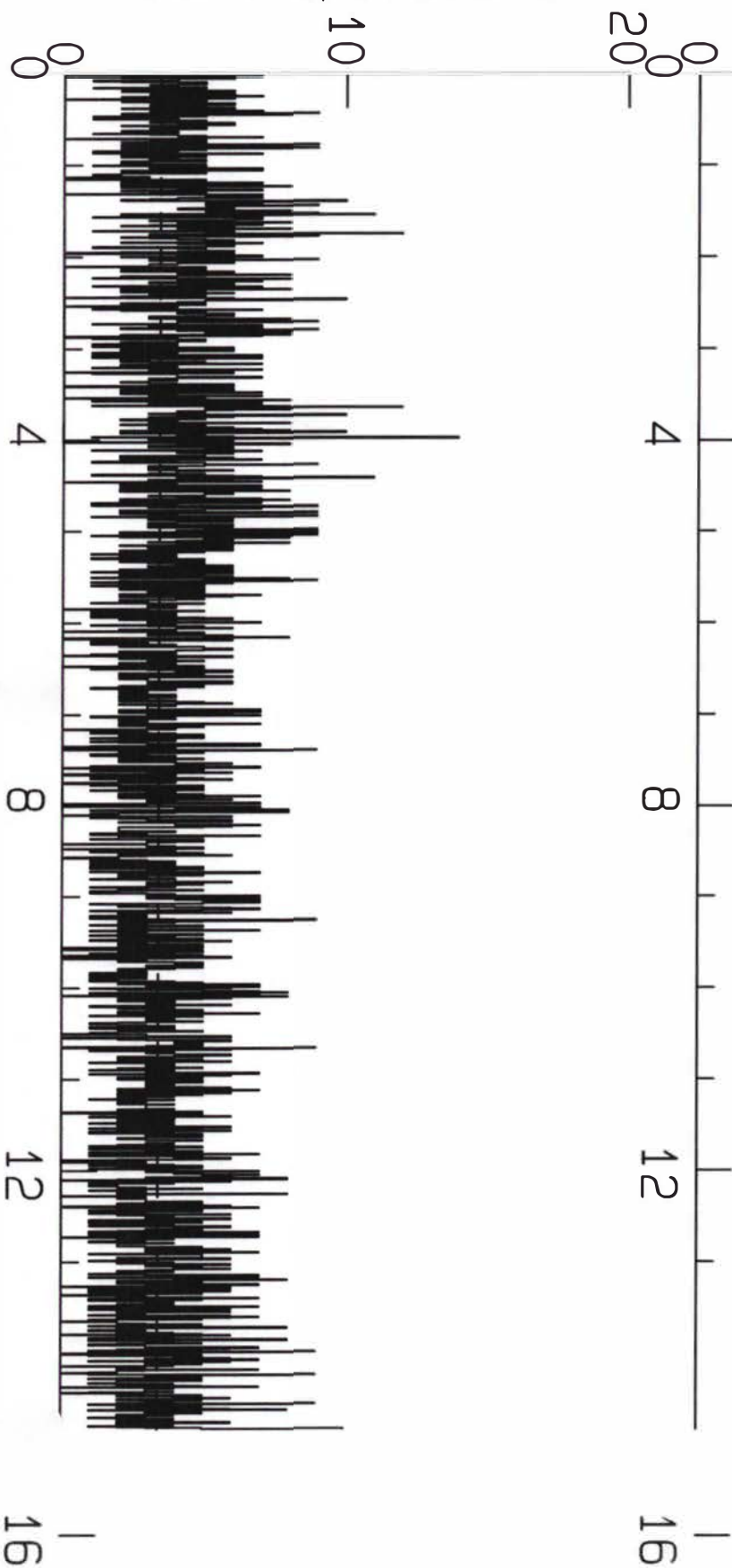
31- 224 keV

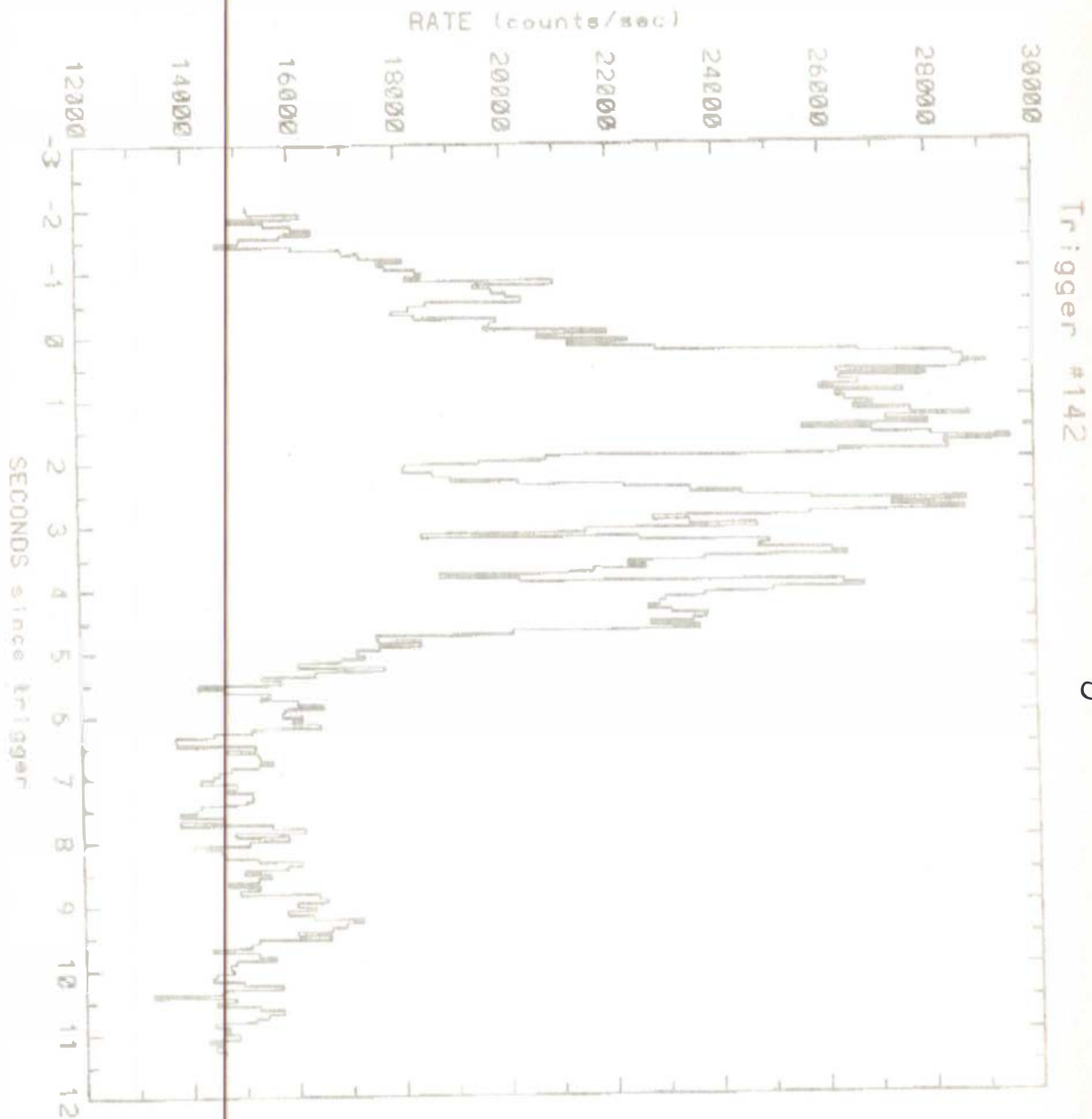
21 / 6 / **

COUNTS/0.062 S



COUNTS/0.008 S





May 2

30-100 keV

16-SEP-1991 17:46:37
 Created by MDPS #0
 (Burst Display)
 Version 2.05
 Trigger # 142
 Trigger Time:
 8378 / 81445.414 = 0 sec
 -2.042 =
 Burst Date Type:
 DISC
 Deadtime
 Corrected: N
 Background Data
 Type: PHEB + DISC
 Minimum Integ. Time
 0.064 seconds
 Detector # 17-01
 08020011
 Discriminators:
 1 1, 2)
 Quality Mask:
 BDISP0

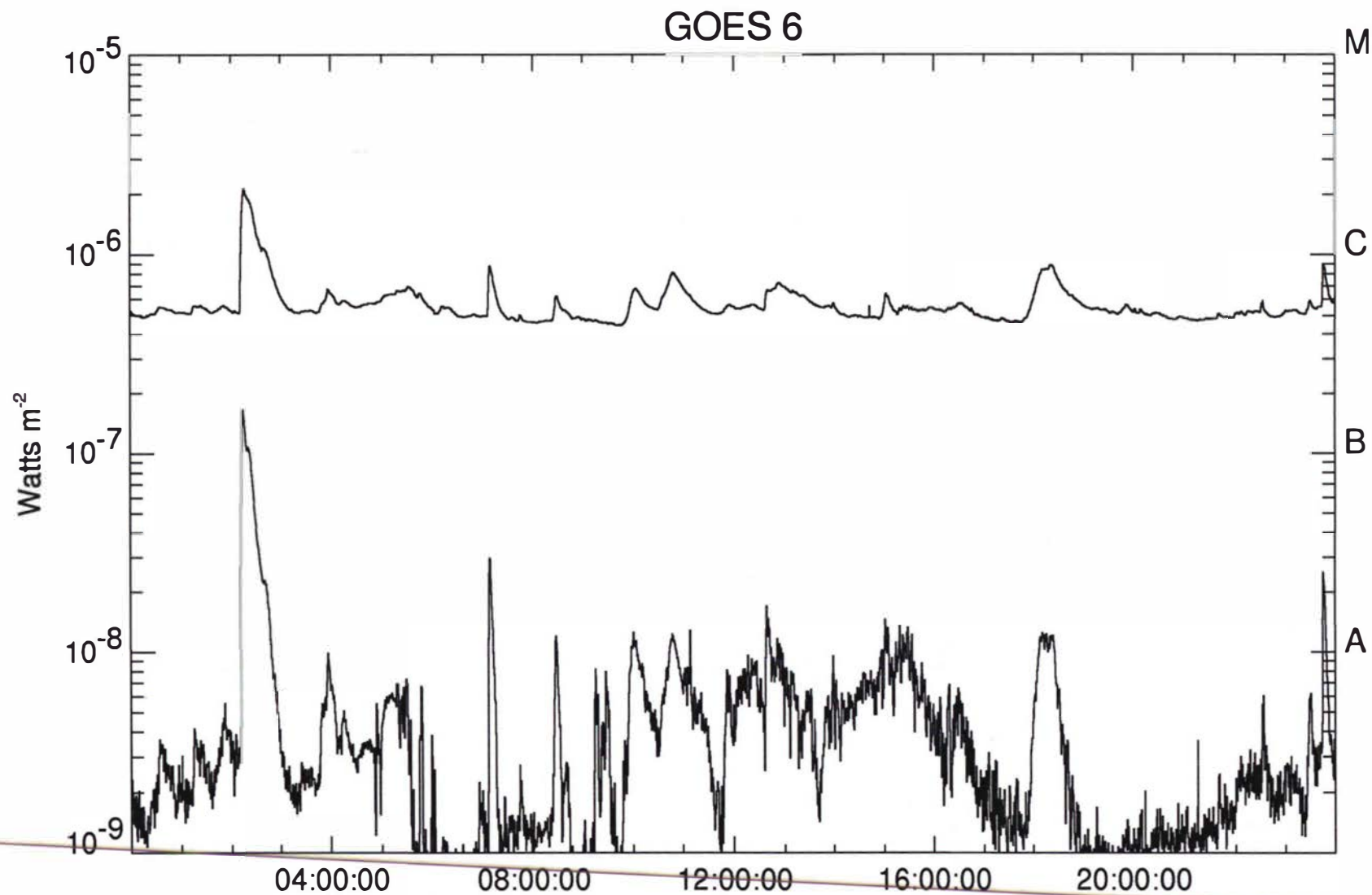
81443.372



2
1

8
2
1

1000000
1000000
1000000
1000000
1000000



Data Start: 91/05/02, 0000:01

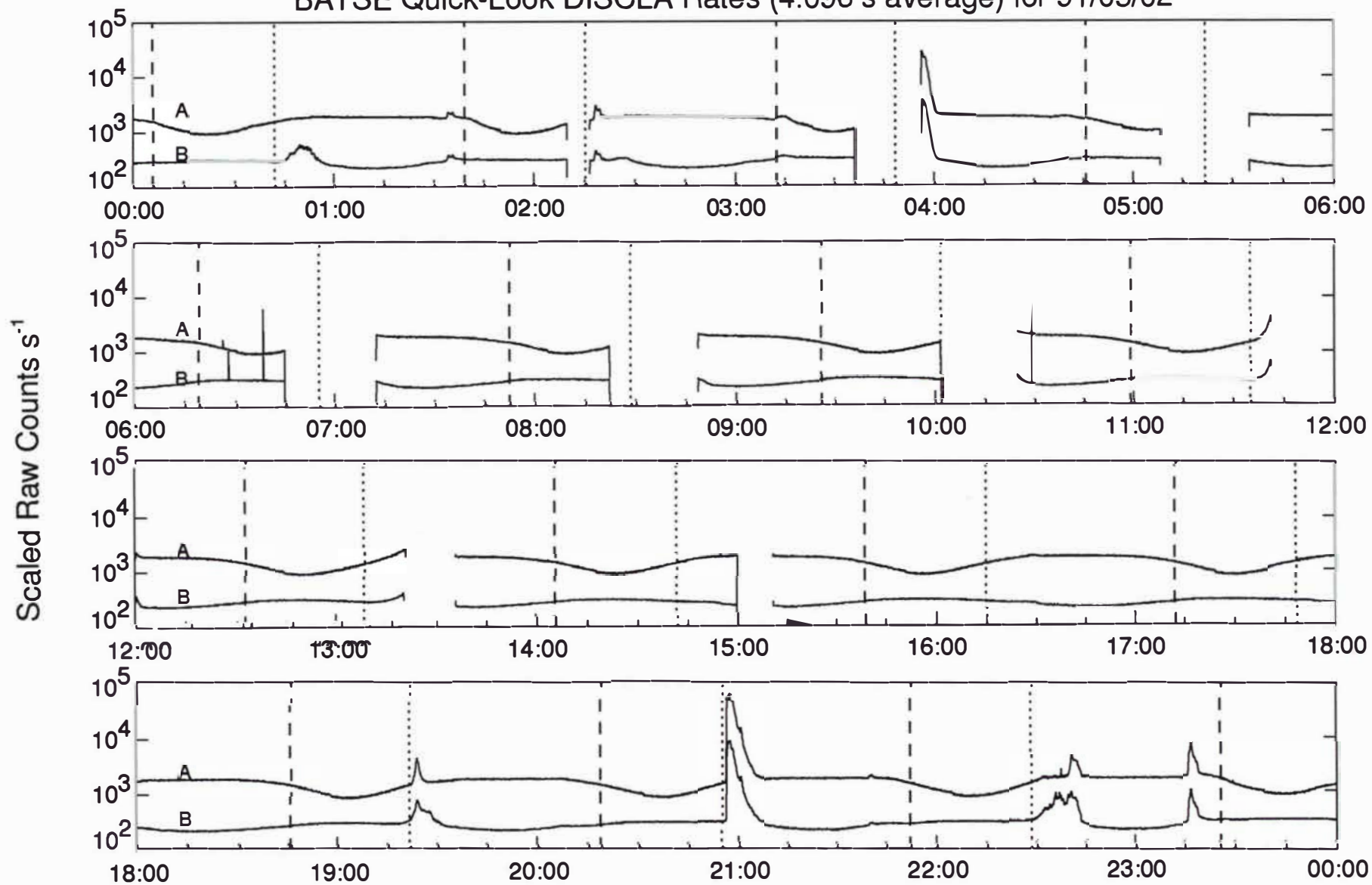
Plot created: 96/11/27, 0232

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/02

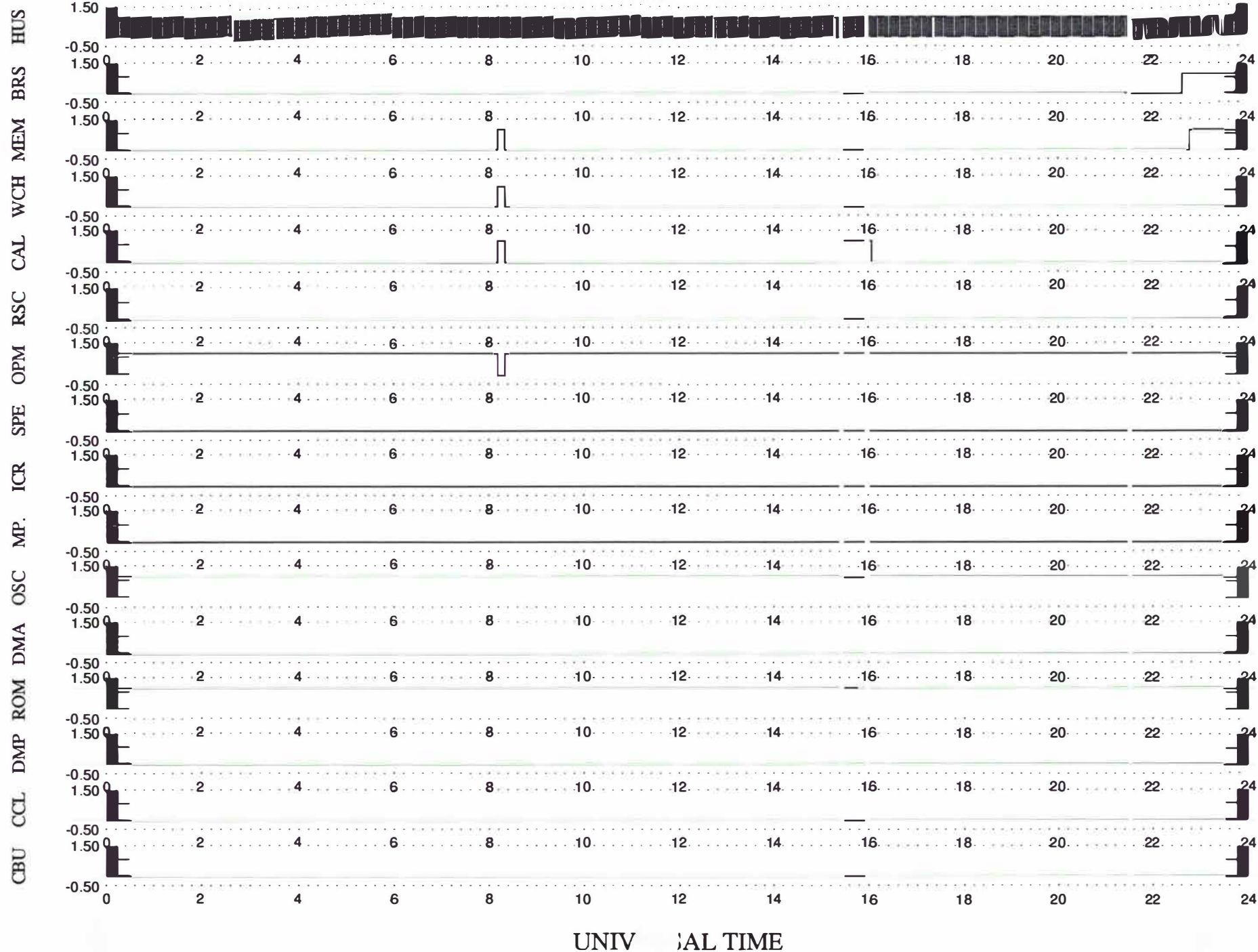


Current Time: 96/11/27, 0233 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

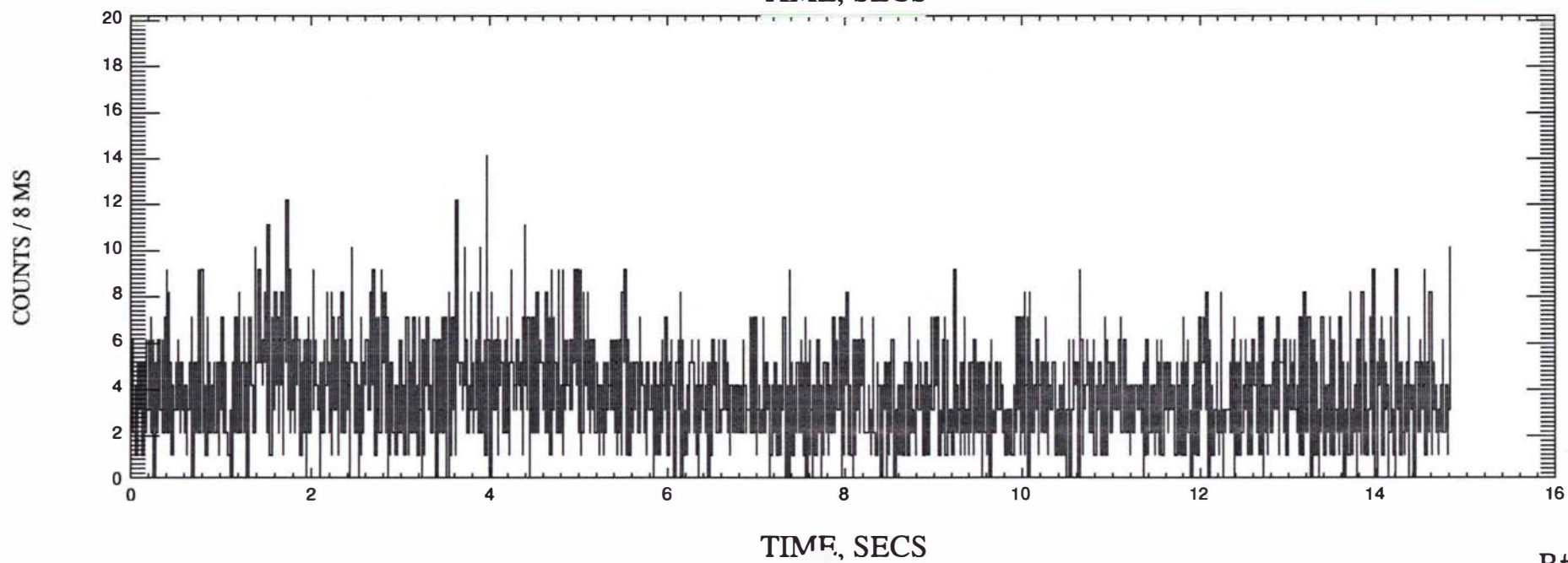
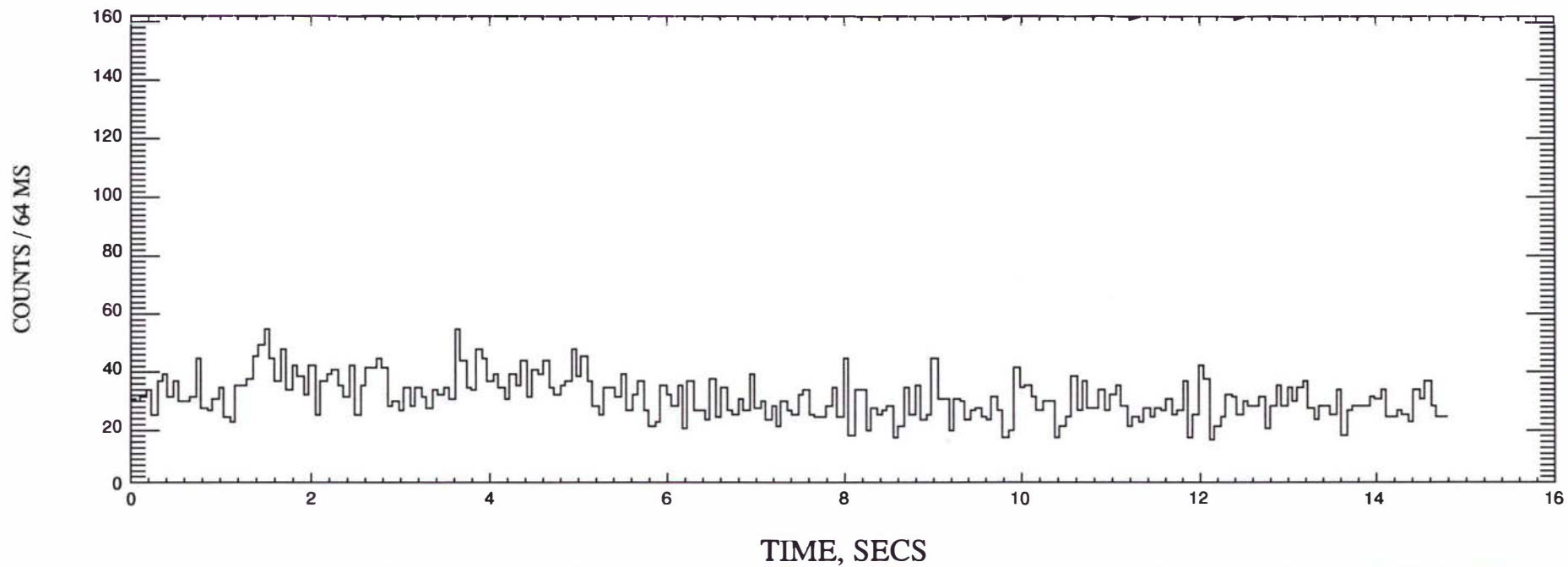
Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

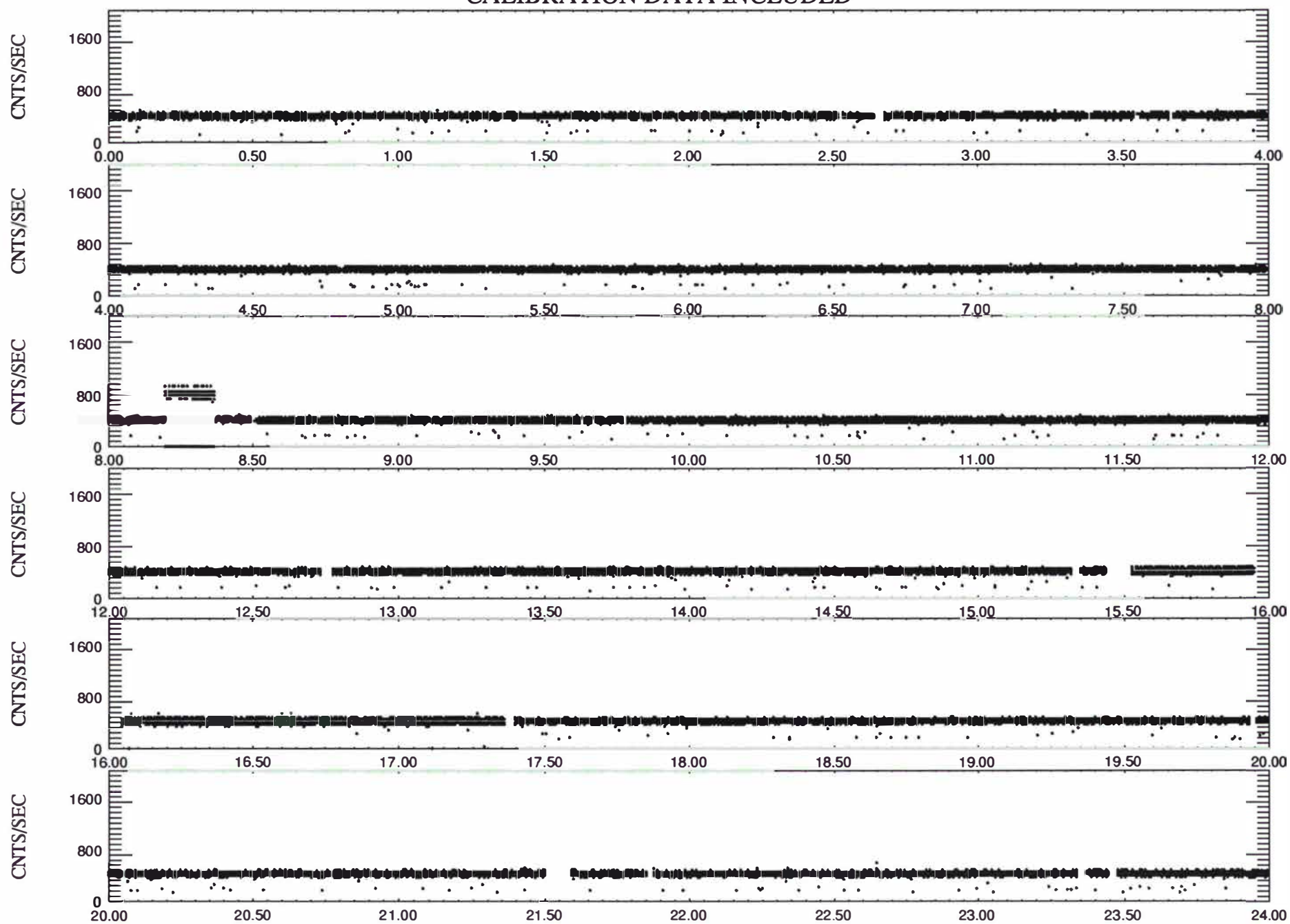
BURST NUMBER 13



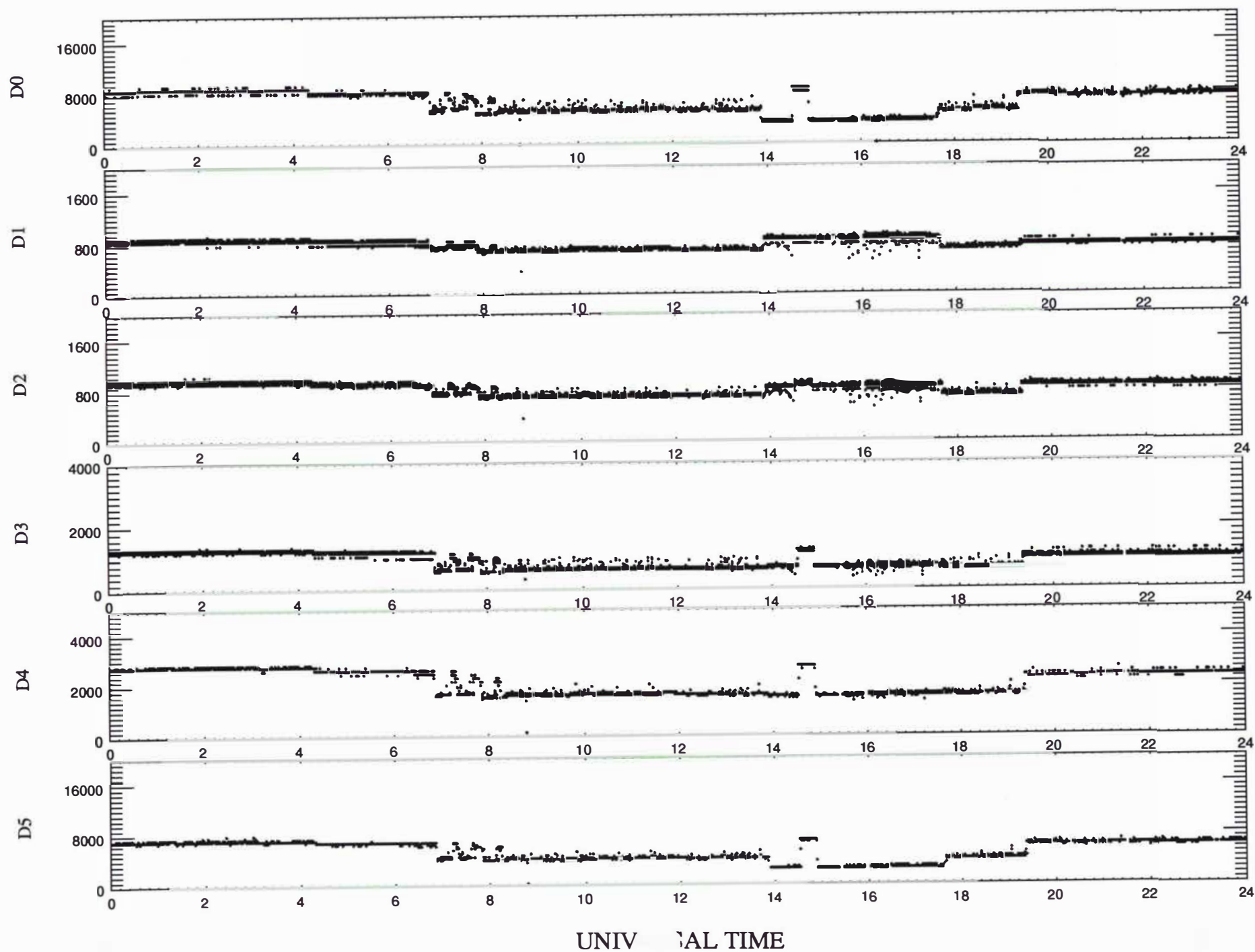
Burst Counter 13 at UT=22.644505865309 h=81520.221 s 22:38:40.221



CALIBRATION DATA INCLUDED



UNIV AL TIME



CATSEARCH PROGRAM

BATSE BURST # 143
EVENT OF 1991 MAY 3-DAY OF YEAR=123
EVENT CROSSING TIME AT BATSE : 25453. S. OR 07:04:12.6
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 87.200 37.600
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 3/ 5/ 91 IS:
RA= 116.898 DEC= 22.801 DIST= 3.036 AU
BATSE-ULYSSES DISTANCE = 454166152. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=150.56 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-1319.34 SECS.
CROSSING TIME AT ULYSSES IS 24133. S. OR 06:42:13 +/- 159.23 SECONDS

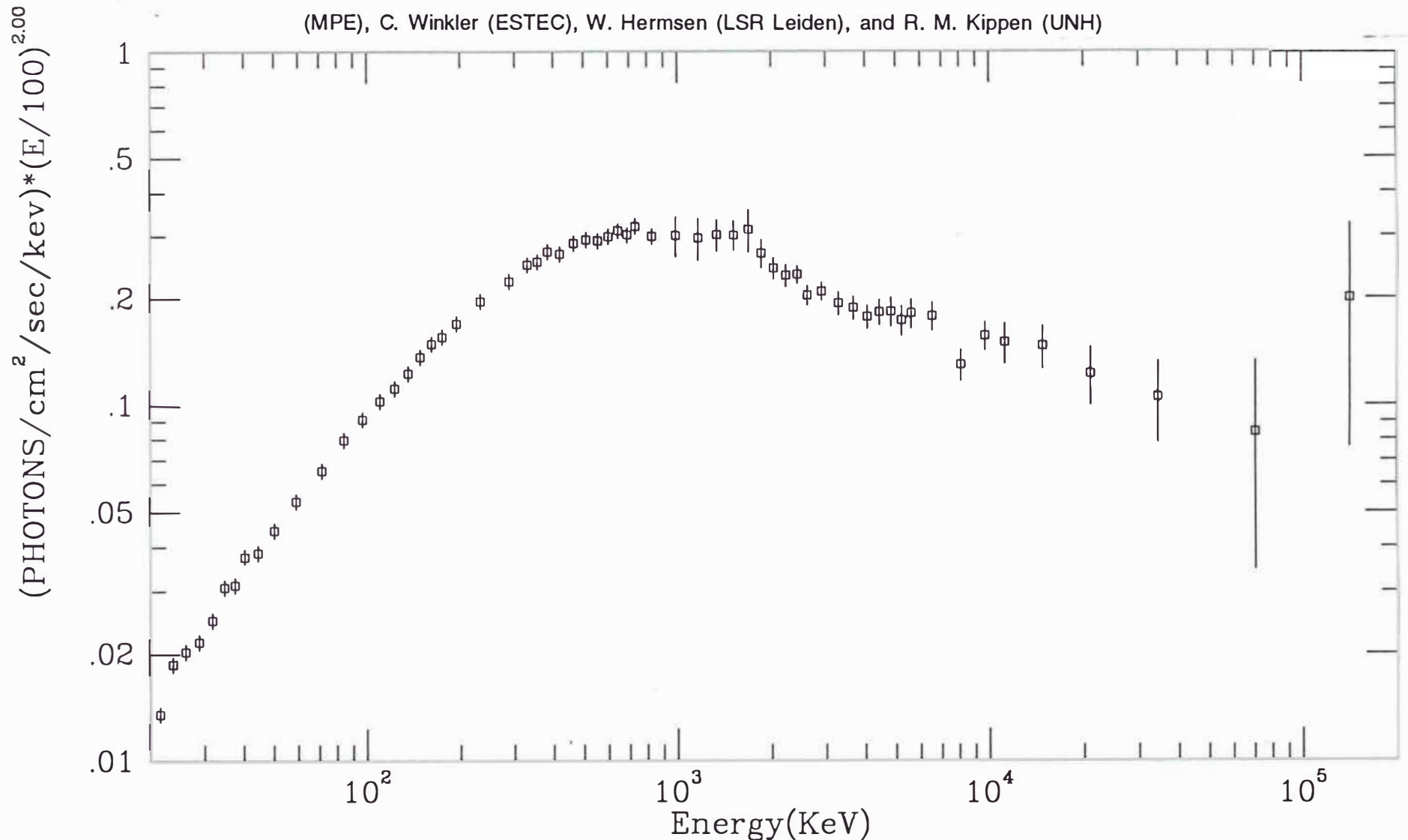
COMPTTEL/BATSE/IPN Burst Localizations

All Coordinates Epoch J2000.0

UB= Ulysses/BATSE UP = Ulysses/PVO BP= BATSE/PVO							BATSE Position					COMPTTEL Position			
		Center		Radius											
Burst	Rf	Ra	Dec	Radius	(-/+)	D (AU)	Ra	Dec	lσ	Smin	Rf	Ra	Dec	lσ	Smin
GRB910425 UB	1	115.140	23.172	51.733	0.053	2.848	91.29	-22.77	1.02	0.27	3	90.20	-22.20	0.92	0.28
GRB910503 UB	1	117.730	22.657	30.352	0.010	3.042	87.45	38.74	0.87	0.03	3	87.00	38.60	0.44	0.30
GRB910601 UB	1	307.038	-20.538	52.936	0.011	3.708	310.12	32.34	0.17	0.02	3	309.90	32.70	0.46	0.37
GRB910627 UB	1	134.824	18.425	66.820	0.031	4.215	197.99	-2.48	0.28	1.28	3	199.40	-5.00	1.63	0.96
UP	1	133.523	18.792	68.352	0.036	3.621	-	-	-	1.53	-	-	-	-	0.71
GRB910709	NA	NA	NA	NA	NA	NA	172.77	81.67	2.31	NA	3	144.10	75.60	1.80	NA
GRB910814 UB	1	328.558	-13.966	45.699	0.018	4.918	346.35	30.43	0.48	1.89	3	343.80	29.50	0.39	0.19
UP	1	328.287	-14.629	46.428	0.019	4.626	-	-	-	1.87	-	-	-	-	0.17
GRB911118 UB	1	166.979	6.889	30.110	0.017	4.972	167.03	-20.85	0.36	2.37	3	166.30	-22.50	1.11	0.71
UP	1	162.619	8.562	32.018	0.019	4.248	-	-	-	2.29	-	-	-	-	0.75
BP	1	190.131	-2.551	30.766	0.086	0.813	-	-	-	1.76	-	-	-	-	0.23
GRB920622 UB	1	150.167	6.667	41.335	0.009	5.800	162.1	47.17	0.31	0.43	3	162.50	49.20	0.81	2.44
GRB920627 UB	1	150.590	6.327	23.540	0.049	5.869	166.02	-2.58	0.65	5.74		166.80	-8.50	1.18	1.61
GRB920830 UB	1	338.192	0.949	86.268	0.018	?	258.53	-73.99	0.54	1.81	3	259.00	-74.50	1.35	1.78
GRB930118	NA	NA	NA	NA	NA	NA	228.40	-34.30	?	NA	4	221.80	-34.80	1.47	NA
GRB930131 UB	1	161.411	-14.563	22.256	0.011	4.218	182.04	-8.24	2.16	1.09	3	186.20	-7.90	1.77	2.93
GRB930309 UB	1	332.600	14.645	36.601	0.035	3.998	325.41	51.73	0.72	0.93	3	322.70	55.20	0.74	4.67
GRB930612 UB	1	143.974	-11.184	63.928	0.053	4.870	103.07	-69.76	0.4	0.07	3	106.50	-71.00	1.60	0.17
GRB930704 UB	1	146.146	-11.823	82.959	0.113	5.089	100.9	60.8	0.59	2.01	3	99.30	62.80	1.08	0.07
BM	1	159.825	8.635	68.701	2.319	1.981	-	-	-	1.04	-	-	-	-	0.45
GRB931229	NA	NA	NA	NA	NA	NA	240.06	19.7	1.4	NA	3	241.90	21.00	2.35	NA
GRB940217 UB	1	328.736	51.947	69.334	0.050	3.038	29.07	4.55	0.69	0.84	3	30.10	3.10	0.32	0.94
GRB940301 UB	1	321.914	52.508	59.395	0.136	2.953	103.51	64.35	0.35	0.02	3	102.70	64.00	0.40	0.17
GRB940314 UB	1	314.850	51.972	64.530	0.220	?	354.86	-2.14	0.94	0.77	3	356.00	-1.40	1.43	0.92
GRB940520 UB	1	300.149	41.387	40.380	0.133	2.986	323.5	6.93	0.88	0.16	3	324.70	7.70	0.70	0.27
GRB940619 UB	1	303.998	39.140	69.375	0.211	3.039	299.05	-29.89	0.34	0.20	3	298.50	-31.50	1.15	1.44
GRB940708 UB	1	308.119	39.489	17.431	0.038	?	301.58	24.66	1.02	1.61	3	300.50	22.70	1.03	0.56
GRB940728 UB	1	133.614	-41.397	36.245	0.131	?	85.49	-39.87	1.44	0.17	3	85.10	-38.00	1.10	0.75
GRB940921 UB	2	155.516	-55.210	54.361	0.121	2.583	196.59	-18.71	?	6.49	4	207.10	-16.40	0.68	0.75
GRB941017	NA	NA	NA	NA	NA	NA	302.63	11.10	?	NA	4	301.70	13.30	2.10	NA
GRB950208 UB	2	334.715	-27.012	83.397	0.022	2.301	337.06	54.19	?	2.17	4	344.80	56.00	1.95	0.05
GRB950421 UB	2	177.048	-19.097	81.048	0.226	2.171	71.92	-63.03	?	1.41	4	70.10	-61.70	1.43	0.11
GRB950425 UB	2	178.121	-21.566	17.005	0.207	2.154	163.16	-35.21	?	1.90	4	164.90	-33.80	0.34	0.11
GRB950522 UB	2	7.656	42.578	86.989	0.063	2.039	109.57	19.31	?	1.60	4	110.81	20.34	1.14	1.47
1 Hurley, K. et al Huntsville workshop (1995)							Smin = minimum distance between point and IPN annulus								
2 BACODINE/IPN burst alert messages (Hurley)															
3 BATSE 3B Catalog															
4 Meegan, C. Priv. Comm. (Trigger Messages)															

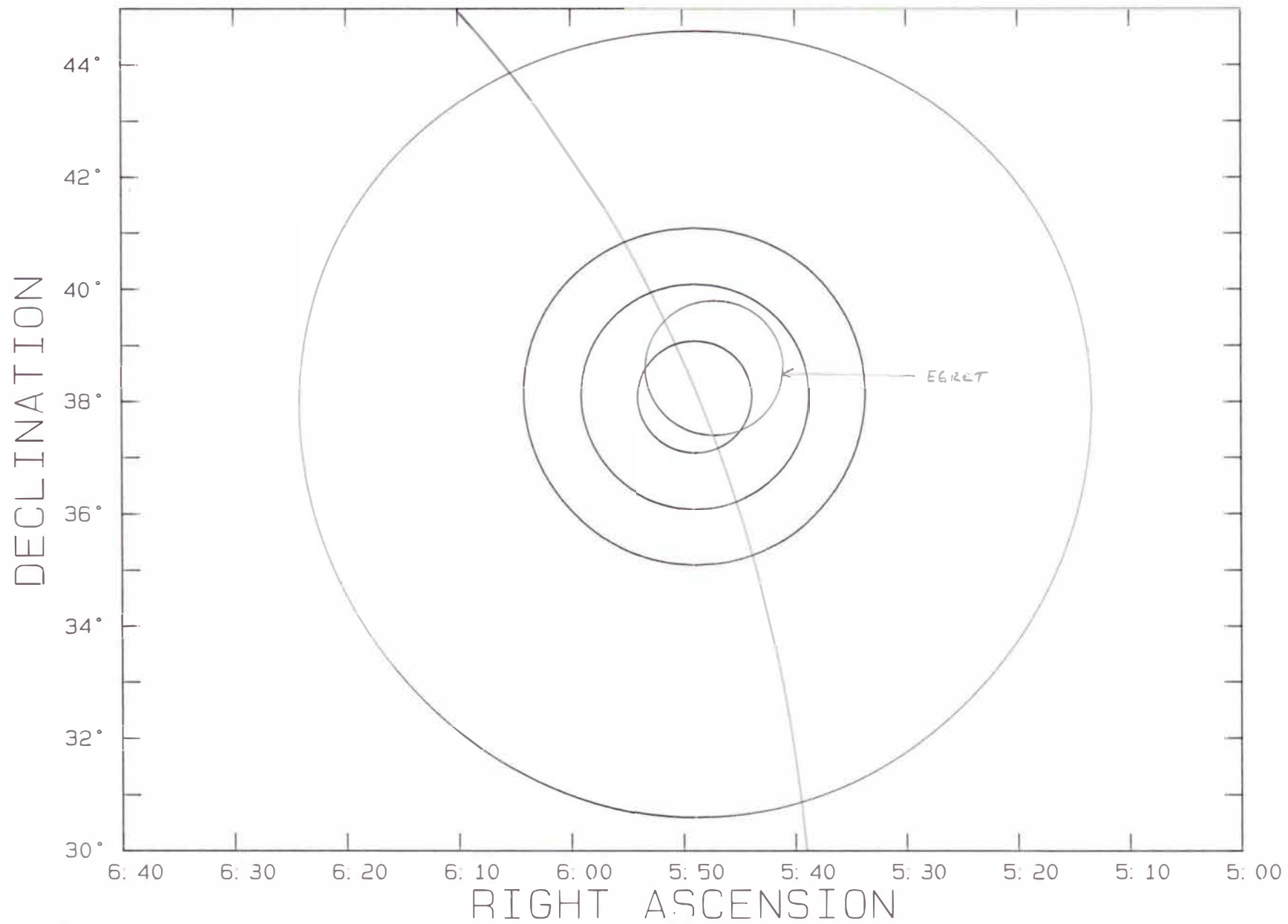
CROSS CALIBRATION OF BURST SPECTRA WITH BATSE EGRET, AND COMPTTEL FOR GRB910503

Bradley E. Schaefer, Bonnard J. Teegarden, Thomas L. Cline, Brenda L. Dingus (NASA/GSFC), Gerald J. Fishman, Charles A. Meegan, Robert B. Wilson (NASA/MSFC), William S. Paciesas, Geoffrey N. Pendl (Univ. Alabama), David L. Band (UCSD), E. J. Schneid (Grumman), Ping W. Kwok (NAS/NRC), V. Sci (MPE), C. Winkler (ESTEC), W. Hermsen (LSR Leiden), and R. M. Kippen (UNH)



4/ 5/93

MAY 3, 1991 6: 42



Apr 6 07:36 1993 standard input Page 13

From kuiper@rulrol.leidenuniv.nl Tue Apr 6 05:50:50 1993
Date: Tue, 6 Apr 93 14:53:03 +0200
From: kuiper@rulrol.leidenuniv.nl (Lucien Kuiper)
To: khurley@space6.ssl.berkeley.edu
Subject: IPN time arcs
Cc: kuiper@rulrol.leidenuniv.nl, hermsen@rulrol.leidenuniv.nl,
vos@ibma.ipp-garching.mpg.de, lhanlon@ests2.estec.esa.nl
Content-Length: 1102

Dear Dr. Hurley,

I am happy to hear that it is allowed to use the IPN time annuli information in the COMPTEL paper (L.Hanlon - 1993, to be submitted to A&A).

The best COMPTEL positions (in (L,B) and (RA2000,DEC2000)) for the imaged bursts occurring in the first year of operation are given below :

Burst	L	B	RA2000	DEC2000
GRB910425	228.48	-19.64	91.39	-22.21
GRB910503	172.50	5.31	87.23	38.09
GRB910601	74.49	- 5.35	310.14	33.05
GRB910627	315.02	58.44	199.17	- 3.84
GRB910709	138.49	36.52	142.19	73.82
GRB910814	94.35	-26.72	343.44	29.54
GRB911118	274.49	33.57	167.20	-23.57

However, it is difficult to give the final COMPTEL error regions because of their irregular shape.

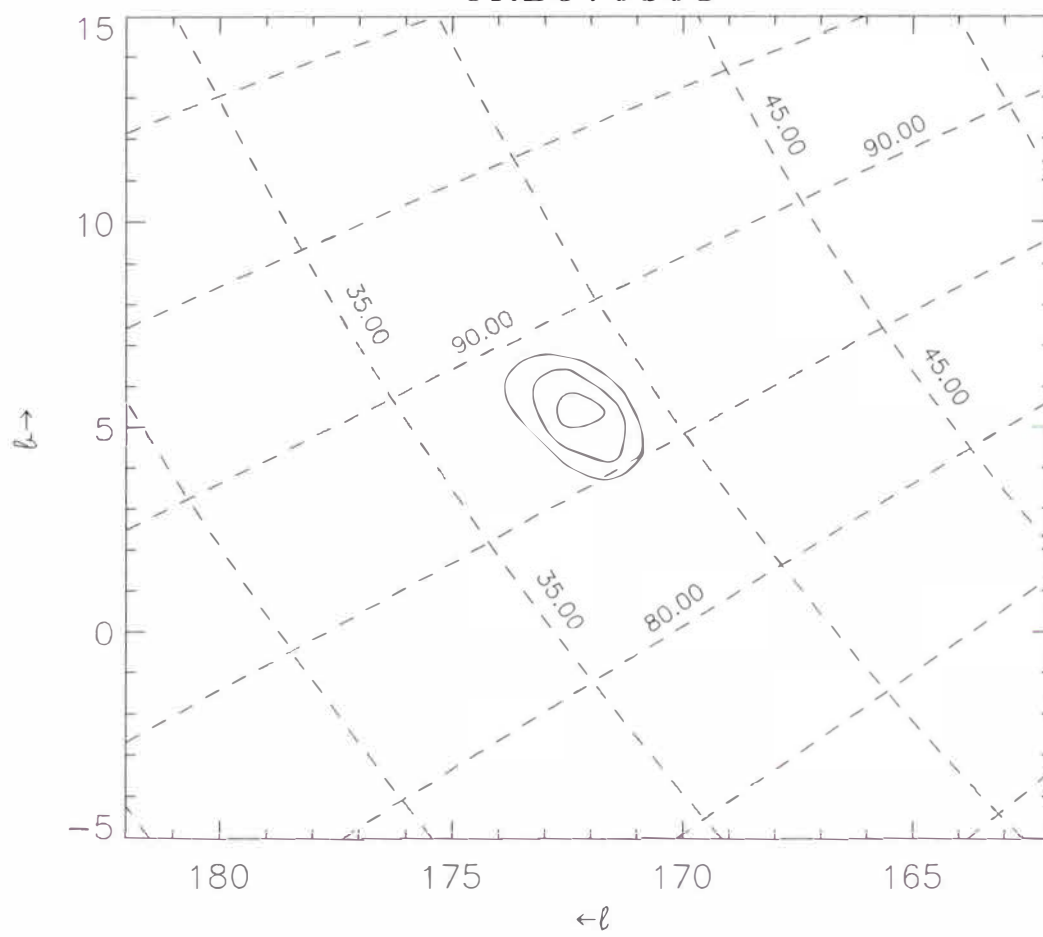
Therefore, I send you the corresponding maps as PostScript-files, showing the exact error contours (1-, 2- and 3-sigma error contours for 2 DoF) one by one.

The figures will appear in Hanlon et al.

After submission of the paper you can use these making reference to the above paper.

Best regards, L. Kuiper

GRB910503



Mar 22 07:33 1993 standard input Page 1

From VOS@ibma.ipp-garching.mpg.de Mon Mar 22 07:23:45 1993
Date: Mon, 22 Mar 93 16:20:44 MEZ
From: "V. Schoenfelder" <VOS@ibma.ipp-garching.mpg.de>
Subject: Triangulation Circles
To: "Dr. Kevin Hurley" <khurley@space6.ssl.berkeley.edu>
Content-Length: 573

Dear Kevin,

The COMPTEL team is at present preparing a paper about all bursts that were seen by COMPTEL in its field-of-view during the first year of the mission.

We shall show COMPTEL images of GRB 910425, 910503, 910601, 910627, 910709, 910714, 910814, and 911118. To demonstrate crude consistency of the derived COMPTEL locations with the triangulation circles from Ulysses and BATSE, it would be nice to add the circles to the images. Do you mind to provide these circles to us?

We would acknowledge your contribution at the end of the paper.

Best regards,

Volker

910503 - 1st Compton Symp

910814 - 1st Huntsville Symp, Cline et al 2nd Comp Symp

910627 - Cline et al ^{2nd} Compton Symp

911118 Cline et al 2nd Comp Symp

From khurley@space6.ssl.berkeley.edu Sat Mar 27 11:43:22 1993
Date: Sat, 27 Mar 93 11:35:18
From: khurley@space6.ssl.berkeley.edu
Content-Length: 1683

Dear Volker,

I have consulted with Jerry Fishman and Michael Sommer concerning your request to show Ulysses/BATSE triangulation circles in your COMPTEL paper. Some of the events that you will be showing have not been published by us, even in preliminary form, and we do intend to publish them as a catalog eventually, so we have had to consider things carefully. We all agree that you can publish the arcs, provided that you can agree to the following conditions.

1. We will give you the RA, dec, and radii for the arcs so that you can draw them. However, the actual numbers are not to be published.
2. For the cases noted below, where a preliminary version of the arc or error box has appeared, we ask that you cite the appropriate reference.

910503: Hurley et al., Proc. 1st Compton Symposium, p. 288, 1992
910814: Cline et al., Gamma Ray Bursts, AIP 265, 1992, p. 72
910627 and 911118: Cline, T., Hurley, K., Sommer, M., Boer, M., Niel, M., Fishman, G., Kouveliotou, C., Meegan, C., Paciesas, W., Wilson, R., Fenimore, E., Laros, J., and Klebesadel, R., in Proc. Compton Symposium, St. Louis, AIP Press (in press)

3. Finally, we also request an acknowledgment in your paper, as follows:

We are grateful to G. Fishman, K. Hurley, C. Kouveliotou, and M. Sommer for communicating the 3rd Interplanetary Network localizations of gamma ray bursts prior to final publication.

(or words to that effect).

If you agree to this procedure, please send me the final COMPTEL coordinates of your error boxes, so that I can check consistency with the IPN locations. I will e-mail you back the numbers for the arcs.

Best regards,

Kevin

cc: G. Fishman, C. Kouveliotou, M. Sommer

From bld@sage0.gsfc.nasa.gov Thu Feb 18 06:44:35 1993
From: bld@sage0.gsfc.nasa.gov (Brenda Dingus)
Subject: Re: proposal
To: khurley@space6.ssl.berkeley.edu
Date: Thu, 18 Feb 1993 09:45:08 -0500 (EST)
X-Mailer: ELM [version 2.4 PL20]
Mime-Version: 1.0
Content-Type: text/plain; charset=US-ASCII
Content-Transfer-Encoding: 7bit
Content-Length: 1036

Kevin,

Thanks for your constructive comments. I am incorporating them into the proposal. I didn't receive the fax, so please send it again. A figure for 910503 isn't very impressive since the energy of the gammas is low so we have poor angular resolution; however, I'd be interested in seeing the timing arc. I've been looking at this burst and have found a 10 GeV photon which is 84 seconds after our burst of 6 photons. The direction is $l=171.8$ $b=6.2$ with an uncertainty of about 0.3 degrees radius. In the 3 days of this viewing period, we saw 19 (6) photons above 5 (8) GeV in the entire field of view. The direction of this photon appears to be consistent with the Ulysses/BATSE triangulation based on a figure I found. Could you plot it for me? Thanks.

As far as the budget goes I am trying to get it through USRA with myself as the PI. However, I'm running into difficulties with USRA and may have to switch the PI to Dave Bertch. I'll know which is the case this morning and will call you by 1:00 EST.

Brenda

$$\alpha = 86.9 \quad \delta = 39.1 \quad (1950)$$

$$\alpha = 87.8 \quad 39.1 \quad (2000)$$

Helio. corr. removed
Date: June 21 1997

BURST TRIANGULATION CHECKLIST

1. Ulysses Data

- ☒ Jim Schmidling's stat file correction applied?
- ☒ Final ephemeris used?
- ☒ Final, CDROM data used?
- ☒ Were data checked by Joe Springer for 0.5 s errors?
- ☒ If a 2 spacecraft triangulation, was Ulysses time corrected for aberration?
- ☒ Is the order of the data in CORREL such that a vernier is done on the data with the best time resolution?

2. BATSE Data

- ☒ 2.042 s subtracted for bursts prior to June 25 1992 and DISCSC programs prior to Version 2.16 (August 28 1992)?
- ☒ Does T_0 in data file agree with T_0 in plot?
- ☒ BATSE ephemeris for T_0 ?
- ☒ Error circle position and radius from public catalog used?
- ☐ If MER data were used, is a 30 ms systematic error included?

3. PVO Data

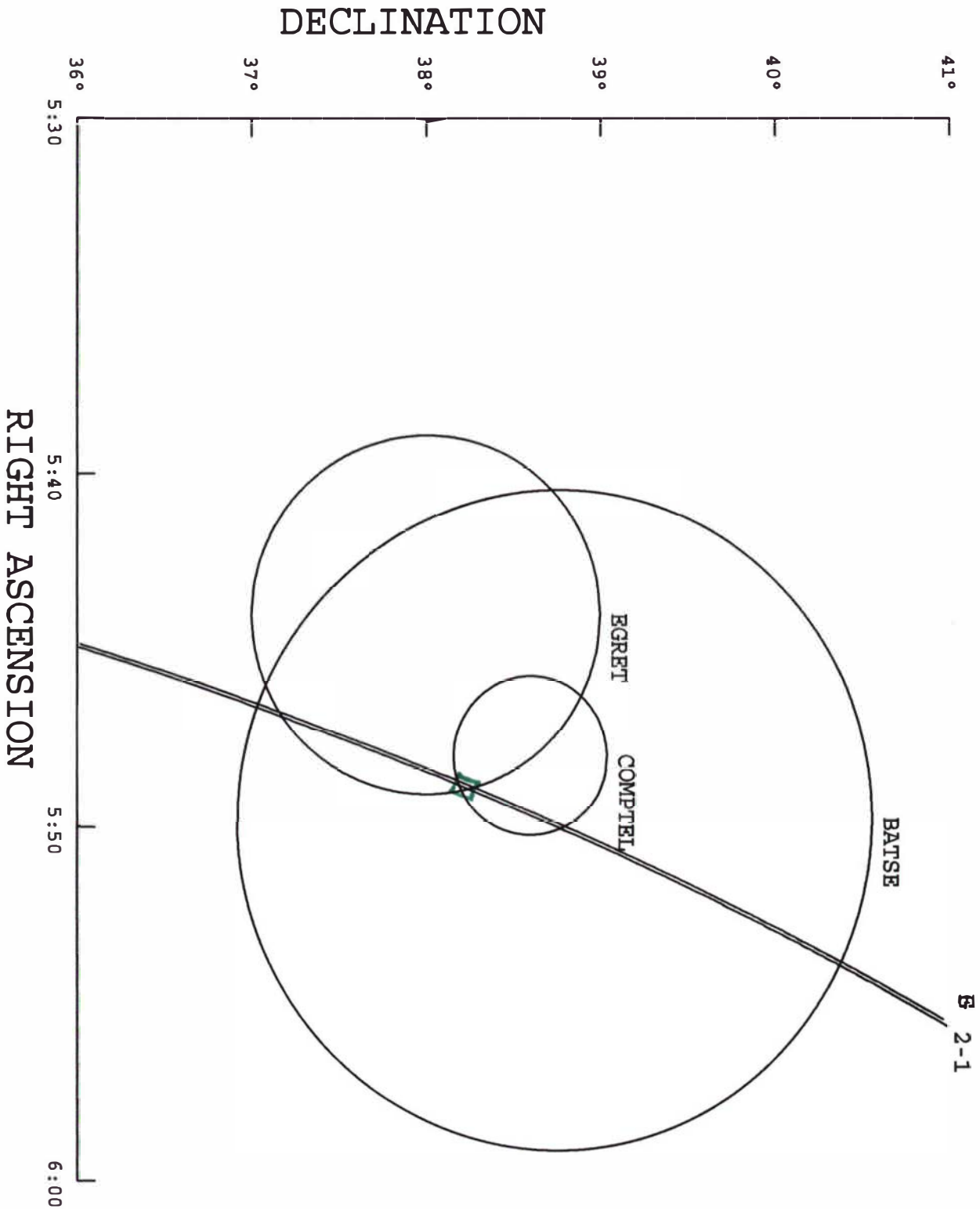
- ☐ Ephemeris of PVO used (not Venus)?
- ☐ 2000 coordinates used?
- ☐ Geocentric time used?

- ☒ ACCESS database updated?

N-M = CORRELATION BETWEEN SATELLITES N AND M
 EARTH-N = EARTH AS SEEN FROM SATELLITE N
 S=SUN E=ECLIPTIC G=GALACTIC EQUATOR
 1 ULYSSES 2 BATSE

EVENT OF MAY 3, 1991 6:42

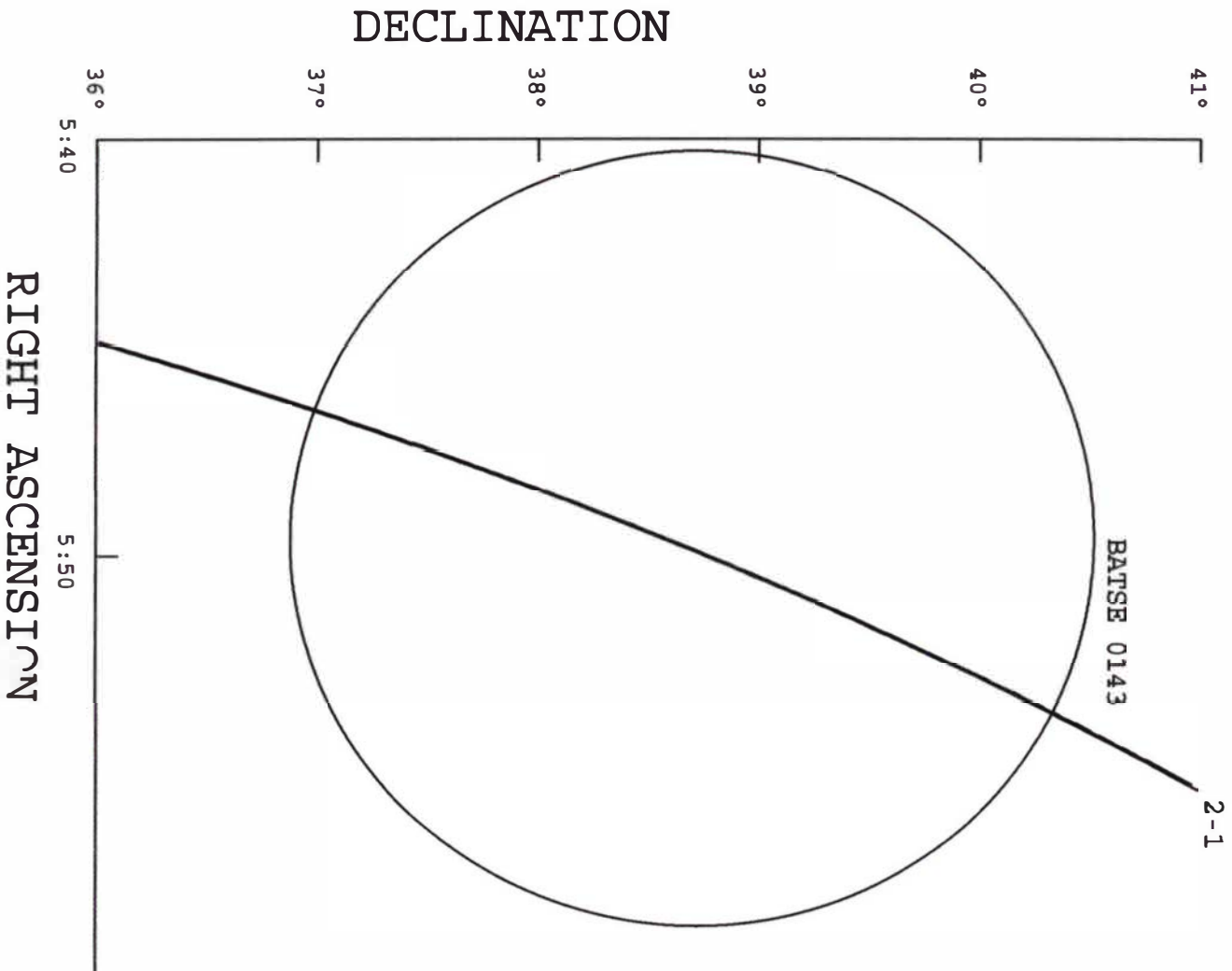
22 / 8 / 8



N-M = CORRELATION BETWEEN SATELLITES N AND M
 EARTH-N = EARTH AS SEEN FROM SATELLITE N
 S=SUN E=ECLIPTIC G=GALACTIC EQUATOR
 1 ULYSSES 2 BATSE

EVENT OF MAY 3, 1991 6:42

21/ 6/97



BATSE

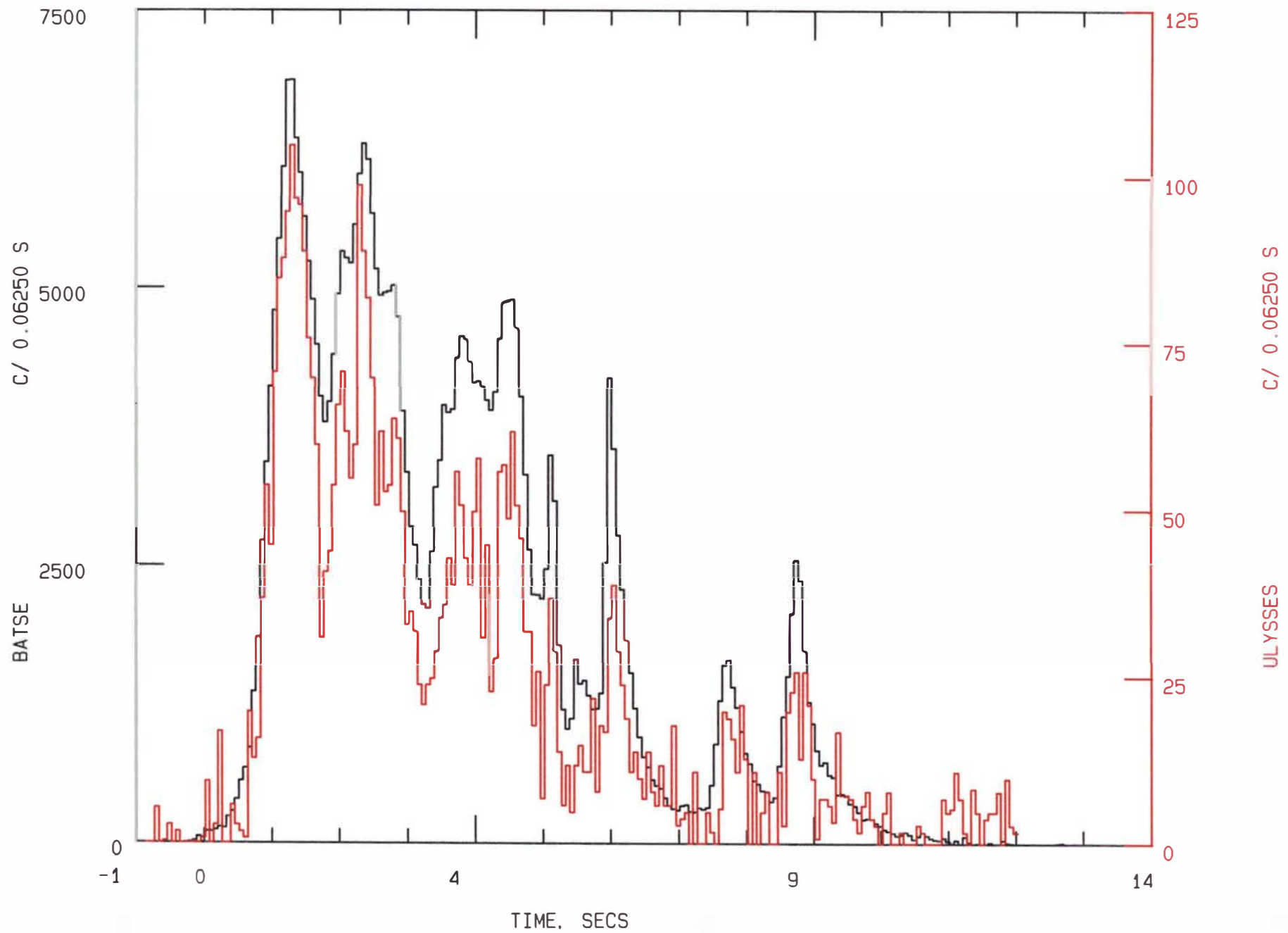
-ULYSSES

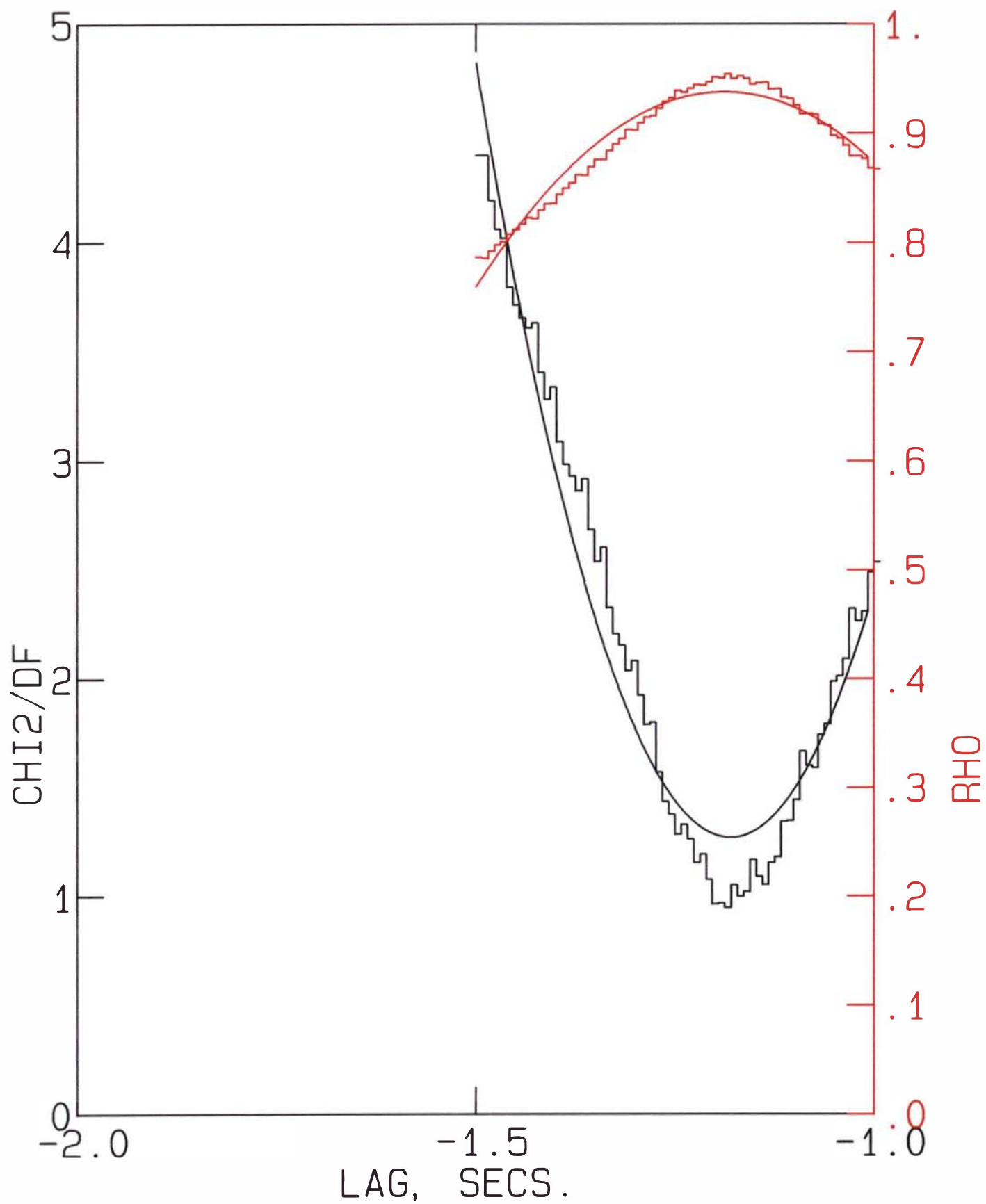
CORRELATION

3/ 5/91

25452.652

21/ 6/97





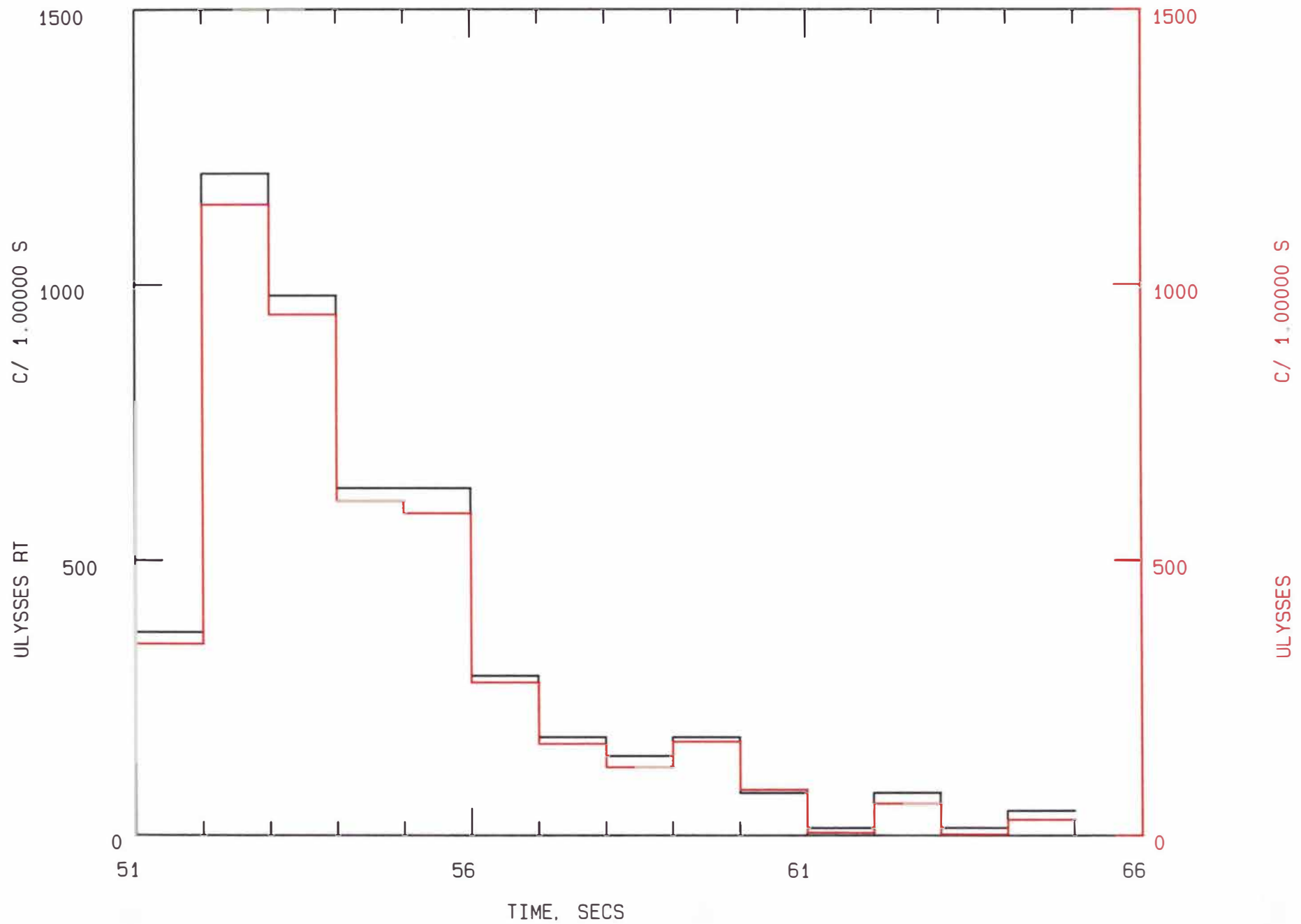
ULYSSES RT-ULYSSES

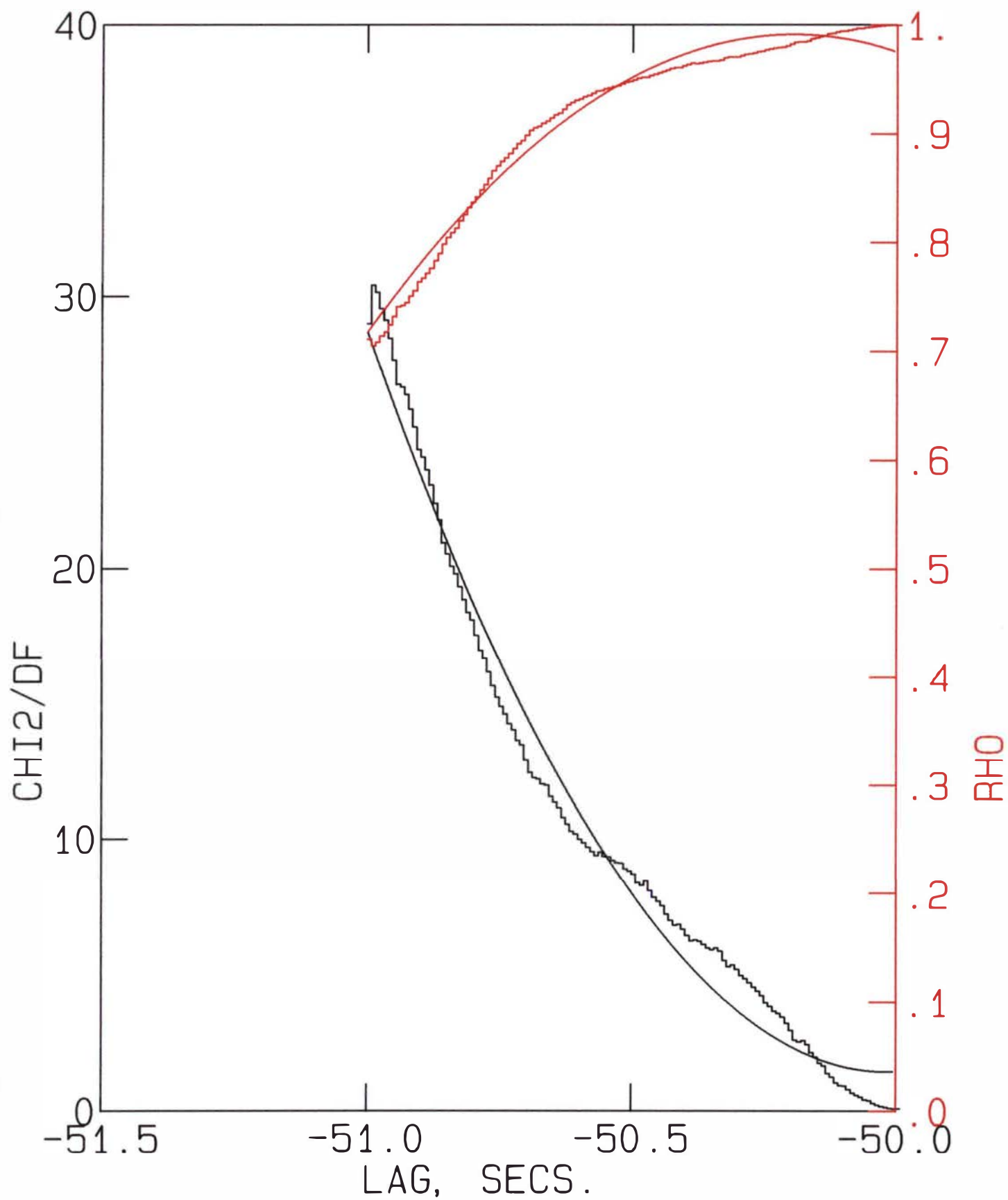
CORRELATION

3/ 5/91

24091.677

21/ 6/97

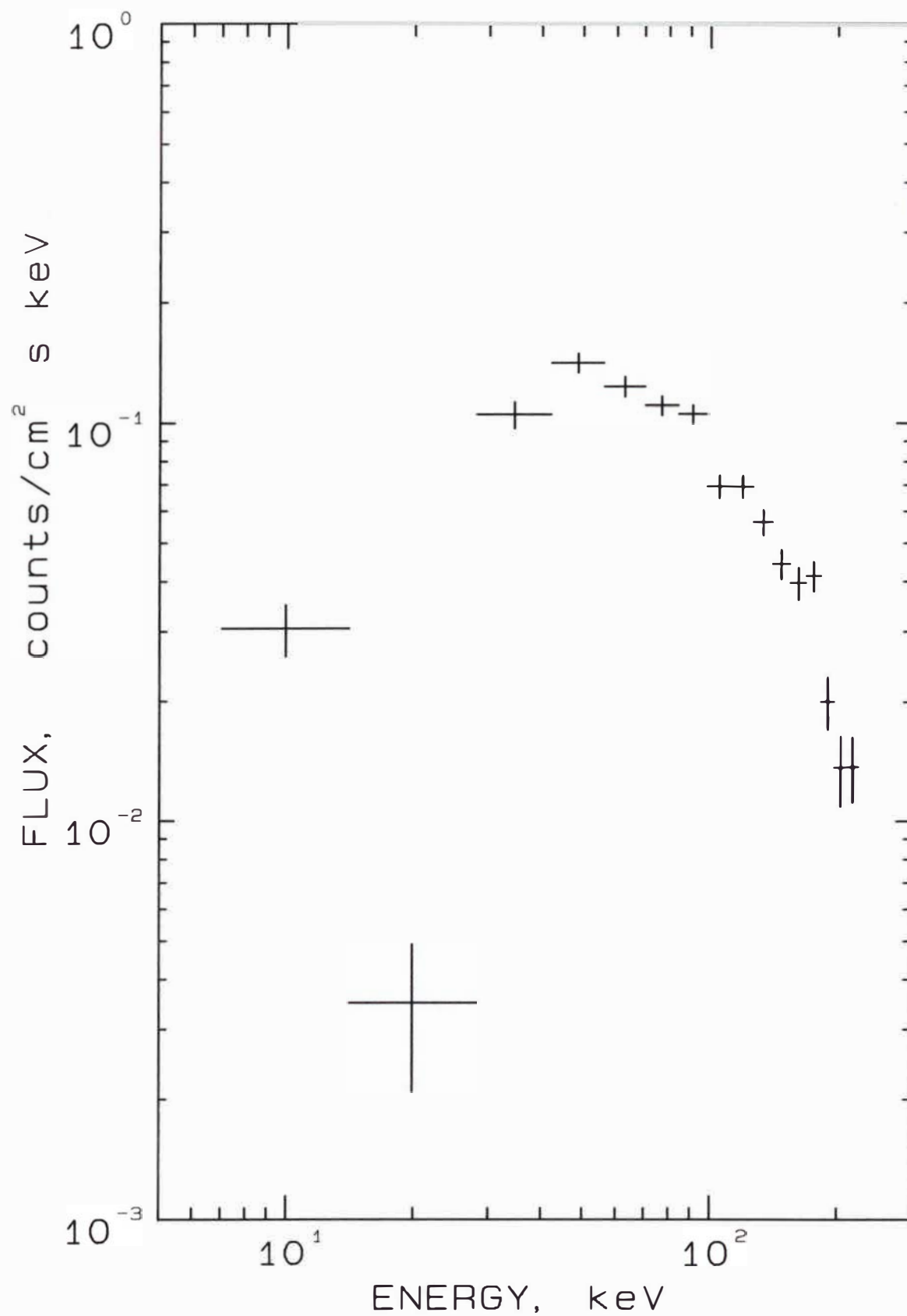




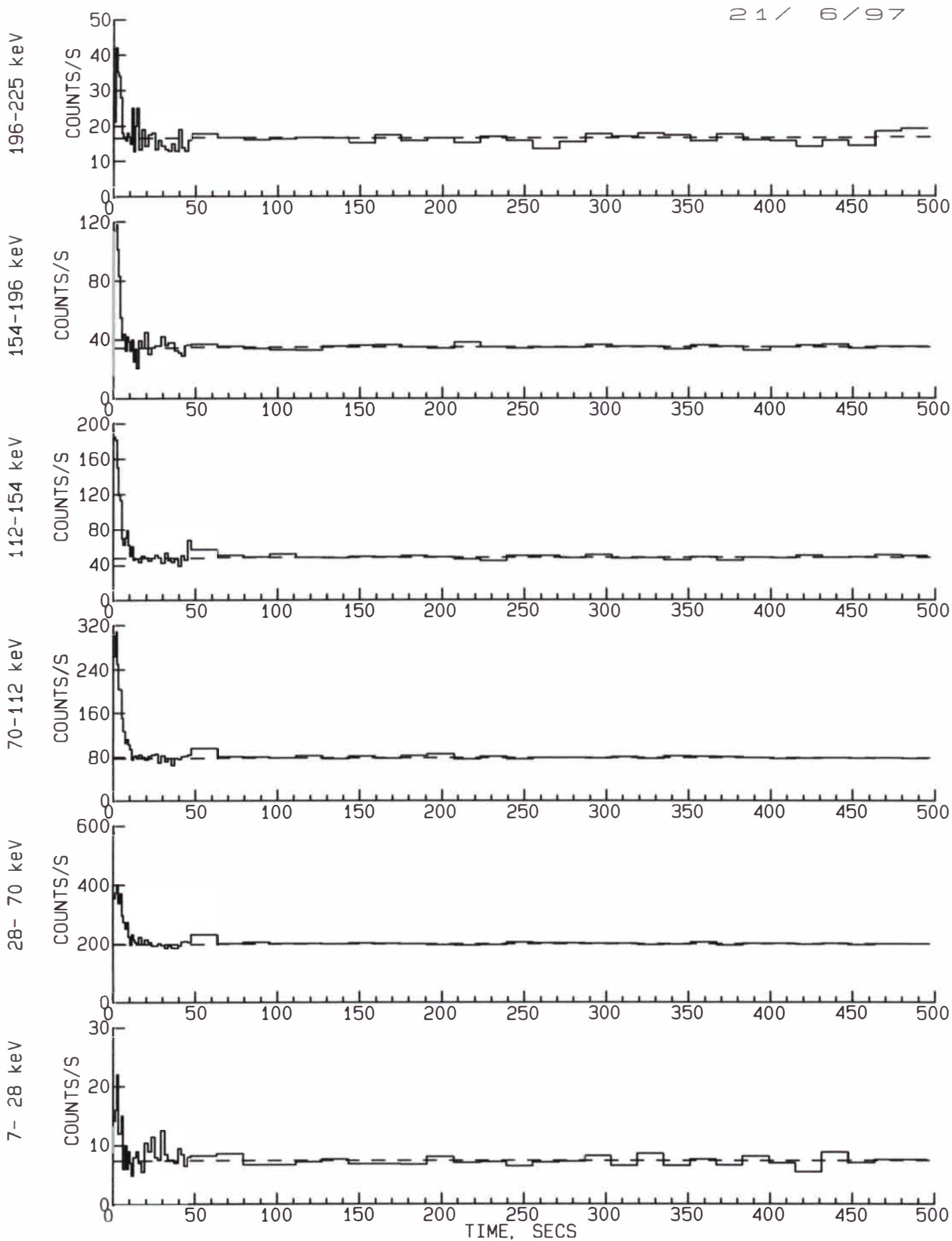
ULYSSES 03/05/91 24143.561

21/ 6/97

SPECTRUM INTEGRATED OVER 31.2 SECONDS, INTERVALS 2 TO 25



ULYSSES 03/05/91 24143.561 BURST SPECTRAL COUNT RATES



ULYSSES

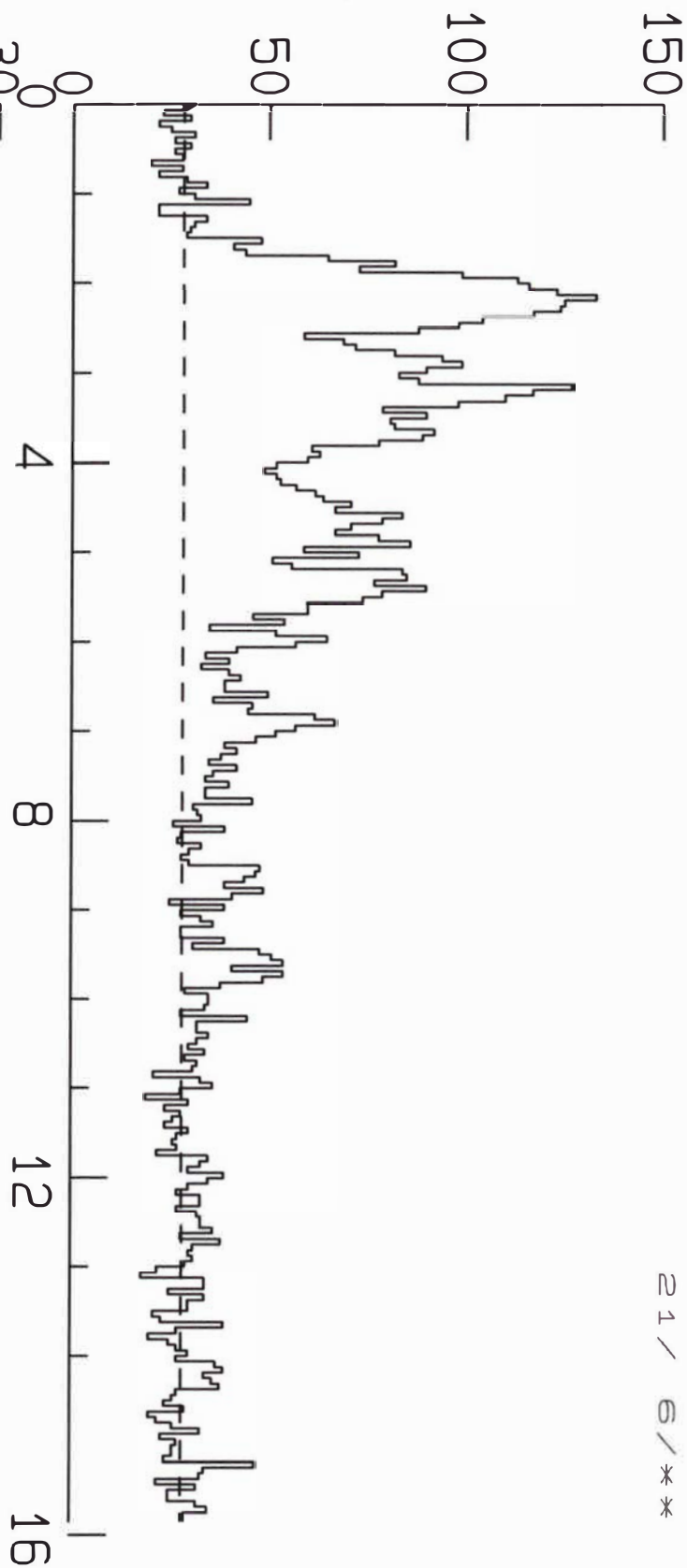
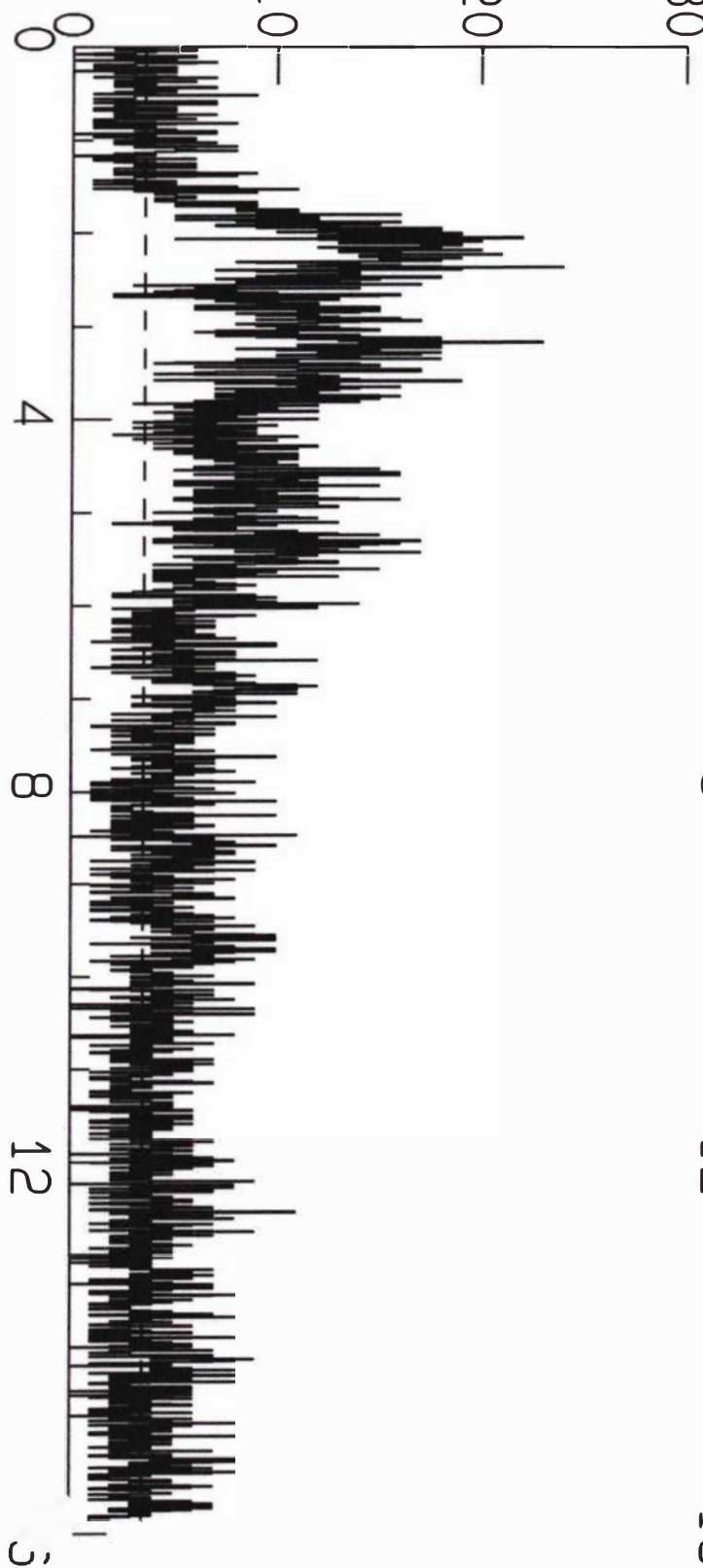
03/05/91

Ttrig=24143.548

32- 225 keV

COUNTS/0.008 S

COUNTS/0.062 S



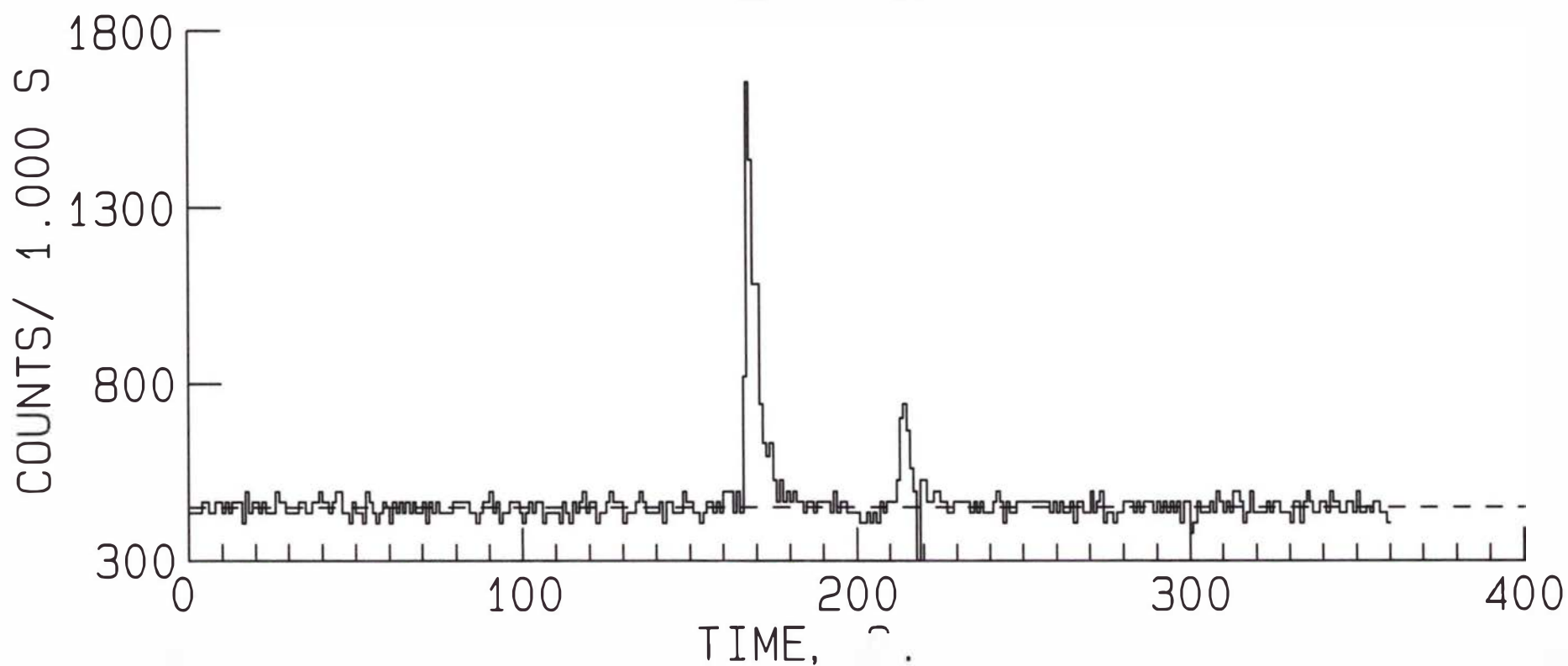
ULYSSES RT

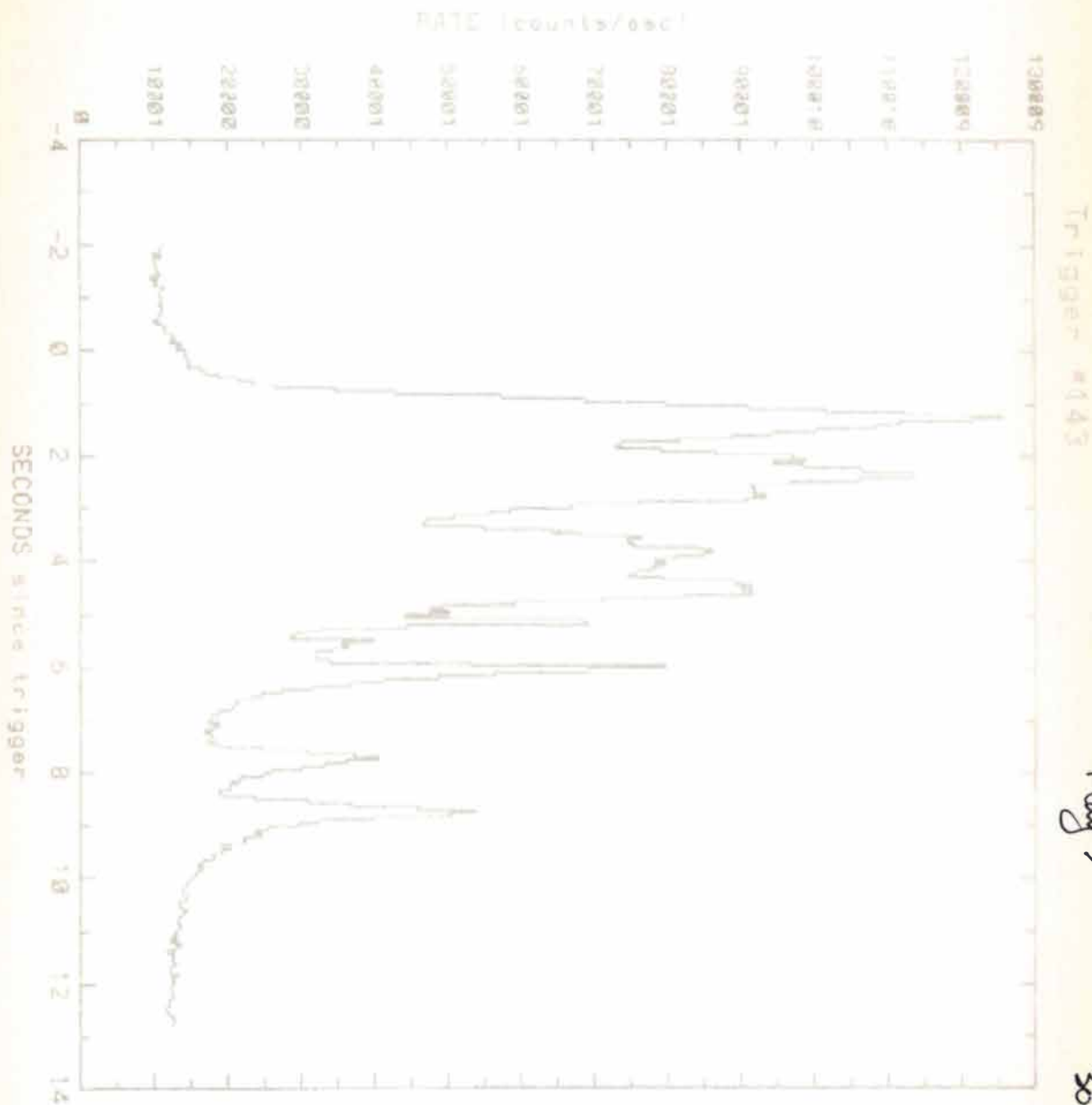
21 / 6 / 97

3/ 5/91 23976.701 s

32- 225 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS





May 3

30-100 keV

16-SEP-1991 17:52:46
 Created by NOPS 30
 Burst Display
 Version 2.00
 Trigger # 043
 Trigger Time:
 1991/09/16 17:45:44
 Burst Time (sec):
 01.000
 Dead Time
 Corrected: N
 Background Data
 Type: PREB + DISCL
 Minimum Integ. Time:
 0.064 seconds
 Detectors (7.0):
 0101010
 Discriminators
 (1, 2)
 Quality Mask:
 001SP0

= OS
 -2.042 =
 25452.652

FAX to

Dr. Kevin Hurley

fax # 510 643-8302

Kevin:

I believe that I have uncovered another giant discrepancy: I asked John Laros to verify what kind of data he has been sending to you from PVO; his reply was that it was indeed 1950.0 equinox BUT that it was sun-time converted. This means that the classical aberration has been applied and that you cannot do it again. Upon further questioning, he said that he believed that he used to correct this OUT in the old days before sending us PVO data that was thus 1950 eqx but Earth time. Incredulous or what?



TLC

fax to

Dr. Kevin Hurley, UCB

fax # 510-843-8302

Kevin:

I have rerun all I can think of, double-checking every portion of each formula against the 'rigorous formulae' in the Astronomical Almanac for 1992, comparing with my 2000-equinox conversion and, of course, looking for any misprints or typos, as well. So far this has been 'to no avail,' with no error or problem turning up.

I did discover, however, that your test-case of from day 0.923 of 1950 with RA = 320.83029 and dec = -4.001389, going to day 1.5 of 2000, got me RA = 321.48275 (vs your reported 321.48292, an error of 0.6 second of arc) and dec = -3.7846 (vs. your reported -3.78558, a much bigger error of 3.5 arc seconds). I noticed that this is like the discrepancies in our 1991 May 3 comparisons: i.e., a larger error in the declination, of several seconds of arc, but an almost negligible one in the RA.

Thus, I wonder, is your test case an example of some approximation: are both these cases representing only one and the same problem, namely, in your area? No offense.

For now, perhaps this problem can be temporarily avoided, so as to get the May 3 result to adequate accuracy in press, out of our way. Let me know what your opinions are both on the timeliness of solving this and on your suspicions about its source.

TLC



fax to

Dr. Kevin Hurley, UCB

fax # 510-643-8302

Kevin:

I have sent you 2 other faxes in the last two days regarding the May event analysis. The additional info here is that I reanalyzed the time history fit (keeping in mind that GRO-BATSE is crude, with its bins phased such that, e.g., the data for 0.0 secs means that intensity is for 0 to 64 milliseconds, centered at +32-ms, etc, etc) and got the same answer with much more certainty, namely, a 0.96-second slip, not your 0.80, as I recall. I am sending this since I couldn't reach you on the phone. Will call Fri.

TLC

From khurley@space6.ssl.berkeley.edu Thu Sep 17 16:50:00 1992
Date: Thu, 17 Sep 92 15:44:12
From: khurley@space6.ssl.berkeley.edu
Content-Length: 694

VOILA! You were right about May 3, 1991. I finally modified my program so that BATSE time intervals are adjusted to the exact Ulysses time resolution. The result is a lag of 0.979 seconds, instead of the previous value that I gave you. I have a FAX from you that says your slip is 0.96 seconds, so the systematics are reduced to 20 milliseconds or so now. The question is, have you run your new cross-correlation program for this event, and if so, what does it give? My program uses the Ulysses 8 millisecond vernier to home in on the best correlation; but I find that in this particular case, it doesn't matter whether I use it or not. The value of 0.979 is found in both cases.

Kevin

From khurley@space6.ssl.berkeley.edu Sat Jul 4 09:57:56 1992
Date: Sat, 4 Jul 92 08:52:28
From: khurley@space6.ssl.berkeley.edu
Content-Length: 766

Tom,

I took a look at the May 3 problem here. First, I found that our 1950.0 coordinates are in pretty good agreement. With my 5 point interpolation, I got 116.9858, 22.7835, and 455136780 km. You had:

116.9858 22.7834 455136714

The difference must be in our precession routines. Mine is not a rigorous one - it's only good for two epochs which are not widely separated, and for positions which are not too close to the celestial poles. If you don't find any error in your precession program, I will proceed to code the rigorously correct routine and implement it. That will probably fix the problem.

As far as the time history delta-T's go, I am faxing you a copy of the Ulysses/BATSE time histories.

I'll be back in the lab on Thursday.

Kevin

fax to -

Dr. Kevin Hurley, UCB

fax # 510-643-8302

Kevin:

VOILA YOURSELF (WHATEVER THAT MEANS) !!!

I DON'T KNOW FRENCH, BUT I ASSUME IT MEANS SOMETHING LIKE 'HOT DAMN.' FURTHERMORE, THIS IS, AS BENNY HILL WOULD SAY, T*T FOR TAT, BEING THAT IT REPLIES TO YOUR 'VOILA' TIMING MESSAGE WITH A MIRROR-IMAGE MESSAGE:

YOU ARE RIGHT, THE 1991 MAY 3 RELATIVE T-ZERO SLIP IS 0.989 SECONDS NOT 1.053 AS I HAD SAID FROM MY VERIFIER FITTING ROUTINE - AND FOR THE REASON THAT I HAD SUSPECTED - A 64-MILLISECOND LABELLING ERROR IN THE BINNING, DUE TO THE FIRST MATRIX ELEMENT HAVING TO BE A 1, NOT A 0, OF COURSE !!!

THE PROGRAM RESULT, TRANSFERRED DIRECTLY FROM THE OUTPUT, IS AS FOLLOWS:

To fit 64-ms-reconfigured Ulysses data on 64, 16, 4, and 1-sec. verniers:

4 rate ~~value~~ fittings = 1.216 1.200 1.200 1.200 seconds,

4 rate ~~difnc~~ fittings = 1.216 1.200 1.200 1.197 seconds,

~~Thus, since GR0 data start -2.0480 sec. relative to GR0 T-zero, and~~

~~since the Ulysses data start -1.8398 s. rel. to the Ulysses T-zero,~~

~~GR0 needs an added T-fiducial, (or Ulysses would, if it's negative)~~

of the following (in the same ordering of 4 rates, and 4 rate-difncs):

1.008 0.992 0.992 0.992 , 1.008 0.992 0.992 0.282 seconds.

Amazing! Of course, what isn't quantified here, yet, is the error or believability width. Based on this result alone, I would say that 4-ms to 8-ms seems reasonable. Based on your totally independent result of 0.979, I suppose that it would have to be 10-ms or more. At any rate, it's less than 64-ms by one whale of a lot. I now have considerable confidence in the whole thing. I think we should congratulate ourselves.

TLC



fax to

Dr. Kevin Hurley, UCB

fax # 510-843-8302

KEVIN:

Enclosed is a summary of my data file (listing all relevant choices and values) for the 91 May 3 event. Note that using 11.5-milliseconds or so as the maximum time-history fitting error gives 4 seconds of arc annulus-radius-deltawidth, whereas the pseudoworry about the earth vs sun time gives 64 seconds of arc.

TLC

1001 May 3

Ulysses Input:

The trigger time is taken to be at the center of the 236th rate (or at 236.5 rate):
1 bin is $(1/128)\text{sec} = 7.8125\text{-msec}$ wide, so the T_0 is 1.839844 sec into the data.

i.e., $T\text{-zero}$ is 236.5 bins of $1/128\text{-s}$ downstream, or 1.839844 s later.

The $\pm$ half-bin-width uncertainty gives a 4-me error for this bit rate.

The trigger time: 24143.672 seconds. (NOTE THE CORRECTION FROM EARLIER INFO)

KH says this is the rawest of all possible Ulysses ephemeris, epoch-1950 NOT-2000:

(Project office says 1-sigma in range is 5 km, 1-sigma in RA and dec are at most 500 nanoradians.)

Input ephemeris: trigger date: 91 05 03 - trigger hour: 06.71

date	hrs	RA(d)	Dec(d)	Range E/SC(km)	S/SC/E(d)
91 05 02 24.00	116.8977	22.8011	454160129.0000	19.37071	
91 05 03 03.00	116.9371	22.7932	454597120.0000	19.35353	
91 05 03 06.00	116.9765	22.7853	455033856.0000	19.33633	
91 05 03 09.00	117.0159	22.7775	455470592.0000	19.31911	
91 05 03 12.00	117.0553	22.7696	455907328.0000	19.30185	
91 05 03 15.00	117.0948	22.7617	456343808.0000	19.28450	

From which we interpolate for 6.7065 hrs

RA=116.9858, dec=22.7834 (eqx '50), dist=455135.714 kkm=1518.172 lt-sec.,
which translates to 117.7200 and 22.8555 (eqx 2000)

(whereas Kevin used RA=117.730, dec= 22.857 (2000-eqx))

Compton-GRO-BATSE Input:

GRO ephemeris for 25455.2 secs: -2257.0 5706.5 2991.0 ((90.0 44.0 = GRO source))

From which we conclude

GRO: RA = 111.58, dec = 26.98 (2000. eqx), and distance = 0.023 lt-me

And: subtract 2.042 sec from the GRO trigger time, supplied, as the onset of the data.

THUS $T\text{-zero} = 25454.604 - 2.042 = 25452.562$

Comptel source field: RA = 87.11, dec = 39.23 ($\pm$ how many degrees?)

Comptel source field needs yet to be combined, for the limits of the annular segment.

Results:

With Ulysses fixed at 24143.672 and GRO at 25452.562+0.989, and assuming
a confidence of 11.5-me overall (max) error in the time history comparison,
(based on an 8-me time comparison width and an 8-me systematic, thrown in)
and assuming Ulysses is earth (not sun) clock (giving a 143-me downlink),

Annulus center RA=117.7313, dec=22.8549, ring theta=30.3492, delta=0.001 deg.

If, out of curiosity, Ulysses data are assumed in Sun time, ring theta=30.3598,
which is a 0.011 deg = 0.64 arc-minute shift, with all other values the same.

Kevin: A question: Is this 2/3 of one-arc-minute shift correct? I seem to remember
that, in the old days, a clock correction for each spacecraft was found to be equivalent
to a (simpler) aberration correction (based on the angle between the Earth's motion
and the source direction). BUT that correction never greater than 1/3 arc minute ??

TO: KEVIN HURLEY, SPACE SCIENCES LABORATORY, U OF CALIFORNIA,
BERKELEY, FAX 001-510-643 76 29

FROM: MICHAEL SOMMER MAX-PLANCK-INSTITUT FUER EXTRATERRESTRISCHE PHYSIK
FAX W.GERMANY 89 - 32 99 35 69

June 30, 1992

Dear Kevin,
Some remarks on various subjects:

1. The ROSAT TOO for GRB920501 has a number CA141865P to refer to.
I talked to Trümper and told him that you don't mind if Jochen Greiner is working on the data while observing the rights of the groups involved. Greiner may not start doing so before July 27 when he is back from vacation.
2. Concerning GRB910503 Comptel data.
I spoke to Louen Kuiper from Leiden, he is the one who calculated one, two and three sigma Comptel error boxes applying a likelihood method. His best position is $l=172.6$ degr., $b=5.2$ degr.
The 3 sigma error contour seemed to have about 3 degrees in diameter.
I suggested to put Kuiper on our positional paper with his most recent calculation, but the Comptel team does not want to have one individual team member on such a paper only the whole team.
We were advised to use the published value (171.8, 6.4) in the AA letter.

Using then final CGRO offset of 2.042 sec, I calculated
 $T(\text{BATSE}) - T(\text{Ulysses}) = 1309.9$ sec time of arrival difference for GRB910503.

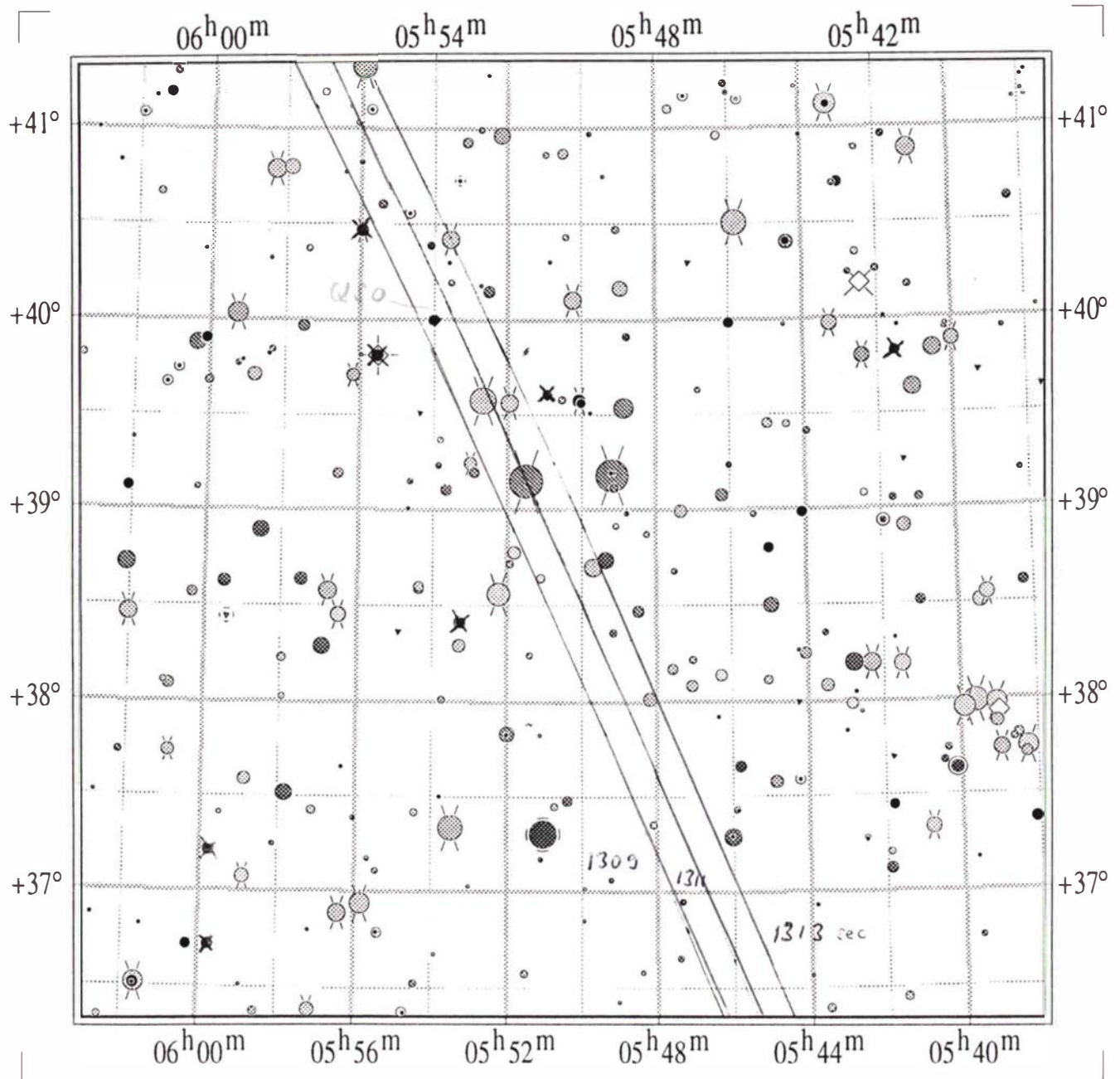
With respect to Michels suggestions about publishing ROSAT results in a separate paper, I think the burst data are really getting old and the positional paper on that burst is getting meager.

As a result ,
I suggest to publish the three bursts in May 1992 (and maybe all others with three satellites) as soon as possible and as accurate as possible. This gives astronomers something to chew on. It makes more sense than to publish just the one burst with a long error box.

Best wishes Michael

SIMBAD Sources in the Field of View

file: USER2\$DISK:[JCG.CHART]SMEXT.SEQ;13



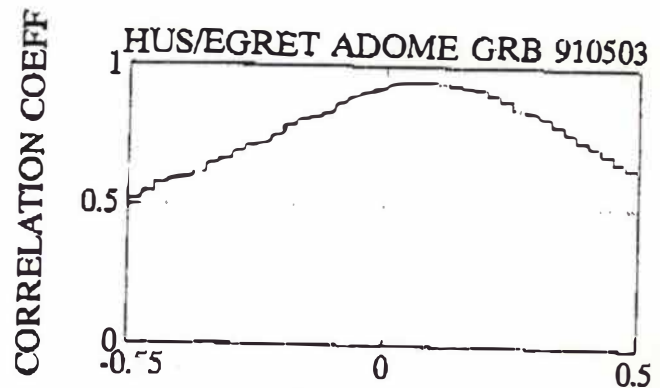
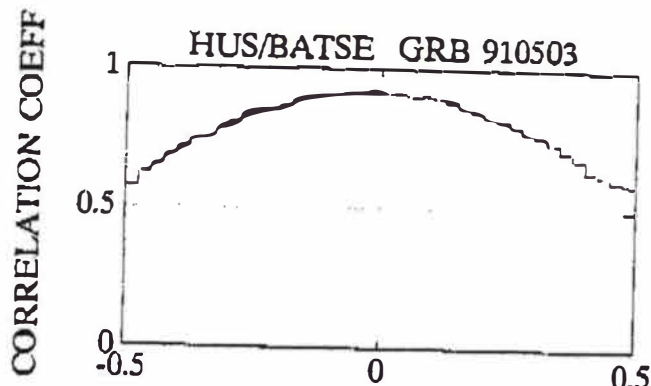
Stars				Galaxies			
magnitude 				size 			
spectral type 				morphological type 			
variability 		add. prop. 		Clusters, ... 		Undef. Obj. 	

TO: KEVIN HURLEY, SPACE SCIENCES LABORATORY, U OF CALIFORNIA,
BERKELEY, FAX 001-415-643 76 29 (001-510)

FROM: MICHAEL SOMMER MAX-PLANCK-INSTITUT FÜR EXTRATERRESTRISCHE PHYSIK
FAX W.GERMANY 89 - 32 99 35 69

1. Timing of GRB910503

Assuming that Ulysses SCET, and GRO absolute times are without errors, I made a correlation of our data with BATSE data and EGRET A-Dome data. The arrival times difference of the burst signals at ULS and GRO is 1312 ± 0.5 sec.



2. A Poster with the Title:

Search for Gamma Ray Burst Sources by Coordinated
Observations from ULYSSES, GRO and PVO

M. Sommer and K. Hurley

has been accepted for the ISY Symposium in Munich late March.

I plan to show the triangulation method and some selected events.

If you have material from your recent poster, I would be happy to adopt it.

3. Thank you very much for taking care of our instrument during Jupiter fly-by. The data I have seen look very good.

Did you intend to select a comparison time of 2 seconds
(E036 = 1) for the TCR data?

Regards Michael

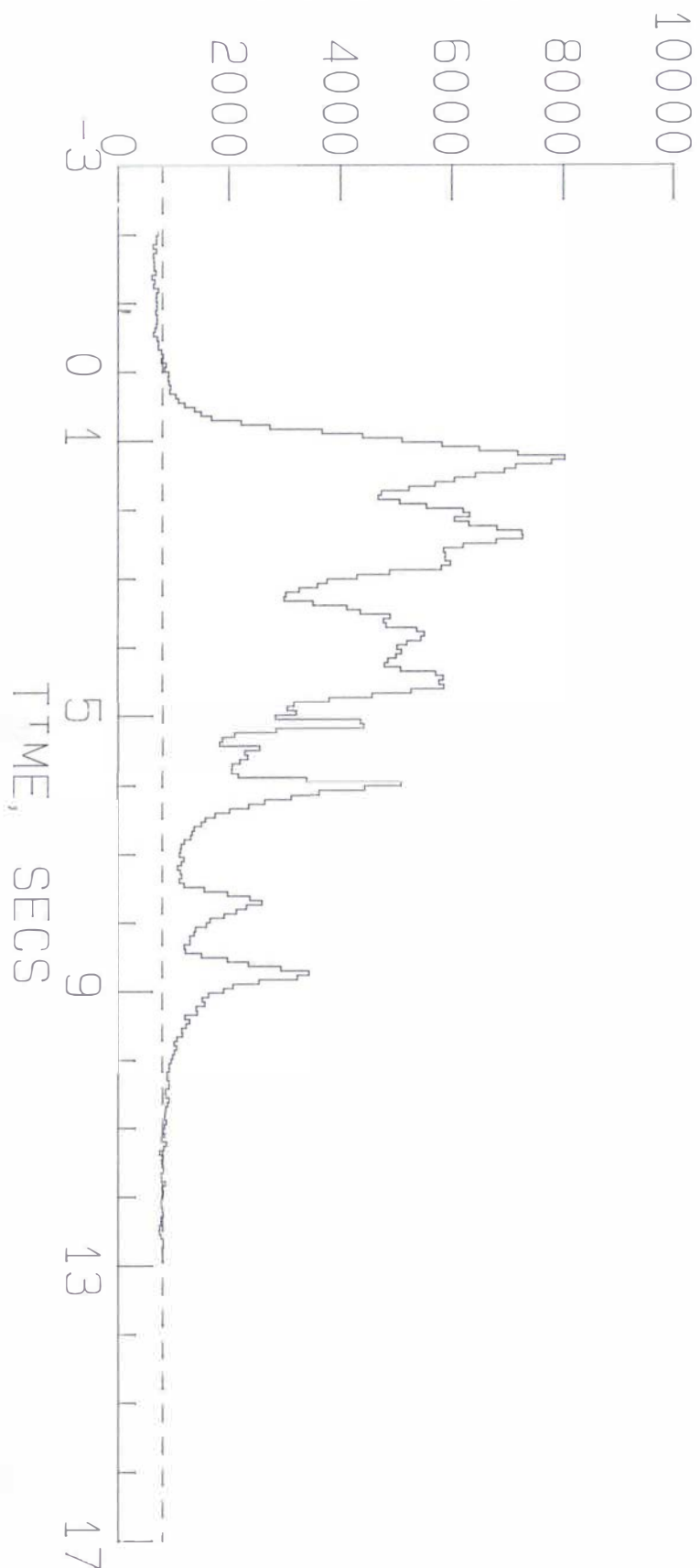
BATSE

03/05/91

25454.694

30- 100 keV

COUNTS/ .064 S



DMSP - 2 s time res data only (RT data only)

Time at peak of event: May 2 81443 s DMSP 9

Feb 19 1st: DMSP 8 42323 } 1st peak
2nd: DMSP 9 42326 }

↑
Discrepancy - take DMSP 9,
better S/N

Mar 10 DMSP 8 1st peak 46923 } Higher
3rd peak 46958 } S/N

DMSP 9 1st 46925
3rd 46959

DMSP 10 1st 46925.5 } Good
2nd 46941.5 } S/N
3rd 46959.5 } Dr... 8

May 3 DMSP 8 1st 25456
2nd 25500

DMSP 9 1st 25454
2nd 25500

June 1 DMSP 9 1st 69756
10 69757.5

Files are corrupted - need to be sanitized before we can get them

On FAKES ① raw time is given. Subtract 1.9 s DMSP 8, 9;

5.5 for DMSP 10 - #'s above have already been corrected

② $G = \gamma$ $P =$ particles - 2 detectors on each DMSP, several
several ranges

Circular No. 5369

**Central Bureau for Astronomical Telegrams
INTERNATIONAL ASTRONOMICAL UNION**

Postal Address: Central Bureau for Astronomical Telegrams
Smithsonian Astrophysical Observatory, Cambridge, MA 02138, U.S.A.
Telephone 617-495-7244/7440/7444 (for emergency use only)
TWX 710-320-6842 ASTROGRAM CAM EASYLINK 62794606
MARS DEN or GREEN@CFA.BITNET MARS DEN or GREEN@CFAP2.SPAN

EF PEGASI

P. Schmeer, Bischmisheim, Germany, reports that this apparent dwarf nova has undergone a rare outburst. Available visual magnitude estimates: Oct. 14.913 UT, 13.0 (Schmeer); 15.779, 10.9 (Schmeer); 15.853, 10.7 (G. Poyner, Birmingham, England).

γ -RAY BURSTS

V. Schönfelder, Max-Planck-Institut für Extraterrestrische Physik (MPE), Garching, communicates on behalf of the COMPTEL collaboration (located at MPE; University of New Hampshire, Durham; Leiden Observatory; and Space Science Department, European Space Agency, Noordwijk): "The imaging Compton telescope COMPTEL onboard the Gamma-Ray Observatory has imaged cosmic γ -ray bursts on Apr. 25, May 3, June 1, and Aug. 14 in its 1-sr field-of-view over the energy range 1-30 MeV. Using Maximum Entropy imaging techniques, direct mapping of these events results in the following positions accurate to 1° (listed as γ -ray burst source indicating the date; UT; and galactic coordinates, l and b): GRB 910425, $0^h37^m48^s$, 229° , -20° ; GRB 910503, $7^h04^m15^s$, 171° , 7° ; GRB 910601, $19^h22^m16^s$, $72^\circ5'$, -5° ; GRB 910814, $19^h14^m35^s$, 95° , -28° ."

COMET McNAUGHT-RUSSELL (1991v)

Orbital elements from MPC 18994:

Epoch = 1992 May 18.0 ET

$T = 1992 \text{ May } 3.2890 \text{ ET}$ $\omega = 257.1508$
 $e = 0.994524$ $\Omega = 119.7742$ } 1950.0
 $q = 3.196705 \text{ AU}$ $i = 90.5341$

1991 ET	α_{1950}	δ_{1950}	Δ	r	m_1
Oct. 11	19 06.71	-55°36.6	3.685	3.740	16.6
21	19 07.07	-55 56.3			
31	19 10.44	-56 15.2	3.875	3.648	16.6
Nov. 10	19 16.60	-56 35.1			
20	19 25.34	-56 57.0	4.017	3.562	16.5
30	19 36.45	-57 21.7			
Dec. 10	19 49.83	-57 49.2	4.094	3.483	16.5
20	20 05.39	-58 19.7			
30	20 23.08	-58 52.9	4.097	3.413	16.4

1991 October 16

Daniel W. E. Green

Khurley

From @STAR.STANFORD.EDU:068486@ESSDP2.SPAN Fri Sep 27 14:20:24 1991
Received: from STAR.STANFORD.EDU by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA08894; Fri, 27 Sep 91 14:20:20 PDT
Message-Id: <9109272120.AA08894@sunspot.ssl.berkeley.edu>
Received: from ESSDP2 by STAR.STANFORD.EDU via MAIL-11 with DECnet;
Fri, 27 Sep 91 14:21:35-PST
Date: Fri 27 Sep 91 14:21:35-PST
From: 068486@ESSDP2.SPAN@STAR.STANFORD.EDU
Subject: 1991 MAY 3
To: KHURLEY@sunspot.ssl.berkeley.edu
Status: R

KEVIN,
PVO WAS TURNED OFF EARLY MAY SECOND, TURNED BACK ON LATE MAY THIRD. NO DATA AT THE TIME OF
RAY

From @space6.ssl.berkeley.edu,@star.stanford.edu:CLINE@LHEAVX.SPAN Wed Jan 22 13:15:21 1992
Received: from space6.ssl.berkeley.edu by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA11852; Wed, 22 Jan 92 13:15:20 PST
Received: by space6.ssl.berkeley.edu (AIX 2.1 2/4.03)
id AA01587; Wed, 22 Jan 92 13:13:54
Received: from STAR.STANFORD.EDU by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA11849; Wed, 22 Jan 92 13:15:10 PST
Message-Id: <9201222115.AA11849@sunspot.ssl.berkeley.edu>
Received: from LHEAVX by STAR.STANFORD.EDU via MAIL-11 with DECnet;
Wed, 22 Jan 92 13:17:10-PST
Date: Wed 22 Jan 92 13:17:09-PST
From: CLINE@LHEAVX.SPAN@star.stanford.edu
Subject: May Third
To: khurley@space6.ssl.berkeley.edu
Status: R

KEVIN,

OK, but what is the big deal about the May third event, anyway? Chryssa's list of the most intense BATSE events does not include it, per se. That list, by the way, includes 17 events with 8 in November and early December. Their time of occurrence pattern is as screwy as their v/vmax. If you don't have it, they are April 21, June 27, 29, July 3, 17, 18, August 2, 14, October 24, November 4, 9, 18, 19, 26, 27, December 2 and 9. The May 3rd event strategy, of course, is acceptable - I didn't intend to give you a bad time, of course.

If I am to do it in a truly independent manner, however, I need everything.
I. Ulysses data. II. Ulysses T-zero marked as such in the data. III. Spacecraft RA and dec with real/1950 distinction, as well as Earth/sun-time distinction.
IV. Opportunity to rederive Ulysses fiducial, relative to Ulysses T-zero, as determined by my independent derivation of GRO BATSE fiducial, and, of course,
V. GRO BATSE T-zero as marked in their data, with their opinion as to clock problems, if any, in the Compton Observatory - all of part V from Huntsville.

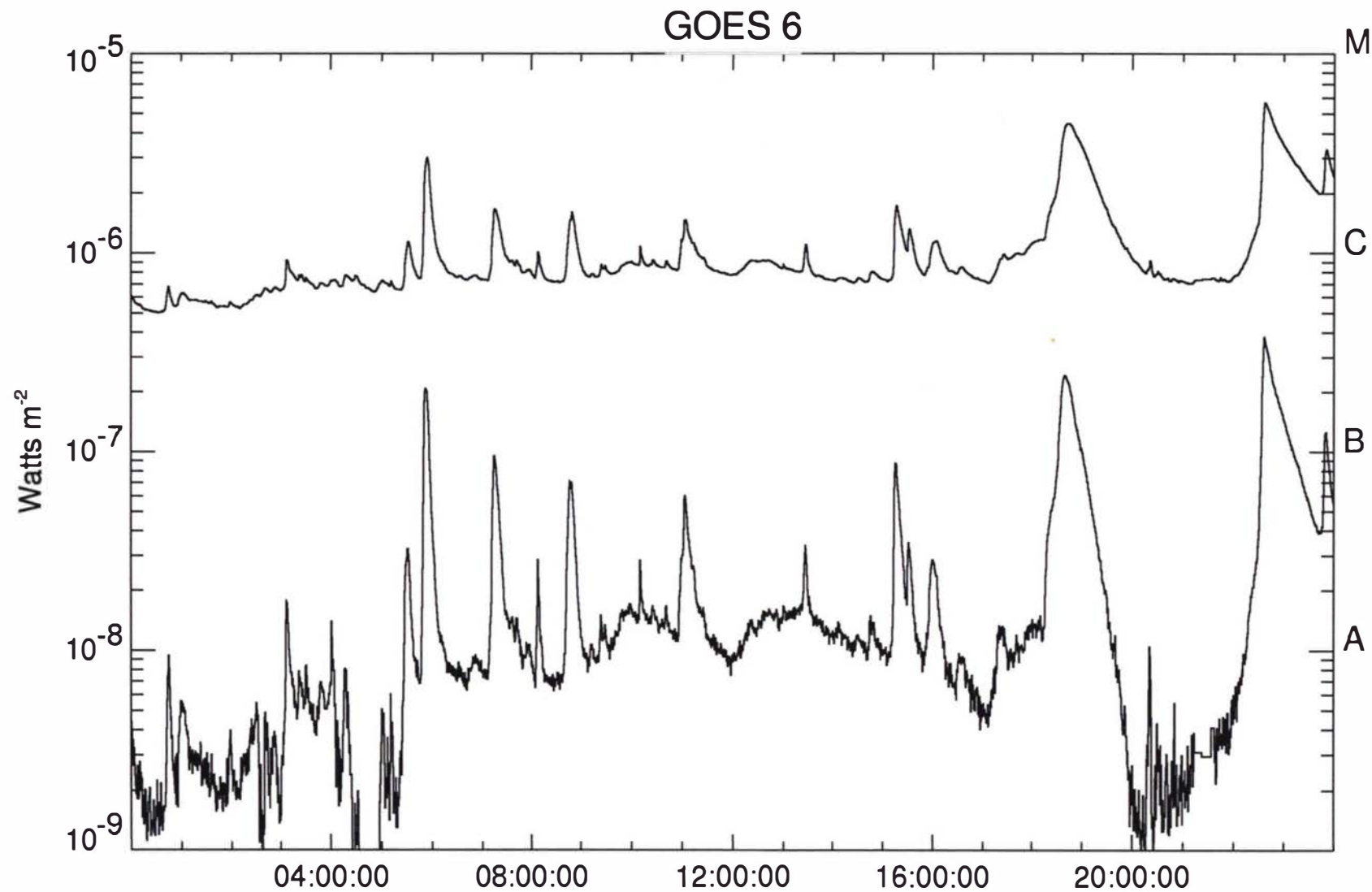
VI. Discussion of error components, consisting of Ulysses-T-fid/Compton-T-fid comparisons, Ulysses timing, Compton timing, Ulysses spatial errors, if significant. This will be a good exercise to begin doing these events for real. I appreciate it.

By the way, Jake Trombka tells me that Mars Observer is looking very good. Mazets has E-mailed me the news that they're broke
; if we want the Wind Konus detector, we'll have to come and get it, put it thru T and E and so on. And we shouldn't expect the Russians to put us up in any decent hotels, anymore. Not surprising. He said that the cost of their coming to visit the USA is more than the combined annual salaries of all 24 guys in his Division. Actual quote.

Let me know if you can send all these items. I think that I have only the six initial Ulysses raw data time histories you sent before, with no indications of T-fiducials or T-zeroes. This message is a test. If you don't get it, I'll fax. TLC.

From @space6.ssl.berkeley.edu,@star.stanford.edu:CLINE@LHEAVX.SPAN Wed Jan 22 13:23:58 1992
Received: from space6.ssl.berkeley.edu by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA11973; Wed, 22 Jan 92 13:23:57 PST
Received: by space6.ssl.berkeley.edu (AIX 2.1 2/4.03)
id AA01594; Wed, 22 Jan 92 13:22:31
Received: from STAR.STANFORD.EDU by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA11970; Wed, 22 Jan 92 13:23:48 PST
Message-Id: <9201222123.AA11970@sunspot.ssl.berkeley.edu>
Received: from LHEAVX by STAR.STANFORD.EDU via MAIL-11 with DECnet;
Wed, 22 Jan 92 13:25:49-PST
Date: Wed 22 Jan 92 13:25:48-PST
From: CLINE@LHEAVX.SPAN@star.stanford.edu
Subject: More
To: khurley@space6.ssl.berkeley.edu
Status: R

Kevin,
What I forgot to say explicitly, although implied, was that my entries of
24142.644 and 25454.694 as the U and C T-fiducials, resp., are to be ignored
and rederived from scratch, hopefully. I do have 116.9859 and 22.7834 as U
RA and dec, with 1518.172 lt-sec, or 455136.58 kkm distance, as well as
247.907 and 26.086 as C RA and dec, 23 lt-msec out. But I'd like to recheck.
TLC



Data Start: 91/05/03, 0000:02

Channel 1 (1.0 - 8.0 Angstroms)

2 (0.5 - 4.0 Angstroms)

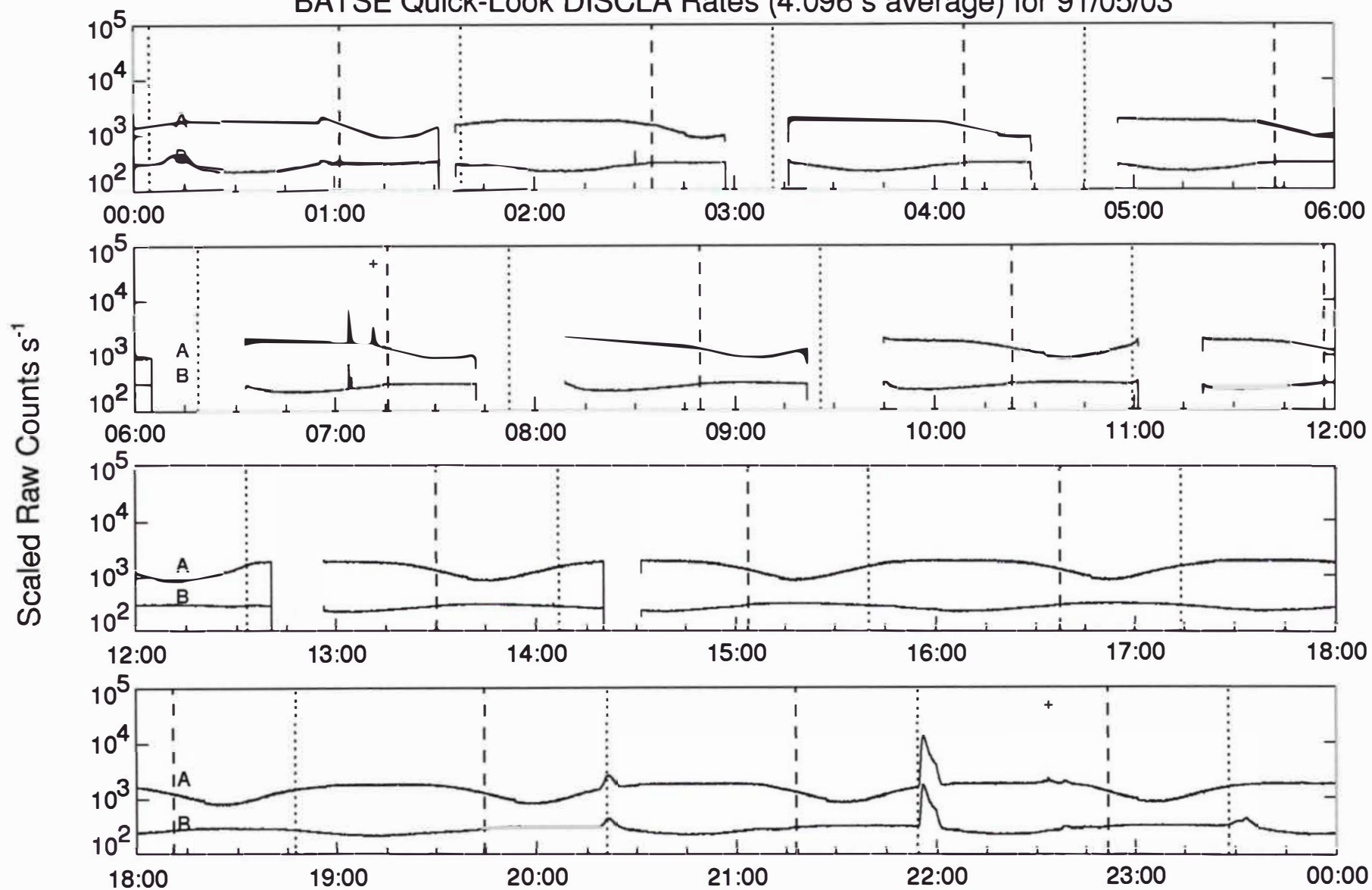
Plot created: 96/11/27, 0235

Background not subtracted

Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/03

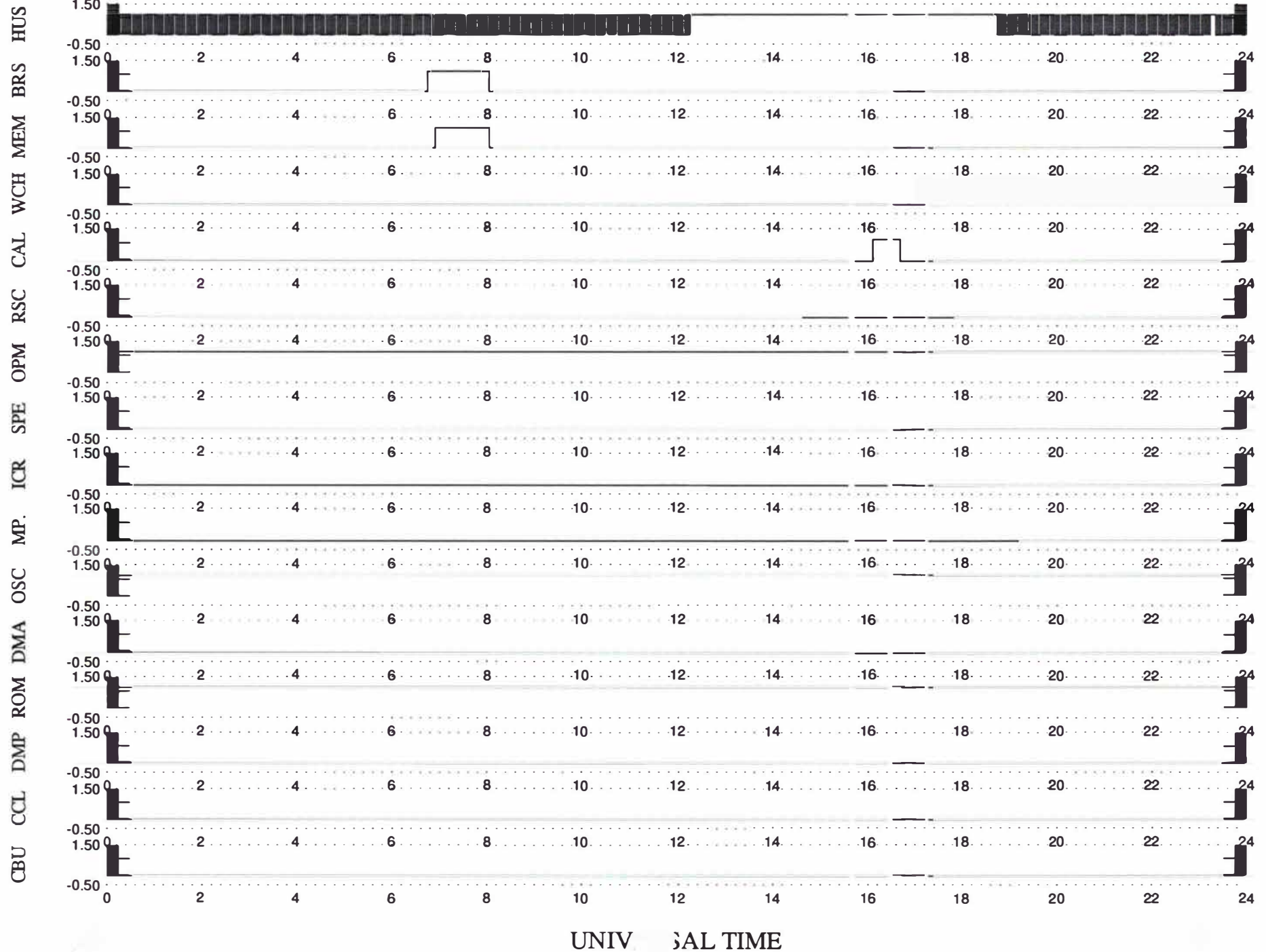


Current Time: 96/11/27, 0236 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

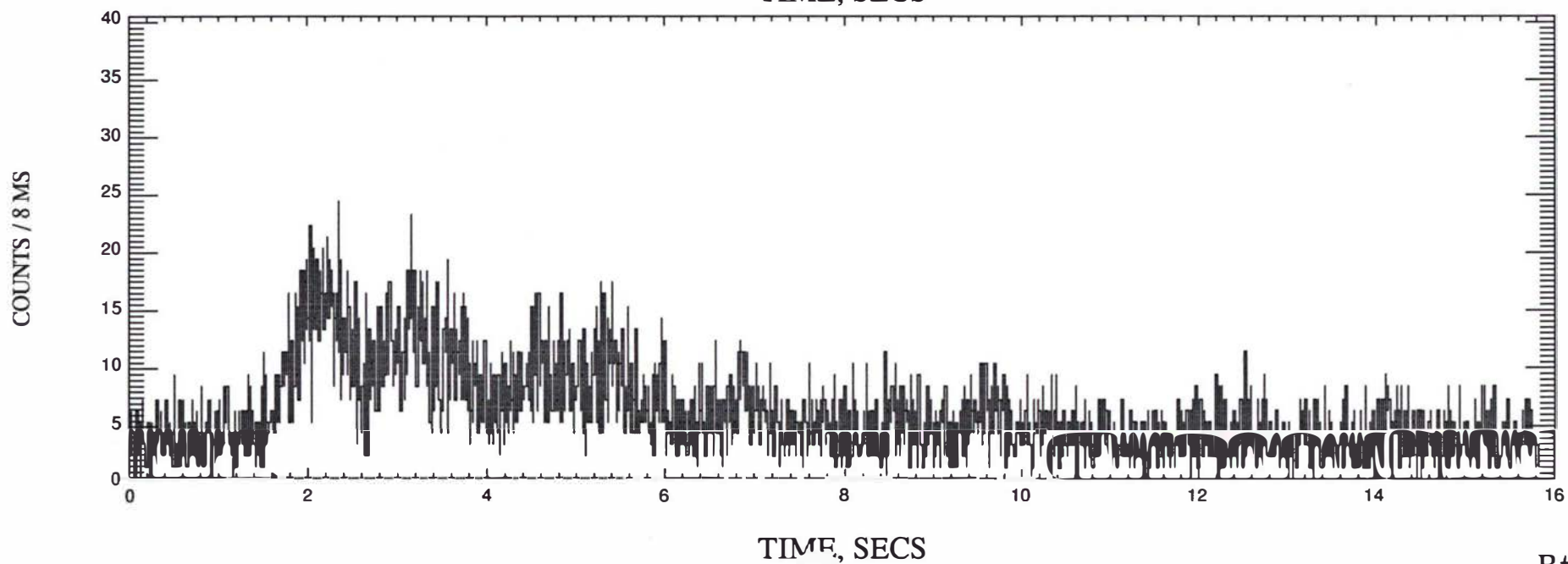
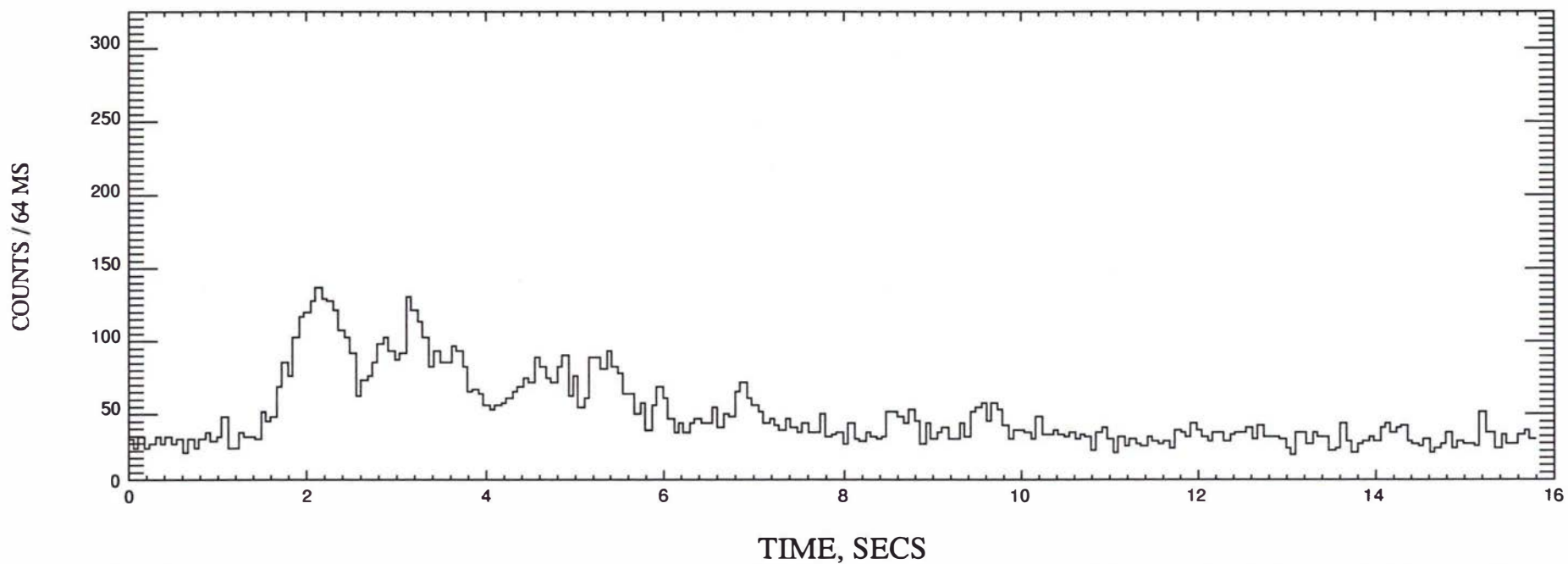
Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

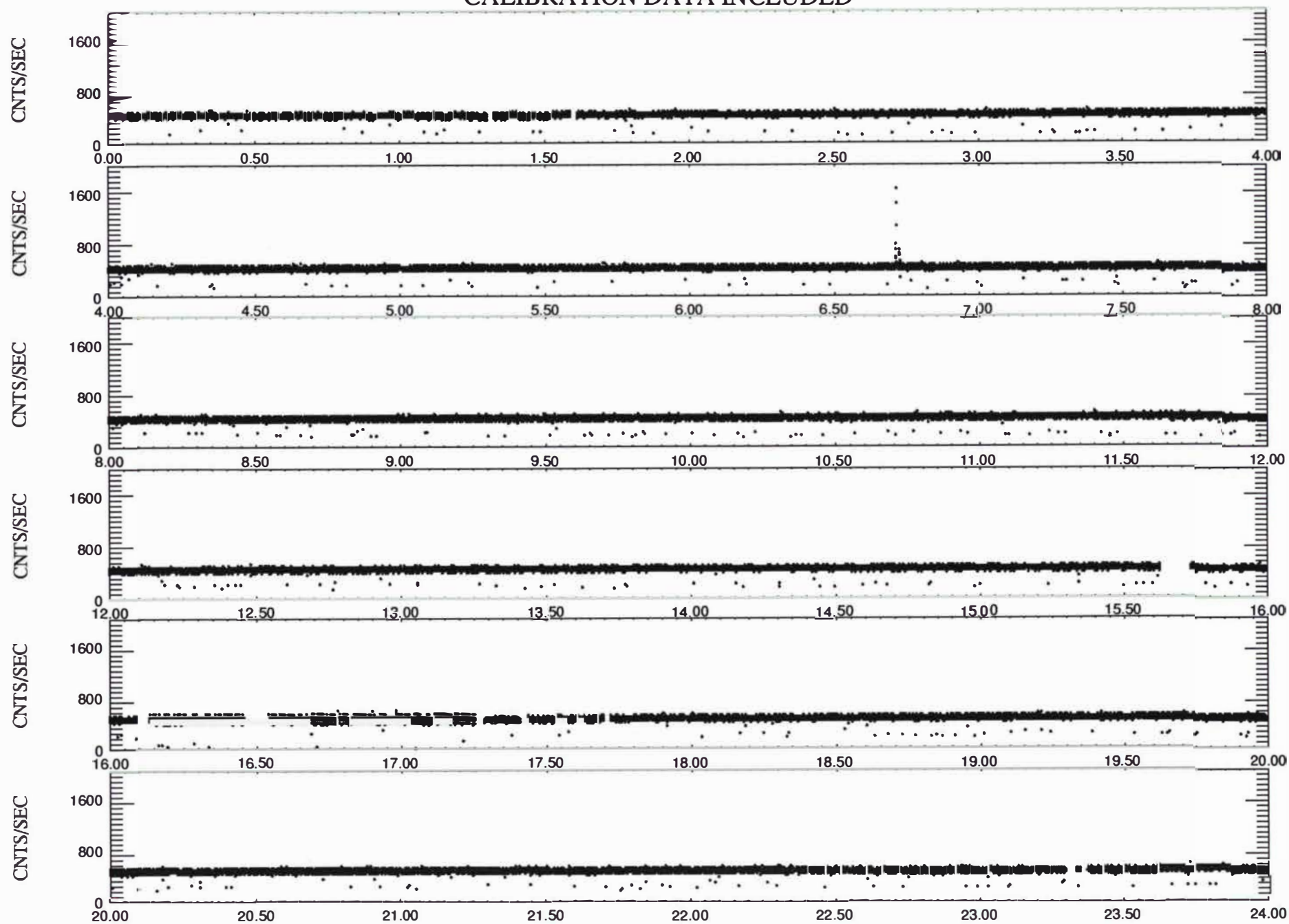
BURST NUMBER 14, 4 - 4, 14



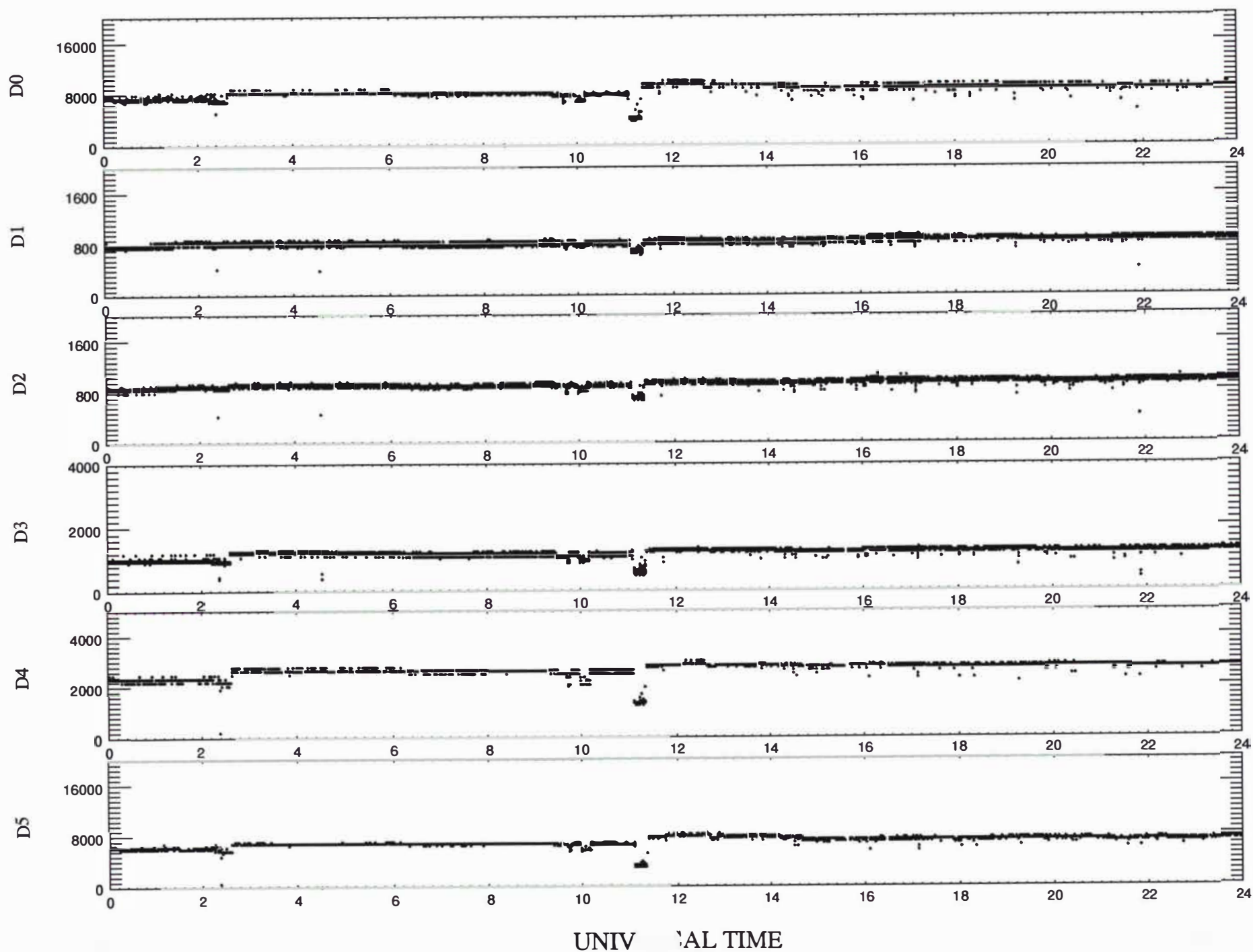
Burst Counter 14 at UT= 6.706544651455 h=24143.561 s 06:42:23.561



CALIBRATION DATA INCLUDED



UNIV AL TIME



From @UCBSP.SSL.BERKELEY.EDU:FINGER@BATSE.SPAN Thu May 9 15:01:24 1991
Received: from UCBSP.SSL.BERKELEY.EDU by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA09156; Thu, 9 May 91 15:01:18 PDT
Message-Id: <9105092201.AA09156@sunspot.ssl.berkeley.edu>
Date: Thu 9 May 91 15:01:41-PST
From: \$C <FINGER@BATSE.SPAN>
To: ANDERSON@sunspot.ssl.berkeley.edu
Subject: [Resent-MM Mail] [Resent-MM Mail] BATSE Solar Flare Data
Status: RO

Date: Thu 9 May 91 15:01:10-PST
From: \$C <FINGER@BATSE.SPAN>
To: MARSHA@UCBSP.SSL.BERKELEY.EDU
Subject: [Resent-MM Mail] BATSE Solar Flare Data

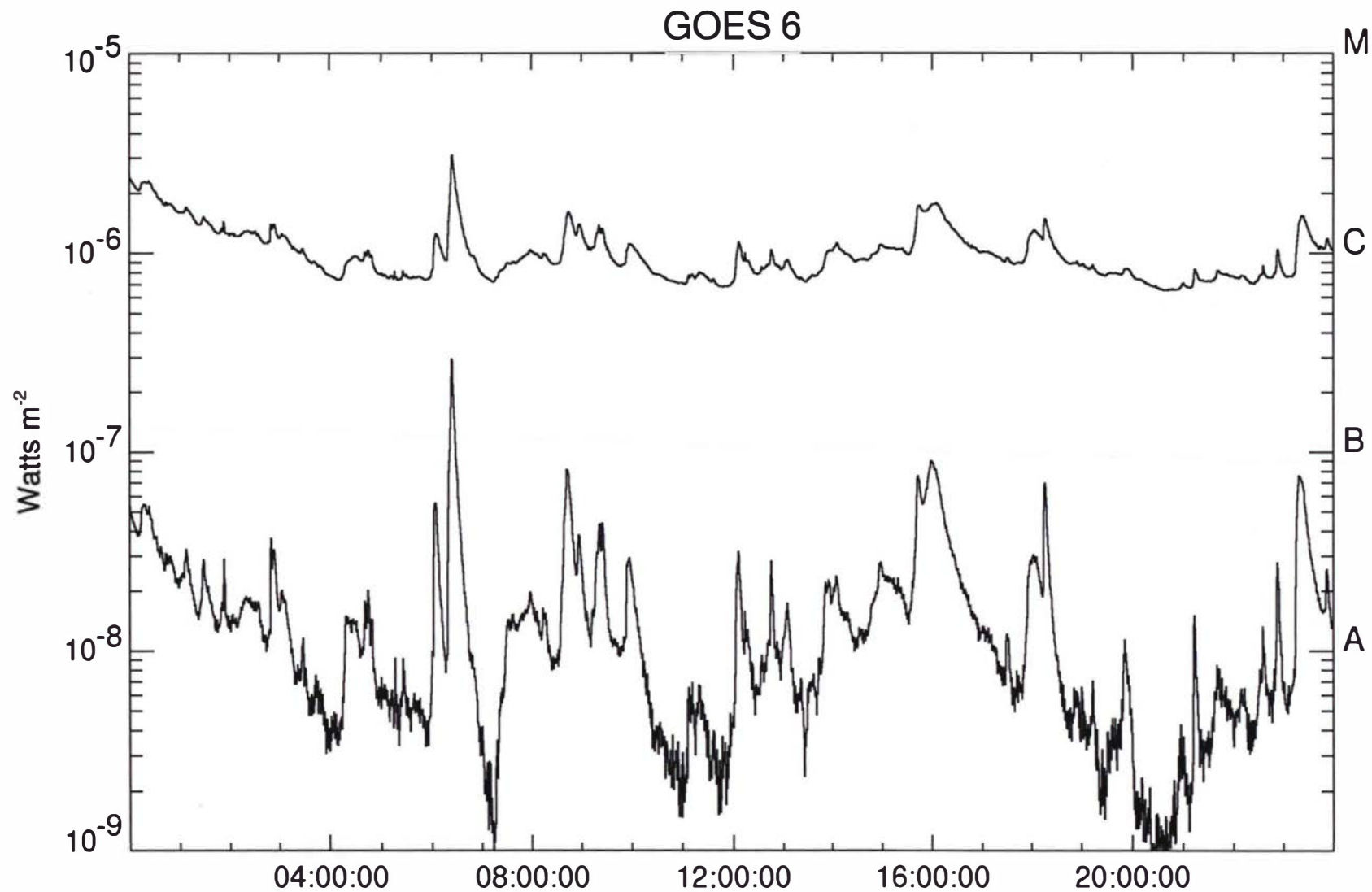
Received: from BATSE by UCBSP.SSL.BERKELEY.EDU via MAIL-11 with DECnet;
Thu, 9 May 91 15:00:40-PST
Date: Thu 9 May 91 15:00:39-PST
From: FINGER@BATSE.SPAN
Subject: BATSE Solar Flare Data
To: "@BATSE_SOLAR_GIS"@BATSE.SPAN

Since its burst trigger was enabled on April 21st, BATSE has triggered on 10 solar flares. The trigger times of these flares and their GOES class are tabulated below:

BATSE trigger time (UTC)	GOES Class
1991 May 4 18:14:02.09	C
1991 May 6 16:11:32.81	C
1991 May 6 23:22:25.77	C
1991 May 7 2:53:29.57	no GOES event
1991 May 7 7:15:14.36	no GOES event
1991 May 7 7:40:36.84	C
1991 May 7 10:35:37.45	M
1991 May 7 19:41:08.20	C
1991 May 7 22:37:42.87	C

BATSE Guest investigators interested in analysing the high time resolution LAD and SPEC detector data acquired during these events should contact:

Mark H. Finger
BATSE::FINGER
(205) 544-6256



Data Start: 91/05/04, 0000:00

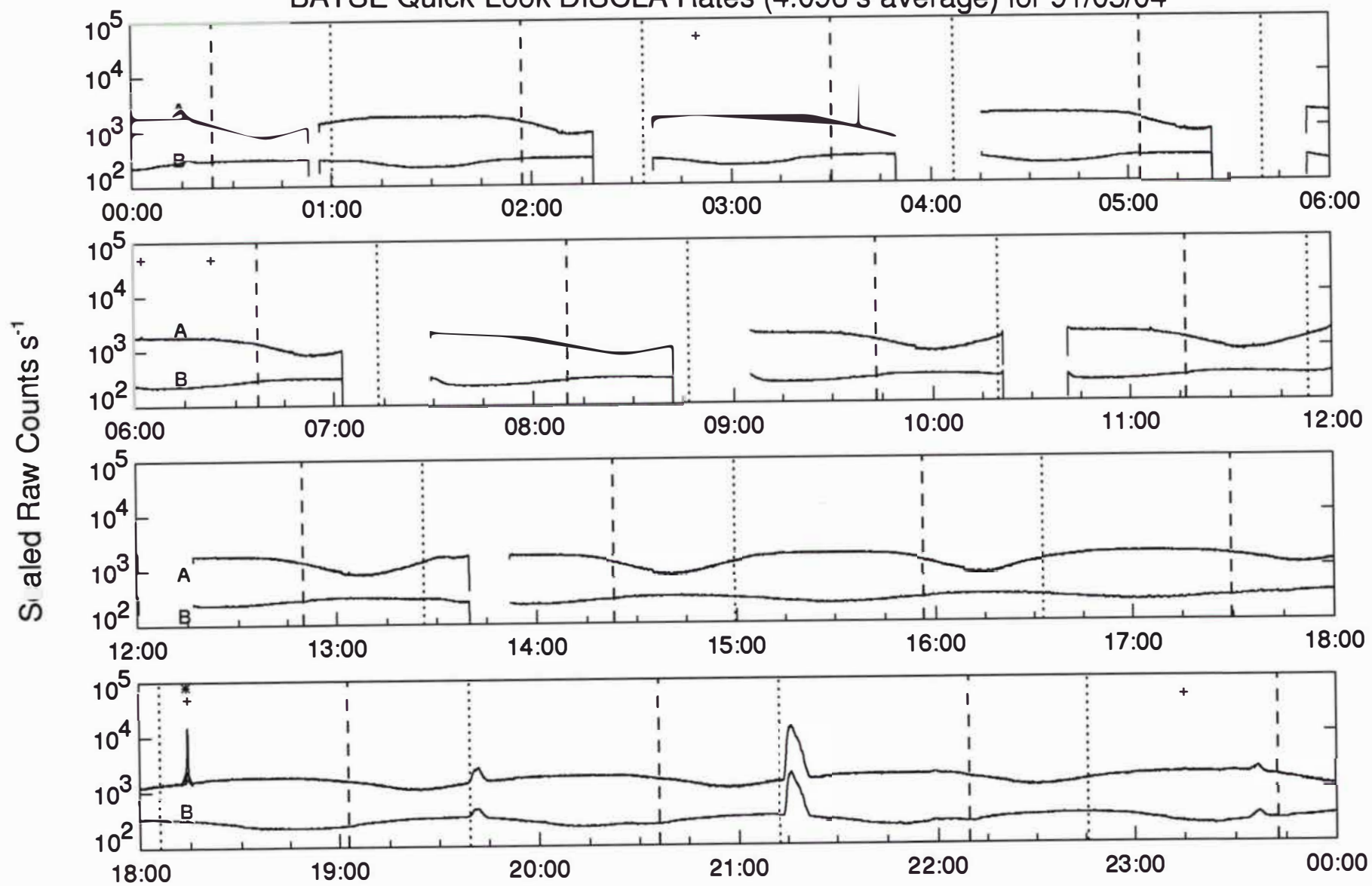
Plot created: 96/11/27, 0240

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/04

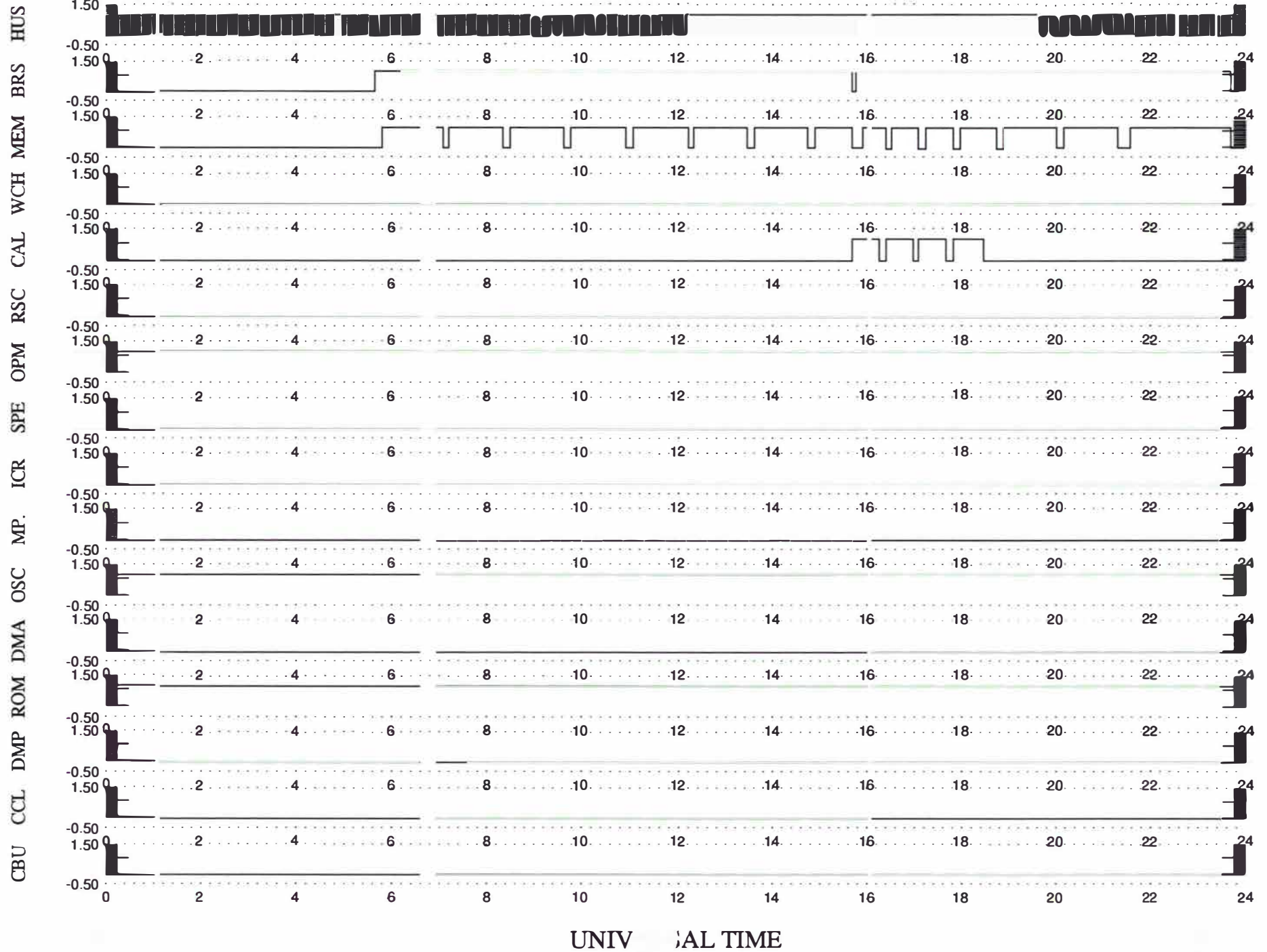


Current Time: 96/11/27, 0241 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

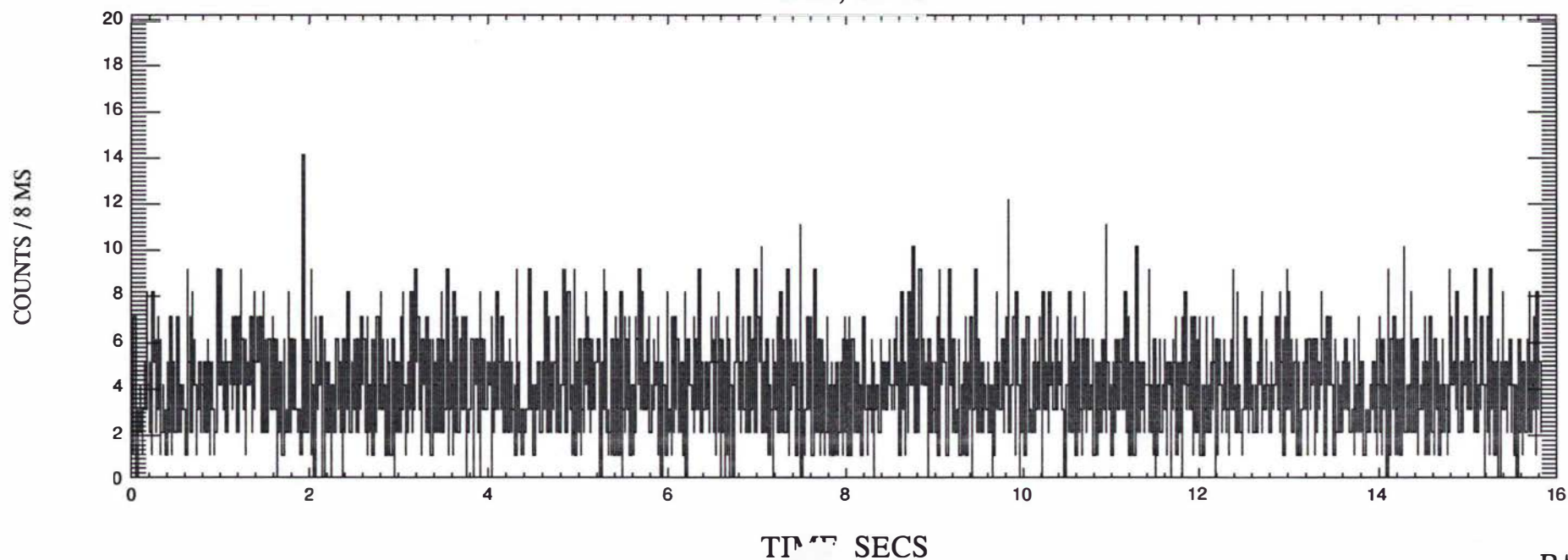
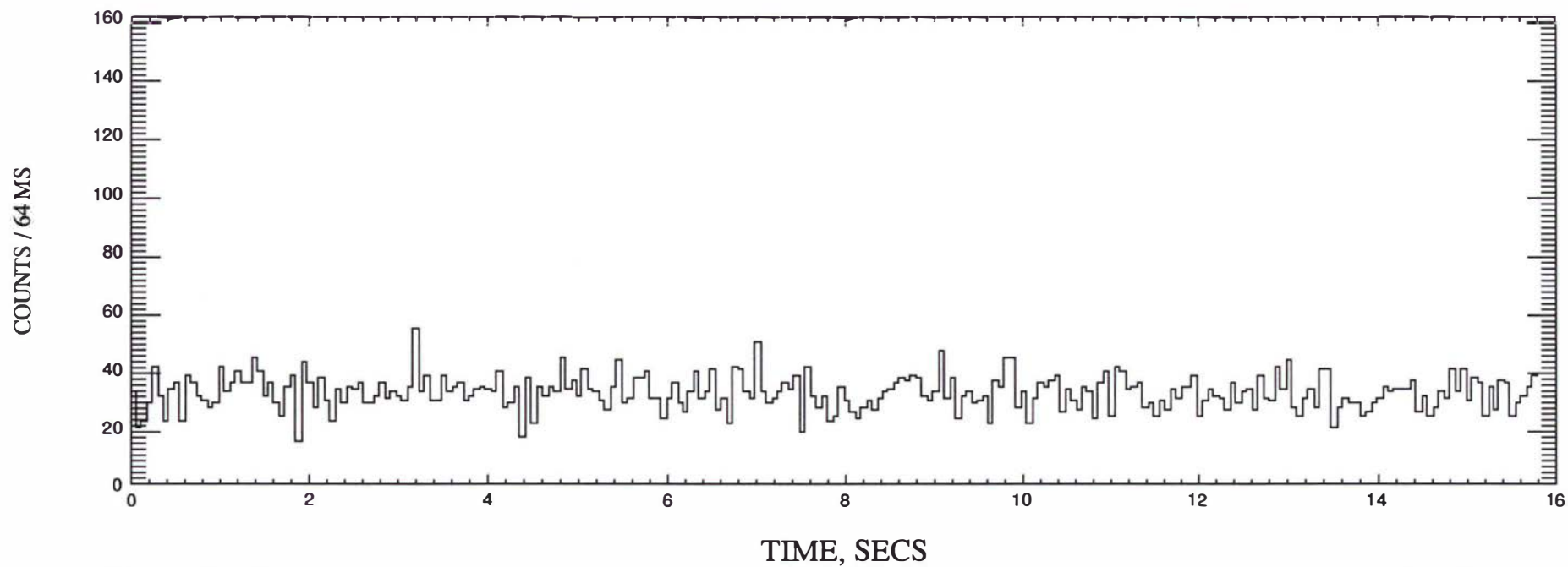
Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

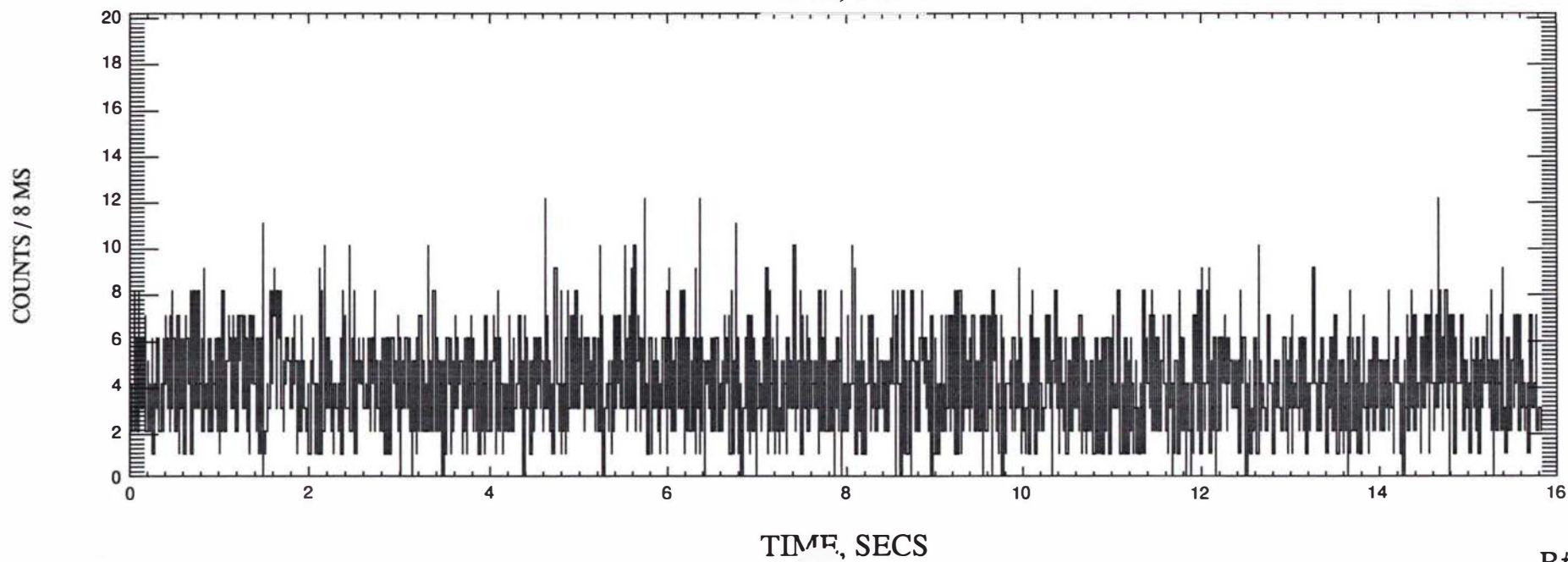
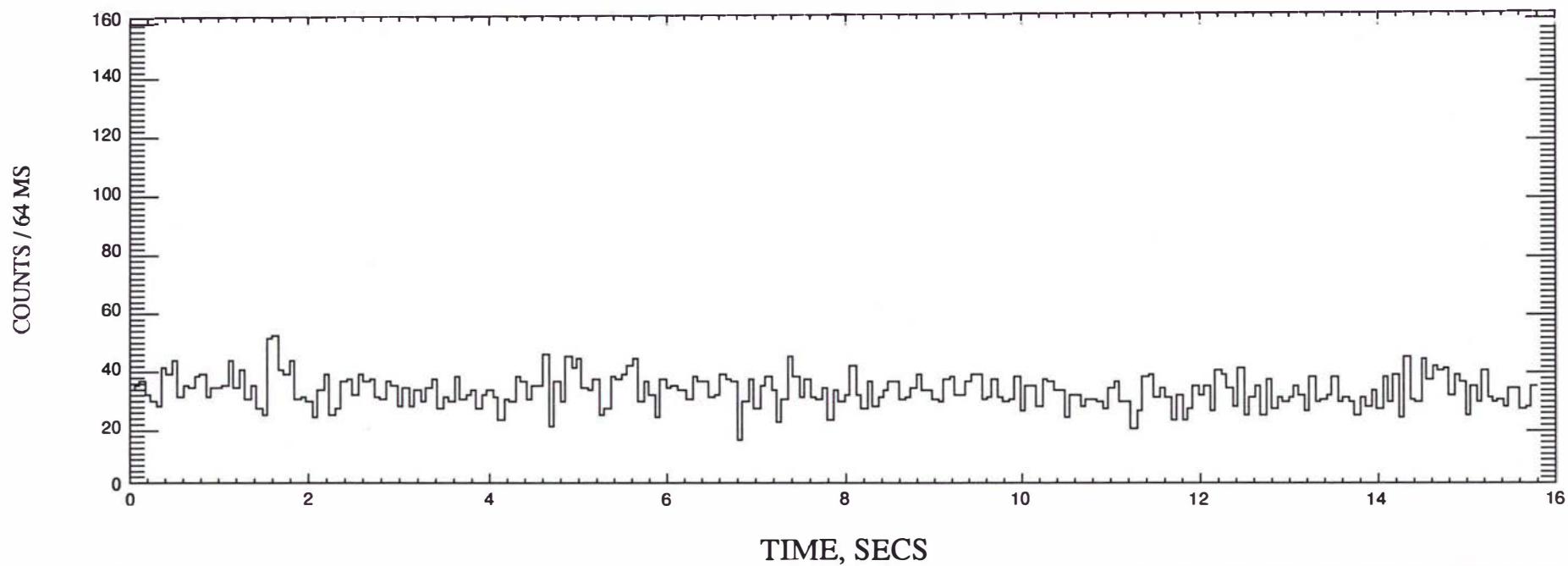
BURST NUMBER 15, 0 - 15



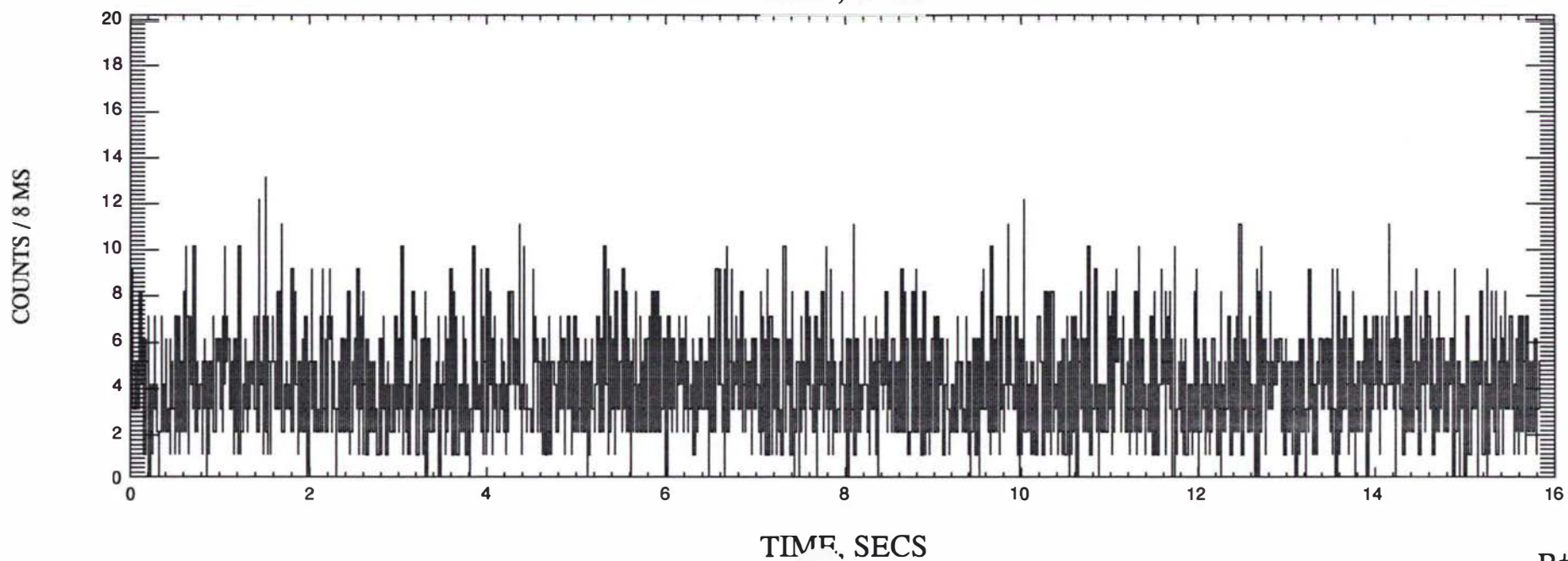
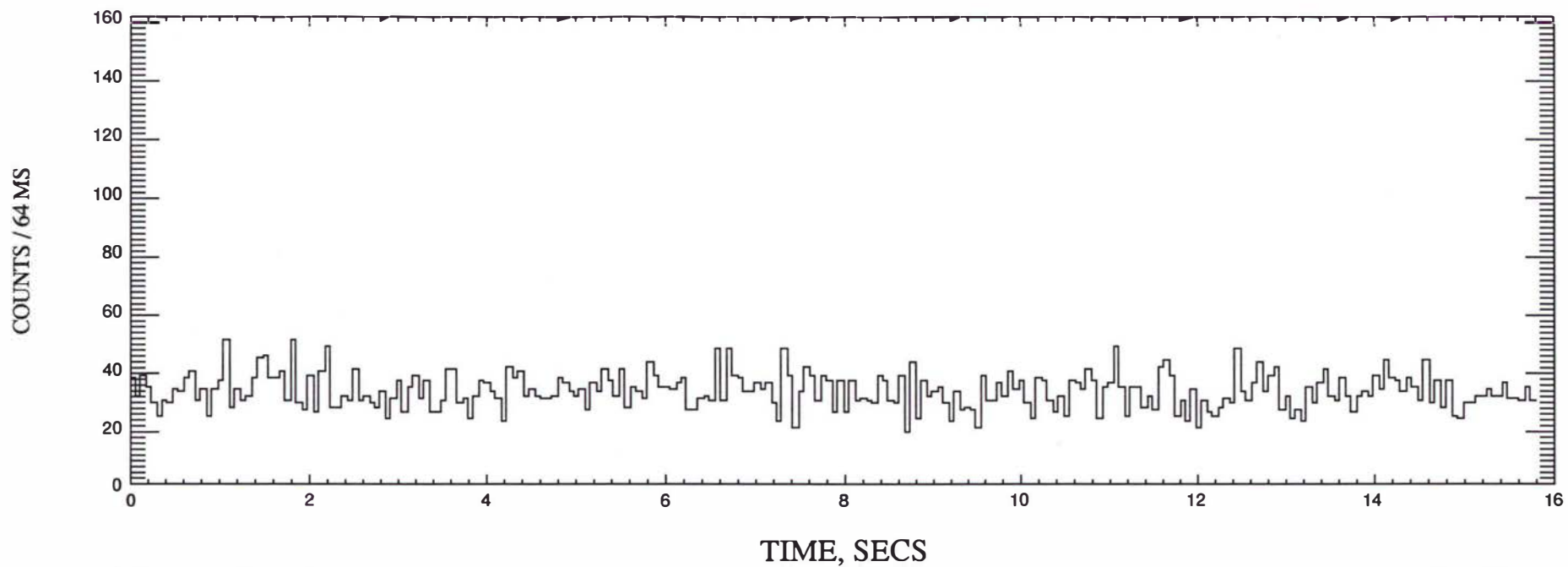
Burst Counter 15 at UT= 5.625303594801 h=20251.093 s 05:37:31.093



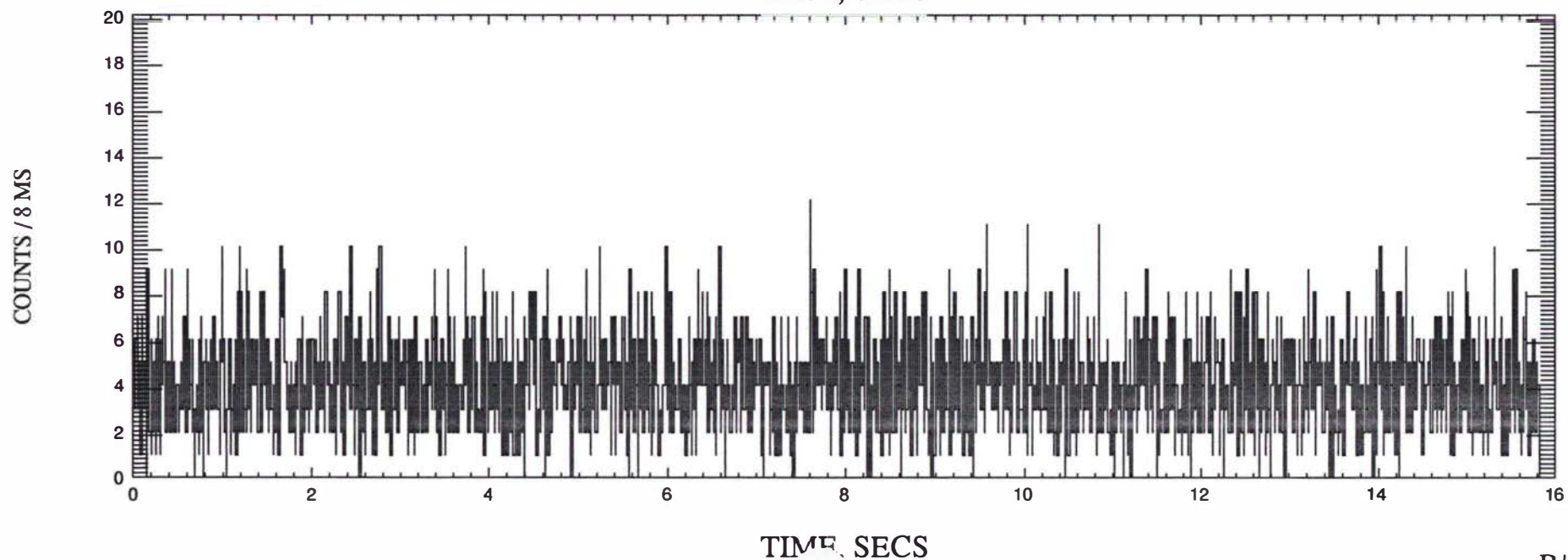
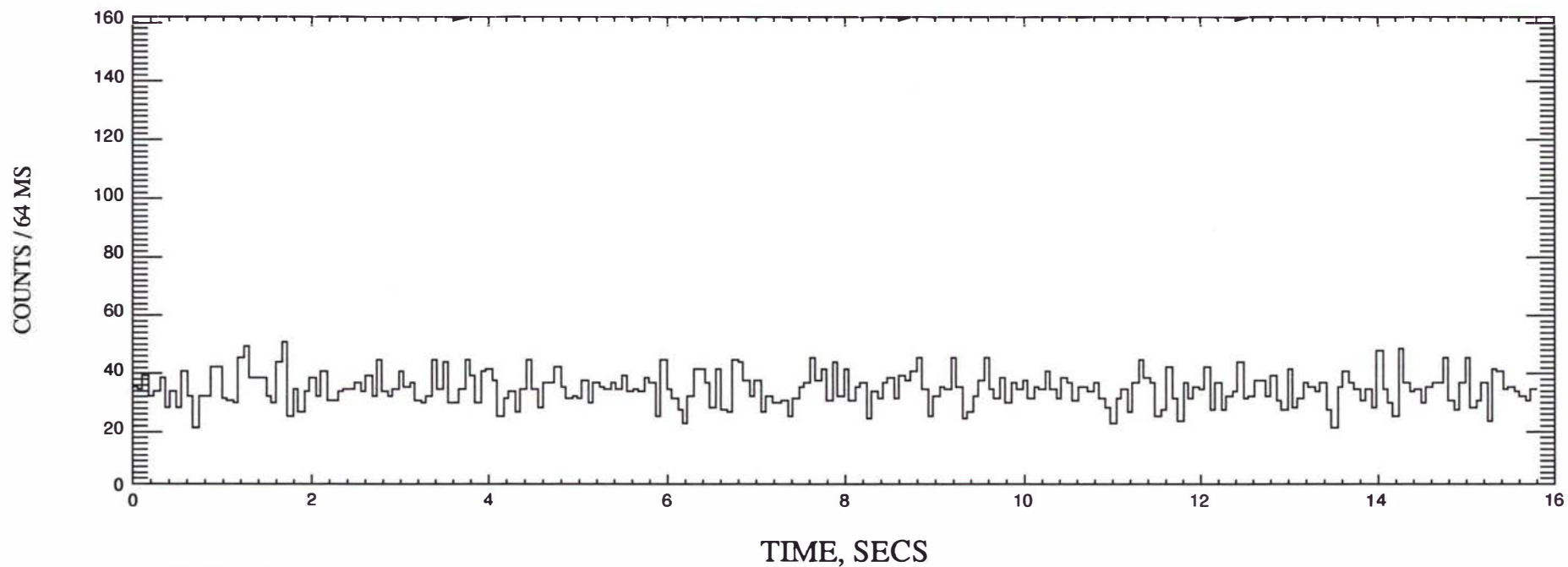
Burst Counter 0 at UT= 6.560042690701 h=23616.154 s 06:33:36.154



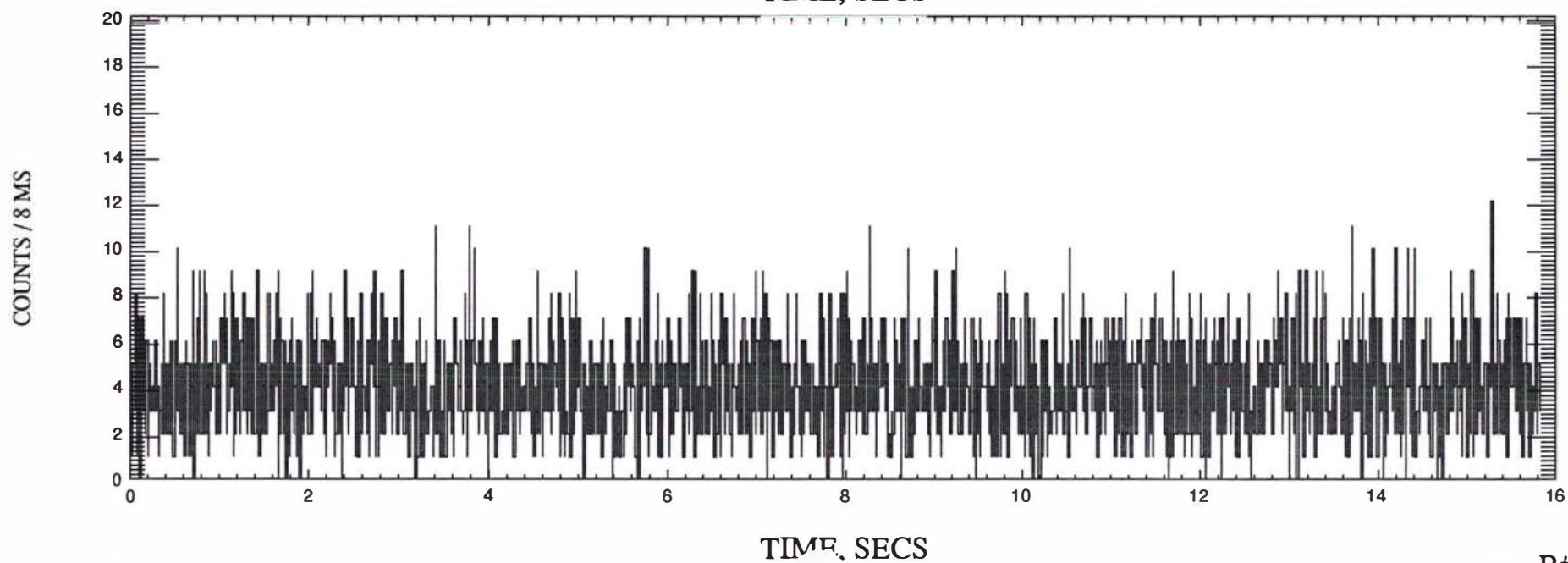
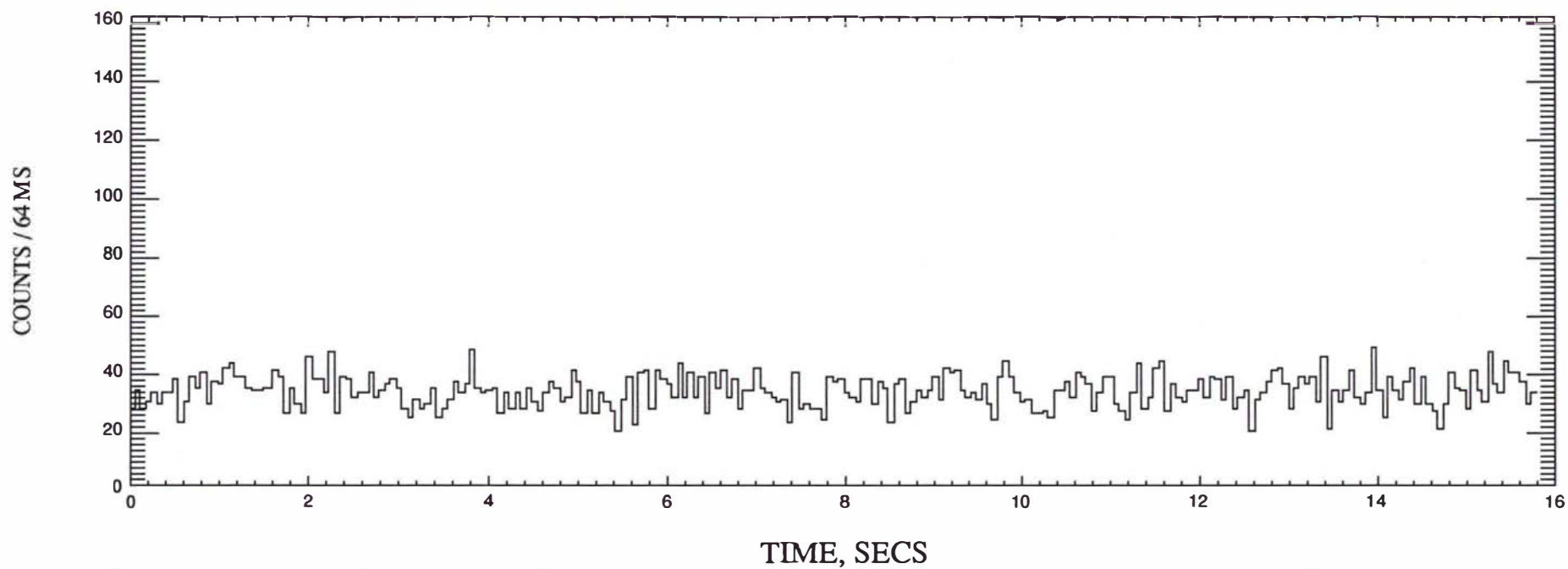
Burst Counter 1 at UT= 8.330904350281 h=29991.256 s 08:19:51.256



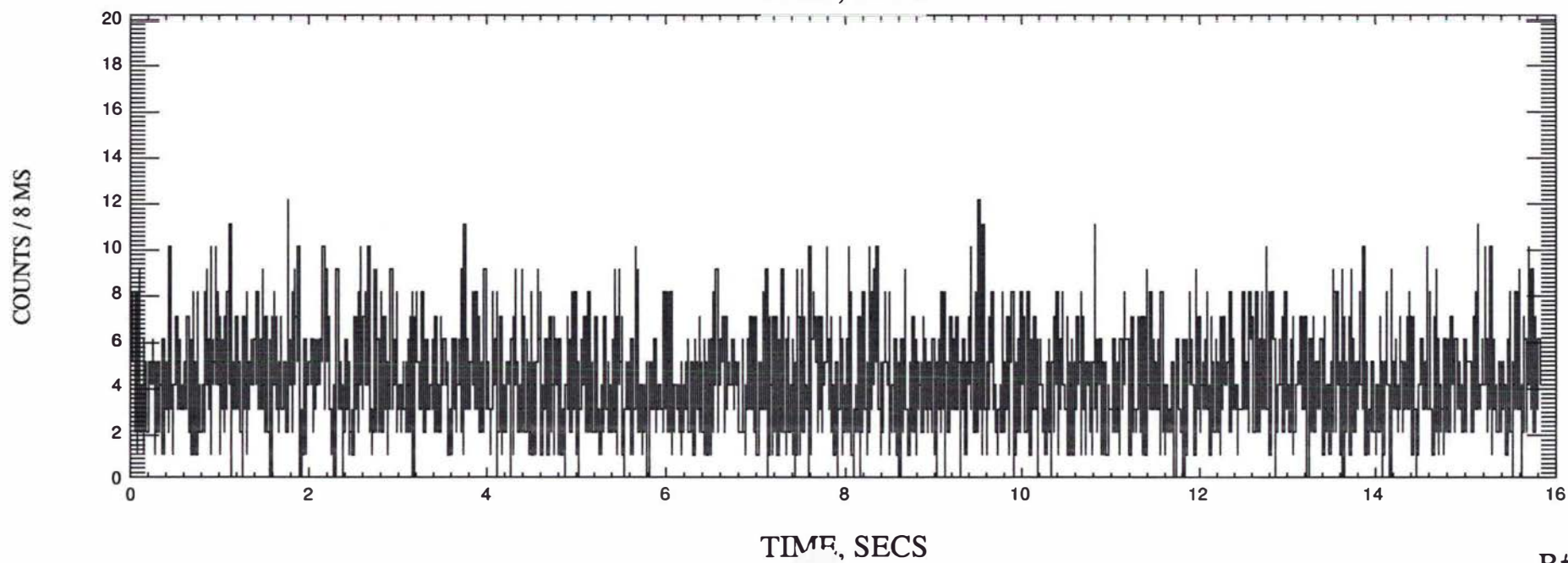
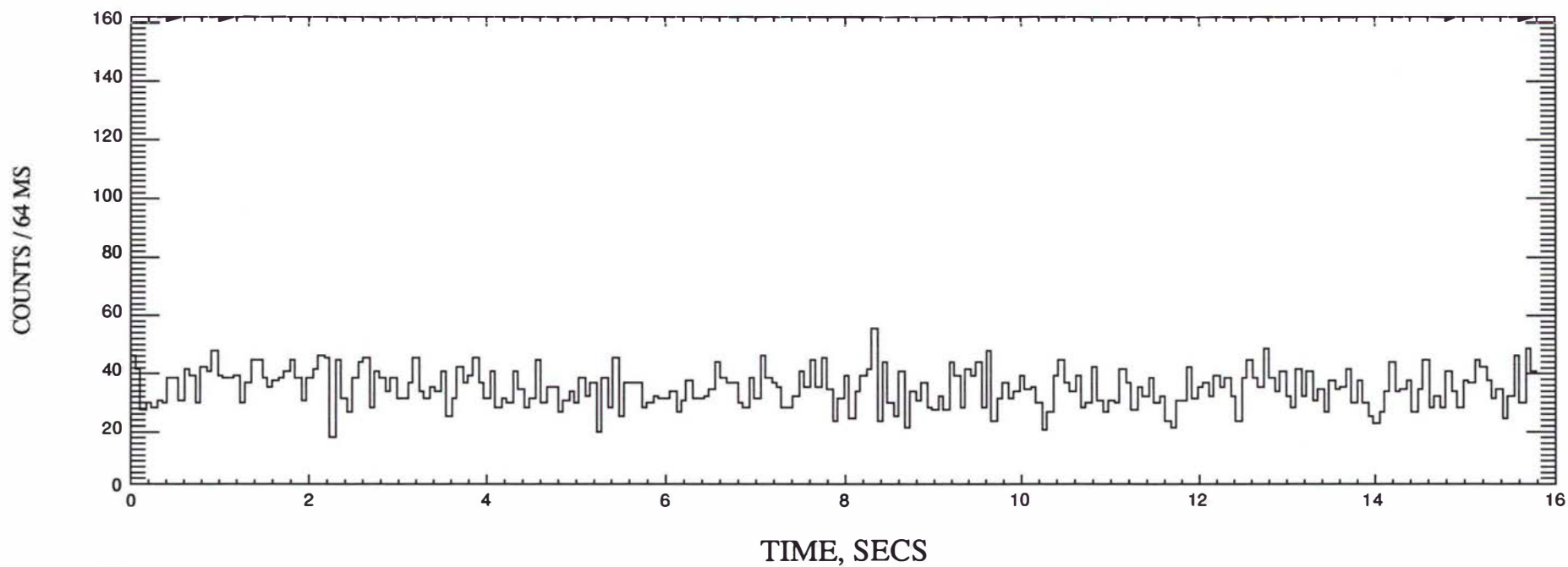
Burst Counter 2 at UT= 9.600646099514 h=34562.326 s 09:36:02.326



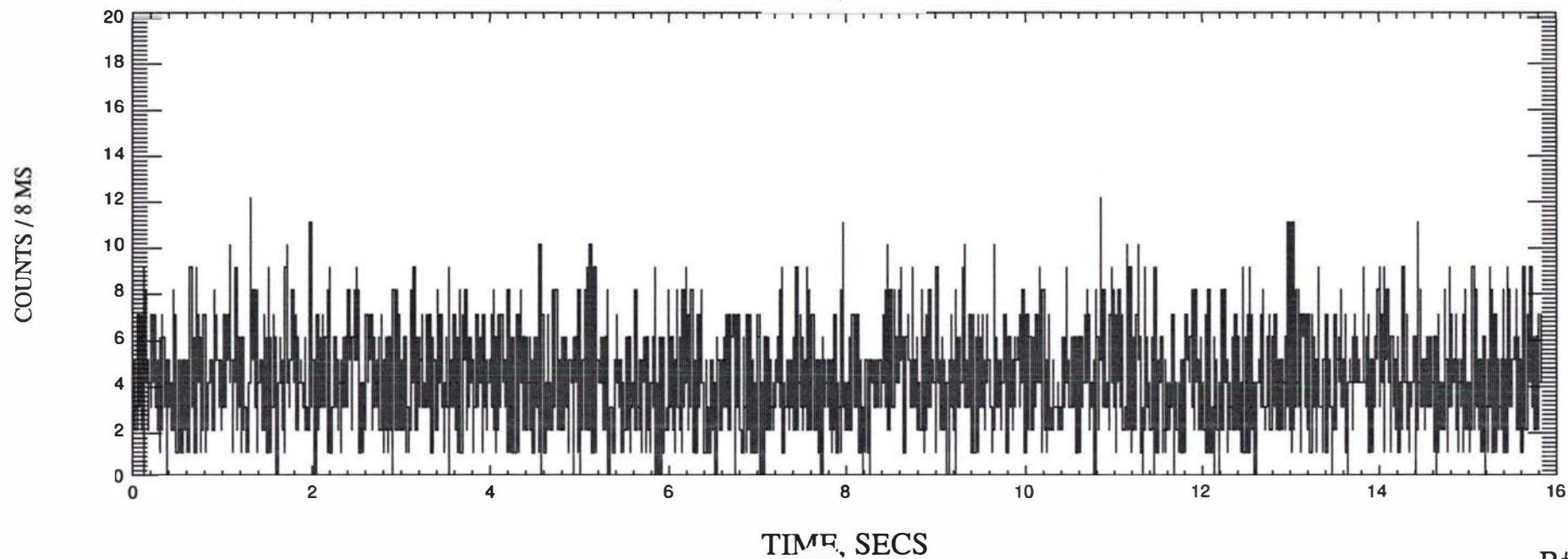
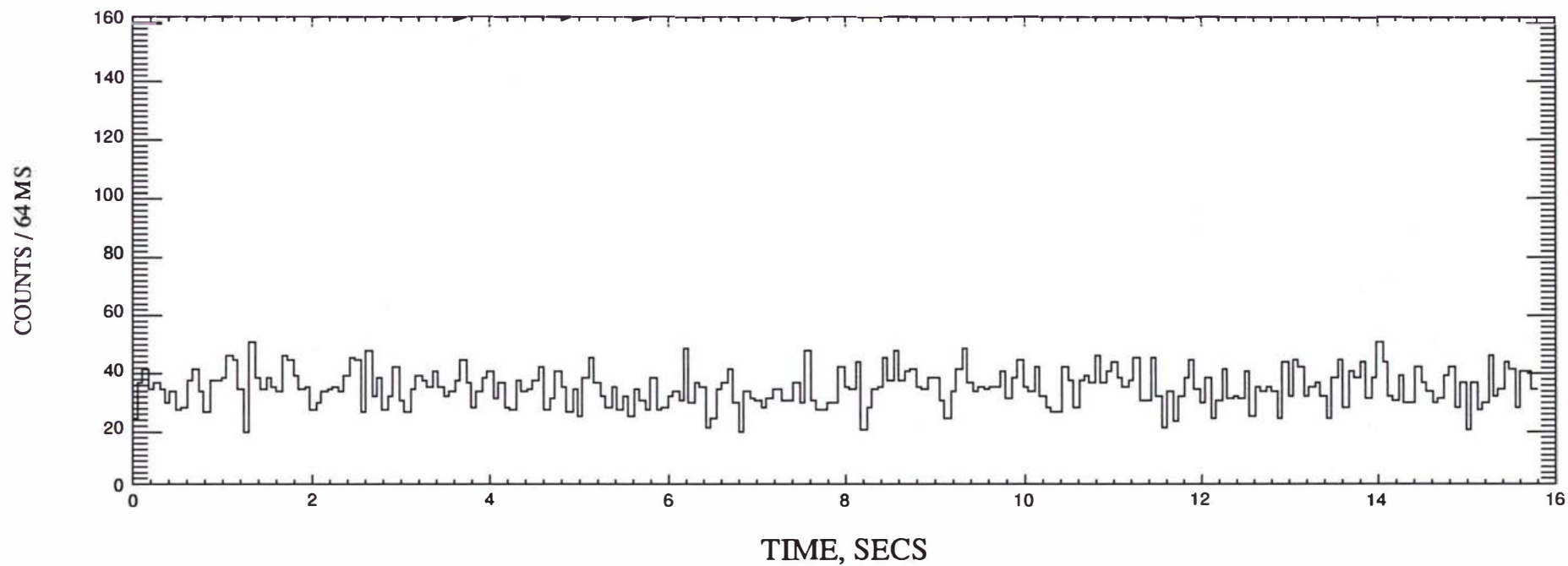
Burst Counter 3 at UT=10.872061025831 h=39139.420 s 10:52:19.420



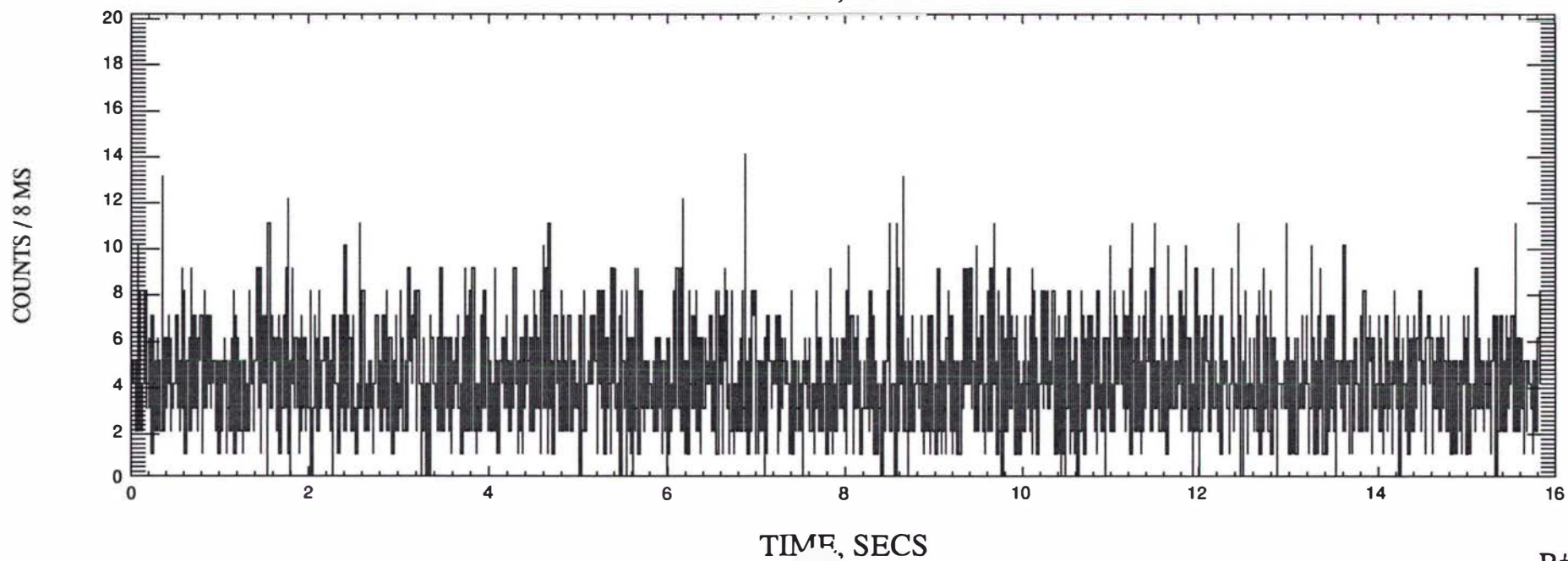
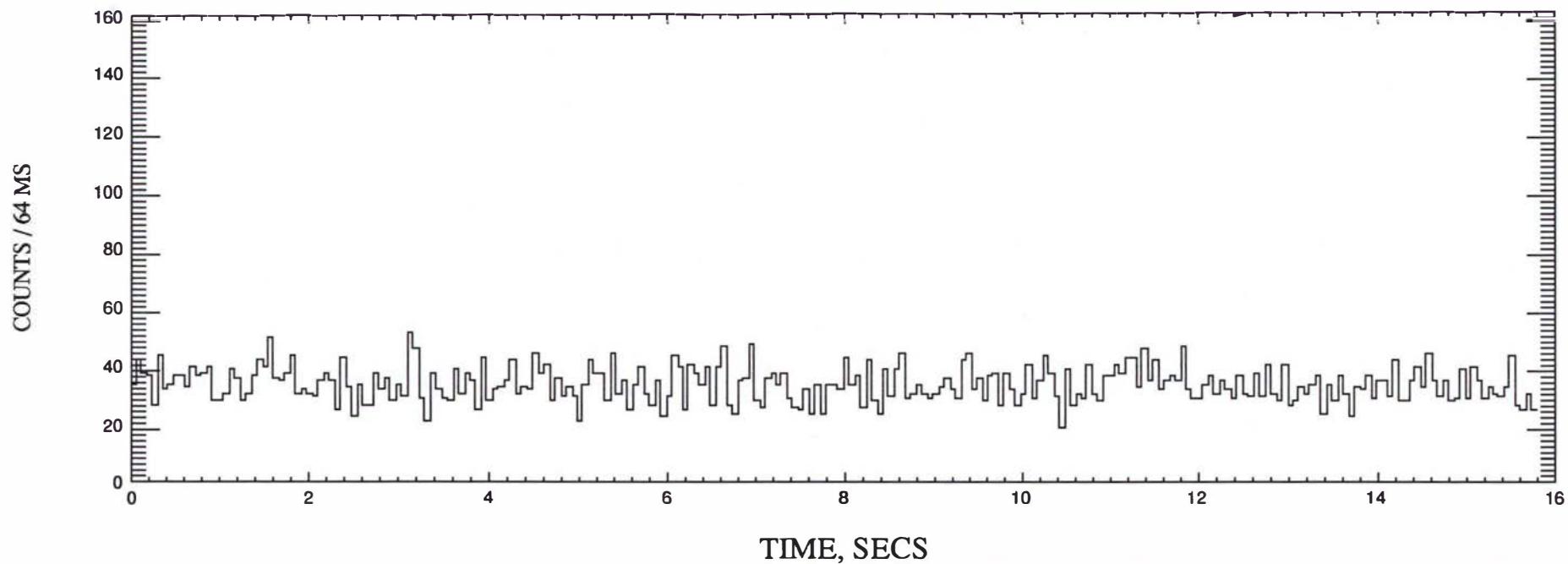
Burst Counter 4 at UT=12.125127423604 h=43650.459 s 12:07:30.459



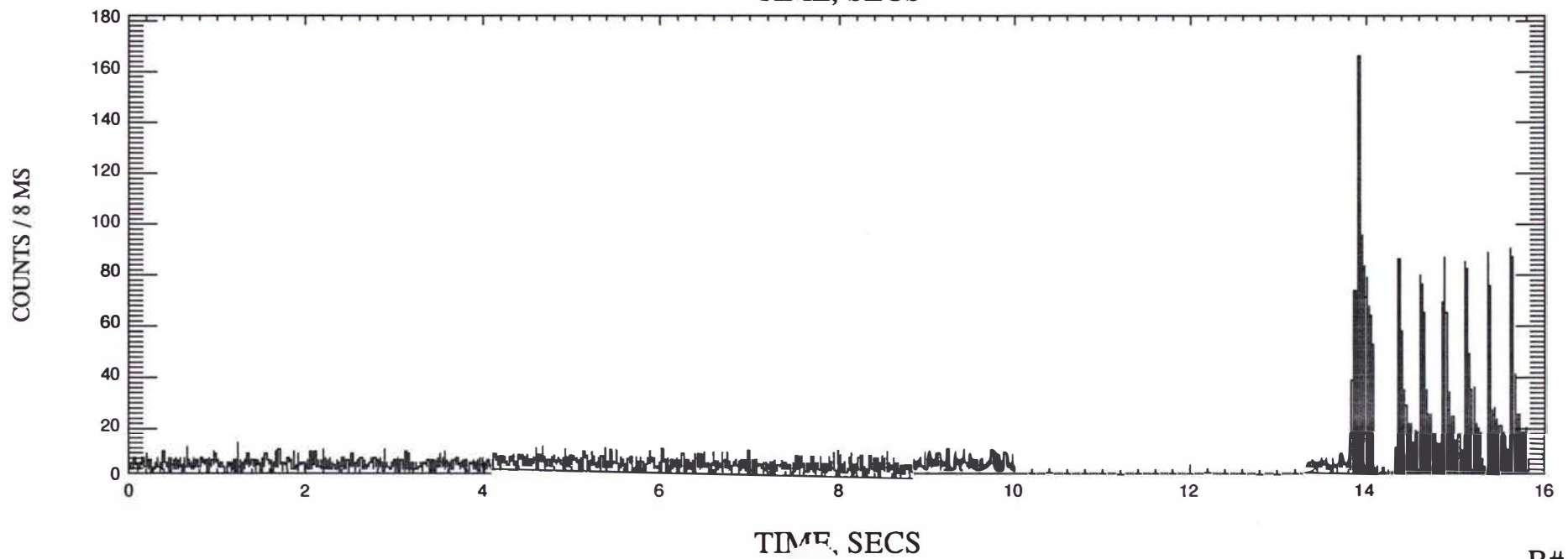
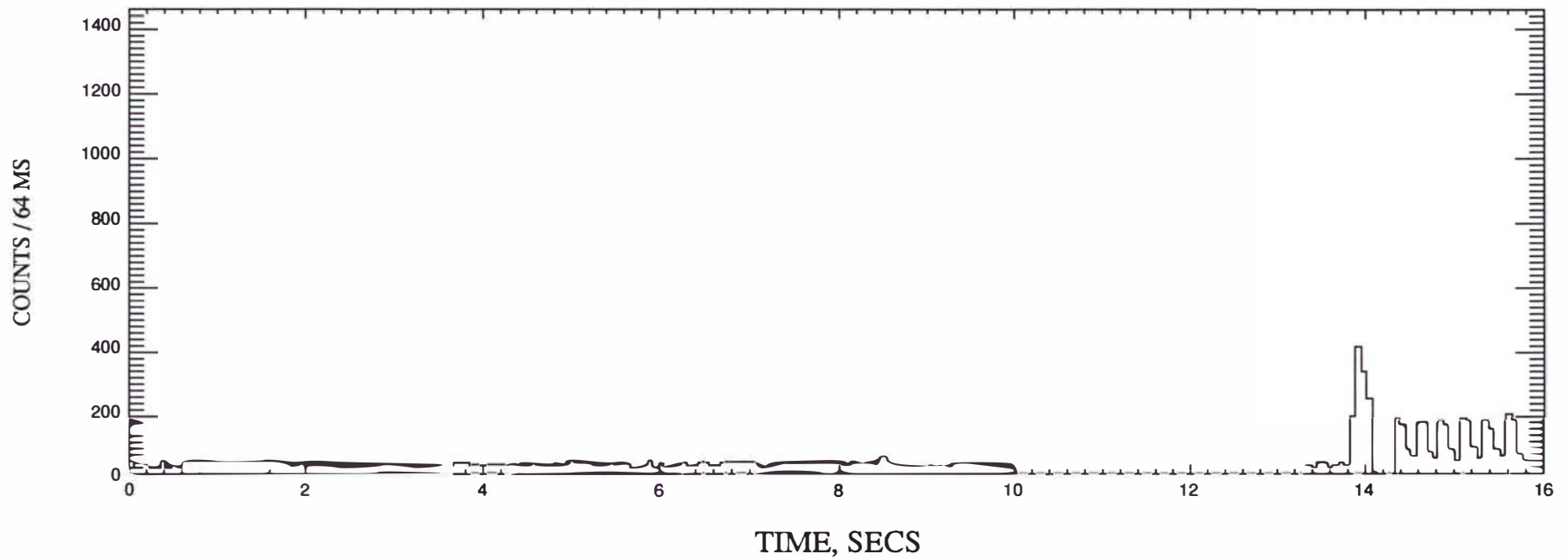
Burst Counter 5 at UT=13.385157801310 h=48186.568 s 13:23:06.568



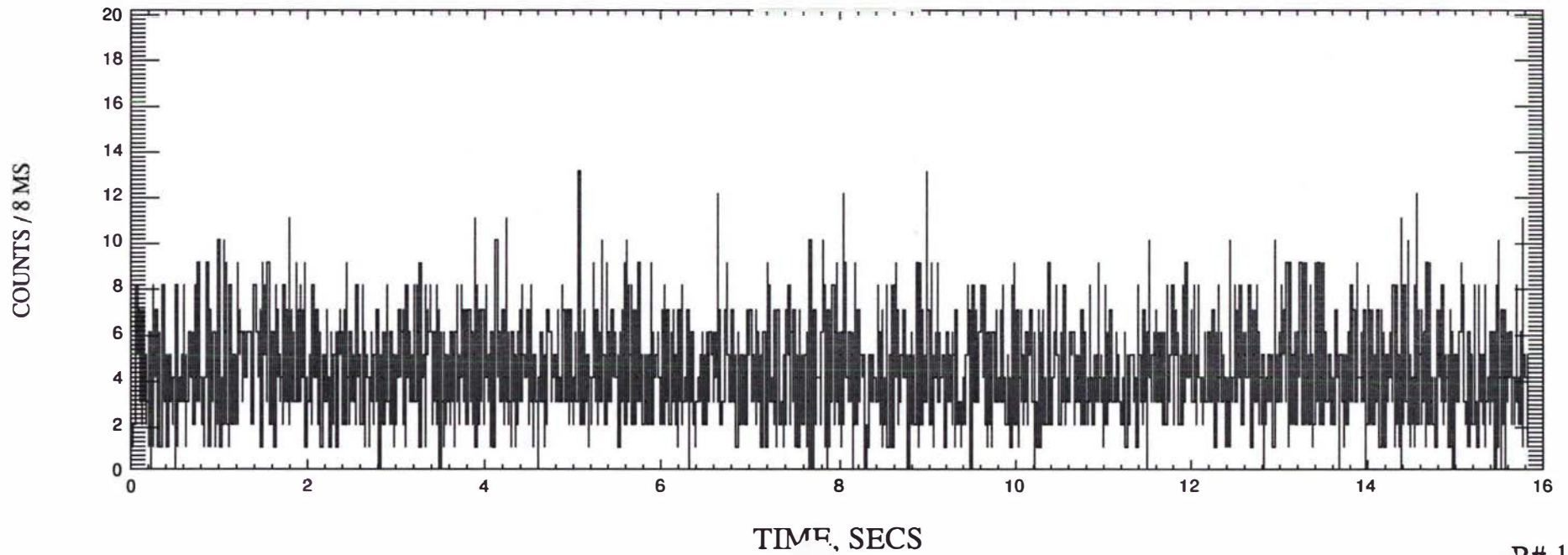
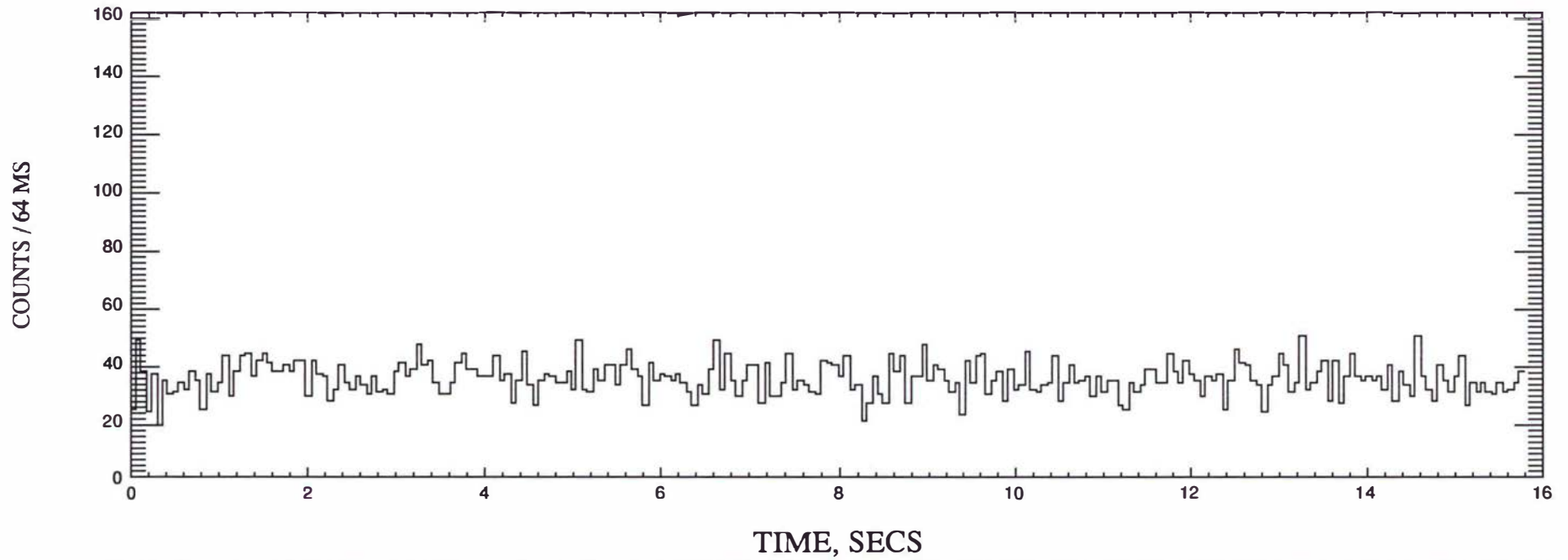
Burst Counter 6 at UT=14.647679498461 h=52731.646 s 14:38:51.646



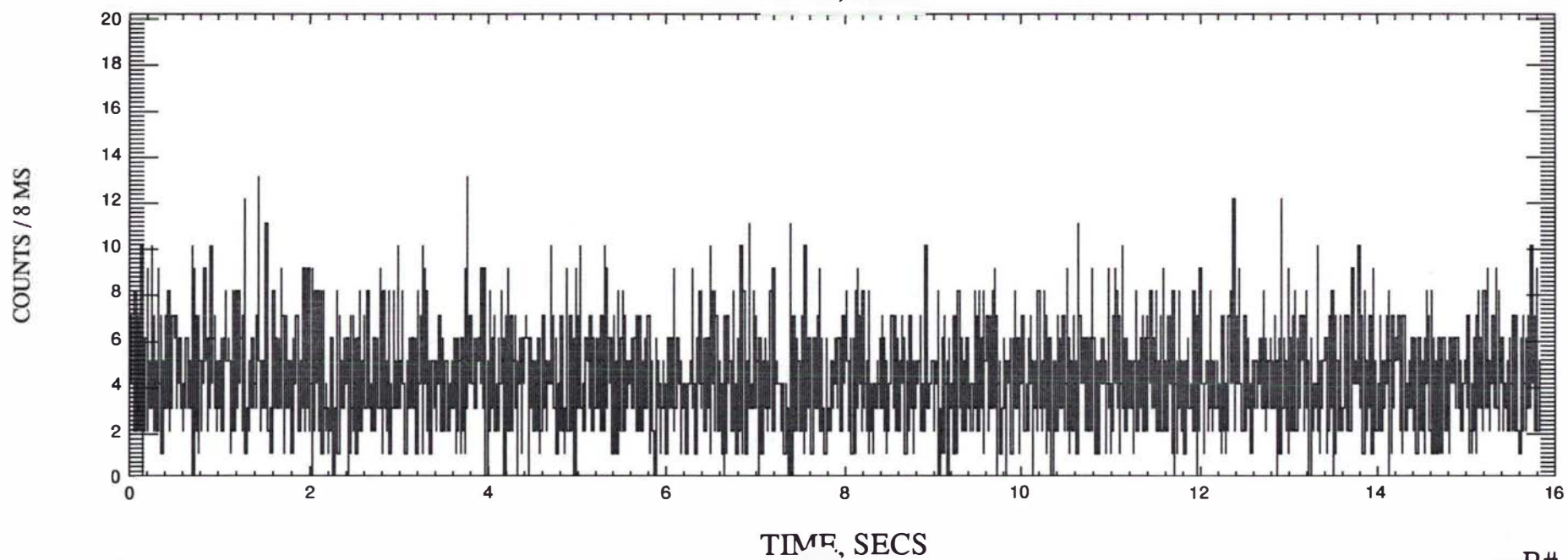
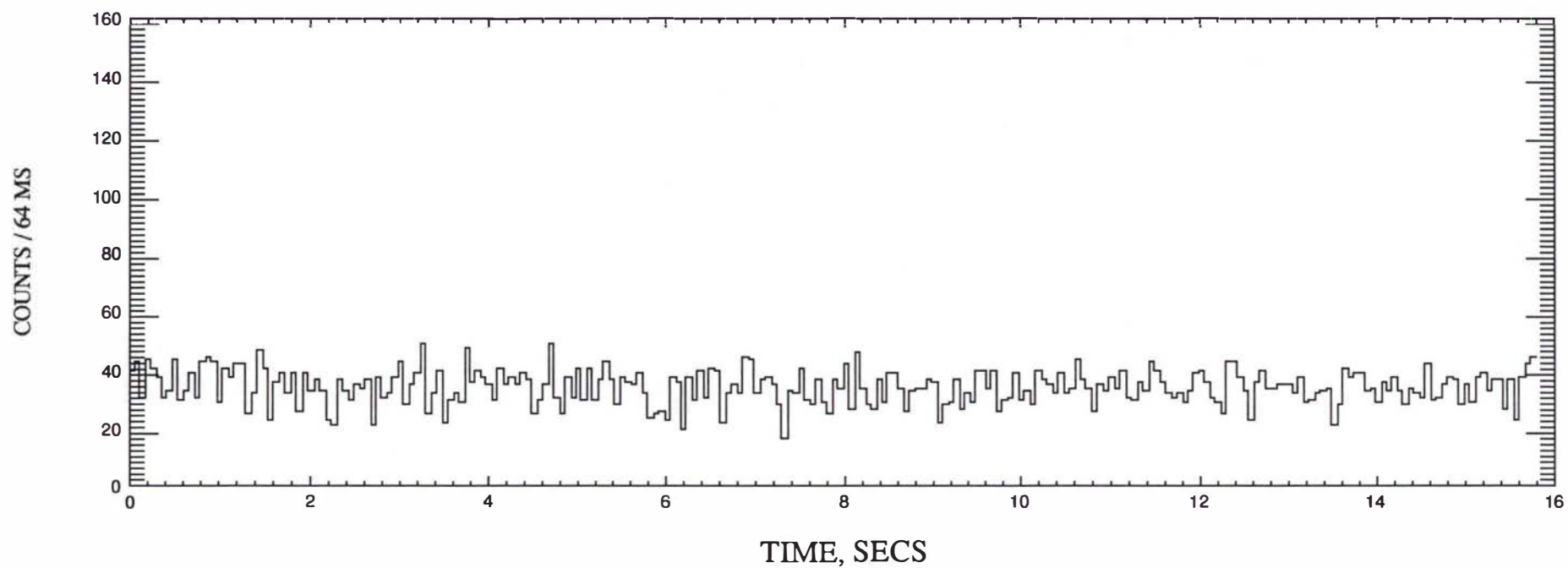
Burst Counter 7 at UT=15.713793796963 h=56569.658 s 15:42:49.658



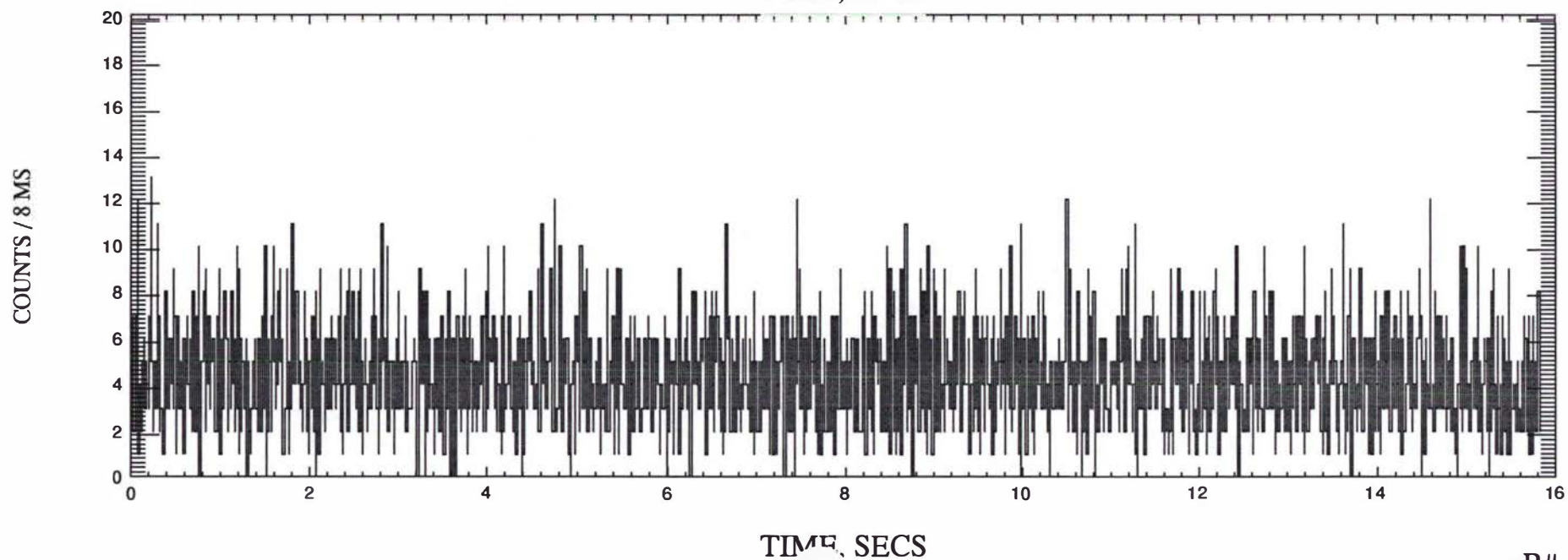
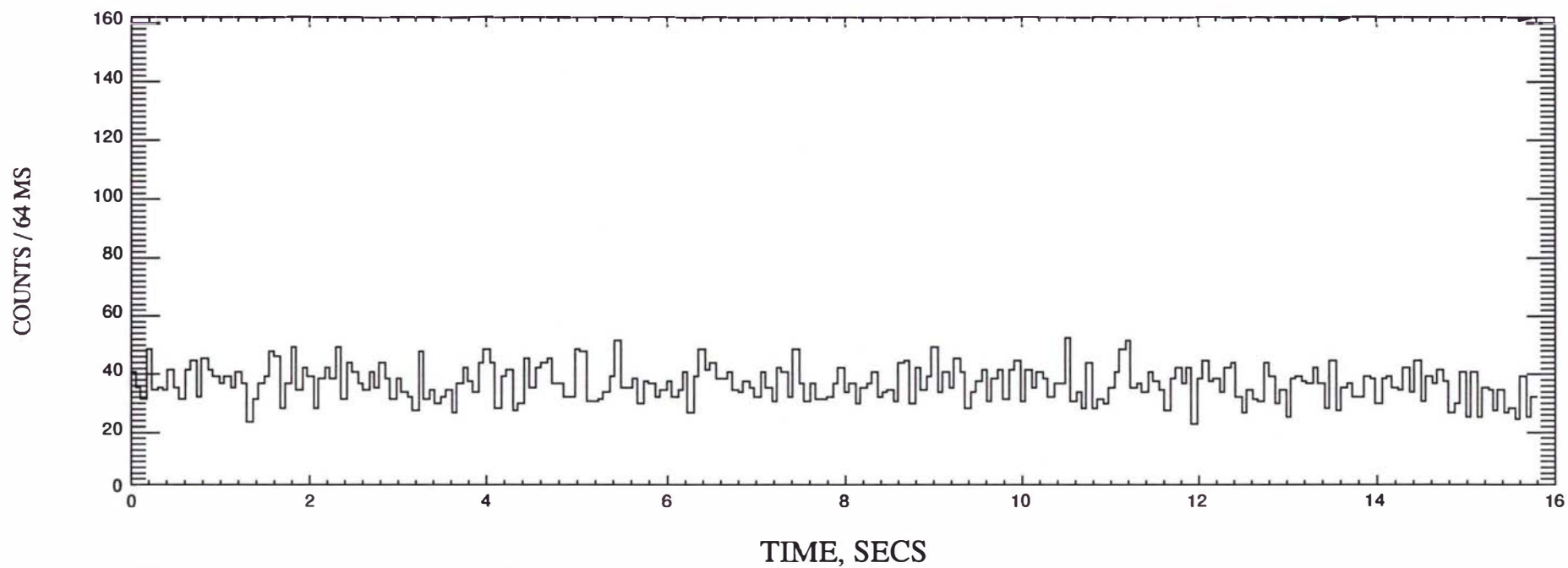
Burst Counter 8 at UT=16.419367315504 h=59109.722 s 16:25:09.722



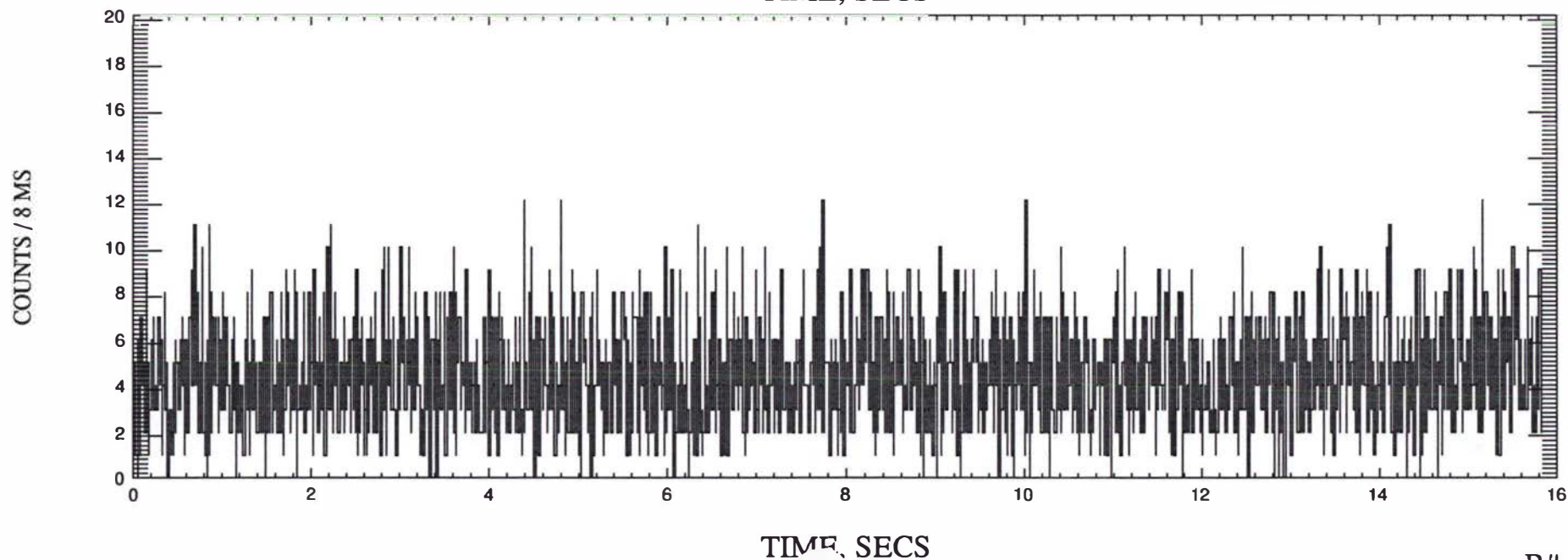
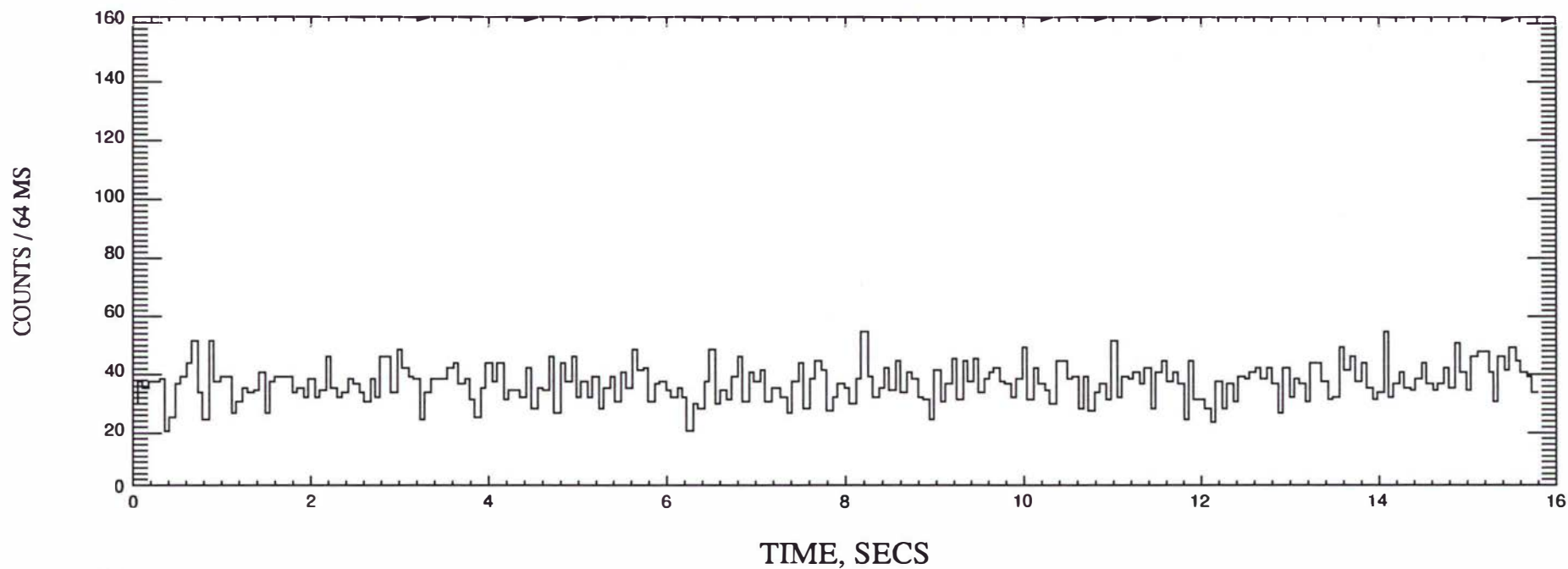
Burst Counter 9 at UT=17.119663658142 h=61630.789 s 17:07:10.789



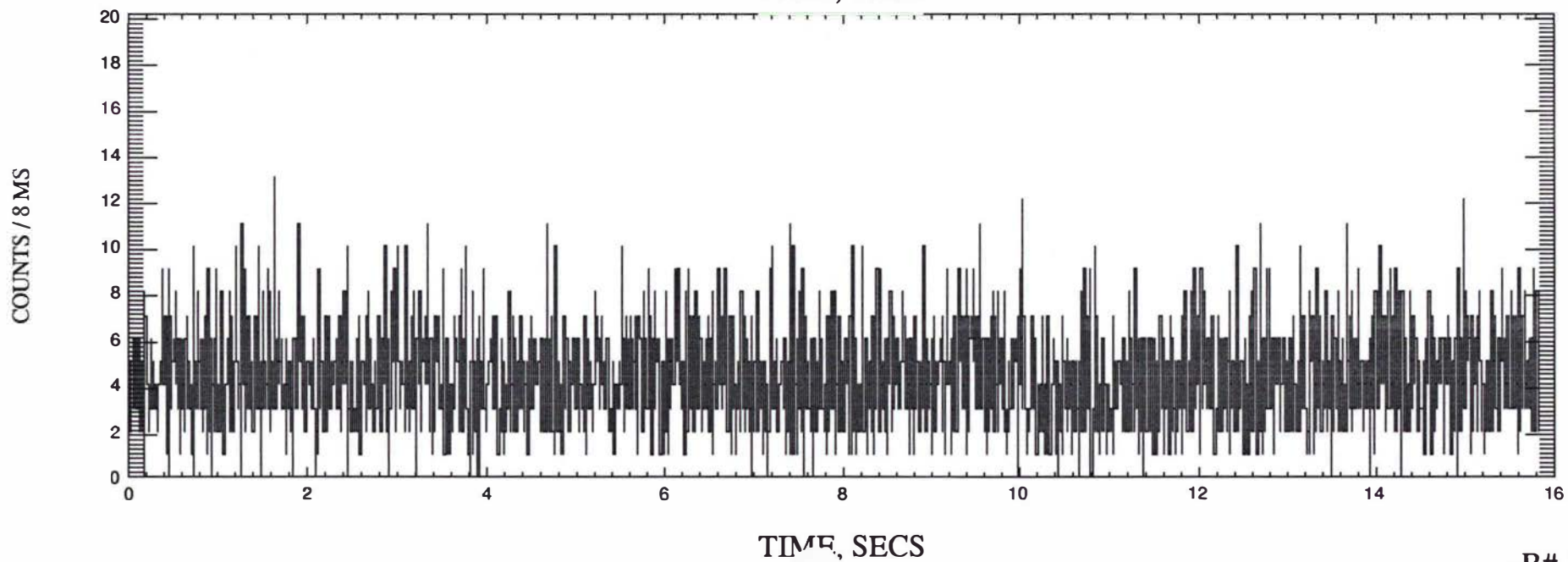
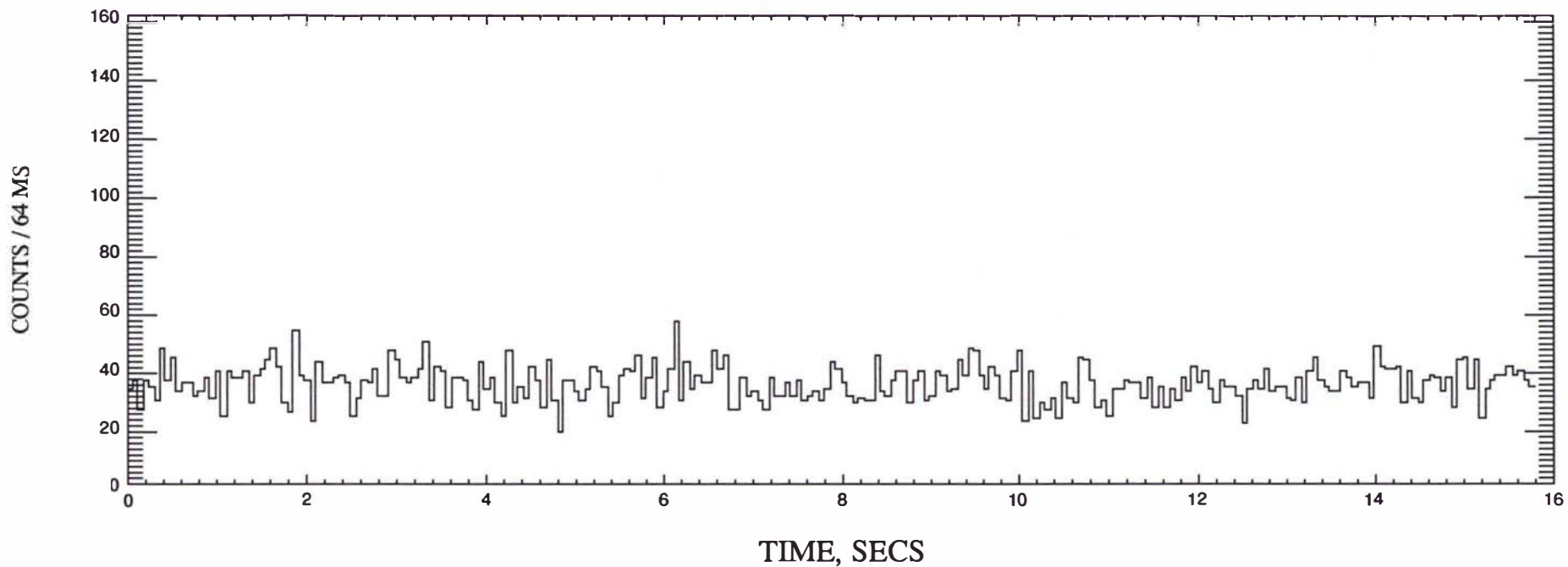
Burst Counter 10 at UT=17.819675712585 h=64150.833 s 17:49:10.833



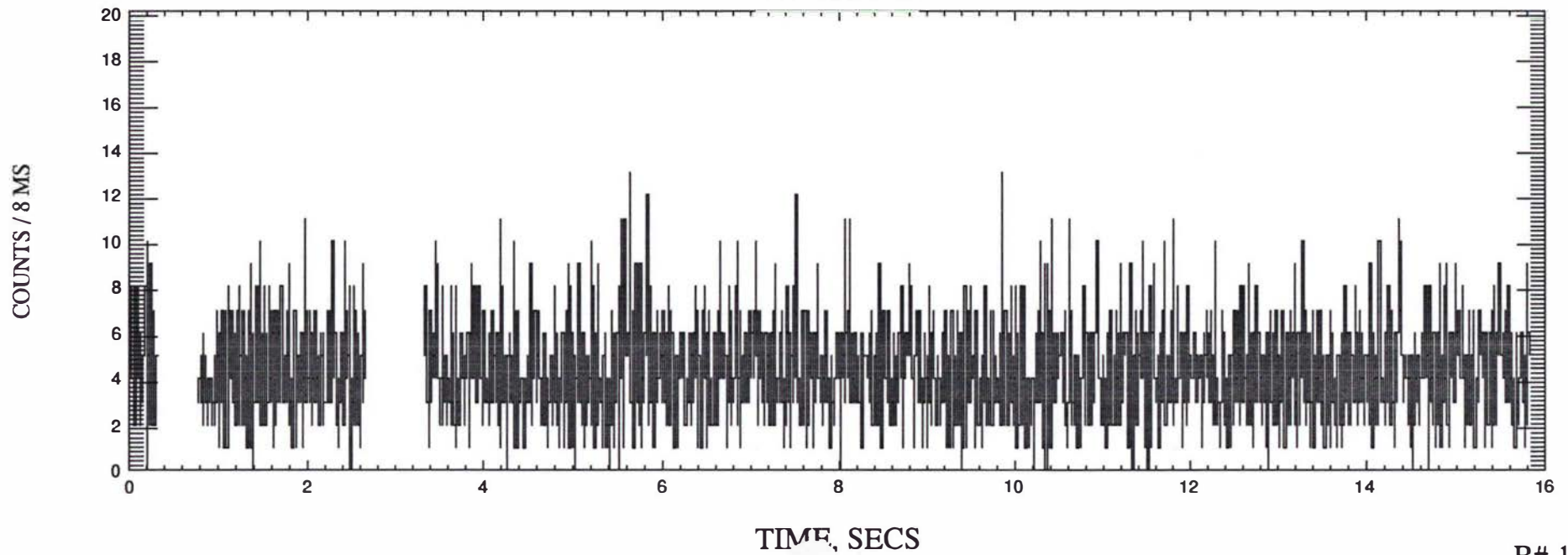
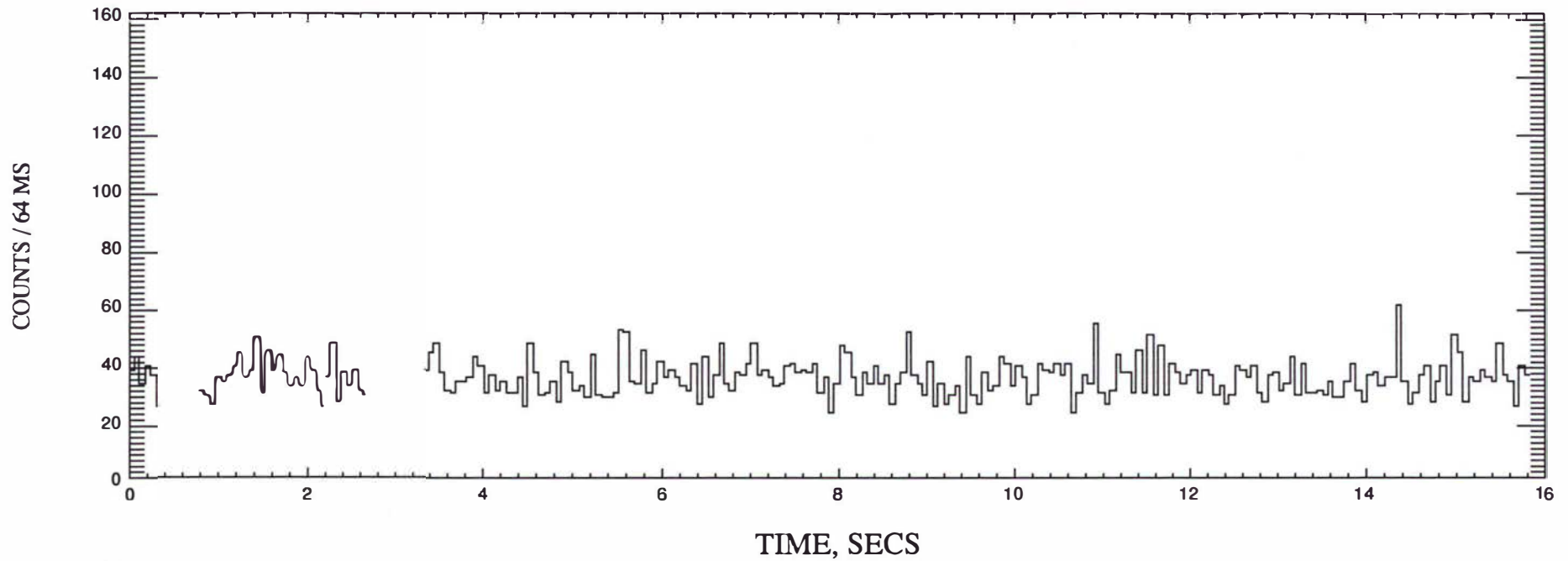
Burst Counter 11 at UT=18.684133114285 h=67262.879 s 18:41:02.879



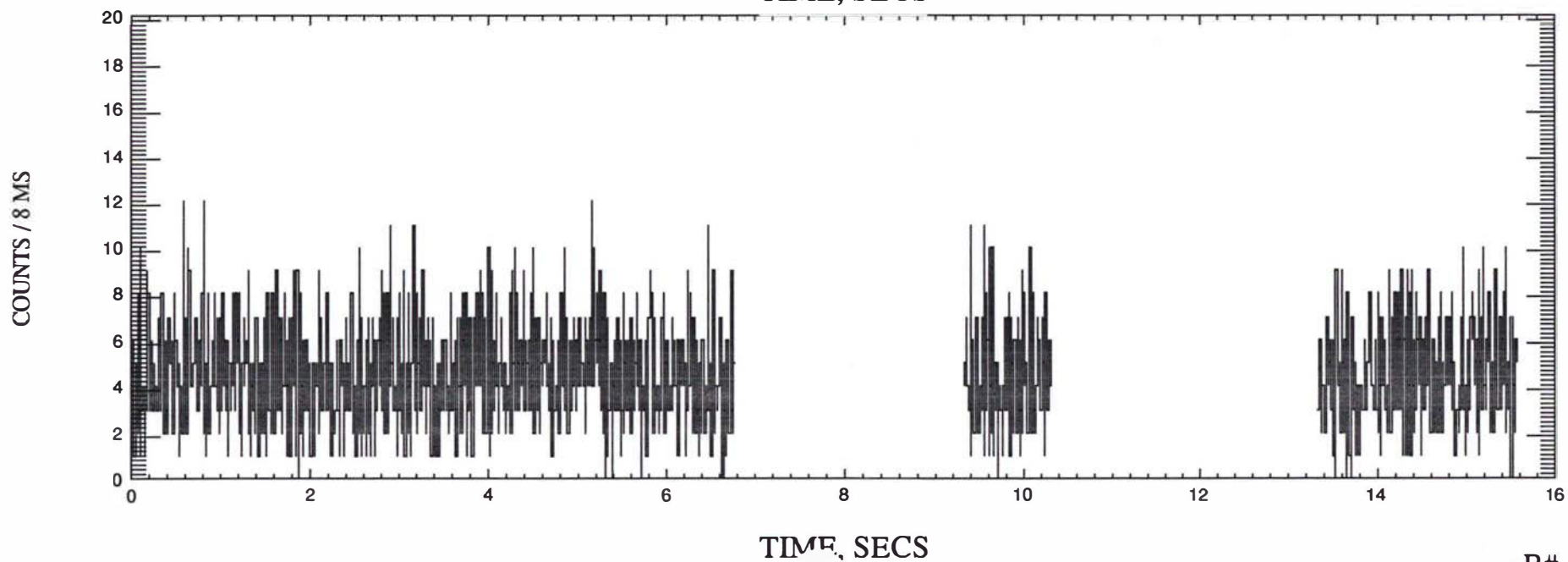
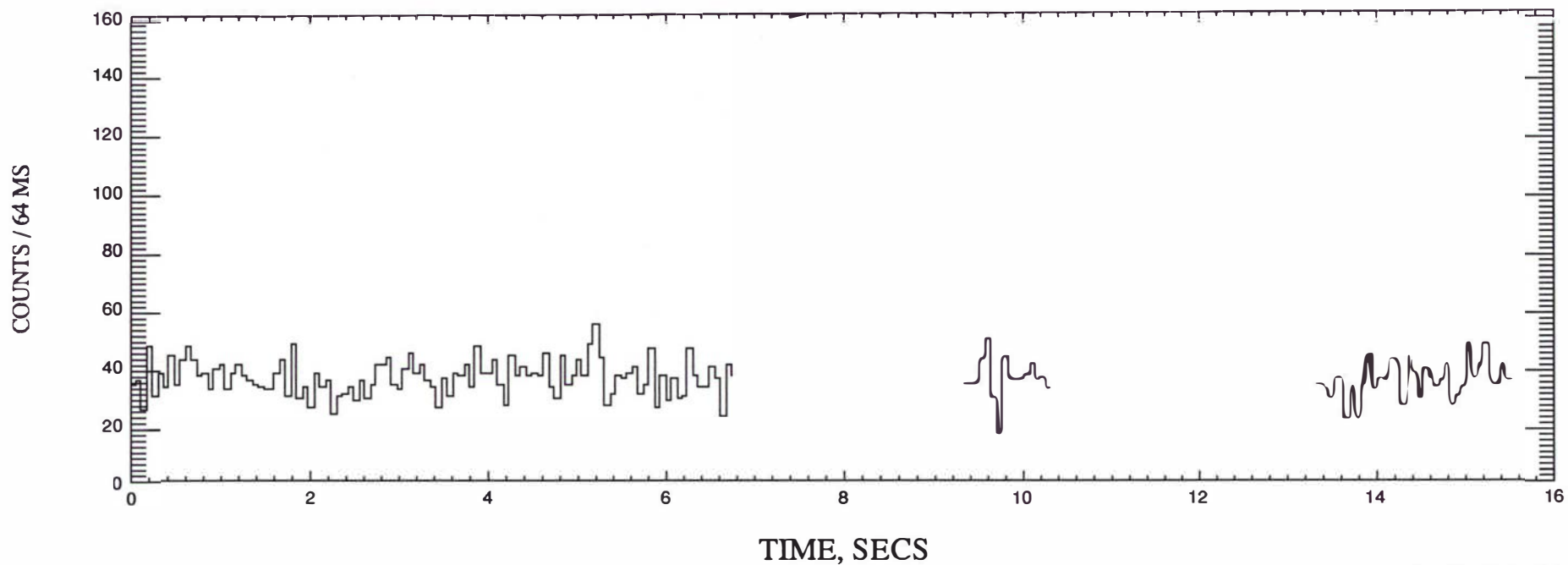
Burst Counter 12 at UT=19.946654807197 h=71807.957 s 19:56:47.957



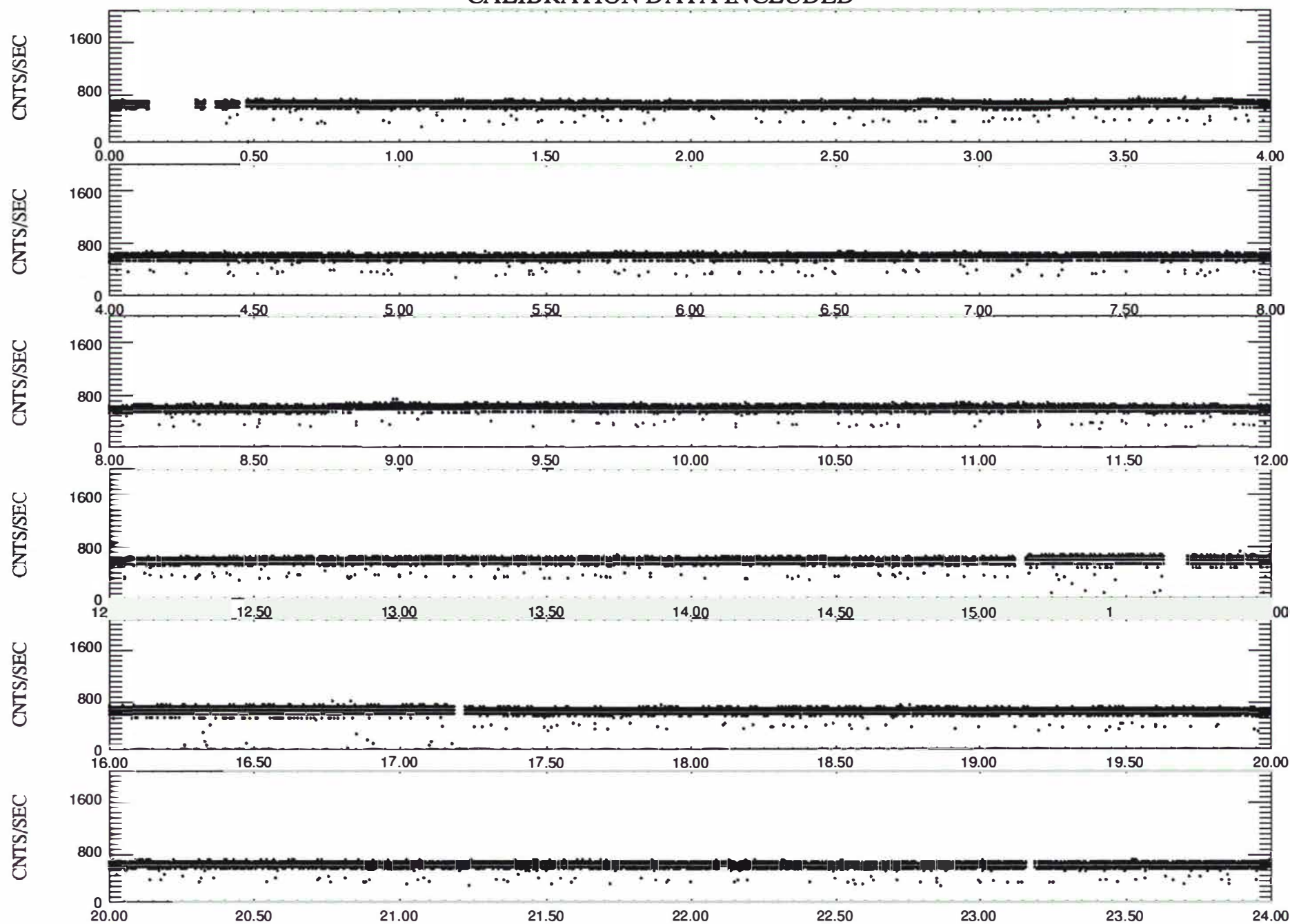
Burst Counter 13 at UT=21.206945601569 h=76345.004 s 21:12:25.004



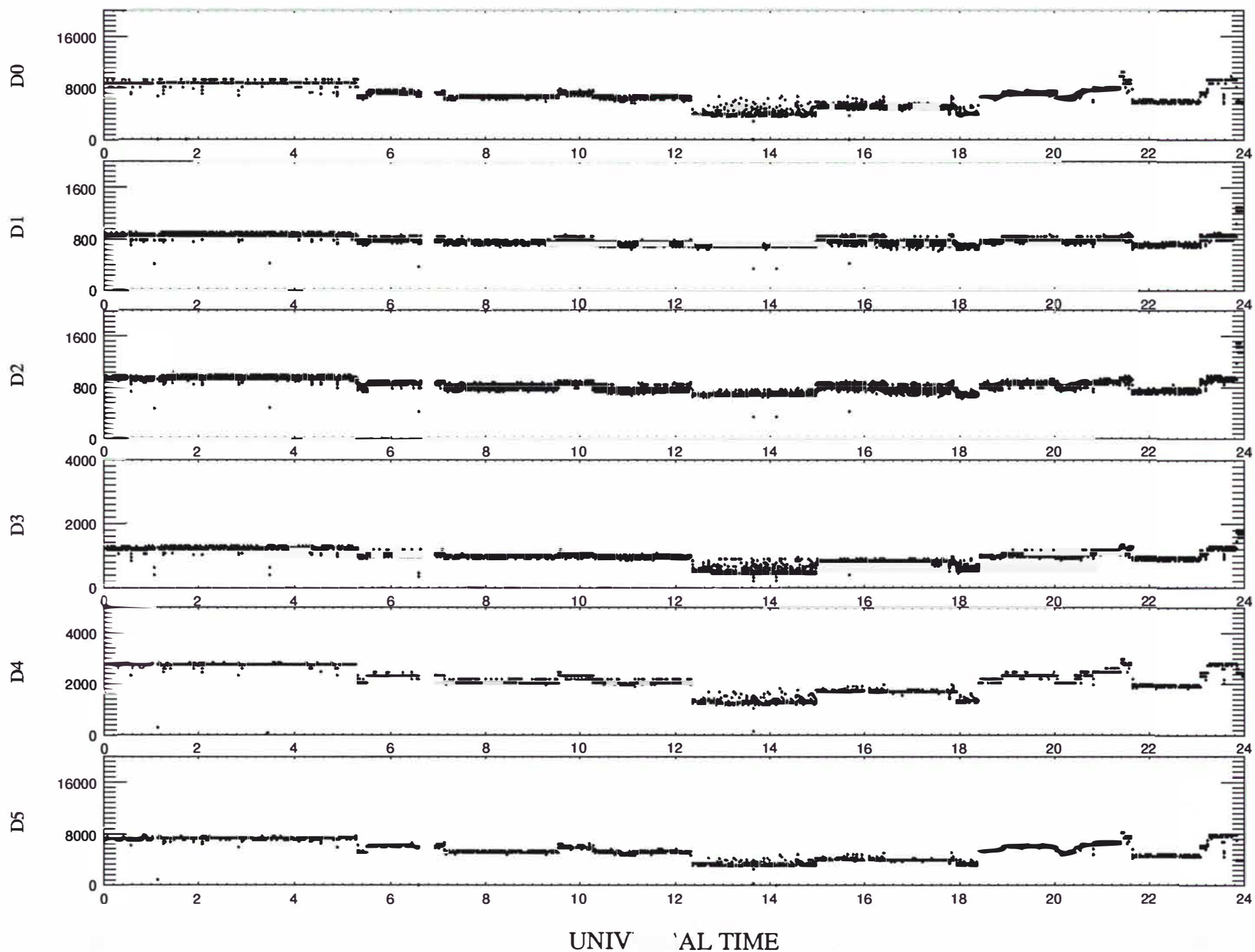
Burst Counter 15 at UT=23.730873540243 h=85431.145 s 23:43:51.145



CALIBRATION DATA INCLUDED



UNIV AL TIME



CATSEARCH PROGRAM

BATSE BURST # 148
EVENT OF 1991 MAY 5 DAY OF YEAR=125
EVENT CROSSING TIME AT BATSE : 72916. S. OR 20:15:16.0
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 178.600 33.200
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 5/ 5/ 91 IS:
RA= 117.529 DEC= 22.674 DIST= 3.083 AU
BATSE-ULYSSES DISTANCE = 461146488. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=125.77 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -899.18 SECS.
CROSSING TIME AT ULYSSES IS 72017. S. OR 20:00:16 +/- 253.02 SECONDS

From @space6.ssl.berkeley.edu,@cmsa.berkeley.edu:ASTMPH@CSEARN.BITNET Sun Aug 30 15:12:21 1992
Date: Mon, 31 Aug 92 00:12:33 MDT
From: Petr Pravec <ASTMPH@CSEARN.BITNET@cmsa.berkeley.edu>
Subject: msg from Rene Hudec
To: khurley@space6.ssl.berkeley.edu
Content-Length: 1712

to: Kevin Hurley <khurley@space6.ssl.berkeley.edu>

Dear Kevin:

we have found the following positional coincidences between BATSE GRB and OT records:

GRB 920224 OT 910407 *In 4 mag, but count rates not too bad. Get BATSE data + check*
GRB 911228 OT 910719 *Get BATSE data*
GRB 920505 OT 910811 " " "
GRB 920121 OT 910917 " " "

i.e. these GRB and OT coincides positionally within the given optical and gamma ray error boxes. However, the error boxes we have for these GRB are large and so the coincidences may be accidental only. Please let me know whether or not are the positions of these GRBS known more accurately by triangulation method. I have already asked Chryssa but she recommended to ask you directly as owner of this information.

The same information would be also important for those GRBS we have simultaneous plates :

911025, 911027, 911127, 911202, 911209, 911210, 920110, 910511, 910809
910505, 910829, 910902, 911129, 911228, 920121, 920209, 920224, 920227, 920305
and 920505 *Same as above*

For these GRB, we have between 1 and 9 Plates taken simultaneously and covering the position. However, the BATSE errors are large (14 deg dia) and hence the search for optical counterparts is very laborious and difficult. If you would have a more precise position determined by triangulation, then we could investigate this box more carefully.

Naturally, I guarantee you that this information will not be given to any other person and will be used for the proposed search only. In the case of any discovery, publication etc. you will be considered as co-author and asked for permission prior release.

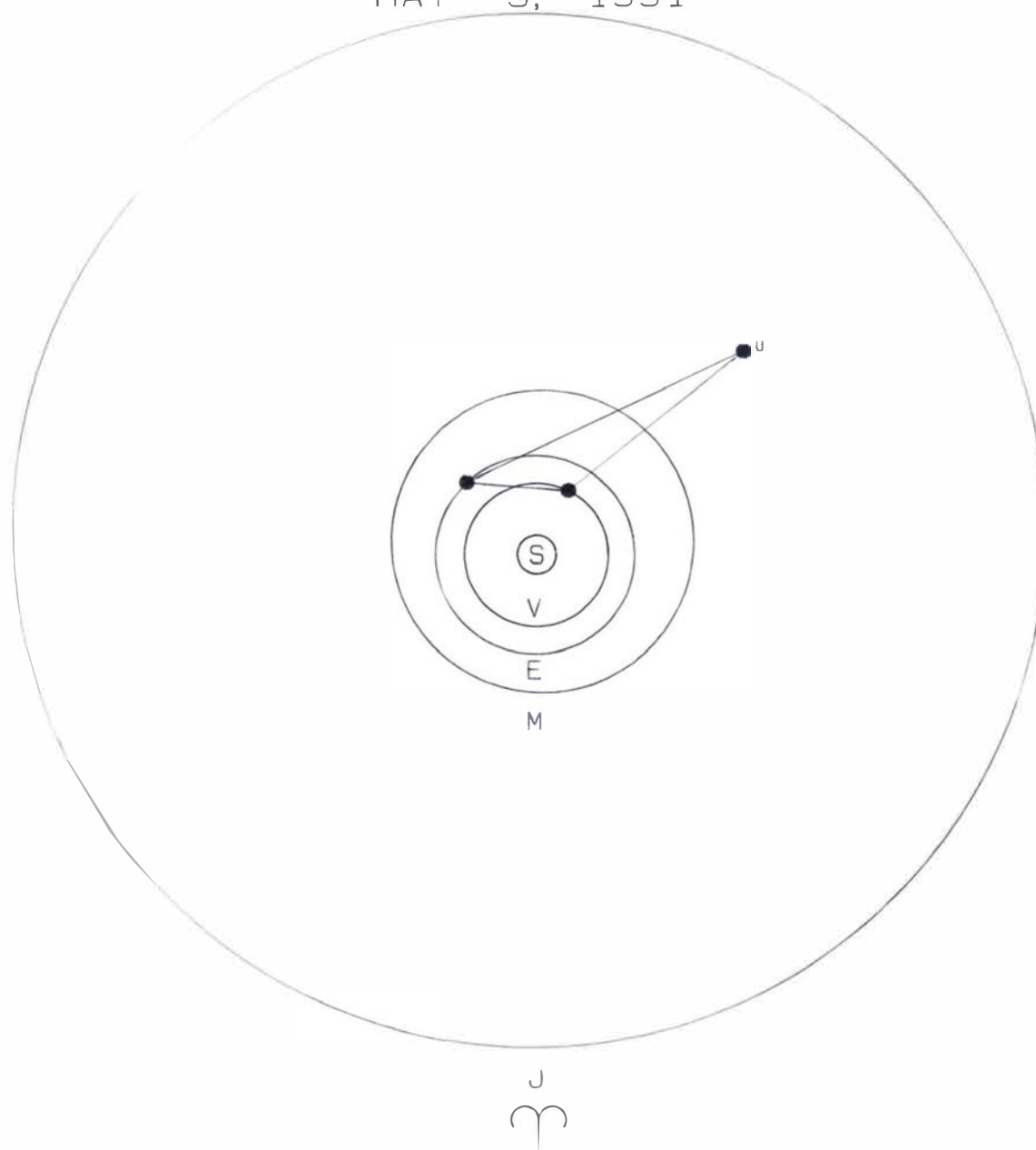
Regarding the release of HCO plates, I have send an email message to Martha Hazen. She will contact you when necessary. Thank you.

Kind regards Rene Hudec

911025 No
911027 No
911127 Yes ✓
911202 Yes ✓
911209 Yes ✓
911210 Maybe
920110 Yes ✓
910511 No ✓
910505 Yes No
910809 ~~Yes for event but not for position~~
910829 Get BATSE data + look
910902 " "
911129 " "
911228 " "

920121 Get BATSE data + look
920209 No - in 4 mag
920224 See above comment
920227 Get BATSE data + look
920305 " "

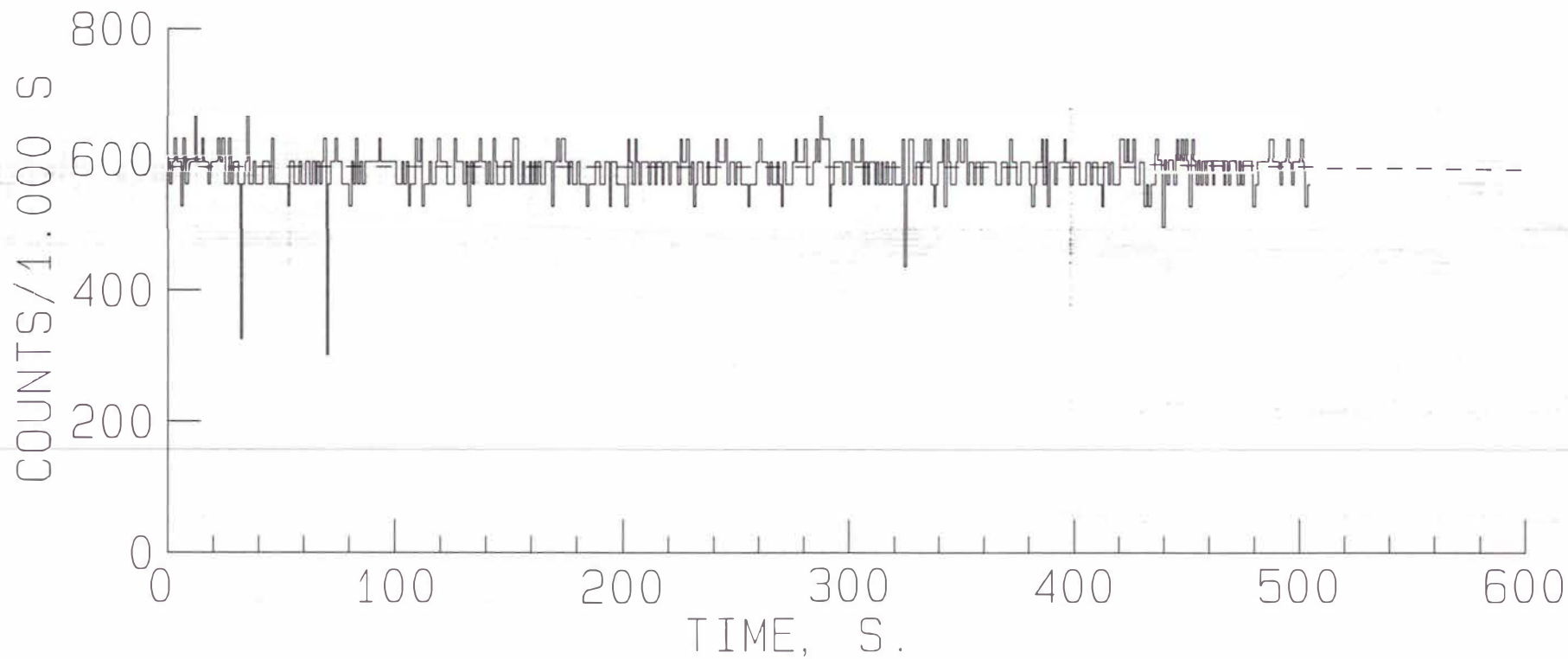
ULYSSES ORBIT - ECLIPTIC PLANE PROJECTION
MAY 5, 1991



21 / 4 / 93

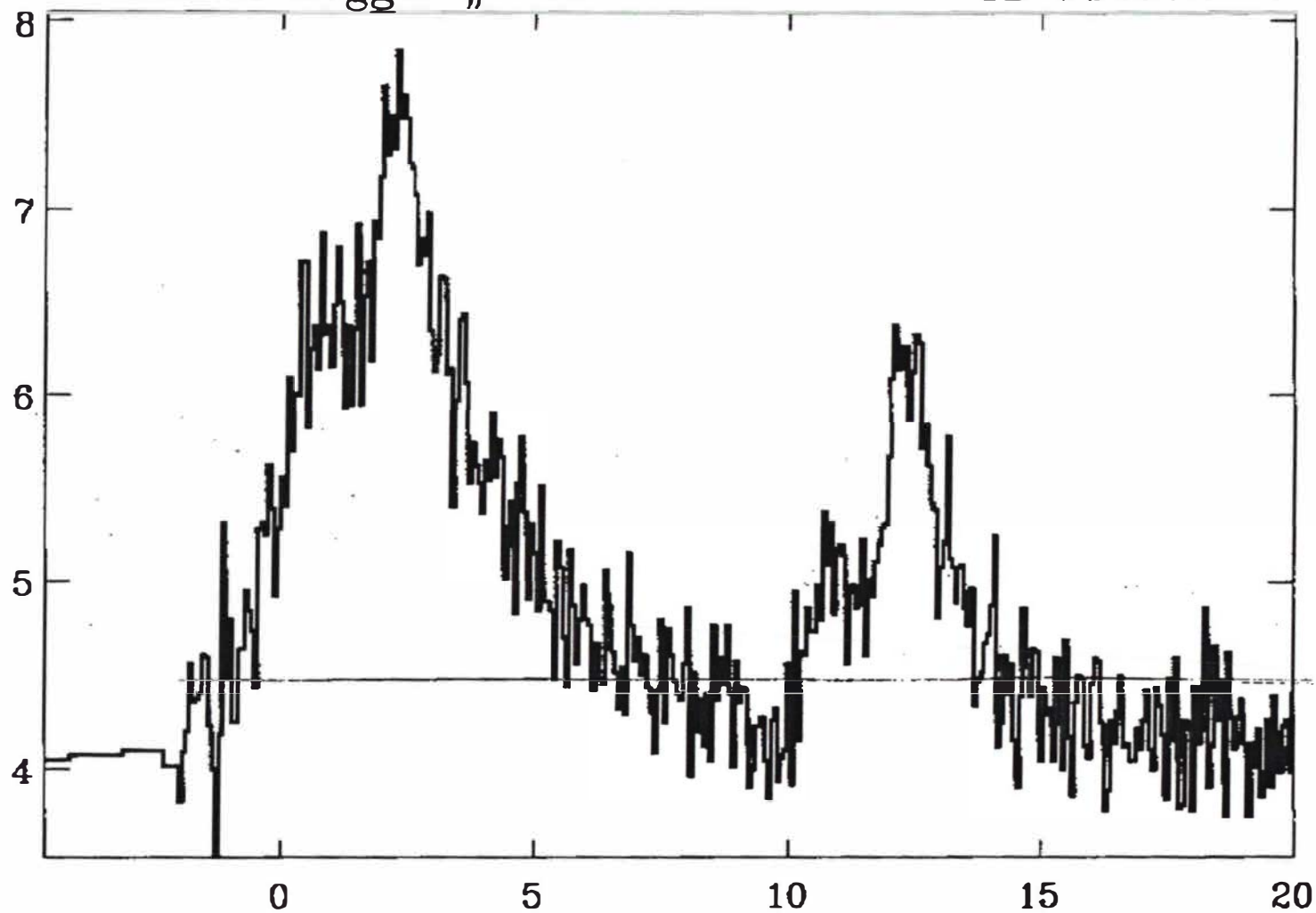
ULYSSES RT
5/ 5/91 71748.445 s
0- 0 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



BATSE trigger # 148

1B 910505 72918s



From @UCBSP.SSL.BERKELEY.EDU:KOUVELIOTOU@BATSE.SPAN Thu May 9 08:18:11 1991
Received: from UCBSP.SSL.BERKELEY.EDU by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA06553; Thu, 9 May 91 08:18:08 PDT
Message-Id: <9105091518.AA06553@sunspot.ssl.berkeley.edu>
Date: Thu 9 May 91 07:16:21-PST
From: \$C <KOUVELIOTOU@BATSE.SPAN>
To: ANDERSON@sunspot.ssl.berkeley.edu
Subject: [Resent-MM Mail] [Resent-MM Mail] batse bursts
Status: R

Date: Thu 9 May 91 07:15:55-PST
From: \$C <KOUVELIOTOU@BATSE.SPAN>
To: MARSHA@UCBSP.SSL.BERKELEY.EDU
Subject: [Resent-MM Mail] batse bursts

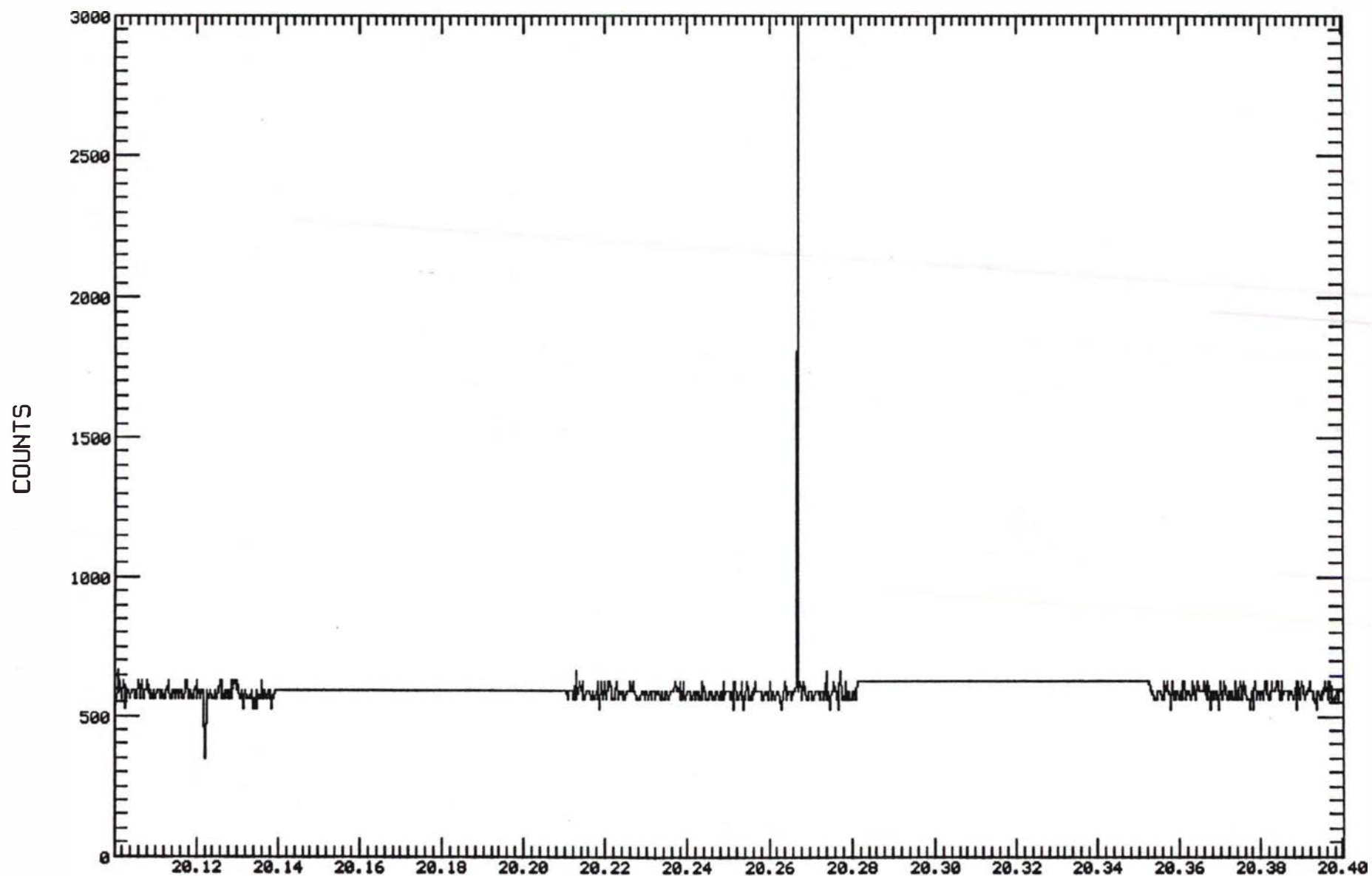
Received: from BATSE by UCBSP.SSL.BERKELEY.EDU via MAIL-11 with DECnet;
Thu, 9 May 91 07:15:27-PST
Date: Thu 9 May 91 07:15:26-PST
From: KOUVELIOTOU@BATSE.SPAN
Subject: batse bursts
To: "UCBSP::KHURLEY"@BATSE.SPAN

Hi there Kevin,
here is the beef!

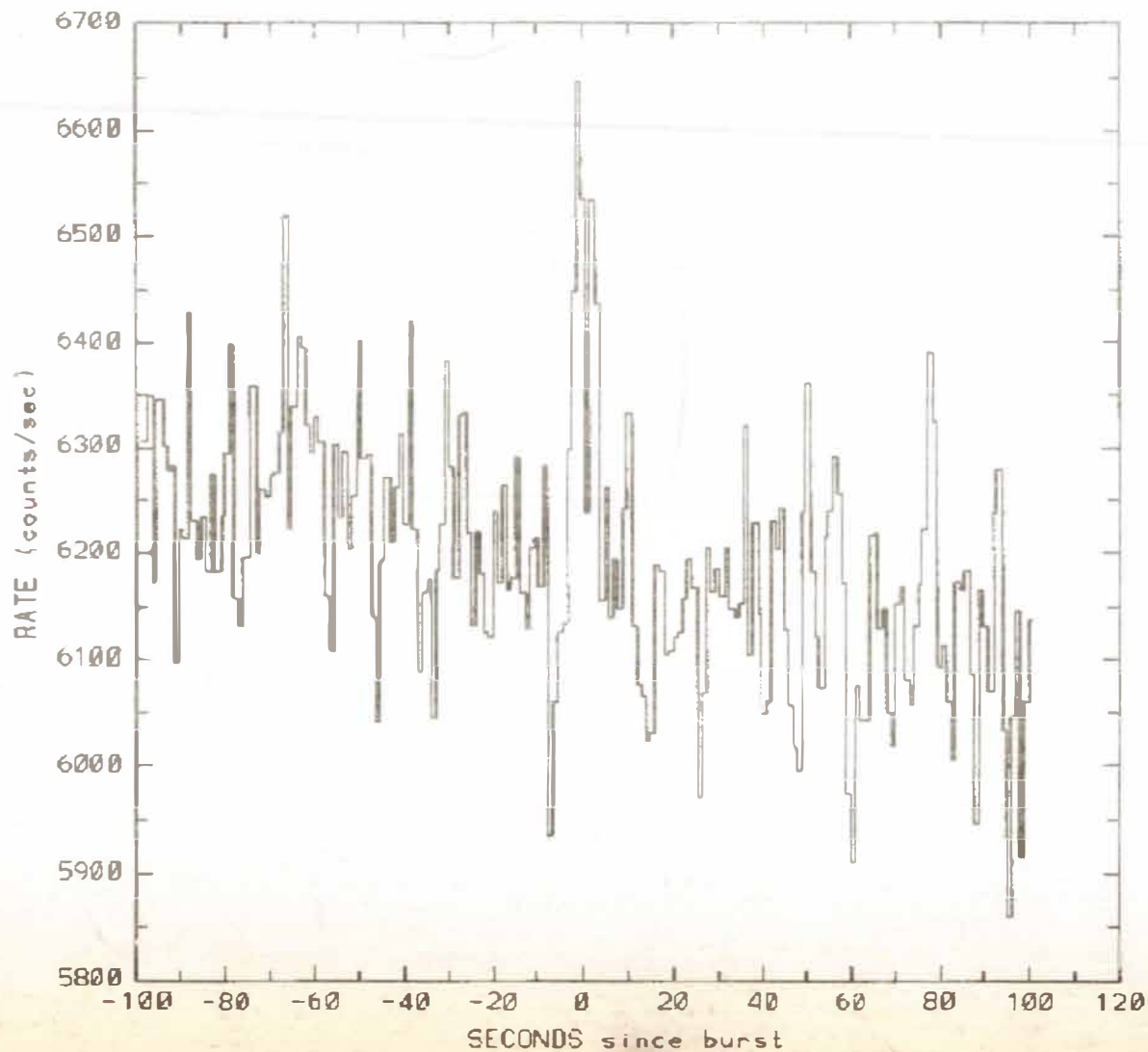
BATSE burst #	Burst name	sec of day UT	
105	GRB910421	33245	
106	GRB910422	2533	
107	GRB910423	71686	
108	GRB910424	71008	
109	GRB910425	2267	
110	GRB910425	20255	
111	GRB910426	80048	
114	GRB910427	32722	
121	GRB910429	11511	
130	GRB910430	61721	
133	GRB910501	30016	
138	GRB910502	40669	
142	GRB910502	81445	
143	GRB910503	25454	A BOOMER ! 3×10^{-5}
148	GRB910505	72918	20:15:18

5/5

→CK



Ulysses U5 Event (?)



15-JUL-1991 08:38:04

Created by MOPS BD
(Eurst Display)
Version t2.05User Input Time:
8361 / 2558.000

Data Type: DISCLA

May 5

Deadtime
Corrected: NIntegration Time:
1.024 second(s)Detectors [7..0]:
00011100Discriminators:
[2, 3]Quality Mask:
BDISP0

27 / 2 / 92

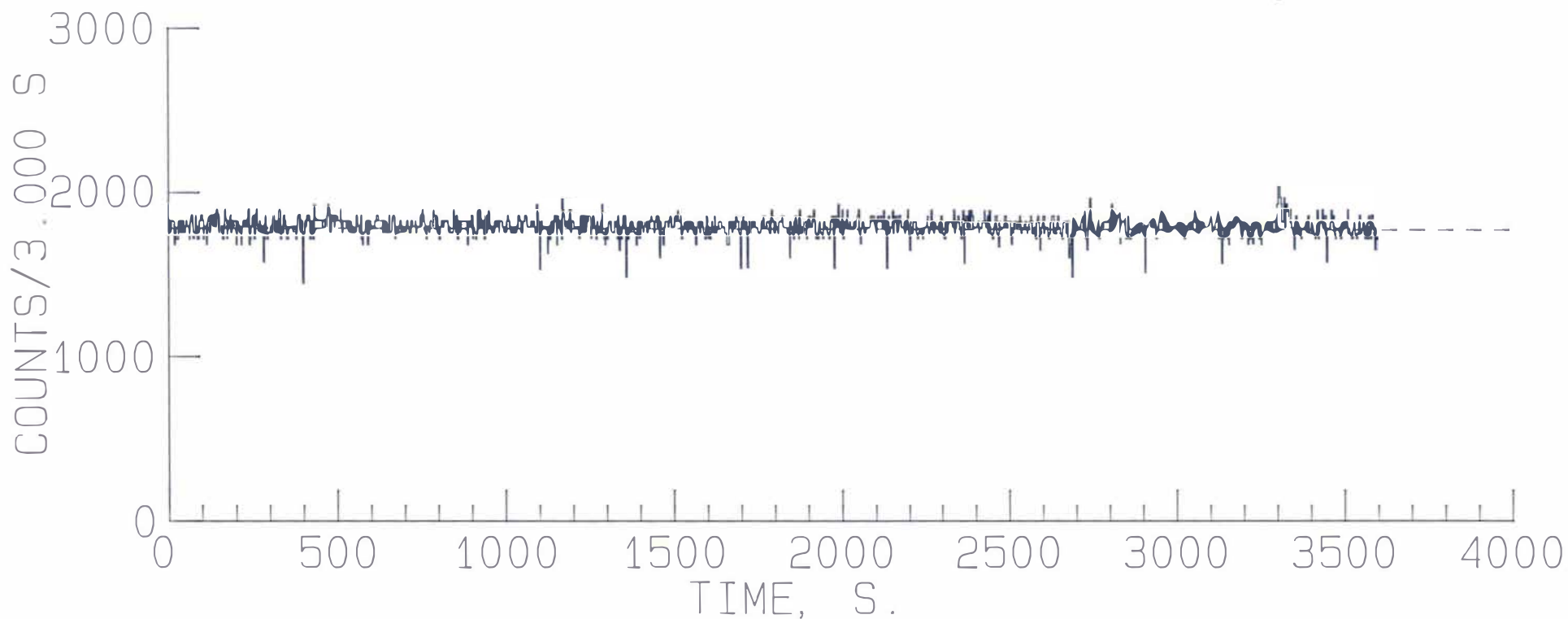
ULYSSES RT

5 / 5 / 91 64080.312 s

1.000 S INTERVALS REGROUPED BY 3

0 - 0 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



PVO-RT

19 / 8 / 92

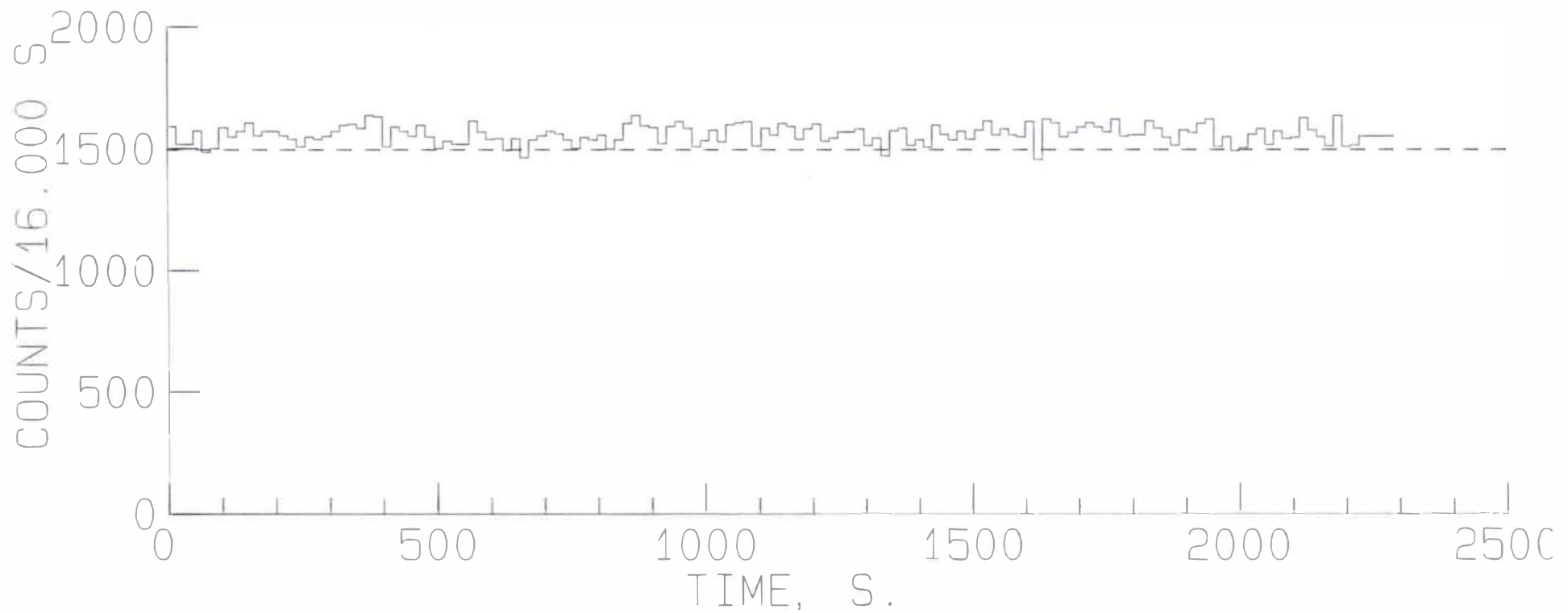
5 / 5 / 91

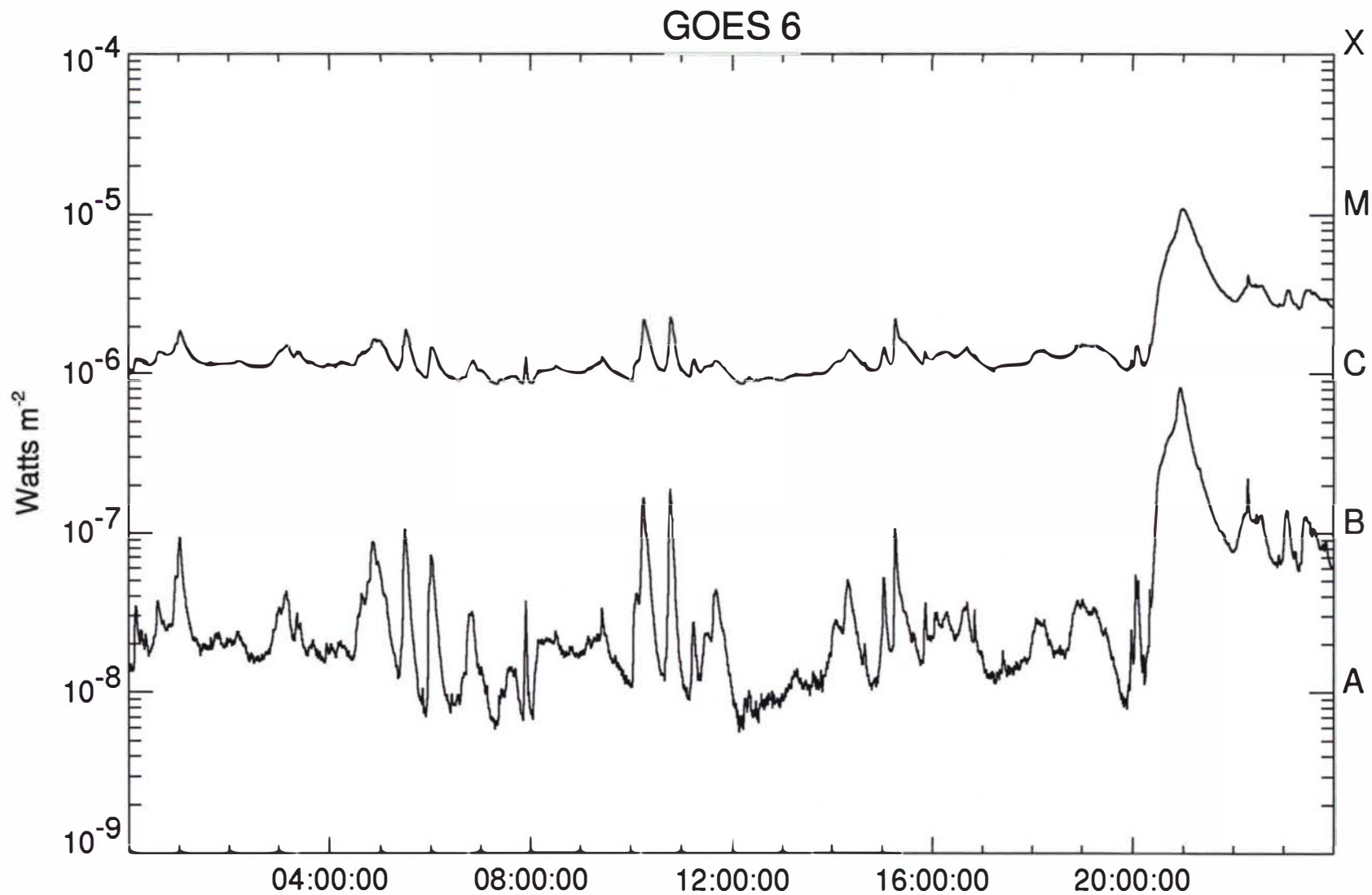
66291.602 s.

16.000 S. INTERVALS REGROUPED BY 1

100-2000 keV

NO





Data Start: 91/05/05, 0000:00

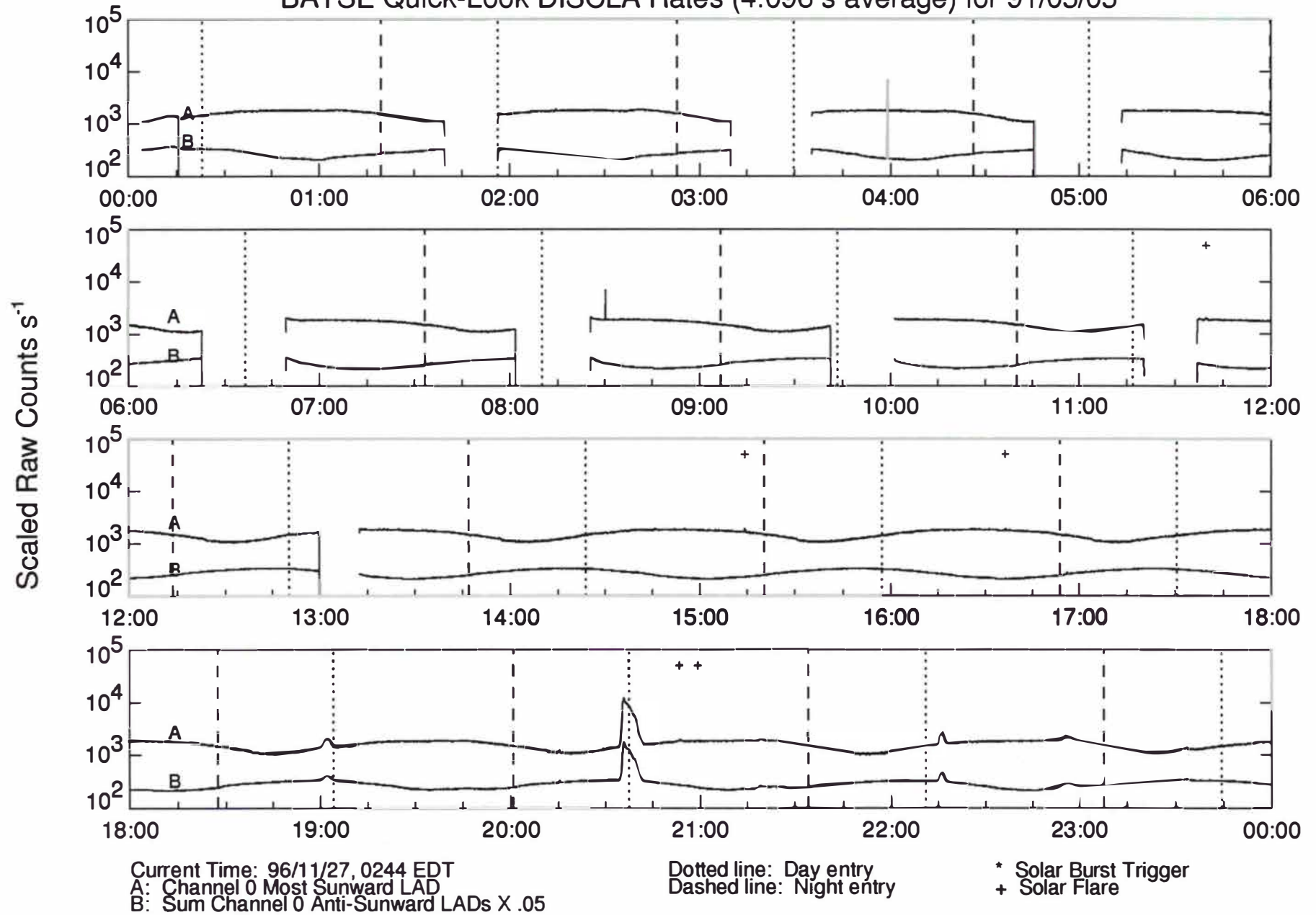
Plot created: 96/11/27, 0243

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

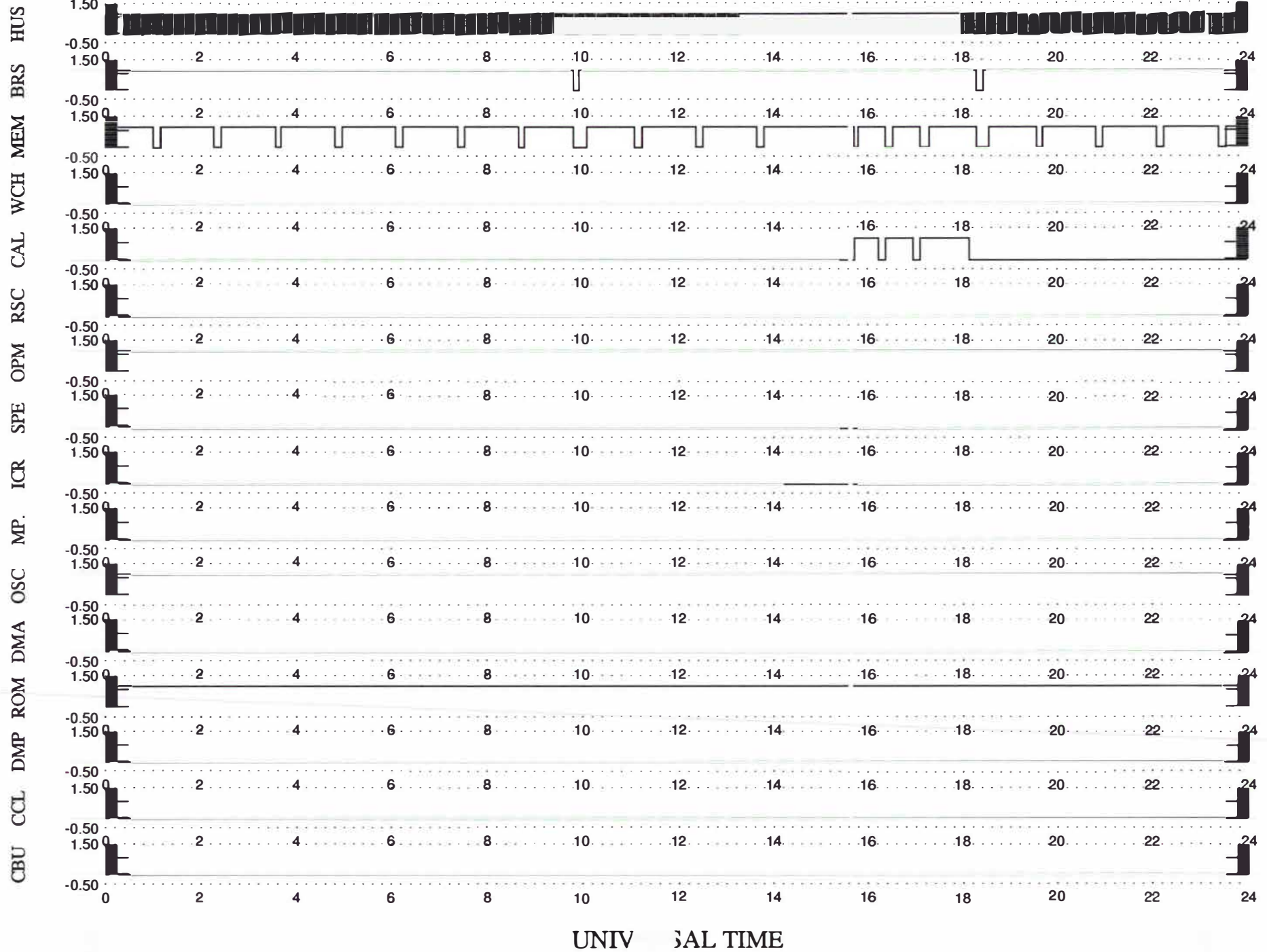
Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

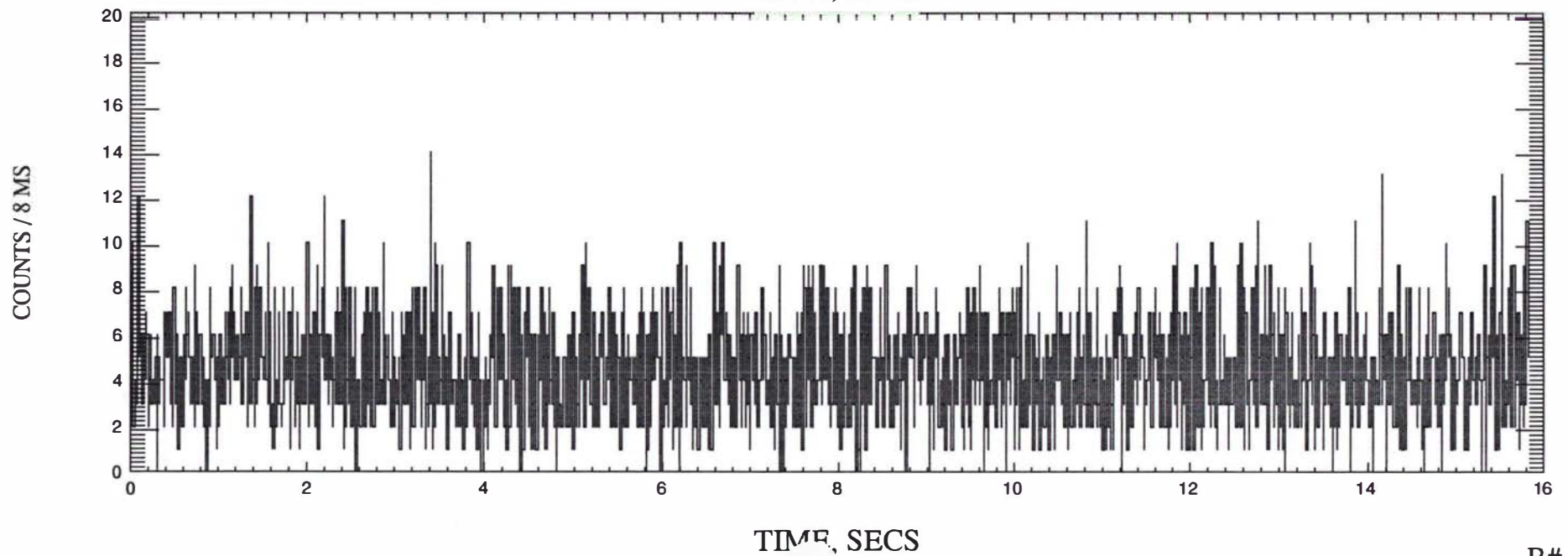
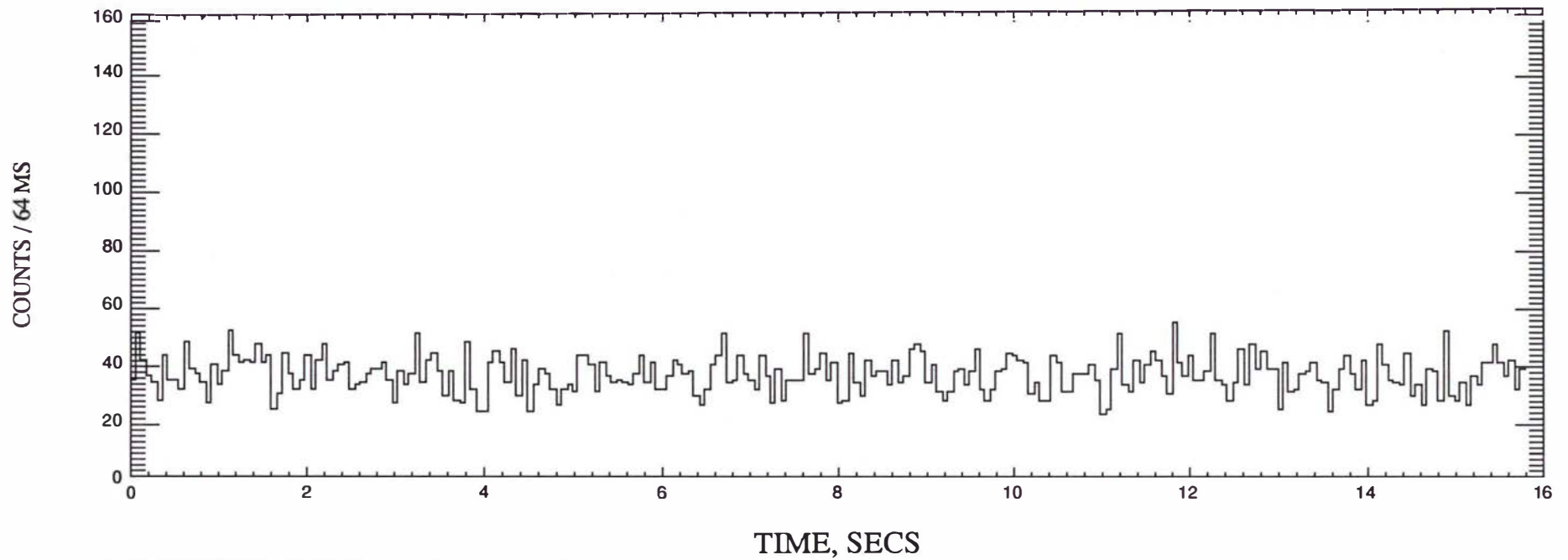
BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/05



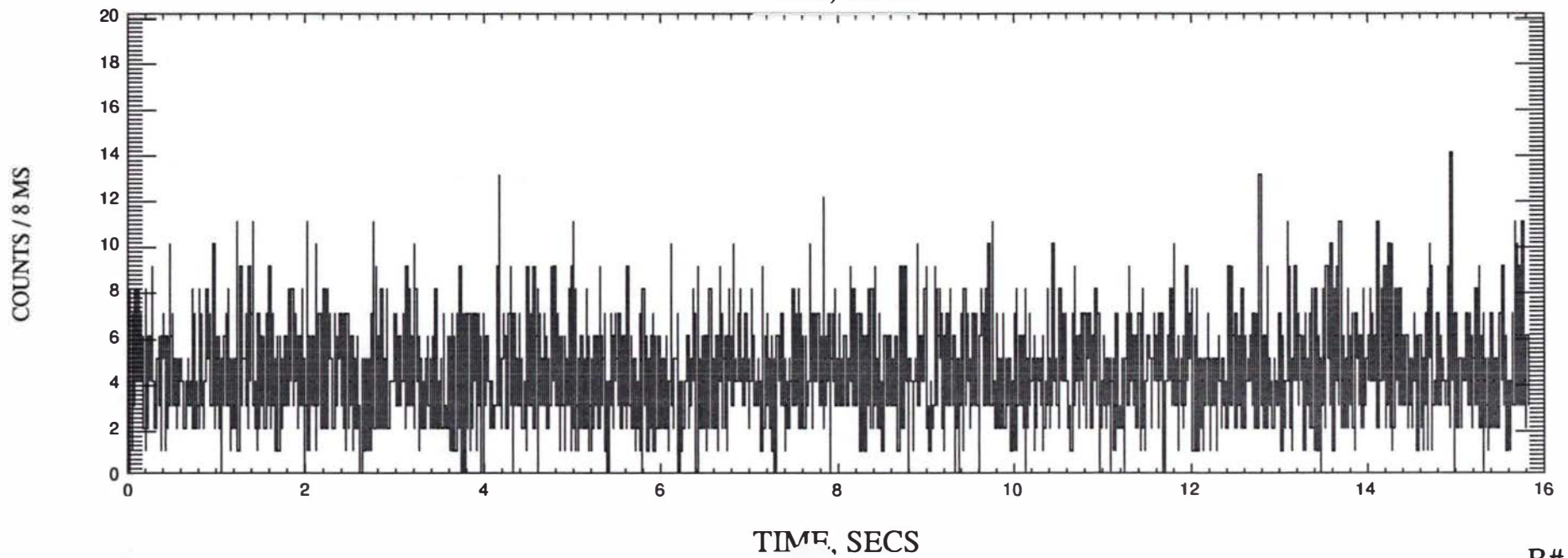
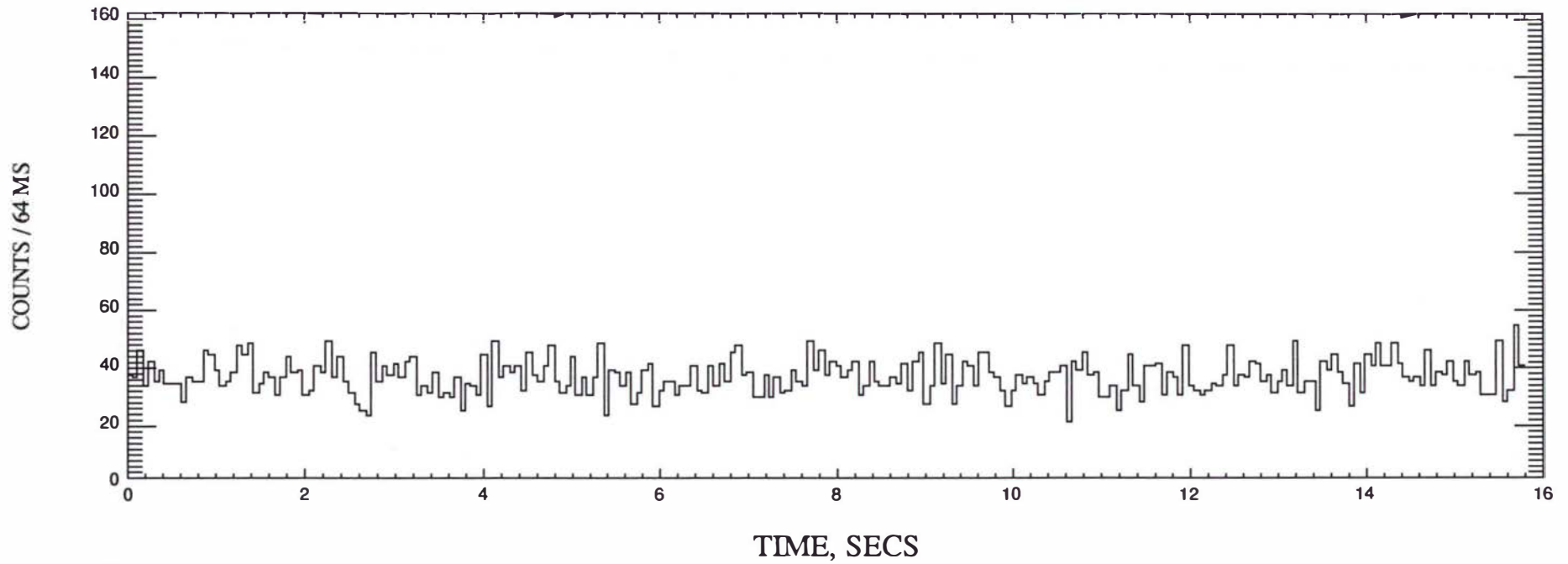
BURST NUMBER 0 - 10, 4 - 4, 11 - 15, 0 - 3



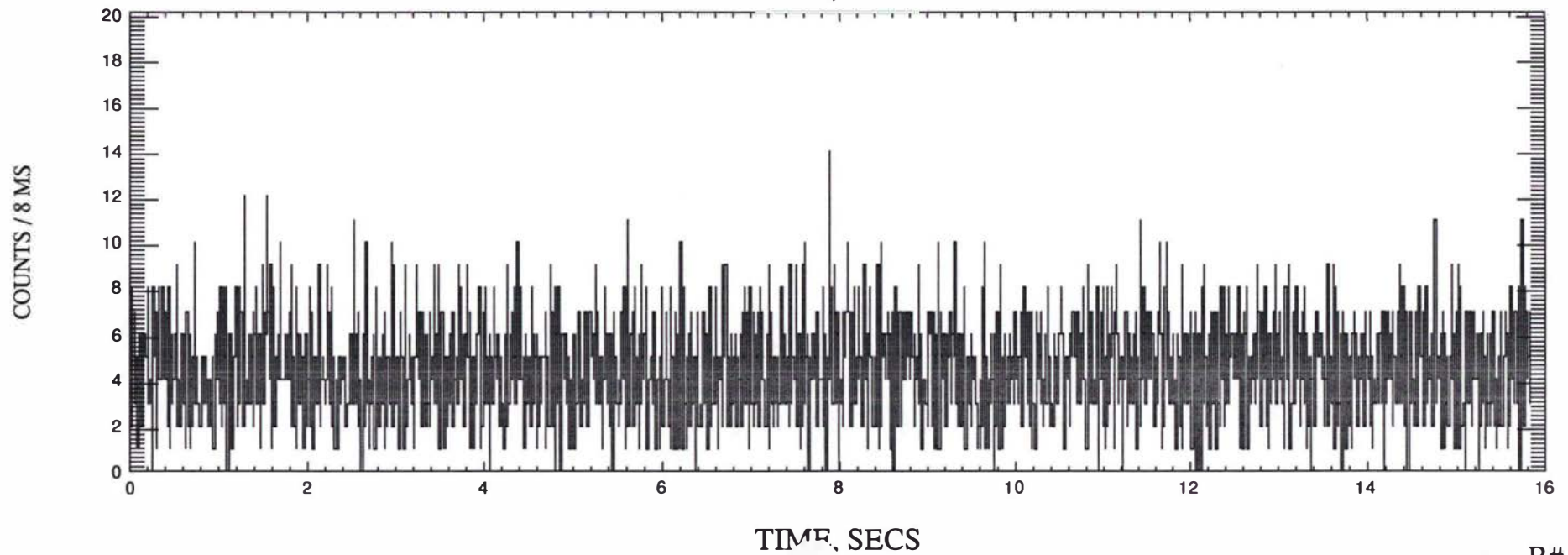
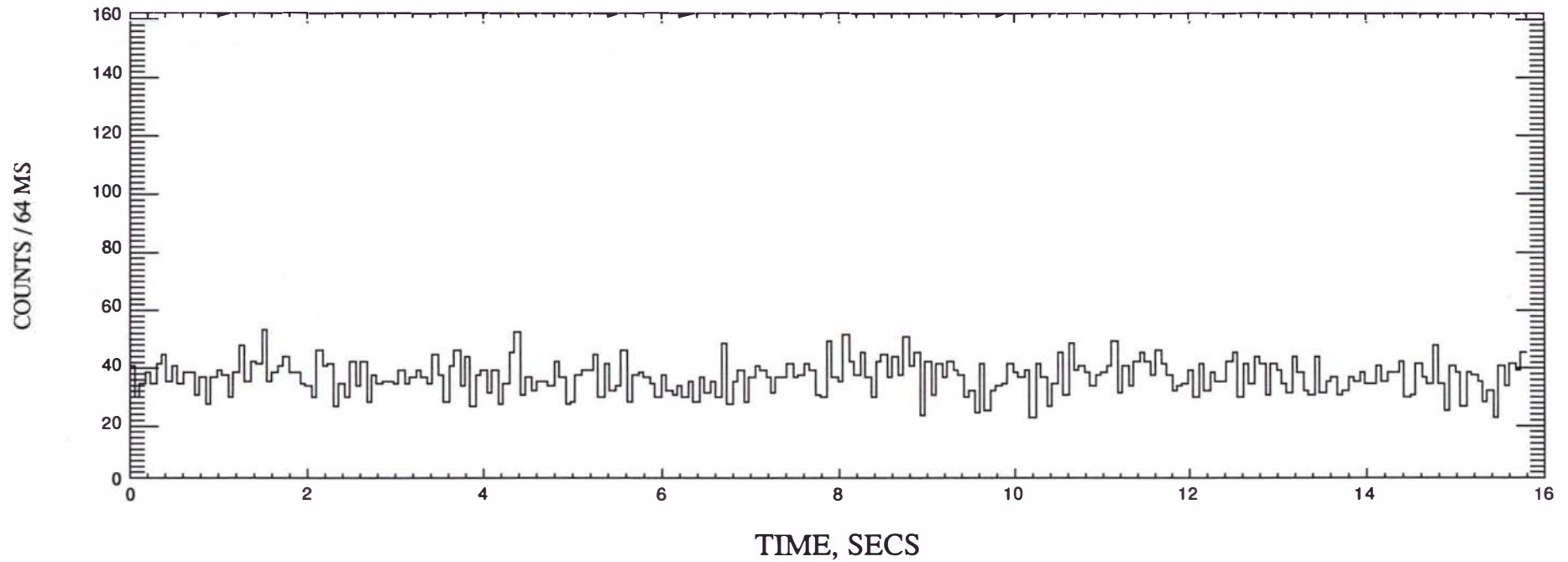
Burst Counter 0 at UT= 0.993387883504 h= 3576.196 s 00:59:36.196



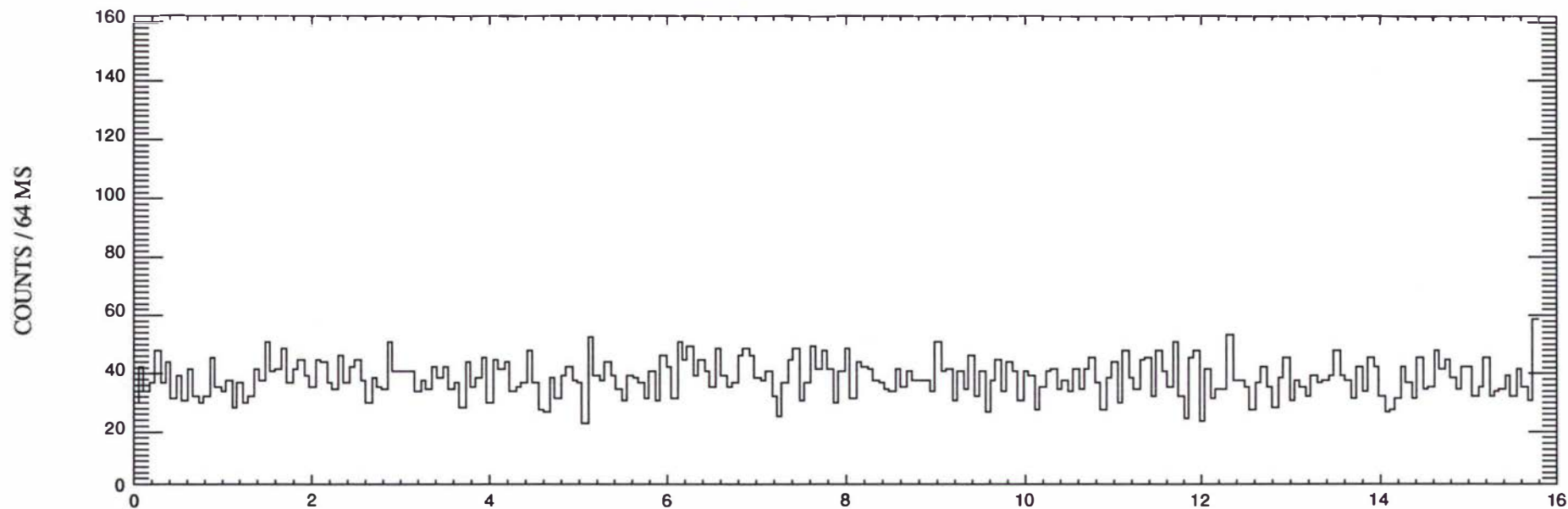
Burst Counter 1 at UT= 2.255922601488 h= 8121.321 s 02:15:21.321



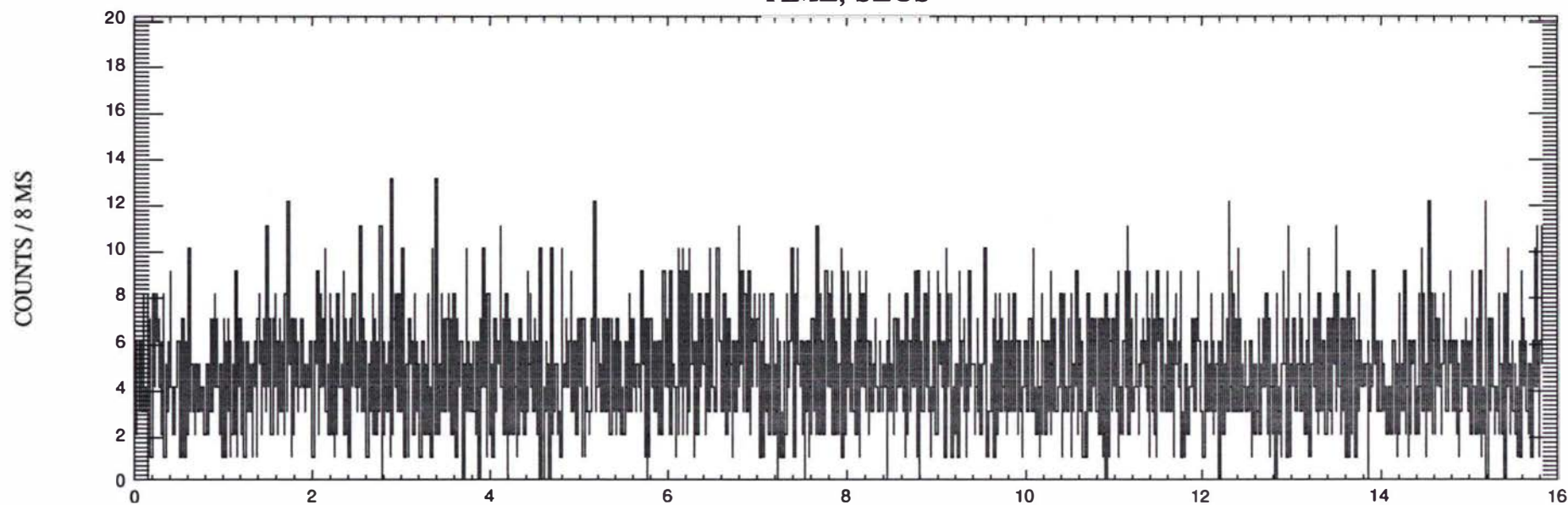
Burst Counter 2 at UT= 3.517589263916 h=12663.321 s 03:31:03.321



Burst Counter 3 at UT= 4.779861390856 h=17207.501 s 04:46:47.501

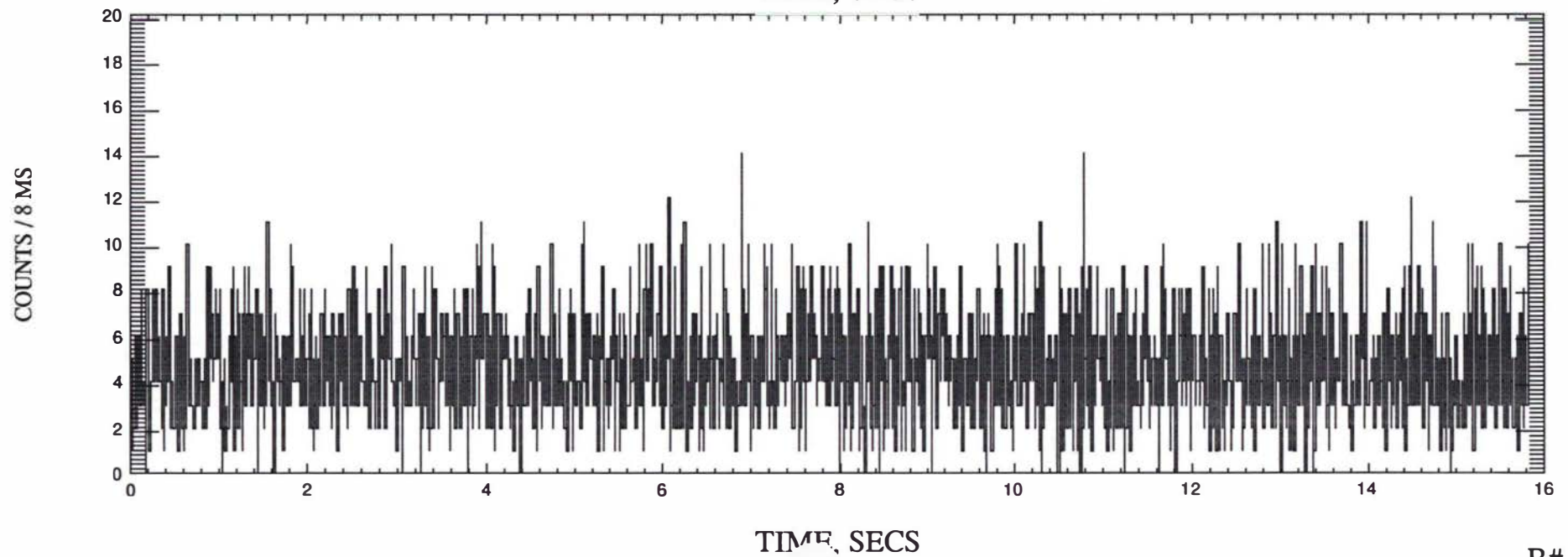
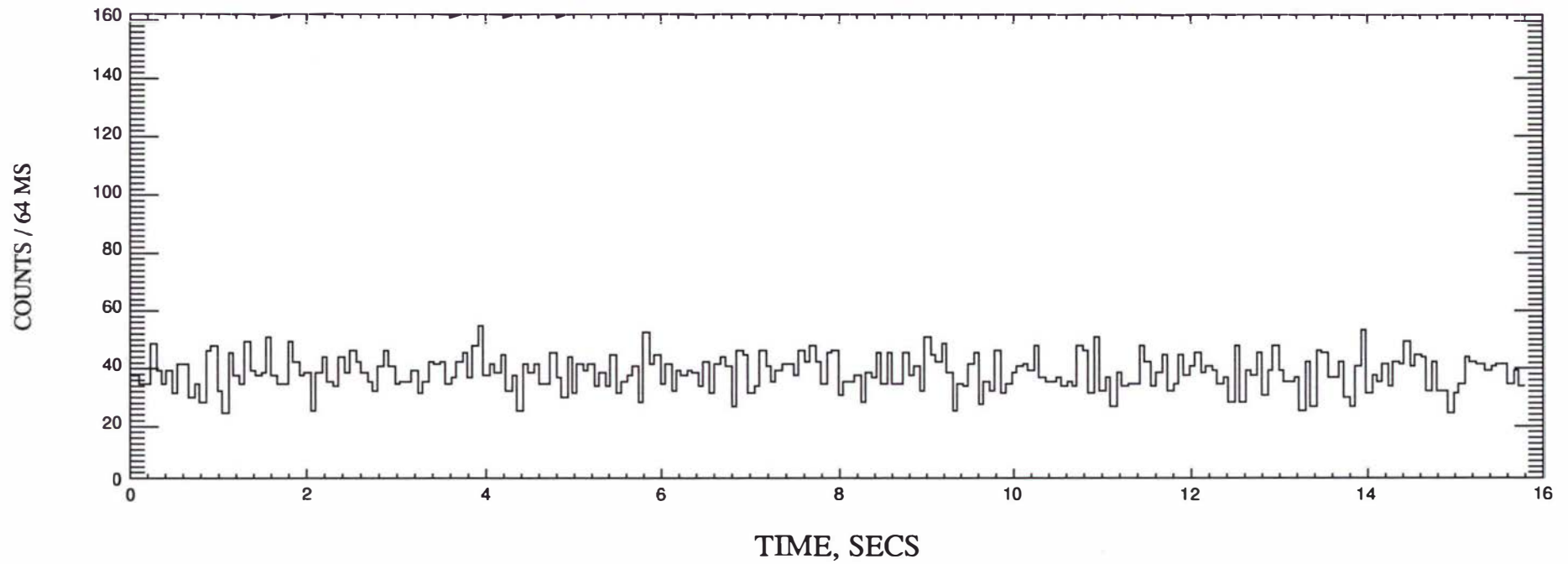


TIME, SECS

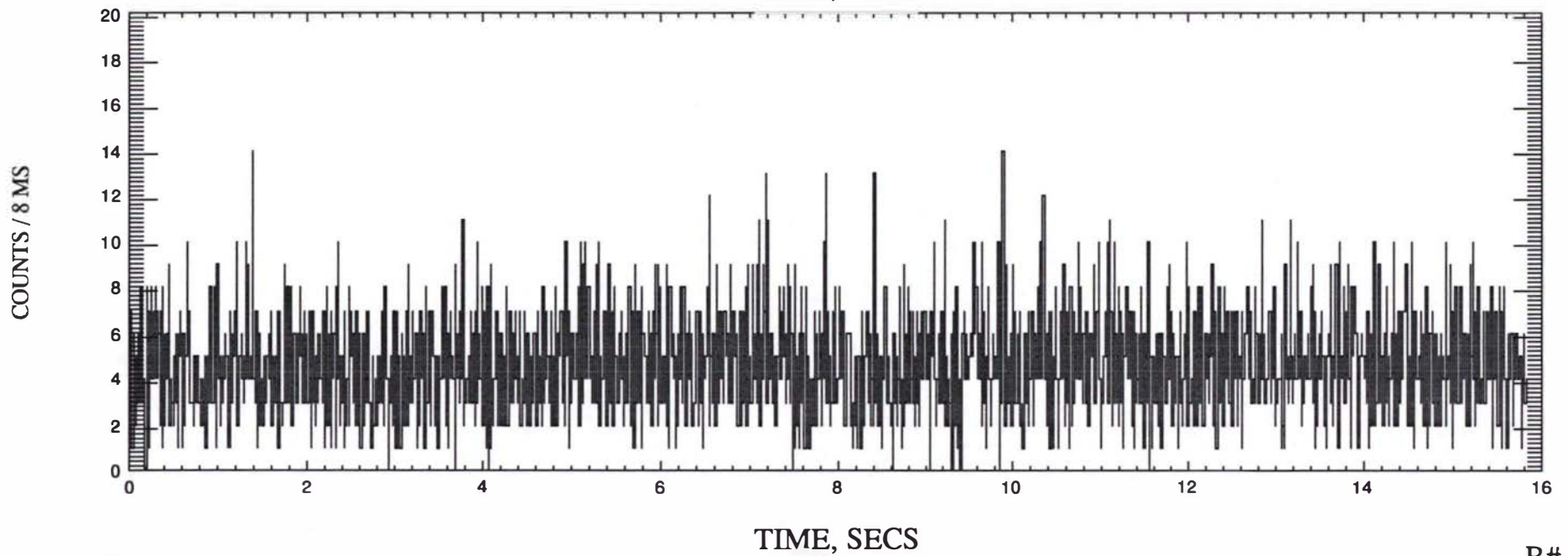
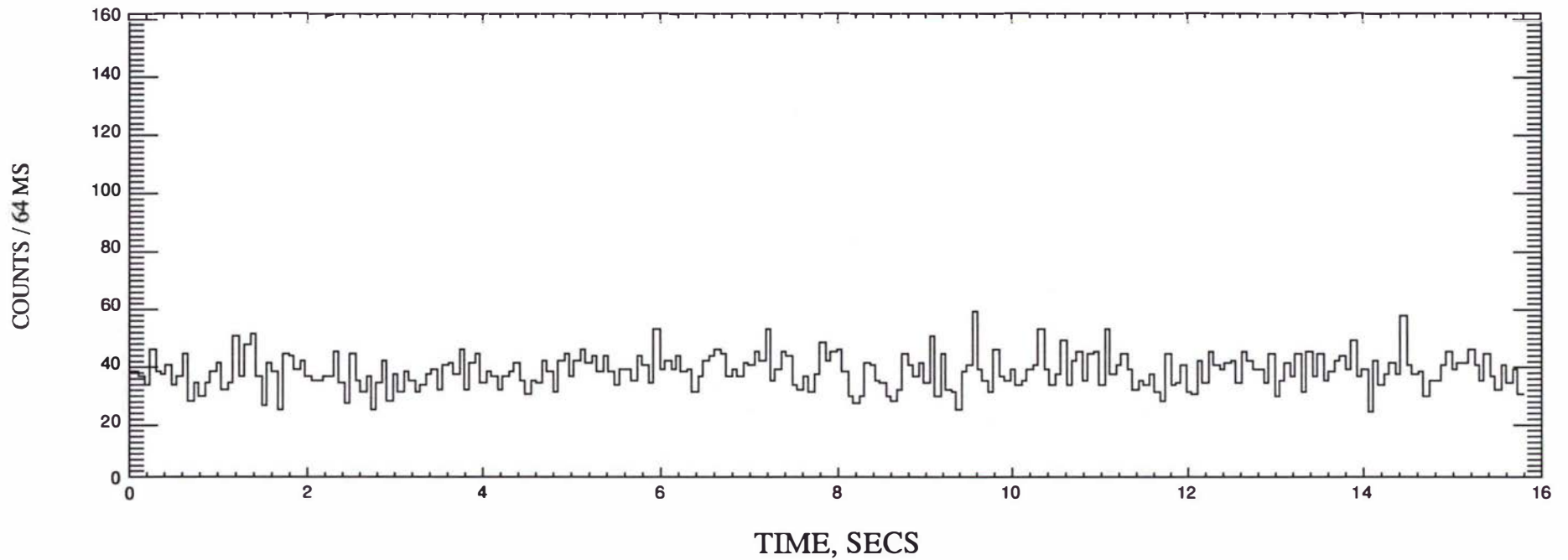


TIME, SECS

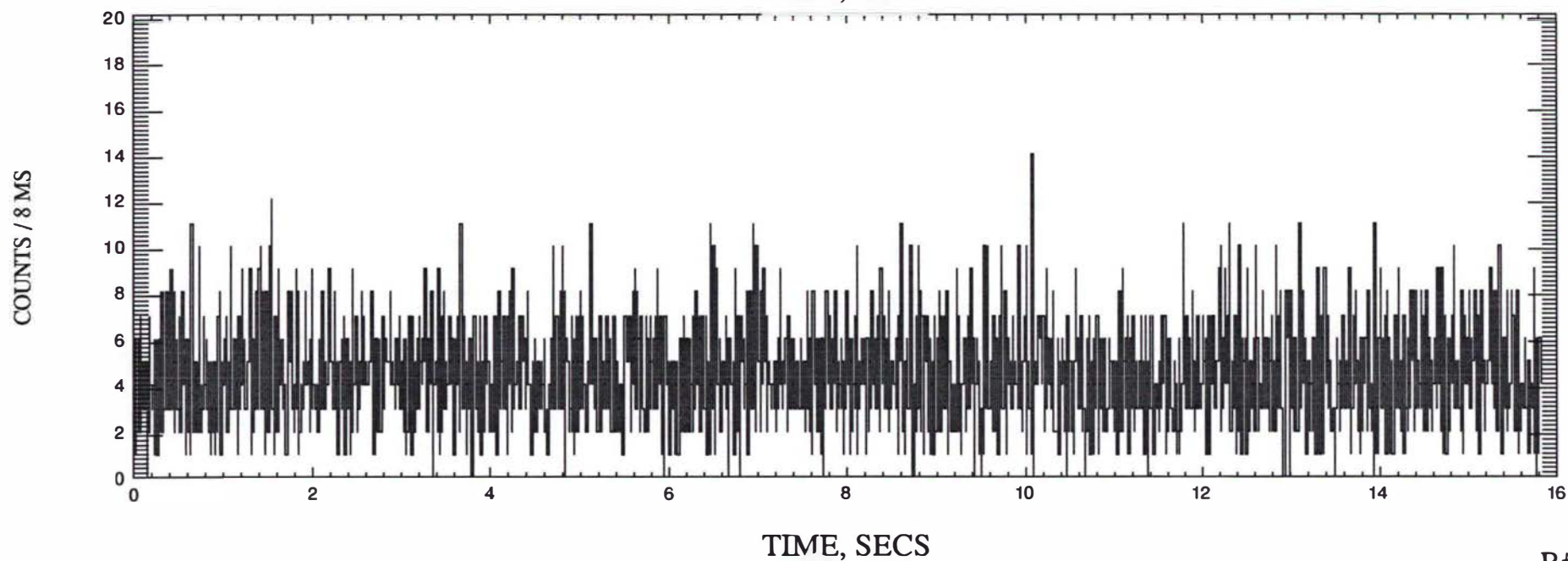
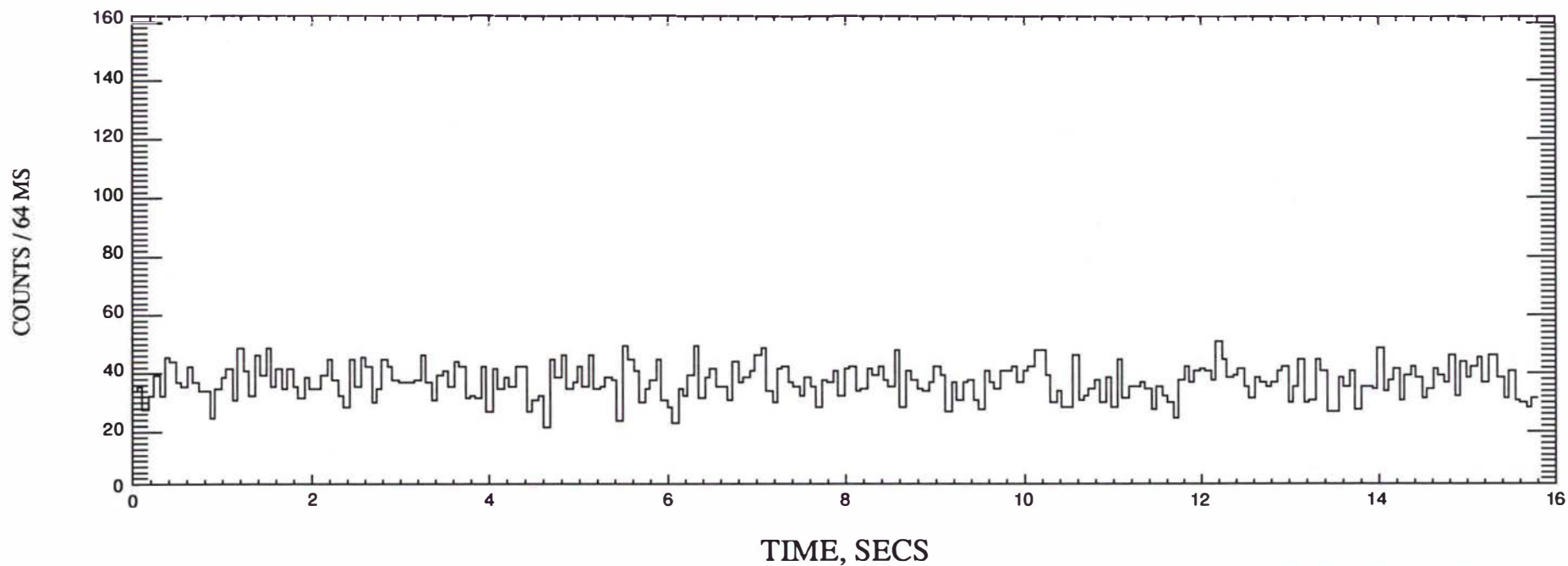
Burst Counter 4 at UT= 6.042096629673 h=21751.548 s 06:02:31.548



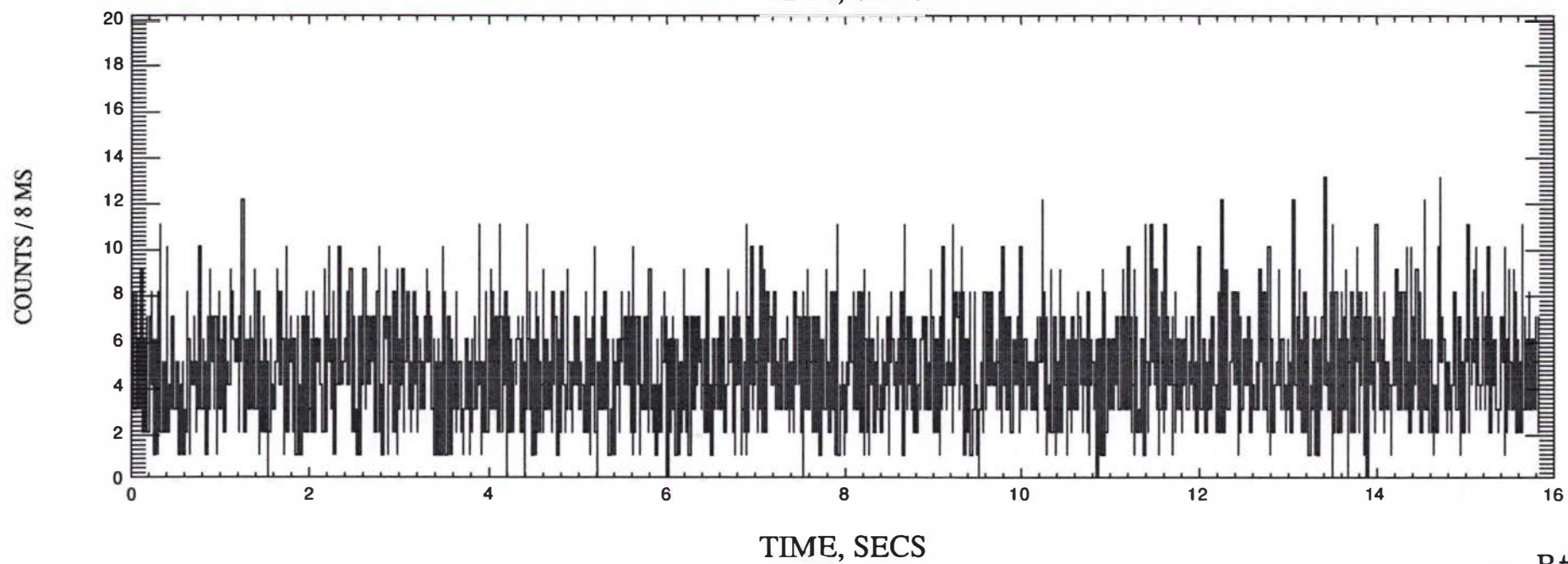
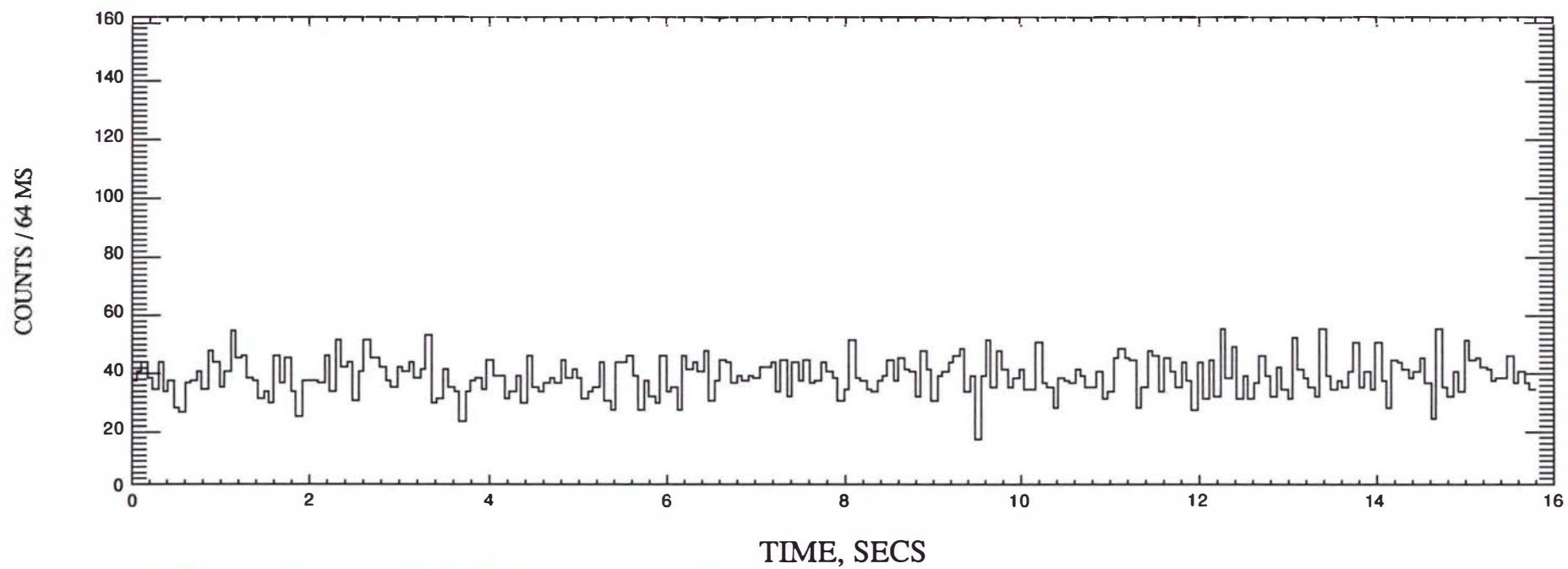
Burst Counter 5 at UT= 7.304338378906 h=26295.618 s 07:18:15.618



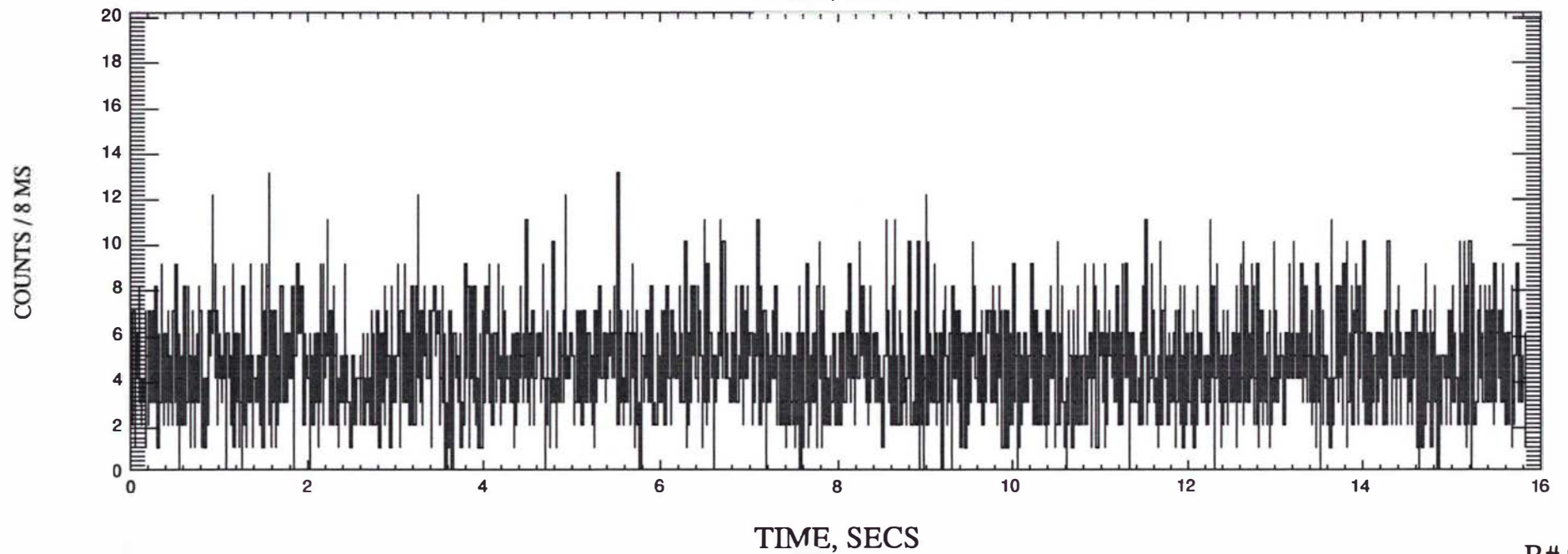
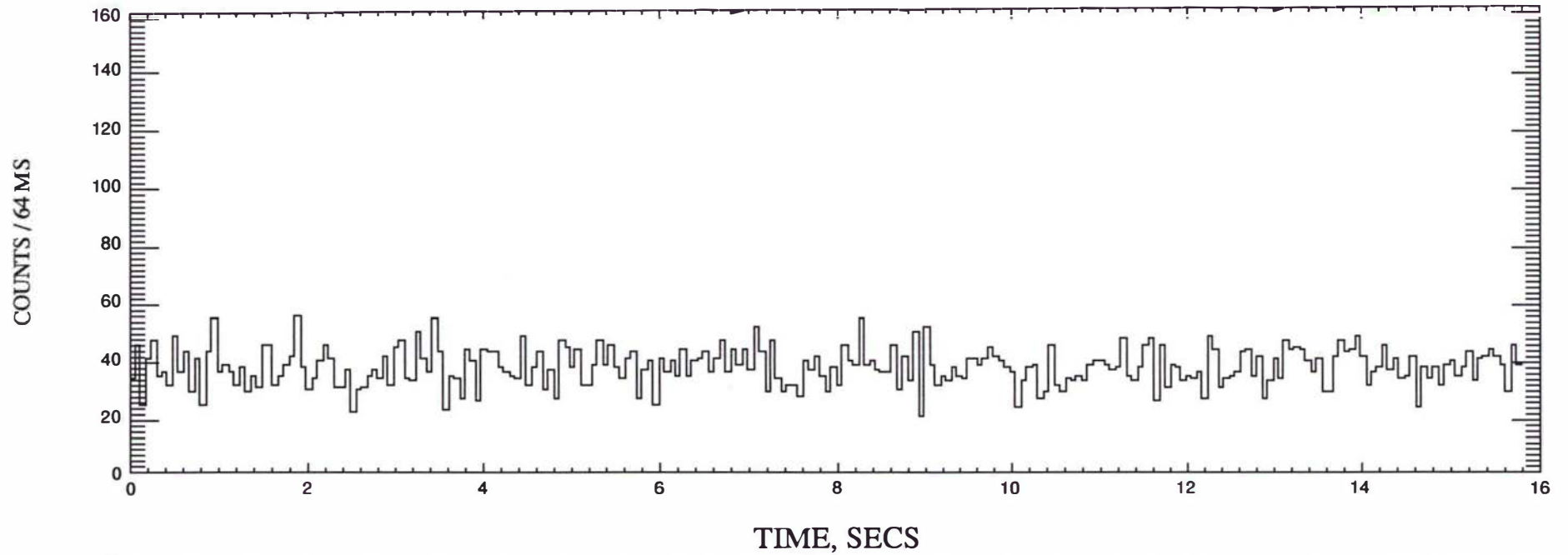
Burst Counter 6 at UT= 8.568533253140 h=30846.720 s 08:34:06.720



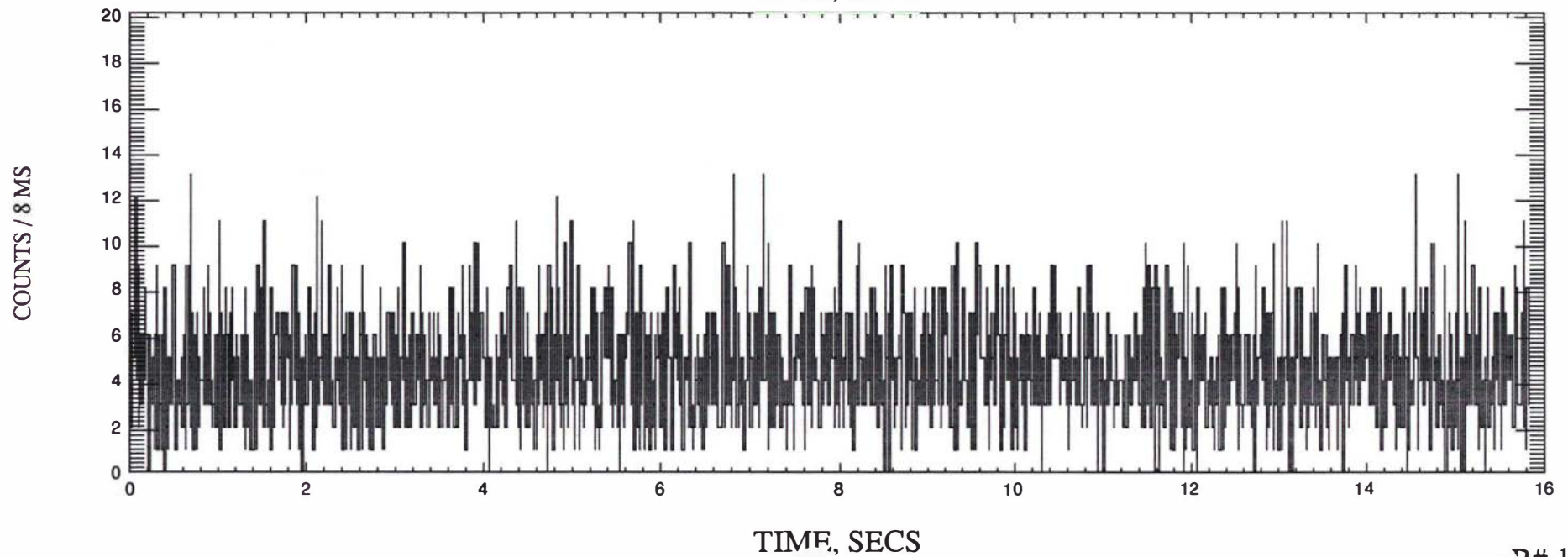
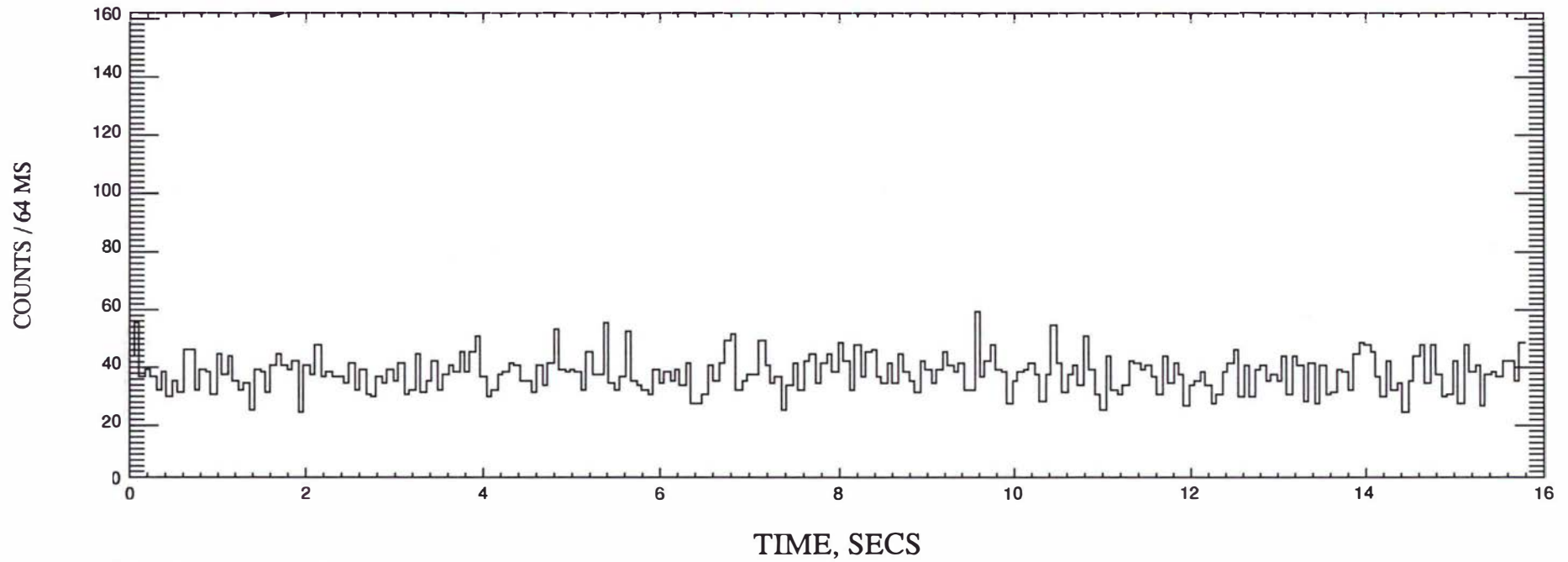
Burst Counter 7 at UT= 9.828817532857 h=35383.743 s 09:49:43.743



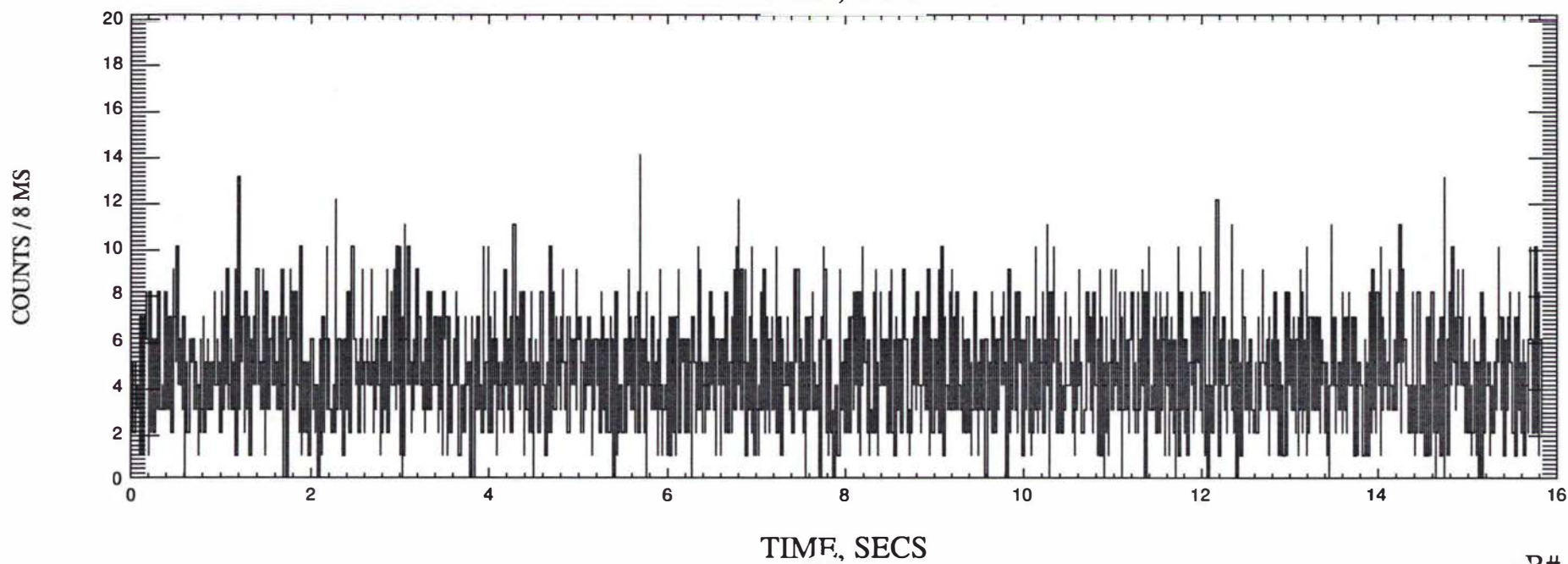
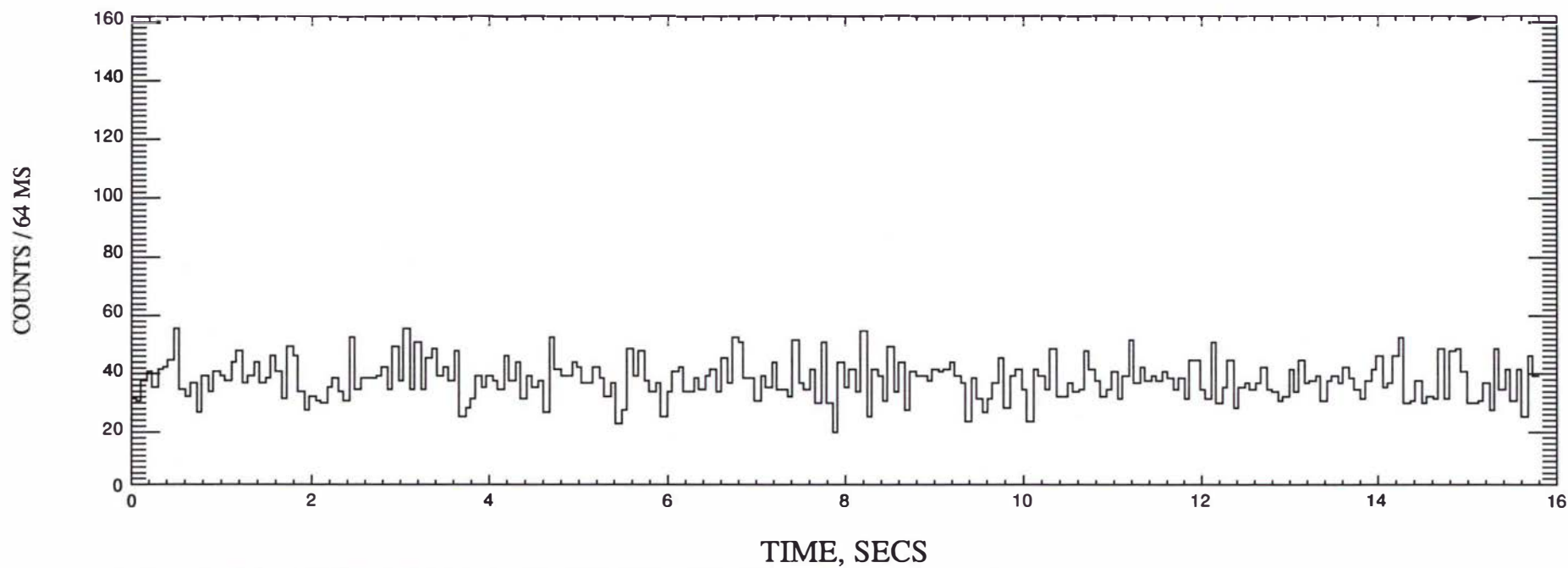
Burst Counter 8 at UT=11.091343328688 h=39928.836 s 11:05:28.836



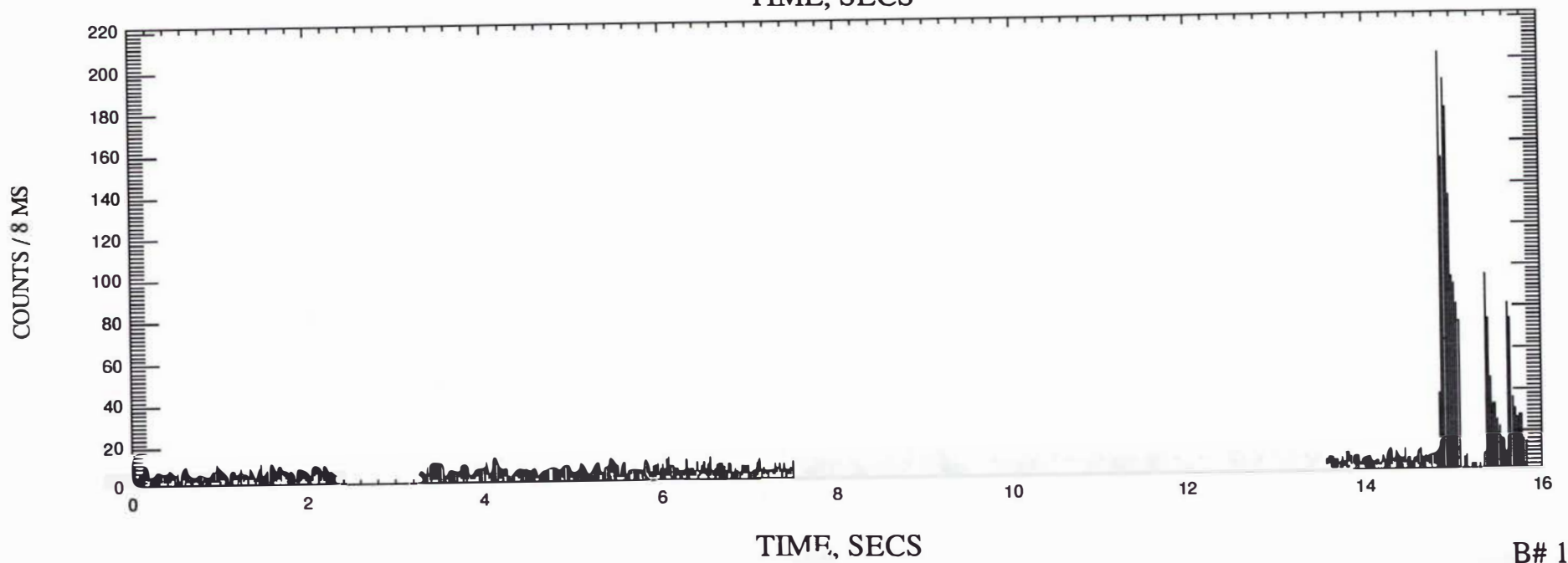
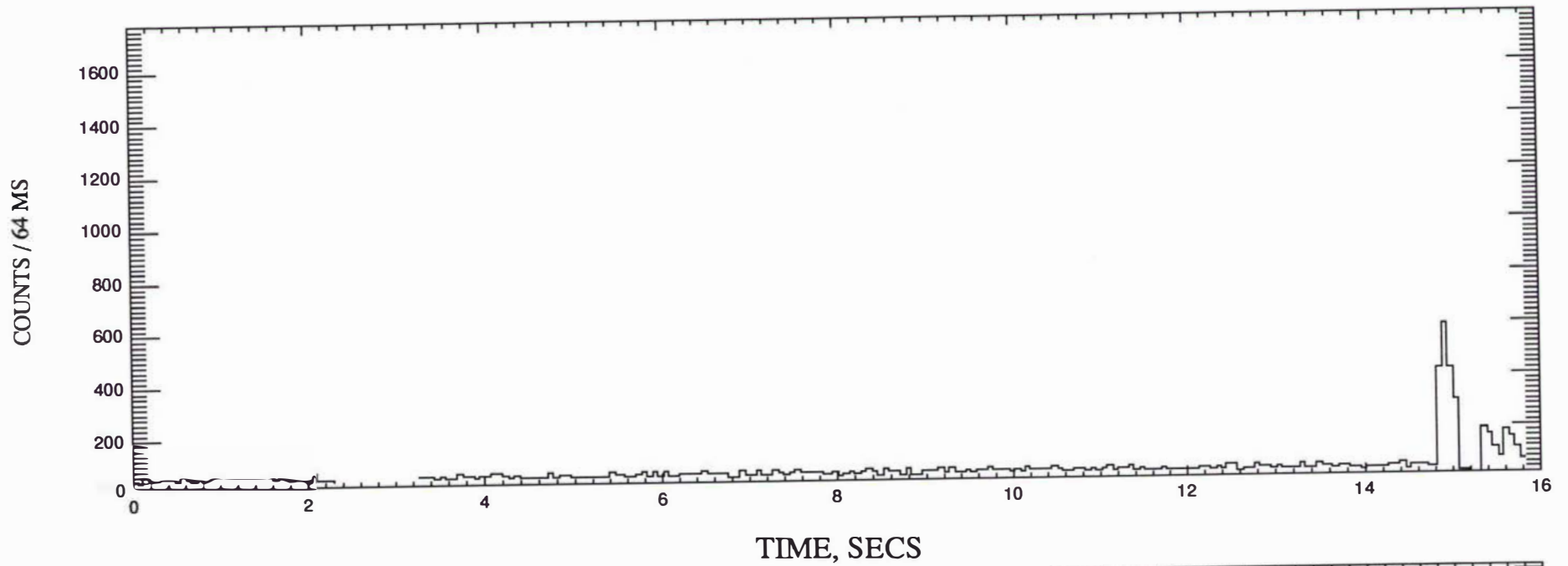
Burst Counter 9 at UT=12.353318150838 h=44471.945 s 12:21:11.945



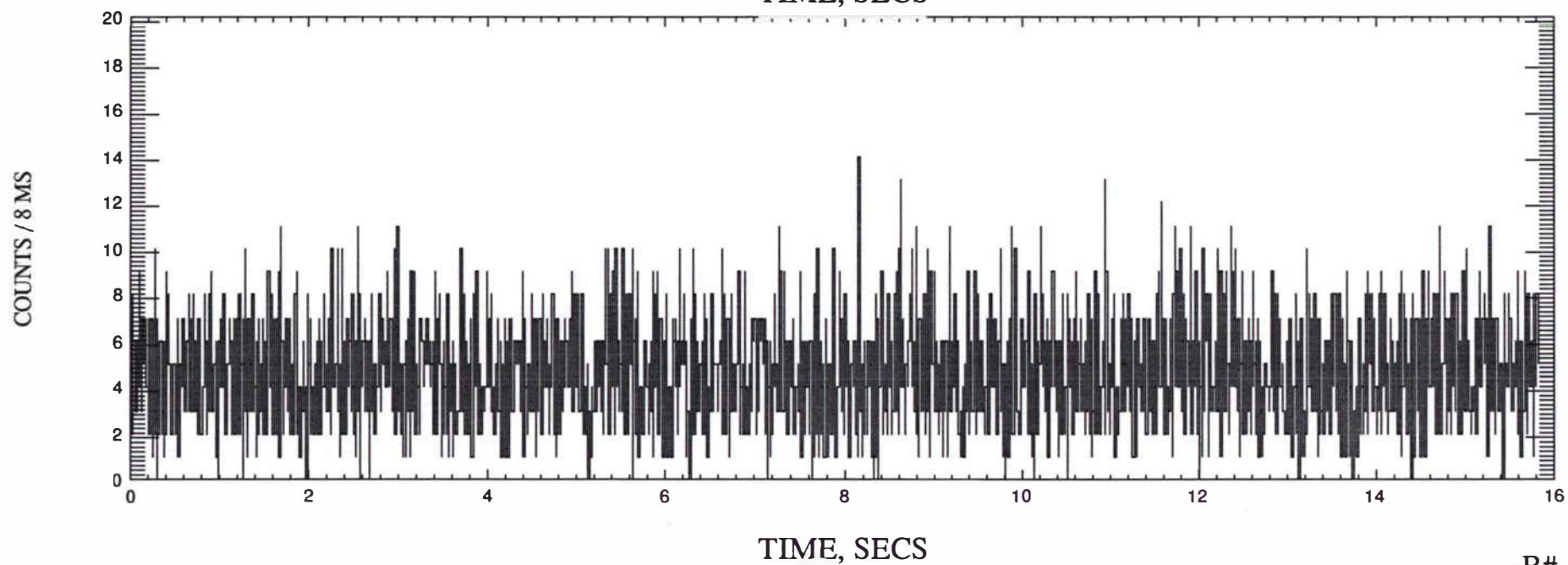
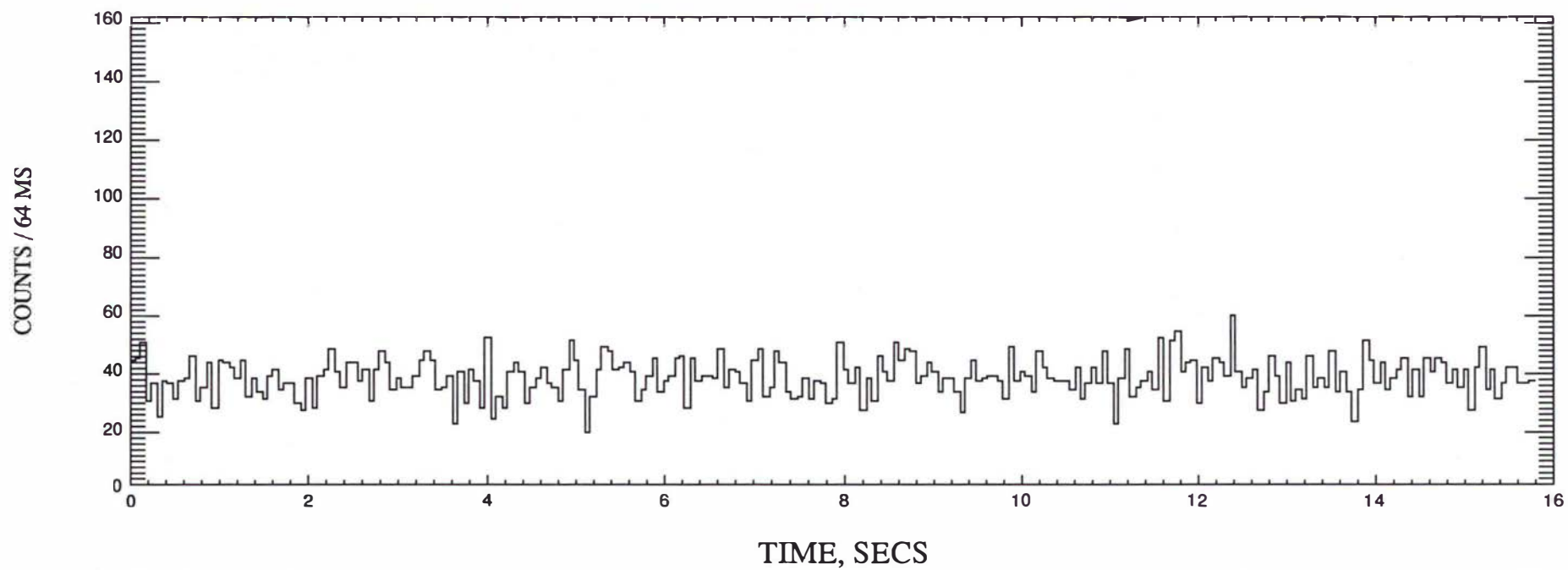
Burst Counter 10 at UT=13.615826827155 h=49016.977 s 13:36:56.977



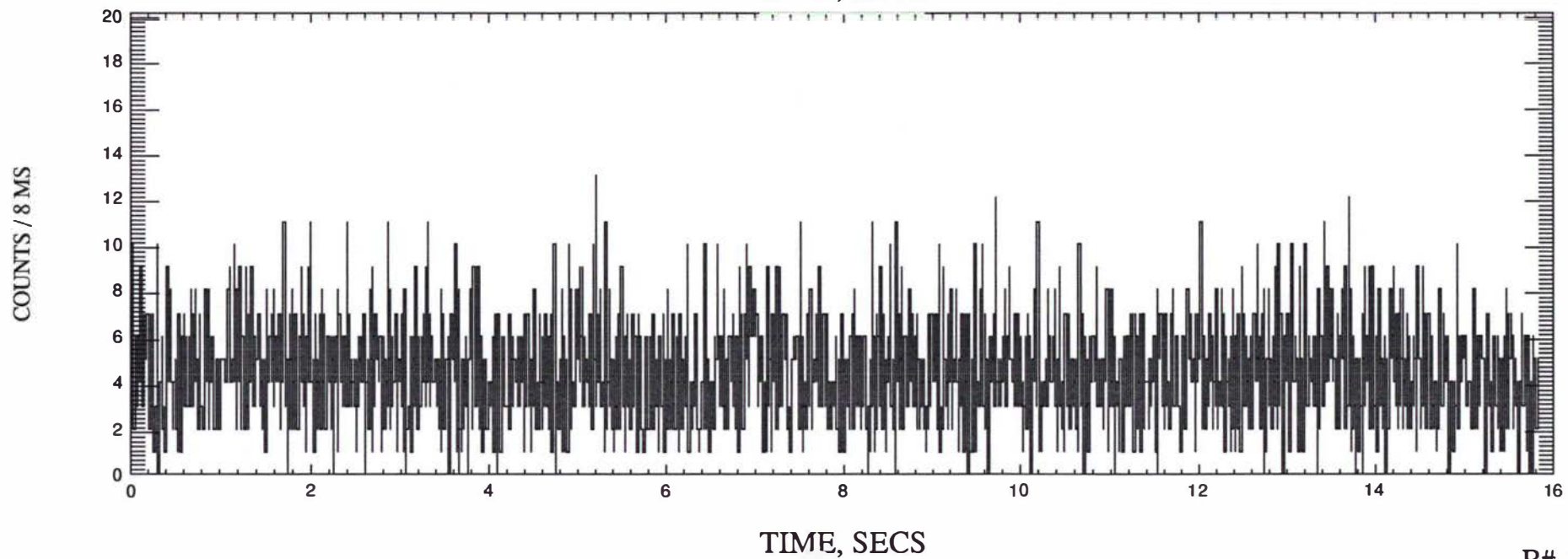
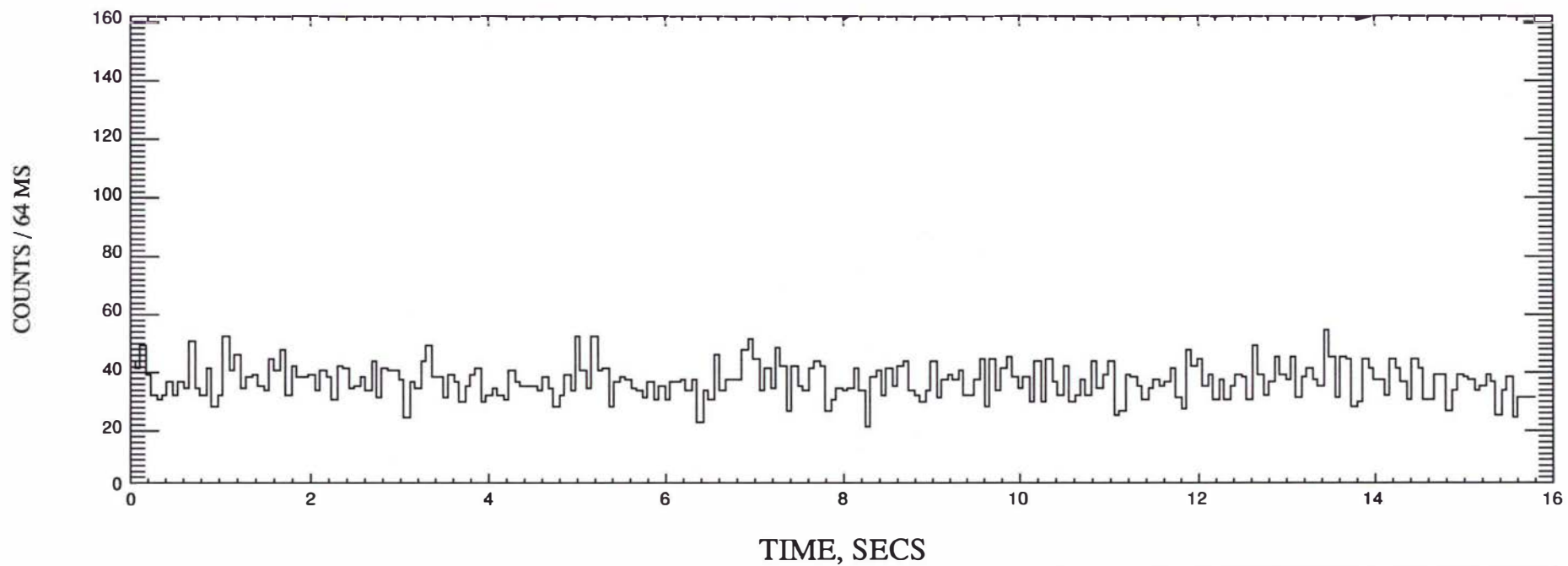
Burst Counter 11 at UT=13.688307295905 h=49277.906 s 13:41:17.906



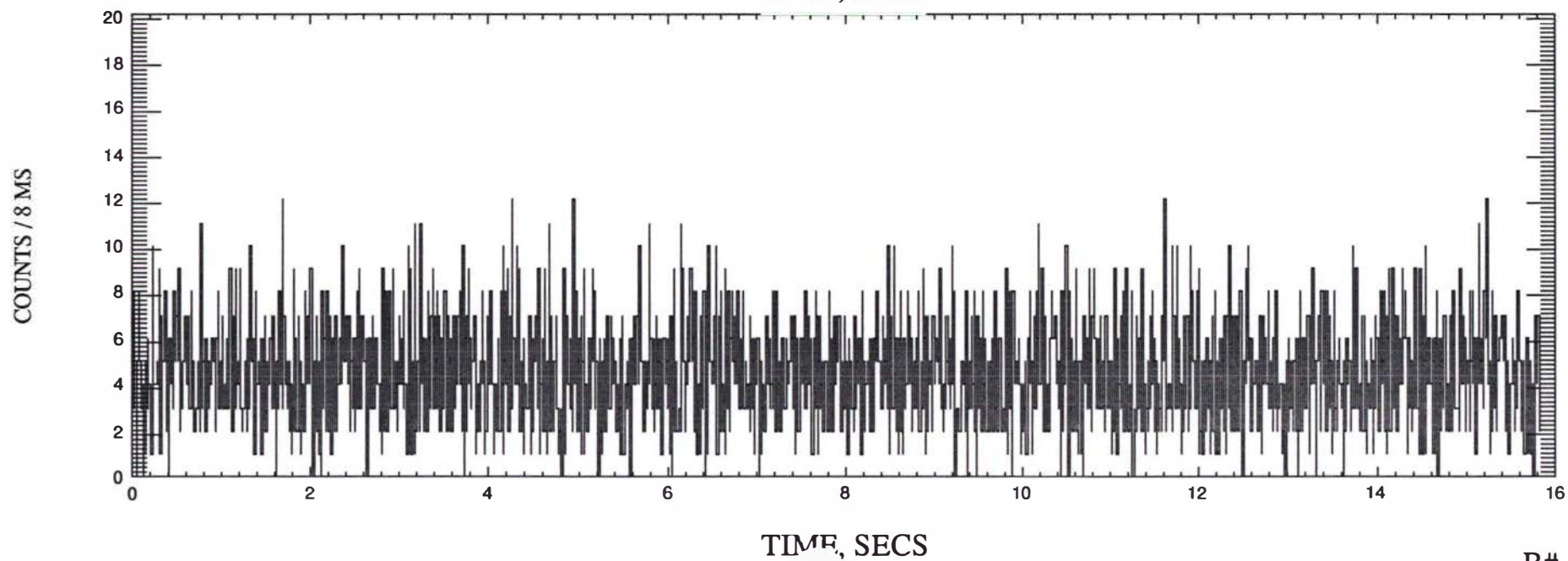
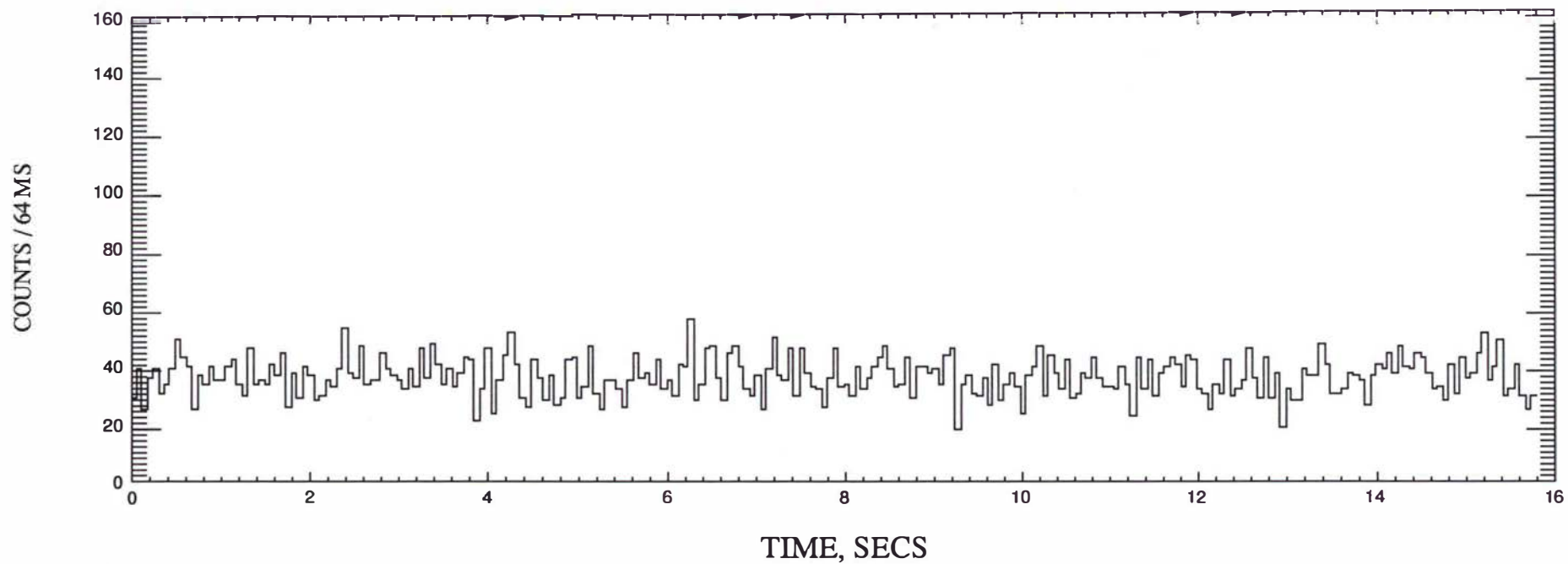
Burst Counter 12 at UT=15.633376308017 h=56280.155 s 15:38:00.155



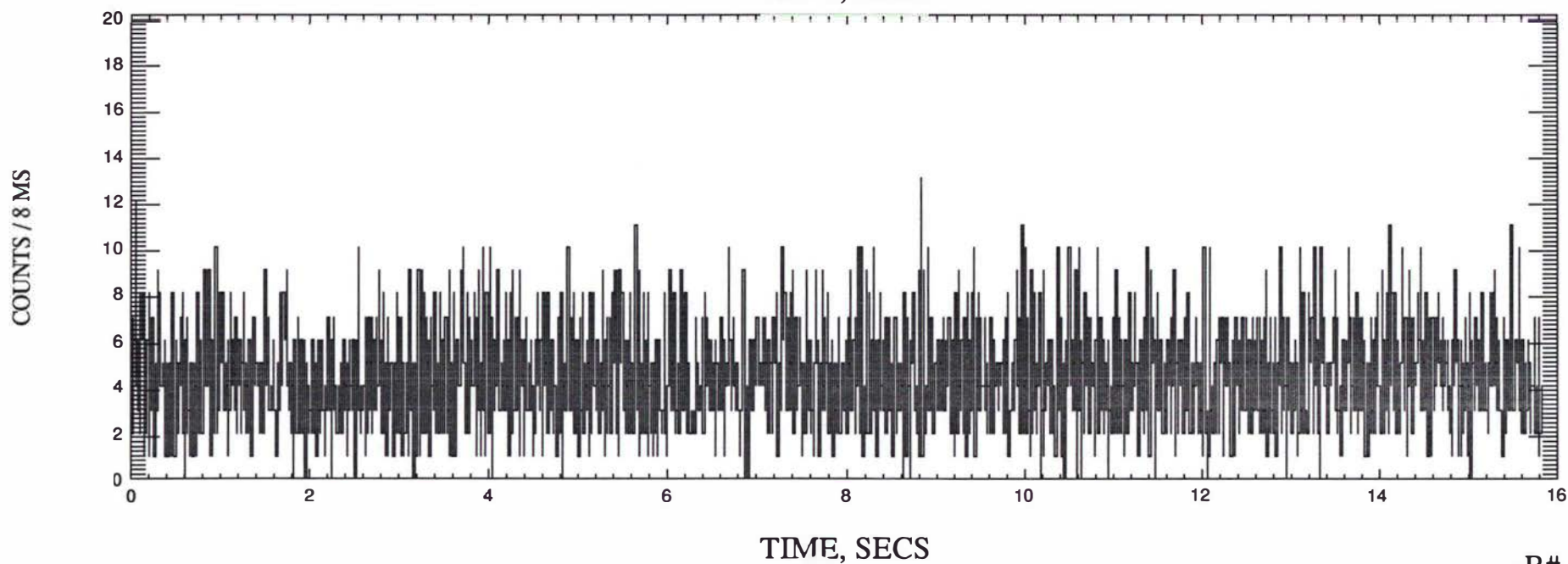
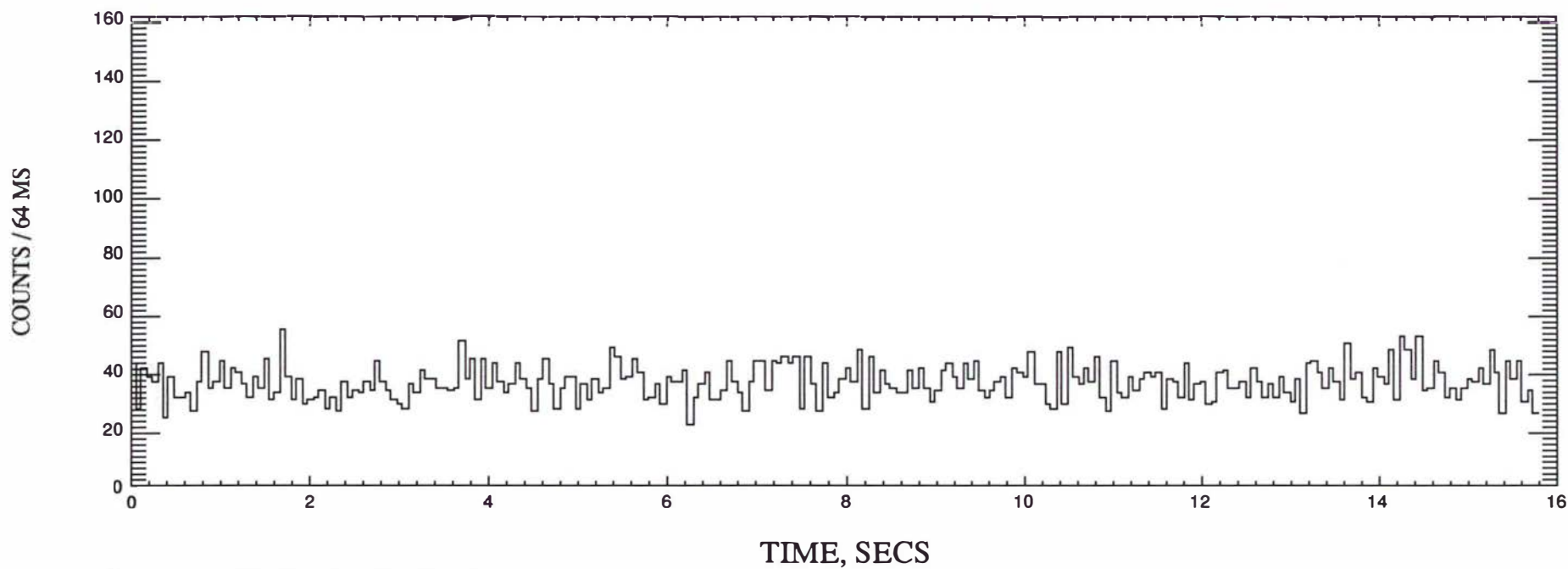
Burst Counter 13 at UT=16.335606244405 h=58808.182 s 16:20:08.182



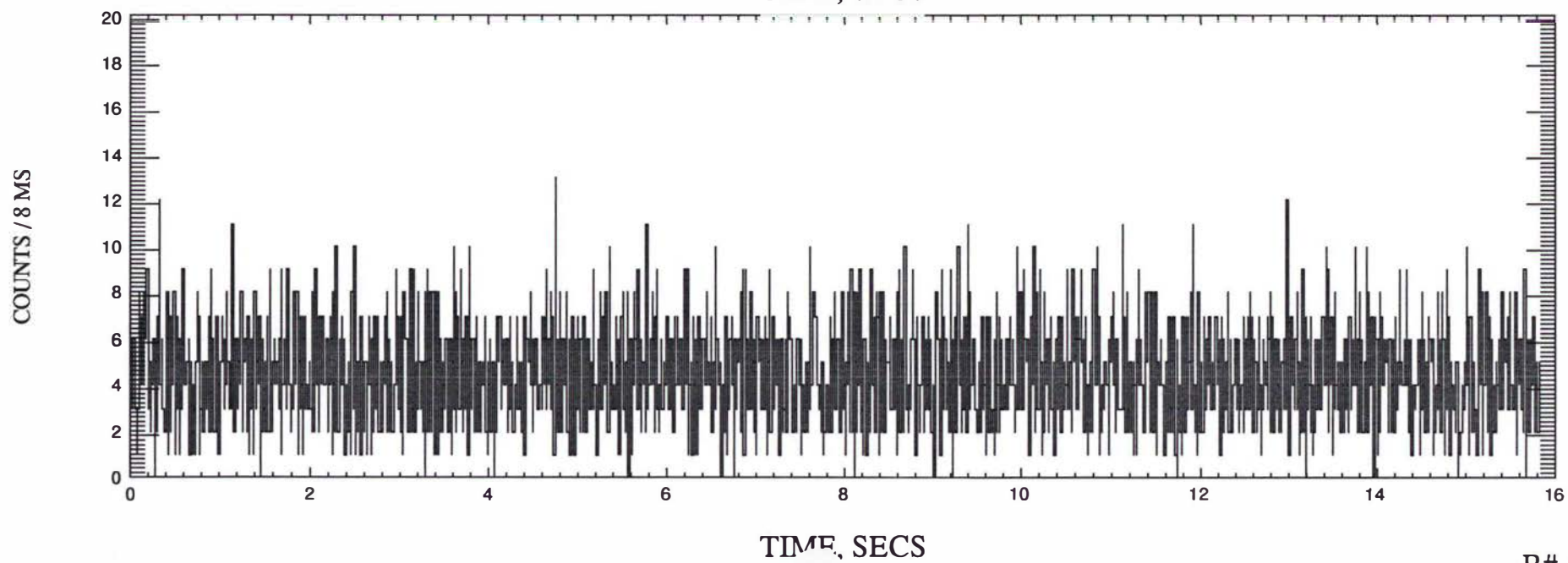
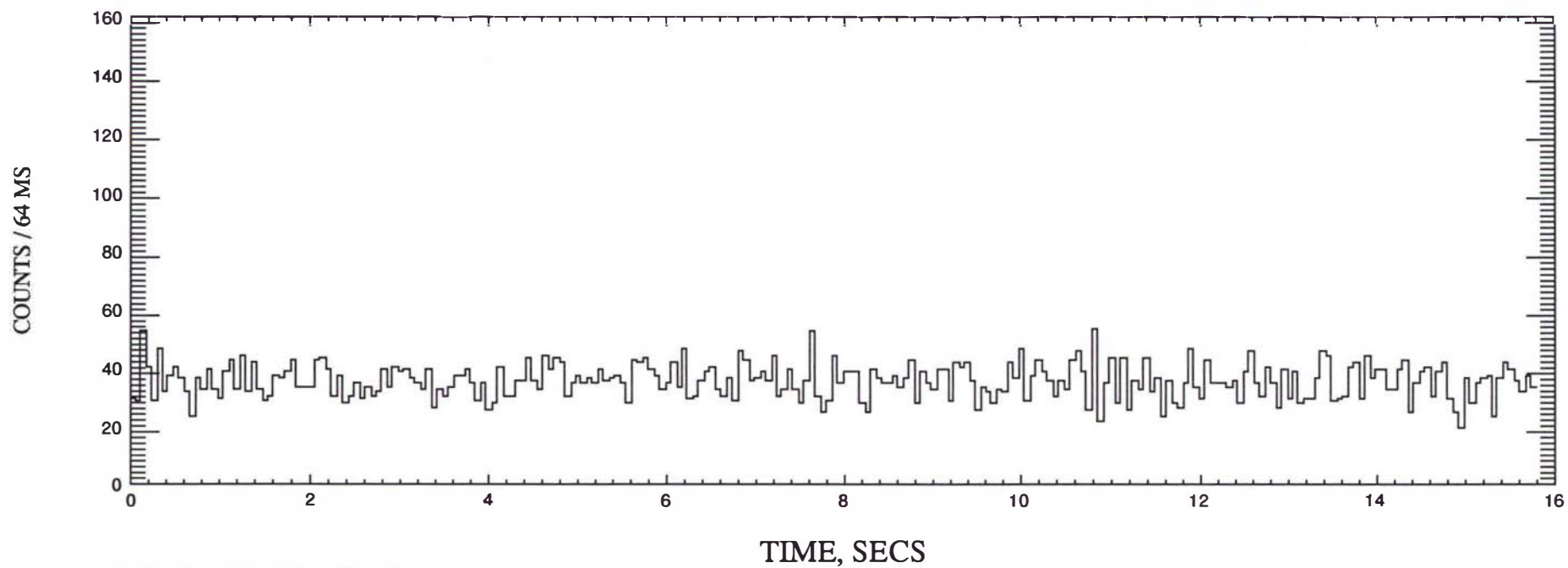
Burst Counter 15 at UT=18.291192474365 h=65848.293 s 18:17:28.293



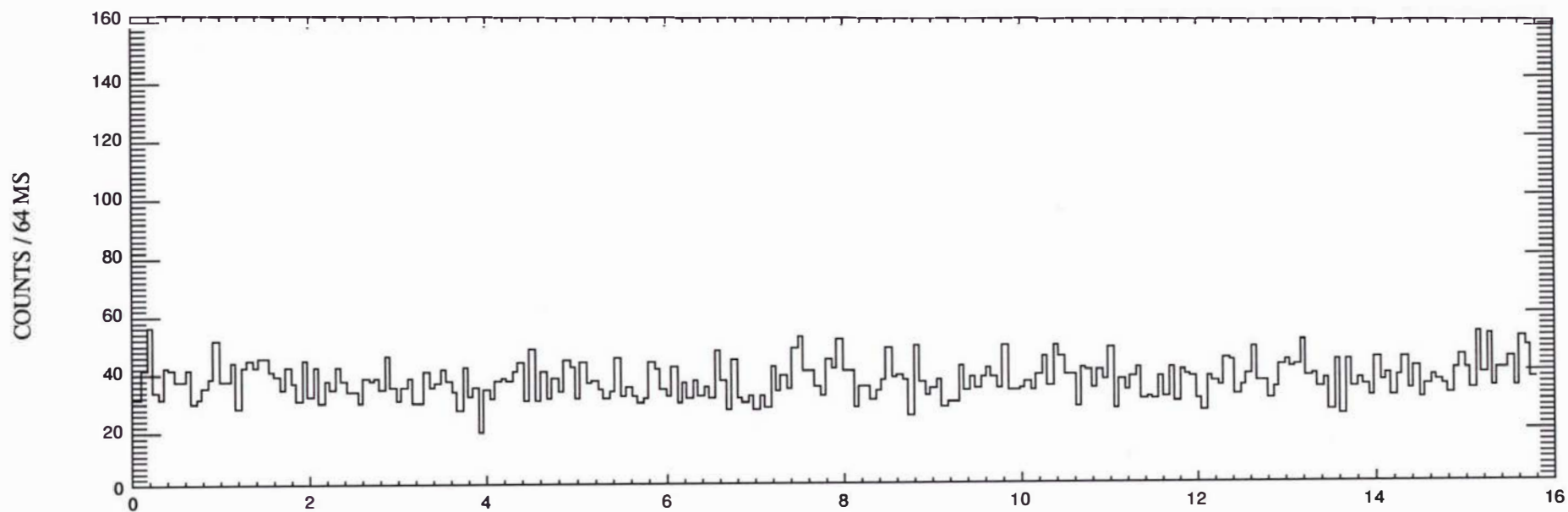
Burst Counter 0 at UT=19.554542922974 h=70396.355 s 19:33:16.355



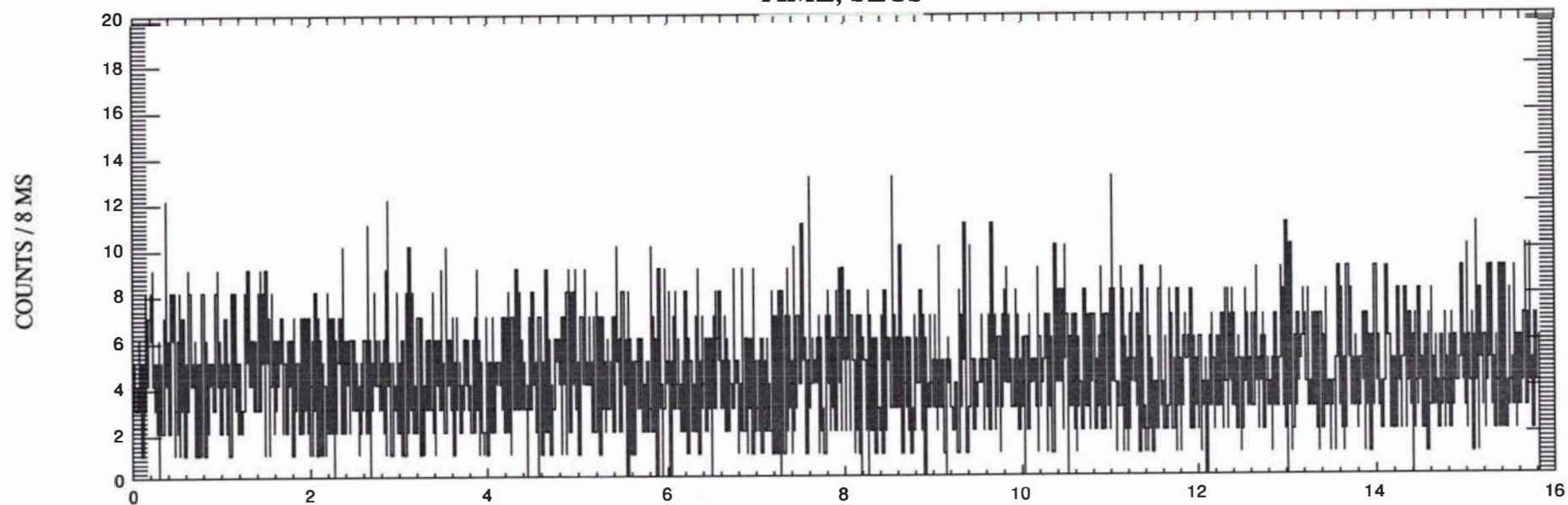
Burst Counter 1 at UT=20.815682241652 h=74936.456 s 20:48:56.456



Burst Counter 2 at UT=22.077915306091 h=79480.495 s 22:04:40.495

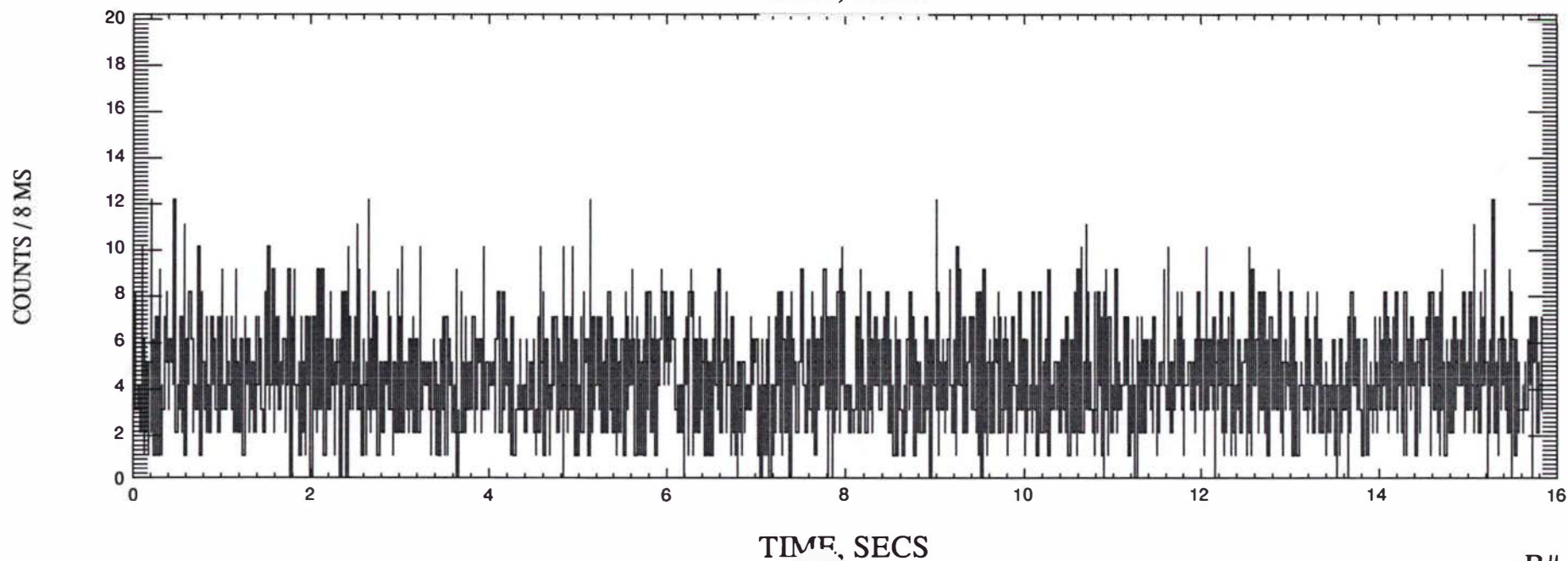
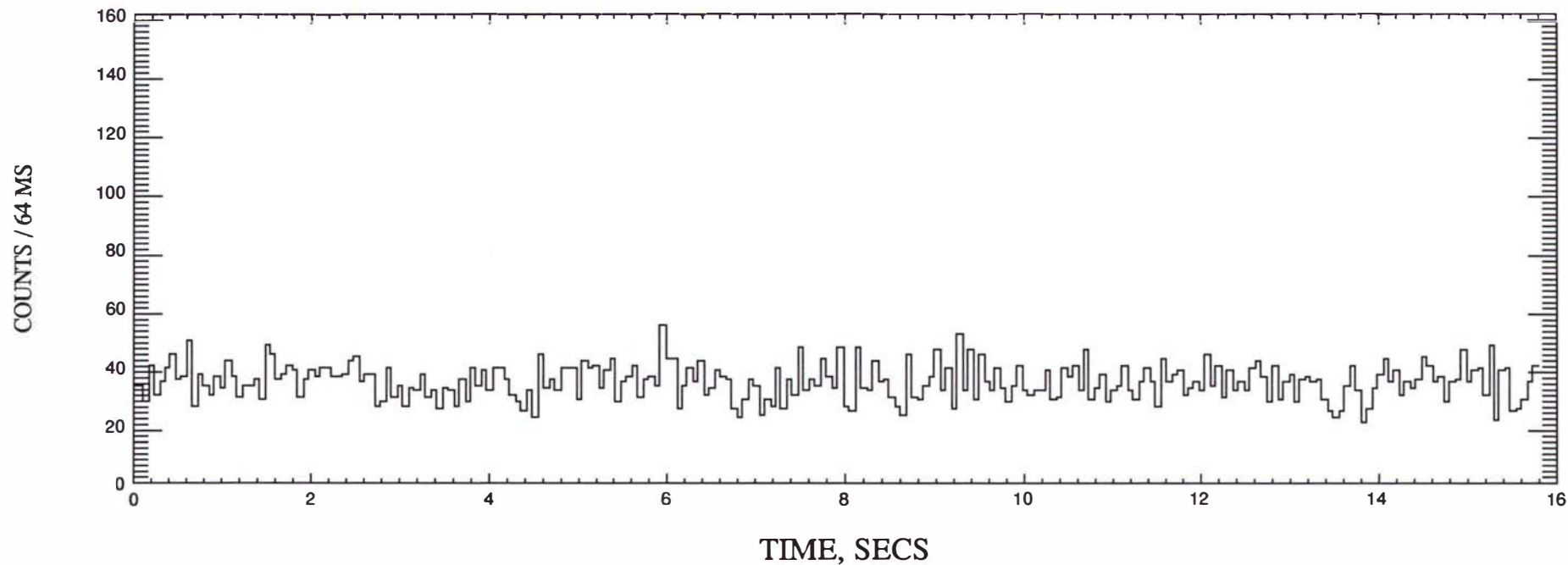


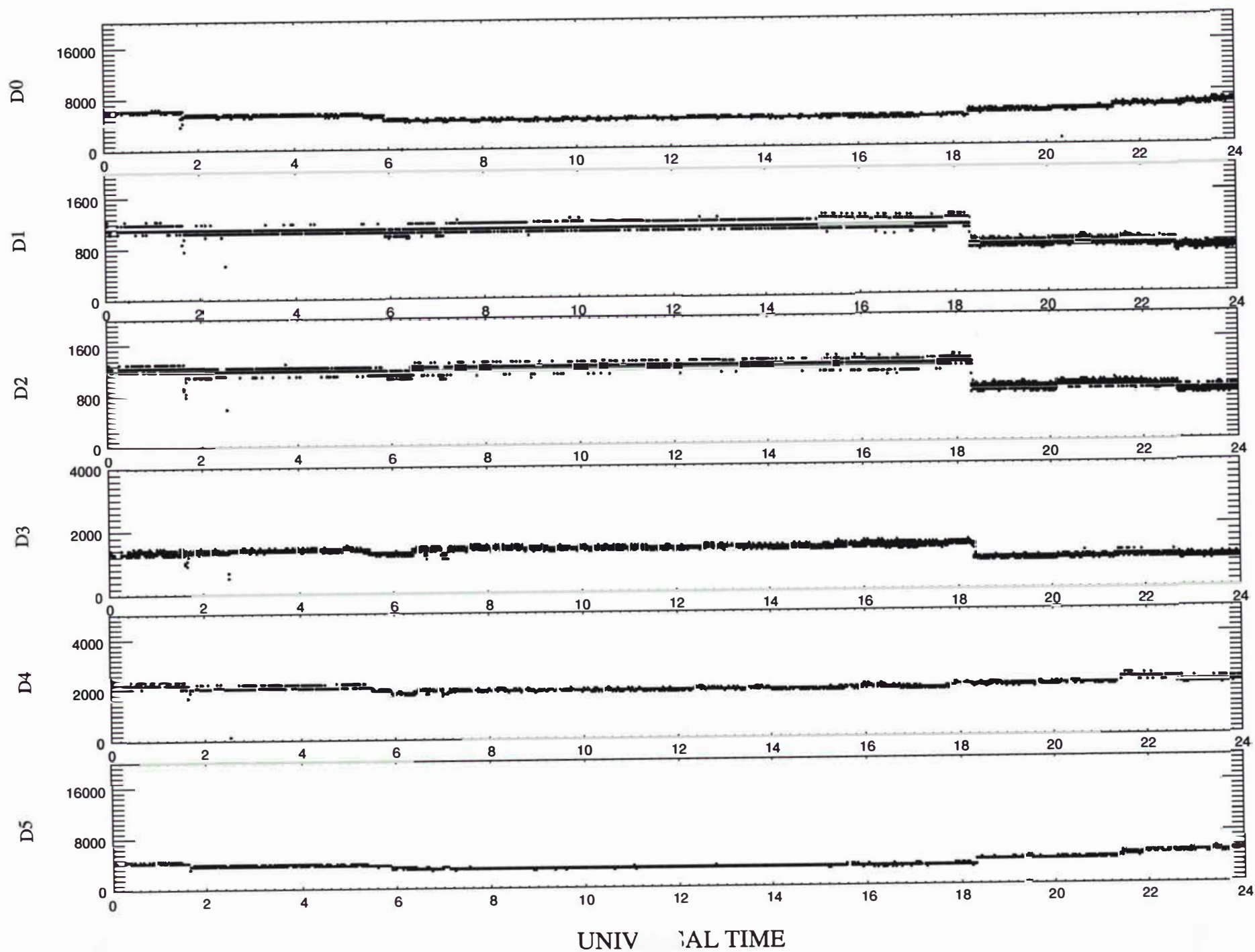
TIME, SECS



TIME, SECS

Burst Counter 3 at UT=23.342110180325 h=84031.597 s 23:20:31.597





CK → KH 15 July 91 BATSE events on MBL - Rate increases

Ap 28 '91 ~~8374~~ 71280 ^{small} RI 1024s

Same event? Must be solar flare, behind the limb for
GRO

May 5 '91 2698 Very weak GRO event

May 6 '91 84145s Observed by BATSE - no time list yet

From @UCBSP.SSL.BERKELEY.EDU:FINGER@BATSE.SPAN Thu May 9 15:01:24 1991
Received: from UCBSP.SSL.BERKELEY.EDU by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA09156; Thu, 9 May 91 15:01:18 PDT
Message-Id: <9105092201.AA09156@sunspot.ssl.berkeley.edu>
Date: Thu 9 May 91 15:01:41-PST
From: \$C <FINGER@BATSE.SPAN>
To: ANDERSON@sunspot.ssl.berkeley.edu
Subject: [Resent-MM Mail] [Resent-MM Mail] BATSE Solar Flare Data
Status: RO

Date: Thu 9 May 91 15:01:10-PST
From: \$C <FINGER@BATSE.SPAN>
To: MARSHA@UCBSP.SSL.BERKELEY.EDU
Subject: [Resent-MM Mail] BATSE Solar Flare Data

Received: from BATSE by UCBSP.SSL.BERKELEY.EDU via MAIL-11 with DECnet;
Thu, 9 May 91 15:00:40-PST
Date: Thu 9 May 91 15:00:39-PST
From: FINGER@BATSE.SPAN
Subject: BATSE Solar Flare Data
To: "@BATSE_SOLAR_GIS"@BATSE.SPAN

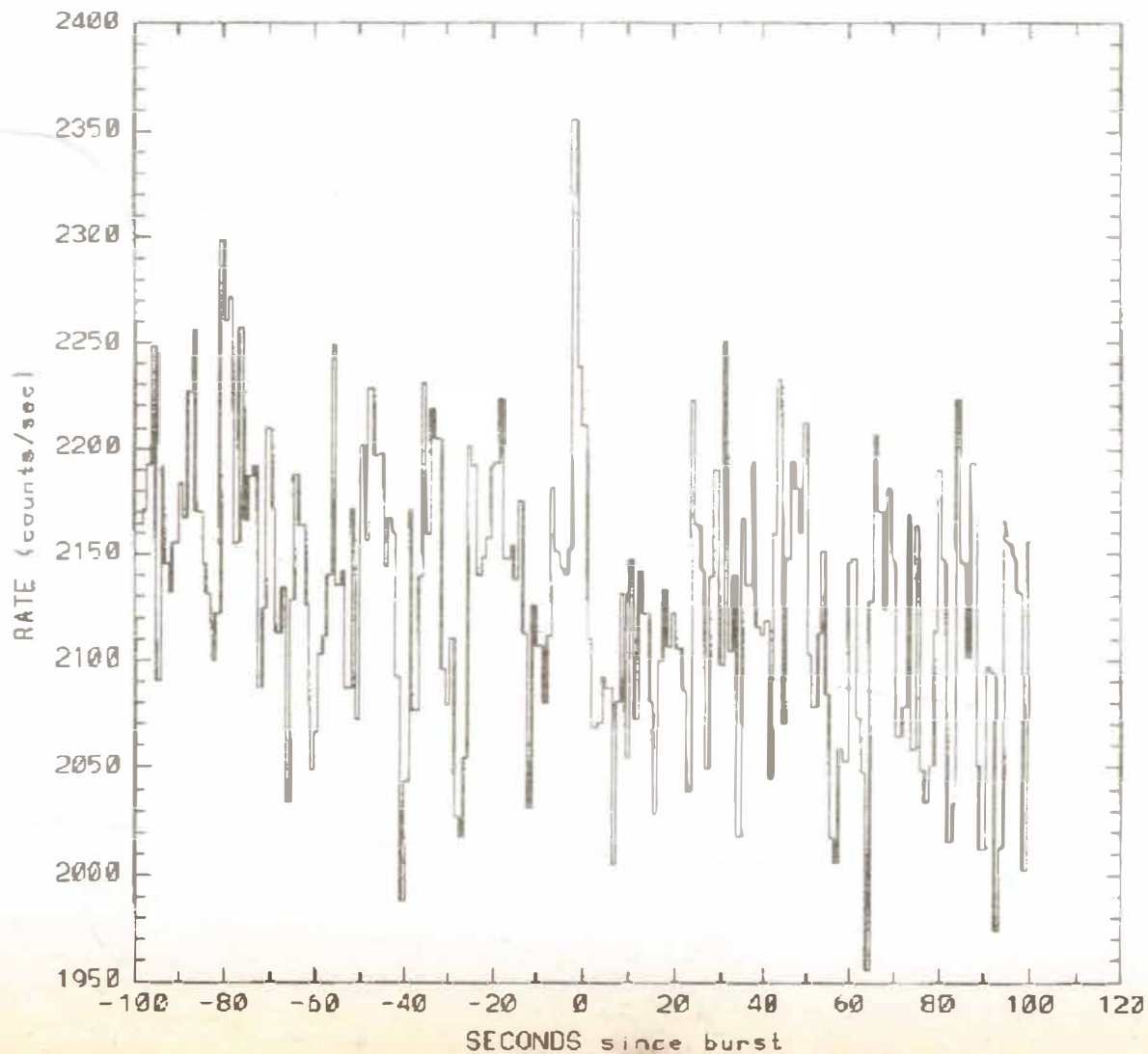
Since its burst trigger was enabled on April 21st, BATSE has triggered on 10 solar flares. The trigger times of these flares and their GOES class are tabulated below:

BATSE trigger time (UTC)	GOES Class
1991 May 4 18:14:02.09	C
1991 May 6 16:11:32.81	C
1991 May 6 23:22:25.77	C
1991 May 7 2:53:29.57	no GOES event
1991 May 7 7:15:14.36	no GOES event
1991 May 7 7:40:36.84	C
1991 May 7 10:35:37.45	M
1991 May 7 19:41:08.20	C
1991 May 7 22:37:42.87	C

BATSE Guest investigators interested in analysing the high time resolution LAD and SPEC detector data acquired during these events should contact:

Mark H. Finger
BATSE::FINGER
(205) 544-6256

Ulysses Ub Event (?)



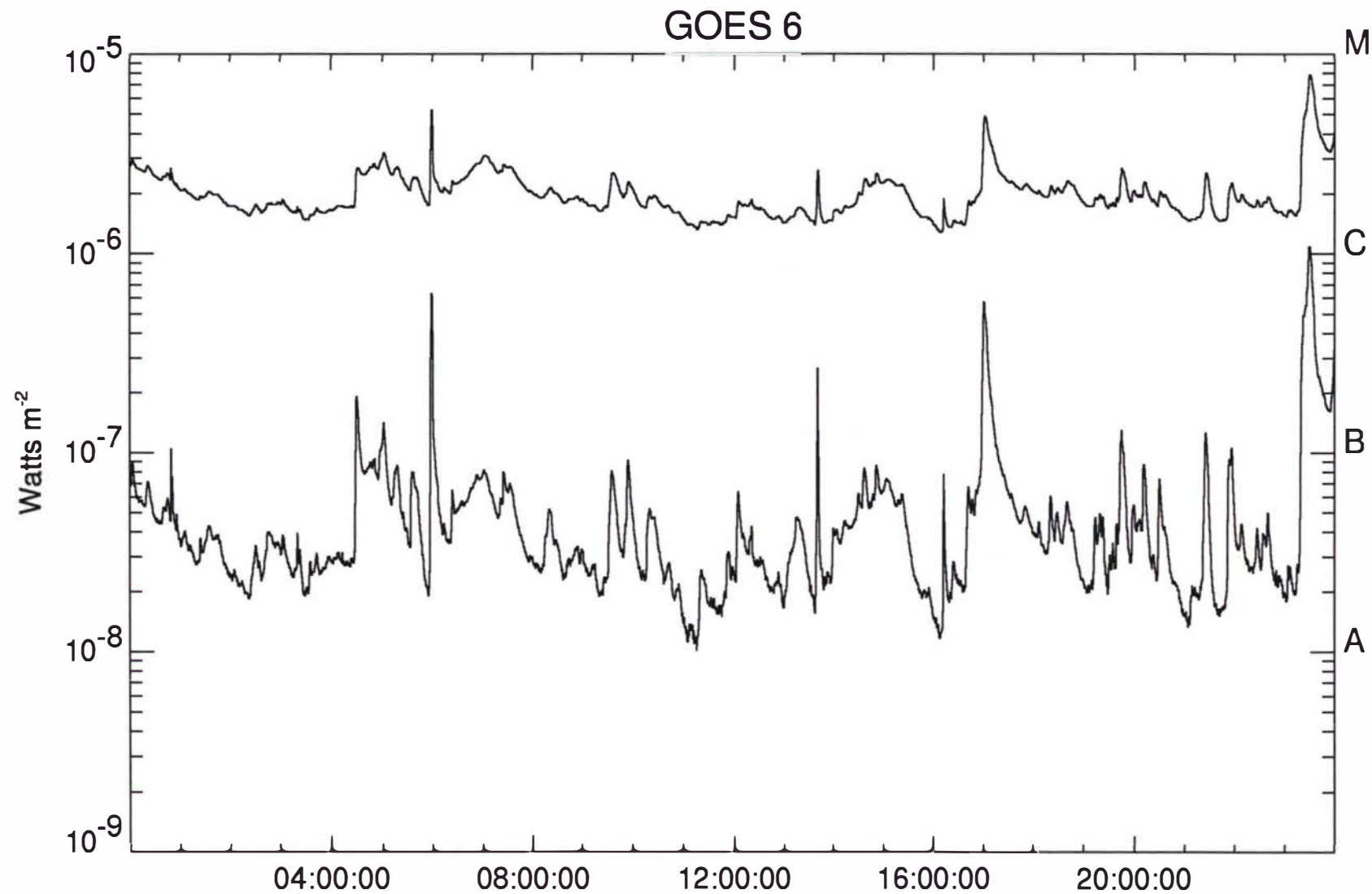
15-JUL-1991 12:37:25

Created by MOPS 80
[Burst Display]
Version 02.02User Input Time:
8382 / 84115.000

Data Type: DISCLA

May 6

Deadtime
Corrected: NIntegration Time:
1.024 second(s)Detectors [7..0]:
00001000Discriminators:
[2, 3]Quality Mask:
BDISP0



Data Start: 91/05/06, 0000:01

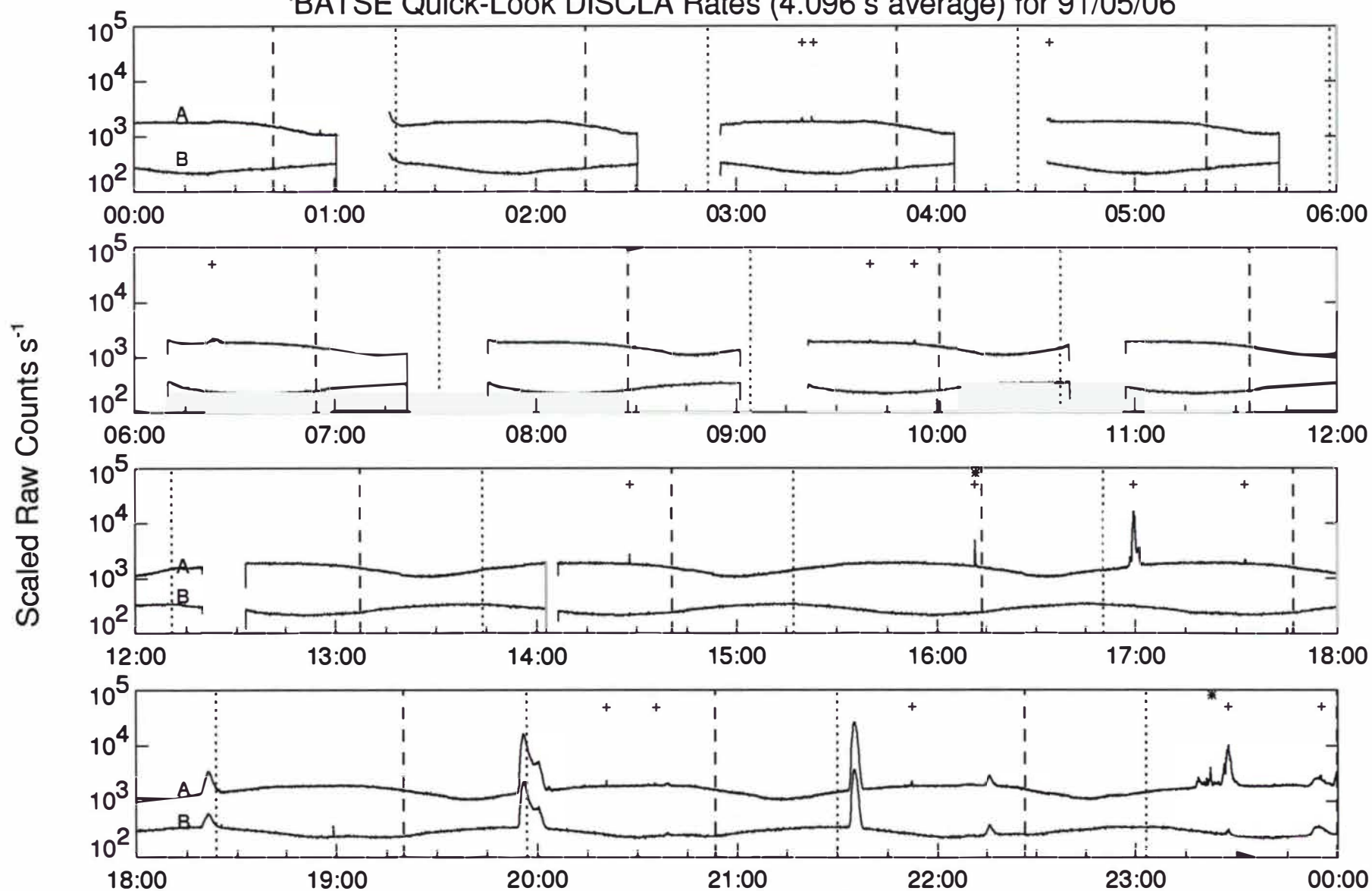
Plot created: 96/11/27, 0247

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/06

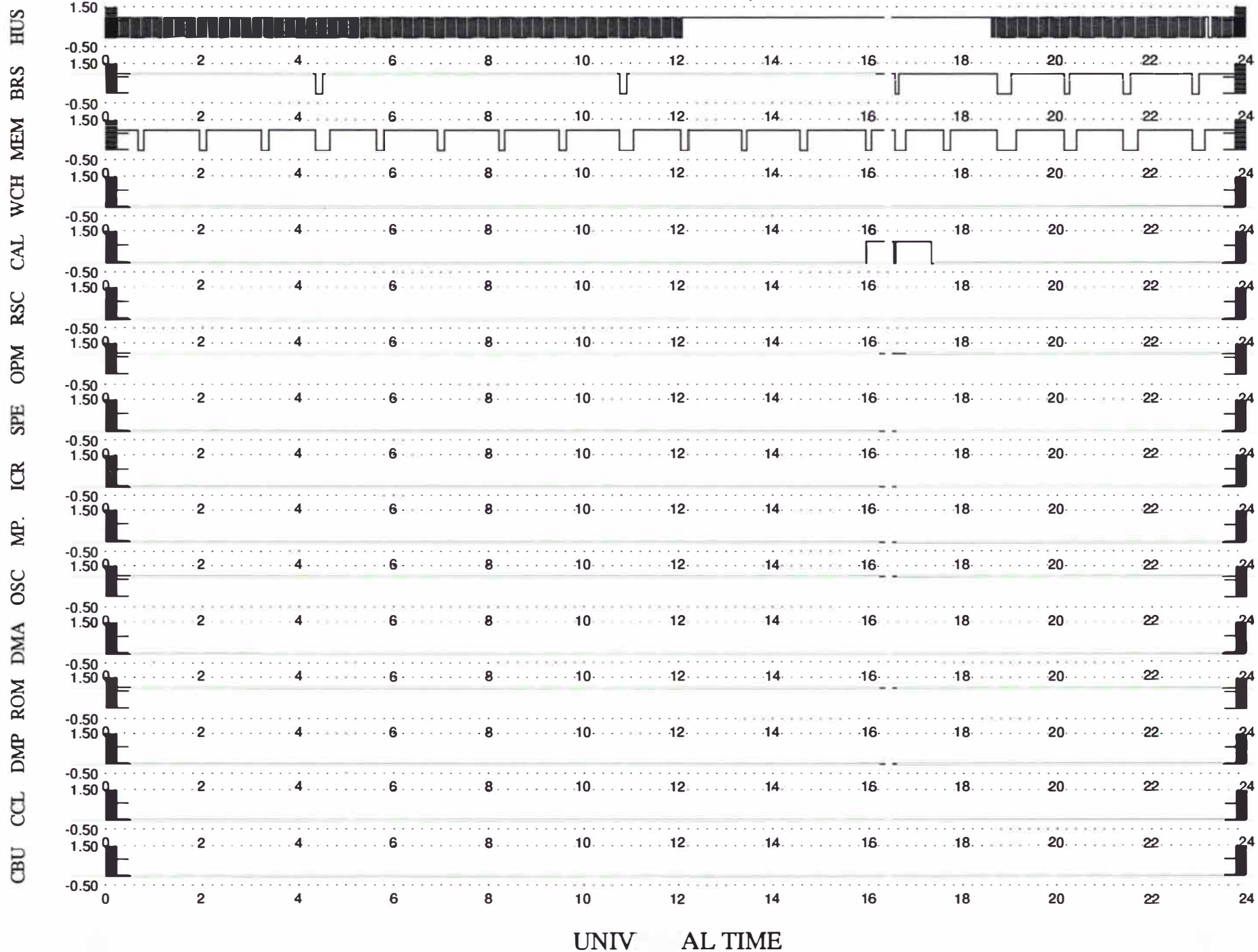


Current Time: 96/11/27, 0247 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

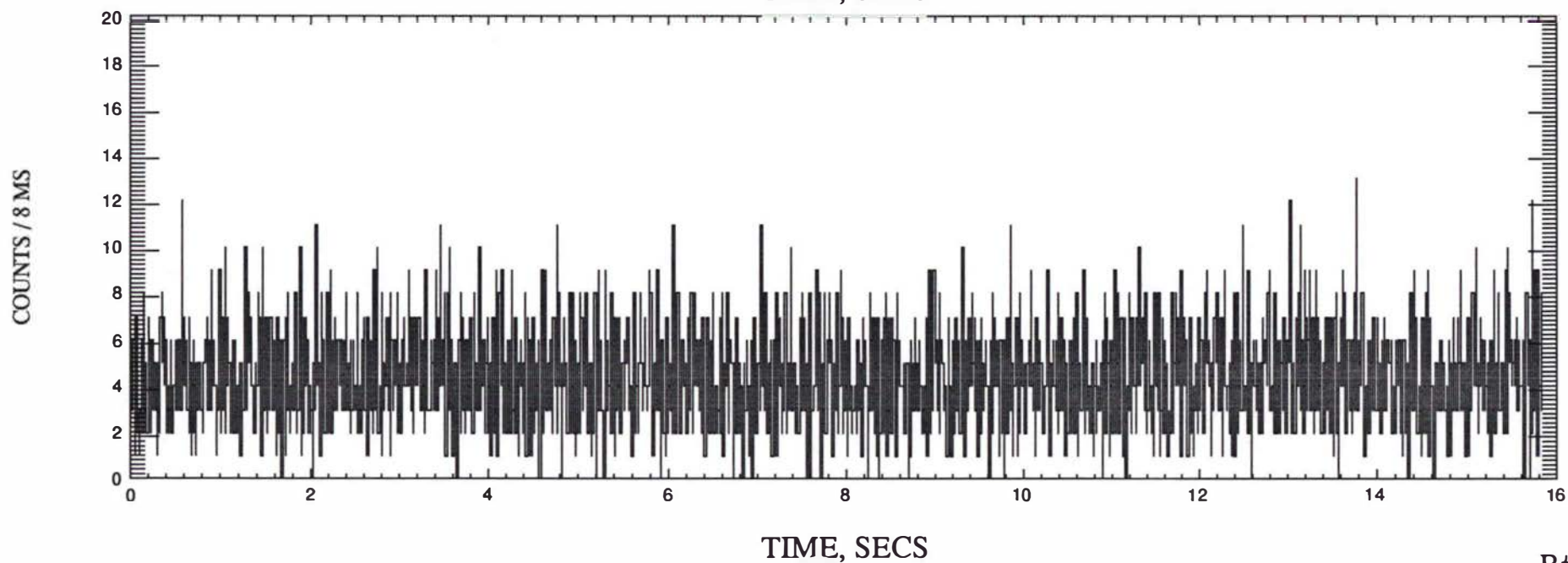
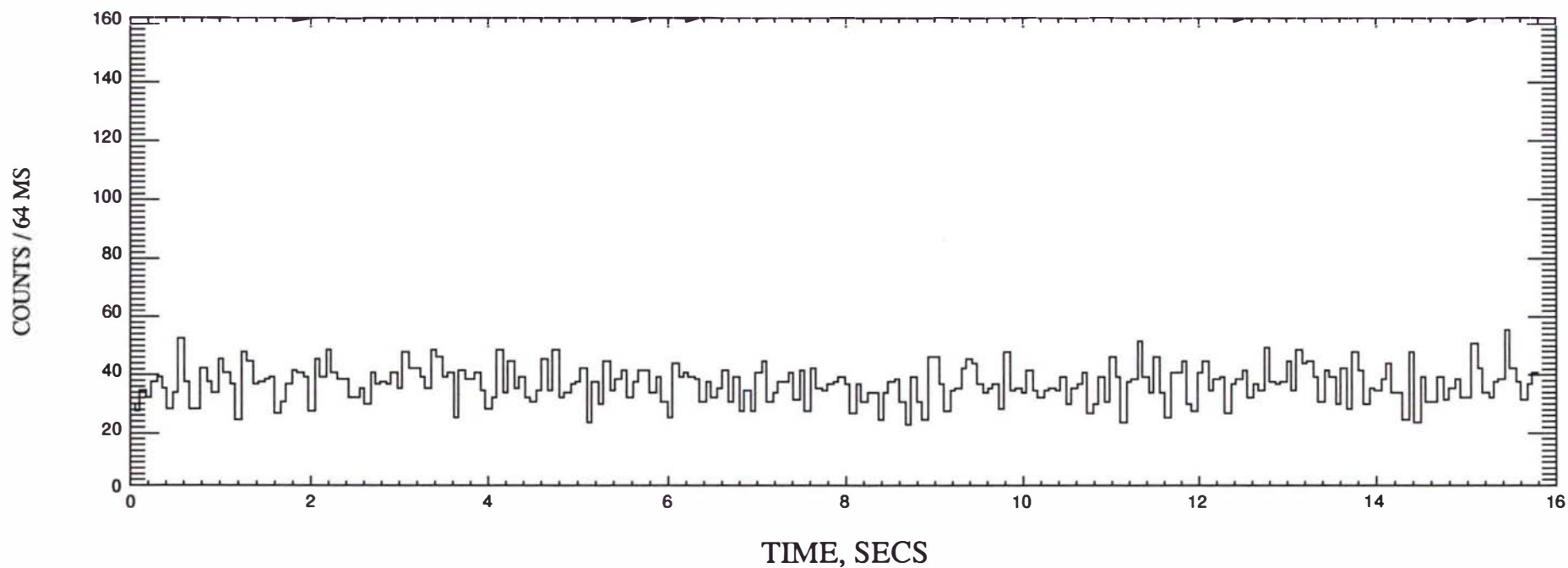
Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

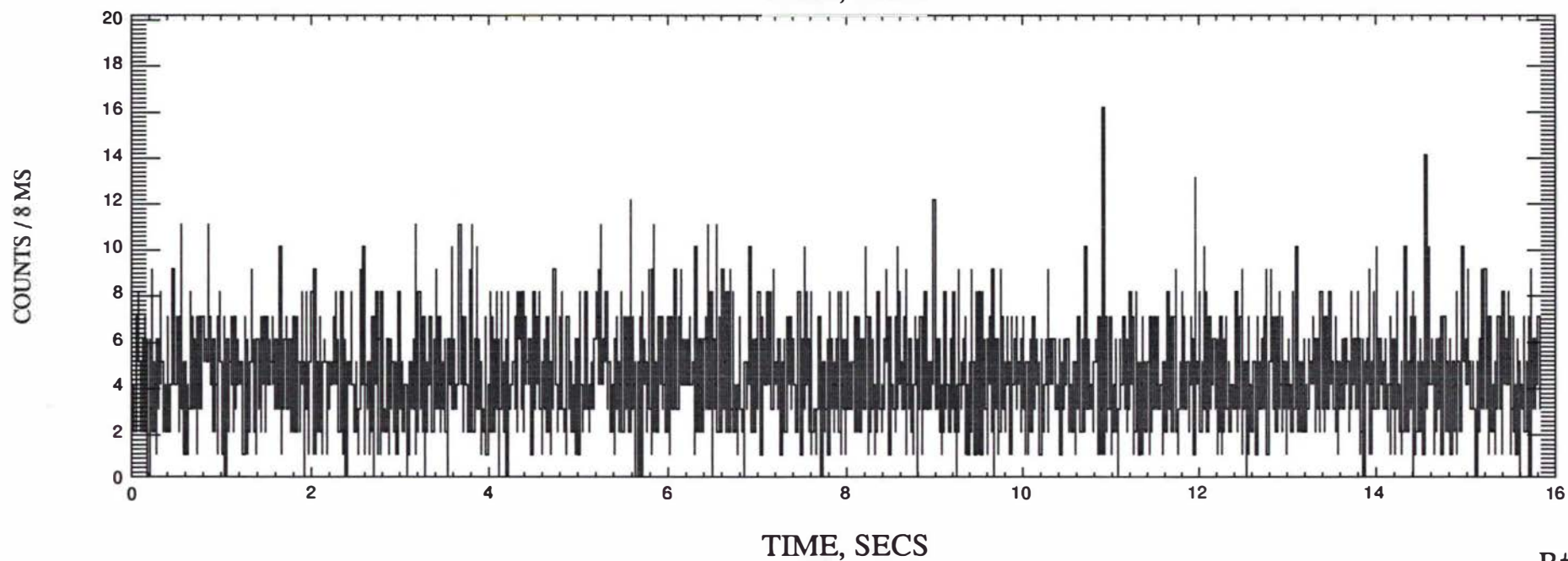
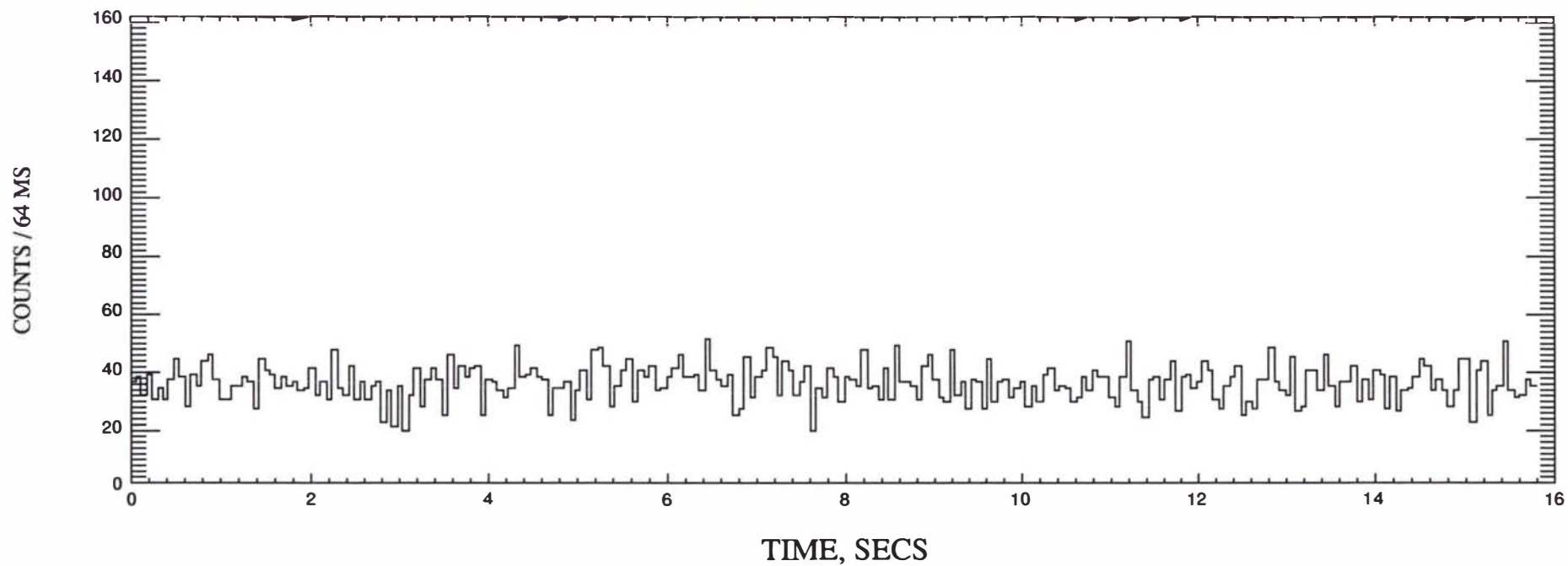
BURST NUMBER 4 - 15, 0 - 6



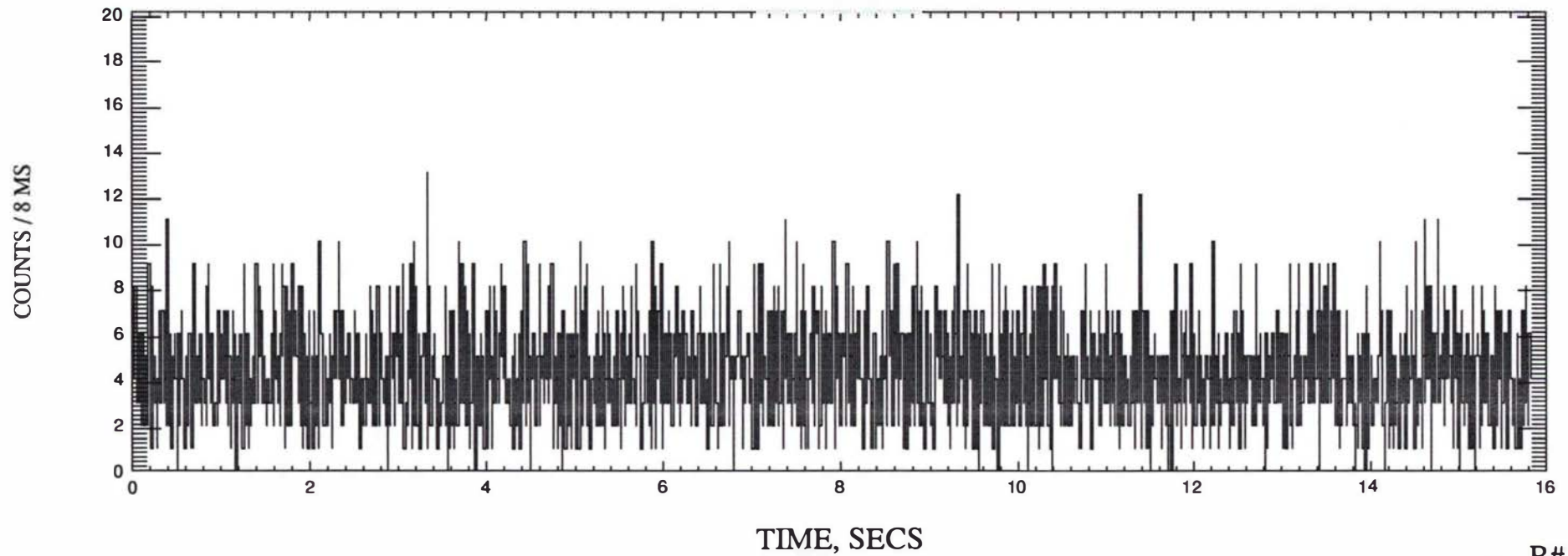
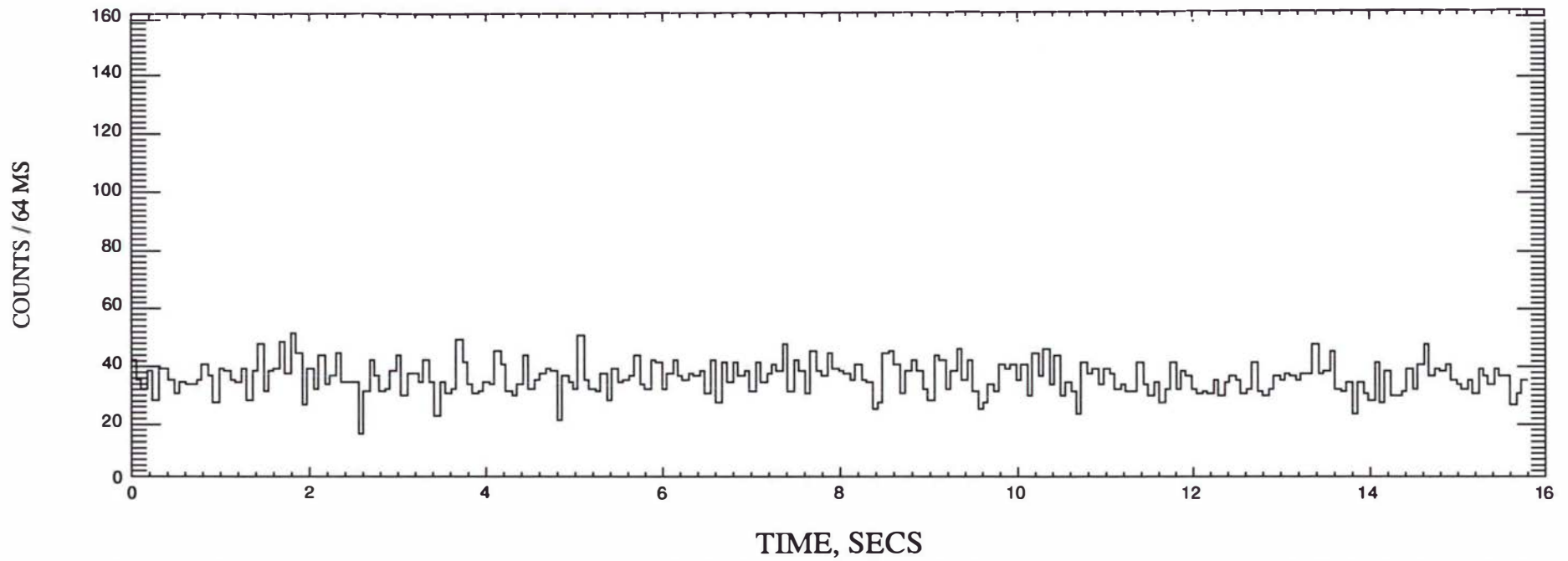
Burst Counter 4 at UT= 0.608253237406 h= 2189.712 s 00:36:29.712



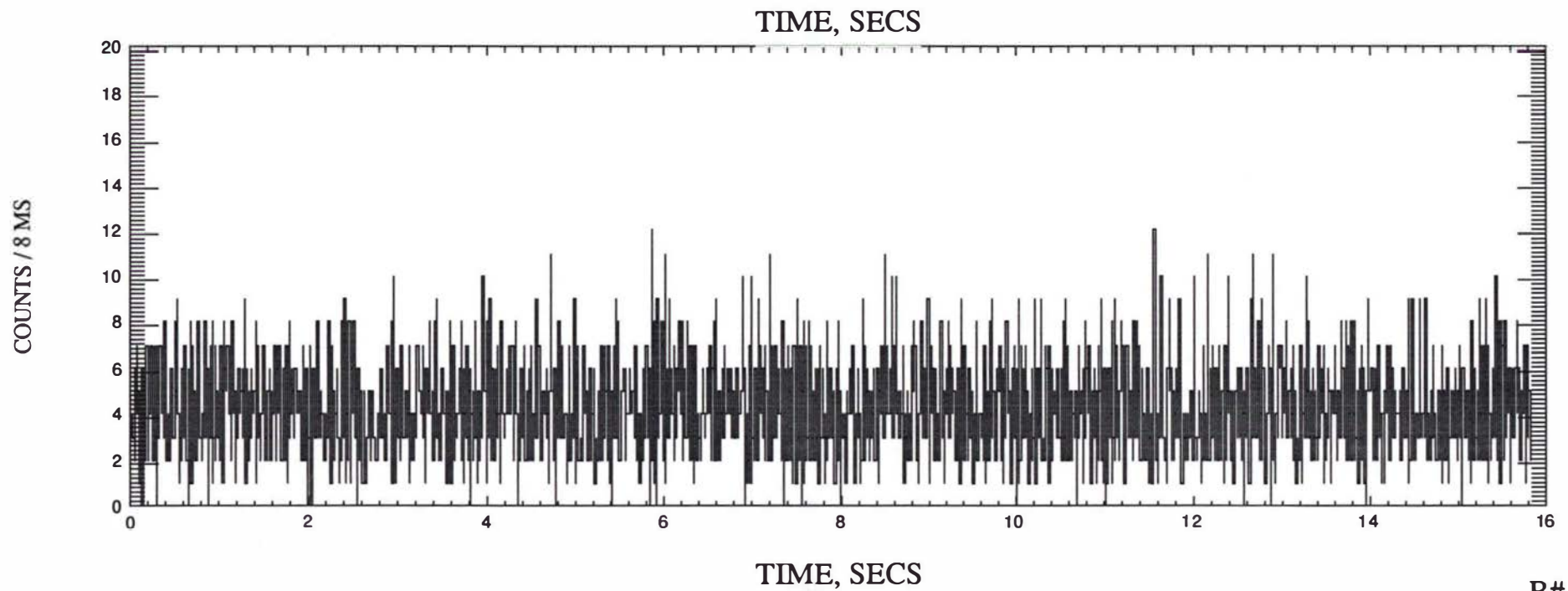
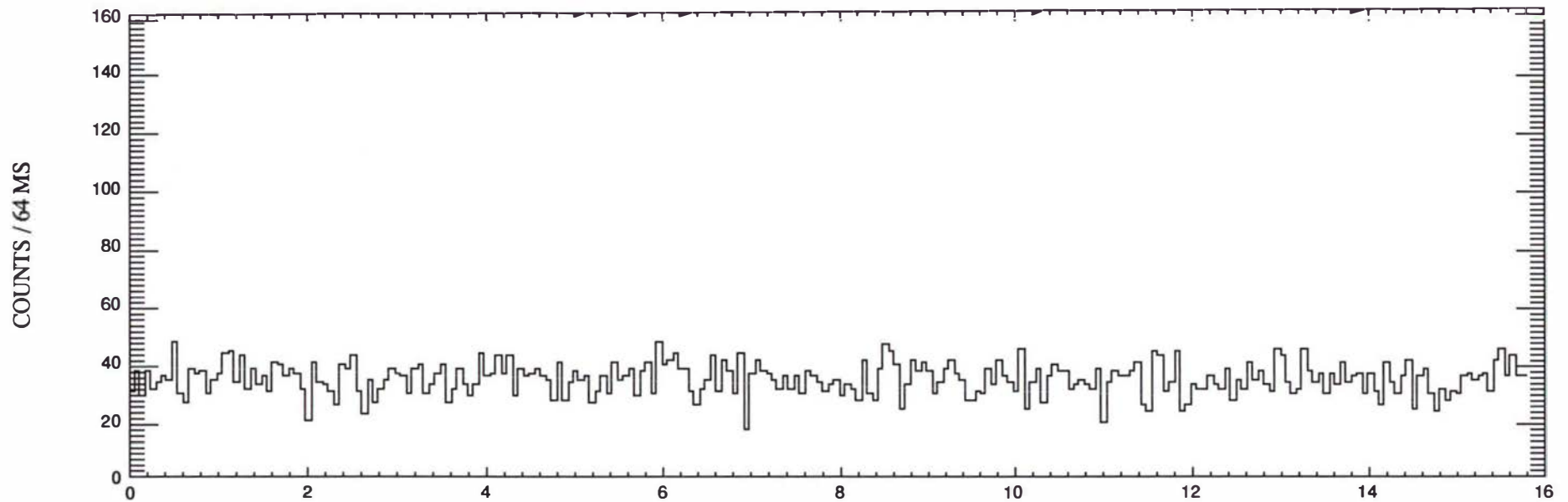
Burst Counter 5 at UT= 1.866879531013 h= 6720.766 s 01:52:00.766



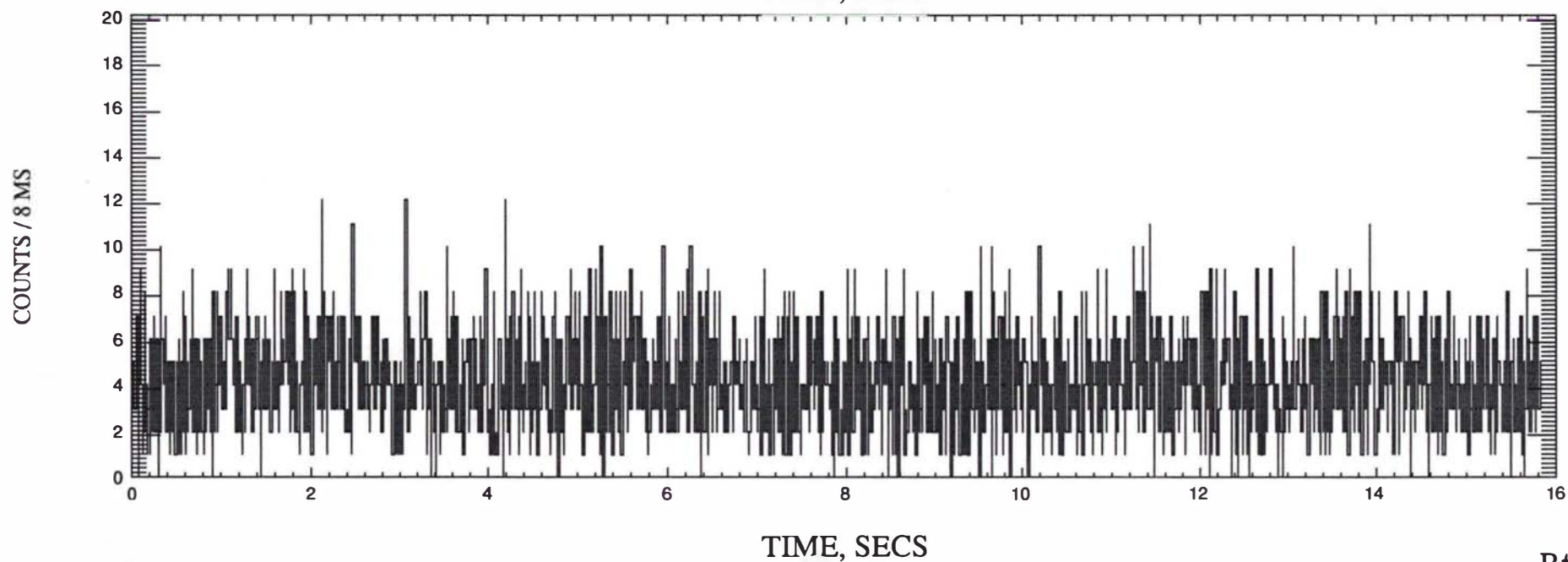
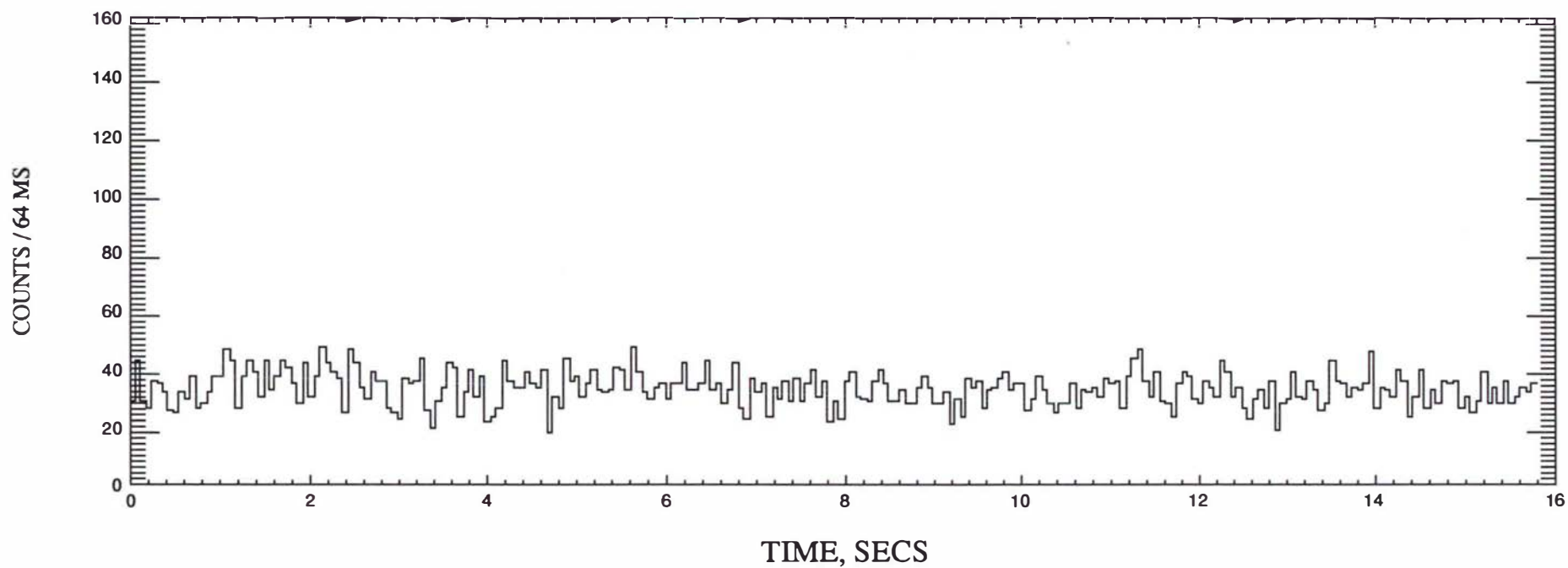
Burst Counter 6 at UT= 3.131907738580 h=11274.868 s 03:07:54.868



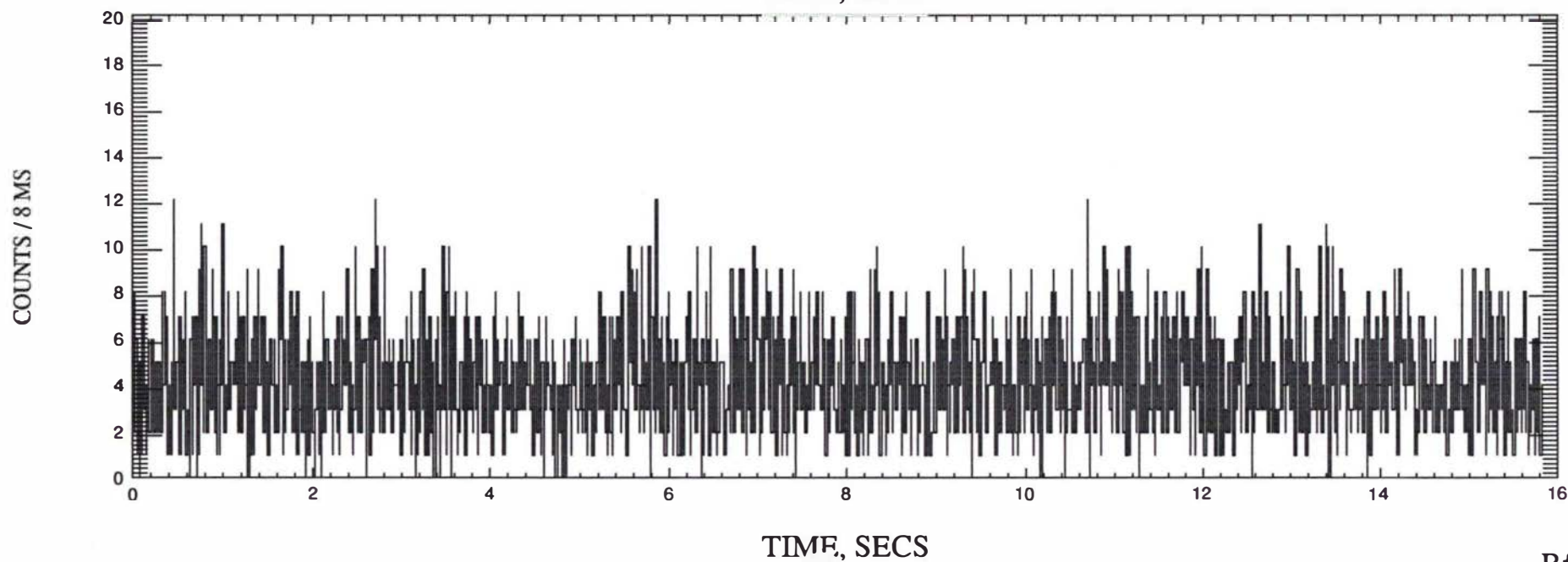
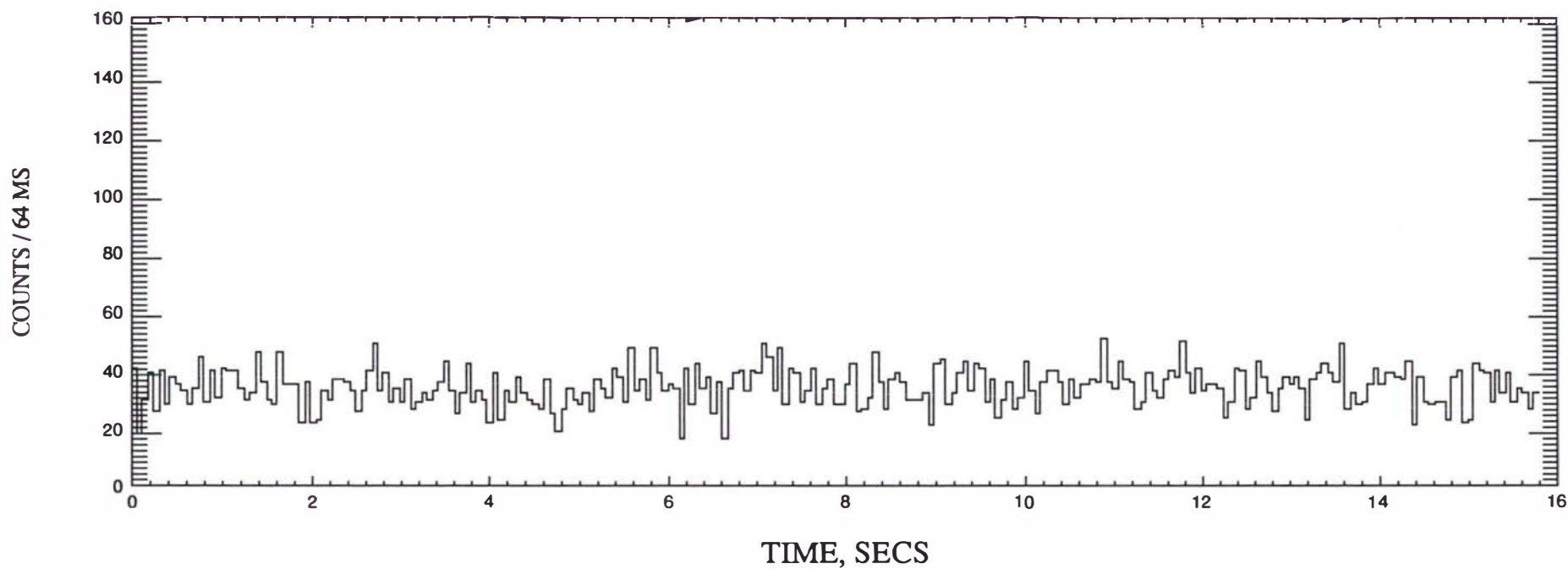
Burst Counter 7 at UT= 4.393311814202 h=15815.923 s 04:23:35.923



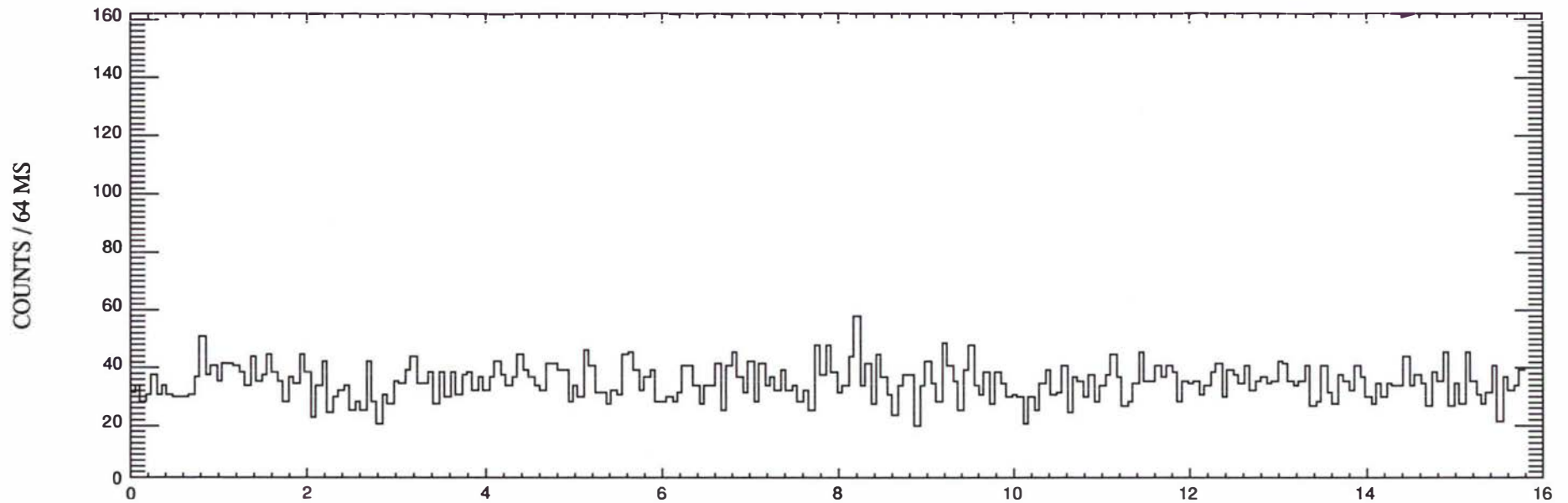
Burst Counter 8 at UT= 5.653053321838 h=20350.992 s 05:39:10.992



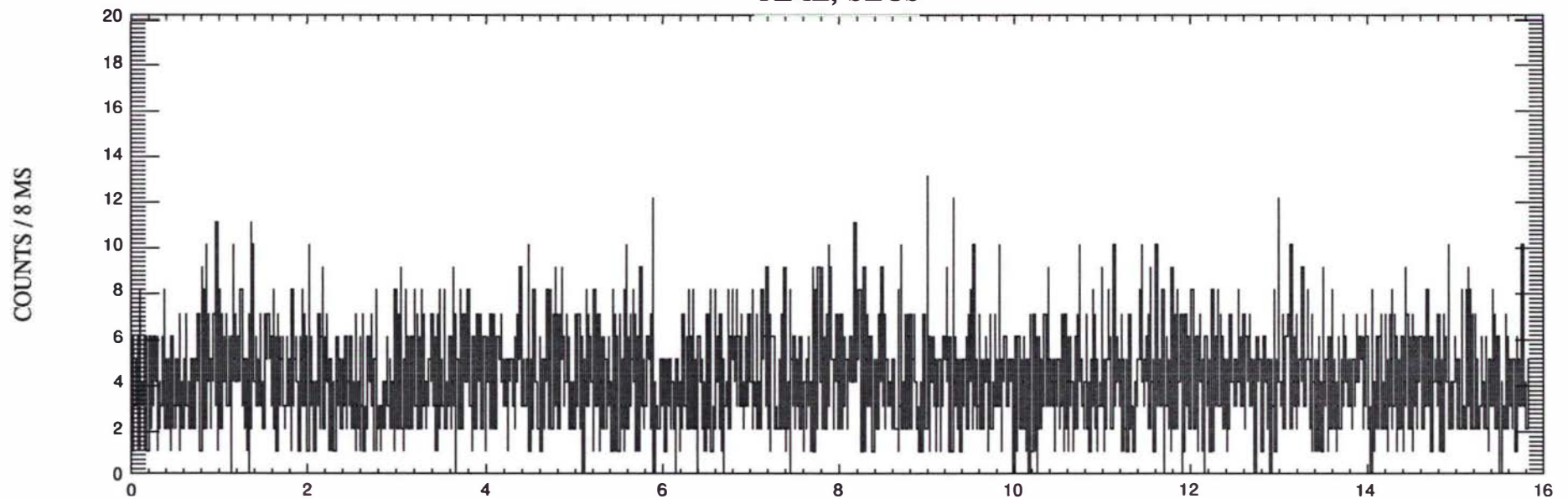
Burst Counter 9 at UT= 6.922521633572 h=24921.078 s 06:55:21.078



Burst Counter 10 at UT= 8.206154437595 h=29542.156 s 08:12:22.156

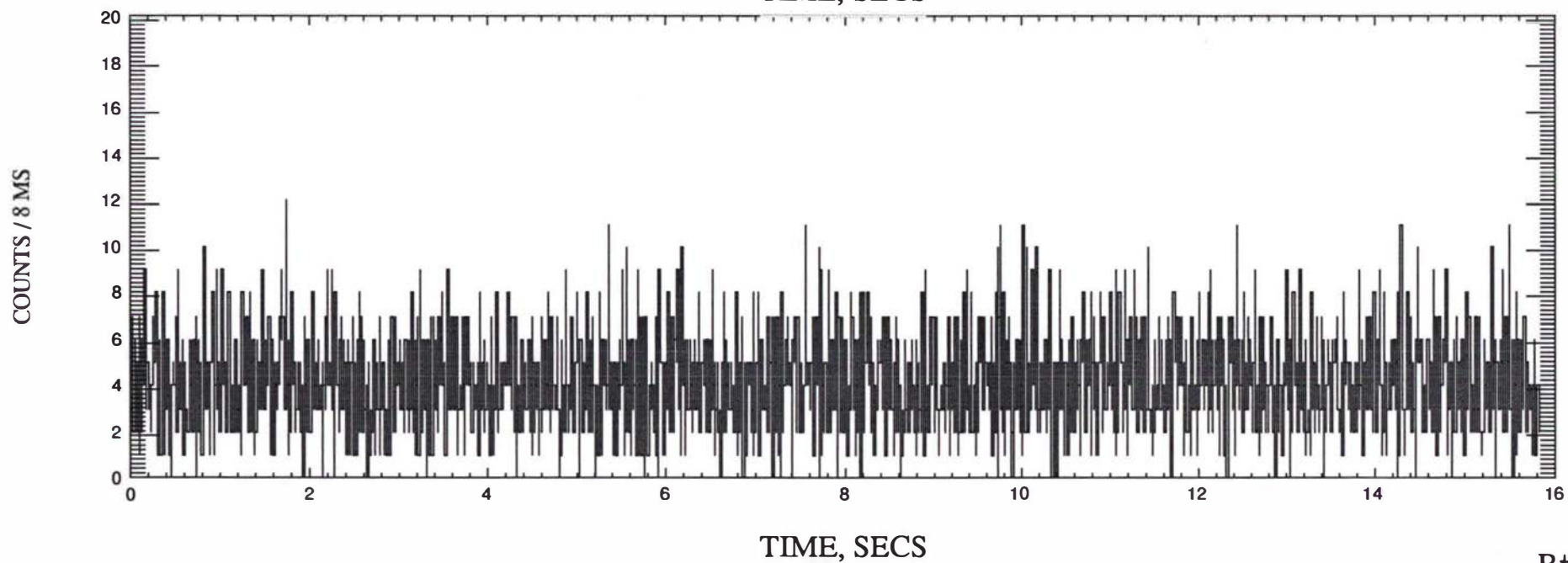
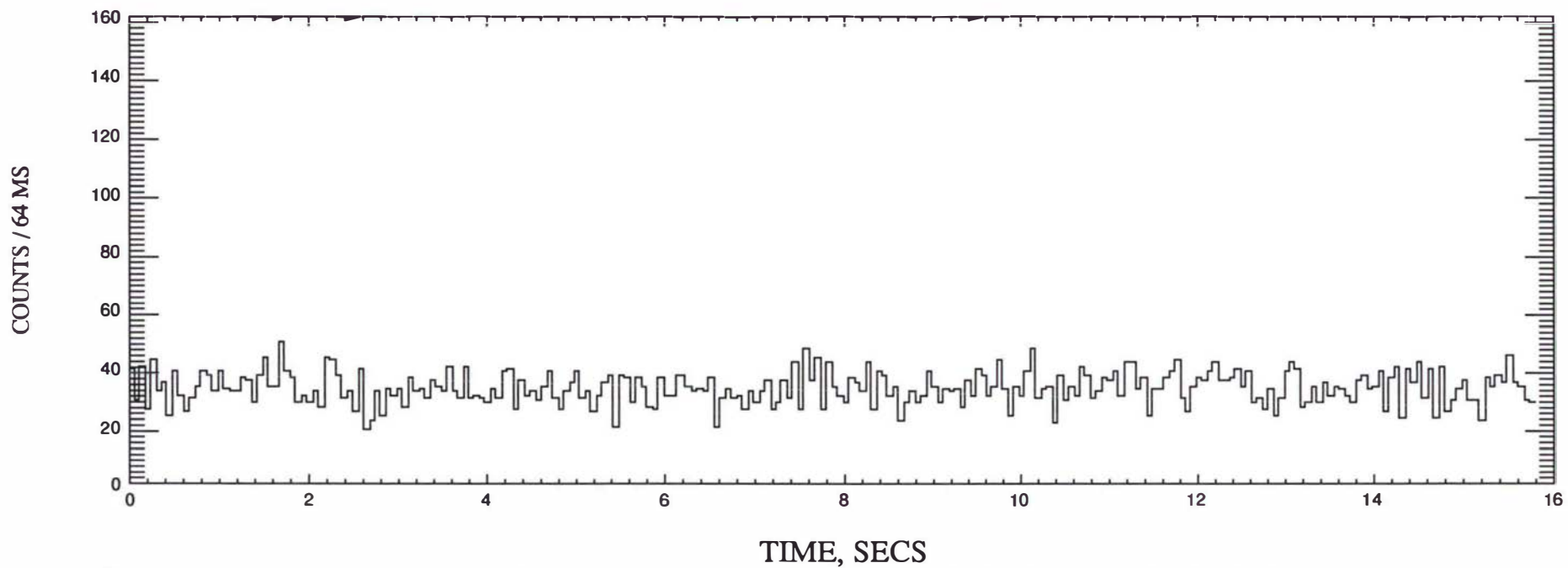


TIME, SECS

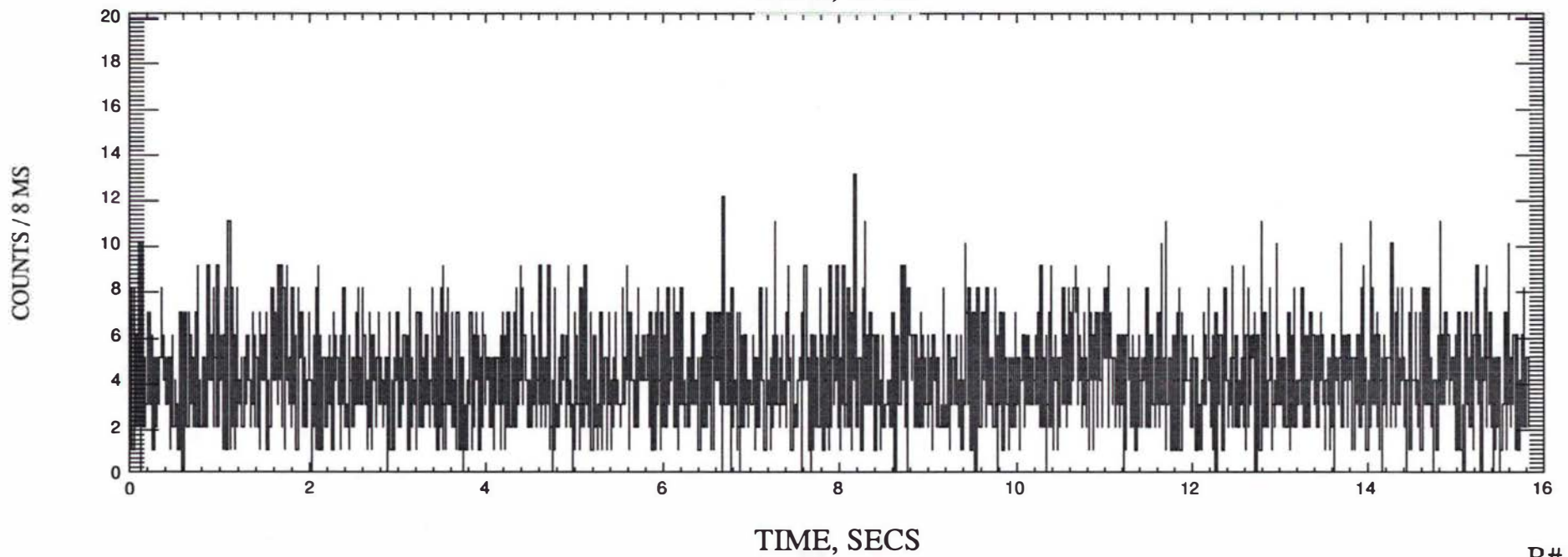
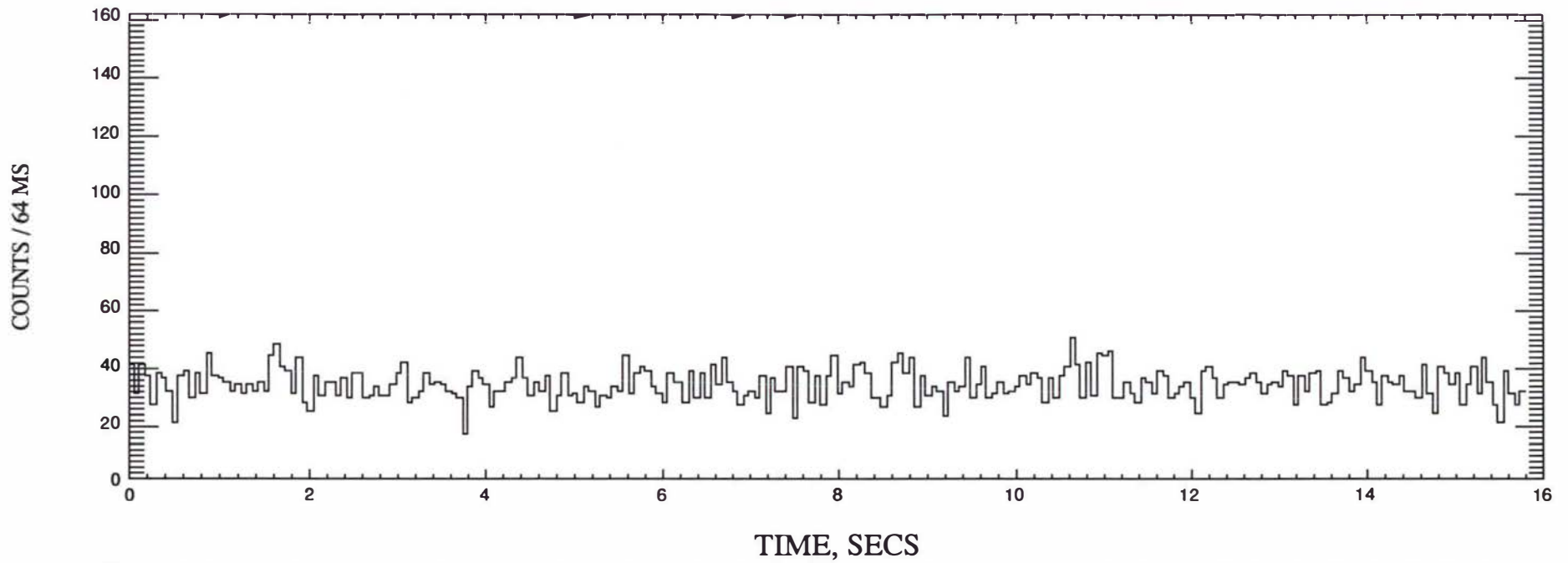


TIME, SECS

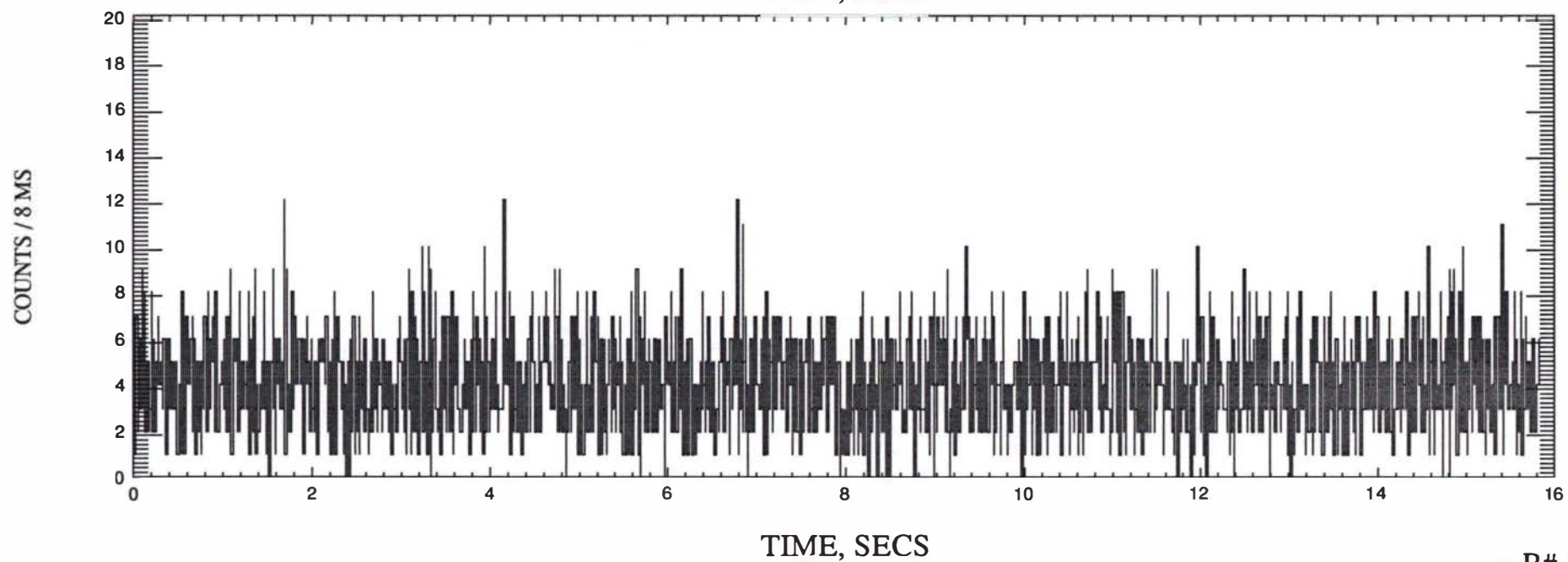
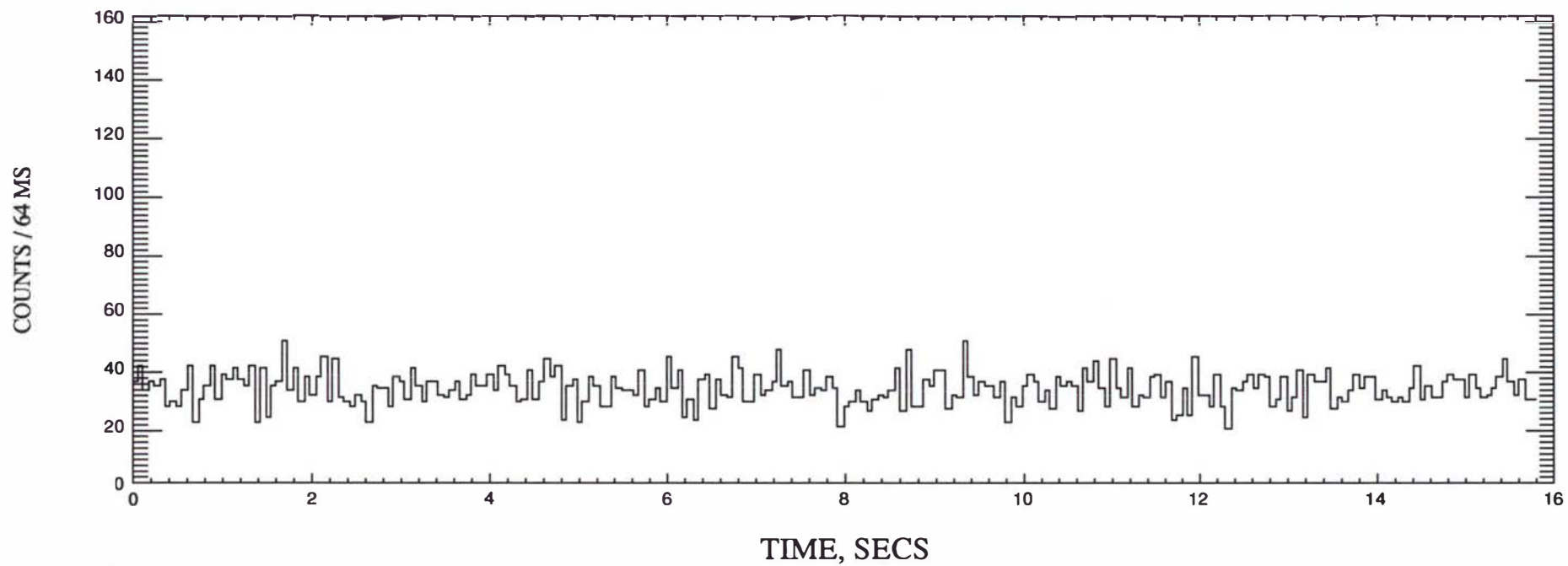
Burst Counter 11 at UT= 9.493953912523 h=34178.234 s 09:29:38.234



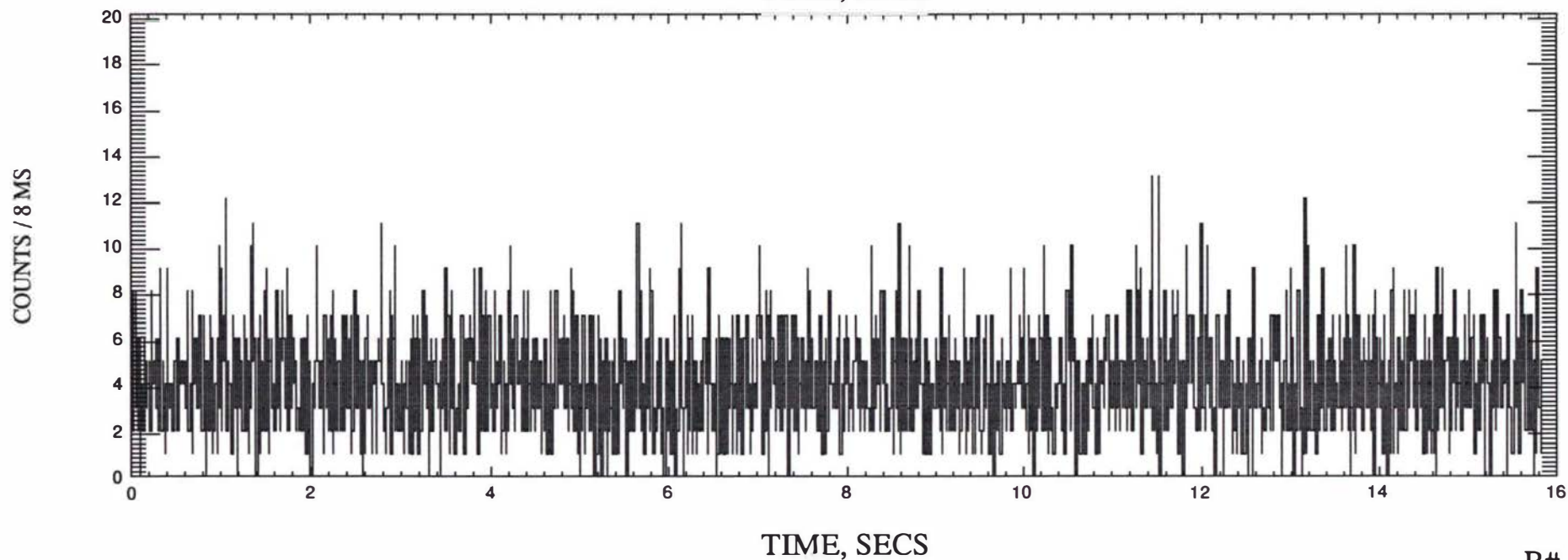
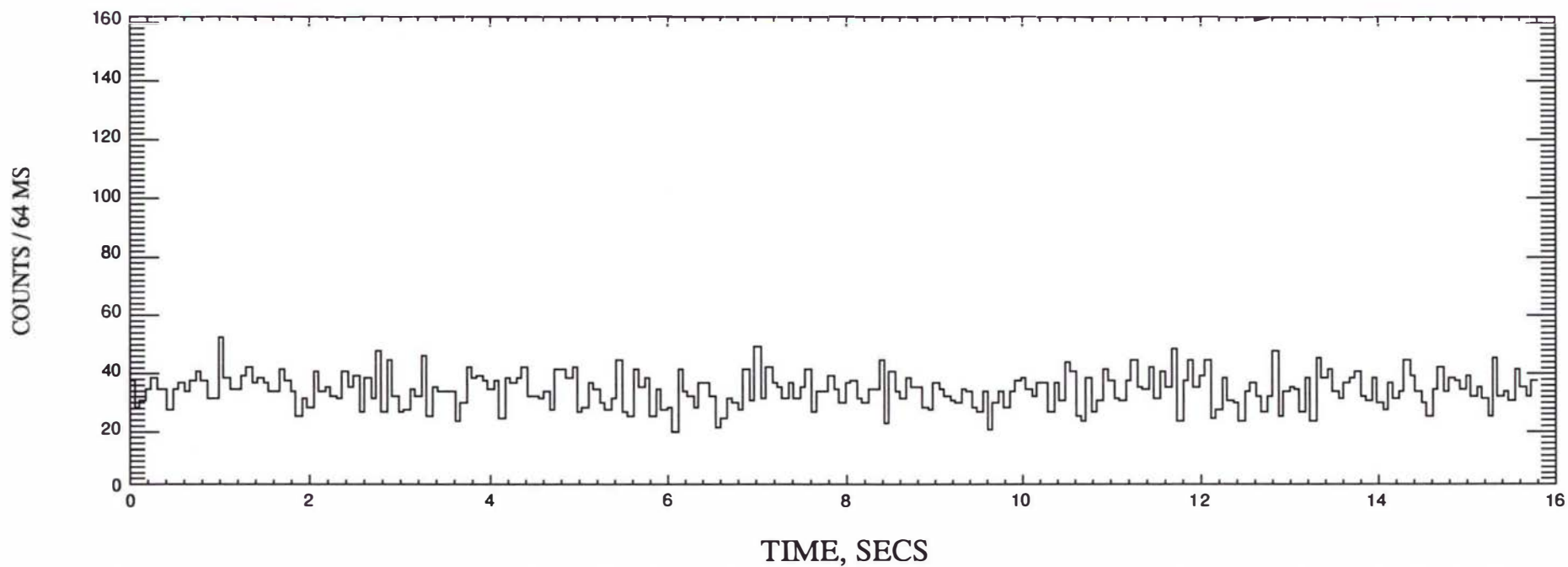
Burst Counter 12 at UT=10.799537917243 h=38878.337 s 10:47:58.337



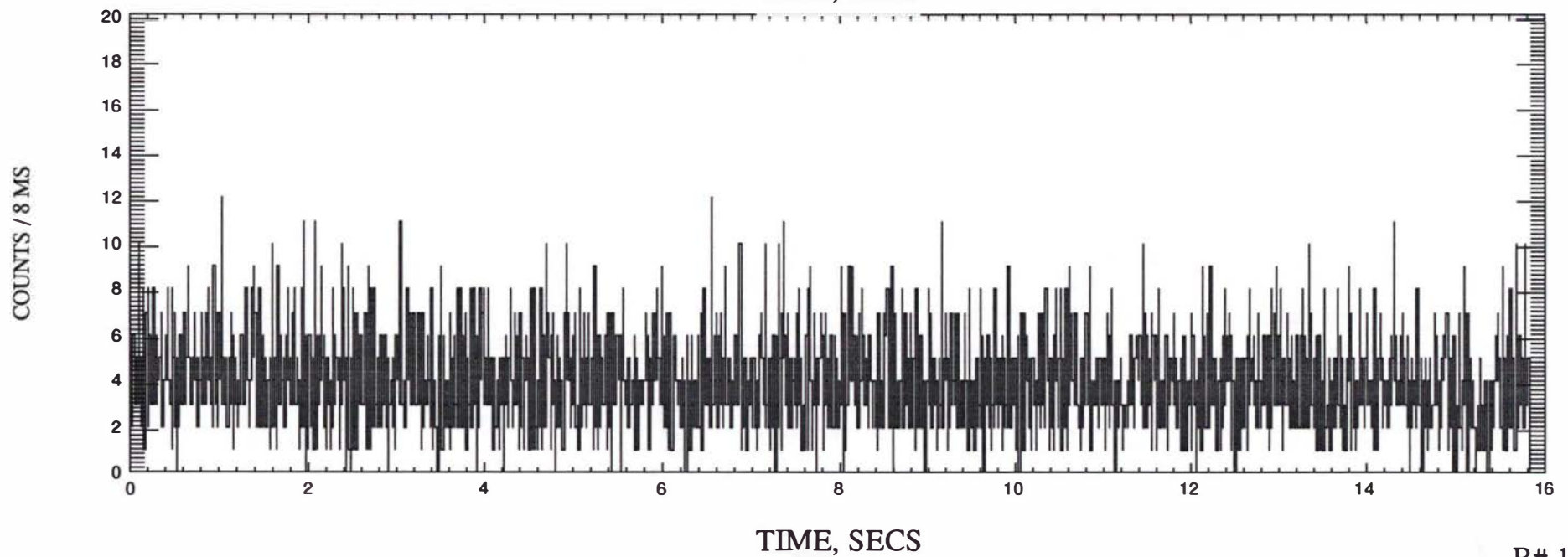
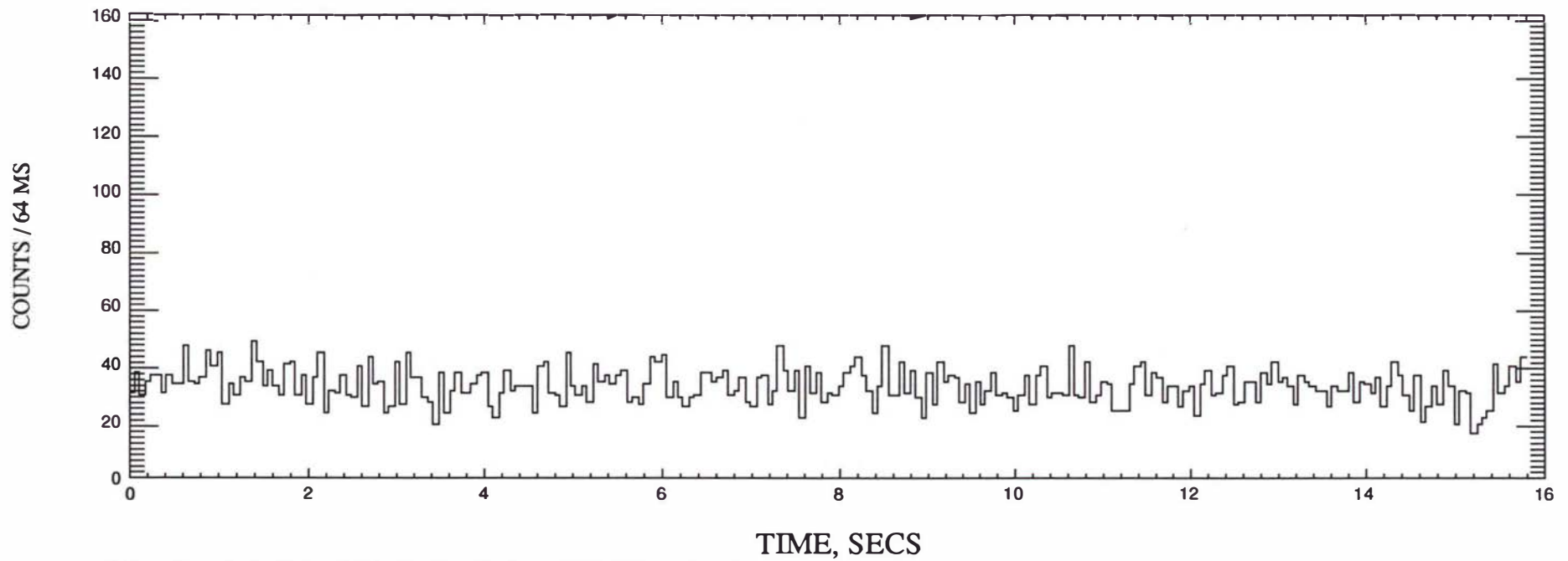
Burst Counter 13 at UT=12.063999476963 h=43430.398 s 12:03:50.398



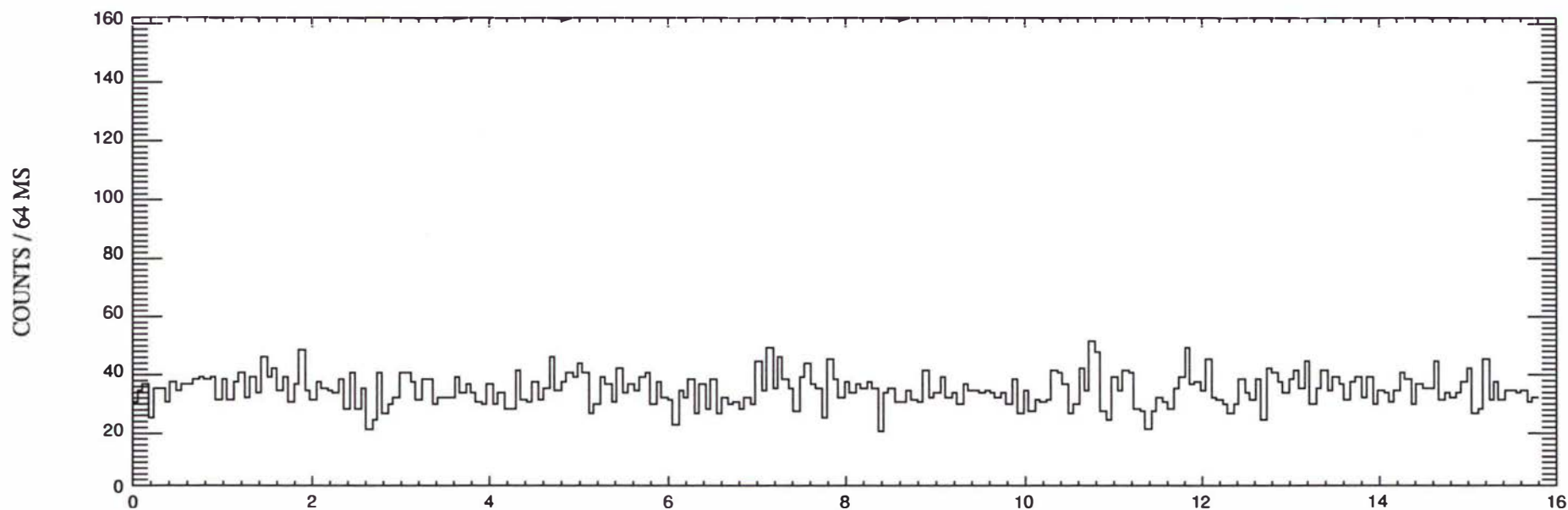
Burst Counter 14 at UT=13.315967784458 h=47937.484 s 13:18:57.484



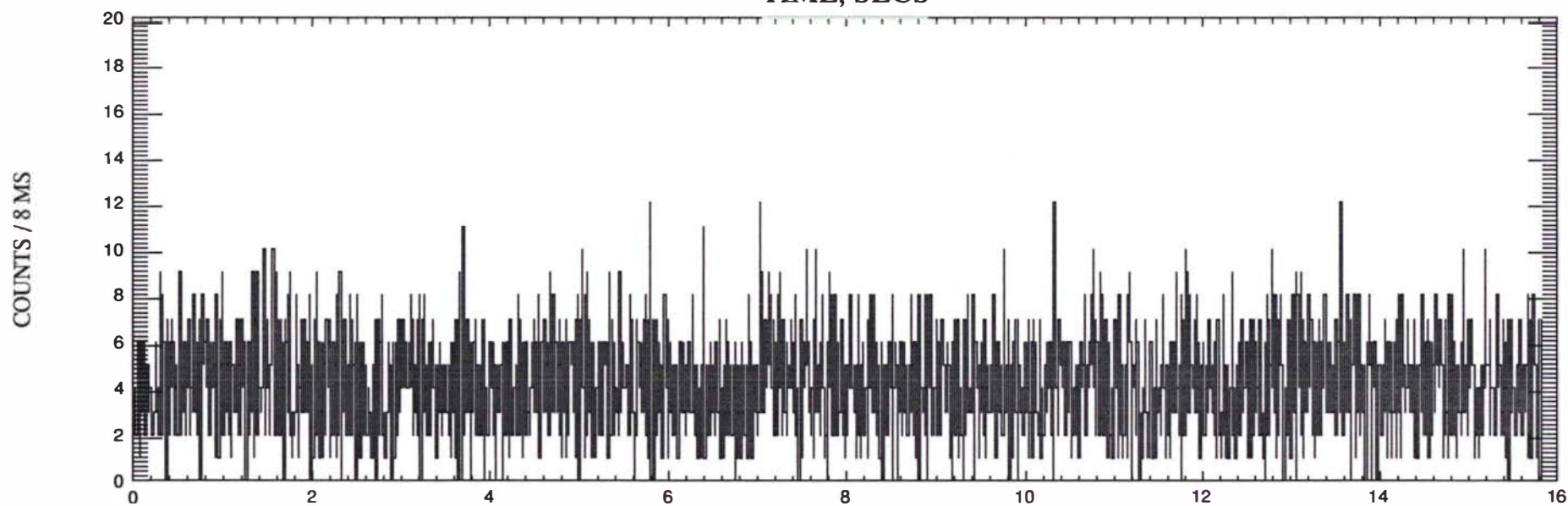
Burst Counter 15 at UT=14.589318474664 h=52521.547 s 14:35:21.547



Burst Counter 0 at UT=15.779900067647 h=56807.640 s 15:46:47.640

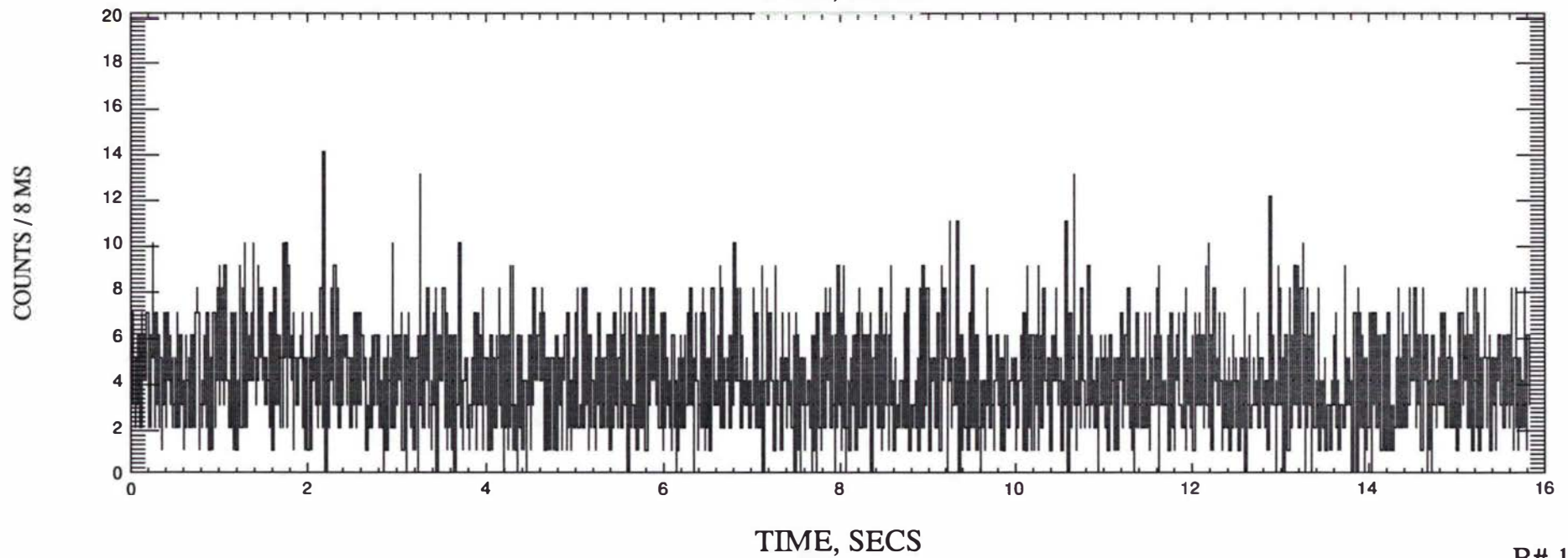
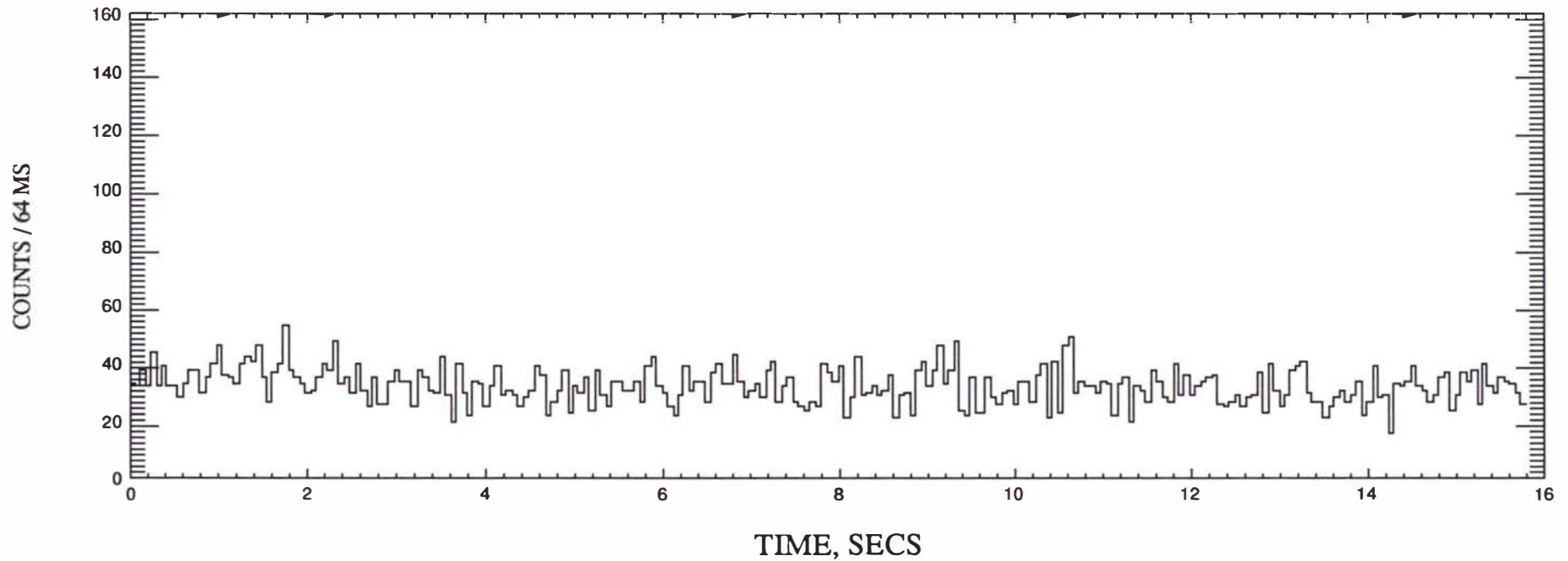


TIME, SECS

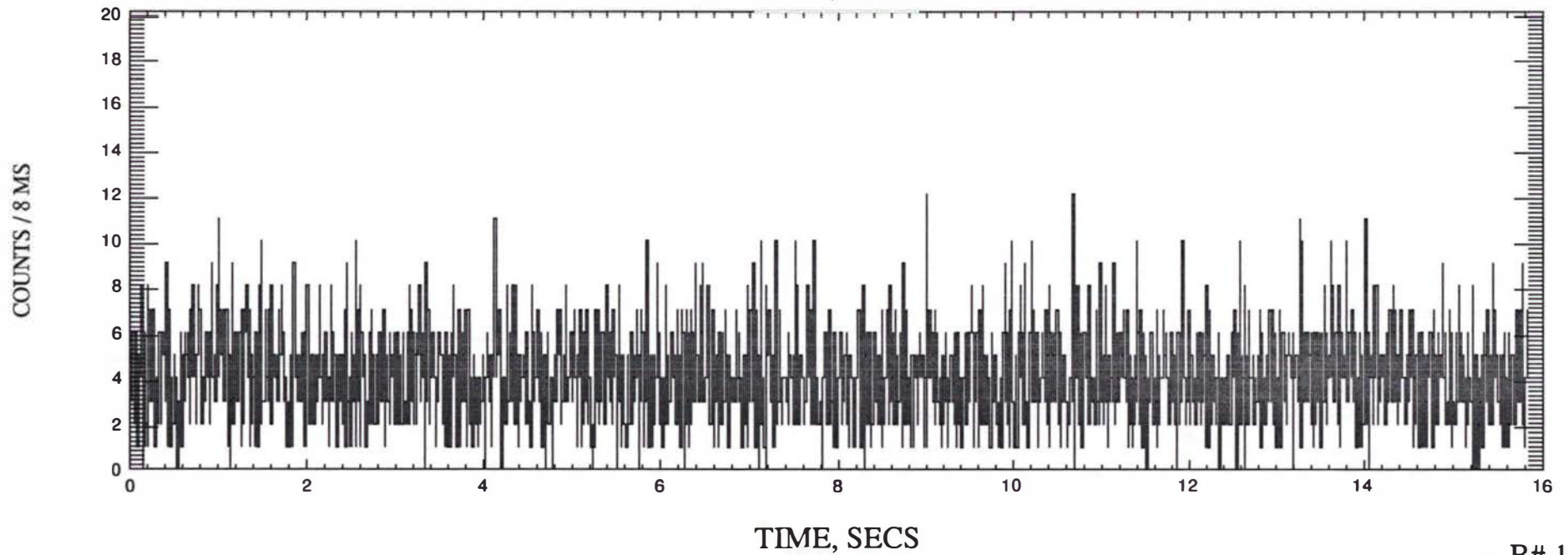
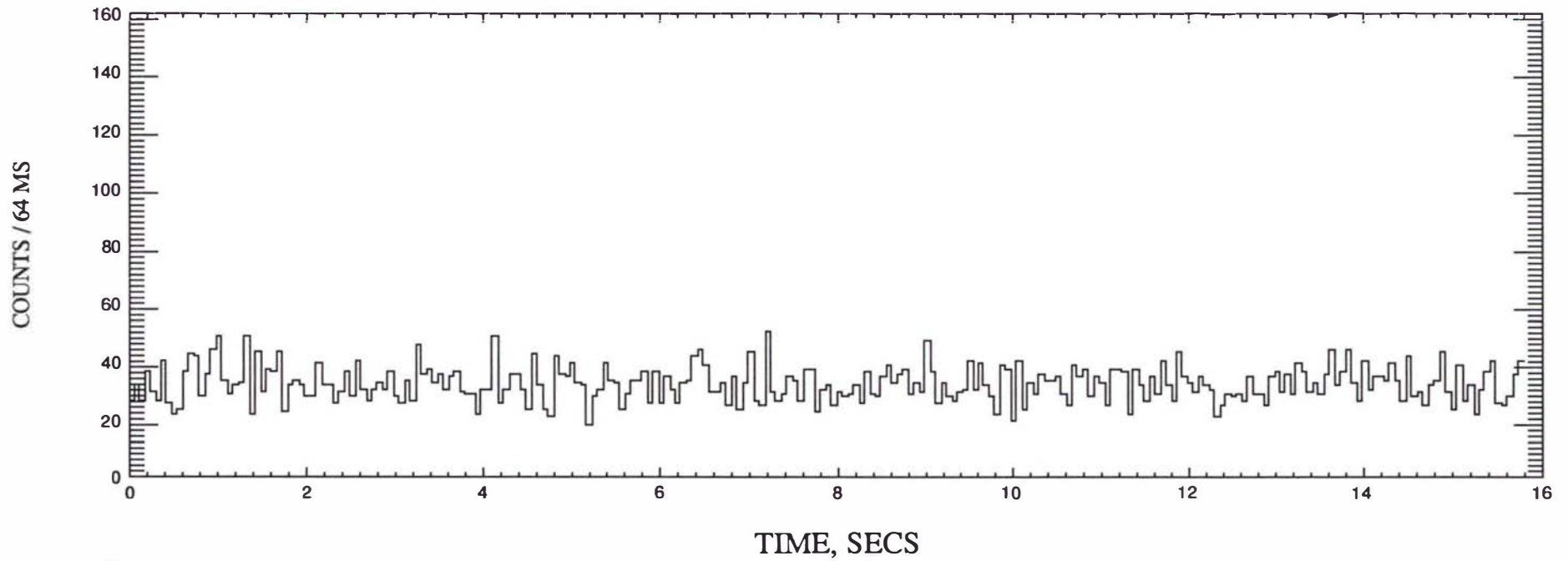


TIME, SECS

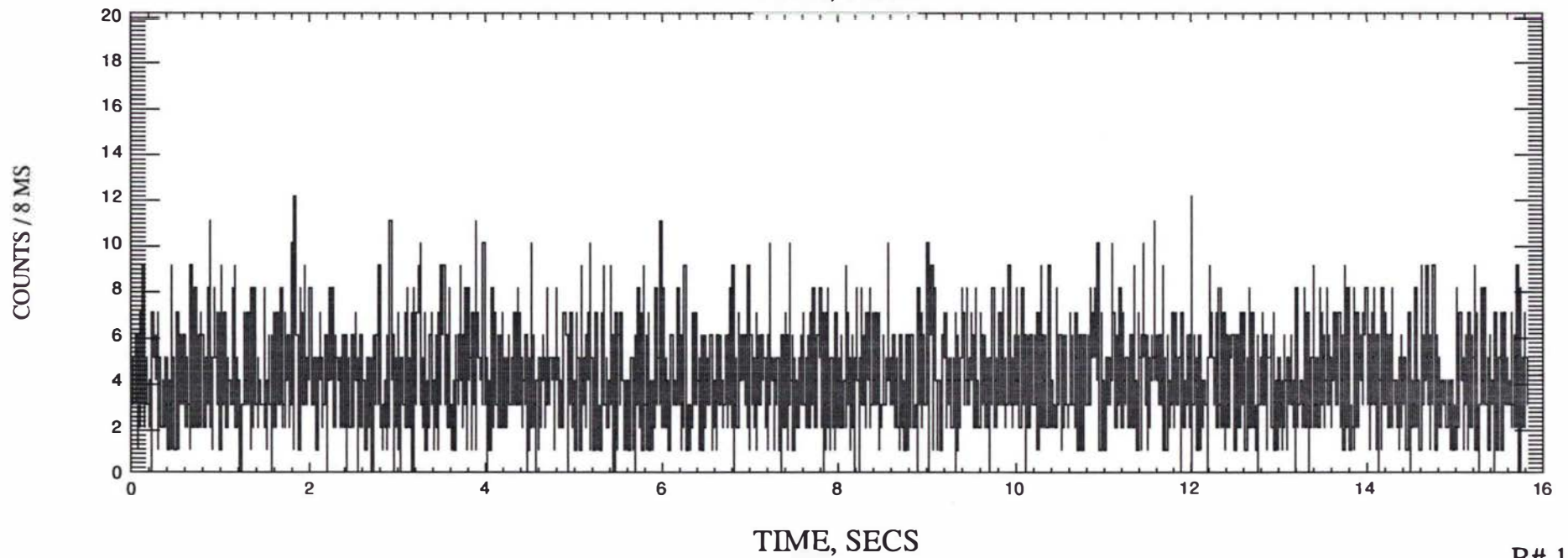
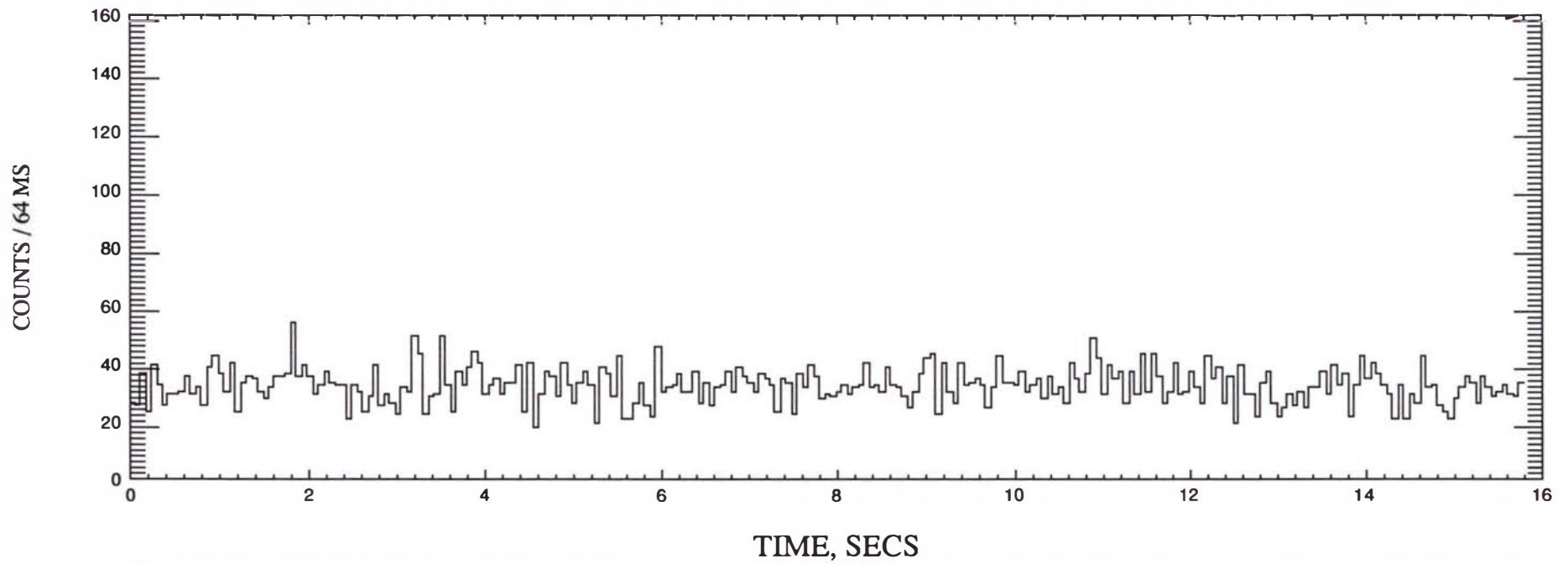
Burst Counter 1 at UT=16.620180189345 h=59832.649 s 16:37:12.649



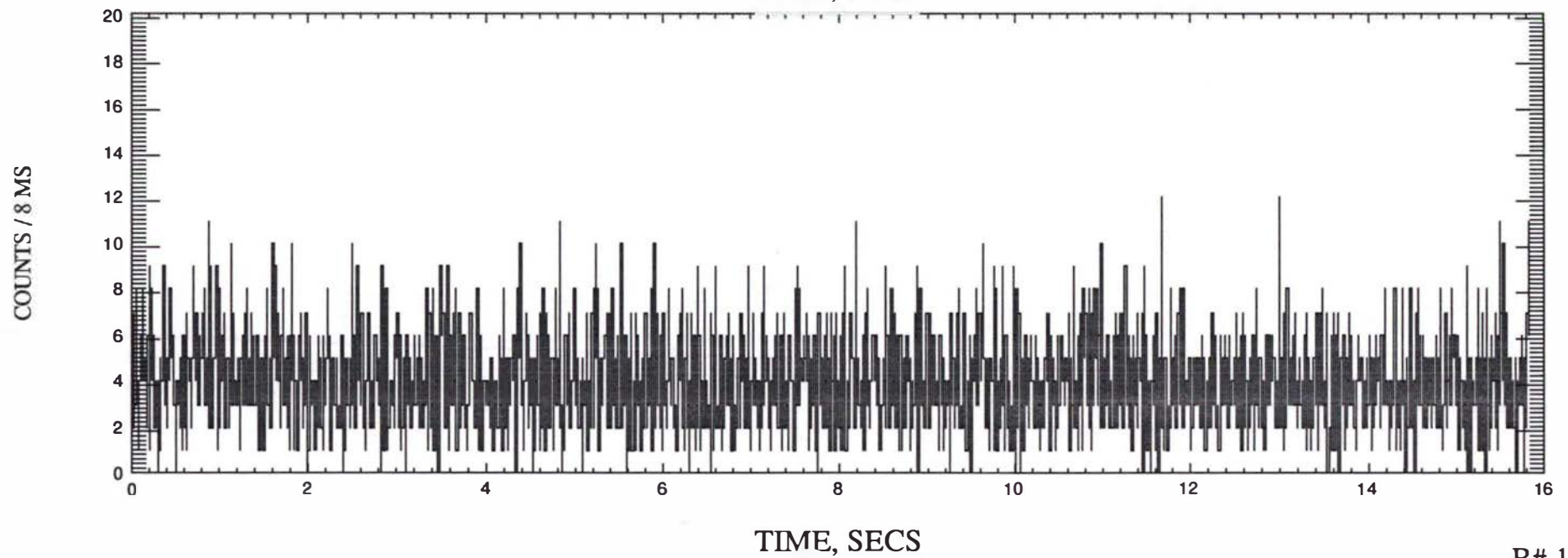
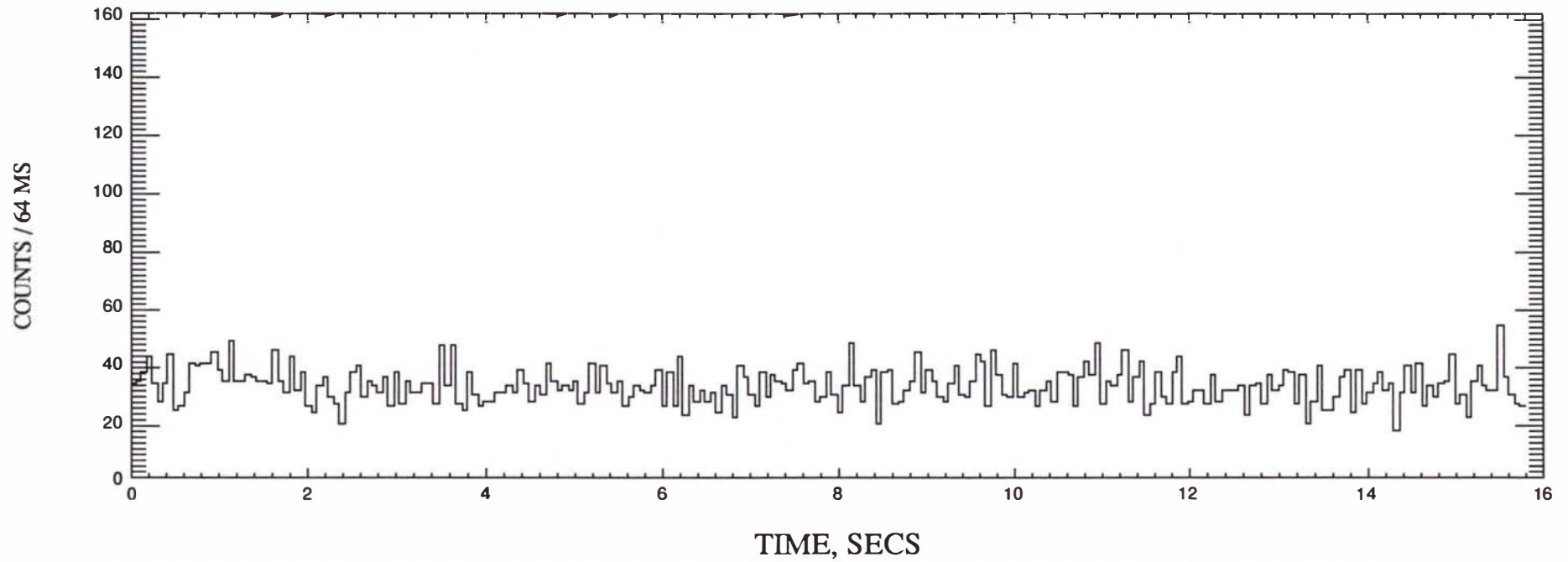
Burst Counter 2 at UT=17.496319690280 h=62986.751 s 17:29:46.751



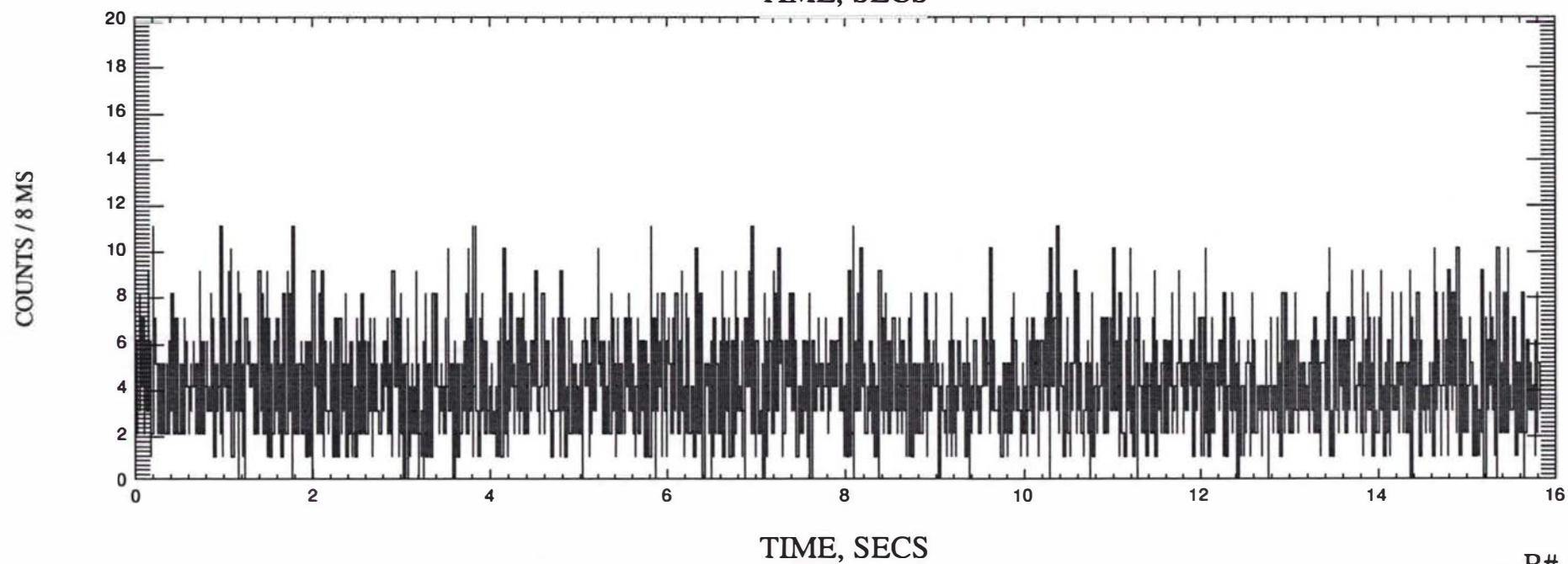
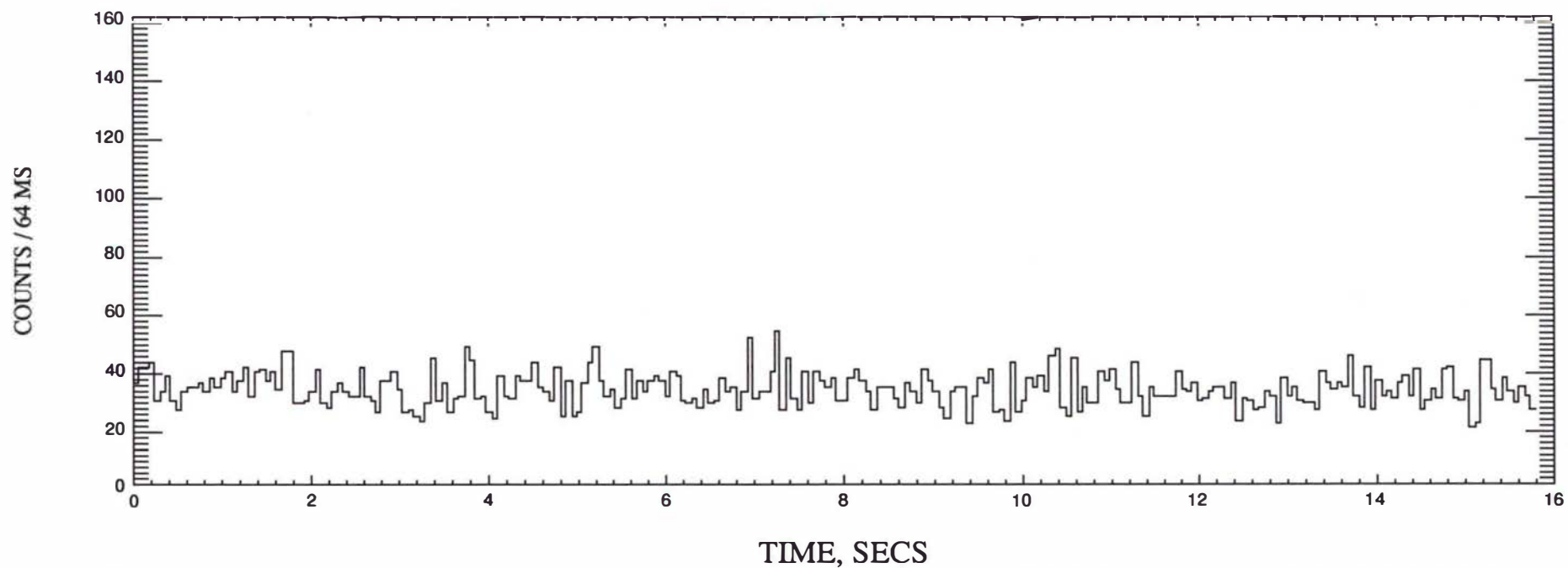
Burst Counter 3 at UT=18.917732688056 h=68103.838 s 18:55:03.838



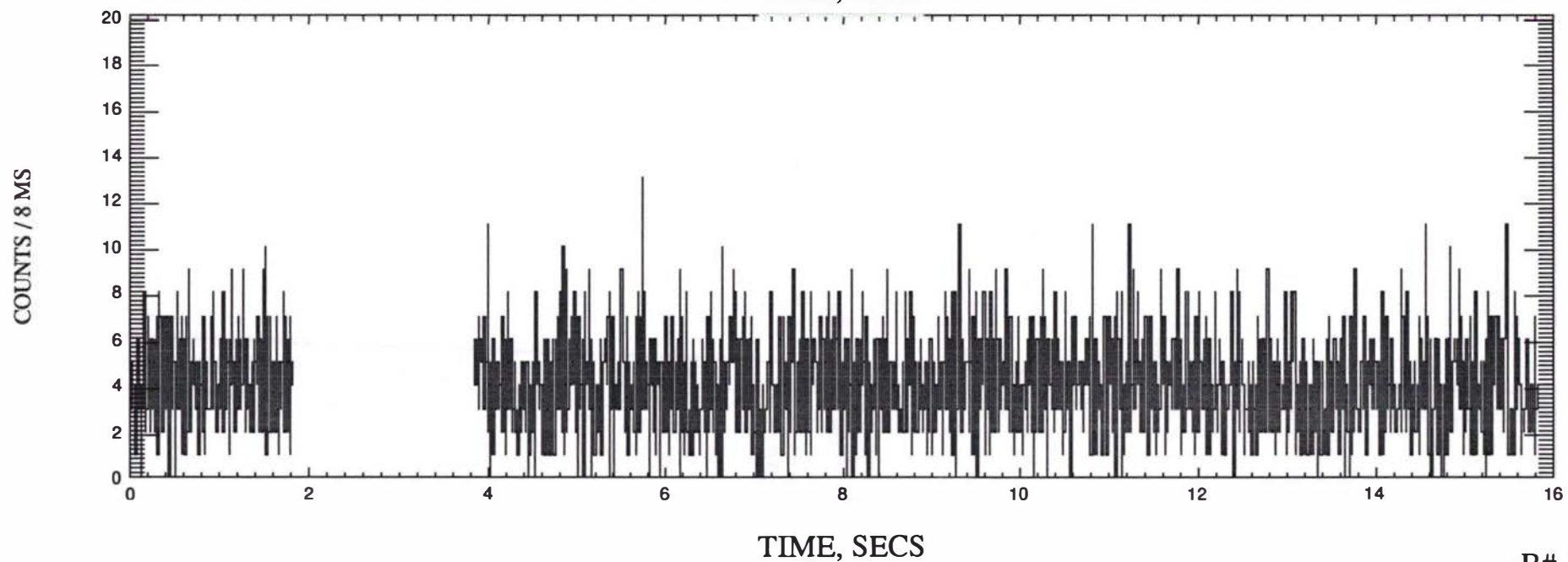
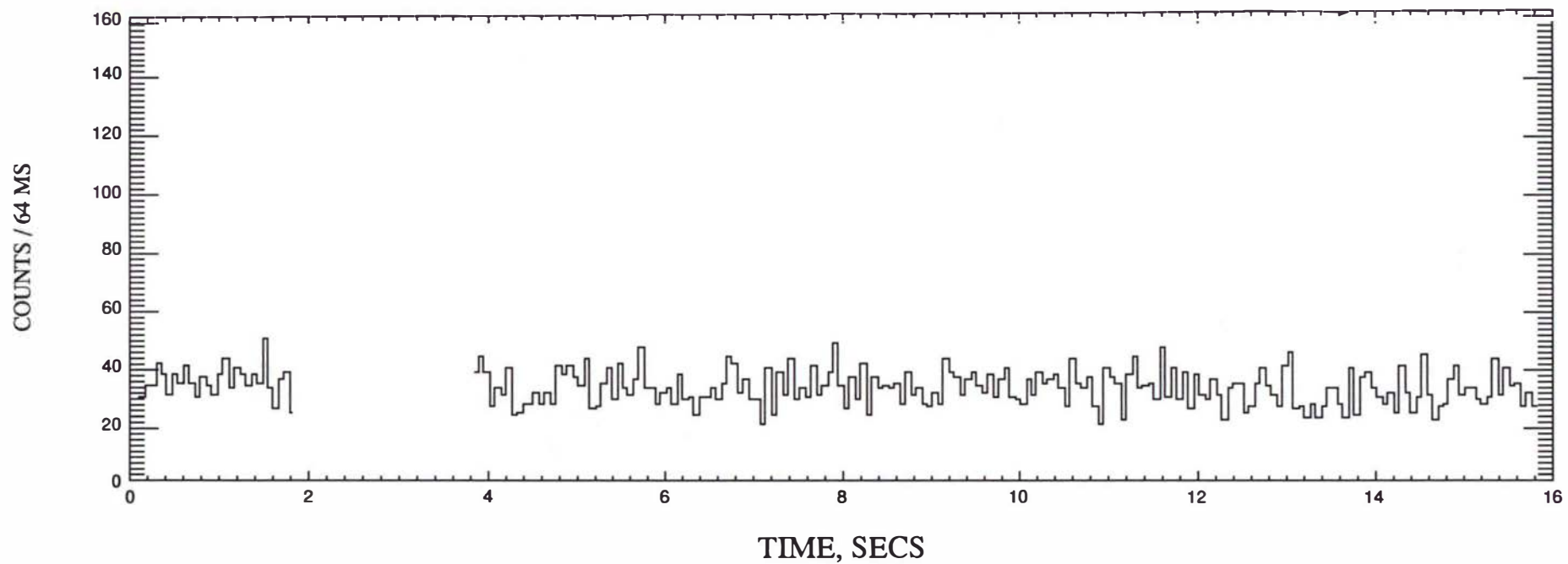
Burst Counter 4 at UT=20.197467922635 h=72710.885 s 20:11:50.885



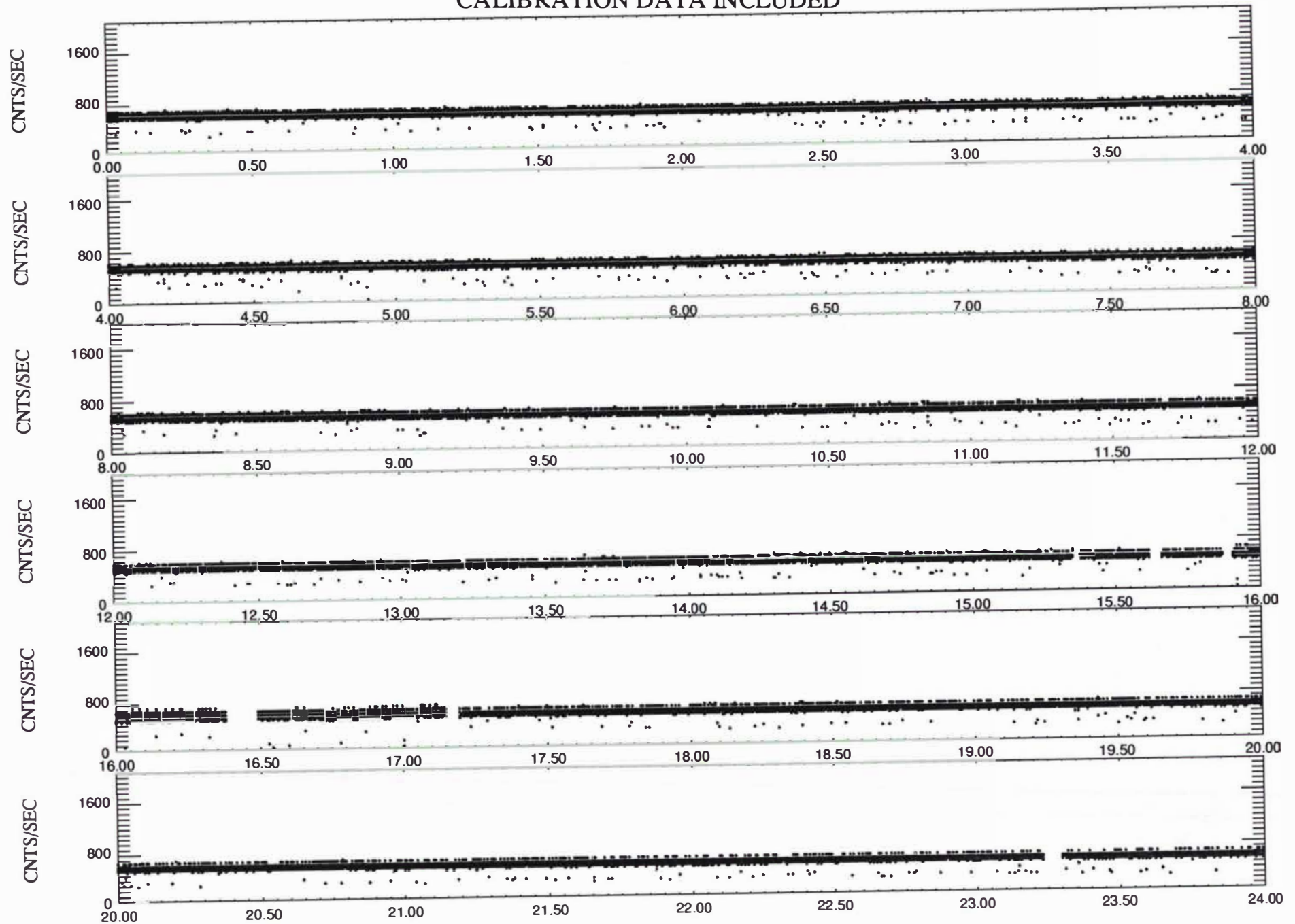
Burst Counter 5 at UT=21.519991789924 h=77471.970 s 21:31:11.970



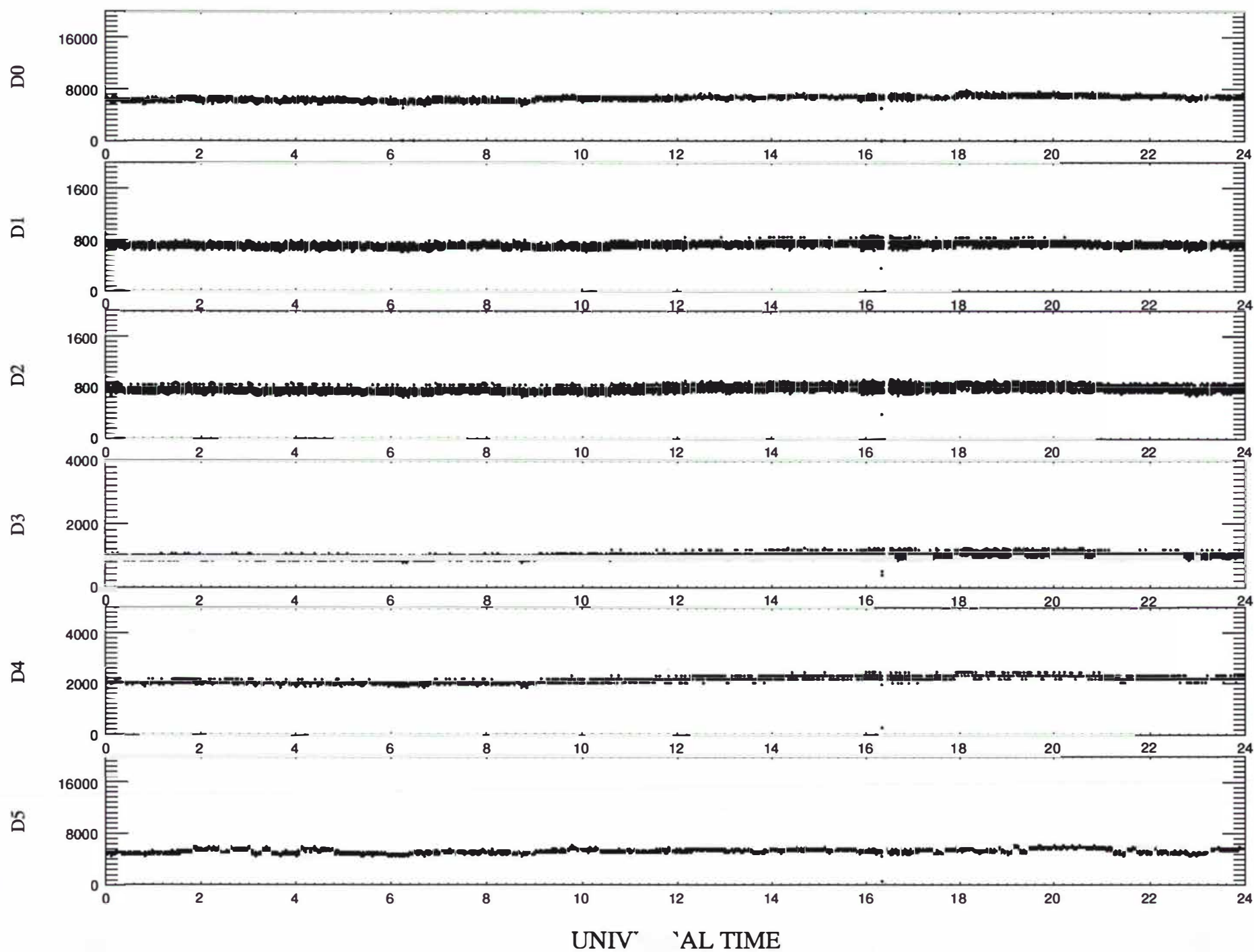
Burst Counter 6 at UT=22.967244631449 h=82682.081 s 22:58:02.081



CALIBRATION DATA INCLUDED



UNIV. TIME



From springer@pop.jpl.nasa.gov Mon Dec 9 06:37 PST 1996
From: Joe Springer <springer@pop.jpl.nasa.gov>
To: "'Kevin Hurley'" <khurley@sunspot.ssl.berkeley.edu>
Subject: RE: More times to check
Date: Mon, 9 Dec 1996 06:37:26 -0800
MIME-Version: 1.0
Content-Transfer-Encoding: 7bit

Kevin,

I checked a range ten minutes before to ten minutes after each of these points and found no timing errors.

How big is the 'big list'? You have previously provided one with 575 events. I shudder.

Joe

From: Kevin Hurley
Sent: Friday, December 06, 1996 5:53 PM
To: Joe.B.Springer@jpl.nasa.gov; khurley@sunspot.ssl.berkeley.edu
Cc: khurley@sunspot.ssl.berkeley.edu
Subject: More times to check

Dear Joe,

Before I hit you with the big list of events to check, I wanted to ask if you could check the following times. We are again writing paper on these, and need to get this straightened out quickly (i.e. within a couple of weeks).

Thanks

Kevin

Date UT (secs)

January 22 1991 55142
February 19 1991 42204
April 21 1991 34040
April 30 1991 60428
May 07 1991 53768
May 11 1991 08090
May 22 1991 43556
June 19 1991 55254
June 27 1991 15335
July 17 1991 17265
July 18 1991 09076
August 14 1991 70996
October 05 1991 26852
October 16 1991 41542
October 31 1991 35550
November 04 1991 52695
November 09 1991 11321
November 18 1991 66112
November 26 1991 43717
December 02 1991 71640
February 18 1992 68388
February 20 1992 49020

February 26 1992 30348
March 08 1992 17470
March 11 1992 07038
March 20 1992 45256
March 25 1992 64261
March 31 1992 66408
April 04 1992 49443
April 06 1992 11150
April 14 1992 84300
May 01 1992 75040
May 17 1992 10549
May 17 1992 50706
May 19 1991 60996
May 25 1992 14411
July 11 1992 58470
July 14 1992 46275
July 20 1992 09807
July 20 1992 18344
July 23 1992 73955

CATSEARCH PROGRAM

BATSE BURST # 160
EVENT OF 1991 MAY 7 DAY OF YEAR=127
EVENT CROSSING TIME AT BATSE : 52276. S. OR 14:31:15.8
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 299.500 -44.200
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 7/ 5/ 91 IS:
RA= 118.160 DEC= 22.545 DIST= 3.129 AU
BATSE-ULYSSES DISTANCE = 468104384. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 21.68 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 1450.95 SECS.
CROSSING TIME AT ULYSSES IS 53727. S. OR 14:55:26 +/- 172.19 SECONDS

RI

Helio corr removed

Date: March 28 1997

BURST TRIANGULATION CHECKLIST

1. Ulysses Data

- ☒ Jim Schmidling's stat file correction applied?
- ☒ Final ephemeris used?
- ☒ Final, CDROM data used?
- ☒ Were data checked by Joe Springer for 0.5 s errors?
- ☐ If a 2 spacecraft triangulation, was Ulysses time corrected for aberration?
- ☒ Is the order of the data in CORREL such that a vernier is done on the data with the best time resolution? *Not - burst*

2. BATSE Data

- ☒ 2.042 s subtracted for bursts prior to June 25 1992 and DISCSC programs prior to Version 2.16 (August 28 1992)?
- ☒ Does T_0 in data file agree with T_0 in plot?
- ☒ BATSE ephemeris for T_0 ?
- ☒ Error circle position and radius from public catalog used?
- ☐ If MER data were used, is a 30 ms systematic error included?

3. PVO Data

- ☒ Ephemeris of PVO used (not Venus)?
- ☒ 2000 coordinates used?
- ☒ Geocentric time used?

N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

G=GALACTIC EQUATOR

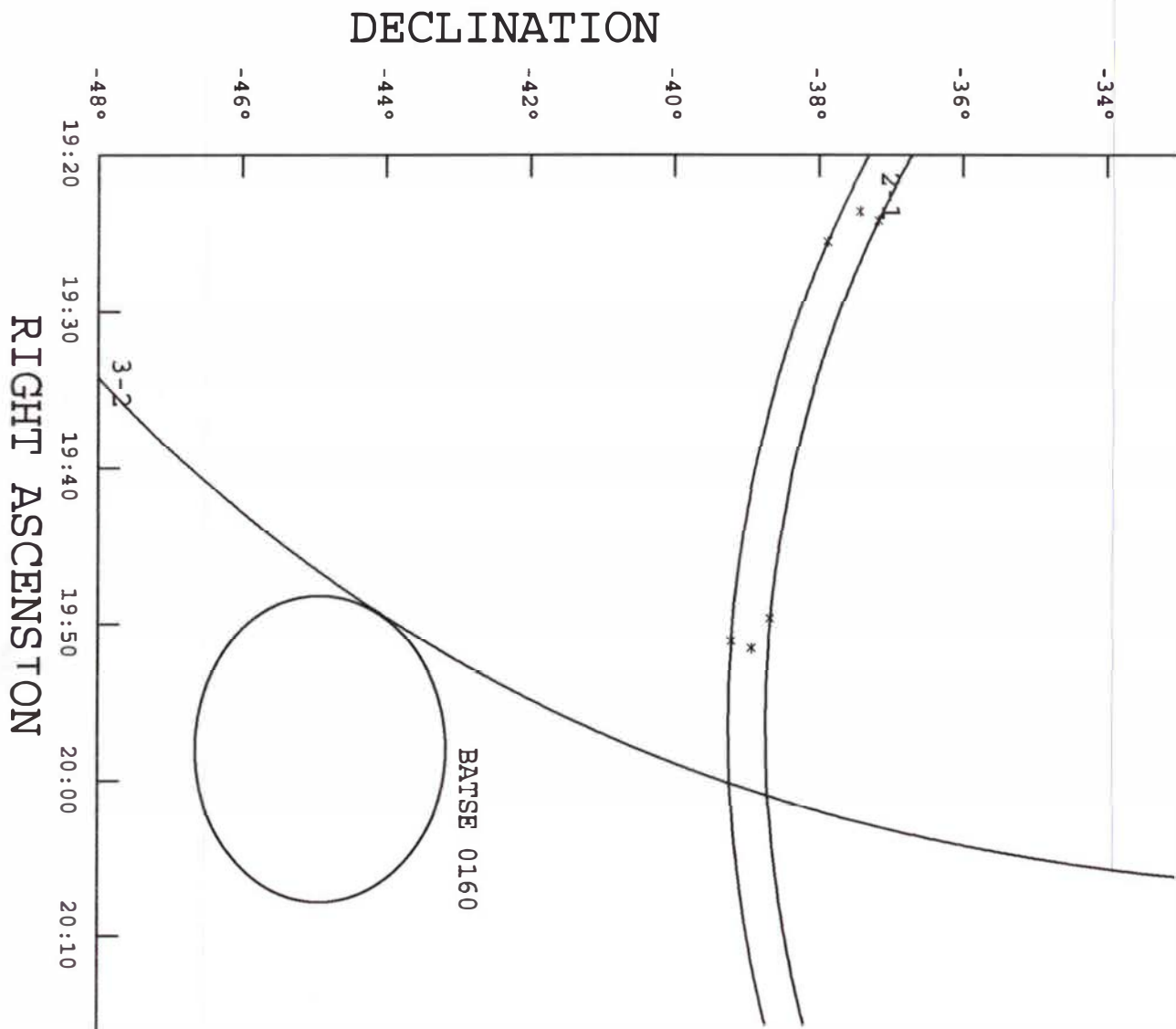
1 ULYSSES

2 BATSE

3 PVO

EVENT OF MAY 7, 1991 14:55

5 / 3/98



N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

G=GALACTIC EQUATOR

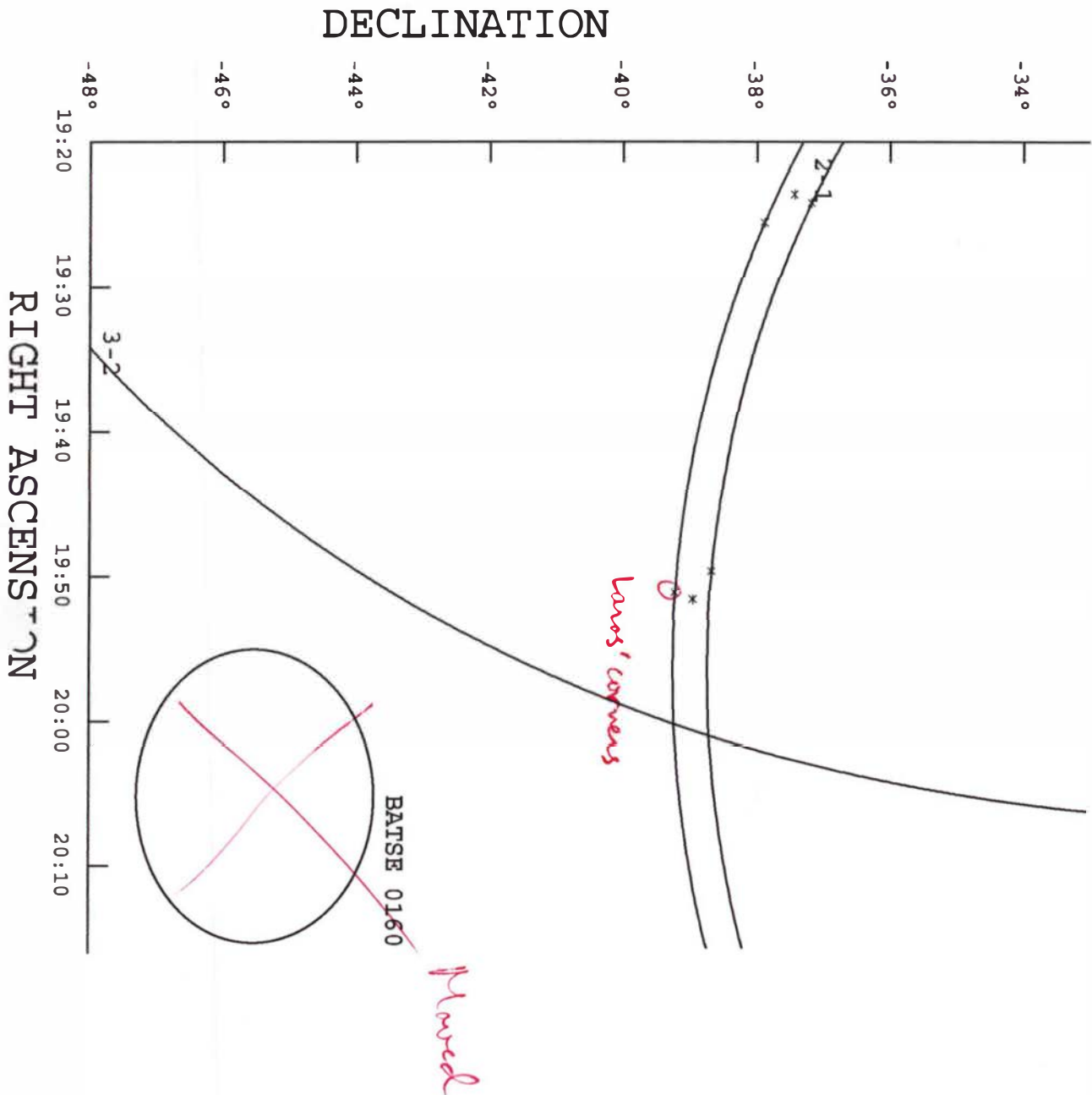
1 ULYSSES

2 BATSE

3 PVO

EVENT OF MAY 7, 1991 14:55

8/10/97



N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

G=GALACTIC EQUATOR

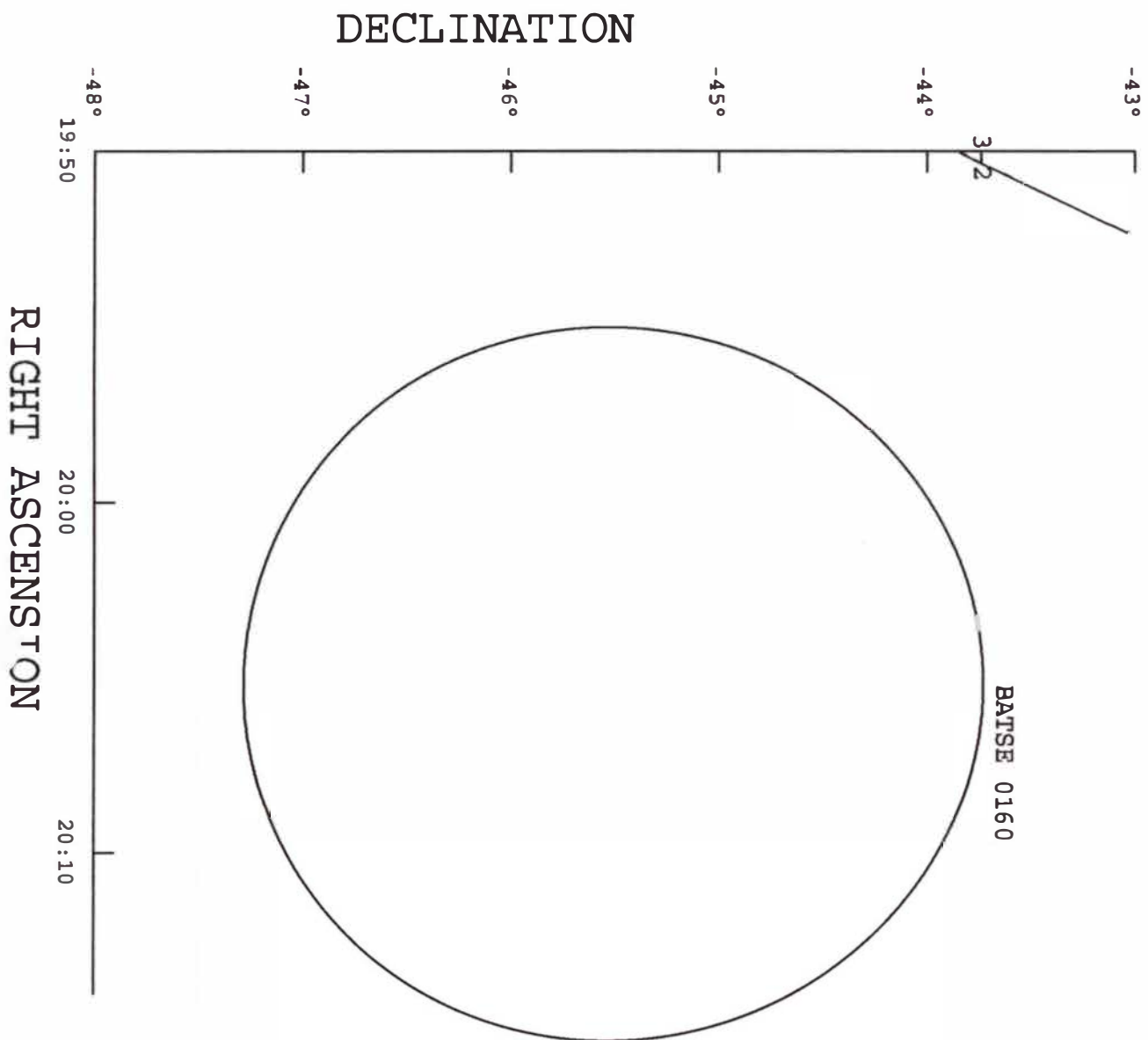
1 ULYSSES

2 BATSE

3 PVO

EVENT OF MAY 7, 1991 14:55

28/ 3/97

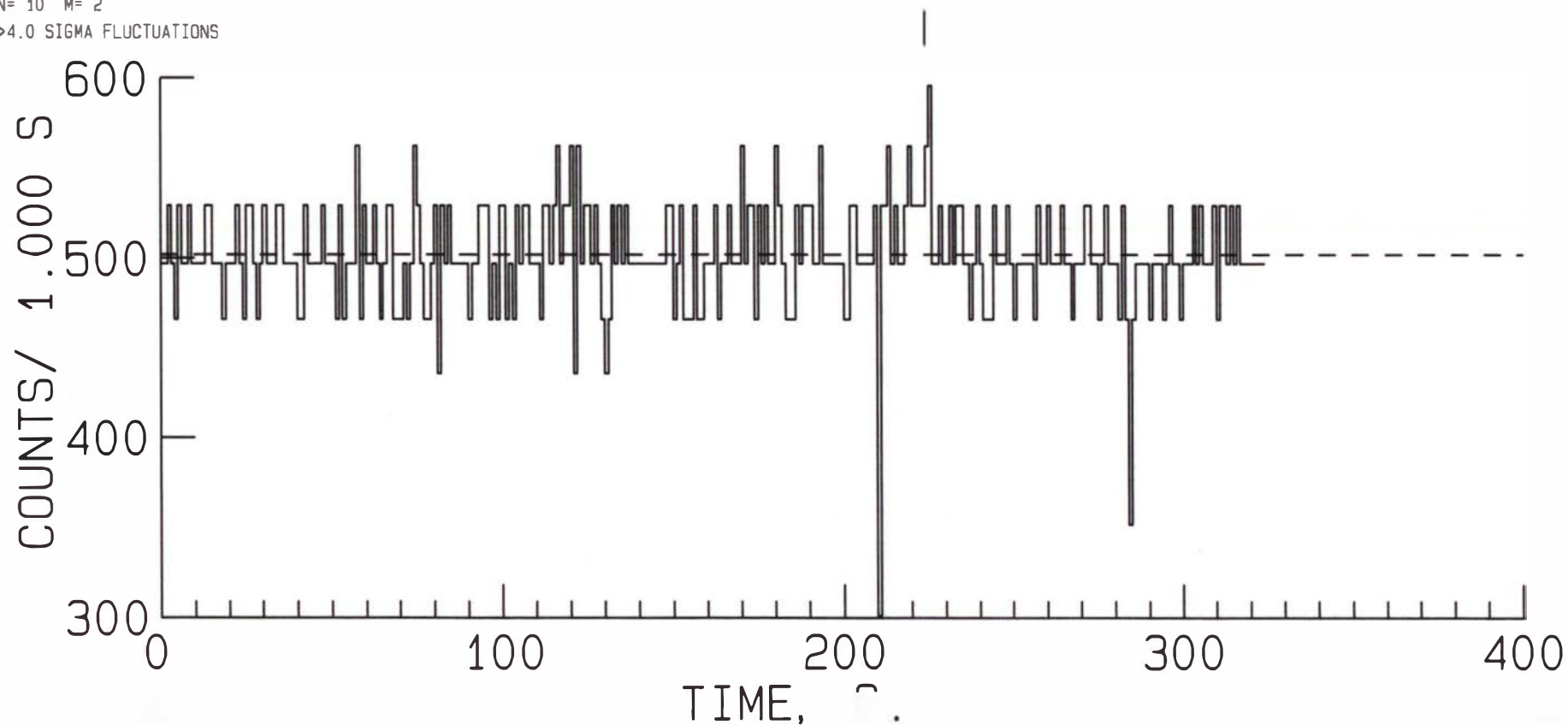


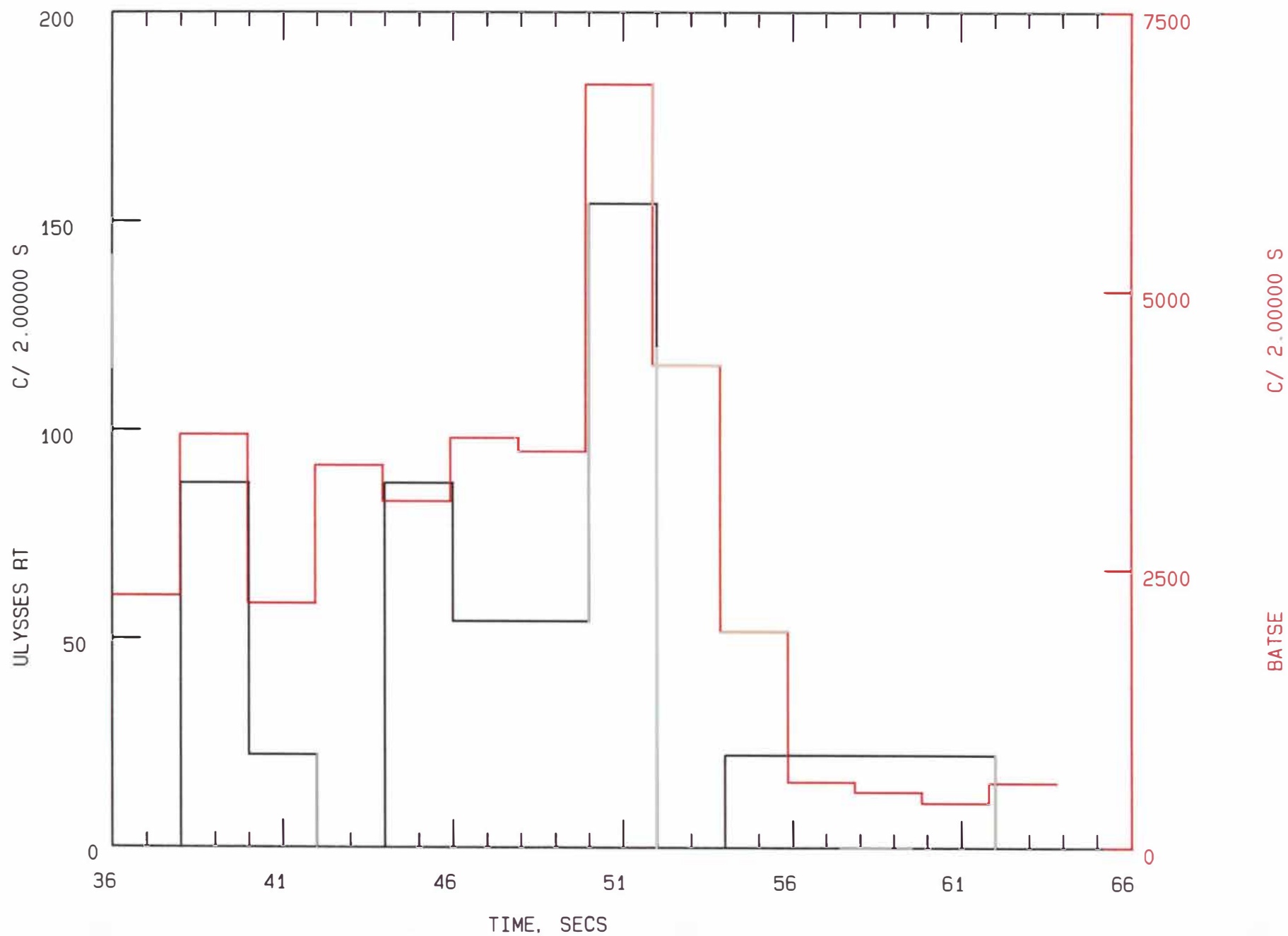
ULYSSES RT
7/ 5/91 53568.060 s
31- 224 keV

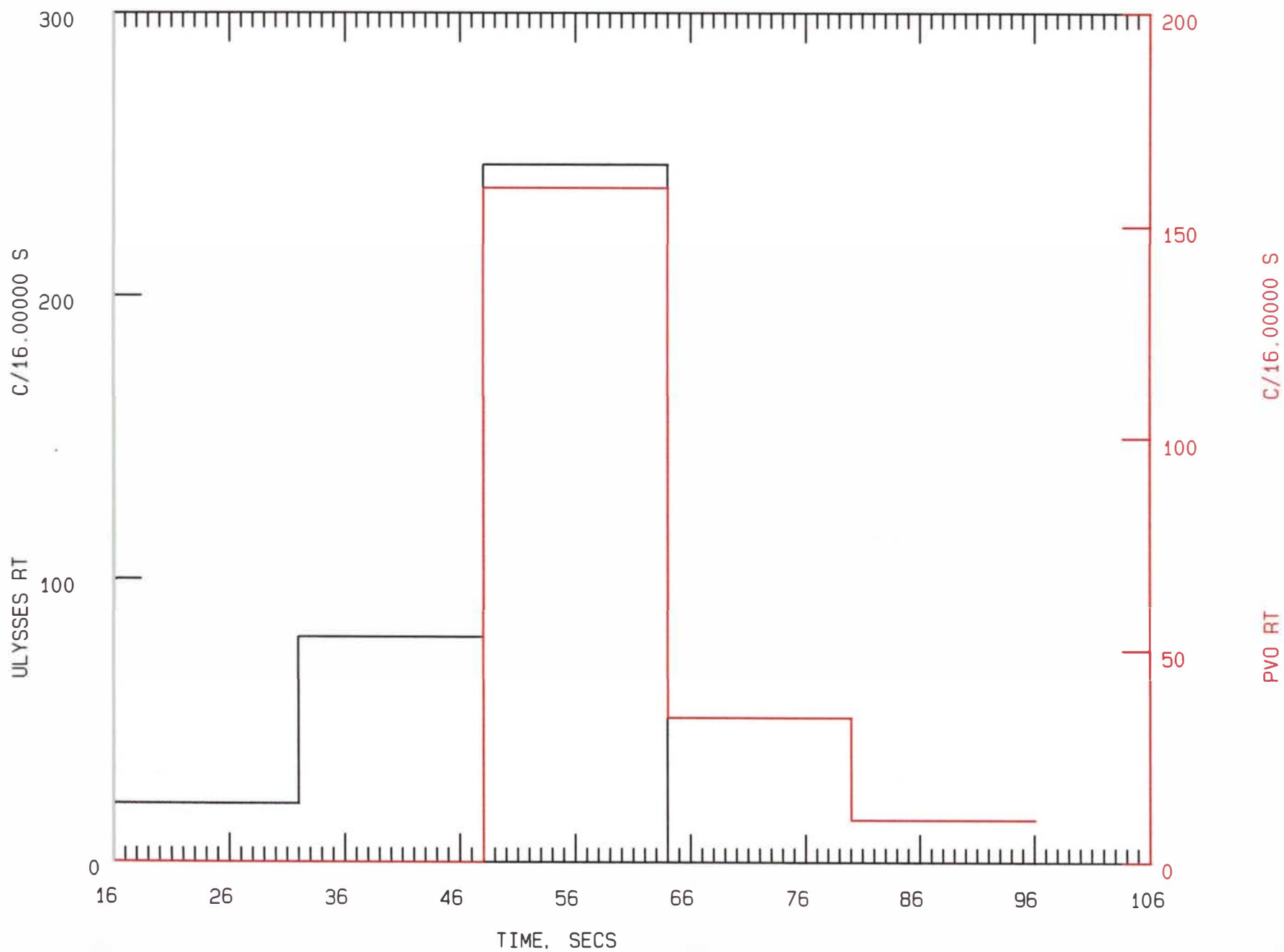
160

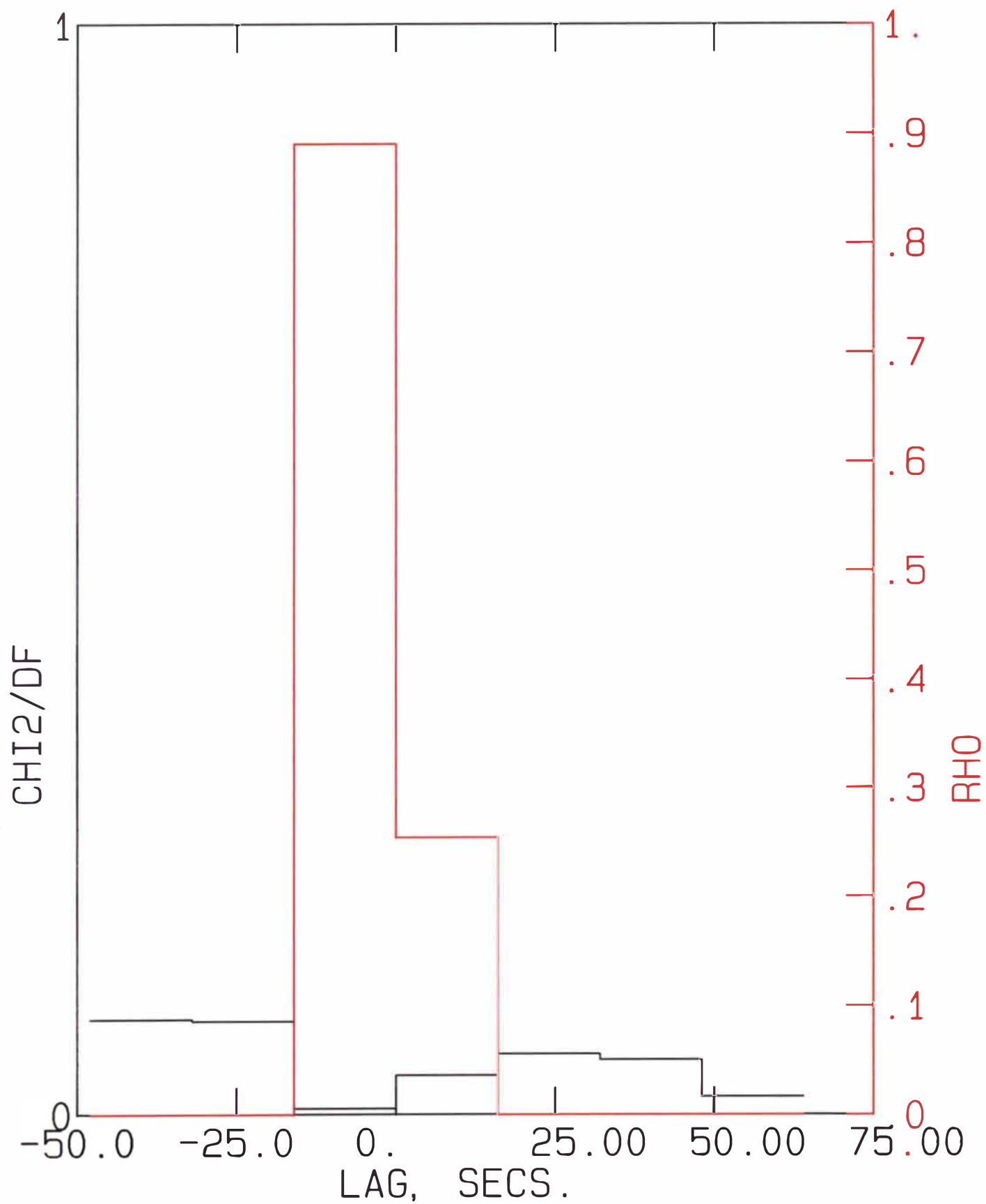
28 / 3 / 97

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS









BATSE

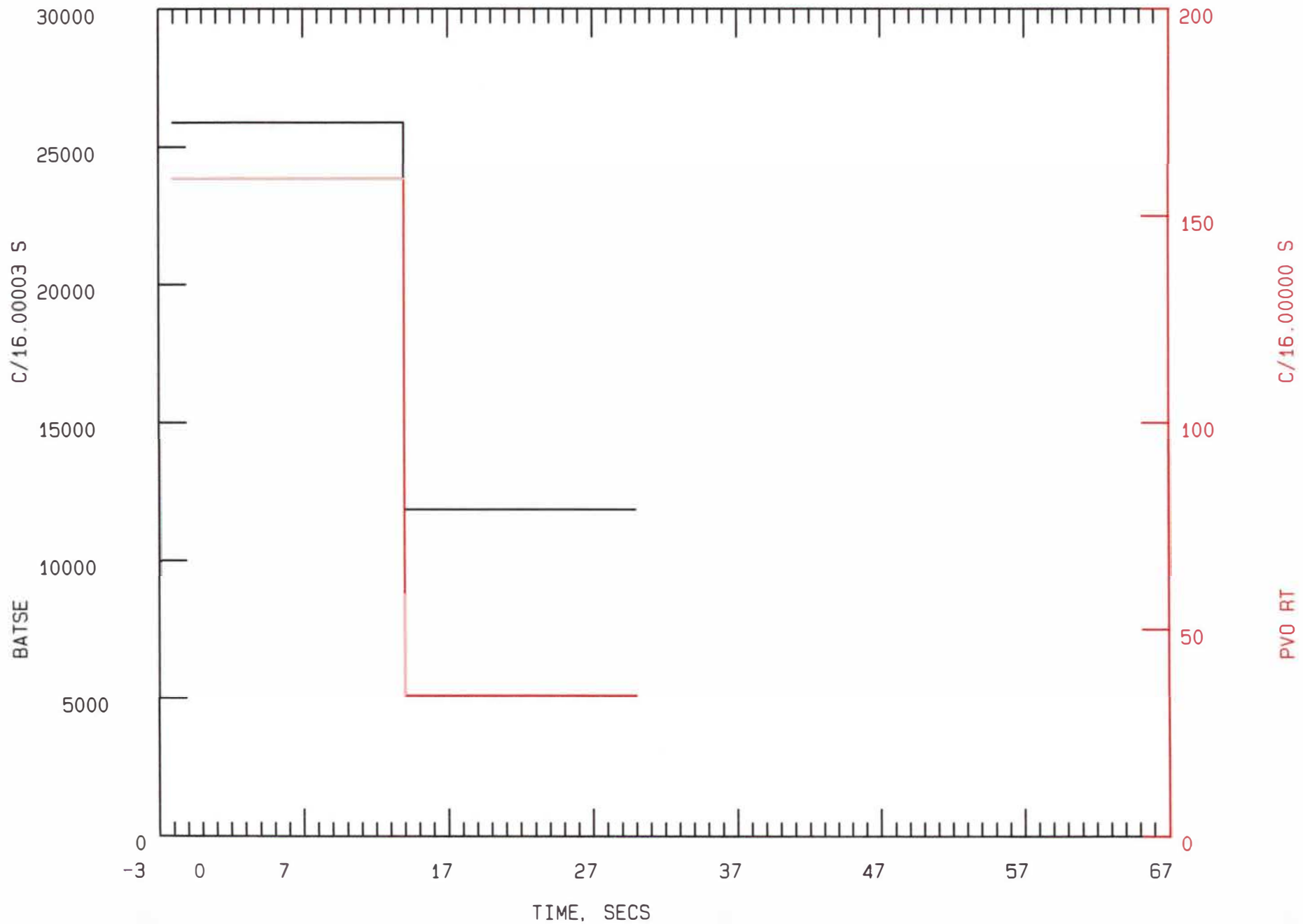
-PVO RT

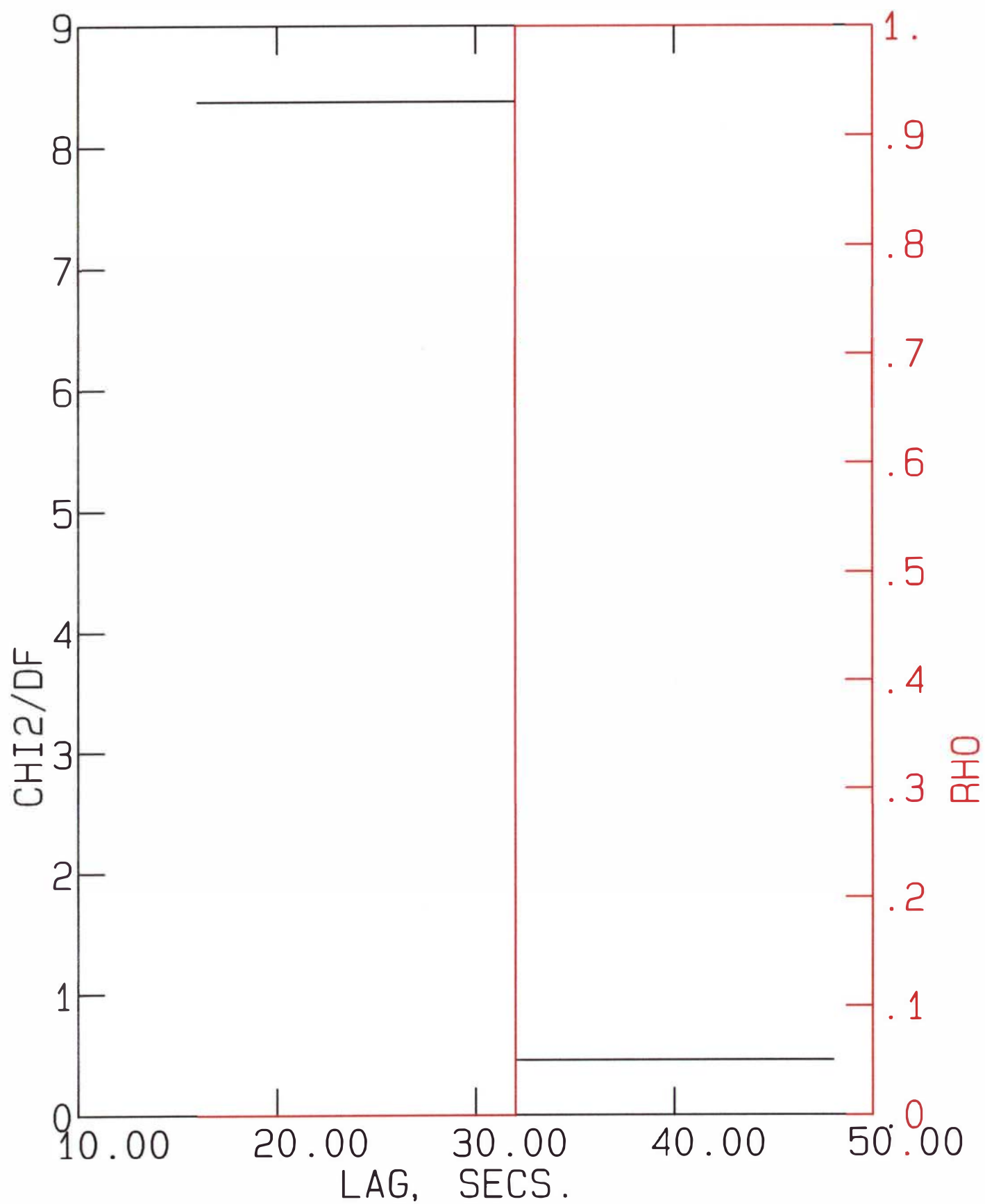
CORRELATION

7/ 5/91

52275.819

28/ 3/97





BATSE

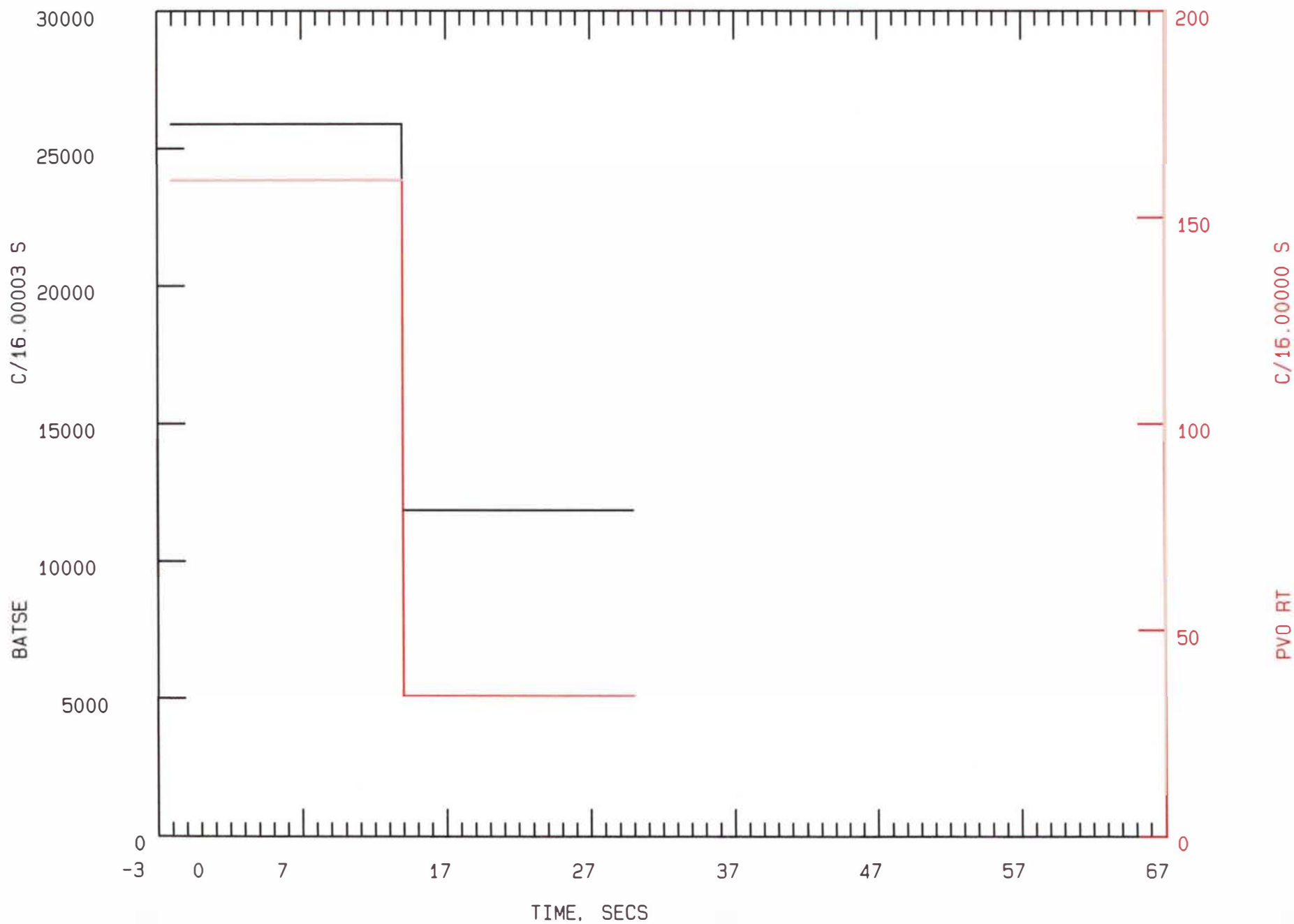
-PVO RT

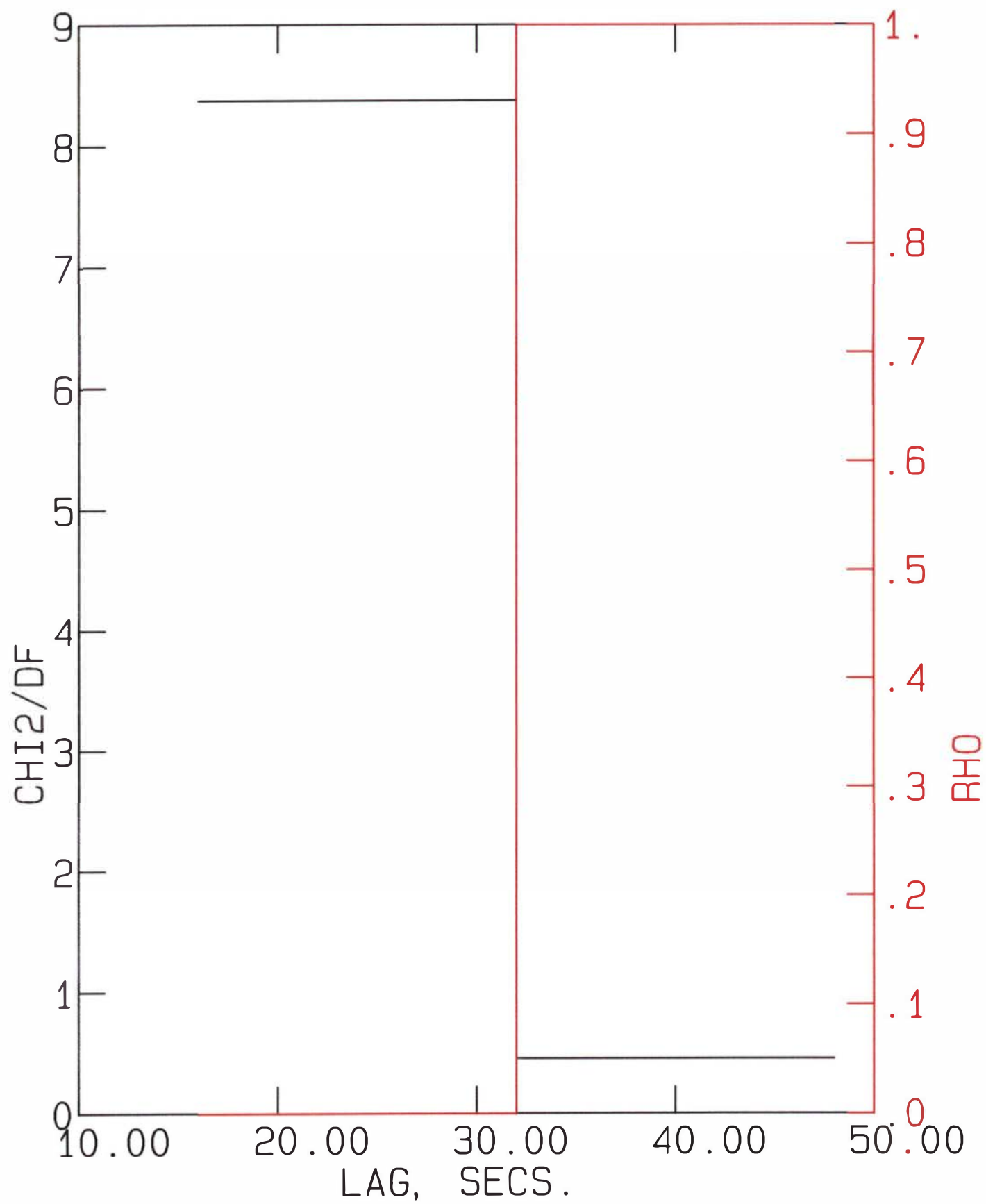
CORRELATION

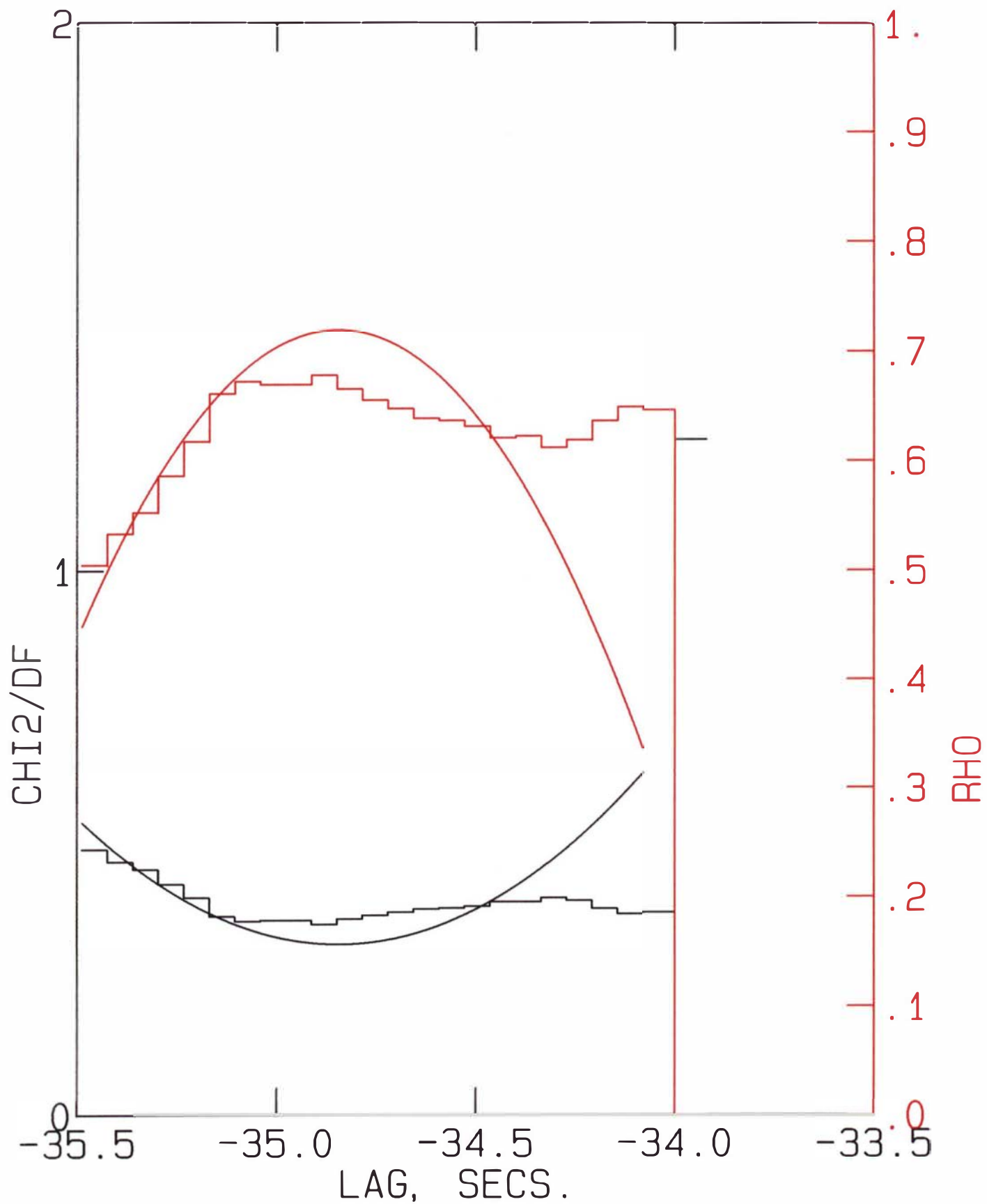
7/ 5/91

52275.819

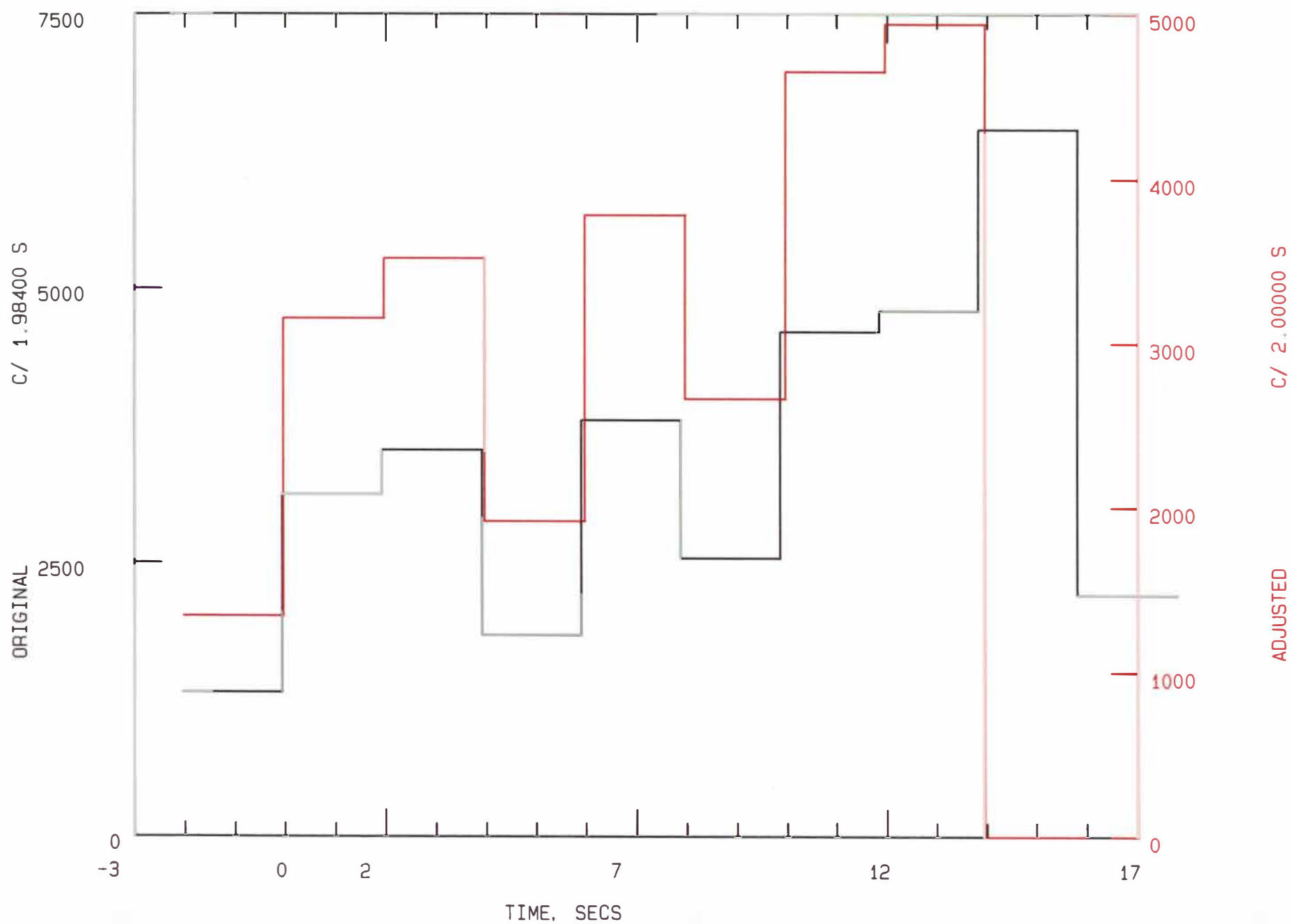
28/ 3/97







28/ 3/97



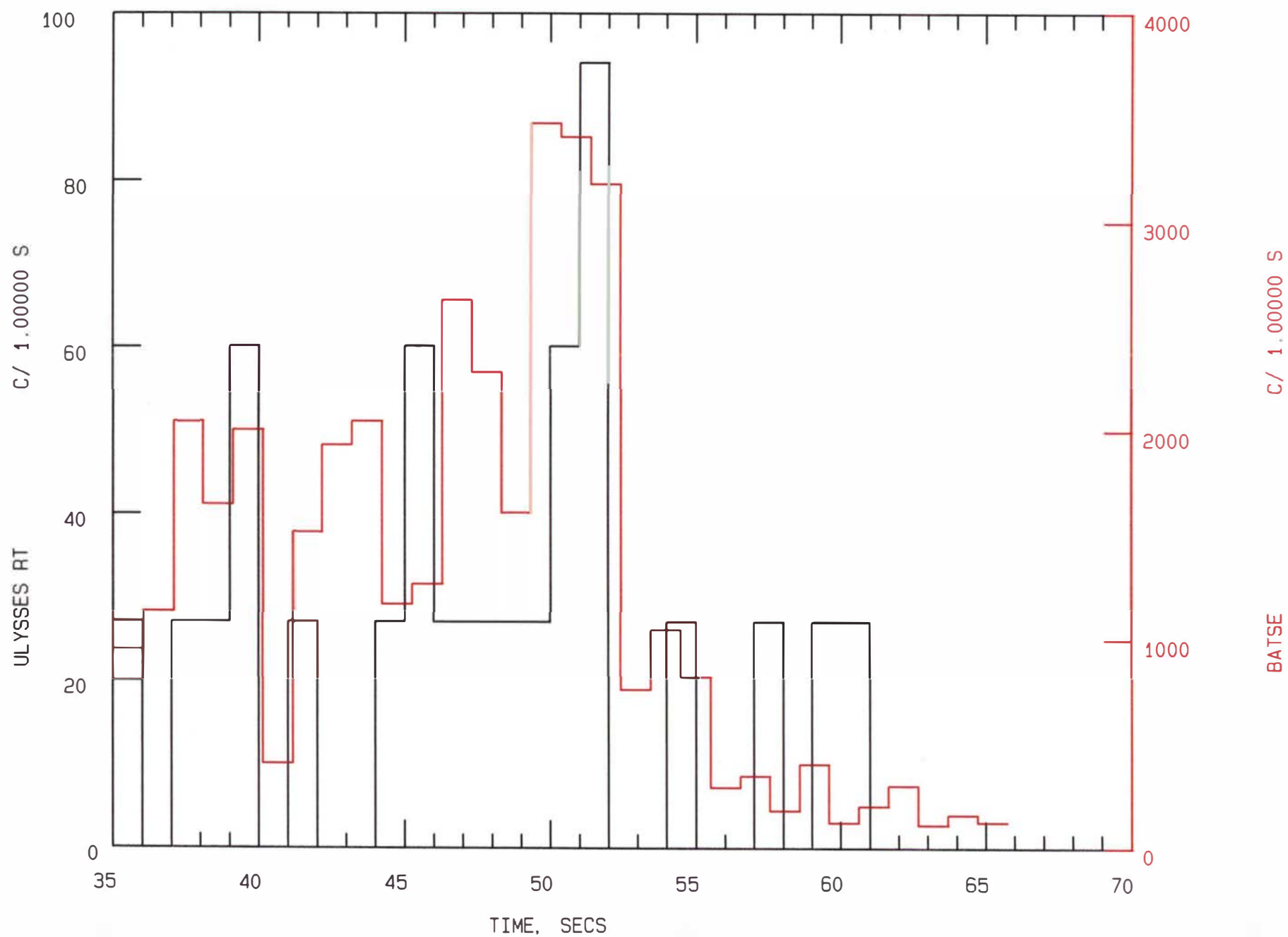
ULYSSES RT-BATSE

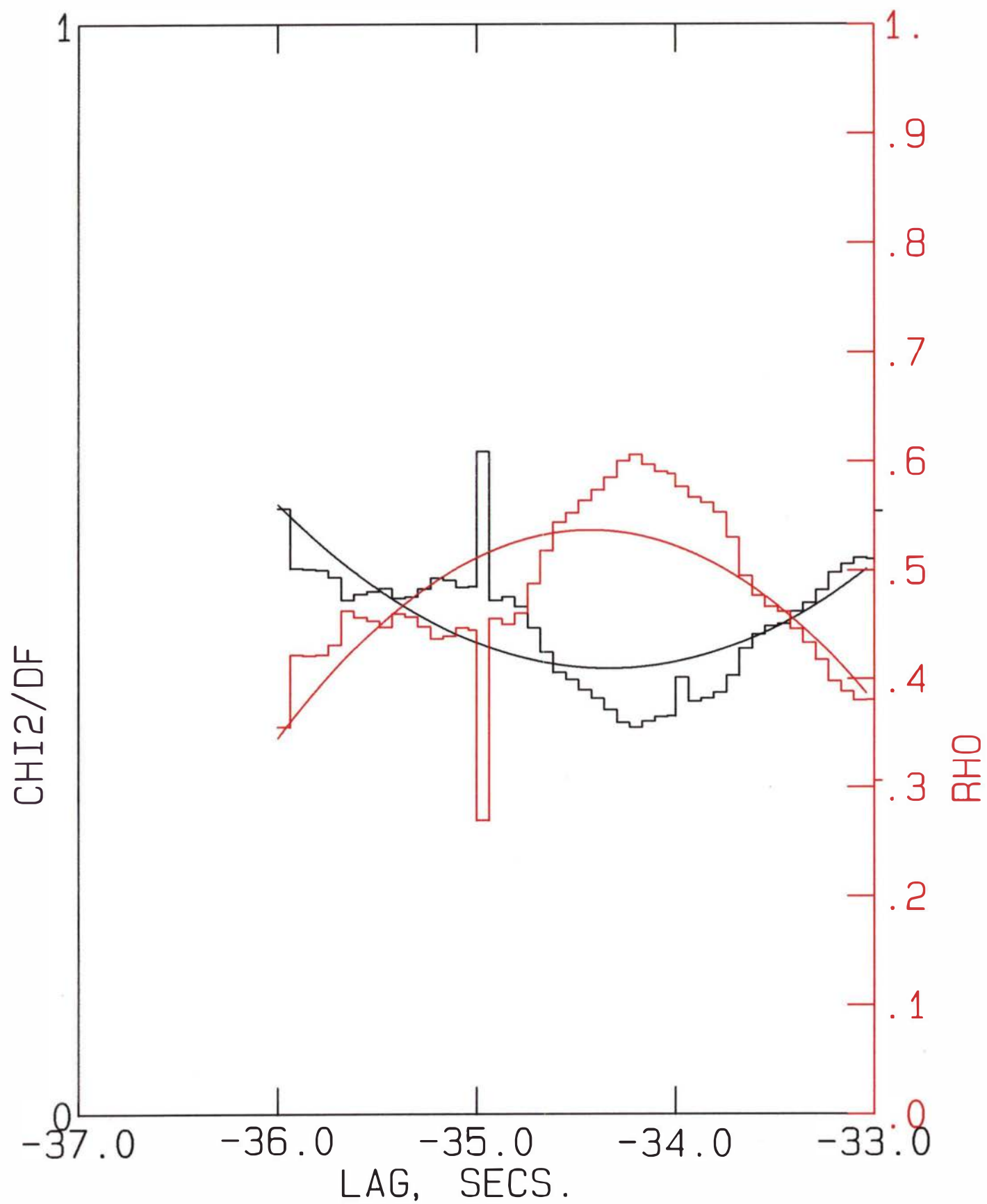
CORRELATION

7/ 5/91

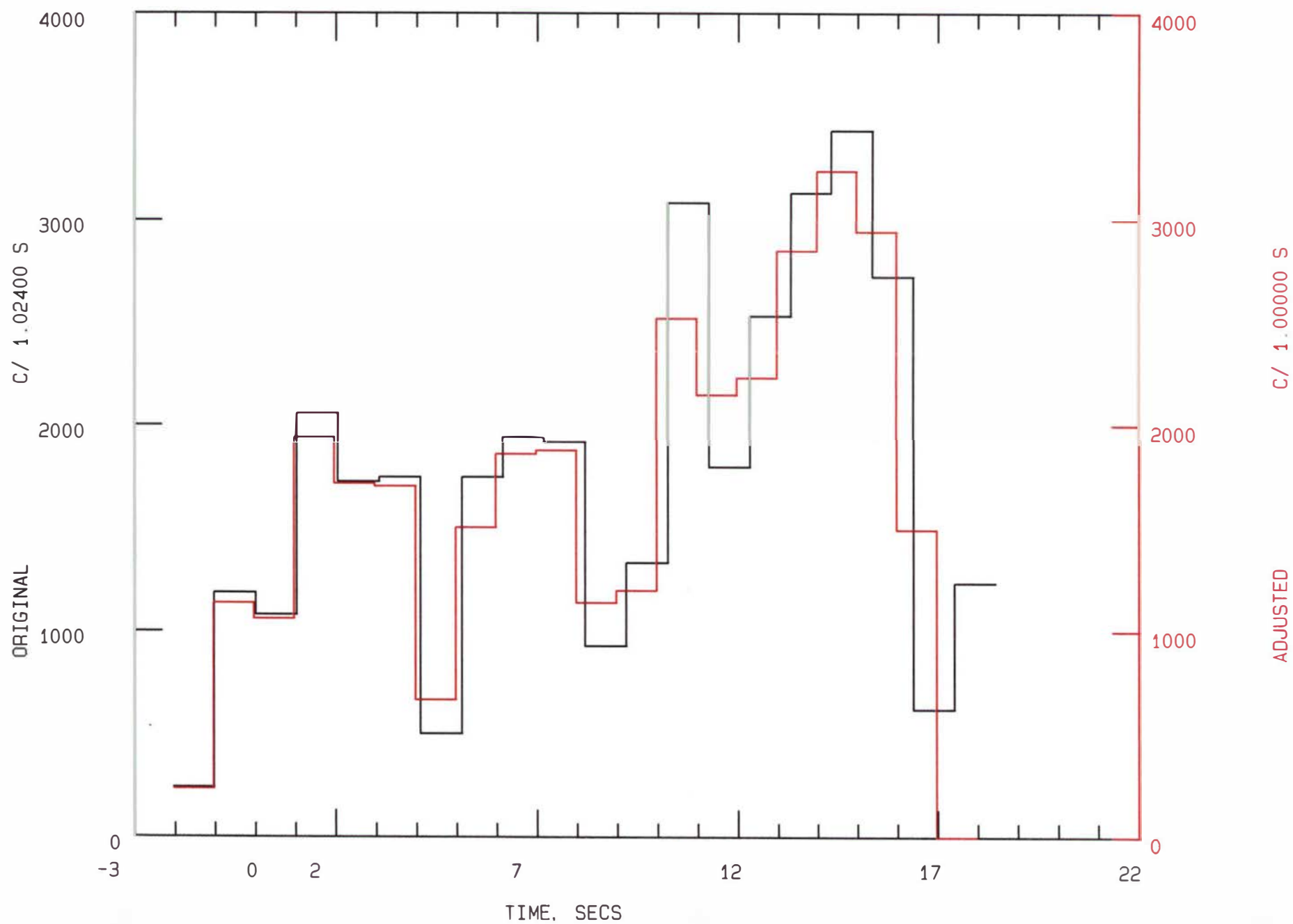
53742.021

28/ 3/97





28/ 3/97



PVO-RT

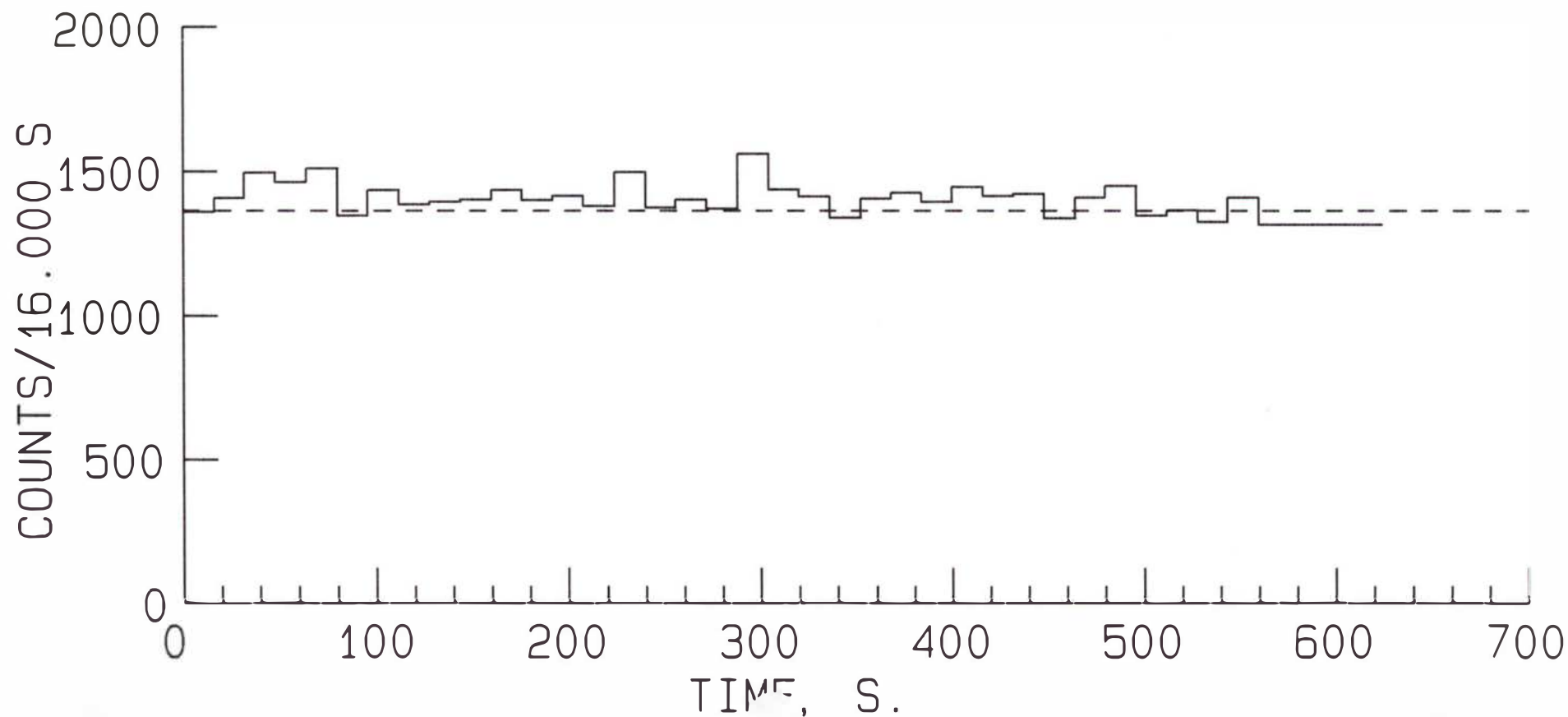
7 / 5 / 91

52439.385 s.

16.000 S. INTERVALS REGROUPED BY 1

100-2000 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



BATSE

07/05/91

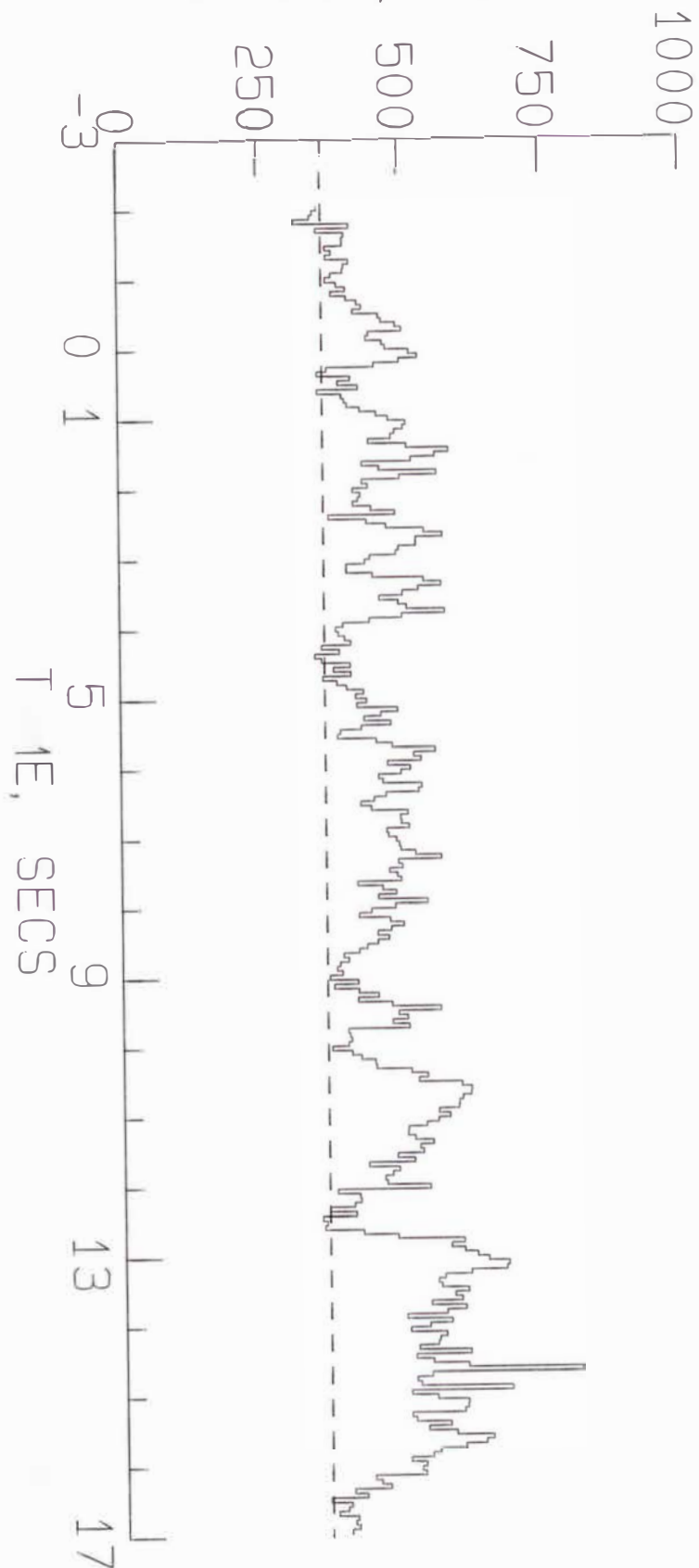
~~52275.819~~

25- 100 keV

~~52273.777~~

NO - OK as originally given

COUNTS/ .064 S



BATSE

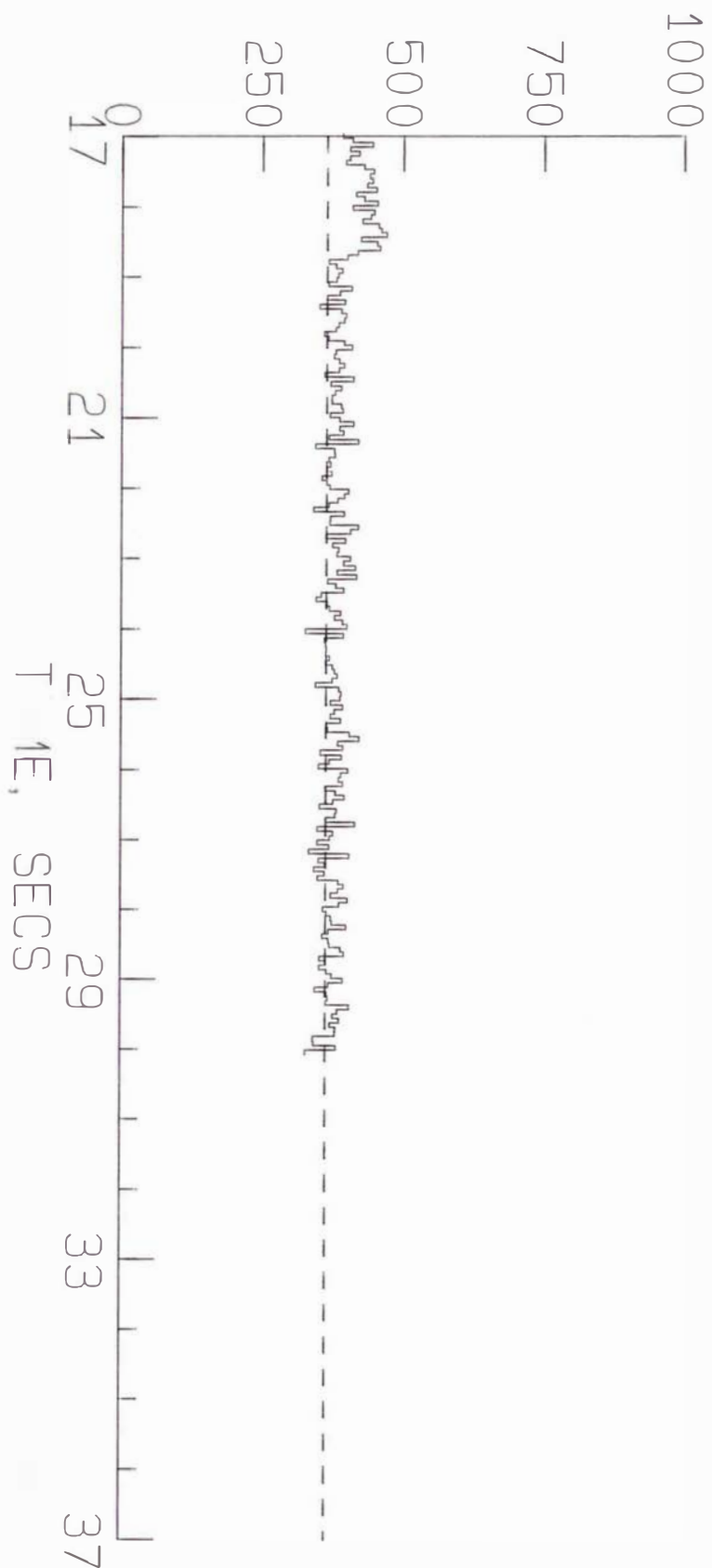
07/05/91

~~52275.819~~

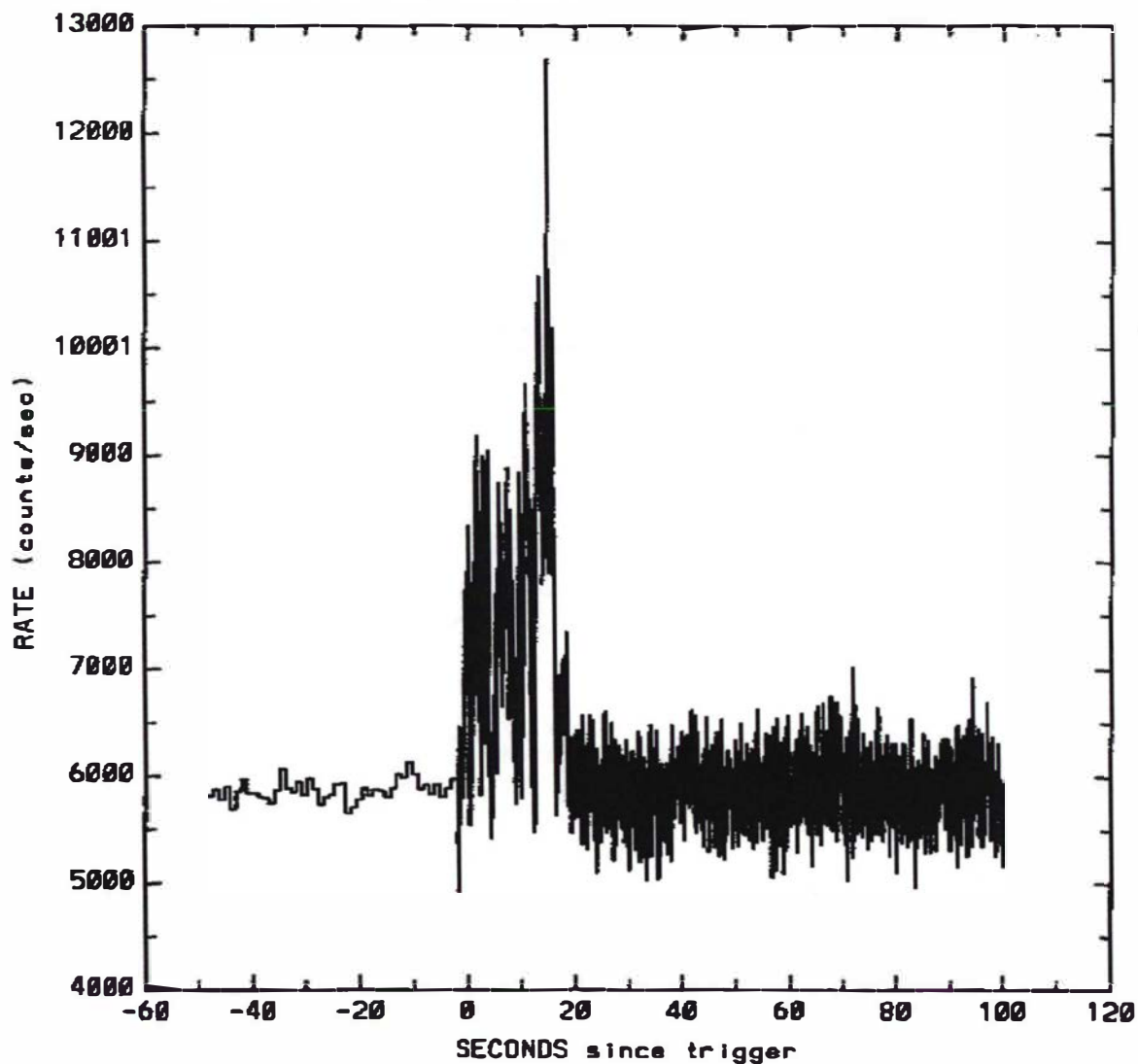
25- 100 keV

52273.777

COUNTS/ .064 S



DATA FOR K. HURLEY



22-JUN-1993 09:15:56

Created by MOPS 80
(Burst Display)
Version 2.19

To OK

Trigger # : 168

Trigger Time:
8383 / 52275.819Burst Data Type:
DISCSC-2.7092 =
5.12 + 5.77

NO

Deadtime
Corrected: NBackground Data
Type: PREB + DISCLAMinimum Integ. Time:
8.864 secondsDetectors (7..8):
00001010Discriminators:
(1..2)Quality Mask:
BDISP1

From @UCBSP.SSL.BERKELEY.EDU:FINGER@BATSE.SPAN Thu May 9 15:01:24 1991
Received: from UCBSP.SSL.BERKELEY.EDU by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA09156; Thu, 9 May 91 15:01:18 PDT
Message-Id: <9105092201.AA09156@sunspot.ssl.berkeley.edu>
Date: Thu 9 May 91 15:01:41-PST
From: \$C <FINGER@BATSE.SPAN>
To: ANDERSON@sunspot.ssl.berkeley.edu
Subject: [Resent-MM Mail] [Resent-MM Mail] BATSE Solar Flare Data
Status: RO

Date: Thu 9 May 91 15:01:10-PST
From: \$C <FINGER@BATSE.SPAN>
To: MARSHA@UCBSP.SSL.BERKELEY.EDU
Subject: [Resent-MM Mail] BATSE Solar Flare Data

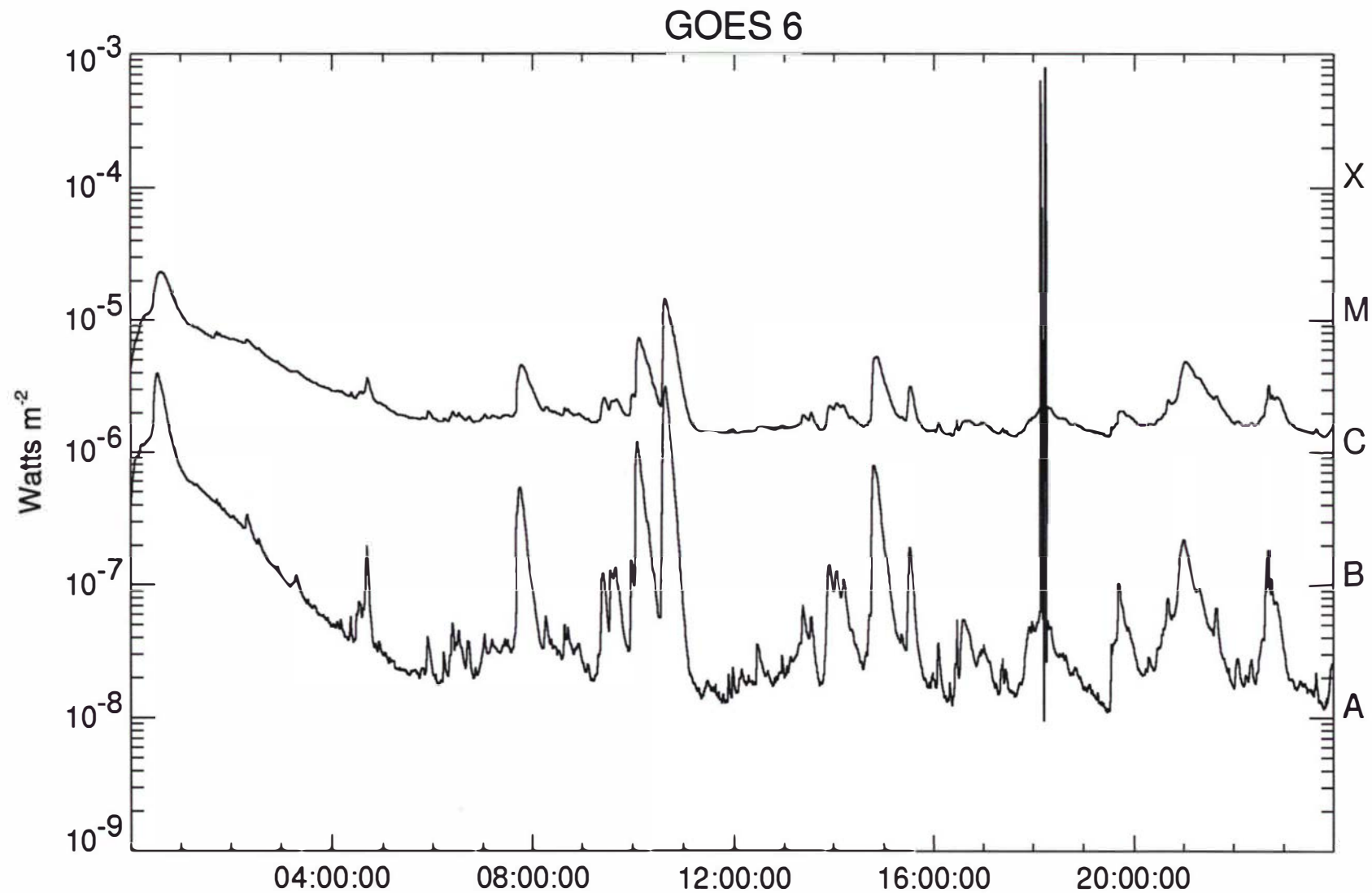
Received: from BATSE by UCBSP.SSL.BERKELEY.EDU via MAIL-11 with DECnet;
Thu, 9 May 91 15:00:40-PST
Date: Thu 9 May 91 15:00:39-PST
From: FINGER@BATSE.SPAN
Subject: BATSE Solar Flare Data
To: "@BATSE_SOLAR_GIS"@BATSE.SPAN

Since its burst trigger was enabled on April 21st, BATSE has triggered on 10 solar flares. The trigger times of these flares and their GOES class are tabulated below:

BATSE trigger time (UTC)	GOES Class
1991 May 4 18:14:02.09	C
1991 May 6 16:11:32.81	C
1991 May 6 23:22:25.77	C
1991 May 7 2:53:29.57	no GOES event
1991 May 7 7:15:14.36	no GOES event
1991 May 7 7:40:36.84	C
1991 May 7 10:35:37.45	M
1991 May 7 19:41:08.20	C
1991 May 7 22:37:42.87	C

BATSE Guest investigators interested in analysing the high time resolution LAD and SPEC detector data acquired during these events should contact:

Mark H. Finger
BATSE::FINGER
(205) 544-6256



Data Start: 91/05/07, 0000:02

Plot created: 96/11/27, 0250

Channel

1 (1.0 - 8.0 Angstroms)

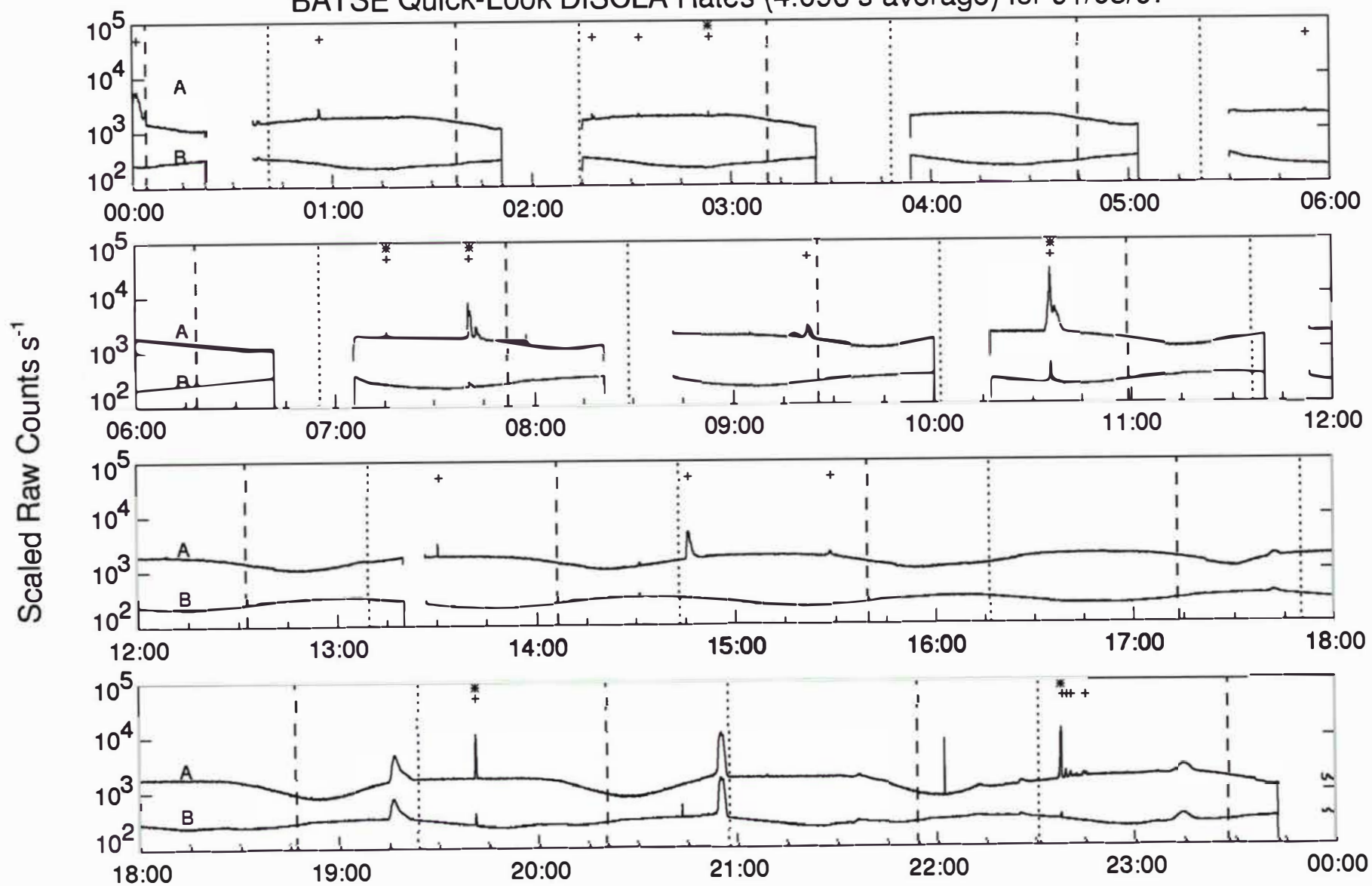
Background not subtracted

2 (0.5 - 4.0 Angstroms)

Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/07

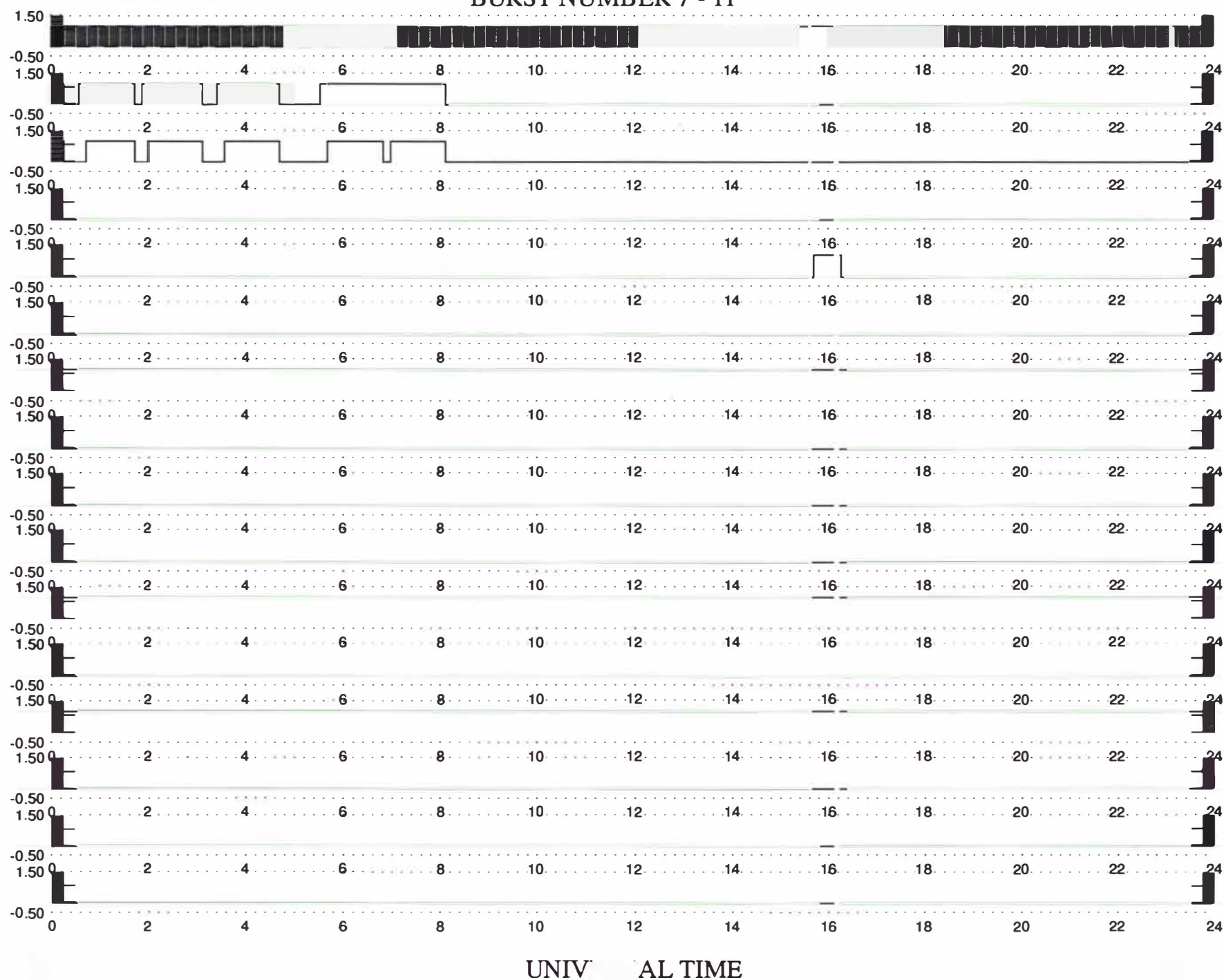


Current Time: 96/11/27, 0251 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

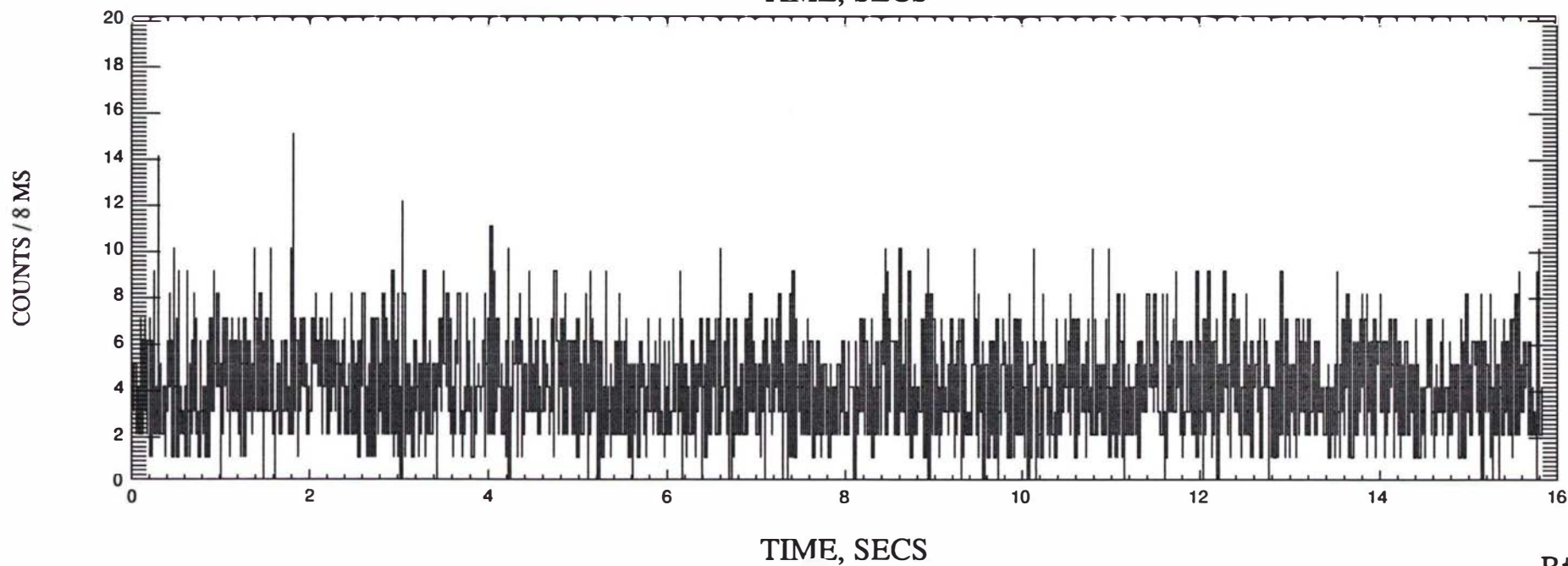
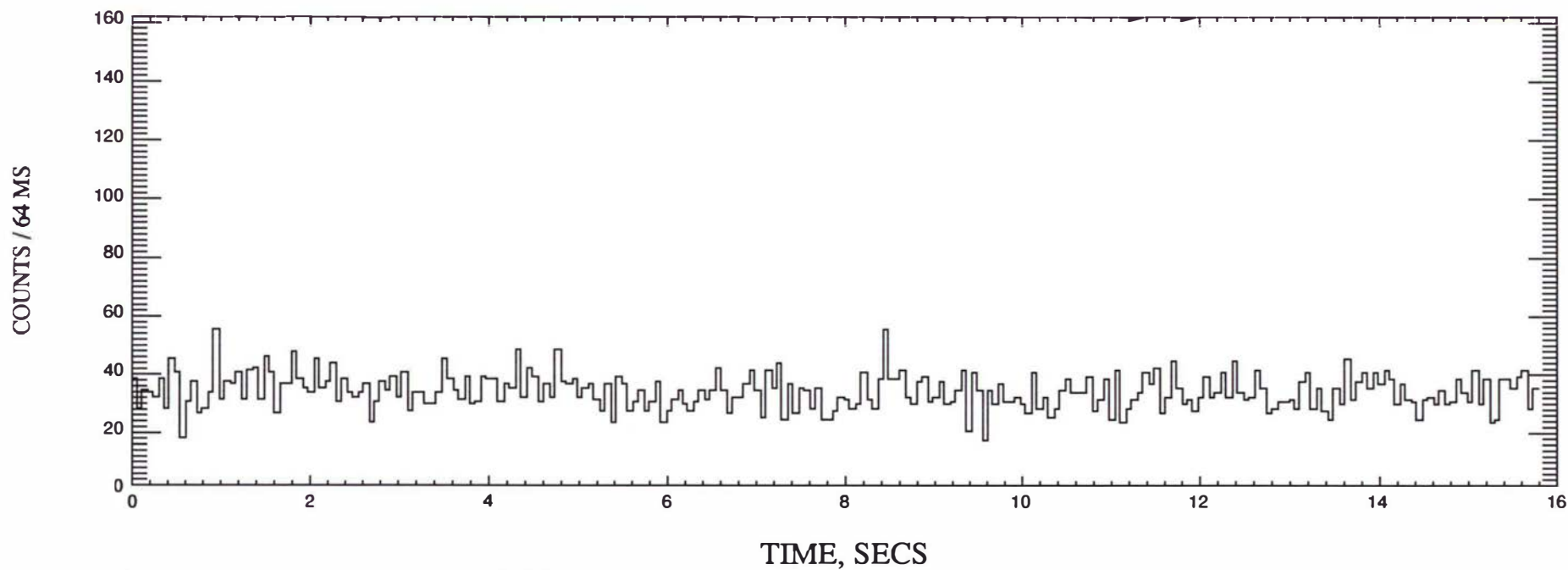
Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

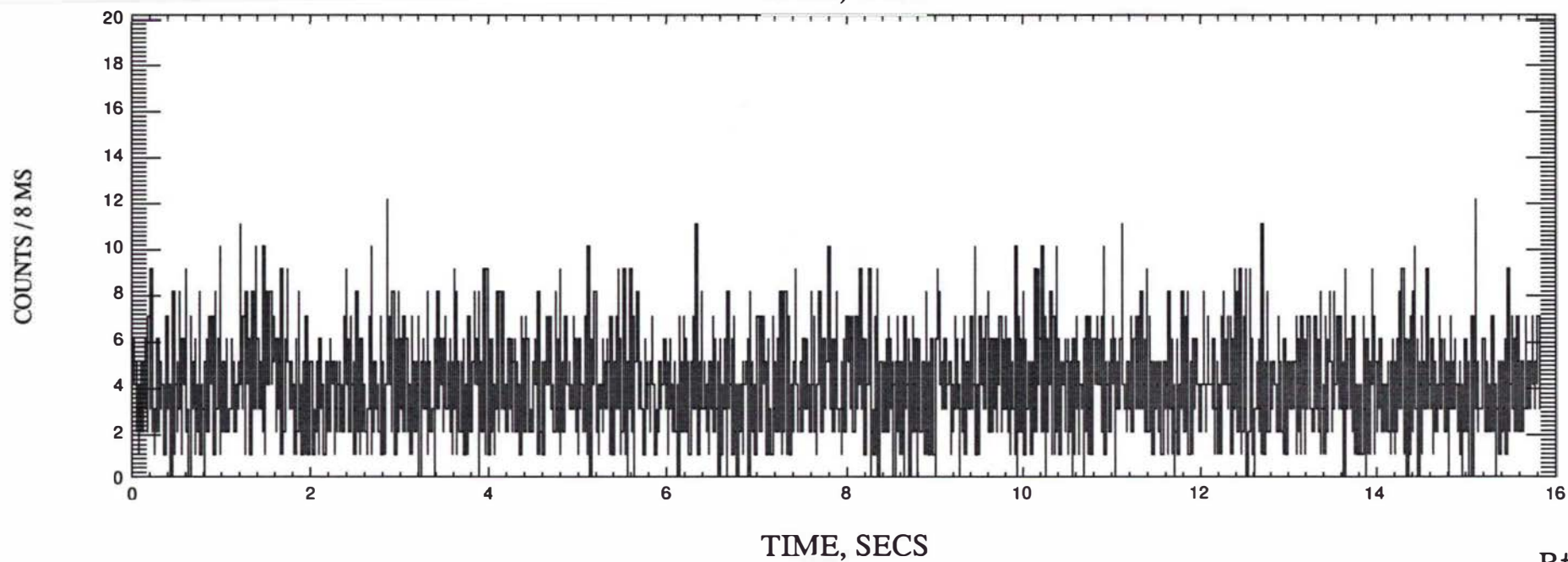
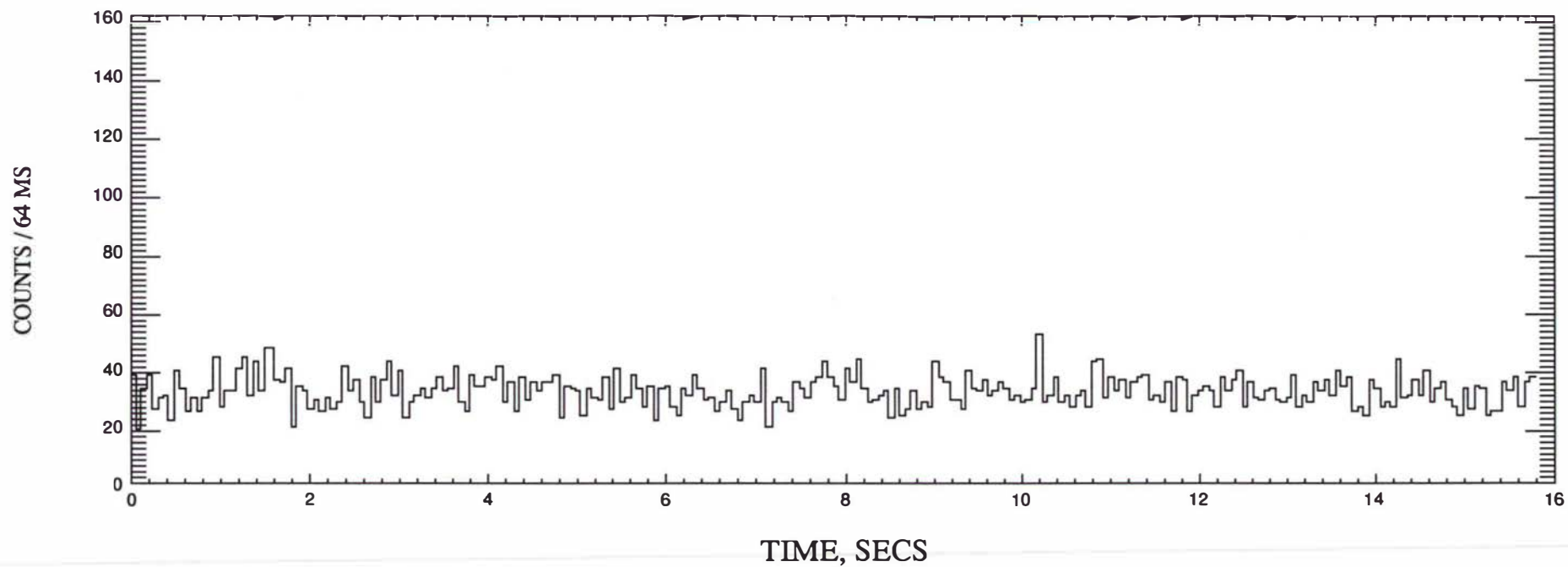
CBU	DMP	ROM	DMA	OSC	MP.	ICR	SPE	OPM	RSC	CAL	WCH	MEM	BRS	HUS
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----



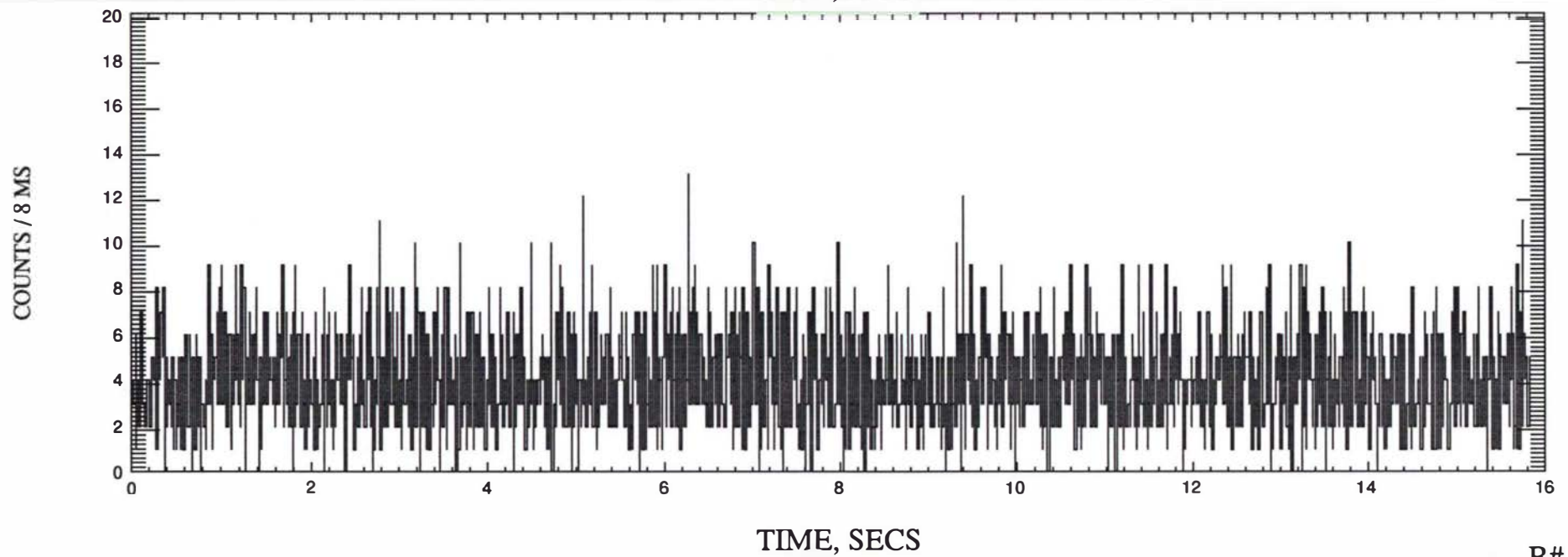
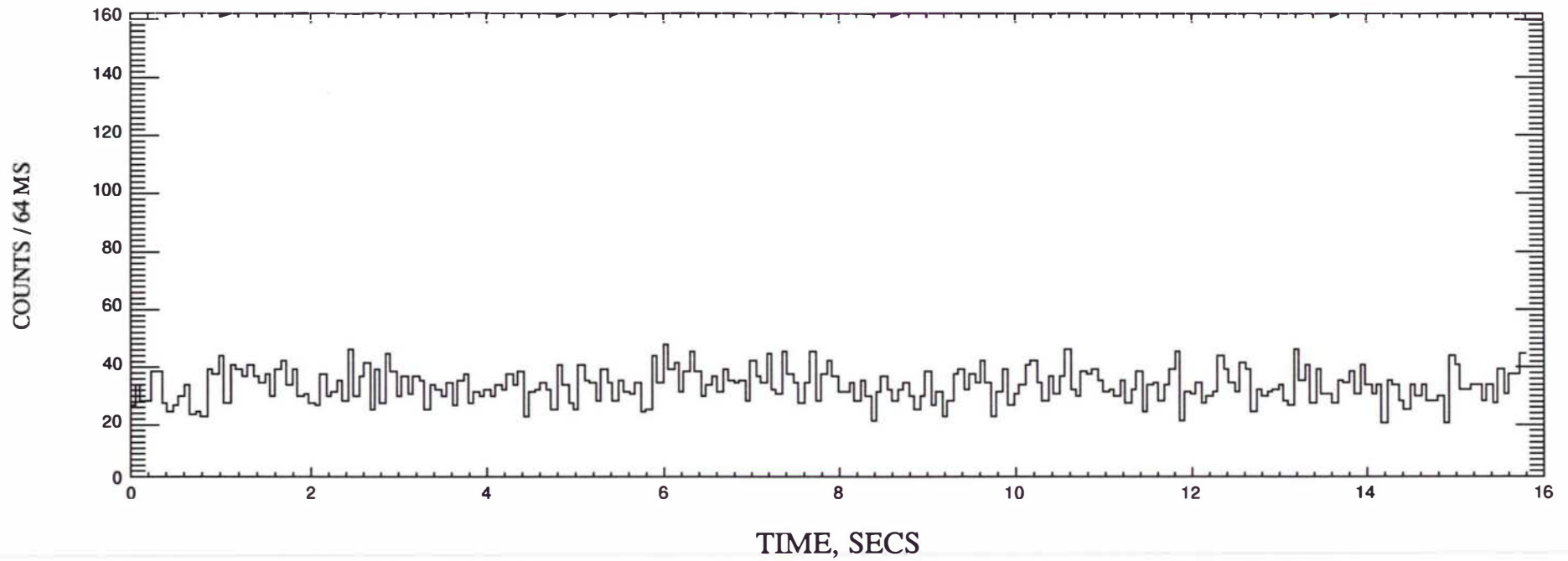
Burst Counter 7 at UT= 0.466993370056 h= 1681.176 s 00:28:01.176



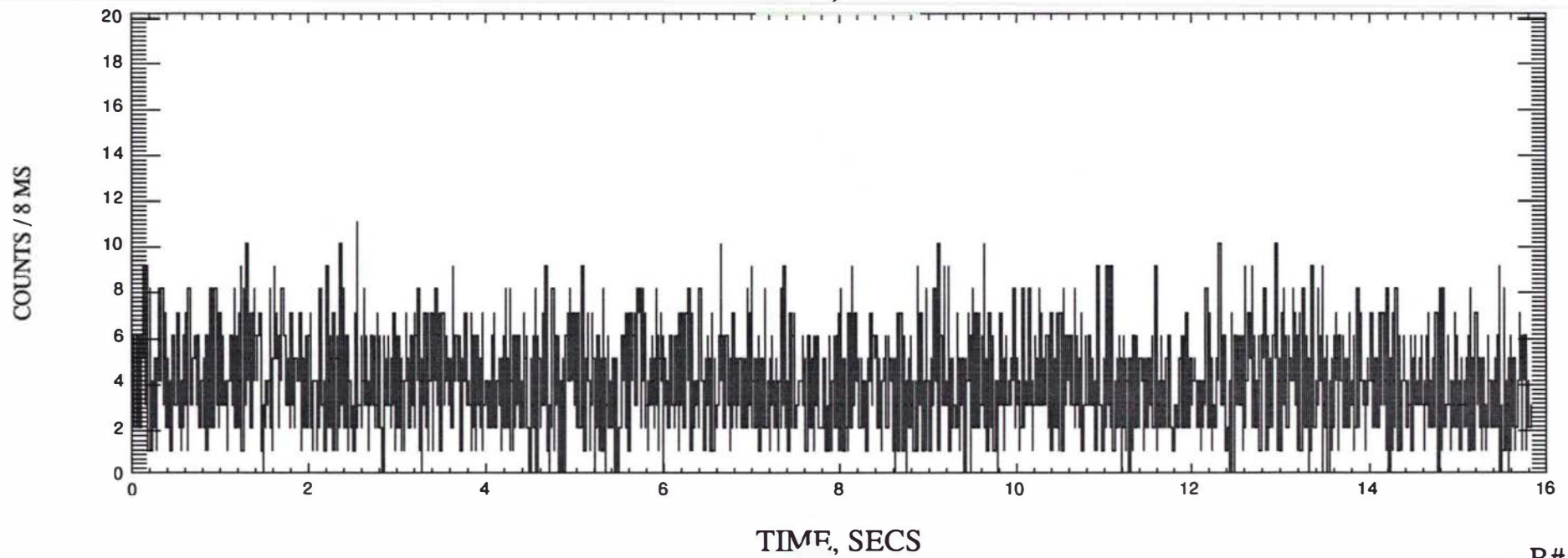
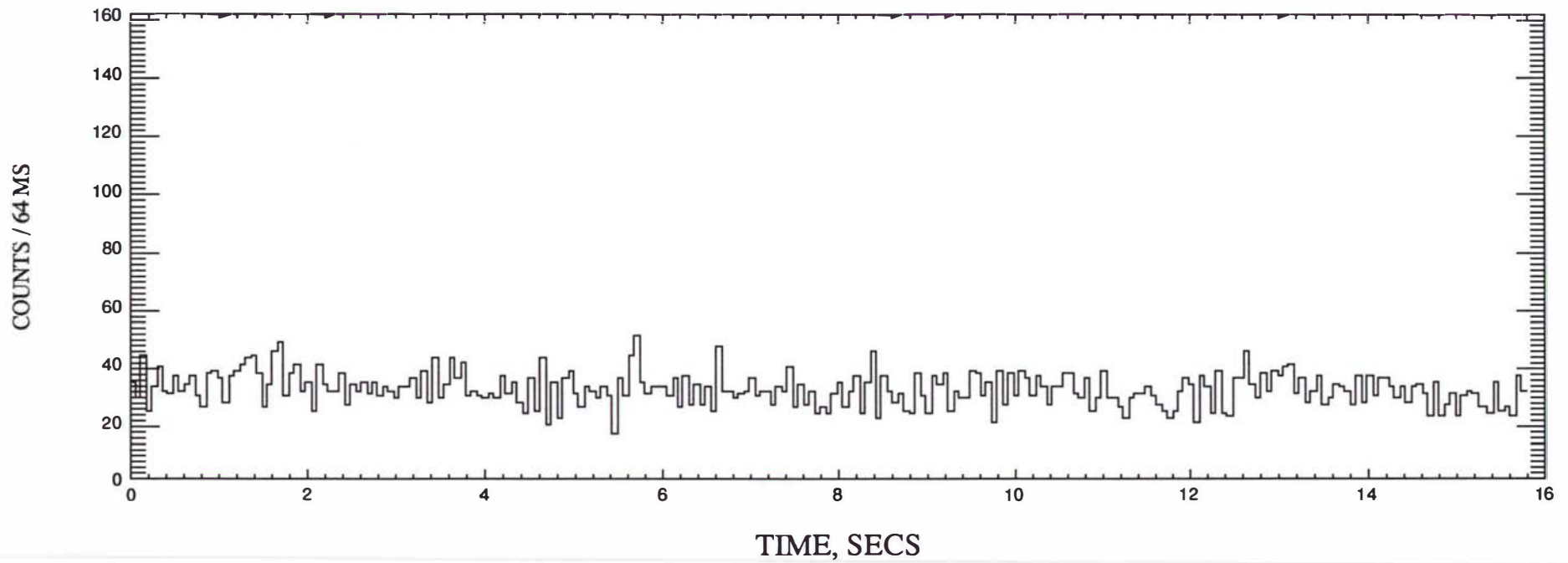
Burst Counter 8 at UT= 1.819792844984 h= 6551.254 s 01:49:11.254



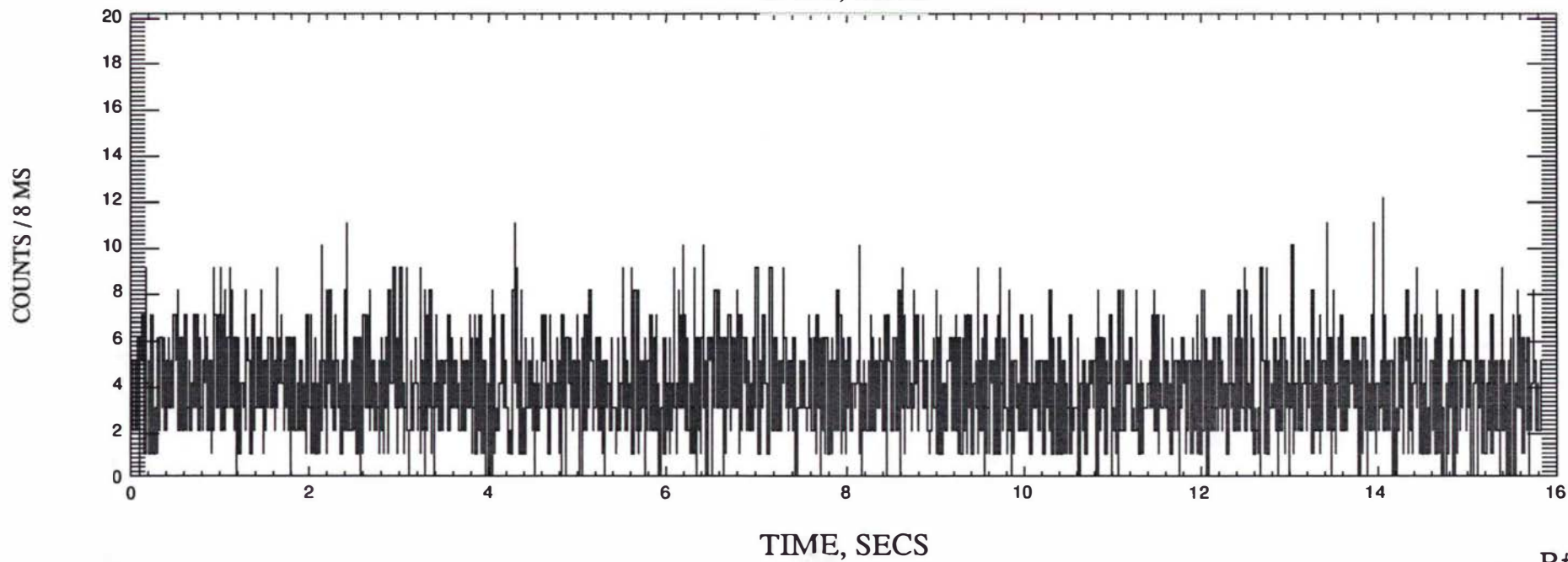
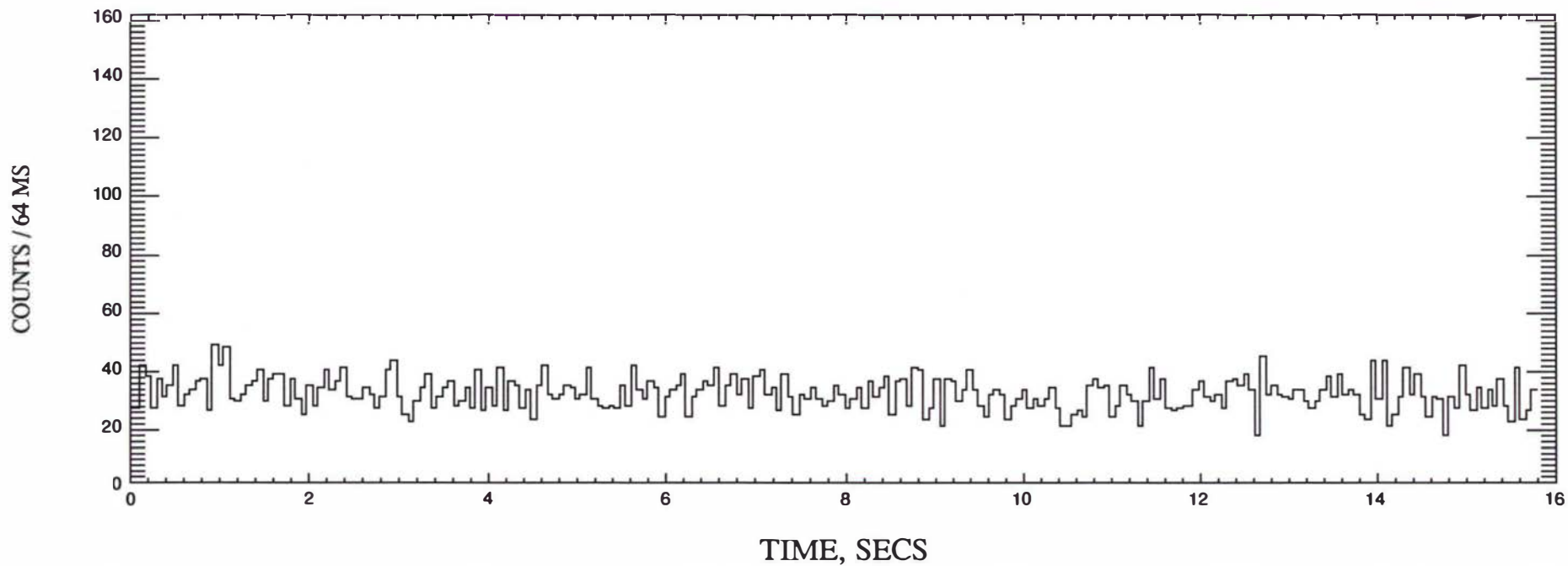
Burst Counter 9 at UT= 3.395928302341 h=12225.342 s 03:23:45.342



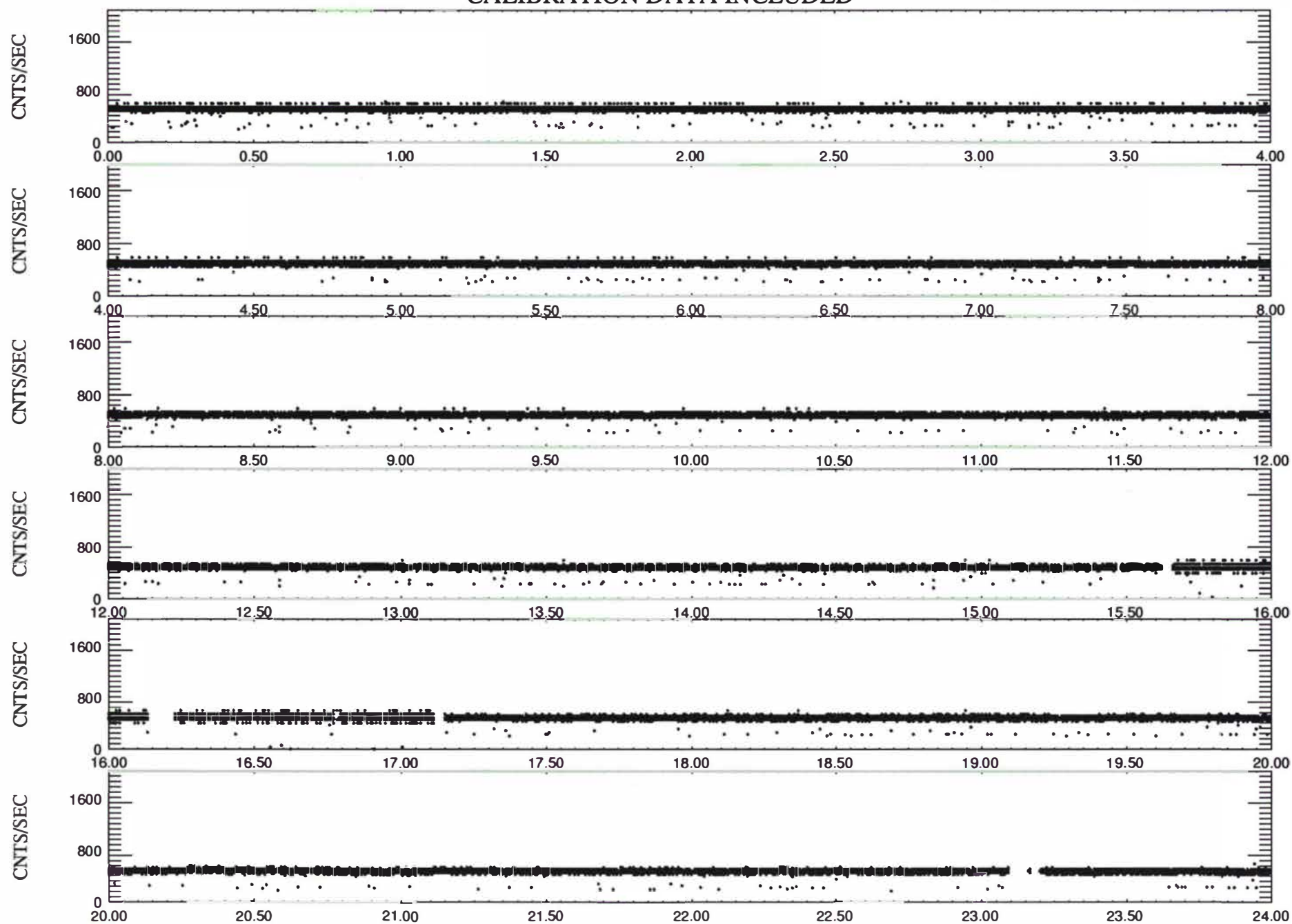
Burst Counter 10 at UT= 5.464855520460 h=19673.480 s 05:27:53.480



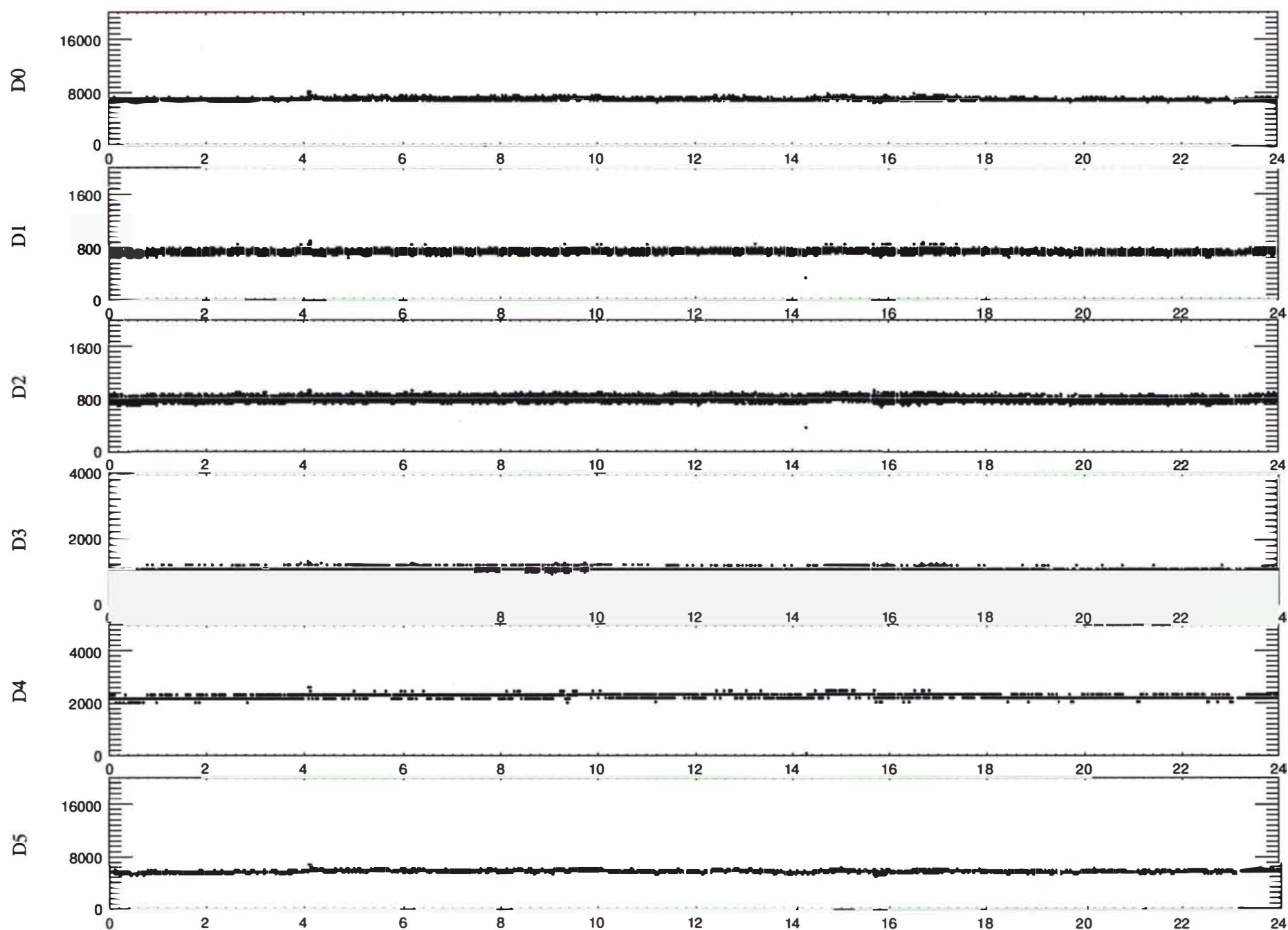
Burst Counter 11 at UT= 6.830430603027 h=24589.550 s 06:49:49.550



CALIBRATION DATA INCLUDED



UNIV AL TIME



UNIVERSAL TIME

FAX MESSAGE

DATE: May 8, 1991

TO: NIGEL ANGOLD, JPL; COPIES TO M. SOMMER, F. COTIN
FAX #: 818 393 4501

FROM: Kevin Hurley
Space Sciences Laboratory
University of California
Berkeley, CA 94720
Fax: (415) 643-9173
Phone: (415) 849-9220

TOTAL NUMBER OF PAGES: 1

ROUTINE MESSAGE

KINDLY SEND THE FOLLOWING COMMAND TO THE HUS EXPERIMENT AS SOON
AS POSSIBLE:

Z018 0014

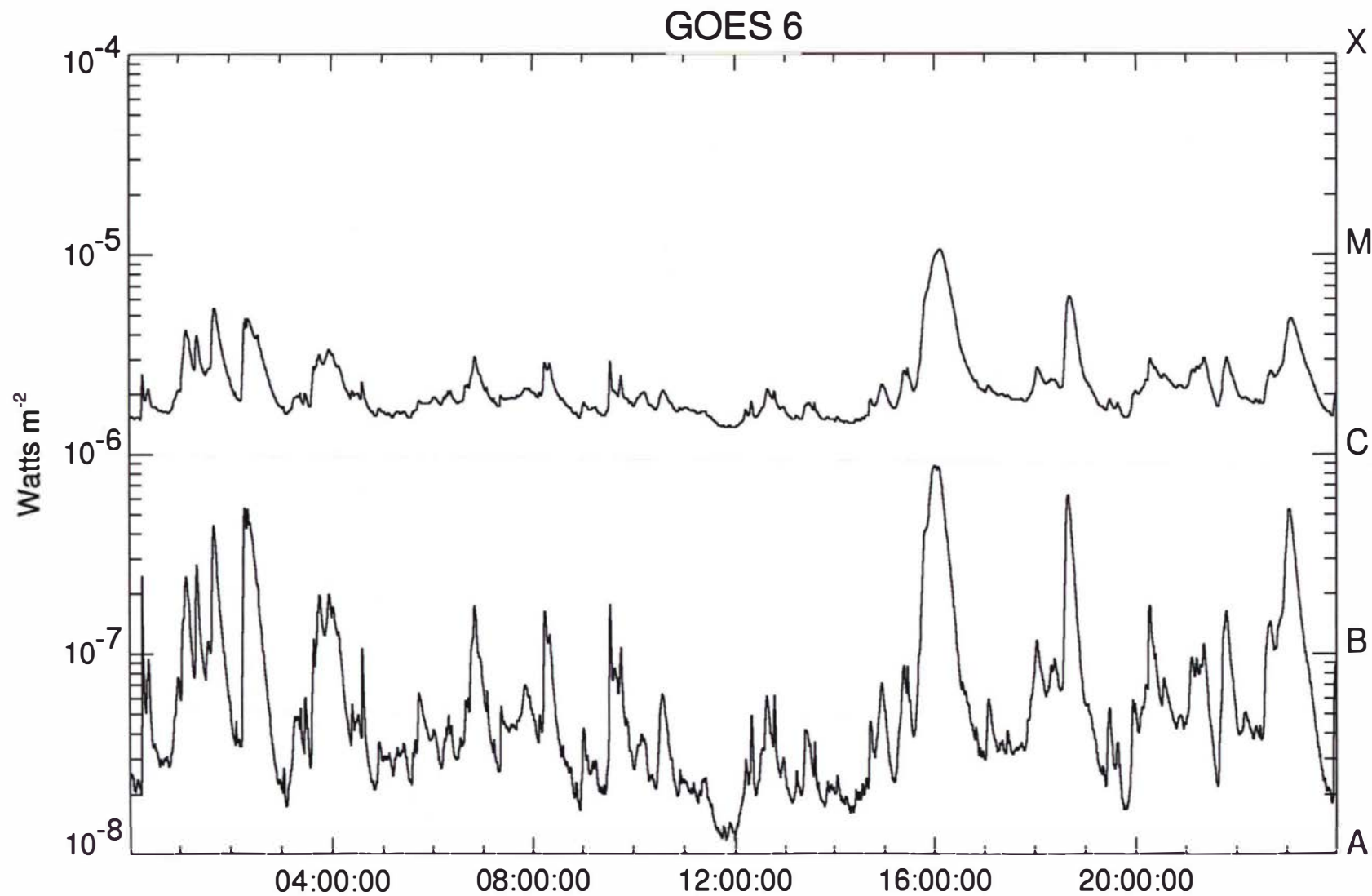
THE PURPOSE OF THIS COMMAND IS:

1. TO CHANGE TO OPERATION MODE 1
2. TO CHANGE THE BURST SAMPLING TIME TO 1/32 SECOND

VERIFICATION MAY BE FOUND BY:

1. CHECKING E021; VALUE OF 0 INDICATES OPERATION MODE 1
2. CHECKING E023; VALUE OF 1 INDICATES 1/32 SECOND SAMPLING TIME





Data Start: 91/05/08, 0000:00

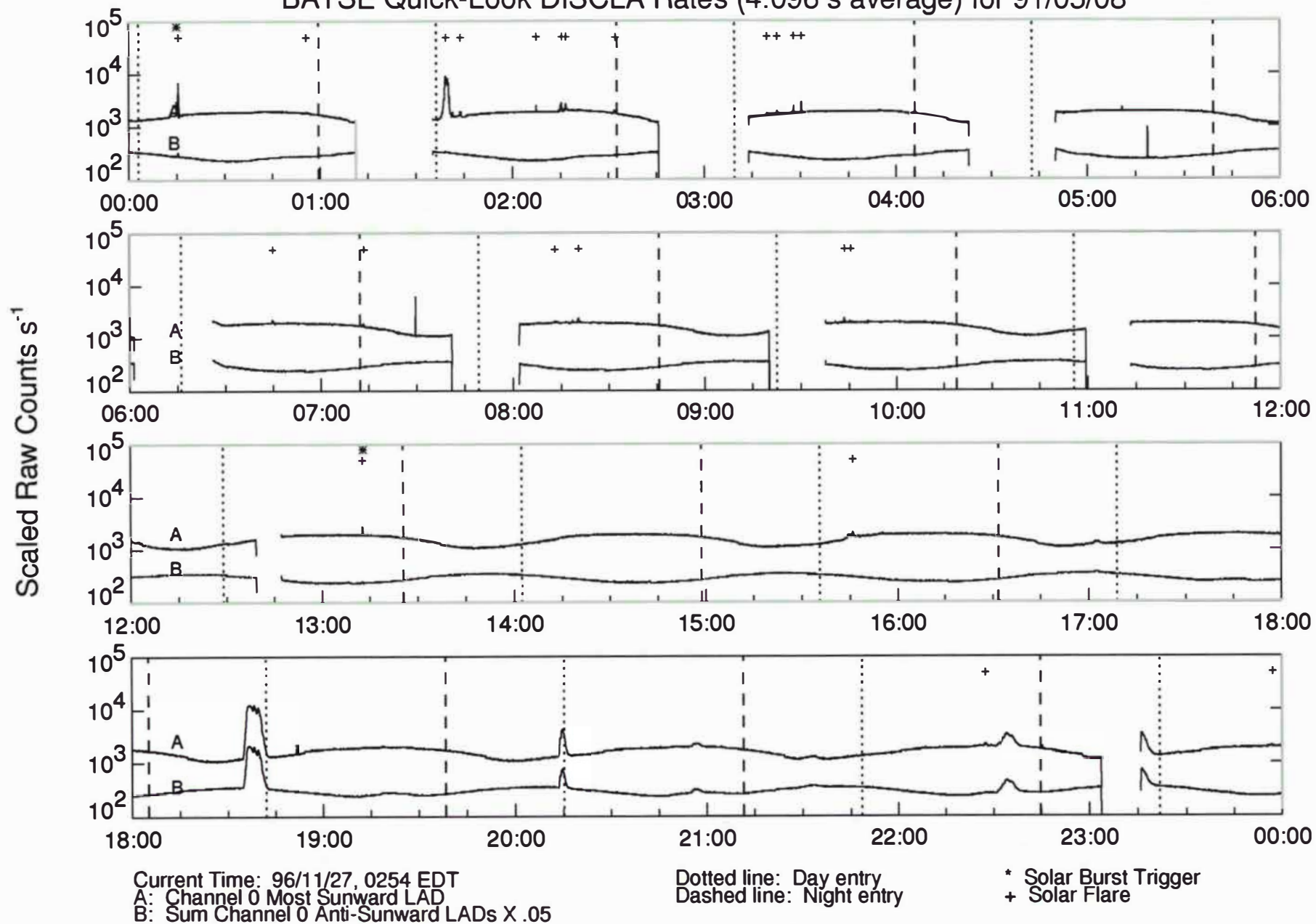
Plot created: 96/11/27, 0253

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

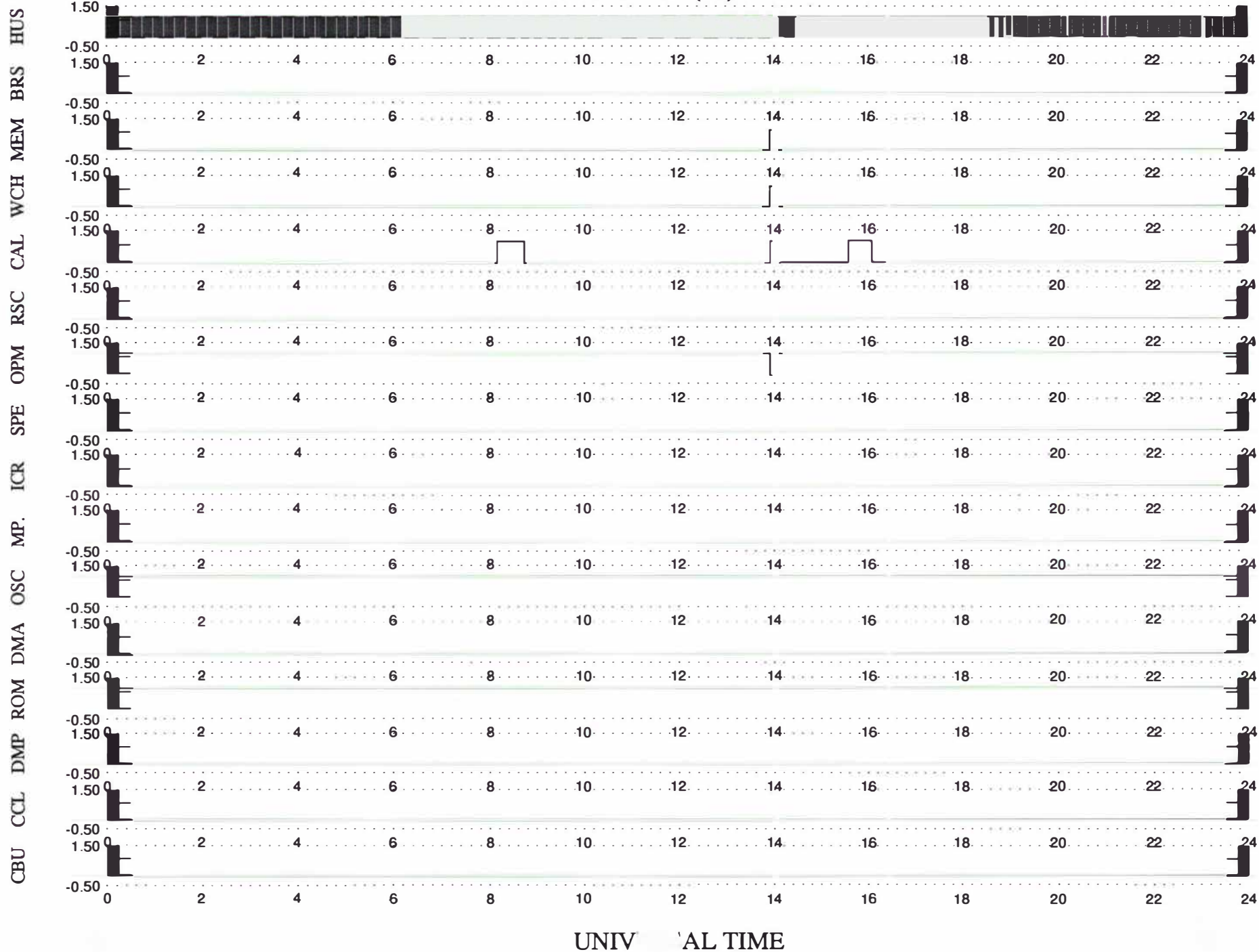
2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

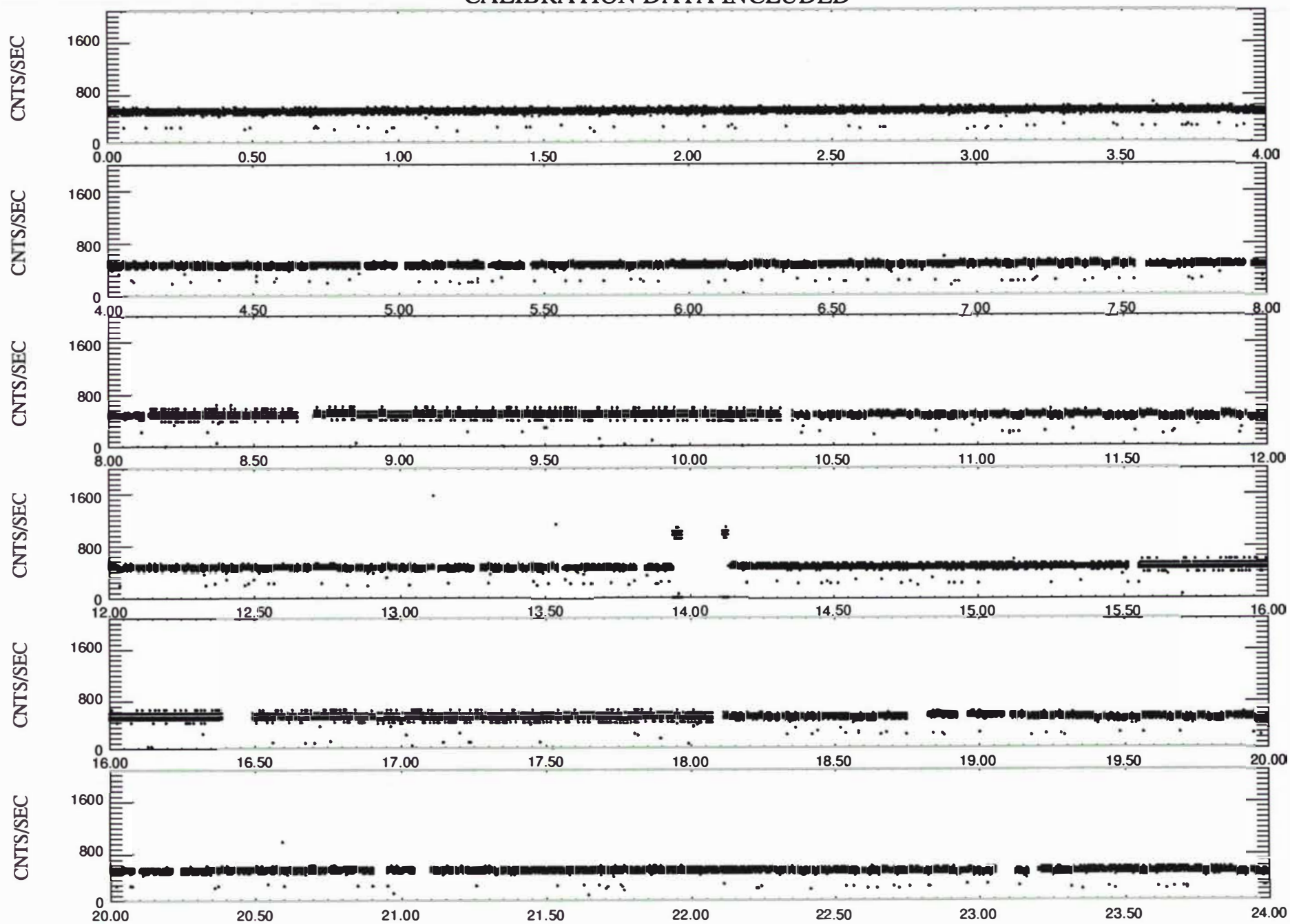
BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/08



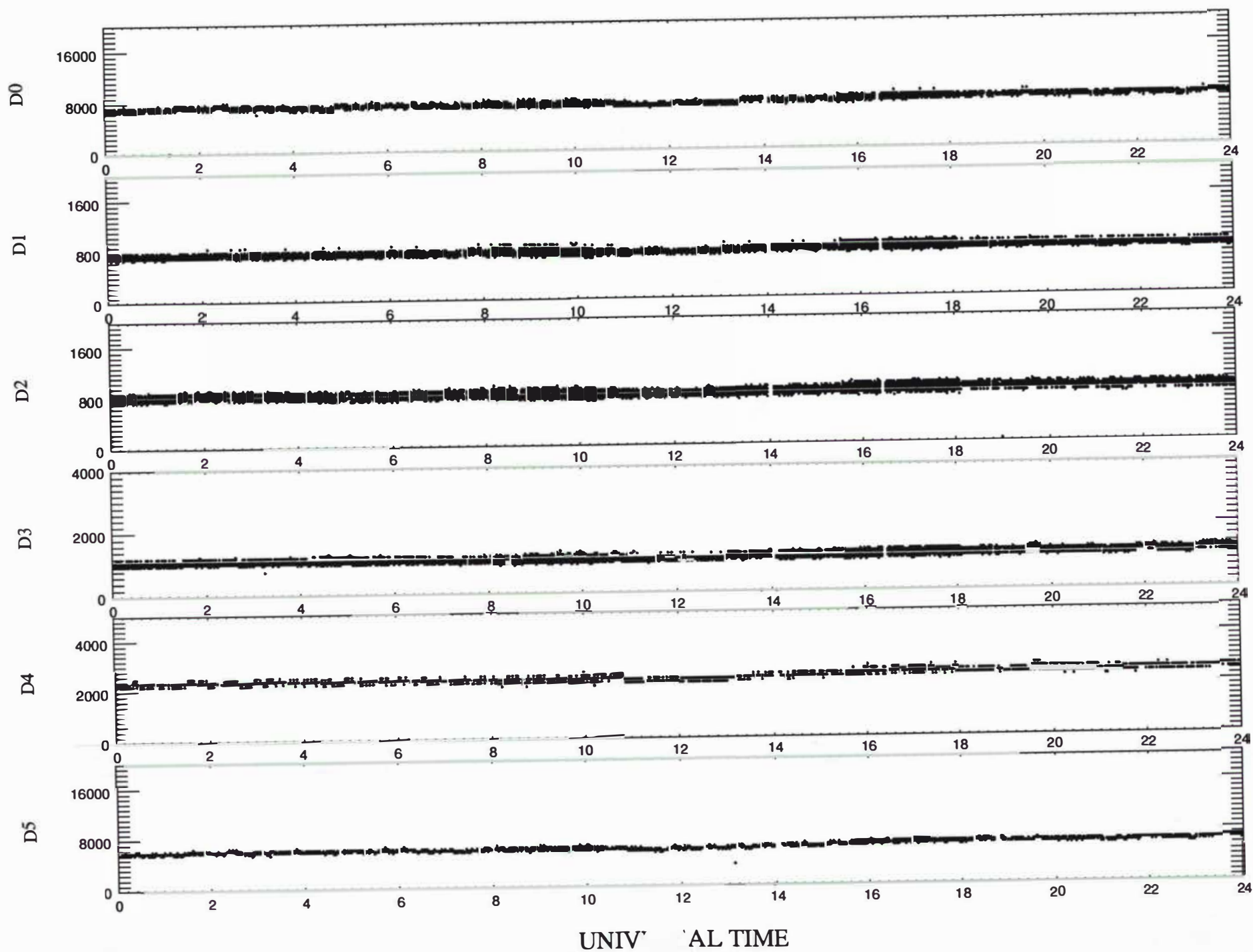
NO BURST (11)



CALIBRATION DATA INCLUDED



UNIV AL TIME



CATSEARCH PROGRAM

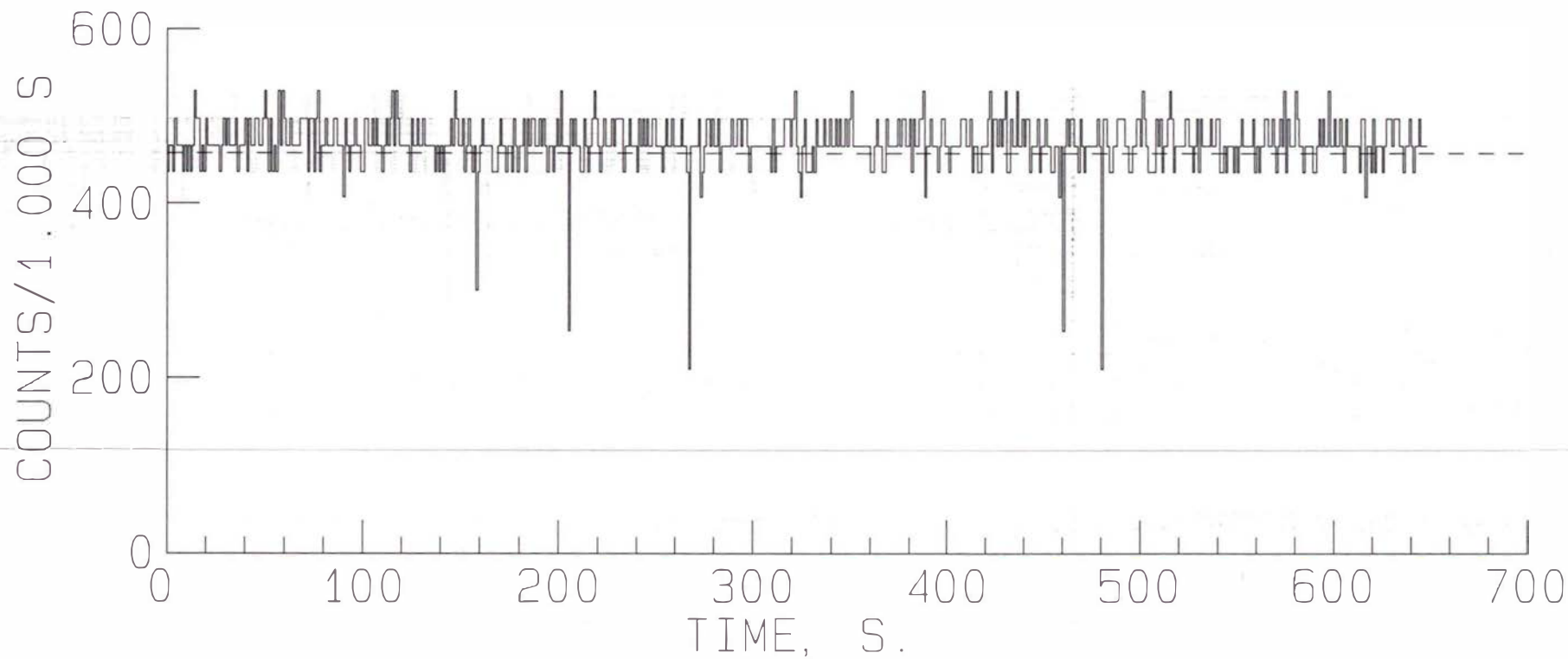
BATSE BURST # 171
EVENT OF 1991 MAY 9 DAY OF YEAR=129
EVENT CROSSING TIME AT BATSE : 11011. S. OR 03:03:30.7
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 340.200 39.600
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 9/ 5/ 91 IS:
RA= 118.793 DEC= 22.414 DIST= 3.175 AU
BATSE-ULYSSES DISTANCE = 475036848. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 73.07 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 461.43 SECS.
CROSSING TIME AT ULYSSES IS 11472. S. OR 03:11:12 +/- 320.19 SECONDS

No

21 / 4 / 93

ULYSSES RT
9/ 5/91 11160.193 s
0- 0 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



From kouveliotou%batse.span@Sdsc.Edu Thu Aug 1 07:25:43 1991
 Received: from Sdsc.Edu (m5.sdsc.edu) by sunspot.ssl.berkeley.edu (4.1/1.30.1)
 id AA07858; Thu, 1 Aug 91 07:25:41 PDT
 Received: from batse.span by Sdsc.Edu with VMSmail ;
 Thu, 1 Aug 91 14:26:06 GMT
 Date: Thu, 1 Aug 91 14:26:06 GMT
 From: kouveliotou%batse.span@Sdsc.Edu
 Message-Id: <910801142606.2040047a@Sdsc.Edu>
 Subject: batse grb list
 To: khurley@sunspot.ssl.berkeley.edu
 X-St-Vmsmail-To: SDSC::"khurley@sunspot.ssl.berkeley.edu"
 Status: R

What file
Anderson/MAC/khurley.ou
 NDY = NO DATA YET

ULYSSES

BATSE burst #	Burst id	UT(s)	RA	dec
105	GRB910421	33245	YES	
106	GRB910422	2533	NO - need better window	
107	GRB910423	71686	± 1400	NO - need better window
108	GRB910424	71008	± 1400	NO - need better window
109	GRB910425	2267	± 1400	MAYBE
110	GRB910425	20255	± 1400	NO
111	GRB910426	80048	± 1400	NO
114	GRB910427	32722	± 1400	NO
121	GRB910429	11511	± 1400	MAYBE
130	GRB910430	61721	± 1450	NO
133	GRB910501	30016	± 1466	MAYBE
138	GRB910502	40669	± 1466	NO
142	GRB910502	81445	Possible trigger; possible RI ± 1466	MAYBE
143	GRB910503	25454	YES 90	44 YES - trigger
148	GRB910505	72918	± 1498	MAYBE
160	GRB910507	52277	± 1520	NO
171	GRB910509	11012	± 1550	NO
179	GRB910511	79094	± 1632	NO
183	GRB910511	79390	± 1632	NO
185	GRB910512	54911	± 1632	NO
204	GRB910517	38929	± 1632	NO
206	GRB910517	86137	± 1632	NO
207	GRB910518	12333	± 1632	NO
211	GRB910518	53727	± 1632	NO
214	GRB910521	18879	± 1726	NO
218	GRB910521	60618	± 1726	NO
219	GRB910522	43931	YES	
222	GRB910523	68606	± 1724	NDY
223	GRB910523	85131	± 1724	NDY
226	GRB910525	69989	Solar event in progress ± 1724	
228	GRB910526	12746	± 1724	NDY
229	GRB910526	16752	± 1724	NDY
235	GRB910528	77217	± 1724	NDY
237	GRB910529	63362	± 1728	NO
249	GRB910601	69736	± 1821	YES
253	GRB910602	38408	± 1821	NO
254	GRB910602	43591	± 1824	NO
257	GRB910602	85203	± 1824	NO
269	GRB910604	75656	± 1824	NDY
289	GRB910607	16263	NDY; Solar protons	
296	GRB910608	79954	NDY	
297	GRB910608	83642	NDY	
298	GRB910609	2909	NDY	
332	GRB910612	31757	Solar protons ± 1920	NO
351	GRB910614	6866	" " ± 1920	NO
373	GRB910616	38367	" " ± 1920	NO
394	GRB910619	51274	" " ± 1920	NO
398	GRB910620	20252	" " ± 2030	NO
401	GRB910620	66170	" " ± 2030	MAYBE
404	GRB910621	7039	" " ± 2030	NO
408	GRB910621	58606	" " ± 2030	NO

FAX MESSAGE

DATE: May 9, 1991

Rec'd

TO: NIGEL ANGOLD, JPL; COPIES TO M. SOMMER, F. COTIN
FAX #: 818 393 4501

FROM: Kevin Hurley
Space Sciences Laboratory
University of California
Berkeley, CA 94720
Fax: (415) 643-7629
Phone: (415) 643-9173

TOTAL NUMBER OF PAGES: 1

ROUTINE MESSAGE

KINDLY SEND THE FOLLOWING COMMAND TO THE HUS EXPERIMENT AS SOON
AS POSSIBLE:

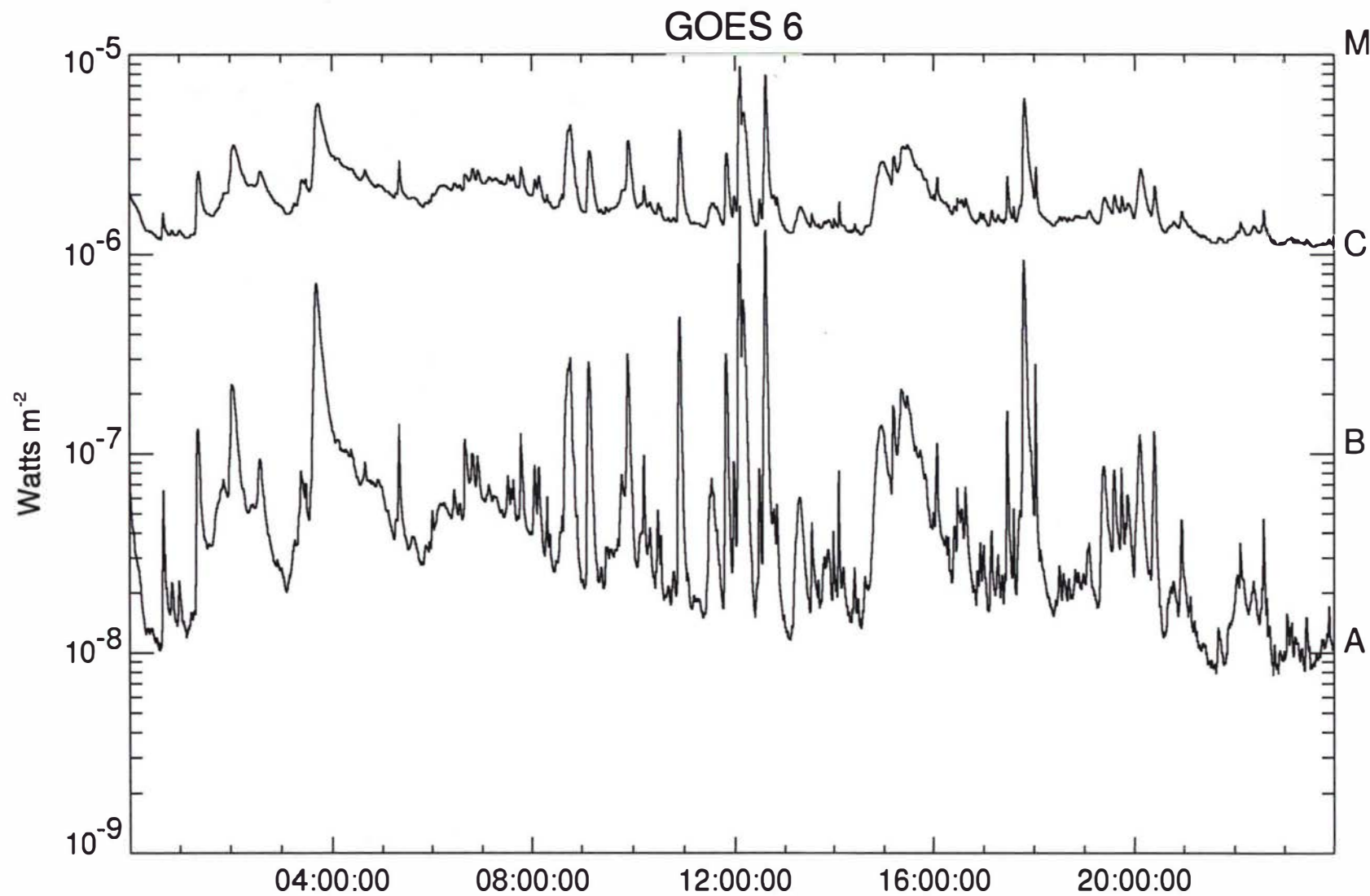
Z019 01A3

THE PURPOSE OF THIS COMMAND IS:

TO SET THE LOWER ENERGY LEVEL DISCRIMINATOR FOR BURST TRIGGERING
TO 19.31 keV

VERIFICATION MAY BE FOUND BY:

EXAMINING E007; NEW VALUE SHOULD BE 0.362



Data Start: 91/05/09, 0000:01

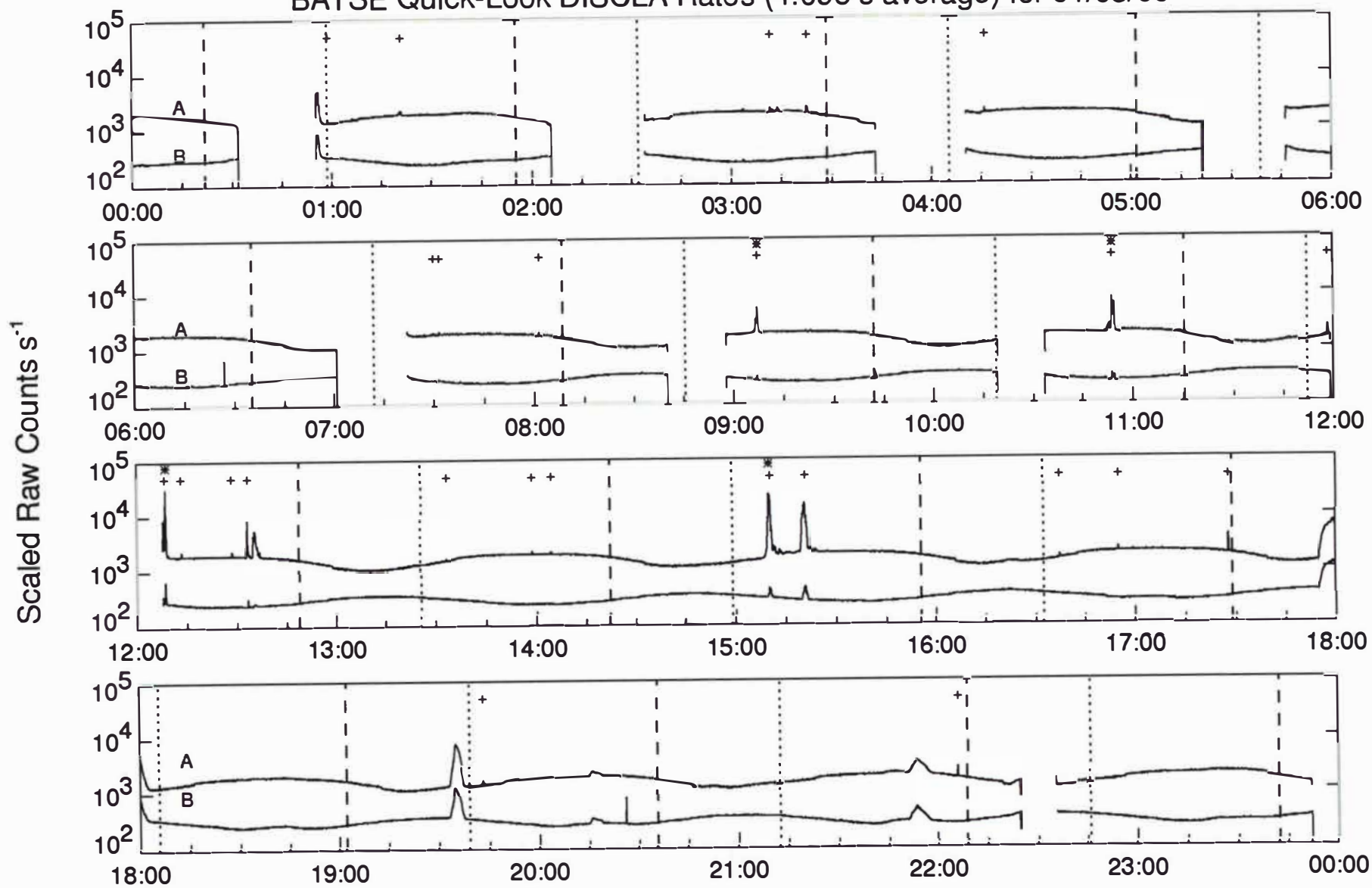
Plot created: 96/11/27, 0257

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/09

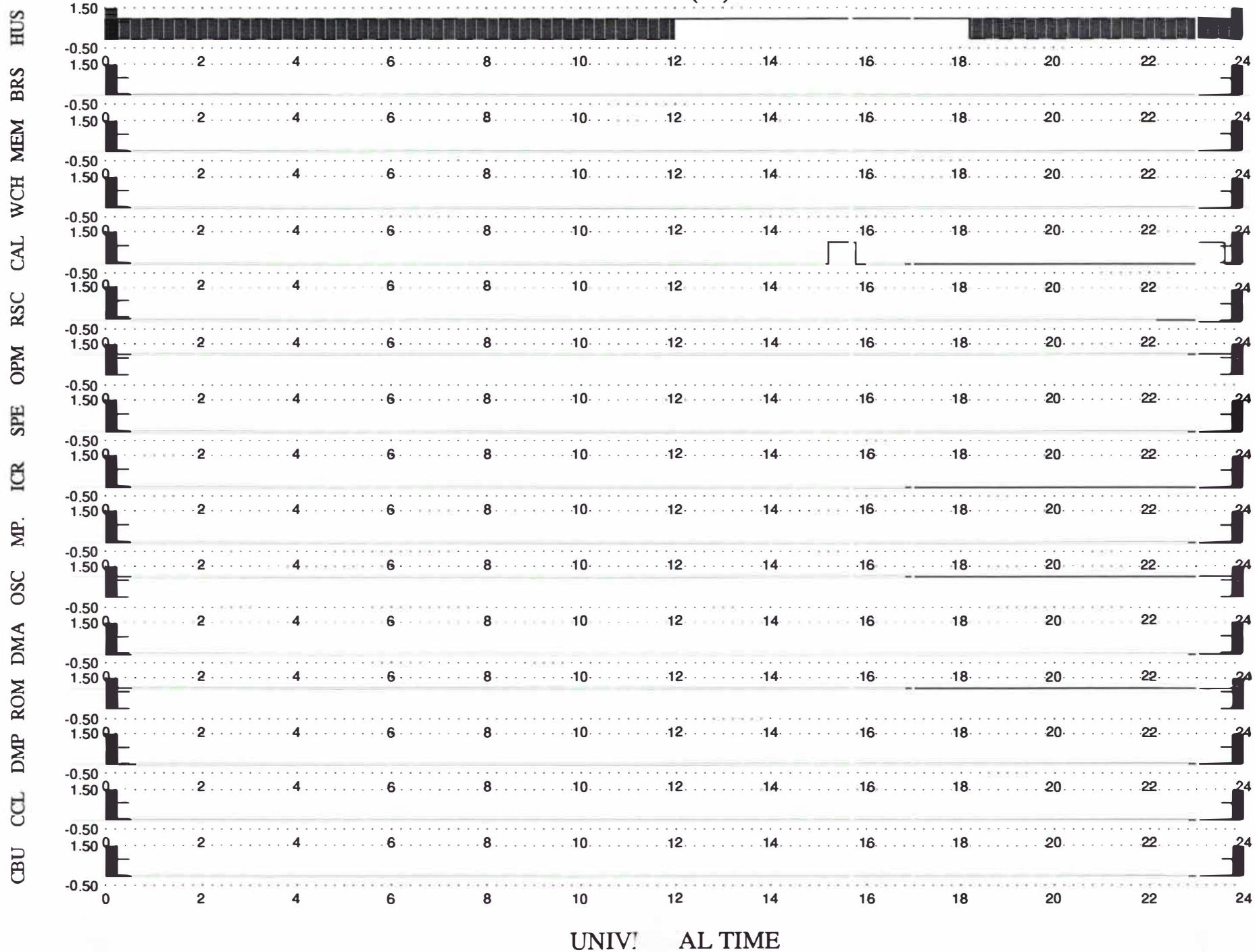


Current Time: 96/11/27, 0257 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

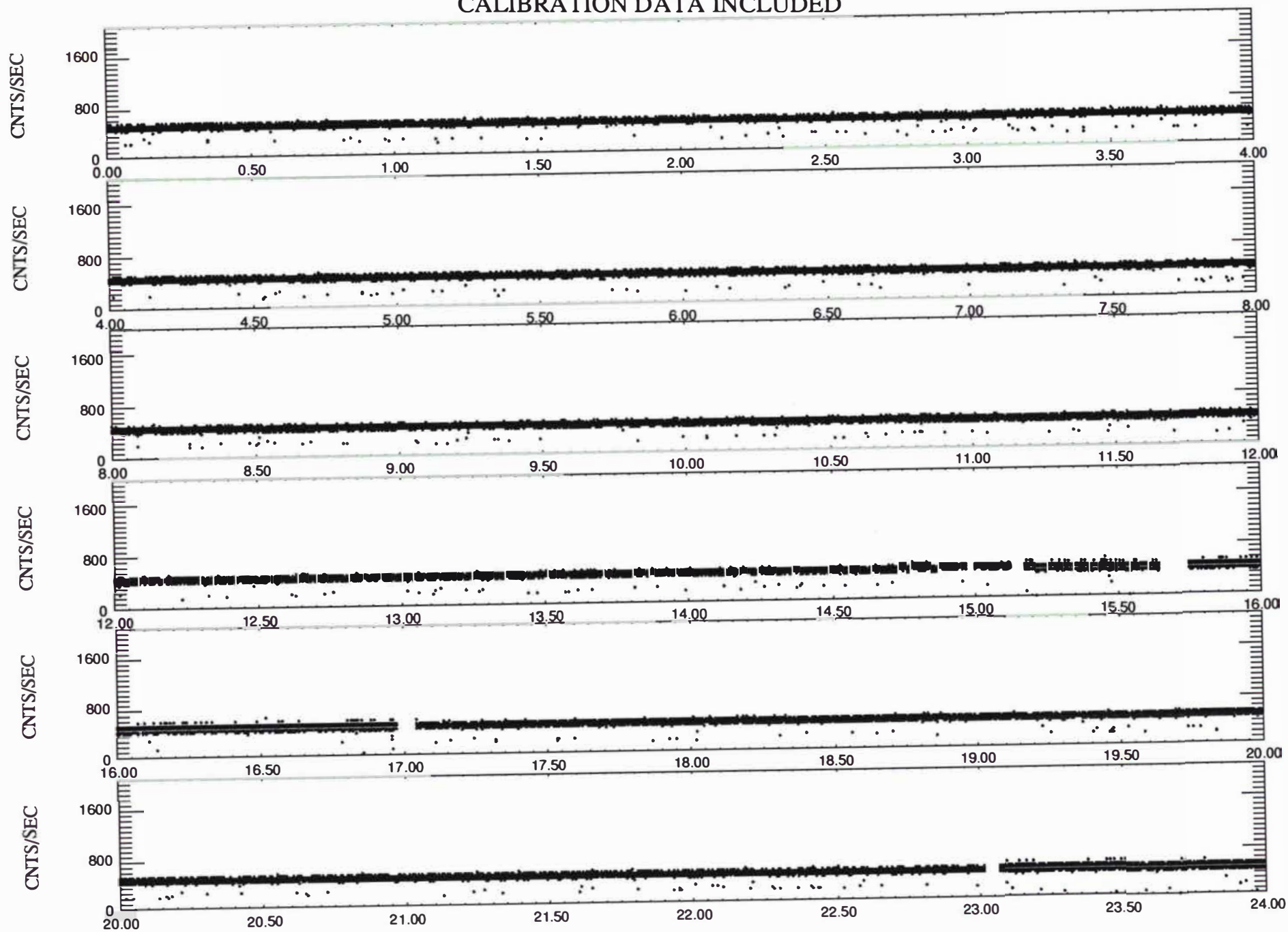
Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

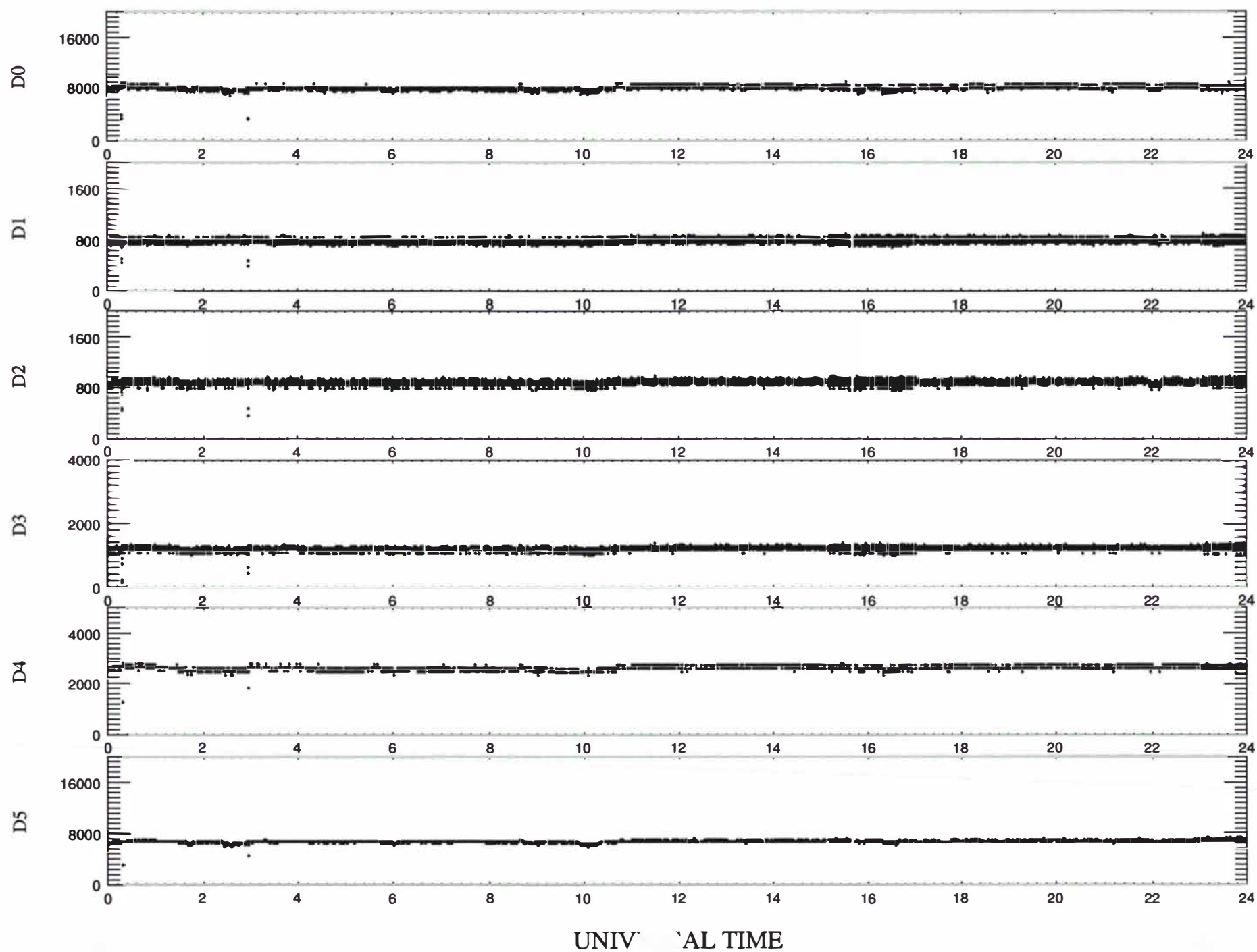
NO BURST (11)



CALIBRATION DATA INCLUDED

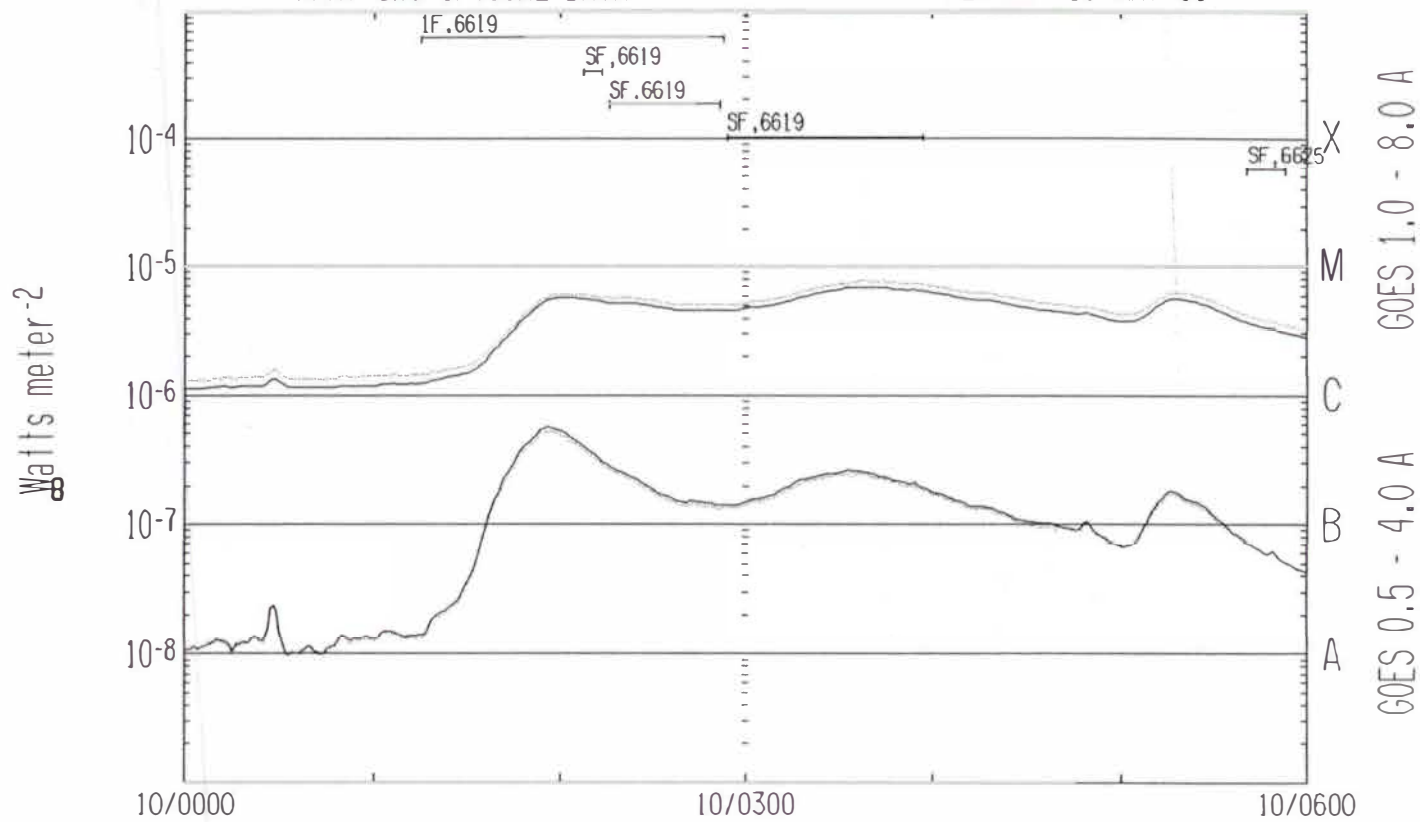


UNIV AL TIME



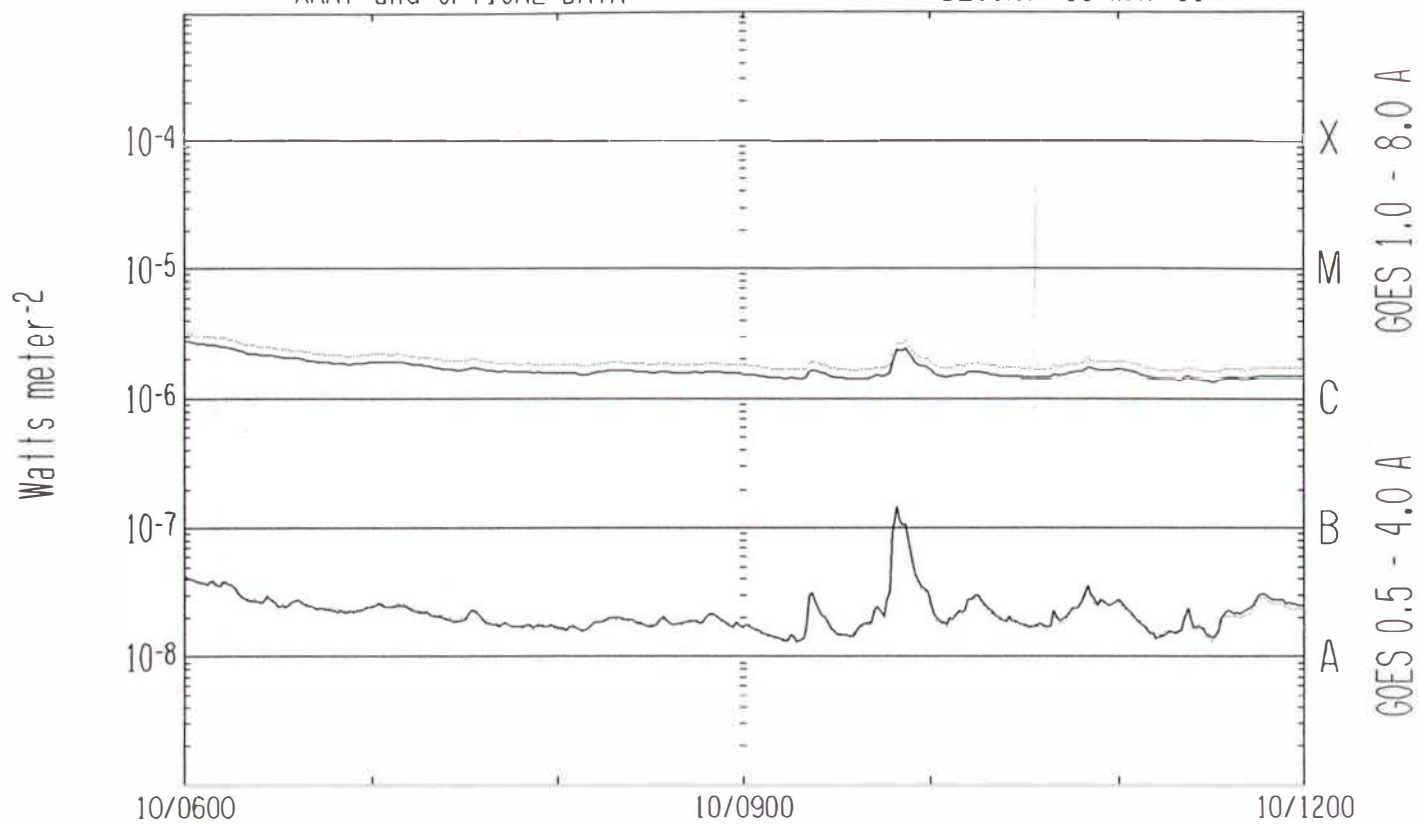
XRAY and OPTICAL DATA

BEGIN: 10 MAY 91



XRAY and OPTICAL DATA

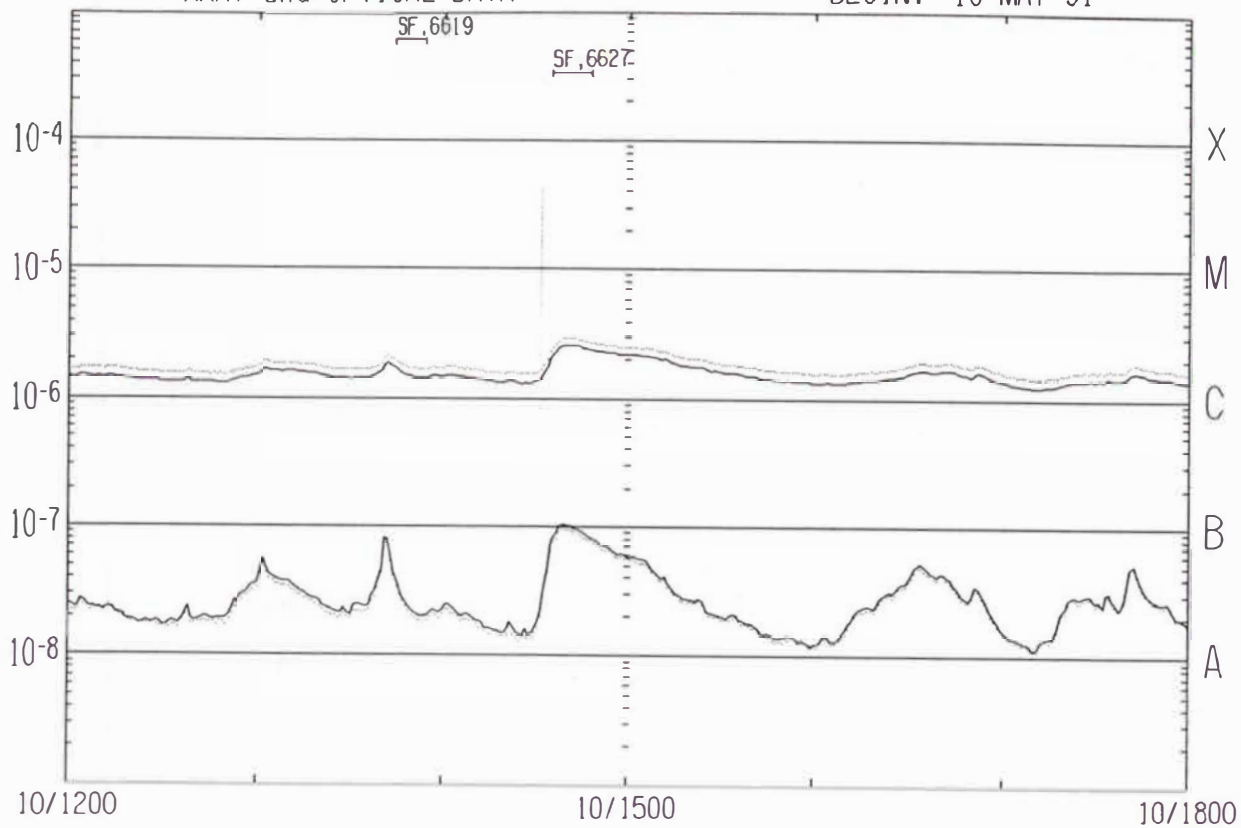
BEGIN: 10 MAY 91



XRAY and OPTICAL DATA

BEGIN: 10 MAY 91

Watts meter-2

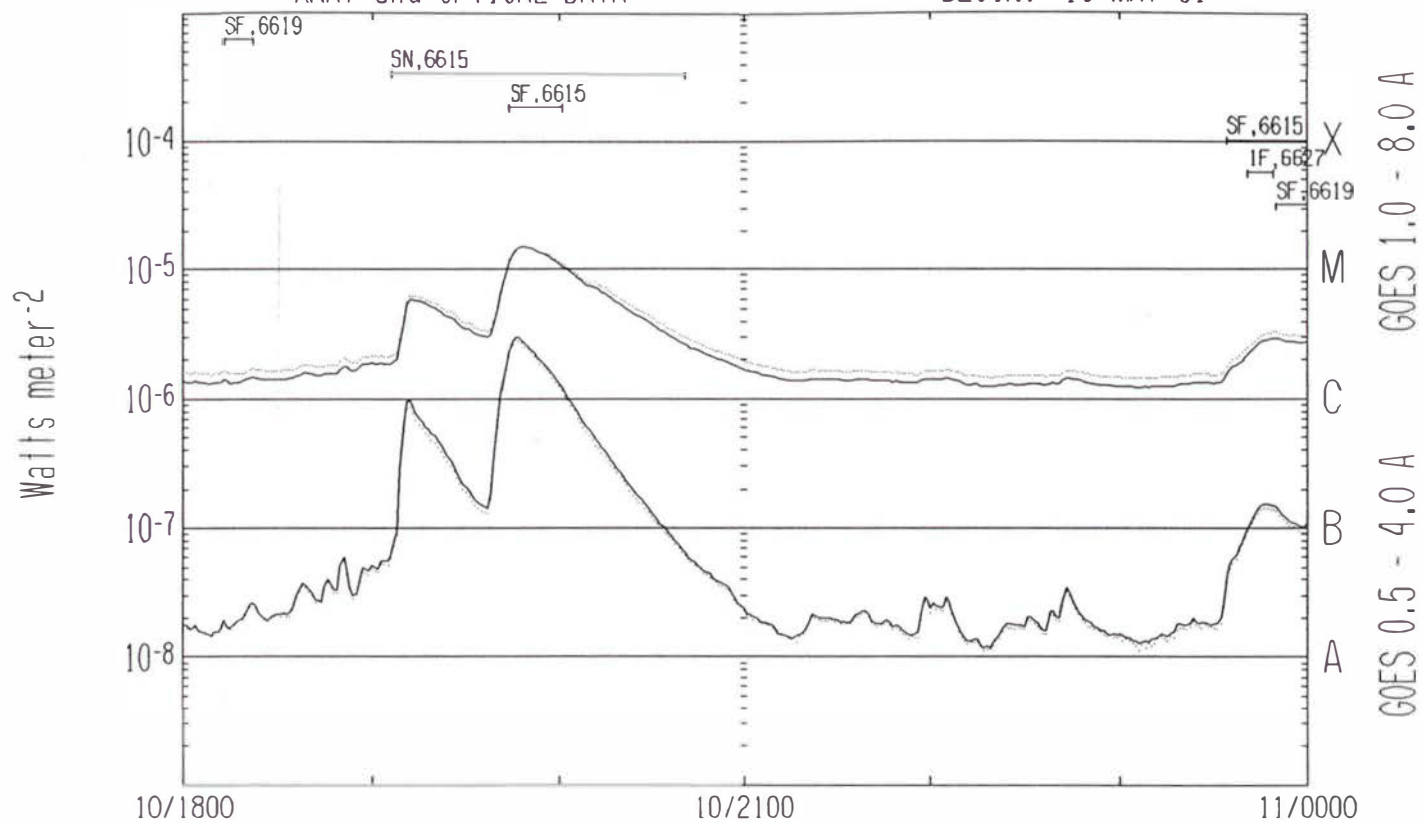


GOES 1.0 - 8.0 A

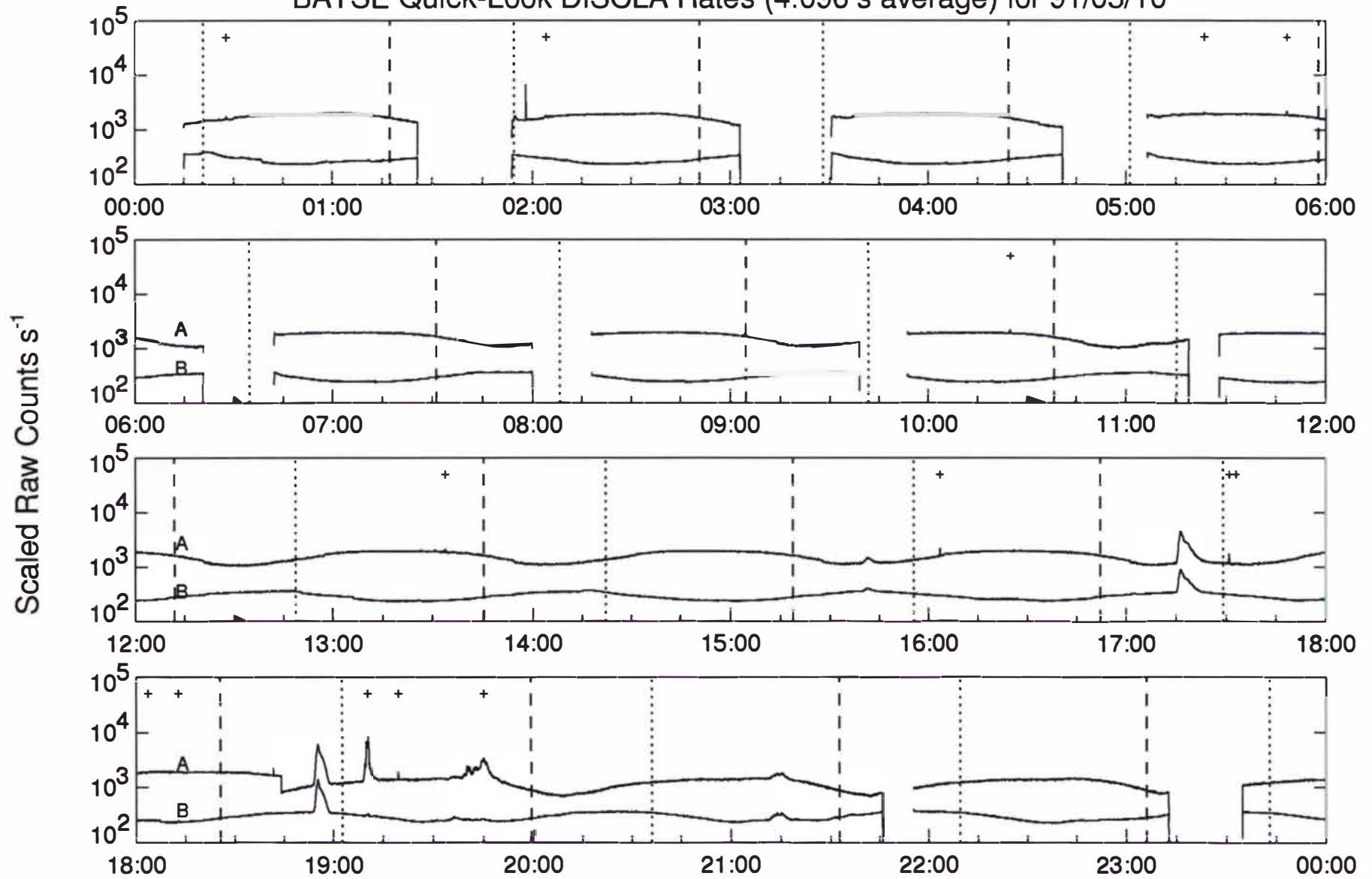
GOES 0.5 - 4.0 A

XRAY and OPTICAL DATA

BEGIN: 10 MAY 91



BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/10

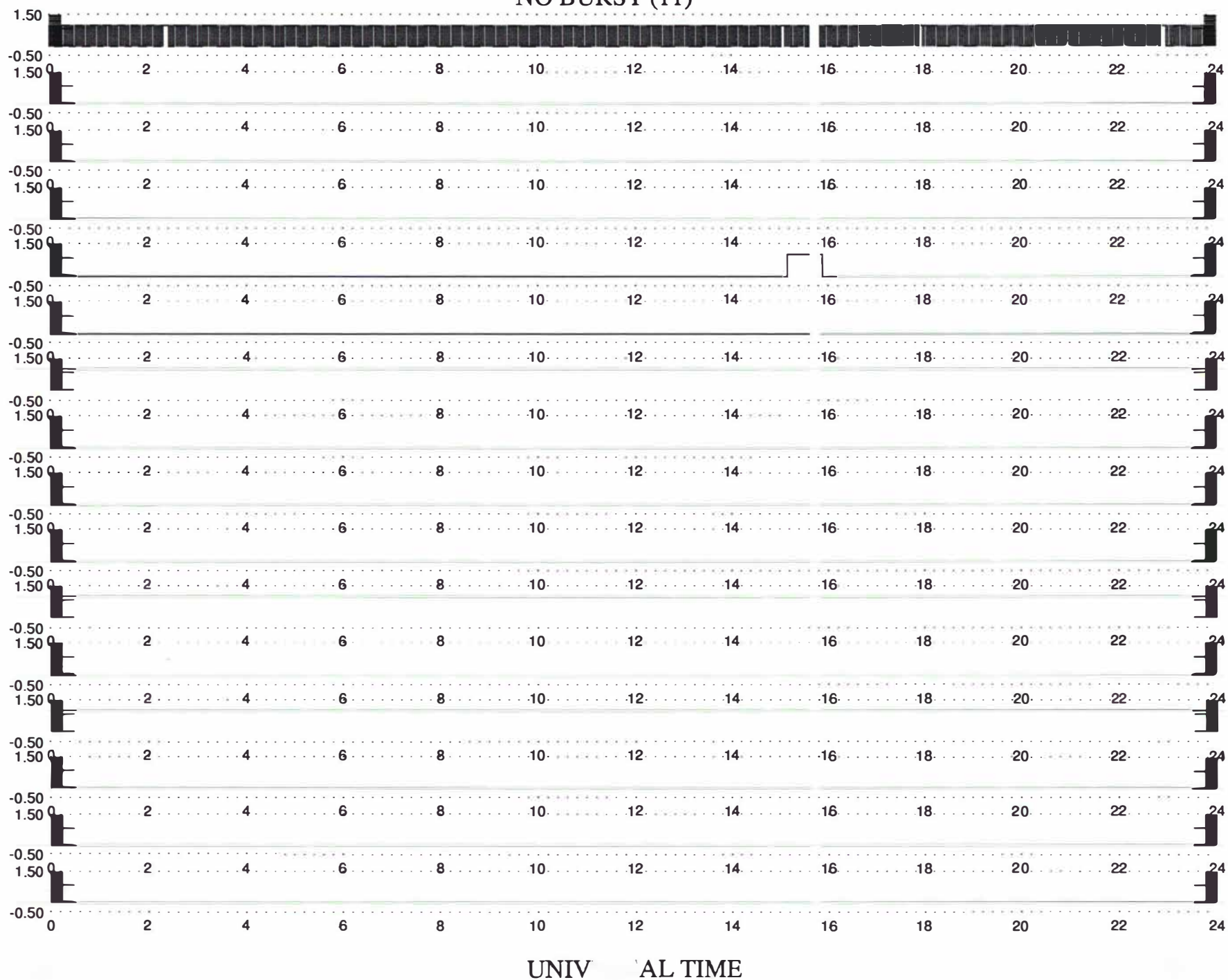


Current Time: 96/11/27, 0301 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

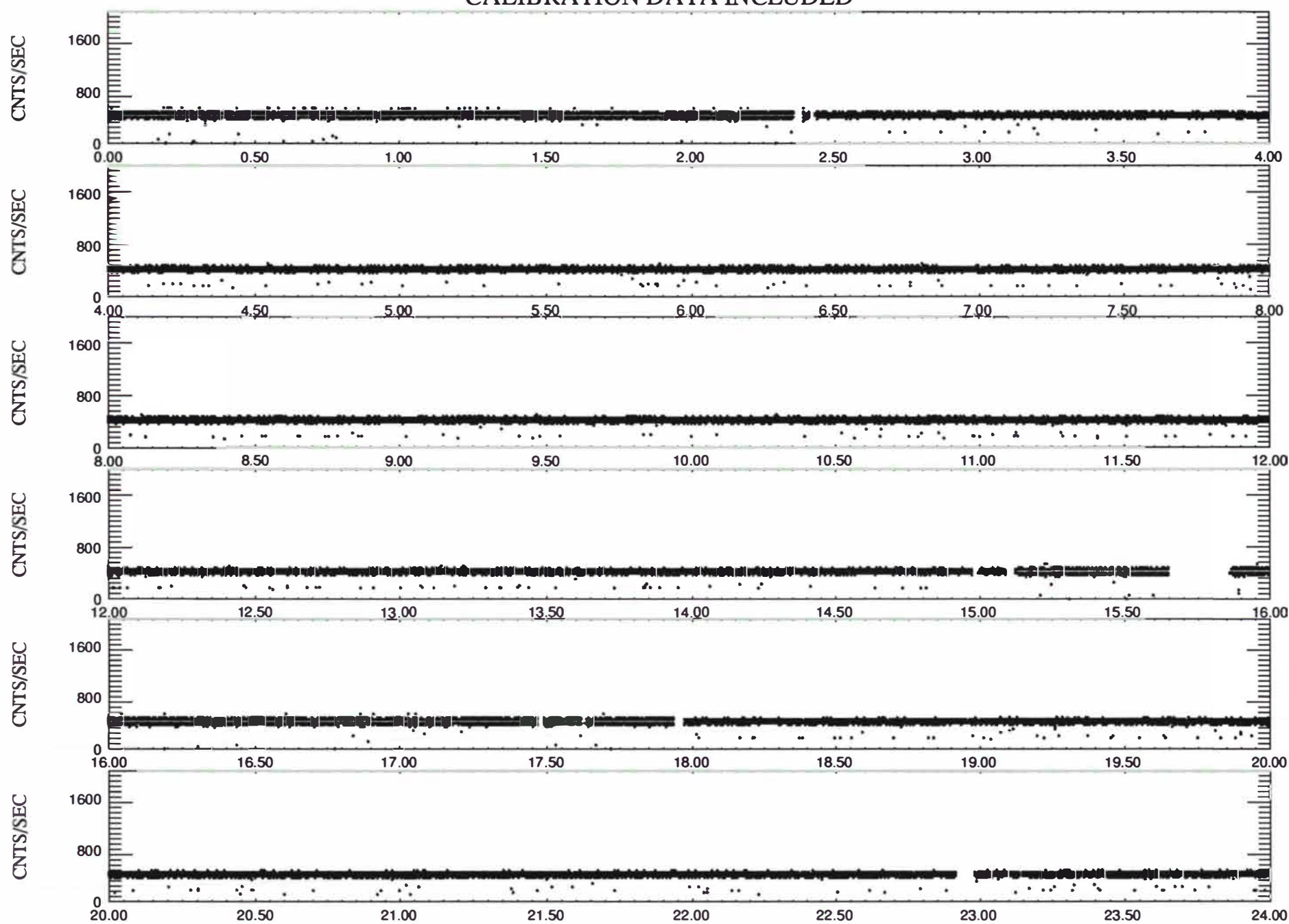
Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

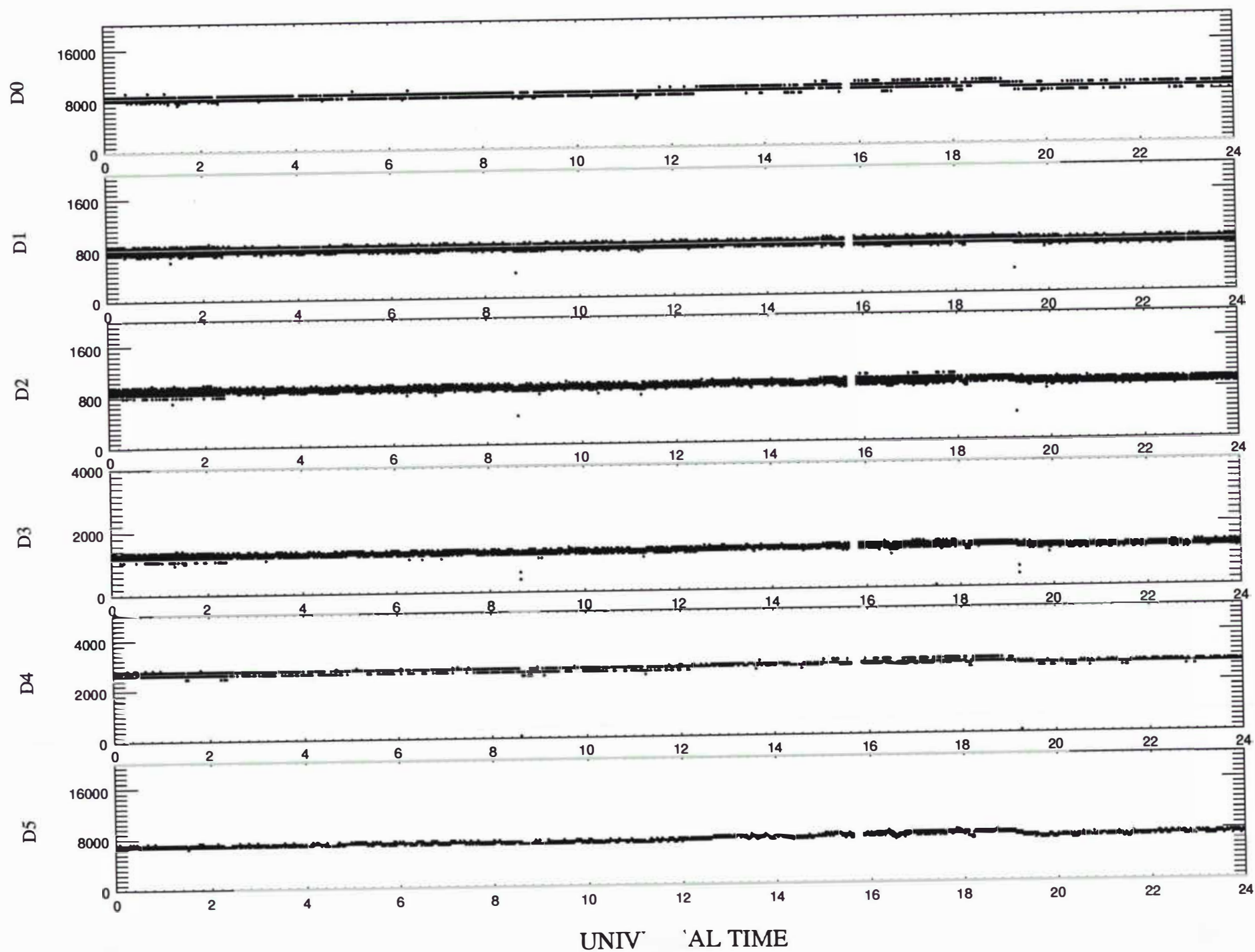
CBU	CCL	DMP	ROM	DMA	OSC	MP.	ICR	SPE	OPM	RSC	CAL	WCH	MEM	BRS	HUS
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----



CALIBRATION DATA INCLUDED



UNIV AL TIME



From springer@pop.jpl.nasa.gov Mon Dec 9 06:37 PST 1996
From: Joe Springer <springer@pop.jpl.nasa.gov>
To: "'Kevin Hurley'" <khurley@sunspot.ssl.berkeley.edu>
Subject: RE: More times to check
Date: Mon, 9 Dec 1996 06:37:26 -0800
MIME-Version: 1.0
Content-Transfer-Encoding: 7bit

Kevin,

I checked a range ten minutes before to ten minutes after each of these points and found no timing errors.

How big is the 'big list'? You have previously provided one with 575 events. I shudder.

Joe

From: Kevin Hurley
Sent: Friday, December 06, 1996 5:53 PM
To: Joe.B.Springer@jpl.nasa.gov; khurley@sunspot.ssl.berkeley.edu
Cc: khurley@sunspot.ssl.berkeley.edu
Subject: More times to check

Dear Joe,

Before I hit you with the big list of events to check, I wanted to ask if you could check the following times. We are again writing a paper on these, and need to get this straightened out quickly (i.e. within a couple of weeks).

Thanks

Kevin

Date	UT (secs)
January 22 1991	55142
February 19 1991	42204
April 21 1991	34040
April 30 1991	60428
May 07 1991	53768
May 11 1991	08090
May 22 1991	43556
June 19 1991	55254
June 27 1991	15335
July 17 1991	17265
July 18 1991	09076
August 14 1991	70996
October 05 1991	26852
October 16 1991	41542
October 31 1991	35550
November 04 1991	52695
November 09 1991	11321
November 18 1991	66112
November 26 1991	43717
December 02 1991	71640
February 18 1992	68388
February 20 1992	49020

February 26 1992 30348
March 08 1992 17470
March 11 1992 07038
March 20 1992 45256
March 25 1992 64261
March 31 1992 66408
April 04 1992 49443
April 06 1992 11150
April 14 1992 84300
May 01 1992 75040
May 17 1992 10549
May 17 1992 50706
May 19 1991 60996
May 25 1992 14411
July 11 1992 58470
July 14 1992 46275
July 20 1992 09807
July 20 1992 18344
July 23 1992 73955

From @space6.ssl.berkeley.edu,@cmsa.berkeley.edu:ASTMPH@CSEARN.BITNET Sun Aug 30 15:12:21 1992
Date: Mon, 31 Aug 92 00:12:33 MDT
From: Petr Pravec <ASTMPH@CSEARN.BITNET@cmsa.berkeley.edu>
Subject: msg from Rene Hudec
To: khurley@space6.ssl.berkeley.edu
Content-Length: 1712

to: Kevin Hurley <khurley@space6.ssl.berkeley.edu>

Dear Kevin:

we have found the following positional coincidences between BATSE
GRB and OT records:

GRB 920224 OT 910407 *In 4 mag, but count rates not too bad. Get BATSE data + check*
GRB 911228 OT 910719 *Get BATSE data*
GRB 920505 OT 910811 " " "
GRB 920121 OT 910917 " " "

i.e. these GRB and OT coincides positionally within the given
optical and gamma ray error boxes. However, the error boxes we
have for these GRB are large and so the coincidences may be
accidental only. Please let me know whether or not are the
positions of these GRBS known more accurately by triangulation
method. I have already asked Chryssa but she recommended to ask
you directly as owner of this information.

The same information would be also important for those GRBS we
have simultaneous plates :

911025, 911027, 911127, 911202, 911209, 911210, 920110, 910511, 910809
910505, 910829, 910902, 911129, 911228, 920121, 920209, 920224, 920227, 920305
and 920505 *Same as above*

For these GRB, we have between 1 and 9 Plates taken simultaneously
and covering the position. However, the BATSE errors are large (
14 deg dia) and hence the search for optical counterparts is very
laborious and difficult. If you would have a more precise position
determined by triangulation, then we could investigate this box
more carefully.

Naturally, I guarantee you that this information will not be given
to any other person and will be used for the proposed search only.
In the case of any discovery, publication etc. you will be
considered as co-author and asked for permission prior release.

Regarding the release of HCO plates, I have send an email message
to Martha Hazen . She will contact you when necessary . Thank you.

Kind regards Rene Hudec

911025	No	920121	Get BATSE data + look
911027	No	920209	No - in 4 mag
911127	Yes ✓	920224	See above comment
911202	Yes ✓	920227	Get BATSE data + look
911209	Yes ✓	920305	"
911210	Maybe		
920110	Yes ✓		
910511	No ✓		
910505	Yes No		
910809	Yes but event not known		
910829	Get BATSE data + look		
910902	" "		
911129	" "		
911228	" "		

CATSEARCH PROGRAM

BATSE BURST # 179
EVENT OF 1991 MAY 11 DAY OF YEAR=131
EVENT CROSSING TIME AT BATSE : 7908. S. OR 02:11:47.7
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 266.500 57.200
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 11/ 5/ 91 IS:
RA= 119.425 DEC= 22.281 DIST= 3.222 AU
BATSE-ULYSSES DISTANCE = 481939392. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 84.14 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 164.06 SECS.
CROSSING TIME AT ULYSSES IS 8072. S. OR 02:14:31 +/- 330.13 SECONDS

Helio. corr removed
Date: Mar 31 1997

BURST TRIANGULATION CHECKLIST

1. Ulysses Data

- ☒ Jim Schmidling's stat file correction applied?
- ☒ Final ephemeris used?
- ☒ Final, CDROM data used?
- ☒ Were data checked by Joe Springer for 0.5 s errors?
- ☐ If a 2 spacecraft triangulation, was Ulysses time corrected for aberration?
- ☒ Is the order of the data in CORREL such that a vernier is done on the data with the best time resolution?

2. BATSE Data

- ☒ 2.042 s subtracted for bursts prior to June 25 1992 and DISCSC programs prior to Version 2.16 (August 28 1992)?
- ☒ Does T_0 in data file agree with T_0 in plot?
- ☒ BATSE ephemeris for T_0 ?
- ☒ Error circle position and radius from public catalog used?
- ☐ If MER data were used, is a 30 ms systematic error included?

3. PVO Data

- ☒ Ephemeris of PVO used (not Venus)?
- ☒ 2000 coordinates used?
- ☒ Geocentric time used?

But this one is not in JL's PVO catalog

From jlaros@LPL.Arizona.EDU Mon Jul 21 10:06 PDT 1997
Date: Mon, 21 Jul 1997 10:12:22 -0700
From: jlaros@LPL.Arizona.EDU (John Laros)
To: khurley@sunspot.ssl.berkeley.edu, cline@tgrs.gsfc.nasa.gov
ject: IPN

Kevin and Tom,

I'm beginning to think we should delete 910511 (BATSE #179) from our list,
for the following reasons:

- (1) PVO has a data gap around the expected arrival time of the burst.
- (2) The PVO response seen about a minute later is only in the lowest energy channel, and therefore might be a glitch.
- (3) If we use the PVO data, our error box misses the BATSE box by a couple of sigmas more than any of the others. A result like that should not be published unless we are sure of it.

What is your opinion?

John

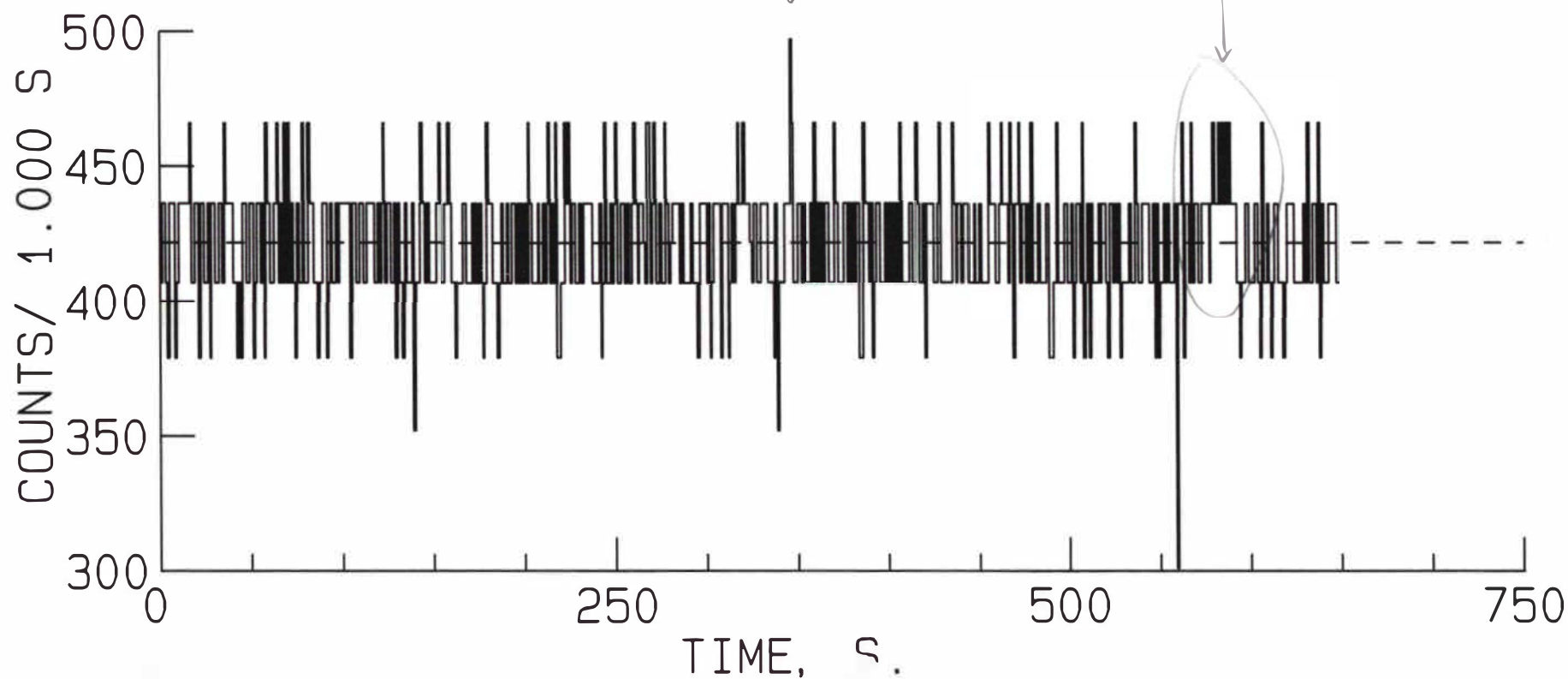
ULYSSES RT

31 / 3 / 97

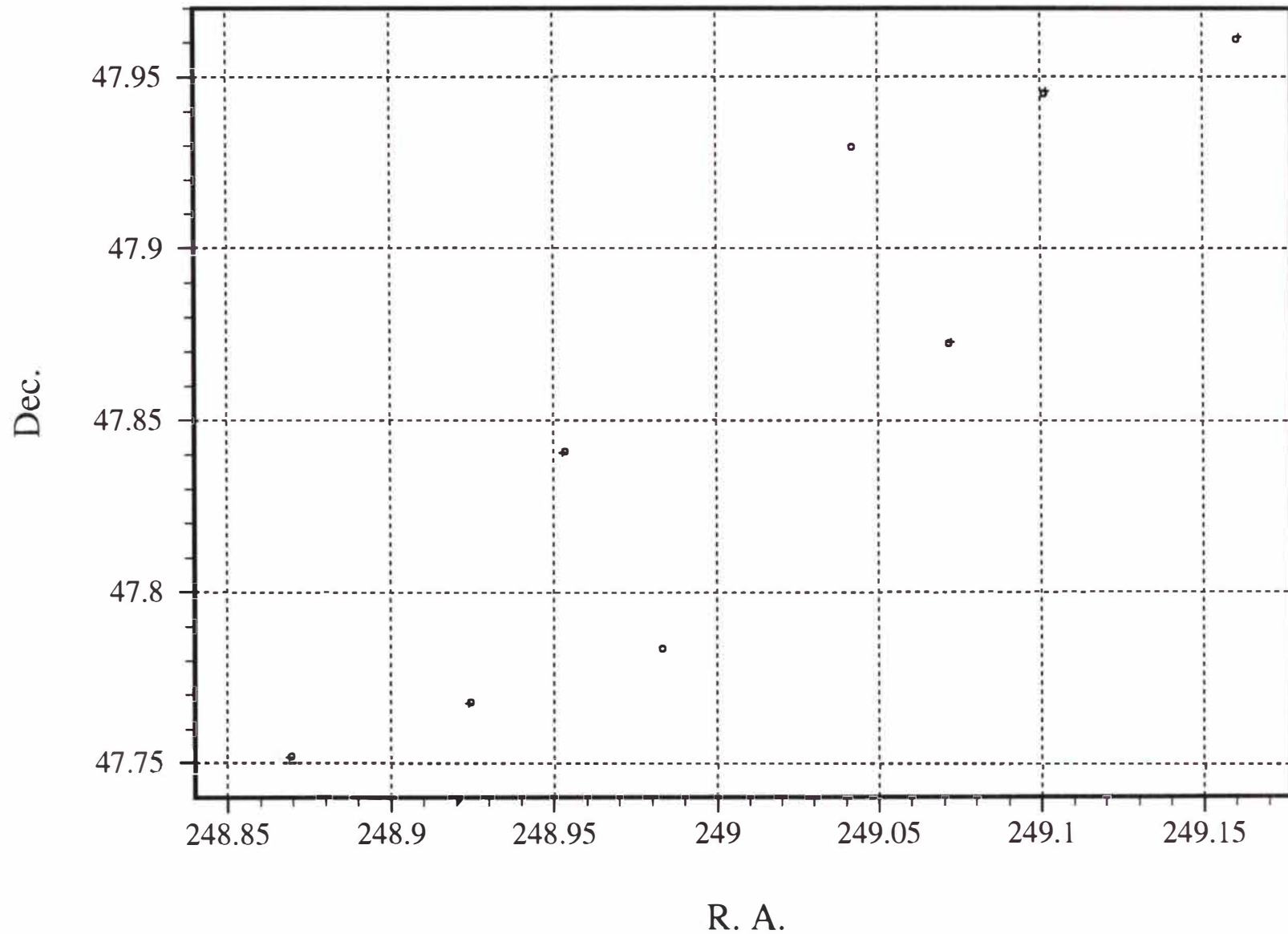
11 / 5 / 91 7740.005 s

31- 223 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



Trig. #0179 (910511)



BATSE

11/05/91

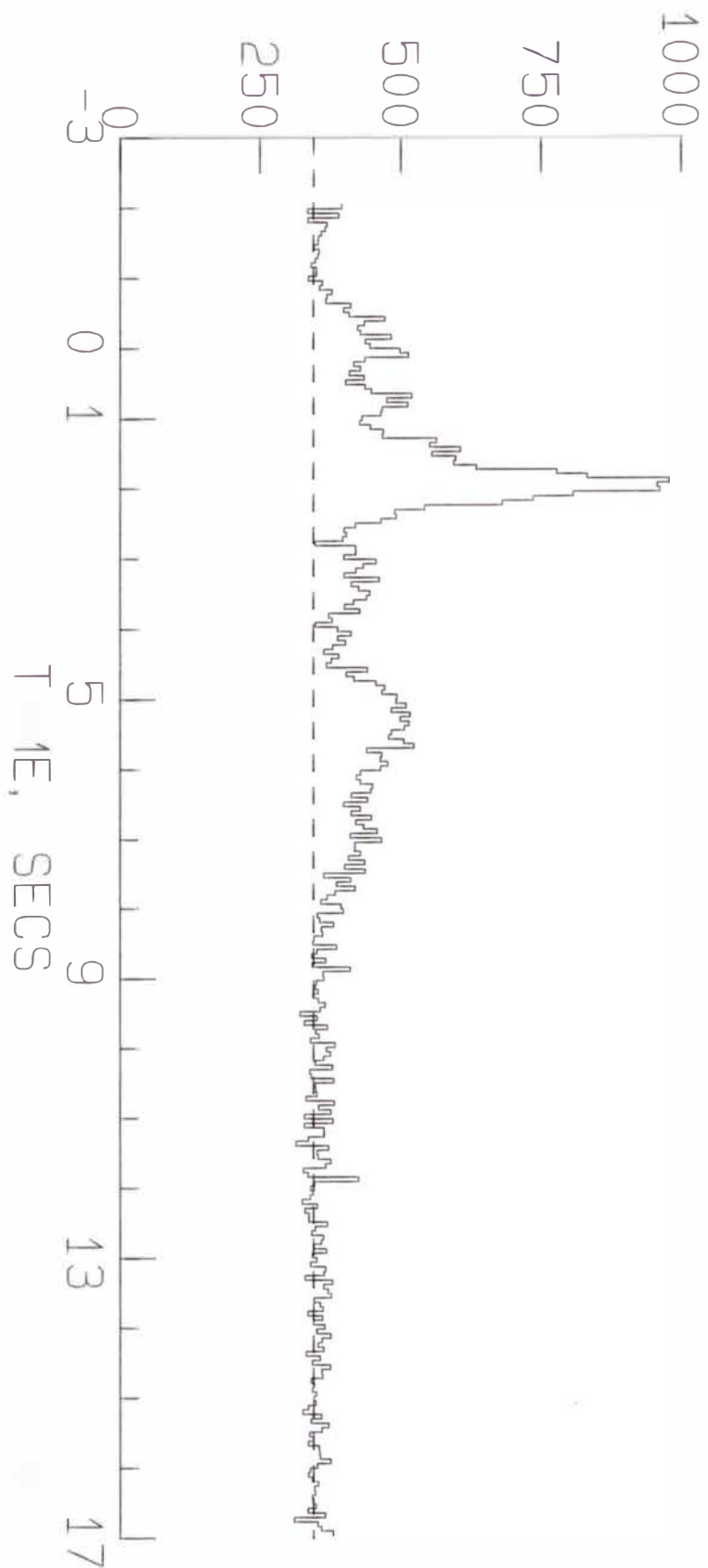
~~7910.000~~

25- 100 keV

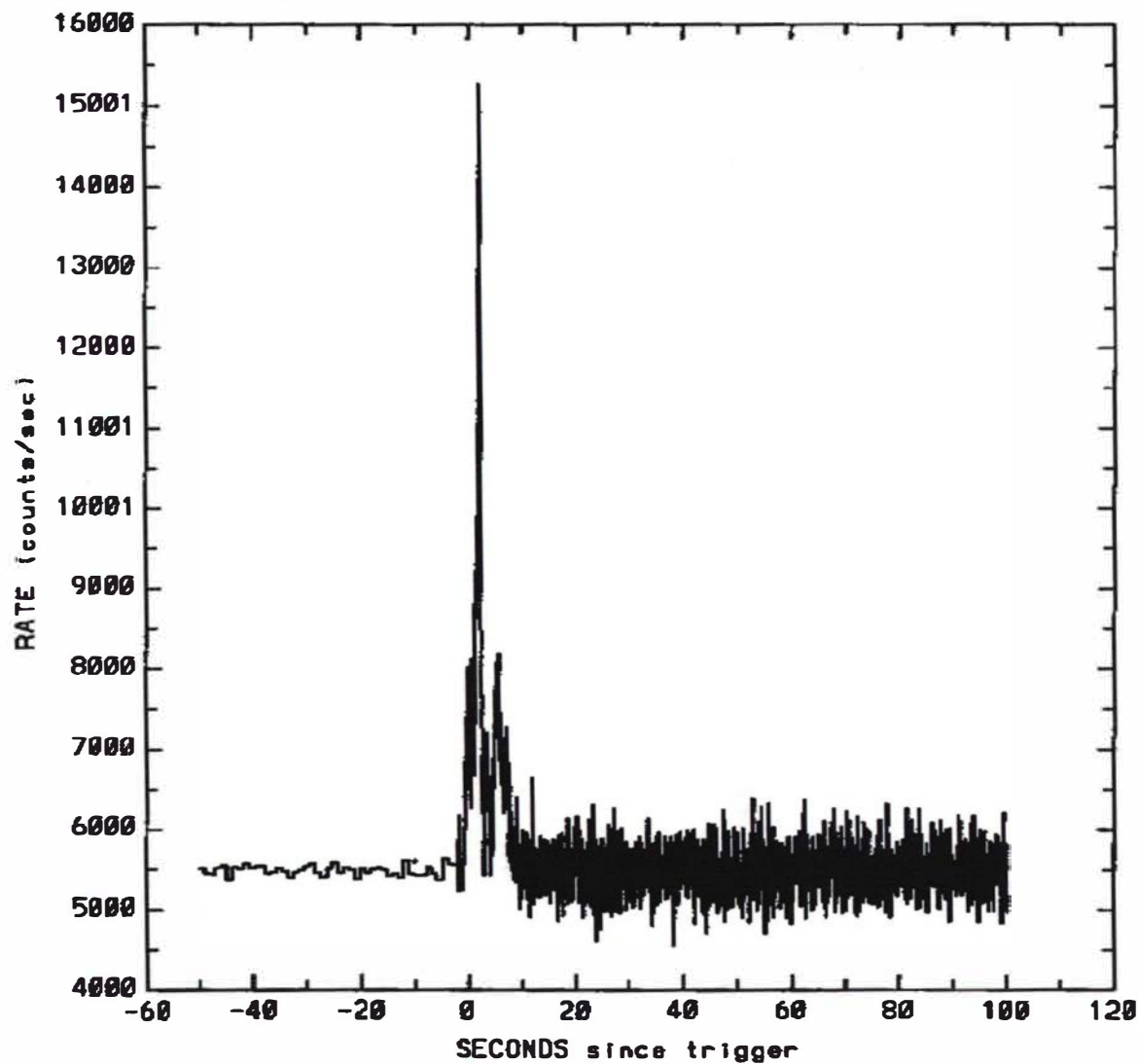
~~7905.649~~

7907.691

COUNTS/ .064 S



DATA FOR K. HURLEY



22-JUN-1993 09:24:48

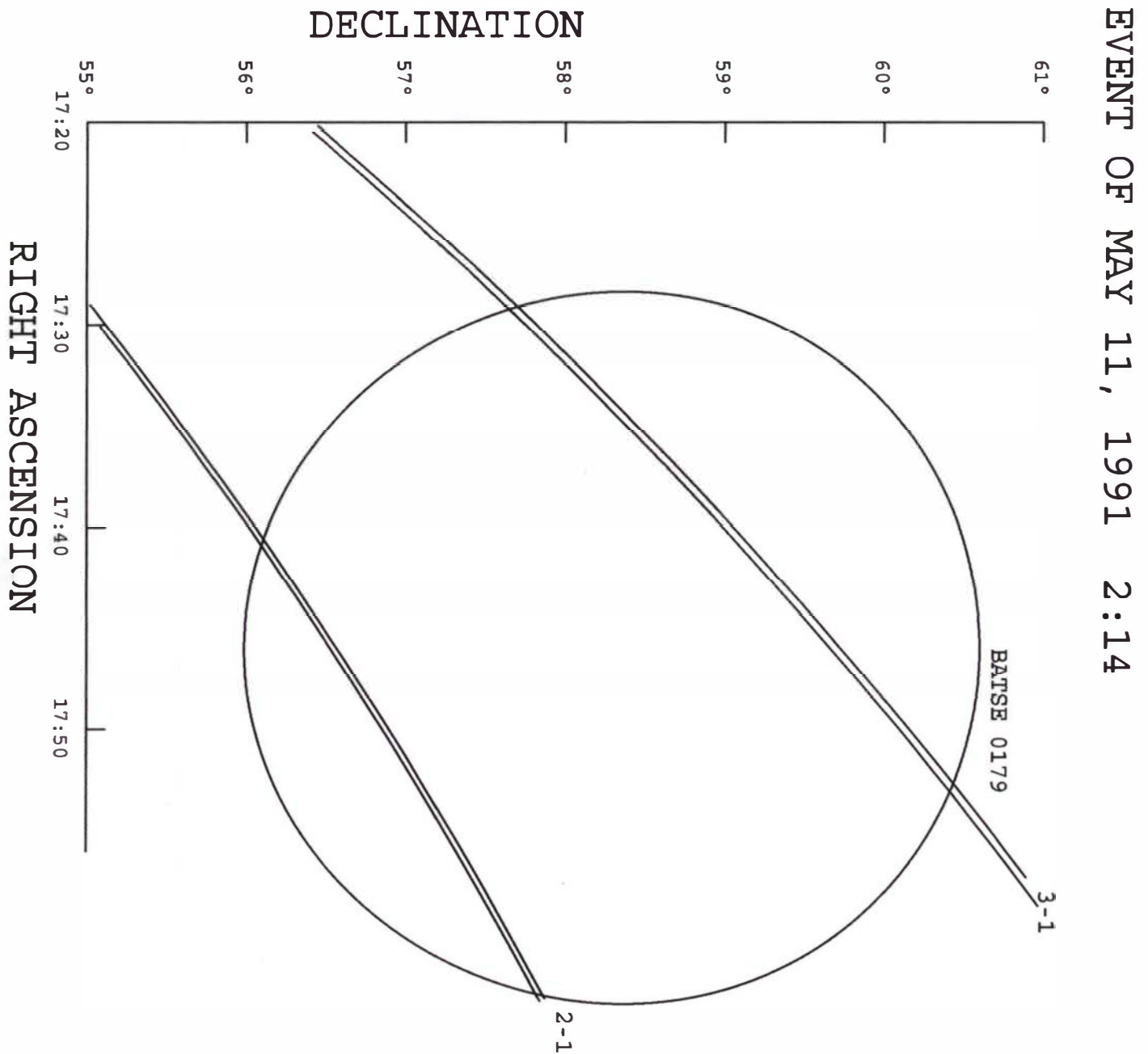
Created by MOPS BD
(Burst Display)
Version 2.19*To correct*

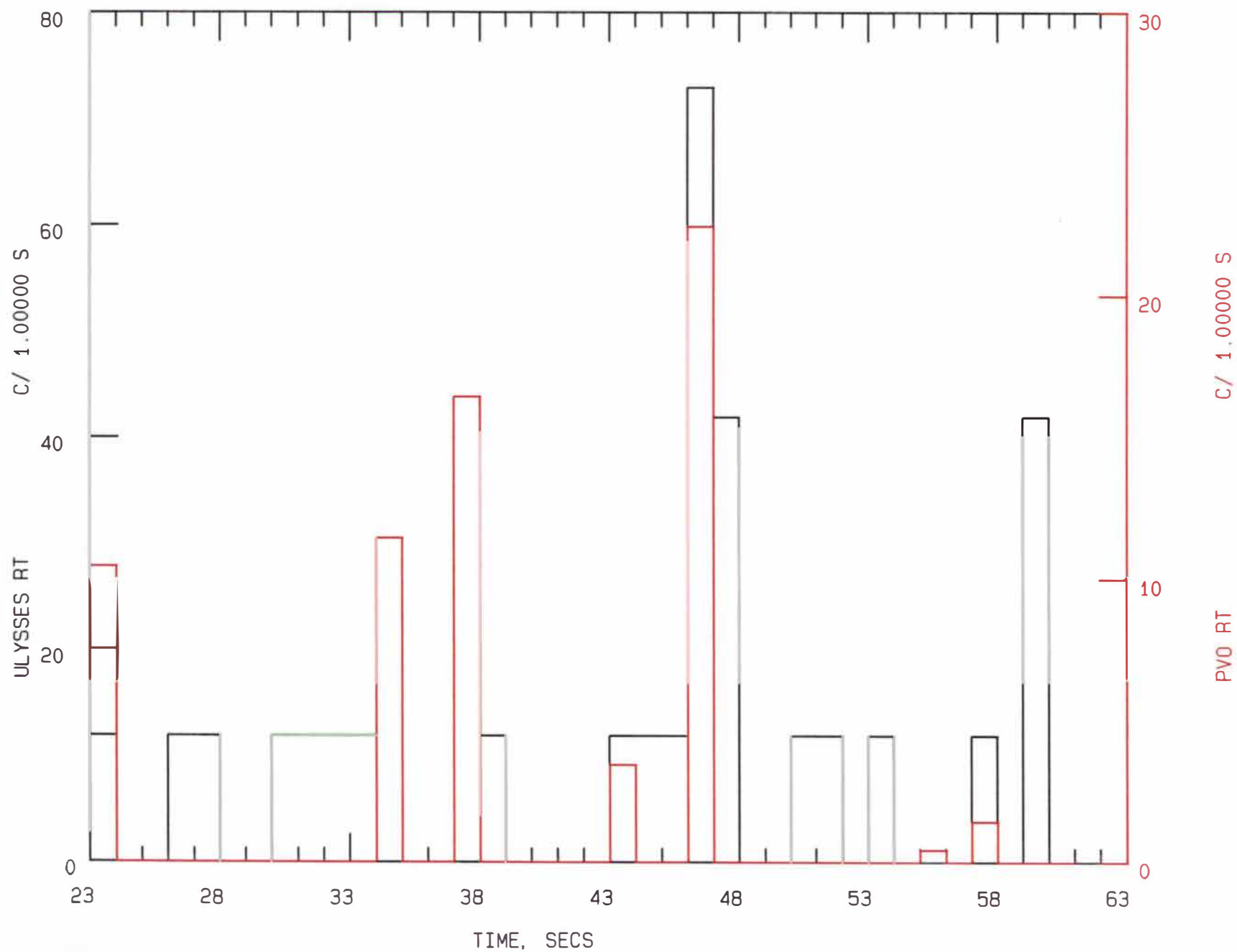
Trigger = 179

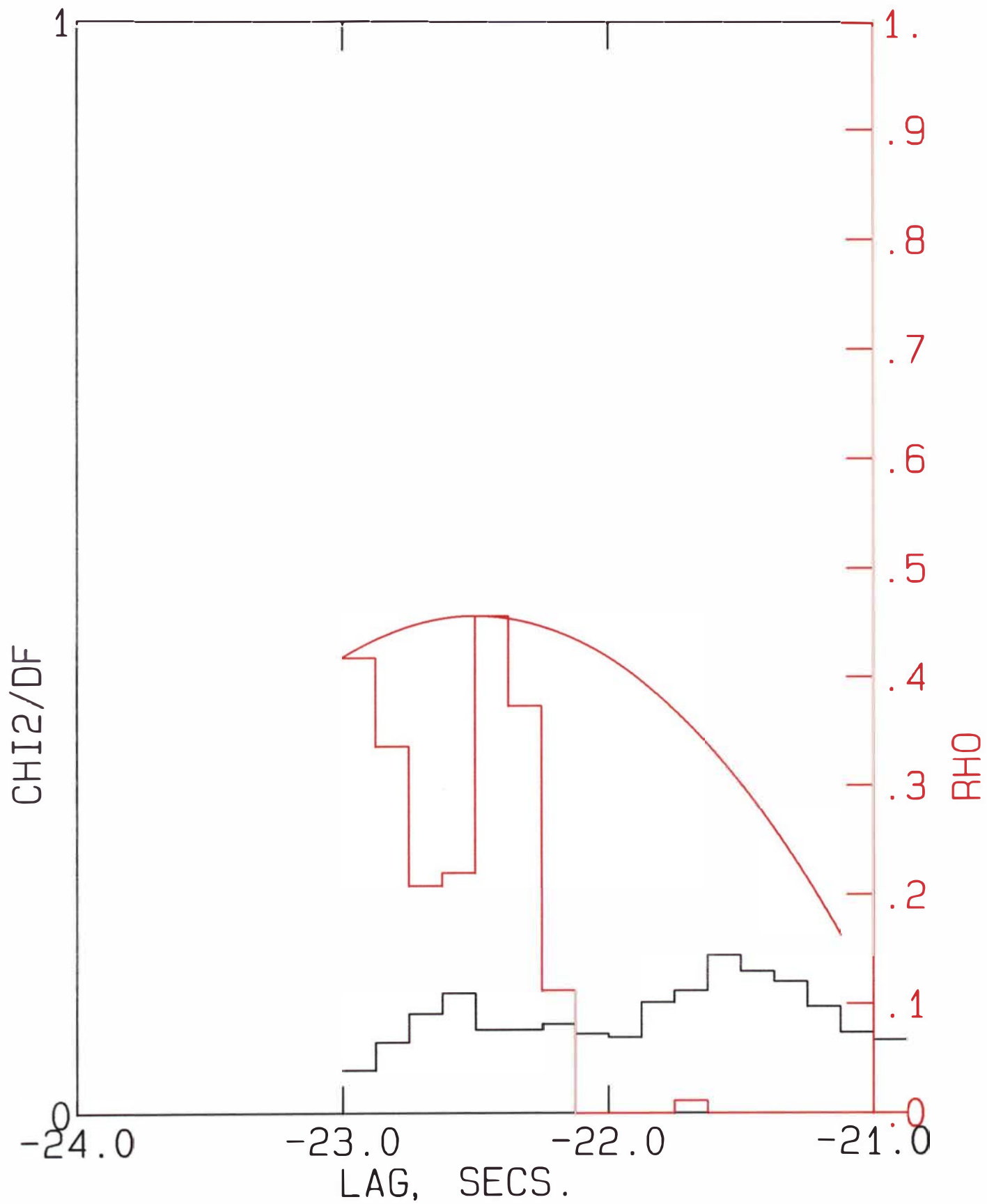
Trigger Time:
8387 / 7087.691*-2.042 =*Burst Data Type:
DISCSC*7205.649*** Correct**NO*Deadtime
Corrected: NBackground Data
Type: PREB + DISCLAMinimum Integ. Time:
0.064 secondsDetectors [7..8]:
10001000Discriminators:
(1, 2)Quality Mask:
80ISPI

G=GALACTIC EQUATOR

3 PVO







PVO RT

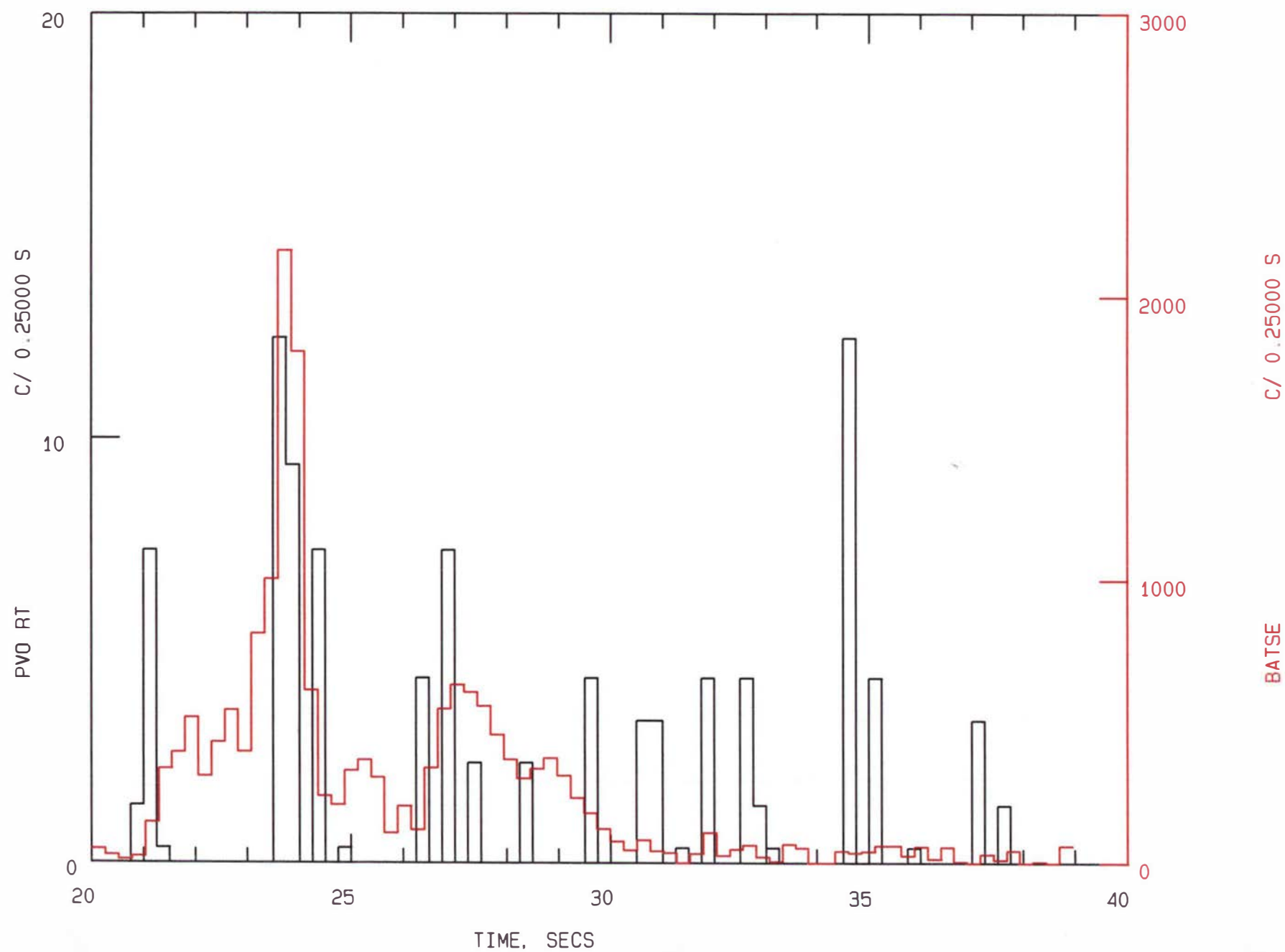
-BATSE

CORRELATION

11/ 5/91

7997.079

31/ 3/97



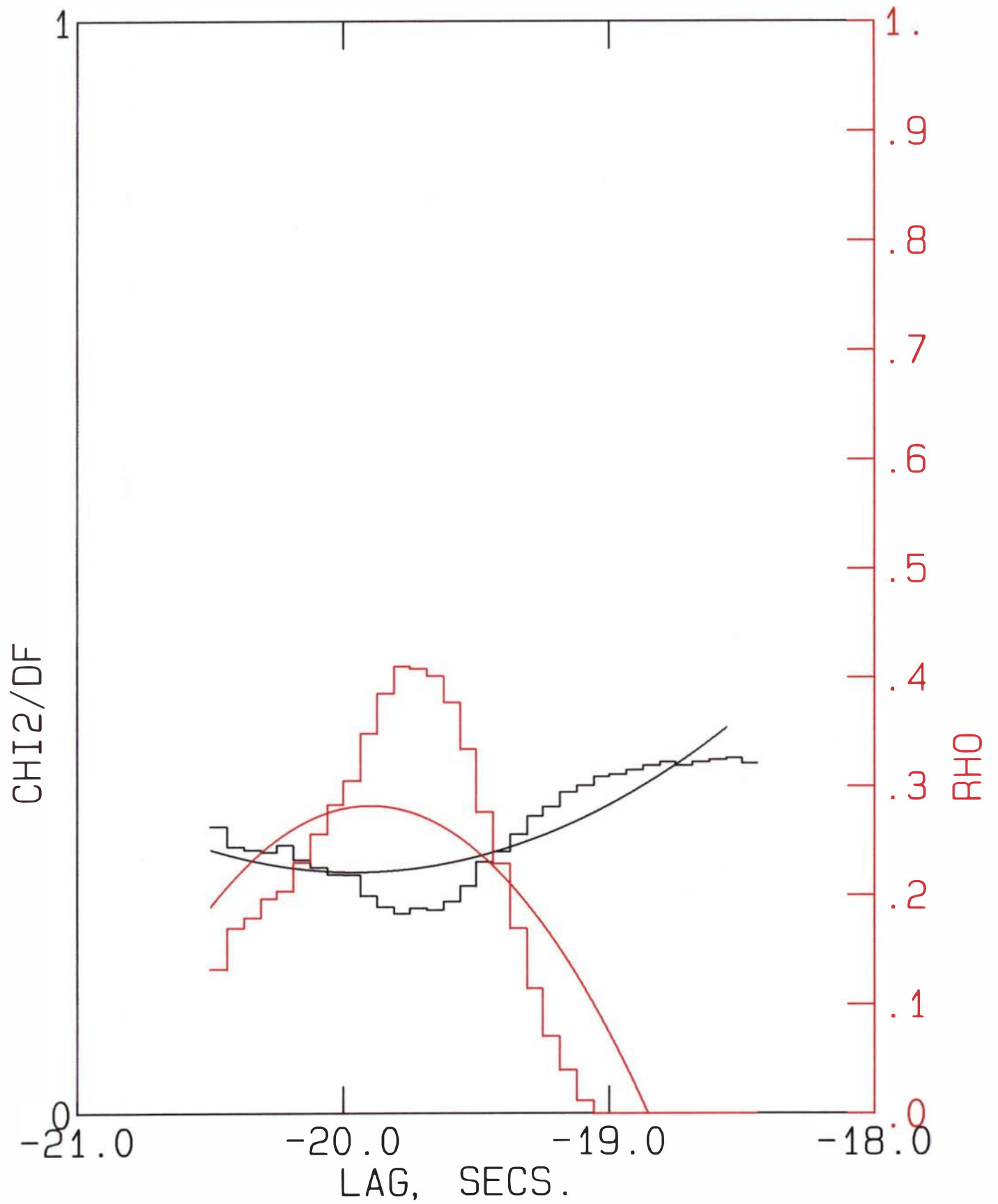
PVO RT

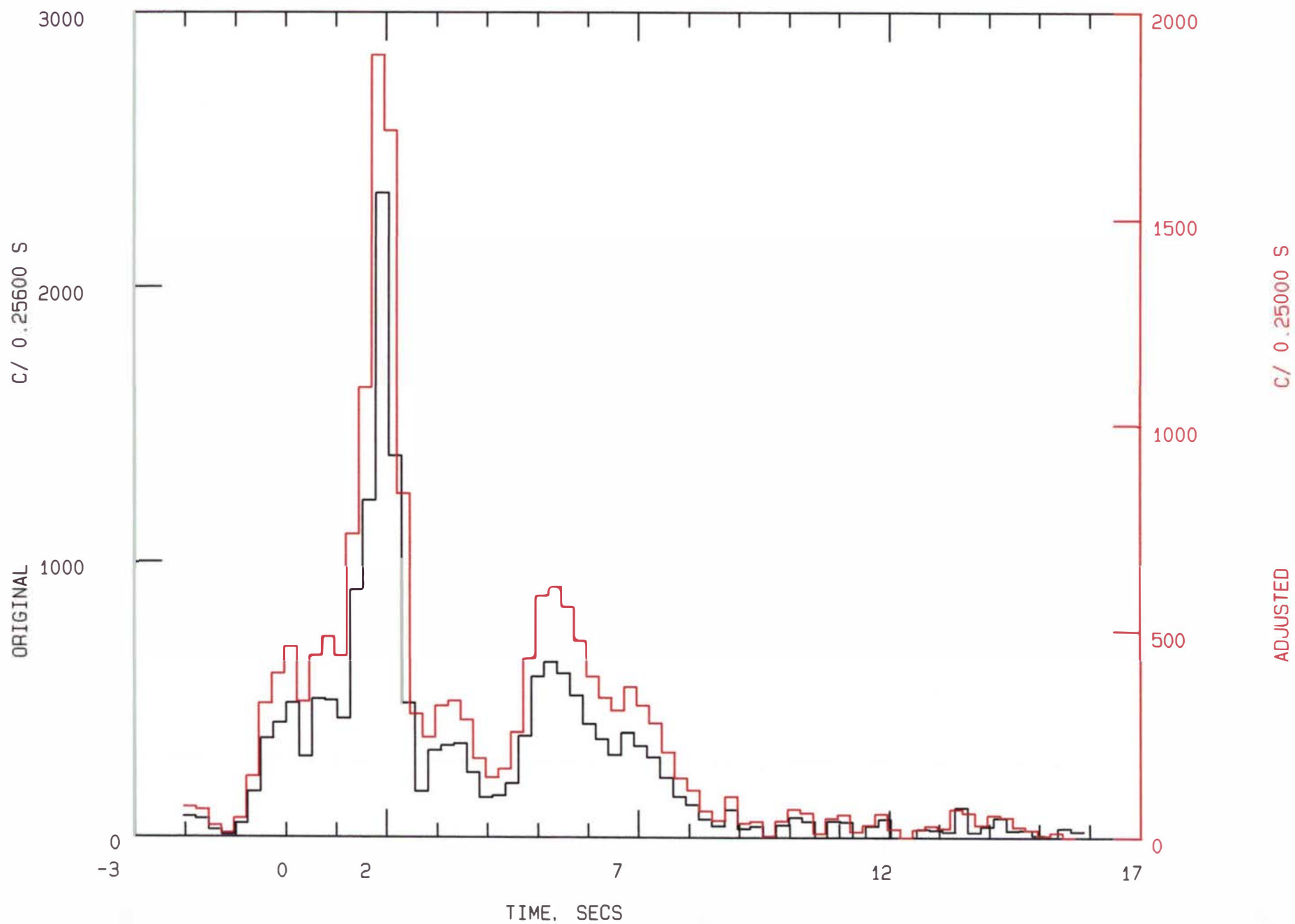
-BATSE

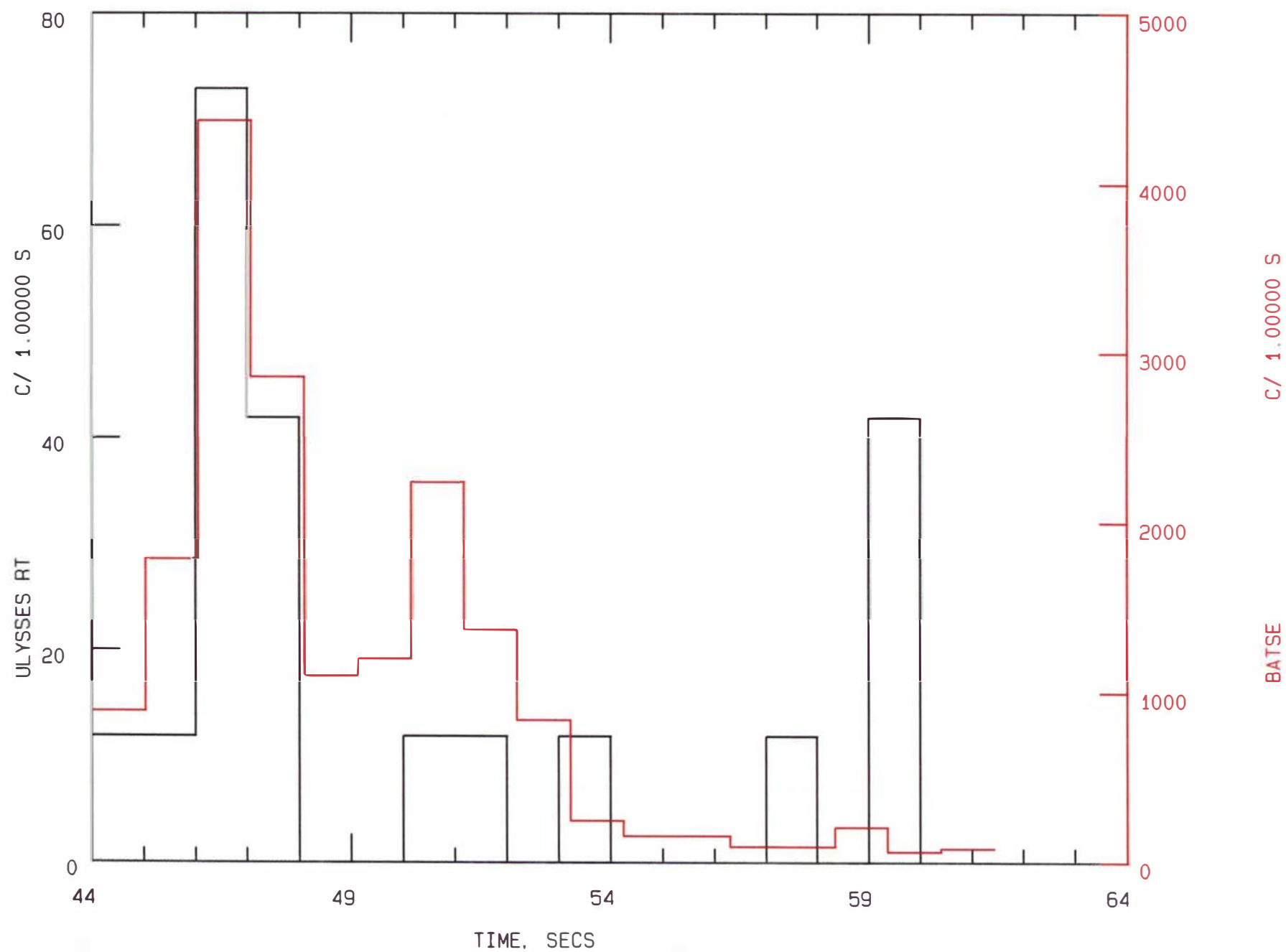
CORRELATION

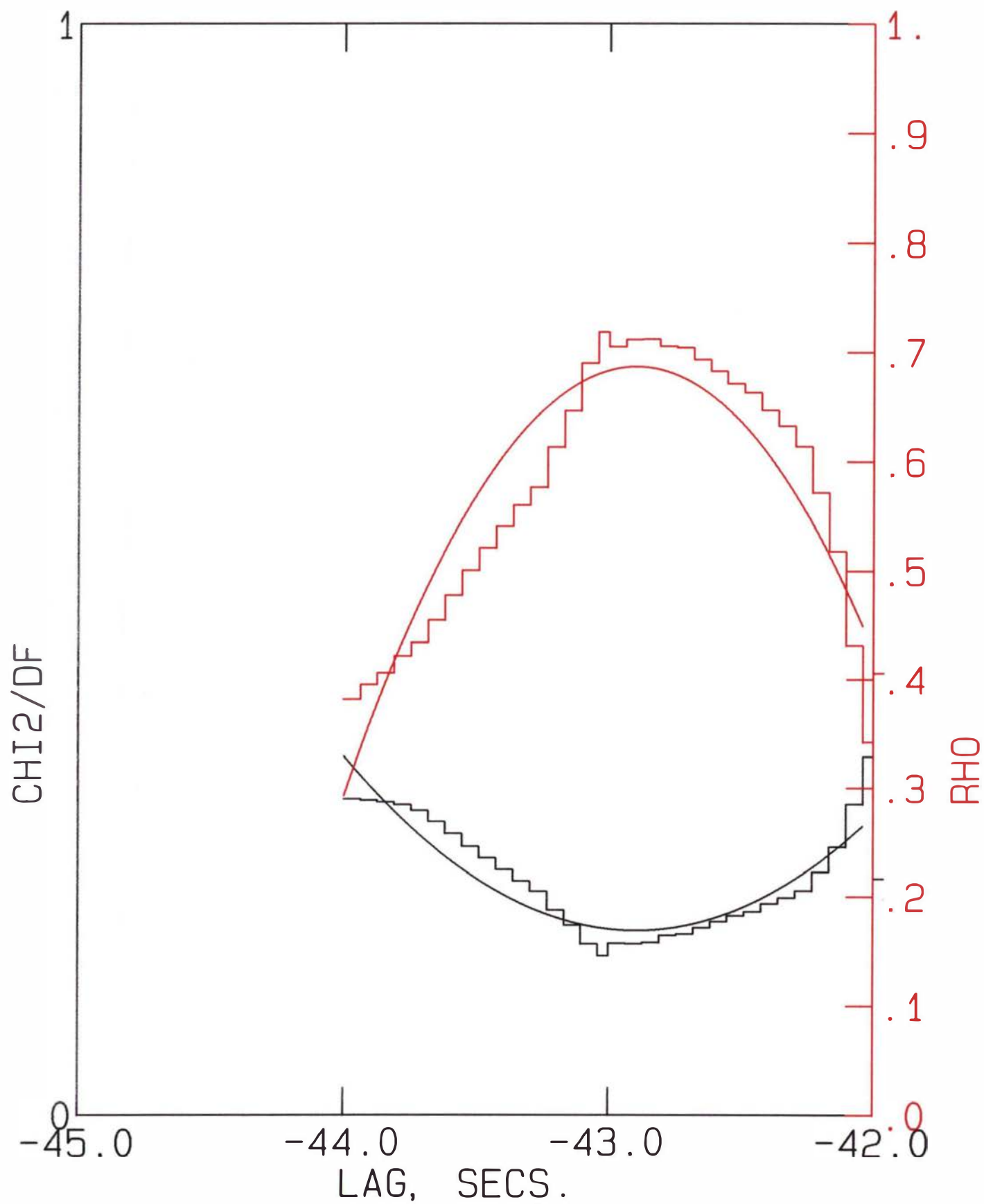
11/ 5/91

7997.079

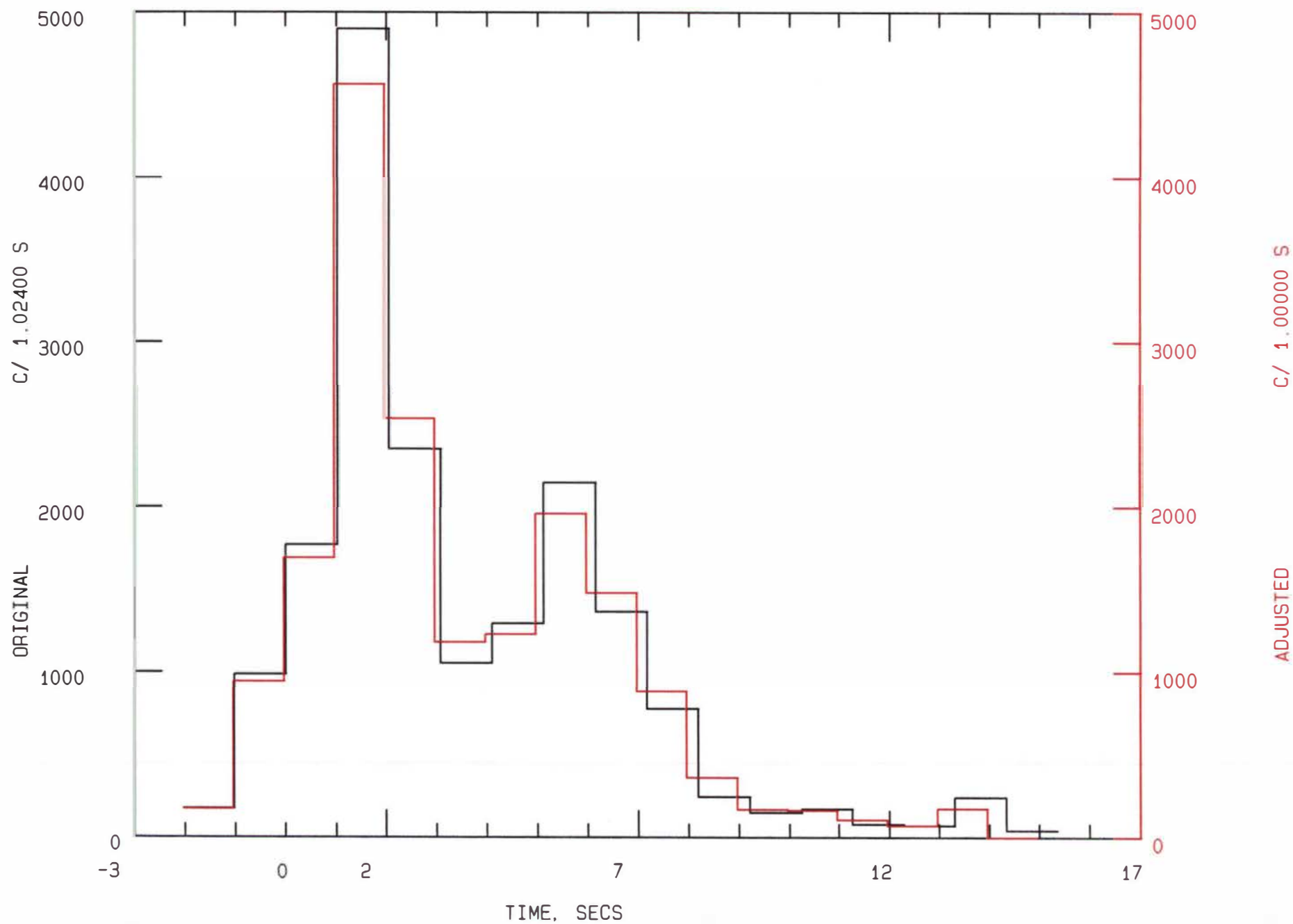








31/ 3/97



PVO-RT

11 / 5 / 91

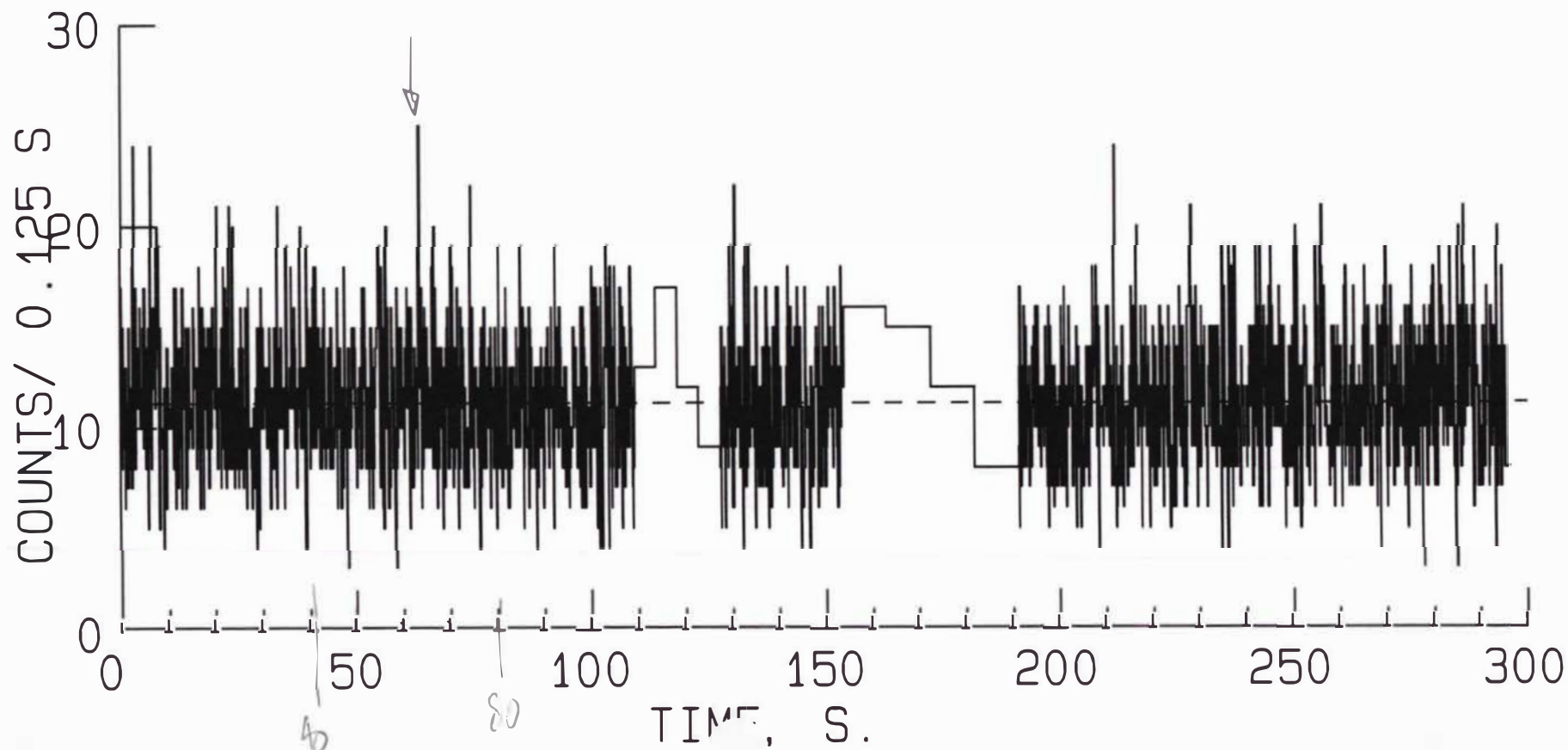
7957.078 s.

0.125 S. INTERVALS REGROUPED BY 1

100-2000 keV

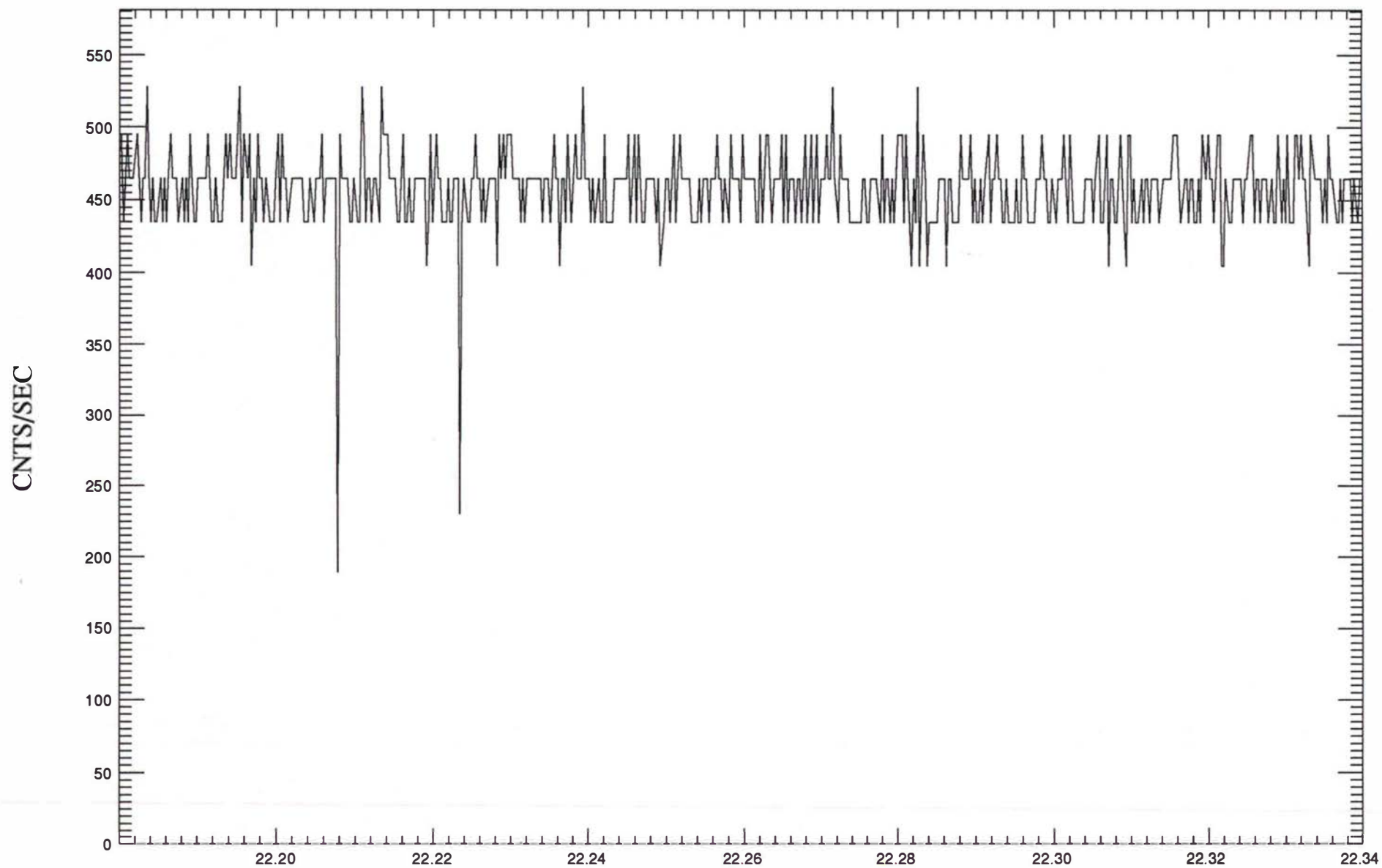
N= 10 M= 2

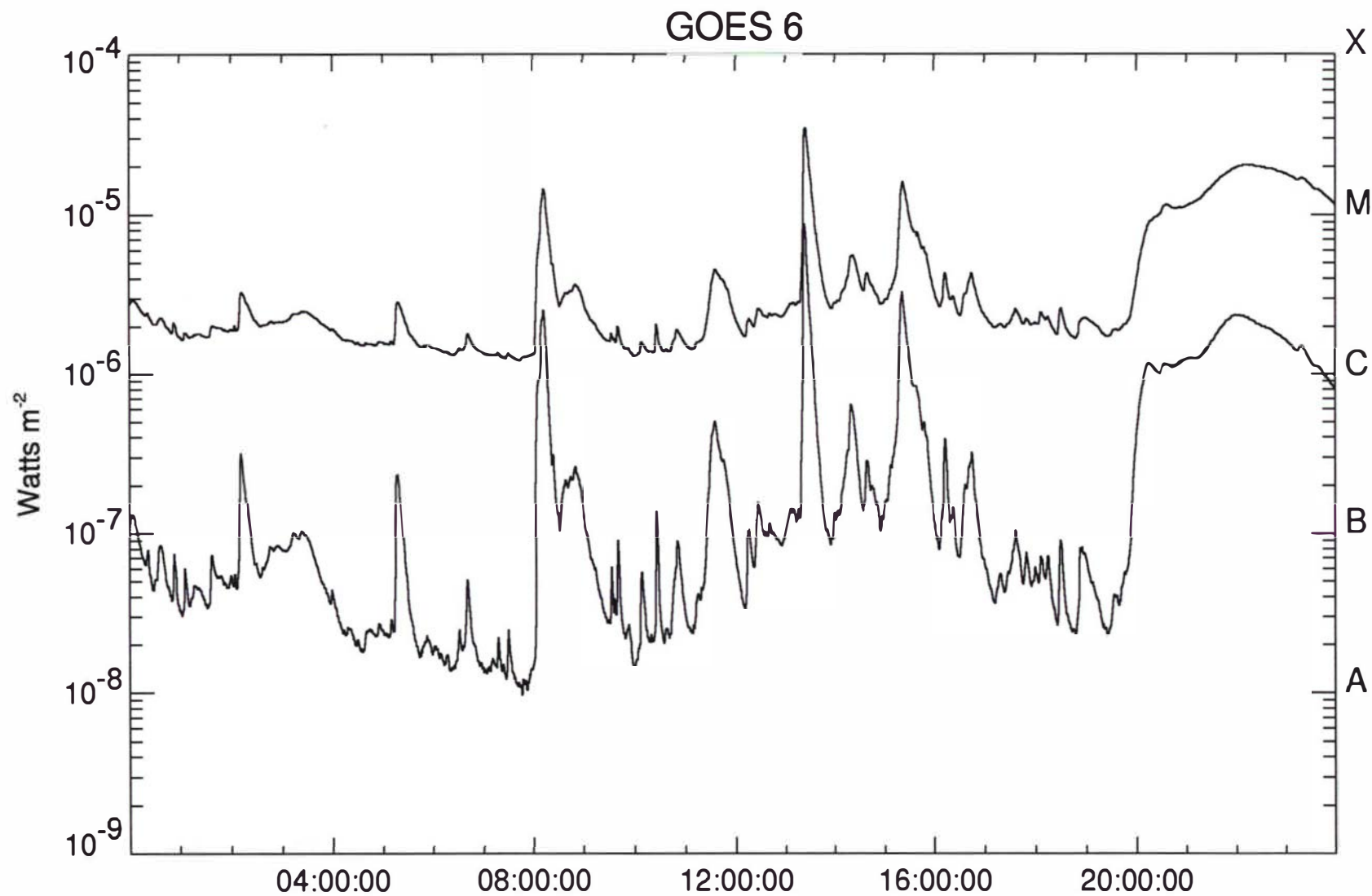
>4.0 SIGMA FLUCTUATIONS



CALIBRATION DATA INCLUDED

May 11





Data Start: 91/05/11, 0000:03

Channel 1 (1.0 - 8.0 Angstroms)

Channel 2 (0.5 - 4.0 Angstroms)

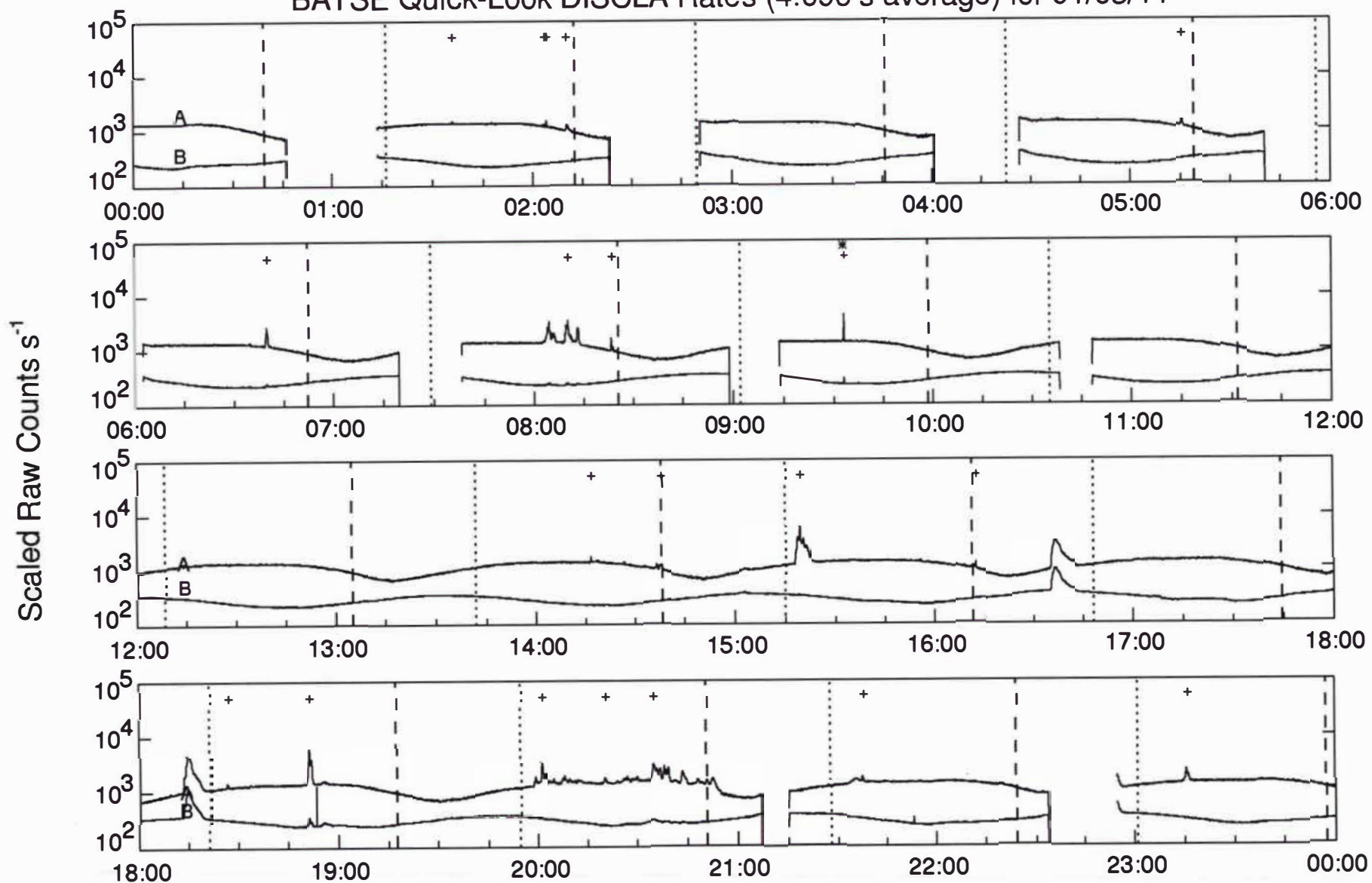
Plot created: 96/11/27, 0303

Background not subtracted

Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/11

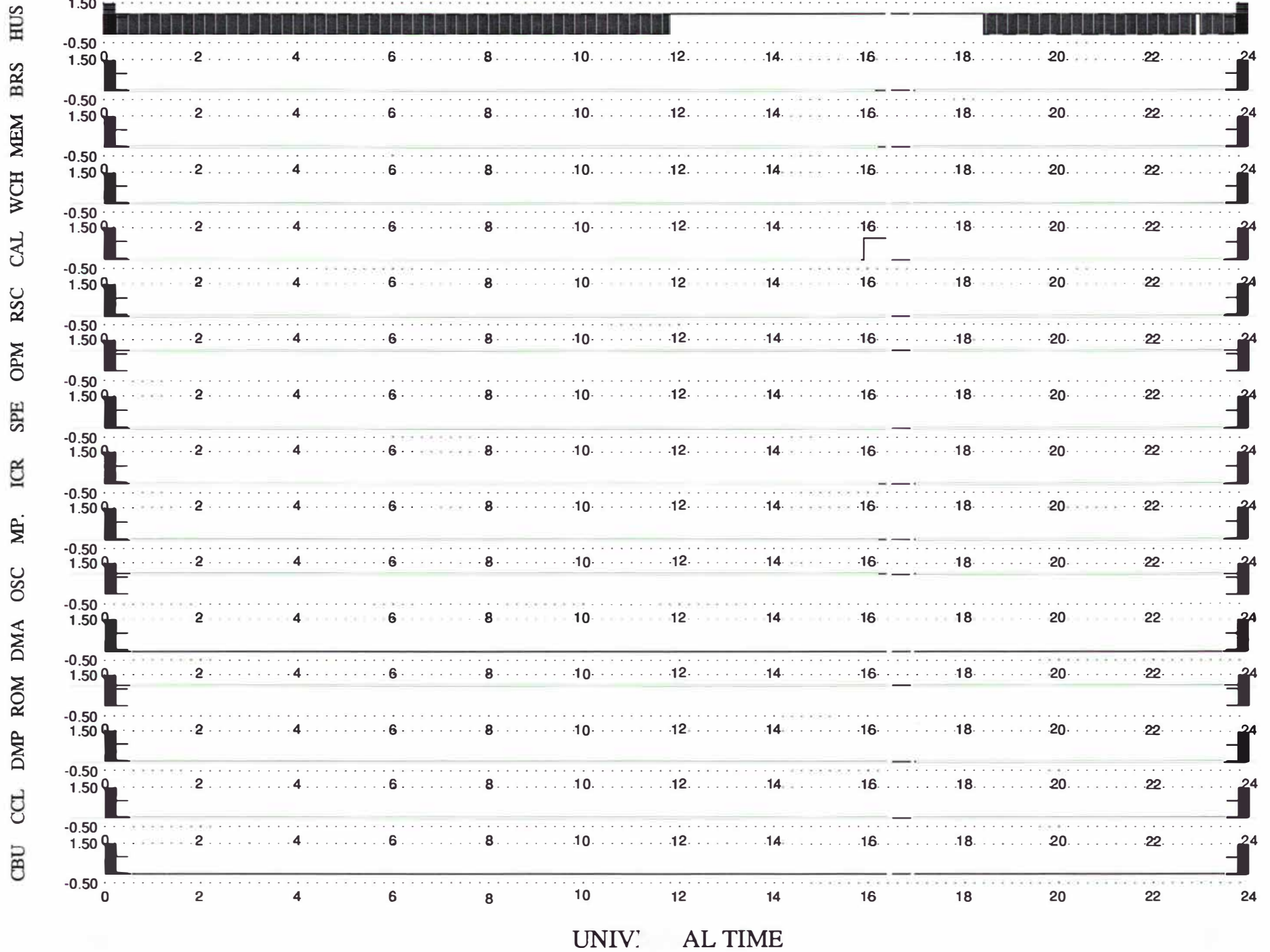


Current Time: 96/11/27, 0304 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

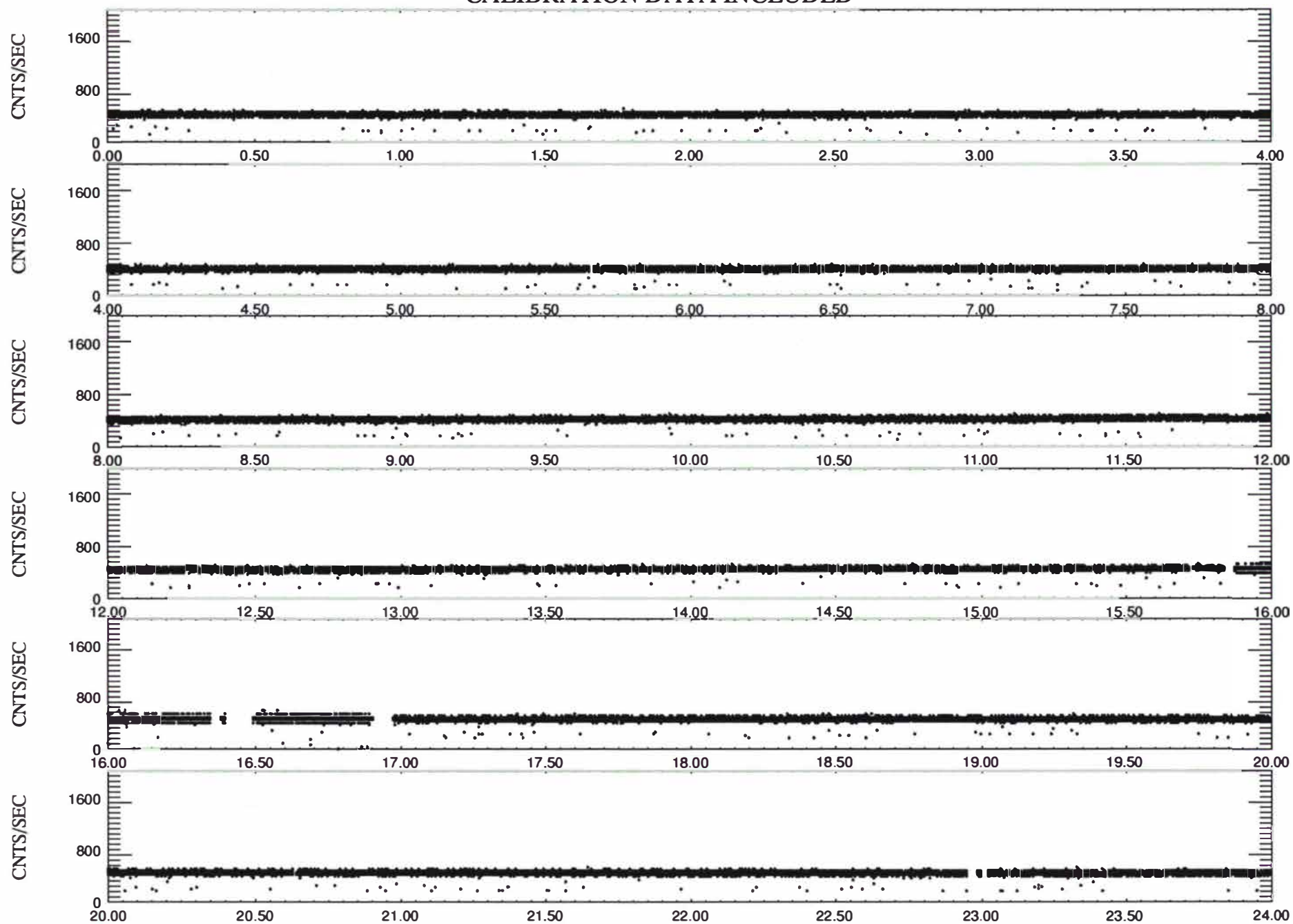
Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

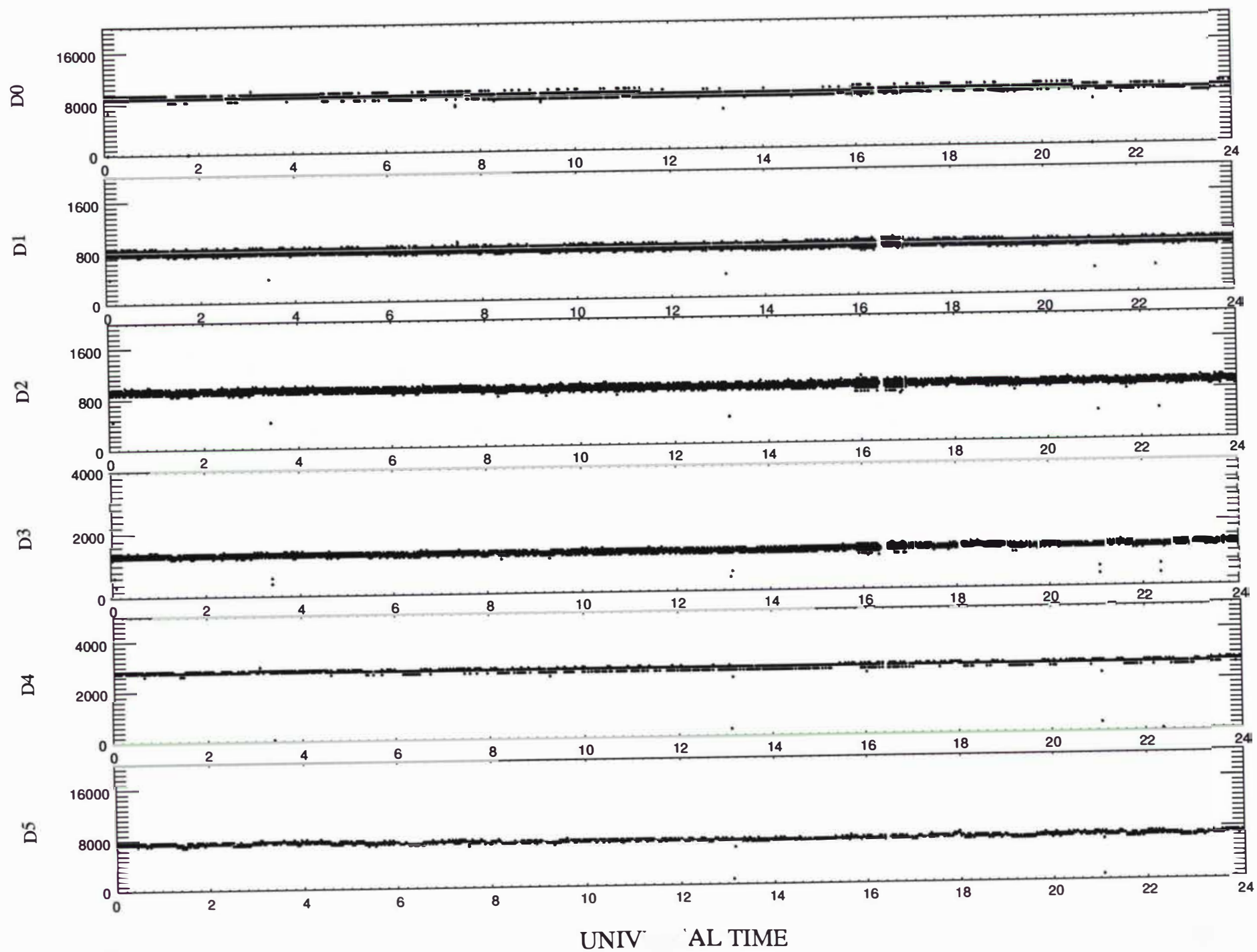
NO BURST (11)



CALIBRATION DATA INCLUDED



UNIV AL TIME



CATSEARCH PROGRAM

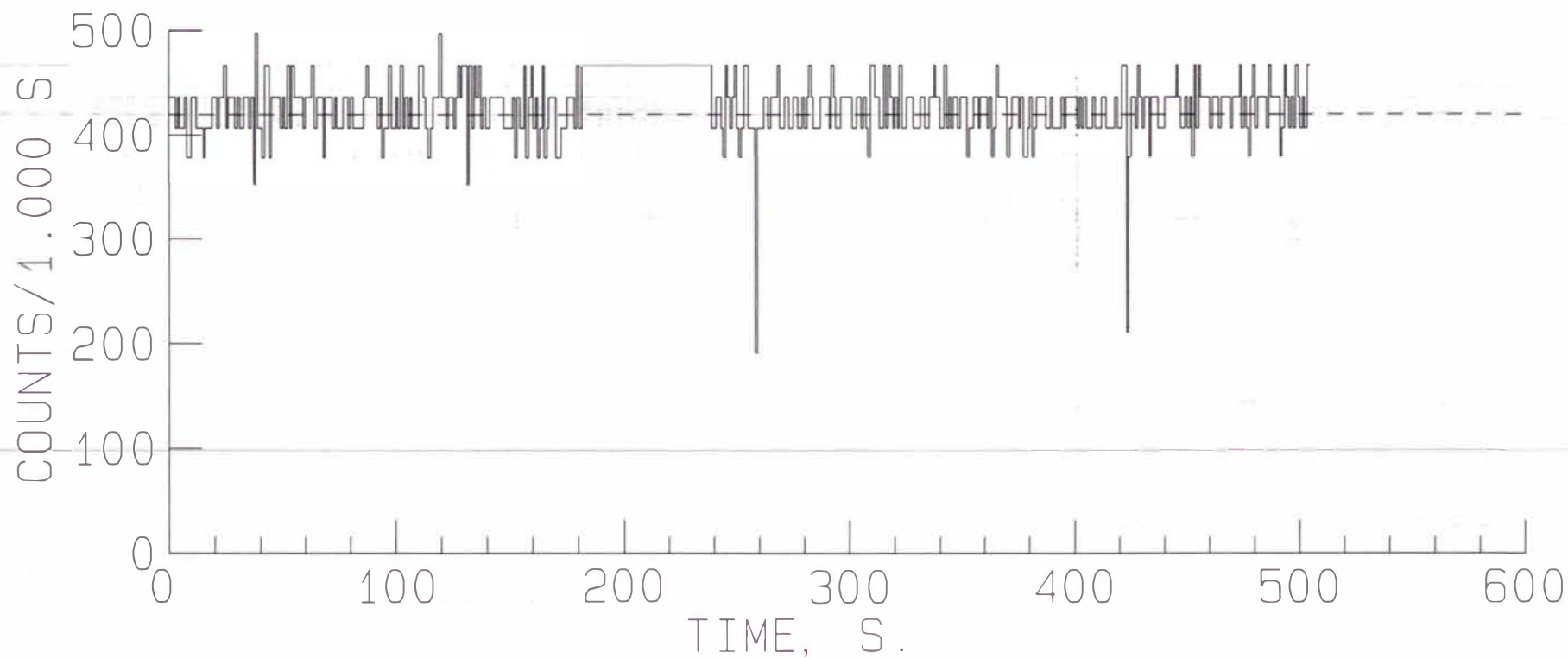
BATSE BURST # 185
EVENT OF 1991 MAY 12 DAY OF YEAR=132
EVENT CROSSING TIME AT BATSE : 54909. S. OR 15:15:09.4
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 93.600 71.700
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 12/ 5/ 91 IS:
RA= 119.742 DEC= 22.214 DIST= 3.245 AU
BATSE-ULYSSES DISTANCE = 485380192. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=128.31 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-1003.65 SECS.
CROSSING TIME AT ULYSSES IS 53906. S. OR 14:58:25 +/- 255.33 SECONDS

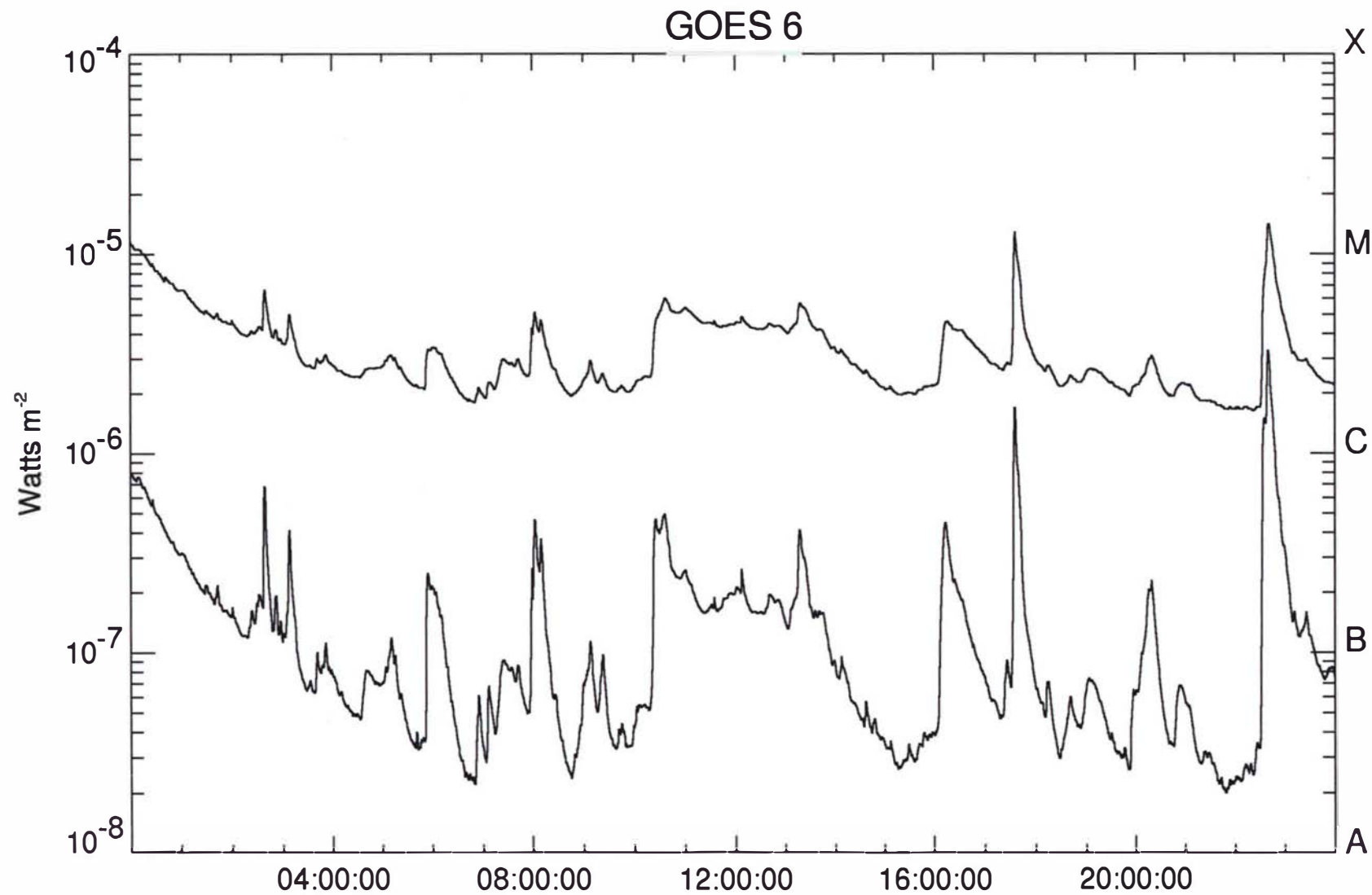
No

21 / 4 / 93

ULYSSES RT
12/ 5/91 53640.199 s
0- 0 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS





Data Start: 91/05/12, 0000:00

Plot created: 96/11/27, 0307

Channel 1 (1.0 - 8.0 Angstroms)

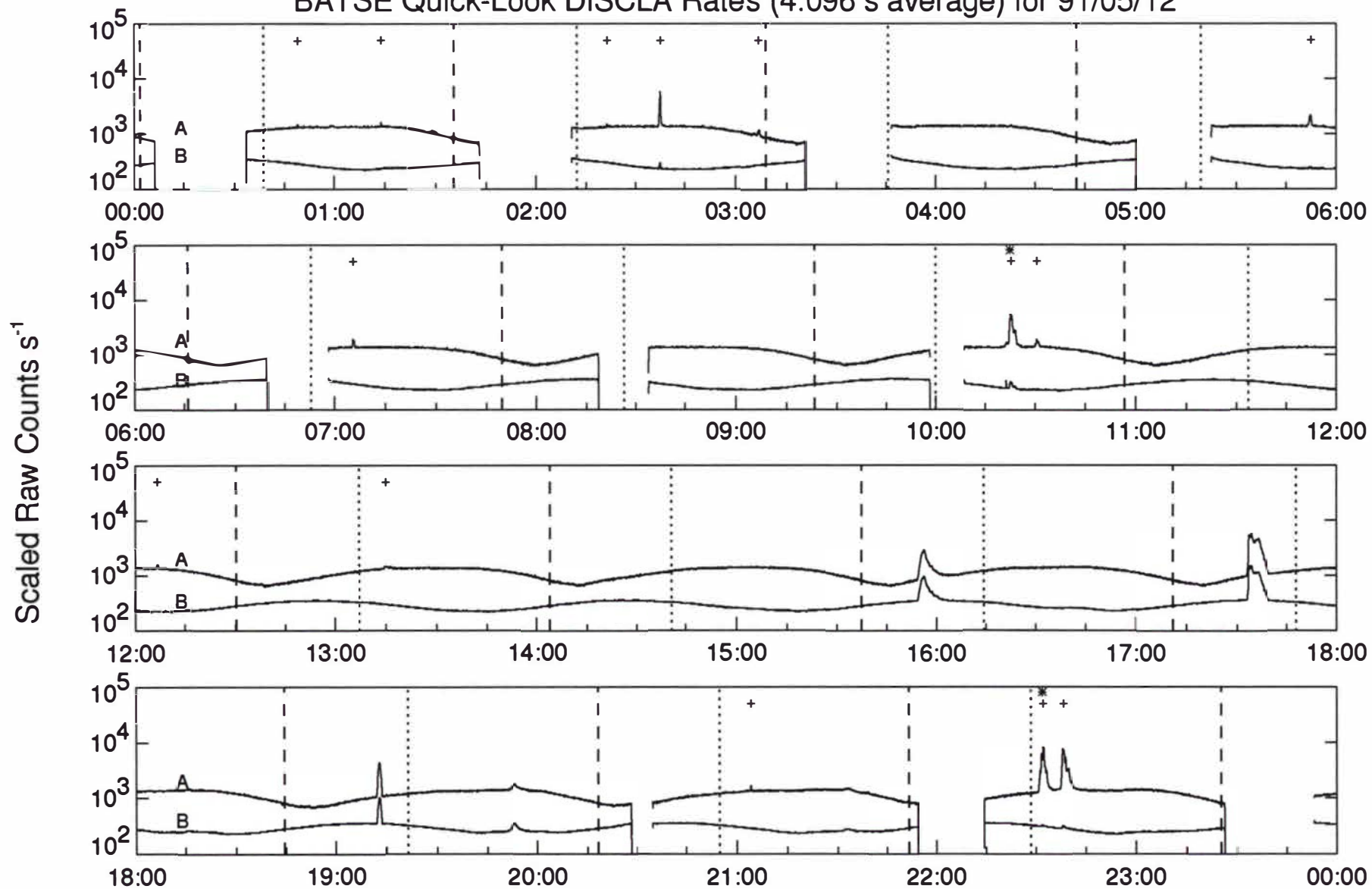
Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms)

Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/12



Current Time: 96/11/27, 0308 EDT

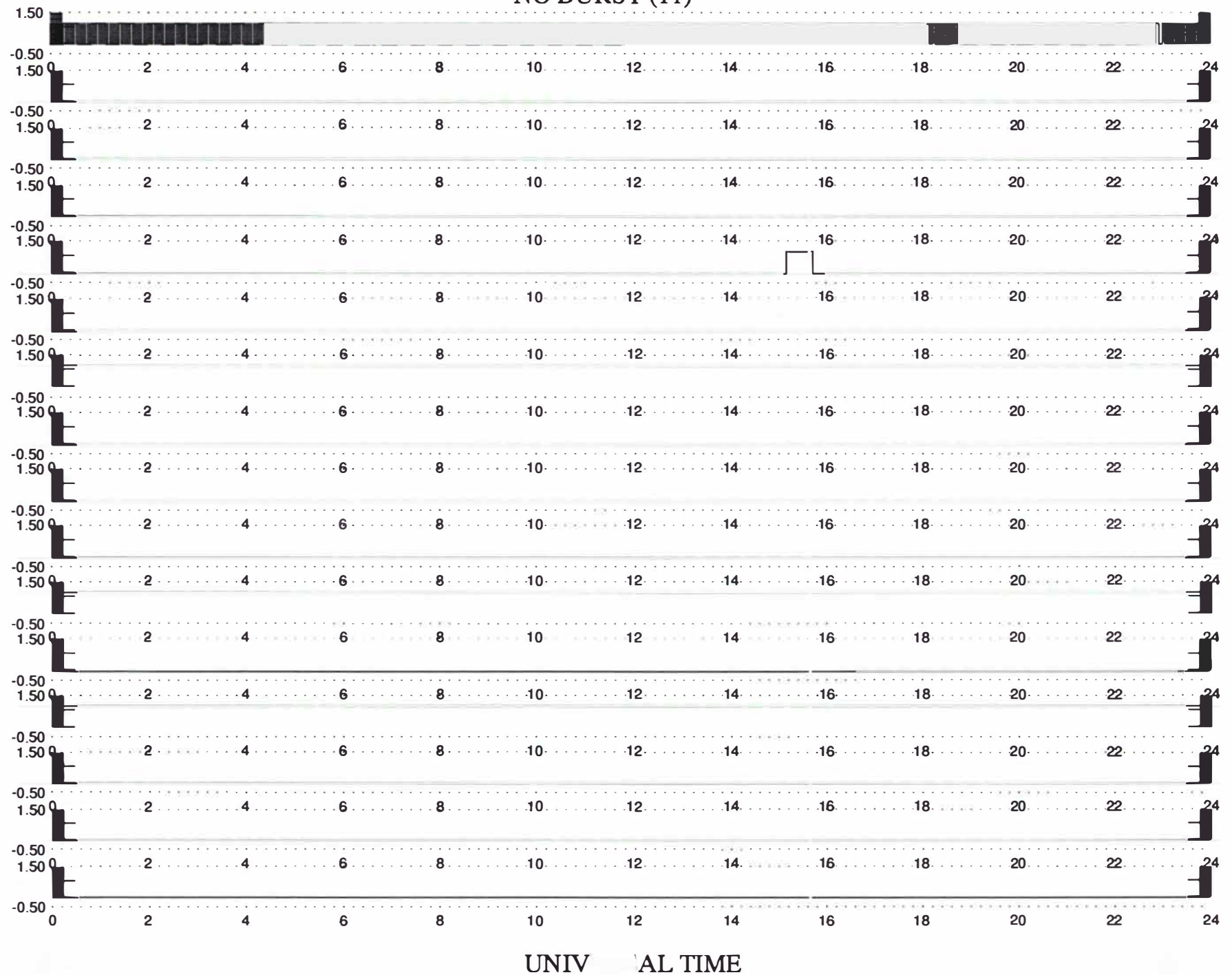
A: Channel 0 Most Sunward LAD

B: Sum Channel 0 Anti-Sunward LADs X .05

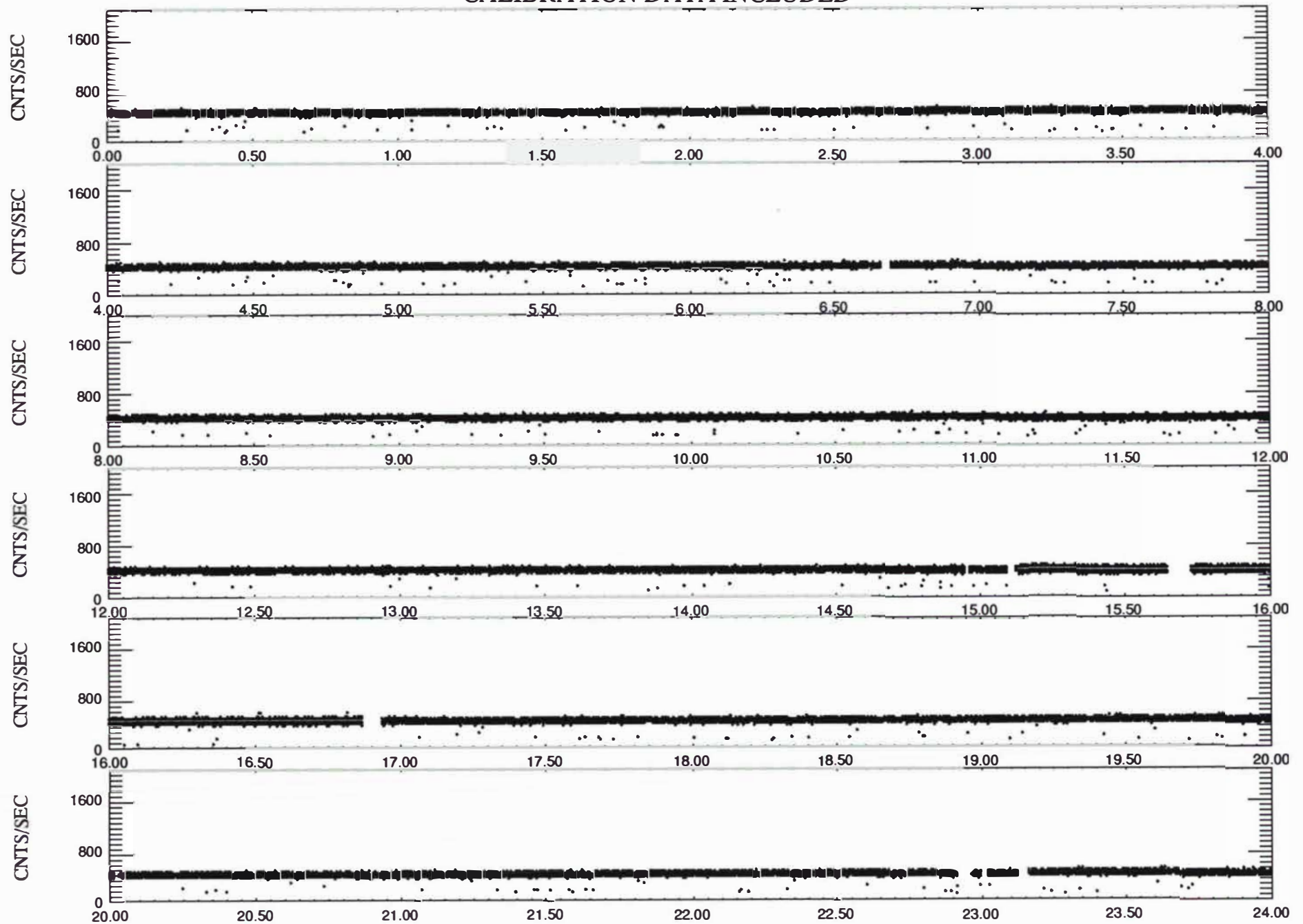
Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare

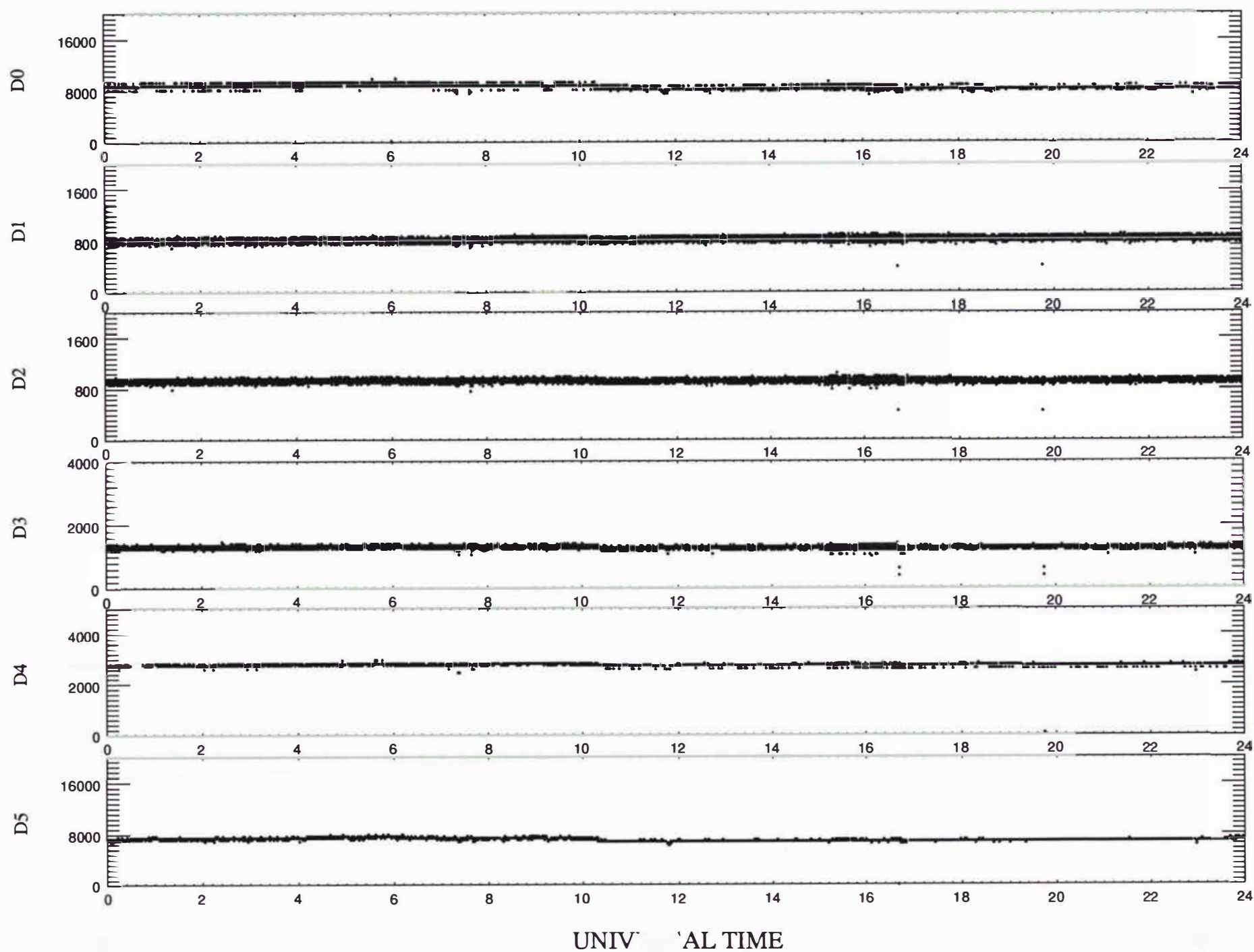
CBU	CCL	DMP	ROM	DMA	OSC	MP.	ICR	SPE	OPM	RSC	CAL	WCH	MEM	BRS	HUS
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----



CALIBRATION DATA INCLUDED



UNIV AL TIME

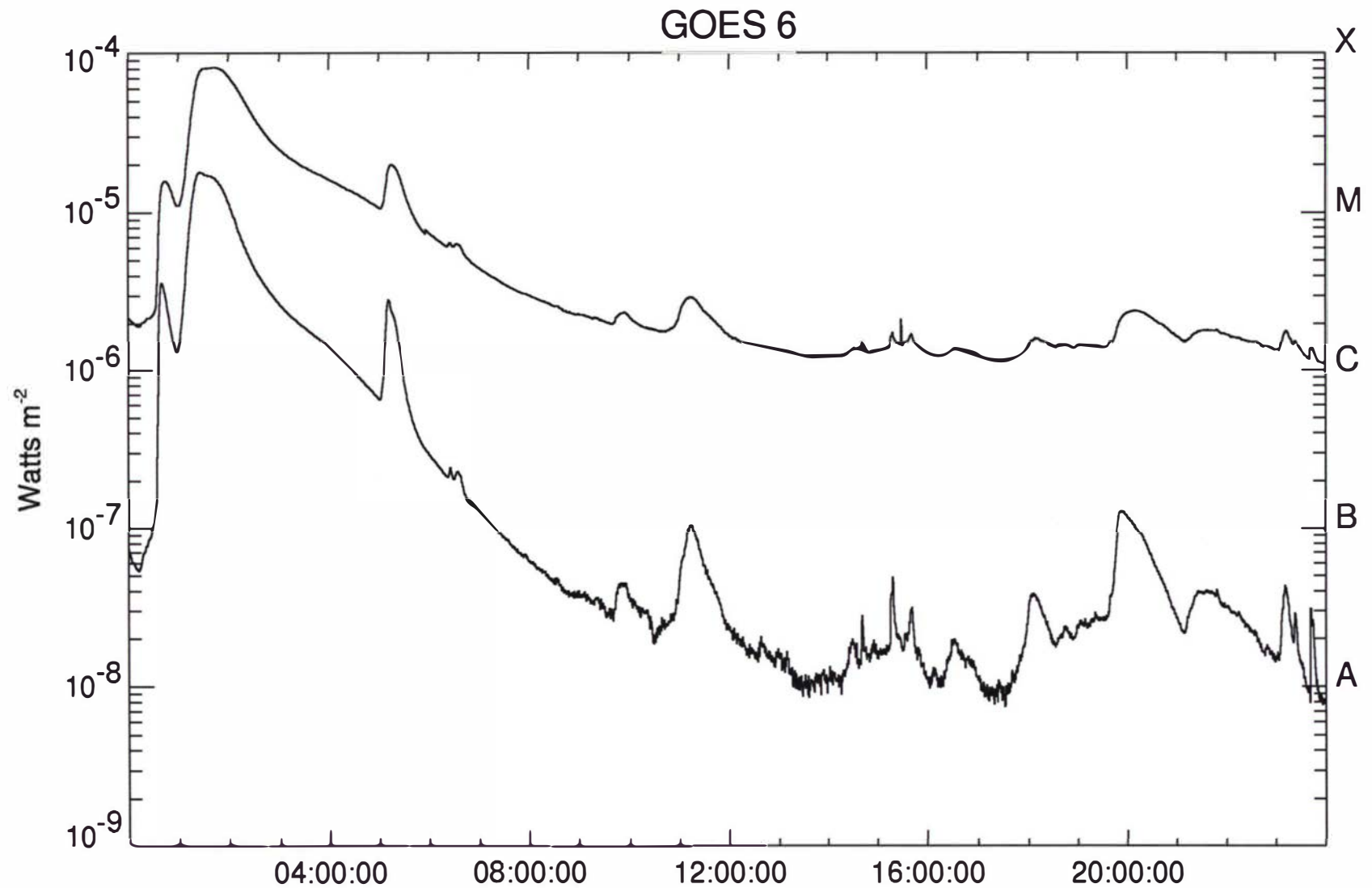


From @UCBSP.SSL.BERKELEY.EDU:ULSSCI@JPLGP.SPAN Tue May 14 14:01:00 1991
Received: from UCBSP.SSL.BERKELEY.EDU by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA07234; Tue, 14 May 91 14:00:56 PDT
Message-Id: <9105142100.AA07234@sunspot.ssl.berkeley.edu>
Date: Tue 14 May 91 14:01:11-PST
From: \$C <ULSSCI@JPLGP.SPAN>
To: ANDERSON@sunspot.ssl.berkeley.edu
Subject: [Resent-MM Mail] [Resent-MM Mail] HUS COMMANDS SENT
Status: R

Date: Tue 14 May 91 14:00:44-PST
From: \$C <ULSSCI@JPLGP.SPAN>
To: MARSHA@UCBSP.SSL.BERKELEY.EDU
Subject: [Resent-MM Mail] HUS COMMANDS SENT

Received: from JPLGP by UCBSP.SSL.BERKELEY.EDU via MAIL-11 with DECnet;
Tue, 14 May 91 14:00:17-PST
Date: Tue 14 May 91 14:00:17-PST
From: ULSSCI@JPLGP.SPAN
Subject: HUS COMMANDS SENT
To: KHURLEY@JPLGP.SPAN, ULSSCI@JPLGP.SPAN

COMMAND 2018 0014 WAS SENT 133/14:58:02 AND VERIFIED AT 133/15:26:26.
COMMAND 2019 01A3 WAS SENT 133/15:03:29 AND VERIFIED AT 133/15:34:26.
E007=.360 VOLTS.



Data Start: 91/05/13, 0000:07

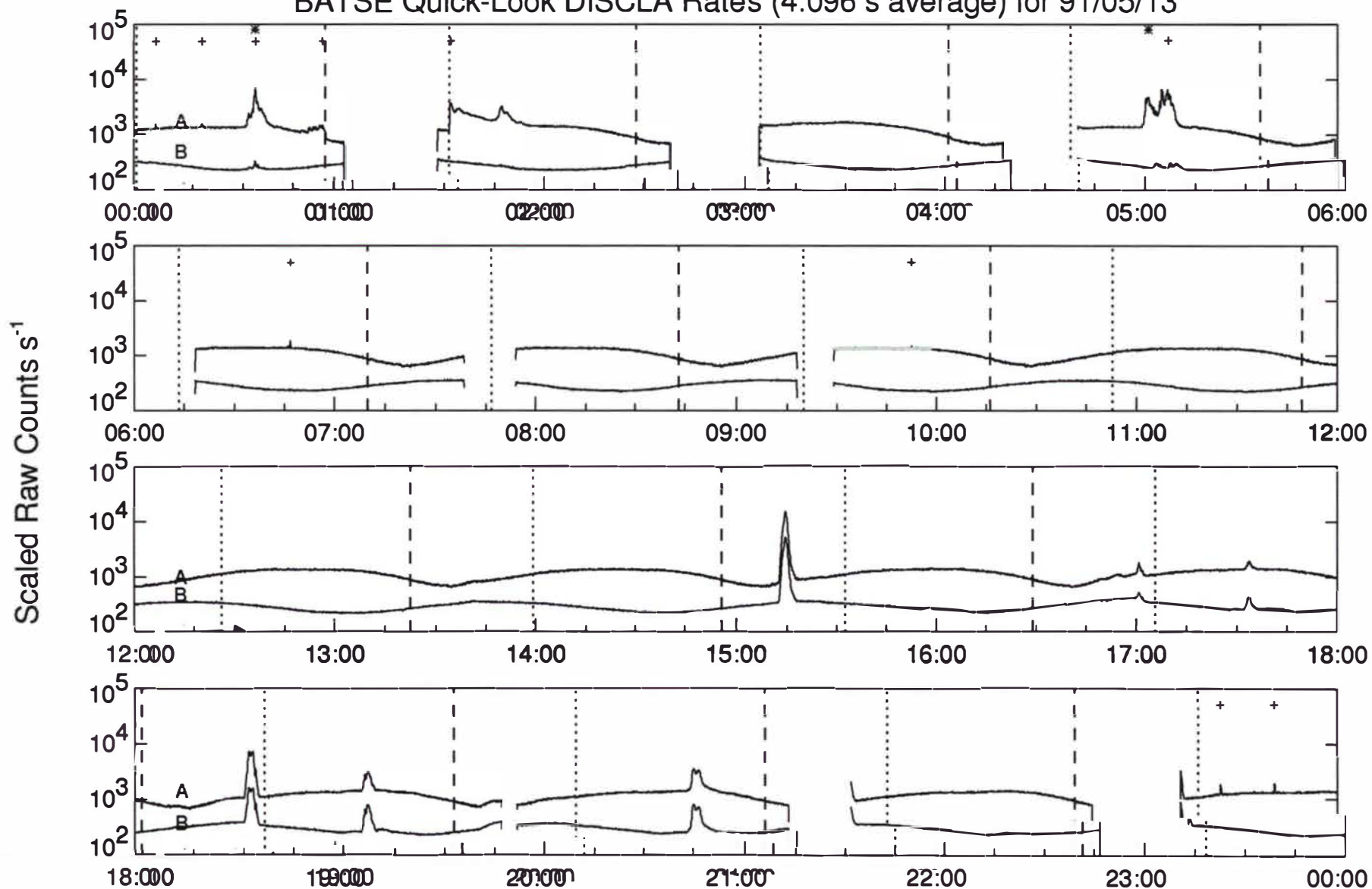
Plot created: 96/11/27, 0310

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/13



Current Time: 96/11/27, 0311 EDT

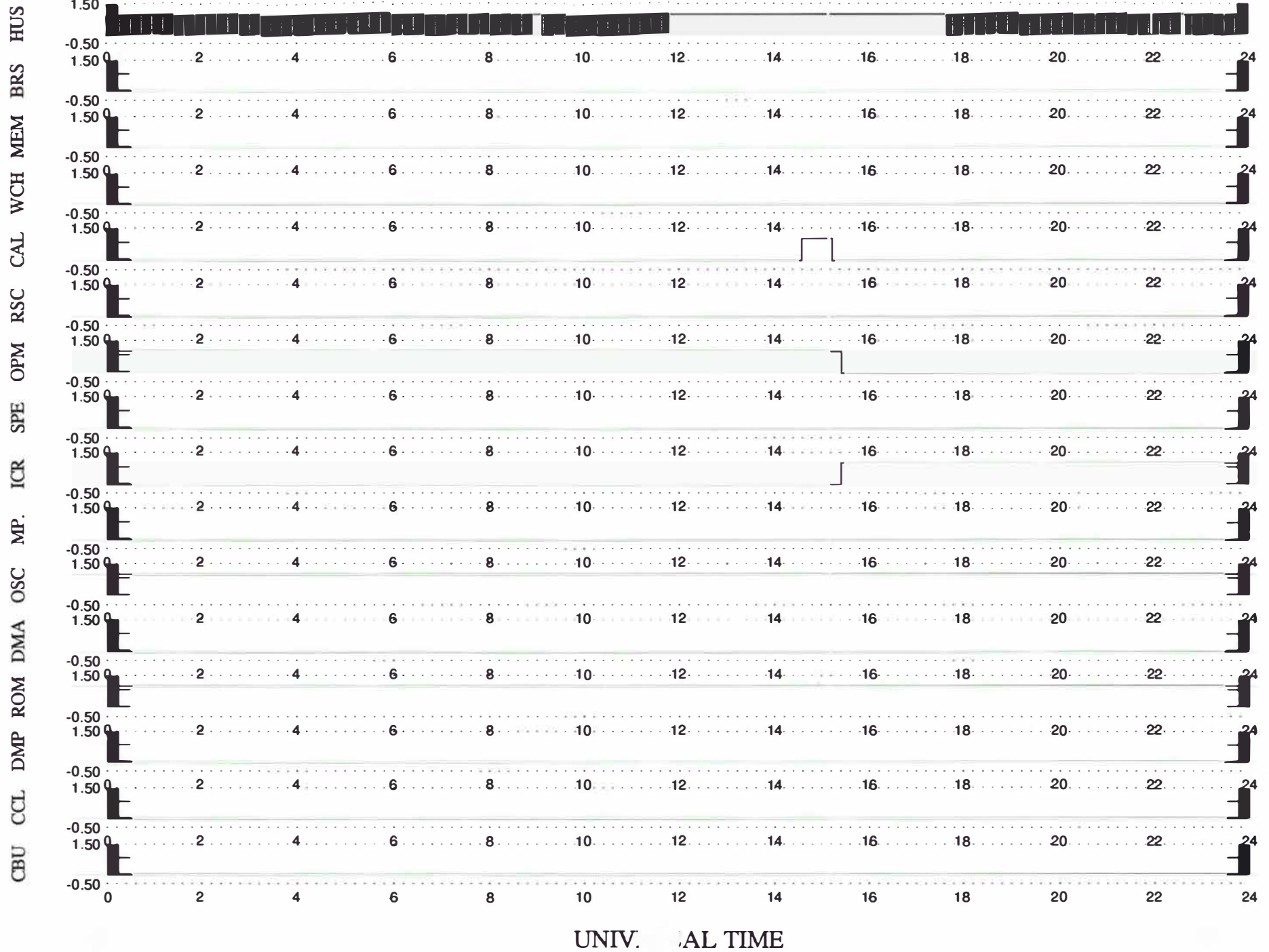
A: Channel 0 Most Sunward LAD

B: Sum Channel 0 Anti-Sunward LADs X .05

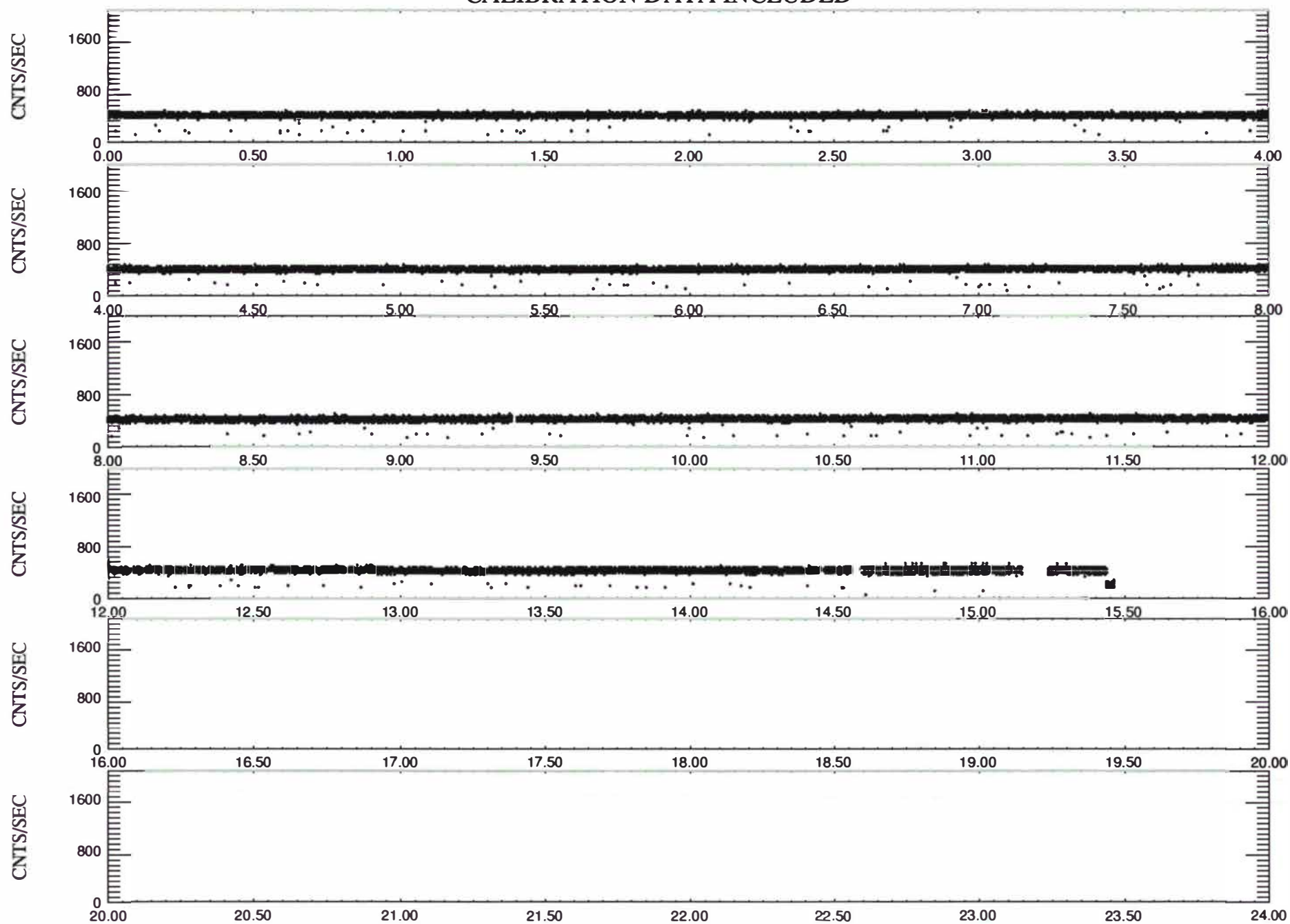
Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare

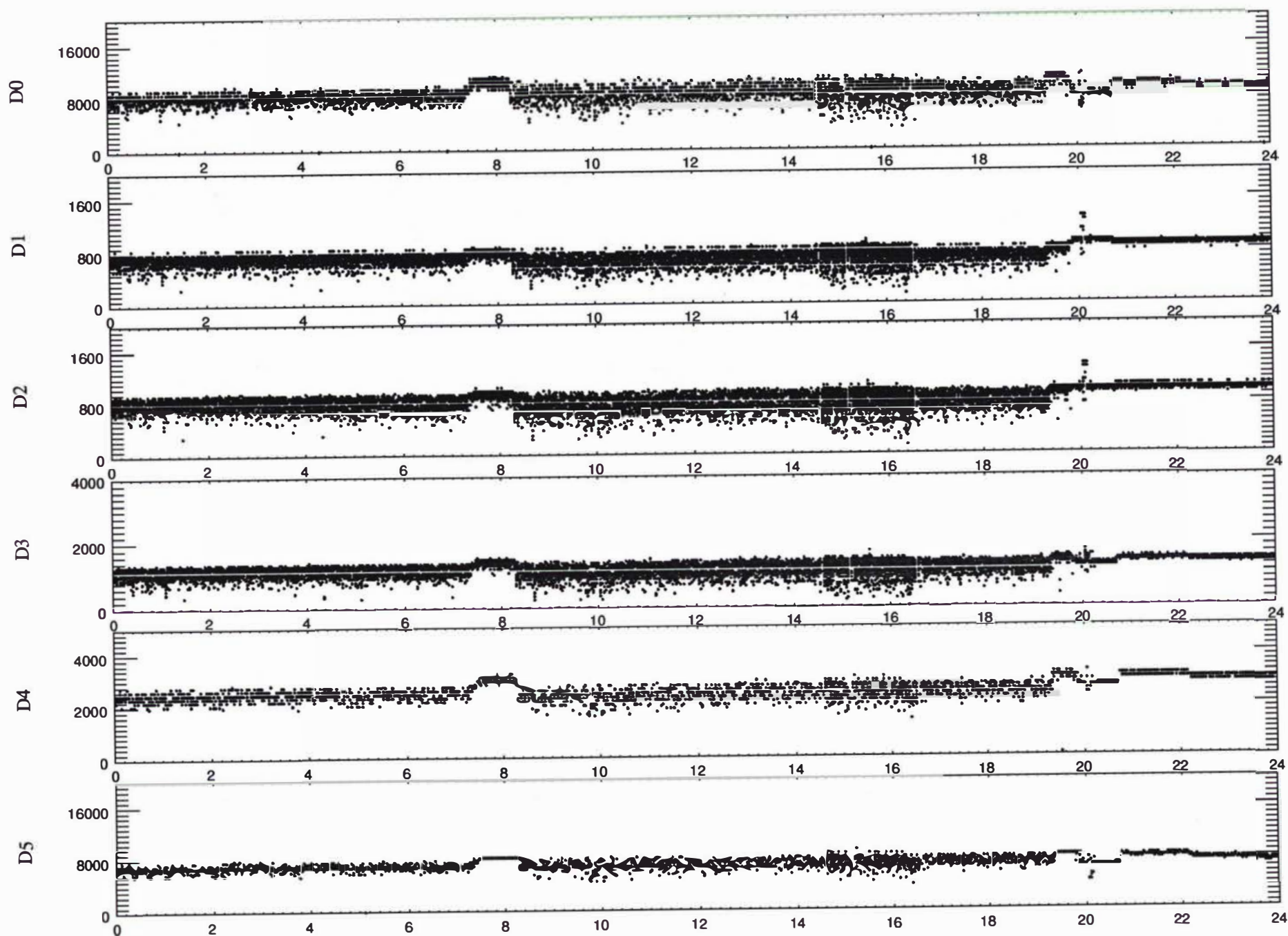
NO BURST (11)



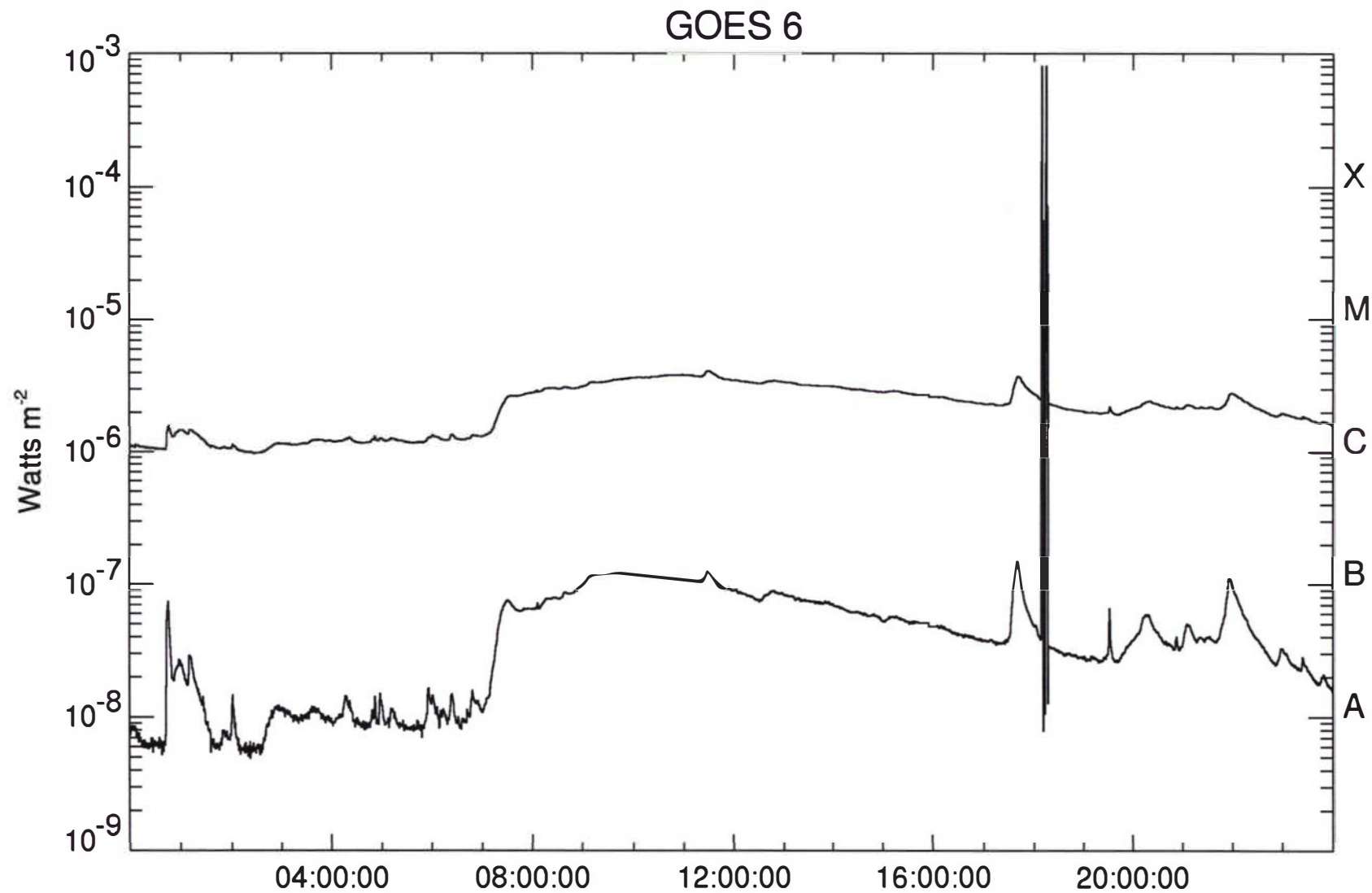
CALIBRATION DATA INCLUDED



UNIV AL TIME



UNIVERSAL TIME



Data Start: 91/05/14, 0000:02

Plot created: 96/11/27, 0314

Channel

1 (1.0 - 8.0 Angstroms)

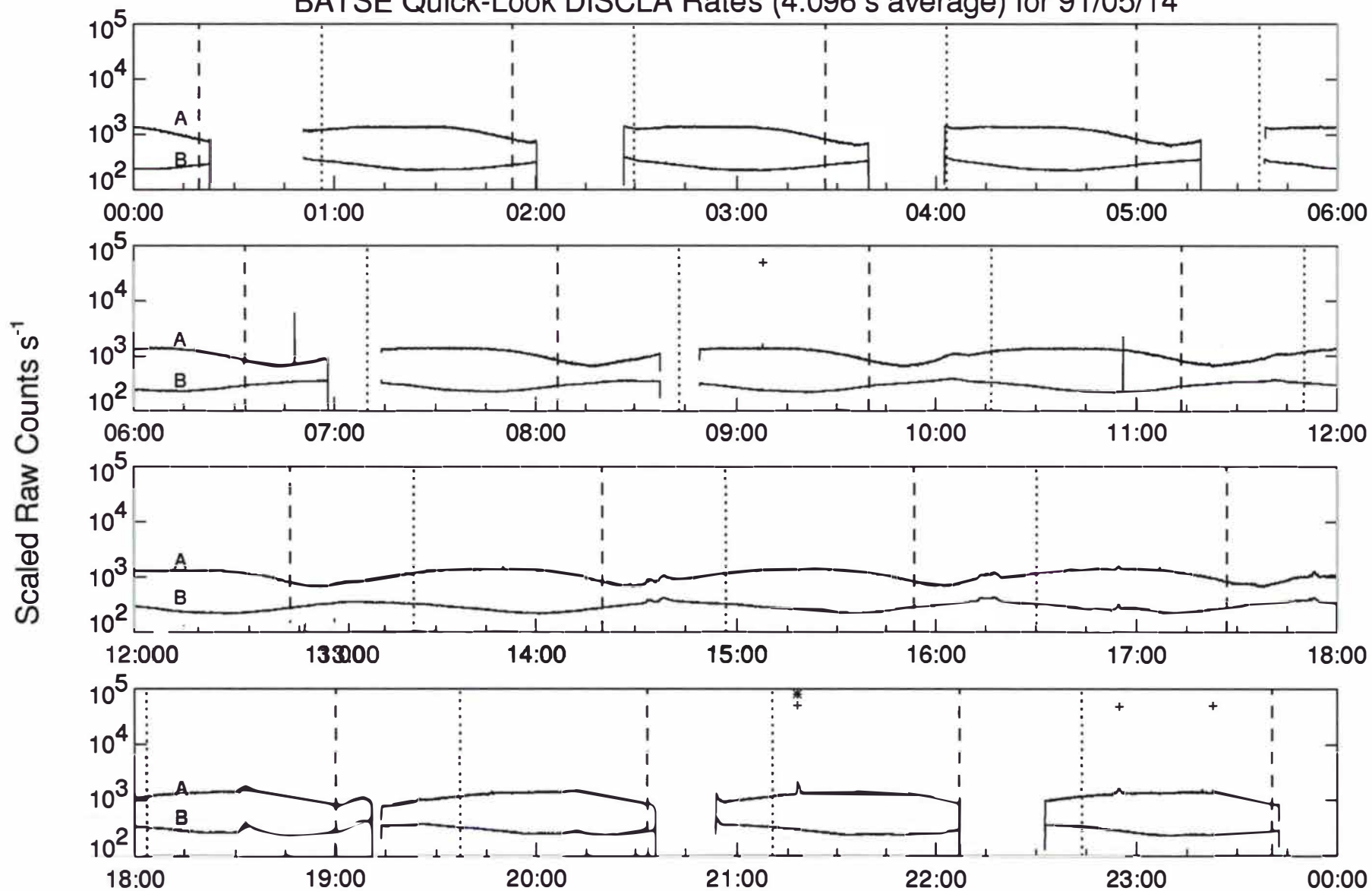
Background not subtracted

2 (0.5 - 4.0 Angstroms)

Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/14

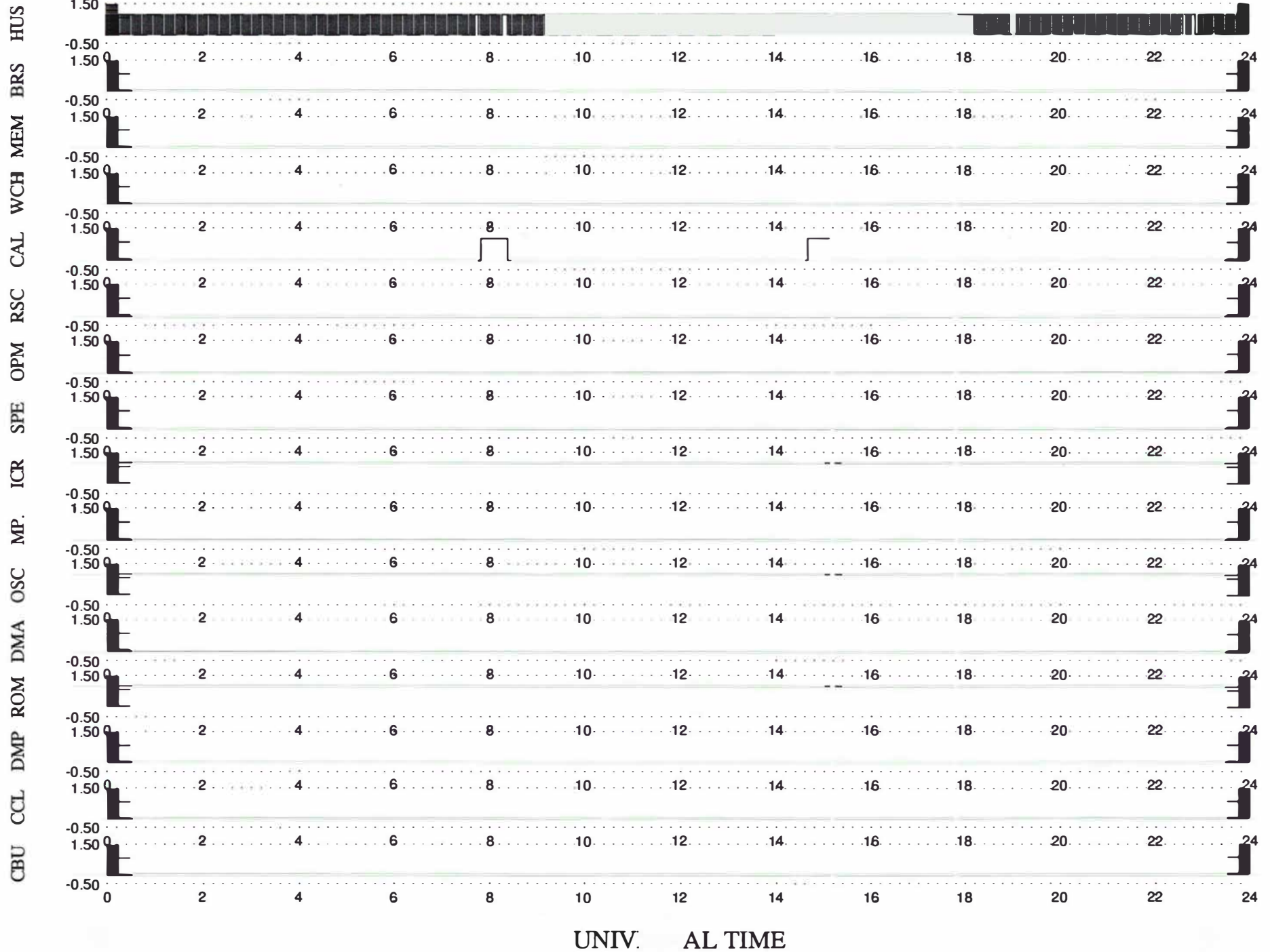


Current Time: 96/11/27, 0315 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

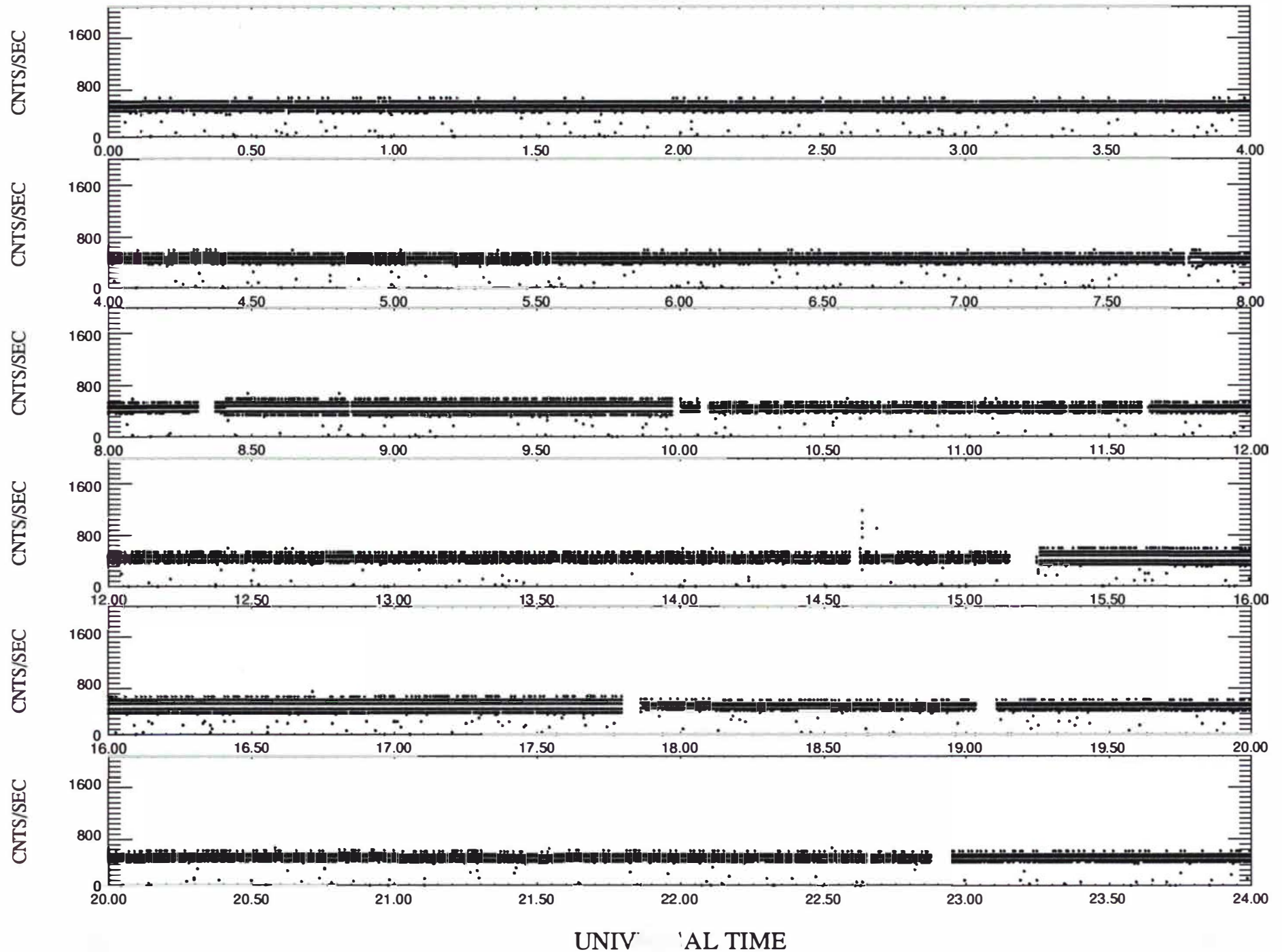
Dotted line: Day entry
 Dashed line: Night entry

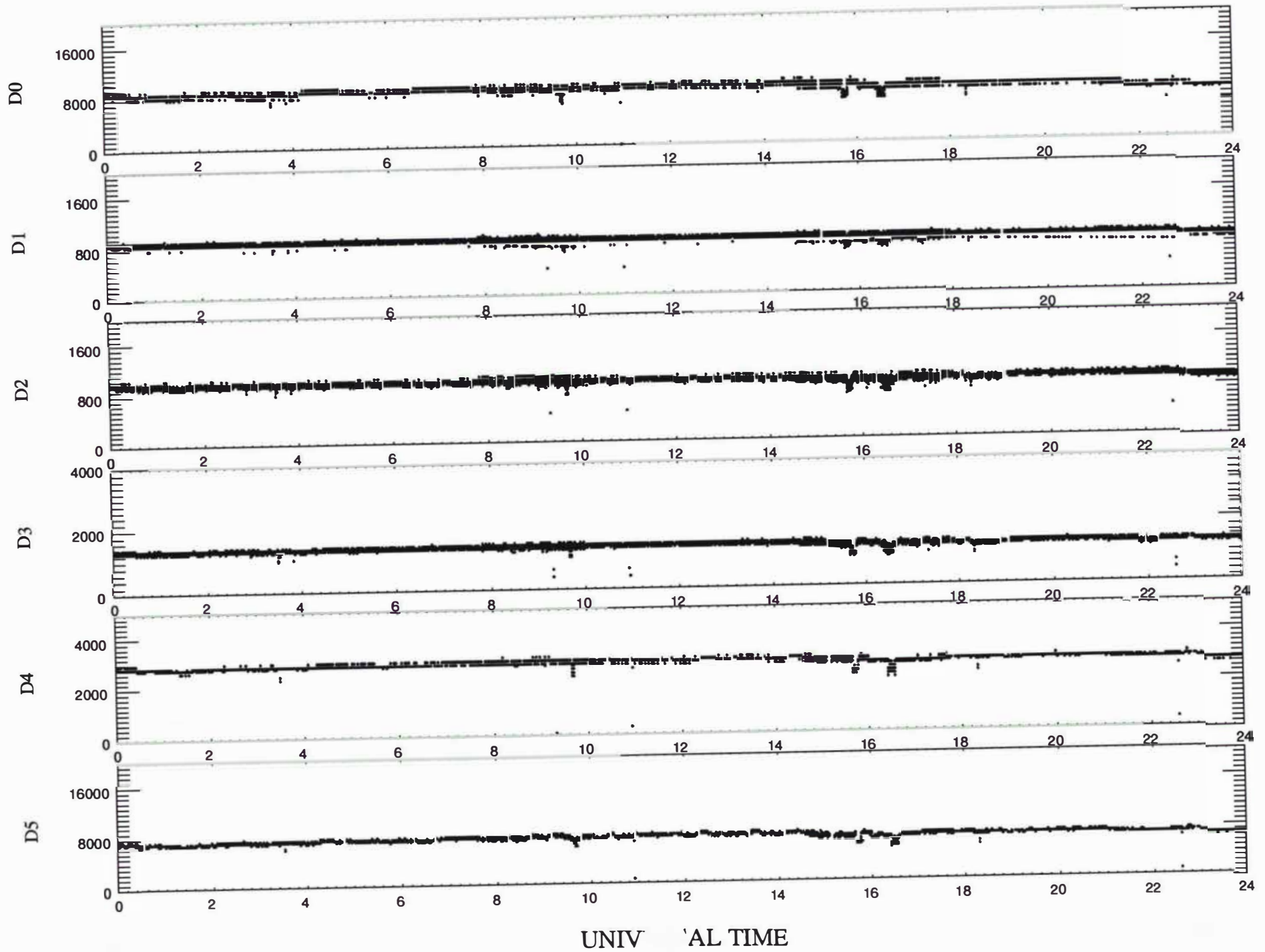
* Solar Burst Trigger
 + Solar Flare

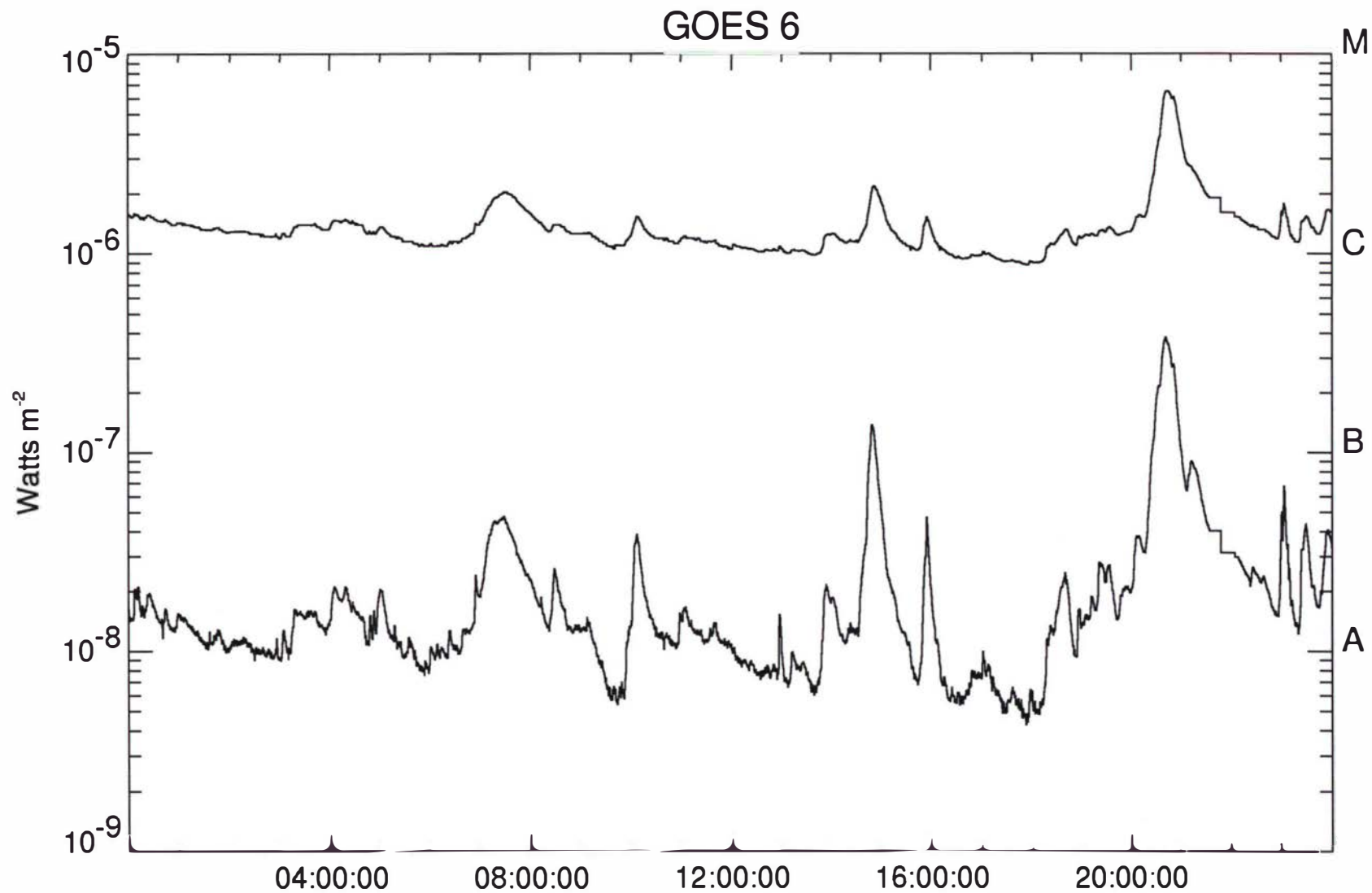
NO BURST (11)



CALIBRATION DATA INCLUDED







Data Start: 91/05/15, 0000:00

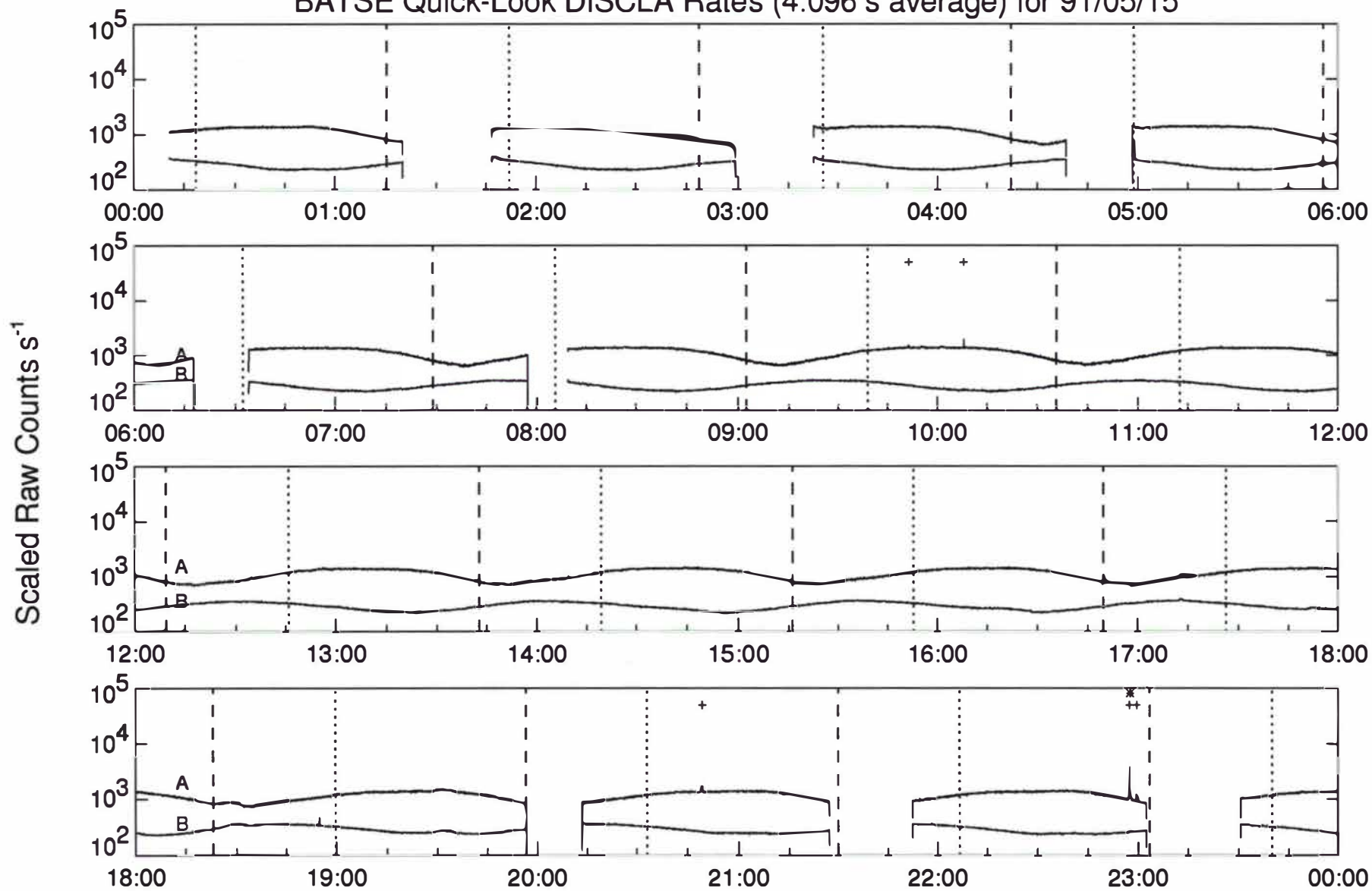
Plot created: 96/11/27, 0317

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/15



Current Time: 96/11/27, 0318 EDT

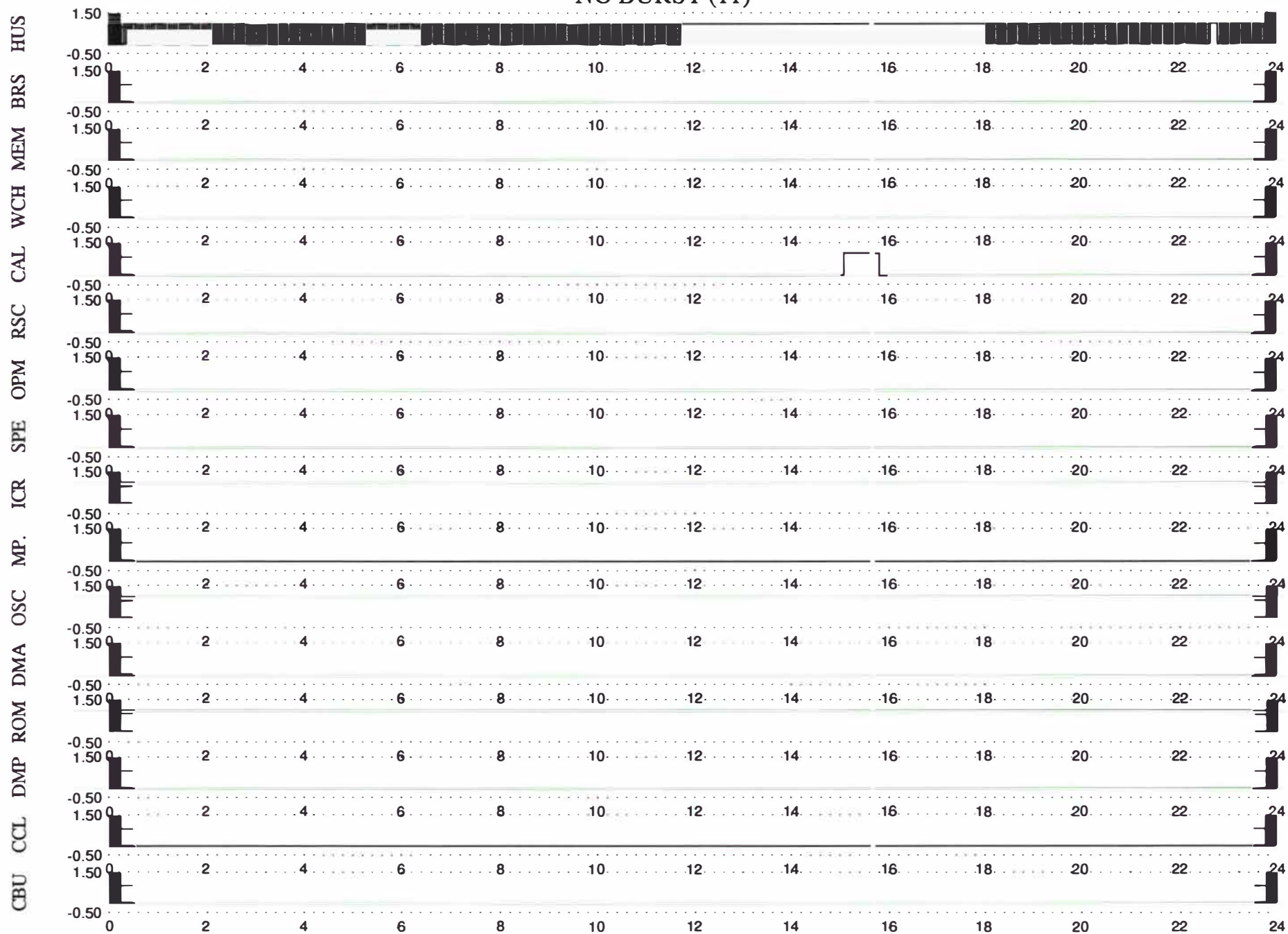
A: Channel 0 Most Sunward LAD

B: Sum Channel 0 Anti-Sunward LADs X .05

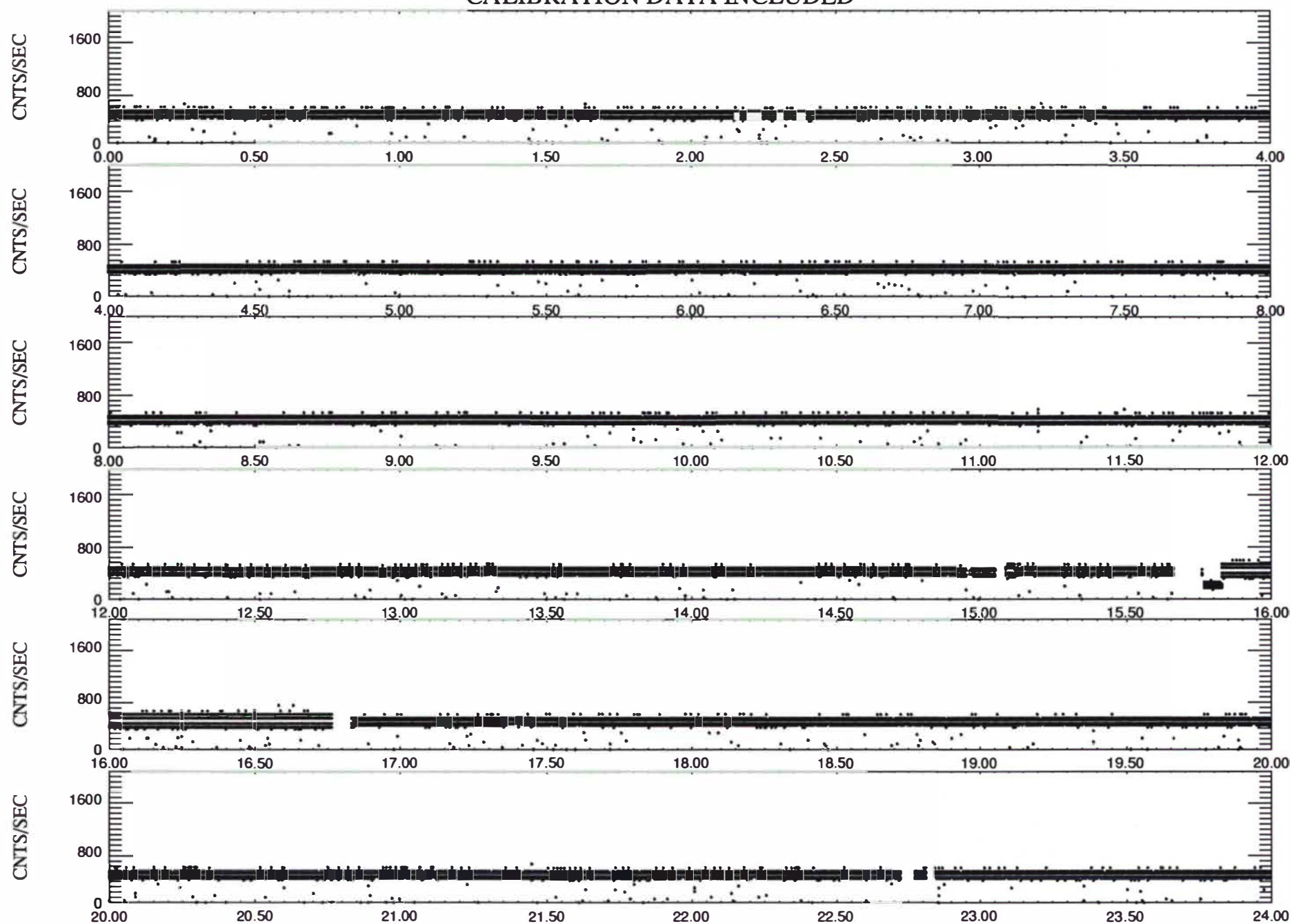
Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare

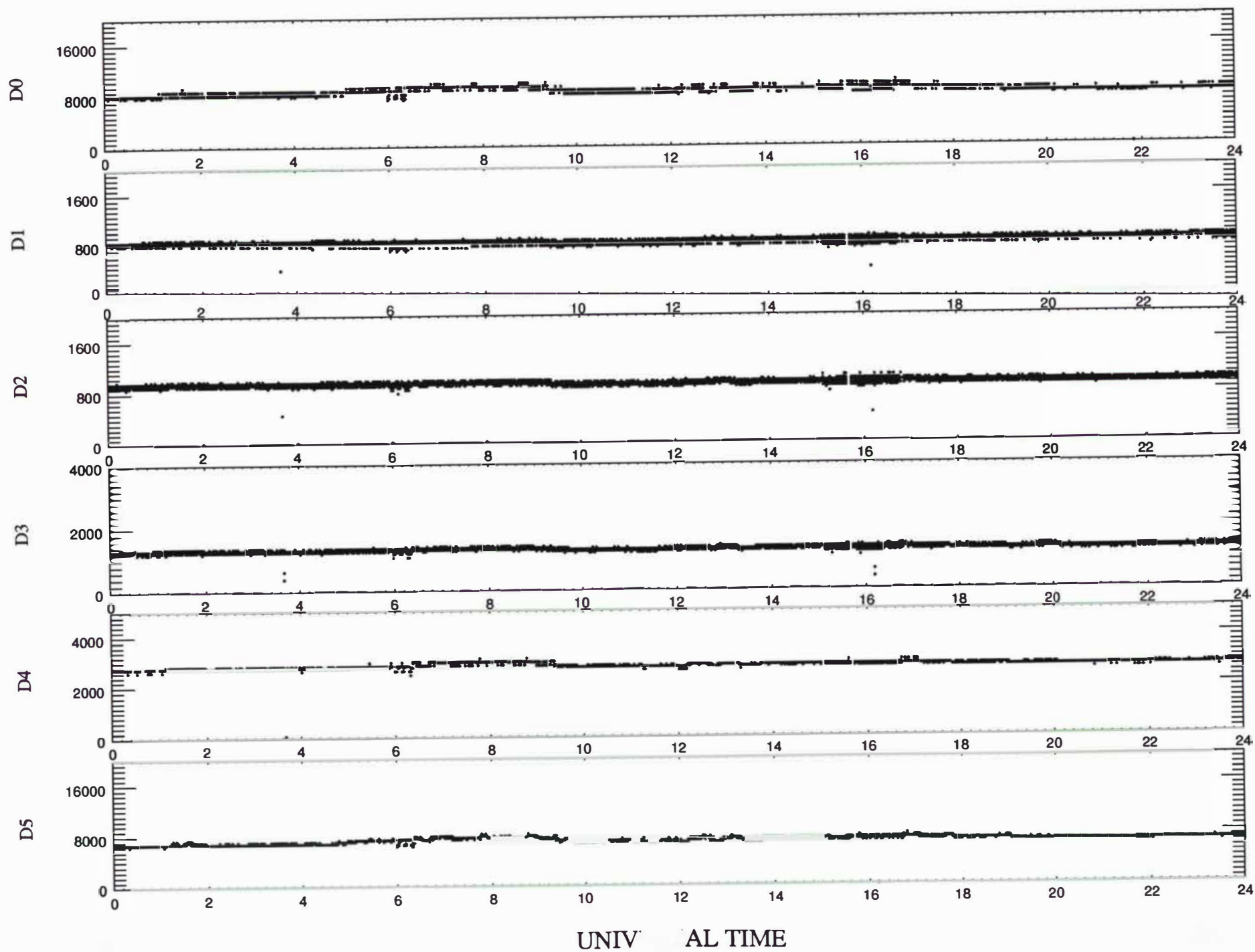
UNIV. AL TIME



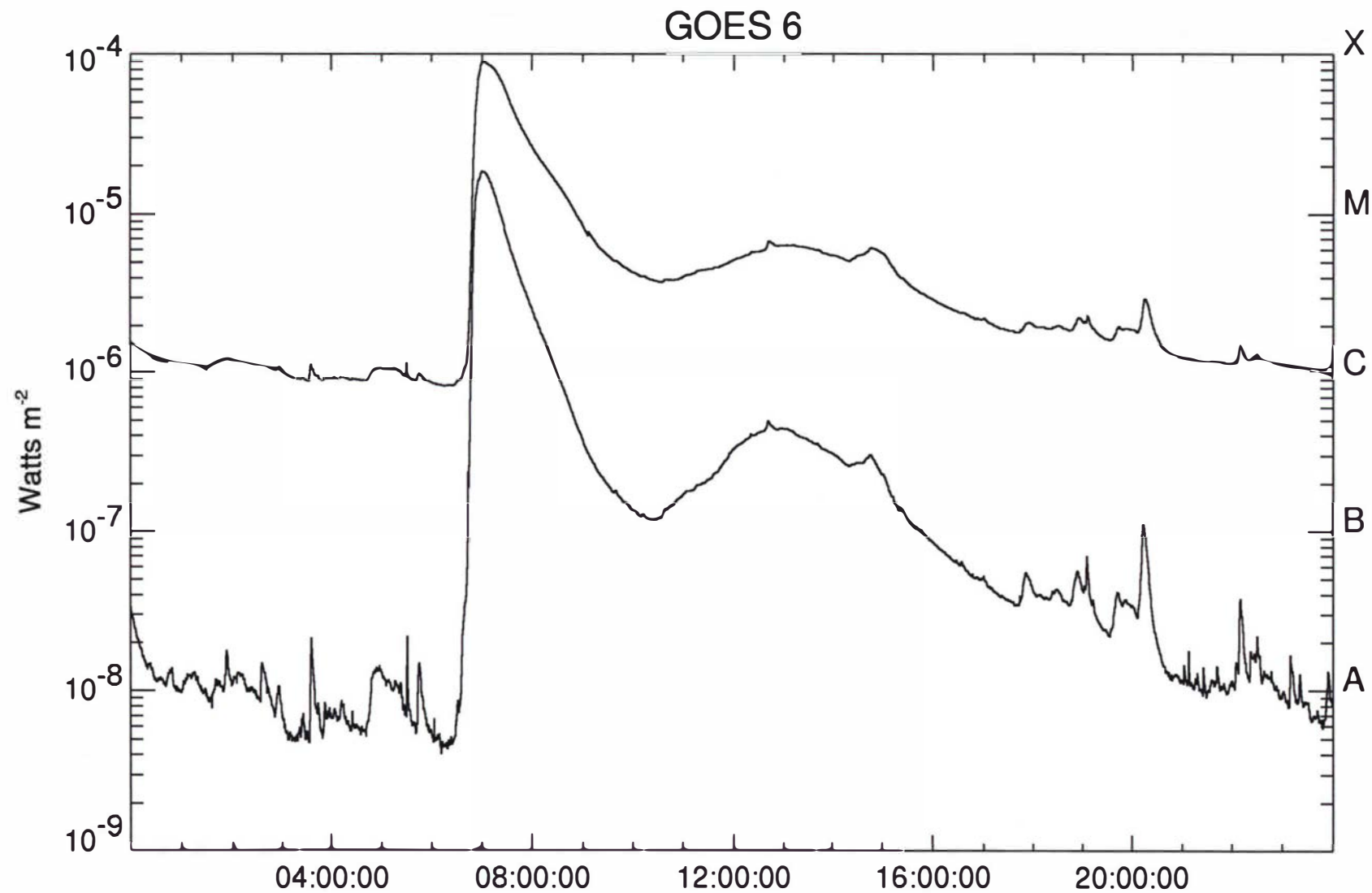
CALIBRATION DATA INCLUDED



UNIV AL TIME



DATE	U.T.	Nr UGB	Event Nature
1991-04-04	14:19:50.243	263-a	GRB
1991-04-04	17:17:18.562	263-b	GRB
1991-04-07	03:13:21.146	265-a	Solar Flare
1991-04-17	20:07:31.886	273-a	GRB
1991-05-16	06:47:23.641	281-a	Solar Flare
1991-05-17	05:02:42.959	282-a	GRB
1991-05-17	09:03:44.505	282-b	Solar Flare
1991-05-27	23:44:36.515	287-a	GRB
1991-05-28	07:26:24.093	287-b	Solar Flare
1991-05-28	18:17:55.430	287-c	Solar Flare
1991-05-31	16:53:41.316	289-a	Solar Flare
1991-06-01	14:56:53.229	290-a	Solar Flare
1991-06-01	~15:08	290-b	Solar Flare
1991-06-01	19:20:29.144	290-c	GRB
1991-06-09	22:05:12.335	293-a	Solar Particles
1991-06-10	02:27:27.347	293-b	Solar Flare
1991-06-10	13:55:19.964	294-a	Solar Flare
1991-06-10	16:53:30.025	294-b	Solar Flare
1991-06-11	01:58:25.934	294-c	Solar Flare
1991-06-26	20:13:20.758	303-a	Solar Flare
1991-06-27	04:29:18.339	303-b	GRB
1991-06-29	19:55:48.409	304-a	GRB
1991-06-30	02:56:07.591	304-b	Solar Flare
1991-06-30	03:29:11.438	304-c	Solar Particles
1991-07-13	19:37:58.821	307-a	Solar Flare
1991-07-17	04:33:04.862	309-a	GRB
1991-07-17	06:25:49.736	309-b	Solar Flare
1991-07-20	01:37:48.274	311-a	Solar Flare
1991-08-14	11:10:26.782	314-a	GRB
1991-08-14	19:14:33.396	315-a	GRB
1991-08-17	17:09:24.566	317-a	GRB
1991-08-21	10:33:39.184	320-a	GRB
1991-08-25	09:36:25.301	323-a	Solar Flare
1991-08-27	13:11:18.345	325-a	Solar Particles
1991-08-27	14:51:03.053	325-b	Solar Particles



Data Start: 91/05/16, 0000:01

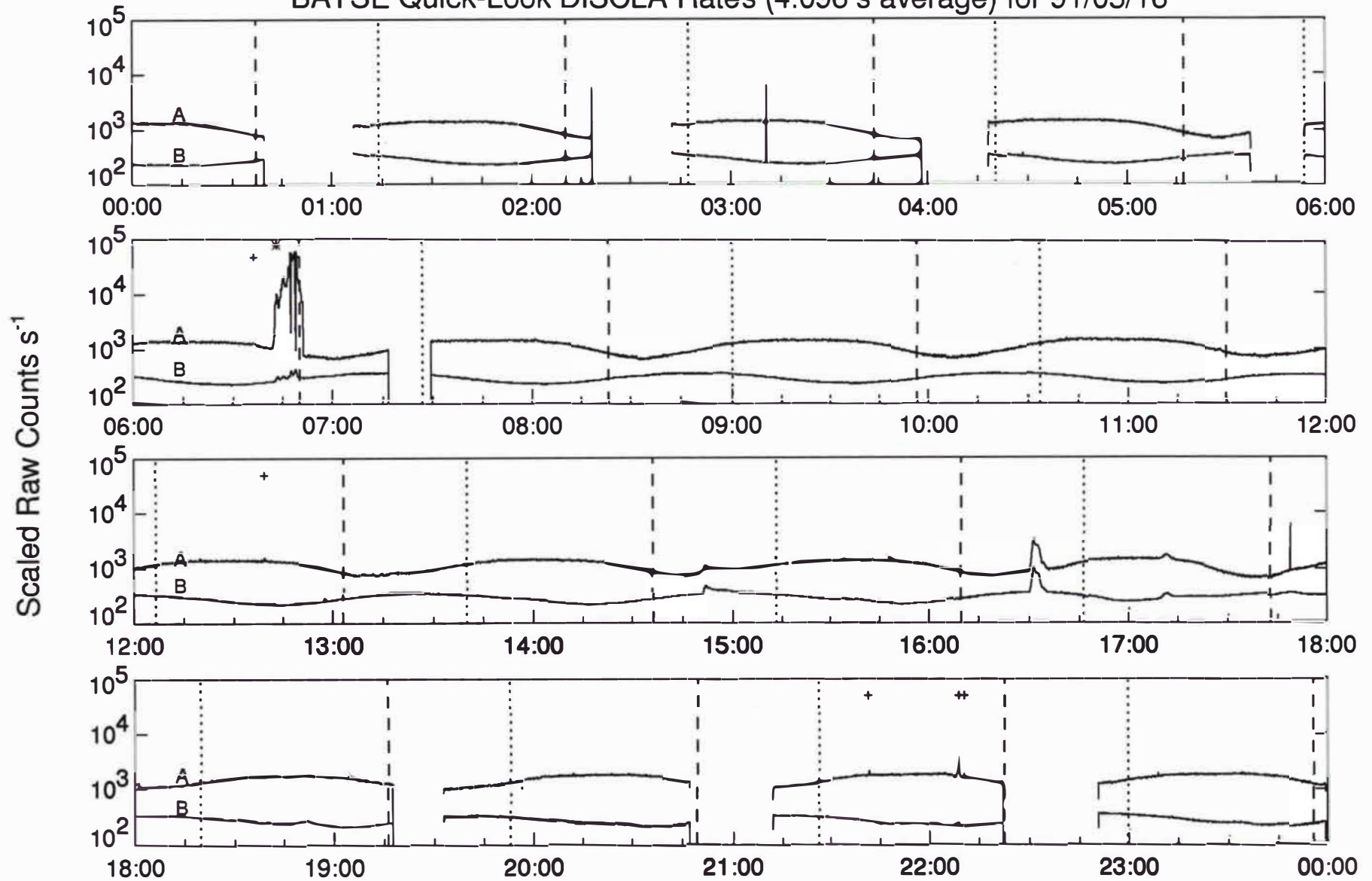
Plot created: 96/11/27, 0321

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/16



Current Time: 96/11/27, 0322 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

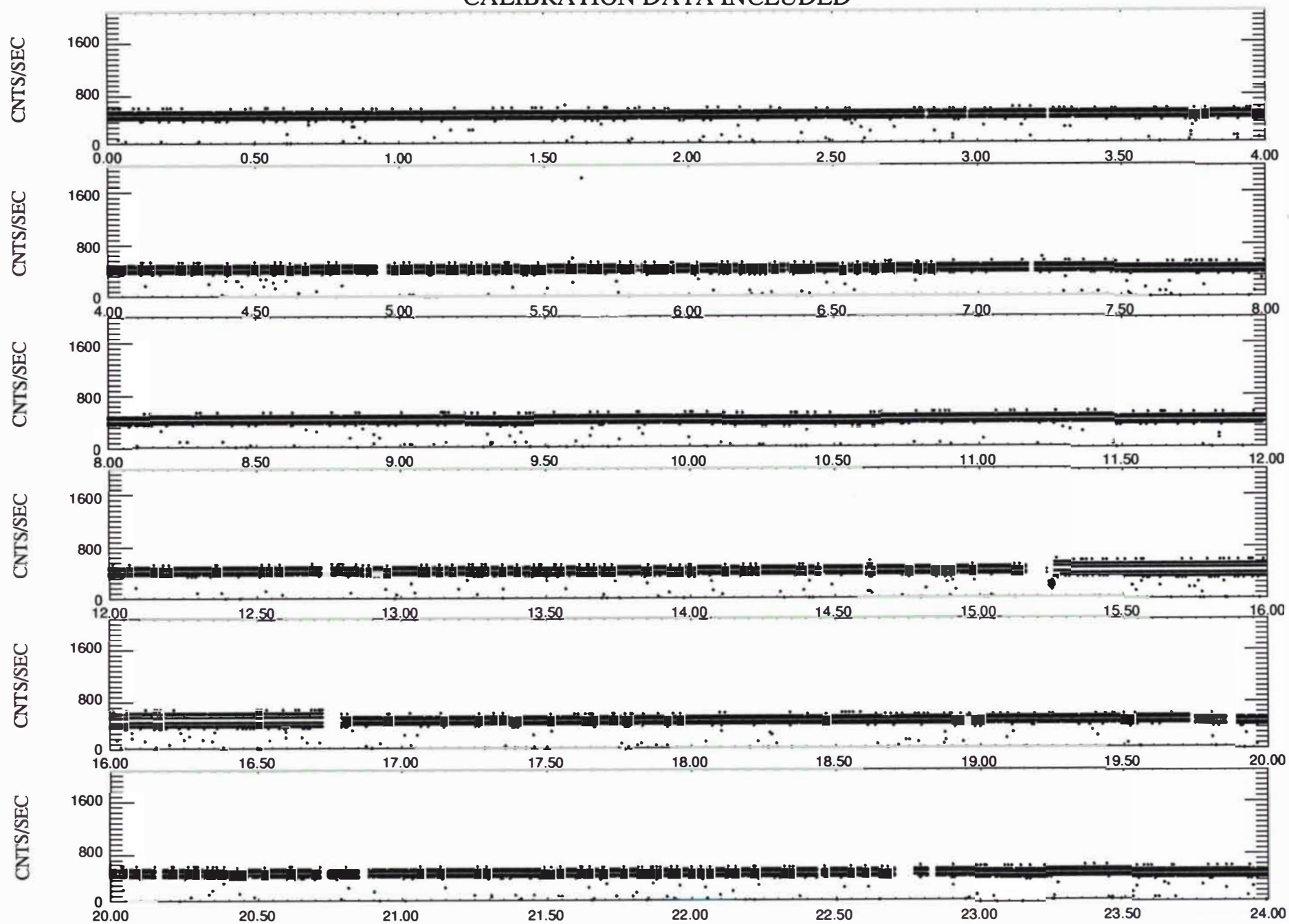
Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

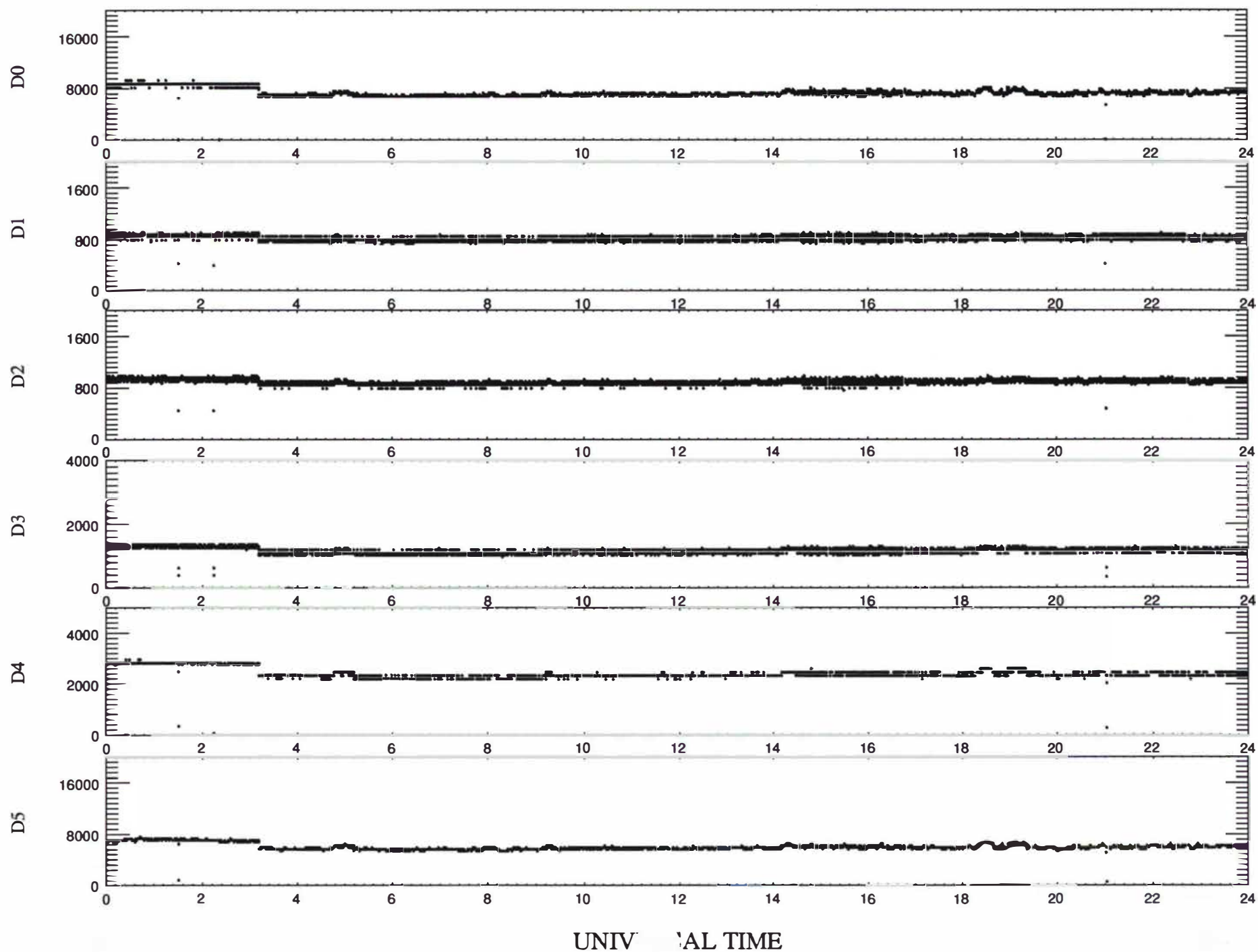
CPU	CCL	DMP	ROM	DMA	OSC	MP.	ICR	SPE	OPM	RSC	CAL	WCH	MEM	BRS	HUS
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----



CALIBRATION DATA INCLUDED



UNIV AL TIME



$$\sum 3 \Delta t's: \overset{U/PW}{584.277} - \overset{U/PVO}{525.894} - \overset{PW/PVO}{56.945} = 10.438$$

$$3\sigma \text{ uncertainty: } \sqrt{1+1+2^2} = 2.449$$

N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

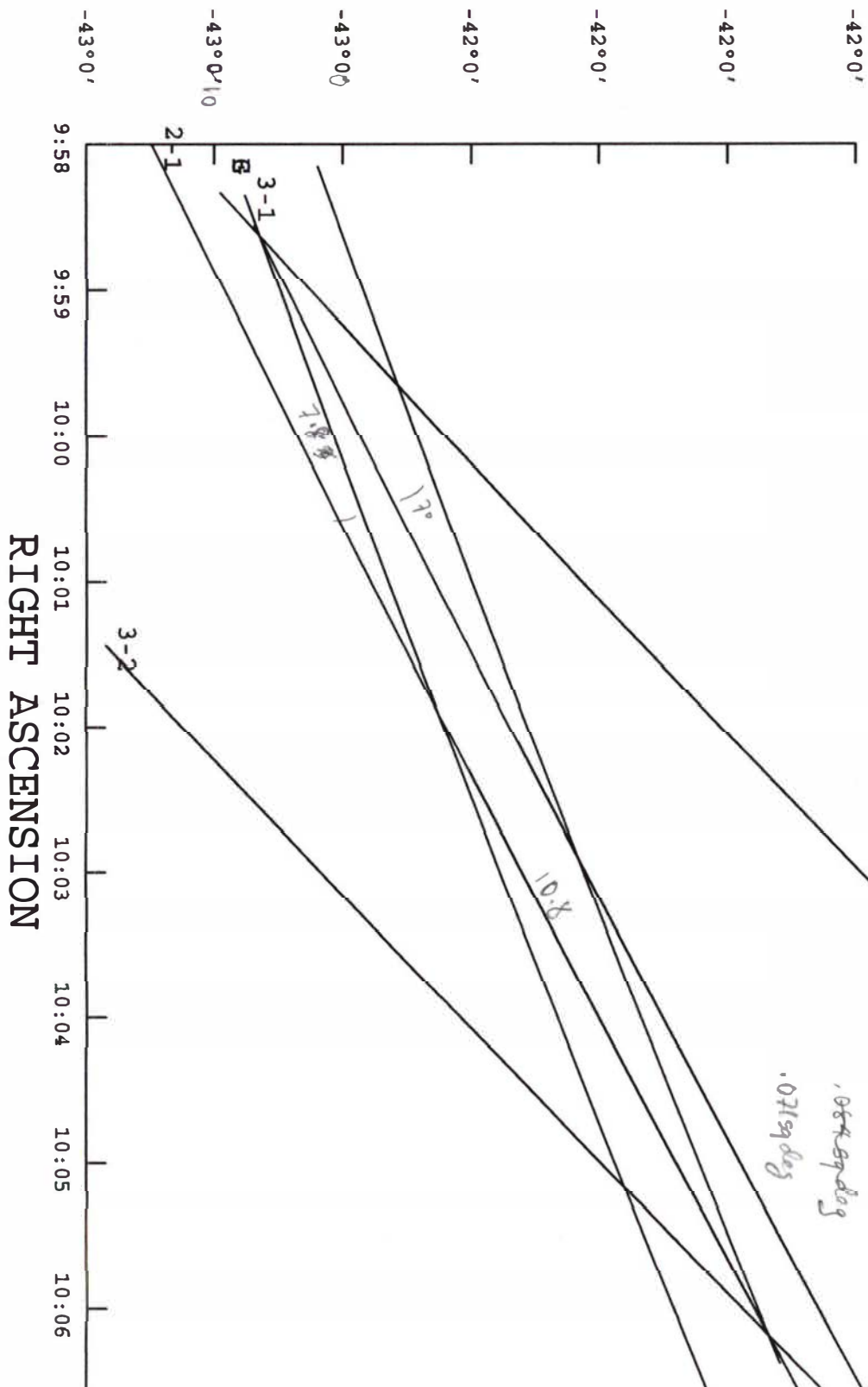
G=GALACTIC EQUATOR

1 ULYSSES

2 PHEBUS

3 PVO

DECLINATION



1 / 9 / 8

N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

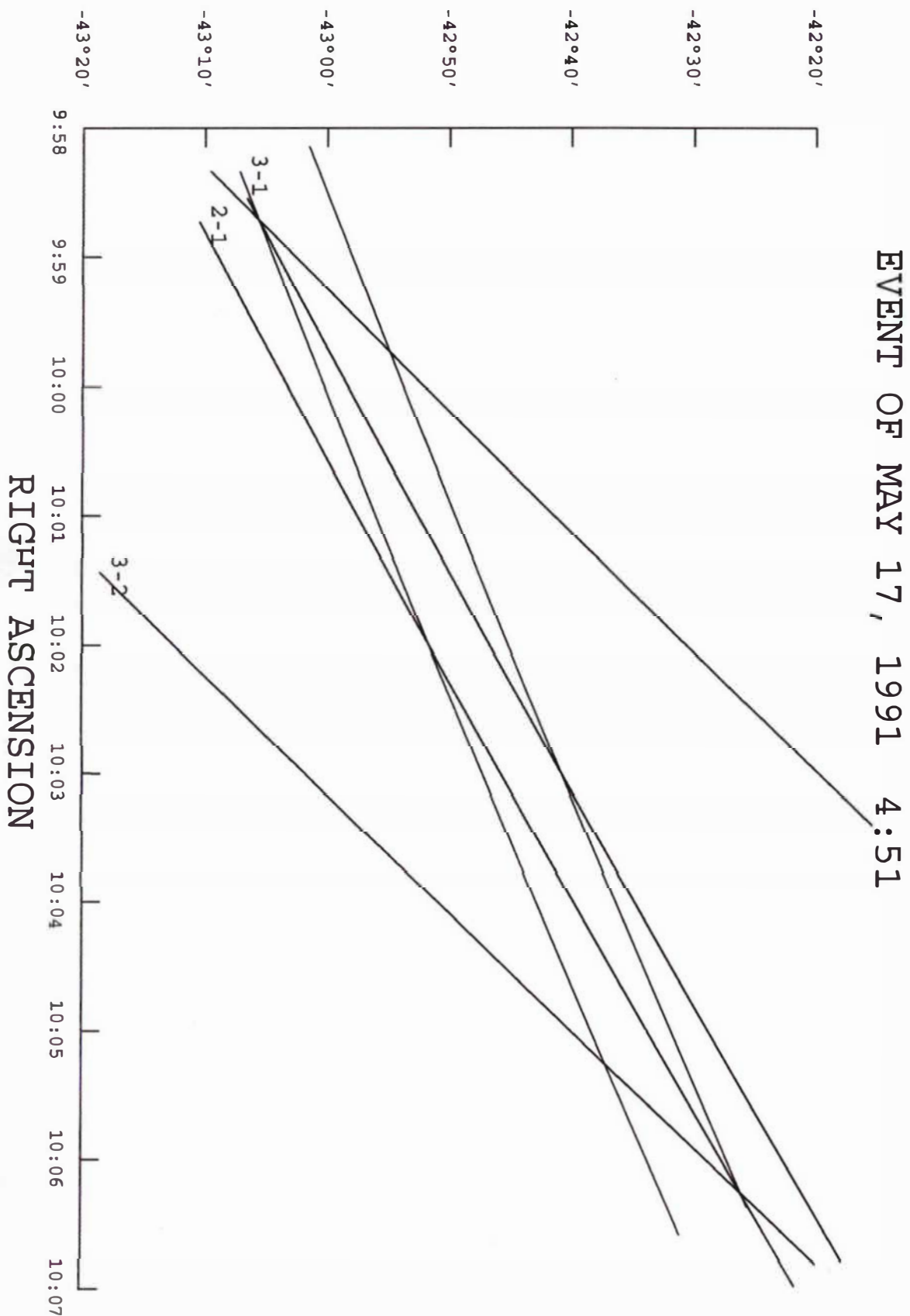
G=GALACTIC EQUATOR

1 ULYSSES

2 PHEBUS

3 PVO

DECLINATION



PVO RT

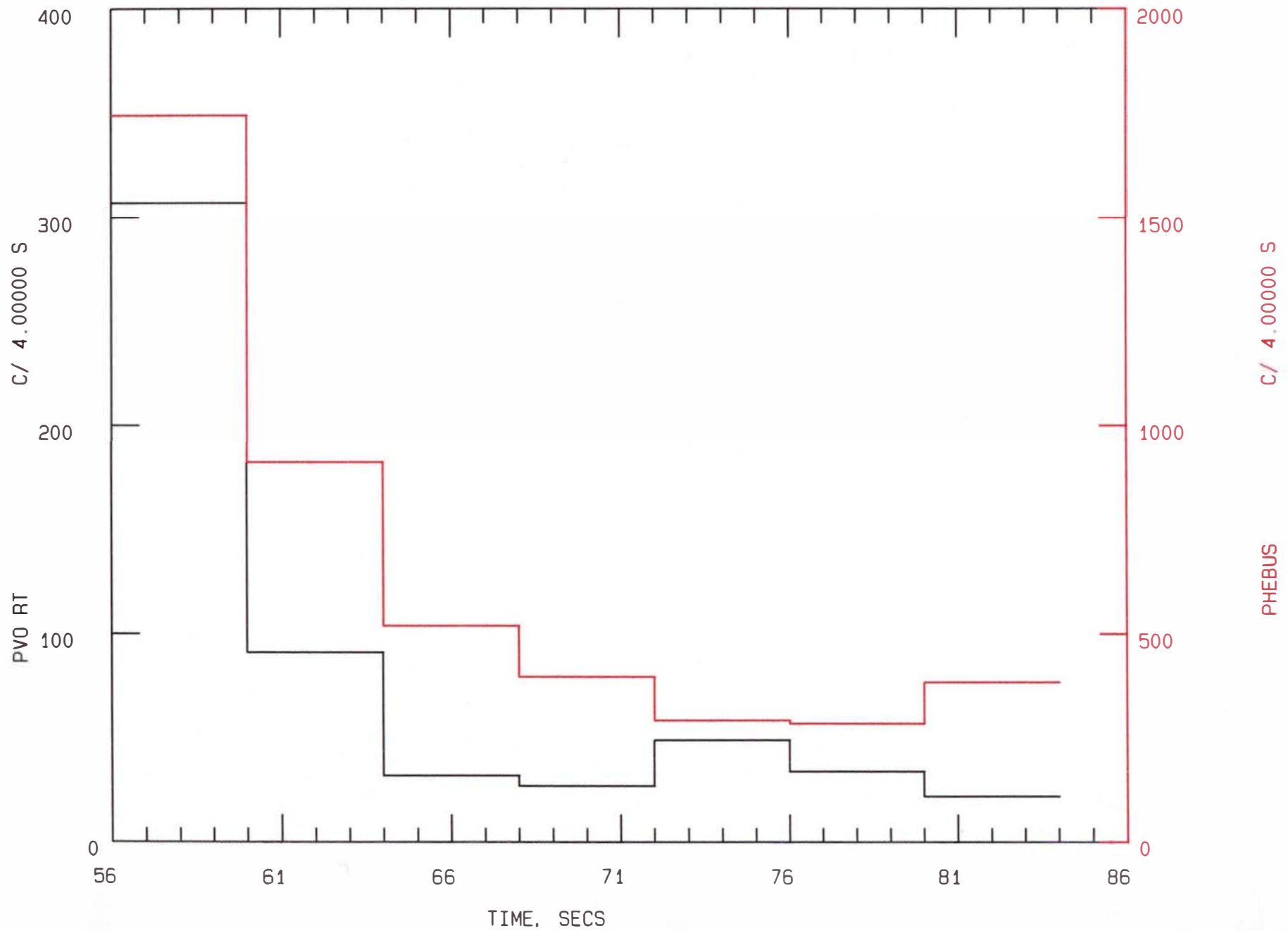
-

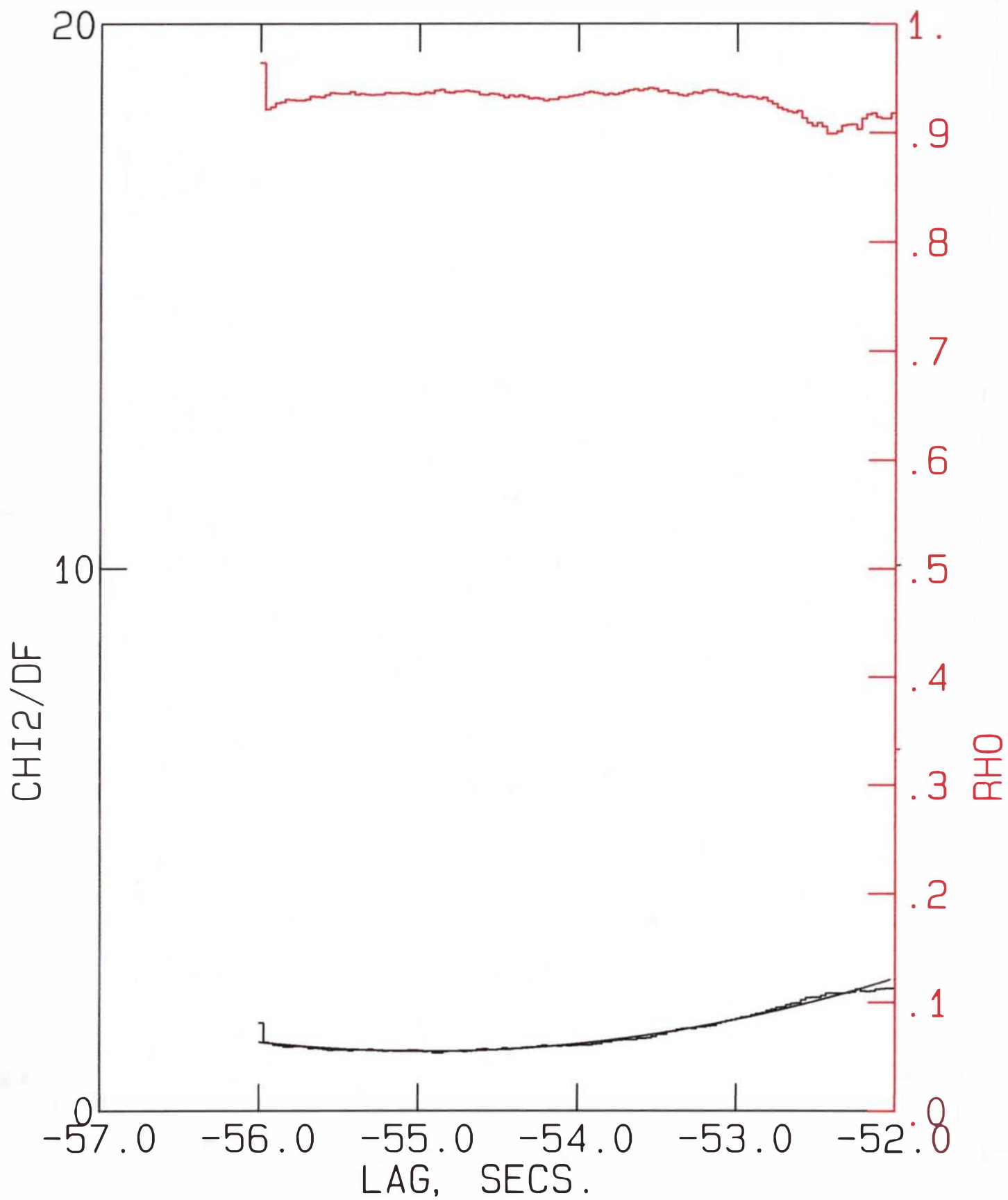
PHEBUS CORRELATION

17/ 5/91

18048.572

15/ 5/98





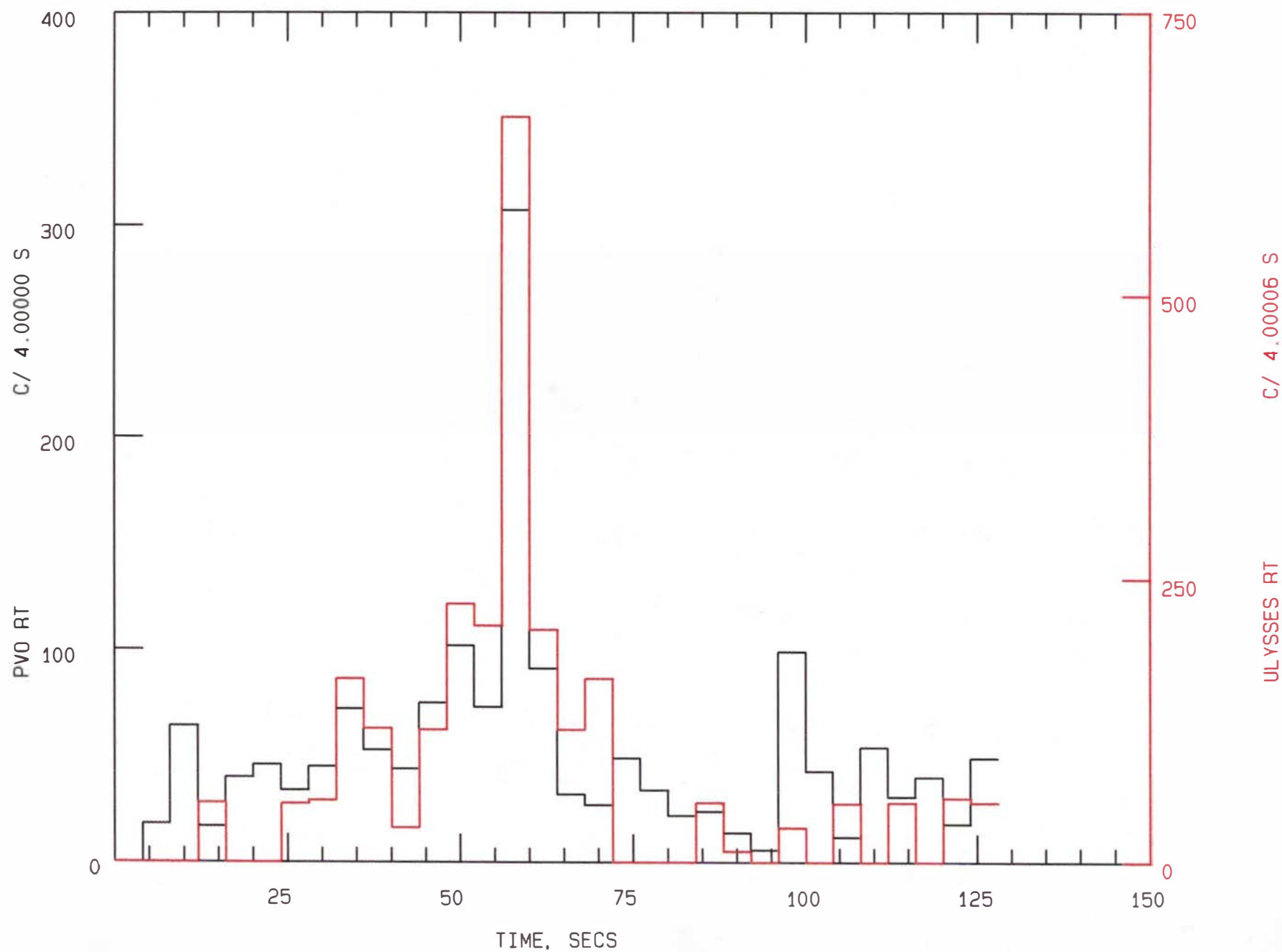
PVO RT

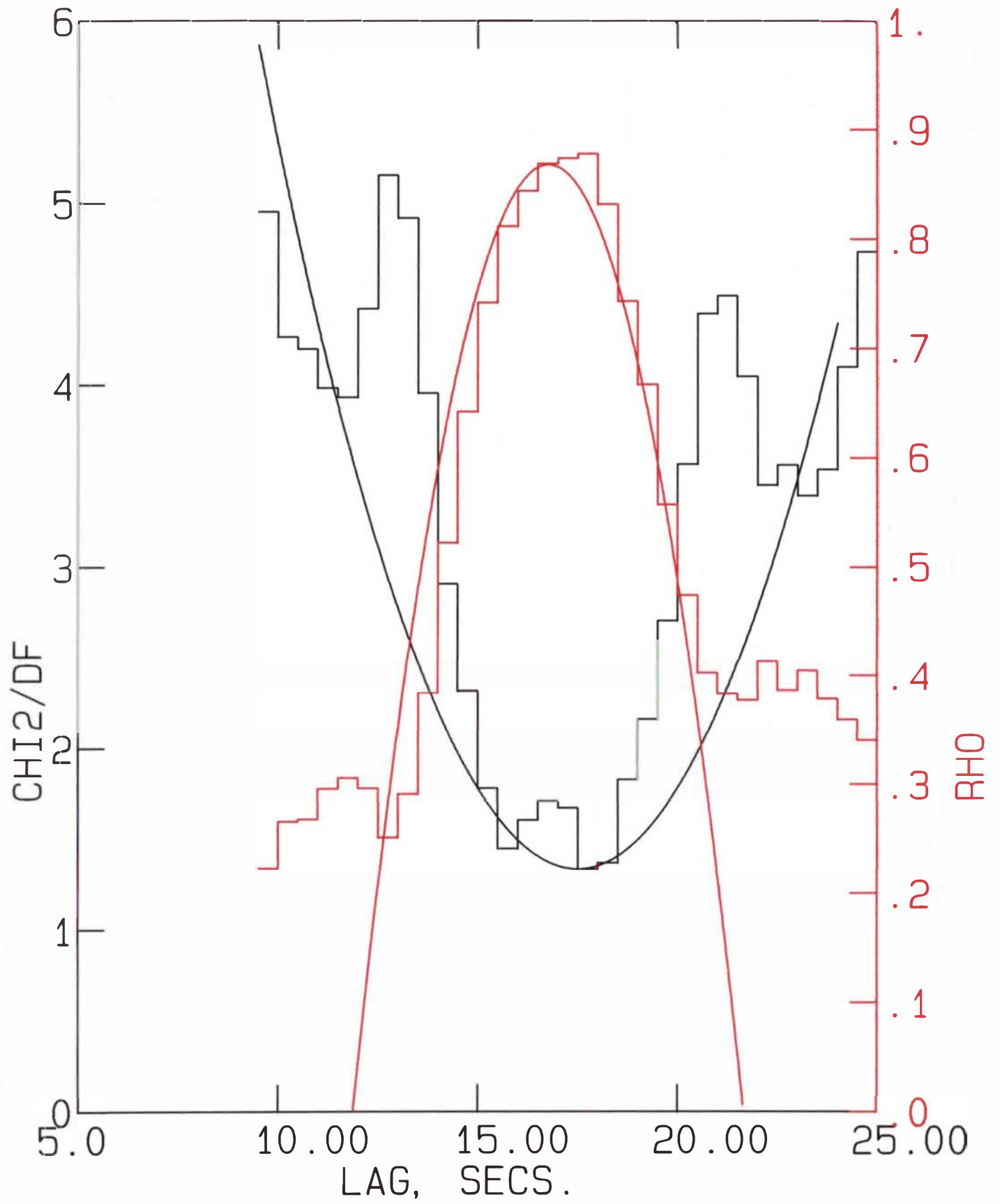
-ULYSSES RT CORRELATION

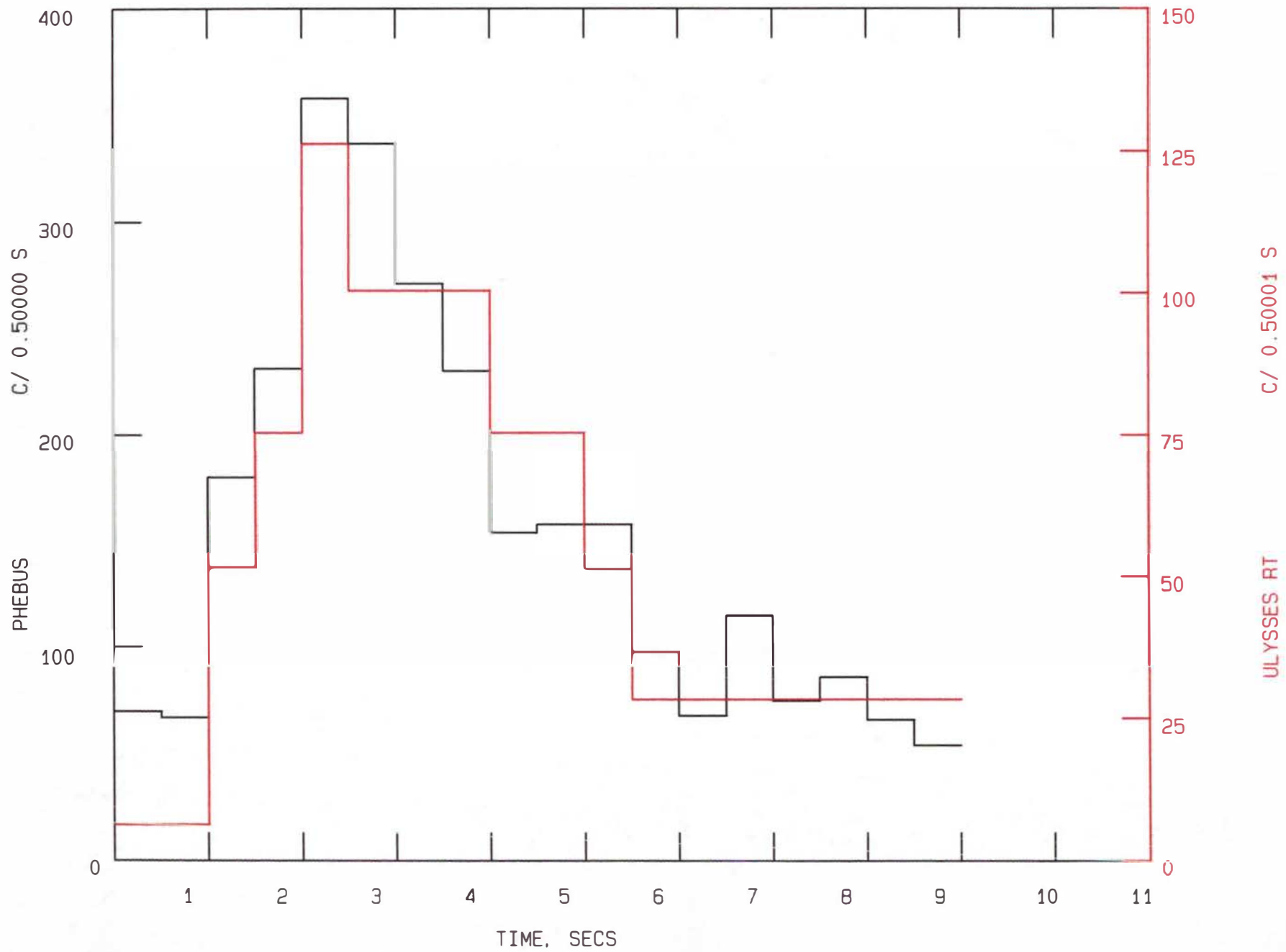
17/ 5/91

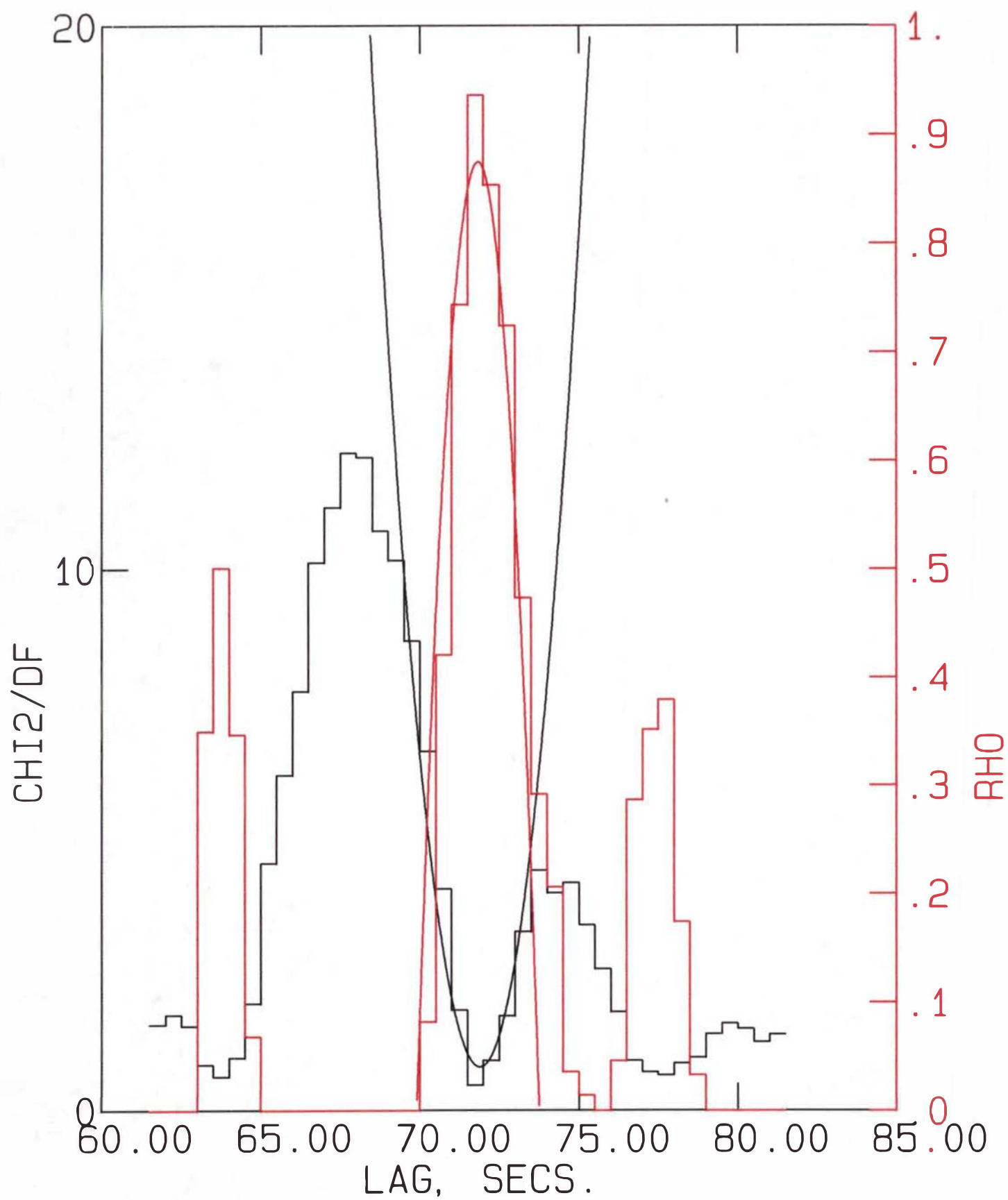
18048.572

15/ 5/98









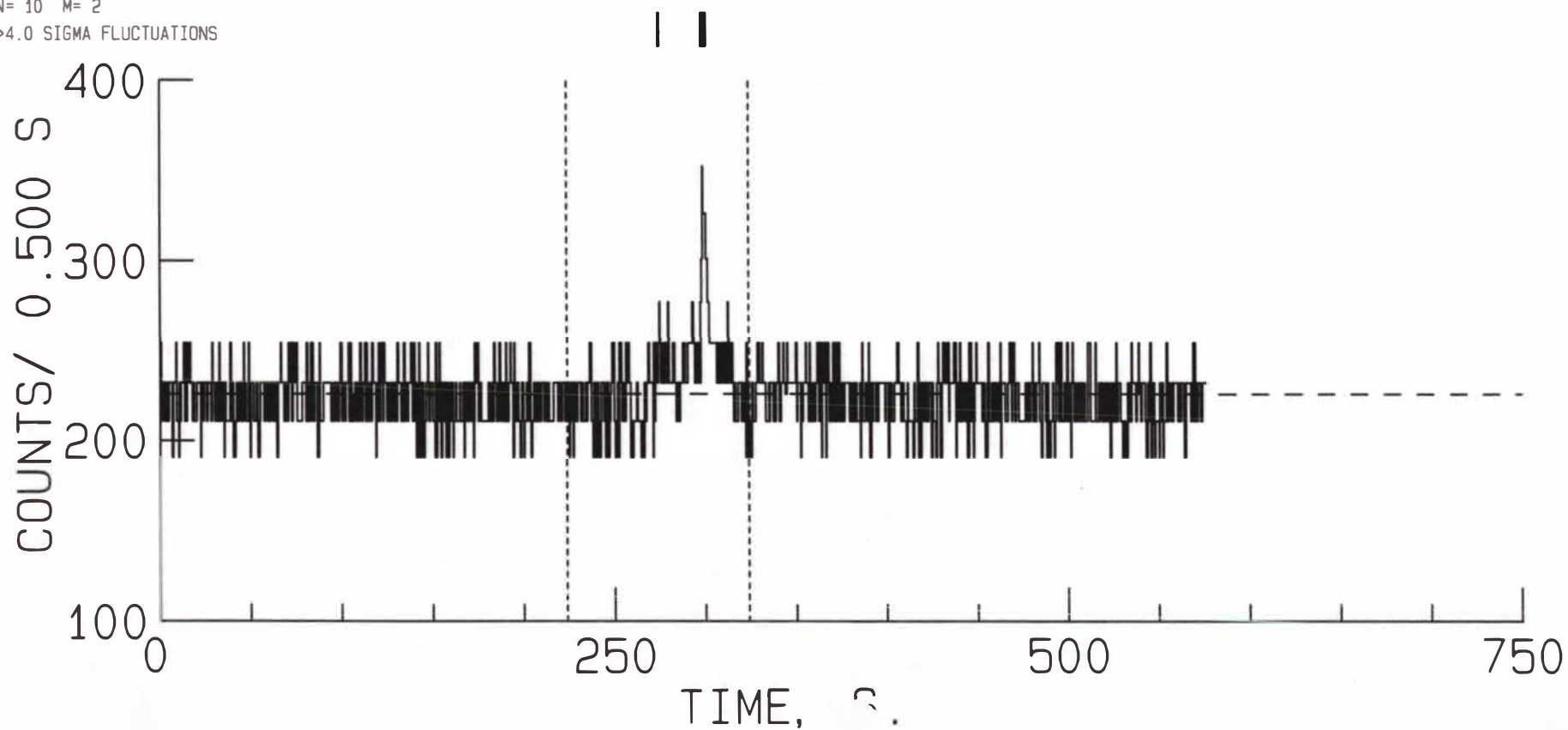
ULYSSES RT

15 / 5 / 98

17 / 5 / 91 17280.270 s

27- 223 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



From nl@dsri.dk Tue Mar 24 14:25 PST 1998
From: Niels Lund <nl@dsri.dk>
Subject: GRB publication
To: khurley@sunspot.ssl.berkeley.edu (kevin hurley)
Date: Tue, 24 Mar 98 23:24:54 MET
Cc: nl@dsri.dk (Niels Lund)

Hello Kevin:

Thank you for your mail. I think it is a good idea to publish the bursts which have been triangulated with PVO, ULYSSES and one or more of the GRANAT or EURECA instruments.

I have a few comments to your event list:

The bursts 910414 and 911018 were not detected by WATCH.
The burst 910517 was detected by WATCH but could not be localized from the available modulation patterns.

This leaves only three WATCH-GRANAT bursts and one WATCH-EURECA burst to be included in the paper.

But I am all for the publication anyway. Do you have the WATCH data for 910517 and 921004?

niels

From TERRELL@nisdpo.lanl.gov Thu Jan 2 14:51 PST 1997
From: TERRELL@nisdpo.lanl.gov
Date: Thu, 2 Jan 1997 15:51:24 -0700
* khurley@sunspot.ssl.berkeley.edu
ject: DMSP DATA FOR GRB910517 AND GRB911222

From: jterrell@lanl.gov (James Terrell, NIS-2) 970102
To: jlaros@lpl.arizona.edu (John Laros)
CC: khurley@sunspot.ssl.berkeley.edu (Kevin Hurley) (data truncated)
Subj: DMSP data for GRB910517 and 911222

John:

Here are four more data sets, for GRB910517(9) and 911222(9,10,11). The data for DMSP10(911222) are included only for positional information, since no detection occurred. Note that the summary notes below for these two events have been changed. Please let me know about interesting things or errors you find in the data, such as directional information, timing conflicts, and timing adjustments required (you too, Kevin!). I will send the rest of the data soon. Happy New Year --Jim

Following are some lines extracted from my files, regarding bursts you have asked about. In cases where there was no DMSP detection, I do not plan to send any data. L at the end of the line means--as you may have suspected--data sent to you. PUB91 means: published in proceedings of the 1991 Huntsville meeting.

DMSP GAMMA PEAKS, 2-SEC COUNTS. 99DEG ORBITS FOR 8--13: TERRELL DMSP.GAM 961220 MOD0102
6108,6077,6035,6114,6120,6119 SEC. ALT=800KM, VIEW TO 117 DEG. GRB PEAKTIMES
(8,9,10--12,13) CORRECTED FOR AVG DELAYS: 1.82,1.98,5.50,-0.13 SEC. CHANNELS:
(8)--50,100,200,420 (9)--50,100 (10--12)--50,100,200,430,550(-1000 KEV)
(11)--60,150,375--6000,>6000 KEV (8,9:SSBX; 10--12:SSBX2; 13:SSBX). BATSE: 3B

DATE FL DAY TIME NOTES---(ND=NO DATA,NA=NOT APPARENT & NOT ANALYZED)-----
(NO=DATA CHECKED--SHOWS NO DETECTION)(SR=S. RADIATION BELT)
(NR=NORTH RADIATION BELT)(SAA=SOUTH ATLANTIC ANOMALY)

901204	338P34691	PVO TRIGGER 34690.57, UL TRIGGER 35044@181LS	
	8 338 34973	PEAKS 34973.0 (400/S,<10S), 34991.0 (80/S,<2S)	11/96 L
	9 338 34973	PEAKS 34973.0 (200/S,<10S), 34991.0 (WEAK,50?/S,<2S)	11/96 L
901216	350 56836	PHEBUS +UL+PVO (8SR,10ND)	11/96
	9 350 56842	PEAKS 56841.6(120),877.6(110),881.6(100),EACH<2S,ONESIDE	11/96L
901225	359P03516	PVO GRB (3515.8) @823LS (8NO,9ND,10ND)	11/96
910106	006 59997	PHEBUS +UL+PVO (8NR,9NR)	12/96
	10 006 59998	PEAK 59998.5 (120),60002.5(120),TOTAL <12SEC	12/96L
910122	022 54829	SIGMA +UL+PVO (9SR,10NR)	11/96
	8 022 54828	PEAKS 54828.4(120),838.4(150),842.4(150),852.4(200)ALL<2S	11/96L
910123	023U45631	UL TRIGGER @456LS (8NO,9NO,10NO)	11/96
910208	039U32238	ULYSSES TRIG @593LS (PVO COSMIC TRIG 32379.9@760LS)	
	8 039 32414	SHARP PEAK (32414.5,1200/S,<2S) (10SAA)	PUB91 L
	9 039 32416	HARD,SHARP PEAK(1500/S,<4S), 32415.5+TAIL TO 32431	PUB91 L
910211	042 12322	PHEBUS +UL+PVO (8NO,9NO,10NO)	11/96
910219	050 42324	WATCH GRB,PVO 42658.3@732LS,ULYS (1406+59.8)(10SAA)	
	8 050 42324	GRB PEAKS 42323.6(250/S,<4S),42373.6(100/S,<4S,WEAK)	L
	9 050 42326	GRB PEAKS AT 42325.6(600C/S,<6S),42375.6(300/S,<8S)	L
910310	069~46930	IAU 5207 GRS1217+06.6(1950)(184.8+6.4)PVO@686,WATCH(46925)	DIRPLOT
	069U46767	ULYSSES RISE @888LIGHT-SEC	
	8 069 46923	GRB PEAKS AT 46923.2(500/S),941.2(800),959.2(350) (@108.6)	PUB9193L
	9 069 46925	GRB PKS 46924.9(1050),930.9(550),940.9(400),958.9(400)@87D	PUB9193L
	10 069 46926	GRB PEAKS AT 46925.7(650/S),941.7(300),959.9(250) @80DEG	PUB9193L
910402	092 52095	GRB,GINGA,PHEBUS,SIGMA,PVO(51575@621,5PKS)	
	8 092 52065	PKS 52064.6(200S,<14S),094.6(3800),104.6(5000),112.6(7100),	L

CENTRE D'ETUDE SPATIALE DES RAYONNEMENTS

9, avenue du Colonel Roche - 31400 TOULOUSE

Telefax : 61-55-67-01 TELEX : 531729 Tel : 61-55-66-66

TELEFAX

Page : 2

Date : 27 Octobre.

: J-P DEZALAY

: K. HURLEY.

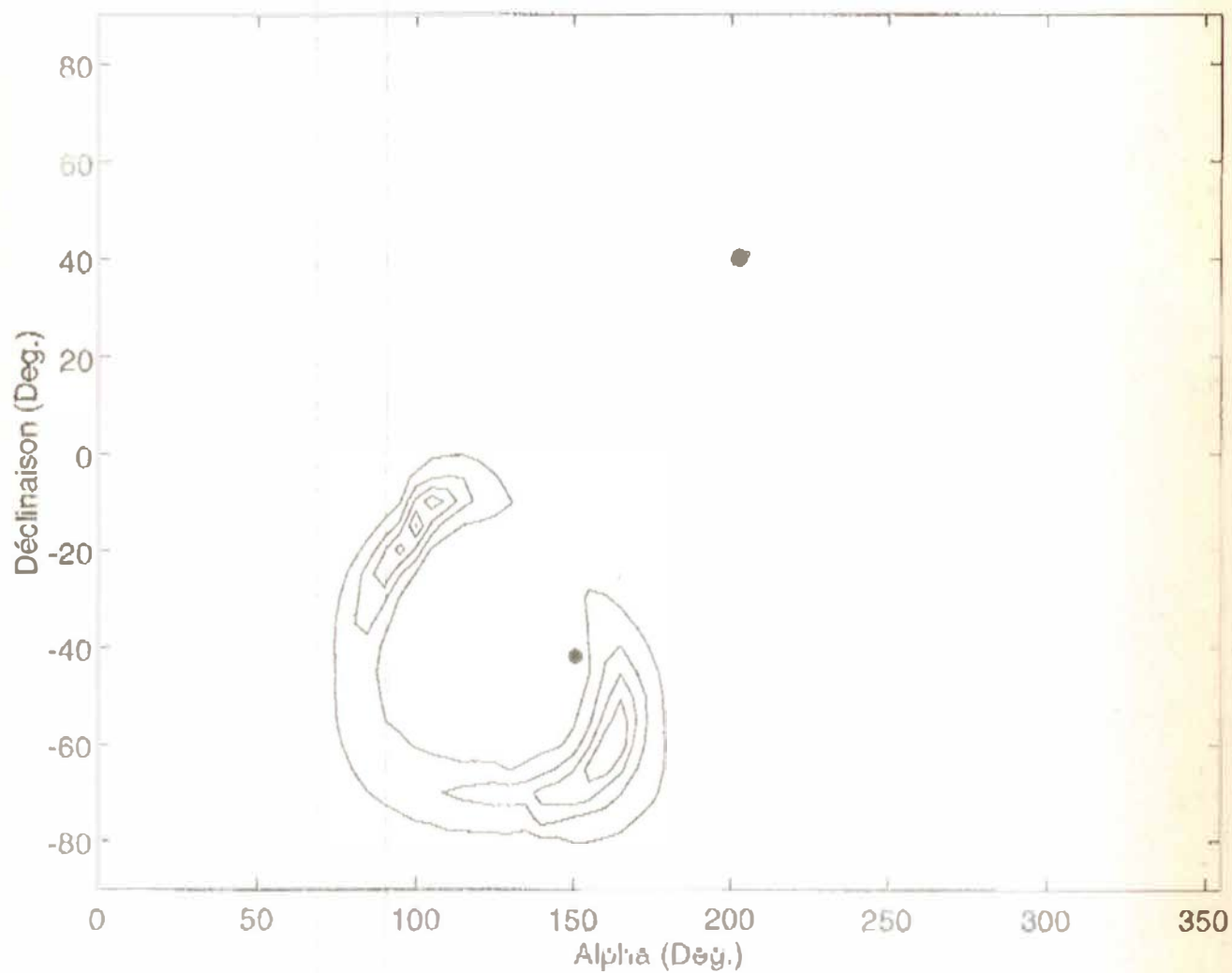
Bonjour KEVIN.

Je t'envoie ma localisation du
91/05/17. à 5:02 U.T.. Je n'ai pas
essayé d'améliorer le résultat car avec
un premier tour grossier la position 151, -42
tombe presque dans ma zone de confiance.
Si cela t'intéresse que j'y passe un peu plus
de temps pour faire mieux (essayer d'autres
triplets de détecteurs, changer les absorptions etc..)
dis-le moi.

Amitiés

Jean-Pascal.

Localisation de GRB910517 (préliminaire)



From khurley@space6.ssl.berkeley.edu Mon Oct 18 17:03:28 1993
Date: Mon, 18 Oct 93 16:58:34
From: khurley@space6.ssl.berkeley.edu
Content-Length: 436

ReBonjour Jean-Pascal,

Dans le e-mail de C. Barat du 15/9/93, il dit que les positions vers l'axe -Z du satellite sont improbables pour le sursaut du 17 Mai 1991. Or, j'ai trouve les deux positions suivantes par triangulation:

151,-43 (angle par rapport a l'axe Z=106 degres) ou
203,40 (angle par rapport a l'axe Z=93 degres)

Donc, les deux sont dans le plan "interdit". Qu'est-ce que tu en penses?

Amities

Kevin

cc: C. Barat

file pheb.1"

From root Wed Sep 15 07:19 1993
Received: by space6.ssl.berkeley.edu (AIX 2.1 2/4.03)
id AA03895; Wed, 15 Sep 93 07:19:28
Received: from mhs-relay.cs.wisc.edu by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA04138; Wed, 15 Sep 93 07:22:11 PDT
X400-Received: by mta mhs-relay.cs.wisc.edu in /PRMD=XNREN/ADMD= /C=US/;
Relayed; Wed, 15 Sep 1993 09:23:36 +0000
X400-Received: by /PRMD=inria/ADMD=atlas/C=fr/; Relayed;
Wed, 15 Sep 1993 09:23:32 +0000
X400-Received: by /PRMD=cnes/ADMD=atlas/C=FR/; Relayed;
Wed, 15 Sep 1993 09:23:20 +0000
Date: Wed, 15 Sep 1993 09:23:20 +0000
X400-Originator: BARAT@cNESTA.span.cnes.fr
X400-Recipients: khurley@space6.ssl.berkeley.edu
X400-Mts-Identifier: [/PRMD=cnes/ADMD=atlas/C=FR/;748102939@eliot.cnes.fr]
X400-Content-Type: P2-1984 (2)
Content-Identifier: Balistic info...
From: BARAT@cnesta.span.cnes.fr
Message-Id: <0097295C.5360EC60.3179@cnesta.cnes.fr>
To: khurley@space6.ssl.berkeley.edu
Subject: Balistic informations for GRB910517 and GRB920918
Status: R

Dear Dr Hans Krimm,

Although the Phebus instrument, which operates in the .1 - 100 MeV nominal energy range, consists of six detectors, in-situ GRB source localizations are difficult due to nearly isotropic response of detectors, large photopeak efficiencies at high energy (0.66 at 1 MeV), FOV partially obstructed by satellite materials ...

I can give you only a rough estimate (or rather a forecast) of the source direction, regarding the count-rate observed in the six detectors. Please, note that I sent to Kevin Hurley the GRB920918 time history in order to localize this event by triangulation.

Sincerely

Claude Barat

cc : K. Hurley

1991 May 17 event detected at 5:02:42.959 UT (h:mm:ss.msec) by PHEBUS

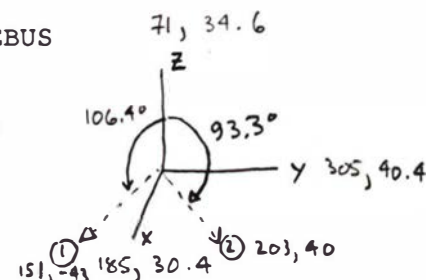
Satellite coordinates at this time (alpha, delta, R,
equatorial system 1950.0)

alpha = 10.2131 (hh,mn,sec)
delta = 34.4732 (deg,',''')
R = 173171.0 (km)

Direction of the satellite axes (alpha, delta, 1950.0)

+ X : alpha = 12.2007 (hh,mn,sec) delta = + 30.2659 (deg,',''')
+ Y : alpha = 20.2016 (hh,mn,sec) delta = + 40.2454 (deg,',''')
+ Z : alpha = 4.4419 (hh,mn,sec) delta = + 34.3729 (deg,',''')

The burst source position appears to be unclear, although solutions located on the half celestial sphere limited by the XOY plane towards -Z are unlikely.



1992 Sept 18 event detected at 9:41:19.340 UT (h:mm:ss.msec) by PHEBUS

Satellite coordinates at this time (alpha, delta, R, 1950.0)

alpha = 9.2802 (hh,mn,sec)
delta = 61.4652 (deg,',''')
R = 159249.4 (km)

From 081877@SSTDP2.LANL.GOV Wed Oct 27 10:21:44 1993
Date: Wed, 27 Oct 1993 11:21:35 -0600 (MDT)
From: 081877@SSTDP2.LANL.GOV
To: khurley@sunspot.ssl.berkeley.edu
Subject: Cleaning off my desk. (The table is next.)
Content-Length: 1735

Kevin,

I am cleaning off my desk, and found the following possible loose ends, which list chronologically by burst.

- ✓ 80/ 5/ 1 69400. I found a note to myself saying to search ICE data at this time. I have no idea why. Do you?
- ✓ 82/ 2/17 49447. This was the data we used to check your calculation of the ICE realtime time. Your time checked to within about 4 ms, but the funny thing was that the data you told me was SC1 was really PC1, according to our software.
- ✓ 93
93/ 3/18 1100UT My note says "Short Ulysses burst". I have no other record of an event on this date in the 1990s. Is there anything to this?
- ✓ 91/ 5/17 18047. You requested PVO ephemerides. They are (138983427, 99.37617, 25.76913) 1950.
- ✓ 91/ 7/ 9 ????? Do you have the data? Yes
- ✓ 91/10/16 39660. I have a PVO ephemeris printout that I may or may not have sent you. It is (84281926, 157.84158, 7.66579) 1950.
- 91/12/ 2 73363. You were worried about the PVO trigger time and time history. Ray's catalog verifies the information that you have. However, there may be realtime data that will allow us to troubleshoot this event. I will ask Robin to investigate.
- ✓ 92/ 5/ 1 76840. Do you have the PVO data? (Take a gander at this one!) Yes
- ✓ 92/ 5/19 59208. Do you have the PVO data? Yes
- ✓ 92/ 5/25 12878. Ditto. Yes
- ✓ 92/ 7/11 58073. Ditto. Yes
- ✓ 92/ 7/14 47300. Ditto. (Realtime response.) Yes
- ✓ 92/ 7/18 13200. Ditto. (Ditto.) No
- ✓ 92/ 7/20 11200. Ditto. (Ditto.) Yes
- ✓ 92/ 7/20 20500. Ditto. (Ditto.) NO
- ✓ 92/ 7/23 72691. Ditto. Yes
- ✓ 92/ 7/31 61854. Ditto. No
- ✓ 92/ 8/30 ????? BATSE alert. Have we looked for this one? NO 6317s (6255 at Venus)
- ✓ 92/ 9/ 8 43405. Solar-looking PVO record. Does anybody care? NO
- 92/10/ 4 49960. Do you have the PVO data? NO
- 92/10/?? ????? Are there any other data that you need?

Dezalay -> KH 7/93

DATE	U.T.	Nr UGB	Event Nature
1991-04-04	14:19:50.243	263-a	GRB
1991-04-04	17:17:18.562	263-b	GRB
1991-04-07	03:13:21.146	265-a	Solar Flare
1991-04-17	20:07:31.886	273-a	GRB
1991-05-16	06:47:23.641	281-a	Solar Flare
1991-05-17	05:02:42.959	282-a	GRB
1991-05-17	09:03:44.505	282-b	Solar Flare
1991-05-27	23:44:36.515	287-a	GRB
1991-05-28	07:26:24.093	287-b	Solar Flare
1991-05-28	18:17:55.430	287-c	Solar Flare
1991-05-31	16:53:41.316	289-a	Solar Flare
1991-06-01	14:56:53.229	290-a	Solar Flare
1991-06-01	~15:08	290-b	Solar Flare
1991-06-01	19:20:29.144	290-c	GRB
1991-06-09	22:05:12.335	293-a	Solar Particles
1991-06-10	02:27:27.347	293-b	Solar Flare
1991-06-10	13:55:19.964	294-a	Solar Flare
1991-06-10	16:53:30.025	294-b	Solar Flare
1991-06-11	01:58:25.934	294-c	Solar Flare
1991-06-26	20:13:20.758	303-a	Solar Flare
1991-06-27	04:29:18.339	303-b	GRB
1991-06-29	19:55:48.409	304-a	GRB
1991-06-30	02:56:07.591	304-b	Solar Flare
1991-06-30	03:29:11.438	304-c	Solar Particles
1991-07-13	19:37:58.821	307-a	Solar Flare
1991-07-17	04:33:04.862	309-a	GRB
1991-07-17	06:25:49.736	309-b	Solar Flare
1991-07-20	01:37:48.274	311-a	Solar Flare
1991-08-14	11:10:26.782	314-a	GRB
1991-08-14	19:14:33.396	315-a	GRB
1991-08-17	17:09:24.566	317-a	GRB
1991-08-21	10:33:39.184	320-a	GRB
1991-08-25	09:36:25.301	323-a	Solar Flare
1991-08-27	13:11:18.345	325-a	Solar Particles
1991-08-27	14:51:03.053	325-b	Solar Particles

18/10/93

PVO-RT

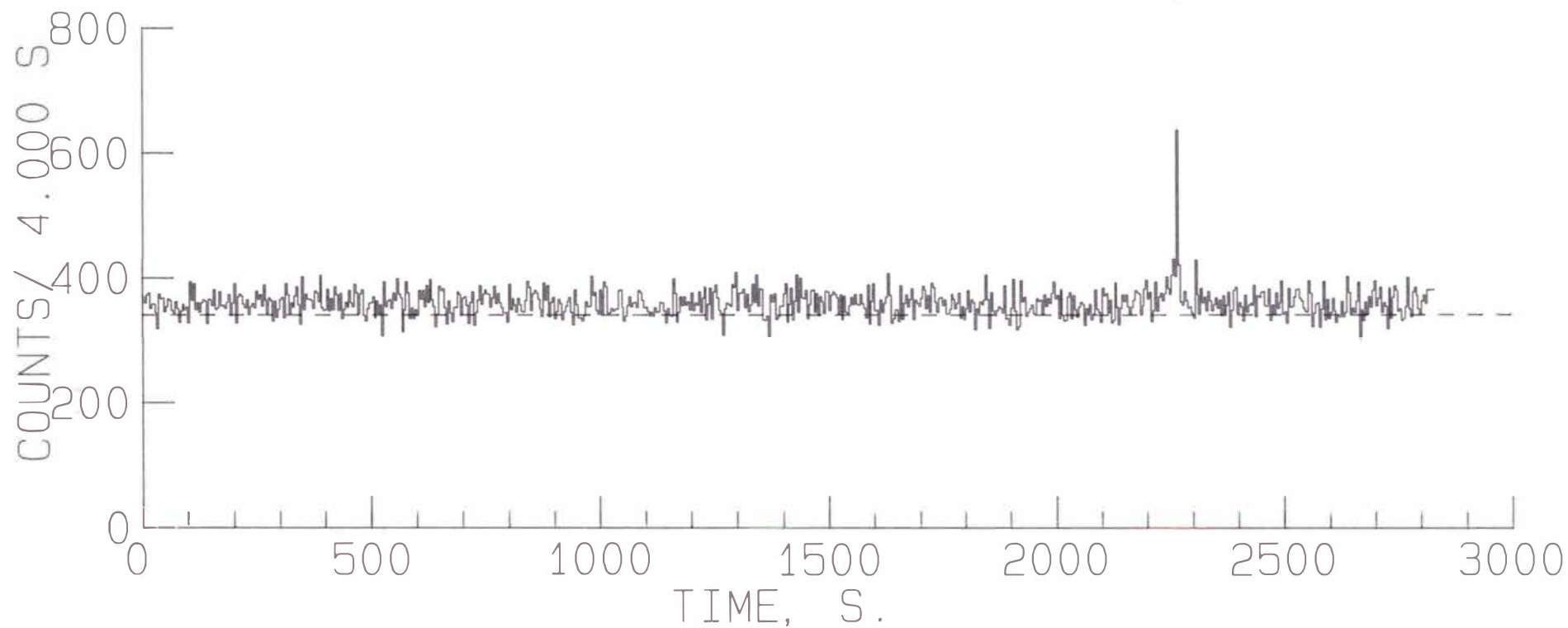
17/ 5/91

15840.560 s.

4.000 S. INTERVALS REGROUPED BY 1

100-2000 keV

10 M= 2
.0 SIGMA FLUCTUATIONS



18/10/93

PVO-RT

17/ 5/91

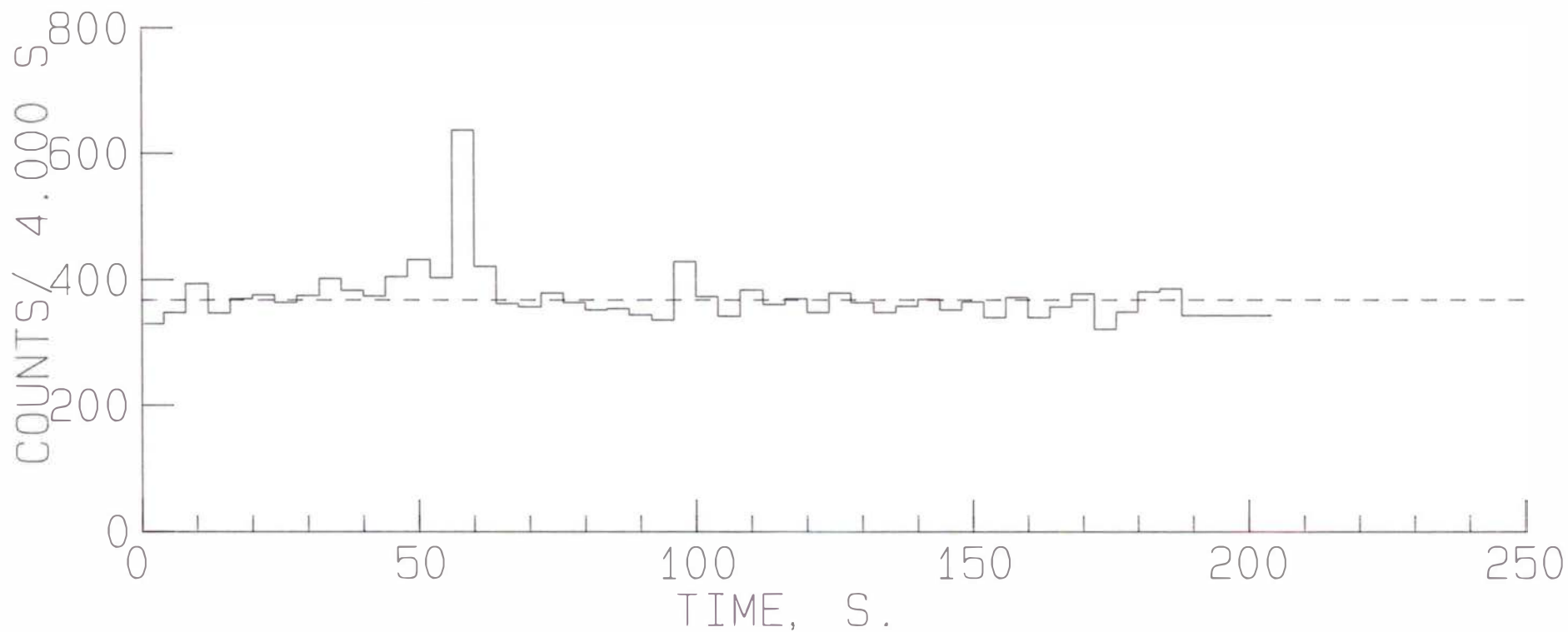
18048.572 s.

4.000 S. INTERVALS REGROUPED BY 1

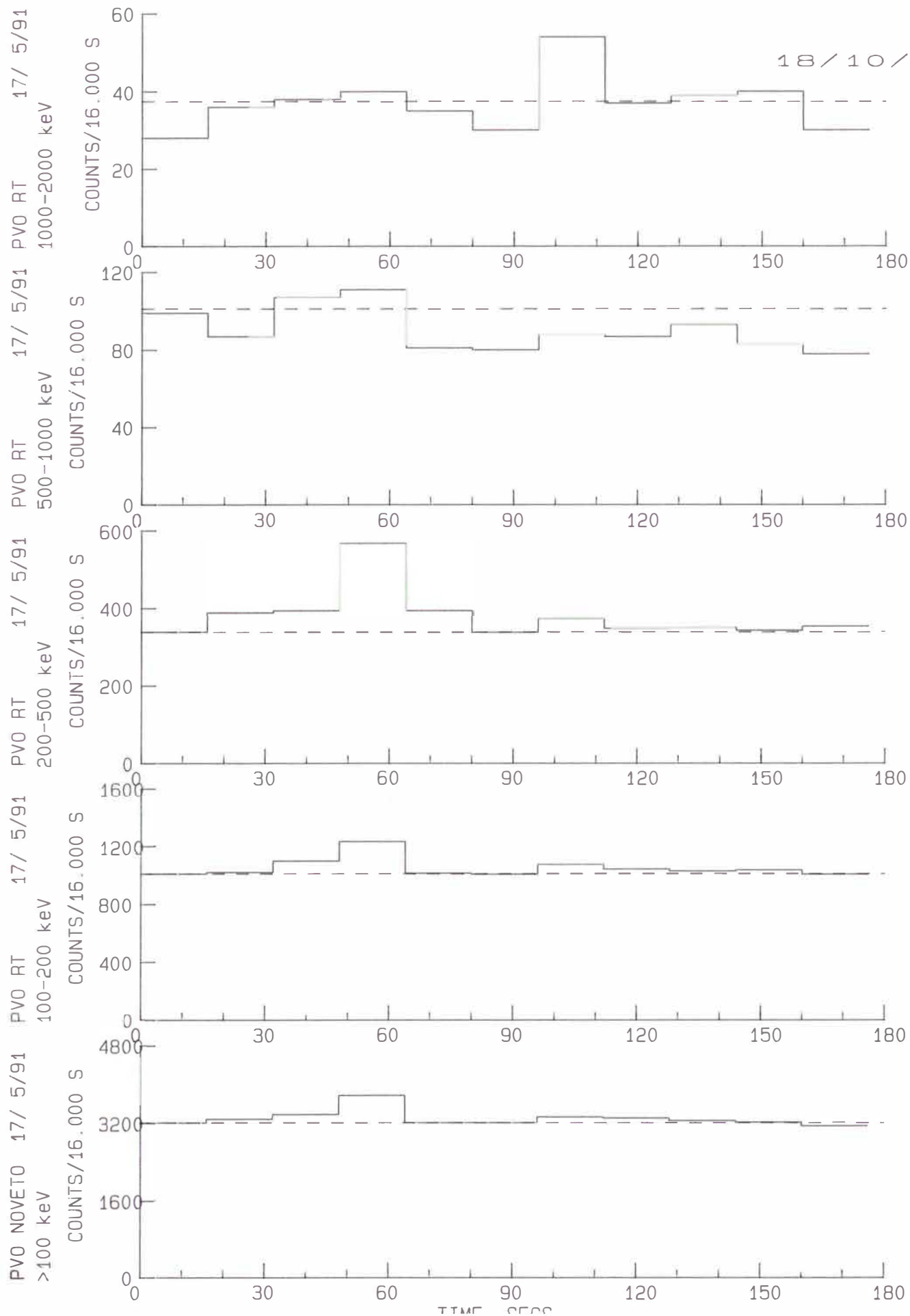
100-2000 keV

10 M= 2
.0 SIGMA FLUCTUATIONS

||



18/10/93



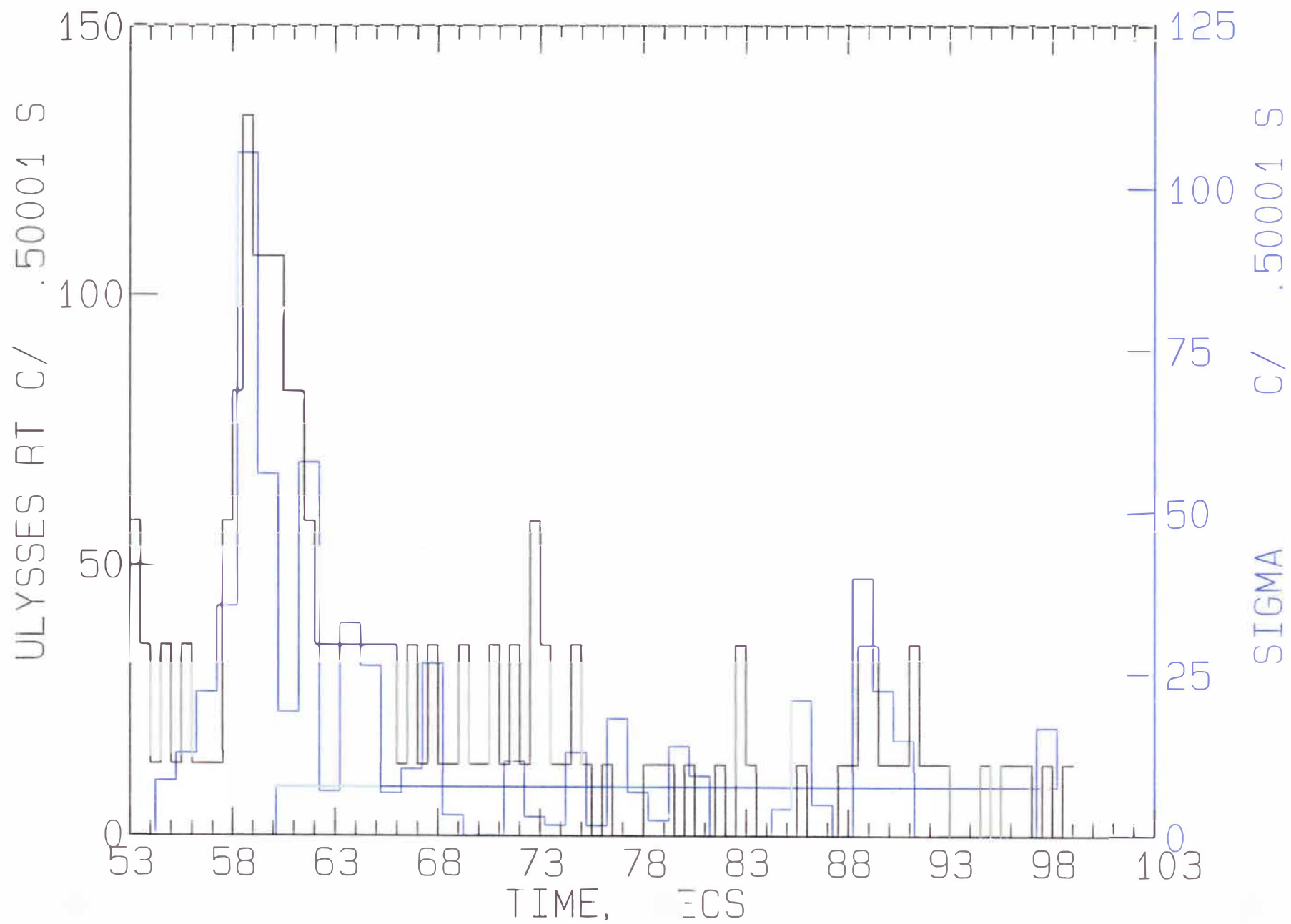
ULYSSES RT-SIGMA

CORRELATION

17/ 5/91

17520.269

18/10/93



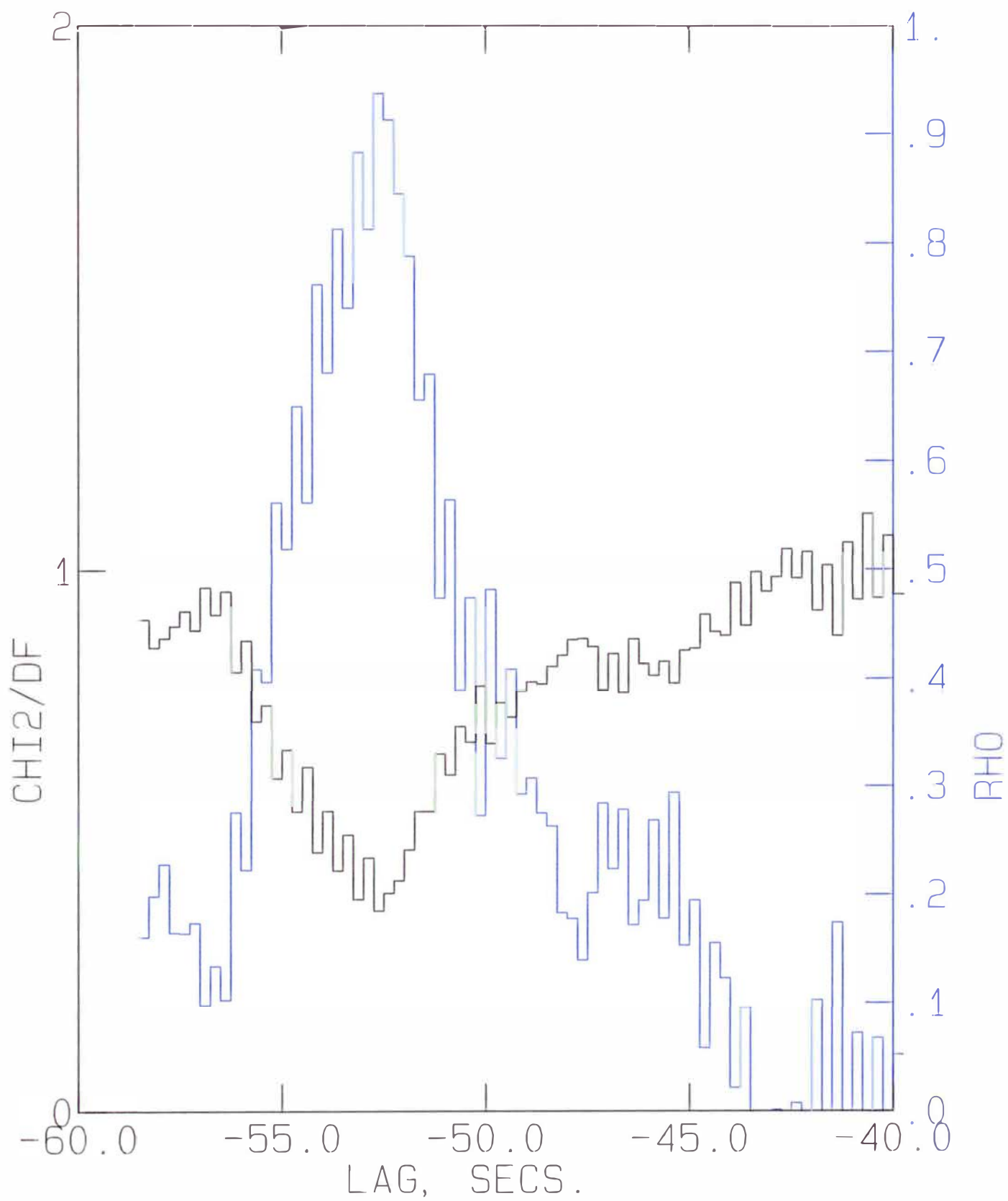
ULYSSES RT-SIGMA

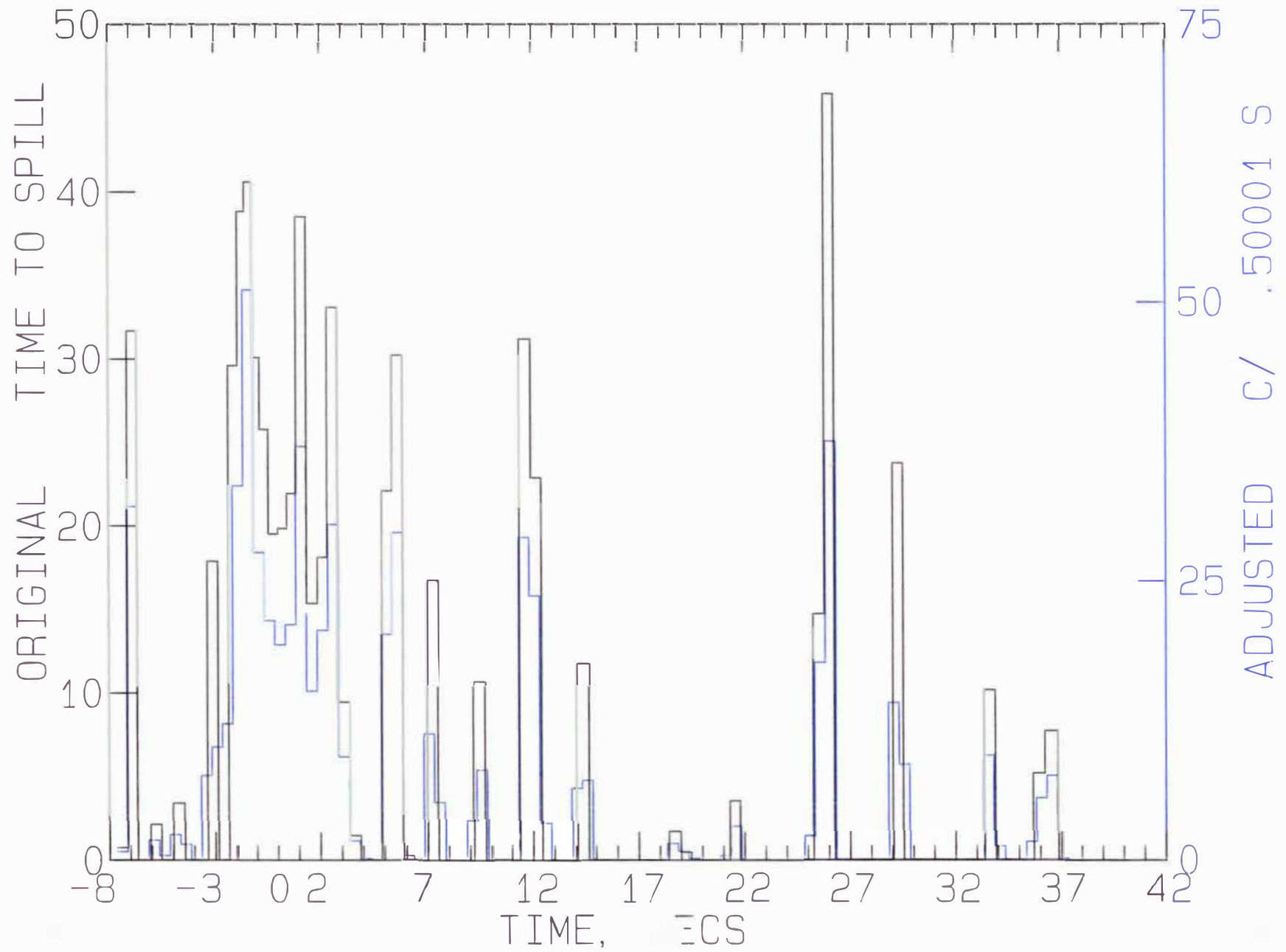
CORRELATION

17/ 5/91

17520.269

18/10/93



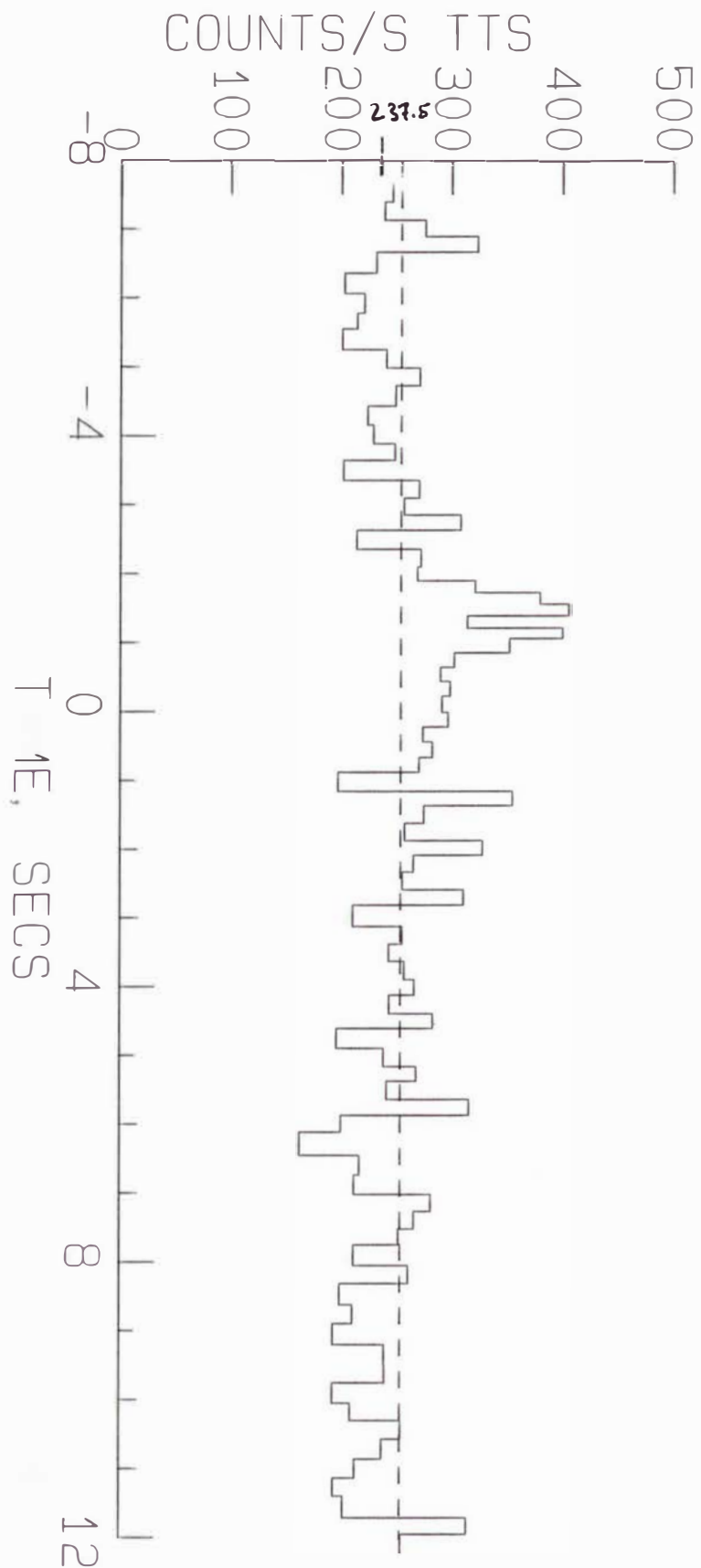


SIGMA

17/05/91

18164.490

30 - 200 keV



SIGMA

17/05/91

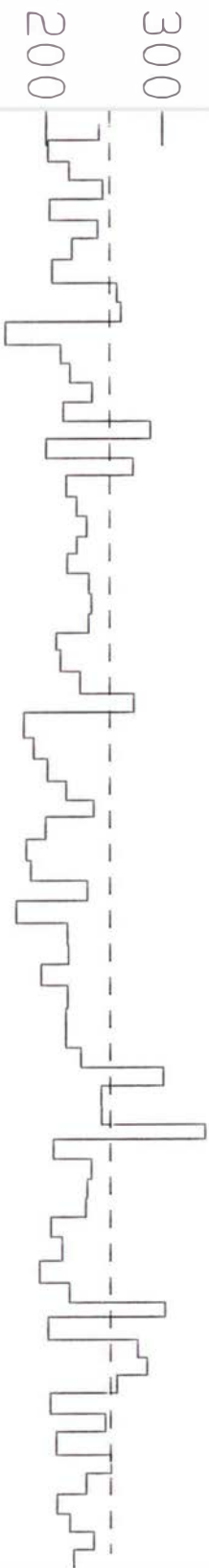
18164.490

30- 200 keV

COUNTS/S TTS

500
400
300
200
100
0

12
16
20
24
28
32
T IE, SECS

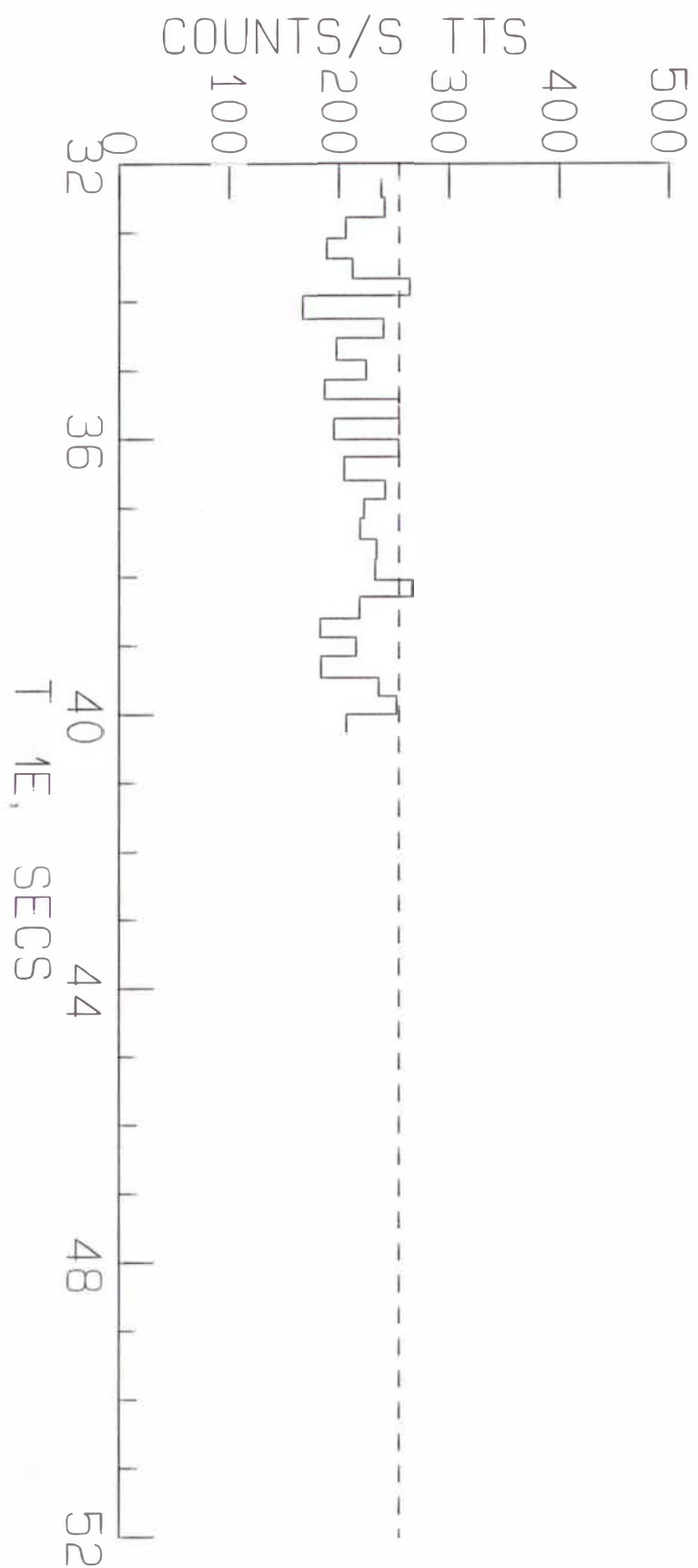


SIGMA

17/05/91

18164.490

30- 200 keV



May 20 08:20 1993 standard input Page 1

From pelaez@cnesta.span.cnes.fr Thu May 20 05:48:20 1993
X400-Received: by mta mhs-relay.cs.wisc.edu in /PRMD=XNREN/ADMD= /C=US/;
Relayed; Thu, 20 May 1993 07:49:41 +0000
X400-Received: by /PRMD=uninett/ADMD= /C=no/; Relayed;
Thu, 20 May 1993 07:49:03 +0000
X400-Received: by /PRMD=inria/ADMD=atlas/C=fr/; Relayed;
Thu, 20 May 1993 07:46:25 +0000
X400-Received: by /PRMD=cnes/ADMD=atlas/C=fr/; Relayed;
Thu, 20 May 1993 07:43:49 +0000
Date: Thu, 20 May 1993 07:43:49 +0000
X400-Originator: pelaez@cnesta.span.cnes.fr
X400-Recipients: khurley@sunspot.ssl.berkeley.edu
X400-Mts-Identifier: [/PRMD=cnes/ADMD=atlas/C=fr/;737901834@eliot.cnes.fr]
X400-Content-Type: P2-1984 (2)
Content-Identifier: Positions GRA...
From: "" <pelaez@cnesta.span.cnes.fr>
To: khurley <khurley@sunspot.ssl.berkeley.edu>
Subject: Positions GRANAT
Content-Length: 1305

CESR/SIGMA/F.PELAEZ

TOULOUSE, 20/05/1993

Kevin,

voici les positions de GRANAT pour GB910402, GB910417, GB910517,
GB920414 et GB920519 :

GB910402 : t0 = 14h 28mn 15s 137ms ----> profil AC
r = 141999.7937 km
R.A.(2000) = 09h 32mn 31.68s
Decl(2000) = 24d 59' 18"

GB910417 : t0 = 20h 07mn 32s 490ms ----> profil GC
r = 195435.2016 km
R.A.(2000) = 09h 01mn 17.09s
Decl(2000) = 46d 22' 19.2"

GB910517 : t0 = 05h 02mn 44s 490ms ----> profil GC
r = 172965.8481 km
R.A.(2000) = 09h 16mn 41.77s 139.175
Decl(2000) = 34d 35' 13" 34.587

GB920414 : t0 = 23h 22mn 43s 021ms ----> profil GC
r = 116687.6609 km
R.A.(2000) = 03h 00mn 43.03s
Decl(2000) = 84d 15' 50.4"

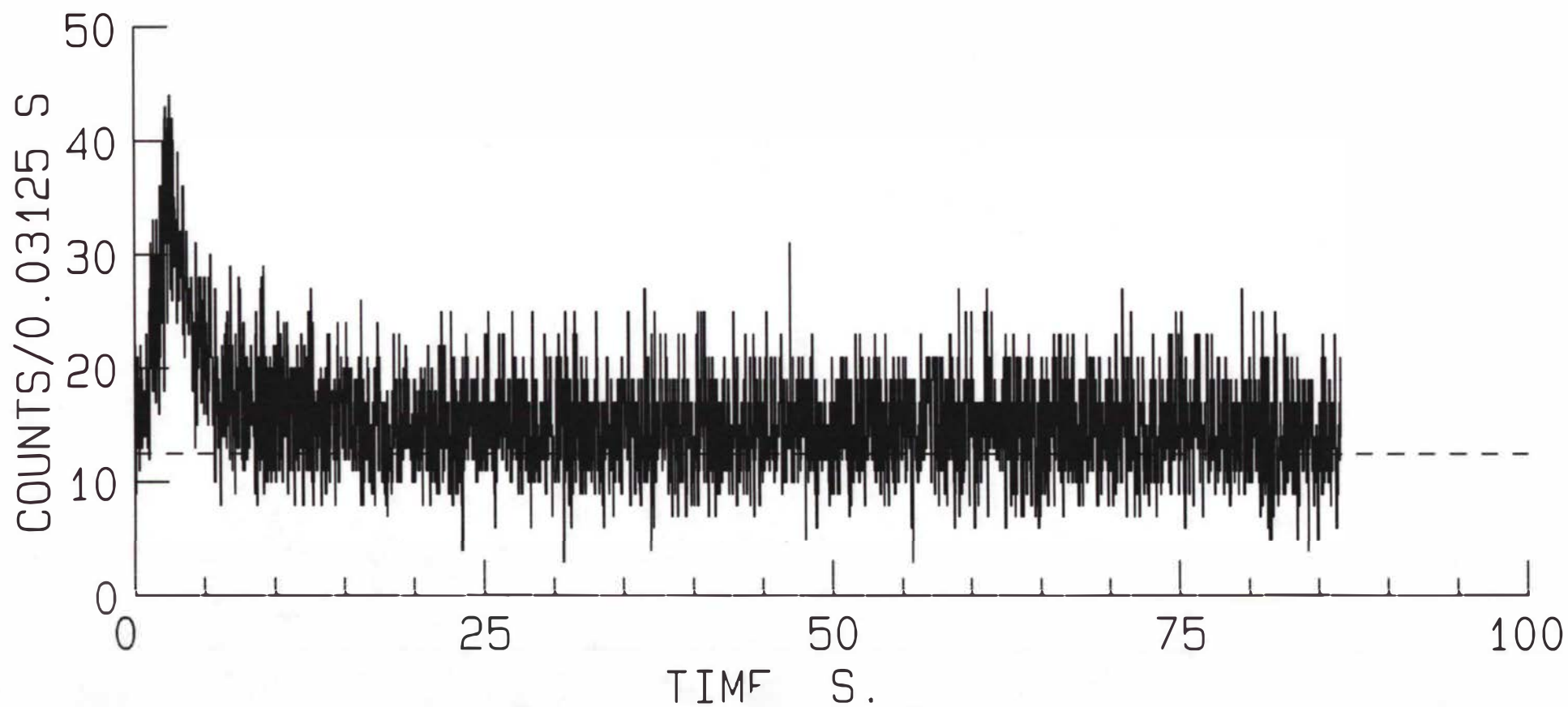
GB920519 : t0 = 16h 30mn 03s 103ms ----> profil VL
r = 166606.1708 km
R.A.(2000) = 08h 55mn 17.80s
Decl(2000) = 30d 18' 58.5"

Les courbes de lumiere suivront dans 5 fichiers separes. Elles sont
donnees sous forme d'histogramme (t1, t2, y). Pour les quatre
premiers sursauts, t1 et t2 sont donnees en secondes depuis t0. Pour le
dernier, t1 et t2 sont donnees en heures T.U. (t0 correspond ici au pic).

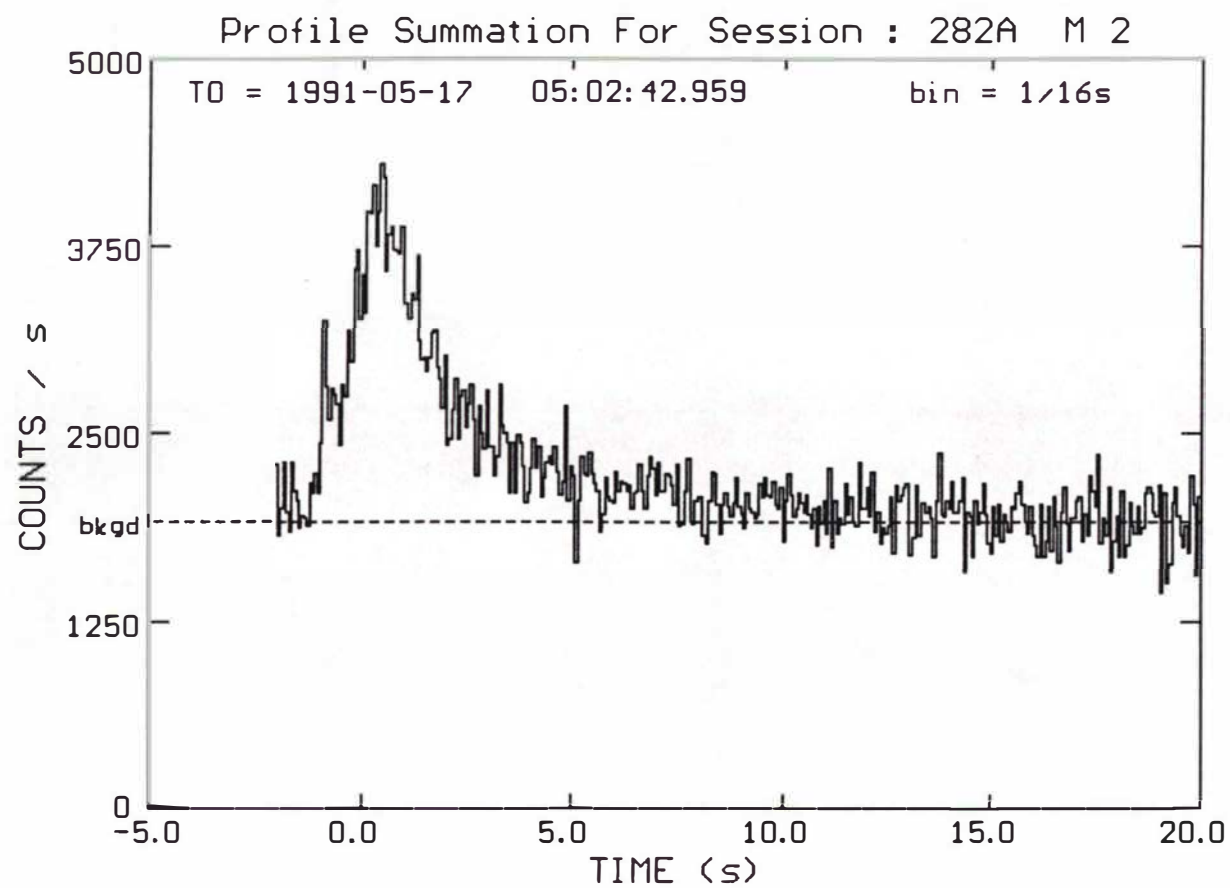
PHEBUS

17/ 5/91 18160.955 s

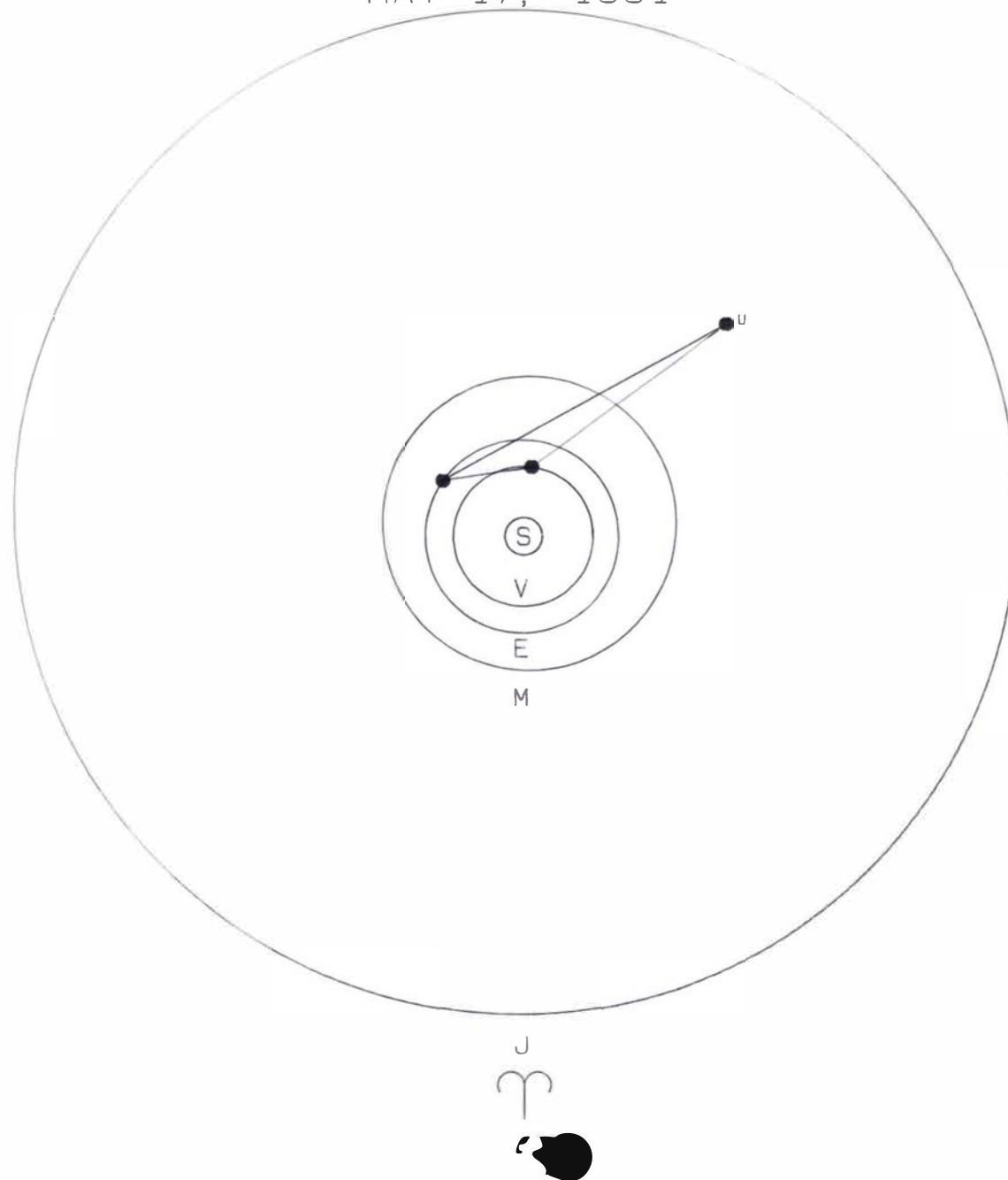
100- 1600 keV



Phebus



ULYSSES ORBIT - ECLIPTIC PLANE PROJECTION
MAY 17, 1991





List of GRB's candidates detected by SIGMA

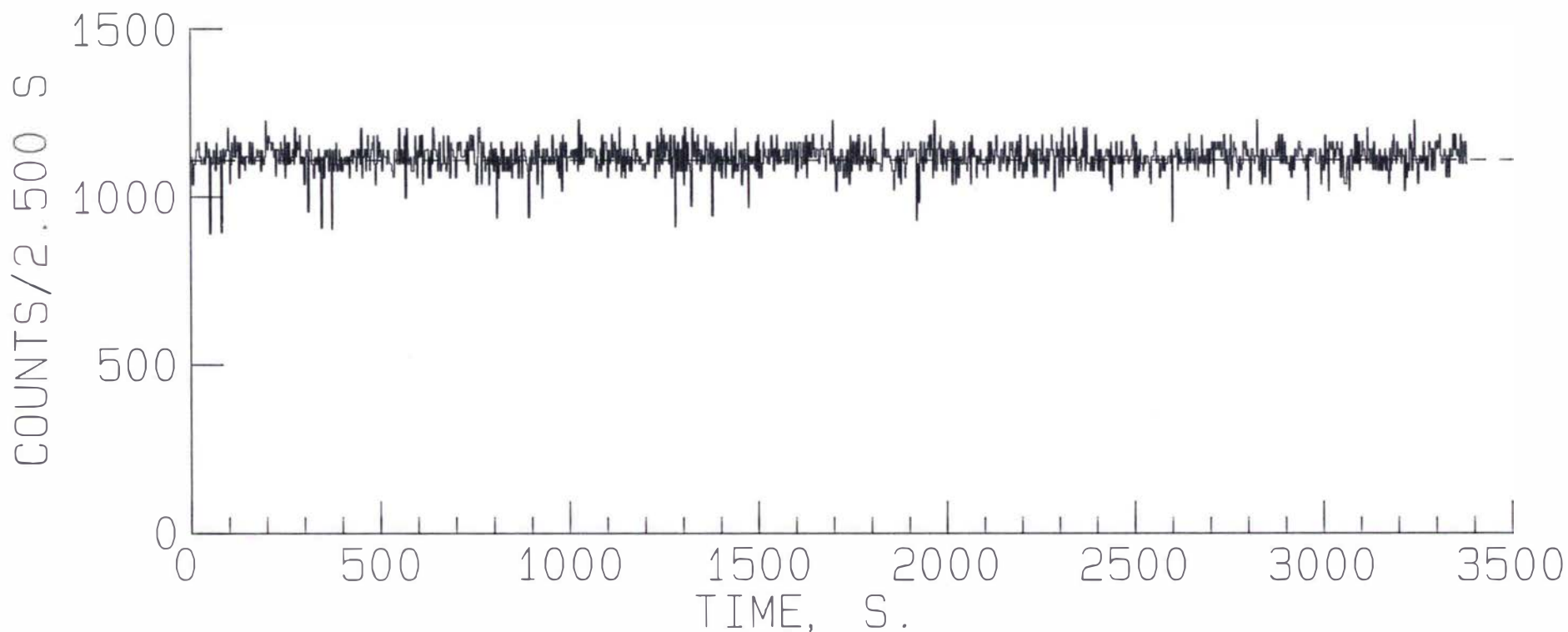
YEAR : 1991

<i>Time of trigger (UT)</i>	<i>Detector</i>	<i>UGB N°</i>	
1991/01/22 15:13:48.564	GCA	228/b	Yes - Trigger
1991/04/02 14:28:15.137	A.C.	262/b	Yes - RI
1991/04/17 20:07:32.490	GCA	273/a	Yes - Trigger
1991/05/17 05:02:44.490	GCA	282/a	Yes - RI
1991/05/17 13:19:10.749 47951	GCA	282/b	NO
1991/06/30 07:37:05.264	A.C.	304/b	Yes - RI
1991/08/14 19:14:34.774	A.C./GCA	315/b	Yes - RI
1991/08/21 10:33:57.648	A.C./GCA	320/a	NO DATA
1991/10/26 15:28:49.212	GCA	363/a	NO
1991/11/19 17:12:34.449 619545	GCA	367/a	NO
1991/11/19 17:28:59.116 62019	GCA	367/b	NO

12/ 9/92

ULYSSES RT
17/ 5/91 46260.246 s
.500 S INTERVALS REGROUPED BY 5
27- 223 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



CATSEARCH PROGRAM

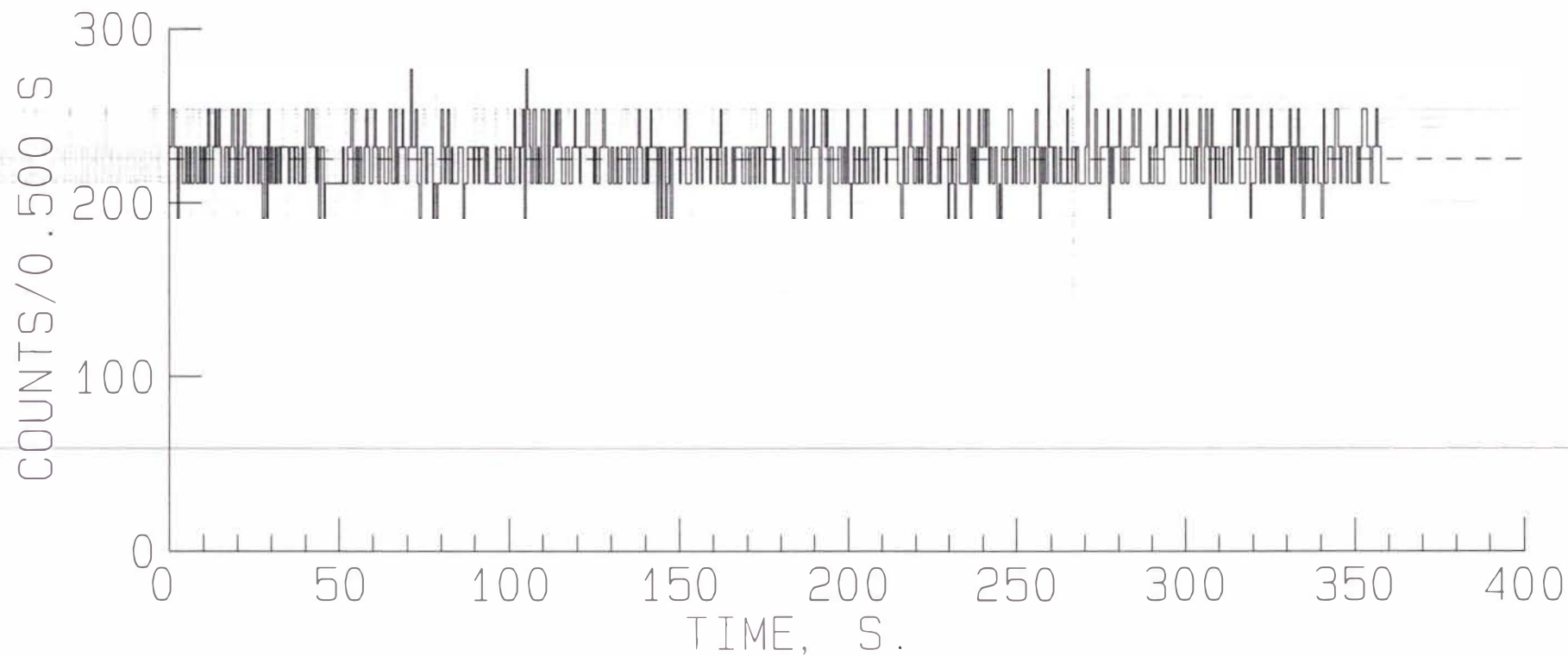
BATSE BURST # 204
EVENT OF 1991 MAY 17 DAY OF YEAR=137
EVENT CROSSING TIME AT BATSE : 38927. S. OR 10:48:47.2
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 107.200 52.100
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 17/ 5/ 91 IS:
RA= 121.325 DEC= 21.870 DIST= 3.359 AU
BATSE-ULYSSES DISTANCE = 502454040. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=147.86 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-1419.20 SECS.
CROSSING TIME AT ULYSSES IS 37508. S. OR 10:25:08 +/- 183.24 SECONDS

NO

14 / 4 / 93

ULYSSES RT
17 / 5 / 91 37332.105 s
0 - 0 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS

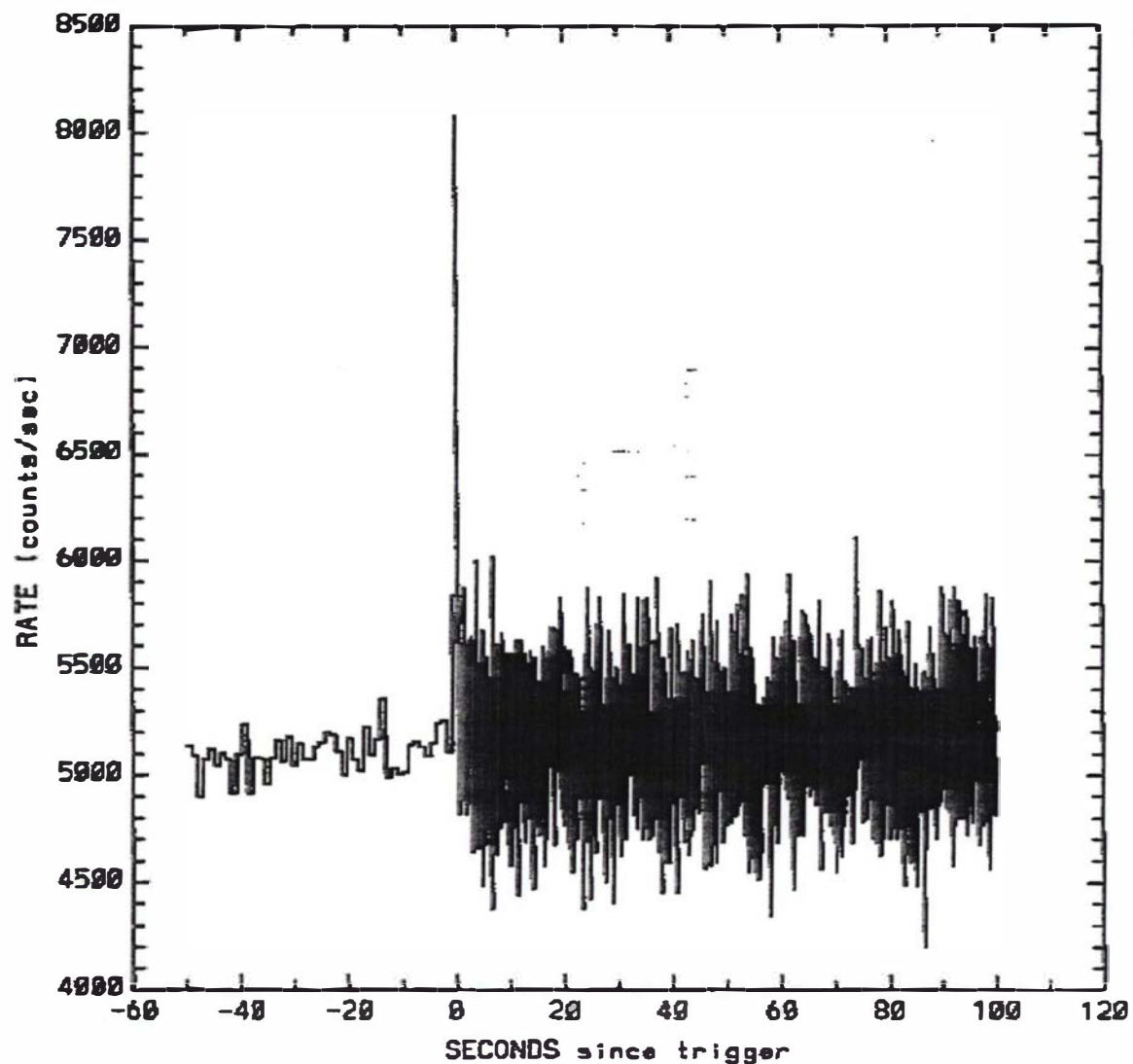


CATSEARCH PROGRAM

BATSE BURST # 206
EVENT OF 1991 MAY 17 DAY OF YEAR=137
EVENT CROSSING TIME AT BATSE : 86135. S. OR 23:55:35.1
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 344.600 25.100
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 17/ 5/ 91 IS:
RA= 121.325 DEC= 21.870 DIST= 3.359 AU
BATSE-ULYSSES DISTANCE = 502454040. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 63.01 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 760.67 SECS.
CROSSING TIME AT ULYSSES IS 86896. S. OR 24:08:15 +/- 320.84 SECONDS

N/O

DATA FOR K. HURLEY



28-MAY-1994 07:12:48

Created by MOPS 80
(Burst Display)
Version 2.20

Trigger # : 206

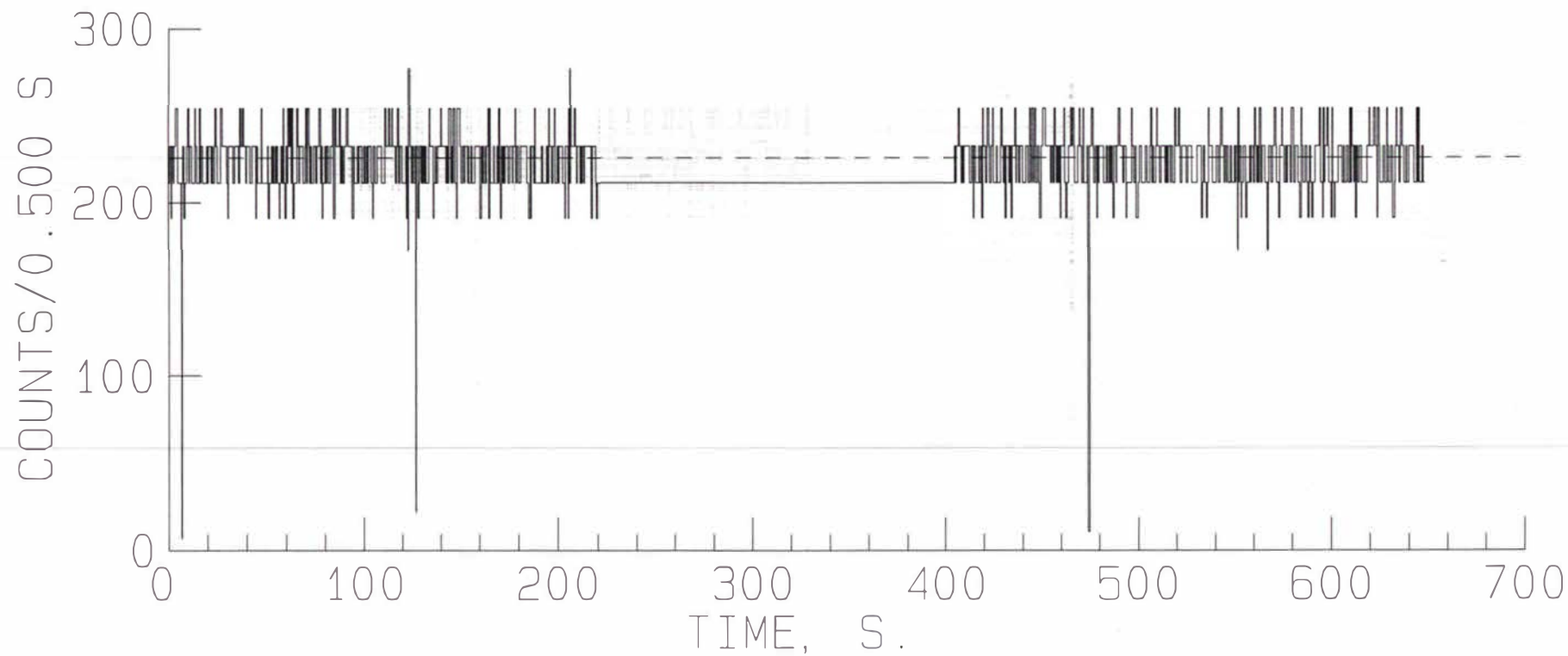
Trigger Time:
8393 / 86135.147Burst Data Type:
DISCSCDeadtime
Corrected: NBackground Data
Type: PREB + DISCLAMinimum Integ. Time:
0.964 secondsDetectors (7..8):
0000011Discriminators:
(1, 2)Quality Mask:
BDISP

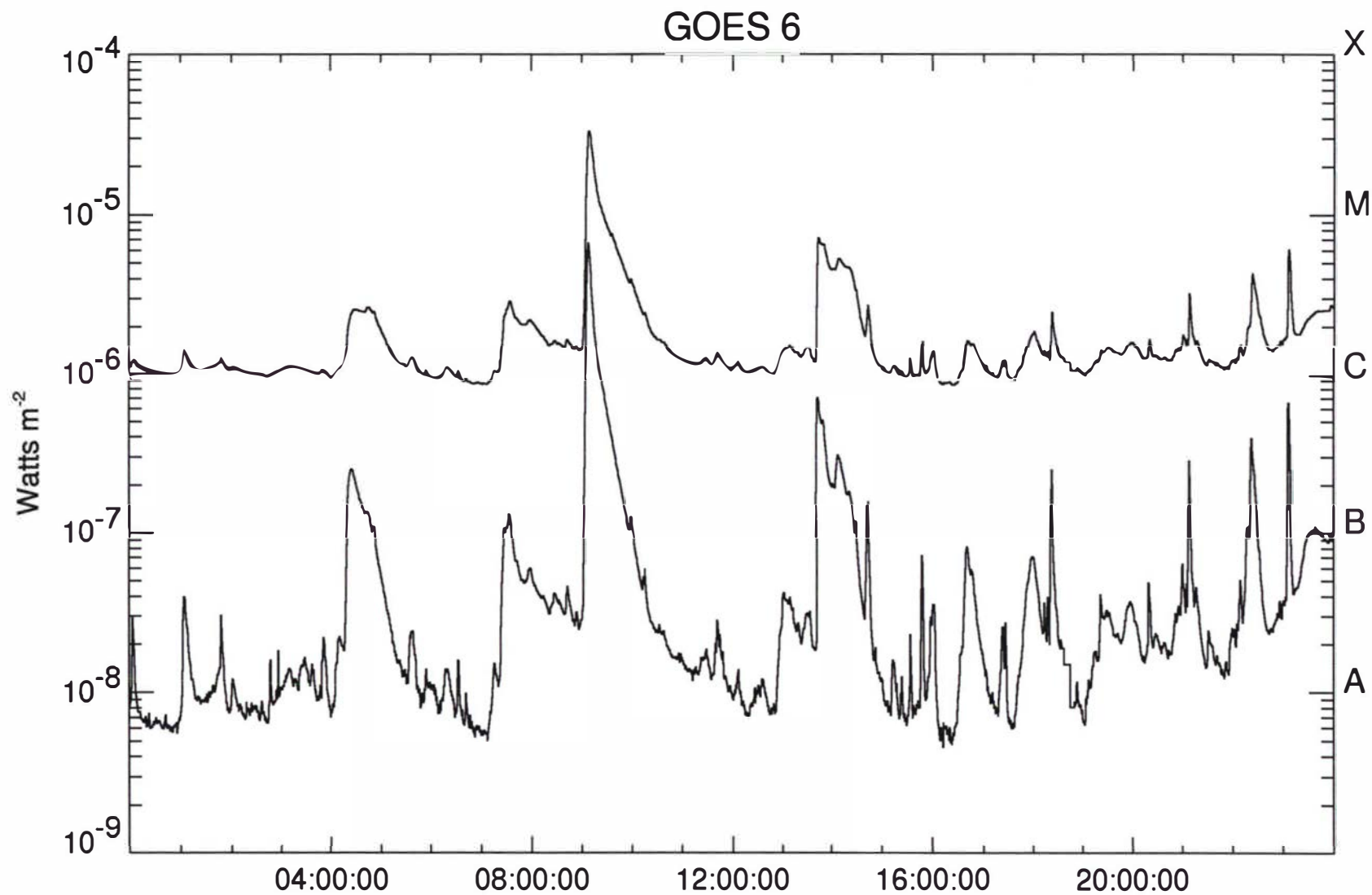
22 / 4 / 93

ULYSSES RT
18 / 5 / 91 180.420 s
0 - 0 keV

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS





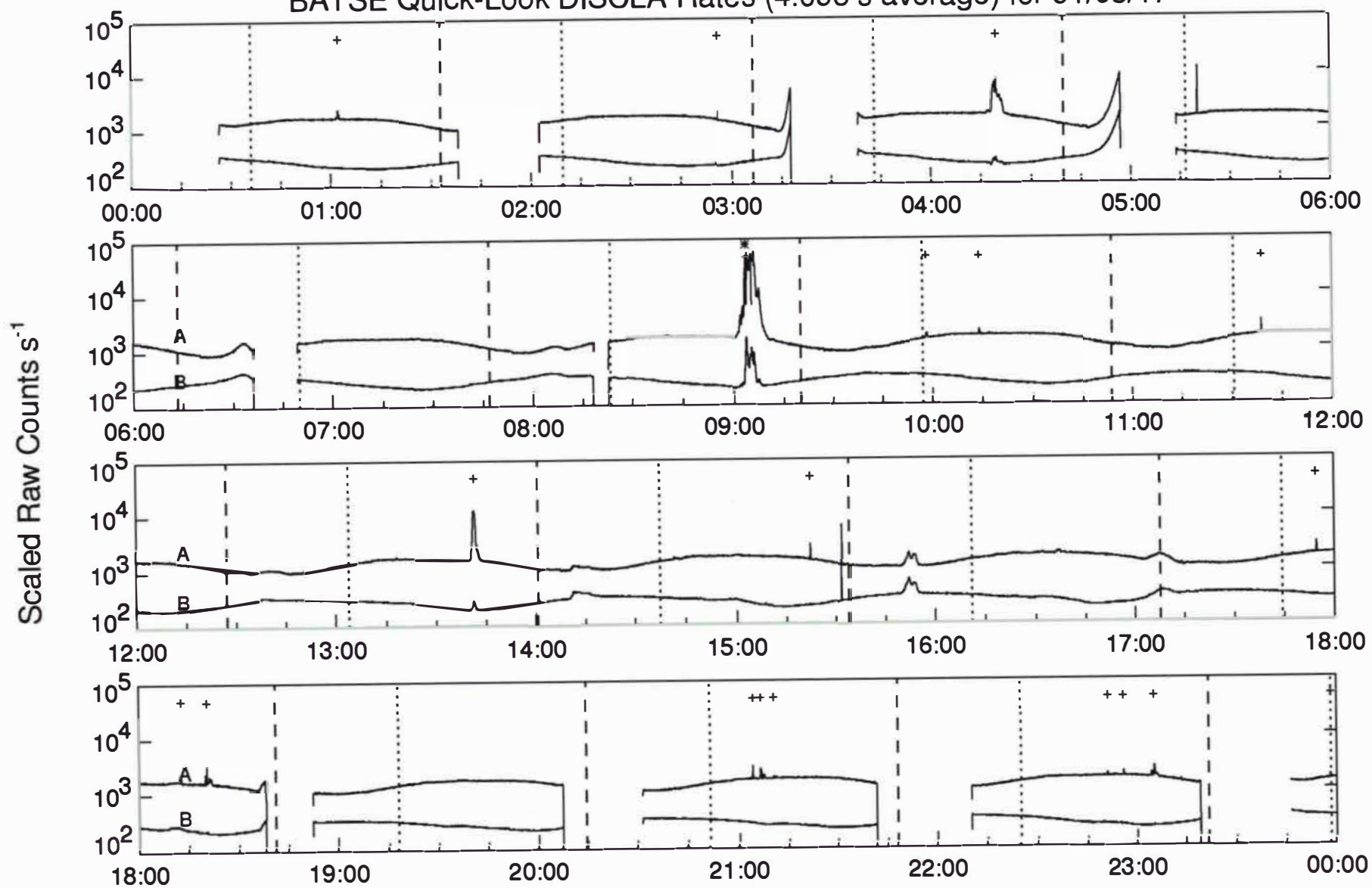
Data Start: 91/05/17, 0000:01

Channel 1 (1.0 - 8.0 Angstroms)
2 (0.5 - 4.0 Angstroms)

Plot created: 96/11/27, 0324

Background not subtracted
Background not subtracted
Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/17

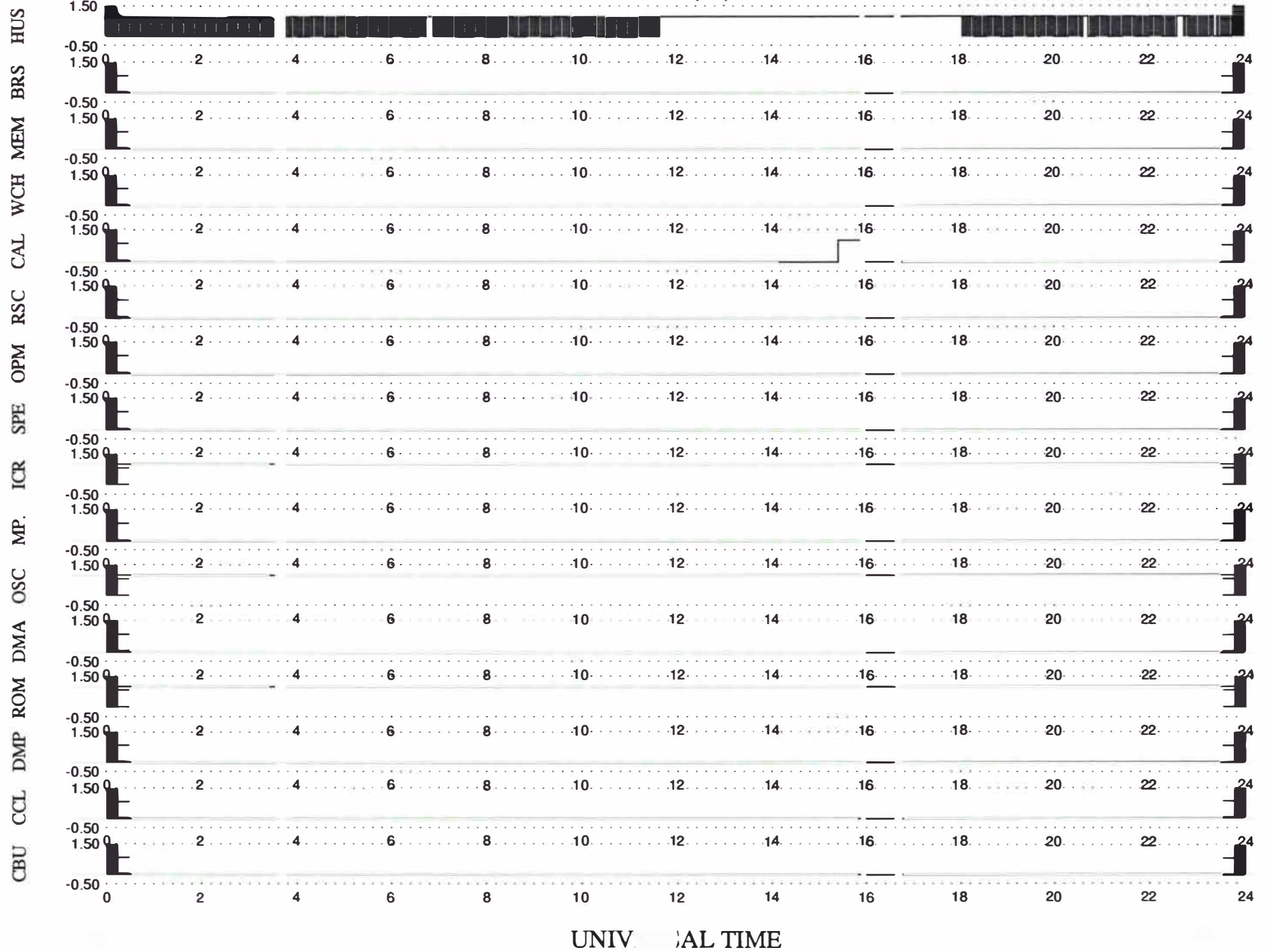


Current Time: 96/11/27, 0325 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

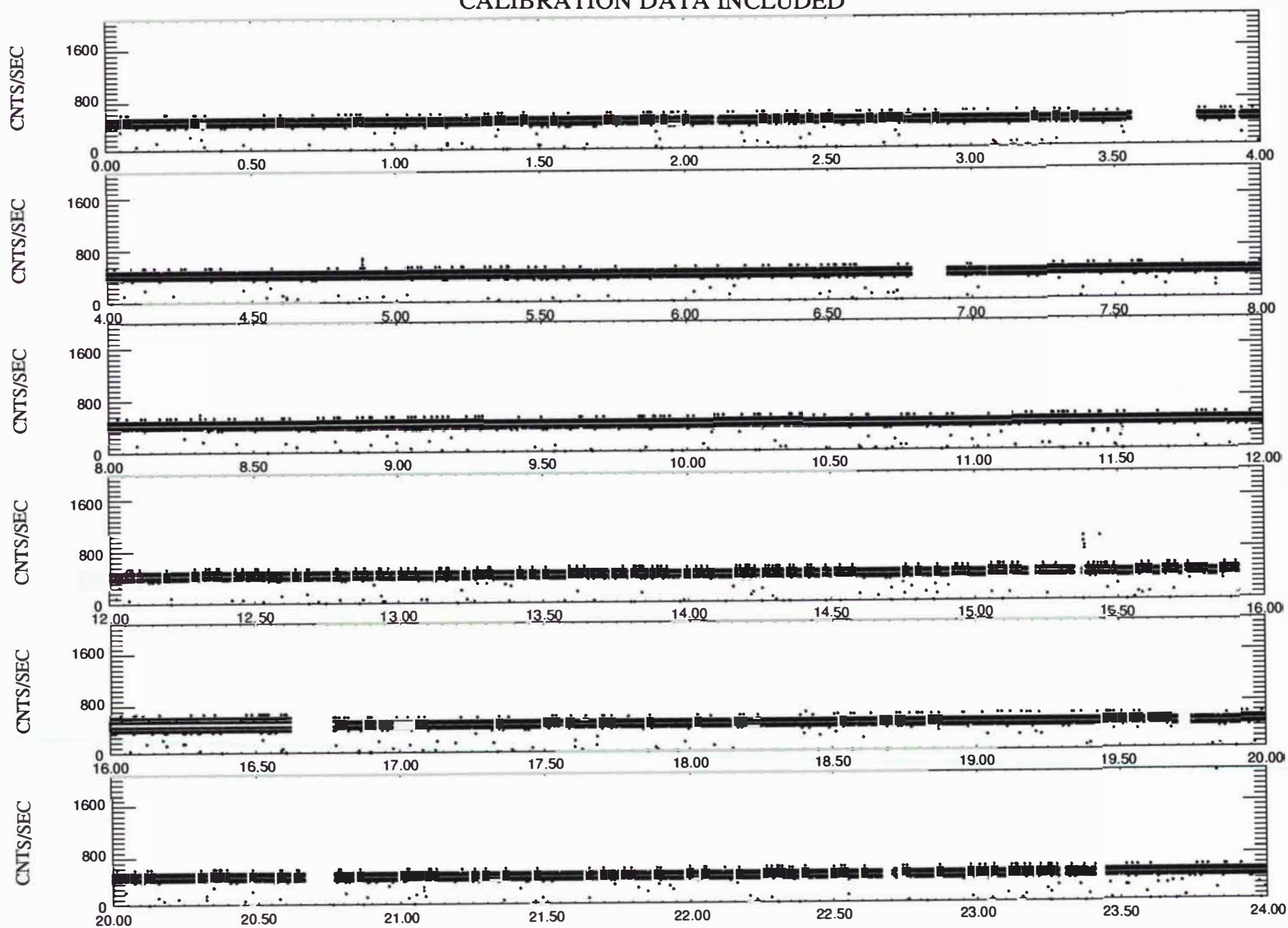
Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

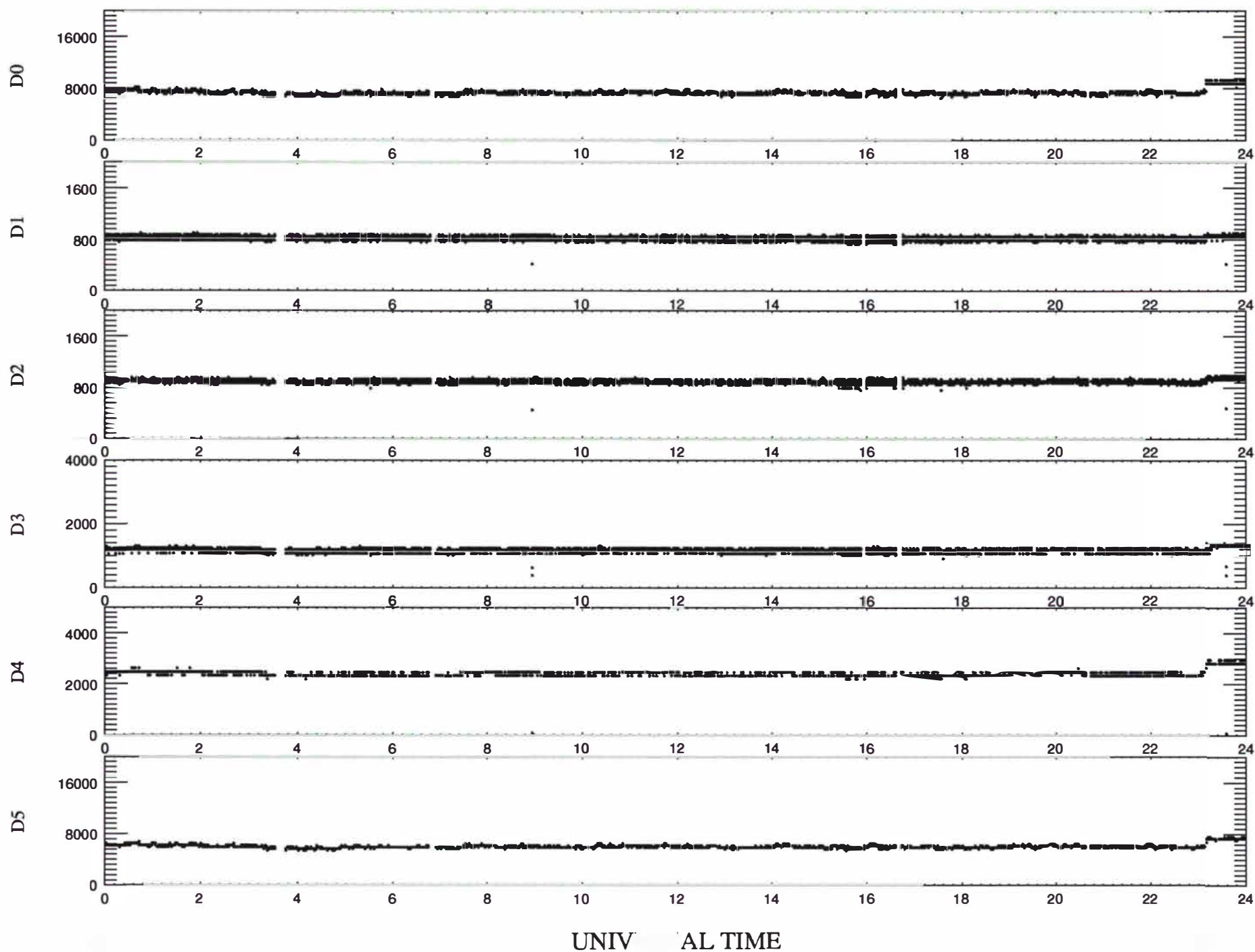
NO BURST (11)



CALIBRATION DATA INCLUDED



UNIVERSAL TIME



From root Wed Dec 8 07:58 1993
Received: by space6.ssl.berkeley.edu (AIX 2.1 2/4.03)
id AA08899; Wed, 8 Dec 93 07:57:44
Received: from mx.nsi.nasa.gov by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA22497; Wed, 8 Dec 93 07:00:41 PST
Received: Wed, 8 Dec 93 07:03:53 PST from ESSDP2.dnet by mx.nsi.nasa.gov (4.1/1.2)
Message-Id: <9312081503.AA10272@mx.nsi.nasa.gov>
Received: from ESSDP2.dnet by AMES.dnet with MAIL-11
(utk-mail11d v1.7); Wed, 8 Dec 93 07:03:57 PST
Date: Wed, 8 Dec 93 07:03:57 PST
From: 068486@essdp2.span.nasa.gov
X-To: AMES::"khurley@space6.ssl.berkeley.edu"
Subject: RE:
To: khurley@space6.ssl.berkeley.edu
Status: R

KEVIN,
HERE ARE THE RESULTS OF OUR SURVEY OF THE PVO REAL-TIME DATA FOR EVIDENCE OF
RESPONSE TO EVENTS LISTED IN YOUR CATALOG.

DATE	TIME	PVO RESPONSE
90/11/11	21:49	N/O
90/11/12	14:57	N/O
90/11/16	01:42	N/O
90/11/19	18:08	N/O
90/11/21	00:04	N/O
90/11/21	18:09	N/O
90/12/02	13:45	N/O
90/12/21	00:30	N/O
90/12/25	05:50	N/O
91/01/17	00:57	N/O
91/01/24	11:50	N/O
91/02/04	08:58	N/O
91/02/04	14:19	N/O
91/02/04	14:58	N/O
91/02/17	02:59	N/O
91/03/14	22:56	N/O
91/03/15	22:55	N/O
91/04/04	17:17	(NO)
91/05/18	17:10	N/O
91/05/23	19:03	N/O
91/05/27	23:44	N/O
91/05/28	21:26	N/O
91/06/02	22:55	N/O
91/06/09	00:48	N/O
91/06/29	19:55	N/O
91/07/09	20:22	N/O
91/07/17	13:07	N/O
91/08/03	08:24	N/O
91/08/15	12:34	N/O
91/08/15	14:24	N/O
91/08/16	01:57	(NO)
91/09/05	23:48	N/O
91/09/16	21:58	N/O
91/09/25	03:35	N/O
91/09/26	18:25	N/O
91/09/30	11:55	N/O
91/10/03	00:39	N/O
91/10/04	01:27	N/O
91/10/06	09:01	(NO)
91/10/22	04:13	N/O
91/10/25	21:25	N/O
91/11/06	03:42	N/O
91/11/14	01:40	N/O
91/11/17	01:58	N/O
91/12/05	23:04	N/O

91/12/21	06:17	N/O	
91/12/21	22:03	N/O	
91/12/27	15:56	N/O	
92/01/05	17:41	N/O	
92/01/13	20:52	N/O	
92/01/25	08:57	N/O	
92/01/30	00:29	N/O	
92/01/30	22:50	N/O	
92/02/18	18:42	N/O	
92/02/21	06:14	N/O	
92/02/26	18:15	YES	TRIGGER AT 29336 S UT
92/02/27	06:00	N/O	
92/02/27	08:45	N/O	
92/03/02	06:16	N/O	
92/03/04	14:34	N/O	
92/03/07	00:18	N/O	
92/03/21	12:50	(NO)	
92/03/26	02:01	N/O	
92/03/27	09:38	N/O	
92/03/29	16:38	(NO)	
92/04/04	22:37	N/O	
92/04/08	12:05	N/O	
92/04/20	02:12	N/O	
92/04/29	18:59	N/O	
92/05/02	19:05	N/O	
92/06/01	THRU 92/06/29	TURNED OFF--	N/O
92/07/01	19:39	N/O	
92/07/07	06:33	N/O	
92/07/17	01:15	N/O	
92/07/23	00:59	N/O	
92/07/23	01:00	N/O	
92/07/23	21:48	N/O	
92/07/25	19:30	N/O	
92/07/25	22:49	N/O	
92/07/26	00:34	N/O	
92/07/31	17:07	N/O	
92/08/10	21:35	N/O	
92/08/14	06:10	N/O	
92/08/16	12:36	N/O	
92/08/22	22:39	N/O	
92/08/30	01:45	N/O	
92/09/04	04:41	N/O	

THIS LIST IS NOT COMPLETE. IT INCLUDES EVENTS FOR WHICH NO REAL-TIME DATA ARE AVAILABLE BECAUSE OF INAPPROPRIATE MODE, NO TRACKING, OR THE EXPERIMENT WAS TURNED OFF. WHERE DATA HAVE BEEN CHECKED, SENSITIVITY DEPENDS UPON THE TIME RESOLUTION AVAILABLE IN THE DATA. I'LL BE SENDING ADDITIONAL RESULTS AS THEY BECOME AVAILABLE.

REGARDS,

RAY

CATSEARCH PROGRAM

110

BATSE BURST # 207
EVENT OF 1991 MAY 18 DAY OF YEAR=138
EVENT CROSSING TIME AT BATSE : 12331. S. OR 03:25:31.4
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 331.640 56.340
BATSE PEAK COUNTING RATE: 0000 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 18/ 5/ 91 IS:
RA= 121.642 DEC= 21.799 DIST= 3.381 AU
BATSE-ULYSSES DISTANCE = 505839488. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 82.15 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 230.49 SECS.
CROSSING TIME AT ULYSSES IS 12562. S. OR 03:29:21.9 +/- 343.70 SECONDS

BATSE BURST# 207

ULYSSES RT

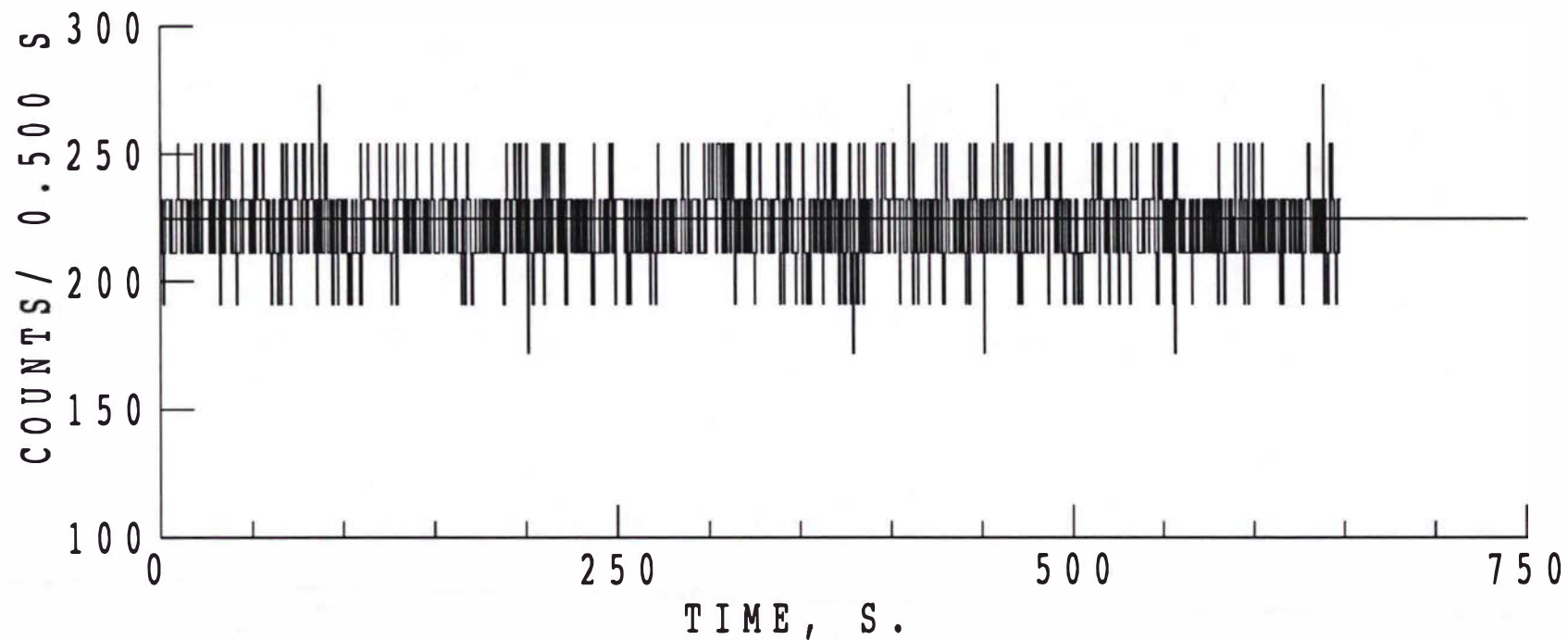
4 / 5 / 98

18 / 5 / 91 11628.106 s

0 - 0 keV

N= 10 M=10
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



CATSEARCH PROGRAM

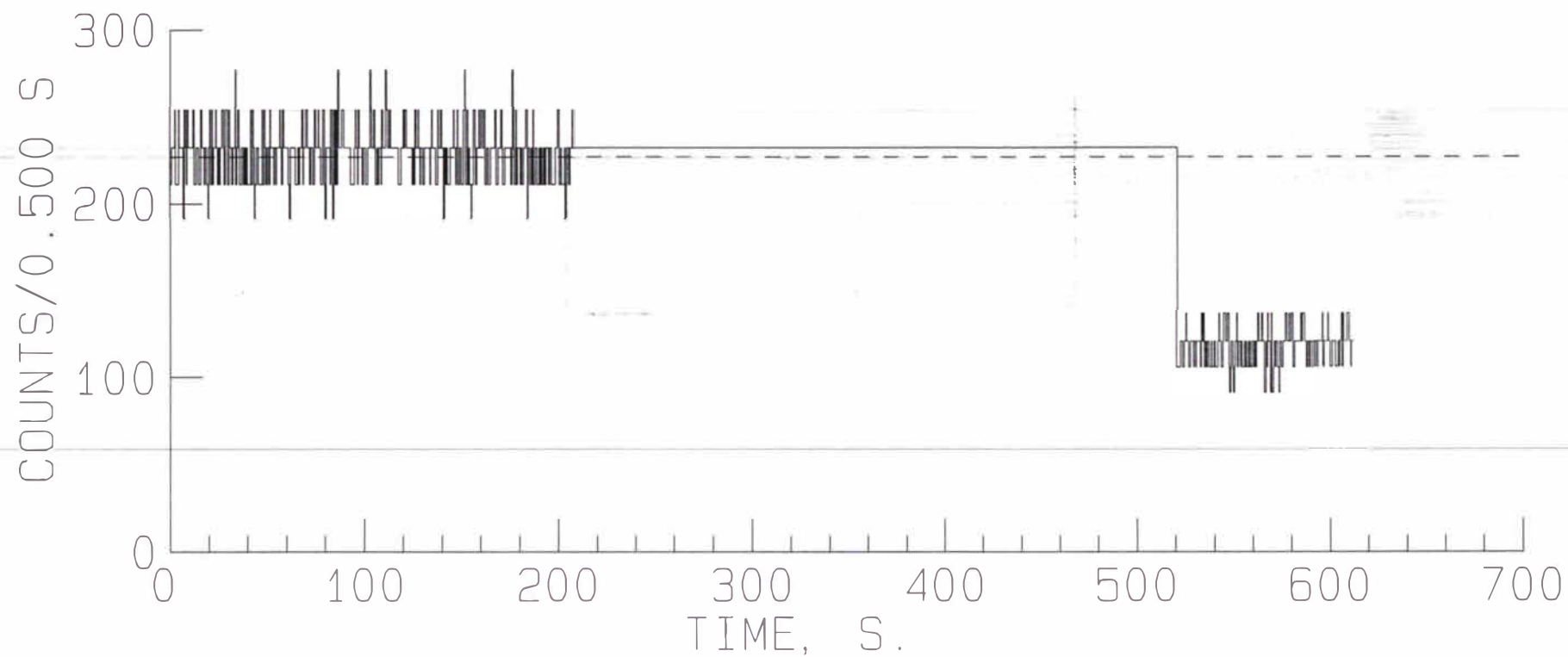
BATSE BURST # 211
EVENT OF 1991 MAY 18 DAY OF YEAR=138
EVENT CROSSING TIME AT BATSE : 53726. S. OR 14:55:25.8
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 246.800 -8.700
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 18/ 5/ 91 IS:
RA= 121.642 DEC= 21.799 DIST= 3.381 AU
BATSE-ULYSSES DISTANCE = 505839488. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 54.22 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 986.52 SECS.
CROSSING TIME AT ULYSSES IS 54712. S. OR 15:11:52 +/- 302.64 SECONDS

N/O

14 / 4 / 93

ULYSSES RT
18/ 5/91 54396.320 s
0- 0 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS

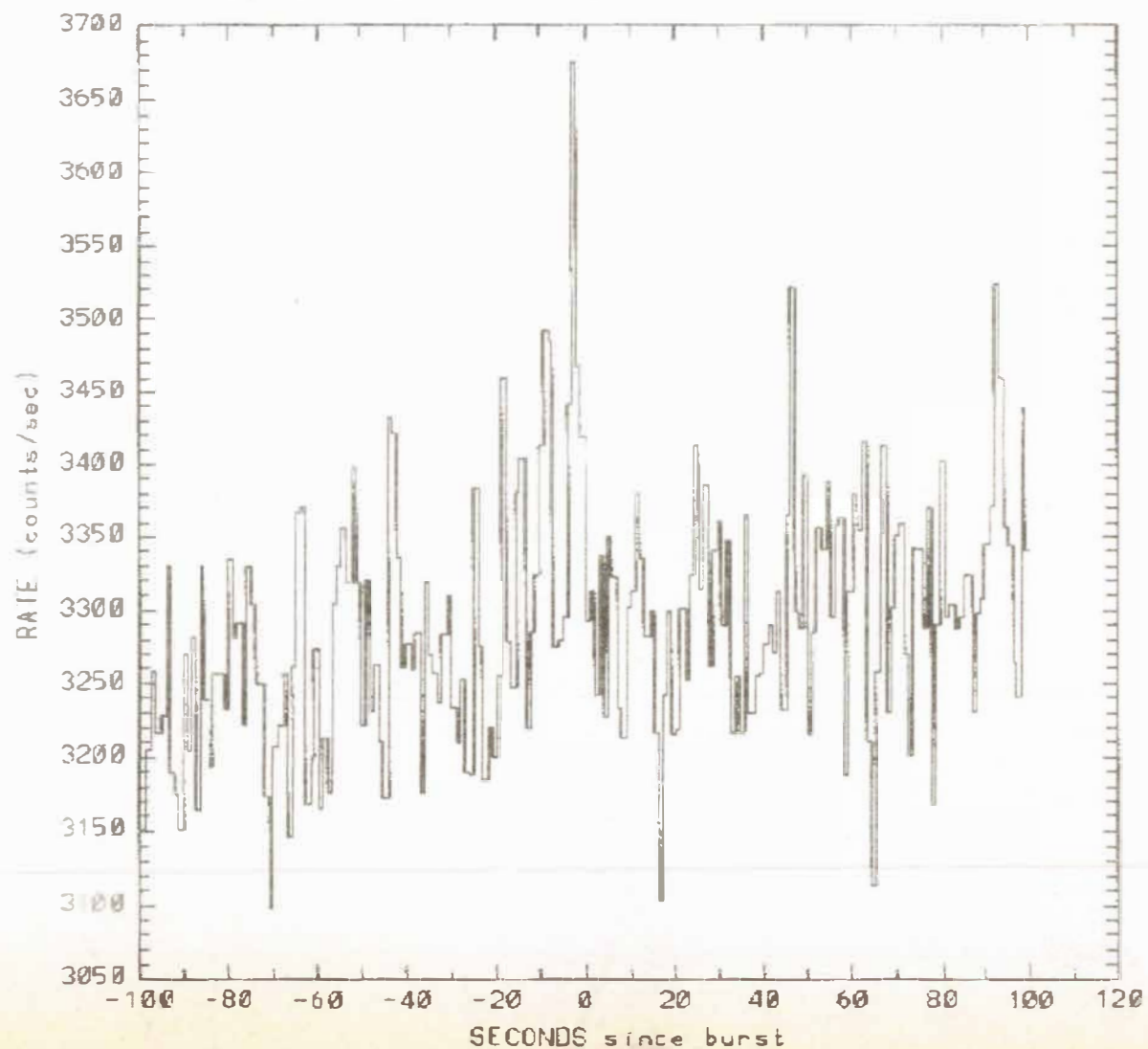


BATSEARCH PROGRAM

E.LNT OF 1991 MAY 18
EVENT CROSSING TIME AT BATSE : 53727. S. OR 14:55:27.0
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 246.000 -11.000
BATSE PEAK COUNTING RATE: 2200 C/S
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 18/ 5/ 91 IS:
RA= 121.391 DEC= 21.788 DIST= 3.297 AU
BATSE-ULYSSES DISTANCE = 493242247. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 53.95 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 968.29 SECS.
CROSSING TIME AT ULYSSES IS 54695. S. OR 15:11:35 +/- 295.64 SECONDS

NO

Ulysses U7 Event (?)



15-JUL-1991 15.16.31

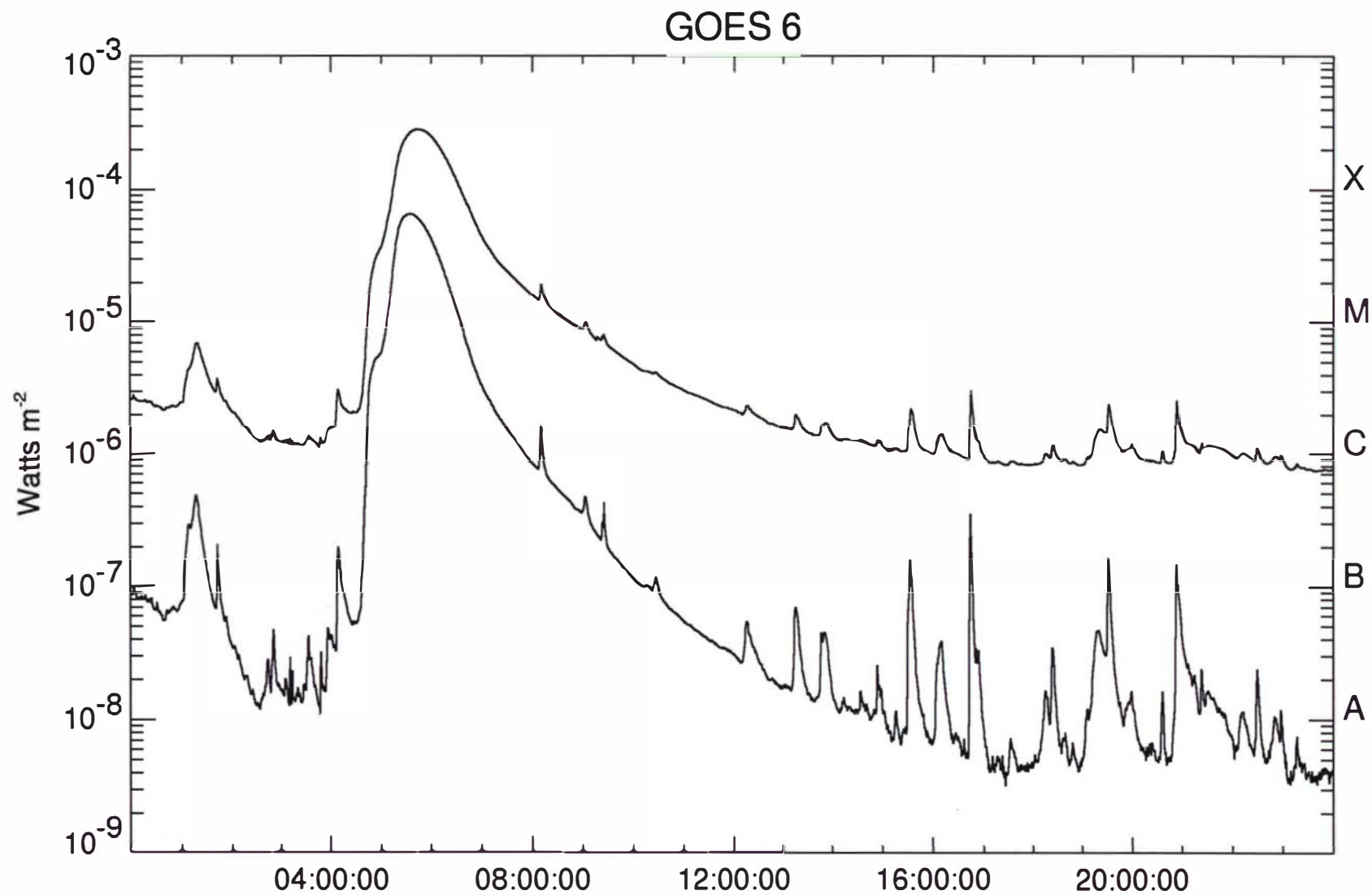
Created by MOPS BD
(Burst Display)
Version 62.05User Input Time:
8394 / 50500.002

Data Type: DISCLA

May 18

Deadtime
Corrected: NIntegration Time:
1.024 secondsDetectors [7..0]:
00001010Discriminators:
1 1 1Quality Mask:
801SP0





Data Start: 91/05/18, 0000:02

Channel

1 (1.0 - 8.0 Angstroms)

2 (0.5 - 4.0 Angstroms)

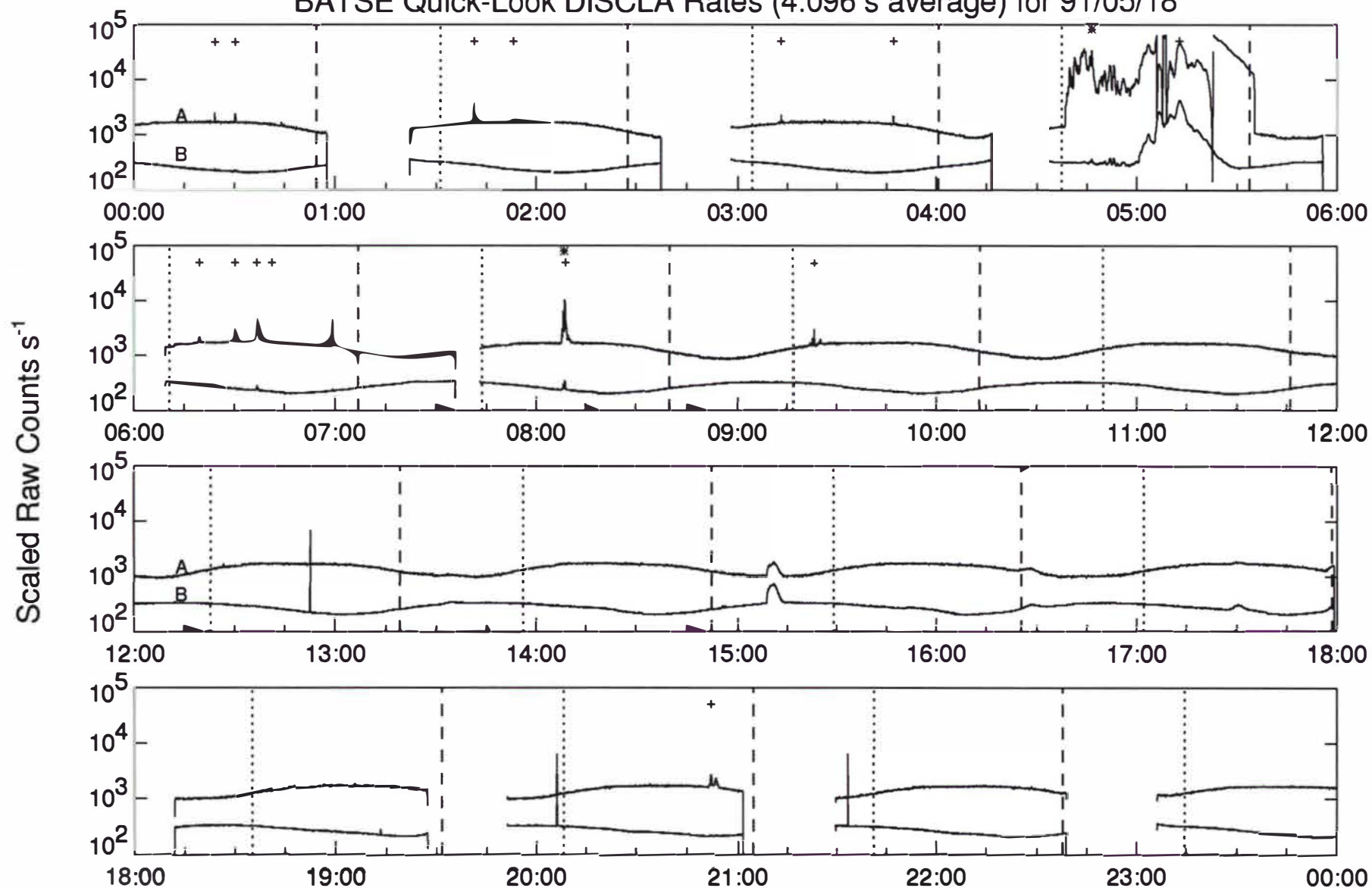
Plot created: 96/11/27, 0327

Background not subtracted

Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/18



Current Time: 96/11/27, 0328 EDT

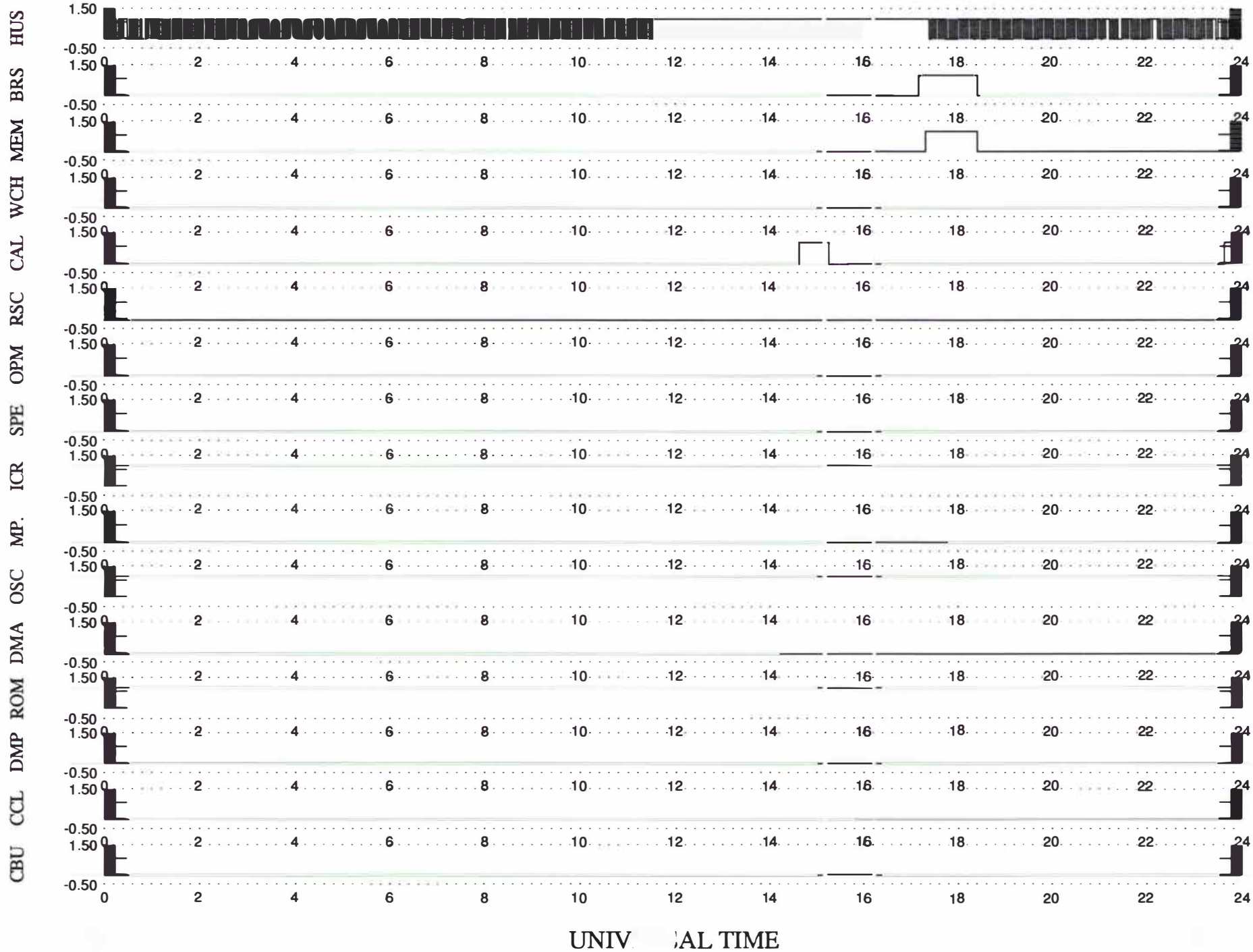
A: Channel 0 Most Sunward LAD

B: Sum Channel 0 Anti-Sunward LADs X .05

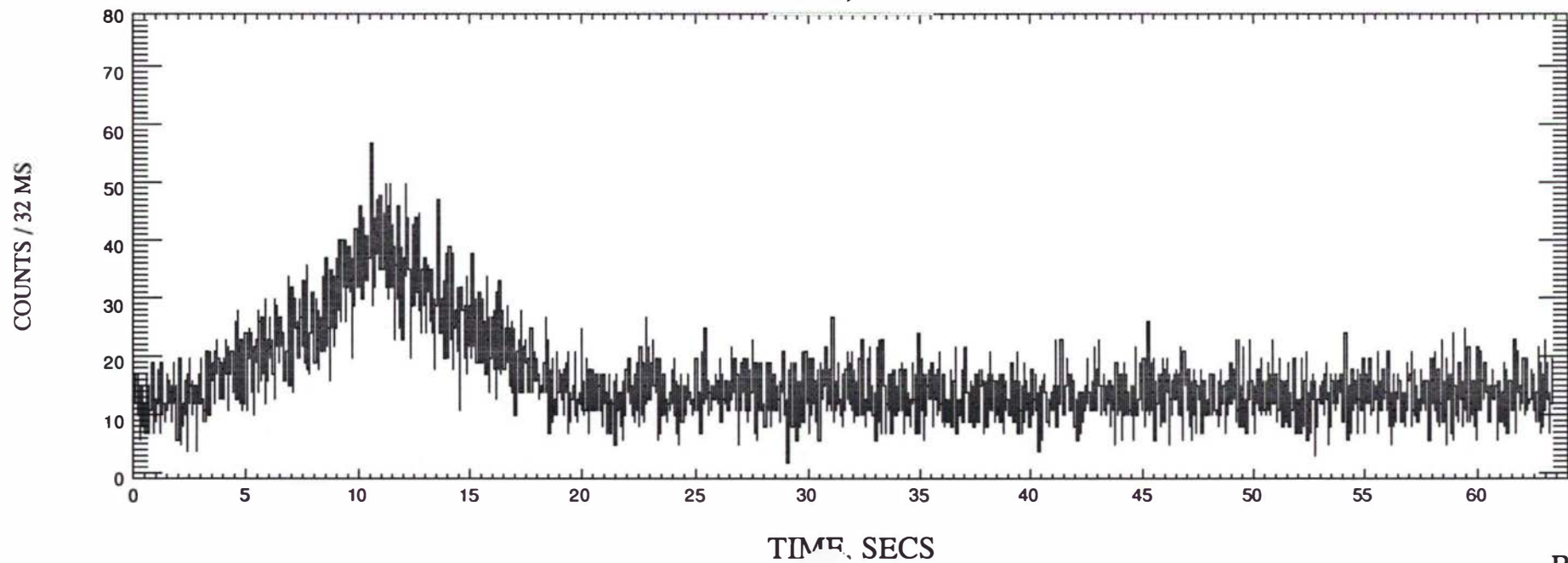
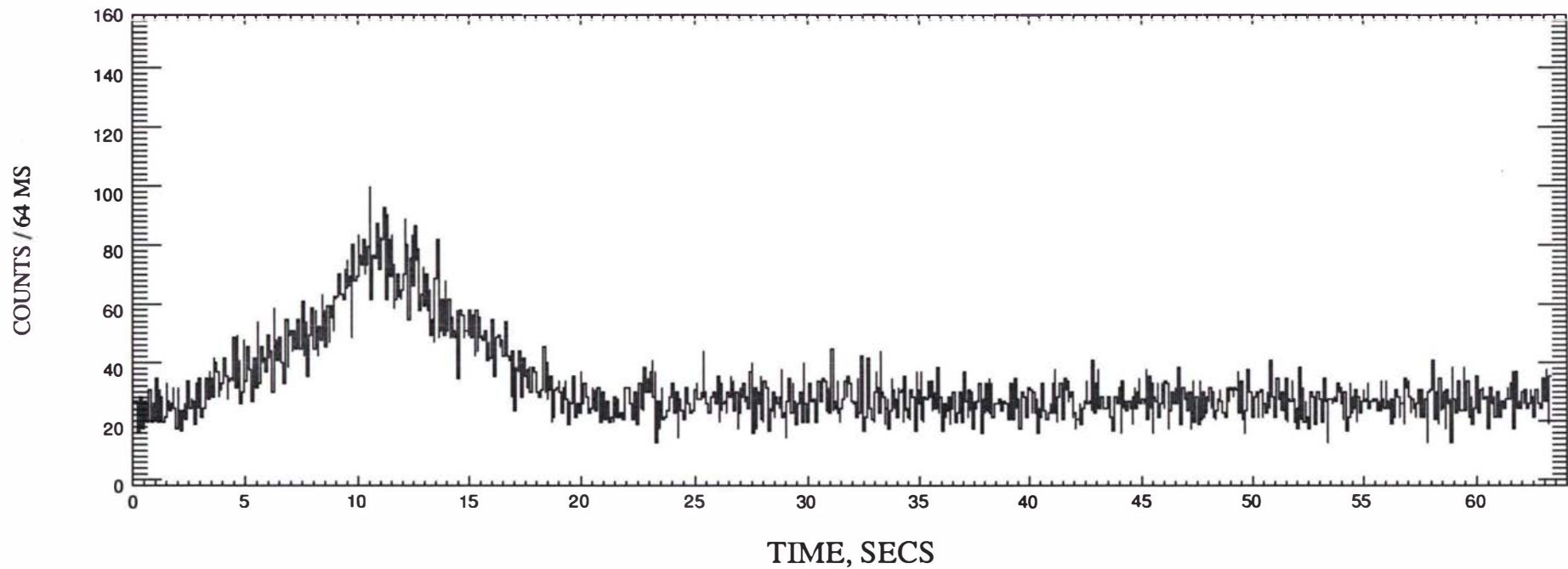
Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare

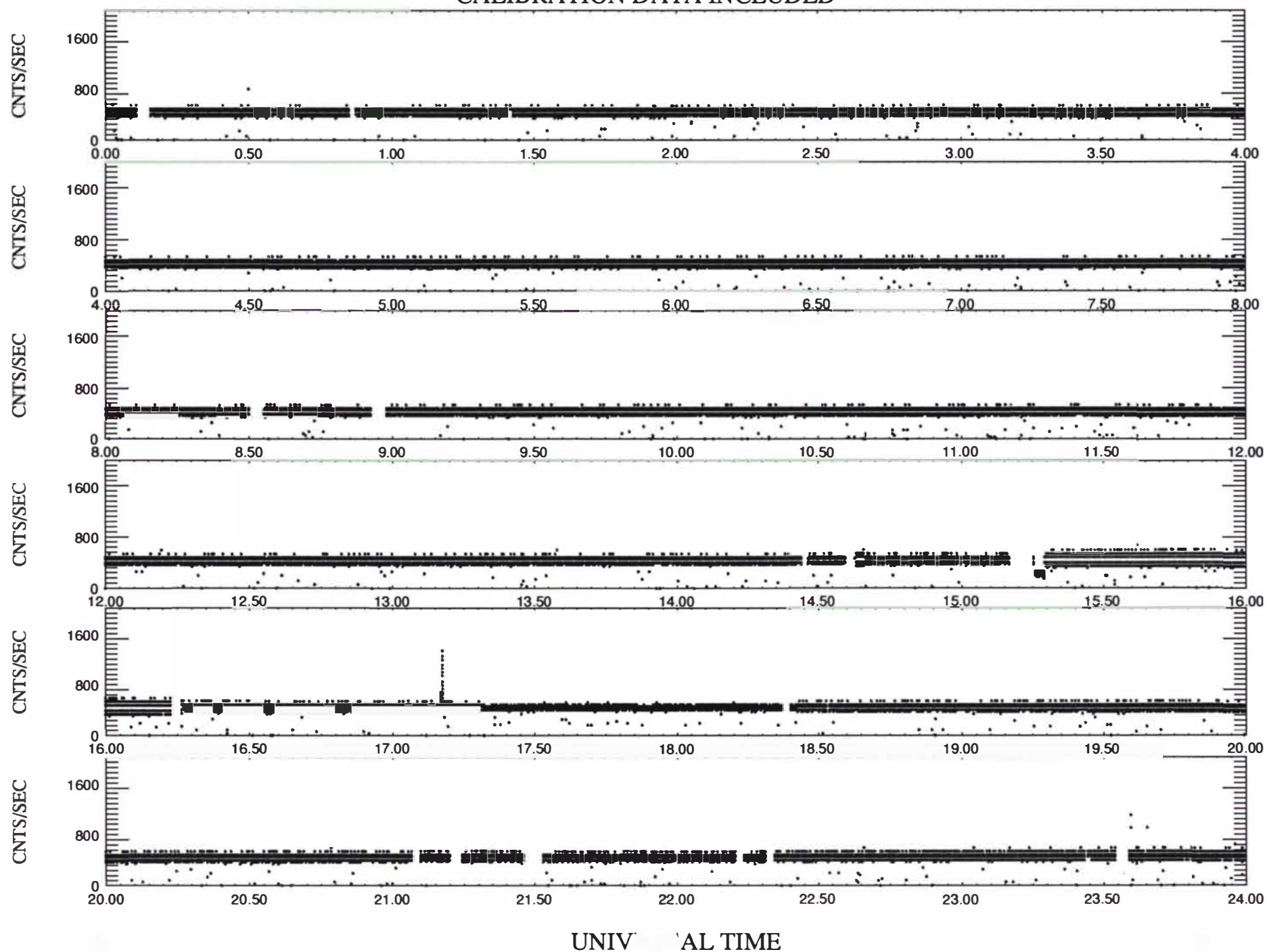
BURST NUMBER 12

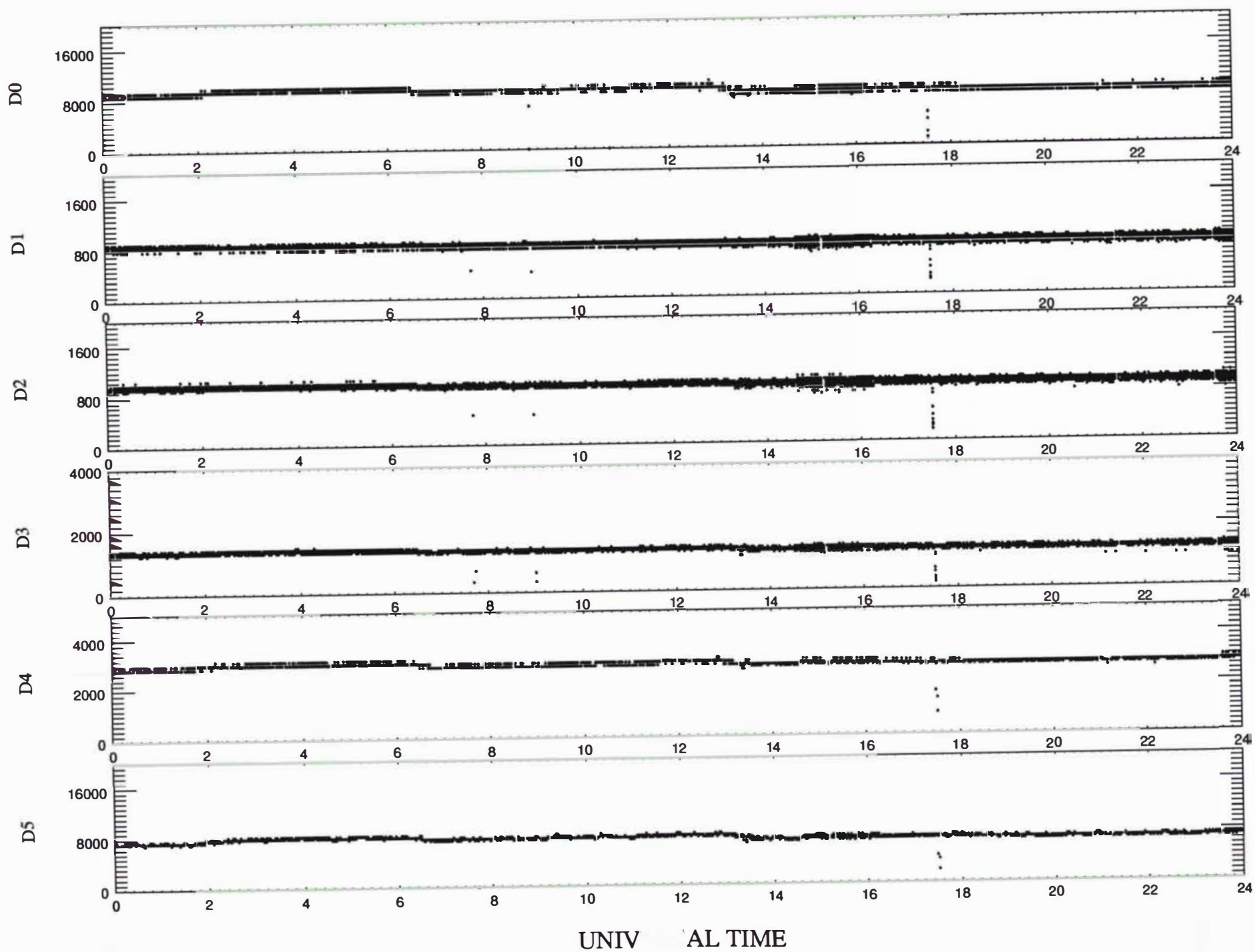


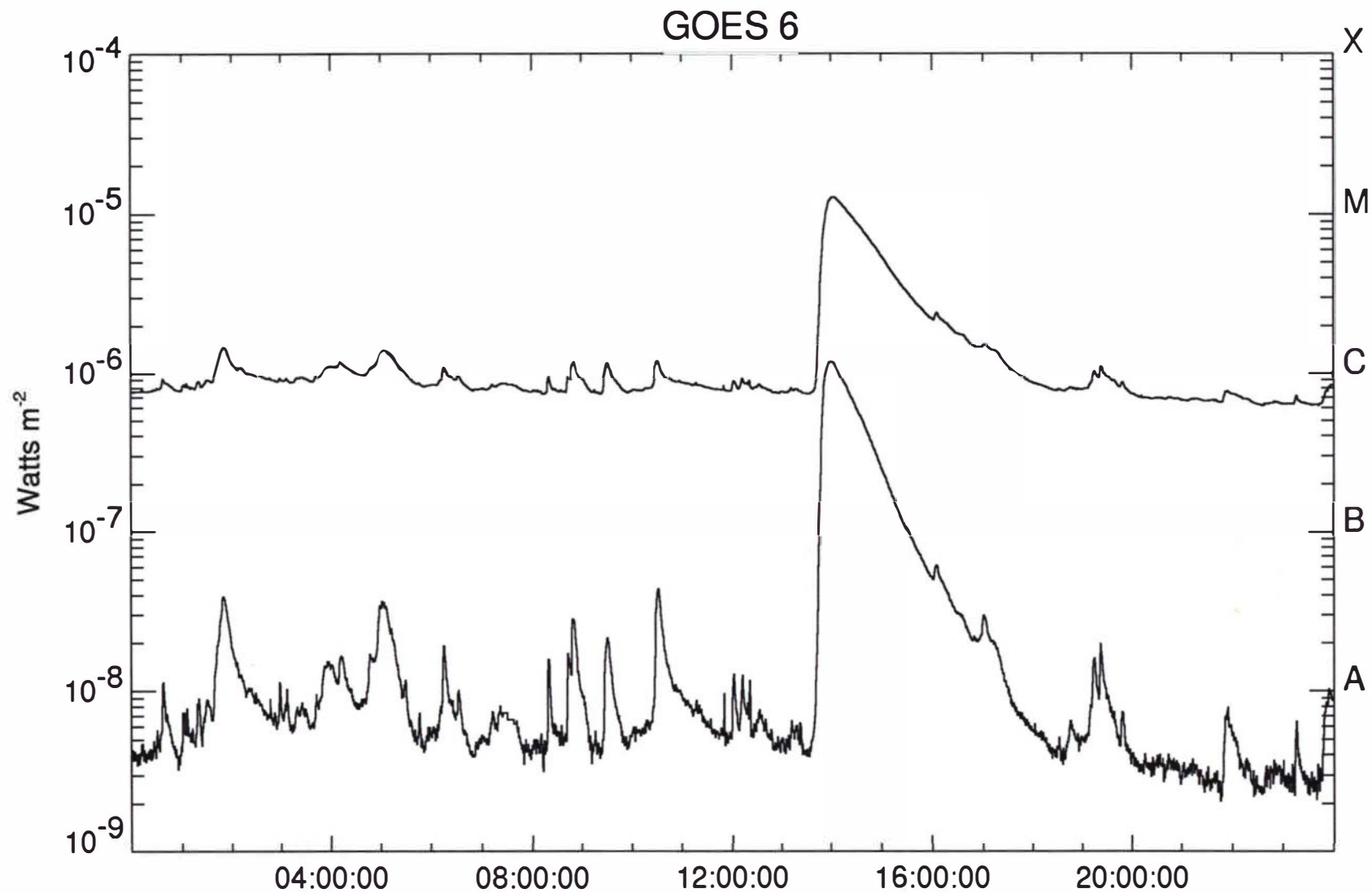
Burst Counter 12 at UT=17.169493230184 h=61810.176 s 17:10:10.176



CALIBRATION DATA INCLUDED







Data Start: 91/05/19, 0000:00

Channel

1 (1.0 - 8.0 Angstroms)

2 (0.5 - 4.0 Angstroms)

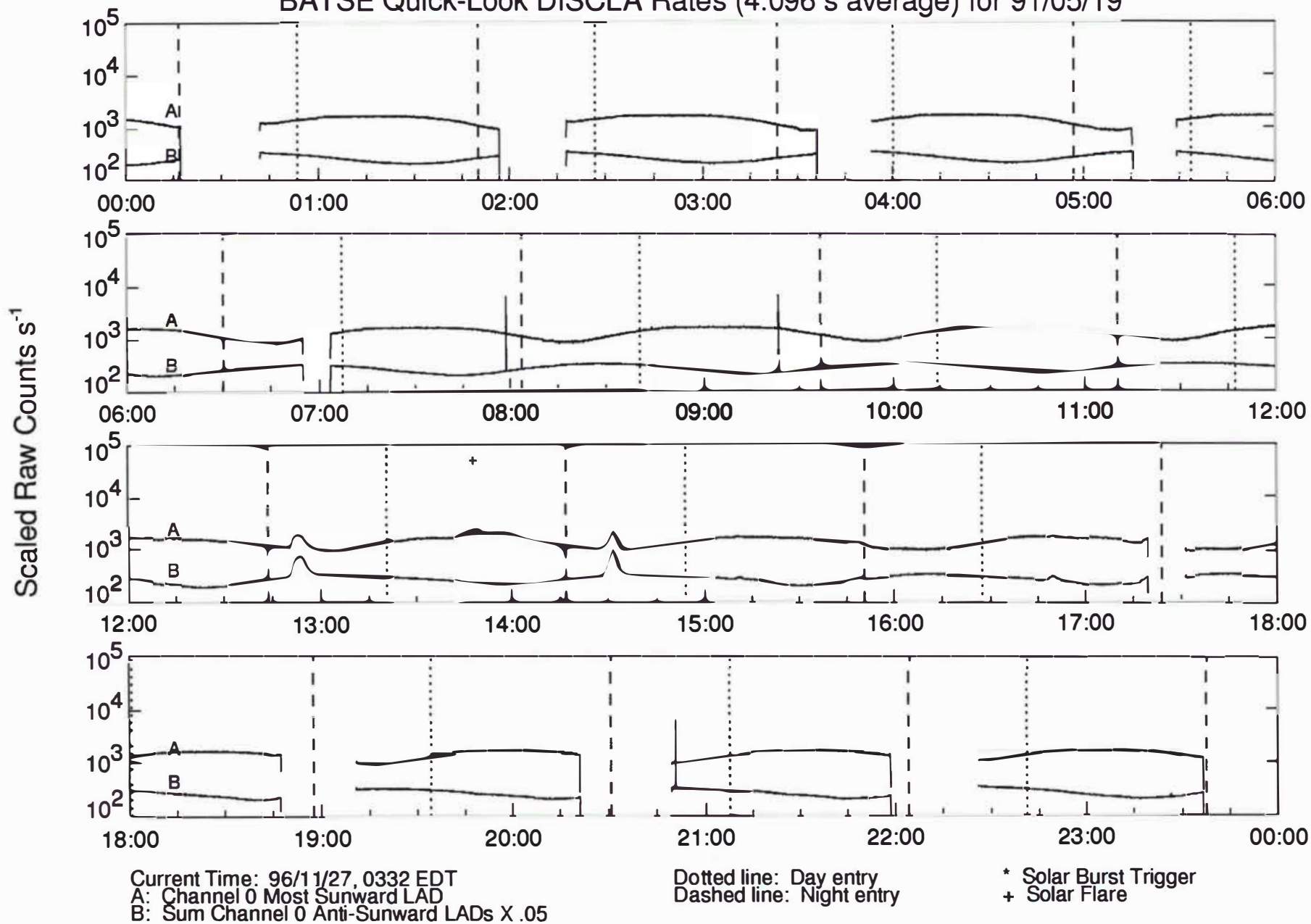
Plot created: 96/11/27, 0331

Background not subtracted

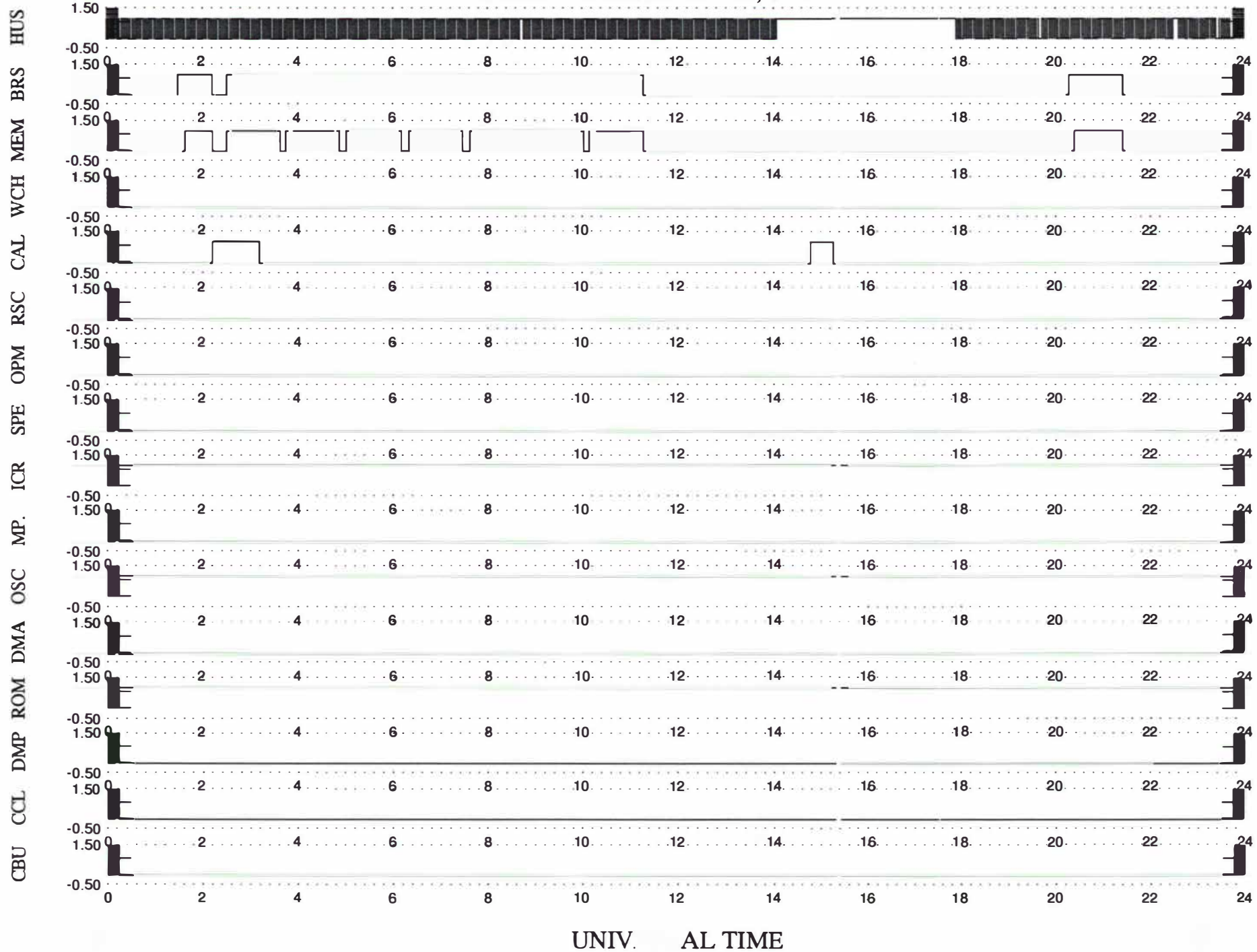
Background not subtracted

Sample average = 10

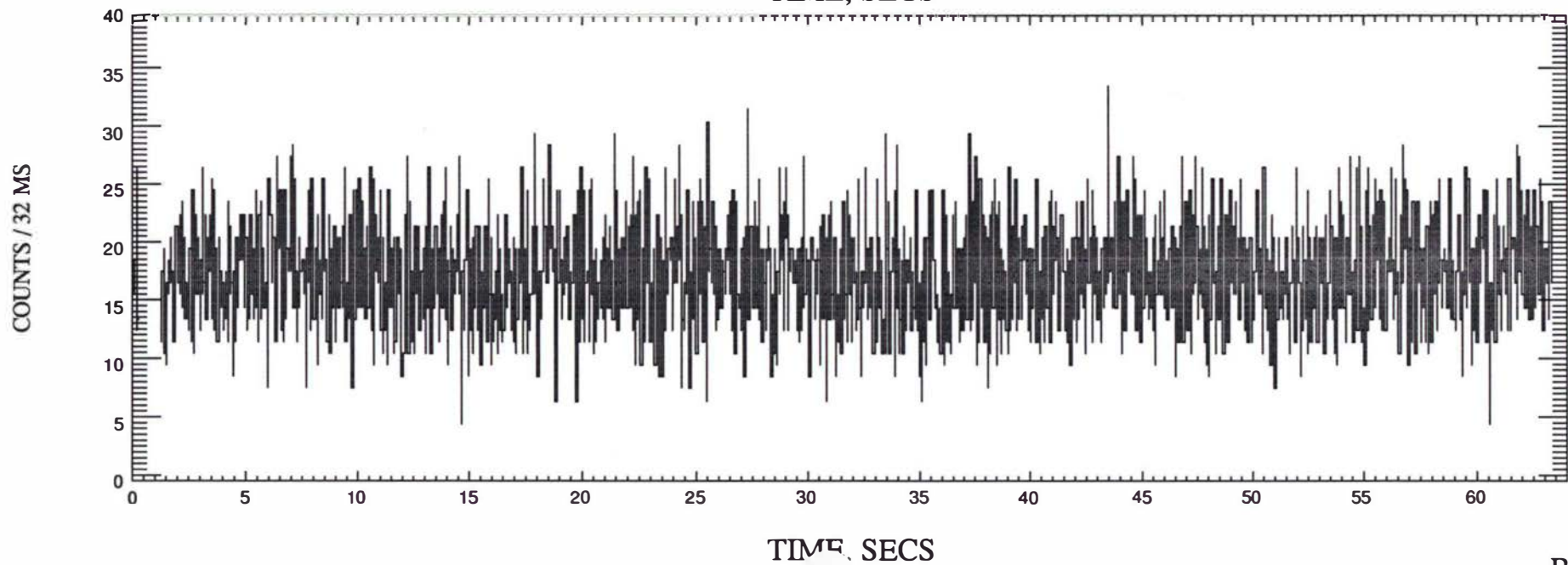
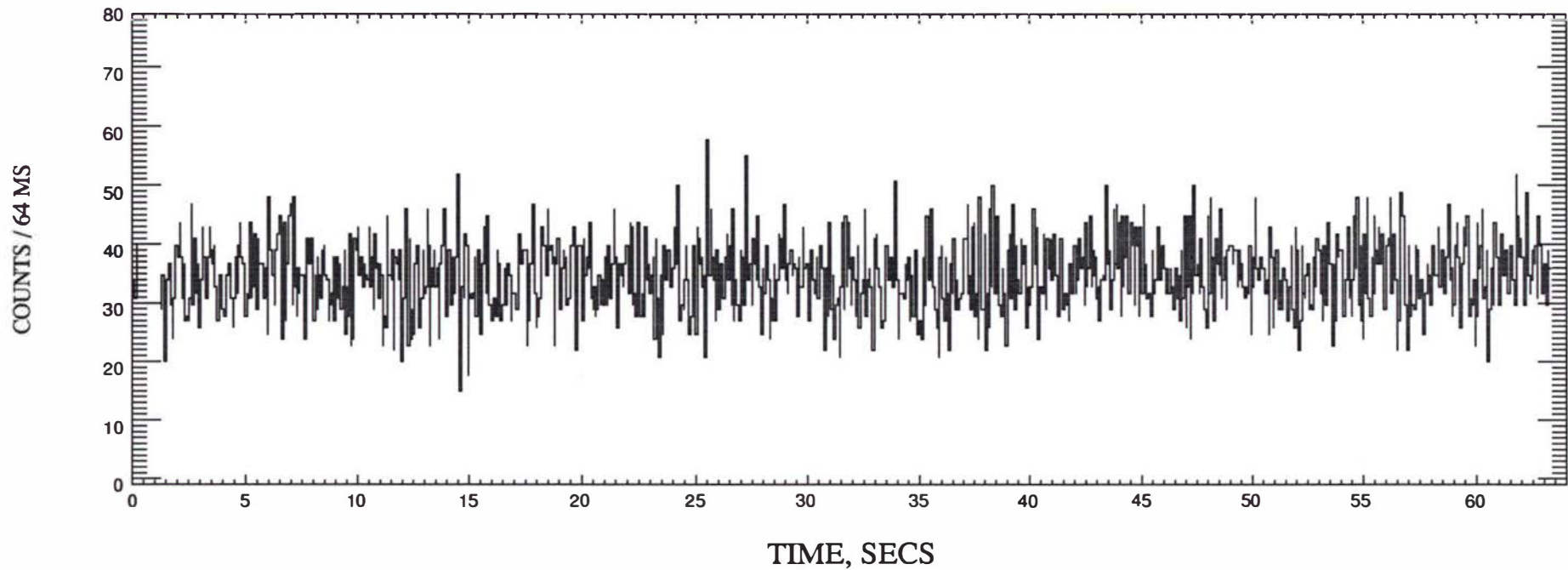
BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/19



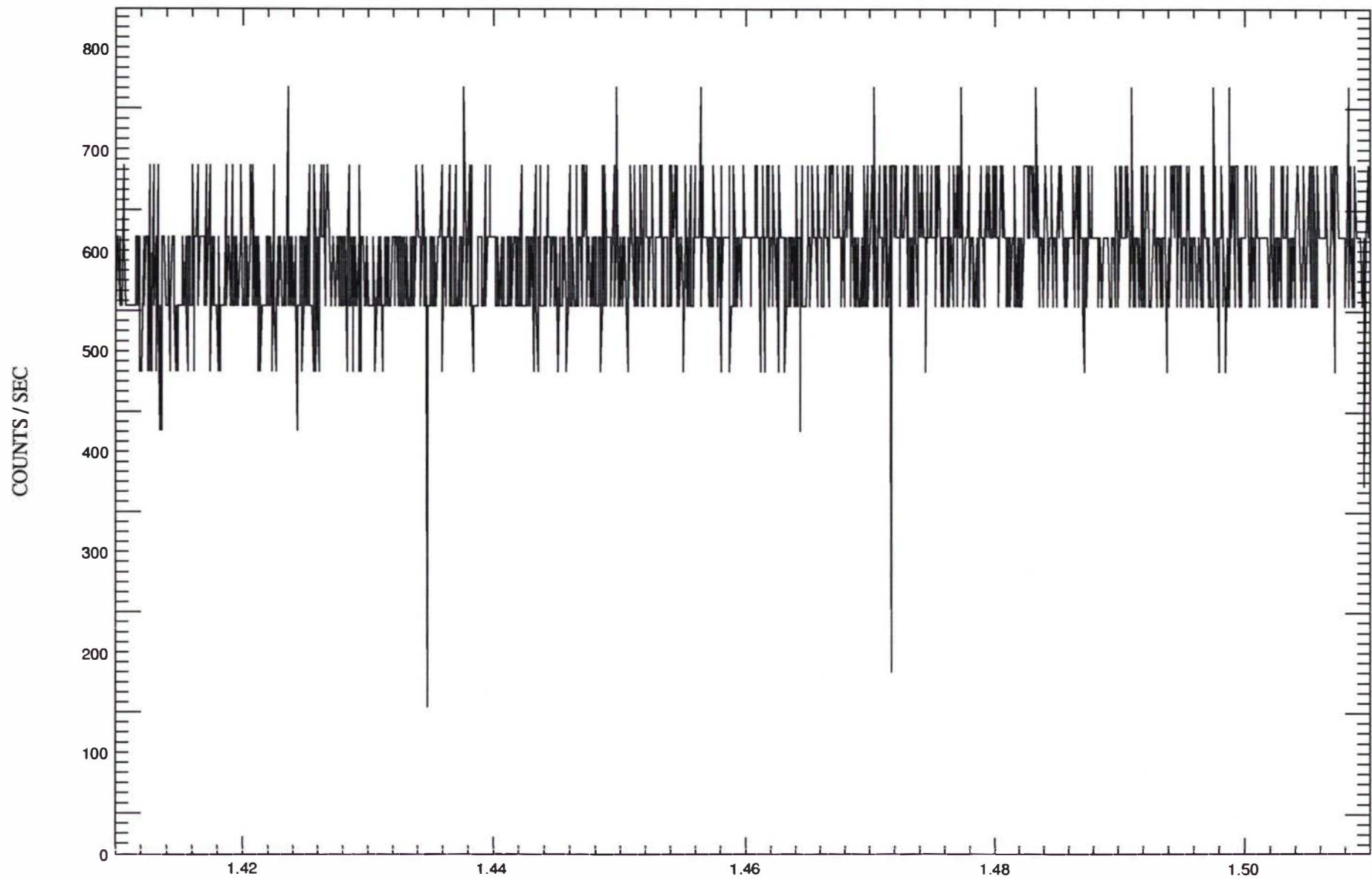
BURST NUMBER 13 - 15, 0 - 5



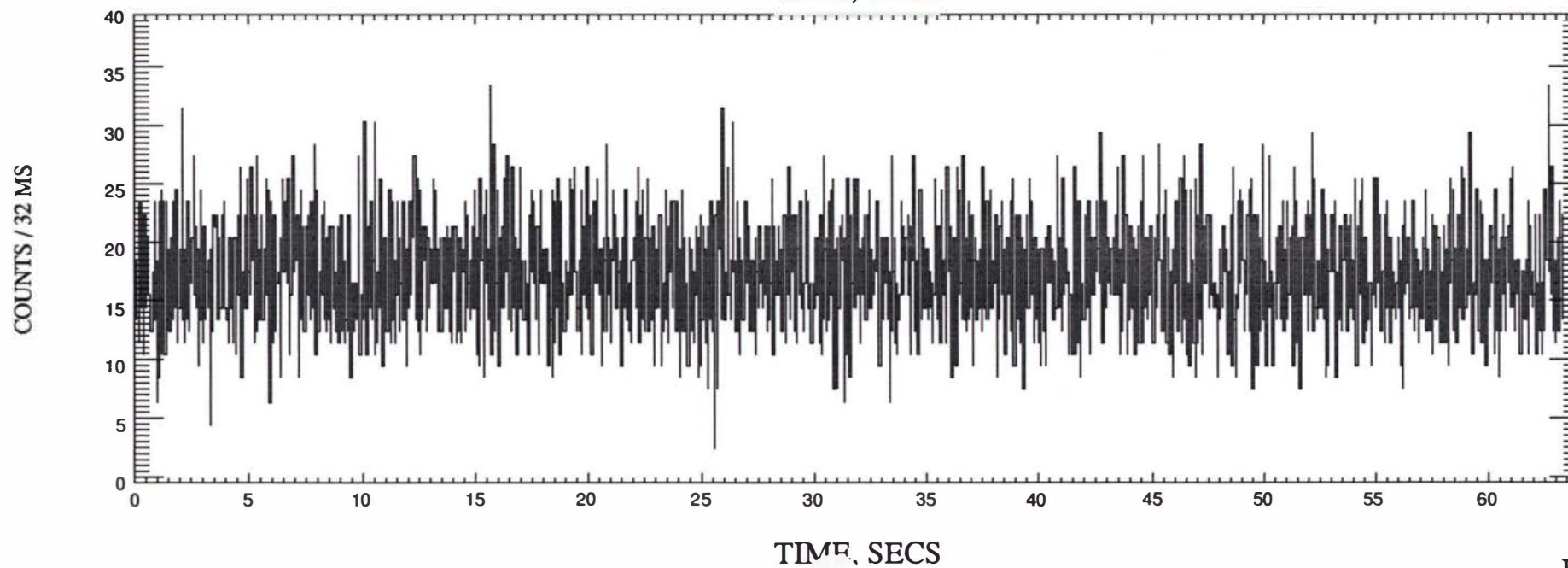
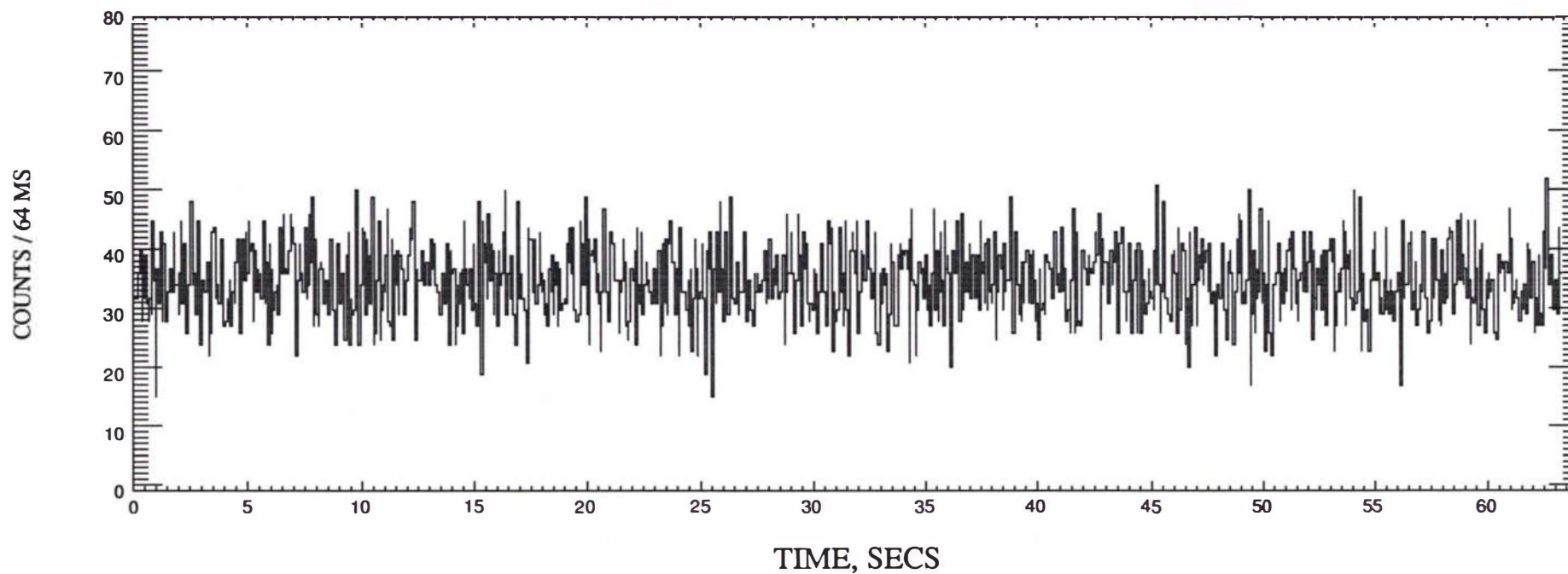
Burst Counter 13 at UT= 1.456785299513 h= 5244.427 s 01:27:24.427



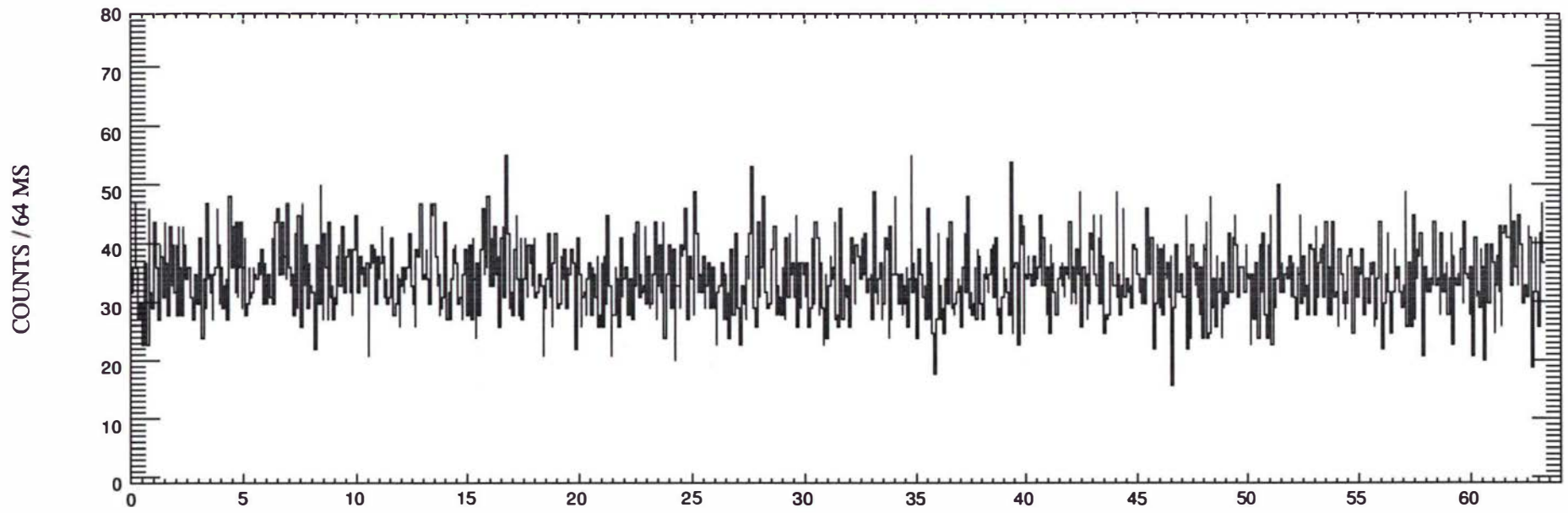
CALIBRATION DATA INCLUDED



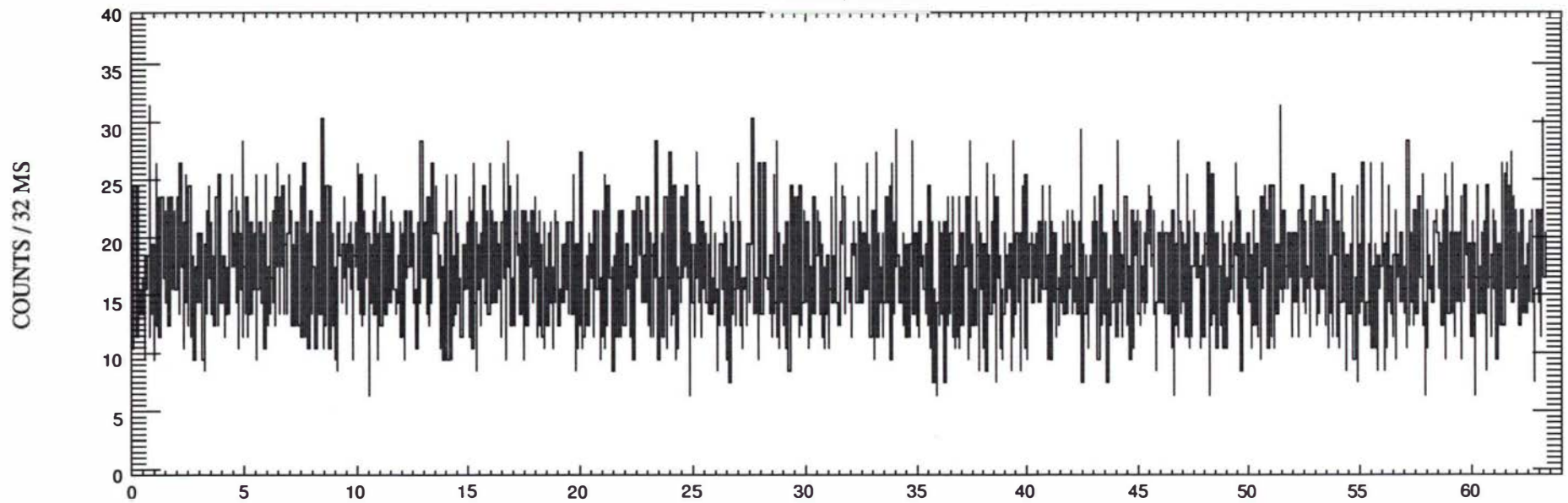
Burst Counter 14 at UT= 2.360957450867 h= 8499.447 s 02:21:39.447



Burst Counter 15 at UT= 3.624598490397 h=13048.555 s 03:37:28.555

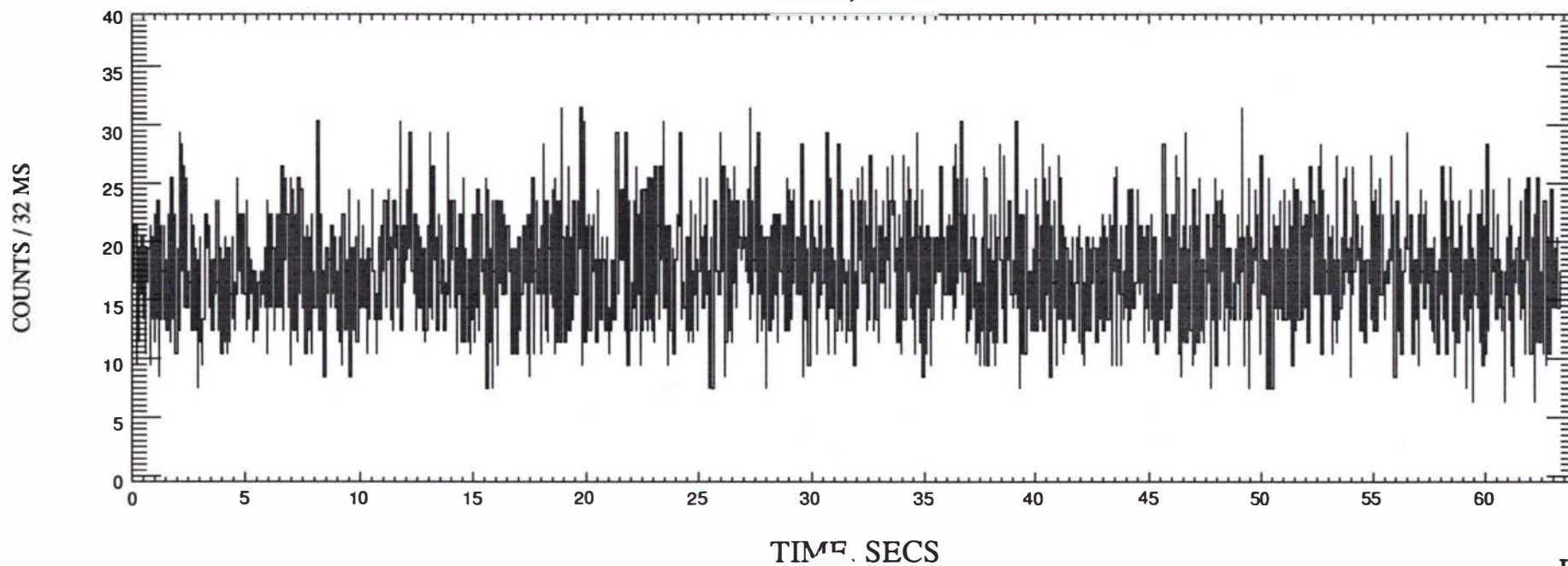
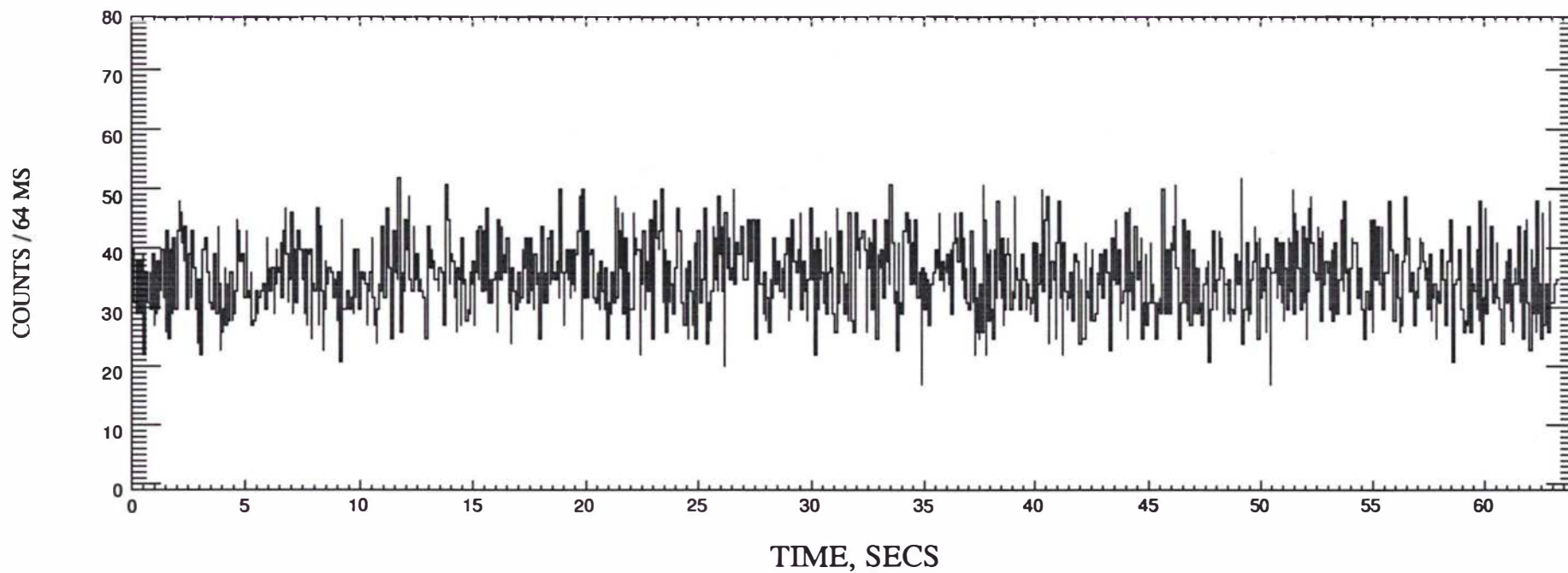


TIME, SECS

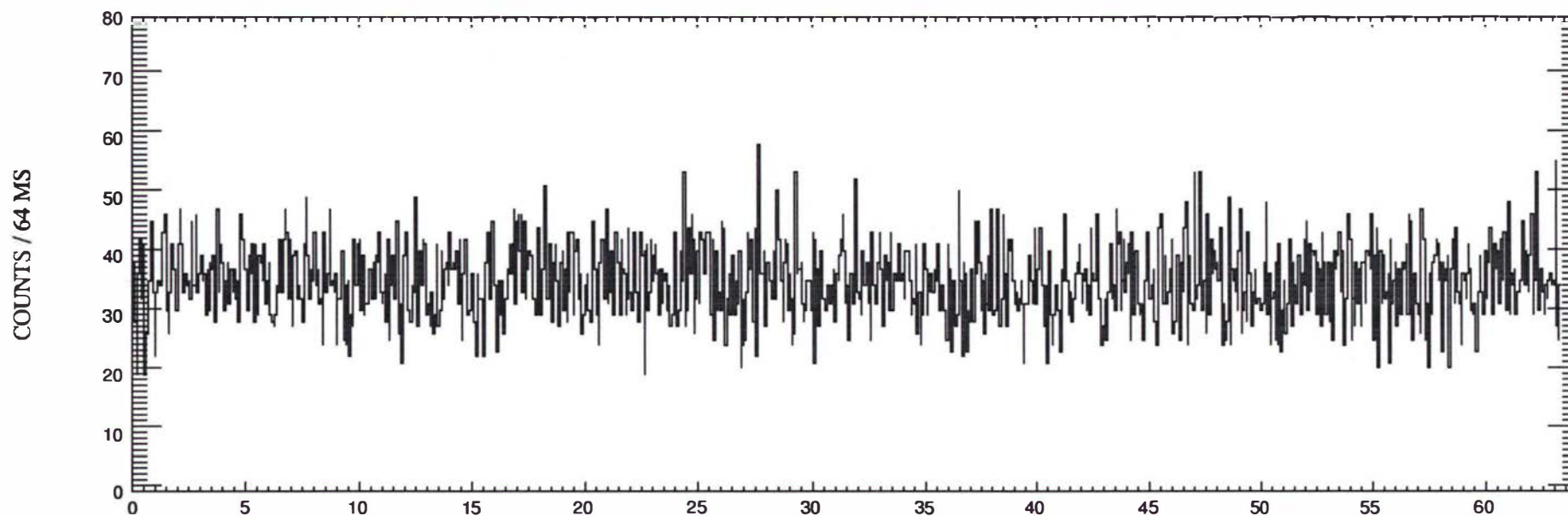


TIME, SECS

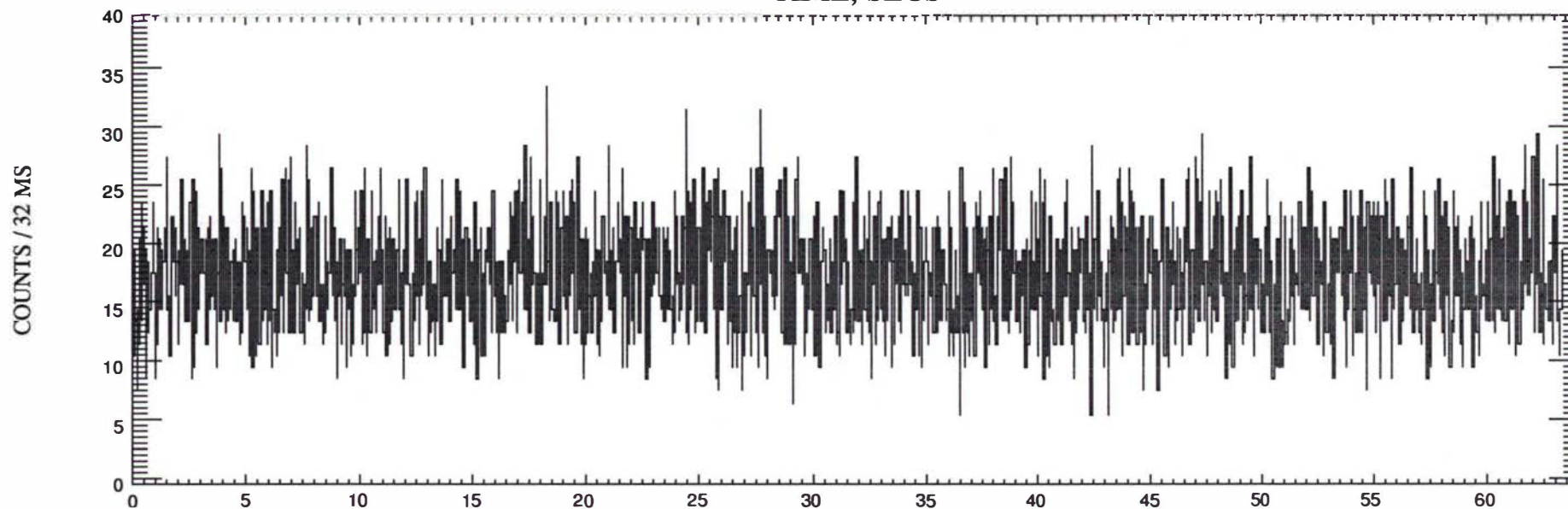
Burst Counter 0 at UT= 4.877950901455 h=17560.623 s 04:52:40.623



Burst Counter 1 at UT= 6.187140986125 h=22273.708 s 06:11:13.708

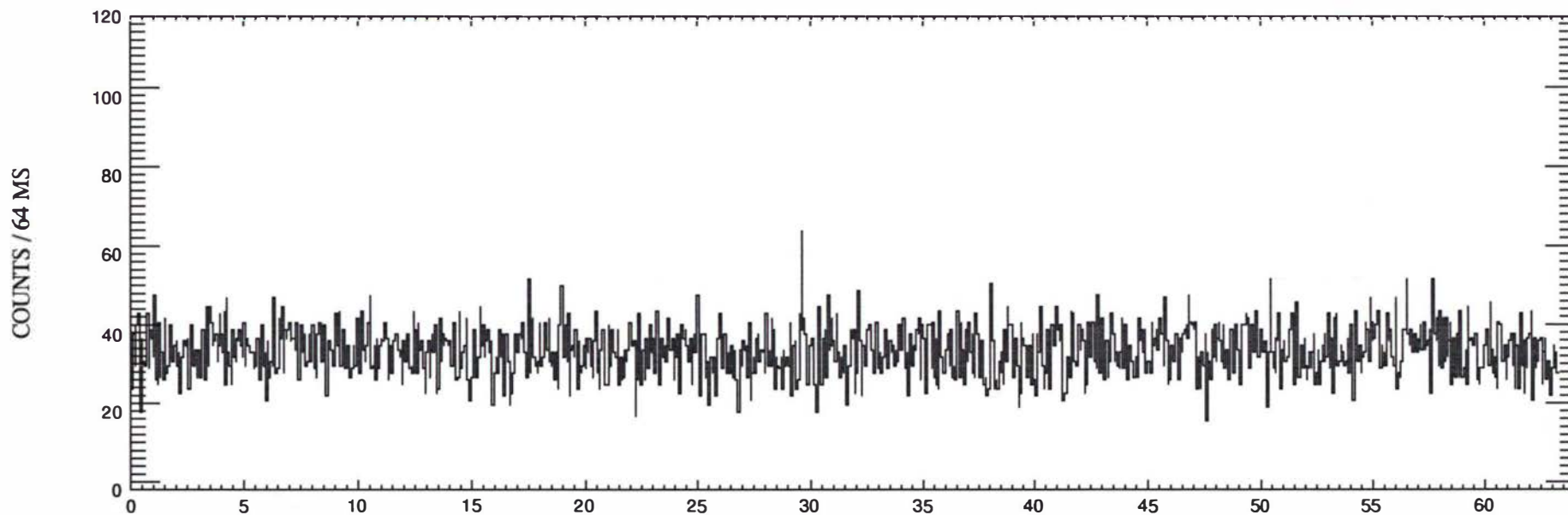


TIME, SECS

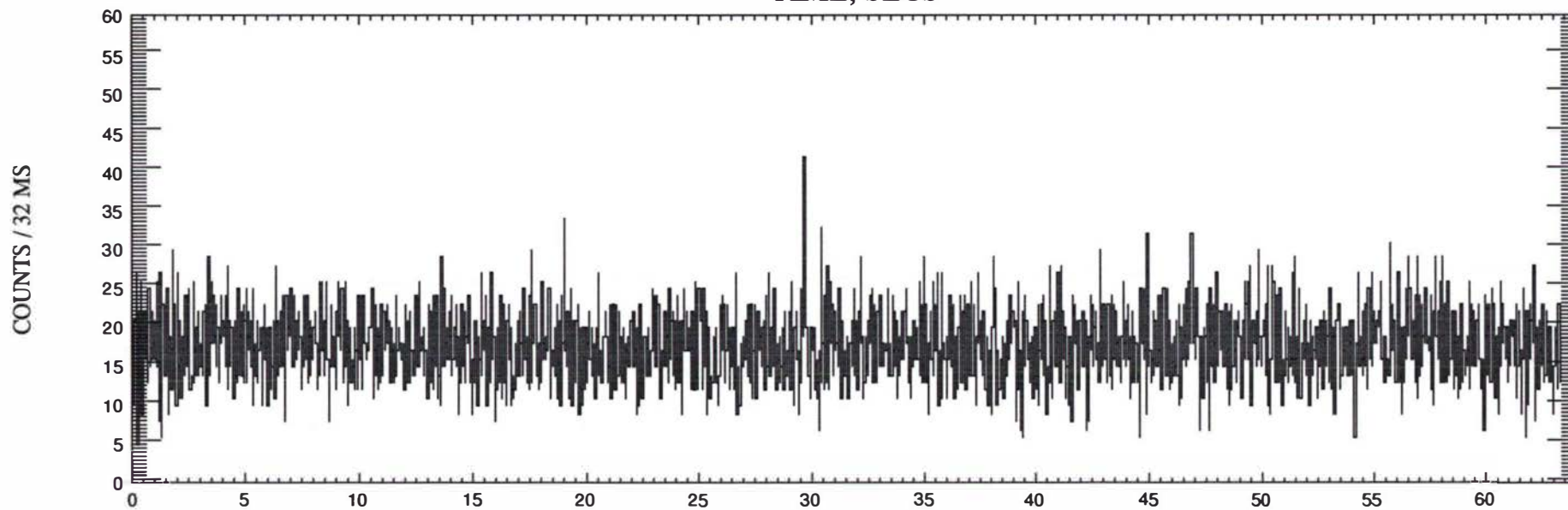


TIME, SECS

Burst Counter 2 at UT= 7.471051122877 h=26895.784 s 07:28:15.784

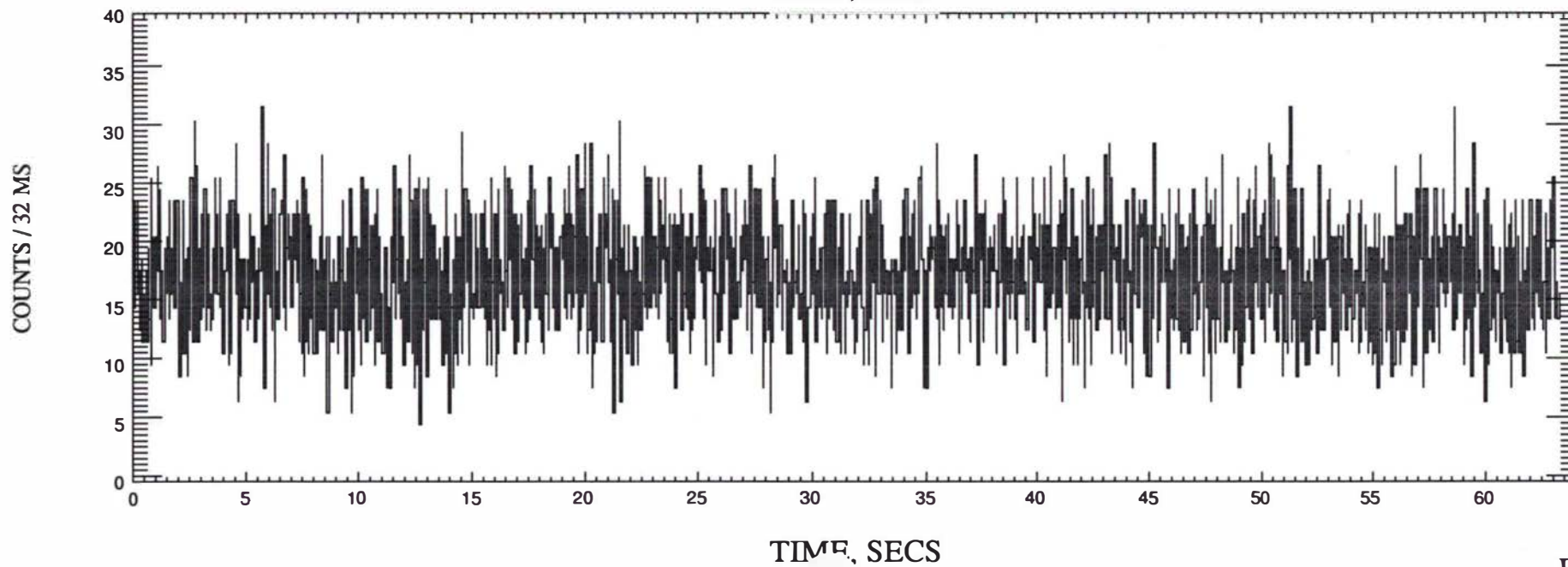
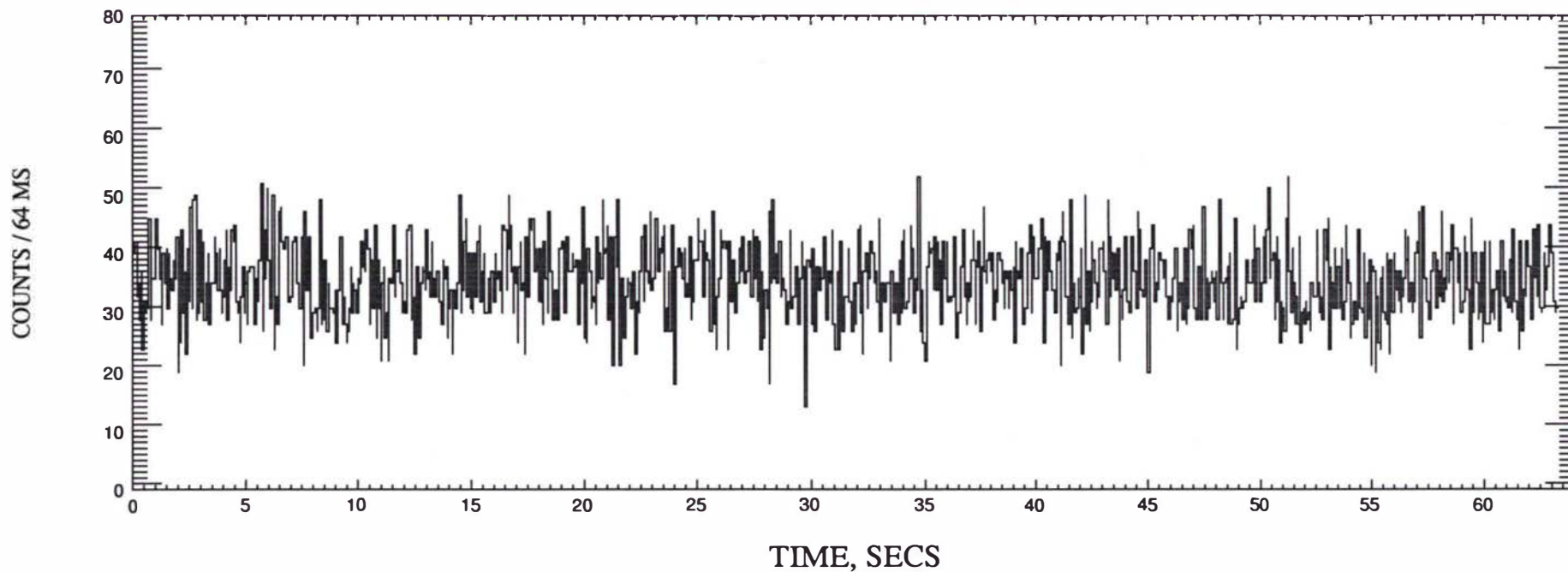


TIME, SECS

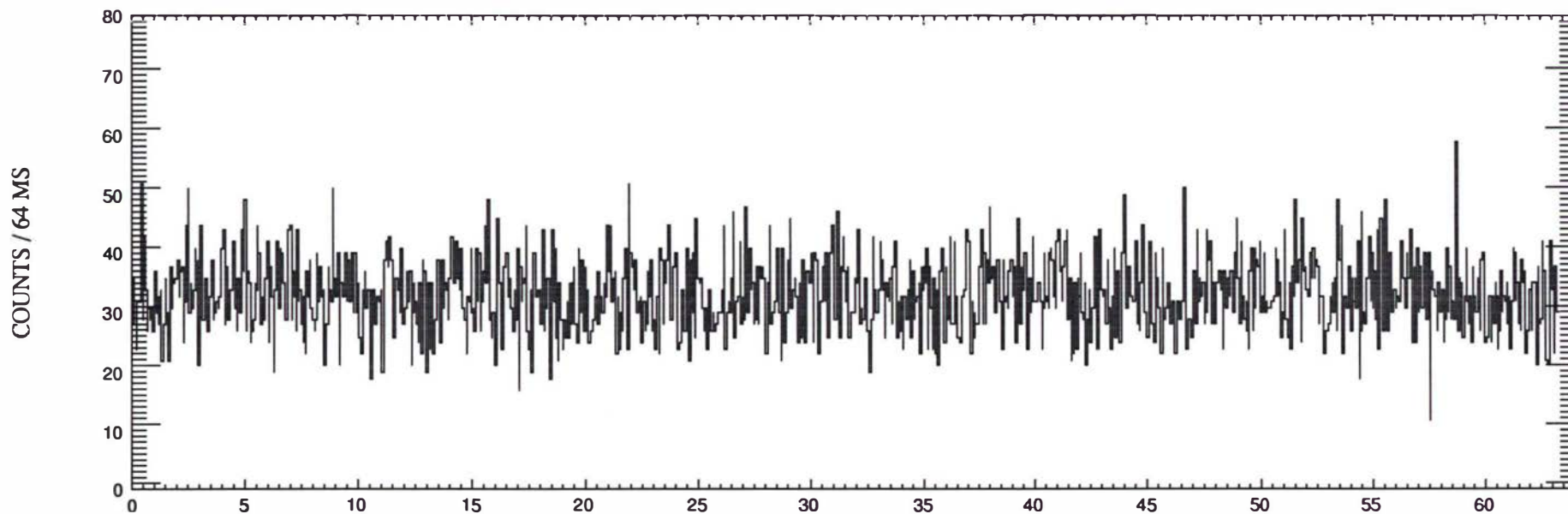


TIME, SECS

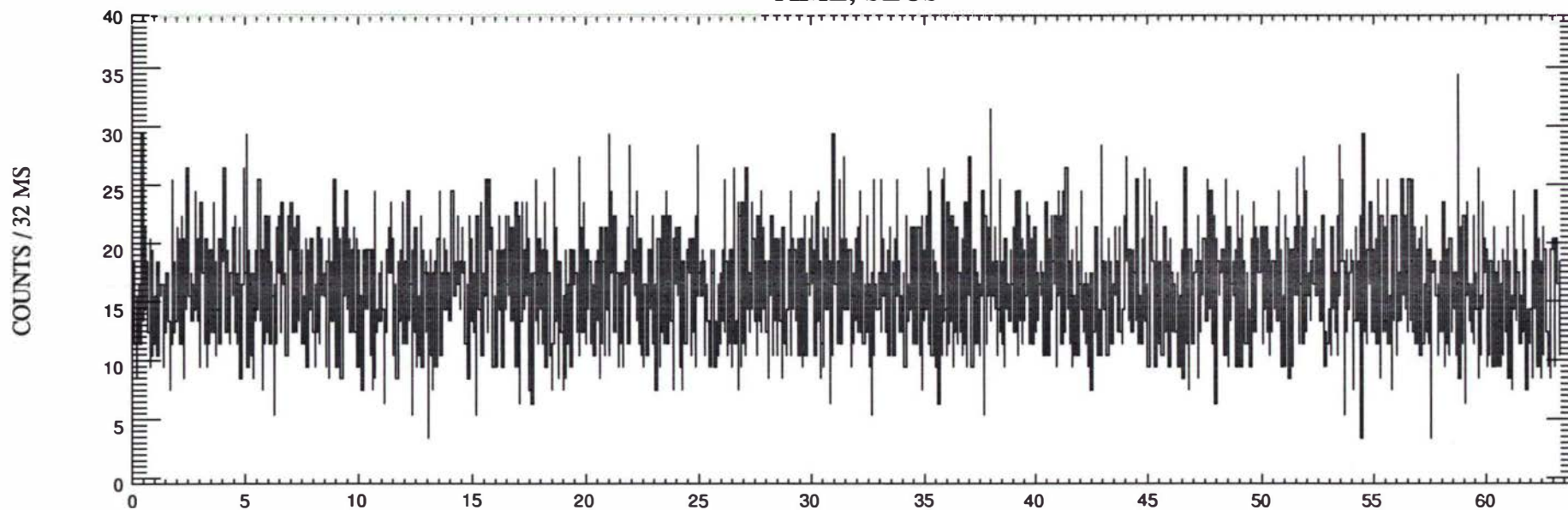
Burst Counter 3 at UT= 7.601320220100 h=27364.753 s 07:36:04.753



Burst Counter 4 at UT=10.022760285272 h=36081.937 s 10:01:21.937

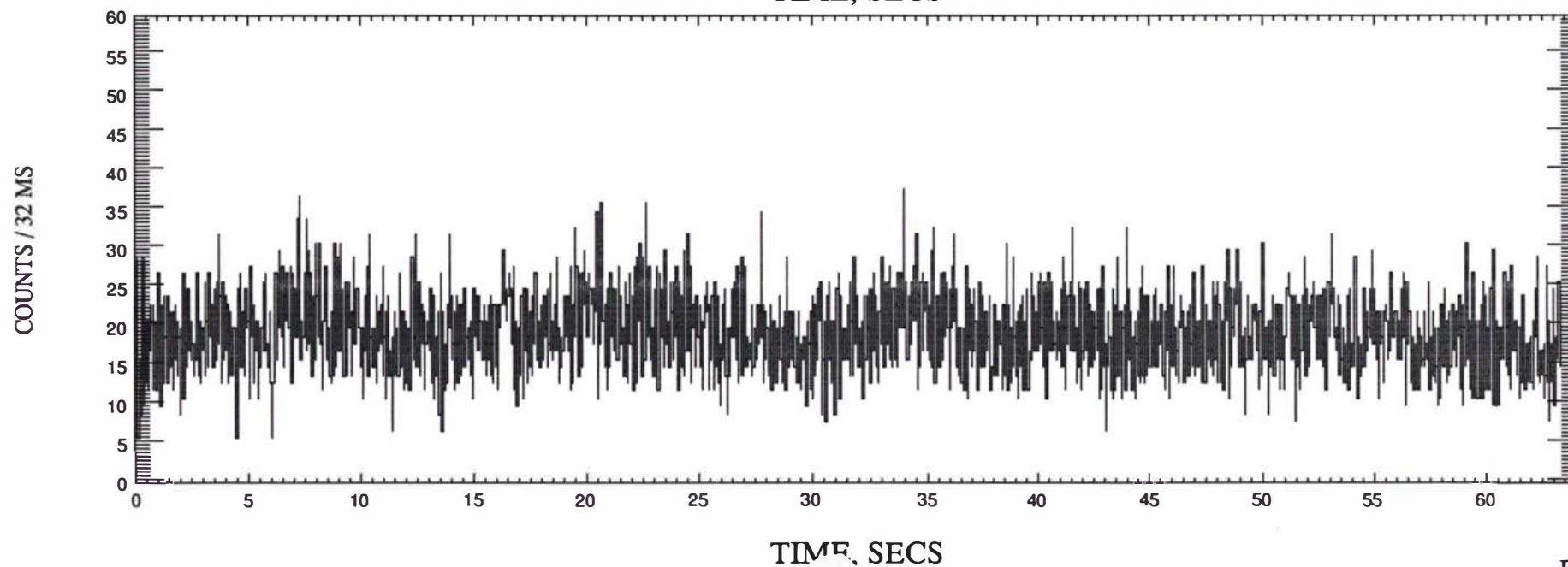
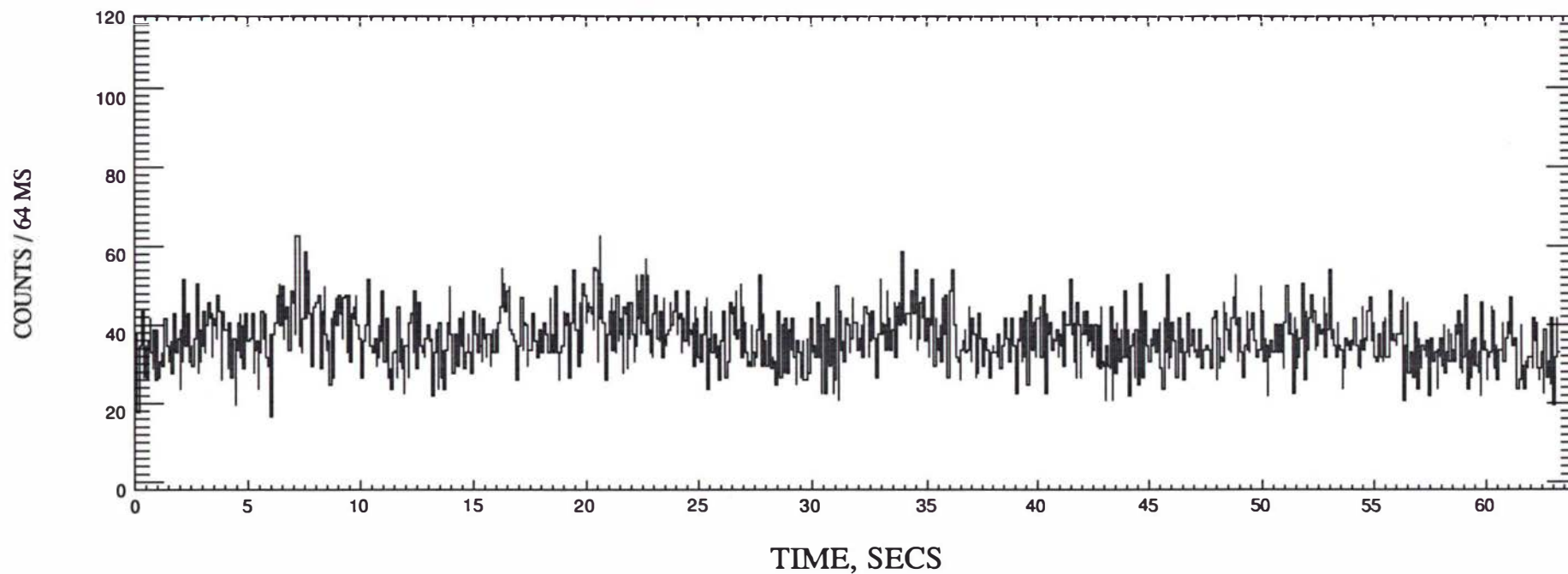


TIME, SECS

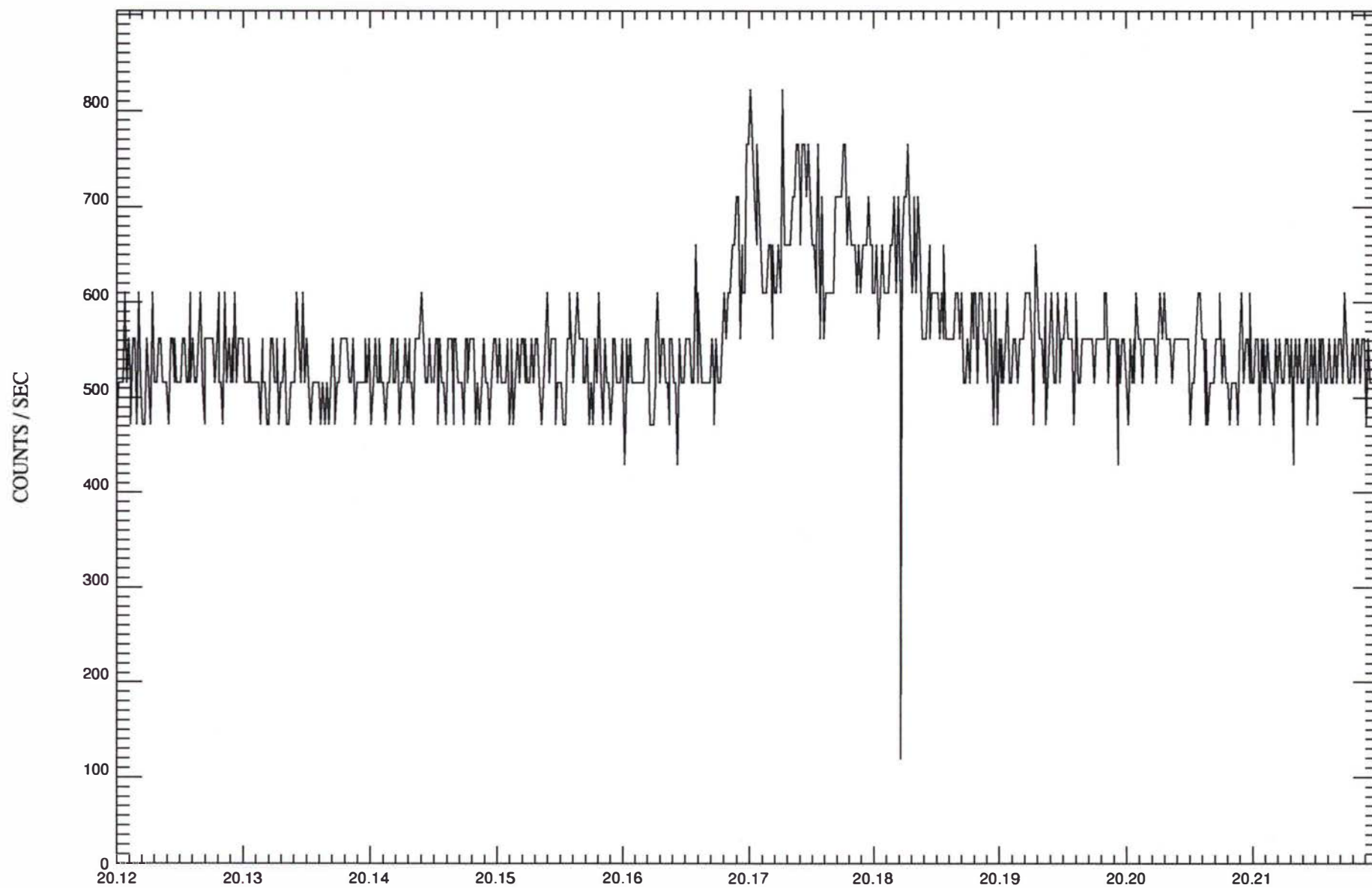


TIME, SECS

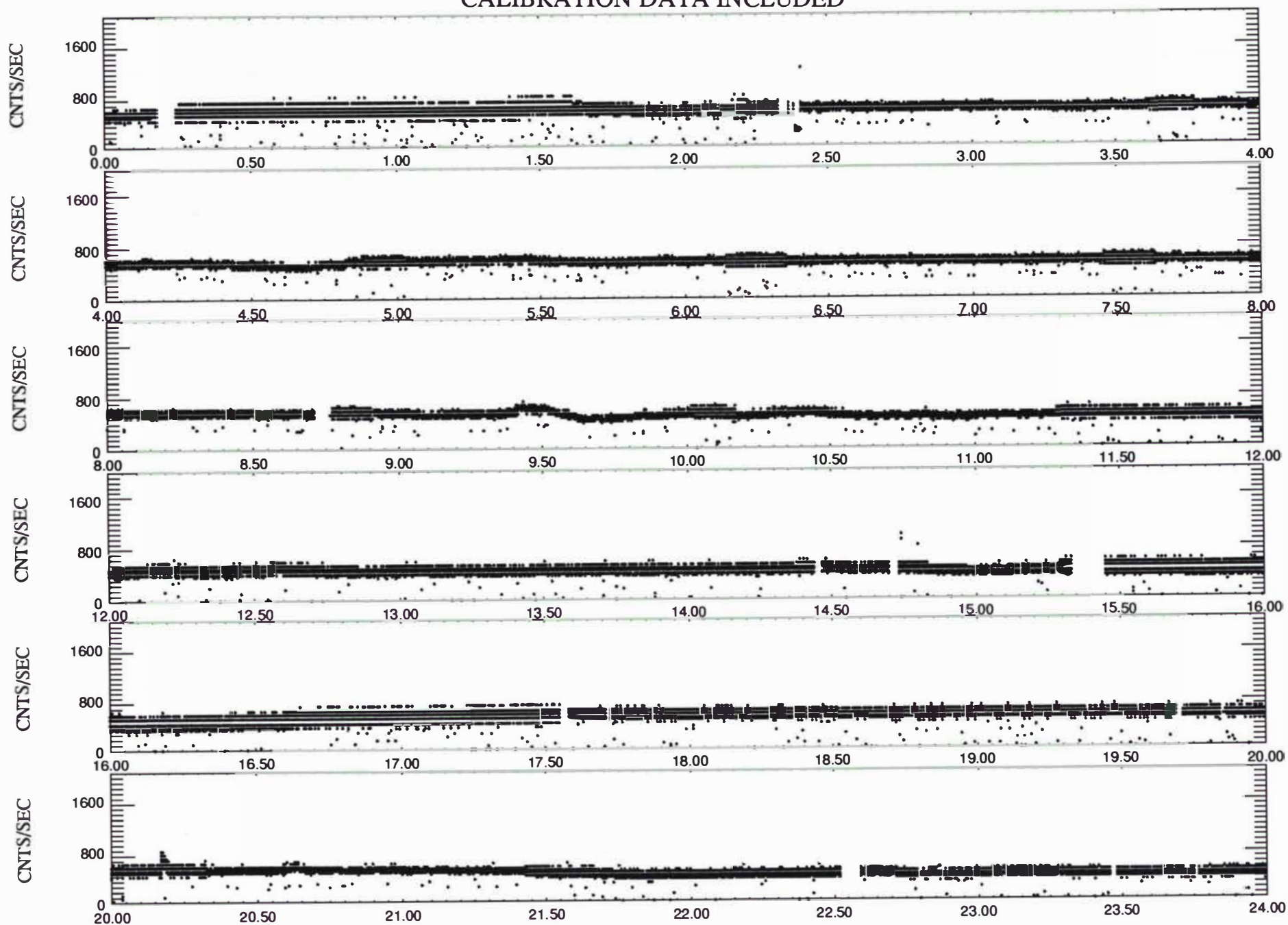
Burst Counter 5 at UT=20.170215424432 h=72612.776 s 20:10:12.776



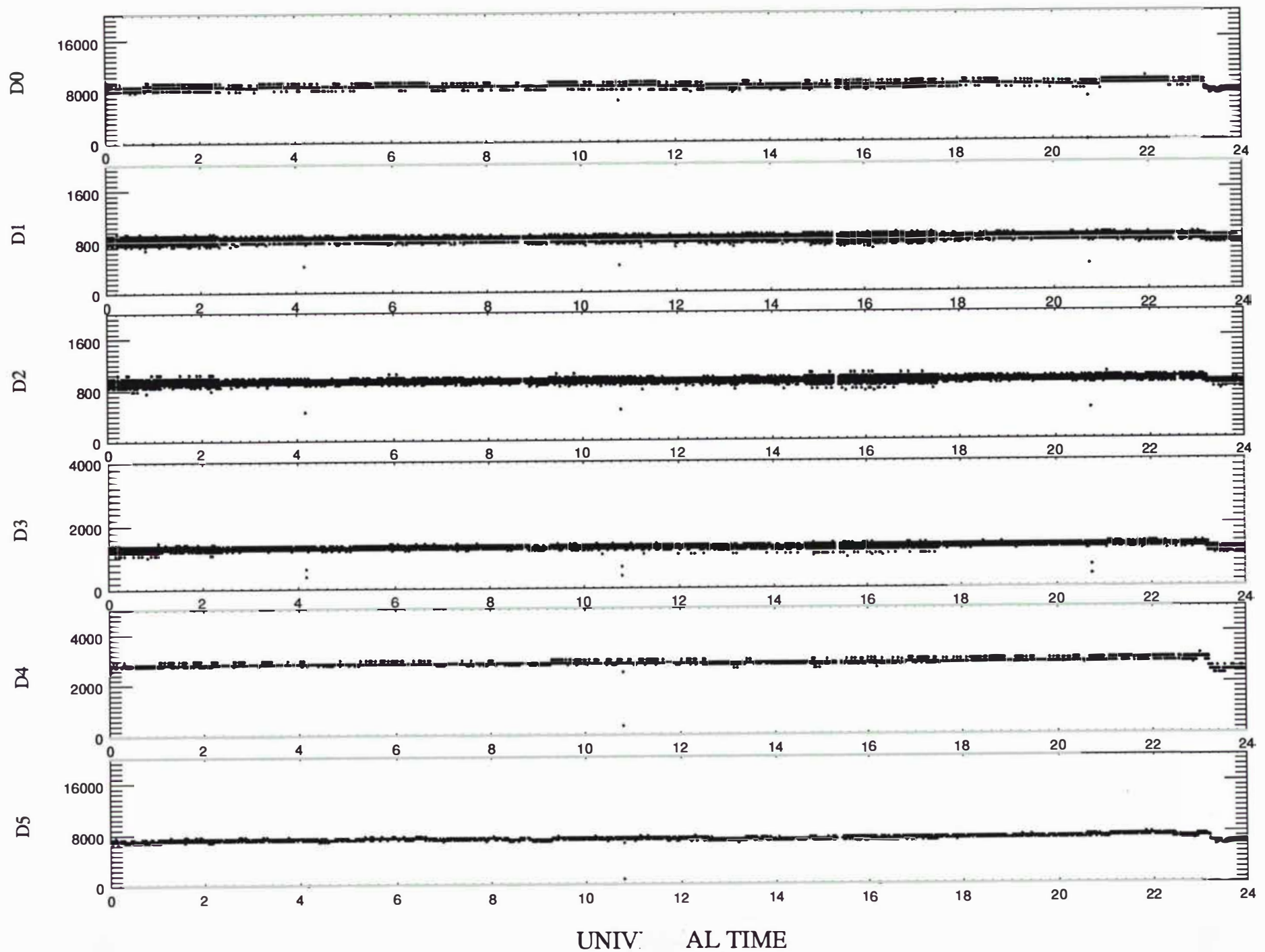
CALIBRATION DATA INCLUDED

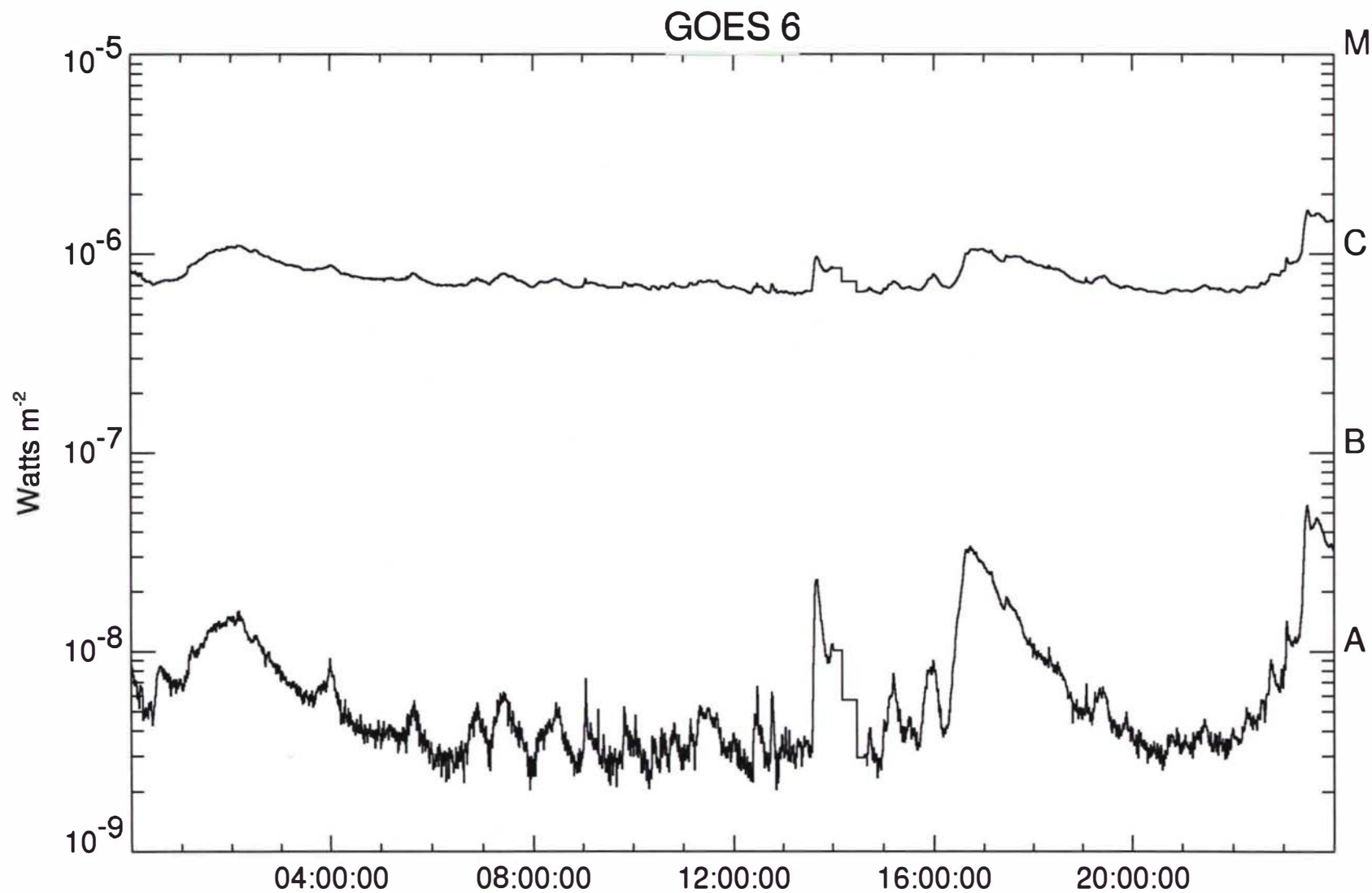


CALIBRATION DATA INCLUDED



UNIV 'AL TIME





Data Start: 91/05/20, 0000:01

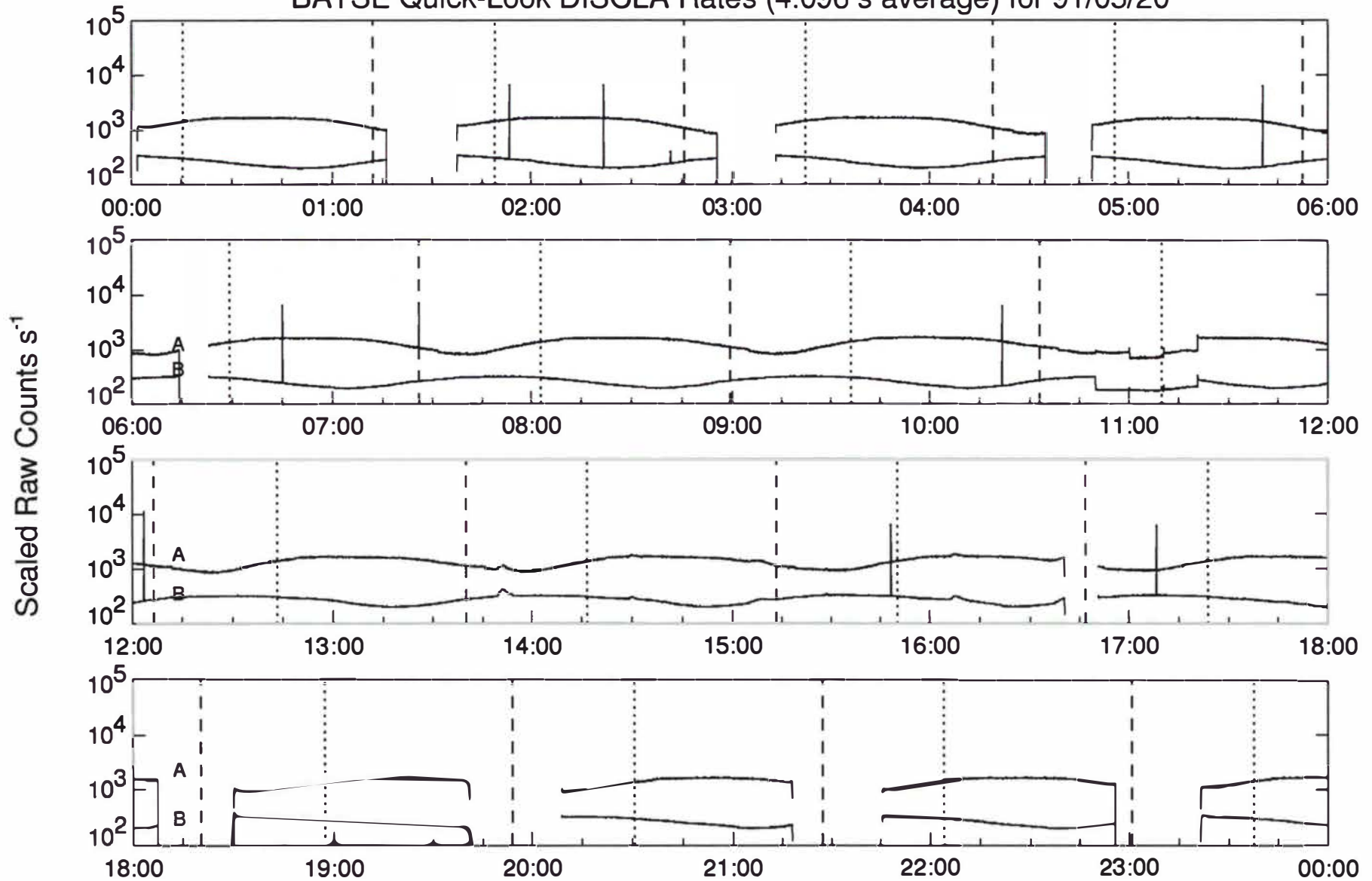
Plot created: 96/11/27, 0334

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/20



Current Time: 96/11/27, 0335 EDT

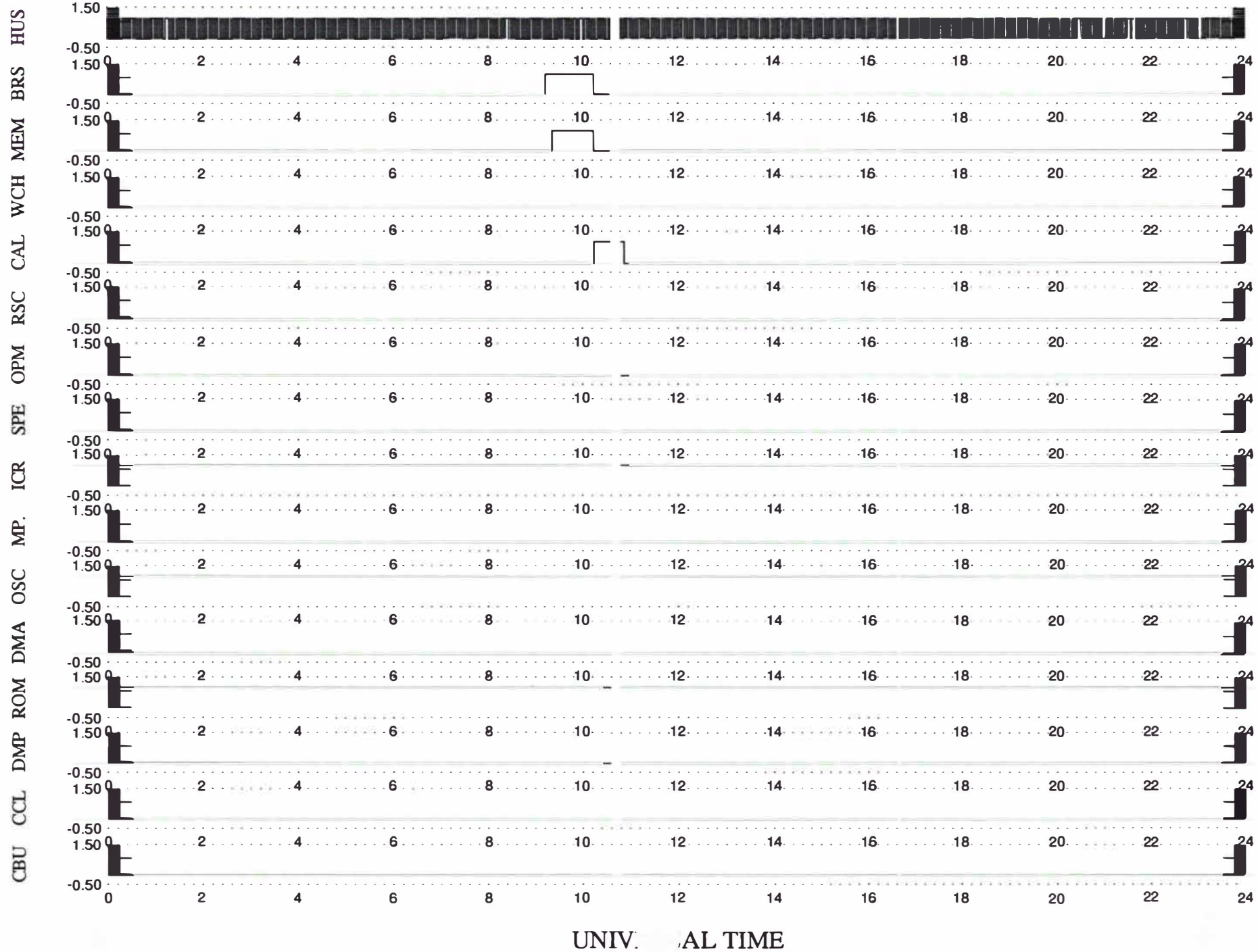
A: Channel 0 Most Sunward LAD

B: Sum Channel 0 Anti-Sunward LADs X .05

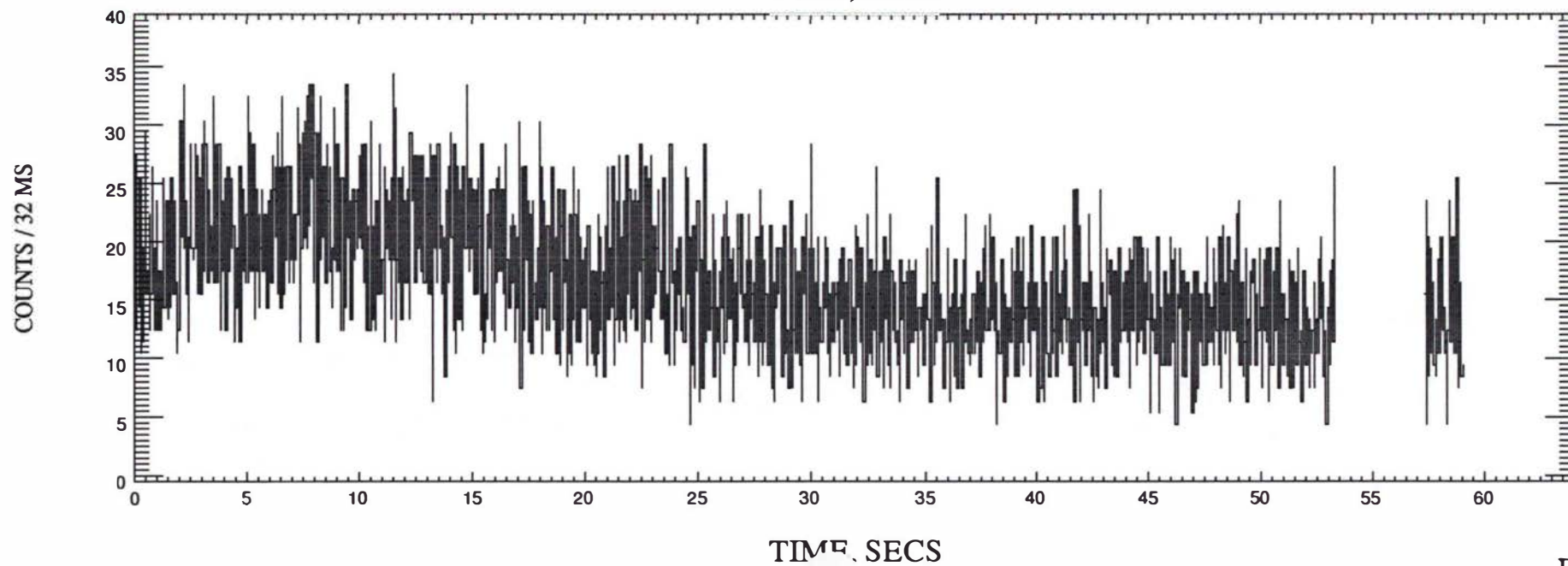
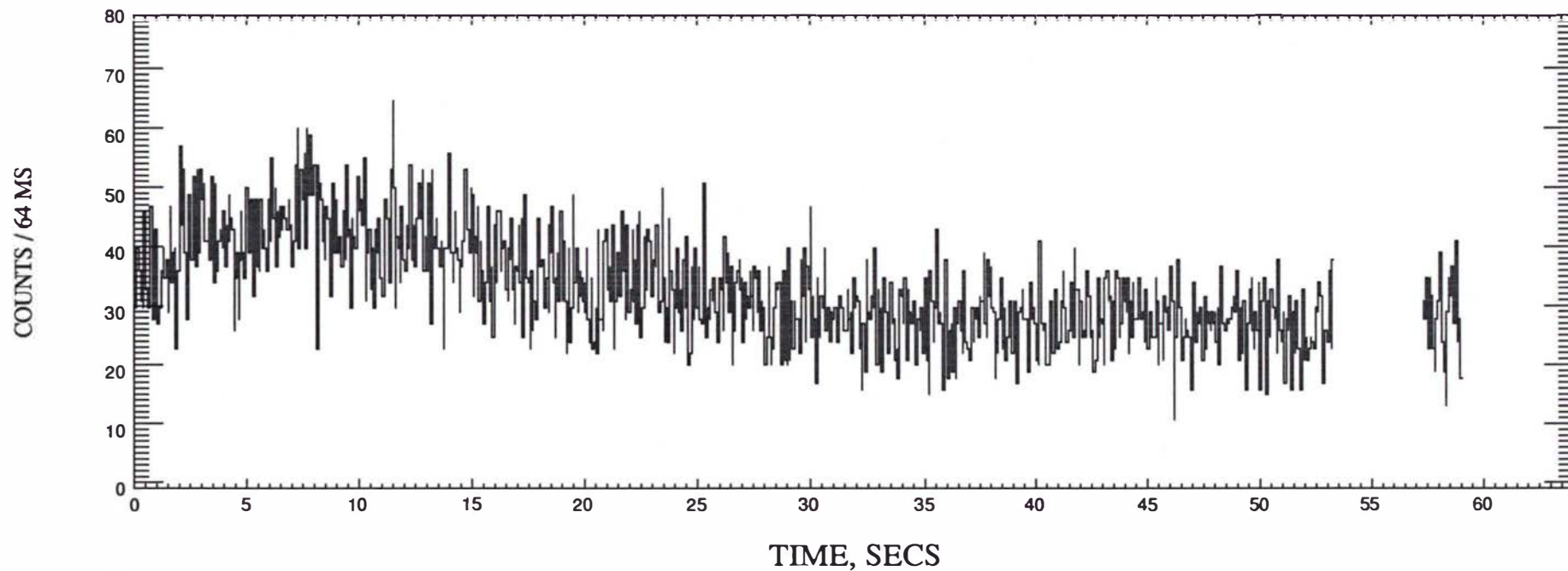
Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare

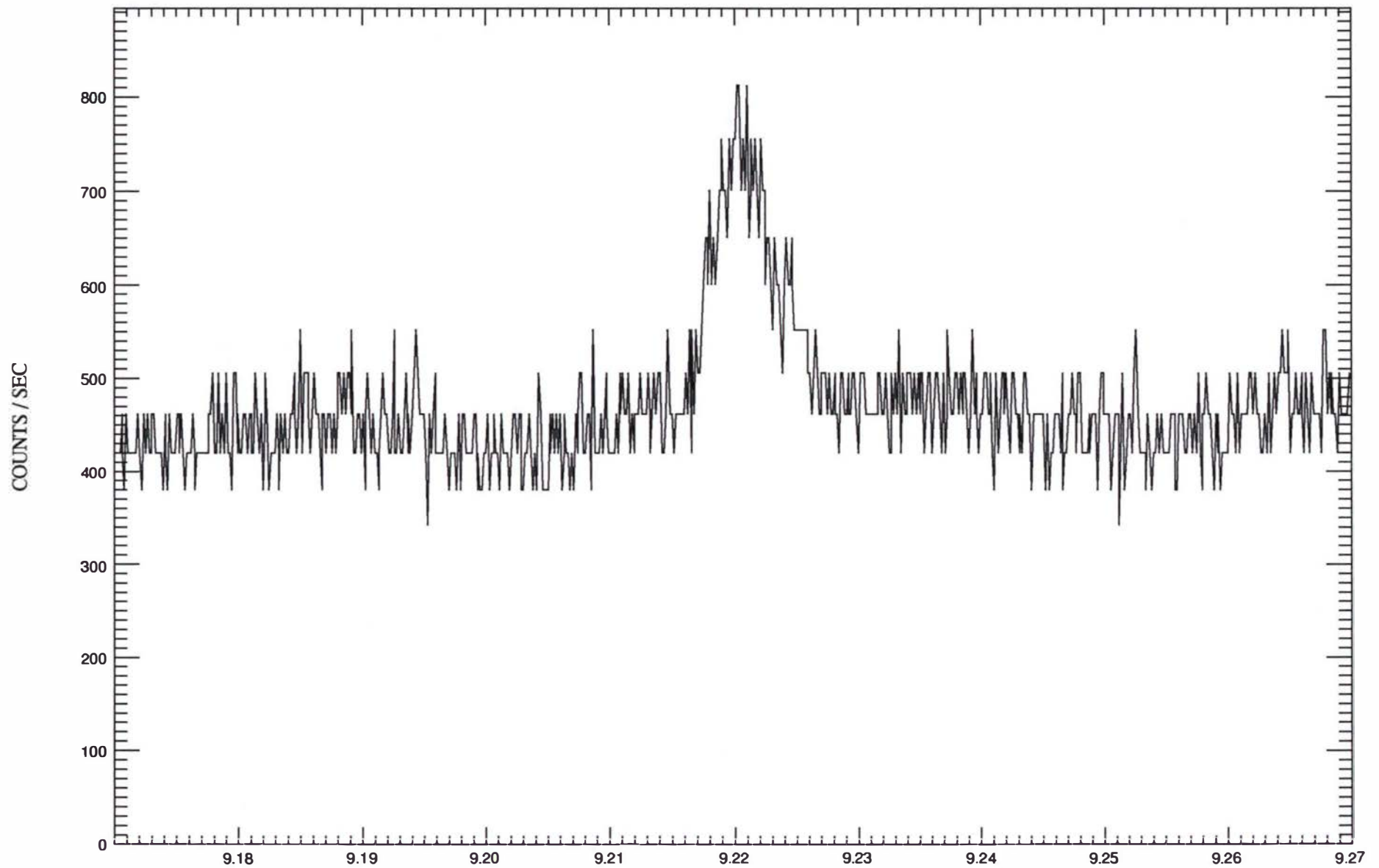
BURST NUMBER 6



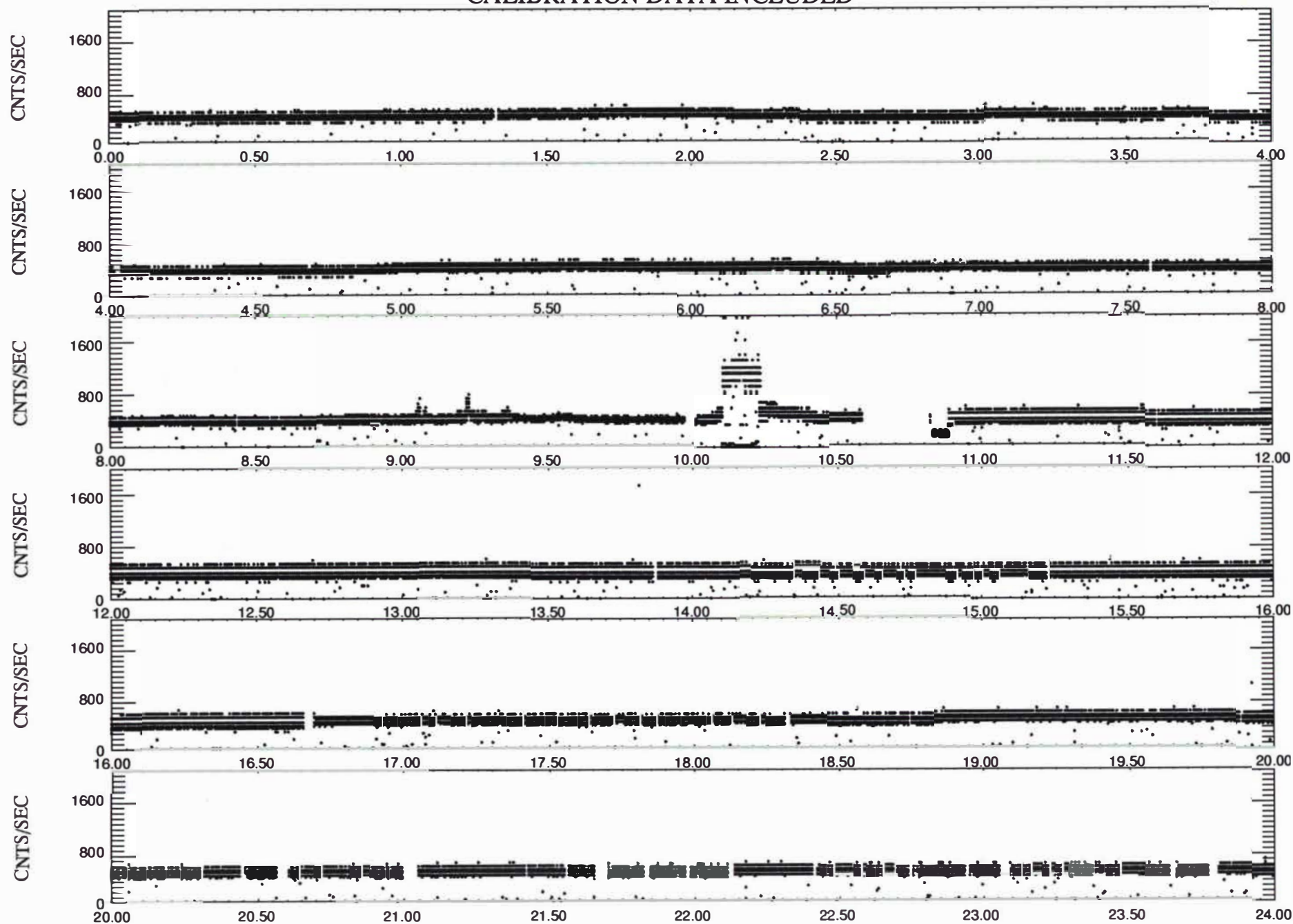
Burst Counter 6 at UT= 9.220363981459 h=33193.310 s 09:13:13.310



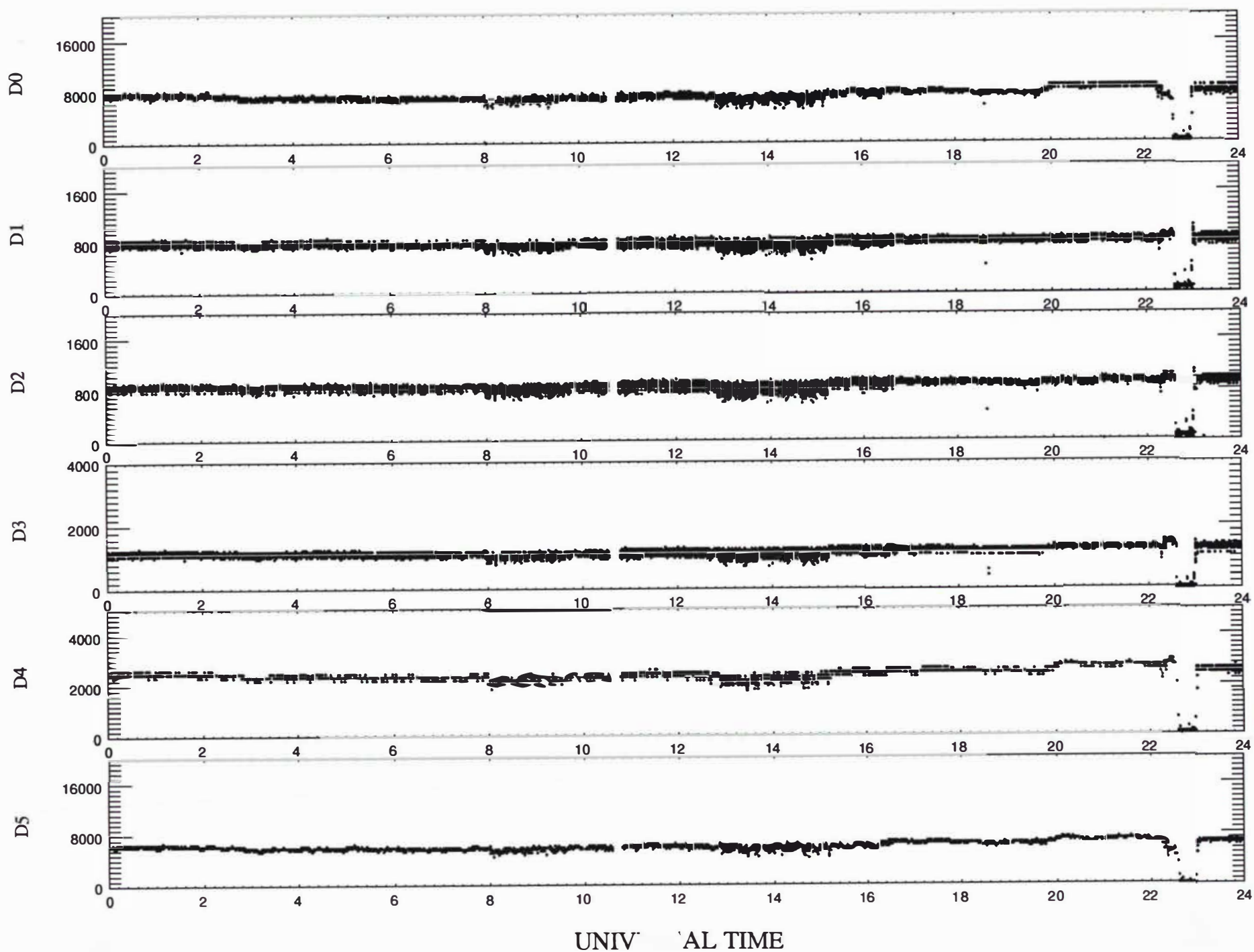
CALIBRATION DATA INCLUDED



CALIBRATION DATA INCLUDED



UNIVERSAL TIME



CATSEARCH PROGRAM

BATSE BURST # 214
EVENT OF 1991 MAY 21 DAY OF YEAR=141
EVENT CROSSING TIME AT BATSE : 18877. S. OR 05:14:37.1
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 115.000 -34.900
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 21/ 5/ 91 IS:
RA= 122.591 DEC= 21.586 DIST= 3.449 AU
BATSE-ULYSSES DISTANCE = 515935992. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=123.06 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -938.72 SECS.
CROSSING TIME AT ULYSSES IS 17938. S. OR 04:58:58 +/- 286.17 SECONDS

ND

14 / 4 / 93

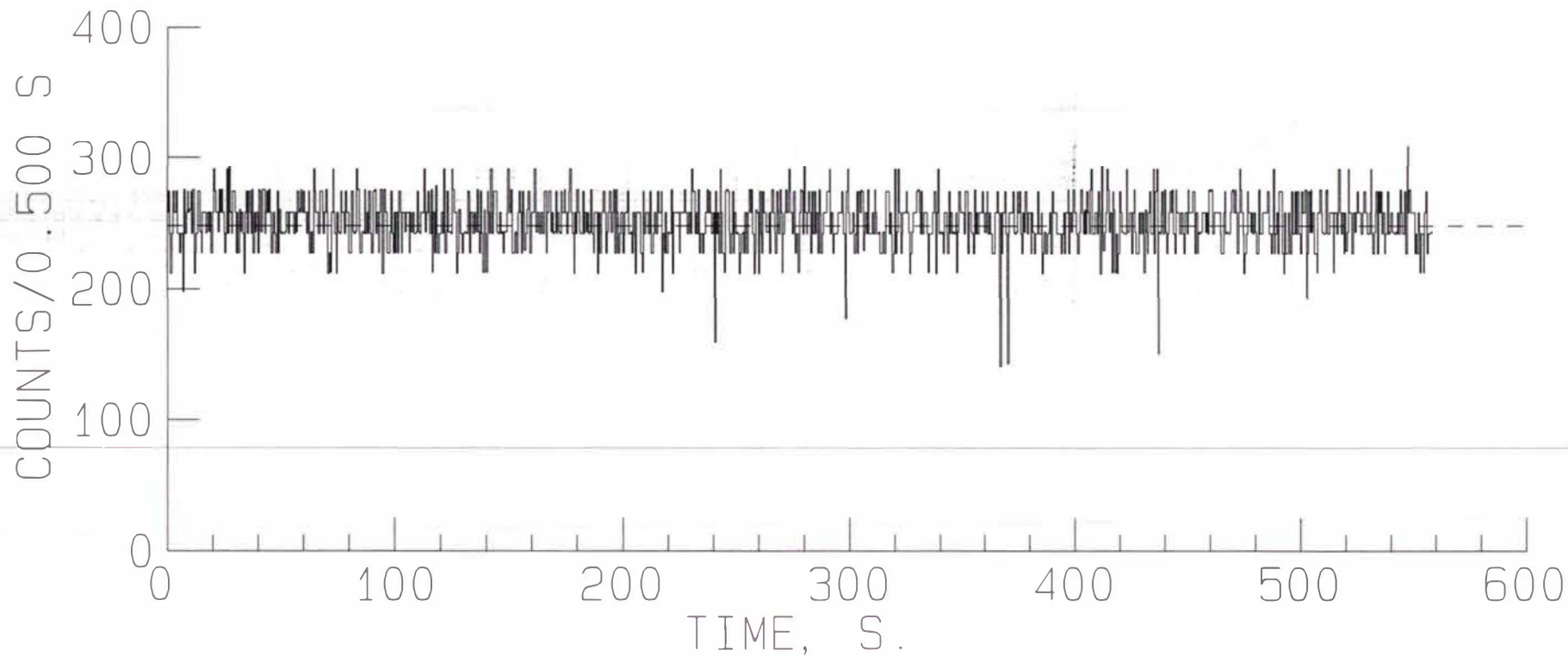
ULYSSES RT

21 / 5 / 91 17640.012 s

0.250 S INTERVALS REGROUPED BY 2

0 - 0 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



CATSEARCH PROGRAM

BATSE BURST # 218
EVENT OF 1991 MAY 21 DAY OF YEAR=141
EVENT CROSSING TIME AT BATSE : 76453. S. OR 21:14:13.2
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 208.100 -38.500
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 21/ 5/ 91 IS:
RA= 122.591 DEC= 21.586 DIST= 3.449 AU
BATSE-ULYSSES DISTANCE = 515935992. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 80.09 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 296.08 SECS.
CROSSING TIME AT ULYSSES IS 76749. S. OR 21:19:09 +/- 348.83 SECONDS

NO ?

14 / 4 / 93

ULYSSES RT

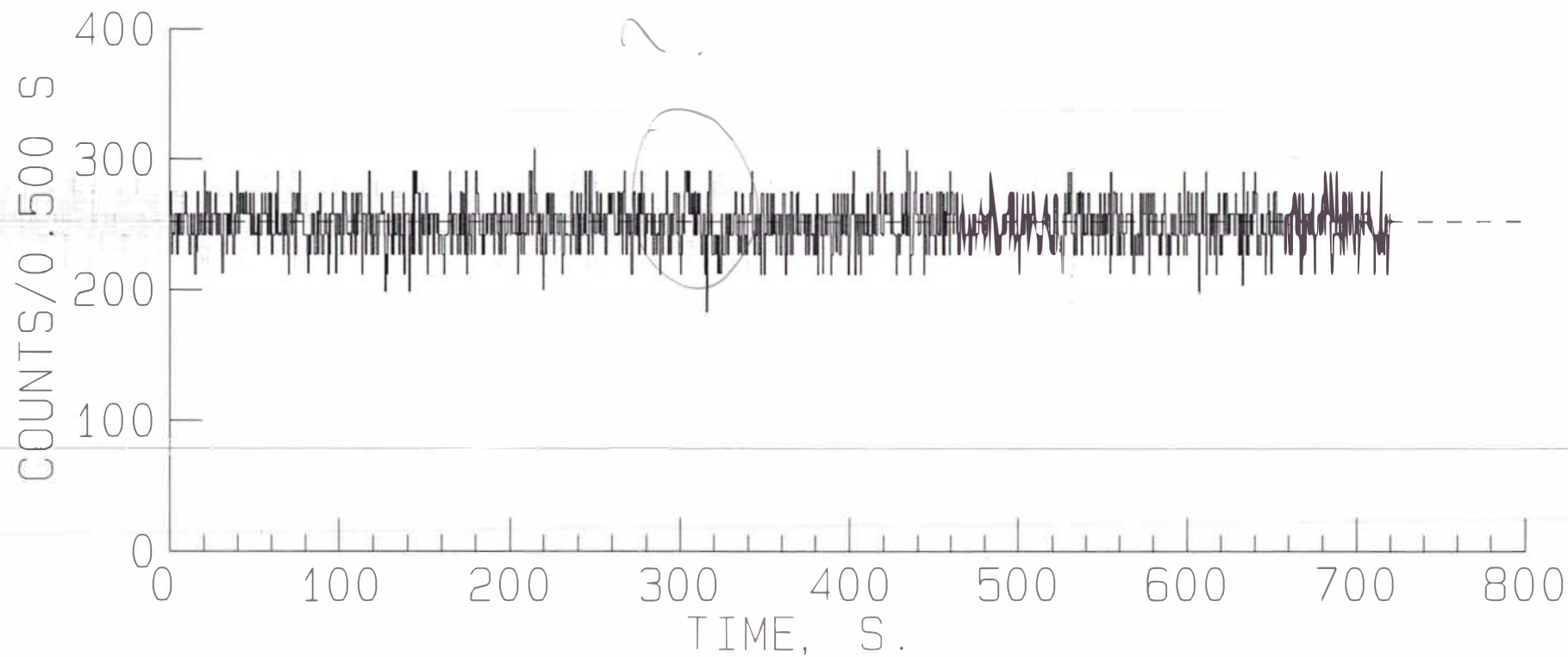
21 / 5 / 91 76392.242 s

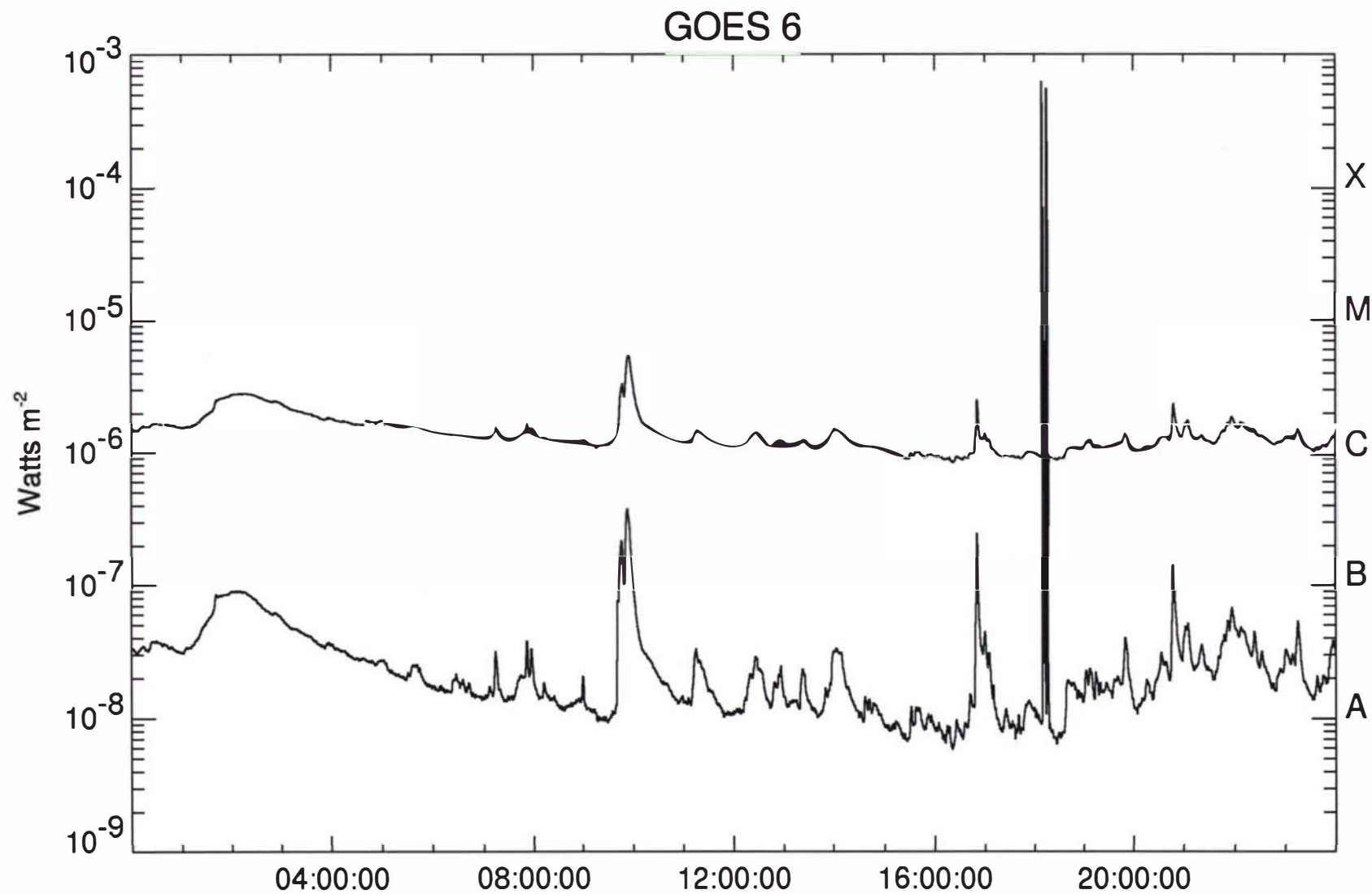
0.250 S INTERVALS REGROUPED BY 2

0 - 0 keV

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS





Data Start: 91/05/21, 0000:02

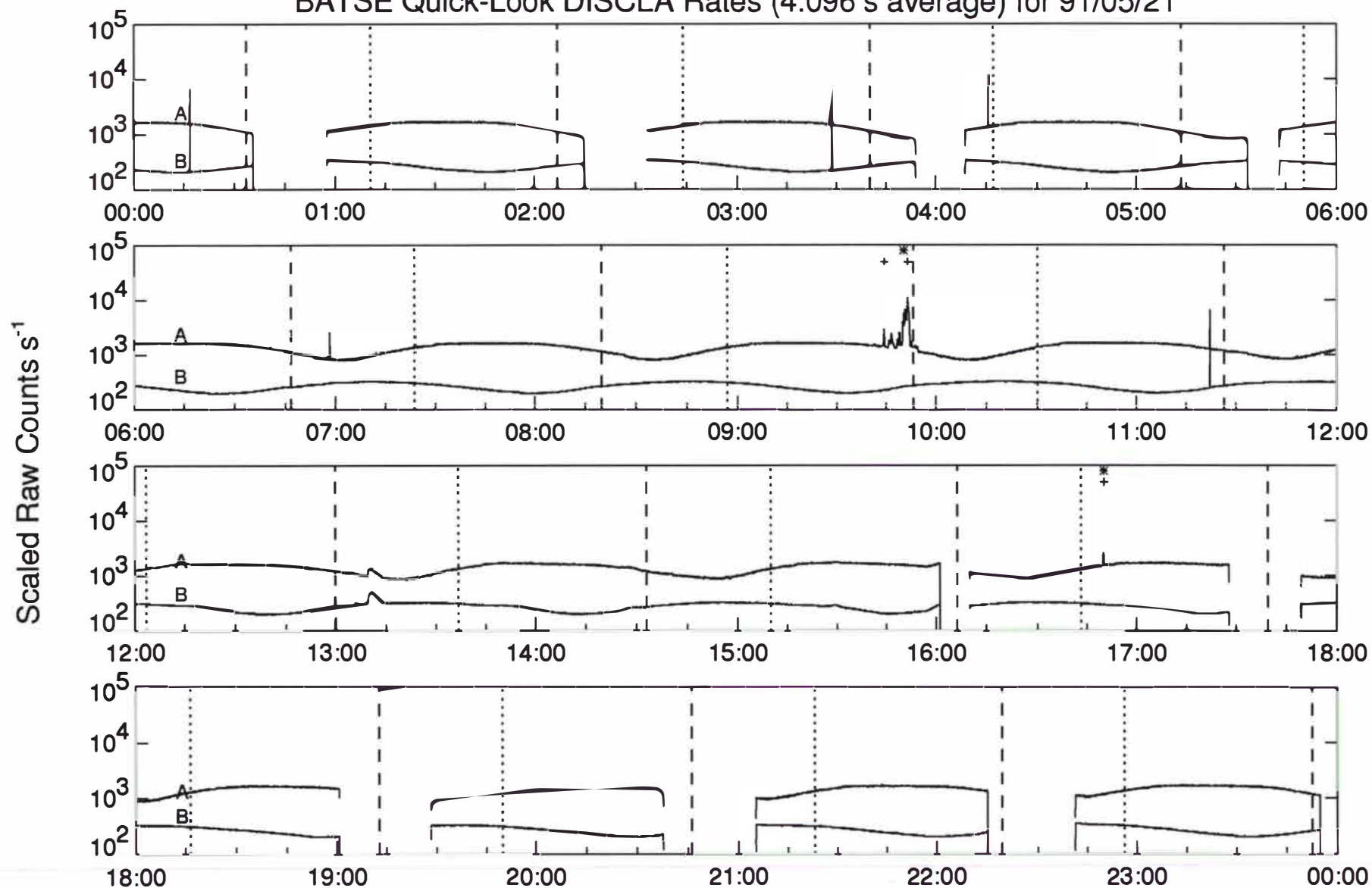
Plot created: 96/11/27, 0337

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/21



Current Time: 96/11/27, 0338 EDT

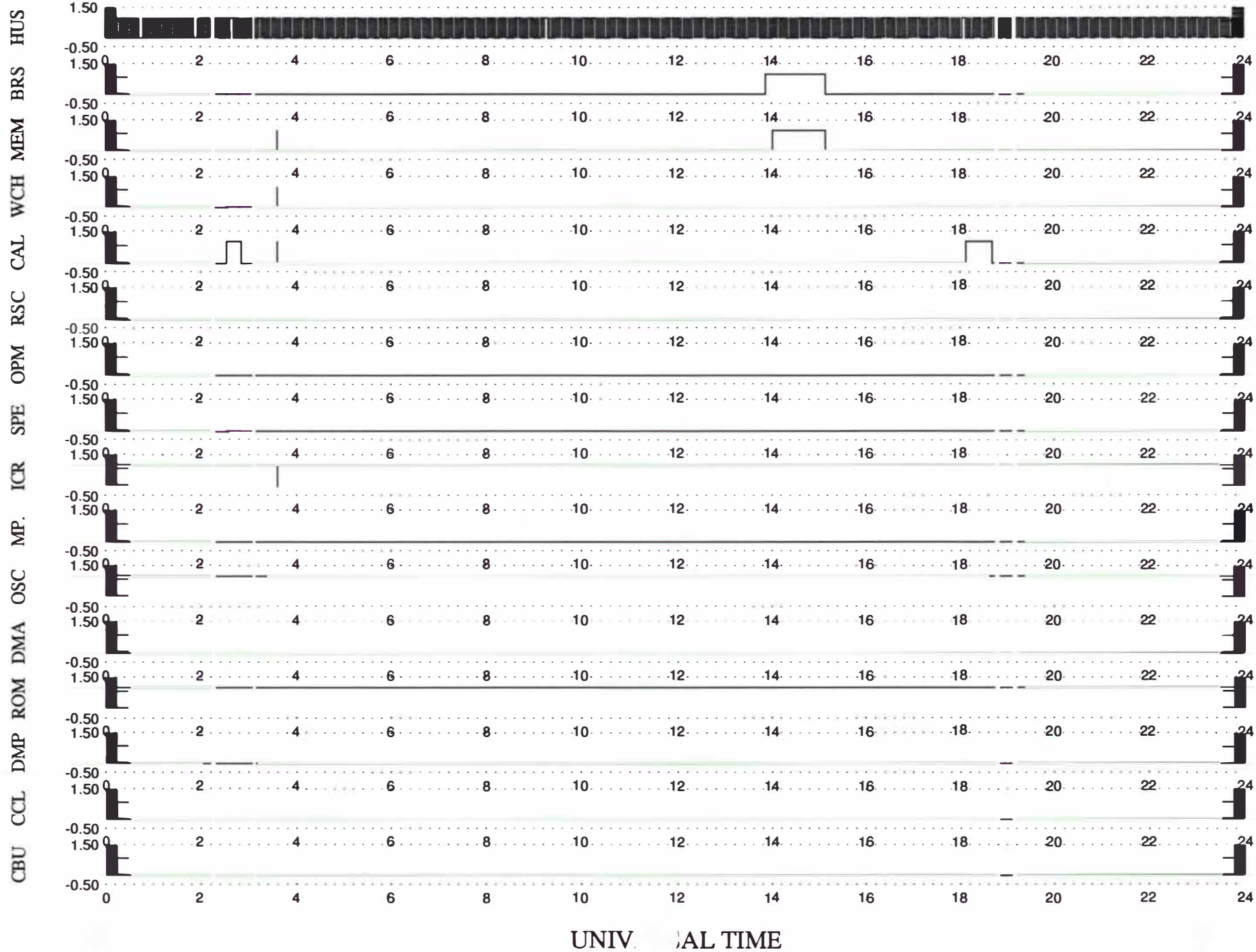
A: Channel 0 Most Sunward LAD

B: Sum Channel 0 Anti-Sunward LADs X .05

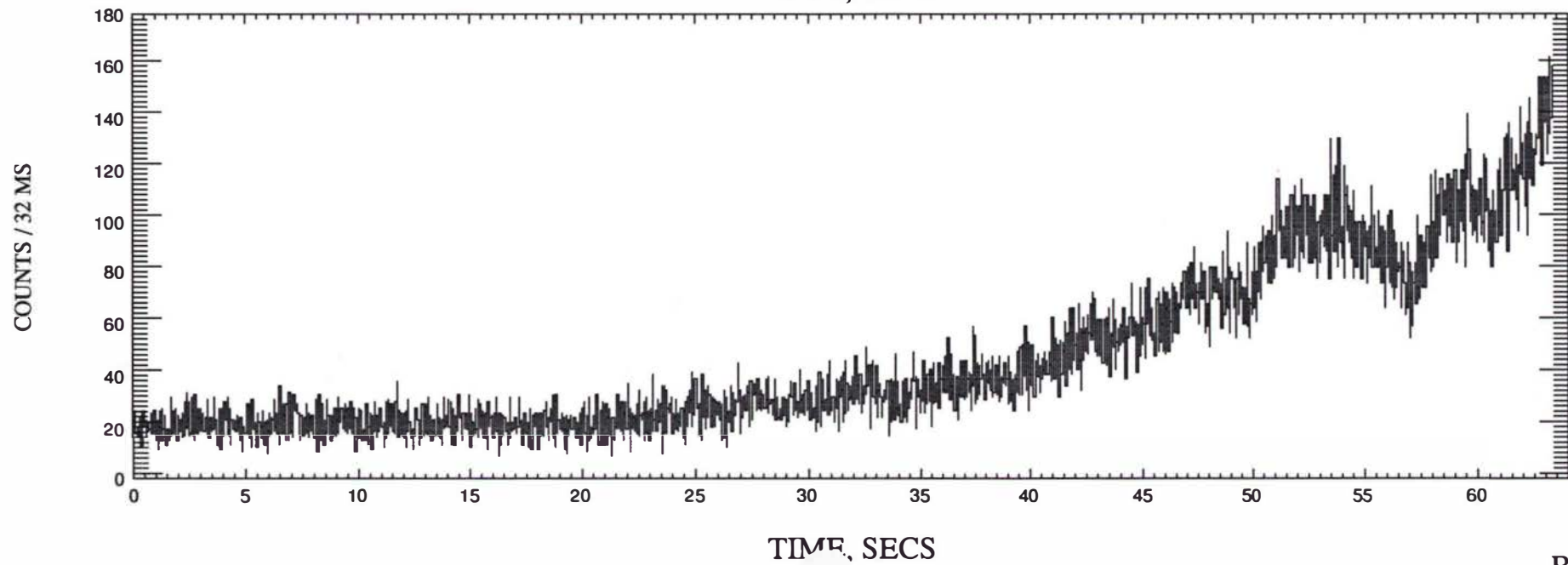
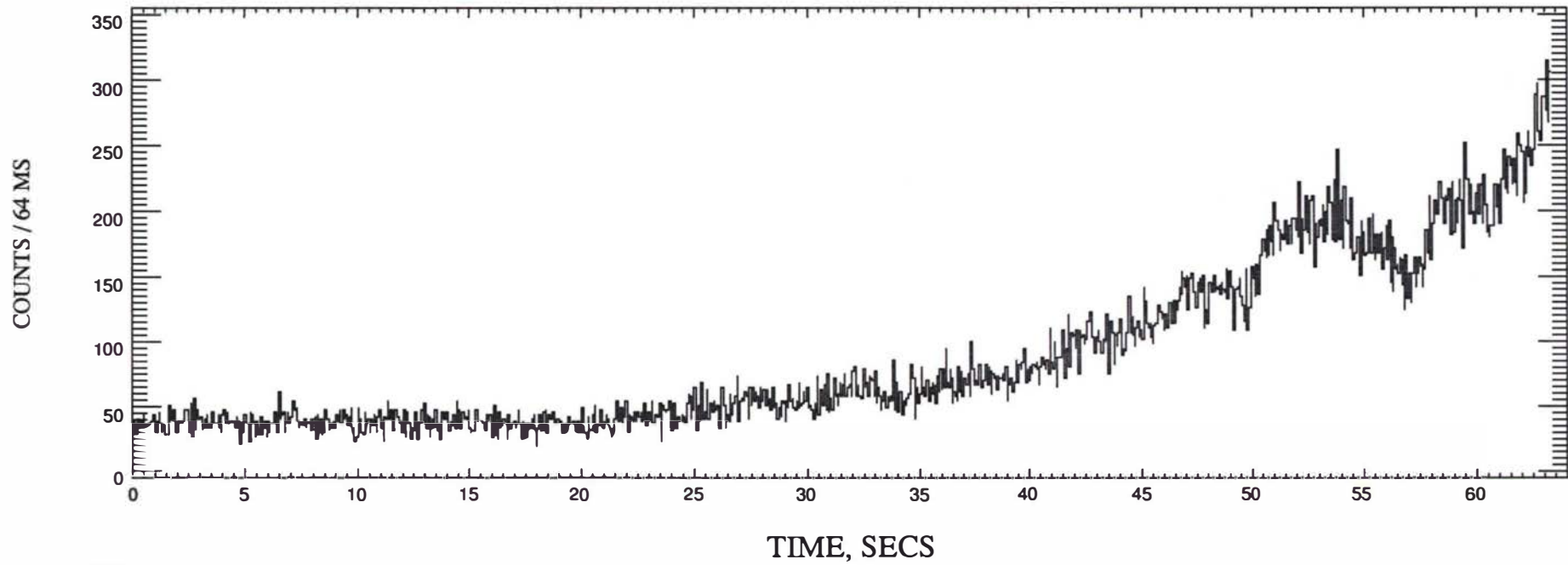
Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare

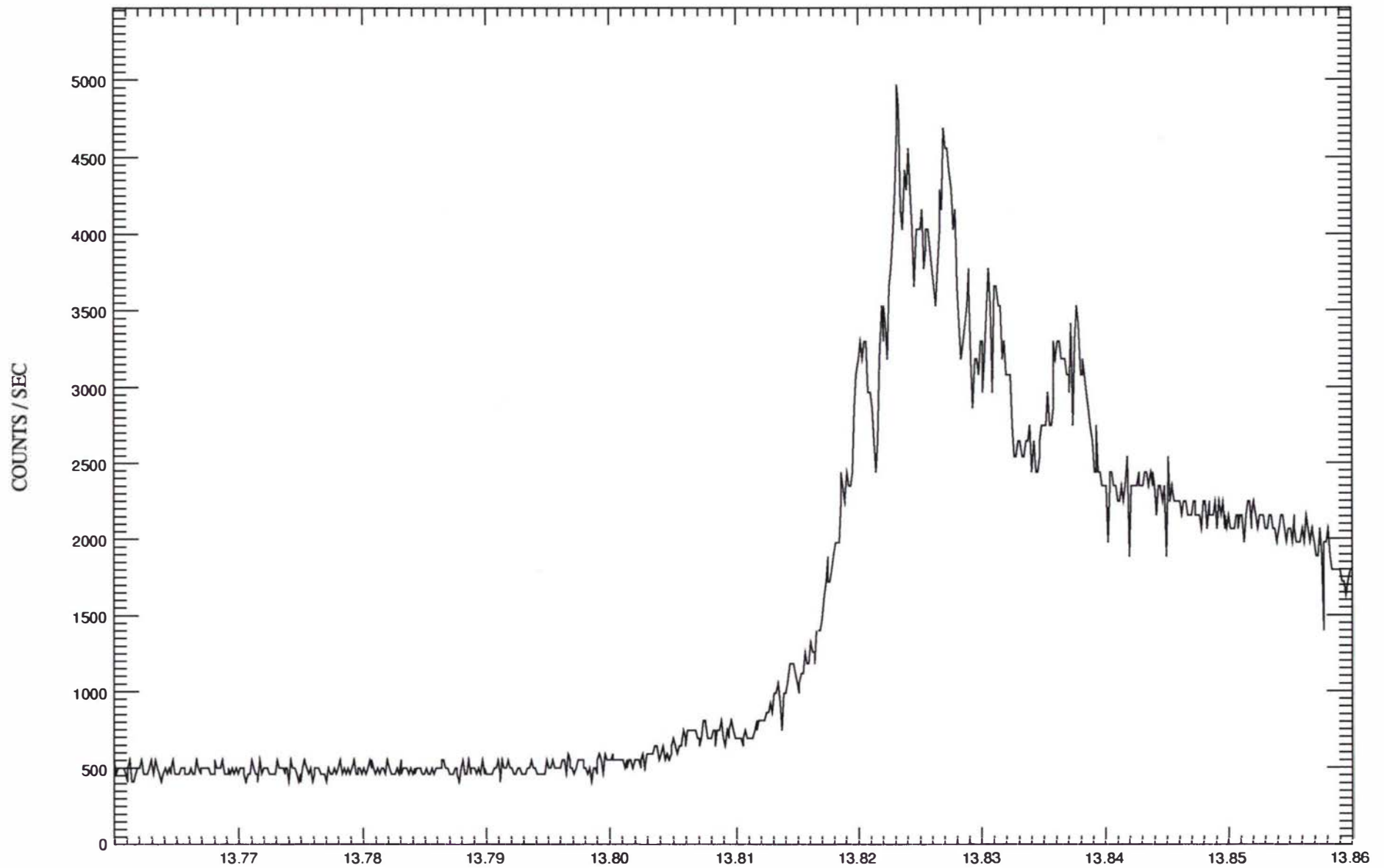
BURST NUMBER 7



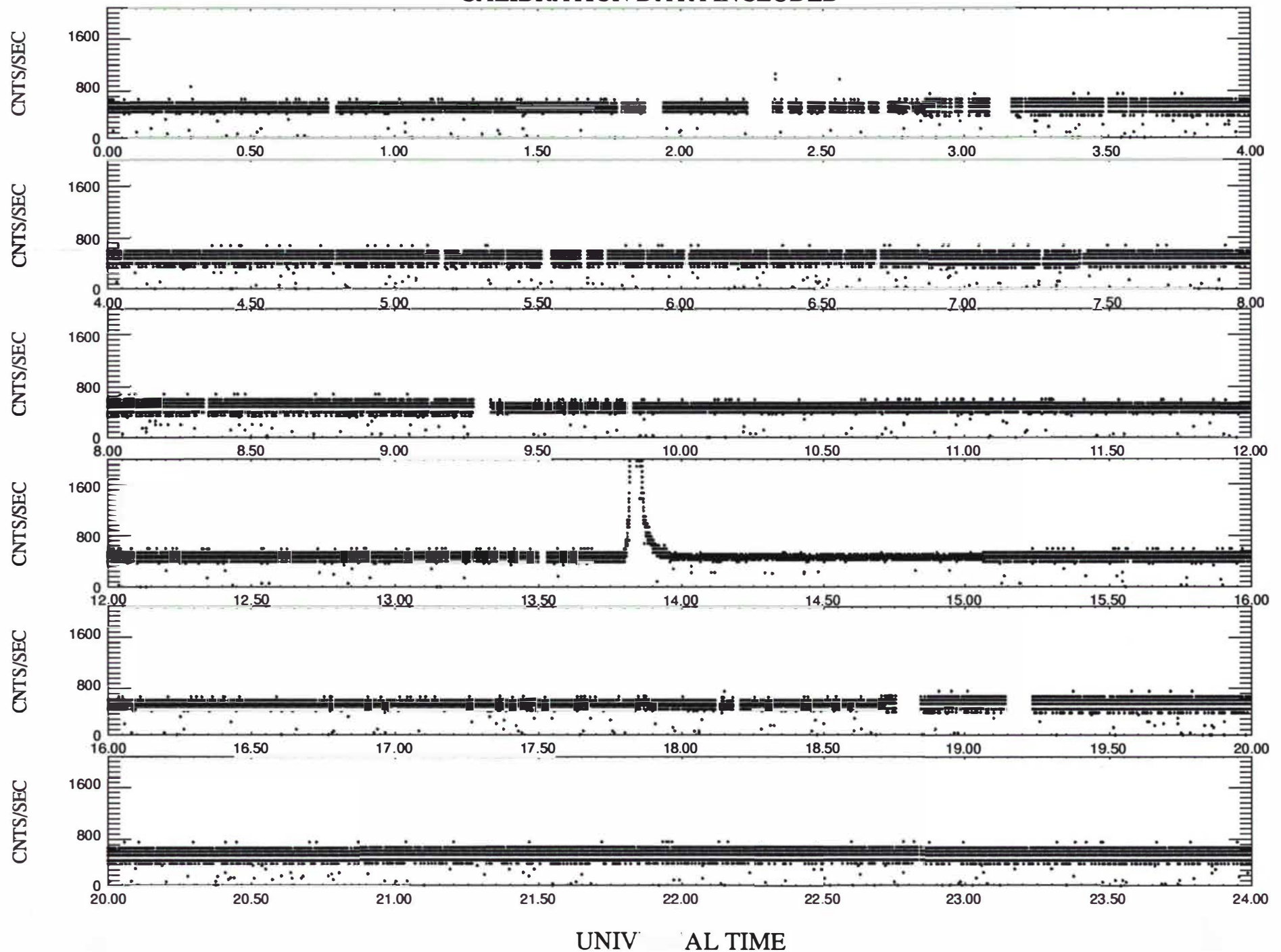
Burst Counter 7 at UT=13.807779803806 h=49708.007 s 13:48:28.007

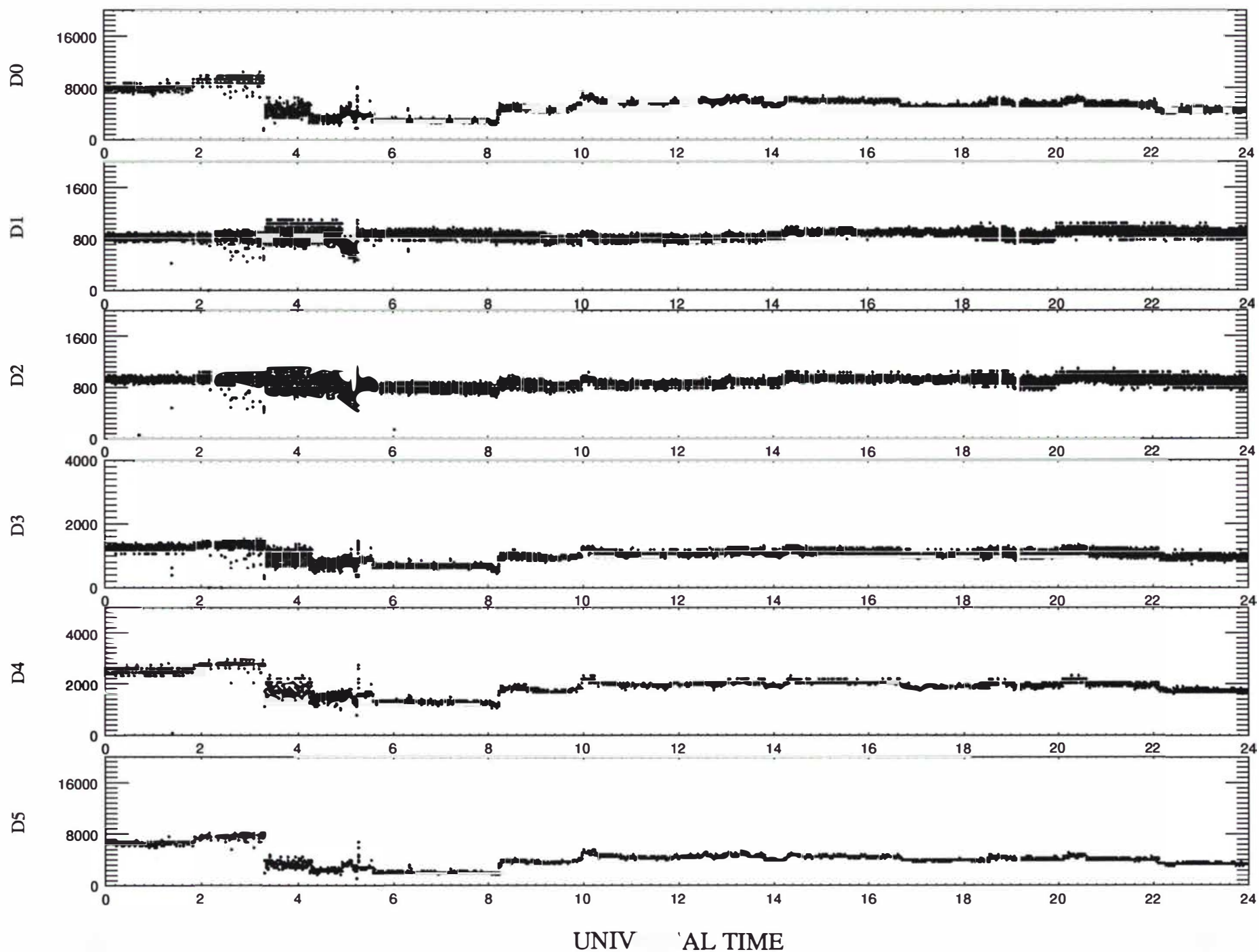


CALIBRATION DATA INCLUDED



CALIBRATION DATA INCLUDED





CATSEARCH PROGRAM

BATSE BURST # 219
EVENT OF 1991 MAY 22 DAY OF YEAR=142
EVENT CROSSING TIME AT BATSE : 43930. S. OR 12:12:09.7
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 137.900 -51.800
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 22/ 5/ 91 IS:
RA= 122.907 DEC= 21.513 DIST= 3.471 AU
BATSE-ULYSSES DISTANCE = 519279552. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=105.52 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -463.44 SECS.
CROSSING TIME AT ULYSSES IS 43466. S. OR 12:04:26 +/- 332.72 SECONDS

From springer@pop.jpl.nasa.gov Mon Dec 9 06:37 PST 1996
From: Joe Springer <springer@pop.jpl.nasa.gov>
To: "'Kevin Hurley'" <khurley@sunspot.ssl.berkeley.edu>
Subject: RE: More times to check
Date: Mon, 9 Dec 1996 06:37:26 -0800
MIME-Version: 1.0
Content-Transfer-Encoding: 7bit

Kevin,

I checked a range ten minutes before to ten minutes after each of these points and found no timing errors.

How big is the 'big list'? You have previously provided one with 575 events. I shudder.

Joe

From: Kevin Hurley
Sent: Friday, December 06, 1996 5:53 PM
To: Joe.B.Springer@jpl.nasa.gov; khurley@sunspot.ssl.berkeley.edu
Cc: khurley@sunspot.ssl.berkeley.edu
Subject: More times to check

Dear Joe,

Before I hit you with the big list of events to check, I wanted to ask if you could check the following times. We are again writing paper on these, and need to get this straightened out quickly (i.e. within a couple of weeks).

Thanks

Kevin

Date UT (secs)

January 22 1991 55142
February 19 1991 42204
April 21 1991 34040
April 30 1991 60428
May 07 1991 53768
May 11 1991 08090
May 22 1991 43556
June 19 1991 55254
June 27 1991 15335
July 17 1991 17265
July 18 1991 09076
August 14 1991 70996
October 05 1991 26852
October 16 1991 41542
October 31 1991 35550
November 04 1991 52695
November 09 1991 11321
November 18 1991 66112
November 26 1991 43717
December 02 1991 71640
February 18 1992 68388
February 20 1992 49020

February 26 1992 30348
March 08 1992 17470
March 11 1992 07038
March 20 1992 45256
March 25 1992 64261
March 31 1992 66408
April 04 1992 49443
April 06 1992 11150
April 14 1992 84300
May 01 1992 75040
May 17 1992 10549
May 17 1992 50706
May 19 1991 60996
May 25 1992 14411
July 11 1992 58470
July 14 1992 46275
July 20 1992 09807
July 20 1992 18344
July 23 1992 73955

Helio corr removed

Date: Jan 29 '97

BURST TRIANGULATION CHECKLIST

1. Ulysses Data

- ☒ Jim Schmidling's stat file correction applied?
- ☒ Final ephemeris used?
- ☒ Final, CDROM data used?
- ☒ Were data checked by Joe Springer for 0.5 s errors?
- ☐ If a 2 spacecraft triangulation, was Ulysses time corrected for aberration? N/A
- ☐ Is the order of the data in CORREL such that a vernier is done on the data with the best time resolution? Not always

2. BATSE Data

- ☒ 2.042 s subtracted for bursts prior to June 25 1992 and DISCSC programs prior to Version 2.16 (August 28 1992)?
- ☒ Does T_0 in data file agree with T_0 in plot?
- ☒ BATSE ephemeris for T_0 ?
- ☒ Error circle position and radius from public catalog used?
- ☐ If MER data were used, is a 30 ms systematic error included? N/A

3. PVO Data

- ☒ Ephemeris of PVO used (not Venus)?
- ☒ 2000 coordinates used?
- ☒ Geocentric time used?

Note - CORREL gives large uncertainties, ~1 s in some cases, but these are obviously too large when judged by eye. 300 ms taken

N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

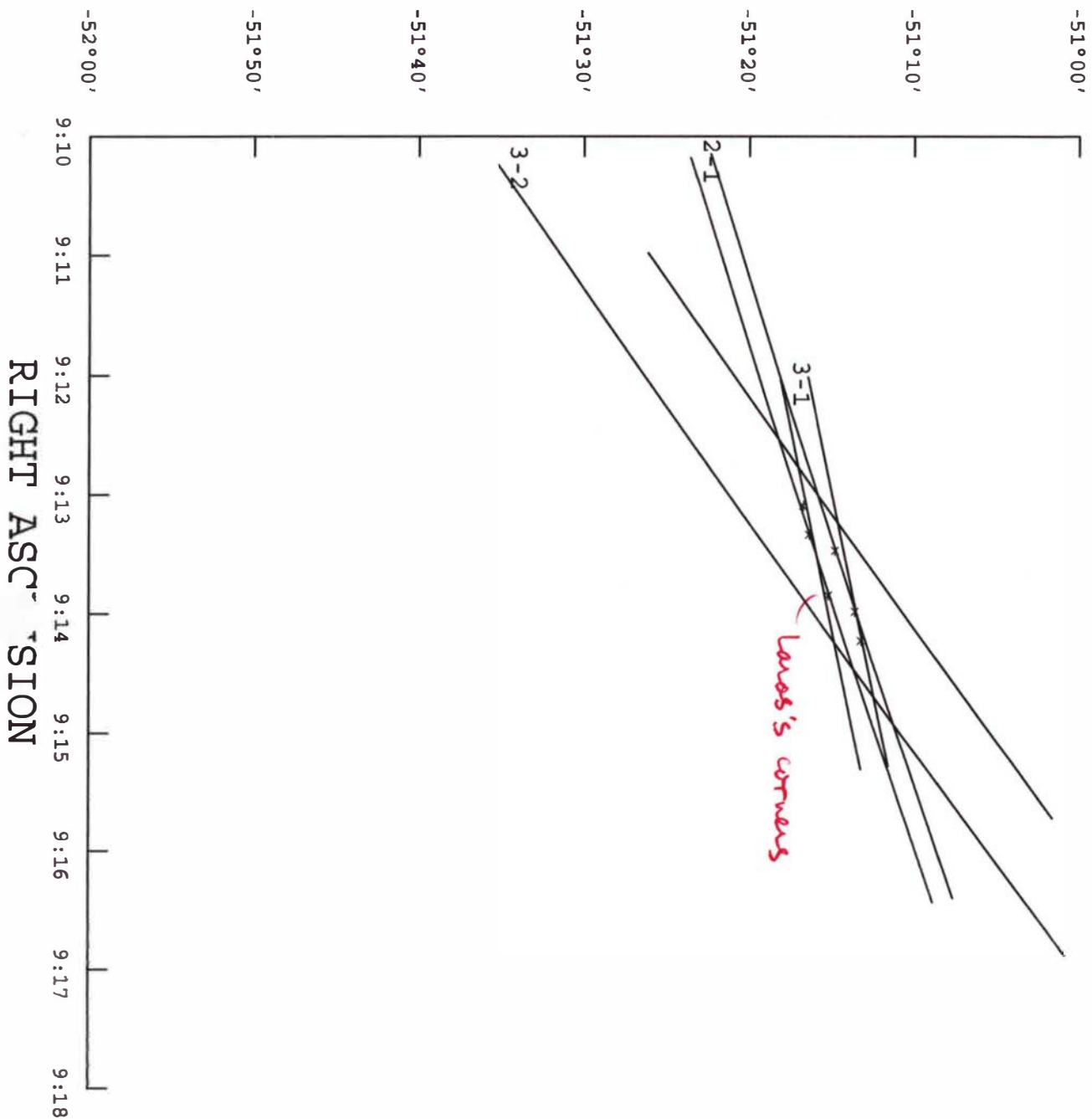
G=GALACTIC EQUATOR

1 ULYSSES

2 BATSE

3 PVO

DECLINATION



EVENT OF MAY 22, 1991 12:05

8/10/97

N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

G=GALACTIC EQUATOR

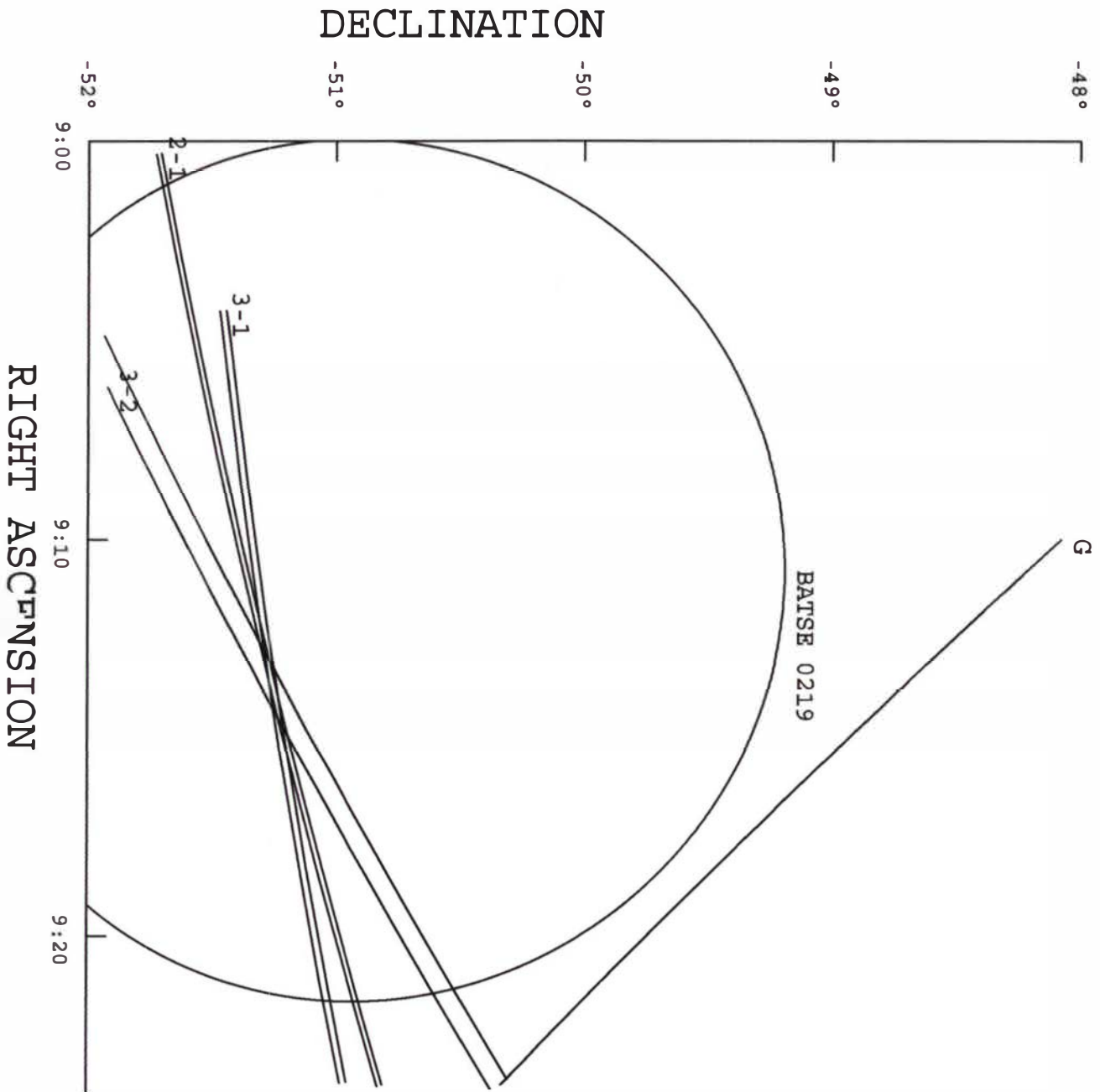
1 ULYSSES

2 BATSE

3 PVO

EVENT OF MAY 22, 1991 12:05

29 / 1/97



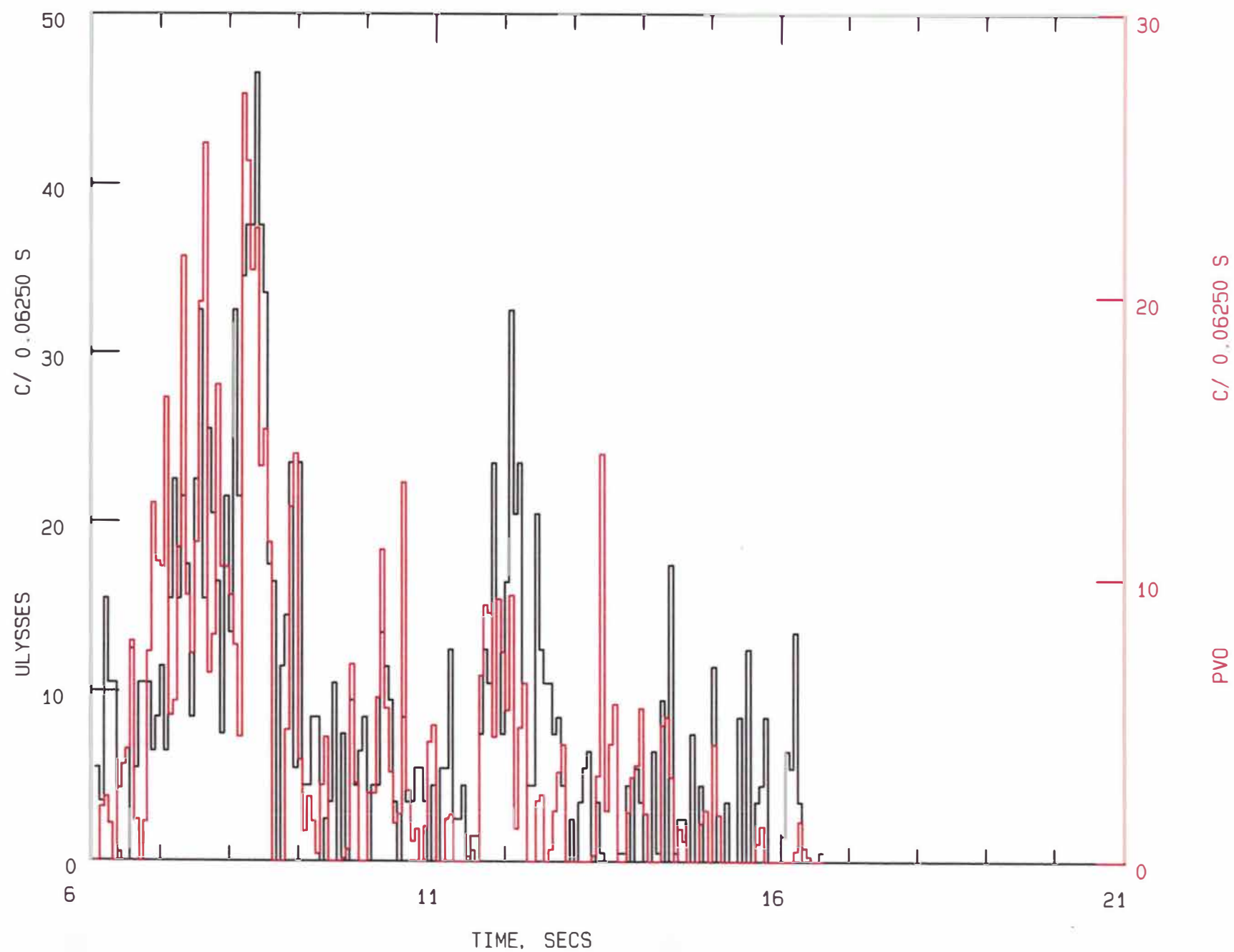
ULYSSES -PV0

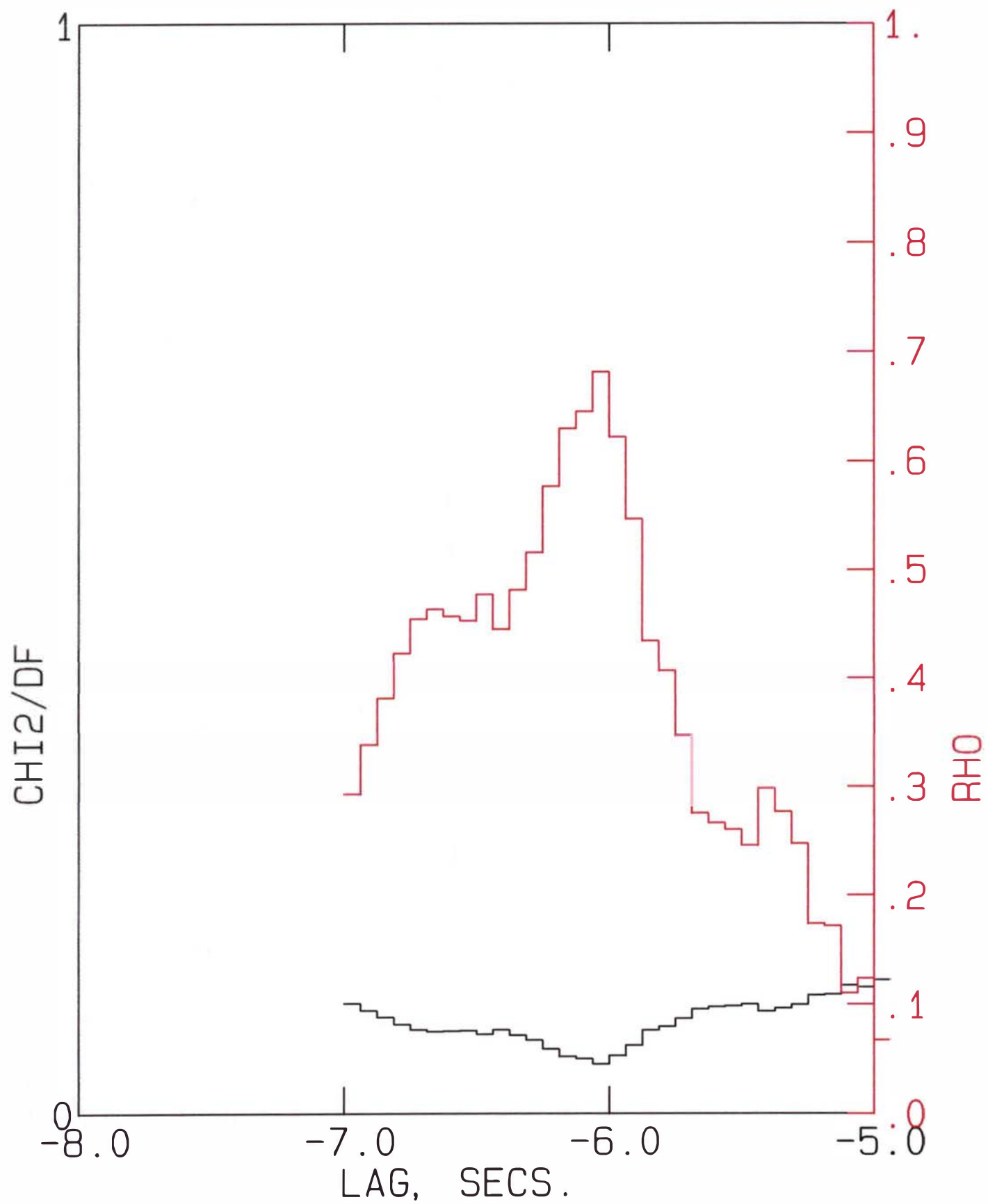
CORRELATION

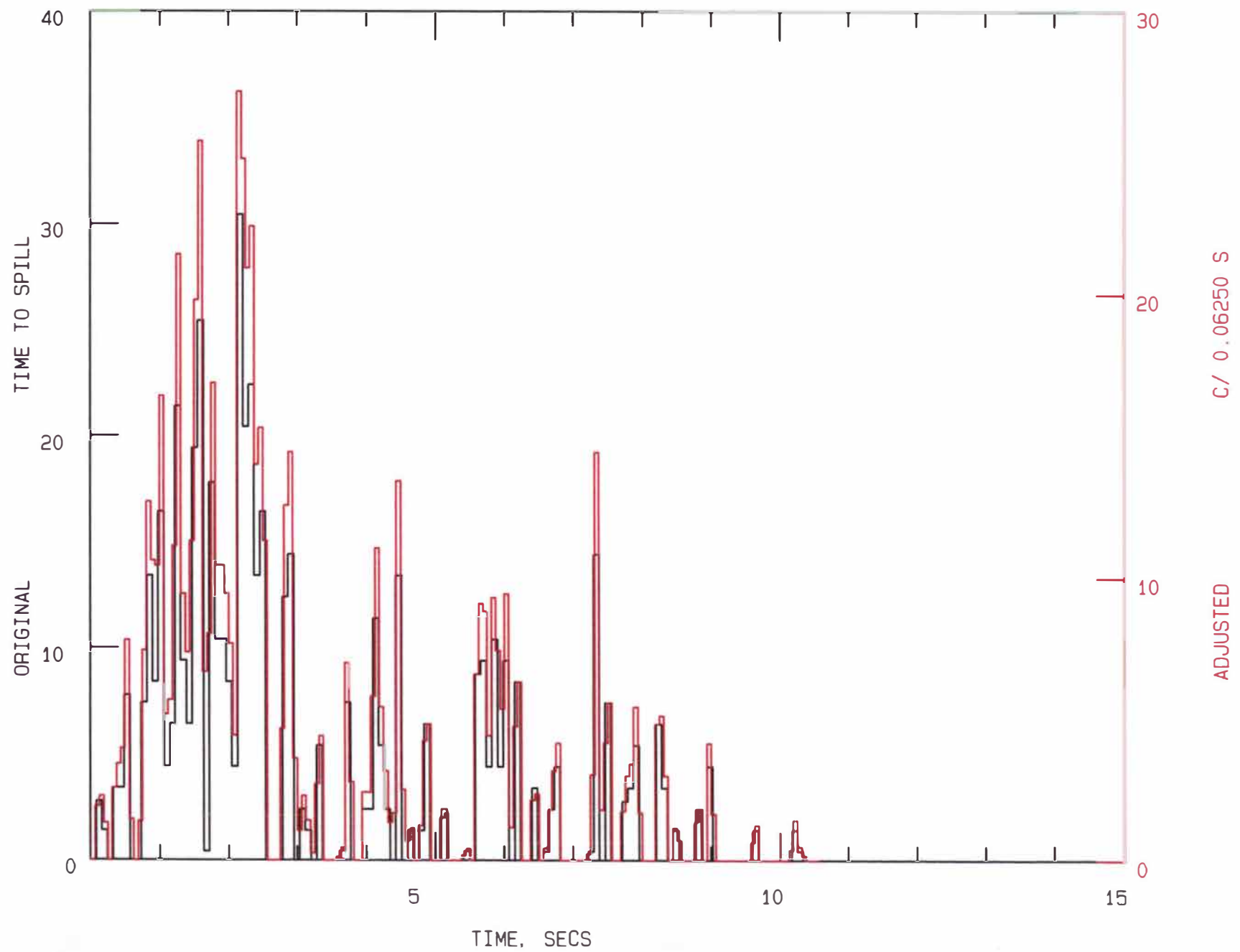
22/05/91

43556.349

29/ 1/97







BATSE

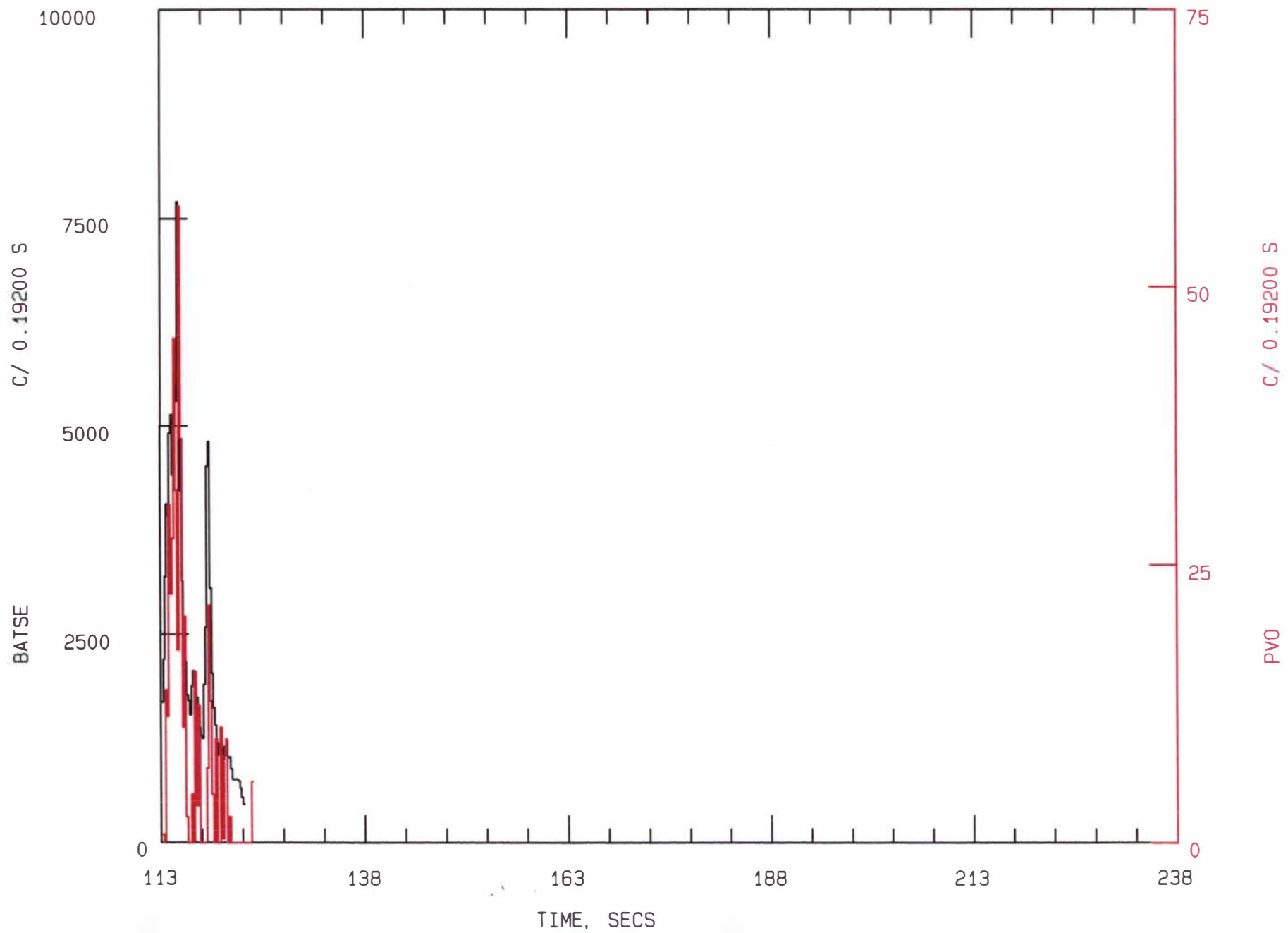
-PVO

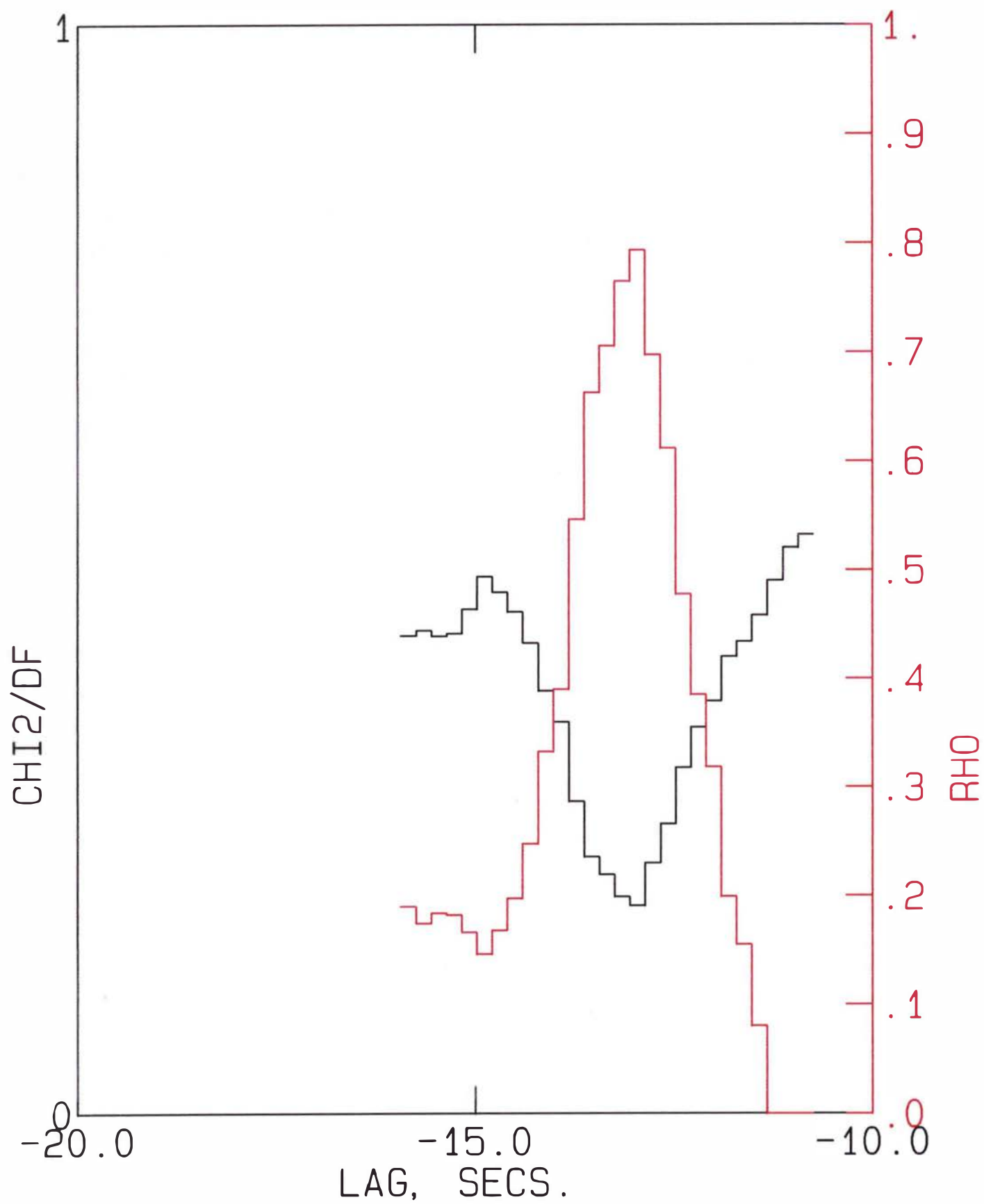
CORRELATION

22/ 5/91

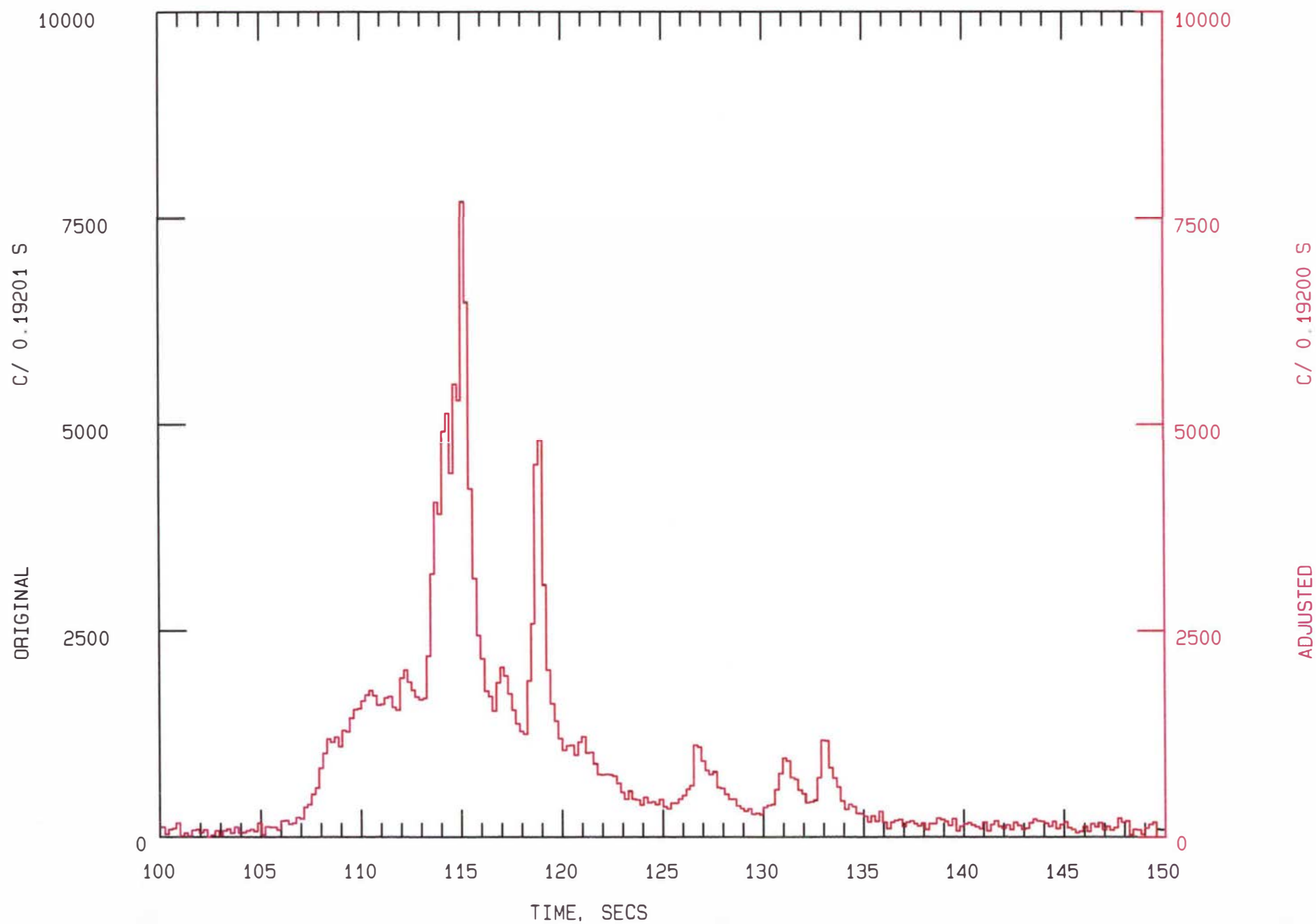
43929.707

29/ 1/97





29/ 1/97



ULYSSES

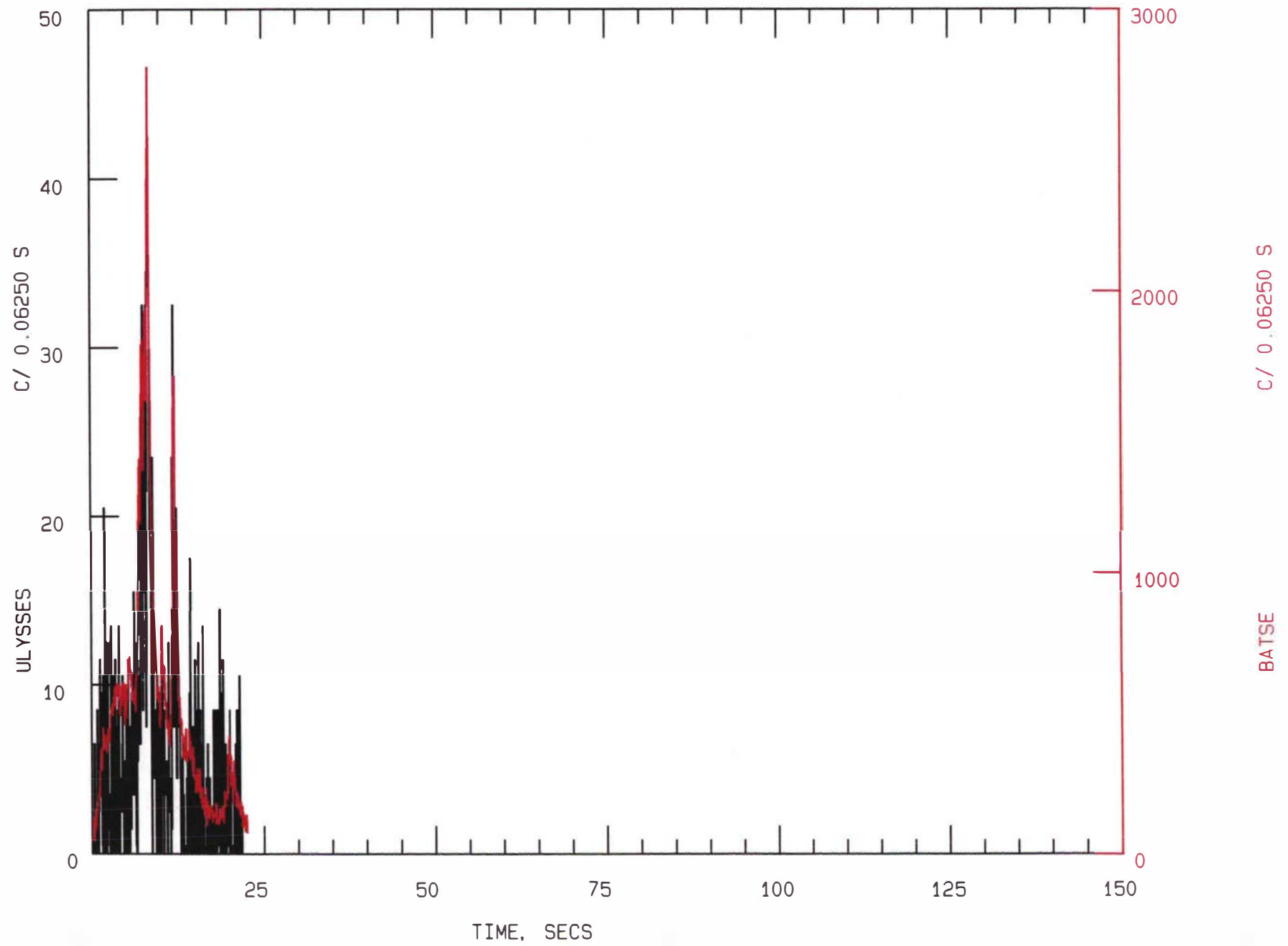
-BATSE

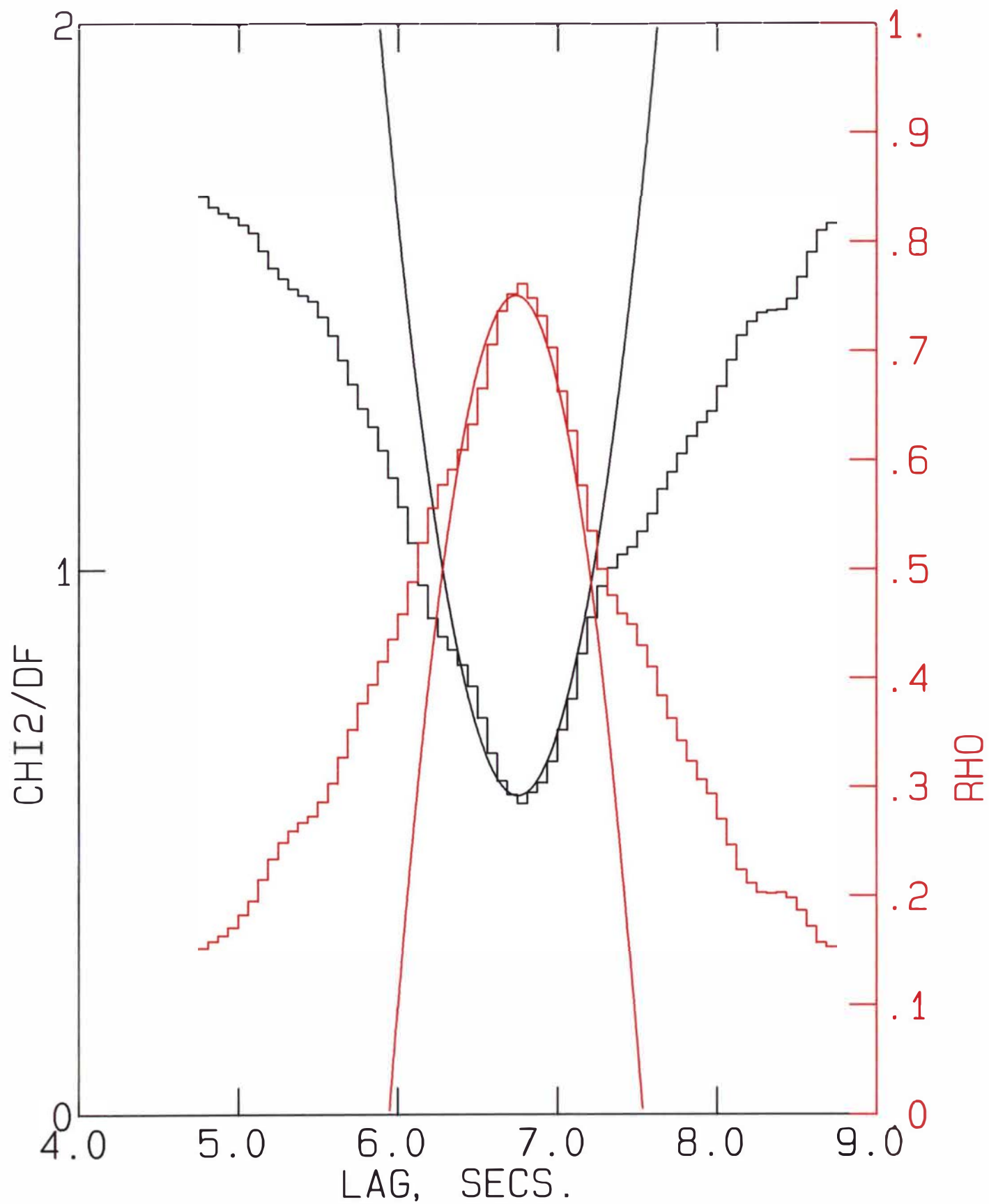
CORRELATION

22/05/91

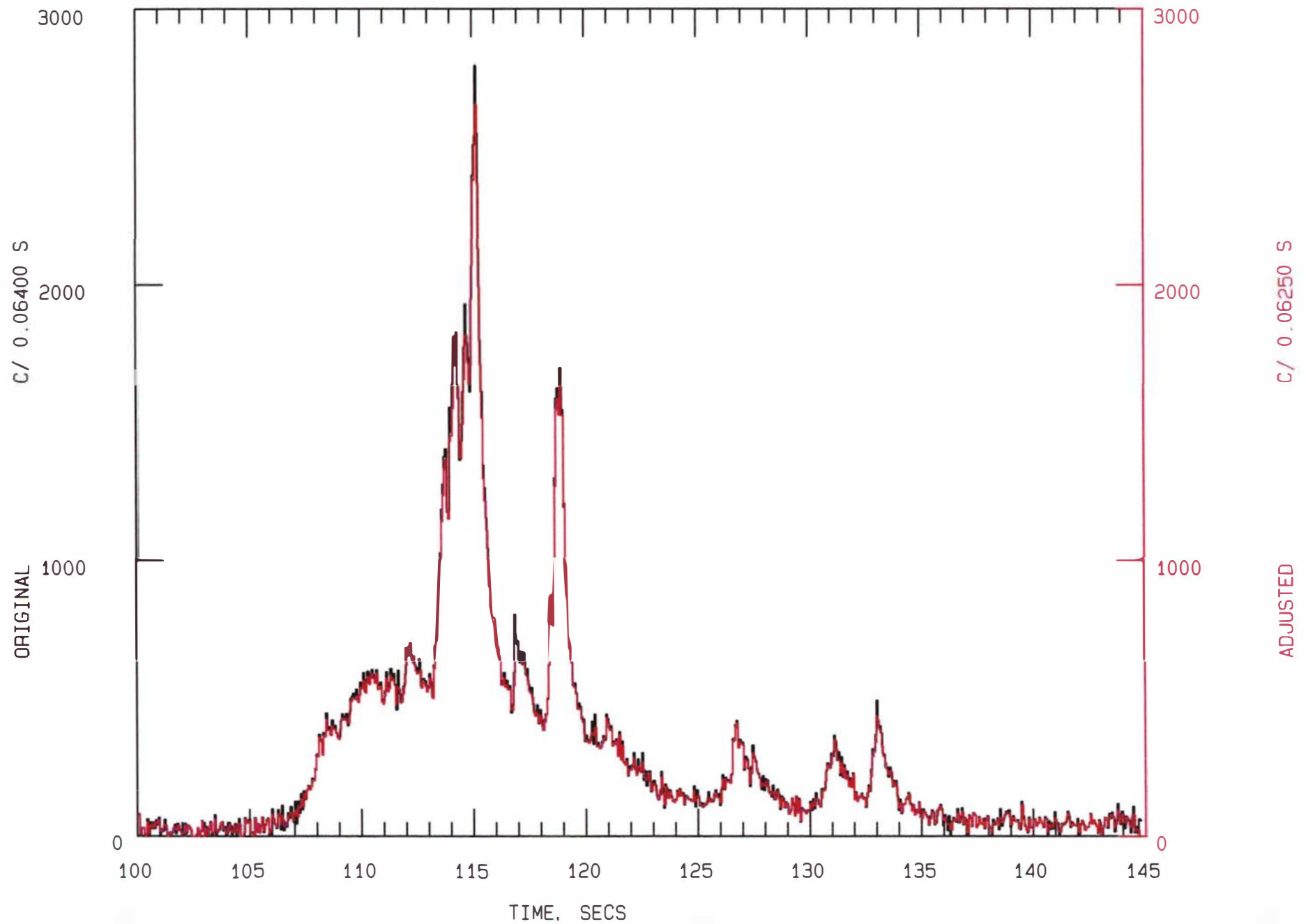
43556.349

29/ 1/97





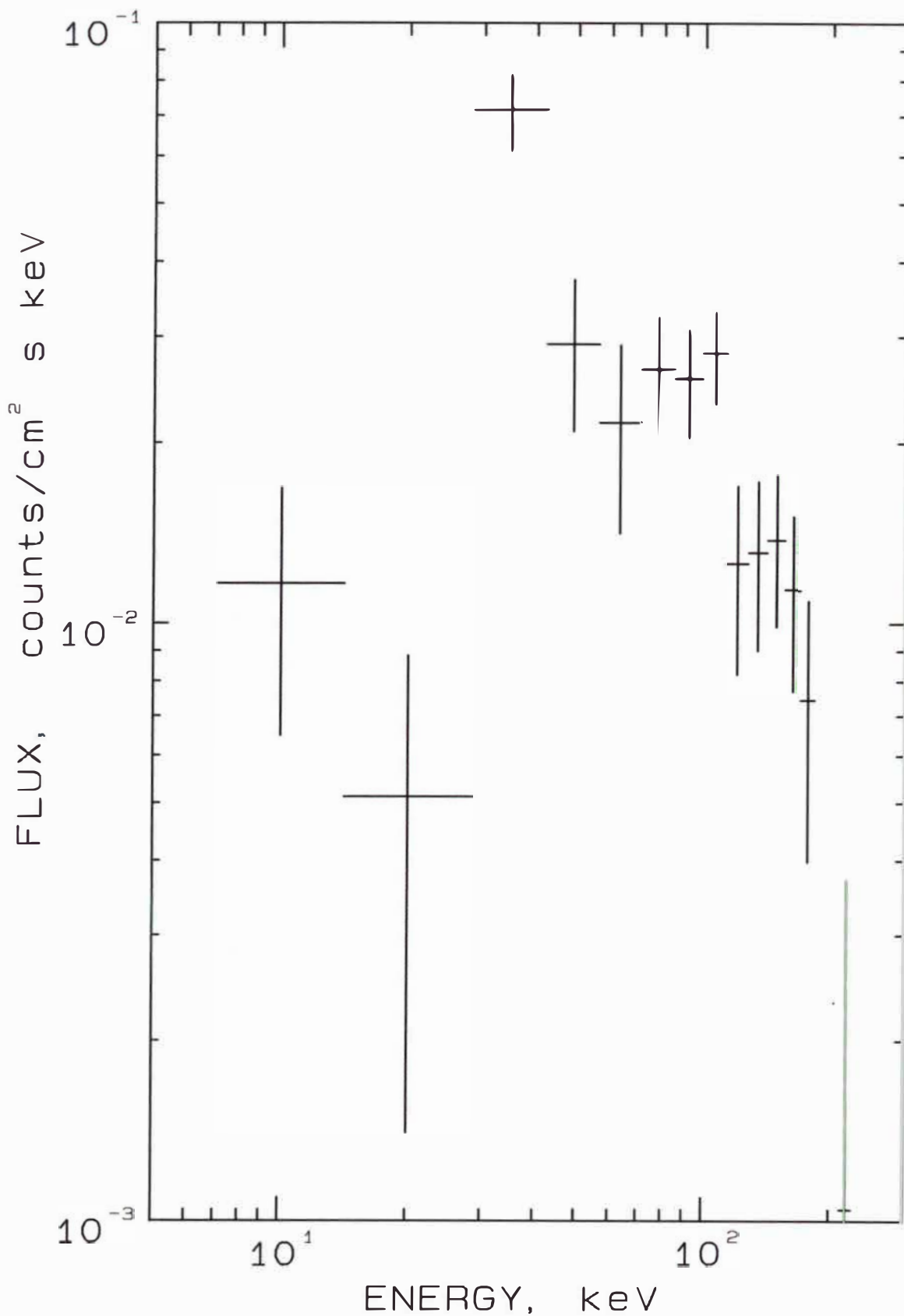
29/ 1/97



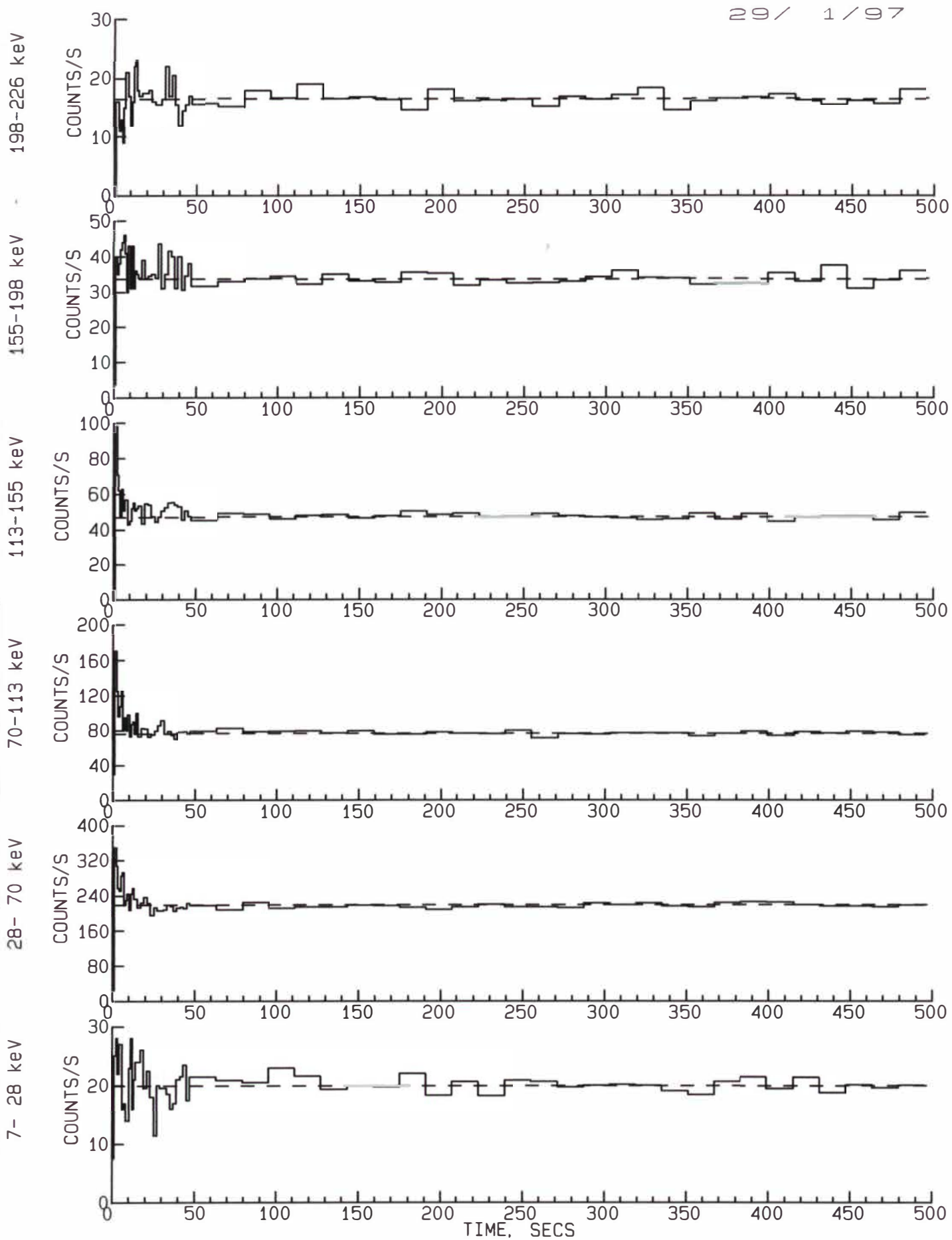
ULYSSES 22/05/91 43556.336

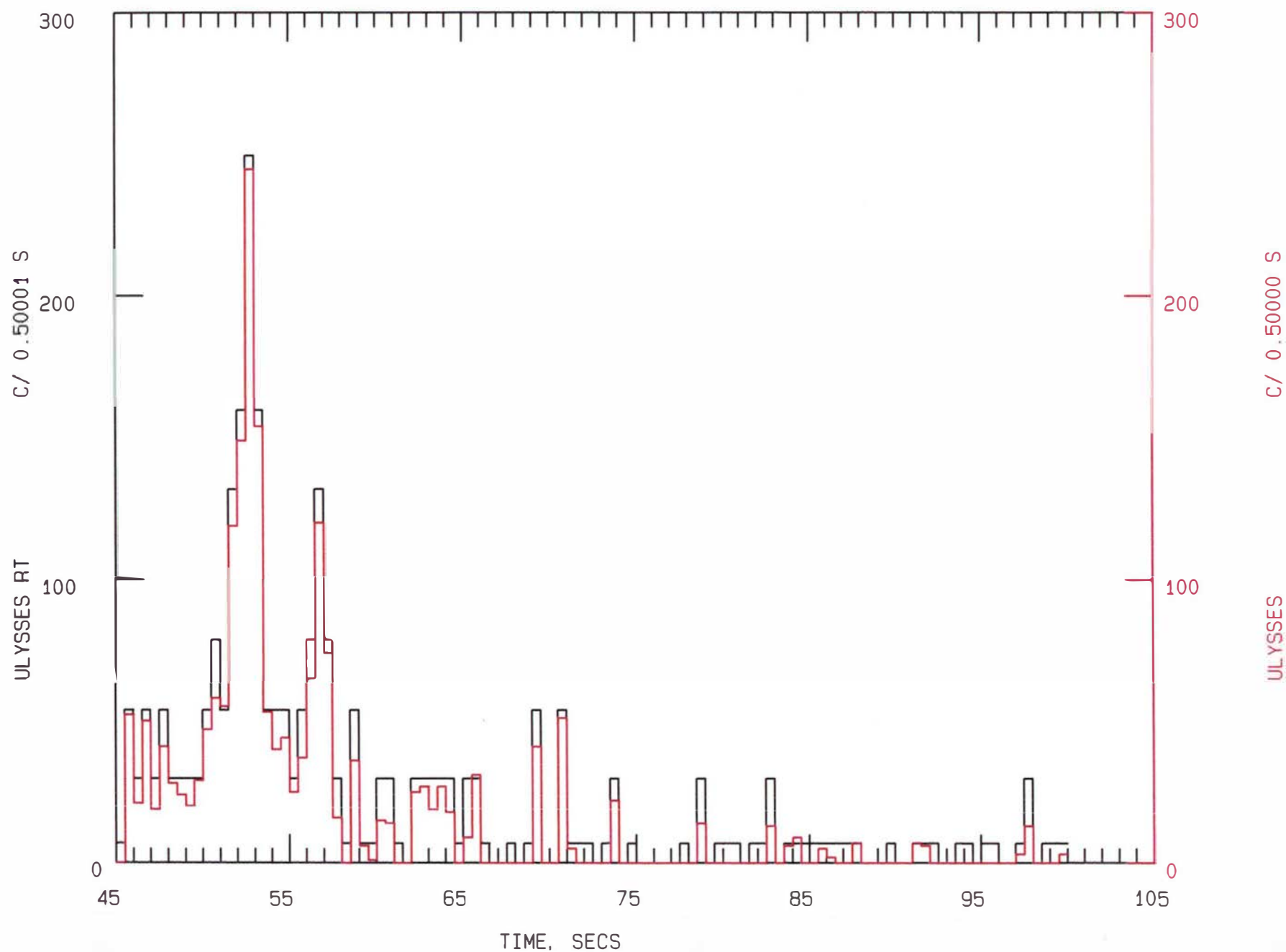
29/ 1/97

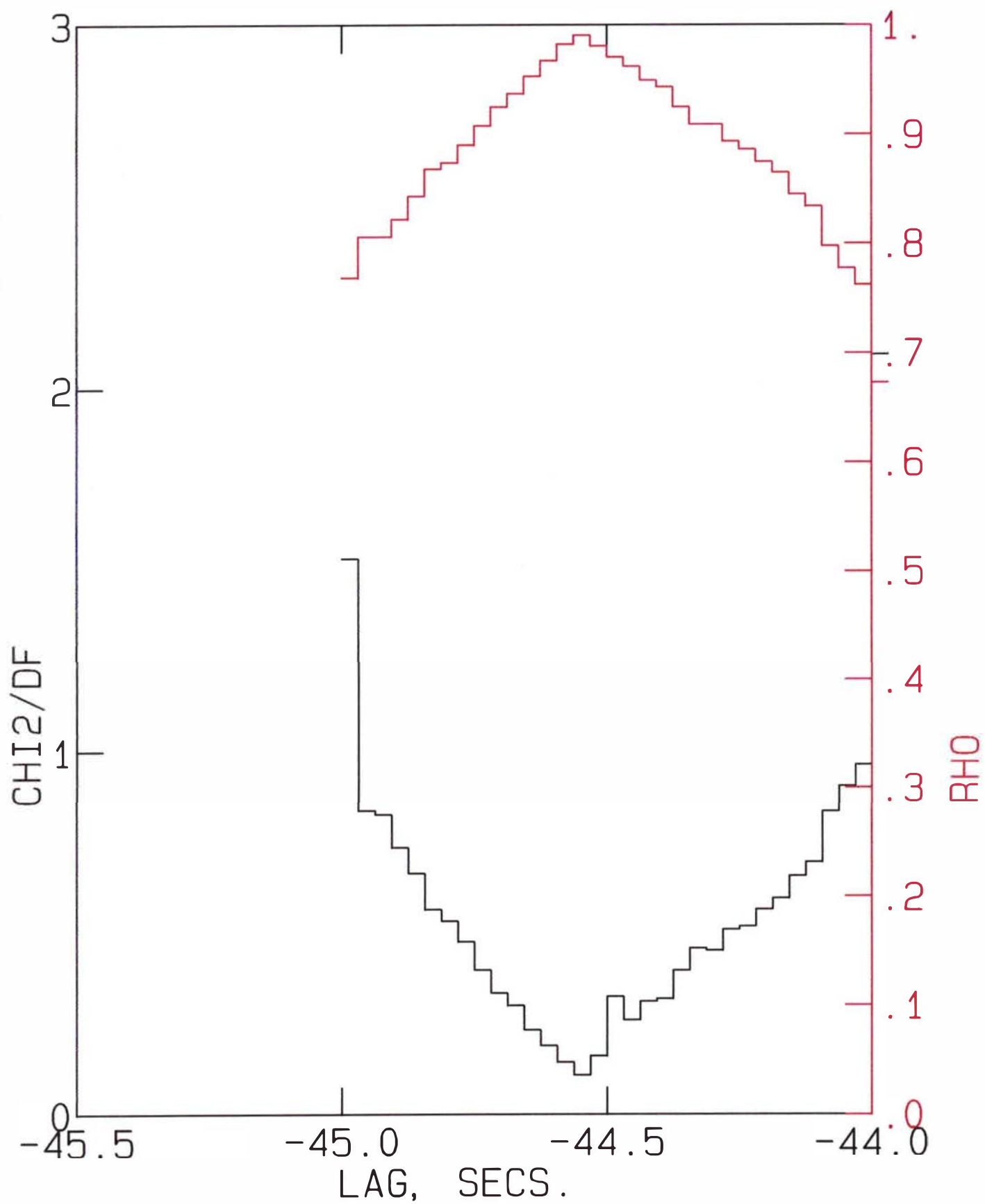
SPECTRUM INTEGRATED OVER 21.1 SECONDS, INTERVALS 2 TO 20



ULYSSES 22/05/91 43556.336 BURST SPECTRAL COUNT RATES







ULYSSES

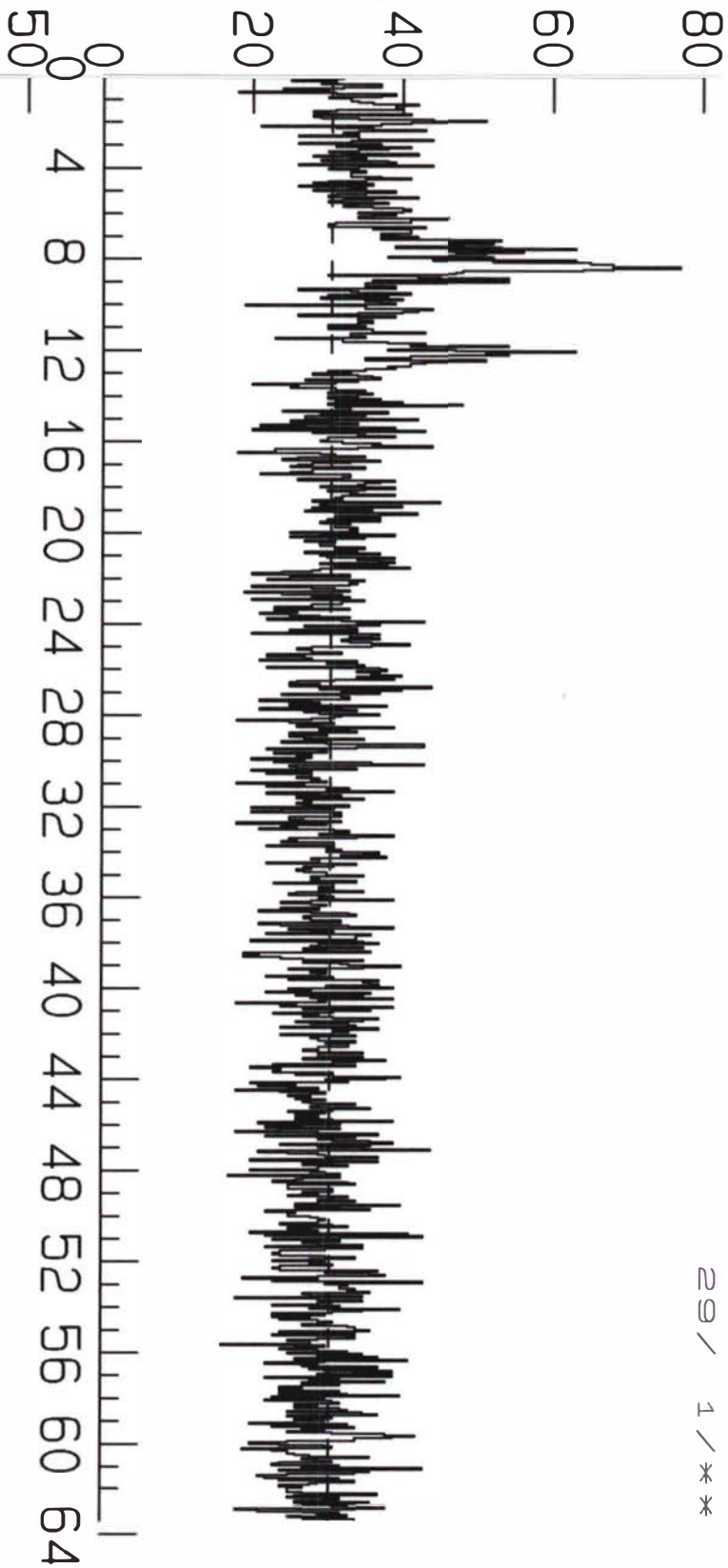
22/05/91

Ttrig=43556.349

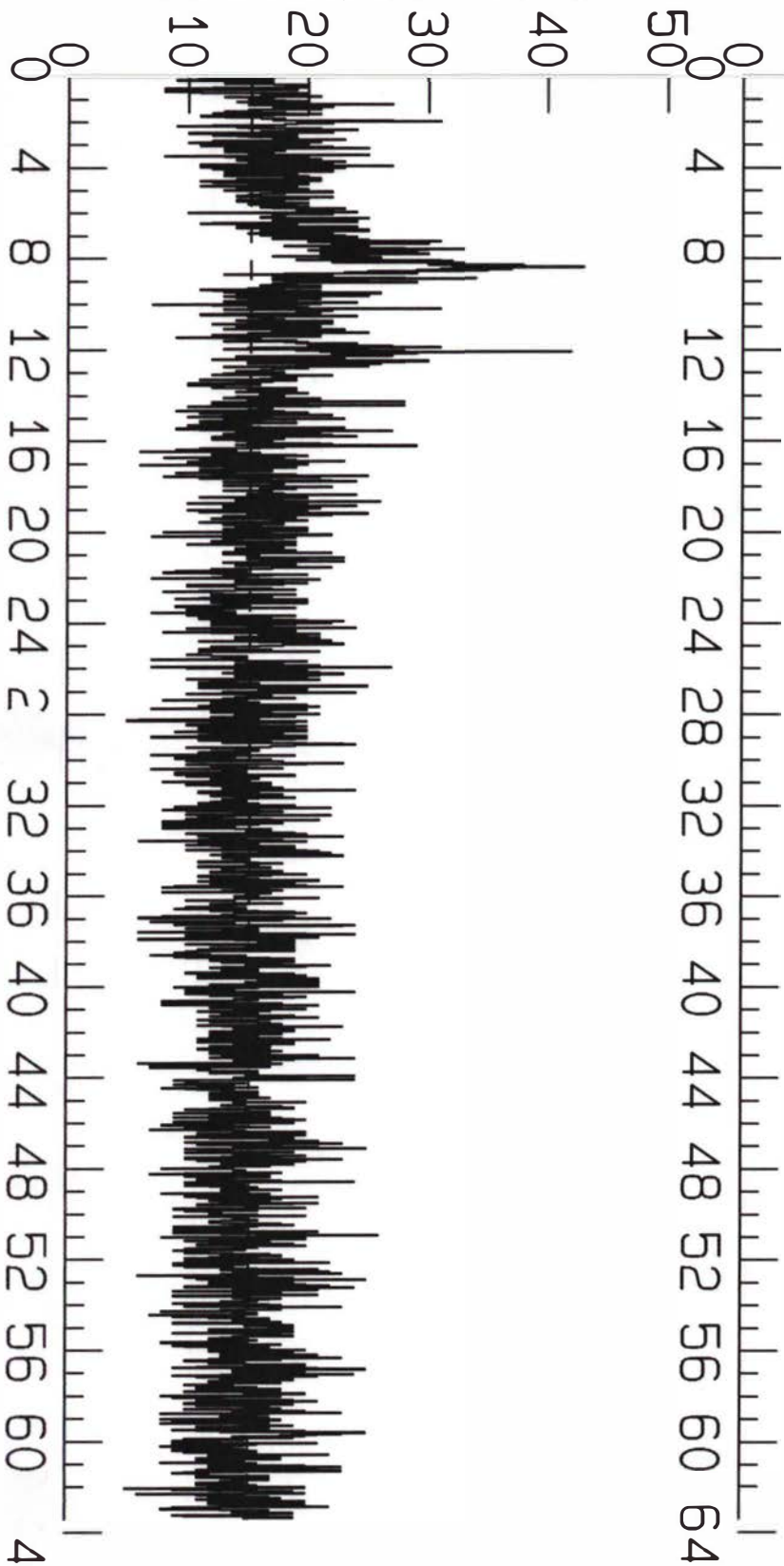
27- 226 keV

29 / 1 / **

COUNTS/0.062 S



COUNTS/0.031 S



ULYSSES RT

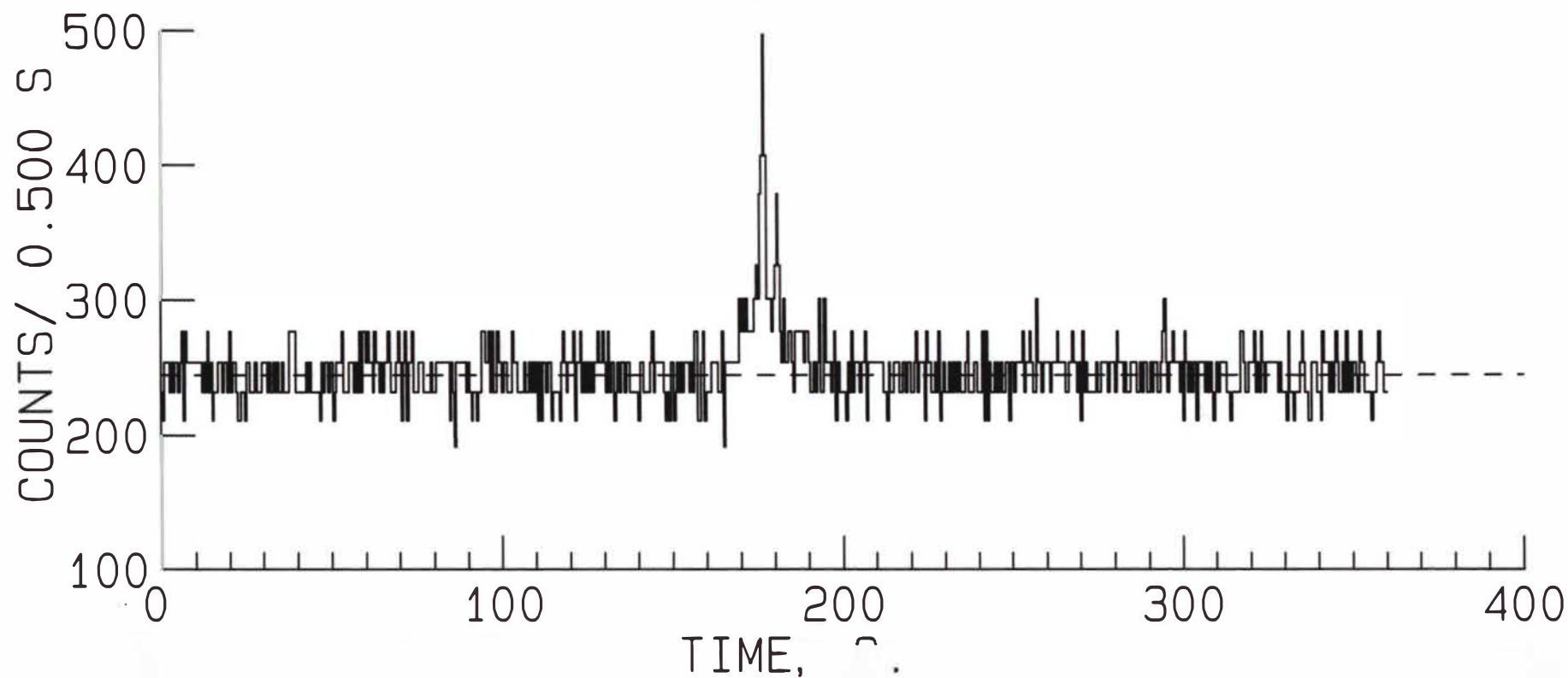
29 / 1 / 97

22 / 5 / 91 43380.375 s

27- 226 keV

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS



GRB	RA°	DEC°	DIMENSIONS	SOURCE
17 FEB 94	29	+4	6'x60'	IAUC 5940
25 APR 91	90	-22		A&A Suppl. 97, 75
09 NOV 91	111	-27	1'x6'	CoI calculation
01 MAY 92	124	-33	1'x2'	CoI calculation
11 MAR 92	132	-36	1'x4'	CoI calculation
22 MAY 91	138	-51	2'x2'	CoI calculation
18 NOV 91	167	-23	2'x10'	CoI calculation
31 JAN 93	184	-10	0.3'x96'	Hurley et al. (preprint)
27 JUN 91	199	-4		A&A Suppl. 97, 75
17 MAY 92	203	-17	2'x6'	CoI calculation
17 JUL 91	247	-58	1'x1'	CoI calculation
SGR 1900+14	285	+14		pos. of G42.8+0.6
06 APR 92	289	-58	2'x2'	CoI calculation
22 JAN 91	297	-71	2'x6'	CoI calculation
25 MAY 92	301	-43	2'x3'	CoI calculation
25 MAR 92	351	13	2'x7'	CoI calculation

From this list, approx. half will be selected for study (depending on season). SGR 1900+14 is one of the three *soft-gamma repeaters*. It has been tentatively associated with a supernova-remnant G42.8+0.6 (Hurley et al., preprint).

21. For SEST proposals, indicate:

- a) Your preferred LST interval :
- b) The period when the targets can be observed, taking into account the Sun constraint (50°) :

22. Justification of requested number of observing nights. Do not include any correction for expected meteorological conditions:

Eight fields are to be imaged in four colours, twice. The exposure time will be 10 min in B, and 5 in V, R, and Z. Hence, in total, 400 min integration.

CoIs are constantly revising the list of targets. Some reduction in the size of error boxes is possible; this may limit the need to image by mosaic.

23. Reasons why the observations cannot be performed in remote mode.

24. Important notice:

If the programme described in this application requires excellent seeing or photometric conditions or low water vapour content, a back-up programme using the same instrumentation has to be described on a separate page.

From holger@astro.ku.dk Thu Jul 7 00:49 PDT 1994
Date: Thu, 7 Jul 94 09:51:25 +0200
From: holger@astro.ku.dk (Holger Pedersen)
To: boer@cesr.cnes.fr, hpedersen@nbivax.nbi.dk,
khurley@sunspot.ssl.berkeley.edu
Subject: NTT_observing_time
Content-Type: text
Content-Length: 1062

Kevin, Michel:

I am pleased to report verbal information from ESO that we have been granted one night of observing time on the 3.5-m New Technology Telescope, in March 1995, for the execution of the observing program mailed to you earlier. The observations are to be conducted using remote control, from Garching. I hope that you can join me in Garching.

Similar observations will be done at the 1.54-m Danish telescope, La Silla, August 5 - 12, 1994. If there is any update to Kevin's list of positions, please let me know.

Best regards

Holger

July 7, 1994

```
=====
Holger Pedersen           e-mail    holger@astro.ku.dk
Copenhagen University Observatory  phone (45) 3532 3966
Oster Voldgade 3          -   (45) 3532 3999 (secretary)
DK 1350 Copenhagen        -   (45) 3888 6779 (private)
Denmark                   fax    (45) 3532 3989
=====
```

6. We have included the small, 3-spacecraft error boxes in this list. "Small" means different things to different observers. Searches through all-sky survey data from ROSAT, or for archival optical transients, for example, may only require error boxes less than about a square degree in size, while for deep optical searches, this might be considered to be an enormous size. We have not included the two-spacecraft locations in this list (e.g., the Ulysses/BATSE events, which give narrow annuli intersecting the much larger BATSE error circle). If you have any use for such events, please let me know. There are quite a few of them.

Distribution list: M. Boer, T. Cline, J. Cordes, D. Hartmann, R. Hudec, C. Kouveliotou, J. Laros, B. McNamara, D. Palmer, B. Paczynski, B. Pedersen, H. Pedersen, R. Romani, B. Schaefer, R. Schnee, M. Sommer, F. Vrba, A. Wilson

SMALL GRB ERROR BOXES FROM THE 3rd INTERPLANETARY NETWORK

#	GRB DATE	OBSERVED BY	ULYSSES FLUENCE (erg/cm ²)	RA (2000)	DEC (2000)	DIMENSIONS	COMMENTS
✓ 22	JAN 91	ULYSSES/PVO/GRANAT	5 x 10 ⁻⁵	296.862	-70.648	2'x6'	DIMENSIONS CAN
✓ 19	FEB 91	ULYSSES/PVO/WATCH	1.4 x 10 ⁻⁵	213.703	+58.693	2'x3'	"
✓ 30	APR 91	ULYSSES/PVO/BATSE	10 ⁻⁵	135.861	+1.747	10'x180'	SLIGHT REDUCTIO
✓ 22	MAY 91	ULYSSES/PVO/BATSE	10 ⁻⁵	138.323	-51.262	2'x2'	FURTHER REDUCTI
✓ 17	JUL 91	ULYSSES/PVO/BATSE	5 x 10 ⁻⁶	247.327	-58.406	1'x1'	GRAZING INCIDENT
✓ 04	NOV 91	ULYSSES/PVO/BATSE	10 ⁻⁶	212.197	+35.346	2'x8'	GRAZING INCIDENT
✓ 09	NOV 91	ULYSSES/PVO/BATSE	10 ⁻⁶	111.330	-27.239	1'x6'	GRAZING INCIDENT
✓ 18	NOV 91	ULYSSES/PVO/BATSE	3 x 10 ⁻⁵	166.598	-23.222	2'x10'	GRAZING INCIDENT
✓ 26	NOV 91	ULYSSES/PVO/BATSE	2 x 10 ⁻⁵	160.352	+6.800	6'x25'	SOME REDUCTION
✓ 11	MAR 92	ULYSSES/PVO/BATSE	2 x 10 ⁻⁵	132.310	-36.466	1'x4'	SOME REDUCTION
✓ 25	MAR 92	ULYSSES/PVO/BATSE	10 ⁻⁵	350.577	13.053	2'x7'	SOME REDUCTION
✓ 06	APR 92	ULYSSES/PVO/BATSE		289.034	-57.600	2'x2'	SOME REDUCTION
✓ 01	MAY 92	ULYSSES/PVO/BATSE	2x10 ⁻⁵	123.830	-32.749	1'x2'	SOME REDUCTION
✓ 17	MAY 92	ULYSSES/PVO/BATSE	2x10 ⁻⁵	203.318	-16.687	2'x6'	SOME REDUCTION
✓ 25	MAY 92	ULYSSES/PVO/BATSE	2x10 ⁻⁵	300.869	-42.573	2'x3'	SOME REDUCTION
✓ 11	JUL 92	ULYSSES/PVO/BATSE	4x10 ⁻⁵	281.536	+72.884	1'x4'	SOME REDUCTION
✓ 17	20 JUL 92	ULYSSES/PVO/BATSE	10 ⁻⁶	202.358	+37.237	1'x3'	SOME REDUCTION
✓ 23	JUL 92	ULYSSES/PVO/SIGMA	2x10 ⁻⁵	287.143	+27.238	1'x4'	SOME REDUCTION

From root Fri Jun 10 12:42 1994
Received: by space6.ssl.berkeley.edu (AIX 2.1 2/4.03)
id AA19070; Fri, 10 Jun 94 12:42:23
Received: from eggneb.astro.ucla.edu by sunspot.ssl.berkeley.edu (5.0/SMI-SVR4)
id AA07585; Fri, 10 Jun 1994 12:51:50 +0800
Received: by eggneb.astro.ucla.edu (5.65/DEC-Ultrix/4.3)
id AA08801; Fri, 10 Jun 1994 12:52:18 -0700
Message-Id: <9406101952.AA08801@eggneb.astro.ucla.edu>
To: khurley@space6.ssl.berkeley.edu
Subject: GRB error boxes
Date: Fri, 10 Jun 94 12:52:18 -0700
From: sammy@eggneb.astro.ucla.edu
X-Mts: smtp
Content-Length: 645
Status: R

Dear Kevin,

Thank you for the error box coordinates you sent us for the 1992 July 20 burst. I enjoyed the opportunity to talk with you during your visit to UCLA.

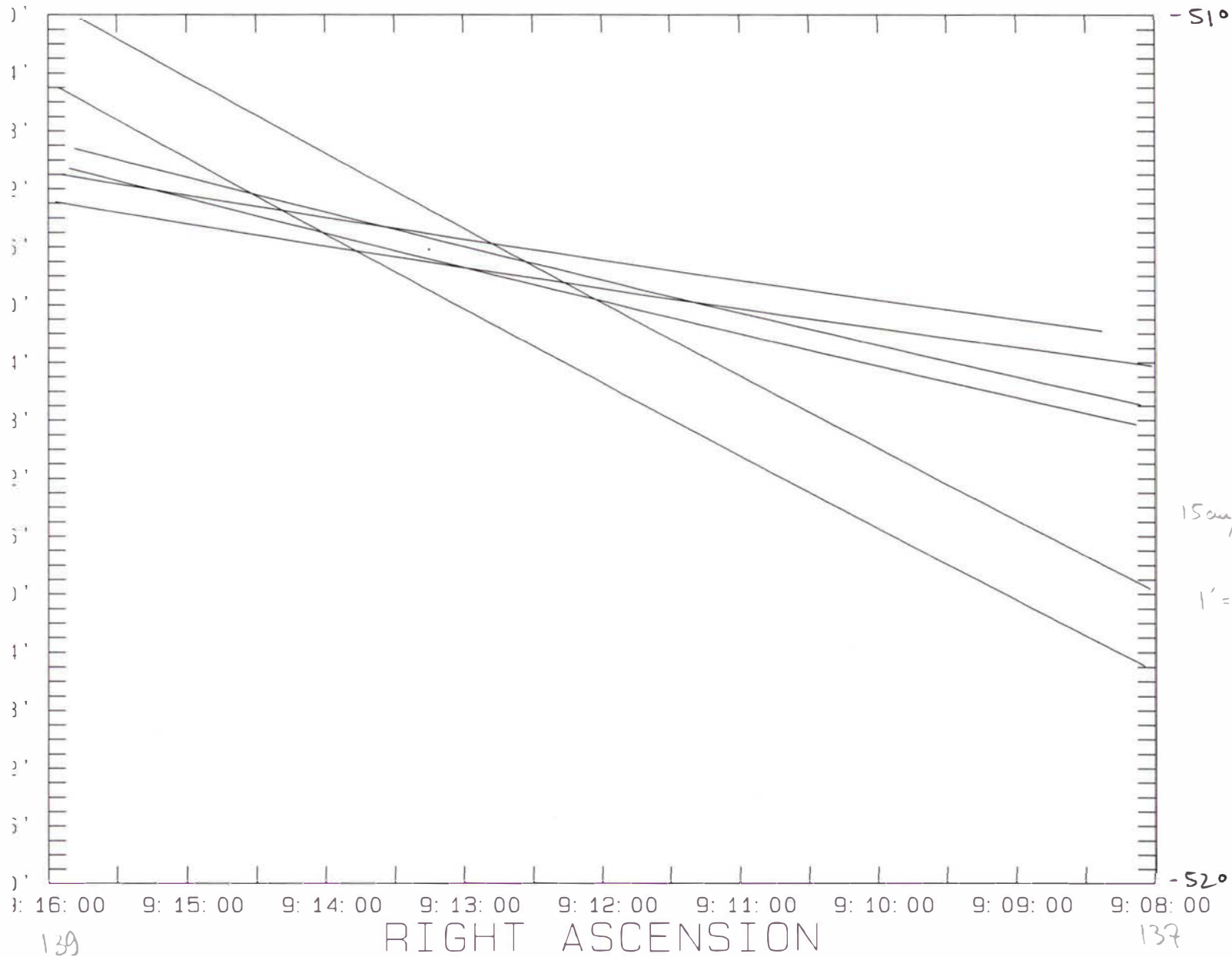
I am writing to request the error box coordinates for the other 17 events in your list. I plan to conduct a deep near-infrared survey to follow up our observations of the July 20 position we showed you, so knowing the orientation of these error boxes would be useful. Also, it is my understanding that there are about ten pre-BATSE GRB positions that are known to arcminute accuracy. Could you send me a list of these events + error boxes?

Thanks in advance.

Sammy Larson

21 / 2/94

MAY 22, 1991 12:05



T. Peré Hildee
c/o Tunny Tunes
This one is right wade!

15 cm / 10

$$l' = 0.25 \text{ cm} = 2.5 \text{ mm}$$

1.25° / 10 cm

From root Thu Feb 17 18:12 1994
Received: by space6.ssl.berkeley.edu (AIX 2.1 2/4.03)
id AA02039; Thu, 17 Feb 94 18:12:05
Received: from UCRPHJ.UCR.EDU by sunspot.ssl.berkeley.edu (5.0/SMI-SVR4)
id AA00993; Thu, 17 Feb 1994 17:15:37 +0800
Date: Thu, 17 Feb 1994 17:21:04 -0800 (PST)
From: CZECH@UCRPHJ.UCR.EDU
Message-Id: <940217172104.21a04385@UCRPHJ.UCR.EDU>
Subject: GRB 910522
To: khurley@space6.ssl.berkeley.edu
X-Vmsmail-To: SMTP%"khurley@space6.ssl.berkeley.edu"
Content-Length: 438
Status: R

Dear kevin,
thanks for faxing me the plot. I have just got results of precise astrometry
of another optical candidate which has been found at the position 2000.0
RA=09 h 13 m 14.98 s and delta=-51deg 16' 09.2" error being +- 3 arcsec.
This seems to be inside the box of GRB910522. Could you check it and send
me the newest error box for this source, perhaps also as fax plot (909-787
4509 c/o dr. Tumay Tumer)? Thanks.
Regards Rene Hudec

$$\alpha = 138.3125 \quad \delta = -51.2692 \quad 0.0008^\circ \text{ radius}$$

From jcg@mpe.dnet.nasa.gov Tue Jan 19 12:53:47 1993
Date: Tue, 19 Jan 93 15:58:43 -0500
From: jcg@mpe.dnet.nasa.gov
To: "khurley@space6.ssl.berkeley.edu"@east.dnet.nasa.gov
Subject: first error boxes
Content-Length: 1723

Dear Kevin,

I have completed the first 5 error boxes. So far there is no source within an error box. Details are given below. Note, that for GRB 920501 (your TOO target) I find really nothing, i.e. even no 1 sigma fluctuation (which is in contrast to what Michel thinks to see).

For the case of GRB 11_MAR_92 I just sent you a fax containing an image together with the detections in this field. The numbers on the circles are the likelihood values for the existence of a point source ($3.1 = 2$ sigma, $5.9 = 3$ sigma), so all three sources along the error box are strong sources. The distance of the pair and the lonely source is about 1 degree, so in principle they would fit into a PSPC FOV. Note that these sources have quit different spectra: the lonely one is rather soft, the other two hard.

I hope to analyze the remaining 10 fields within the next days. The extraction of the data out of the archive took a little longer, since the processing (including the FITS conversion which is needed for the extraction) was stopped over the two weeks holiday period.

Sincerely yours
Jochen

No.	GB_NAME	size of long axis	comments
1	19_FEB_91	10'	1sigma fluctuation (soft) 1' outside of box
2	21_APR_91		
3	22_MAY_91	35'	3 2.5sigma fluctuations in 4'-10' distance new SNR 20' away
4	17_JUL_91		
5	04_NOV_91		
6	09_NOV_91		
7	18_NOV_91		
8	26_NOV_91		
9	02_DEC_91		
10	11_MAR_92	2 degree	3 sources along the long axis in 5'-10' distance
11	25_MAR_92		
12	06_APR_92	30'	nothing
13	01_MAY_92	8'	nothing
14	17_MAY_92		
15	25_MAY_92		

From jcg@mpc .nasa.gov Mon Jan 25 02:37:22 1993
 Date: Mon, 23 05:35:57 -0500
 From: jcg@mpc .nasa.gov
 To: "khurley@space6.ssl.berkeley.edu"@east.dnet.nasa.gov
 Subject: next 5 error boxes
 Content-Length: 1639

Dear Kevin,

here are the next 5 error boxes. There is only one interesting case, namely GRB 920325. The position of the source is empty on the Palomar plates; the next star (about 17th mag.) is in 1' distance. Normally, the error in the X-ray positions are of the order of 20-30 arcsec. Though this X-ray source is quite faint, I would think that this 1' distant star is too far away from the X-ray position to be the optical counterpart.

The coordinates of the X-ray source are (please, do not circulate):

alpha (2000.0) = 23h 25m 10.7s

delta (2000.0) = 13d 20' 10"

The PSPC countrate is 0.023 cts/sec, and the survey exposure time was 450 sec. If you think of proposing this target for AO4 then let me know.

Sincerely yours
 Jochen

No.	GB_NAME	size of long axis	comments
1	19_FEB_91	10'	1sigma fluctuation (soft) 1' outside of box
2	21_APR_91		
3	22_MAY_91	35'	3 2.5sigma fluctuations in 4'-10' distance new SNR 20' away
4	17_JUL_91		
5	04_NOV_91	30'	3 2-3sigma fluct. around box in 2'-5' distance
6	09_NOV_91	60'	2sigma and 1sigma fluct. in 8' and 5' distance
7	18_NOV_91		
8	26_NOV_91		
9	02_DEC_91	22'	2sigma fluct. 2' off the box
10	11_MAR_92	2 degree	3 sources along the long axis in 5'-10' distance
11	25_MAR_92	45'	5sigma source 2' off the box
12	06_APR_92	30'	nothing
13	01_MAY_92	8'	nothing
14	17_MAY_92	22'	nothing
15	25_MAY_92		

From jcg@mpc.dnet.nasa.gov Mon Jan 25 10:11:55 1993
 Date: Mon, 25 Jan 93 13:10:31 -0500
 From: jcg@mpc.dnet.nasa.gov
 To: "khurley@space6.ssl.berkeley.edu"@east.dnet.nasa.gov
 Subject: remaining 5 error boxes
 Content-Length: 1433

Dear Kevin,

here is the final list of all 15 error boxes. There is no other interesting feature in addition to GRB 920325 (see last report). For the large error boxes one expects sources to be inside the error box.

M. Sommer told me that you possibly will visit MPE next week. I would be glad to show you the results and discuss further details.

Best regards
 Jochen

No.	GB_NAME	size of long axis	comments
1	19_FEB_91	10'	1sigma fluctuation (soft) 1' outside of box
2	21_APR_91	2.7 deg.	7sigma source 7' outside of box
3	22_MAY_91	35'	3 2.5sigma fluctuations in 4'-10' distance new SNR 20' away
4	17_JUL_91	2.6 deg.	2.5sigma fluctuation in box
5	04_NOV_91	30'	3 2-3sigma fluct. around box in 2'-5' distance
6	09_NOV_91	60'	2sigma and 1sigma fluct. in 8' and 5' distance
7	18_NOV_91	38'	bright source 13' outside of box
8	26_NOV_91	47'	2.5sigma fluctuation in box
9	02_DEC_91	22'	2sigma fluct. 2' off the box
10	11_MAR_92	2 deg.	3 sources along the long axis in 5'-10' distance
11	25_MAR_92	45'	5sigma source 2' off the box
12	06_APR_92	30'	nothing
13	01_MAY_92	8'	nothing
14	17_MAY_92	22'	nothing
15	25_MAY_92	8'	2sigma fluctuation at box boundary

From SCHAEFER@tgrs.gsfc.nasa.gov Thu Jan 14 07:37:15 1993
 Date: Thu, 14 Jan 1993 10:35:58 -0500 (EST)
 From: SCHAEFER@tgrs.gsfc.nasa.gov
 Subject: Preferred positions
 To: khurley@space6.ssl.berkeley.edu
 X-Vmsmail-To: SMTP%"khurley@space6.ssl.berkeley.edu"
 Content-Length: 1975

Hi;

I guess that as I write this you are downtown presenting a talk!
 Sorry I'm not there, but the short notice on observing time is rushing many things.

My earlier note gave the error boxes that could be observed from CTIO and the second list was for the VLA. For CTIO, the preferred boxes are those south of the equator and roughly near RA=10hr. So I would suggest selecting from 22 May 1991, 9 Nov 1991, 18 Nov 1991, 11 March 1992, and 1 May 1992. I would feel comfortable with 4 boxes, and 2 boxes will lead to wasted telescope time. For VLA, the preferred boxes are north of -20 degrees and between RA=3hr and 16hr. Our long observing time implies that we need many boxes well spread out in RA over that range. We would strongly prefer the smallest boxes. Our strong preferences are for bursts 911104, 920720, and 911109. These three boxes are the only ones with long periods of extended visibility, so that others may only be looked at for short periods.

We are in the A-n-B array which has a FOV with reasonable sensitivity of roughly 1' in diameter. David has recently discovered that we could use a different mode (spectroscopy mode, with smaller bandwidths but worse sensitivities) that can get to diameters of 5'. The trouble here is the reduced sensitivity. This means that any large (around 5') boxes that we look at should be for brief 'snapshots'. That is, increasing the observing time from 20 to 40 minutes has little impact on our time allocation, so that the deeply-searched boxes lose little, while the large boxes do not lose sensitivity. But the boxes we can stare at for a long time must be small (<1') or else we lose big (we lose big either by mosaicing or going to spectroscopy mode). Also, please be sure to send along your best position (of course including center and edge positions) for all the bursts. But concentrate on the three deep look boxes 911104, 920720, and 911109.

Cheers,
 Brad & David

CTIO

Schneider's corrections
 and assessment of other timing
 probs, as of 1/13

22 May 91 (122) 435.0 S 12:05 No RT data +.007 No other probs

Nov 91 (313) 11200 S (grazing inc.) } ~~5.5 min~~ No probs

18 Nov 91 (322) 66100 18:00 (in concert w BATSE)

11 Mar 92 (071) 0700 00:11:40 (grazing inc) -.002 No other probs

VLA

✓ Nov 4 91 No prob -.015 1 May 92 92 (128) No probs

Jul 91 92 (193) Down-link -.004

Nov 9 91 +.024

July 92 92 (202) No probs -.021

✓ Nov 18 91 +.005

Nov 25 92 (085) 12.51 No other probs
 May 1 92 (122) No probs

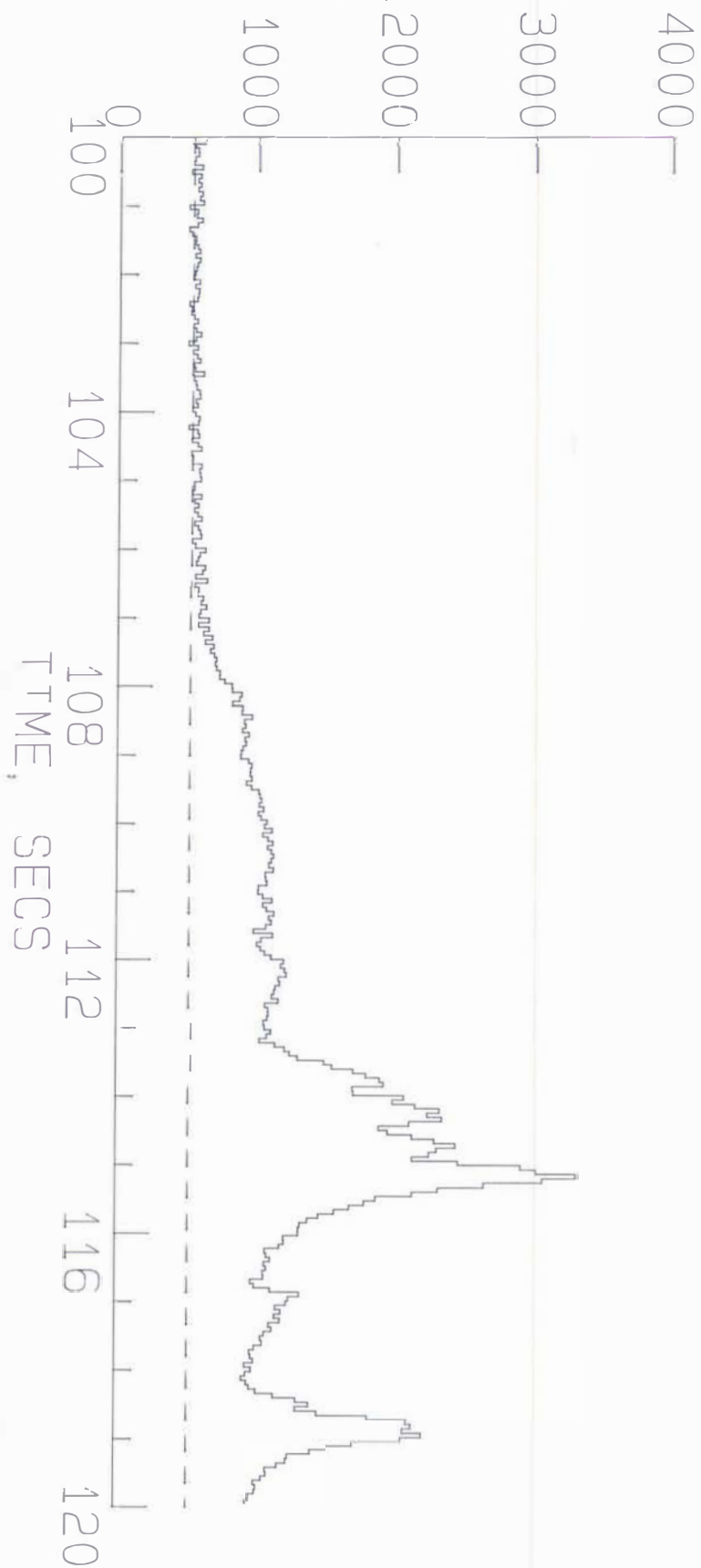
BATSE

22/05/91

43931.749

30- 100 keV

COUNTS/ .064 S



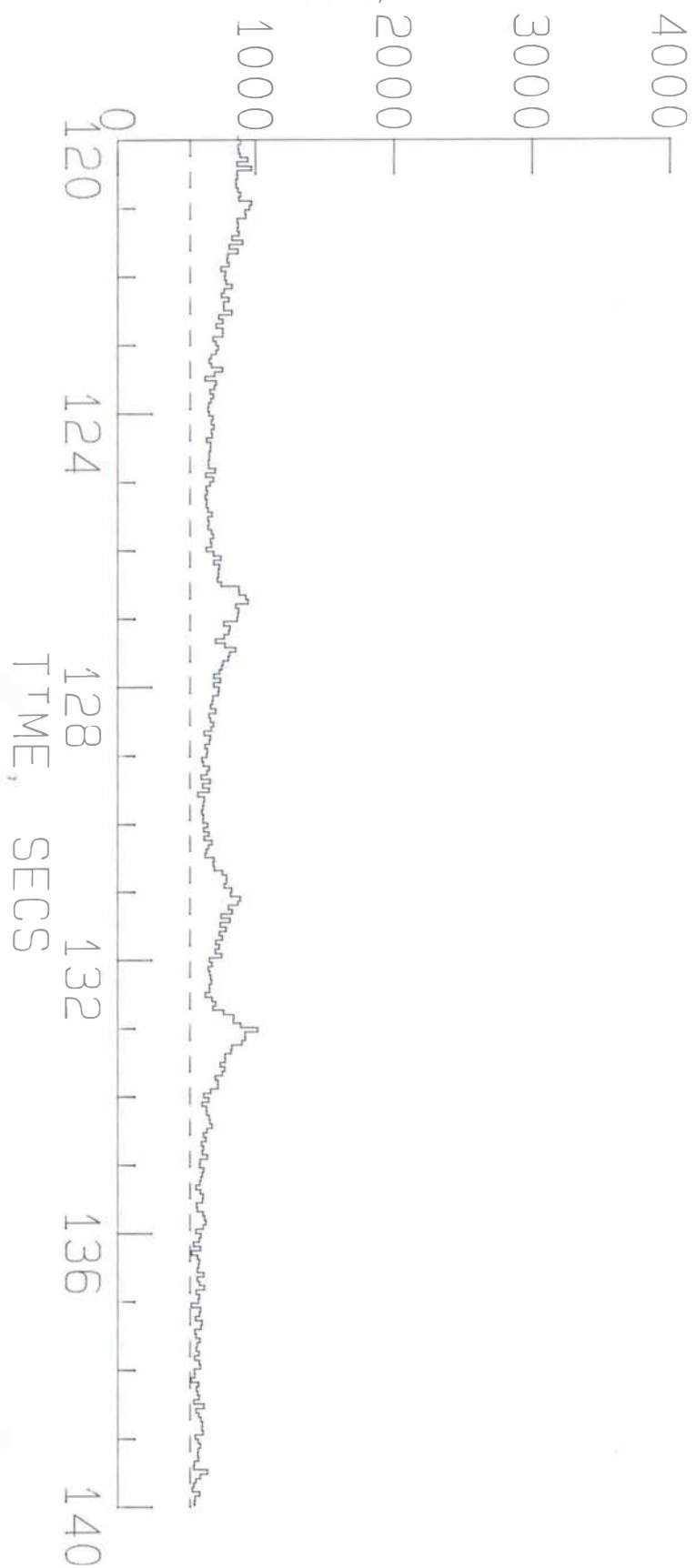
BATSE

22/05/91

43931.749

30- 100 keV

COUNTS/ .064 S



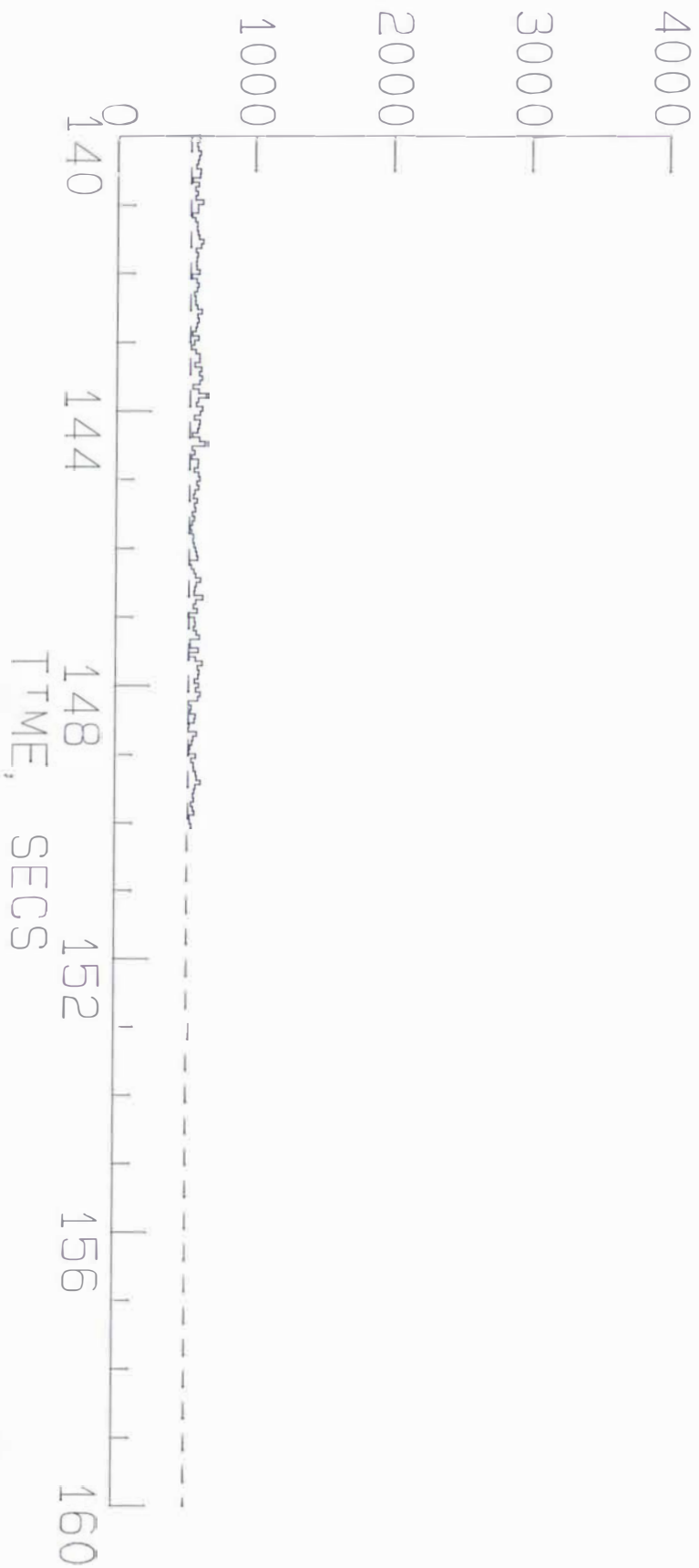
BATSE

22/05/91

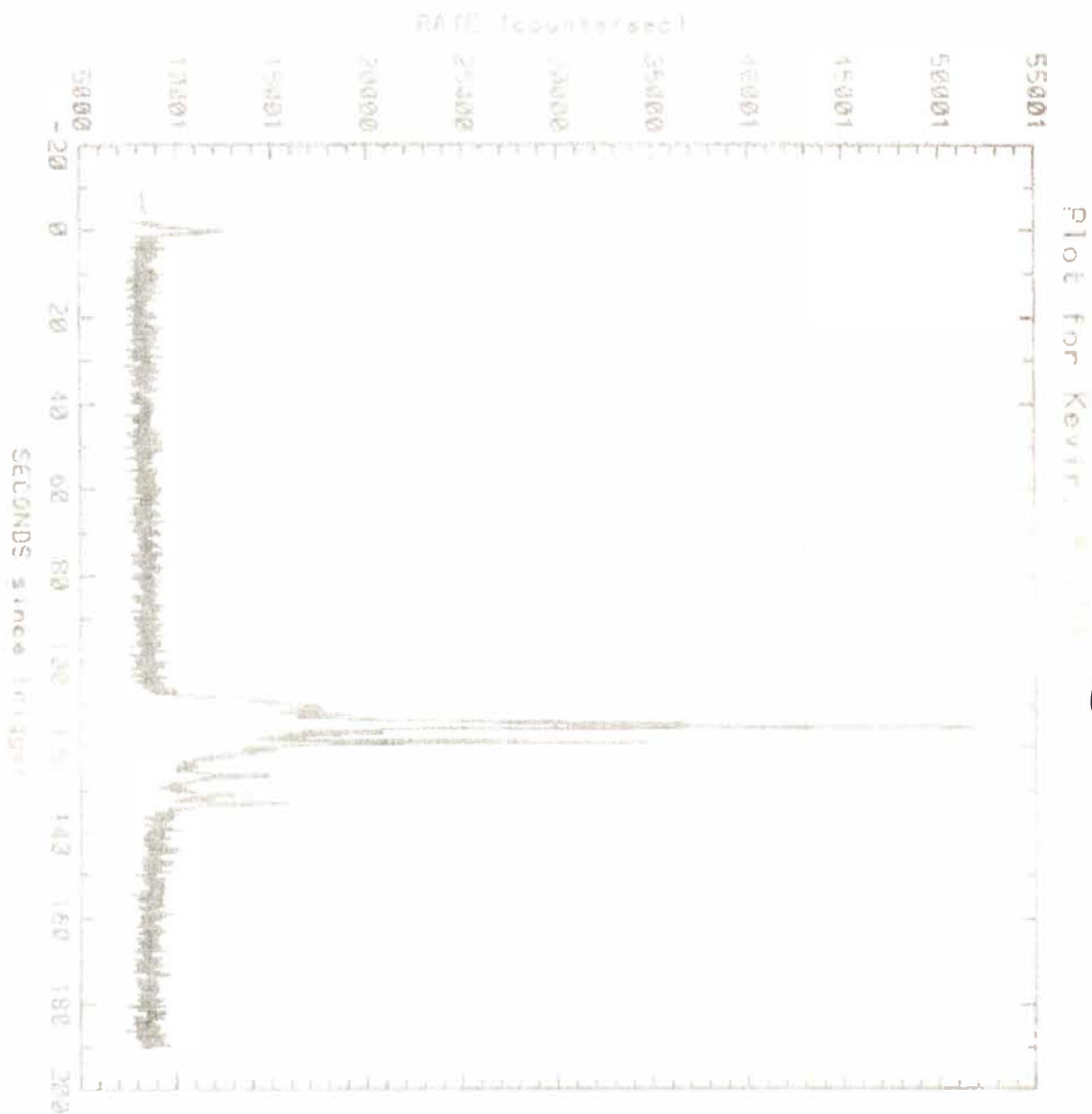
43931.749

30- 100 keV

COUNTS/ .064 S



May 22



1-001-1991 12-47-20
 Created by MDS 30
 Burst Display
 Version 2.00

File: 001-1991 12-47-20
 Time: 12-47-20
 Date: 12-47-20
 Burst: 001-1991 12-47-20
 Disc: 001-1991 12-47-20

Channel:
 Corrected: 0
 Background:
 Type: 0
 Name: 0
 Detector:
 001-1991 12-47-20
 Description:
 001-1991 12-47-20
 Plot: 1991 12-47-20
 BATSE

PV0

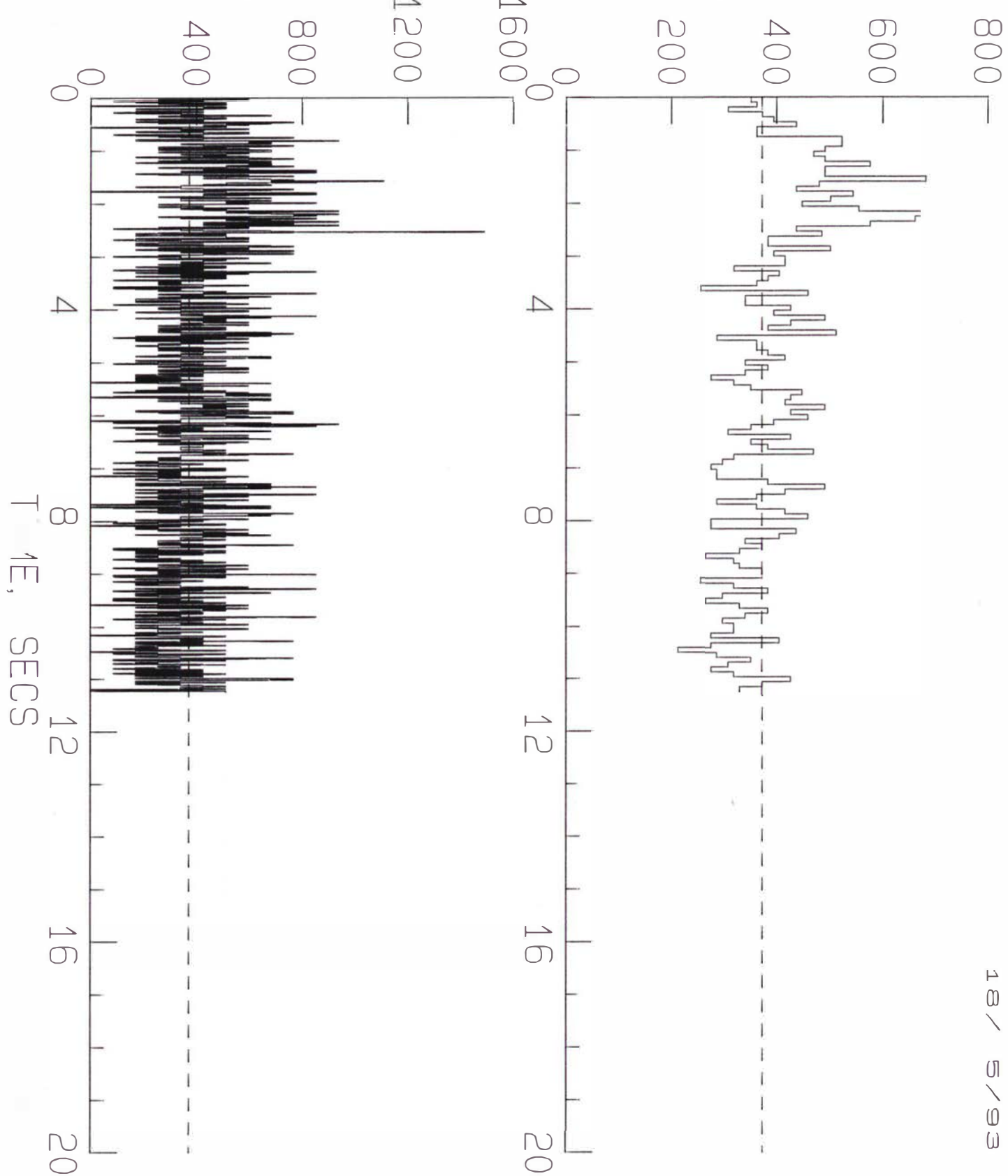
22/05/91

43980.081

100-2000 keV

COUNTS/S TTS

COUNTS/S TTS



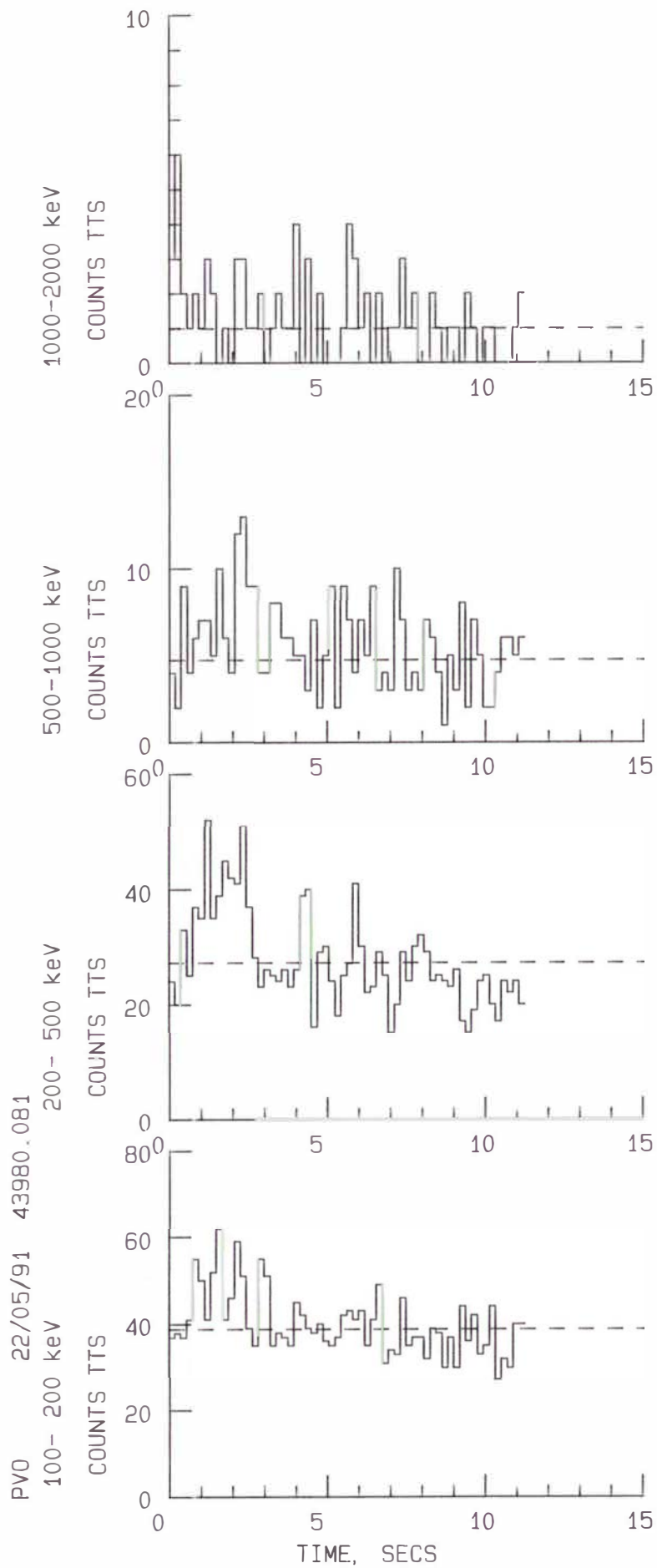


Table 1 GRBs List

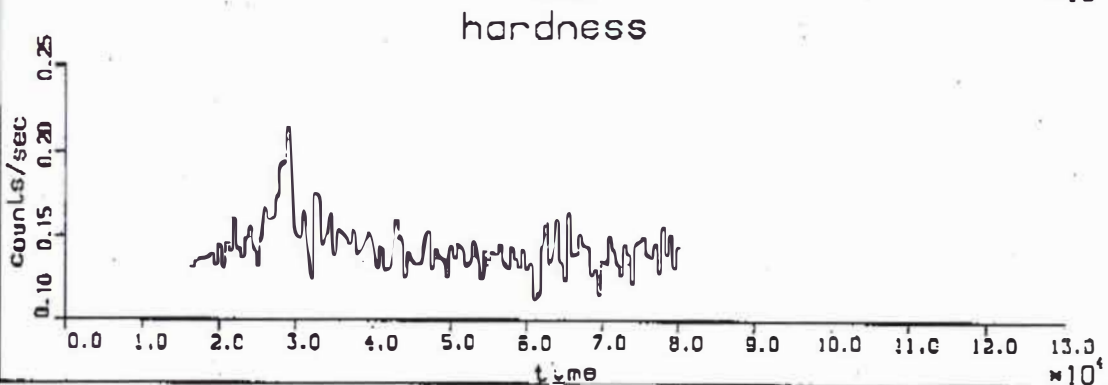
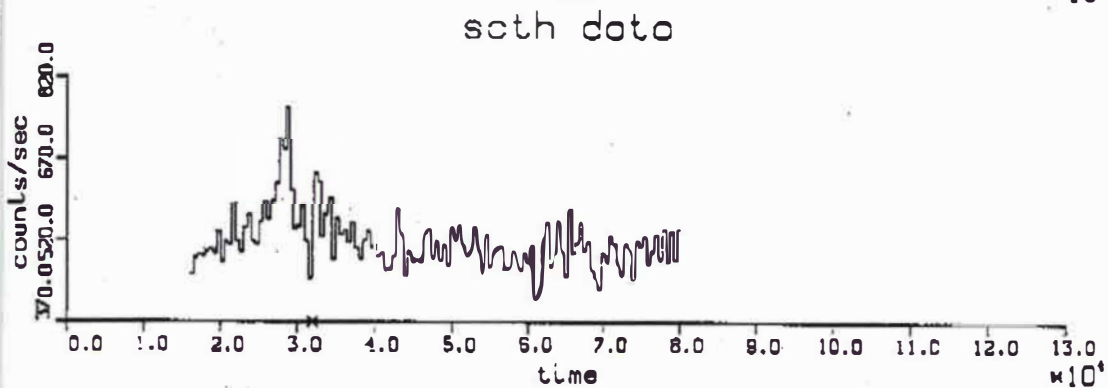
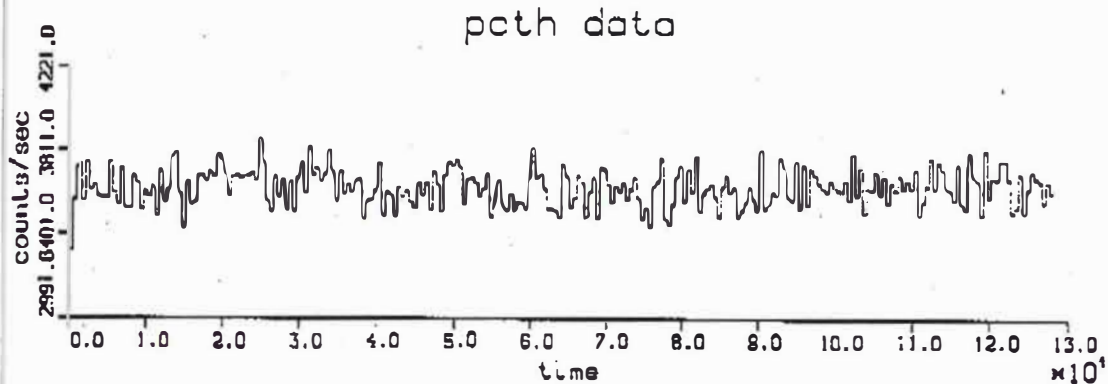
Event ID	Time(U.T.) (hr:mn)	Peak Counts Cp (cnts/4sec)	Bit
901009	00:15:52		Hi
901021	00:09:07		Hi
901103	05:52:56		Hi
901112	19:20:38		Lo Uly
901219	21:52:50		Hi Uly
901022	15:14:08		Hi Uly
901030	11:56:08		Hi
90204	08:58:47		Hi Uly
90206	08:45:29		Med Uly
90312	12:43:34		Hi Uly
90314	22:56:12		Lo Uly
90315	22:55:48		Lo Uly
90322	12:41:48		Med
90402	14:28:13		Med Uly
90429	03:11:50		Med GRO
910522	12:14:08		Hi Uly
910527	23:45:36		Hi
910709	20:22:38		Med
910717	04:33:05		Hi GRO
910723	14:06:16		Lo
910725	13:12:06		Med GRO
910803	08:33:28		Med GRO
910814	19:14:34		Lo GRO
910815	12:34:32		Med
910821	10:33:39		Hi
910827	13:11:18		Hi
910905	23:48:55		Med GRO
910907	01:04:56		Lo GRO?
910926	18:25:56		Lo GRO
911008	17:56:04		Lo
911016	11:01:30		Lo GRO
911029	04:50:52		Lo
accuracy			Hi <+-0.1s
			Med +-0.5s
			Lo +-2.0s

Murakami's
Preliminary list

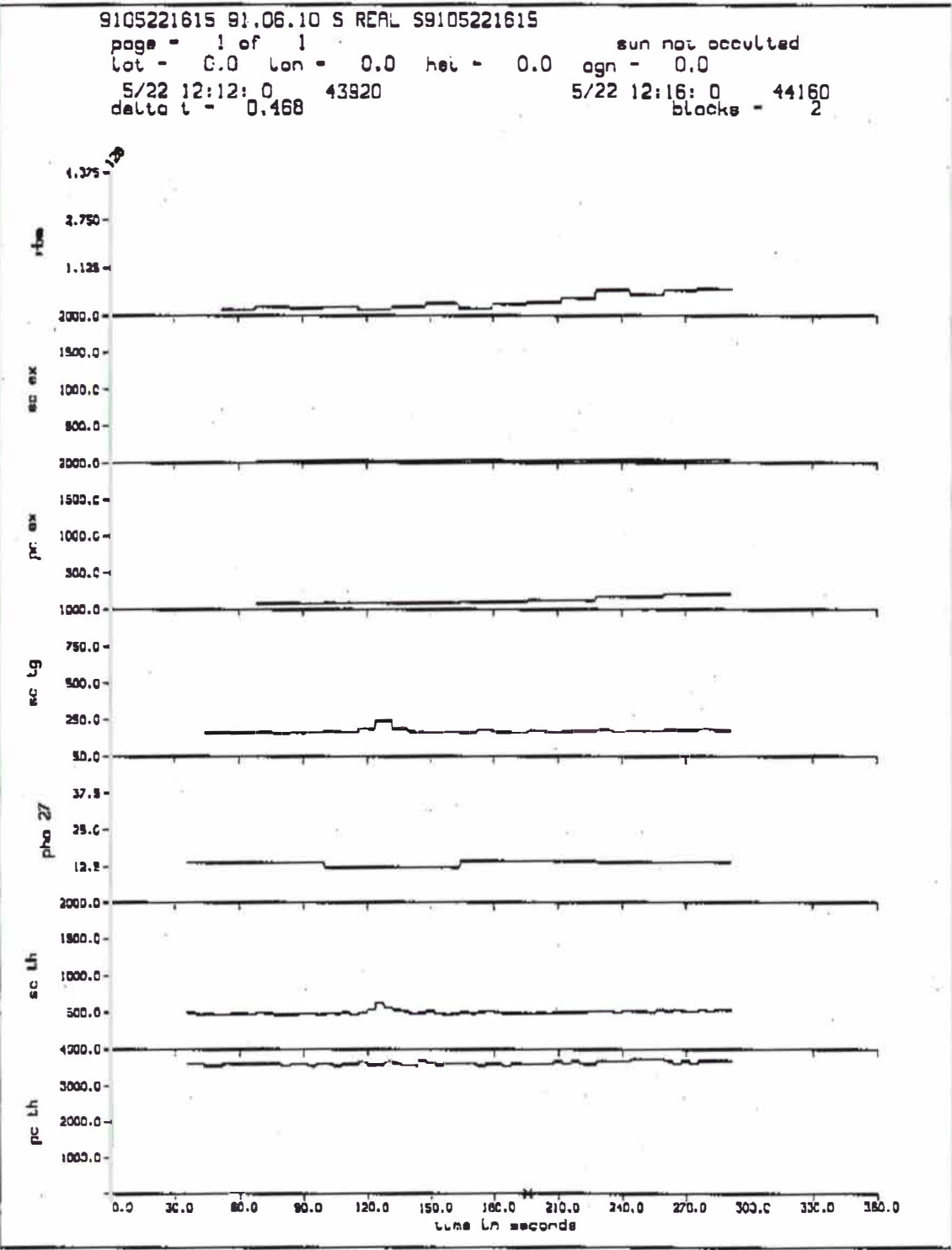
SOLAR
Requested Uly data Requested RT data Requested RT data N/O
Got Gunga data
Requested U. RT data
Got Gunga data
SOLAR
Requested RT
Requested RT data
Uly RT
RT requested
RT requested
Uly
RT requested
RT requested
RT requested
RT
RT requested
No data
Requested RT
Requested RT
Requested RT
Requested RT
Requested RT
Requested RT
Requested RT

Ginga Data
From Ed Teunisse
Toulouse 3/92

9105221699 91.06.10 MEMORY S9105221699
0.00 0.00 0.00 0 0.00
0/ 0/ 0 0: 0: 0.000 mode - 128

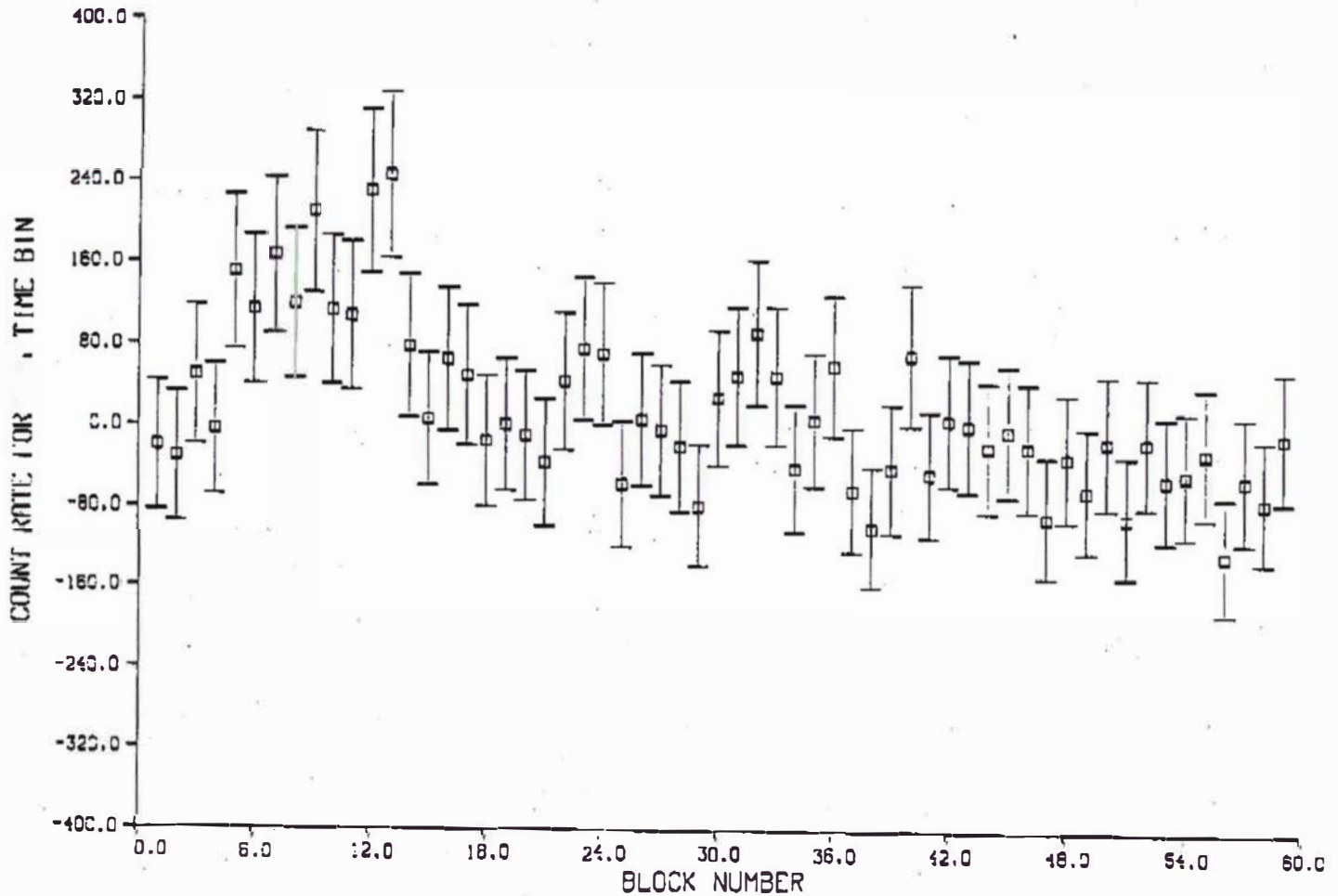


ms!



91/ 5/22 43980.082

13 13 3.828E+02 1.534E+00 1.895E+00 2.465E+02 1.629E+00 4.269E+02



1 BLOCK = 0.1875 s

From @cmsa.Berkeley.EDU:MEB%DGAIPPI1S.BITNET Wed Dec 4 18:20:33 1991
Received: from nettlerash.berkeley.edu by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA02718; Wed, 4 Dec 91 18:20:30 PST
Received: from cmsa.Berkeley.EDU by nettlerash.berkeley.edu (5.64/1.34.5+4)
id AA23877; Wed, 4 Dec 91 18:22:25 -0800
Message-Id: <9112050222.AA23877@nettlerash.berkeley.edu>
Received: from cmsa.Berkeley.EDU by cmsa.Berkeley.EDU (IBM VM SMTP R1.2.2MX) with BSMTTP id 5
Received: from DGAIPPI1S.BITNET by cmsa.Berkeley.EDU (Mailer R2.08 R208004) with
BSMTTP id 6392; Wed, 04 Dec 91 04:48:41 PST
Received: by DGAIPPI1S (Mailer R2.08) id 3478; Wed, 04 Dec 91 13:49:20 EST
Date: Wed, 04 Dec 91 13:38:31 EST
From: Michel BOER <MEB%DGAIPPI1S.BITNET@cmsa.Berkeley.EDU>
To: Kevin HURLEY <khurley@sunspot.ssl.berkeley.edu>
Status: R

Cher Kevin,

1/ OK pour la rencontre de Jupiter. Je ne savais pas que Cotin y allait. Je vais reflechir pour le SWT, peut etre Atteia, qui sera aux USA a ce moment la y ira, si il veut.

2/ La proposition GRO est la meme que celle que j'avais deja faite. Je crois qu'il vaut mieux etre clair et ne pas melanger GRO et triangulation (qui est en principe exclue du champ de ce programme. De toute facon les boites d'erreurs GRO telles qu'elles (sauf BATSE) peuvent donner deja des resultats interessants. En ce qui concerne la triangulation, il vaut mieux je crois travailler comme nous le faisons deja actuellement.

3/ Je n'ai pas l'intention d'exclure qui que ce soit, et il me semble que je ne l'ai pas encore fait. Ce qui doit d'ailleurs etre reciproque, autrement dit au CESR je tiens a continuer a m'occuper de triangulations. Et a etre au courant des affaires Ulysses puisque c'est moi qui m'en occuperai au CESR.

4/ Sur un autre registre, j'ai regarde la boite du 22 mai dans ROSAT, et elle est vide jusqu'a a peu pres 5 sigma. Au dela je n'ai pas encore regarde (il est possible aussi que quand je traiterai les fichiers de photons, je trouve aussi une source vers 5 sigma, l'analyse standard oubliant des sources parfois, mais j'en doute. J'attends que la boite du 17 juillet soit mieux localise pour la traiter.

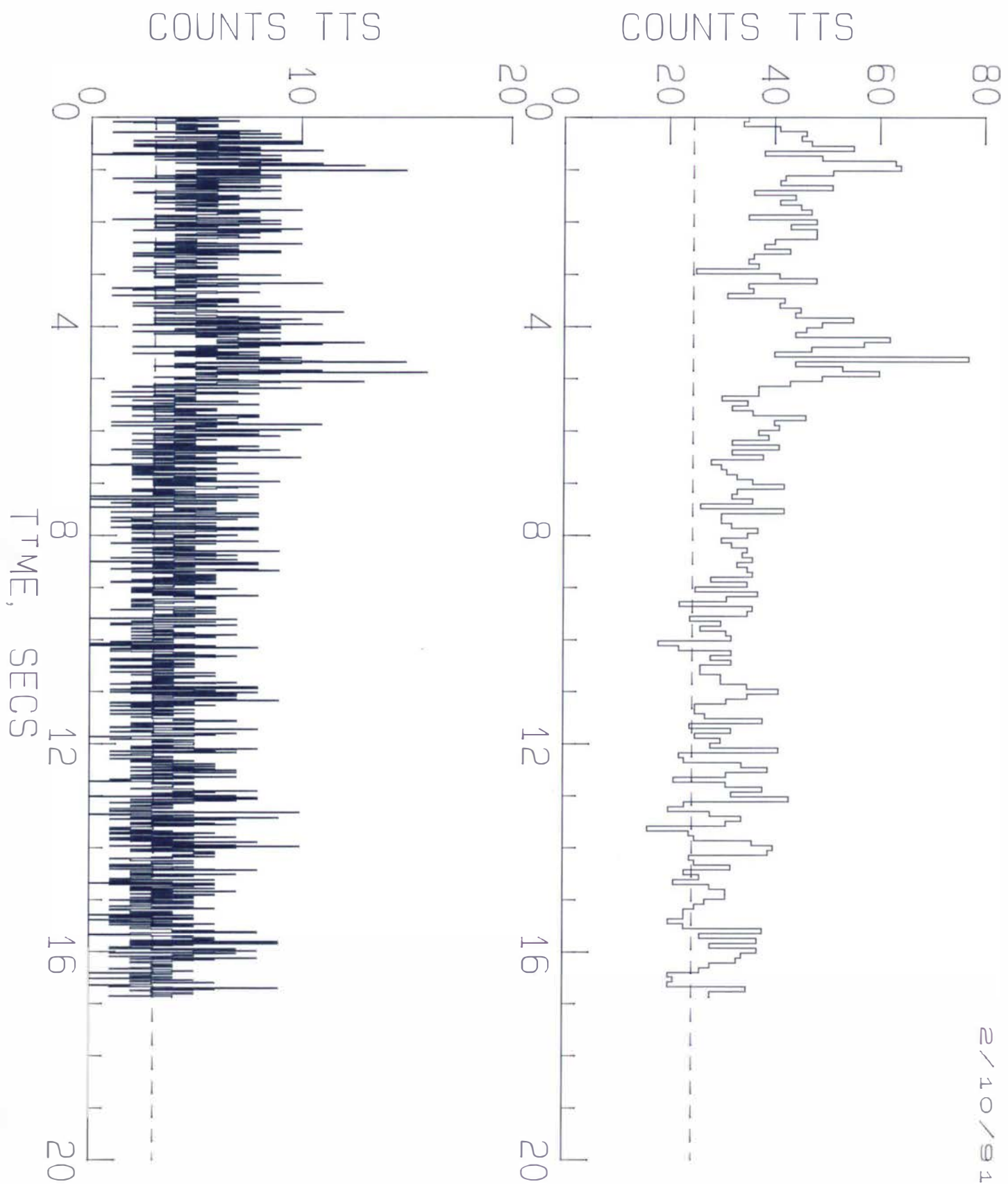
Amities
Michel

PV0

22/05/91

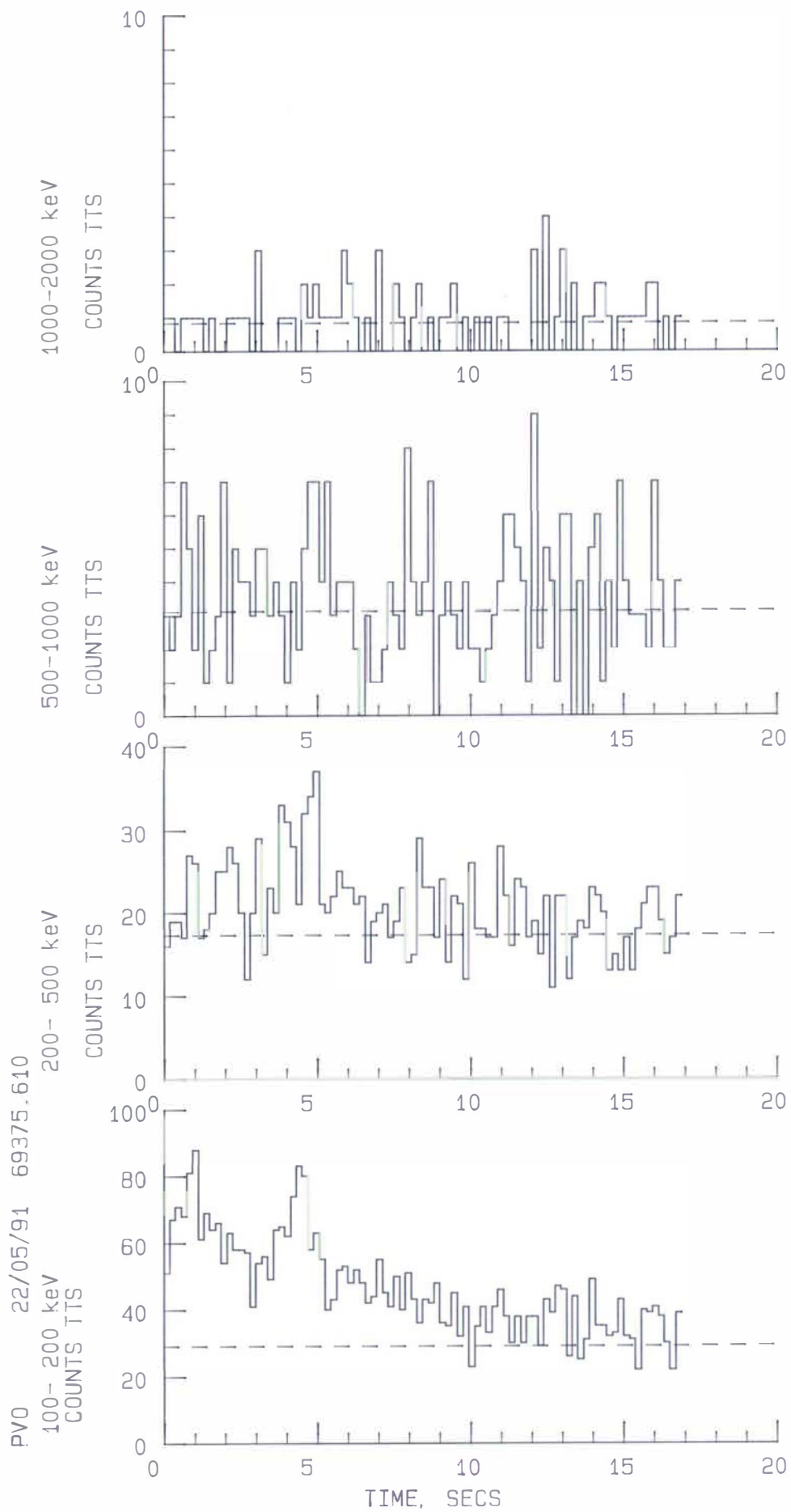
69375.610

100-2000 keV



2/10/91

2/10/91

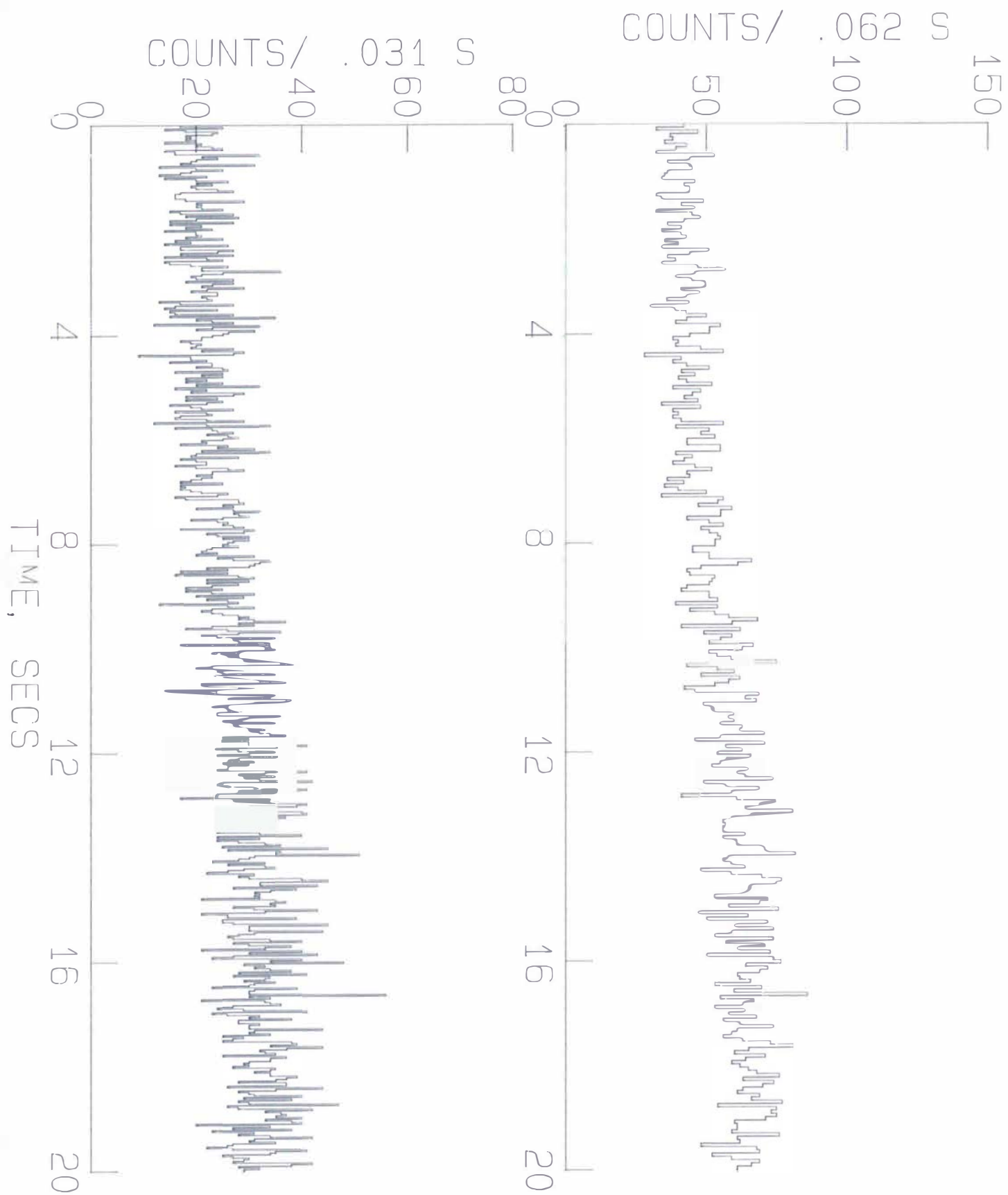


ULYSSES

22/05/91

70539.000

0- 0 keV

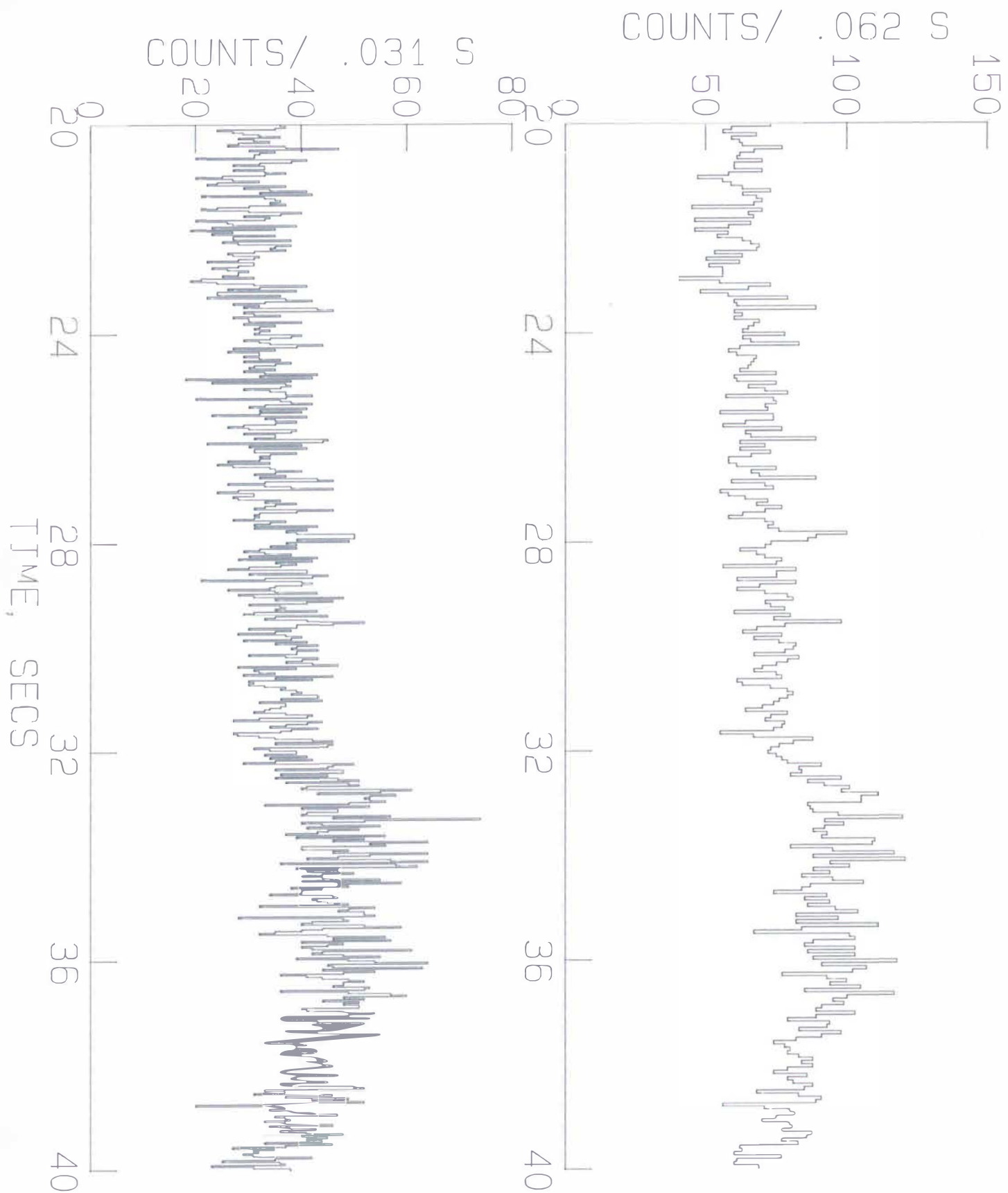


ULYSSES

22/05/91

70539.000

0- 0 keV

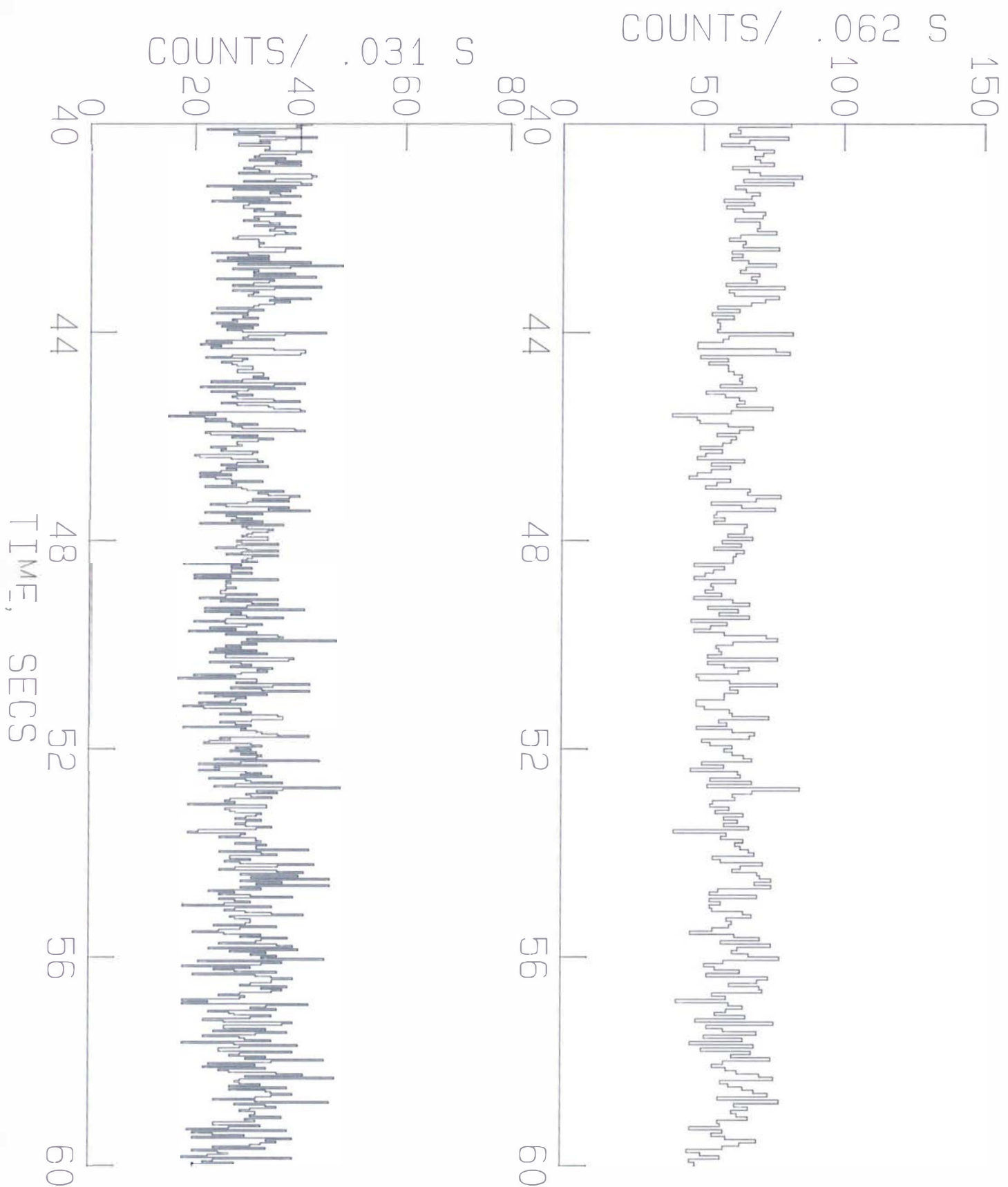


ULYSSES

22/05/91

70539.000

0- 0 keV

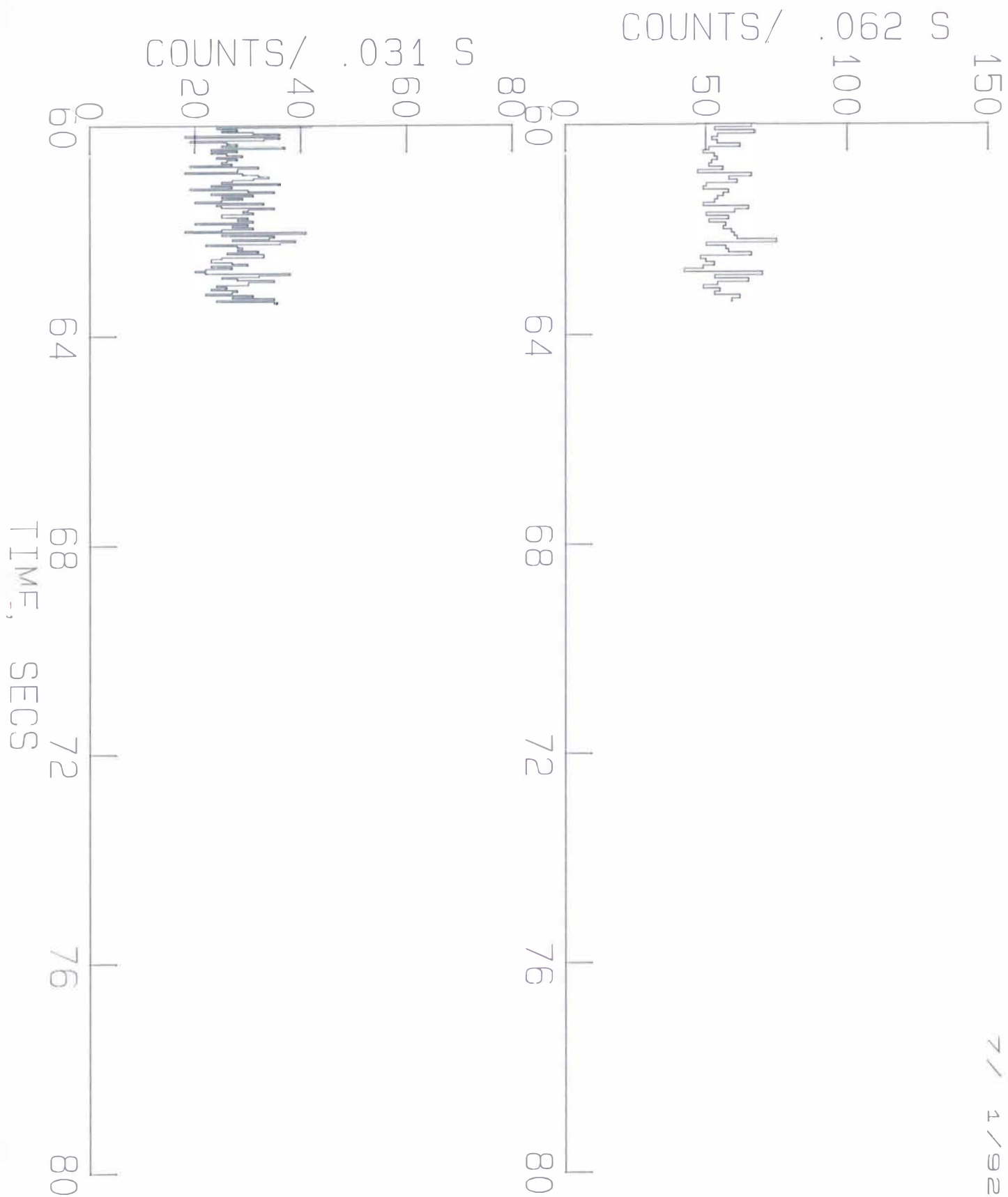


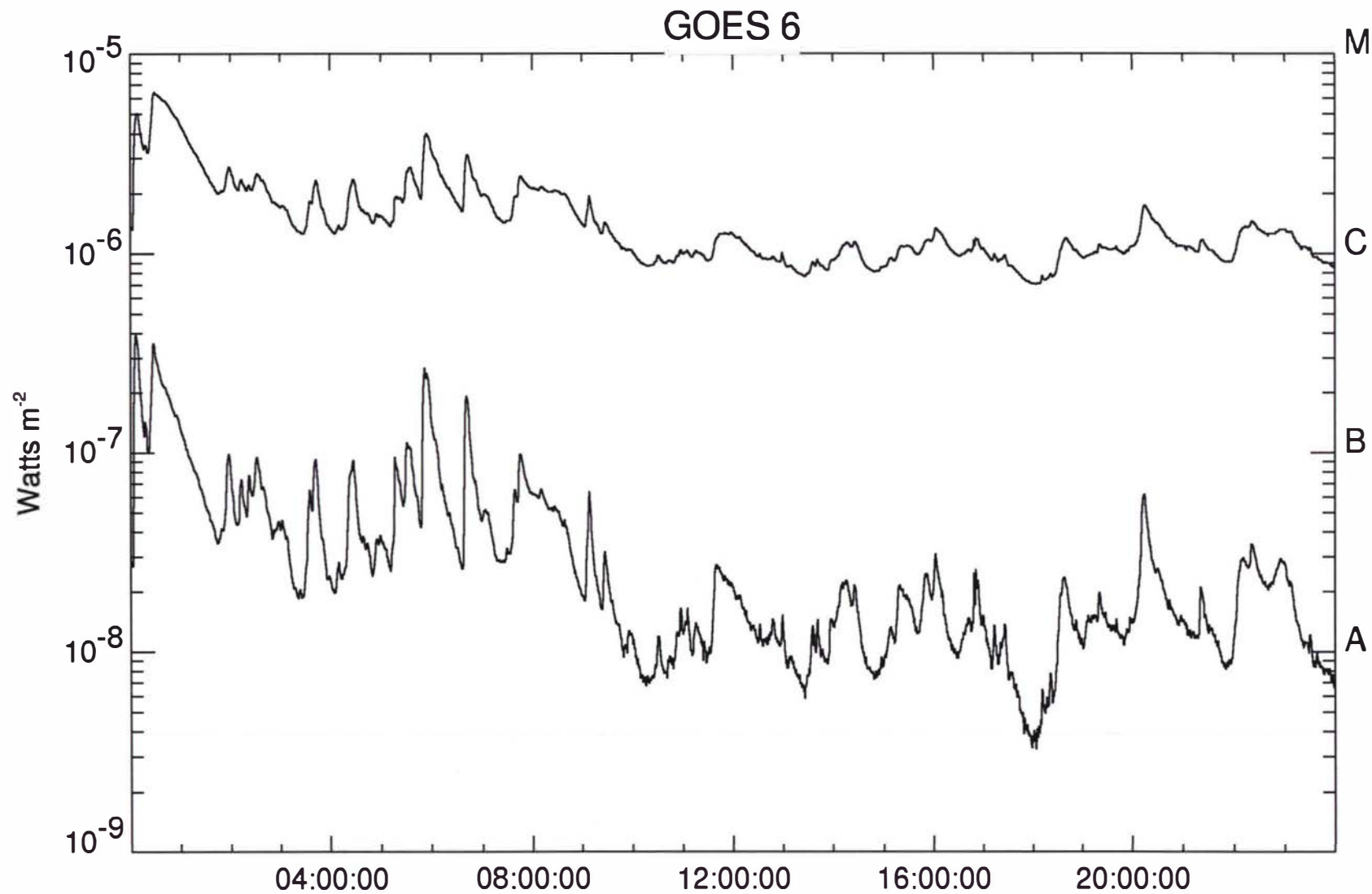
ULYSSES

22/05/91

70539.000

0- 0 keV





Data Start: 91/05/22, 0000:02

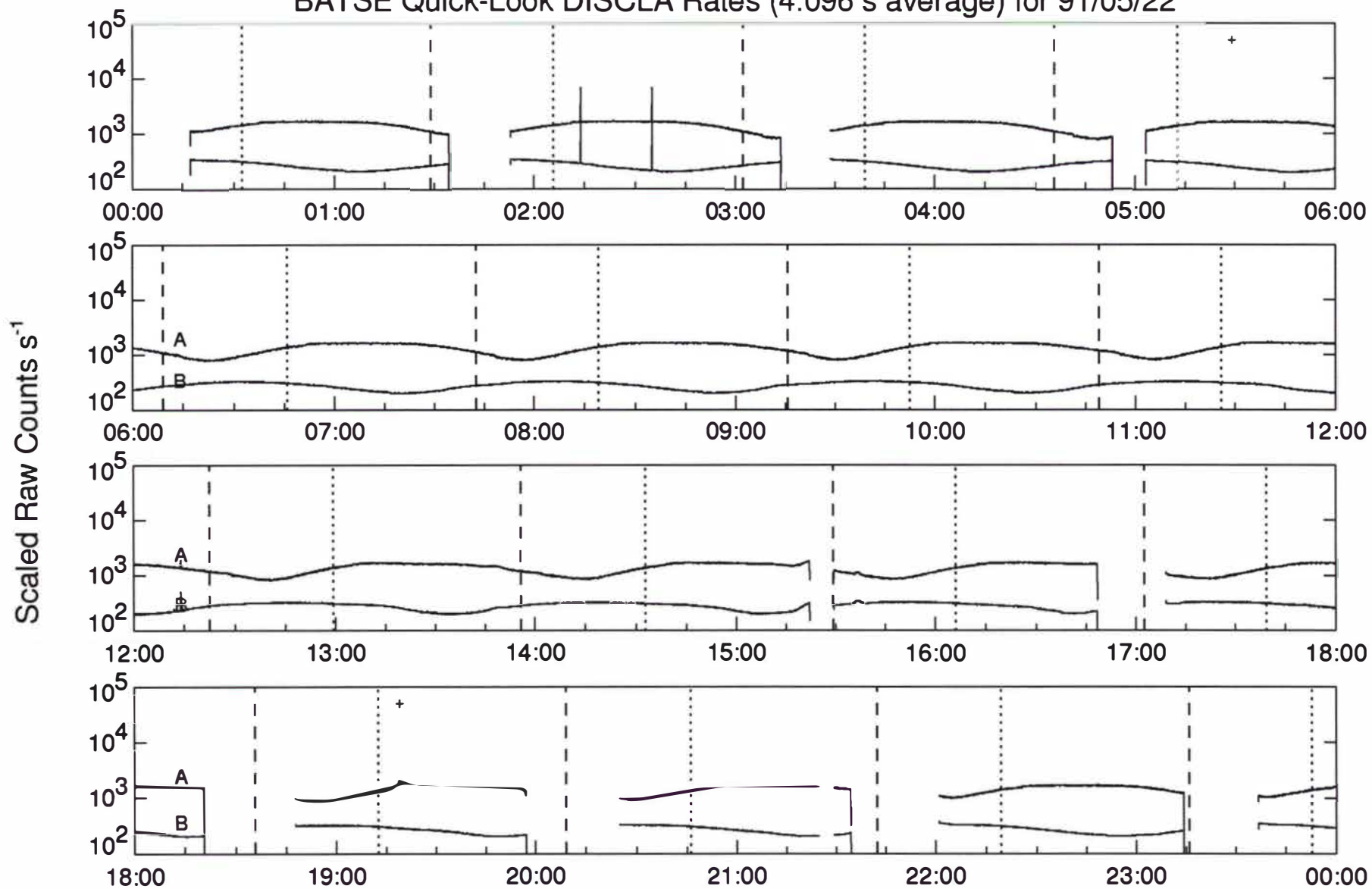
Plot created: 96/11/27, 0340

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/22



Current Time: 96/11/27, 0341 EDT

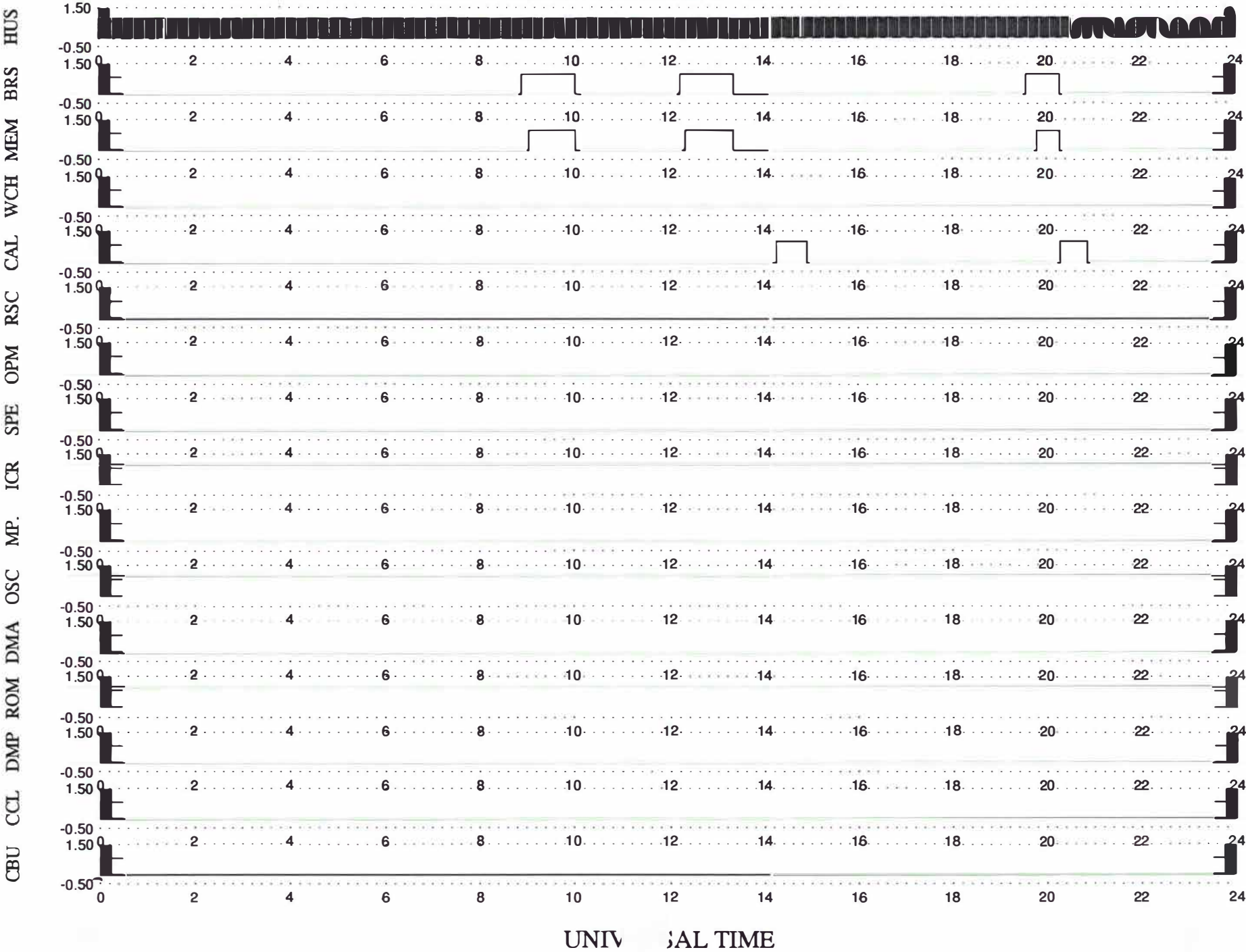
A: Channel 0 Most Sunward LAD

B: Sum Channel 0 Anti-Sunward LADs X .05

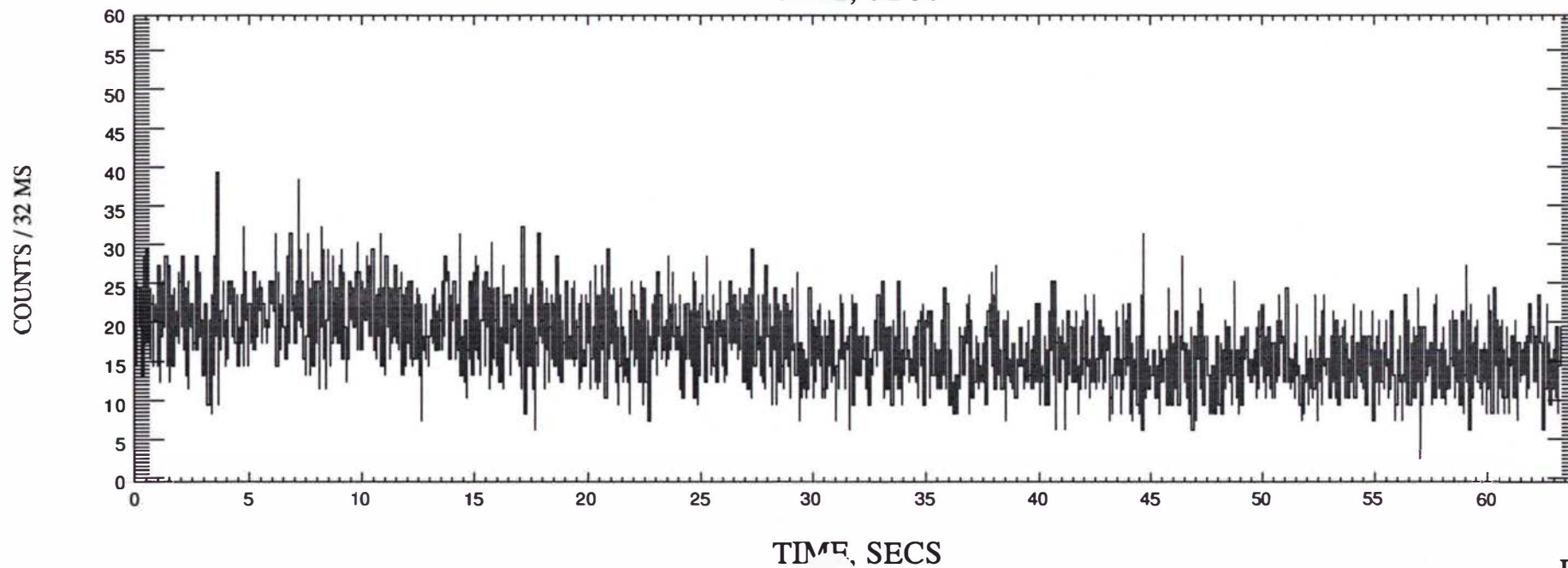
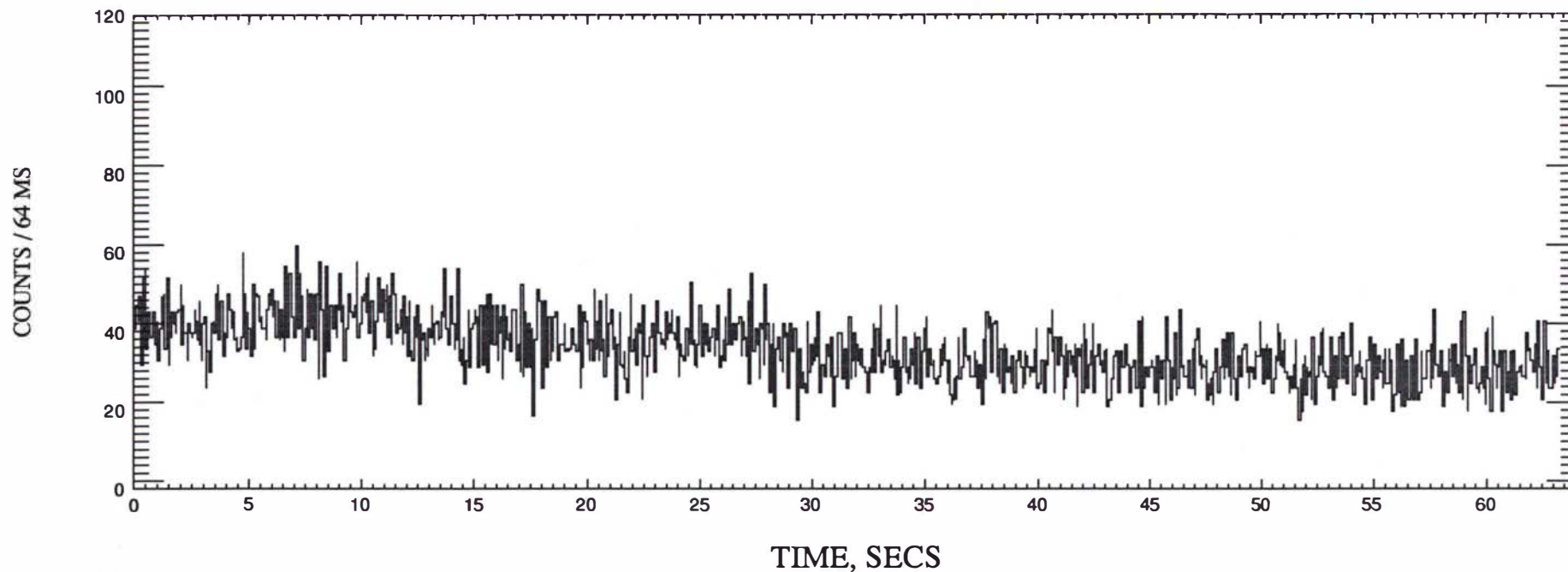
Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare

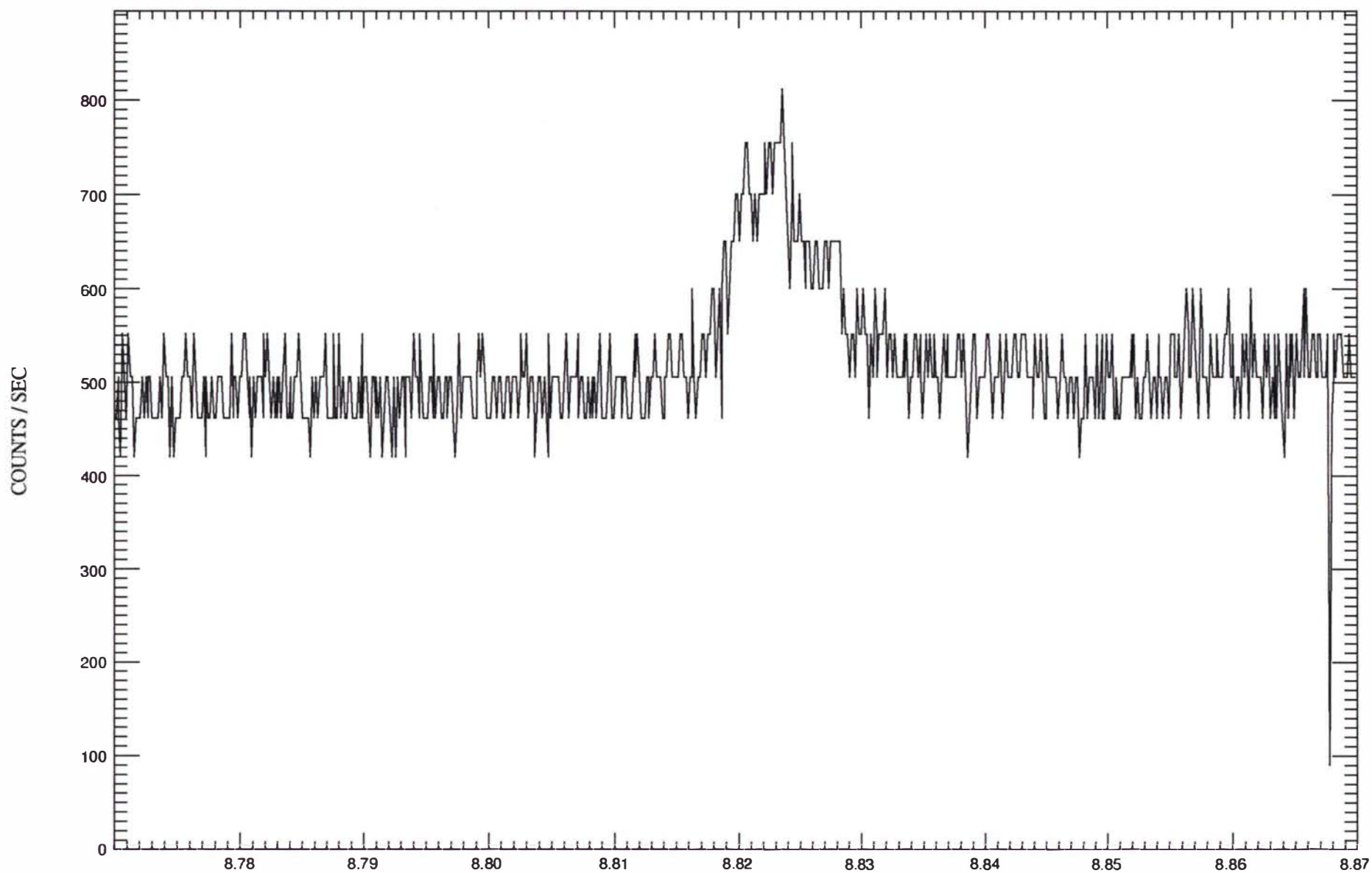
BURST NUMBER 8 - 10



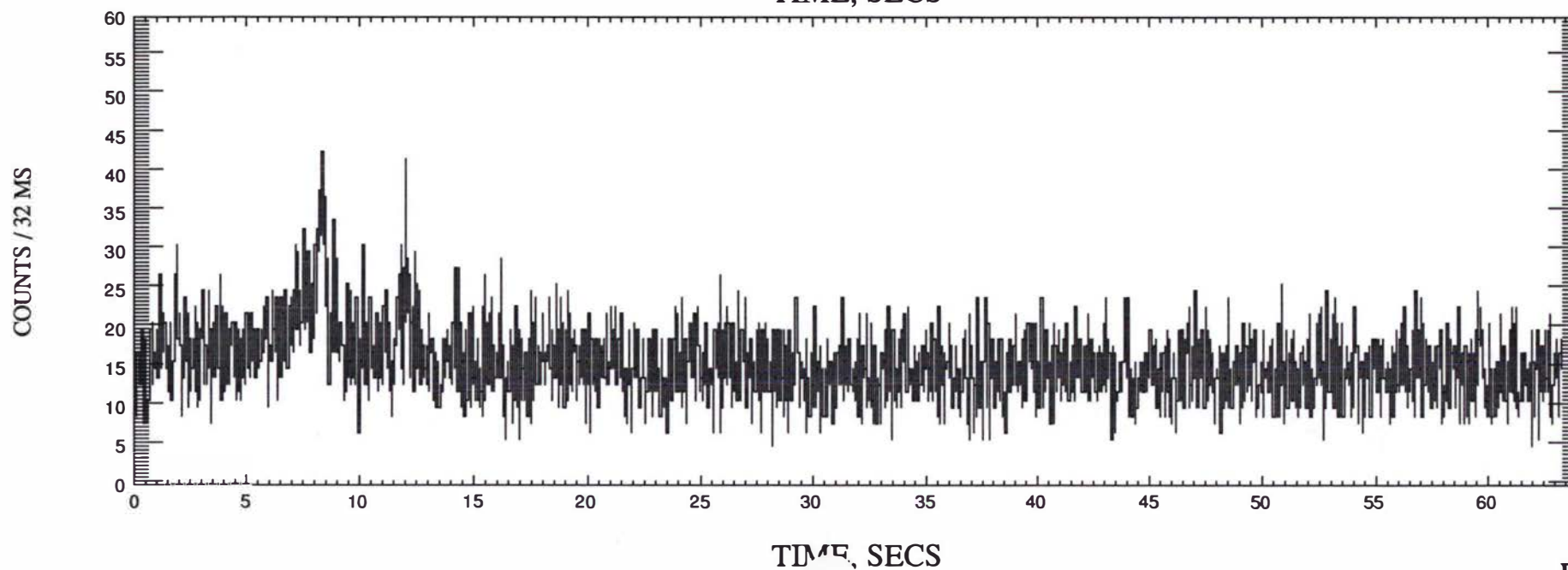
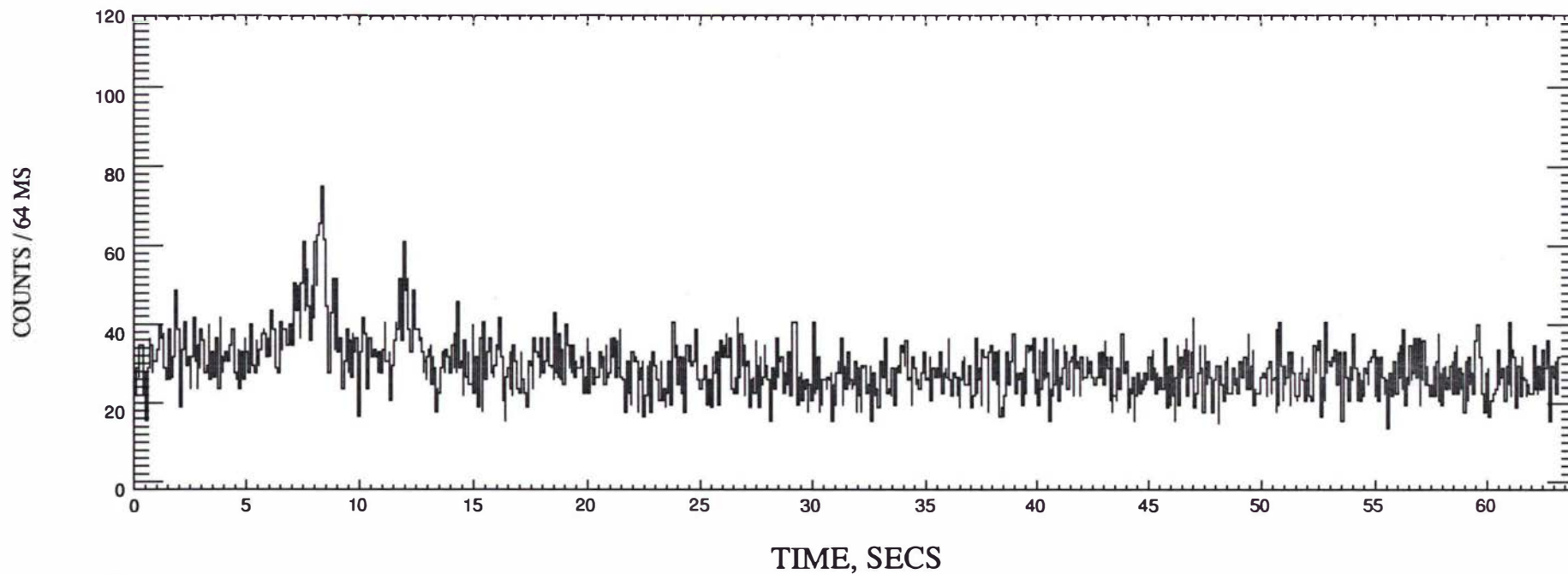
Burst Counter 8 at UT= 8.822756042480 h=31761.922 s 08:49:21.922



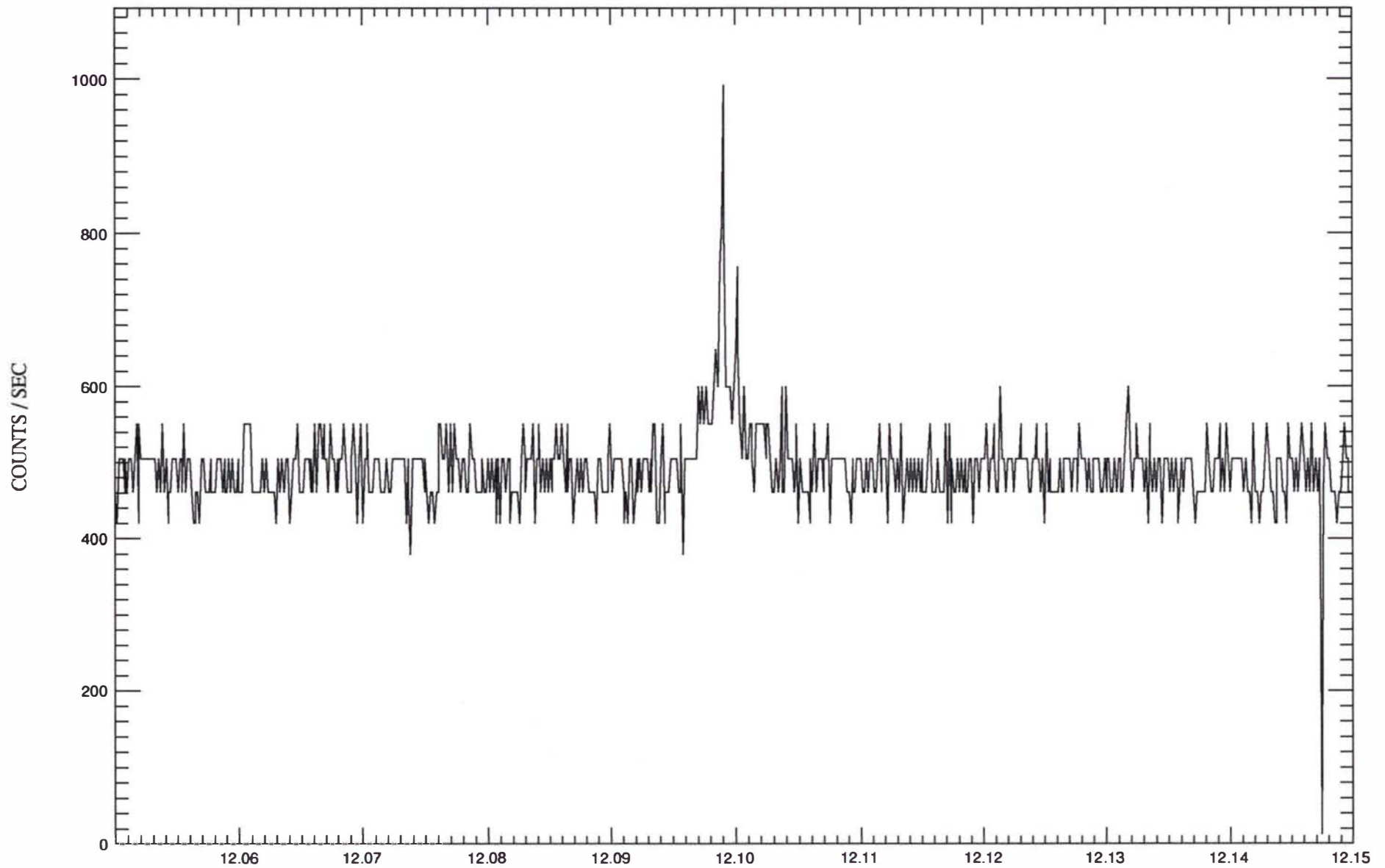
CALIBRATION DATA INCLUDED



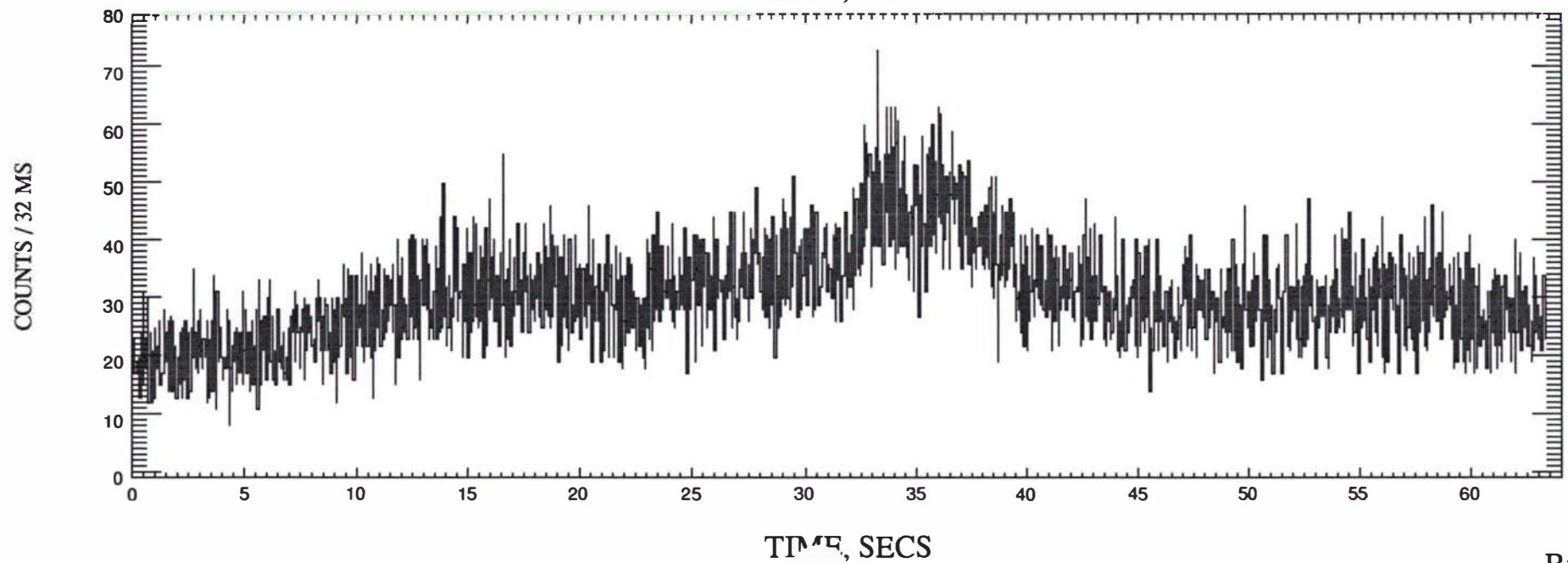
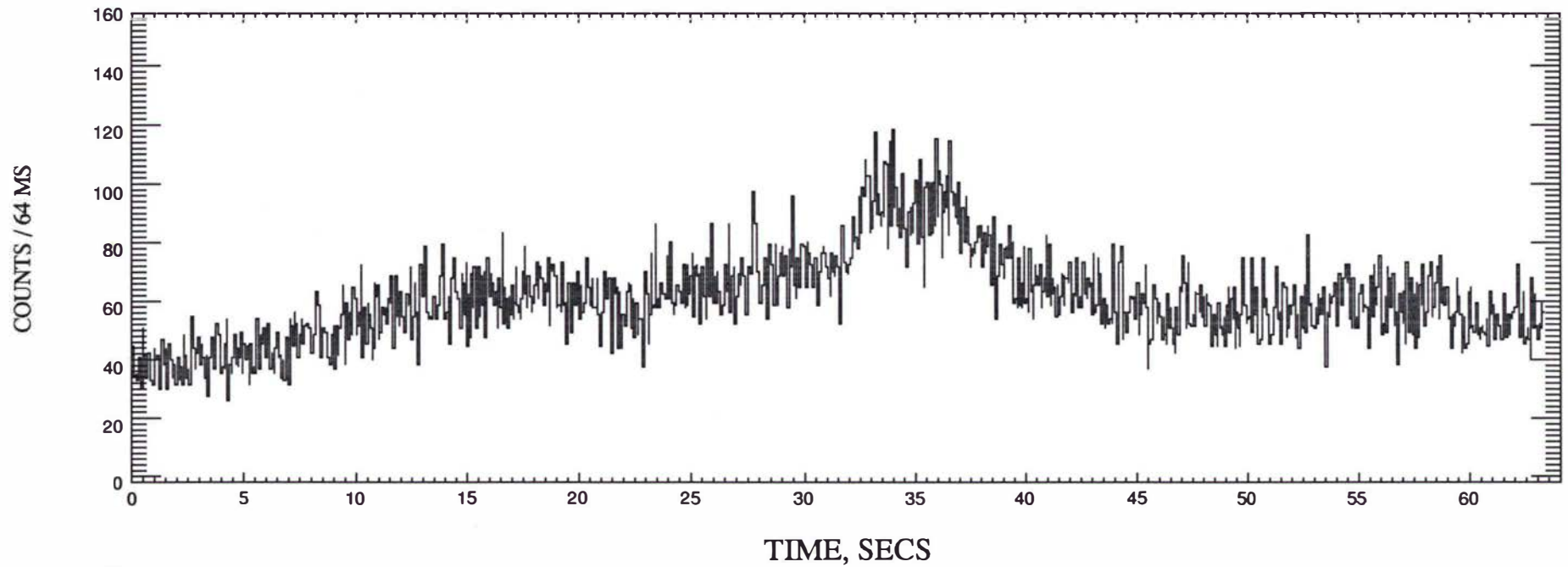
Burst Counter 9 at UT=12.098982217577 h=43556.336 s 12:05:56.336



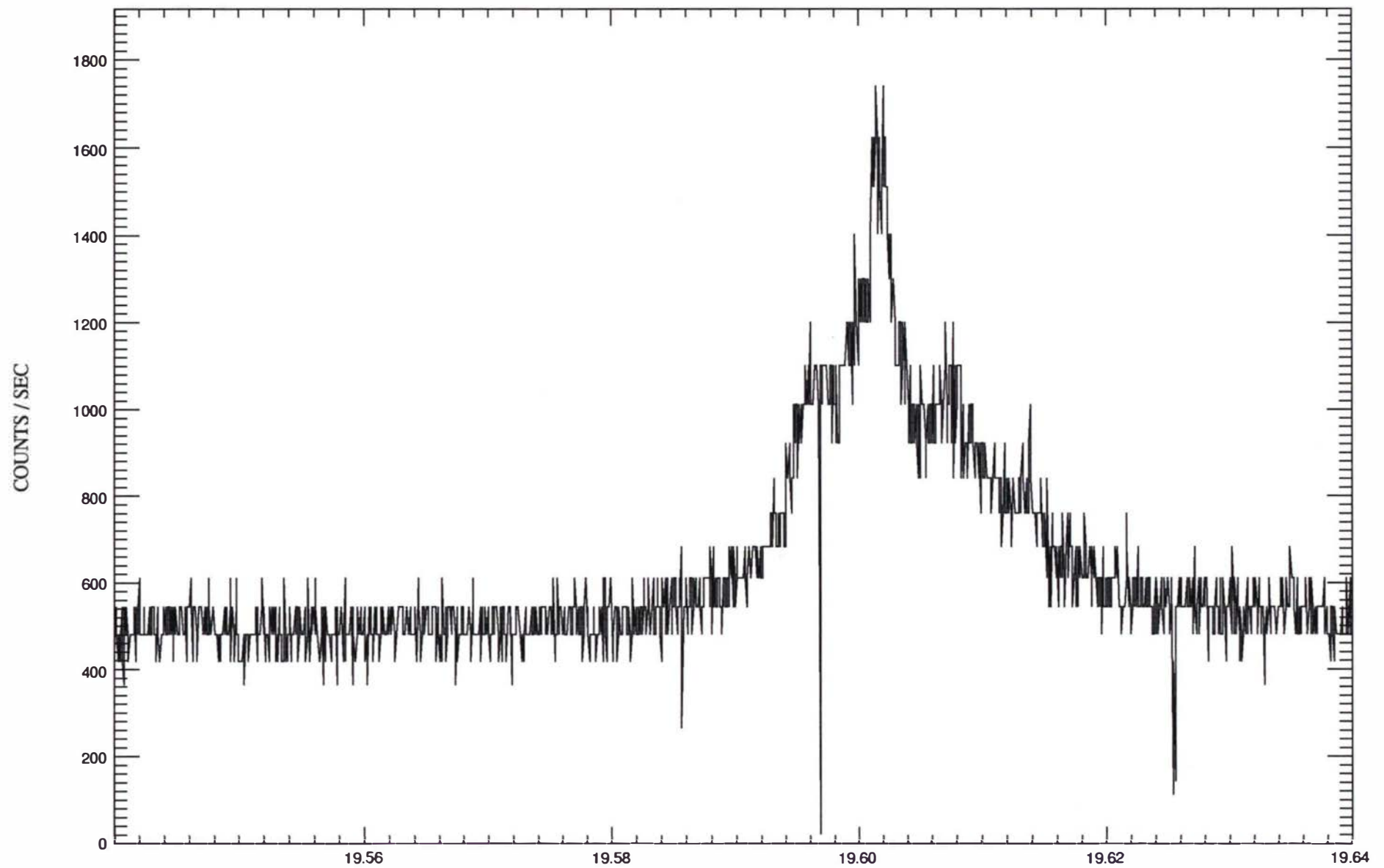
CALIBRATION DATA INCLUDED



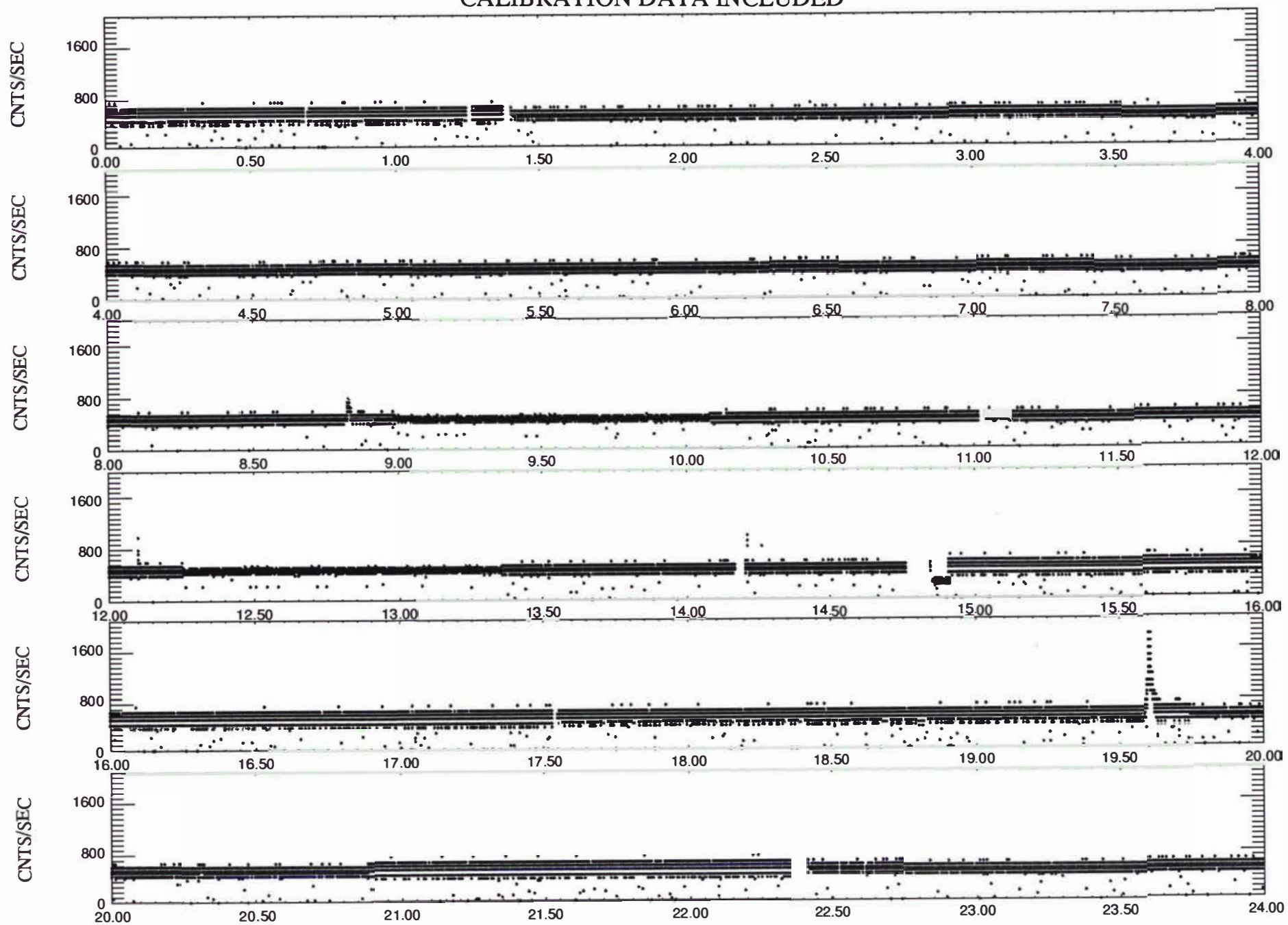
Burst Counter 10 at UT=19.594181531270 h=70539.054 s 19:35:39.054



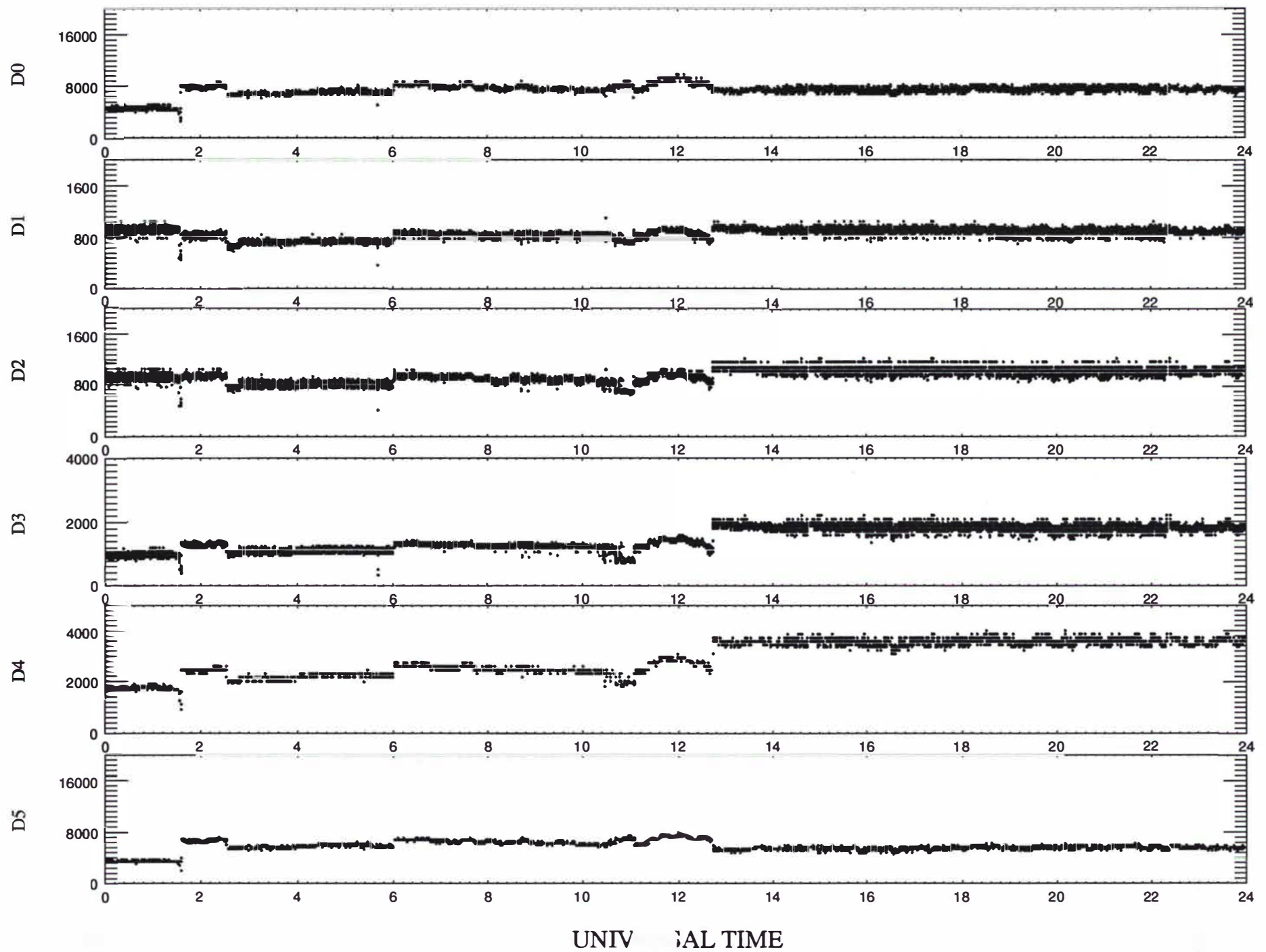
CALIBRATION DATA INCLUDED



CALIBRATION DATA INCLUDED



UNIV AL TIME



From root Wed Dec 8 07:58 1993
 Received: by space6.ssl.berkeley.edu (AIX 2.1 2/4.03)
 id AA08899; Wed, 8 Dec 93 07:57:44
 Received: from mx.nsi.nasa.gov by sunspot.ssl.berkeley.edu (4.1/1.30.1)
 id AA22497; Wed, 8 Dec 93 07:00:41 PST
 Received: Wed, 8 Dec 93 07:03:53 PST from ESSDP2.dnet by mx.nsi.nasa.gov (4.1/1.2)
 Message-Id: <9312081503.AA10272@mx.nsi.nasa.gov>
 Received: from ESSDP2.dnet by AMES.dnet with MAIL-11
 (utk-mail11d v1.7); Wed, 8 Dec 93 07:03:57 PST
 Date: Wed, 8 Dec 93 07:03:57 PST
 From: 068486@essdp2.span.nasa.gov
 X-To: AMES:."khurley@space6.ssl.berkeley.edu"
 Subject: RE:
 To: khurley@space6.ssl.berkeley.edu
 Status: R

KEVIN,
 HERE ARE THE RESULTS OF OUR SURVEY OF THE PVO REAL-TIME DATA FOR EVIDENCE OF
 RESPONSE TO EVENTS LISTED IN YOUR CATALOG.

DATE	TIME	PVO RESPONSE
90/11/11	21:49	N/O
90/11/12	14:57	N/O
90/11/16	01:42	N/O
90/11/19	18:08	N/O
90/11/21	00:04	N/O
90/11/21	18:09	N/O
90/12/02	13:45	N/O
90/12/21	00:30	N/O
90/12/25	05:50	N/O
91/01/17	00:57	N/O
91/01/24	11:50	N/O
91/02/04	08:58	N/O
91/02/04	14:19	N/O
91/02/04	14:58	N/O
91/02/17	02:59	N/O
91/03/14	22:56	N/O
91/03/15	22:55	N/O
91/04/04	17:17	(NO)
91/05/18	17:10	N/O
91/05/23	19:03	N/O
91/05/27	23:44	N/O
91/05/28	21:26	N/O
91/06/02	22:55	N/O
91/06/09	00:48	N/O
91/06/29	19:55	N/O
91/07/09	20:22	N/O
91/07/17	13:07	N/O
91/08/03	08:24	N/O
91/08/15	12:34	N/O
91/08/15	14:24	N/O
91/08/16	01:57	(NO)
91/09/05	23:48	N/O
91/09/16	21:58	N/O
91/09/25	03:35	N/O
91/09/26	18:25	N/O
91/09/30	11:55	N/O
91/10/03	00:39	N/O
91/10/04	01:27	N/O
91/10/06	09:01	(NO)
91/10/22	04:13	N/O
91/10/25	21:25	N/O
91/11/06	03:42	N/O
91/11/14	01:40	N/O
91/11/17	01:58	N/O
91/12/05	23:04	N/O

91/12/21	06:17	N/O	
91/12/21	22:03	N/O	
91/12/27	15:56	N/O	
92/01/05	17:41	N/O	
92/01/13	20:52	N/O	
92/01/25	08:57	N/O	
92/01/30	00:29	N/O	
92/01/30	22:50	N/O	
92/02/18	18:42	N/O	
92/02/21	06:14	N/O	
92/02/26	18:15	YES	TRIGGER AT 29336 S UT
92/02/27	06:00	N/O	
92/02/27	08:45	N/O	
92/03/02	06:16	N/O	
92/03/04	14:34	N/O	
92/03/07	00:18	N/O	
92/03/21	12:50	(NO)	
92/03/26	02:01	N/O	
92/03/27	09:38	N/O	
92/03/29	16:38	(NO)	
92/04/04	22:37	N/O	
92/04/08	12:05	N/O	
92/04/20	02:12	N/O	
92/04/29	18:59	N/O	
92/05/02	19:05	N/O	
92/06/01	THRU 92/06/29	TURNED OFF--	N/O
92/07/01	19:39	N/O	
92/07/07	06:33	N/O	
92/07/17	01:15	N/O	
92/07/23	00:59	N/O	
92/07/23	01:00	N/O	
92/07/23	21:48	N/O	
92/07/25	19:30	N/O	
92/07/25	22:49	N/O	
92/07/26	00:34	N/O	
92/07/31	17:07	N/O	
92/08/10	21:35	N/O	
92/08/14	06:10	N/O	
92/08/16	12:36	N/O	
92/08/22	22:39	N/O	
92/08/30	01:45	N/O	
92/09/04	04:41	N/O	

THIS LIST IS NOT COMPLETE. IT INCLUDES EVENTS FOR WHICH NO REAL-TIME DATA ARE AVAILABLE BECAUSE OF INAPPROPRIATE MODE, NO TRACKING, OR THE EXPERIMENT WAS TURNED OFF. WHERE DATA HAVE BEEN CHECKED, SENSITIVITY DEPENDS UPON THE TIME RESOLUTION AVAILABLE IN THE DATA. I'LL BE SENDING ADDITIONAL RESULTS AS THEY BECOME AVAILABLE.

REGARDS,

RAY

CATSEARCH PROGRAM

BATSE BURST # 222
EVENT OF 1991 MAY 23 DAY OF YEAR=143
EVENT CROSSING TIME AT BATSE : 68605. S. OR 19:03:24.5
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 109.700 1.300
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 23/ 5/ 91 IS:
RA= 123.223 DEC= 21.441 DIST= 3.493 AU
BATSE-ULYSSES DISTANCE = 522612640. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=155.93 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-1591.67 SECS.
CROSSING TIME AT ULYSSES IS 67013. S. OR 18:36:52 +/- 149.27 SECONDS

RI

Helio. corr. removed

Date: June 22 1997

BURST TRIANGULATION CHECKLIST

1. Ulysses Data

- ☒ Jim Schmidling's stat file correction applied?
- ☒ Final ephemeris used?
- ☒ Final, CDROM data used?
- ☒ Were data checked by Joe Springer for 0.5 s errors?
- ☒ If a 2 spacecraft triangulation, was Ulysses time corrected for aberration?
- ☒ Is the order of the data in CORREL such that a vernier is done on the data with the best time resolution?

2. BATSE Data

- ☐ 2.042 s subtracted for bursts prior to June 25 1992 and DISCSC programs prior to Version 2.16 (August 28 1992)? *N/A*
- ☒ Does T_0 in data file agree with T_0 in plot?
- ☒ BATSE ephemeris for T_0 ?
- ☒ Error circle position and radius from public catalog used?
- ☒ If MER data were used, is a 30 ms systematic error included?

3. PVO Data

- ☐ Ephemeris of PVO used (not Venus)?
- ☐ 2000 coordinates used?
- ☐ Geocentric time used?

- ☒ ACCESS database updated?

N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

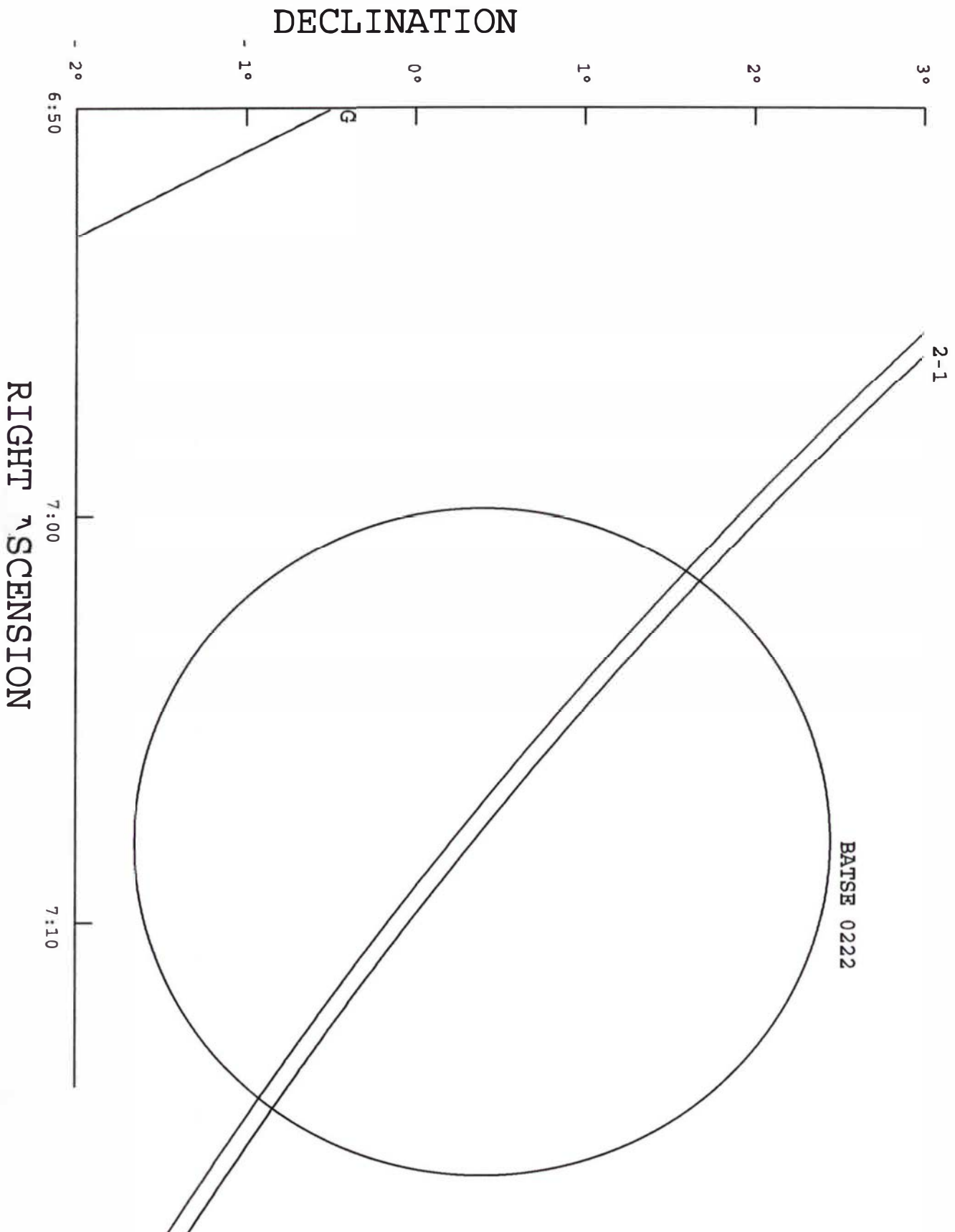
G=GALACTIC EQUATOR

1 ULYSSES

2 BATSE

EVENT OF MAY 23, 1991 18:36

22 / 6/97



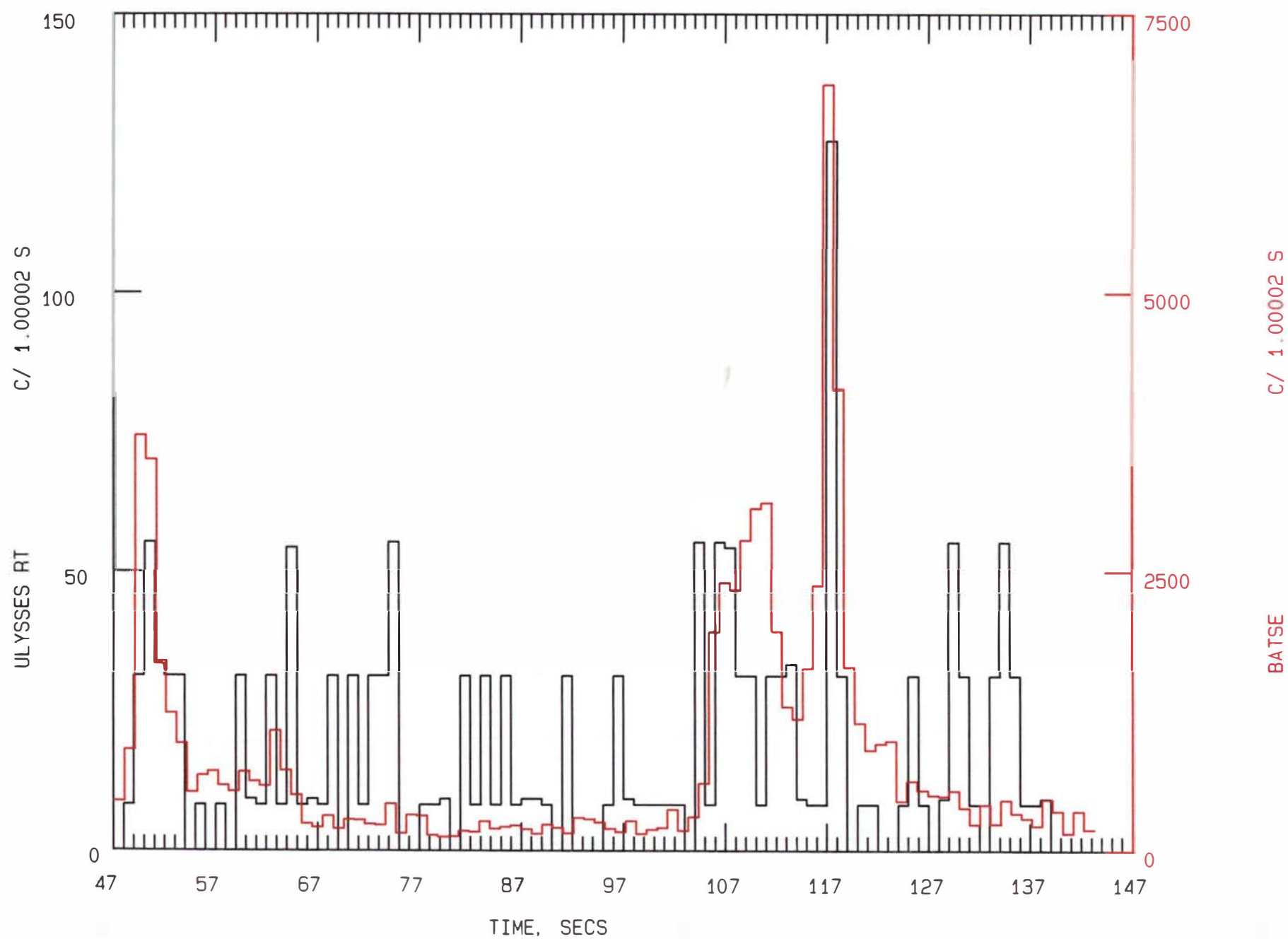
ULYSSES RT-BATSE

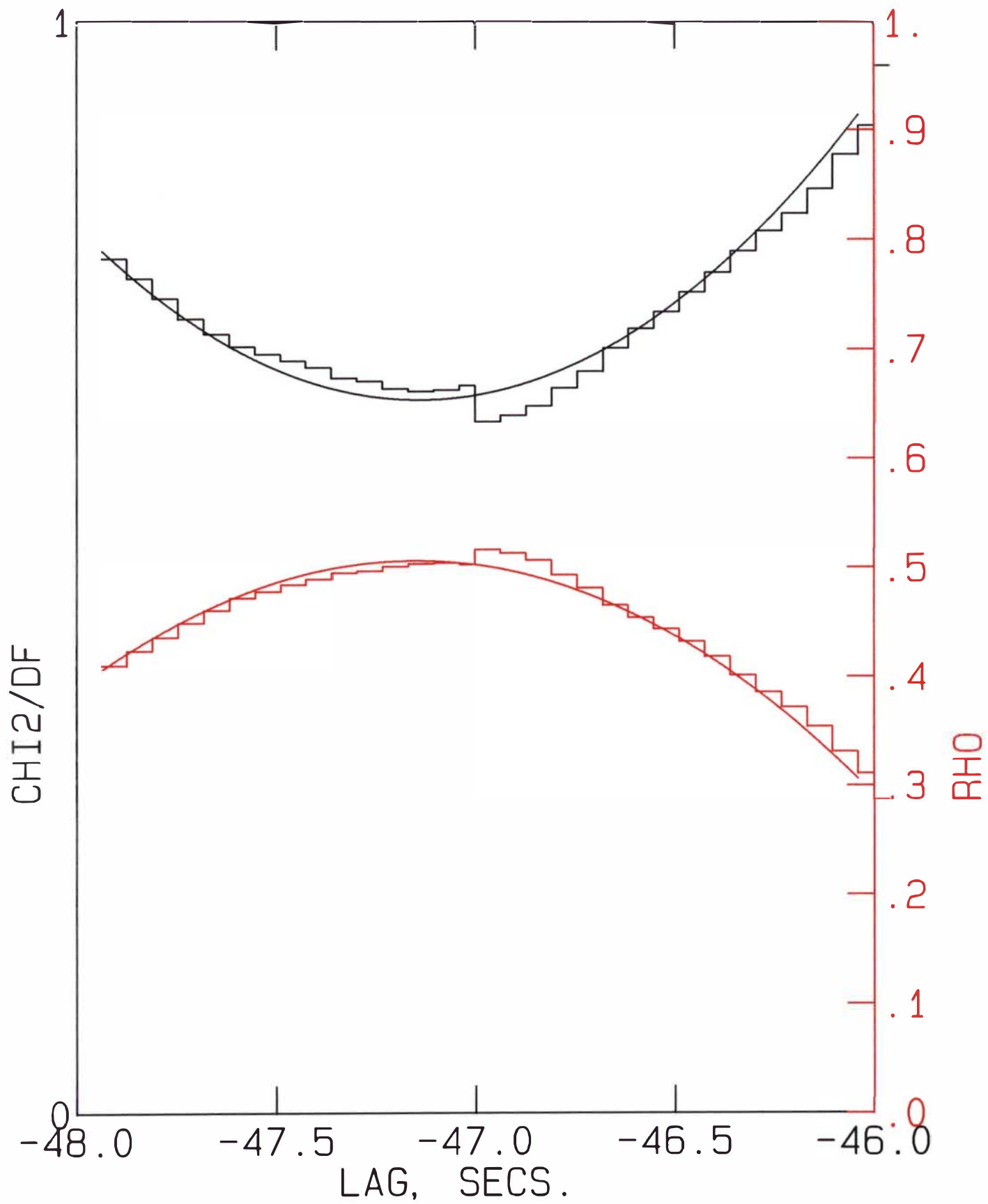
CORRELATION

23/ 5/91

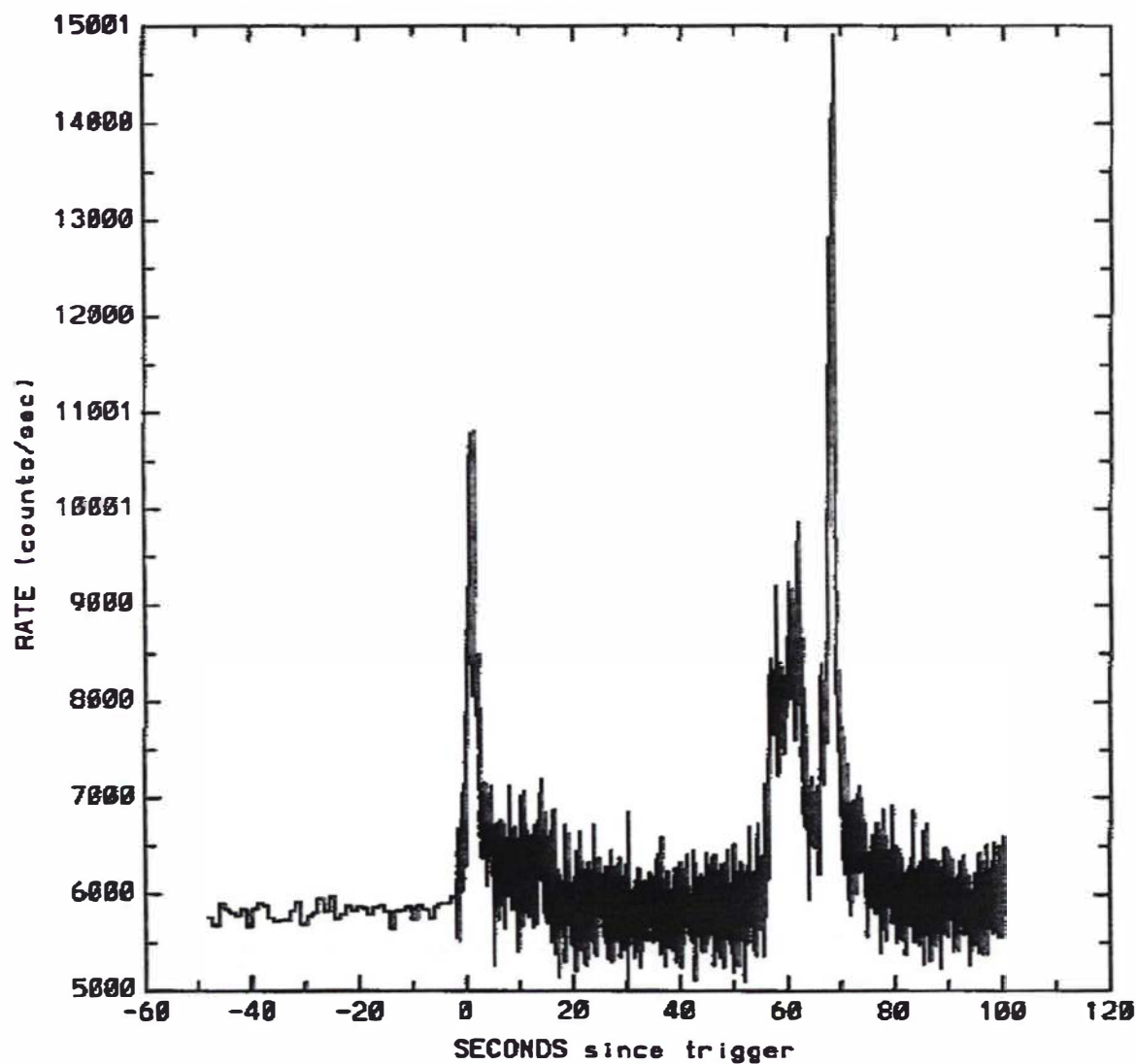
66992.362

22/ 6/97





DATA FOR K. HURLEY



22-JUN-1993 13:19:52

Created by MOPS BD
(Burst Display)
Version 2.19

10 OK

Trigger # : 222

Trigger Time:
8399 / 68684.523

-2.042-

Burst Data Type:
DISCSC

68602.481

Deadtime
Corrected: N
Background Data
Type: PREB + DISCLA
Minimum Integ. Time:
0.064 second(s)Detectors [7..0].
01818000Discriminators:
(1. 2)Quality Rank:
BDISP1

BATSE

91 05 23

~~00/52/20~~

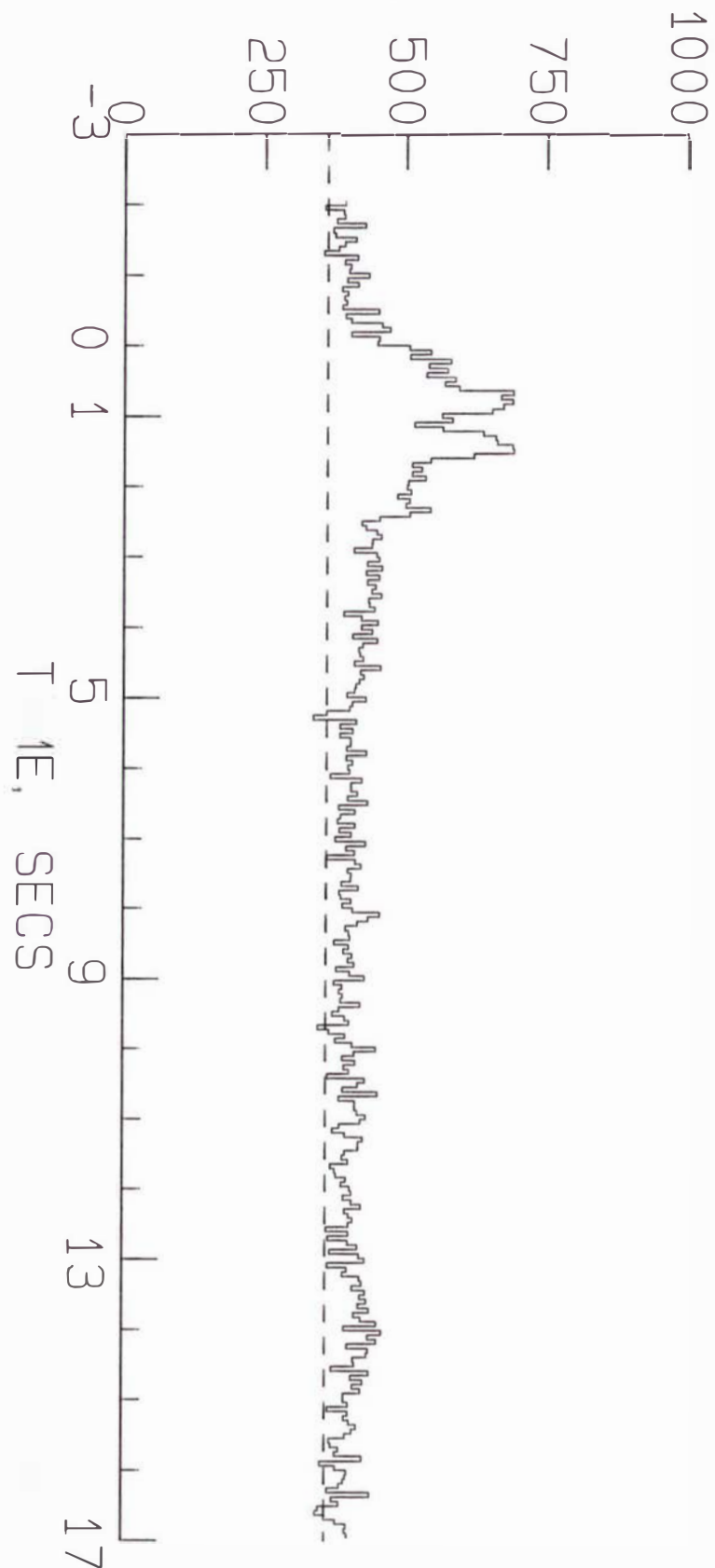
68604.523 - ~~2.042~~ =

25- 100 keV

~~68602.481~~

No - OK as is

COUNTS/ .064 S



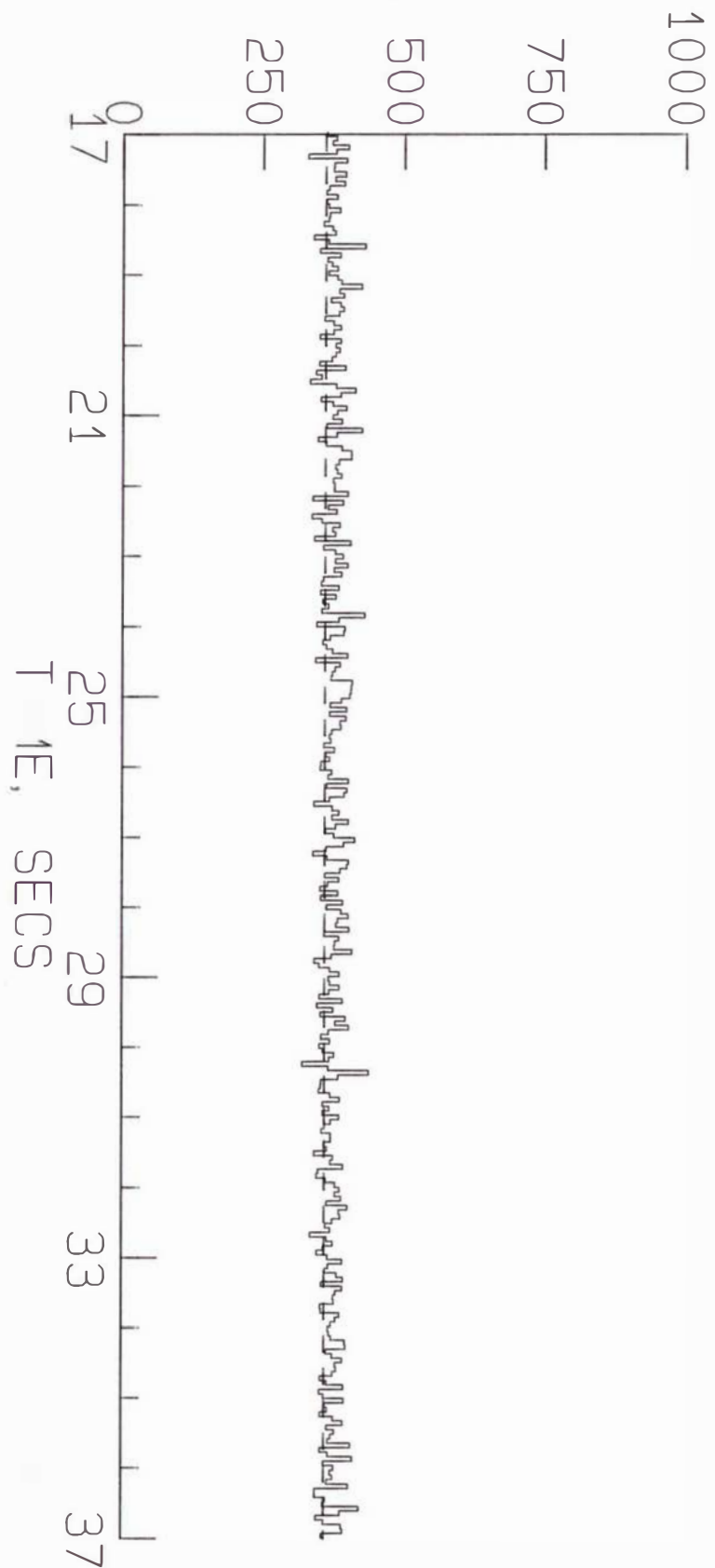
BATSE

00/52/20

68604.523

25- 100 keV

COUNTS/ .064 S



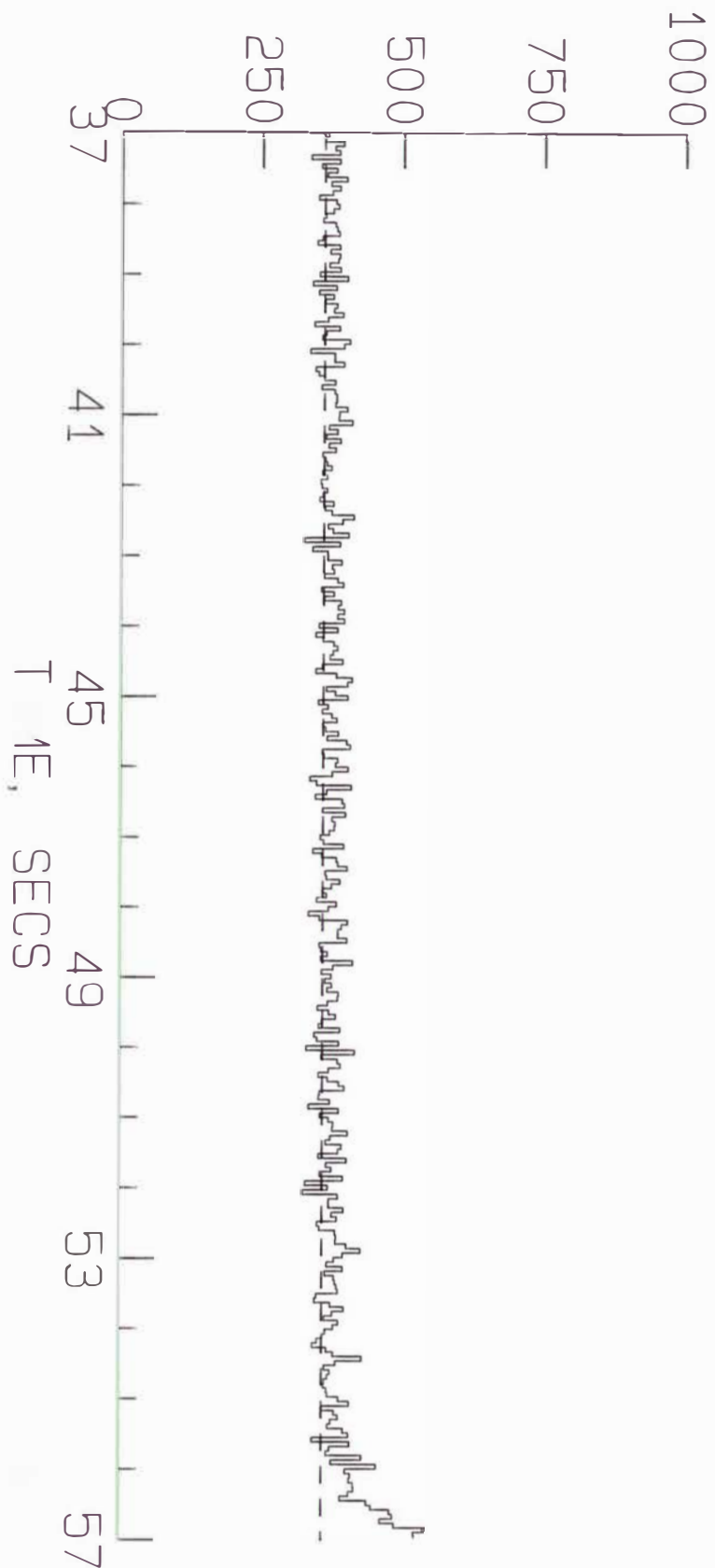
BATSE

00/52/20

68604.523

25- 100 keV

COUNTS/ .064 S



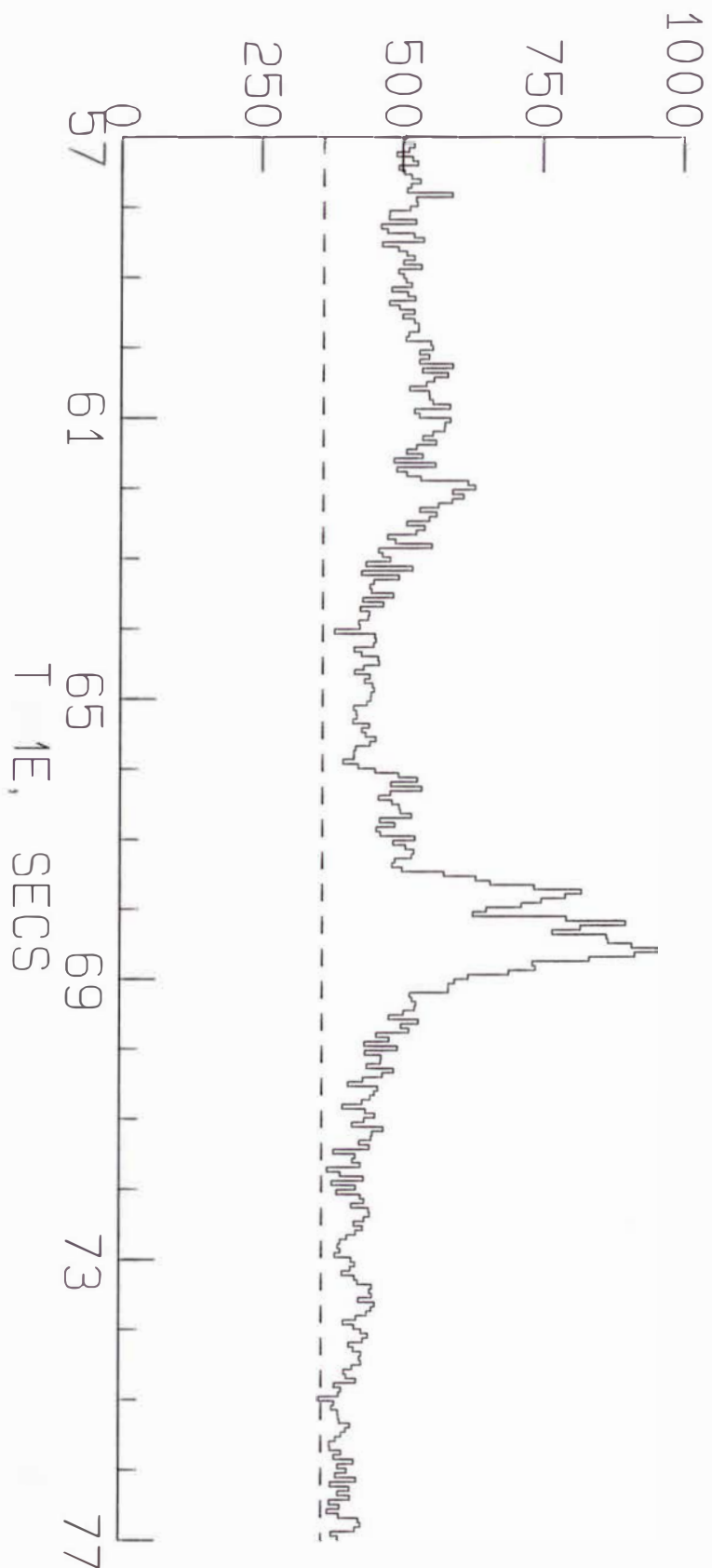
BATSE

00/52/20

68604.523

25- 100 keV

COUNTS/ .064 S



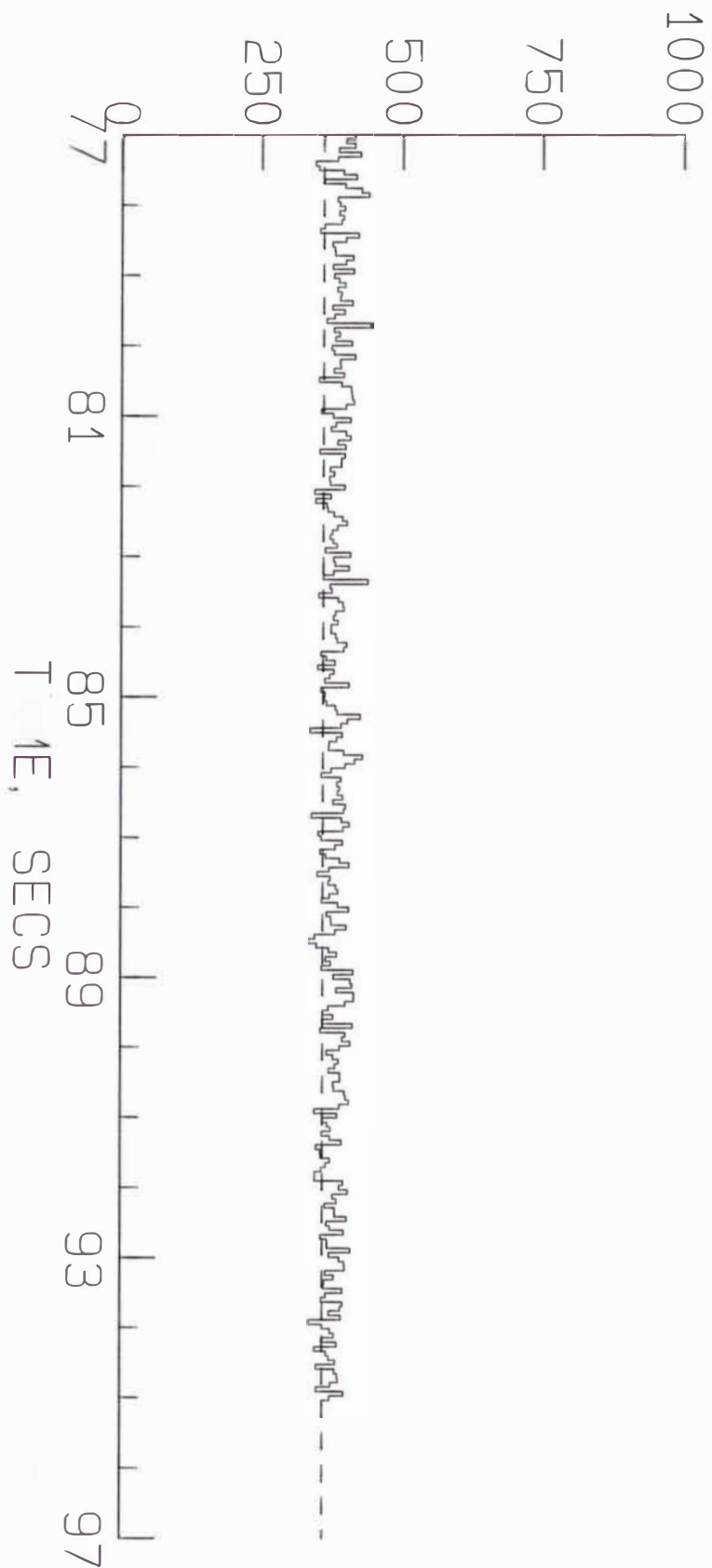
BATSE

00/52/20

68604.523

25- 100 keV

COUNTS/ .064 S

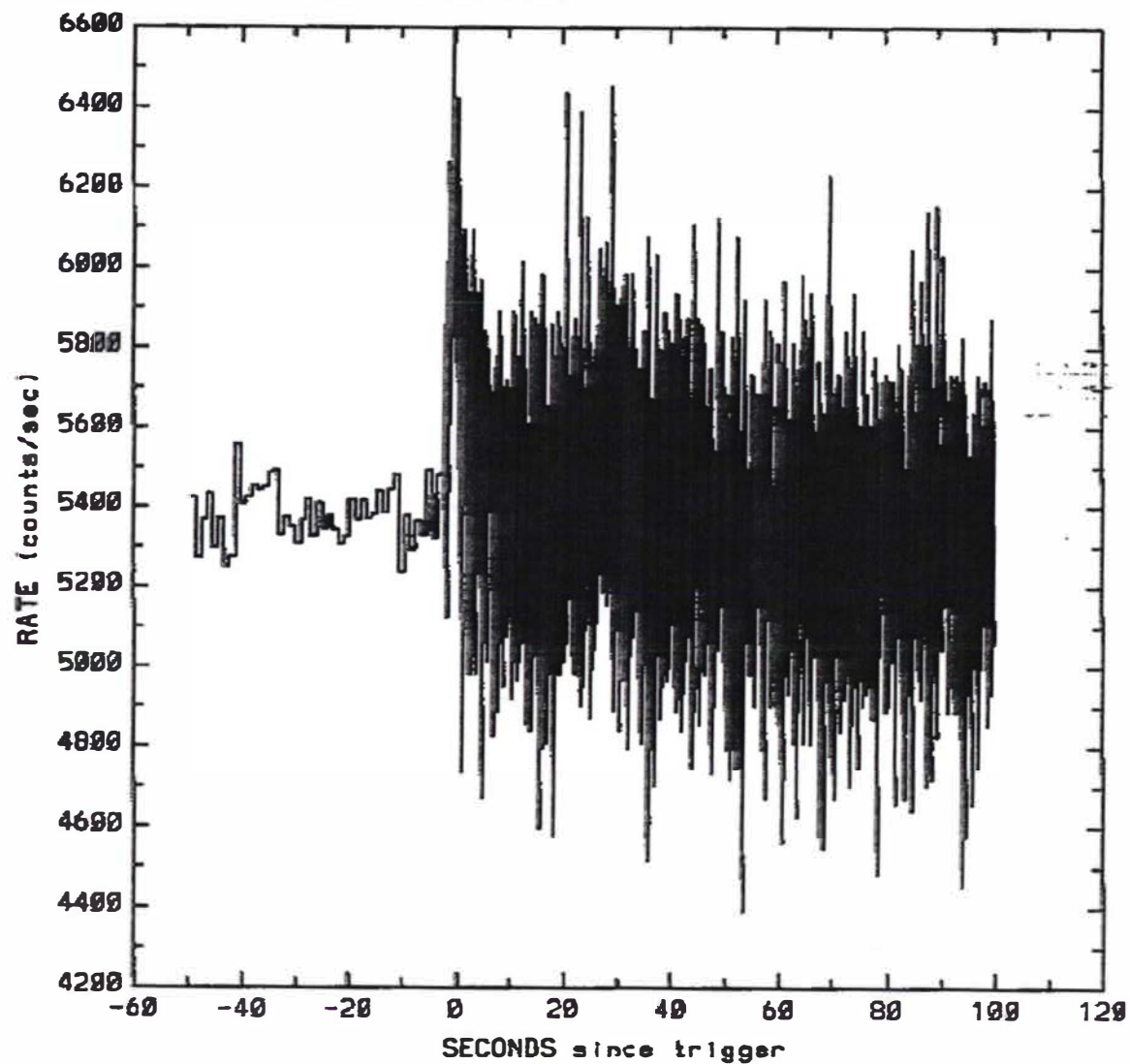


CATSEARCH PROGRAM

BATSE BURST # 223
EVENT OF 1991 MAY 23 DAY OF YEAR=143
EVENT CROSSING TIME AT BATSE : 85129. S. OR 23:38:49.1
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 352.000 27.500
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 23/ 5/ 91 IS:
RA= 123.223 DEC= 21.441 DIST= 3.493 AU
BATSE-ULYSSES DISTANCE = 522612640. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 67.96 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 654.23 SECS.
CROSSING TIME AT ULYSSES IS 85783. S. OR 23:49:43 +/- 340.47 SECONDS

NO

DATA FOR K. HURLEY



20-MAY-1994 08:53:59

Created by MOPS 80
(Burst Display)
Version 2.28

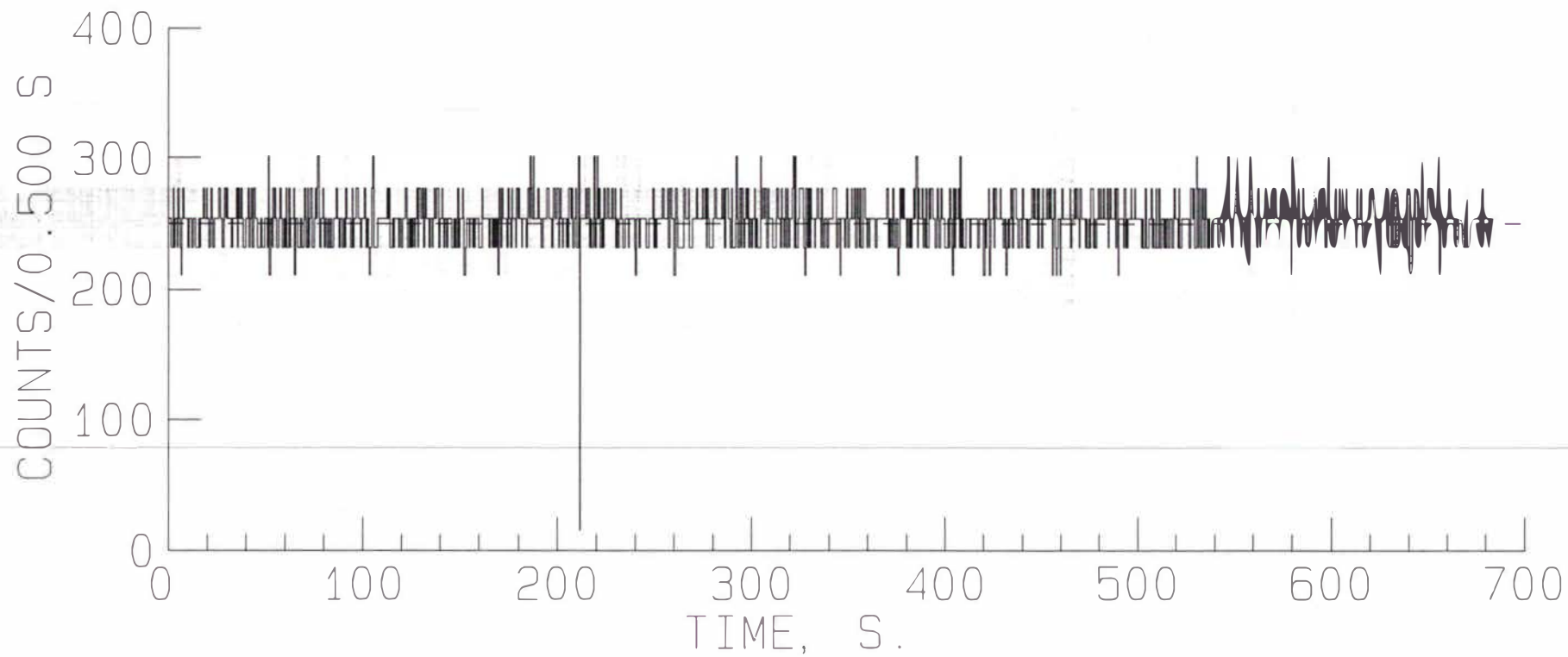
Trigger # : 223

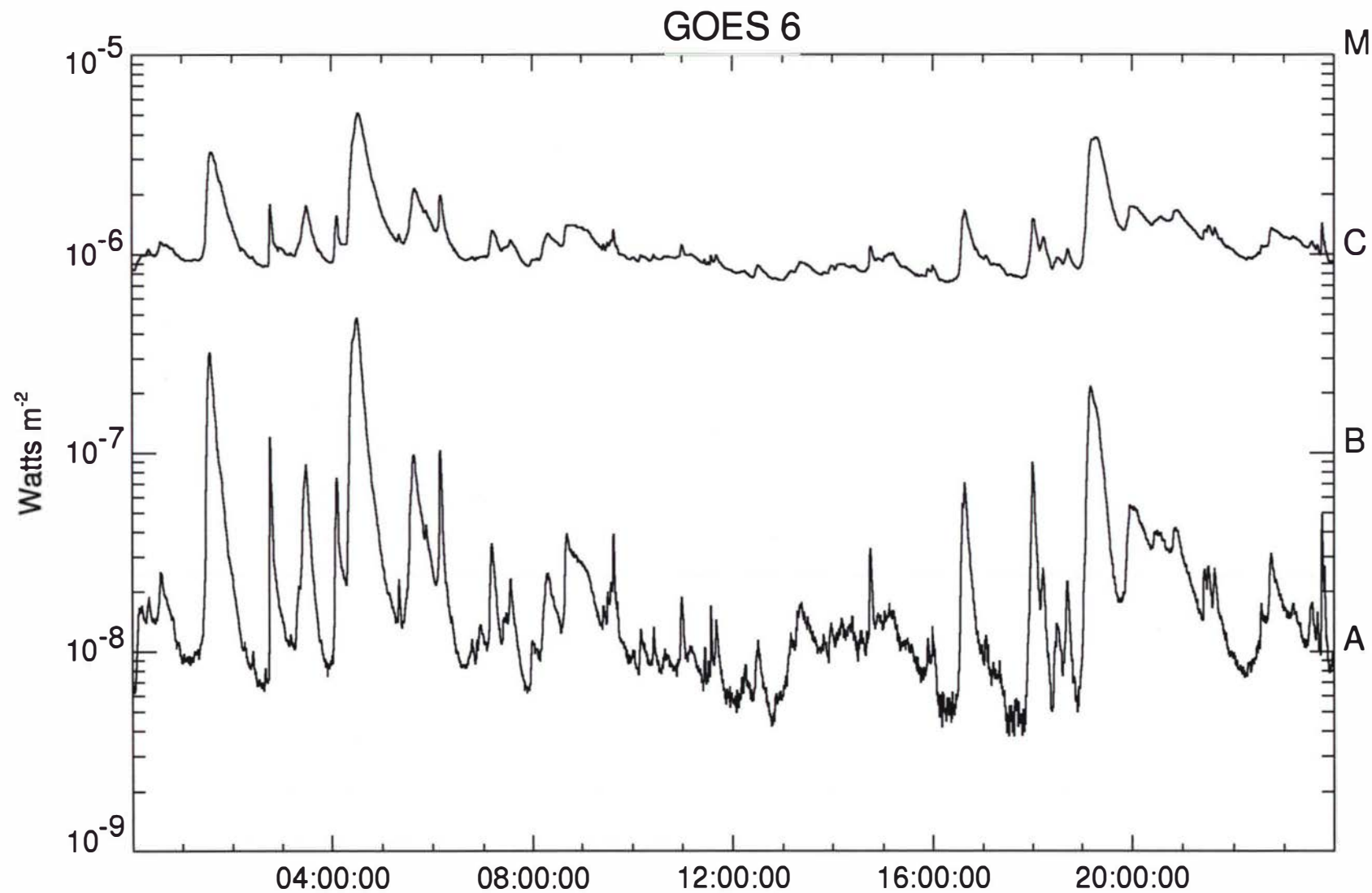
Trigger Time:
8399 / 85129.867Burst Data Type:
DISCSCDeadtime
Corrected: N
Background Data
Type: PREB + DISCLA
Minimum Integ. Time:
0.004 secondsDetectors [7..8]:
80000011Discriminators:
1 1, 2]Quality Mask:
8DISP1

14 / 4 / 93

ULYSSES RT
23 / 5 / 91 85428.211 s
0 - 0 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS





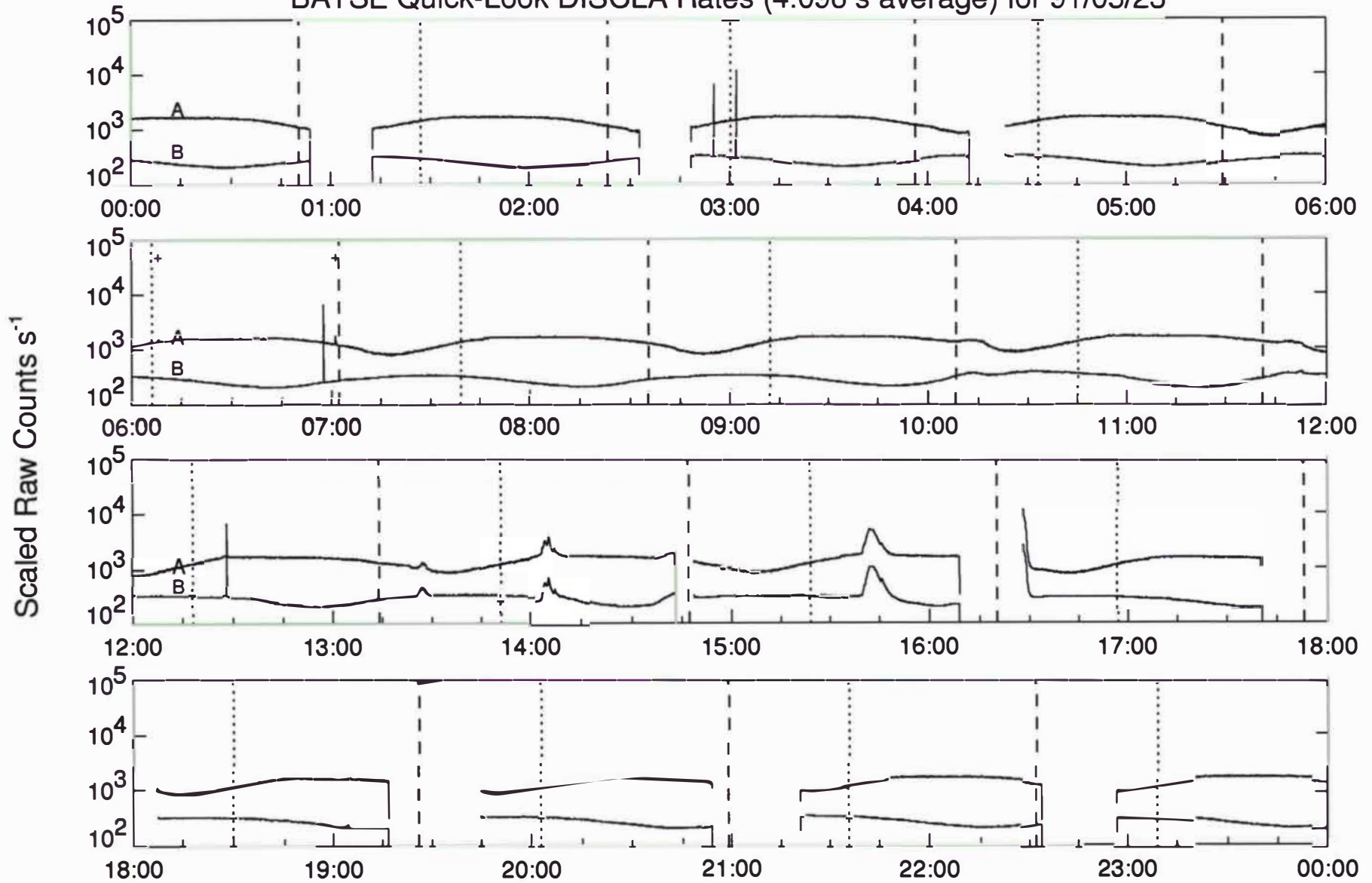
Data Start: 91/05/23, 0000:00

Channel 1 (1.0 - 8.0 Angstroms)
2 (0.5 - 4.0 Angstroms)

Plot created: 96/11/27, 0343

Background not subtracted
Background not subtracted
Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/23

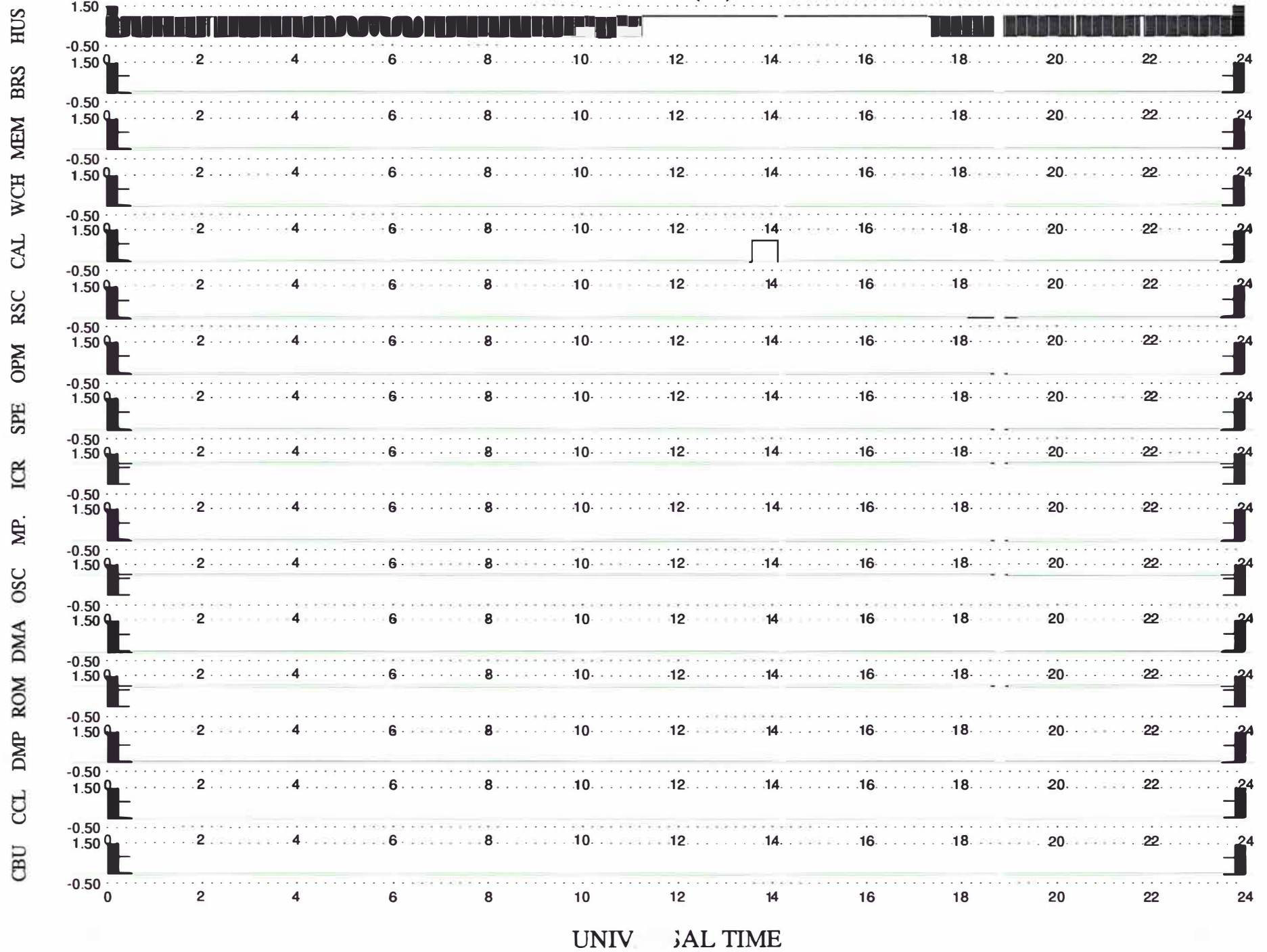


Current Time: 96/11/27, 0344 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

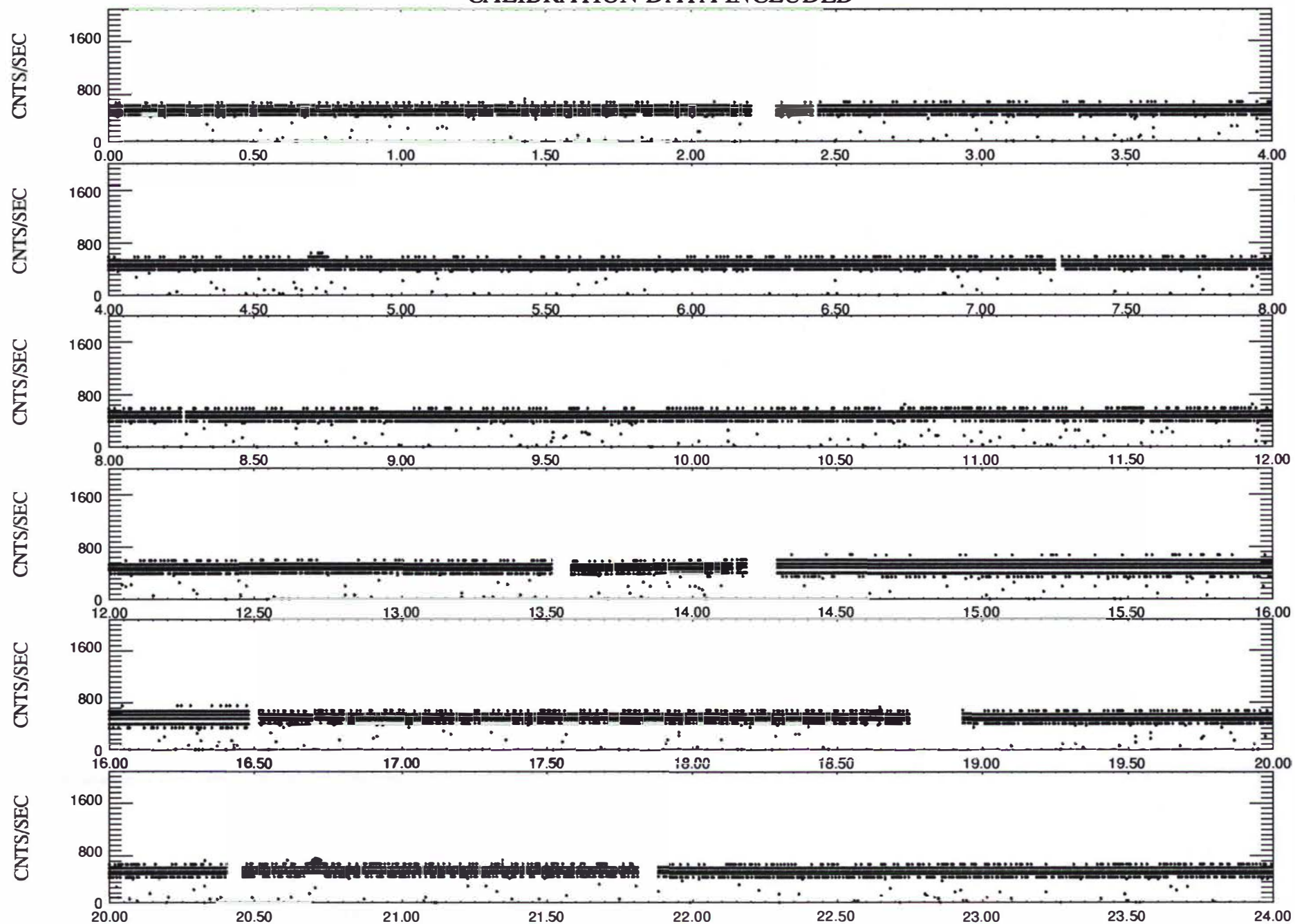
Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

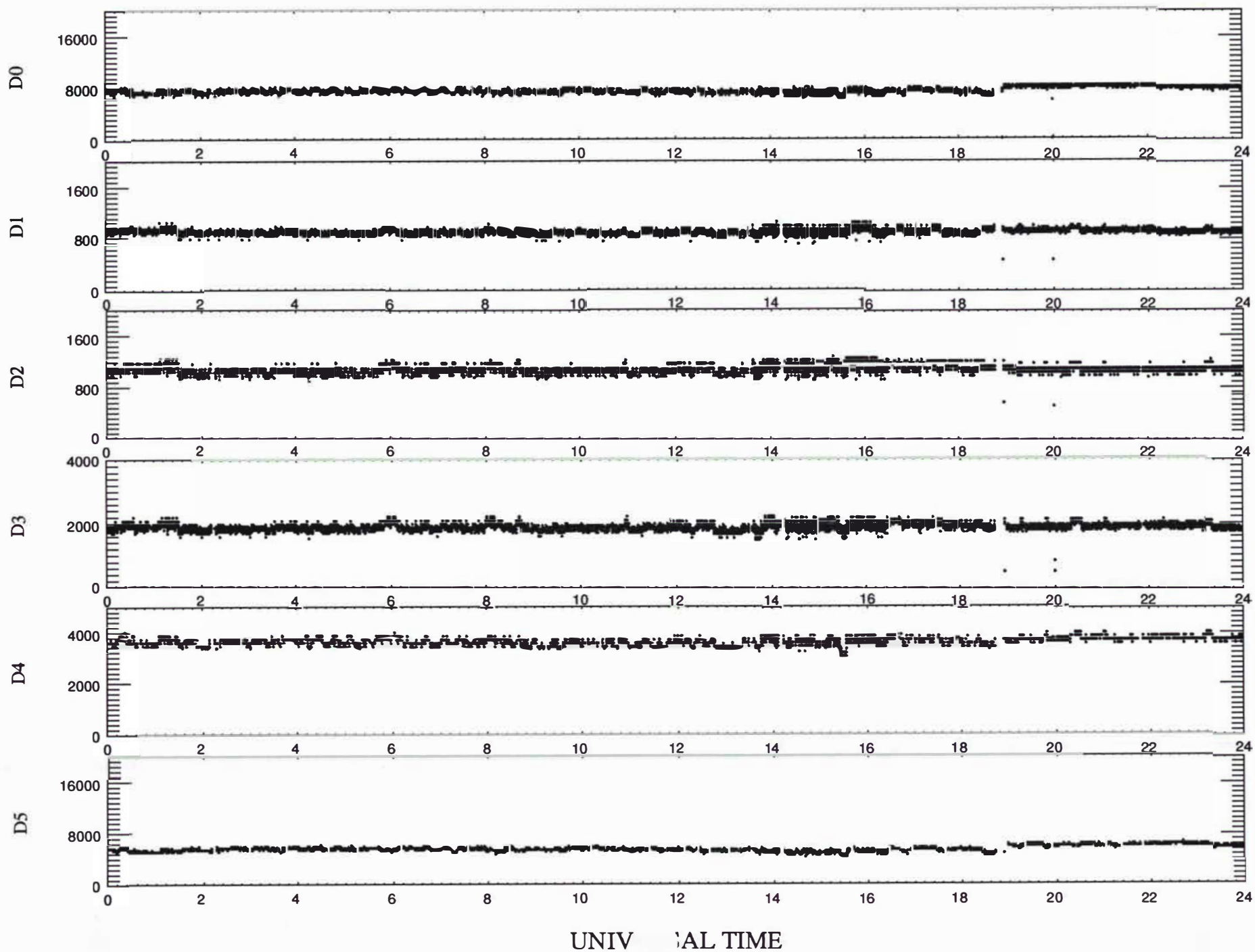
NO BURST (10)

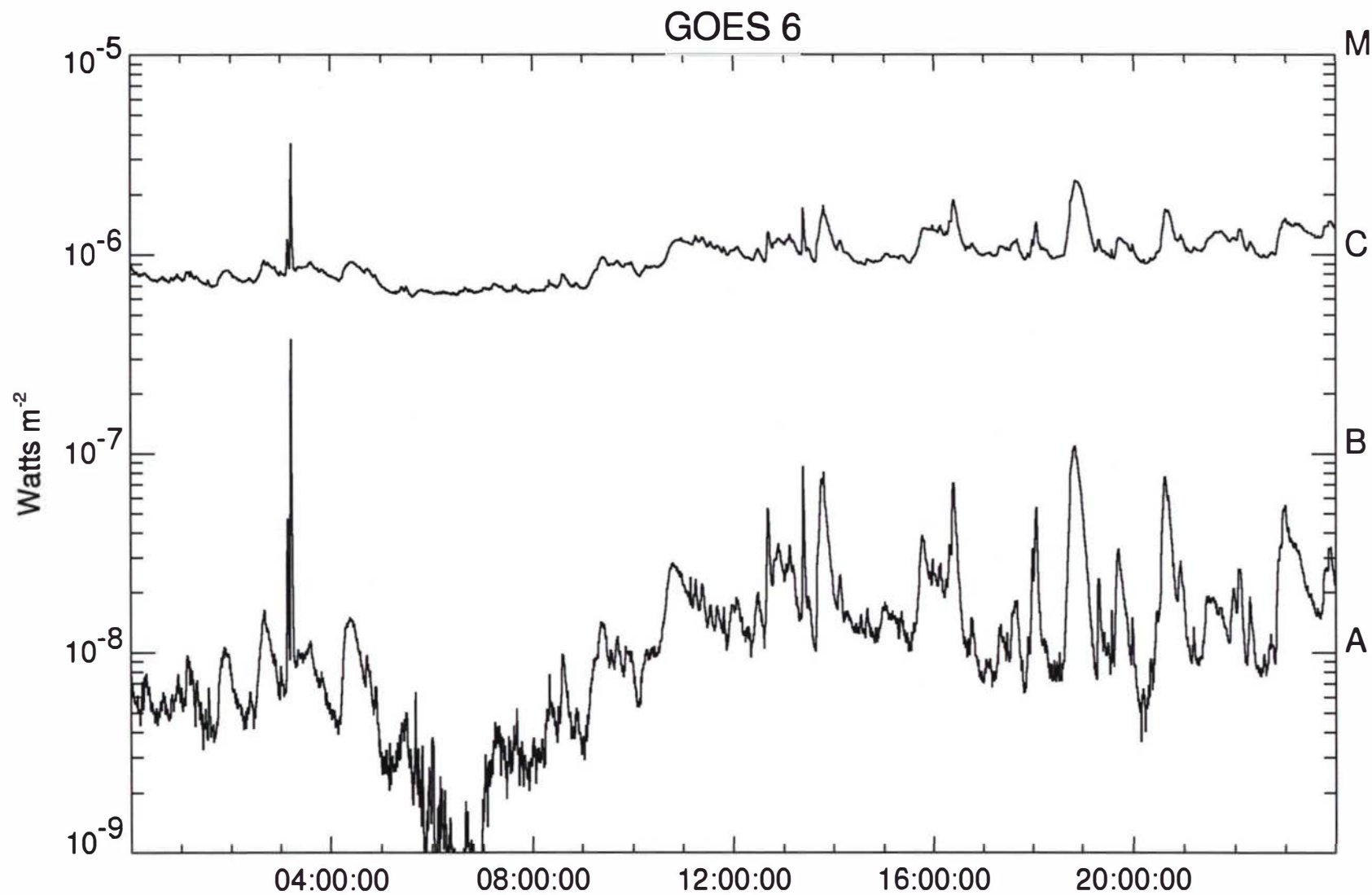


CALIBRATION DATA INCLUDED



UNIV. TIME





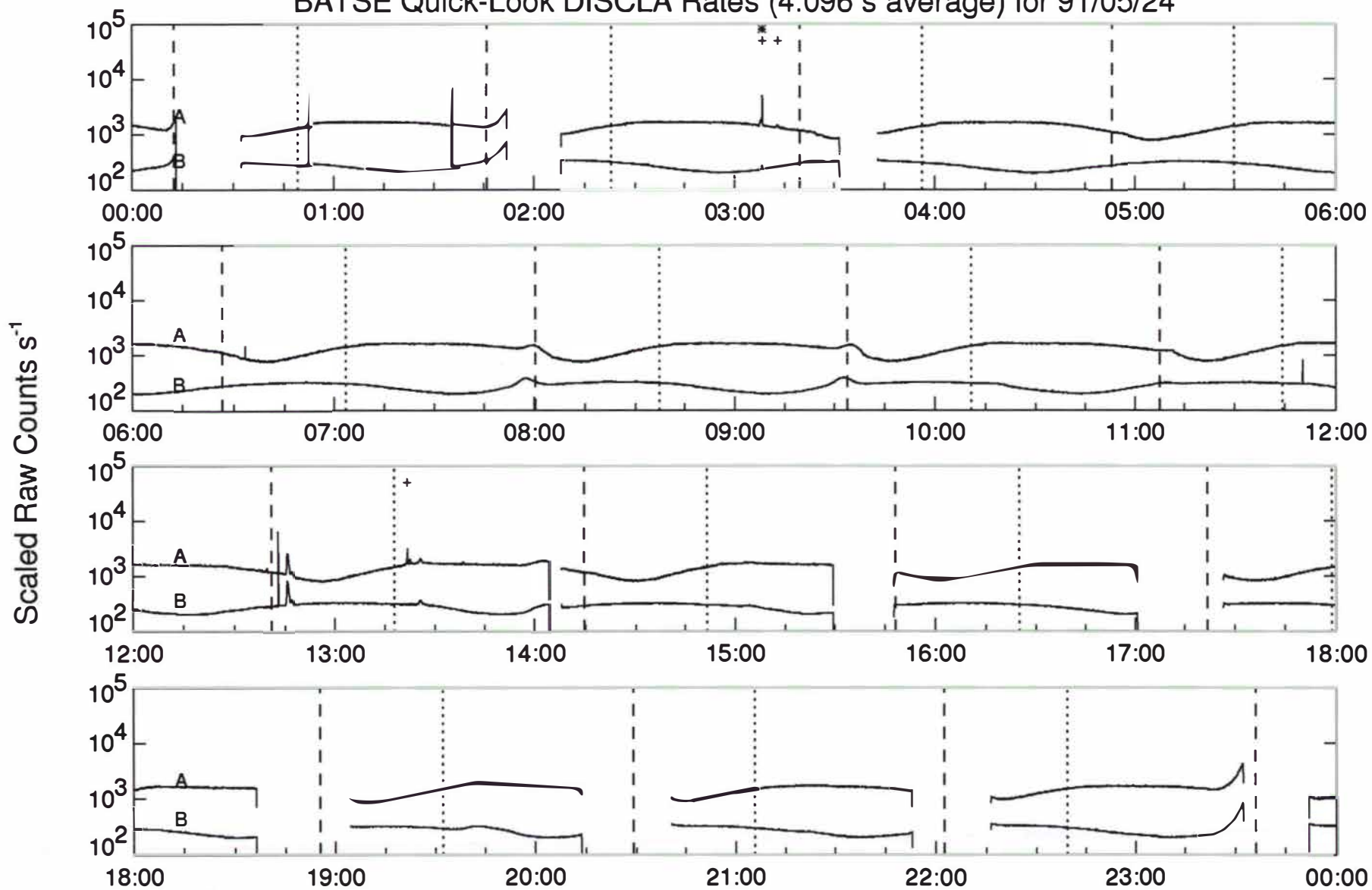
Data Start: 91/05/24, 0000:01

Channel 1 (1.0 - 8.0 Angstroms)
2 (0.5 - 4.0 Angstroms)

Plot created: 96/11/27, 0346

Background not subtracted
Background not subtracted
Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/24



Current Time: 96/11/27, 0347 EDT

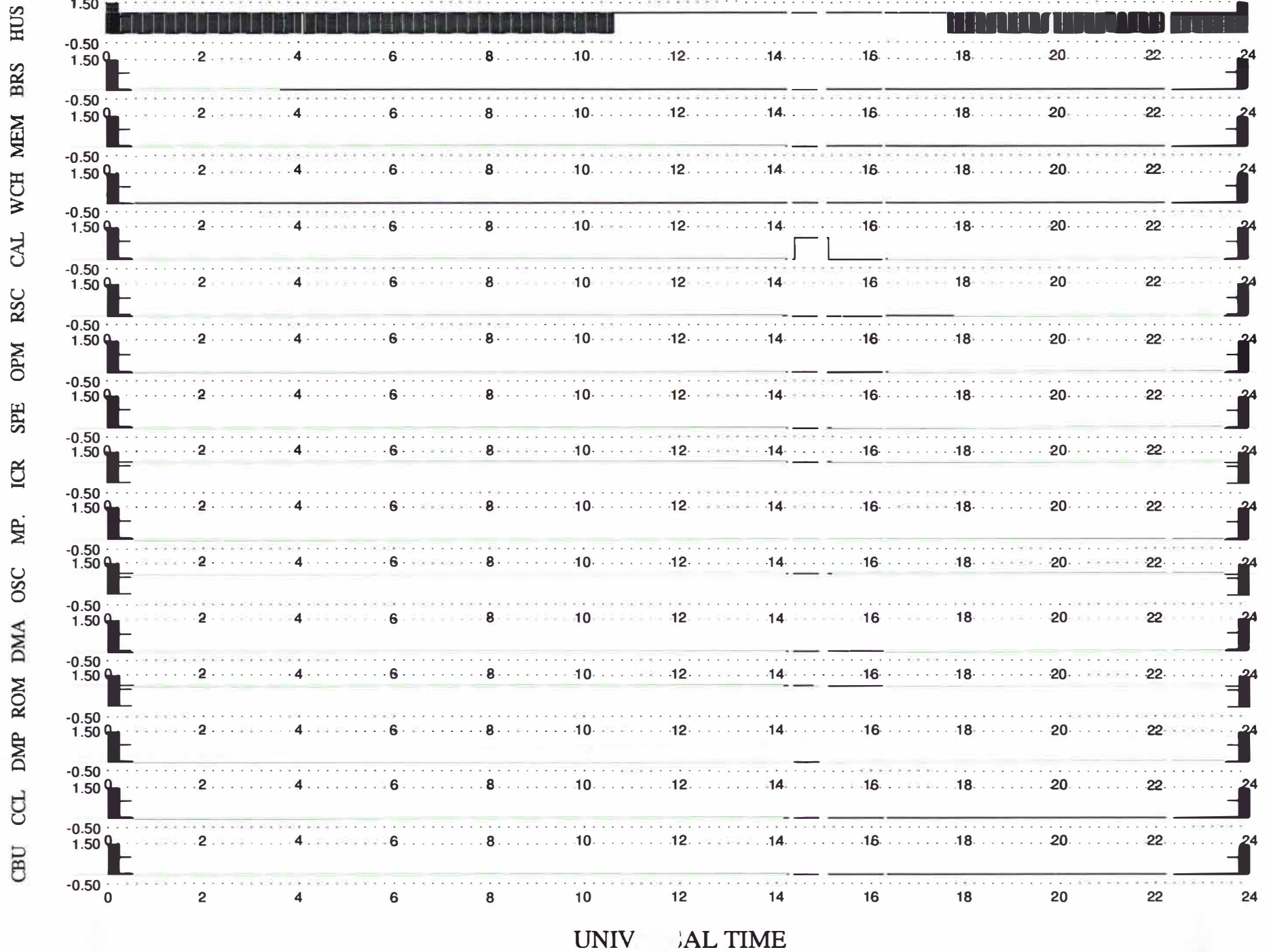
A: Channel 0 Most Sunward LAD

B: Sum Channel 0 Anti-Sunward LADs X .05

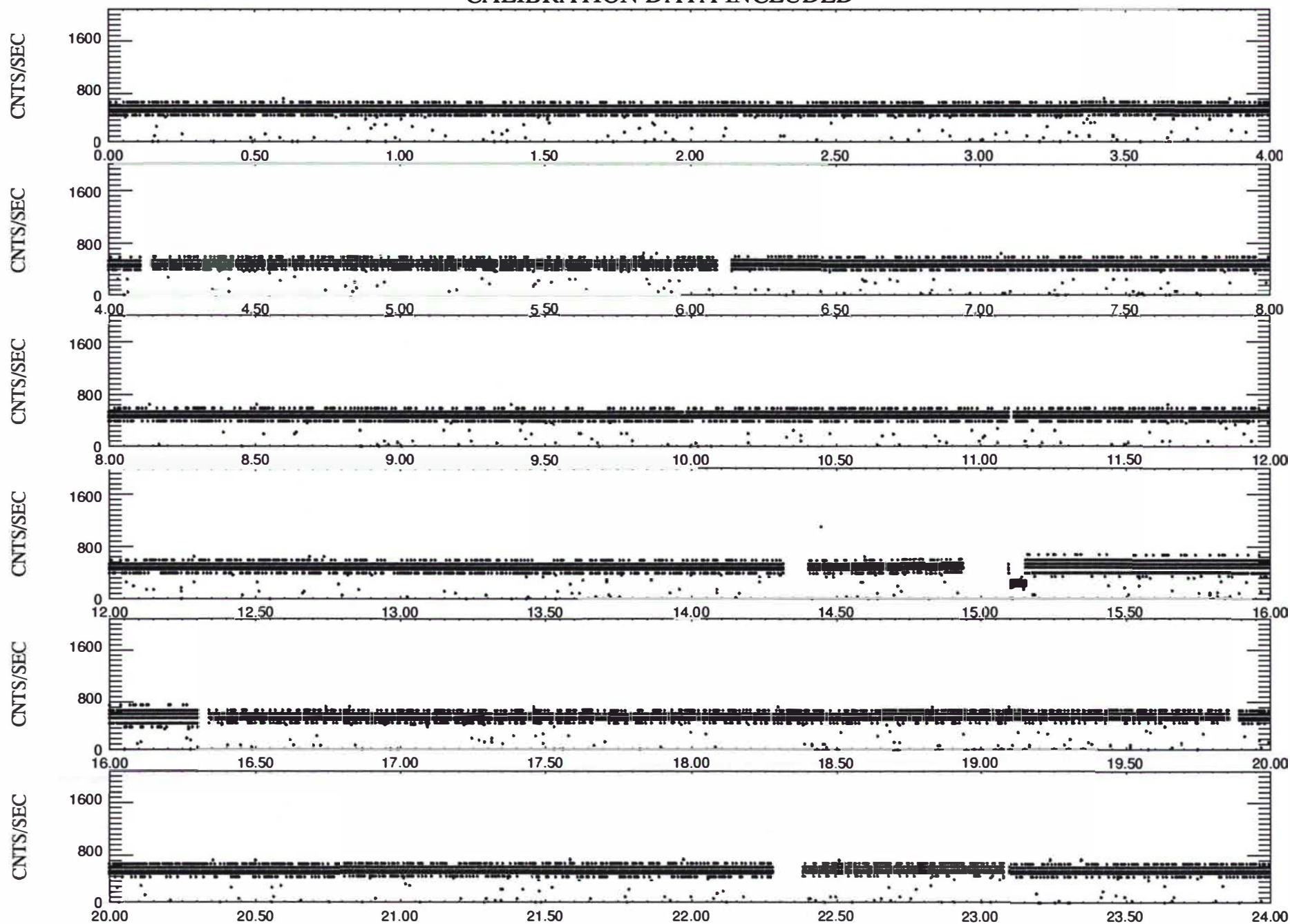
Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare

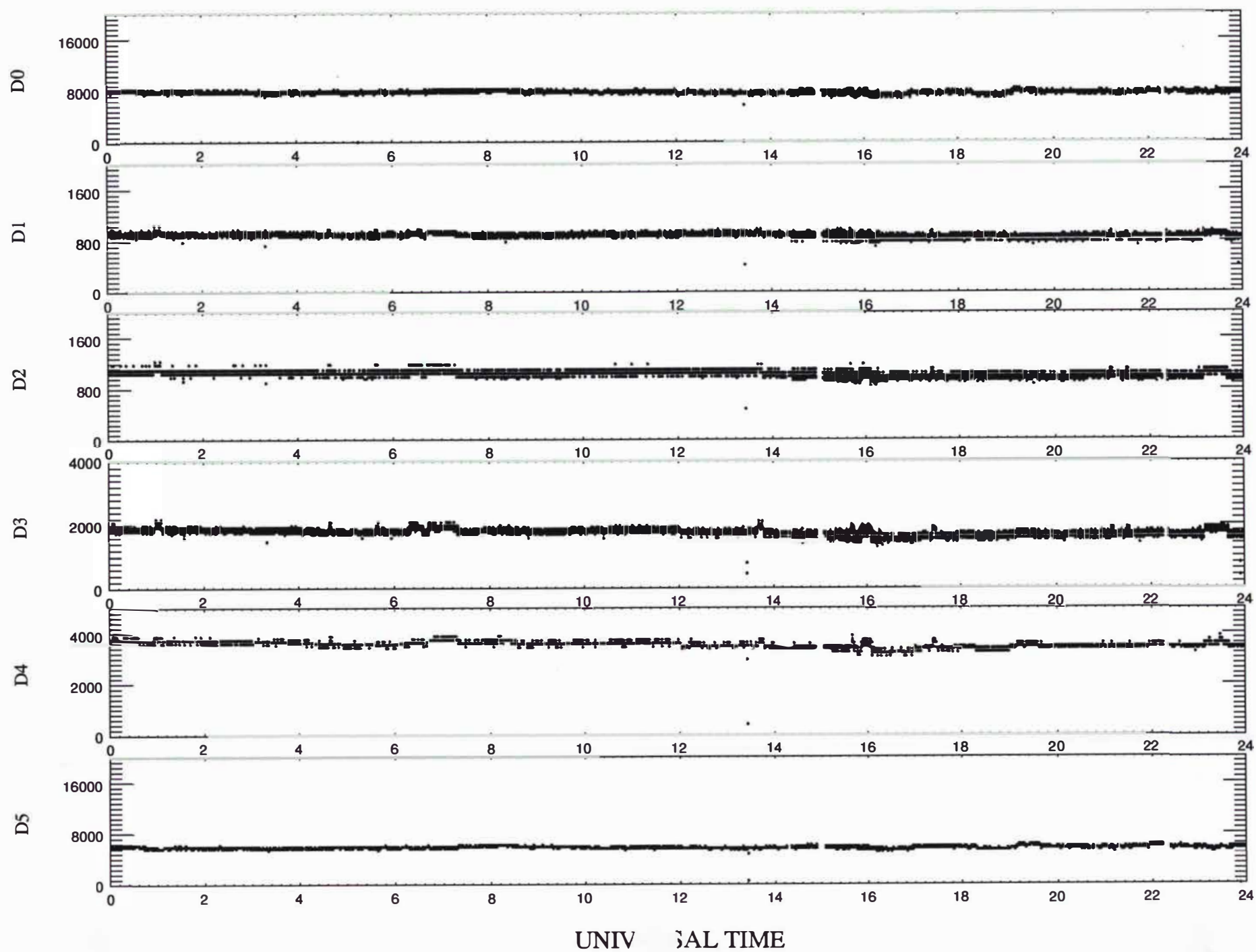
NO BURST (10)



CALIBRATION DATA INCLUDED



UNIV CAL TIME



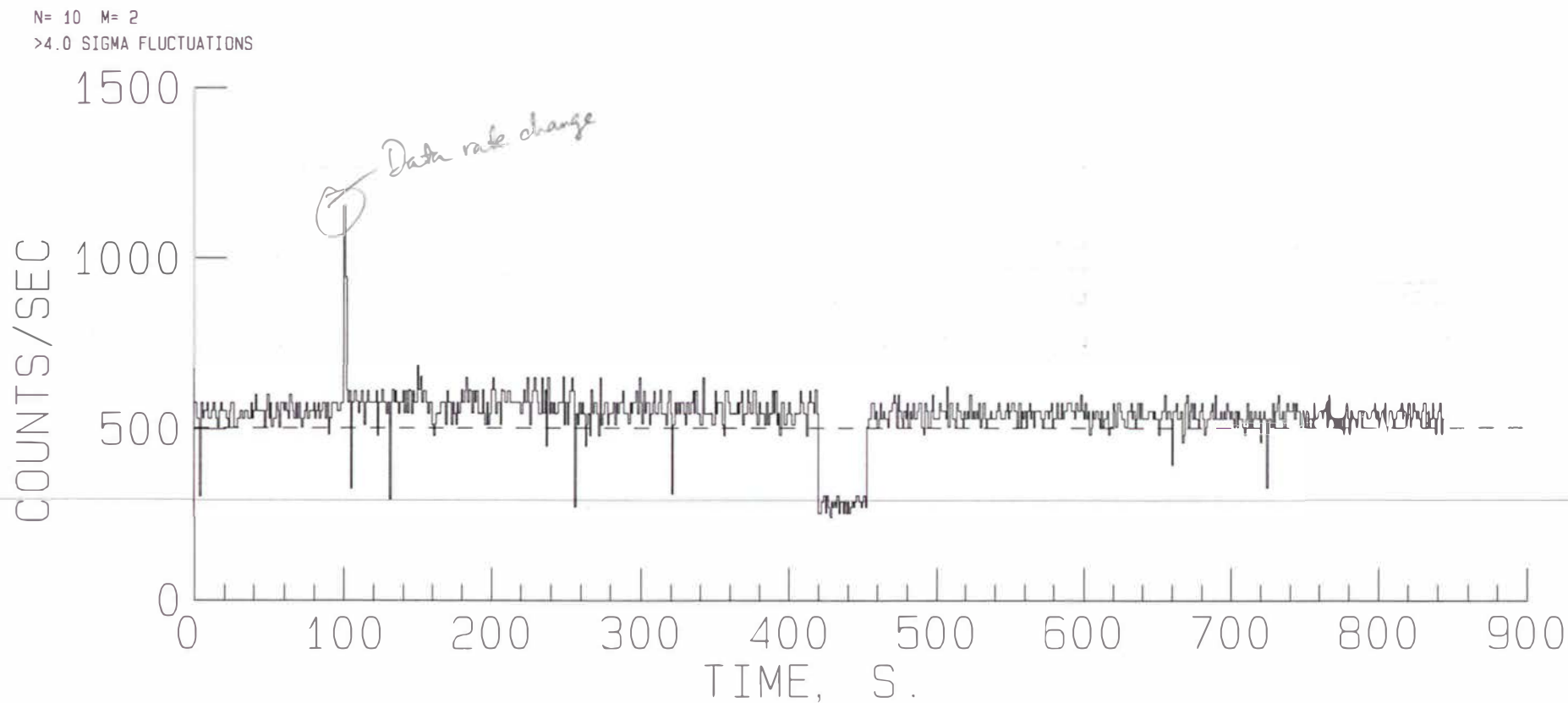
CATSEARCH PROGRAM

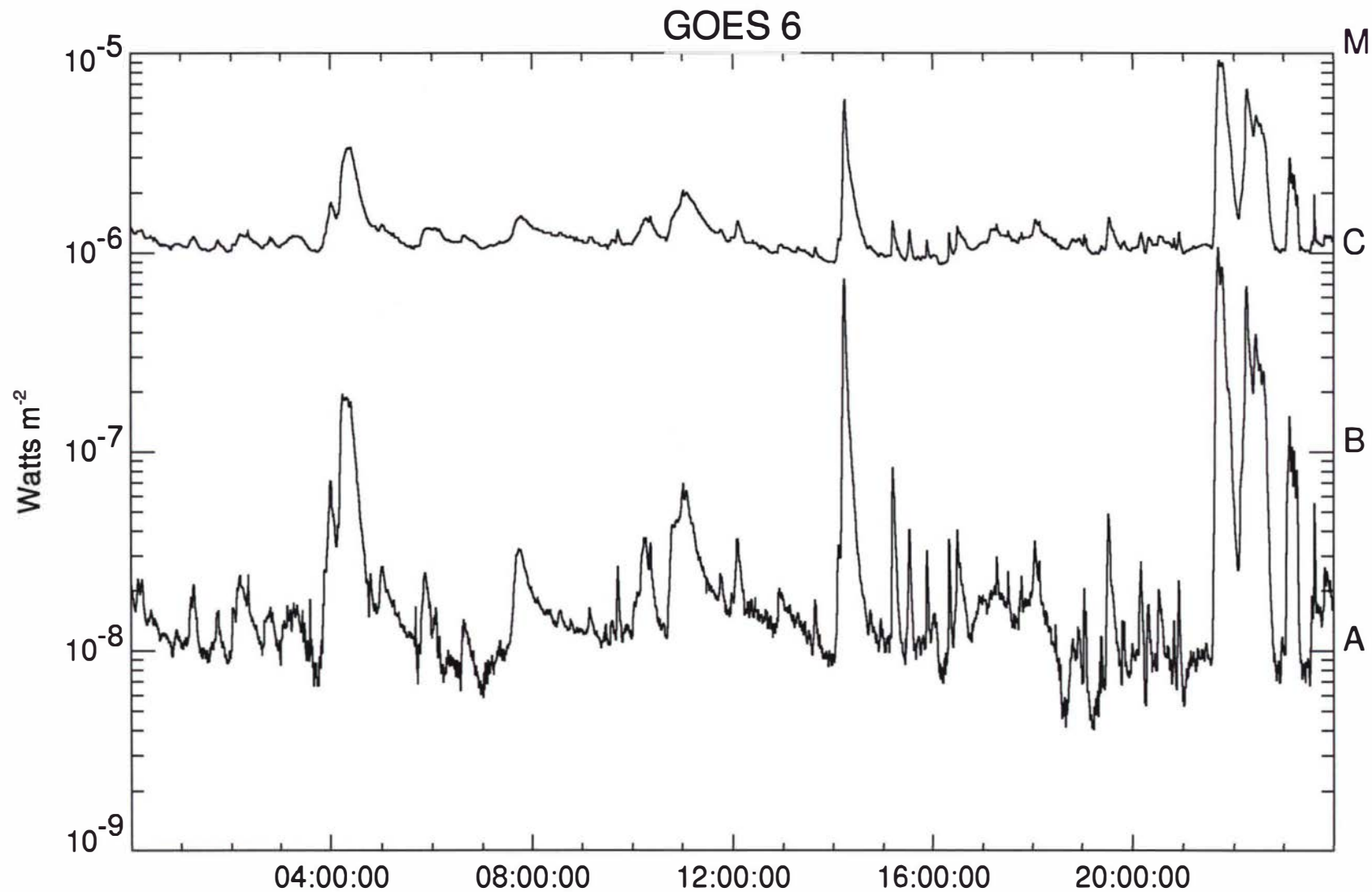
BATSE BURST # 226
EVENT OF 1991 MAY 25 DAY OF YEAR=145
EVENT CROSSING TIME AT BATSE : 69988. S. OR 19:26:27.9
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 229.600 -60.000
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 25/ 5/ 91 IS:
RA= 123.854 DEC= 21.294 DIST= 3.538 AU
BATSE-ULYSSES DISTANCE = 529241416. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 63.84 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 778.39 SECS.
CROSSING TIME AT ULYSSES IS 70766. S. OR 19:39:26 +/- 336.91 SECONDS

NO

14 / 4 / 93

ULYSSES RT
25 / 5 / 91 70416.070 s
0.500 S INTERVALS REGROUPED BY 2
0 - 0 keV





Data Start: 91/05/25, 0000:02

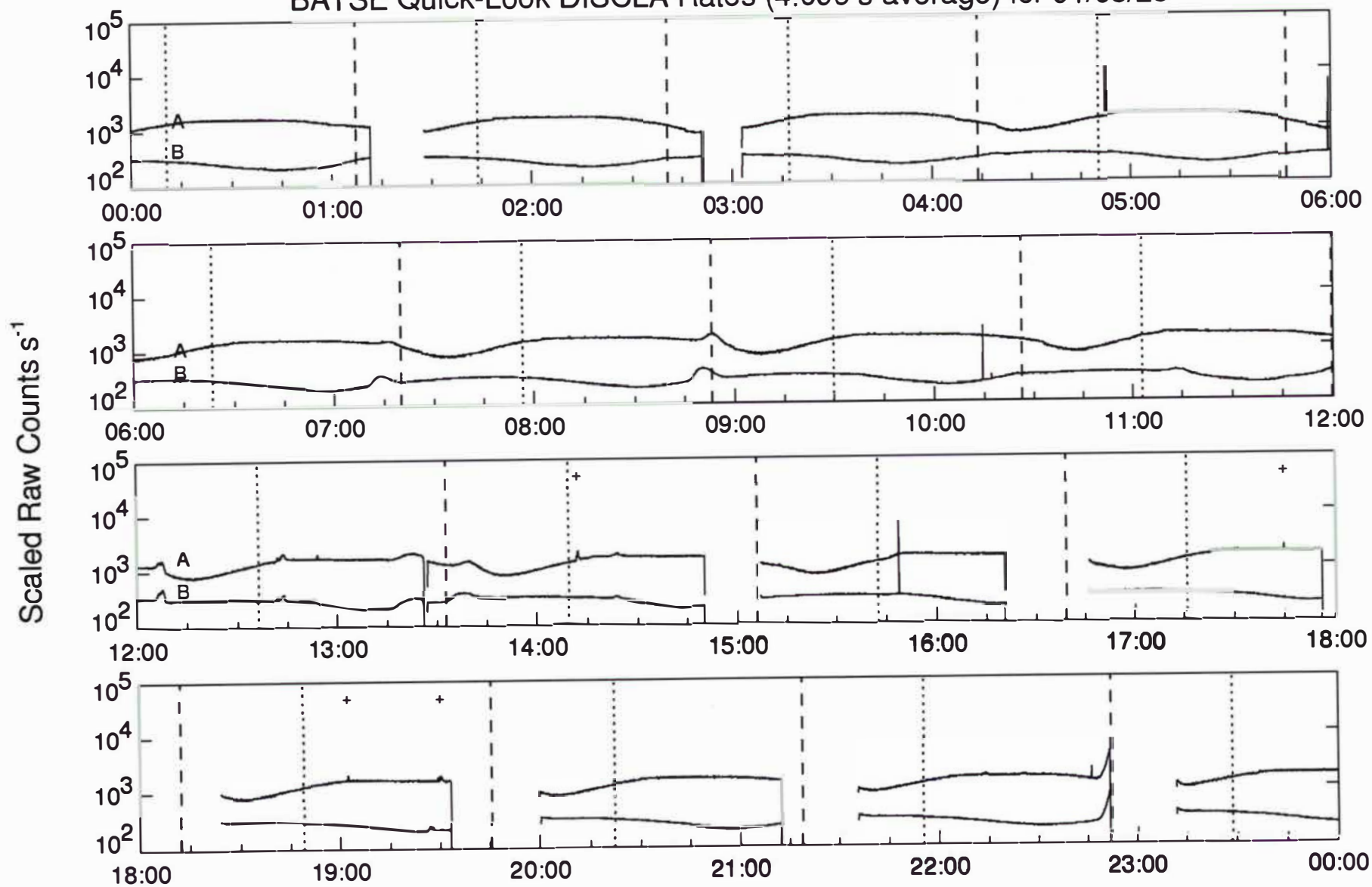
Plot created: 96/11/27, 0350

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/25

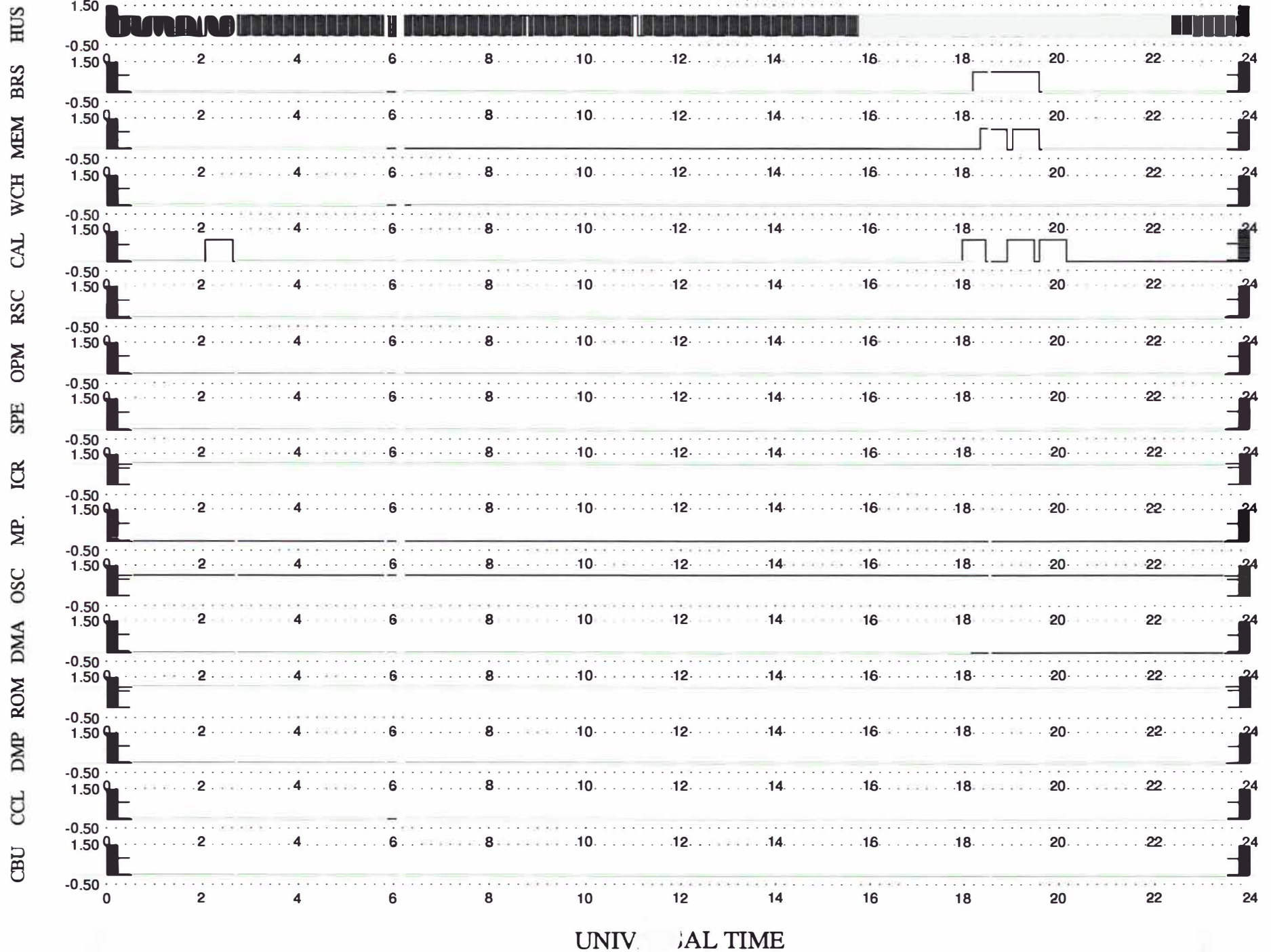


Current Time: 96/11/27, 0351 EDT
A: Channel 0 Most Sunward LAD
B: Sum Channel 0 Anti-Sunward LADs X .05

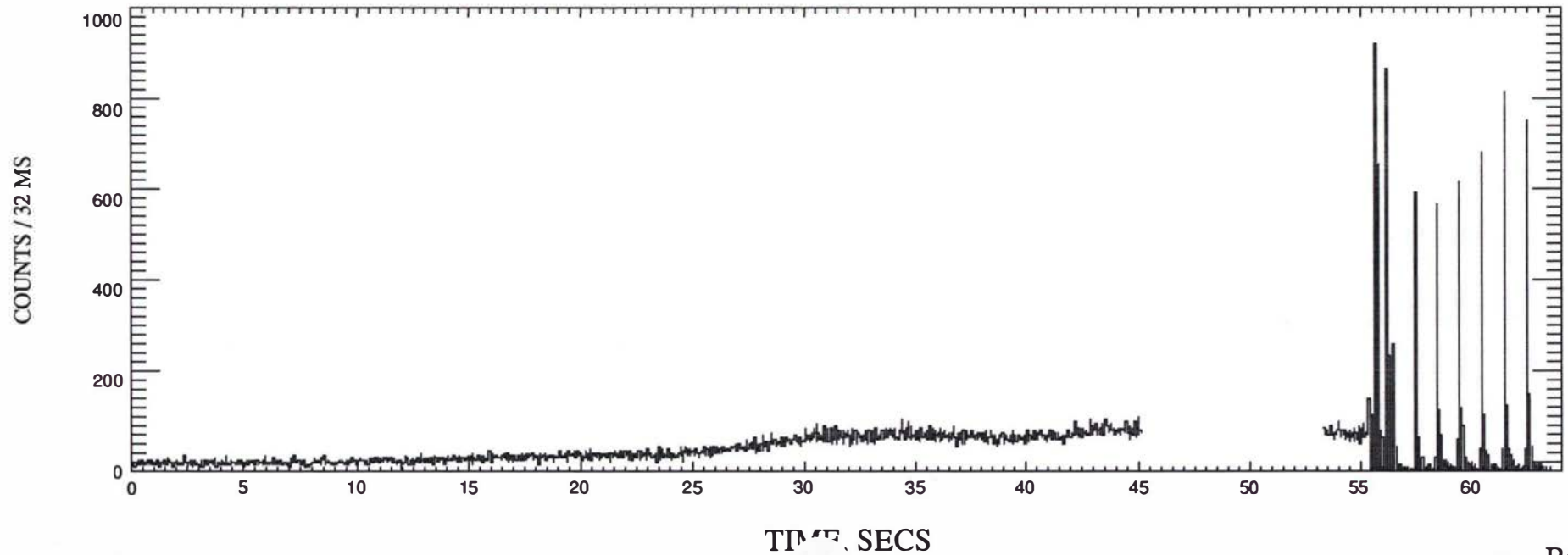
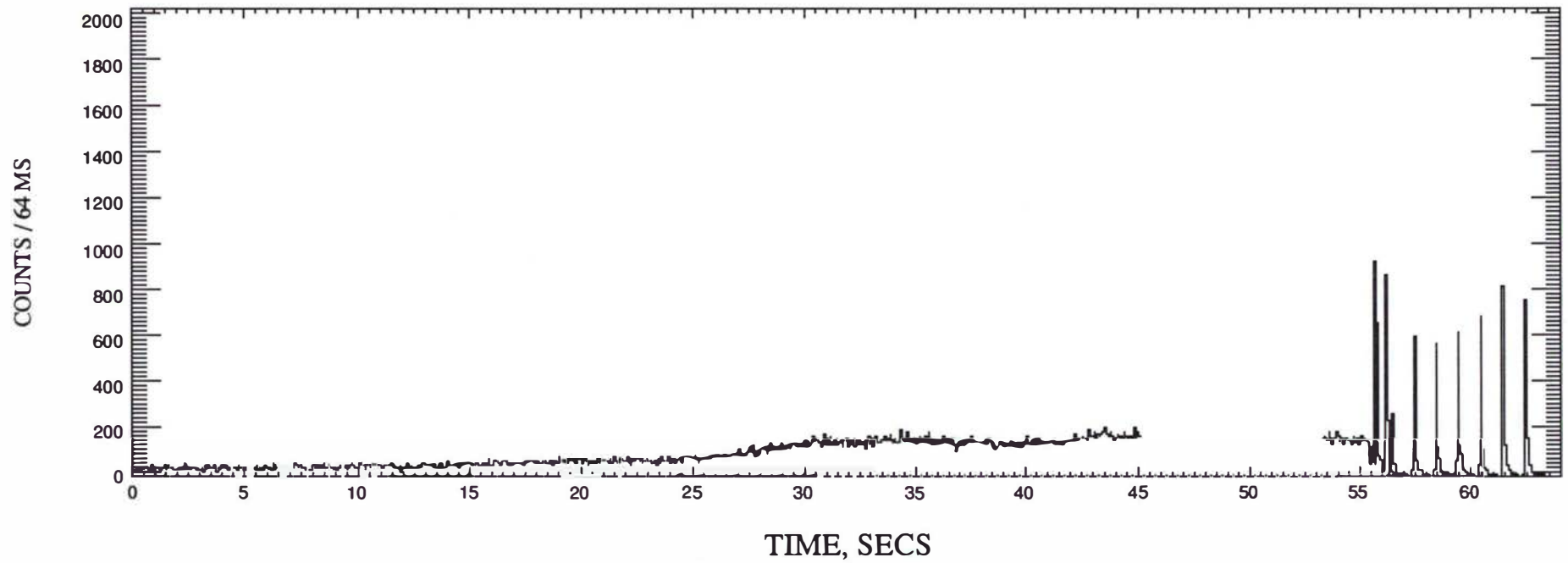
Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare

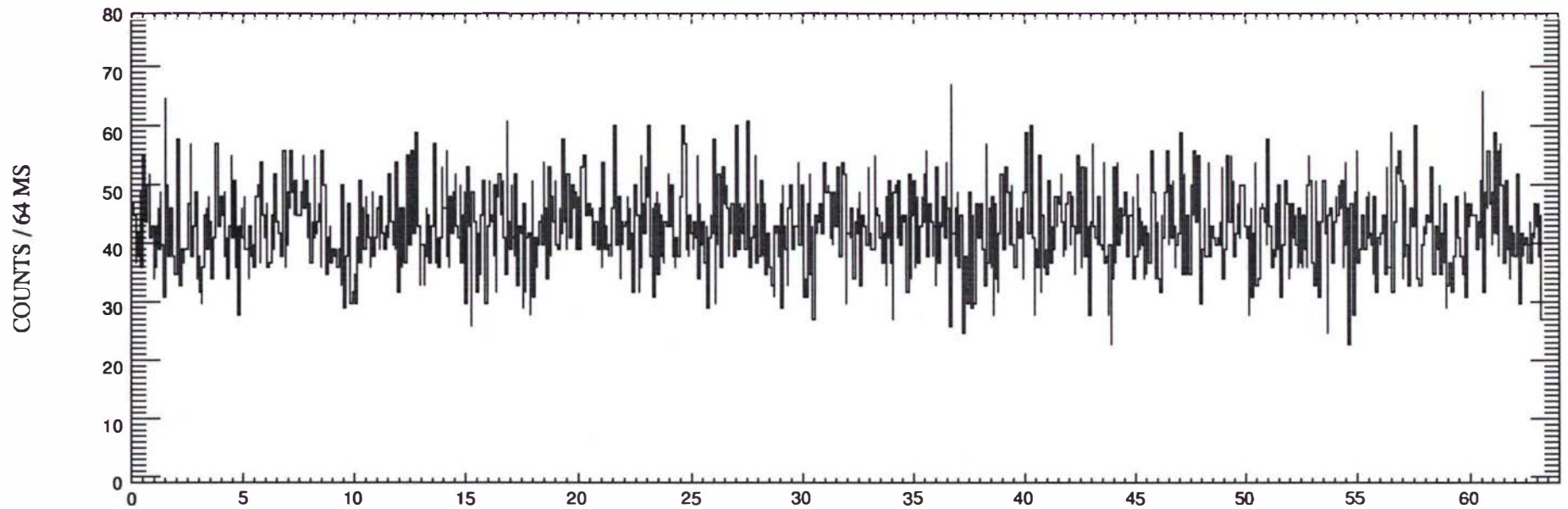
BURST NUMBER 11, 12



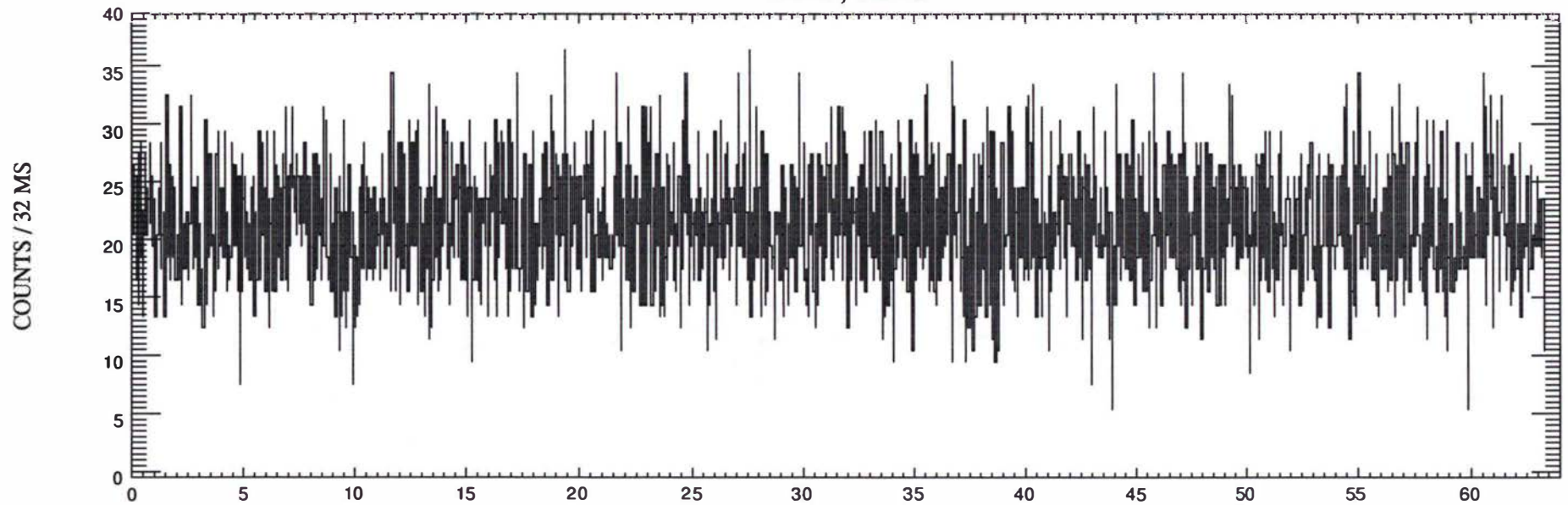
Burst Counter 11 at UT=18.173606567383 h=65424.984 s 18:10:24.984



Burst Counter 12 at UT=18.882717166477 h=67977.782 s 18:52:57.782

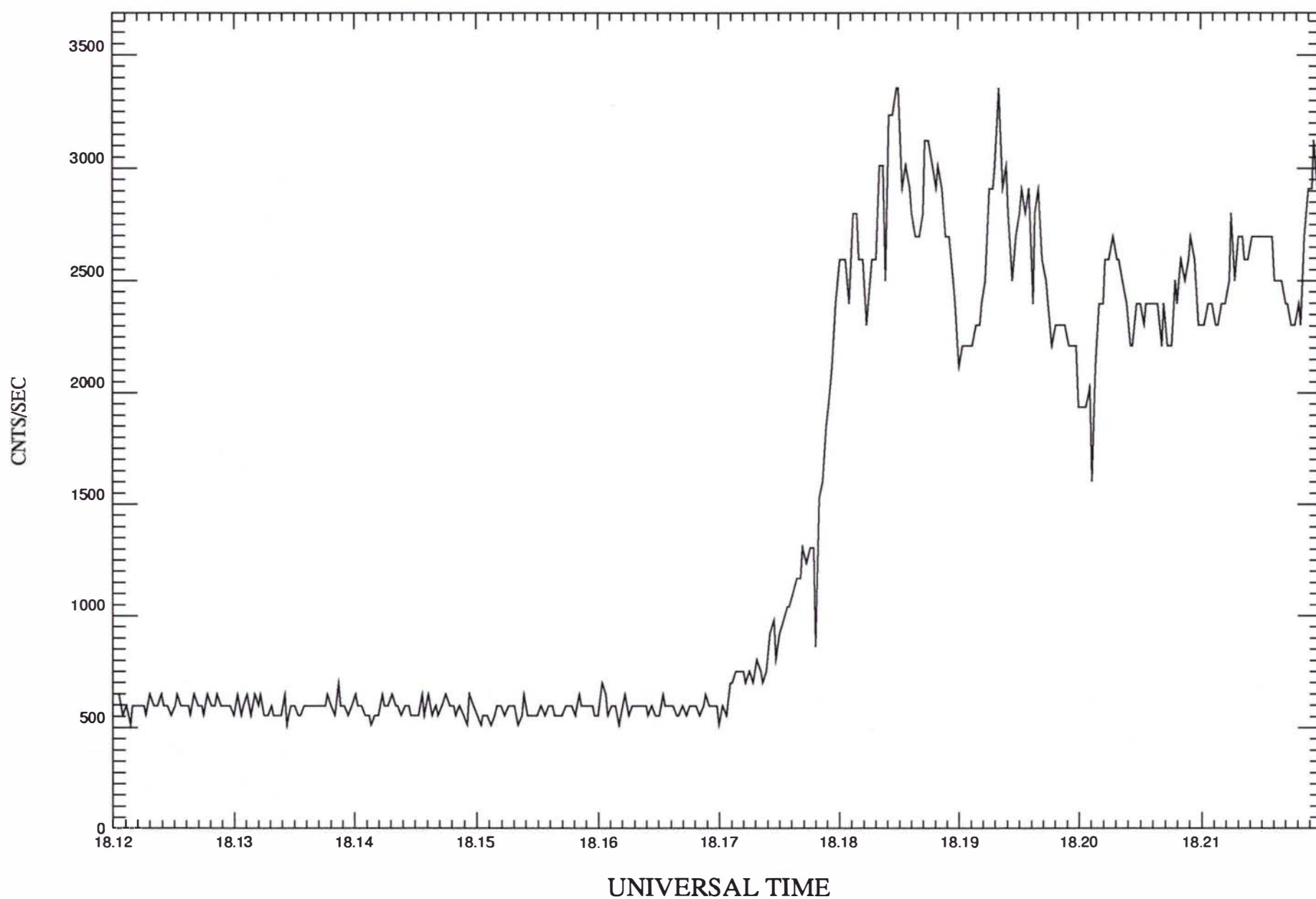


TIME, SECS

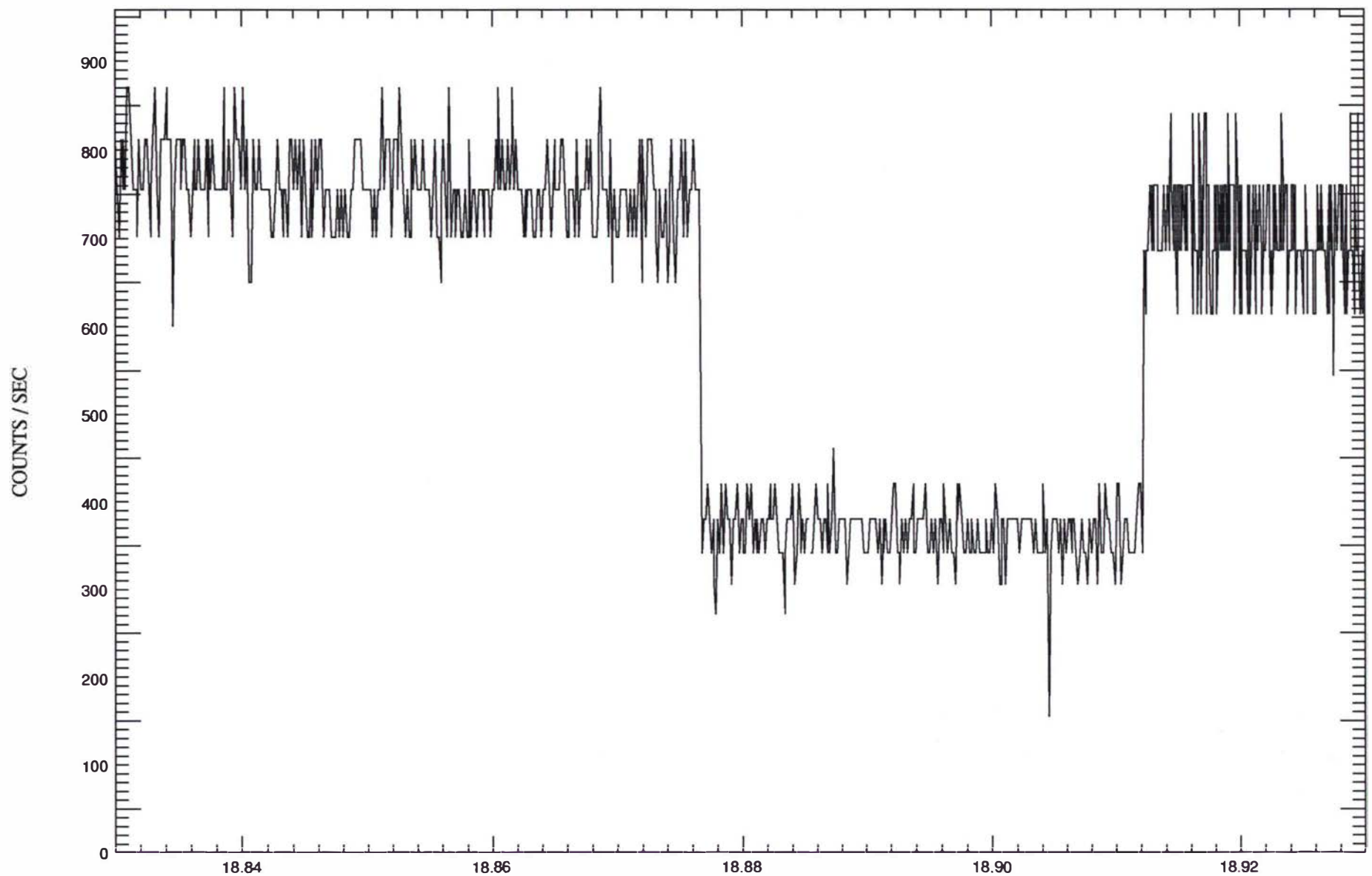


TIME, SECS

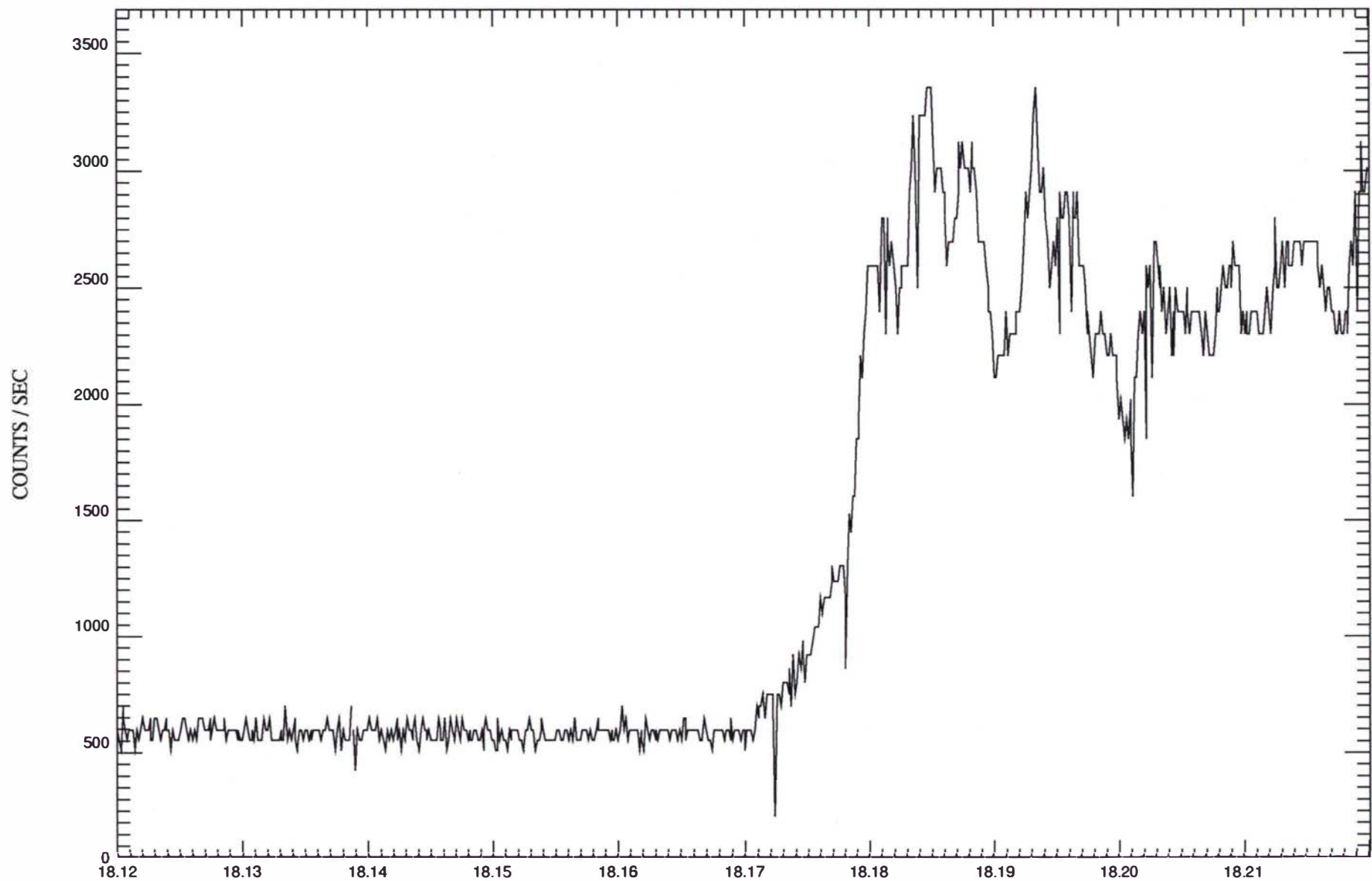
CALIBRATION DATA INCLUDED



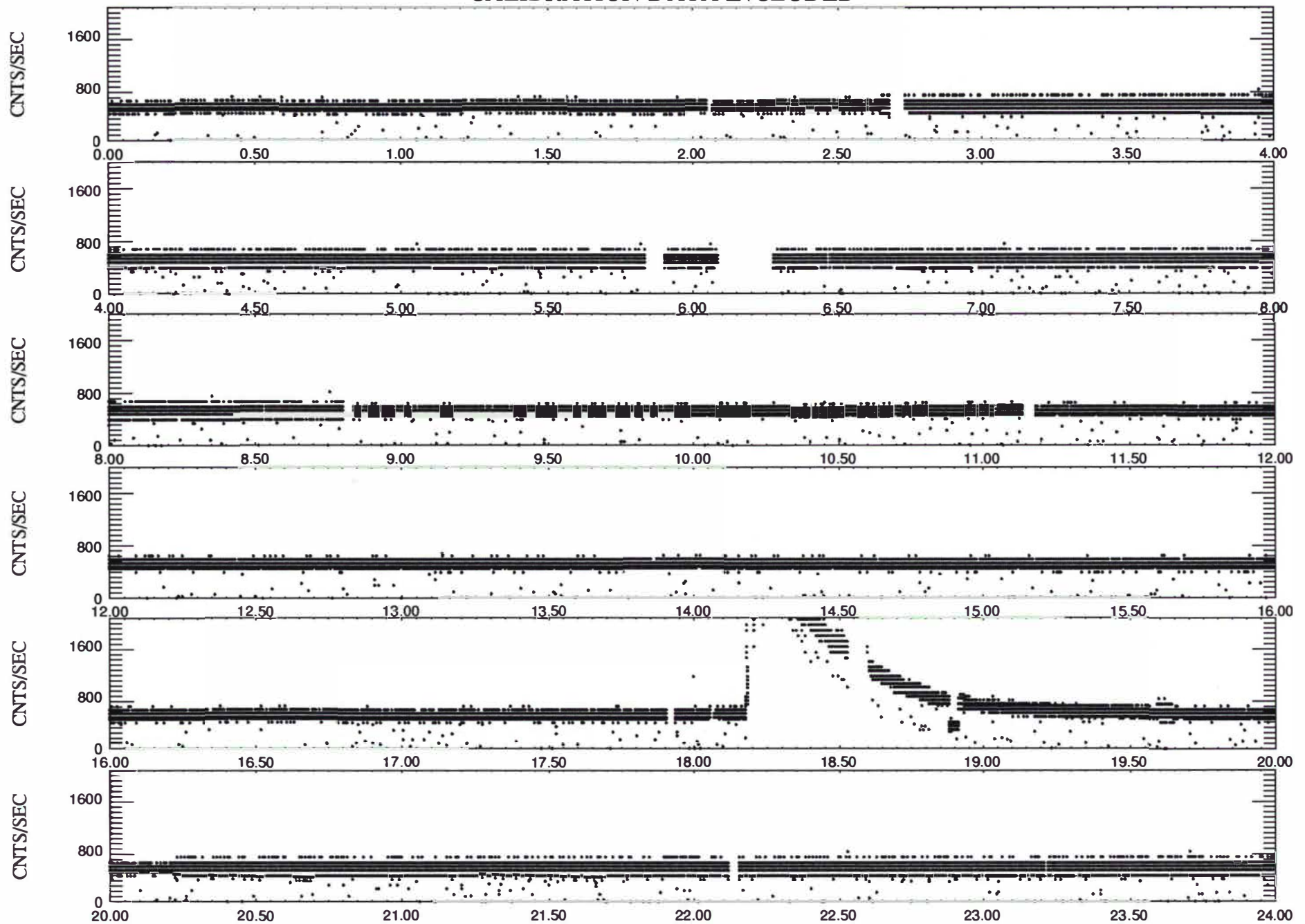
CALIBRATION DATA INCLUDED



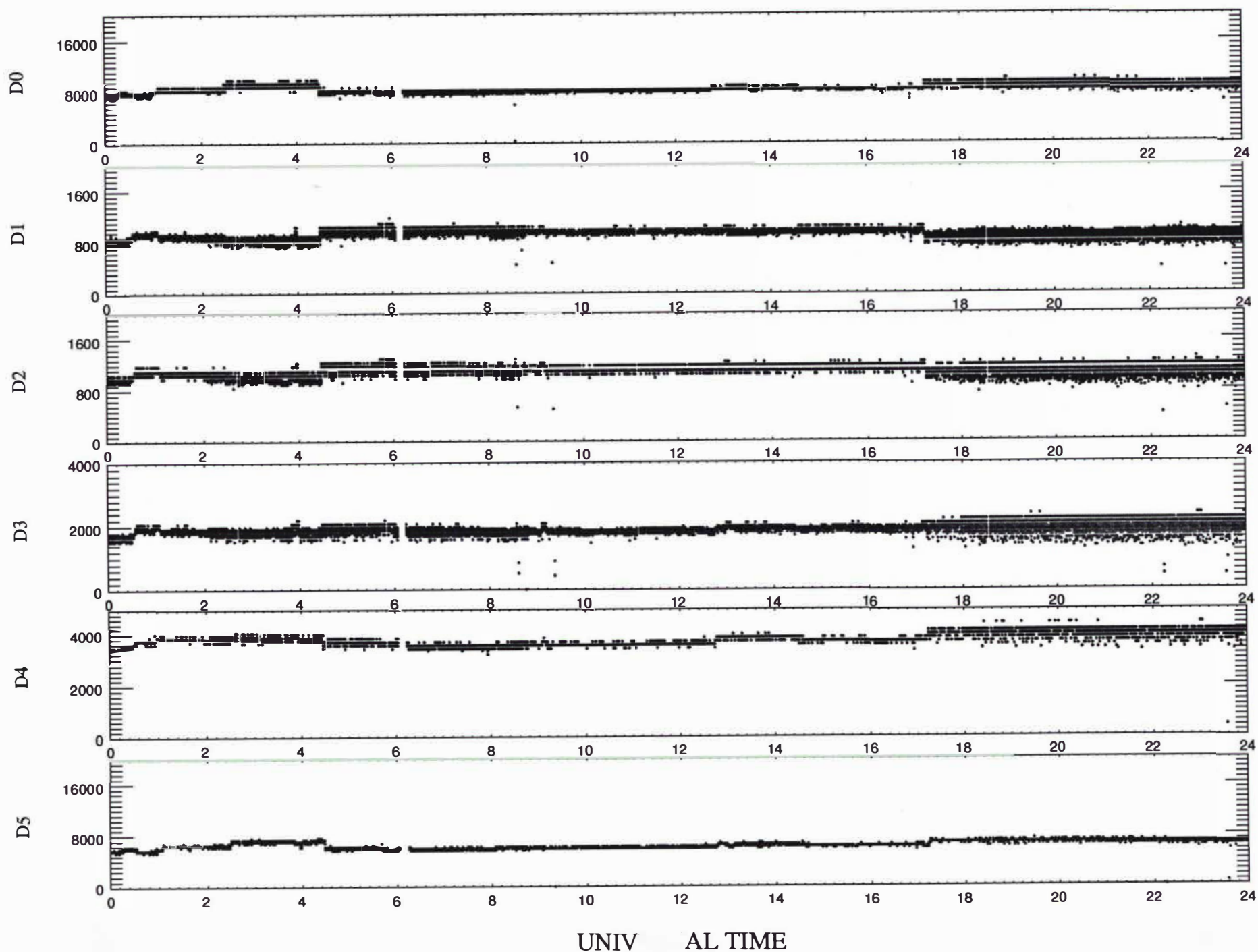
CALIBRATION DATA INCLUDED



CALIBRATION DATA INCLUDED



UNIV AL TIME



CATSEARCH PROGRAM

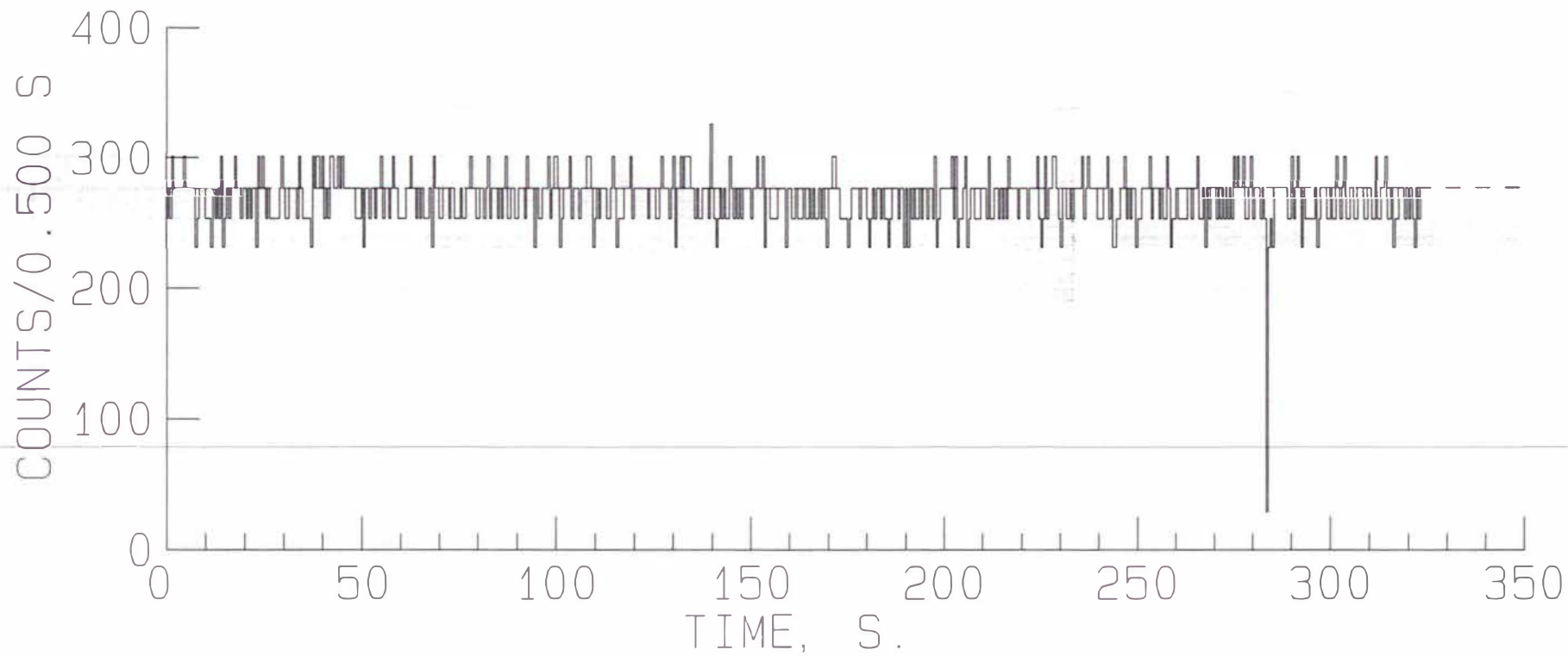
BATSE BURST # 228
EVENT OF 1991 MAY 26 DAY OF YEAR=146
EVENT CROSSING TIME AT BATSE : 12744. S. OR 03:32:24.2
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 110.100 .600
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 26/ 5/ 91 IS:
RA= 124.169 DEC= 21.220 DIST= 3.560 AU
BATSE-ULYSSES DISTANCE = 532538600. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=155.23 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-1612.89 SECS.
CROSSING TIME AT ULYSSES IS 11131. S. OR 03:05:31 +/- 154.73 SECONDS

NO

14 / 4 / 93

ULYSSES RT
26 / 5 / 91 10980.348 s
0 - 0 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



CATSEARCH PROGRAM

AD

BATSE BURST # 229
EVENT OF 1991 MAY 26 DAY OF YEAR=146
EVENT CROSSING TIME AT BATSE : 16750. S. OR 04:39:10.1
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 30.540 -50.710
BATSE PEAK COUNTING RATE: 0000 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 26/ 5/ 91 IS:
RA= 124.169 DEC= 21.220 DIST= 3.560 AU
BATSE-ULYSSES DISTANCE = 532538600. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 71.49 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 563.99 SECS.
CROSSING TIME AT ULYSSES IS 17314. S. OR 04:48:34.1 +/- 351.01 SECONDS

9 / 11 / 95

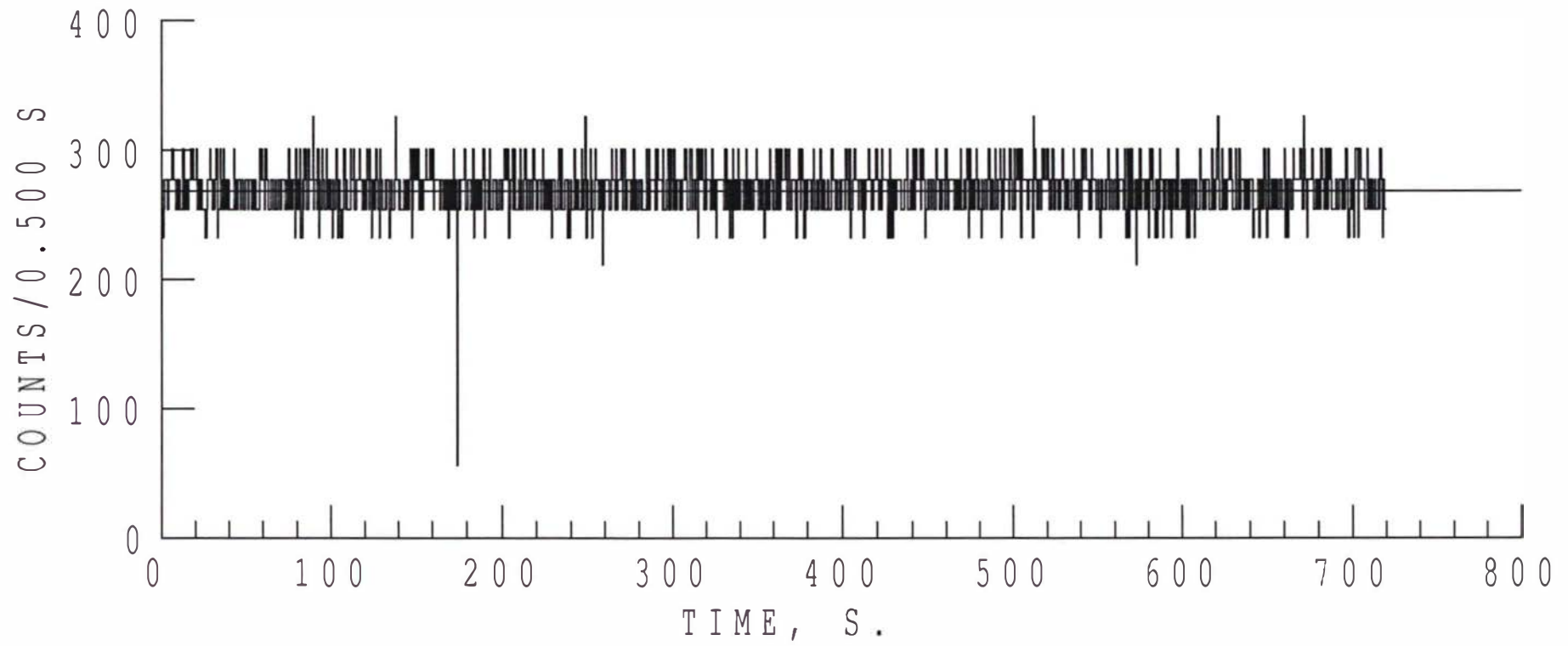
ULYSSES RT

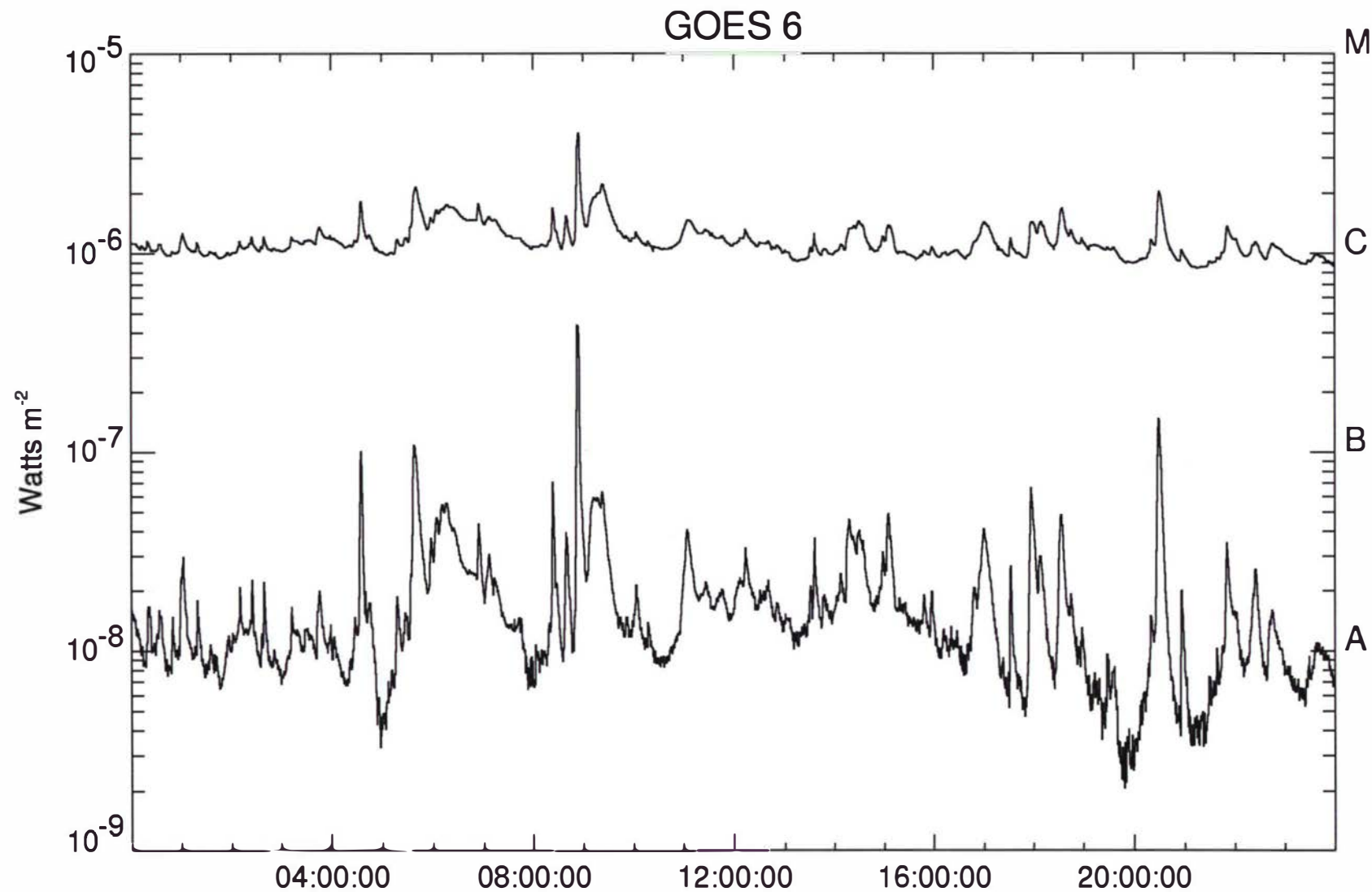
26 / 5 / 91 16956.469 s

0 - 0 keV

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS





Data Start: 91/05/26, 0000:00

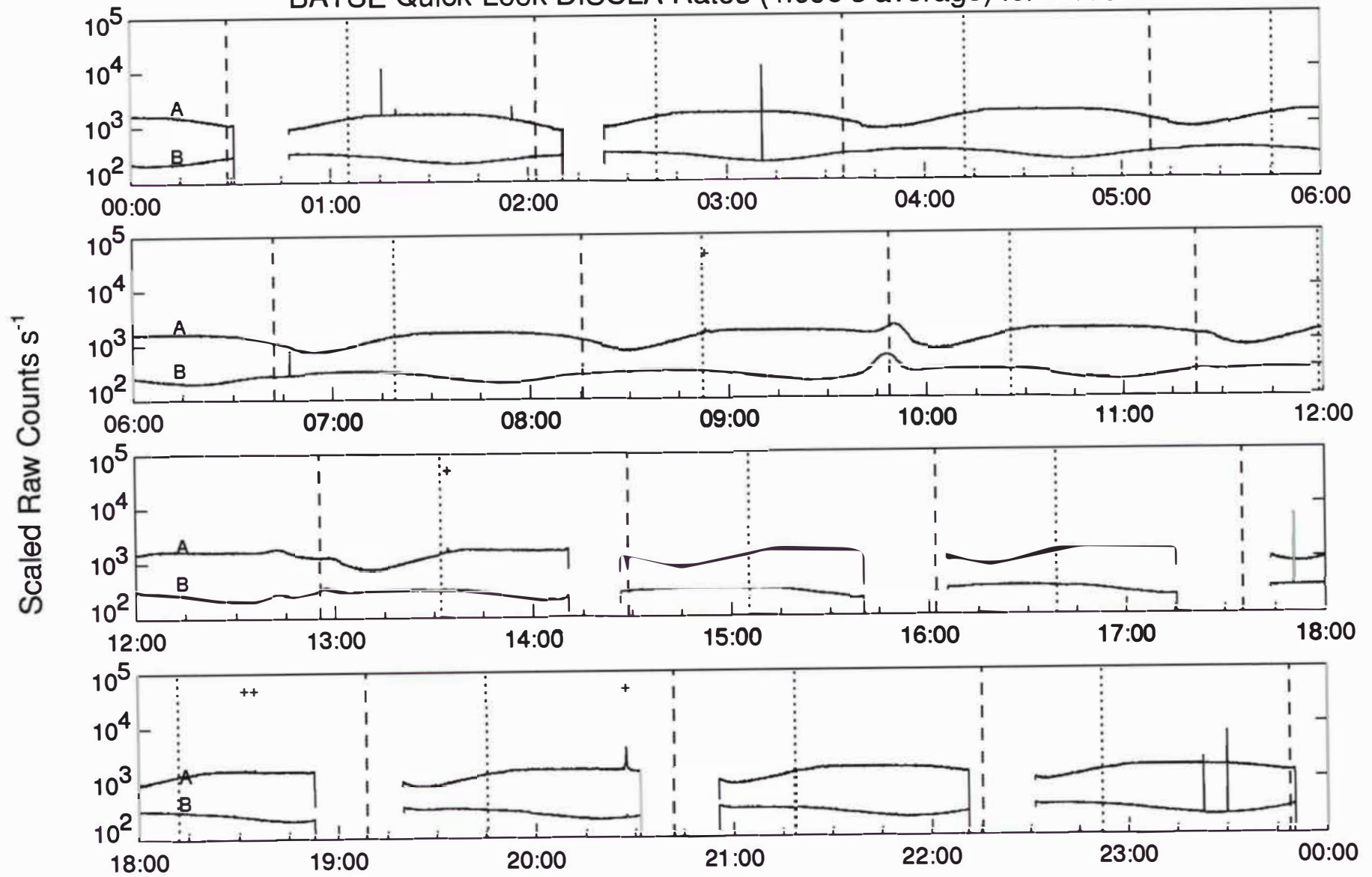
Plot created: 96/11/27, 0353

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/26

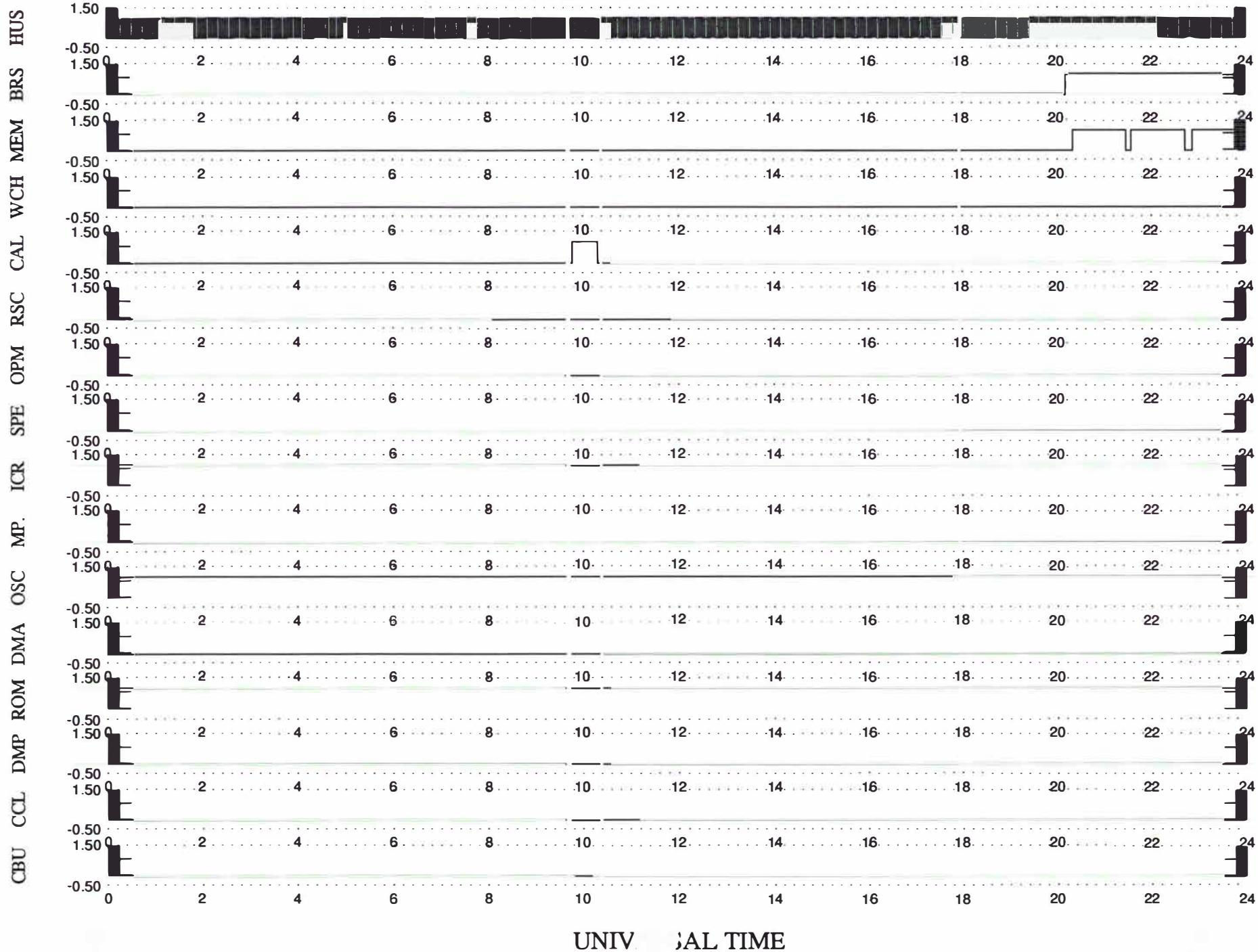


Current Time: 96/11/27, 0354 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

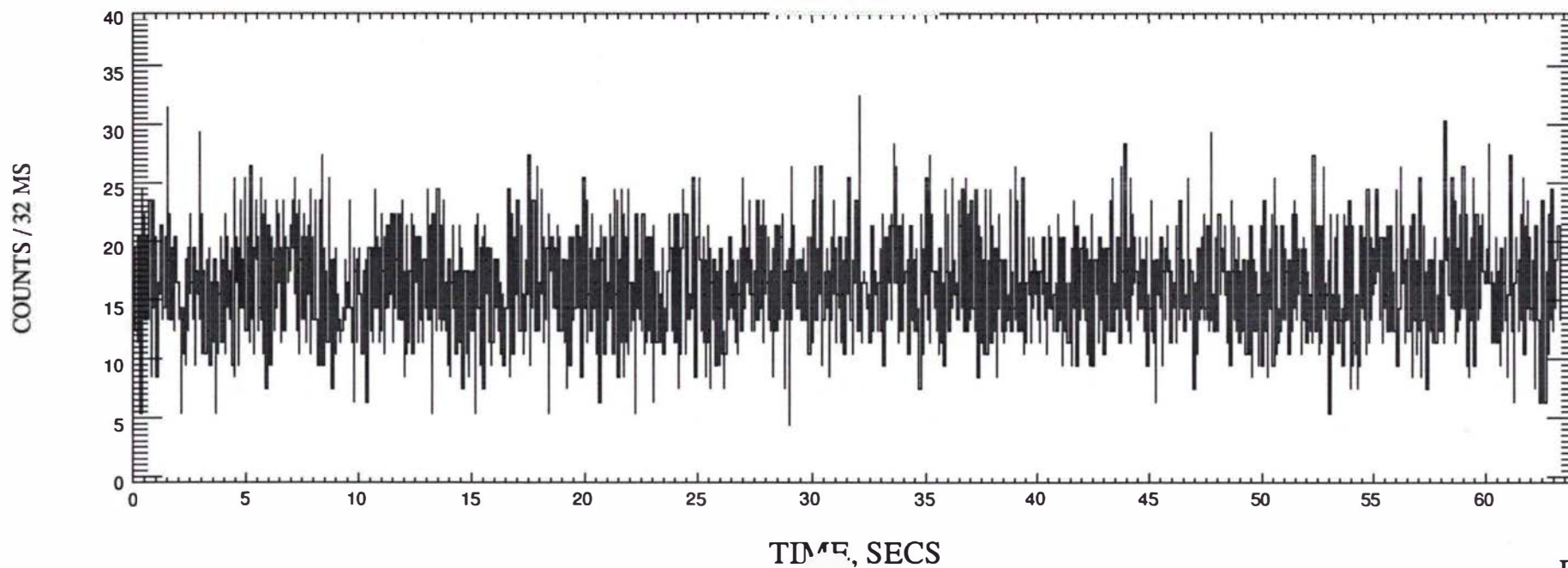
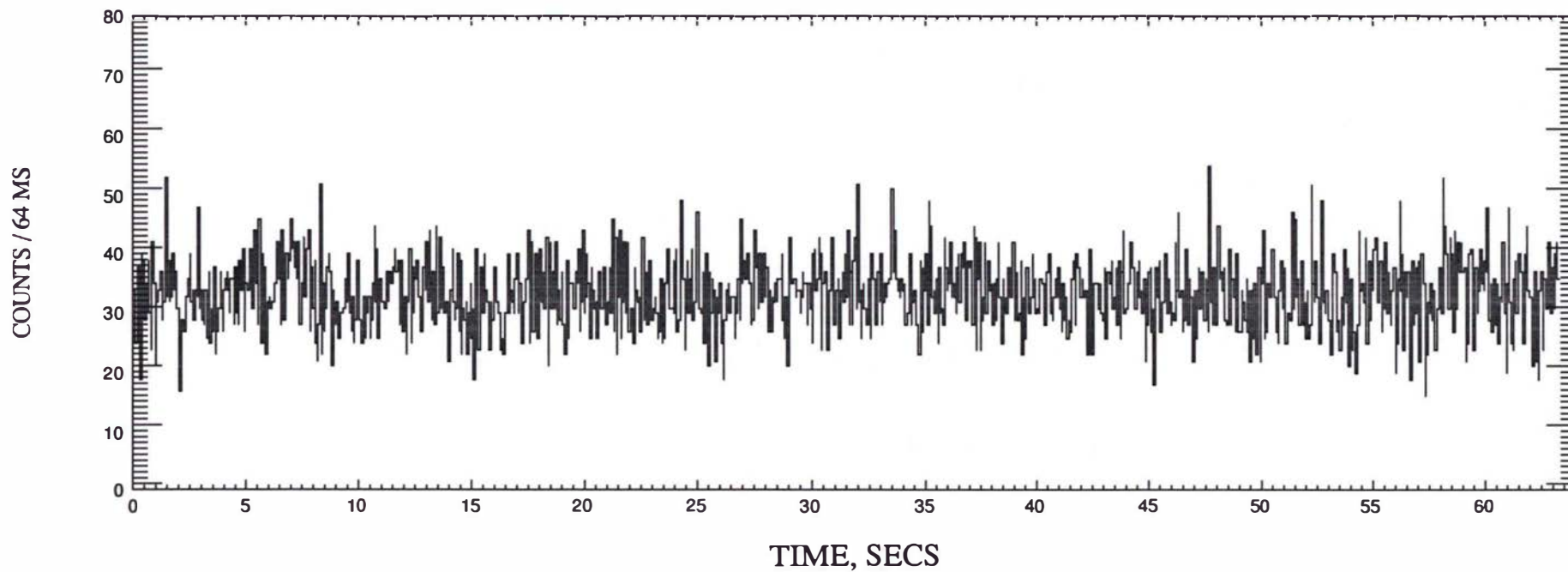
Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

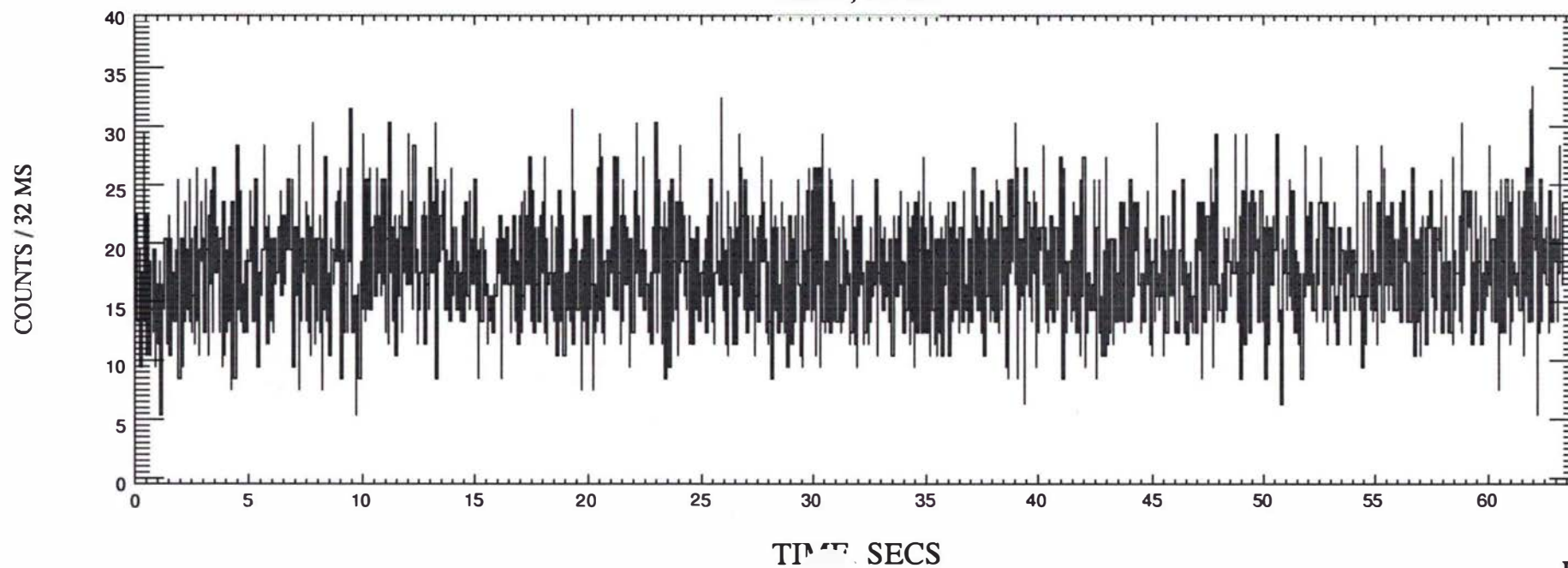
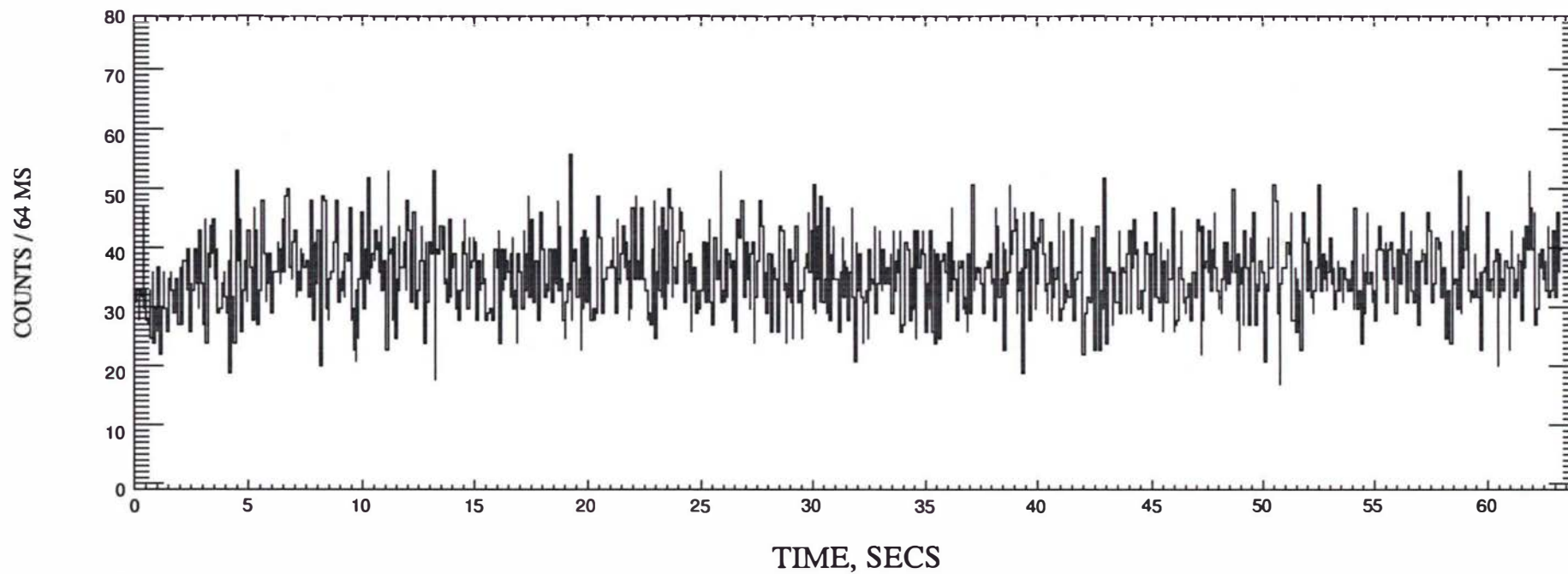
BURST NUMBER 13 - 15



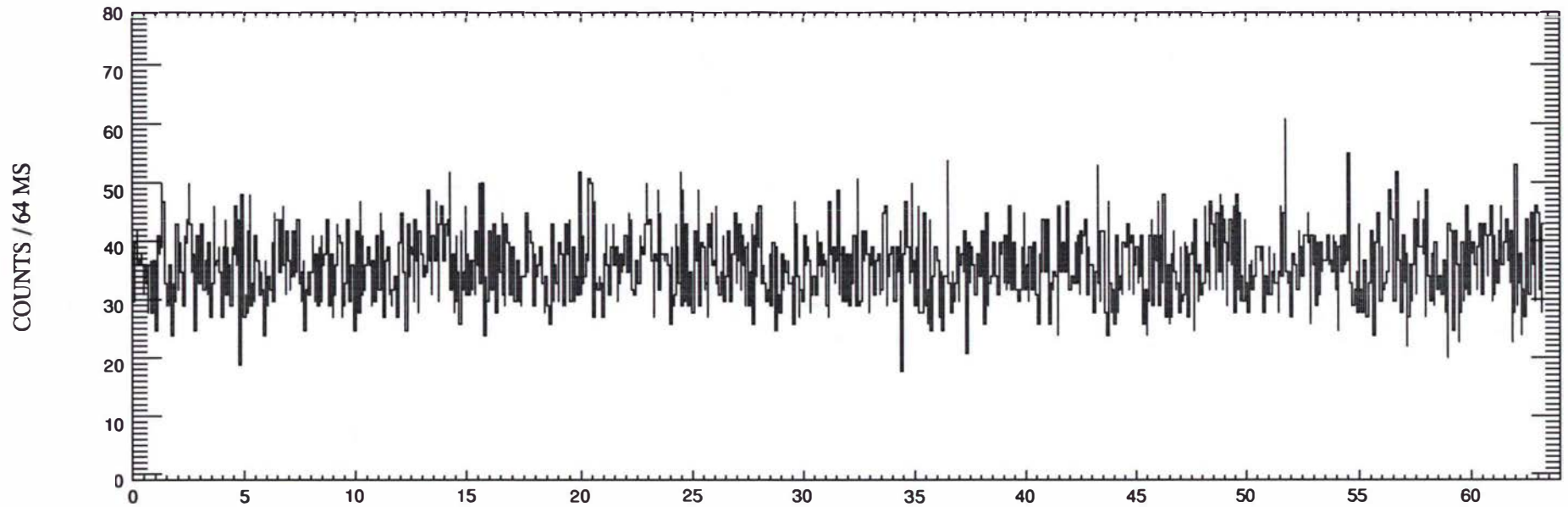
Burst Counter 13 at UT=20.098488023546 h=72354.557 s 20:05:54.557



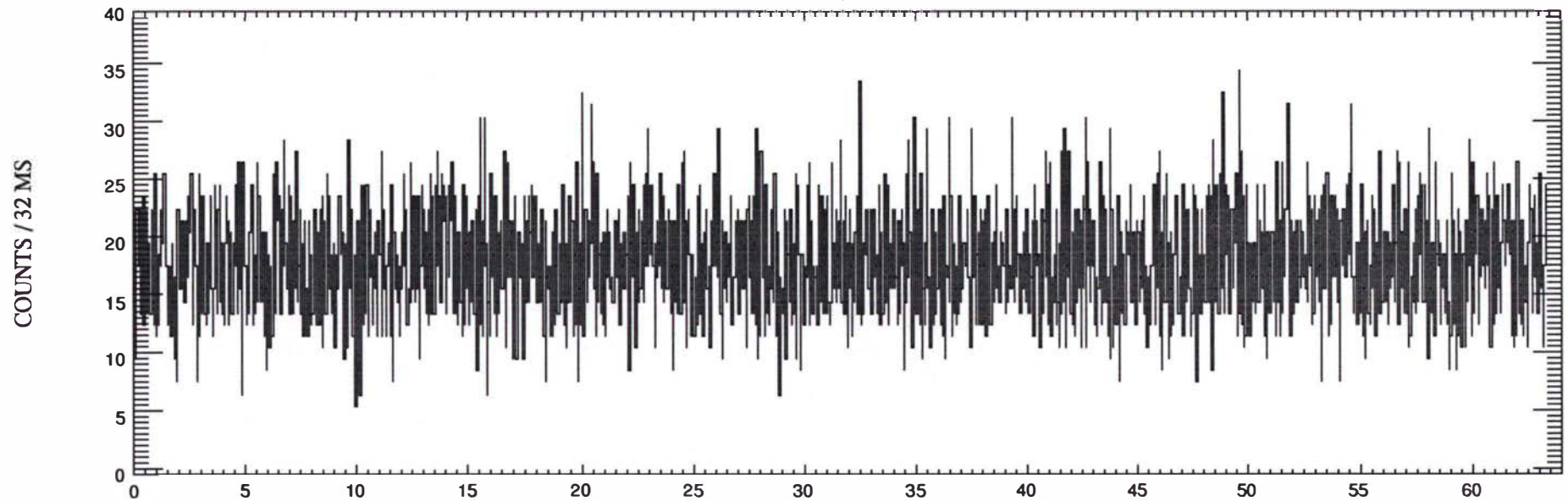
Burst Counter 14 at UT=21.358515544468 h=76890.656 s 21:21:30.656



Burst Counter 15 at UT=22.629654172262 h=81466.755 s 22:37:46.755

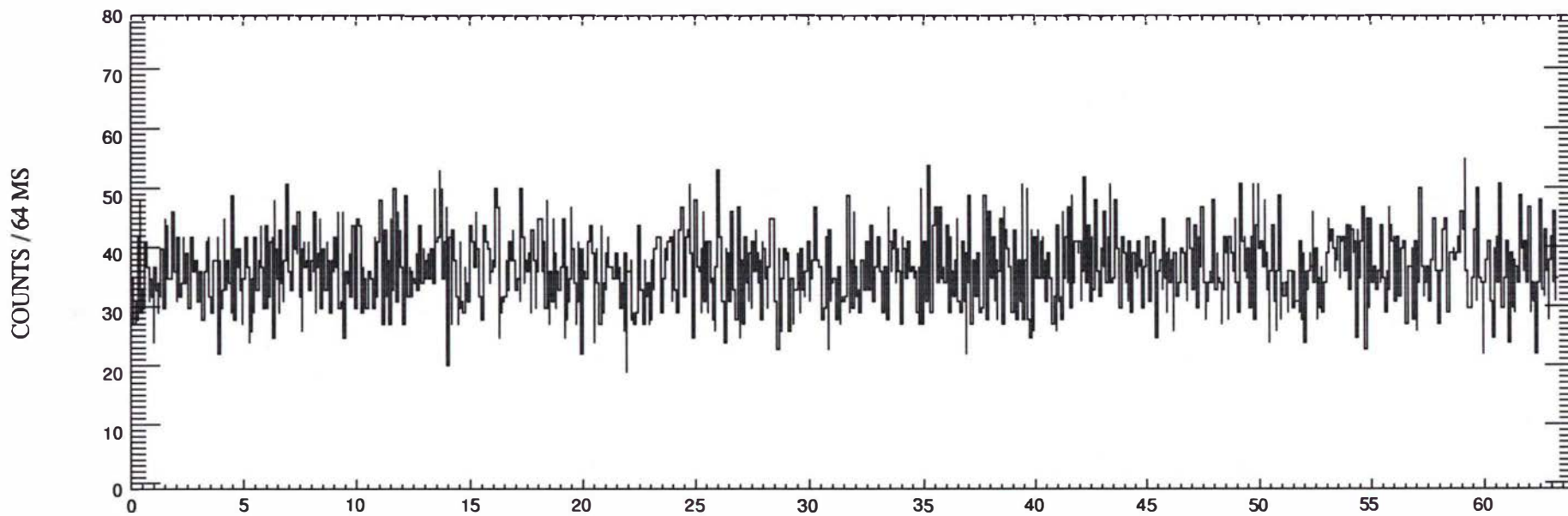


TIME, SECS

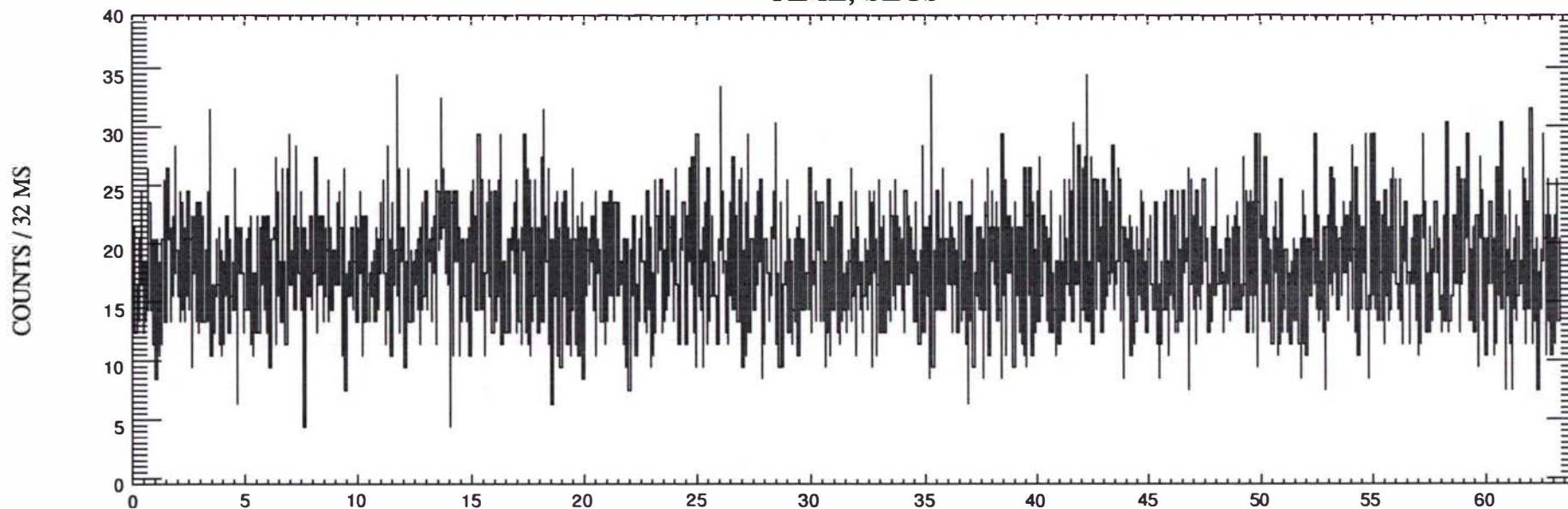


TIME, SECS

Burst Counter 0 at UT=23.883010686239 h=85978.838 s 23:52:58.838

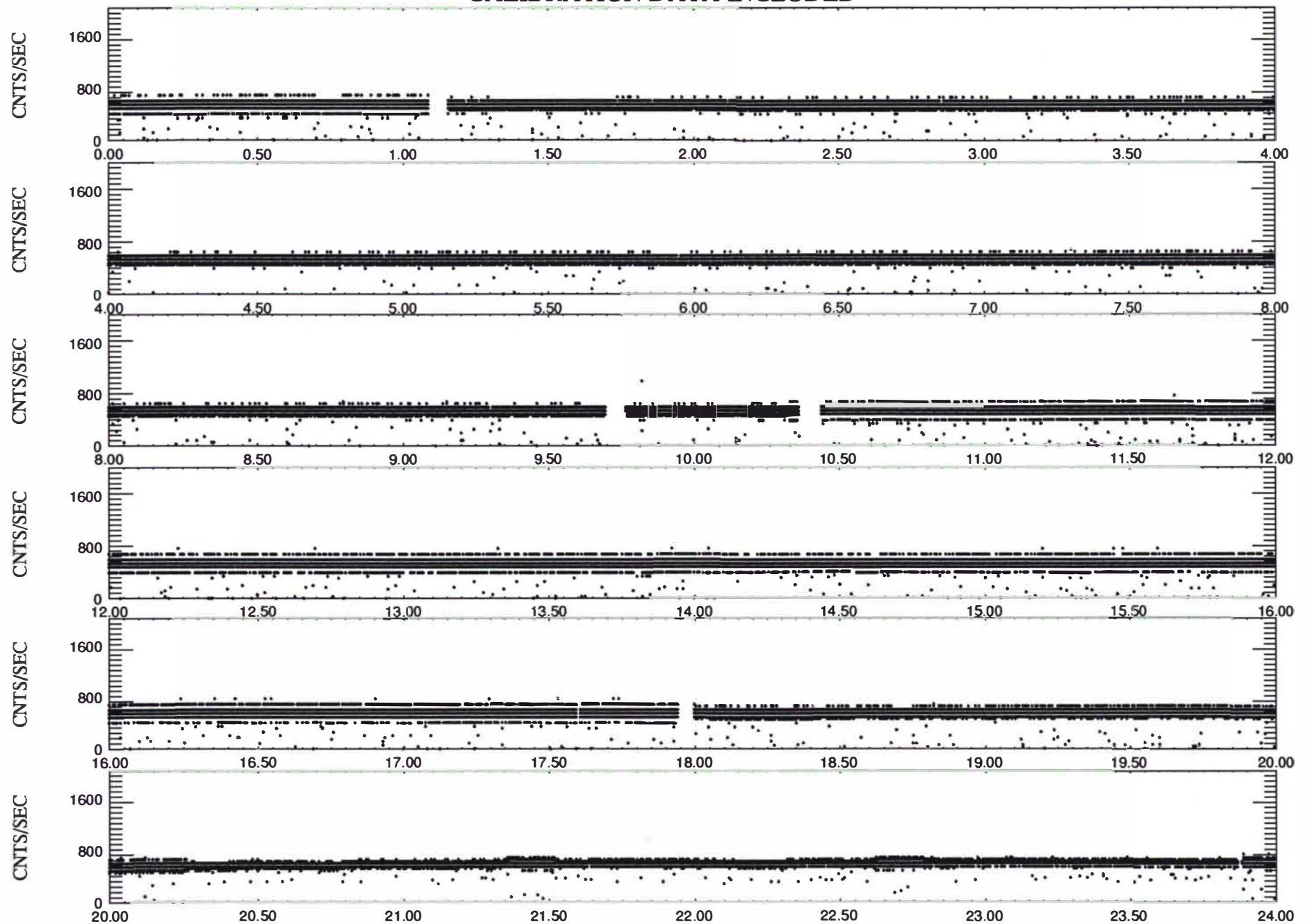


TIME, SECS



TIME, SECS

CALIBRATION DATA INCLUDED



UNIV CAL TIME

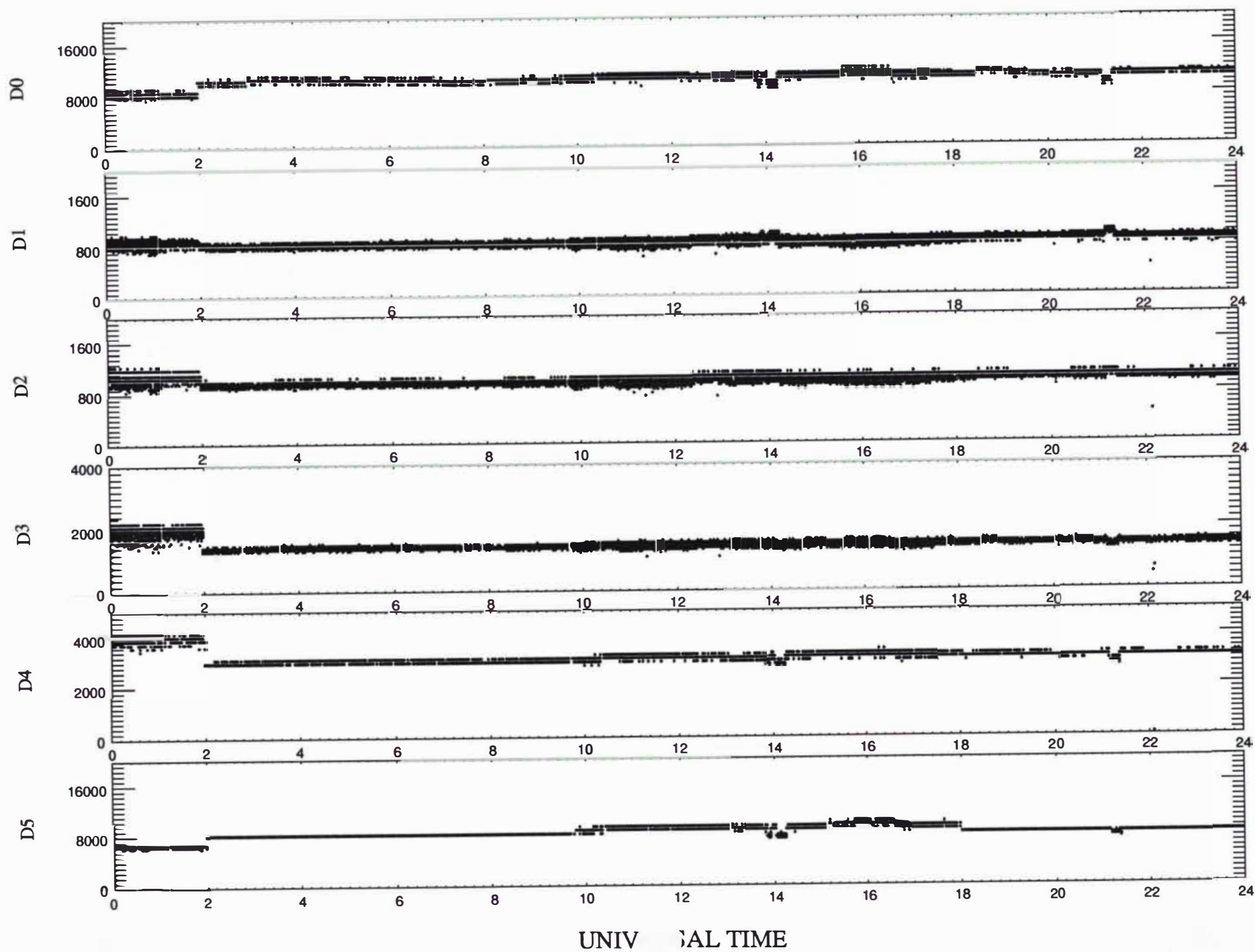


Table 1. (Contd.)

Burst	Number	Activation time	Duration T_{90} , s	$C_{\max}/C_{\min}$	Remarks
1	2	3	4	5	6
PB901121b	194.3	18 ^h 09 ^m 10 ^s .643	7.59 ± 0.51	1.33 ± 0.24	
PB901213	209.3	7 06 23.125	2.48 ± 0.19	1.93 ± 0.36	
PB901216	211.1	15 47 15.796	2.23 ± 0.54	2.05 ± 0.35	
PB901218	213.1	16 10 55.518	10.35 ± 0.68	2.87 ± 0.30	
PB901221	214.1	0 30 04.998	7.38 ± 0.29	1.05 ± 0.22	
PB910106	218.1	16 39 57.526	1.59 ± 0.19	1.81 ± 0.26	U
PB910117	223.1	0 57 12.234	11.53 ± 0.64	2.04 ± 0.27	
PB910122	228.1	15 13 50.333	13.89 ± 0.12	4.10 ± 0.37	SU
PB910202	234.2	20 57 39.164	4.77 ± 0.31	1.16 ± 0.23	
PB910203	234.3	9 19 06.273	4.55 ± 0.33	1.52 ± 0.29	
PB910204a	235.1	8 58 45.809	4.65 ± 0.15	1.33 ± 0.24	
PB910204b	235.2	10 48 08.317	24.52 ± 0.47	1.50 ± 0.24	
PB910204c	235.3	14 50 33.466	8.72 ± 0.38	1.98 ± 0.26	
PB910206	236.3	8 45 28.848	0.70 ± 0.09	3.17 ± 0.42	U
PB910210	237.1	17 35 33.690	2.64 ± 0.30	2.12 ± 0.33	
PB910211	237.2	3 25 22.422	4.77 ± 0.30	2.82 ± 0.28	U
PB910314	255.3	22 56 15.307	7.08 ± 0.38	9.62 ± 0.55	U
PB910402	262.1	14 27 44.130	35.88 ± 0.05	64.86 ± 1.85	U
PB910404a	263.1	14 19 50.241	13.78 ± 0.21	2.59 ± 0.25	
PB910404b	263.2	17 17 18.561	4.14 ± 0.18	1.55 ± 0.21	
PB910417	273.1	20 07 31.882	19.39 ± 0.21	5.71 ± 0.39	SU
PB910517	282.1	5 02 42.956	2.80 ± 0.11	3.56 ± 0.32	SU
PB910527	287.1	23 44 33.511	0.12 ± 0.01	2.13 ± 0.34	

Note: The burst was observed independently with other instruments: K – KONUS, W – WATCH, S – SIGMA, G – GINGA, U – ULYSSES.

signal, produced automatically when there is an excess rate of registered pulses in the range from 0.1 to 1.6 MeV by eight standard deviations over 0.25 or 1 s integration time, activates the instrument to study burst information in more detail.

THE CRITERION OF BURST DETECTION

Each of the six *PHEBUS* instrument detectors is equipped with a trigger cell to register bursts. A cell is activated if the count rate exceeds the background level, in at least two detectors simultaneously, by at least $C_{\min}$ for any of the two time intervals, 0.25 and 1 s. The $C_{\min}$ value is automatically determined for all detectors by a microprocessor, and it is equal to eight standard deviations for each of the above-mentioned time intervals. If the "burst" signal is produced, synchronized information on the light-curve of the burst is registered for each detector. Spectral information from all detectors is also registered.

A cosmic gamma-ray burst, a solar flare, or in some cases, high-energy charged particles of the magnetosphere may cause an event. Solar flares were identified

by comparing the list of events registered from the Sun in the H α line and solar radio observations data with the list of events registered by the *PHEBUS* instrument. Magnetospheric events were sorted out of the remaining list on the basis of their long histories, smooth light curves, and soft energy spectra. The rest of the events were considered cosmic gamma-ray bursts. Some of them were also registered by other burst instruments of the *GRANAT* observatory (KONUS, WATCH, SIGMA) [1 - 3] or by instruments of other satellites (GINGA, ULYSSES) [4, 5]. The column "Remarks" in Table 1 indicates which space instruments, besides *PHEBUS*, registered the given event.

During the first year and a half of the instrument's operation, it registered 147 detections, 66 of them being cosmic gamma-ray bursts.

This catalog contains only cosmic gamma-ray bursts. The first column of Table 1 gives the designation of the burst. The two first letters, PB (*PHEBUS* burst) mean that the *PHEBUS* instrument has registered the burst. Figures designate the year, month, and day of the registration of the burst. The second column contains the number of the *GRANAT* observatory observing run

(k)

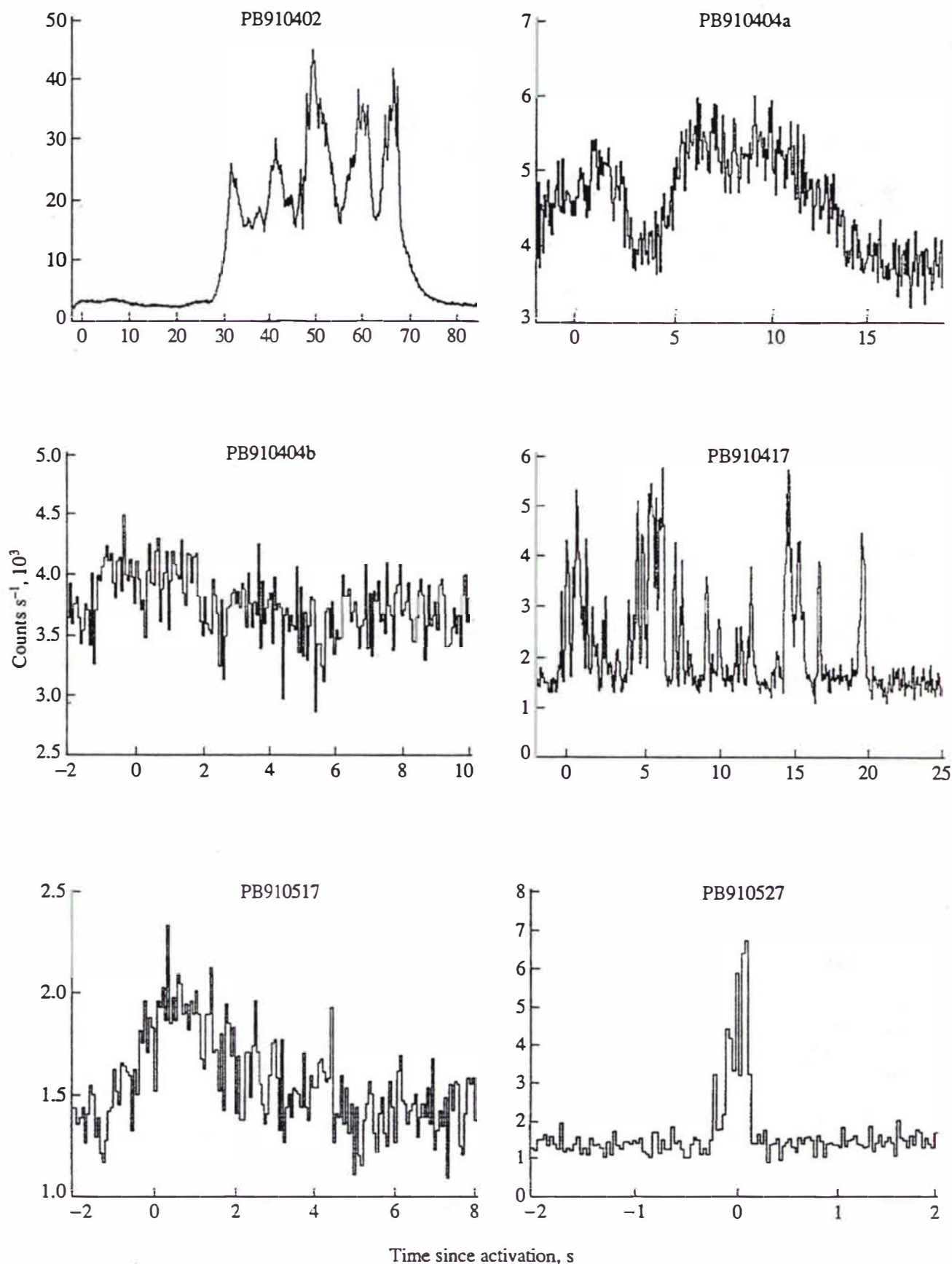


Fig. 1. (Contd.).

From root Wed Dec 8 07:58 1993
Received: by space6.ssl.berkeley.edu (AIX 2.1 2/4.03)
id AA08899; Wed, 8 Dec 93 07:57:44
Received: from mx.nsi.nasa.gov by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA22497; Wed, 8 Dec 93 07:00:41 PST
Received: Wed, 8 Dec 93 07:03:53 PST from ESSDP2.dnet by mx.nsi.nasa.gov (4.1/1.2)
message-Id: <9312081503.AA10272@mx.nsi.nasa.gov>
Received: from ESSDP2.dnet by AMES.dnet with MAIL-11
(utk-maill11d v1.7); Wed, 8 Dec 93 07:03:57 PST
Date: Wed, 8 Dec 93 07:03:57 PST
From: 068486@essdp2.span.nasa.gov
X-To: AMES::"khurley@space6.ssl.berkeley.edu"
Subject: RE:
To: khurley@space6.ssl.berkeley.edu
Status: R

KEVIN,

HERE ARE THE RESULTS OF OUR SURVEY OF THE PVO REAL-TIME DATA FOR EVIDENCE OF
RESPONSE TO EVENTS LISTED IN YOUR CATALOG.

DATE	TIME	PVO RESPONSE
90/11/11	21:49	N/O
90/11/12	14:57	N/O
90/11/16	01:42	N/O
90/11/19	18:08	N/O
90/11/21	00:04	N/O
90/11/21	18:09	N/O
90/12/02	13:45	N/O
90/12/21	00:30	N/O
90/12/25	05:50	N/O
91/01/17	00:57	N/O
91/01/24	11:50	N/O
91/02/04	08:58	N/O
91/02/04	14:19	N/O
91/02/04	14:58	N/O
91/02/17	02:59	N/O
91/03/14	22:56	N/O
91/03/15	22:55	N/O
91/04/04	17:17	(NO)
91/05/18	17:10	N/O
91/05/23	19:03	N/O
91/05/27	23:44	N/O
91/05/28	21:26	N/O
91/06/02	22:55	N/O
91/06/09	00:48	N/O
91/06/29	19:55	N/O
91/07/09	20:22	N/O
91/07/17	13:07	N/O
91/08/03	08:24	N/O
91/08/15	12:34	N/O
91/08/15	14:24	N/O
91/08/16	01:57	(NO)
91/09/05	23:48	N/O
91/09/16	21:58	N/O
91/09/25	03:35	N/O
91/09/26	18:25	N/O
91/09/30	11:55	N/O
91/10/03	00:39	N/O
91/10/04	01:27	N/O
91/10/06	09:01	(NO)
91/10/22	04:13	N/O
91/10/25	21:25	N/O
91/11/06	03:42	N/O
91/11/14	01:40	N/O
91/11/17	01:58	N/O
91/12/05	23:04	N/O

91/12/21	06:17	N/O
91/12/21	22:03	N/O
91/12/27	15:56	N/O
92/01/05	17:41	N/O
92/01/13	20:52	N/O
92/01/25	08:57	N/O
92/01/30	00:29	N/O
92/01/30	22:50	N/O
92/02/18	18:42	N/O
92/02/21	06:14	N/O
92/02/26	18:15	YES TRIGGER AT 29336 S UT
92/02/27	06:00	N/O
92/02/27	08:45	N/O
92/03/02	06:16	N/O
92/03/04	14:34	N/O
92/03/07	00:18	N/O
92/03/21	12:50	(NO)
92/03/26	02:01	N/O
92/03/27	09:38	N/O
92/03/29	16:38	(NO)
92/04/04	22:37	N/O
92/04/08	12:05	N/O
92/04/20	02:12	N/O
92/04/29	18:59	N/O
92/05/02	19:05	N/O
92/06/01	THRU 92/06/29	TURNED OFF--N/O
92/07/01	19:39	N/O
92/07/07	06:33	N/O
92/07/17	01:15	N/O
92/07/23	00:59	N/O
92/07/23	01:00	N/O
92/07/23	21:48	N/O
92/07/25	19:30	N/O
92/07/25	22:49	N/O
92/07/26	00:34	N/O
92/07/31	17:07	N/O
92/08/10	21:35	N/O
92/08/14	06:10	N/O
92/08/16	12:36	N/O
92/08/22	22:39	N/O
92/08/30	01:45	N/O
92/09/04	04:41	N/O

THIS LIST IS NOT COMPLETE. IT INCLUDES EVENTS FOR WHICH NO REAL-TIME DATA ARE AVAILABLE BECAUSE OF INAPPROPRIATE MODE, NO TRACKING, OR THE EXPERIMENT WAS TURNED OFF. WHERE DATA HAVE BEEN CHECKED, SENSITIVITY DEPENDS UPON THE TIME RESOLUTION AVAILABLE IN THE DATA. I'LL BE SENDING ADDITIONAL RESULTS AS THEY BECOME AVAILABLE.

REGARDS,

RAY

24

Dezalay -> KH 7/93

DATE	U.T.	Nr UGB	Event Nature
1991-04-04	14:19:50.243	263-a	GRB
1991-04-04	17:17:18.562	263-b	GRB
1991-04-07	03:13:21.146	265-a	Solar Flare
1991-04-17	20:07:31.886	273-a	GRB
1991-05-16	06:47:23.641	281-a	Solar Flare
1991-05-17	05:02:42.959	282-a	GRB
1991-05-17	09:03:44.505	282-b	Solar Flare
1991-05-27	23:44:36.515	287-a	GRB
1991-05-28	07:26:24.093	287-b	Solar Flare
1991-05-28	18:17:55.430	287-c	Solar Flare
1991-05-31	16:53:41.316	289-a	Solar Flare
1991-06-01	14:56:53.229	290-a	Solar Flare
1991-06-01	~15:08	290-b	Solar Flare
1991-06-01	19:20:29.144	290-c	GRB
1991-06-09	22:05:12.335	293-a	Solar Particles
1991-06-10	02:27:27.347	293-b	Solar Flare
1991-06-10	13:55:19.964	294-a	Solar Flare
1991-06-10	16:53:30.025	294-b	Solar Flare
1991-06-11	01:58:25.934	294-c	Solar Flare
1991-06-26	20:13:20.758	303-a	Solar Flare
1991-06-27	04:29:18.339	303-b	GRB
1991-06-29	19:55:48.409	304-a	GRB
1991-06-30	02:56:07.591	304-b	Solar Flare
1991-06-30	03:29:11.438	304-c	Solar Particles
1991-07-13	19:37:58.821	307-a	Solar Flare
1991-07-17	04:33:04.862	309-a	GRB
1991-07-17	06:25:49.736	309-b	Solar Flare
1991-07-20	01:37:48.274	311-a	Solar Flare
1991-08-14	11:10:26.782	314-a	GRB
1991-08-14	19:14:33.396	315-a	GRB
1991-08-17	17:09:24.566	317-a	GRB
1991-08-21	10:33:39.184	320-a	GRB
1991-08-25	09:36:25.301	323-a	Solar Flare
1991-08-27	13:11:18.345	325-a	Solar Particles
1991-08-27	14:51:03.053	325-b	Solar Particles

- localisations ? JLA 10/19/92
- gain 405

LISTE DES SURSAUTS PHEBUS VUS PAR ULYSSE :

Date	Heure Phebus		Sigma	Heure Ulysse	Seance	Cmax Phebus	Cmax Ulysse	Loc. α, δ	Comment.
✓ 1990-11-11	78542				188	295			HUS : rien
✓ 1990-11-12	53858	I		53783	189	223			
✓ 1990-11-16	6130				190	142			HUS : no data
✓ 1990-11-21	288	I		210	194	173	143		
✓ 1990-11-21	65351	I		65261	194	167	99		
✓ 1990-12-13	25583				209	234			HUS : rien
✓ 1990-12-16	56836				211	120			faible
✓ 1990-12-19	78769				213	689			HUS : no data
✓ 1990-12-21	1806				214	166			HUS : lim sup
✓ 1991-01-06	59998	T		60315	218	179	249		
✓ 1991-01-17	3432				223	206			HUS : lim sup
✓ 1991-01-22	54830	T	gca	55160	228	728	461		
✓ 1991-02-02	75459				234	129			faible
✓ 1991-02-04	32326	I		31840	235	102	176		mou
✓ 1991-02-06	31529	T		30974	236	244	281		
✓ 1991-02-11	12322	I		12910	237	353	191		
✓ 1991-03-14	82575	I		82404	255	961	580		
✓ 1991-04-02	52064	I	ac	51137	262	9080	2410		
✓ 1991-04-17	72452	T	gca	71200	273	758	226		
✓ 1991-05-17	18163	I	gca	17579	282	326	214		
✓ 1991-05-27	85477				287	245			HUS : lim sup
✓ 1991-06-01	69629	I		70870	290	1871	984	309.8 33.2	loc Comptel
✓ 1991-06-27	16158	I		15336	303	244	359	193.8 -14.6	loc Network
✓ 1991-06-29	71748	I			304	250			
✓ 1991-07-17	16385	T		17265	309	342	265	246.8 -53.8	loc Network
✓ 1991-08-14	40227	I			314	340			
✓ 1991-08-14	69273	I	ac/gca	70995	315	1048	168	342.5 30.0	loc Network
✓ 1991-08-17	61765				317	153			faible
✓ 1991-08-21	38019		ac/cga		320	206			HUS : no data

From "SSL::BRIGGS"@ssl.msfc.nasa.gov Mon Sep 14 16:23:40 1992
 Date: Mon, 14 Sep 1992 18:25:29 -0500 (CDT)
 From: "SSL::BRIGGS"@ssl.msfc.nasa.gov (Michael S. Briggs, 205-544-7716, Code ES-62, MSFC)
 Subject: Schwartz's 5
 To: khurley@space6.ssl.berkeley.edu
 X-Vmsmail-To: SSL::SMTP%"khurley@space6.ssl.berkeley.edu"
 Content-Length: 1256

Hello Kevin,

At Chryssa's request I am providing more information about the 5
 BATSE triggers whose classification Richard Schwartz has questioned.
 The count rates in the table are eyeball averages of the tops of the peaks,
 i.e. very short spikes and statistical fluctuations are ignored. None are
 visible in channel 4.

Trig #	TJD	sec	date	duration (sec)	chan 1 (c/s)	chan 2 (c/s)	chan 3 (c/s)	<i>Bkgd - subtracted</i>	<i>Ulysses crossing if Factor*</i> <i>Solar</i>
230	8403	20250	27 May 91	8	4000	1400	200		21548s 5.7
288	8414	730	7 Jun 91	40	350	400	300		2127s 7.8
1039	8571	14386	11 Nov 91	15	1200	1800	1200		16383 16
1217	8615	8281	25 Dec 91	2	2400	1500	0		10109 13
1272	8624	27700	3 Jan 92	5	6000	2500	200?		29499 13

Are any of these bright enough to be visible to Ulysses? Most of them
 look fairly flare-like, however, some have rather shorter durations than
 the typical flare. If you think that they might be visible, could you
 check the appropriate time for if they were a flare? A confirmation of
 either burst or flare would be useful.

Thanks, Michael

* $\frac{1}{R^2}$ factor for solar event

From kouveliotou%8868.span@Sdsc.Edu Fri Aug 28 12:24:29 1992
Date: Fri, 28 Aug 92 19:24:20 GMT
From: kouveliotou%8868.span@Sdsc.Edu (Chryssa Kouveliotou NASA/MSFC (205) 544-7711)
Subject: solar or cosmic ?
To: khurley@sunspot.ssl.berkeley.edu
X-St-Vmsmail-To: HURLEY
Content-Length: 393

Kevin,

Richard Schwartz suggested that 5 or 6 events classified as flares are maybe grbs. Could you check in the Ulysses data for the following times ?

May 27, 1991 UT 20248.2 ra = 63.5 dec = 21.2
June 7, 1991 UT 727.7 ra = 74.5 dec = 22.7
Nov 11, 1991 UT 14383.8 ra = 225.8 dec = -17.3
Dec 25, 1991 UT 8279.0 ra = 273.0 dec = -23.4
Jan 3 , 1992 UT 27698.8 ra = 283.2 dec = -22.9

Thanks,

CK

DAY, MONTH, YEAR, AND HELIOCENTRIC ECLIPTIC LONGITUDE OF VENUS

DAY, MONTH, YEAR, AND HELIOCENTRIC ECLIPTIC LONGITUDE OF EARTH

27 5 1991 245.23

DAY, MONTH, YEAR, AND HELIOCENTRIC ECLIPTIC LONGITUDE OF ULYSSES

POSITION OF ULYSSES ON 27/ 5/1991 IS:

RA= 124.799 DEC= 21.070 DIST= 3.604 AU

27 5 1991 137.75

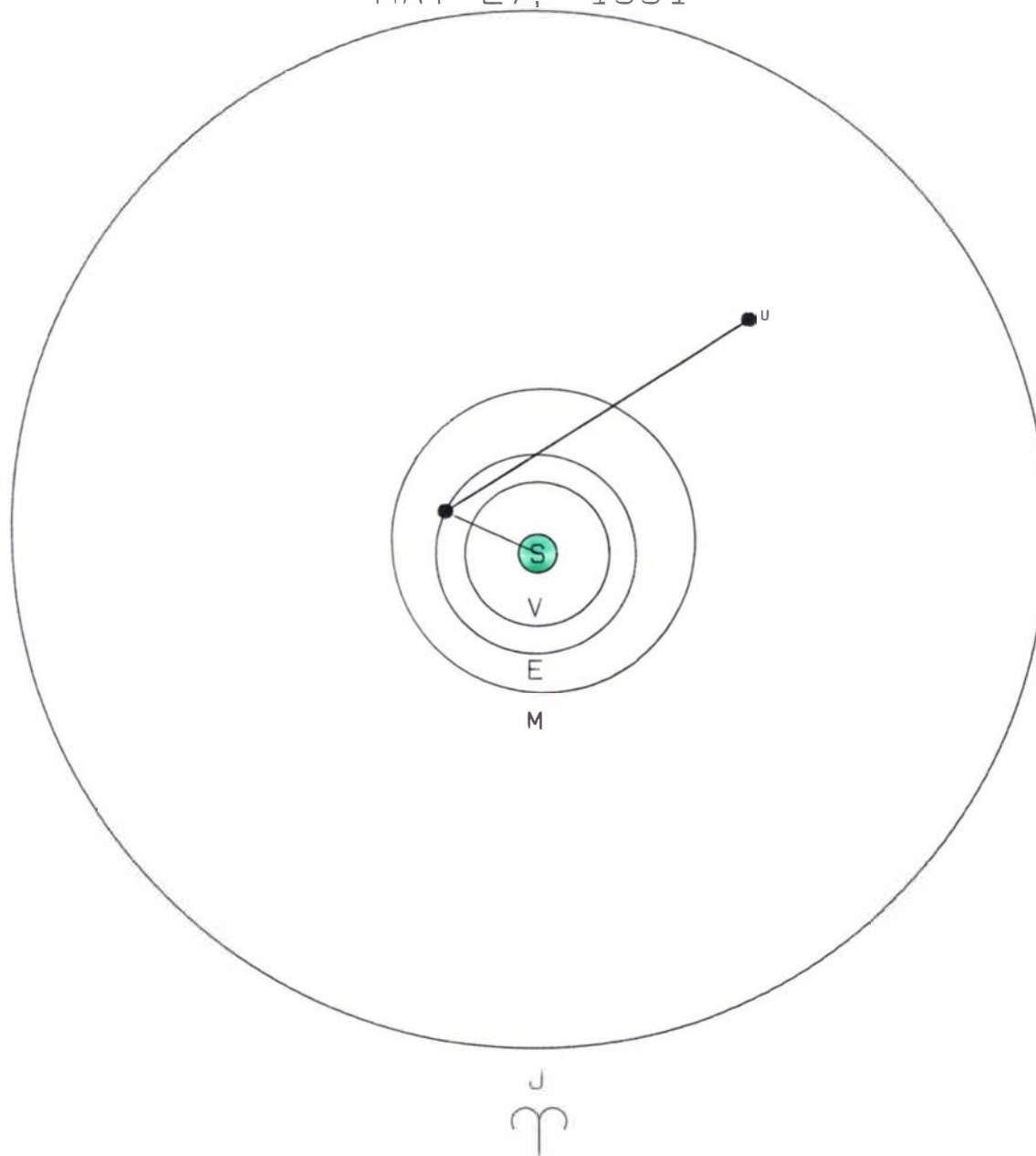
INTERSPACECRAFT DISTANCES IN AU

VENUS-ULYSSES 2.685

EARTH-ULYSSES 3.604

EARTH-VENUS 1.677

ULYSSES ORBIT - ECLIPTIC PLANE PROJECTION
MAY 27, 1991



BATSEARCH PROGRAM

BATSE BURST #

EVENT OF 1991 MAY 27 DAY OF YEAR=147

EVENT CROSSING TIME AT BATSE : 20248. S. OR 05:37:28.0

COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)

BURST ARRIVAL DIRECTION: 63.000 21.000

BATSE PEAK COUNTING RATE: 0 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND

POSITION OF ULYSSES ON 27/ 5/ 91 IS:

RA= 124.484 DEC= 21.145 DIST= 3.582 AU

BATSE-ULYSSES DISTANCE = 535823816. KM.

ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=123.02 DEG.

LIGHT TRAVEL TIME ALONG PROJECTED PATH= -974.01 SECS.

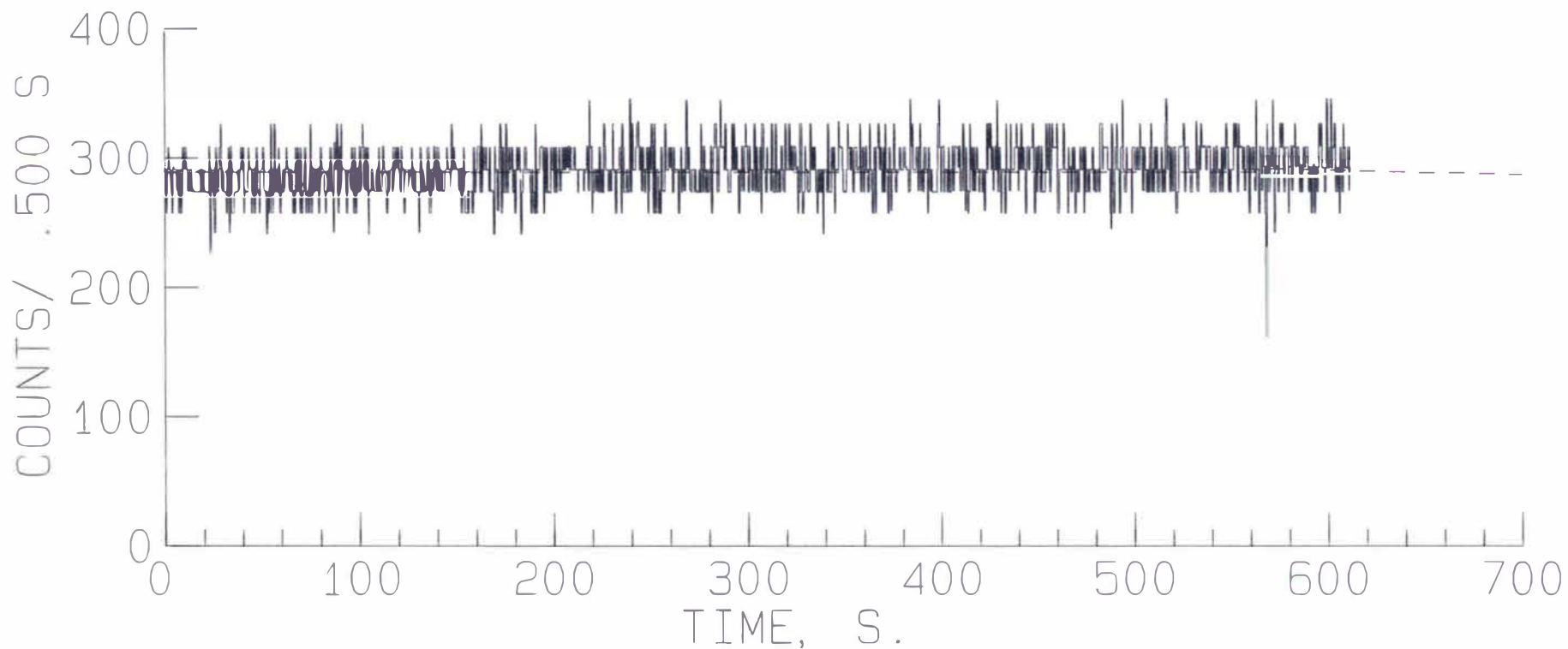
CROSSING TIME AT ULYSSES IS 19274. S. OR 05:21:13 +/- 295.39 SECONDS

If solar: Ulysses-Batse dist is 2.6 AU = 1300s

9 / 9 / 92

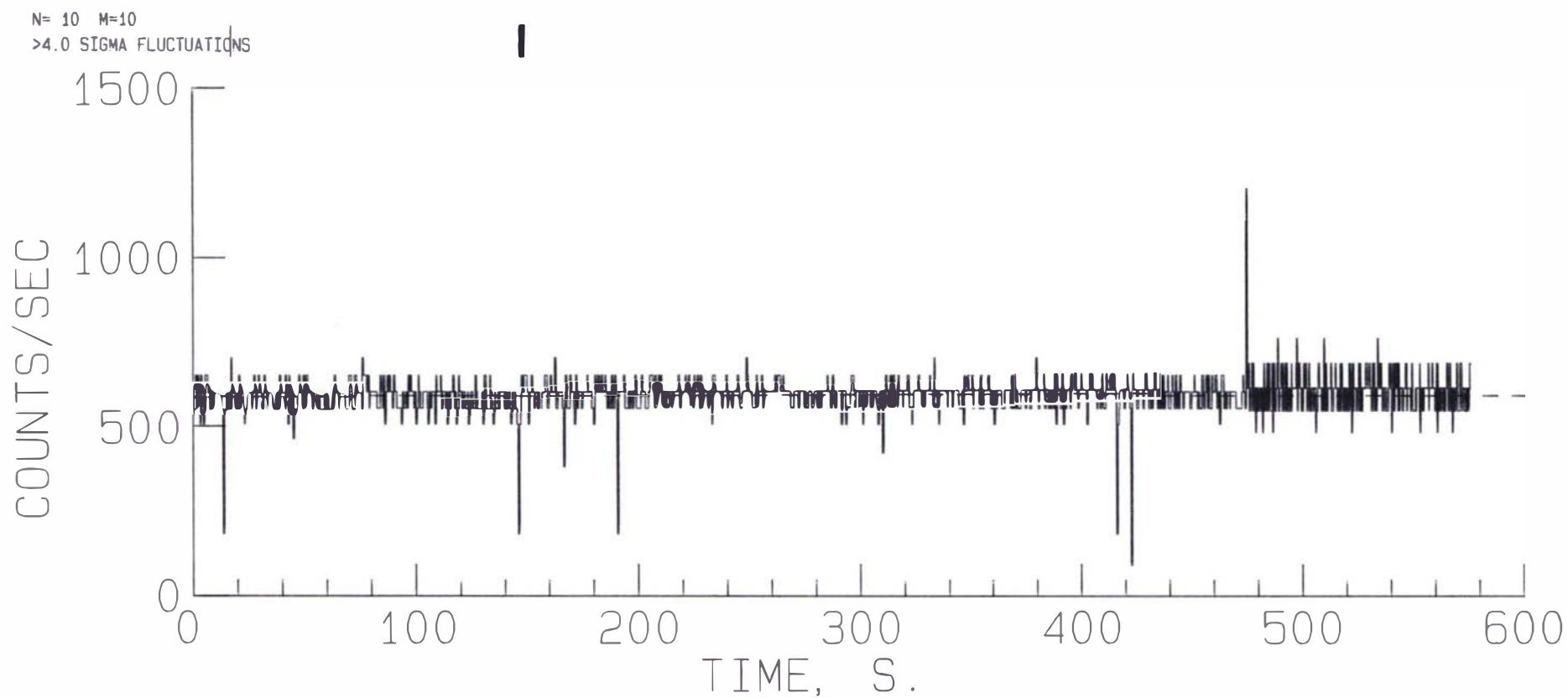
ULYSSES RT
27/ 5/91 18972.205 s (*cosmic origin*)
.250 S INTERVALS REGROUPED BY 2
27- 224 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



19/ 9/92

ULYSSES RT
27/ 5/91 21276.002 s (*Solar origin*)
27- 224 keV



POSITION OF ULYSSES ON 27/ 5/1991 IS:

RA= 124.484 DEC= 21.145 DIST= 3.582 AU

THE DISTANCE BETWEEN TWO OBJECTS AT

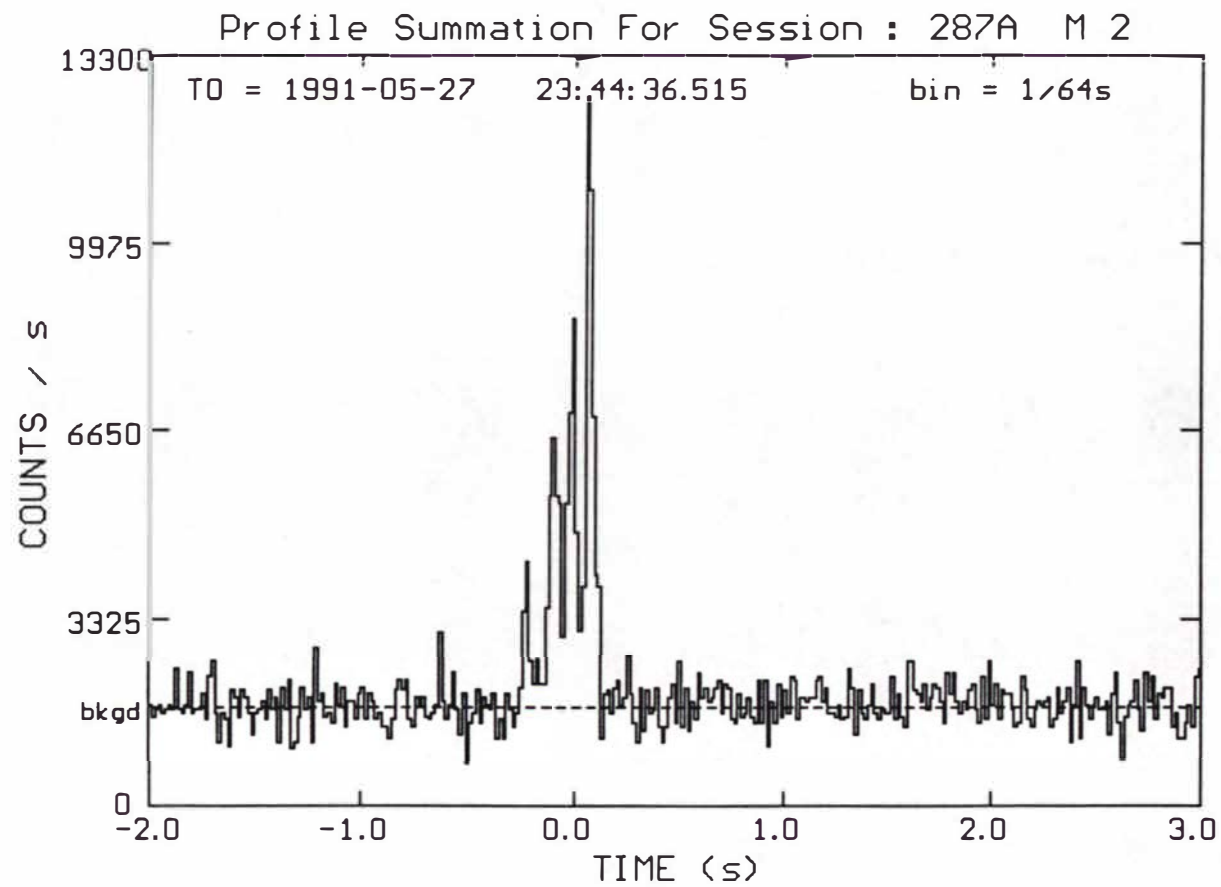
.000 .000 .00 KM. AND

124.484 21.145 535823800.00 KM. IS

535823800.00 KM., OR 3.582 A.U., OR 1787.32 LIGHT-SECONDS

THE ANGLE BETWEEN THEM IS 121.874 DEGREES

Phobos



From 081877@essdp2.lanl.gov Mon Aug 10 09:12:09 1992
Date: Mon, 10 Aug 92 10:05:15 -0600
From: 081877@essdp2.LANL.GOV
To: "khurley@sunspot.ssl.berkeley.edu"@BETA.LANL.GOV
Subject: PVO stuff
Content-Length: 450

Kevin, Here is the GB920525 ephemeris from tape.

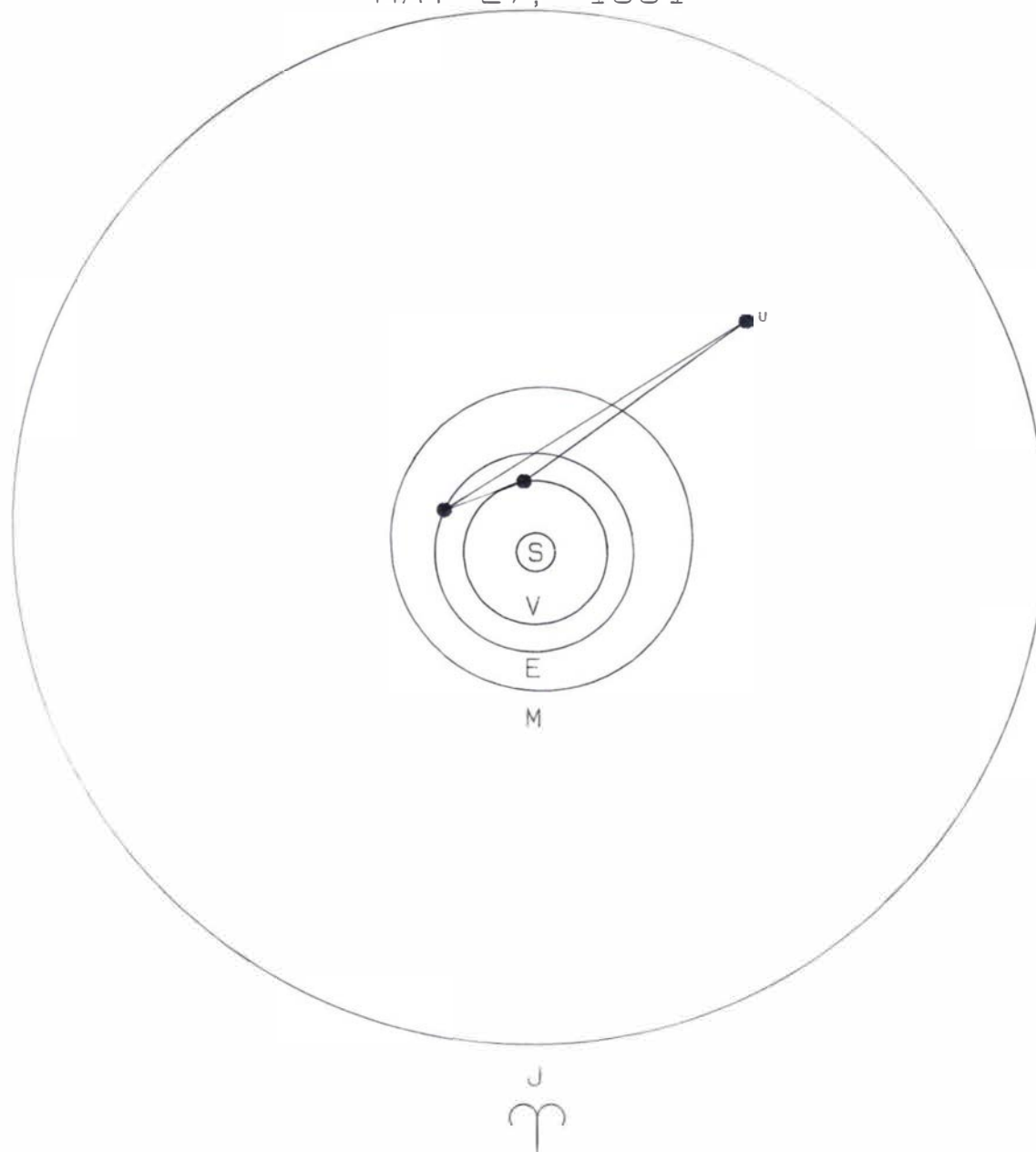
1992 day 146 at 12882 UT: 258083840. 56.19562 19.18962 (1950)

Also, I am about to send you some files with realtime data on the following events: 910428, 910505, 910517, 911016, 911029, 911123, 911217, 920220, 920331, and 920502. Generally, the data are not very interesting.

There was no PVO coverage for the following events: 910527, 910721, 910827, 910907, 910927, 911120, and 911210.

John

ULYSSES ORBIT - ECLIPTIC PLANE PROJECTION
MAY 27, 1991



DAY, MONTH, YEAR, AND HELIOCENTRIC ECLIPTIC LONGITUDE OF VENUS
27 5 1991 189.46

DAY, MONTH, YEAR, AND HELIOCENTRIC ECLIPTIC LONGITUDE OF EARTH
27 5 1991 245.23

DAY, MONTH, YEAR, AND HELIOCENTRIC ECLIPTIC LONGITUDE OF ULYSSES
POSITION OF ULYSSES ON 27/ 5/1991 IS:

RA= 124.484 DEC= 21.145 DIST= 3.582 AU
27 5 1991 137.52

INTERSPACECRAFT DISTANCES IN AU

VENUS-ULYSSES 2.756

EARTH-ULYSSES 3.582

EARTH-VENUS .851

Table 1 GRBs List

Event ID	Time(U.T.) (hr:mn)	Peak Counts Cp (cnts/4sec)	Bit
901009	00:15:52		Hi
901021	00:09:07		Hi
901103	05:52:56		Hi
901112	19:20:38		Lo Uly
901219	21:52:50		Hi Uly
901222	15:14:08		Hi Uly
90130	11:56:08		Hi
90204	08:58:47		Hi Uly
90206	08:45:29		Med Uly
90312	12:43:34		Hi Uly
90314	22:56:12		Lo Uly
90315	22:55:48		Lo Uly
90322	12:41:48		Med
90402	14:28:13		Med Uly
90429	03:11:50		Med GRO
90522	12:14:08		Hi Uly
90527	23:45:36		Hi
90709	20:22:38		Med
90717	04:33:05		Hi GRO
90723	14:06:16		Lo
90725	13:12:06		Med GRO
90803	08:33:28		Med GRO
90814	19:14:34		Lo GRO
90815	12:34:32		Med
90821	10:33:39		Hi
90827	13:11:18		Hi
90905	23:48:55		Med GRO
90907	01:04:56		Lo GRO?
90926	18:25:56		Lo GRO
911008	17:56:04		Lo
911016	11:01:30		Lo GRO
911029	04:50:52		Lo
accuracy			Hi <+-0.1s Med +-0.5s Lo +-2.0s

Murakami's
Preliminary list

SOLAR
Requested Ulysses data Request PVO data if found N/O
Got Gunga data
Requested U. RT data
Got Gunga data
SOLAR
Requested RT
Requested RT data
Uly RT
RT requested
RT requested
Uly
RT requested
RT requested
RT requested
RT
RT requested
No data
Requested RT
Requested RT
Requested RT
Requested RT
Requested RT
Requested RT

CK 11/6

Σ events - Pat Lestak $\rightarrow$ Kouneliotou

June 1 69730 (19:20) BATSE conf + Ulysses

" 27 16159 (4:29) " " "

29 71750 (19:56) α " δ " " 0

*

BATSE/ WATCH Event

Oct	16	39696	α	δ	
			300.5	-1.2	(BATSE)
			19:42	-5	(WATCH $\pm 1^\circ$)

Seen as soft by WATCH, but hard by BATSE (19500 c/s per

* Con't

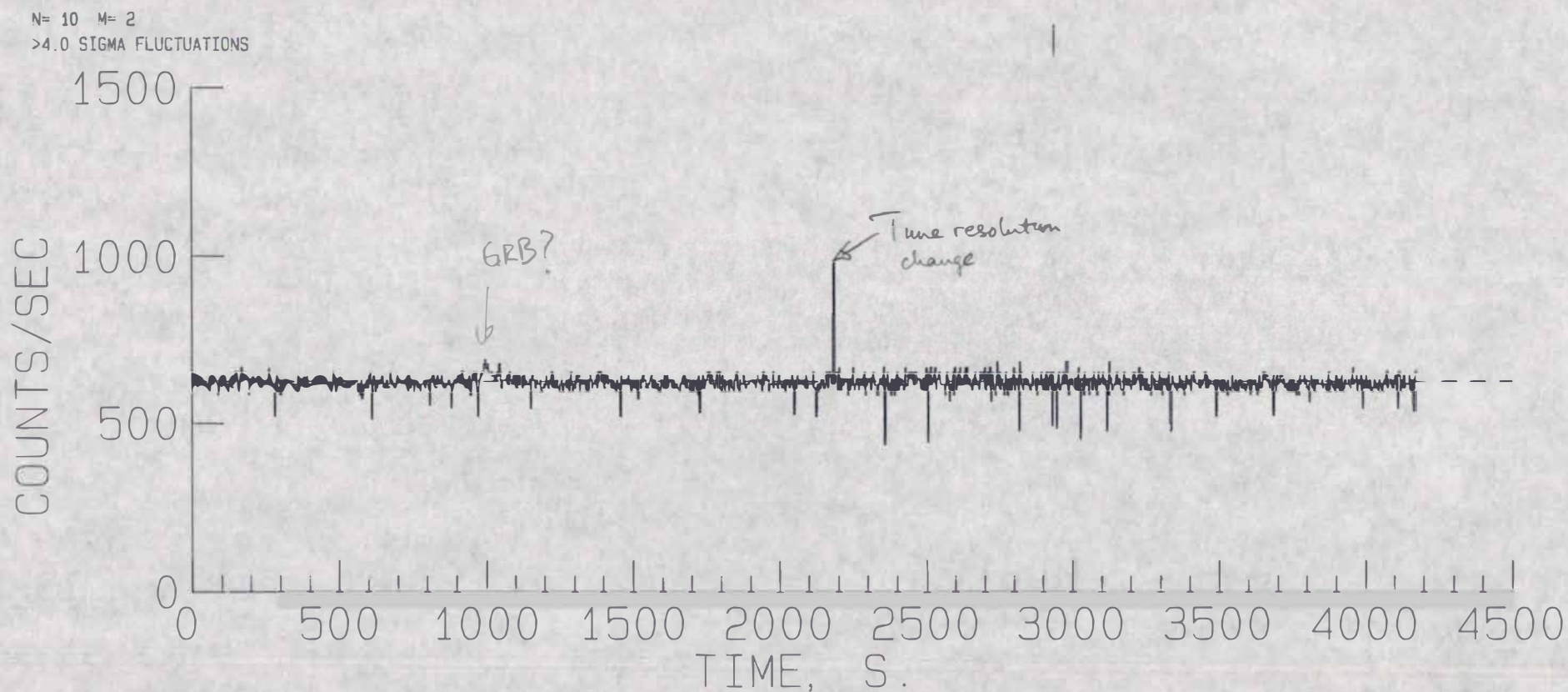
April 17 20:07:32

May 17 5:02:42

May 27 23: ~~40~~ 44:00

23/ 5/92

ULYSSES RT
27/ 5/91 83664.477 s
1.000 S INTERVALS REGROUPED BY 3
27- 224 keV



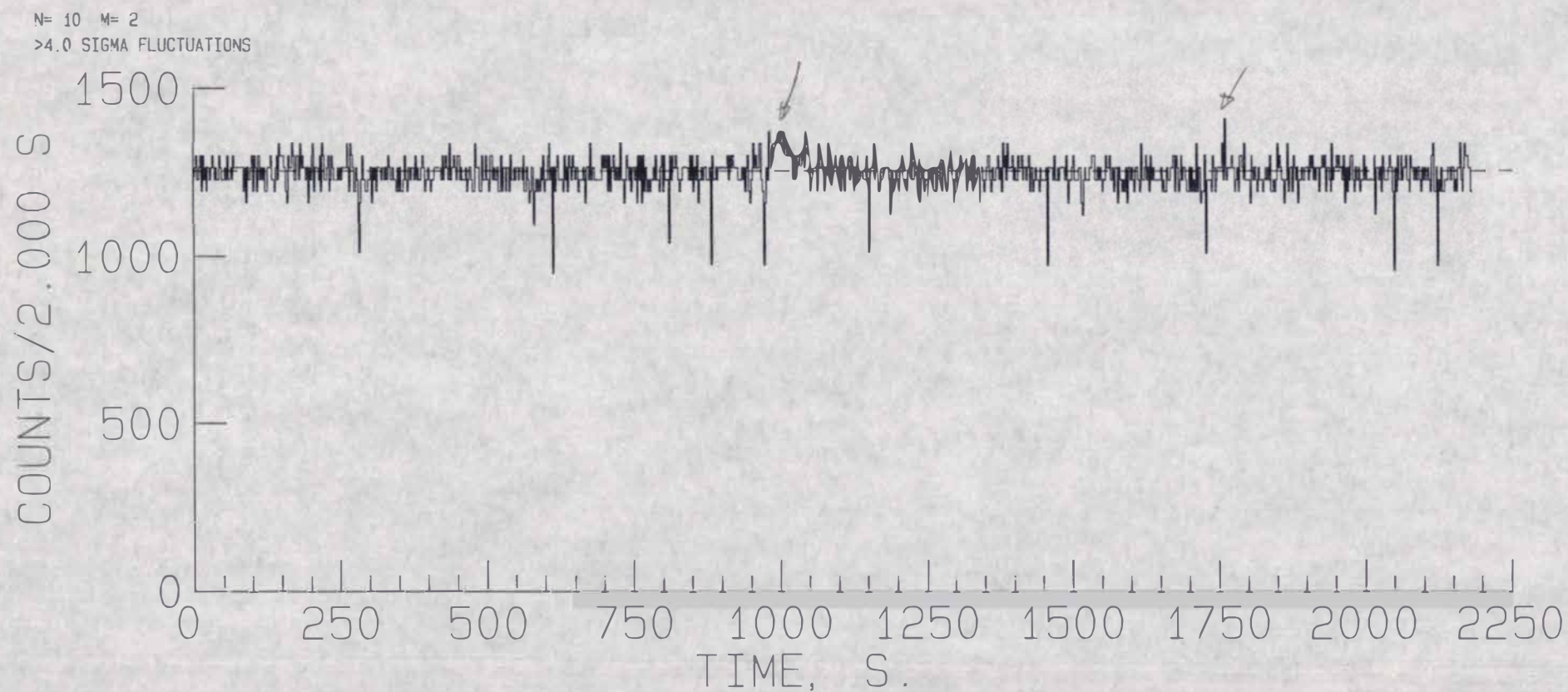
23/ 5/92

ULYSSES RT

27/ 5/91 83664.477 s

1.000 S INTERVALS REGROUPED BY 2

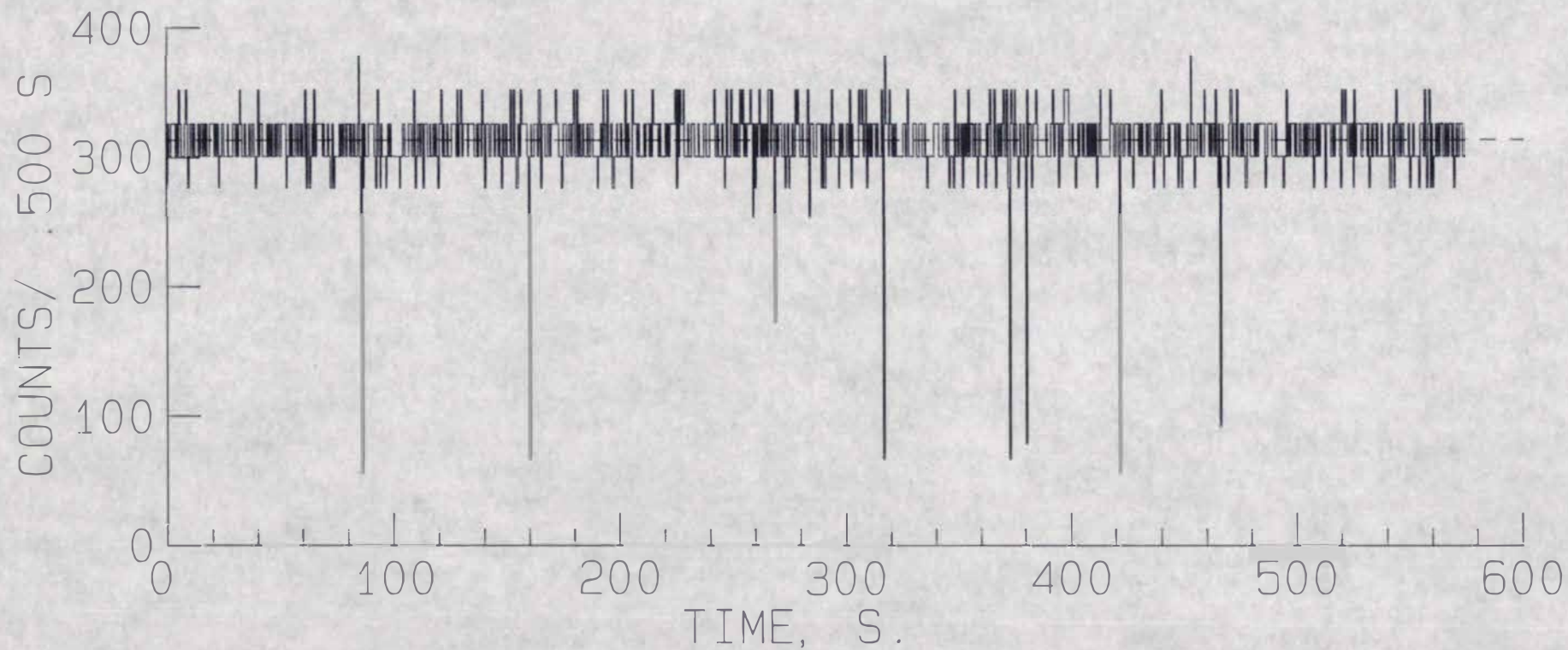
27- 224 keV



23/ 5/92

ULYSSES RT
27/ 5/91 85848.523 s
27- 224 keV

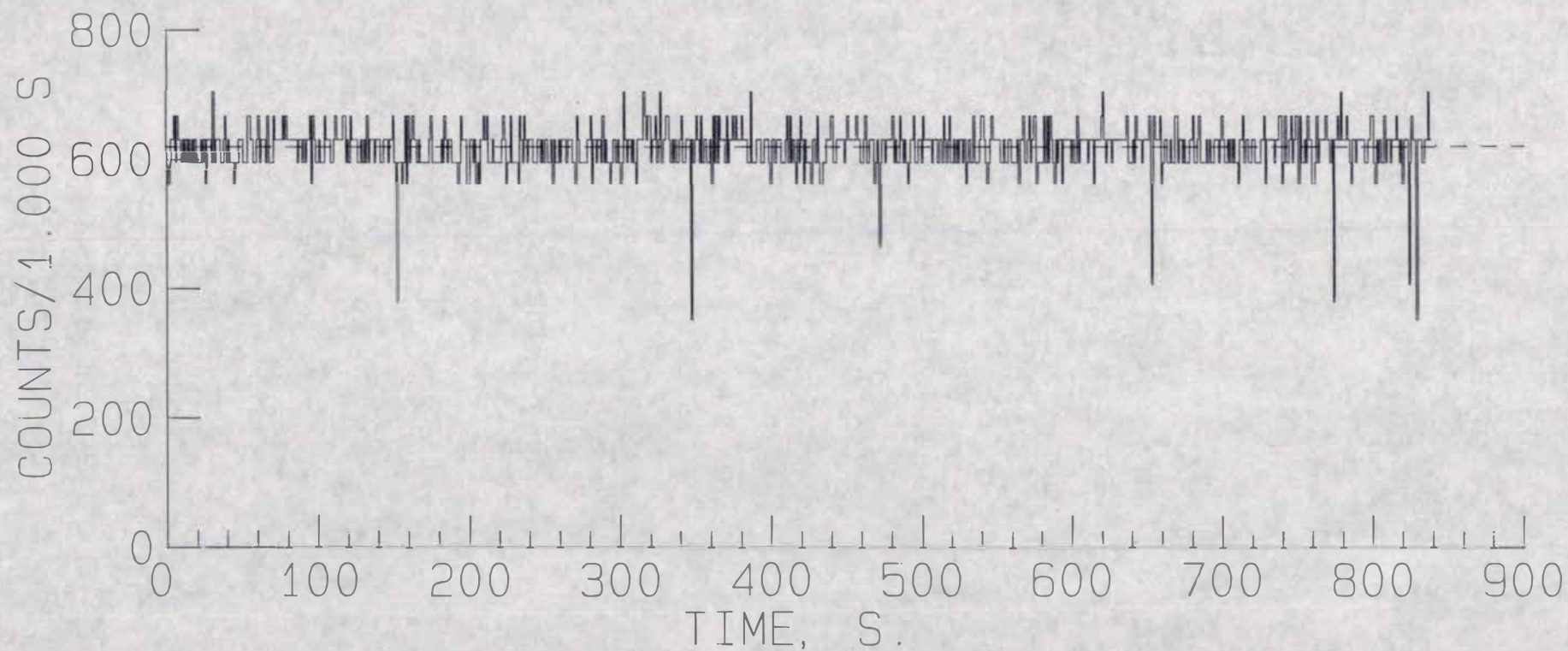
N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



23/ 5/92

ULYSSES RT
28/ 5/91 25.529 s
27- 225 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



28/ 2/92

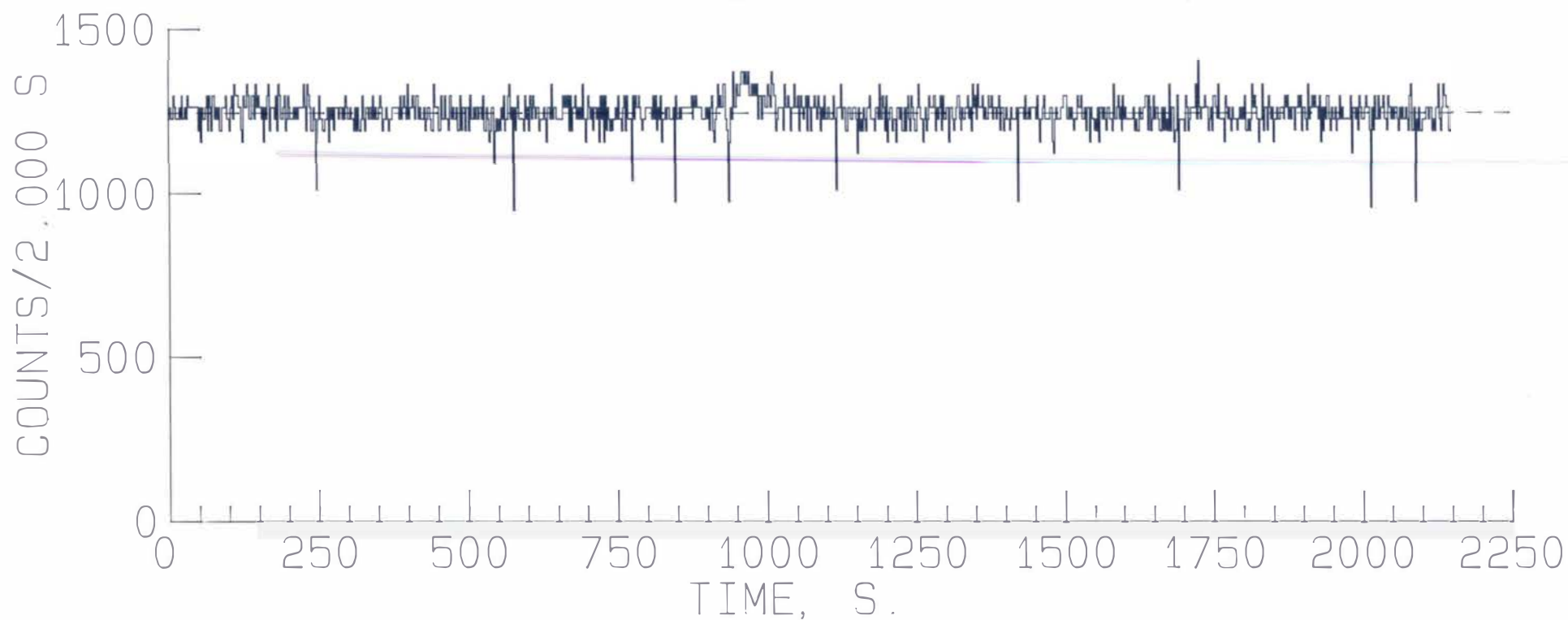
ULYSSES RT

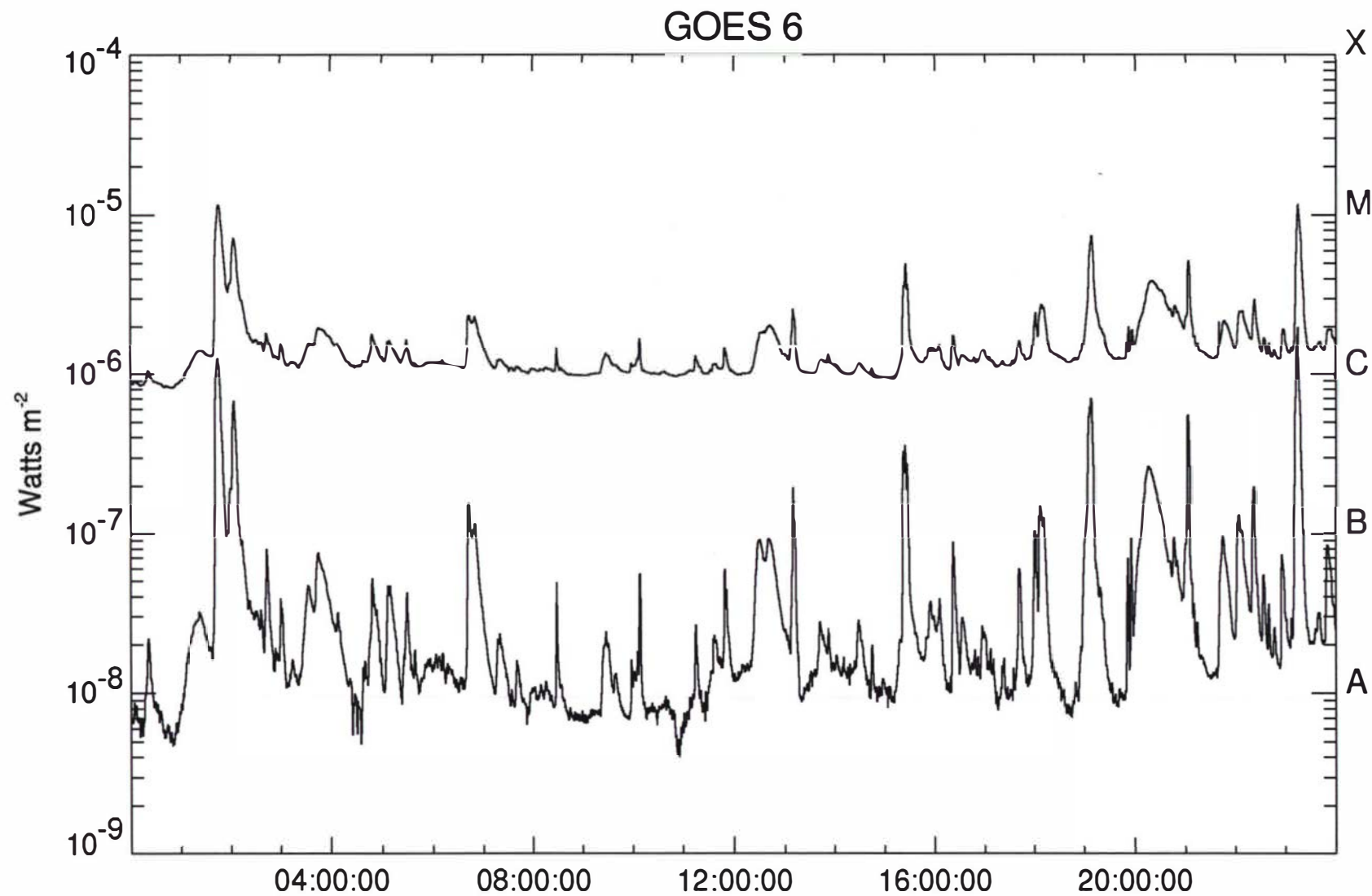
27/ 5/91 83700.477 s

1.000 S INTERVALS REGROUPED BY 2

0- 0 keV

N= 10 M=10
>4.0 SIGMA FLUCTUATIONS





Data Start: 91/05/27, 0000:00

Plot created: 96/11/27, 0357

Channel 1 (1.0 - 8.0 Angstroms)

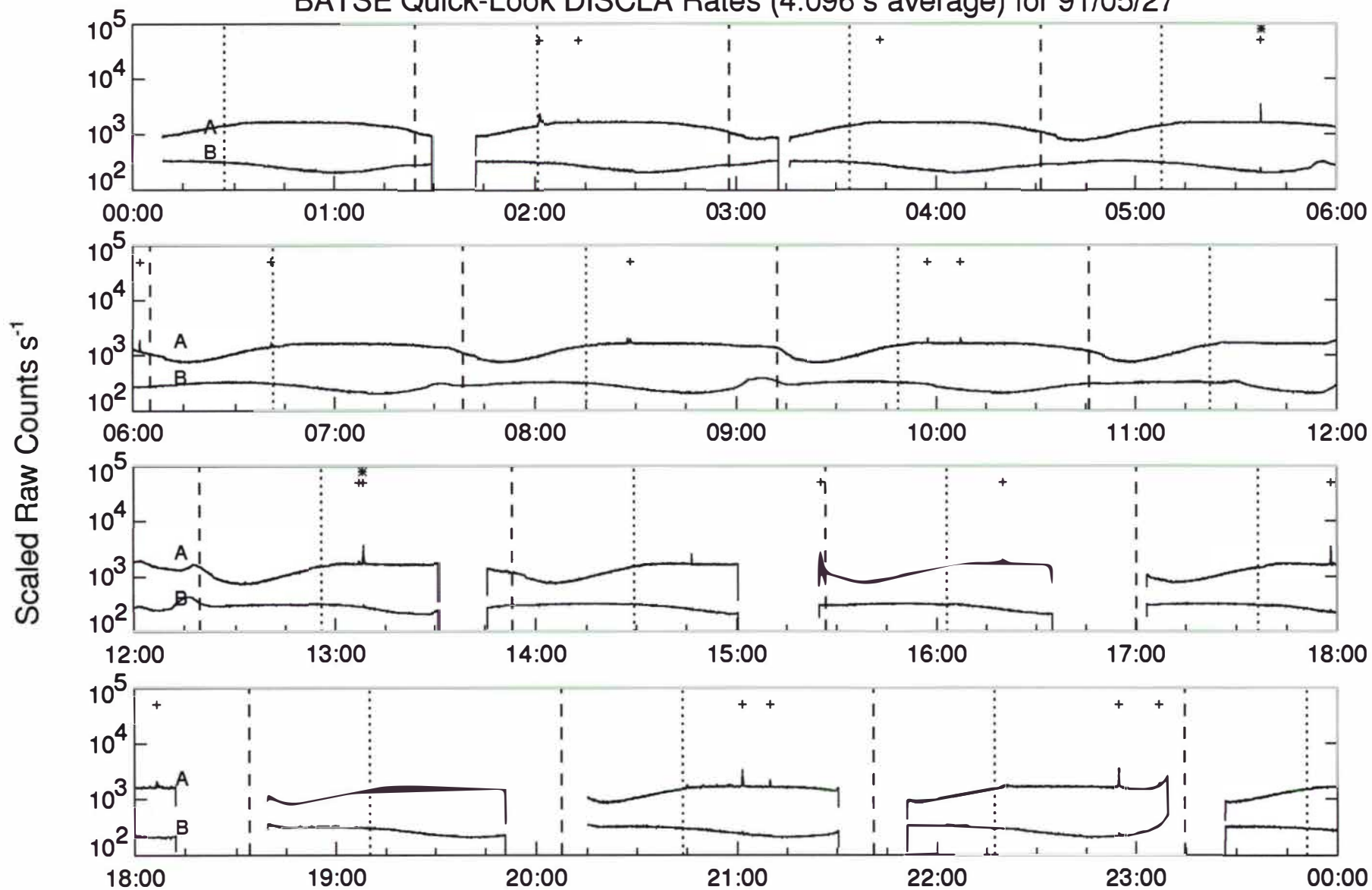
Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms)

Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/27



Current Time: 96/11/27, 0357 EDT

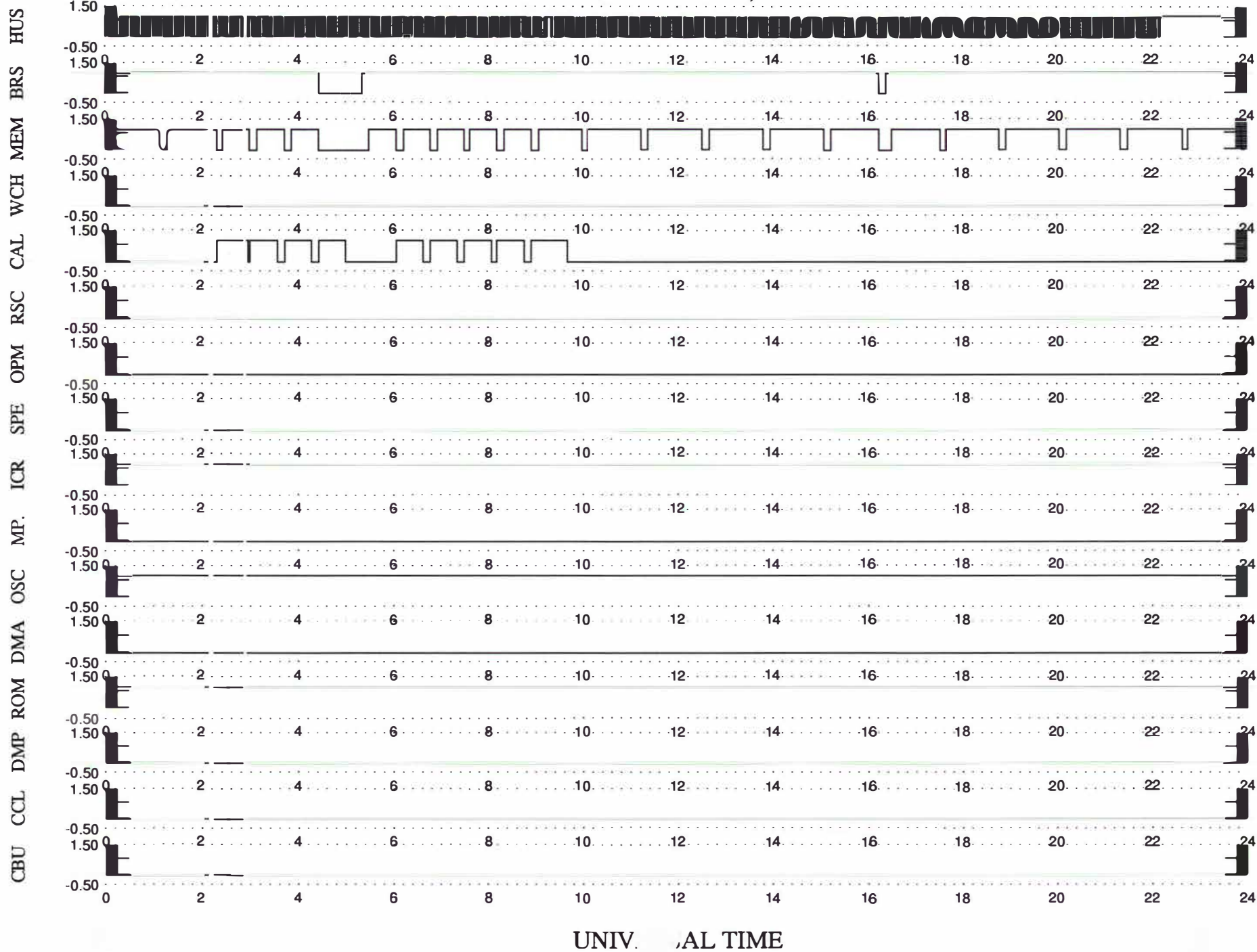
A: Channel 0 Most Sunward LAD

B: Sum Channel 0 Anti-Sunward LADs X .05

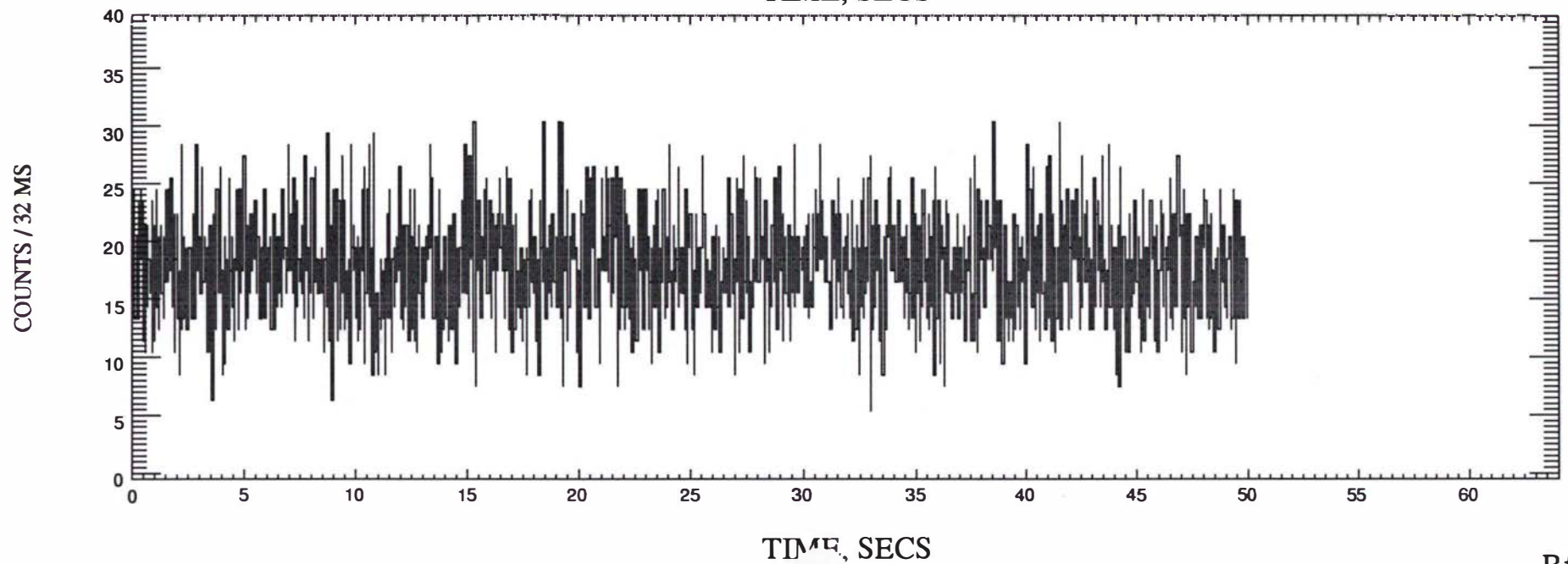
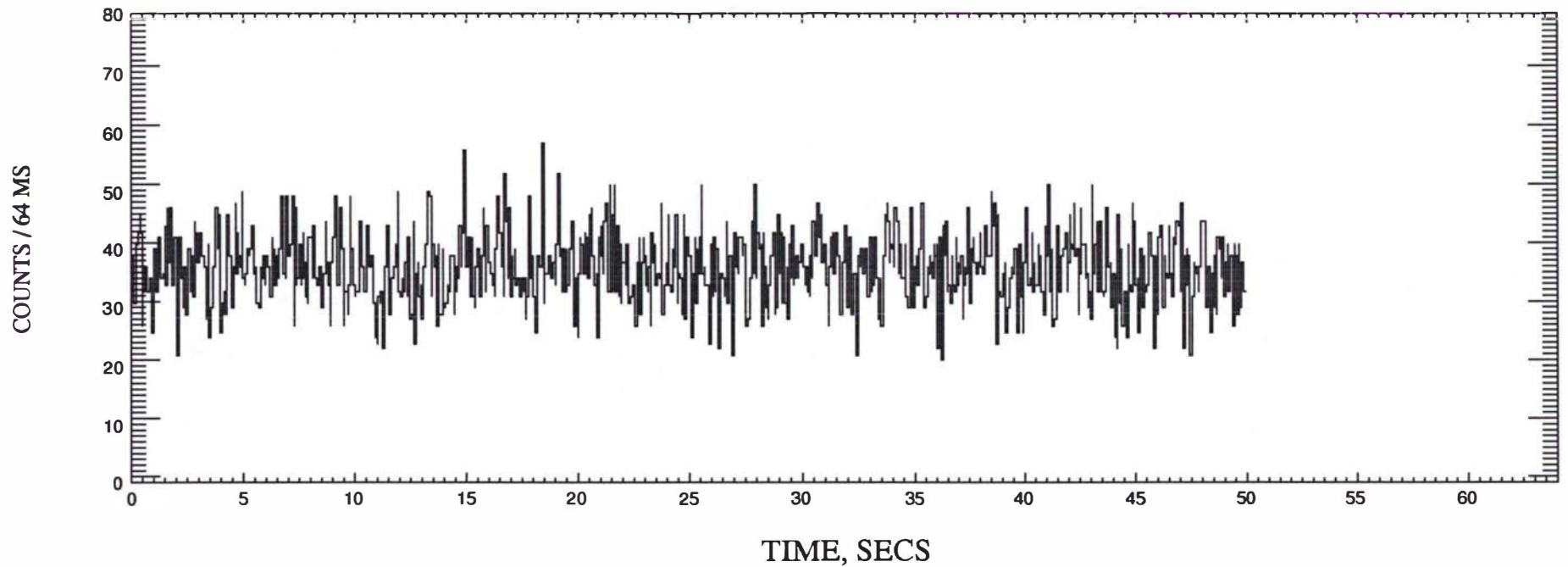
Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare

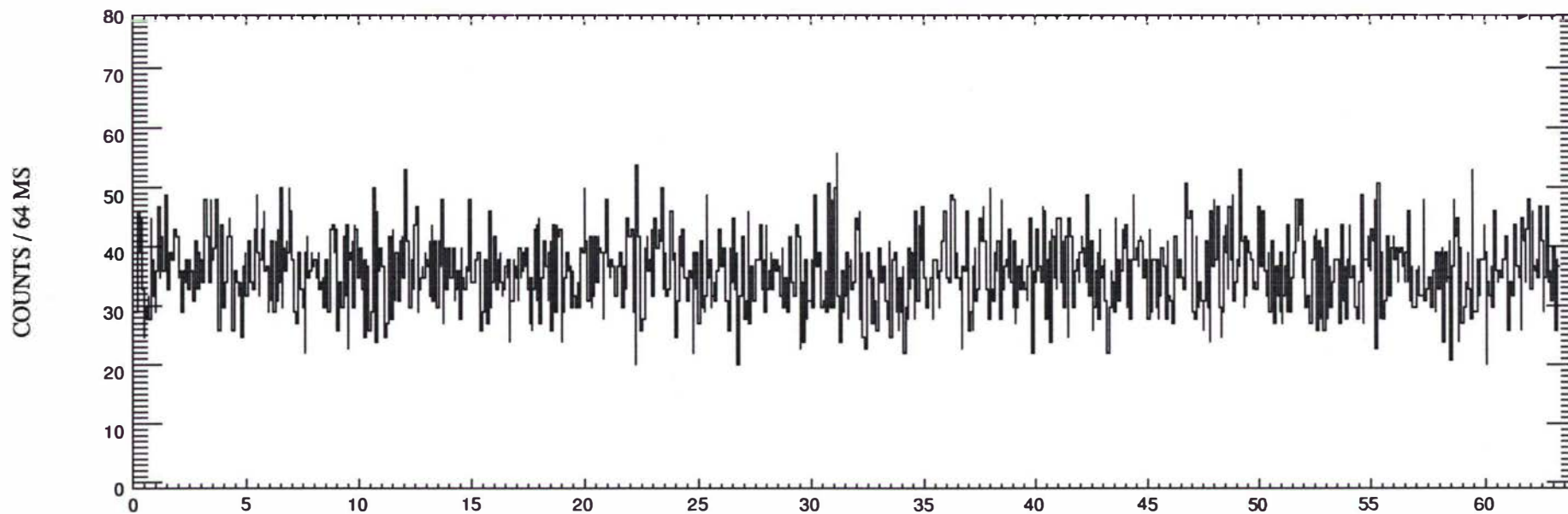
BURST NUMBER 0 - 15, 0 - 6



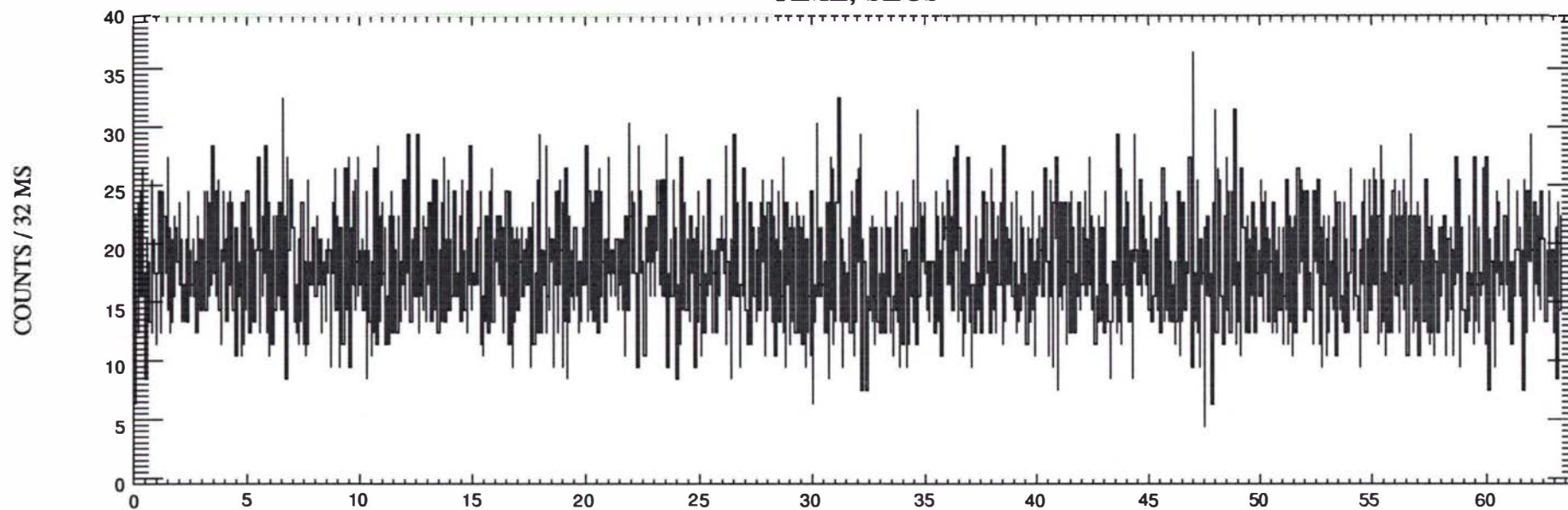
Burst Counter 1 at UT= 1.151919937134 h= 4146.912 s 01:09:06.912



Burst Counter 2 at UT= 2.211389846802 h= 7961.003 s 02:12:41.003

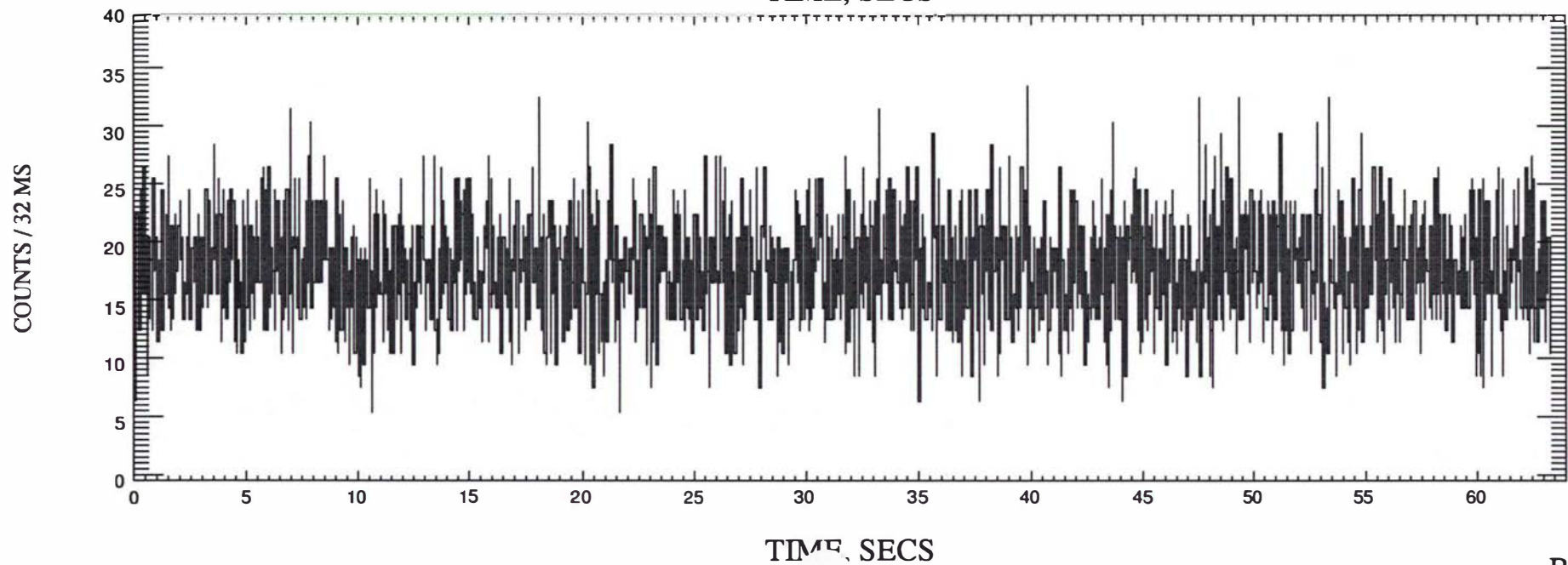
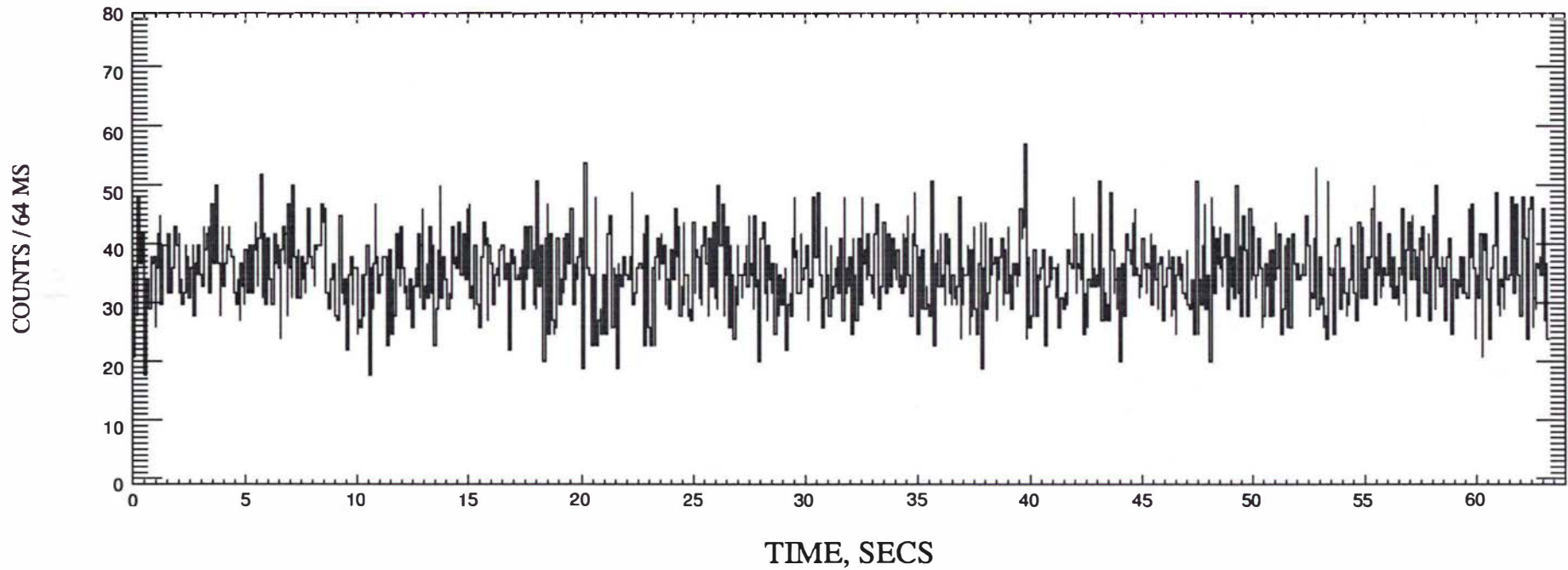


TIME, SECS

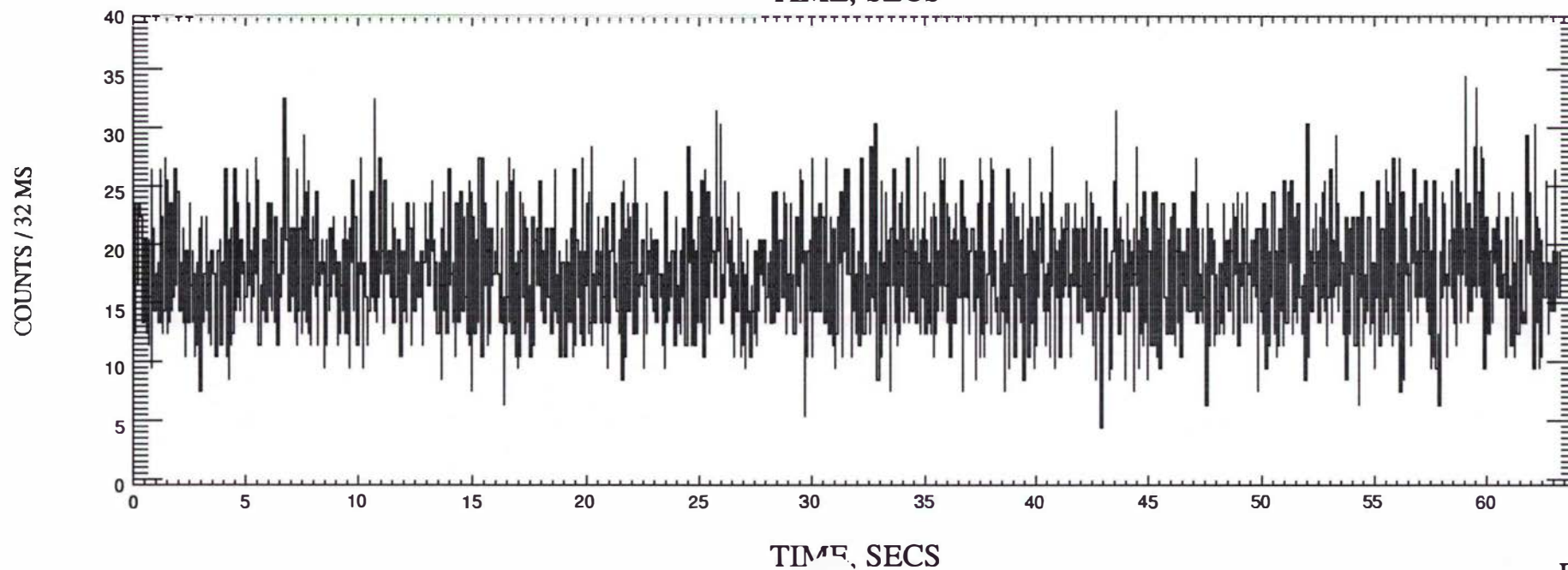
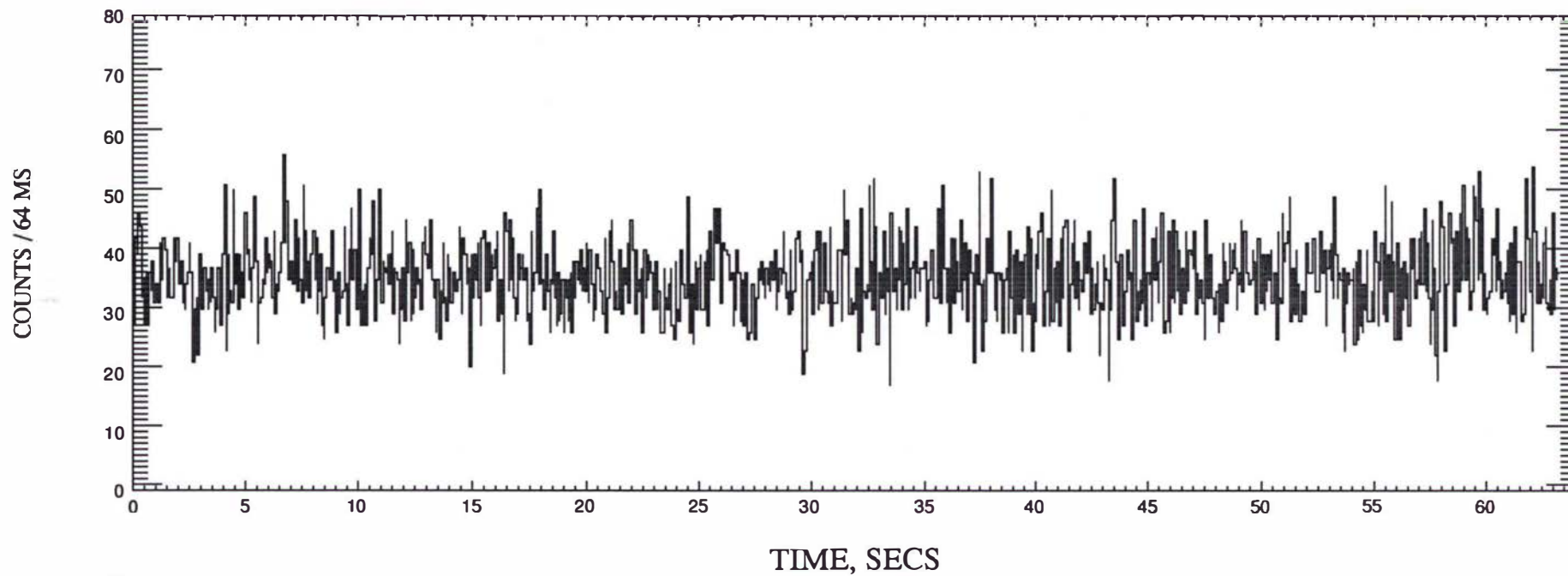


TIME, SECS

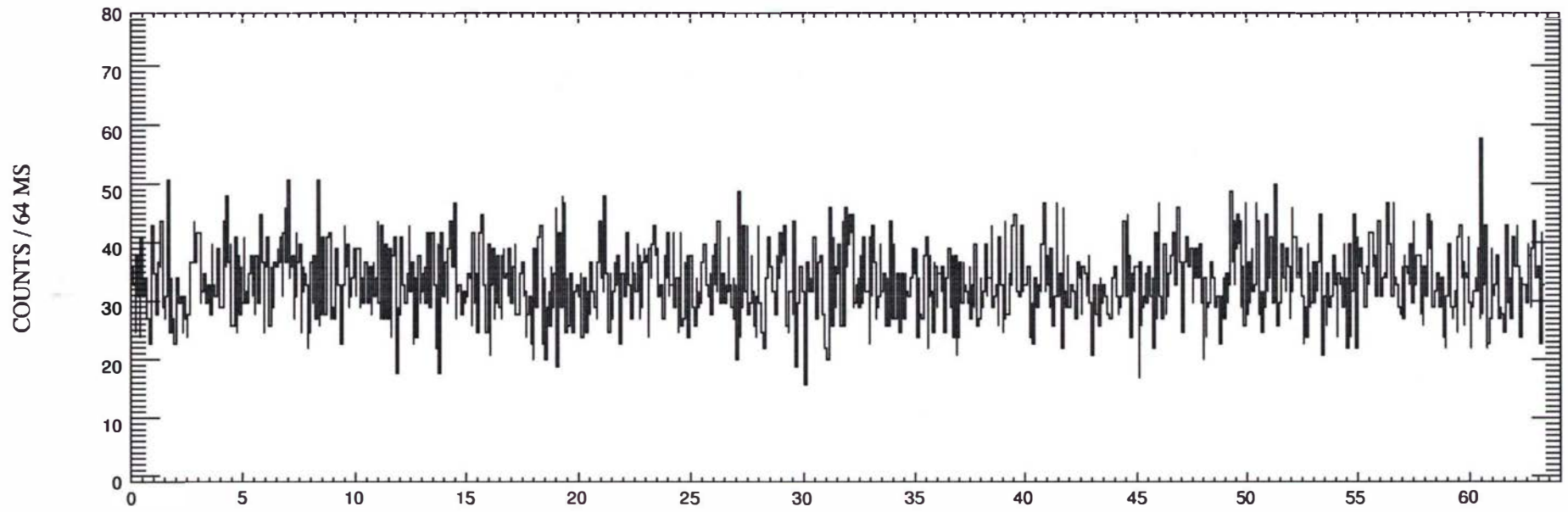
Burst Counter 3 at UT= 3.002509350247 h=10809.034 s 03:00:09.034



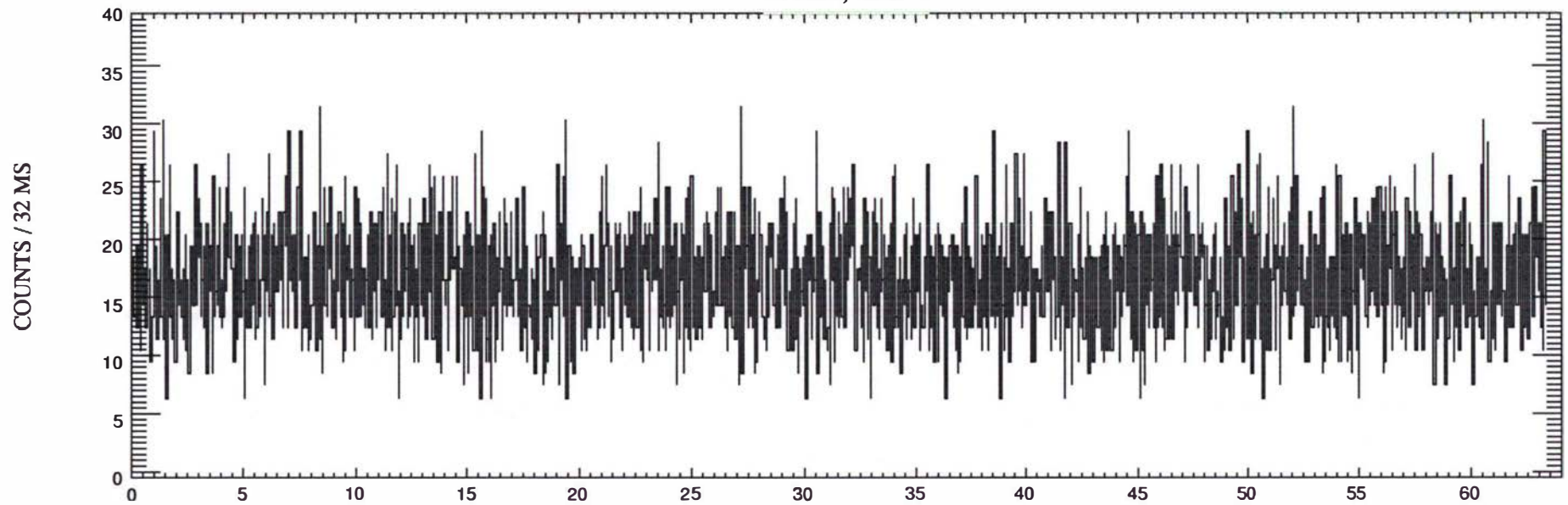
Burst Counter 4 at UT= 3.703089663188 h=13331.123 s 03:42:11.123



Burst Counter 5 at UT= 5.337842106289 h=19216.232 s 05:20:16.232

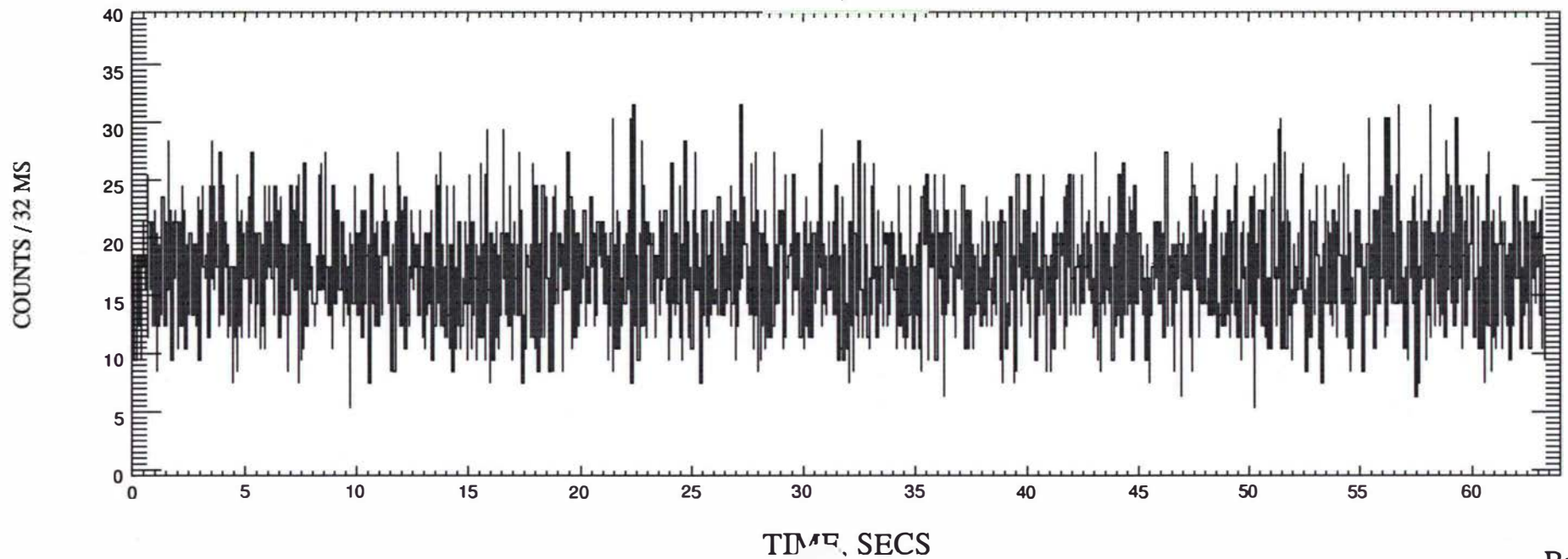
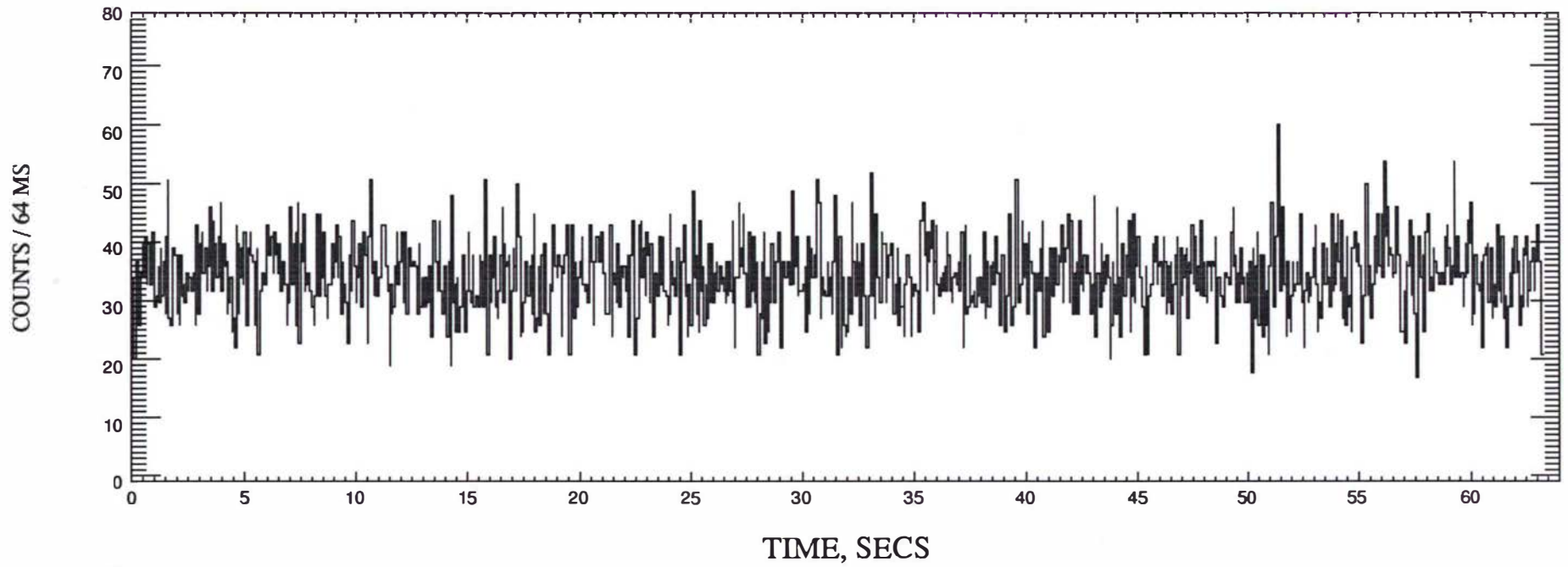


TIME, SECS

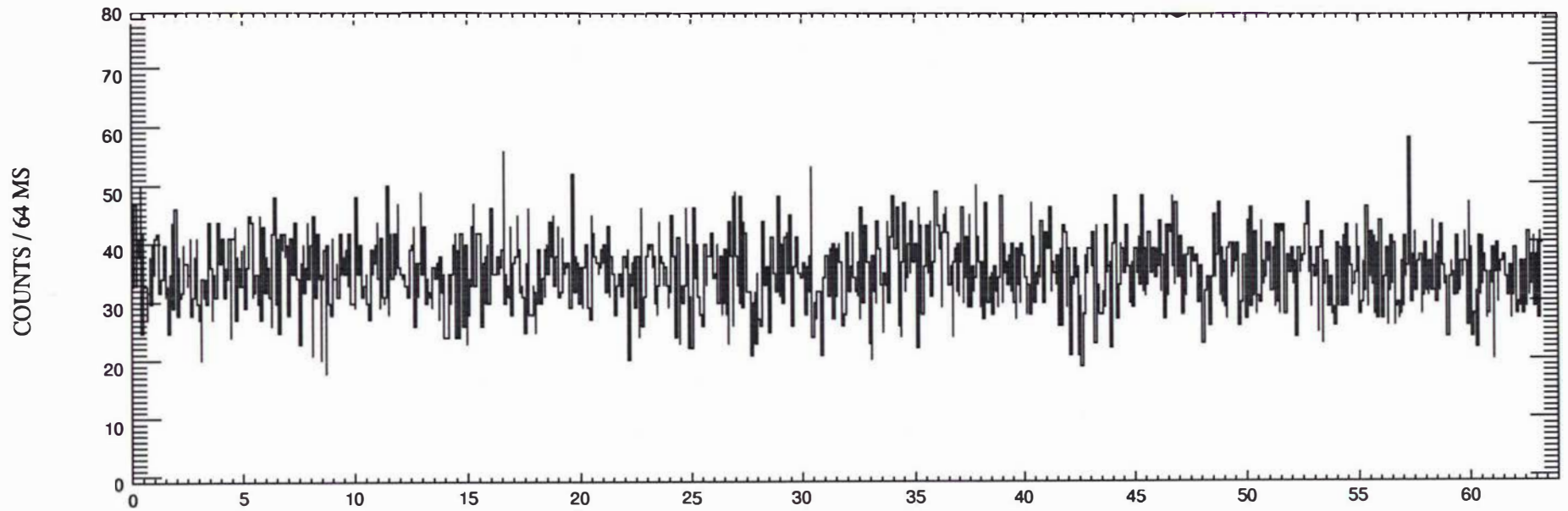


TIME, SECS

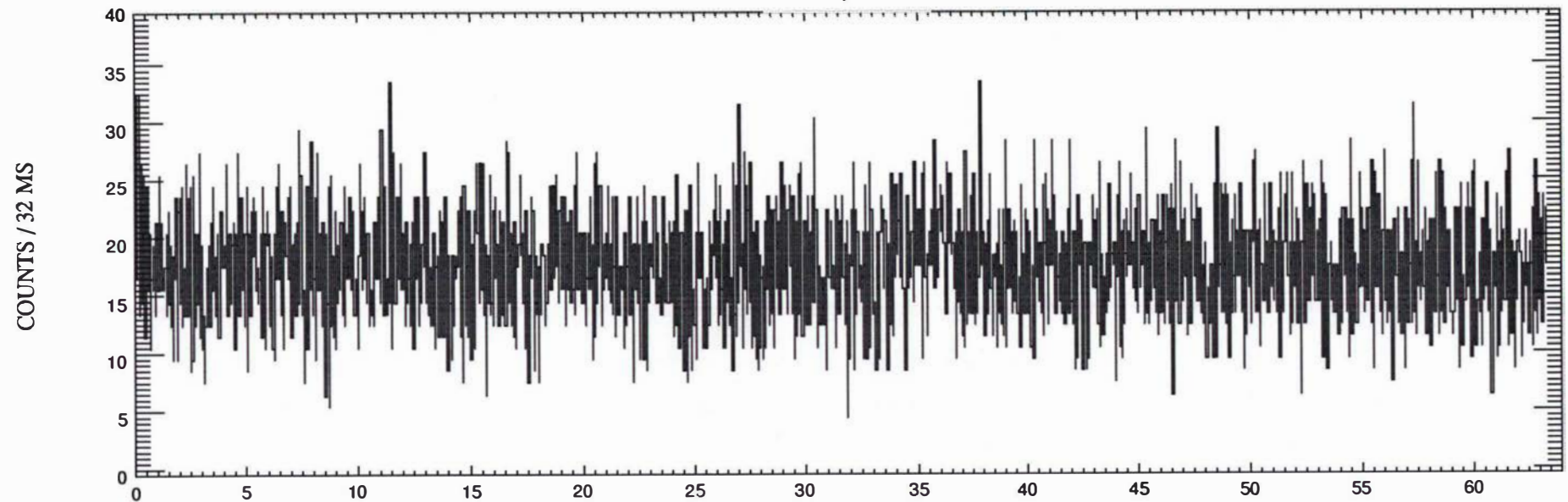
Burst Counter 6 at UT= 6.060911746555 h=21819.282 s 06:03:39.282



Burst Counter 7 at UT= 6.764534767999 h=24352.325 s 06:45:52.325

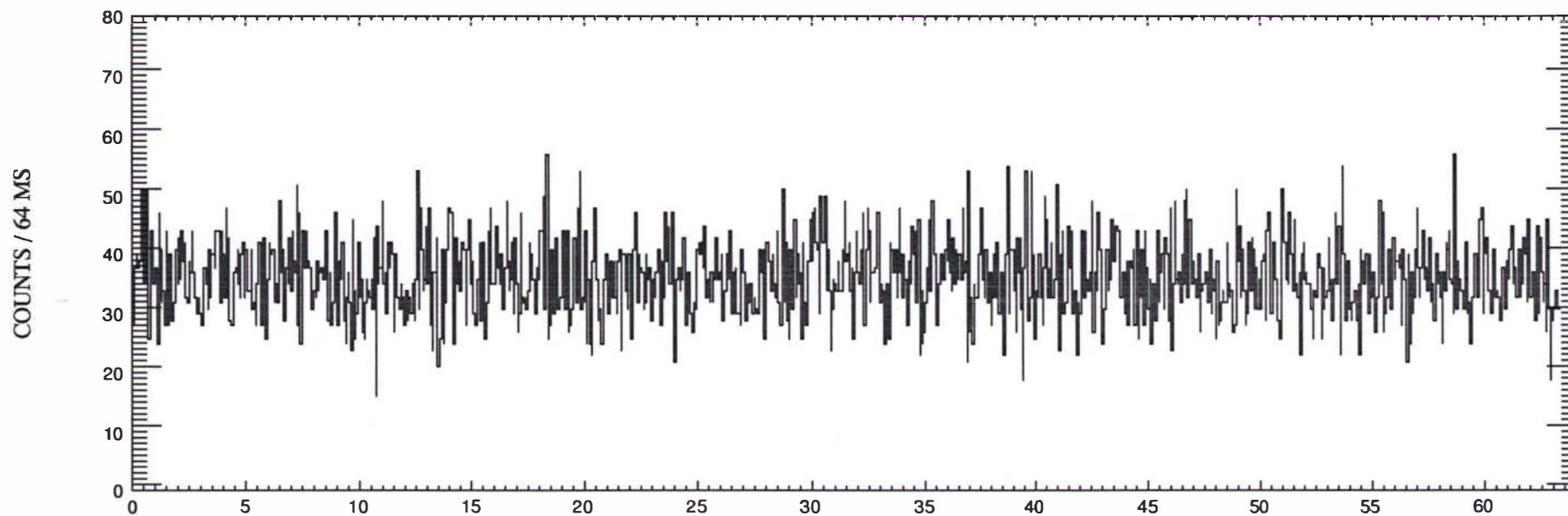


TIME, SECS

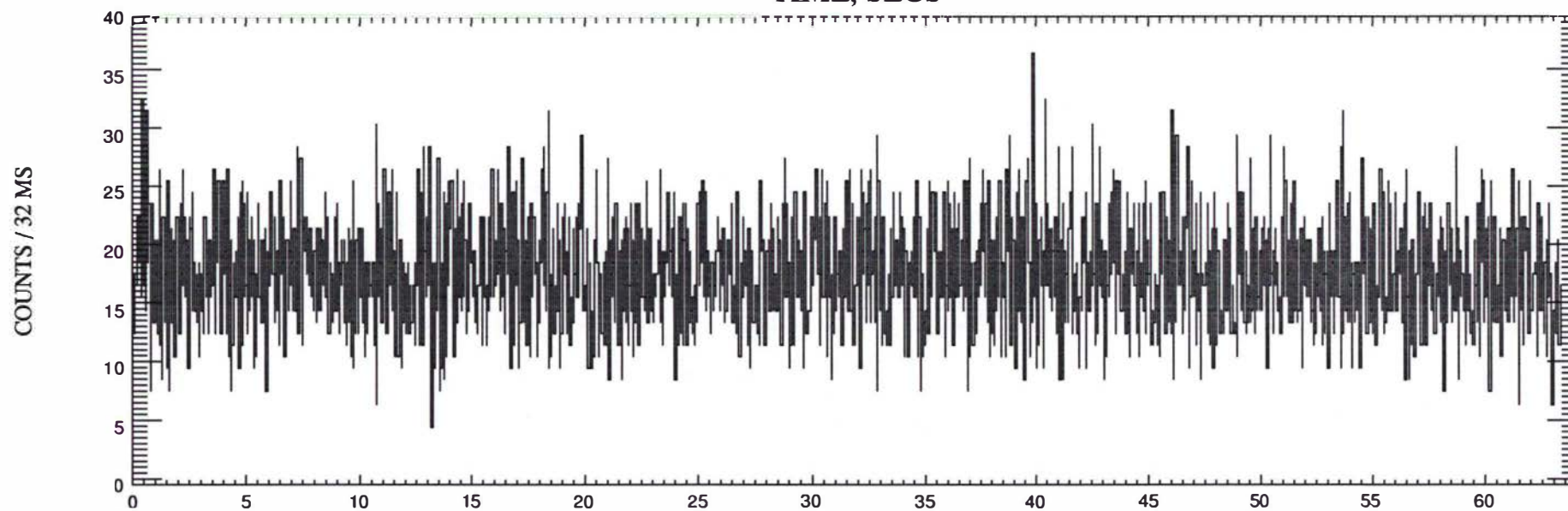


TIME, SECS

Burst Counter 8 at UT= 7.491215519375 h=26968.376 s 07:29:28.376

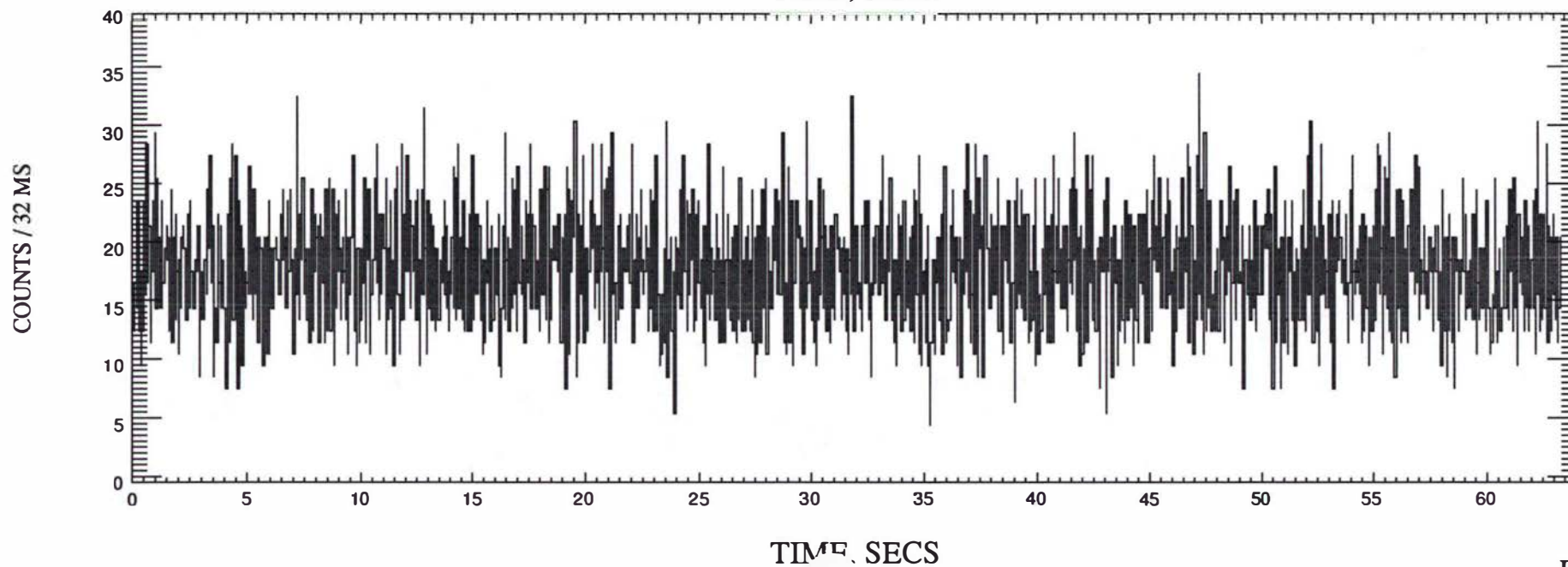
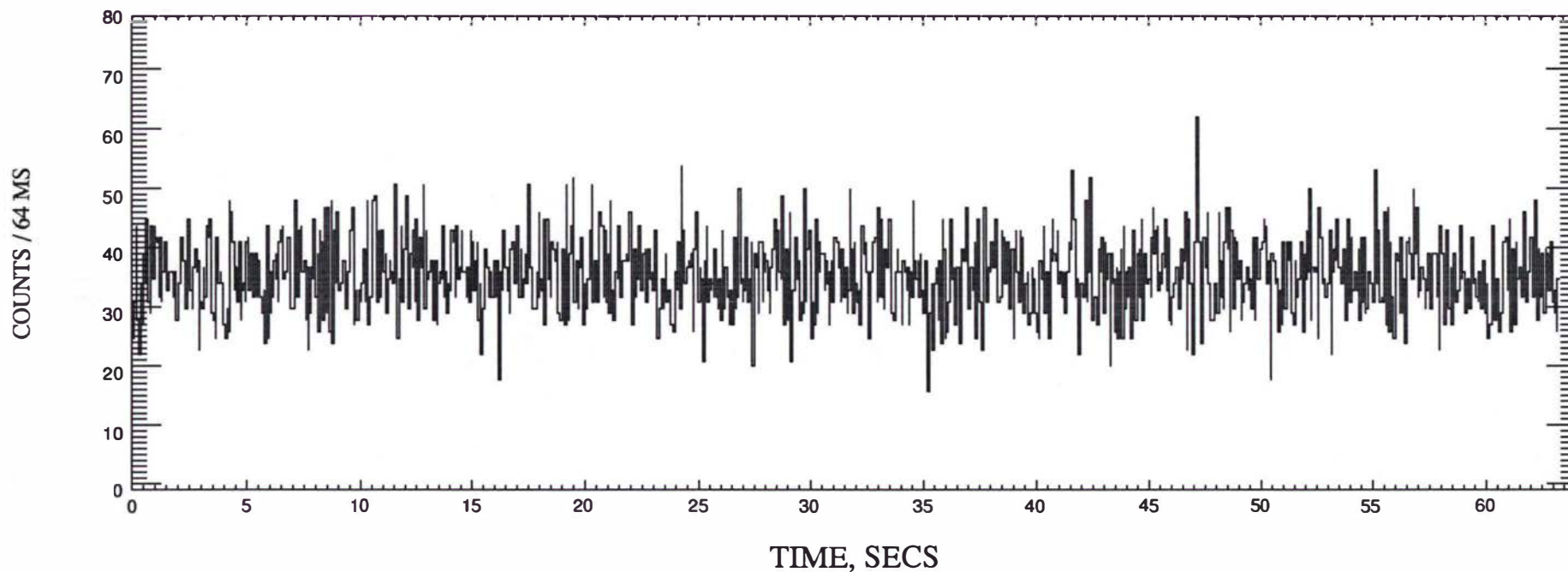


TIME, SECS

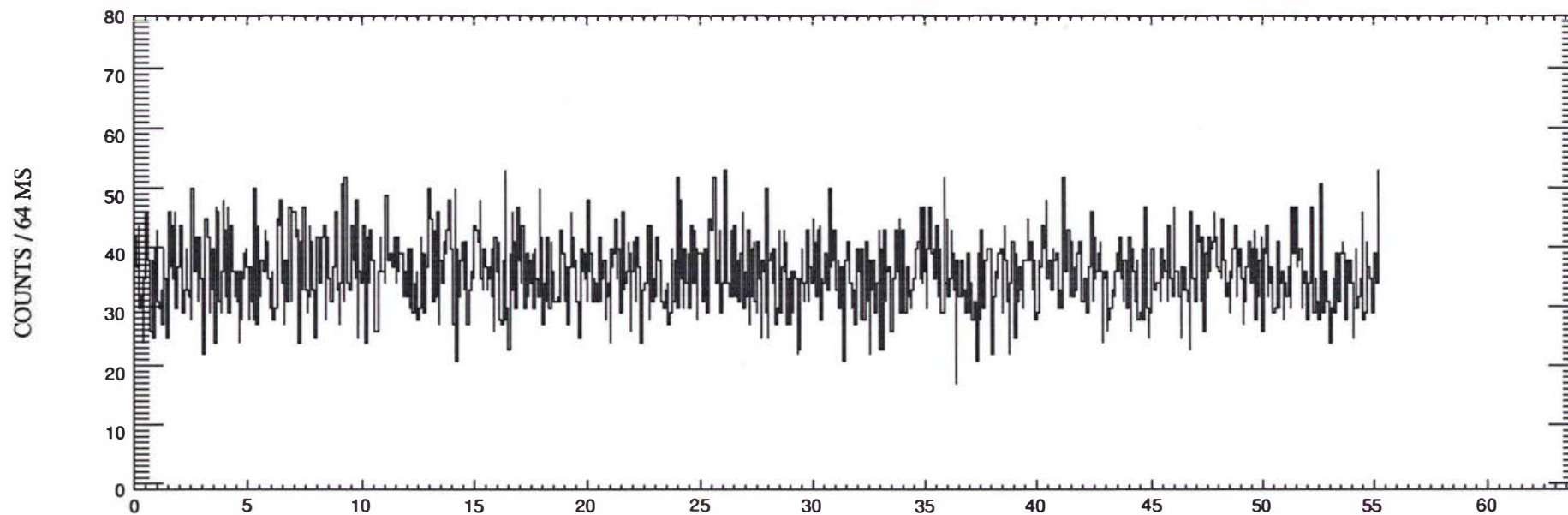


TIME, SECS

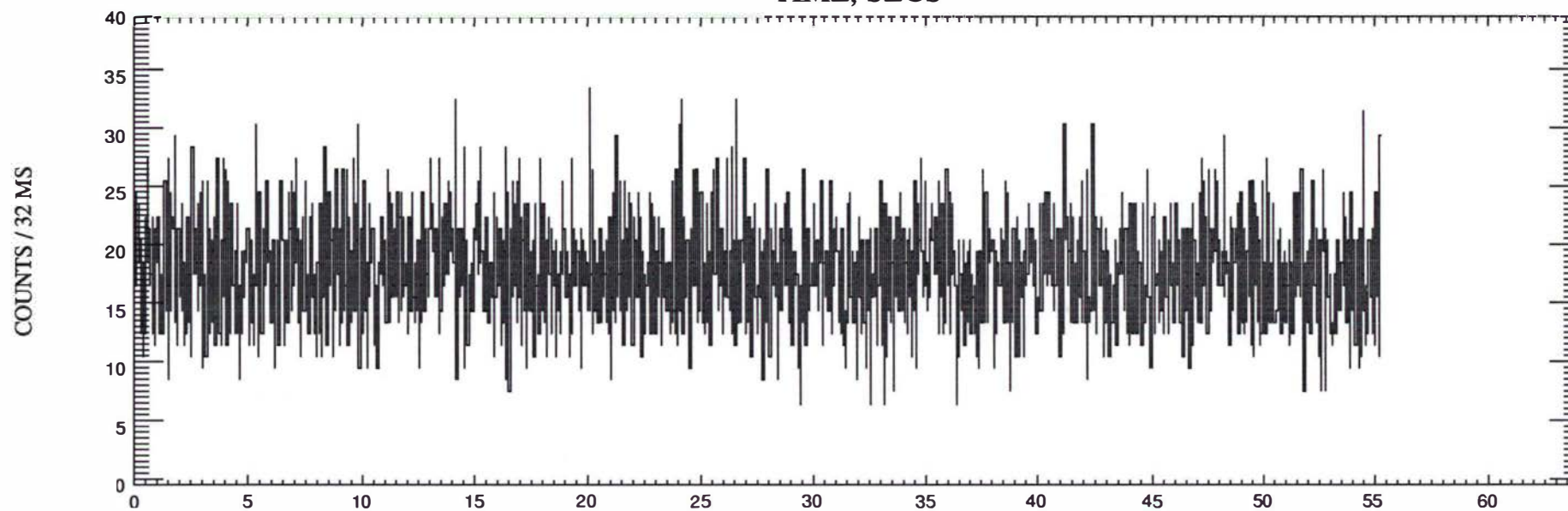
Burst Counter 9 at UT= 8.196509552002 h=29507.434 s 08:11:47.434



Burst Counter 10 at UT= 8.901523632473 h=32045.485 s 08:54:05.485

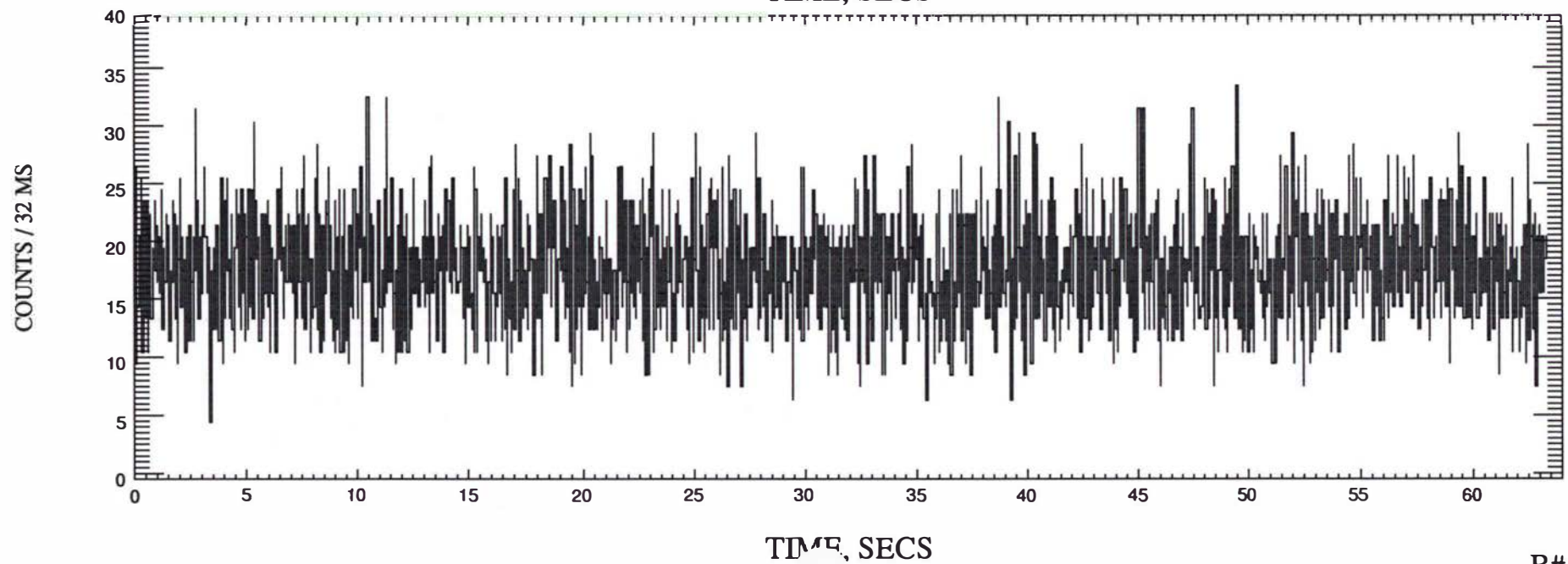
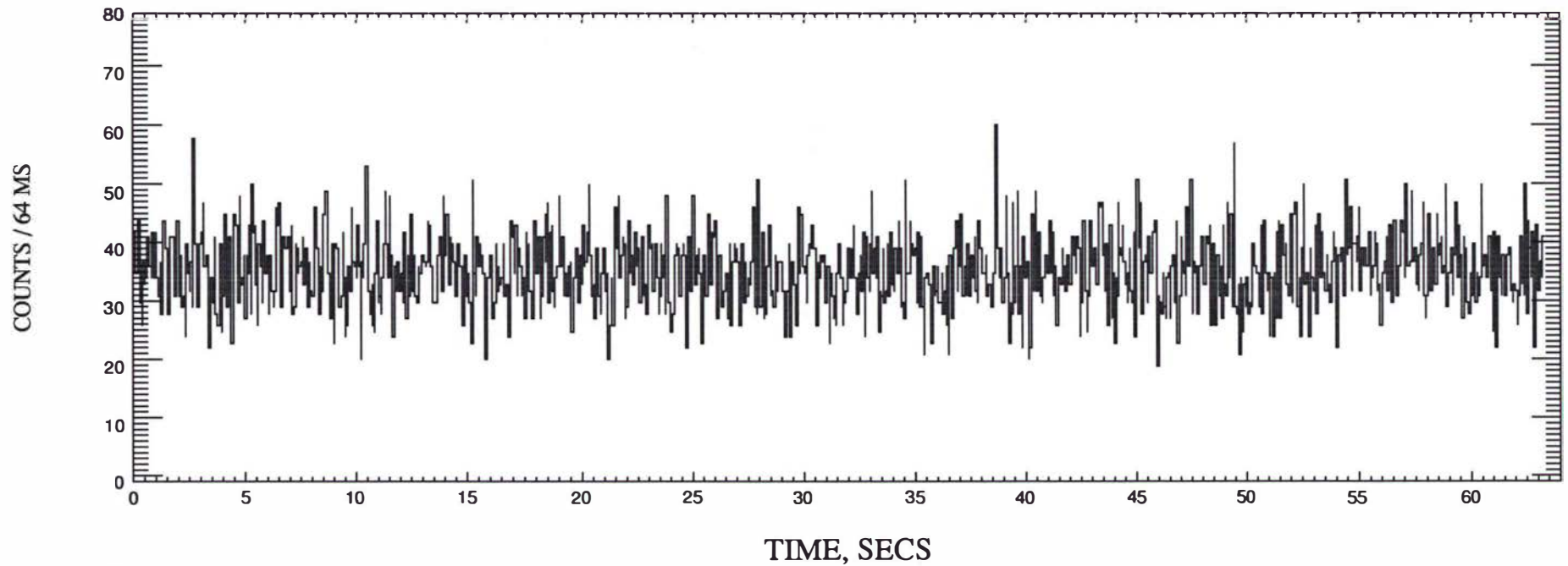


TIME, SECS

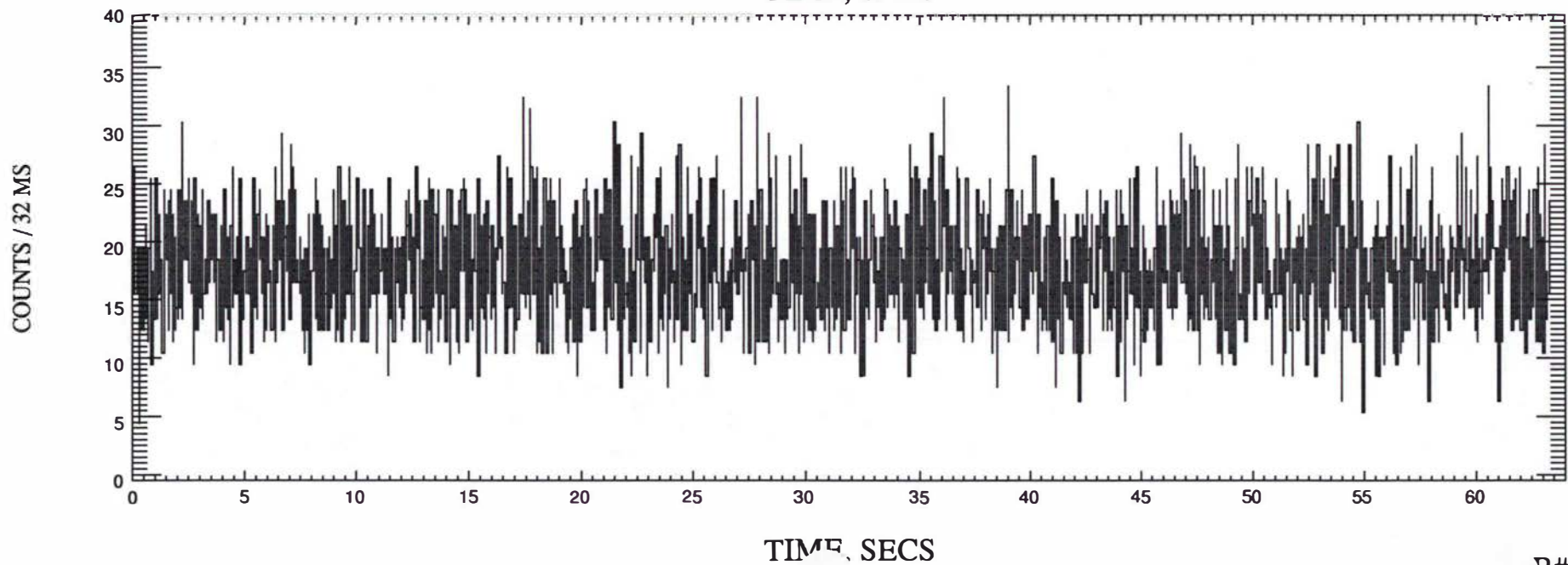
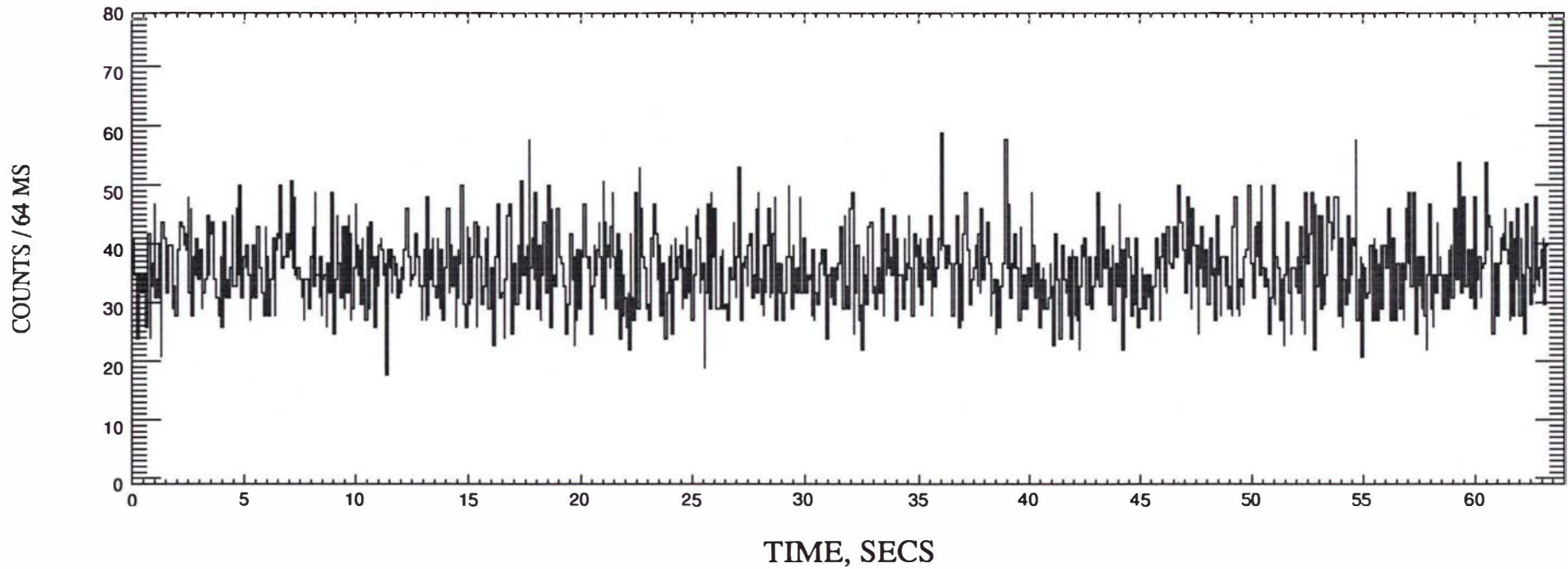


TIME, SECS

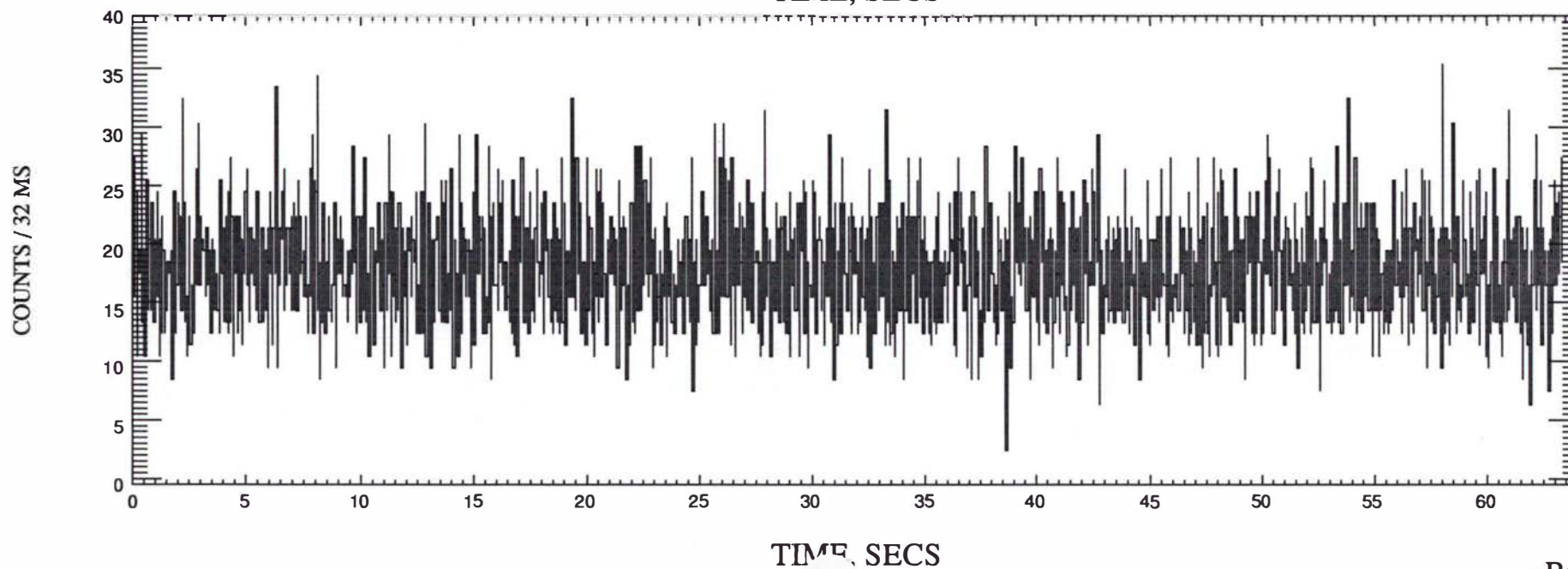
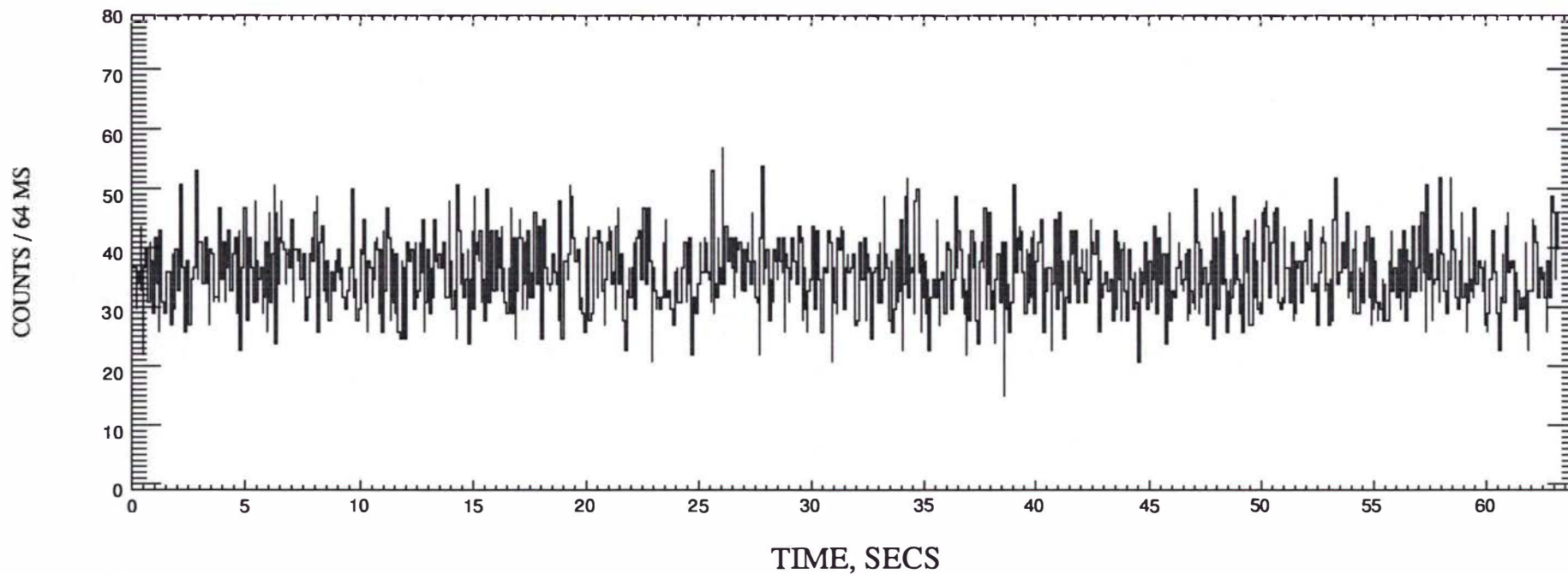
Burst Counter 11 at UT= 9.931818957859 h=35754.548 s 09:55:54.548



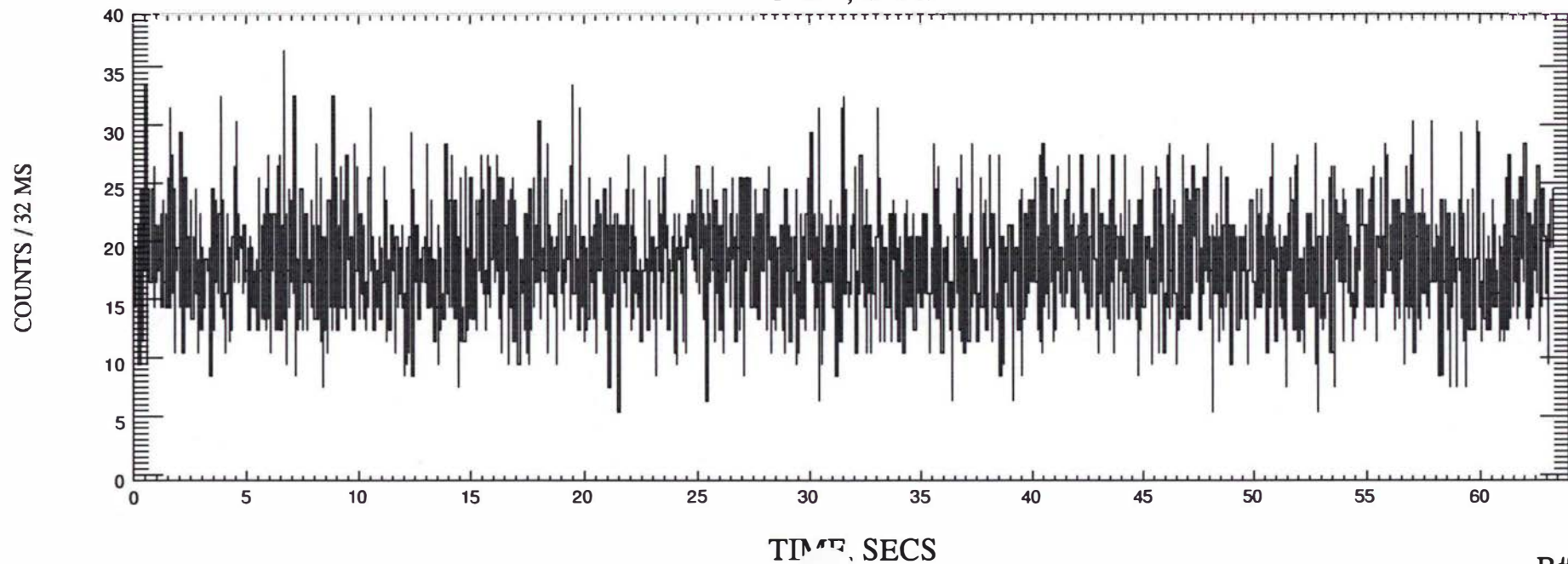
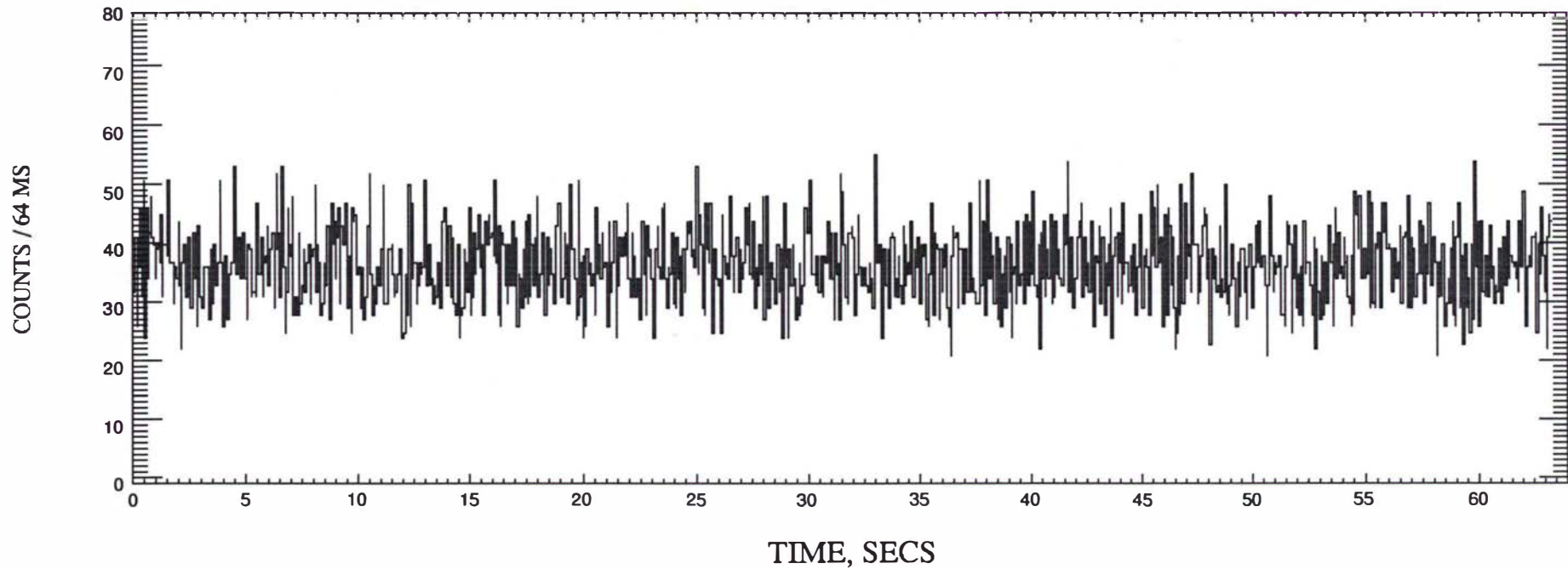
Burst Counter 12 at UT=11.190173297458 h=40284.624 s 11:11:24.624



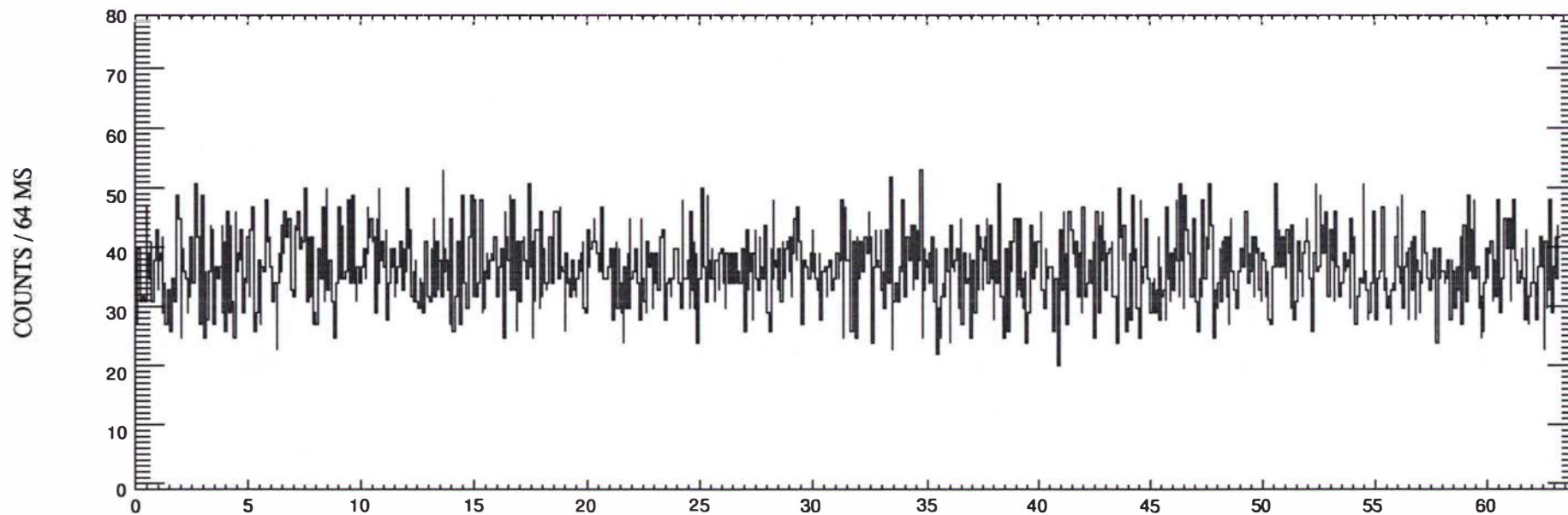
Burst Counter 13 at UT=12.453818439907 h=44833.746 s 12:27:13.746



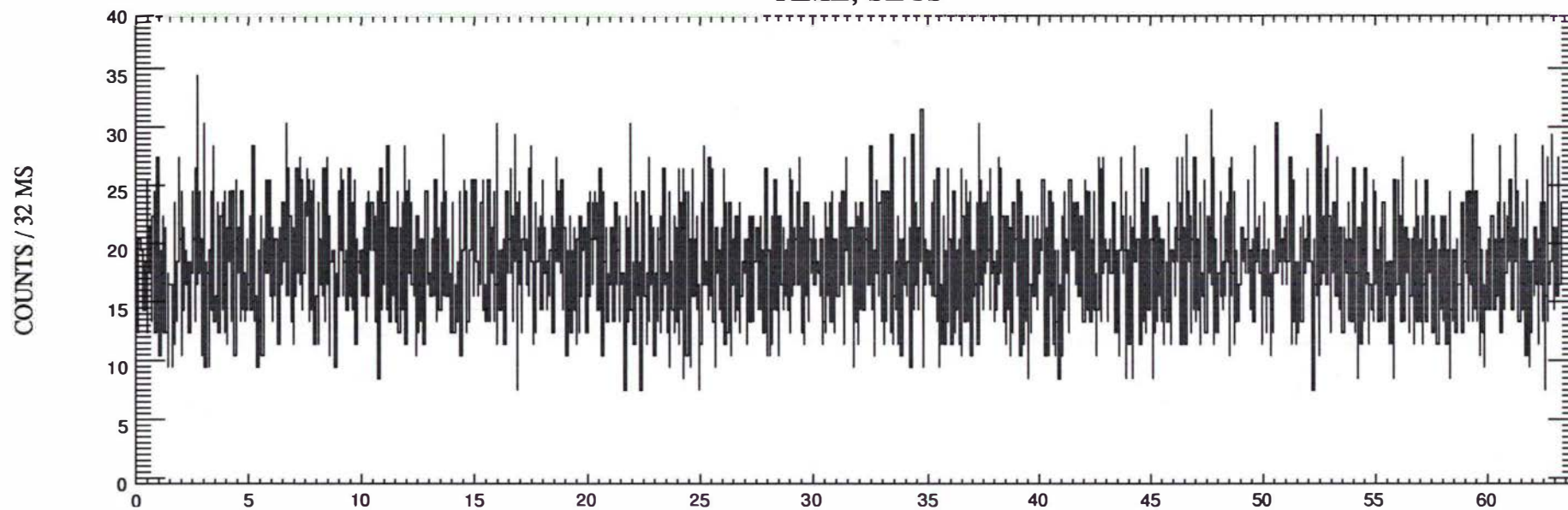
Burst Counter 14 at UT=13.713561672635 h=49368.822 s 13:42:48.822



Burst Counter 15 at UT=14.977198130290 h=53917.913 s 14:58:37.913

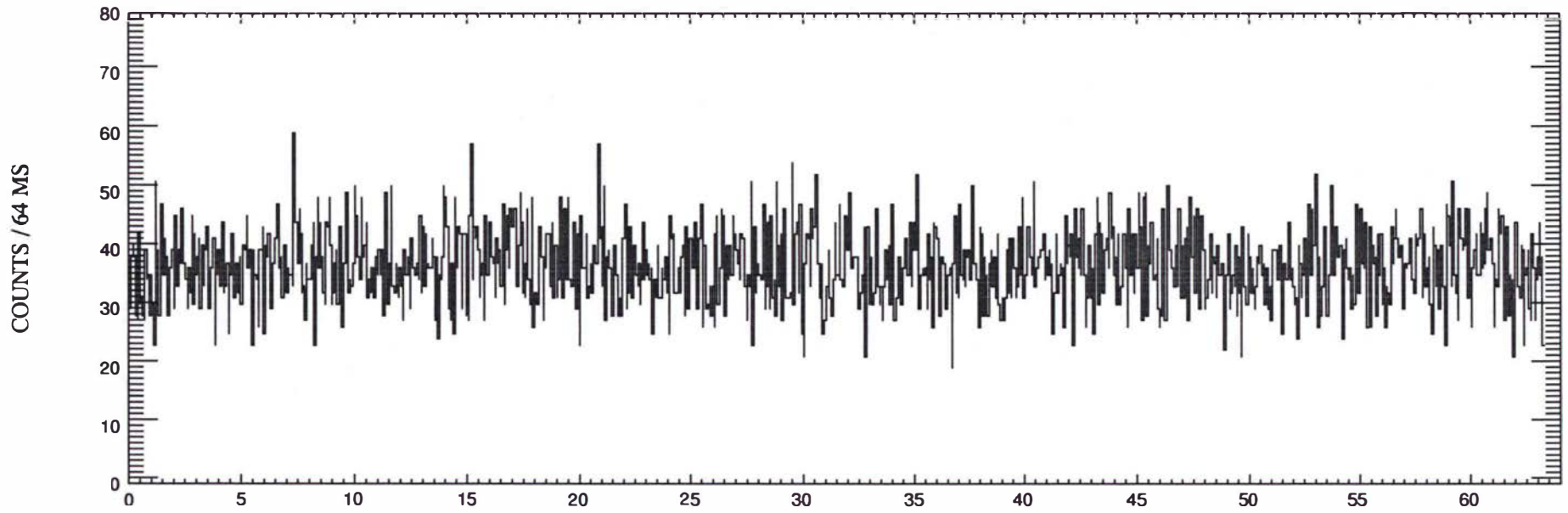


TIME, SECS

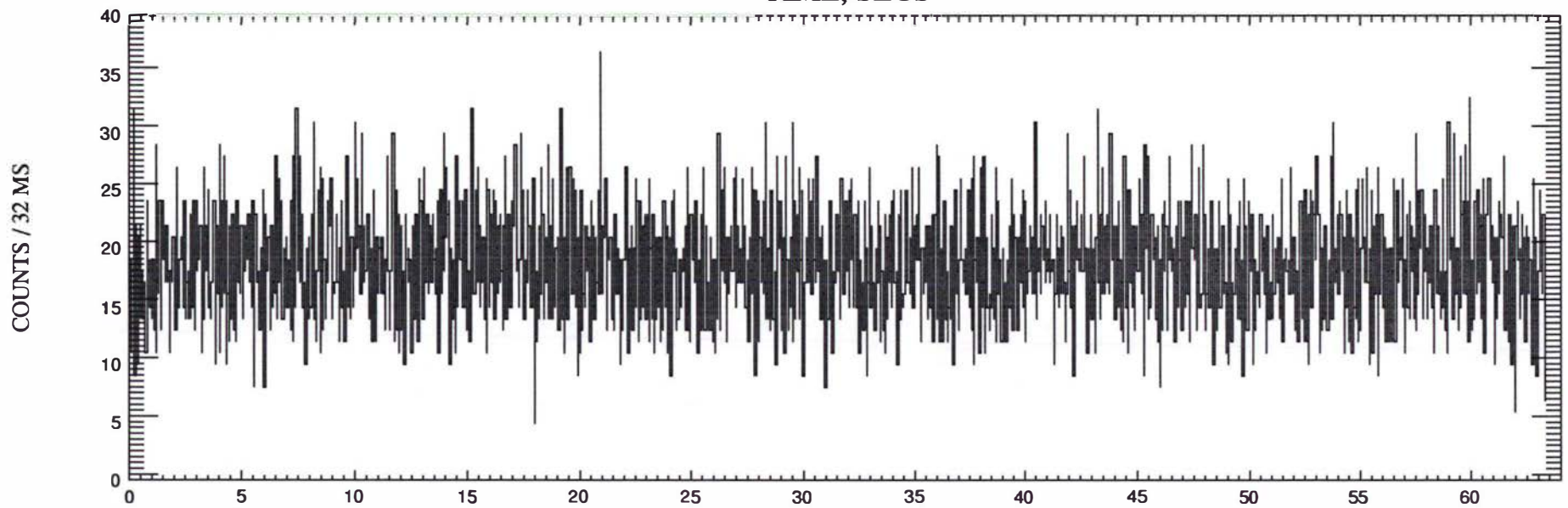


TIME, SECS

Burst Counter 0 at UT=16.239996918572 h=58463.989 s 16:14:23.989

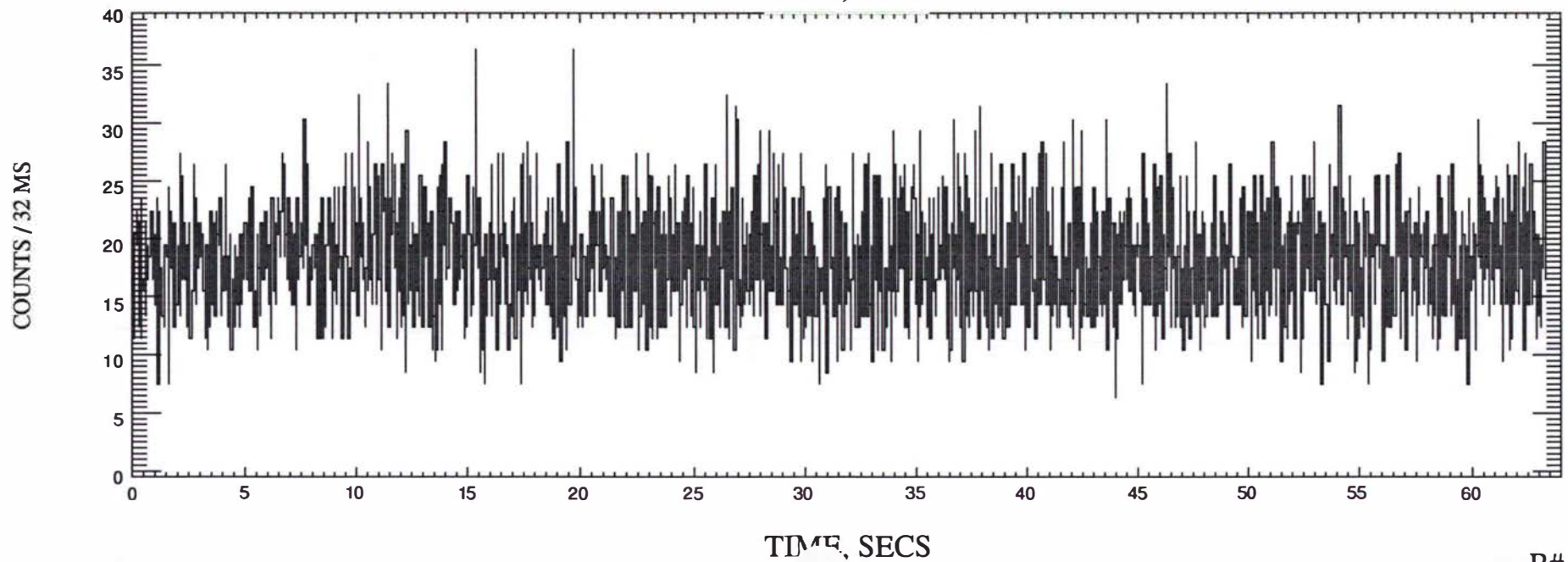
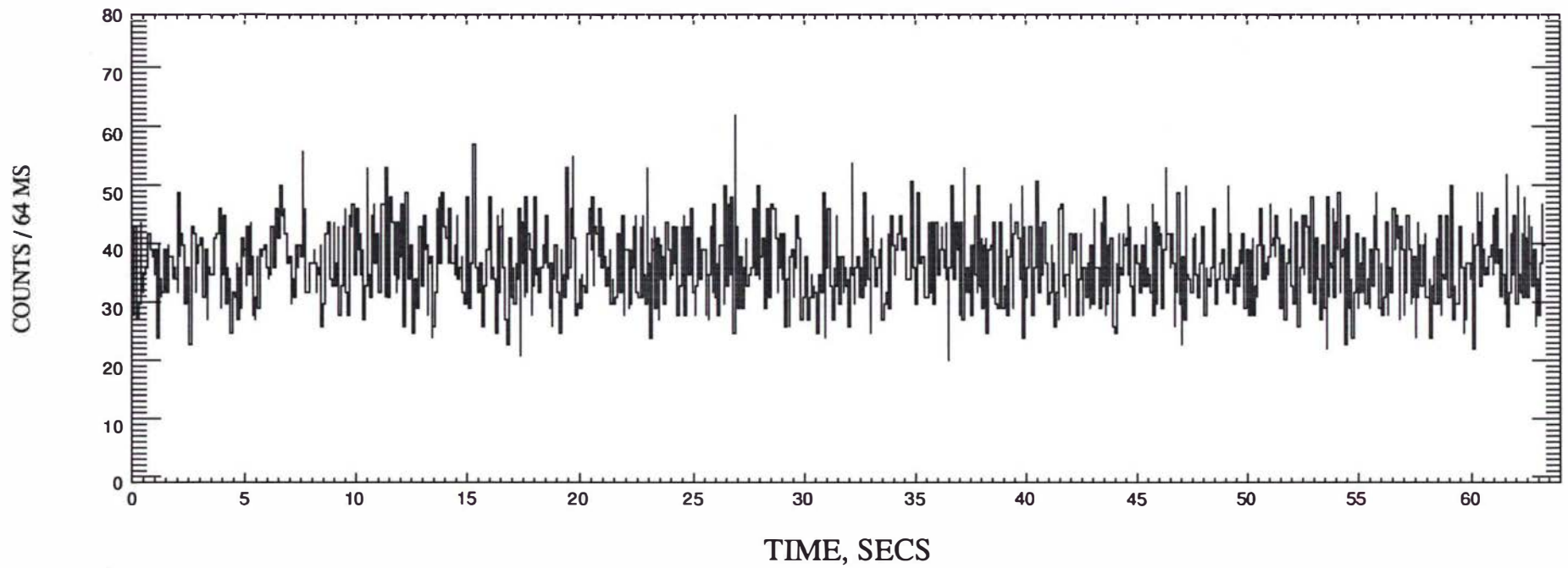


TIME, SECS

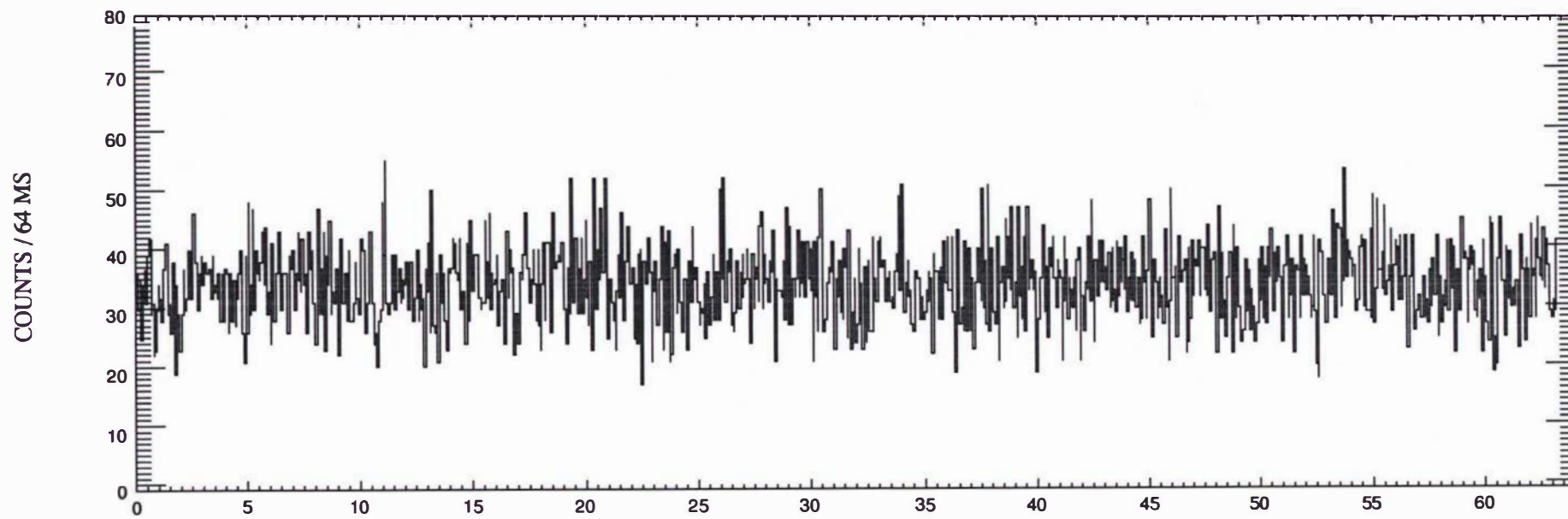


TIME, SECS

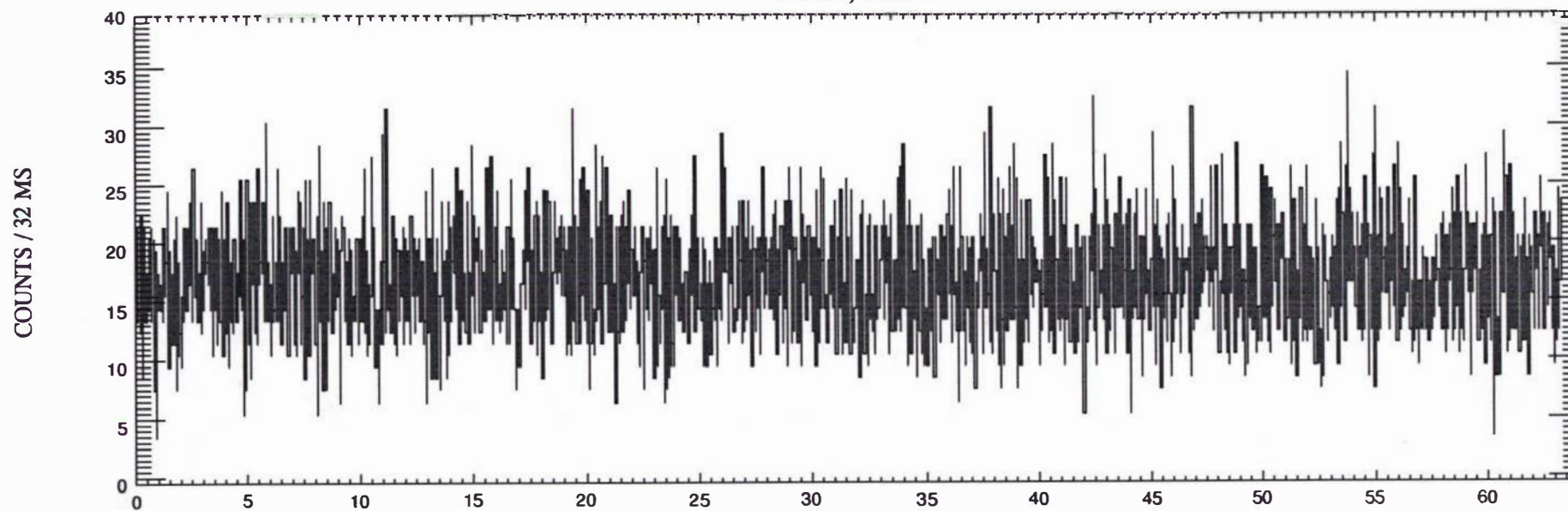
Burst Counter 1 at UT=17.501412679884 h=63005.086 s 17:30:05.086



Burst Counter 2 at UT=18.769497926500 h=67570.193 s 18:46:10.193

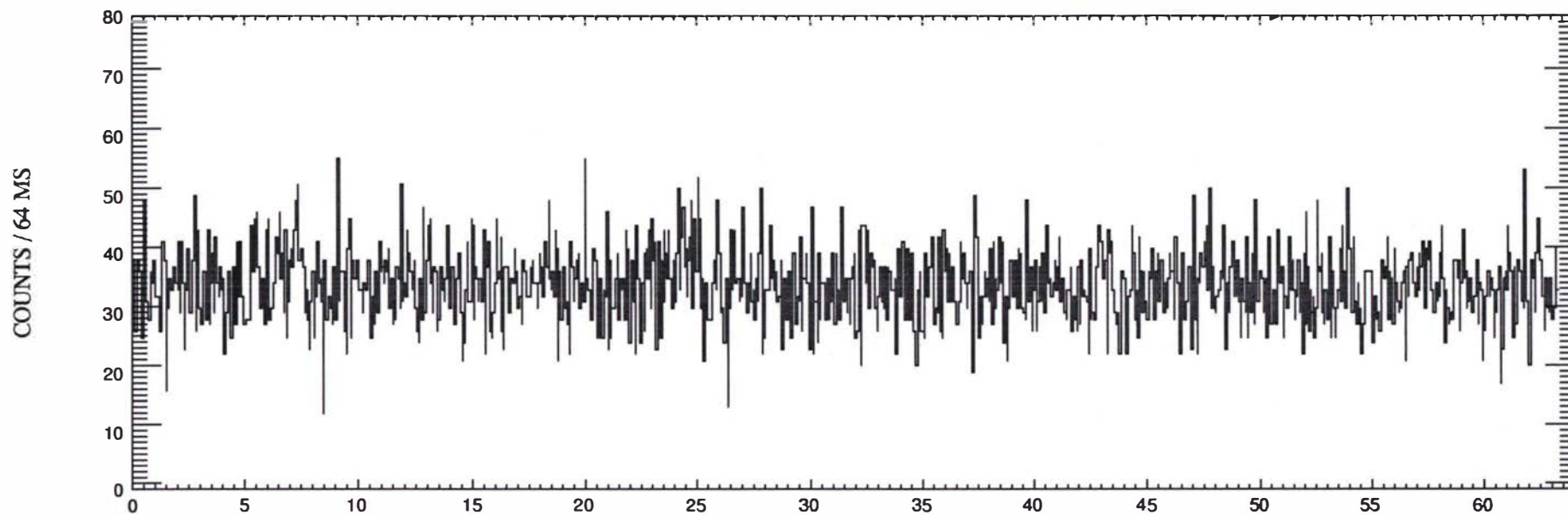


TIME, SECS

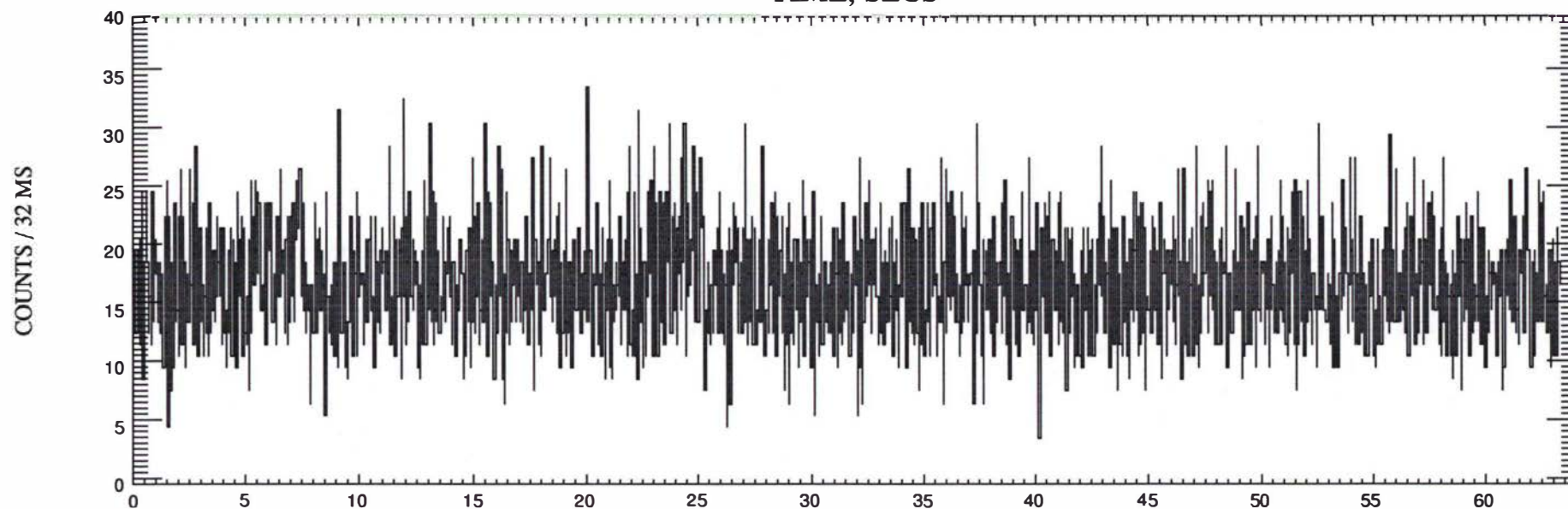


TIME, SECS

Burst Counter 3 at UT=20.045909991794 h=72165.276 s 20:02:45.276

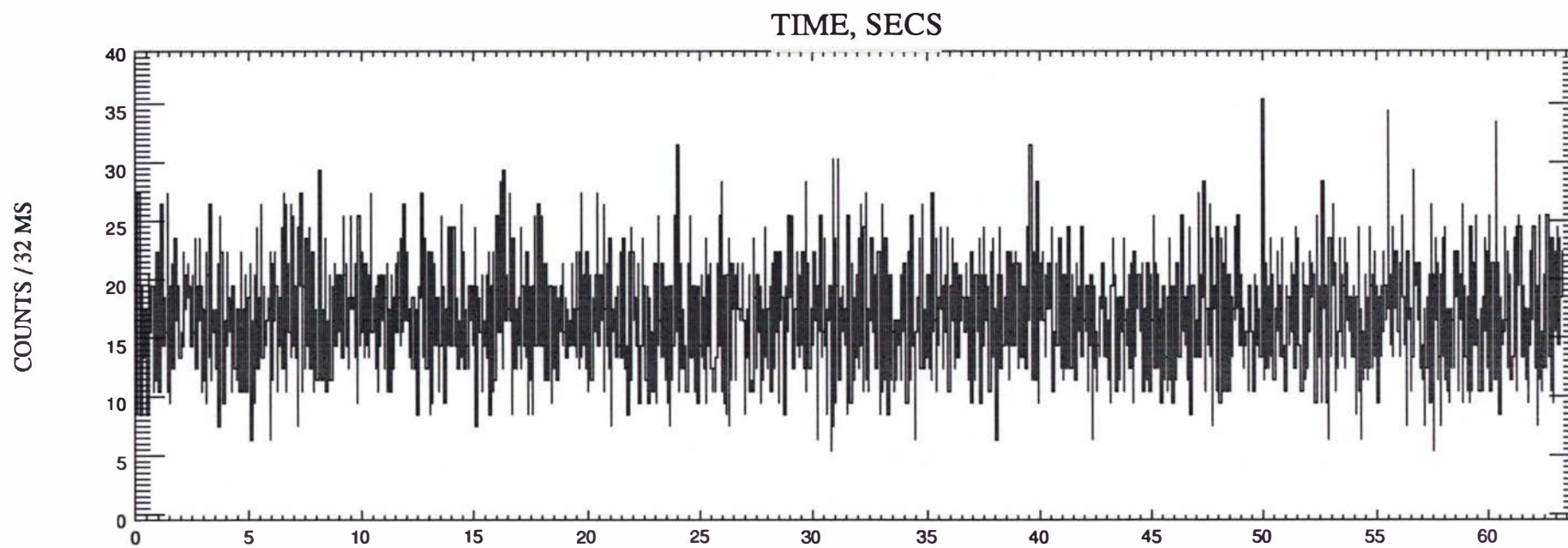
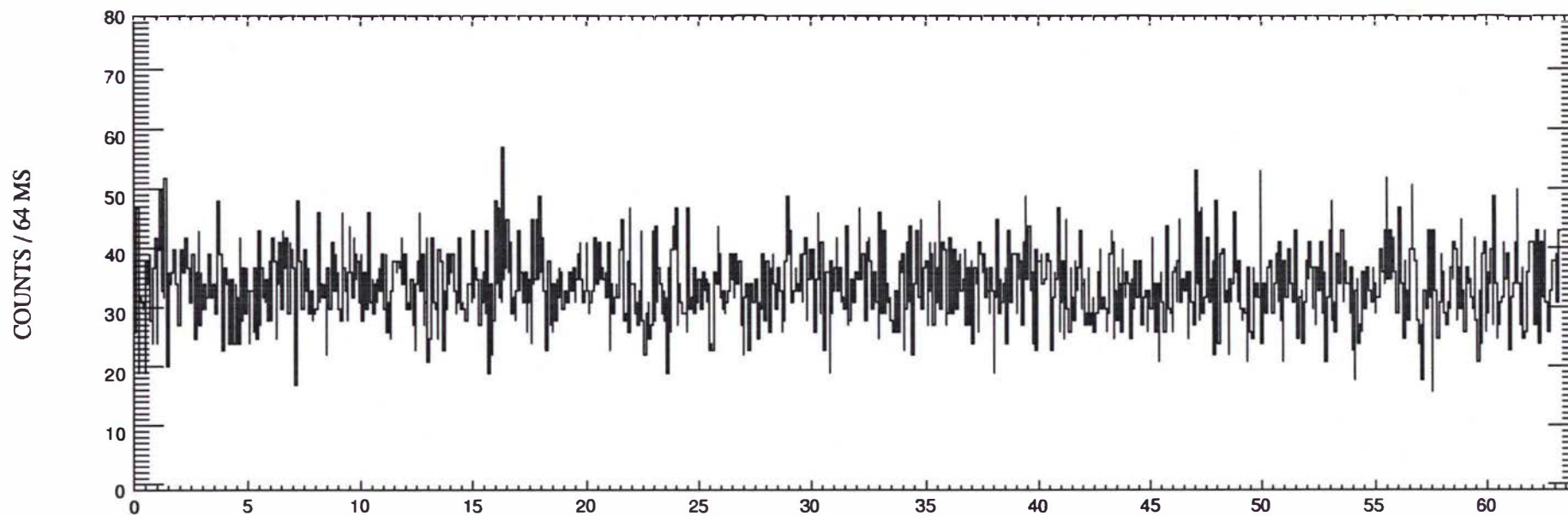


TIME, SECS

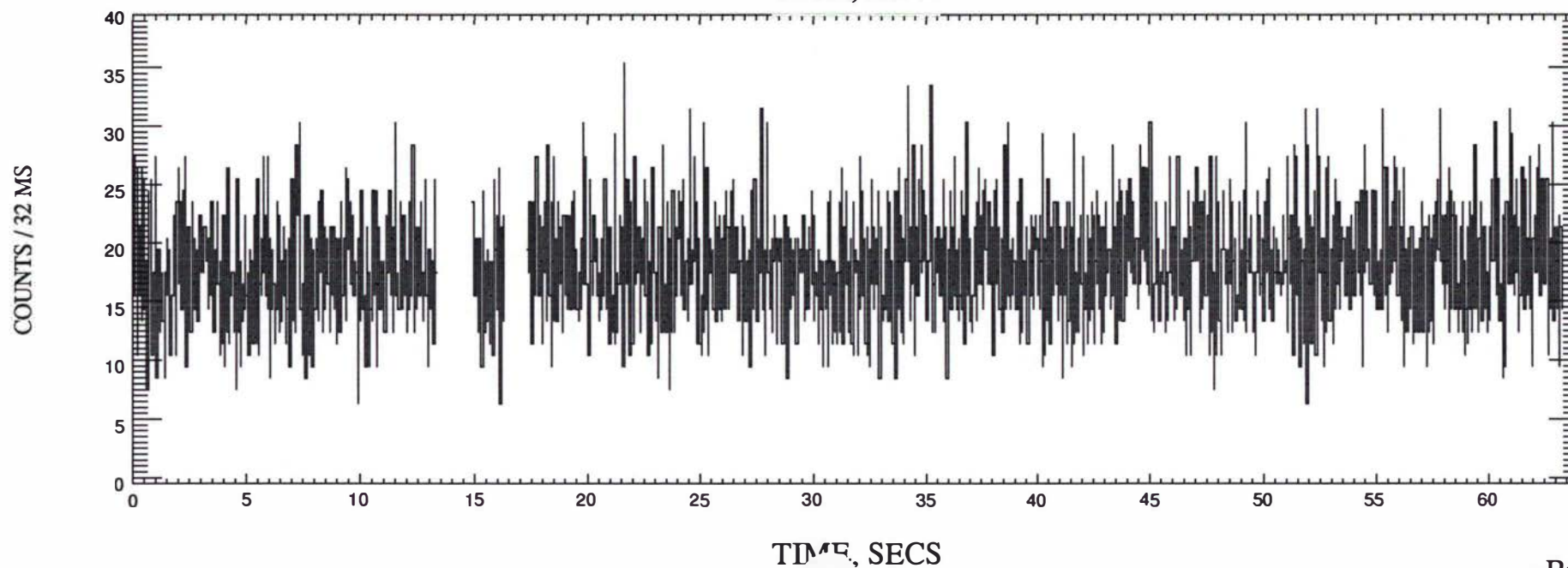
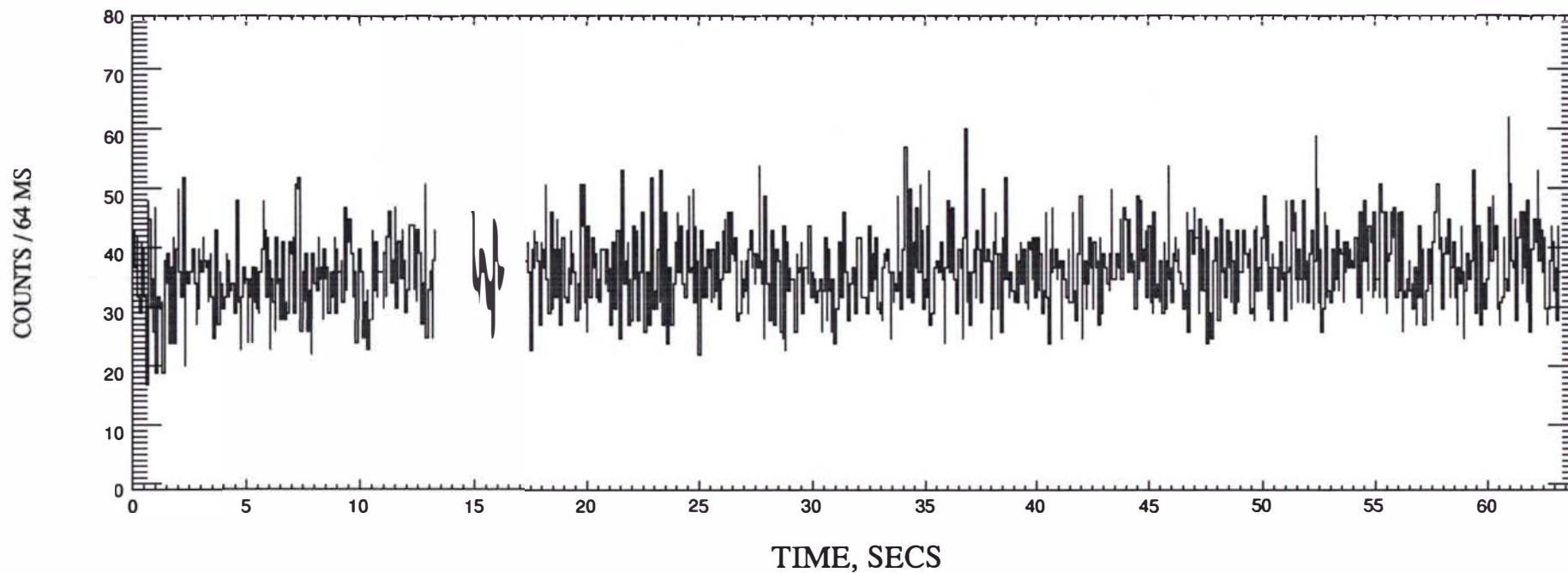


TIME, SECS

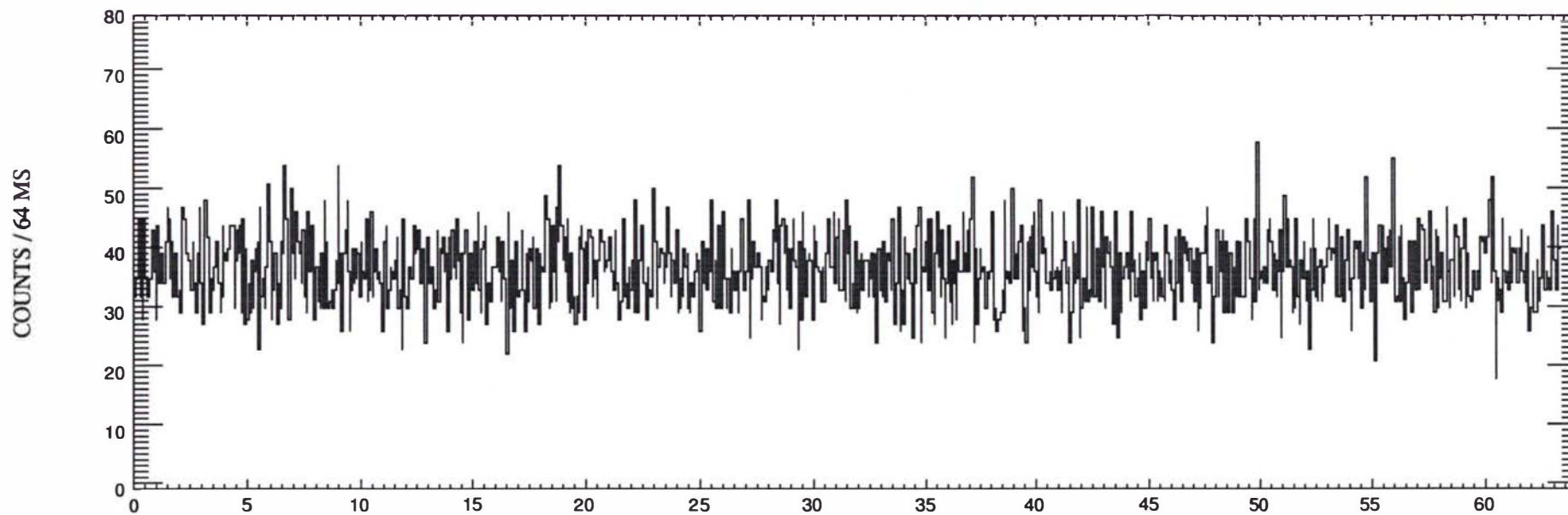
Burst Counter 4 at UT=21.327881957160 h=76780.375 s 21:19:40.375



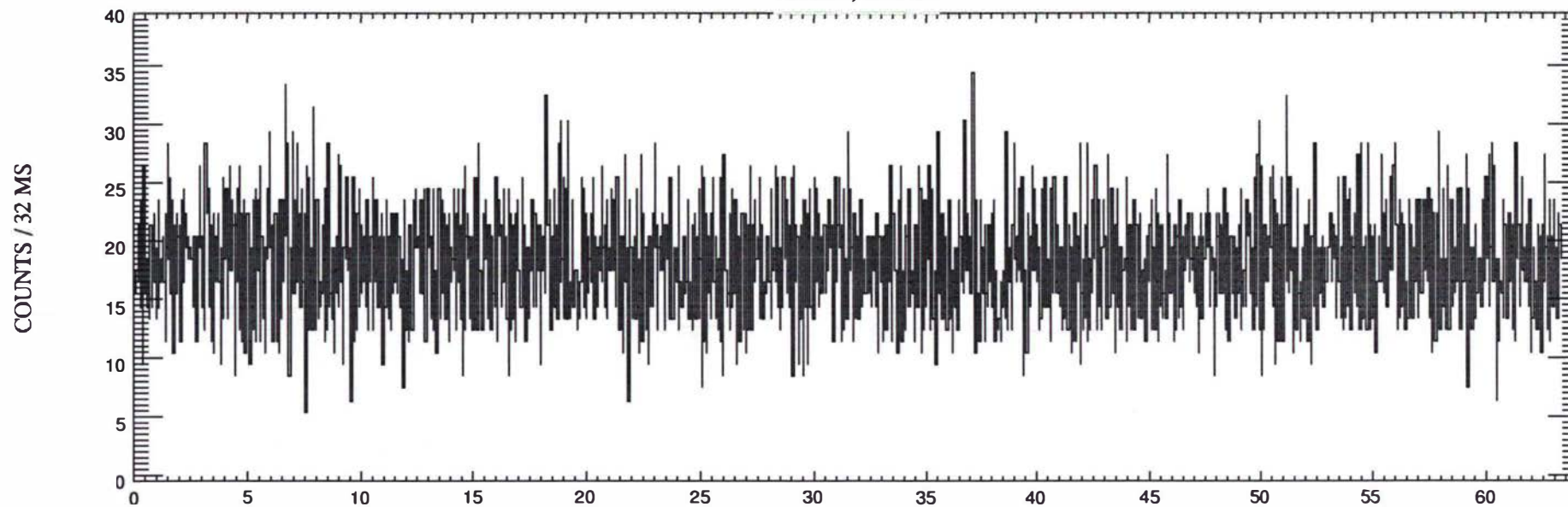
Burst Counter 5 at UT=22.585129525926 h=81306.466 s 22:35:06.466



Burst Counter 6 at UT=23.849299841987 h=85857.479 s 23:50:57.479

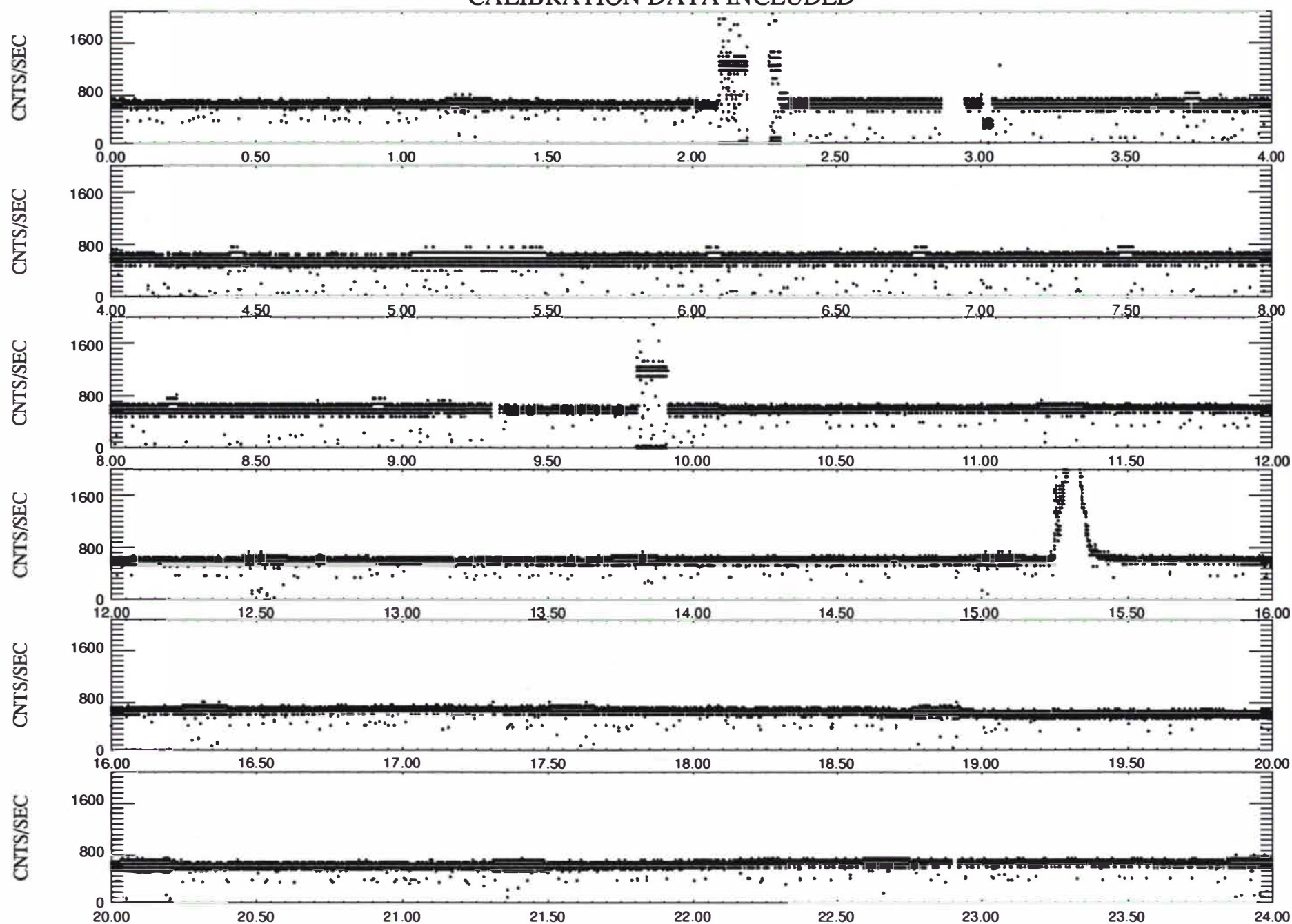


TIME, SECS

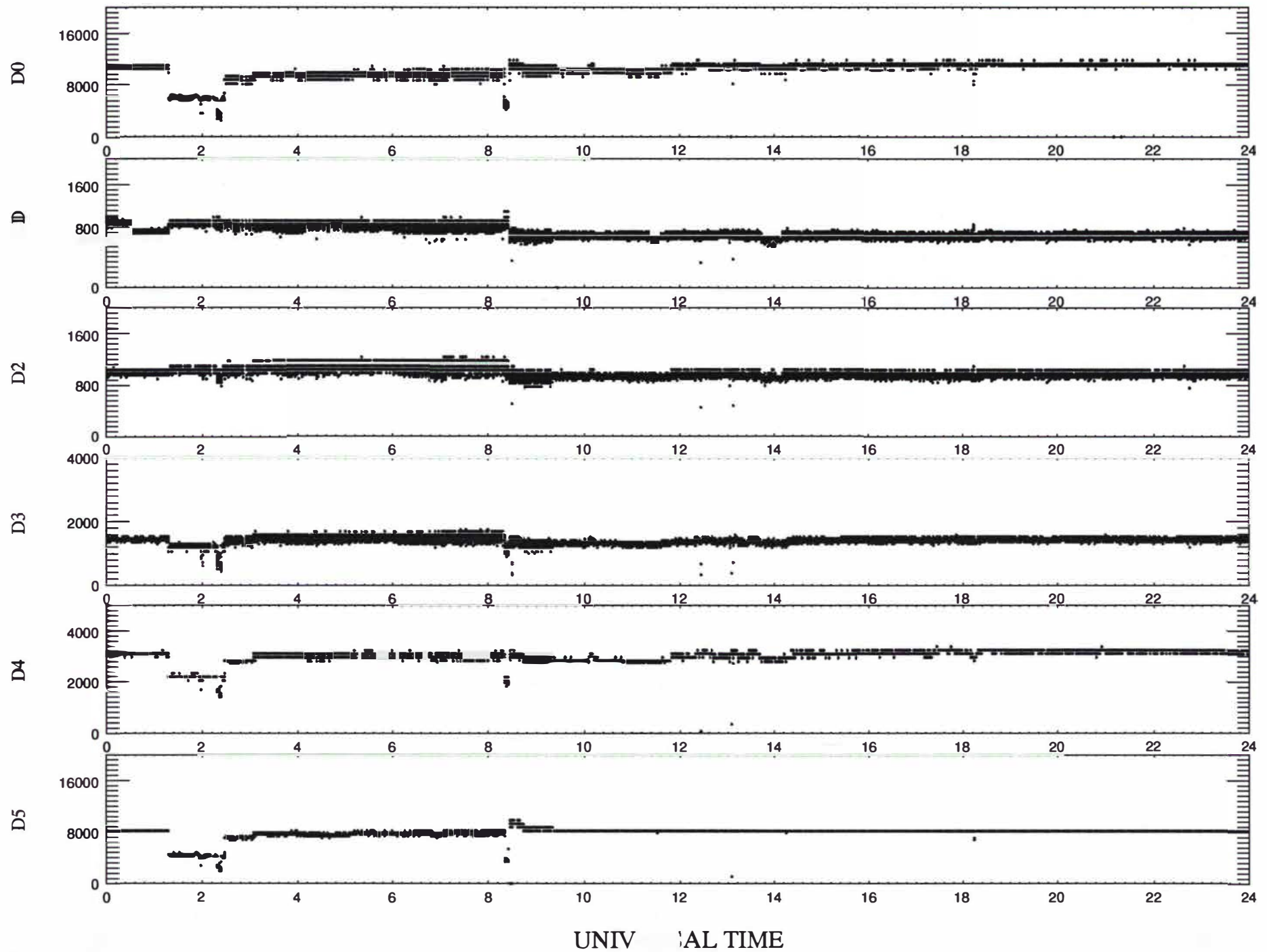


TIME, SECS

CALIBRATION DATA INCLUDED



UNIVERSAL TIME



From root Wed Dec 8 07:58 1993
 Received: by space6.ssl.berkeley.edu (AIX 2.1 2/4.03)
 id AA08899; Wed, 8 Dec 93 07:57:44
 Received: from mx.nsi.nasa.gov by sunspot.ssl.berkeley.edu (4.1/1.30.1)
 id AA22497; Wed, 8 Dec 93 07:00:41 PST
 Received: Wed, 8 Dec 93 07:03:53 PST from ESSDP2.dnet by mx.nsi.nasa.gov (4.1/1.2)
 Message-Id: <9312081503.AA10272@mx.nsi.nasa.gov>
 Received: from ESSDP2.dnet by AMES.dnet with MAIL-11
 (utk-maill11d v1.7); Wed, 8 Dec 93 07:03:57 PST
 Date: Wed, 8 Dec 93 07:03:57 PST
 From: 068486@essdp2.span.nasa.gov
 X-To: AMES::"khurley@space6.ssl.berkeley.edu"
 Subject: RE:
 To: khurley@space6.ssl.berkeley.edu
 Status: R

KEVIN,
 HERE ARE THE RESULTS OF OUR SURVEY OF THE PVO REAL-TIME DATA FOR EVIDENCE OF
 RESPONSE TO EVENTS LISTED IN YOUR CATALOG.

DATE	TIME	PVO RESPONSE
90/11/11	21:49	N/O
90/11/12	14:57	N/O
90/11/16	01:42	N/O
90/11/19	18:08	N/O
90/11/21	00:04	N/O
90/11/21	18:09	N/O
90/12/02	13:45	N/O
90/12/21	00:30	N/O
90/12/25	05:50	N/O
91/01/17	00:57	N/O
91/01/24	11:50	N/O
91/02/04	08:58	N/O
91/02/04	14:19	N/O
91/02/04	14:58	N/O
91/02/17	02:59	N/O
91/03/14	22:56	N/O
91/03/15	22:55	N/O
91/04/04	17:17	(NO)
91/05/18	17:10	N/O
91/05/23	19:03	N/O
91/05/27	23:44	N/O
91/05/28	21:26	N/O
91/06/02	22:55	N/O
91/06/09	00:48	N/O
91/06/29	19:55	N/O
91/07/09	20:22	N/O
91/07/17	13:07	N/O
91/08/03	08:24	N/O
91/08/15	12:34	N/O
91/08/15	14:24	N/O
91/08/16	01:57	(NO)
91/09/05	23:48	N/O
91/09/16	21:58	N/O
91/09/25	03:35	N/O
91/09/26	18:25	N/O
91/09/30	11:55	N/O
91/10/03	00:39	N/O
91/10/04	01:27	N/O
91/10/06	09:01	(NO)
91/10/22	04:13	N/O
91/10/25	21:25	N/O
91/11/06	03:42	N/O
91/11/14	01:40	N/O
91/11/17	01:58	N/O
91/12/05	23:04	N/O

91/12/21	06:17	N/O
91/12/21	22:03	N/O
91/12/27	15:56	N/O
92/01/05	17:41	N/O
92/01/13	20:52	N/O
92/01/25	08:57	N/O
92/01/30	00:29	N/O
92/01/30	22:50	N/O
92/02/18	18:42	N/O
92/02/21	06:14	N/O
92/02/26	18:15	YES TRIGGER AT 29336 S UT
92/02/27	06:00	N/O
92/02/27	08:45	N/O
92/03/02	06:16	N/O
92/03/04	14:34	N/O
92/03/07	00:18	N/O
92/03/21	12:50	(NO)
92/03/26	02:01	N/O
92/03/27	09:38	N/O
92/03/29	16:38	(NO)
92/04/04	22:37	N/O
92/04/08	12:05	N/O
92/04/20	02:12	N/O
92/04/29	18:59	N/O
92/05/02	19:05	N/O
92/06/01	THRU 92/06/29	TURNED OFF--N/O
92/07/01	19:39	N/O
92/07/07	06:33	N/O
92/07/17	01:15	N/O
92/07/23	00:59	N/O
92/07/23	01:00	N/O
92/07/23	21:48	N/O
92/07/25	19:30	N/O
92/07/25	22:49	N/O
92/07/26	00:34	N/O
92/07/31	17:07	N/O
92/08/10	21:35	N/O
92/08/14	06:10	N/O
92/08/16	12:36	N/O
92/08/22	22:39	N/O
92/08/30	01:45	N/O
92/09/04	04:41	N/O

THIS LIST IS NOT COMPLETE. IT INCLUDES EVENTS FOR WHICH NO REAL-TIME DATA ARE AVAILABLE BECAUSE OF INAPPROPRIATE MODE, NO TRACKING, OR THE EXPERIMENT WAS TURNED OFF. WHERE DATA HAVE BEEN CHECKED, SENSITIVITY DEPENDS UPON THE TIME RESOLUTION AVAILABLE IN THE DATA. I'LL BE SENDING ADDITIONAL RESULTS AS THEY BECOME AVAILABLE.

REGARDS,

RAY

24

Dezalay -> KH 7/93

DATE	U.T.	Nr UGB	Event Nature
1991-04-04	14:19:50.243	263-a	GRB
1991-04-04	17:17:18.562	263-b	GRB
1991-04-07	03:13:21.146	265-a	Solar Flare
1991-04-17	20:07:31.886	273-a	GRB
1991-05-16	06:47:23.641	281-a	Solar Flare
1991-05-17	05:02:42.959	282-a	GRB
1991-05-17	09:03:44.505	282-b	Solar Flare
1991-05-27	23:44:36.515	287-a	GRB
1991-05-28	07:26:24.093	287-b	Solar Flare
1991-05-28	18:17:55.430	287-c	Solar Flare
1991-05-31	16:53:41.316	289-a	Solar Flare
1991-06-01	14:56:53.229	290-a	Solar Flare
1991-06-01	~15:08	290-b	Solar Flare
1991-06-01	19:20:29.144	290-c	GRB
1991-06-09	22:05:12.335	293-a	Solar Particles
1991-06-10	02:27:27.347	293-b	Solar Flare
1991-06-10	13:55:19.964	294-a	Solar Flare
1991-06-10	16:53:30.025	294-b	Solar Flare
1991-06-11	01:58:25.934	294-c	Solar Flare
1991-06-26	20:13:20.758	303-a	Solar Flare
1991-06-27	04:29:18.339	303-b	GRB
1991-06-29	19:55:48.409	304-a	GRB
1991-06-30	02:56:07.591	304-b	Solar Flare
1991-06-30	03:29:11.438	304-c	Solar Particles
1991-07-13	19:37:58.821	307-a	Solar Flare
1991-07-17	04:33:04.862	309-a	GRB
1991-07-17	06:25:49.736	309-b	Solar Flare
1991-07-20	01:37:48.274	311-a	Solar Flare
1991-08-14	11:10:26.782	314-a	GRB
1991-08-14	19:14:33.396	315-a	GRB
1991-08-17	17:09:24.566	317-a	GRB
1991-08-21	10:33:39.184	320-a	GRB
1991-08-25	09:36:25.301	323-a	Solar Flare
1991-08-27	13:11:18.345	325-a	Solar Particles
1991-08-27	14:51:03.053	325-b	Solar Particles

LISTE DES SURSAUTS VUS PAR LES EXPERIENCES CESR

SUR GRANAT : SIGMA (AC et CAMERA) et PHEBUS

Version : 1.0

Date : 21/10/1991

DATE	HEURE T.U.(1)	No UGB	CAM	V.L	PHE	A-C	Origin
1991-04-04	17h17mn18s562ms	263-b			X		Cos
1991-04-17	20h07mn31s886ms	273-a	X	X	X		Cos
1991-05-16	06h47mn23s641ms	281-a	X	X	X		Sol
1991-05-17	05h02mn42s959ms	282-a	X	X	X		Cos
1991-05-17	09h03mn44s505ms	282-b			X		Sol
1991-05-27	23h44mn36s515ms	287-a			X		Cos
1991-05-28	07h26mn24s093ms	287-b			X		Sol
* 1991-05-28	18h17mn55s430ms	287-c			X		Sol
1991-05-31	16h53mn41s316ms	289-a	XX	X	X		Sol
1991-06-01	14h56mn53s229ms	290-a	XX	X	XX	X	Sol
* 1991-06-01	19h20mn29s144ms	290-b		X	X		Cos
* 1991-06-10	02h27mn27s347ms	293-a		X	X		Sol
* 1991-06-10	13h55mn19s964ms	294-a			X		Sol
* 1991-06-10	16h53mn30s025ms	294-b			X		Sol
* 1991-06-11	02h04mn27s839ms	294-c				X	Sol
1991-06-26	20h13mn20s758ms	303-a		X	X		Sol
1991-06-27	04h29mn18s339ms	303-b			X		Sol
1991-06-29	19h55mn48s409ms	304-a			X		Cos
1991-06-30	02h56mn07s591ms	304-b	XX	X	X	X	Sol
* 1991-06-30	03h29mn11s438ms	304-c			X		Cos?
* 1991-06-30	07h37mn05s264ms	304-d				X	Cos
* 1991-07-17	06h25mn53s027ms	309-a	XX	X			Sol
* 1991-08-14	19h14mn34s774ms	315-a	X	X		X	Cos
* 1991-08-14	10h33mn47s678ms	320-a	X	X		X	Cos
1991-00-00	00h00mn00s000ms	000-a					

CATSEARCH PROGRAM

BATSE BURST # 235
EVENT OF 1991 MAY 28 DAY OF YEAR=148
EVENT CROSSING TIME AT BATSE : 77215. S. OR 21:26:55.3
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 242.700 47.100
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 28/ 5/ 91 IS:
RA= 124.799 DEC= 21.070 DIST= 3.604 AU
BATSE-ULYSSES DISTANCE = 539095568. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 88.06 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 60.94 SECS.
CROSSING TIME AT ULYSSES IS 77276. S. OR 21:27:56 +/- 362.95 SECONDS

~~RI~~
No - too weak

ULYSSES RT

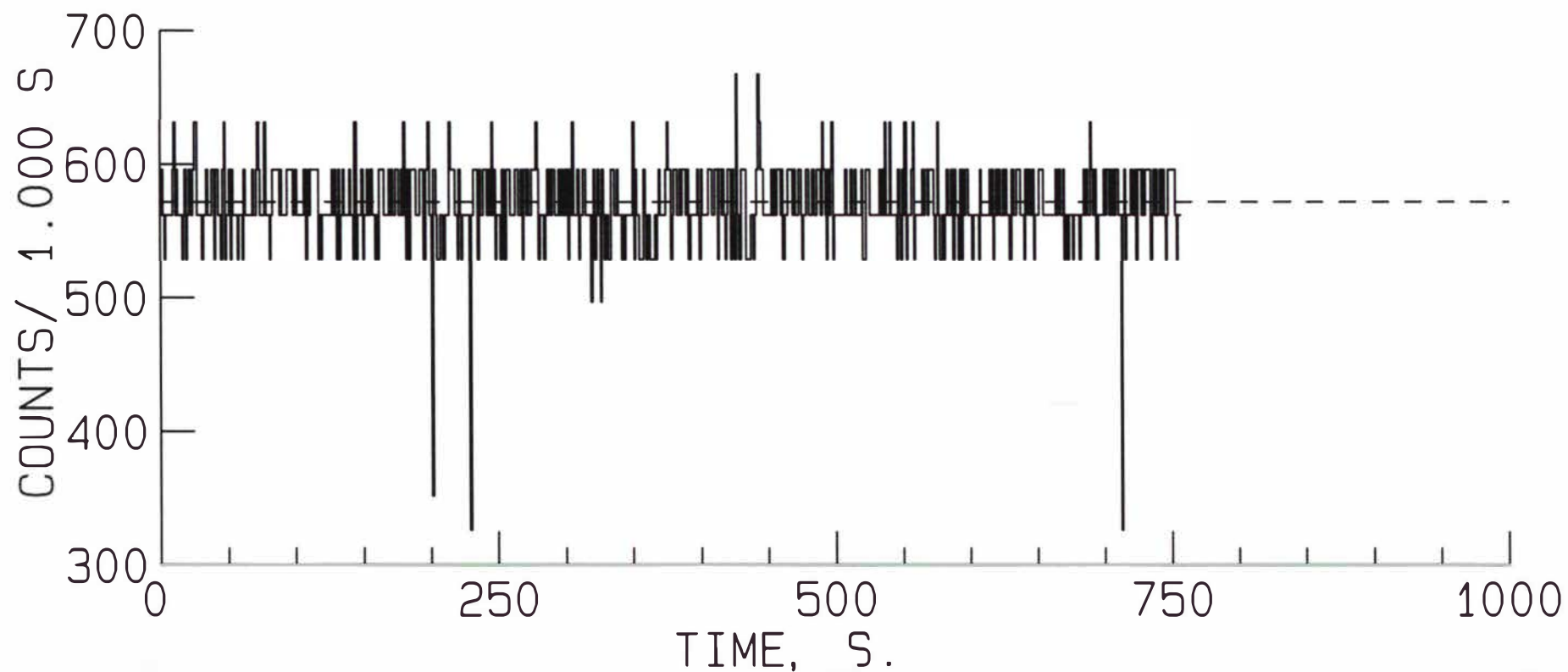
24 / 5 / 96

28 / 5 / 91 76896.205 s

27- 225 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS

| 4.07 σ



BATSE

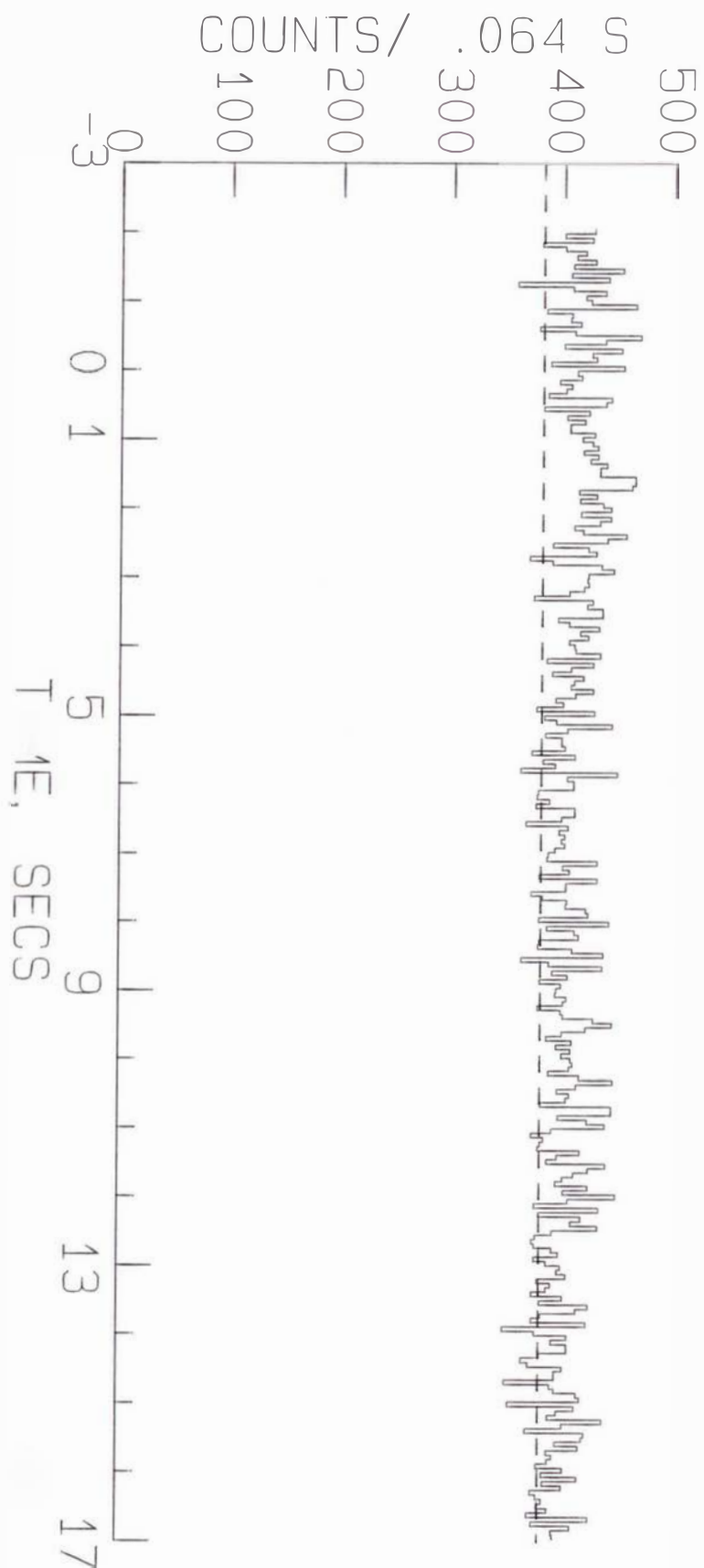
28/05/91

~~77215.339~~

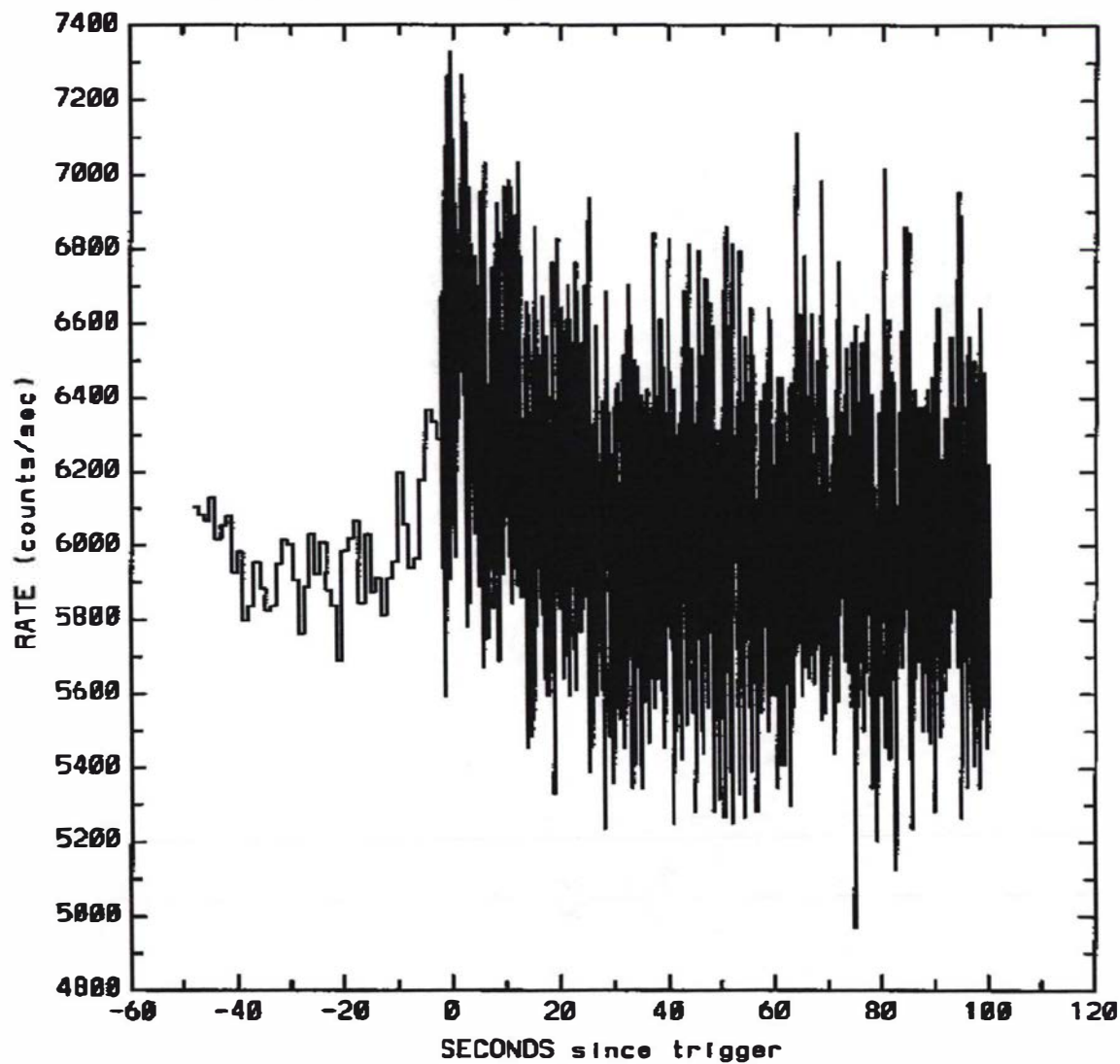
25- 100 keV

~~77215.339~~

NO - OK as is



DATA FOR K. HURLEY



24-JUN-1993 09:14.03

Created by MOPS 80
(Burst Display)
Version 2.19

To OK

Trigger # : 235

Trigger Time:
6404 / 77215.339Burst Data Type:
DISCSC

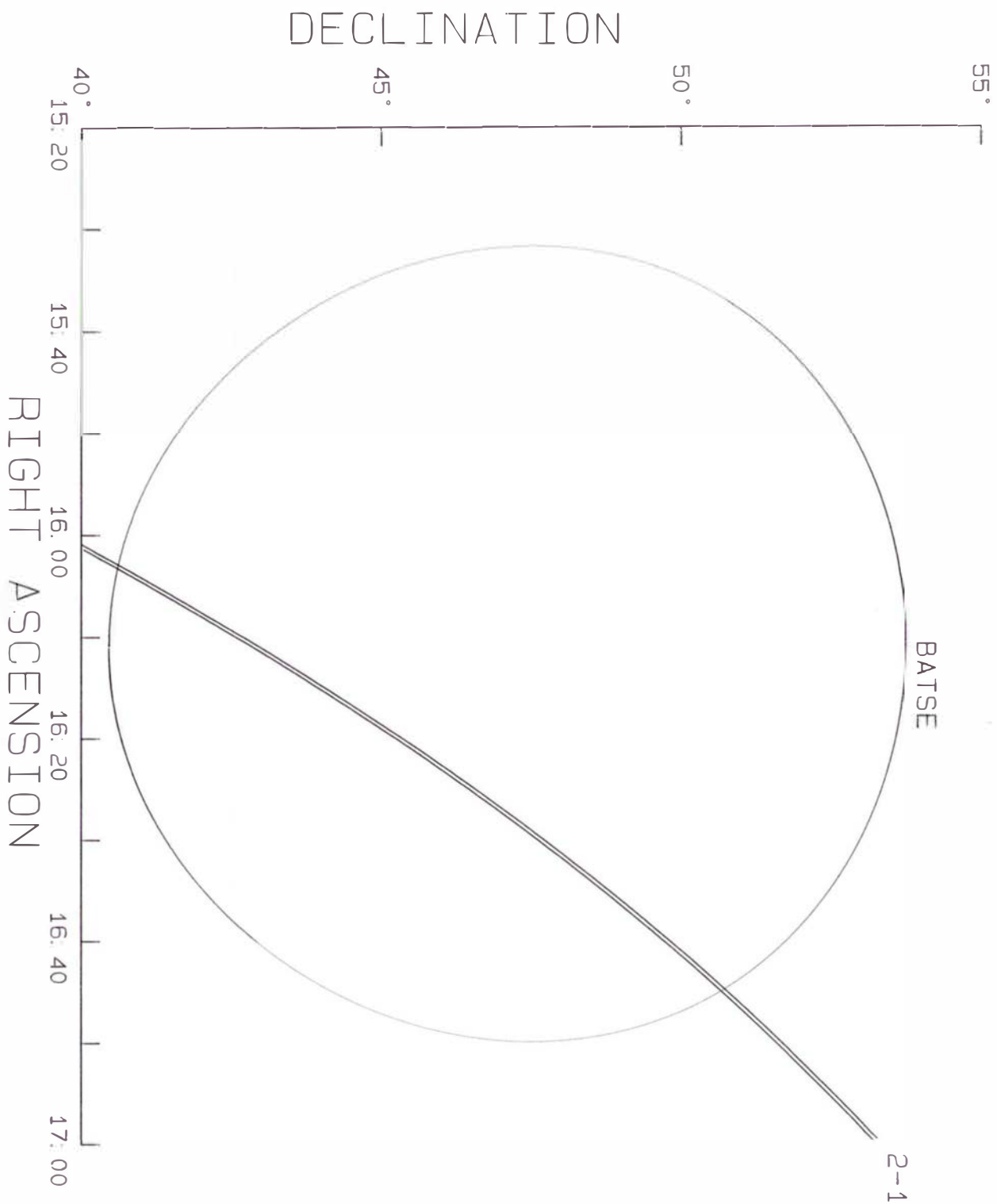
NO

Deadtime
Corrected: NBackground Data
Type: PRED + DISCLAMinimum Integ. Time:
0.064 secondsDetectors [7..0].
80001100Discriminators:
[1, 2]Quality Mask:
80ISP1

EARTH-N = EARTH AS SEEN FROM SATELLITE N
S=SUN E=ECLIPTIC G=GALACTIC EQUATOR
1 ULYSSES 2 BATSE

EVENT OF MAY 28, 1991 21:28

9/ 9/93



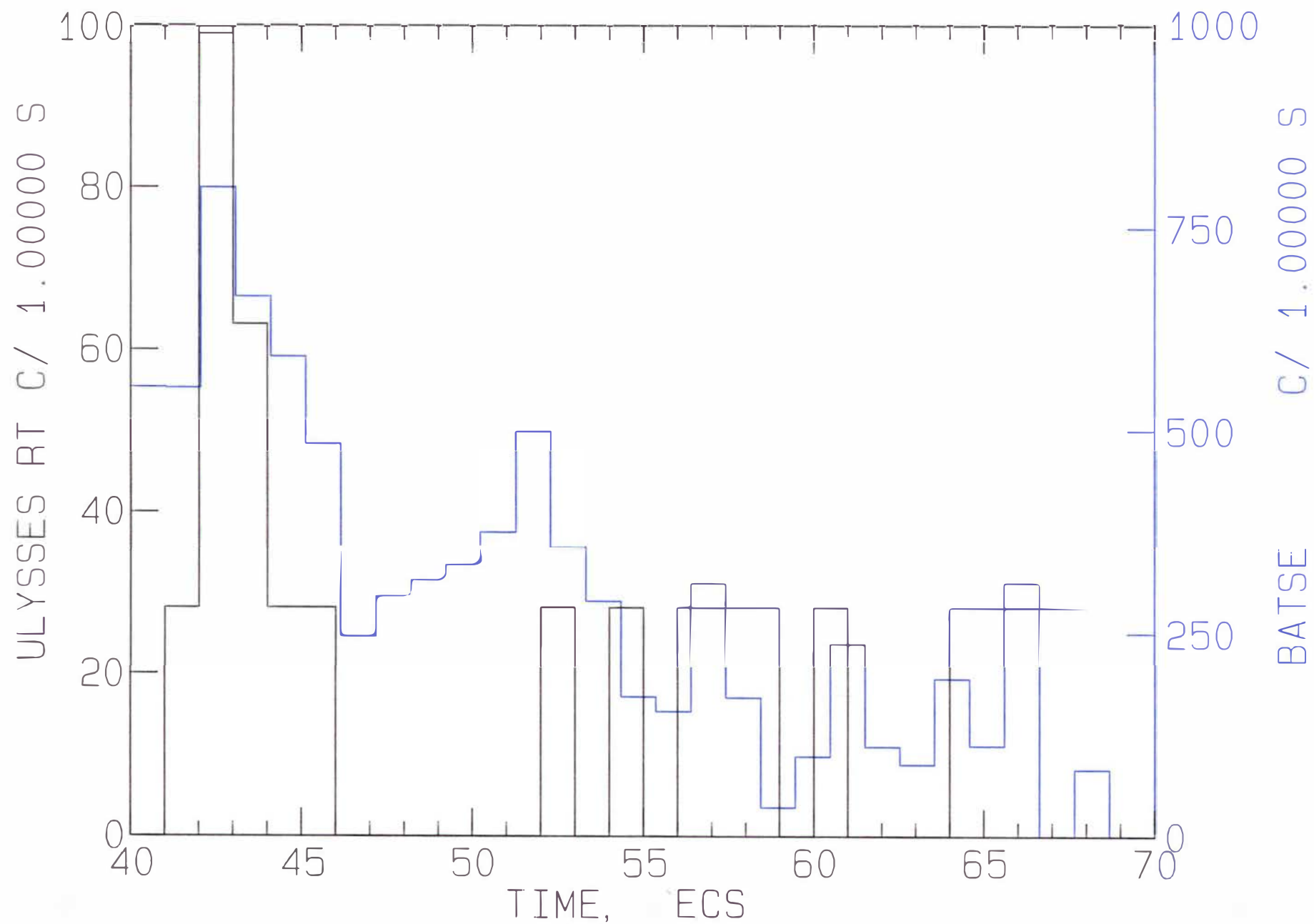
ULYSSES RT-BATSE

CORRELATION

28/ 5/91

77296.367

9/ 9/93



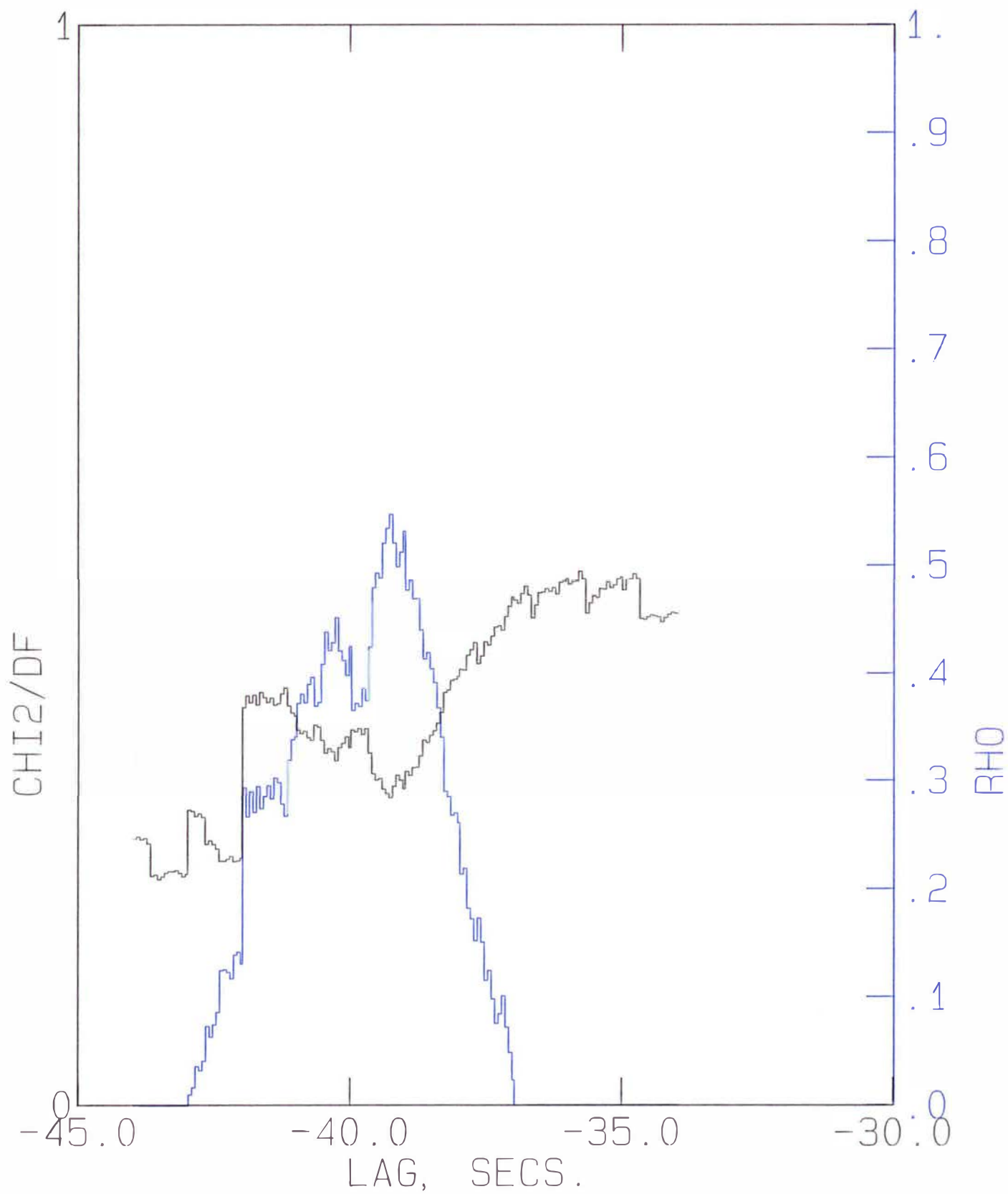
ULYSSES RT-BATSE

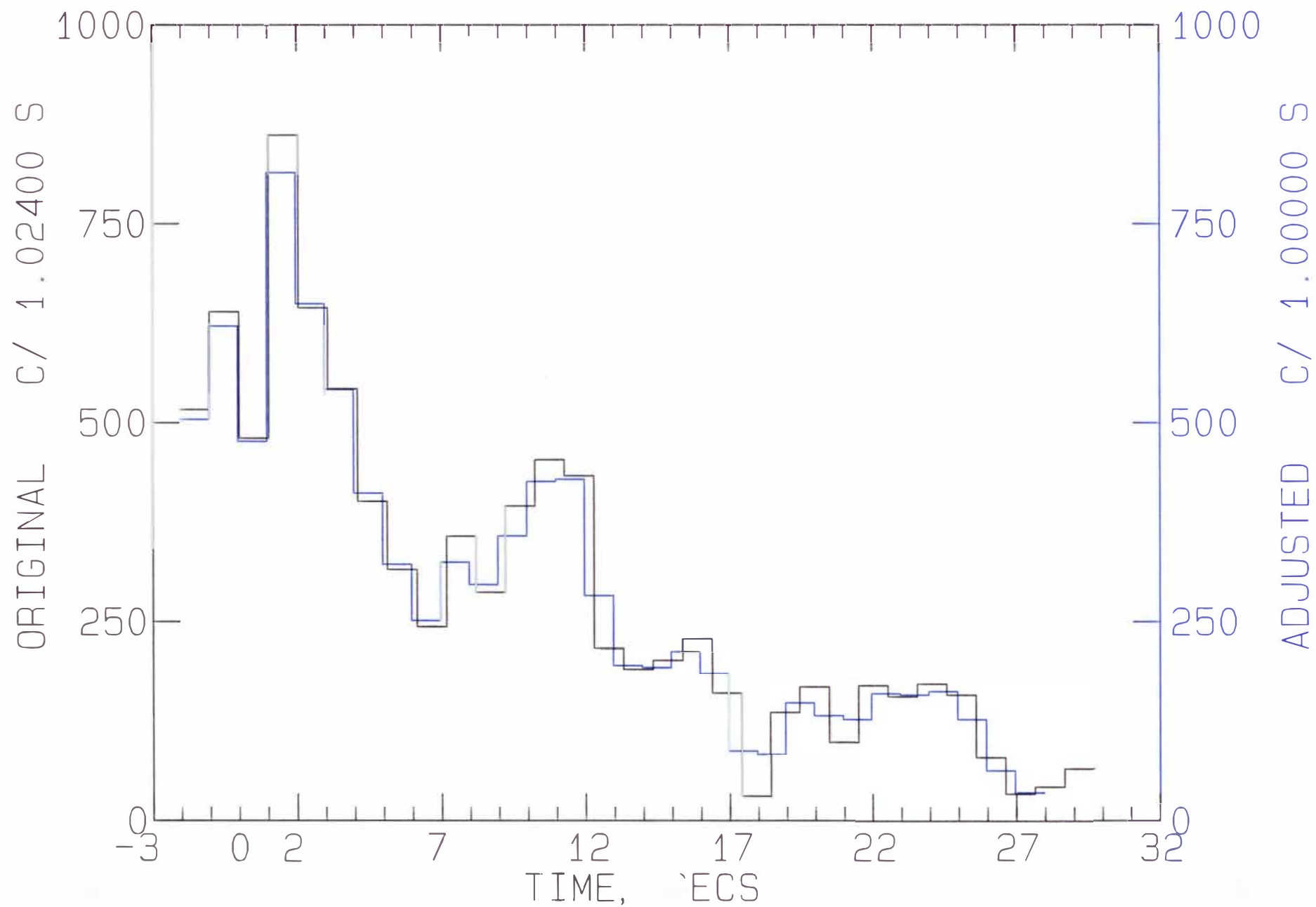
CORRELATION

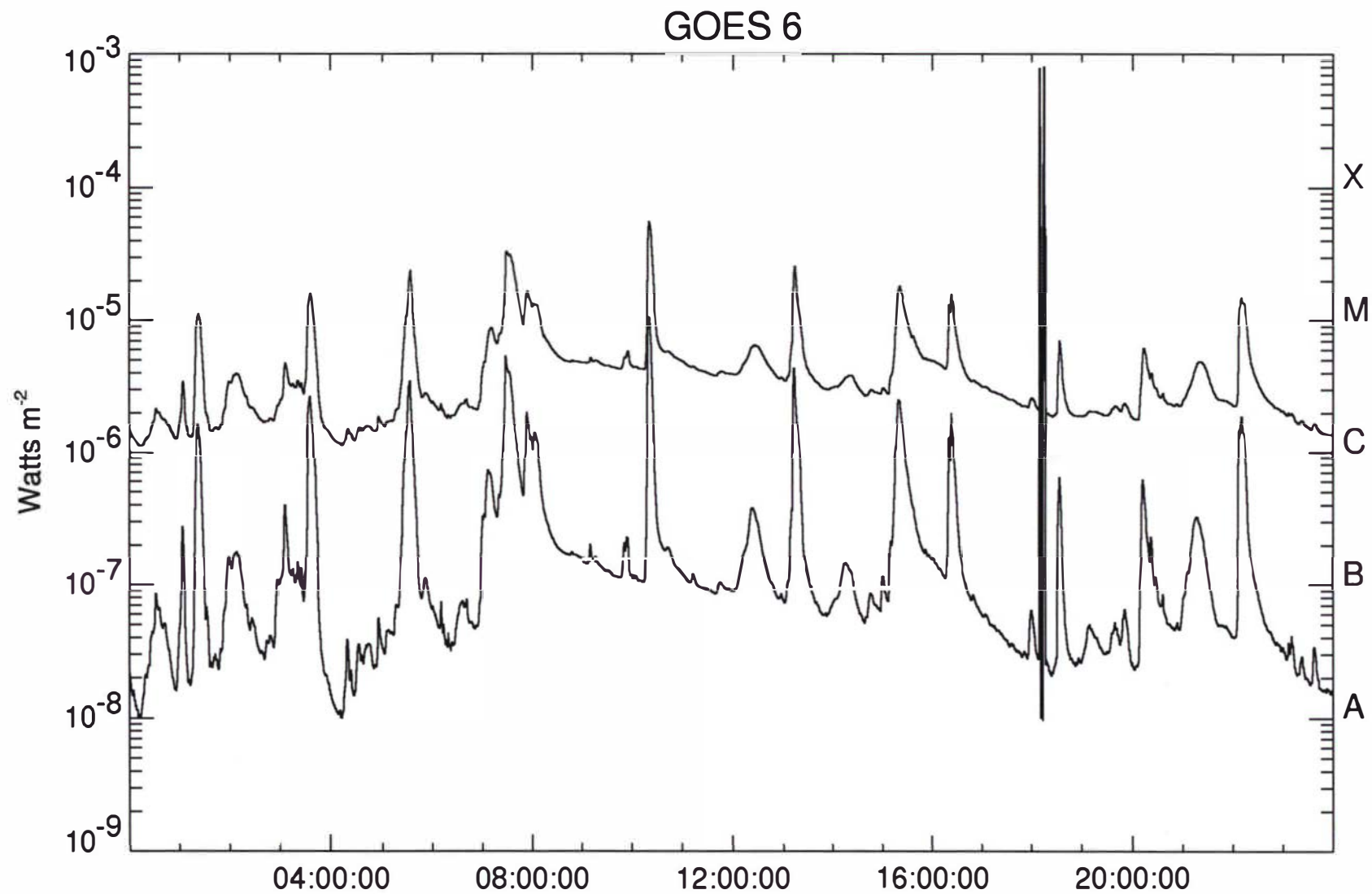
28/ 5/91

77296.367

9/ 9/93







Data Start: 91/05/28, 0000:01

Plot created: 96/11/27, 0400

Channel 1 (1.0 - 8.0 Angstroms)

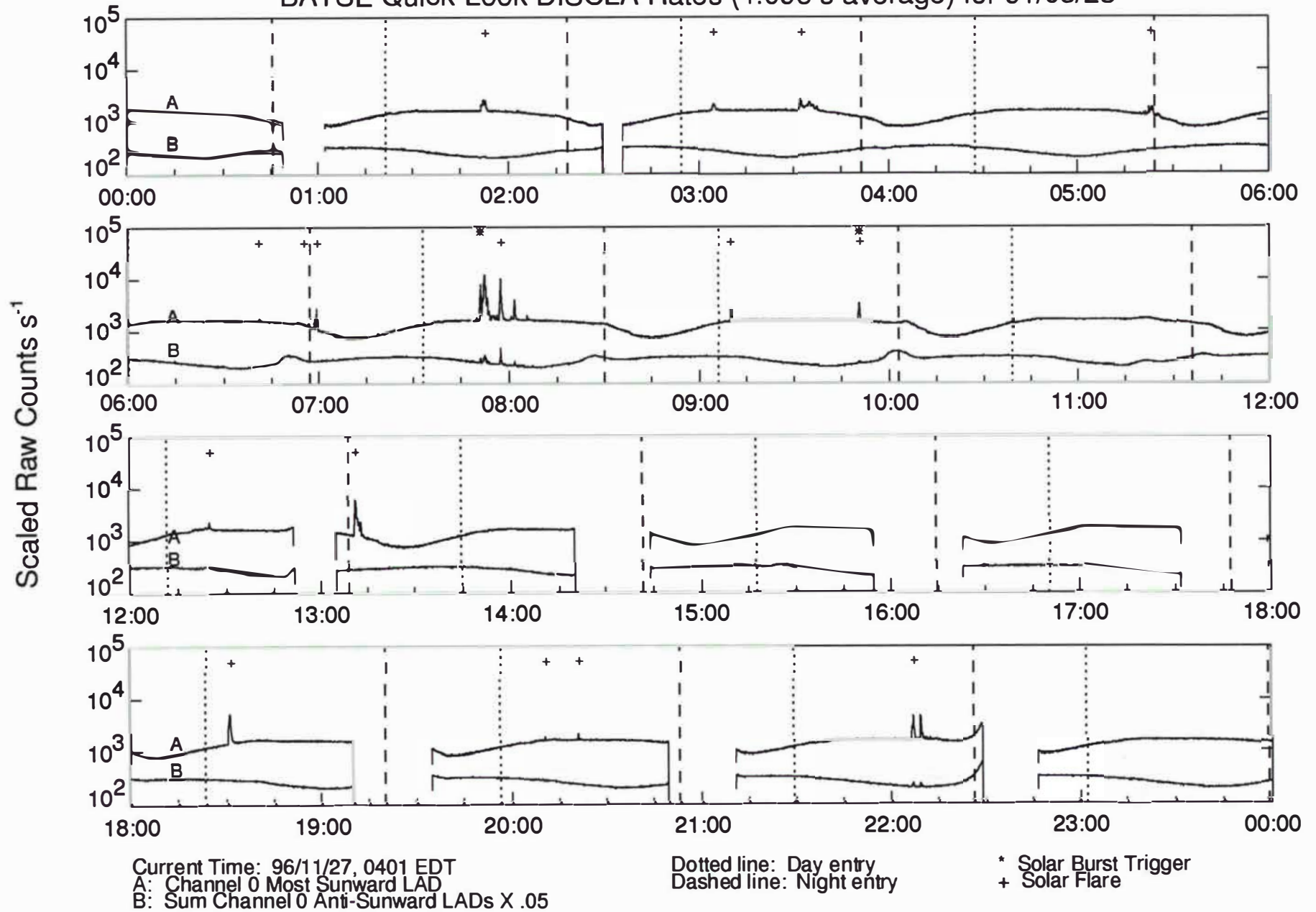
Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms)

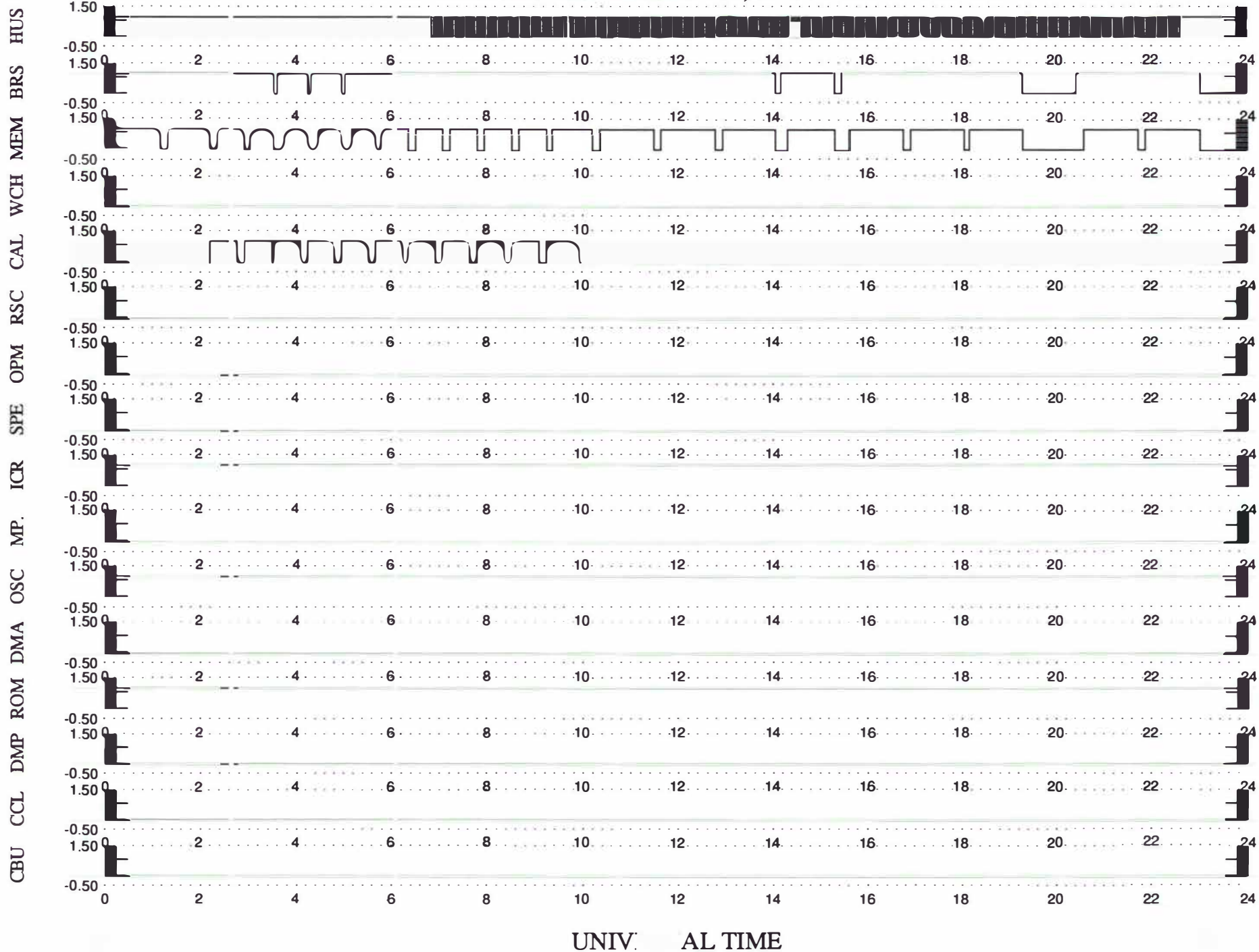
Background not subtracted

Sample average = 10

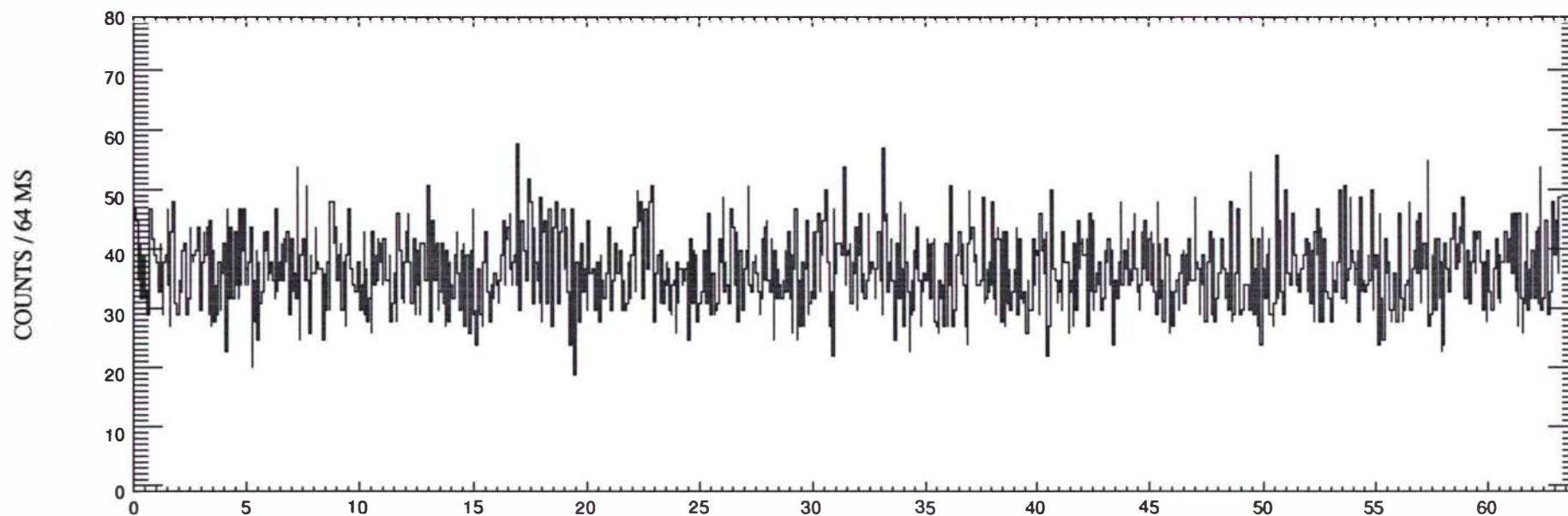
BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/28



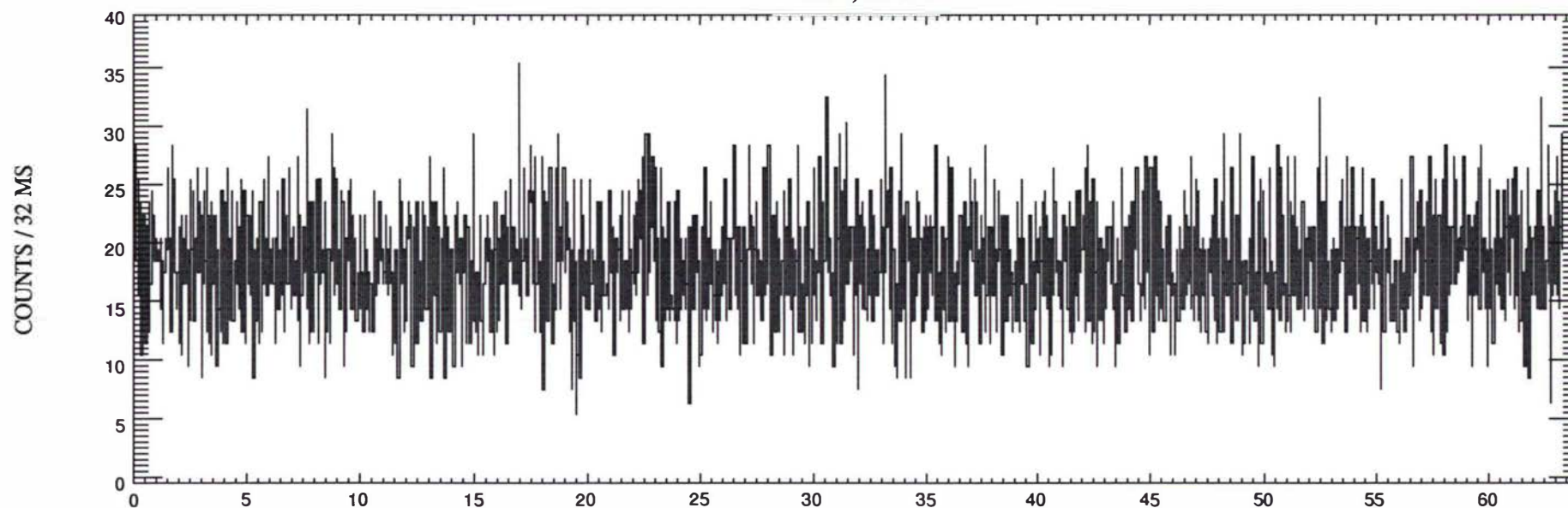
BURST NUMBER 7 - 15, 0 - 11



Burst Counter 7 at UT= 1.109898109436 h= 3995.633 s 01:06:35.633

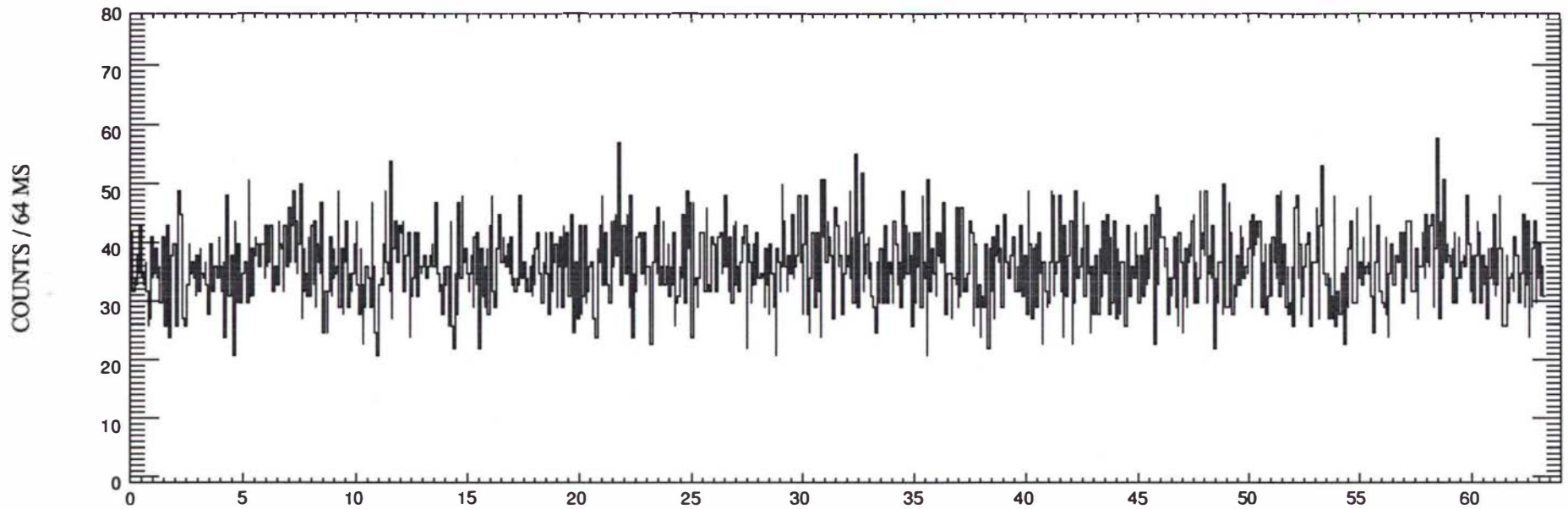


TIME, SECS

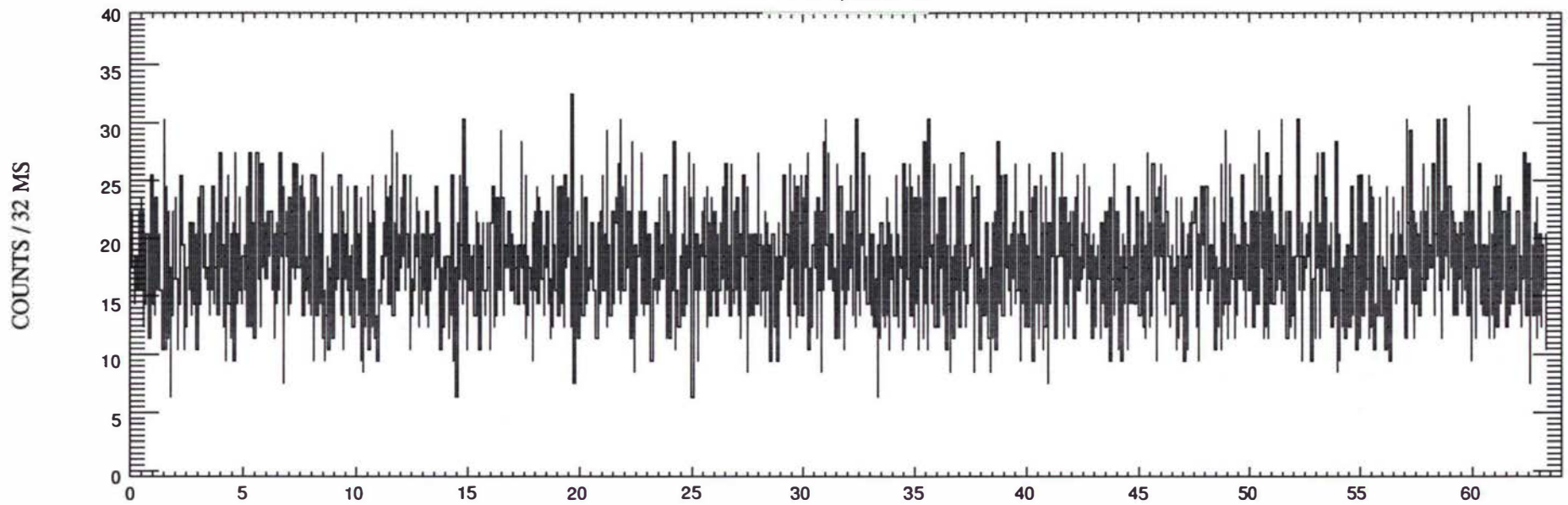


TIME, SECS

Burst Counter 8 at UT= 2.161026352776 h= 7779.695 s 02:09:39.695

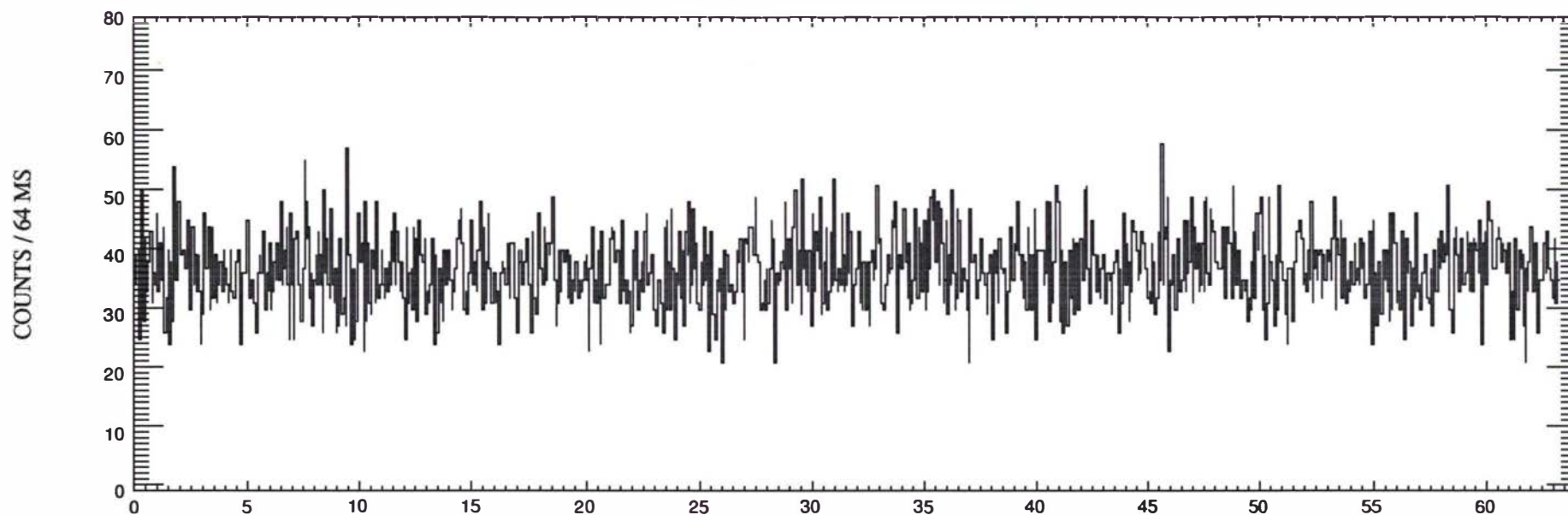


TIME, SECS

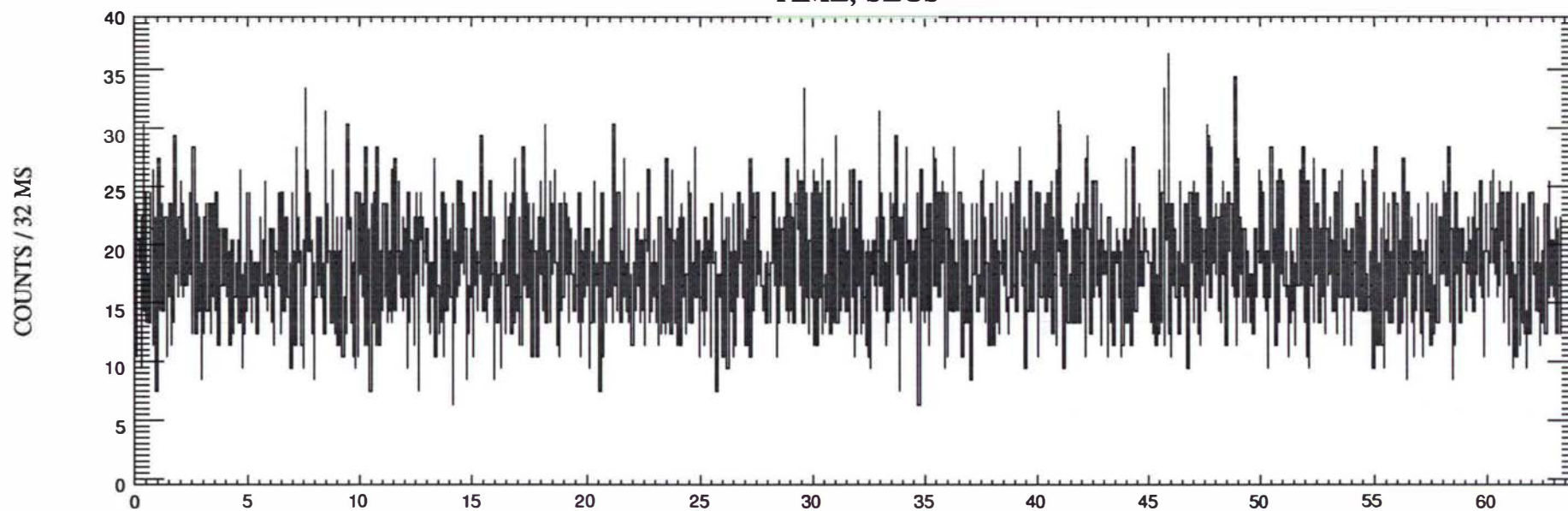


TIME, SECS

Burst Counter 9 at UT= 2.862437655131 h=10304.776 s 02:51:44.776

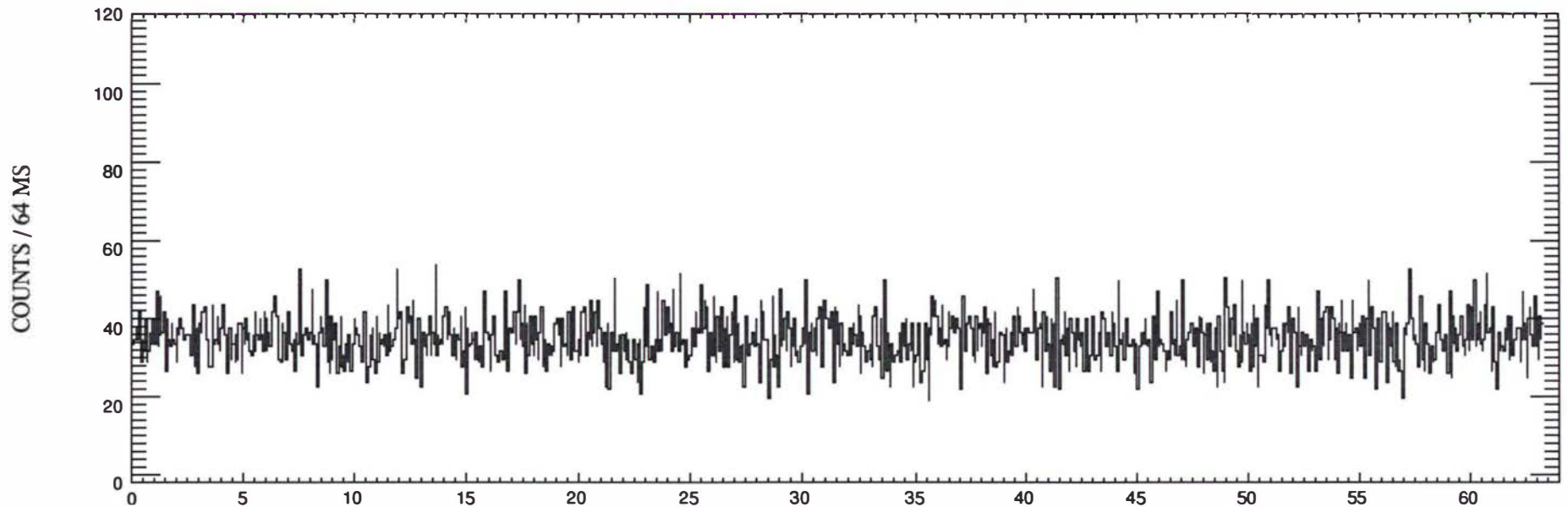


TIME, SECS

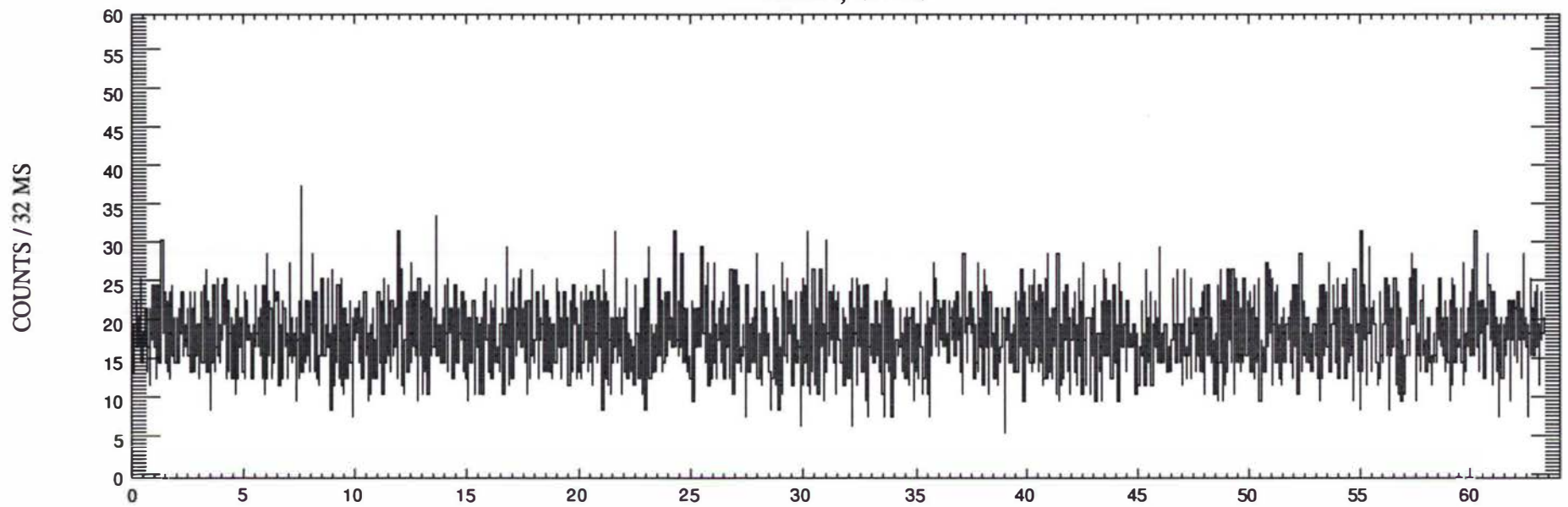


TIME, SECS

Burst Counter 10 at UT= 3.564114066230 h=12830.811 s 03:33:50.811

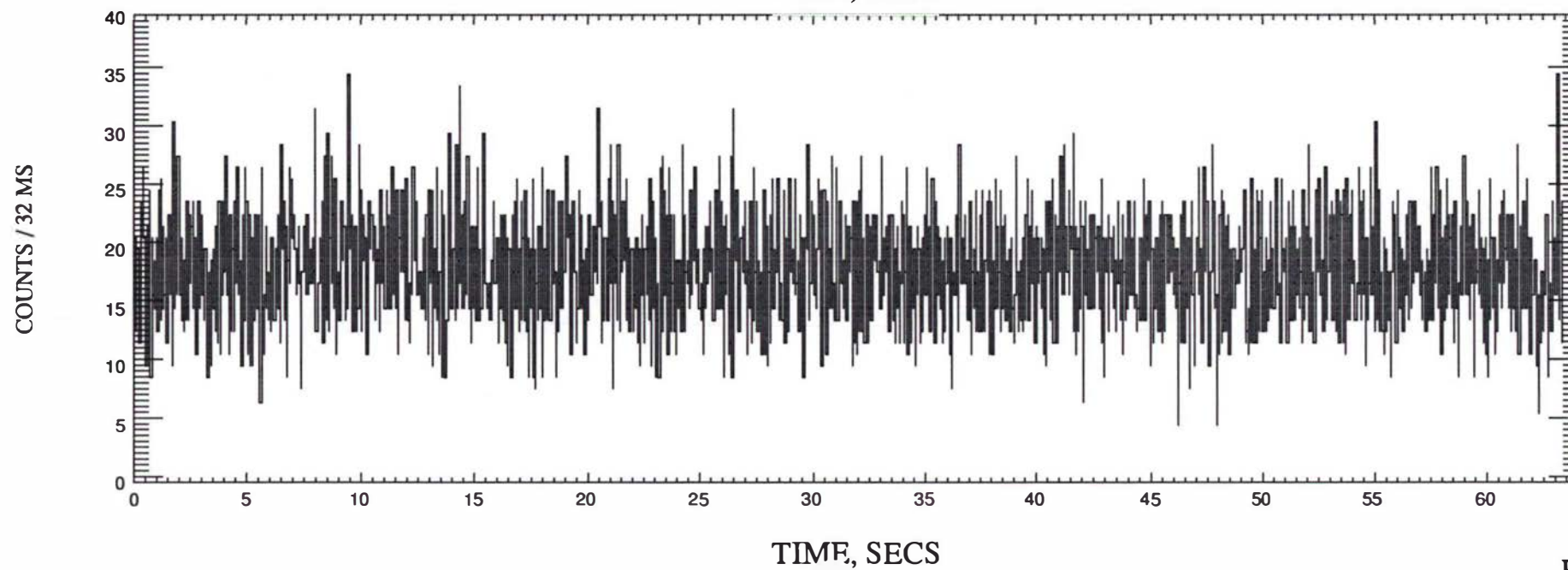
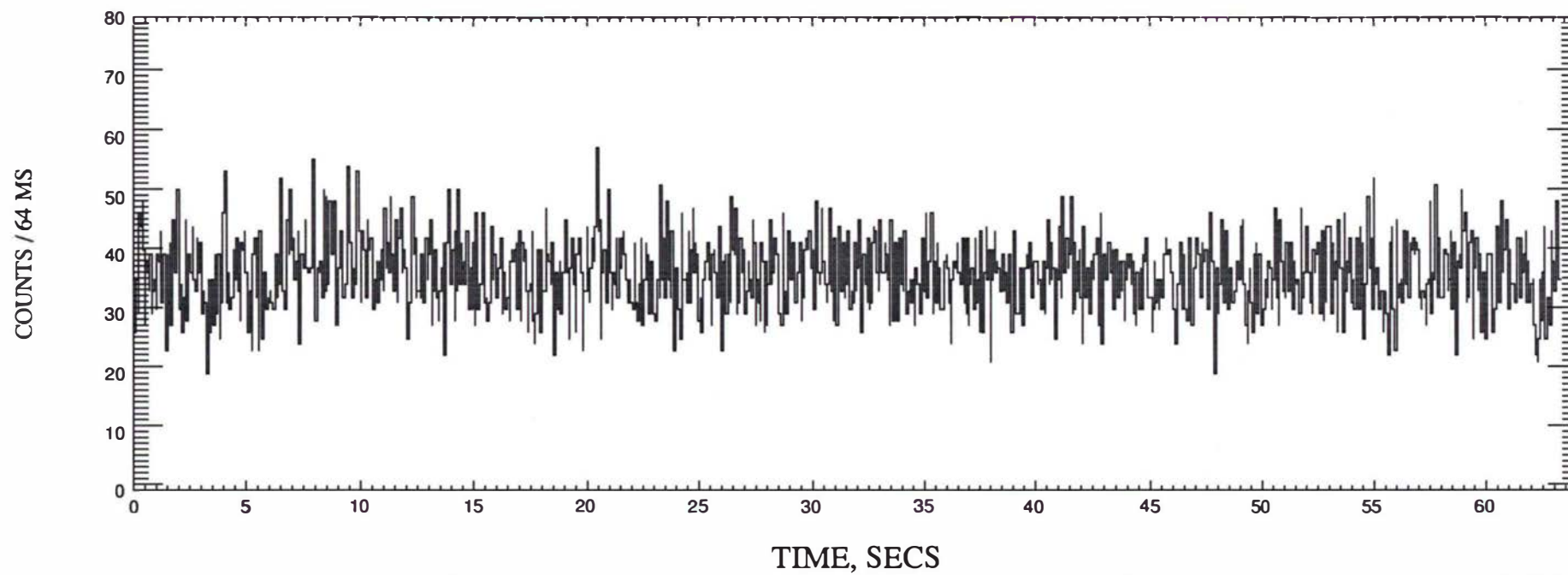


TIME, SECS

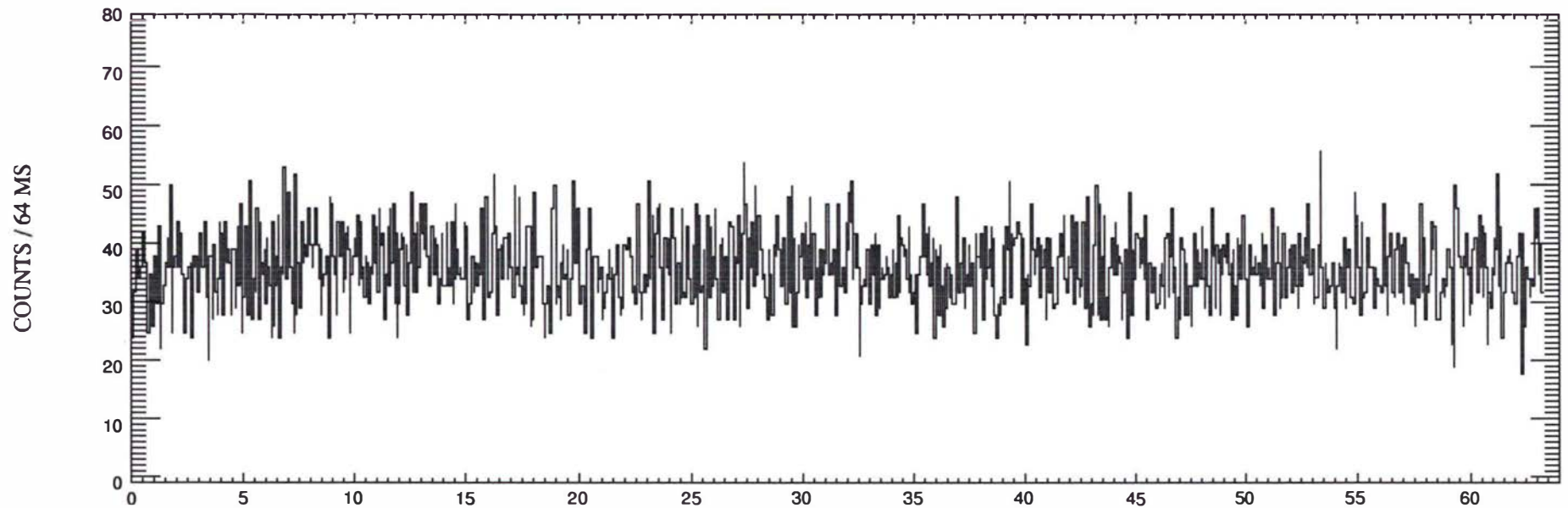


TIME, SECS

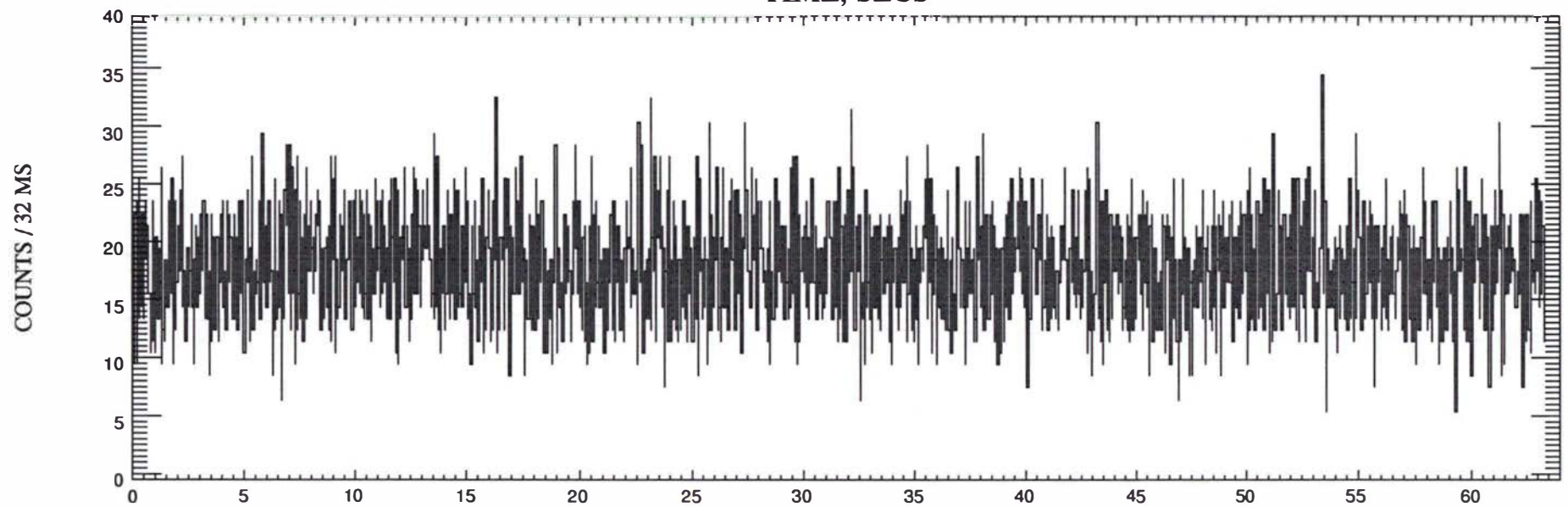
Burst Counter 11 at UT= 4.281074761285 h=15411.869 s 04:16:51.869



Burst Counter 12 at UT= 4.986922179328 h=17952.920 s 04:59:12.920

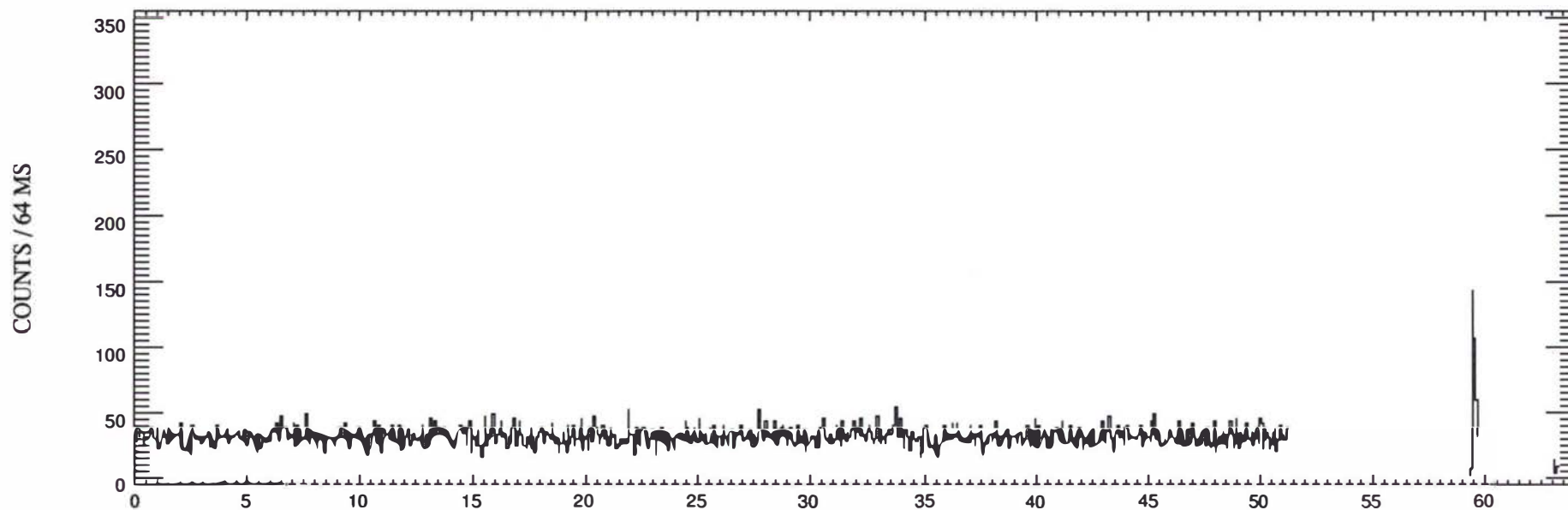


TIME, SECS

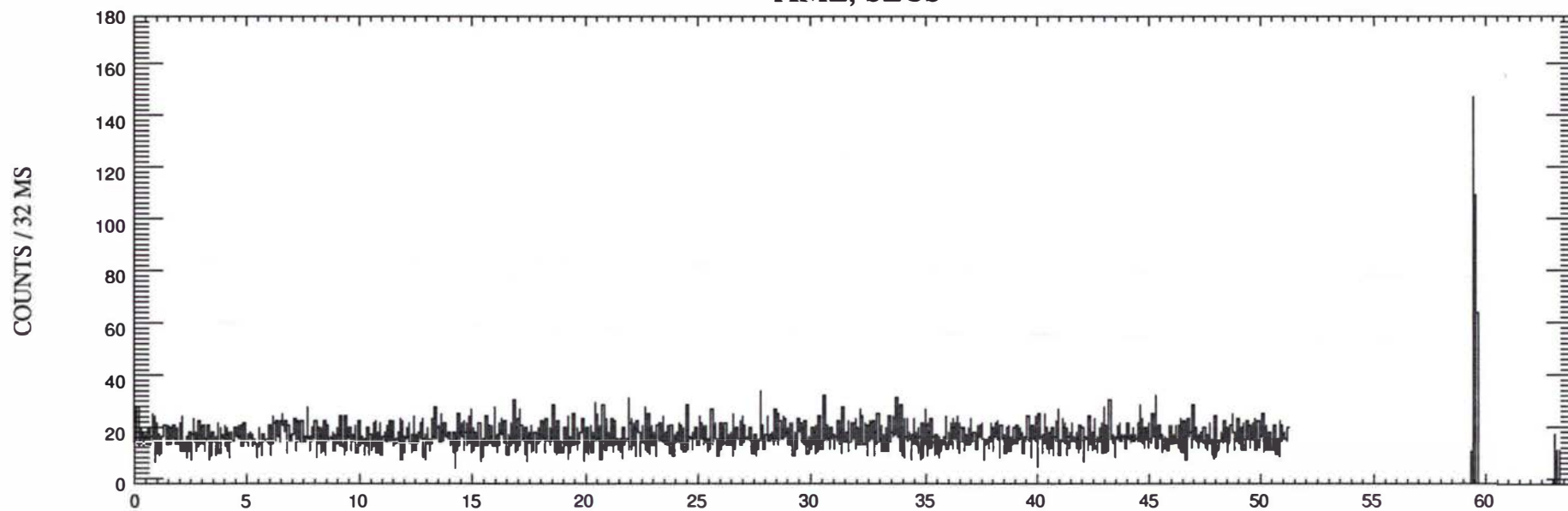


TIME, SECS

Burst Counter 13 at UT= 5.690250824822 h=20484.903 s 05:41:24.903

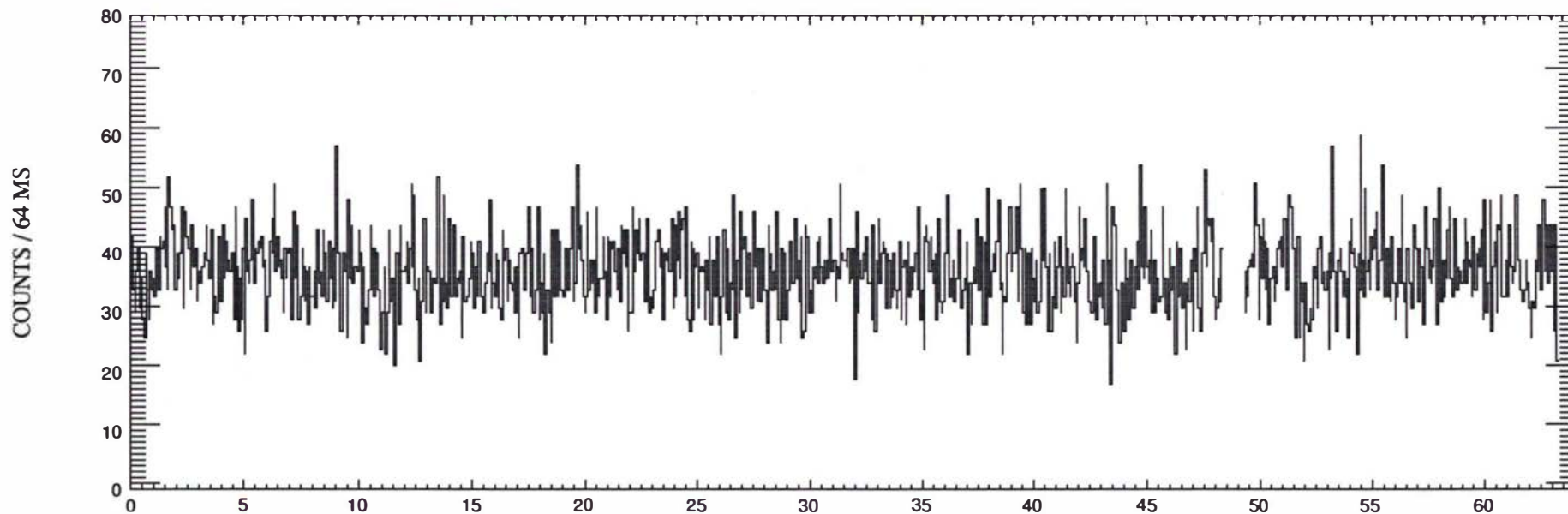


TIME, SECS

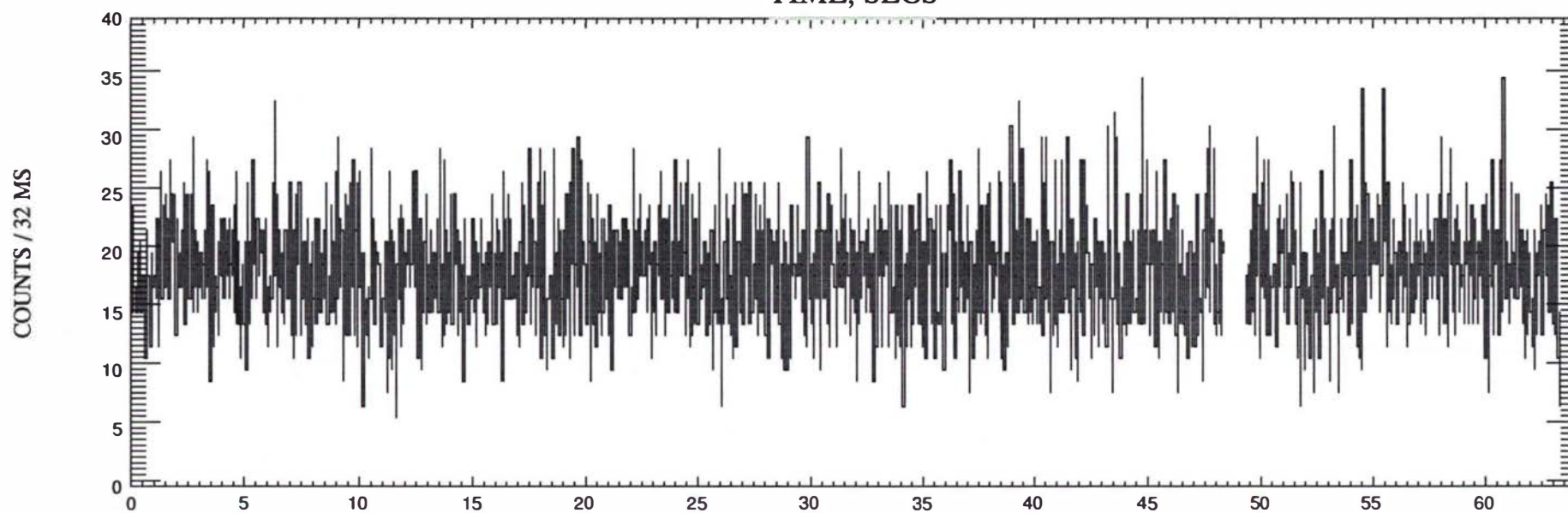


TIME, SECS

Burst Counter 14 at UT= 6.389728880988 h=23003.024 s 06:23:23.024

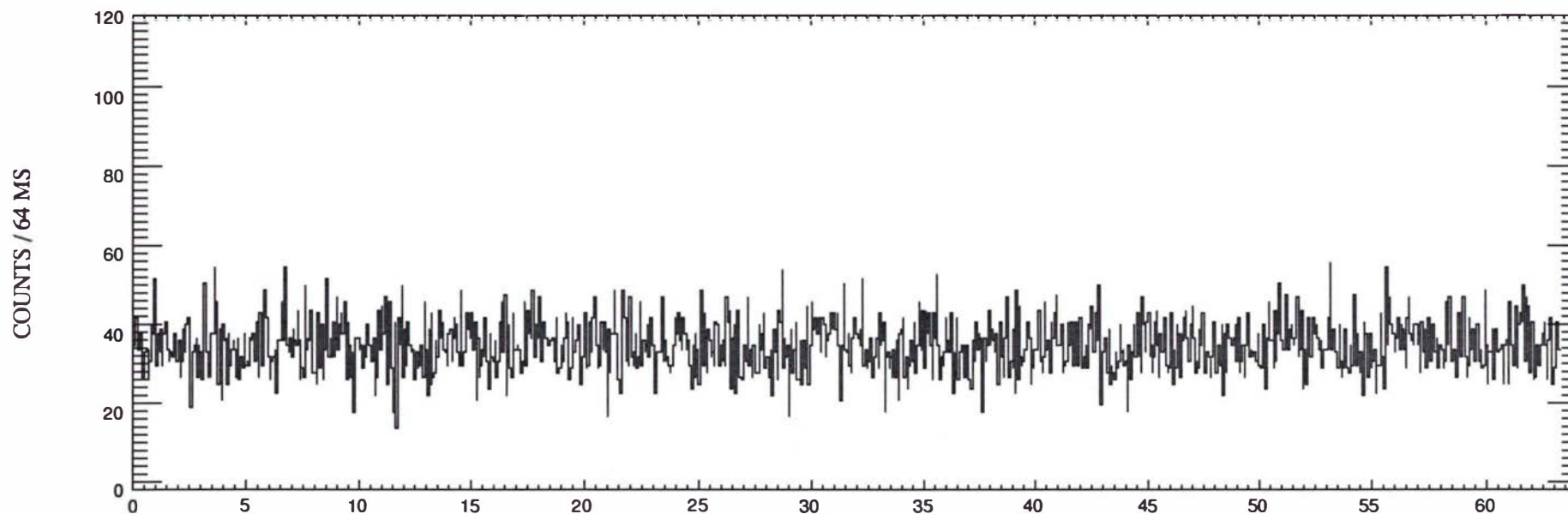


TIME, SECS

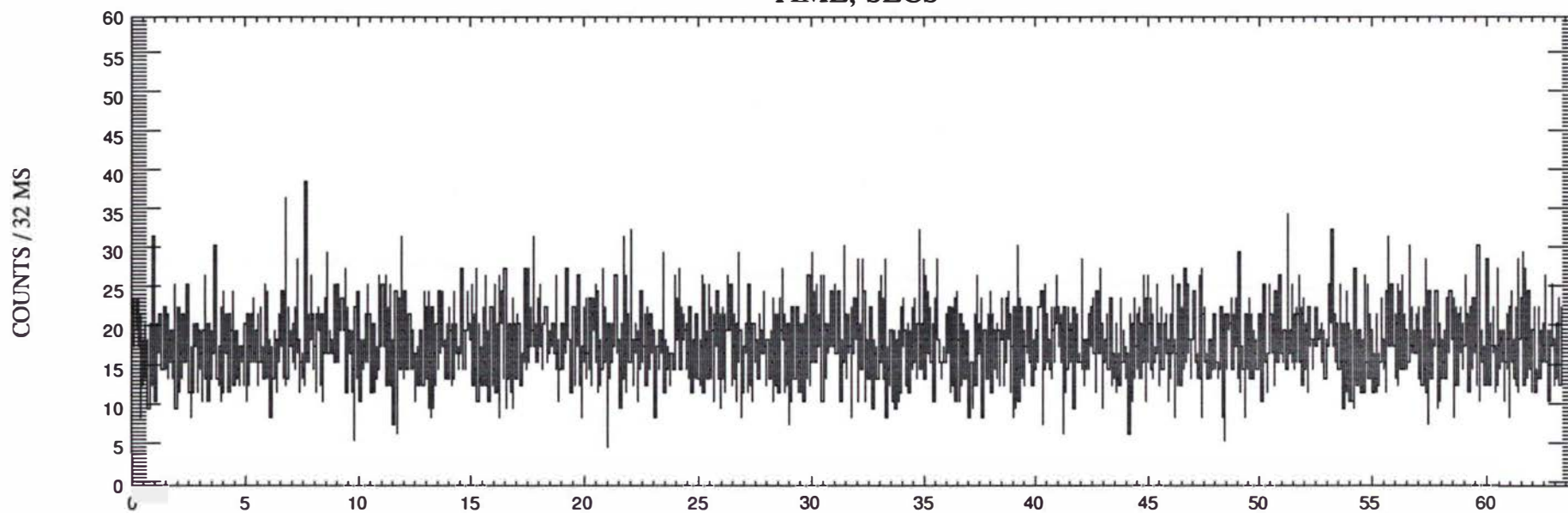


TIME, SECS

Burst Counter 15 at UT= 7.103909632365 h=25574.075 s 07:06:14.075

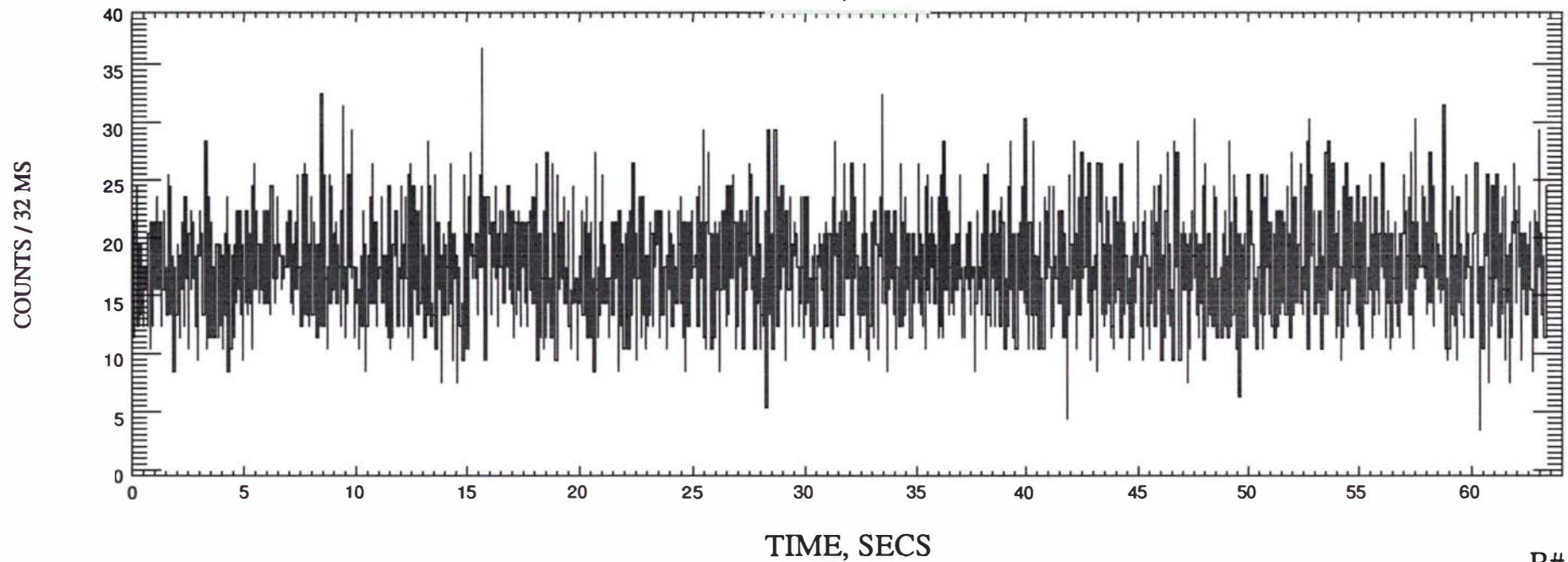
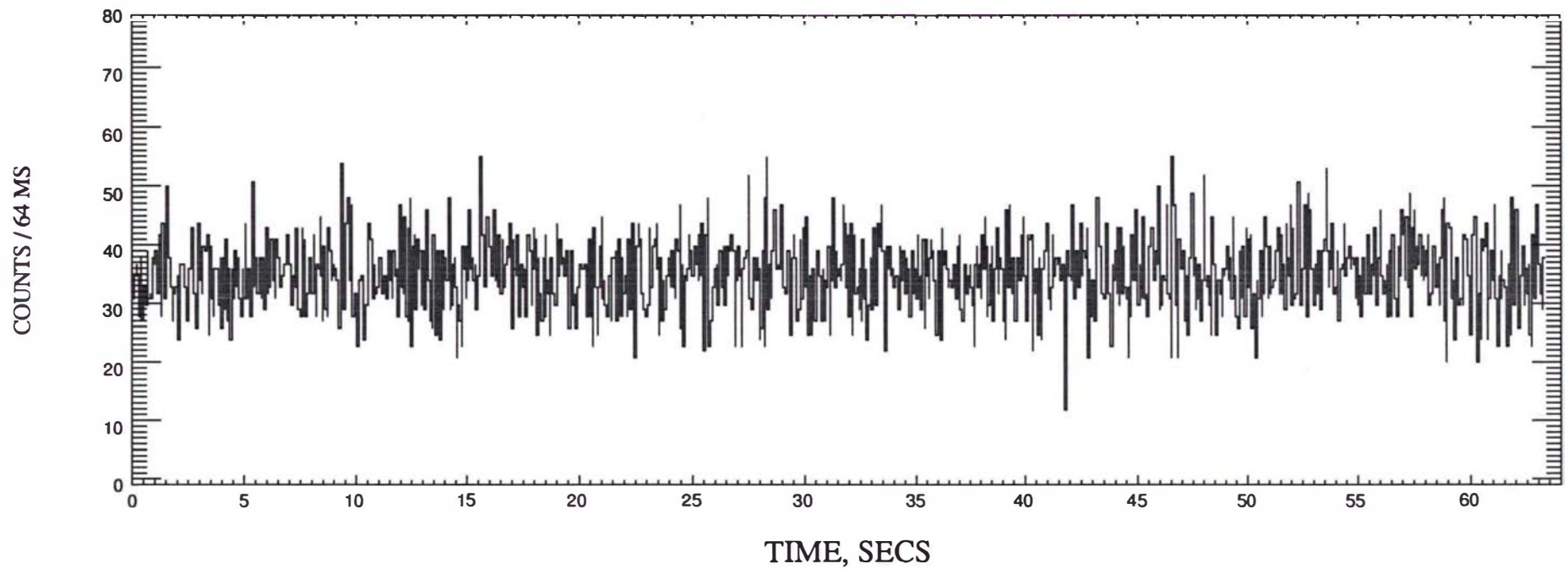


TIME, SECS

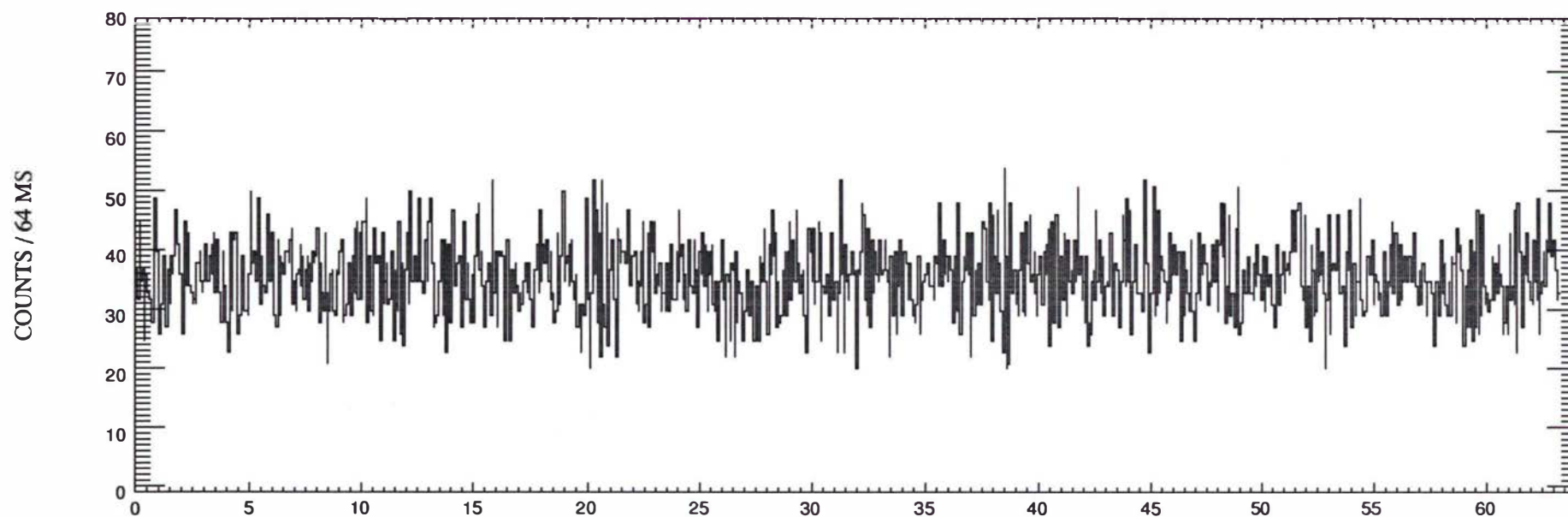


TIME, SECS

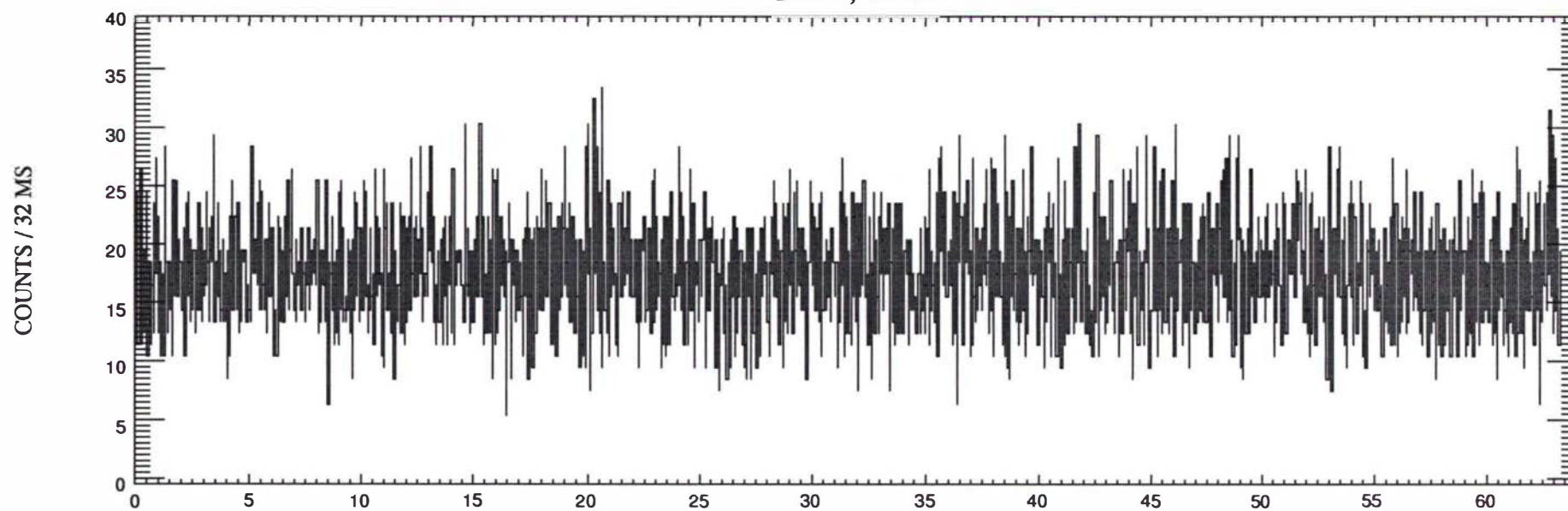
Burst Counter 0 at UT= 7.803923717075 h=28094.125 s 07:48:14.125



Burst Counter 1 at UT= 8.510324516296 h=30637.168 s 08:30:37.168

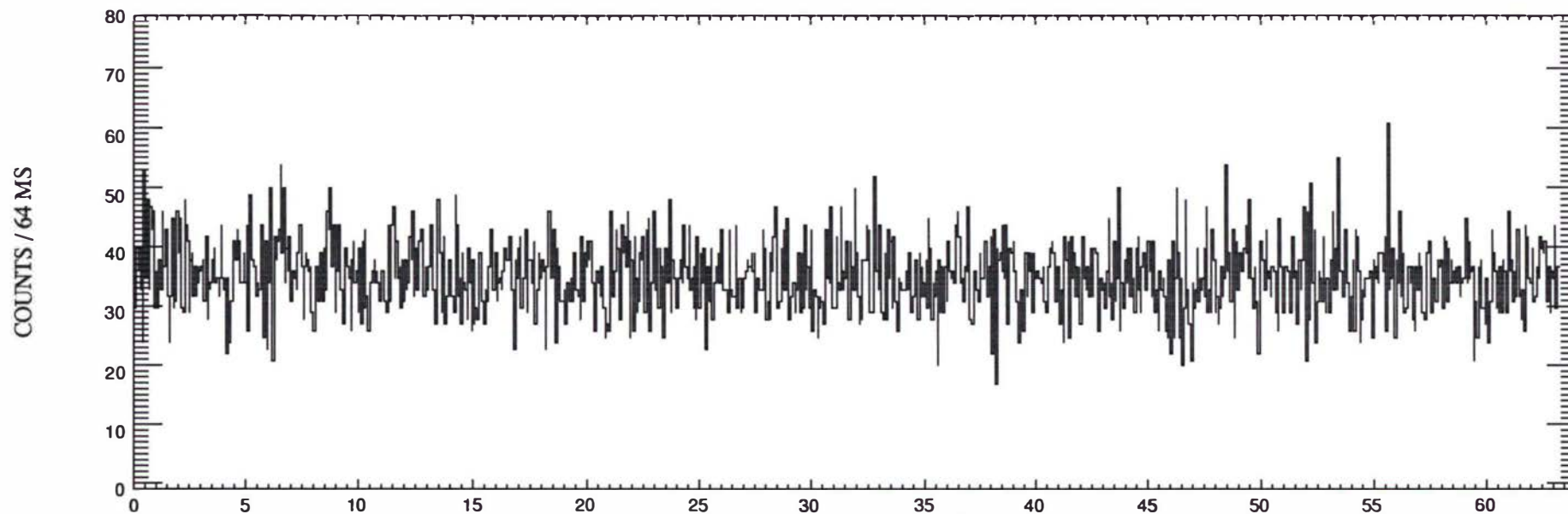


TIME, SECS

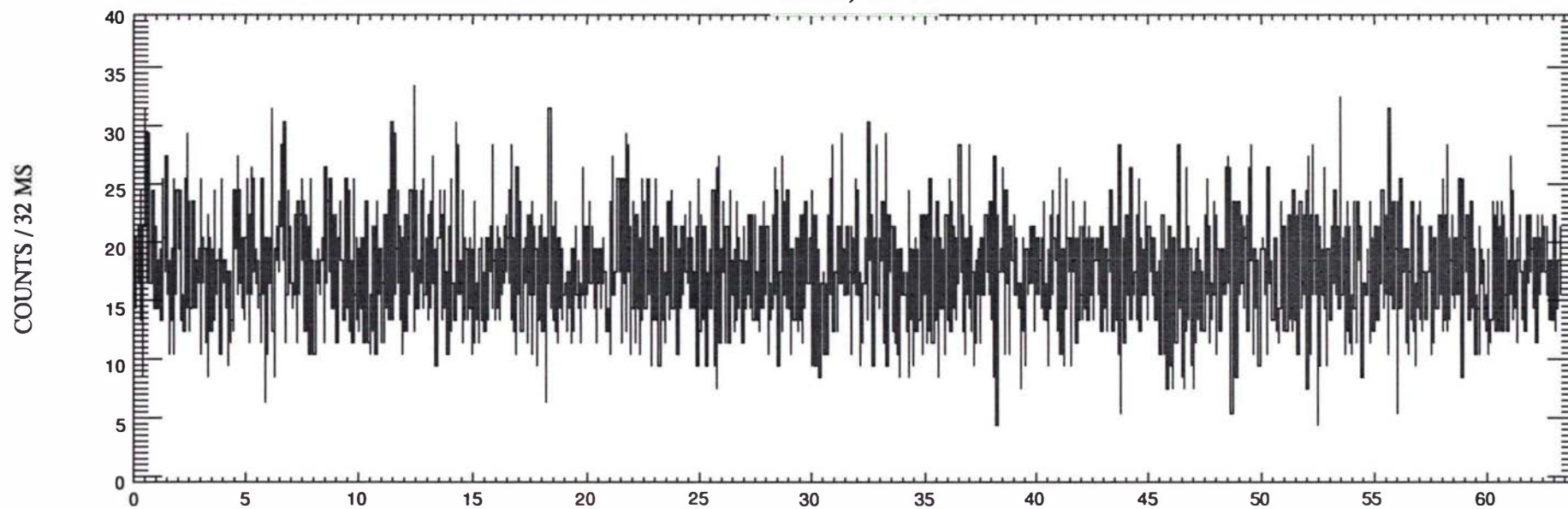


TIME, SECS

Burst Counter 2 at UT= 9.221727489895 h=33198.219 s 09:13:18.219

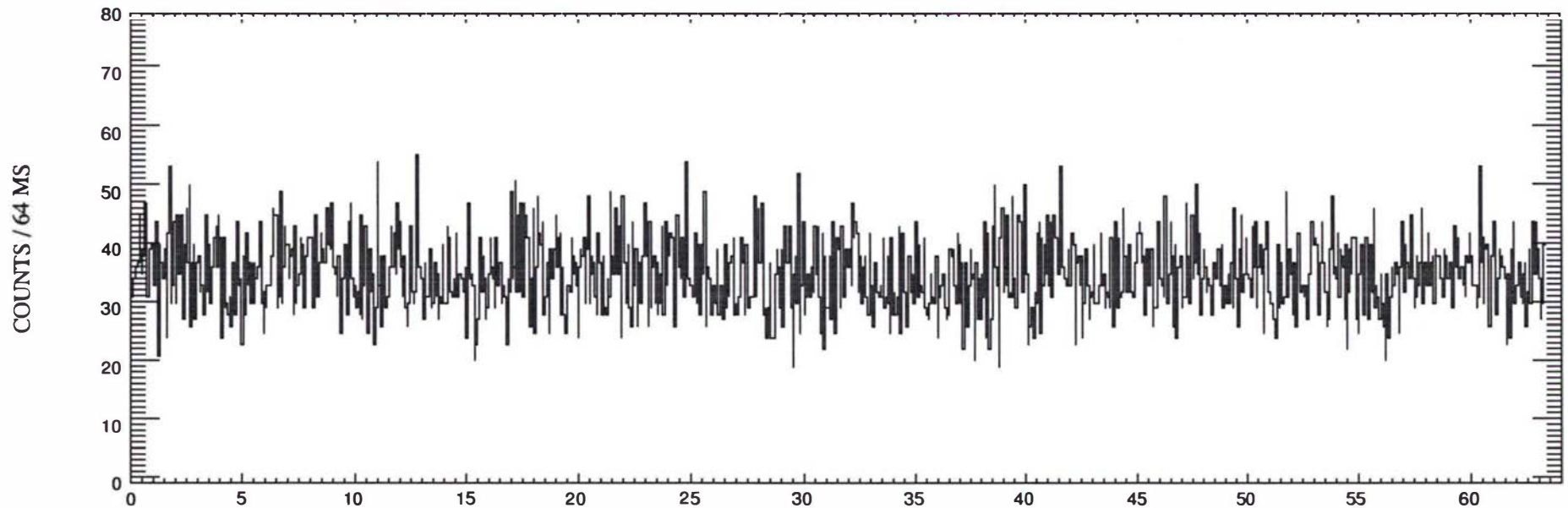


TIME, SECS

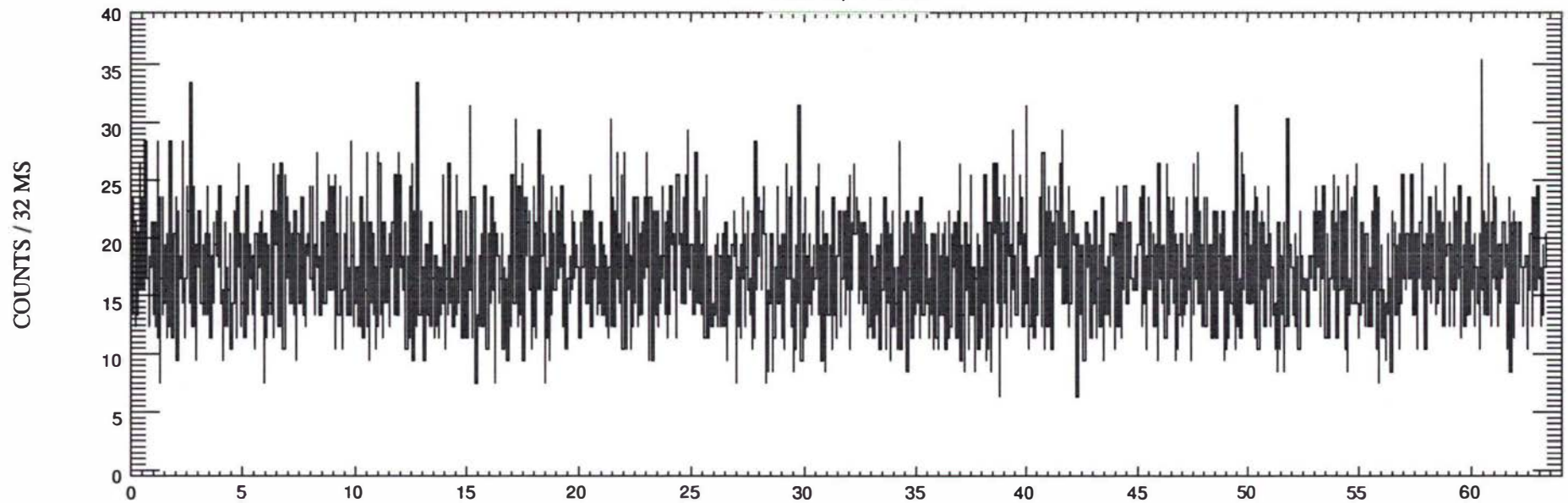


TIME, SECS

Burst Counter 3 at UT=10.198136855231 h=36713.293 s 10:11:53.293

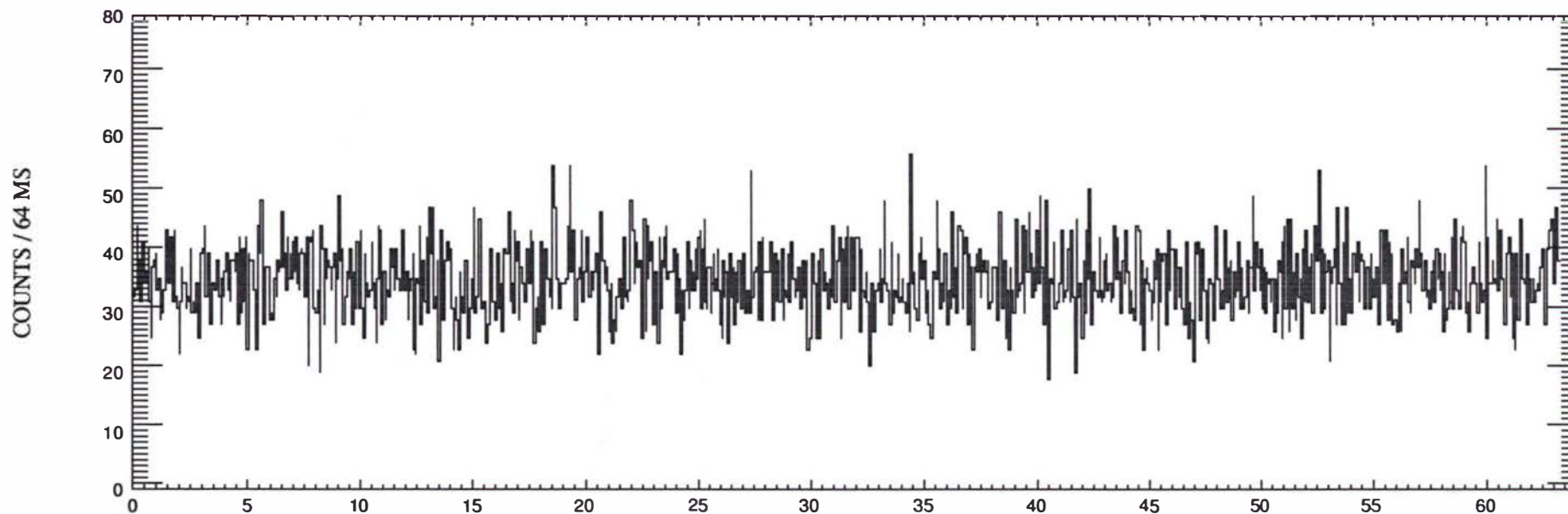


TIME, SECS

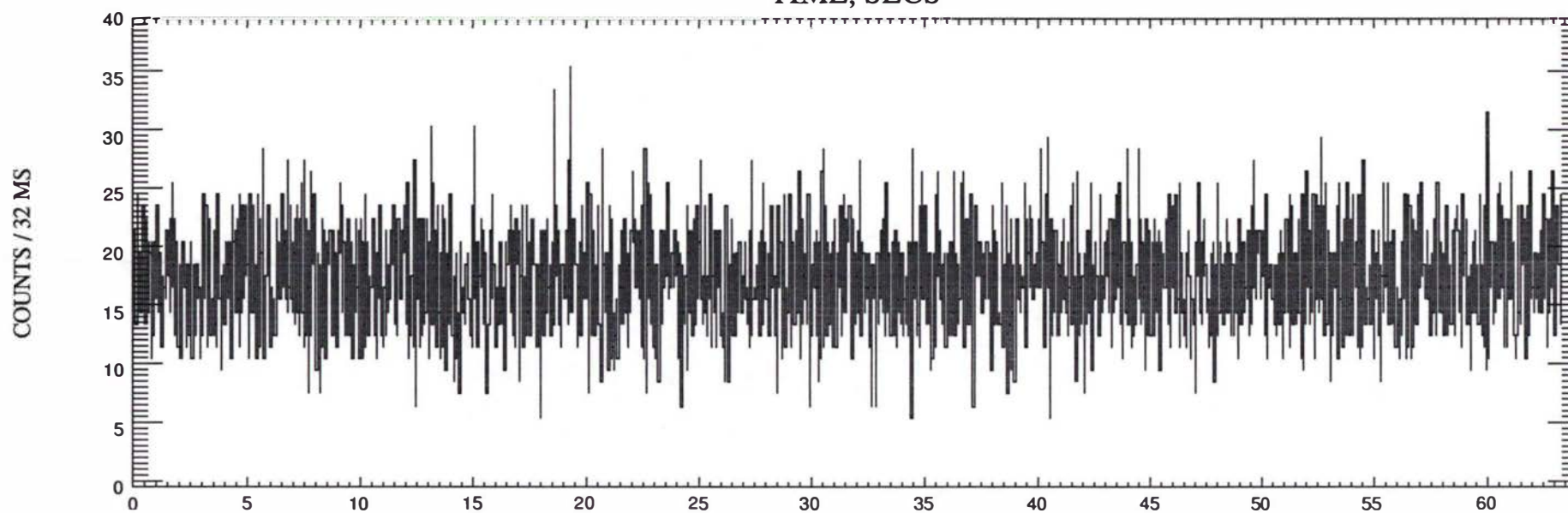


TIME, SECS

Burst Counter 4 at UT=11.482051094903 h=41335.384 s 11:28:55.384

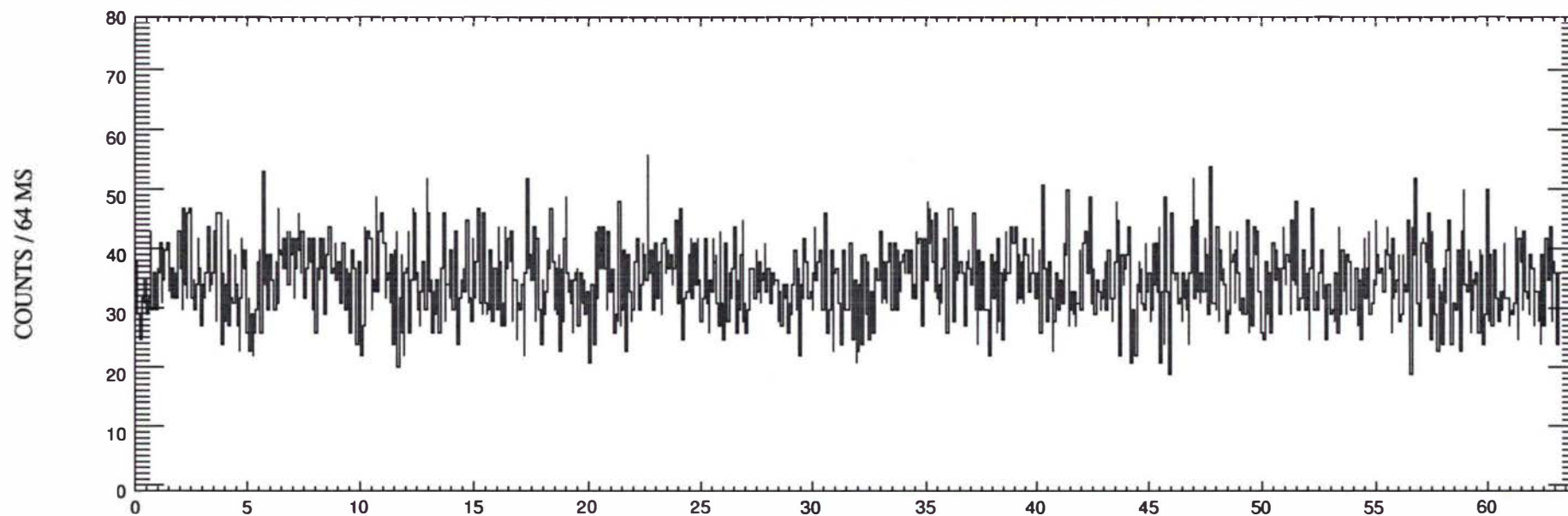


TIME, SECS

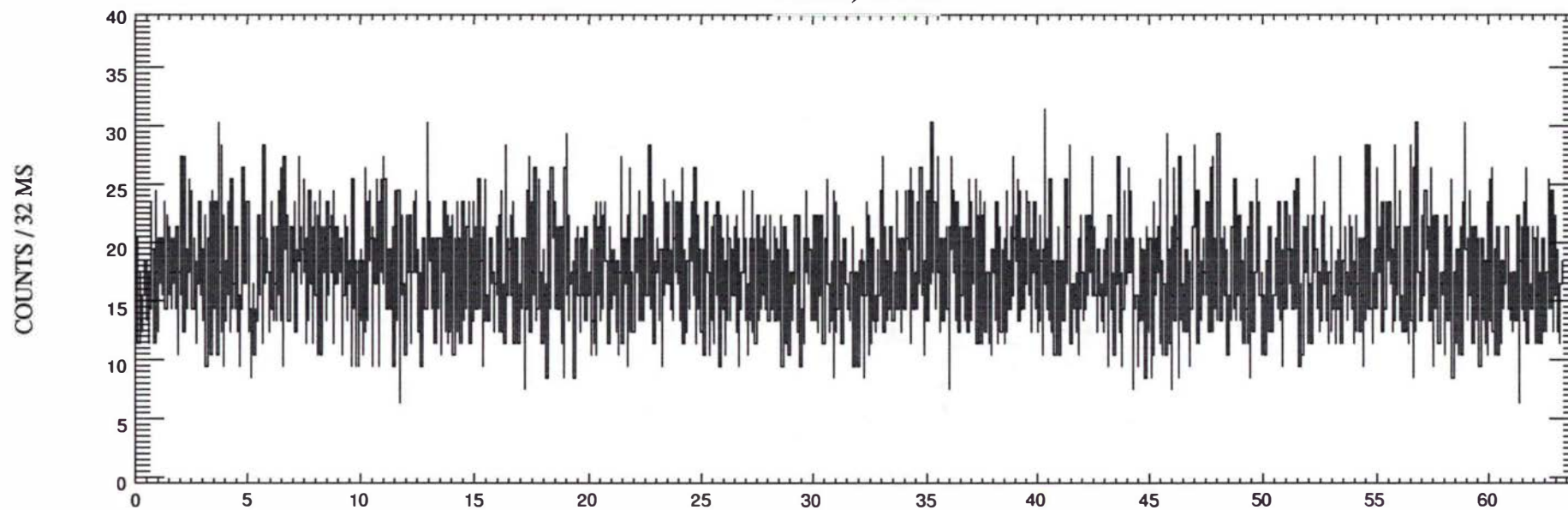


TIME, SECS

Burst Counter 5 at UT=12.747905434502 h=45892.460 s 12:44:52.460

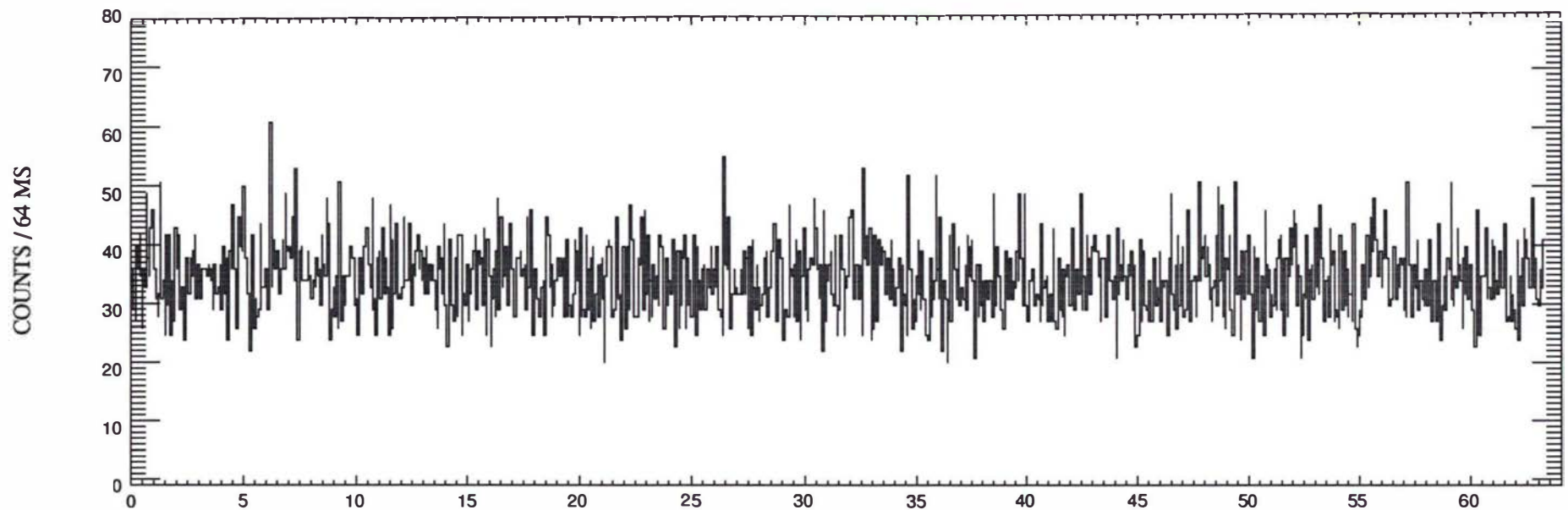


TIME, SECS

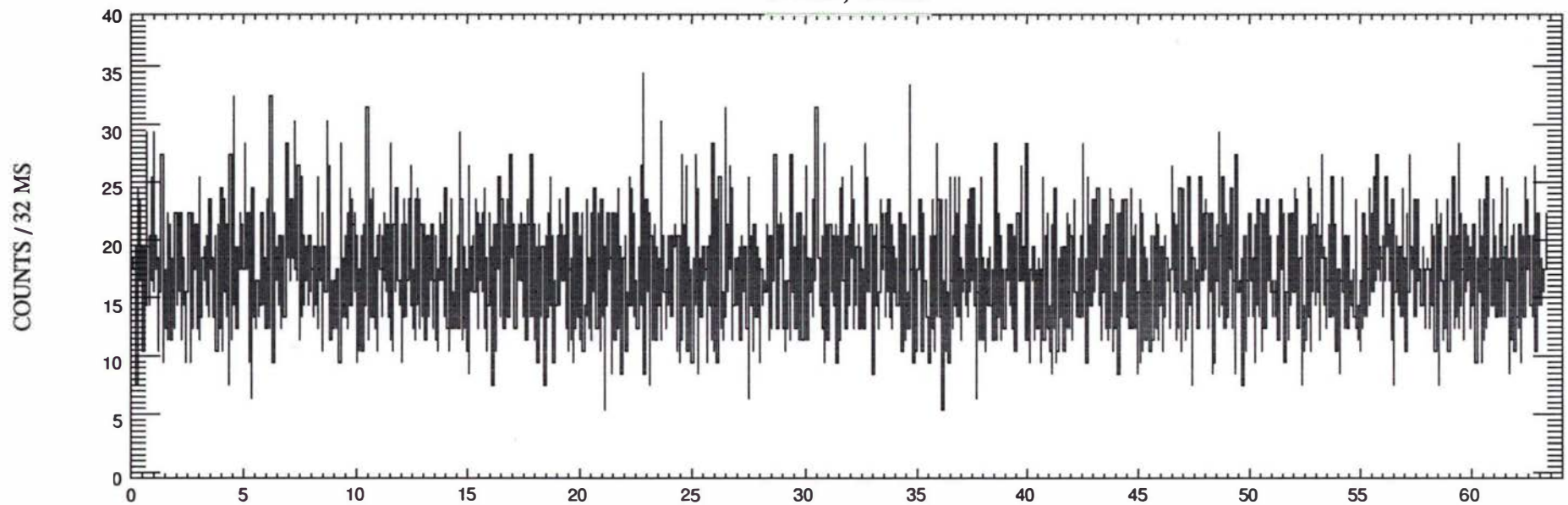


TIME, SECS

Burst Counter 6 at UT=14.089875873990 h=50723.553 s 14:05:23.553

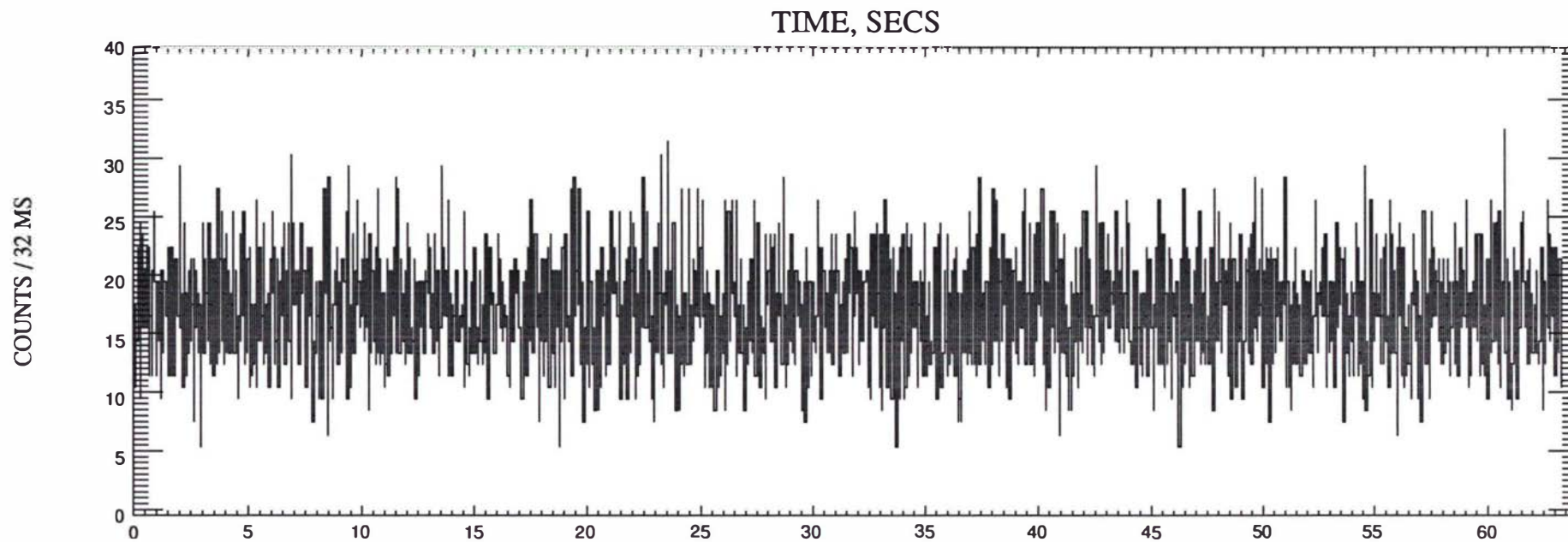
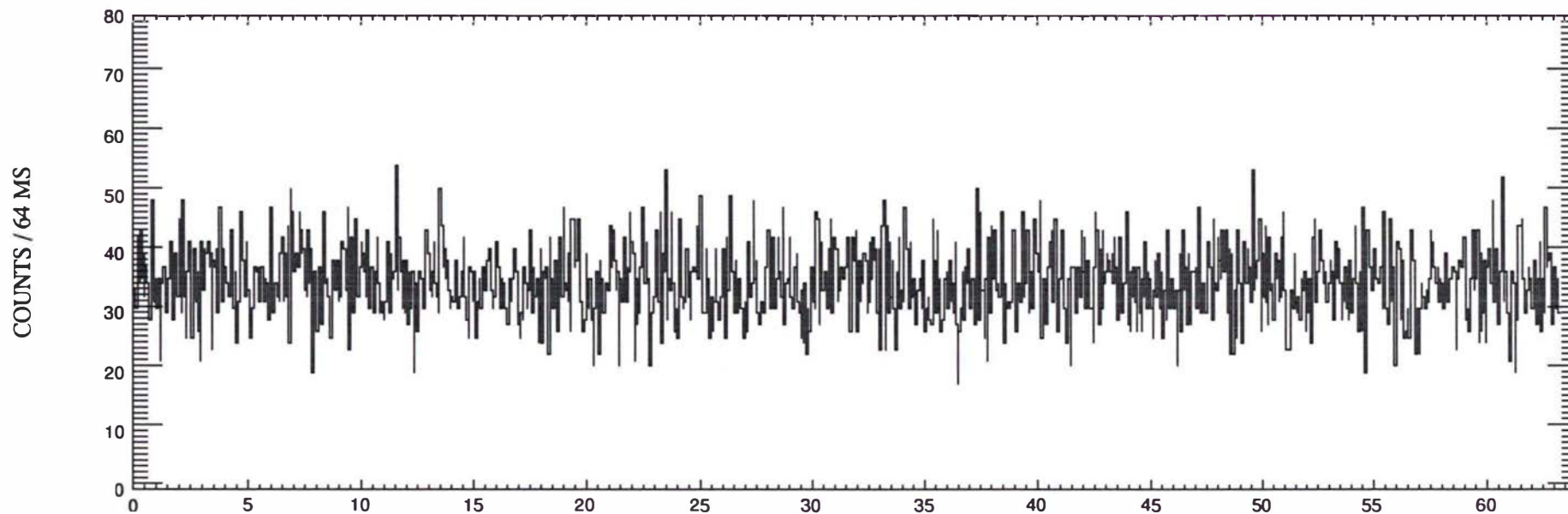


TIME, SECS



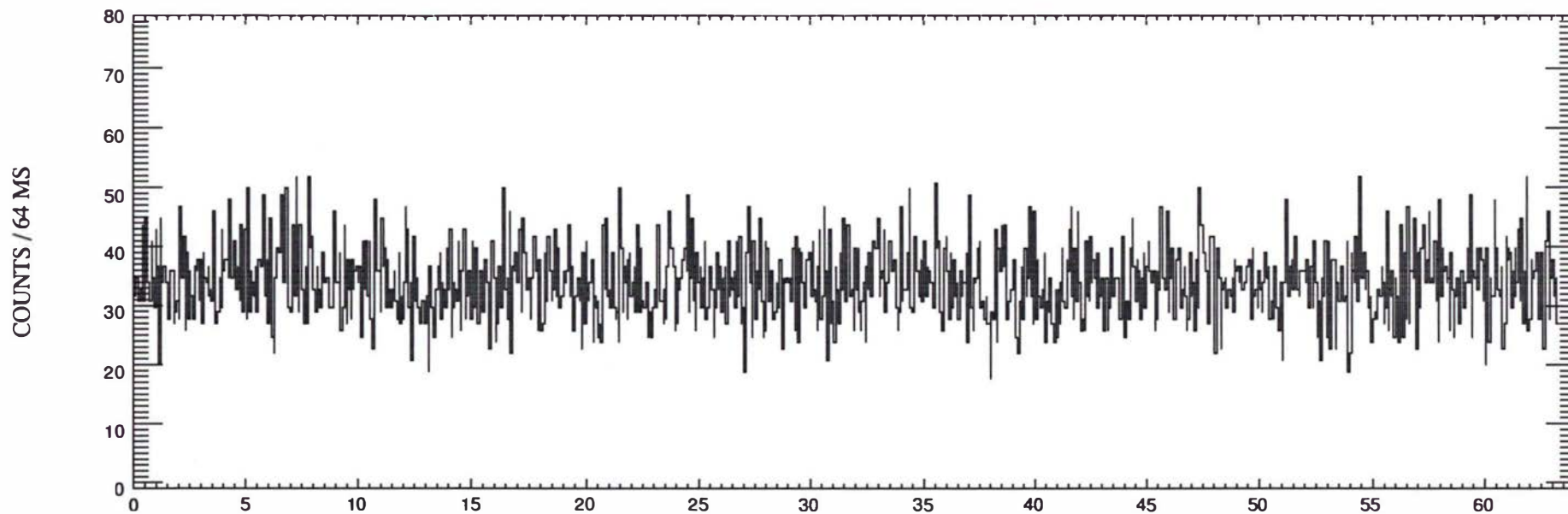
TIME, SECS

Burst Counter 7 at UT=15.397692248027 h=55431.692 s 15:23:51.692

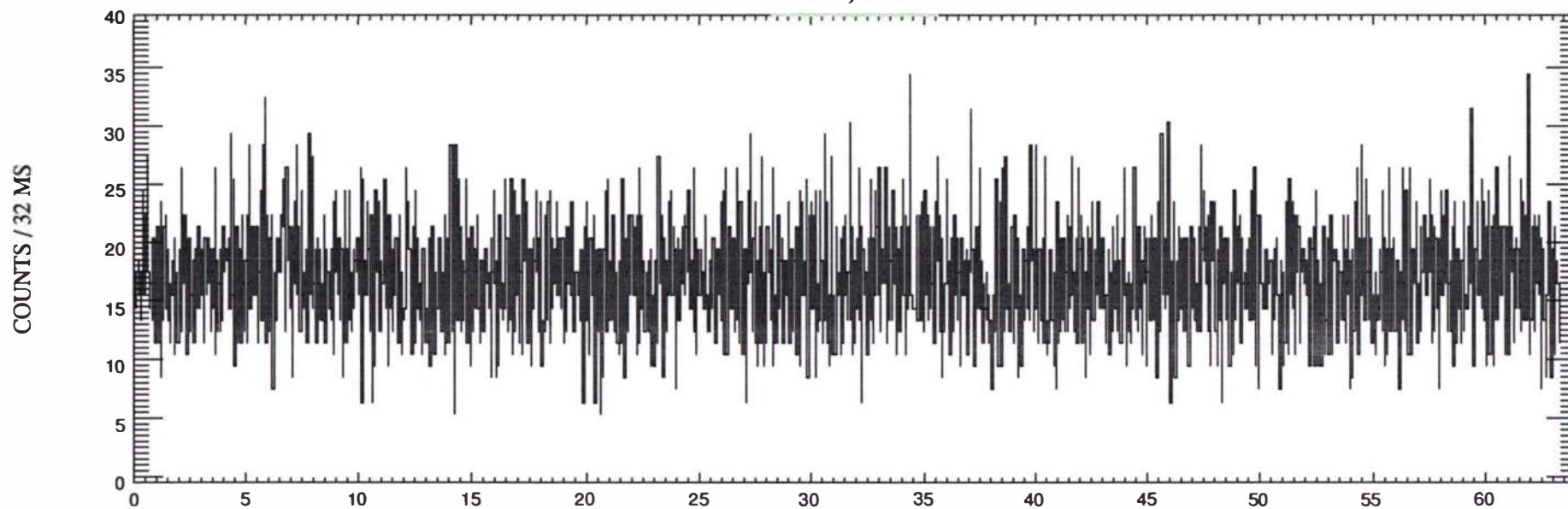


TIME, SECS

Burst Counter 8 at UT=16.705209066603 h=60138.753 s 16:42:18.753

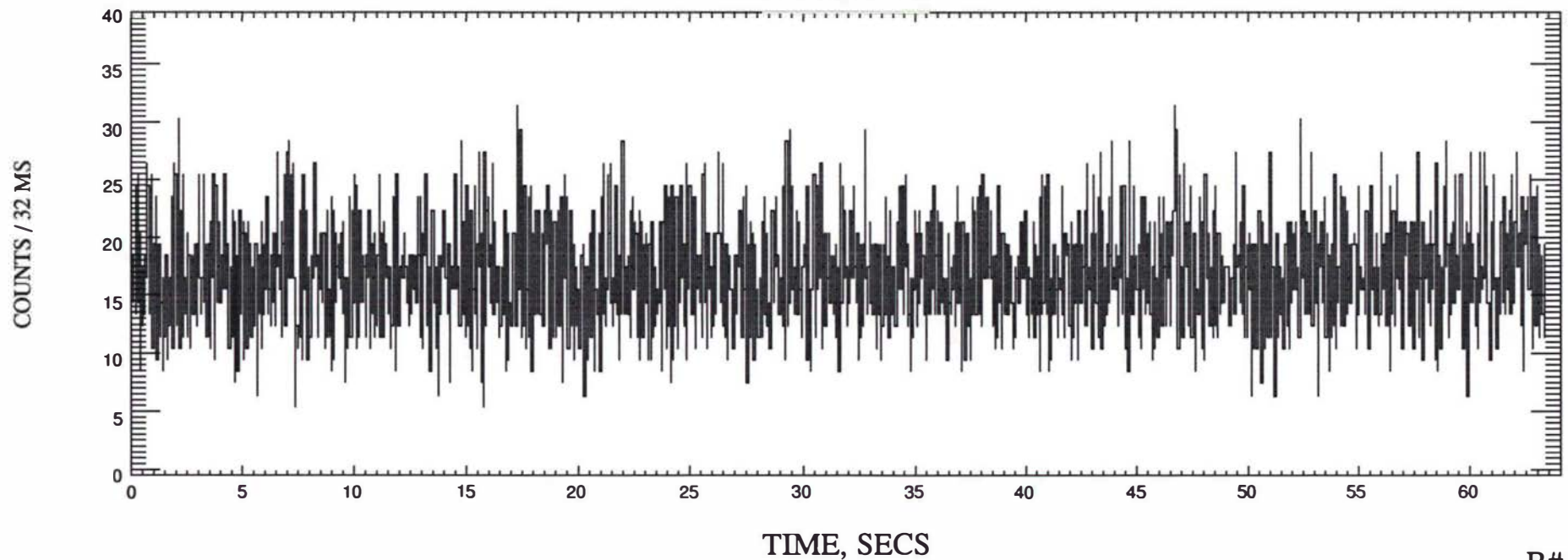
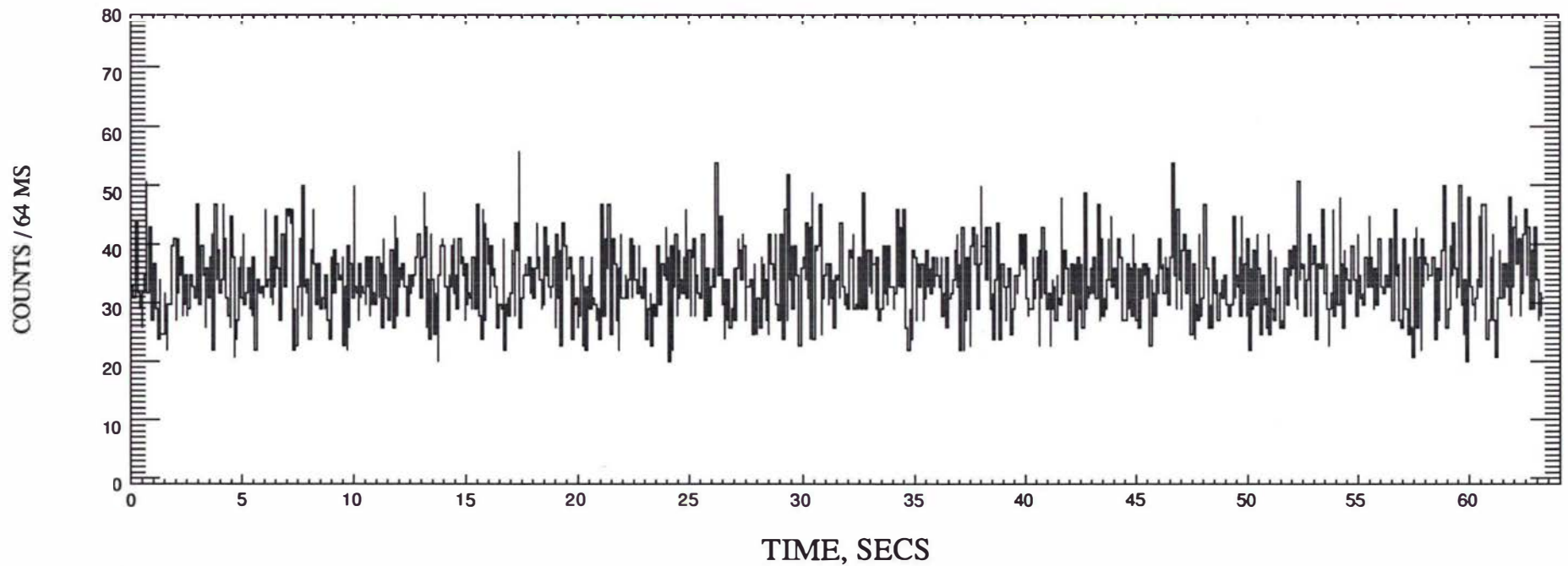


TIME, SECS

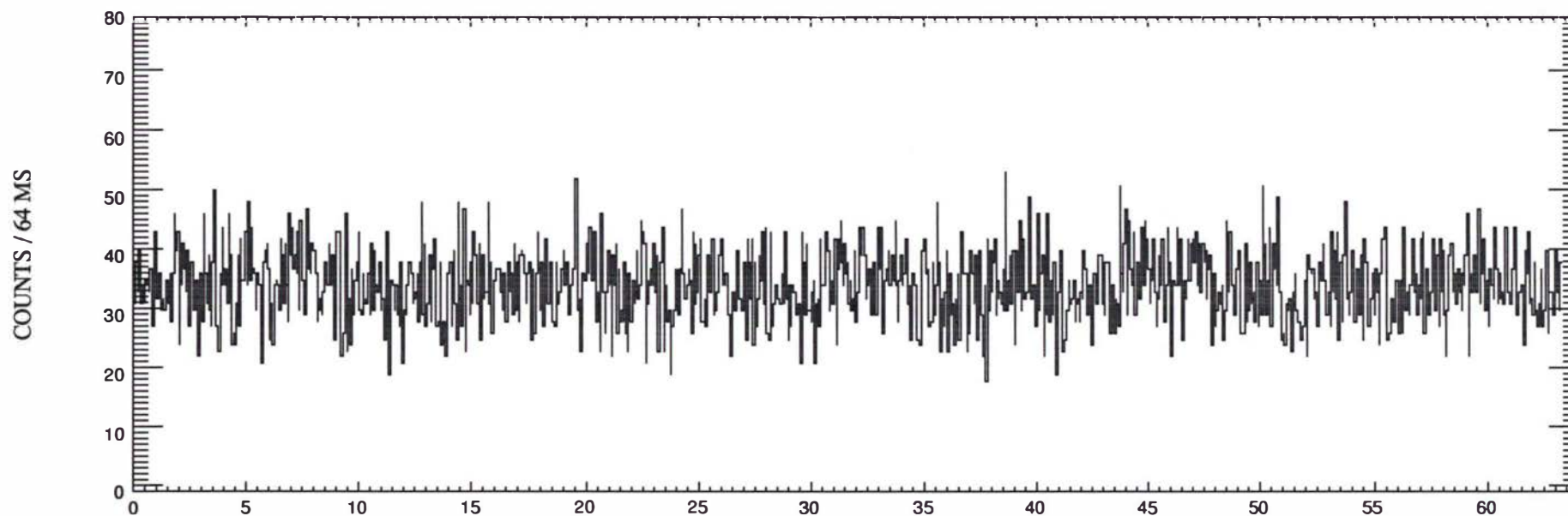


TIME, SECS

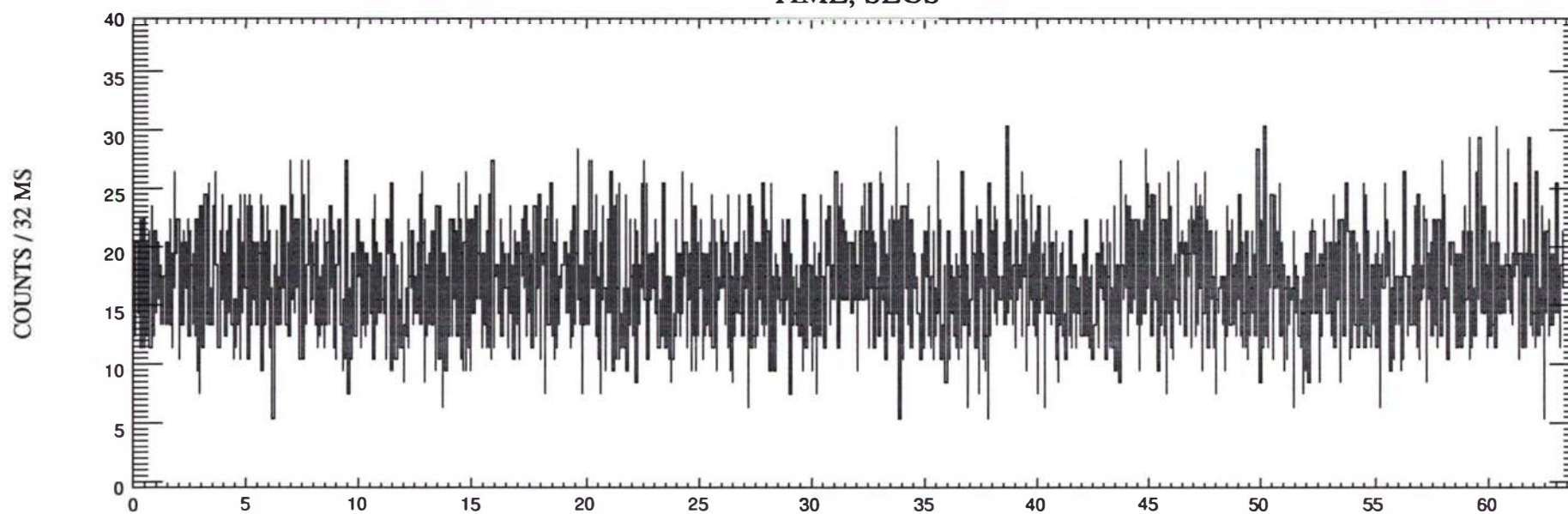
Burst Counter 9 at UT=18.008578745524 h=64830.883 s 18:00:30.883



Burst Counter 10 at UT=20.408346964518 h=73470.049 s 20:24:30.049

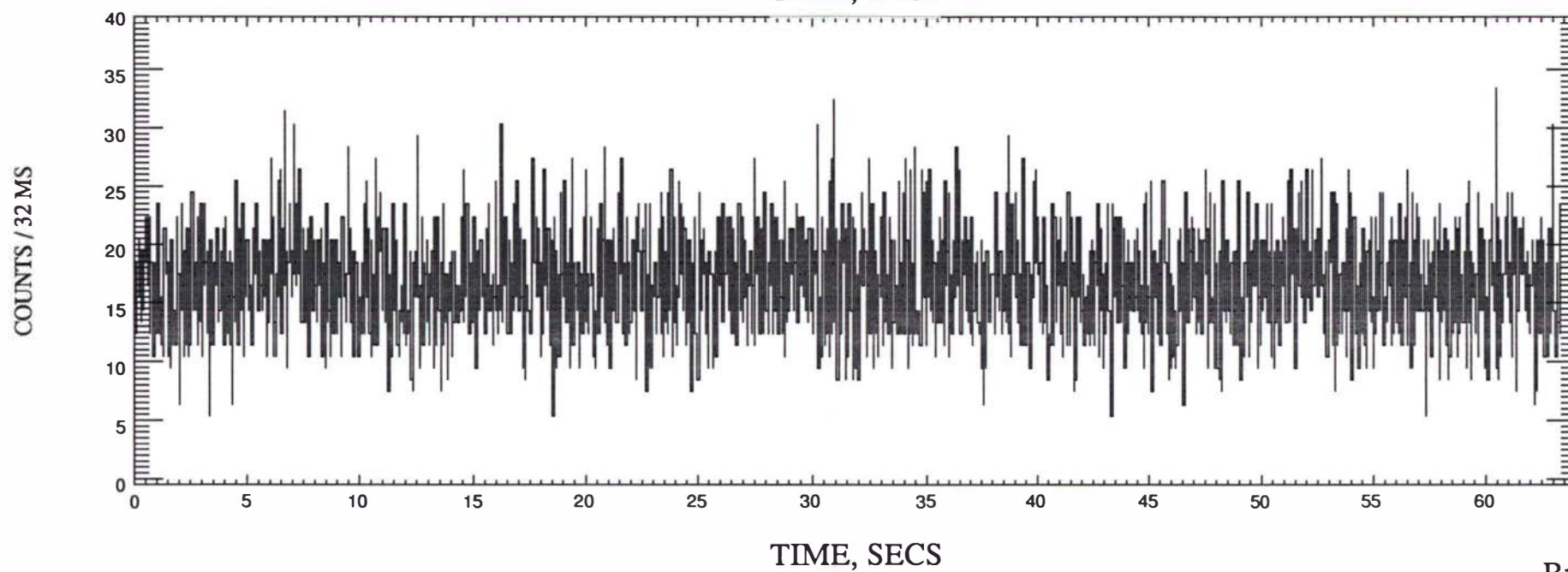
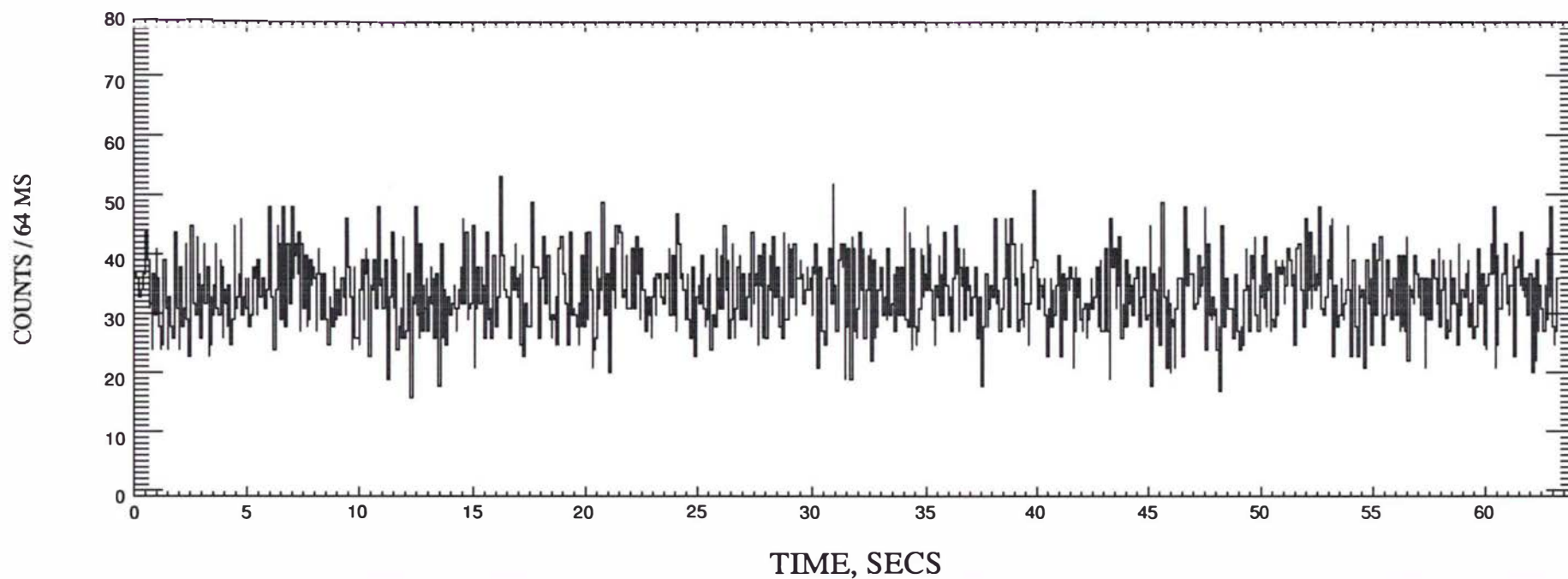


TIME, SECS

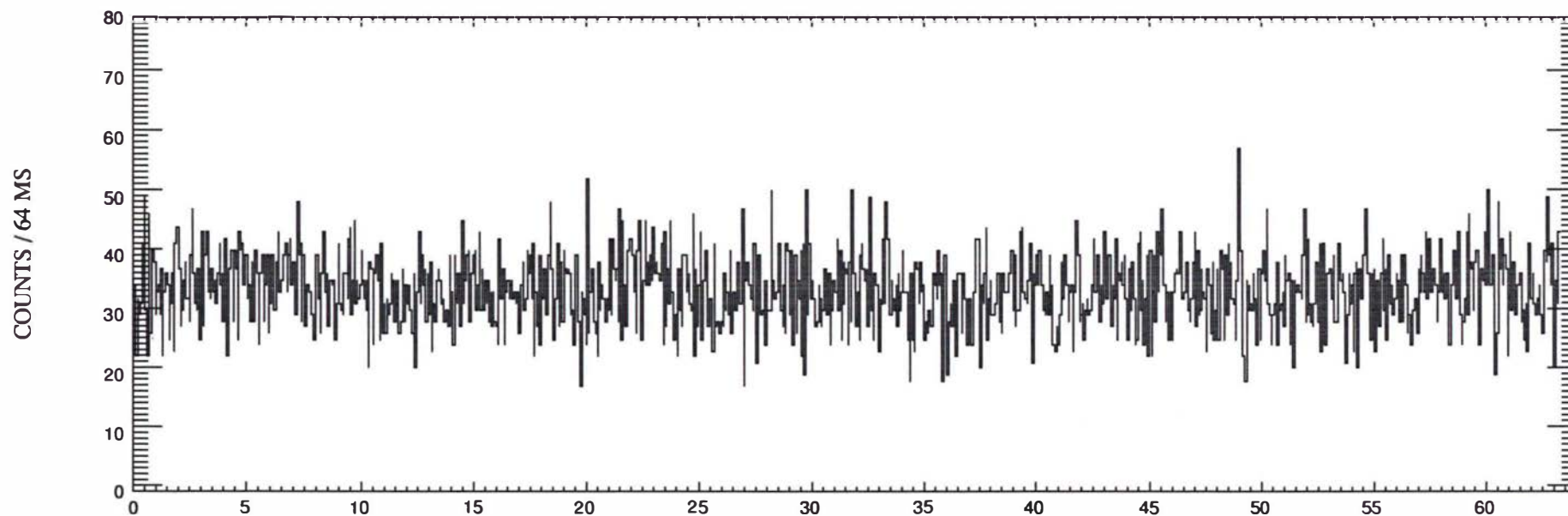


TIME, SECS

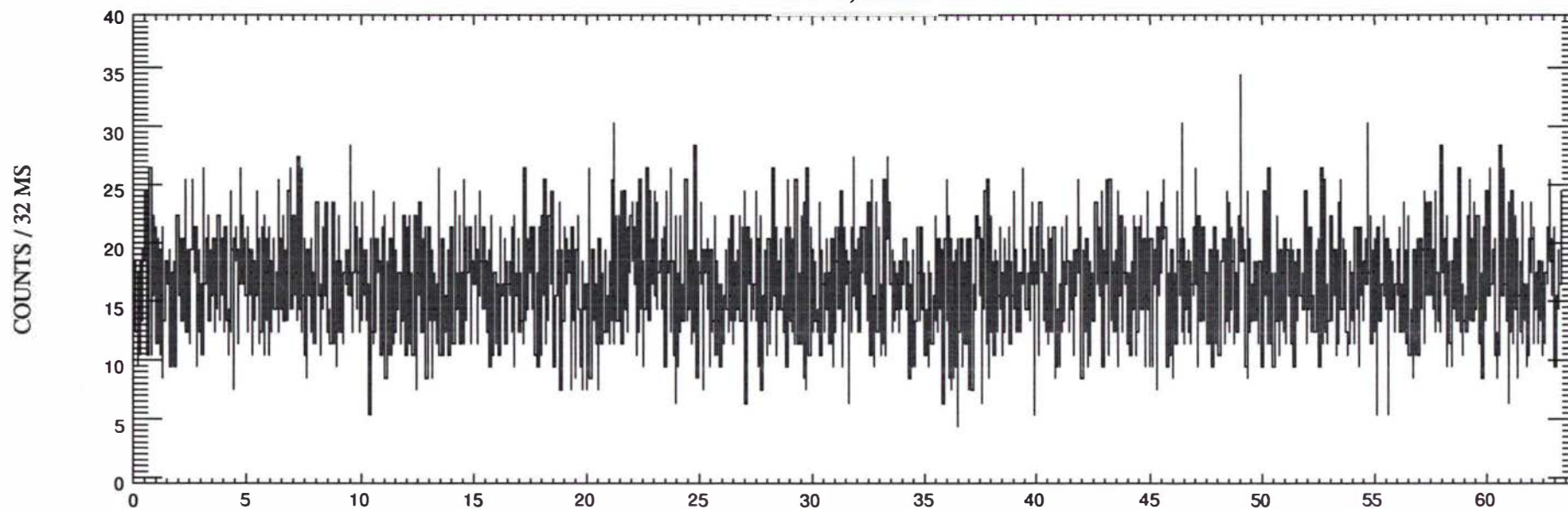
Burst Counter 11 at UT=21.699479230245 h=78118.125 s 21:41:58.125



Burst Counter 12 at UT=23.955915620592 h=86241.296 s 23:57:21.296

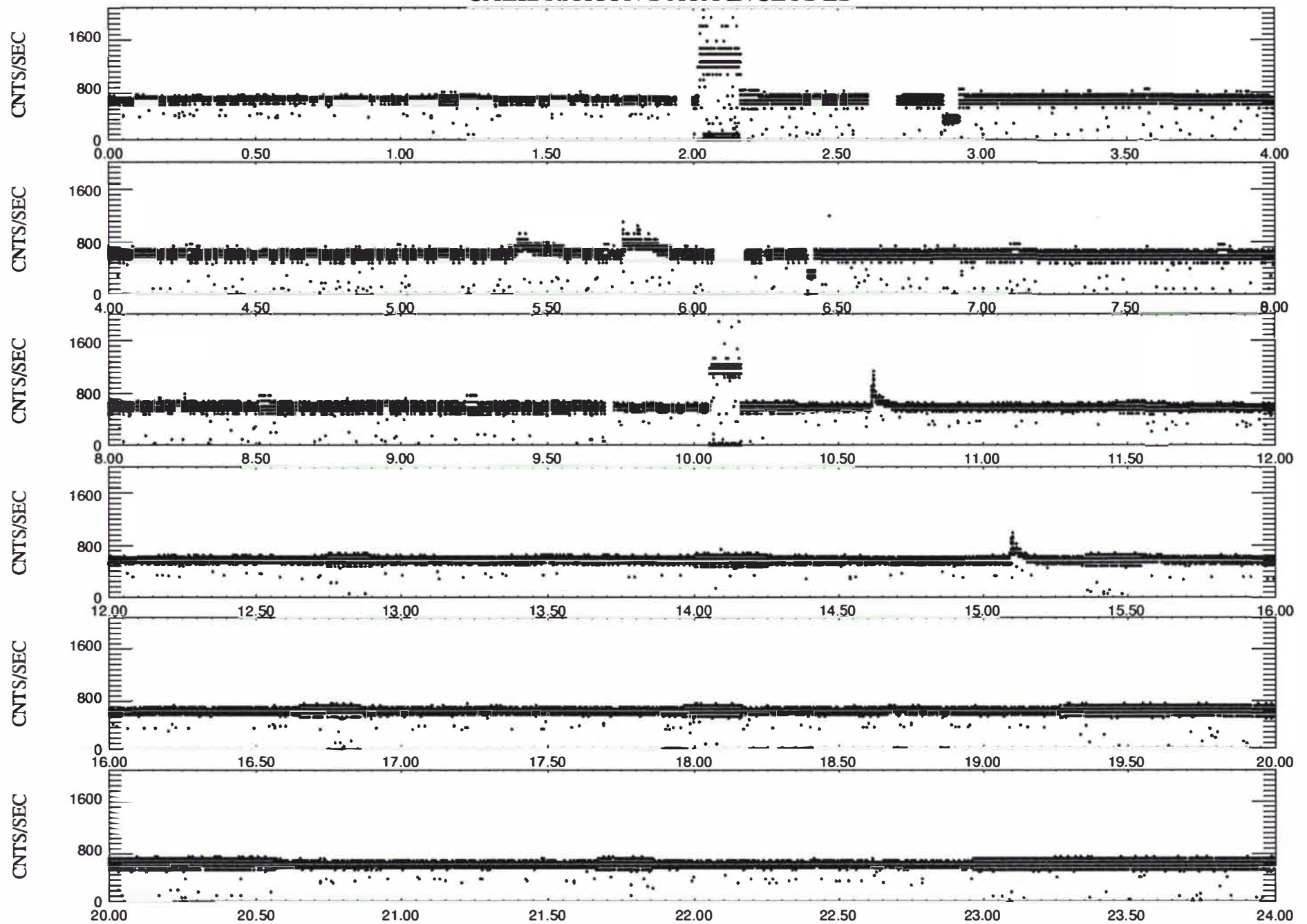


TIME, SECS

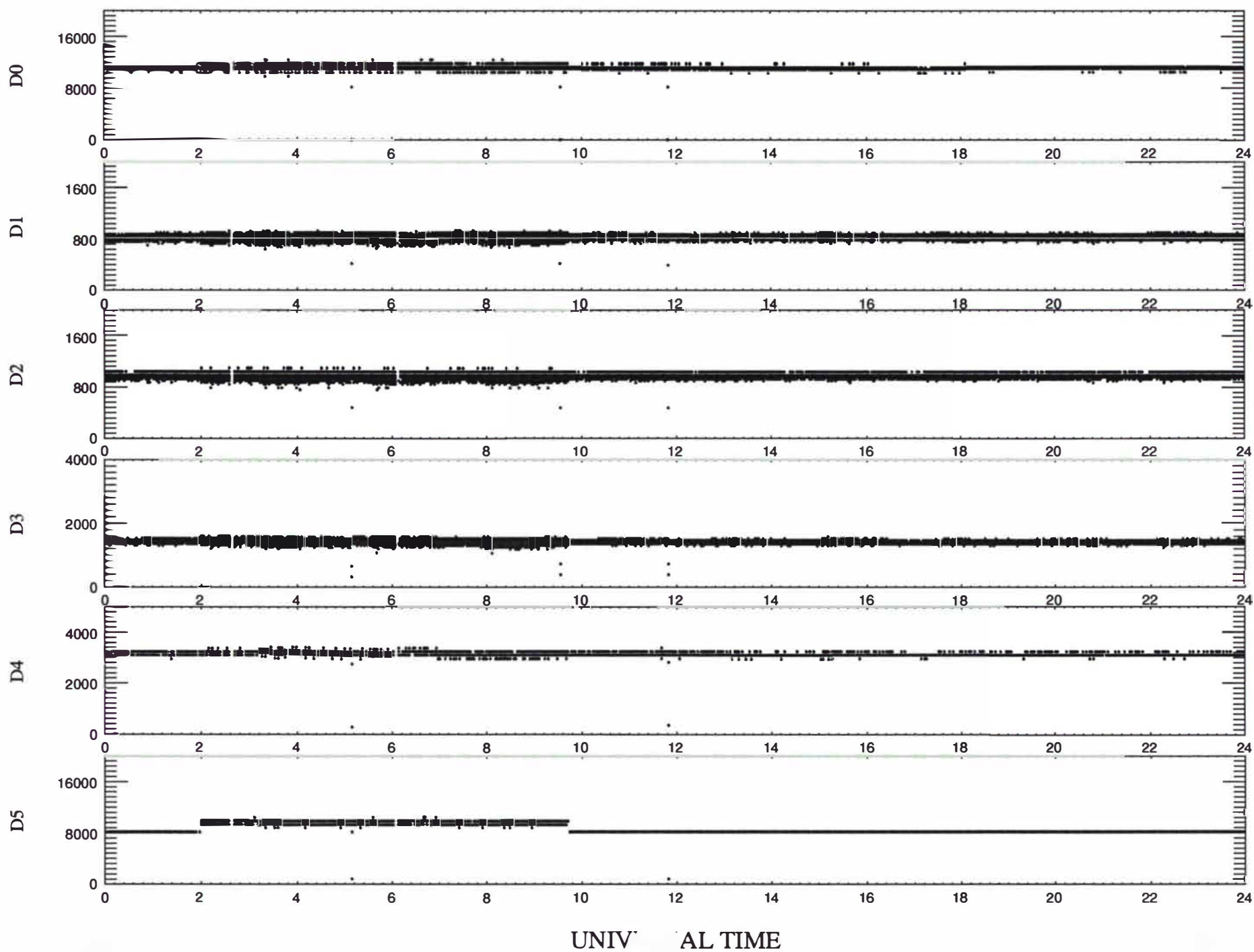


TIME, SECS

CALIBRATION DATA INCLUDED



UNIV CAL TIME



From TERRELL@nisdp0.lanl.gov Wed Nov 27 14:03 PST 1996

From: TERRELL@nisdp0.lanl.gov

Date: Wed, 27 Nov 1996 15:03:22 -0700

To: khurley@sunspot.ssl.berkeley.edu

Subject: dmstp data (901204)

From: jterrell@lanl.gov (James Terrell, NIS-2) 961127

To: jlaros@lpl.arizona.edu (John Laros)

CC: khurley@sunspot.ssl.berkeley.edu (Kevin Hurley) (data truncated)

Subj: DMSP data (901204)

John:

Here are 2 more data sets, for 901204 (my last letter to you contained data for GRB920519). Before that are some lines extracted from my files, regarding bursts you have asked about. In cases where there was no DMSP detection, I do not plan to send any data. PUB91 means published in proceedings of a 1991 meeting.

Happy Thanksgiving! --Jim

DMSP GAMMA PEAKS, 2-SEC COUNTS. 99DEG ORBITS FOR 8--13: TERRELL DMSP.GAM 961127
6108,6077,6035,6114,6120,6119 SEC. ALT=800KM, VIEW TO 117 DEG. GRB PEAKTIMES
(8,9,10--12,13) CORRECTED FOR AVG DELAYS: 1.82,1.98,5.50,-0.13 SEC. CHANNELS:
(8)--50,100,200,420 (9)--50,100 (10--12)--50,100,200,430,550(-1000 KEV)
(13)--60,150,375--6000,>6000 KEV (8,9:SSBXM; 10--12:SSBX2; 13:SSBX). BATSE: 3B

DATE FL DAY TIME NOTES---(ND=NO DATA,NA=NOT APPARENT & NOT ANALYZED)-----
(NO=DATA CHECKED--SHOWS NO DETECTION)(SR=S. RADIATION BELT)
(NR=NORTH RADIATION BELT)(SAA=SOUTH ATLANTIC ANOMALY)

901204 338P34691 PVO TRIGGER 34690.57
8 338 34973 PEAKS 34973.0 (400/S,<10S), 34991.0 (80/S,<2S) 11/96 L
9 338 34973 PEAKS 34973.0 (200/S,<10S), 34991.0 (WEAK,50?/S,<2S) 11/96 L
901225 359P03516 PVO GRB (3515.8) @830LS (8NO,9ND,10ND) 11/96
910123 023U45631 UL TRIGGER @700LS (8NO,9NO,10NO) 11/96
910208 039U32238 ULYSSES TRIG @593LS (PVO COSMIC TRIG 32379.9)
8 039 32414 SHARP PEAK (32414.5,1200/S,<2S) (10SAA) PUB91 L
9 039 32416 HARD,SHARP PEAK(1500/S,<4S), 32415.5+TAIL TO 32431 PUB91 L
910219 050 42205 WATCH GRB,PVO 42658.3,ULYS @688S (1406+59.8)
8 050 42324 GRB PEAKS 42323.6(250/S,<4S),42373.6(100/S,<4S,WEAK)
9 050 42326 GRB PEAKS,<6S AT 42325.6(600C/S,<6S),42375.6(300/S,<8S)
910310 069-46930 IAU 5207 GRS1217+06.6(1950)(184.8+6.4)PVO,WATCH DIRPLOT
068U46767 ULYSSES RISE @888LIGHT-SEC
8 069 46923 GRB PEAKS AT 46923.2(500/S),941.2(800),959.2(350) (@108.6) PUB9193
9 069 46925 GRB PKS 46924.9(1050),930.9(550),940.9(400),958.9(400) @87D PUB9193
10 069 46926 GRB PEAKS AT 46925.7(650/S),941.7(300),959.9(250) @80DEG PUB9193
910402 092 52095 GRB,GINGA,PHEBUS,SIGMA,PVO(51575,5PKS),1989-046(52105)
8 092 52065 PKS 52064.6(200S,<14S),094.6(3800),104.6(5000),112.6(7100),
8 092 52065 (CONTINUED) 52122.6(5700),130.6(5700) (9SAA,10NO)
910417 107 72452 GRB, WATCH,SIGMA,ULYSSES (PVO TRIG 72130.1)
9 107 72453 PKS 72453.1(130/S),457.1(170),467.1(90) (ALL<2S)(8NO,10SR)
910428 9 118 20551 BROAD PKS 20550.9(900),554.9(900),604.9(1500,<16S) (8SAA) 7/95
10 118 20552 BROAD PKS 20551.8(950/S),555.8(800),605.8(900,<8S) 10/96
118P20866 PVO TRIG 20865.8 (ULYSSES 21802,DIST=1455SEC)
910529 8 149 46062 PKS 46062.0(120/S),68.0(120),80.0(1070),<28S (9SAA,10NO:L) 10/96 L
149P45873 PVO TRIGGER 45872.6@420 LIGHT-SEC
911010 283P23049 PVO TRIG 23049.3@260LS (8NO,9NO,10NO) 11/96
0426 117P03957 PVO TRIG 3956.7 (8NO,10NO,11NO) 11/96
920519 140 59514 BATSE GRB#1613 (319.94,44.17J) (NOT EVIDENT--PEAK MISSED)
140P59212 (59211.9)PVO TRIG +PHEB,GRAN,ULYS (DMSP8SR,11NO@156DEG)
10 140 59406 PKS 59406.3(330/S,<16S)@100DEG,422.3(350,<6),516.3(70,<8) L

920723	205	72188	GRANAT GRB(285.7,26.8(1950)) IAU5579(8ND,10NA@148D)		
	205P72694		PVO TRIGGER, 72694.1 (11NR)		
920731	213	61620	YOHKO GRB, ULYSSES 62196(BATSE NO) (PVO 61857.4)		
	10	213	61660	PKS 61662.2(200),682.2(200),700.2(100) (8SAA,11NO)	ANNULUS
921004	8	278	50421	GRB,NARROW PKS 50421.0(1100),429.0(500) (10NO,11SR)	ANNULUS
		278U49107		GRB, ULYSSES@3038LSEC(BATSE NO)+YOH+EUR(PVO 49963.7)	

From jlaros@LPL.Arizona.EDU Fri Jun 30 08:44 PDT 1995
Date: Fri, 30 Jun 1995 08:46:58 -0700
From: jlaros@LPL.Arizona.EDU (John Laros)
To: khurley@sunspot.ssl.berkeley.edu
Subject: PVO MRO events
Cc: jlaros@LPL.Arizona.EDU, rklebesadel@nisdp0.lanl.gov

Kevin,

I am at LANL working on the PVO data. Ray has generated an up-to-date PVO triggered GRB list. It differs from your master list as follows:

910529: PVO has a good looking MRO at 45869.576. At the time of the Uly/BATSE event around 63ks, the PVO background rate had gone through the ceiling, apparently due to particles. Are you sure the later event is not solar?

910627: There is no PVO trigger. A preliminary look at RT data shows an enhancement, but it appears long and soft. We need to plot up the RT data, but right now it looks more solar than cosmic.

910814: There is no PVO trigger at 40ks.

911228: The 2 PVO events listed for this date actually occurred on 12/26. They are similar and odd, with slow rises, fast declines, and spectra that are on the soft end of the GRB distribution. Time for...network synthesis!?

920426: There is a PVO trigger at 03953.730. It is not the greatest looking thing in the world, but is probably most likely to be a GRB with a rather slow rise and soft spectrum.

We are now attacking the real time data.

Regards,

John

INTERPOLATED POSITION OF ULYSSES ON 29/ 5/1991 IS:

RA= 125.050 DEC= 20.980 DIST= 3.539 AU

POSITION OF VENUS ON 29/ 5/1991 IS ALPHA= 113.912 DELTA= 24.287 DISTANCE= .83584 AU

THE DISTANCE BETWEEN TWO OBJECTS AT

125.050 20.980 529389900.00 KM. AND

113.912 24.287 125041600.00 KM. IS

407235100.00 KM., OR 2.722 A.U., OR 1358.39 LIGHT-SECONDS

THE ANGLE BETWEEN THEM IS 10.795 DEGREES

2nd PVO event was at $56799 = 15:46 = 15.77$

$1358s = .38 \text{ hrs}$

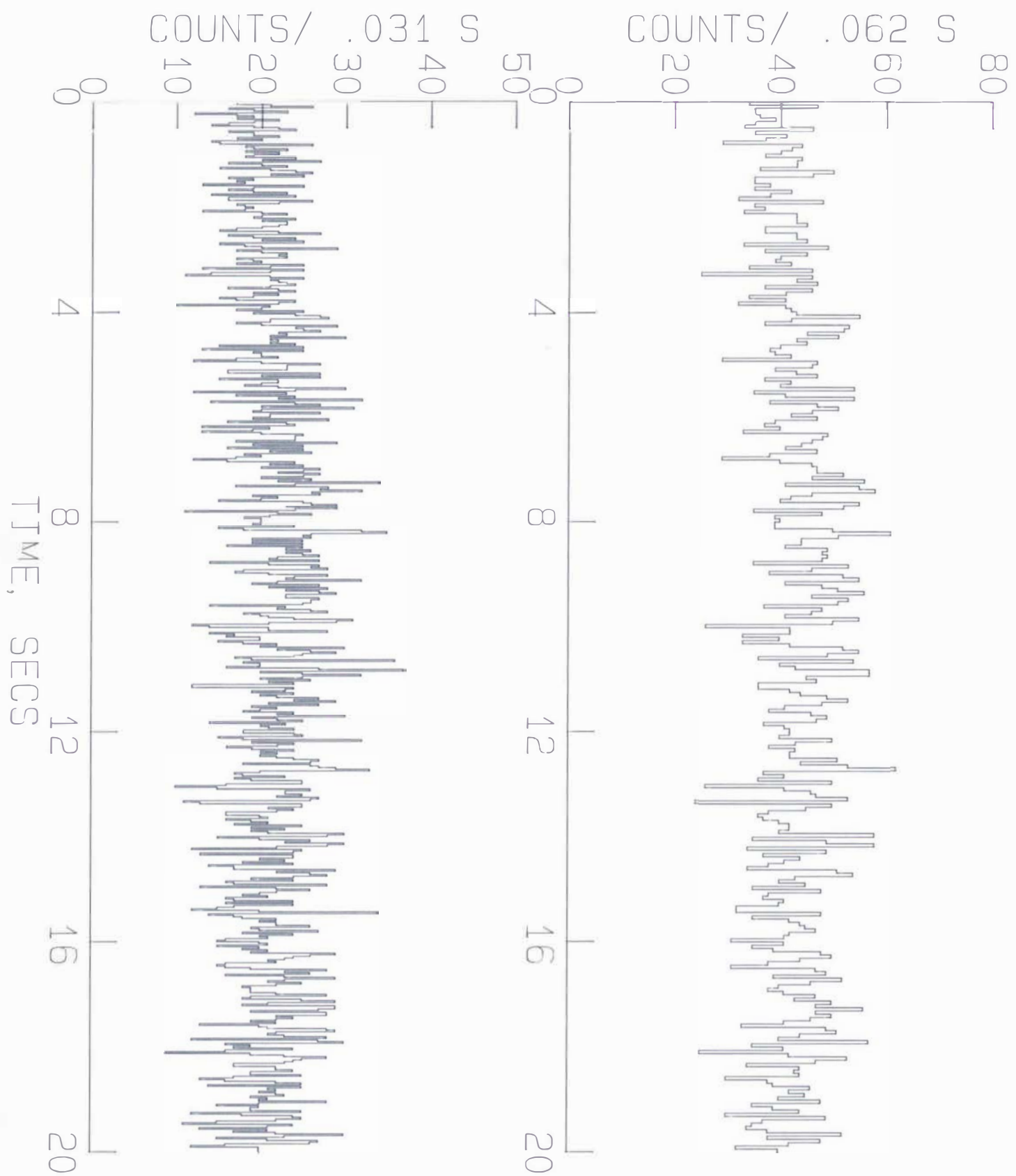
$15.39 - 16.15$

ULYSSES

29/05/91

44793.000

0- 0 keV

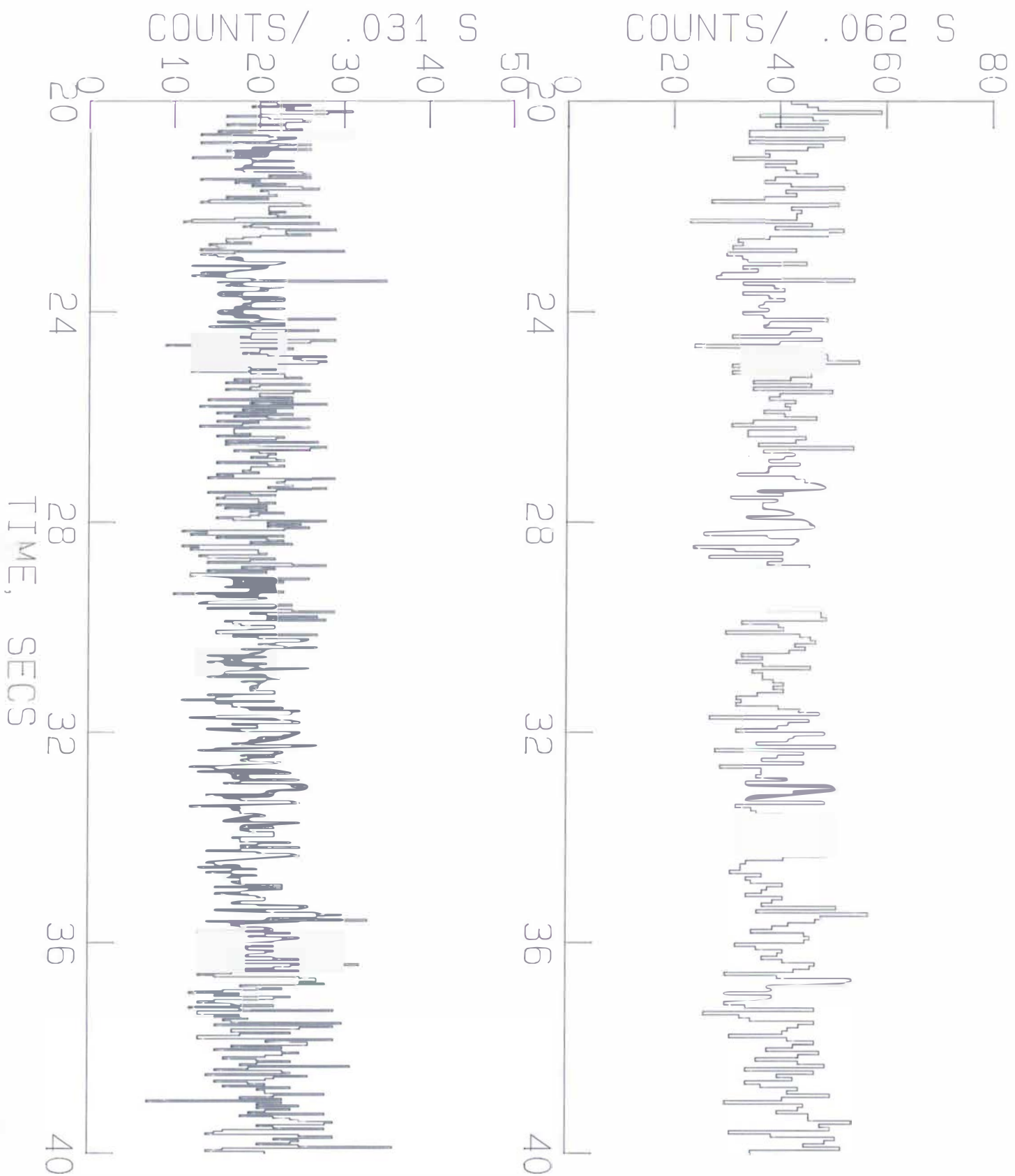


ULYSSES

29/05/91

44793.000

0- 0 keV

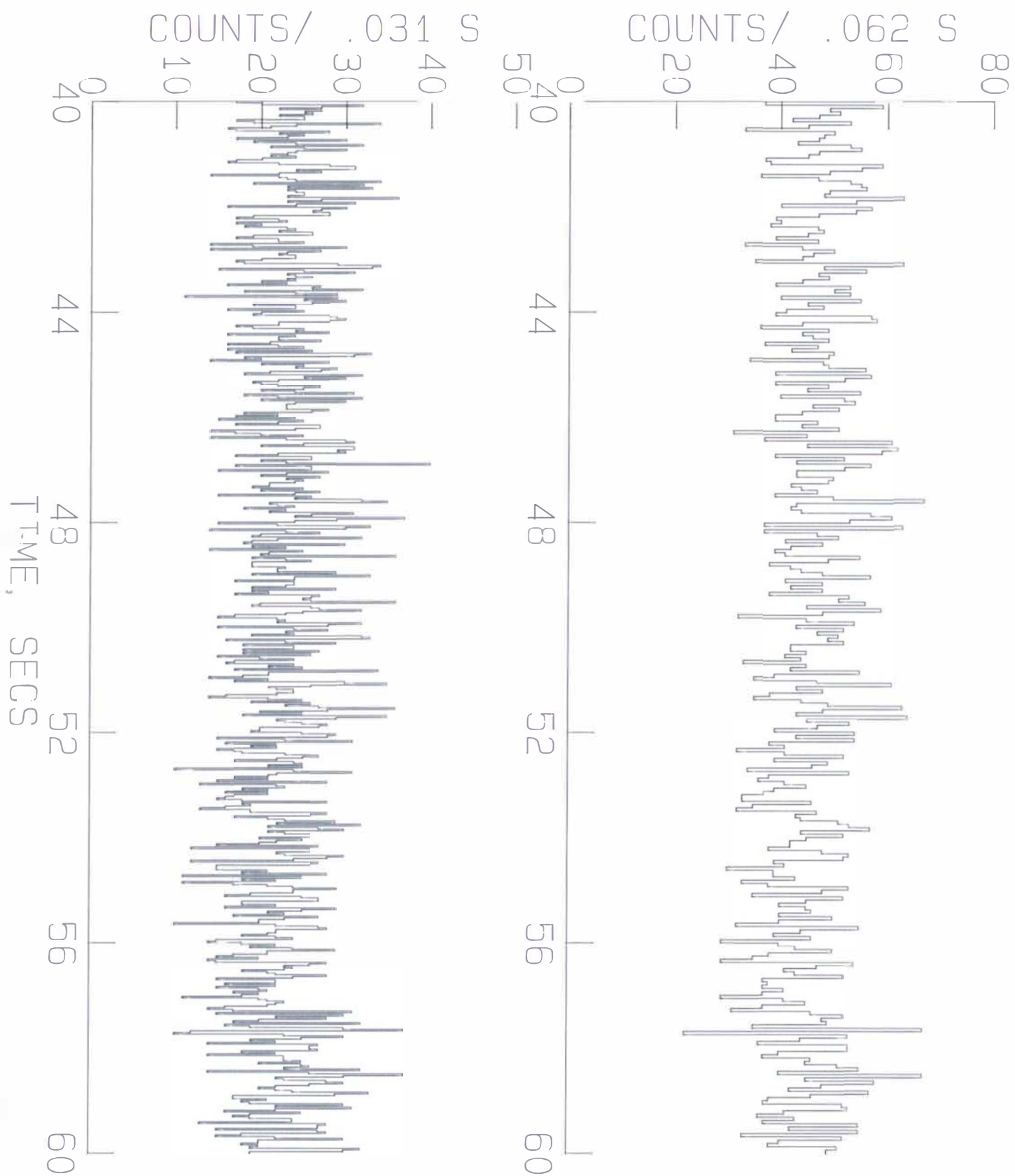


ULYSSES

29/05/91

44793.000

0- 0 keV

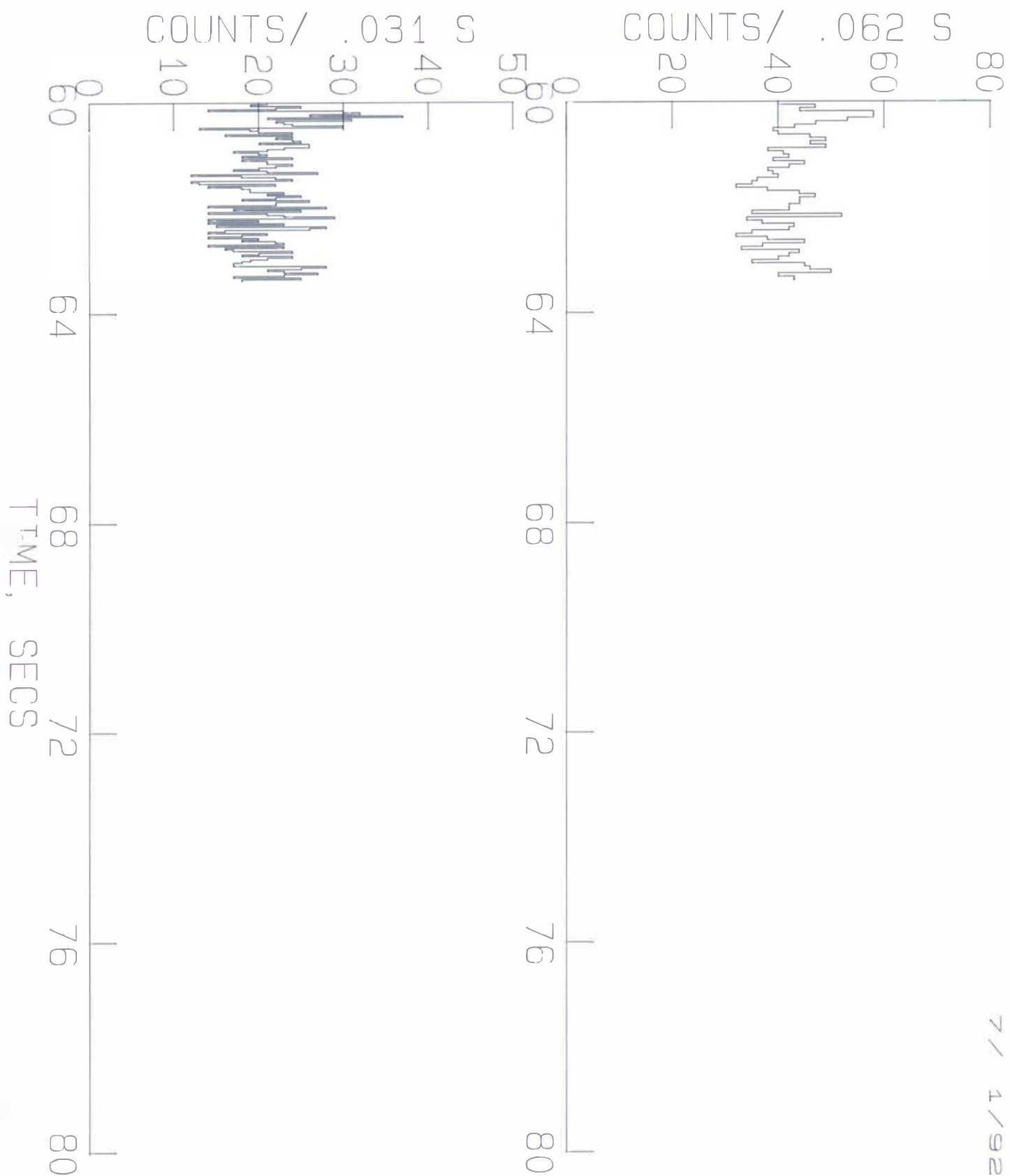


ULYSSES

29/05/91

44793.000

0- 0 keV



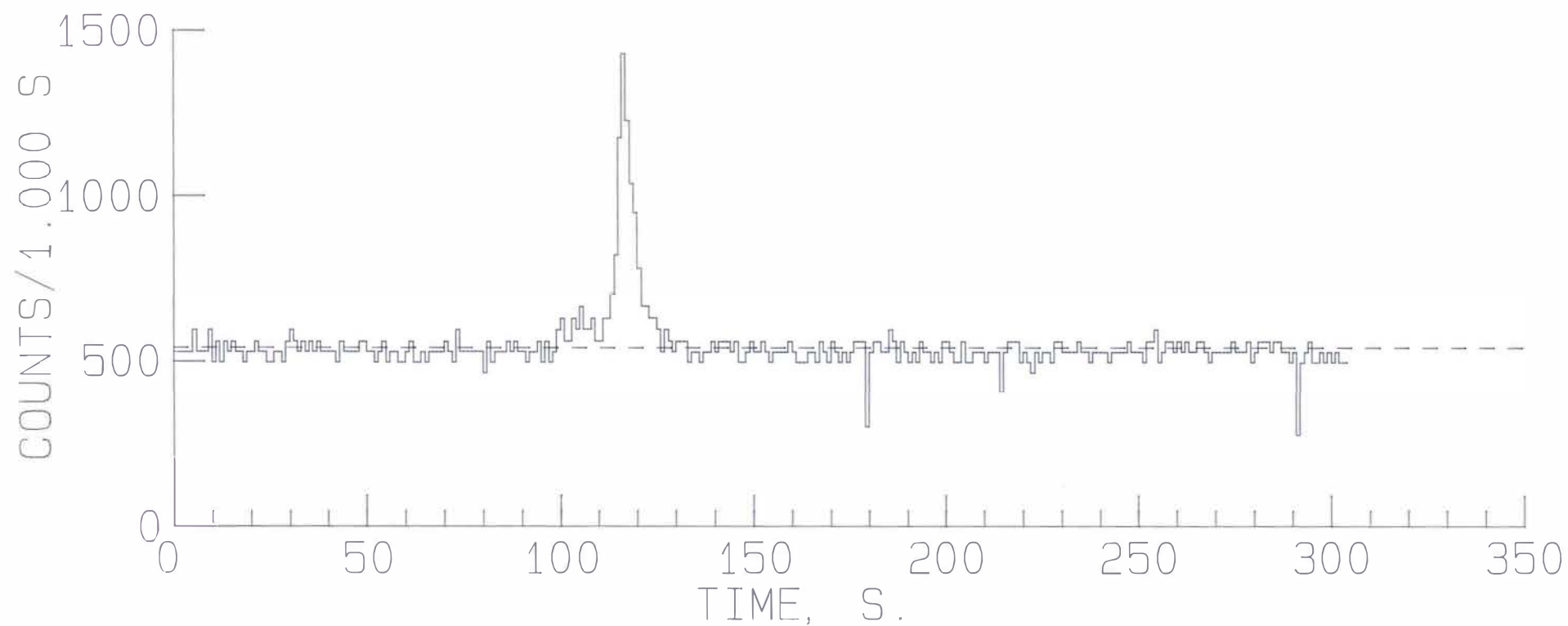
→ Murakami 3/92

21 / 1 / 91

ULYSSES RT

29/ 5/91 45344.121 s

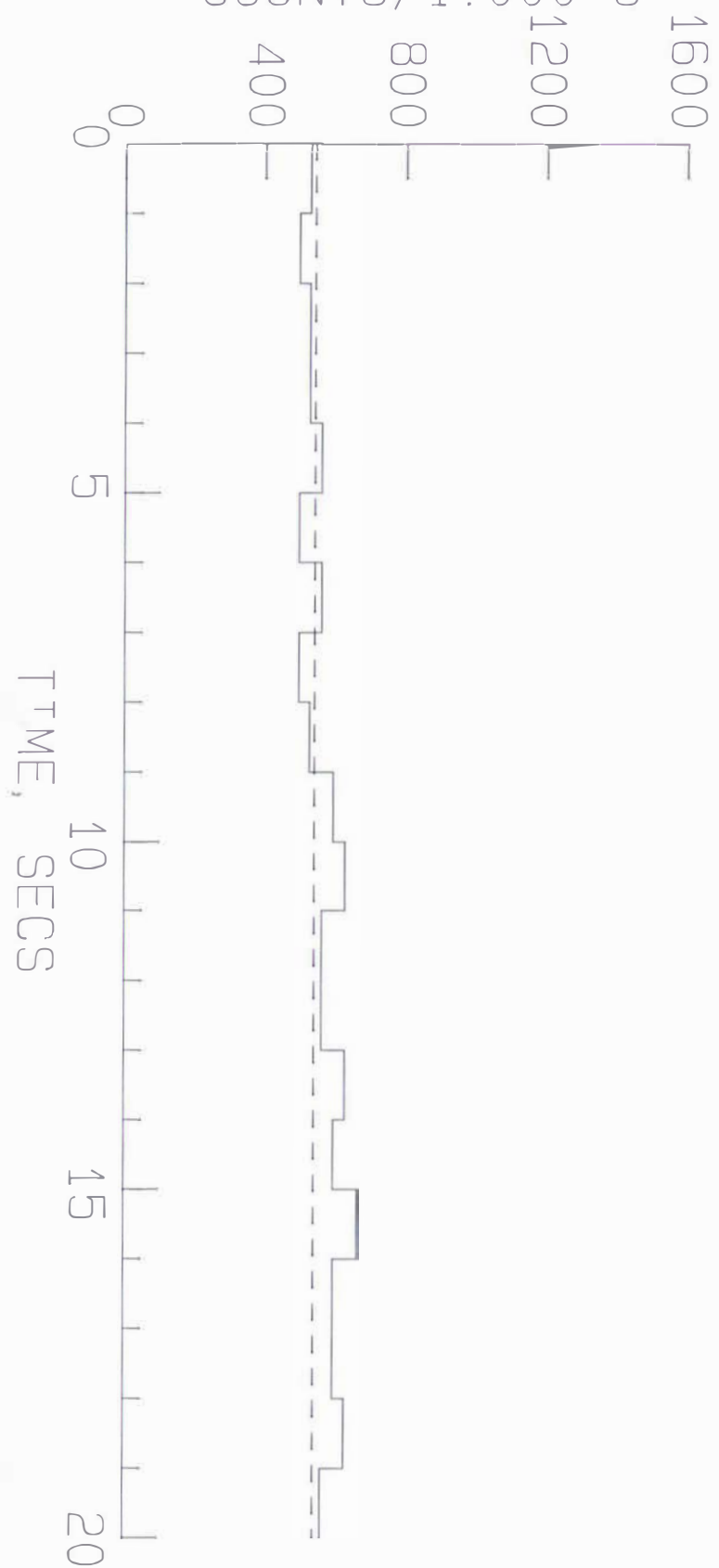
0- 0 keV



ULYSSES RT 29/ 5/91

0- 0 keV 45434.121 S

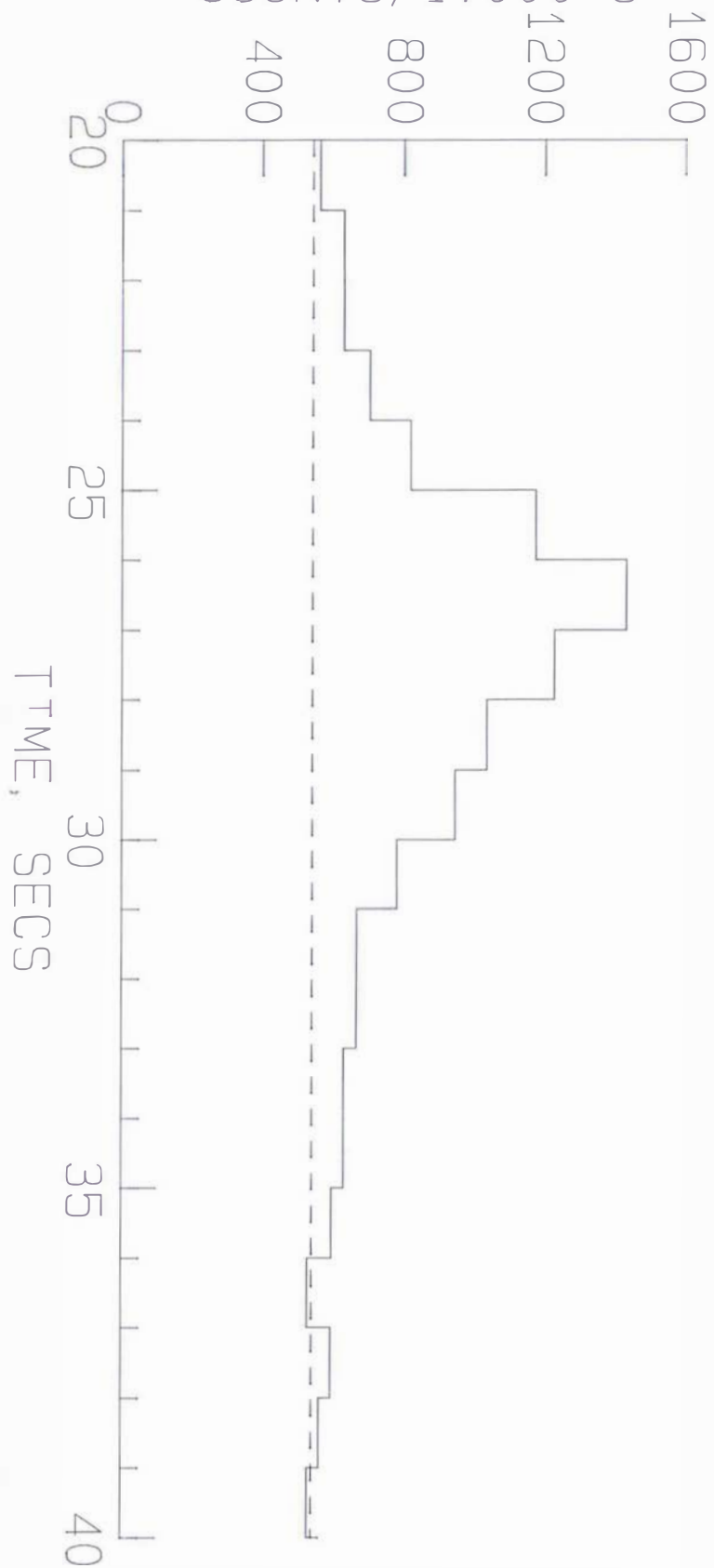
COUNTS/1.000 S



ULYSSES RT 29/ 5/91

0- 0 keV 45434.121 S

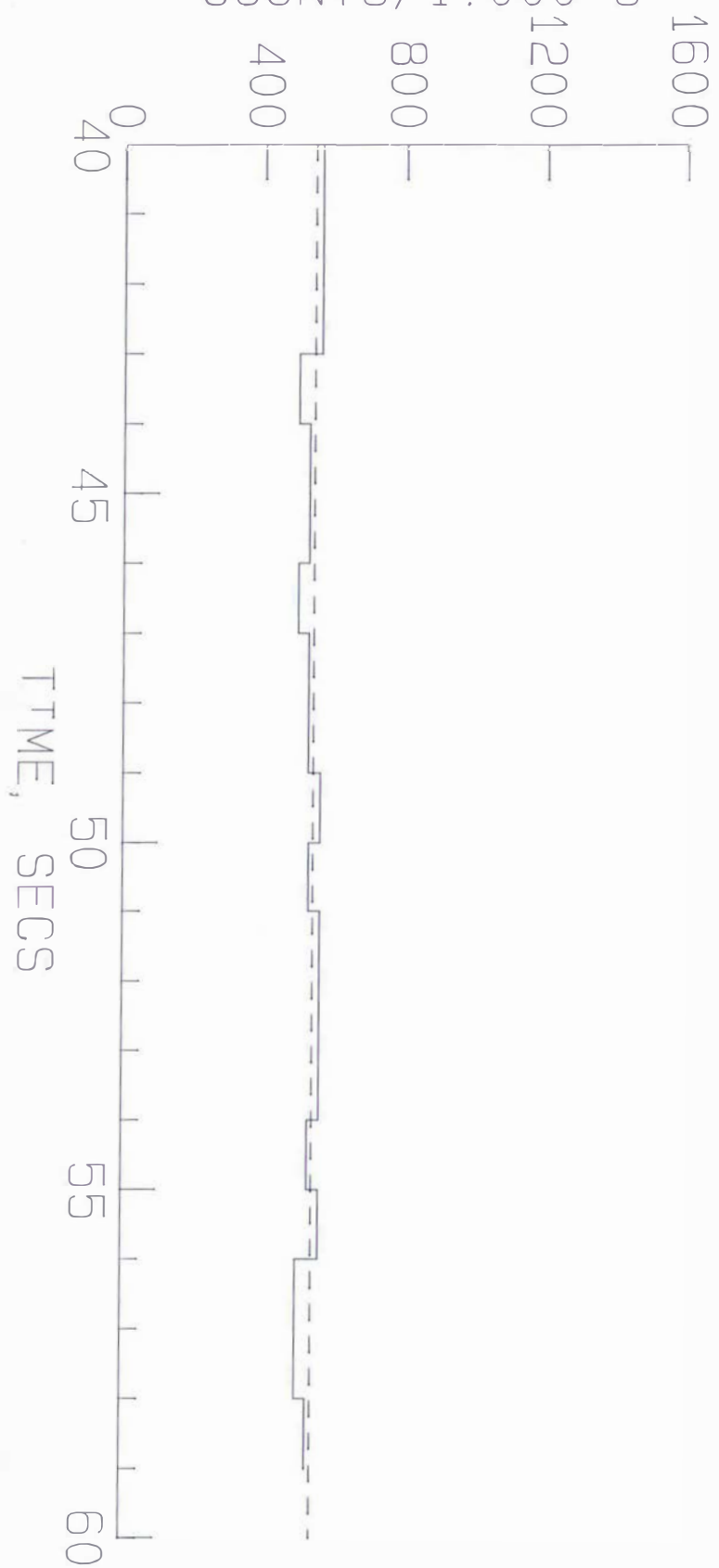
COUNTS/1.000 S



ULYSSES RT 29/ 5/91

0- 0 keV 45434.121 S

COUNTS/1.000 S



PV0

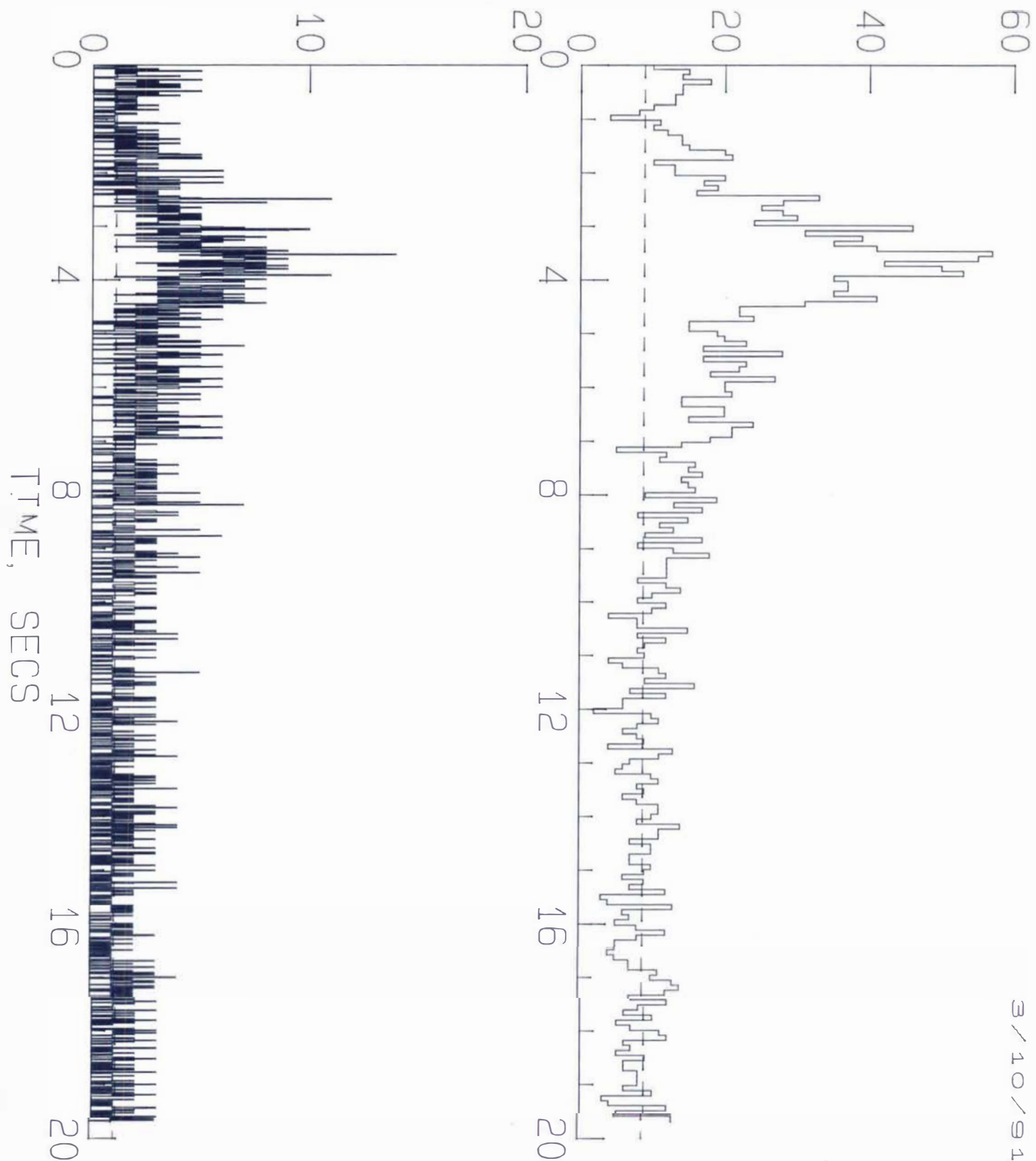
29/05/91

45872.575

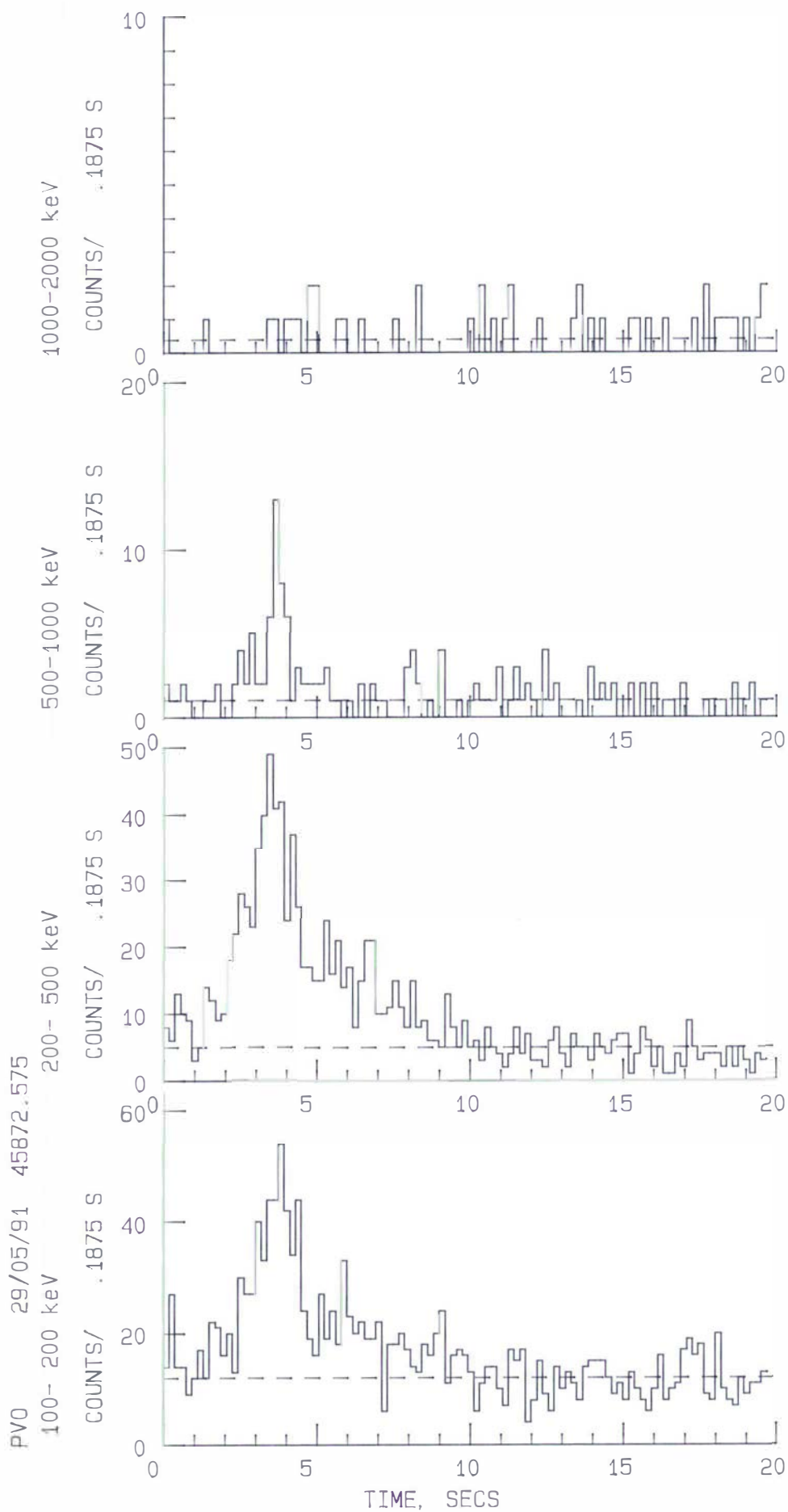
100-2000 keV

COUNTS/ .012 S

COUNTS/ .094 S



3/10/91



From @STAR.STANFORD.EDU:081877@ESSDP2.SPAN Wed Oct 9 14:19:16 1991
 Received: from STAR.STANFORD.EDU by sunspot.ssl.berkeley.edu (4.1/1.30.1)
 id AA13515; Wed, 9 Oct 91 14:19:13 PDT
 Message-Id: <9110092119.AA13515@sunspot.ssl.berkeley.edu>
 Received: from ESSDP2 by STAR.STANFORD.EDU via MAIL-11 with DECnet;
 Wed, 9 Oct 91 14:20:27-PST
 Date: Wed 9 Oct 91 14:20:26-PST
 From: 081877@ESSDP2.SPAN@STAR.STANFORD.EDU
 Subject: More PVO ephemerides
 To: khurley@sunspot.ssl.berkeley.edu
 Status: R

PVO 3. EPH

Y	D	T	R (km)	ra	dec	
90	338	34687.	252680317.	258.57381	-23.39342	
90	353	78321.	248677456.	279.85427	-24.06424	
90	359	03515.	247046400.	286.878	-23.635	interpolated
91	22	54418.	235291563.	324.15655	-15.89856	
91	39	32380.	226250855.	344.05029	-8.33670	
91	50	42658.	219342141.	356.67619	-2.68948	
91	69	47568.	205682631.	17.93532	7.18626	
91	104	26605.	174752730.	58.48658	21.75443	
91	107	72130.	171182172.	62.82395	22.74430	
91	118	20865.	160264715.	75.80118	24.88636	
91	142	43979.	132772367.	105.72326	25.32471	
91	149	45872.	124406157.	113.85479	24.29285	
91	198	16419.	66888778.	154.15816	9.19120	

PV0

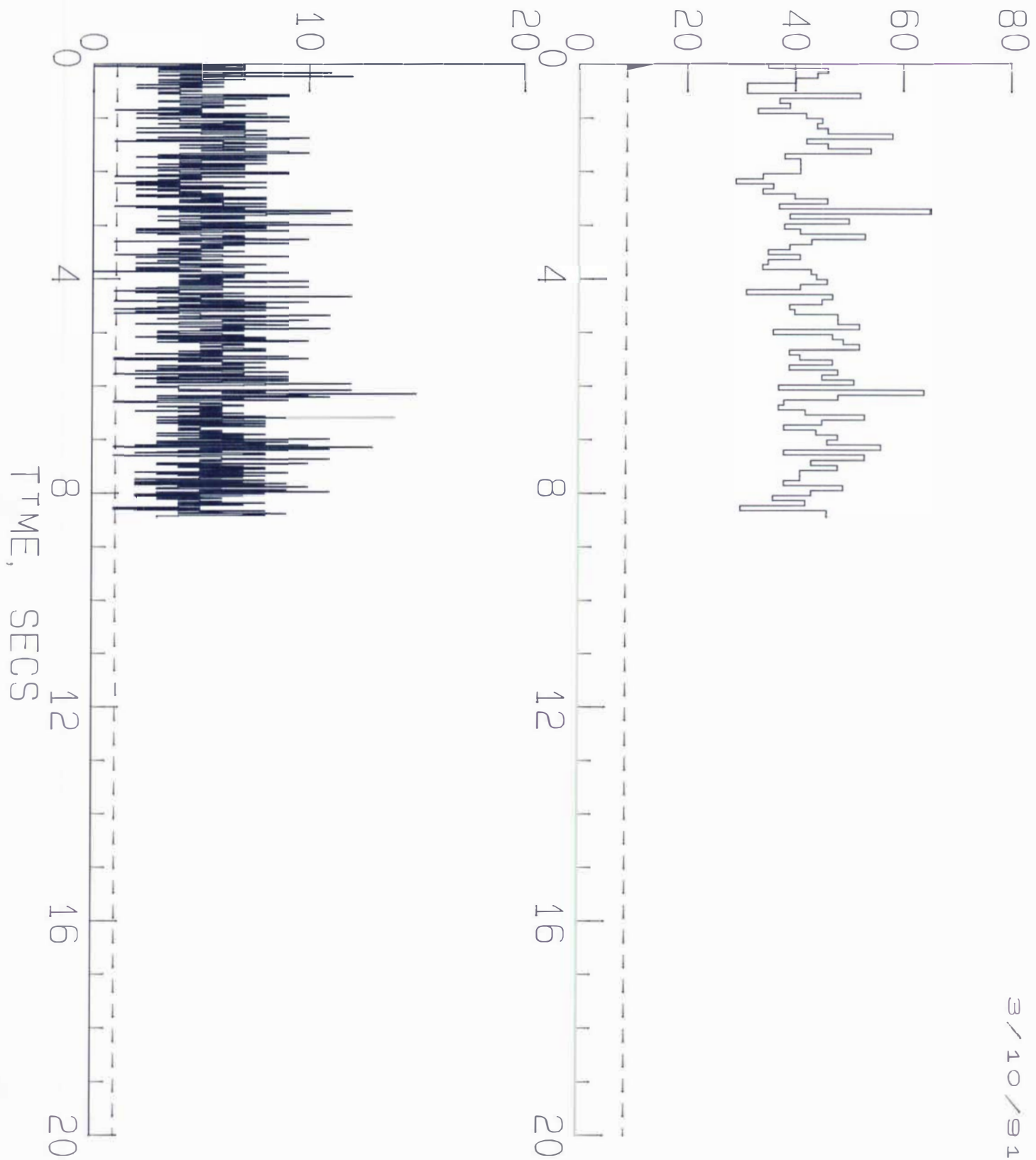
29/05/91

56799.313

100-2000 keV

COUNTS/ .012 S

COUNTS/ .094 S



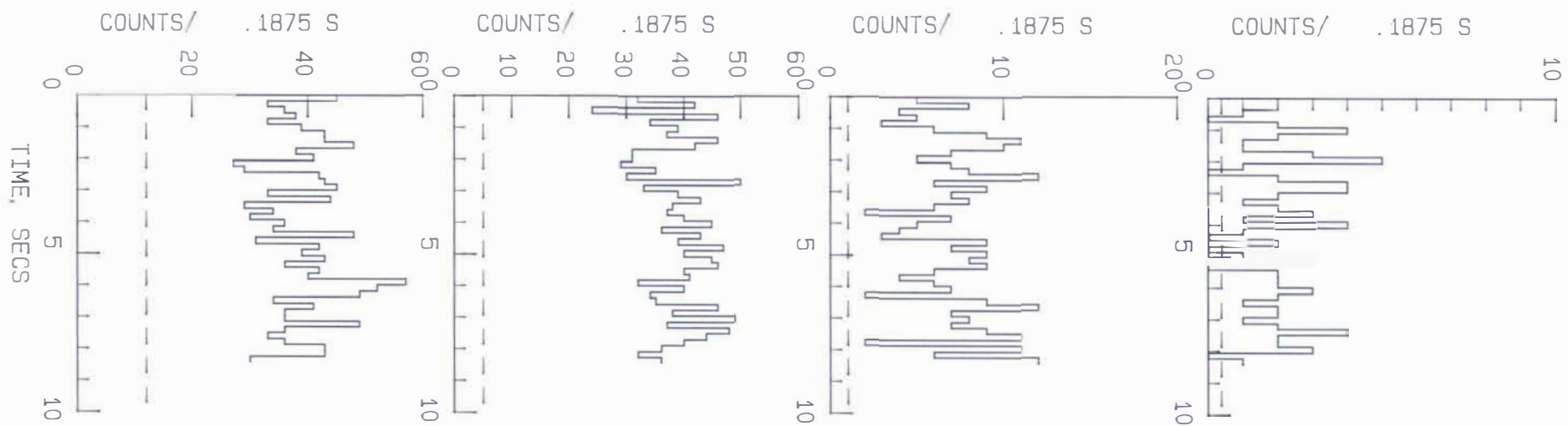
PV0 29/05/91 56799.313

100- 200 keV

200- 500 keV

500-1000 keV

1000-2000 keV



CATSEARCH PROGRAM

BATSE BURST # 237
EVENT OF 1991 MAY 29 DAY OF YEAR=149
EVENT CROSSING TIME AT BATSE : 63361. S. OR 17:36:00.8
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 216.700 -27.300
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 29/ 5/ 91 IS:
RA= 125.113 DEC= 20.995 DIST= 3.625 AU
BATSE-ULYSSES DISTANCE = 542353856. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 79.20 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 338.85 SECS.
CROSSING TIME AT ULYSSES IS 63700. S. OR 17:41:39 +/- 363.68 SECONDS

~~21~~ Rejected - too weak

From root Thu Dec 9 11:14 1993
Received: by space6.ssl.berkeley.edu (AIX 2.1 2/4.03)
id AA09450; Thu, 9 Dec 93 11:14:17
Received: from mx.nsi.nasa.gov by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA01091; Thu, 9 Dec 93 10:17:05 PST
Received: Thu, 9 Dec 93 10:20:23 PST from ESSDP2.dnet by mx.nsi.nasa.gov (4.1/1.2)
Message-Id: <9312091820.AA06809@mx.nsi.nasa.gov>
Received: from ESSDP2.dnet by AMES.dnet with MAIL-11
(utk-maillld vl.7); Thu, 9 Dec 93 10:20:24 PST
Date: Thu, 9 Dec 93 10:20:24 PST
From: 068486@essdp2.span.nasa.gov
X-To: AMES::"khurley@space6.ssl.berkeley.edu"
Subject: RE:
To: khurley@space6.ssl.berkeley.edu
Status: R

KEVIN,

HERE ARE MORE RESULTS. I WILL BE SENDING YOU THE DATA FILES.

DATE	TIME	PVO RESPONSE
90/12/13	07:06	MAYBE-NEAR 3 SIGMA RESPONSE AT 25847 UT
90/12/16	15:47	MAYBE-3.4 SIGMA RESPONSE AT 57130 UT
90/12/18	13:54	N/O
91/01/06	16:39	RI 6 SIGMA 59443-59459 UT
91/02/02	20:57	RI-4 SIGMA AT 75598 UT C3, 5.8 SIGMA SUMMED 75438-75758 UT IS THIS AN EXTREMELY LONG EVENT?
91/02/06	16:39	RI- 6 SIGMA
91/02/11	03:25	RI
91/03/22	12:41	(NO)
91/04/04	14:19	(NO)
91/05/29	17:36	N/O
91/11/19	17:12	(NO)
91/12/22	15:00	RI WEAK
92/01/16	18:30	RI
92/02/24	09:53	N/O
92/02/29	19:21	(NO)
92/07/14	13:04	RI
92/07/20	05:52	RI
92/07/25	01:41	(NO)

THIS LIST IS STILL NOT COMPLETE. THE REMAINING EVENTS ON MY LIST WERE RECORDED
WITH 64 S TIME RESOLUTION. THESE DATA MAY NOT BE USEFUL.

REGARDS,

RAY

ULYSSES RT

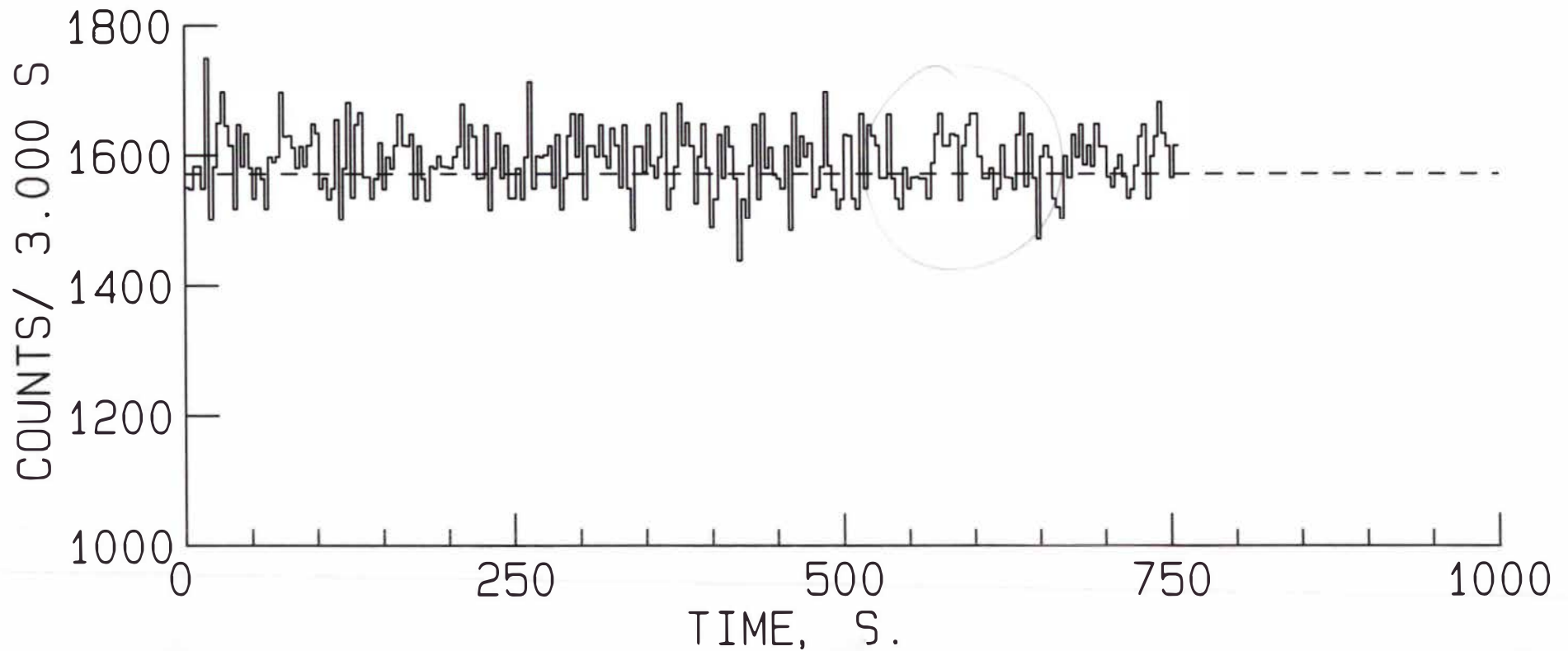
24 / 5 / 96

29 / 5 / 91 63324.227 s

0.250 S INTERVALS REGROUPED BY 12

27- 226 keV

N= 10 M= 1
>4.0 SIGMA FLUCTUATIONS



ULYSSES RT

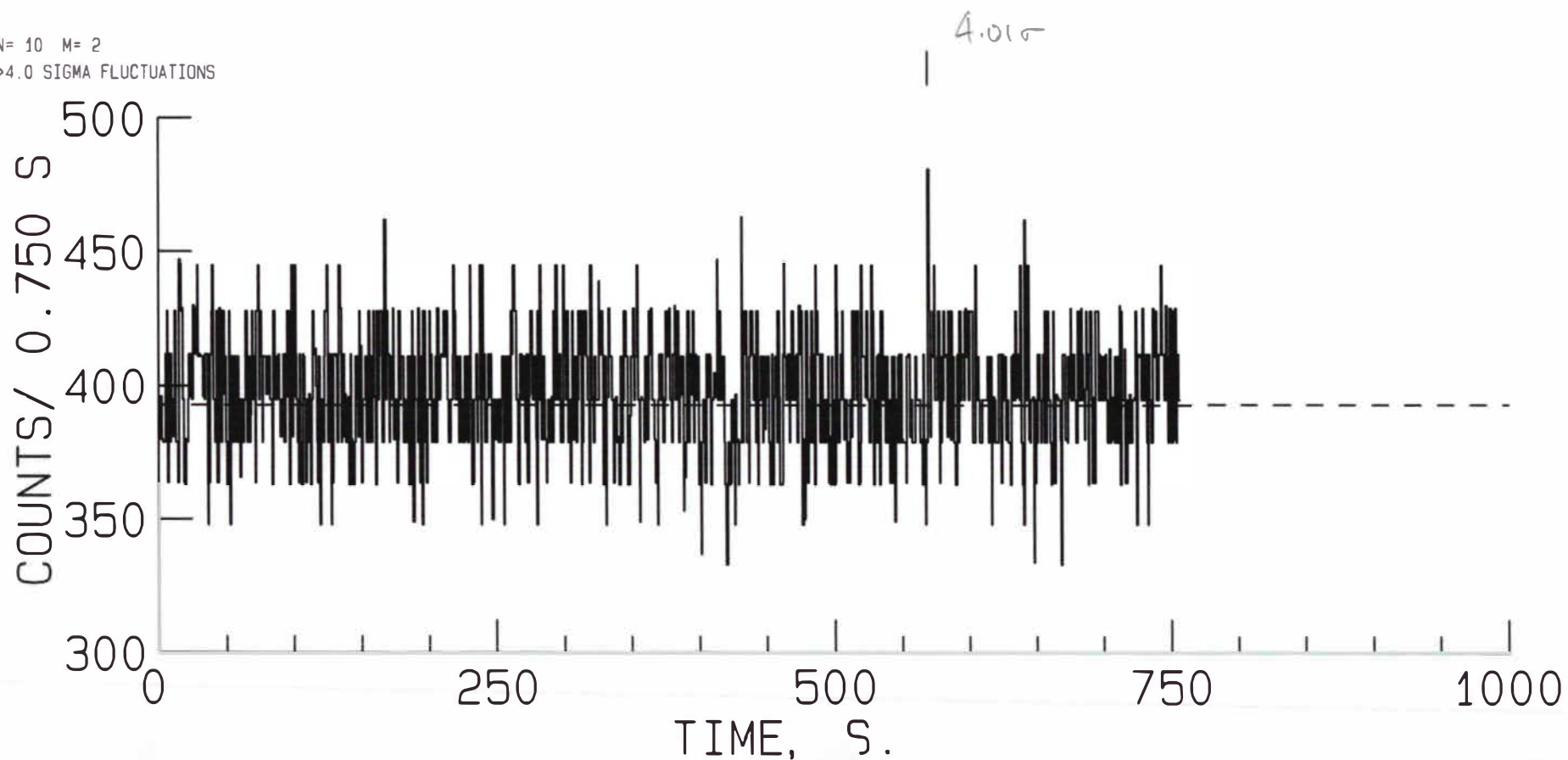
24 / 5 / 96

29 / 5 / 91 63324.227 s

0.250 S INTERVALS REGROUPED BY 3

27- 226 keV

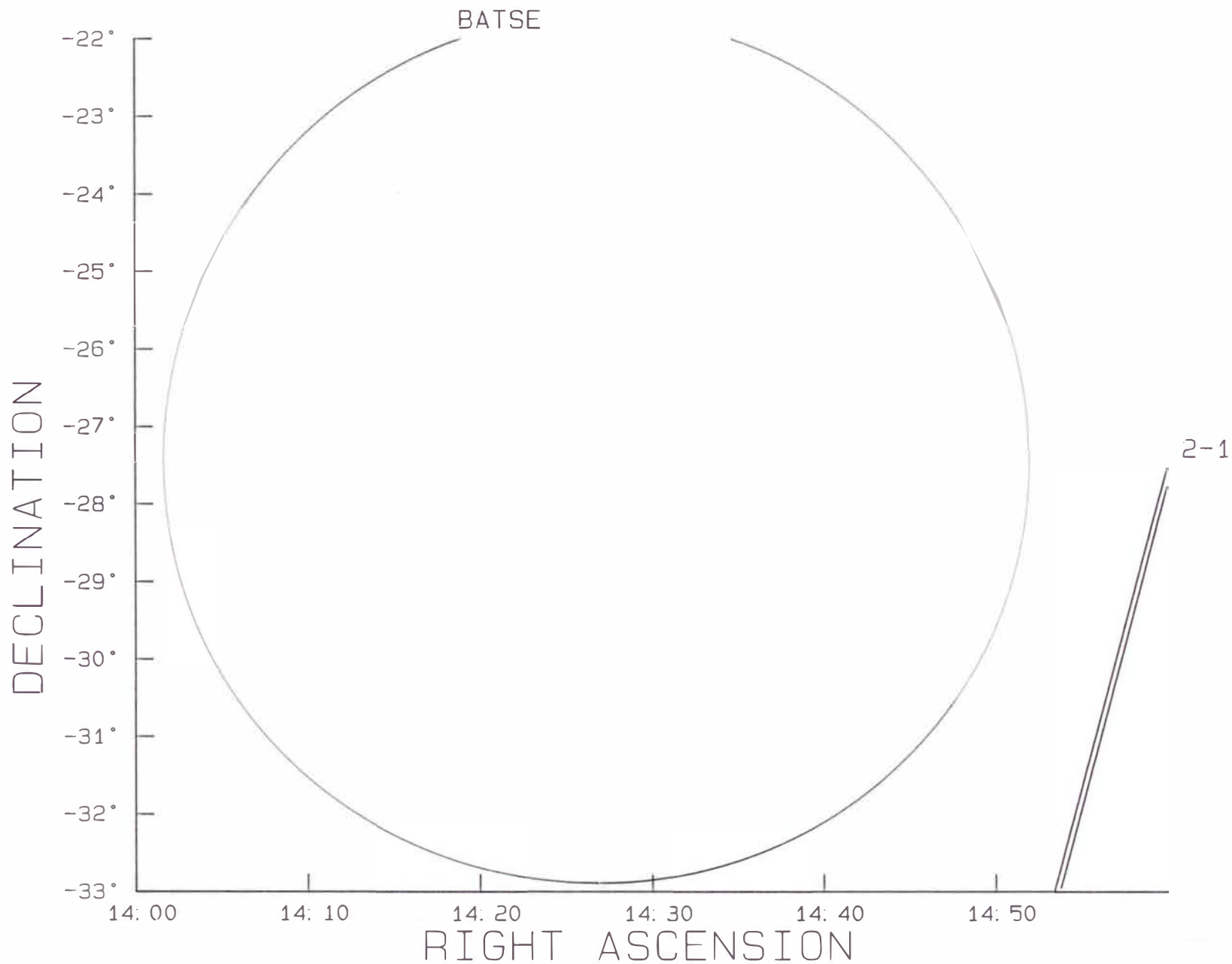
N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



EVENT OF MAY 29, 1991 17: 44

9/ 9/93

EARTH-N = EARTH AS SEEN FROM SATELLITE N
S=SUN E=ECLIPTIC G=GALACTIC EQUATOR
1 ULYSSES 2 BATSE



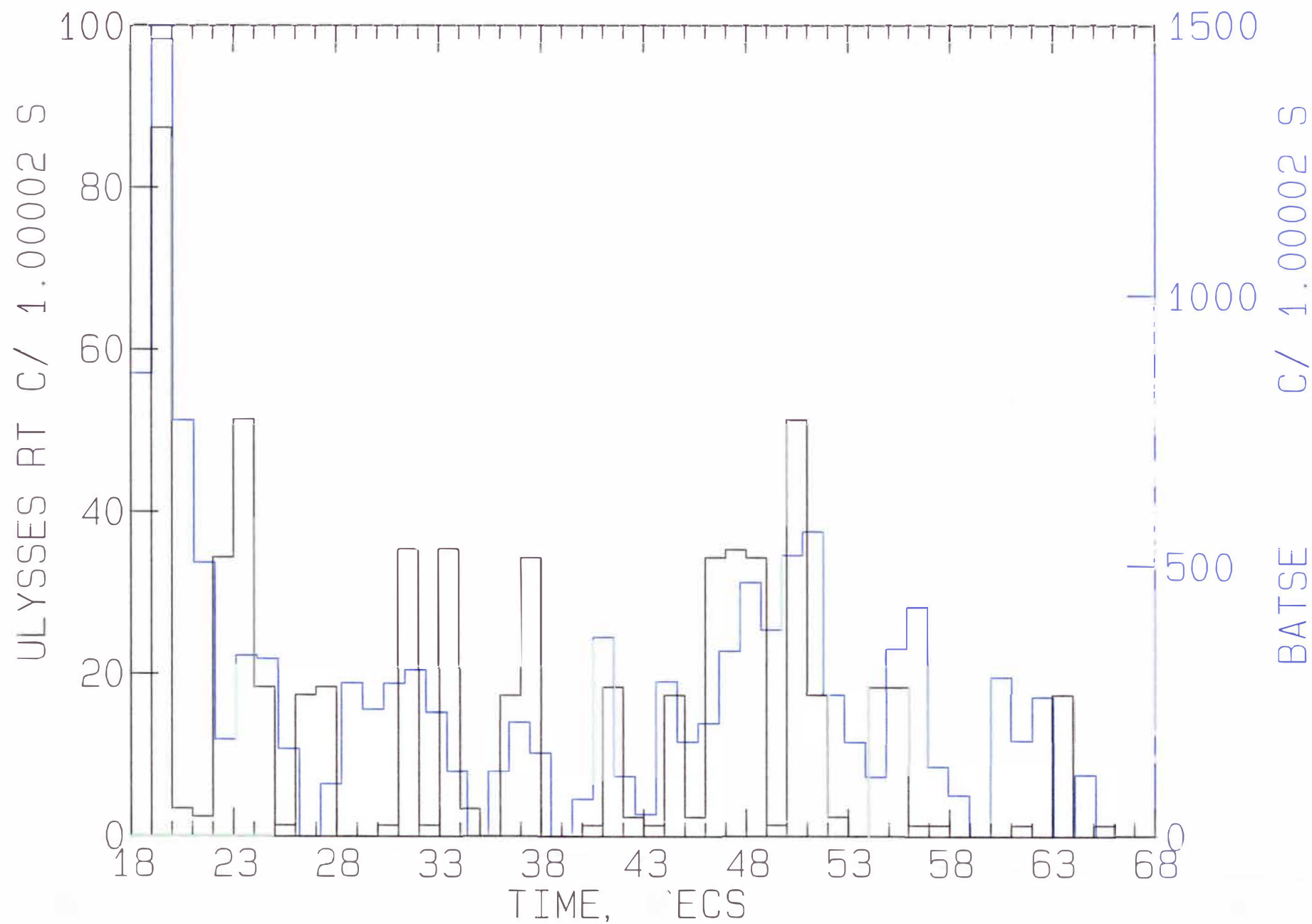
ULYSSES RT-BATSE

CORRELATION

29/ 5/91

63874.238

9/ 9/93



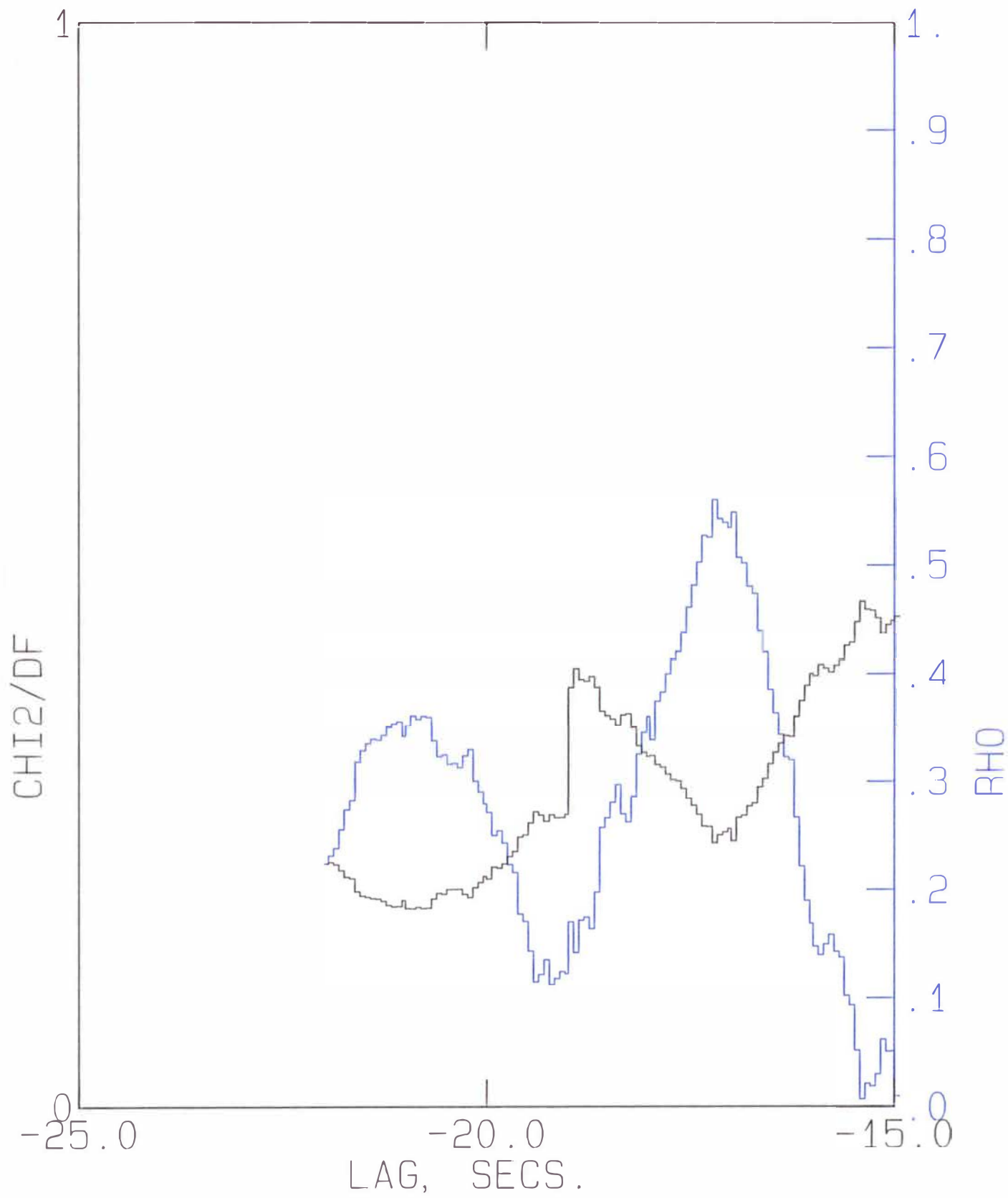
ULYSSES RT-BATSE

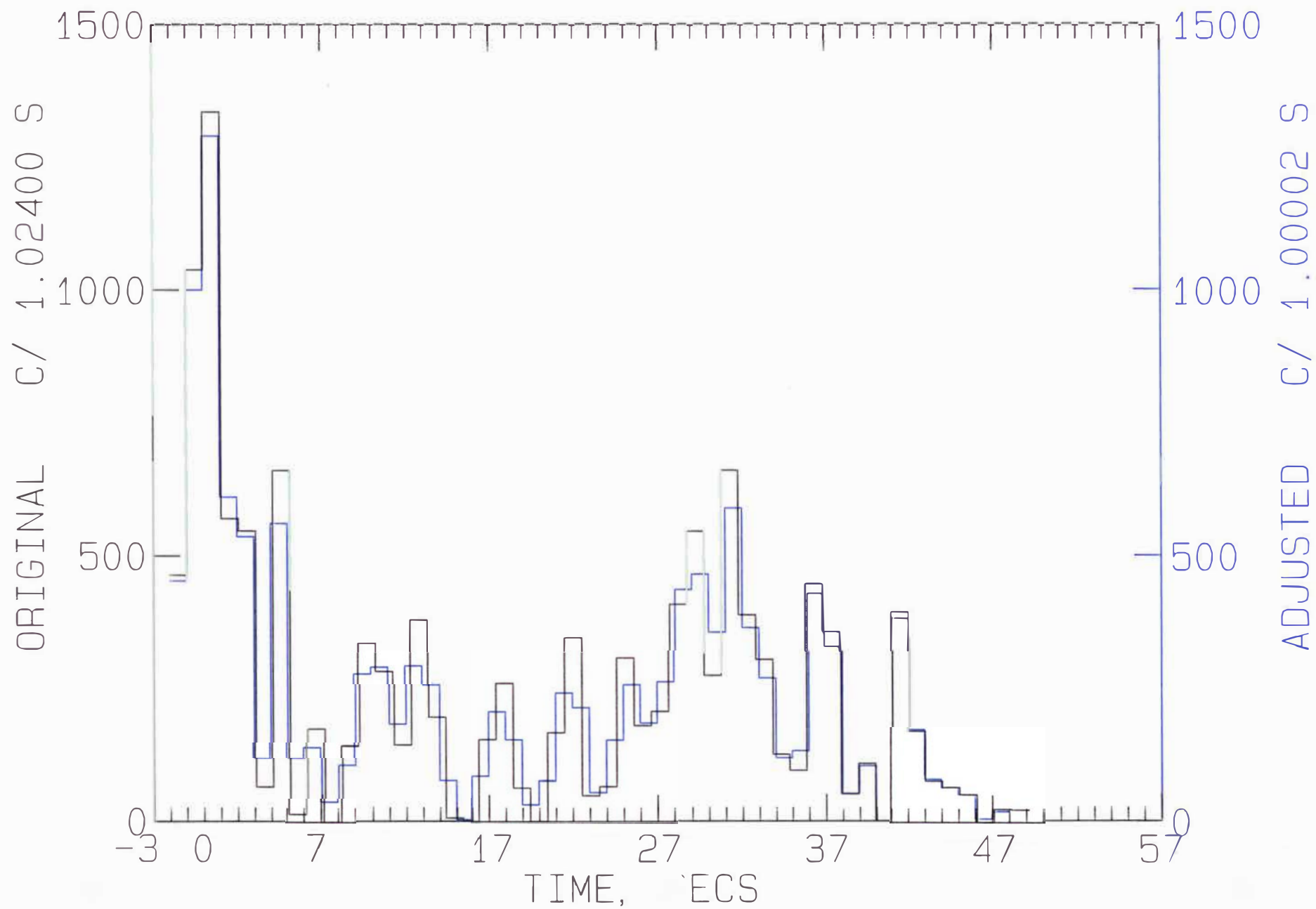
CORRELATION

29/ 5/91

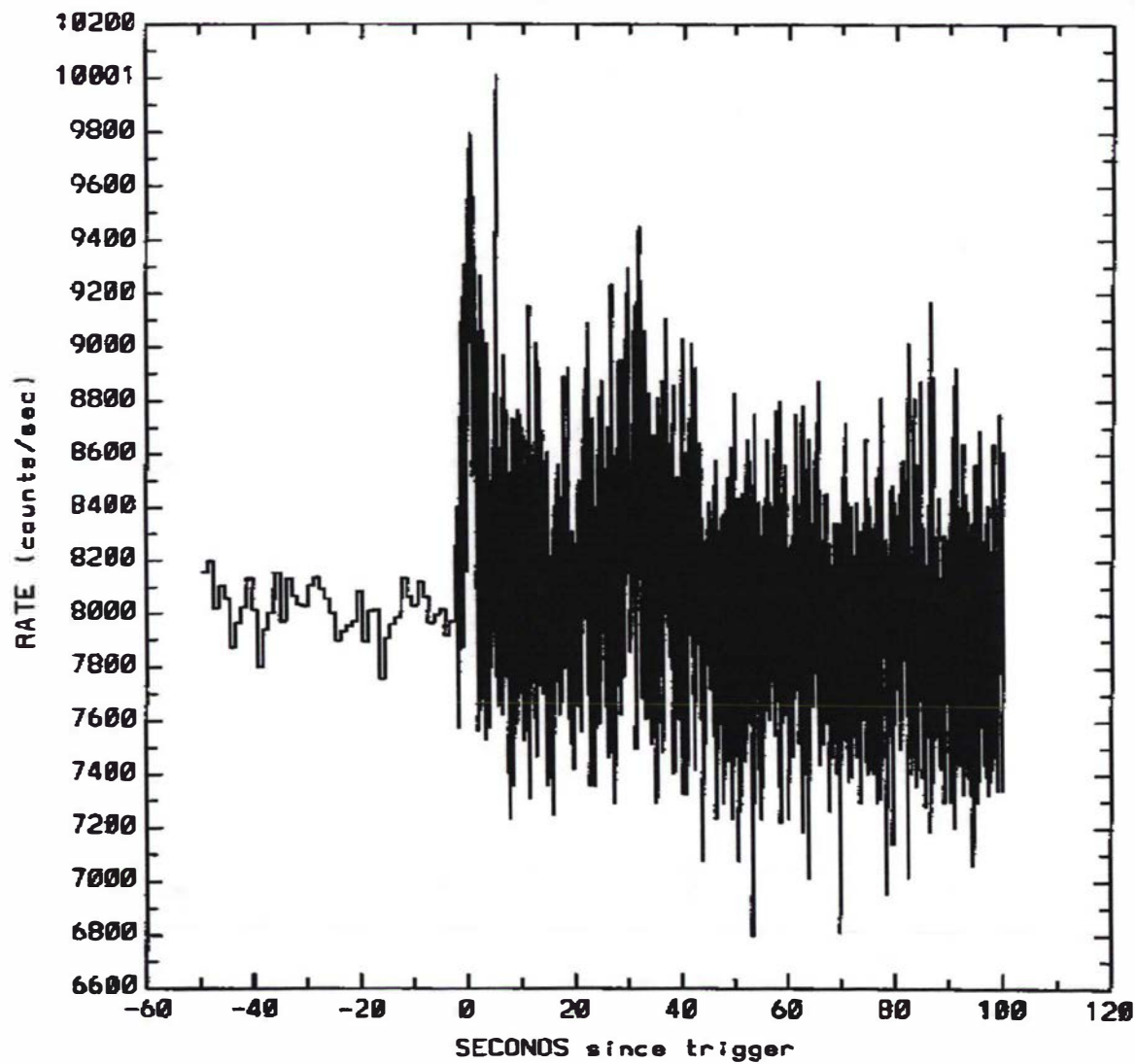
63874.238

9/ 9/93





DATA FOR K. HURLEY



29-JUN-1993 13:58.42

Created by MOPS BD
(Burst Display)
Version 2.19

To OK

Trigger # . 237

Trigger Time:
8485 / 63368.875Burst Data Type:
DISCSC-2.02
63368.833
NODeadtime
Corrected: N
Background Data
Type: PREB + DISCLA
Minimum Integ. Time:
0.064 secondsDetectors [7..8]:
11100000Discriminators:
[1. 2]Quality Mask:
801SP1

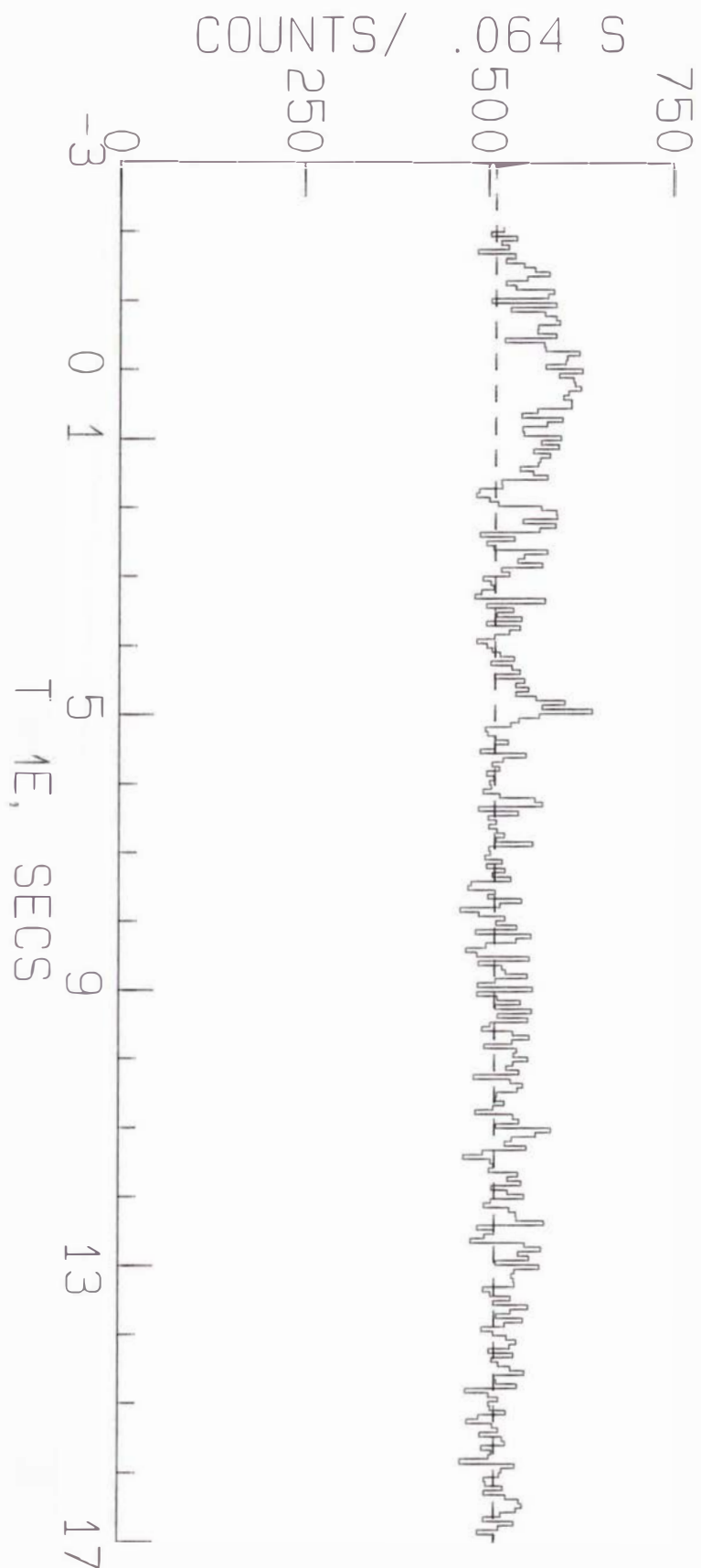
BATSE

29/05/91

~~63360.875~~

25- 100 keV

63358.833



BATSE

29/05/91

~~63360.875~~

25- 100 keV

63358.833

COUNTS/ .064 S

750
500
250
0

17

21

25

29

33

37

T IE, SECS

From @UCBSP.SSL.BERKELEY.EDU:MCGLYNN@[7073.DECnet] Thu May 30 11:07:24 1991
Received: from UCBSP.SSL.BERKELEY.EDU by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA01189; Thu, 30 May 91 11:06:53 PDT
Message-Id: <9105301806.AA01189@sunspot.ssl.berkeley.edu>
Date: Thu 30 May 91 11:06:44-PST
From: \$C <MCGLYNN@[7073.DECnet]>
To: ANDERSON@sunspot.ssl.berkeley.edu
Subject: [Resent-MM Mail] OSSE Solar Observation.
Status: R

Received: from [7073.DECnet] by UCBSP.SSL.BERKELEY.EDU via MAIL-11 with
DECnet; Thu, 30 May 91 11:06:07-PST
Date: Thu 30 May 91 11:06:06-PST
From: MCGLYNN@[7073.DECnet] (Tom McGlynn)
Subject: OSSE Solar Observation.
To: "@D.DIS"@[7073.DECnet]

The following message is being sent to the GRO electronic bulletin
distribution list. It will also be posted on the GRO bulletin board.

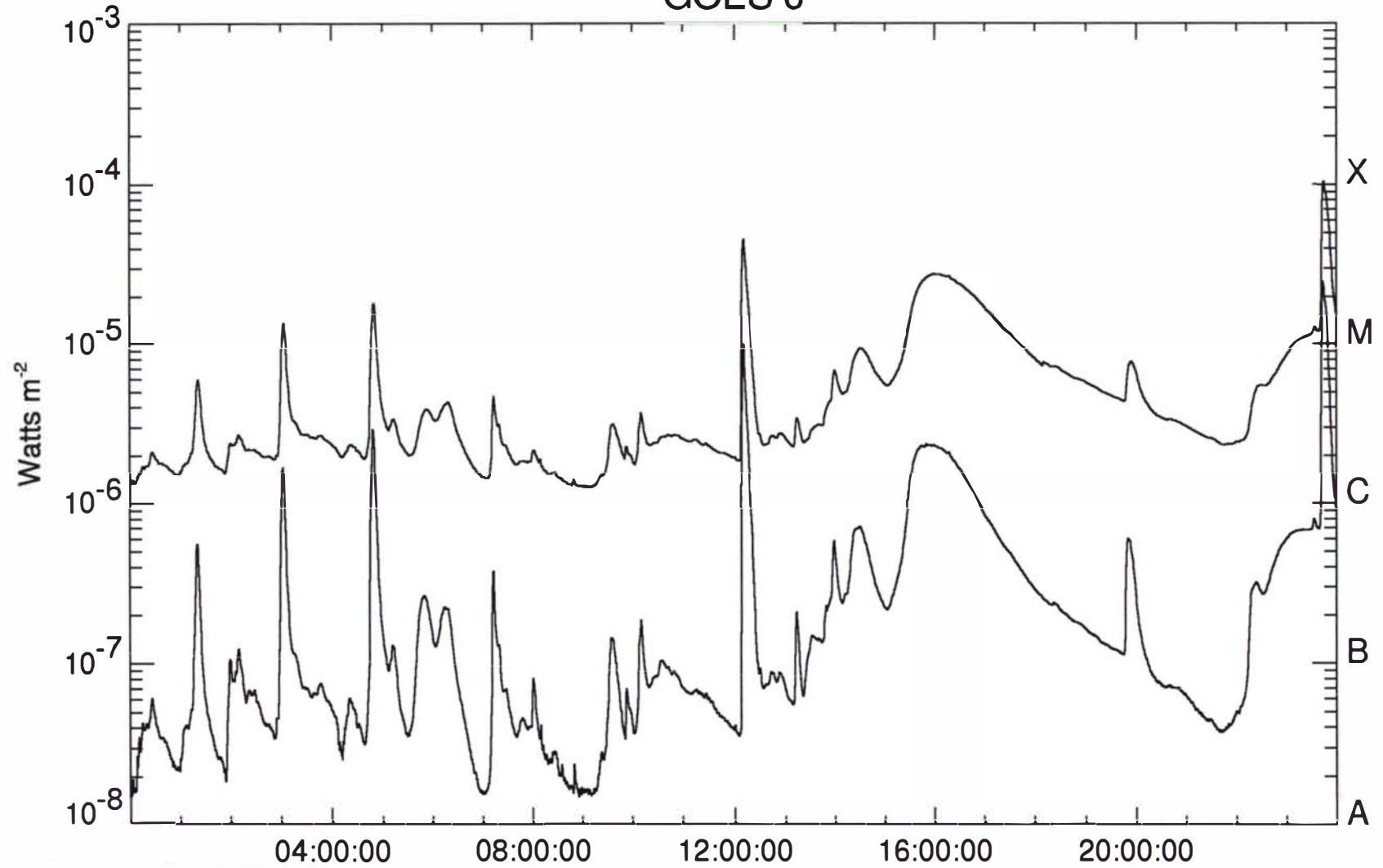
Subj: OSSE flare observation

During the last 48 hours, the Sun has produced 13 M-class flares and one X-class flare. All but one of the M-class flares were produced by NOAA active region 6654 and this region has changed little in the last 24 hours, remaining magnetically potent. As of 29 May 2100 UT, the region was located at N07E40. The current flare-event probabilities for the whole Sun are 80% for M-class flares and 15% for X-class flares throughout the next 3 days. Today, 30 May 1991, begins the second of the Phase I 14-day viewing periods and the Sun will be accessible to the OSSE nominal field of view via a slew for the first 12 days of this period. For the above reasons, the Sun has been declared the OSSE Viewing Period 2 secondary target (replacing NGC 1275) for a minimum of two days. If activity diminishes significantly, normal pointing operations will resume. If activity remains high, continued solar observations will be considered.

The instrument will be configured in the following way:

1. All four detectors will be pointed at the Sun.
2. Full energy-resolution spectra will be accumulated at 8 sec intervals.
3. Count rates in 4 energy windows will be obtained at 16 msec intervals. The windows are defined as follows:
 1. 200 -450 keV
 2. 575 - 750 keV
 3. 4.0 - 7.0 MeV
 4. 10.0 - 50.0 MeV

GOES 6



Data Start: 91/05/29, 0000:02

Channel

1 (1.0 - 8.0 Angstroms)

2 (0.5 - 4.0 Angstroms)

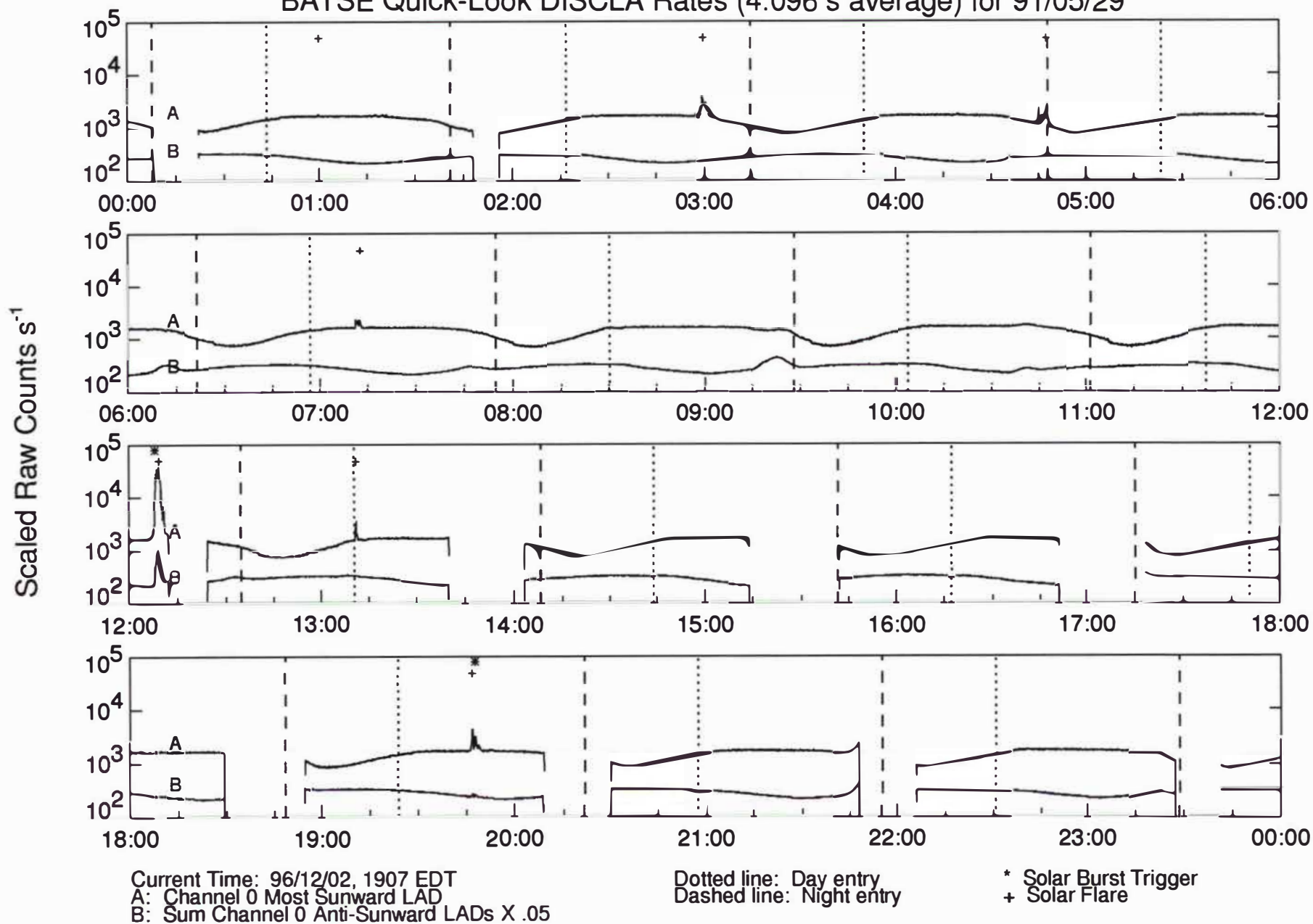
Plot created: 96/12/02, 1906

Background not subtracted

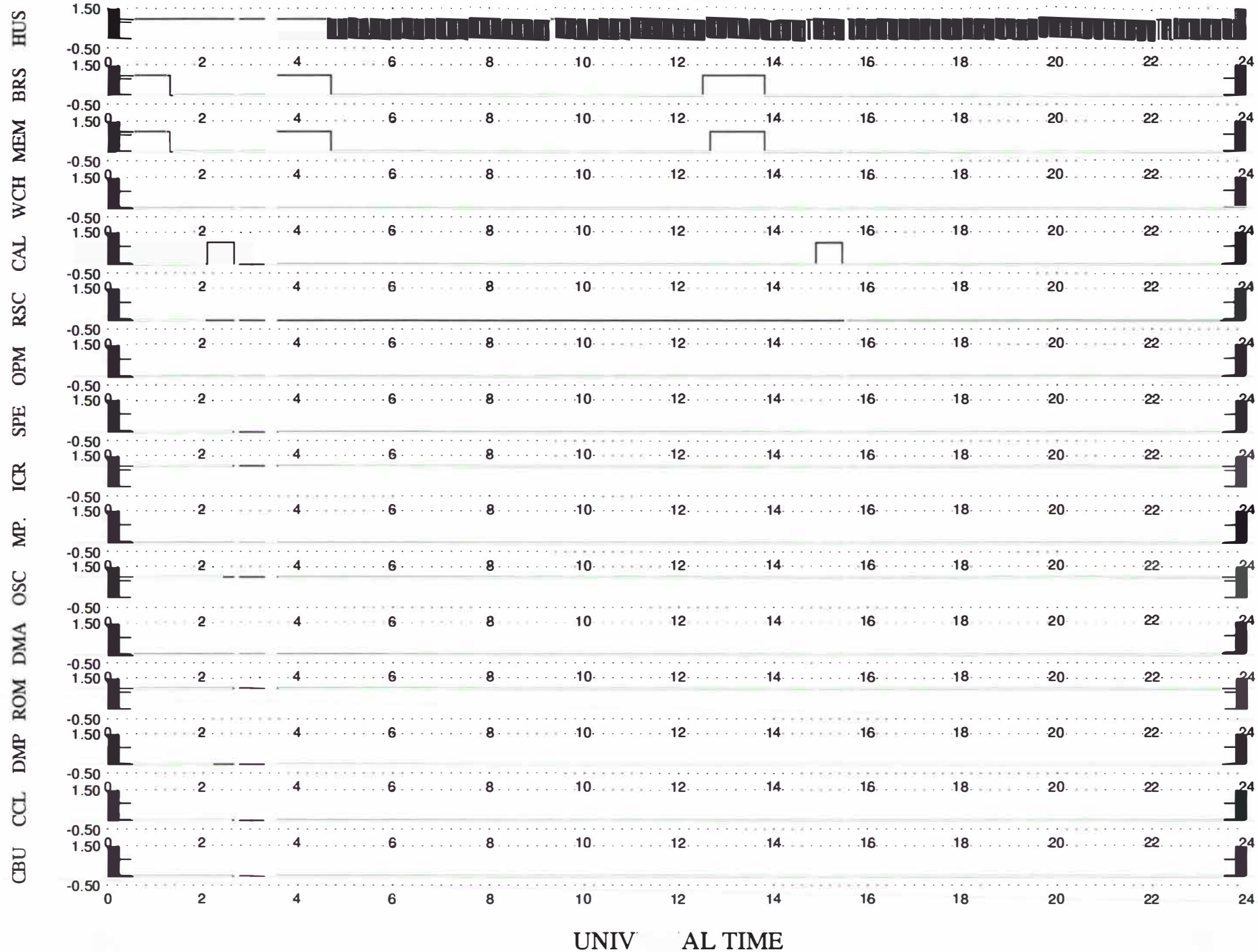
Background not subtracted

Sample average = 10

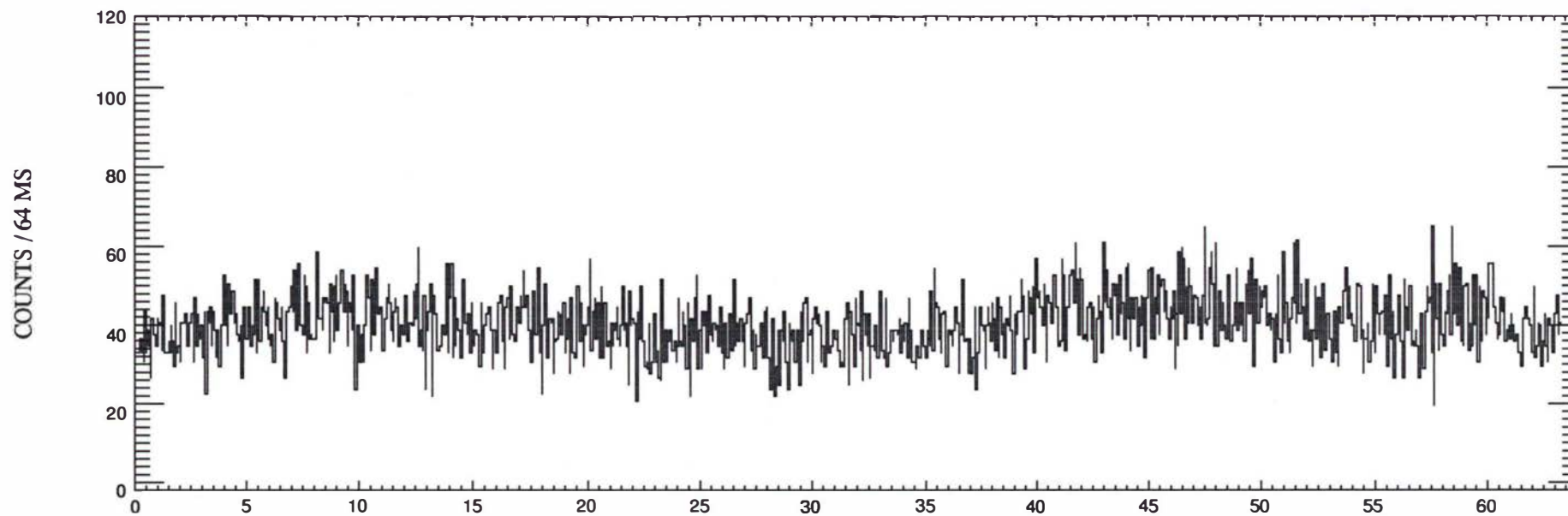
BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/29



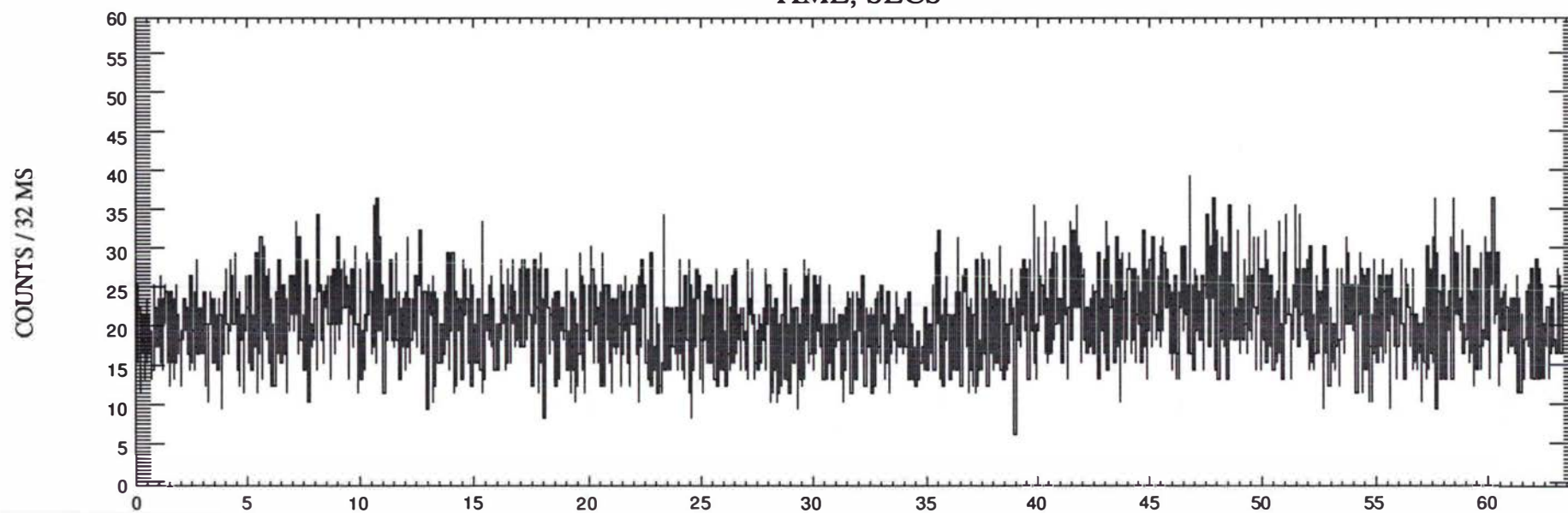
BURST NUMBER 12 - 14



Burst Counter 14 at UT=12.44269705455 h=44793.709 s 12:26:33.709

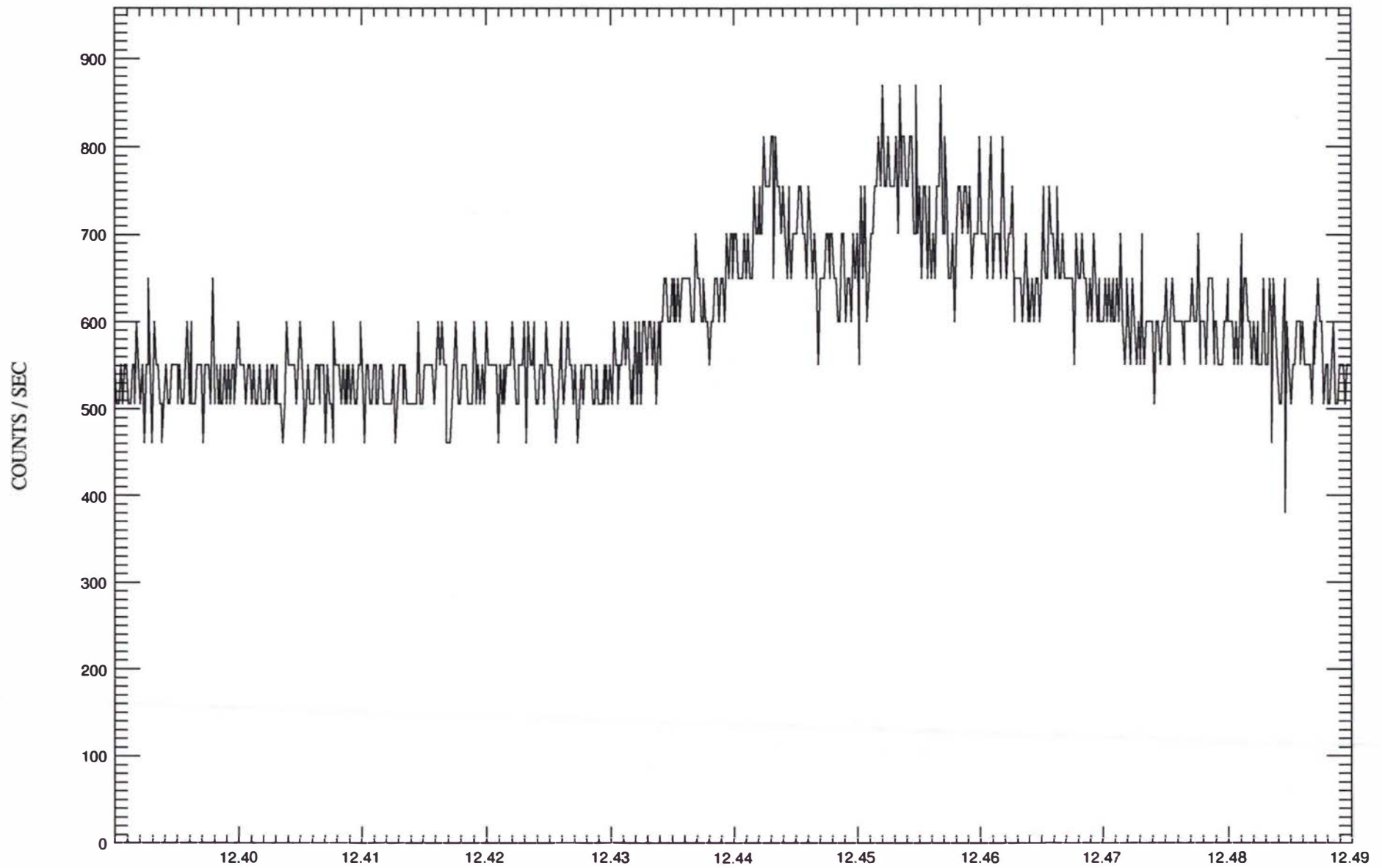


TIME, SECS

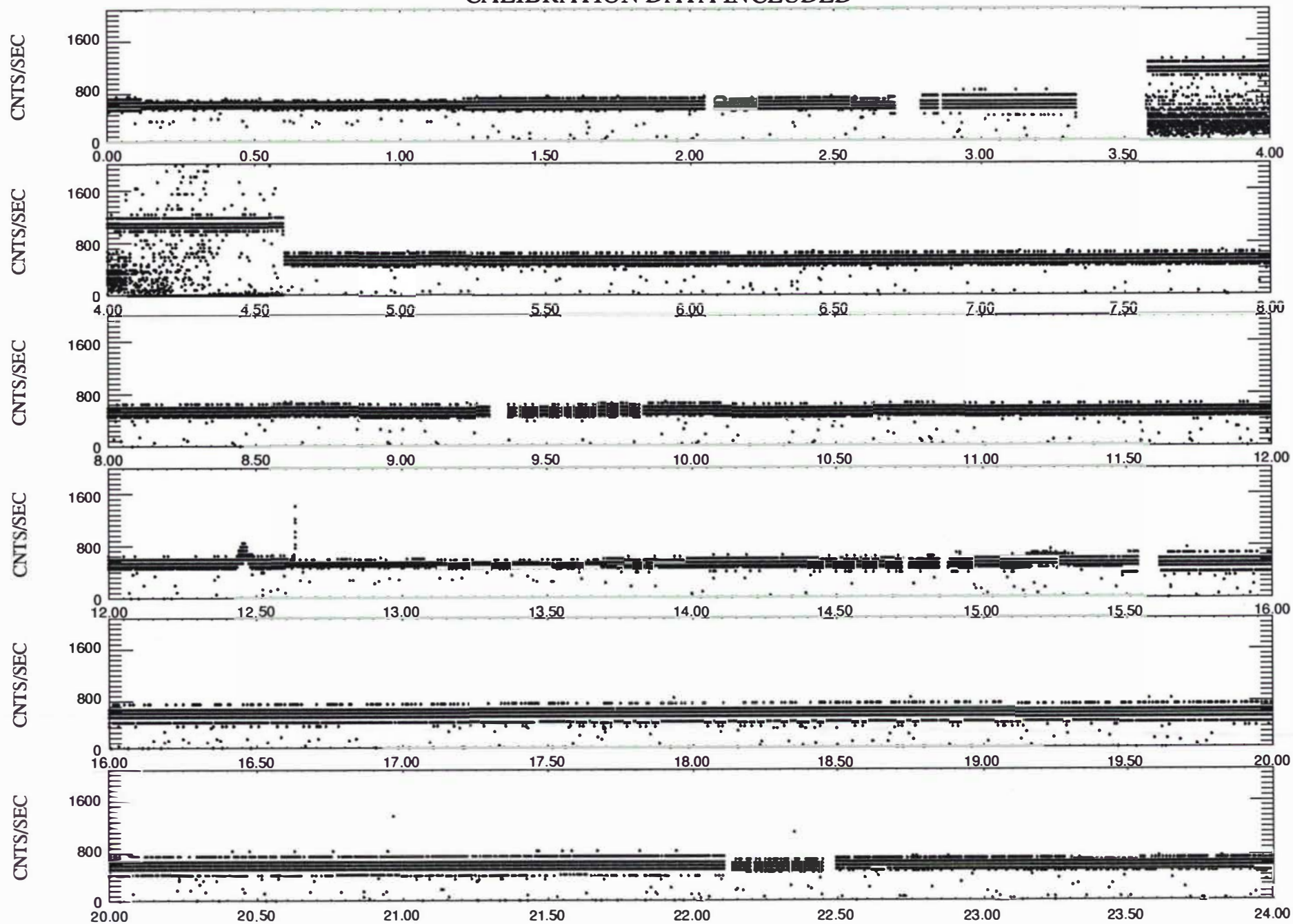


TIME, SECS

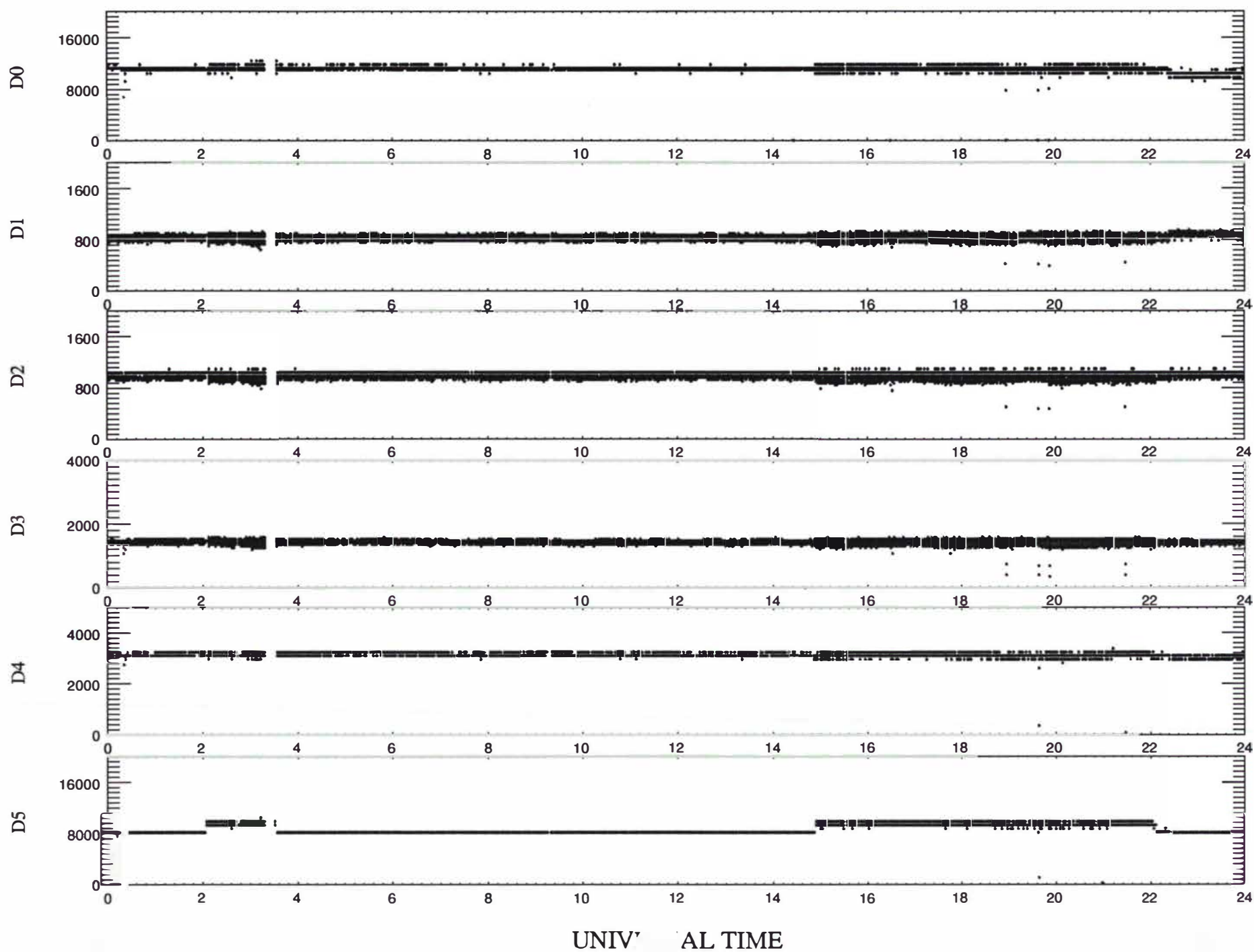
CALIBRATION DATA INCLUDED

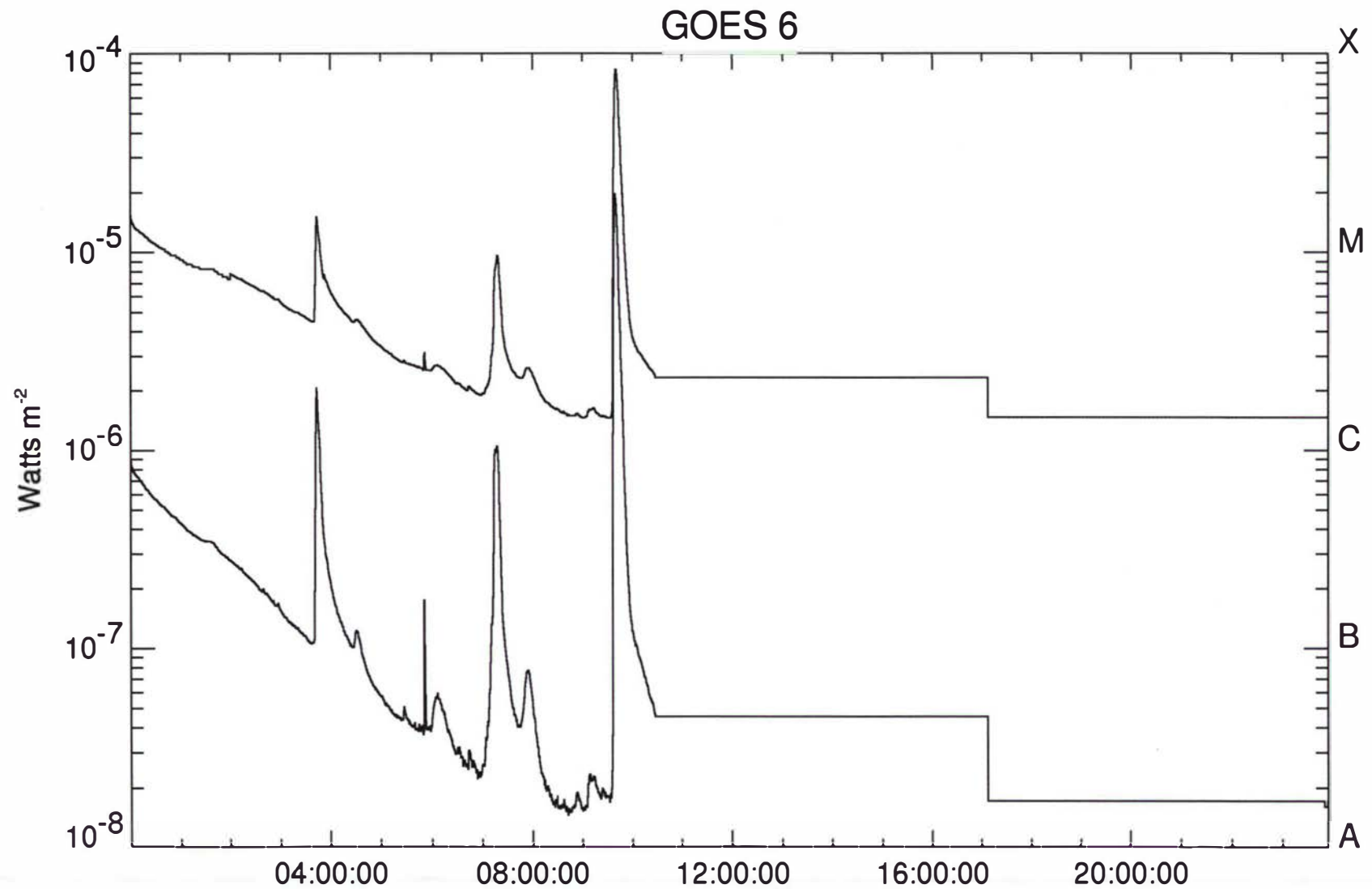


CALIBRATION DATA INCLUDED



UNIV AL TIME





Data Start: 91/05/30, 0000:00

Channel 1 (1.0 - 8.0 Angstroms)

Channel 2 (0.5 - 4.0 Angstroms)

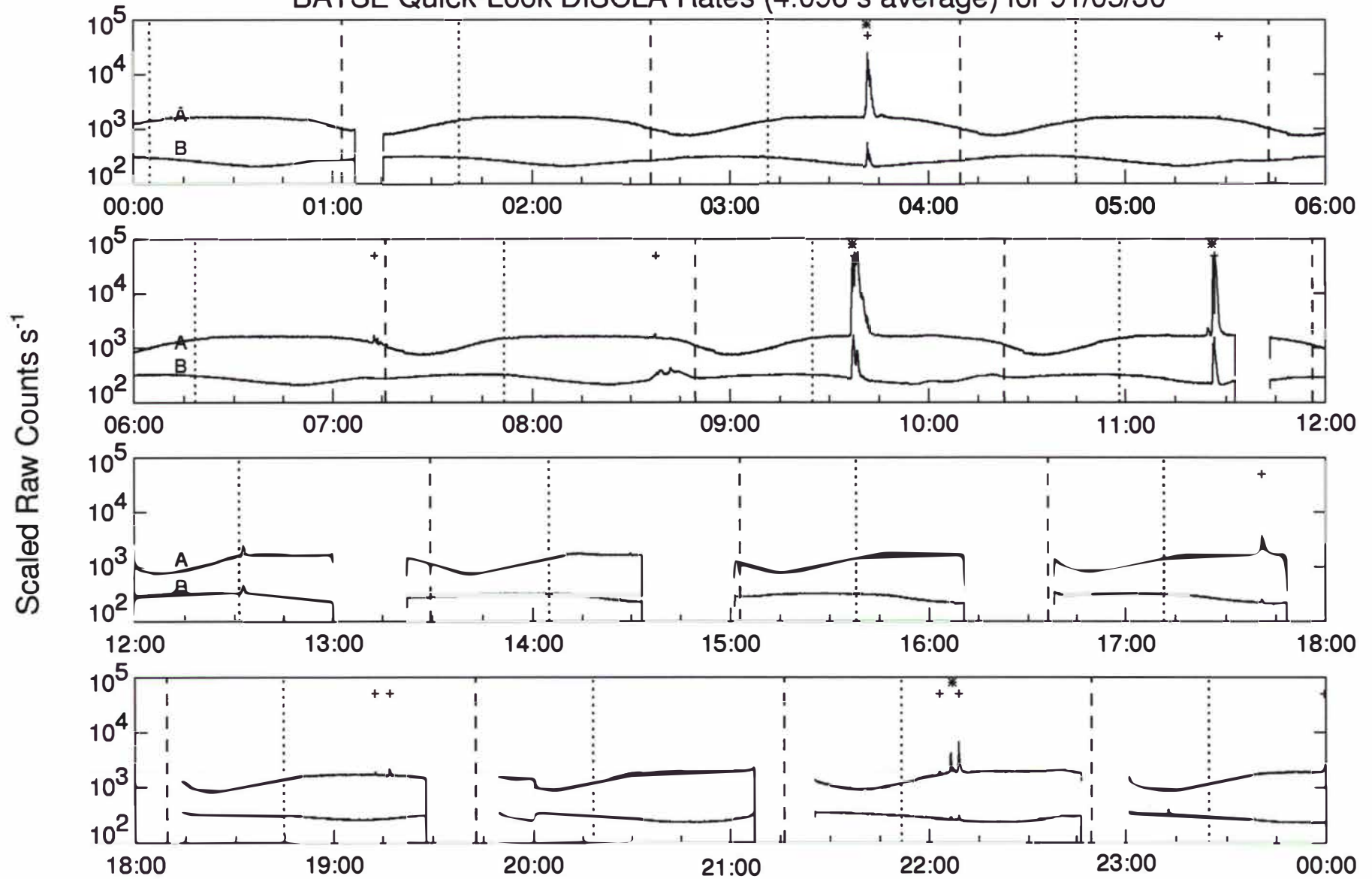
Plot created: 96/12/02, 1910

Background not subtracted

Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/30



Current Time: 96/12/02, 1910 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

From @UCBSP.SSL.BERKELEY.EDU:MCGLYNN@[7073.DECnet] Thu May 30 11:07:24 1991
Received: from UCBSP.SSL.BERKELEY.EDU by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA01189; Thu, 30 May 91 11:06:53 PDT
Message-Id: <9105301806.AA01189@sunspot.ssl.berkeley.edu>
Date: Thu 30 May 91 11:06:44-PST
From: \$C <MCGLYNN@[7073.DECnet]>
To: ANDERSON@sunspot.ssl.berkeley.edu
Subject: [Resent-MM Mail] OSSE Solar Observation.
Status: R

Received: from [7073.DECnet] by UCBSP.SSL.BERKELEY.EDU via MAIL-11 with
DECnet; Thu, 30 May 91 11:06:07-PST
Date: Thu 30 May 91 11:06:06-PST
From: MCGLYNN@[7073.DECnet] (Tom McGlynn)
Subject: OSSE Solar Observation.
To: "@D.DIS"@[7073.DECnet]

The following message is being sent to the GRO electronic bulletin
distribution list. It will also be posted on the GRO bulletin board.

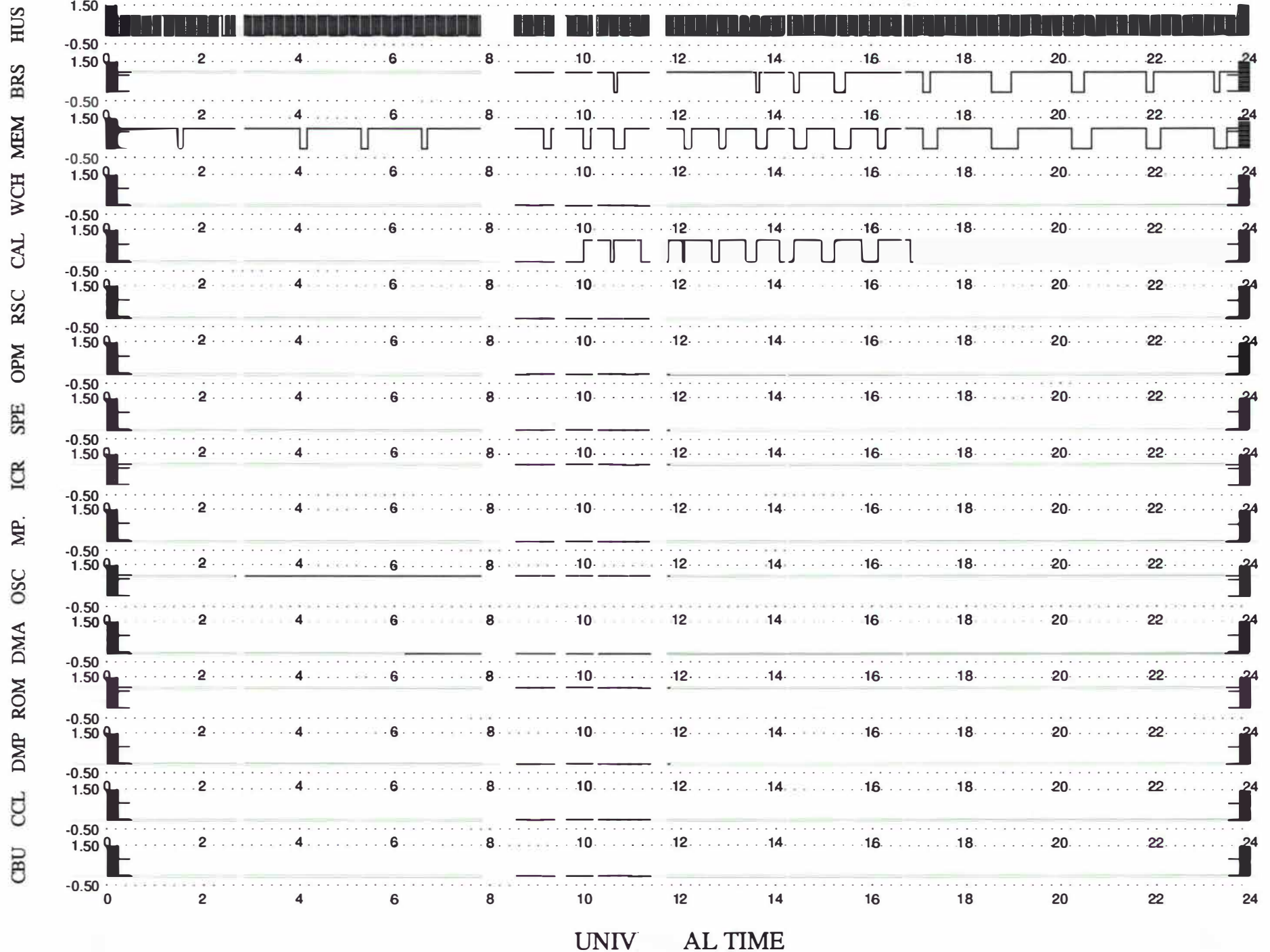
Subj: OSSE flare observation

During the last 48 hours, the Sun has produced 13 M-class flares and one X-class flare. All but one of the M-class flares were produced by NOAA active region 6654 and this region has changed little in the last 24 hours, remaining magnetically potent. As of 29 May 2100 UT, the region was located at N07E40. The current flare-event probabilities for the whole Sun are 80% for M-class flares and 15% for X-class flares throughout the next 3 days. Today, 30 May 1991, begins the second of the Phase I 14-day viewing periods and the Sun will be accessible to the OSSE nominal field of view via a slew for the first 12 days of this period. For the above reasons, the Sun has been declared the OSSE Viewing Period 2 secondary target (replacing NGC 1275) for a minimum of two days. If activity diminishes significantly, normal pointing operations will resume. If activity remains high, continued solar observations will be considered.

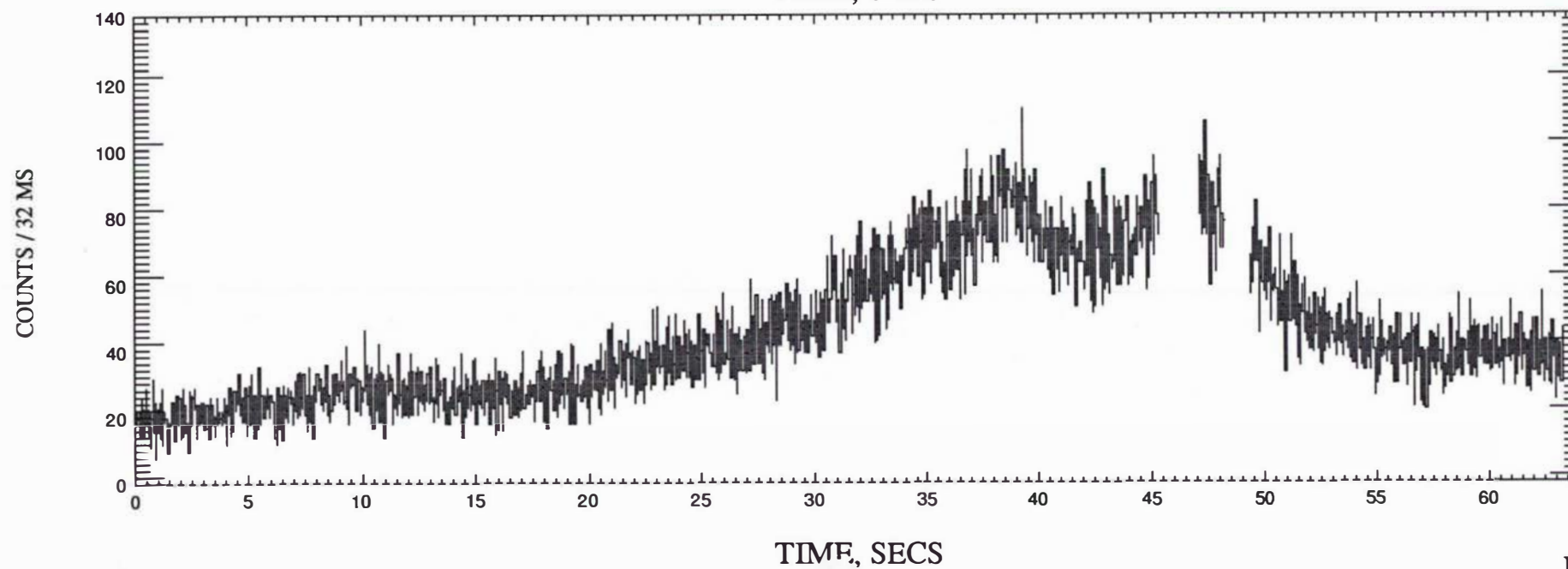
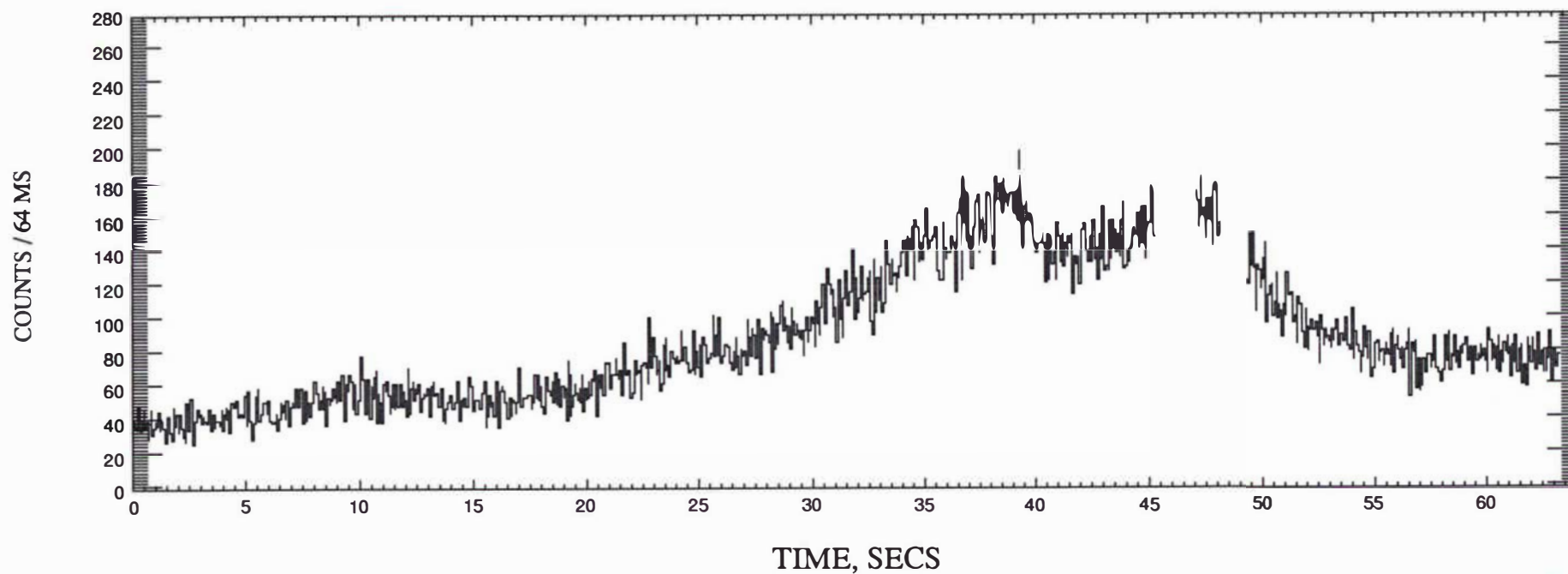
The instrument will be configured in the following way:

1. All four detectors will be pointed at the Sun.
2. Full energy-resolution spectra will be accumulated at 8 sec intervals.
3. Count rates in 4 energy windows will be obtained at 16 msec intervals. The windows are defined as follows:
 1. 200 - 450 keV
 2. 575 - 750 keV
 3. 4.0 - 7.0 MeV
 4. 10.0 - 50.0 MeV

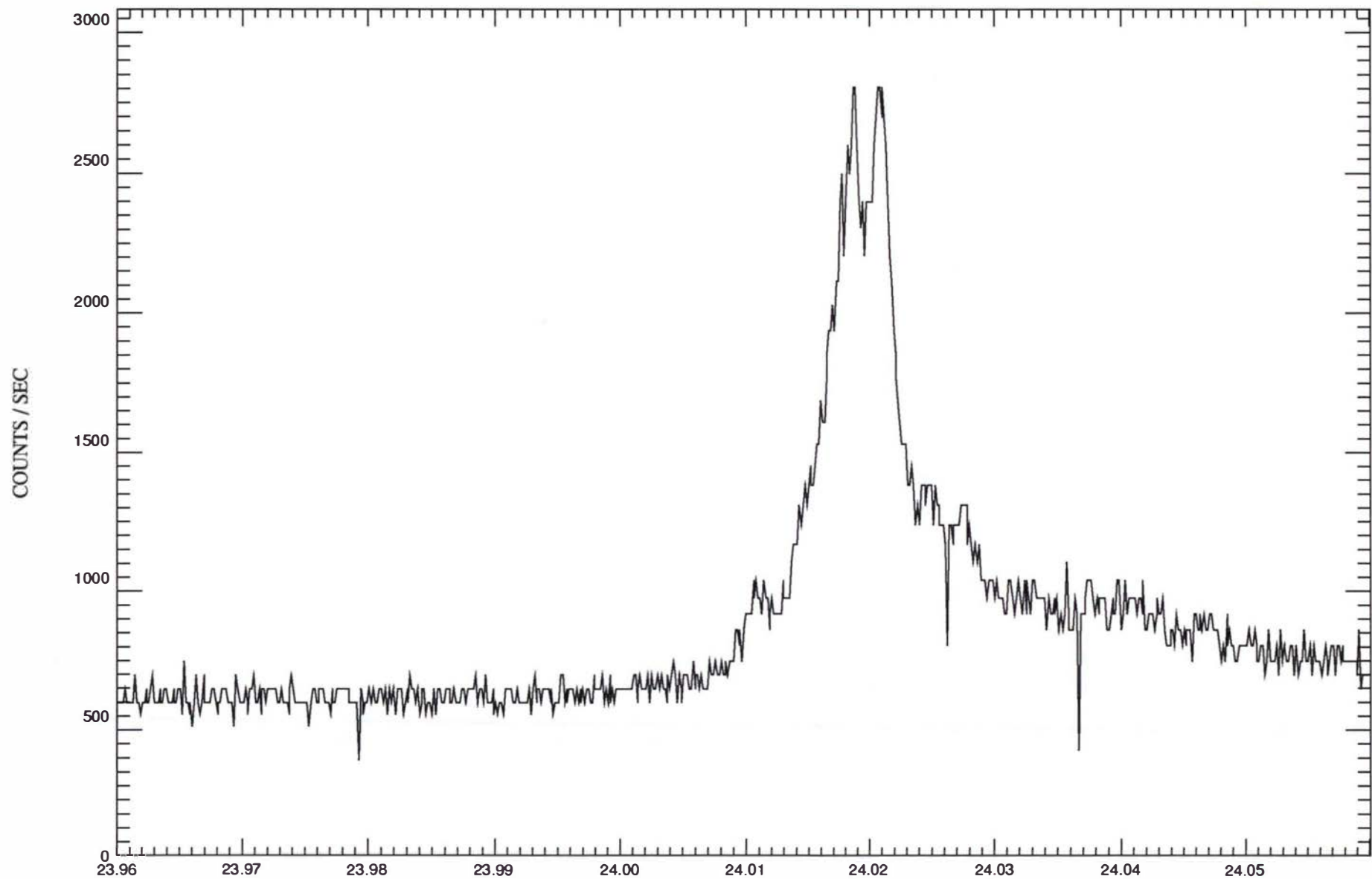
BURST NUMBER 15, 0 - 15, 0 - 4



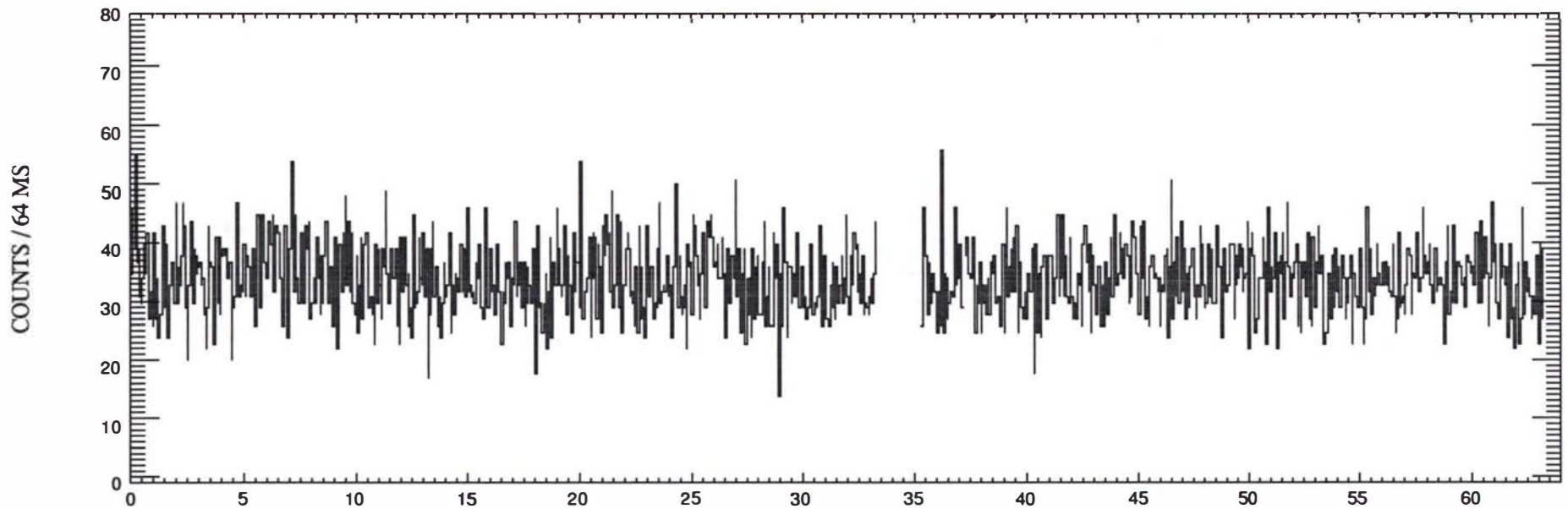
Burst Counter 15 at UT= 0.010077145894 h= 36.278 s 00:00:36.278



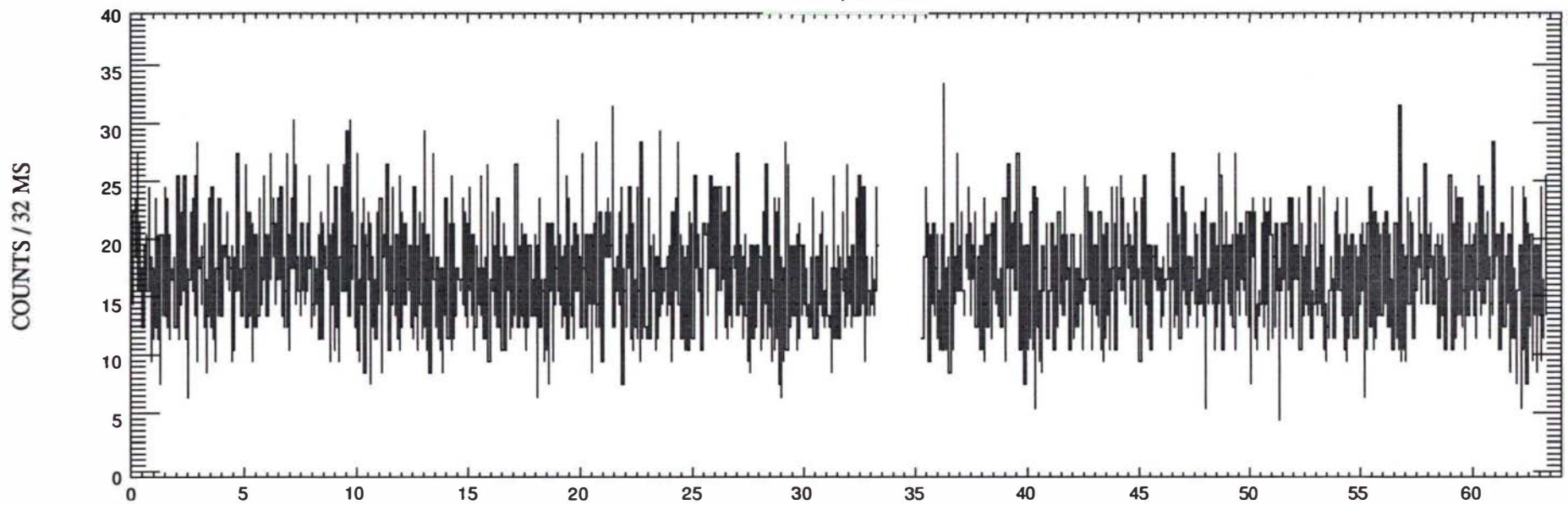
CALIBRATION DATA INCLUDED



Burst Counter 0 at UT= 1.154474813673 h= 4156.109 s 01:09:16.109

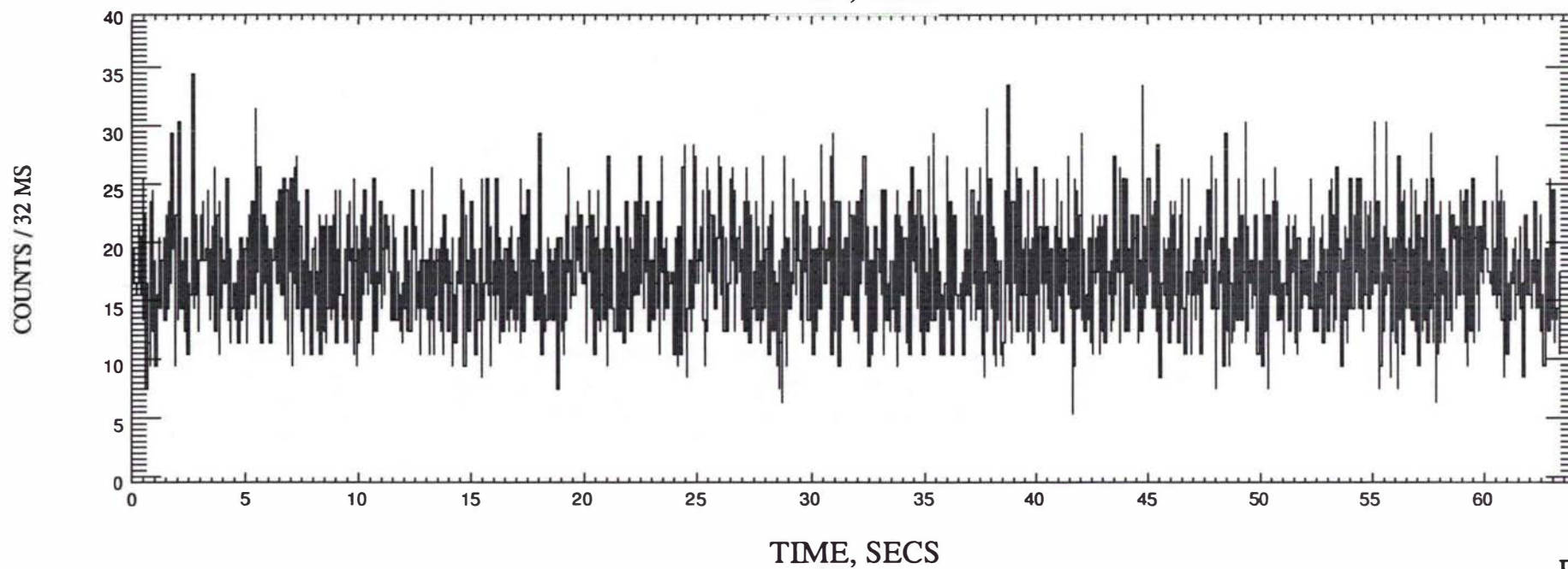
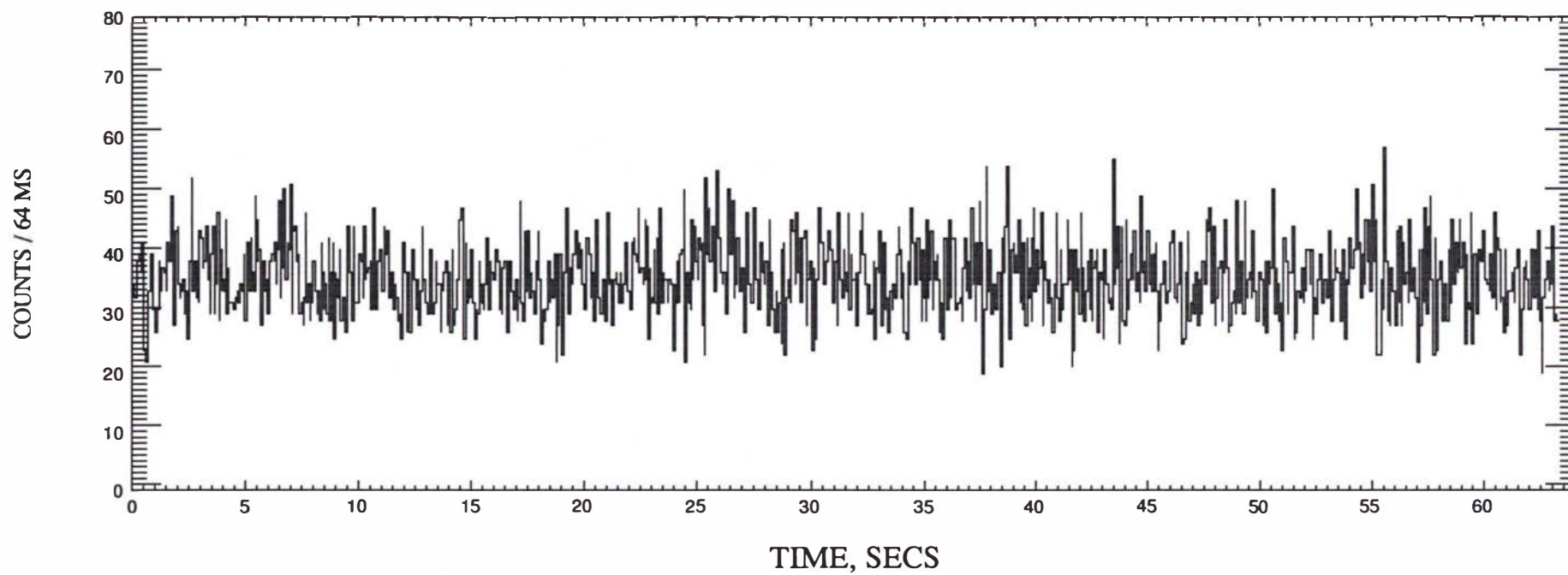


TIME, SECS

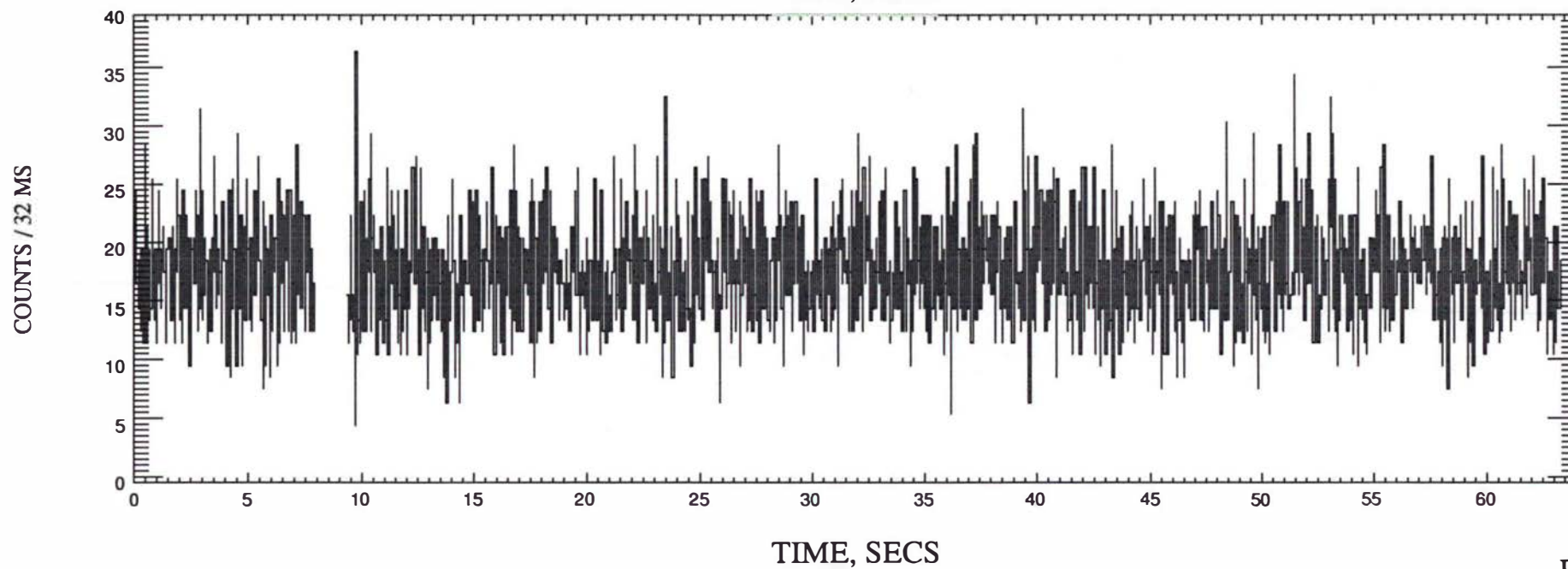
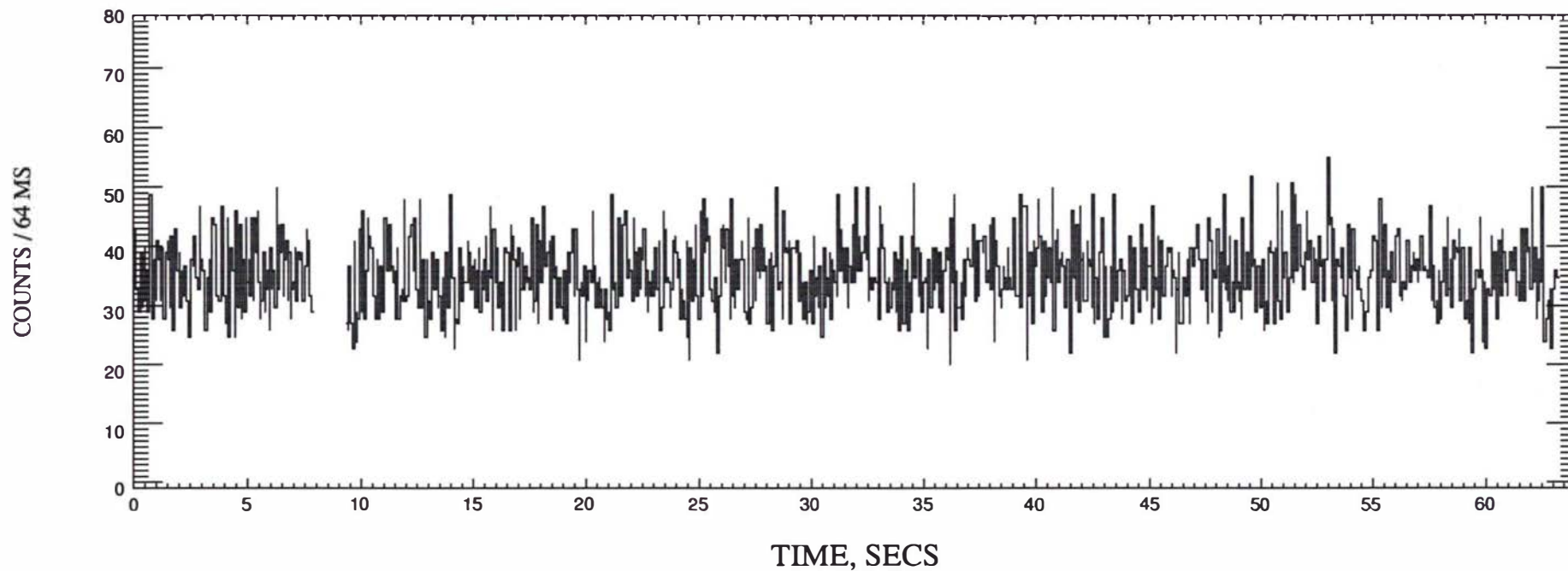


TIME, SECS

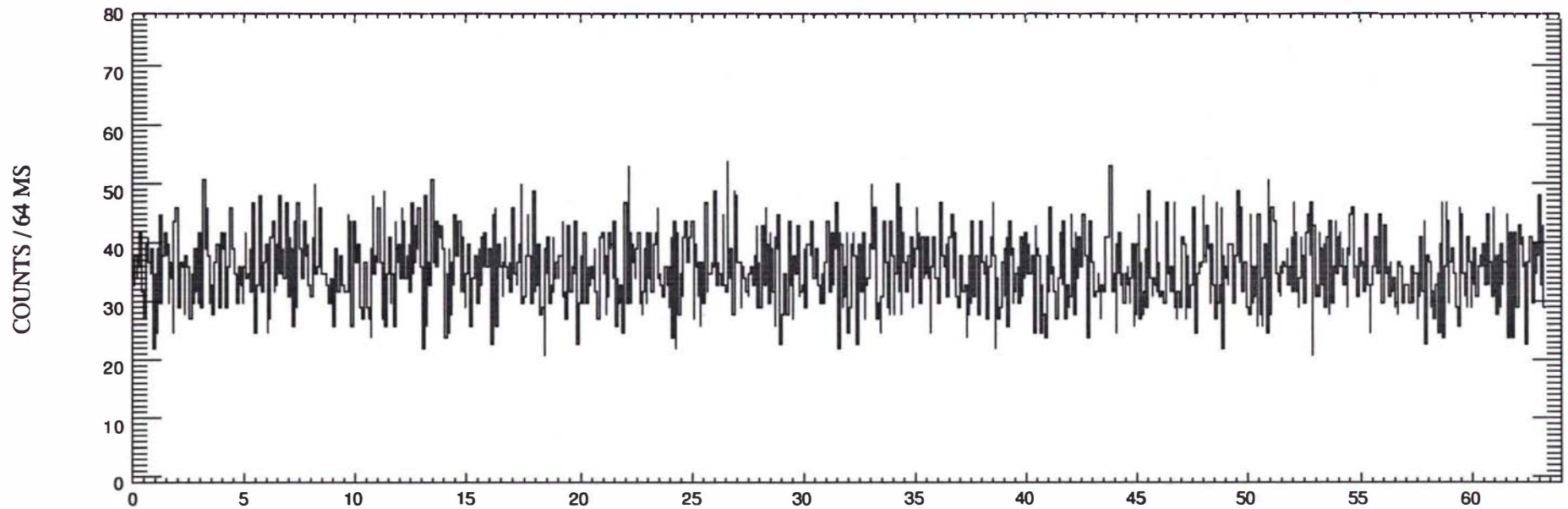
Burst Counter 1 at UT= 1.235861532423 h= 4449.102 s 01:14:09.102



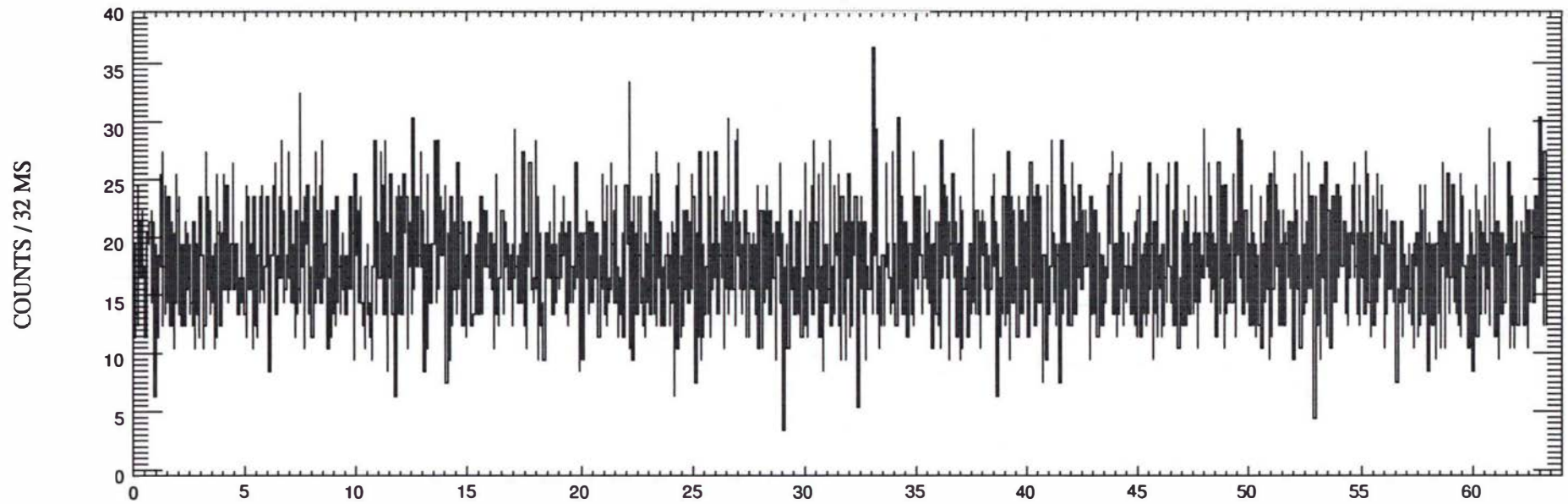
Burst Counter 2 at UT= 3.828140504625 h=13781.306 s 03:49:41.306



Burst Counter 3 at UT= 5.255946617126 h=18921.408 s 05:15:21.408

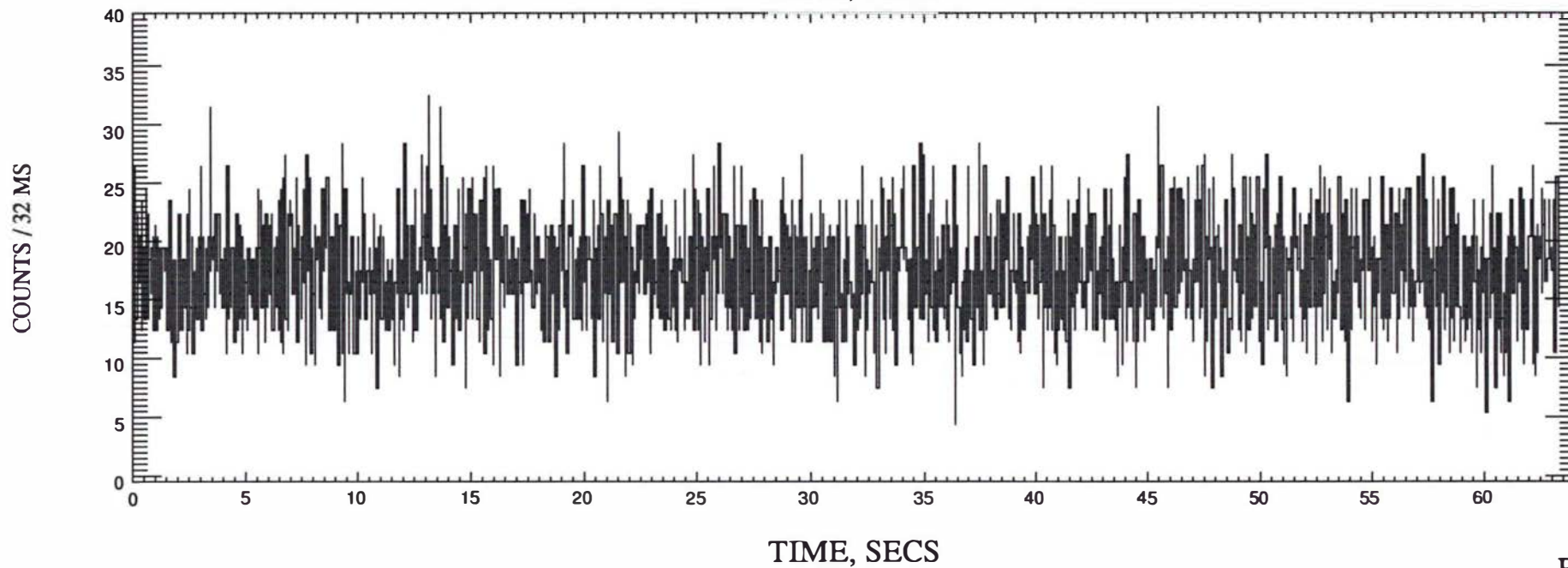
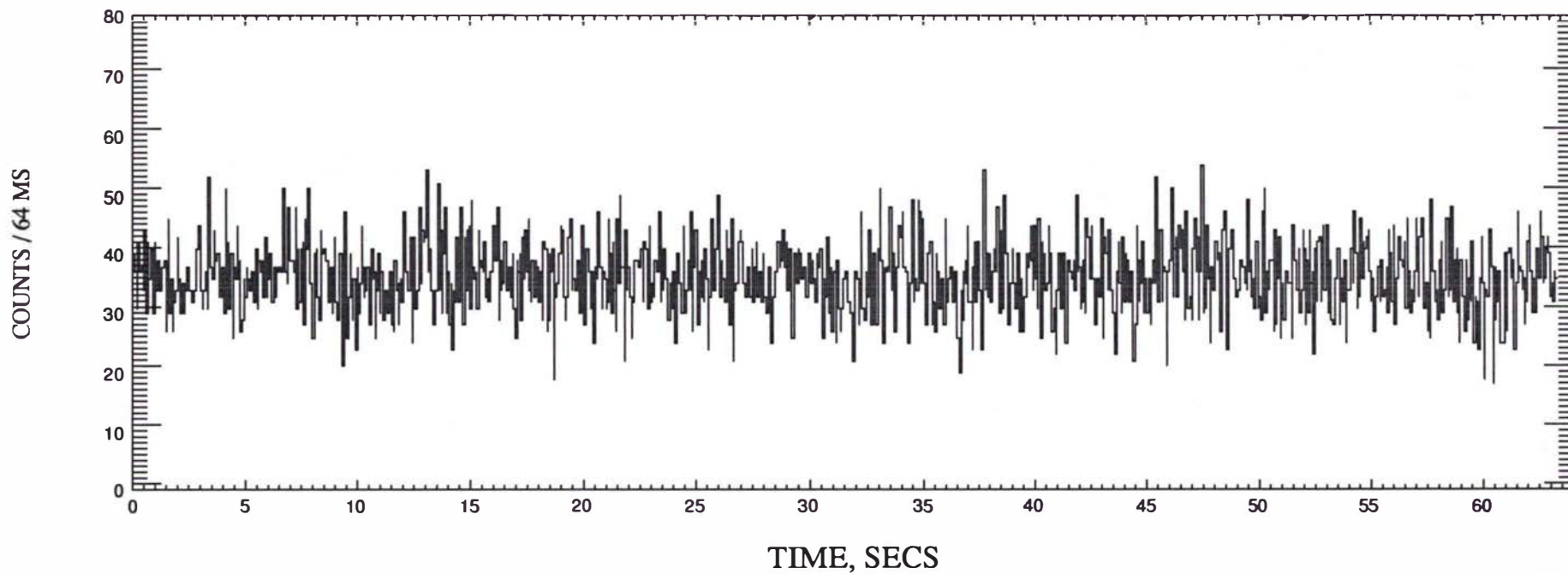


TIME, SECS

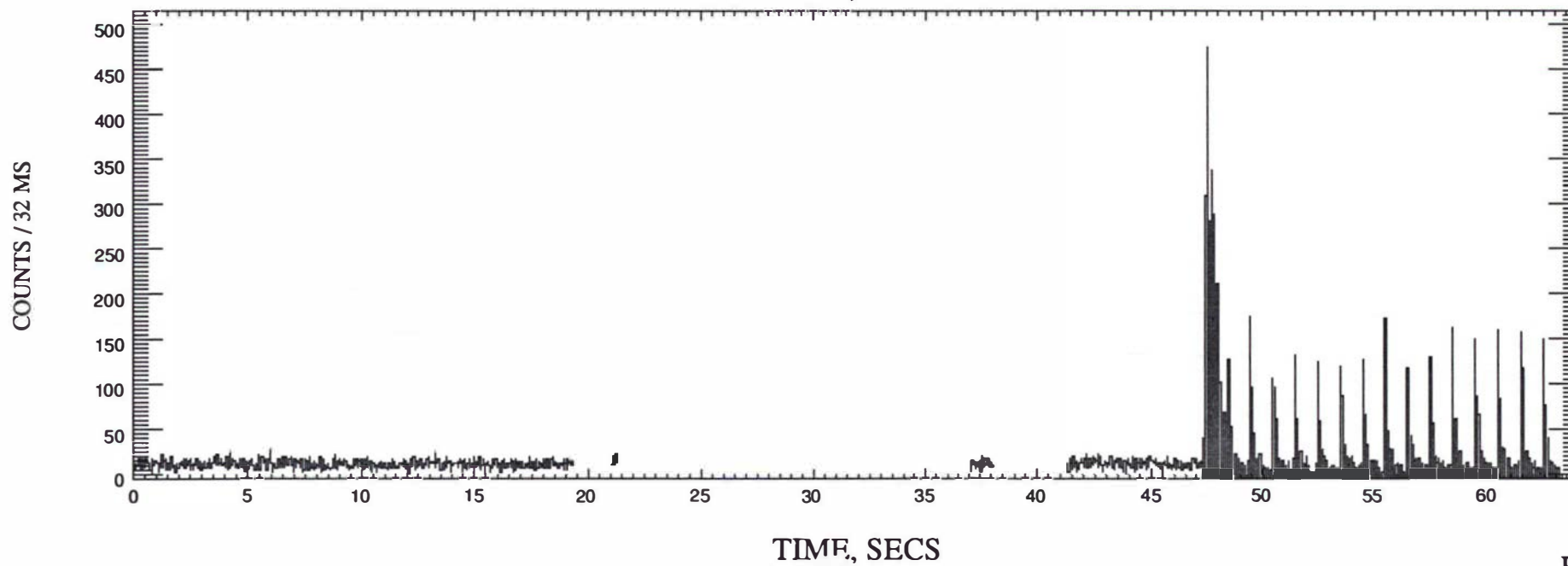
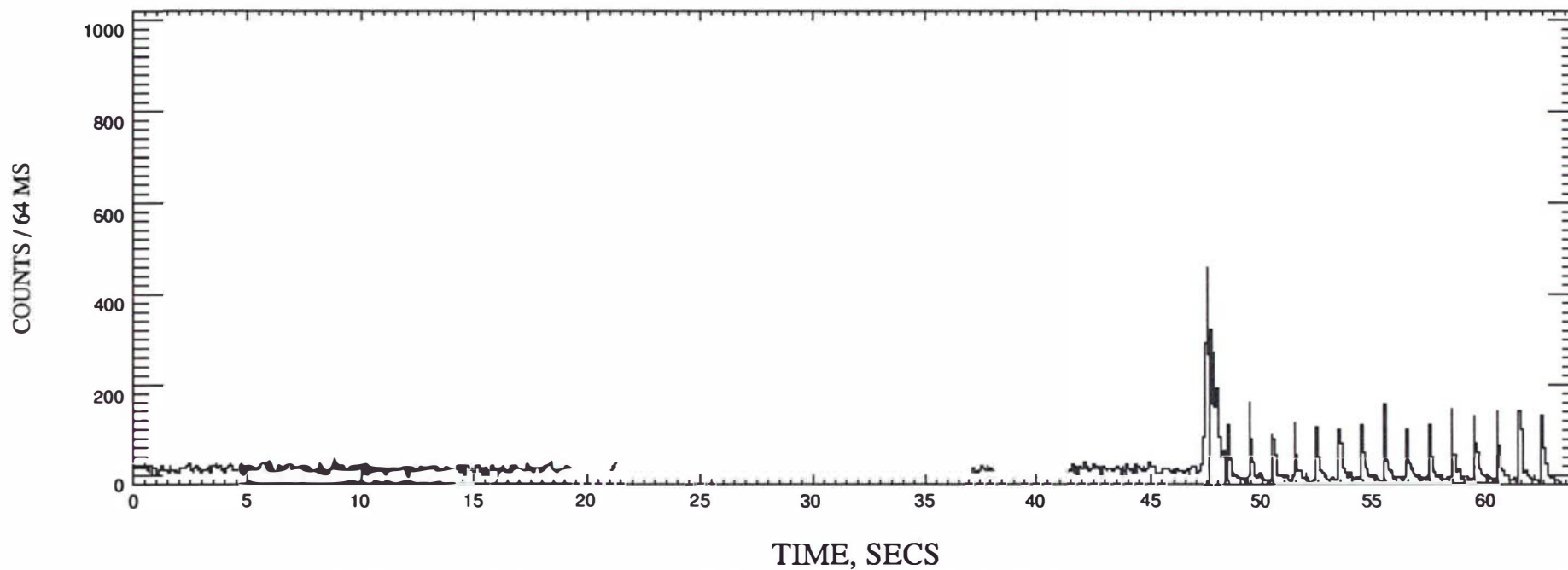


TIME, SECS

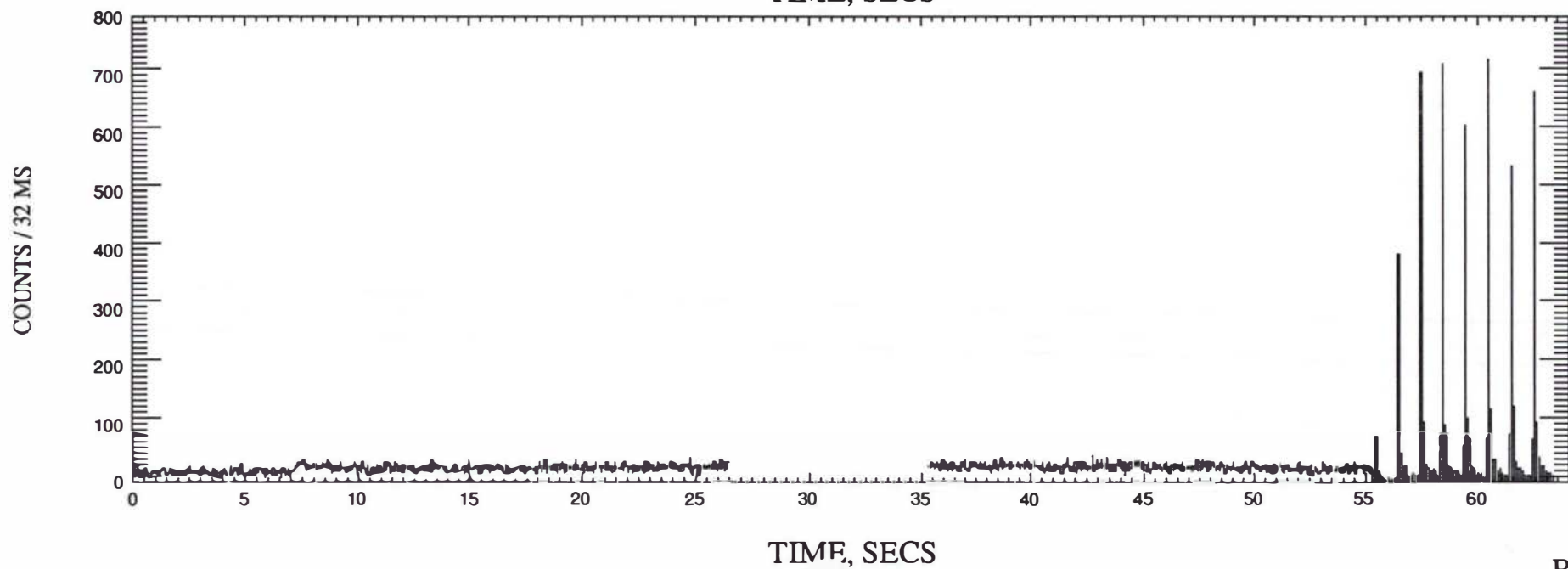
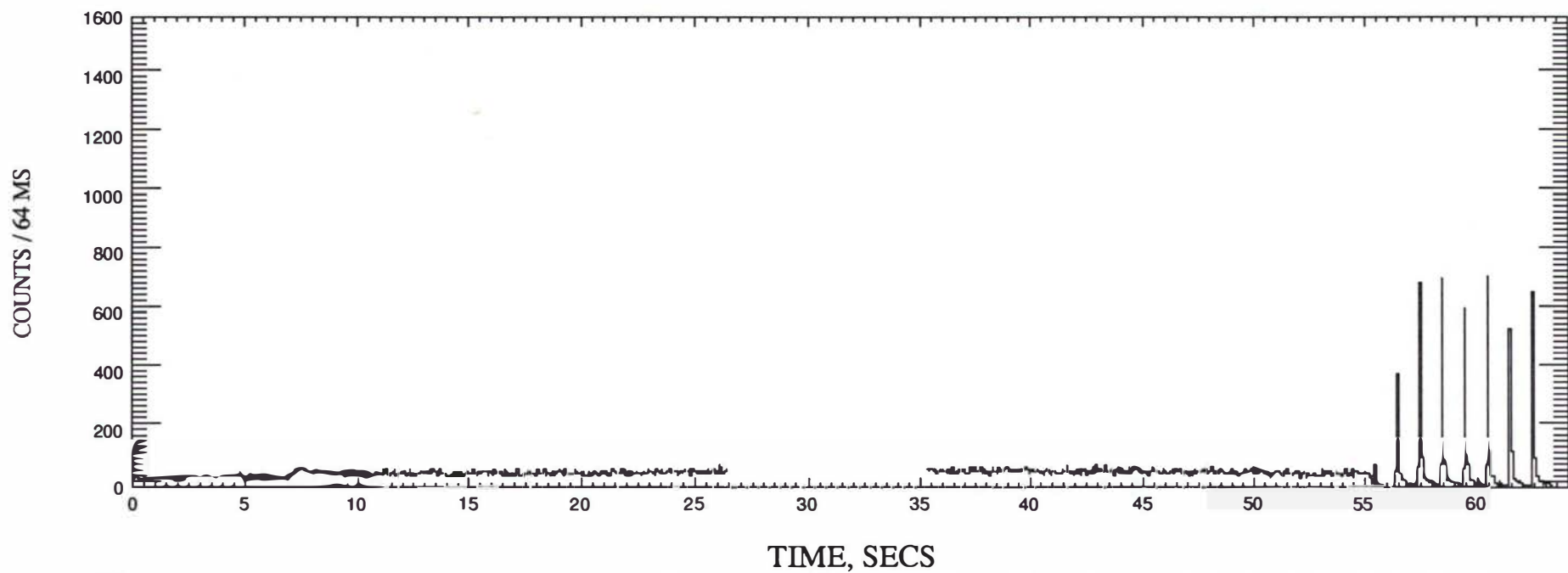
Burst Counter 4 at UT= 6.531525497437 h=23513.492 s 06:31:53.492



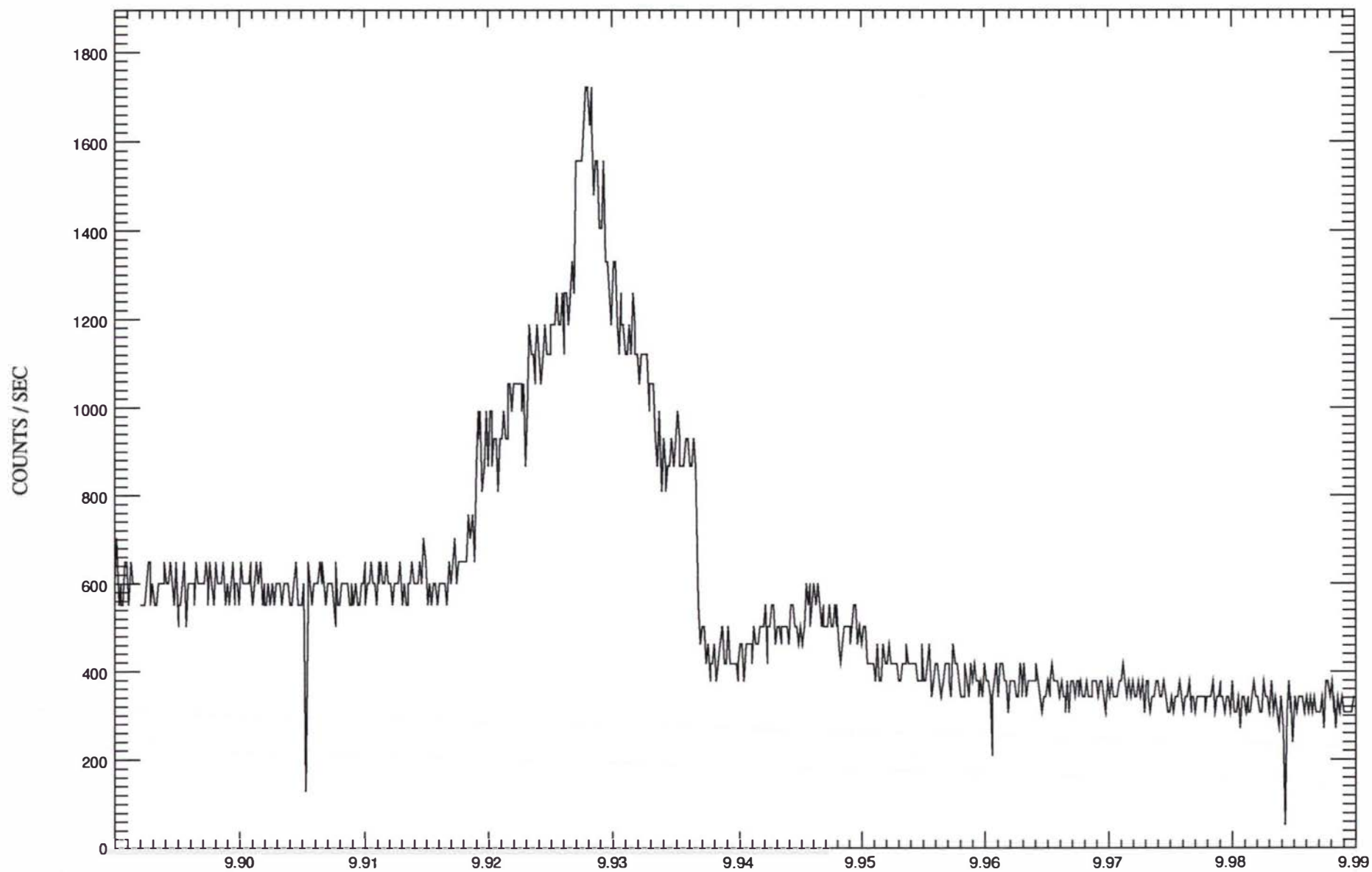
Burst Counter 6 at UT= 9.066856443617 h=32640.683 s 09:04:00.683



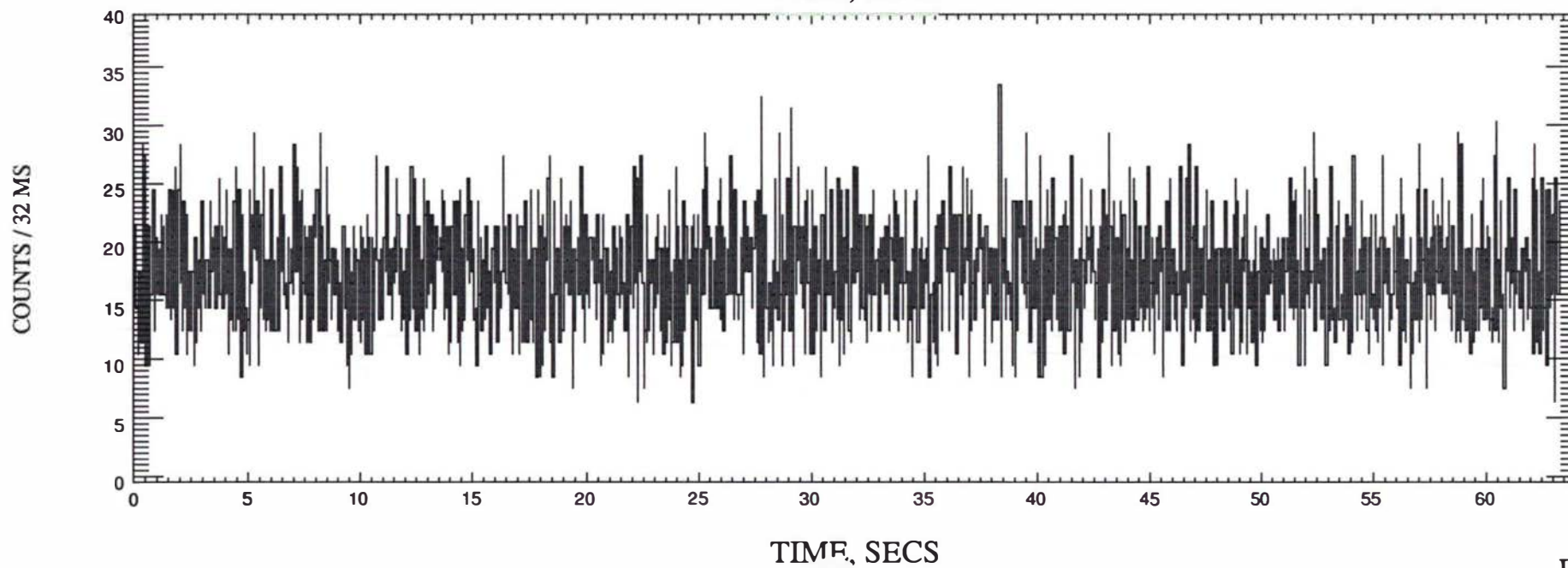
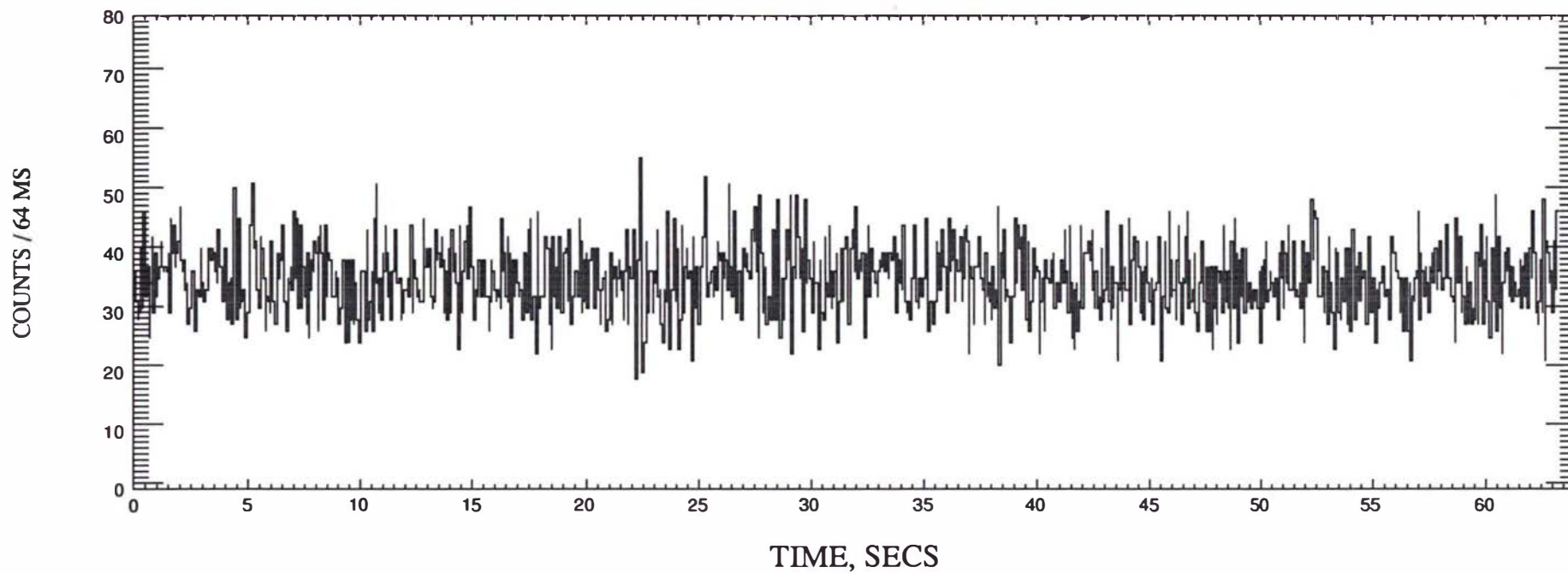
Burst Counter 7 at UT= 9.936938145955 h=35772.977 s 09:56:12.977



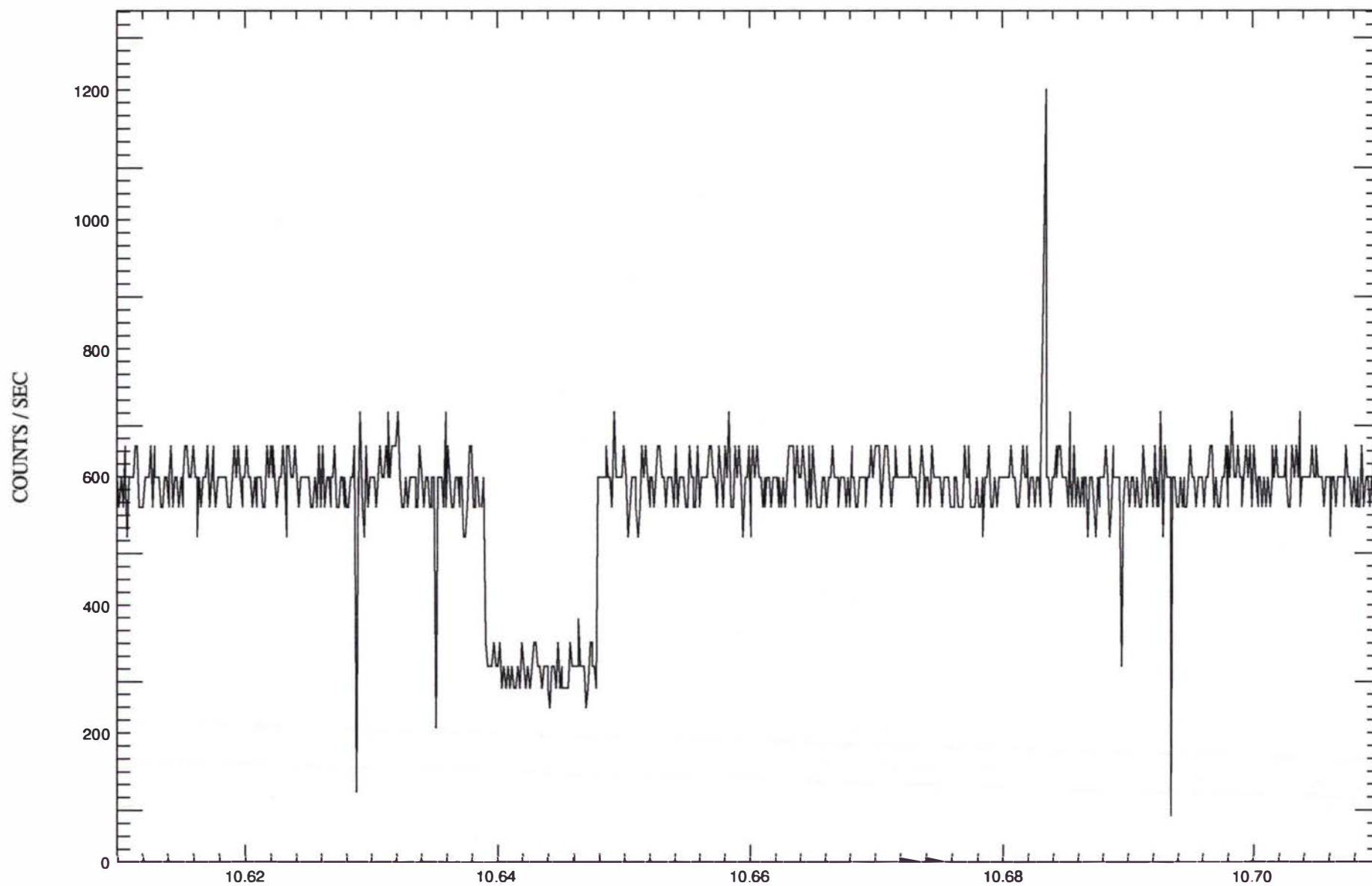
CALIBRATION DATA INCLUDED



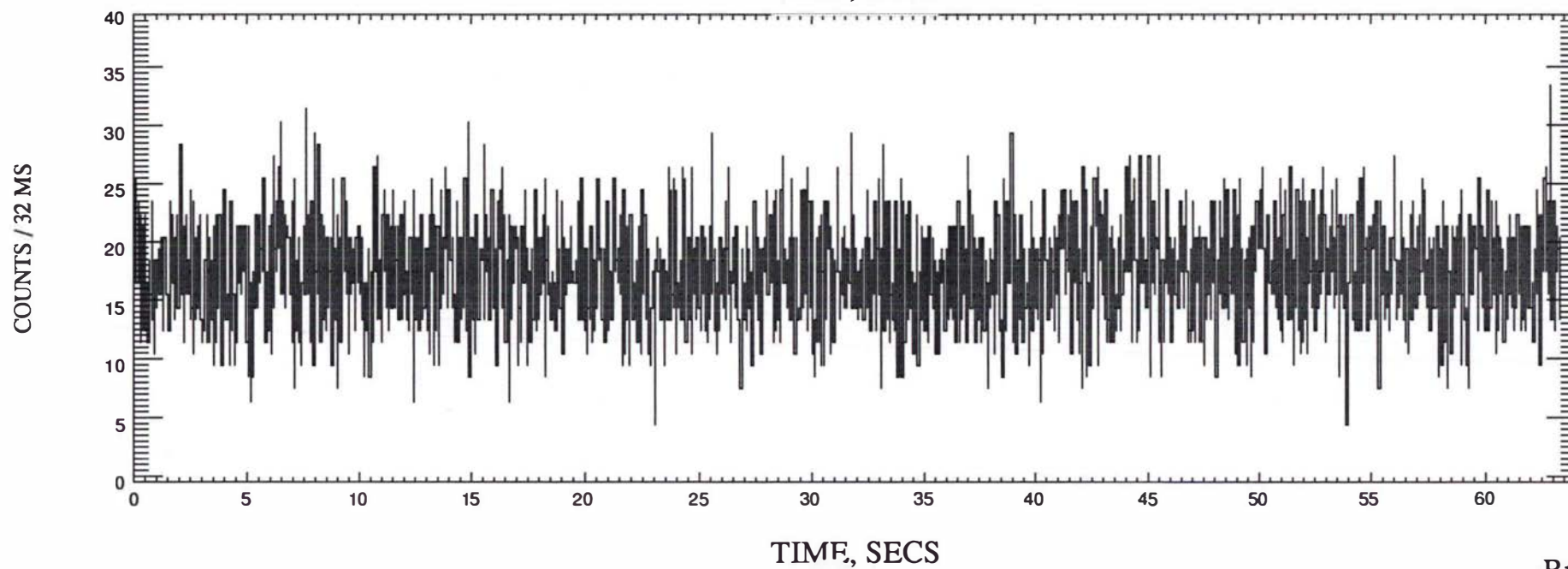
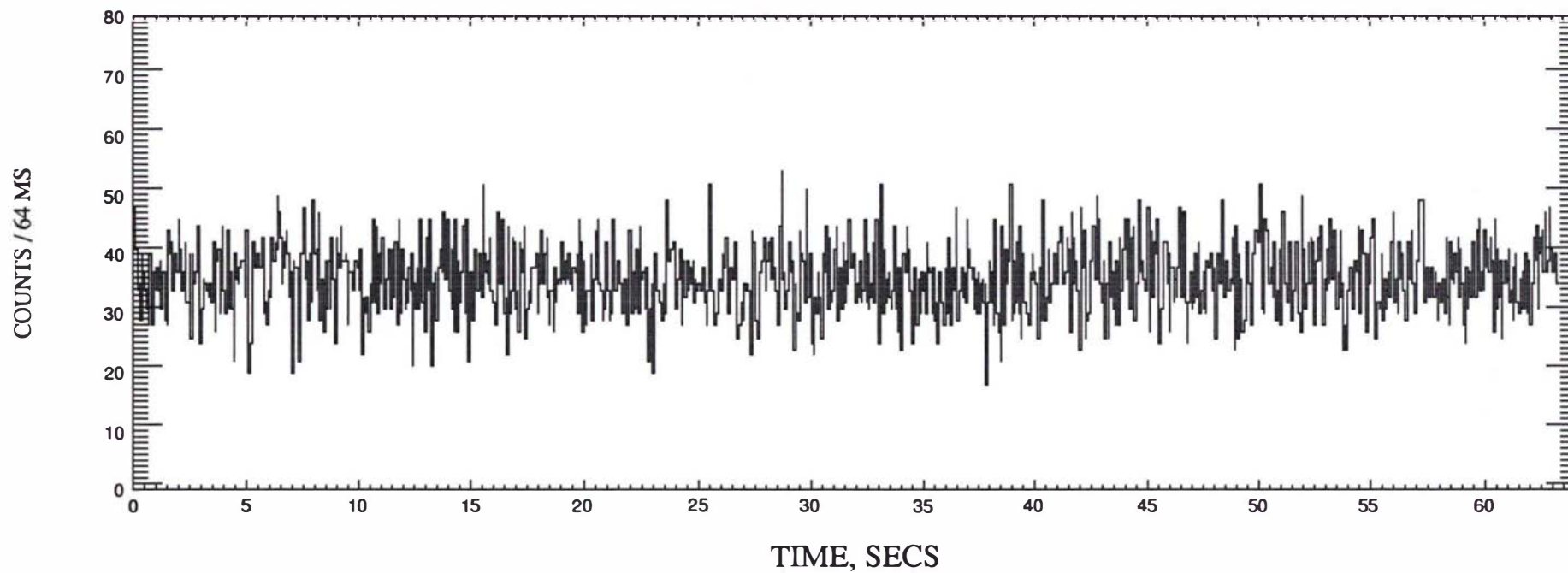
Burst Counter 8 at UT=10.664945640564 h=38393.804 s 10:39:53.804



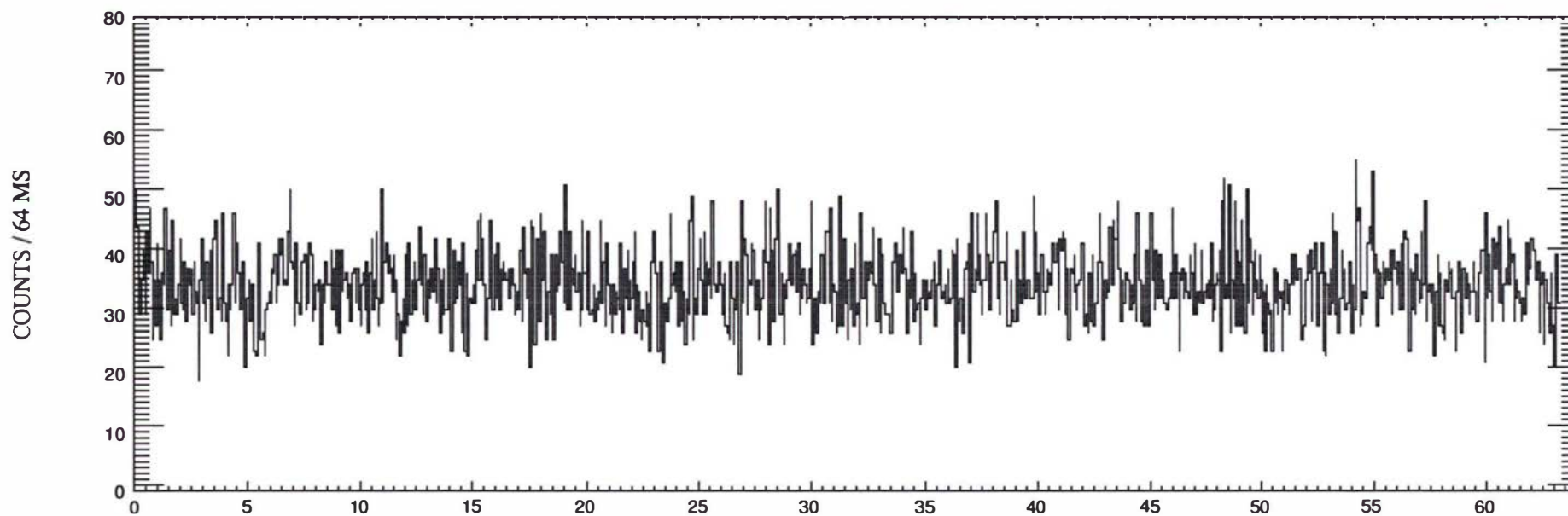
CALIBRATION DATA INCLUDED



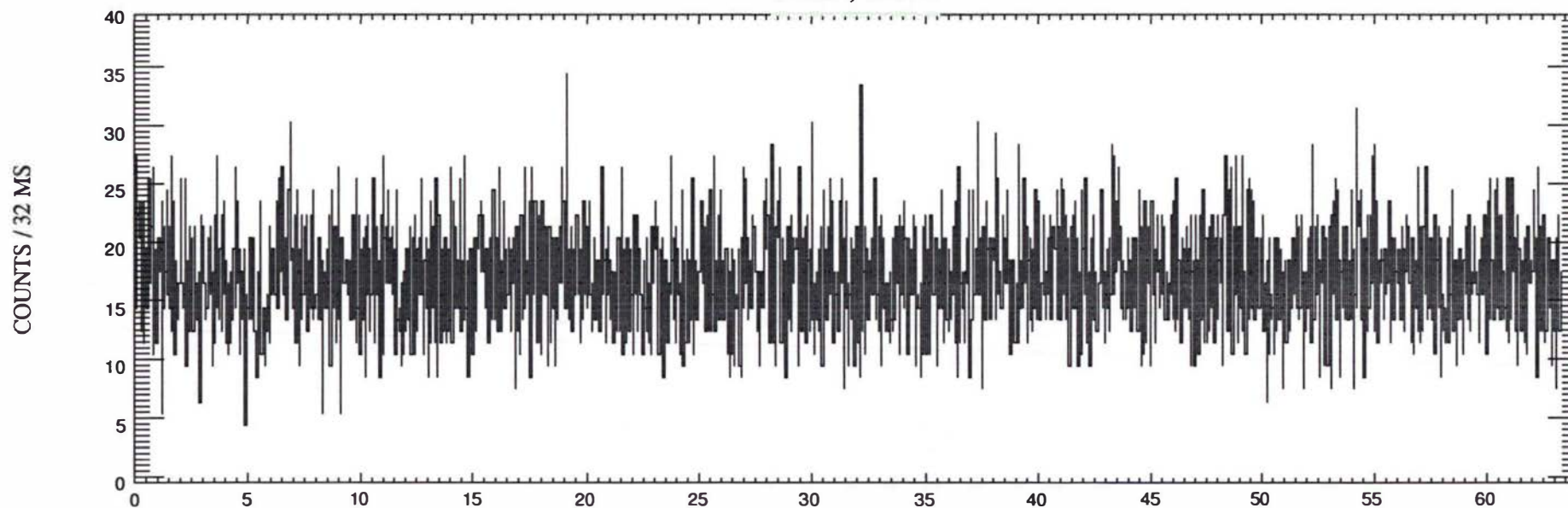
Burst Counter 10 at UT=12.087473975288 h=43514.906 s 12:05:14.906



Burst Counter 11 at UT=12.792761578030 h=46053.942 s 12:47:33.942

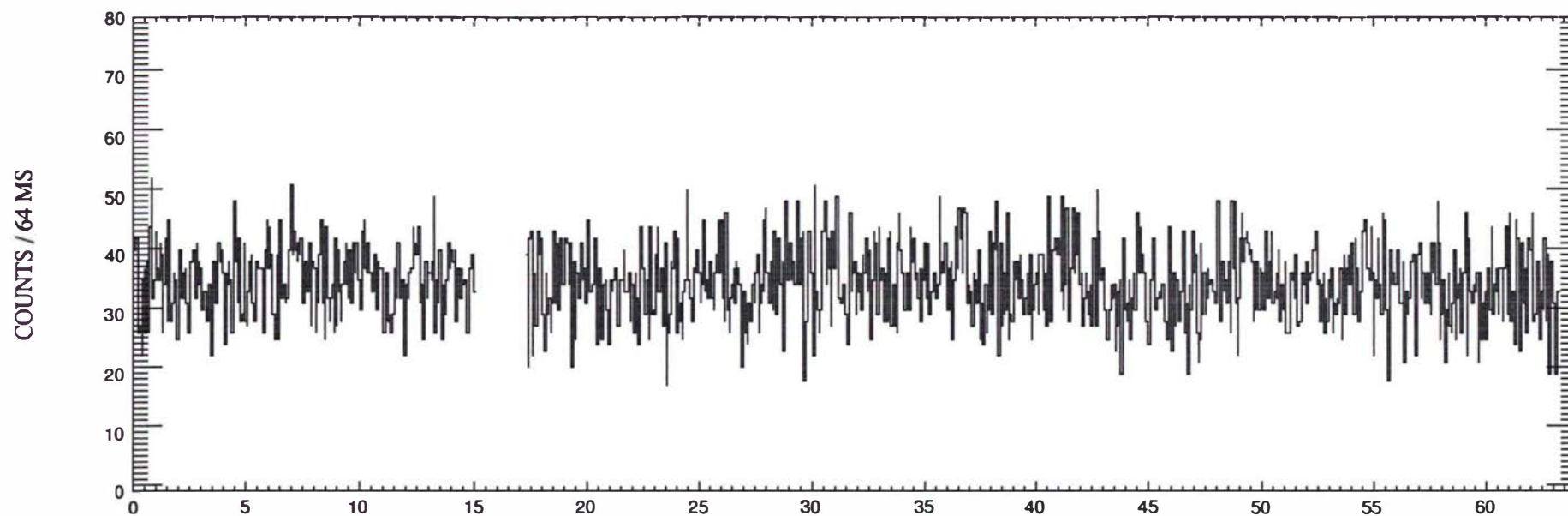


TIME, SECS

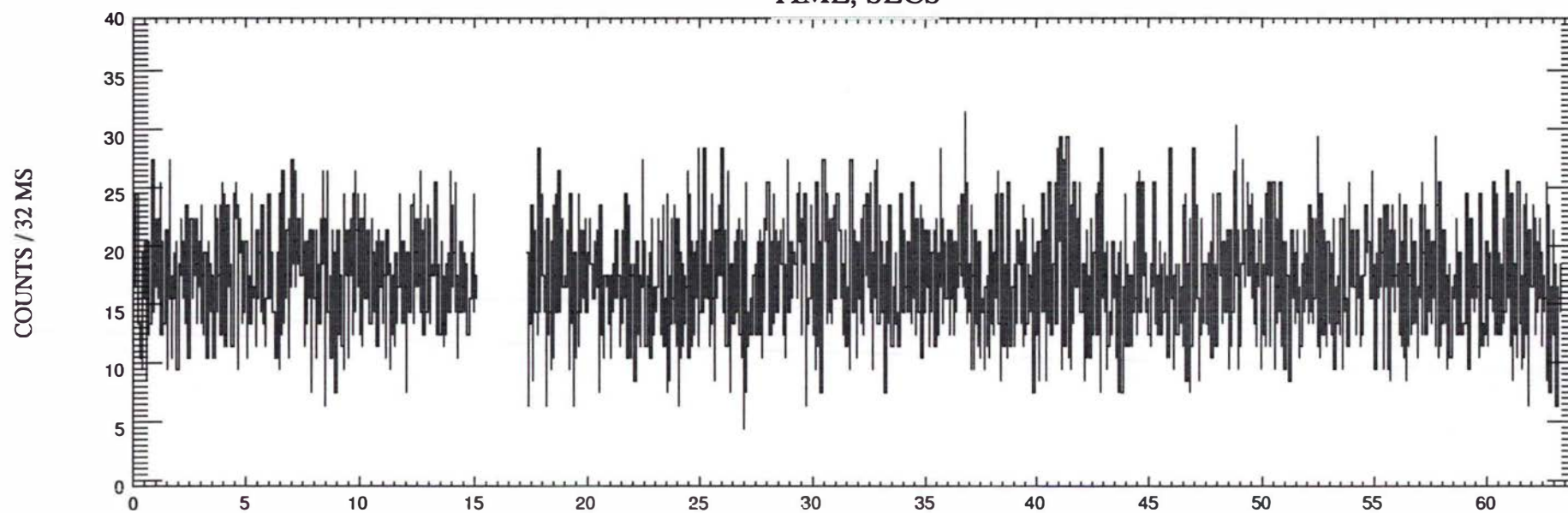


TIME, SECS

Burst Counter 12 at UT=13.654727359348 h=49157.018 s 13:39:17.018

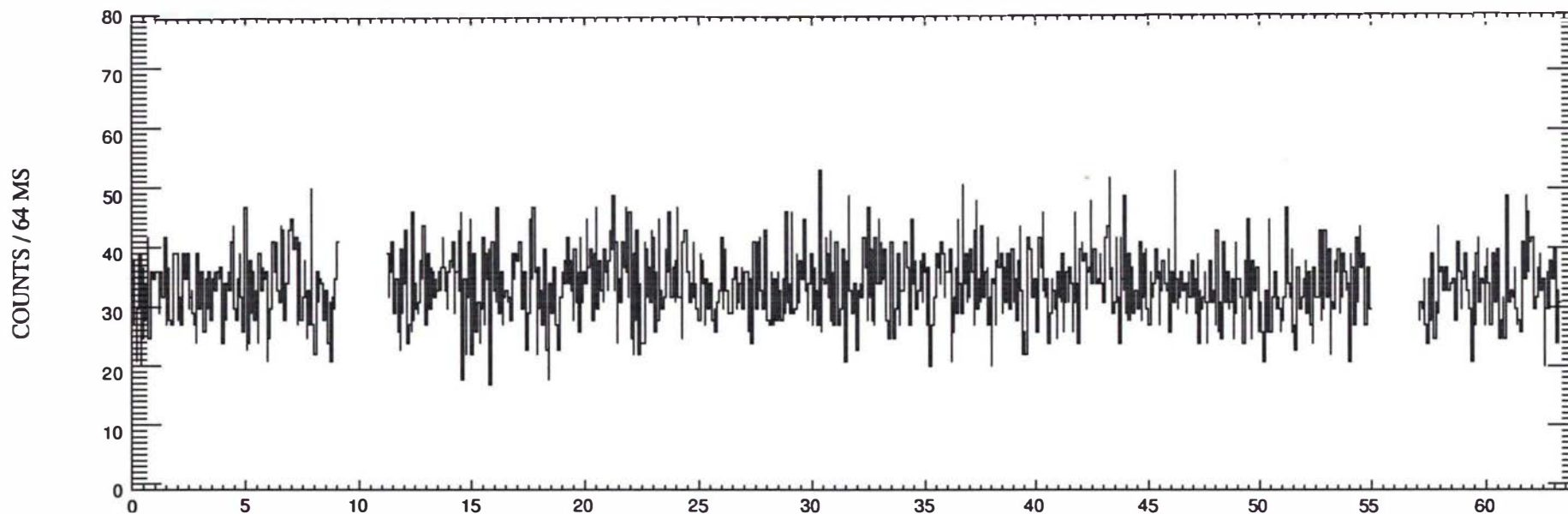


TIME, SECS

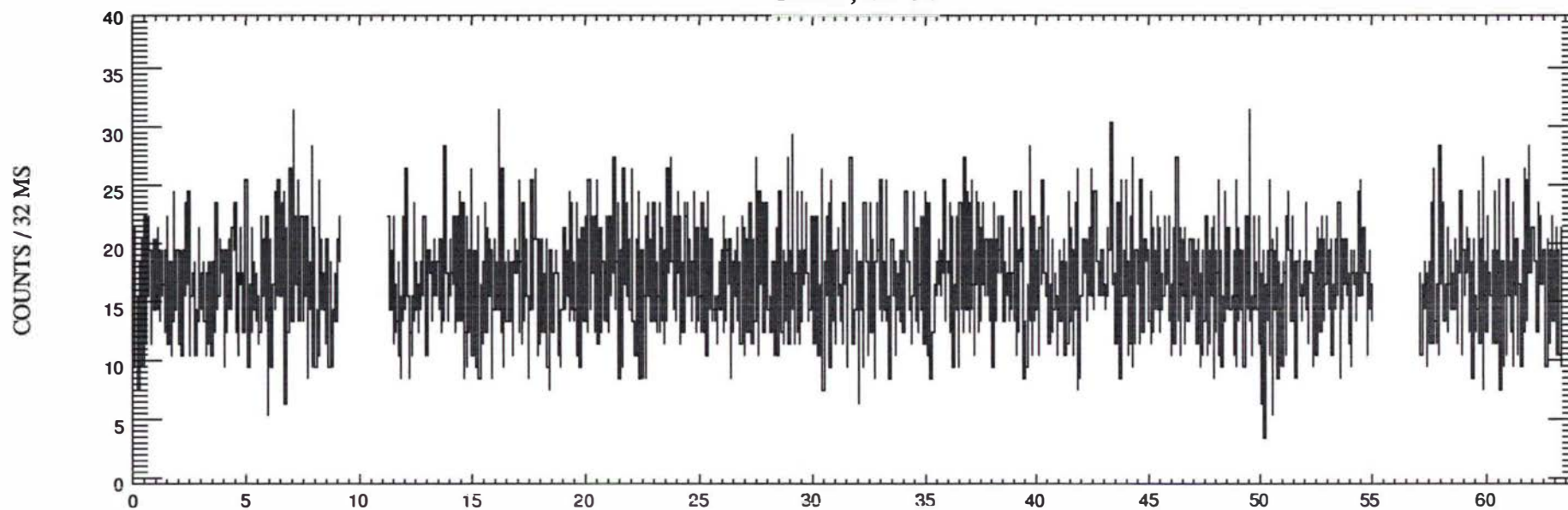


TIME, SECS

Burst Counter 13 at UT=14.500855115255 h=52203.078 s 14:30:03.078

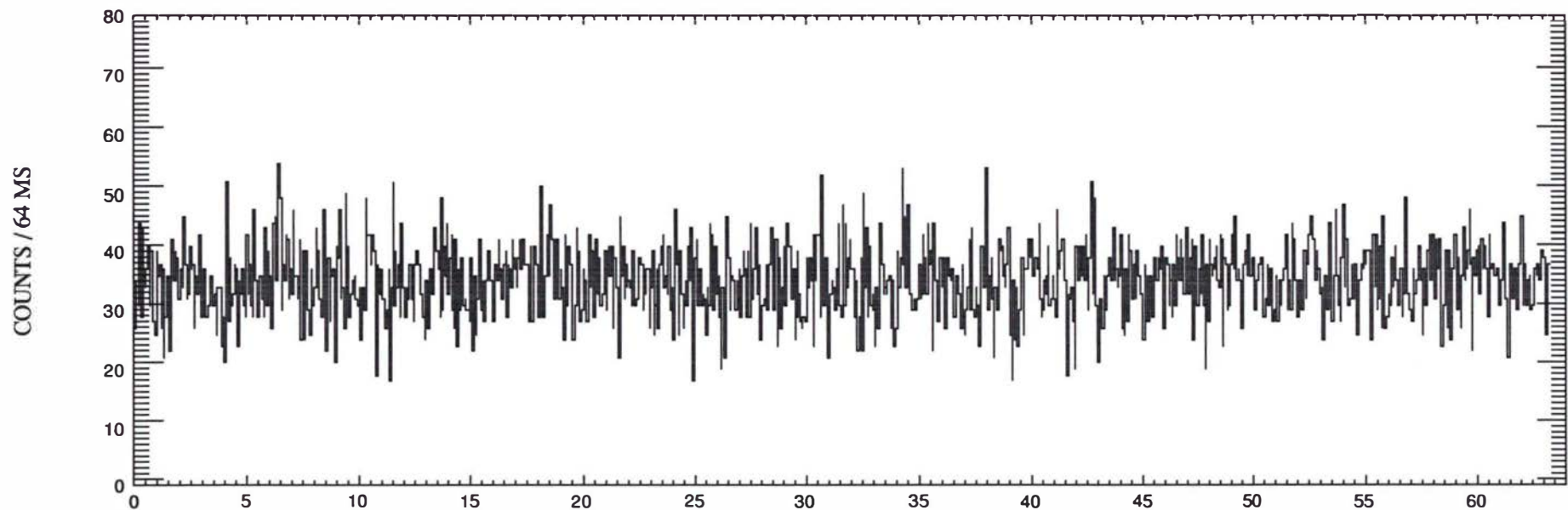


TIME, SECS

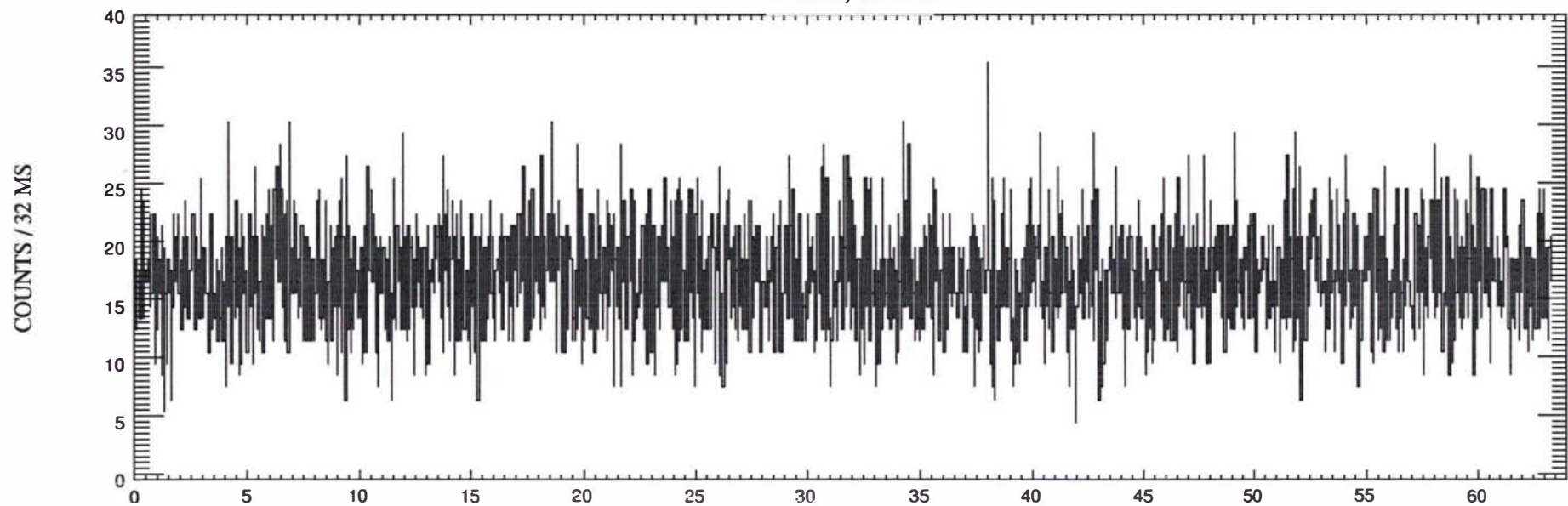


TIME, SECS

Burst Counter 14 at UT=15.435595753988 h=55568.145 s 15:26:08.145

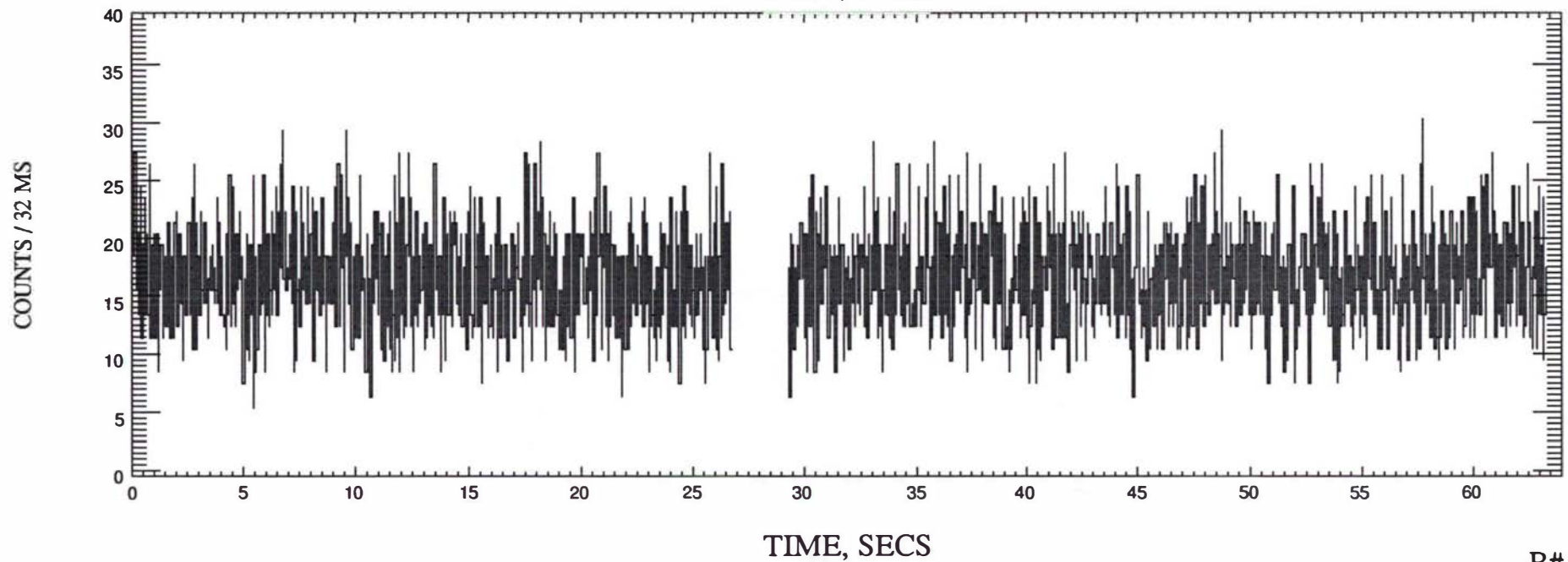
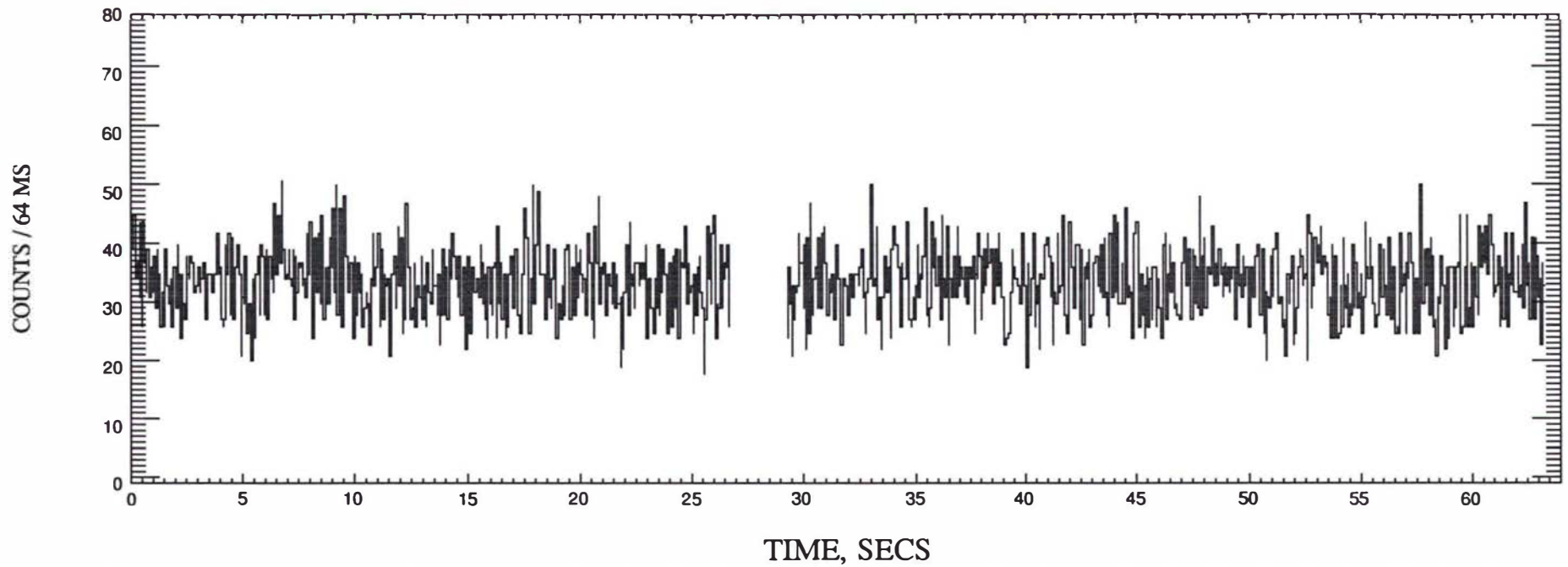


TIME, SECS

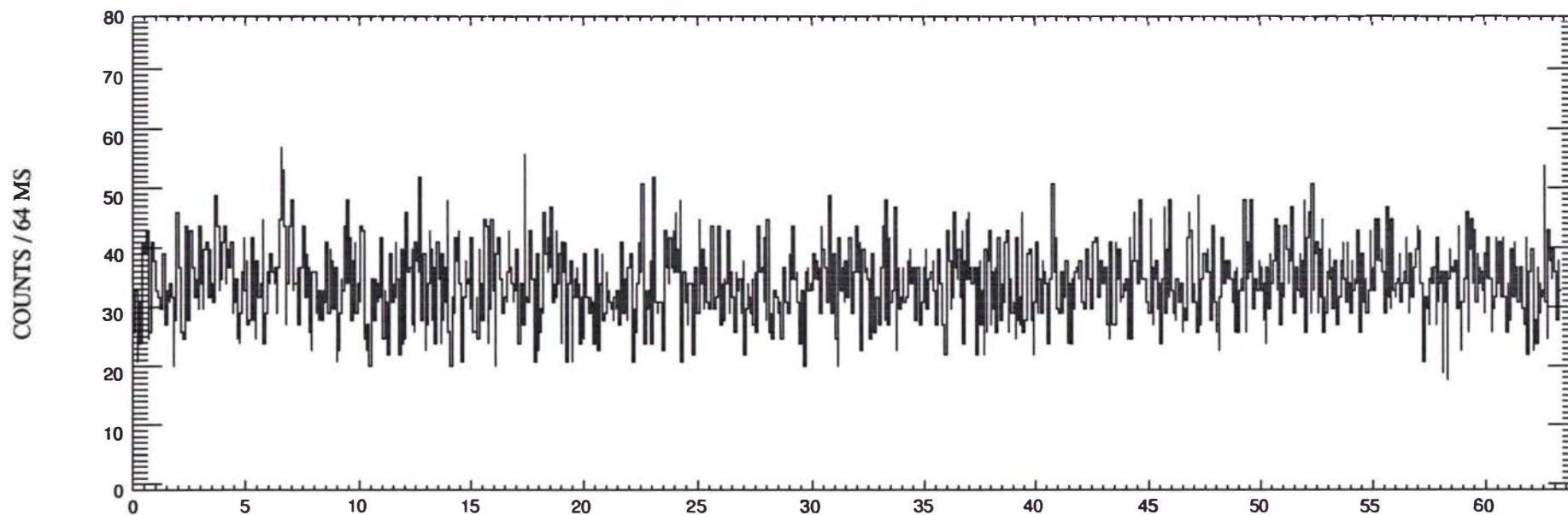


TIME, SECS

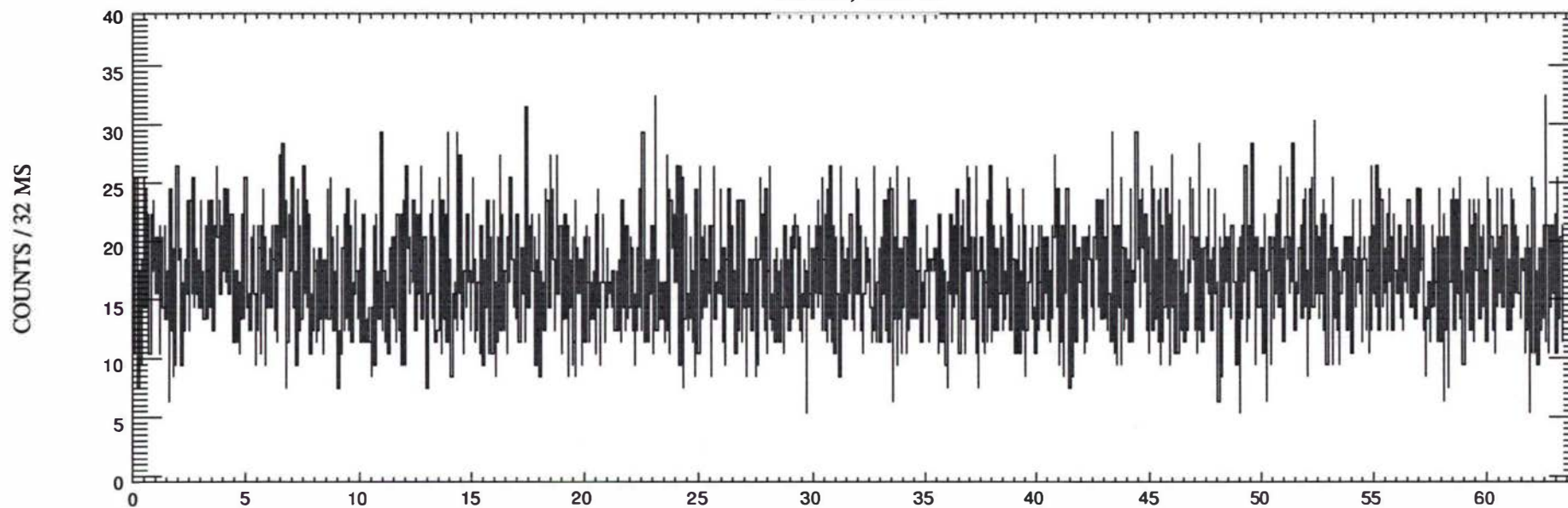
Burst Counter 15 at UT=16.168943252563 h=58208.196 s 16:10:08.196



Burst Counter 0 at UT=17.197296418084 h=61910.267 s 17:11:50.267

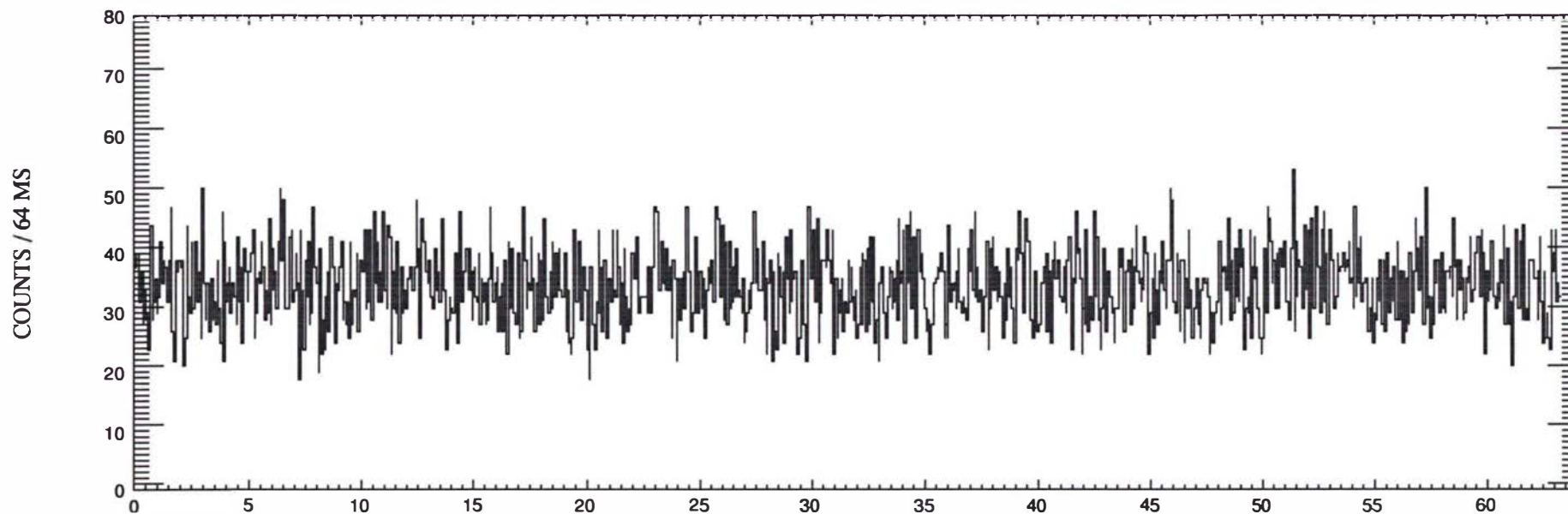


TIME, SECS

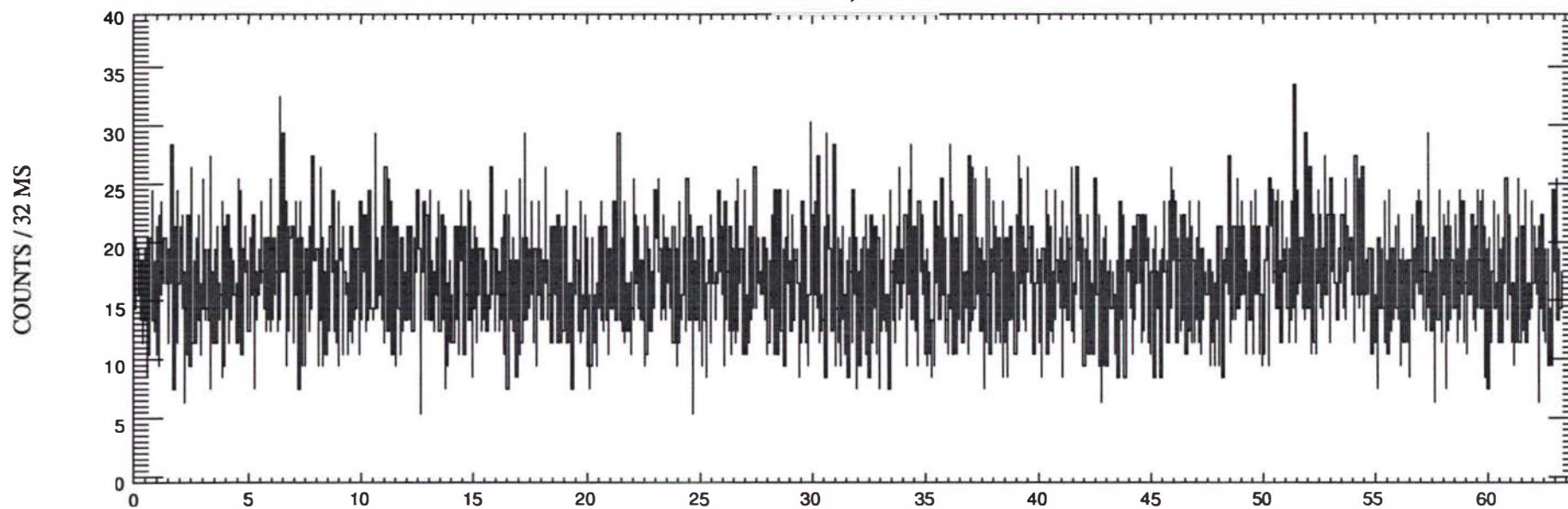


TIME, SECS

Burst Counter 1 at UT=18.870383800930 h=67933.382 s 18:52:13.382

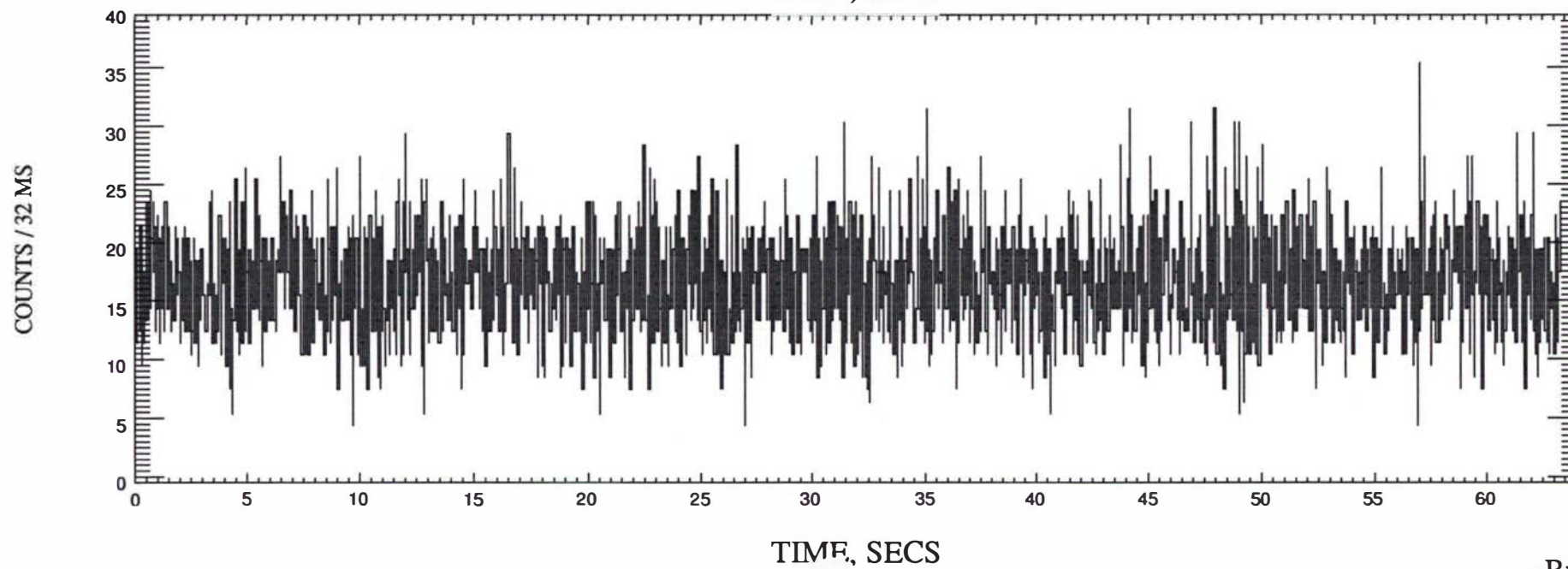
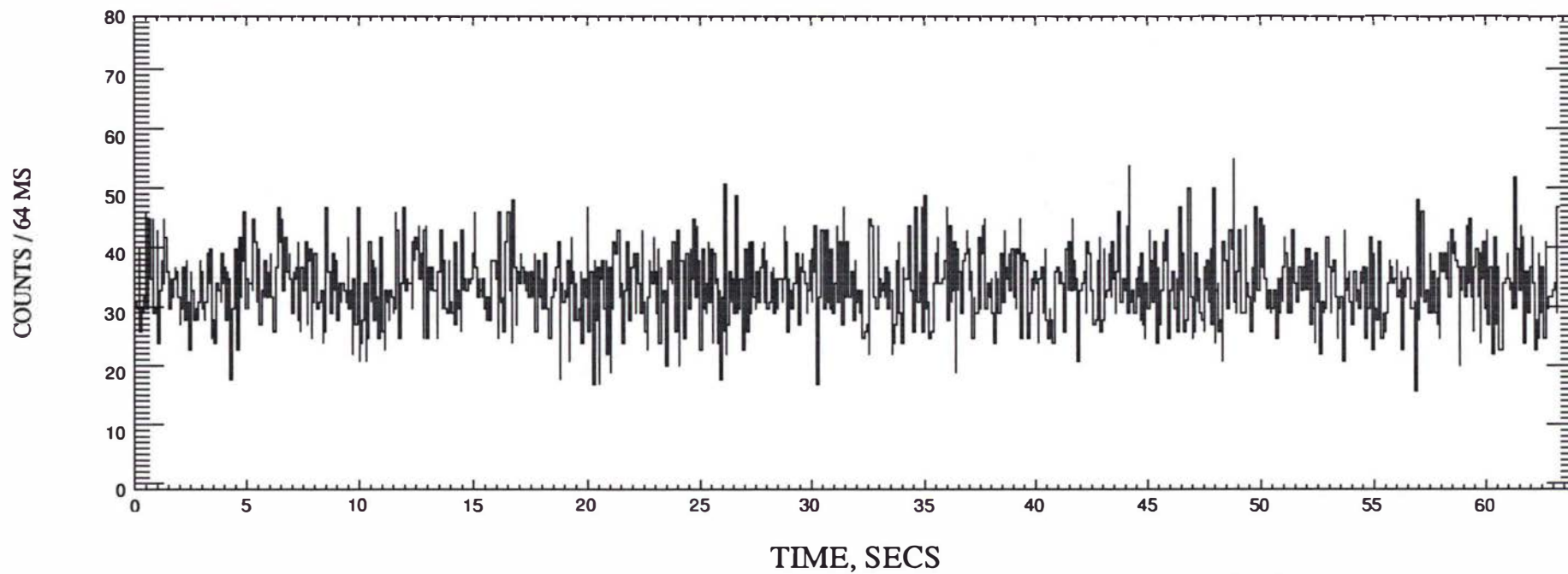


TIME, SECS

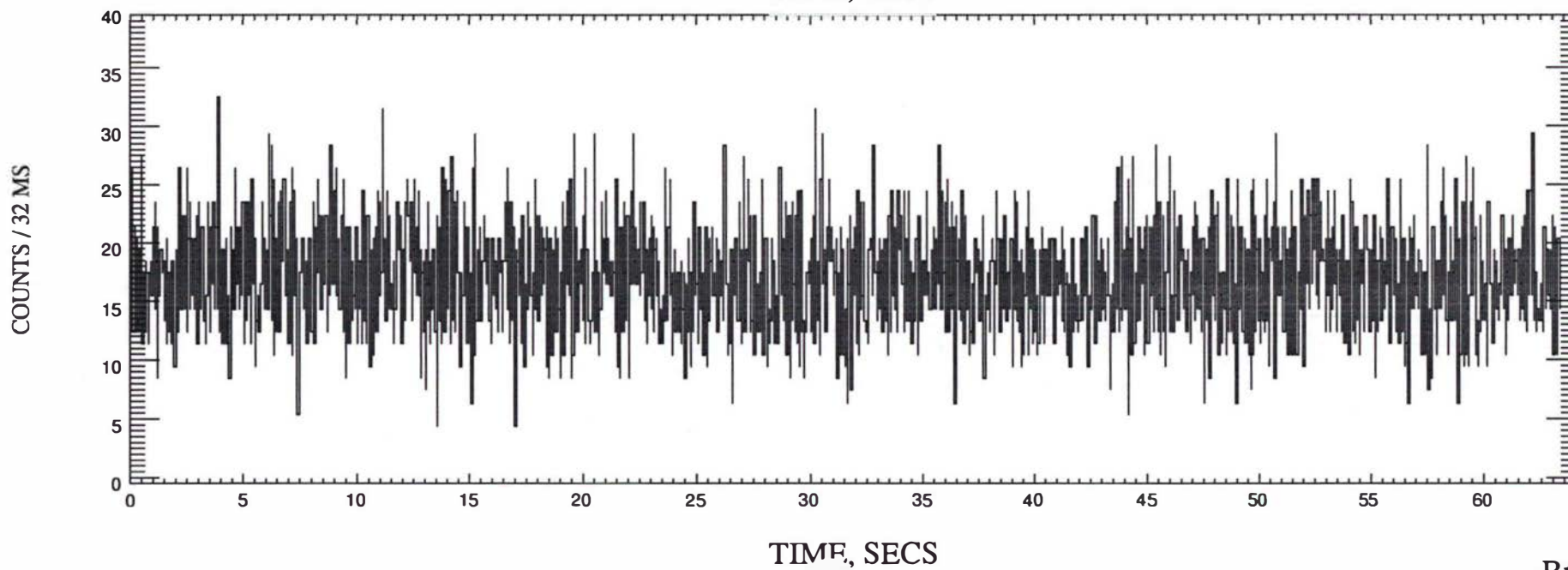
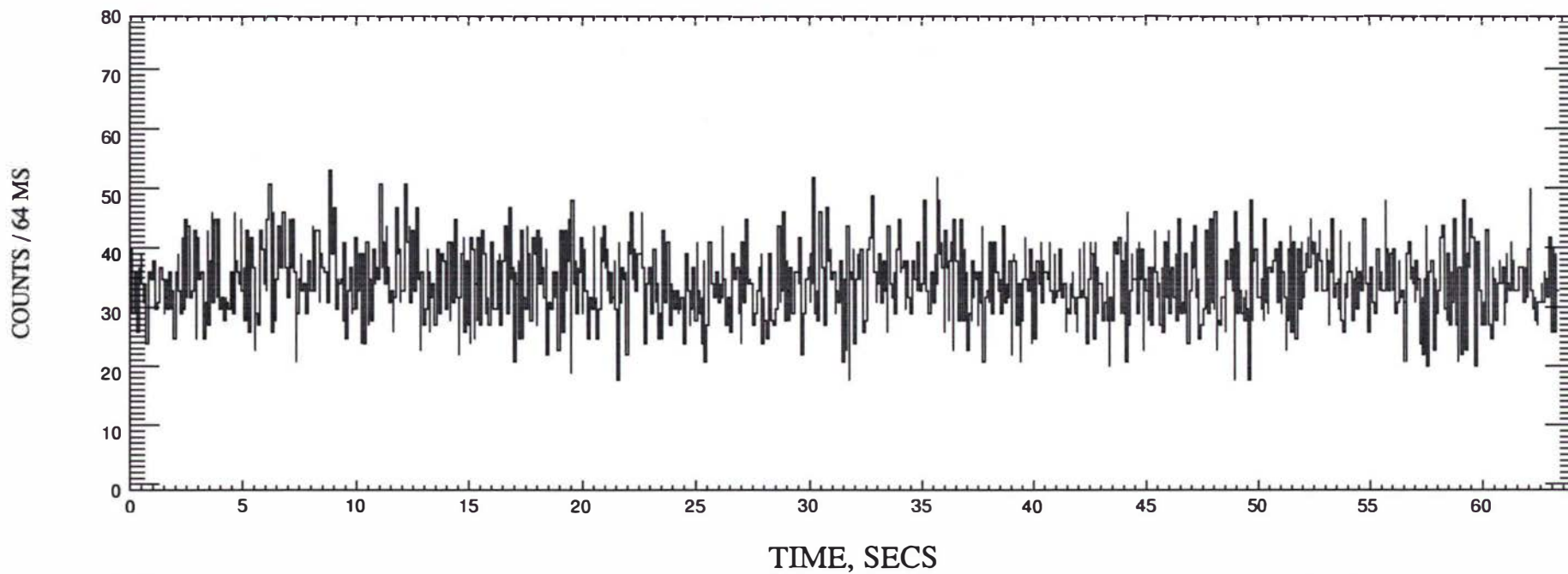


TIME, SECS

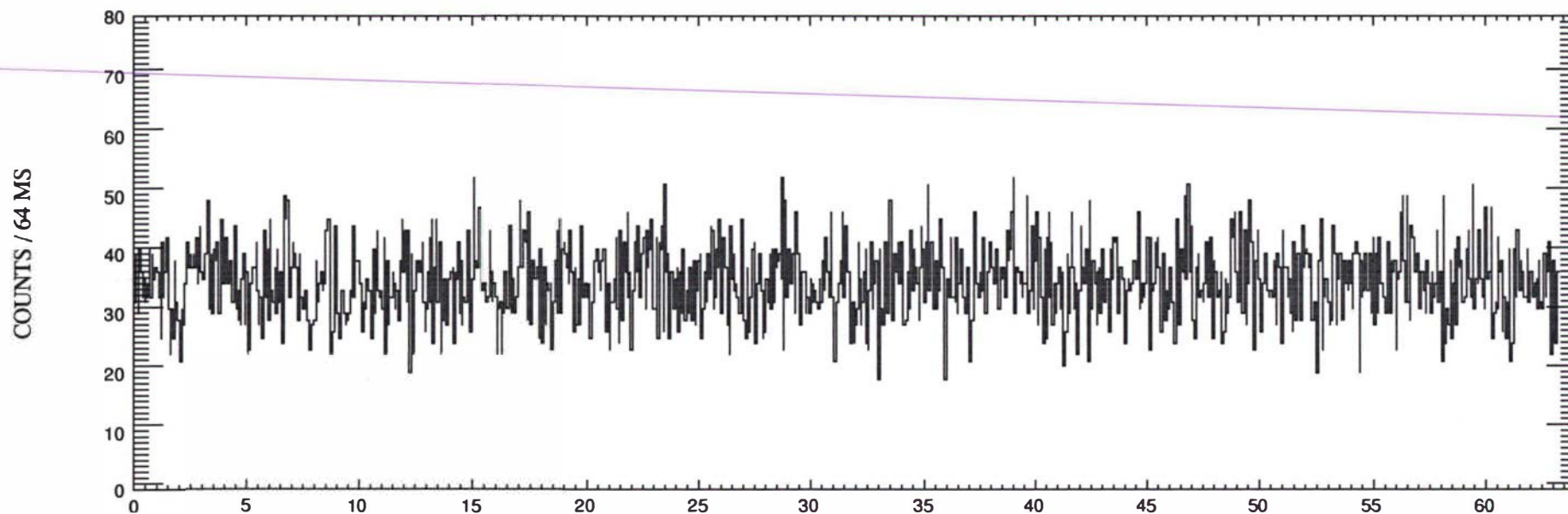
Burst Counter 2 at UT=20.496523907979 h=73787.486 s 20:29:47.486



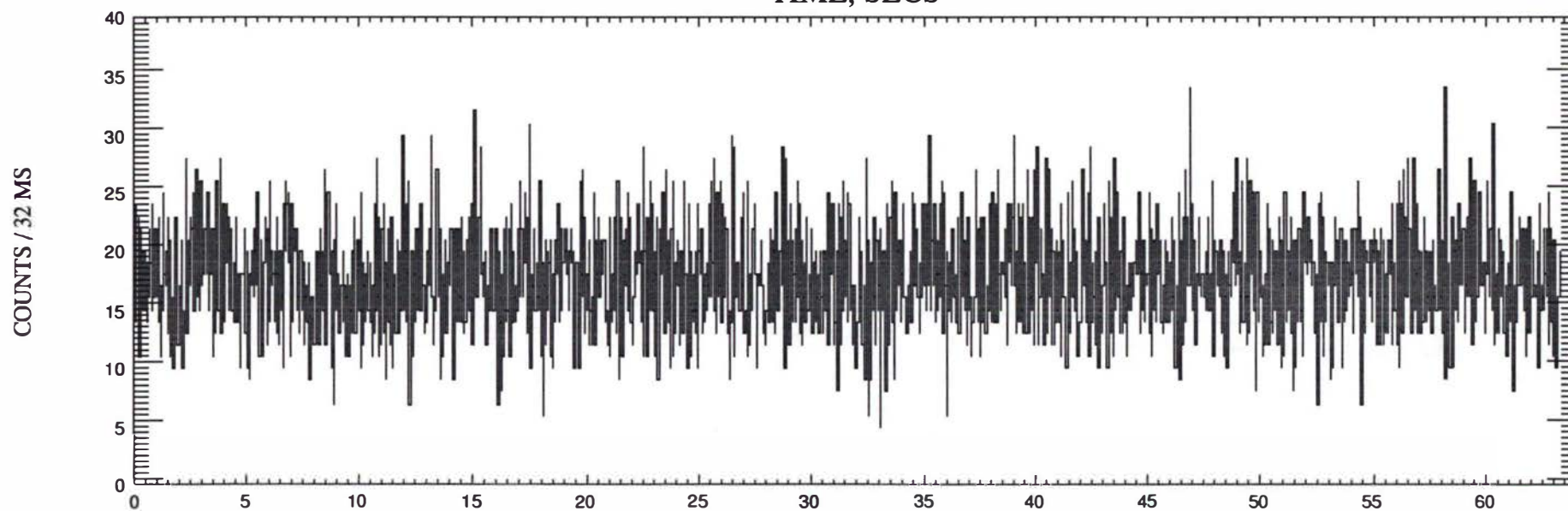
Burst Counter 3 at UT=21.879612134298 h=78766.604 s 21:52:46.604



Burst Counter 4 at UT=23.272138294644 h=83779.698 s 23:16:19.698

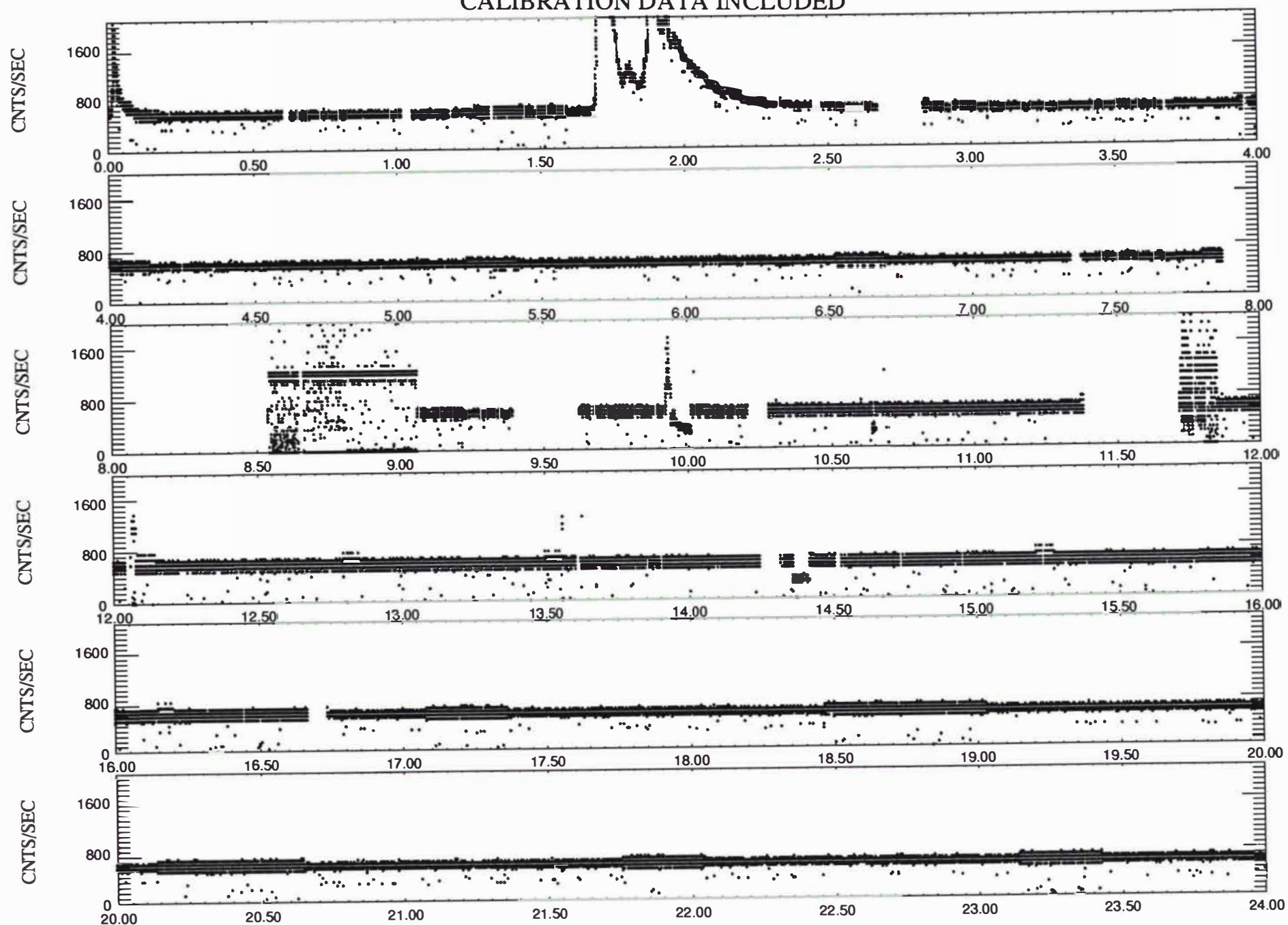


TIME, SECS

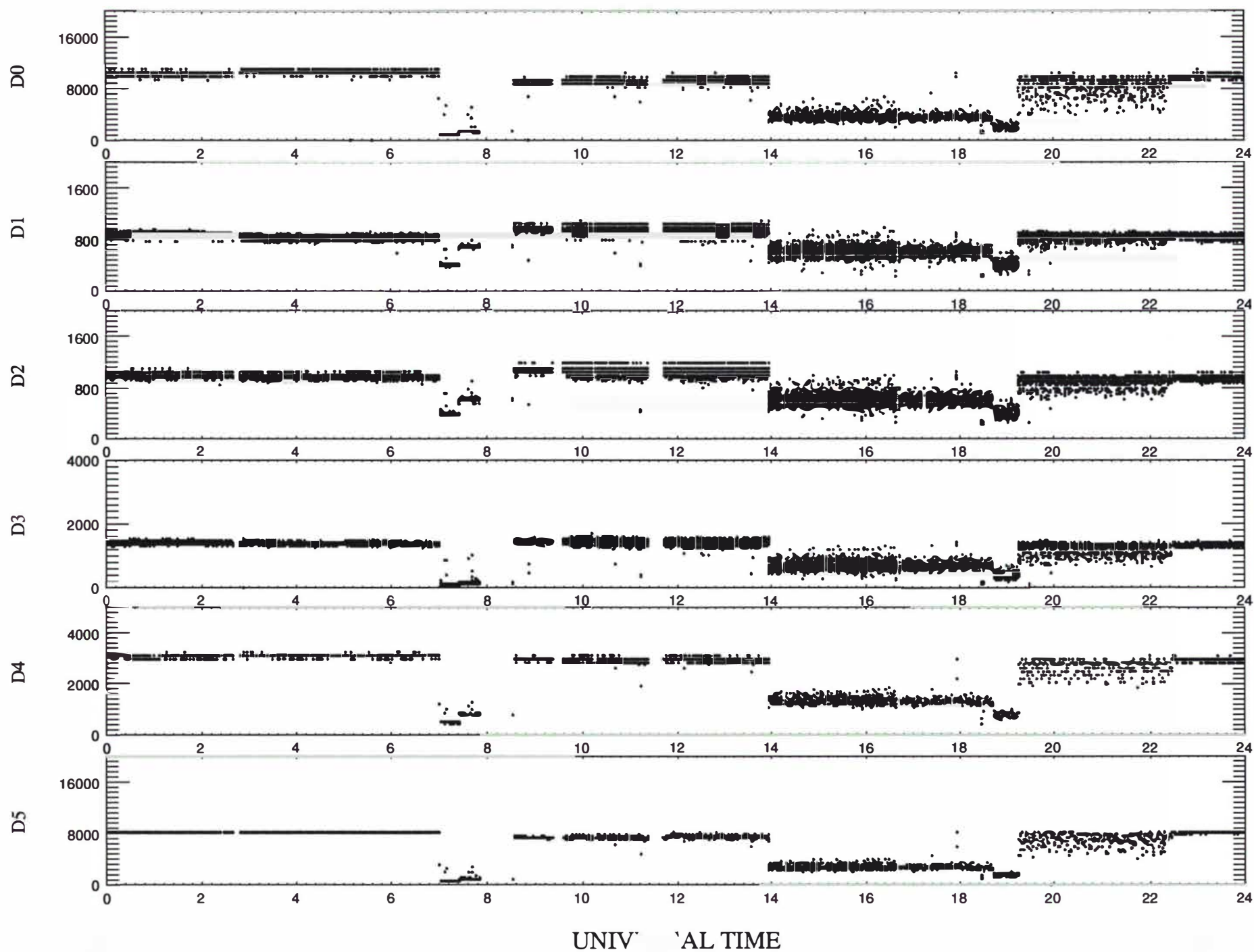


TIME, SECS

CALIBRATION DATA INCLUDED

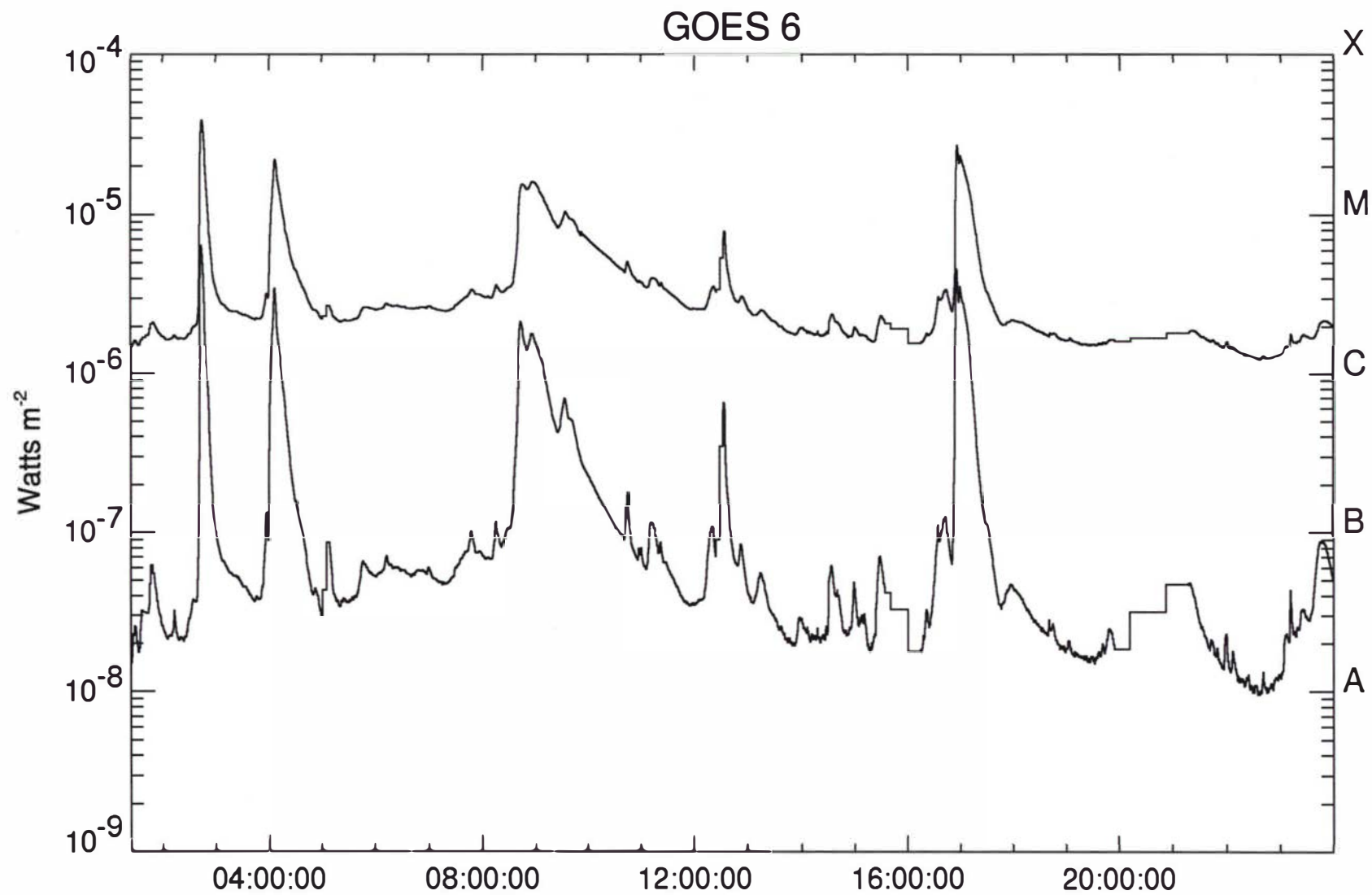


UNIV' AL TIME



Dezalay -> KH 7/93

DATE	U.T.	Nr UGB	Event Nature
1991-04-04	14:19:50.243	263-a	GRB
1991-04-04	17:17:18.562	263-b	GRB
1991-04-07	03:13:21.146	265-a	Solar Flare
1991-04-17	20:07:31.886	273-a	GRB
1991-05-16	06:47:23.641	281-a	Solar Flare
1991-05-17	05:02:42.959	282-a	GRB
1991-05-17	09:03:44.505	282-b	Solar Flare
1991-05-27	23:44:36.515	287-a	GRB
1991-05-28	07:26:24.093	287-b	Solar Flare
1991-05-28	18:17:55.430	287-c	Solar Flare
1991-05-31	16:53:41.316	289-a	Solar Flare
1991-06-01	14:56:53.229	290-a	Solar Flare
1991-06-01	~15:08	290-b	Solar Flare
1991-06-01	19:20:29.144	290-c	GRB
1991-06-09	22:05:12.335	293-a	Solar Particles
1991-06-10	02:27:27.347	293-b	Solar Flare
1991-06-10	13:55:19.964	294-a	Solar Flare
1991-06-10	16:53:30.025	294-b	Solar Flare
1991-06-11	01:58:25.934	294-c	Solar Flare
1991-06-26	20:13:20.758	303-a	Solar Flare
1991-06-27	04:29:18.339	303-b	GRB
1991-06-29	19:55:48.409	304-a	GRB
1991-06-30	02:56:07.591	304-b	Solar Flare
1991-06-30	03:29:11.438	304-c	Solar Particles
1991-07-13	19:37:58.821	307-a	Solar Flare
1991-07-17	04:33:04.862	309-a	GRB
1991-07-17	06:25:49.736	309-b	Solar Flare
1991-07-20	01:37:48.274	311-a	Solar Flare
1991-08-14	11:10:26.782	314-a	GRB
1991-08-14	19:14:33.396	315-a	GRB
1991-08-17	17:09:24.566	317-a	GRB
1991-08-21	10:33:39.184	320-a	GRB
1991-08-25	09:36:25.301	323-a	Solar Flare
1991-08-27	13:11:18.345	325-a	Solar Particles
1991-08-27	14:51:03.053	325-b	Solar Particles



Data Start: 91/05/31, 0124:13

Channel 1 (1.0 - 8.0 Angstroms)

2 (0.5 - 4.0 Angstroms)

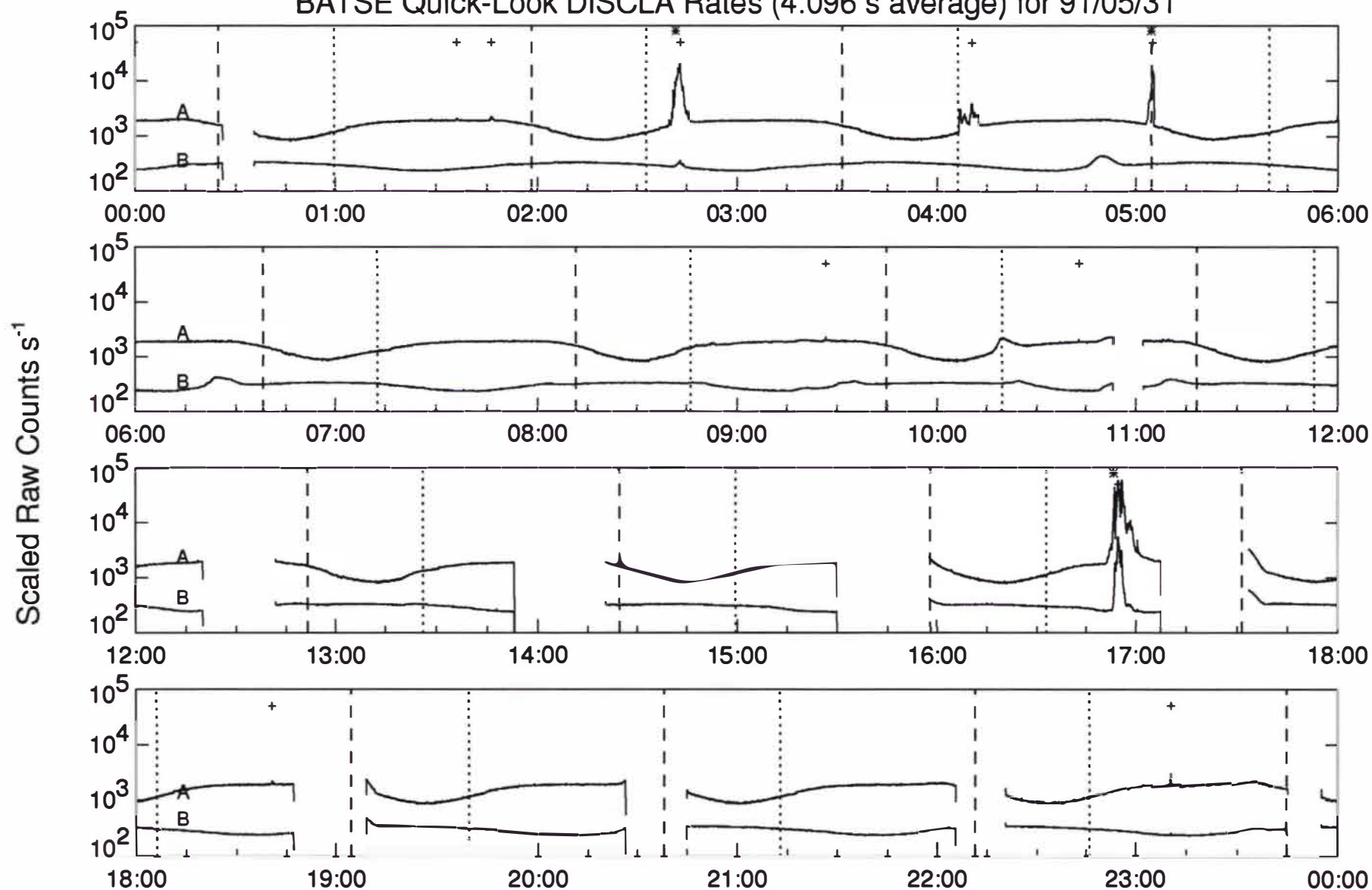
Plot created: 96/12/02, 1913

Background not subtracted

Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 91/05/31



Current Time: 96/12/02, 1914 EDT

A: Channel 0 Most Sunward LAD

B: Sum Channel 0 Anti-Sunward LADs X .05

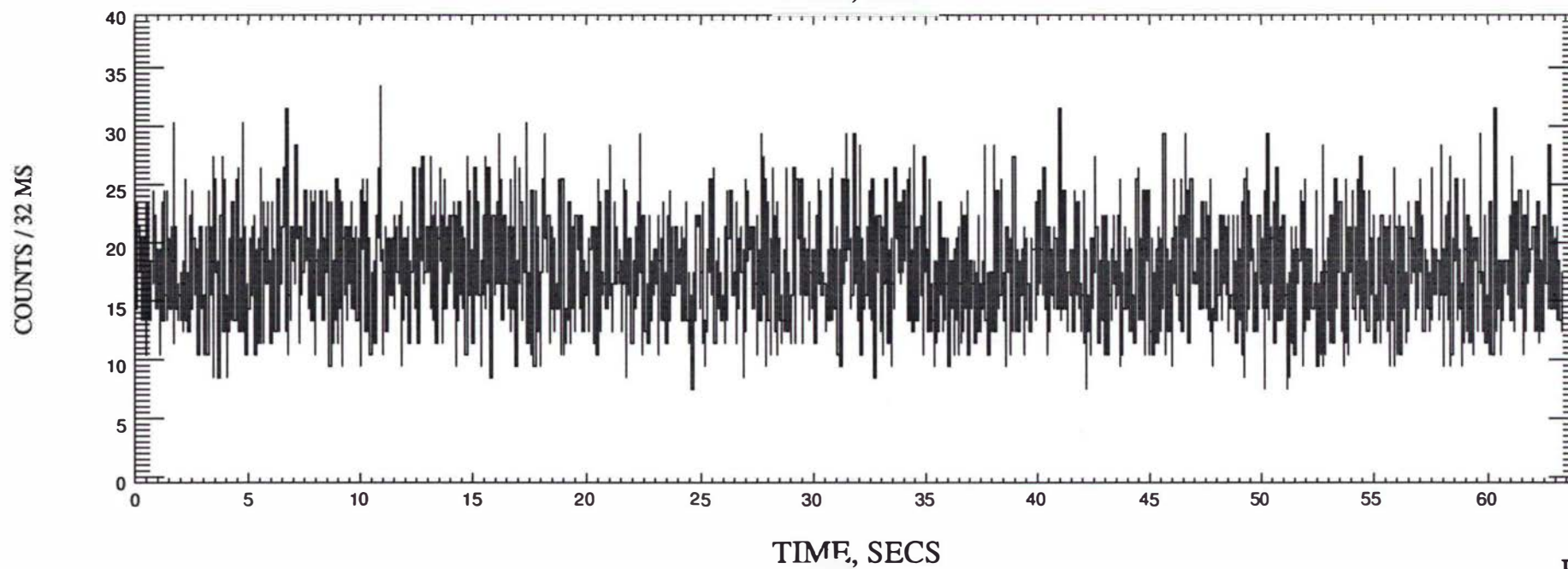
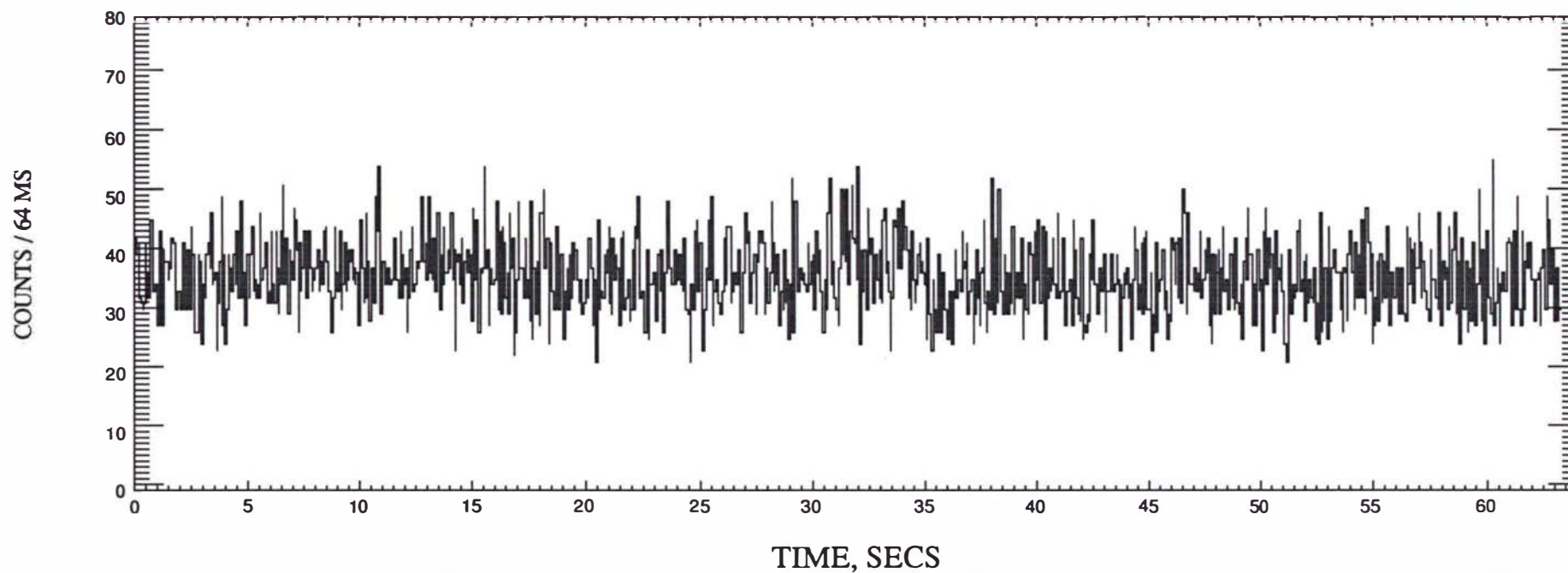
Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare

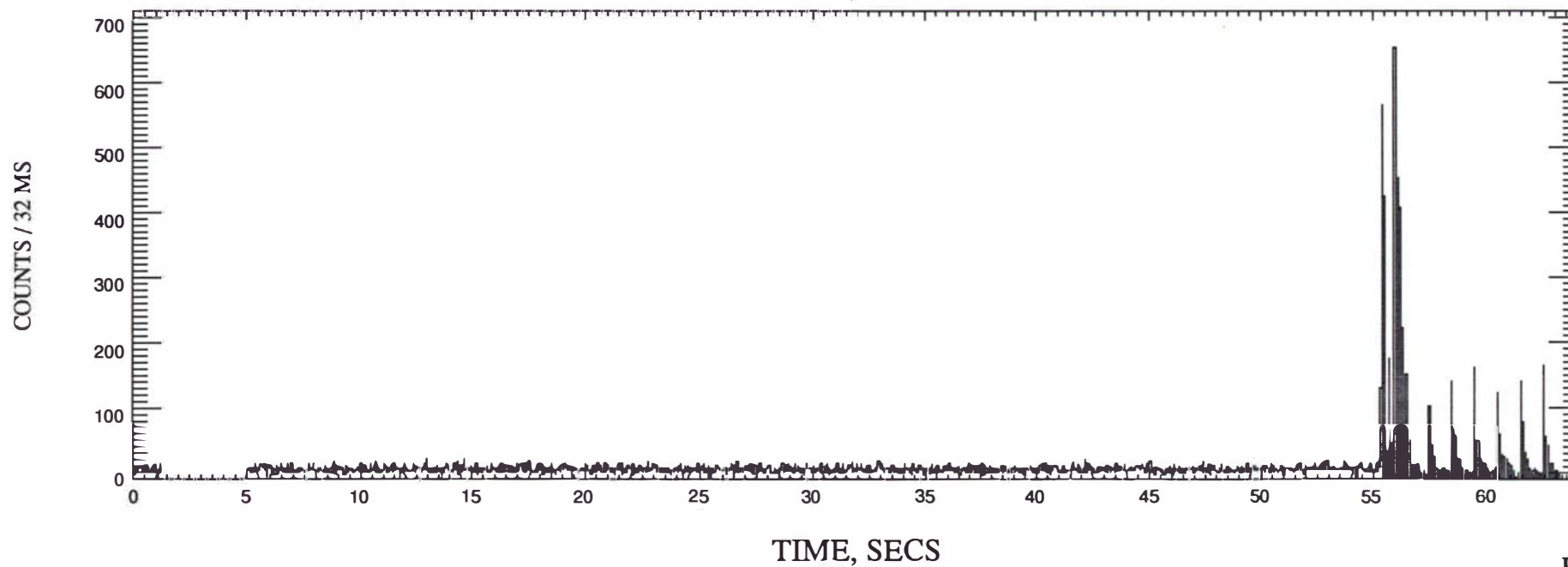
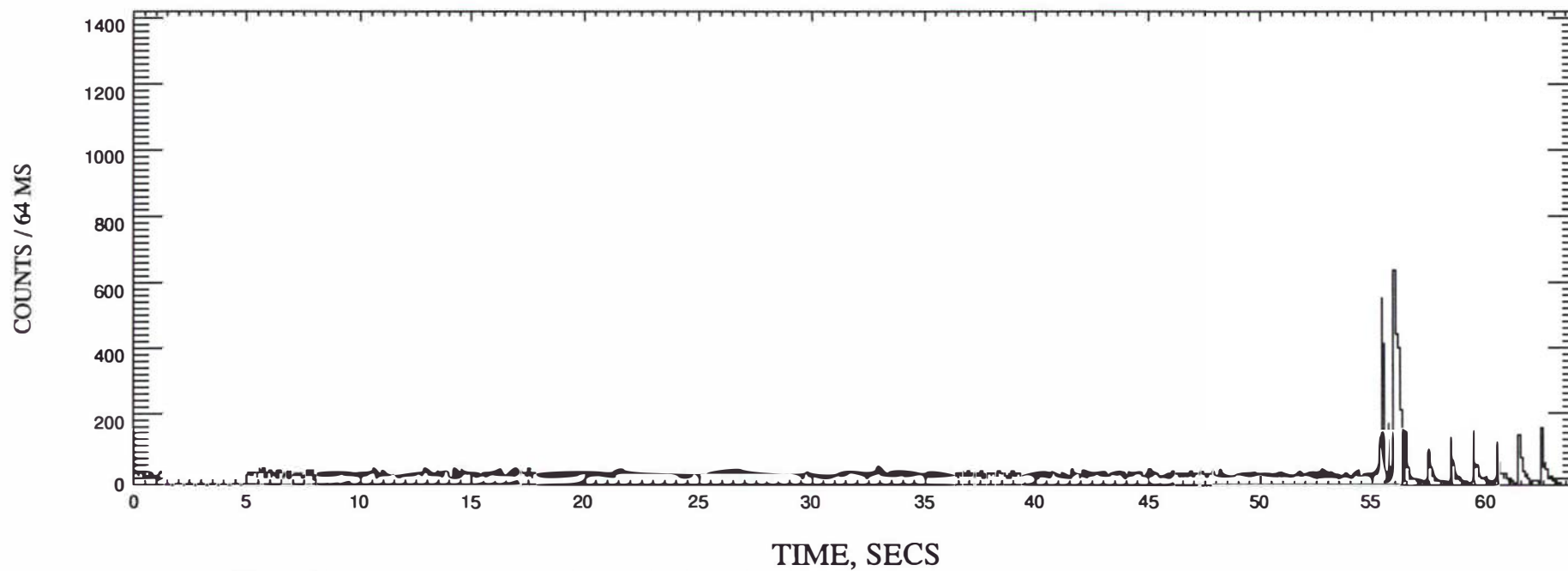
BURST NUMBER 5 - 15, 0 - 3



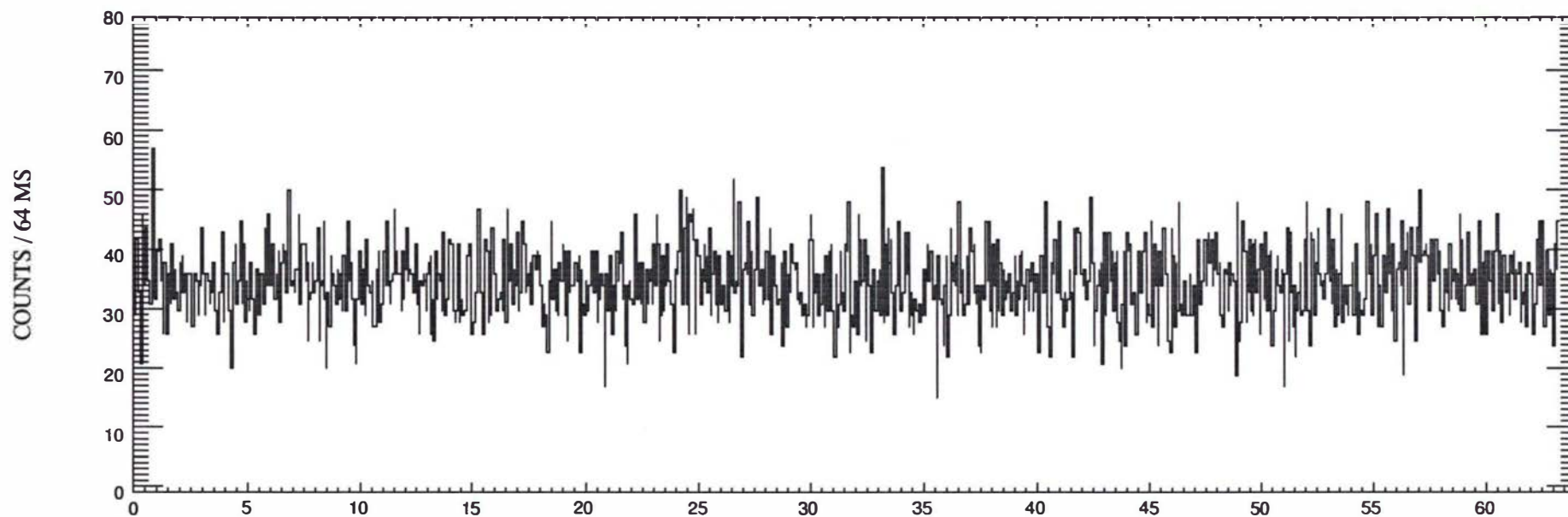
Burst Counter 5 at UT= 0.535499297248 h= 1927.797 s 00:32:07.797



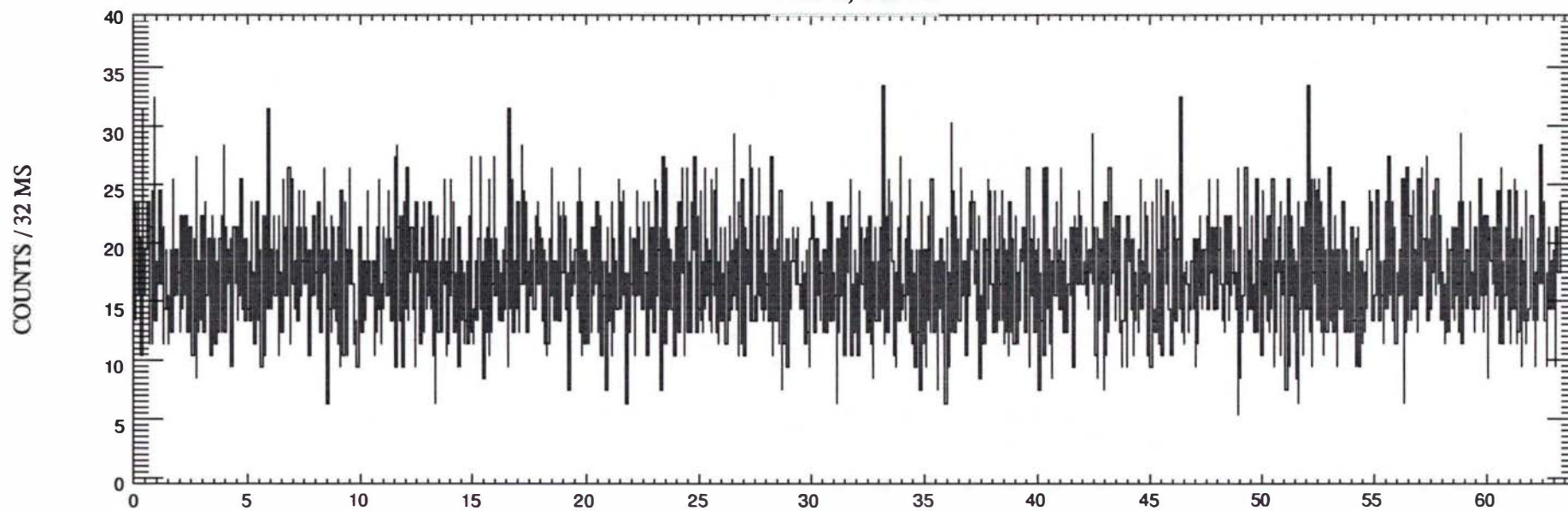
Burst Counter 6 at UT= 1.802464235094 h= 6488.871 s 01:48:08.871



Burst Counter 8 at UT= 3.258050956726 h=11728.983 s 03:15:28.983

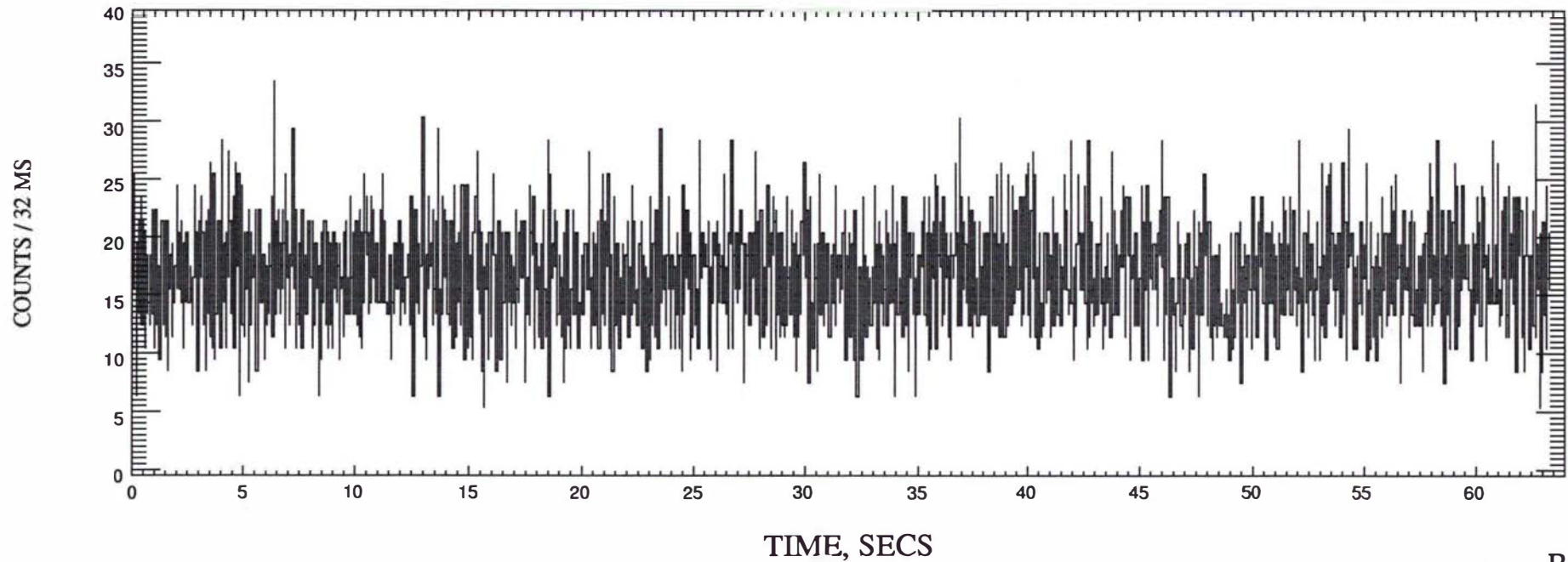
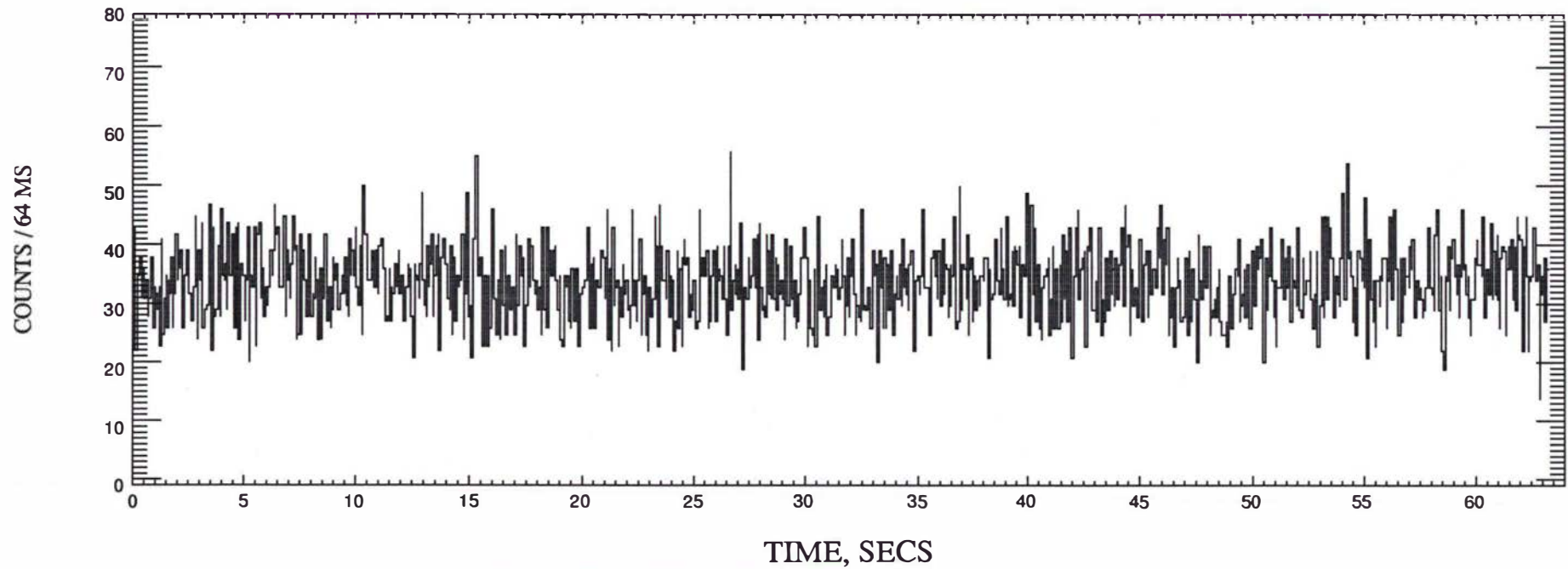


TIME, SECS

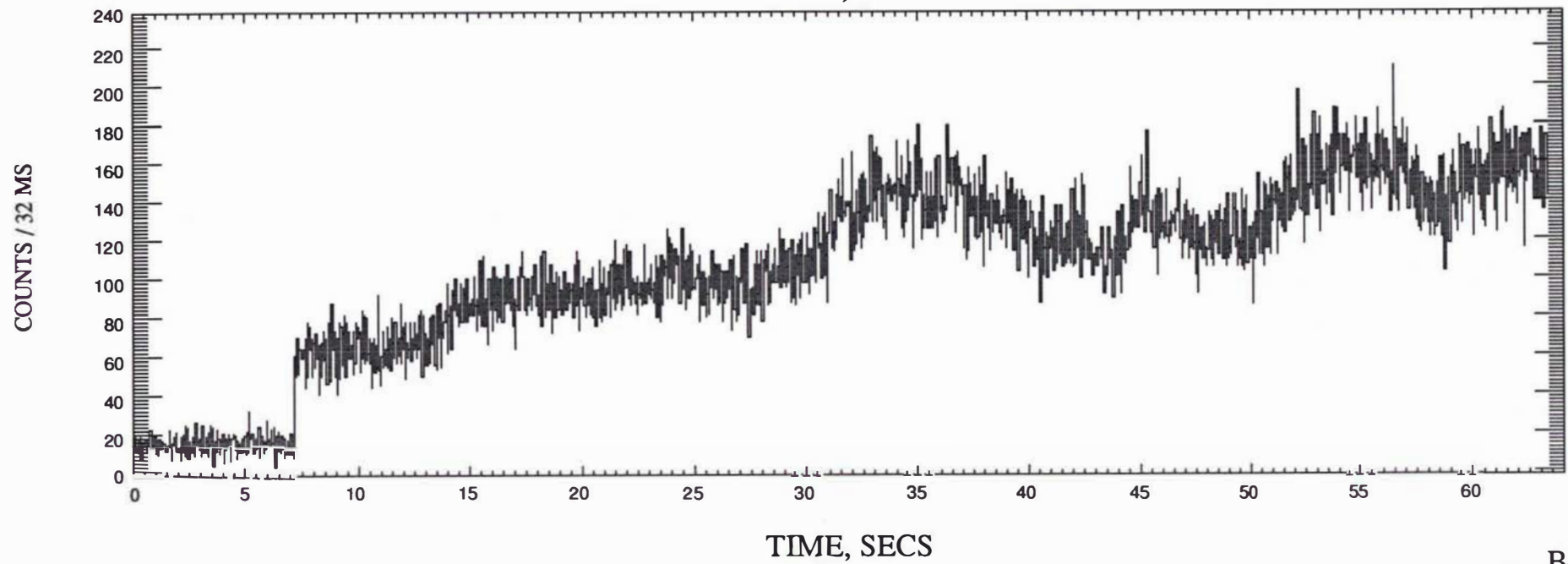
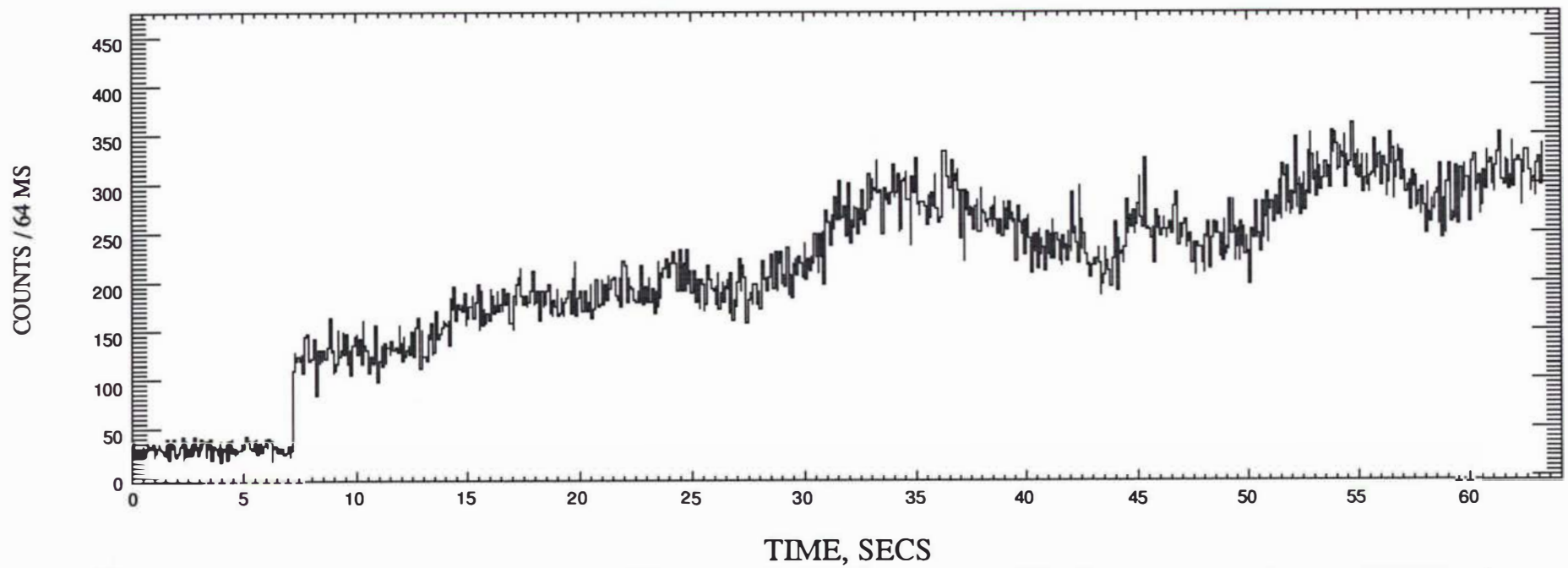


TIME, SECS

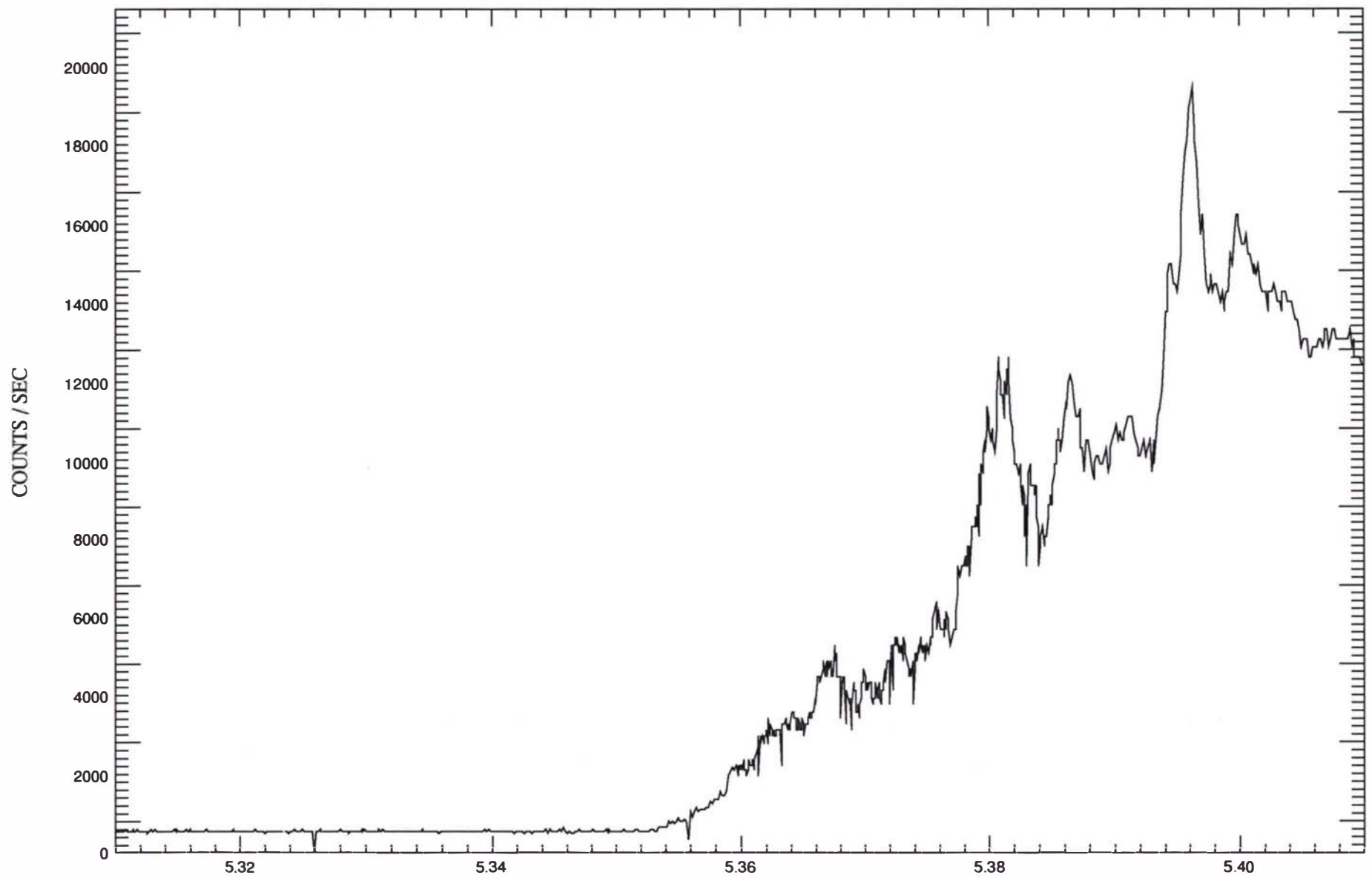
Burst Counter 9 at UT= 4.658077871535 h=16769.080 s 04:39:29.080



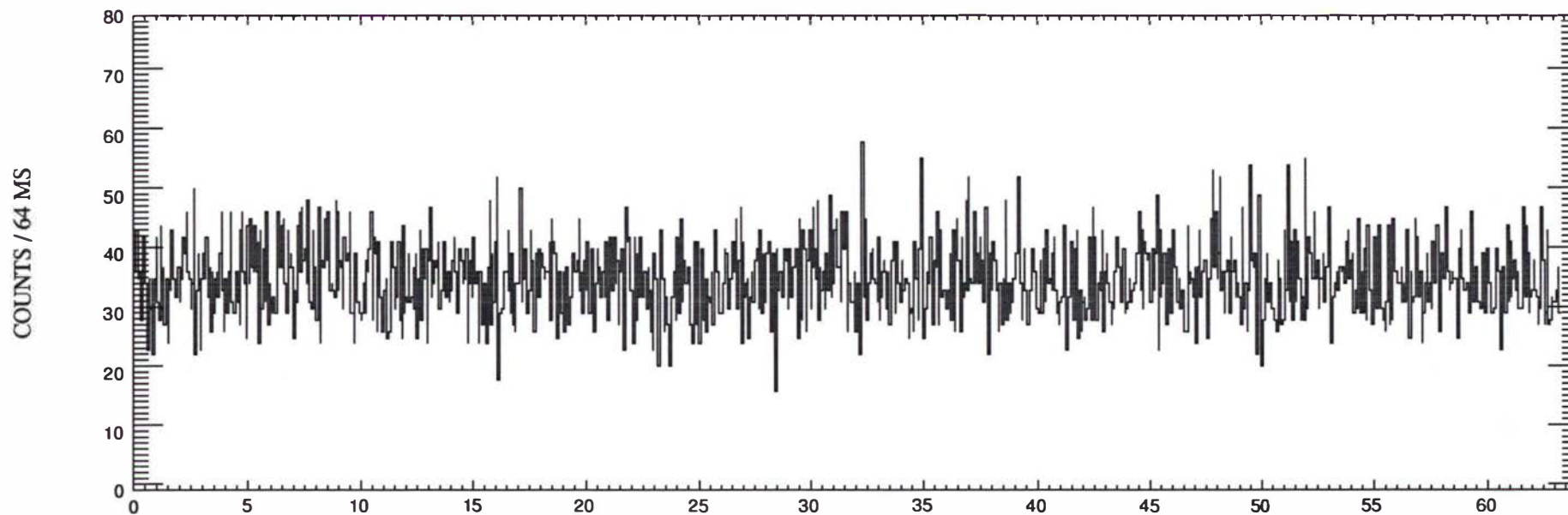
Burst Counter 10 at UT= 5.359513477749 h=19294.249 s 05:21:34.249



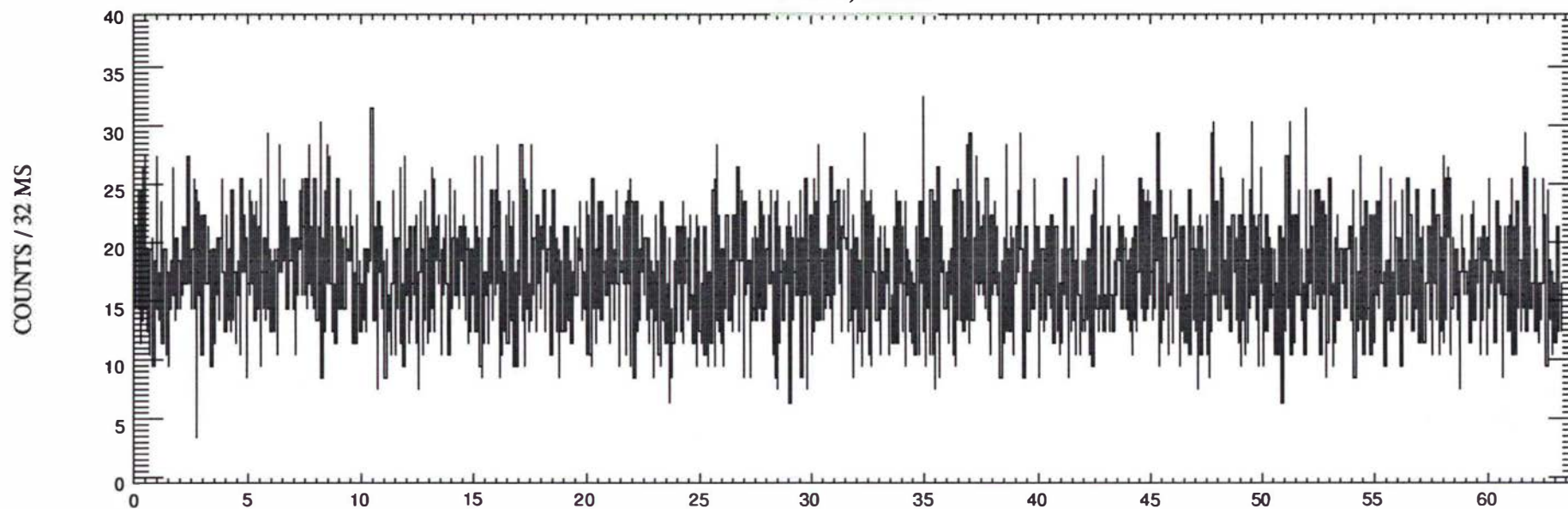
CALIBRATION DATA INCLUDED



Burst Counter 11 at UT= 6.109489996168 h=21994.164 s 06:06:34.164

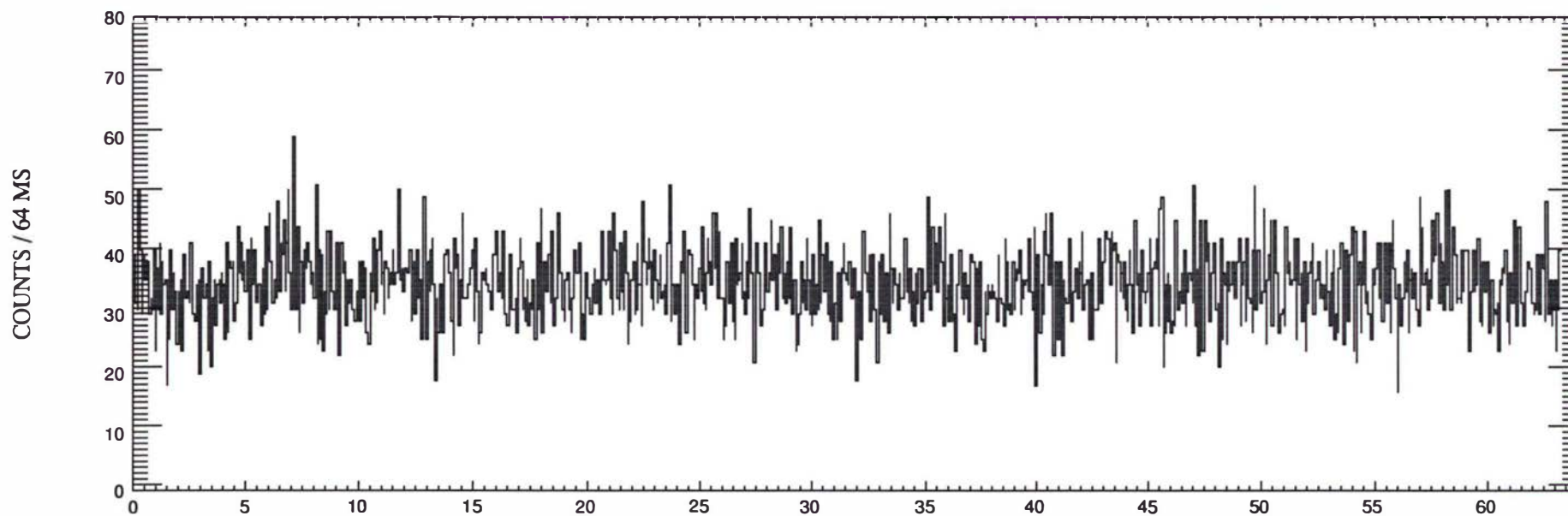


TIME, SECS

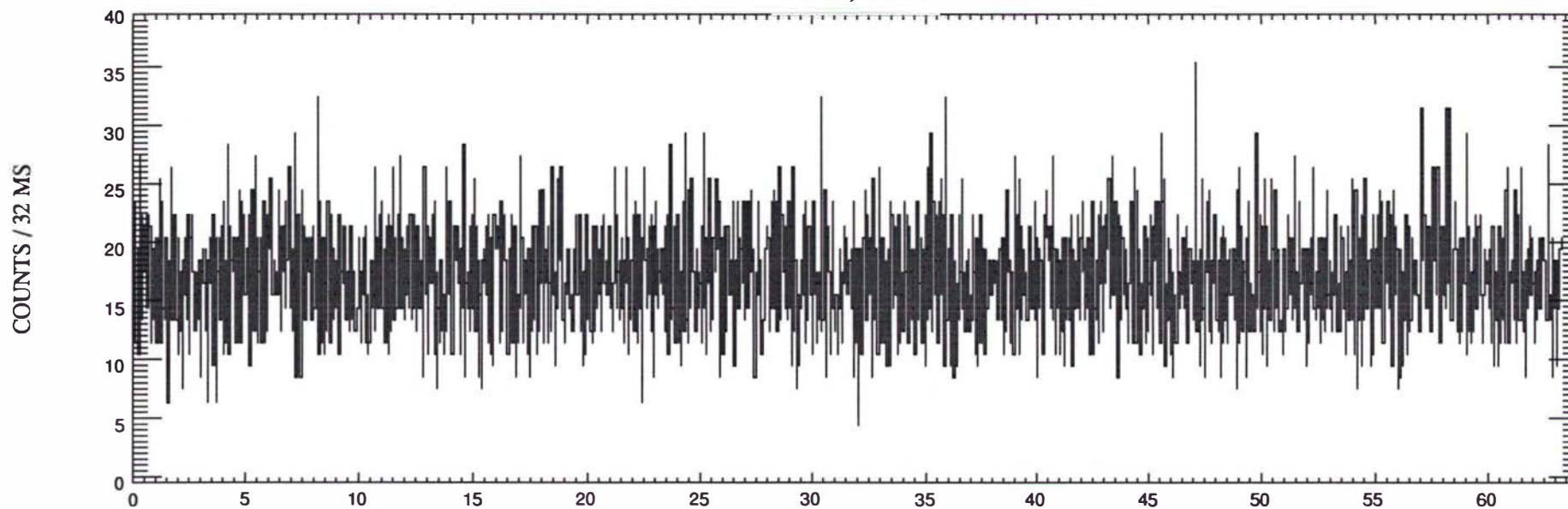


TIME, SECS

Burst Counter 12 at UT= 6.907561136882 h=24867.220 s 06:54:27.220

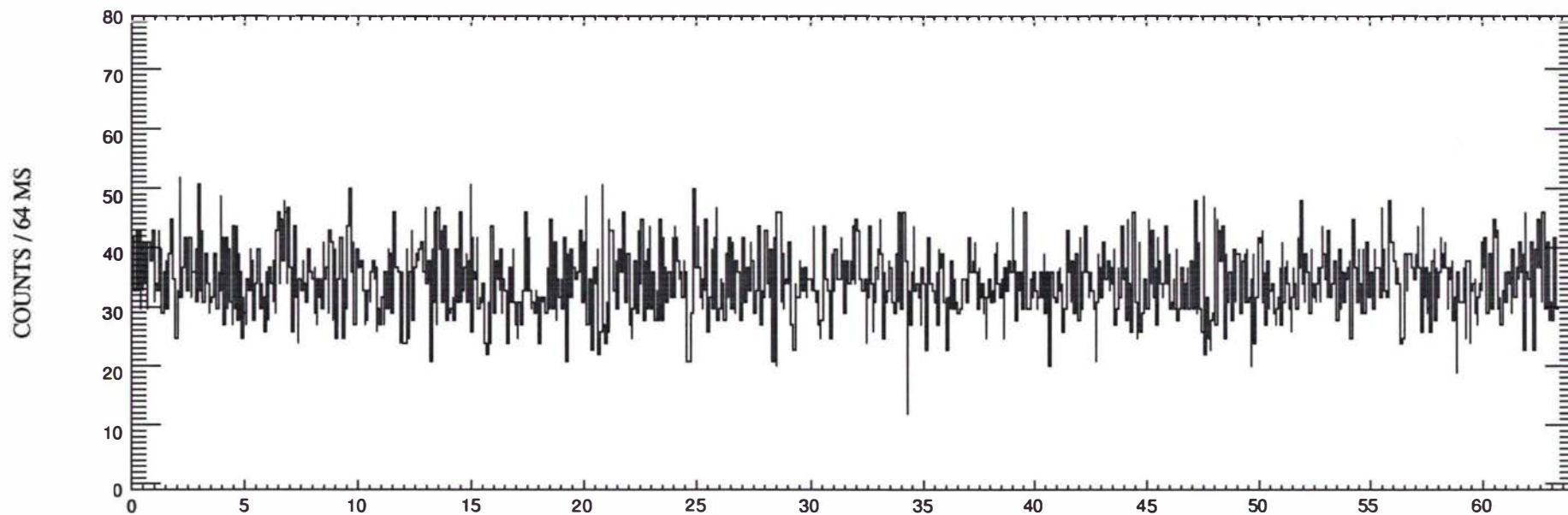


TIME, SECS

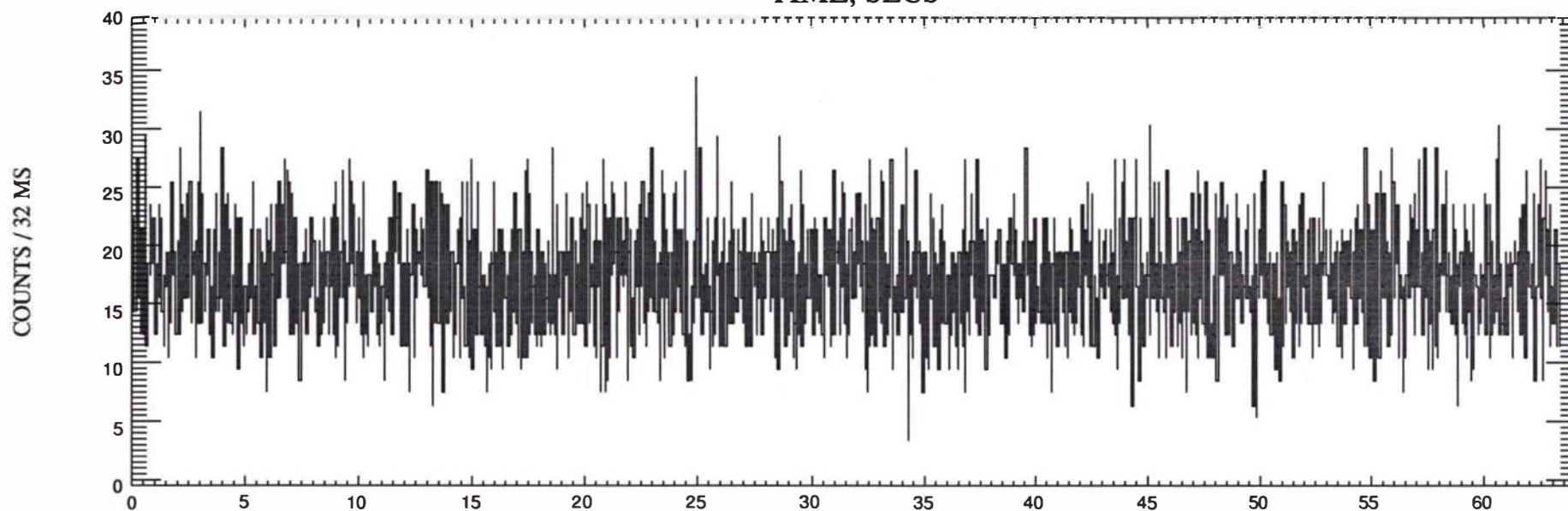


TIME, SECS

Burst Counter 13 at UT= 7.648135197957 h=27533.287 s 07:38:53.287

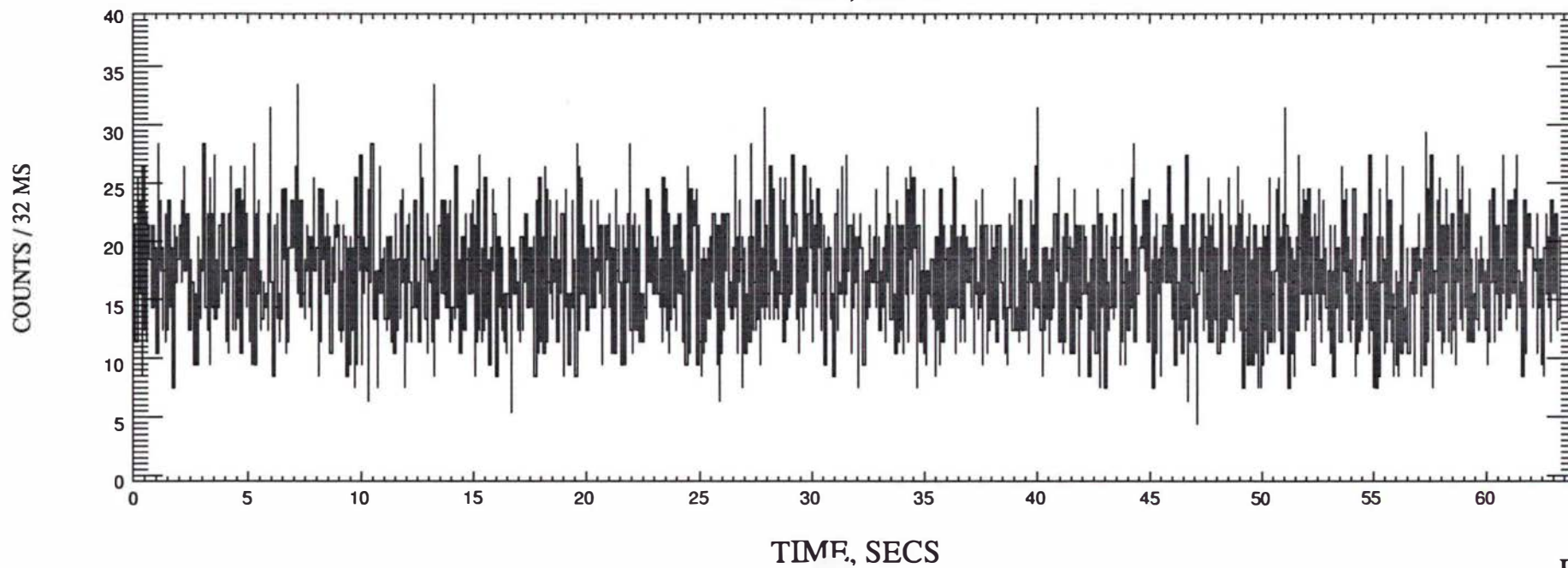
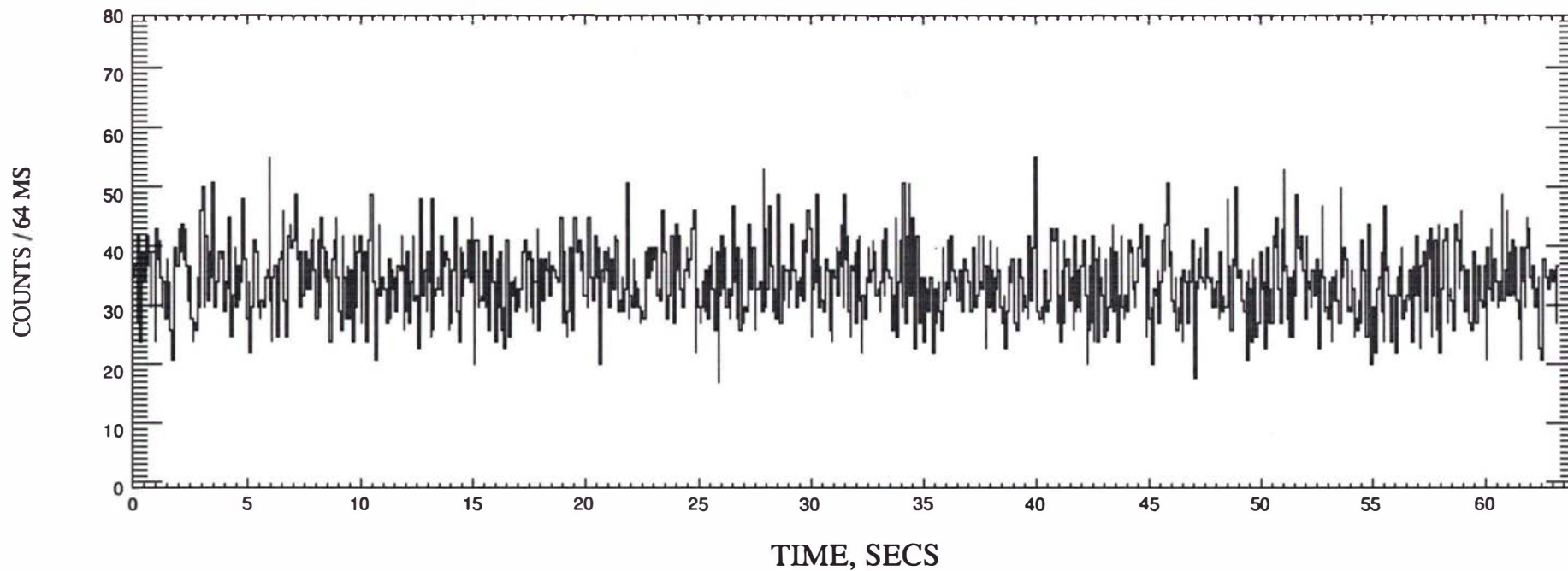


TIME, SECS

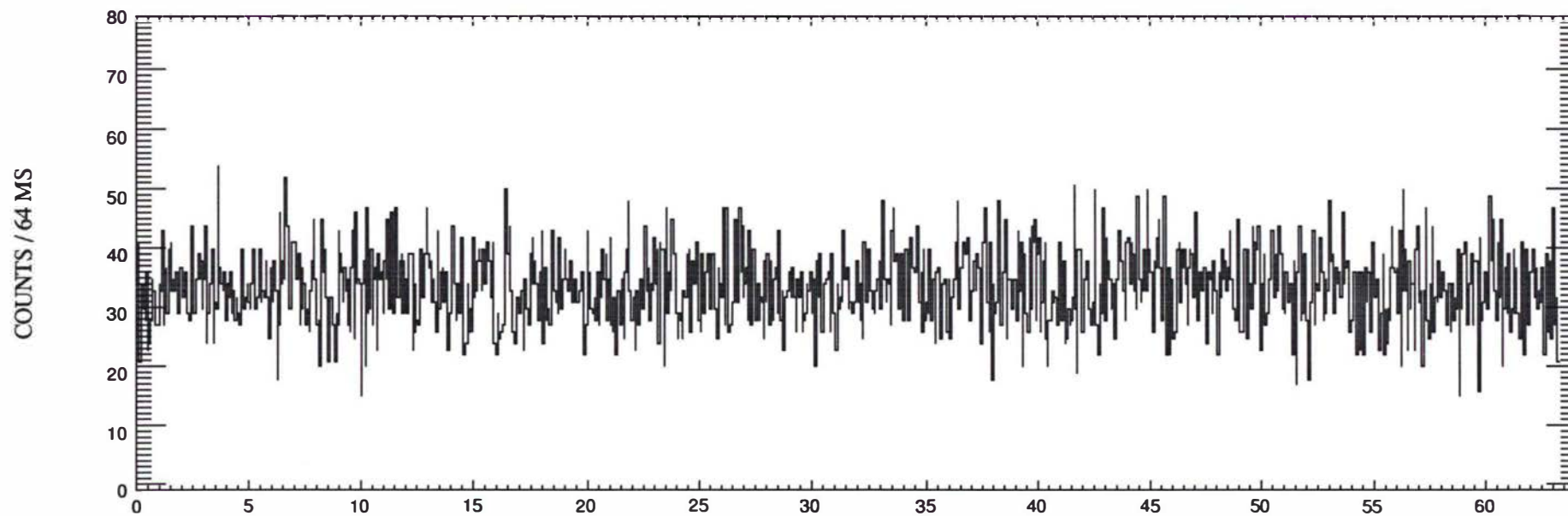


TIME, SECS

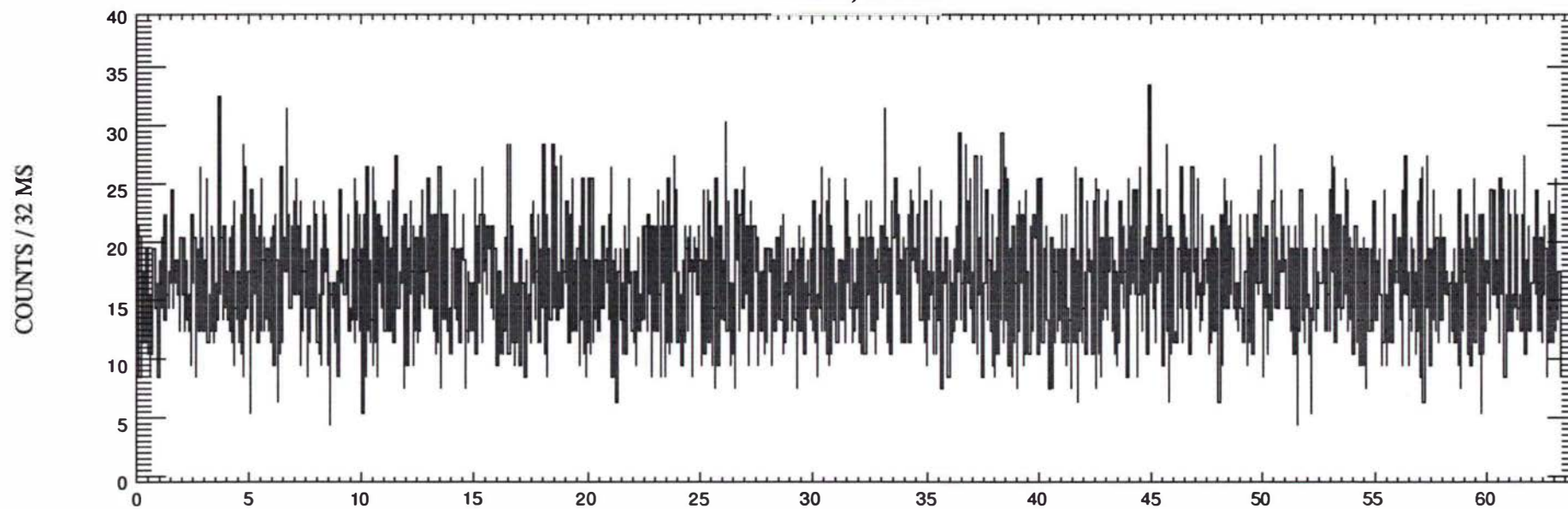
Burst Counter 14 at UT= 8.418146438599 h=30305.327 s 08:25:05.327



Burst Counter 15 at UT=11.434327850342 h=41163.580 s 11:26:03.580



TIME, SECS



TIME, SECS

11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

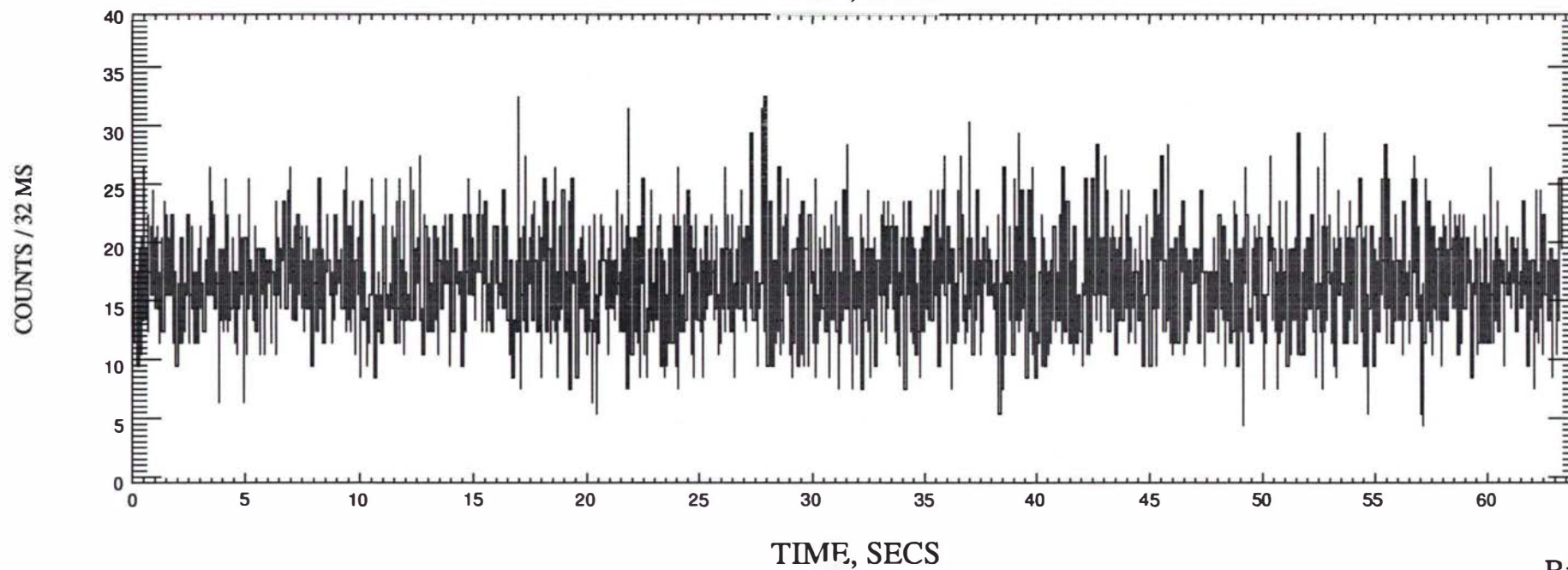
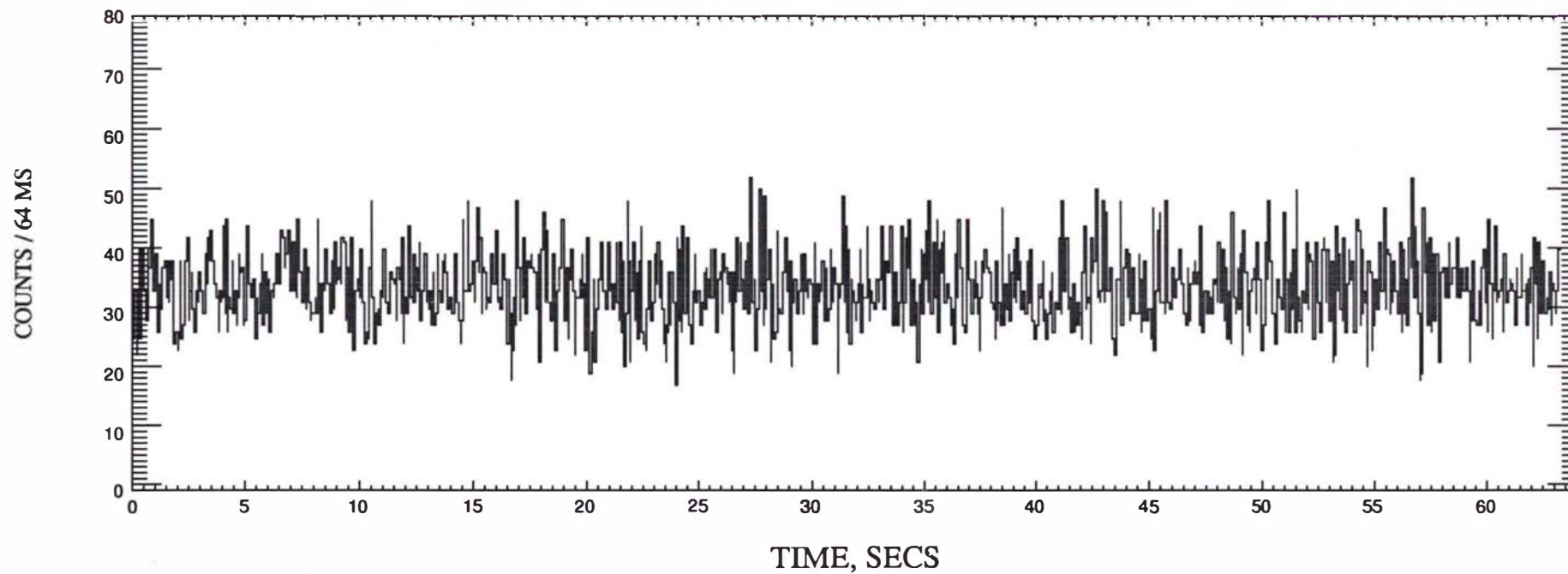
2012

2012

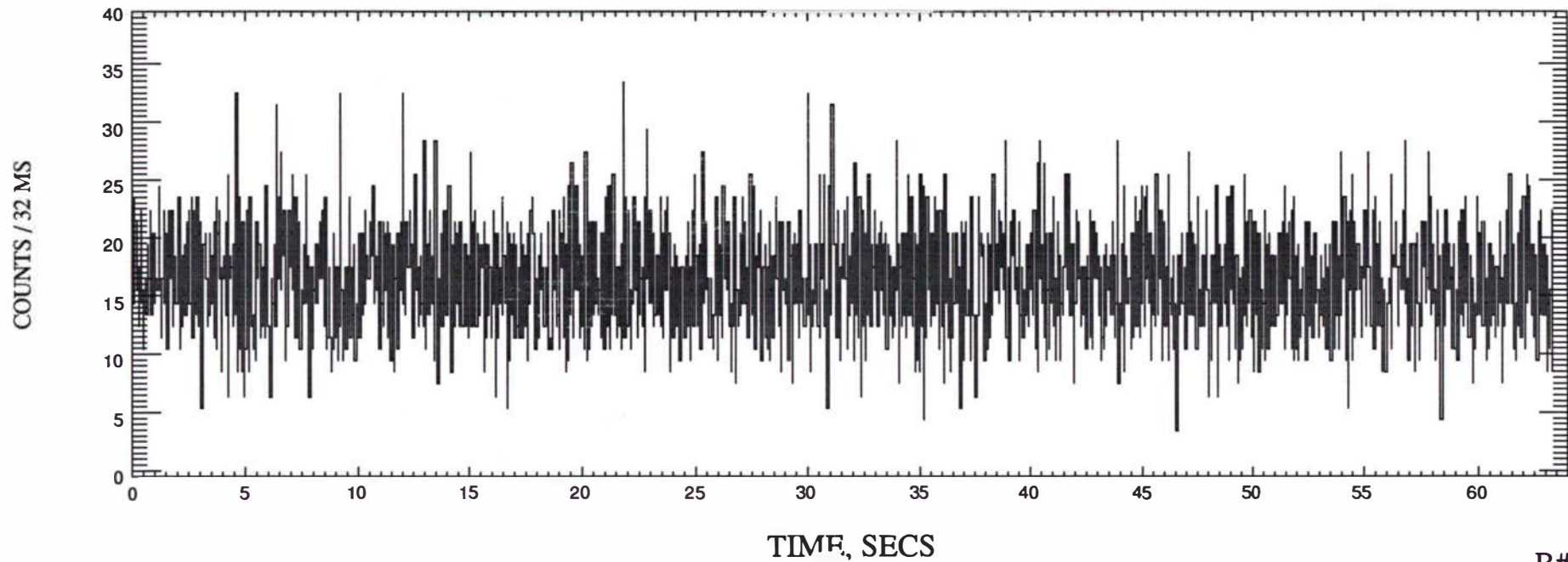
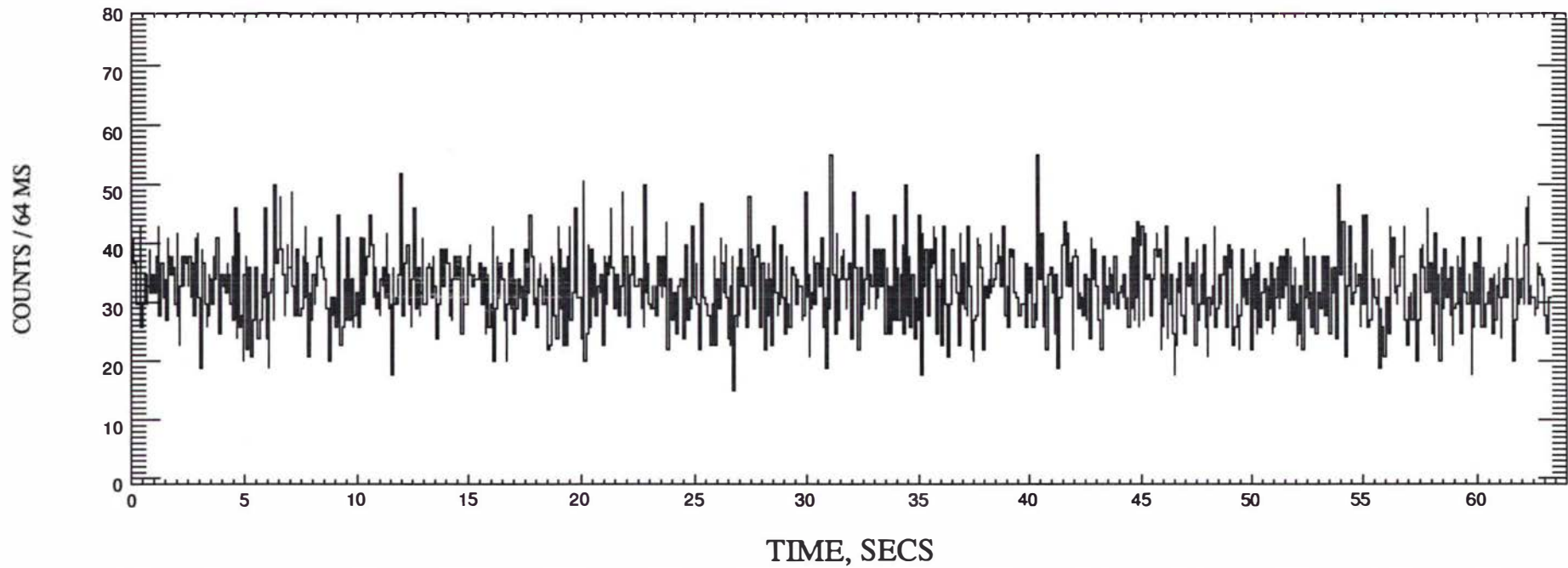
2012

2012

Burst Counter 0 at UT=12.891574109395 h=46409.667 s 12:53:29.667



Burst Counter 1 at UT=16.082191992866 h=57895.891 s 16:04:55.891

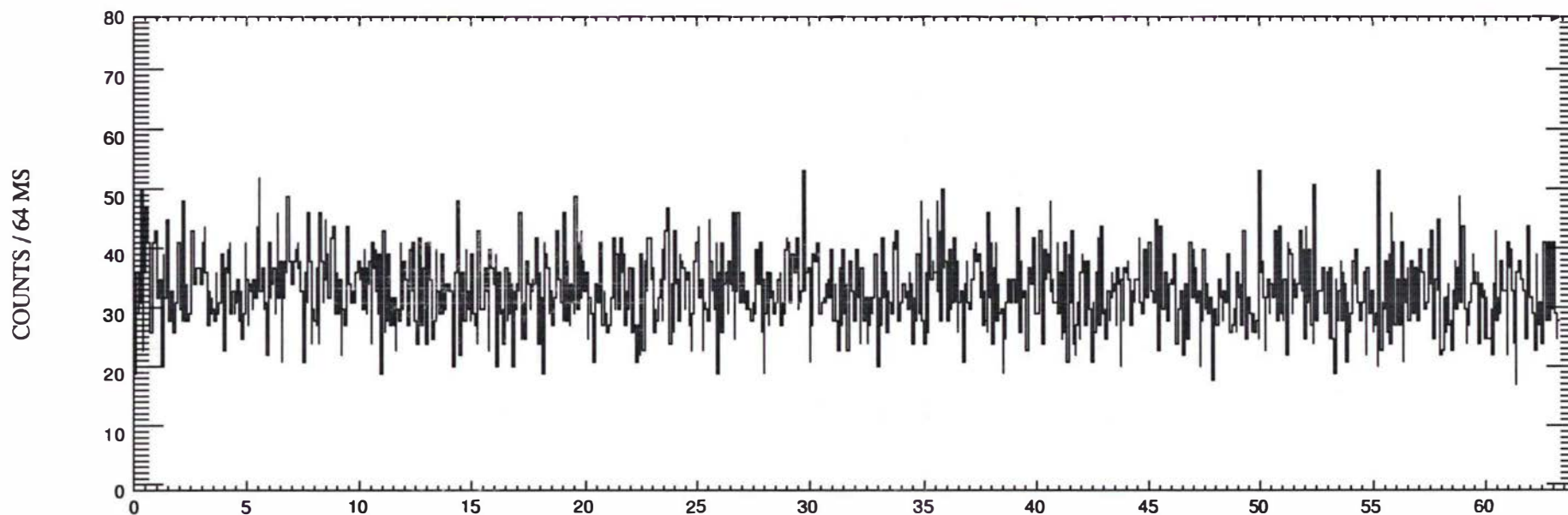


Step 1: $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

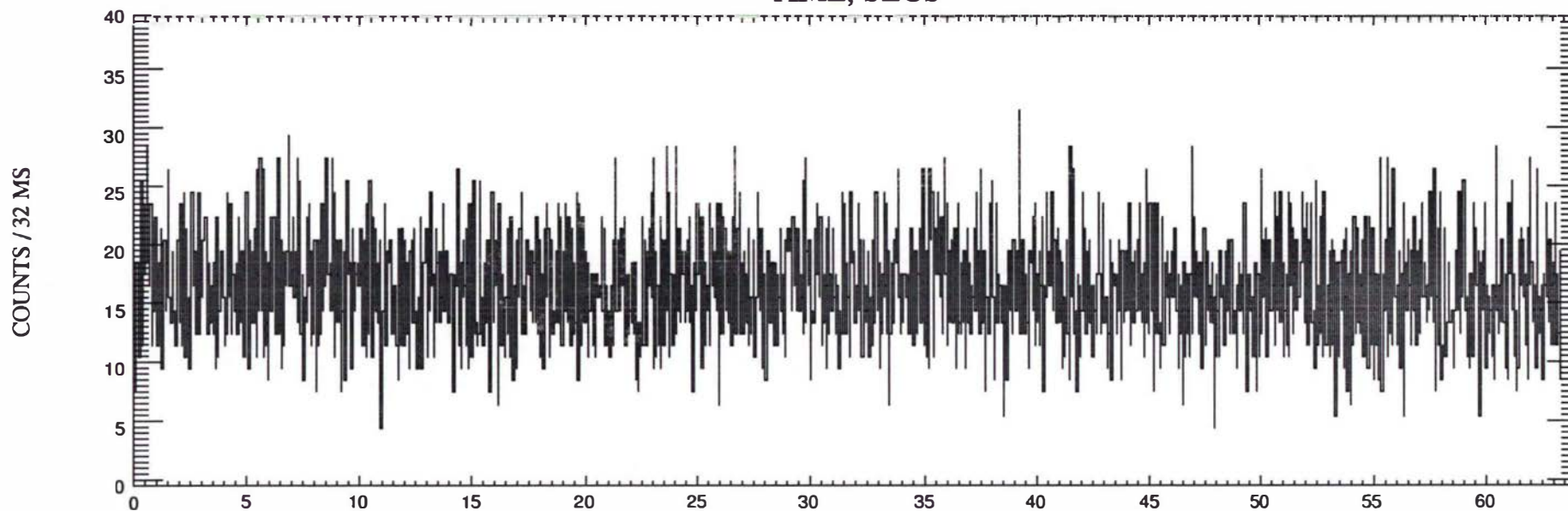
1

15110

Burst Counter 2 at UT=18.987247149150 h=68354.090 s 18:59:14.090



TIME, SECS



TIME, SECS

Hand

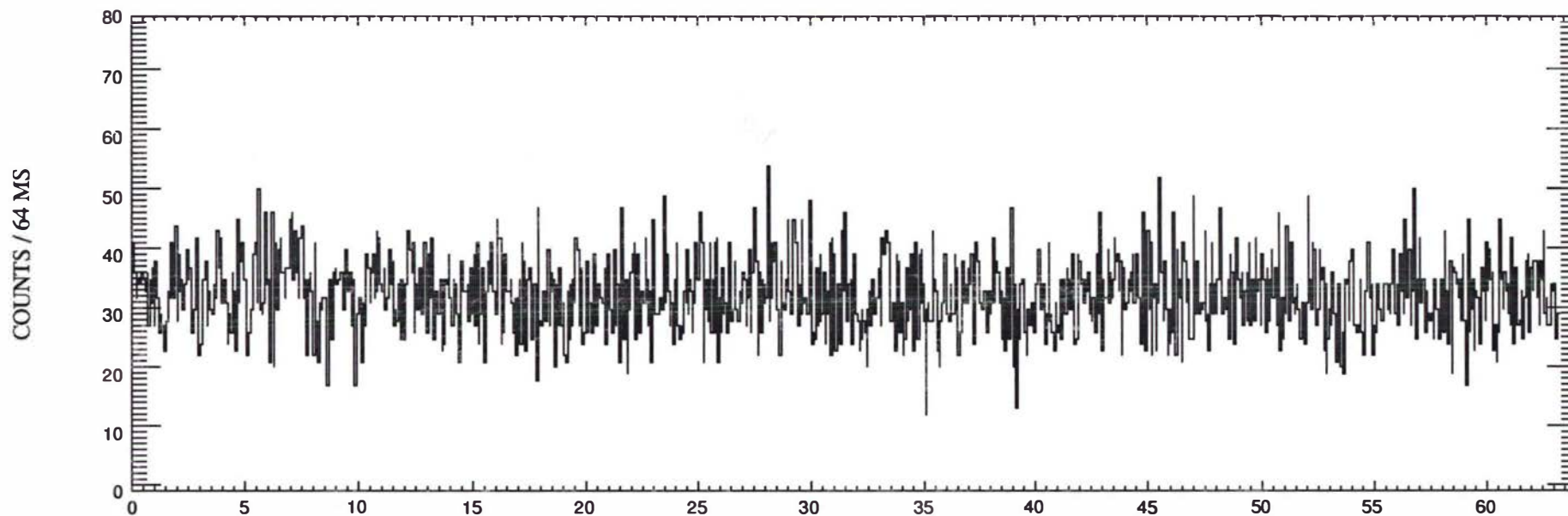


1870-1880

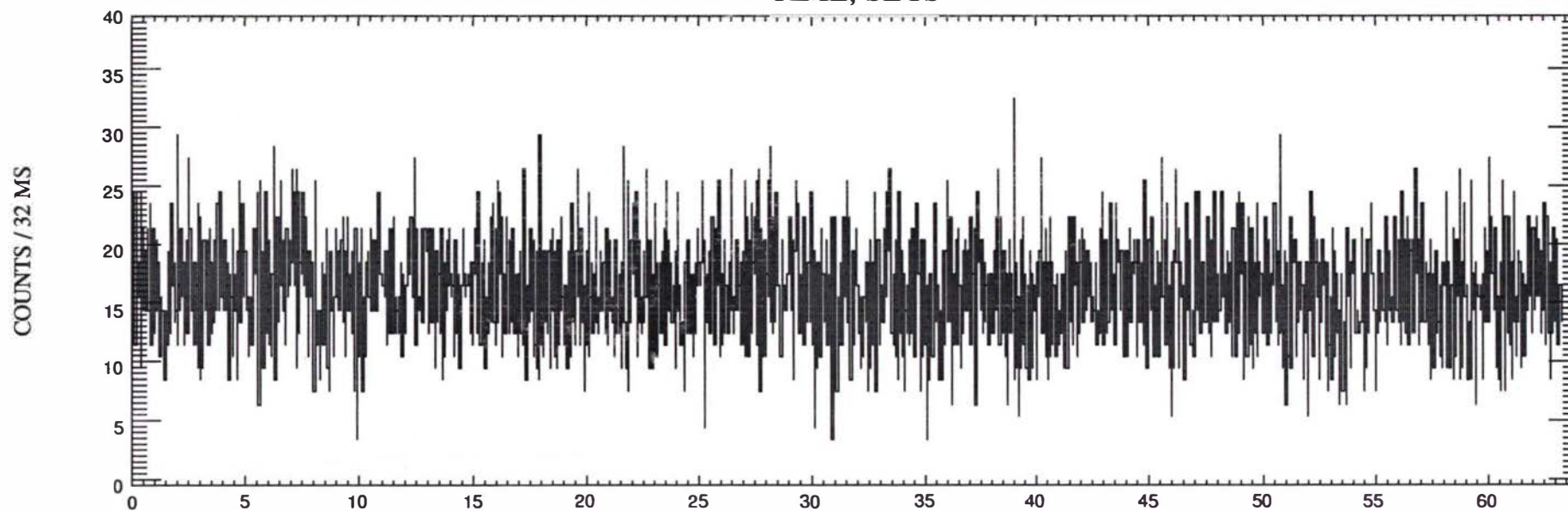


1870-1880
1890-1900
1910-1920
1930-1940
1950-1960
1970-1980
1990-2000

Burst Counter 3 at UT=21.730918600294 h=78231.307 s 21:43:51.307



TIME, SECS



TIME, SECS

15.00

15.00

15.00

15.00

15.00

15.00

15.00

15.00

15.00

15.00

15.00

15.00

15.00

15.00

15.00

15.00

15.00

15.00

15.00

15.00

15.00

15.00

15.00

15.00

15.00

15.00

COPY OF THE CITY RECORDS

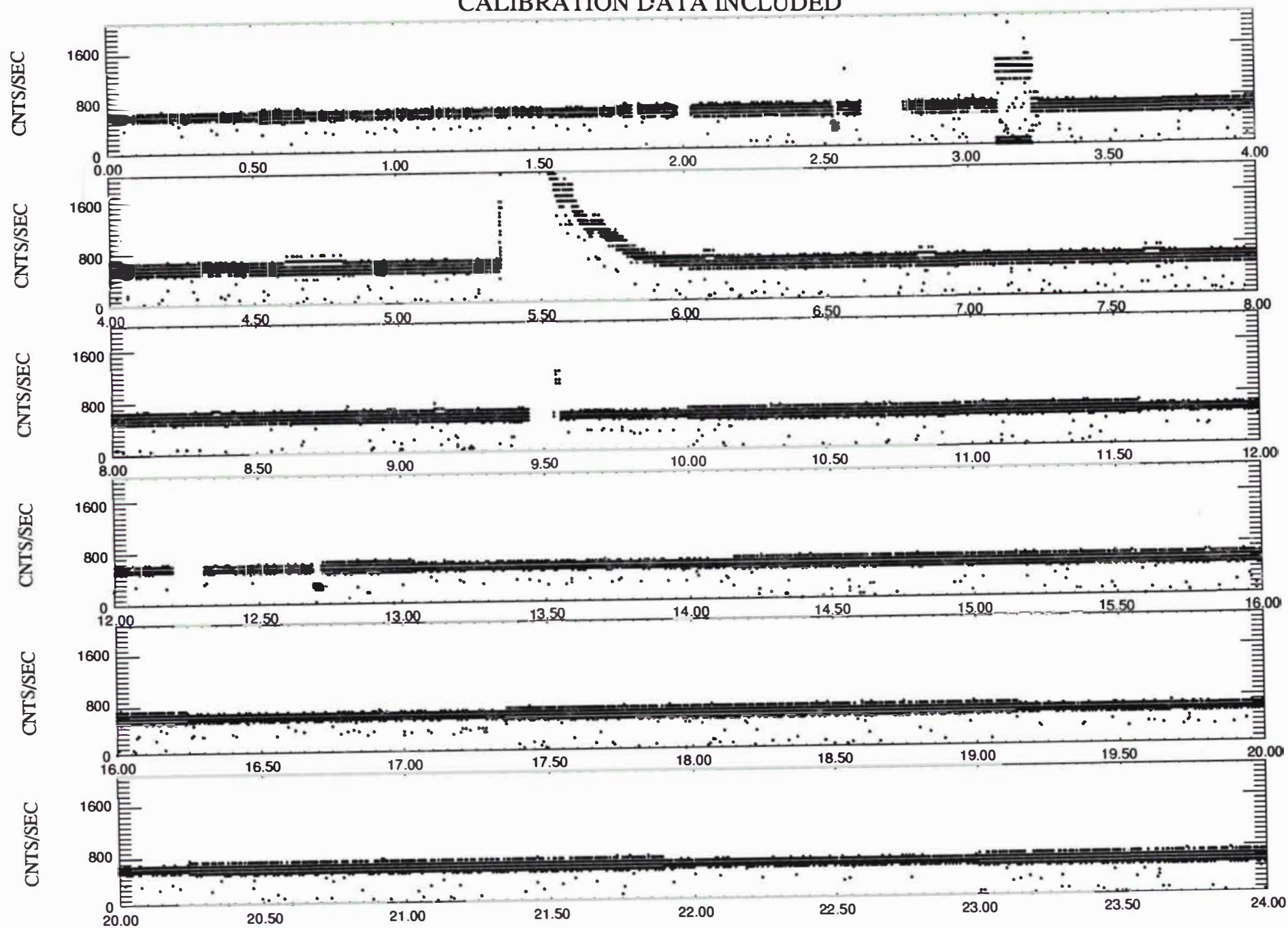
DE 1000000

DE 1000000

DE 1000000

DE 1000000

CALIBRATION DATA INCLUDED



UNIV AL TIME



HTS 3D COLLMR \ 2EC

121 Jan 1981 10 00 00

HTS 3D

