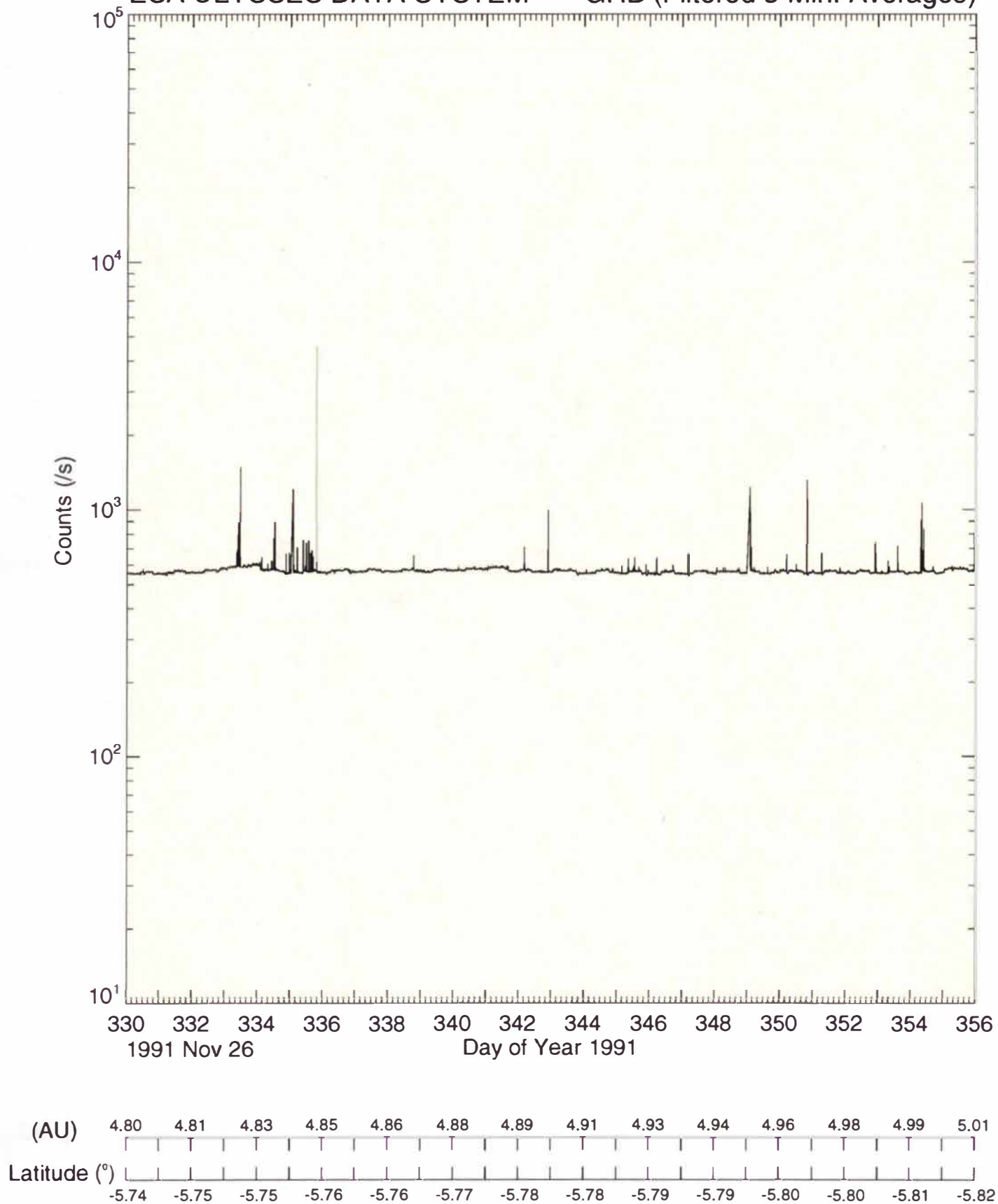


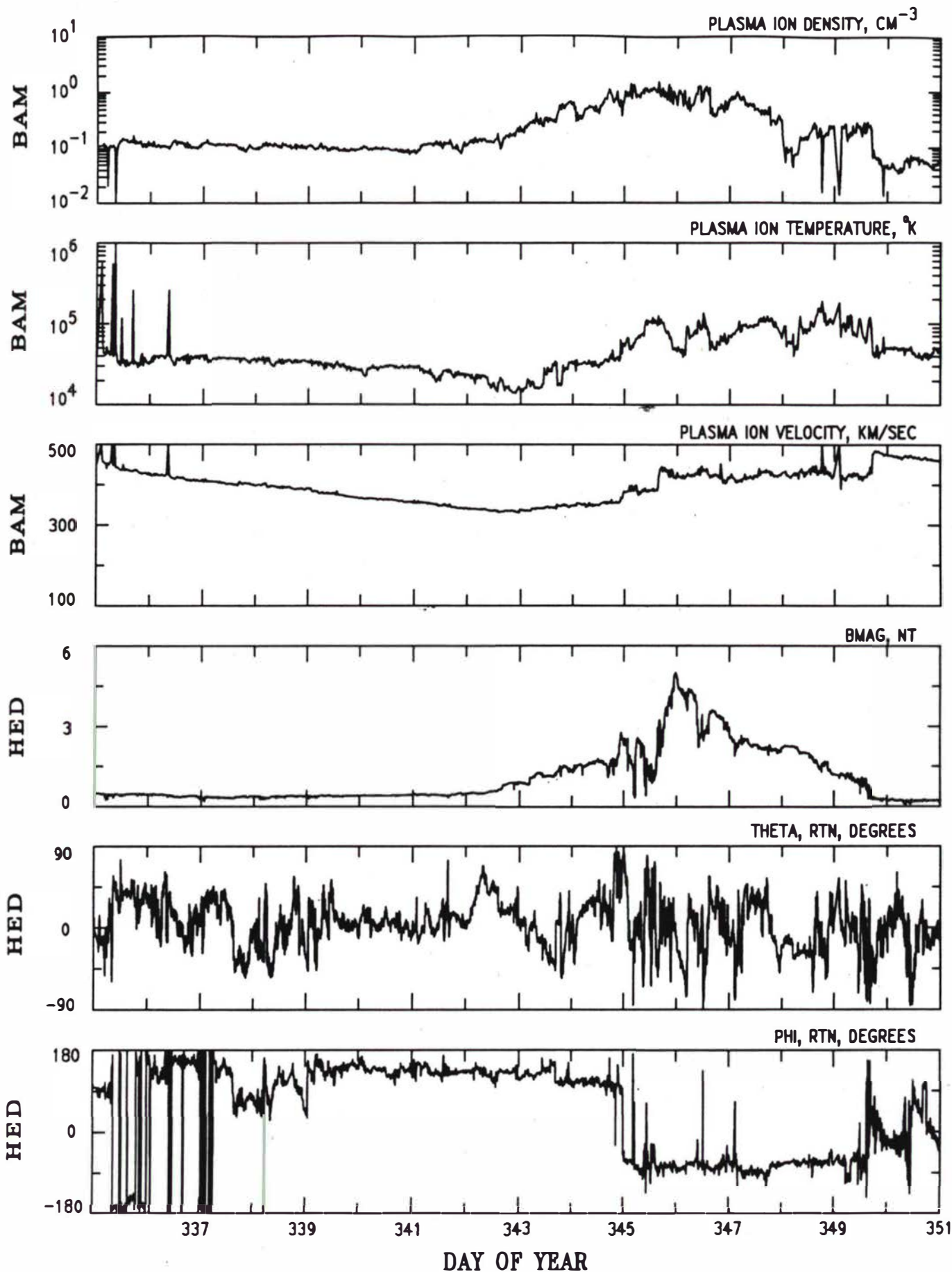
ESA ULYSSES DATA SYSTEM

GRB (Filtered 5 Min. Averages)



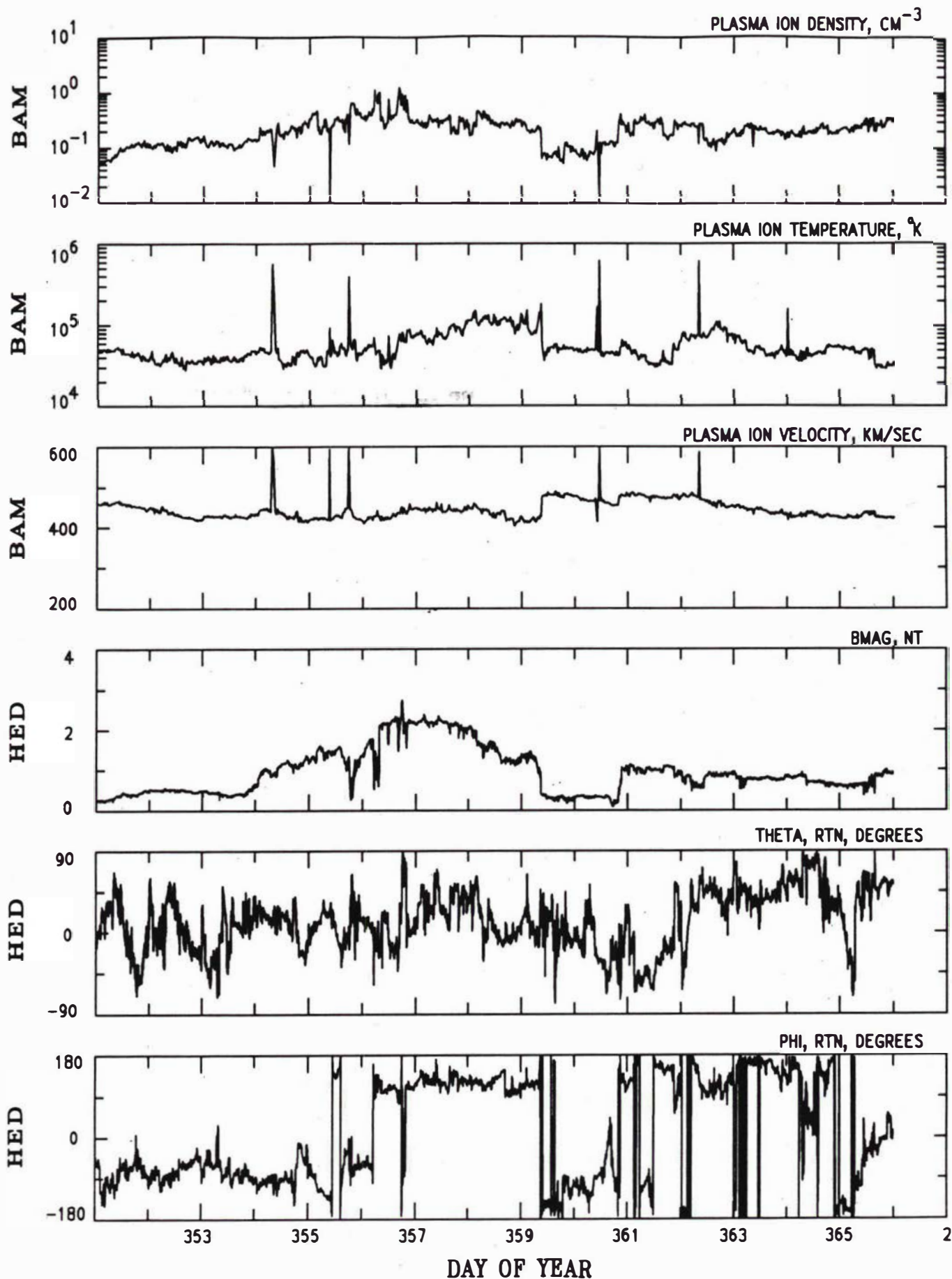
ULYSSES CDR - SOLAR WIND PLASMA AND MAGNETIC FIELD

91 335 DEC 1 00:00:00.000 - 91 351 DEC 17 00:00:00.000



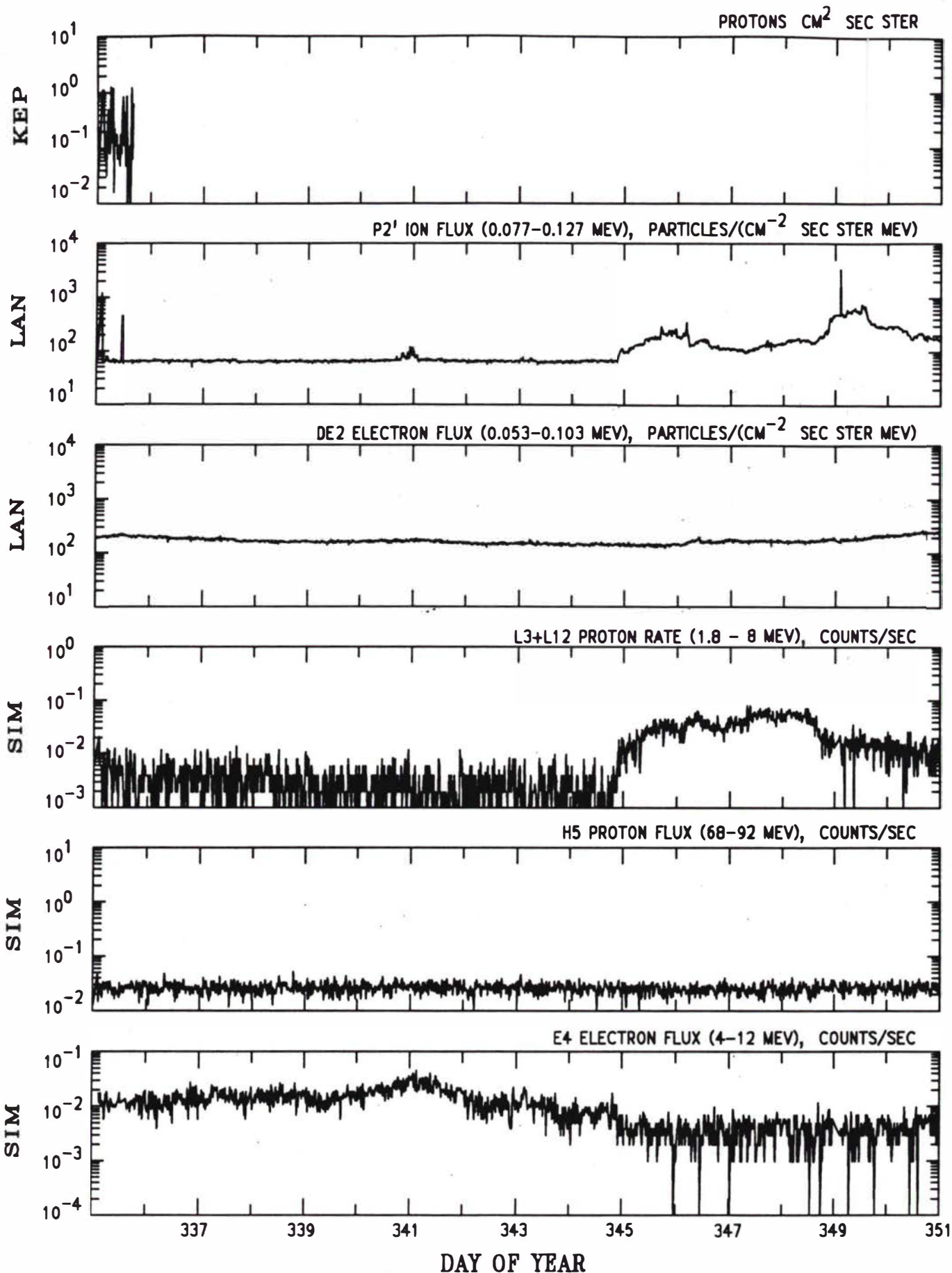
ULYSSES CDR - SOLAR WIND PLASMA AND MAGNETIC FIELD

91 351 DEC 17 00:00:00.000 - 92 002 JAN 2 00:00:00.000



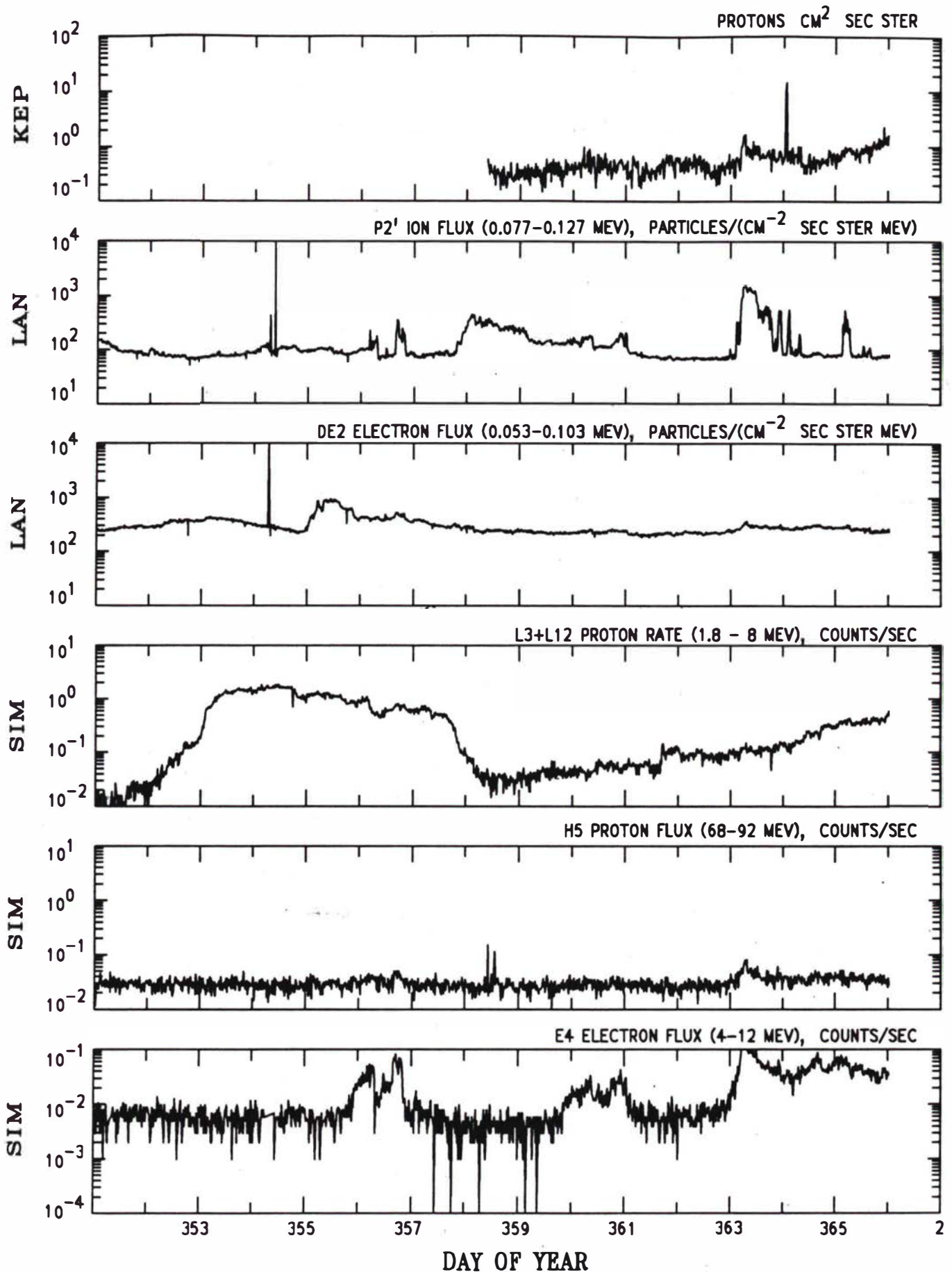
ULYSSES CDR - ENERGETIC PARTICLES, LOW ENERGY IONS AND COSMIC RAY

91 335 DEC 1 00:00:00.000 - 91 351 DEC 17 00:00:00.000



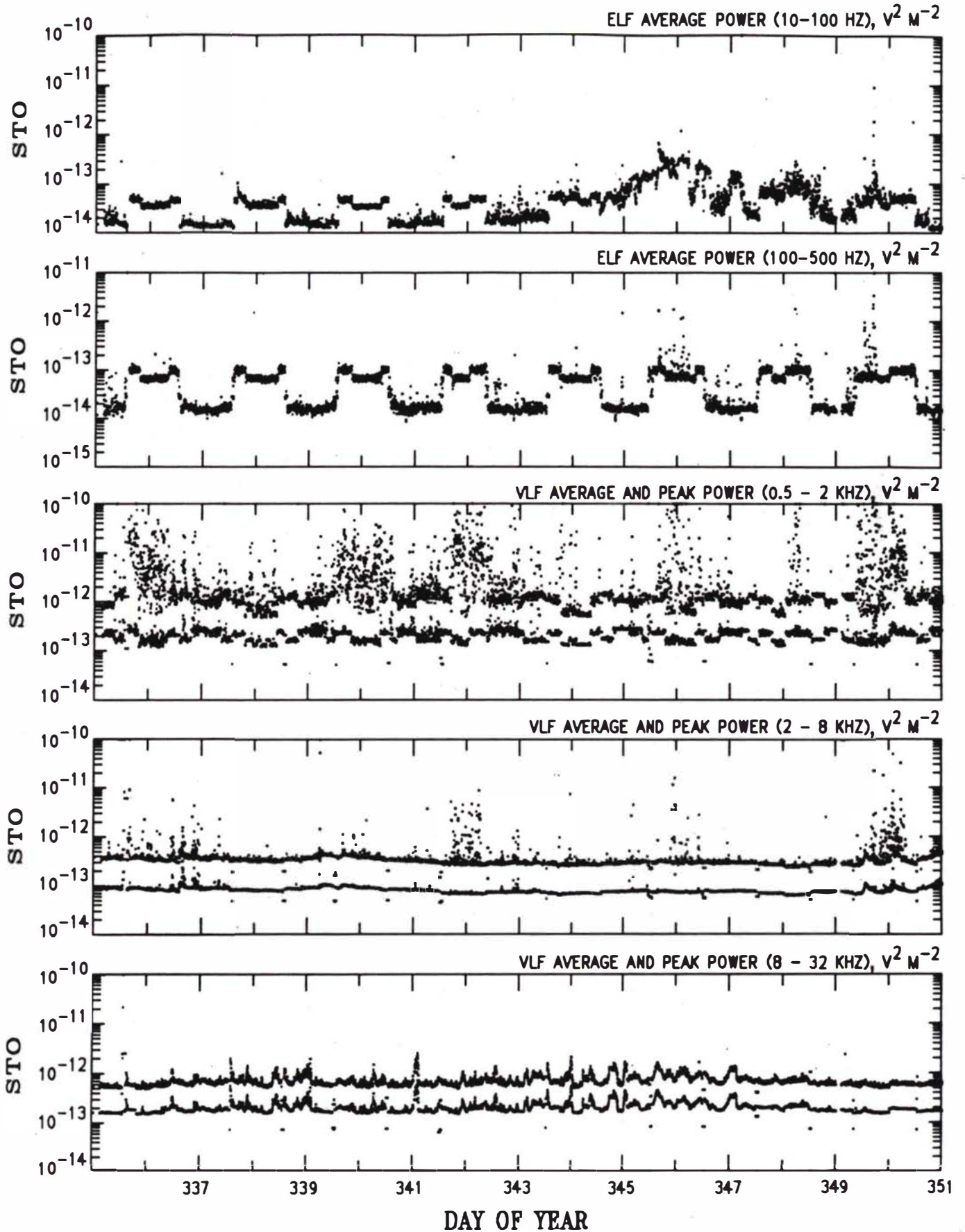
ULYSSES CDR - ENERGETIC PARTICLES, LOW ENERGY IONS AND COSMIC RAY

91 351 DEC 17 00:00:00.000 - 92 002 JAN 2 00:00:00.000



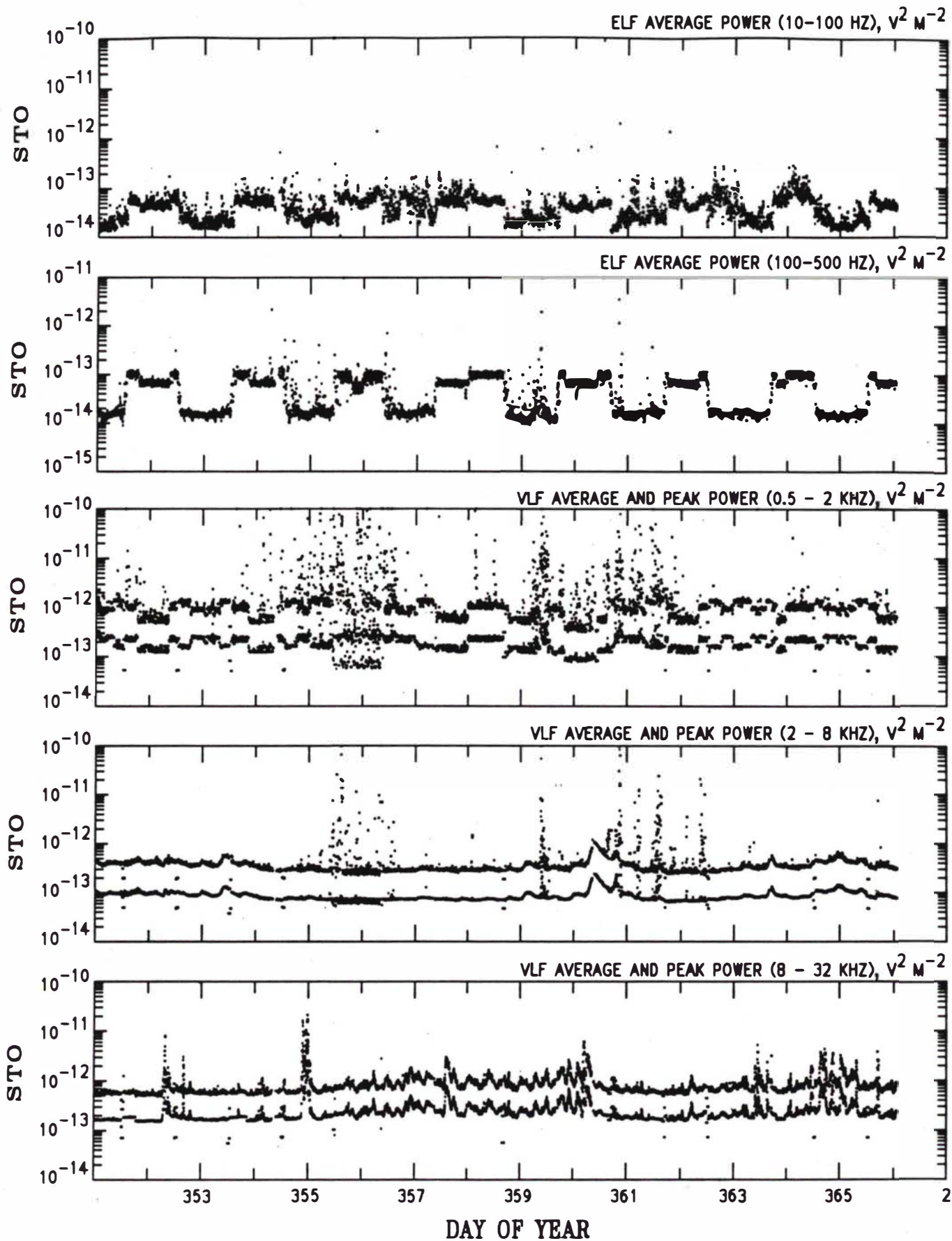
ULYSSES CDR - PLASMA WAVE

91 335 DEC 1 00:00:00.000 - 91 351 DEC 17 00:00:00.000



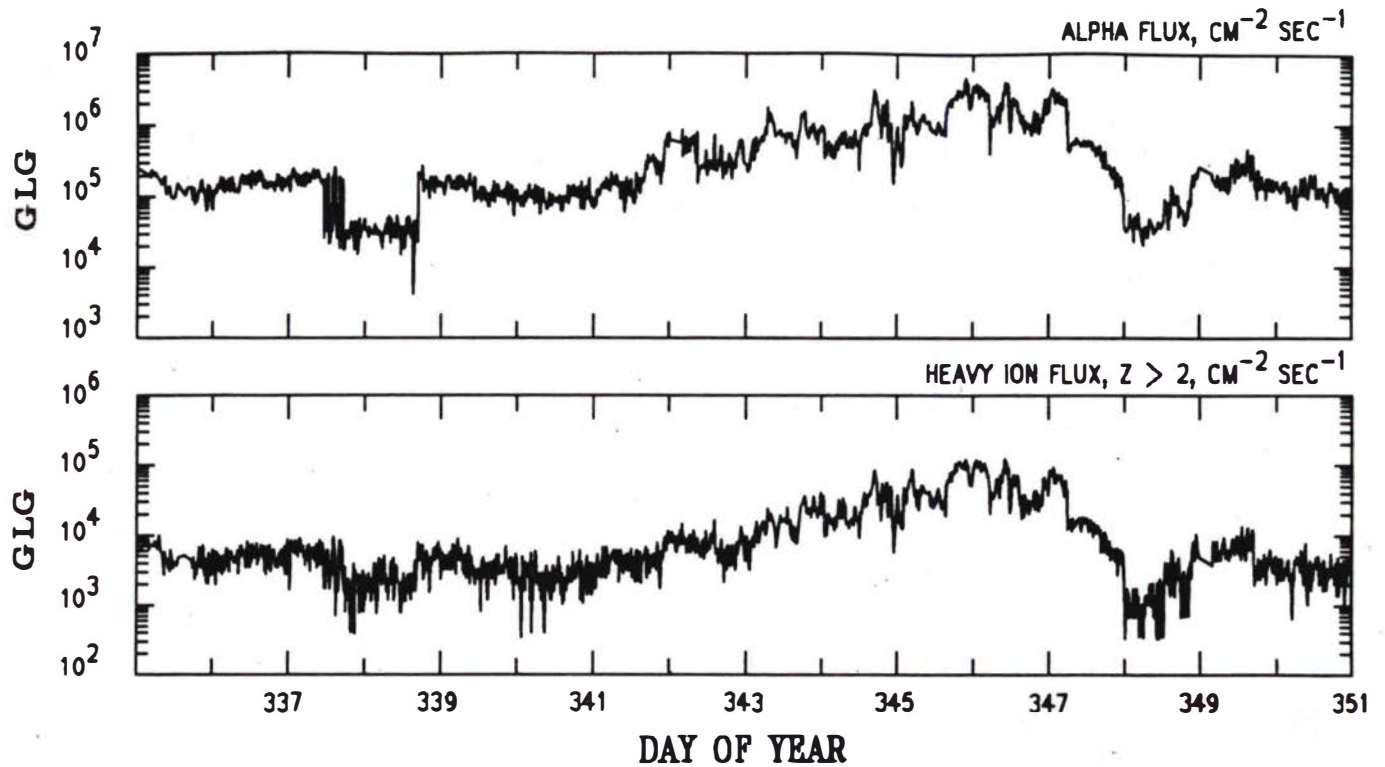
ULYSSES CDR - PLASMA WAVE

91 351 DEC 17 00:00:00.000 - 92 002 JAN 2 00:00:00.000



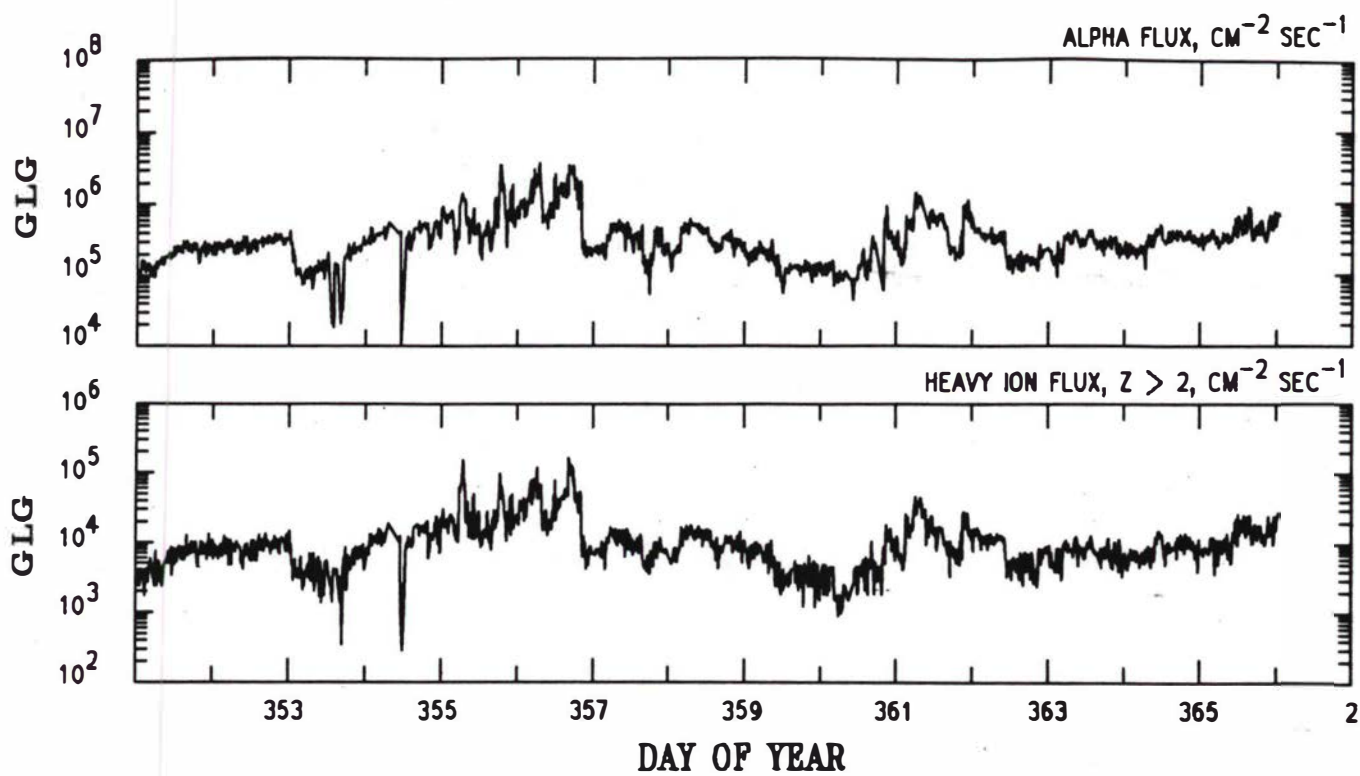
ULYSSES CDR - SOLAR WIND ION COMPOSITION

91 335 DEC 1 00:00:00.000 - 91 351 DEC 17 00:00:00.000



ULYSSES CDR - SOLAR WIND ION COMPOSITION

91 351 DEC 17 00:00:00.000 - 92 002 JAN 2 00:00:00.000



.91.335.00.07.13.907

HUS monthly long term thermal data

818 HOLD RET

E002 2ARADTMP S/C

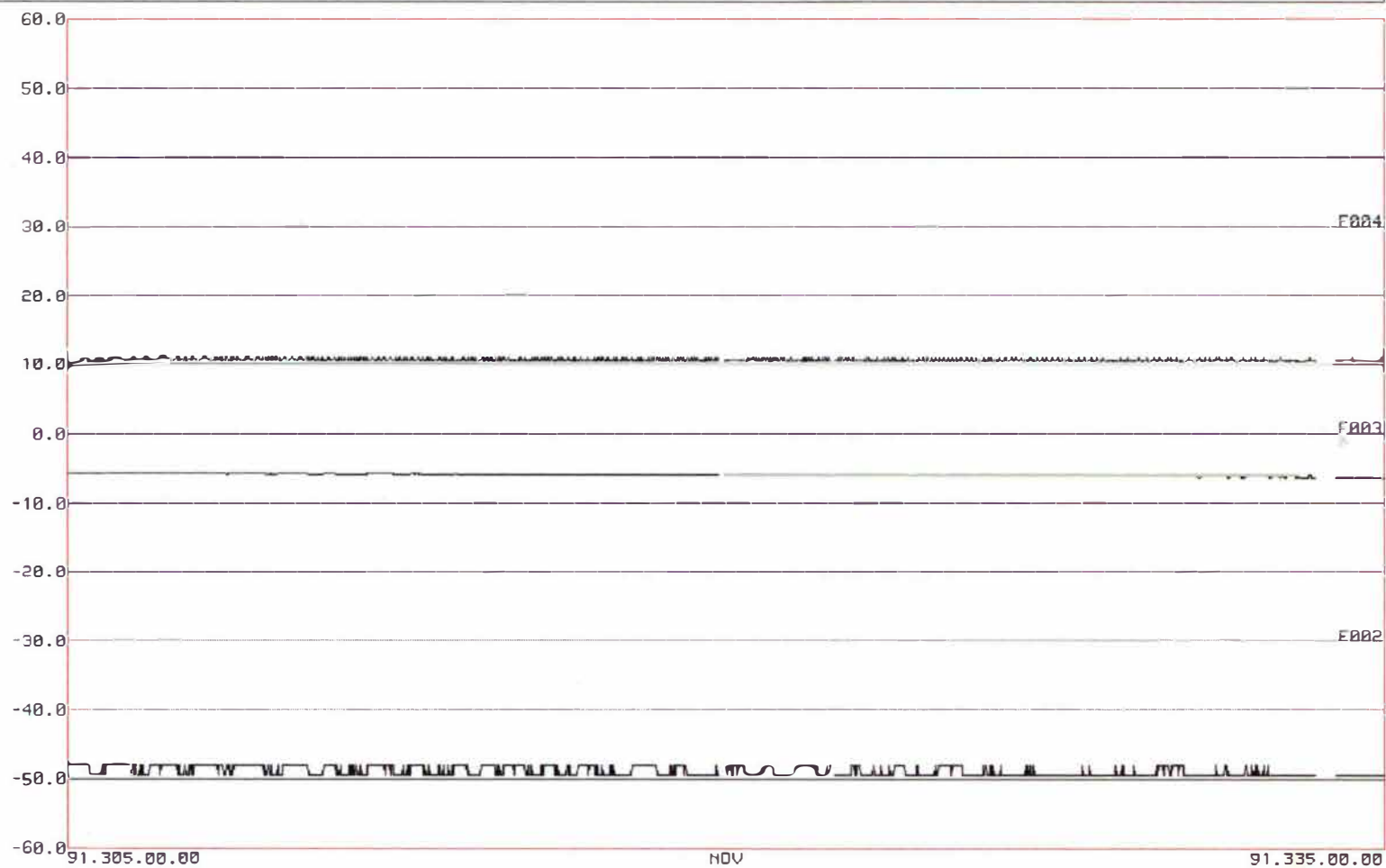
-6.4

E003 2BSENTMP S/C

-49.3

E004 2ASENSTMP EX

10.73



From khurley@omni:.dna_node.jplgp.span Thu Nov 26 00:01:52 1992
Date: Wed, 25 Nov 92 23:51:53 -0800
From: khurley@omni:.dna_node.jplgp.span
To: "khurley@sunspot.ssl.berkeley.edu"%jpldig.span@JPLDIG.jpl.nasa.gov
Content-Length: 1653

1st Dec	Routine operations. DSS 12 antenna stowed because of high winds. 2.5 hours of data were lost (real-time and playback).
2nd Dec	KEP EPAC IFC.
3rd Dec	Earth pointing manoeuvre. No further manoeuvres until 4th January. GLG MCP calibration.
4th Dec	GLG MCP calibration.
5th Dec	Routine operations.
6th Dec	Routine operations.
7th Dec	Routine operations.
8th Dec	Routine operations. EPC/TWTA changeover.
9th Dec	KEP EPAC IFC. HED calibration.
10th Dec	Routine operations. STO FES memory load. STO RAR command change.
11th Dec	Routine operations. STO ROM/RAM dump.
12th Dec	Routine operations.
13th Dec	Routine operations.
14th Dec	Routine operations.
15th Dec	Routine operations.
16th Dec	KEP EPAC IFC.
17th Dec	Routine operations.
18th Dec	Routine operations.
19th Dec	Routine operations.
20th Dec	Routine operations.
21st Dec	Routine operations.
22nd Dec	Routine operations.
23rd Dec	KEP EPAC IFC. HED calibration.
24th Dec	SIM HET calibration. STO 6 heater test.

25th Dec	Routine operations.
	Switch from non-coherent to coherent downlink during playback resulted in 30 minutes of lost playback data.
26th Dec	KEP GAS health check.
	False receiver lock after switch to coherent downlink resulted in loss of 10 minutes real-time and 20 minutes playback data.
27th Dec	STO sounder change.
28th Dec	STO RAR change.
29th Dec	Routine operations.
	Receiver exciter problem resulted in loss of 21 minutes real-time data.
30th Dec	KEP EPAC IFC.
31st Dec	Routine operations.

From nl@dsri.dk Wed Jun 9 08:39:55 1993
Date: Wed, 9 Jun 93 17:39:43 +0200
From: Niels Lund <nl@dsri.dk>
To: khurley@ucbssl.berkeley.edu
Content-Length: 1831

Dear Kevin:

Thank you for your message with the draft proposal for ASCA. I would like to enlist as a co-proposer. We should of course follow up on our well localized events, at some level there must be something real behind these bursts!

What is the mechanics of observing with ASCA? I suppose that data are available at Goddard or other US sites, are you aware which software is being used? I am interested in getting into this a little deeper in preparation for the flood of data which will descend on us at DSRI once SPECTRUM-XG gets into the air.

I have begun to work on your master burst list. What a terrible format you have chosen - 159 character wide lines! - where can I get that printed??? I spend an hour editing the list, deleting the columns for the future missions - I didn't see any mention of BALLERINA?

Going over the list I note an event reported by me on **dec 1st 1991**. That event should be deleted. We have now dug sufficiently deep in our data to prove that it was a very energetic cosmic ray event.

I have noted two events which may be soft repeater events:

910408 22:24:18, duration 0.25 s, soft spectrum, 240 excess counts
910414 07:28:27, duration 0.5 s, intermediate, 109 excess counts

I find two close events in your list, however, in one case I have to stretch your time window; this, of course, is not legal, but could it be that you missed the second event which is even more marginal than the first?

910408, ULYSSES-WATCH: 1177 s, your window: 1219
910414, ULYSSES-WATCH: 1616 s, your window: 1290

We have no chance to locate such events with WATCH.

The I have confirmation and a single (nonredundant, unreliable) WATCH localization for the event:

910717 04:33:07, duration 10 s, very soft, 523 excess counts

I will have to stop for today, but I shall continue to work on this.

Niels

From kouveliotou%batse.span@Sdsc.Edu Mon Dec 2 15:08:46 1991
Received: from Sdsc.Edu (m5.sdsc.edu) by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA04525; Mon, 2 Dec 91 15:08:42 PST
Received: from batse.span by Sdsc.Edu with VMSmail ;
Mon, 2 Dec 91 23:09:58 GMT
Date: Mon, 2 Dec 91 23:09:58 GMT
From: kouveliotou%batse.span@Sdsc.Edu
Message-Id: <911202230958.2500459f@Sdsc.Edu>
Subject: did you see it ?
To: khurley@sunspot.ssl.berkeley.edu
X-St-Vmsmail-To: KEVIN
Status: R

From: BATSE::PACIESAS "Bill Paciesas (205)544-7712" 2-DEC-1991 17:05:19.96
To: KOUVELIOTOU
CC:
Subj:

From: BATSE::KOUVELIOTOU 2-DEC-1991 09:34:09.73
To: FISHMAN
CC: MEEGAN, PACIESAS, HORACK
Subj: WATCH

From: EAST::"<@dkuug.dk:sb@danru.dk>" 2-DEC-1991 05:19:31.25
To: batse::kouveliotou
CC:
Subj: grb911201

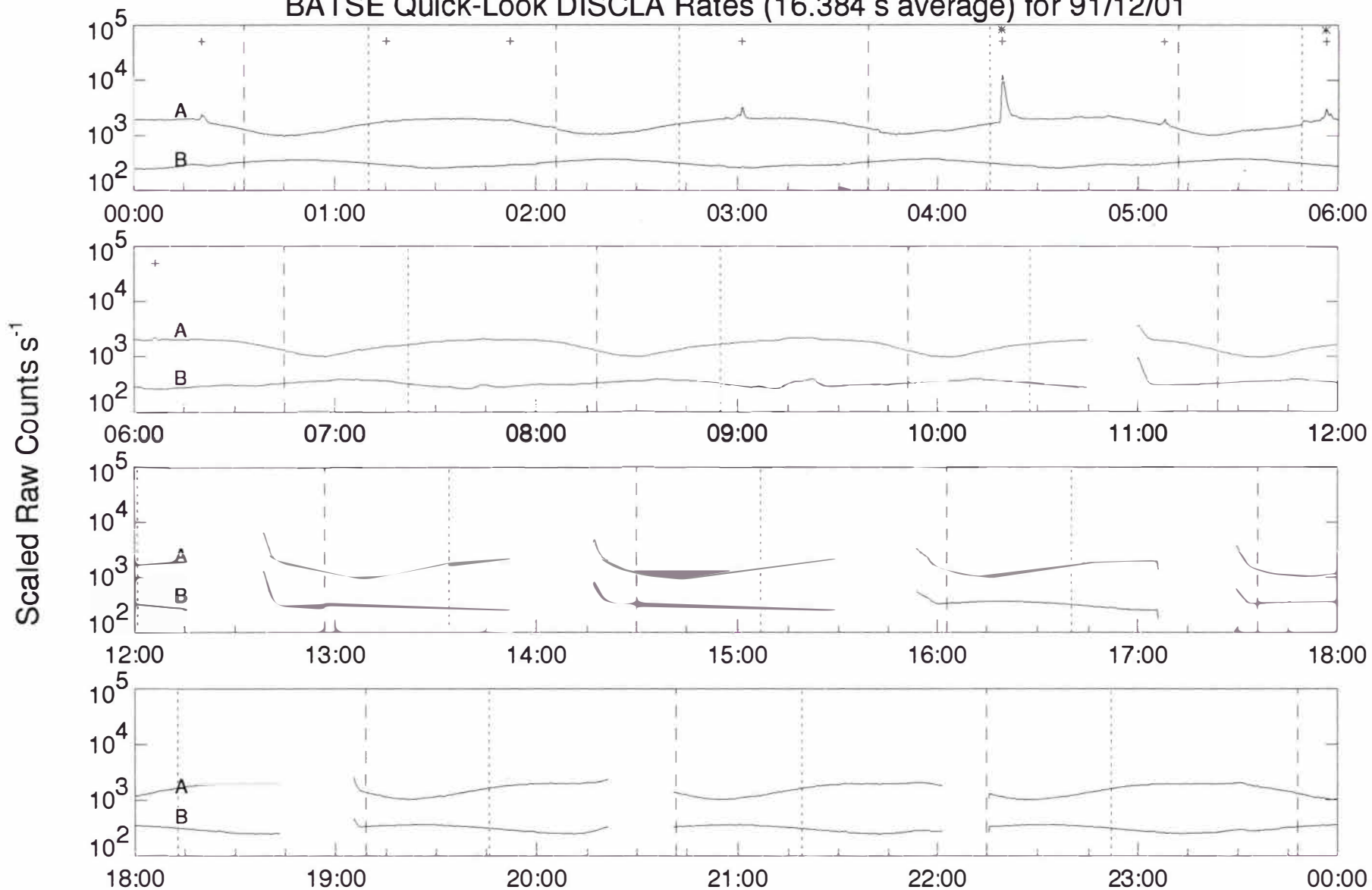
Dear colleague,

Niels Lund has just informed me from the GRANAT groundstation in USSR, that WATCH has seen a very bright gamma burst on December 1 at 20:55:51 +- 5s. The duration of the event was 30 ms with a 5 ms risetime. The peak count rate was about 25000 counts per second corresponding to saturation of the WATCH detector. No localization was obtained due to the short duration of the event, but the center of field of view the instrument was $\alpha = 17^{\text{h}}20^{\text{m}}$ $\delta = -6^{\circ}$ deg, and the radius of the FOV is 65 degrees (we note that this field contains the Sun and the galactic center). We look forward to hear about other observations of this interesting event.

Best regards,

Soren Brandt

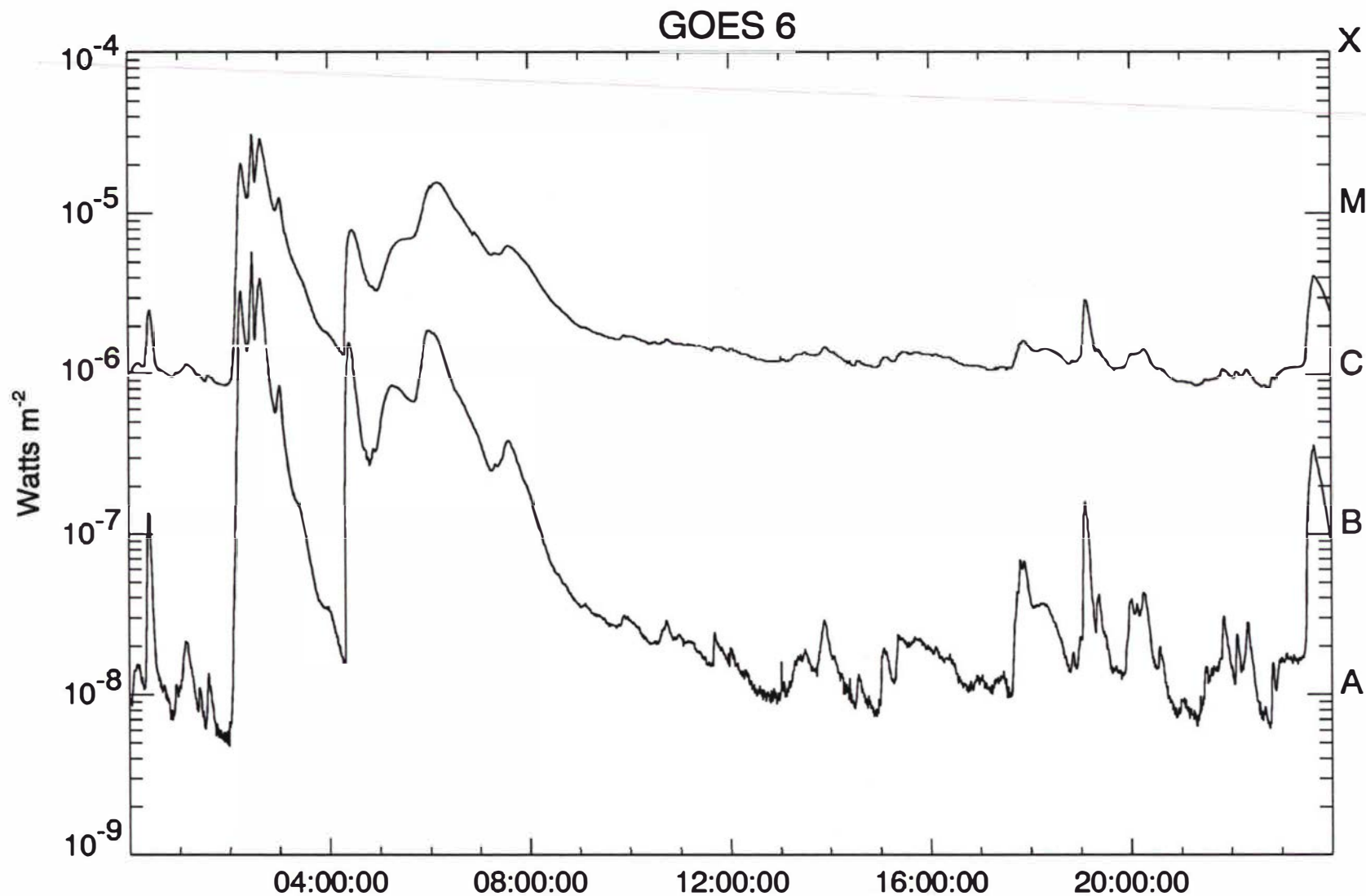
BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/01



Current Time: 92/10/18, 1849 EDT
 A: Channel 1 Most Sunward LAD
 B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare



Data Start: 91/12/01, 0000:02

Plot created: 97/10/16, 1802

Channel 1 (1.0 - 8.0 Angstroms)

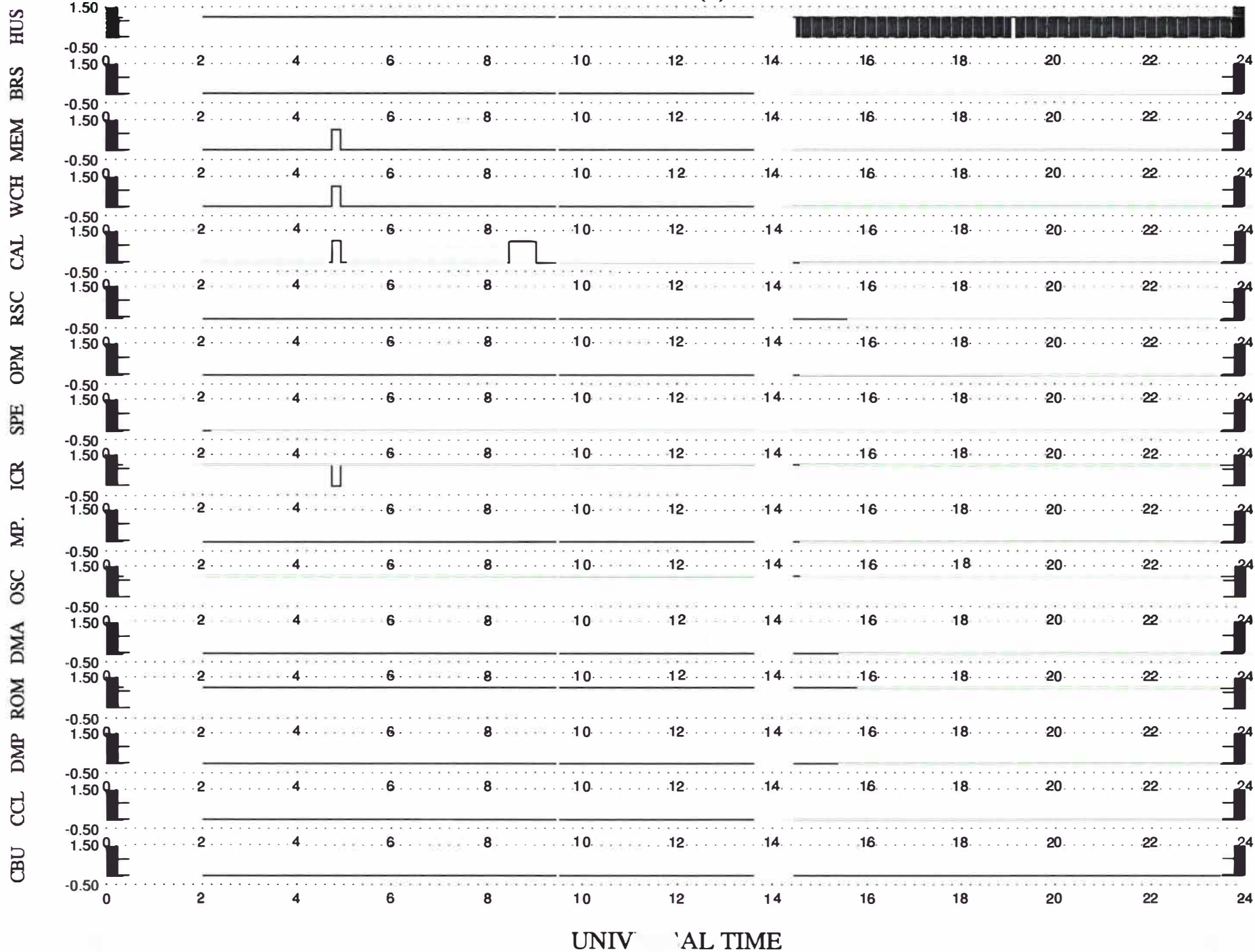
Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms)

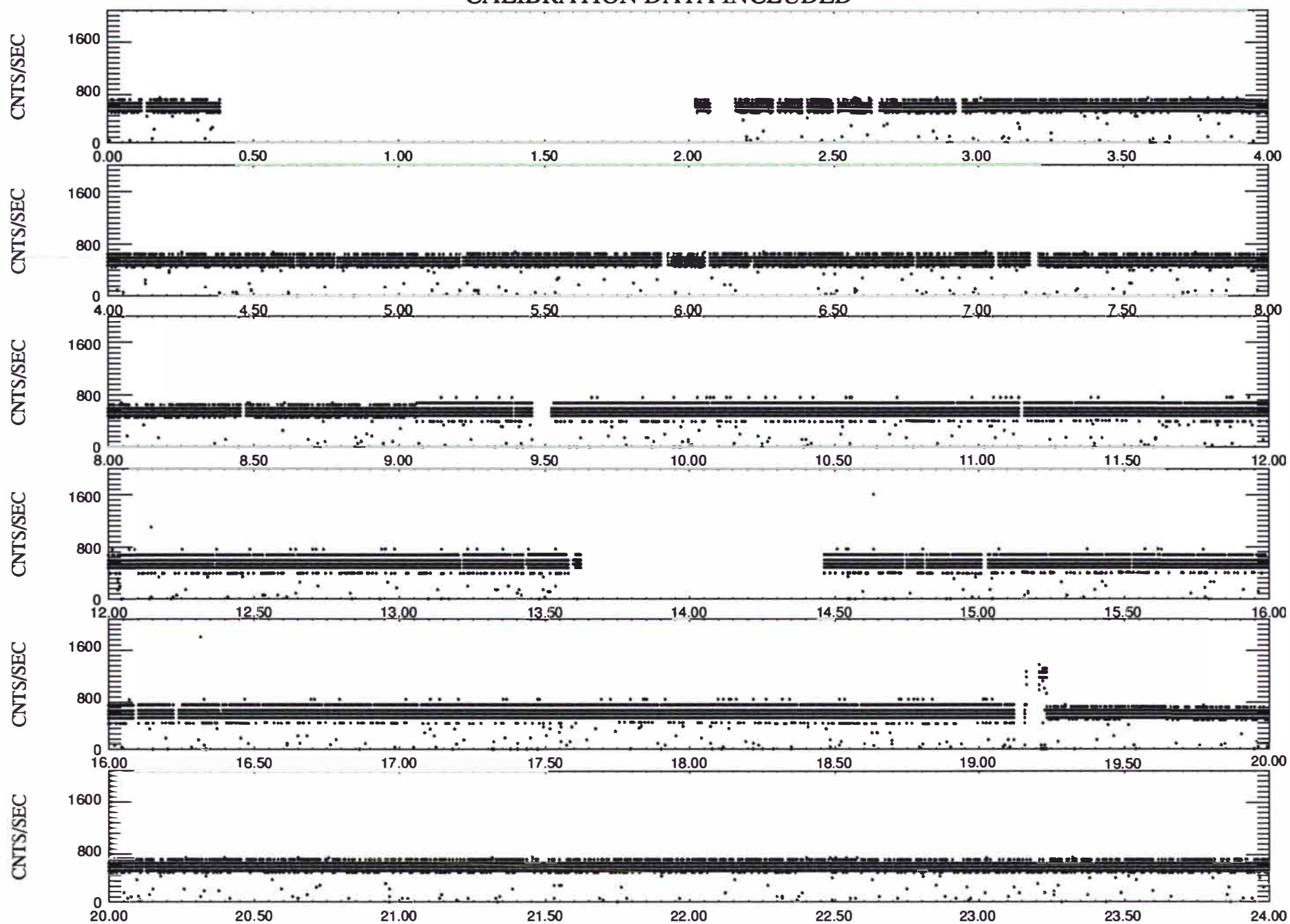
Background not subtracted

Sample average = 10

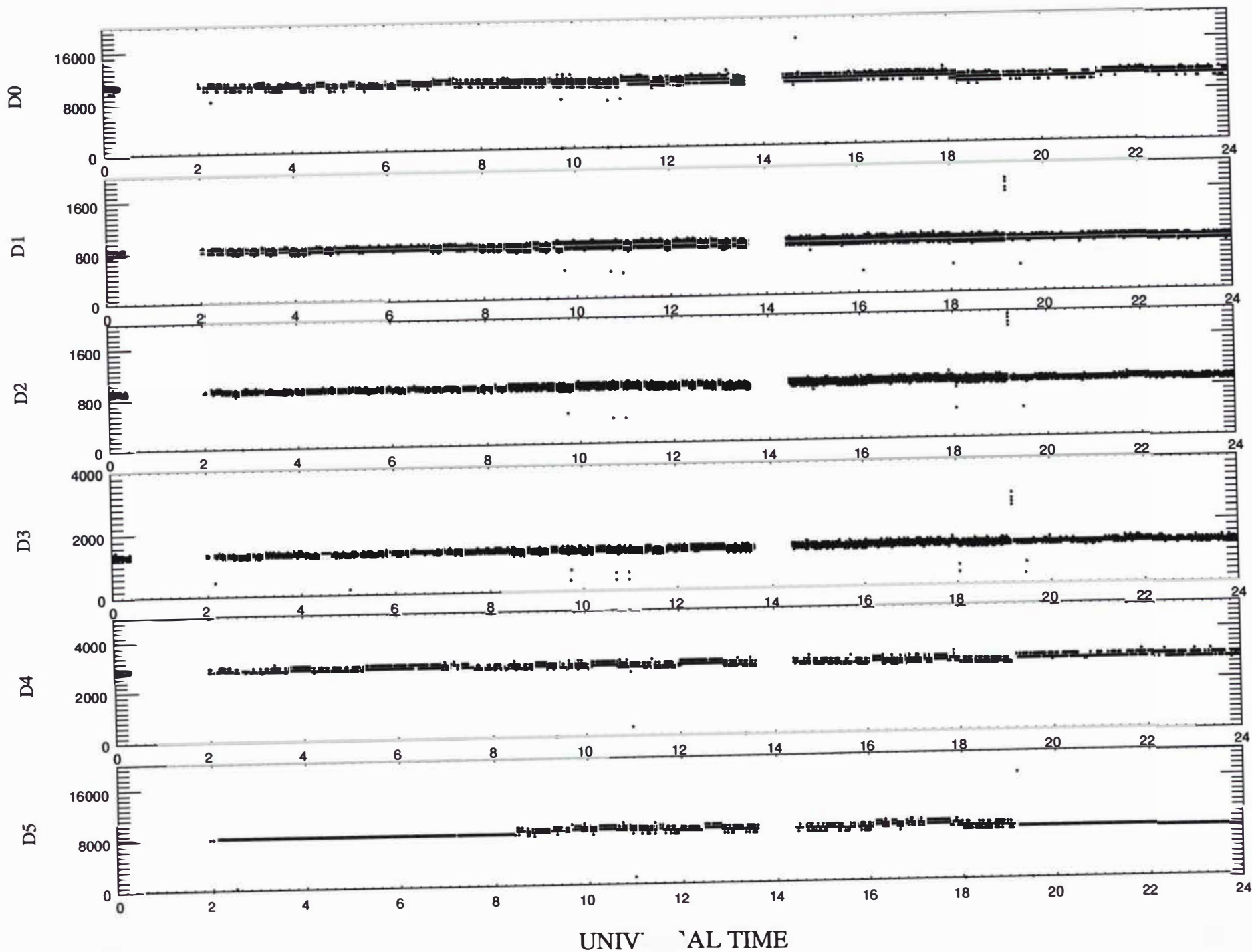
NO BURST (4)



CALIBRATION DATA INCLUDED



UNIV 'AL TIME



CATSEARCH PROGRAM

BATSE BURST # 1141
EVENT OF 1991 DEC 2 DAY OF YEAR=336
EVENT CROSSING TIME AT BATSE : 73730. S. OR 20:28:49.7
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 173.000 -24.700
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 2/12/ 91 IS:
RA= 167.340 DEC= 6.774 DIST= 4.867 AU
BATSE-ULYSSES DISTANCE = 728029896. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=148.05 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-2060.48 SECS.
CROSSING TIME AT ULYSSES IS 71669. S. OR 19:54:29 +/- 241.84 SECONDS

Discrepancy: -187.836882 s, at 91336, 19.853428 UT

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

Helio corr removed

Date: Jan 24 1997

BURST TRIANGULATION CHECKLIST

1. Ulysses Data

- ☒ Jim Schmidling's stat file correction applied?
- ☒ Ephemeris calculated for start of record of real time data?
- ☒ Final ephemeris used?
- ☒ Does ULYTRIG program output contain trigger time, and not SOR? (Ditto for FILE.ult)
- ☒ 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 necessarily - this is a difficult event to Δ due to different trigger points in the time history

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? N/A

3. PVO Data

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

Access database updated

N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

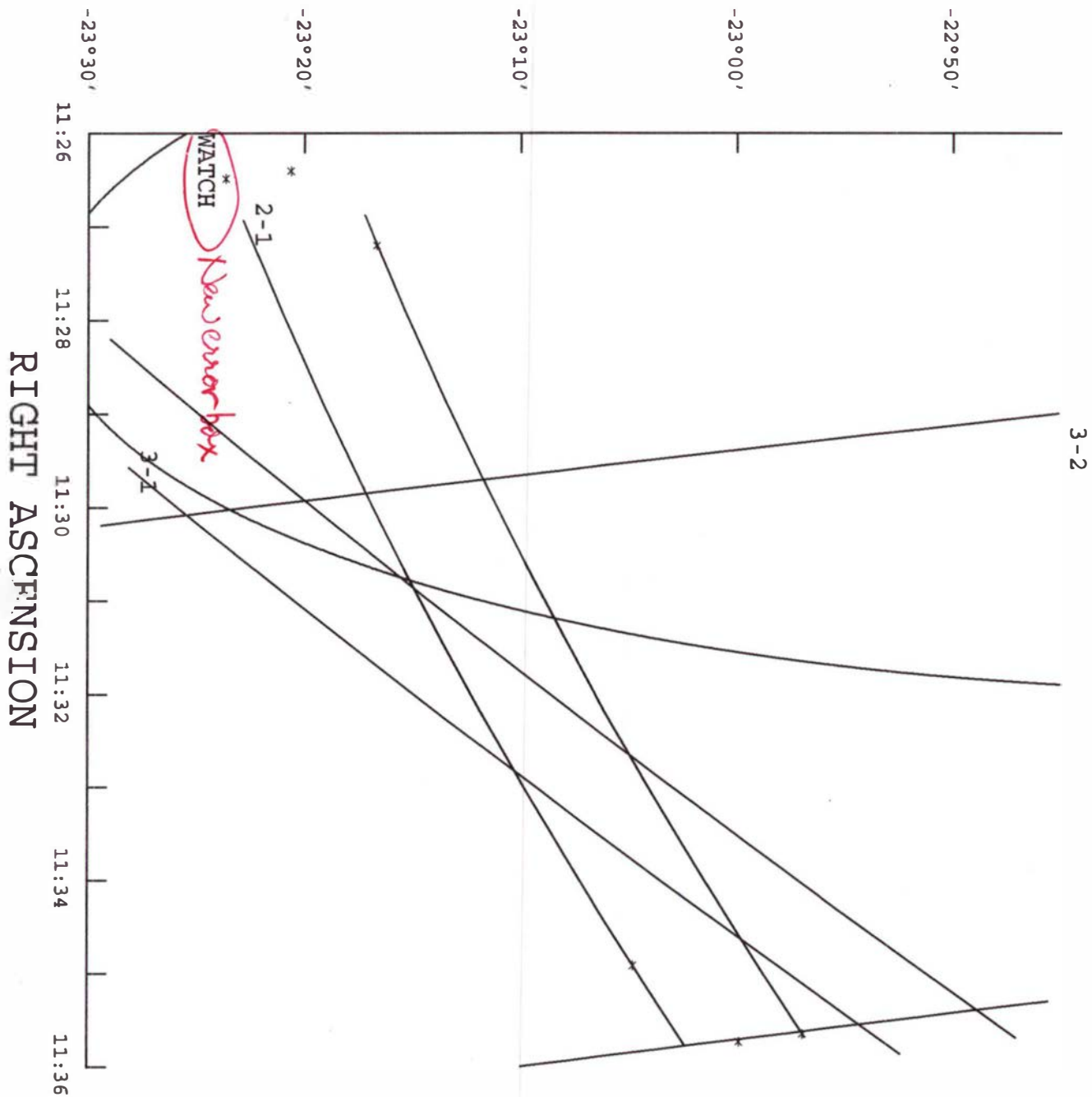
G=GALACTIC EQUATOR

1 ULYSSES

2 BATSE

3 PVO

DECLINATION



EVENT OF DEC 2, 1991 19:53

25/11/97

From jlaros@LPL.Arizona.EDU Mon Jan 27 13:35 PST 1997
Date: Mon, 27 Jan 1997 14:39:05 -0700
From: jlaros@LPL.Arizona.EDU (John Laros)
To: khurley@sunspot.ssl.berkeley.edu
Subject: Re: GRB911202
Cc: jlaros@LPL.Arizona.EDU

Kevin,

PVO trigger: 73363.547 (heliocentric frame, but who cares)
PVO ephemeris: 137092639. 205.0455 -8.0151 (J2000)

This is a really ugly one as far as PVO data are concerned. I did not even attempt to do a computer lag. My original estimate, based on eyeballing the BATSE >110 keV profile, was that PVO triggered around 9 s after the BATSE trigger. I think your delay implies 12 s, which looks on the late side to me because of PVO's max 4 s trigger time scale. In other words, if PVO hasn't triggered by 12 s, it never will. Now that I think about it, I would put the most probable lag at 10.5 s, based on the assumption that PVO just barely triggered and the observation that the highest 4-s bin is from 6.5 to 10.5 s after BATSE trigger. I guess that means I would favor splitting the difference, but keeping the uncertainty at 3 s.

Unfortunately, the situation is actually muddier. I have realtime data at 4 s resolution from what is claimed to be that interval, generated by the newer software. There is no apparent response, but there is a short data gap that I originally thought covered the trigger time. Today I noticed that the gap is actually after the trigger, so the burst should have been seen in real time. To make sure, I just asked Robin to generate some "old-style" realtime data over that interval. Her reply was that none exists! I will keep pursuing this, so stay tuned. In the mean time, should we adopt 6.6 ± 3 s as the delay?

John

Dec 2 1991

Because PVO only saw the tail of this event with poor statistics, there is considerable uncertainty. Two BATSE time histories, 25-100, 100-2000 keV, were used. Results for ν Is integration times

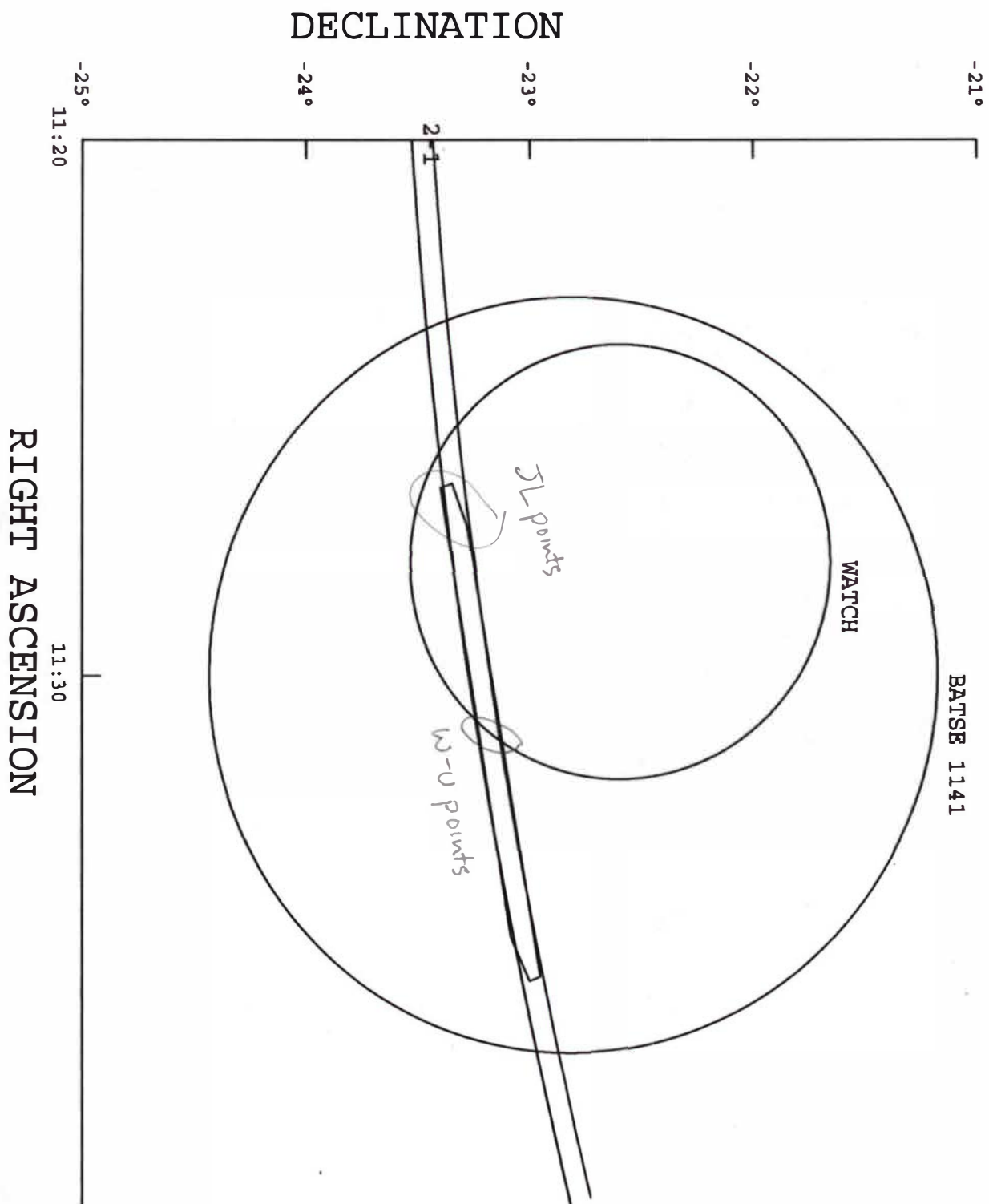
	25-100	100-2000	JL1	Uncertainty
PVO-BATSE Δt	378.1	379.5	375.2	$\pm 3s$
PVO-Ulysses Δt	1720.6	$\equiv$ 1720.6		$\pm 1s$
BATSE-Ulysses Δt	2099.3	2099.3		$\pm 1s$
Residual uncertainty	0.6	-0.8		

Take

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 DEC 2, 1991 19:53

25 / 3 / 99



N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

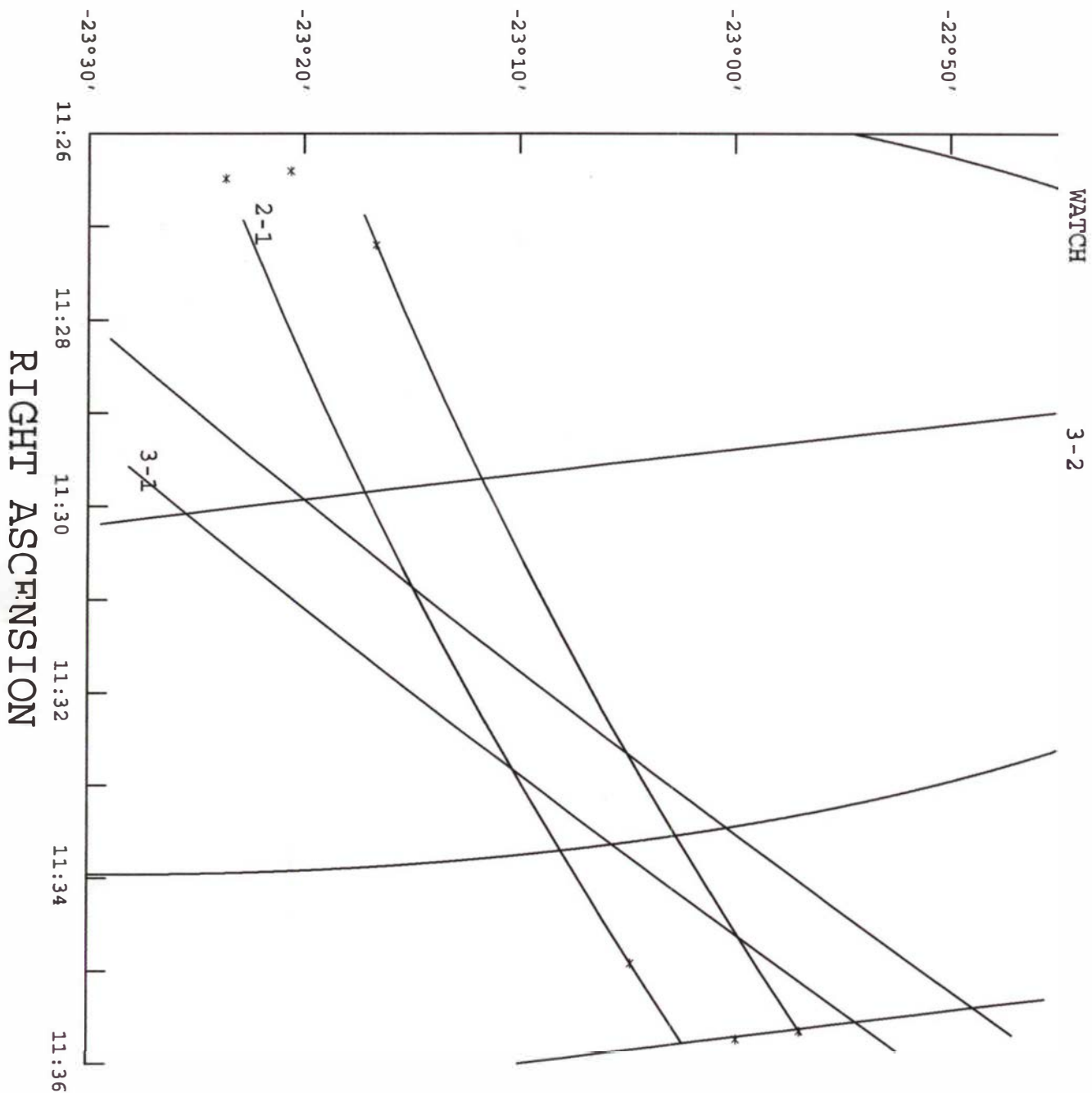
G=GALACTIC EQUATOR

1 ULYSSES

2 BATSE

3 PVO

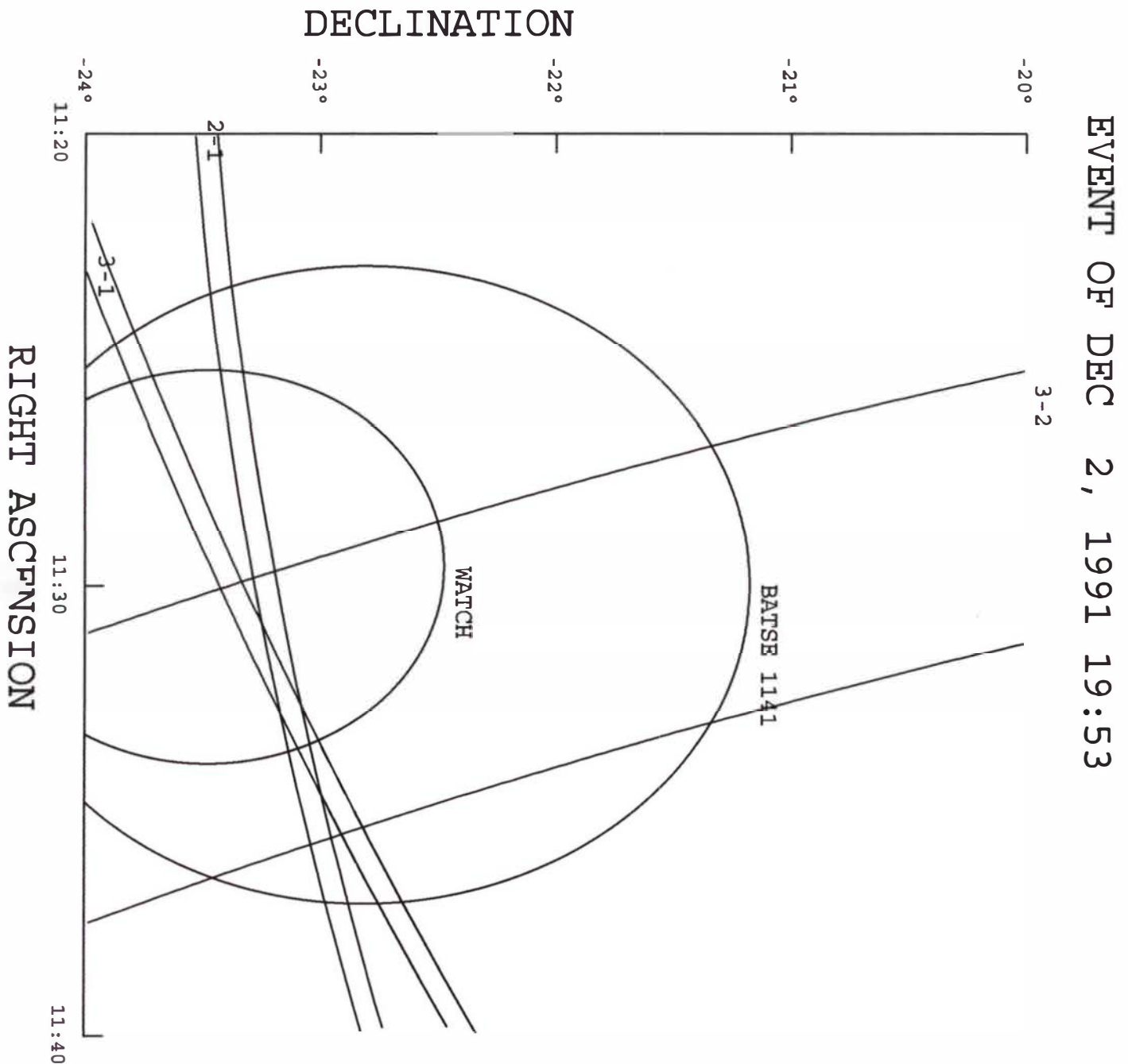
DECLINATION



9/10/97

G=GALACTIC EQUATOR

3 PVO



BATSE

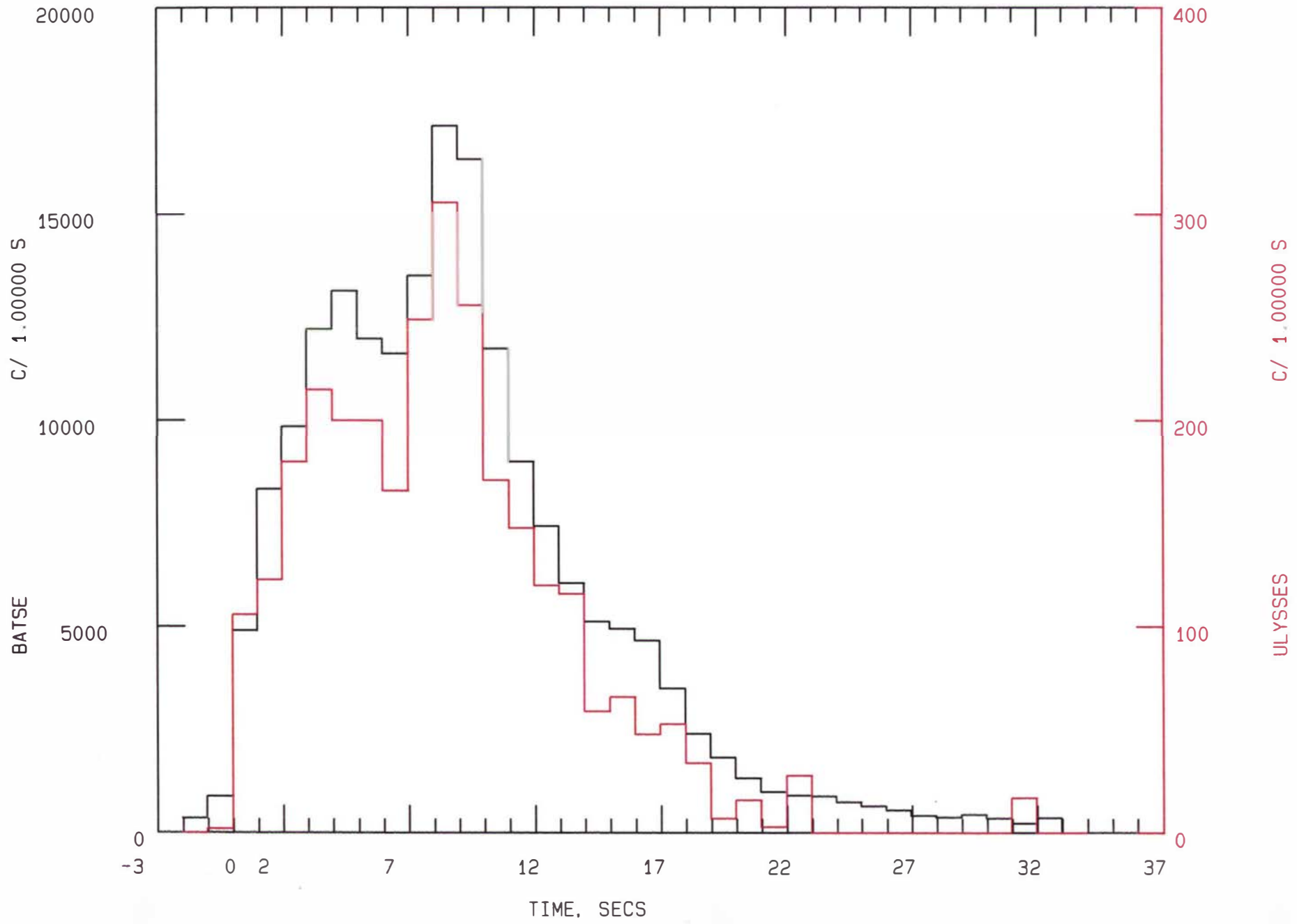
-ULYSSES

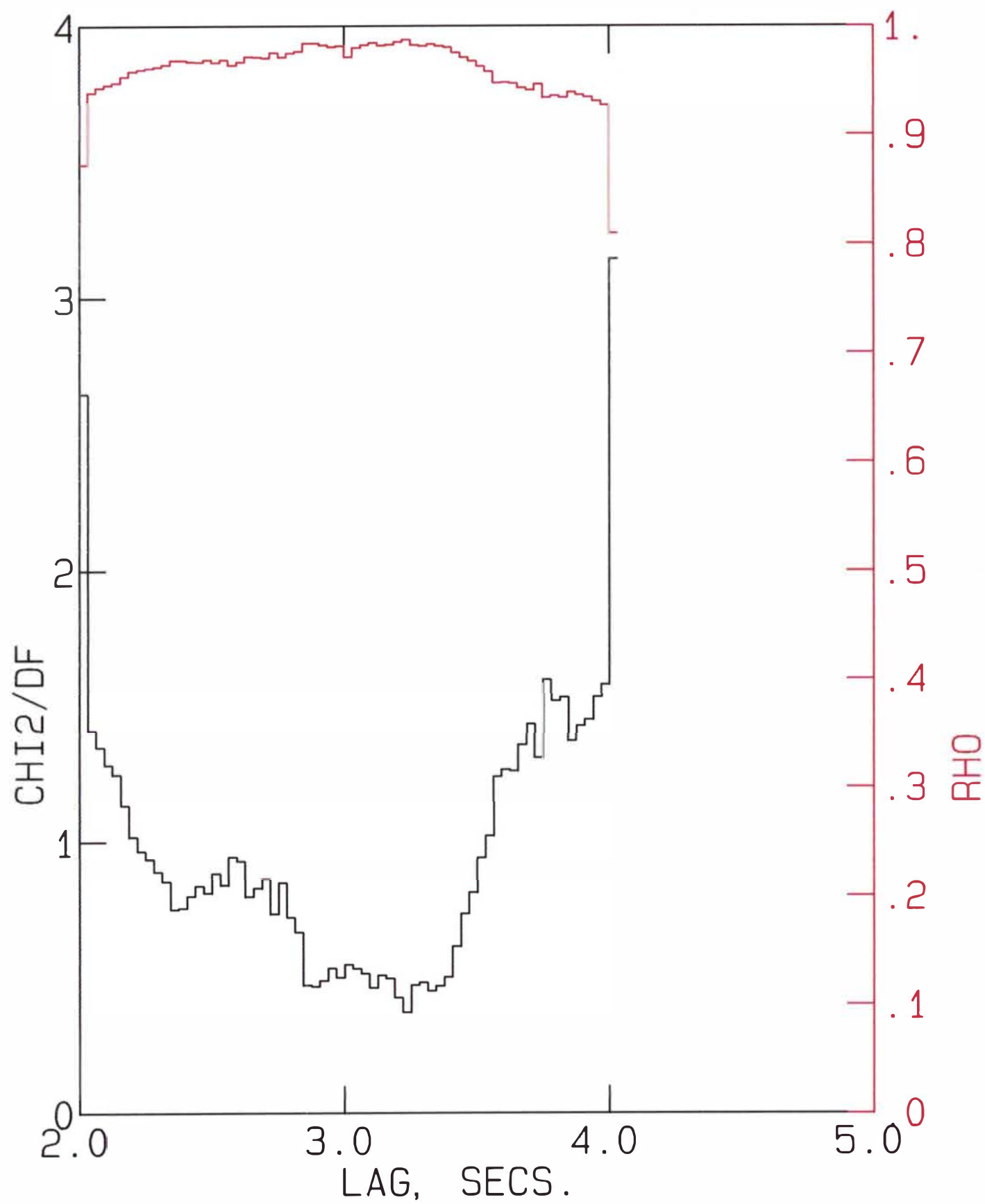
CORRELATION

2/12/91

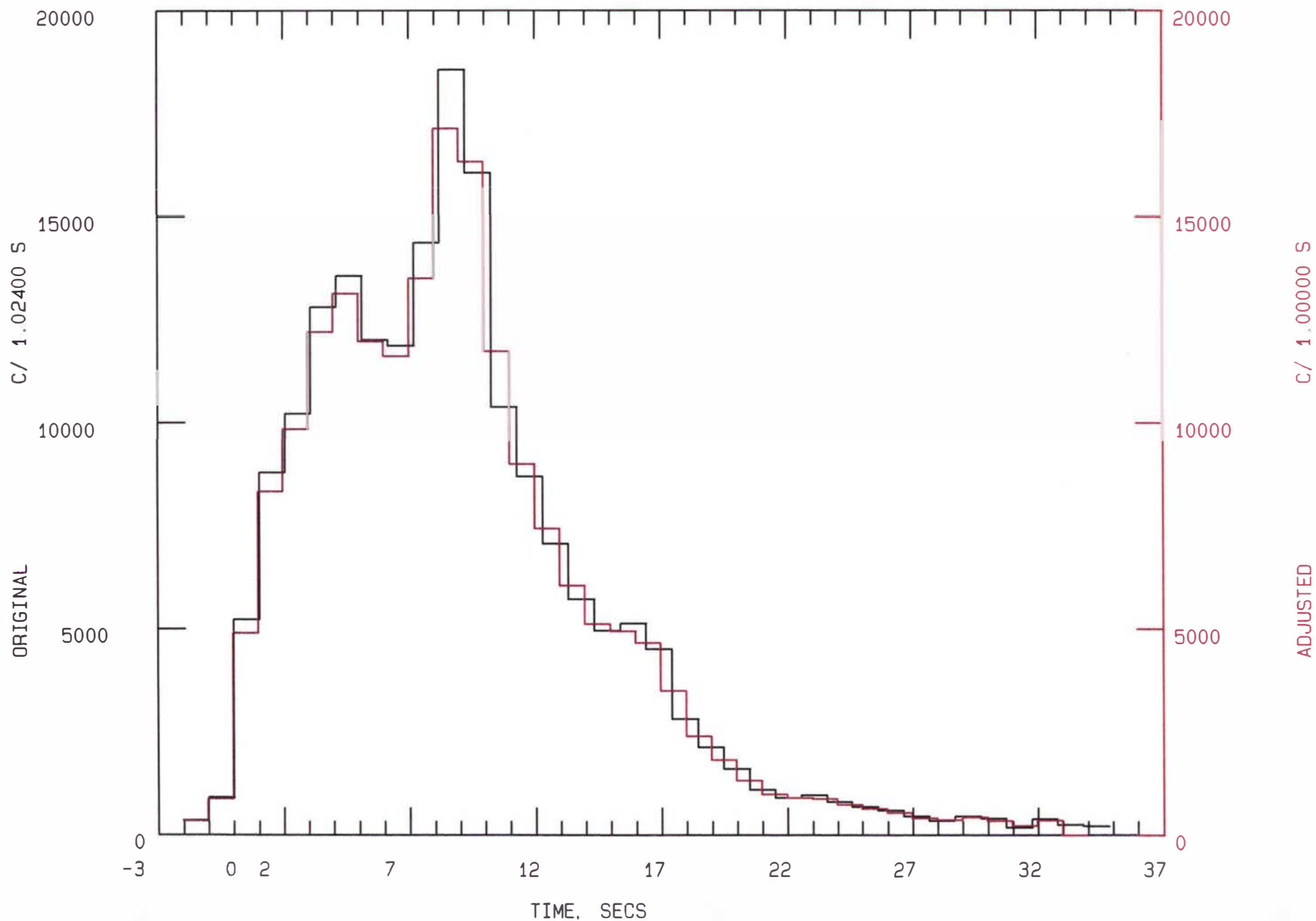
73729.707

28/ 1/97





28/ 1/97



BATSE

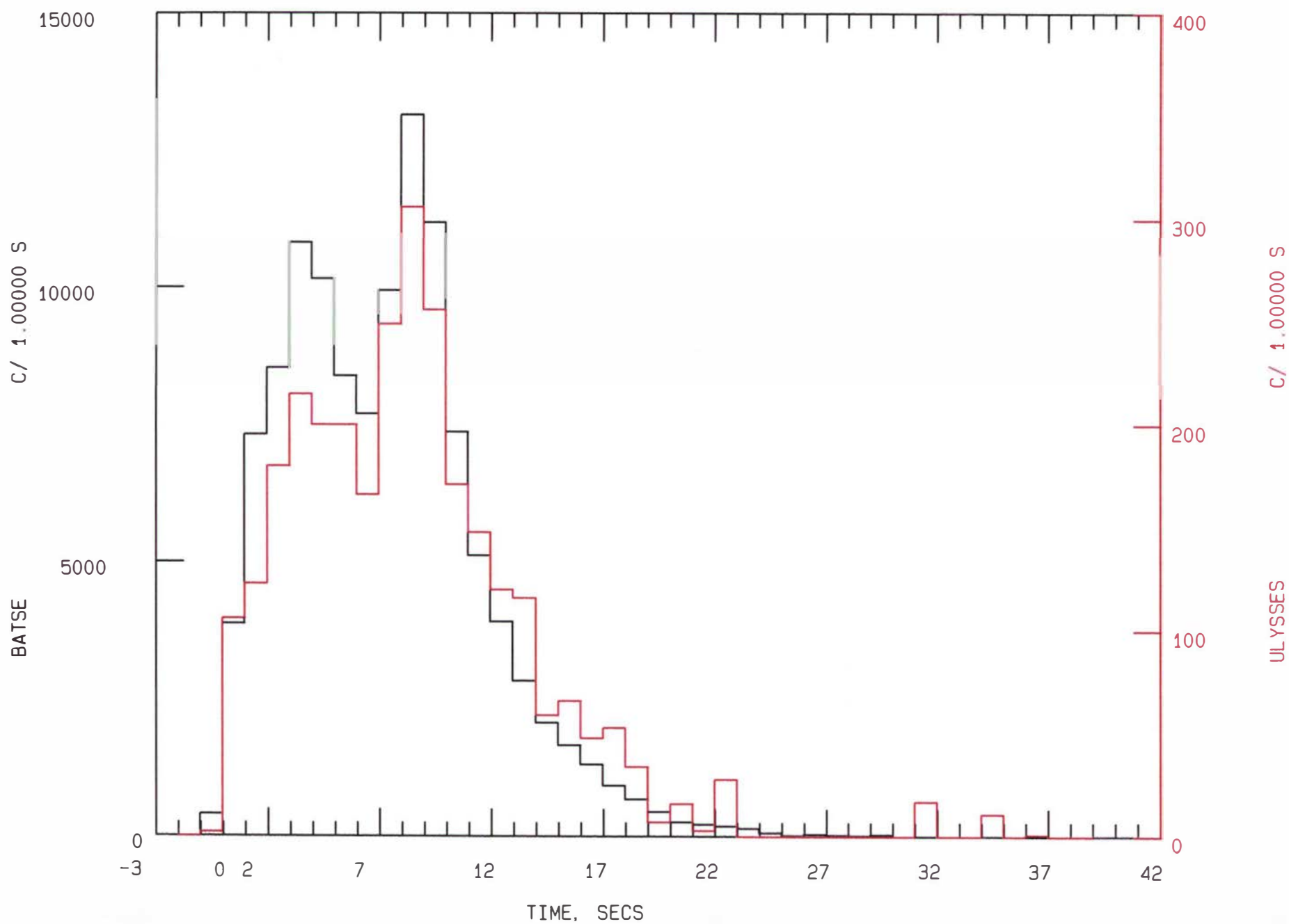
-ULYSSES

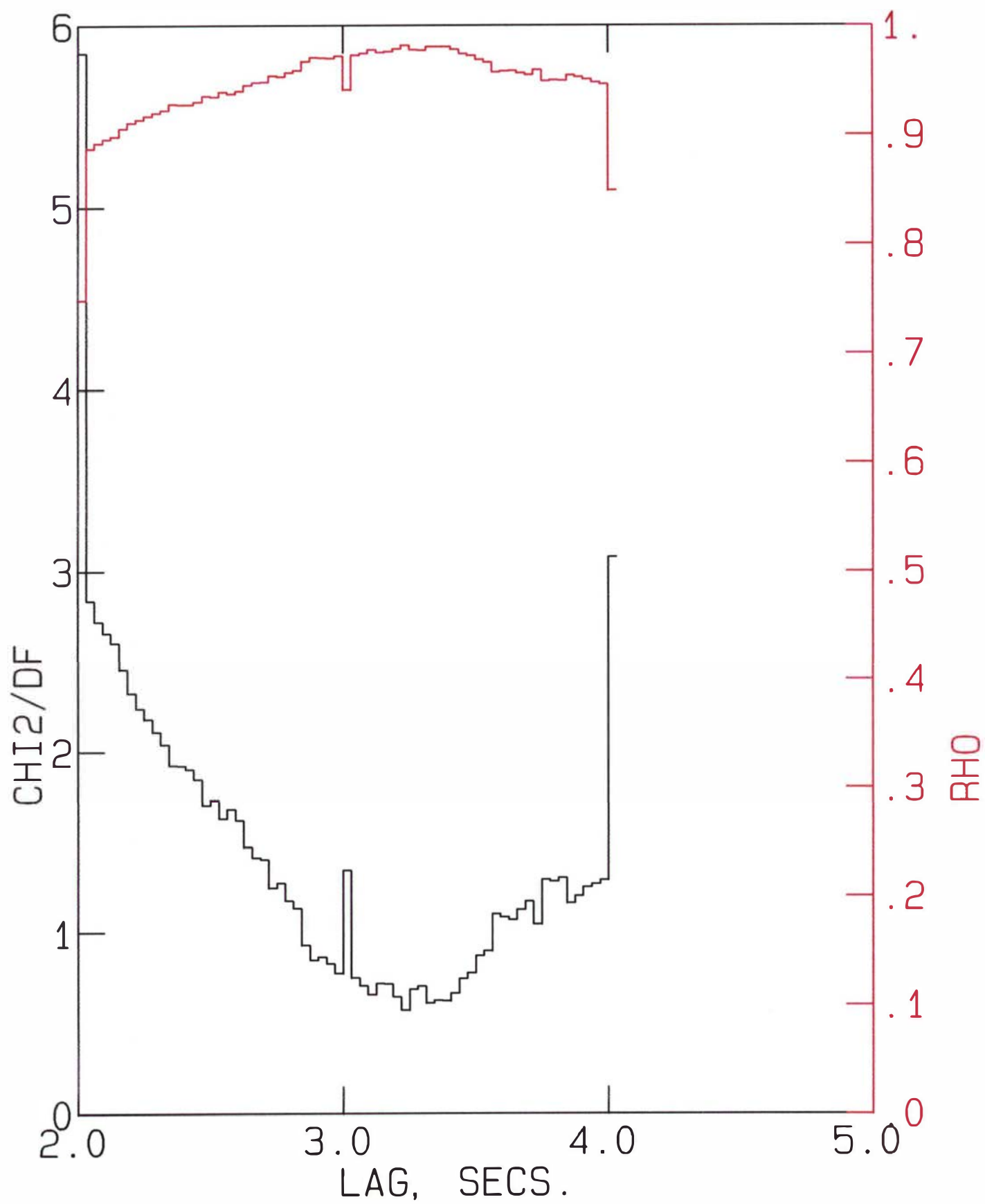
CORRELATION

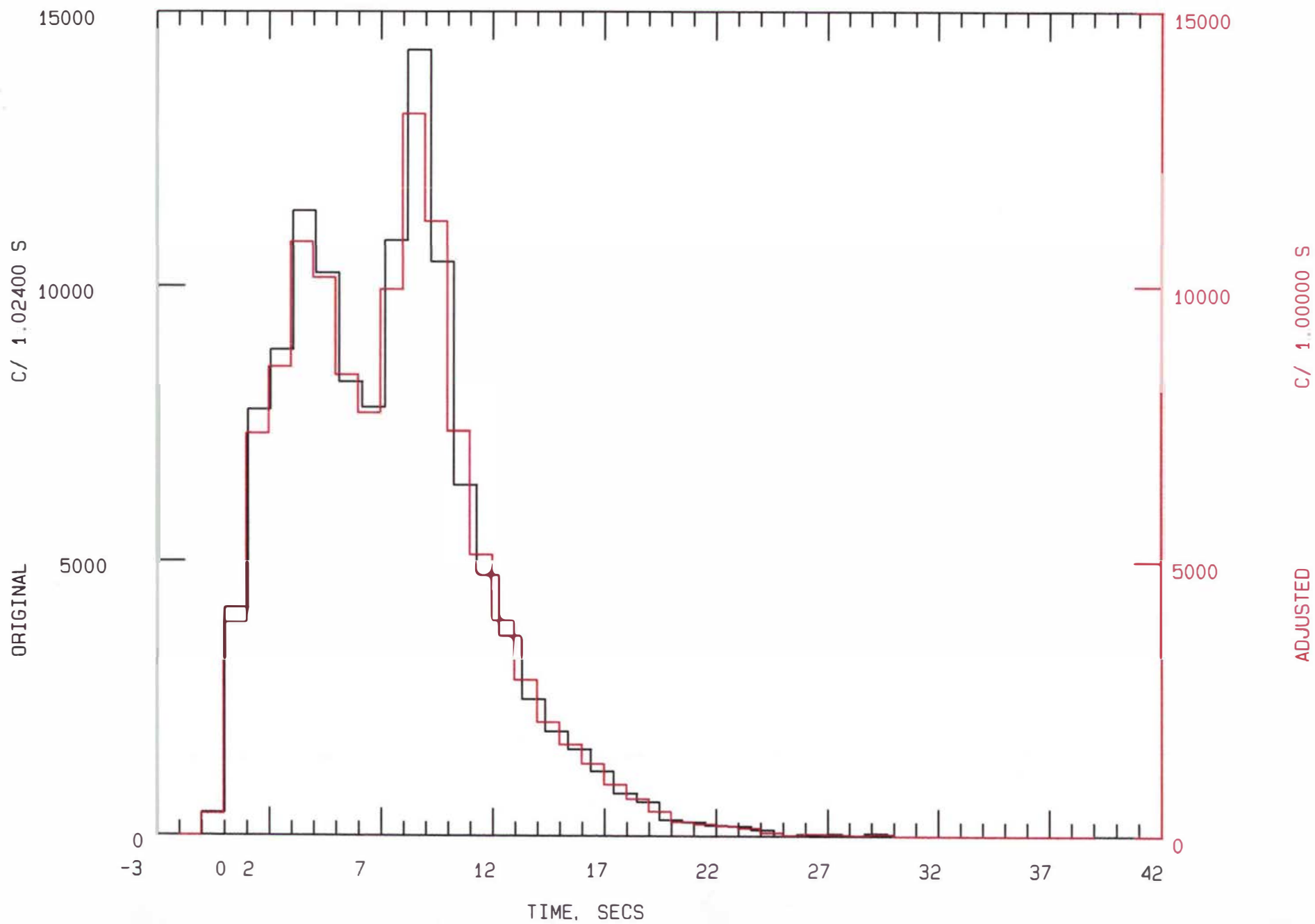
2/12/91

73729.707

28/ 1/97







PV0

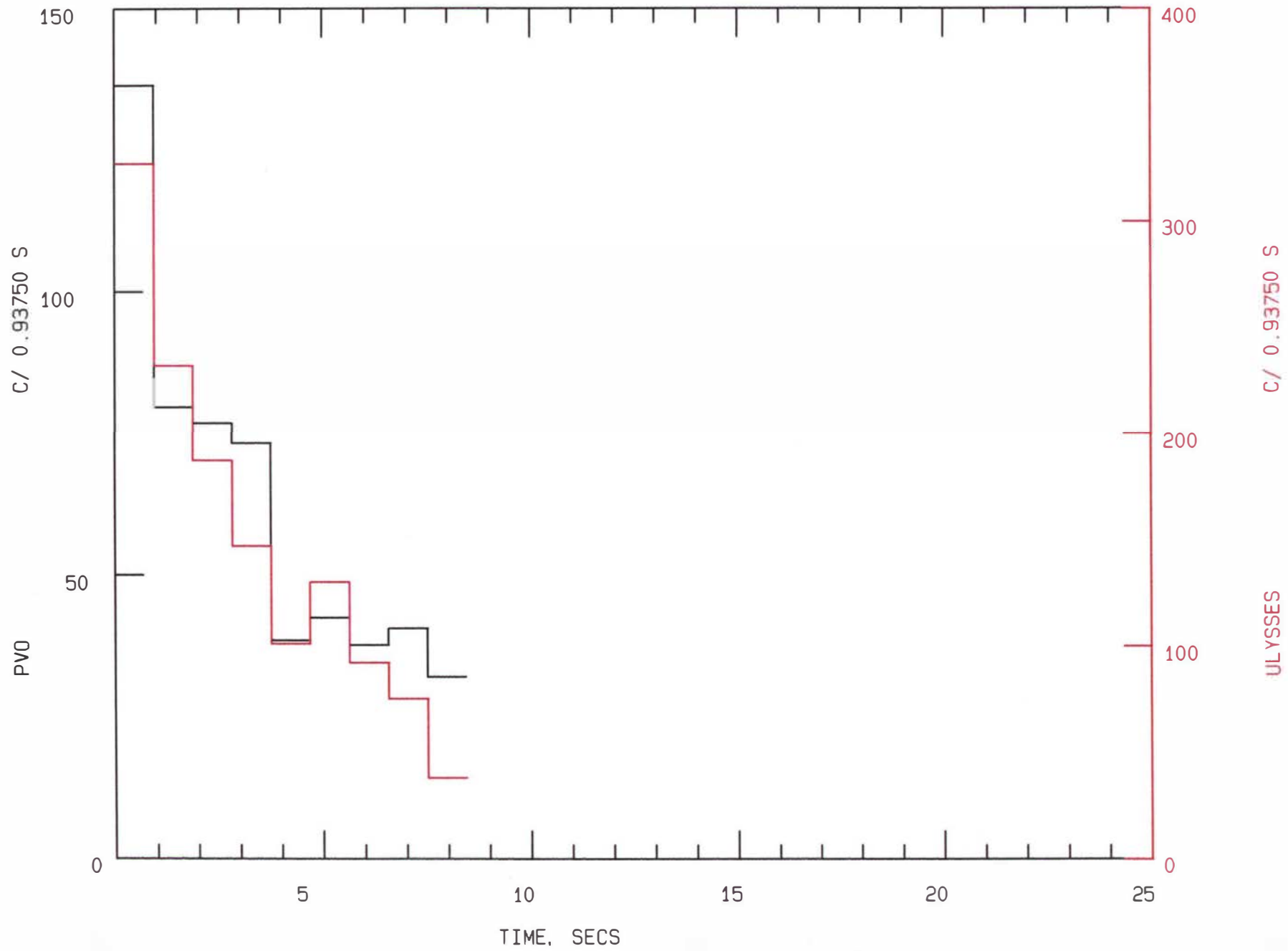
-ULYSSES

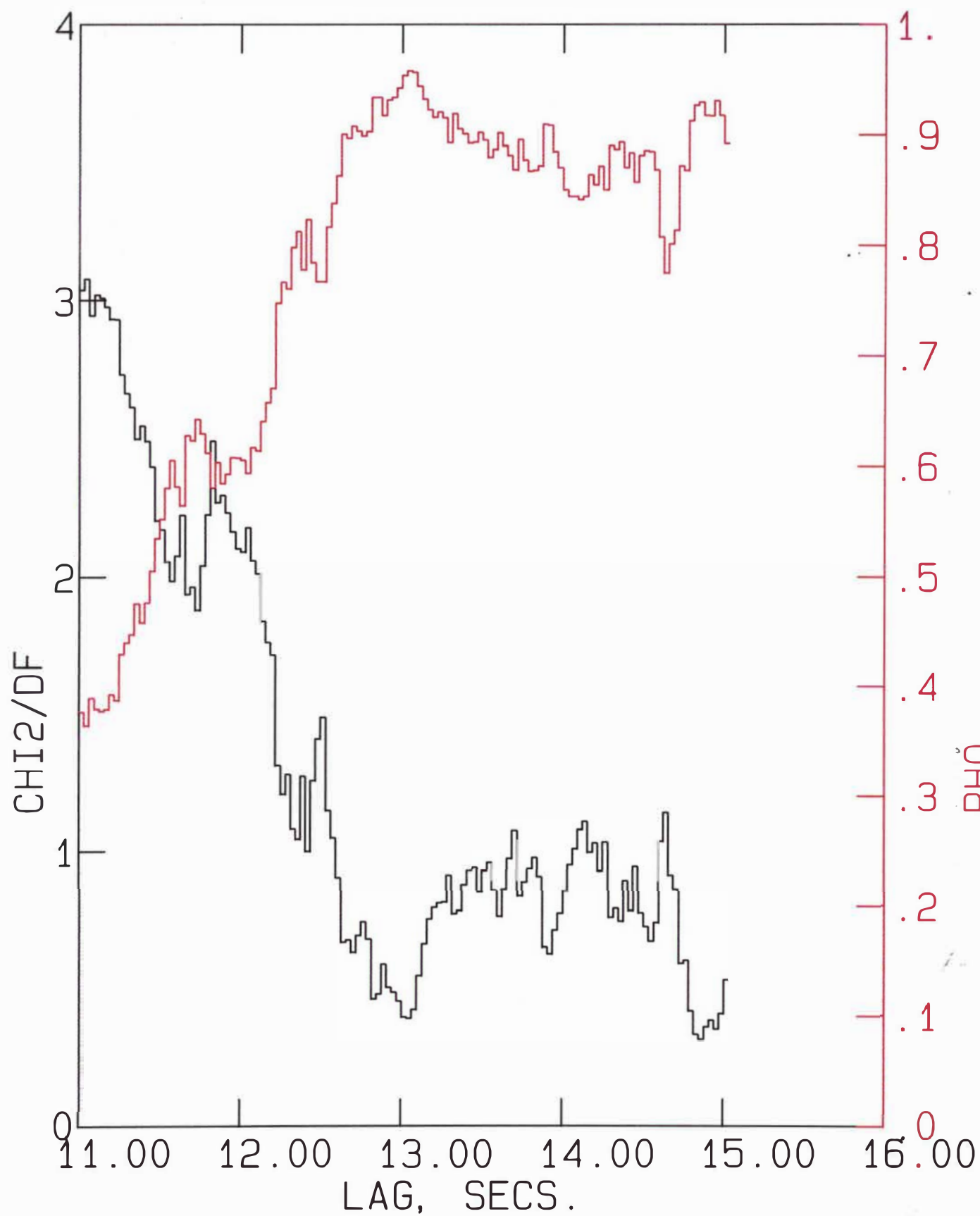
CORRELATION

02/12/91

73363.547

28/ 1/97





PV0

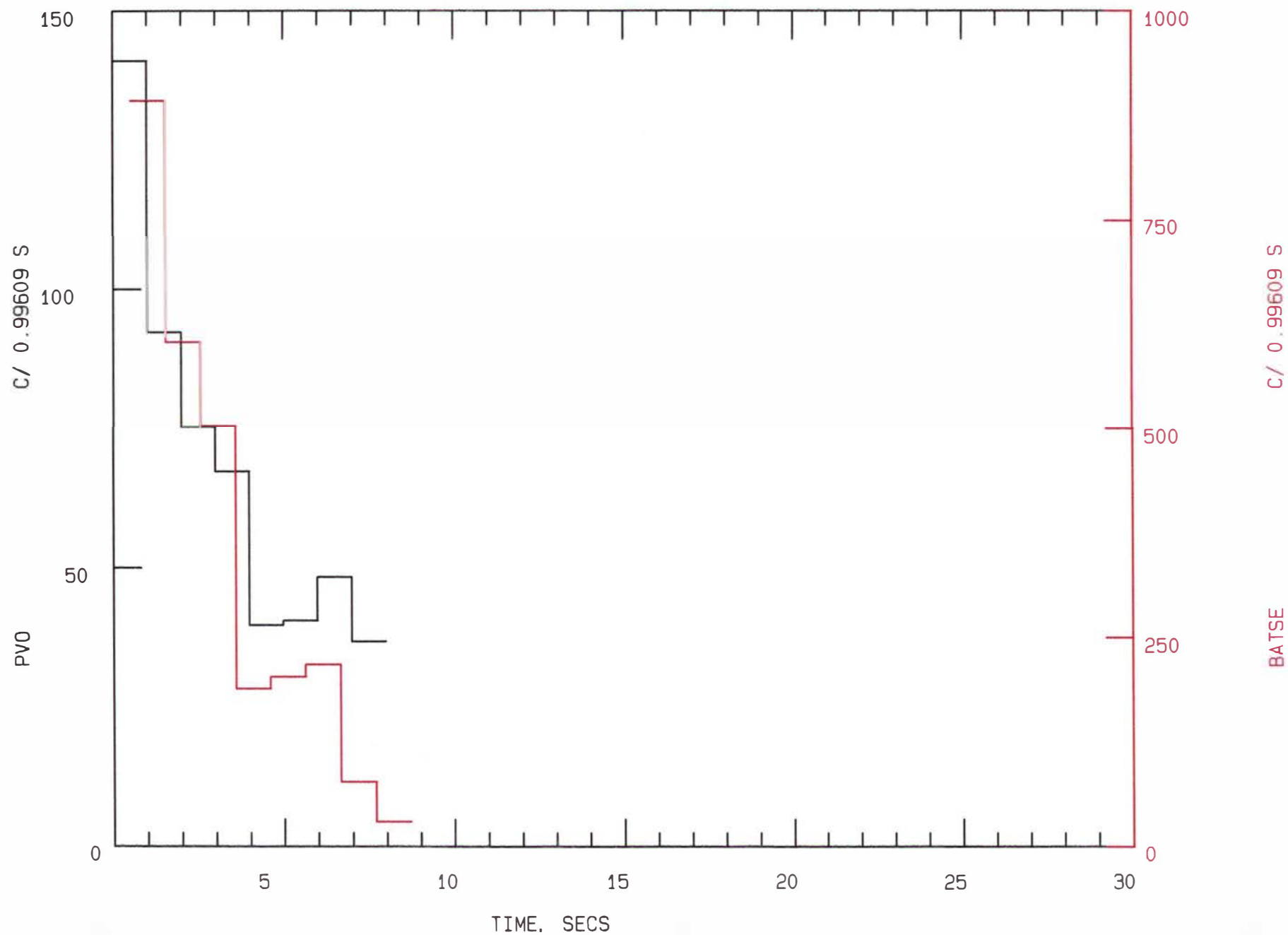
-BATSE

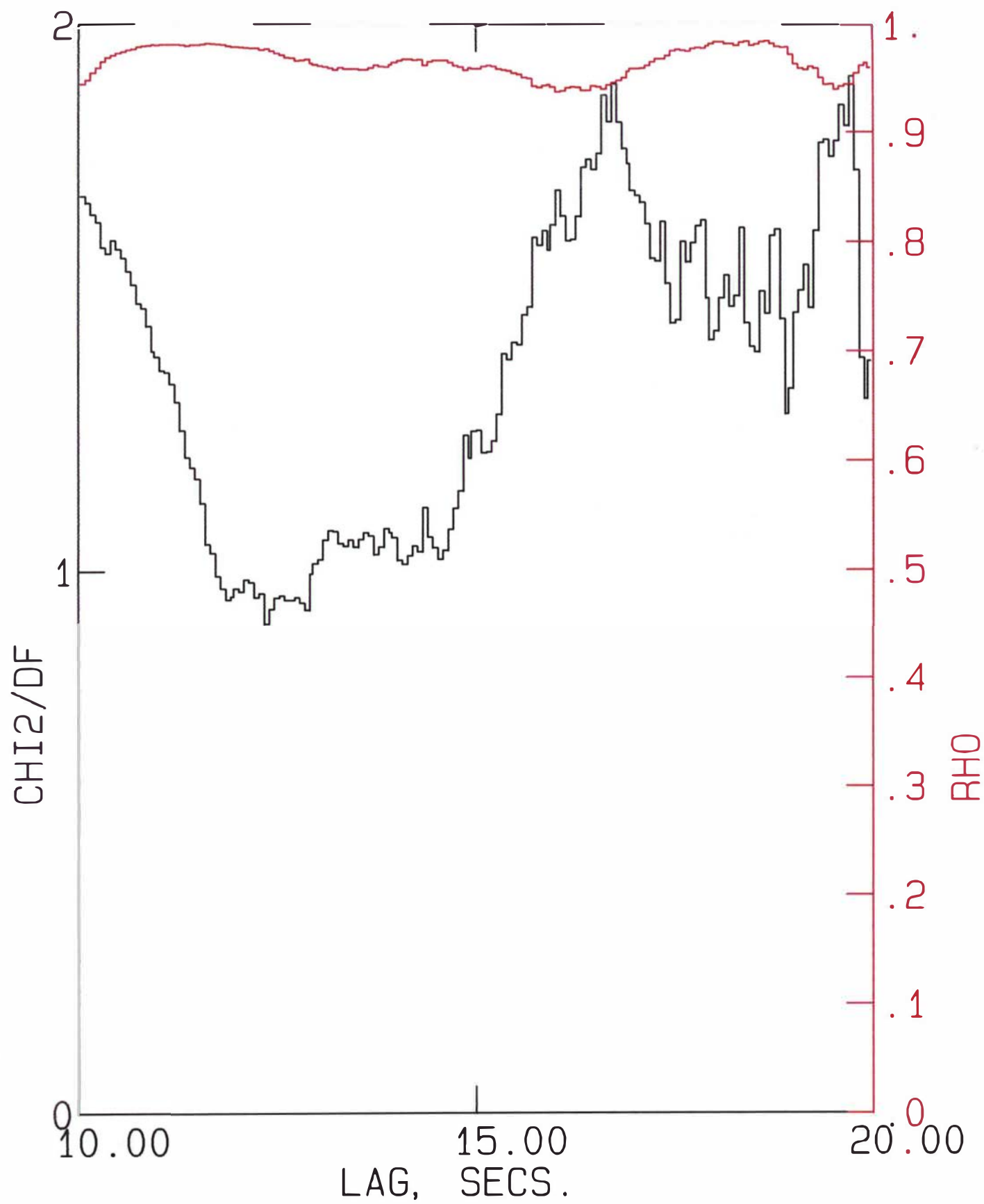
CORRELATION

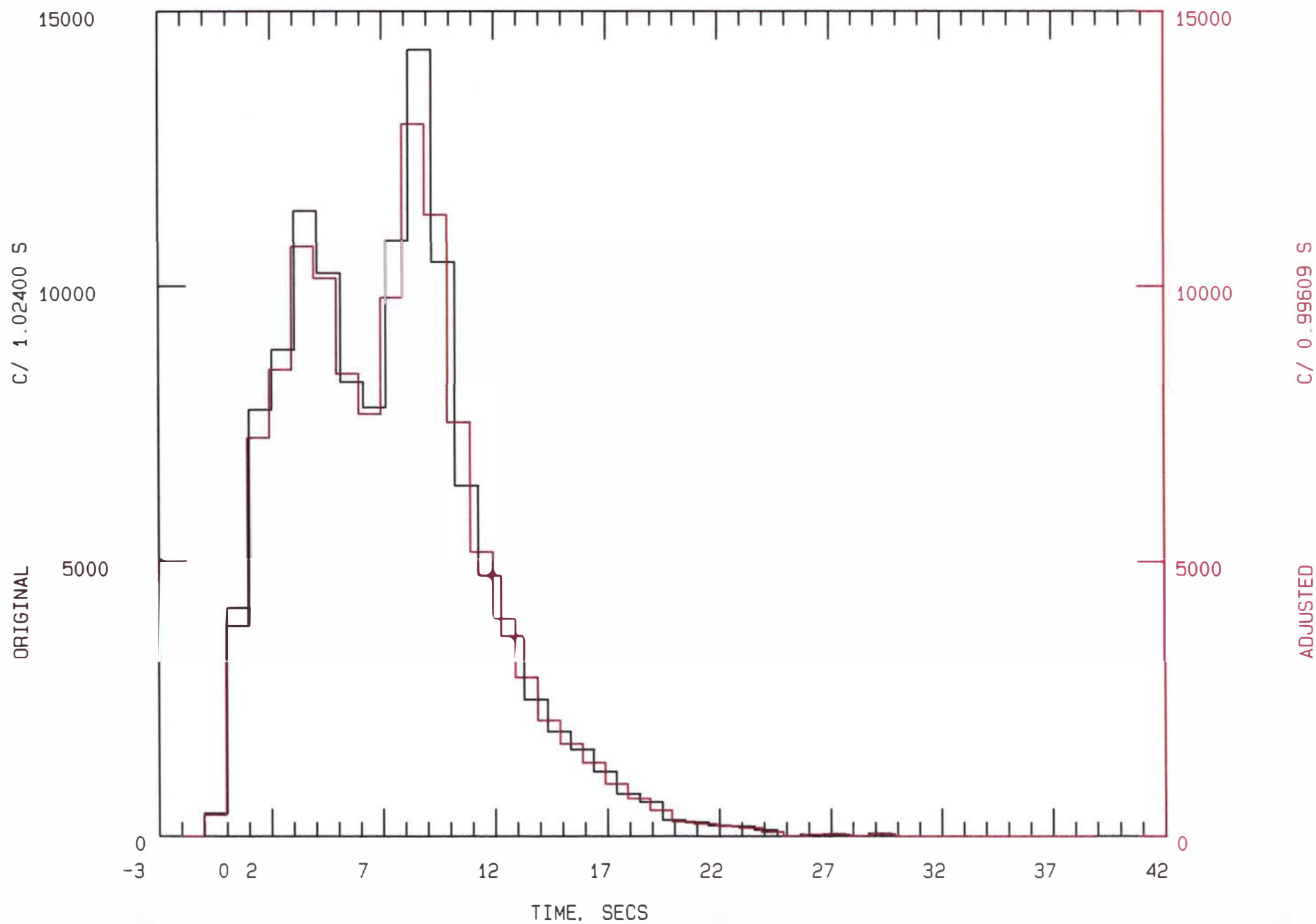
02/12/91

73363.547

28/ 1/97







PV0

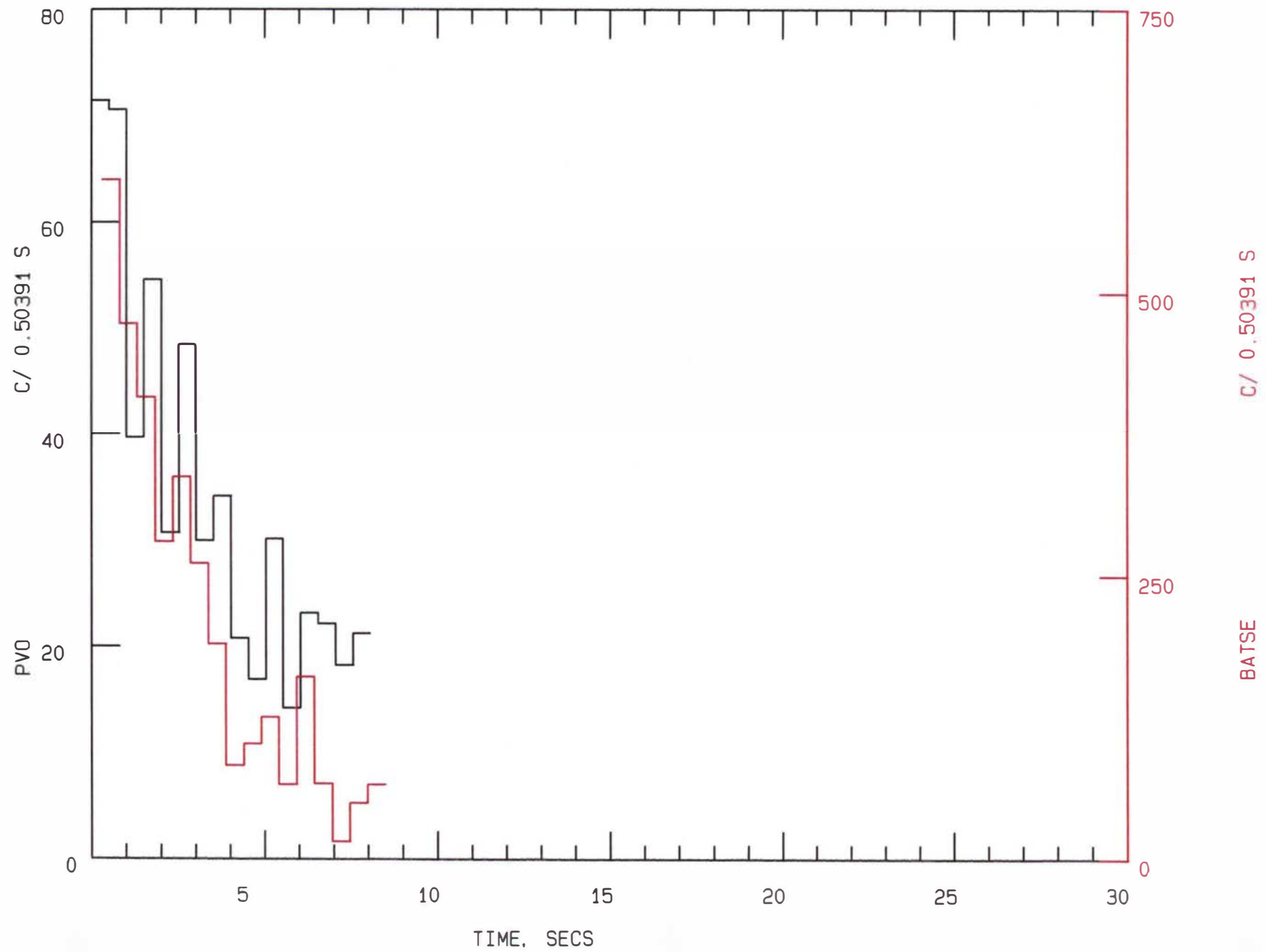
-BATSE

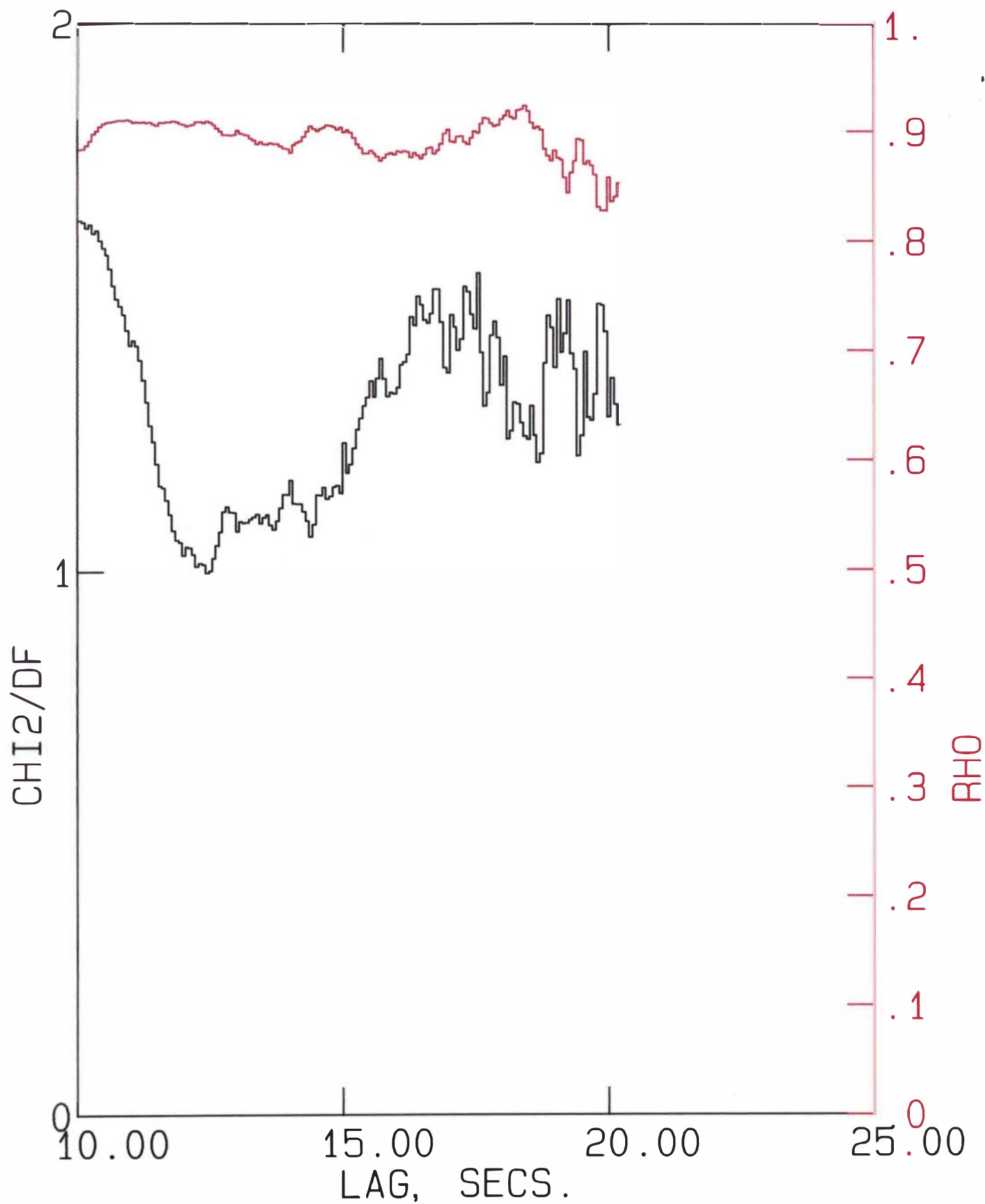
CORRELATION

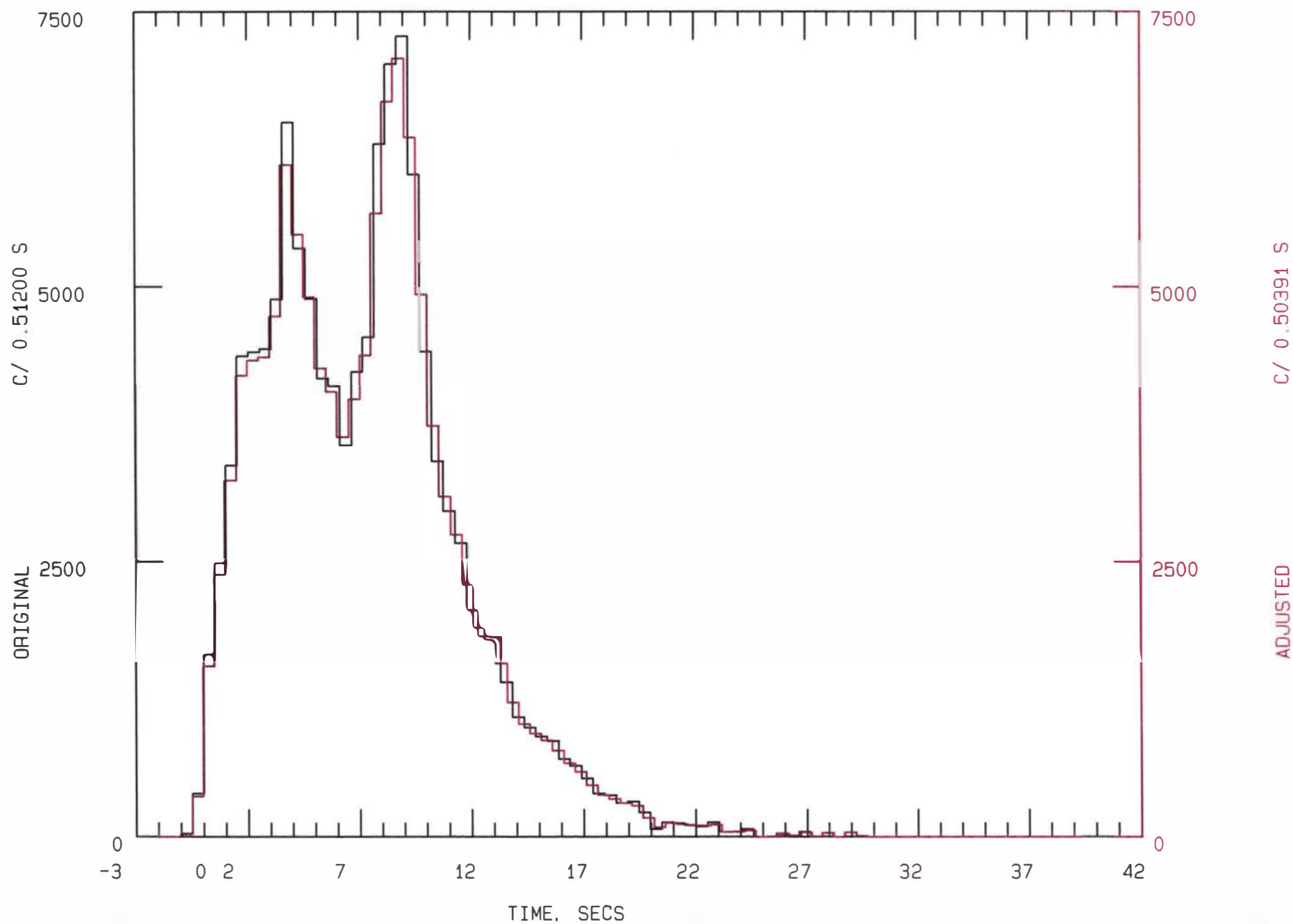
02/12/91

73363.547

28/ 1/97







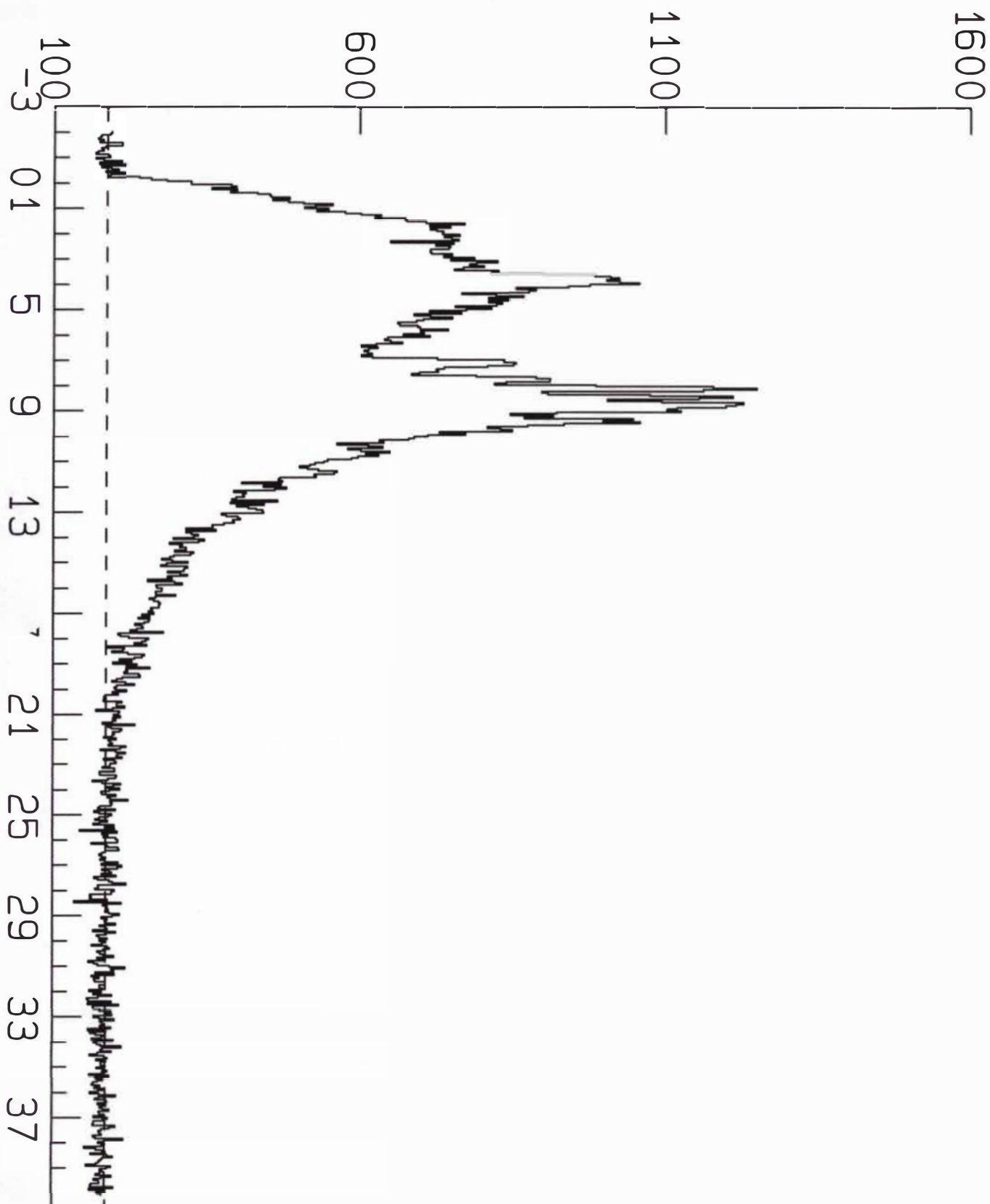
BATSE

02/12/91

73729.707

25- 100 keV

COUNTS/0.064 S



PV0

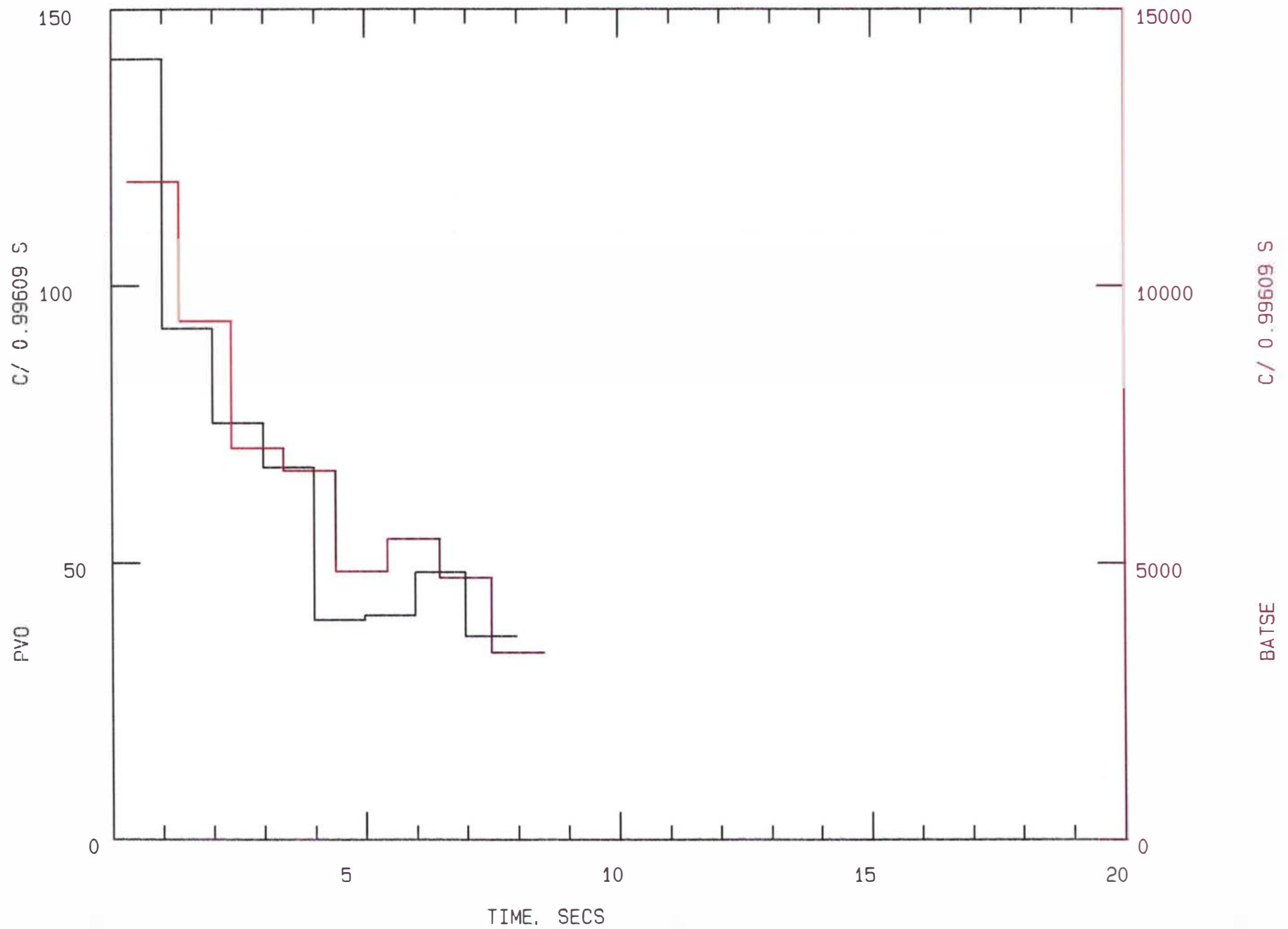
-BATSE

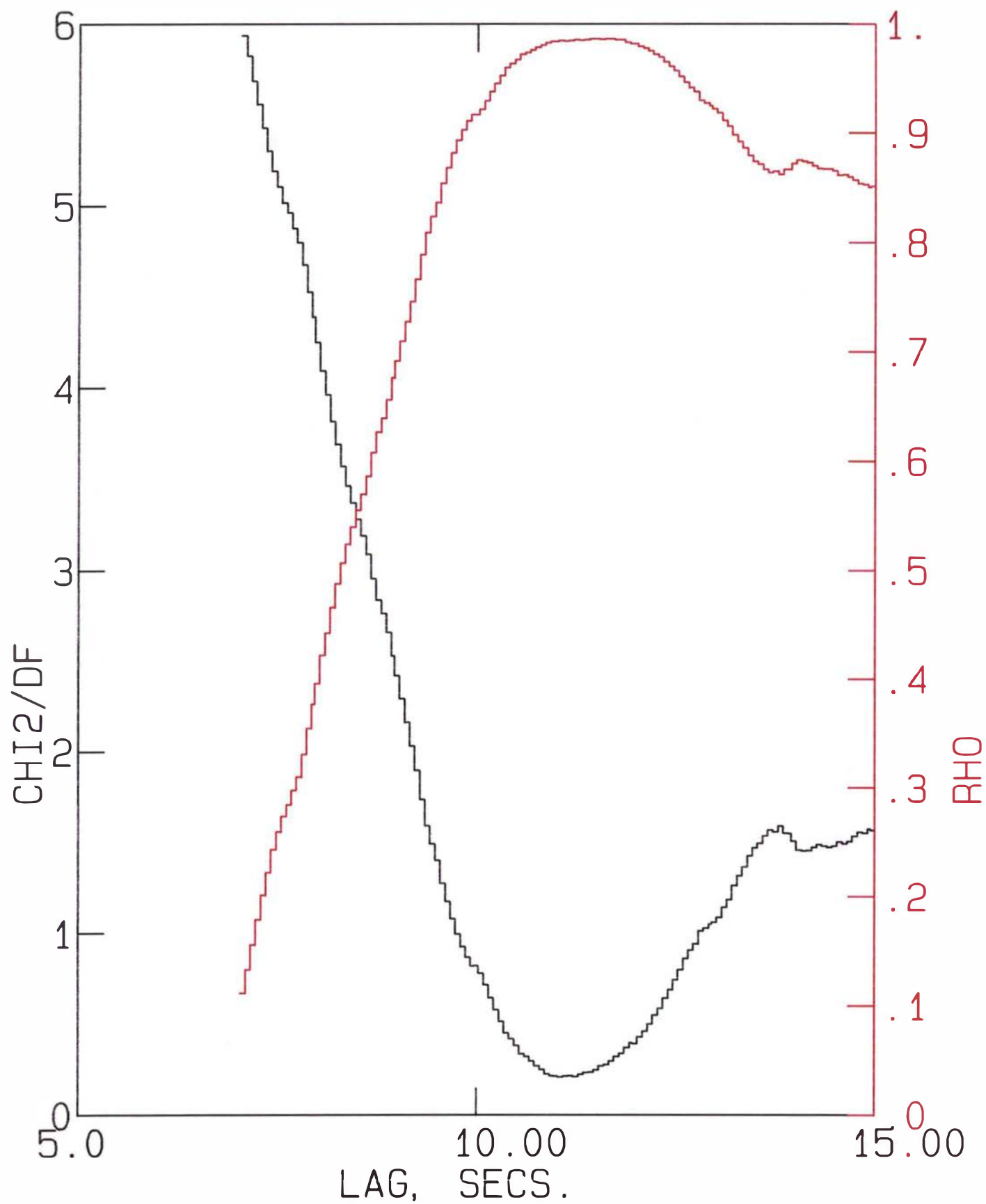
CORRELATION

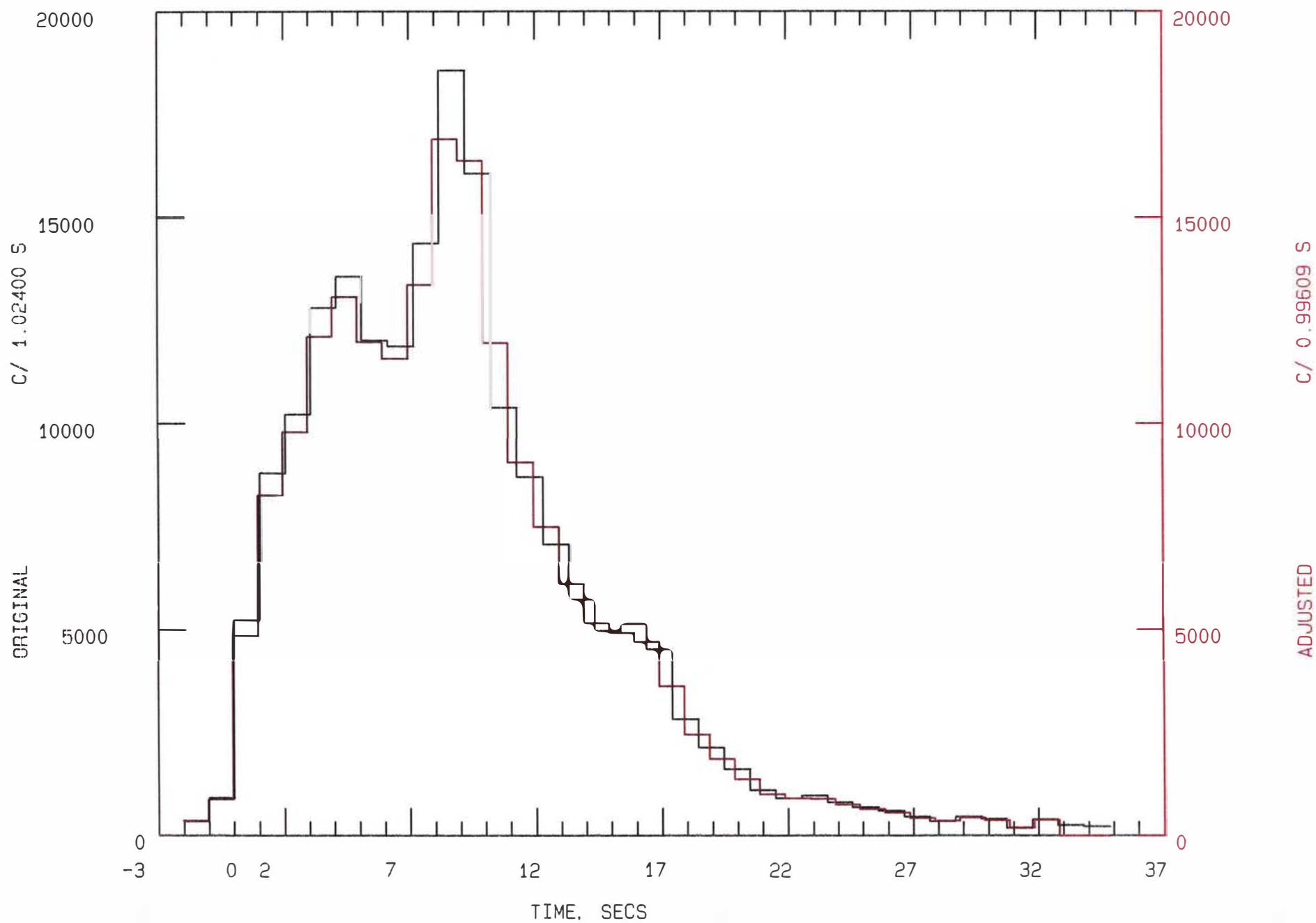
02/12/91

73363.547

23/ 1/97







BATSE

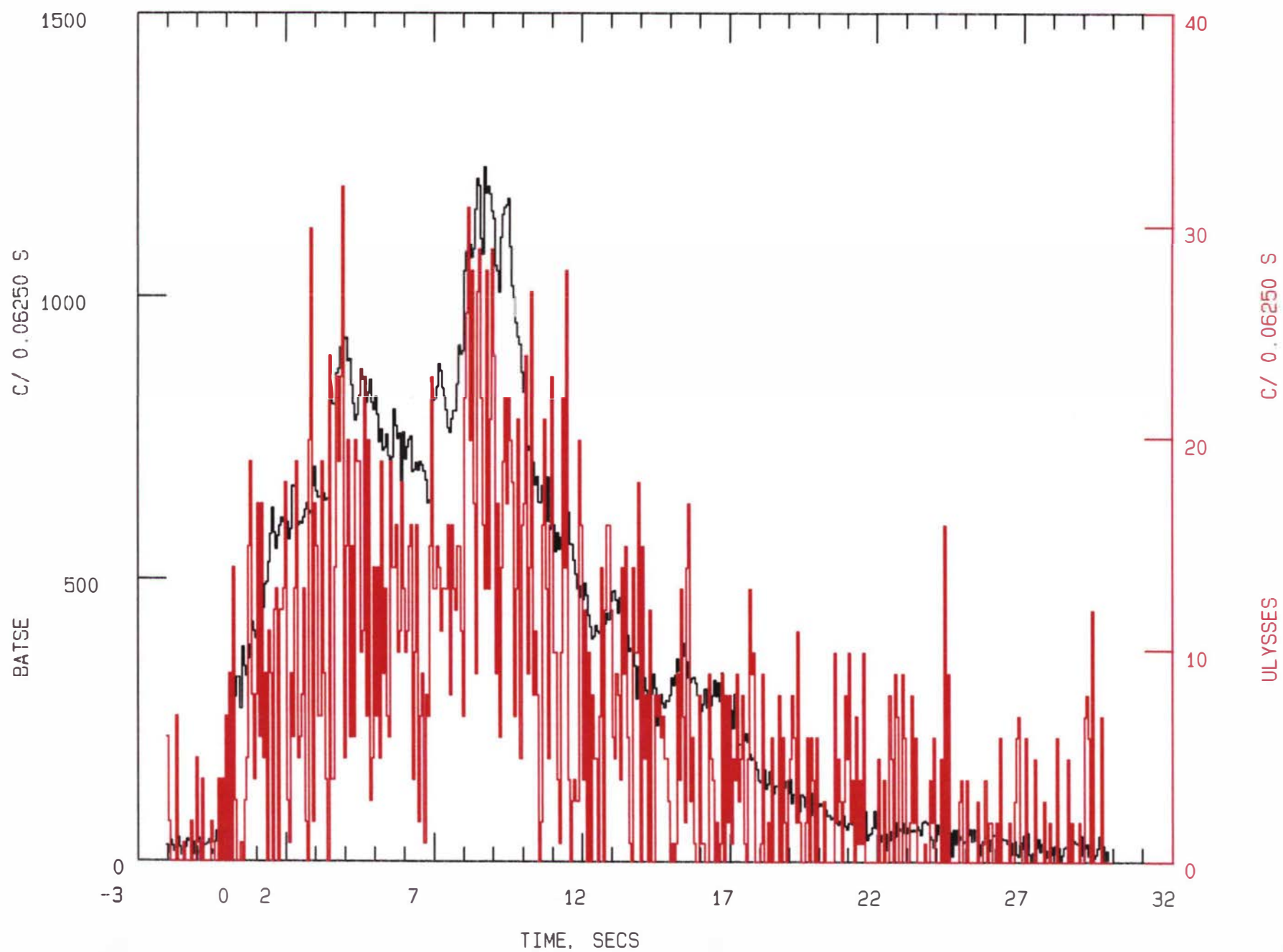
-ULYSSES

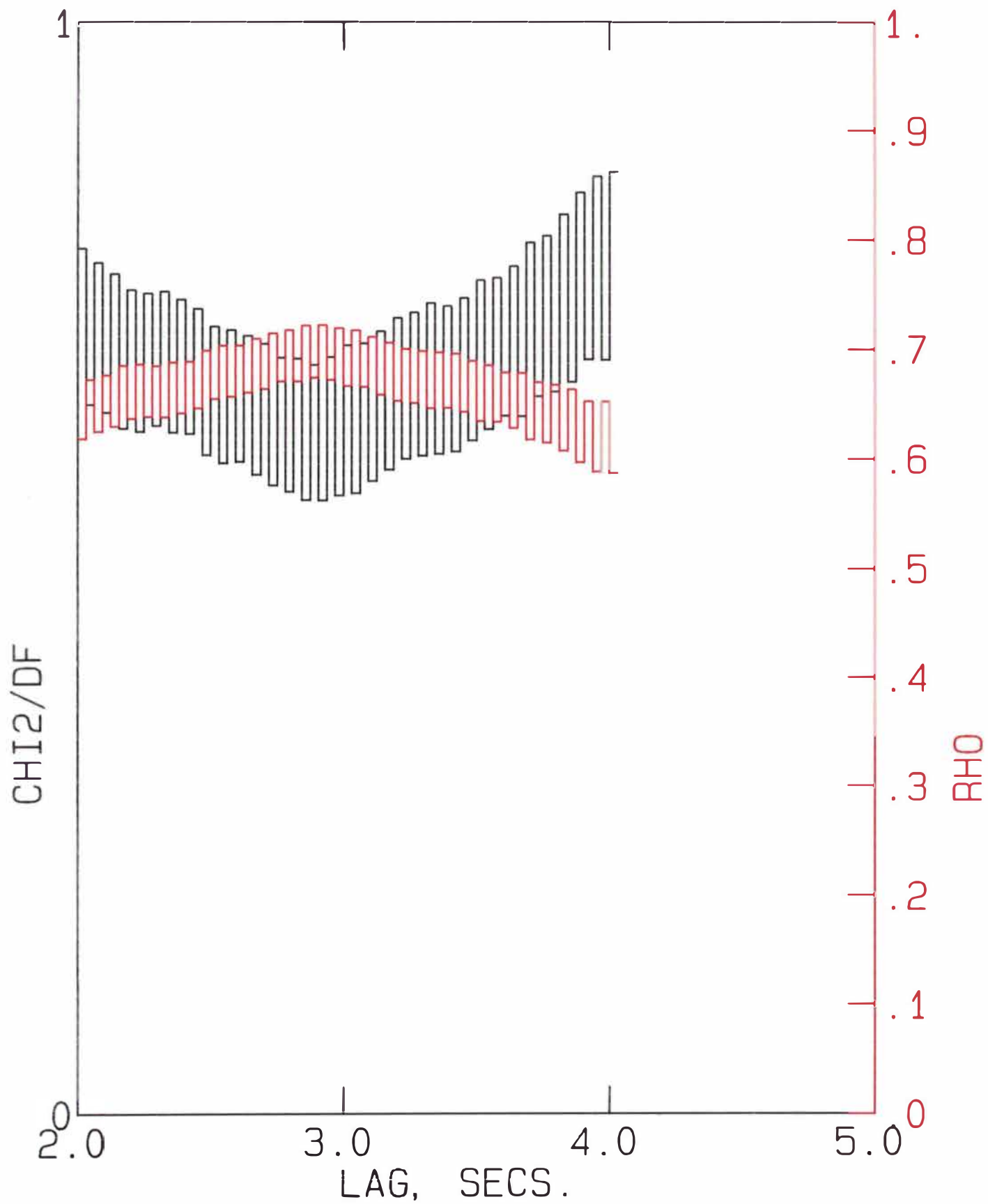
CORRELATION

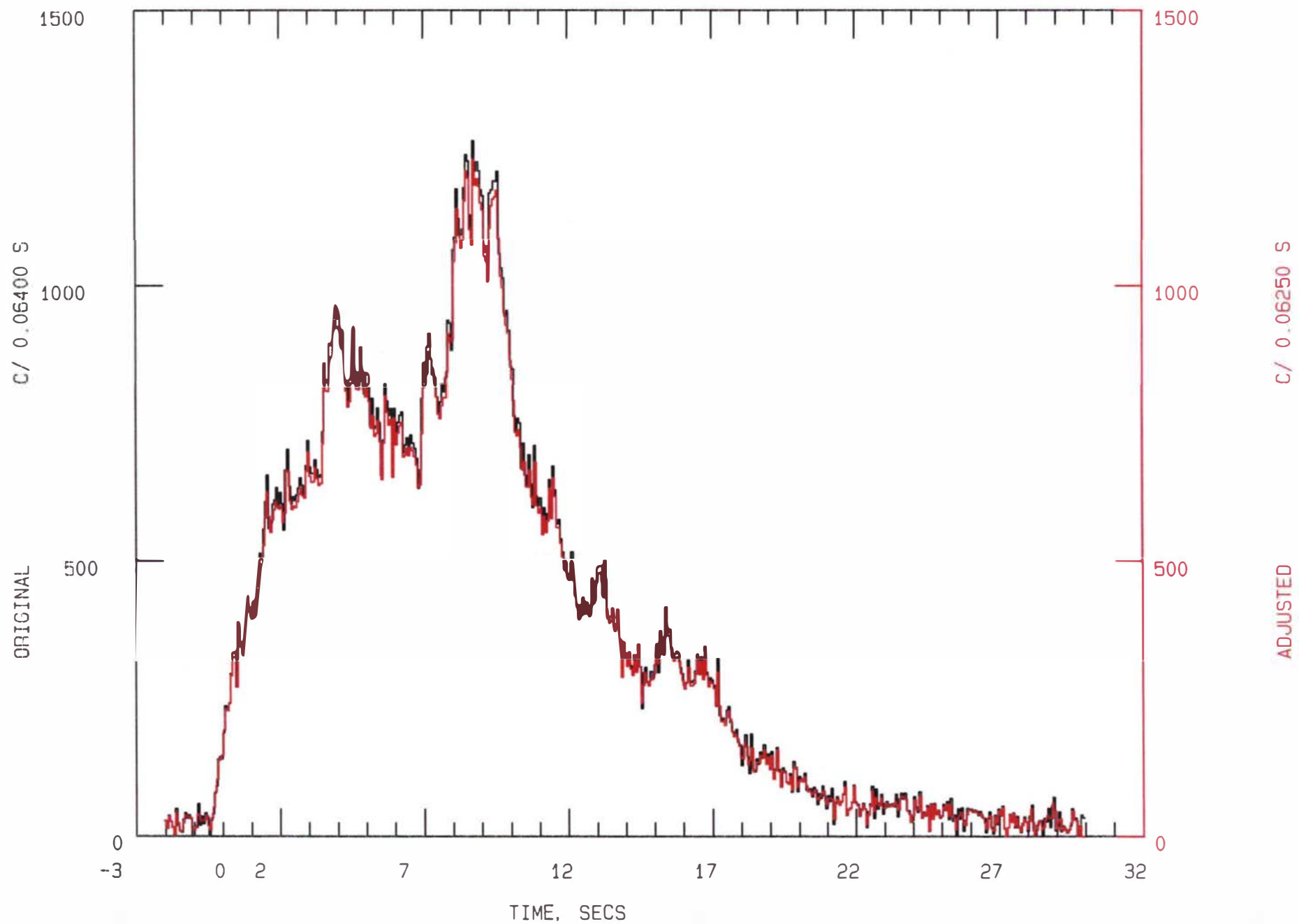
2/12/91

73729.707

23/ 1/97







PV0

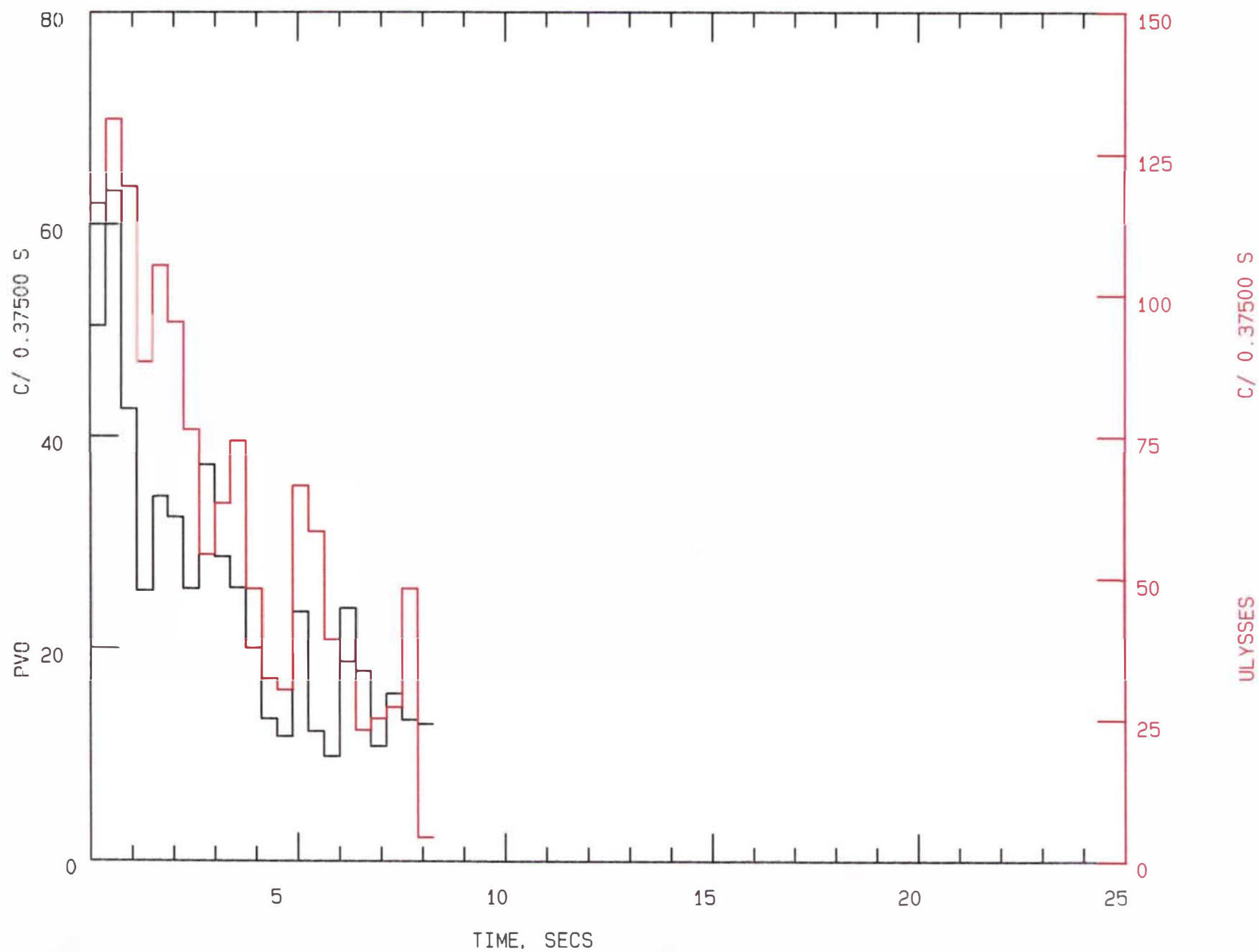
-ULYSSES

CORRELATION

02/12/91

73363.547

23/ 1/97



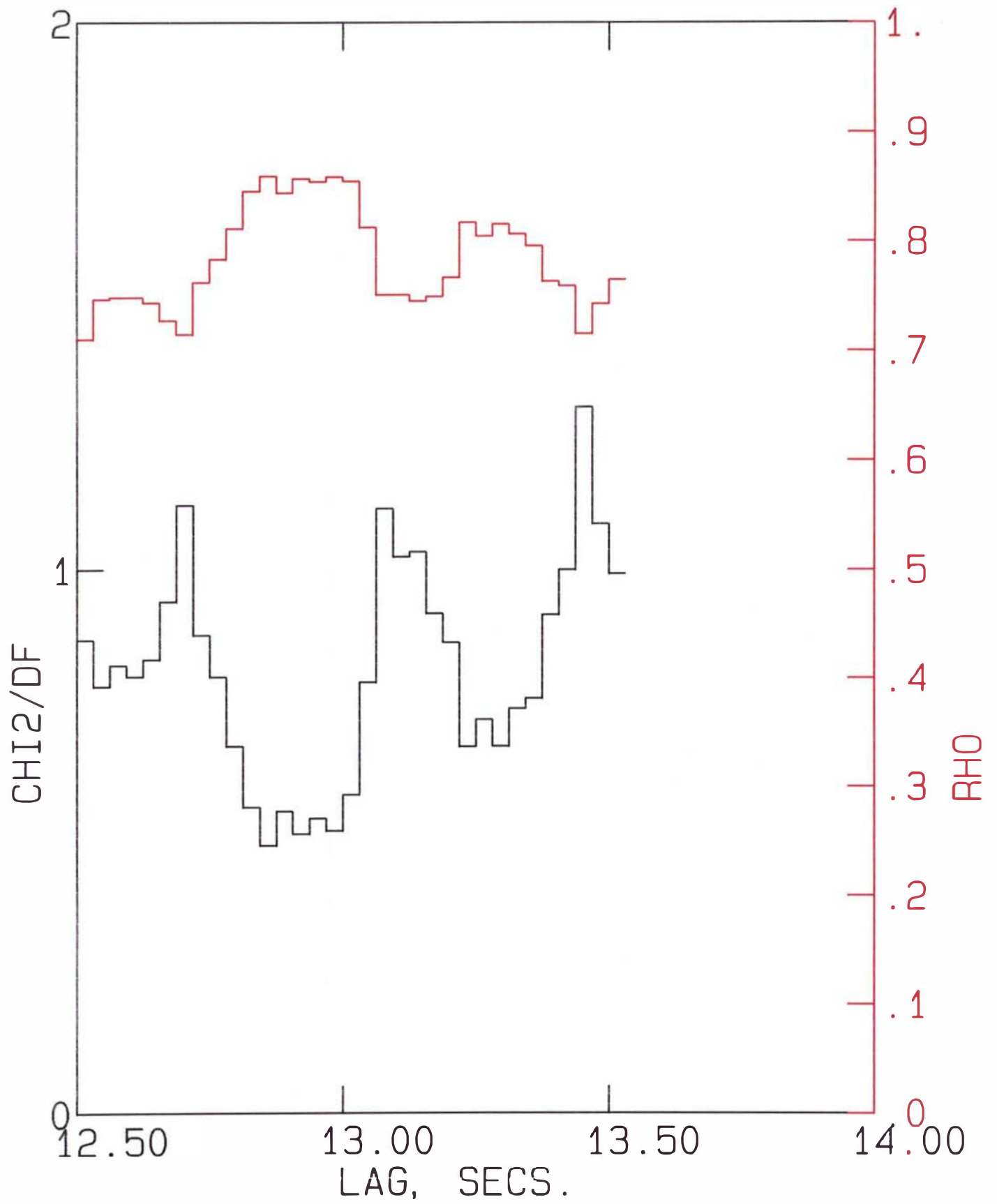
PVO

-ULYSSES

CORRELATION

02/12/91

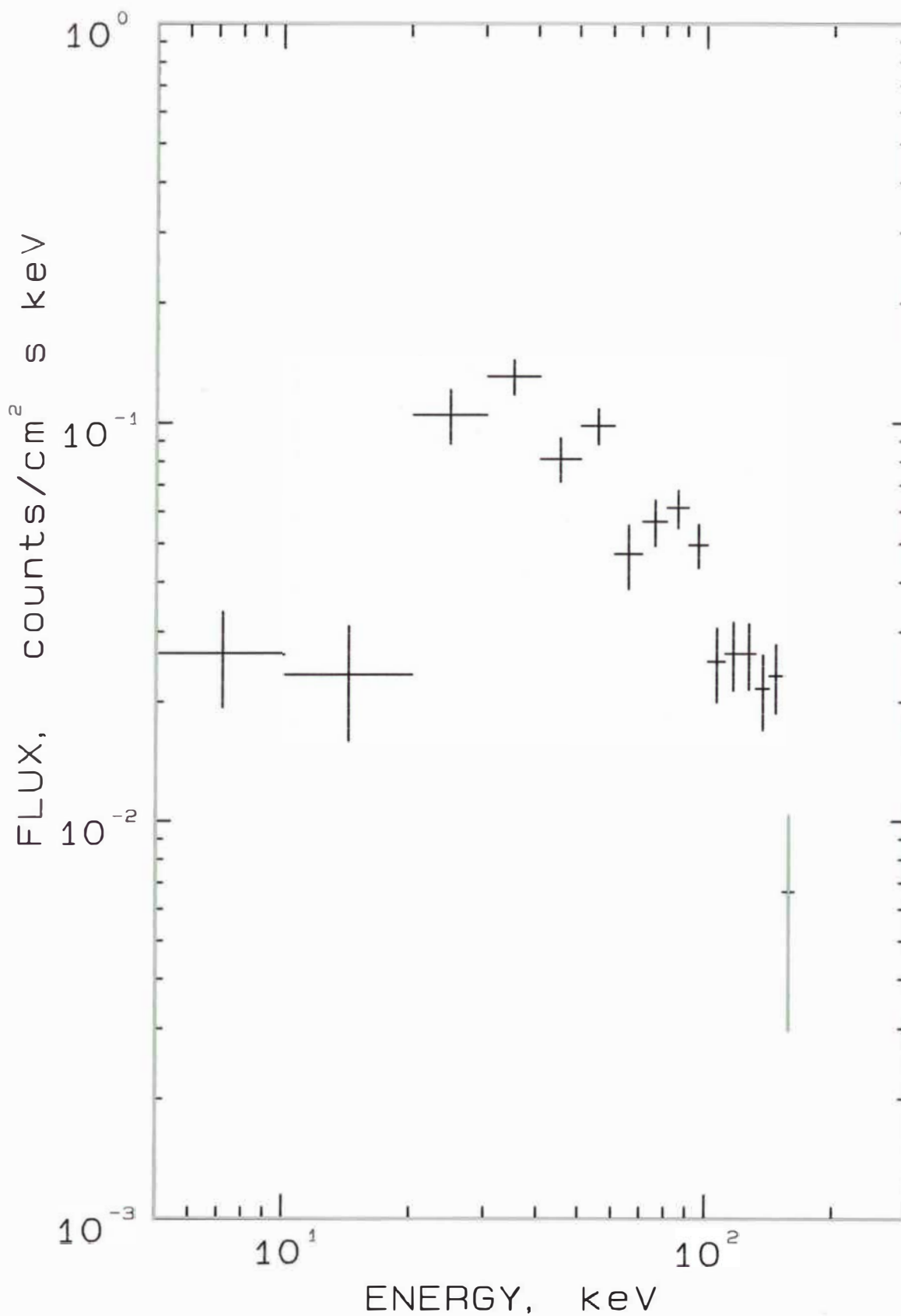
73363.547



ULYSSES 02/12/91 71632.483

23/ 1/97

SPECTRUM INTEGRATED OVER 21.1 SECONDS, INTERVALS 2 TO 20



ULYSSES 02/12/91 71632.483 BURST SPECTRAL COUNT RATES

5- 20 keV

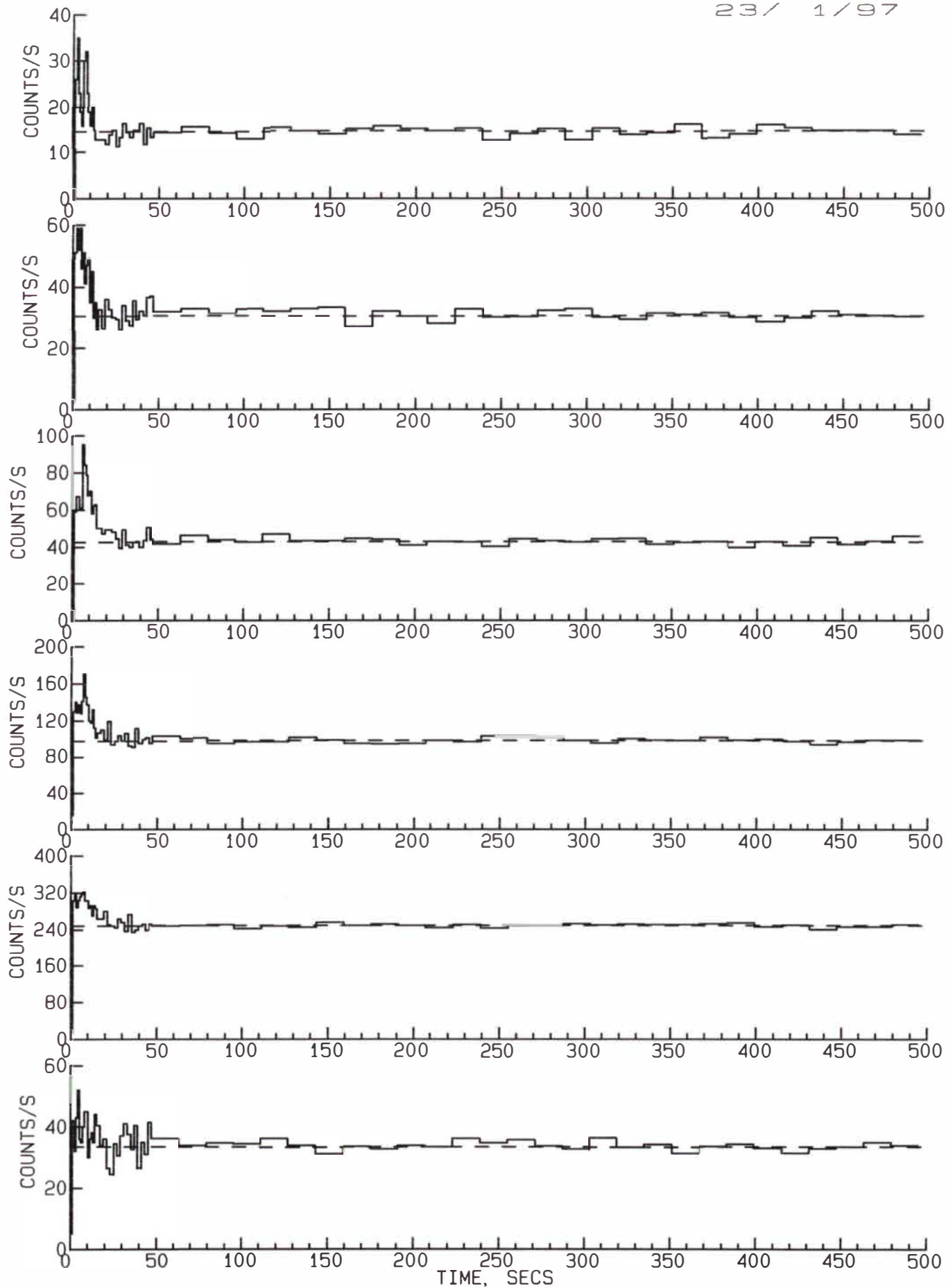
20- 50 keV

50- 81 keV

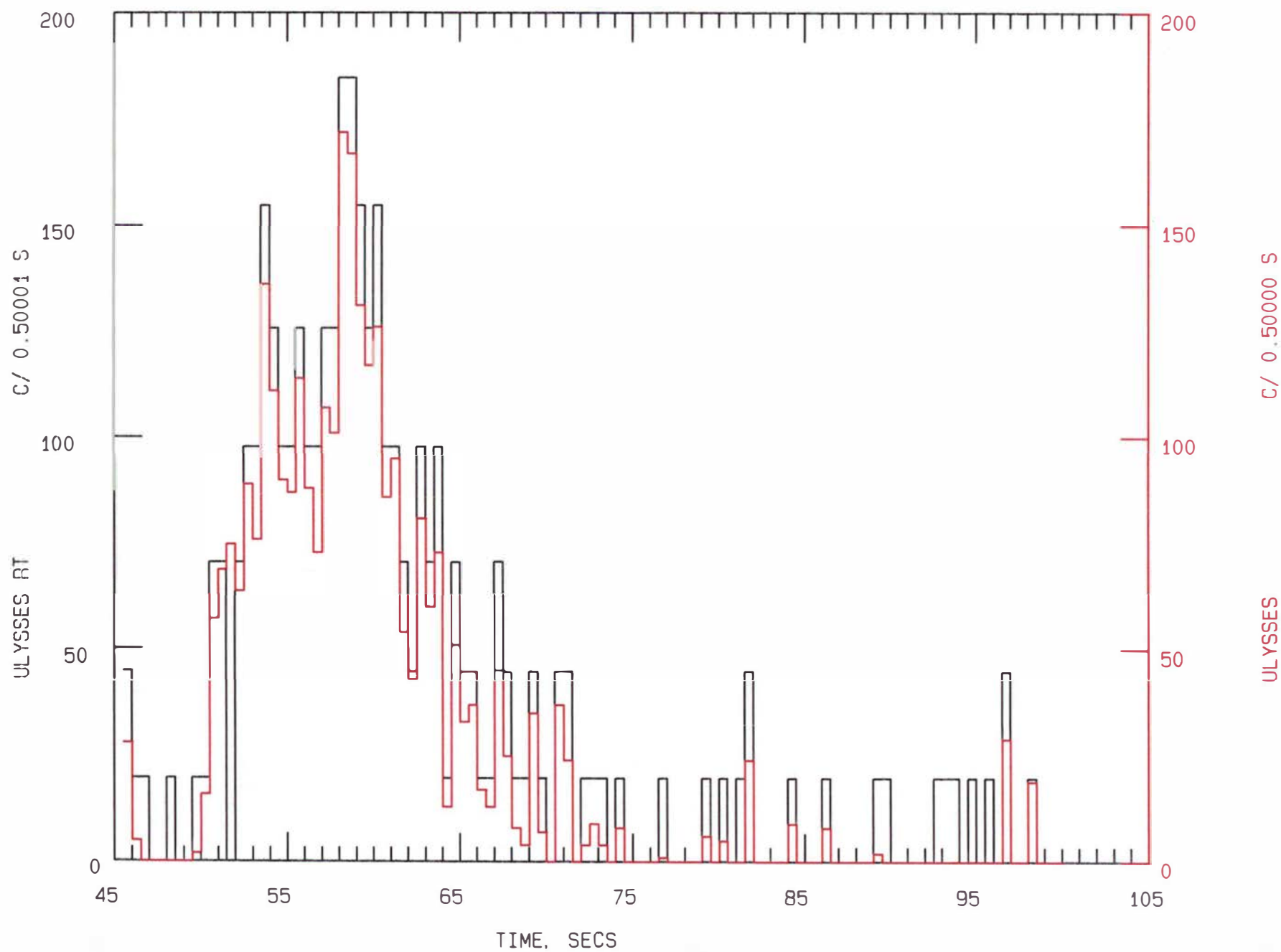
81-111 keV

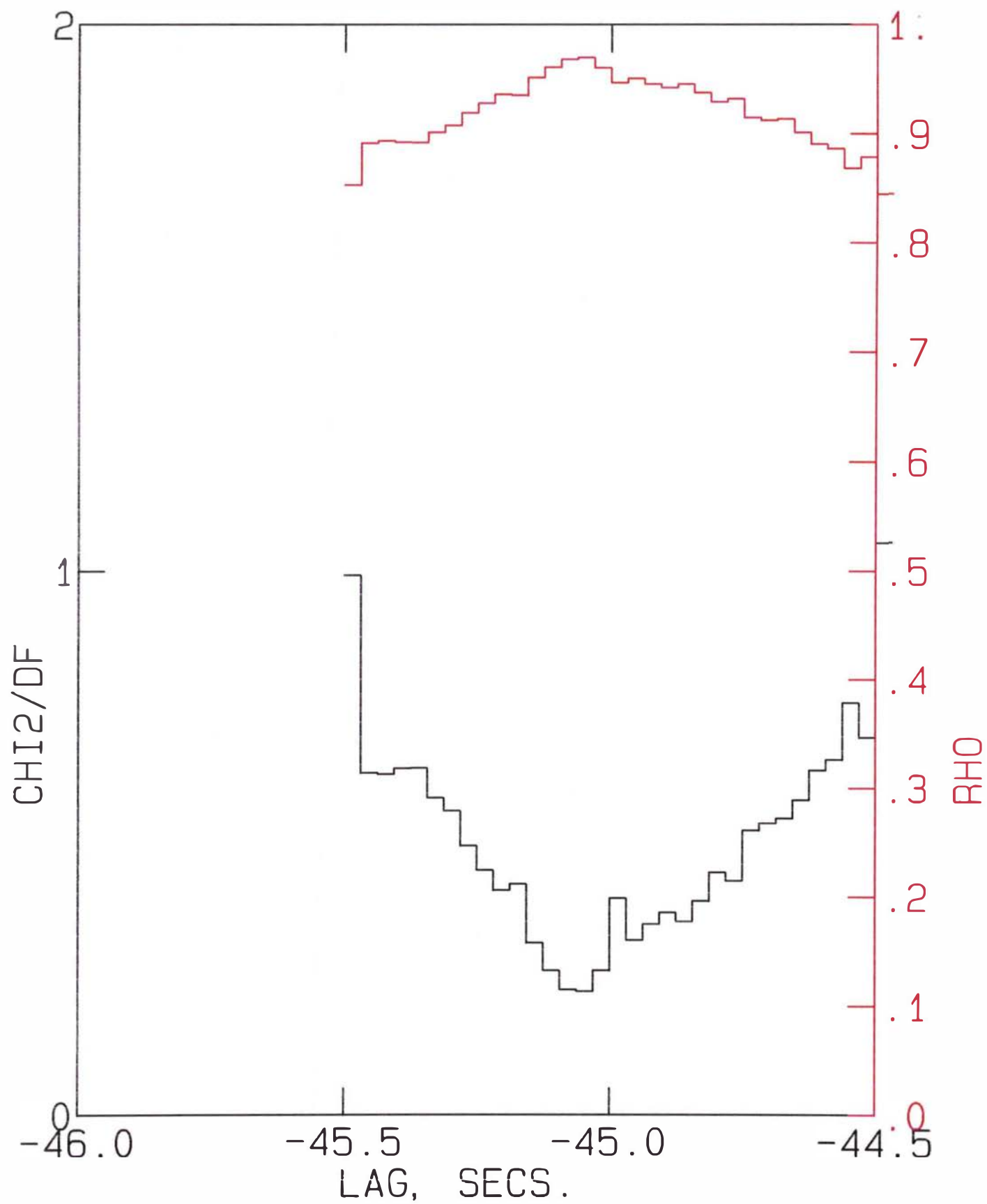
111-142 keV

142-162 keV



23/ 1/97





ULYSSES

02/12/91

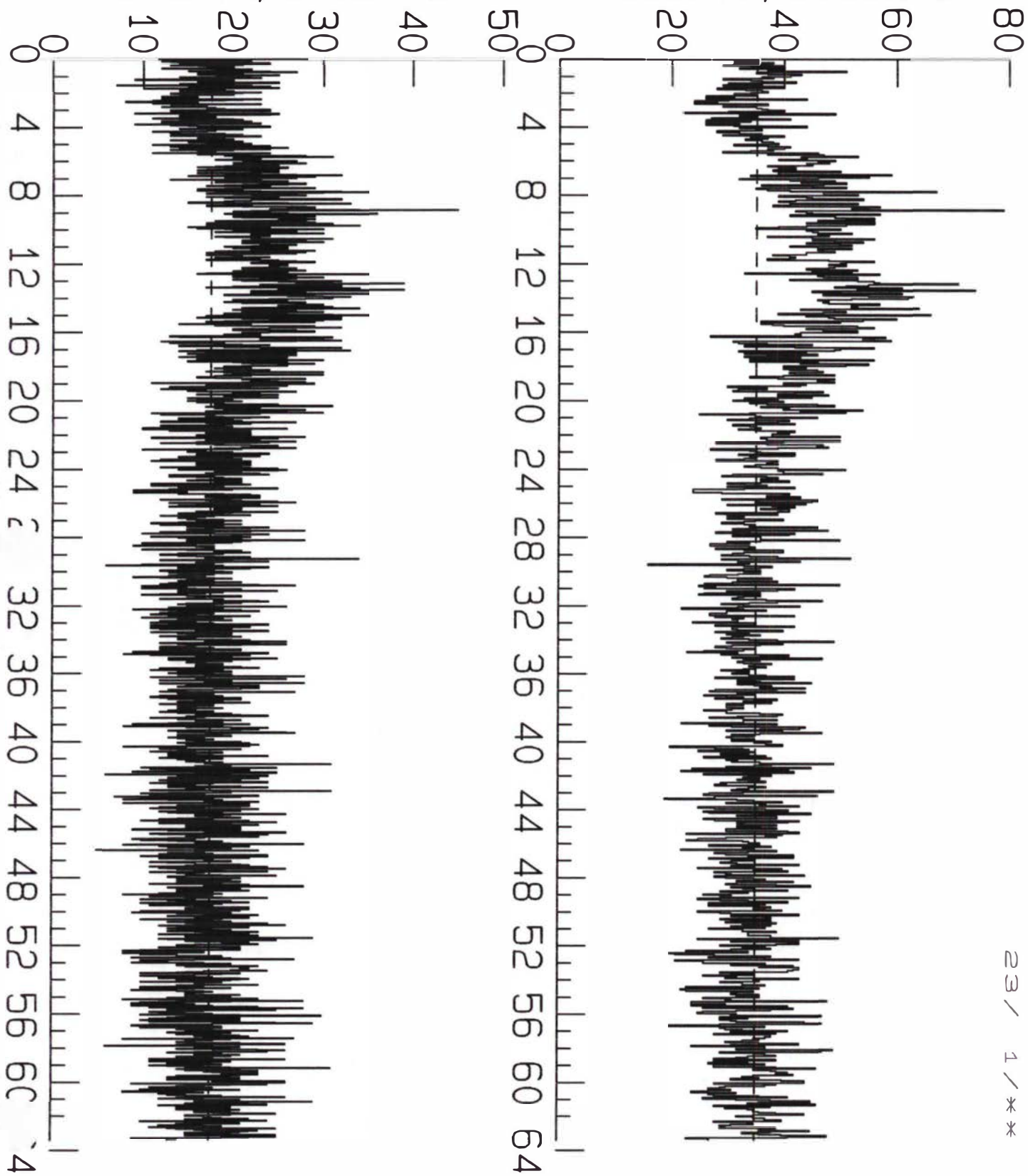
Ttrig=71632.463

18- 163 keV

23 / 1 / **

COUNTS/0.031 S

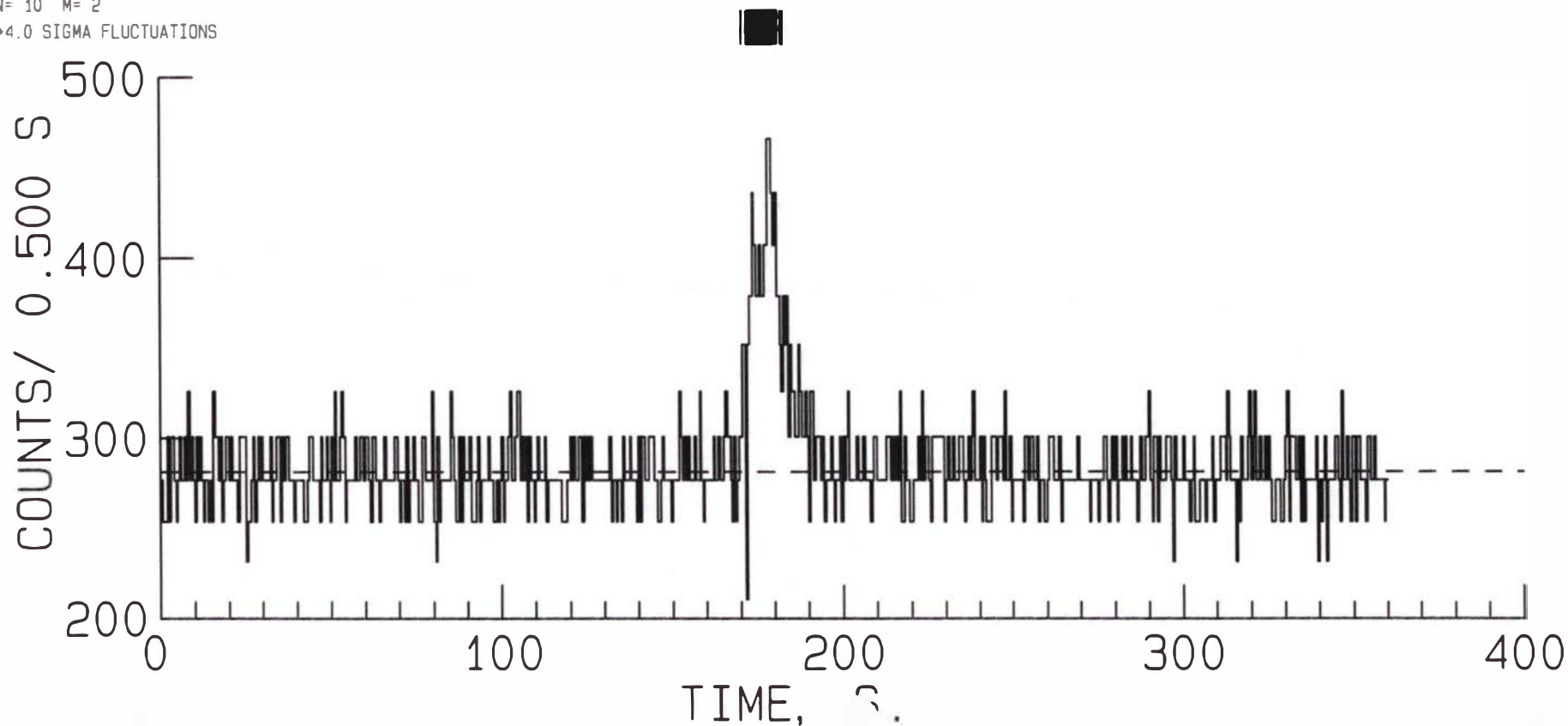
COUNTS/0.062 S

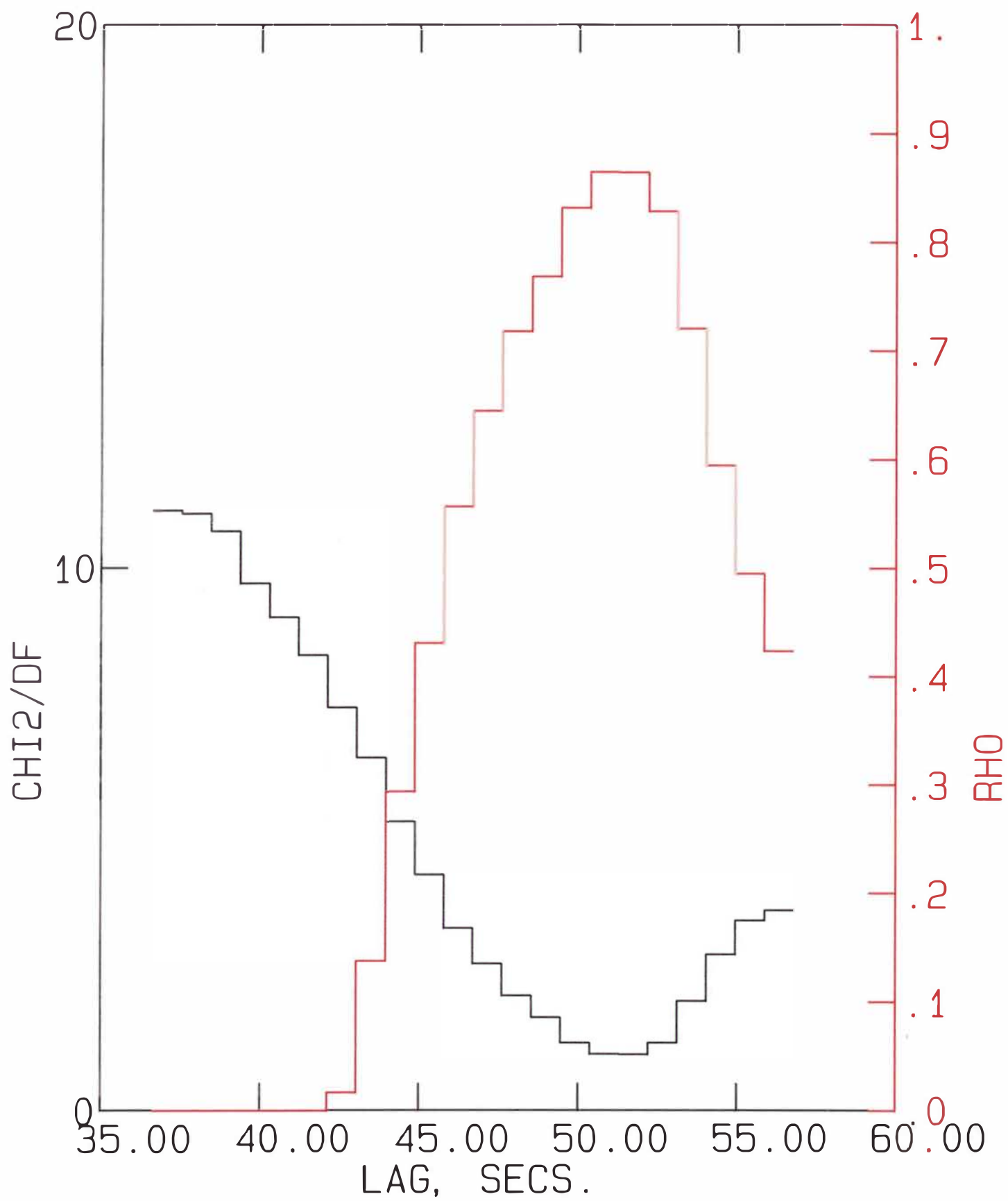


ULYSSES RT
2/12/91 71460.030 s
18- 163 keV

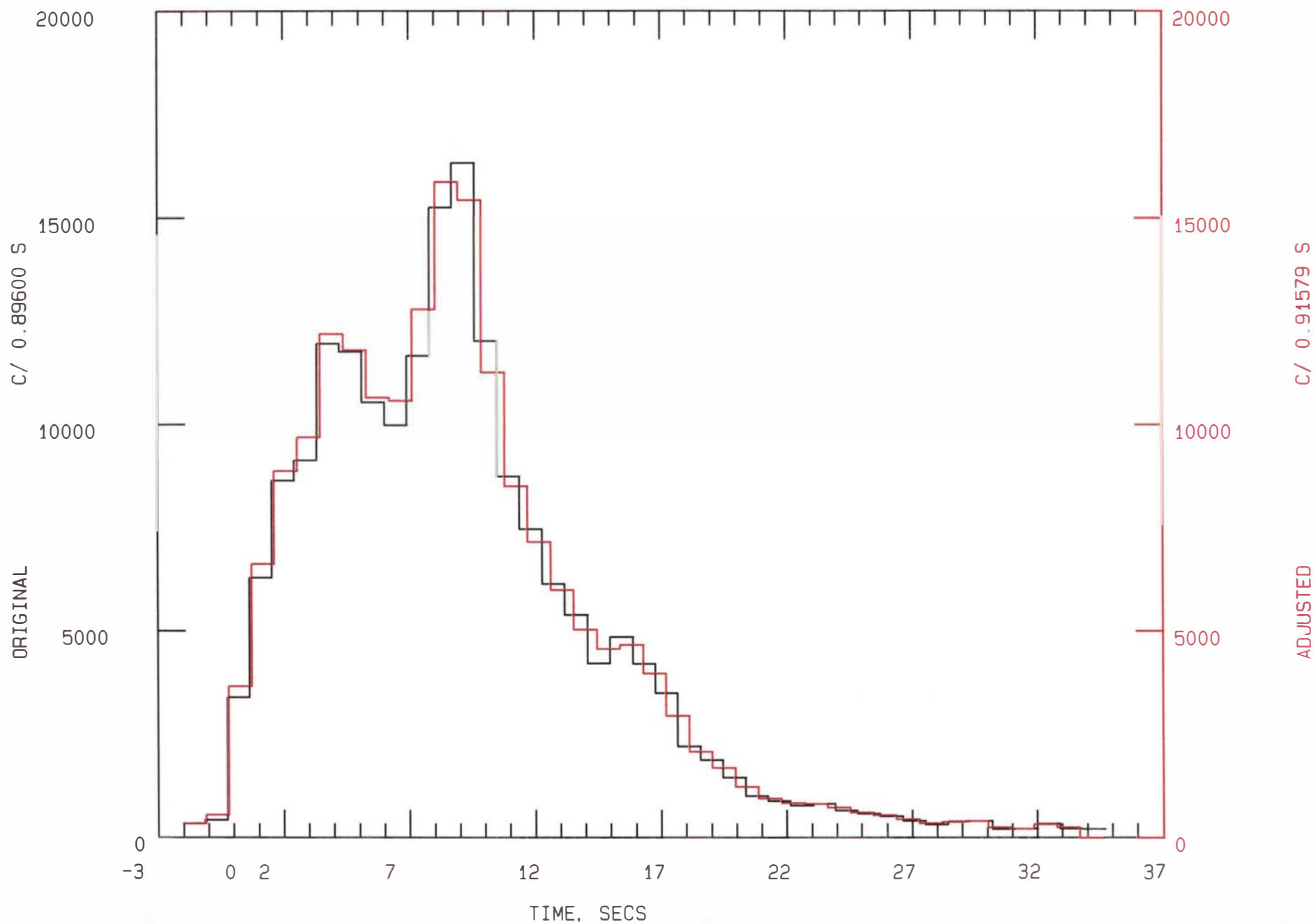
23 / 1 / 97

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS





5/11/96



From root Thu Feb 3 13:55 1994
Received: by space6.ssl.berkeley.edu (AIX 2.1 2/4.03)
id AA00852; Thu, 3 Feb 94 13:55:12
Received: from SSTDP2.LANL.GOV by sunspot.ssl.berkeley.edu (5.0/SMI-SVR4)
id AA13978; Thu, 3 Feb 1994 12:59:12 +0800
Date: Thu, 3 Feb 1994 14:00:37 -0700 (MST)
From: 046369@SSTDP2.LANL.GOV
To: KHURLEY@space6.ssl.berkeley.edu
Message-Id: <940203140037.23c05074@SSTDP2.LANL.GOV>
Subject: DMSP OBSERVATIONS OF GRO GRB
Content-Length: 2739
Status: R

FROM: SMTP%"TERRELL@ESSDP2.LANL.GOV" (ESSDP2::TERRELL) (JAMES TERRELL 94/02/03)
TO: SSL::KOUVELIOTOU AND GIBSON::COLE (CHRYSSA KOUVELIOTOU AND STAYCE COLE)
CC: SMTP%"KHURLEY@SPACE6.SSL.BERKELEY.EDU" (KEVIN HURLEY)
SUBJ: DMSP OBSERVATIONS OF GRO GRB

Chryssa and Stayce:

Thanks very much for the listing of strong Batse bursts sent to me 11/1/93.
I have now managed to check all of them against DMSP data, and find that
many of them were also detected by DMSP8,9,10, or 11. Probably the higher percent
of detections in recent data is due to more extraction of full data. In many
cases such added effort would not be necessary if source direction
(and consequent obscuration of some DMSP satellites) were known to me.
I would appreciate data on more strong events. Here is the present list:

NOTES:

NA: Not apparent in 20-second averaged data (extracting the 2-sec data is
a more time-consuming task, not undertaken in every case).

NA?: Some slight indication of a peak in 20-second averaged data.

SA: South Atlantic Anomaly, obscuring data with high background rates.

SR: South Radiation Belt background.

NR: North Radiation Belt background.

ND: No data for this time.

YES: Burst definitely detected by one or more DMSP satellites (8,9,10,11).

NO: No evidence of a peak in 2-sec data. (NO/OBSC: Obscured by Earth)

DATE	UT	DMSP
910421	33245	8NO 9SR 10NR
910627	16159	8NA 9NR 10ND
910629	71750	8NA 9SR 10NA
910703	18225	8NA 9NA? 10SR
910717	16386	8NA 9SA 10SR
910718	76051	8NA 9SA 10SA
910802	2718	ND
910814	69275	ND
911024	76208	ND
911104	54283	YES--54286 PEAK
911109	12459	8NO 9NR 10NO
911118	68260	ND
911119	23343	YES--23342
911126	46129	8SR 9SR 10NO
911127	15730	YES--15739
911202	73731	YES--73733
911209	66959	8SR 9SR 10NR 11ND
920226	29730	8SA 9NA? 10SA 11SA
920229	69769	8SR 9ND 10NA 11NA
920311	8246	YES--8431
920315	15569	8NA 9NR 10NA 11NA
920325	62258	YES--62256
920404	47506	8NA 10NA? 11NR
920406	9855	8NO/OBSC 10SR 11SR/OBSC
920414	84163	NA
920517	11877	YES--11883
920525	12423	YES--12427

920622	25504	8SA 10NR 11SA
920627	46956	NA
920711	53140	YES--58157
920718	77563	8NA 10SA 11NA
920720	11524	8NA/OBSC 10NA/OBSC 11SR
920824	39183	YES--39186
920902	1736	YES--1743
921009	24070	YES--24073
921022	55259	8ND 10NA 11NA
921123	22711	YES--22727
921123	46583	YES--46542
921207	57647	YES--57649
921209	41738	8NR 10NA 11NR
930106	56259	YES--56260
930110	6698	8NA 10NR 11NA
930120	84700	YES--84779
930131	68231	YES--68231
930201	60115	YES--60129
930309	11269	NA
930329	11365	8NA 10SR 11NA
930405	32089	YES--32105
930406	26185	8NA 10NR 11NA
930428	04032	8NA 10NA 11SR
930506	53571	YES--53578
930506	65631	NA

PVO

02/12/91

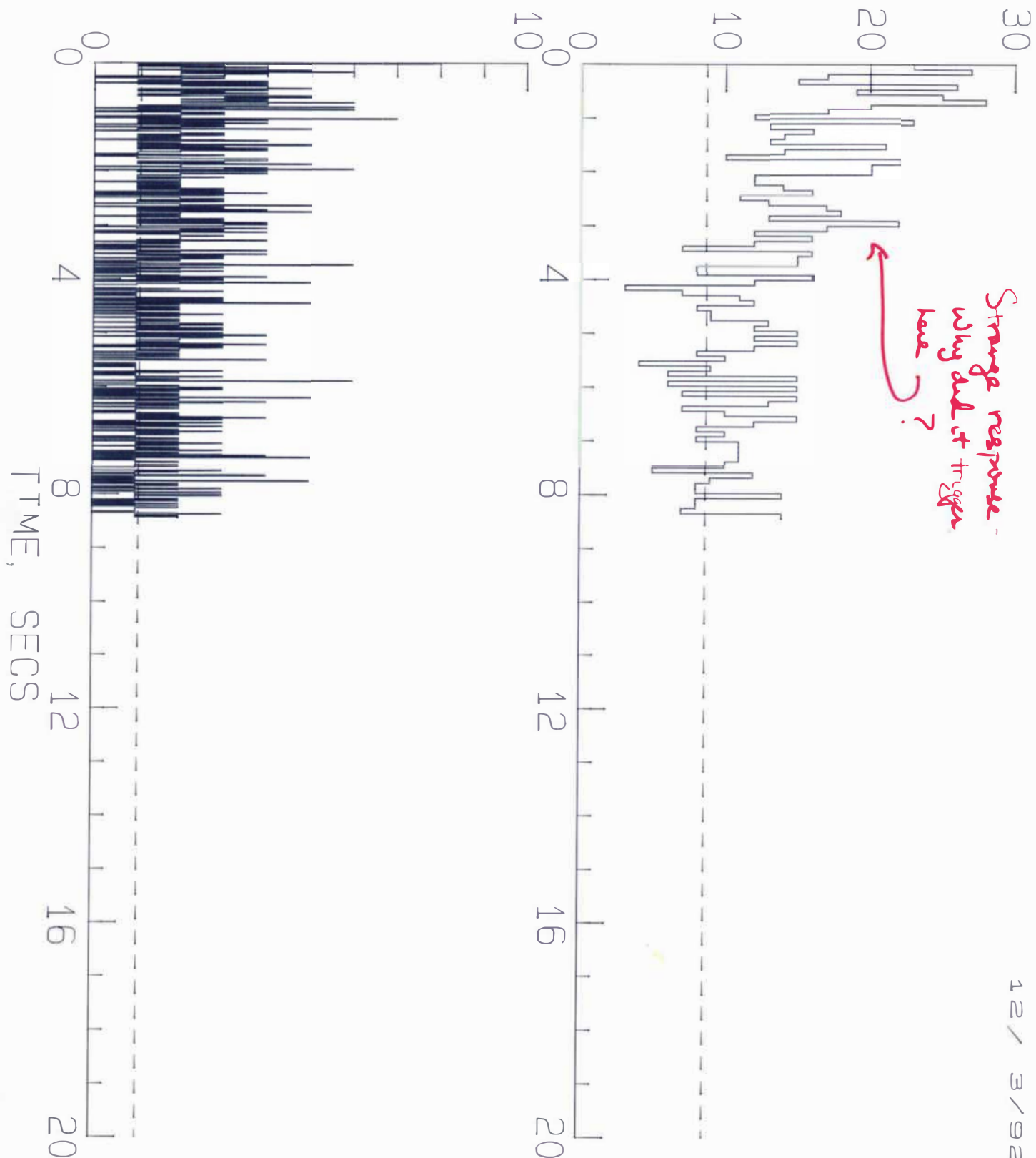
73363.547

~~73406.706~~

100-2000 keV

COUNTS/ .012 S

COUNTS/ .094 S



Version 3.0 sep. 12 1993.

The data given below is pre-publication data. The data should not be quoted without prior consultations with the WATCH-GRANAT collaboration. The list is prepared in support of searches for counterparts or multi-spacecraft identifications. The positions given for the localized sources are in most cases based on the fitted mean attitude of GRANAT. The positional uncertainty is 1 degree error circle radius.

#	date	UT-time	sd	l(s)	m(s)	m/l	position(1950)	Q	t	comments	#Wm	sdp	theta	phi
1	900118	17:40:47	33	280	225	1.1	11h36.3m -44.7	F3	8	4 peaks	0423	28	22.42	26.50
2	900126	18:04:27	146	25	11	0.5	08h44.6m -38.0	F3	r	2 peaks, soft tail	0481	70	21.35	138.49
3	900222	11:56:34	38	33	15	1.5	22h29.9m 35.1	F3	1	1 peak, soft tail	0650	25	20.16	144.39
4	900708	11:30:20	36	160	95	2.0	12h22.3m 31.4	F3	1	3 peaks	1490	29	58.49	90.41
5	900901	01:35:46	36	230	110	4.0	18h19.4m -44.8	F3	4	4 peaks	1811	28	39.58	167.23
6	900925	20:25:22	18	45	42	1.2	08h56.0m -35.3	F3	1	Structured event	1970	13	50.37	264.93
7	900929	01:49:48	40	180	180	1.3	11h12.9m -06.6	F3	r	2 groups of spikes	1990	32	44.31	344.08
8	901009	00:15:50	30	11	9	3.5	23h12.1m +29.6	F3	1	1 peak	2041	17	52.34	319.13
9	901116	01:42:08	19	15	15	2.2	02h36.7m +25.1	F3	8	1 peak	2241	11	53.92	15.72
10	901219	21:52:52	24	50	35	2.2	23h06.9m -53.9	F3	8	1 peak	2490	18	57.94	83.18
11	910122	15:13:35	28	127	-	0.0			1	Soft, structured	2670	25	42.26	142.13
12	910219	11:45:24	43	67	54	0.7	14h12.5m 59.0	F3	r	2 peaks	2813	29	25.97	230.72
13	910310	13:02:05	81	41	40	2.5	12h11.9m 06.4	F3	1	3 peaks	2931	40	51.36	351.15
14	910627	04:29:24	20	11	-	0.4	13h14m -03.2	F3	1	1 peak. X-burst?	3643	18	20.70	262.04
15	910821	10:33:56	21	66	66	0.5	23h31.8m -72.6	F3	4	Struct. + sharp pk.	3991	14	51.52	116.19
16	911016	11:03:30	22	160	-	0.1	19h47.8m -04.8	F3	8	very soft, 2 peaks	4381	17	32.03	227.19
17	911202	20:28:59	41	20	11	0.7	11h27.1m -23.2	F3	1	Single struct. peak	4623	16	35.87	30.52
18	911209	18:36:11	42	30	12	1.8	17h26.4m -44.4	F3	r	4 peaks	4680	28	34.53	320.77
19	920311	02:20:37	42	40	40	1.3	08h45.4m -36.4	F3	8	1 peak	5201	37	51.39	83.56
20	920714	13:04:51	36	40	36	2.1	14h41.6m -30.0	F3	8	1 peak	5921	28	43.75	202.33
21	920718	14:41:15	30	90	30	0.4	01h22.6m -3.5	F3	8	1 odd peak	5953	20	17.97	302.95
22	920718	21:32:46	40	7	5	1.8	19h43.0m -56.5	F3	1	1 dull peak	5951	29	24.43	93.23
23	920723	20:03:10	186	13	8	3.9	19h04.5m 27.4	F3	1	1 dull peak	5991	79	33.49	208.18
24	920902	00:29:04	49	13	9	4.6	18h36.0m -22.8	F3	1	1 dull peak	6163	30	49.14	320.14
25	920903	01:36:15	23	154	103	2.0	19h43.0m 35.2	F3	4	Main peak + spikes	6173	14	38.94	230.29
26	920903	23:29:05	92	24	15	2.5	20h06.3m 21.7	F3	r	1 peak (low E. str)	6183	49	43.53	249.60
27	920925	20:30:42	25	120	120	2.5	13h27.0m 43.1	F3	1	3 peaks	6313	13	51.98	115.24
28	920925	22:49:14	43	347	340	1.3	22h02.0m 24.0	F3	4	struct, soft tails	6311	32	43.03	65.02

date UT-time sd l(s) m(s) m/l position(1950) Q t comments #Wm

comments:

UT-time: Time for peak count rate in Med CsI band. Note time resolution!
Times marked with an asterisk are not yet well calibrated to UT.

sd: Standard deviations above background (in count rates).

l(s): Duration in 6-15 keV band (Low NaI channel)

m(s): Duration in 15-180 keV band (Med CsI channel)

m/l: Hardness: (sd(Med NaI)+sd(Med CsI)) / sd(Low NaI)

posit.: All events in the above list (except 910627) have been localized consistently at least twice based on independent data sets. We are therefore convinced of their true cosmic nature, even without confirming evidence from other spacecraft. GRB 910627 has been included in the list because it is confirmed to be cosmic by many other instruments, and the WATCH position is quite secure due to the good signal to noise ratio.

Q: Type of attitude data: I2: initial pointing at obs. start. 2 axes (poor, syst. error: ± 0.8 deg)
A2: actual pointing at burst time. 2 axes (better, syst. error: ± 0.5 deg)
F3: fitted mean pointing for TM session. 3 axes (TBD (± 0.5 deg?))
t: Best time resolution available: 1, 4, 8, 16 motor rotations (approx. 0.9 s)
m: 1 motor rotation in 4 ms steps
r: raw memory (4 ms steps)

#wm Telemetry session and WATCH unit identifier
sdp: Standard deviations above background in final modulation pattern
used for source localization. As a rough guide, the statistical
uncertainty in the source position is $240/\text{sdp}$ arcminutes. In most
cases the systematic errors dominates the error budget.

theta and phi: Source position in WATCH instrument coordinates.

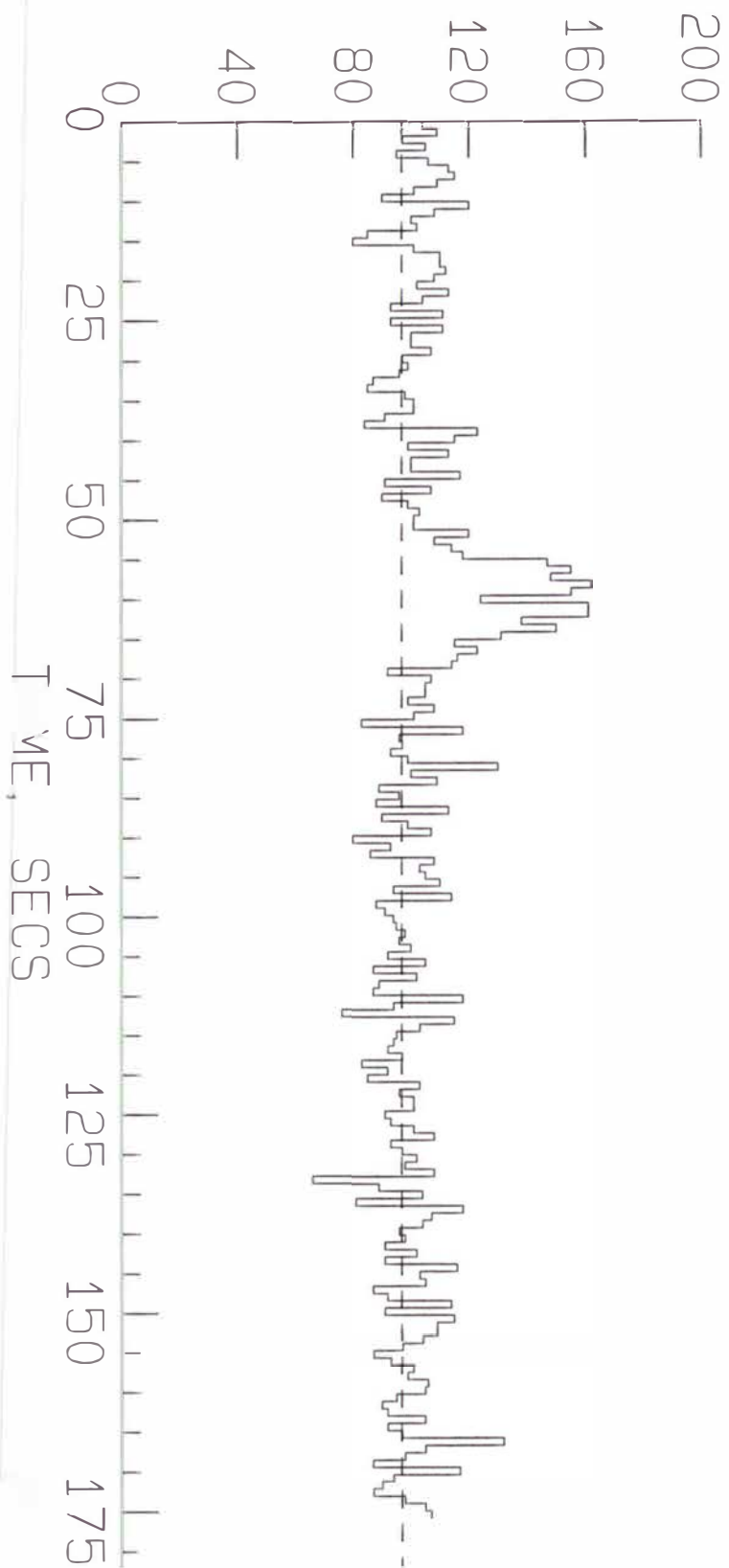
WATCH

02/12/91

73677.445

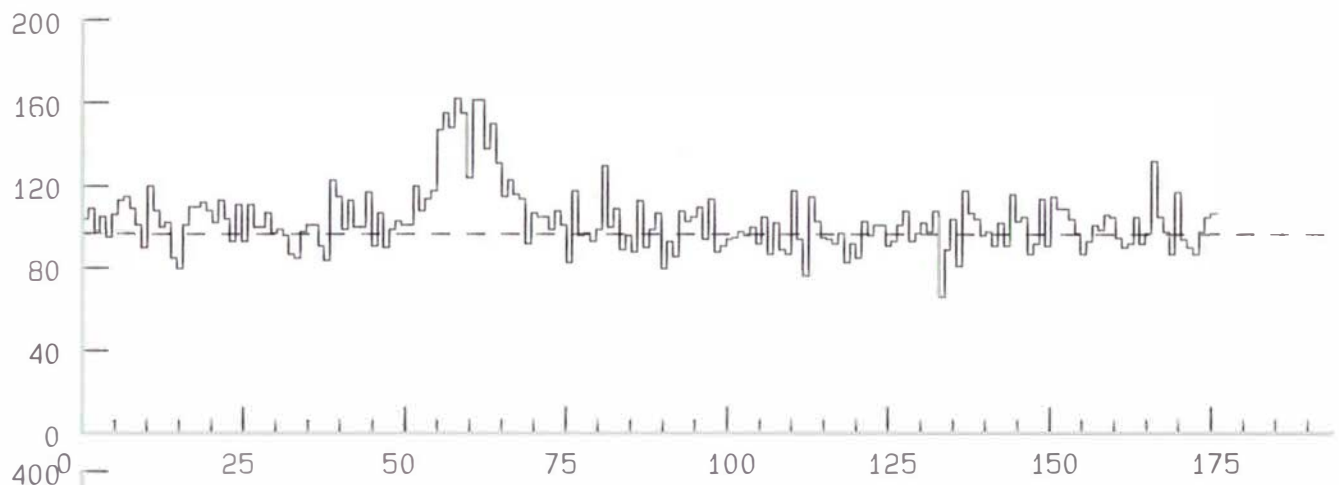
15- 180 keV

COUNTS/ .916 S

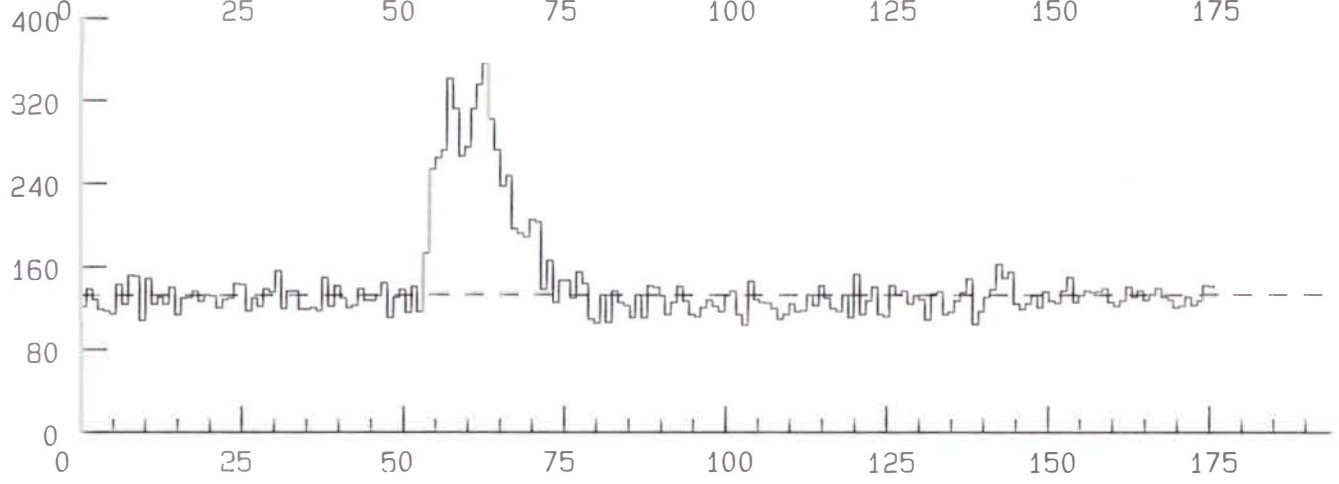


WATCH 02/12/91 73677.445

15- 180 keV
COUNTS/ 9158 S



6- 15 keV
COUNTS/ 9158 S



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@empe. nasa.gov Mon Jan 25 02:37:22 1993
 Date: Mon, 25 Jan 93 05:35:57 -0500
 From: jcg@empe.dnet.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 A04 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@empe.dnet.nasa.gov Mon Jan 25 10:11:55 1993
 Date: Mon, 25 Jan 93 13:10:31 -0500
 From: jcg@empe.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.

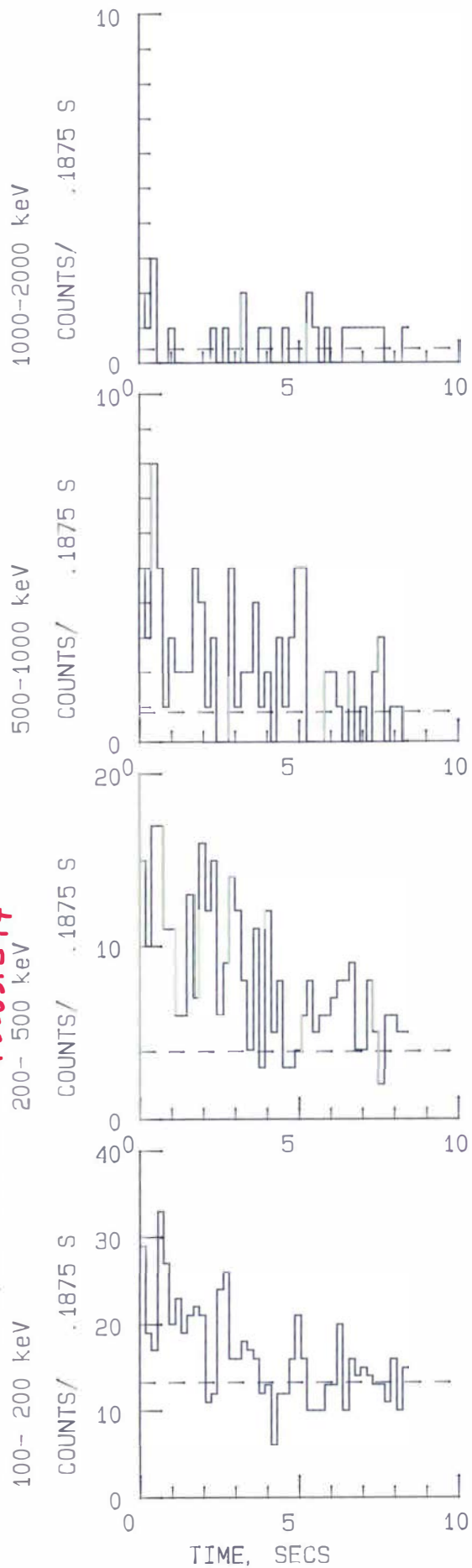
M. Sommer told me that you possibly will visit MPE next week. I would be glad to show you the results and discuss further details.

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

12 / 3 / 92

PV0 02/12/91 73106 ~~706~~ **73363.547**



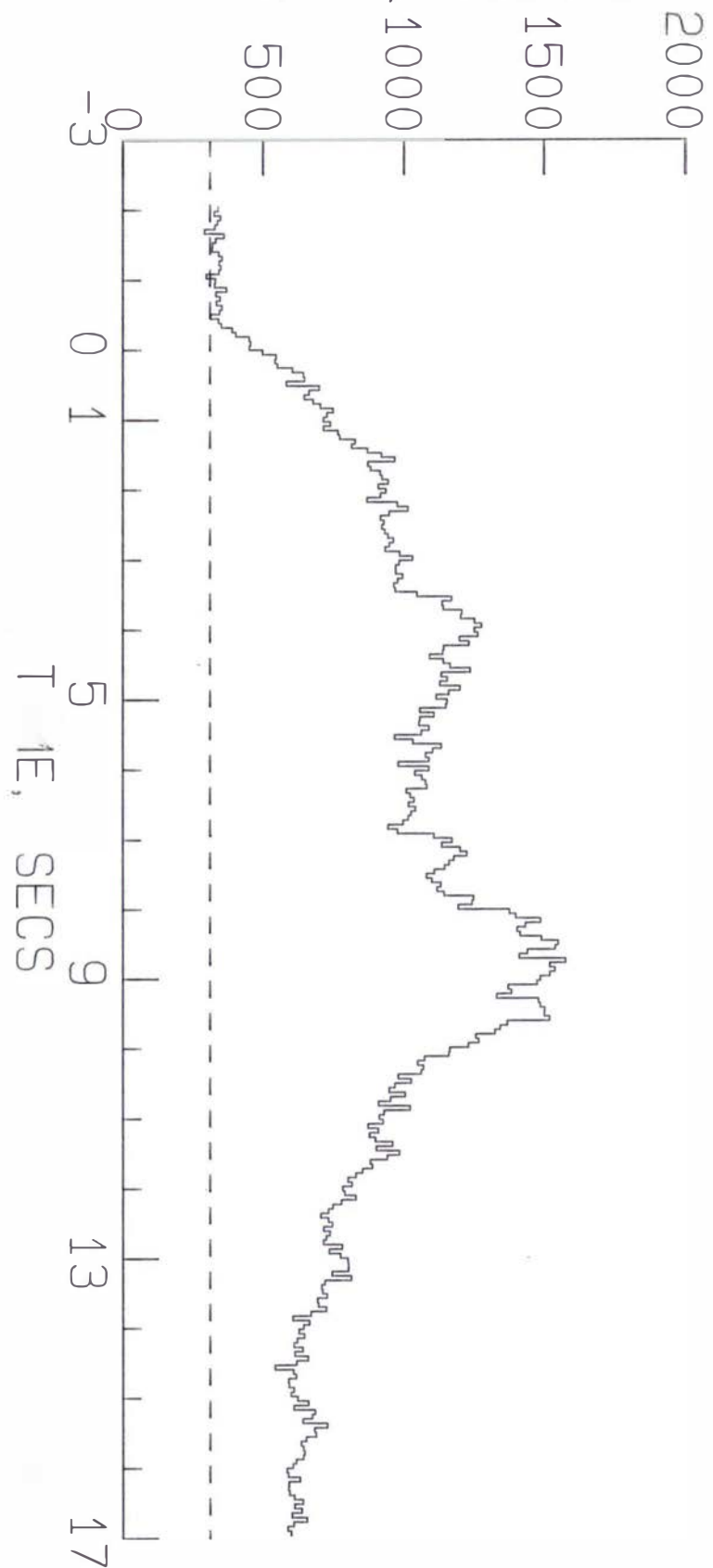
BATSE

02/12/91

73731.749

25- 100 keV

COUNTS/ .064 S



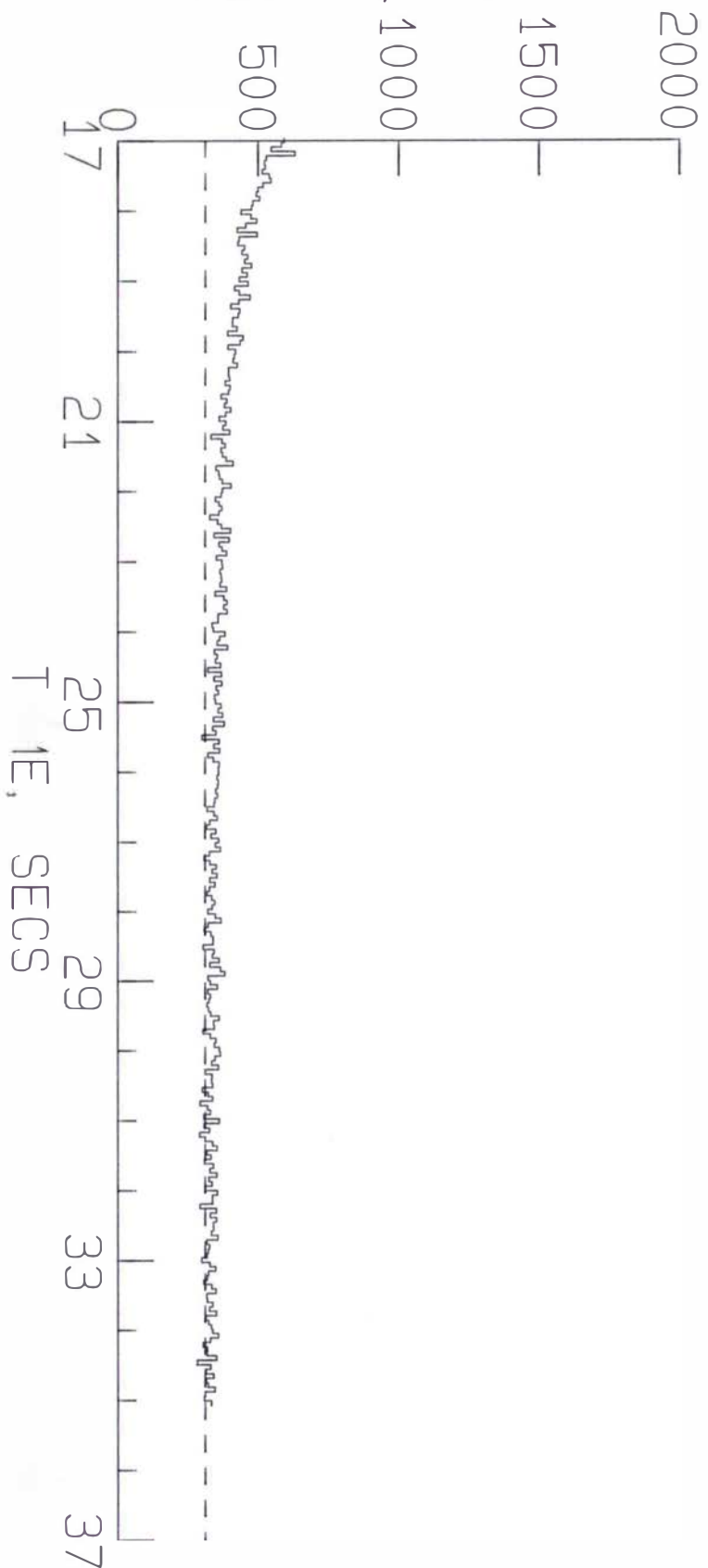
BATSE

02/12/91

73731.749

25- 100 keV

COUNTS/ .064 S



From khurley@space6.ssl.berkeley.edu Fri Oct 2 08:03:14 1992
Date: Fri, 2 Oct 92 06:57:59
From: khurley@space6.ssl.berkeley.edu
Content-Length: 774

MESSAGE FOR RENE HUDEC

Dear Rene,

I am sending you (by regular mail) the results of my burst locations for some of the events you requested. You will receive plots and printouts for the following events:

Nov 27, Dec 2, Dec 9, 1991, and Jan 10 1992

For the following events, I had no BATSE data, and could not search the Ulysses data: Aug 29, Sep 2, Nov 29, Dec 28, 1991; Jan 21, Feb 24, Feb 27, and Mar 5, 1992. I have requested the BATSE data from Chryssa, and will look when she sends them. But the fact that they were not communicated to me before probably means that they were too weak to detect on Ulysses.

For the following events, it turned out that there was definitely no Ulysses data: May 5, May 11, Oct 25, Oct 27 1991; Feb 9 1992.

Best regards,

Kevin

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, 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.

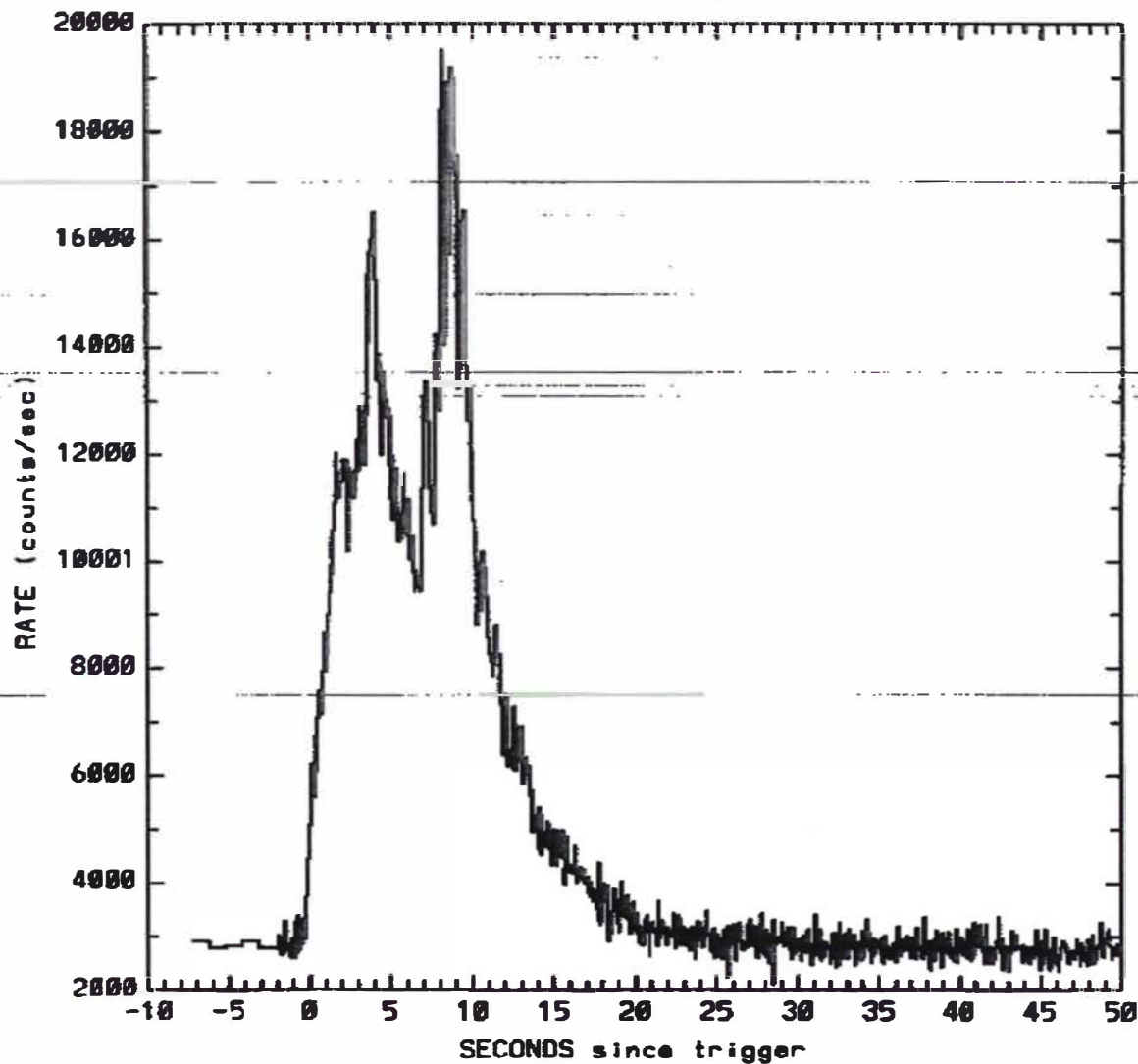
Naturally, I guarantee you that this information will not be given
to any other person and will be used for the proposed search only.
In the case of any discovery, publication etc. you will be
considered as co-author and asked for permission prior release.
Regarding the release of HCO plates, I have 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 but count rates not too bad~~
910829 Get BATSE data + look
910902 " "
911228 " "
911227 " "

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

DISCSC Data for K. Hurley. No. 1141



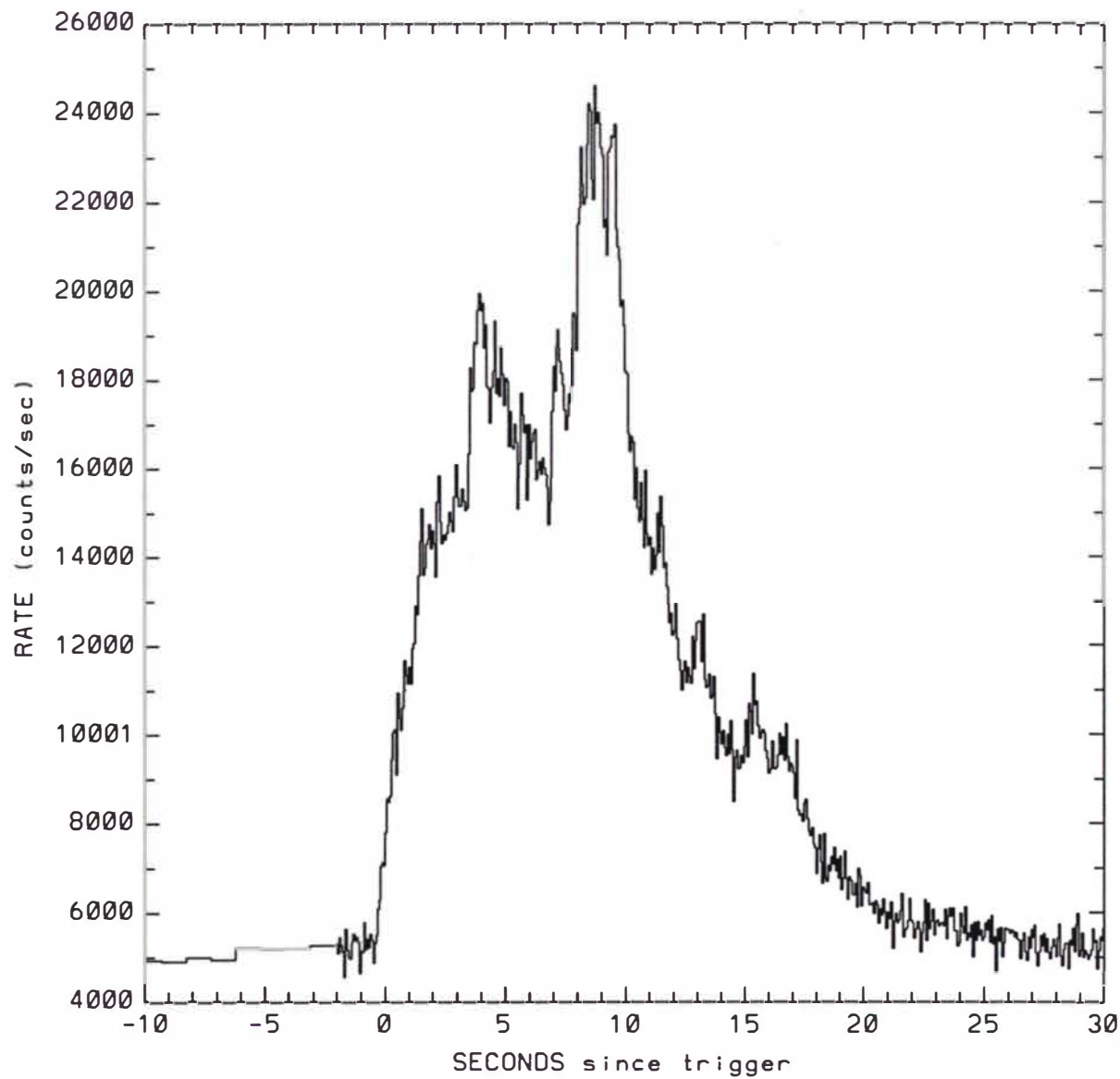
28-JAN-1997 08:58:37

Created by NOPS 80
(Burst Display)
Version 12.25

Trigger = 1141

Trigger Time:
0592 / 73729.787Burst Data Type:
DISCSCDeadtime
Corrected: N
Background Data
Type: PREB + DISCLAMinimum Integ. Time:
0.064 secondsDetectors [7..8].
7-5Discriminators:
(3..4)Quality Mask:
BDISP1

Data fro K. Hurley



8-JUL-1992 16.50.21

Created by MDPS BD
(Burst Display)
Version 2.14

Trigger # : 1141

Trigger Time:
8592 / 73731.749 -2.042

Burst Data Type:
DISCSC

Deadtime
Corrected: N

Background Data
Type: PREB + DISCLA

Minimum Integ. Time:
0.064 second(s)

Detectors [7..0]:
10100000

Discriminators:
(1, 2)

Quality Mask:
BDISP0

CATSEARCH PROGRAM

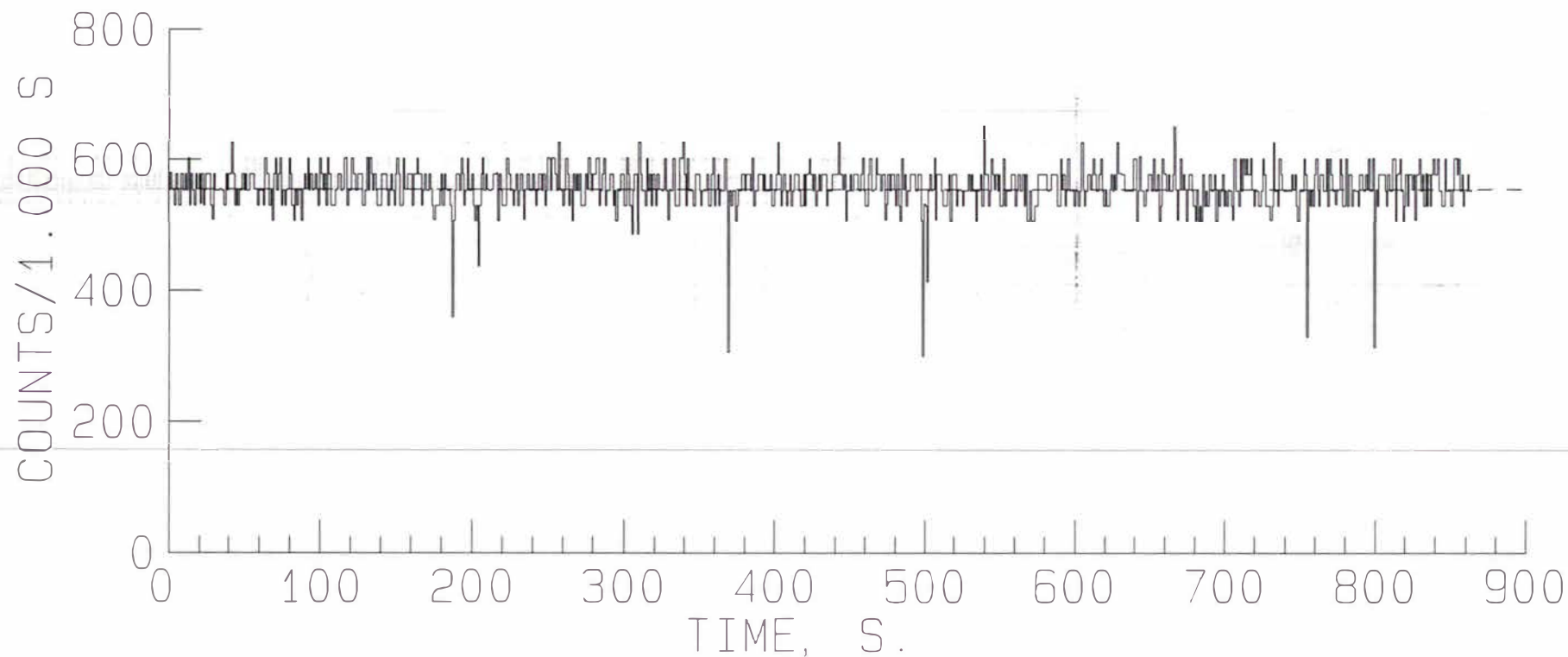
BATSE BURST # 1142
EVENT OF 1991 DEC 2 DAY OF YEAR=336
EVENT CROSSING TIME AT BATSE : 85891. S. OR 23:51:31.3
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 237.300 -.800
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 2/12/ 91 IS:
RA= 167.340 DEC= 6.774 DIST= 4.867 AU
BATSE-ULYSSES DISTANCE = 728029896. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=109.79 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -822.28 SECS.
CROSSING TIME AT ULYSSES IS 85069. S. OR 23:37:49 +/- 434.22 SECONDS

NO

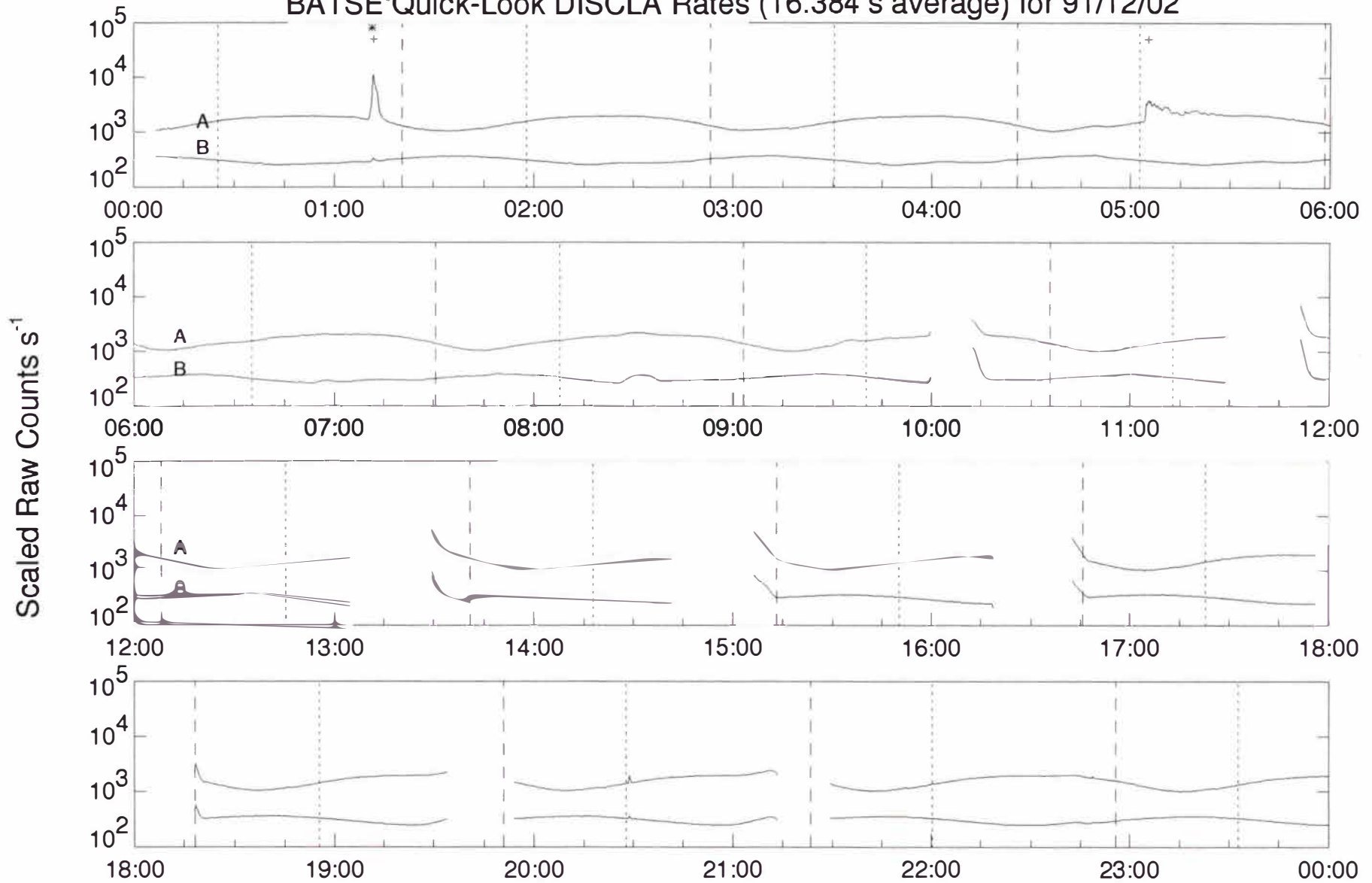
14 / 4 / 93

ULYSSES RT
2/12/91 84636.148 s
0.500 S INTERVALS REGROUPED BY 2
0- 0 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/02

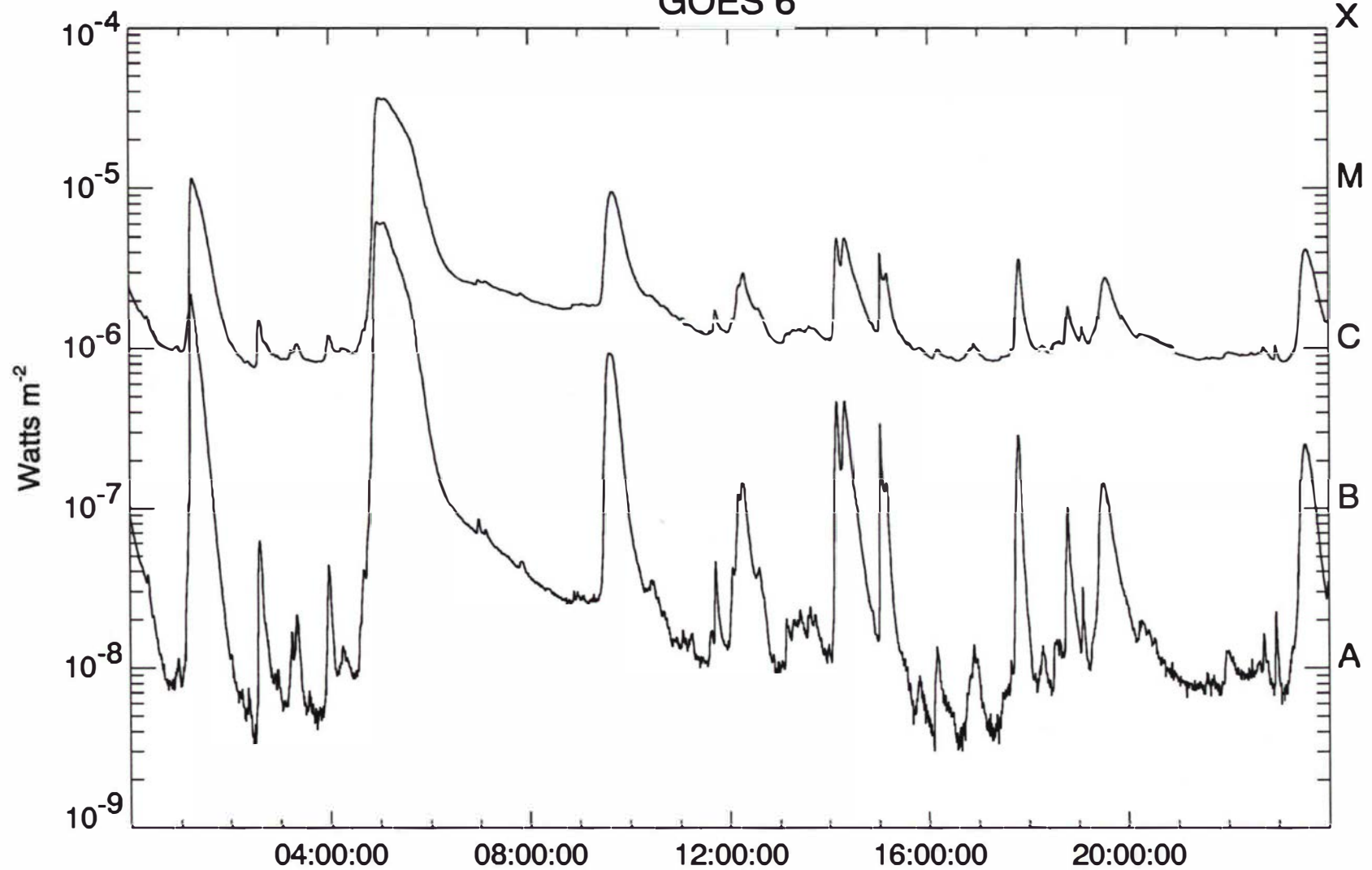


Current Time: 92/10/18, 1851 EDT
 A: Channel 1 Most Sunward LAD
 B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

GOES 6



Data Start: 91/12/02, 0000:00

Plot created: 97/10/20, 1403

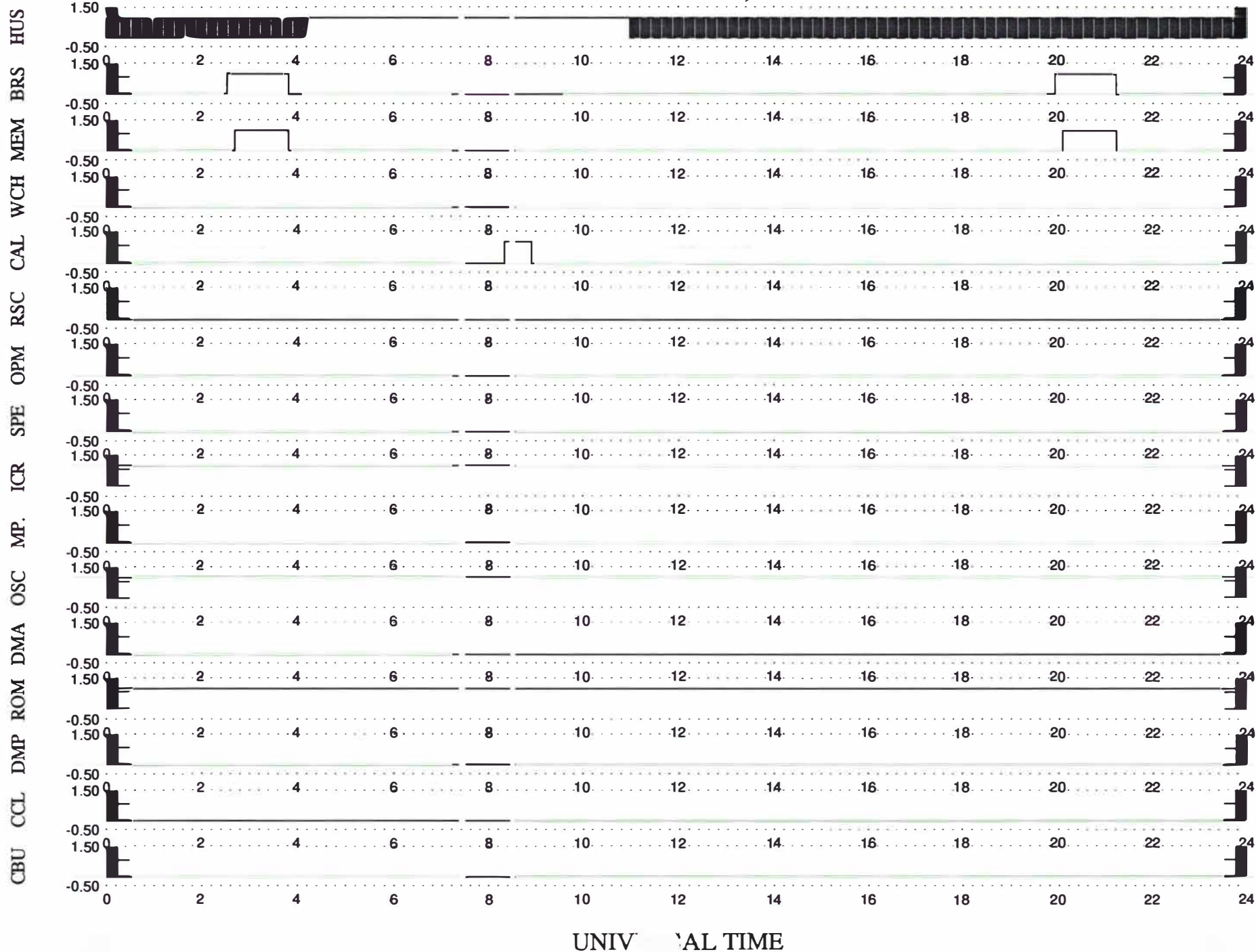
Channel

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

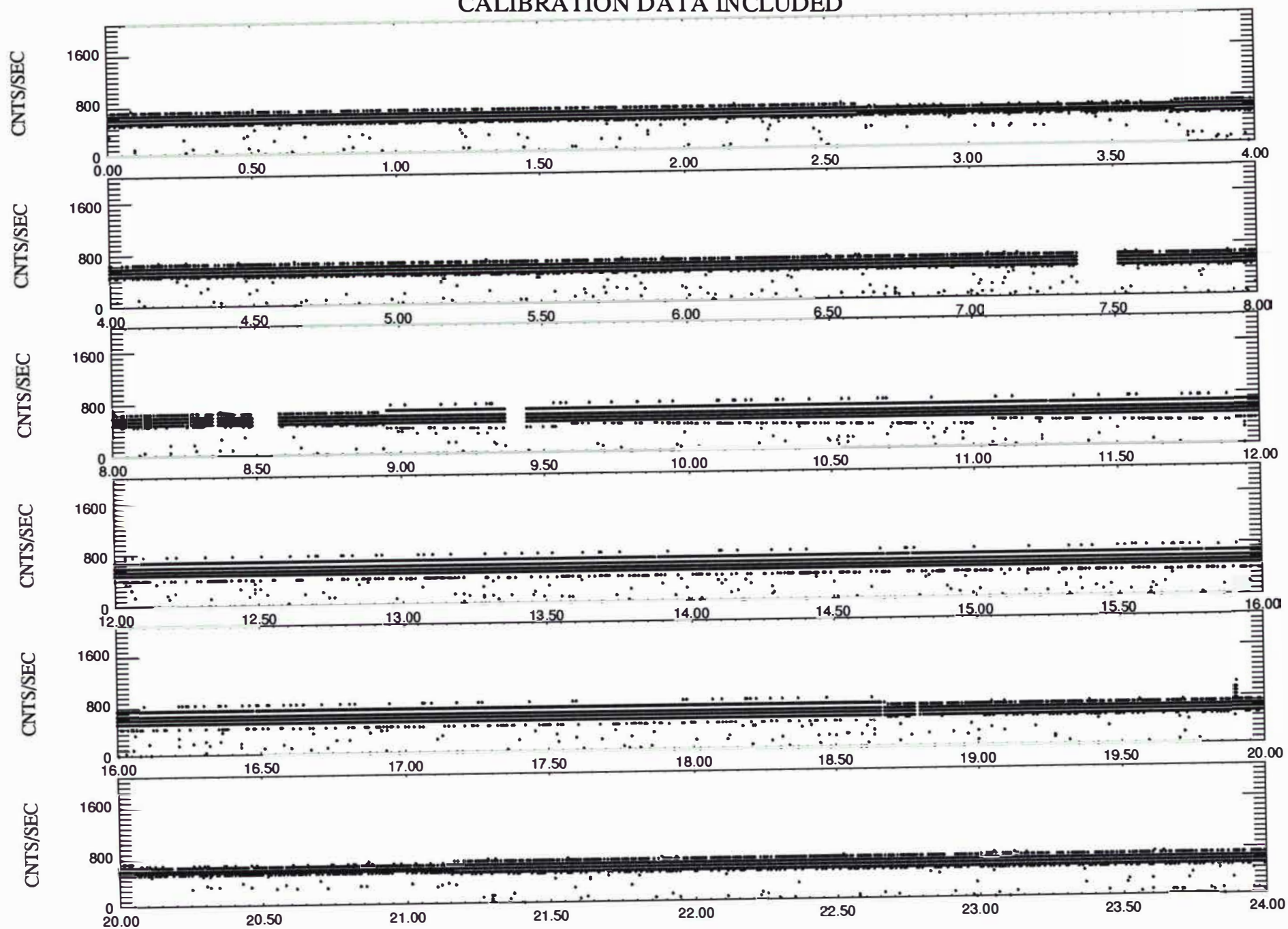
Background not subtracted
Background not subtracted

Sample average = 10

BURST NUMBER 5, 6

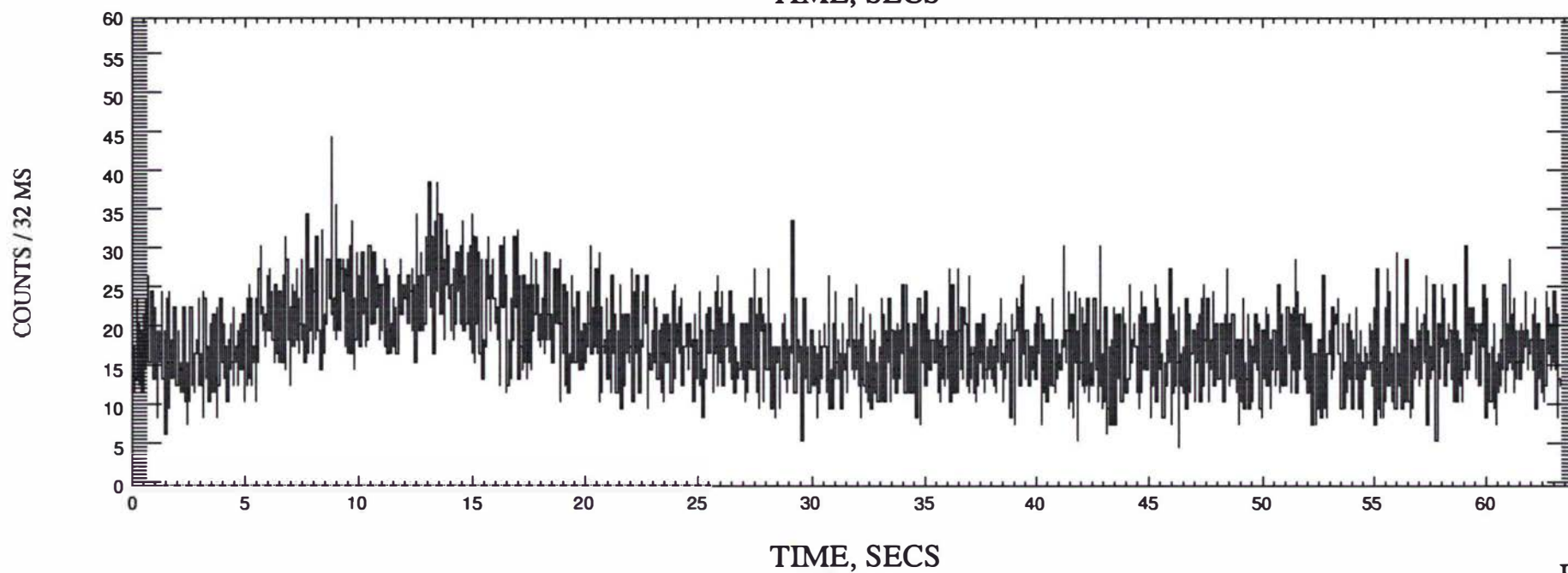
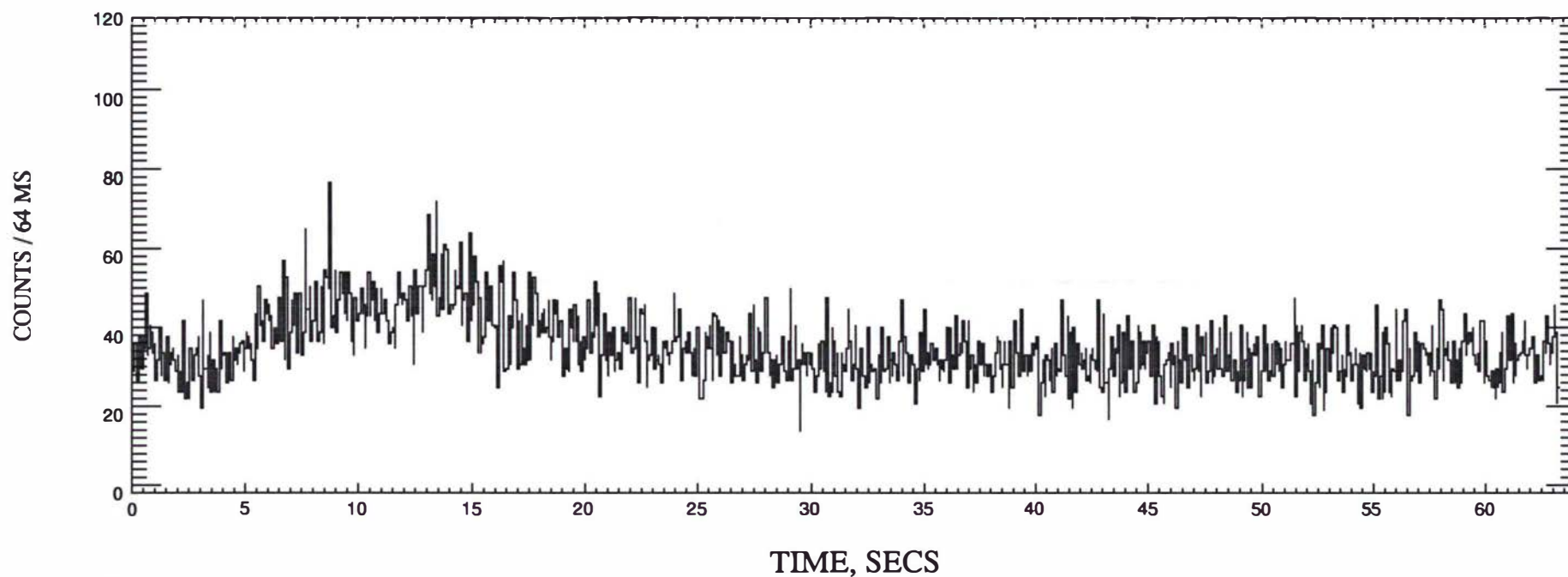


CALIBRATION DATA INCLUDED

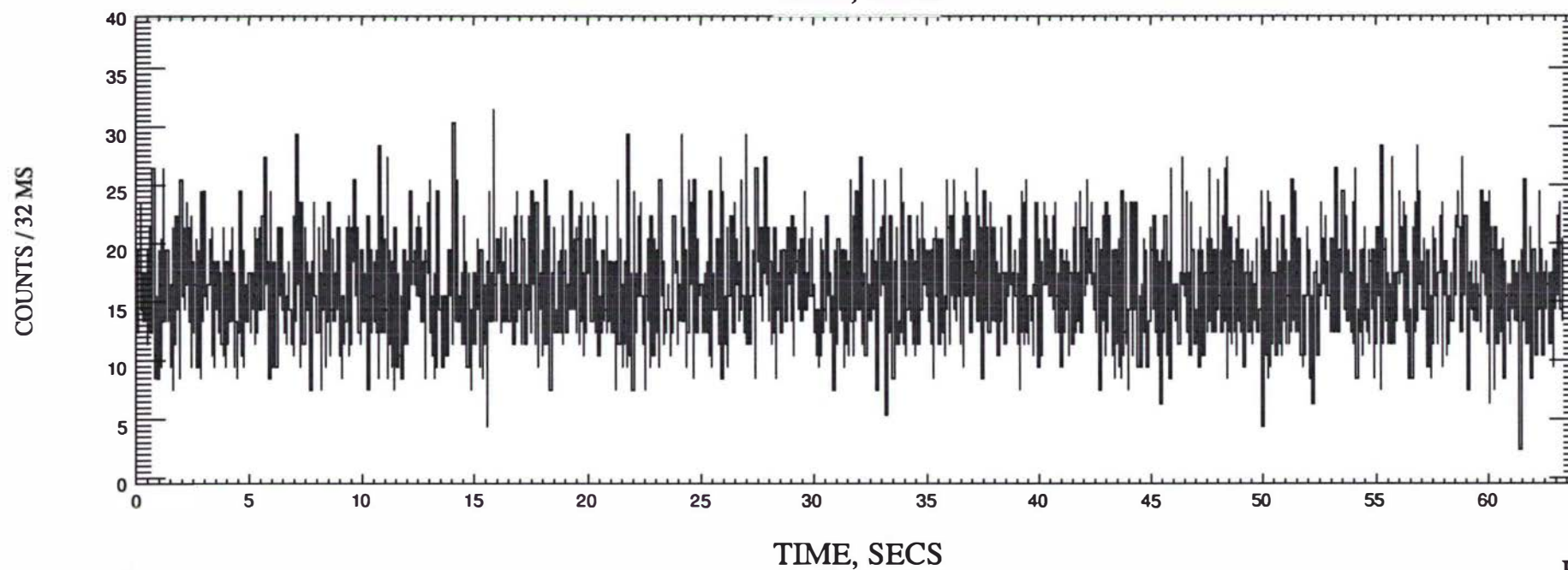
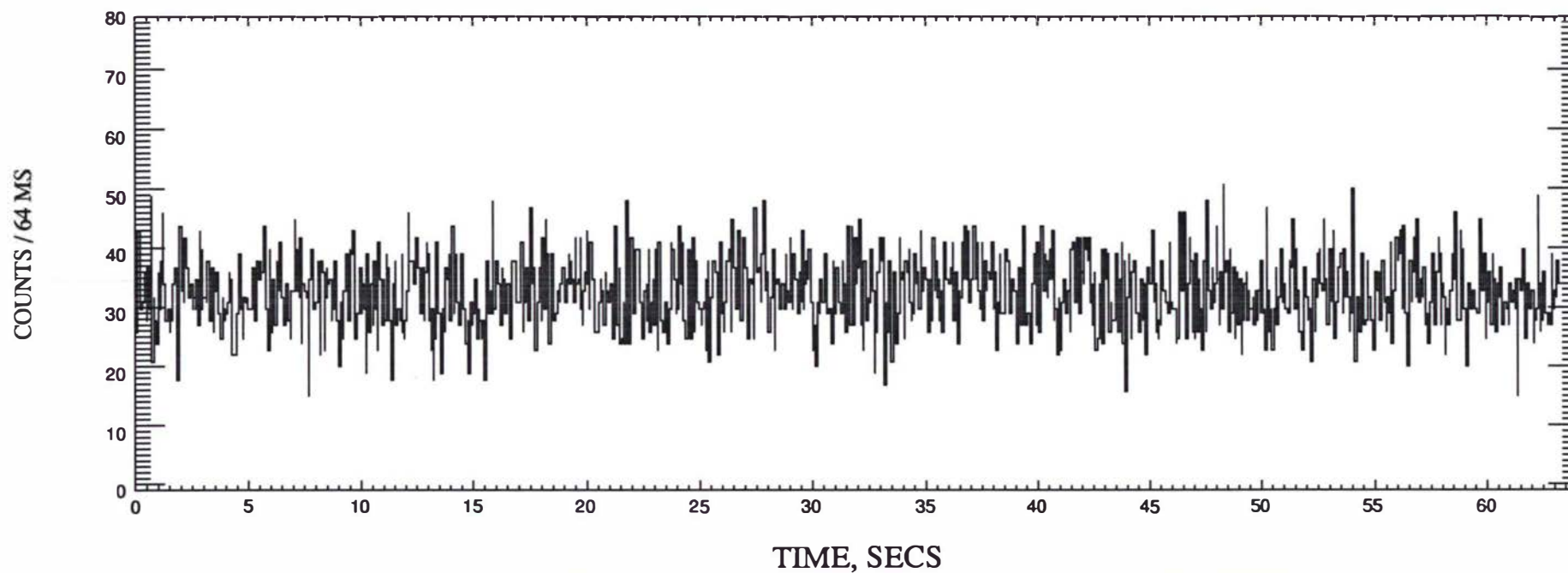


UNIV. CAL TIME

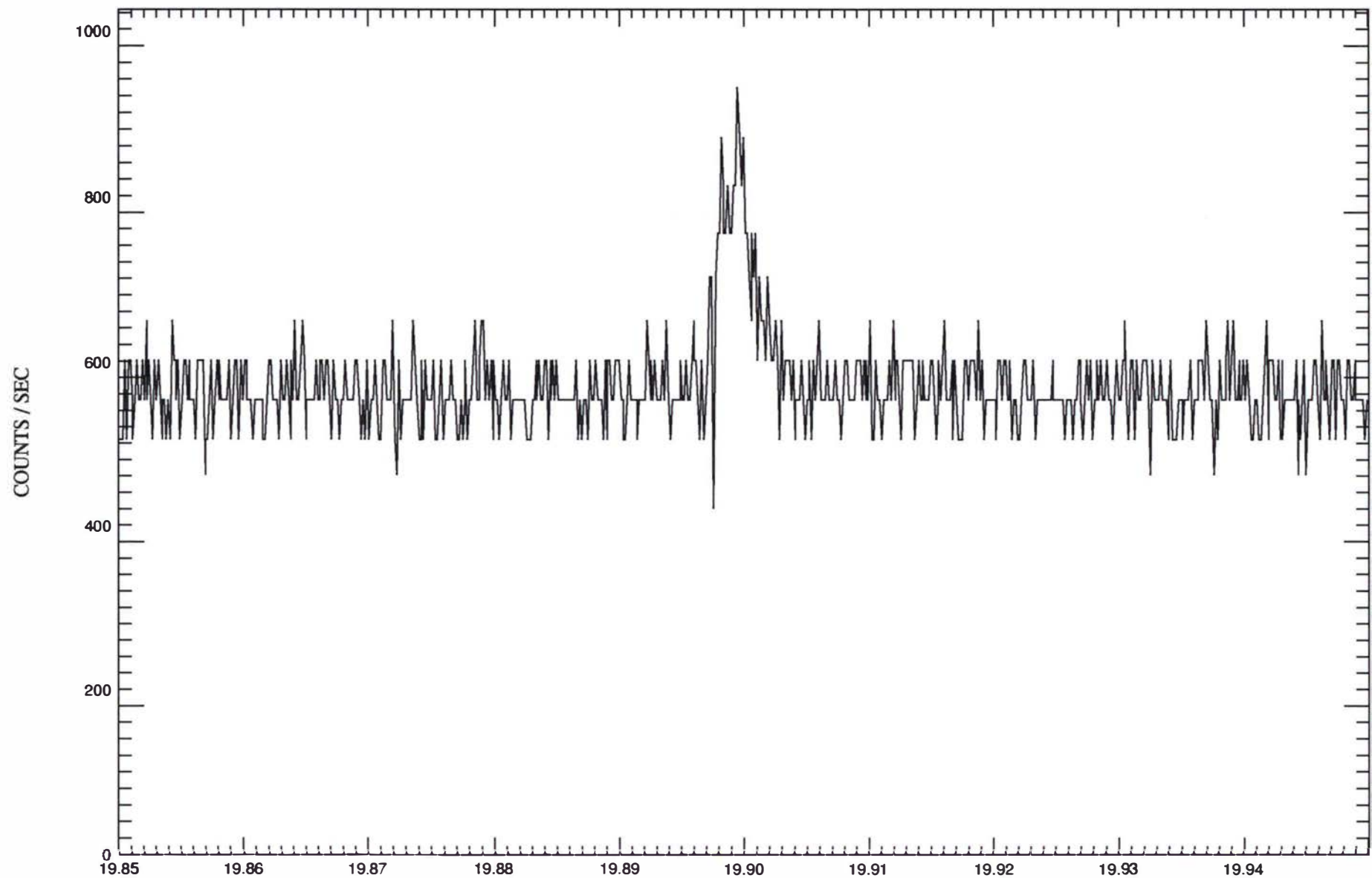
Burst Counter 6 at UT=19.897912016975 h=71632.483 s 19:53:52.483



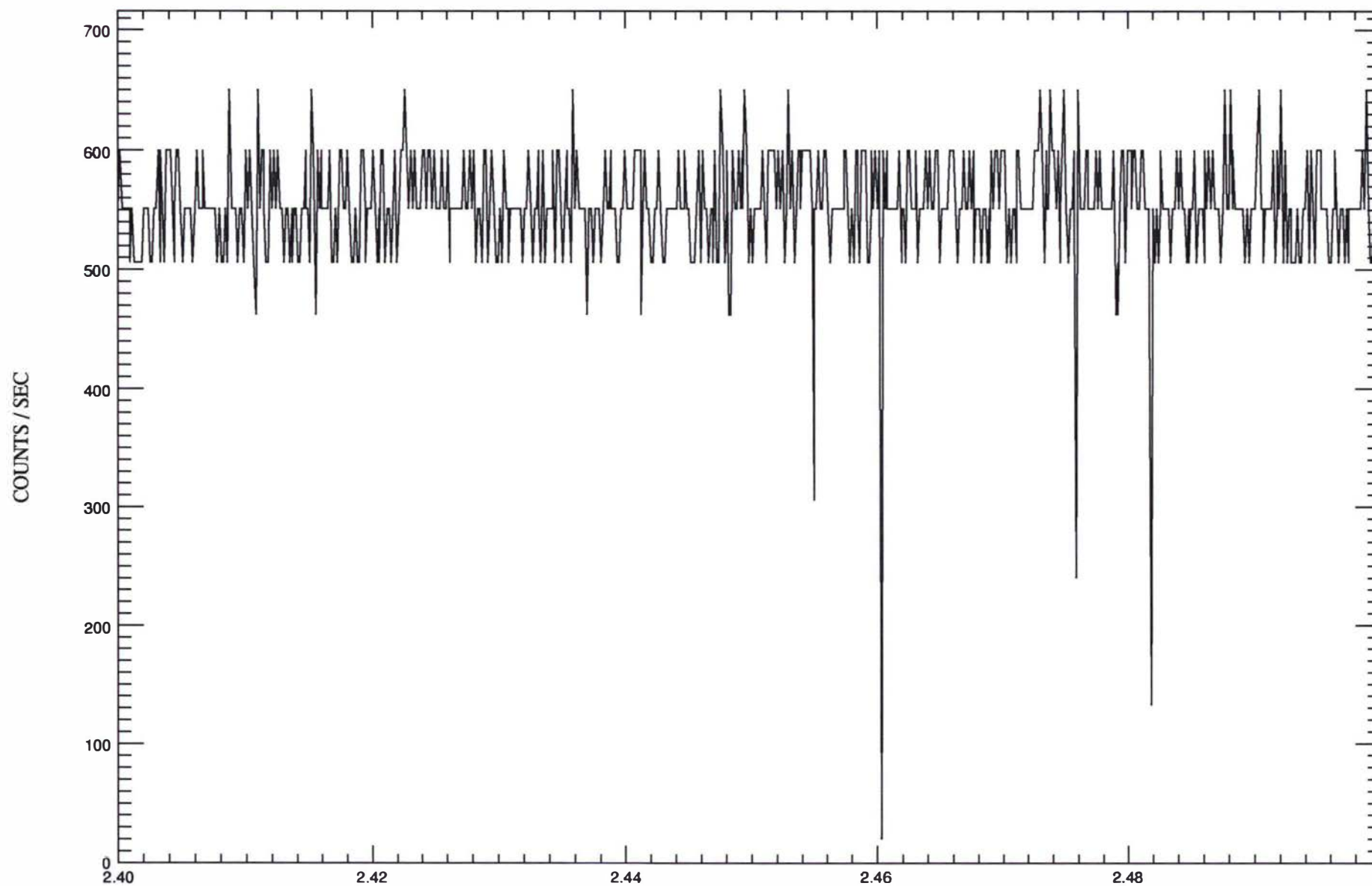
Burst Counter 5 at UT= 2.446304766337 h= 8806.697 s 02:26:46.697

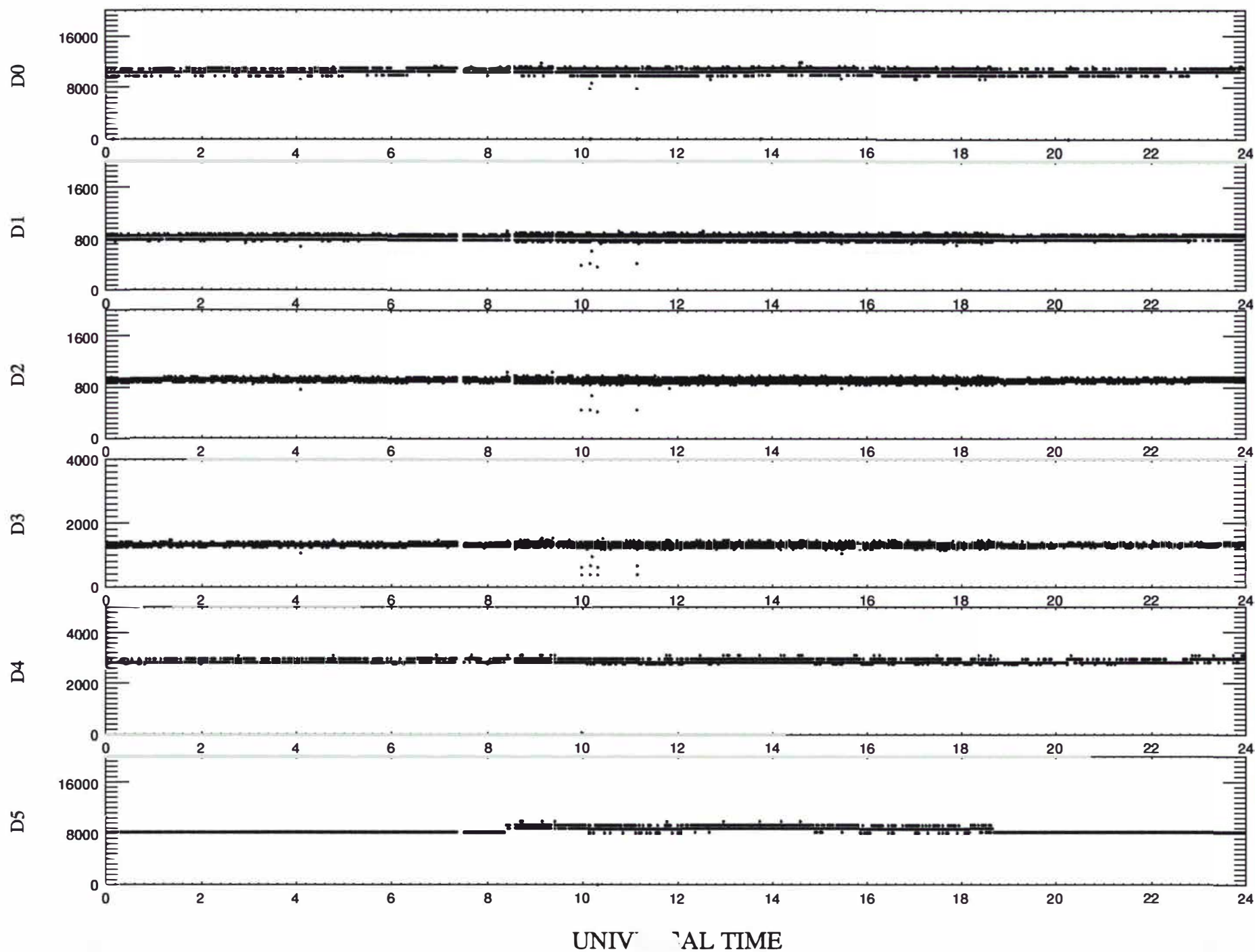


CALIBRATION DATA INCLUDED

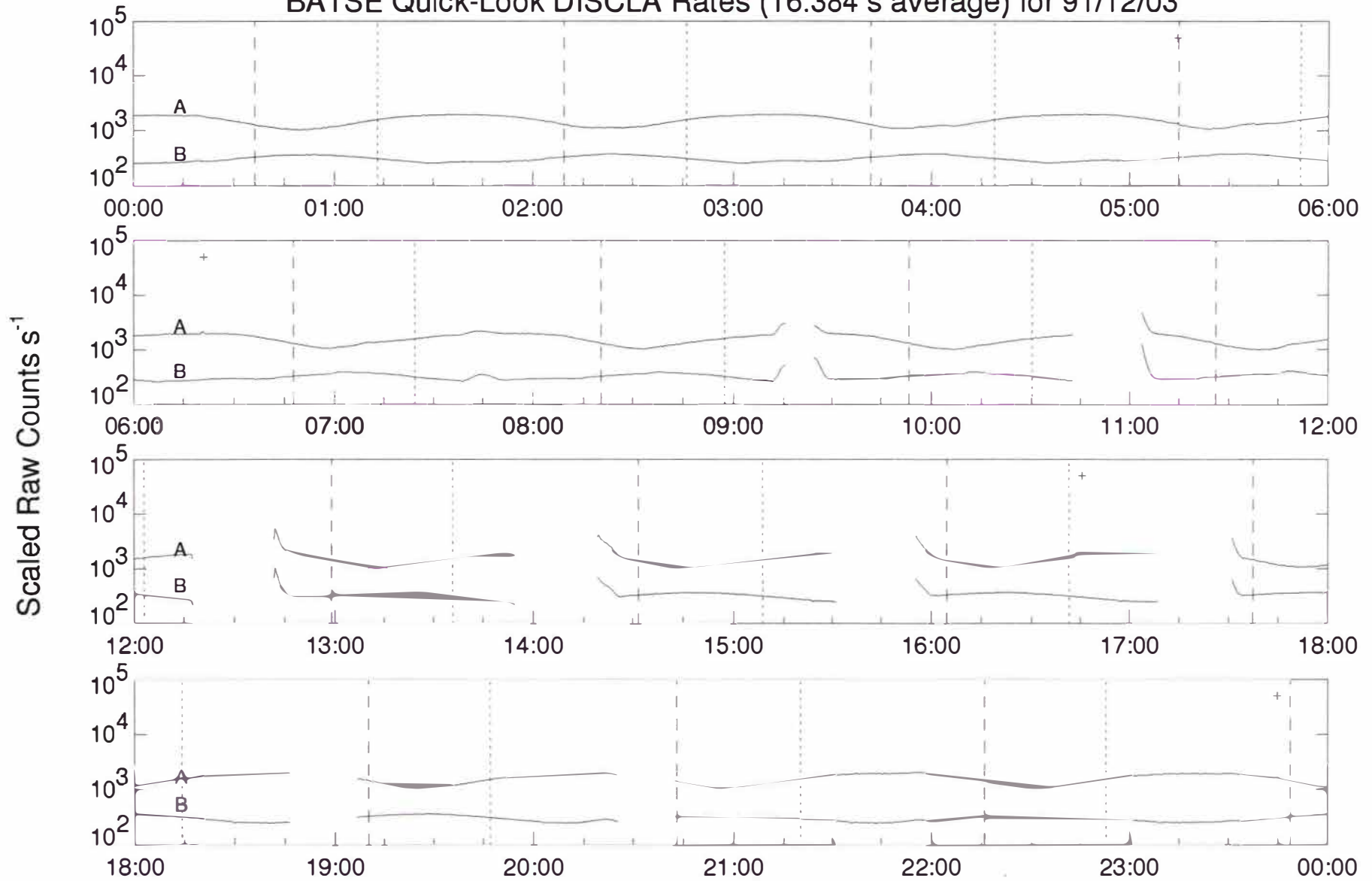


CALIBRATION DATA INCLUDED





BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/03

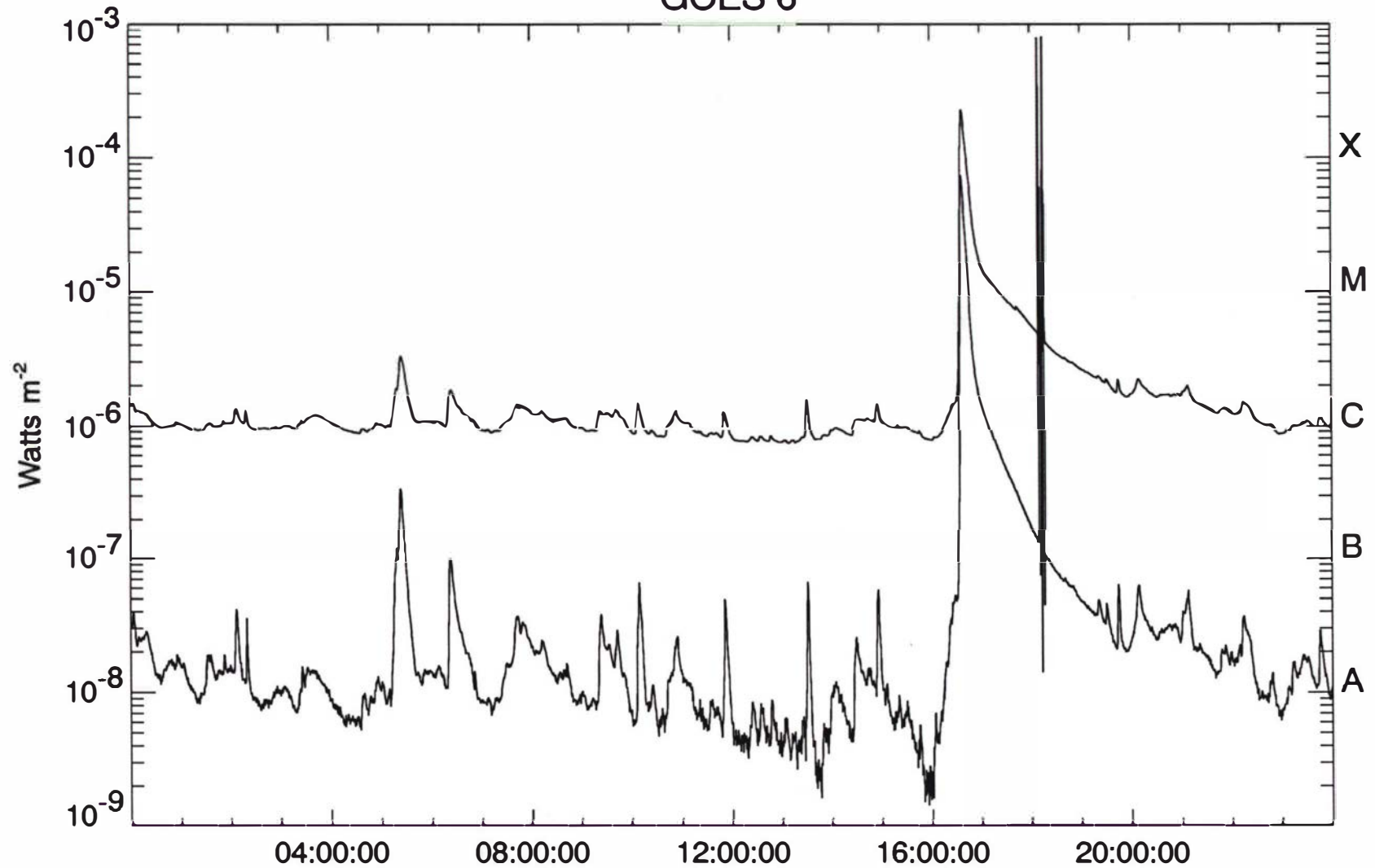


Current Time: 92/10/18, 1852 EDT
 A: Channel 1 Most Sunward LAD
 B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

GOES 6



Data Start: 91/12/03, 0000:01

Plot created: 97/10/20, 1407

Channel

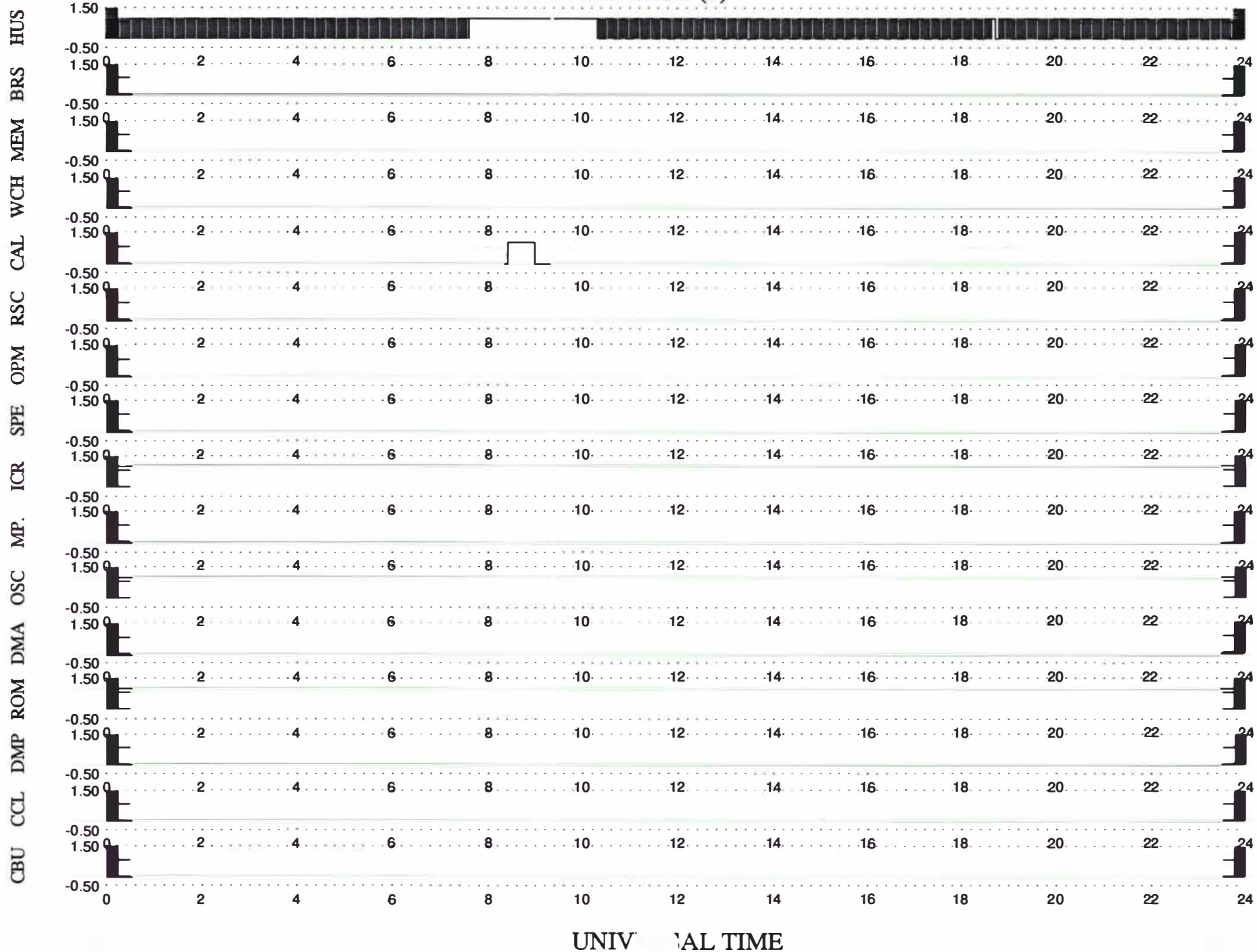
1 (1.0 - 8.0 Angstroms)

Background not subtracted

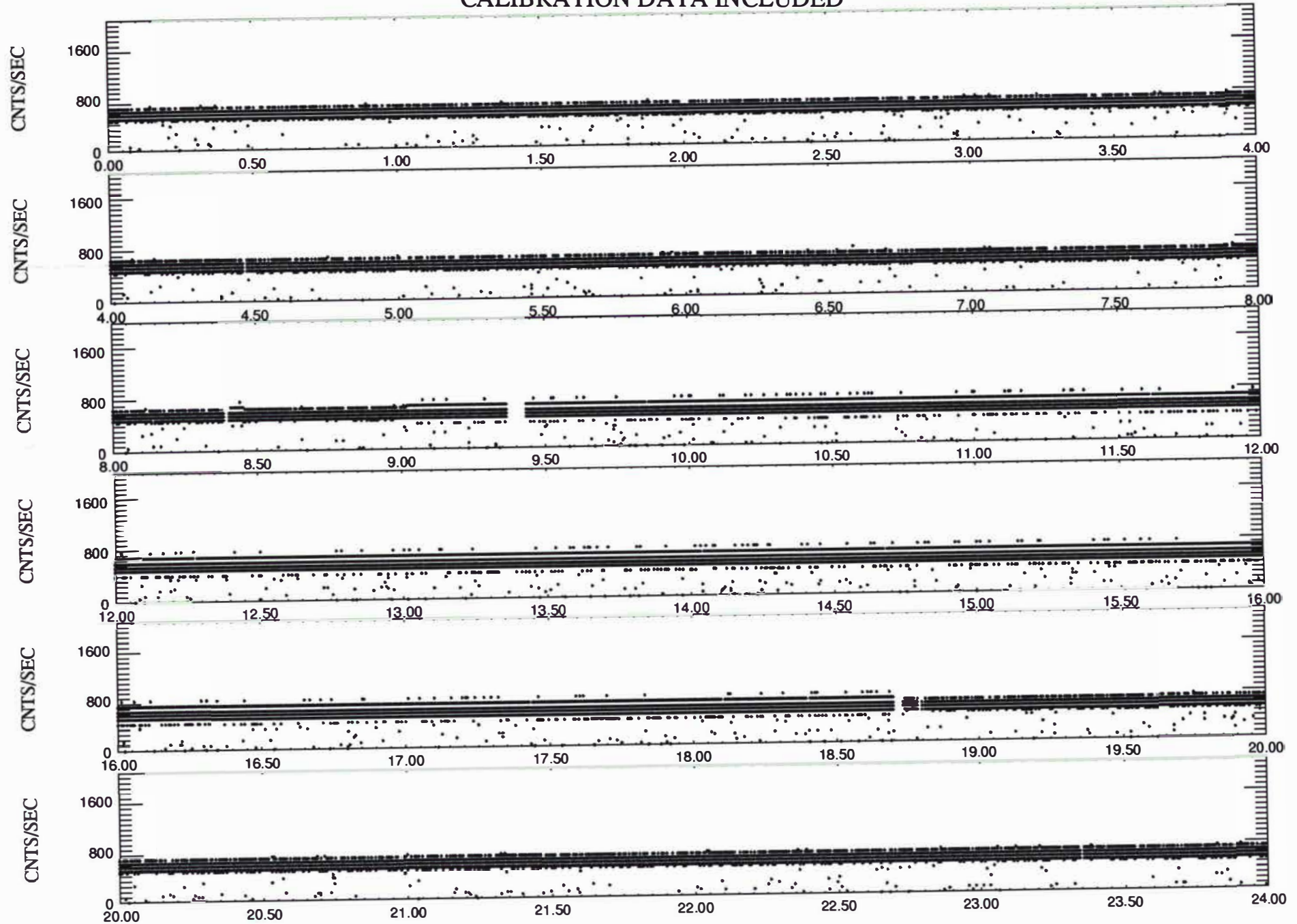
2 (0.5 - 4.0 Angstroms)

Background not subtracted

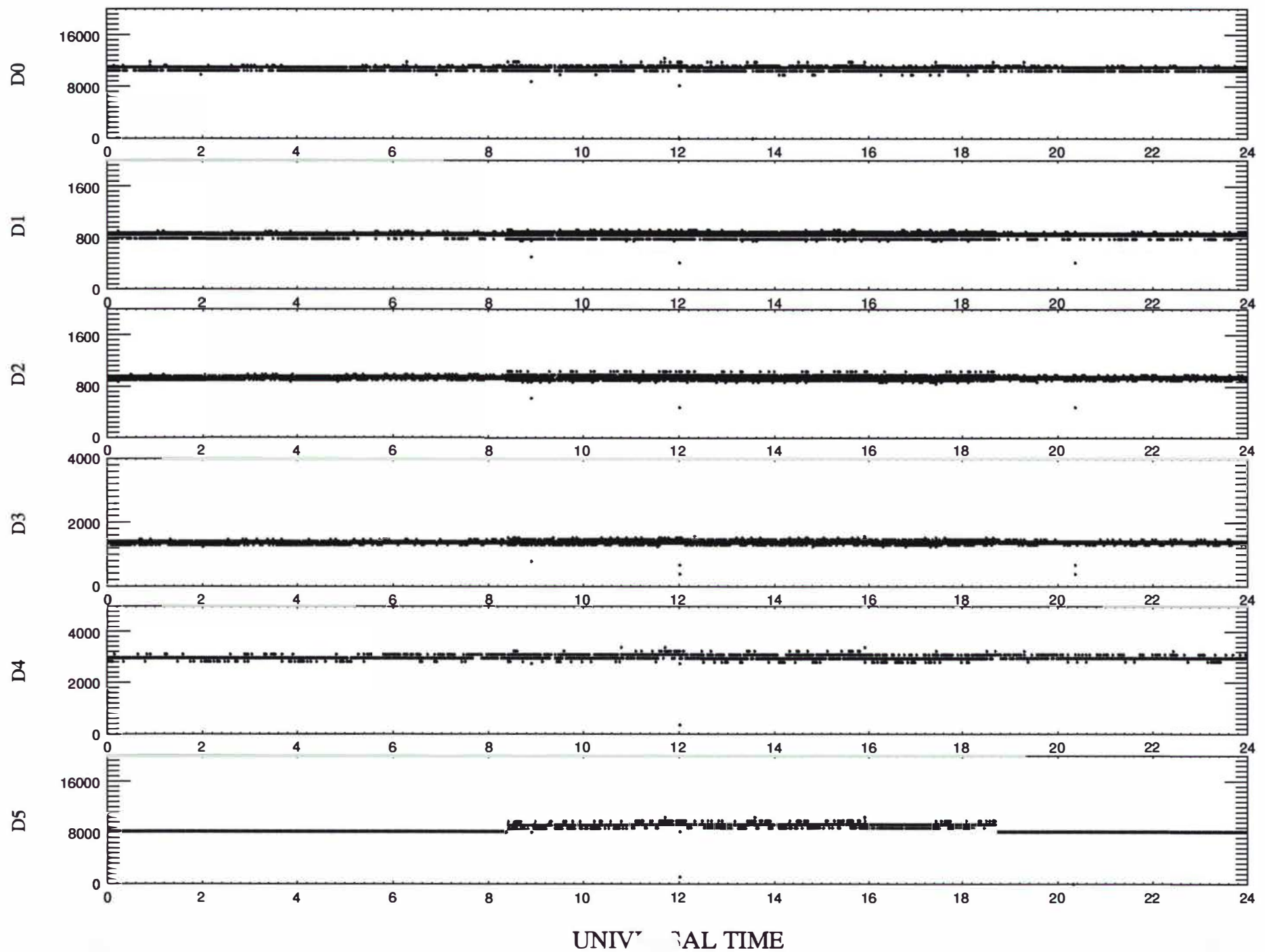
Sample average = 10



CALIBRATION DATA INCLUDED



UNIV CAL TIME



CATSEARCH PROGRAM

BATSE BURST # 1145
EVENT OF 1991 DEC 4 DAY OF YEAR=338
EVENT CROSSING TIME AT BATSE : 62503. S. OR 17:21:42.7
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 69.100 -24.400
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 4/12/ 91 IS:
RA= 167.448 DEC= 6.735 DIST= 4.850 AU
BATSE-ULYSSES DISTANCE = 725512128. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 79.64 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 435.01 SECS.
CROSSING TIME AT ULYSSES IS 62938. S. OR 17:28:57 +/- 469.92 SECONDS

ND

14 / 4 / 93

ULYSSES RT

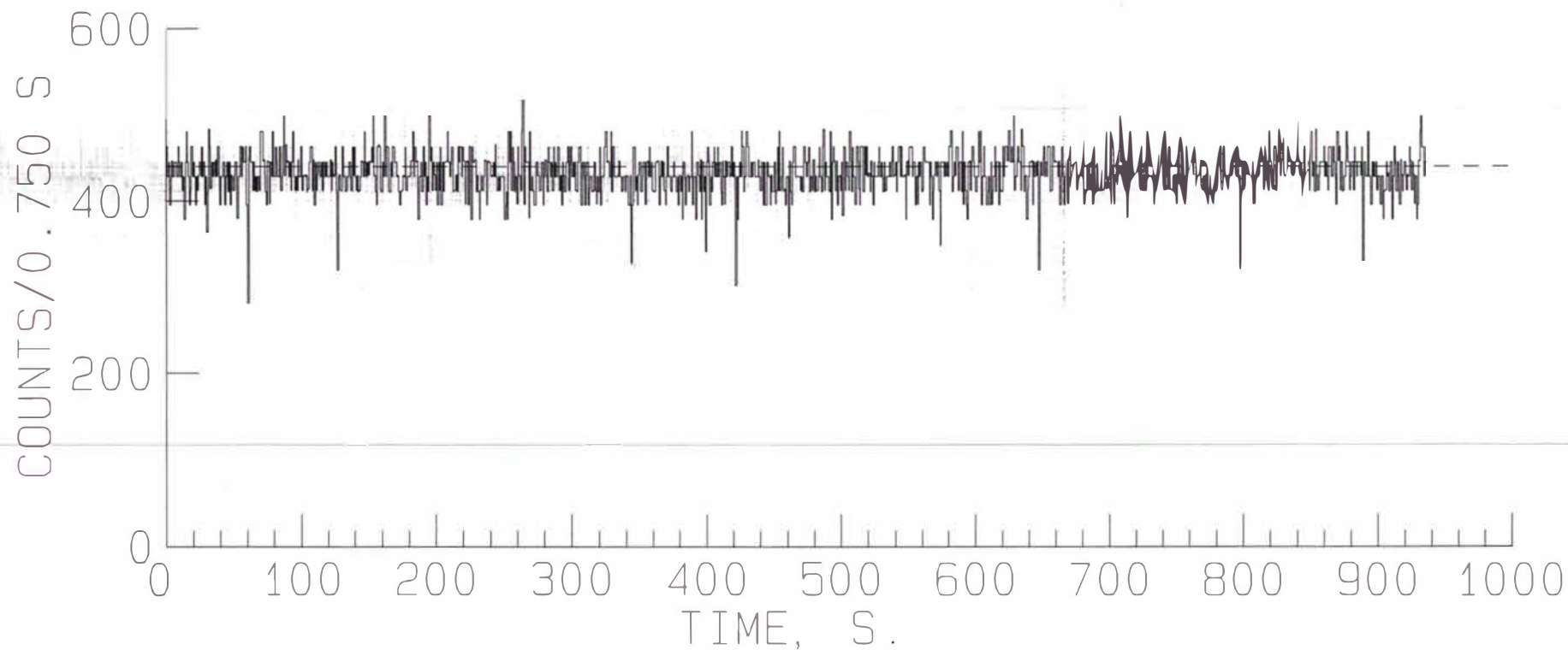
4/12/91 62460.055 s

0.250 S INTERVALS REGROUPED BY 3

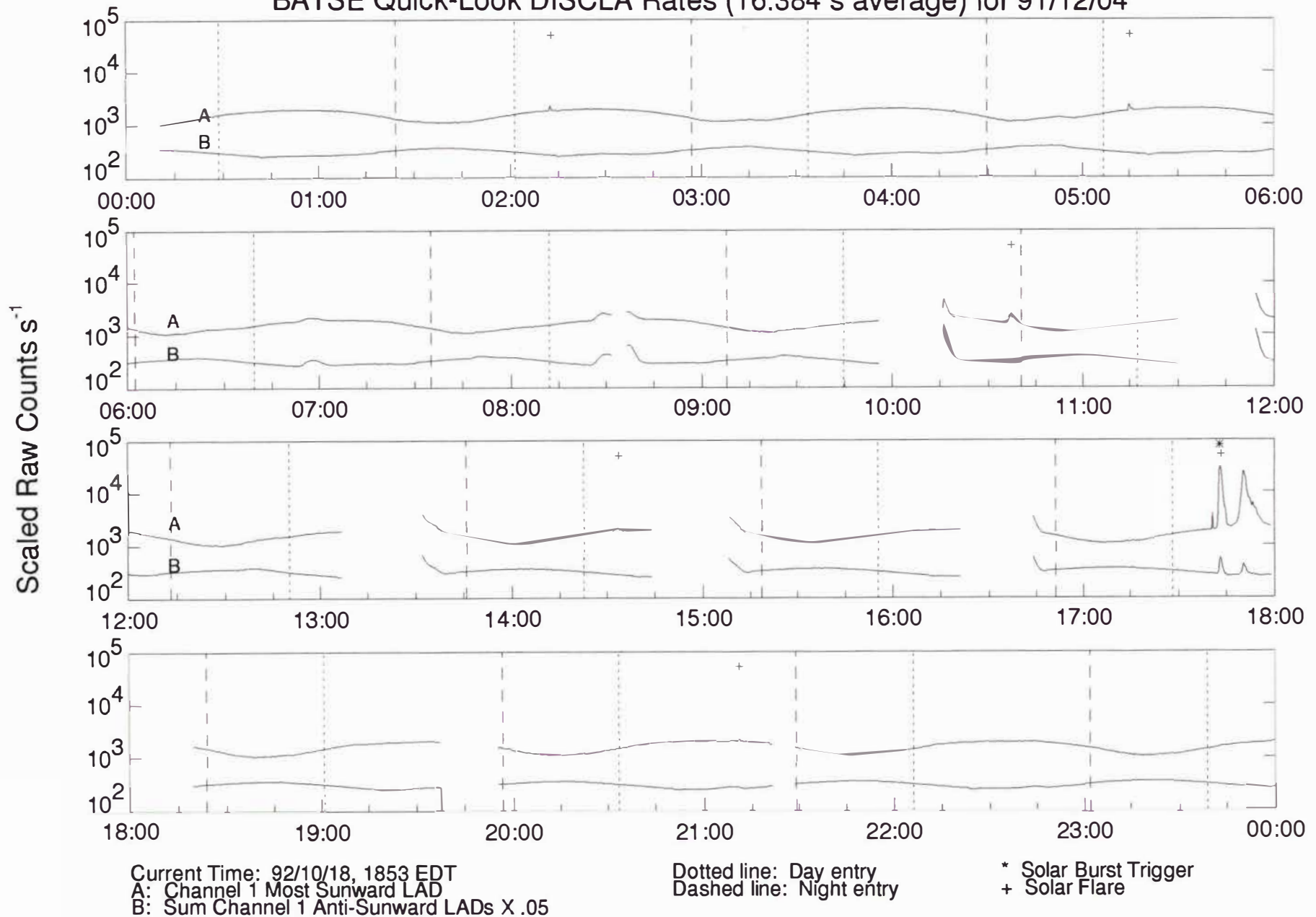
0- 0 keV

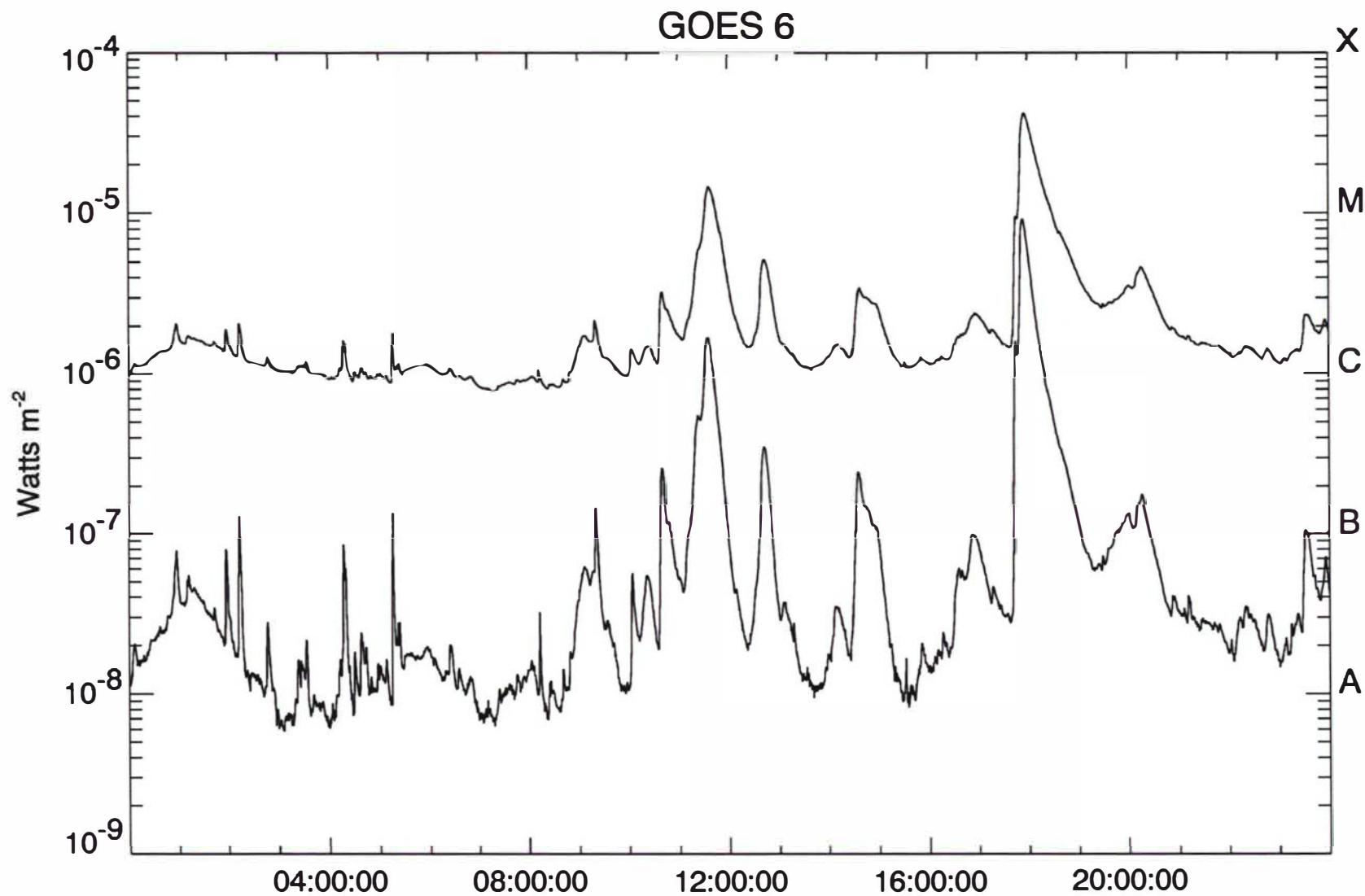
N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS



BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/04





Data Start: 91/12/04, 0000:02

Plot created: 97/10/20, 1411

Channel

1

(1.0 - 8.0 Angstroms)

Background not subtracted

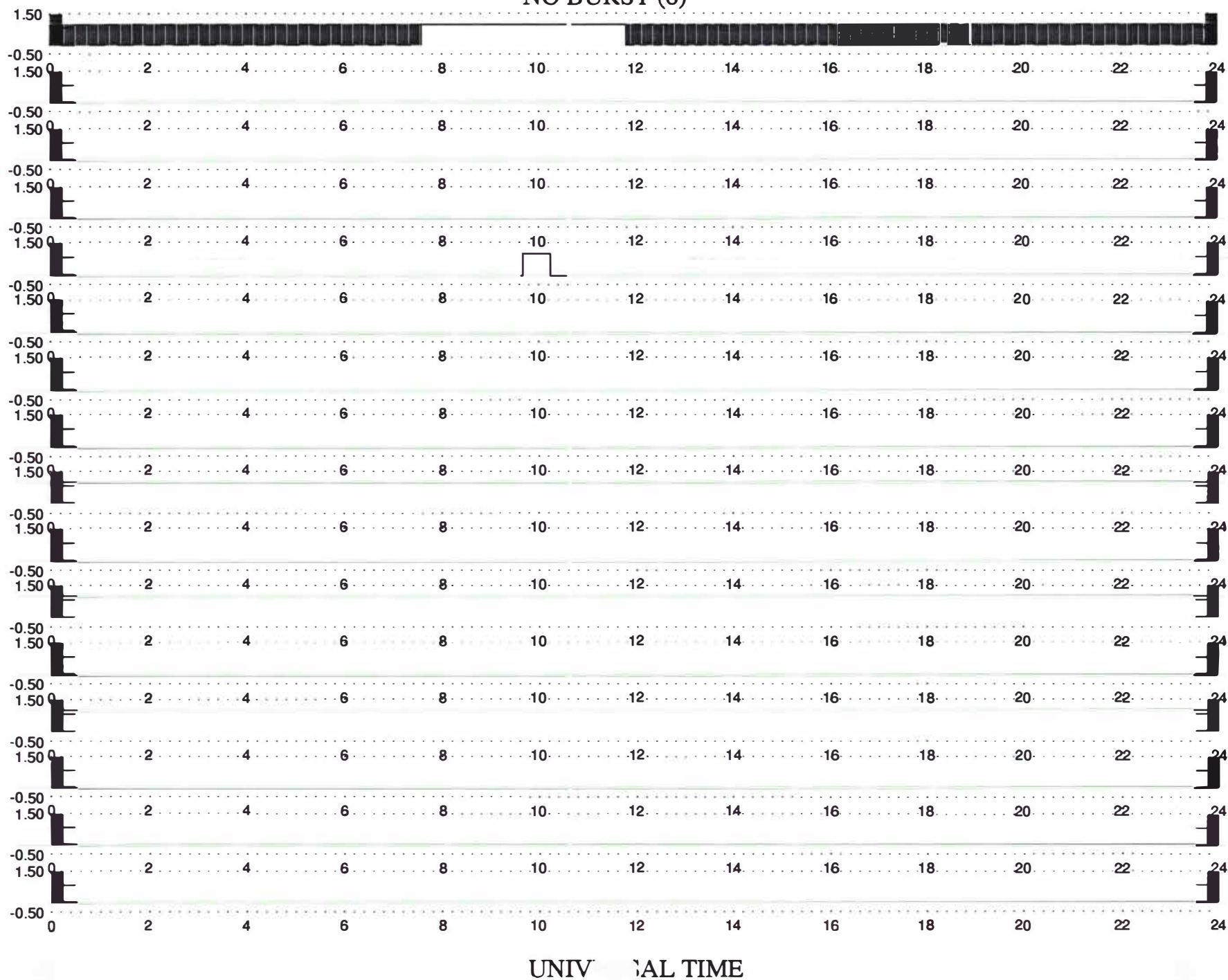
2

(0.5 - 4.0 Angstroms)

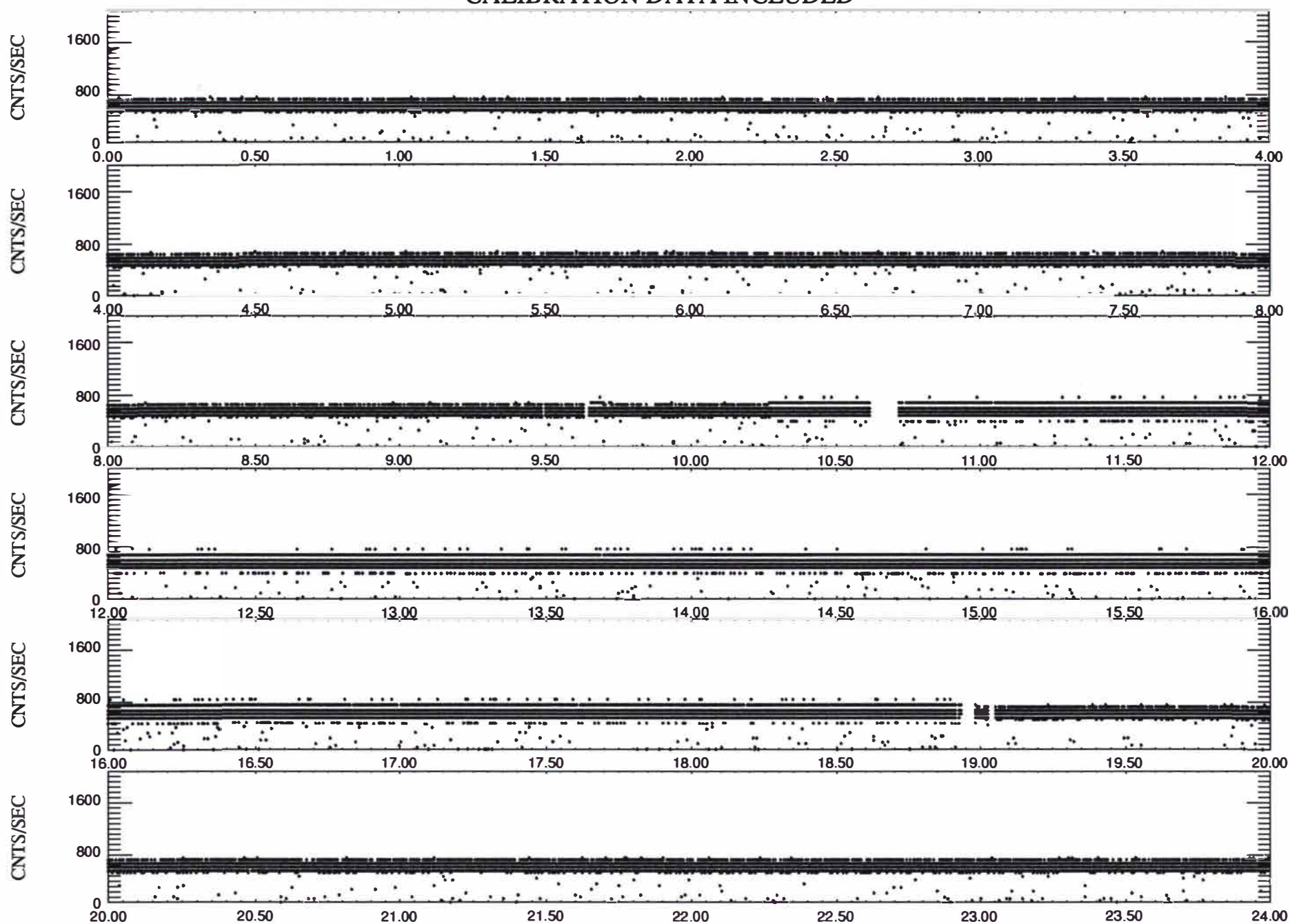
Background not subtracted

Sample average = 10

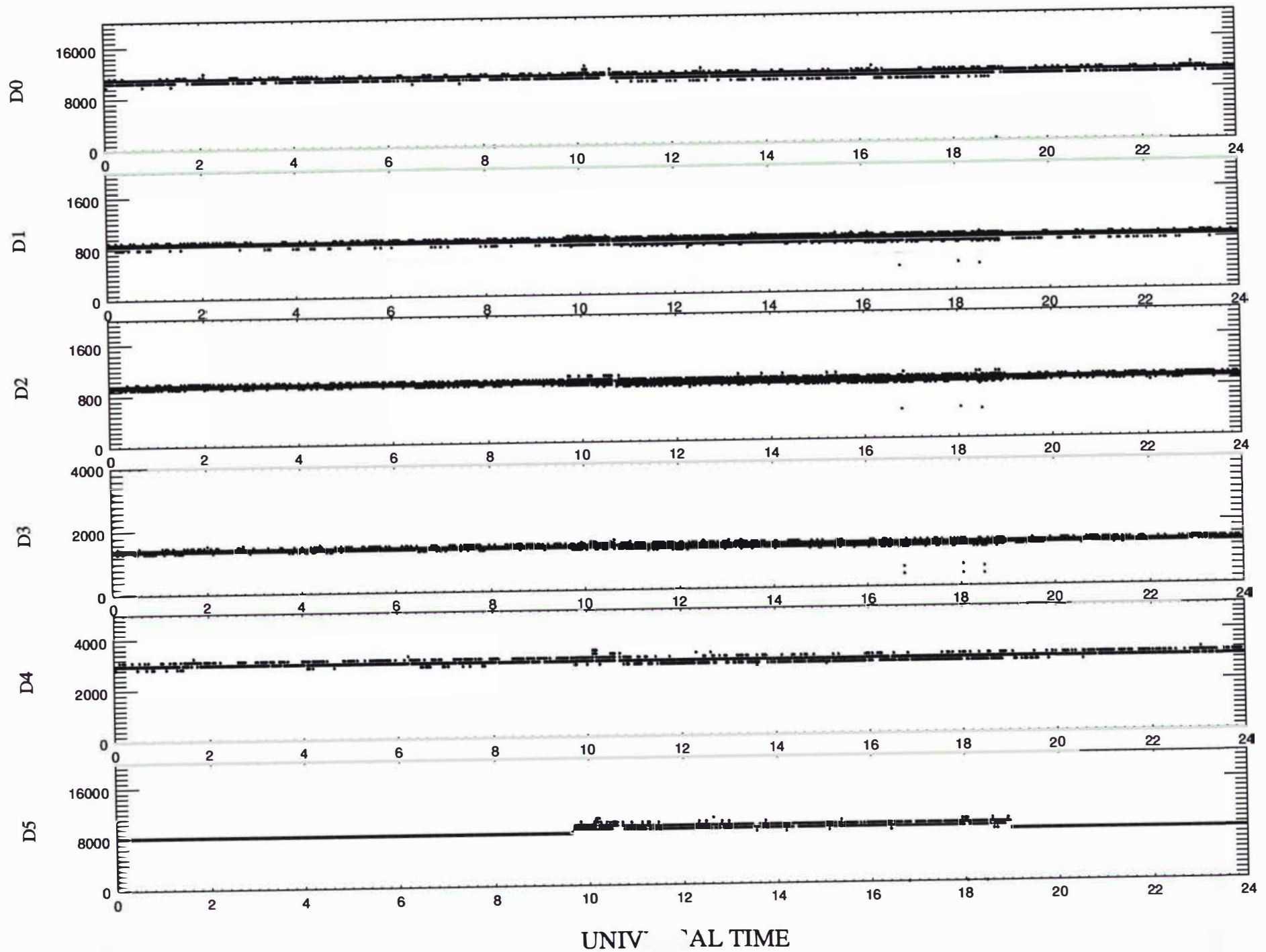
CPU	DMP	ROM	DMA	OSC	MP.	ICR	SPE	OPM	RSC	CAL	WCH	MEM	BRS	HUS
CCL	DMP	ROM	DMA	OSC	MP.	ICR	SPE	OPM	RSC	CAL	WCH	MEM	BRS	HUS



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-maill1d 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

DATE	U.T.	Nr UGB	Event Nature
1991-08-27	15:33:19.885	325-c	Solar Particles
1991-09-01	05:24:27.051	327-a	GRB
1991-09-07	01:05:10.287	330-a	GRB
1991-09-07	19:23:04.162	331-a	Solar Flare
1991-10-01	18:14:23.671	345-a	Unknown
1991-10-01	19:01:20.457	345-b	Unknown
1991-10-04	01:27:10.195	347-a	Unknown
1991-10-13	18:09:49.270	353-a	Solar Flare
1991-10-13	21:02:34.557	353-b	Solar Flare
1991-10-14	17:34:33.822	354-a	Unknown
1991-10-16	11:01:35.345	355-a	GRB
1991-10-18	05:32:15.504	356-a	GRB
1991-10-25	21:25:15.926	362-a	GRB
1991-10-26	15:06:06.127	363-a	Unknown
1991-10-26	15:28:41.044	363-b	Unknown
1991-10-26	20:35:18.850	363-c	Solar Flare
1991-11-19	17:12:34.357	367-a	GRB
1991-11-19	17:28:41.794	367-b	Solar Flare
1991-11-21	07:23:32.063	368-a	Unknown
1991-11-21	07:43:41.945	368-b	Unknown
1991-11-21	07:58:33.952	368-c	Unknown
1991-12-05	19:48:38.788	375-a	Solar Flare
1991-12-14	20:55:02.702	378-a	Unknown
1991-12-15	06:23:41.586	378-b	Unknown
1991-12-15	11:41:18.304	378-c	Unknown
1991-12-20	14:02:29.154	380-a	Solar Flare
1991-12-20	14:53:07.976	380-b	Solar Flare
1991-12-20	16:04:57.705	380-c	Solar Flare
1991-12-22	15:00:10.116	381-a	GRB
1992-01-10	00:12:08.191	386-a	Unknown
1992-01-10	02:45:56.628	386-b	Unknown
1992-01-10	09:18:06.120	386-c	Unknown & GRB
1992-01-18	09:42:49.763	392-a	Unknown
1992-01-18	12:38:59.105	392-b	Unknown
1992-01-18	~12:52	392-c	Unknown

FAXCOVER

DANISH SPACE RESEARCH INSTITUTE

GL. LINDTOFTVEJ 7
DK-2800 LYNGBY
DENMARK

PHONE: +45 42 88 22 77 TELEFAX: +45 45 93 02 83 TELEX: 37198 dansu dk

DATE: Nov 23, 1993

Page 1 of 2

FROM: Alberto J. CASTRO-TIRADO

TO : Kevin HURLEY

FAX no

Name : 510 643 8640

Dear Kevin.

Thank you for your answer. Enclosed I send you the list of CONFIRMED 69 GRBS plus 14 CANDIDATES. Now you may fill the WATCH response in the Master GRB list for WATCH-GRANAT in the period 1/1/90 - 25/9/92.

GRB 920321 (at 13:00:44) is a ≤ 1.5 burst in WATCH data, so I think it could be the same event seen by Ulysses. We do not have better time resolution.

The other repeater is 900126/920311. The two error boxes are separated by 1° , at $\sim \alpha = 08^h 46^m$ $\delta = -38^\circ$ (1450.0)

Kind regards,

Alberto

First GRANAT/WATCH
Gamma-Ray Burst
Catalogue

1W OBS (yy:mm:dd)	U.T. (hh:mm:ss)
900118	17:40:48
900120	20:37:33
900123a	01:42:13
900123b	18:44:17
900126	18:04:27
900222	11:56:35
900308	09:32:02
900327	10:24:28
900404	17:54:36
900413	10:11:21
900708a	11:30:21
900708b	18:44:53
900901	01:35:47
900925	20:25:22
900929	01:49:18
901009	00:15:46
901015b	08:44:48
901027	04:21:07
901112	14:57:37
901116	01:42:10
901119	18:08:32
901219	21:52:43
910117	00:57:51
910122	15:11:40
910202	20:57:35
910219	11:45:25
910310	13:02:06
910312	12:43:09
910425	00:37:52
910517	05:02:20
910627	04:29:24
910717a	04:11:07
910717b	13:07:25

910721	19:30:12
910723	14:06:20
910814	19:14:31
910815	14:24:32
910817	17:09:26
910818	13:44:46
910821	10:33:36
910901	05:24:14
910925	03:35:36
910927	23:26:53
911016	11:03:31
911018	05:32:00
911022	04:13:58
911202	20:28:51
911205	23:04:41
911209	18:36:00
920105	17:41:17
920116	18:30:35
920130	00:29:17
920302	06:16:54
920307	00:18:06
920311	02:20:20
920325	17:17:37
920615	14:24:56
920714	13:04:53
920718a	14:41:16
920718b	21:32:47
920720	05:53:04
920723a	01:00:44
920723b	20:03:11
920814	06:10:25
920902	00:29:04
920903a	01:36:15
920903b	23:28:52
920925a	19:40:44
920925b	20:45:14
920925c	22:46:14

CANDIDATES

900415	06:20:58
900603	06:20:50
900616	03:56:50
900618	23:12:22
900625	22:04:16
900628	11:17:53
900815	11:35:12
900914	04:46:40
901015a	02:42:16
910408	22:24:18
910414	07:28:27
910816	01:57:40
920314	05:48:12
920721	13:00:49
920721	06:17:25

CATSEARCH PROGRAM

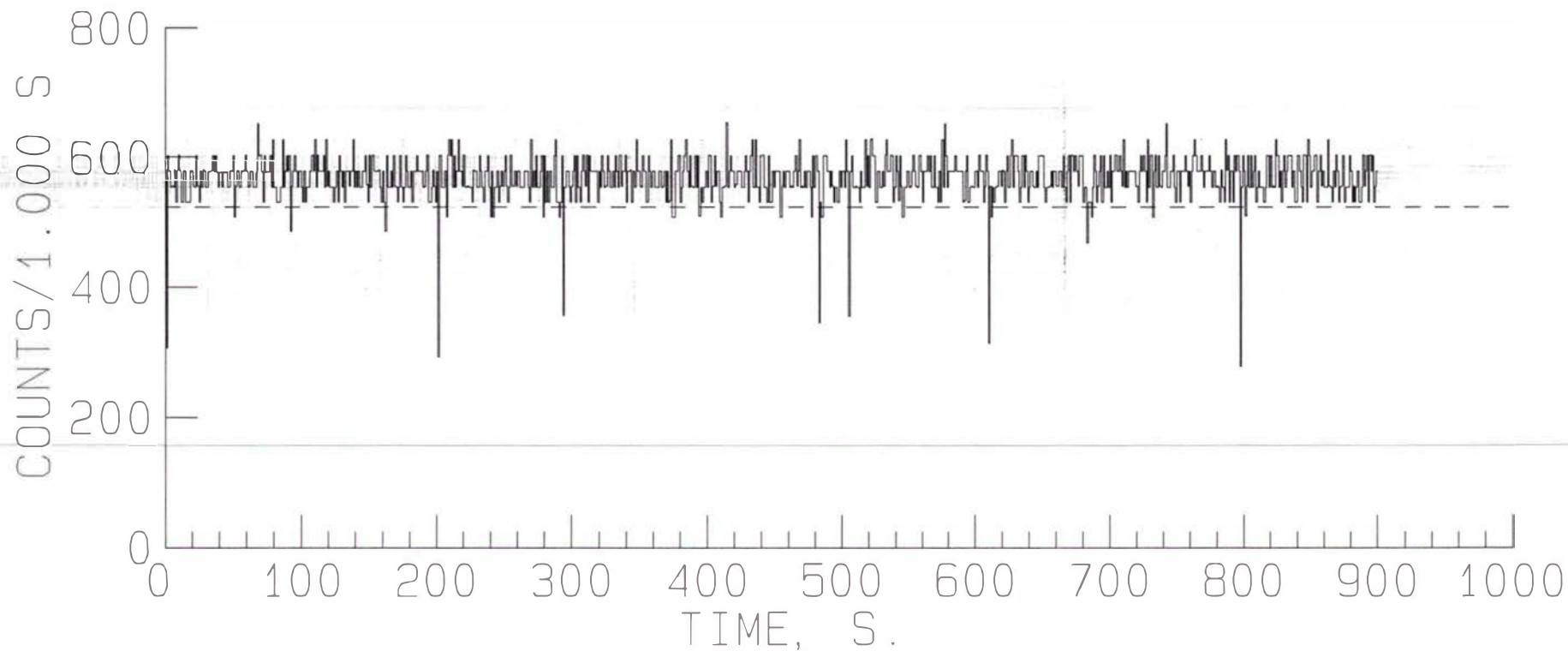
BATSE BURST # 1148
EVENT OF 1991 DEC 5 DAY OF YEAR=339
EVENT CROSSING TIME AT BATSE : 83081. S. OR 23:04:41.0
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 101.500 -28.400
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 5/12/ 91 IS:
RA= 167.496 DEC= 6.717 DIST= 4.841 AU
BATSE-ULYSSES DISTANCE = 724245016. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=107.44 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -724.15 SECS.
CROSSING TIME AT ULYSSES IS 82357. S. OR 22:52:36 +/- 439.14 SECONDS

ND

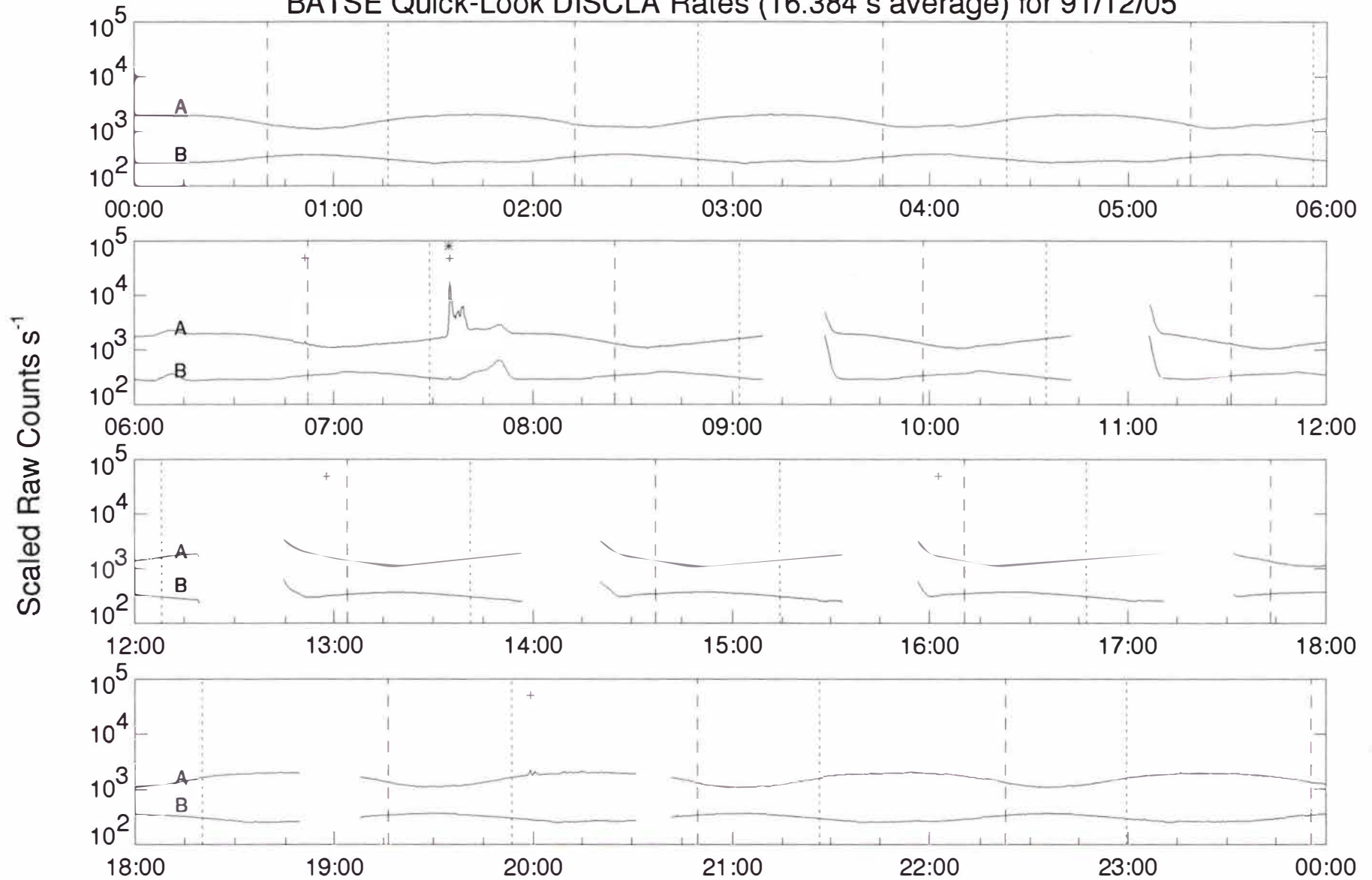
14 / 4 / 93

ULYSSES RT
5/12/91 81900.367 s
0.500 S INTERVALS REGROUPED BY 2
0- 0 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/05

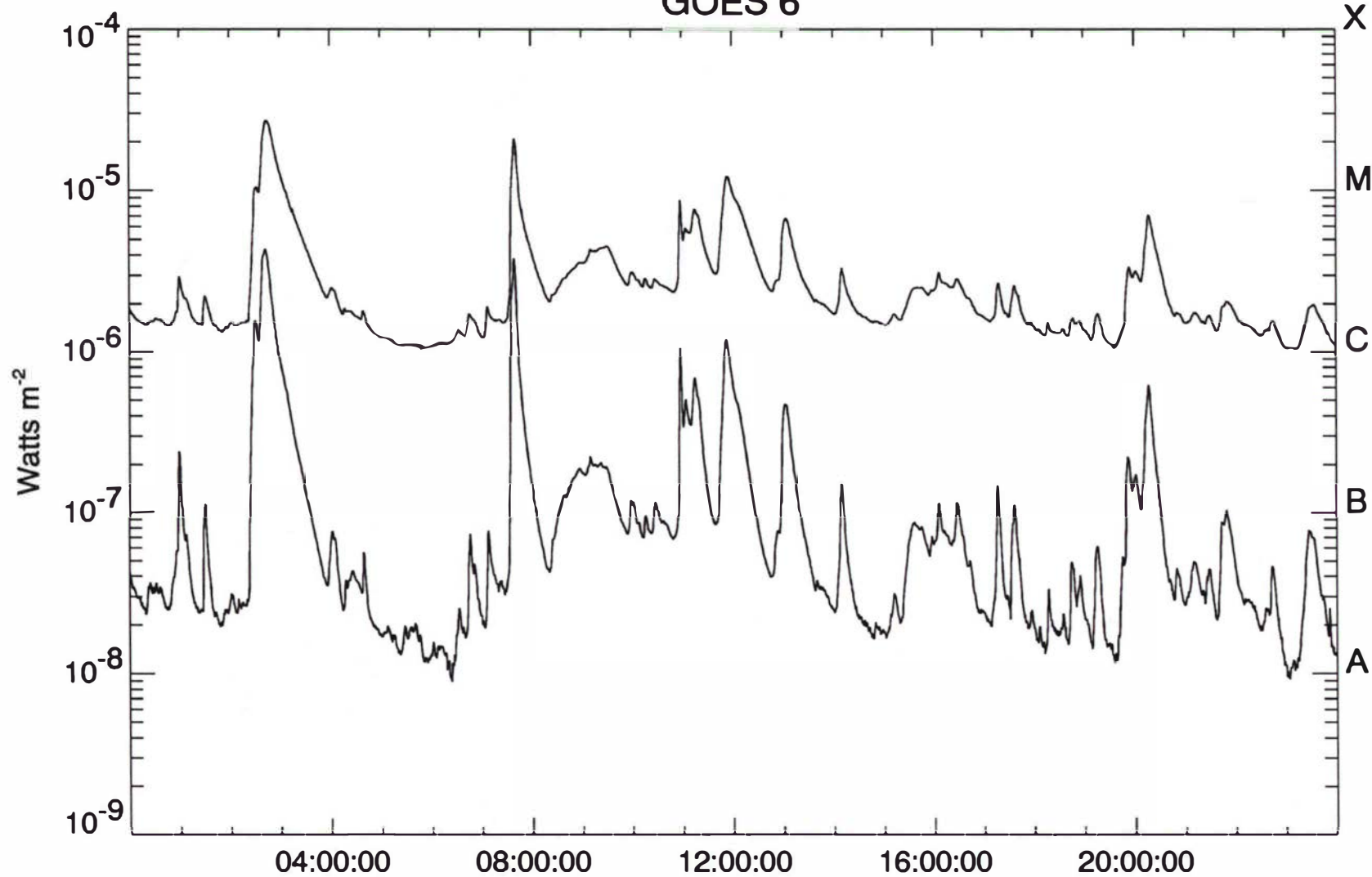


Current Time: 92/10/18, 1854 EDT
 A: Channel 1 Most Sunward LAD
 B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

GOES 6



Data Start: 91/12/05, 0000:02

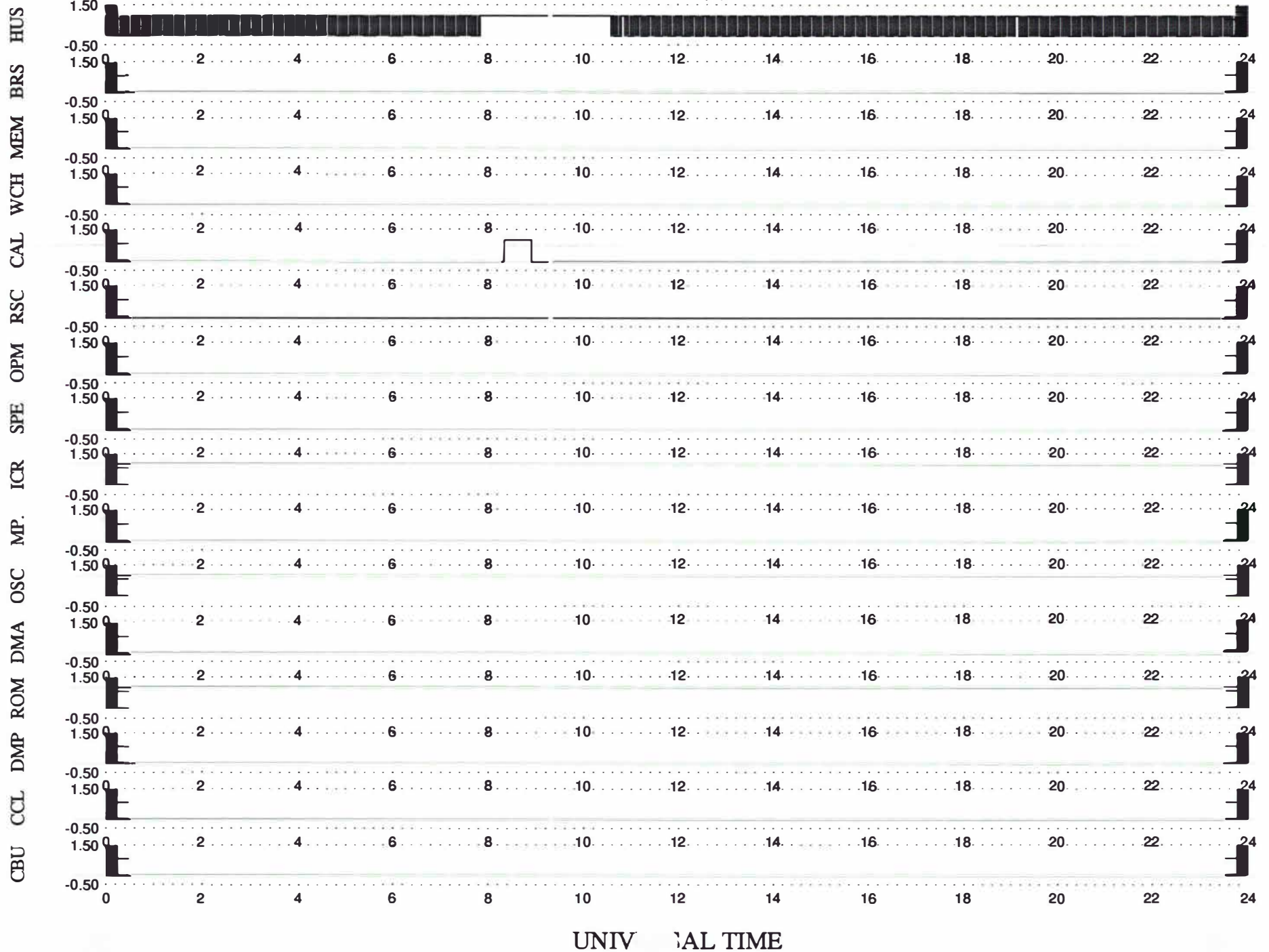
Plot created: 97/10/20, 1415

Channel

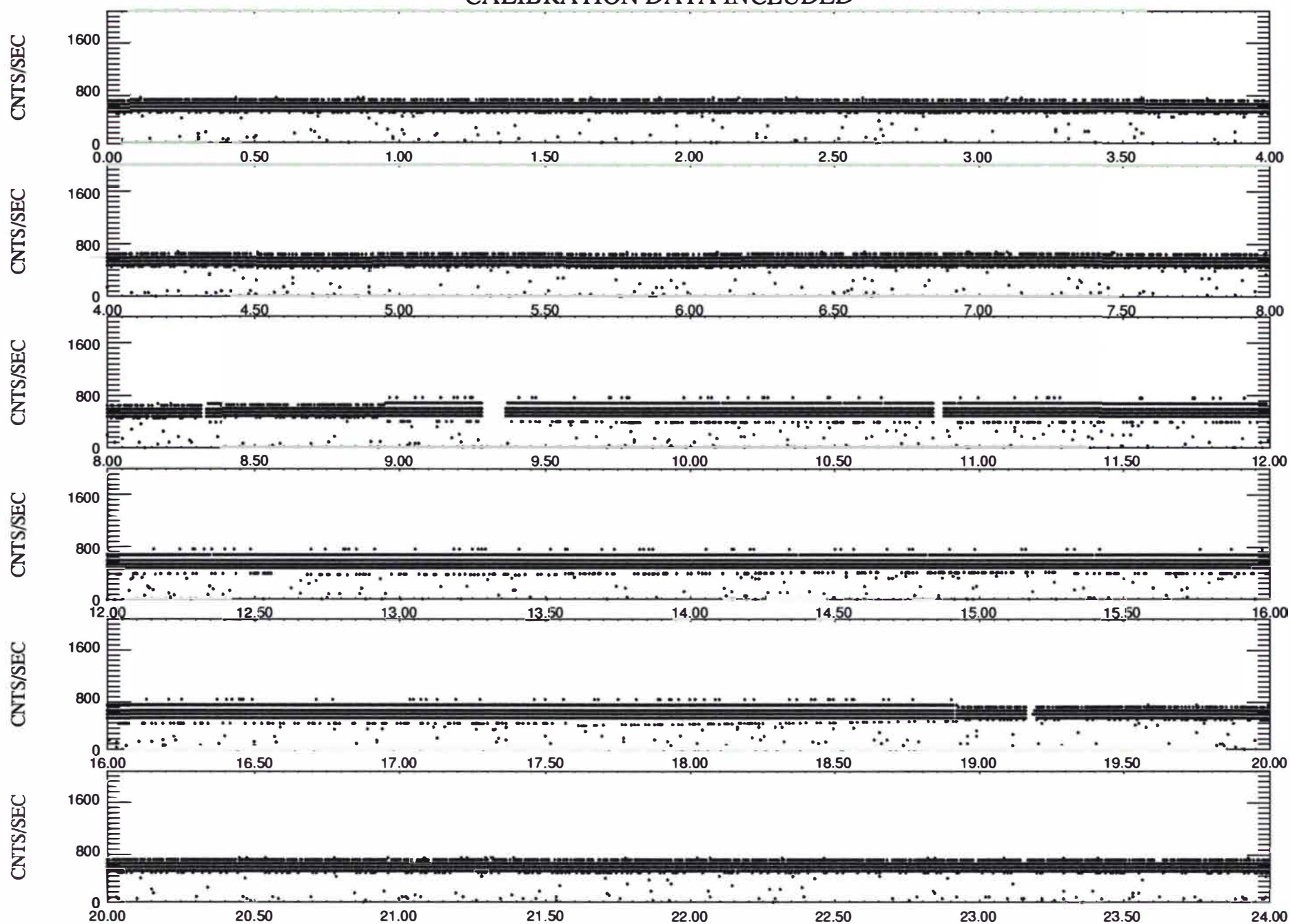
1 (1.0 - 8.0 Angstroms)
2 (0.5 - 4.0 Angstroms)

Background not subtracted
Background not subtracted
Sample average = 10

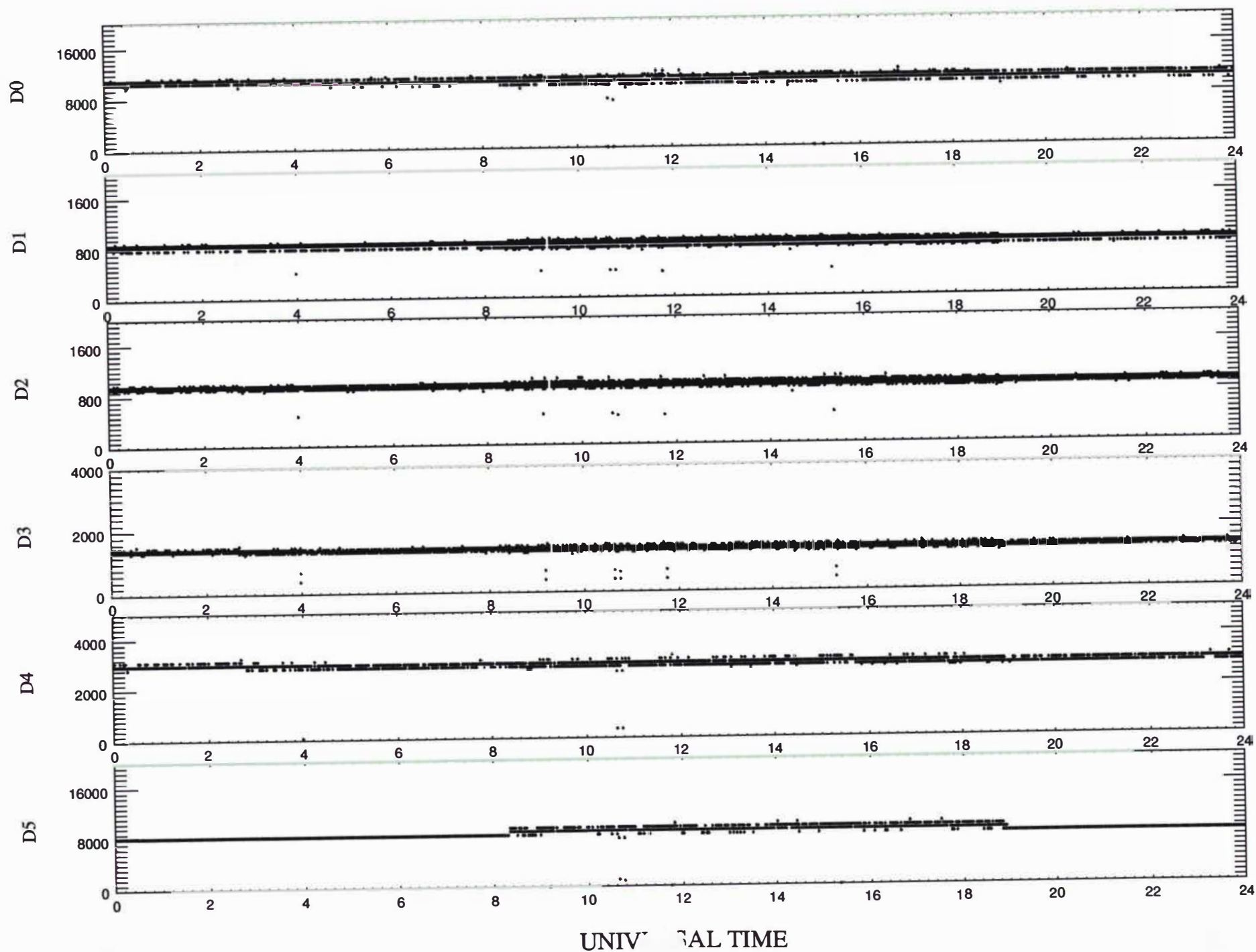
NO BURST (6)



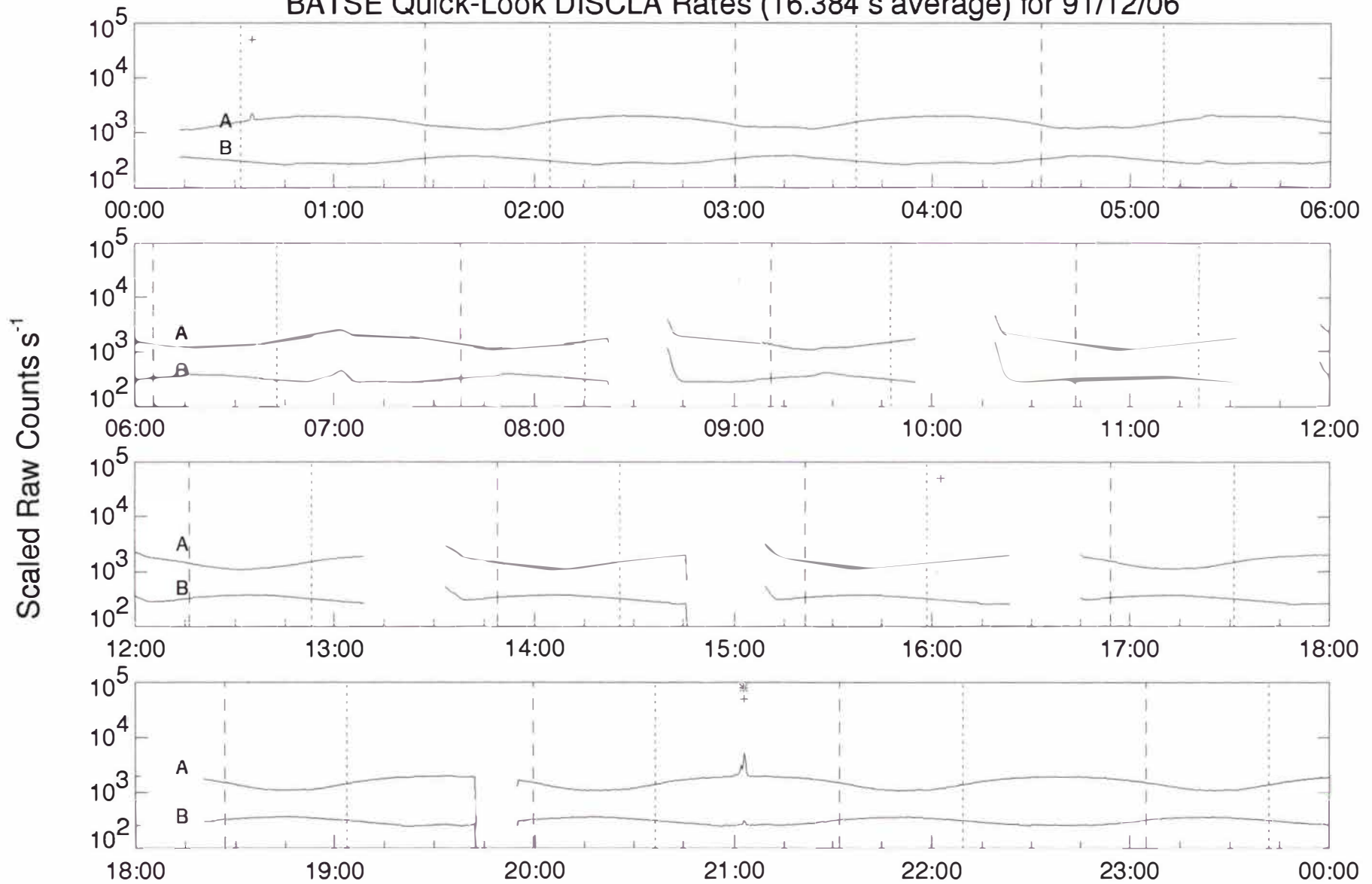
CALIBRATION DATA INCLUDED



UNIV. TIME



BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/06

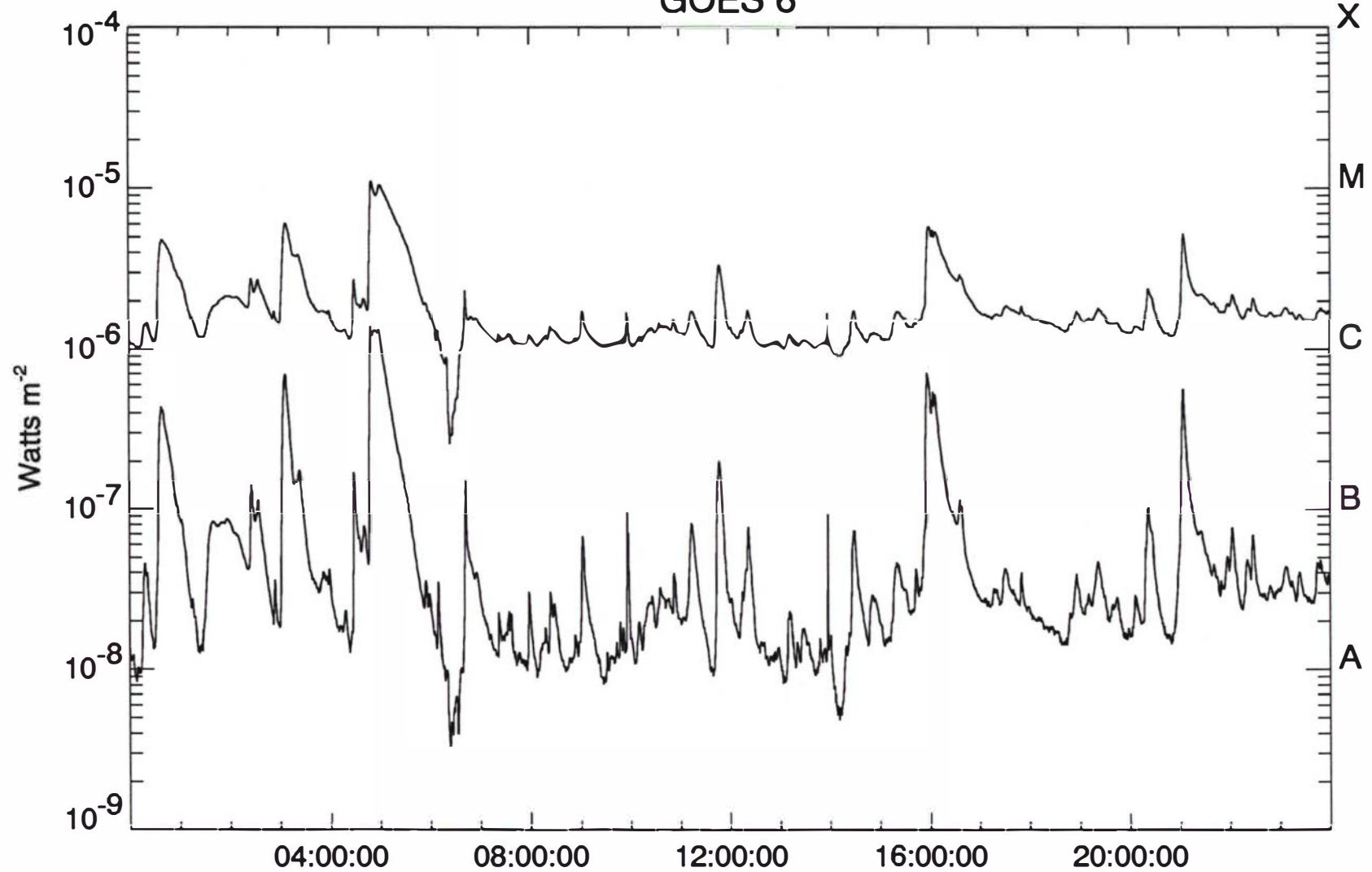


Current Time: 92/10/18, 1855 EDT
A: Channel 1 Most Sunward LAD
B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare

GOES 6



Data Start: 91/12/06, 0000:01

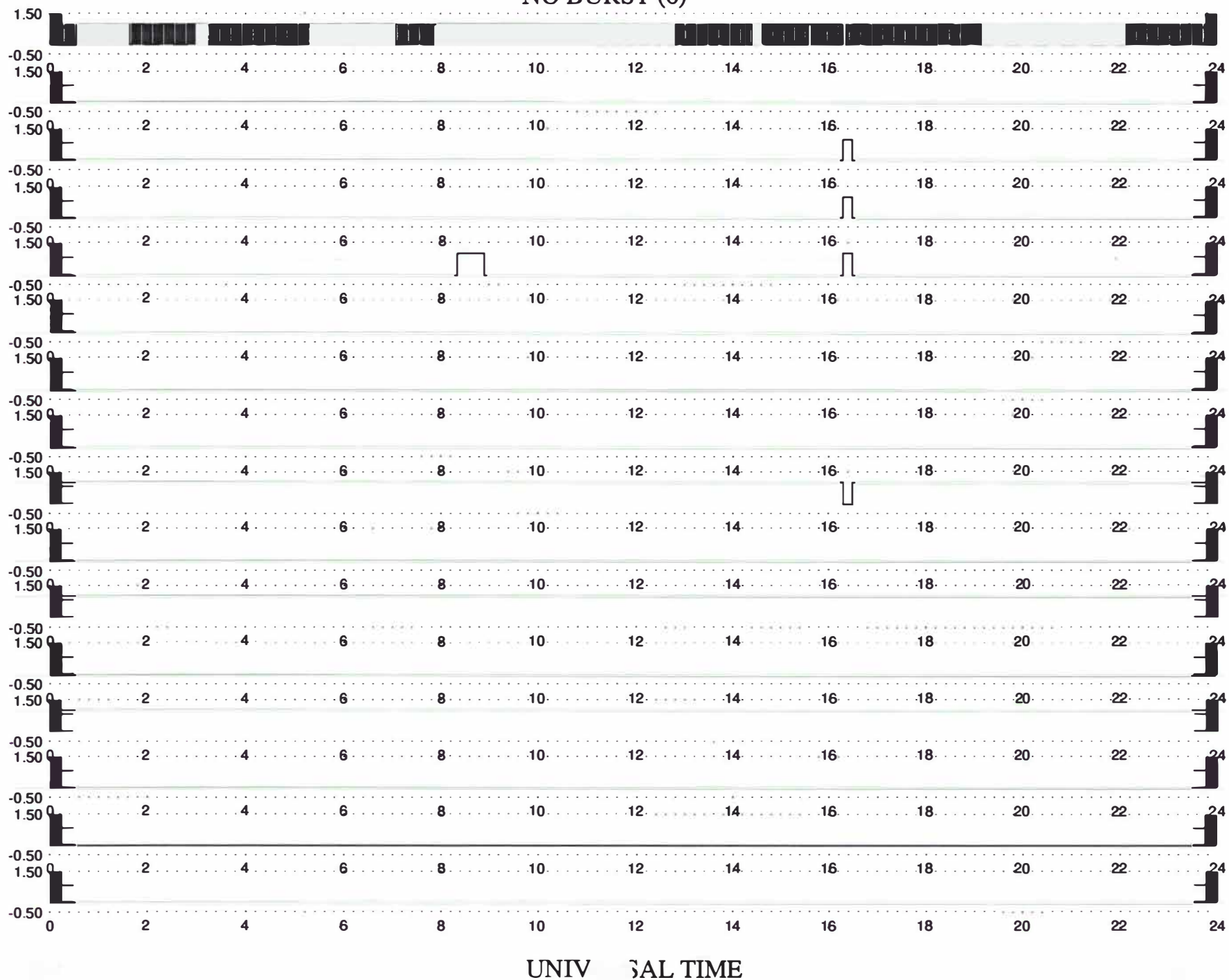
Plot created: 97/10/20, 1419

Channel

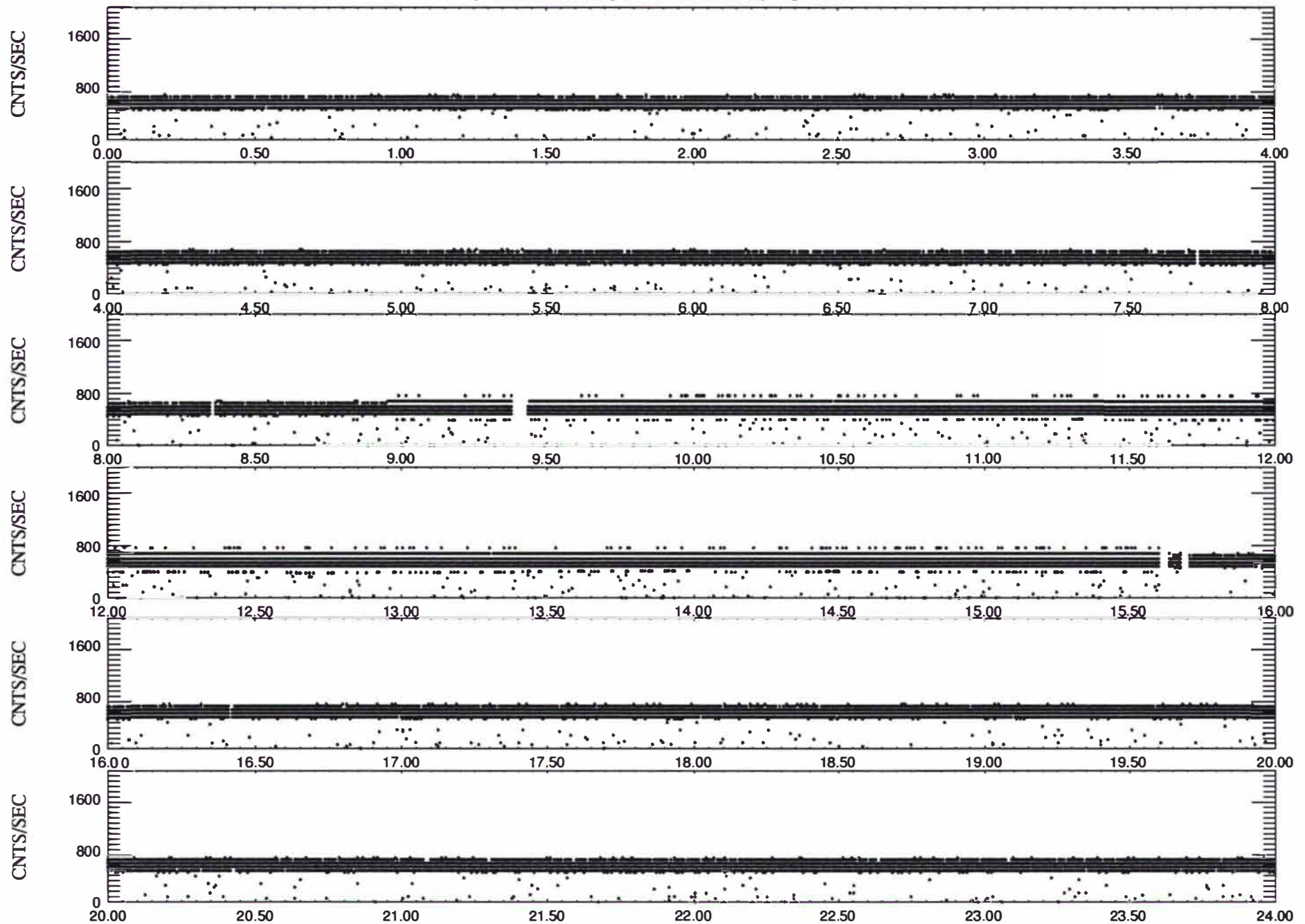
1 (1.0 - 8.0 Angstroms)
2 (0.5 - 4.0 Angstroms)

Background not subtracted
Background not subtracted
Sample average = 10

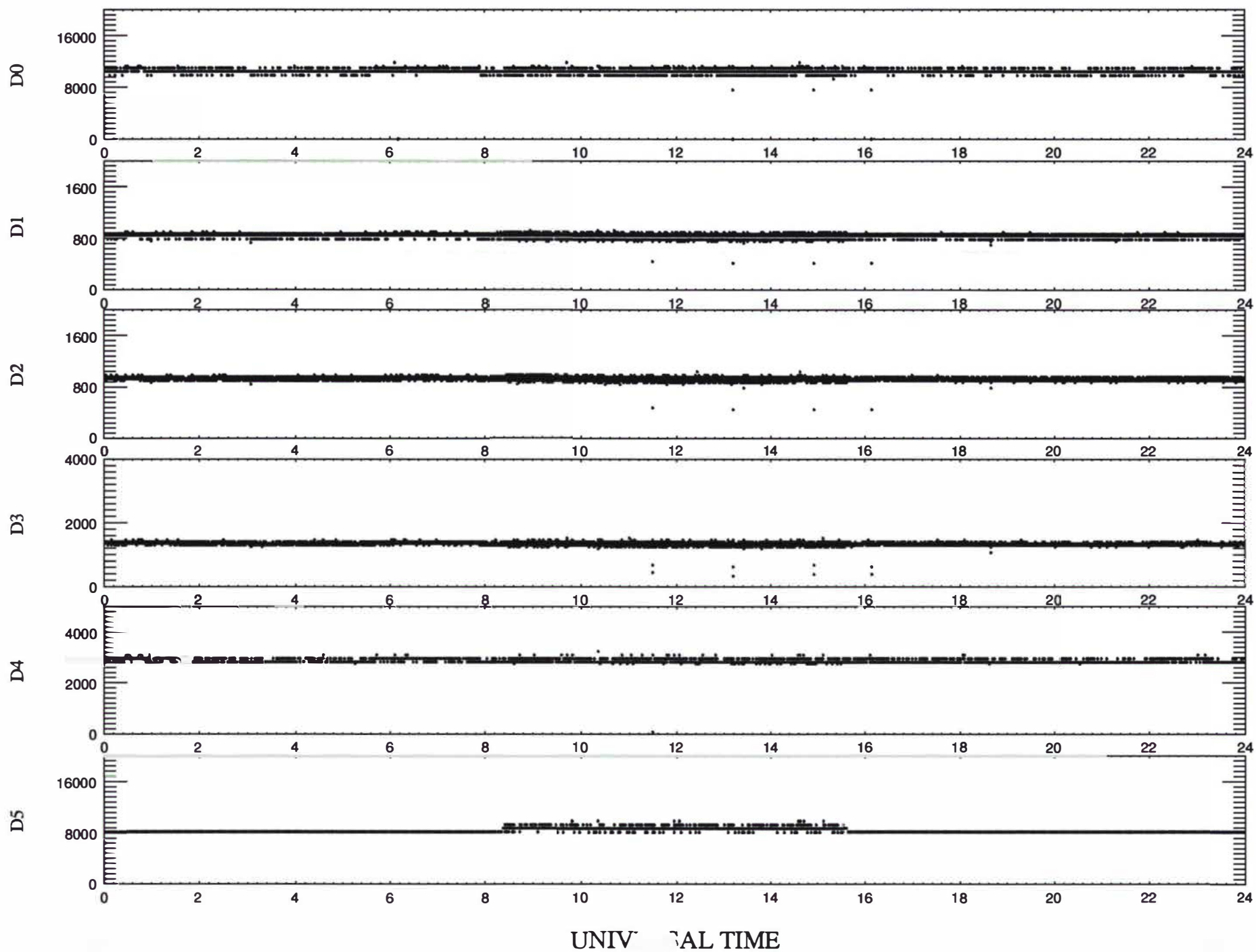
CBU CCL DMP ROM DMA OSC MP. ICR SPE OPM RSC CAL WCH MEM BRS HUS



CALIBRATION DATA INCLUDED



UNIV UNIV TIME



CATSEARCH PROGRAM

BATSE BURST # 1150
EVENT OF 1991 DEC 7 DAY OF YEAR=341
EVENT CROSSING TIME AT BATSE : 35445. S. OR 09:50:45.3
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 304.000 28.300
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 7/12/ 91 IS:
RA= 167.585 DEC= 6.686 DIST= 4.824 AU
BATSE-ULYSSES DISTANCE = 721698824. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 54.67 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 1392.02 SECS.
CROSSING TIME AT ULYSSES IS 36837. S. OR 10:13:57 +/- 412.13 SECONDS

Helio. corr. removed

Date: *Oct 28 '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? *190 s off!*
- ☒ 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? *No - poor stat.*

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)?
- ☐ 2(XX) coordinates used?
- ☐ Geocentric time used?

- ☒ ACCESS database updated?

From connauv@eagles.msfc.nasa.gov Wed Oct 29 08:35 PST 1997
Date: Wed, 29 Oct 1997 10:28:44 -0600
From: connauv@eagles.msfc.nasa.gov (Valerie Connaughton)
To: khurley@sunspot.ssl.berkeley.edu
Subject: Re: good news for BATSE 1150
^ VMS-To: SMTP%"khurley@sunspot.ssl.berkeley.edu"
X-VMS-Cc: BRIGGS, CONNAUV

RE: the source of this burst possibly being occulted during a Ulysses
trigger 350 seconds before the BATSE trigger.

This is not the case. Trigger time: 35445.
Previous occultation ended: 33699
Next occultation begins: 37224 seconds of day.

And we are not in SAA or any kind of gap. I had a look at the continuous
data around that time, and there is nothing obvious in even the softest
channel.

vc

N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

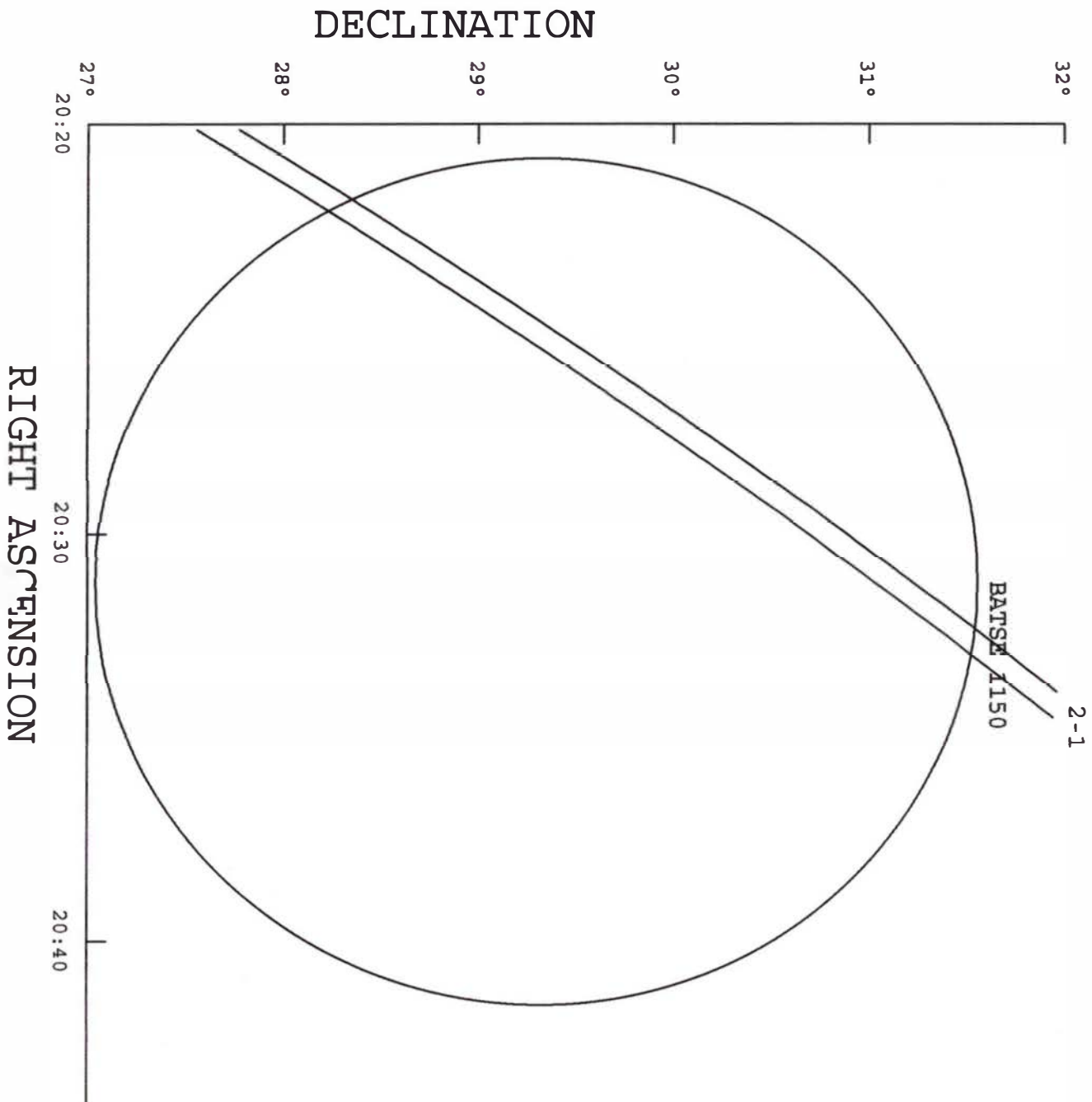
G=GALACTIC EQUATOR

1 ULYSSES

2 BATSE

EVENT OF DEC 7, 1991 10:13

28/10/97



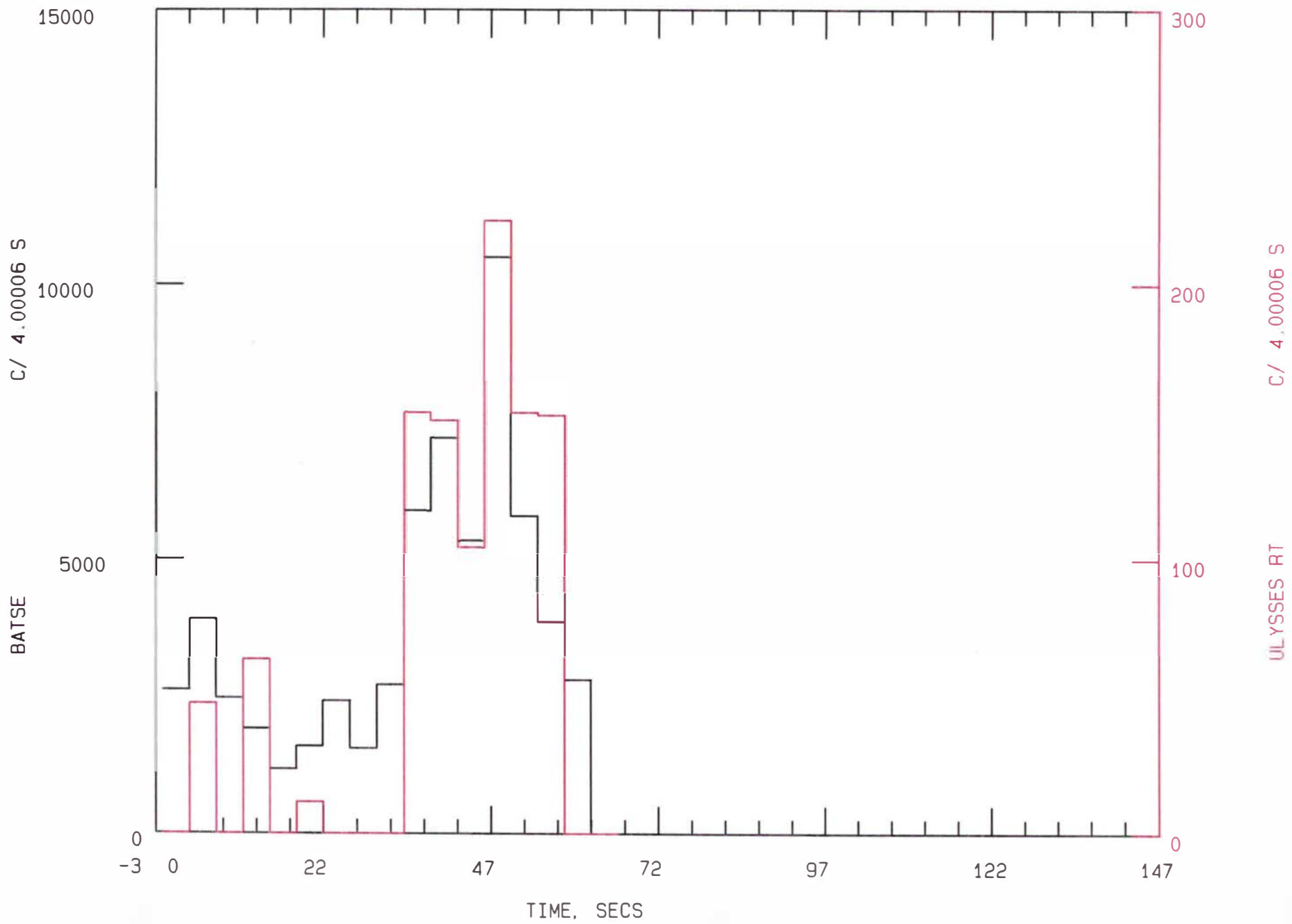
BATSE

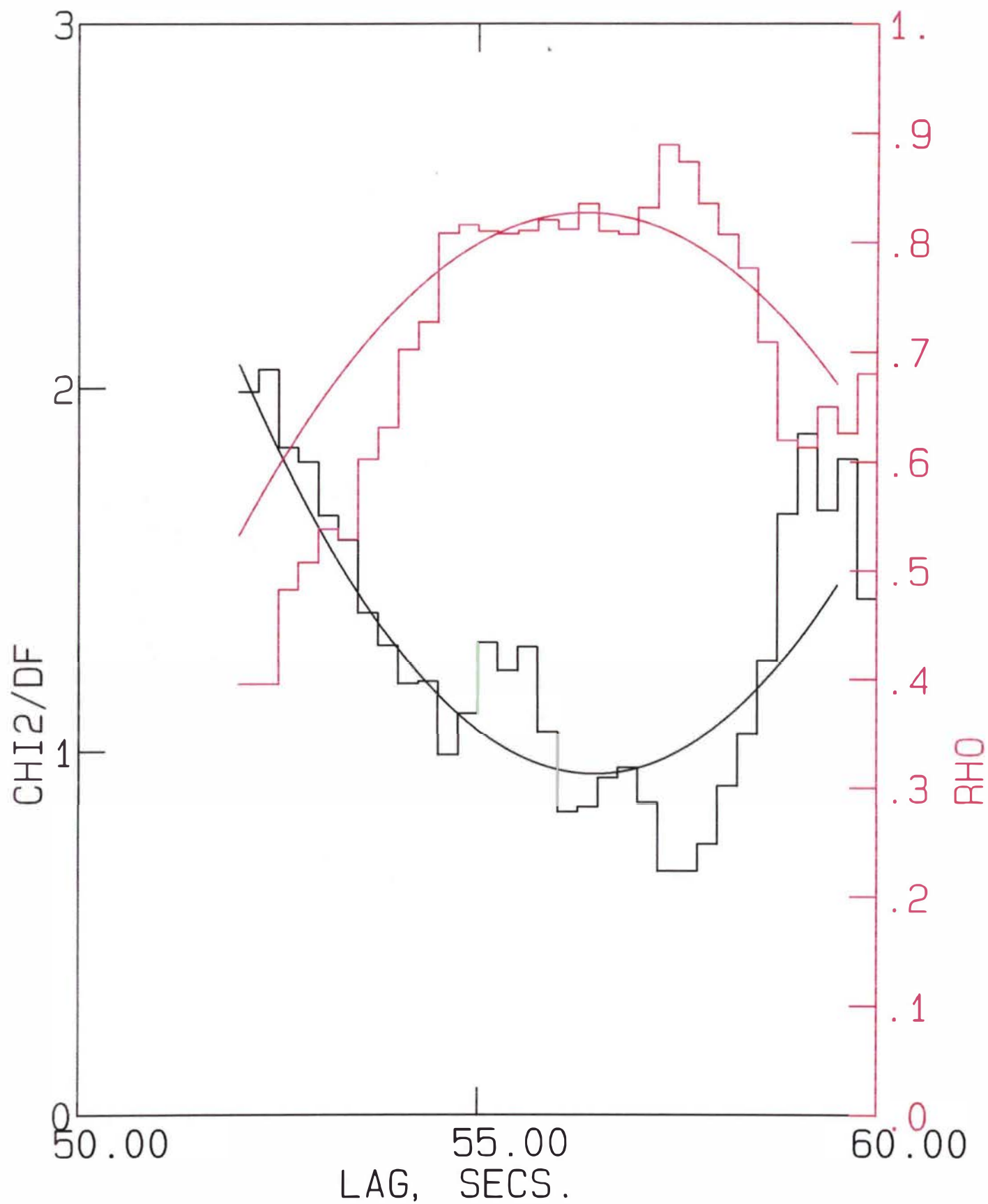
-ULYSSES RT CORRELATION

7/12/91

35445.355

28/10/97





ULYSSES RT

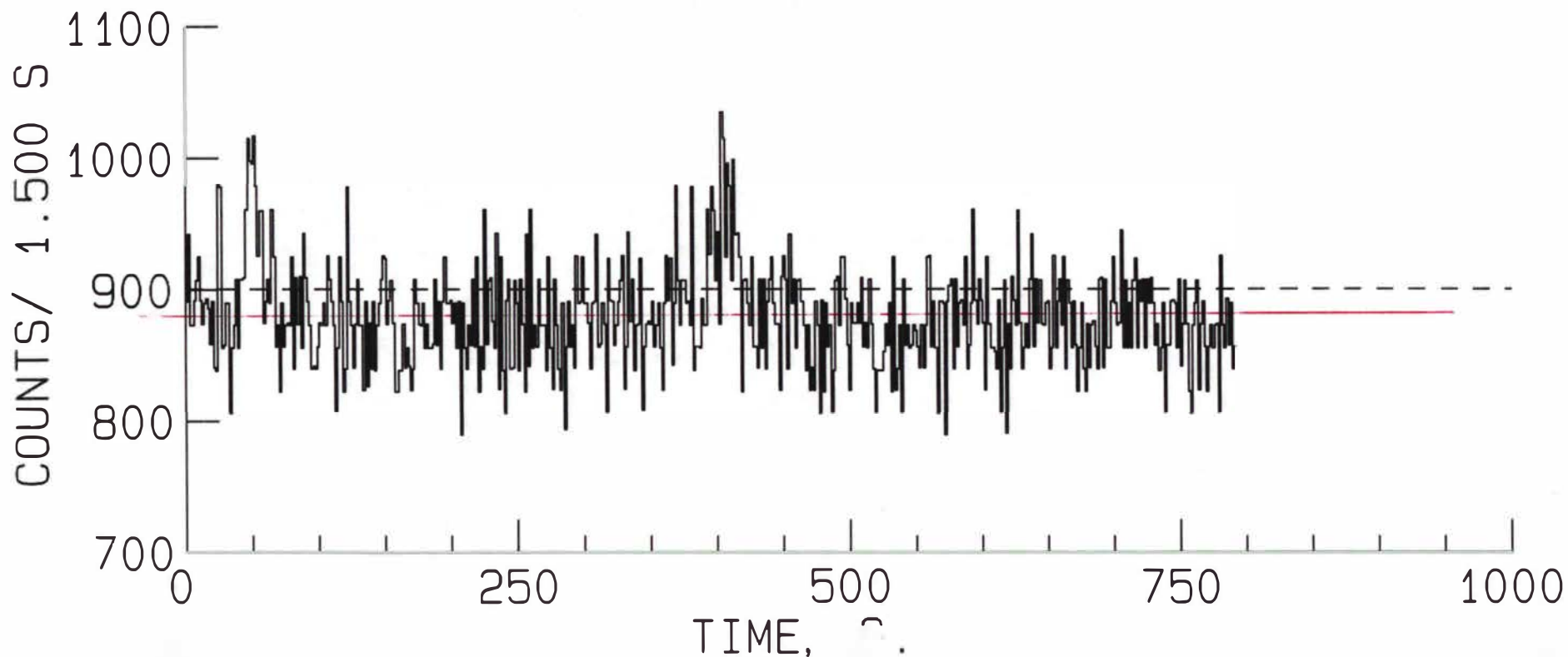
28/10/97

7/12/91 36504.009 s

0.250 S INTERVALS REGROUPED BY 6

18- 162 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



1st peak in U time history

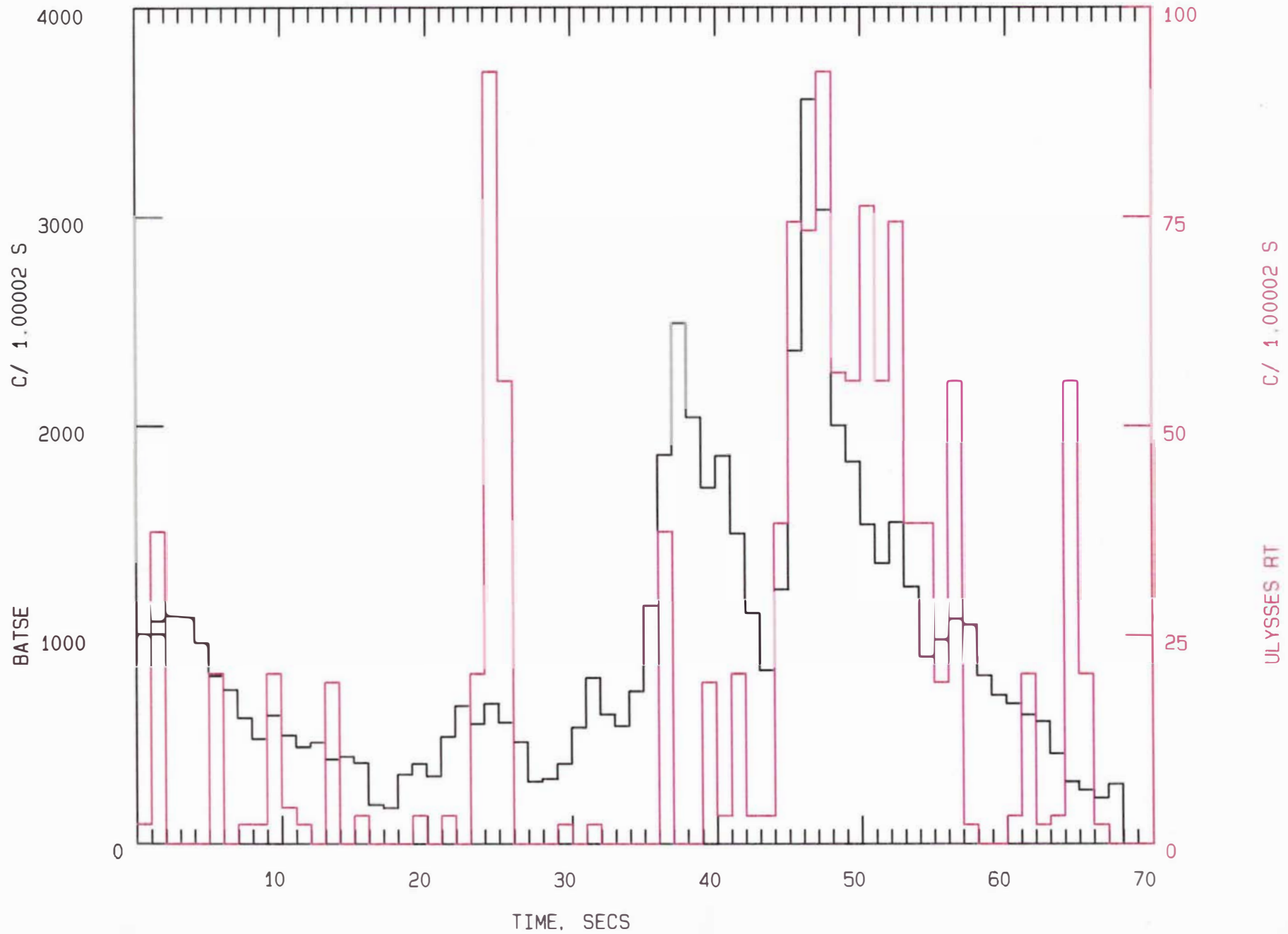
BATSE

-ULYSSES RT CORRELATION

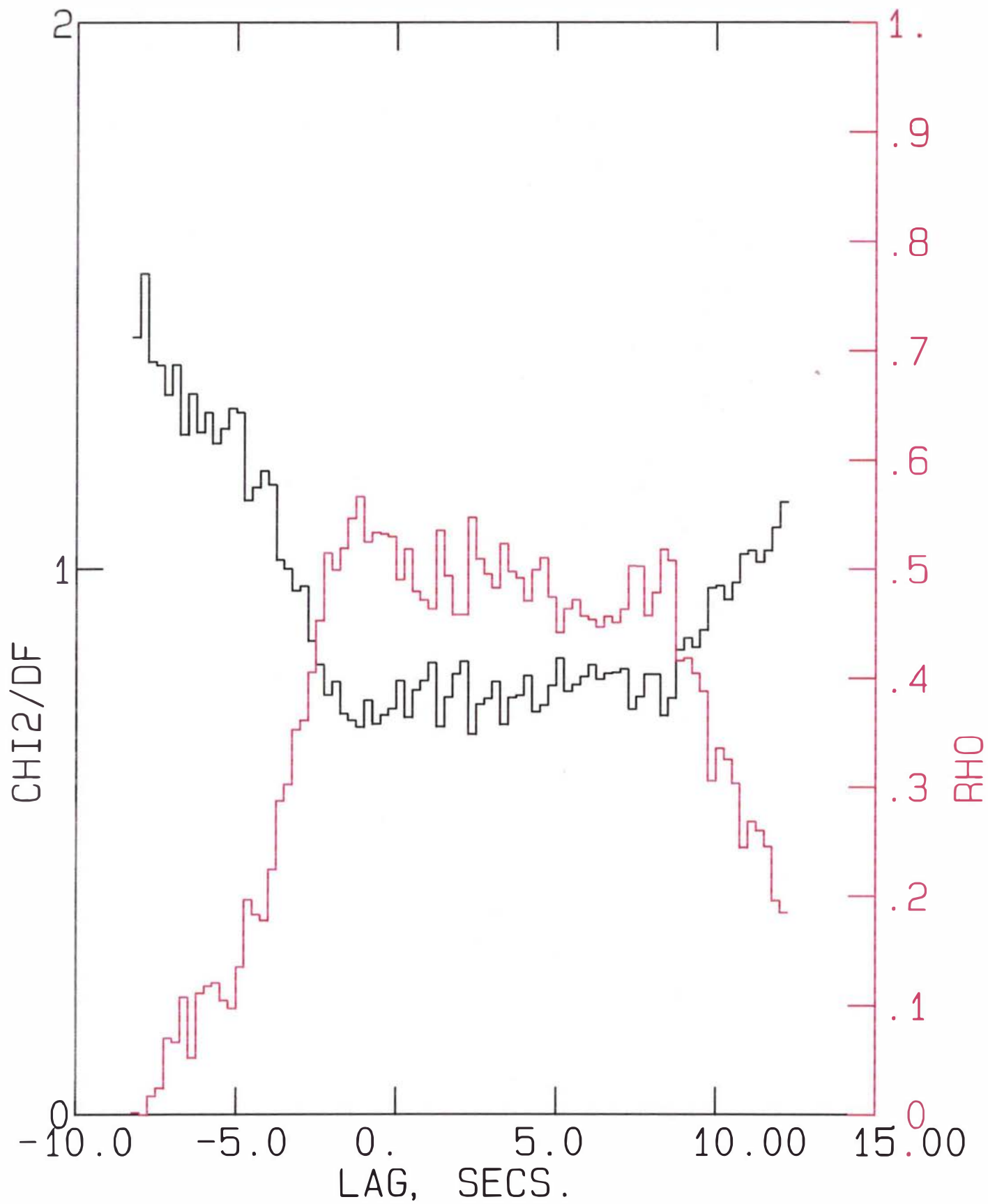
7/12/91

35445.355

28/10/97



1st peak in U time history



Facsimile Cover Sheet

To: JOHN LAROS
Company: LOS ALAMOS NATL. LAB.
Phone:
Fax: 505 665 4414

From: KEVIN HURLEY
Company: UC BERKELEY
Phone:
Fax:

Date: April 15, 1992

**Pages including this
cover page:** 1

Comments: Here are the dates and times of some Ulysses/BATSE bursts which you might have as real-time events on PVO. Times are Venus crossing, and are fairly accurate (to a few hundred seconds) since they were computed using the BATSE arrival directions.

Dec 7, 1991 35559 secs
Dec 27, 1991 03893 secs
Jan 10, 1992 34277 secs

} No R/T data for any of these
JL 4/20

NASA
TELEFAX**BATSE**MARSHALL SPACE FLIGHT CENTER
HUNTSVILLE, ALABAMA 35812
SPACE SCIENCE LABORATORY

From:

Name: C. Kouveliotou Mail Code: _____Phone: _____ FAX No.: 205-544-5800
or - 7754DATE 04/9/92

This is page 1 of _____ pages

To:

Name: K. Hurley FAX No: 510-643-7629

Address: _____

Kevin, please do not send any digital
file data for the March 11, event.

5-3527-9-127

The 8 detector plot does not show
a second event, solar or cosmic. It encompasses
2000s around the trigger!

DATA TYPE: DISCLA

TIME RES:

2.048

CHANNEL NUMBER: 1

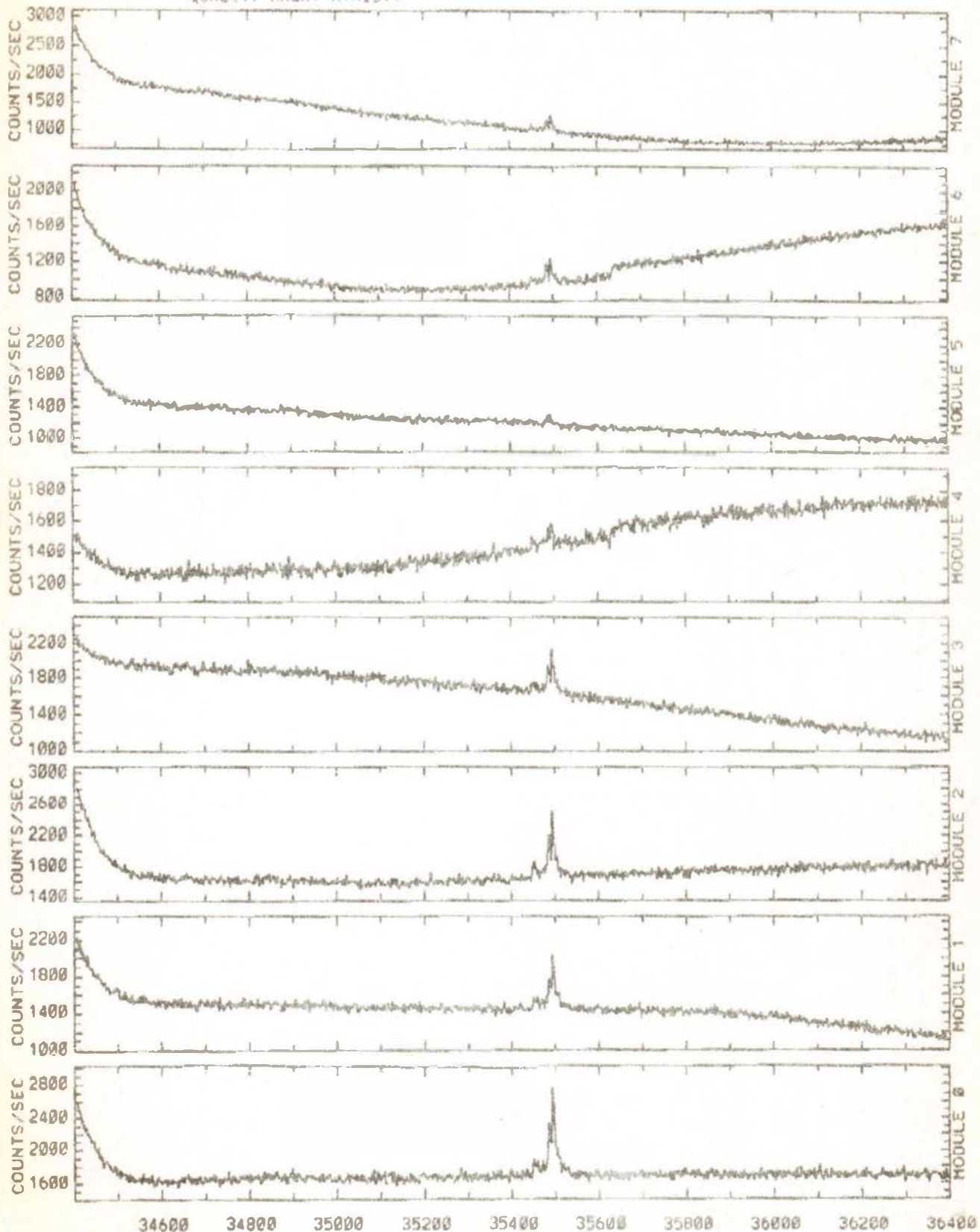
DATA START TIME: 8597/ 34404.9054

DATA STOP TIME: 8597/ 36395.6214

QUALITY MASK: RTHIST1

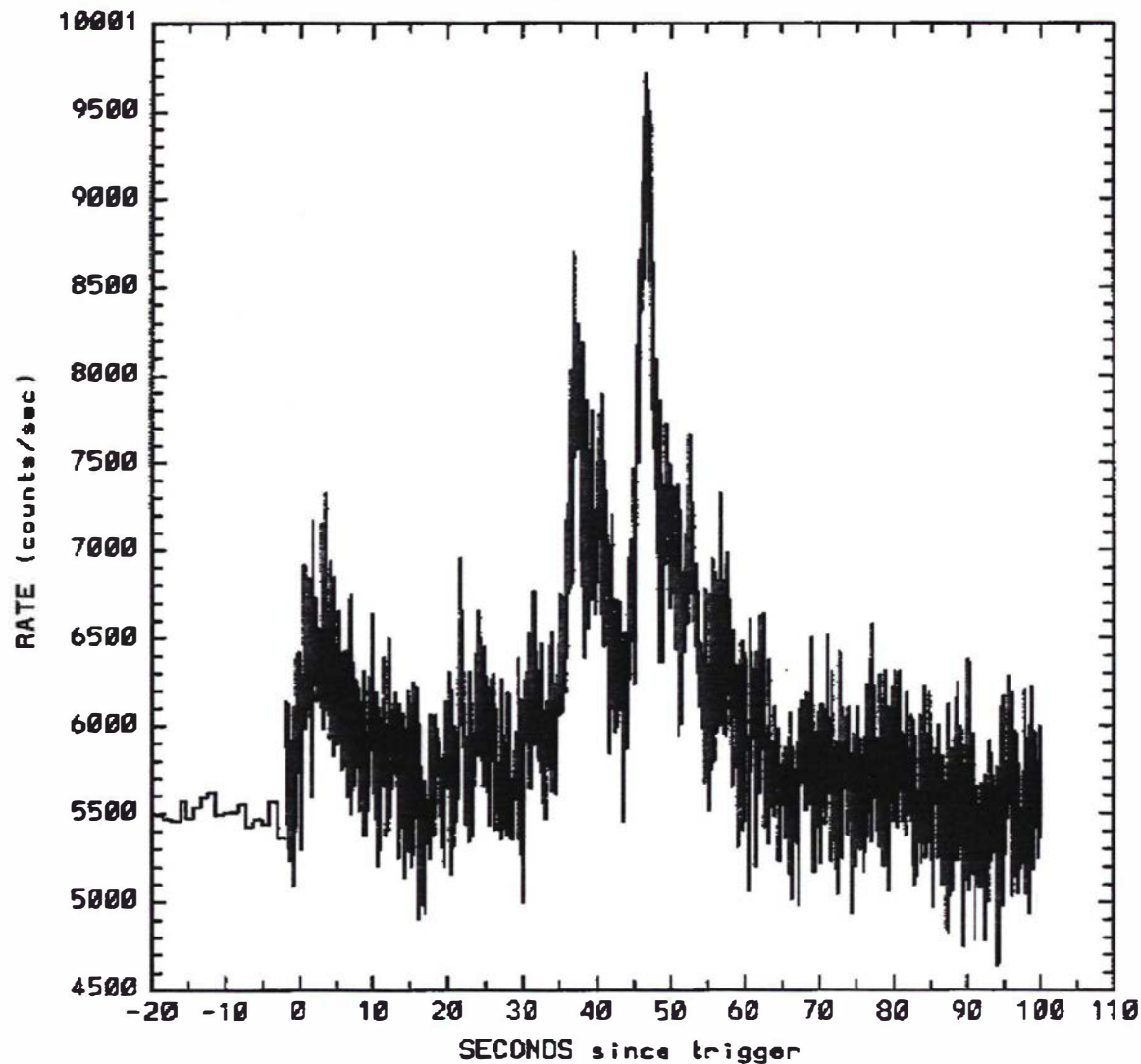
CREATION DATE: 8-DEC-1991 11:41:07.78

PROGRAM CODE: RH VERSION: 2.04



Trigger 1150, IJD 8597

Data for K Hurley



Dec 7 '91 Got file
17-MAY-1992 16:56:52 +zphem

Created by MOPS 80
(Burst Display)
Version 2.11

Trigger # . 1150

Trigger Time:
8597 / 35447.397 - 2.042

Burst Data Type:
DISCSC

Deadtime
Corrected: N

Background Data
Type: PREB + DISCLA

Minimum Integ. Time:
0.064 seconds

Detectors [7..0]:
00002110

Discriminators:
(1, 2)

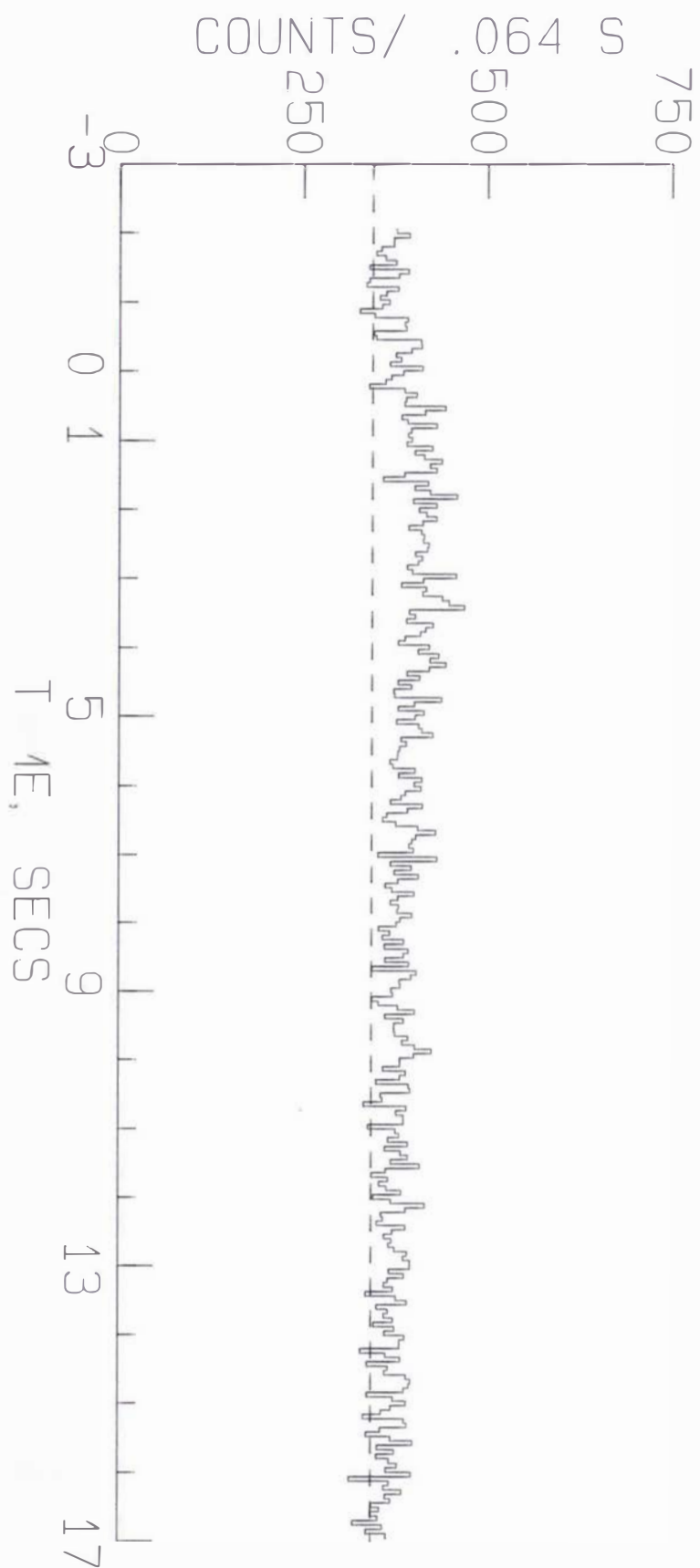
Quality Mask:
BDISP0

BATSE

07/12/91

35447.397 - 2.042

25- 100 keV



BATSE

07/12/91

35447.397

25- 100 keV

COUNTS/ .064 S

750
500
250
0

17

21

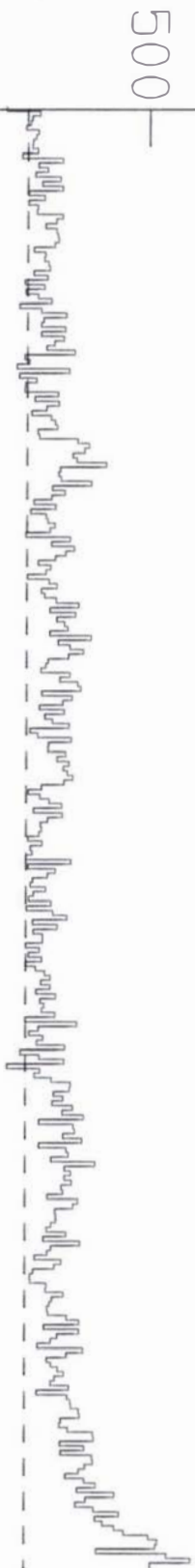
25

29

33

37

T
4E, SECS



BATSE

07/12/91

35447.397

25- 100 keV

COUNTS/ .064 S

750
500
250

37

41

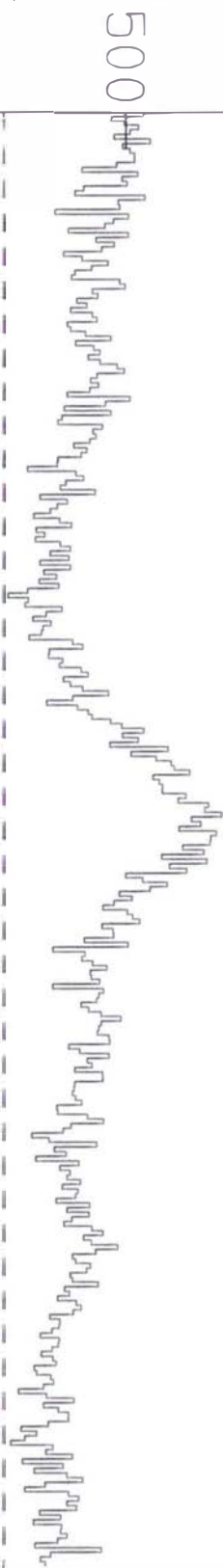
45

49

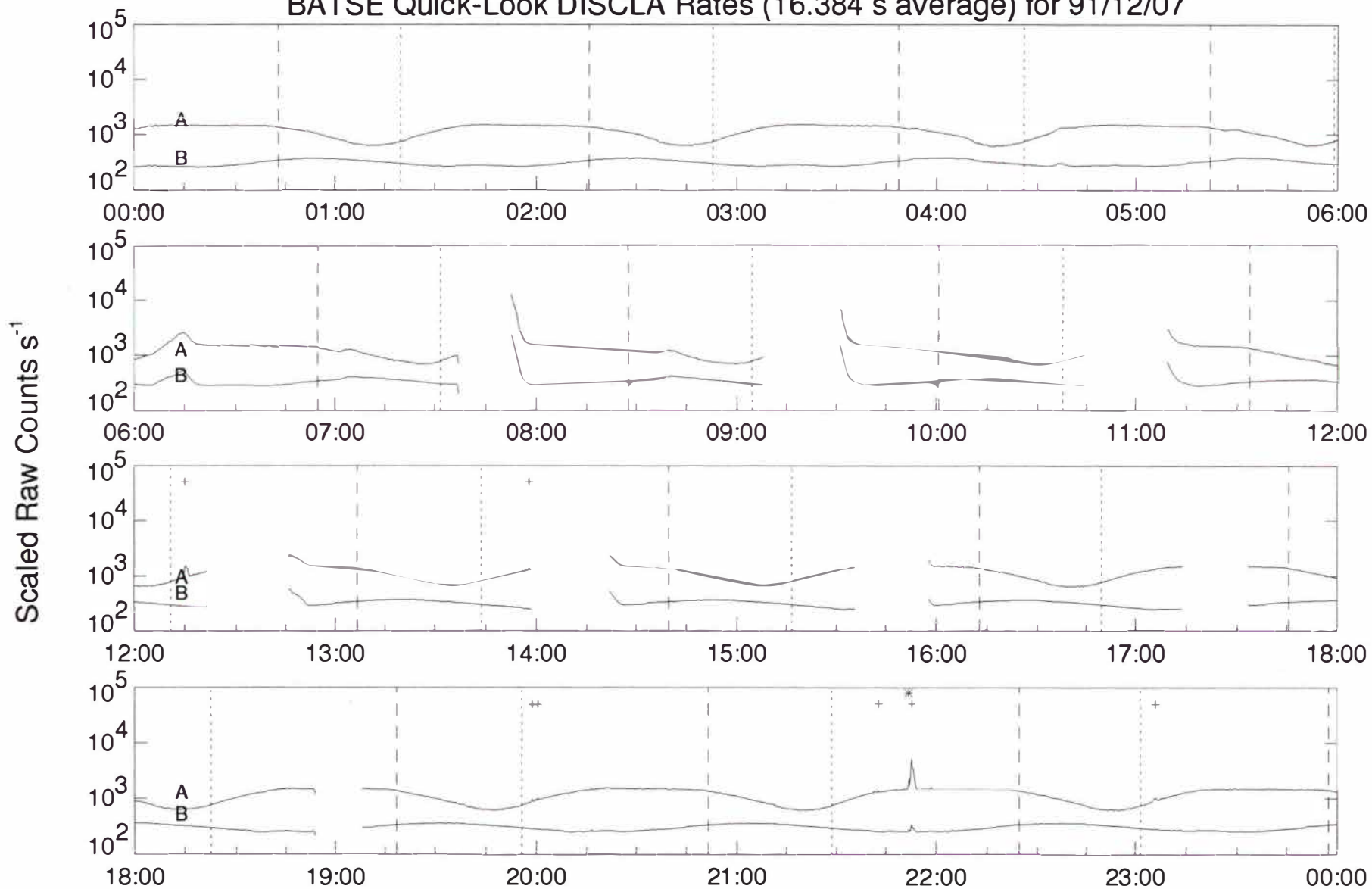
53

57

T
4E, SECS



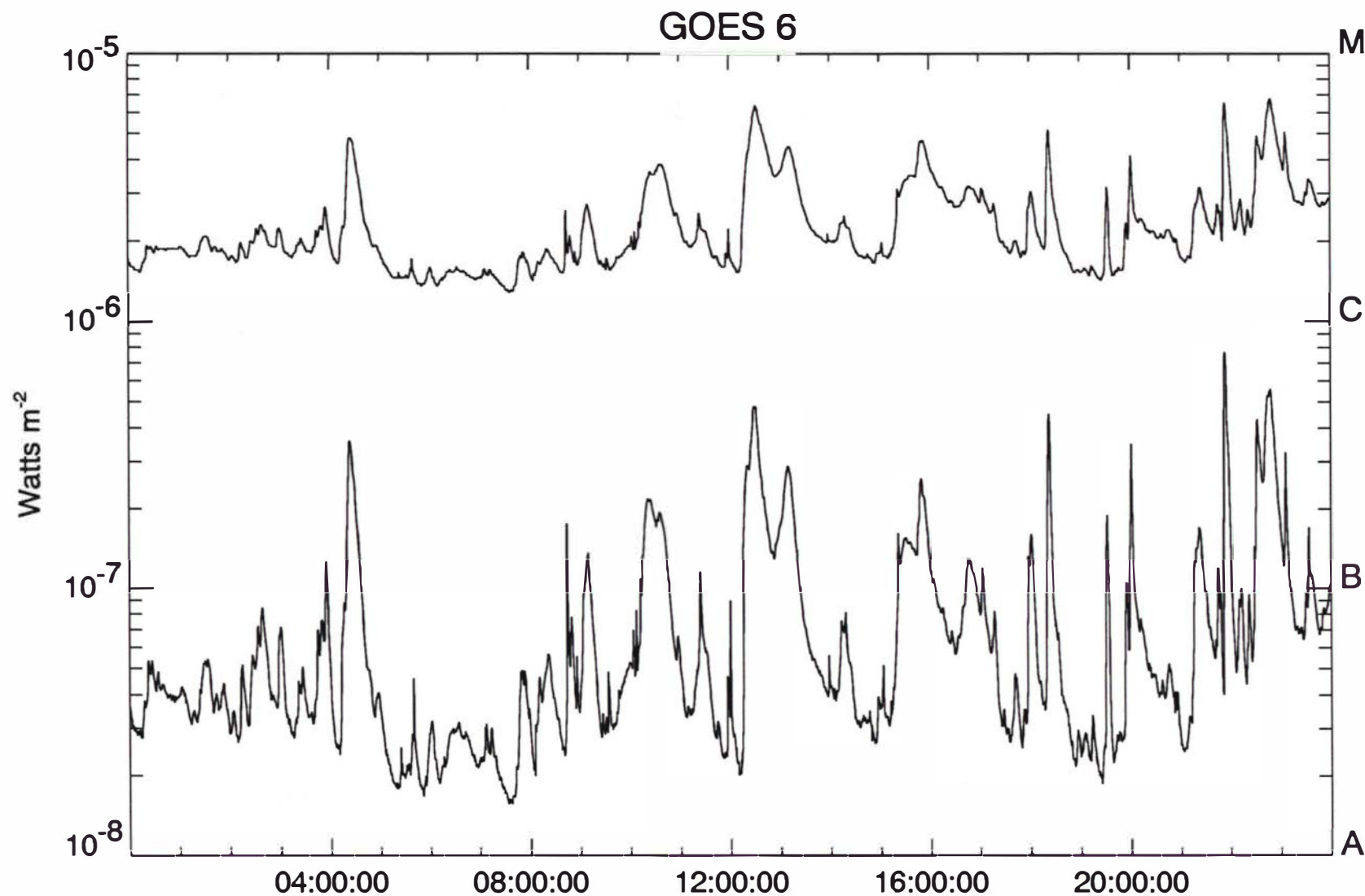
BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/07



Current Time: 92/10/18, 1857 EDT
 A: Channel 1 Most Sunward LAD
 B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare



Data Start: 91/12/07, 0000:02

Plot created: 97/10/20, 1424

Channel

1 (1.0 - 8.0 Angstroms)

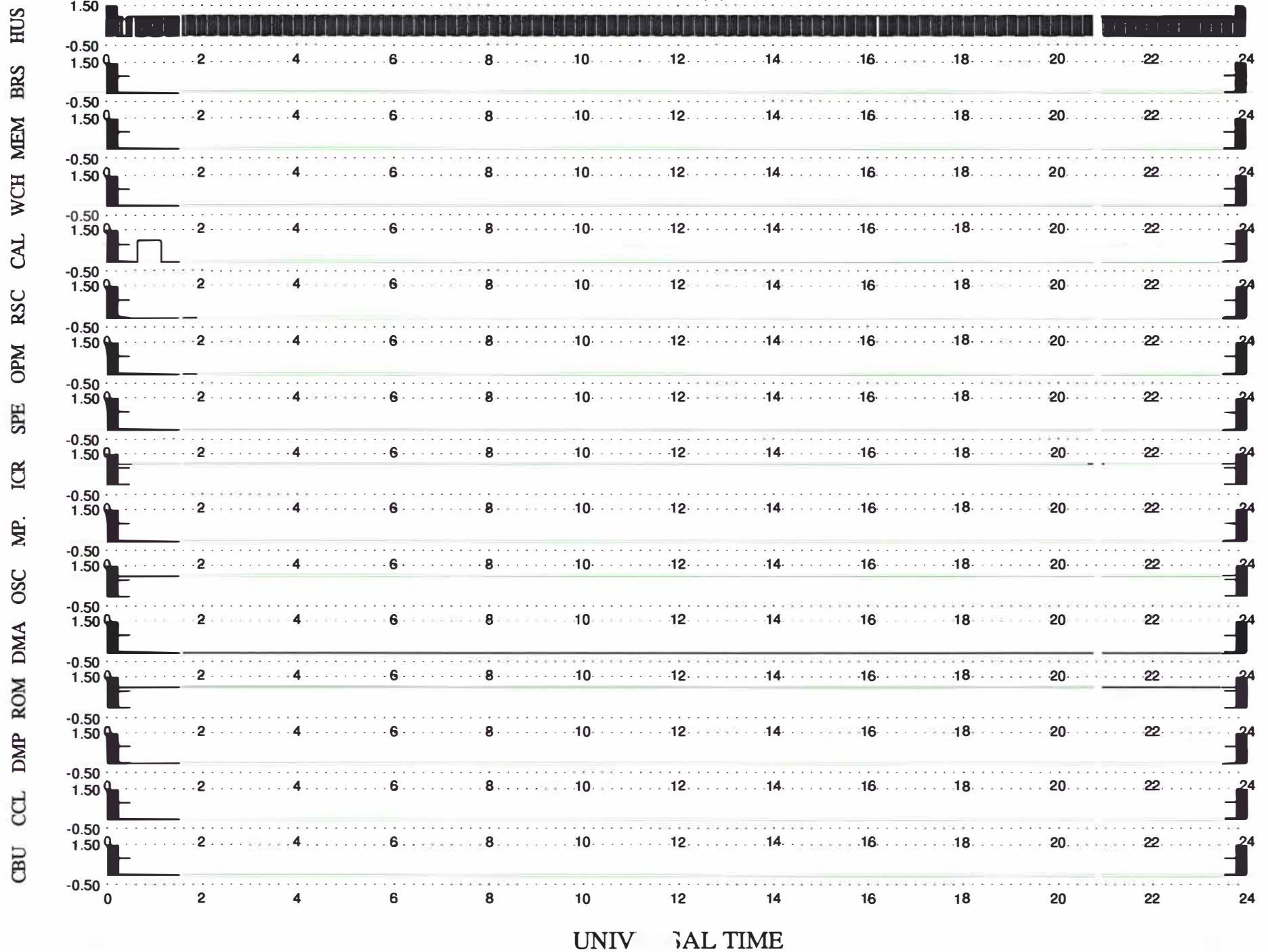
Background not subtracted

2 (0.5 - 4.0 Angstroms)

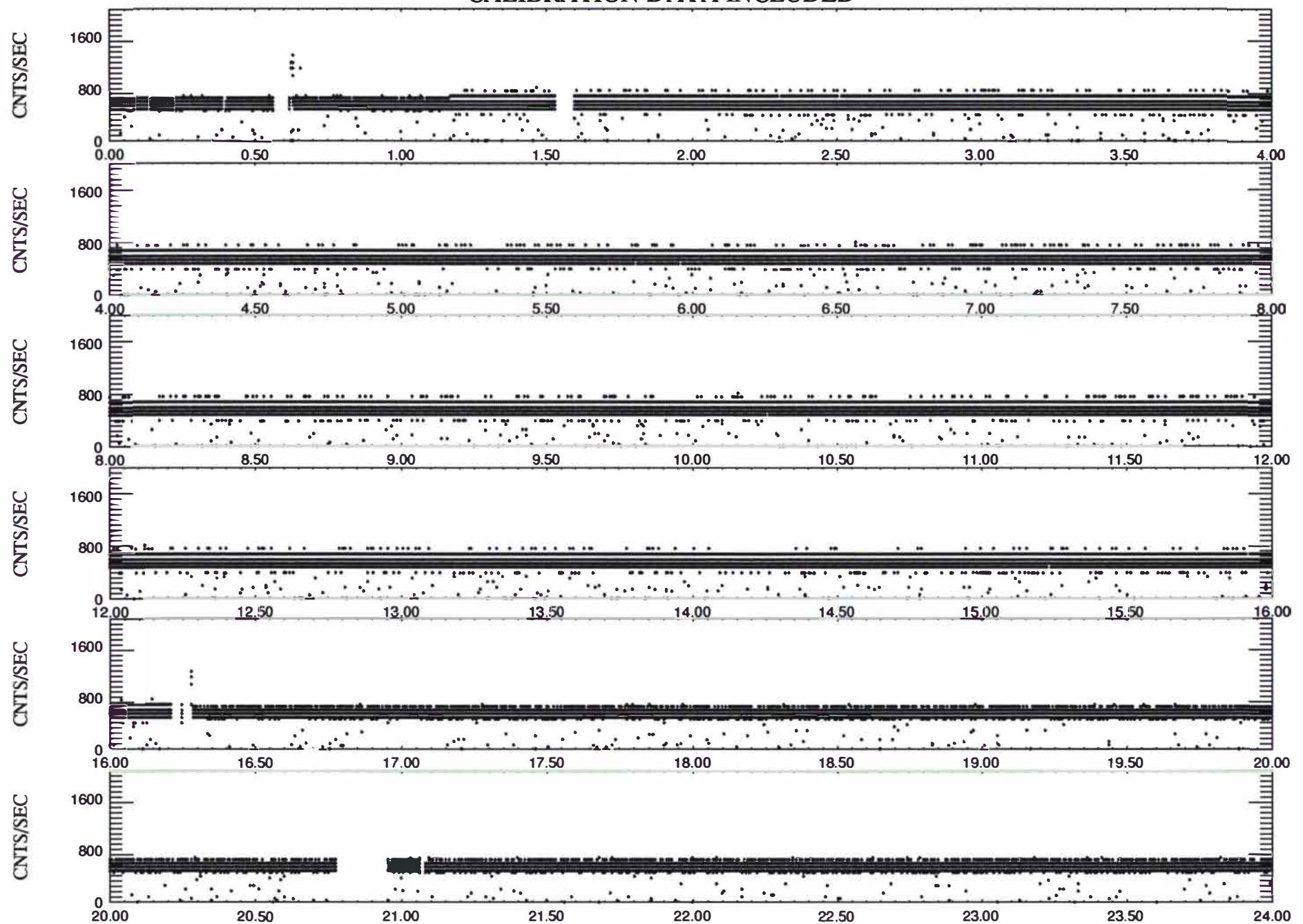
Background not subtracted

Sample average = 10

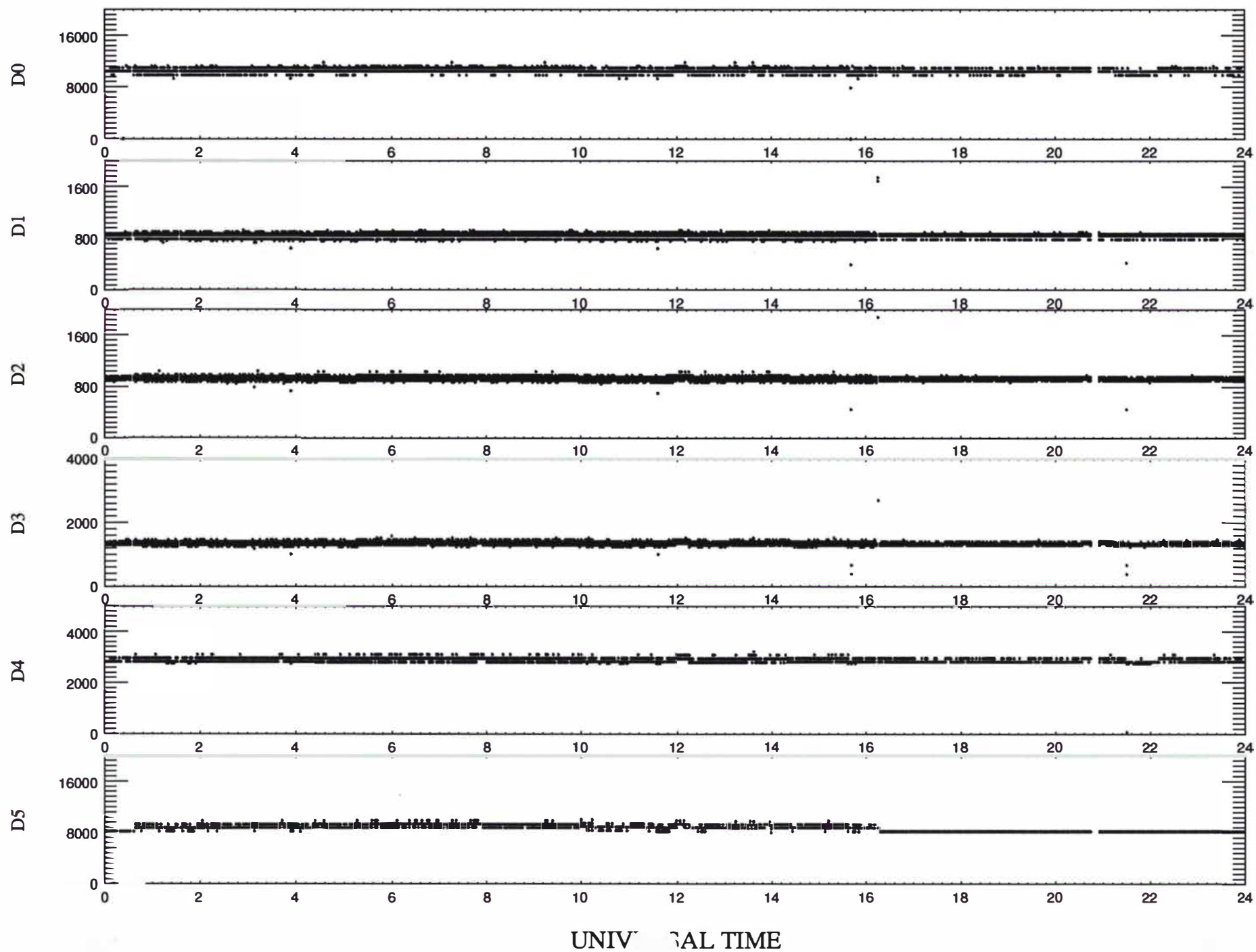
NO BURST (6)



CALIBRATION DATA INCLUDED



UNIV CAL TIME



CATSEARCH PROGRAM

BATSE BURST # 1152
EVENT OF 1991 DEC 8 DAY OF YEAR=342
EVENT CROSSING TIME AT BATSE : 346. S. OR 00:05:45.7
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 112.680 -21.140
BATSE PEAK COUNTING RATE: 0000 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 8/12/ 91 IS:
RA= 167.624 DEC= 6.673 DIST= 4.816 AU
BATSE-ULYSSES DISTANCE = 720419744. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=119.35 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-1177.94 SECS.
CROSSING TIME AT ULYSSES IS 85568. S. OR 23:46:07.7 +/- 395.76 SECONDS

File

14 / 11 / 95

ULYSSES RT

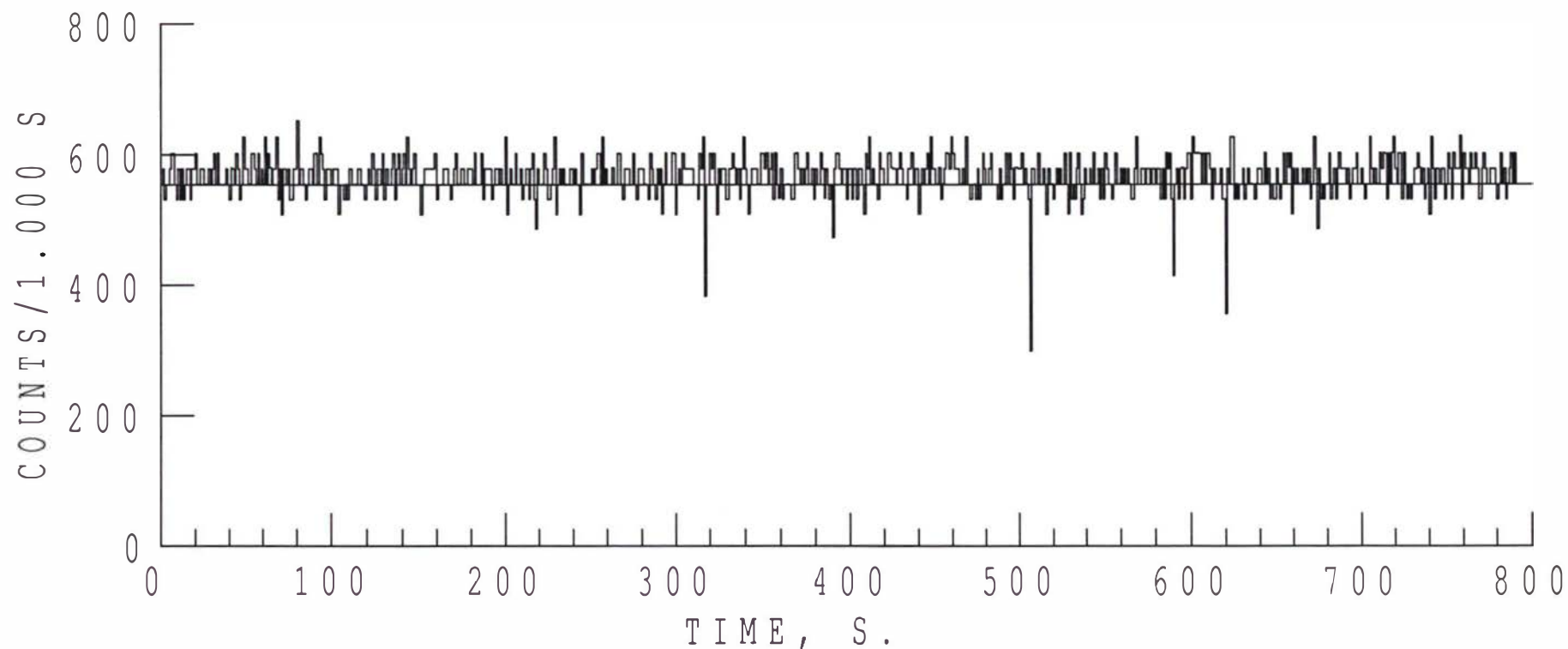
7/12/91 85176.133 s

0.500 S INTERVALS REGROUPED BY 2

0 - 0 keV

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS



CATSEARCH PROGRAM

BATSE BURST # 1153
EVENT OF 1991 DEC 8 DAY OF YEAR=342
EVENT CROSSING TIME AT BATSE : 75902. S. OR 21:05:01.5
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 29.900 -45.800
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 8/12/ 91 IS:
RA= 167.624 DEC= 6.673 DIST= 4.816 AU
BATSE-ULYSSES DISTANCE = 720419744. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 53.44 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 1431.40 SECS.
CROSSING TIME AT ULYSSES IS 77333. S. OR 21:28:52 +/- 406.86 SECONDS

No

14 / 4 / 93

ULYSSES RT

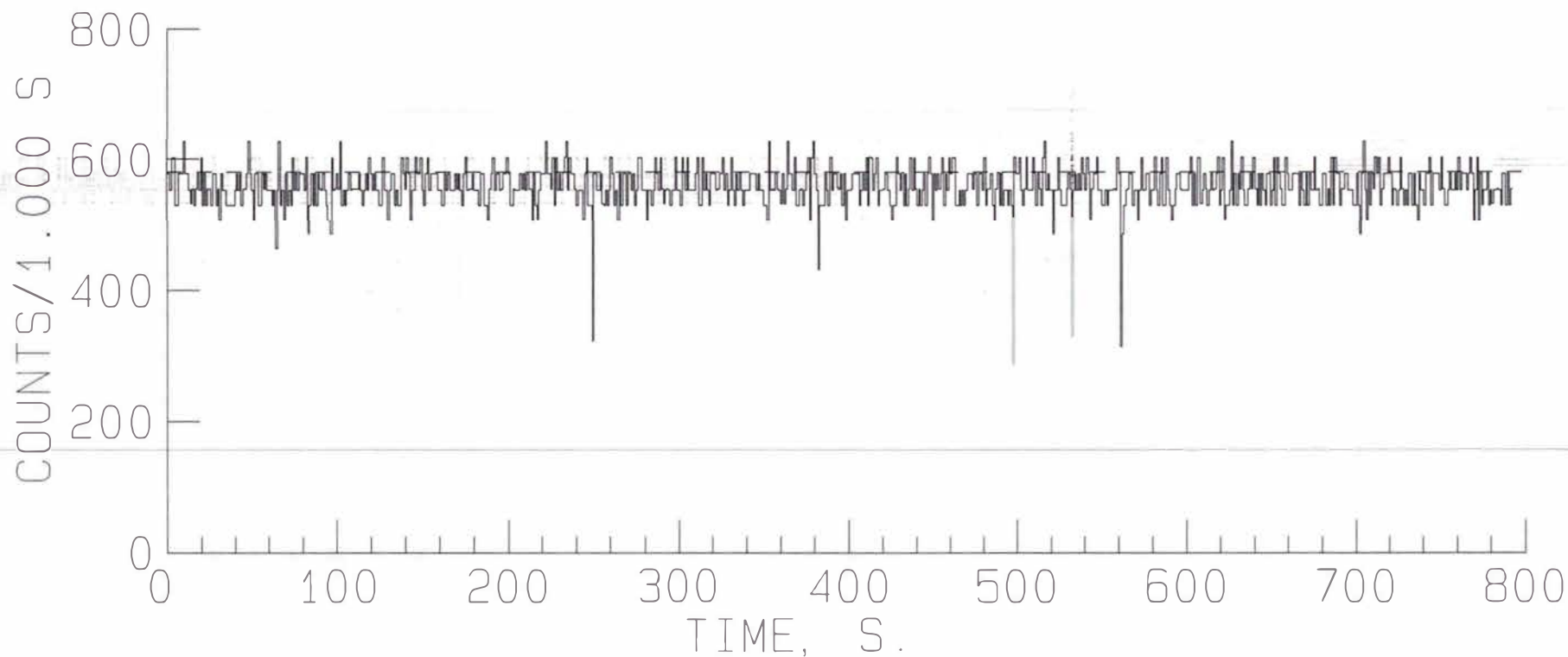
8/12/91 76932.023 s

0.500 S INTERVALS REGROUPED BY 2

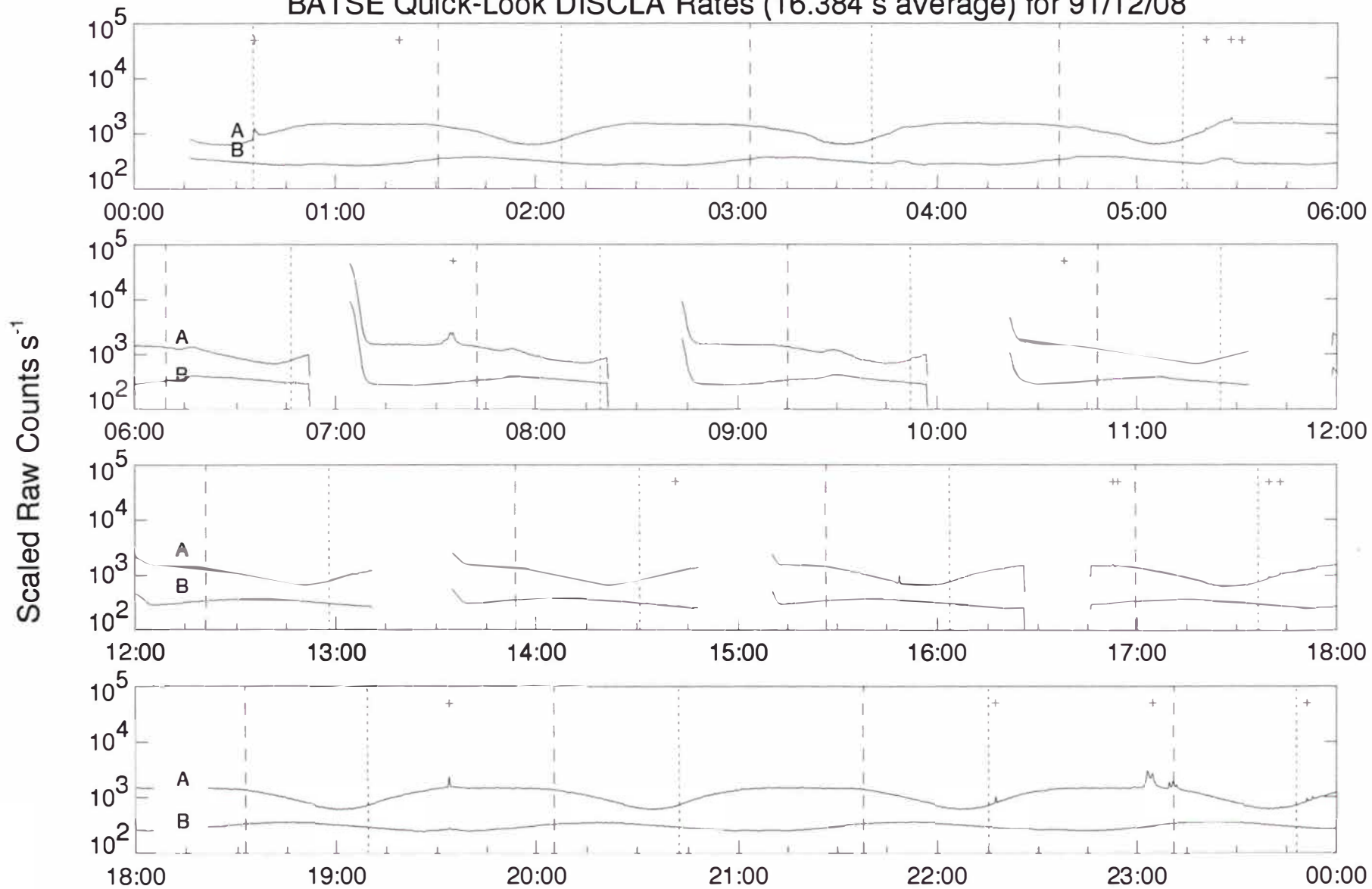
0- 0 keV

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS



BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/08

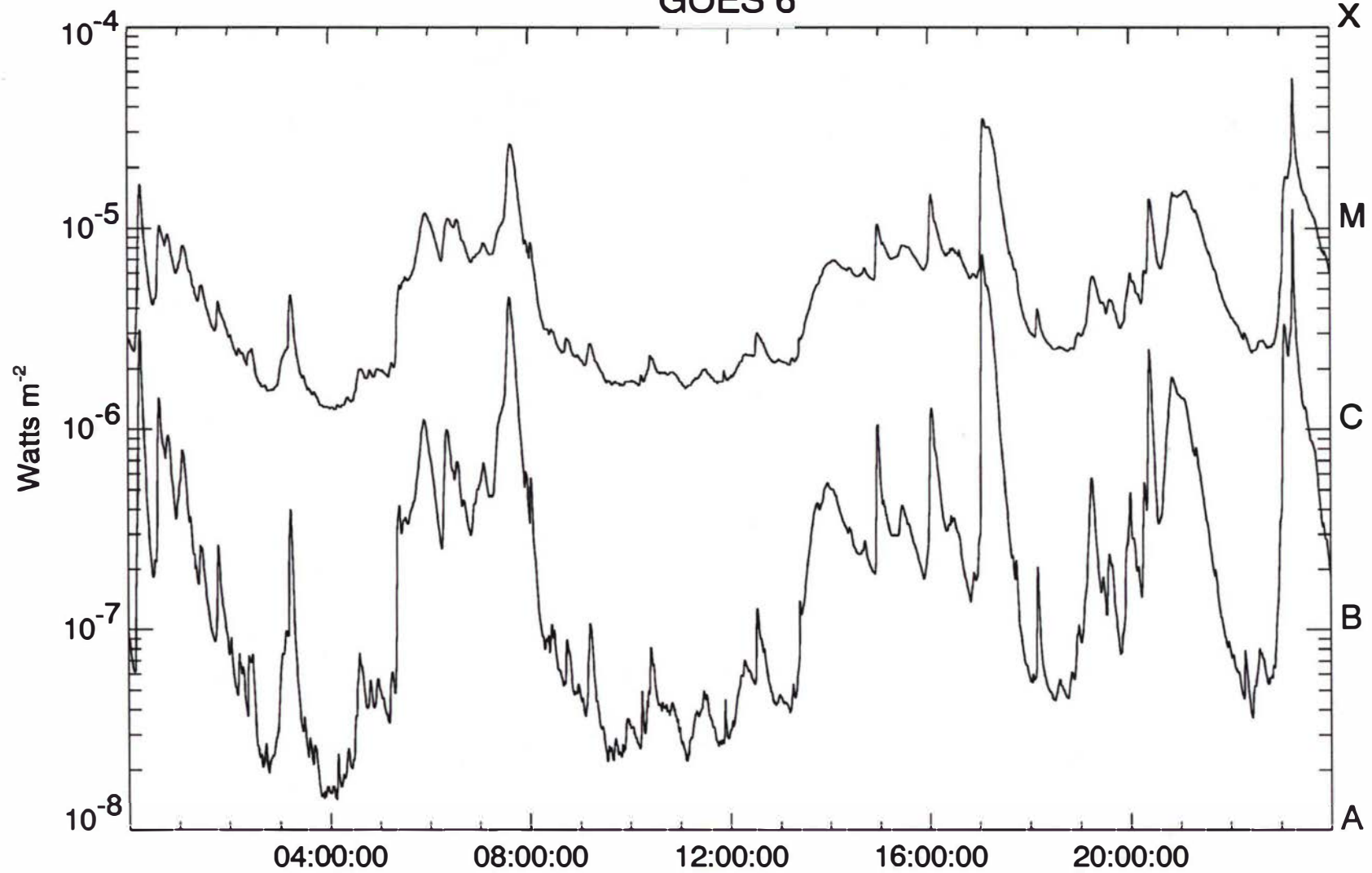


Current Time: 92/10/18, 1858 EDT
 A: Channel 1 Most Sunward LAD
 B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

GOES 6



Data Start: 91/12/08, 0000:00

Plot created: 97/10/20, 1429

Channel

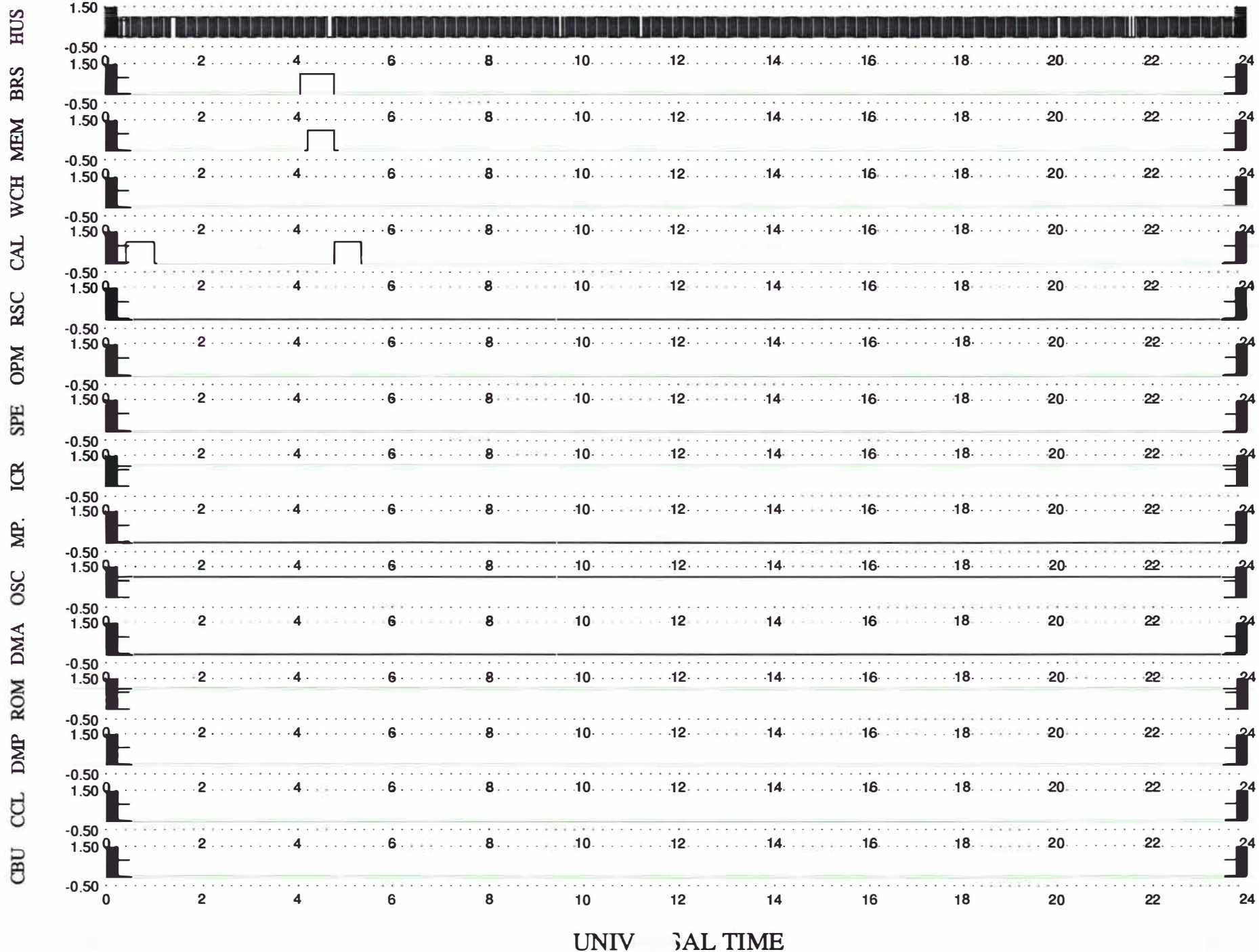
1 (1.0 - 8.0 Angstroms)
2 (0.5 - 4.0 Angstroms)

Background not subtracted

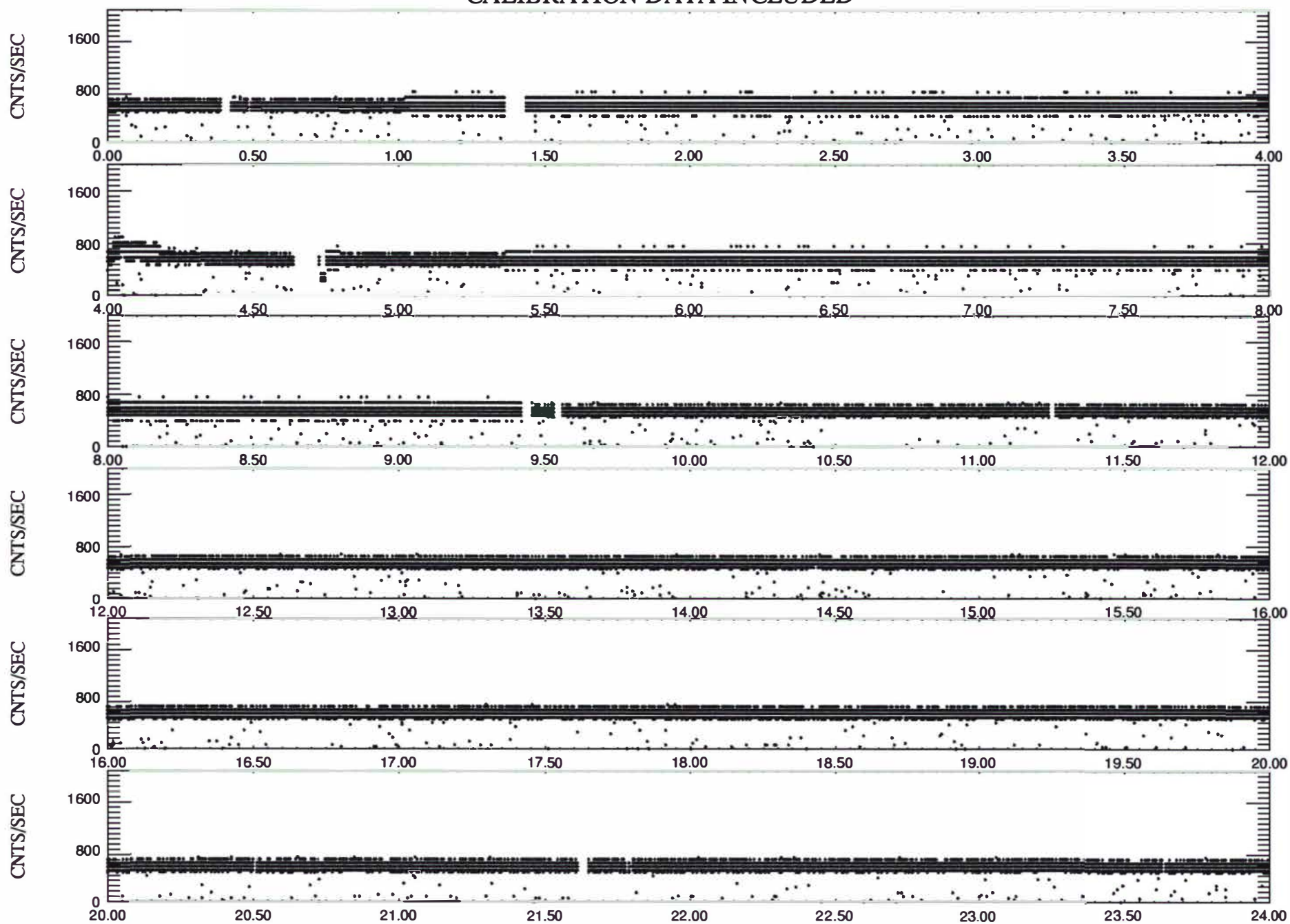
Background not subtracted

Sample average = 10

BURST NUMBER 7

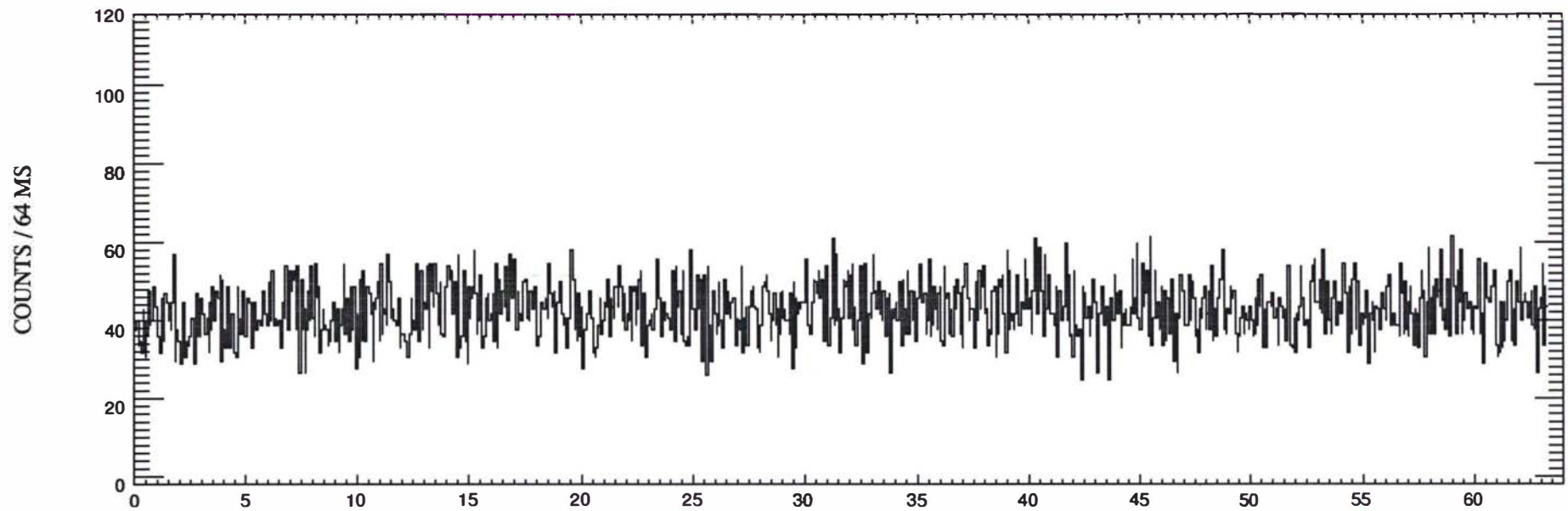


CALIBRATION DATA INCLUDED

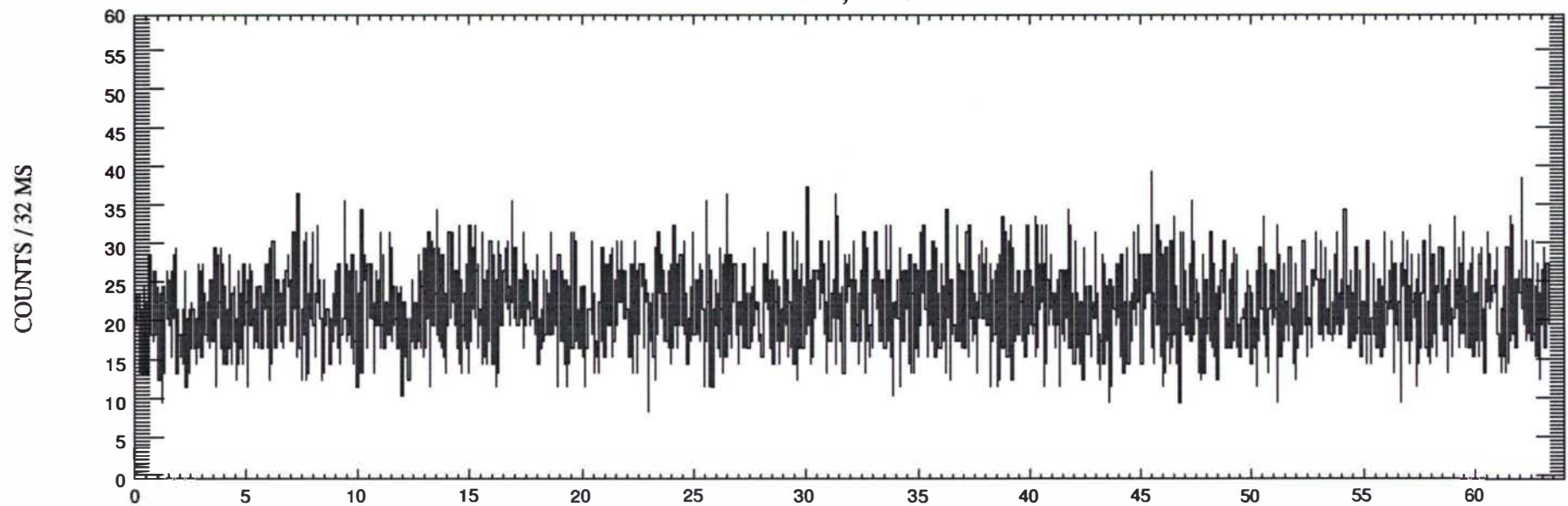


UNIV TIME

Burst Counter 7 at UT= 4.021552450392 h=14477.589 s 04:01:17.589

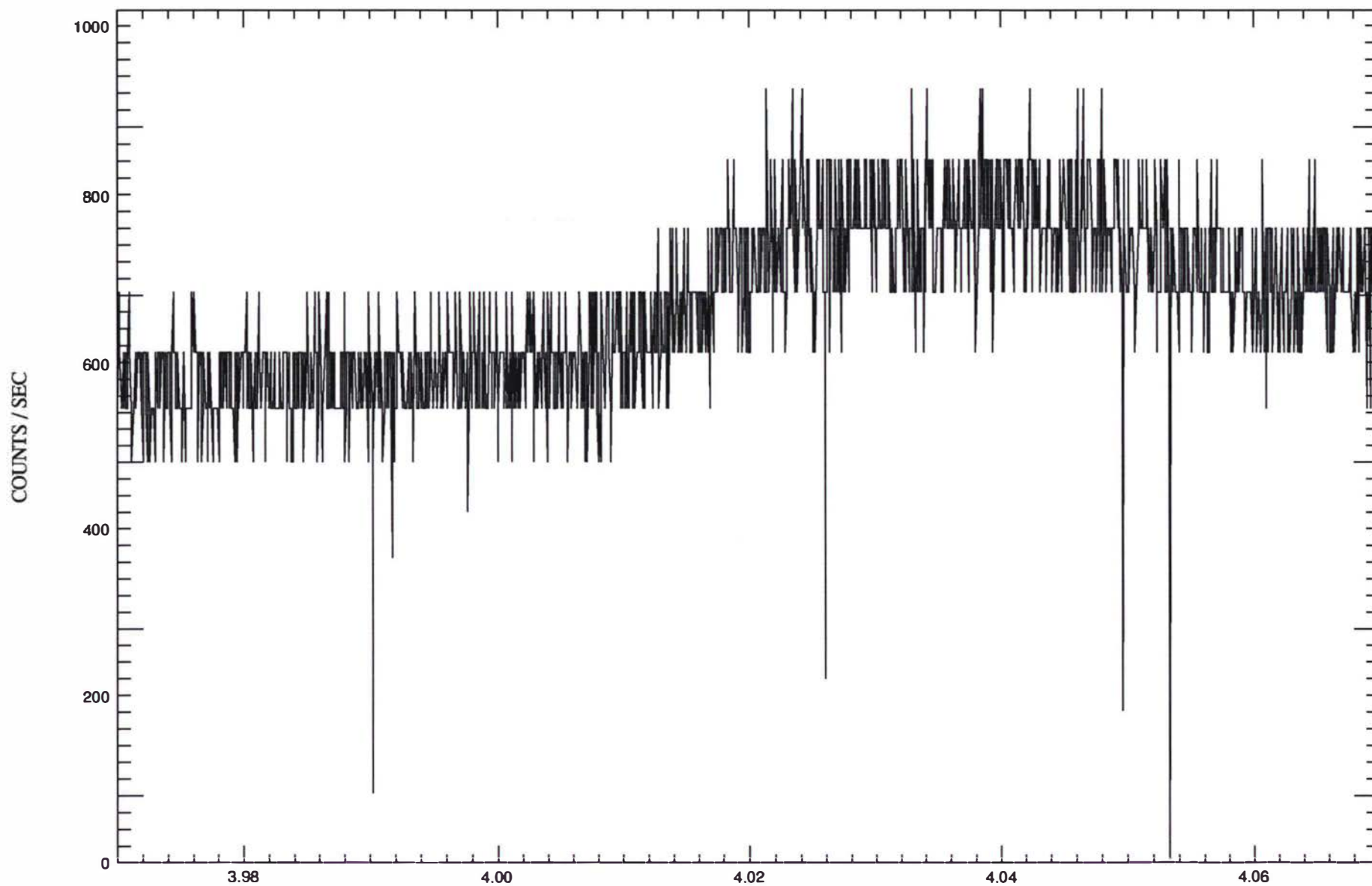


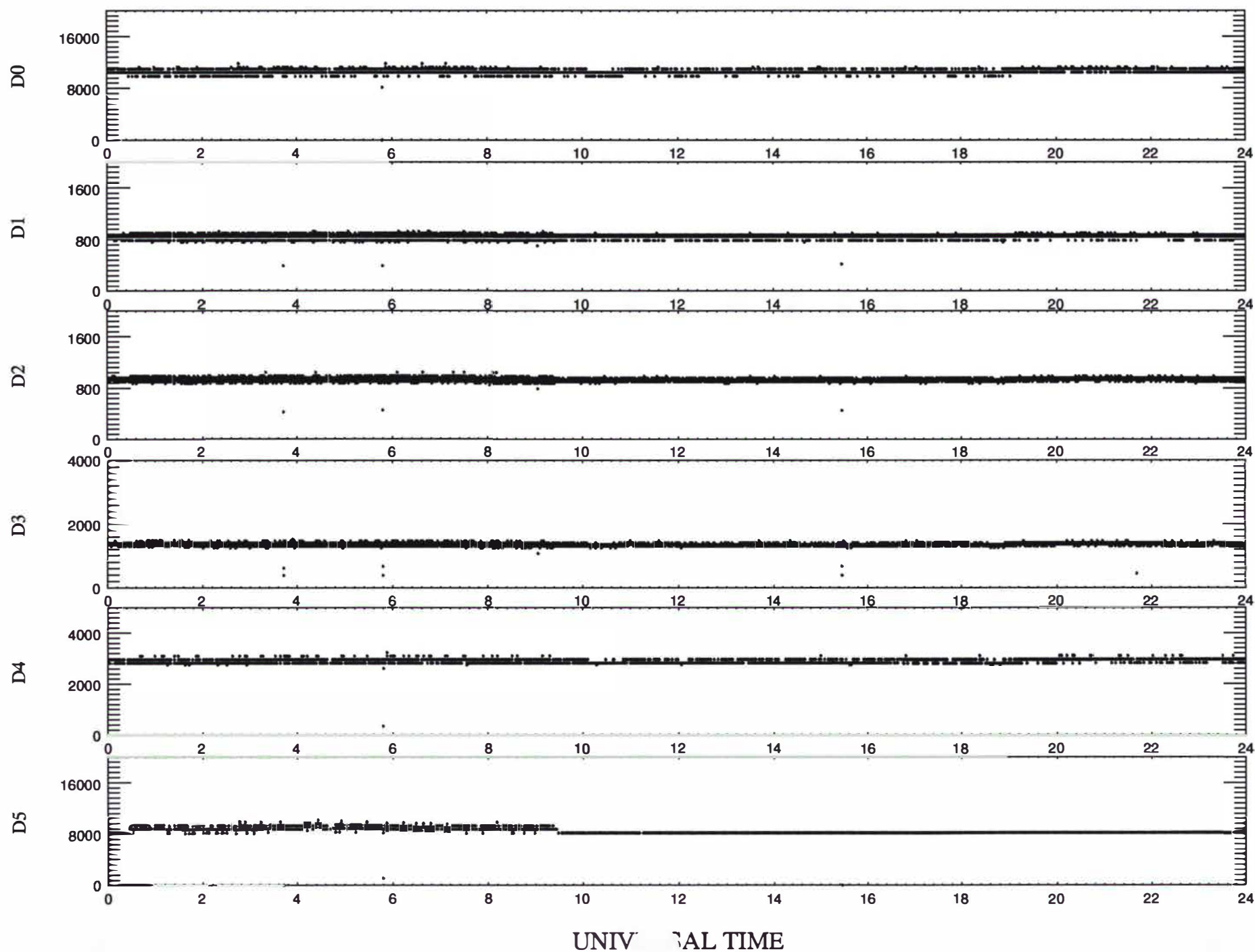
TIME, SECS



TIME, SECS

CALIBRATION DATA INCLUDED





CATSEARCH PROGRAM

BATSE BURST # 1154

EVENT OF 1991 DEC 9 DAY OF YEAR=343

EVENT CROSSING TIME AT BATSE : 3408. S. OR 00:56:47.9

COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)

NO

BURST ARRIVAL DIRECTION: 74.610 24.160

BATSE PEAK COUNTING RATE: 0000 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND

POSITION OF ULYSSES ON 9/12/ 91 IS:

RA= 167.660 DEC= 6.661 DIST= 4.807 AU

BATSE-ULYSSES DISTANCE = 719139168. KM.

ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 89.96 DEG.

LIGHT TRAVEL TIME ALONG PROJECTED PATH= 1.79 SECS.

CROSSING TIME AT ULYSSES IS 3410. S. OR 00:56:49.7 +/- 466.49 SECONDS

10 / 11 / 95

ULYSSES RT

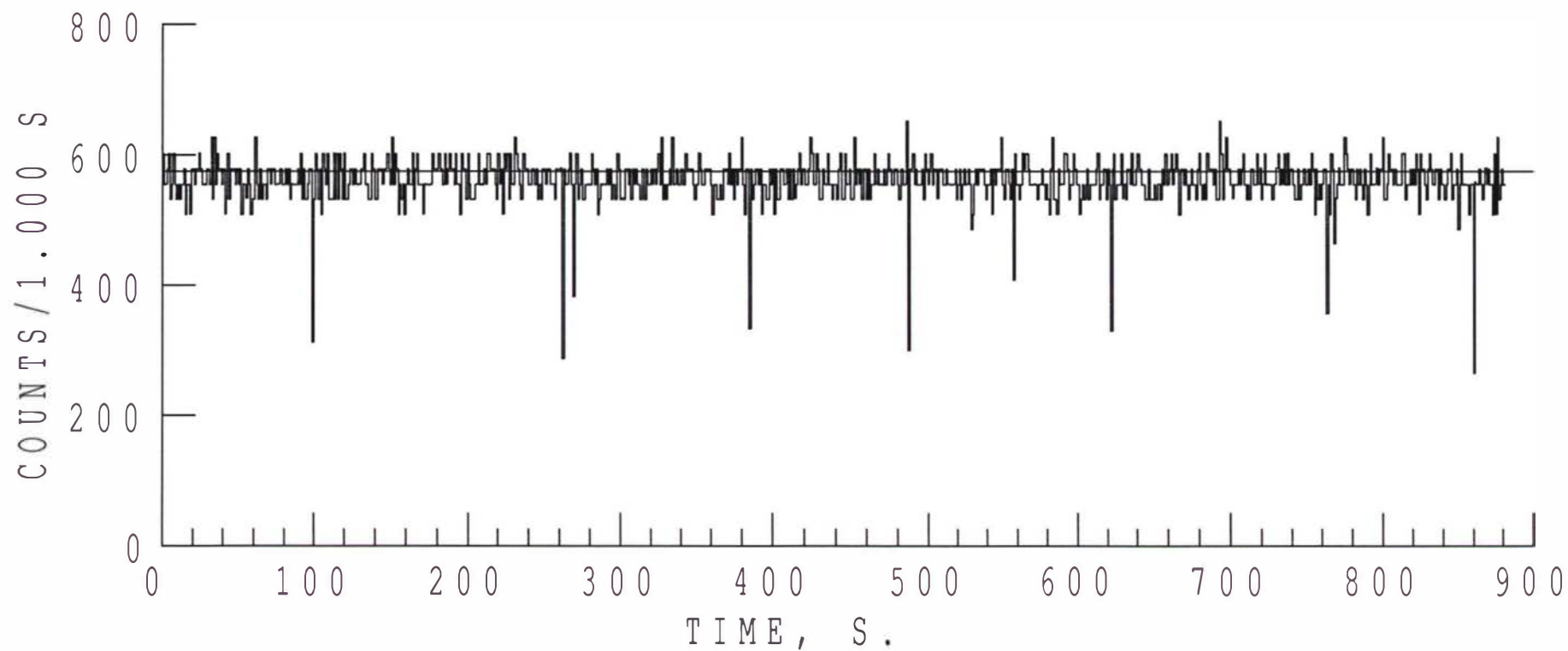
9/12/91 2952.340 s

0.500 S INTERVALS REGROUPED BY 2

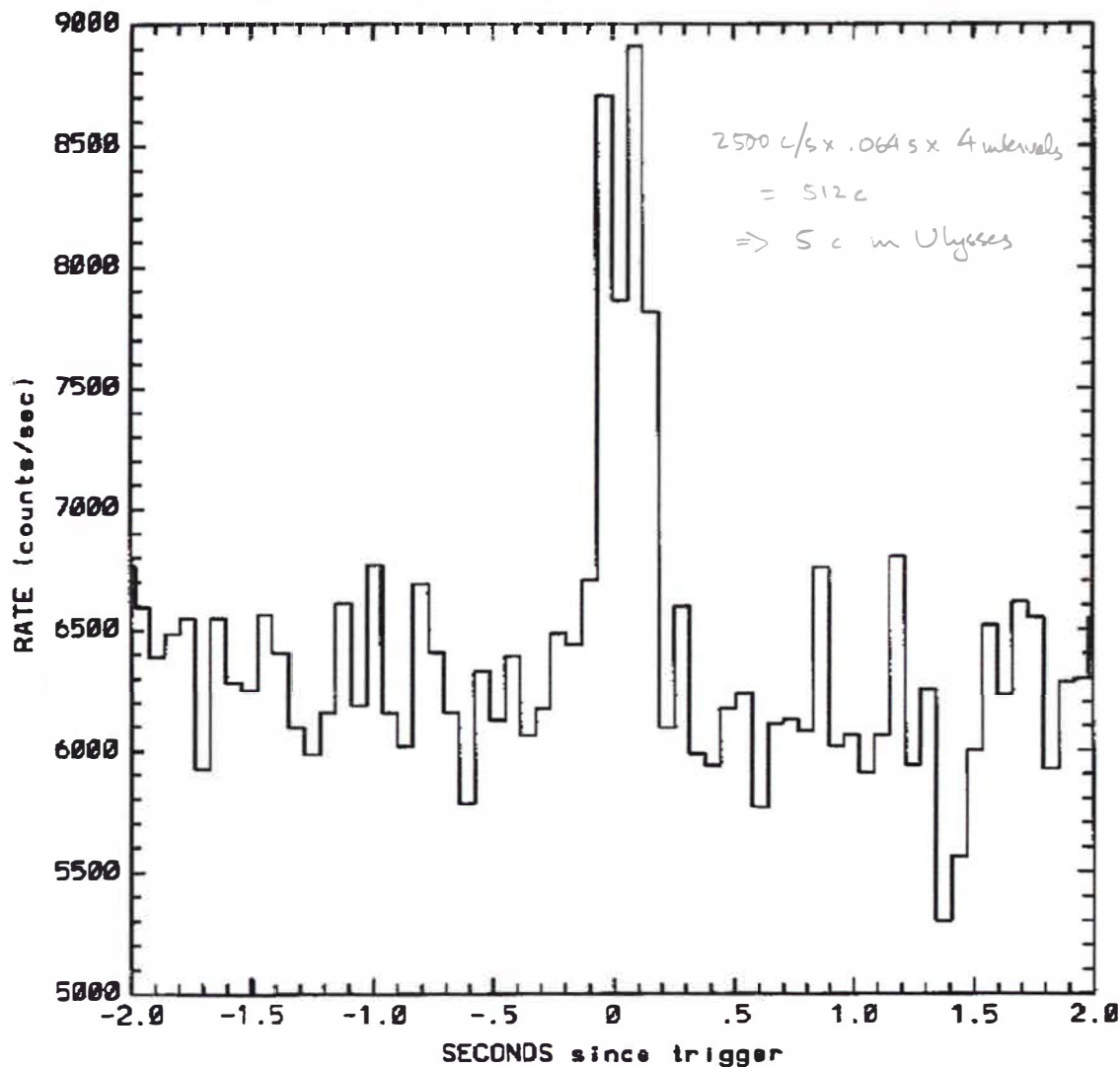
0 - 0 keV

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS



Data for K. Hurley



Dec 9 91 Got file + ephemeris

17-MAY-1992 14:48:09

Created by MOPS BD
(Burst Display)
Version 2.11

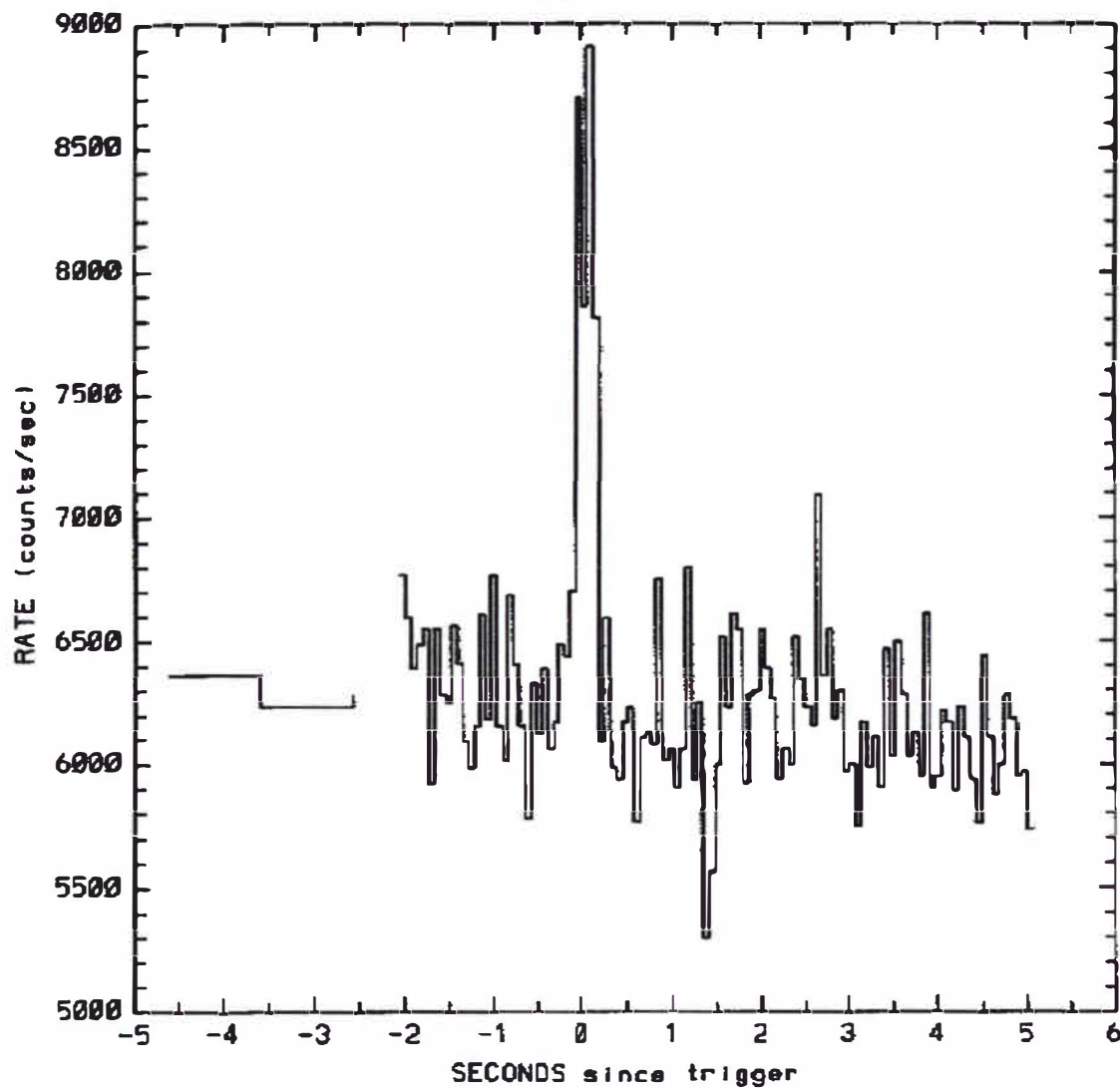
Trigger # = 1154

Trigger Time:
8599 / 3410.021 - 2.042 =Burst Data Type:
DISCSC 3407.979

~ 2000 c/s above bkgd
for ~.3s = 600 c → 6-12 c
in Ulysses

Deadtime
Corrected: NBackground Data
Type: PREB + DISCLAMinimum Integ. Time:
0.064 secondsDetectors [7..8]:
01010000Discriminators:
[1, 2)Quality Mask:
001SP0

Data for K. Hurley



17-MAY-1992 14.39.44

Created by MOPS BD
(Burst Display)
Version 2.11

Trigger * : 1154

Trigger Time:
8599 / 3418.821 - 2.042 =

Burst Data Type: DISCSC 3407.979

Deadtime
Corrected: N

Background Data
Type: PREB + DISCLA

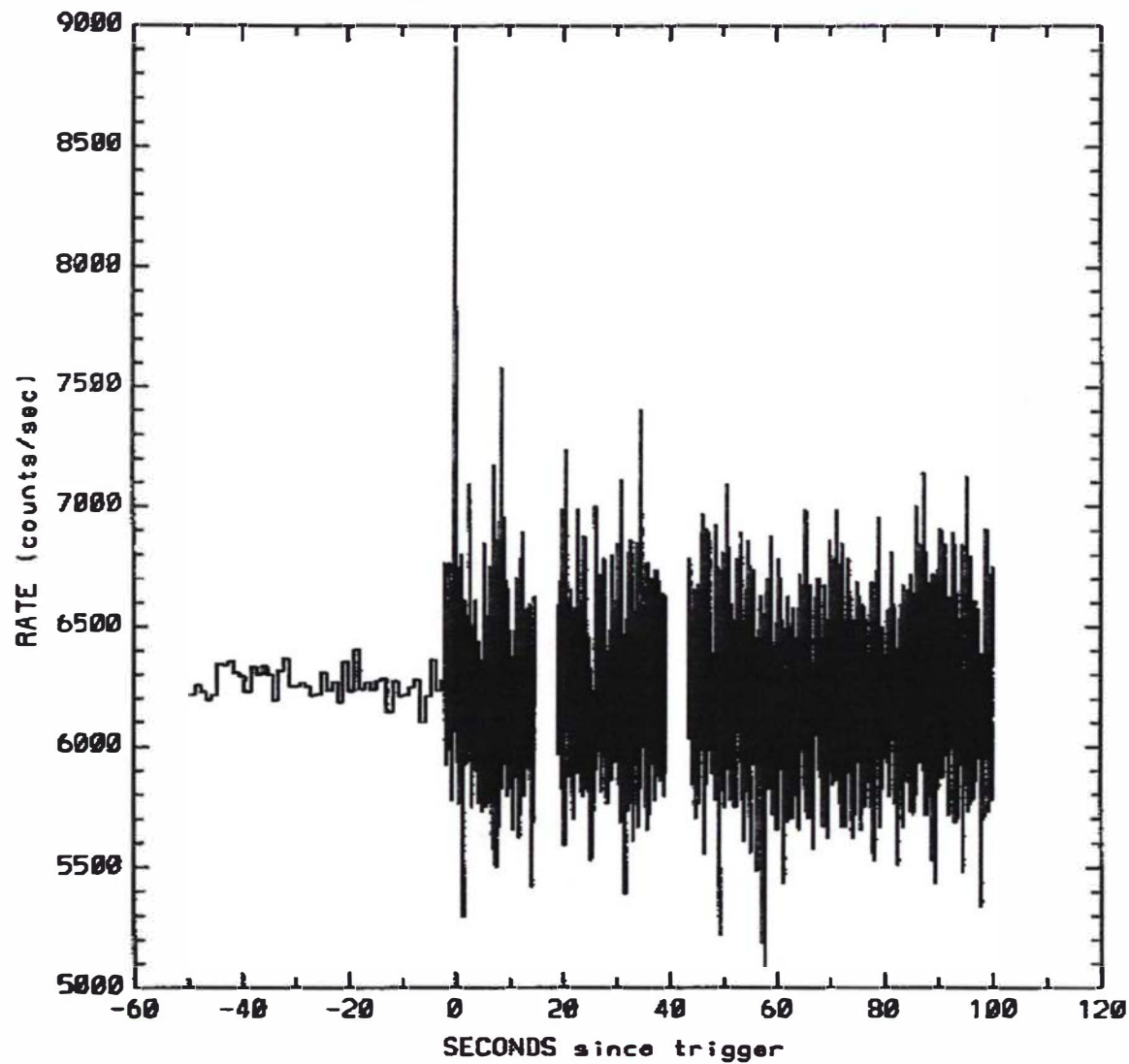
Minimum Integ. Time:
0.064 seconds

Detectors [7..8]:
01010000

Discriminators:
(1, 2)

Quality Mask:
B01SP0

DATA FOR K. HURLEY



38-JUL-1993 18:39:83

Created by MDPS BD
(Burst Display)
Version 2.19

Trigger # : 1154

Trigger Time:
8599 / 3487.979 *Correct*

Burst Data Type:
DISCSC

Deadtime
Corrected: N

Background Data
Type: PREB + DISCLA

Minimum Integ. Time:
0.064 seconds

Detectors [7..8]:
01010000

Discriminators:
(1, 2)

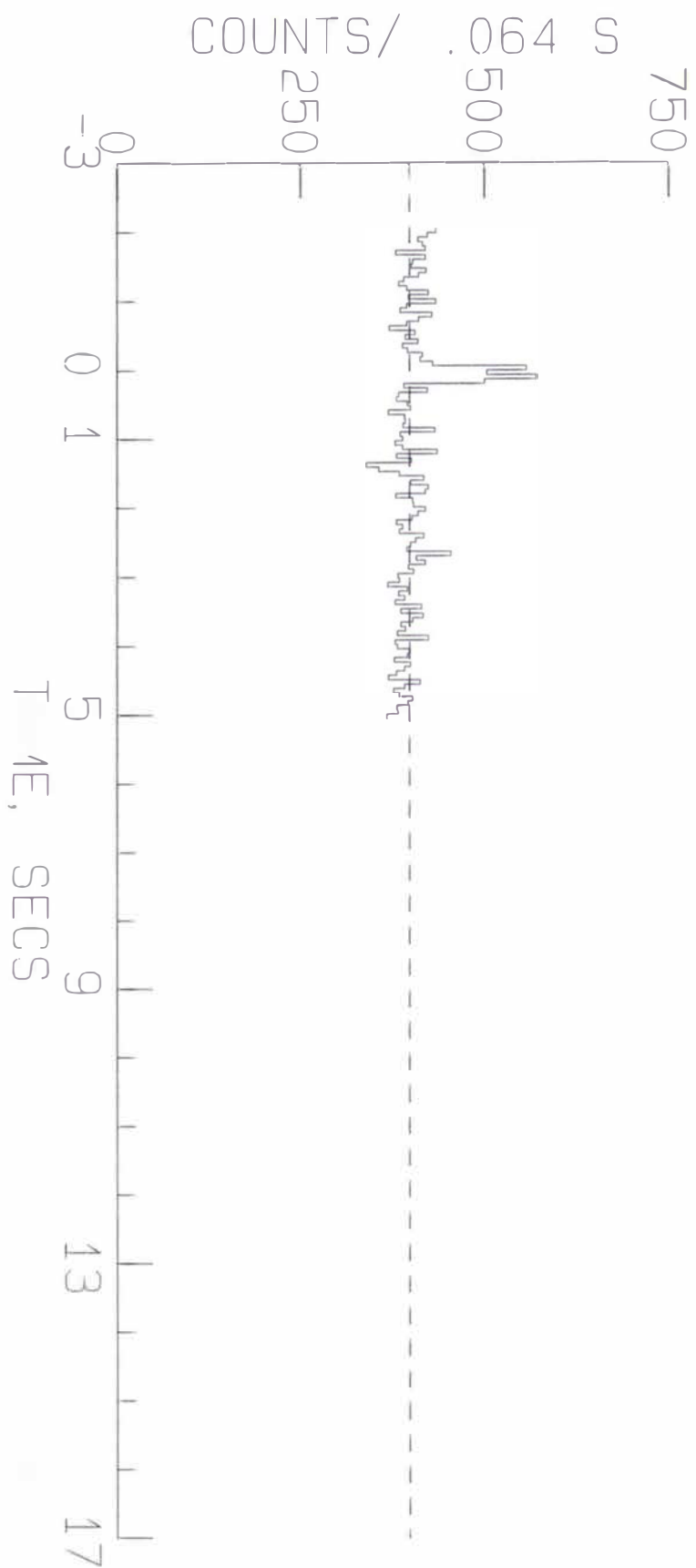
Quality Mask:
BDISP1

BATSE

09/12/91

3410.021

25- 100 keV



From rhudec@asu.cas.cz Tue Apr 4 05:15 PDT 1995
Date: Tue, 4 Apr 95 14:12:36 +0200
From: rhudec@asu.cas.cz (Rene HUDEC)
To: khurley@sunspot.ssl.berkeley.edu
Subject: GRB

Dear Kevin:

thnak you for your supporting fax/letter.
Some time ago, I have asked you to look for localization of GRB
911209B at 3408 s UT but still have no answer. Please check this
trigger and let me know. We have a possible optical candidate for
this GRB.

Thanks and regards

Rene

E-mail:	rhudec@asu.cas.cz	Post:	Rene Hudec
Phone:	0042-204-857128		Astronomical Institute
FAX:	0042-2-881611		CZ-25165 Ondrejov
			Czech Republic

CATSEARCH PROGRAM

BATSE BURST # 1156
EVENT OF 1991 DEC 9 DAY OF YEAR=343
EVENT CROSSING TIME AT BATSE : 58963. S. OR 16:22:42.5
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 46.110 -31.300
BATSE PEAK COUNTING RATE: 0000 C/S

ND

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 9/12/ 91 IS:
RA= 167.660 DEC= 6.661 DIST= 4.807 AU
BATSE-ULYSSES DISTANCE = 719139168. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 59.71 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 1209.79 SECS.
CROSSING TIME AT ULYSSES IS 60172. S. OR 16:42:52.3 +/- 428.00 SECONDS

9 / 11 / 95

ULYSSES RT

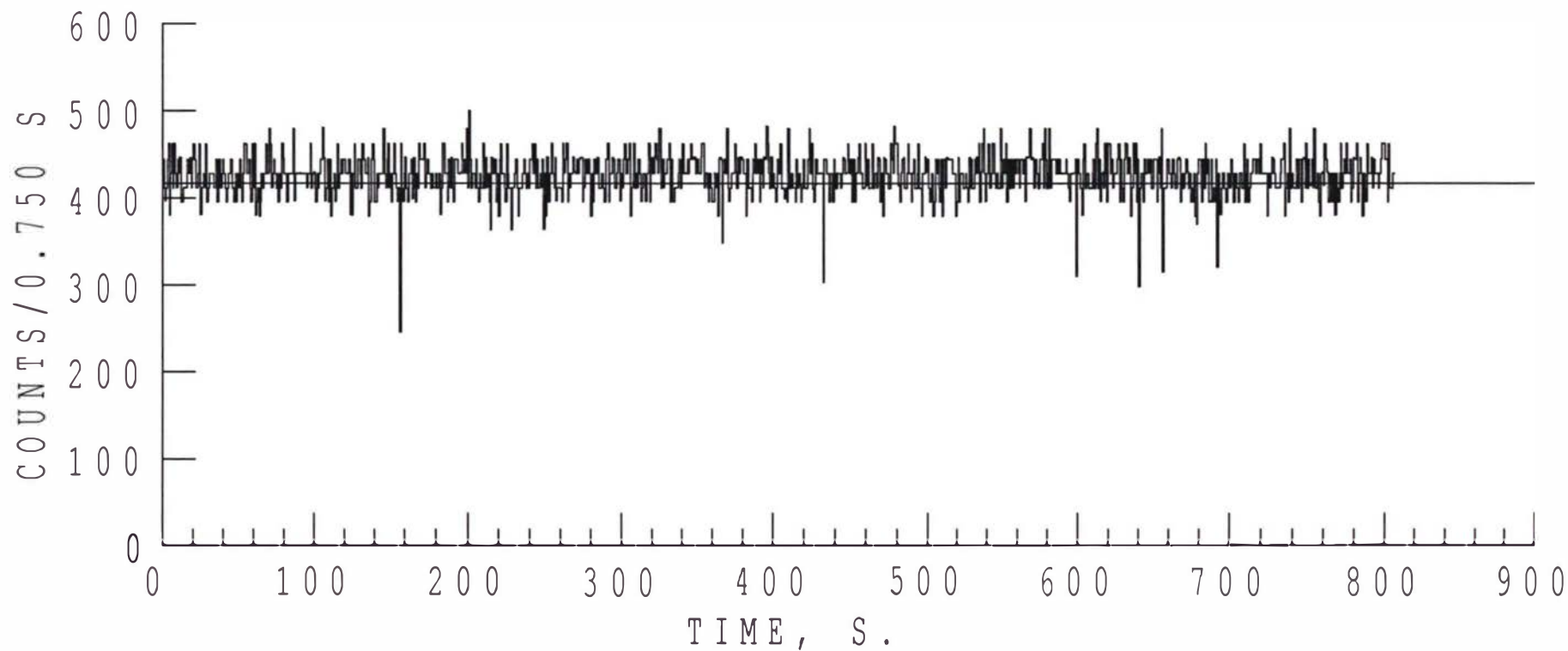
9 / 12 / 91 59760.098 s

0.250 S INTERVALS REGROUPED BY 3

0 - 0 keV

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS



CATSEARCH PROGRAM

BATSE BURST # 1157
EVENT OF 1991 DEC 9 DAY OF YEAR=343
EVENT CROSSING TIME AT BATSE : 66958. S. OR 18:35:57.8
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 262.800 -45.700
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 9/12/ 91 IS:
RA= 167.660 DEC= 6.661 DIST= 4.807 AU
BATSE-ULYSSES DISTANCE = 719139168. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 81.65 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 348.22 SECS.
CROSSING TIME AT ULYSSES IS 67306. S. OR 18:41:46 +/- 467.34 SECONDS

Helio. corr. removed

Date: Nov 25 '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?
- ☒ 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)?
- ☒ 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*

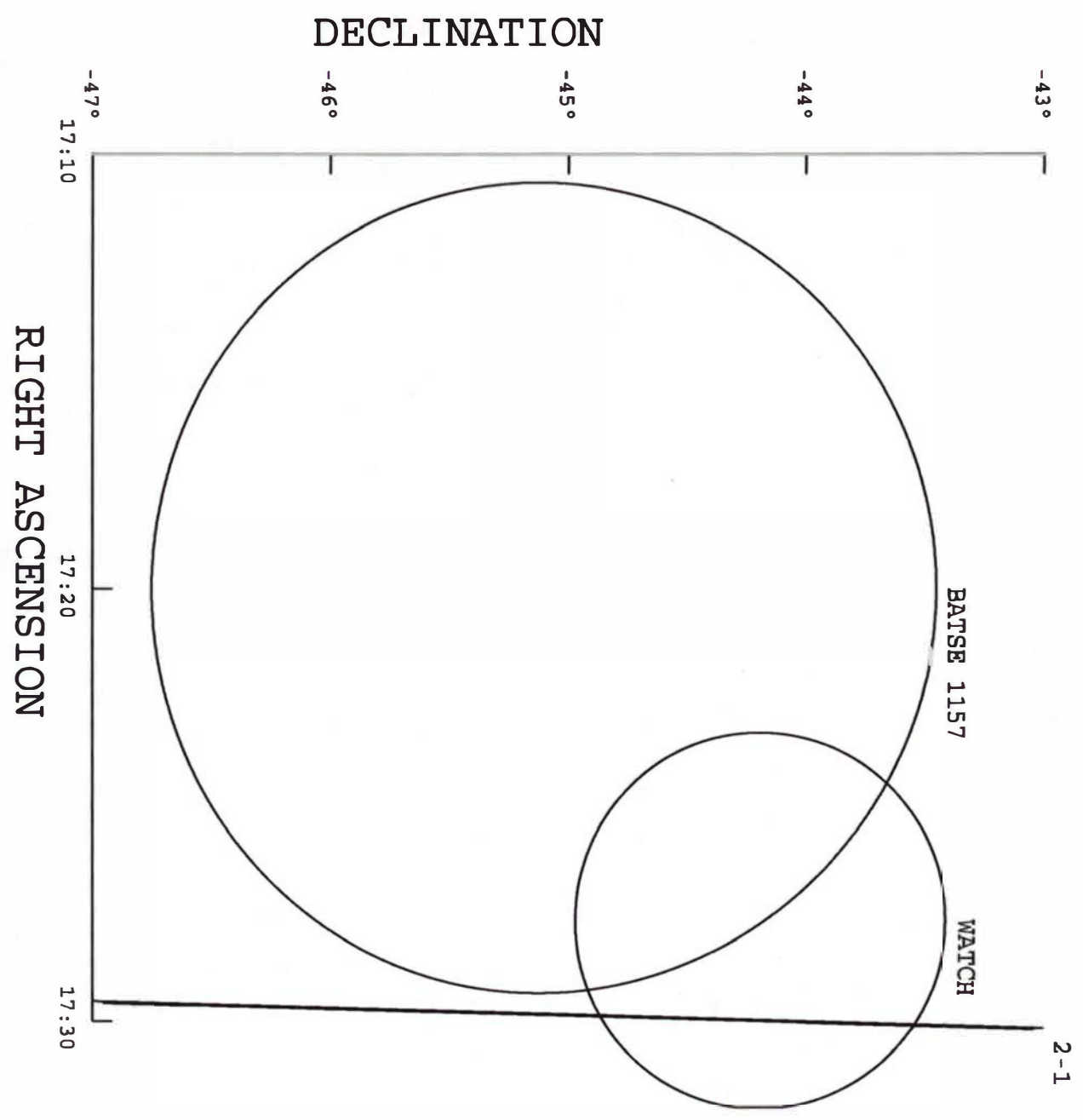
3. PVO Data

- ☐ Ephemeris of PVO used (not Venus)?
- ☐ 2000 coordinates used?
- ☐ Geocentric time used?
- ☒ 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 DEC 9, 1991 18:41

25 / 3/99



N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

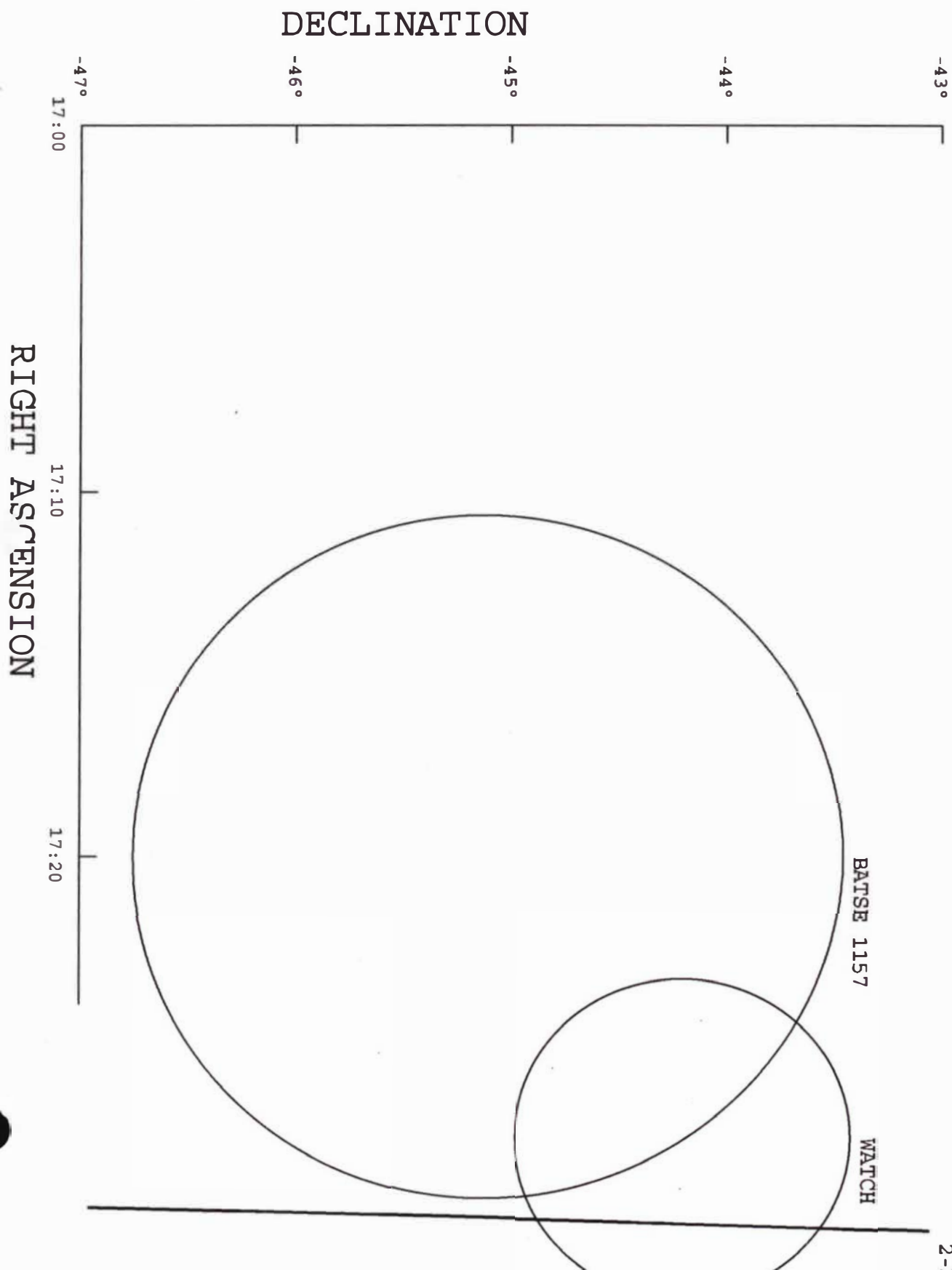
G=GALACTIC EQUATOR

1 ULYSSES

2 BATSE

EVENT OF DEC 9, 1991 18:41

25/11/97



BATSE

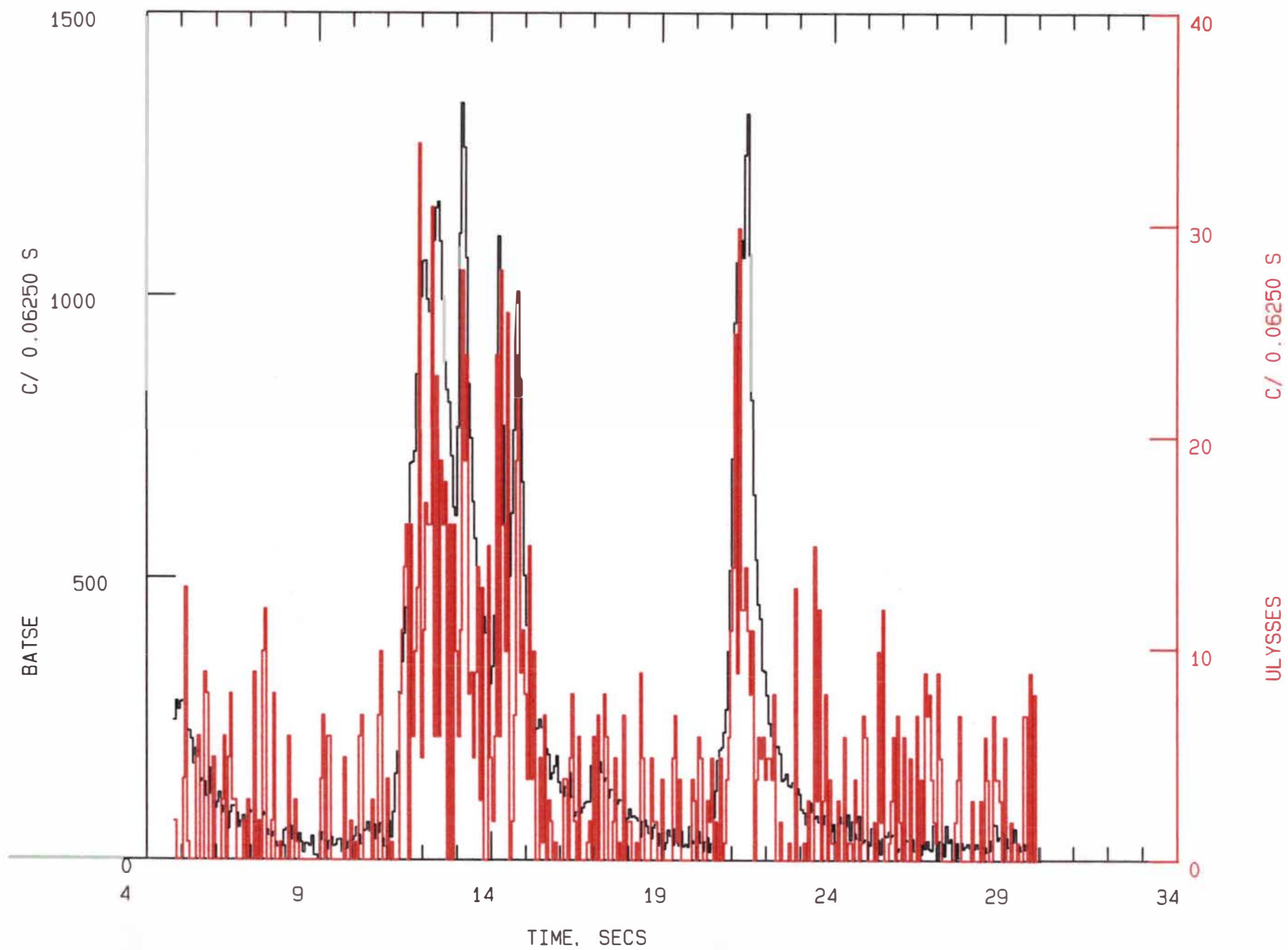
-ULYSSES

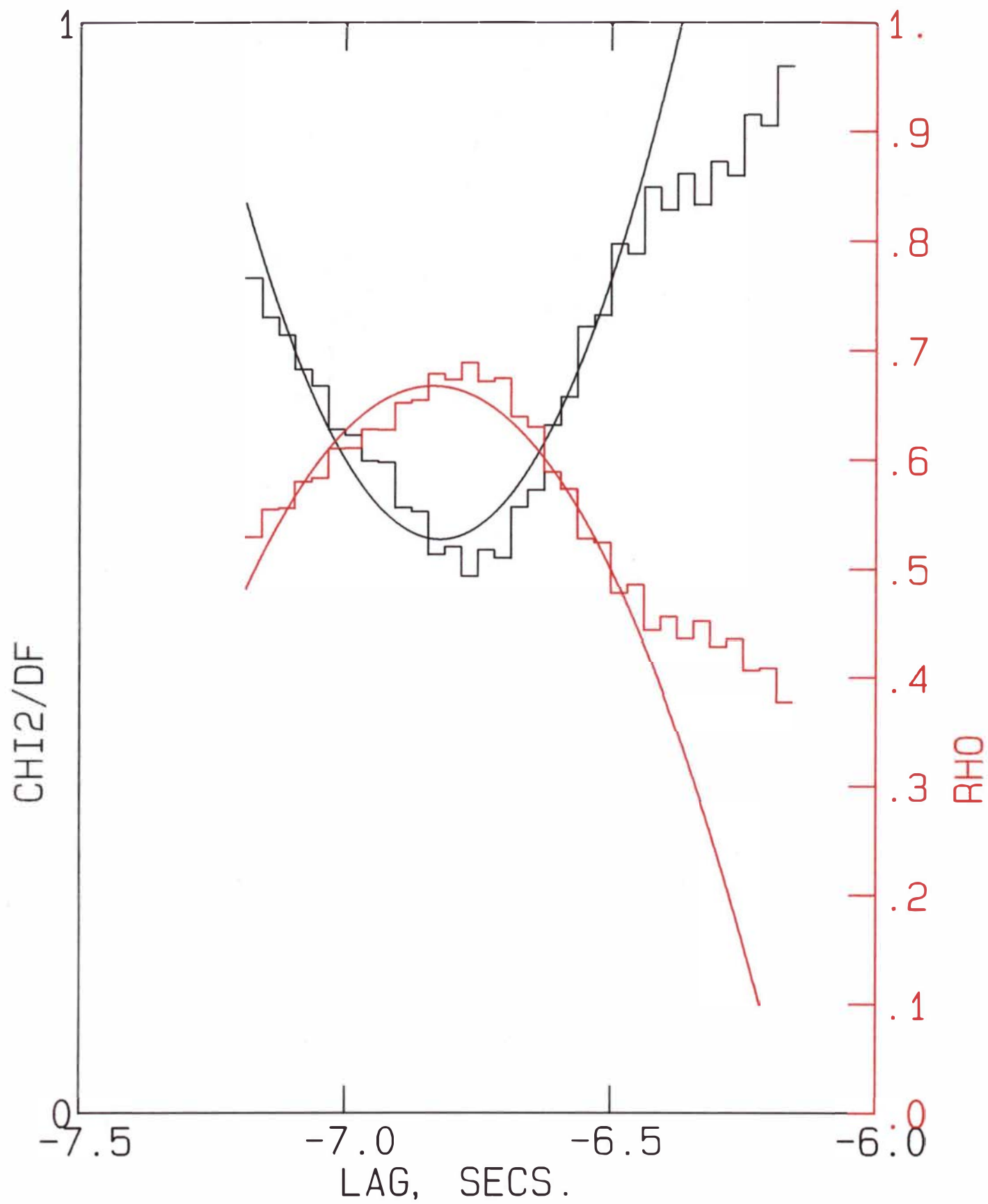
CORRELATION

9/12/91

66957.867

25/11/97





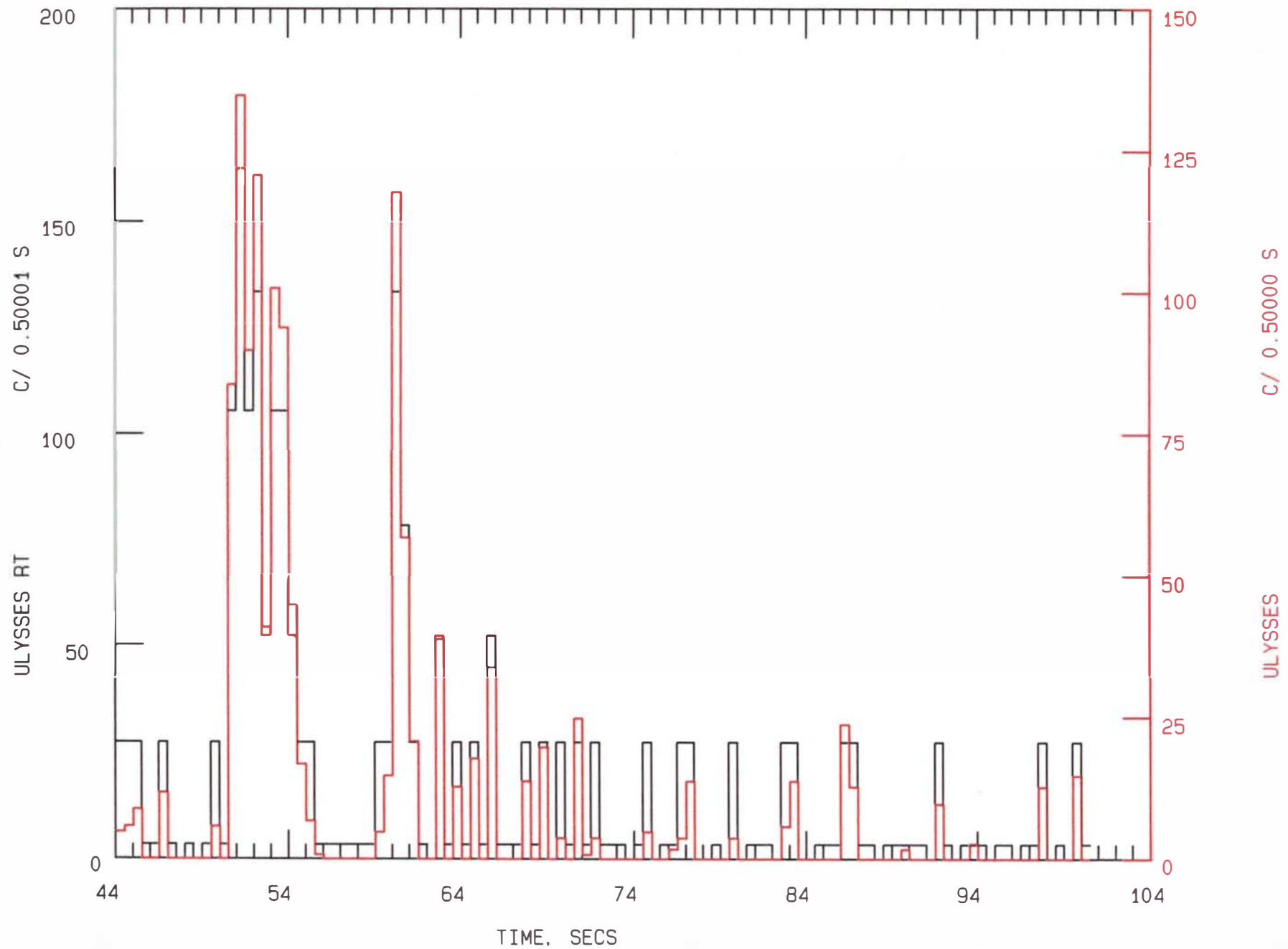
ULYSSES RT-ULYSSES

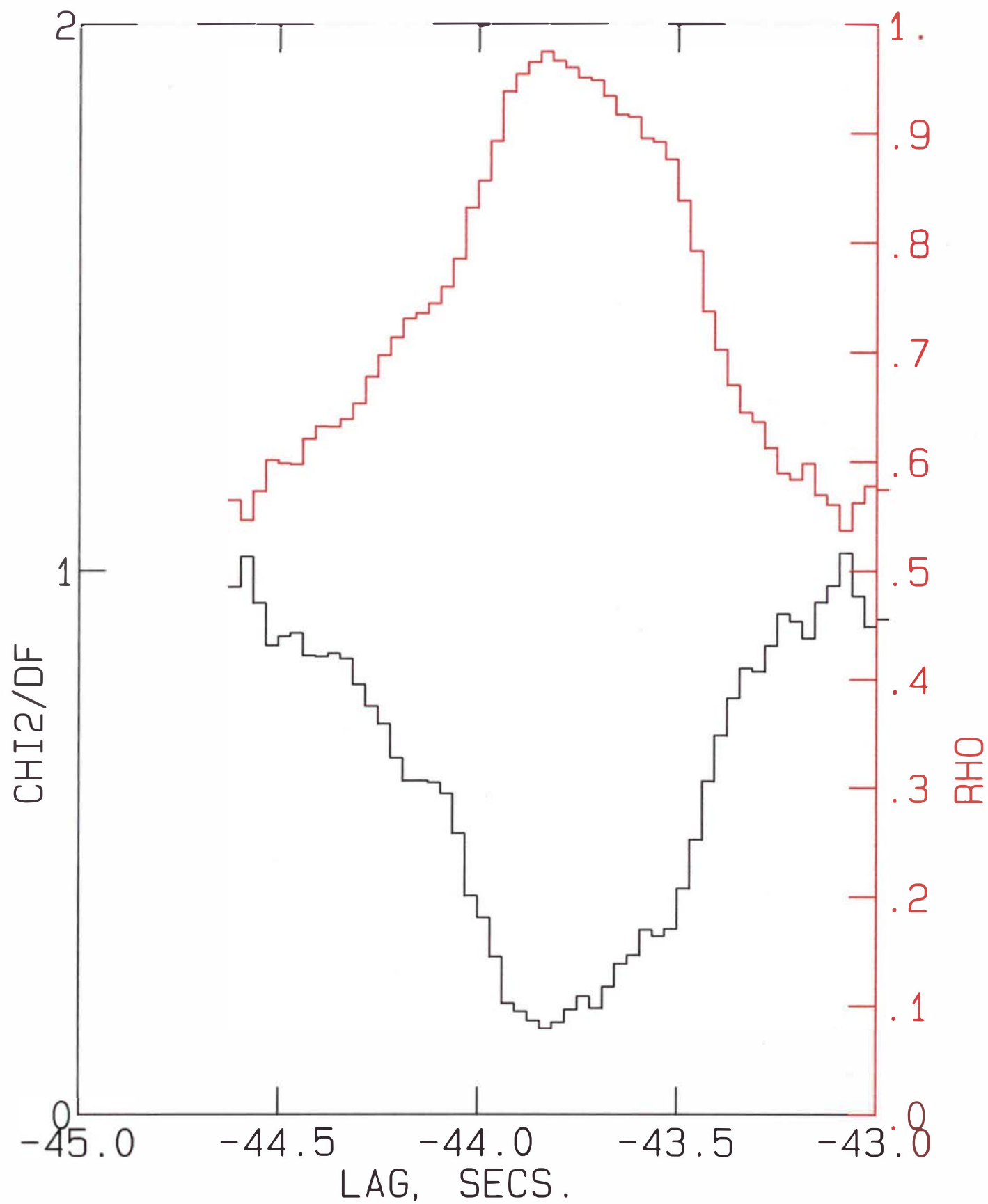
CORRELATION

9/12/91

67228.468

25/11/97

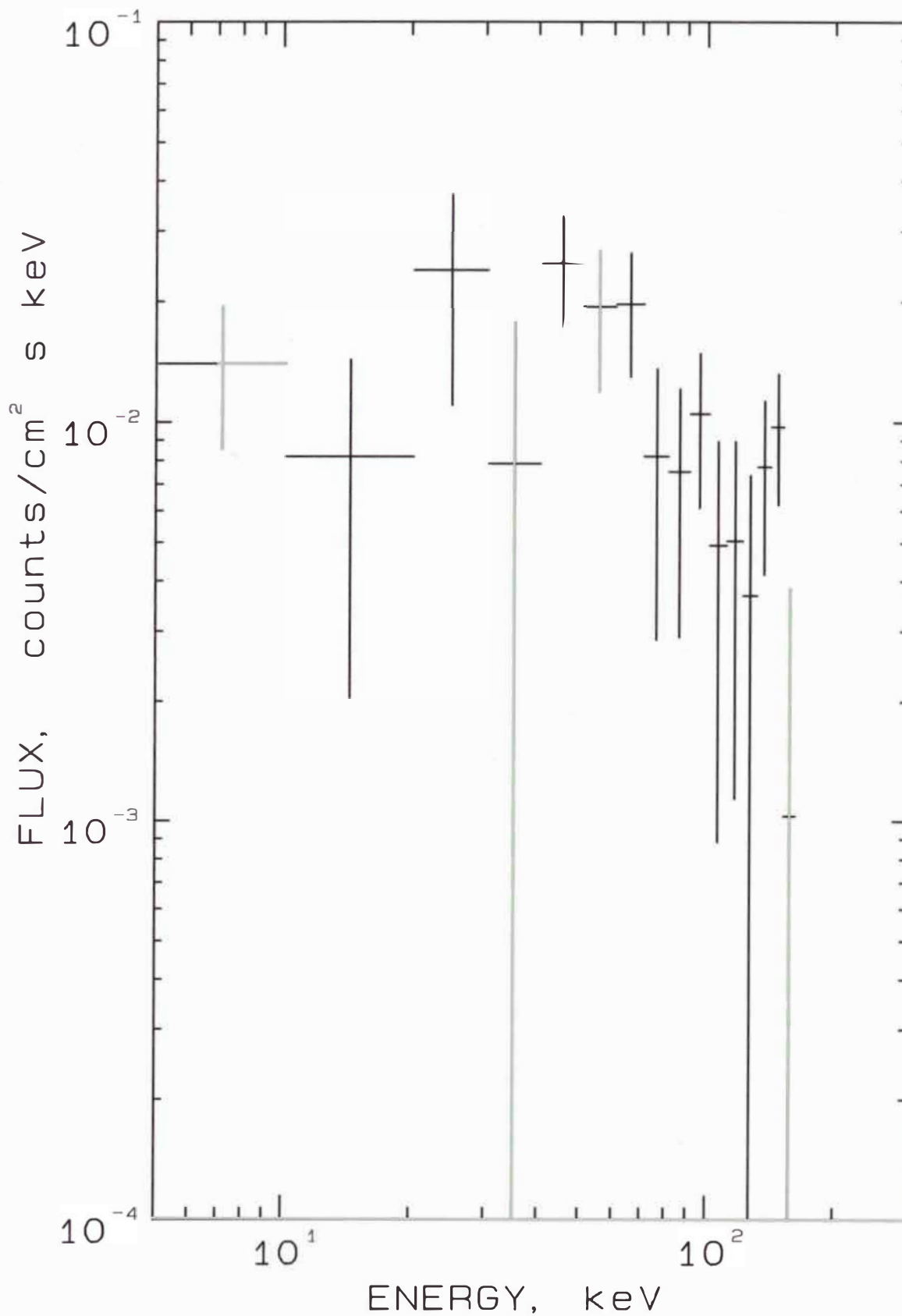




ULYSSES 09/12/91 67279.459

25/11/97

SPECTRUM INTEGRATED OVER 31.3 SECONDS, INTERVALS 2 TO 25



ULYSSES 09/12/91 67279.459 BURST SPECTRAL COUNT RATES

5- 20 keV

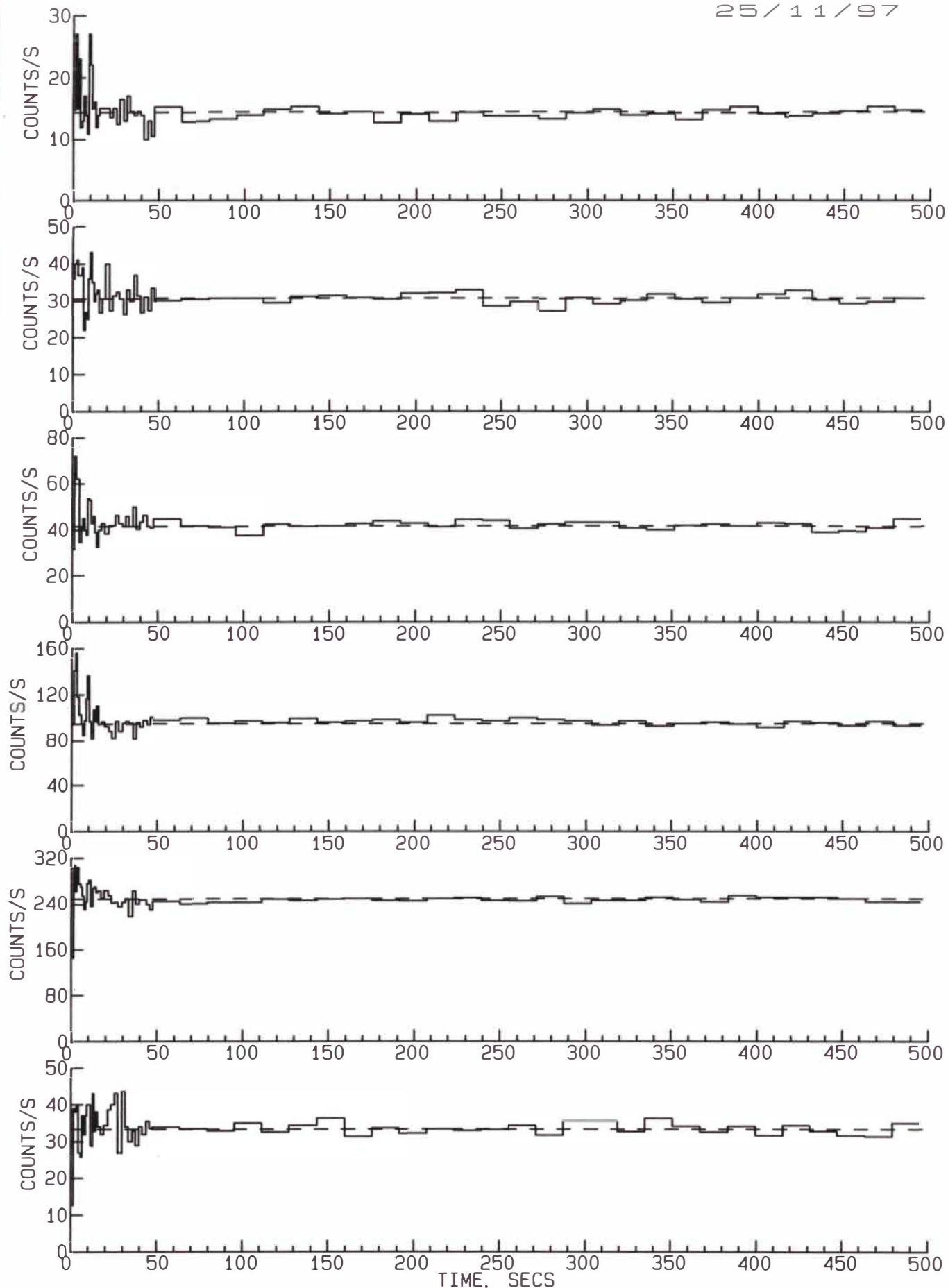
20- 50 keV

50- 81 keV

81-111 keV

111-142 keV

142-162 keV



ULYSSES

09/12/91

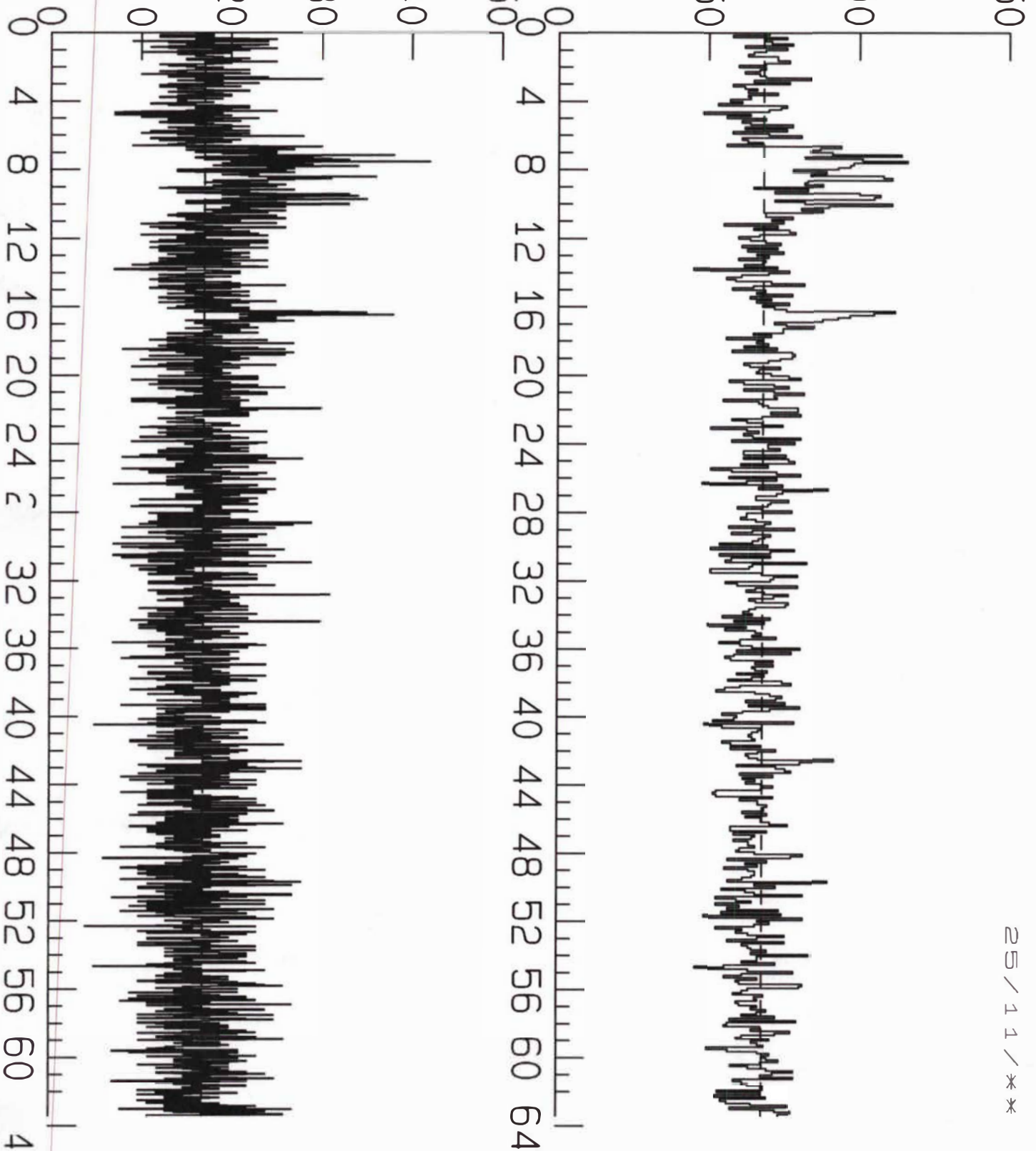
Ttrig=67279.724

18- 163 keV

COUNTS/0.031 S

COUNTS/0.125 S

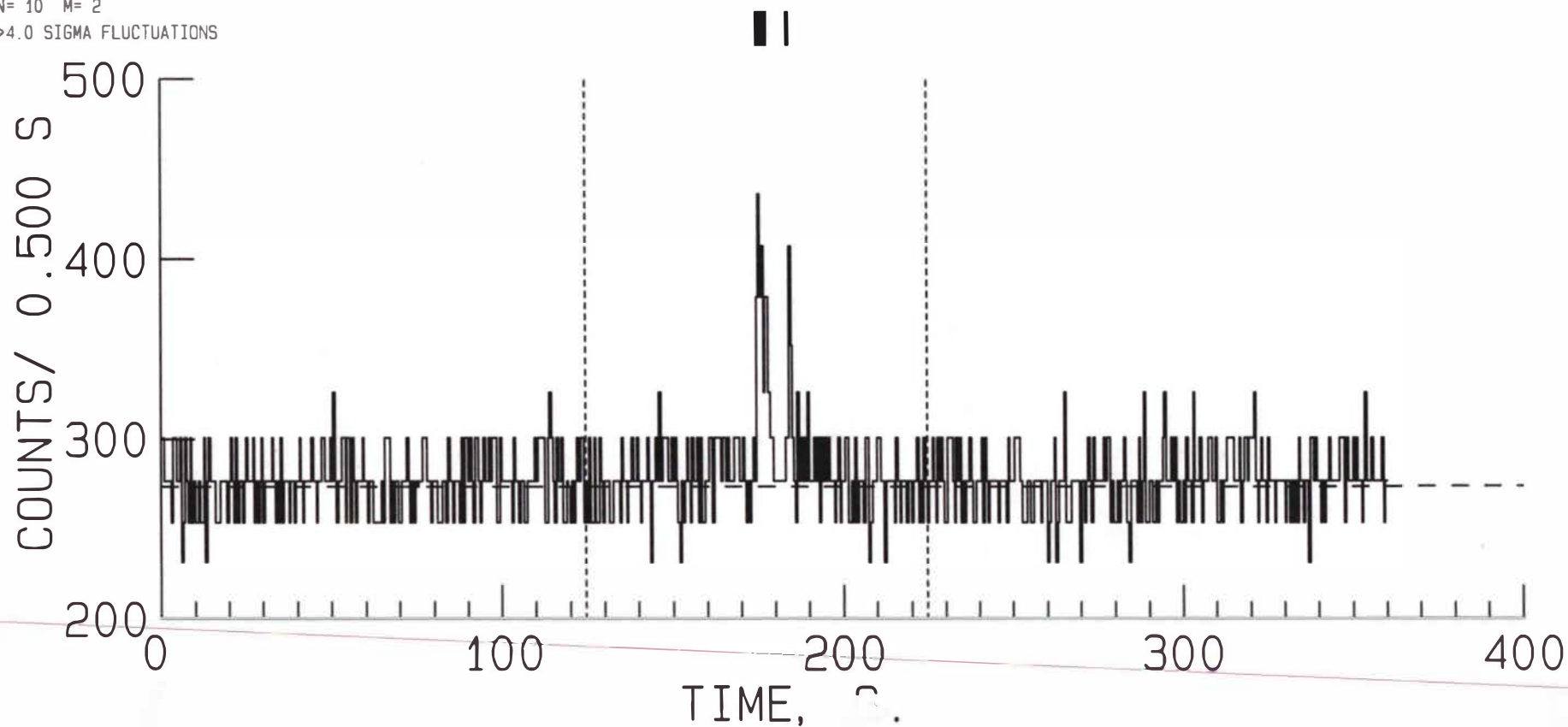
25 / 11 / **



ULYSSES RT
9/12/91 67104.216 s
18- 163 keV

25 / 11 / 97

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



From sb@dsri.dk Fri Oct 15 06:35:14 1993
Date: Fri, 15 Oct 93 14:33:16 +0100
From: Soeren Brandt <sb@dsri.dk>
To: khurley@sunspot.ssl.berkeley.edu
Subject: more bursts
Content-Length: 583

Hello Kevin,

I have localized a few more bursts in the WATCH-EURECA data.
Here follows the preliminary positions (J2000) and the time
of peak flux.

GRB 920814 06:10:31.2 17h20m22s -46d10'

GRB 920918 09:41:20 16h23m30s -04d18'

GRB 921118 22:12:12 23h23m26s 49d34'

I am particularly interested in the event of Aug 14 1992.
It happens to be rather close to the error box of GRB 911209.
So it would be very interesting to see where the timing circles
from those two event meet.
Do you see that burst at all, it does not appear on your list.

Best regards,
Soren

From root Thu Feb 3 13:55 1994
Received: by space6.ssl.berkeley.edu (AIX 2.1 2/4.03)
id AA00852; Thu, 3 Feb 94 13:55:12
Received: from SSTDP2.LANL.GOV by sunspot.ssl.berkeley.edu (5.0/SMI-SVR4)
id AA13978; Thu, 3 Feb 1994 12:59:12 +0800
Date: Thu, 3 Feb 1994 14:00:37 -0700 (MST)
From: 046369@SSTDP2.LANL.GOV
To: KHURLEY@space6.ssl.berkeley.edu
Message-Id: <940203140037.23c05074@SSTDP2.LANL.GOV>
Subject: DMSP OBSERVATIONS OF GRO GRB
Content-Length: 2739
Status: R

FROM: SMTP%"TERRELL@ESSDP2.LANL.GOV" (ESSDP2::TERRELL) (JAMES TERRELL 94/02/03)
TO: SSL::KOUVELIOTOU AND GIBSON::COLE (CHRYSSA KOUVELIOTOU AND STAYCE COLE)
CC: SMTP%"KHURLEY@SPACE6.SSL.BERKELEY.EDU" (KEVIN HURLEY)
SUBJ: DMSP OBSERVATIONS OF GRO GRB

Chryssa and Stayce:

Thanks very much for the listing of strong Batse bursts sent to me 11/1/93.
I have now managed to check all of them against DMSP data, and find that
many of them were also detected by DMSP8,9,10, or 11. Probably the higher percent
of detections in recent data is due to more extraction of full data. In many
cases such added effort would not be necessary if source direction
(and consequent obscuration of some DMSP satellites) were known to me.
I would appreciate data on more strong events. Here is the present list:

NOTES:

NA: Not apparent in 20-second averaged data (extracting the 2-sec data is
a more time-consuming task, not undertaken in every case).
NA?: Some slight indication of a peak in 20-second averaged data.
SA: South Atlantic Anomaly, obscuring data with high background rates.
SR: South Radiation Belt background.
NR: North Radiation Belt background.
ND: No data for this time.
YES: Burst definitely detected by one or more DMSP satellites (8,9,10,11).
NO: No evidence of a peak in 2-sec data. (NO/OBSC: Obscured by Earth)

DATE	UT	DMSP
910421	33245	8NO 9SR 10NR
910627	16159	8NA 9NR 10ND
910629	71750	8NA 9SR 10NA
910703	18225	8NA 9NA? 10SR
910717	16386	8NA 9SA 10SR
910718	76051	8NA 9SA 10SA
910802	2718	ND
910814	69275	ND
911024	76208	ND
911104	54283	YES--54286 PEAK
911109	12459	8NO 9NR 10NO
911118	68260	ND
911119	23343	YES--23342
911126	46129	8SR 9SR 10NO
911127	15730	YES--15739
911202	73731	YES--73733
911209	66959	8SR 9SR 10NR 11ND
920226	29730	8SA 9NA? 10SA 11SA
920229	69769	8SR 9ND 10NA 11NA
920311	8246	YES--8431
920315	15569	8NA 9NR 10NA 11NA
920325	62258	YES--62256
920404	47506	8NA 10NA? 11NR
920406	9855	8NO/OBSC 10SR 11SR/OBSC
920414	84163	NA
920517	11877	YES--11883
920525	12423	YES--12427

920622	25504	8SA 10NR 11SA
920627	46956	NA
920711	53140	YES--58157
920718	77563	8NA 10SA 11NA
920720	11524	8NA/OBSC 10NA/OBSC 11SR
920824	39183	YES--39186
920902	1736	YES--1743
921009	24070	YES--24073
921022	55259	8ND 10NA 11NA
921123	22711	YES--22727
921123	46583	YES--46542
921207	57647	YES--57649
921209	41738	8NR 10NA 11NR
930106	56259	YES--56260
930110	6698	8NA 10NR 11NA
930120	84700	YES--84779
930131	68231	YES--68231
930201	60115	YES--60129
930309	11269	NA
930329	11365	8NA 10SR 11NA
930405	32089	YES--32105
930406	26185	8NA 10NR 11NA
930428	04032	8NA 10NA 11SR
930506	53571	YES--53578
930506	65631	NA

From @space6.ssl.berkeley.edu,@cmsa.berkeley.edu:X024862@JPNRKY00.BITNET Thu Nov 26 03:41:24 J
Date: 26 NOV 1992 18:19:41 JST
From: <X024862@JPNRKY00.BITNET@cmsa.berkeley.edu>
Subject: YOHKOH GRB Event List
To: <khurley@space6.ssl.berkeley.edu>
Content-Length: 1674

To: Dr. K. Hurley (SSL/UCB)
Fr. Masato Yoshimori (Rikkyo Univ.)
Date: Thu. 26 Nov. 1992

Dear Dr. Hurley:

I am sending the YOHKOH GRB event list. YOHKOH has two GRB detectors, hard X-ray spectrometer (HXS) and radiation belt monitor (RBM). HXS is a NaI detector (3 in. dia x 1 in. thick) which provides a 32 channel energy spectrum (20 - 600 keV) every 2 sec and a time profile every 31 ms. RBM is a NaI detector (2 in. dia x 1 cm thick) which provides a 32 channel energy spectrum (10 - 300 keV) every 2 sec and a time profile every 31 ms.

YOHKOH GRB Event List (1991 Oct. 1 - 1992 Sept.3)

Date (Day/Month/Year)	UT (hh:mm)	Comment
27/11/91* U B	04:22	HXS
✓09/12/91	18:36	HXS/RBM
21/12/91* No U No B	06:17	HXS/RBM
18/02/92* U-RS No B	18:44	HXS
✓06/04/92	02:45	HXS/RBM
19/04/92* U-RS No U No B	01:22	HXS/RBM
19/05/92* U-RS No U No B	16:30	HXS/RBM
17/06/92* U-RS No U No B	05:29	HXS
✓22/06/92	07:05	HXS/RBM
01/07/92* No U No B	19:39	HXS
11/07/92 U	16:09	HXS/RBM
✓31/07/92	17:07	HXS/RBM
16/08/92 No U No B	12:36	HXS
✓24/08/92	10:56	HXS/RBM
✓03/09/92	23:29	HXS

* Recorded with time resolution of 0.25 or 2 sec.
Accurate burst times (hh:mm:ss) are available shortly.

We hope the YOHKOH GRB event list is helpful to you.

With best regards,

Masato Yoshimori

Acknowledge-To: <X024862@JPNRKY00>

From khurley@space6.ssl.berkeley.edu Tue Nov 24 08:06:08 1992
Date: Tue, 24 Nov 92 07:59:26
From: khurley@space6.ssl.berkeley.edu
Content-Length: 1629

Dear Dr. Yoshimori

Thank you for your recent fax inquiring about the locations of Yohkoh gamma ray bursts. Here are the replies.

1991 Dec 9 18:36: Observed by Ulysses, BATSE, and WATCH. Triangulated position combined with independent BATSE and WATCH positions consistent with source location around RA 17:30, Dec -45.

1992 Apr 6 02:45: Observed by Ulysses, PVO, and BATSE. Triangulated position indicates location around RA 19:15, Dec -57

1992 Jun 22 07:05: Observed by Ulysses, SIGMA/GRANAT, COMPTEL, and BATSE. Preliminary triangulated position combined with COMPTEL location consistent with source location around RA 10:00 Dec +48.

1992 July 31 17:07: Observed by Ulysses. Apparently no other observations.

1992 Aug 24 10:56: Observed by Ulysses and BATSE. Triangulated position and independent BATSE location consistent with source position around RA 15:00, Dec -50.

1992 Sep 3 23:29: Observed by Ulysses on September 4. Apparently no other observations.

As you are aware, I sent a letter to Professor Uchida on January 31 of this year, proposing to collaborate with Yohkoh scientists on burst locations. I am particularly interested in events which were detected by Ulysses, but not by GRO or any other near-earth spacecraft (there seem to be two of these in your list). I never received a reply to this letter, so I am not sure what the status of this suggestion is. If there is agreement that a collaboration is possible, then we should establish formats for data exchange by e-mail and proceed to exchange lists of candidate events. Please let me know whether you agree.

Best regards,

Kevin Hurley

11/01/92 12:59 4567890987654321 期:2097 郵 (三) 0080 Page 1/2 1/2

M. Yoshimori

Department of Physics
Rikkyo University
3-34-1 Nishi-Ikebukuro, Toshima-ku, Tokyo 171, Japan
Phone. 011-81-3-3985-2391
Fax. 011-81-3-5992-3434
E-Mail: X024862@JPNRKY00.BITNET

To: Dr. K. Hurley (Space Sciences Lab. UCB)
Fax. 001-1-510-643-7629
Date: Fri. 20 Nov. 1992

Dear Dr. Hurley:

Yohkoh has observed the following six gamma-ray bursts since its launch (Aug. 30, 1991):

Date	Start Time (UT)
1991 Dec.09	18 h 36 m
1992 Apr.06	02 h 45 m
1992 June 22	07 h 05 m
1992 July 31	17 h 07 m
1992 Aug.24	10 h 56 m
1992 Sept.03	23 h 29 m

If you have the data of their locations obtained from GRO/ BATSE and Ulysses, please let me know them. I am sending the time profiles of four Yohkoh bursts.

Thank you in advance for it.

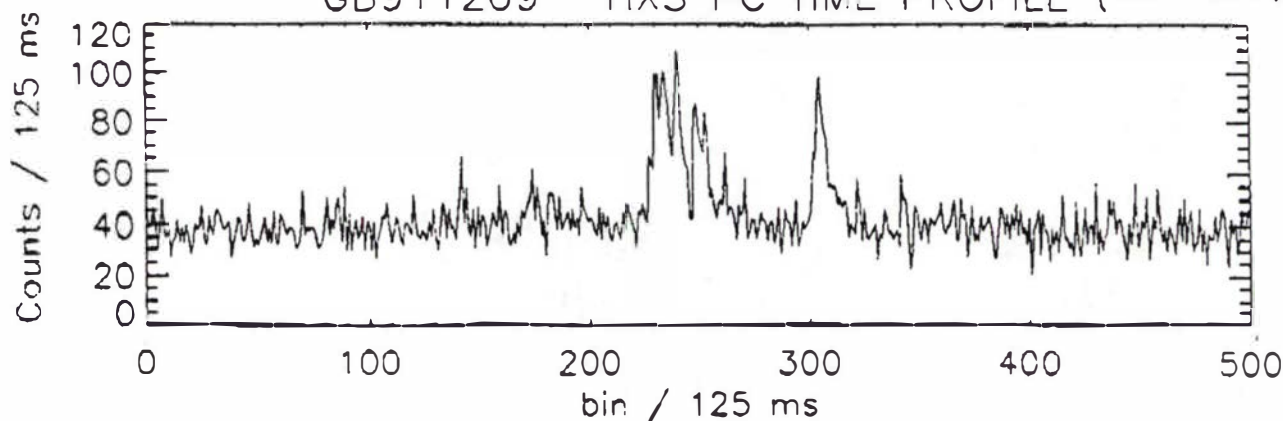
With best regards,

Masato Yoshimori

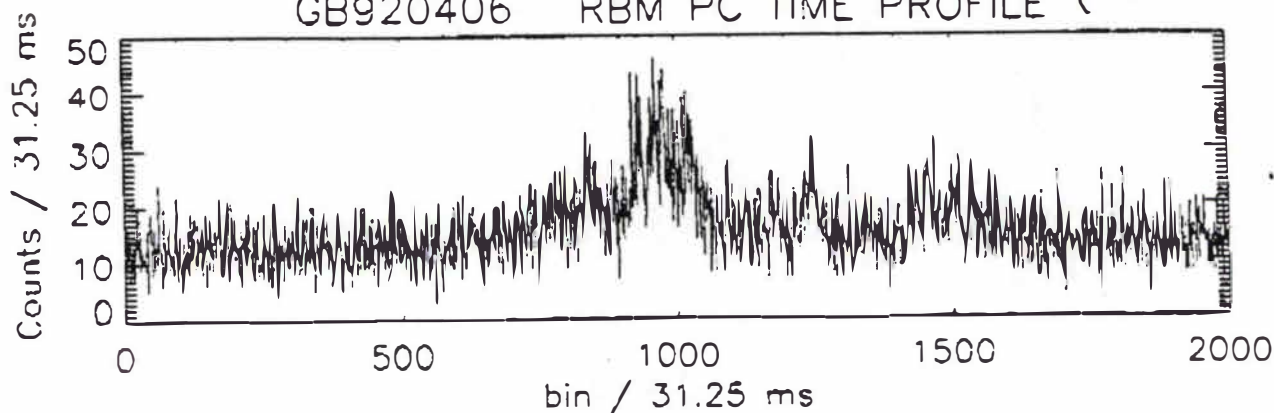


1/2

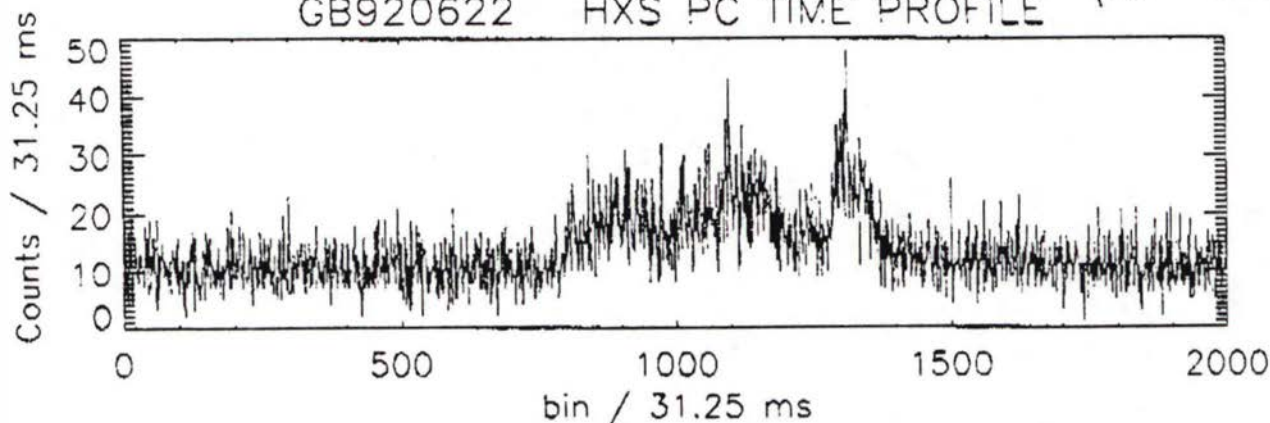
GB911209 HXS PC TIME PROFILE (20-600keV)



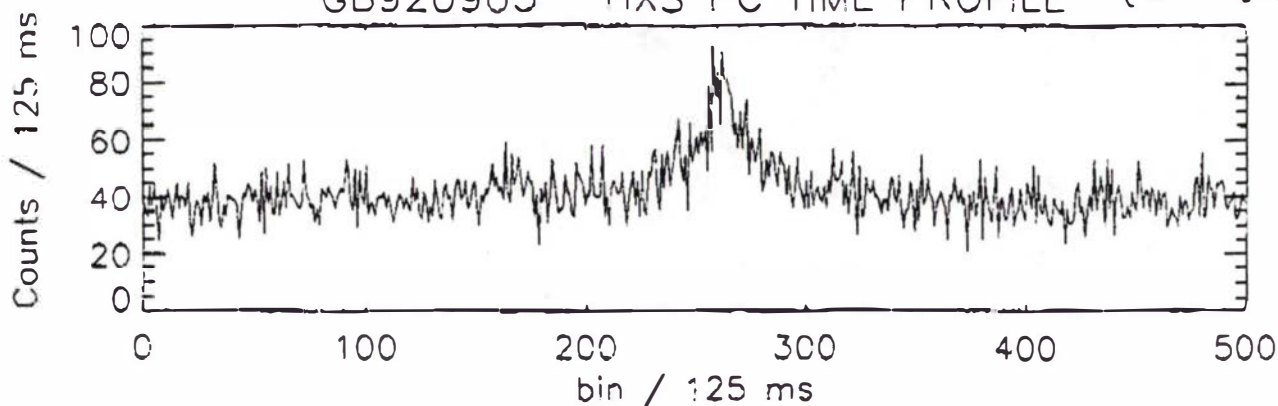
GB920406 RBM PC TIME PROFILE (10-300keV)



GB920622 HXS PC TIME PROFILE (20-600keV)



GB920903 HXS PC TIME PROFILE (20-600keV)



From khurley@space6.ssl.berkeley.edu Fri Oct 2 08:03:14 1992
Date: Fri, 2 Oct 92 06:57:59
From: khurley@space6.ssl.berkeley.edu
Content-Length: 774

MESSAGE FOR RENE HUDEC

Dear Rene,

I am sending you (by regular mail) the results of my burst locations for some of the events you requested. You will receive plots and printouts for the following events:

Nov 27, Dec 2, Dec 9, 1991, and Jan 10 1992

For the following events, I had no BATSE data, and could not search the Ulysses data: Aug 29, Sep 2, Nov 29, Dec 28, 1991; Jan 21, Feb 24, Feb 27, and Mar 5, 1992. I have requested the BATSE data from Chryssa, and will look when she sends them. But the fact that they were not communicated to me before probably means that they were too weak to detect on Ulysses.

For the following events, it turned out that there was definitely no Ulysses data: May 5, May 11, Oct 25, Oct 27 1991; Feb 9 1992.

Best regards,

Kevin

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 but event not clear~~
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 " "

From murakami@astro.isas.ac.jp Mon Apr 20 22:16:17 1992
 Date: Tue, 21 Apr 92 14:16:07 GMT
 From: Toshio MURAKAMI <murakami@astro.isas.ac.jp>
 To: khurley@sunspot.ssl.berkeley.edu
 Subject: Digital data
 Content-Length: 1780

Dear Kevin-san, sorry for such long delay. We are almost solve the question about the our timing system of Ginga. As you know we have never been any experience of timing with other satellite before. I hope you to use our data with great care and to check our timing system using Ulysses and GRO. I heard our data might help to solve the timing problem of GRO in case if Ginga has no any error (I am now believing so). GRO people already have one Ginga file of GB910717 to check their timing. I heard that there was 2.04sec(?) shift between us. Thus I am now ready to send our GRB digital files through E-mail to you.

By the way I am sending two GRBs GB910122 and GB910204 as a test. I am not including GB910314 and GB910315 because these were in bit-low mode with only 4 sec time resolution. Do you think these are still useful? We are ready to send you GB910717 if you like. Are there any other one you want? Please let me know your preference refer to the Ginga GRB list. I am not sending GB901219 at 21:52 because you have no data. What means no data in your last E-mail?

The files contain time in UT at the start (not the end) of the first data, height in km and the earth center vector looking from the satellite in equatorial coordinates with 2048 data of 31.25msec time resolution. The error of time may not be more than +/-2 msec I hope. In case if you feel something curious please let me know.

Concerning the Yohkoh GRBs, I have checked the data base and find at least 5 candidates. GB911127 at around 4h, GB911209 at 18h, GB911221 at 6h, GB920218 at 18h, GB920406 at 2h. Two of them show coincidences with GRO. These are still in the levels of candidate so I hope you to confirm. Two e-mails will follow this..

..Murakami

GINGA

Jan 30 '91 11:56 (RT requested)
 Feb 6 '91 8:45 Trigger *
 Mar 22 '91 12:41 (RT requested)
 Apr 2 '91 10:28 RI
 Apr 29 '91 5:11 RI
 May 22 '91 12:14 Trig *
 May 27 '91 23:45 (RT requested)
 Jul 9 '91 20:22 (RT req.)
 Jul 17 '91 4:33 *
 Jul 23 '91 14:06 (RT req)
 Jul 25 '91 13:12 (RT req)
 Aug 3 '91 8:33 (RT req)
 Aug 14 '91 19:14 *
 Aug 15 '91 12:34 (RT req)
 Aug 27 '91 13:11 (RT req)
 Sep 5 '91 23:48 (RT req)

Sep 7 1991 01:04 (RT req)
 Sep 26 1991 18:25 (RT req)
 Oct 8 1991 17:53 (RT req)
 Oct 16 1991 11:01 (RT req)
 Oct 29 1991 4:50 (RT req)

YOHKOH

Nov 27 '91 Yes
 Dec 9 '91 Yes
 Dec 21 '91 Yes
 Feb 18 '92 Probably
 Apr 6 '92 2:45

* requested Ginga data

From @STAR.STANFORD.EDU:081877@ESSDP1.SPAN Mon Mar 23 15:42:36 1992
Received: from STAR.STANFORD.EDU by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA21971; Mon, 23 Mar 92 15:42:32 PST
Message-Id: <9203232342.AA21971@sunspot.ssl.berkeley.edu>
Received: from ESSDP1 by STAR.STANFORD.EDU via MAIL-11 with DECnet;
Mon, 23 Mar 92 15:44:43-PST
Date: Mon 23 Mar 92 15:44:43-PST
From: 081877%ESSDP1.SPAN@STAR.STANFORD.EDU
Subject: PVO realtime events
To: khurley@sunspot.ssl.berkeley.edu
Status: R

Kevin,

We have data on 29 and 30 April, but not 27 November and 9 December.
The April data will be there momentarily, if all goes well.

John

Version 3.0 sep. 12 1993.

The data given below is pre-publication data. The data should not be quoted without prior consultations with the WATCH-GRANAT collaboration. The list is prepared in support of searches for counterparts or multi-spacecraft identifications. The positions given for the localized sources are in most cases based on the fitted mean attitude of GRANAT.

The positional uncertainty is 1 degree error circle radius.

#	date	UT-time	sd	l(s)	m(s)	m/l	position(1950)	Q	t	comments	#Wm	sdp	theta	phi
1	900118	17:40:47	33	280	225	1.1	11h36.3m -44.7	F3	8	4 peaks	0423	28	22.42	26.50
2	900126	18:04:27	146	25	11	0.5	08h44.6m -38.0	F3	r	2 peaks, soft tail	0481	70	21.35	138.49
3	900222	11:56:34	38	33	15	1.5	22h29.9m 35.1	F3	1	1 peak, soft tail	0650	25	20.16	144.39
4	900708	11:30:20	36	160	95	2.0	12h22.3m 31.4	F3	1	3 peaks	1490	29	58.49	90.41
5	900901	01:35:46	36	230	110	4.0	18h19.4m -44.8	F3	4	4 peaks	1811	28	39.58	167.23
6	900325	20:25:22	18	45	42	1.2	8h56.0m -35.3	F3	1	Structured event	1970	13	50.37	264.93
7	900929	01:49:48	40	180	180	1.3	11h12.9m -06.6	F3	r	2 groups of spikes	1990	32	44.31	344.08
8	901009	00:15:50	30	11	9	3.5	23h12.1m +29.6	F3	1	1 peak	2041	17	52.34	319.13
9	901116	01:42:08	19	15	15	2.2	02h36.7m +25.1	F3	8	1 peak	2241	11	53.92	15.72
10	901219	21:52:52	24	50	35	2.2	23h06.9m -53.9	F3	8	1 peak	2490	18	57.94	83.18
11	910122	15:13:35	28	127	-	0.0			1	Soft, structured	2670	25	42.26	142.13
12	910219	11:45:24	43	67	54	0.7	14h12.5m 59.0	F3	r	2 peaks	2813	29	25.97	230.72
13	910310	13:02:05	81	41	40	2.5	12h11.9m 06.4	F3	1	3 peaks	2931	40	51.36	351.15
14	910627	04:29:24	20	11	-	0.4	(13h14m -03.2)	I2	1	1 peak. X-burst?	3643	18	20.70	262.04
15	910821	10:33:56	21	66	66	0.5	23h31.8m -72.6	F3	4	Struct. + sharp pk.	3991	14	51.52	116.19
16	911016	11:03:30	22	160	-	0.1	19h47.8m -04.8	F3	8	very soft, 2 peaks	4381	17	32.03	227.19
17	911202	20:28:59	41	20	11	0.7	11h27.1m -23.2	F3	1	Single struct. peak	4623	16	35.87	30.52
18	911209	18:36:11	42	30	12	1.8	17h26.4m -44.4	F3	r	4 peaks	4680	28	34.53	320.77
19	920311	02:20:37	42	40	40	1.3	08h45.4m -36.4	F3	8	1 peak	5201	37	51.39	83.56
20	920714	13:04:51	36	40	36	2.1	14h41.6m -30.0	F3	8	1 peak	5921	28	43.75	202.33
21	920718	14:41:15	30	90	30	0.4	01h22.6m -3.5	F3	8	1 odd peak	5953	20	17.97	302.95
22	920718	21:32:46	40	7	5	1.8	19h43.0m -56.5	F3	1	1 dull peak	5951	29	24.43	93.23
23	920723	20:03:10	186	13	8	3.9	19h04.5m 27.4	F3	1	1 dull peak	5991	79	33.49	208.18
24	920902	00:29:04	49	13	9	4.6	18h36.0m -22.8	F3	1	1 dull peak	6163	30	49.14	320.14
25	920903	01:36:15	23	154	103	2.0	19h43.0m 35.2	F3	4	Main peak + spikes	6173	14	38.94	230.29
26	920903	23:29:05	92	24	15	2.5	20h06.3m 21.7	F3	r	1 peak (low E. str)	6183	49	43.53	249.60
27	920925	20:30:42	25	120	120	2.5	13h27.0m 43.1	F3	1	3 peaks	6313	13	51.98	115.24
28	920925	22:49:14	43	347	340	1.3	22h02.0m 24.0	F3	4	struct, soft tails	6311	32	43.03	65.02

1950
261.6 -44.4 →
2050
262.510, -44.441

date UT-time sd l(s) m(s) m/l position(1950) Q t comments #Wm

Comments:

UT-time: Time for peak count rate in Med CsI band. Note time resolution!

Times marked with an asterisk are not yet well calibrated to UT.

sd: Standard deviations above background (in count rates).

l(s): Duration in 6-15 keV band (Low NaI channel)

m(s): Duration in 15-180 keV band (Med CsI channel)

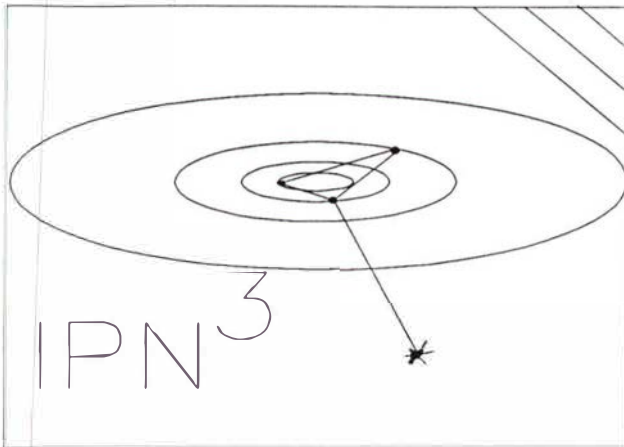
m/l: Hardness: (sd(Med NaI)+sd(Med CsI)) / sd(Low NaI)

posit.: All events in the above list (except 910627) have been localized consistently at least twice based on independent data sets. We are therefore convinced of their true cosmic nature, even without confirming evidence from other spacecraft. GRB 910627 has been included in the list because it is confirmed to be cosmic by many other instruments, and the WATCH position is quite secure due to the good signal to noise ratio.

Q: Type of attitude data: I2: initial pointing at obs. start. 2 axes (poor, syst. error: ± 0.8 deg)
A2: actual pointing at burst time. 2 axes (better, syst. error: ± 0.5 deg)
F3: fitted mean pointing for TM session. 3 axes (TBD (± 0.5 deg?))
t: Best time resolution available: 1, 4, 8, 16 motor rotations (approx. 0.9 s)
m: 1 motor rotation in 4 ms steps
r: raw memory (4 ms steps)

#Wm Telemetry session and WATCH unit identifier
sdp: Standard deviations above background in final modulation pattern
used for source localization. As a rough guide, the statistical
uncertainty in the source position is $240/\text{sdp}$ arcminutes. In most
cases the systematic errors dominates the error budget.

theta and phi: Source position in WATCH instrument coordinates.



FAX FROM K. HURLEY
UNIVERSITY OF CALIFORNIA
SPACE SCIENCES LABORATORY
BERKELEY, CA. 94720
PHONE: (510) 643-9173
FAX: (510) 643-8640 (OFFICE), -8302 (SECT'Y)
E-MAIL: khurley@sunspot.ssl.berkeley.edu

TO: Niels Lund, DSRI
FAX #:
DATE: July 23, 1993
TOTAL NUMBER OF PAGES: 6

As we discussed, I am sending you my notes on those Watch/Ulysses events which seem to have some potential for making small error boxes. Note that there are some Watch events for which we have no data, and cannot proceed. I would like to get the data as soon as possible. I think that this will make a nice Huntsville paper, provided we can remove the inconsistencies.

WATCH/ULYSSES EVENTS

1. 19 Feb 91. Done. Watch/Ulysses/PVO triangulation agrees with Watch error box. Optical transient inside Watch error box, but not inside IPN location.
2. 10 March 91. Watch/Ulysses/PVO event. I need the Watch digital data to triangulate this.
3. 17 Jul 91. Watch/BATSE/Ulysses/PVO event. BATSE and triangulation positions are around RA=241, dec=-63; Watch position given as 234, +29. Inconsistent.
4. 16 Oct 91. Watch/BATSE/Ulysses/PVO event. Earth/Venus/Ulysses were aligned, making the triangulation uncertain, but the Watch error box is consistent with Ulysses/BATSE annulus, and marginally consistent with BATSE error box. Needs more work.
5. 9 Dec 91. Watch/Ulysses/BATSE event. Watch error box is several degrees from Ulysses/BATSE annulus, but inside BATSE error box. This one needs more work.
6. 14 Jul 92. Watch/Sigma/BATSE/PVO event. The Sigma camera localized this event. Everyone is in agreement!
7. 18 Jul 92, 14:41. Watch/Ulysses event. I need the Watch digital data to do the triangulation.
8. 18 Jul 92, 21:32. Watch/Ulysses/BATSE event. I haven't triangulated it yet, but have all the data I need to do it.
9. 23 Jul 92. Watch/Ulysses/Sigma/PVO event. Localized by Sigma gamma camera. Previous Watch position (with 0.5° radius error box) was inconsistent with triangulated position, but in Sigma error box. New Watch position (with 1° radius error box) is consistent with everybody, although the IPN location is at the edge of the Watch box. PVO ephemeris needs to be updated - still using Venus.
10. 3 Sep 92 1:36. Ulysses/Watch/BATSE event. I need the BATSE data to triangulate this one.
11. 3 Sep 92 23:11. Ulysses/Watch event. I need the Watch data to triangulate it.
12. 25 Sep 92 19:30. This one is new (at least, to me). I'm looking for it in the Ulysses real-time data (I know we didn't trigger on it). However, there is also a Phebus event on this day, with time given as 20:30. I wonder if there is a mistake here somewhere?
13. 25 Sep 92 22:49. Ulysses/Watch event. I need the Watch data to triangulate it.

Possible
Ulysses RA 25
Watch error box
Phebus event

From root Thu Aug 5 05:22 1993
 Received: by space6.ssl.berkeley.edu (AIX 2.1 2/4.03)
 id AA13940; Thu, 5 Aug 93 05:22:42
 Received: from danpost.uni-c.dk by sunspot.ssl.berkeley.edu (4.1/1.30.1)
 id AA01678; Thu, 5 Aug 93 05:22:43 PDT
 Received: from uhuru.dsri.dk by danpost.uni-c.dk (5.65c+/1.34)
 id AA08631; Thu, 5 Aug 1993 14:26:14 +0200
 Received: by uhuru.dsri.dk (4.1/SMI-4.1)
 id AA15442; Thu, 5 Aug 93 14:24:35 +0200
 Date: Thu, 5 Aug 93 14:24:35 +0200
 From: Niels Lund <nl@dsri.dk>
 Message-Id: <9308051224.AA15442@uhuru.dsri.dk>
 To: khurley@ssl.Berkeley.EDU
 Status: R

Dear Kevin:

Attached find time histories for two events: GRB 911209 and GRB 910310. You have already received GRB 911209 once before (one month ago), but I have detected an error in the on board software providing the time stamp on our count rate data, this error resulting in time stamps delayed by slightly over one rotation time of our modulators - approximately 0.9 s. This error does not affect the timing of our high resolution data, so I don't think it will move the time for GRB 910219.

Please delete the old data for GRB911209 from your files!

I have also received updated pointing information for GRB 911209. The pointing information I used previously was the "expected" pointing. What I have now should be the "actual" pointing at the beginning of the SIGMA observation. This is still not the true pointing at the time of the burst! But there is in this case an unusually large deviation between the expected and the actual pointing - about 5 degrees - so there is hope that the inconsistency you mentioned in your fax will go away. I must stop now, but expect to have the updated sky position for this event for tomorrow.

niels

GRB 911209 WATCH data. (W4680)
 WATCH LOCALIZATION
 (Matching BATSE event)
 (WATCH times have been updated 930805. nl)

Low Energy NaI (6- 15 keV)
 UT start time: ' 1991 12 9 18 35 43.702
 UT end time: ' 1991 12 9 18 39 12.931
 Channel width: 0.8173 s

145	169	185	160	155	161	136	161	153	159
175	169	175	164	197	164	160	157	177	177
224	177	154	189	231	212	247	195	178	192
157	175	197	350	366	311	288	230	212	202
207	170	151	162	314	299	200	176	161	164
197	185	190	161	235	172	157	182	166	172
153	173	162	147	169	140	156	161	186	146
178	155	146	199	164	178	164	163	175	160
144	199	161	180	203	177	147	152	187	166
164	179	196	152	165	173	184	183	165	179
181	184	191	191	185	165	161	162	159	180
181	177	193	161	185	156	183	183	193	163
161	185	183	195	158	148	168	188	190	142
165	160	174	158	173	167	154	202	157	145

From nl@dsri.dk Mon Aug 9 08:07:41 1993
Date: Mon, 9 Aug 93 13:10:41 +0200
From: Niels Lund <nl@dsri.dk>
To: khurley@ucbssl.berkeley.edu
Content-Length: 20026

Dear Kevin:

Attached find two more WATCH time histories.

I have used a lot of time on GRB 911209 to get a better position. The GRANAT pointing data I have are apparently not consistent with our own data on Sco X-1 and Cyg X-1, both of these sources are by good luck in the field together with the burst. My best estimate for the burst position is now RA: 17h32m, Dec -43.8d (1950), but I expect that there will be future revisions.

263°, -43.8° (1950)→

263.90524, -43.83392

You were right about your suspicions concerning the UT-time of GRB 920925A. The time given by PHEBUS (20:30) is correct.

Both Soren Brandt and Alberto have been quite busy last week checking our data against your list and lists from PHEBUS and SIGMA. Obviously our own previous scanning have not been very efficient because they have come up with 14 new bursts which can be localized by WATCH. In addition many weak bursts have been identified in our data, bursts too weak to establish a reliable position based on WATCH data alone.

I attach an updated burst list giving the times of the bursts we can localize.

niels

Kevin: Please note the small peak 9 m 35 s before the main event. Do you see the same in the ULYSSES data? (Did BATSE see this although they missed the main event ?) WATCH cannot localize the precursor, but if it is real the ULYSSES-WATCH timing may show it to be consistent with the main event!
Niels

GRB 920925B WATCH data. (W6311)

Low energy count rate (6-15 keV)

UT start time: ' 1992 09 25 22 36 26.871

UT end time: ' 1992 9 25 23 7 19.063

Channel width: 3.61756 s

725	783	792	739	761	725	763	724	861	764
819	727	717	702	755	780	769	698	759	713
692	720	727	770	768	726	759	714	741	724
771	758	771	786	793	774	754	779	773	755
734	757	757	790	741	805	786	779	721	735
768	764	739	757	759	721	772	740	757	819
764	787	751	784	802	778	715	795	773	732
758	729	733	728	775	765	780	735	751	795
766	754	731	746	748	721	739	749	742	796
734	761	745	763	745	754	801	753	772	753
724	692	742	785	736	742	779	763	753	756
737	732	779	763	736	755	767	779	759	770
738	759	748	747	747	712	739	743	722	765
756	772	709	802	772	770	752	762	765	748
806	757	810	800	794	762	787	716	814	757
754	757	762	744	761	716	811	770	750	830
765	784	822	838	800	825	790	1015	895	870
759	837	821	808	851	851	886	750	795	777

From root Fri Jul 2 01:59 1993

Received: by space6.ssl.berkeley.edu (AIX 2.1 2/4.03)
id AA03630; Fri, 2 Jul 93 01:59:24

Received: from danpost.uni-c.dk by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA02409; Fri, 2 Jul 93 02:00:40 PDT

Received: from uhuru.dsri.dk by danpost.uni-c.dk (5.65c+/1.34)
id AA16538; Fri, 2 Jul 1993 11:02:15 +0200

Received: by uhuru.dsri.dk (4.1/SMI-4.1)
id AA16796; Fri, 2 Jul 93 10:59:59 +0200

Date: Fri, 2 Jul 93 10:59:59 +0200

From: Niels Lund <nl@dsri.dk>

Message-Id: <9307020859.AA16796@uhuru.dsri.dk>

To: khurley@ssl.Berkeley.EDU

Status: R

α, δ 1950 = 257, -44.2

α, δ 2000 = 257.90, -44.26

Dear Kevin

Just before leaving on vacation I send you an updated list of
WATCH-GRANAT bursts. (I noted that you displaced our two bursts on
September 25 to July in your latest list)

After my vacation I will prepare some more count rate records for
you.

niels

WATCH-GRANAT Gamma Ray Bursts. Niels Lund, Alberto Castro-Tirado & Soren Brandt, July 1993
Danish Space Research Institute.

The data given below is pre-publication data. The data should not be quoted without prior
consultations with the WATCH-GRANAT collaboration. The list is prepared in support of
searches for counterparts or multi-spacecraft identifications. The positions given for
the localized sources are in most cases based on the predicted attitude of GRANAT.
The positional uncertainty is 1 degree error circle radius.

#	date	UT-time	sd	l(s)	m(s)	m/l	position(1950)	t	comments	#wm	sdp	theta	phi
1	900118	17:40:48	54	280	225	1.1	11h35m -45.2	8	4 peaks	0423	30	22.42	26.50
2	900126	18:04:27	207	25	11	0.5	08h44m -37.6	r	2 peaks, soft tail	0481	112	21.35	138.49
3	900222	11:56:35	64	33	15	1.5	22h25m 34.0	1	1 peak, soft tail	0650	29	20.16	144.39
4	900308	09:39:02	14	?	15	3	-----	16	PHEBUS burst	0721			
5	900404	17:54:36	30	0.3	0.3	2.5	-----	m	SIGMA burst	0901			
6	900708	11:30:21	62	160	95	2.0	12h21m 30.8	1	3 peaks	1490	33	58.49	90.41
7	900901	01:35:47	60	230	110	4.0	18h19m -44.9	4	4 peaks	1811	34	39.58	167.23
8	910219	11:45:25	66	67	54	0.7	14h13m 58.6	r	2 peaks	2813	40	25.97	230.72
9	910310	13:02:06	139	41	40	2.5	12h14m 07.8	1	3 peaks	2931	55	51.36	351.15
10	910408	22:24:18	24	0.3	0.3	0.5	-----	r	ULYSSES burst	3151			
11	910414	07:28:27	22	0.5	0.5	1.8	-----	m	Unconfirmed	3183			
12	910717	04:33:07	15	10	-	0	15h37m 29.3	1	BATSE burst	3751	15	4.6	245.9
13	911016	11:03:31	24	160	-	0.1	19h48m -04.8	8	very soft, 2 peaks	4381	18	32.0	227.2
14	911209	18:36:11	73	30	12	1.8	17h08m -44.2	r	4 peaks	4680	40	34.53	320.77
15	920714	13:04:52	62	40	36	2.1	14h43m -30.0	8	1 peak	5921	32	43.75	202.33
16	920718	14:41:16	40	90	30	0.4	01h21m -03.7	8	1 odd peak	5953	22	17.97	302.95
17	920718	21:32:47	69	7	5	1.8	19h37m -56.5	1	1 dull peak	5951	39	24.43	93.23
18	920723	20:03:11	312	115	200	3.9	19h04m 26.4	1	1 dull peak	5991	153	33.49	208.18
19	920903	01:36*	81	13	9	4.6	18h31m -22.2	1	1 dull peak	6163	50	49.14	320.14

20	920903 23:11*	39	154	103	2.0	19h39m	34.8	4	1 peak + spikes	6173	15	38.9	230.3
21	920925 19:30:43	43	120	120	2.5	13h24m	42.3	1	3 peaks	6313	16	52.0	115.2
22	920925 22:49:14	72	347	340	1.3	22h02m	25.9	4	struct, soft tails	6311	35	43.03	65.02

#	date	UT-time	sd	l(s)	m(s)	m/l	position(1950)	t	comments	#Wm
---	------	---------	----	------	------	-----	----------------	---	----------	-----

comments:

UT-time: Time for peak count rate in Med CsI band. Note time resolution!

Times marked with an asterisk are not yet well calibrated to UT.

sd: Standard deviations above background (in count rates).

l(s): Duration in 6-15 keV band (Low NaI channel)

m(s): Duration in 15-180 keV band (Med CsI channel)

m/l: Hardness: (sd(Med NaI)+sd(Med CsI)) / sd(Low NaI)

t: Best time resolution available: 1, 4, 8, 16 motor rotations (approx. 0.9 s)

m: 1 motor rotation in 4 ms steps

r: raw memory (4 ms steps)

#Wm Telemetry session and WATCH unit identifier

sdp: Standard deviations above background in final modulation pattern used for source localization. As a rough guide, the statistical uncertainty in the source position is 240/sdp arcminutes. In most cases the systematic errors dominates the error budget.

theta and phi: Source position in WATCH instrument coordinates.

From root Fri Jul 16 15:29 1993
Received: by space6.ssl.berkeley.edu (AIX 2.1 2/4.03)
id AA07838; Fri, 16 Jul 93 15:29:21
Received: from UCBSP.SSL.BERKELEY.EDU by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA21891; Fri, 16 Jul 93 15:30:05 PDT
Message-Id: <9307162230.AA21891@sunspot.ssl.berkeley.edu>
Date: Fri 16 Jul 93 15:31:54-PST
From: SC <046369@essdp2.span.nasa.gov>
To: KHURLEY@sunspot.ssl.berkeley.edu
Subject: [Resent-MM Mail] DMSP GAMMA-RAY BURST DATA
Status: R

Received: from ESSDP2 by UCBSP.SSL.BERKELEY.EDU via MAIL-11 with
DECnet; Fri, 16 Jul 93 15:31:29-PST
Date: Fri 16 Jul 93 15:31:29-PST
From: 046369@ESSDP2.SPAN.NASA.GOV
Subject: DMSP GAMMA-RAY BURST DATA
To: "UCBSP::HURLEY"@ESSDP2.SPAN.NASA.GOV

FROM: ESSDP2::TERRELL (JAMES TERRELL, LOS ALAMOS NATL LAB)
TO: UCBSP::HURLEY (KEVIN HURLEY)
CC:
SUBJ: DMSP GAMMA-RAY BURST DATA, AS OF 16 JULY 1993

HERE ARE SOME NOTES CORRECTING DMSP PEAKTIMES FOR YOUR MASTER BURST LIST.
I HAVE MORE GRAPHS AND INFO TO SEND, BUT HAVE RUN OUT OF TIME.
I WILL SEND MORE INFO AFTER RETURNING 28 JULY--JIM.

27SEP91 84415 YES (8SAA,9YES,10SAA)
16OCT91 36696 YES (8SAA,9YES,10NR)
4NOV91 54286 YES (8SR,9YES,10YES)
27NOV91 15739 YES (8NO,9NO,10YES)
2DEC91 73733 YES (8YES,9NO@144DEG,10NR)
9DEC91 66959 N/O (8SR,9SR,10NR,11ND)
21DEC91 22686 YES (8ND,9NO,10NO,11YES)
10JAN92 33478 NA (BLANK) (8ND,9NA,10SAA,11NA)
10FEB92 35633 YES (8NO,9WEAK,10SAA,11SAA)
6APR92 9855 N/O (OBSCURED) (8NO@141,10SR,11NO@137DEG)
1MAY92 76696 N/O (OBSCURED) (8NO@127,10NO@157,11NO@147DEG)
22JUN92 25506 N/O (8SAA,10NR,11SA)
28JUN92 76452 YES (8ND,10YES,11NO)
29JUN92 75897 YES (ALL YES, SOFT)
14JUL92 47069 NA (BLANK) (8NA,10SAA,11SR)
16JUL92 60933 YES (9NO,10YES,11YES)
20JUL92 11524 N/O (OBSCURED) (8NA@130,10NA@145,11SR)
23JUL92 72188 N/O (OBSCURED) (8ND,10NA@148,11NR)
10AUG92 79599 YES? (8YES?,10NA,11NA) (LONG SOFT PEAK)
4OCT92 50421 YES (8YES,10YES,11SR)
23NOV92 22727 YES (8YES,10YES,1SR) (NOT AT 22712)
23NOV92 46542 YES (8NR,10SR,11YES) (NOT AT 46584, BATSE GRB)
7DEC92 57649 YES (8YES,10YES,11YES)
6JAN93 55260 YES (8SAA,10YES,11SR)
12JAN93 55082 YES (8YES,10NO@138,11VERYWEAK) (8:BIG PEAK AT 55202)
20JAN93 84779 YES (8YES,10,YES,11YES) (NO, AT 84700!)

From nl@dsri.dk Thu Aug 5 05:22:48 1993
Date: Thu, 5 Aug 93 14:24:35 +0200
From: Niels Lund <nl@dsri.dk>
To: khurley@ucbssl.berkeley.edu
Content-Length: 23770

Dear Kevin:

Attached find time histories for two events: GRB 911209 and GRB 910310. You have already received GRB 911209 once before (one month ago), but I have detected an error in the on board software providing the time stamp on our count rate data, this error resulting in time stamps delayed by slightly over one rotation time of our modulators - approximately 0.9 s. This error does not affect the timing of our high resolution data, so I don't think it will move the time for GRB 910219.

Please delete the old data for GRB911209 from your files!

Done

I have also received updated pointing information for GRB 911209. The pointing information I used previously was the "expected" pointing. What I have now should be the "actual" pointing at the beginning of the SIGMA observation. This is still not the true pointing at the time of the burst! But there is in this case an unusually large deviation between the expected and the actual pointing - about 5 degrees - so there is hope that the inconsistency you mentioned in your fax will go away. I must stop now, but expect to have the updated sky position for this event for tomorrow.

niels

GRB 911209 WATCH data. (W4680)
WATCH LOCALIZATION
(Matching BATSE event)
(WATCH times have been updated 930805. nl)

Low Energy NaI (6- 15 keV)
UT start time: ' 1991 12 9 18 35 43.702
UT end time: ' 1991 12 9 18 39 12.931
Channel width: 0.8173 s

145	169	185	160	155	161	136	161	153	159
175	169	175	164	197	164	160	157	177	177
224	177	154	189	231	212	247	195	178	192
157	175	197	350	366	311	288	230	212	202
207	170	151	162	314	299	200	176	161	164
197	185	190	161	235	172	157	182	166	172
153	173	162	147	169	140	156	161	186	146
178	155	146	199	164	178	164	163	175	160
144	199	161	180	203	177	147	152	187	166
164	179	196	152	165	173	184	183	165	179
181	184	191	191	185	165	161	162	159	180
181	177	193	161	185	156	183	183	193	163
161	185	183	195	158	148	168	188	190	142
165	160	174	158	173	167	154	202	157	145
147	165	167	192	160	148	169	173	167	176
174	171	157	170	181	195	150	176	192	185
190	156	157	153	172	169	162	188	154	150
177	143	173	153	168	169	140	185	156	169
172	165	167	175	153	173	186	187	168	184
178	178	174	185	164	158	168	168	183	143
185	189	170	170	178	182	175	207	168	174
192	168	180	191	159	168	181	180	178	169
172	172	149	163	185	165	156	165	151	182

162	149	194	160	165	190	164	169	139	176
146	176	177	180	155	167	170	143	173	183
166	168	174	184	185	206				

Med Energy NaI (15-150 keV)

UT start time: ' 1991 12 9 18 35 43.702

UT end time: ' 1991 12 9 18 39 12.931

Channel width: 0.8173 s

30	32	26	40	28	38	45	42	35	41
45	53	54	42	32	23	40	38	40	36
44	37	37	35	42	48	32	41	46	38
39	41	32	106	106	87	94	70	44	47
40	45	46	52	88	75	44	43	52	50
41	45	49	43	45	48	33	46	41	42
47	36	40	34	50	40	43	39	38	45
46	33	47	38	36	47	32	42	38	41
36	46	42	38	35	36	37	34	34	37
40	30	47	42	44	36	41	34	39	35
38	37	31	37	29	38	44	48	37	32
41	29	43	45	34	36	44	38	37	37
41	41	44	46	32	29	50	37	42	39
38	34	41	36	39	41	36	42	54	36
40	46	43	34	49	41	34	37	38	34
44	32	32	48	35	50	45	42	38	34
42	42	34	26	39	44	34	40	46	37
40	44	36	34	40	40	38	52	36	44
32	41	41	28	42	27	41	36	48	51
34	31	35	27	40	40	47	41	46	35
32	33	41	31	40	38	36	36	39	39
45	39	32	42	40	44	40	52	36	49
36	40	33	30	46	35	39	33	51	42
46	45	32	41	41	43	37	42	34	46
39	37	30	45	38	40	26	31	38	33
44	32	47	42	41	38				

Med Energy CsI (15-180 keV)

UT start time: ' 1991 12 9 18 35 43.702

UT end time: ' 1991 12 9 18 39 12.931

Channel width: 0.8173 s

50	40	27	39	35	31	33	34	41	44
42	47	47	49	43	41	45	43	34	45
46	46	43	39	50	50	40	45	37	42
31	40	45	133	117	80	98	64	43	59
43	49	45	38	91	80	52	49	40	35
37	45	44	41	38	49	34	40	40	32
29	46	39	32	33	36	32	32	41	40
32	28	47	36	29	30	40	34	29	56
41	35	36	47	28	43	36	34	40	31
41	42	42	51	41	39	45	35	39	41
47	27	36	39	31	47	40	49	20	48
40	39	31	29	30	31	35	50	43	35
31	33	46	33	31	40	31	40	49	39
43	42	48	27	42	37	40	48	42	32
46	28	46	44	34	44	38	38	25	46
34	32	38	32	33	35	40	35	32	28
34	34	39	37	29	41	34	32	37	41
40	31	45	37	33	36	49	35	38	40
43	35	50	37	37	40	32	35	41	36
38	35	34	49	52	41	32	42	39	43
28	39	44	45	45	45	41	33	38	34
29	46	37	44	34	31	42	36	40	39
35	37	32	44	35	32	36	42	34	21
35	29	39	49	39	46	41	43	37	45
47	43	41	41	38	38	38	43	35	46

42 37 35 45 28 41

Sum of Med E NaI and CsI (15 - 180 keV)
 UT start time: ' 1991 12 9 18 35 43.702
 UT end time: ' 1991 12 9 18 39 12.931
 Channel width: 0.8173 s

80	72	53	79	63	69	78	76	76	85
87	100	101	91	75	64	85	81	74	81
90	83	80	74	92	98	72	86	83	80
70	81	77	239	223	167	192	134	87	106
83	94	91	90	179	155	96	92	92	85
78	90	93	84	83	97	67	86	81	74
76	82	79	66	83	76	75	71	79	85
78	61	94	74	65	77	72	76	67	97
77	81	78	85	63	79	73	68	74	68
81	72	89	93	85	75	86	69	78	76
85	64	67	76	60	85	84	97	57	80
81	68	74	74	64	67	79	88	80	72
72	74	90	79	63	69	81	77	91	78
81	76	89	63	81	78	76	90	96	68
86	74	89	78	83	85	72	75	63	80
78	64	70	80	68	85	85	77	70	62
76	76	73	63	68	85	68	72	83	78
80	75	81	71	73	76	87	87	74	84
75	76	91	65	79	67	73	71	89	87
72	66	69	76	92	81	79	83	85	78
60	72	85	76	85	83	77	69	77	73
74	85	69	86	74	75	82	88	76	88
71	77	65	74	81	67	75	75	85	63
81	74	71	90	80	89	78	85	71	91
86	80	71	86	76	78	64	74	73	79
86	69	82	87	69	79				

Low energy count rate (ch 0-2, 6-9 keV)
 UT Start time: 1991 12 9 18 36 18.877
 Channel width: 0.012769 s

NOTE: The high resolution data shows the second (and smaller)
 of the two main peaks!

0	0	0	1	0	0	0	1
2	2	0	1	2	1	1	0
2	1	0	0	0	0	3	1
1	0	2	2	0	0	1	0
0	0	0	2	0	2	1	1
1	0	2	0	0	3	1	0
1	2	1	0	0	0	0	0
1	3	1	1	0	2	2	2
0	0	0	0	3	1	1	0
2	0	0	0	1	1	0	1
1	2	2	1	1	0	0	2
1	0	1	2	2	2	2	0
1	1	2	0	1	0	0	2
1	1	1	1	2	4	2	1
3	2	2	2	1	3	1	1
2	2	1	2	1	1	1	1
2	0	0	1	1	1	3	4
0	1	3	3	1	2	1	4
2	0	1	4	0	1	1	1
2	0	1	0	2	0	0	0
3	1	1	4	2	1	3	2
0	1	1	3	1	0	5	1
3	1	1	2	0	1	1	2
3	0	2	2	1	0	2	0
6	0	2	1	2	1	0	2

3	1	1	2	0	2	1	1
0	0	2	1	0	0	2	0
1	1	2	0	1	1	0	0
0	0	0	0	0	1	0	0
0	0	2	0	0	1	3	0
1	1	2	1	1	1	1	0
1	0	1	1	1	0	2	1
3	1	0	1	0	0	1	1
0	0	2	1	0	1	2	0
0	2	2	2	2	0	3	2
0	1	1	3	1	1	0	1
2	0	1	1	1	1	1	0
0	1	0	1	3	0	1	1
0	0	2	0	0	3	0	0
2	0	3	1	2	1	1	1
0	0	0	1	2	1	1	0
1	1	1	2	0	0	1	0
0	2	0	1	3	1	2	0
0	1	0	1	0	1	1	1
1	1	0	2	0	0	1	0
0	1	0	1	0	1	2	1
0	0	1	1	0	0	1	1
1	1	1	0	1	0	1	1
2	2	0	0	1	1	1	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

Med energy count rate (ch 3-19, 9-25 keV)

UT Start time: 1991 12 9 18 36 18.877

Channel width: 0.012769 s

1	1	1	1	1	1	1	1
0	1	0	0	1	0	1	2
1	2	1	0	1	1	0	1
1	1	1	2	1	0	2	0
2	0	0	2	1	1	4	0
3	0	0	0	0	2	1	1
0	1	0	1	0	1	0	2
0	1	2	0	0	0	0	0
1	0	0	1	2	1	2	3
1	1	1	4	1	3	0	2
1	2	2	1	2	1	1	0
0	2	3	1	0	0	1	2
0	1	2	3	2	2	4	4
2	0	3	2	5	2	7	3
1	4	3	3	1	5	4	3
2	3	4	4	1	6	0	4
5	3	2	5	2	3	4	0
1	3	5	2	3	2	3	2
2	2	1	1	3	2	2	0
3	0	1	3	3	4	1	4
0	1	2	1	3	3	0	1
3	3	0	1	4	0	0	1

Channel width: 0.012769 s

Lund 6/93

WATCH-GRANAT Gamma Ray Bursts

#	date	UT-time	sd	l(s)	m(s)	m/l	position		t	comments	#Wm
1	900118	17:40:48	54	280	225	1.1	hh:mm:ss	+dd:mm:ss	8	4 peaks	0423
2	900126	18:04:27	207	25	11	0.5			r	2 peaks, soft tail	0481
3	900222	11:56:35	64	33	15	1.5			1	1 peak, soft tail	0650
4	900308	09:39:02	14	?	15	3	-----	-----	16	PHEBUS burst	0721
5	900404	17:54:36	30	0.3	0.3	2.5	-----	-----	m	SIGMA burst	0901
6	900708	11:30:21	62	160	95	2.0			1	3 peaks	1490
7	910219	11:45:25	66	67	54	0.7			r	2 peaks	2813
8	910310	13:02:06	139	41	40	2.5			1	3 peaks	2931
9	910408	22:24:18	24	0.3	0.3	0.5	-----	-----	r	ULYSSES burst	3151
10	910414	07:28:27	22	0.5	0.5	1.8	-----	-----	m	Unconfirmed	3183
11	910717	04:33:07	15	10	-	0			1	BATSE burst	3751
12	911016	11:03:31	24	160	-	0.1			8	very soft, 2 peaks	4381
13	911209	18:36:11	73	30	12	1.8			r	4 peaks	4680
14	920714	13:04:52	62	40	36	2.1			8	1 peak	5921
15	920718	14:41:16	40	90	30	0.4			8	1 odd peak	5953
16	920718	21:32:47	69	7	5	1.8			1	1 dull peak	5951
17	920723	20:03:11	312	115	200	3.9			1	1 dull peak	5991
18	920925	19:30:43	43	120	120	2.5			1	3 peaks	6313
19	920925	22:49:14	72	347	340	1.3			4	struct, soft tails	6311
#	date	UT-time	sd	l(s)	m(s)	m/l	position		t	comments	#Wm

comments:

UT-time: Time for peak count rate in Med CsI band. Note time resolution!

sd: Standard deviations above background (in count rates).

l(s): Duration in 6-15 keV band (Low NaI channel)

m(s): Duration in 15-180 keV band (Med CsI channel)

m/l: Hardness: (sd(Med NaI)+sd(Med CsI)) / sd(Low NaI)

t: Best time resolution available: 1, 4, 8, 16 motor rotations (approx. 0.9 s)

m: 1 motor rotation in 4 ms steps

r: raw memory (4 ms steps)

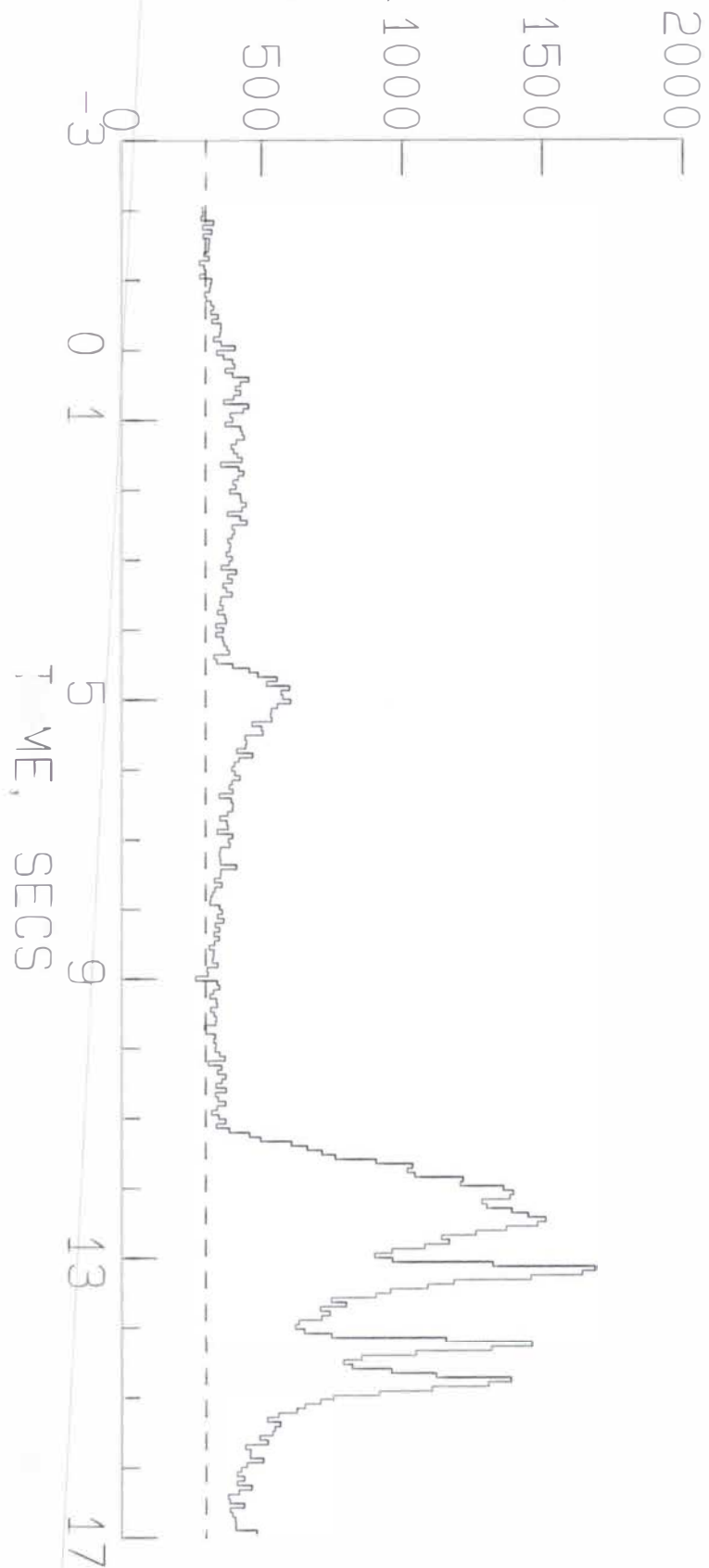
BATSE

09/12/91

66959.909 - 2.042

25- 100 keV

COUNTS/ .064 S



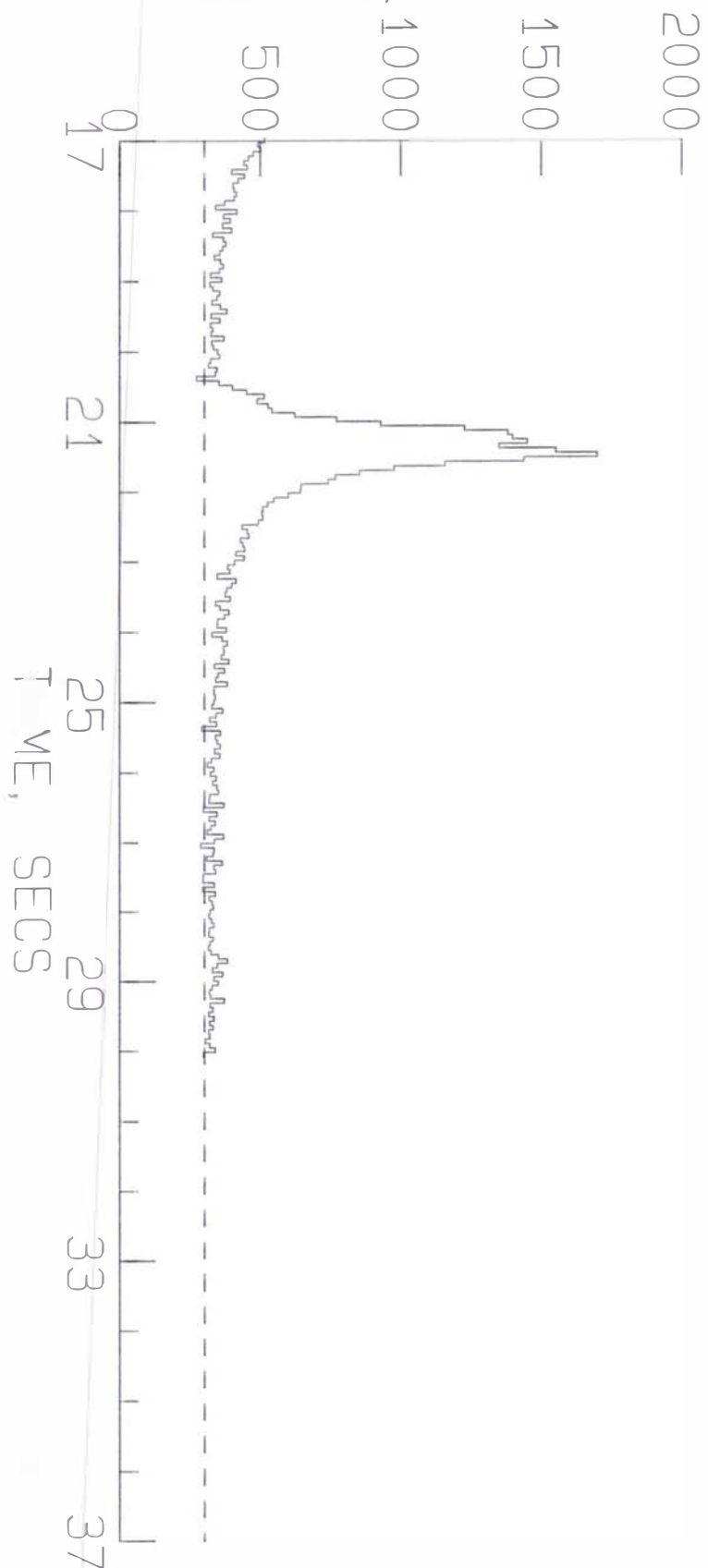
BATSE

09/12/91

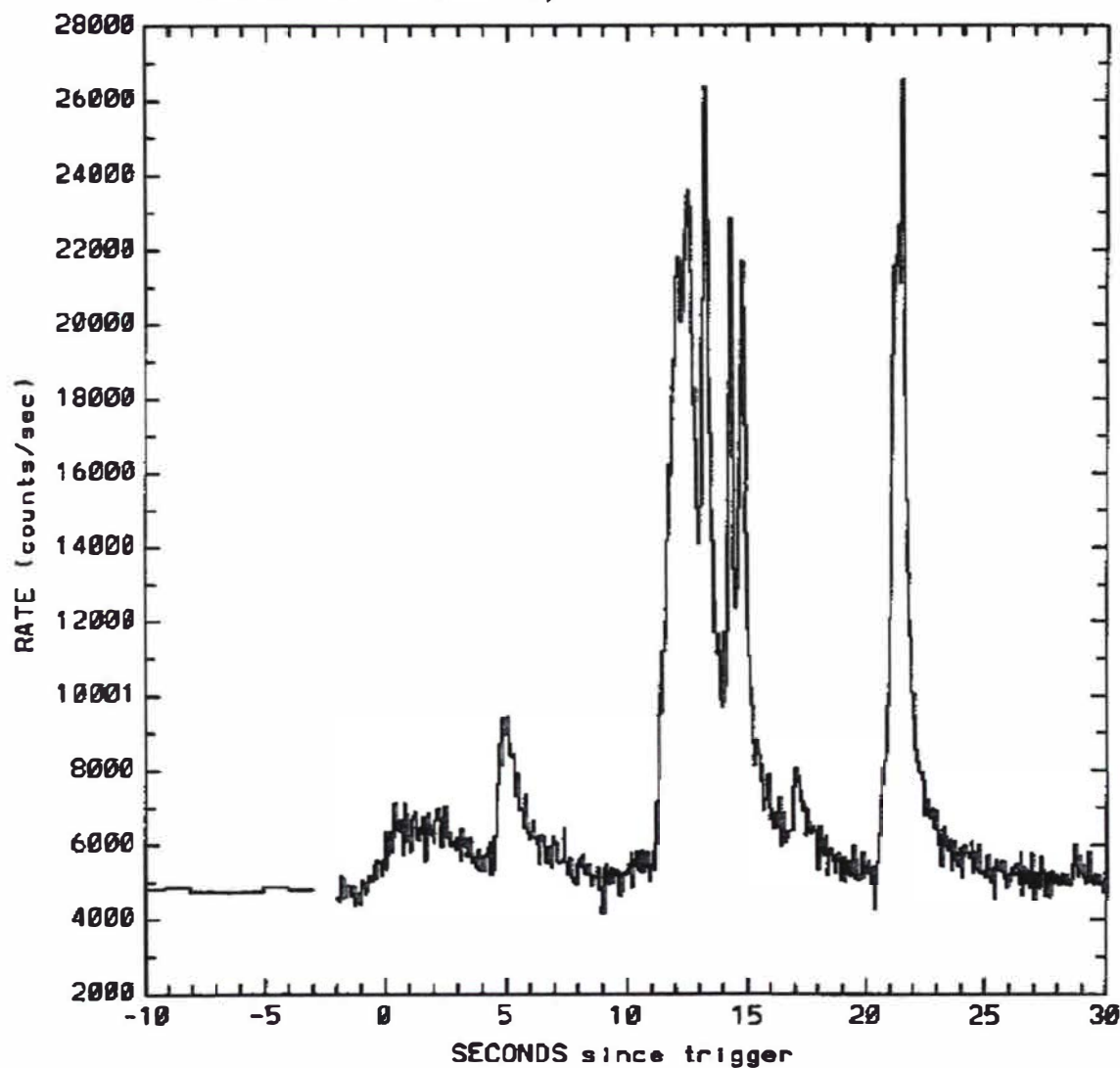
66959.909

25- 100 keV

COUNTS/ .064 S



Data for K Hurley



Dec 9 '91
17-MAY-1992 17:04:16

Created by WOPS BD
(Burst Display)
Version 2.11

Trigger # : 1157

Trigger Time:
8593 / 66959.009

Burst Data Type:
DISCSC

Deadtime
Corrected: N
Background Data
Type: PREB + DISCLA
Minimum Integ. Time:
0.064 seconds

Detectors [7..8]:
00100010

Discriminators:
(1, 2)

Quality Mask:
BDISP0

WATCH 09/12/91 66978.877

6- 9 keV

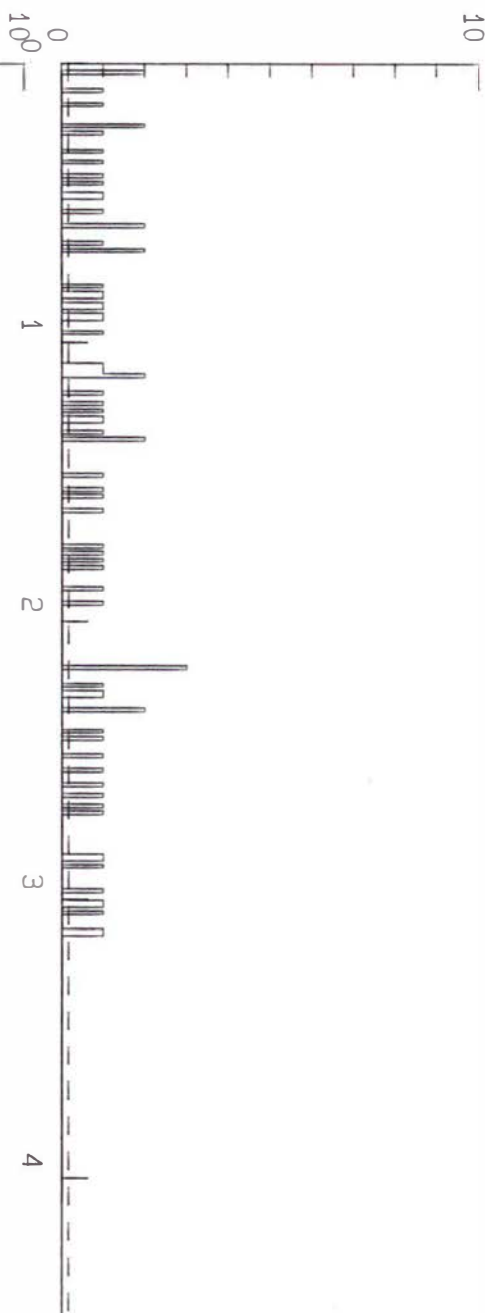
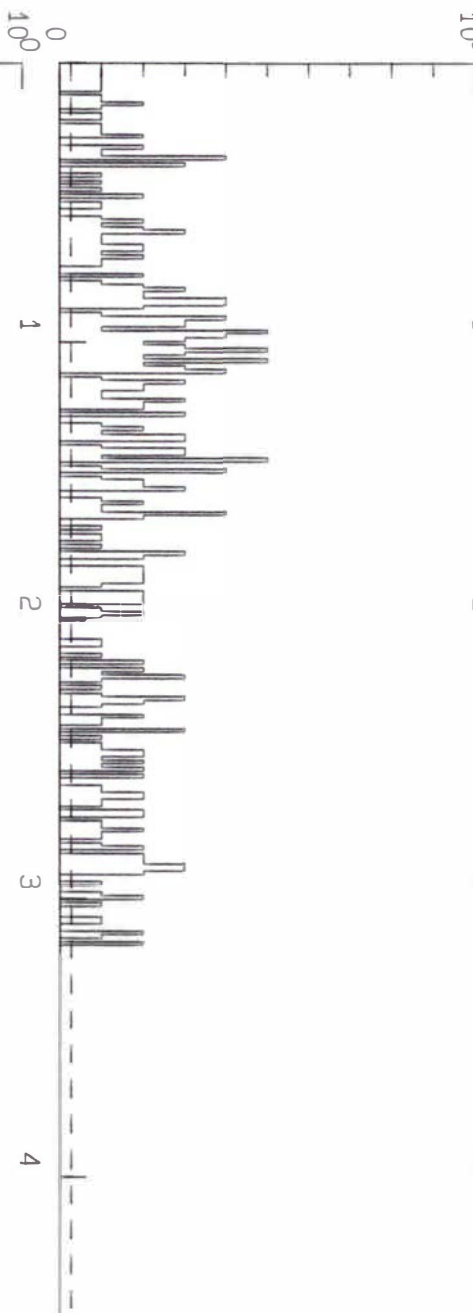
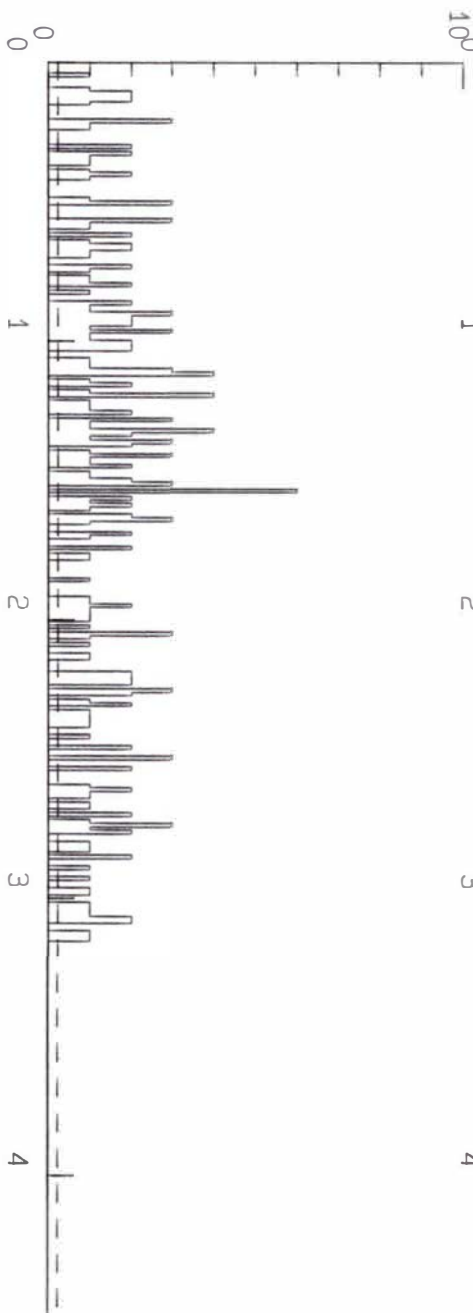
9- 25 keV

25- 150 keV

COUNTS/ .0128 S

COUNTS/ .0128 S

COUNTS/ .0128 S



WATCH

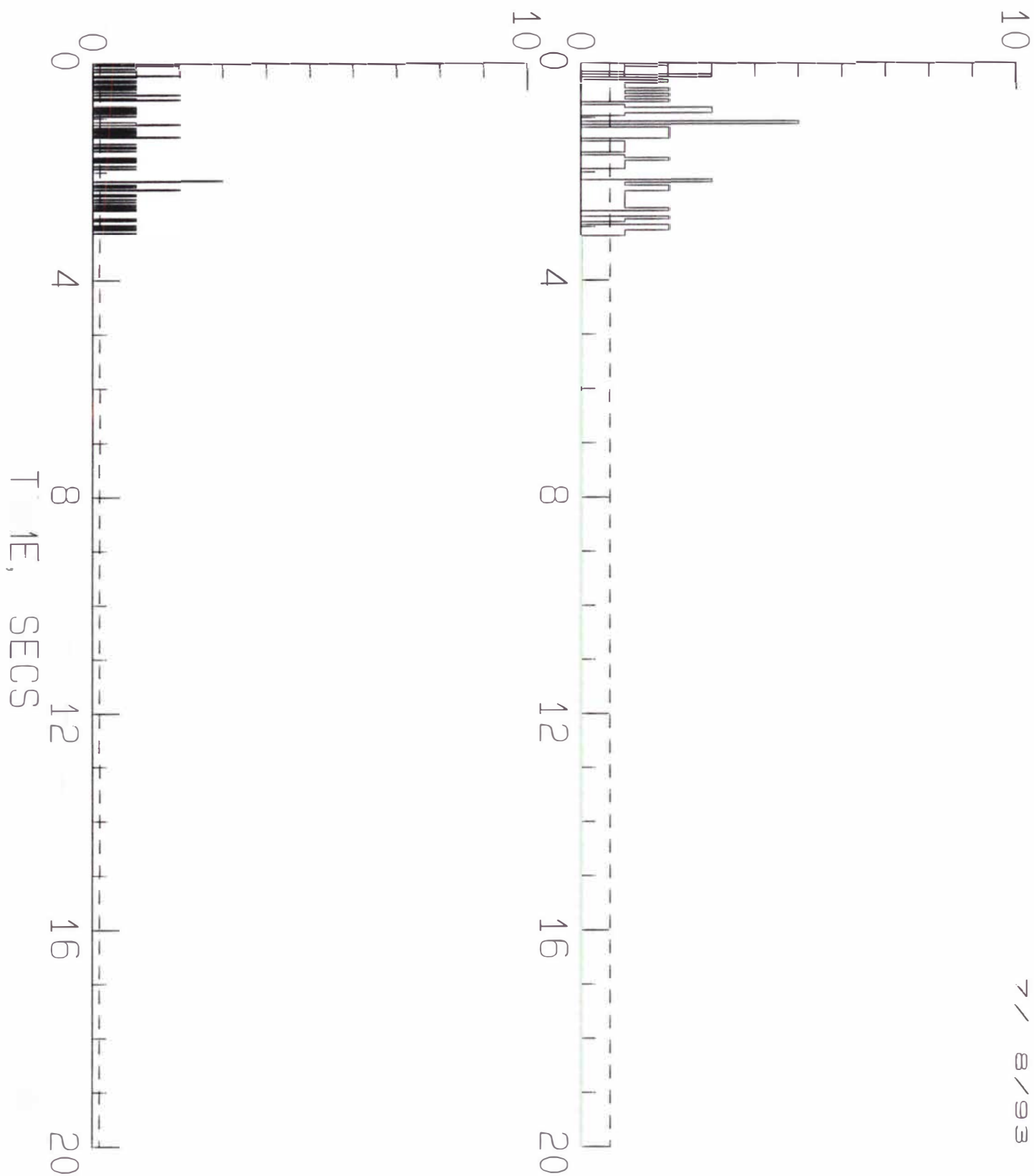
09/12/91

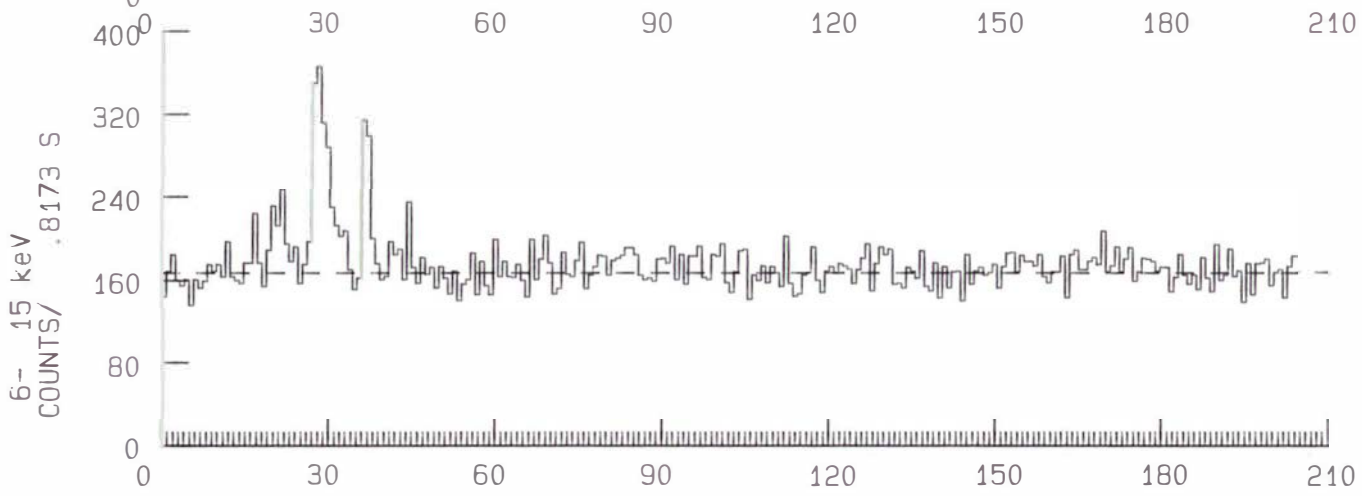
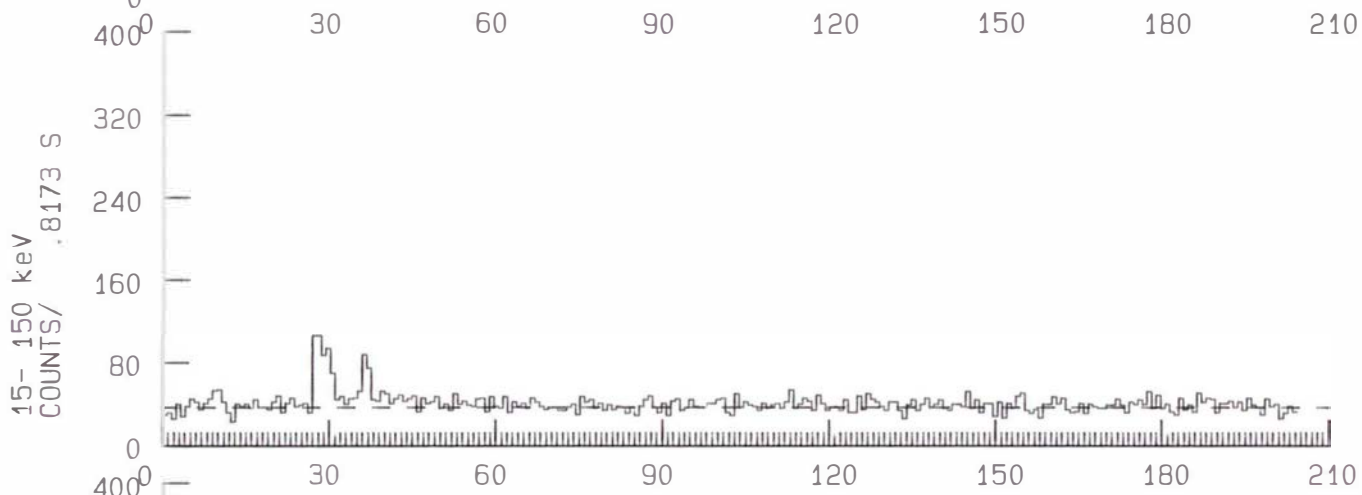
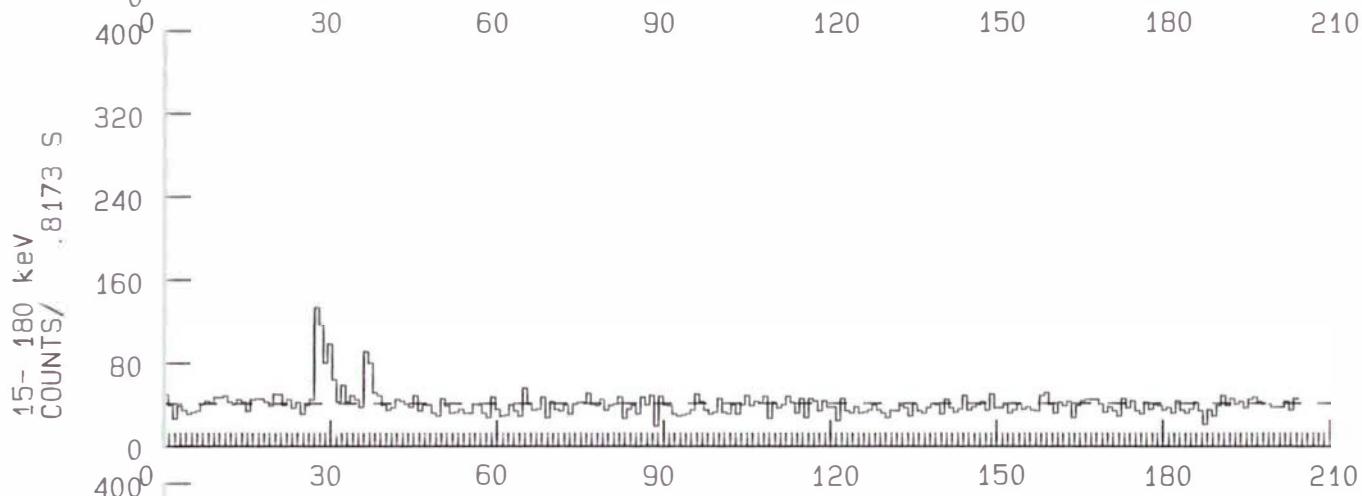
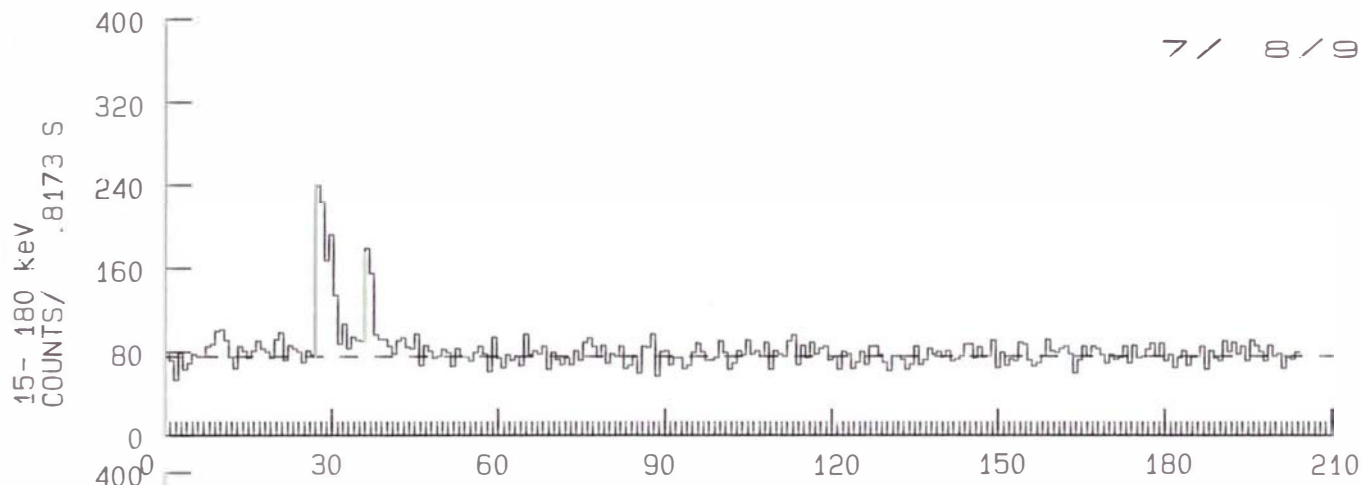
66978.877

25- 150 keV

COUNTS/ .013 S

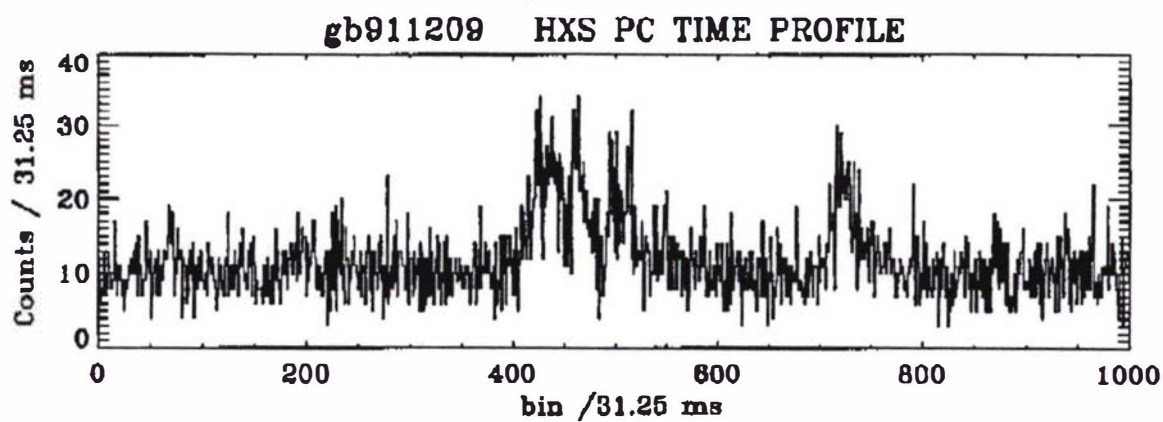
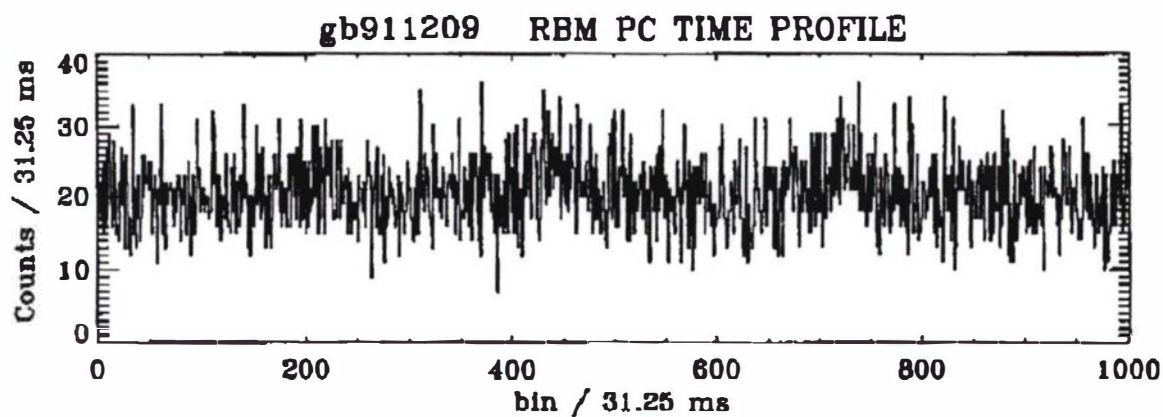
COUNTS/ .051 S





WATCH 09/12/91 66943.702

3/19



From @dkuug.dk:sb@danru.dk Mon Dec 16 02:03:24 1991
Received: from dkuug.dk by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA10047; Mon, 16 Dec 91 02:03:15 PST
Received: from danru.dk by dkuug.dk via EUnet with UUCP (5.64+/8+bit/IDA-1.2.8)
id AA14288; Mon, 16 Dec 91 11:05:08 +0100
Received: by danru.dk (smail2.5)
id AA27514; 16 Dec 91 11:03:39 MET (Mon)
To: khurley@sunspot.ssl.berkeley.edu
Subject: grb911209
Message-Id: <9112161103.AA27510@danru.dk>
Date: 16 Dec 91 11:03:35 MET (Mon)
From: sb@danru.dk (Soeren Brandt)
X-Charset: ASCII
X-Char-Esc: 29
Status: R

Dear colleague,

Please find a draft for an IAU circular concerning a gamma ray
burst detected by WATCH on GRANAT:

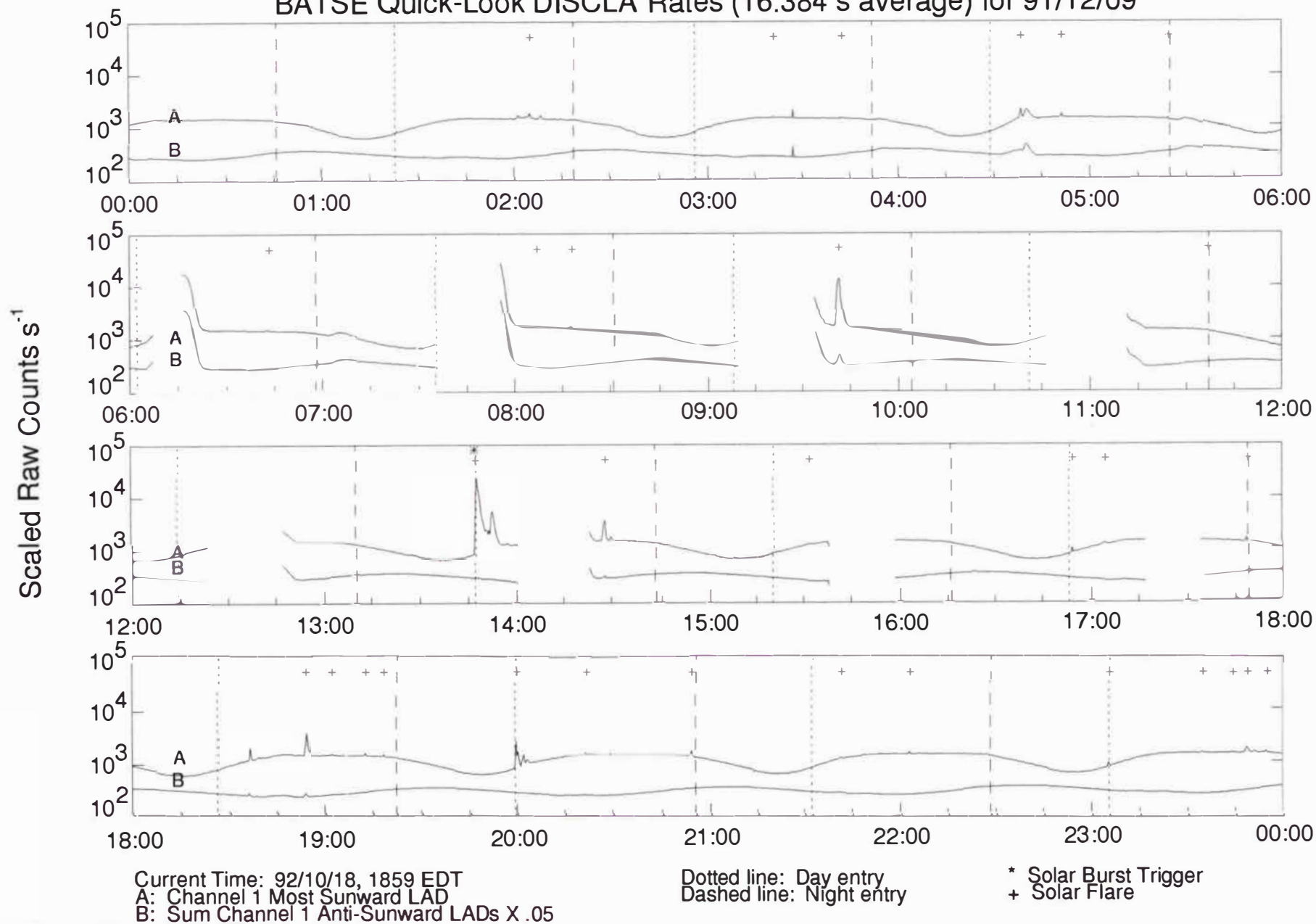
258.75° N. Lund, S. Brandt, and A.J. Castro-Tirado on behalf of the WATCH/
GRANAT team (Danish Space Research Institute, Lyngby; and Space Re-
search Institute, Moscow), report: A gamma ray burst, GRS 1715-44
(r.a. = 17h15m dec. = -44.1, equinox 1950.0, error radius 1 degree)
was recorded by the WATCH all-sky X-ray monitor on Dec. 9.77 UT. = 66528 s
The event contained two pulses with 12 s separation. Follow up
observations are encouraged.

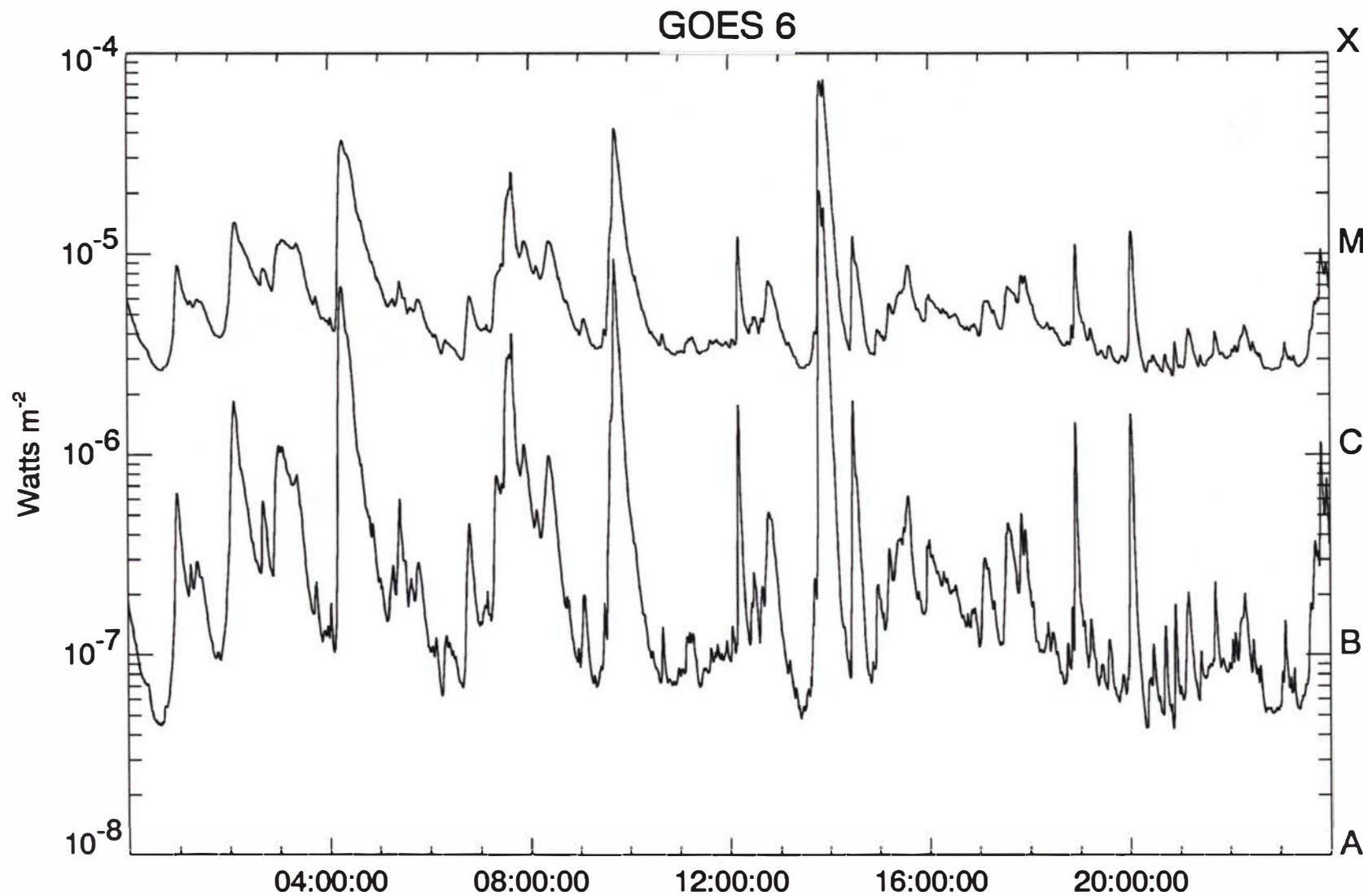
Unfortunately, the position of the burst is quite close to the Sun,
making optical follow-up impossible.
The late reporting of this event is due to snow blocking the roads
around the GRANAT groundstation in Crimea last week, making reception
of telemetry impossible for some days.

Best regards,

Soren Brandt

BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/09





Data Start: 91/12/09, 0000:01

Plot created: 97/10/20, 1437

Channel

1 (1.0 - 8.0 Angstroms)

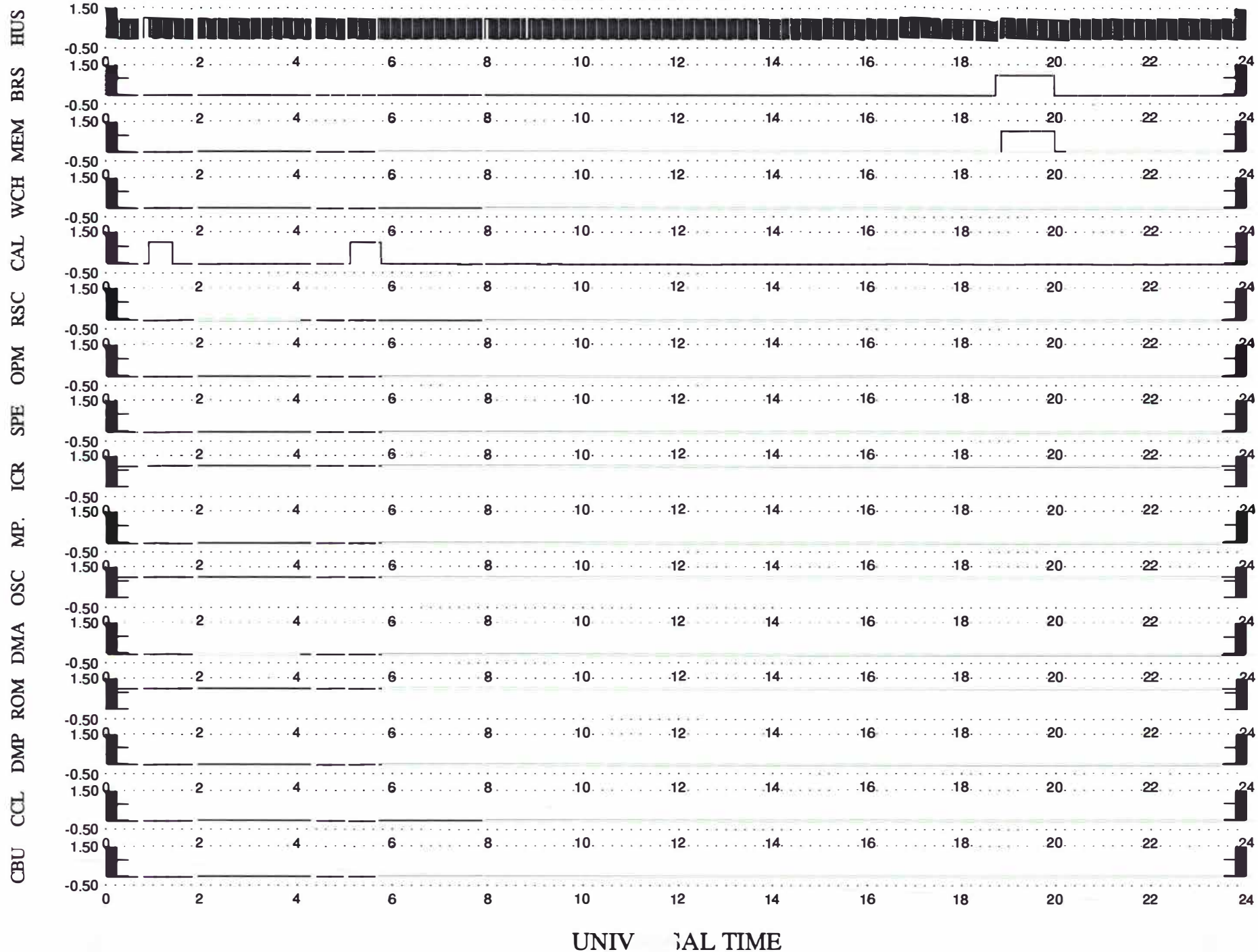
Background not subtracted

2 (0.5 - 4.0 Angstroms)

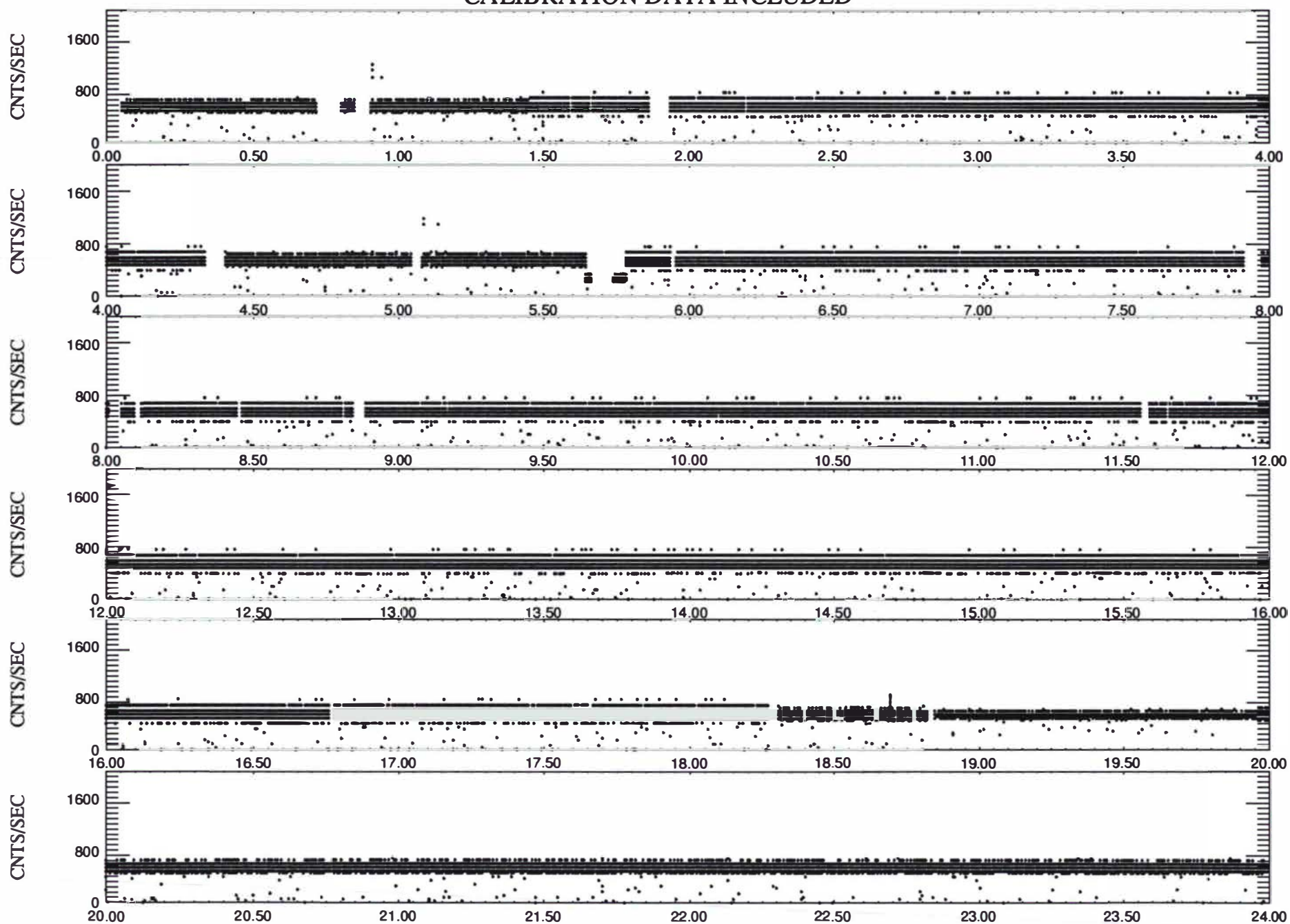
Background not subtracted

Sample average = 10

BURST NUMBER 8

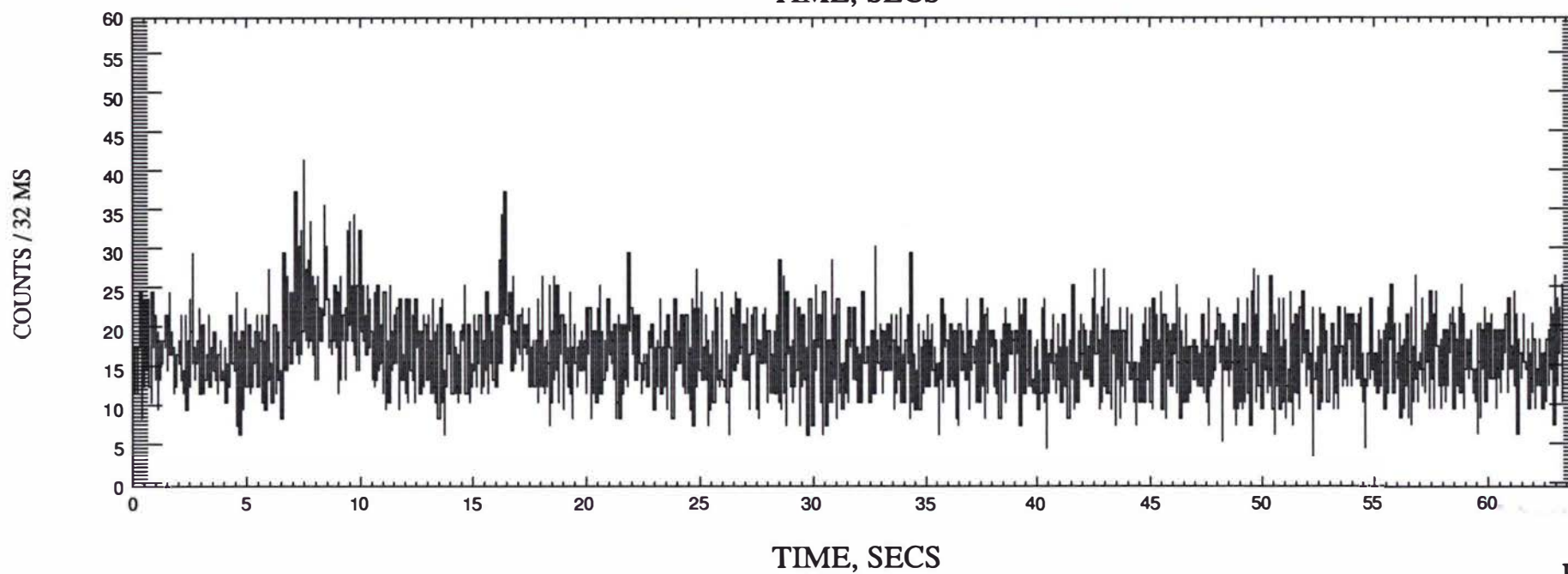
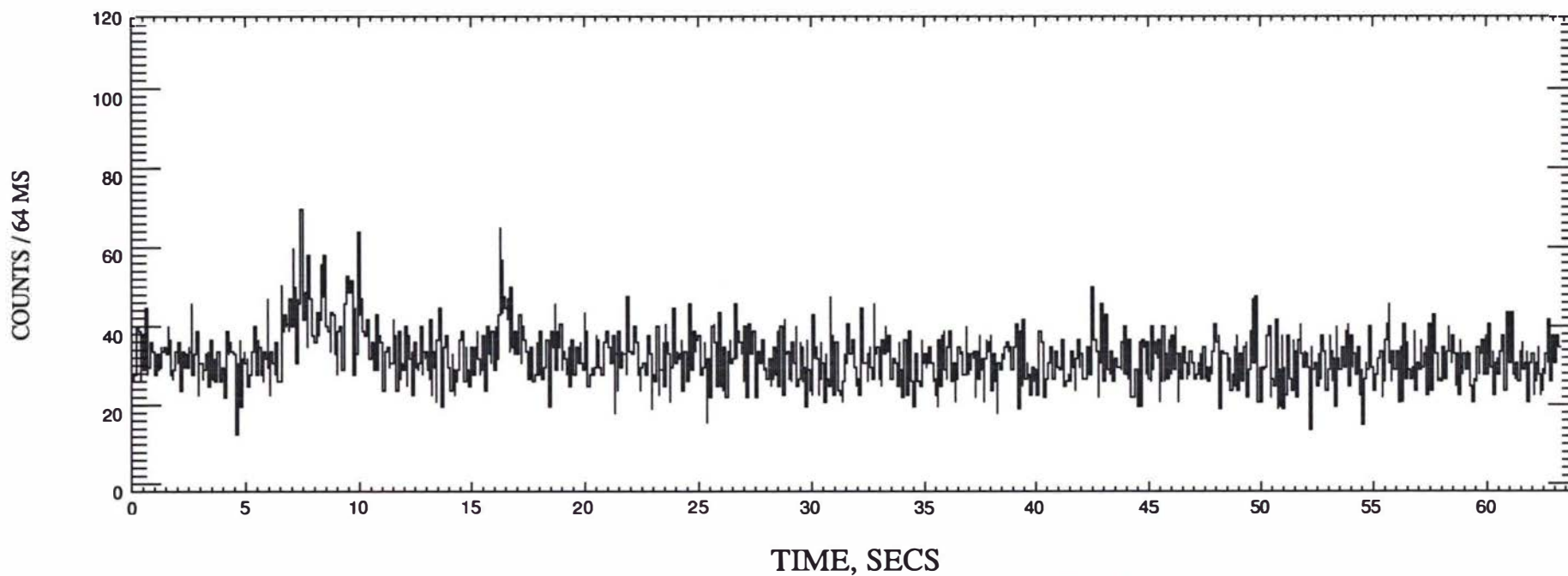


CALIBRATION DATA INCLUDED

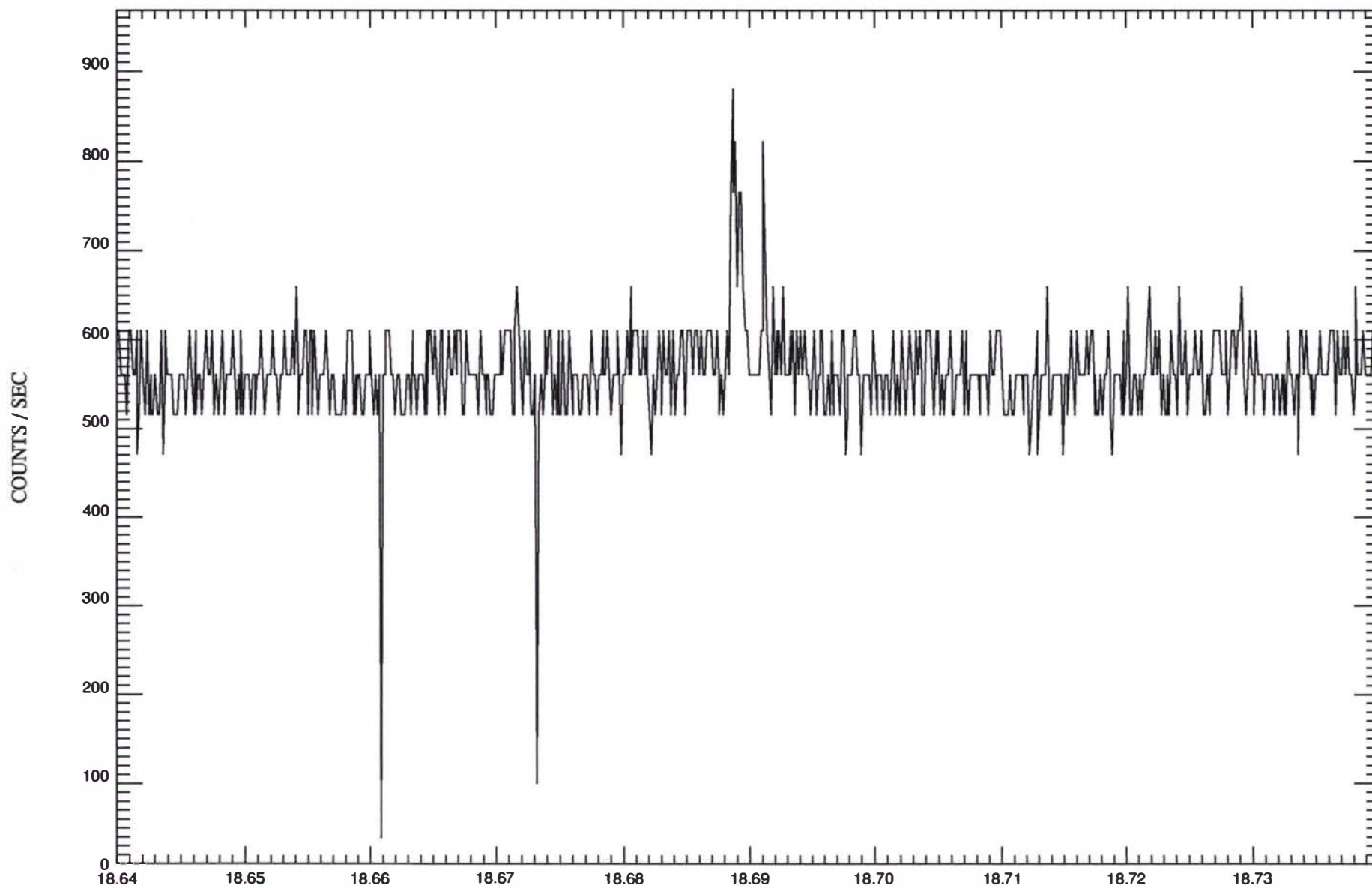


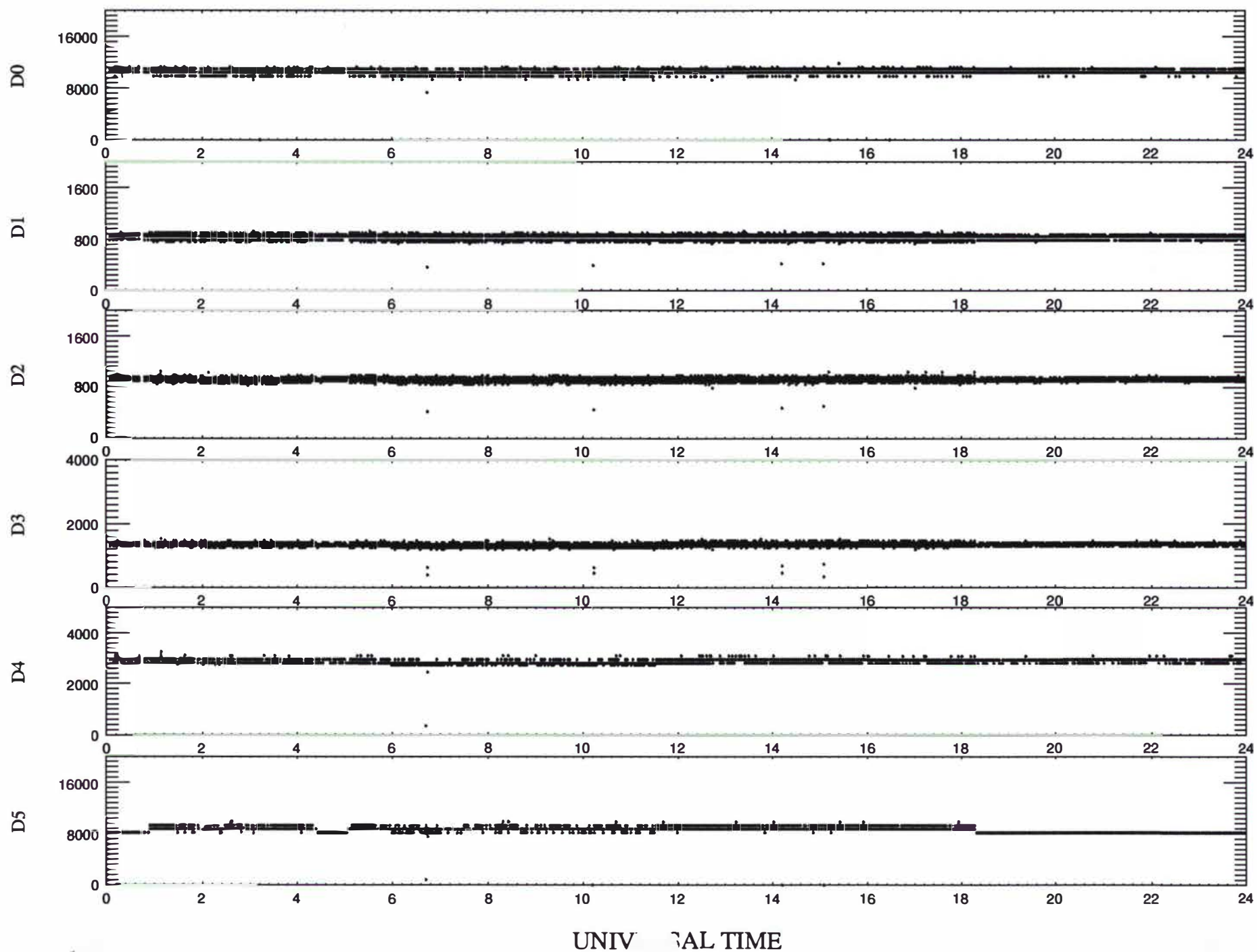
UNIV TIME

Burst Counter 8 at UT=18.688738611009 h=67279.459 s 18:41:19.459



CALIBRATION DATA INCLUDED





CATSEARCH PROGRAM

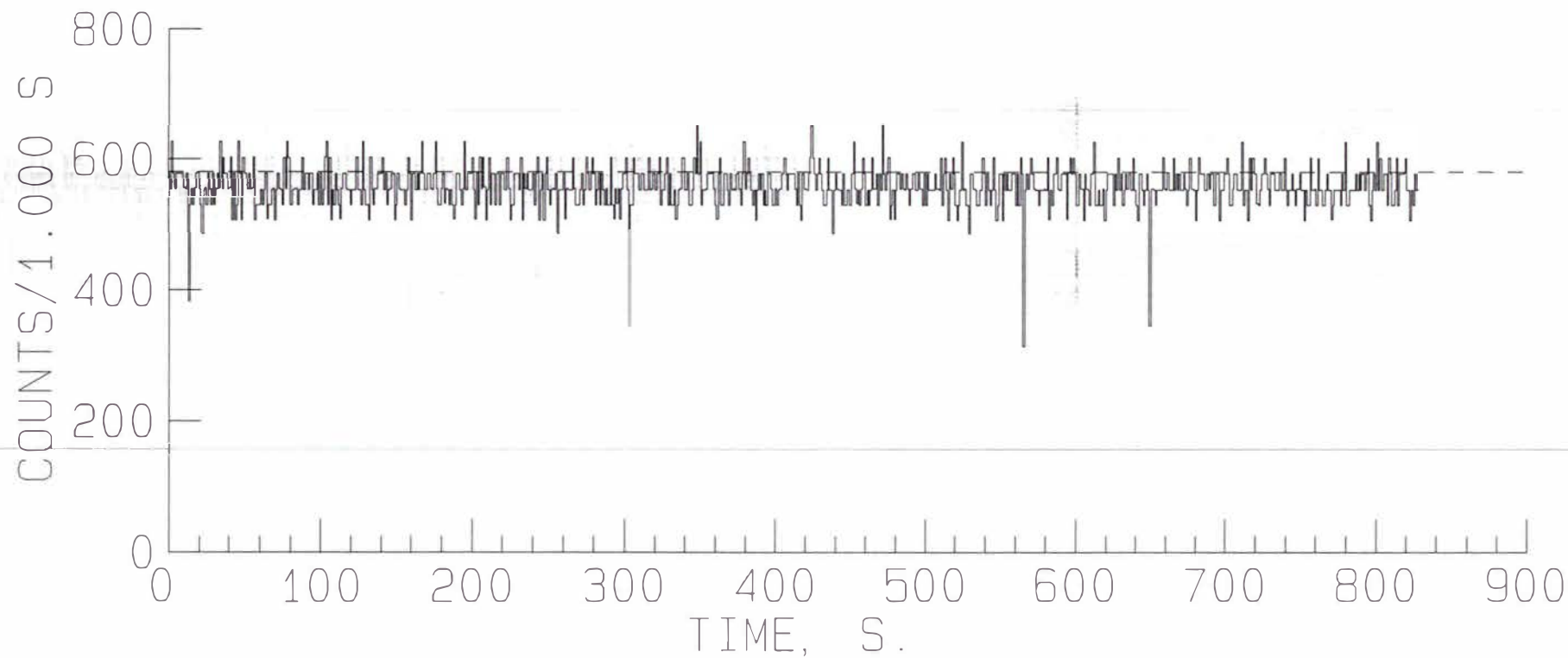
BATSE BURST # 1159
EVENT OF 1991 DEC 10 DAY OF YEAR=344
EVENT CROSSING TIME AT BATSE : 75947. S. OR 21:05:47.3
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 294.200 -19.400
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 10/12/ 91 IS:
RA= 167.693 DEC= 6.650 DIST= 4.799 AU
BATSE-ULYSSES DISTANCE = 717857096. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 53.43 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 1426.73 SECS.
CROSSING TIME AT ULYSSES IS 77374. S. OR 21:29:34 +/- 405.54 SECONDS

NO

14 / 4 / 93

ULYSSES RT
10/12/91 76968.352 s
0.500 S INTERVALS REGROUPED BY 2
0- 0 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



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 there is no 3
 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 "

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, ~~911210~~, and 911210.

John

CROSSING TIME PROGRAM

EVENT CROSSING TIME AT EARTH : 75949. S. OR 21:05:49.0
COORDINATES ARE .000 .000 0. (RA, DEC, DIST.)

BURST ARRIVAL DIRECTION: 293.000 -19.000

EVENT CROSSING TIME AT VENUS WILL BE FOUND FOR DATE 10/12/1991 (D/M/Y)

COORDINATES OF THIS OBJECT ARE:

DISTANCE FROM EARTH= 144782590. KM., OR .9678 A.U.

RA=212.836 DEGREES, OR 14.H 11.M 20.7S

DEC=-10.752 DEGREES, OR -10.D ***M -7.2S

DISTANCE BETWEEN OBJECTS 1 AND 2 = 144782590.

ANGLE WHICH 1ST OBJECT-2ND OBJECT VECTOR

MAKES WITH GRB ARRIVAL DIRECTION=102.68

LIGHT TRAVEL TIME ALONG PROJECTED PATH= -105.97 SECS.

CROSSING TIME AT VENUS IS 75843. S. OR 21:04:03

From kouveliotou%ssl.span@Sdsc.Edu Sun May 17 15:25:45 1992
Date: Sun, 17 May 92 22:27:20 GMT
From: kouveliotou%ssl.span@Sdsc.Edu
Subject: gro locations for 1150,1157,1159
To: khurley@sunspot.ssl.berkeley.edu
X-St-Vmsmail-To: KEVIN
Content-Length: 200

1150

For UT : 35492.4534

X = 5553.75
Y = - 3926
Z = - 273

1157

For UT: 66964.0694

X = - 6299
Y = - 90.75
Z = - 2555.75

1159

For UT: 75949.6694

X = - 4585.25
Y = - 3843.50
Z = - 3232.25

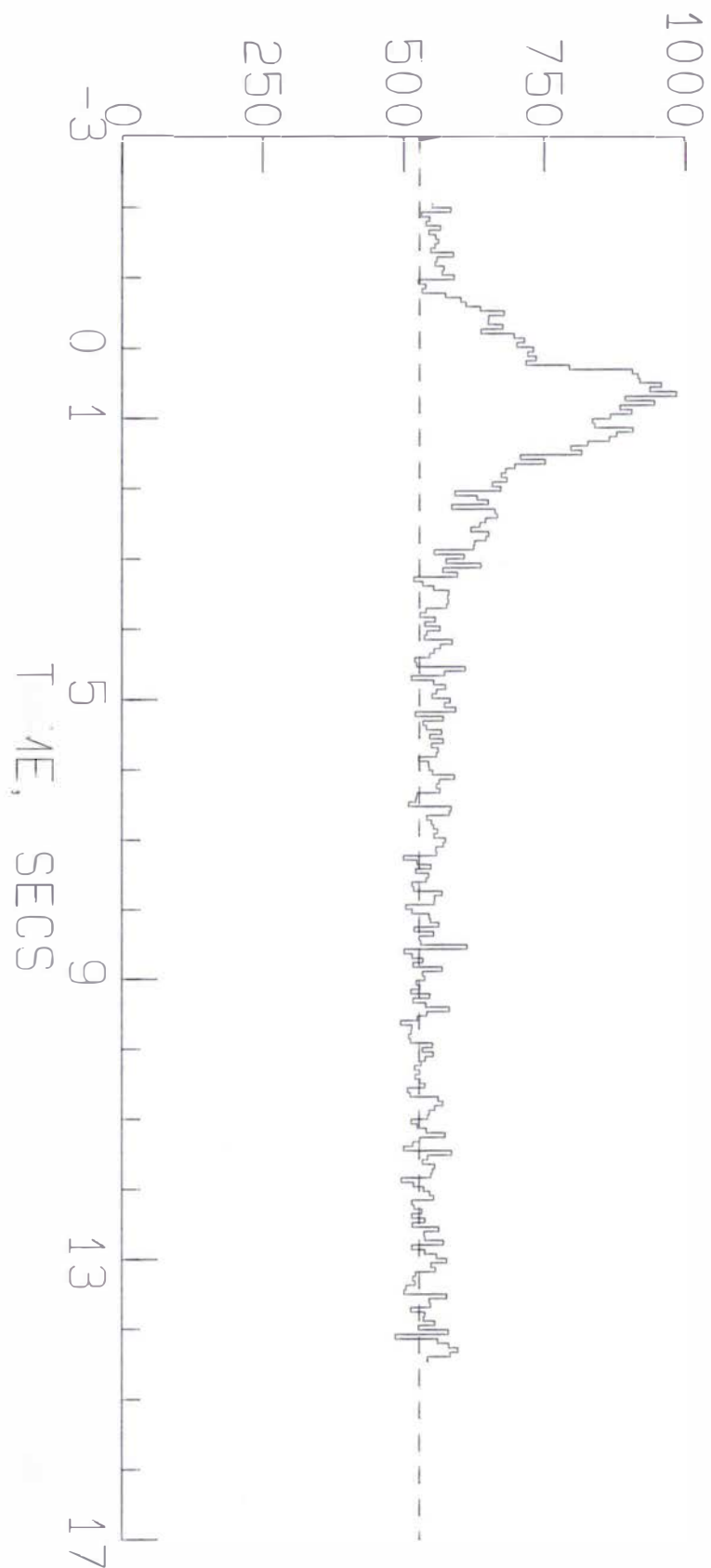
BATSE

10/12/91

75949.413

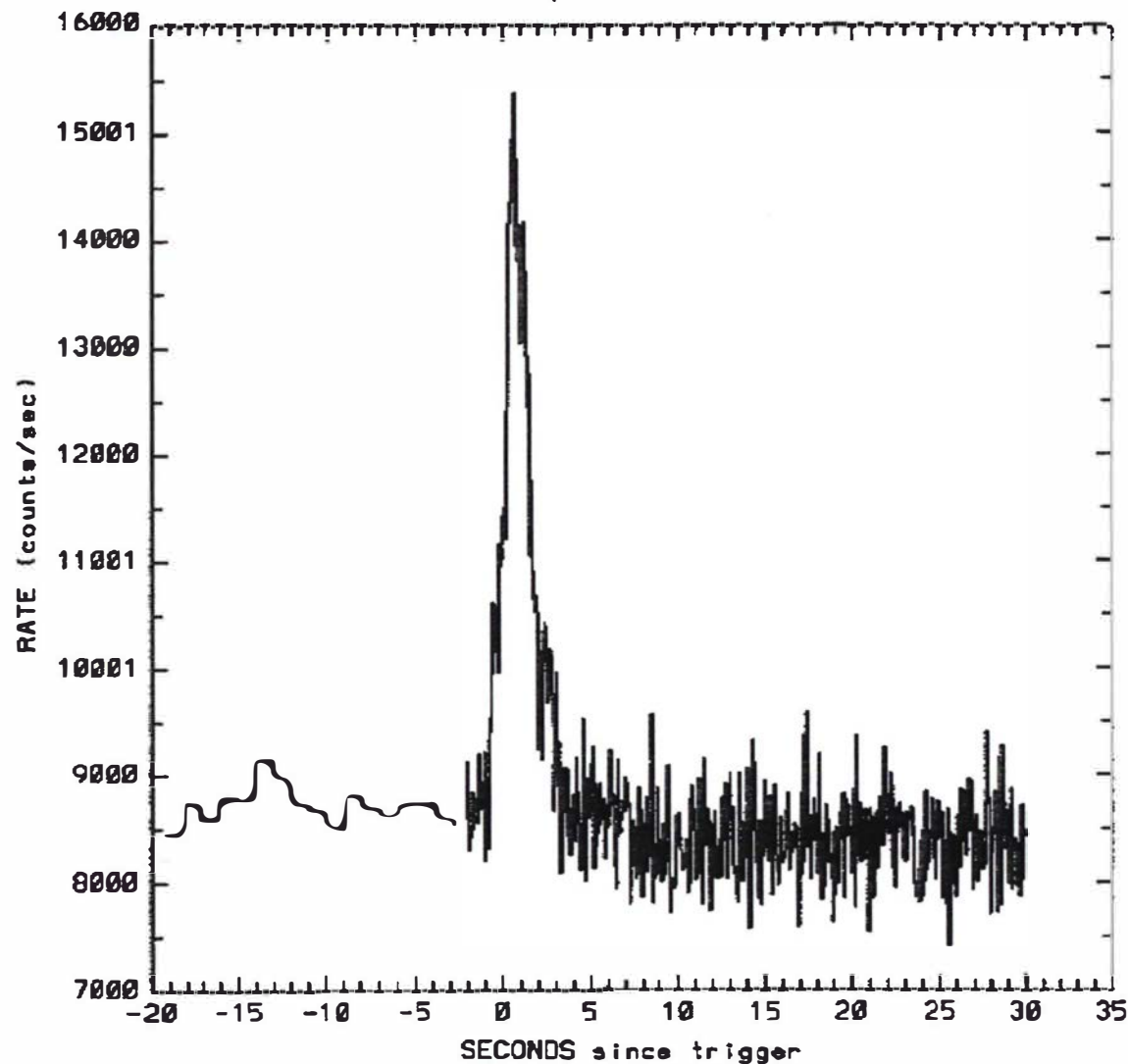
25- 100 keV

COUNTS/ .064 S



6/13/92

Data for K Hurley



Dec 10, 91 Got file
+ephem

17-MAY-1992 17:09:40

Created by MOPS 80
(Burst Display)
Version 2.11

Trigger * 1159

Trigger Time:
8600 / 75949.413

Burst Data Type:
OISCS

Deadline
Corrected: N

Background Data
Type: PREB + OISCLA

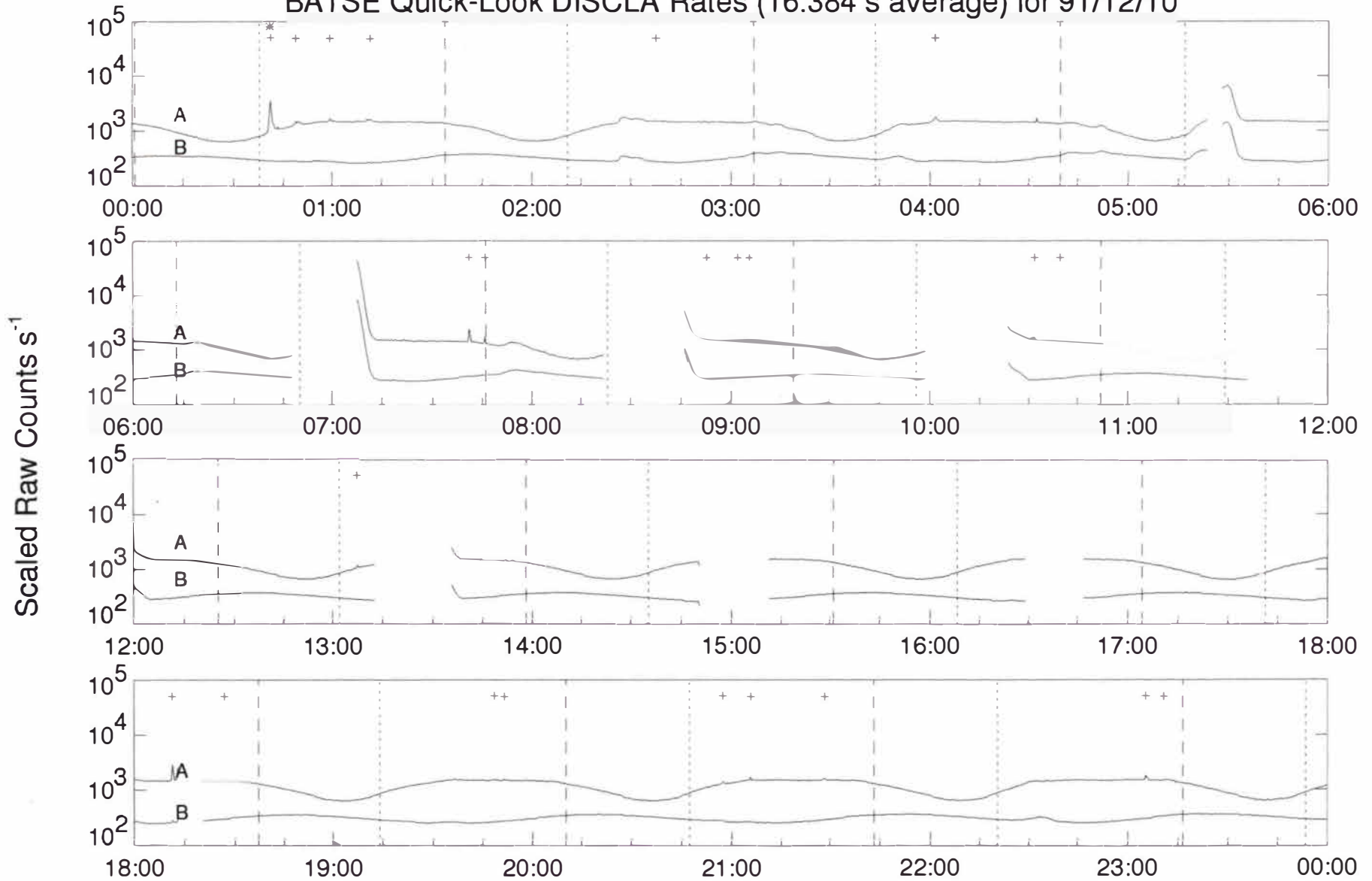
Minimum Integ. Time:
0.064 seconds

Detectors [7..8]:
00001011

Discriminators:
(1, 2)

Quality Mask:
801SP0

BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/10

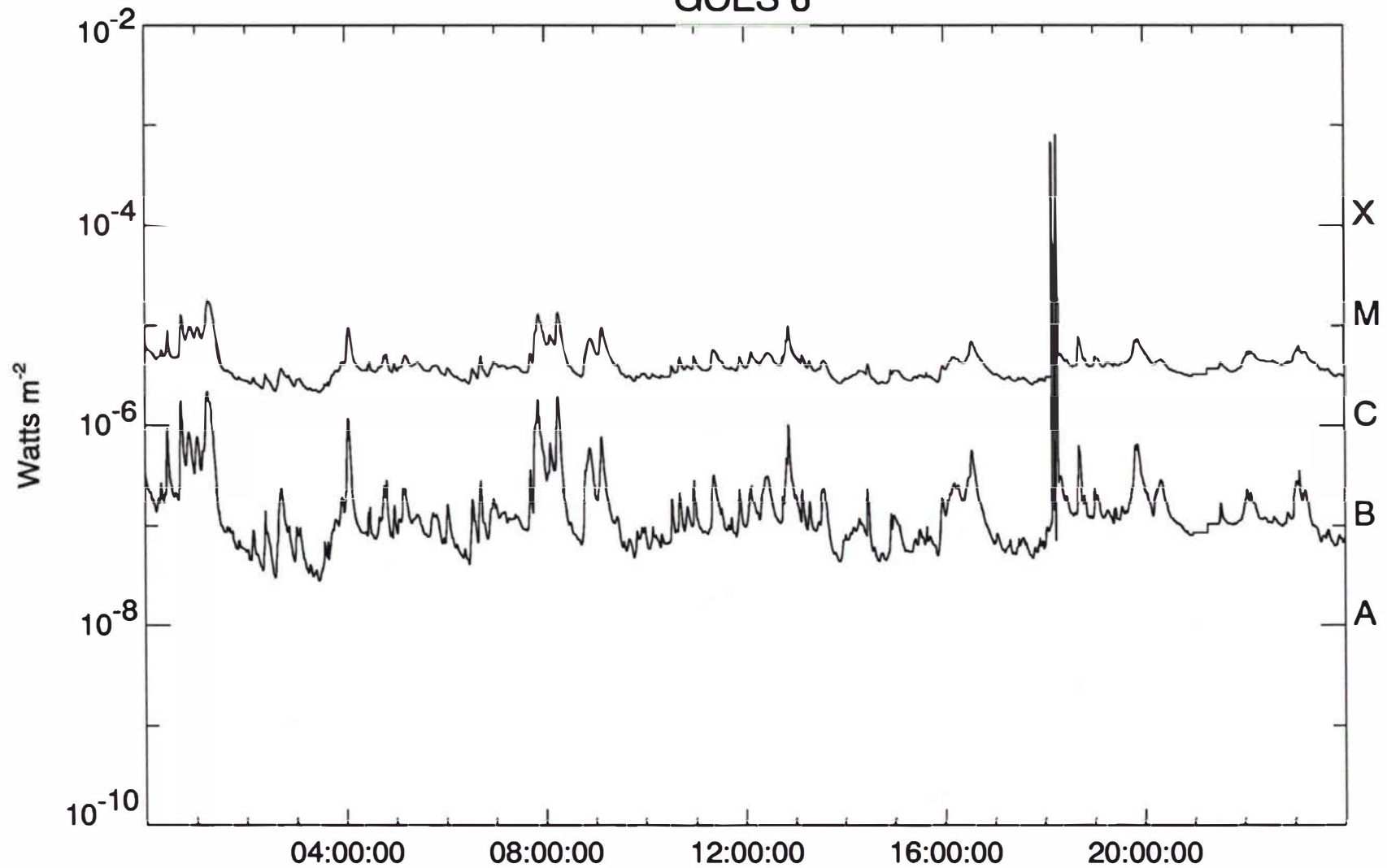


Current Time: 92/10/18, 1901 EDT
A: Channel 1 Most Sunward LAD
B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare

GOES 6



Data Start: 91/12/10, 0000:02

Plot created: 97/10/20, 1441

Channel

1 (1.0 - 8.0 Angstroms)

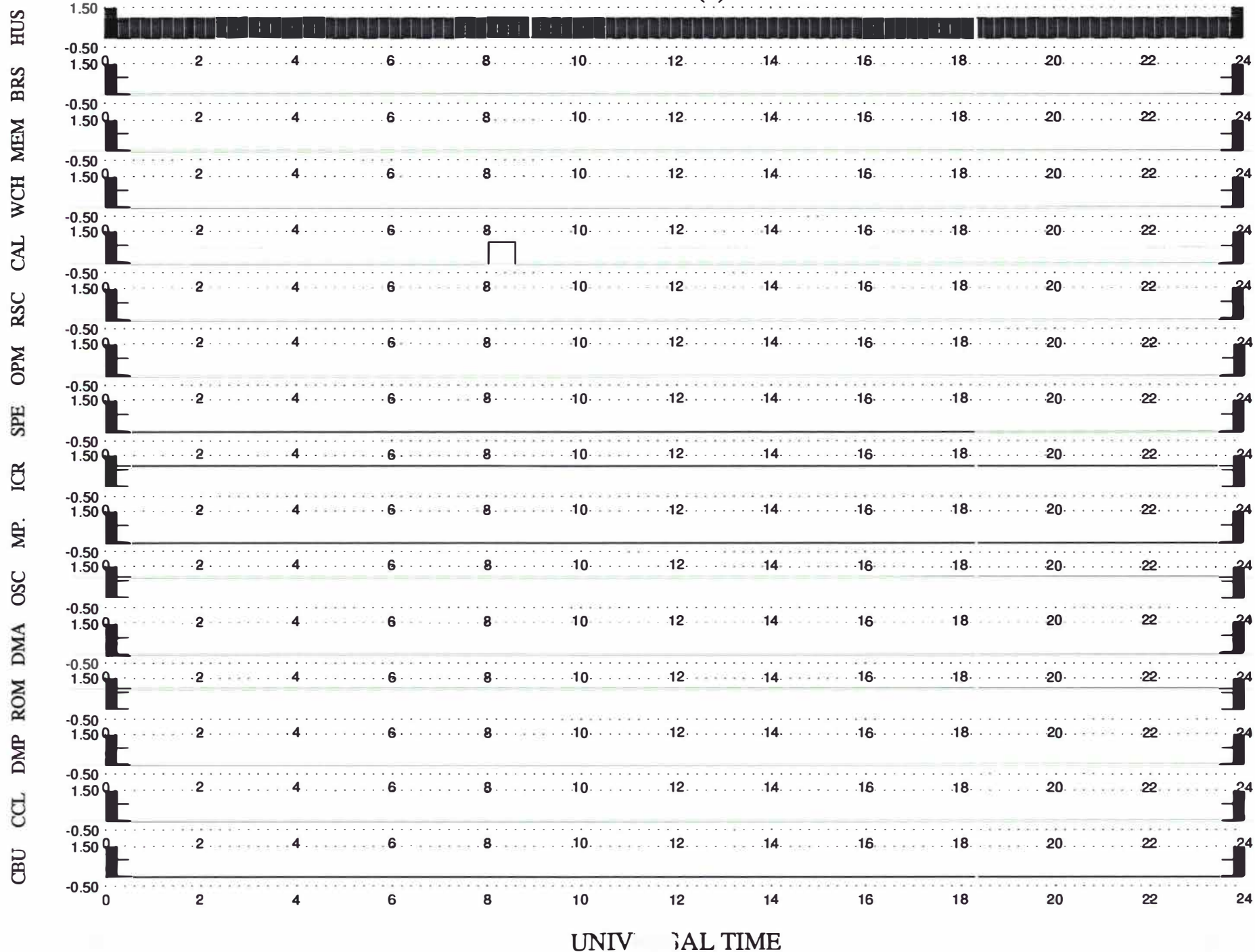
Background not subtracted

2 (0.5 - 4.0 Angstroms)

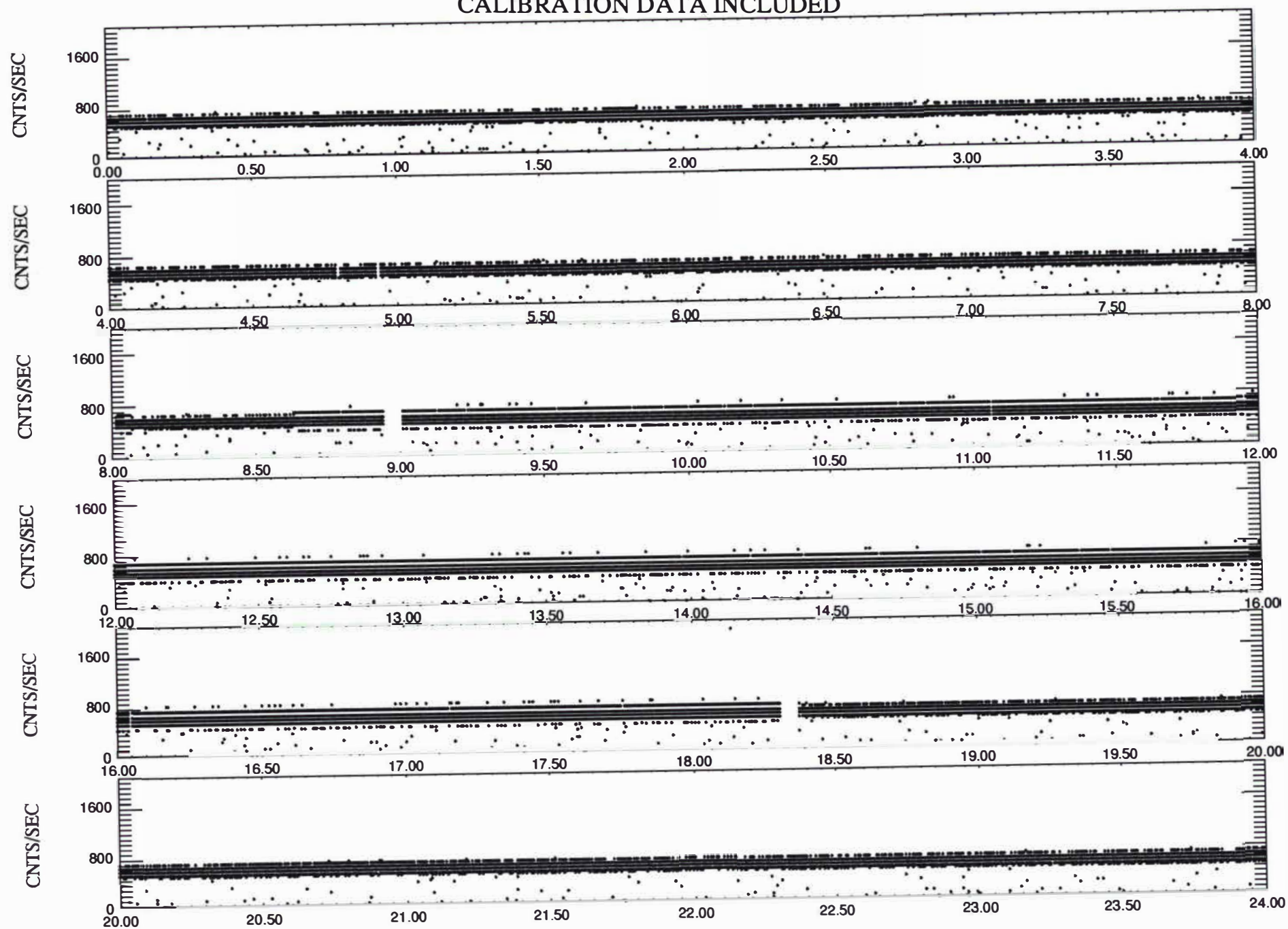
Background not subtracted

Sample average = 10

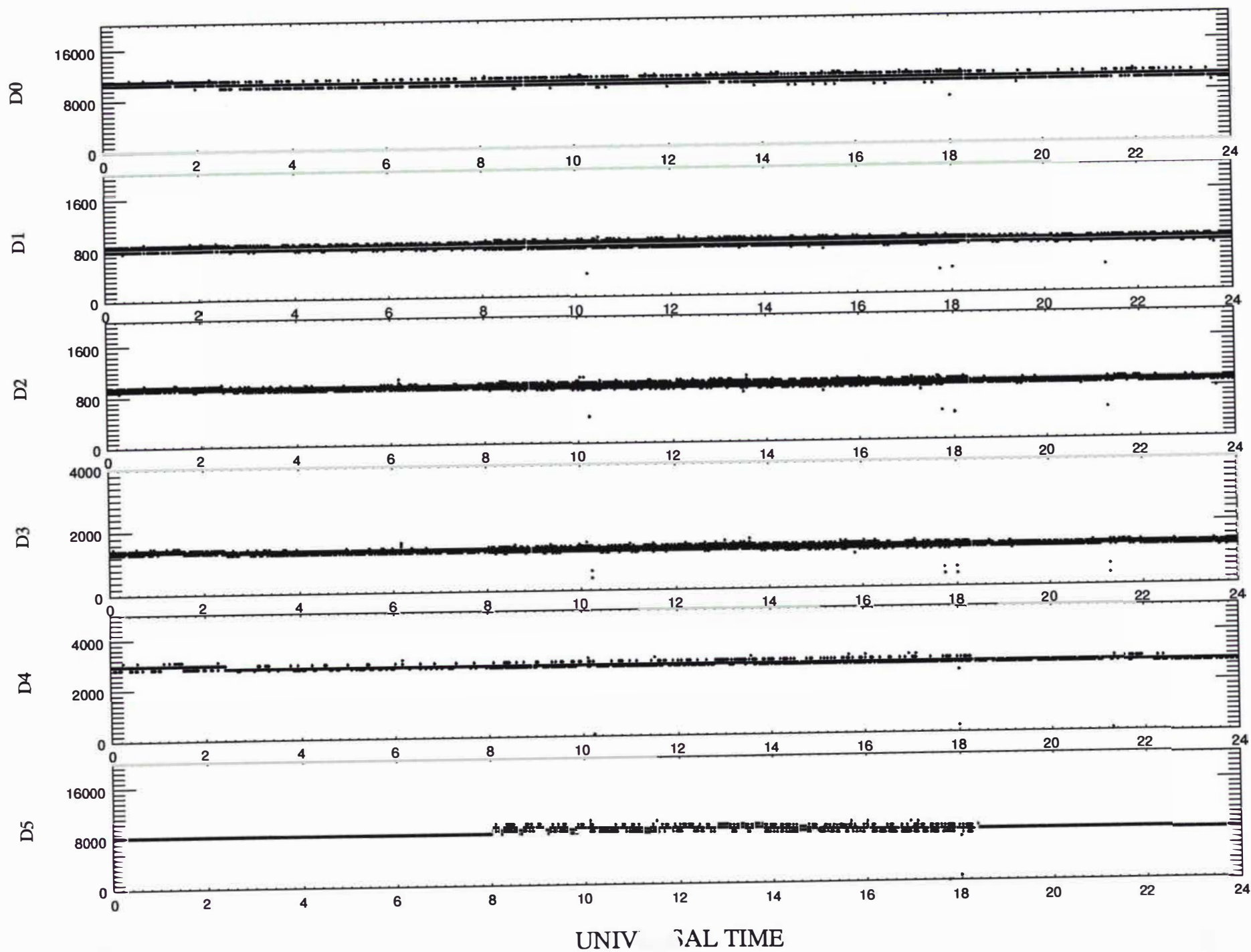
NO BURST (8)



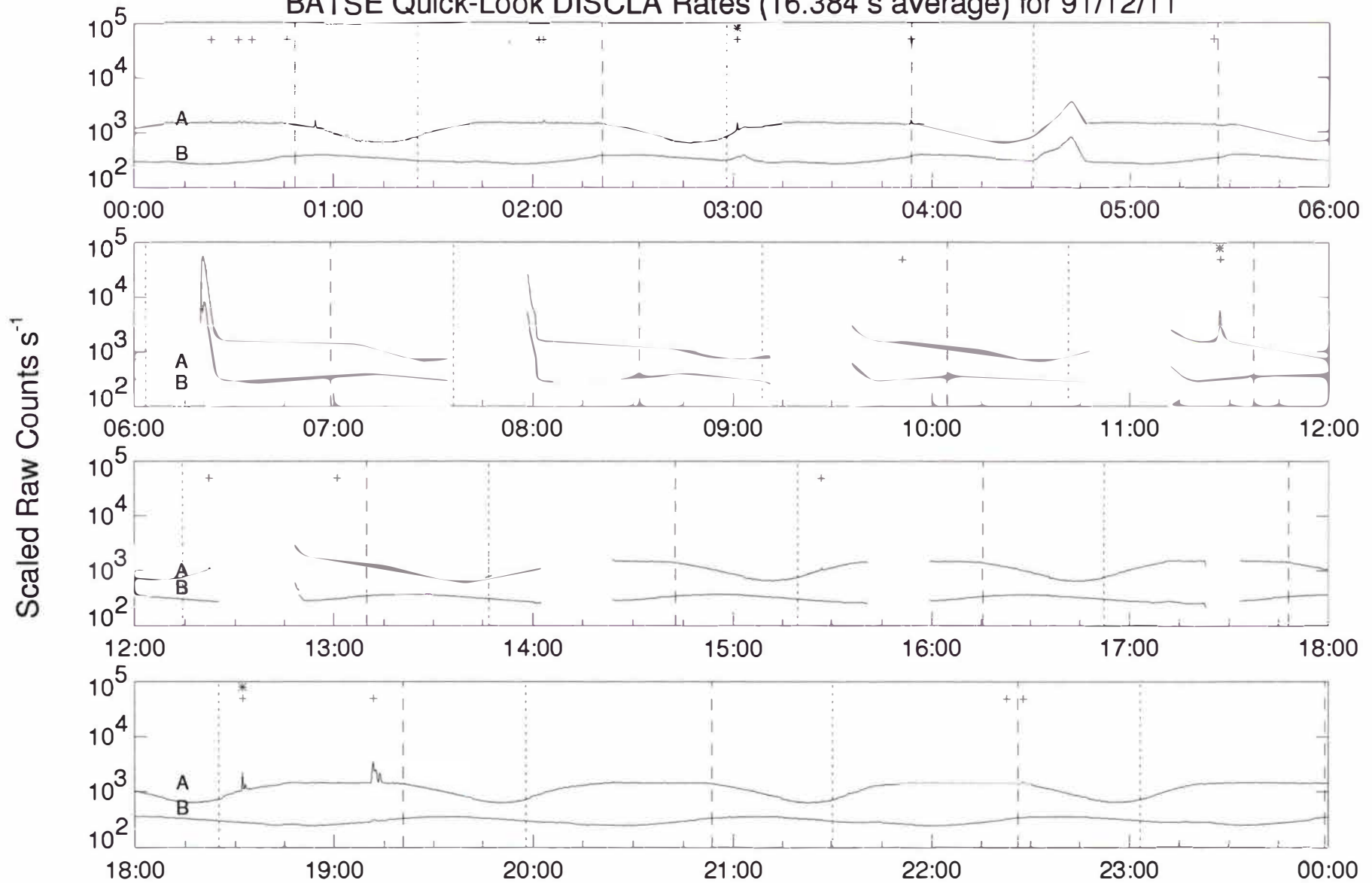
CALIBRATION DATA INCLUDED



UNIV CAL TIME



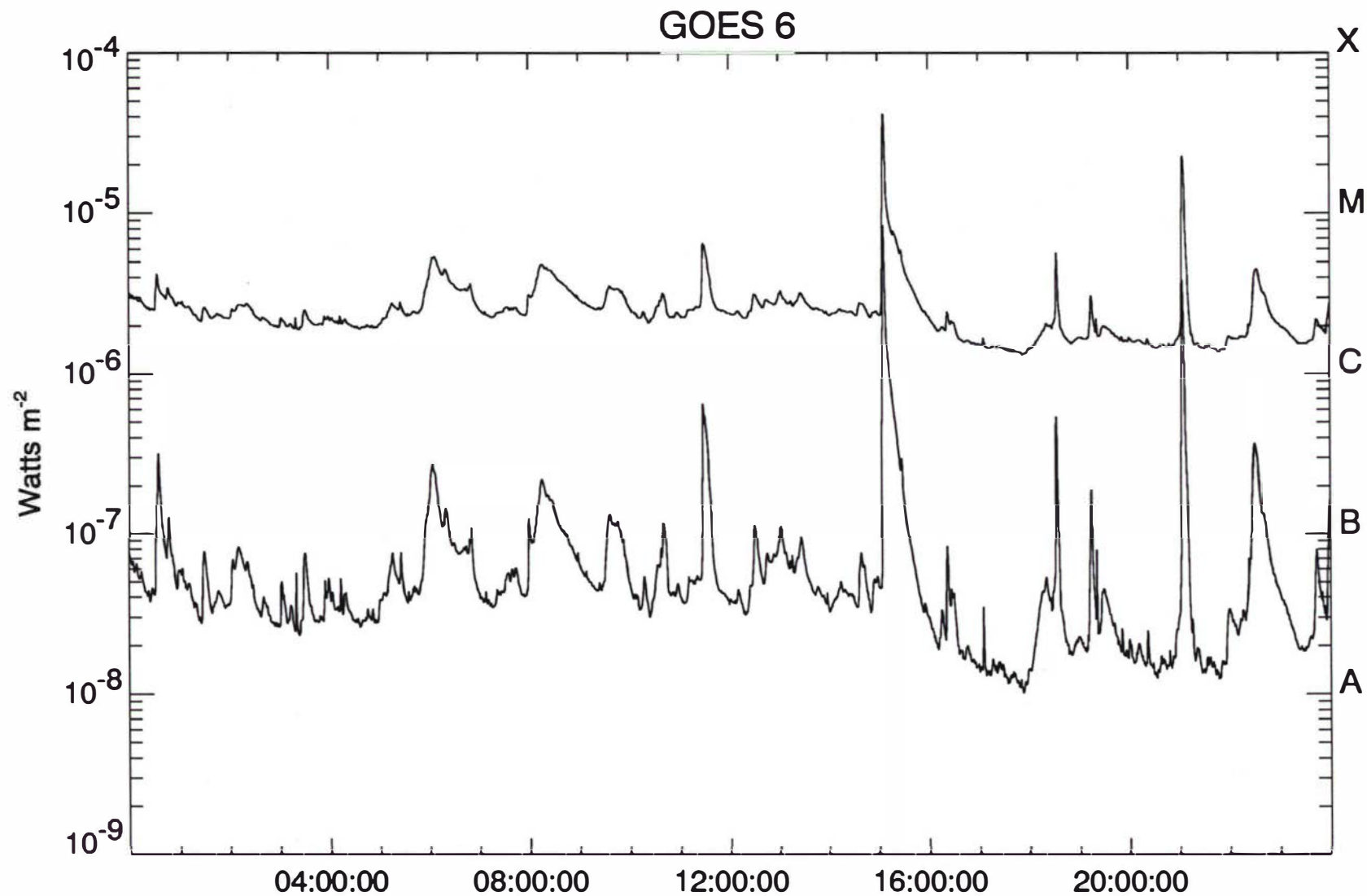
BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/11



Current Time: 92/10/18, 1902 EDT
 A: Channel 1 Most Sunward LAD
 B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare



Data Start: 91/12/11, 0000:00

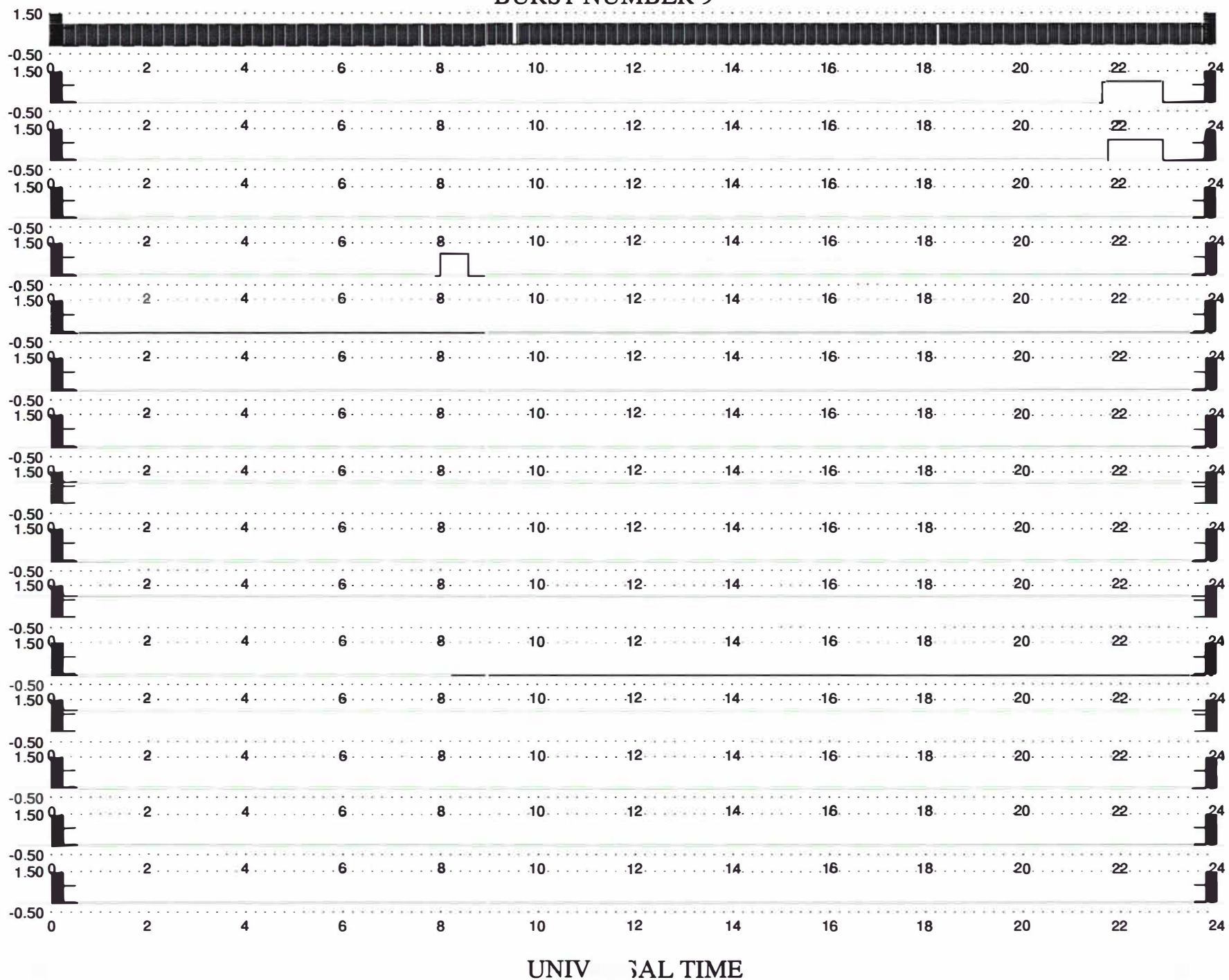
Plot created: 97/10/20, 1447

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

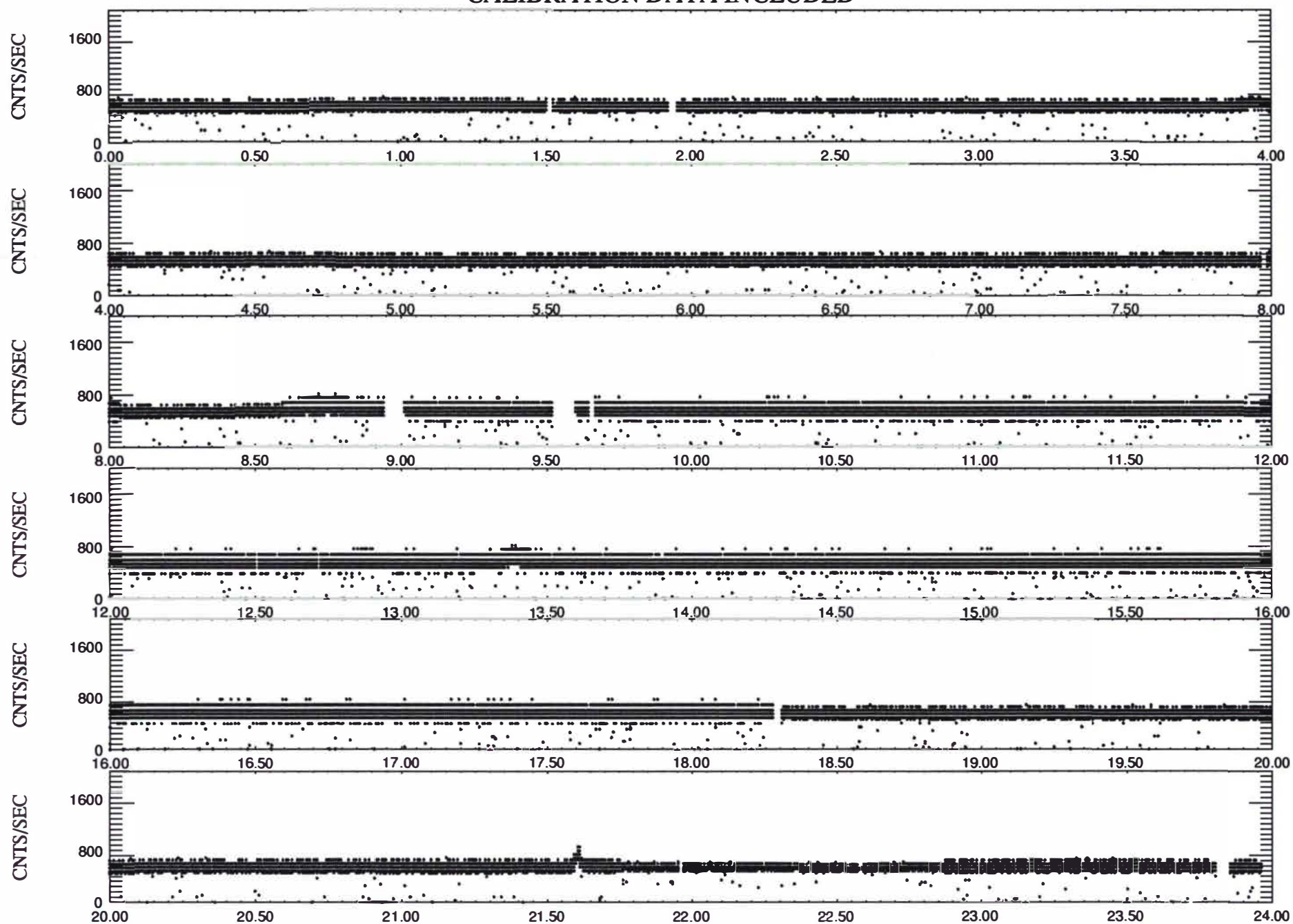
2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

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

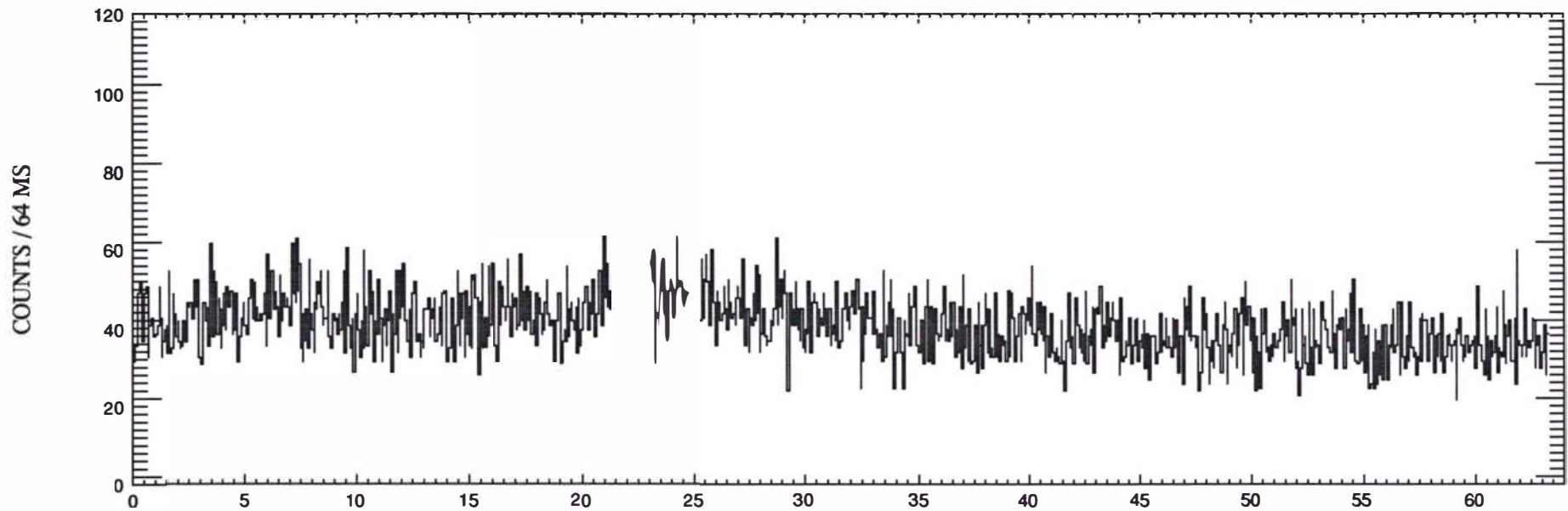


CALIBRATION DATA INCLUDED

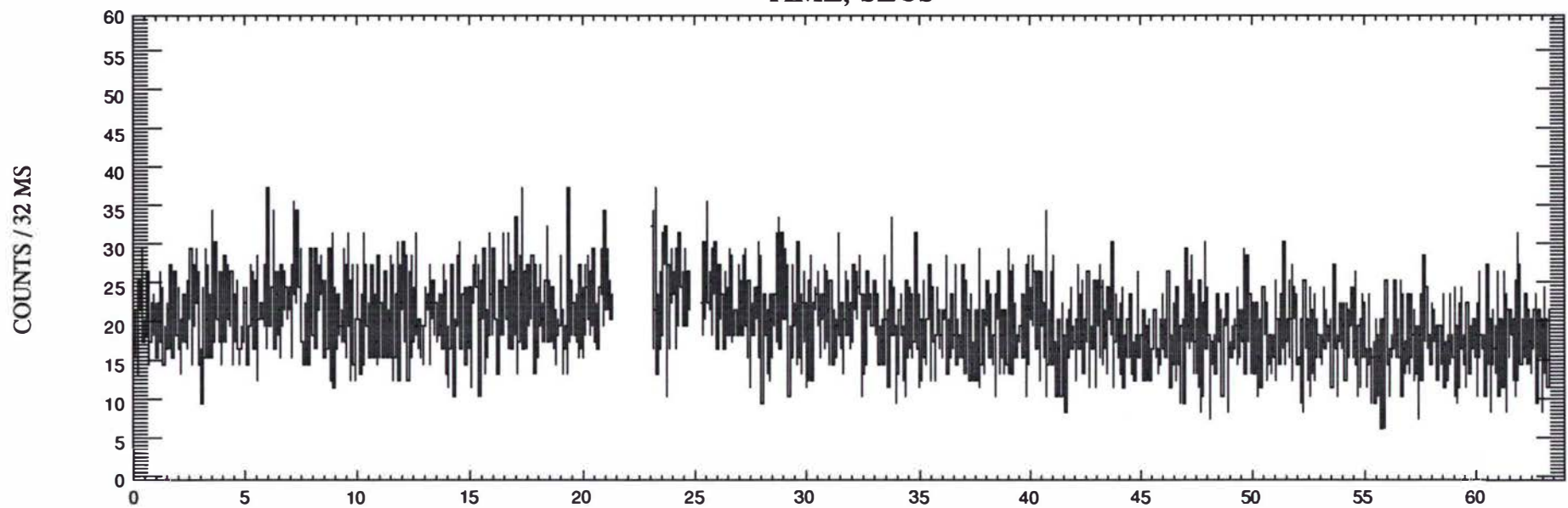


UNIV GAL TIME

Burst Counter 9 at UT=21.600583979289 h=77762.102 s 21:36:02.102

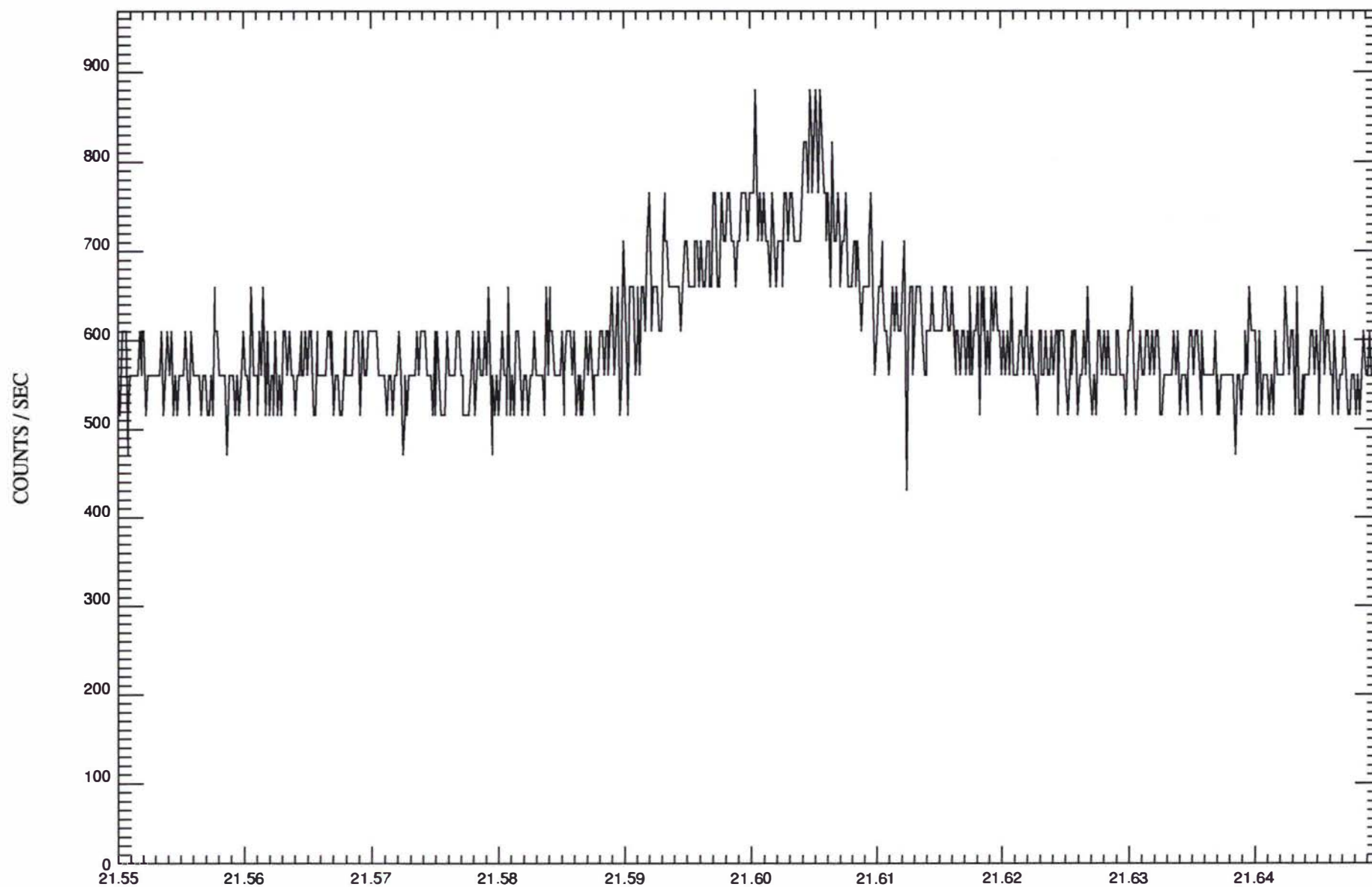


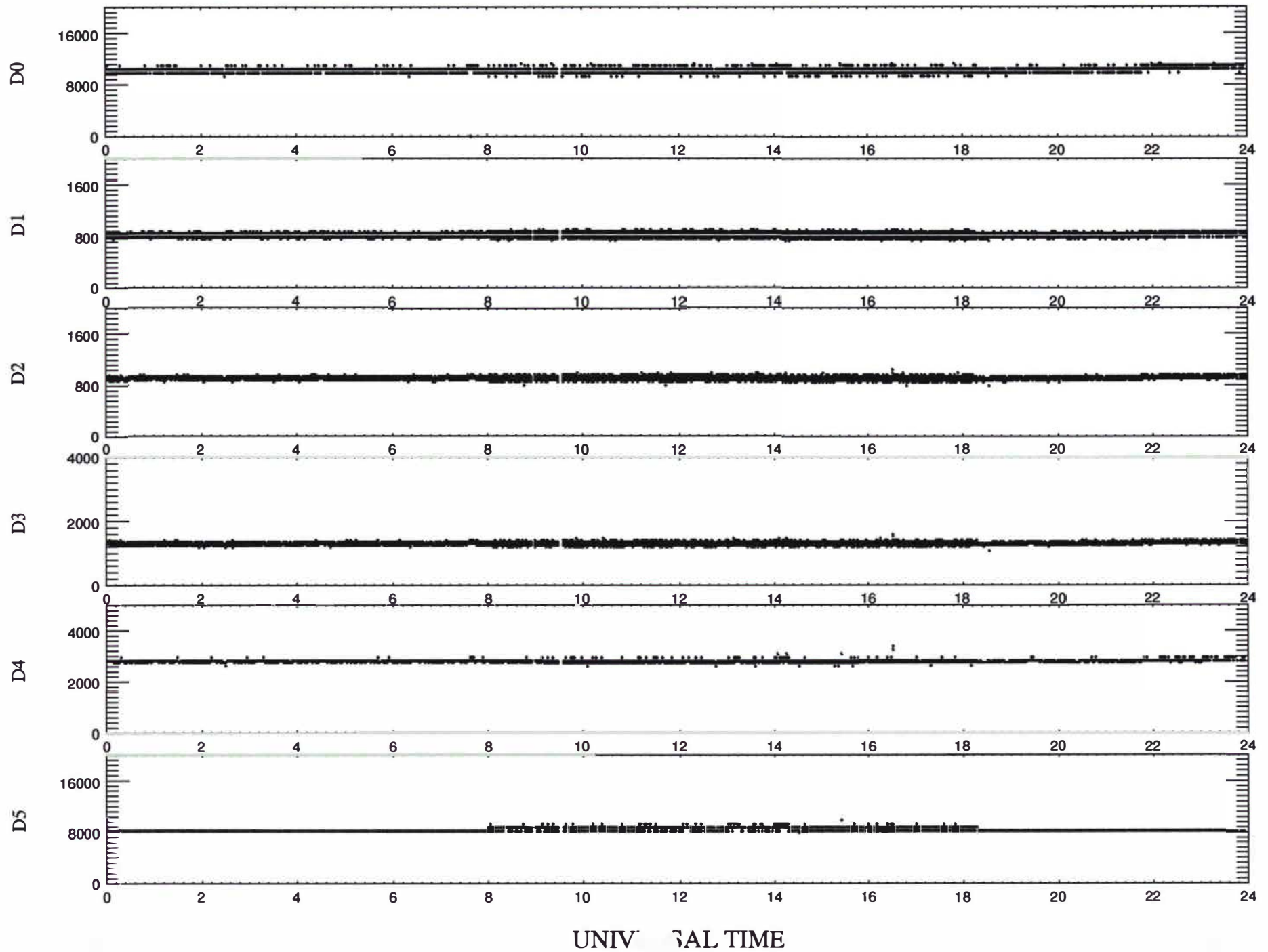
TIME, SECS



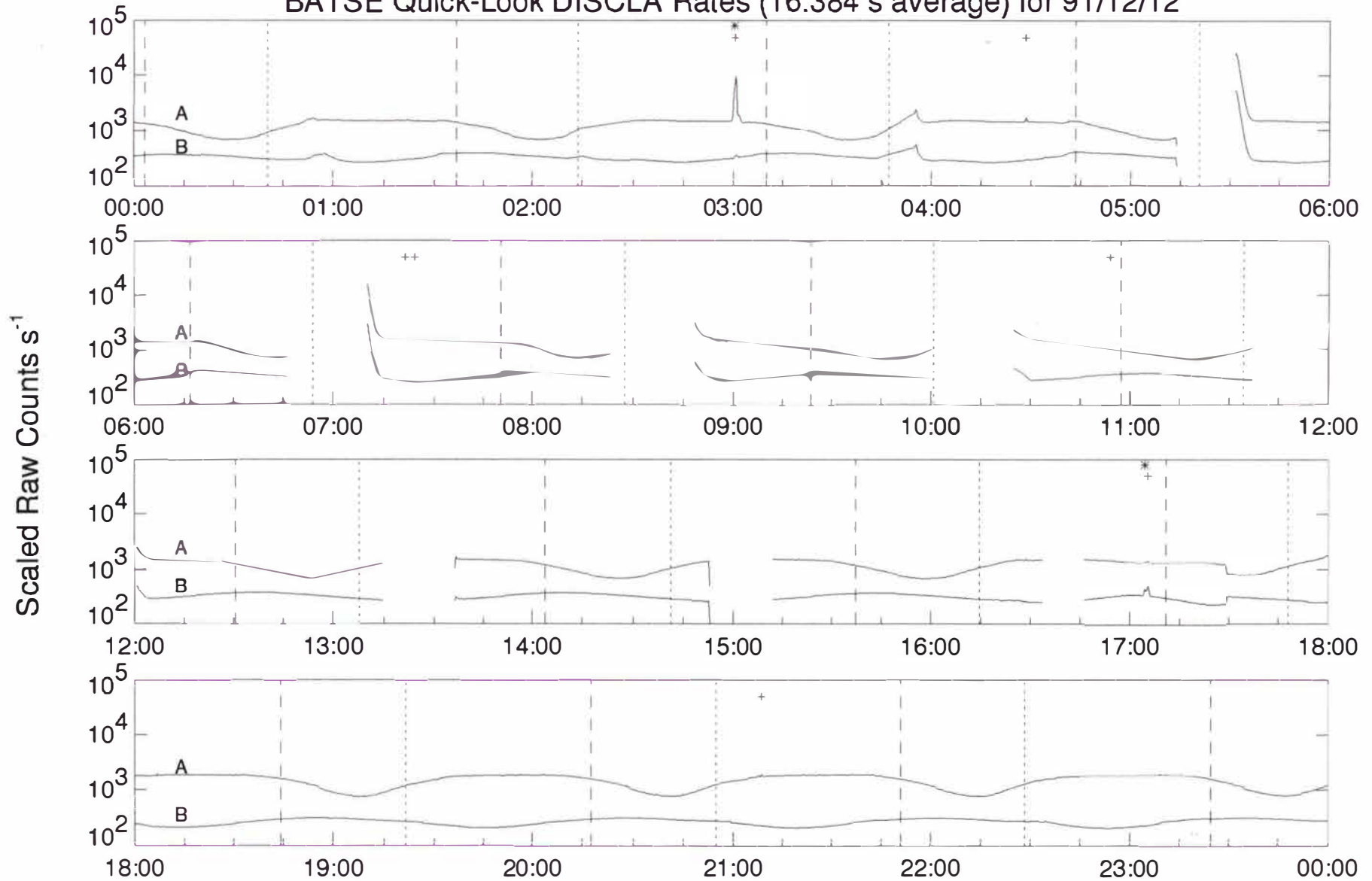
TIME, SECS

CALIBRATION DATA INCLUDED





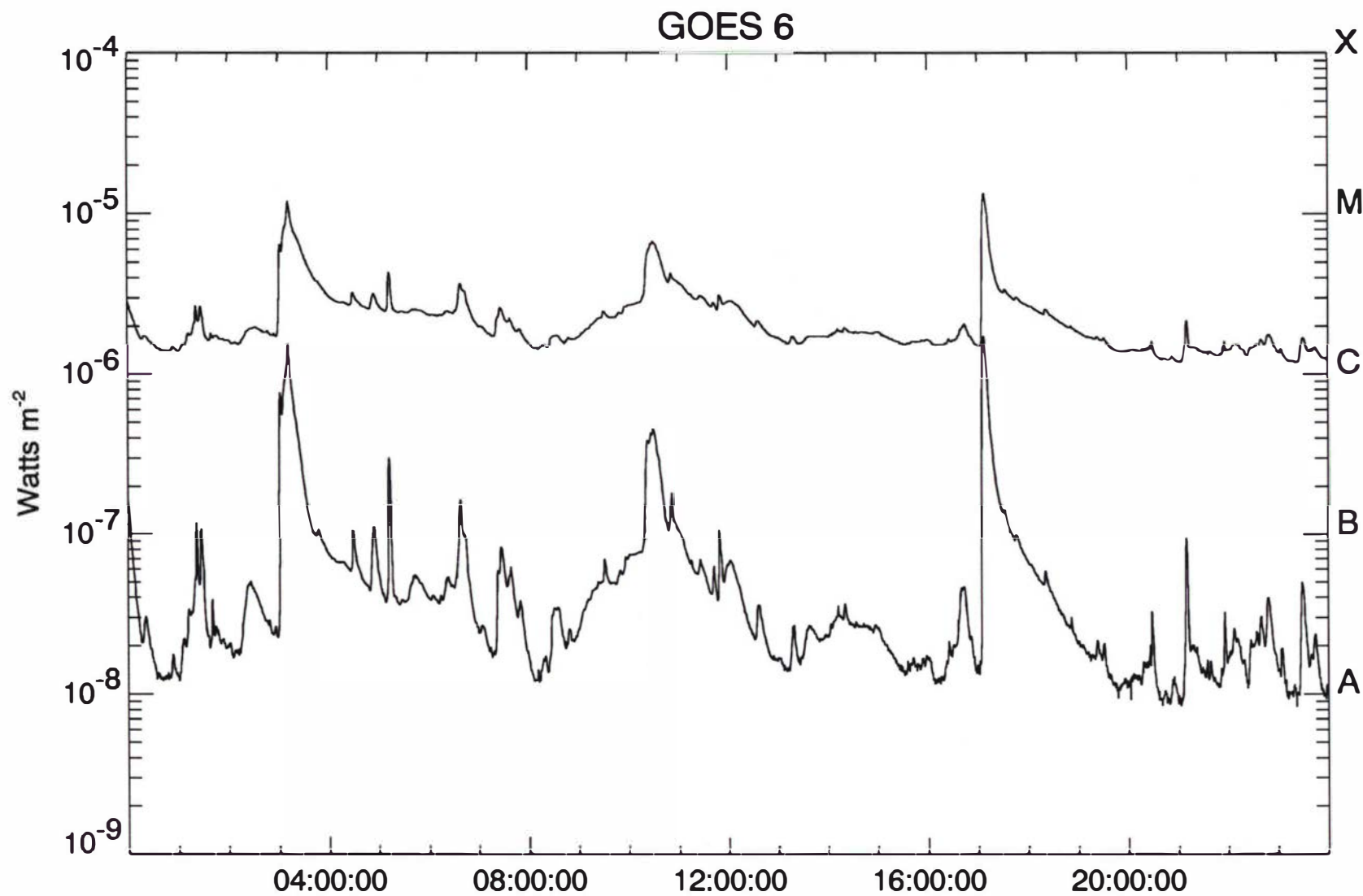
BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/12



Current Time: 92/10/18, 1903 EDT
A: Channel 1 Most Sunward LAD
B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare



Data Start: 91/12/12, 0000:01

Plot created: 97/10/20, 1451

Channel

1 (1.0 - 8.0 Angstroms)

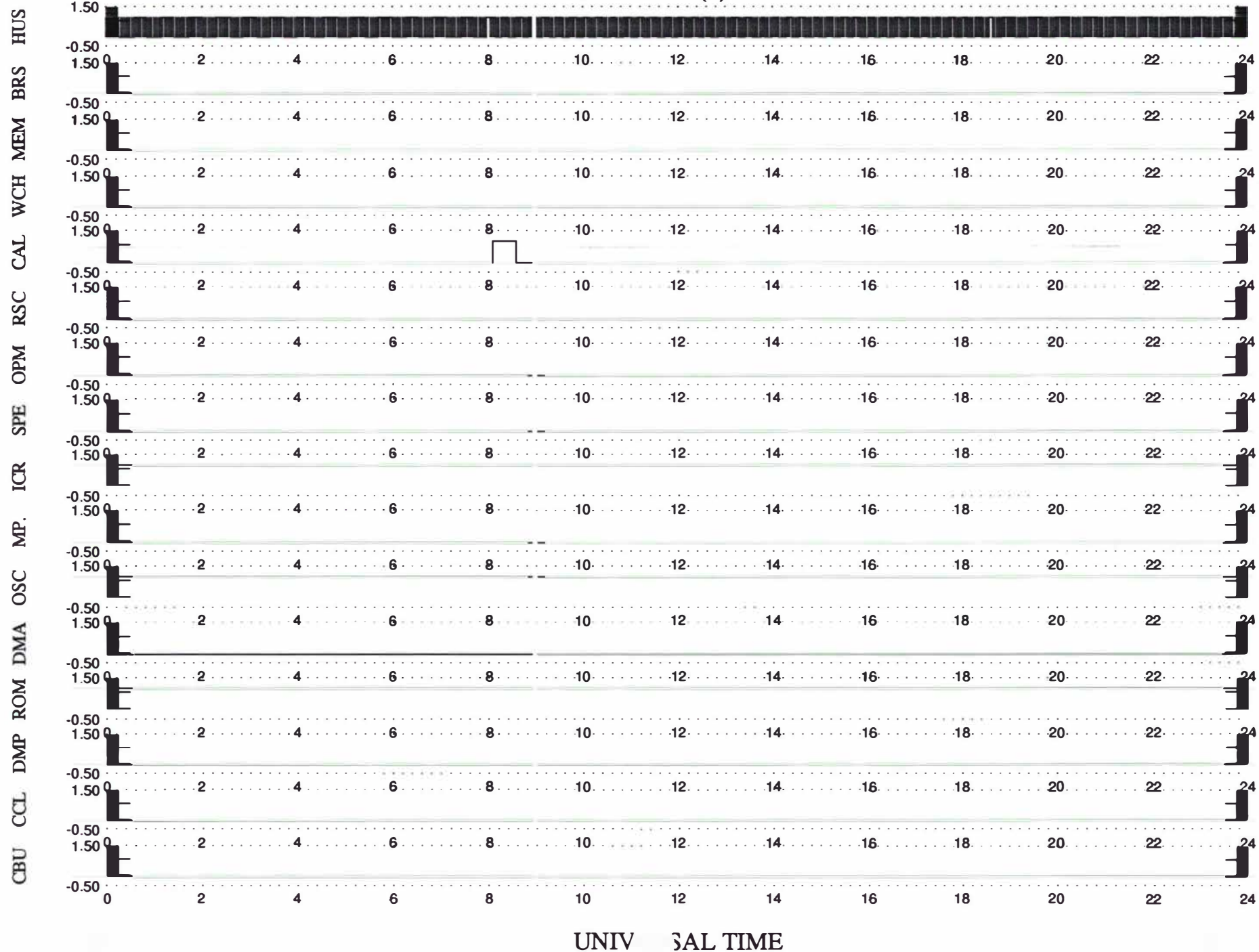
Background not subtracted

2 (0.5 - 4.0 Angstroms)

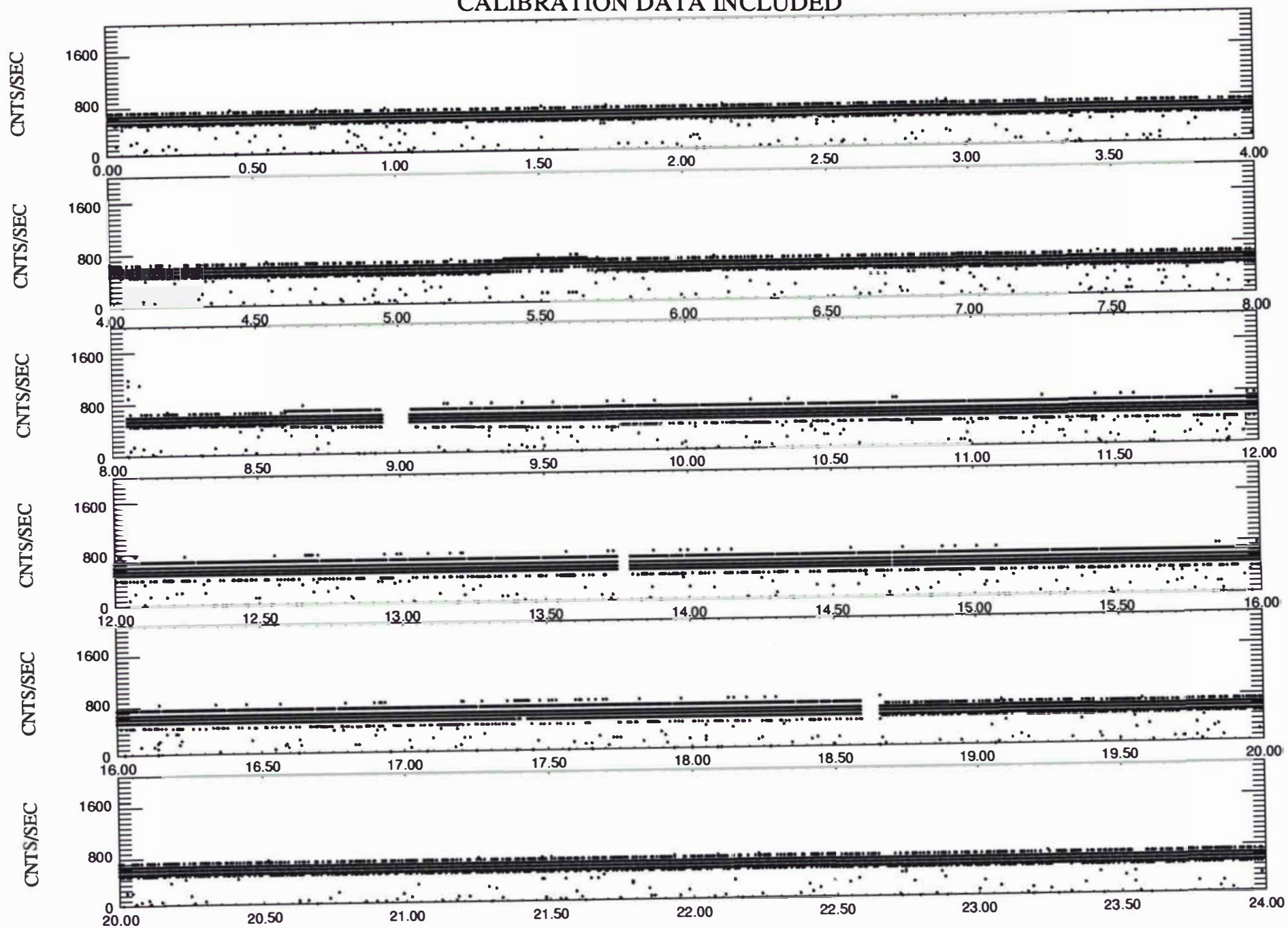
Background not subtracted

Sample average = 10

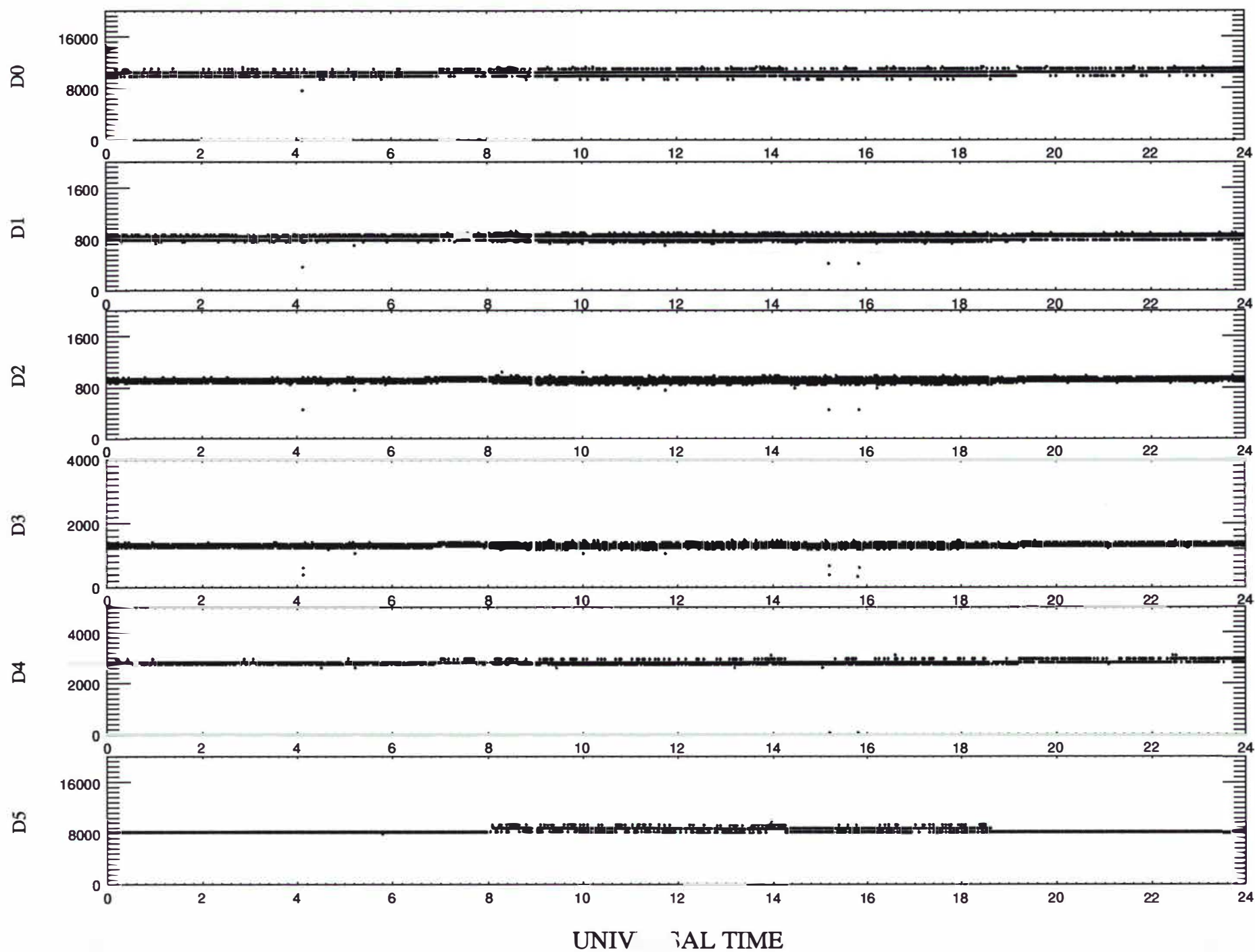
NO BURST (9)



CALIBRATION DATA INCLUDED



UNIV CAL TIME



CATSEARCH PROGRAM

BATSE BURST # 1167
EVENT OF 1991 DEC 13 DAY OF YEAR=347
EVENT CROSSING TIME AT BATSE : 74137. S. OR 20:35:37.2
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 218.000 -43.000
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 13/12/ 91 IS:
RA= 167.771 DEC= 6.626 DIST= 4.773 AU
BATSE-ULYSSES DISTANCE = 714009384. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=112.71 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -919.43 SECS.
CROSSING TIME AT ULYSSES IS 73218. S. OR 20:20:17 +/- 417.48 SECONDS

NO

14 / 4 / 93

ULYSSES RT

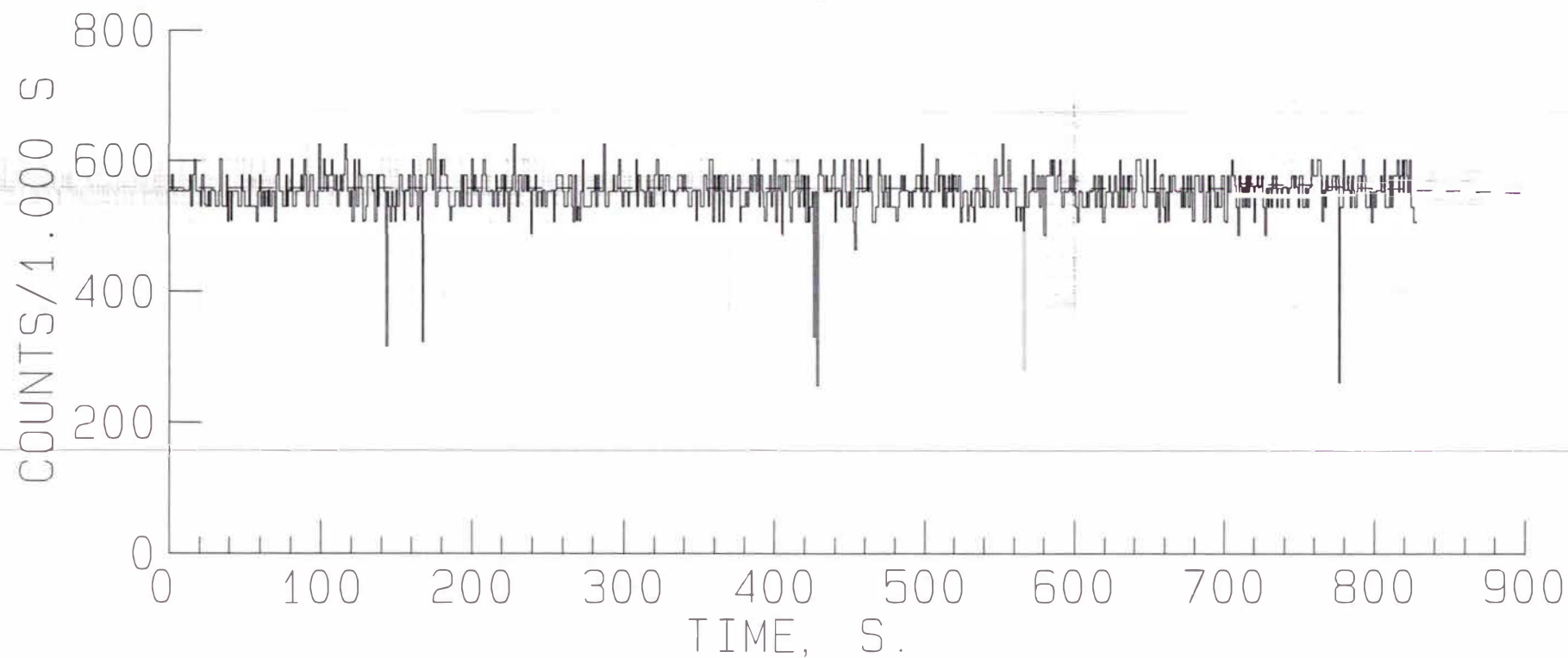
13/12/91 72792.250 s

0.500 S INTERVALS REGROUPED BY 2

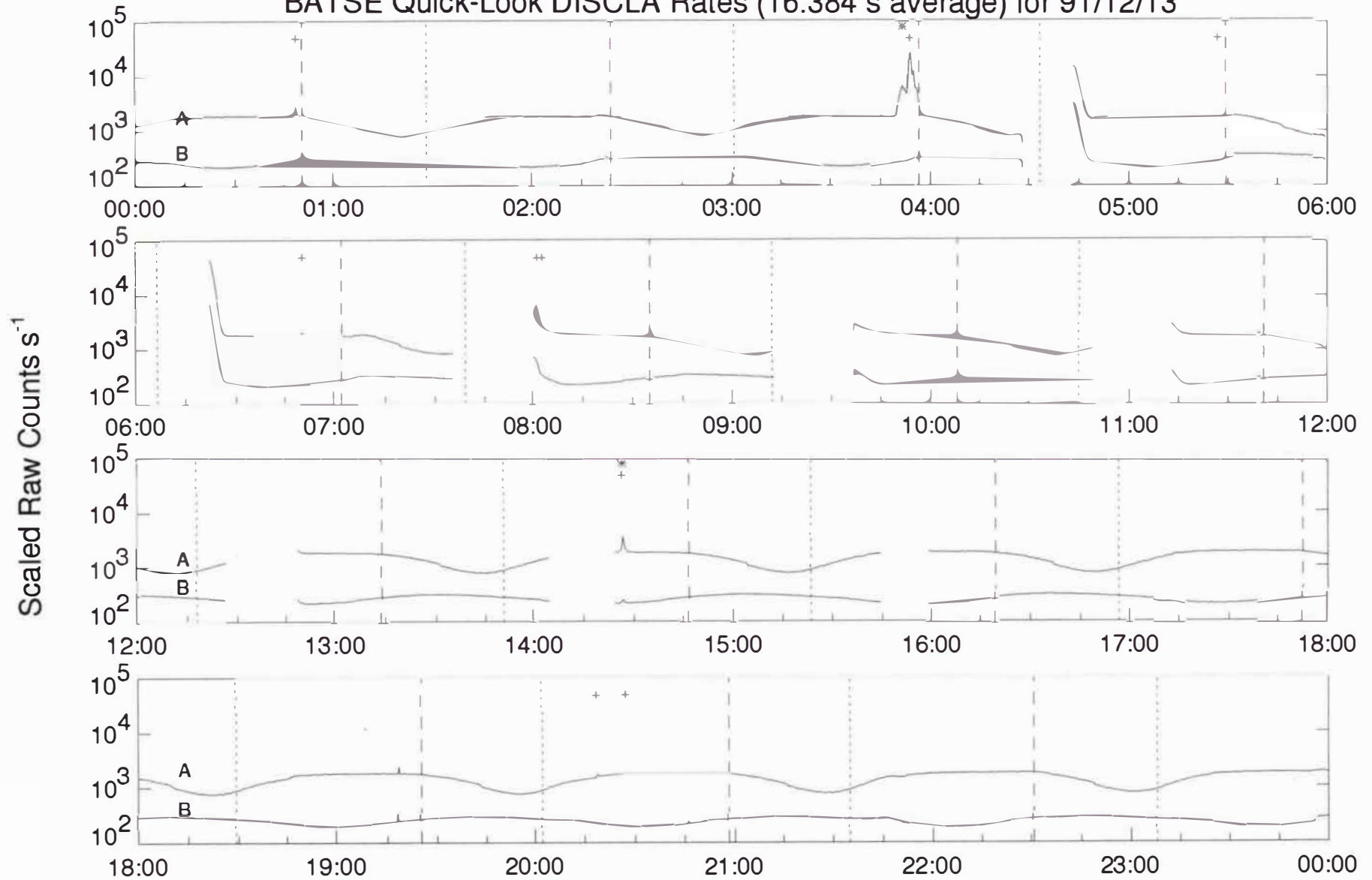
0- 0 keV

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS



BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/13



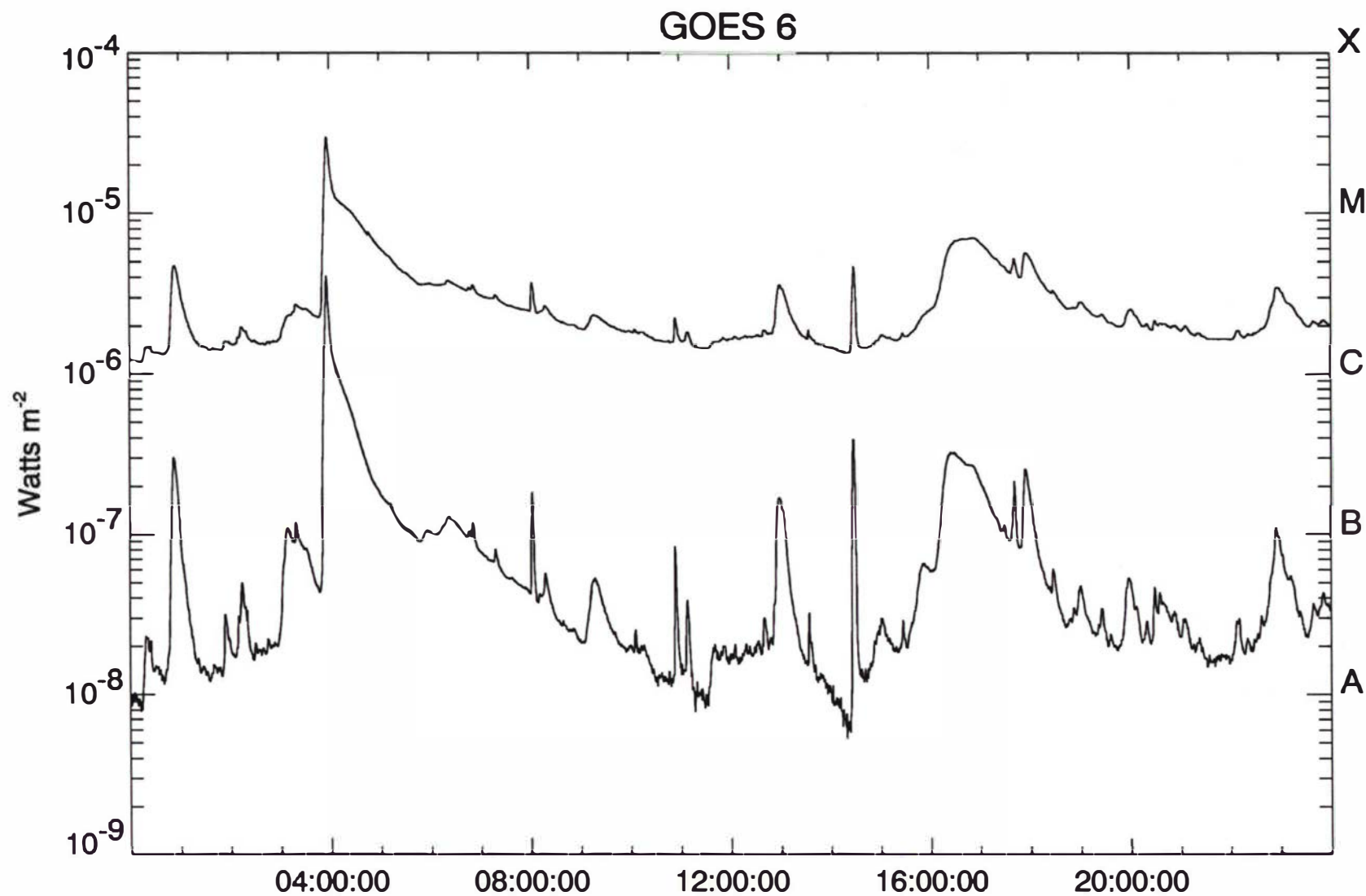
Current Time: 92/10/18, 1904 EDT

A: Channel 1 Most Sunward LAD

B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare



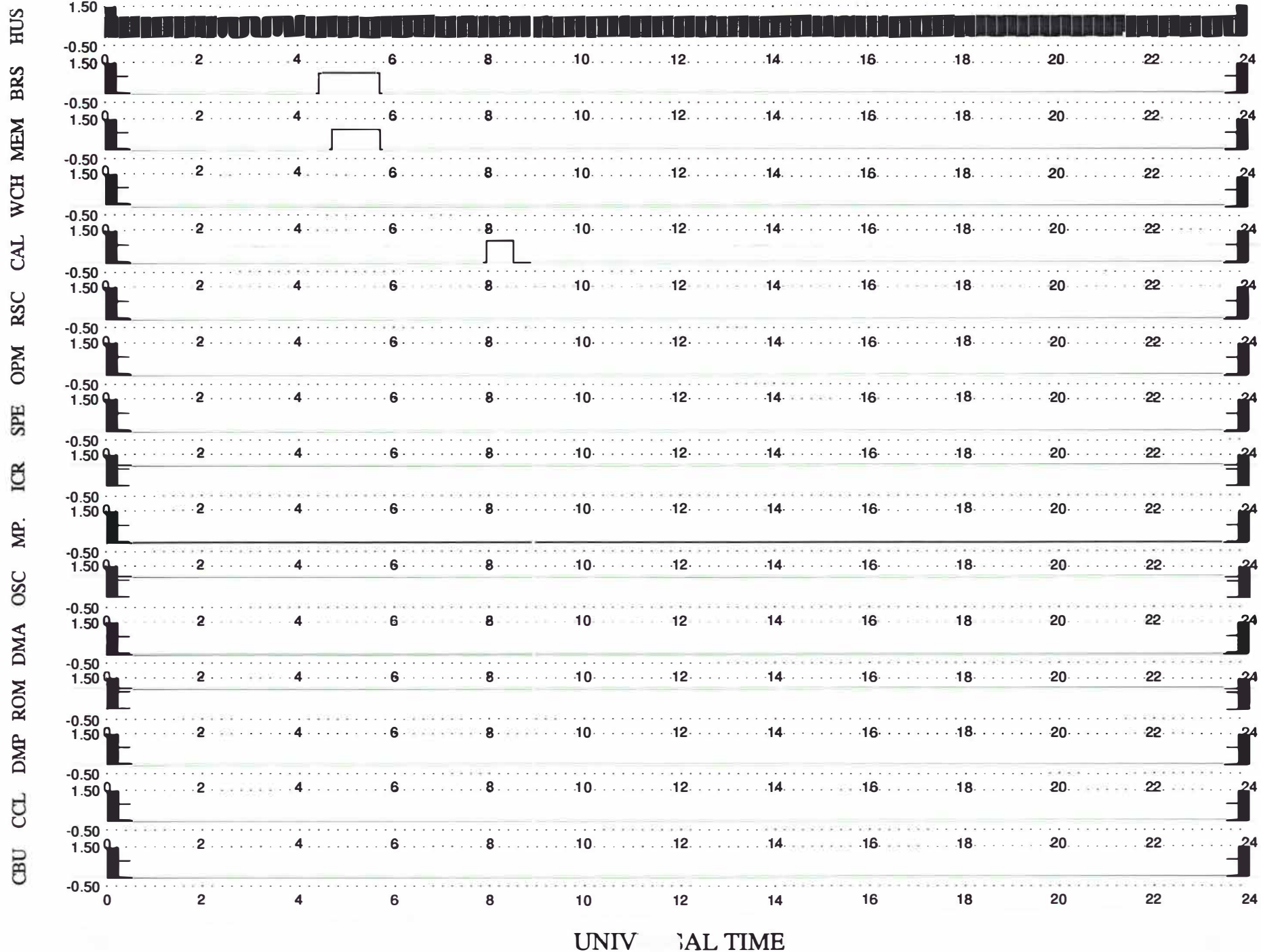
Data Start: 91/12/13, 0000:02

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

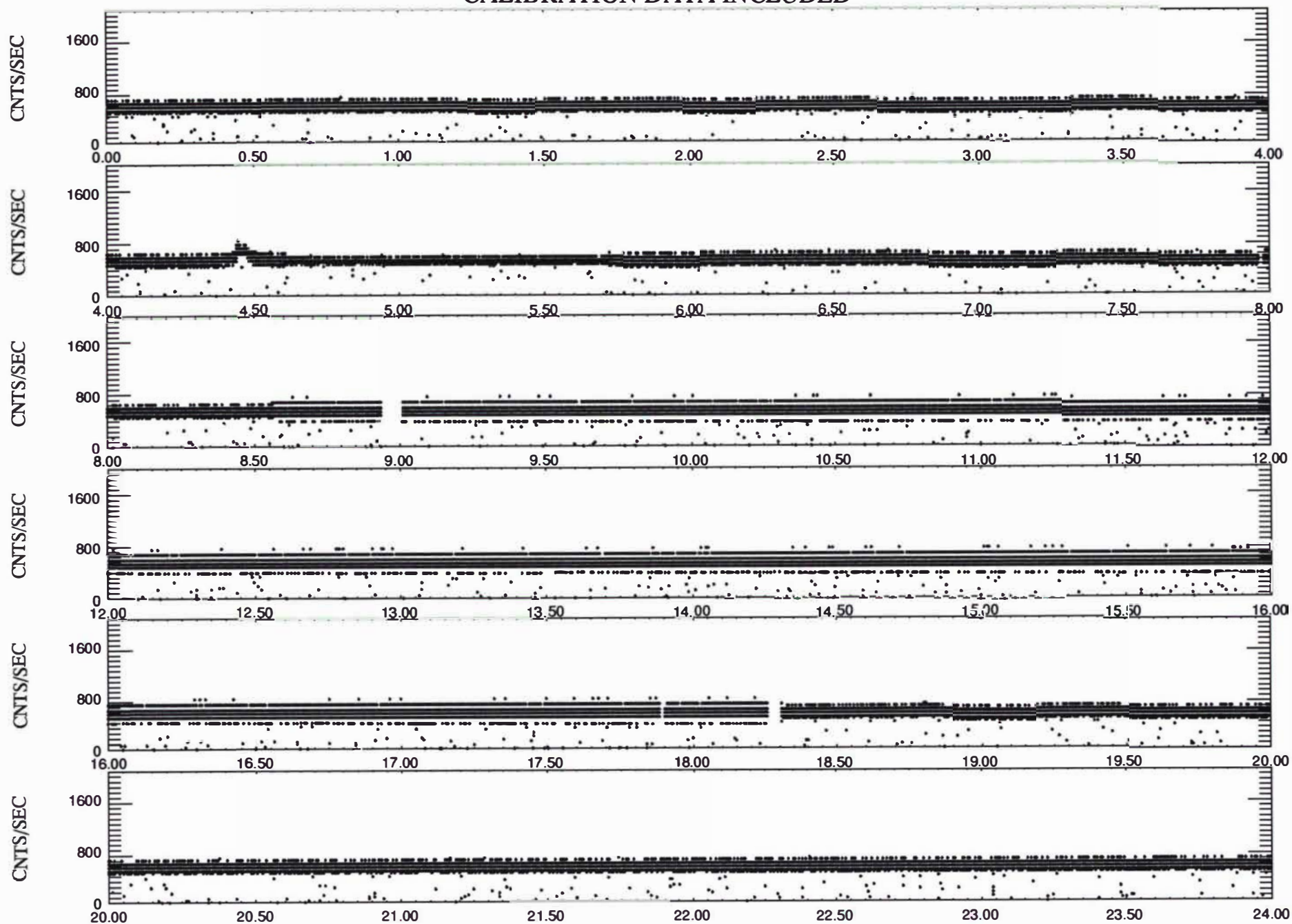
Plot created: 97/10/20, 1456

Background not subtracted
Background not subtracted
Sample average = 10

BURST NUMBER 10

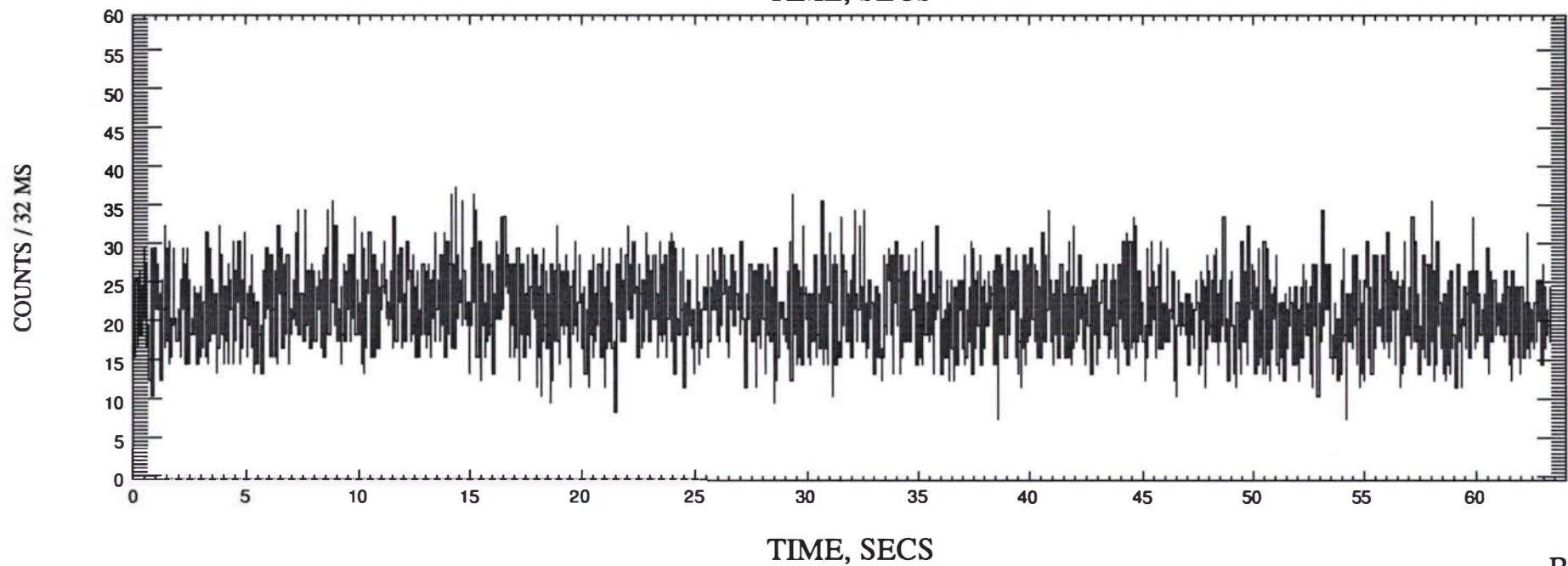
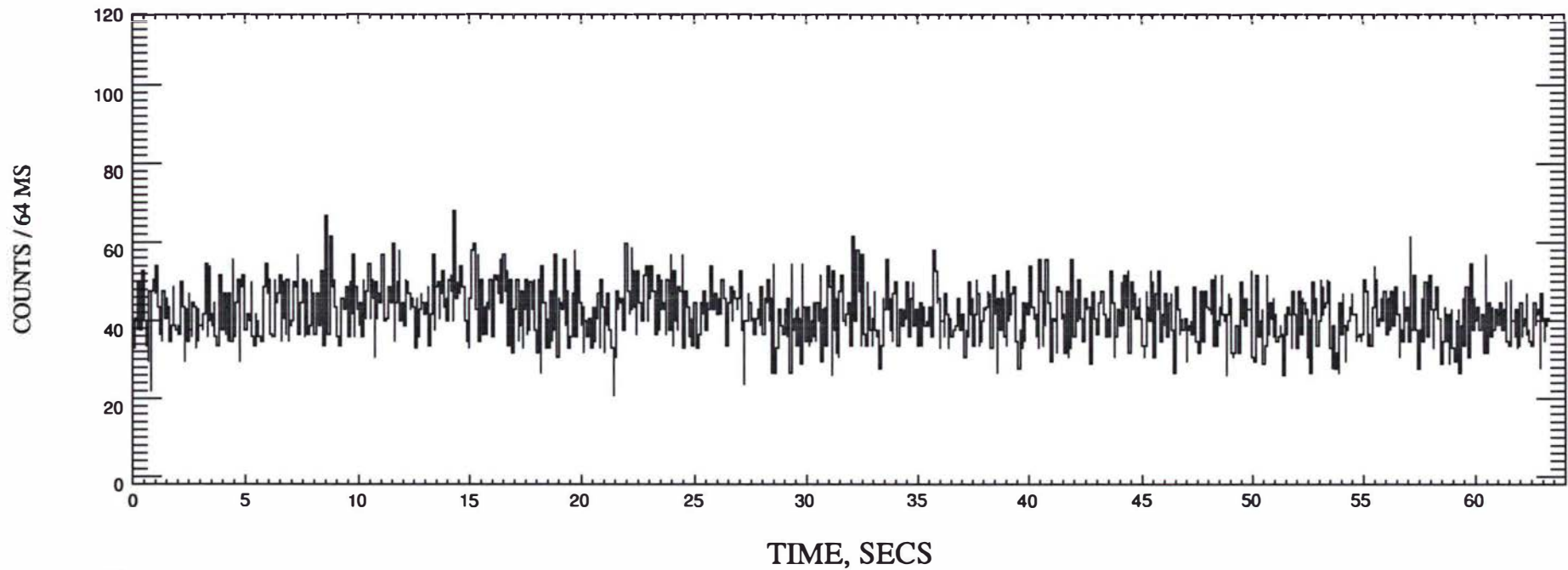


CALIBRATION DATA INCLUDED

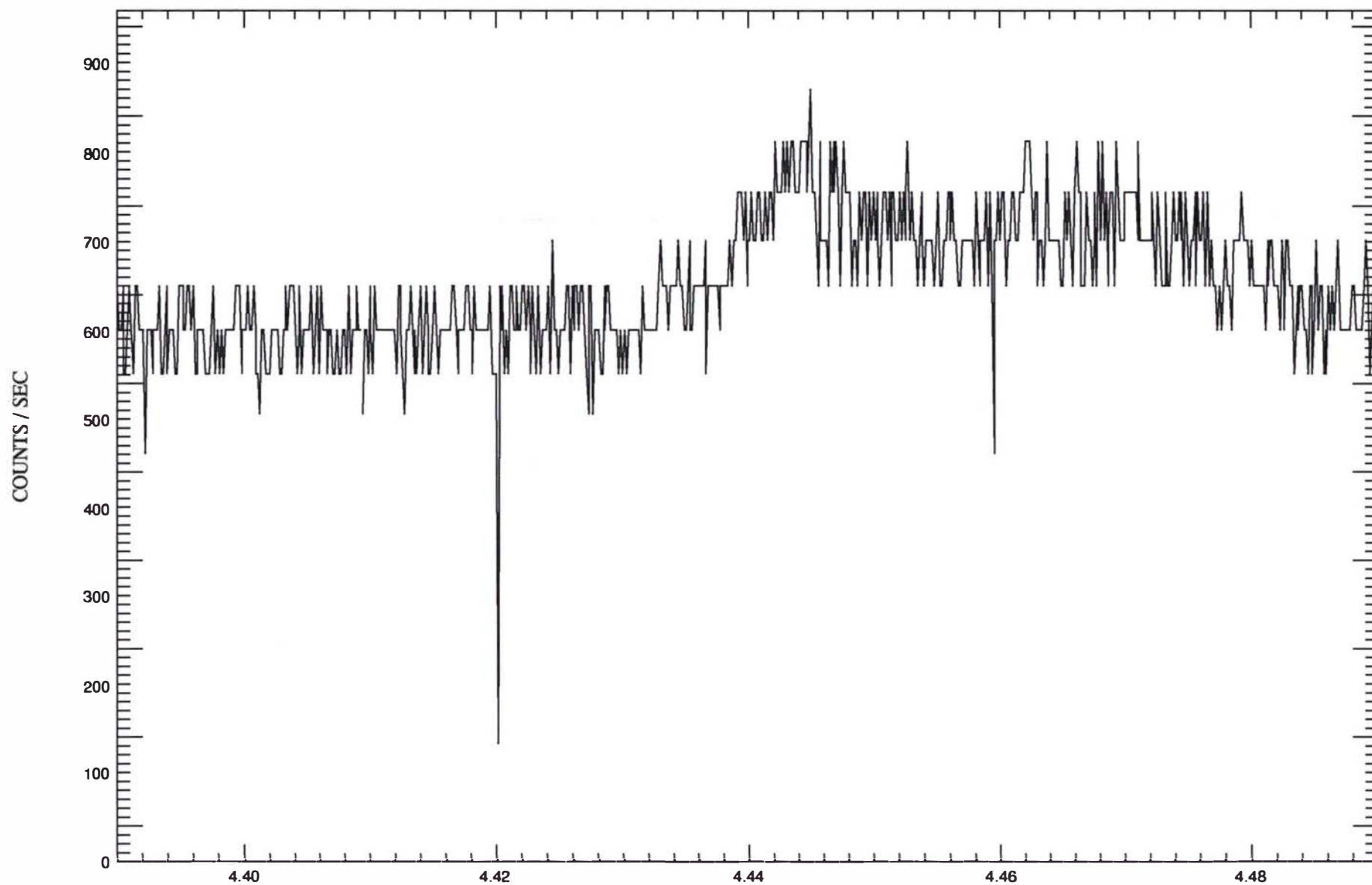


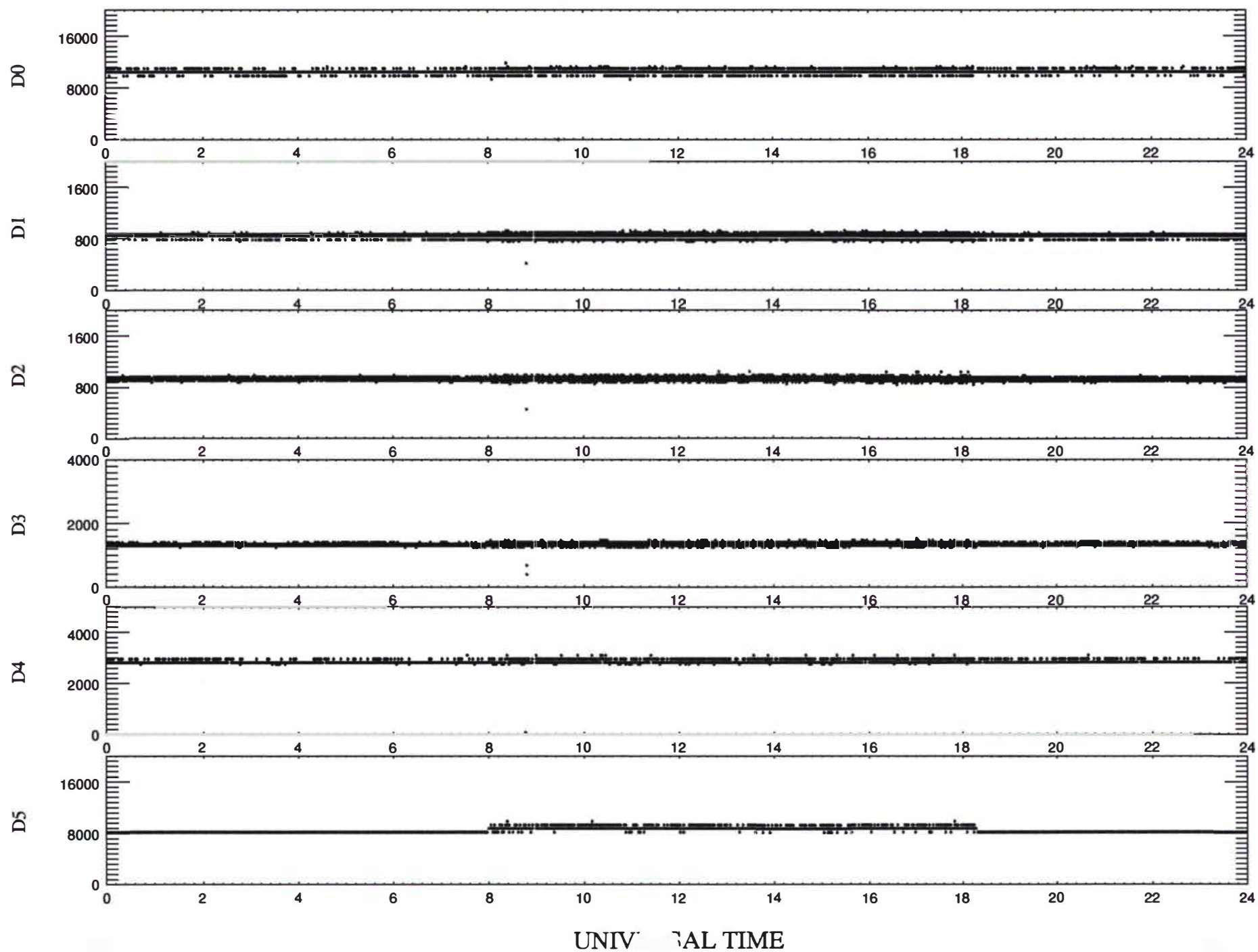
UNIV. TIME

Burst Counter 10 at UT= 4.442571508620 h=15993.257 s 04:26:33.257



CALIBRATION DATA INCLUDED

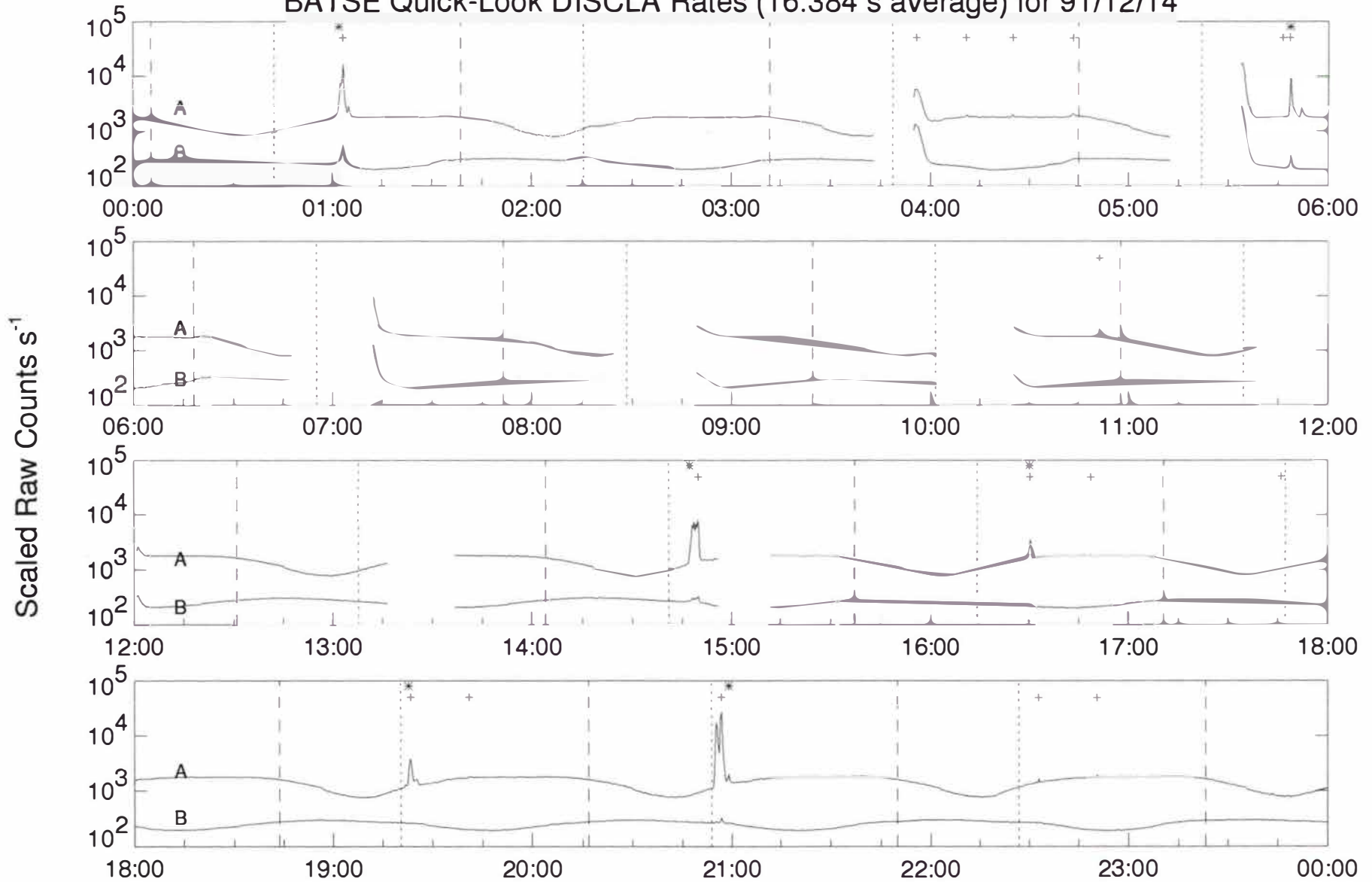




Dezelay -> KH 7/93

DATE	U.T.	Nr UGB	Event Nature
1991-08-27	15:33:19.885	325-c	Solar Particles
1991-09-01	05:24:27.051	327-a	GRB
1991-09-07	01:05:10.287	330-a	GRB
1991-09-07	19:23:04.162	331-a	Solar Flare
1991-10-01	18:14:23.671	345-a	Unknown
1991-10-01	19:01:20.457	345-b	Unknown
1991-10-04	01:27:10.195	347-a	Unknown
1991-10-13	18:09:49.270	353-a	Solar Flare
1991-10-13	21:02:34.557	353-b	Solar Flare
1991-10-14	17:34:33.822	354-a	Unknown
1991-10-16	11:01:35.345	355-a	GRB
1991-10-18	05:32:15.504	356-a	GRB
1991-10-25	21:25:15.926	362-a	GRB
1991-10-26	15:06:06.127	363-a	Unknown
1991-10-26	15:28:41.044	363-b	Unknown
1991-10-26	20:35:18.850	363-c	Solar Flare
1991-11-19	17:12:34.357	367-a	GRB
1991-11-19	17:28:41.794	367-b	Solar Flare
1991-11-21	07:23:32.063	368-a	Unknown
1991-11-21	07:43:41.945	368-b	Unknown
1991-11-21	07:58:33.952	368-c	Unknown
1991-12-05	19:48:38.788	375-a	Solar Flare
1991-12-14	20:55:02.702	378-a	Unknown
1991-12-15	06:23:41.586	378-b	Unknown
1991-12-15	11:41:18.304	378-c	Unknown
1991-12-20	14:02:29.154	380-a	Solar Flare
1991-12-20	14:53:07.976	380-b	Solar Flare
1991-12-20	16:04:57.705	380-c	Solar Flare
1991-12-22	15:00:10.116	381-a	GRB
1992-01-10	00:12:08.191	386-a	Unknown
1992-01-10	02:45:56.628	386-b	Unknown
1992-01-10	09:18:06.120	386-c	Unknown & GRB
1992-01-18	09:42:49.763	392-a	Unknown
1992-01-18	12:38:59.105	392-b	Unknown
1992-01-18	~12:52	392-c	Unknown

BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/14



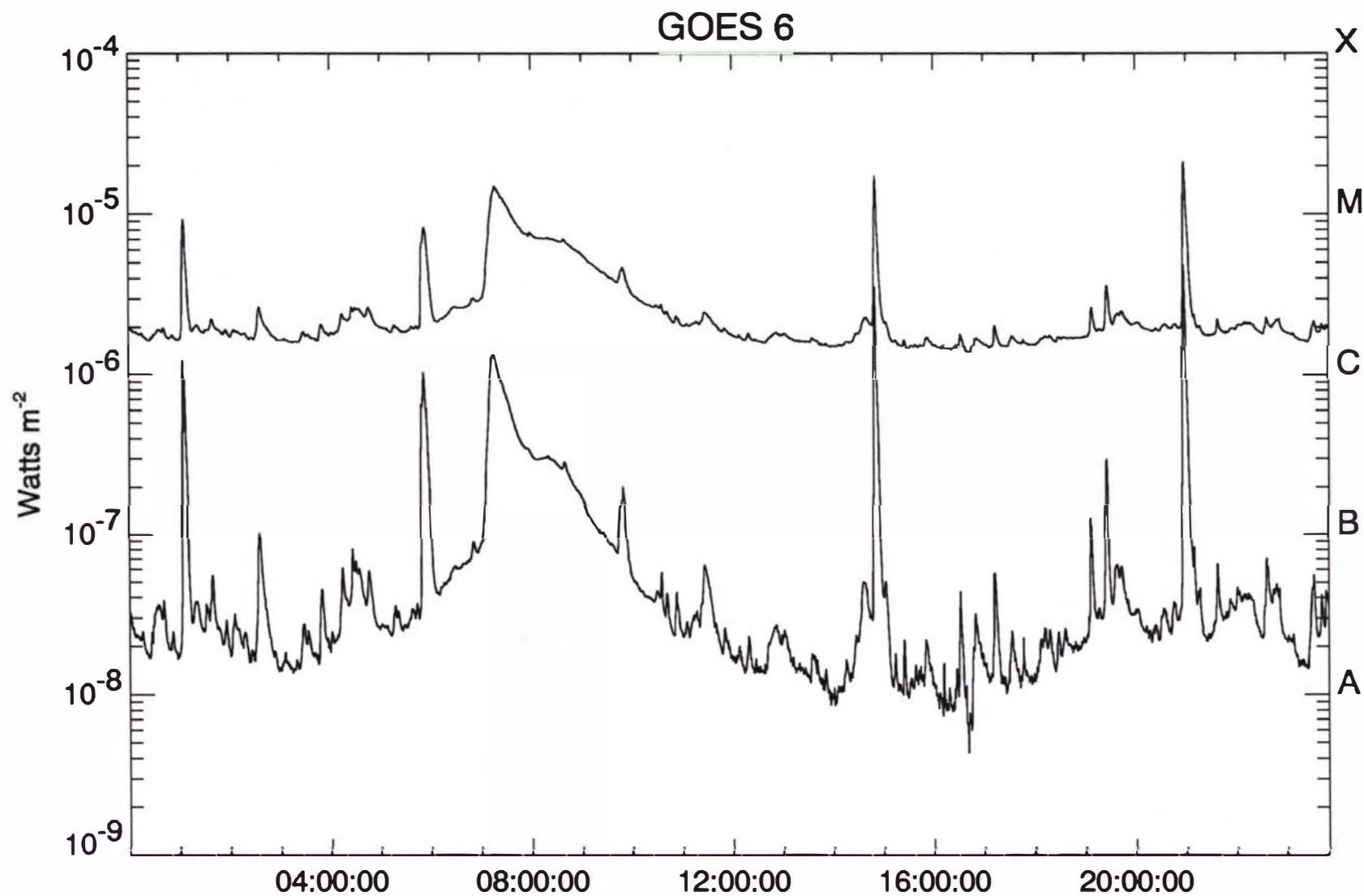
Current Time: 92/10/18, 1905 EDT

A: Channel 1 Most Sunward LAD

B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare



Data Start: 91/12/14, 0000:00

Plot created: 97/10/20, 1503

Channel

1 (1.0 - 8.0 Angstroms)

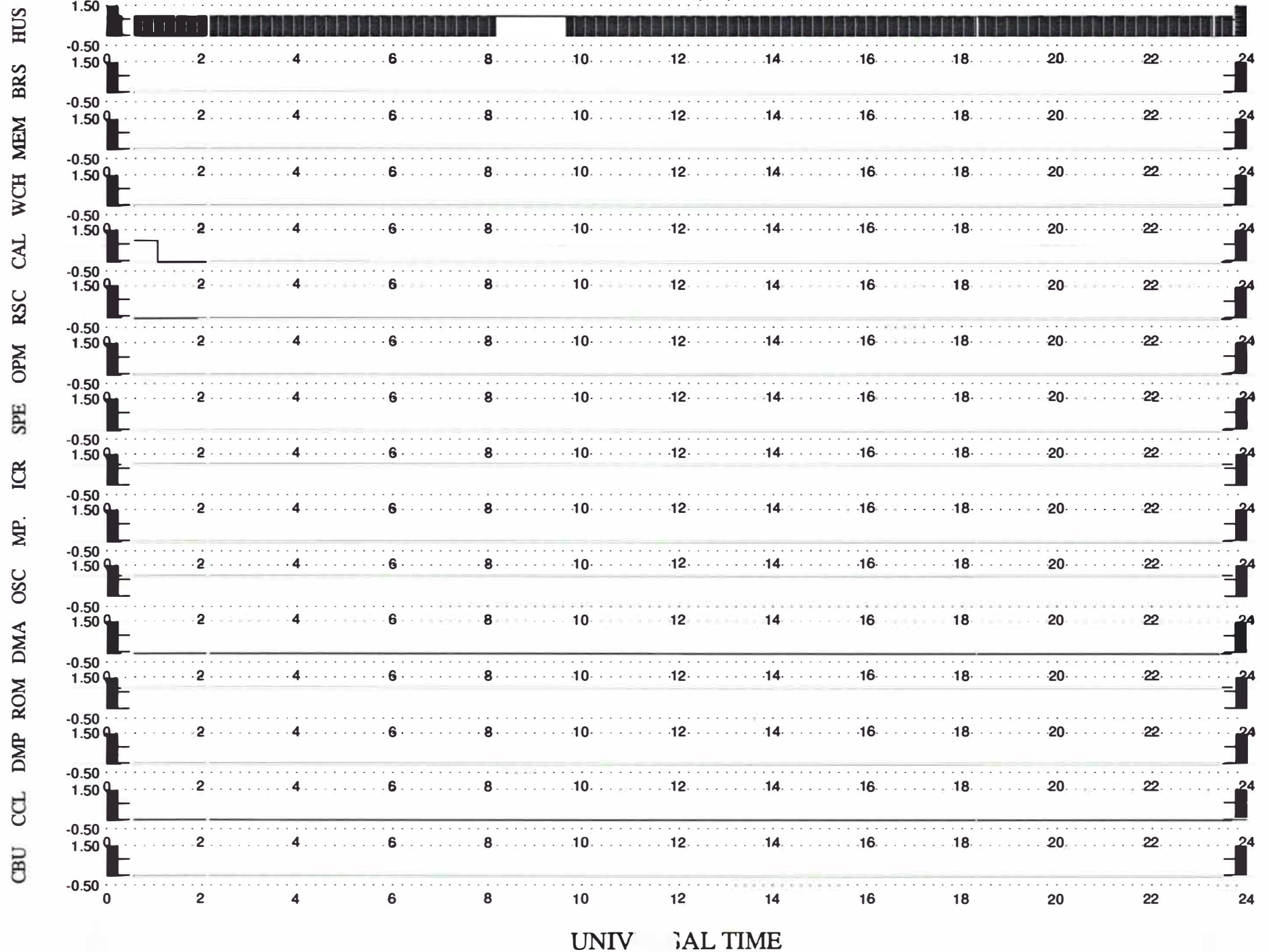
Background not subtracted

2 (0.5 - 4.0 Angstroms)

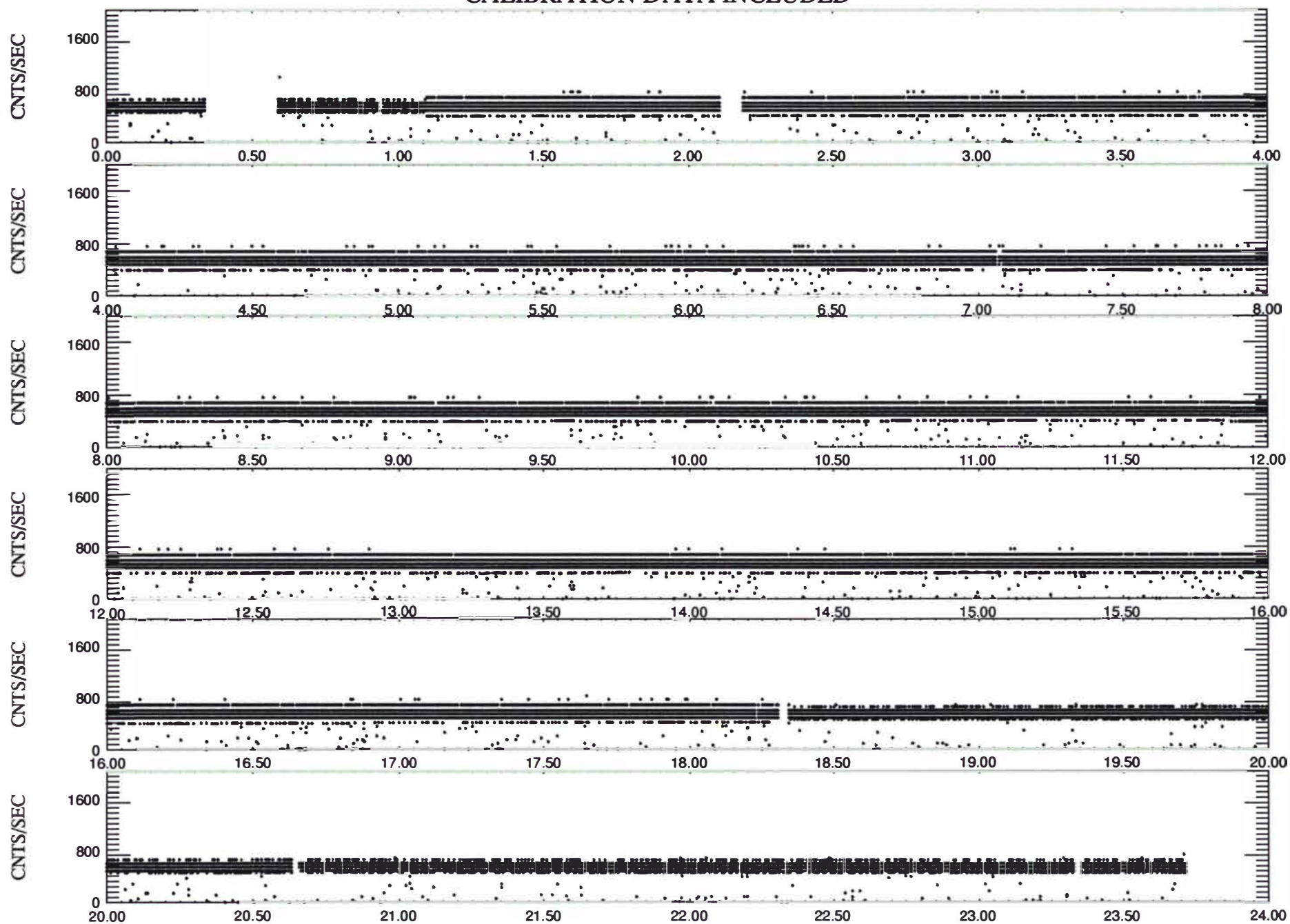
Background not subtracted

Sample average = 10

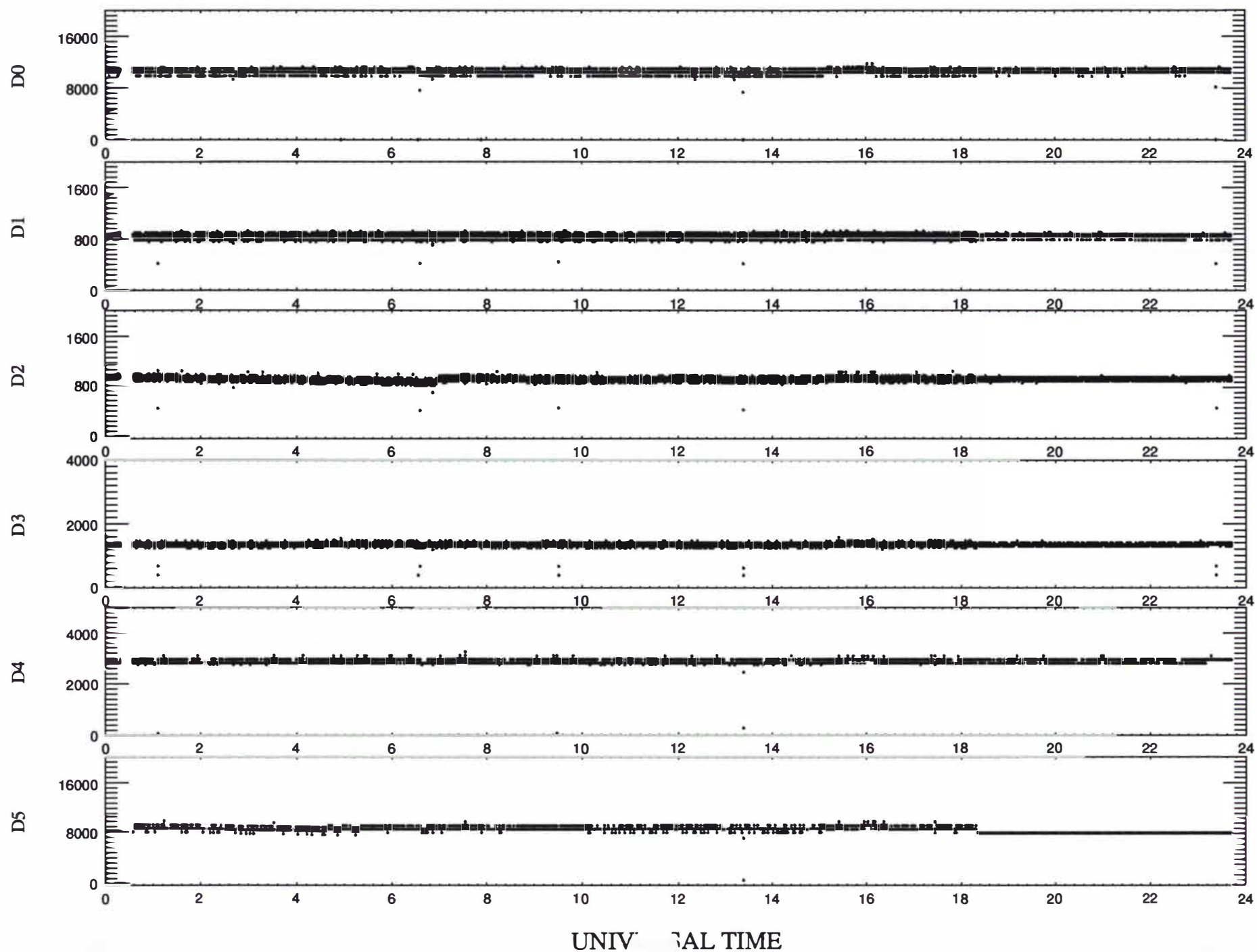
NO BURST (10)



CALIBRATION DATA INCLUDED



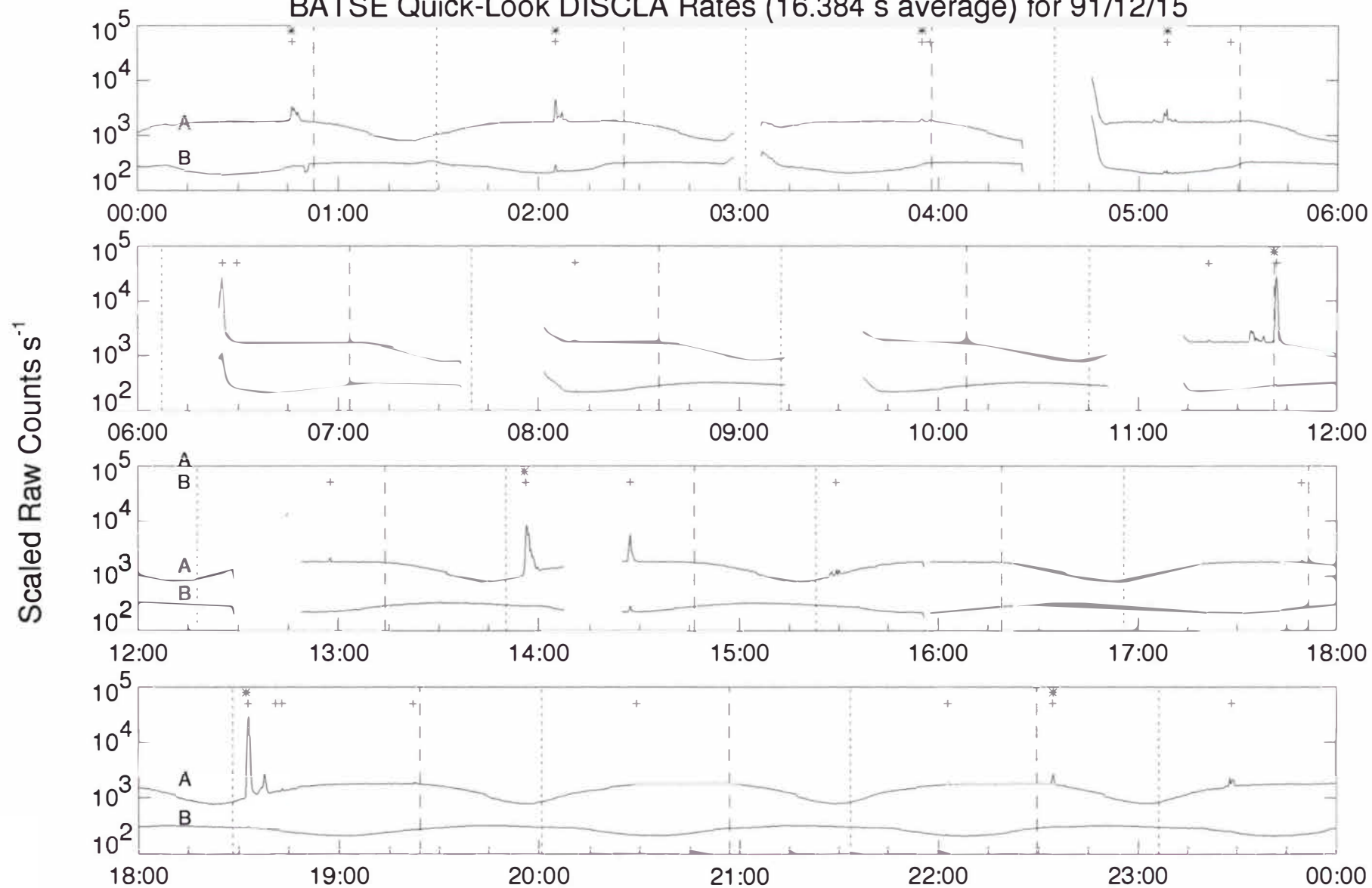
UNIV AL TIME



Dezember -> Kth 7/93

DATE	U.T.	Nr UGB	Event Nature
1991-08-27	15:33:19.885	325-c	Solar Particles
1991-09-01	05:24:27.051	327-a	GRB
1991-09-07	01:05:10.287	330-a	GRB
1991-09-07	19:23:04.162	331-a	Solar Flare
1991-10-01	18:14:23.671	345-a	Unknown
1991-10-01	19:01:20.457	345-b	Unknown
1991-10-04	01:27:10.195	347-a	Unknown
1991-10-13	18:09:49.270	353-a	Solar Flare
1991-10-13	21:02:34.557	353-b	Solar Flare
1991-10-14	17:34:33.822	354-a	Unknown
1991-10-16	11:01:35.345	355-a	GRB
1991-10-18	05:32:15.504	356-a	GRB
1991-10-25	21:25:15.926	362-a	GRB
1991-10-26	15:06:06.127	363-a	Unknown
1991-10-26	15:28:41.044	363-b	Unknown
1991-10-26	20:35:18.850	363-c	Solar Flare
1991-11-19	17:12:34.357	367-a	GRB
1991-11-19	17:28:41.794	367-b	Solar Flare
1991-11-21	07:23:32.063	368-a	Unknown
1991-11-21	07:43:41.945	368-b	Unknown
1991-11-21	07:58:33.952	368-c	Unknown
1991-12-05	19:48:38.788	375-a	Solar Flare
1991-12-14	20:55:02.702	378-a	Unknown
1991-12-15	06:23:41.586	378-b	Unknown
1991-12-15	11:41:18.304	378-c	Unknown
1991-12-20	14:02:29.154	380-a	Solar Flare
1991-12-20	14:53:07.976	380-b	Solar Flare
1991-12-20	16:04:57.705	380-c	Solar Flare
1991-12-22	15:00:10.116	381-a	GRB
1992-01-10	00:12:08.191	386-a	Unknown
1992-01-10	02:45:56.628	386-b	Unknown
1992-01-10	09:18:06.120	386-c	Unknown & GRB
1992-01-18	09:42:49.763	392-a	Unknown
1992-01-18	12:38:59.105	392-b	Unknown
1992-01-18	~12:52	392-c	Unknown

BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/15



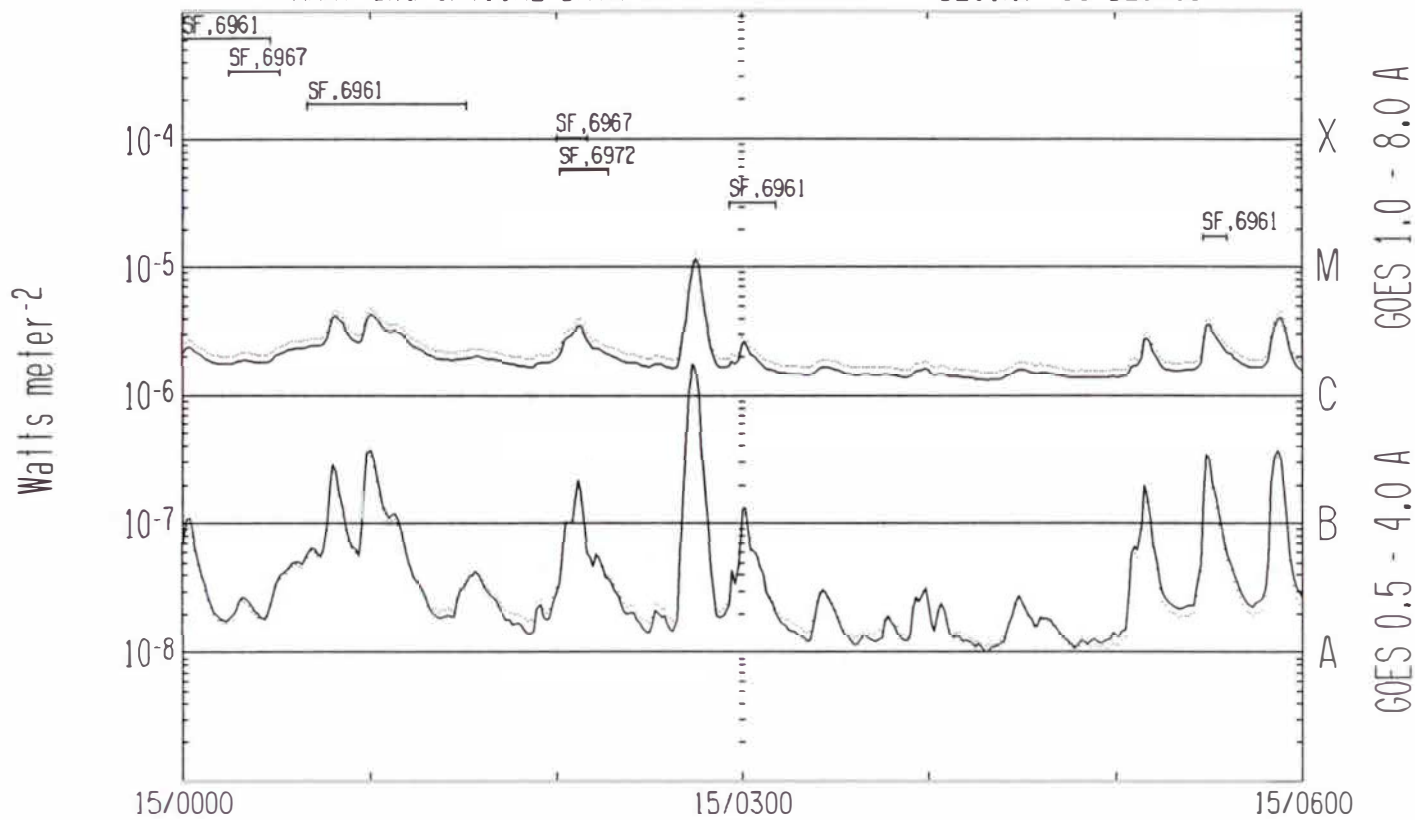
Current Time: 92/10/18, 1906 EDT
 A: Channel 1 Most Sunward LAD
 B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

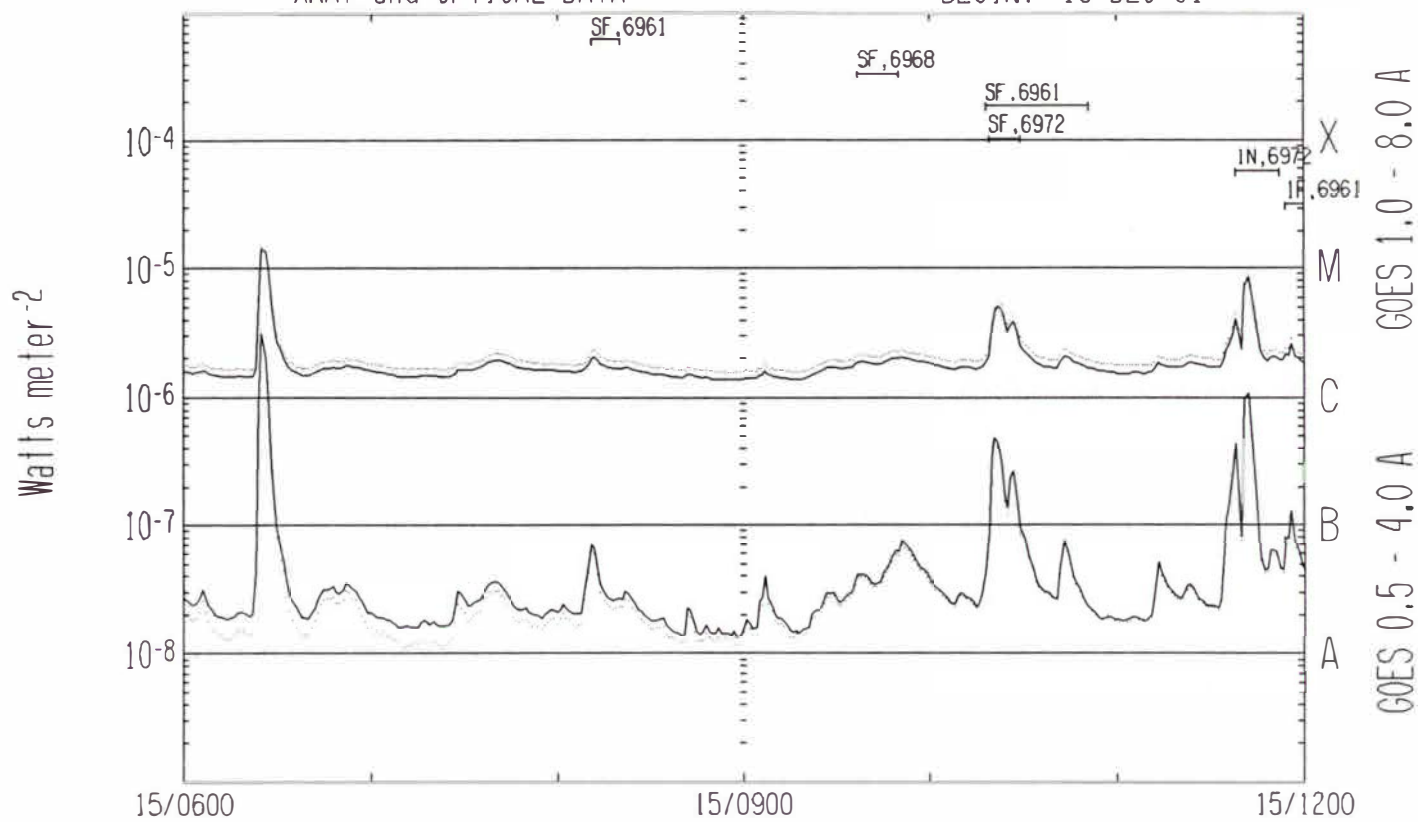
XRAY and OPTICAL DATA

BEGIN: 15 DEC 91



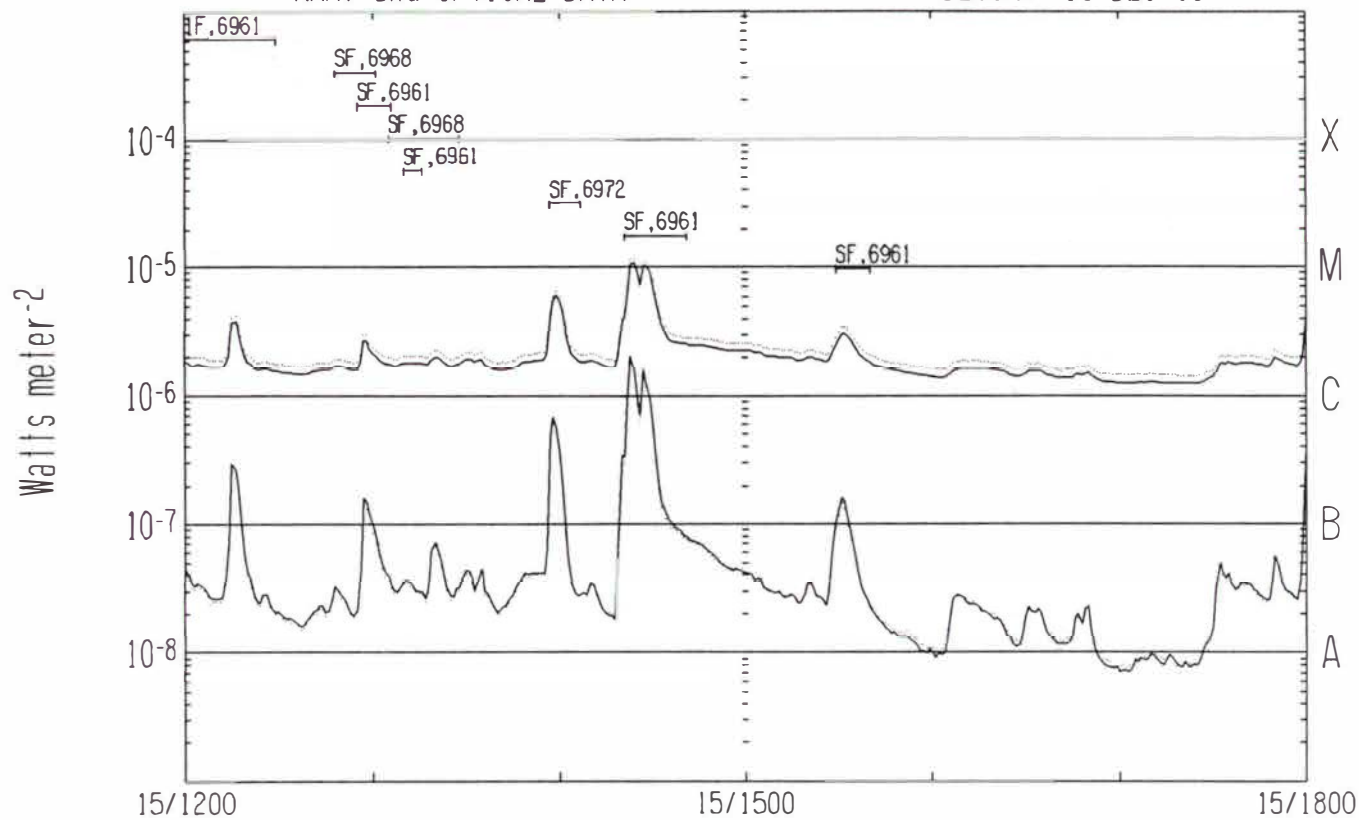
XRAY and OPTICAL DATA

BEGIN: 15 DEC 91



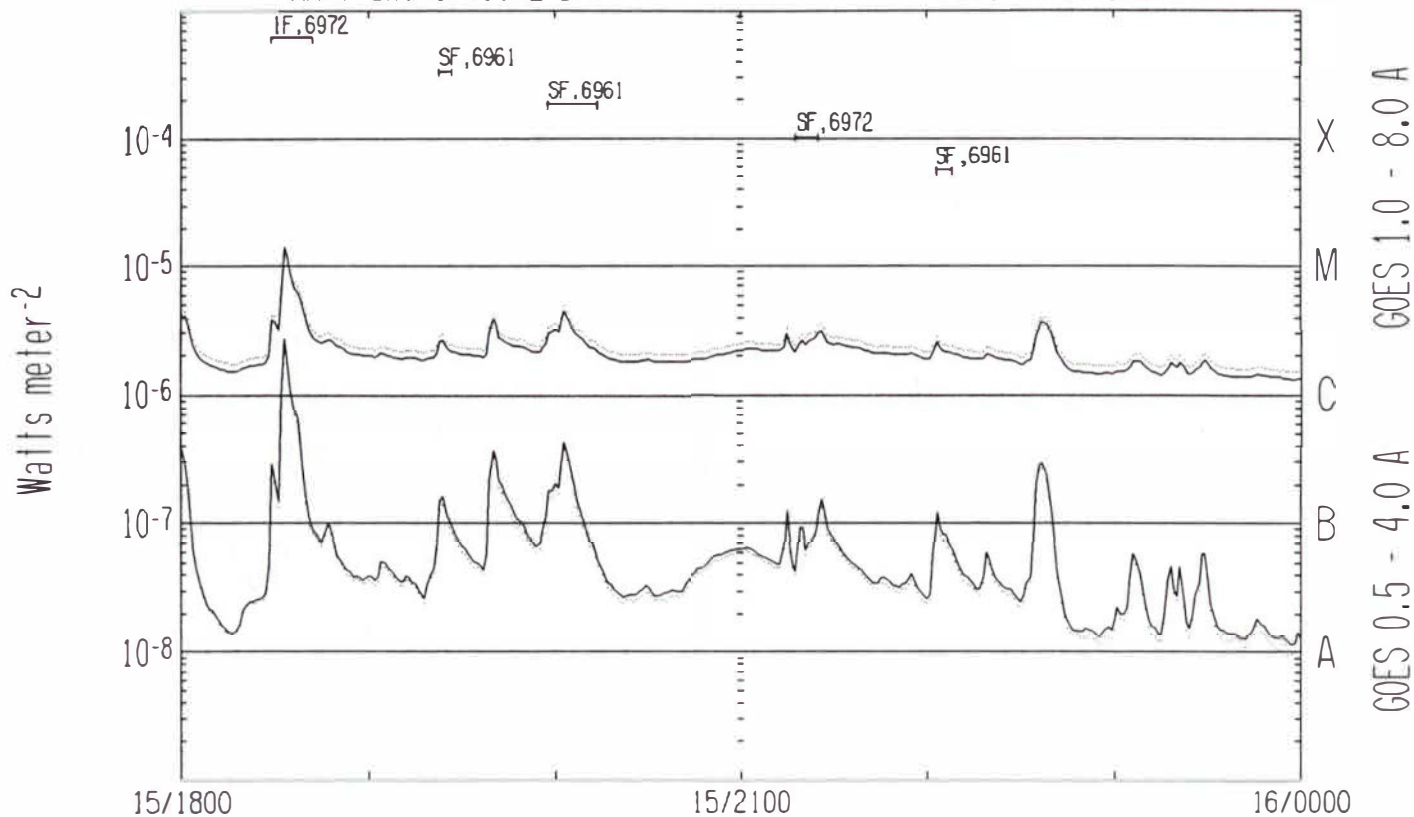
XRAY and OPTICAL DATA

BEGIN: 15 DEC 91

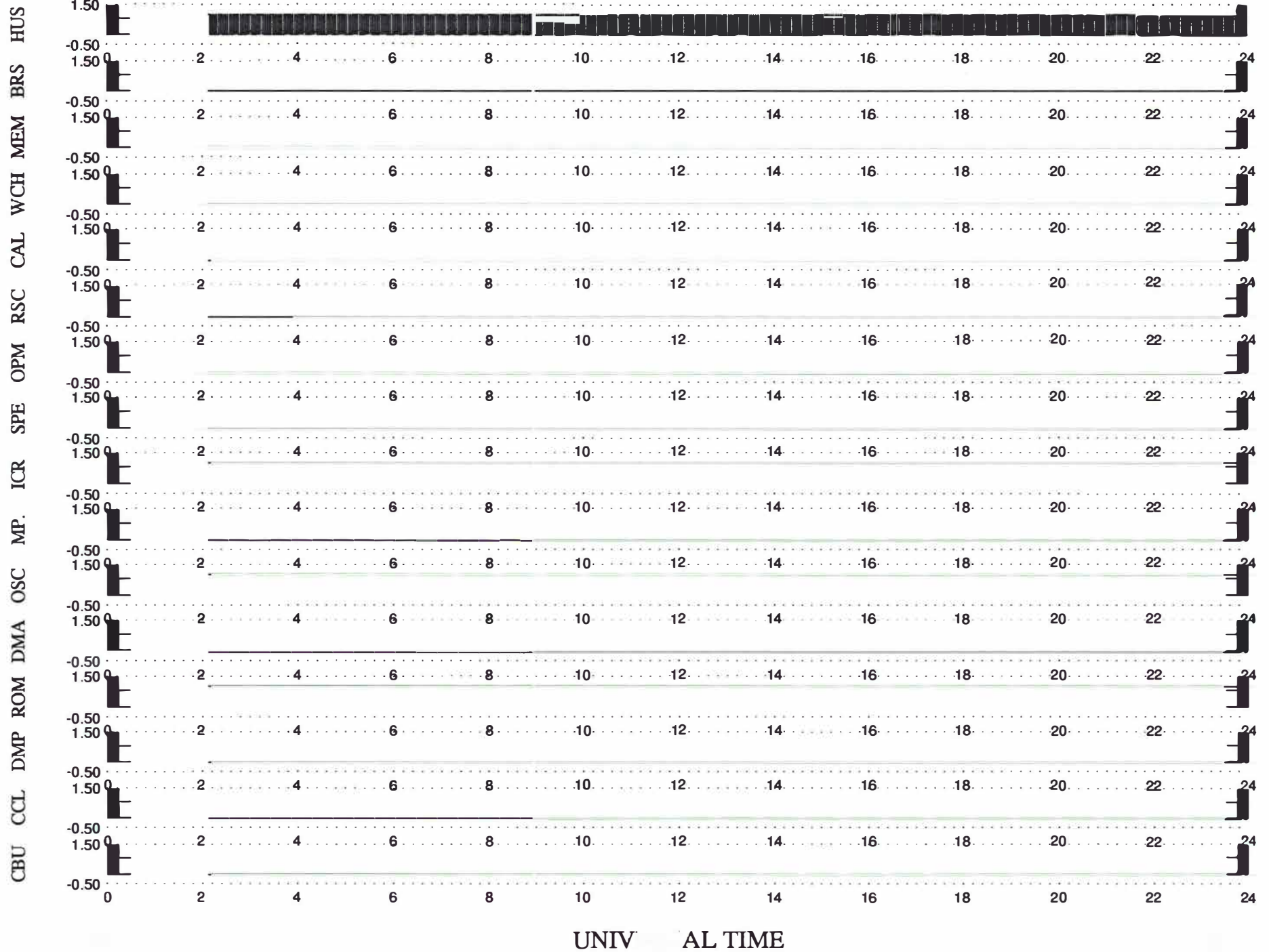


XRAY and OPTICAL DATA

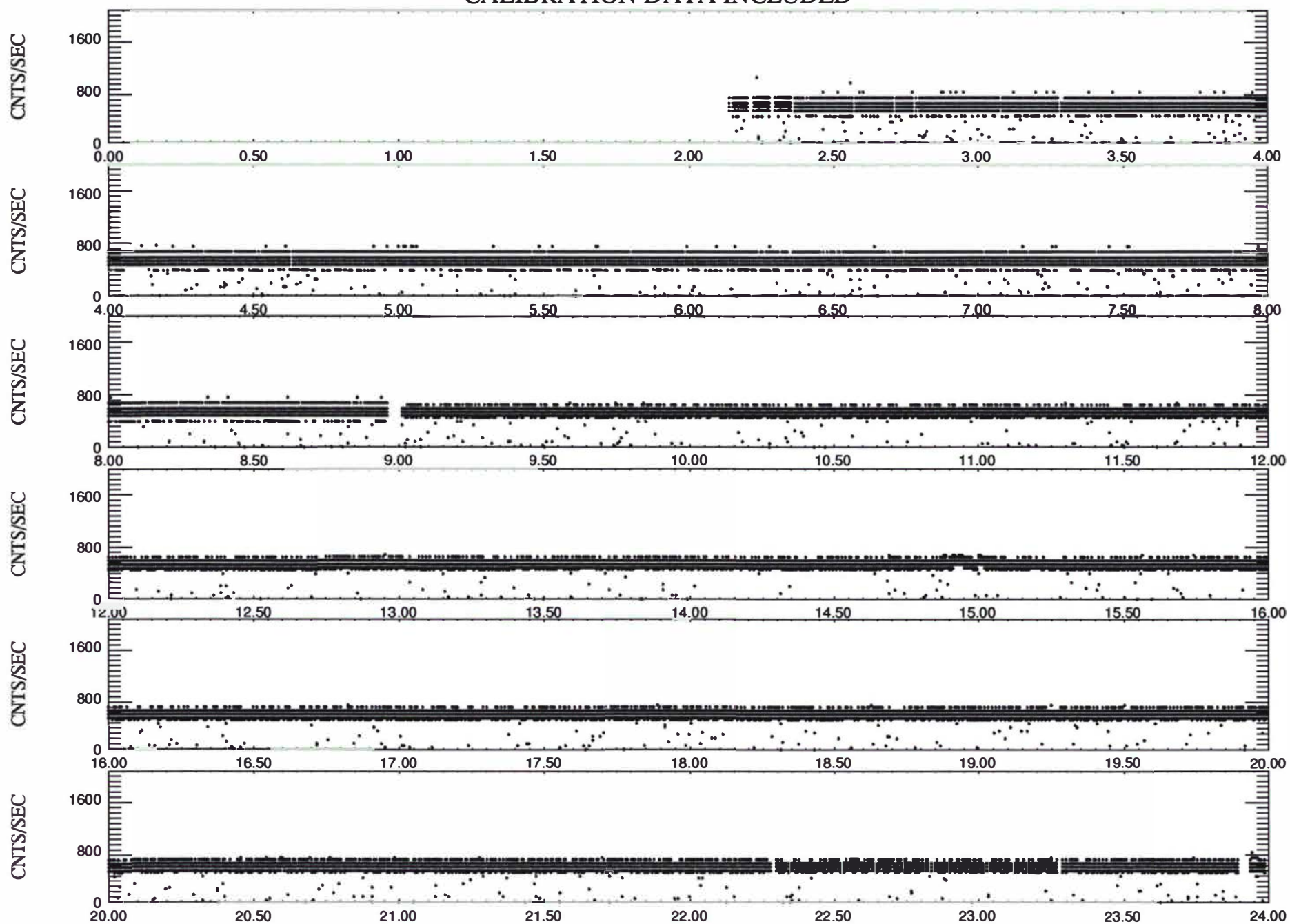
BEGIN: 15 DEC 91



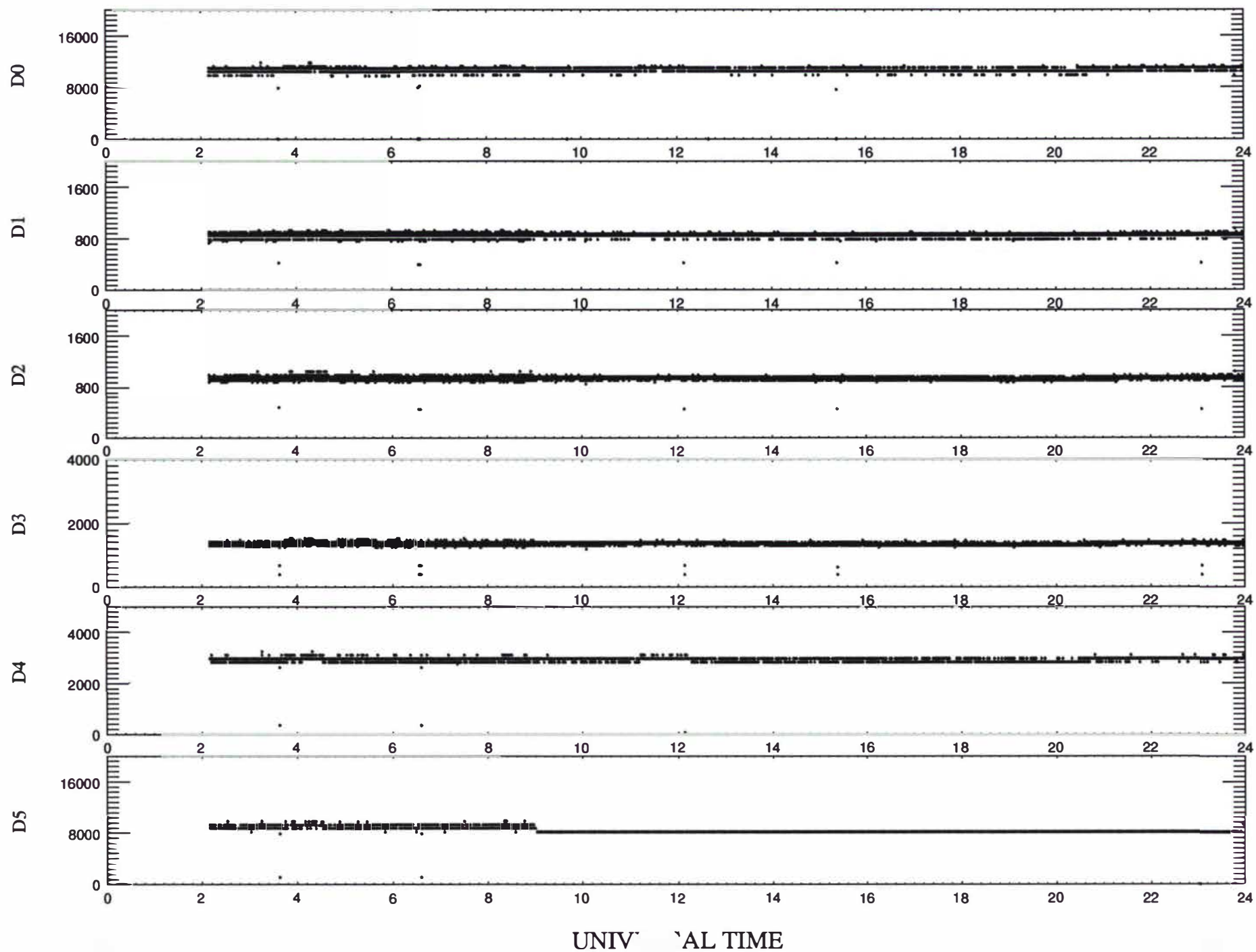
NO BURST (10)



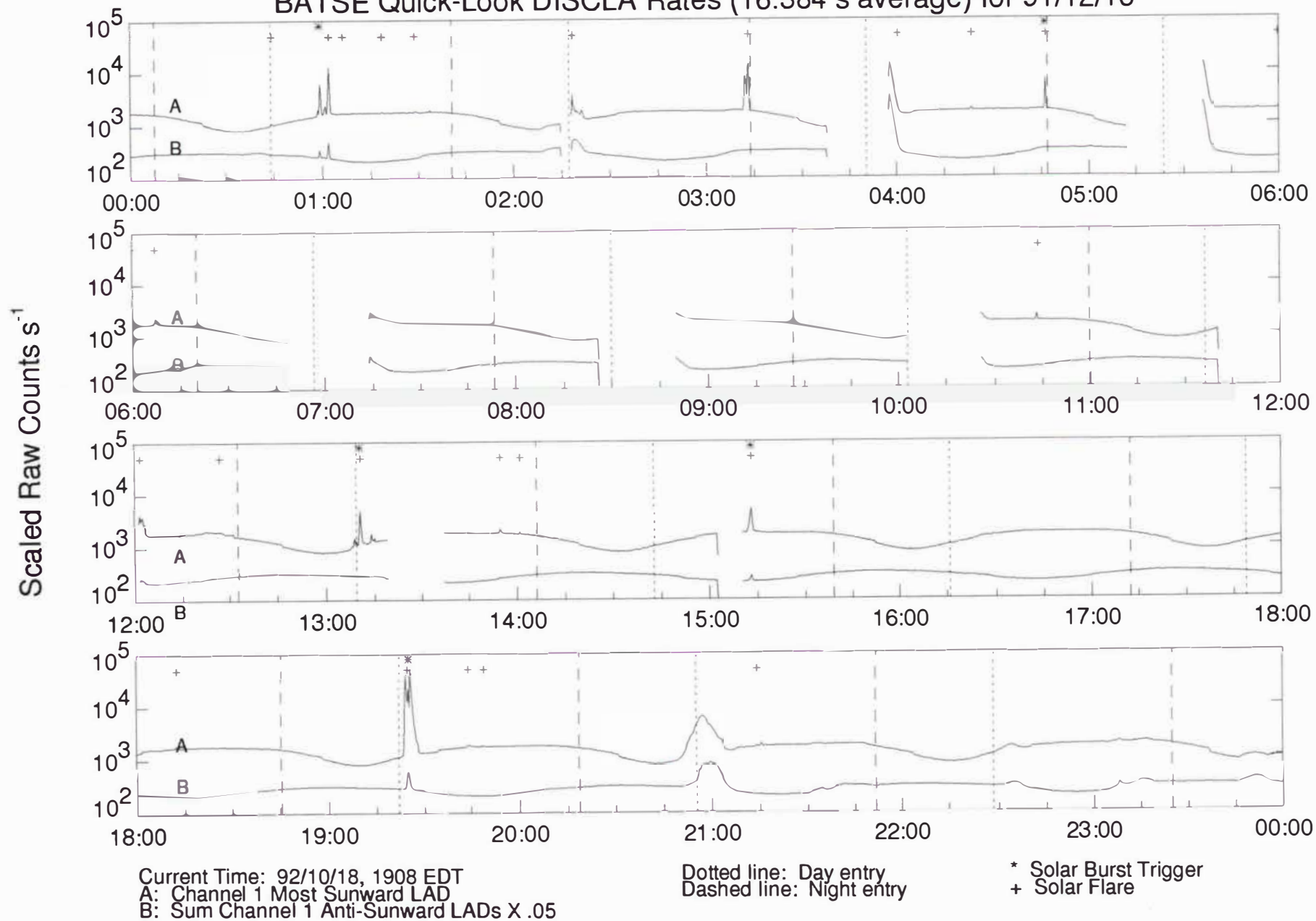
CALIBRATION DATA INCLUDED



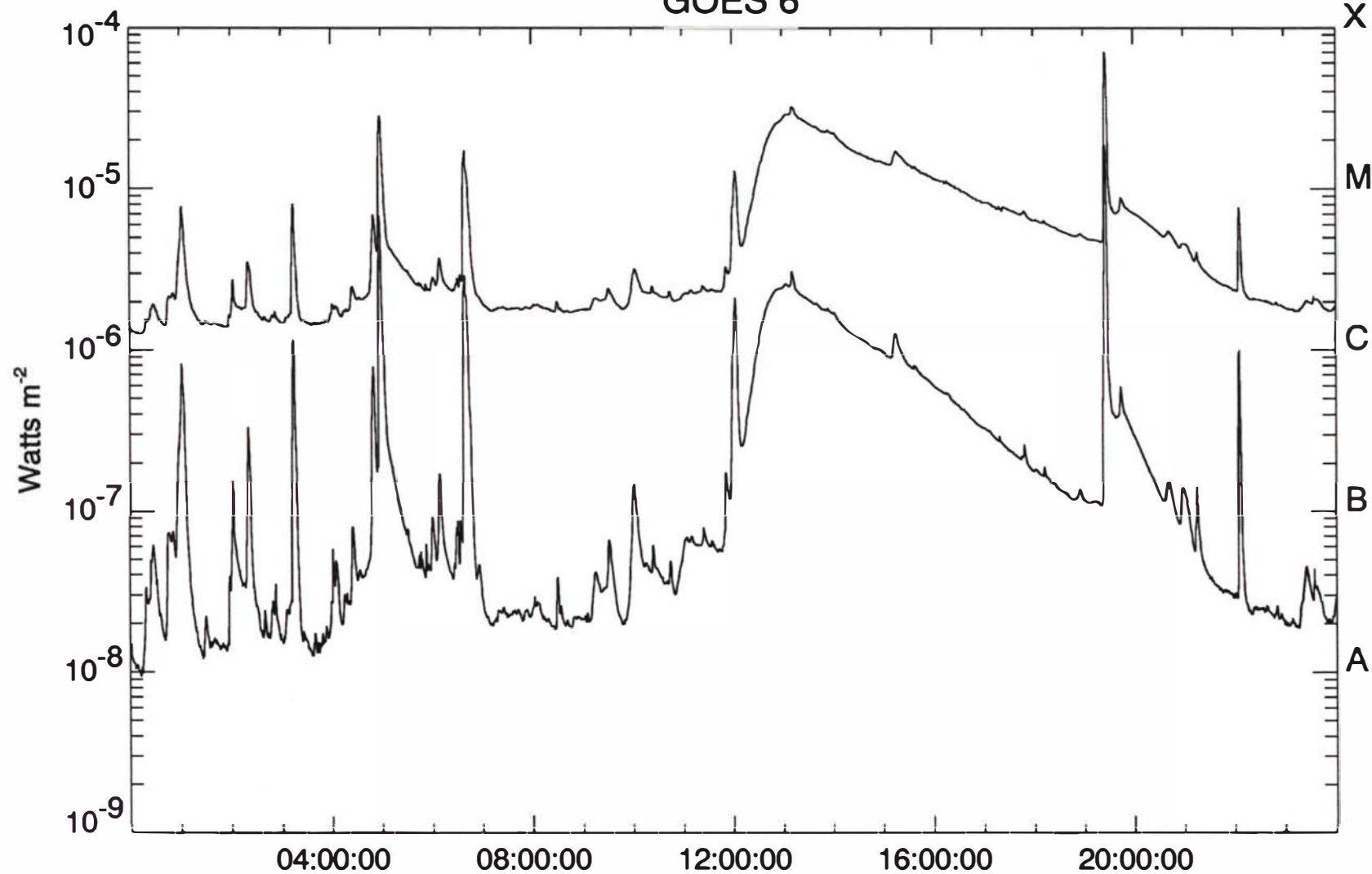
UNIV AL TIME



BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/16



GOES 6



Data Start: 91/12/16, 0000:02

Plot created: 97/10/20, 1510

Channel

1 (1.0 - 8.0 Angstroms)

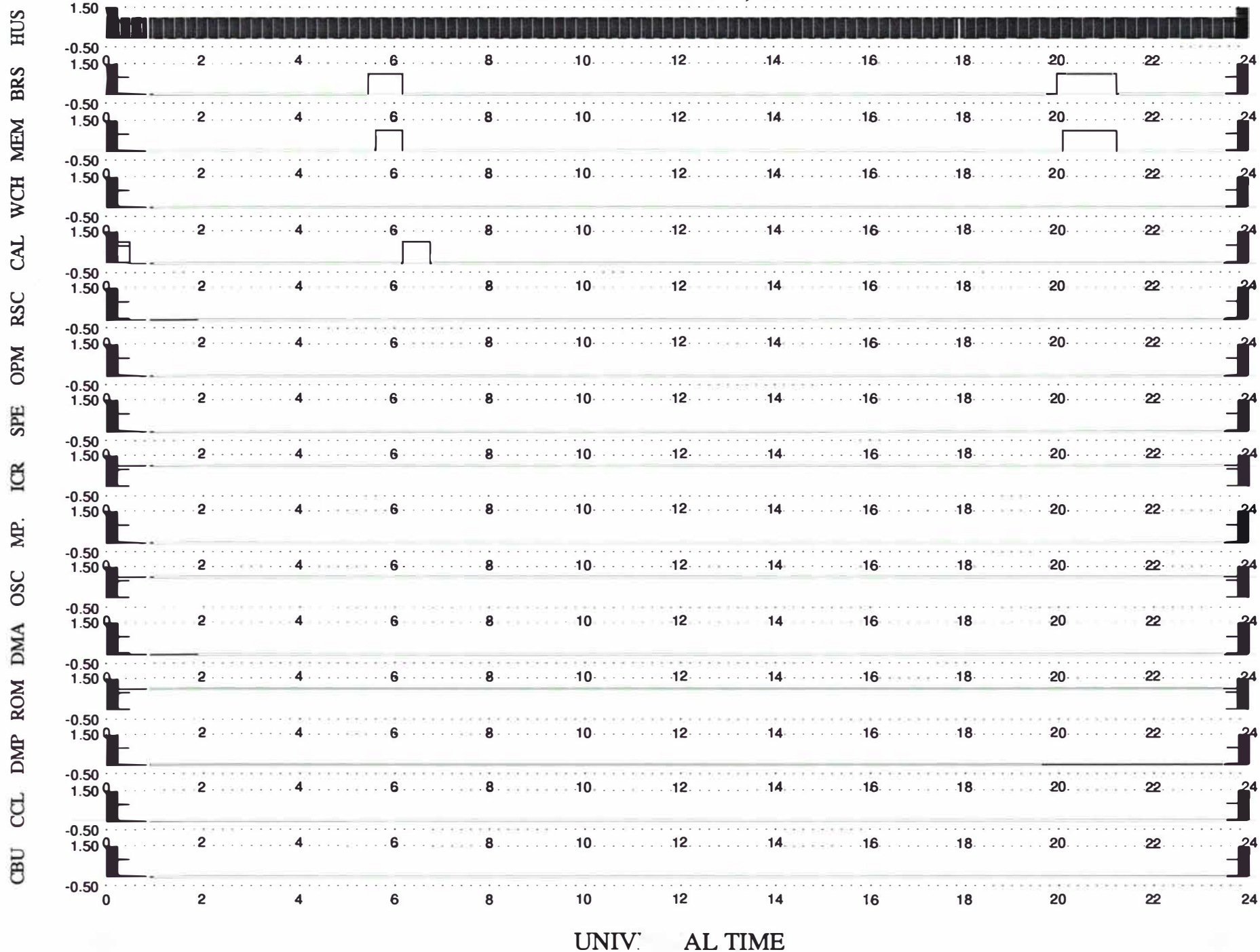
Background not subtracted

2 (0.5 - 4.0 Angstroms)

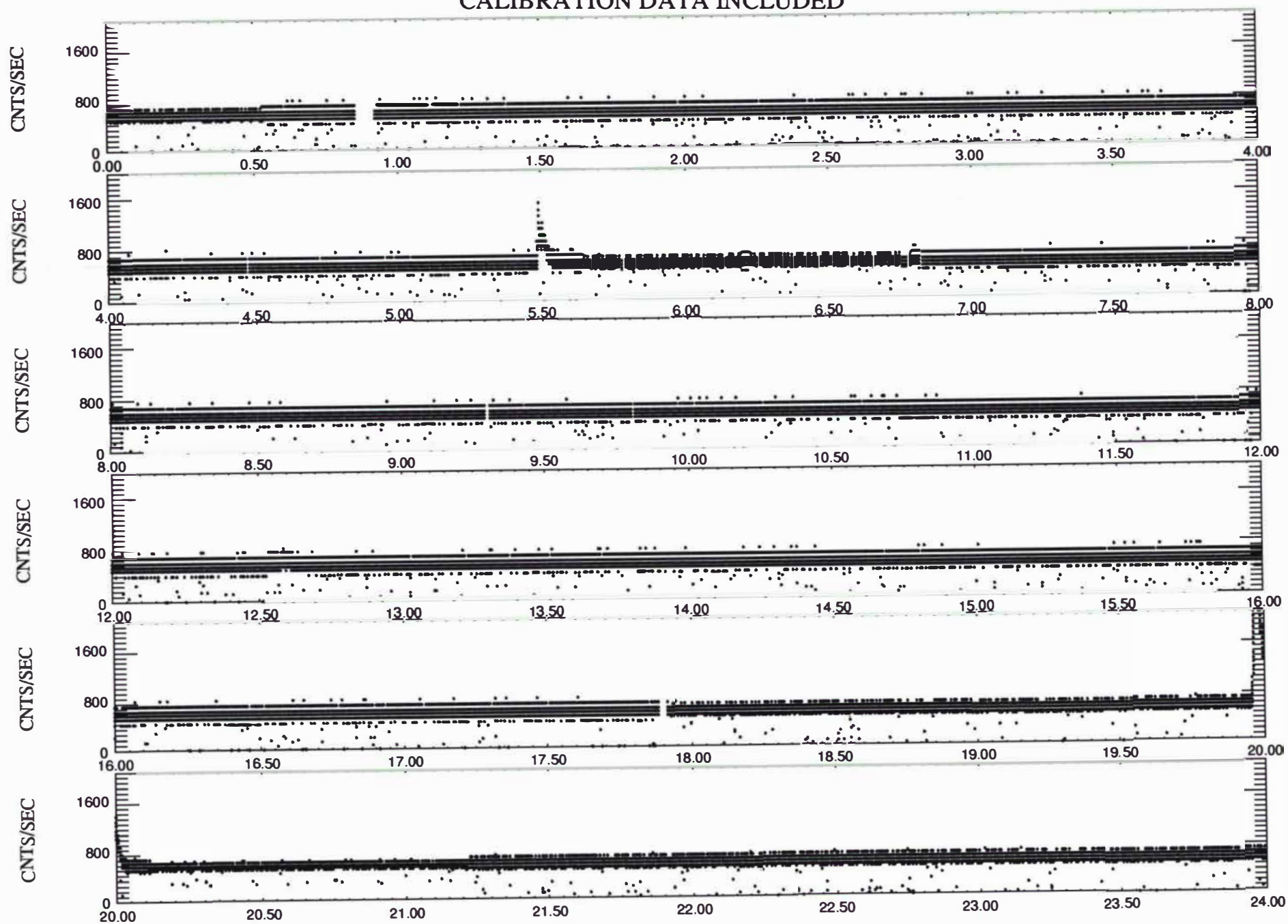
Background not subtracted

Sample average = 10

BURST NUMBER 11, 12

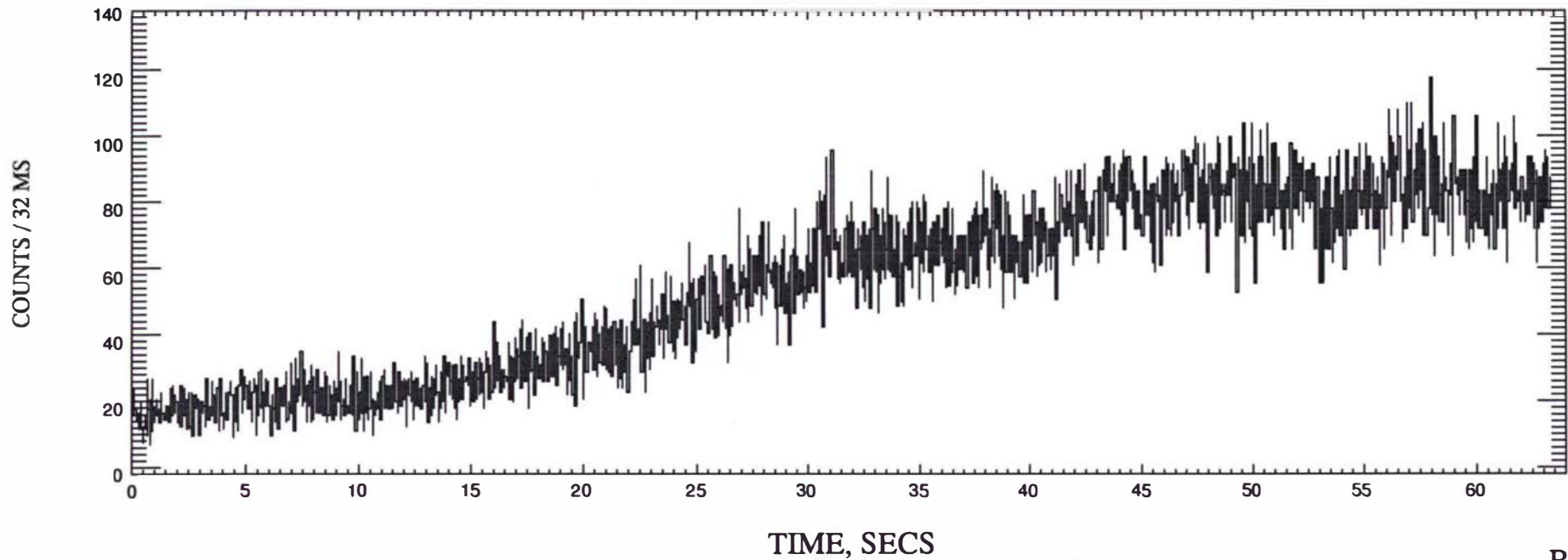
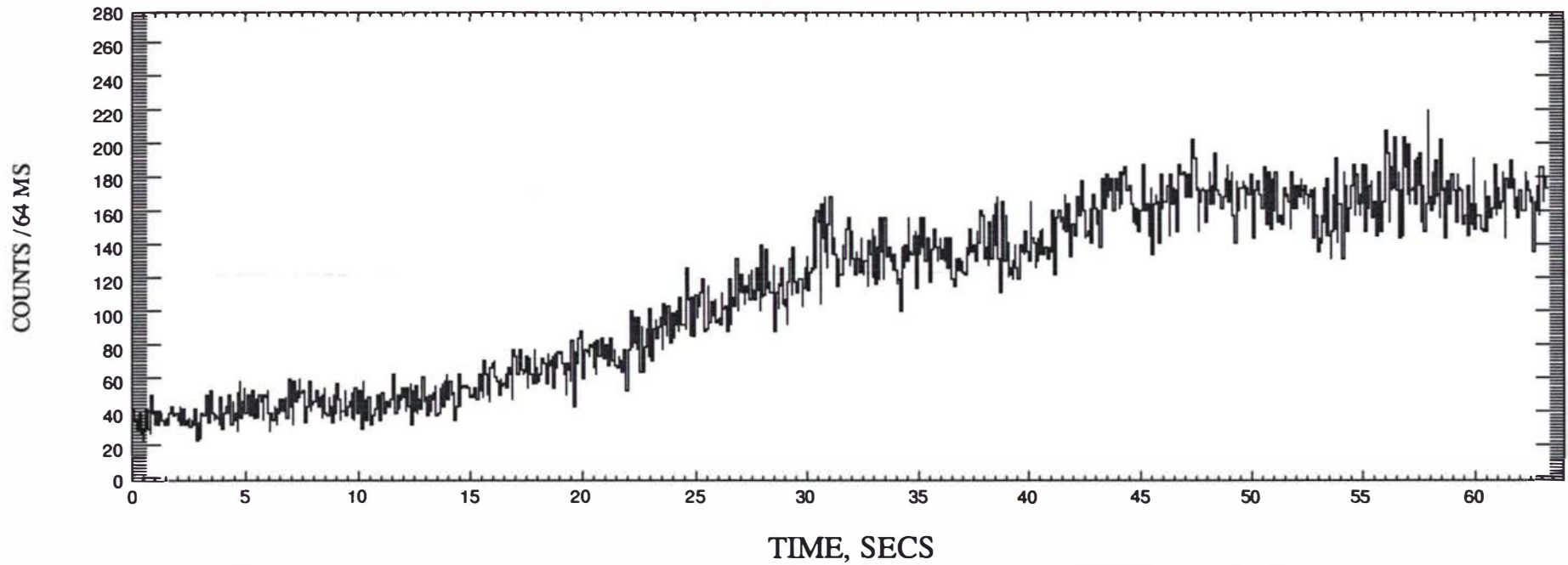


CALIBRATION DATA INCLUDED

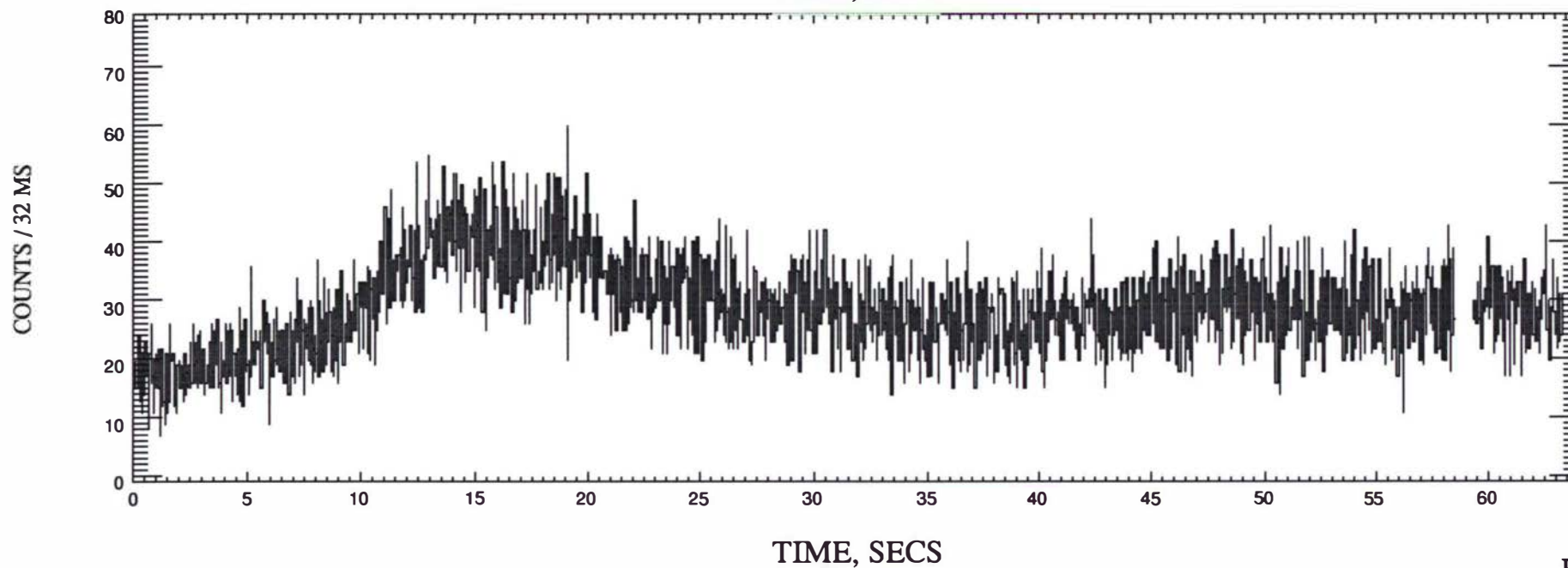
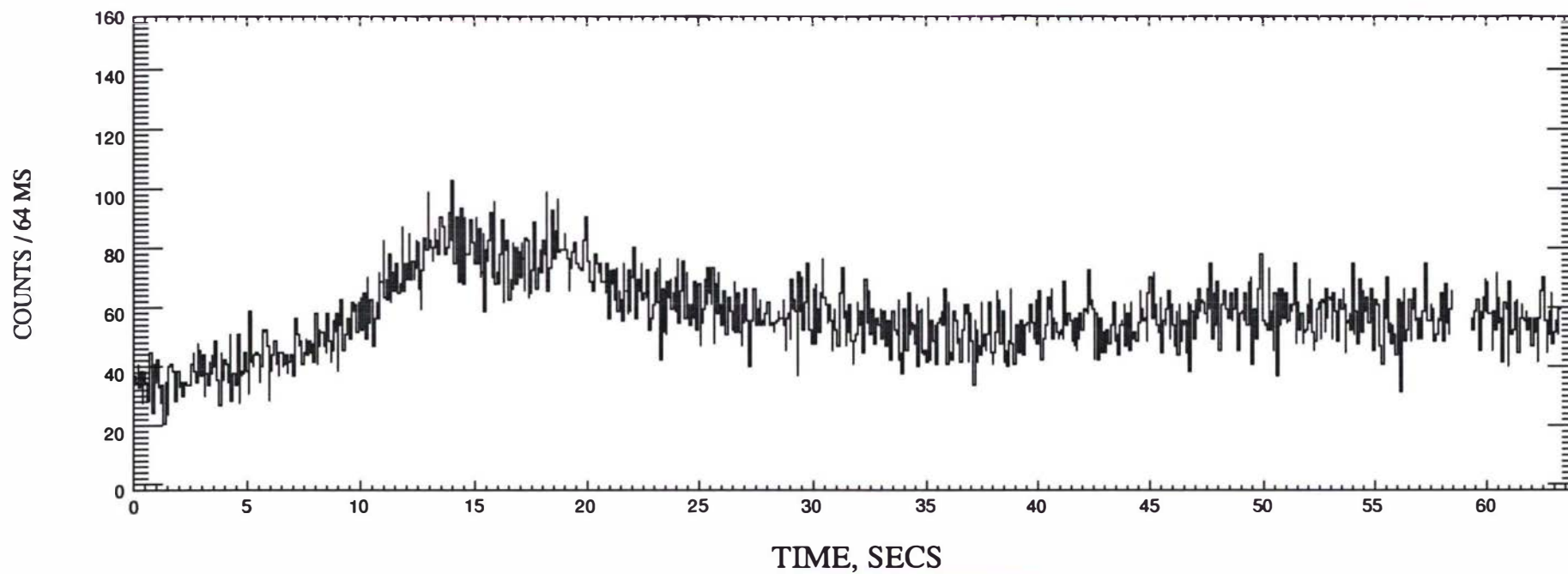


UNIV AL TIME

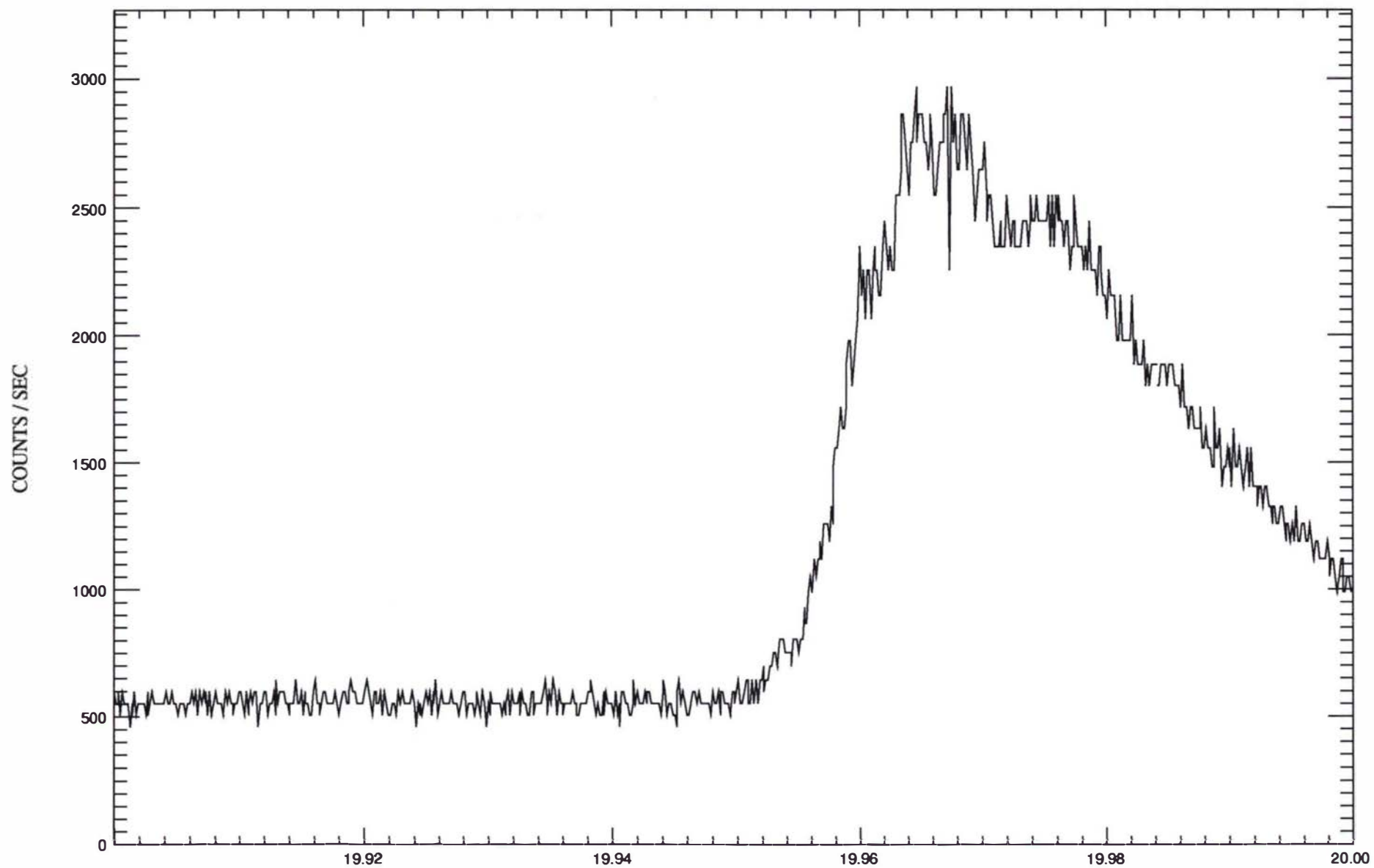
Burst Counter 12 at UT=19.953658629523 h=71833.171 s 19:57:13.171



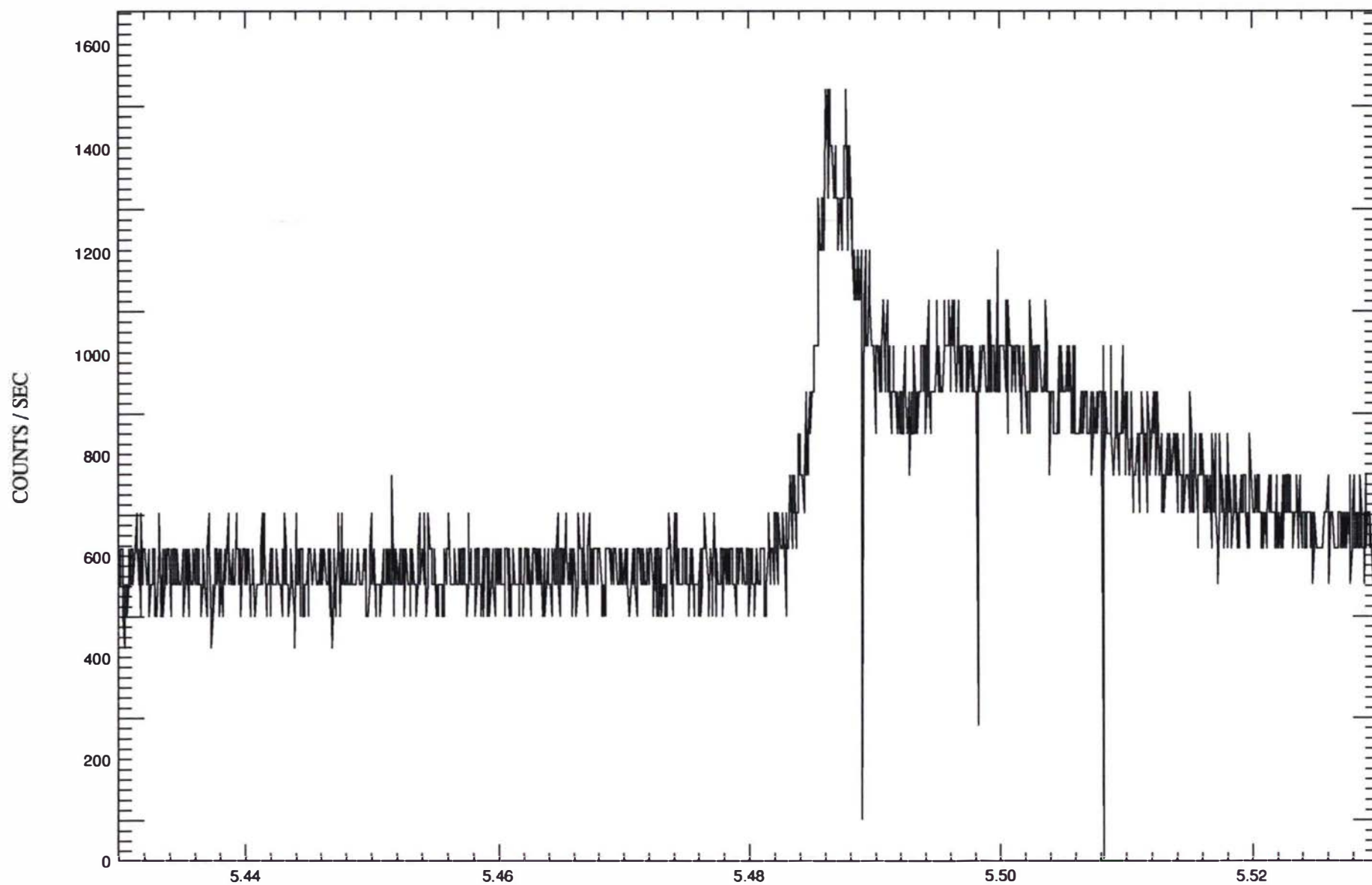
Burst Counter 11 at UT= 5.484587317573 h=19744.514 s 05:29:04.514

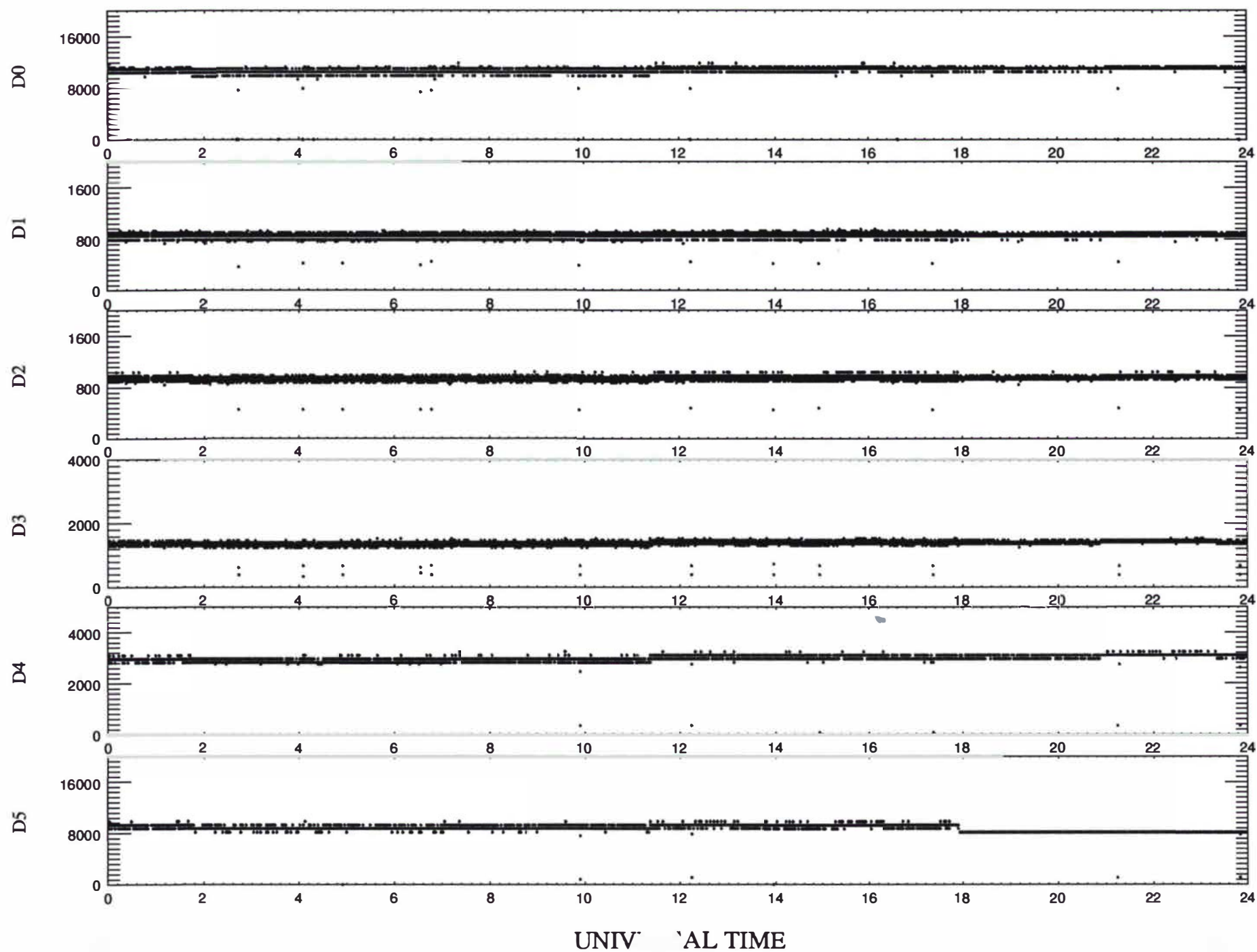


CALIBRATION DATA INCLUDED



CALIBRATION DATA INCLUDED





CATSEARCH PROGRAM

BATSE BURST # 1190
EVENT OF 1991 DEC 17 DAY OF YEAR=351
EVENT CROSSING TIME AT BATSE : 30126. S. OR 08:22:05.7
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 12.800 20.300
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 17/12/ 91 IS:
RA= 167.830 DEC= 6.613 DIST= 4.739 AU
BATSE-ULYSSES DISTANCE = 708906528. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 36.43 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 1902.64 SECS.
CROSSING TIME AT ULYSSES IS 32028. S. OR 08:53:48 +/- 322.67 SECONDS

Helio. corr. removed

Date: Nov 25 '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?
- ☒ 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)?
- ☒ 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?
- ☒ ACCESS database updated?

N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

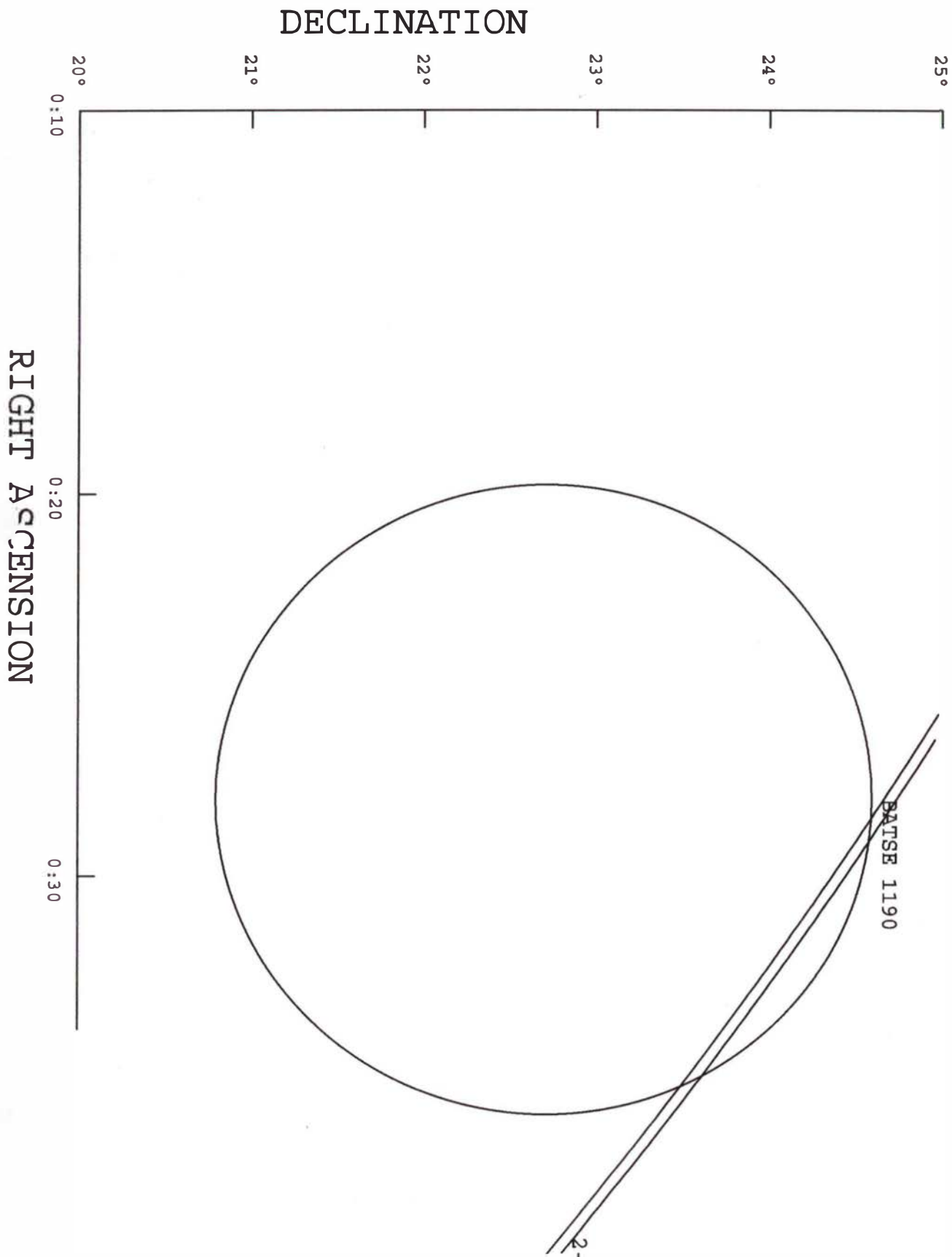
G=GALACTIC EQUATOR

1 ULYSSES

2 BATSE

EVENT OF DEC 17, 1991 8:53

25/11/97



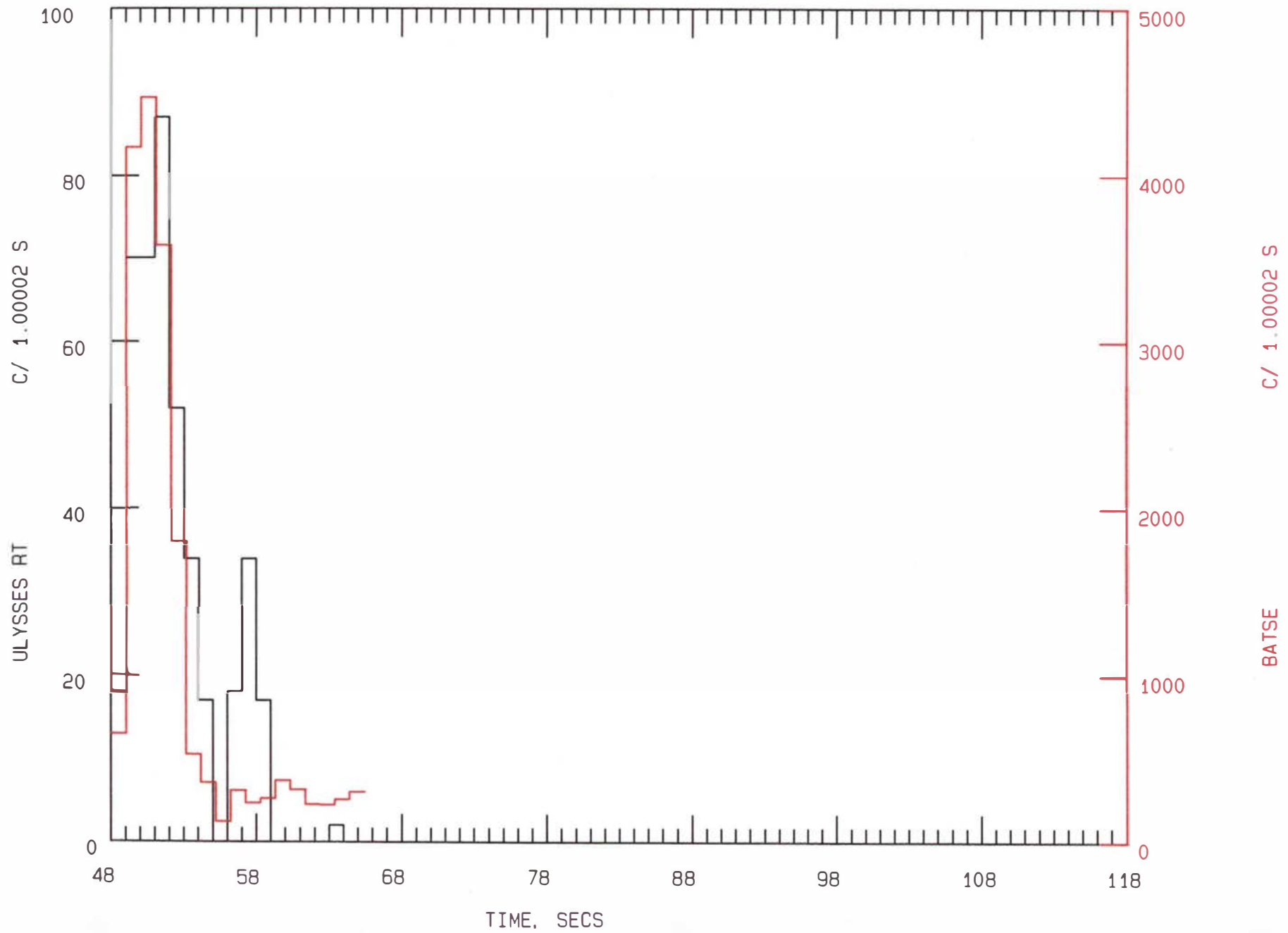
ULYSSES RT-BATSE

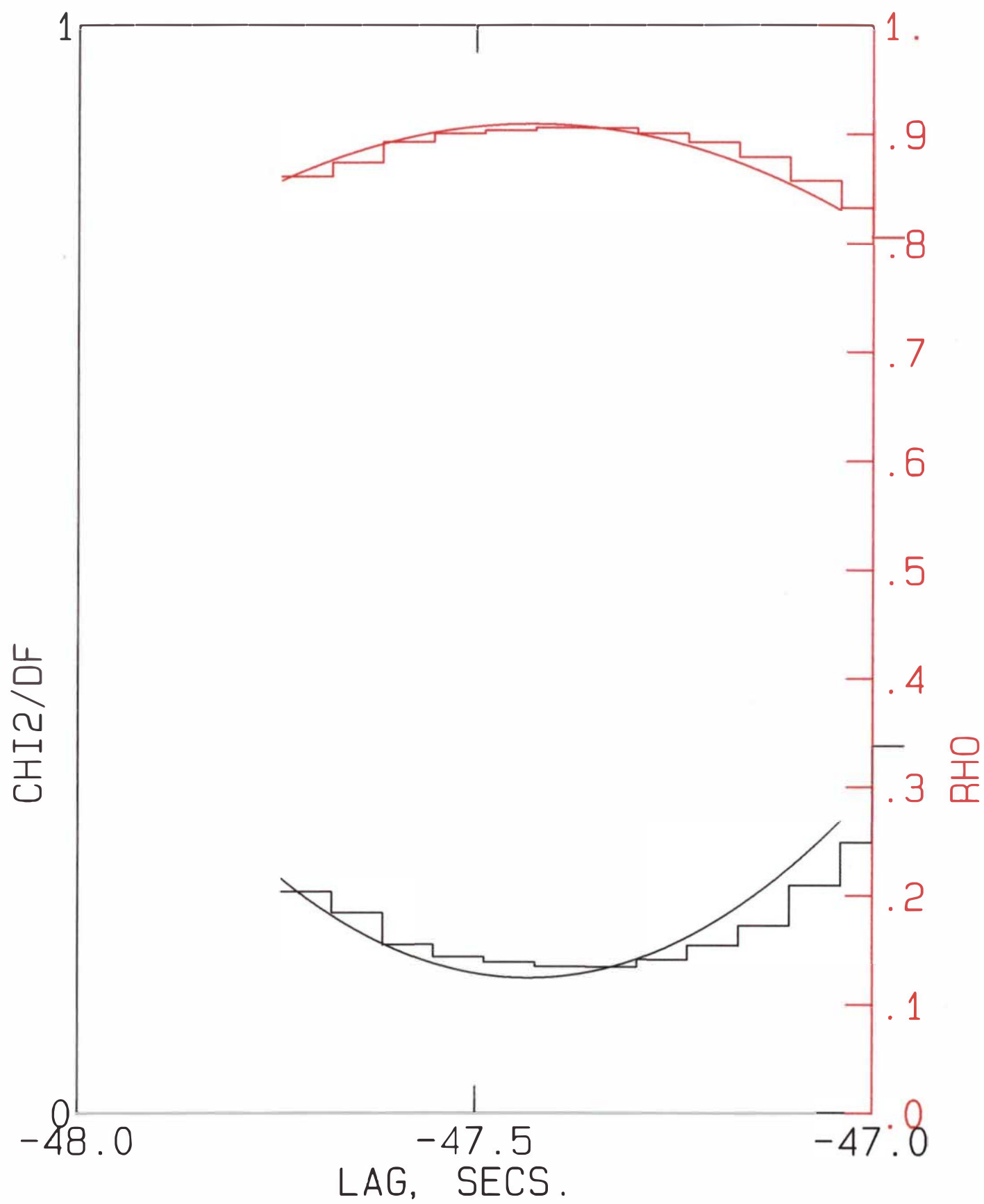
CORRELATION

17/12/91

31990.475

25/11/97





ULYSSES RT

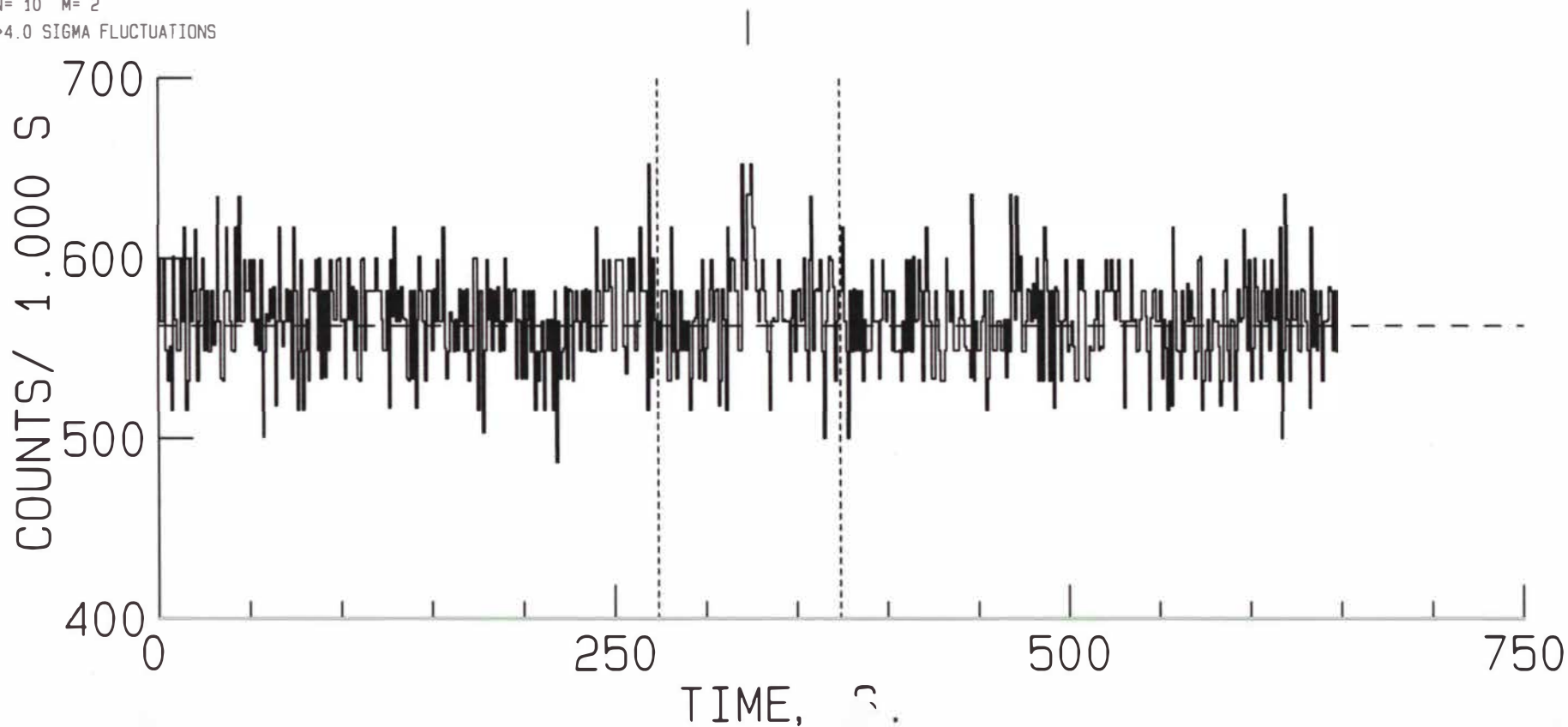
25 / 11 / 97

17/12/91 31716.227 s

0.250 S INTERVALS REGROUPED BY 4

18- 162 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



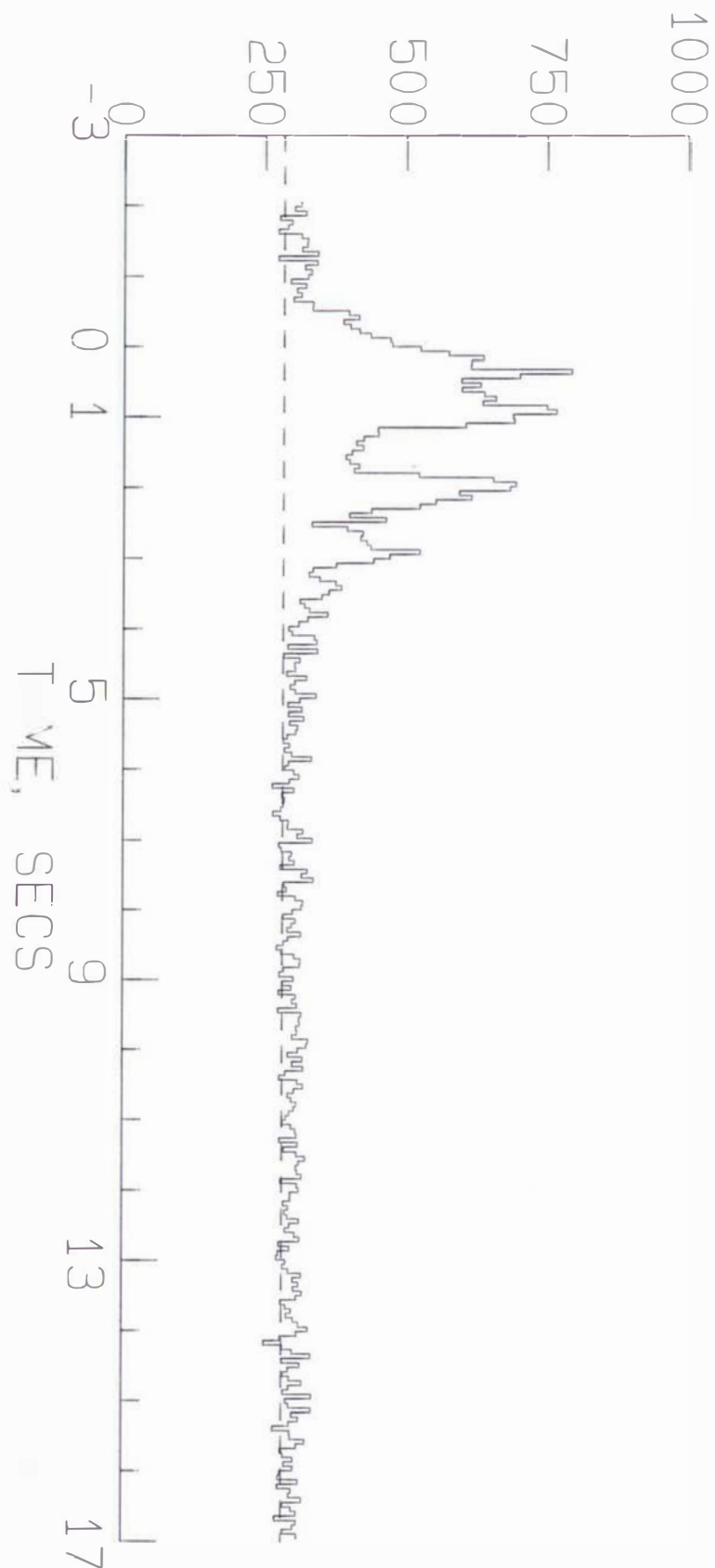
BATSE

17/12/91

30127.717 - 2.042

25- 100 keV

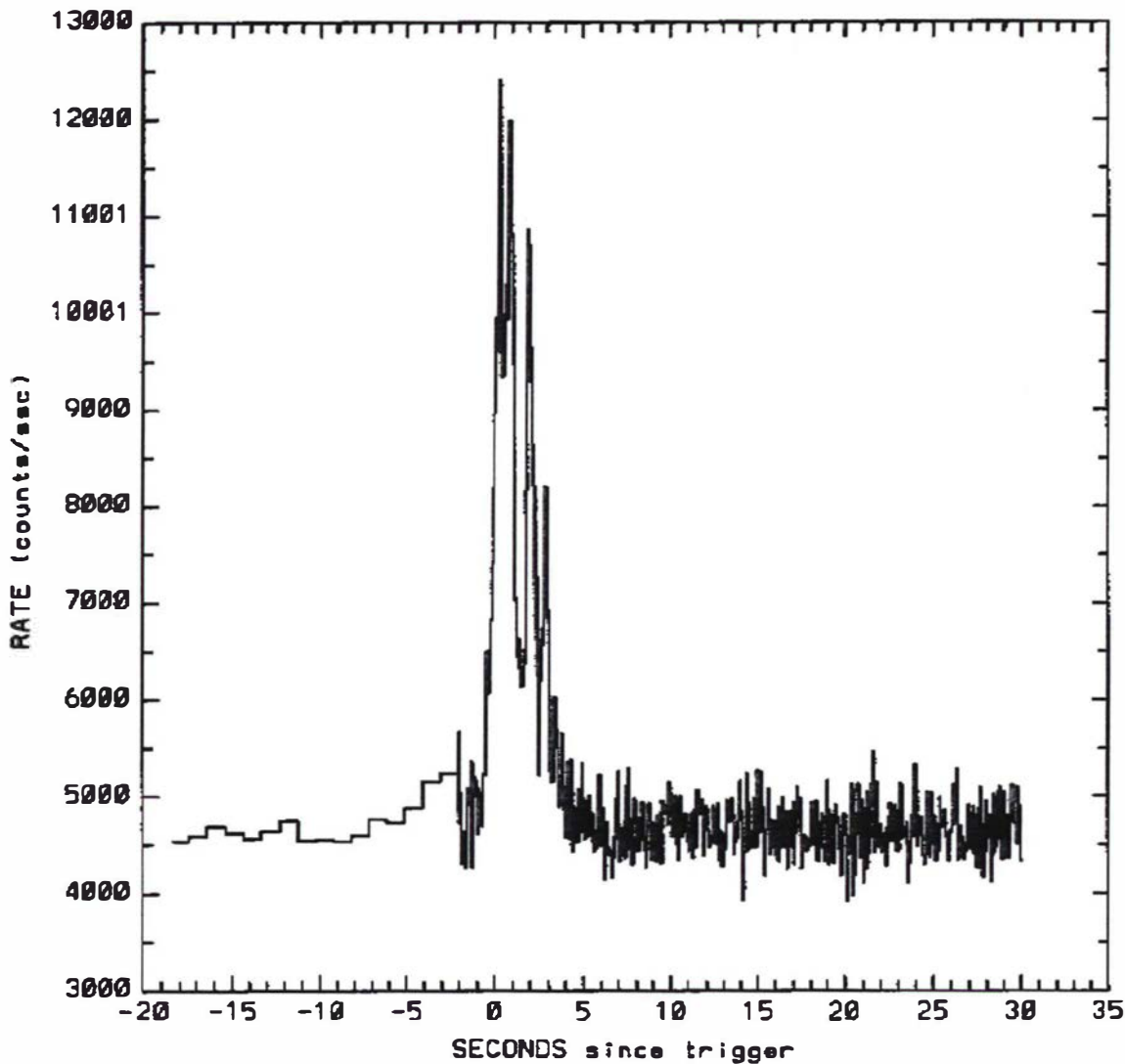
COUNTS/ .064 S



6/13/92

Data for K. Hurley

Dec 17 got file



17-MAY-1992 17:31.01

Created by MOPS 80
(Burst Display)
Version 2.11

Trigger # = 1190

Trigger Time:
8607 / 30127.717 - 2.042 =

Burst Data Type: DISCSC 30125.675

Deadtime
Corrected, N

Background Data
Type: PREB + DISCLA

Minimum Integ. Time:
0.064 seconds

Detectors (7..8):
00100010

Discriminators:
(1, 2)

Quality Mask:
801SP0

19 / 8 / 92

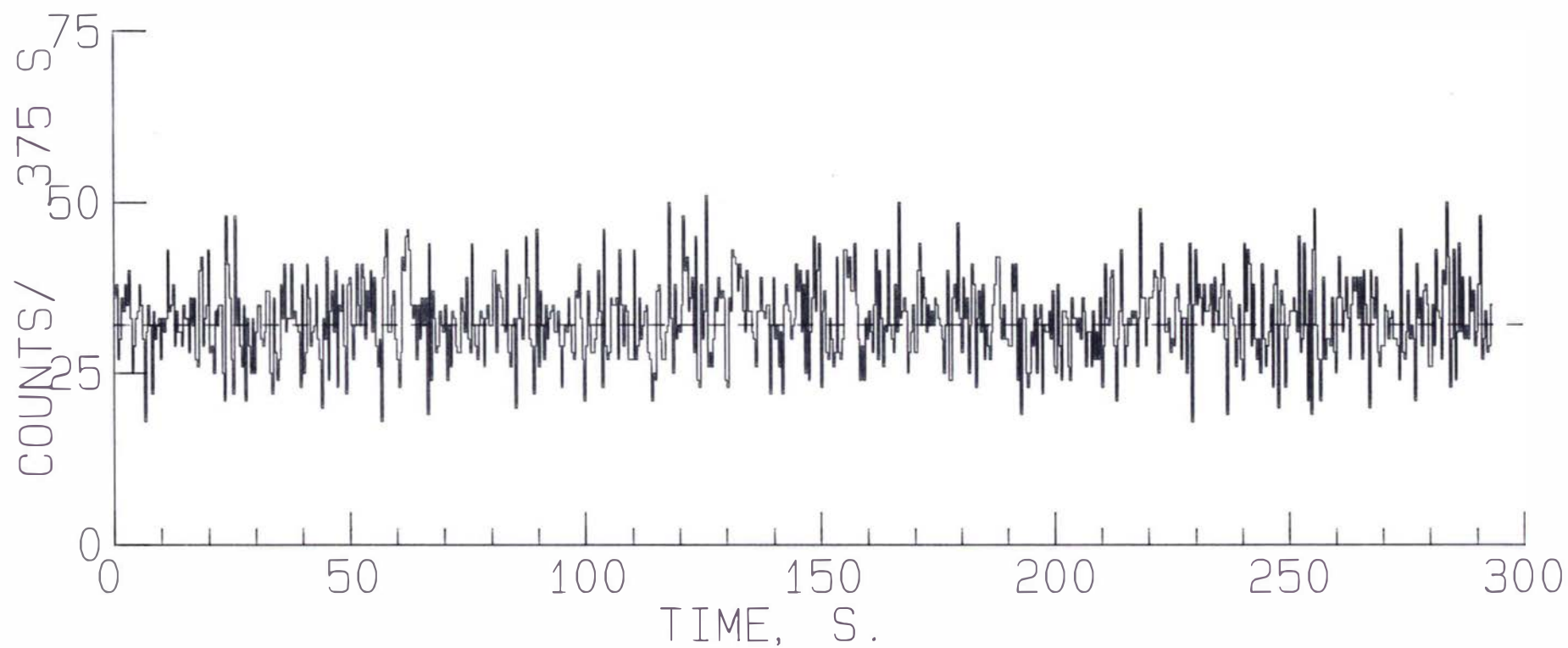
PVO-RT

17/12/91

30400.850 s.

.187 S. INTERVALS REGROUPED BY 2

100-2000 keV



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

CATSEARCH PROGRAM

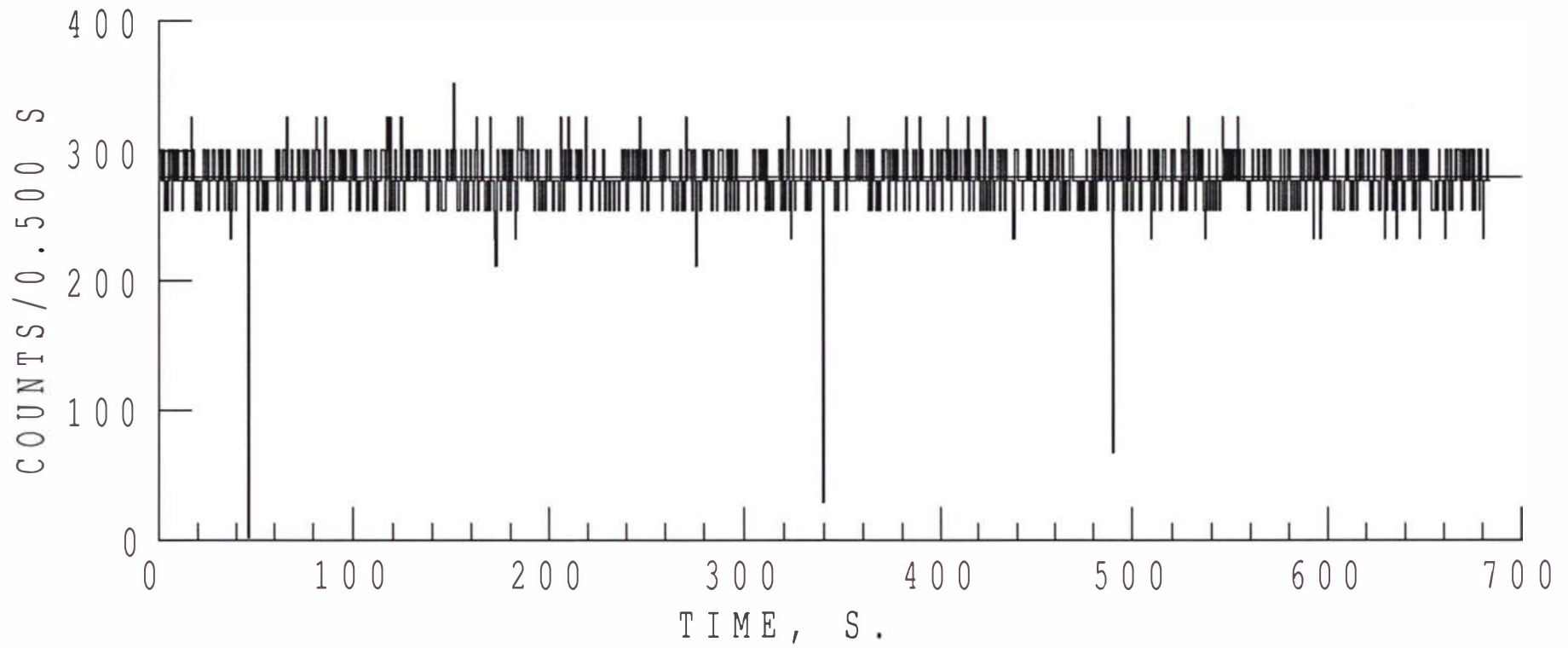
BATSE BURST # 1192
EVENT OF 1991 DEC 17 DAY OF YEAR=351
EVENT CROSSING TIME AT BATSE : 81598. S. OR 22:39:58.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 28.890 0.030
BATSE PEAK COUNTING RATE: 0000 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 17/12/ 91 IS:
RA= 167.830 DEC= 6.613 DIST= 4.739 AU
BATSE-ULYSSES DISTANCE = 708906528. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 41.50 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 1771.00 SECS.
CROSSING TIME AT ULYSSES IS 83369. S. OR 23:09:29.0 +/- 348.93 SECONDS

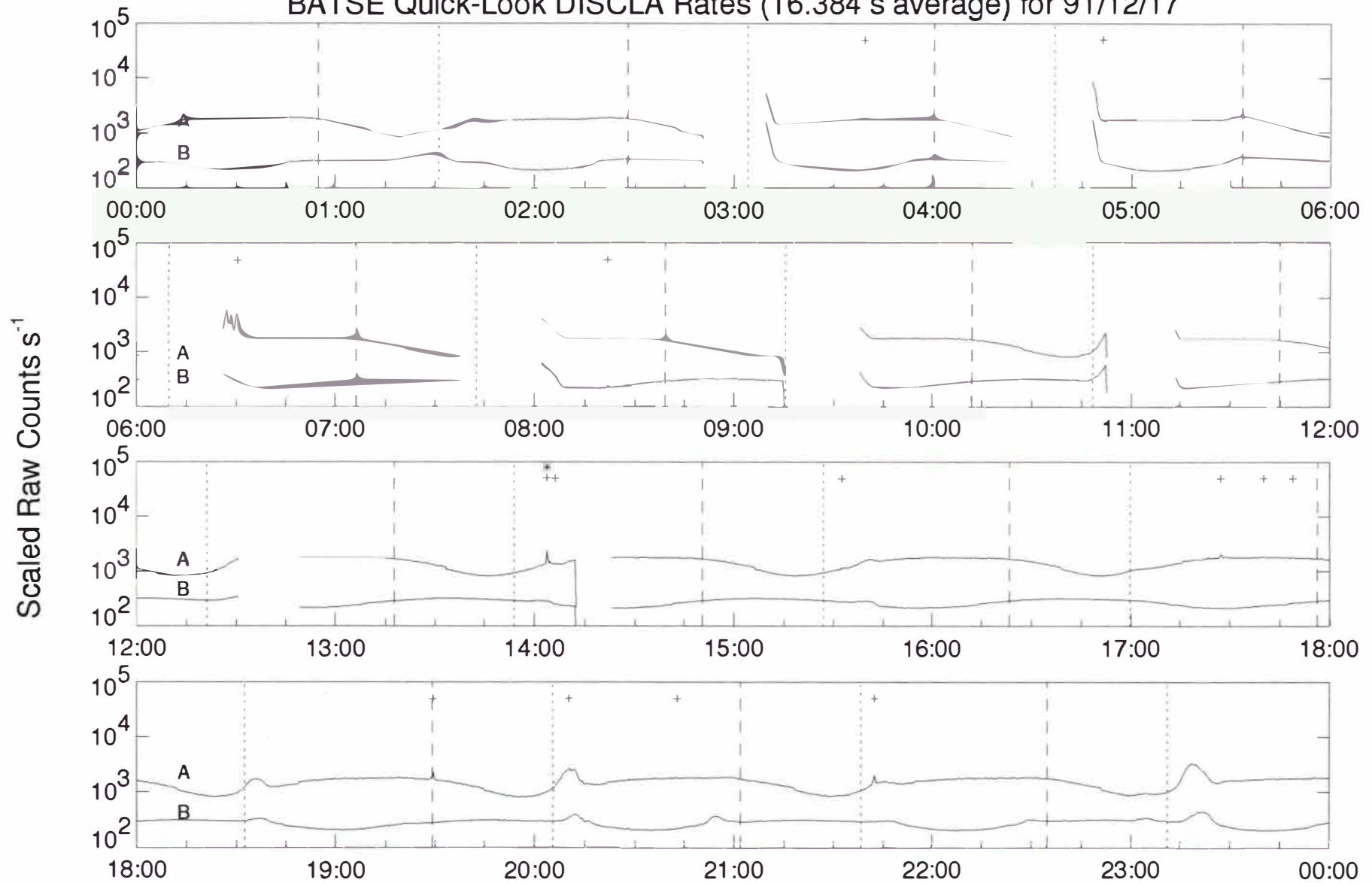
9 / 11 / 95

ULYSSES RT
17/12/91 83016.352 s
0 - 0 keV

M=10 M=2
>4.0 SIGMA FLUCTUATIONS



BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/17



Current Time: 92/10/18, 1909 EDT

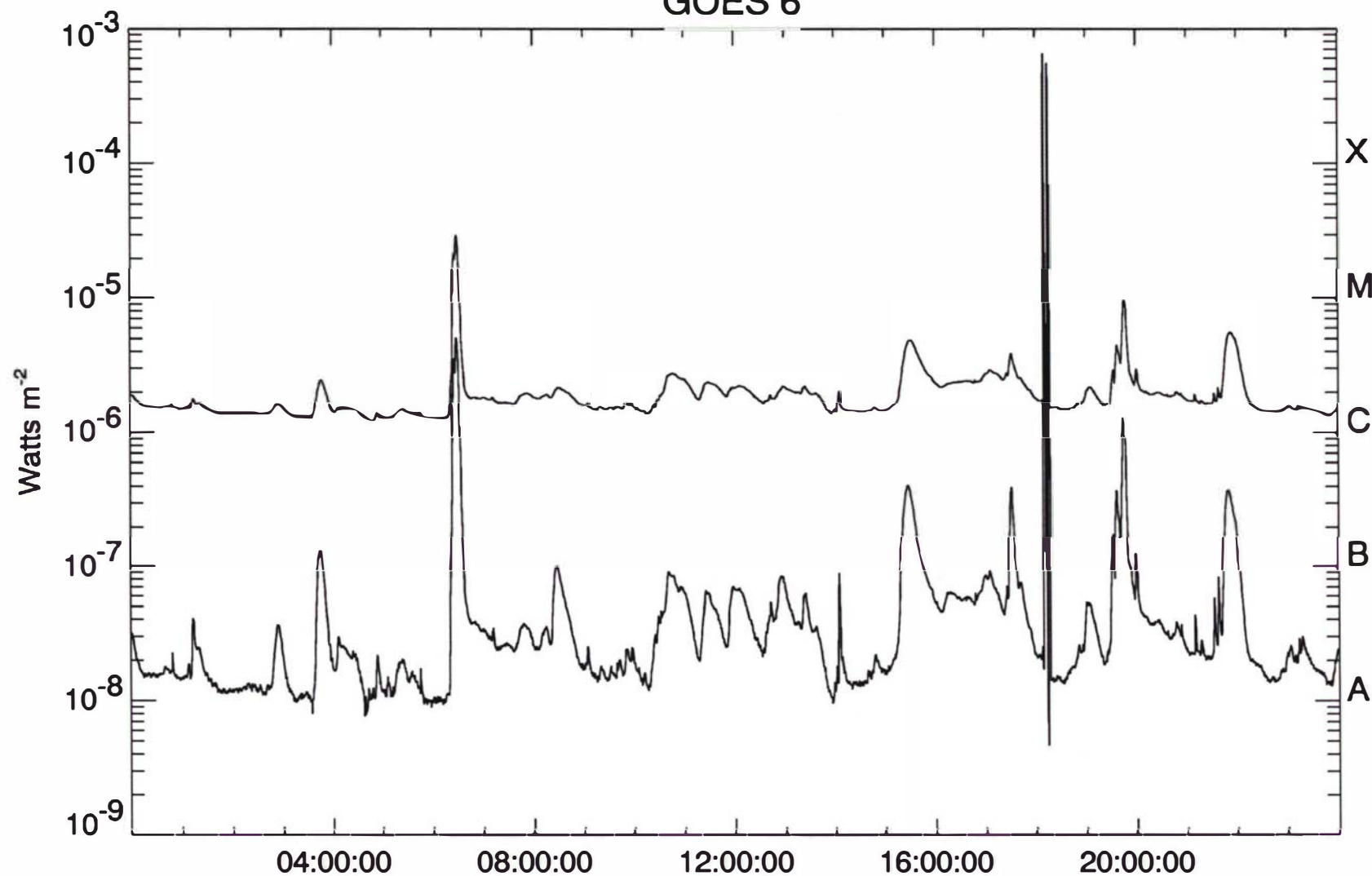
A: Channel 1 Most Sunward LAD

B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare

GOES 6



Data Start: 91/12/17, 0000:00

Plot created: 97/10/20, 1518

Channel

1 (1.0 - 8.0 Angstroms)

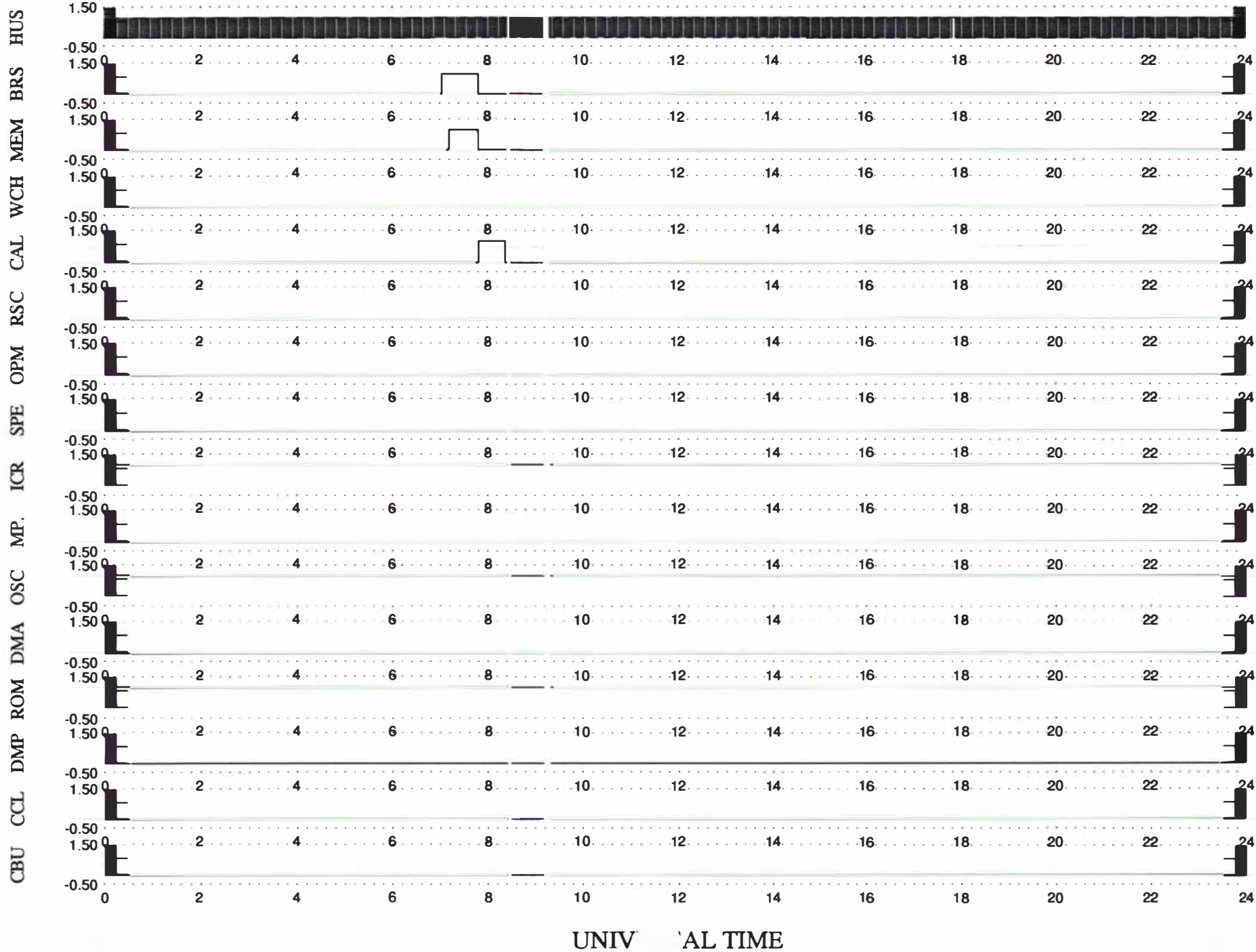
Background not subtracted

2 (0.5 - 4.0 Angstroms)

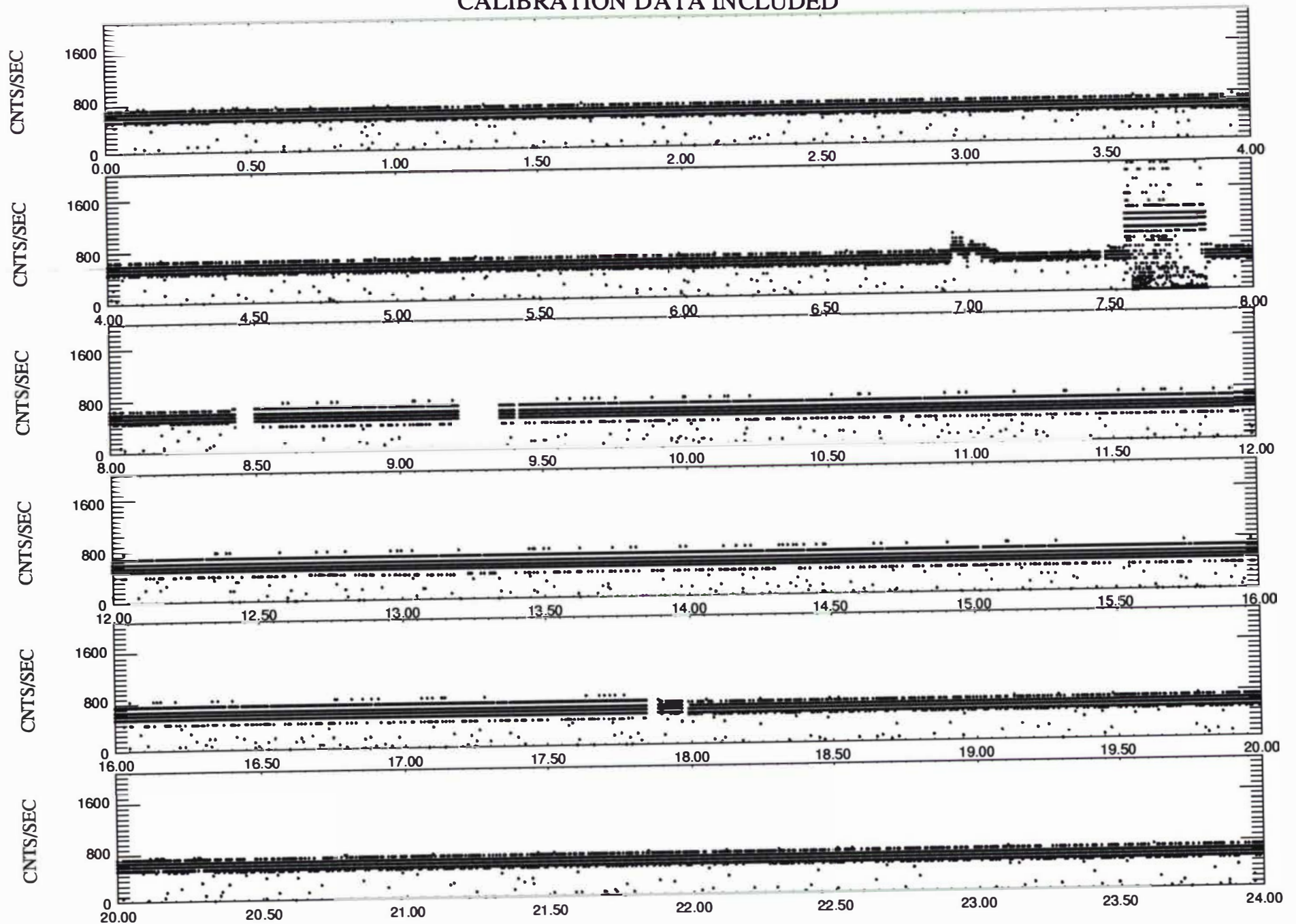
Background not subtracted

Sample average = 10

BURST NUMBER 13

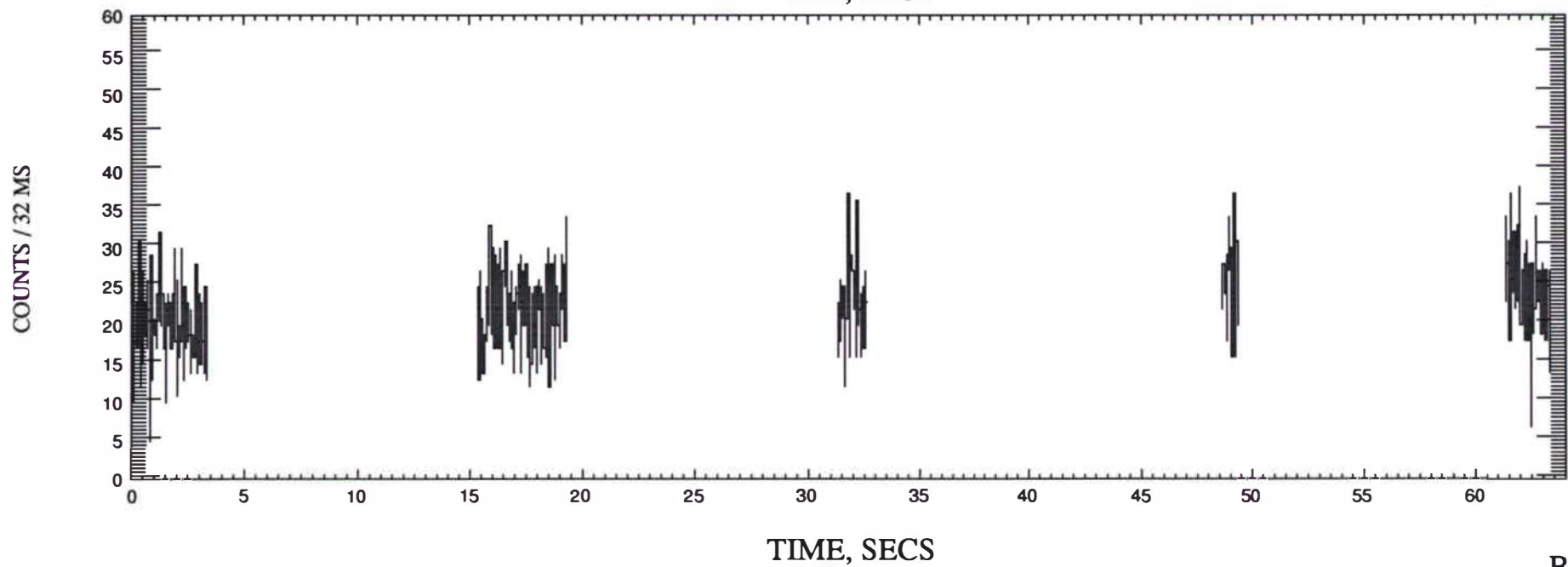
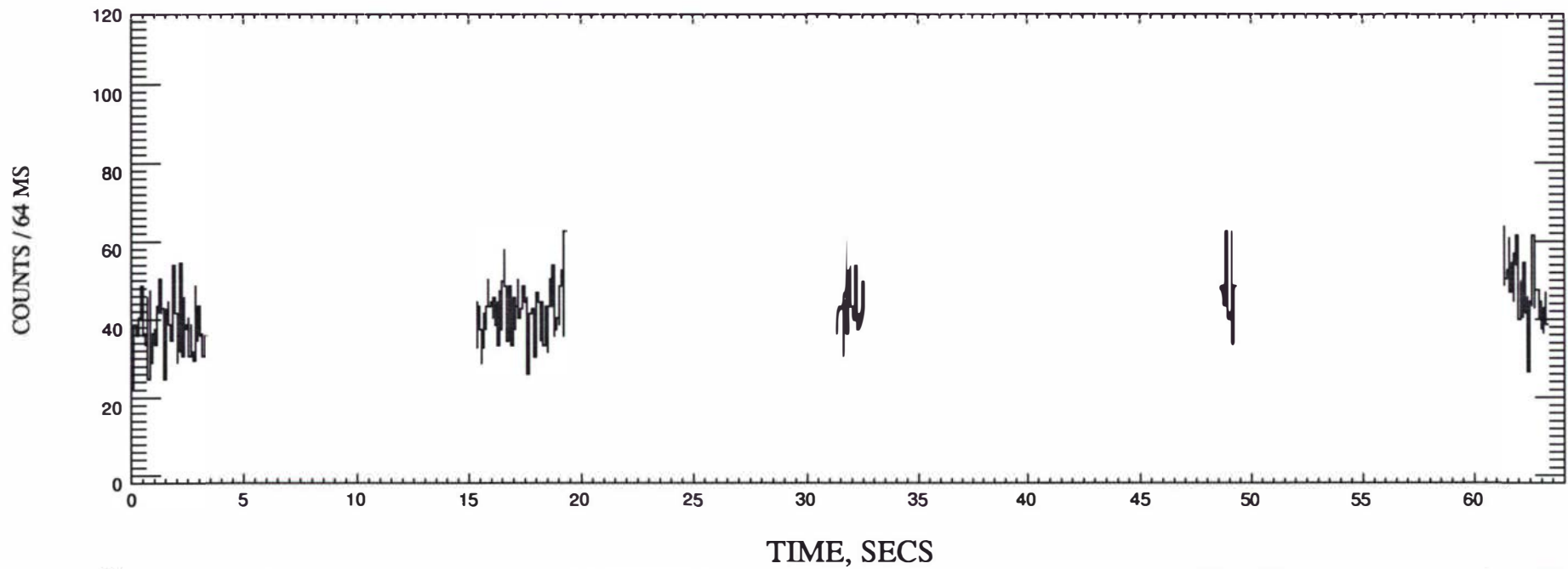


CALIBRATION DATA INCLUDED

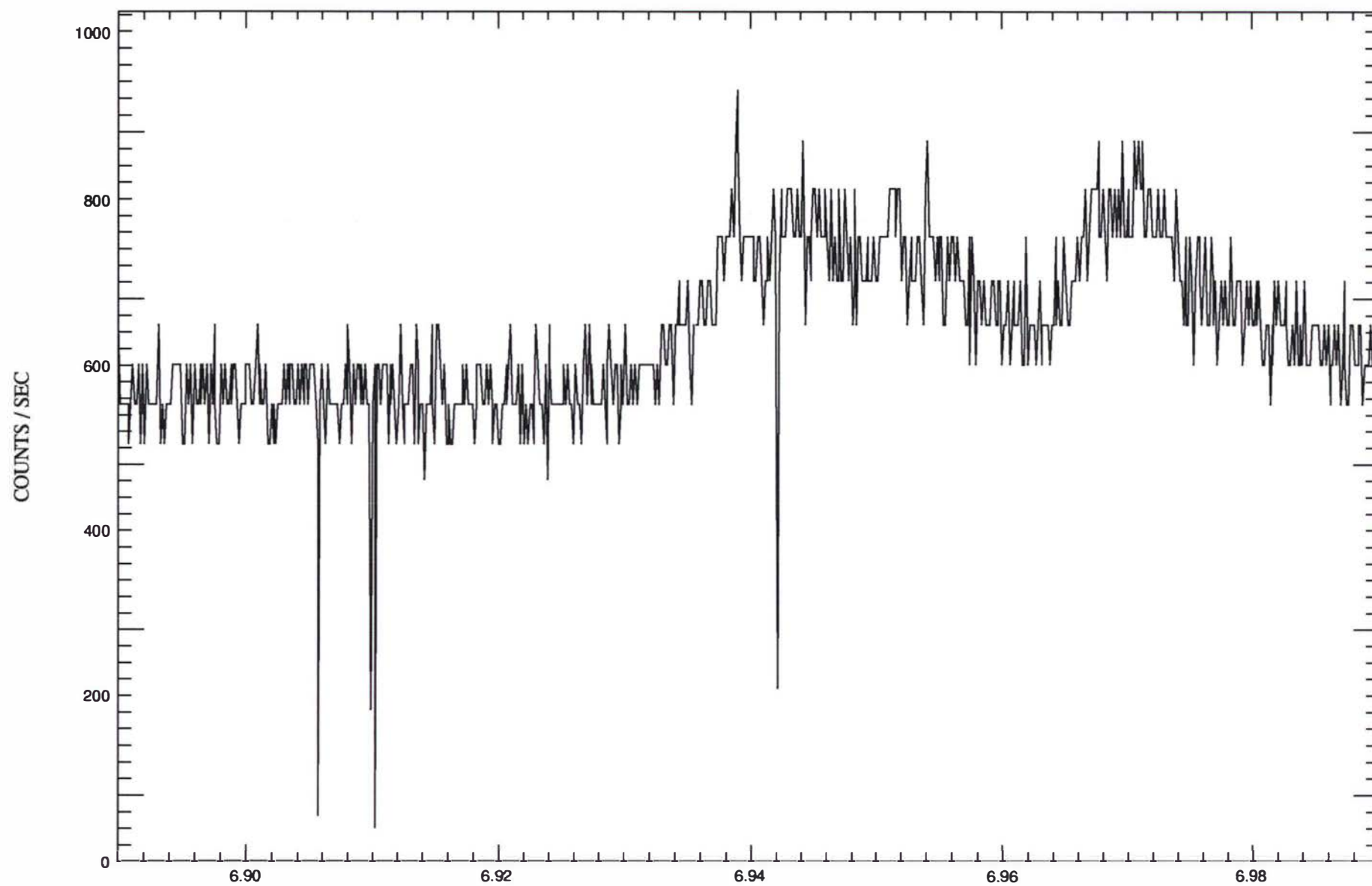


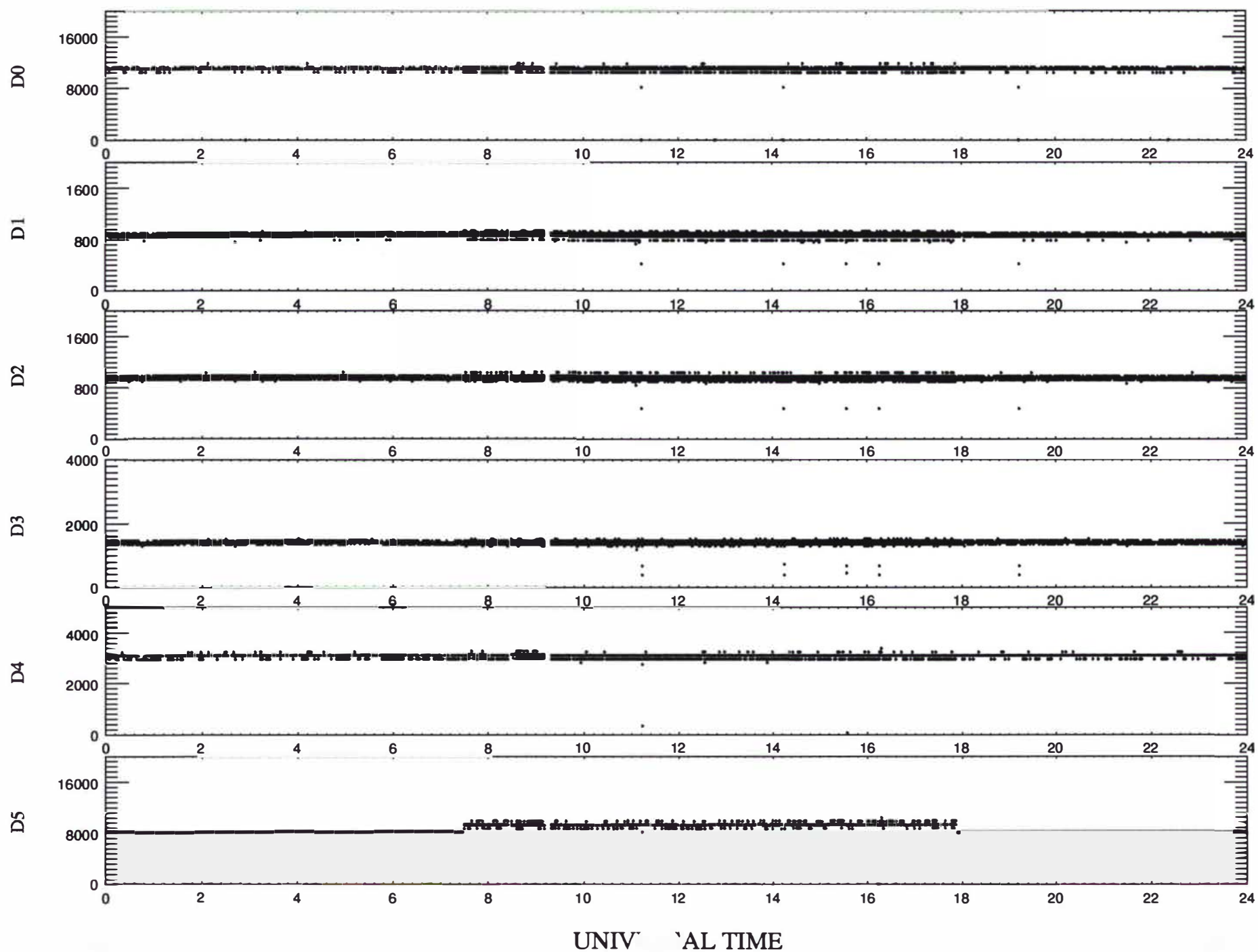
UNIVERSAL TIME

Burst Counter 13 at UT= 6.938432180617 h=24978.356 s 06:56:18.356

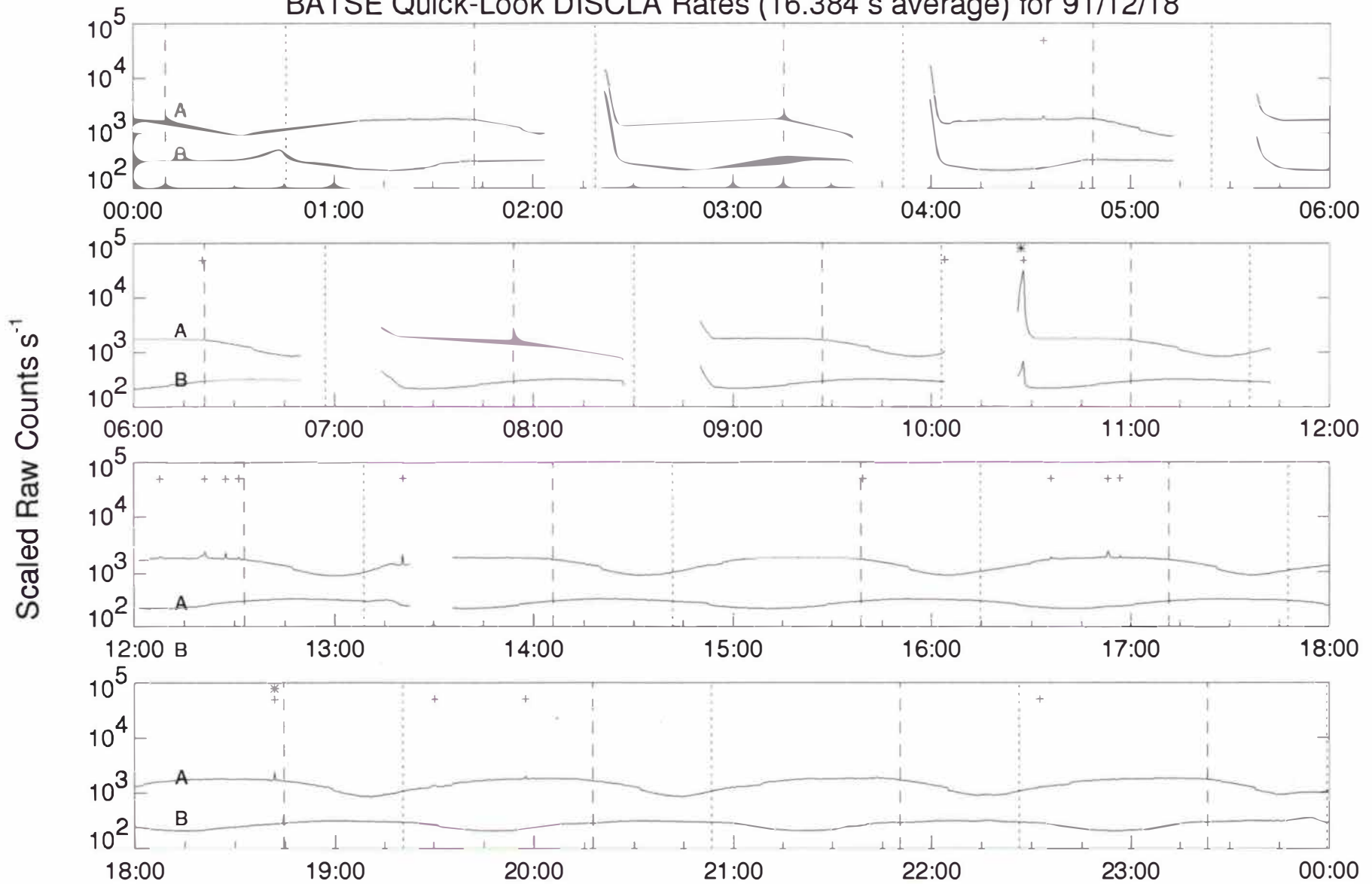


CALIBRATION DATA INCLUDED





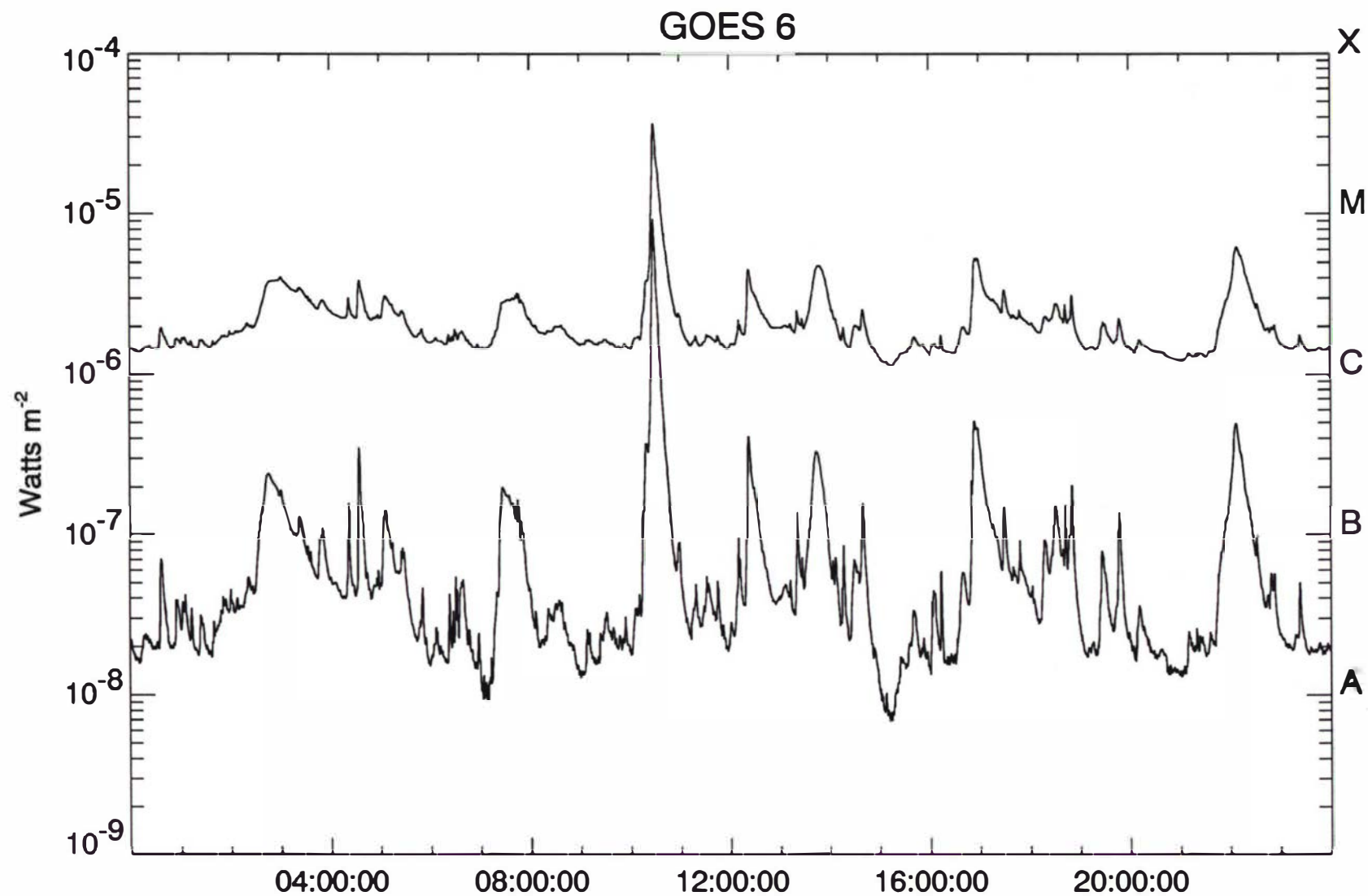
BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/18



Current Time: 92/10/18, 1910 EDT
 A: Channel 1 Most Sunward LAD
 B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare



Data Start: 91/12/18, 0000:01

Plot created: 97/10/20, 1523

Channel

1 (1.0 - 8.0 Angstroms)

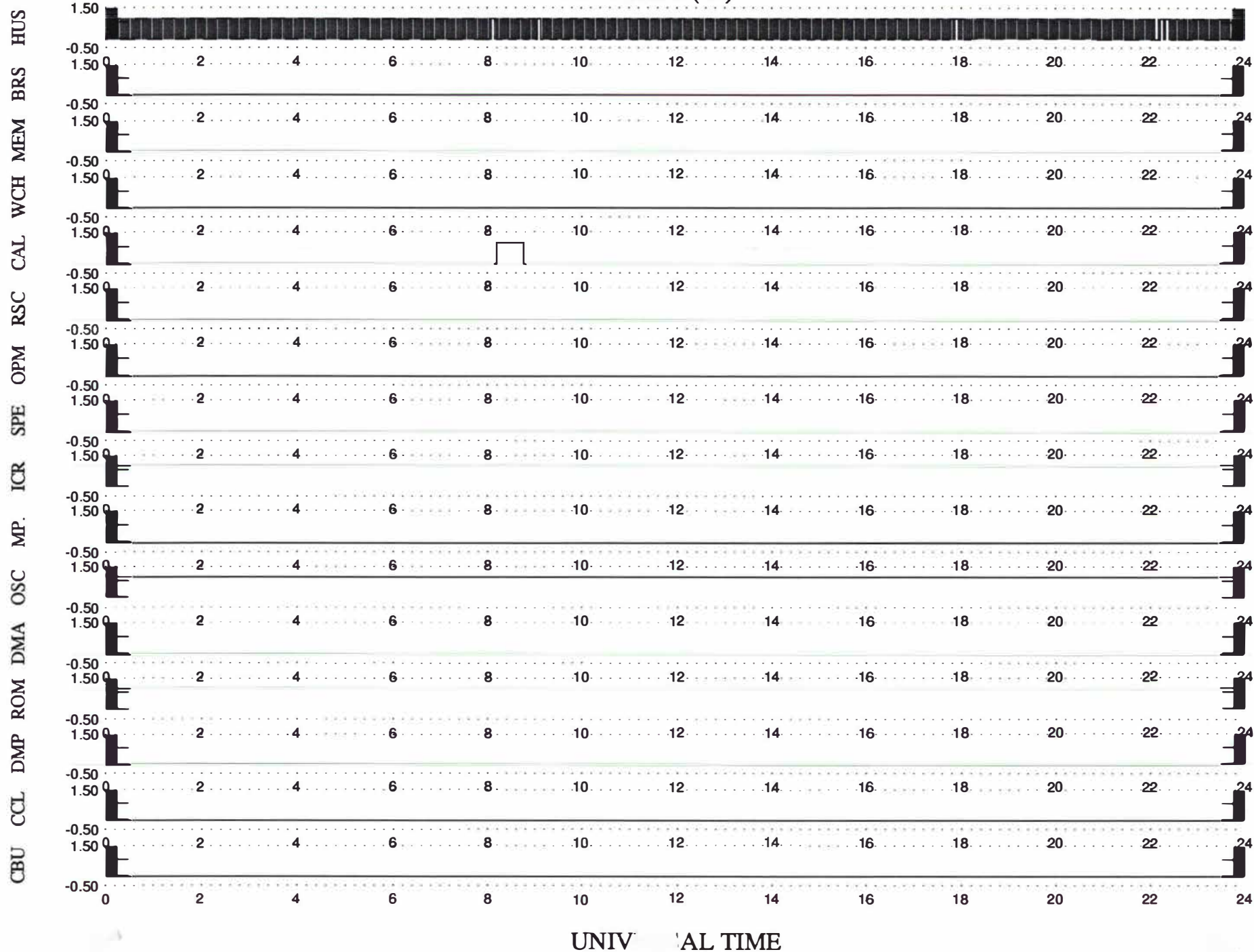
Background not subtracted

2 (0.5 - 4.0 Angstroms)

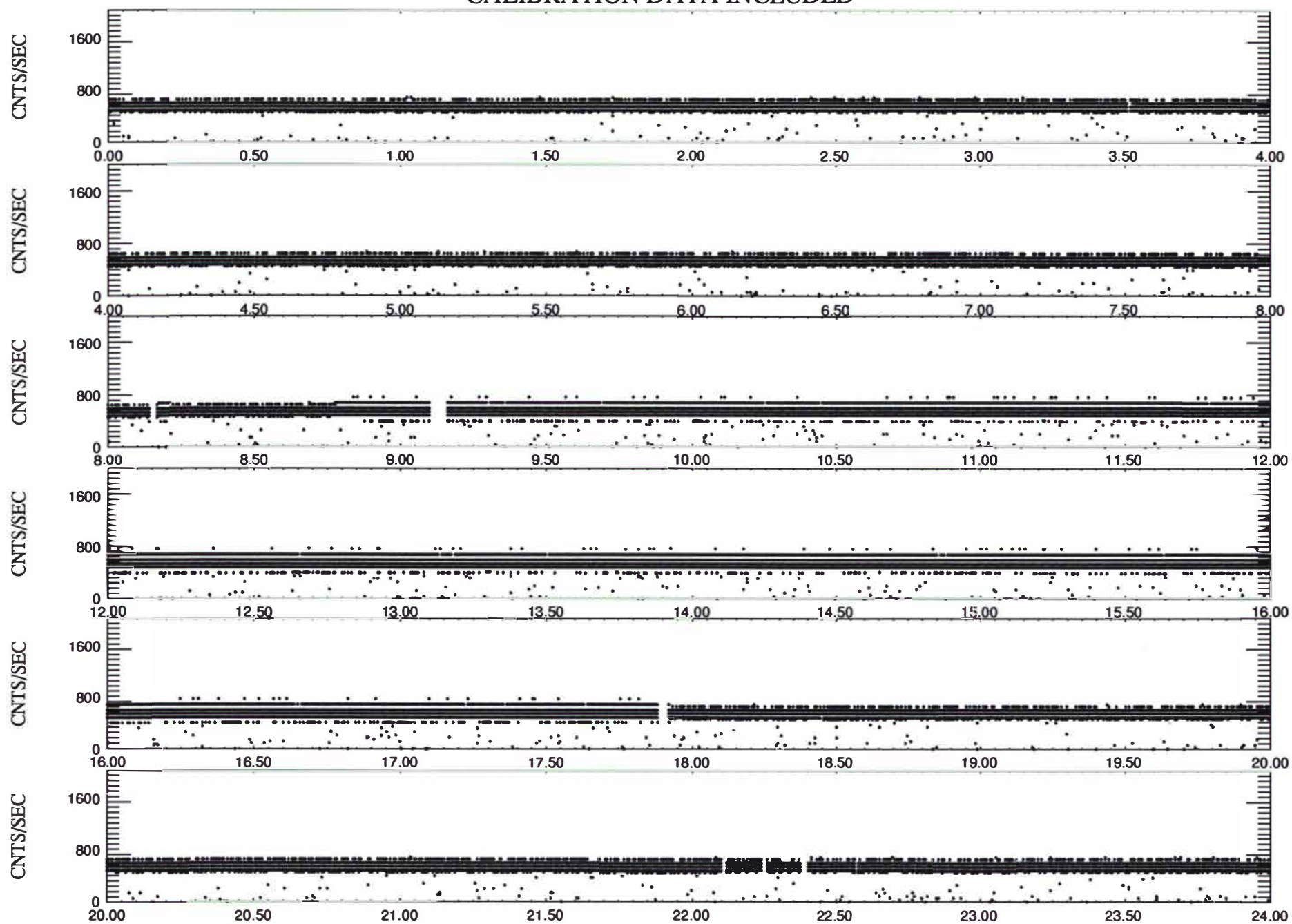
Background not subtracted

Sample average = 10

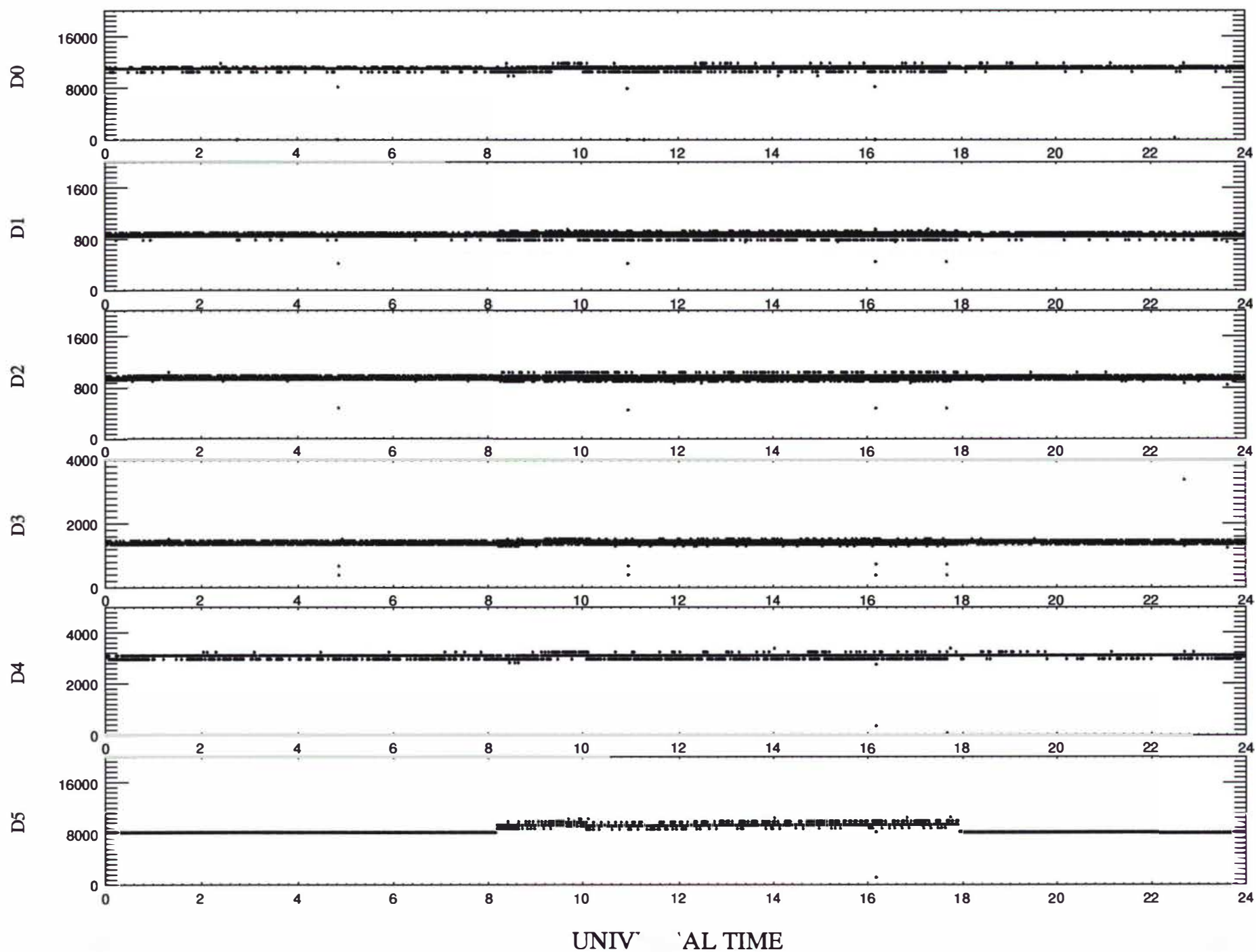
NO BURST (13)



CALIBRATION DATA INCLUDED



UNIV 'AL TIME



CATSEARCH PROGRAM

BATSE BURST # 1196
EVENT OF 1991 DEC 19 DAY OF YEAR=353
EVENT CROSSING TIME AT BATSE : 32534. S. OR 09:02:14.1
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 354.250 -0.160
BATSE PEAK COUNTING RATE: 0000 C/S

100

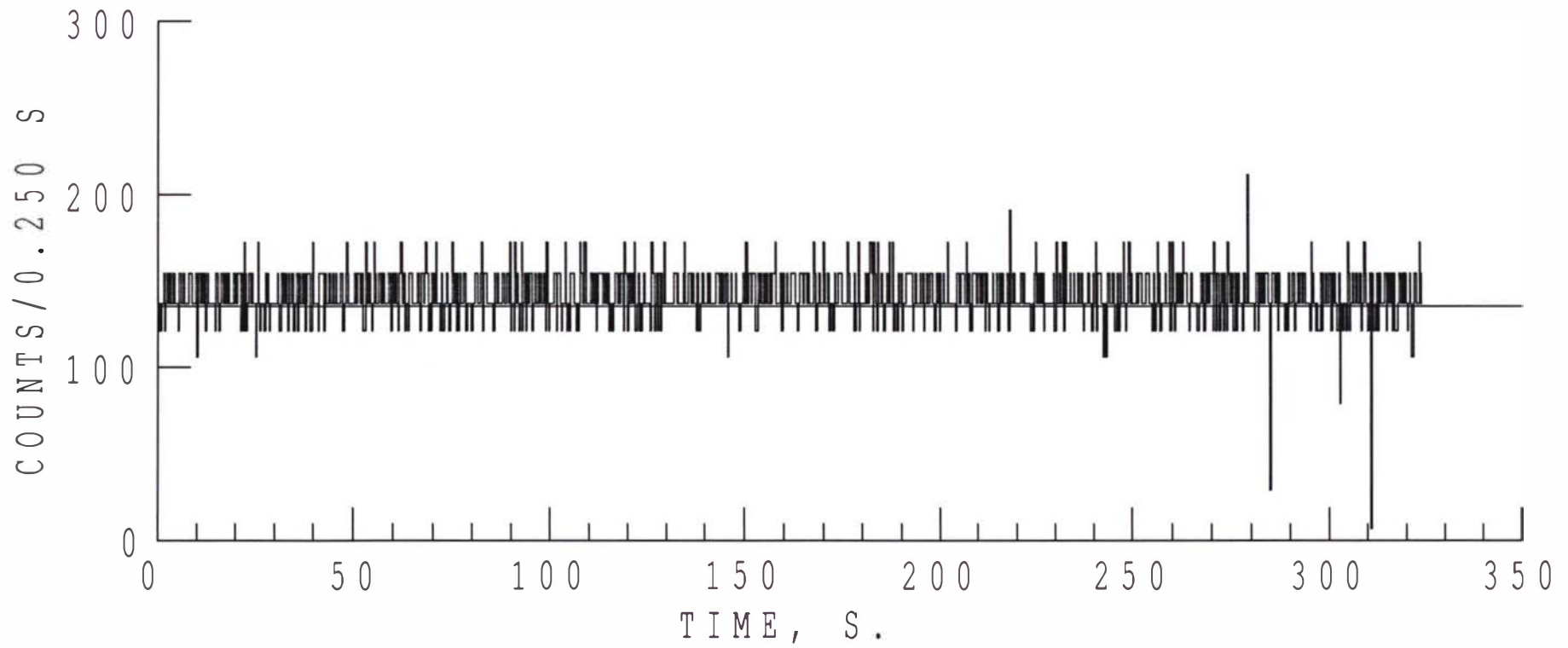
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 19/12/ 91 IS:
RA= 167.839 DEC= 6.615 DIST= 4.722 AU
BATSE-ULYSSES DISTANCE = 706379784. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 9.09 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 2326.66 SECS.
CROSSING TIME AT ULYSSES IS 34861. S. OR 09:41:00.7 +/- 149.94 SECONDS

9 / 11 / 95

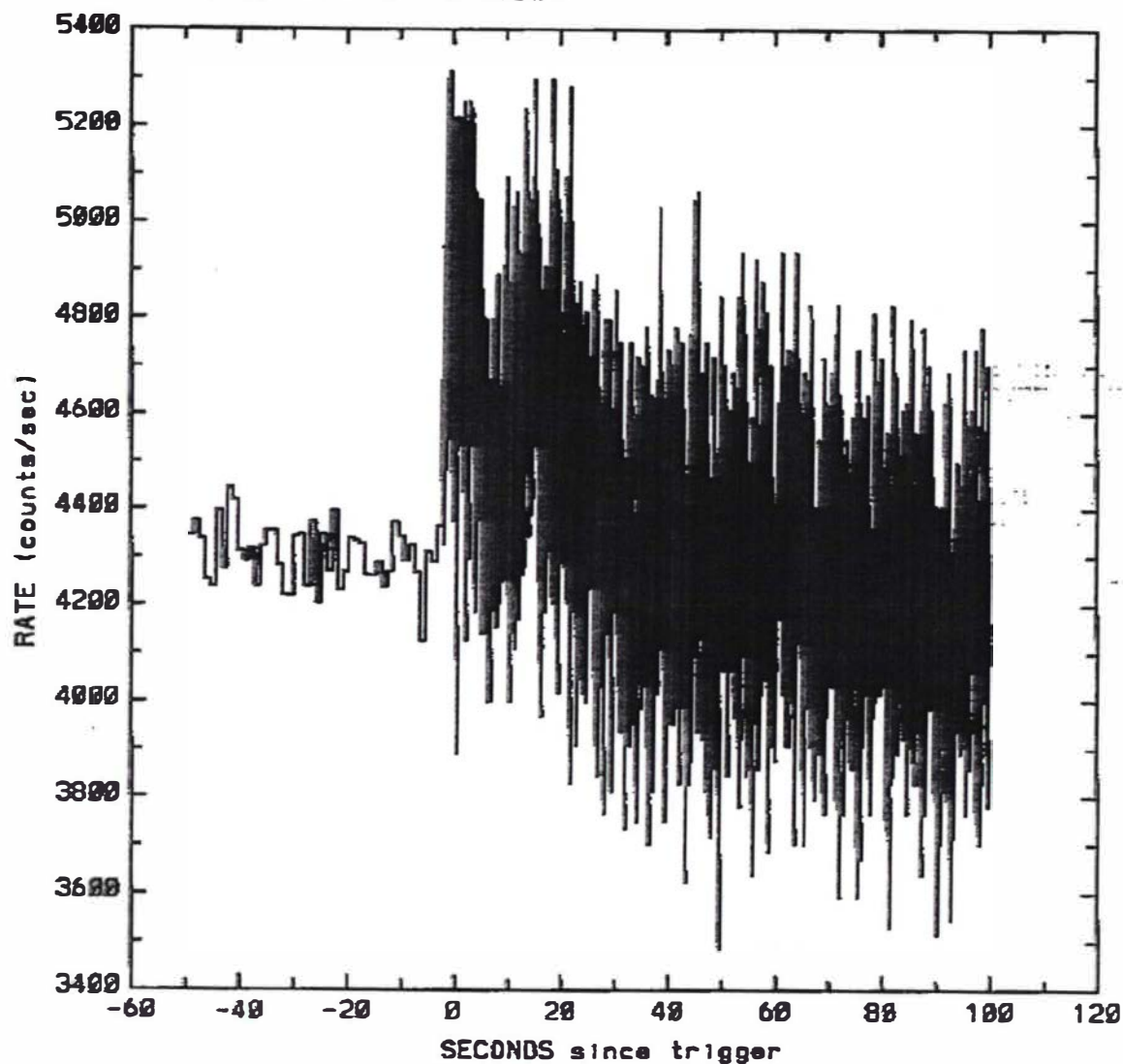
ULYSSES RT
19/12/91 34704.242 s
0 - 0 keV

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS



DATA FOR K. HURLEY



20-MAY-1994 13:09.15

Created by MOPS 80
(Burst Display)
Version 2.28

Trigger # : 1196

Trigger Time:
8609 / 32534.123Burst Data Type:
DISCSCDeadtime
Corrected: NBackground Data
Type: PREB + DISCLAMinimum Integ. Time:
0.064 secondsDetectors (7..8):
88000011Discriminators:
(1..2)Quality Mask:
BDISP1

CATSEARCH PROGRAM

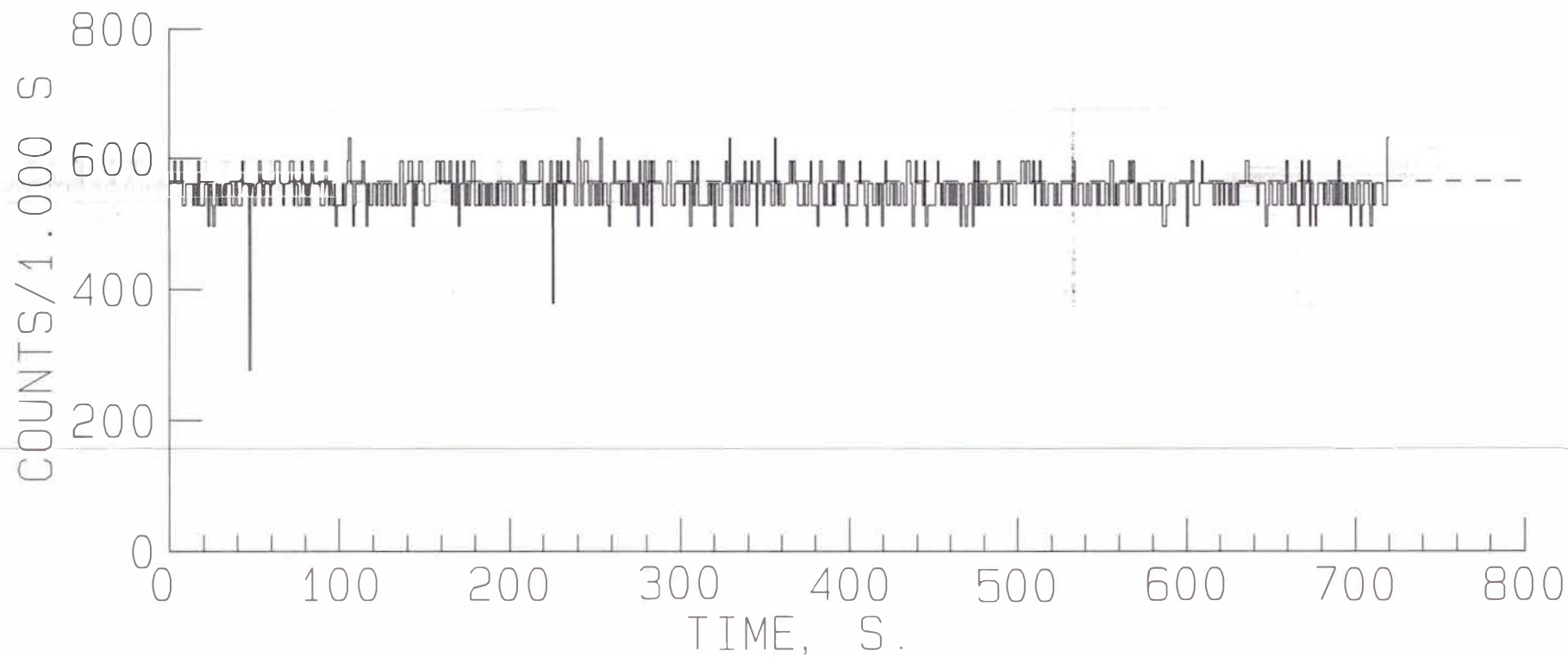
BATSE BURST # 1197
EVENT OF 1991 DEC 19 DAY OF YEAR=353
EVENT CROSSING TIME AT BATSE : 79038. S. OR 21:57:18.0
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 220.400 -4.400
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 19/12/ 91 IS:
RA= 167.839 DEC= 6.615 DIST= 4.722 AU
BATSE-ULYSSES DISTANCE = 706379784. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=126.39 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-1397.83 SECS.
CROSSING TIME AT ULYSSES IS 77640. S. OR 21:34:00 +/- 358.09 SECONDS

NO

14 / 4 / 93

ULYSSES RT
19/12/91 77292.227 s
0- 0 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



FAX MESSAGE

DATE: November 5, 1991

TO: JOHN LAROS, LANL, (505) 665 4414

FROM: Kevin Hurley
University of California
Space Sciences Laboratory
Berkeley, CA 94720
Phone: (510) 643-9173
Fax: (510) 643-7629
E-mail: khurley@sunspot.ssl.berkeley.edu

11-6
FAXED

TOTAL NUMBER OF PAGES: 1

PLEASE NOTE AREA CODE CHANGE

I HAVEN'T BEEN ABLE TO REACH YOU BY PHONE - HERE IS WHAT I WANTED TO ASK/TELL YOU.

1. I SUBMITTED A LETTER OF INTENT FOR THE GRO PHASE 2 GI PROGRAM - YOUR NAME IS ON IT. WE CAN WORK OUT THE DETAILS LATER.

2. WE ARE HAVING TROUBLE FINDING A CONSISTENT POSITION FOR THE AUGUST 14 EVENT, I.E. ONE THAT IS CONSISTENT WITH THE BATSE AND COMPTON LOCATIONS. THERE SEEMS TO BE AN ERROR OF ABOUT 10 SECONDS SOMEWHERE. OUR PVO TRIGGER TIME IS 69378.466, DERIVED FROM MY SOFTWARE. IS THIS CONSISTENT WITH YOUR TIME?

T₀₀ = 69394.176 according to RK's archive

3. DO YOU HAVE A PVO TRIGGER LIST FOR NOVEMBER/DECEMBER 1990? I HAVE A RECORD OF ONLY ONE EVENT, DECEMBER 4, AND WE WOULD LIKE TO LOOK FOR MORE ULYSSES/PVO EVENTS.

+ 19th + 25th.

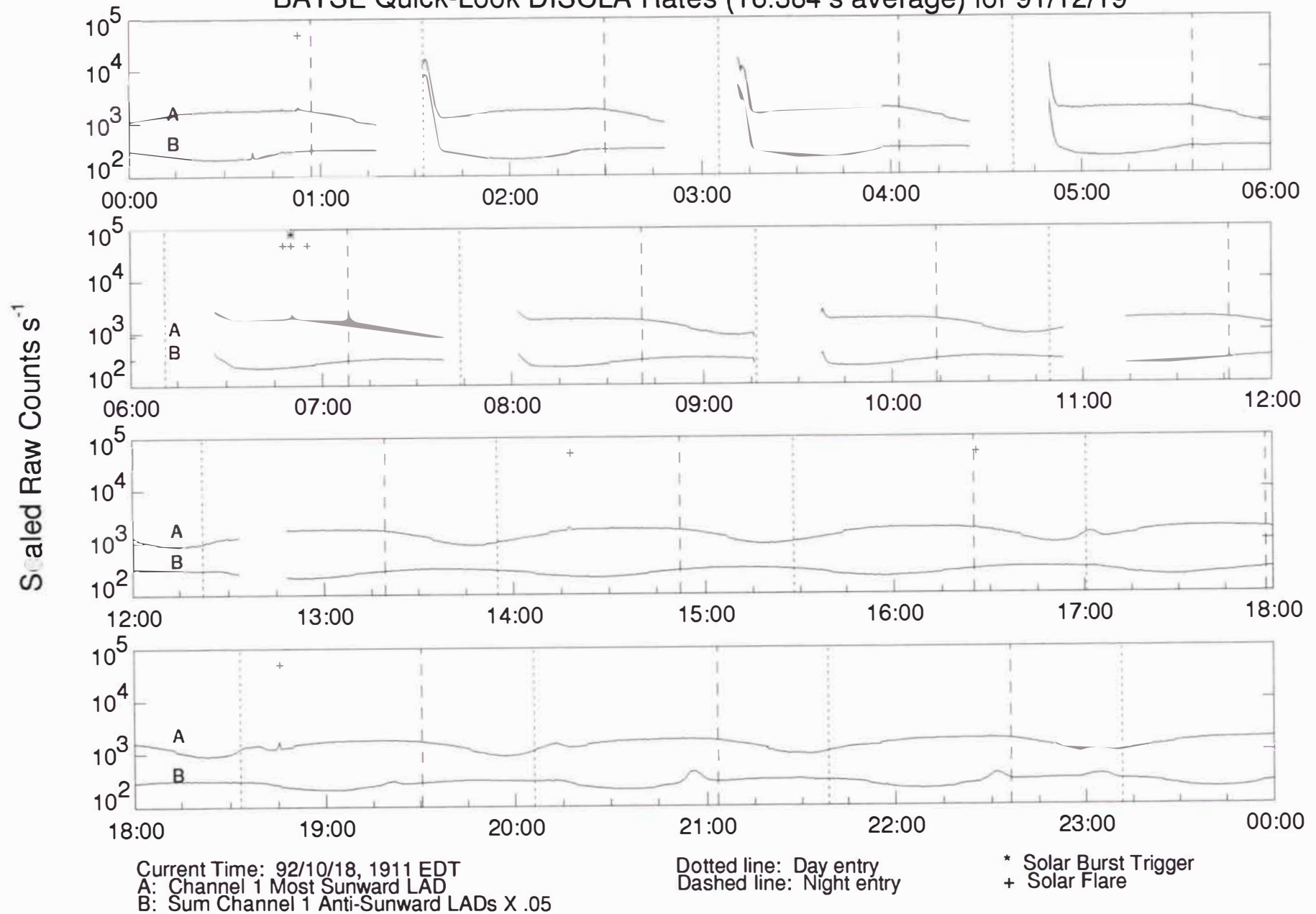
4. WE ARE TRYING TO CONFIRM AN EVENT ON APRIL 2, 1991, OBSERVED BY ULYSSES AT 51120 SECONDS. VENUS CROSSING TIME WOULD HAVE BEEN +/- 1000 SECS. DO YOU HAVE IT?

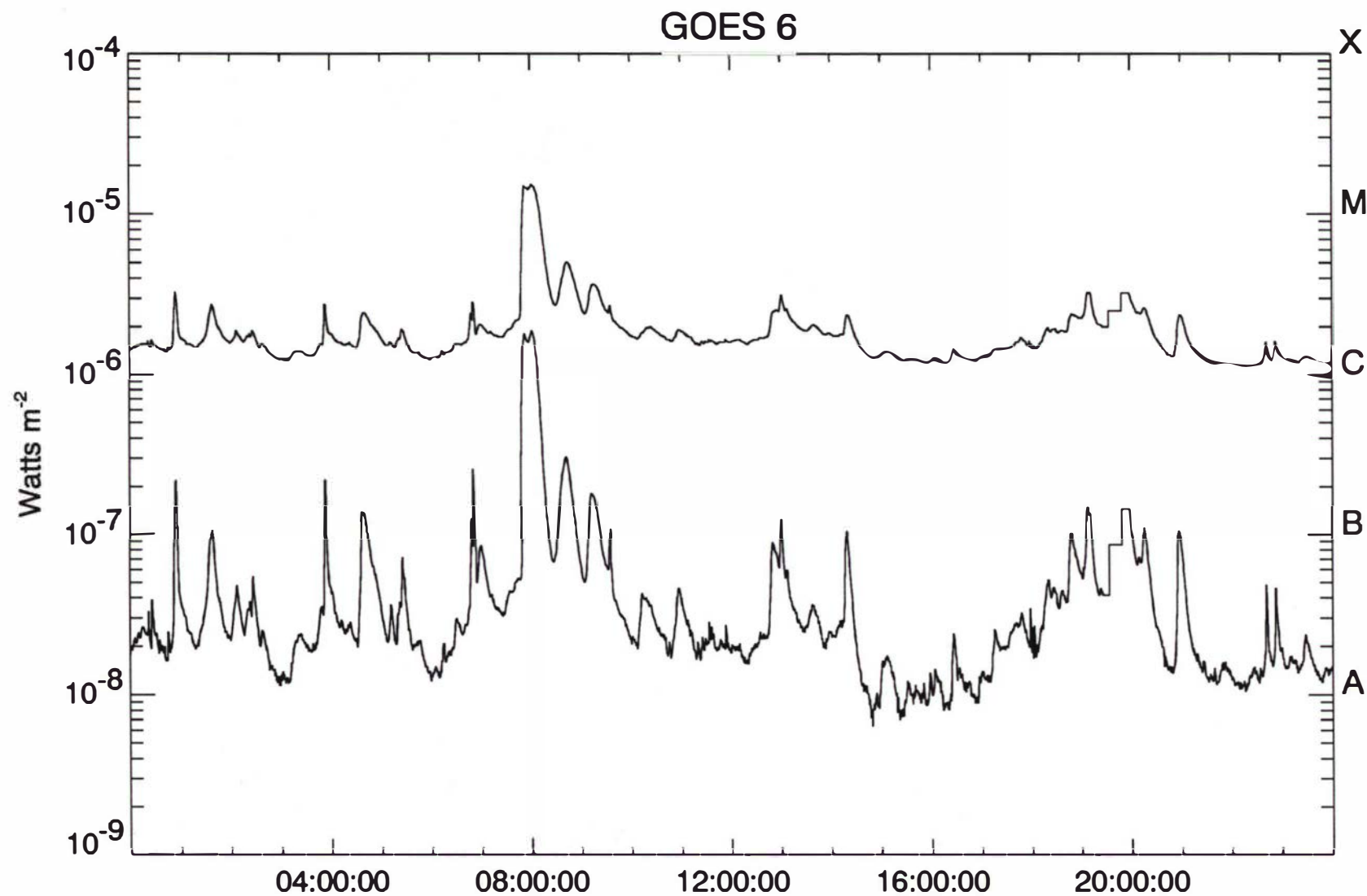
Real time - will send e-mail

5. THE FOLLOWING REQUEST COMES FROM THE SIGMA PEOPLE IN TOULOUSE. THEY ARE TRYING TO CONFIRM THE FOLLOWING BURSTS: 11 JAN 90 02:34; 27 MAR 90 10:25; 11 APR 90 16:43; 24 JUL 90 18:20; 6 DEC 90 20:33 (NO ULYSSES DATA FOR THIS ONE); 16 DEC 90 17:44 (POSSIBLE ULYSSES RATE INCREASE). DID YOU OBSERVE ANY OF THESE WITH PVO OR GINGA?

*100
COVERAGE
for any
J*

BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/19





Data Start: 91/12/19, 0000:02

Plot created: 97/10/20, 1527

Channel

1 (1.0 - 8.0 Angstroms)

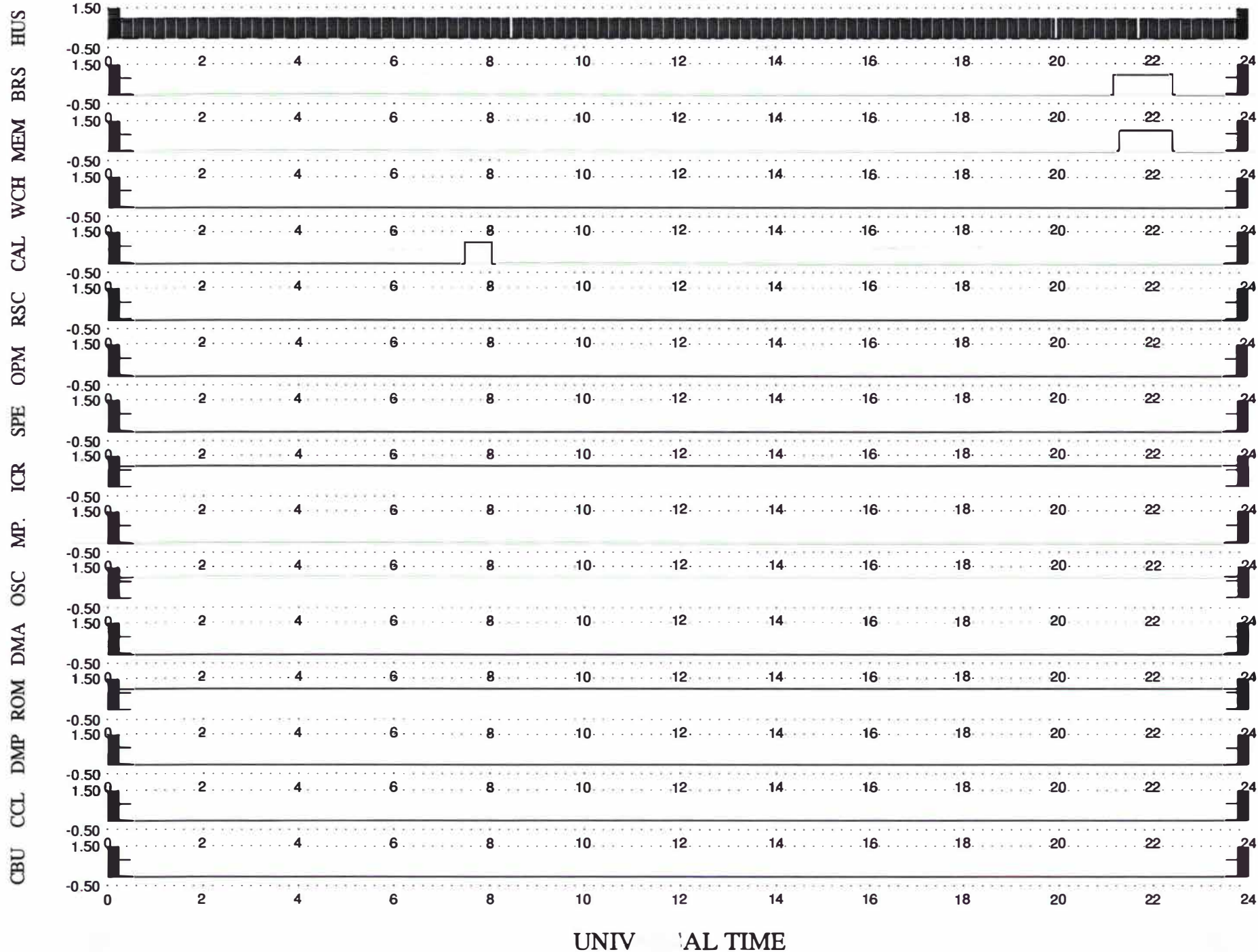
Background not subtracted

2 (0.5 - 4.0 Angstroms)

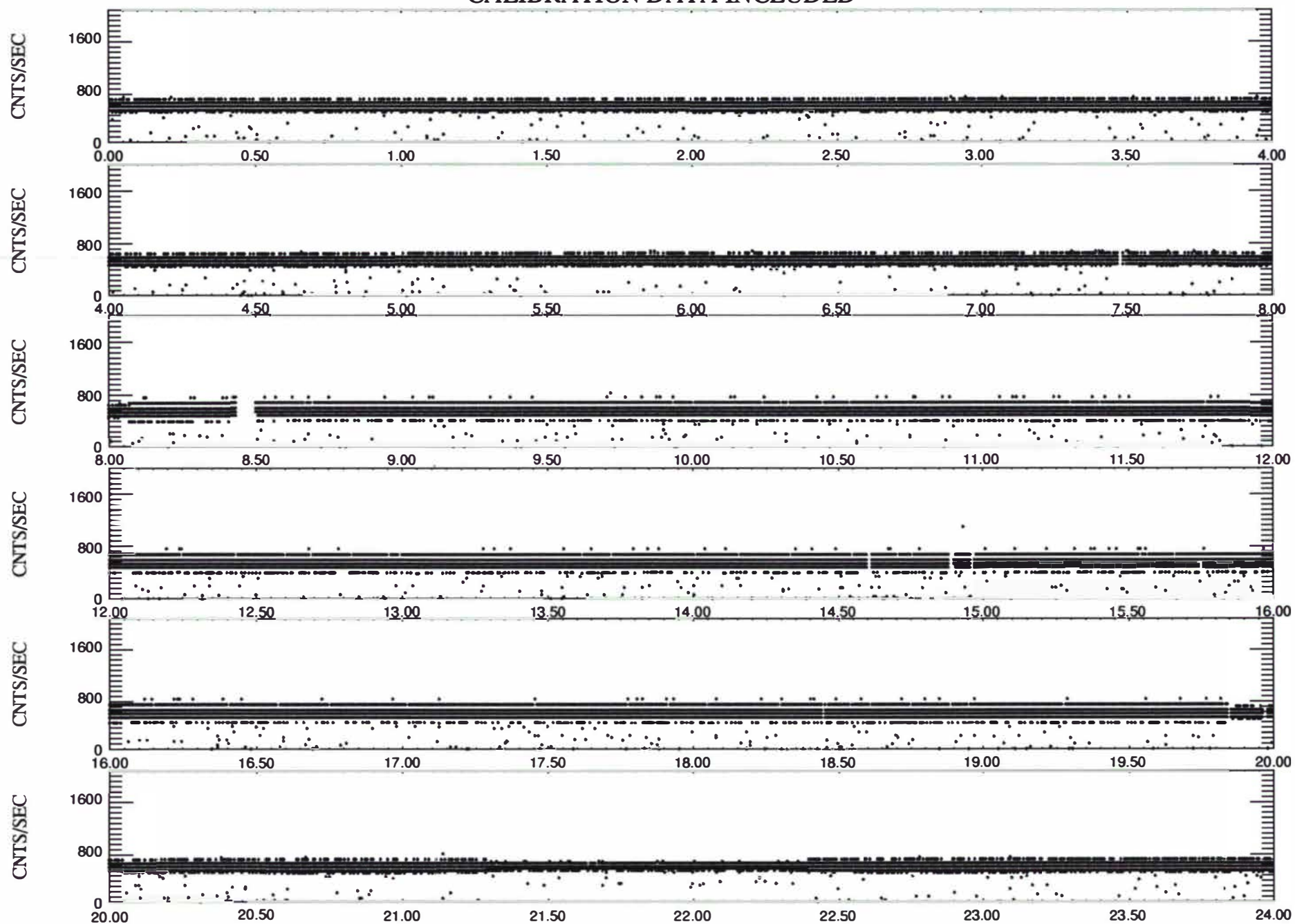
Background not subtracted

Sample average = 10

BURST NUMBER 14

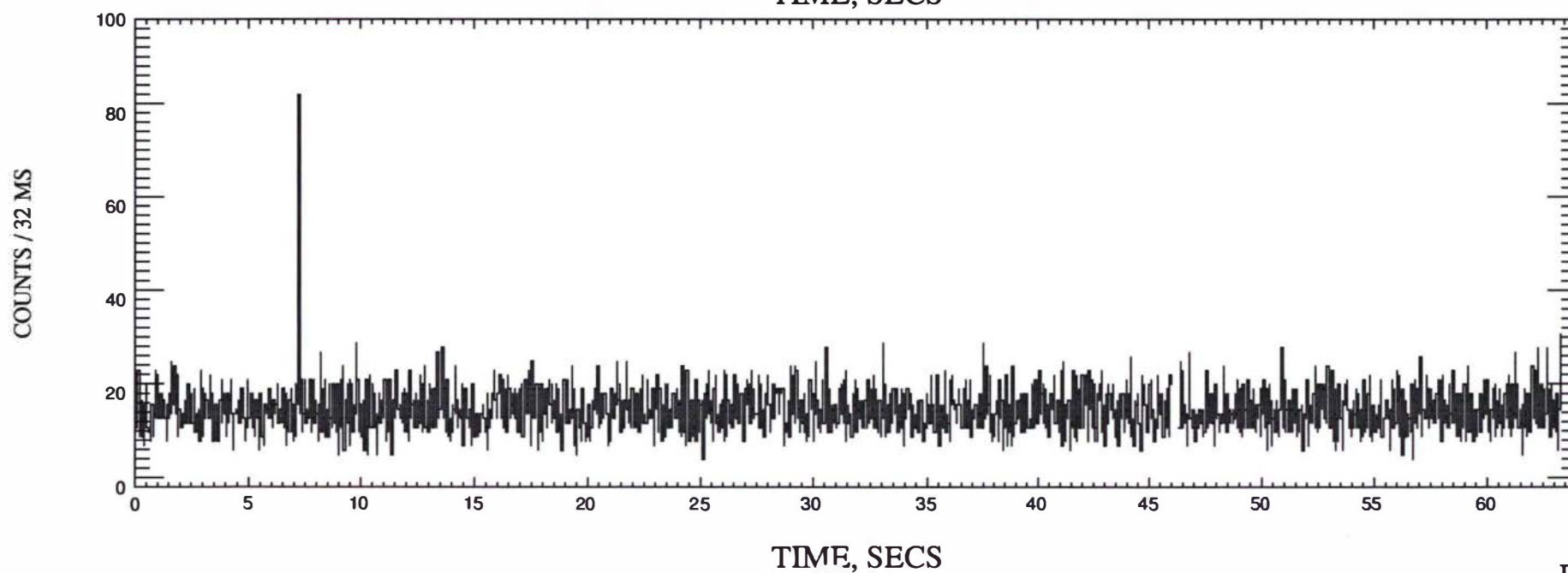
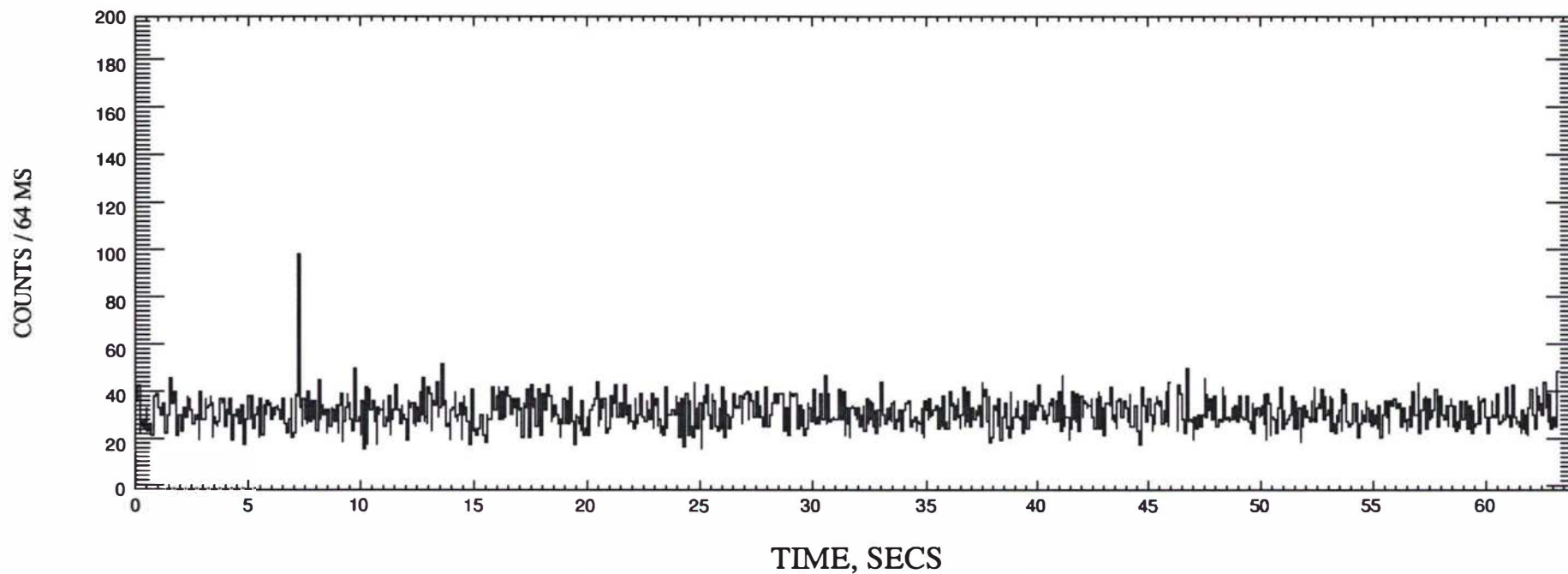


CALIBRATION DATA INCLUDED

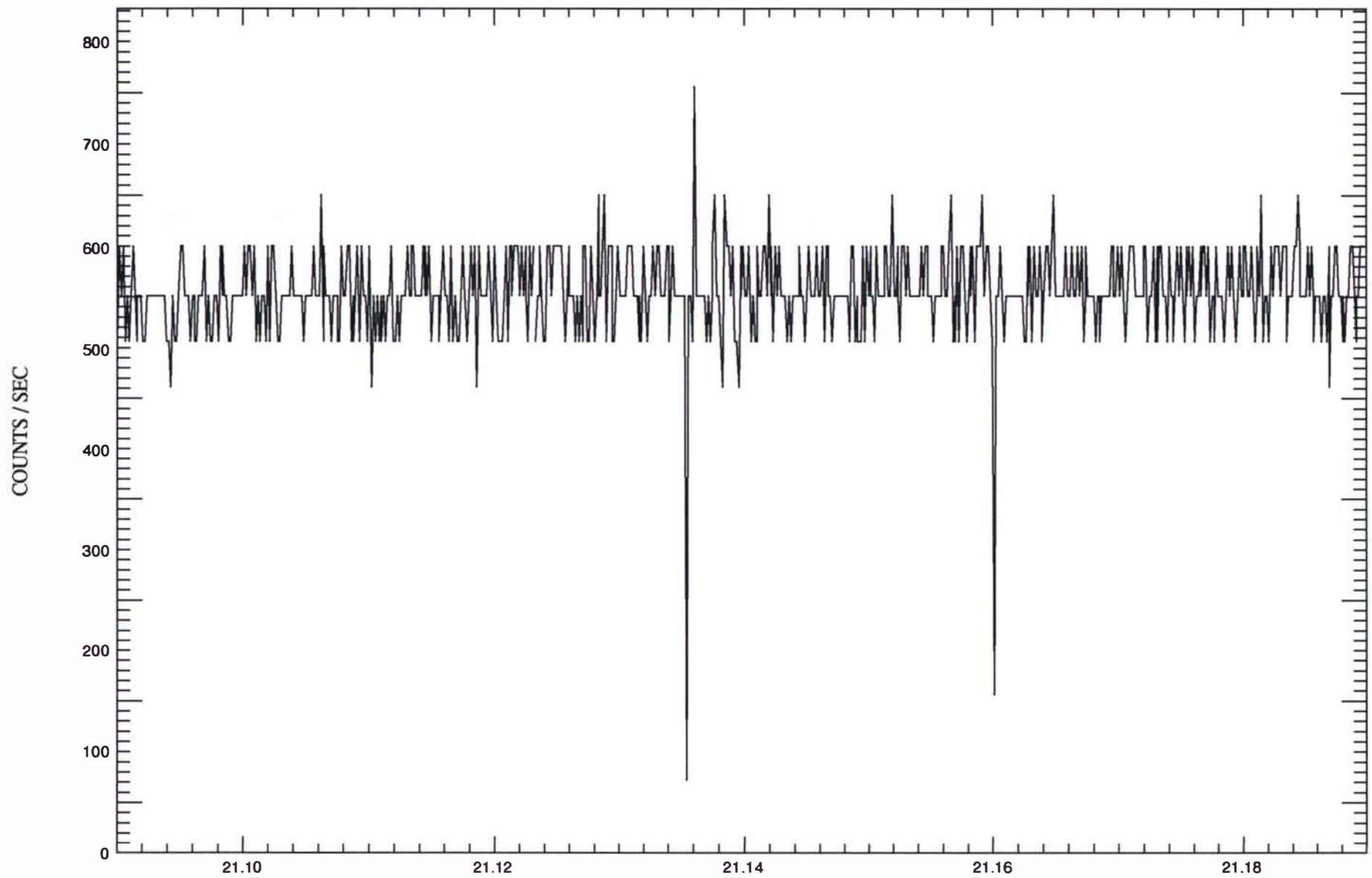


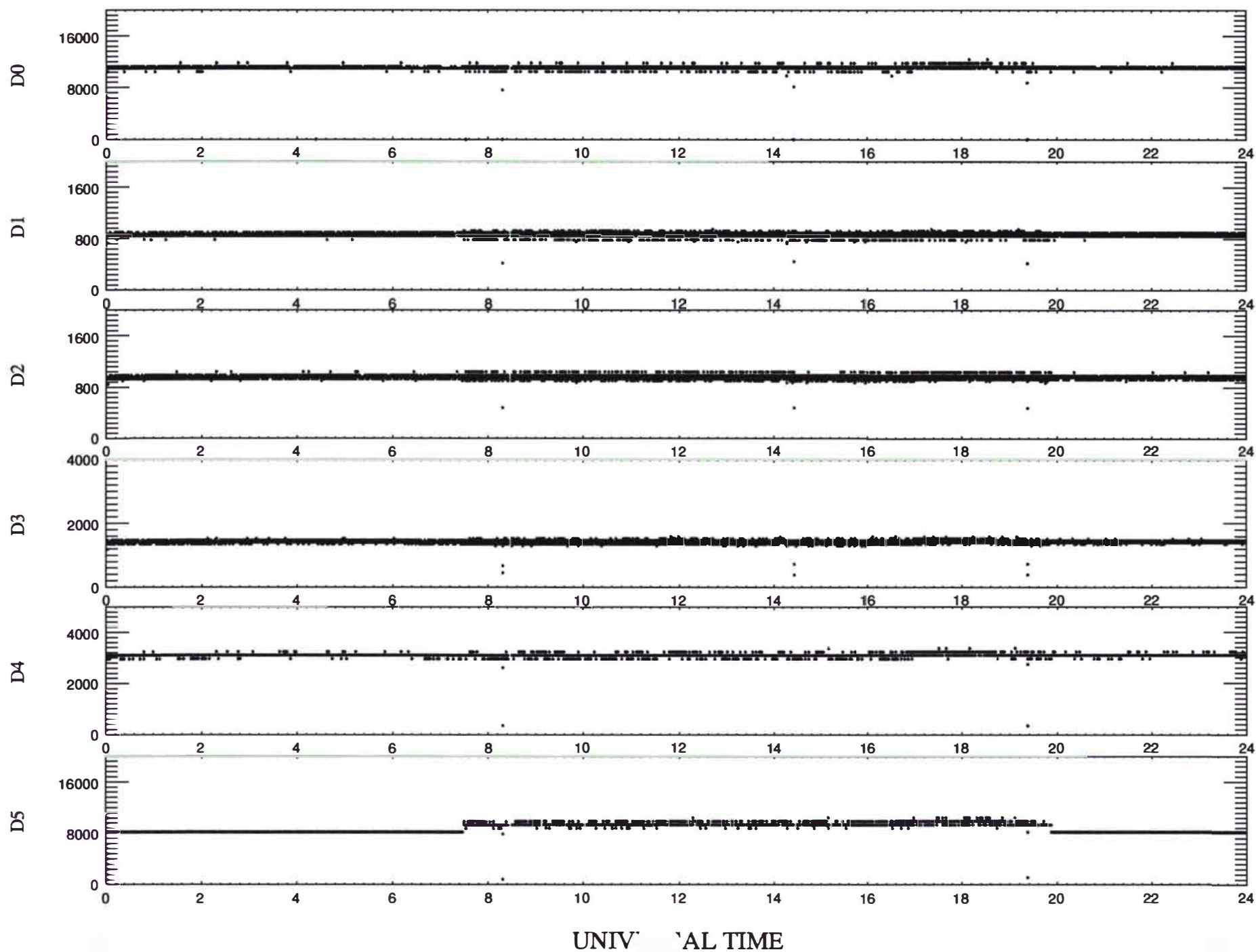
UNIV AL TIME

Burst Counter 14 at UT=21.136219147576 h=76090.389 s 21:08:10.389



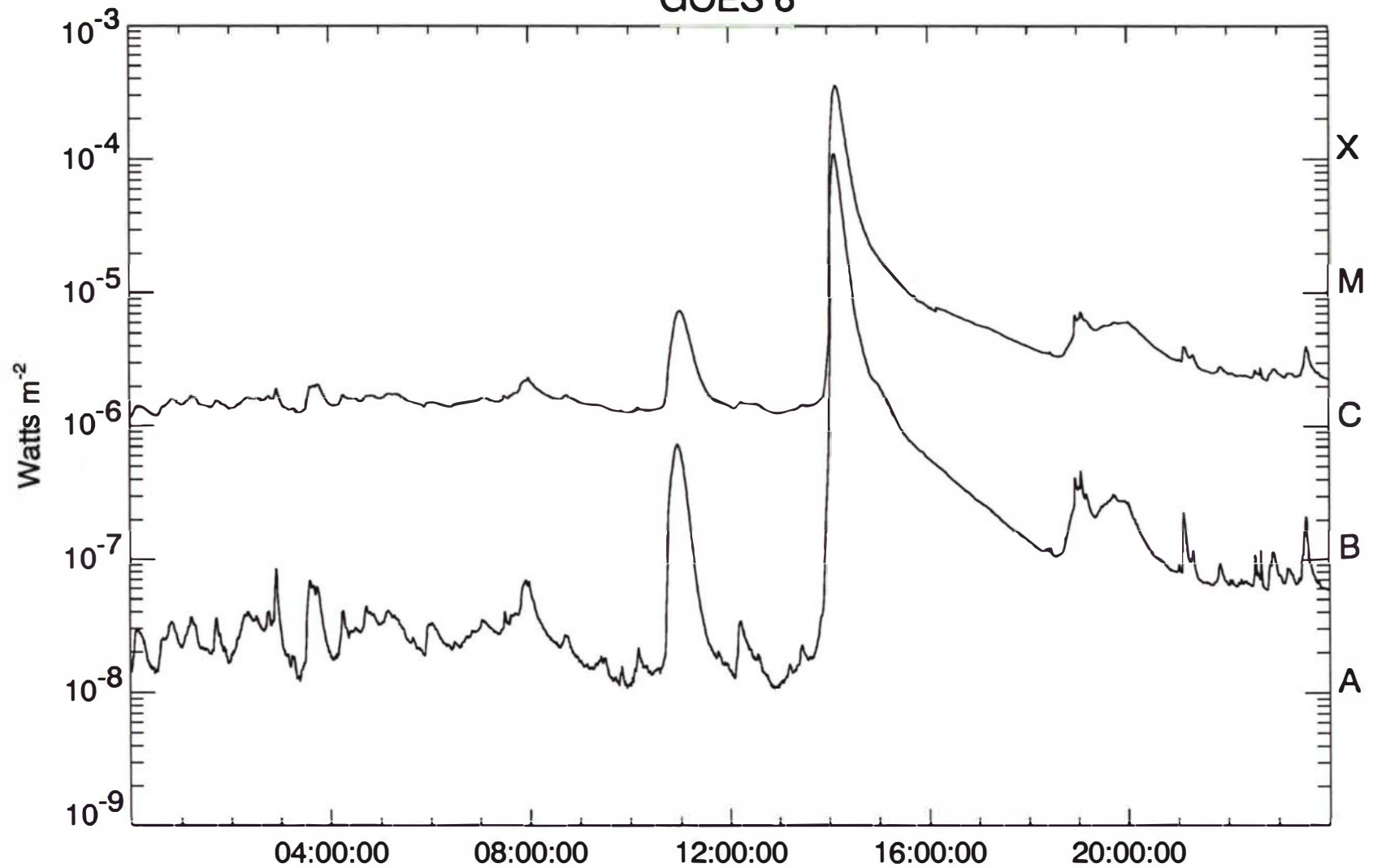
CALIBRATION DATA INCLUDED





DATE	U.T.	Nr UGB	Event Nature
1991-08-27	15:33:19.885	325-c	Solar Particles
1991-09-01	05:24:27.051	327-a	GRB
1991-09-07	01:05:10.287	330-a	GRB
1991-09-07	19:23:04.162	331-a	Solar Flare
1991-10-01	18:14:23.671	345-a	Unknown
1991-10-01	19:01:20.457	345-b	Unknown
1991-10-04	01:27:10.195	347-a	Unknown
1991-10-13	18:09:49.270	353-a	Solar Flare
1991-10-13	21:02:34.557	353-b	Solar Flare
1991-10-14	17:34:33.822	354-a	Unknown
1991-10-16	11:01:35.345	355-a	GRB
1991-10-18	05:32:15.504	356-a	GRB
1991-10-25	21:25:15.926	362-a	GRB
1991-10-26	15:06:06.127	363-a	Unknown
1991-10-26	15:28:41.044	363-b	Unknown
1991-10-26	20:35:18.850	363-c	Solar Flare
1991-11-19	17:12:34.357	367-a	GRB
1991-11-19	17:28:41.794	367-b	Solar Flare
1991-11-21	07:23:32.063	368-a	Unknown
1991-11-21	07:43:41.945	368-b	Unknown
1991-11-21	07:58:33.952	368-c	Unknown
1991-12-05	19:48:38.788	375-a	Solar Flare
1991-12-14	20:55:02.702	378-a	Unknown
1991-12-15	06:23:41.586	378-b	Unknown
1991-12-15	11:41:18.304	378-c	Unknown
1991-12-20	14:02:29.154	380-a	Solar Flare
1991-12-20	14:53:07.976	380-b	Solar Flare
1991-12-20	16:04:57.705	380-c	Solar Flare
1991-12-22	15:00:10.116	381-a	GRB
1992-01-10	00:12:08.191	386-a	Unknown
1992-01-10	02:45:56.628	386-b	Unknown
1992-01-10	09:18:06.120	386-c	Unknown & GRB
1992-01-18	09:42:49.763	392-a	Unknown
1992-01-18	12:38:59.105	392-b	Unknown
1992-01-18	~12:52	392-c	Unknown

GOES 6

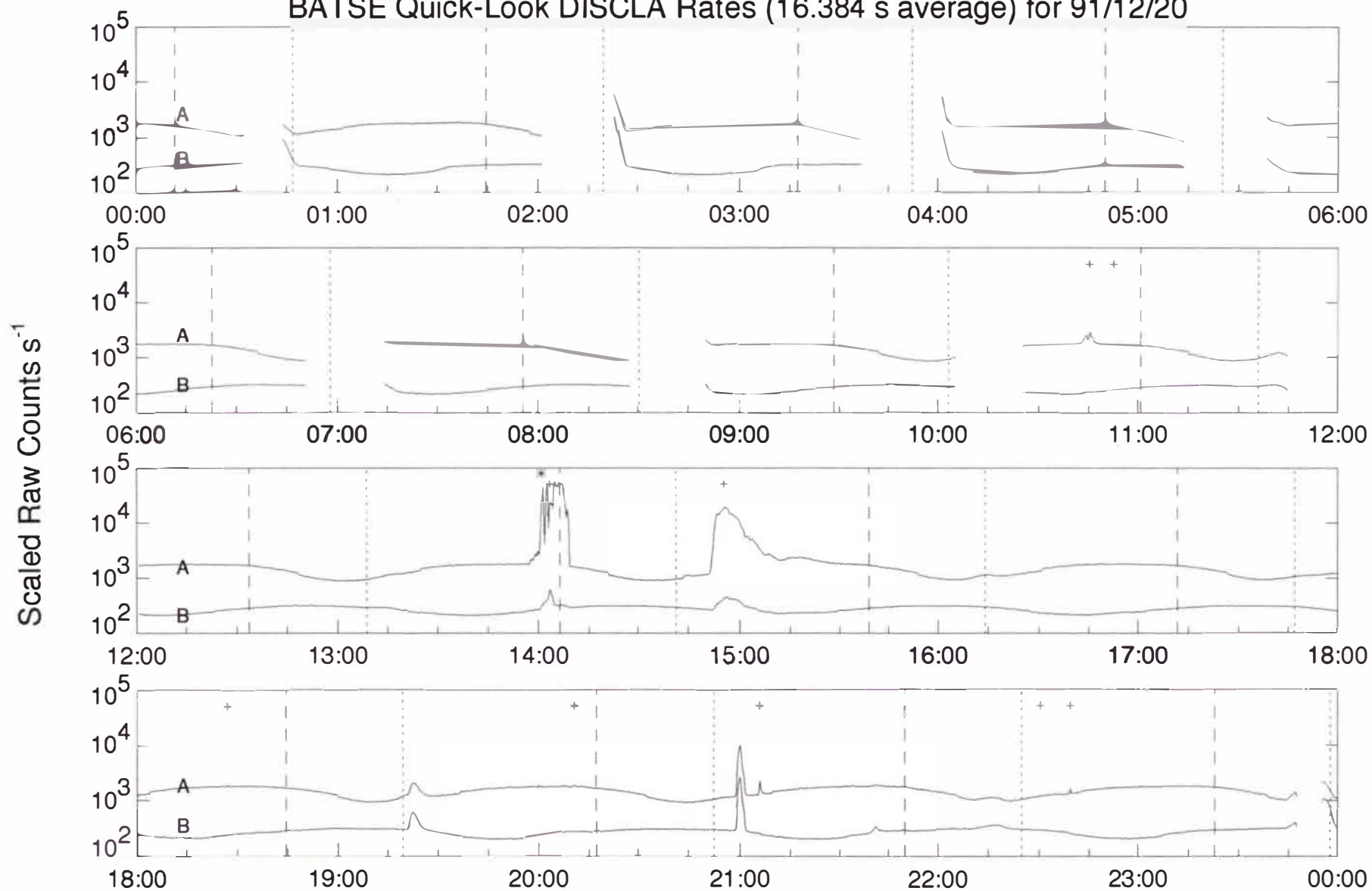


Data Start: 91/12/20, 0000:00

Plot created: 97/10/20, 1531

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 (16.384 s average) for 91/12/20

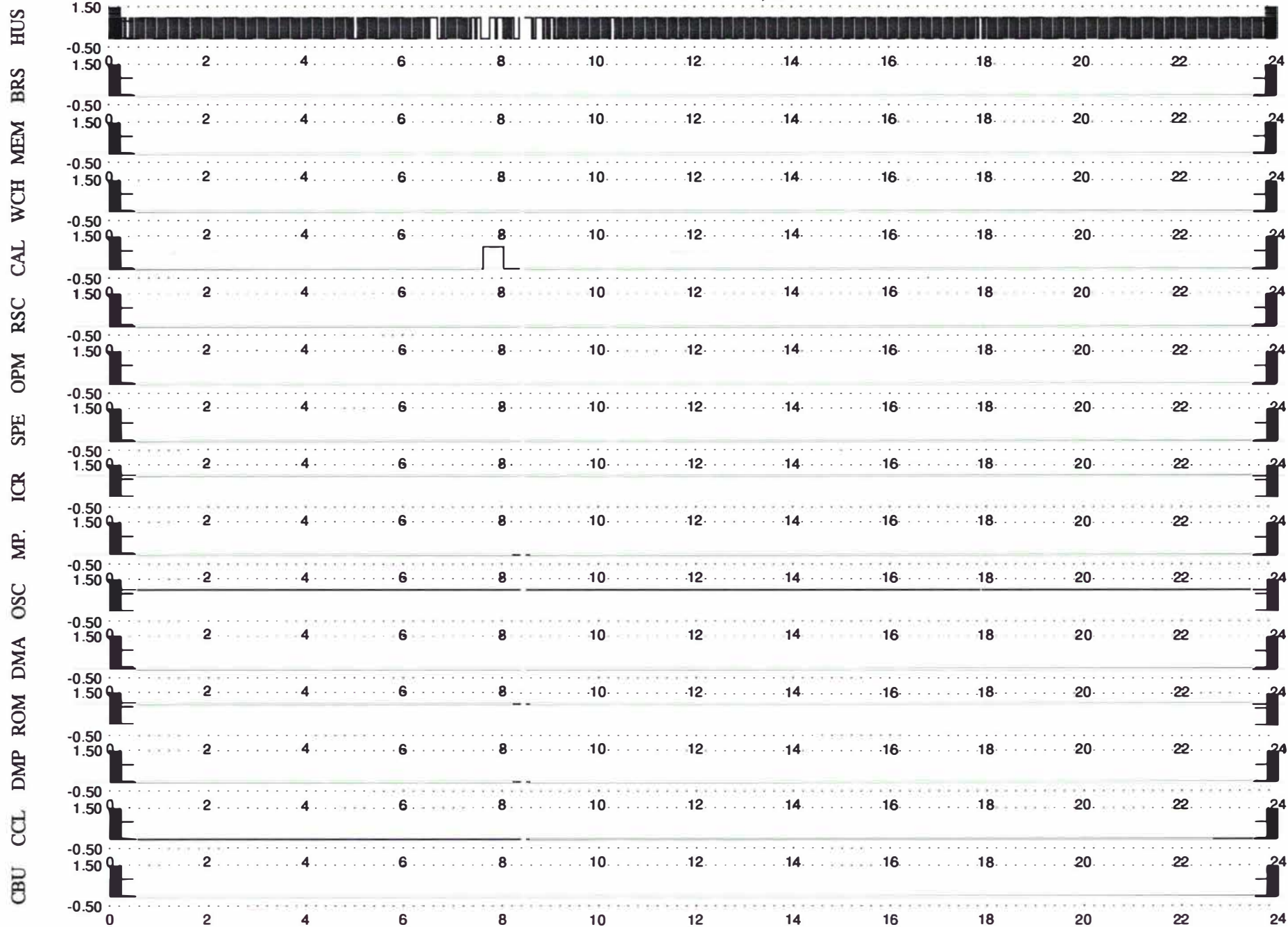


Current Time: 92/10/18, 1912 EDT
 A: Channel 1 Most Sunward LAD
 B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

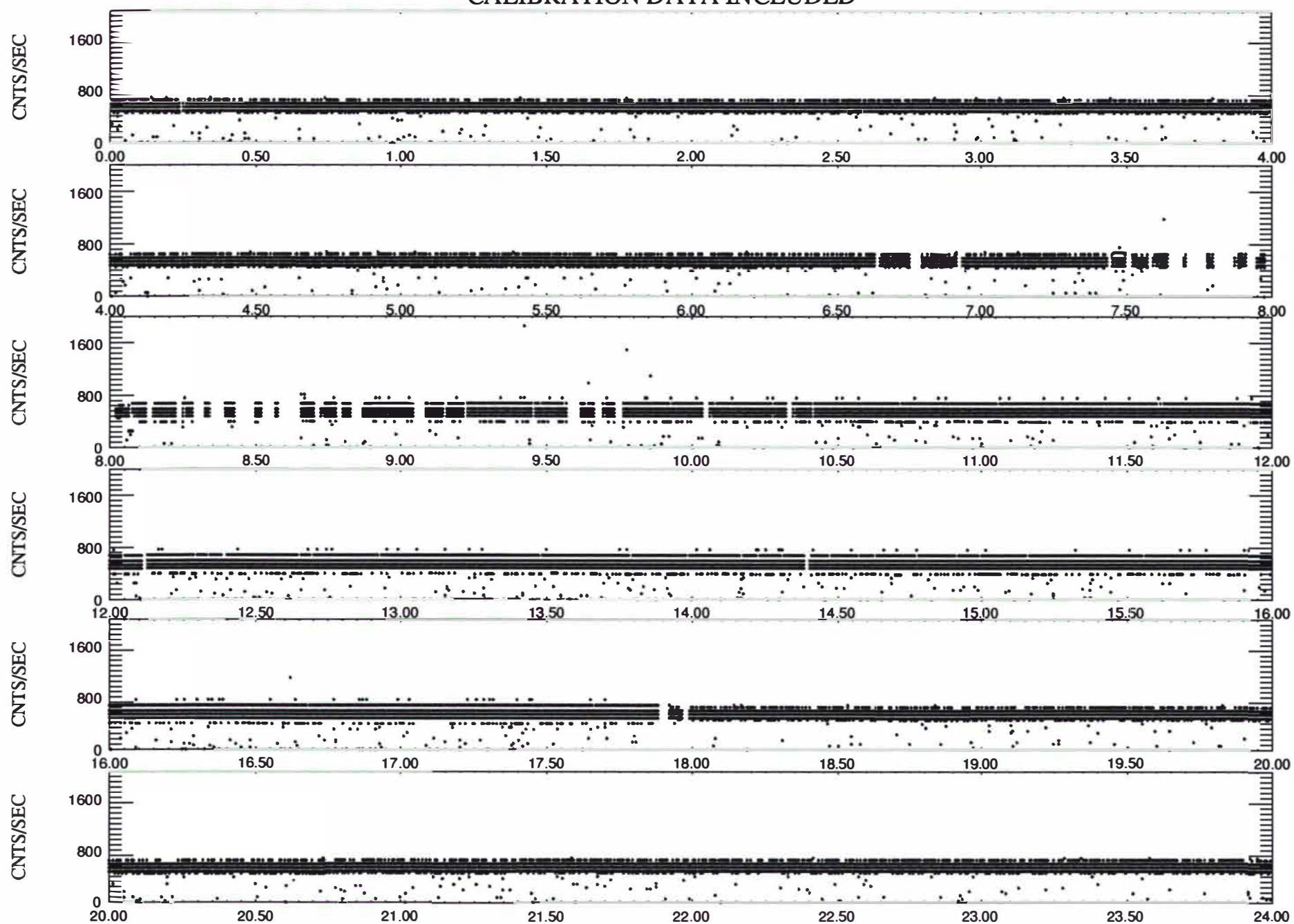
* Solar Burst Trigger
 + Solar Flare

BURST NUMBER 12, 14

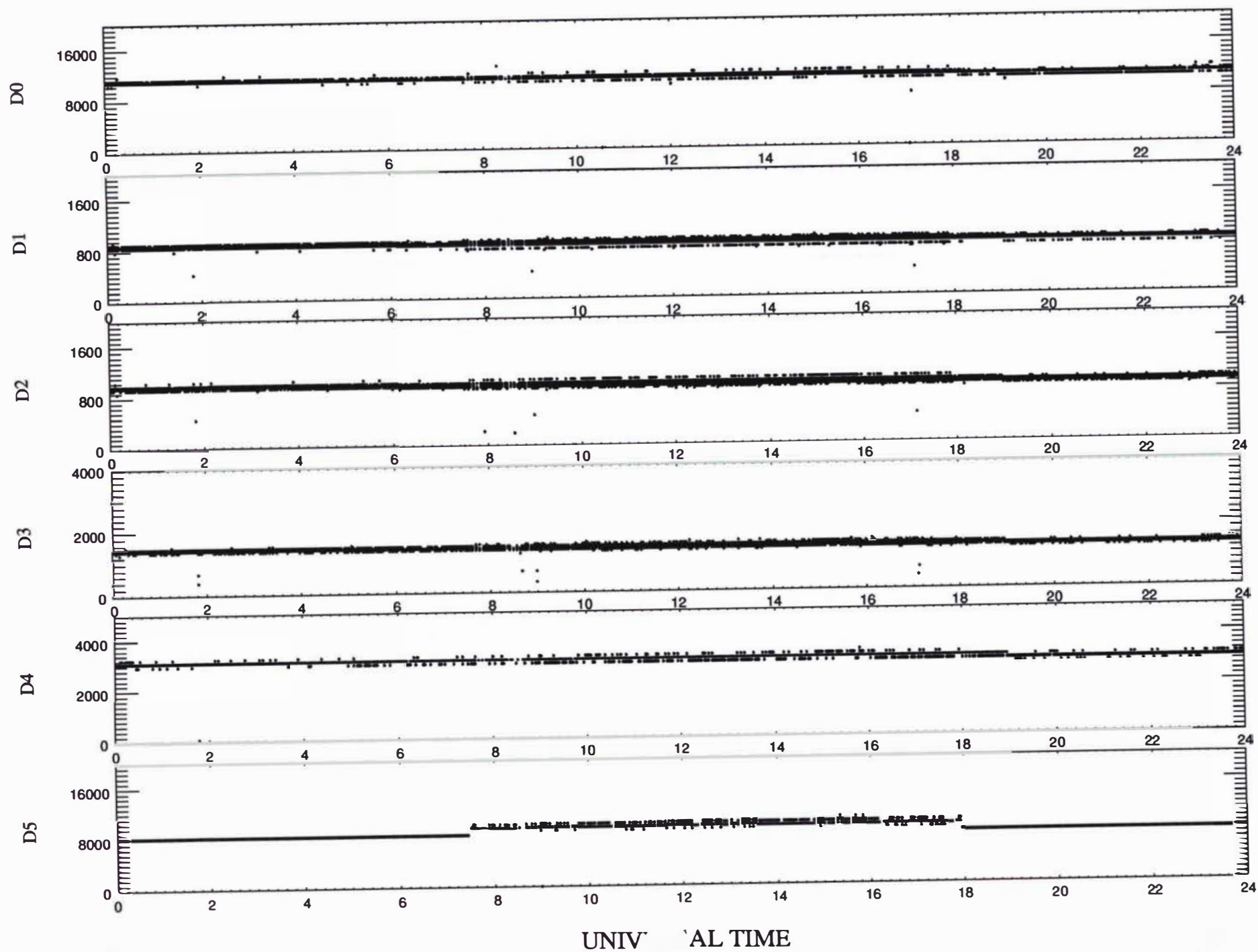


UNIVERSAL TIME

CALIBRATION DATA INCLUDED



UNIVERSAL TIME



Date: Jul 19 2011

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)?
- ☐ 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

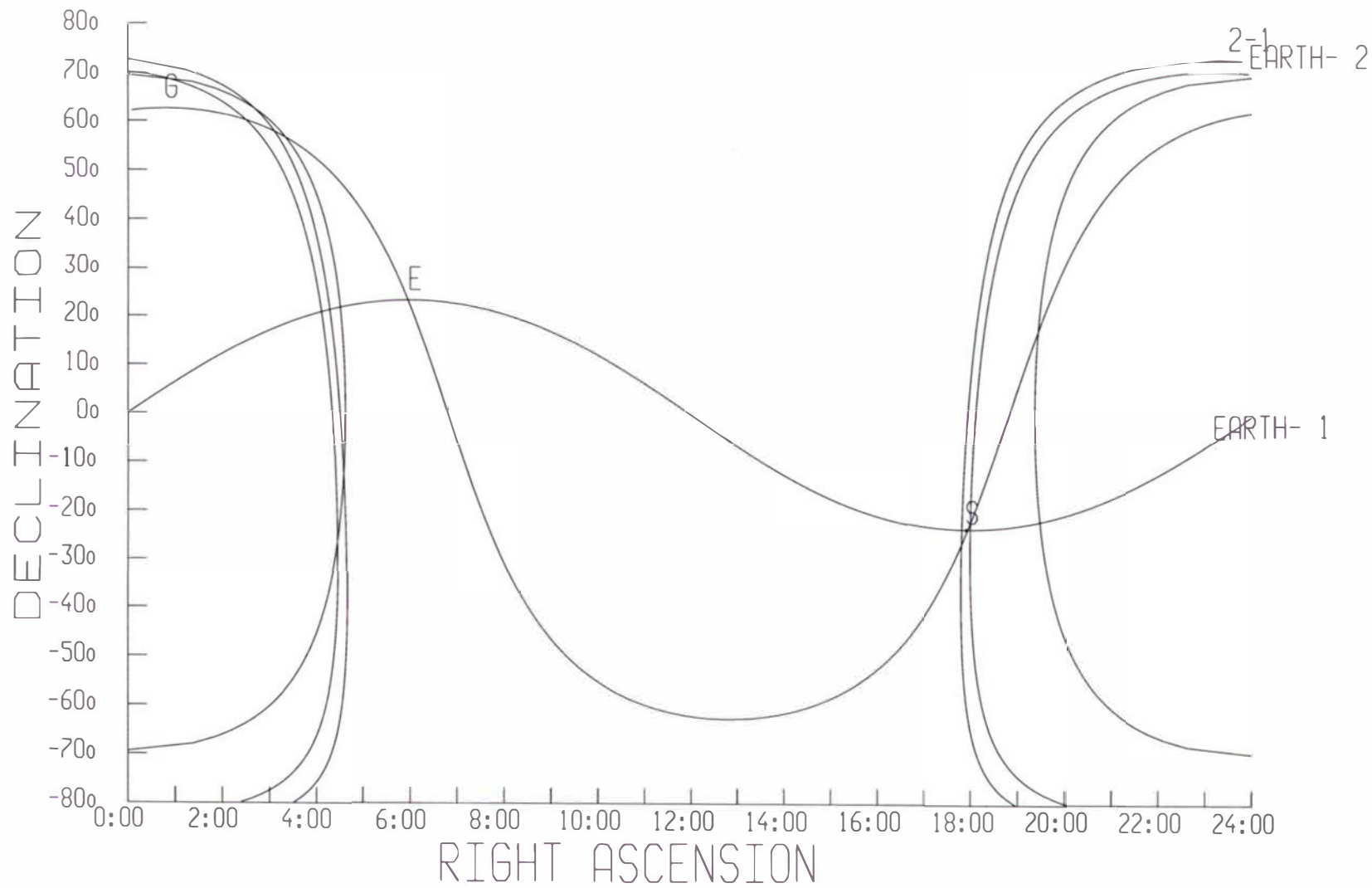
- ☐ Ephemeris of PVO used (not Venus)?
- ☐ 2000 coordinates used?
- ☐ Geocentric time used?
- ☒ ACCESS and MBL databases updated with identical times?

Not correlated - used DMSP peak time + Ulysses trigger time

EVENT OF DEC 21, 1991 6:26

19/07/2011

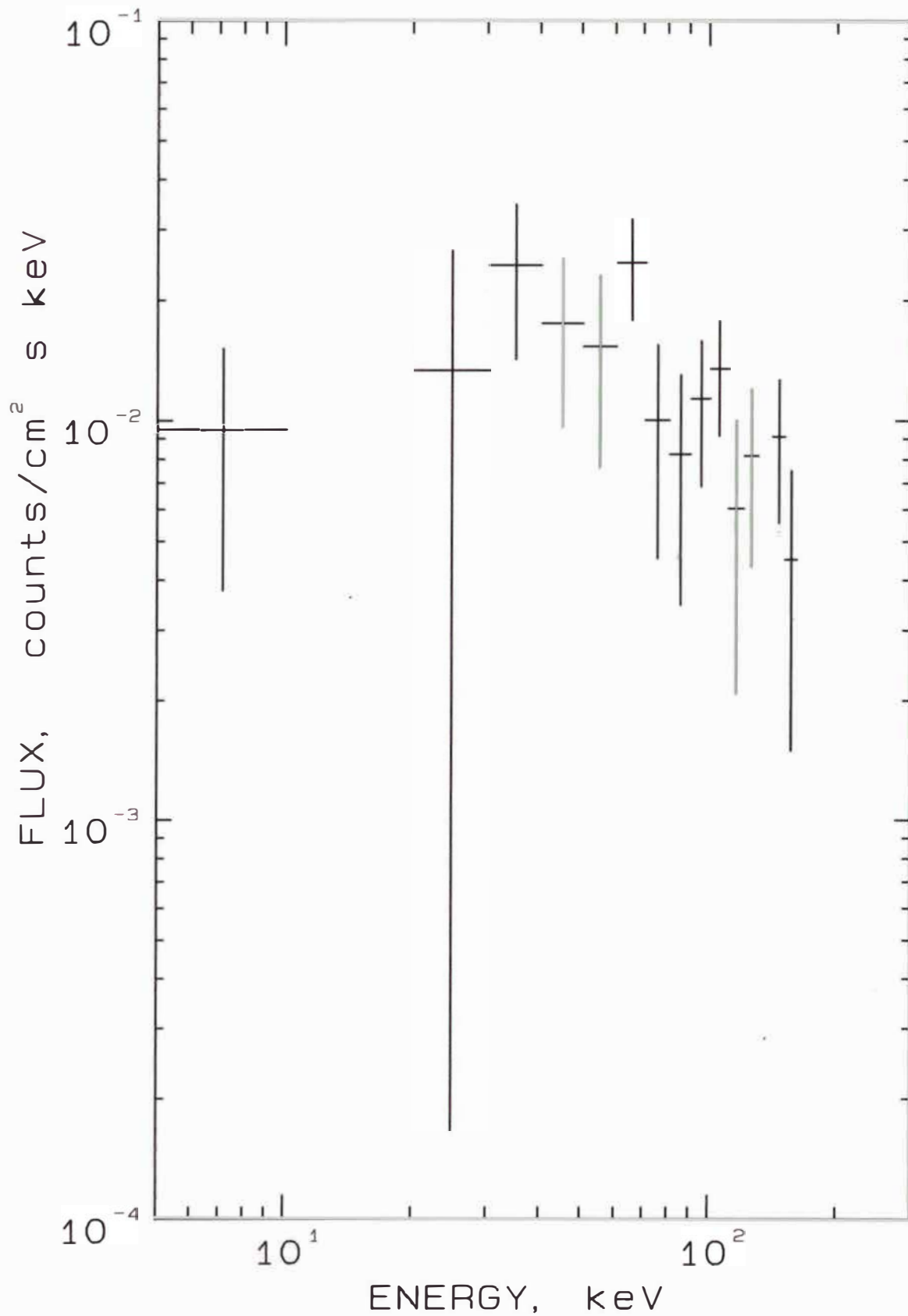
N-M = CORRELATION BETWEEN SATELLITES N AND M
EARTH-N = EARTH AS SEEN FROM SATELLITE N
S-SUN E=ECLIPTIC G=GALACTIC EQUATOR
1 ULYSSES 2 DMSP



ULYSSES 21/12/91 23169.693

28/10/97

SPECTRUM INTEGRATED OVER 31.1 SECONDS, INTERVALS 2 TO 25



ULYSSES 21/12/91 23169.693 BURST SPECTRAL COUNT RATES

5- 20 keV

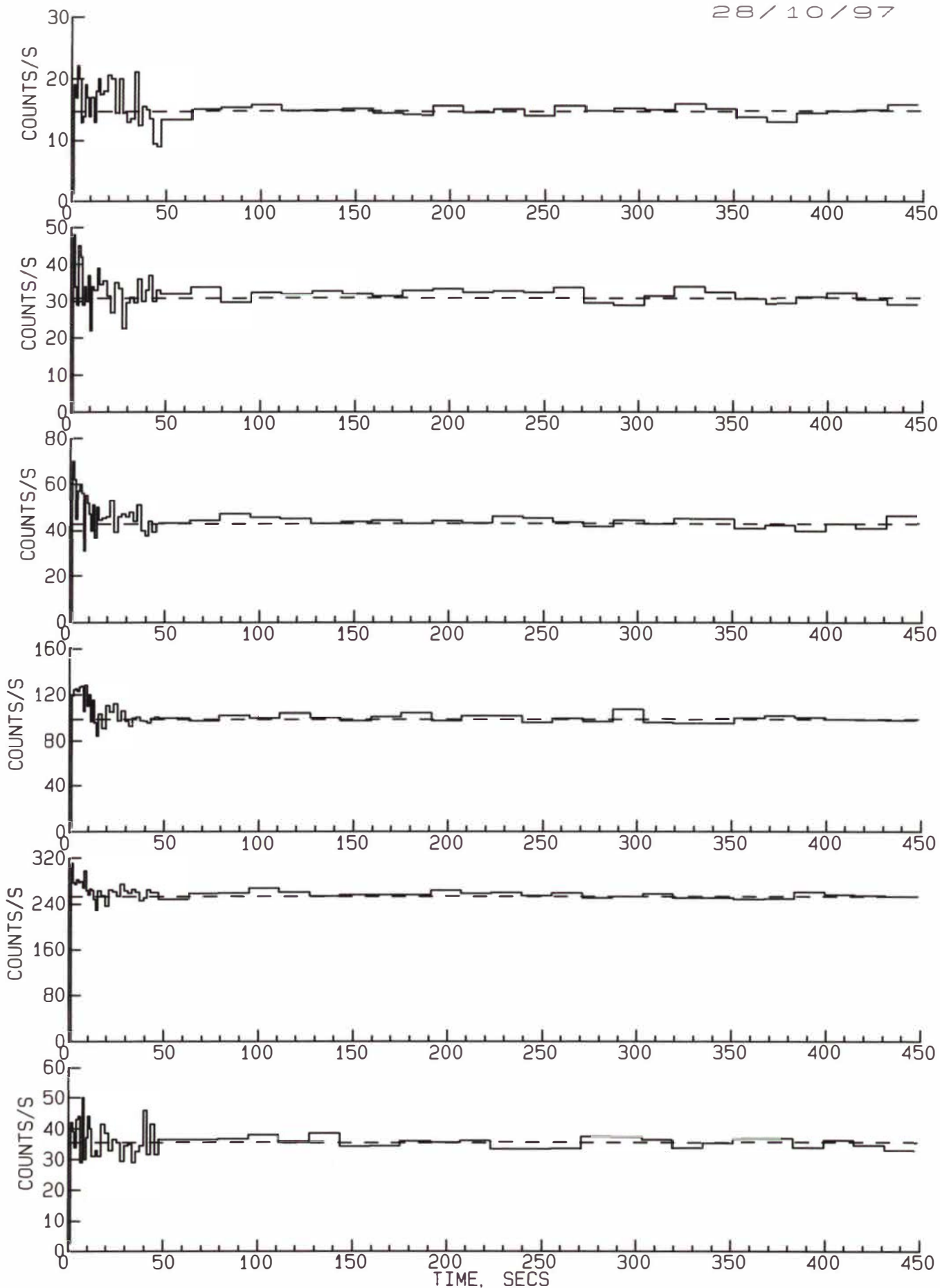
20- 50 keV

50- 80 keV

80-111 keV

111-141 keV

141-161 keV



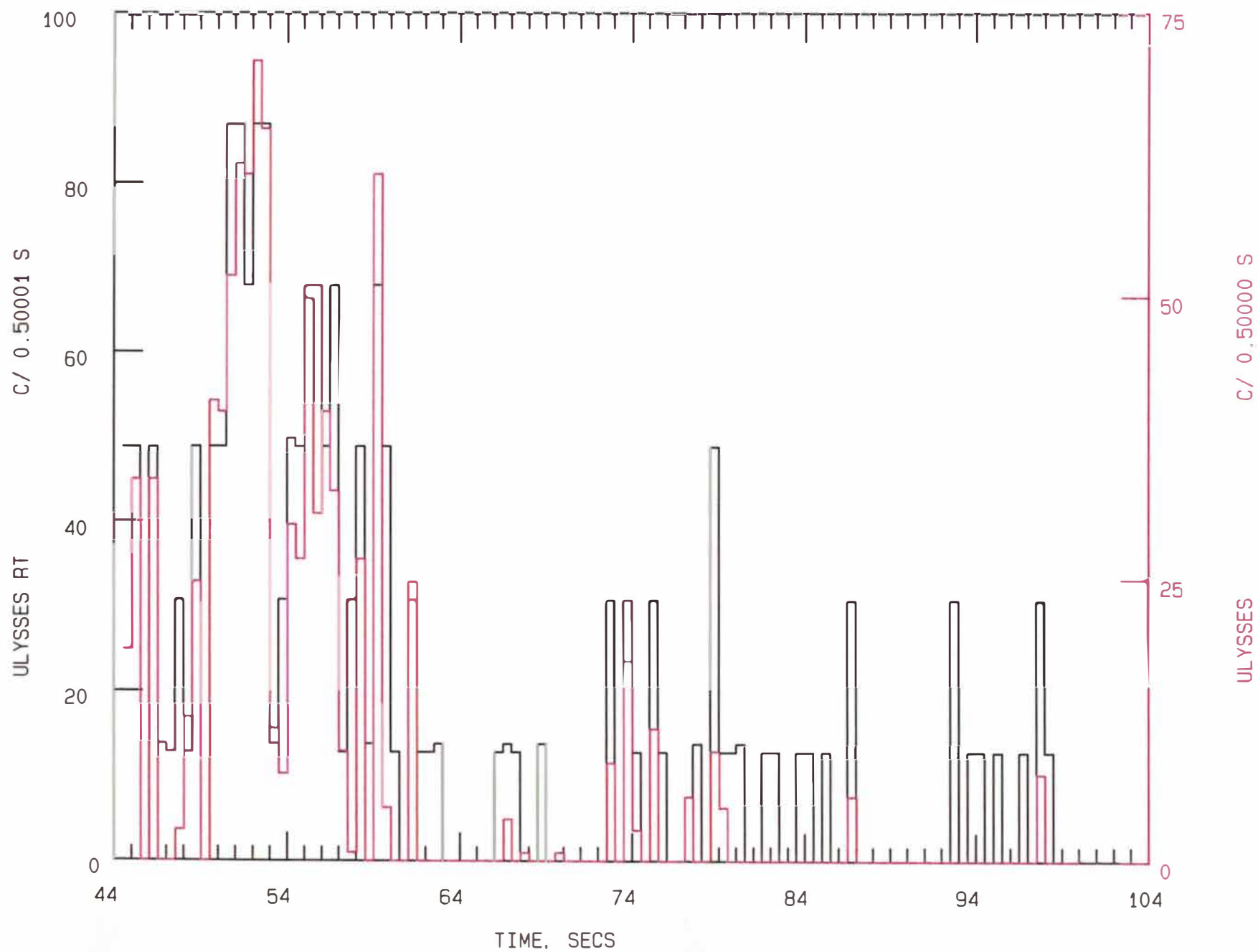
ULYSSES RT-ULYSSES

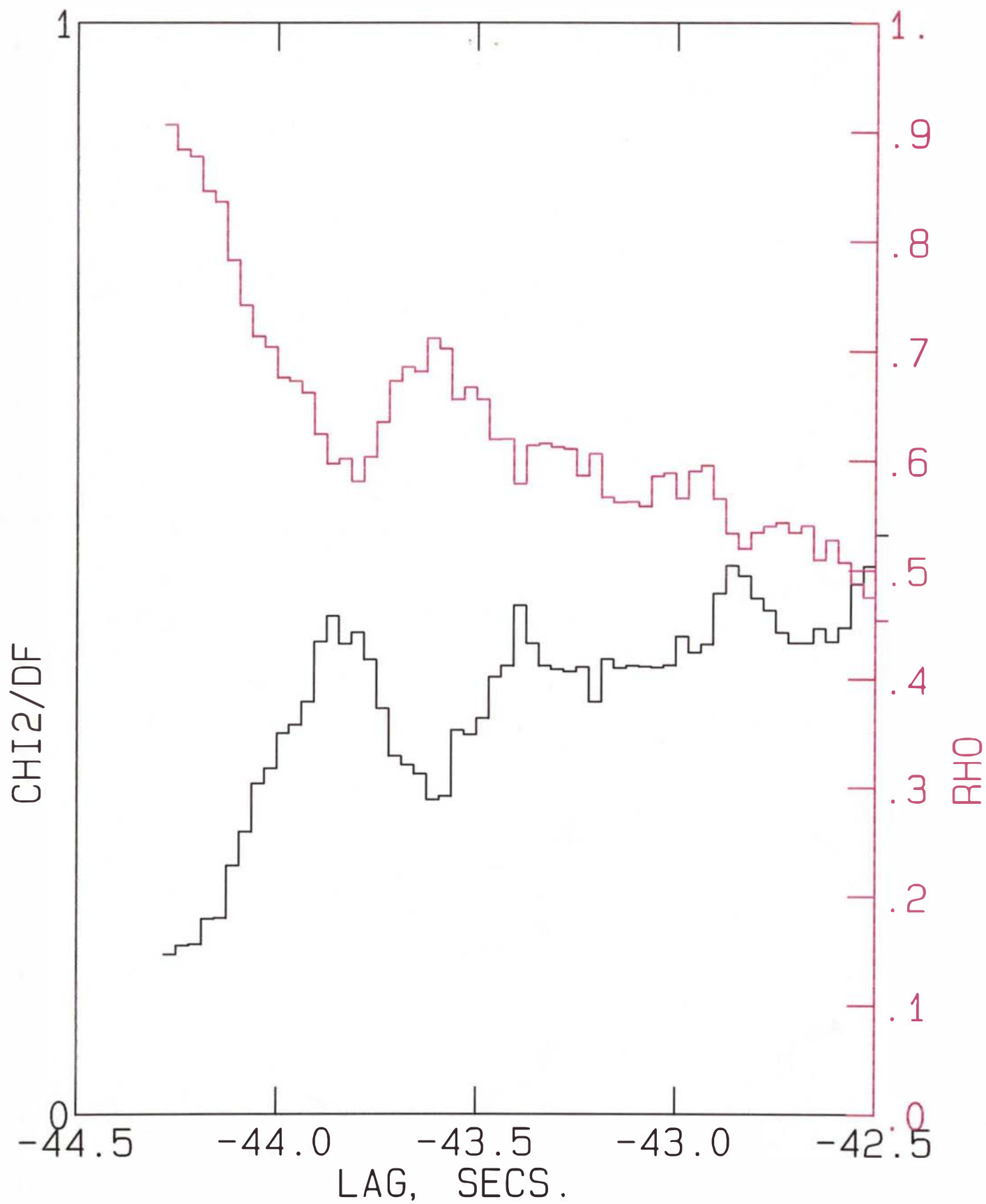
CORRELATION

21/12/91

23118.230

28/10/97





ULYSSES

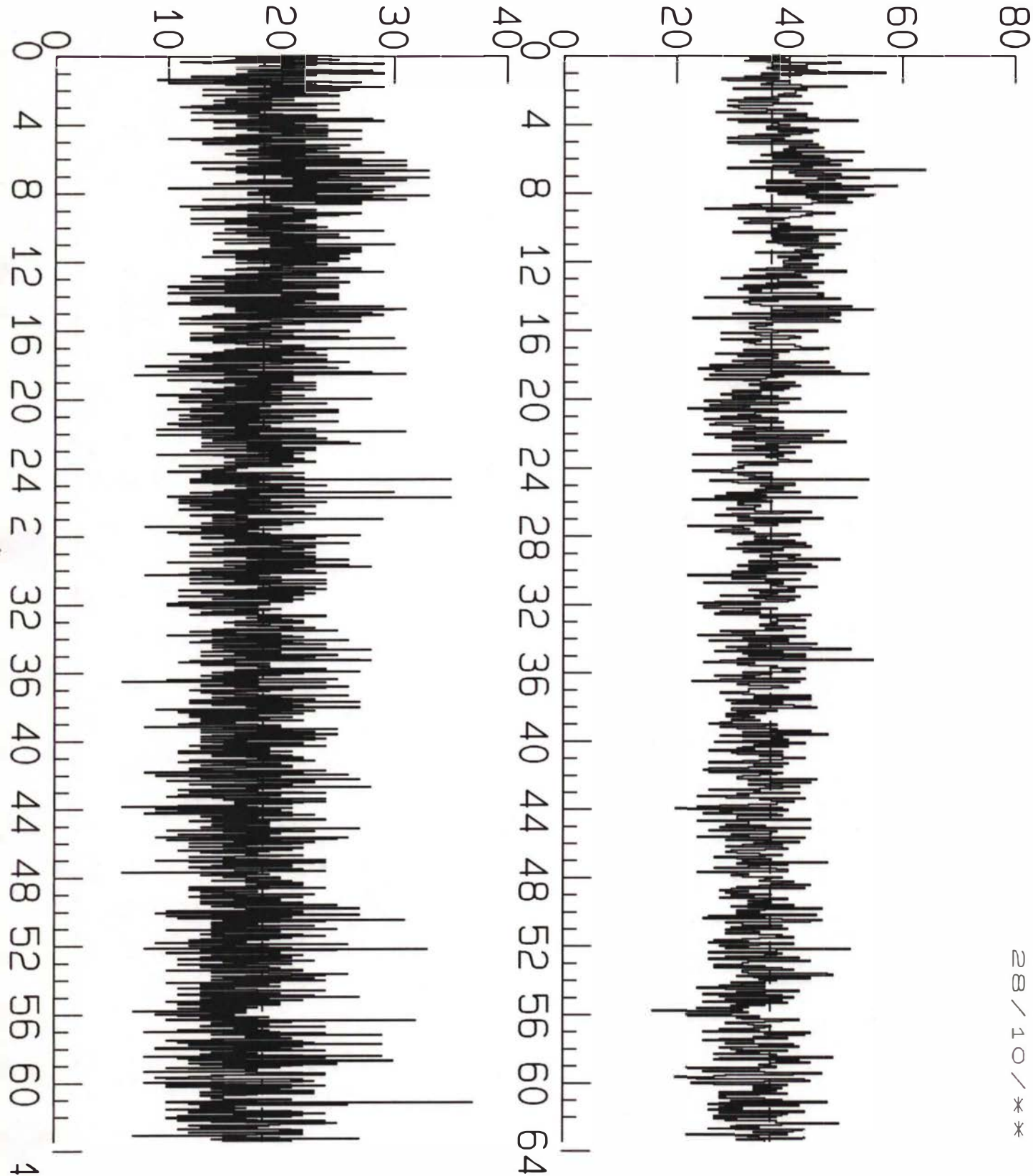
21/12/91

Ttrig=23169.926

18- 163 keV

COUNTS/0.031 S

COUNTS/0.062 S



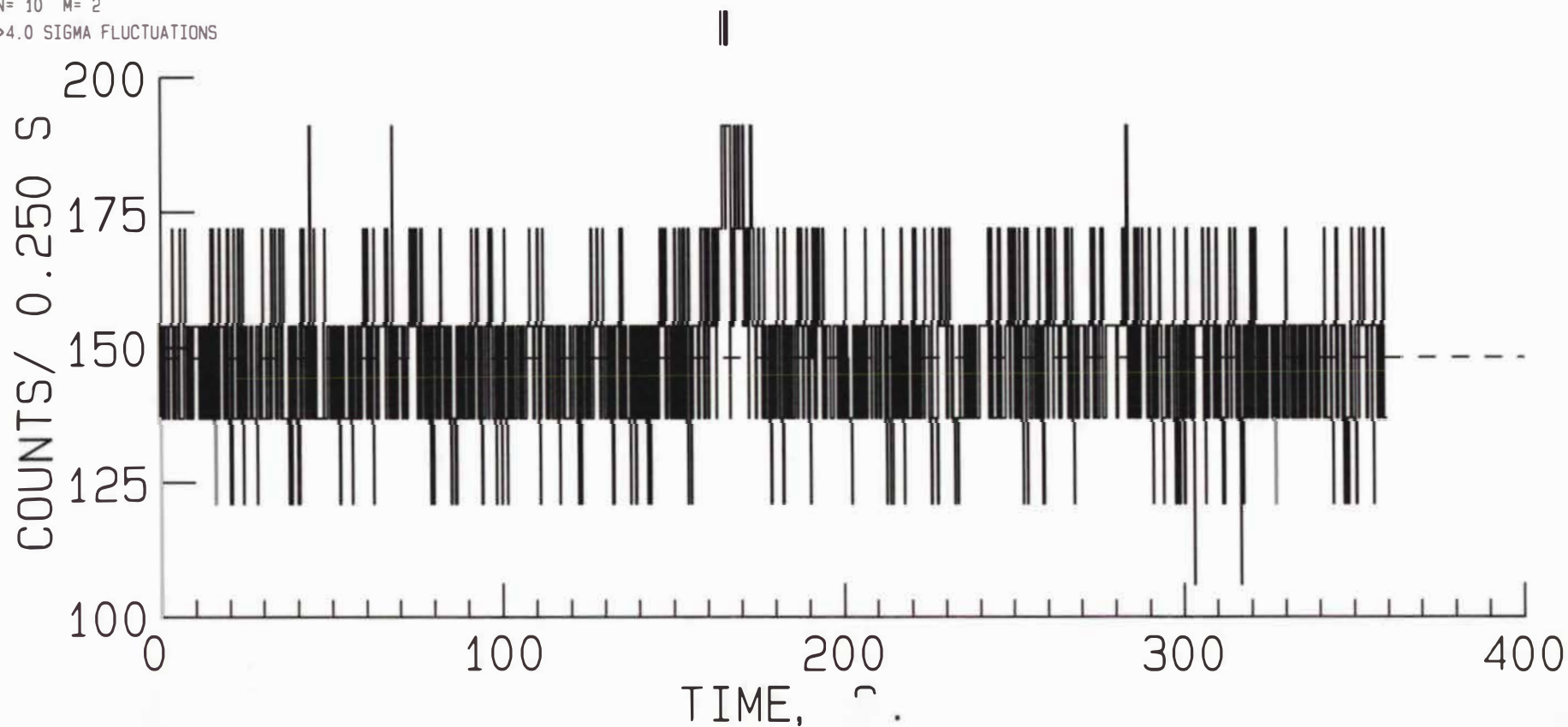
ULYSSES RT

28/10/97

21/12/91 23004.005 s

18- 163 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



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

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-maill1d 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

From root Fri Jul 16 15:29 1993
Received: by space6.ssl.berkeley.edu (AIX 2.1 2/4.03)
id AA07838; Fri, 16 Jul 93 15:29:21
Received: from UCBSP.SSL.BERKELEY.EDU by sunspot.ssl.berkeley.edu (4.1/1.30.1)
id AA21891; Fri, 16 Jul 93 15:30:05 PDT
Message-Id: <9307162230.AA21891@sunspot.ssl.berkeley.edu>
Date: Fri 16 Jul 93 15:31:54-PST
From: \$C <046369@essdp2.span.nasa.gov>
To: KHURLEY@sunspot.ssl.berkeley.edu
Subject: [Resent-MM Mail] DMSP GAMMA-RAY BURST DATA
Status: R

Received: from ESSDP2 by UCBSP.SSL.BERKELEY.EDU via MAIL-11 with
DECnet; Fri, 16 Jul 93 15:31:29-PST
Date: Fri 16 Jul 93 15:31:29-PST
From: 046369@ESSDP2.SPAN.NASA.GOV
Subject: DMSP GAMMA-RAY BURST DATA
To: "UCBSP::HURLEY"@ESSDP2.SPAN.NASA.GOV

FROM: ESSDP2::TERRELL (JAMES TERRELL, LOS ALAMOS NATL LAB)
TO: UCBSP::HURLEY (KEVIN HURLEY)
CC:
SUBJ: DMSP GAMMA-RAY BURST DATA, AS OF 16 JULY 1993

HERE ARE SOME NOTES CORRECTING DMSP PEAKTIMES FOR YOUR MASTER BURST LIST.
I HAVE MORE GRAPHS AND INFO TO SEND, BUT HAVE RUN OUT OF TIME.
I WILL SEND MORE INFO AFTER RETURNING 28 JULY--JIM.

27SEP91 84415 YES (8SAA,9YES,10SAA)
16OCT91 36696 YES (8SAA,9YES,10NR)
4NOV91 54286 YES (8SR,9YES,10YES)
27NOV91 15739 YES (8NO,9NO,10YES)
2DEC91 73733 YES (8YES,9NO@144DEG,10NR)
9DEC91 66959 N/O (8SR,9SR,10NR,11ND)
21DEC91 22686 YES (8ND,9NO,10NO,11YES)
10JAN92 33478 NA (BLANK) (8ND,9NA,10SAA,11NA)
10FEB92 35633 YES (8NO,9WEAK,10SAA,11SAA)
6APR92 9855 N/O (OBSCURED) (8NO@141,10SR,11NO@137DEG)
1MAY92 76696 N/O (OBSCURED) (8NO@127,10NO@157,11NO@147DEG)
22JUN92 25506 N/O (8SAA,10NR,11SA)
28JUN92 76452 YES (8ND,10YES,11NO)
29JUN92 75897 YES (ALL YES, SOFT)
14JUL92 47069 NA (BLANK) (8NA,10SAA,11SR)
16JUL92 60933 YES (9NO,10YES,11YES)
20JUL92 11524 N/O (OBSCURED) (8NA@130,10NA@145,11SR)
23JUL92 72188 N/O (OBSCURED) (8ND,10NA@148,11NR)
10AUG92 79599 YES?(8YES?,10NA,11NA) (LONG SOFT PEAK)
4OCT92 50421 YES (8YES,10YES,11SR)
23NOV92 22727 YES (8YES,10YES,1SR) (NOT AT 22712)
23NOV92 46542 YES (8NR,10SR,11YES) (NOT AT 46584, BATSE GRB)
7DEC92 57649 YES (8YES,10YES,11YES)
6JAN93 55260 YES (8SAA,10YES,11SR)
12JAN93 55082 YES (8YES,10NO@138,11VERYWEAK) (8:BIG PEAK AT 55202)
20JAN93 84779 YES (8YES,10,YES,11YES) (NO, AT 84700!)

From @space6.ssl.berkeley.edu,@cmsa.berkeley.edu:X024862@JPNRKY00.BITNET Thu Nov 26 03:41:24 J
Date: 26 NOV 1992 18:19:41 JST
From: <X024862@JPNRKY00.BITNET@cmsa.berkeley.edu>
Subject: YOHKOH GRB Event List
To: <khurley@space6.ssl.berkeley.edu>
Content-Length: 1674

To: Dr. K. Hurley (SSL/UCB)
Fr. Masato Yoshimori (Rikkyo Univ.)
Date: Thu. 26 Nov. 1992

Dear Dr. Hurley:

I am sending the YOHKOH GRB event list. YOHKOH has two GRB detectors, hard X-ray spectrometer (HXS) and radiation belt monitor (RBM). HXS is a NaI detector (3 in. dia x 1 in. thick) which provides a 32 channel energy spectrum (20 - 600 keV) every 2 sec and a time profile every 31 ms. RBM is a NaI detector (2 in. dia x 1 cm thick) which provides a 32 channel energy spectrum (10 - 300 keV) every 2 sec and a time profile every 31 ms.

YOHKOH GRB Event List (1991 Oct. 1 - 1992 Sept.3)

Date (Day/Month/Year)	UT (hh:mm)	Comment
27/11/91* U B	04:22	HXS 0.15 17:00 + 50
✓09/12/91	18:36	HXS/RBM
21/12/91* No U HXS	06:17 22620	HXS/RBM
18/02/92* U-RS No B	18:44	HXS
✓06/04/92	02:45	HXS/RBM
19/04/92* No U HXS	01:22	HXS/RBM
19/05/92* U-RS No B	16:30	HXS/RBM
17/06/92* B U-RS	05:29	HXS
✓22/06/92	07:05	HXS/RBM
01/07/92* No B No B	19:39	HXS
11/07/92 U	16:09	HXS/RBM
✓31/07/92	17:07	HXS/RBM
16/08/92 No U HXS	12:36	HXS
✓24/08/92	10:56	HXS/RBM
✓03/09/92	23:29	HXS

* Recorded with time resolution of 0.25 or 2 sec.
Accurate burst times (hh:mm:ss) are available shortly.

We hope the YOHKOH GRB event list is helpful to you.

With best regards,

Masato Yoshimori

Acknowledge-To: <X024862@JPNRKY00>

From khurley@space6.ssl.berkeley.edu Tue Dec 1 17:49:52 1992
Date: Tue, 1 Dec 92 17:43:25
From: khurley@space6.ssl.berkeley.edu
Content-Length: 1348

Jear Dr. Yoshimori

Thanks for the e-mail list. I have done a preliminary check, and here are the results.

27/11/91 4:22 Ulysses, BATSE triggers. Position is around 17:40,+50
21/12/91 6:17 No Ulysses or BATSE trigger*
18/02/92 18:44 Ulysses Rate Increase, no BATSE
19/04/92 1:22 PVO trigger, no Ulysses, no BATSE*
19/05/92 16:30 Ulysses Rate Increase, PVO trigger, no BATSE
17/06/92 5:29 Ulysses Rate Increase, BATSE
01/07/92 19:39 No Ulysses or BATSE trigger
11/07/92 16:09 Ulysses trigger, no BATSE
16/08/92 12:36 No Ulysses trigger, no BATSE*

* for the cases where there is no Ulysses trigger, I will search the real-time data (typically 0.25 - 0.5 second time resolution) over the appropriate time window (about +/- 3000 seconds for this time period). I'll keep you informed about the results.

Where I have indicated no BATSE response, this means either:

If there was a Ulysses trigger, we looked for a BATSE response and found none.

If there was no Ulysses trigger or rate increase, we probably did not look for a BATSE event. We would have been notified of one if it was intense, but if it was weak, we probably would not have received any information. Chryssa Kouveliotou of the BATSE team will be contacting you soon, and you might wish to request that she take a closer look at their data.

Best regards,

Kevin Hurley

From khurley@space6.ssl.berkeley.edu Mon Dec 7 17:31:51 1992
Date: Mon, 7 Dec 92 17:25:42
From: khurley@space6.ssl.berkeley.edu
Content-Length: 987

Dear Dr. Yoshimori,

Good news! I think I have found the remaining four Yohkoh events in the Ulysses data. For December 21, 1991, and July 1 and August 16, 1992, we have fairly strong count rate increases (but no trigger) at 0.25 second resolution, and there is no doubt that they are bursts. For April 19, 1992, we have a weaker event lasting about 2 seconds (our time resolution was 0.5 seconds). Since we had to search about 6000 seconds of data (the Ulysses crossing window) it is possible that this one is just a fluctuation. If you can give me more information about the Yohkoh event, I can decide. Also, it will be helpful if you can give me the coordinates (RA and dec) of the Earth center for Yohkoh for this and any future events, since Earth-blocking can eliminate part of the Ulysses window.

I suggest we now proceed to exchange data. I will e-mail you some Ulysses files with an explanation of how to read them.

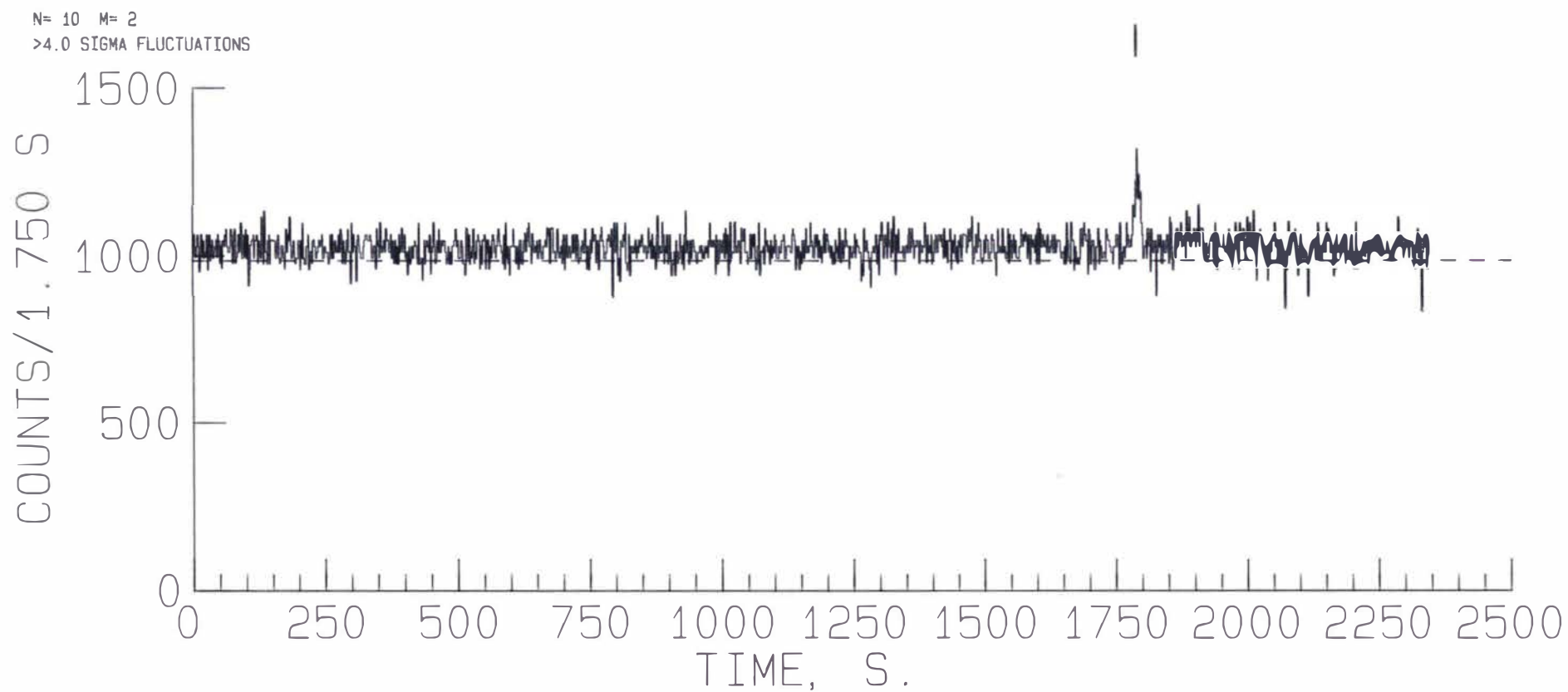
Best regards,

Kevin Hurley

cc: Chryssa Kouveliotou

7/12/92

ULYSSES RT
21/12/91 21307.725 s
.250 S INTERVALS REGROUPED BY 7
18- 163 keV



From murakami@astro.isas.ac.jp Mon Apr 20 22:16:17 1992
 Date: Tue, 21 Apr 92 14:16:07 GMT
 From: Toshio MURAKAMI <murakami@astro.isas.ac.jp>
 To: khurley@sunspot.ssl.berkeley.edu
 Subject: Digital data
 Content-Length: 1780

Dear Kevin-san, sorry for such long delay. We are almost solve the question about the our timing system of Ginga. As you know we have never been any experience of timing with other satellite before. I hope you to use our data with great care and to check our timing system using Ulysses and GRO. I heard our data might help to solve the timing problem of GRO in case if Ginga has no any error (I am now believing so). GRO people already have one Ginga file of GB910717 to check their timing. I heard that there was 2.04sec(?) shift between us. Thus I am now ready to send our GRB digital files through E-mail to you.

By the way I am sending two GRBs GB910122 and GB910204 as a test. I am not including GB910314 and GB910315 because these were in bit-low mode with only 4 sec time resolution. Do you think these are still useful? We are ready to send you GB910717 if you like. Are there any other one you want? Please let me know your preference refer to the Ginga GRB list. I am not sending GB910219 at 21:52 because you have no data. What means no data in your last E-mail?

The files contain time in UT at the start (not the end) of the first data, height in km and the earth center vector looking from the satellite in equatorial coordinates with 2048 data of 31.25msec time resolution. The error of time may not be more than +/-2 msec I hope. In case if you feel something curious please let me know.

Concerning the Yohkoh GRBs, I have checked the data base and find at least 5 candidates. GB911127 at around 4h, GB911209 at 18h, GB911221 at 6h, GB920218 at 18h, GB920406 at 2h. Two of them show coincidences with GRO.

These are still in the levels of candidate so I hope you to confirm. Two e-mails will follow this..

T. Murakami

GINGA

Jan 30 '91 11:56 (RT requested)

Feb 6 '91 8:45 Trigger *

Mar 22 '91 12:41 (RT requested)

Apr 2 '91 10:28 RI

Apr 29 '91 3:11 RI

May 22 '91 12:14 Trig *

May 27 '91 23:45 (RT requested)

Jul 9 '91 20:22 (RT req.)

Jul 17 '91 4:33 *

Jul 23 '91 14:06 (RT req.)

Jul 25 '91 13:12 (RT req.)

Aug 3 '91 8:33 (RT req.)

Aug 12 '91 19:14 *

Aug 15 '91 12:34 (RT req.)

Aug 27 '91 13:11 (RT req.)

Sep 5 '91 23:48 (RT req.)

Sep 7 1991 01:04 (RT req)

Sep 26 1991 18:25 (RT req)

Oct 8 1991 17:53 (RT req)

Oct 16 1991 11:01 (RT req)

Oct 29 1991 4:50 (RT req)

YOHKOH

Nov 27 '91 Yes

Dec 9 '91 Yes

Dec 21 '91 Yes

Feb 18 '92 Probably

Apr 6 '92 2:45

* requested Ginga data

CATSEARCH PROGRAM

BATSE BURST # 1200
EVENT OF 1991 DEC 21 DAY OF YEAR=355
EVENT CROSSING TIME AT BATSE : 79406. S. OR 22:03:25.7
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 209.800 -45.600
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 21/12/ 91 IS:
RA= 167.835 DEC= 6.623 DIST= 4.705 AU
BATSE-ULYSSES DISTANCE = 703879968. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=115.74 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-1019.83 SECS.
CROSSING TIME AT ULYSSES IS 78386. S. OR 21:46:25 +/- 401.68 SECONDS

RI

Date:

Helio. corr. removed
Nov 18 '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?
- ☐ Is the order of the data in CORREL such that a vernier is done on the data with the best time resolution? *No - bad stats*

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)?
- ☒ 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?

- ☒ ACCESS database updated?

N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

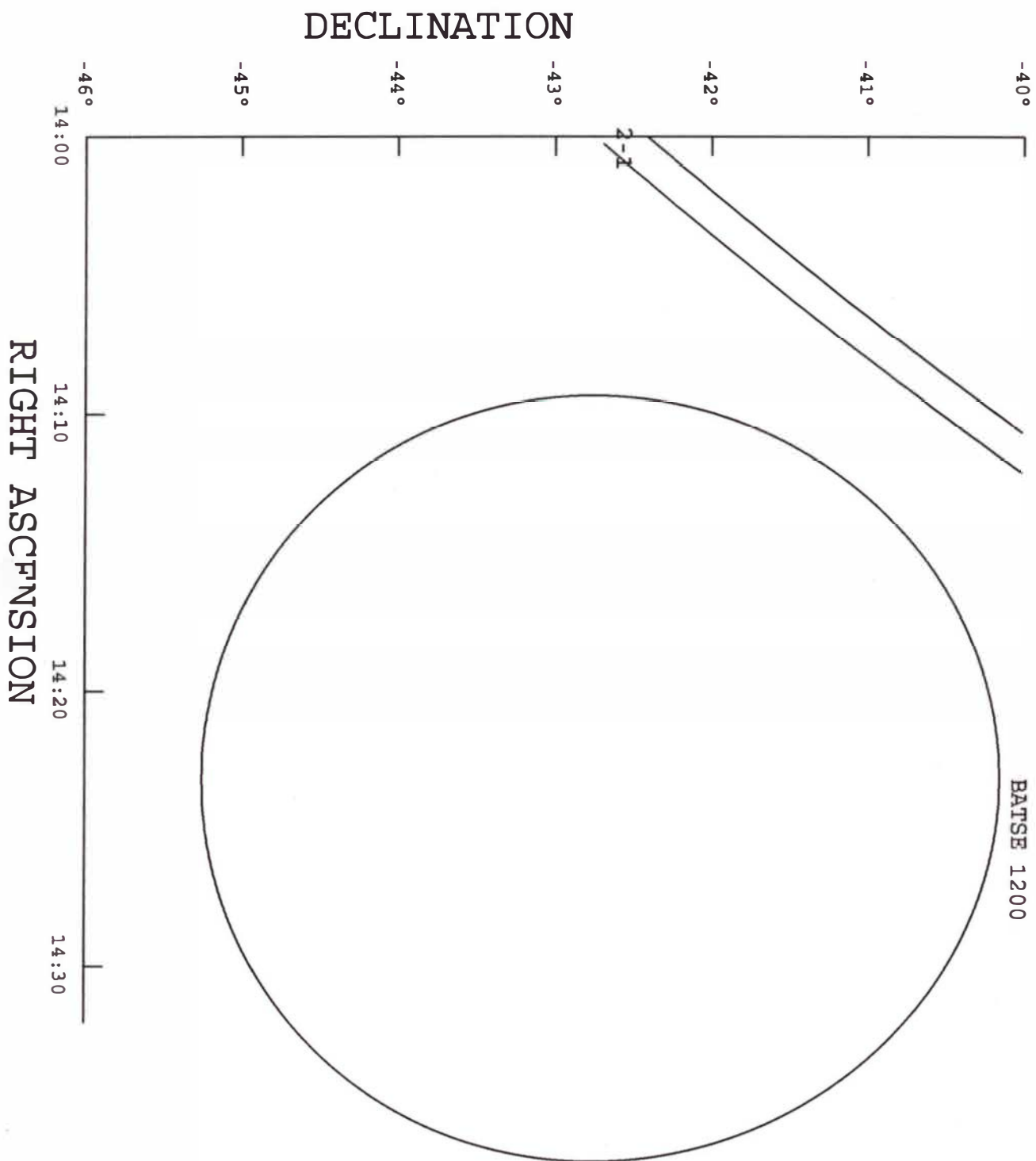
G=GALACTIC EQUATOR

1 ULYSSES

2 BATSE

EVENT OF DEC 21, 1991 21:44

18/11/97



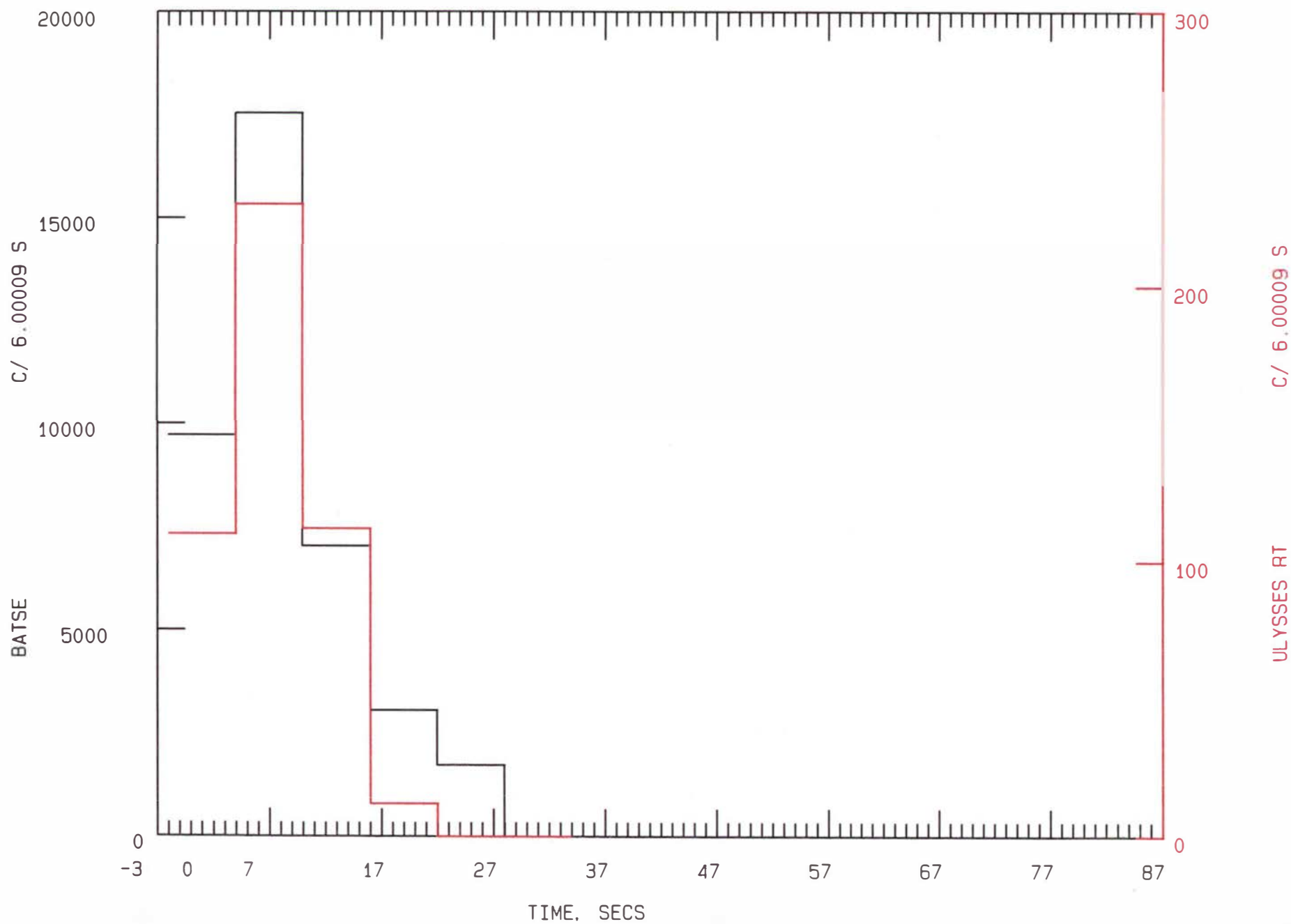
BATSE

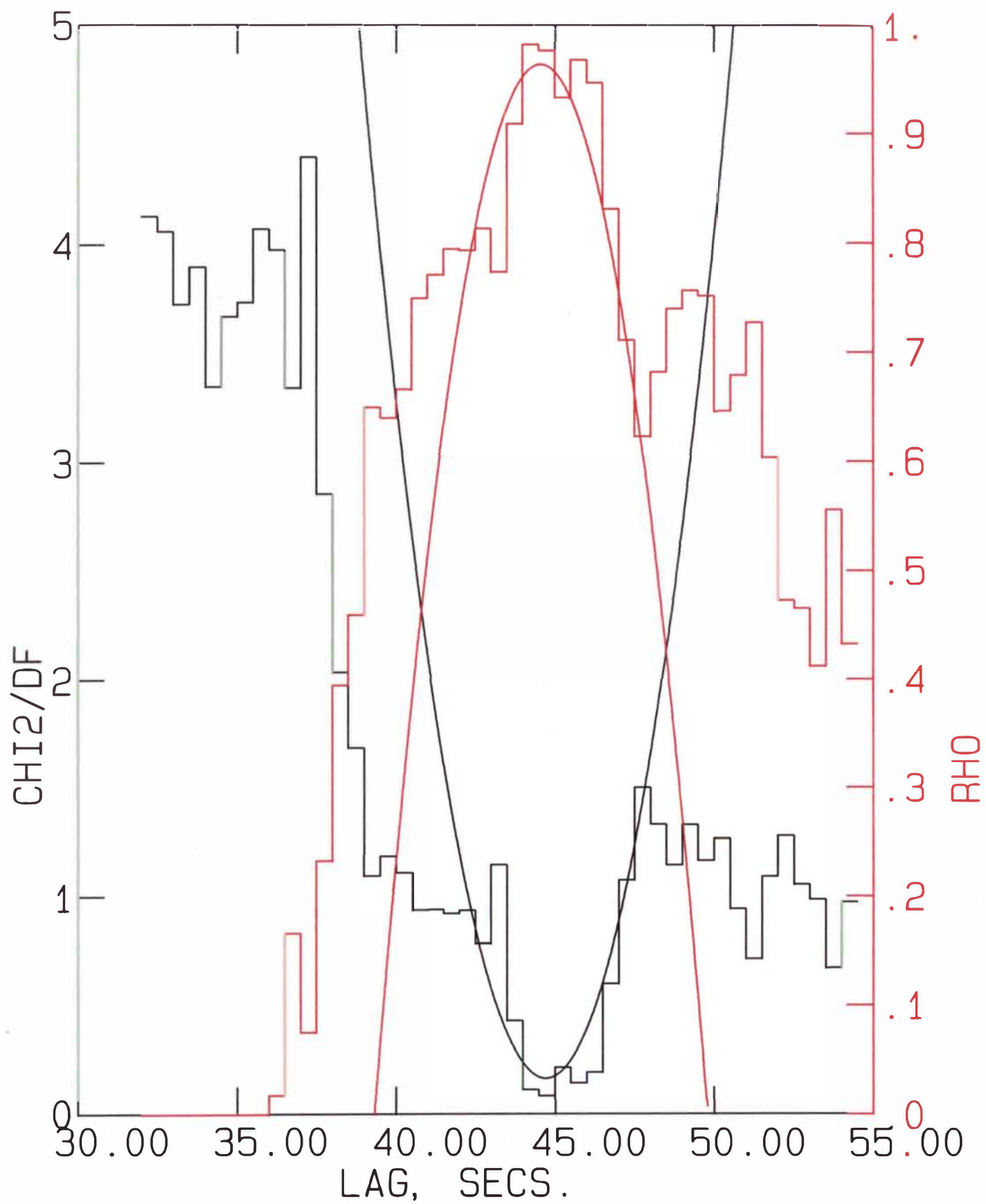
-ULYSSES RT CORRELATION

21/12/91

79405.675

18/11/97





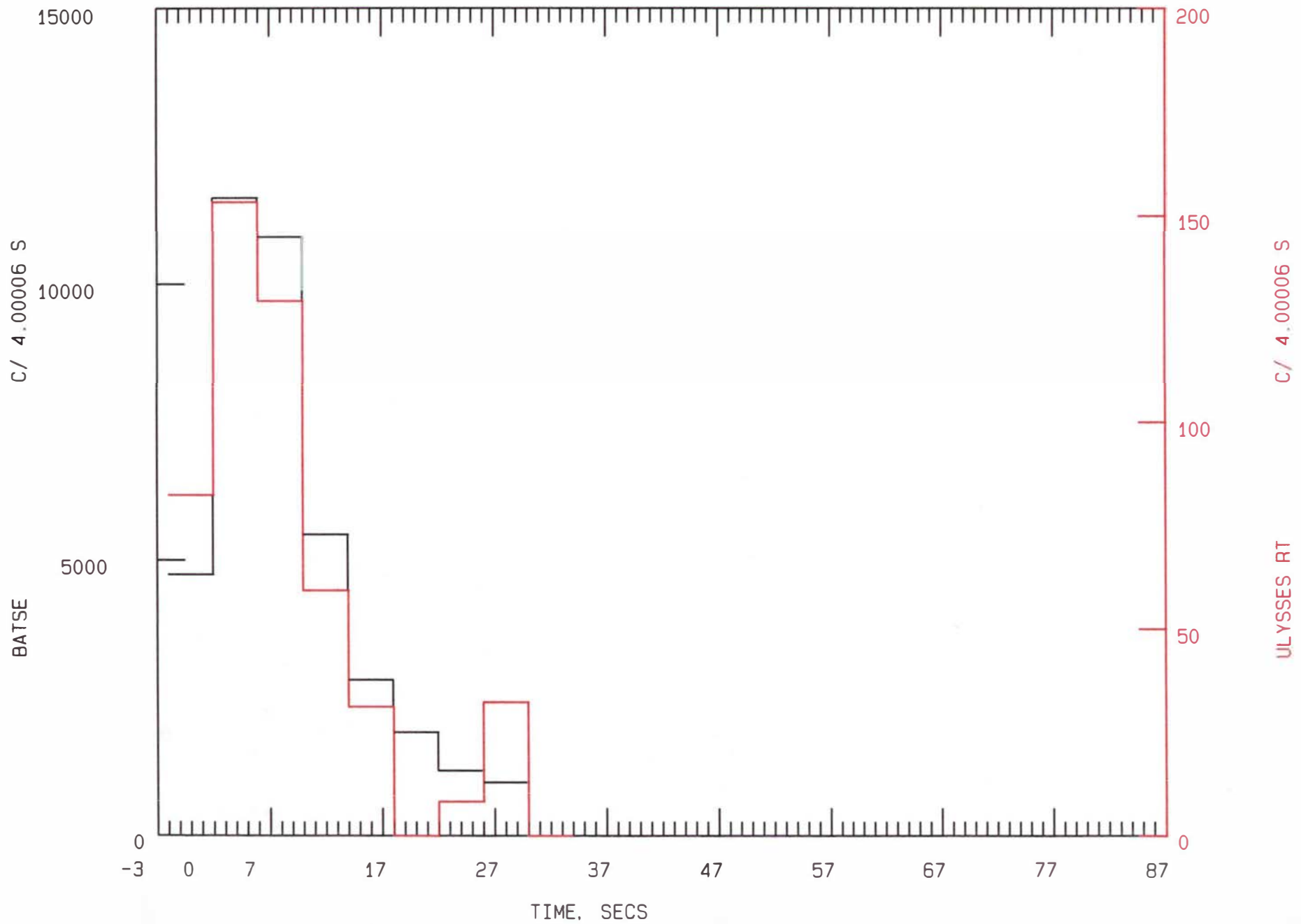
BATSE

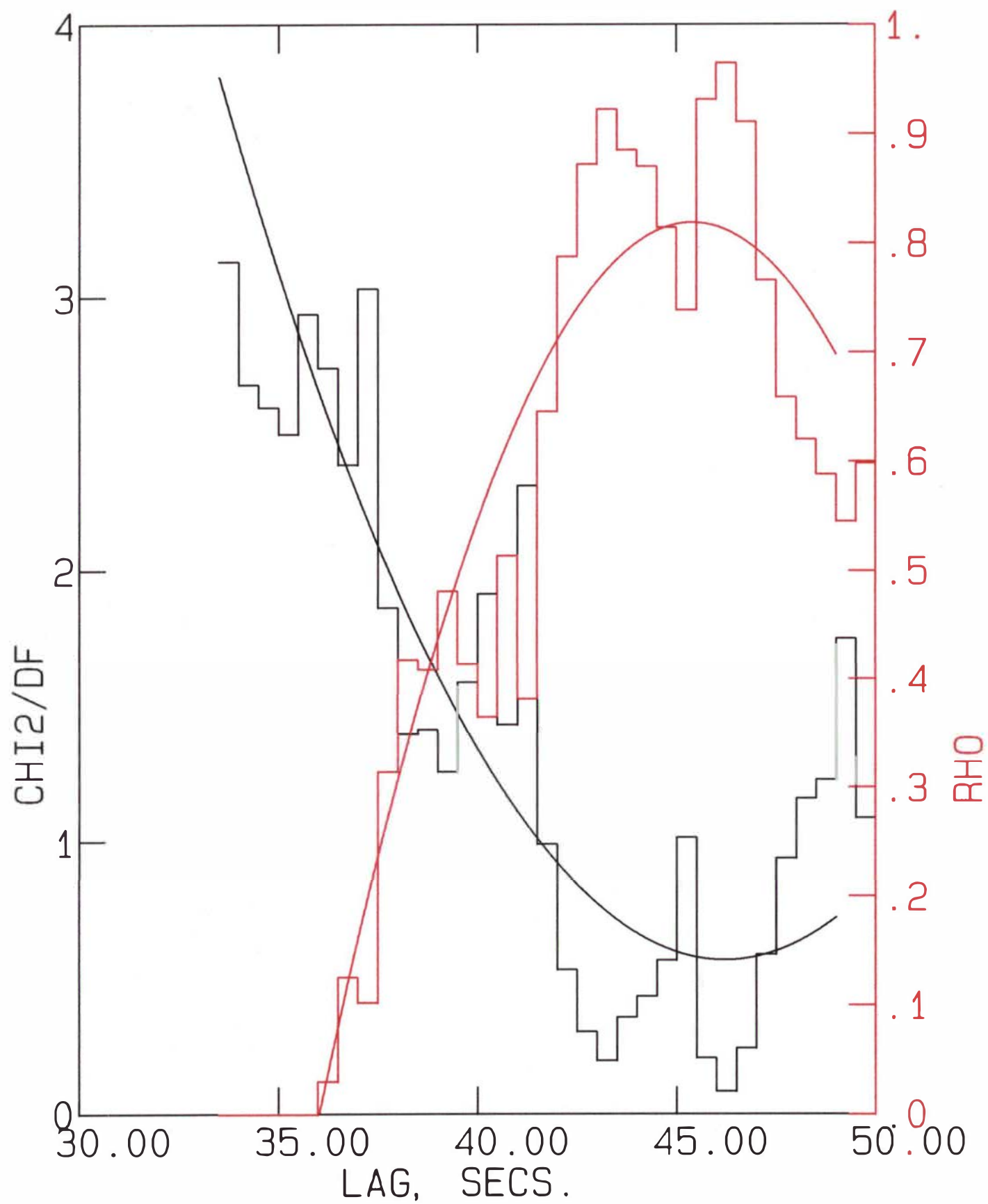
-ULYSSES RT CORRELATION

21/12/91

79405.675

18/11/97





ULYSSES RT

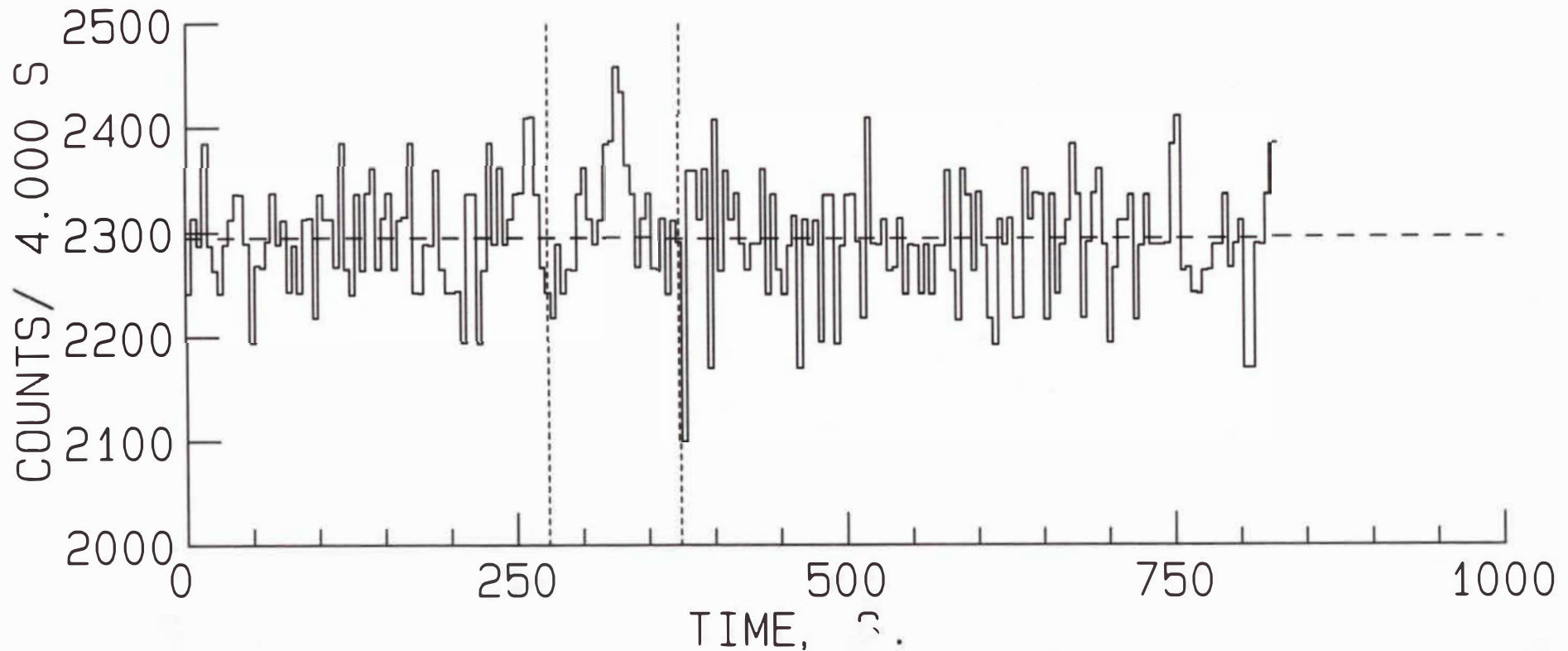
18 / 11 / 97

21/12/91 77976.191 s

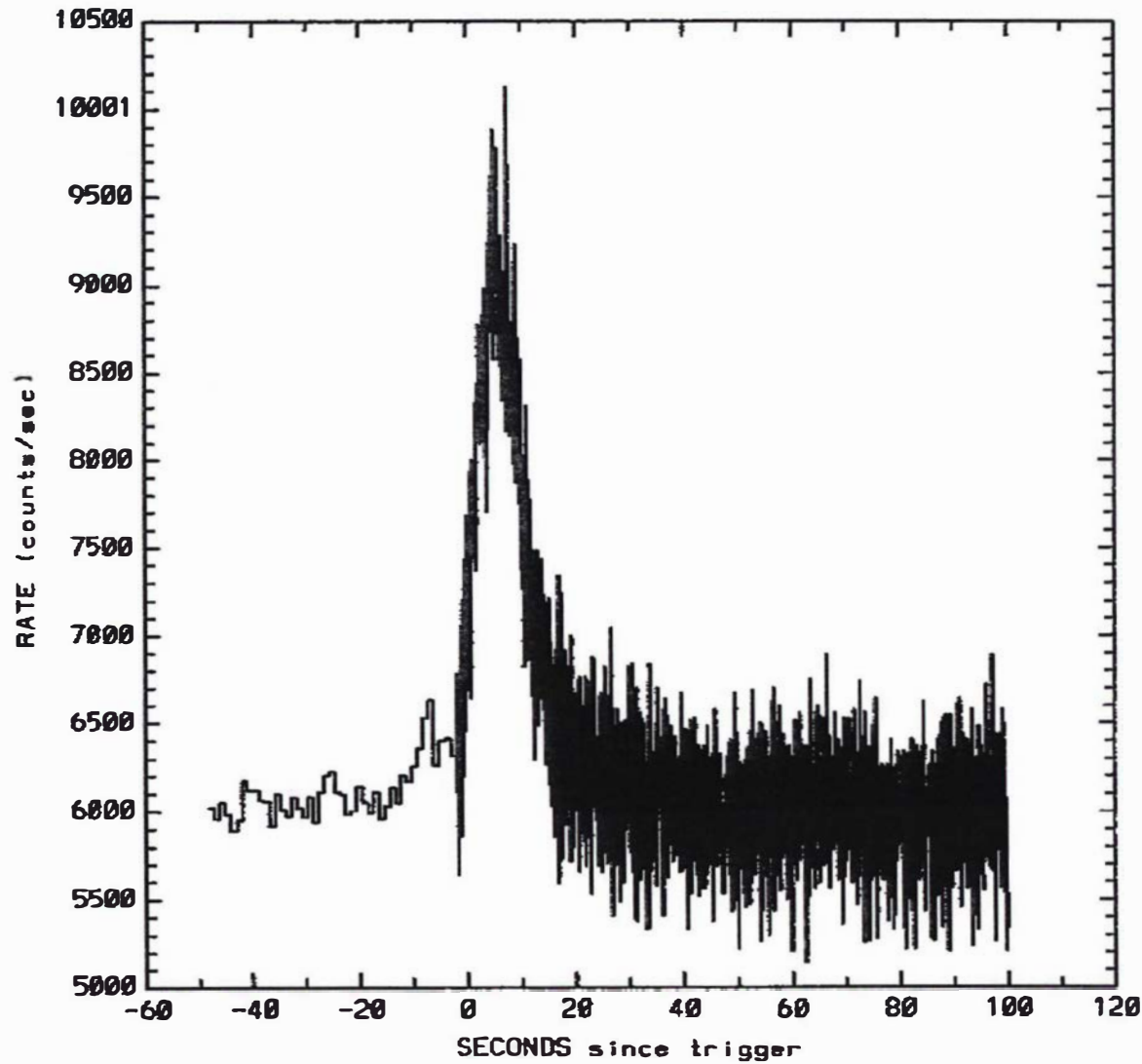
0.500 S INTERVALS REGROUPED BY 8

18- 163 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



DATA FOR K. HURLEY



30-JUL-1993 10:45:03

Created by MOPS BD
(Burst Display)
Version 2.19

Trigger # : 1200 1200

Trigger Time:
8611 / 79405.675 OKBurst Data Type:
DISCSCDeadtime
Corrected: NBackground Data
Type: PREB + DISCLAMinimum Integ. Time:
0.064 second(s)Detectors (7..0),
01000100Discriminators:
(1. 2)Quality Mask:
BDISP1

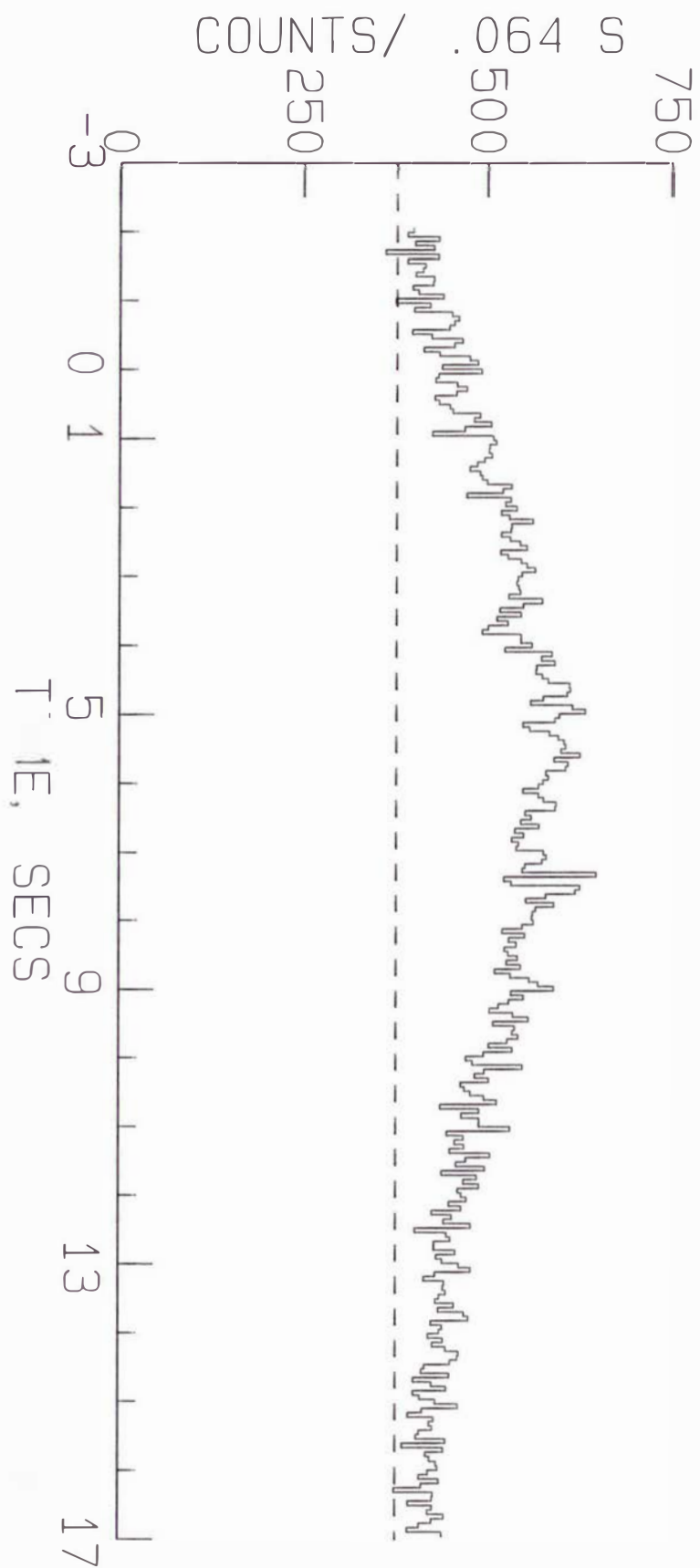
BATSE

21/12/91

79405.675

25- 100 keV

OK



BATSE

21/12/91

79405.675

25- 100 keV

COUNTS/ .064 S

750
500
250

17

21

25

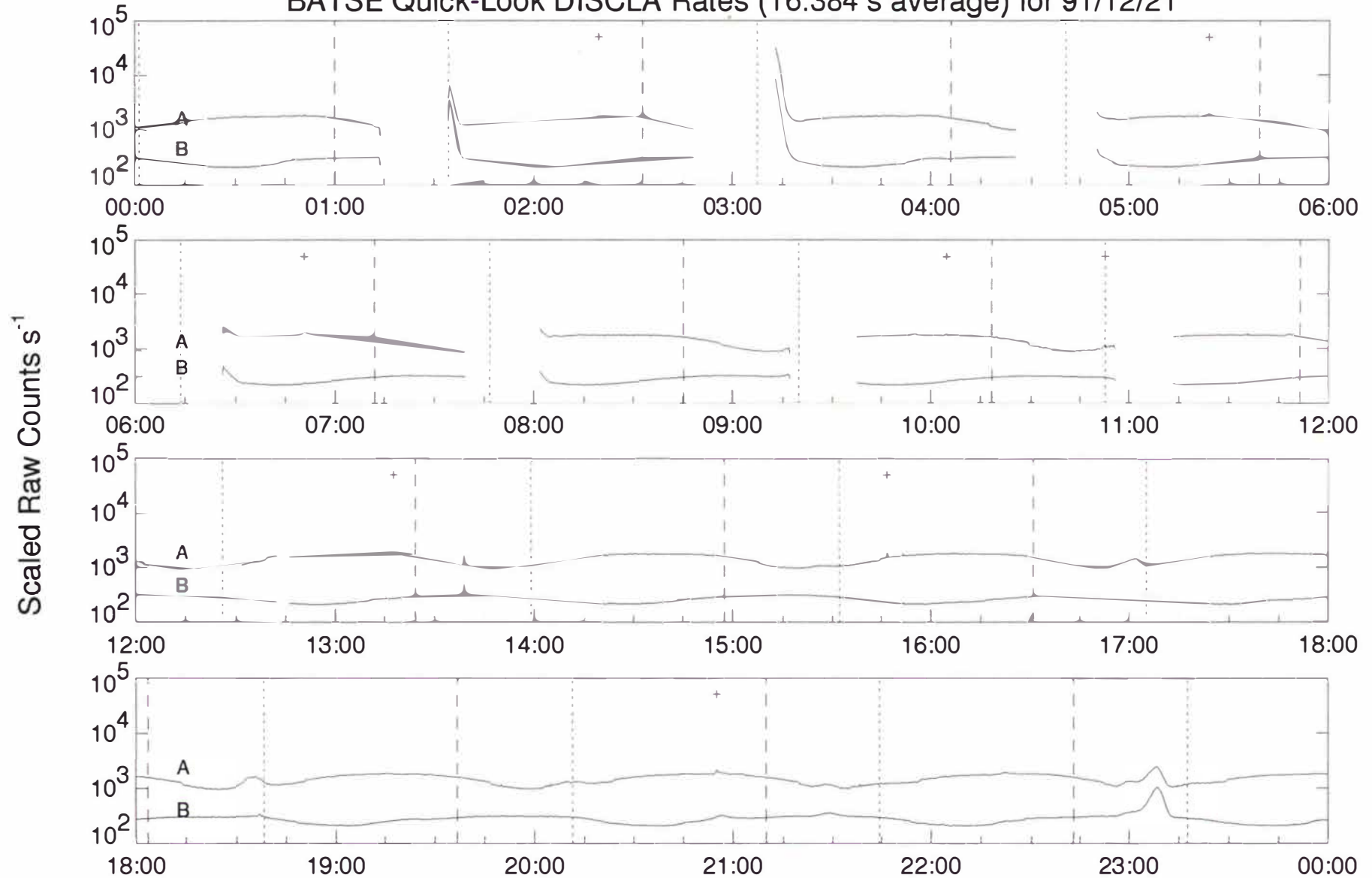
29

33

37

TIME, SECS

BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/21



Current Time: 92/10/18, 1913 EDT

A: Channel 1 Most Sunward LAD

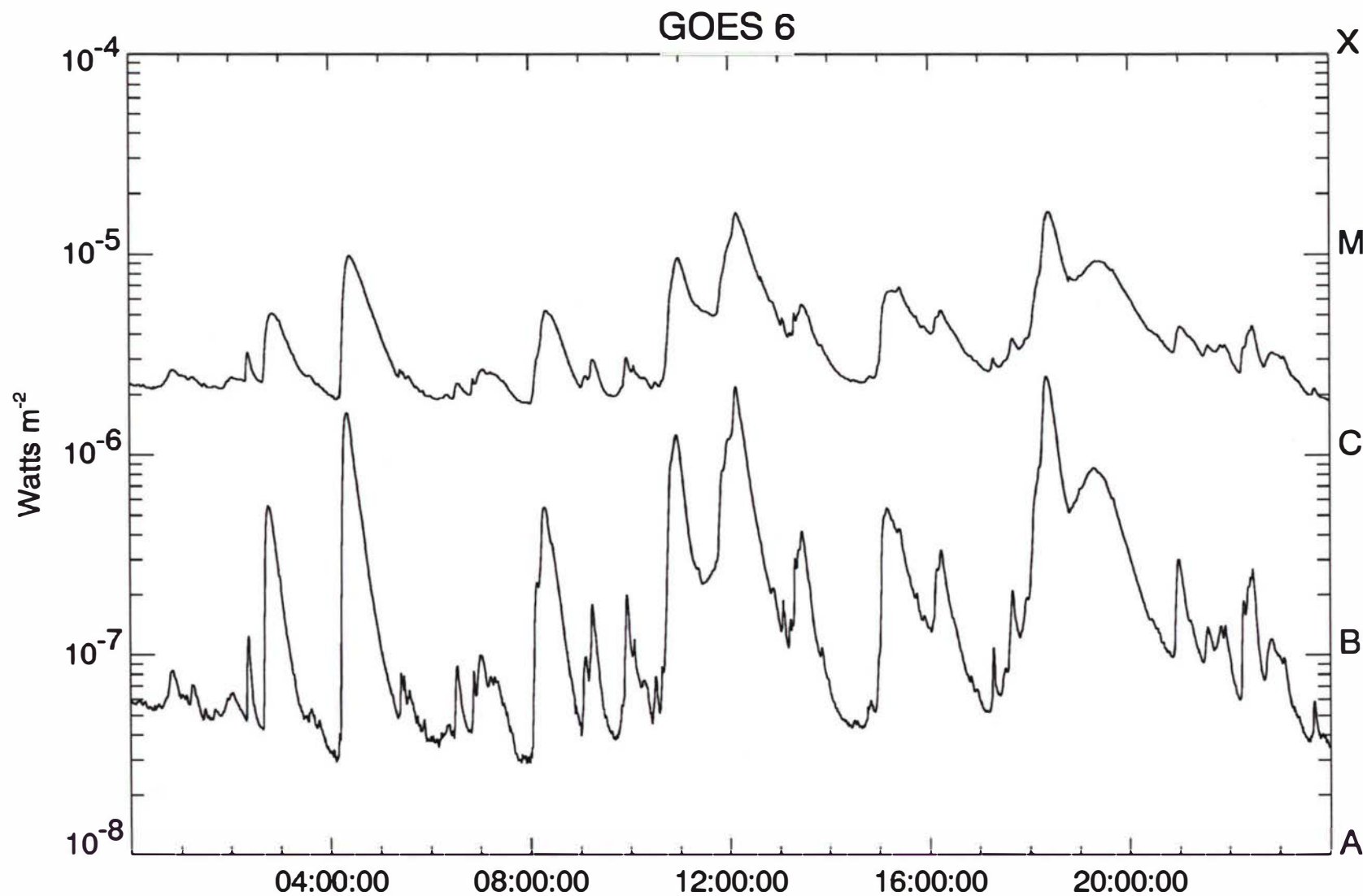
B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry

Dashed line: Night entry

* Solar Burst Trigger

+ Solar Flare



Data Start: 91/12/21, 0000:01

Plot created: 97/10/20, 1536

Channel

1 (1.0 - 8.0 Angstroms)

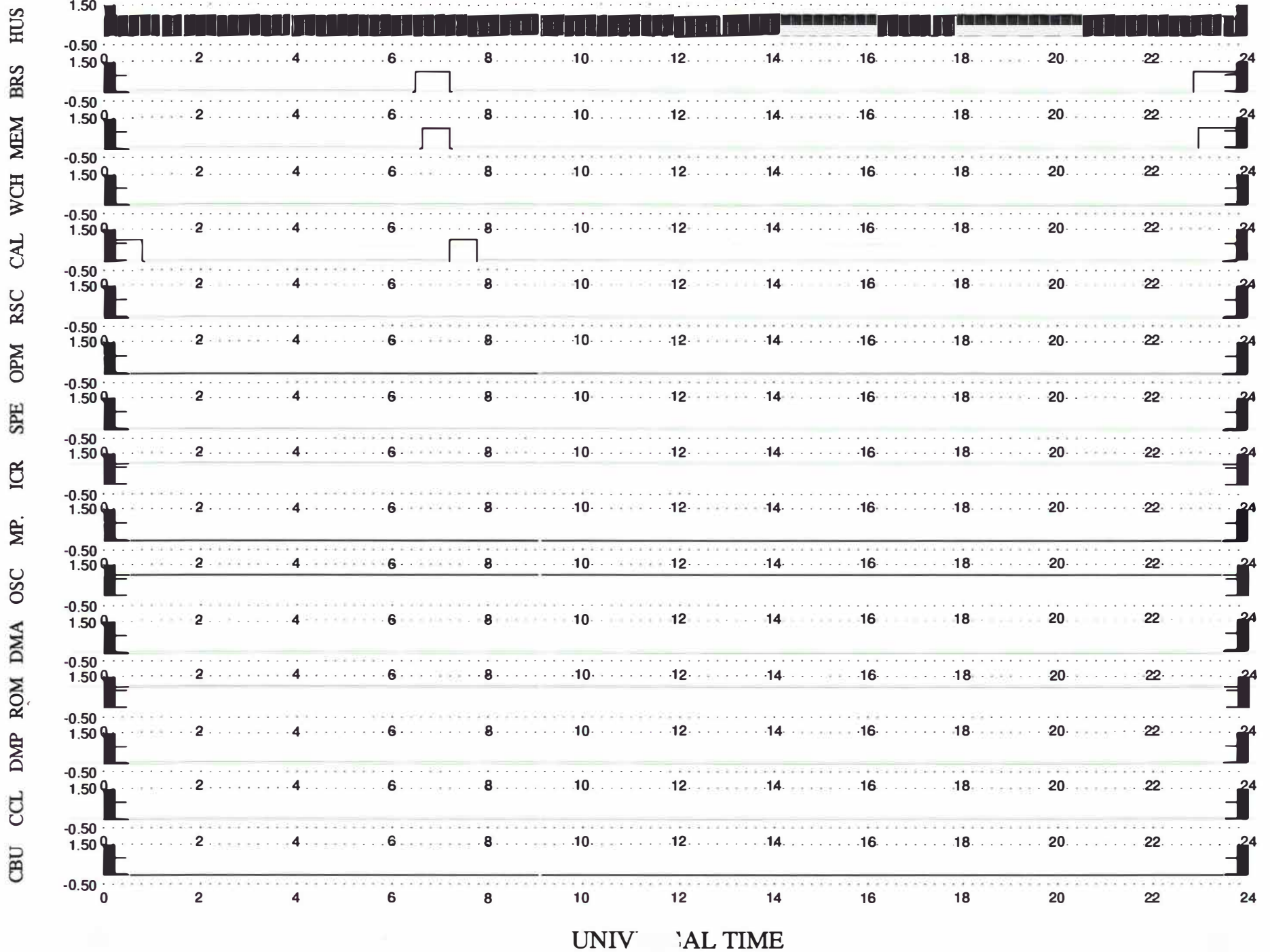
Background not subtracted

2 (0.5 - 4.0 Angstroms)

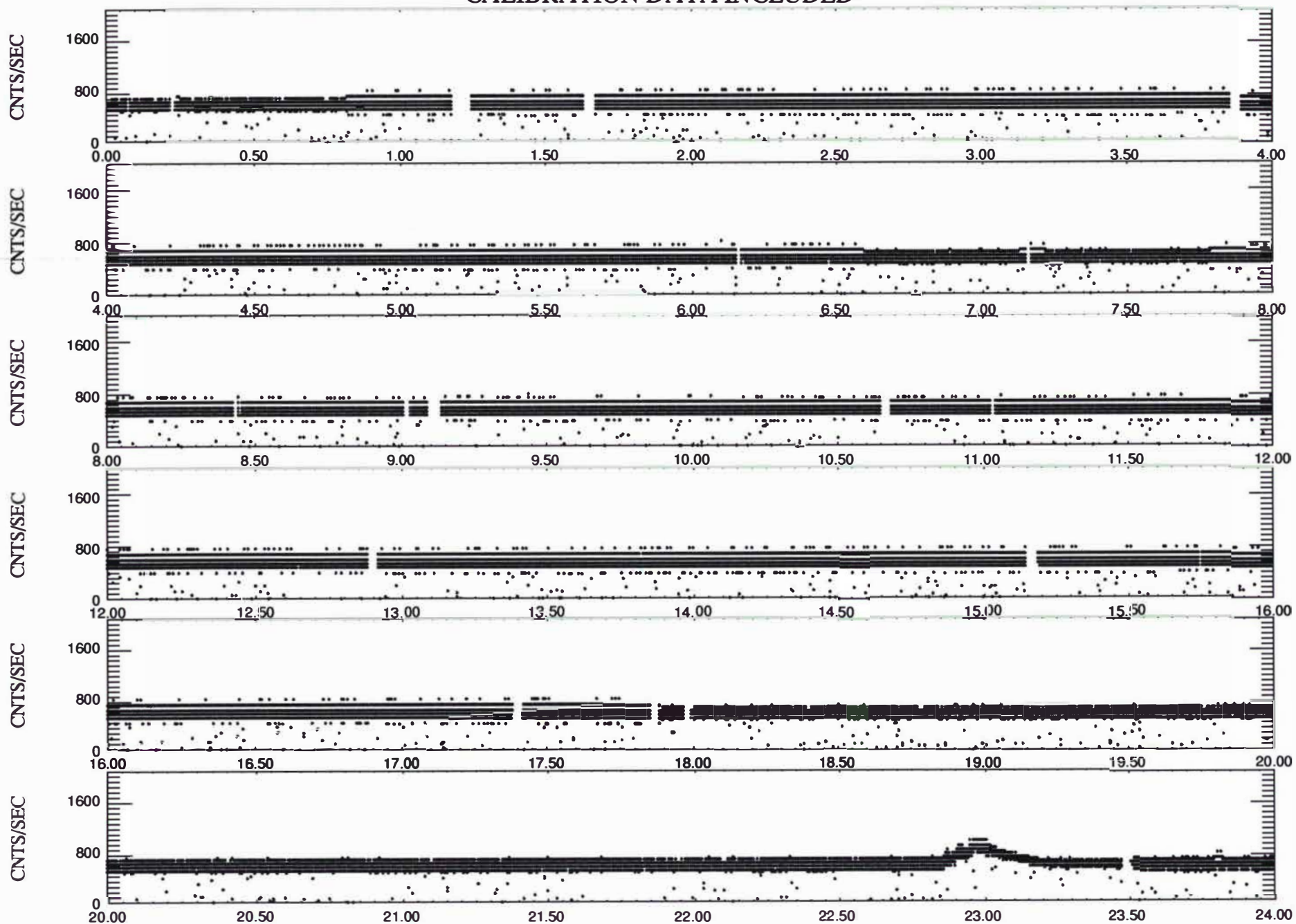
Background not subtracted

Sample average = 10

BURST NUMBER 15, 0

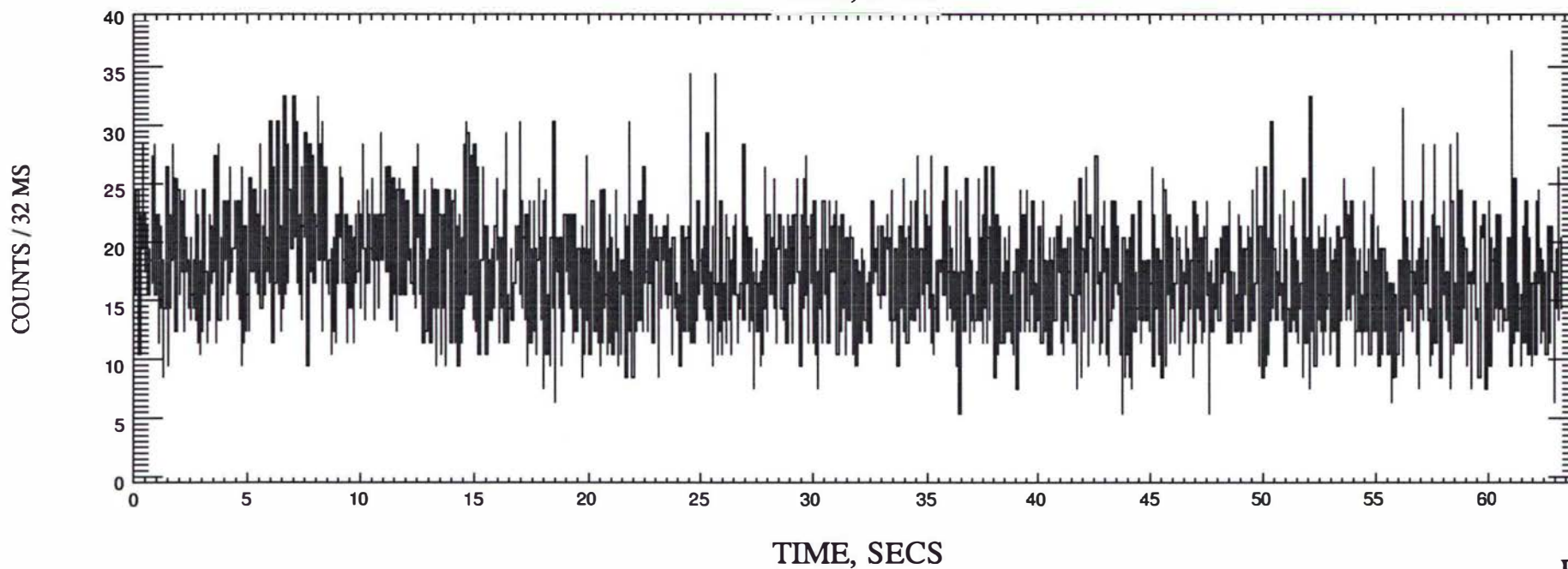
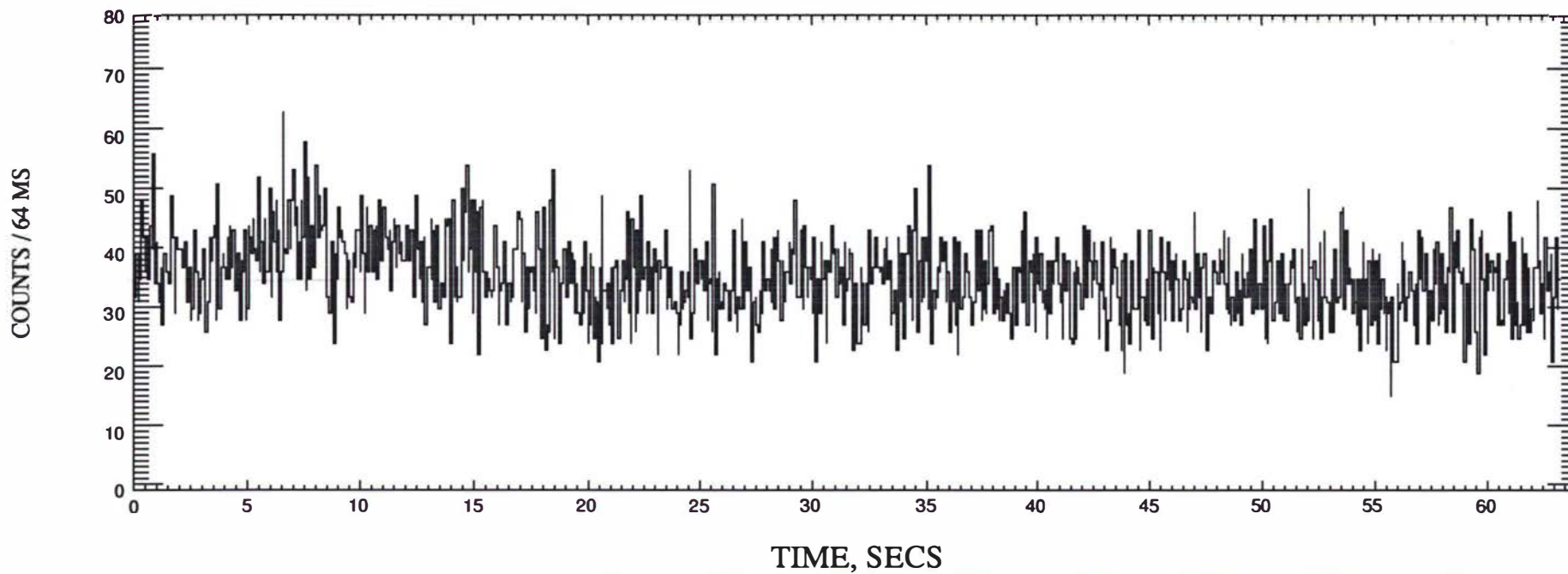


CALIBRATION DATA INCLUDED

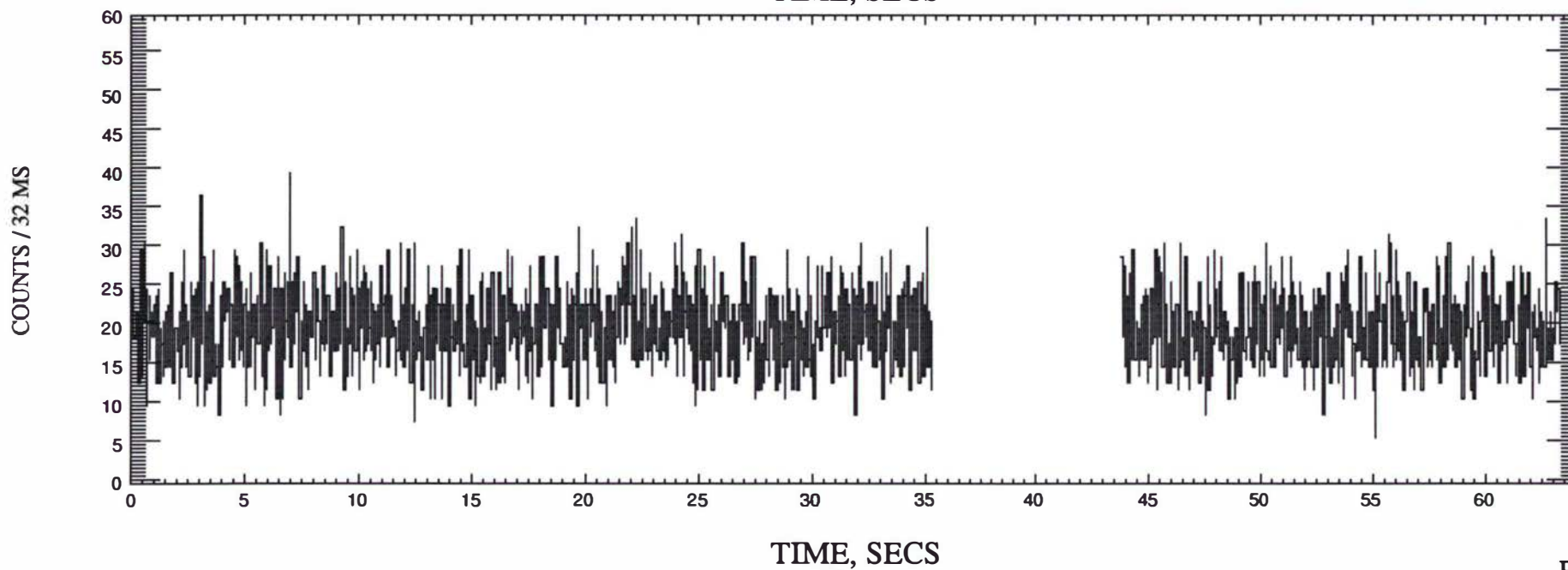
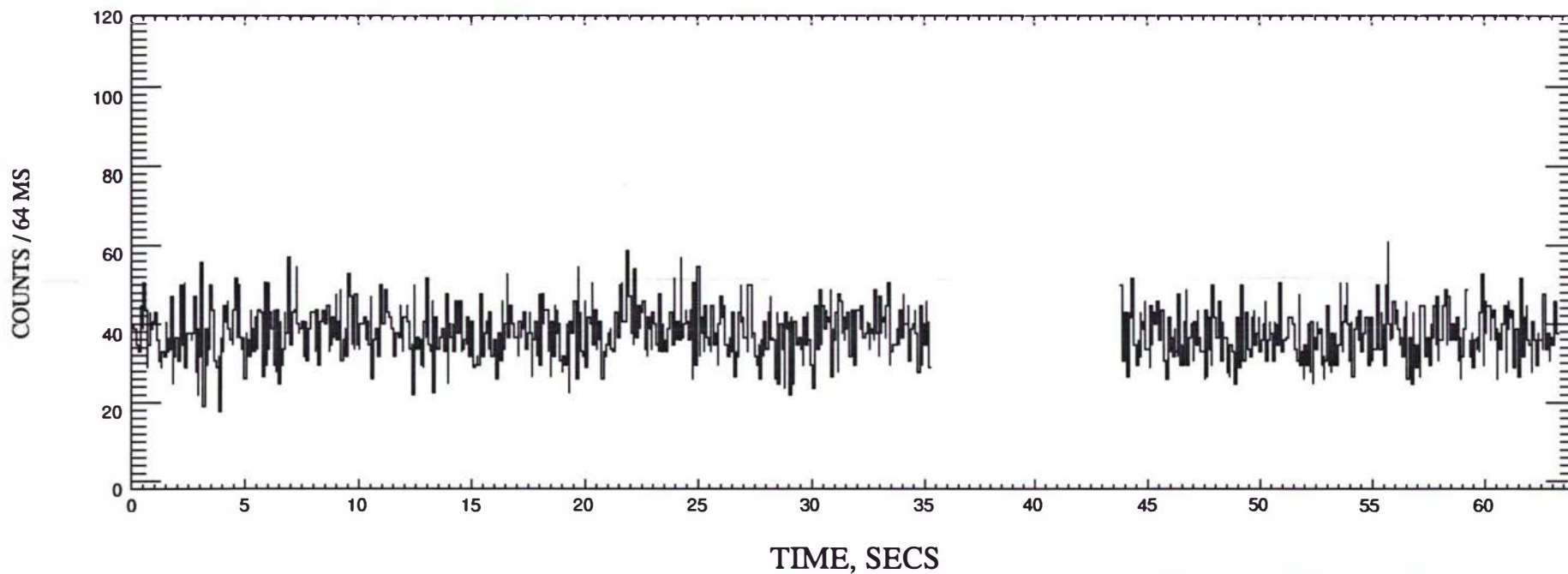


UNIVERSAL TIME

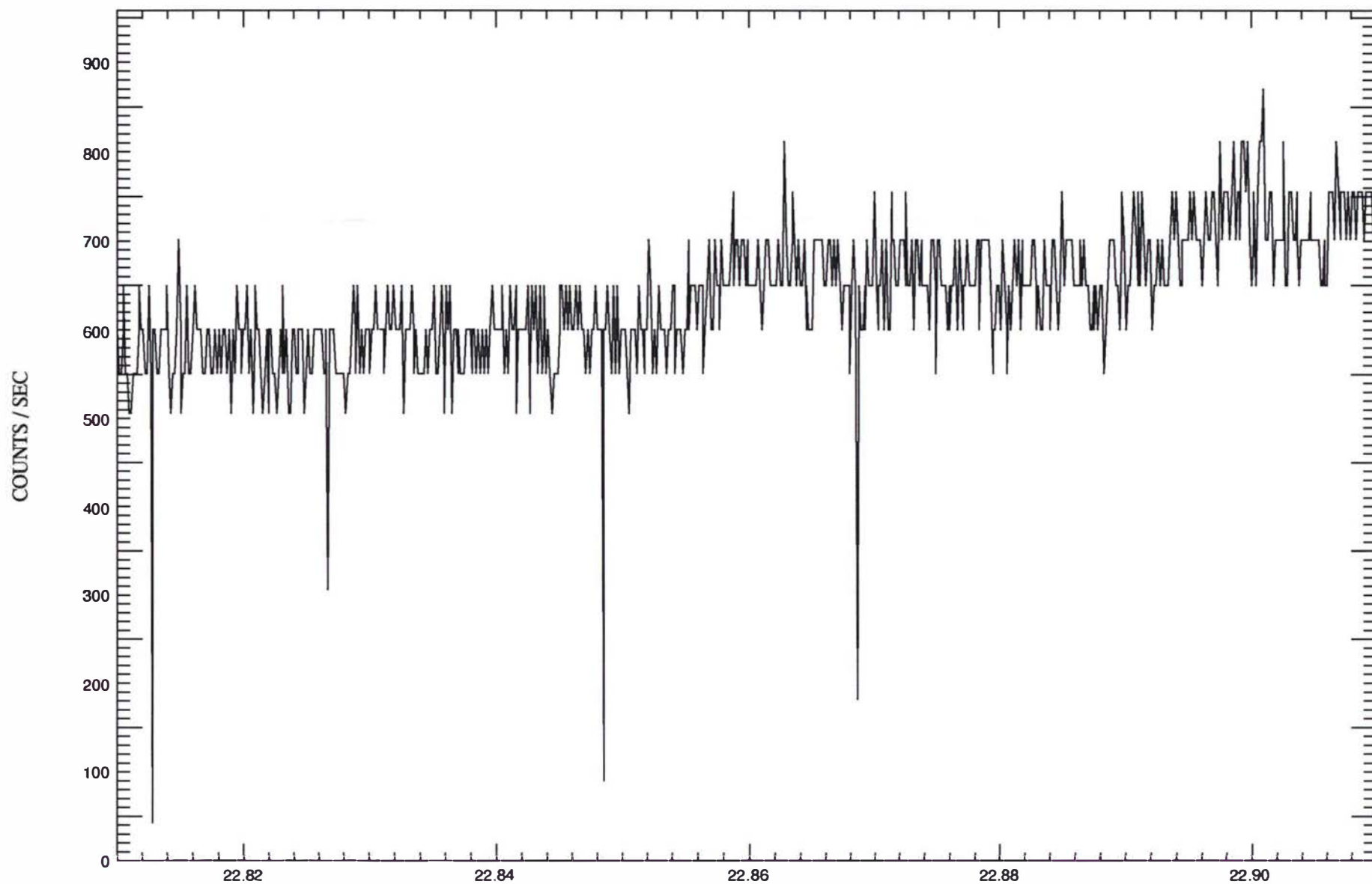
Burst Counter 15 at UT= 6.436025873820 h=23169.693 s 06:26:09.693

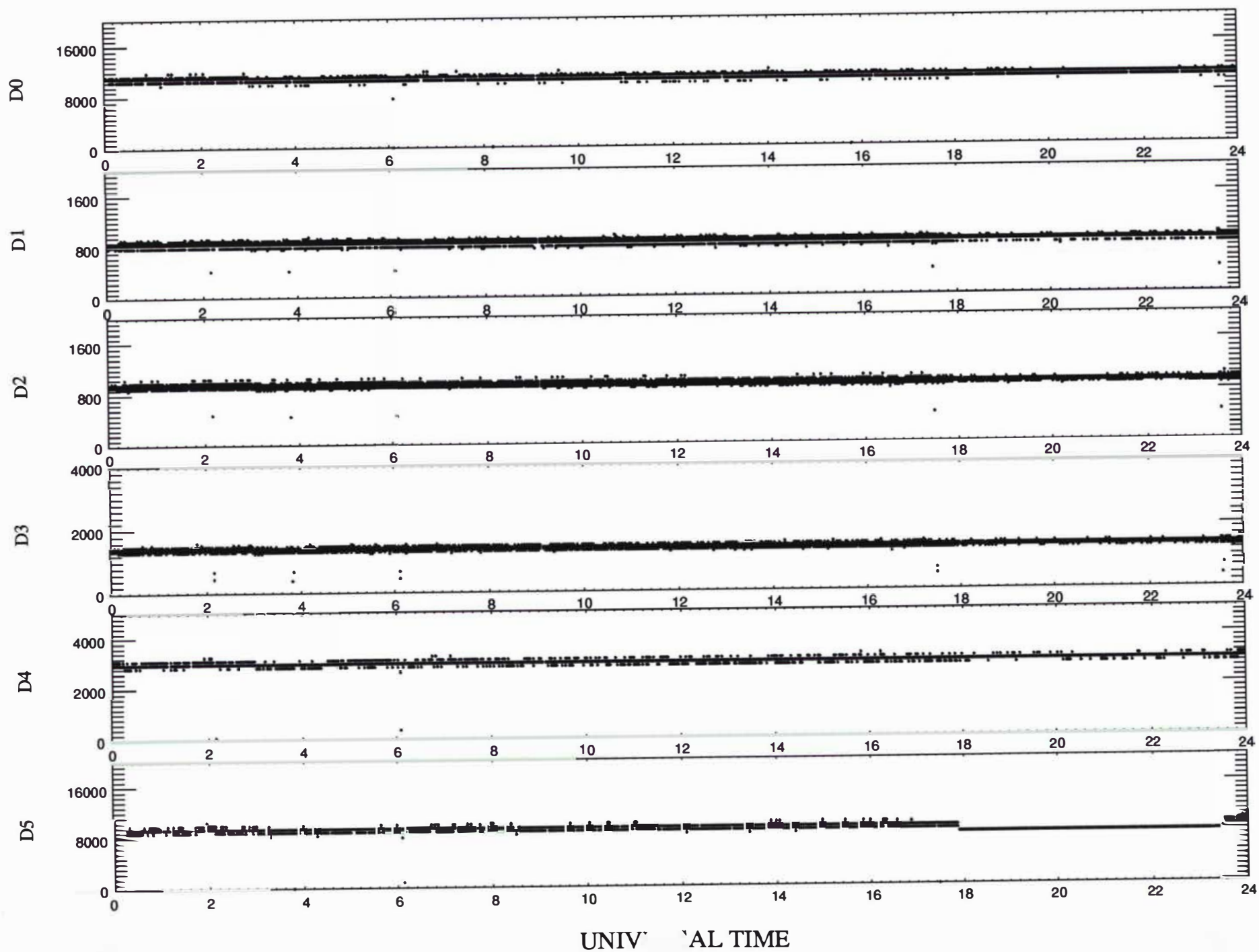


Burst Counter 0 at UT=22.858890041775 h=82292.004 s 22:51:32.004



CALIBRATION DATA INCLUDED





Helio corr removed 12/3/98

Date: June 29 '98

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? *No - bad stats*

2. BATSE Data *N/A*

- ☐ 2.042 s subtracted for bursts prior to June 25 1992 and DISCSC programs prior to Version 2.16 (August 28 1992)?
- ☐ 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? *No*
- ☐ ACCESS database updated?

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-maill1d v1.7); 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

From TERRELL@nisdp0.lanl.gov Thu Jan 2 14:51 PST 1997

From: TERRELL@nisdp0.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

JLA 10/10/92

Date	Heure Phebus		Sigma	Heure Ulysse	Seance	Cmax Phebus	Cmax Ulysse	Loc. α, δ	Comment.
✓ 1991-09-01	19467				327	145			faible
✓ 1991-09-07	3910	I		2066	330	177	90		
✓ 1991-10-16	39695				355	213			HUS : lim sup
✓ 1991-10-18	19936	I		21720	356	553	375		
✓ 1991-10-25	77116				362	107			faible
✓ 1991-11-19	61954		gca		367	131			faible
✓ 1991-12-22	54010	I		53610	381	277	179		
✓ 1992-01-10	33540	I	ac	34298	386		151		bdf Phebus faux
✓ 1992-01-25	32247		ac/gca		397				HUS : lim sup
✓ 1992-02-10	35633		ac		404				HUS : no data
✓ 1992-02-18	67459				411				HUS : manque données
✓ 1992-02-29	69678				415				HUS : lim sup
✓ 1992-03-11	8427	I	ac/gca	7045	422		505	131.6 -36.1	loc Network
✓ 1992-03-25	62257	I	ac/gca	64262	430		154		
✓ 1992-04-04	81448	I		79239	434		212		
✓ 1992-04-05	27698	I	ac	28498	434		91		
✓ 1992-04-14	84162	I	gca	84257	441		171		
✓ 1992-04-20	7947	I		7573	444		112		
✓ 1992-05-19	59421	I		61011	449		268		
✓ 1992-06-22	25505	I	ac/gca	23347	468		408		
✓ 1992-06-28	76453				473				HUS : no data
✓ 1992-07-14	47072	I	ac/gca	46282	482		221	219.9 +5.4	loc Sigma gca
✓ 1992-07-20	11529	I	ac/gca	9808	486		227		
✓ 1992-07-23	72189	I	ac/gca	73964	489		1084	285.8 +26.7	loc Sigma gca

N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

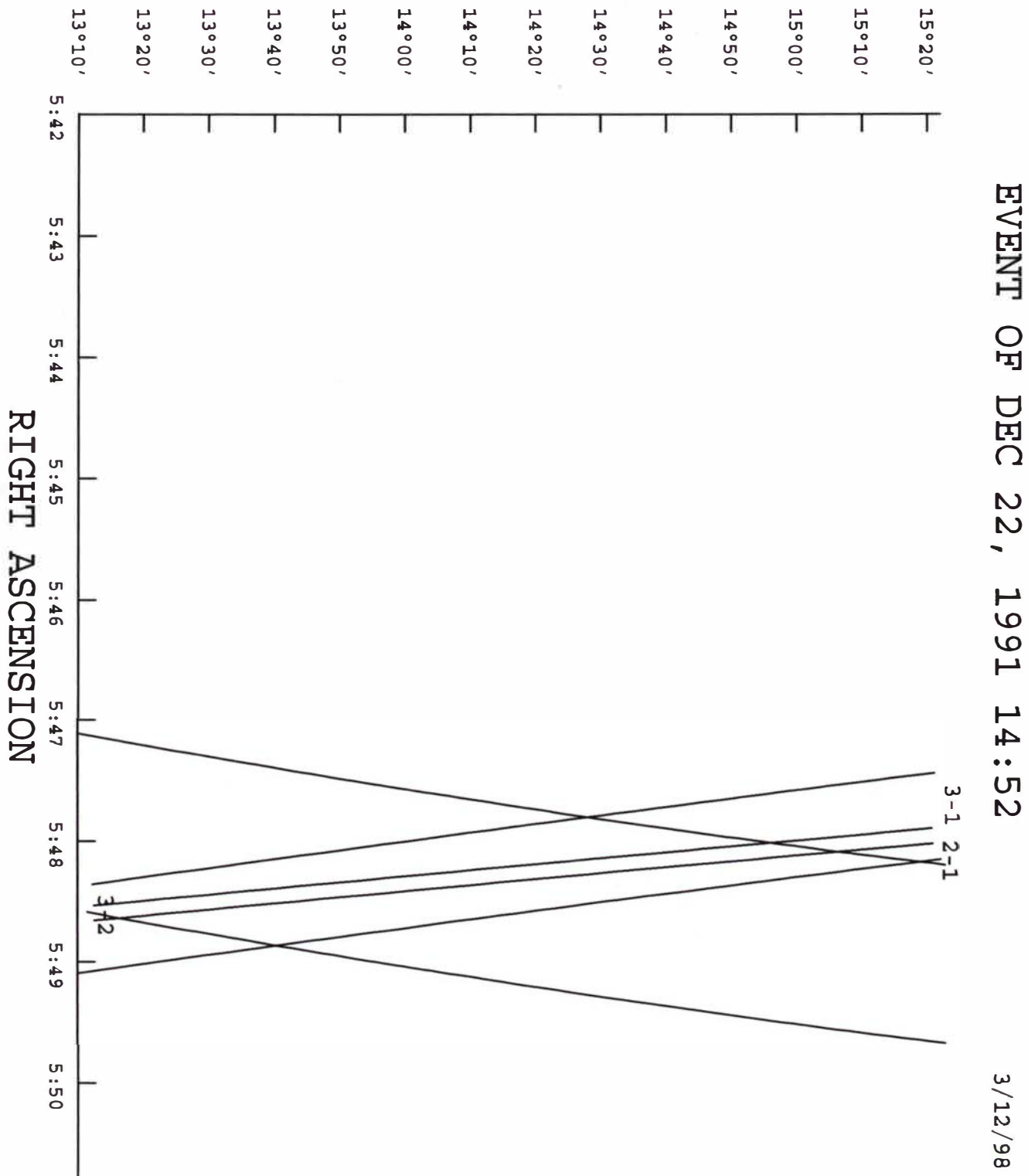
G=GALACTIC EQUATOR

1 ULYSSES

2 PHEBUS

3 PVO

DECLINATION



N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

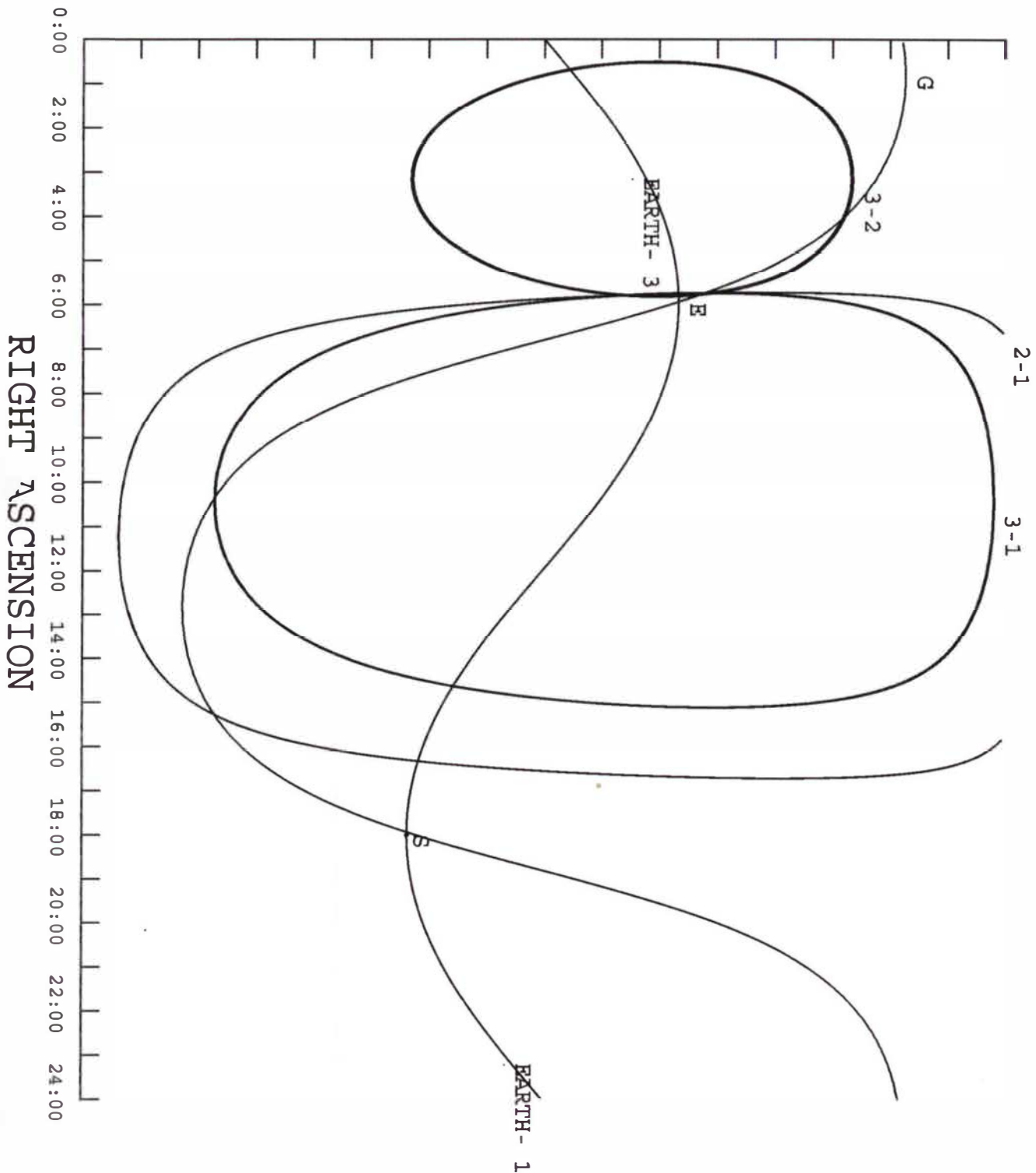
G=GALACTIC EQUATOR

1 ULYSSES

2 PHEBUS

3 PVO

DECLINATION



EVENT OF DEC 22, 1991 14:52

29 / 6 / 98

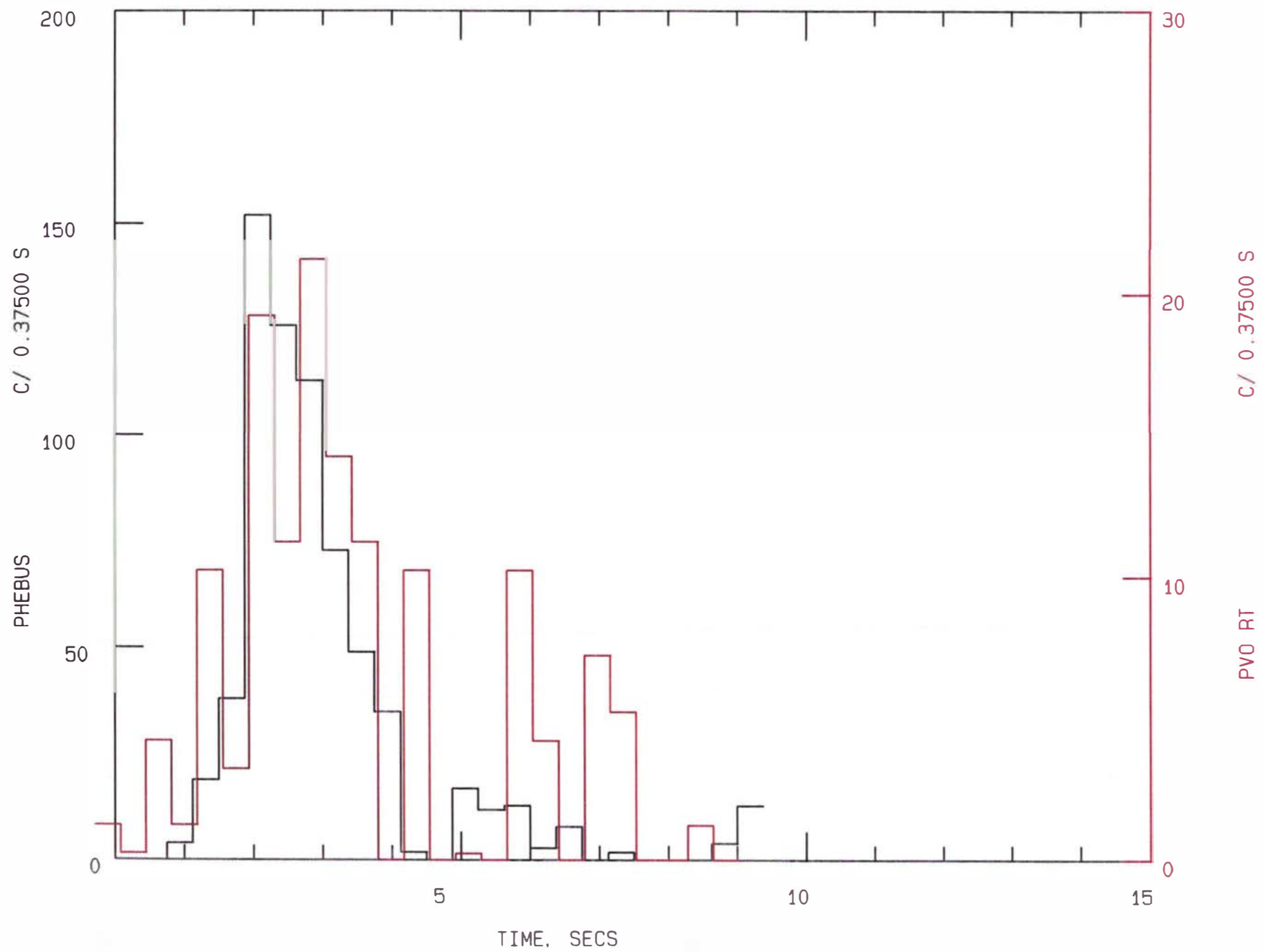
PHEBUS-PVO RT

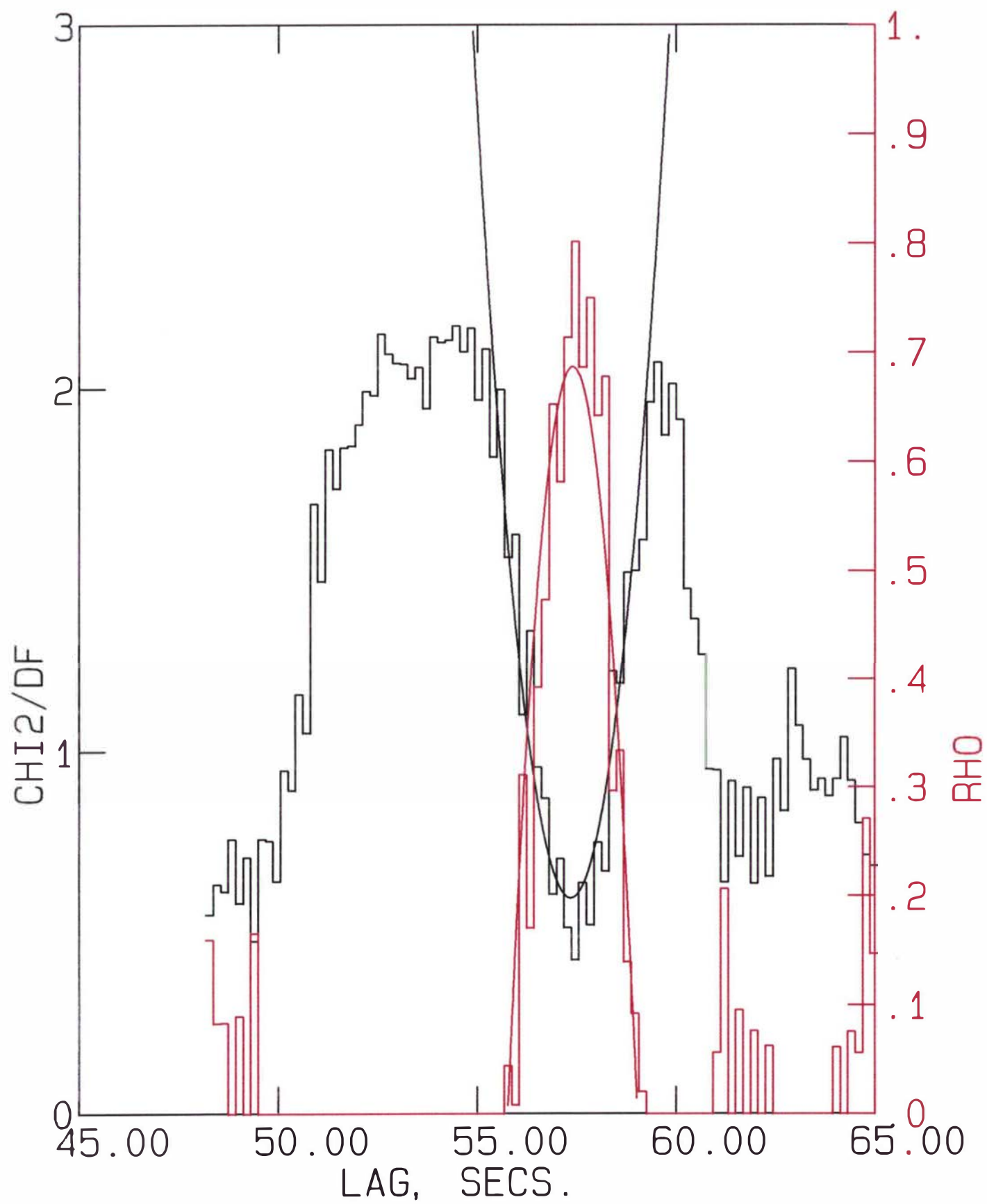
CORRELATION

22/12/91

54008.112

29/ 6/98





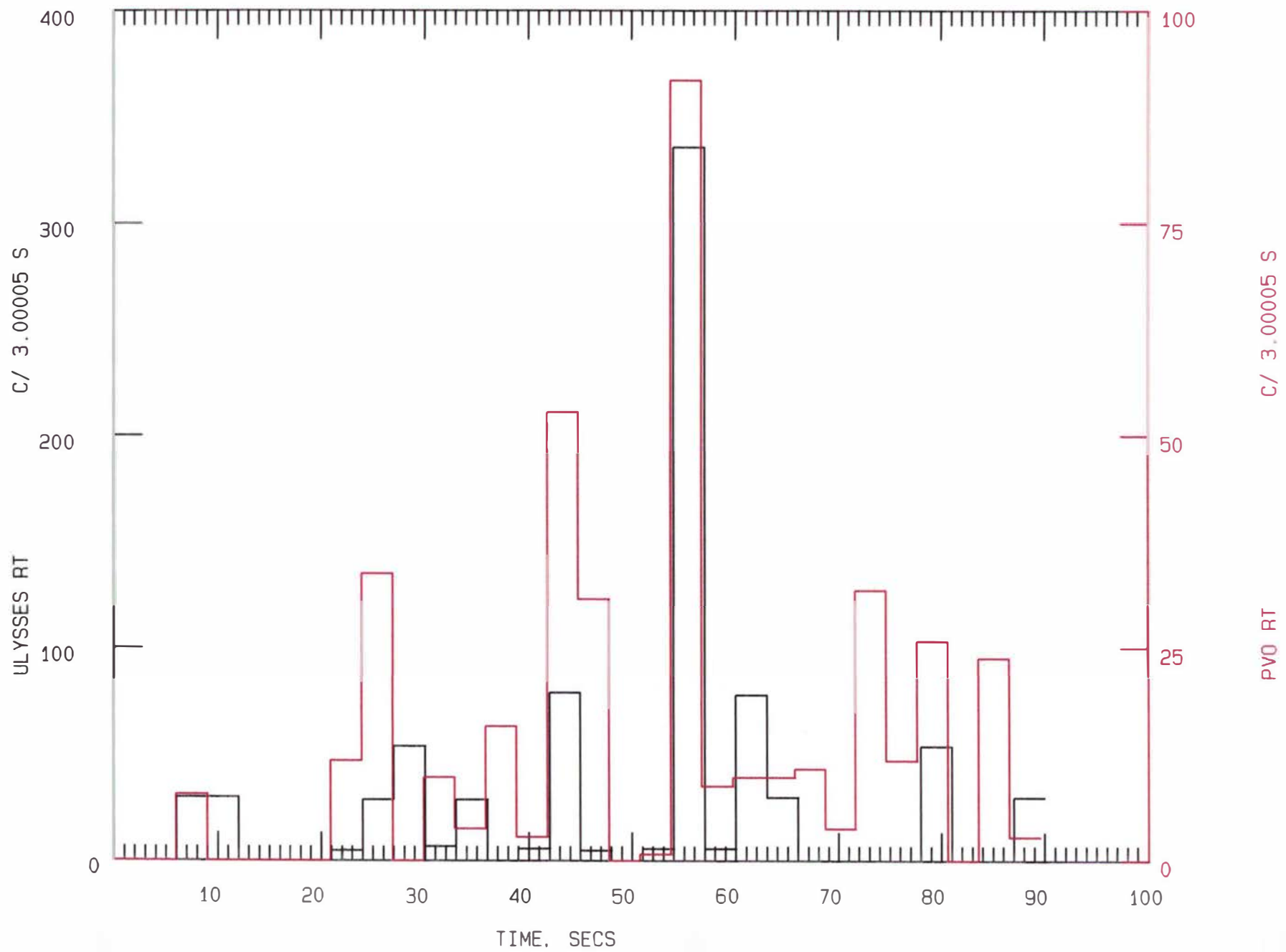
ULYSSES RT-PVO RT

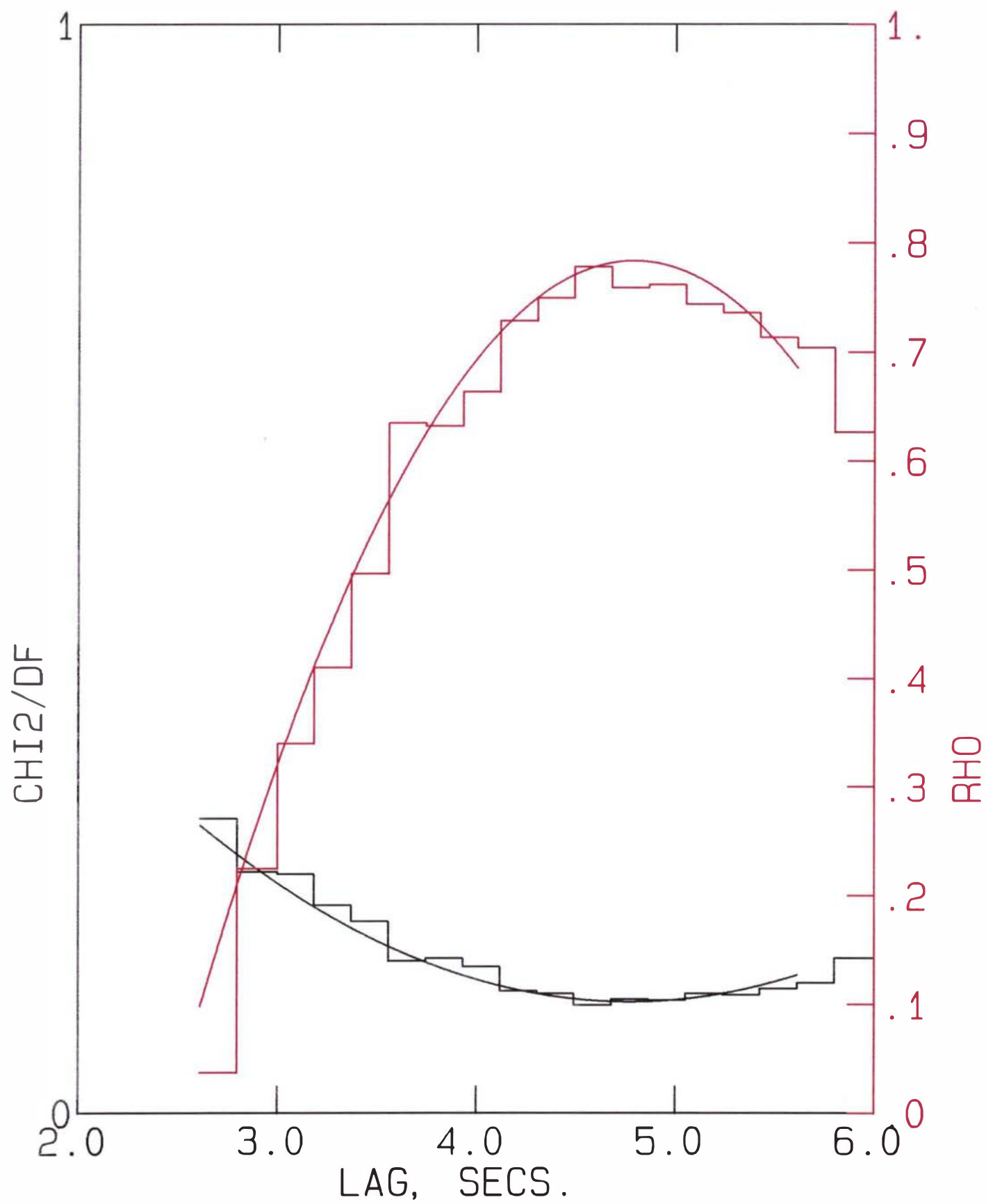
CORRELATION

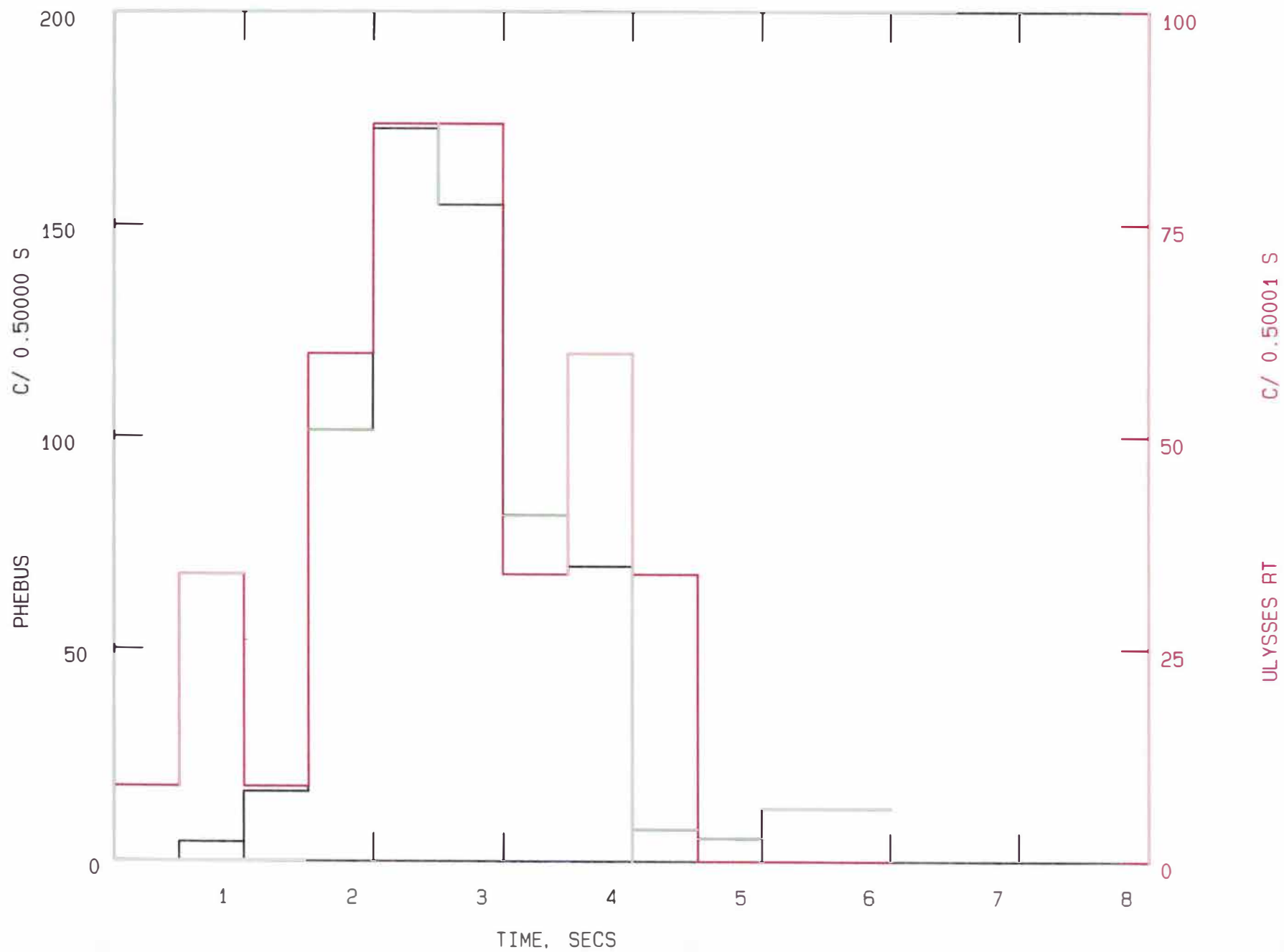
22/12/91

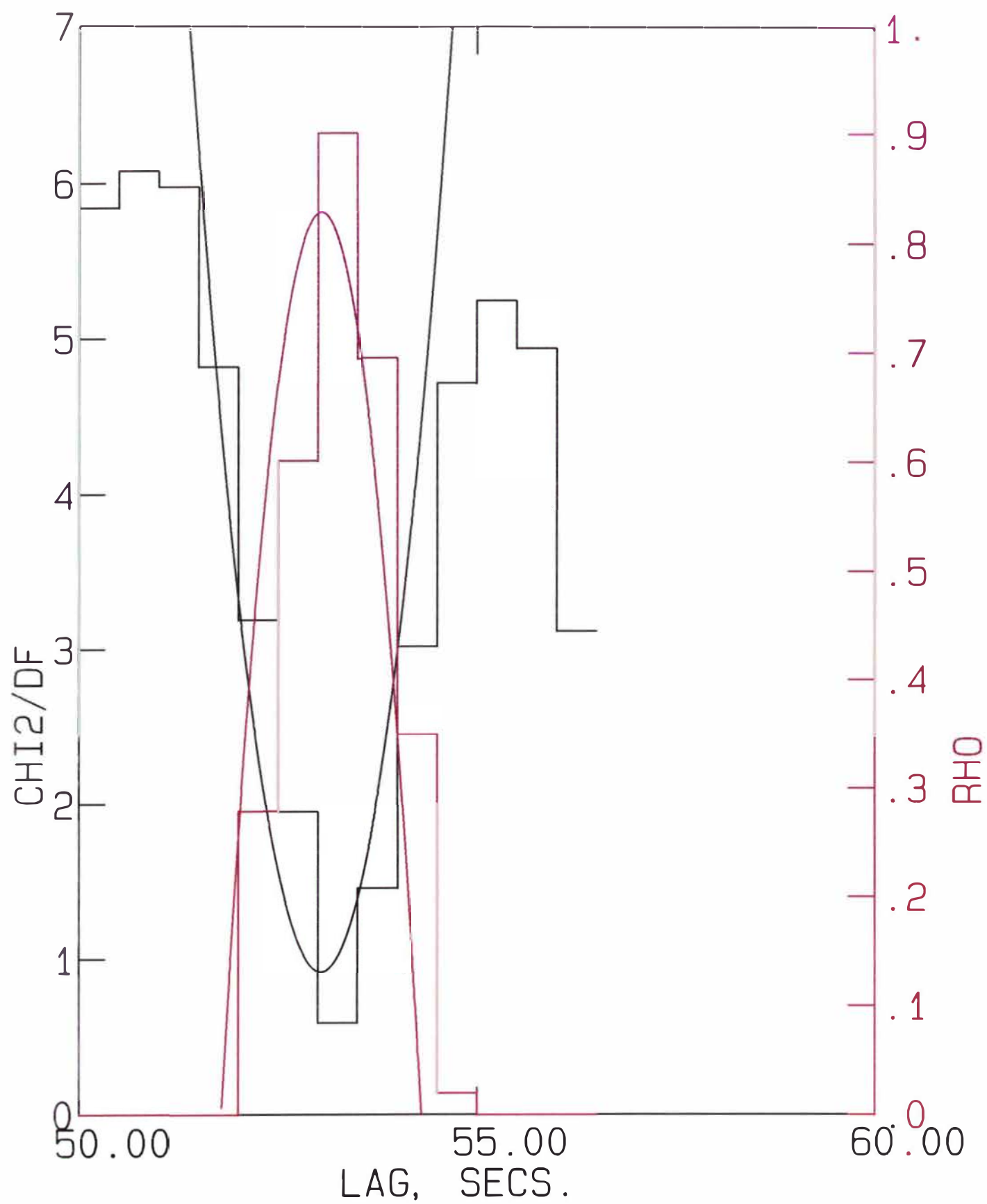
53554.484

29/ 6/98









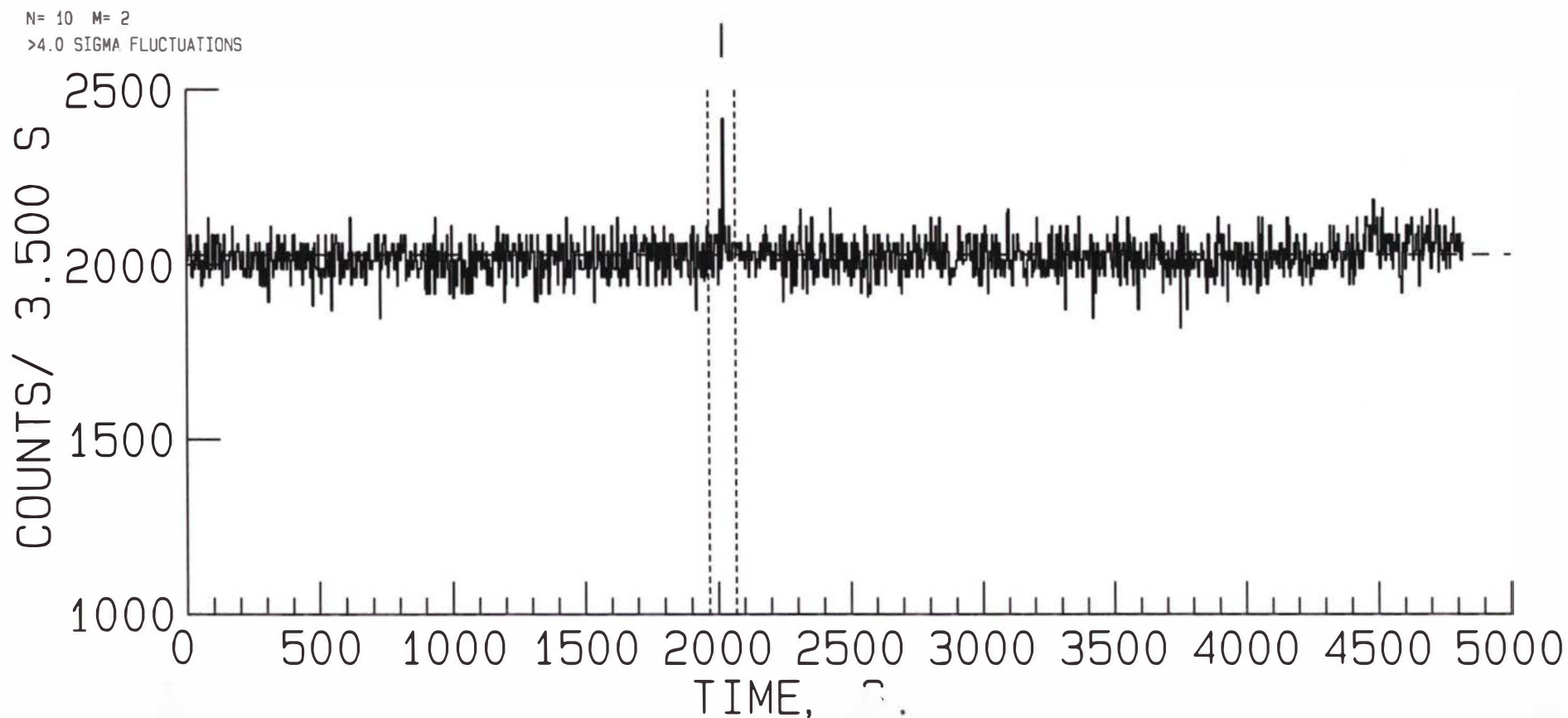
ULYSSES RT

29 / 6 / 98

22/12/91 51588.225 s

0.500 S INTERVALS REGROUPED BY 7

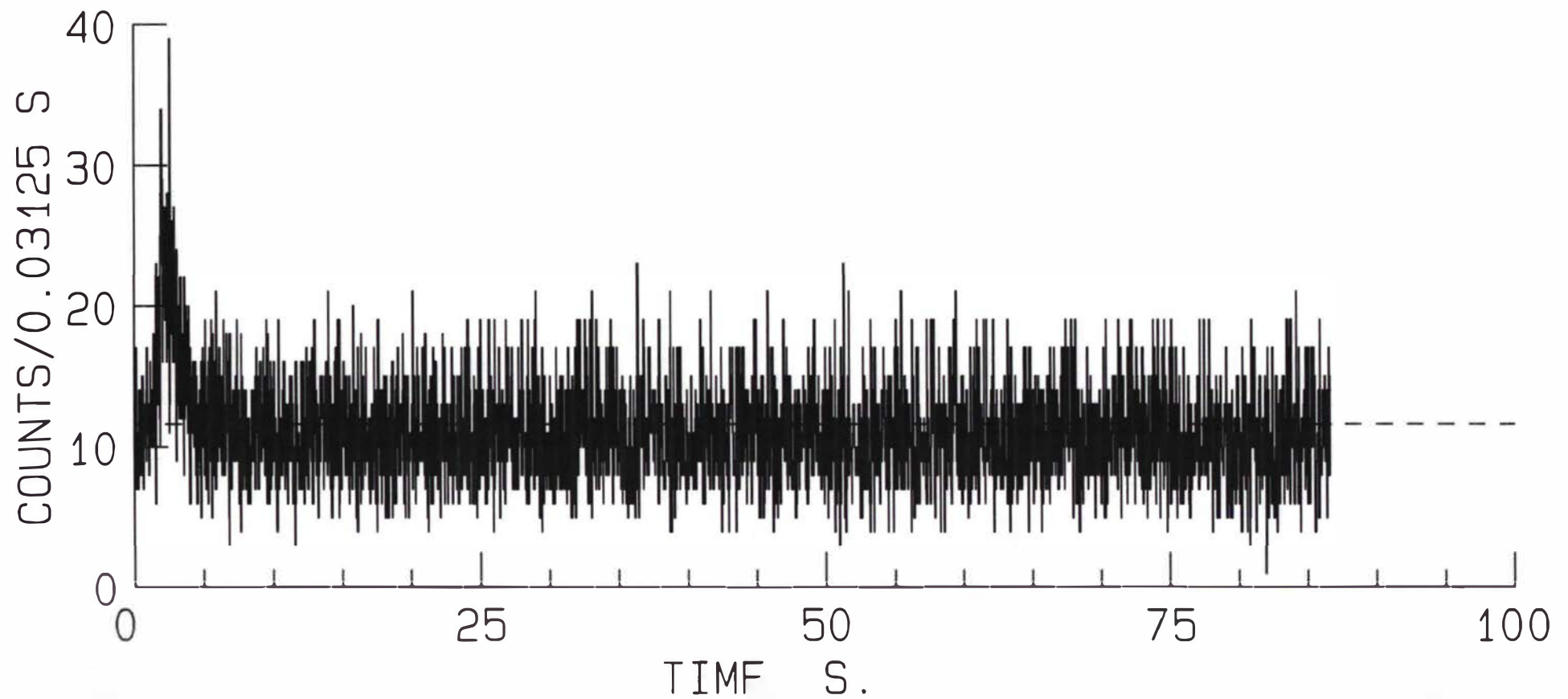
18- 163 keV



PHEBUS

22/12/91 54008.112 s

100- 1600 keV



30/12/93

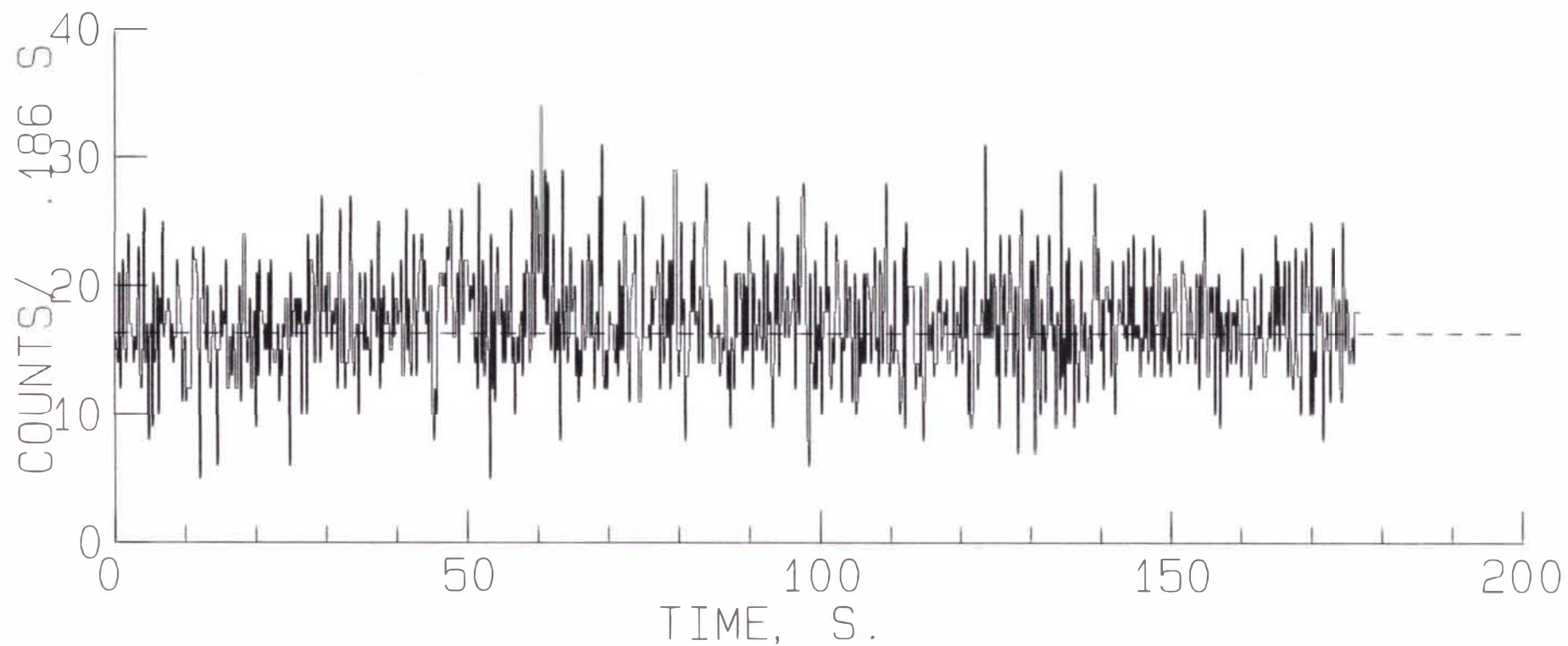
PV0-RT

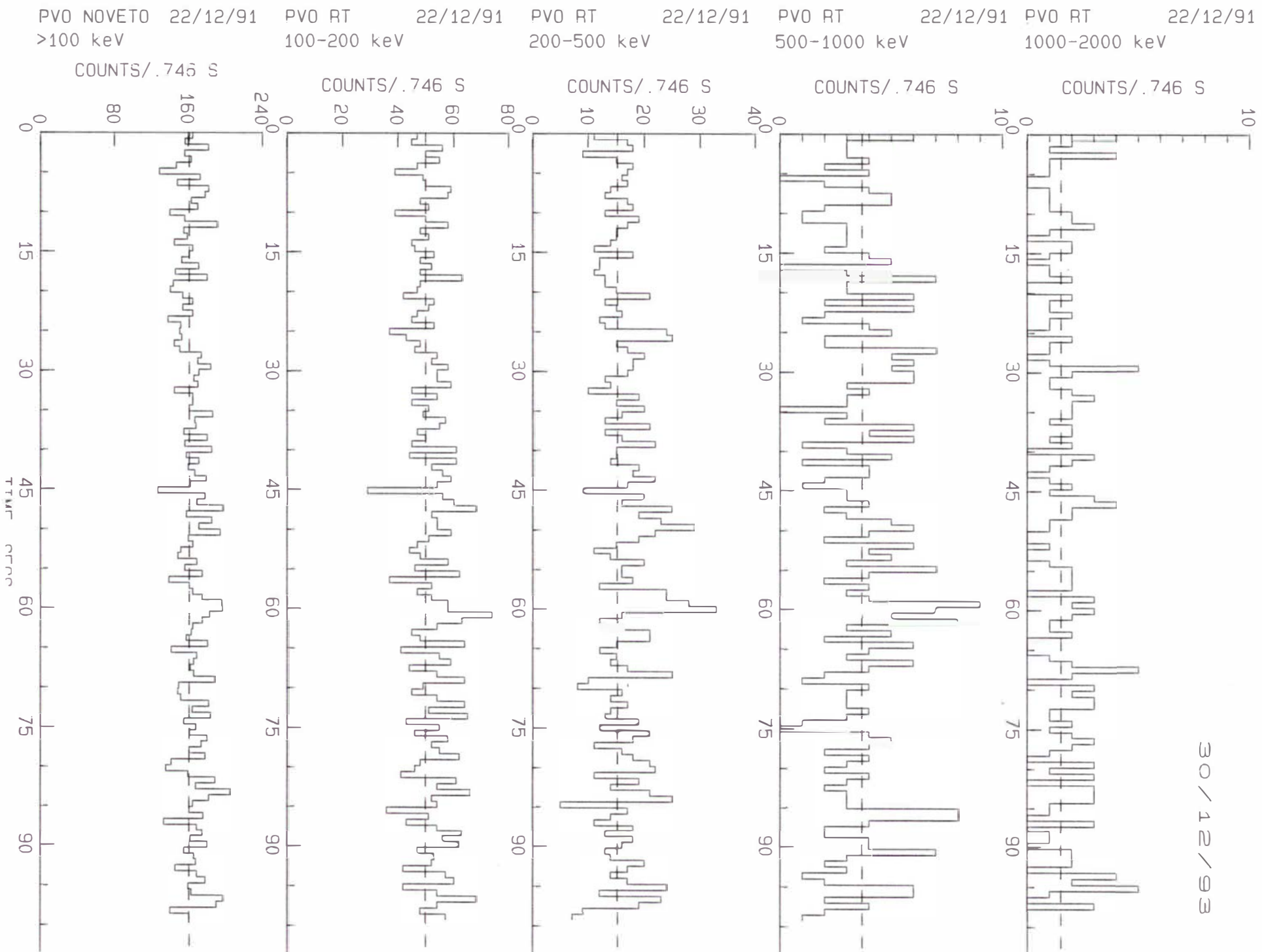
22/12/91

54364.477 s.

.186 S. INTERVALS REGROUPED BY 1
100-2000 keV

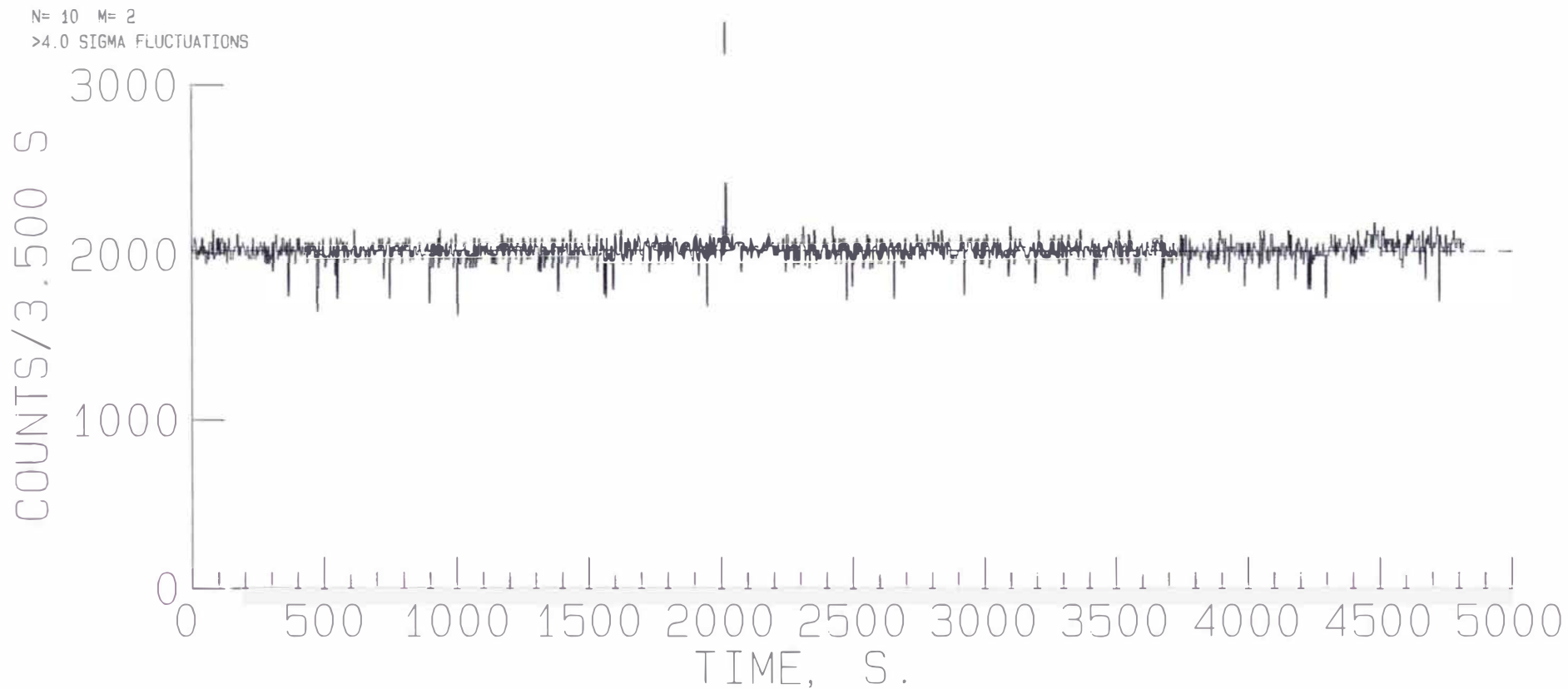
10 M= 2
.0 SIGMA FLUCTUATIONS



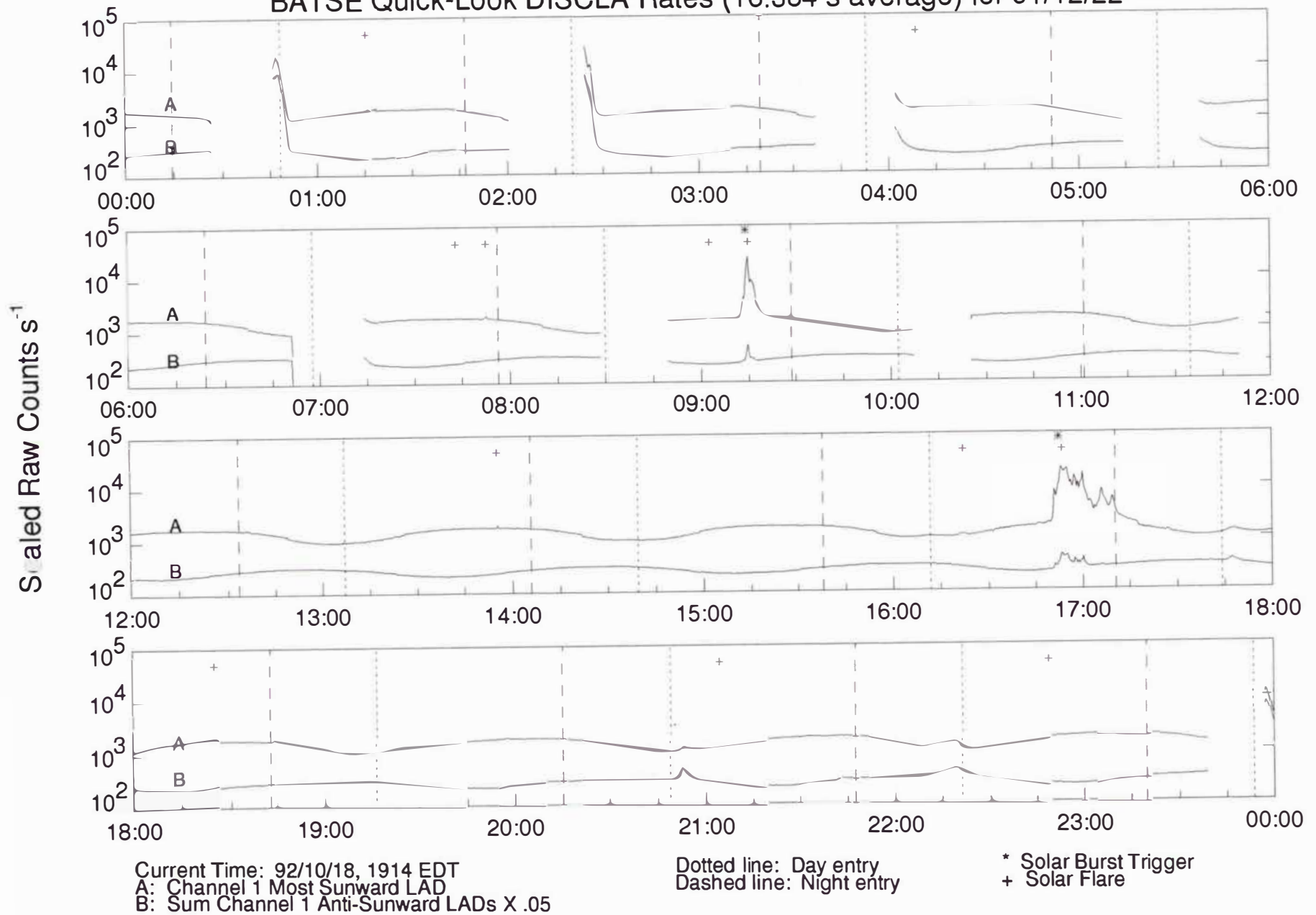


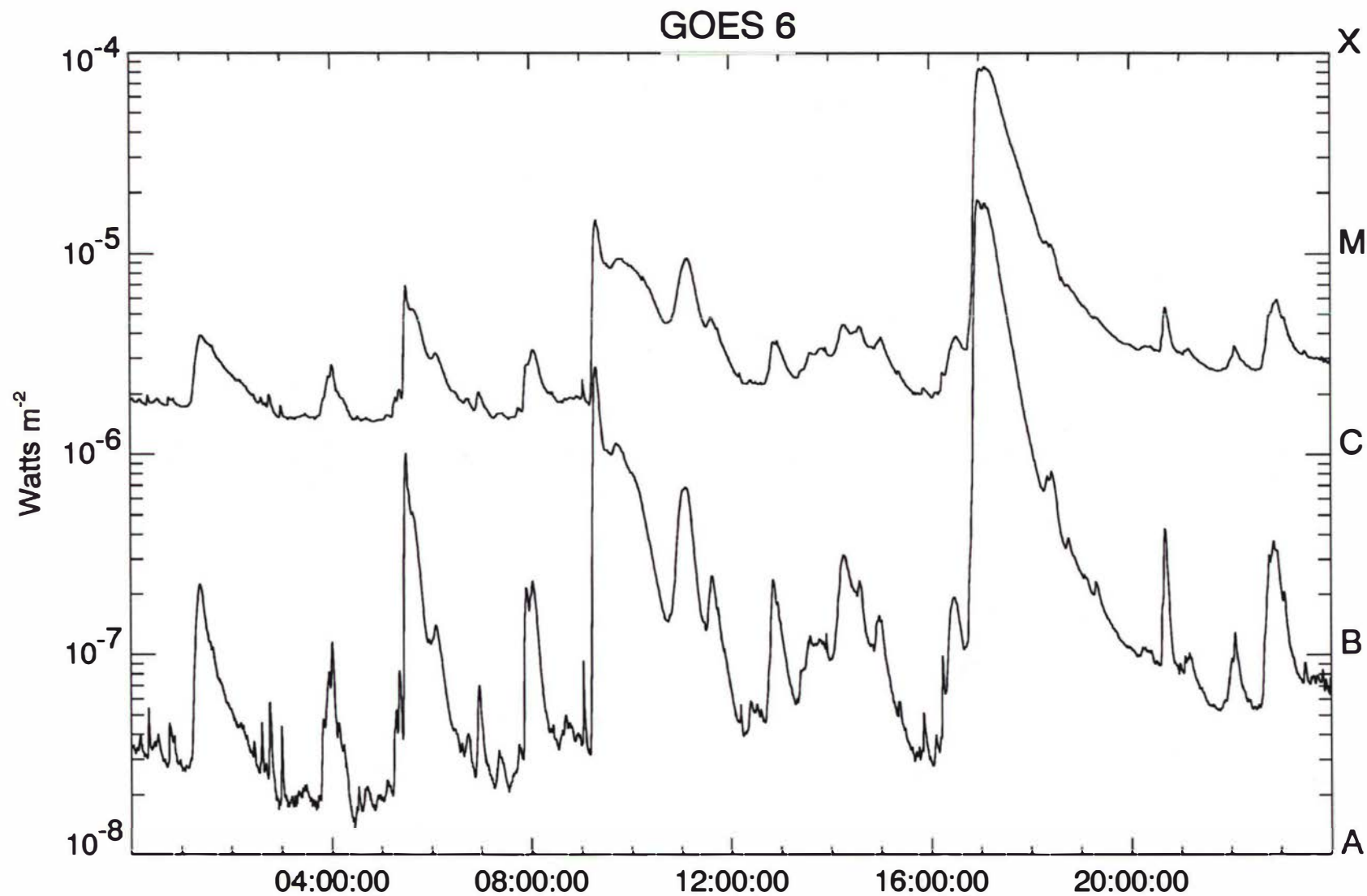
6 / 6 / 92

ULYSSES RT
22/12/91 51588.223 s
.500 S INTERVALS REGROUPED BY 7
18- 163 keV



BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/22





Data Start: 91/12/22, 0000:02

Plot created: 97/10/20, 1546

Channel

1 (1.0 - 8.0 Angstroms)

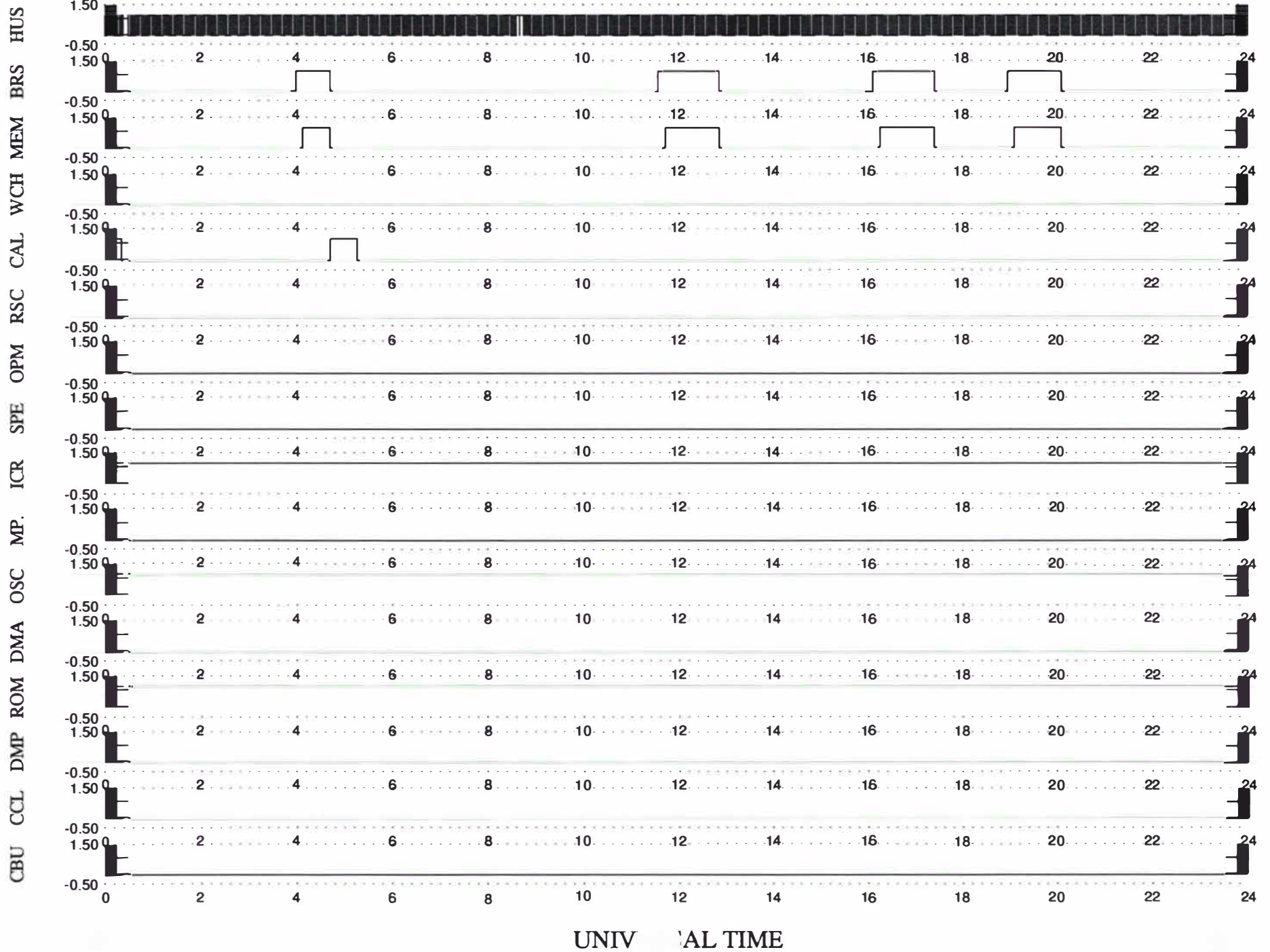
Background not subtracted

2 (0.5 - 4.0 Angstroms)

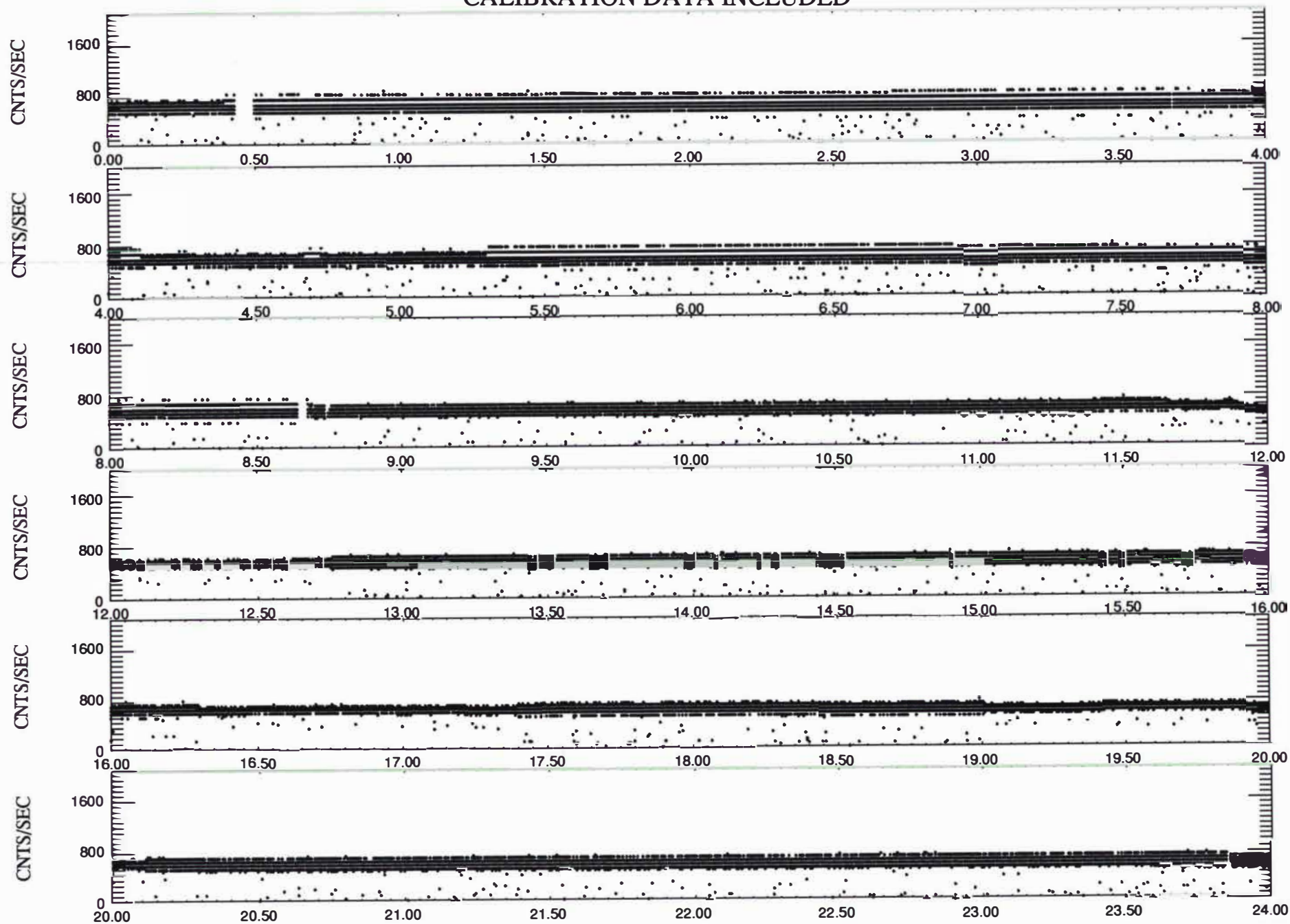
Background not subtracted

Sample average = 10

BURST NUMBER 1 - 4

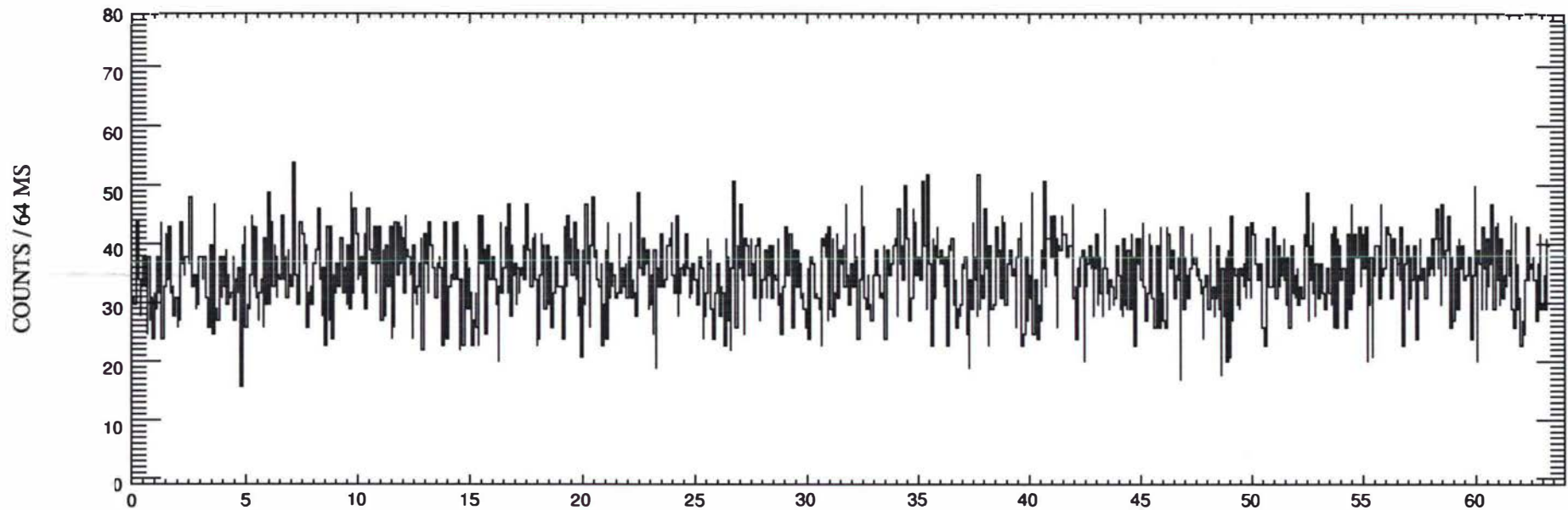


CALIBRATION DATA INCLUDED

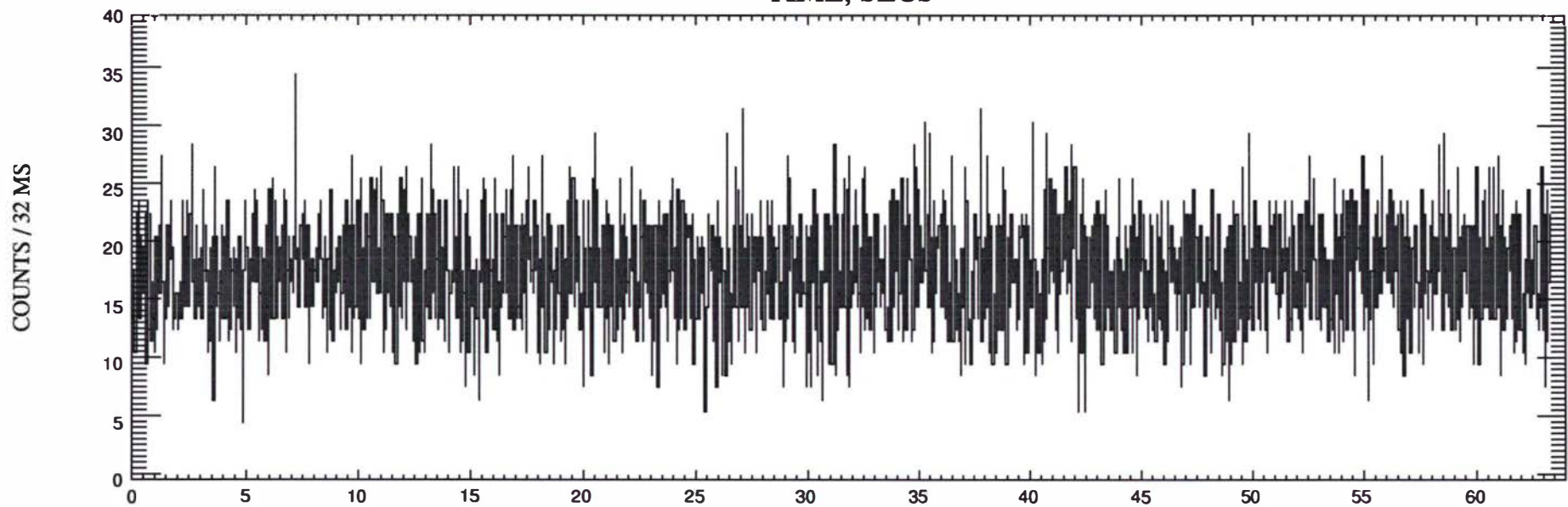


UNIV AL TIME

Burst Counter 4 at UT=18.861520881653 h=67901.475 s 18:51:41.475

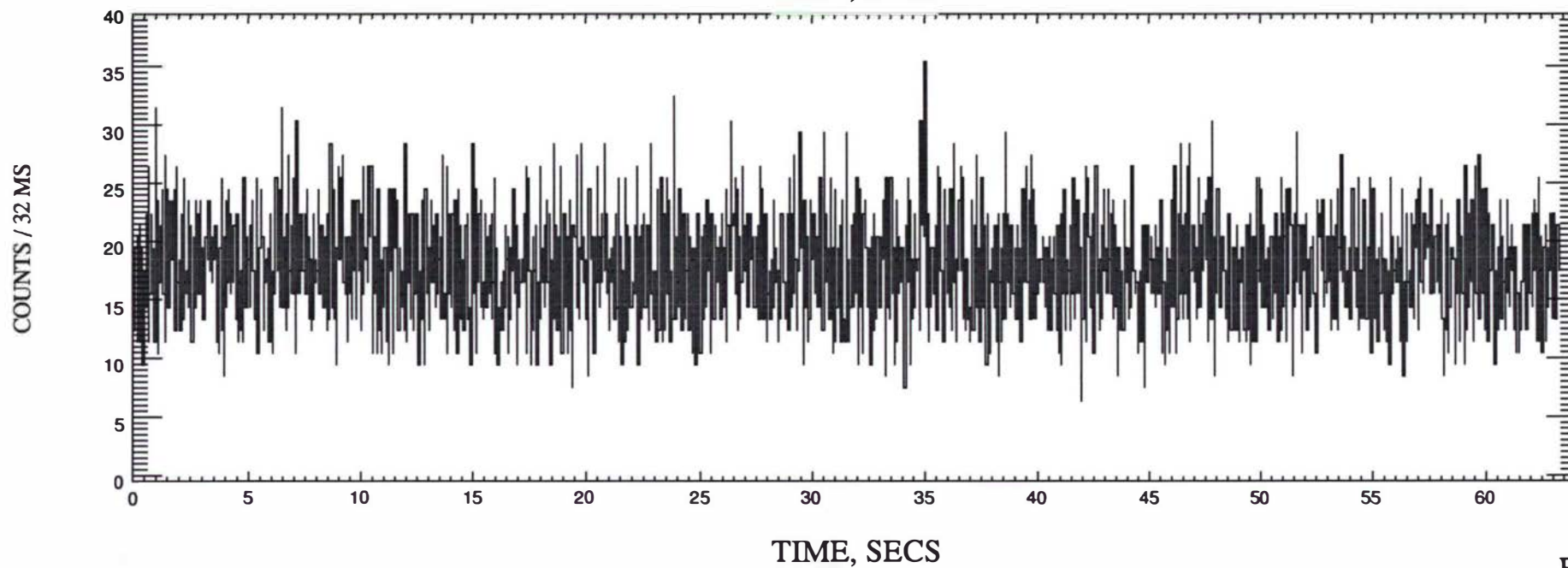
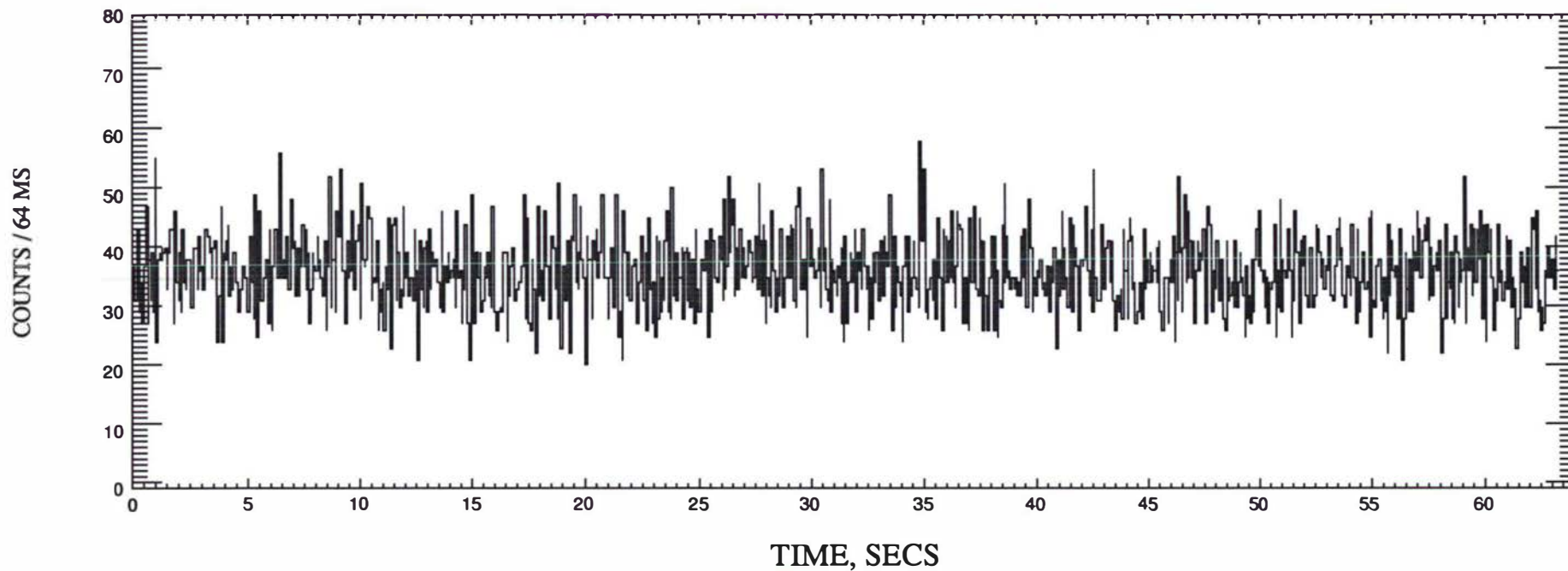


TIME, SECS

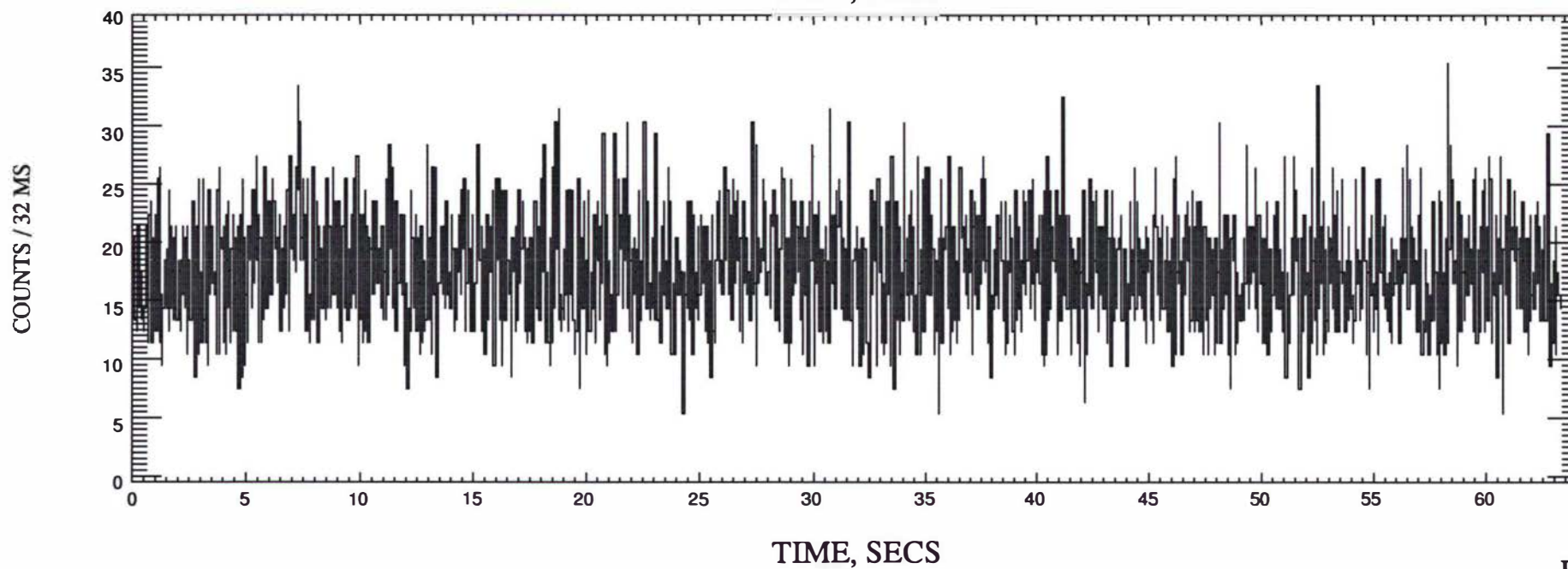
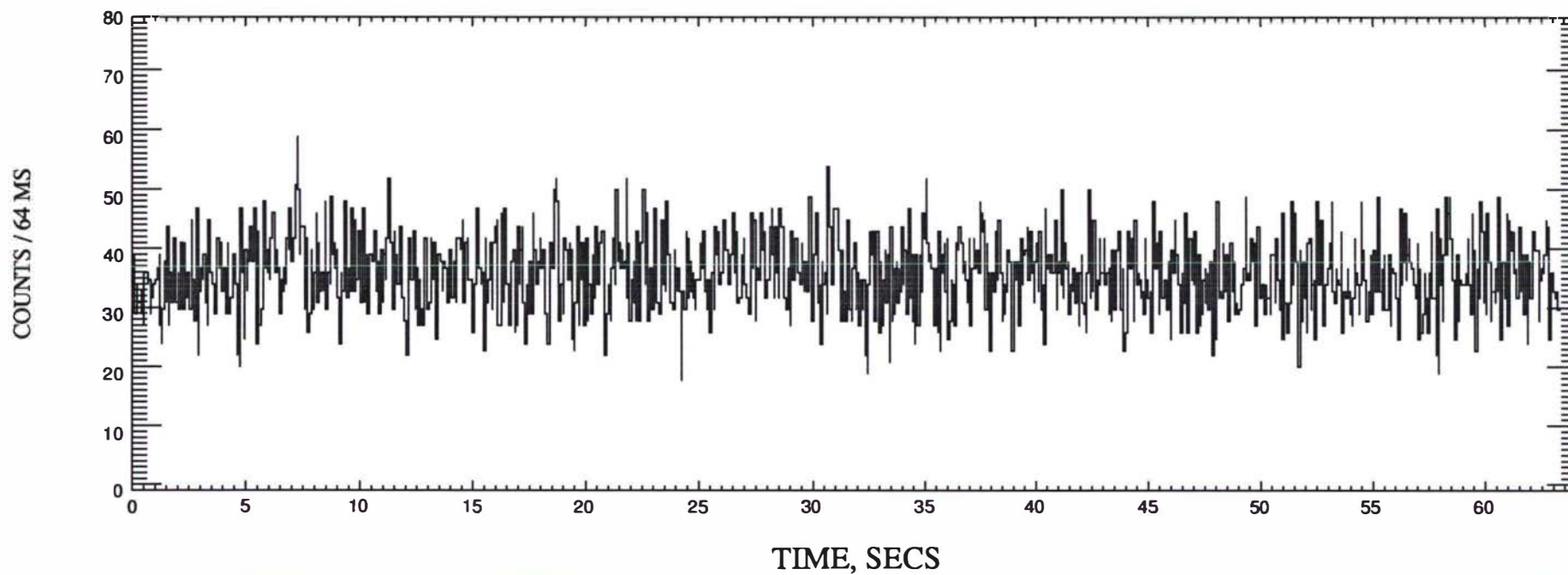


TIME, SECS

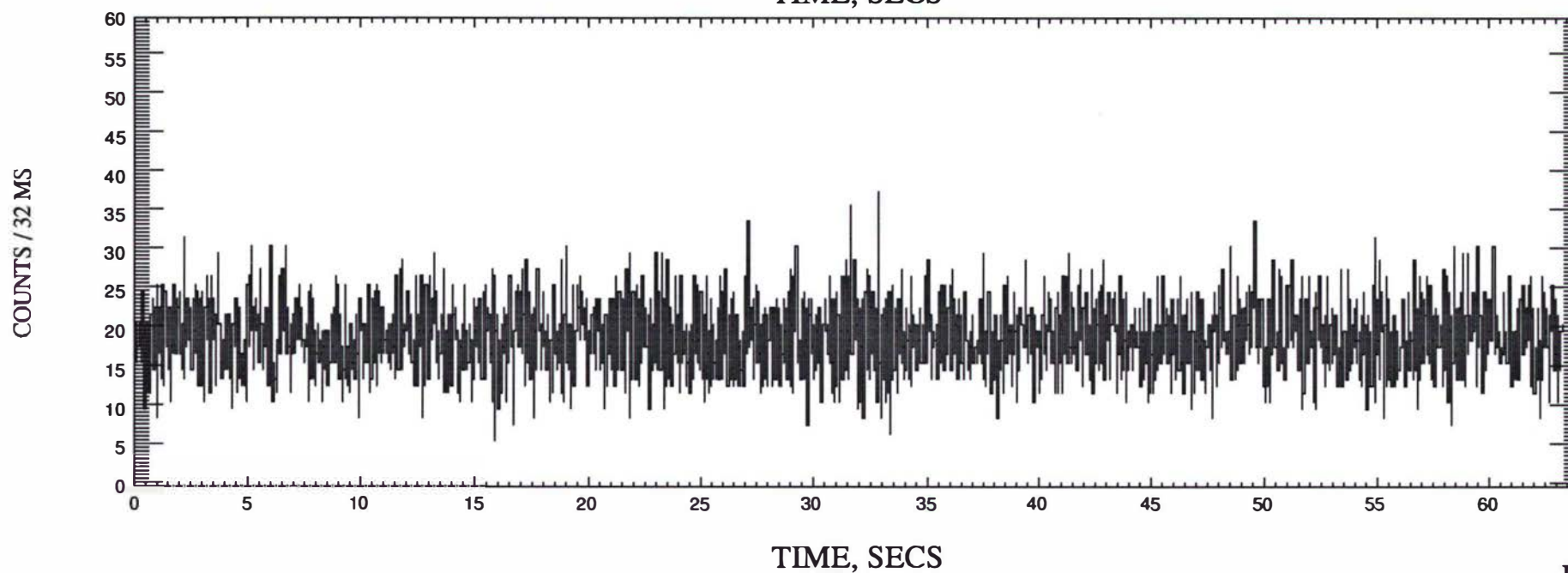
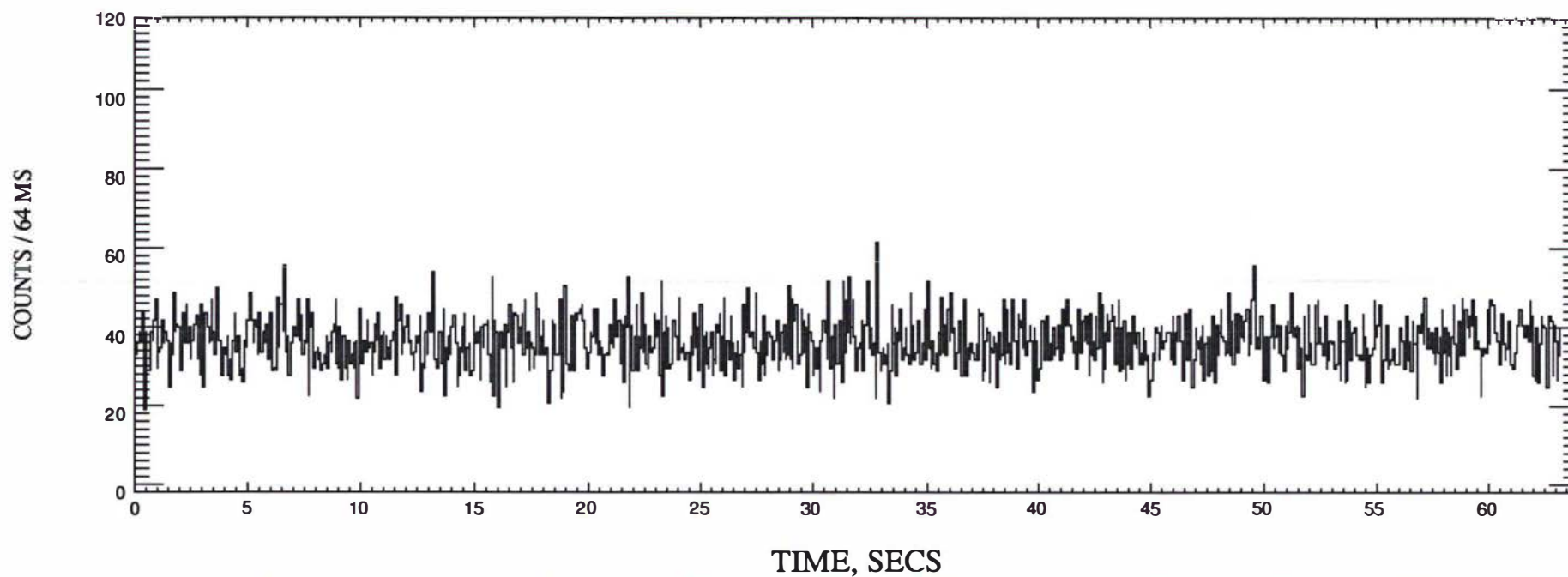
Burst Counter 3 at UT=16.129117507935 h=58064.823 s 16:07:44.823

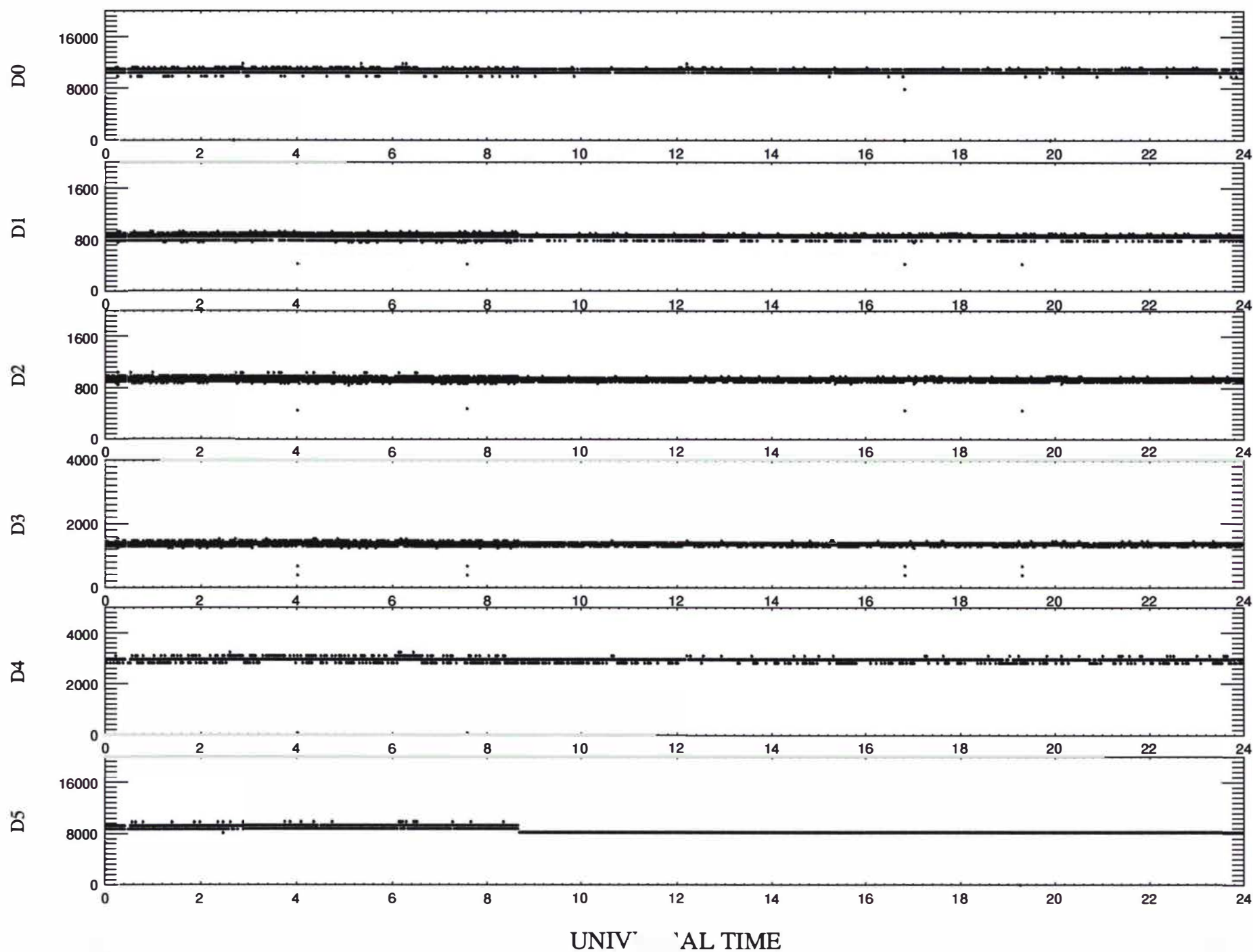


Burst Counter 2 at UT=11.495634524028 h=41384.284 s 11:29:44.284



Burst Counter 1 at UT= 3.959187694126 h=14253.076 s 03:57:33.076





CATSEARCH PROGRAM

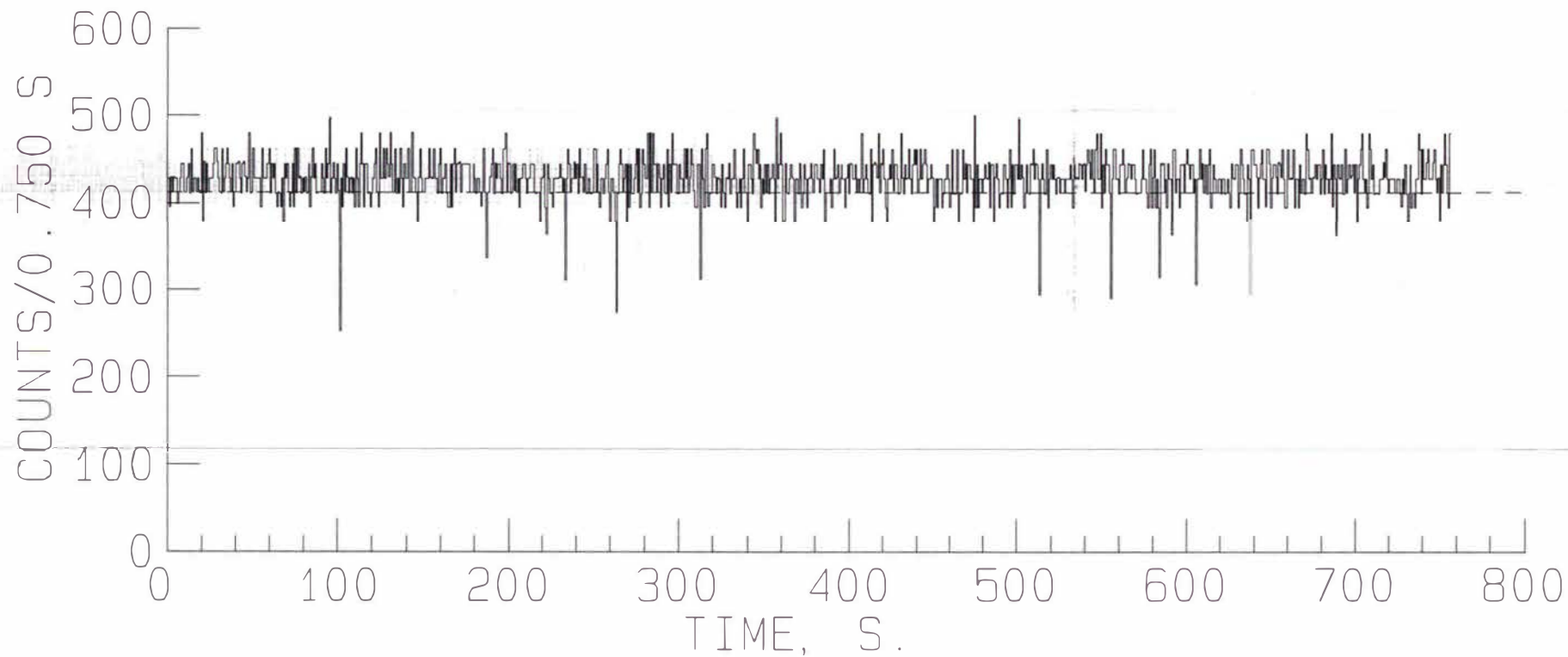
BATSE BURST # 1204
EVENT OF 1991 DEC 23 DAY OF YEAR=357
EVENT CROSSING TIME AT BATSE : 20218. S. OR 05:36:57.6
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 322.700 -51.600
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 23/12/ 91 IS:
RA= 167.818 DEC= 6.636 DIST= 4.689 AU
BATSE-ULYSSES DISTANCE = 701410072. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 49.52 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 1518.92 SECS.
CROSSING TIME AT ULYSSES IS 21737. S. OR 06:02:16 +/- 382.03 SECONDS

NO

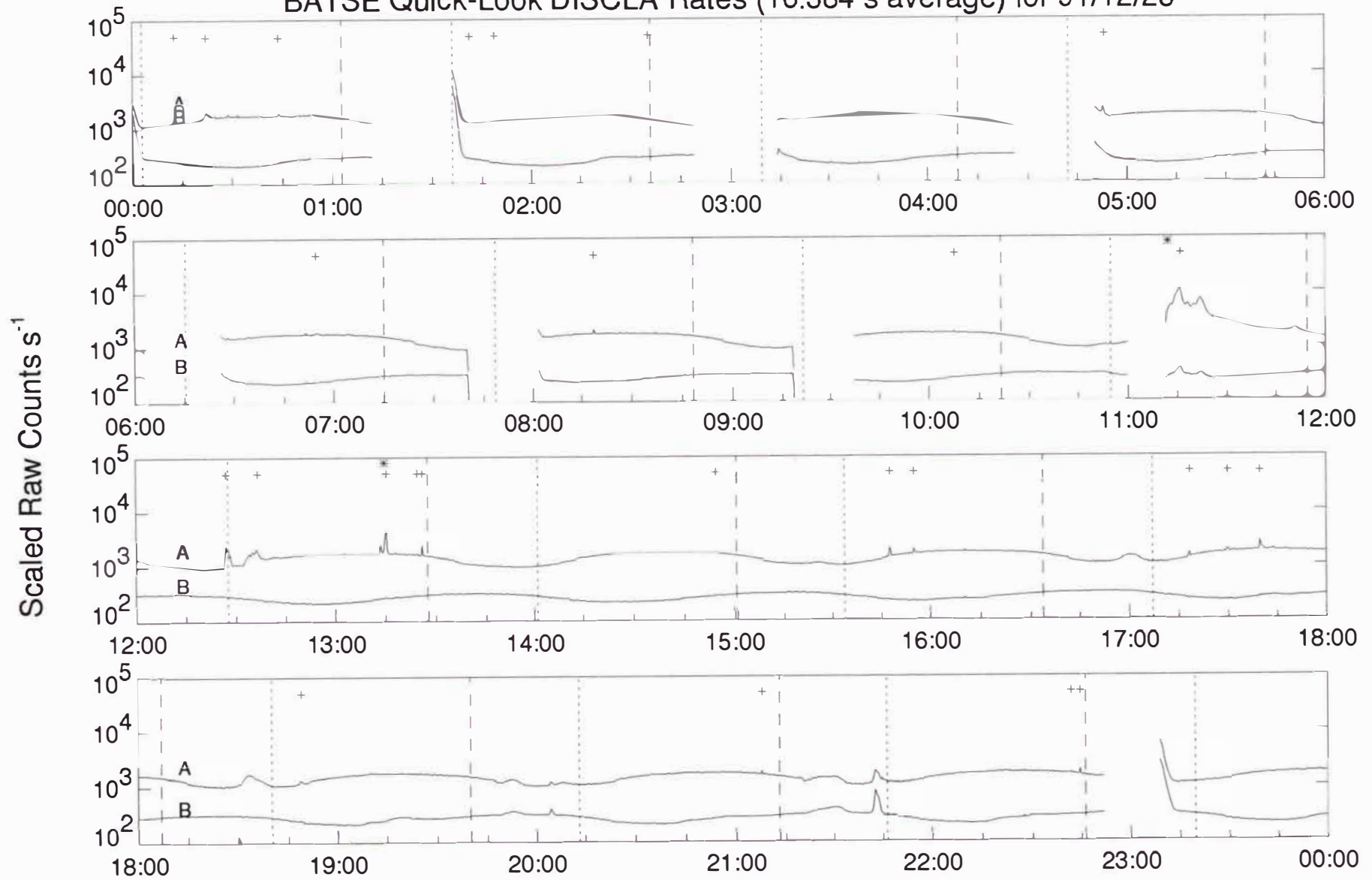
14 / 4 / 93

ULYSSES RT
23/12/91 21348.188 s
0.250 S INTERVALS REGROUPED BY 3
0- 0 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/23

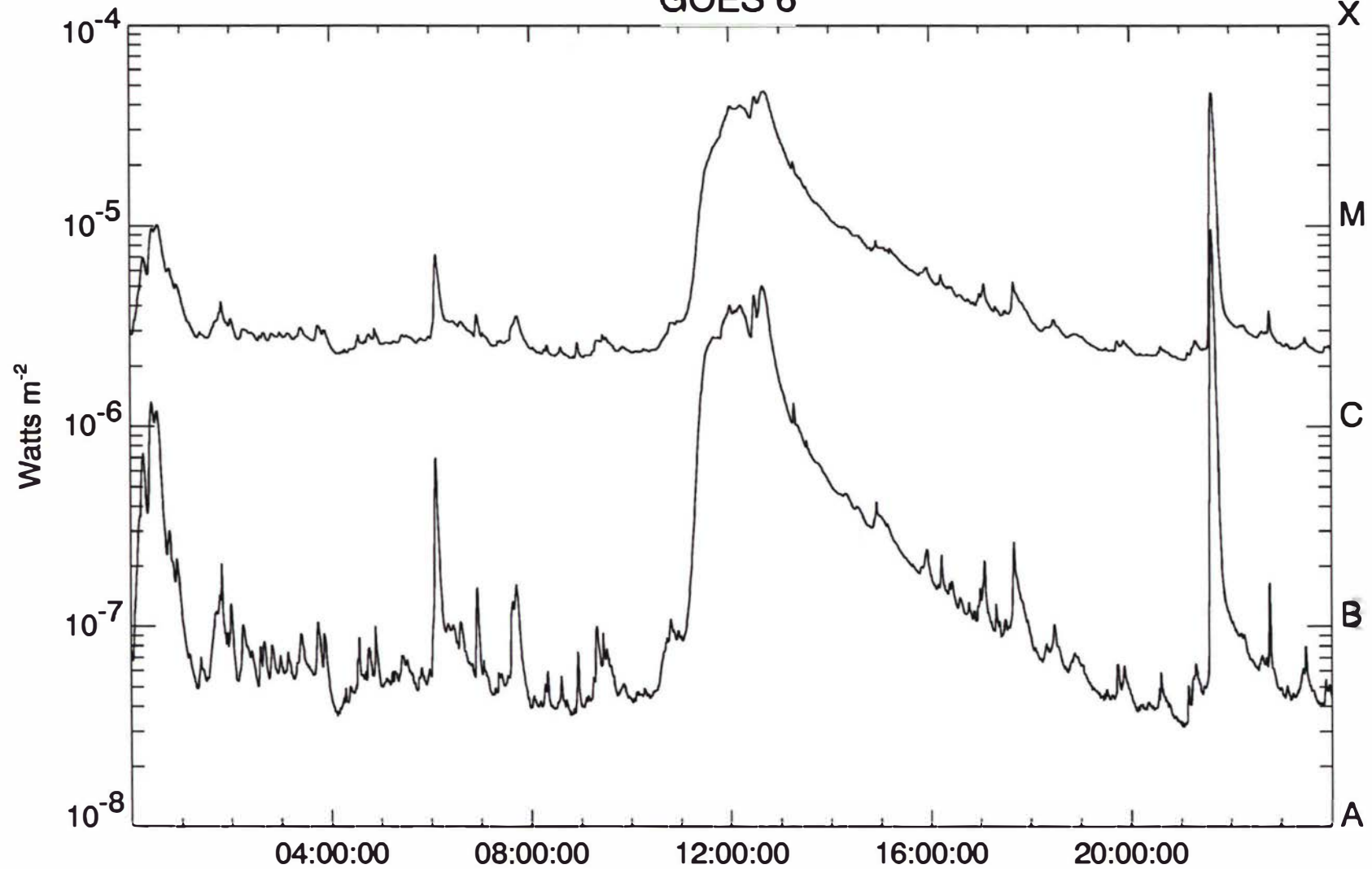


Current Time: 92/10/18, 1916 EDT
 A: Channel 1 Most Sunward LAD
 B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

GOES 6



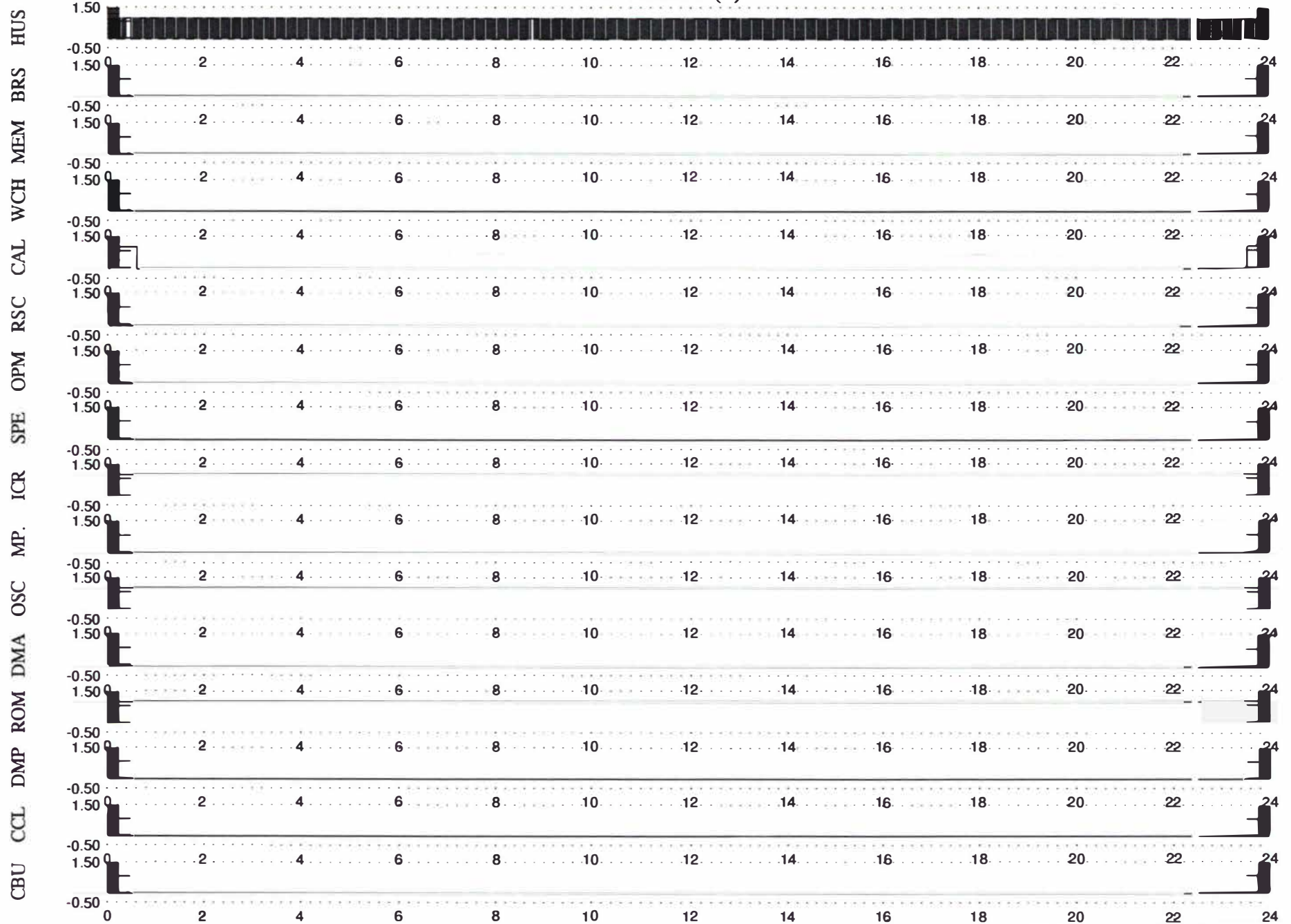
Data Start: 91/12/23, 0000:00

Plot created: 97/10/20, 1550

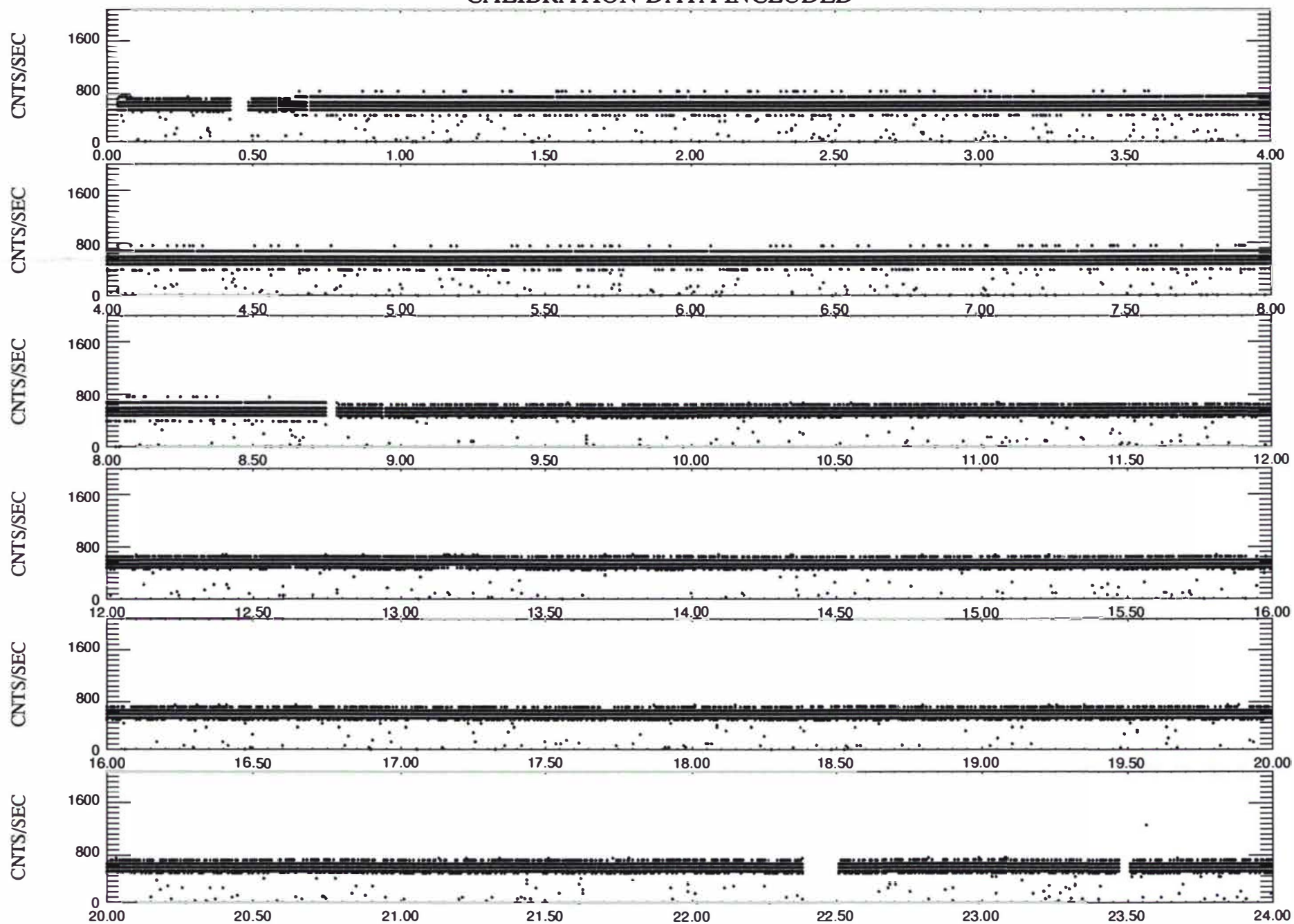
Channel 1 (1.0 - 8.0 Angstroms)
Channel 2 (0.5 - 4.0 Angstroms)

Background not subtracted
Background not subtracted
Sample average = 10

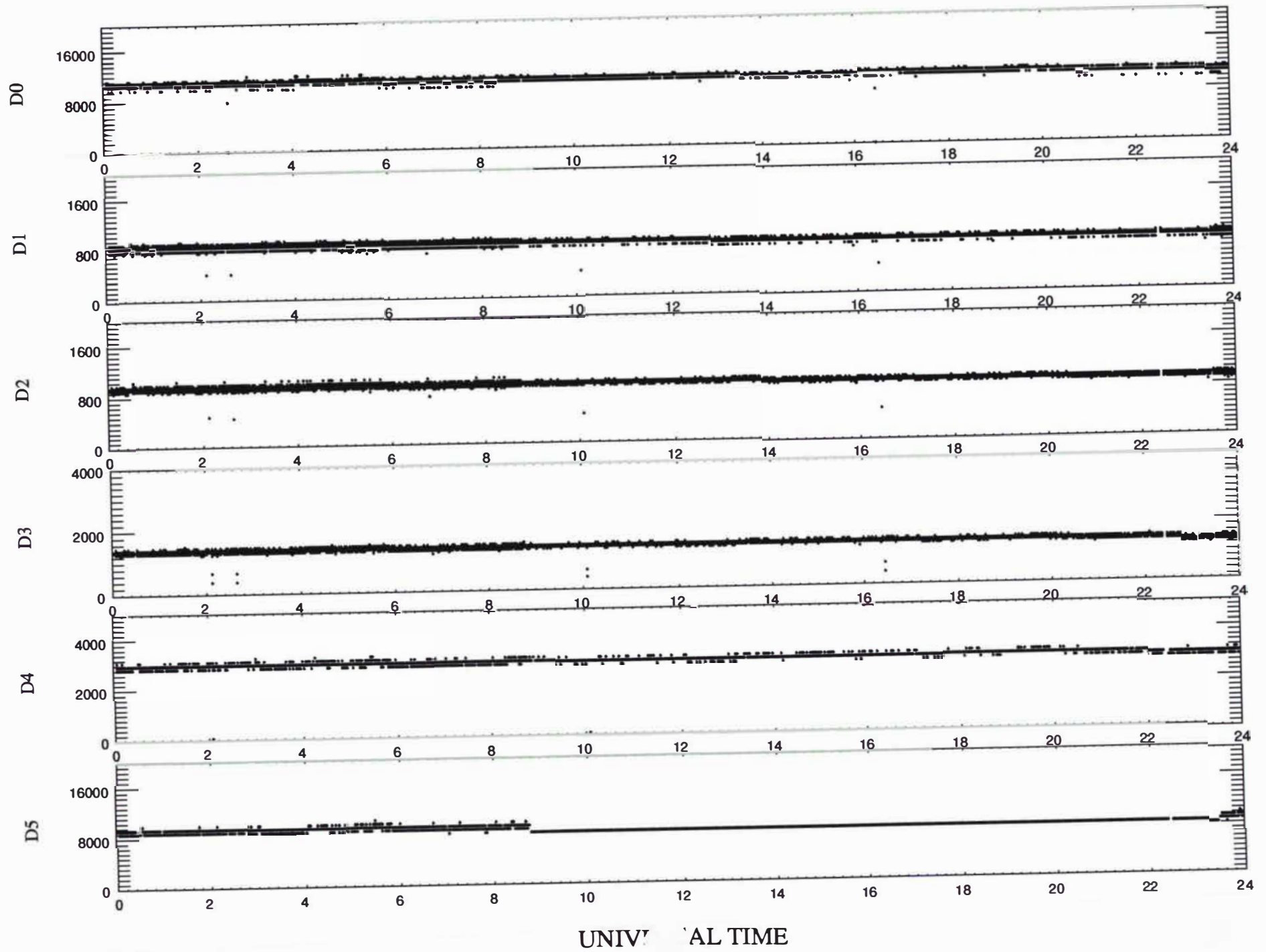
UNIVERSAL TIME



CALIBRATION DATA INCLUDED



UNIV AL TIME



CATSEARCH PROGRAM

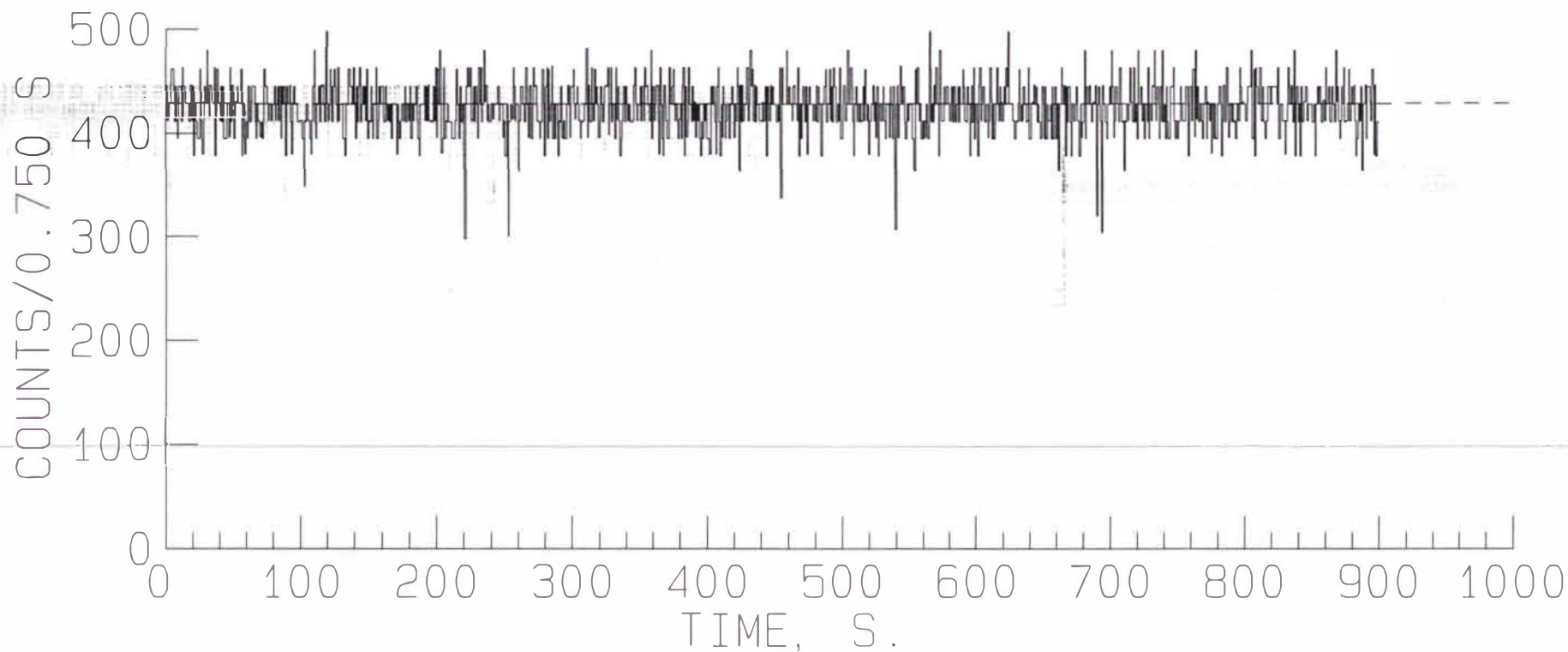
BATSE BURST # 1211
EVENT OF 1991 DEC 24 DAY OF YEAR=358
EVENT CROSSING TIME AT BATSE : 21944. S. OR 06:05:44.1
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 255.300 11.400
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 24/12/ 91 IS:
RA= 167.804 DEC= 6.645 DIST= 4.680 AU
BATSE-ULYSSES DISTANCE = 700189336. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 93.75 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -152.77 SECS.
CROSSING TIME AT ULYSSES IS 21791. S. OR 06:03:11 +/- 452.30 SECONDS

ND

14 / 4 / 93

ULYSSES RT
24/12/91 21348.170 s
0.250 S INTERVALS REGROUPED BY 3
0- 0 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



CATSEARCH PROGRAM

RI

BATSE BURST # 1212
EVENT OF 1991 DEC 24 DAY OF YEAR=358
EVENT CROSSING TIME AT BATSE : 39778. S. OR 11:02:57.8
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 45.430 -10.790
BATSE PEAK COUNTING RATE: 0000 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 24/12/ 91 IS:
RA= 167.804 DEC= 6.645 DIST= 4.680 AU
BATSE-ULYSSES DISTANCE = 700189336. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 57.04 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 1270.81 SECS.
CROSSING TIME AT ULYSSES IS 41049. S. OR 11:24:08.7 +/- 409.51 SECONDS

Hoho. corr. removed

Date: Nov 25 '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?
- ☐ Is the order of the data in CORREL such that a vernier is done on the data with the best time resolution? *No-bad stats*

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)?
- ☒ 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?
- ☒ ACCESS database updated?

N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

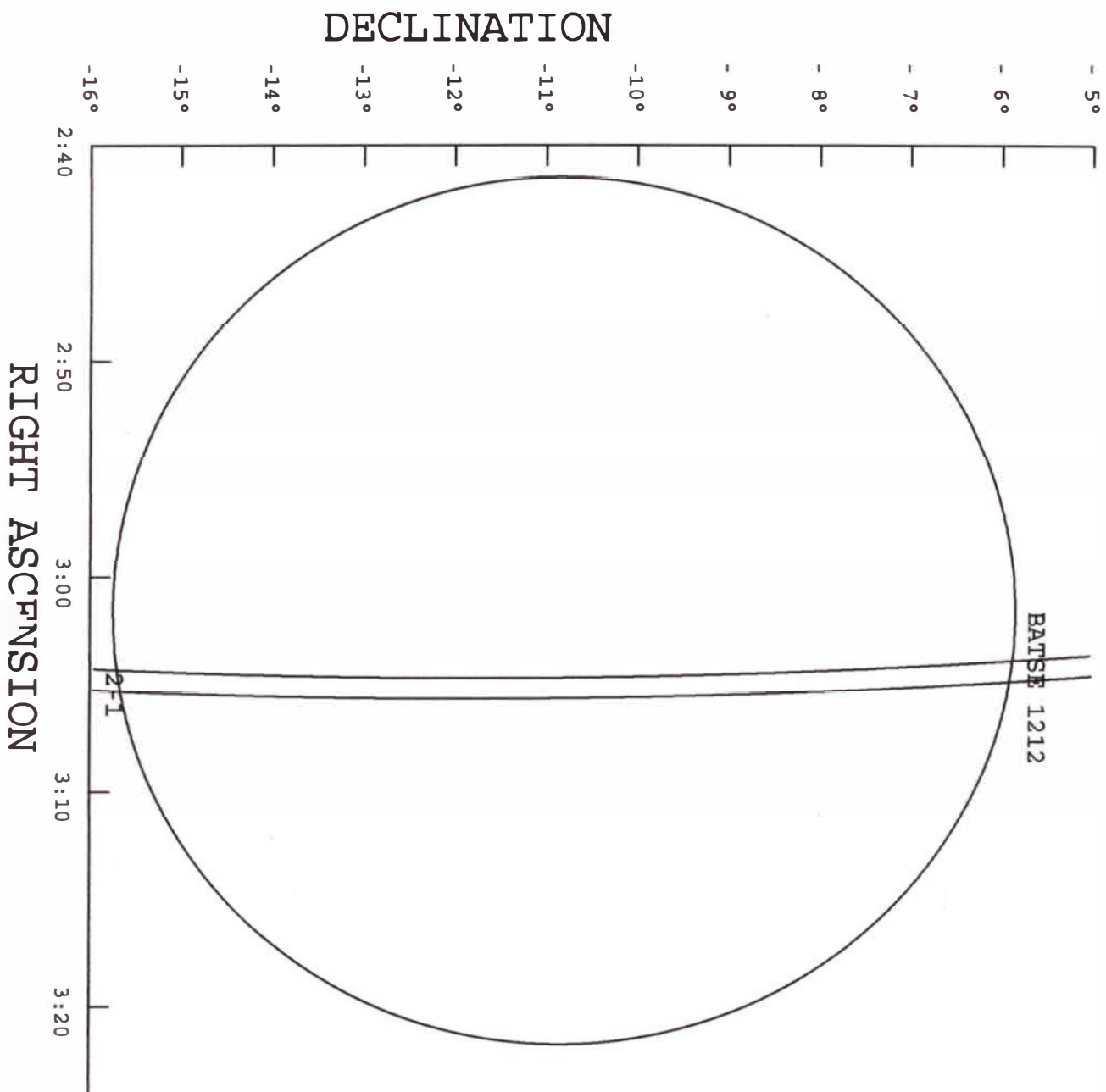
G=GALACTIC EQUATOR

1 ULYSSES

2 BATSE

EVENT OF DEC 24, 1991 11:23

25/11/97



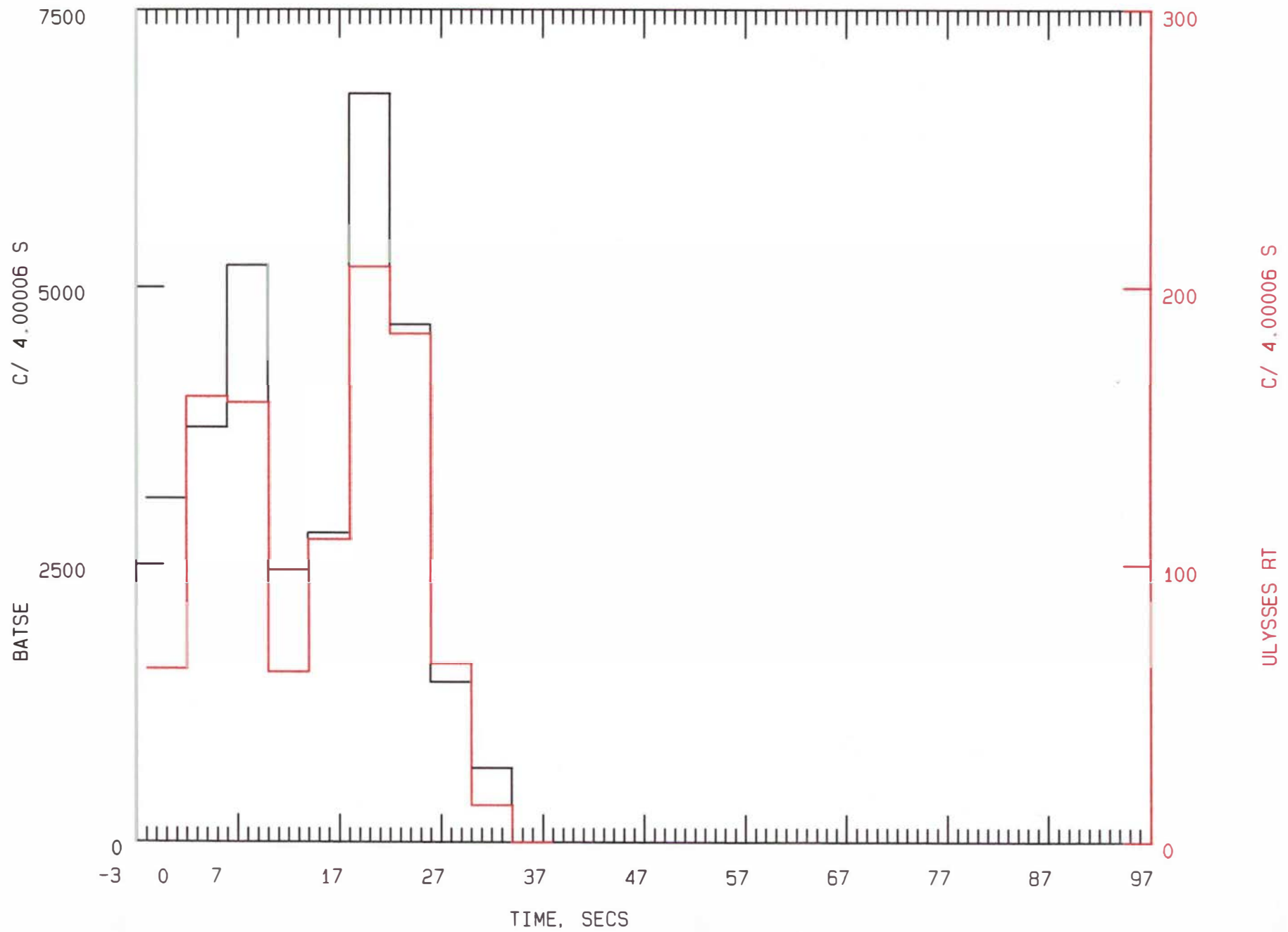
BATSE

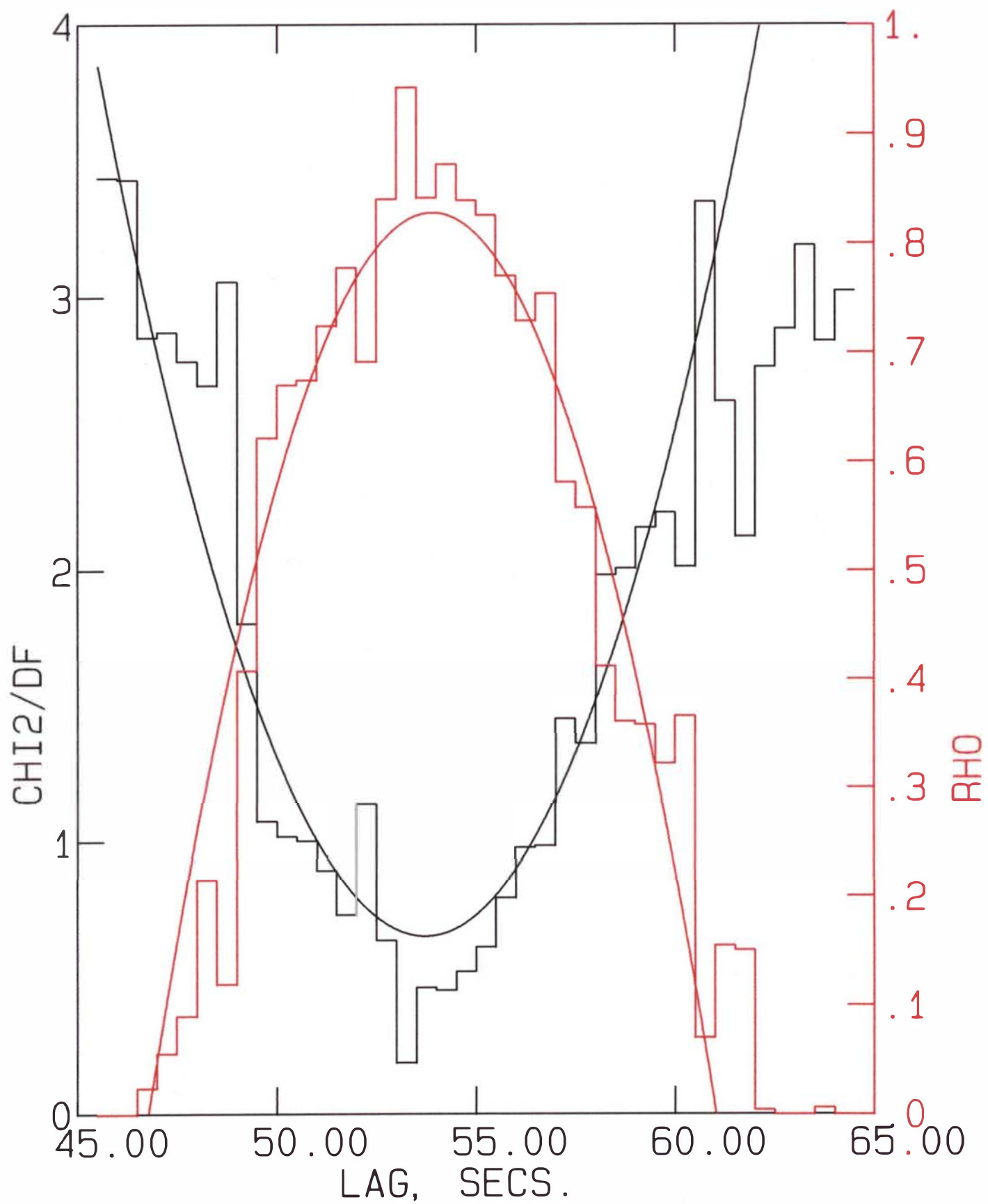
-ULYSSES RT CORRELATION

24/12/91

39777.899

25/11/97





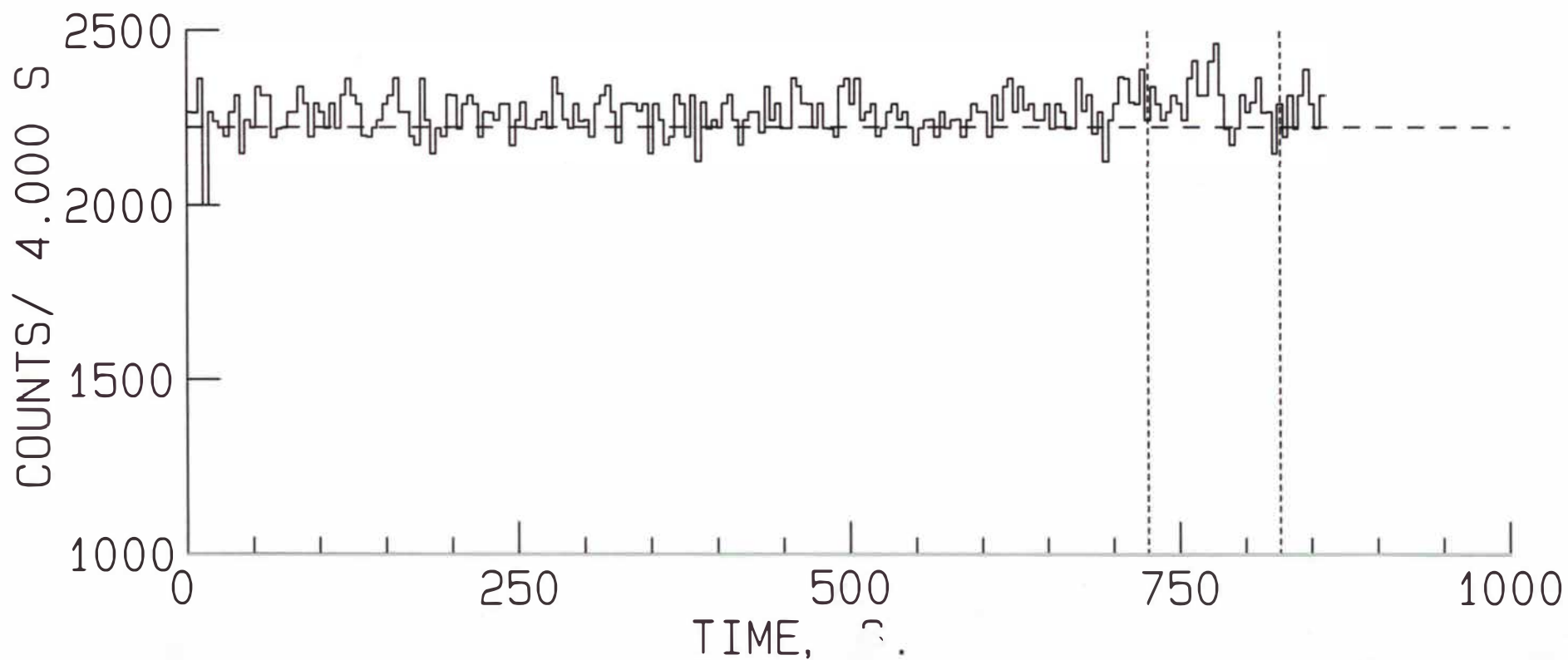
ULYSSES RT

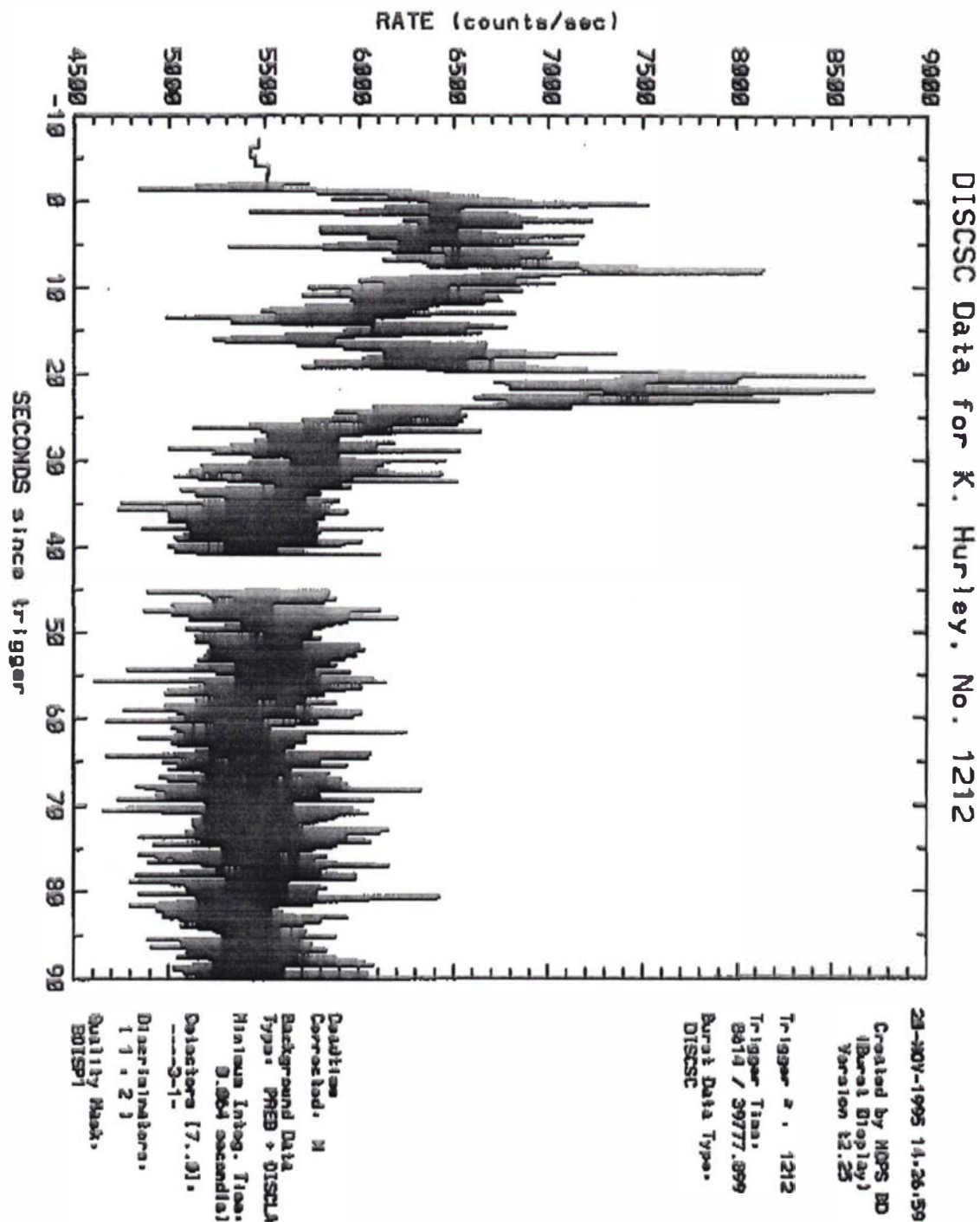
25 / 11 / 97

24/12/91 40284.494 s

0.500 S INTERVALS REGROUPED BY 8

18- 163 keV





911224

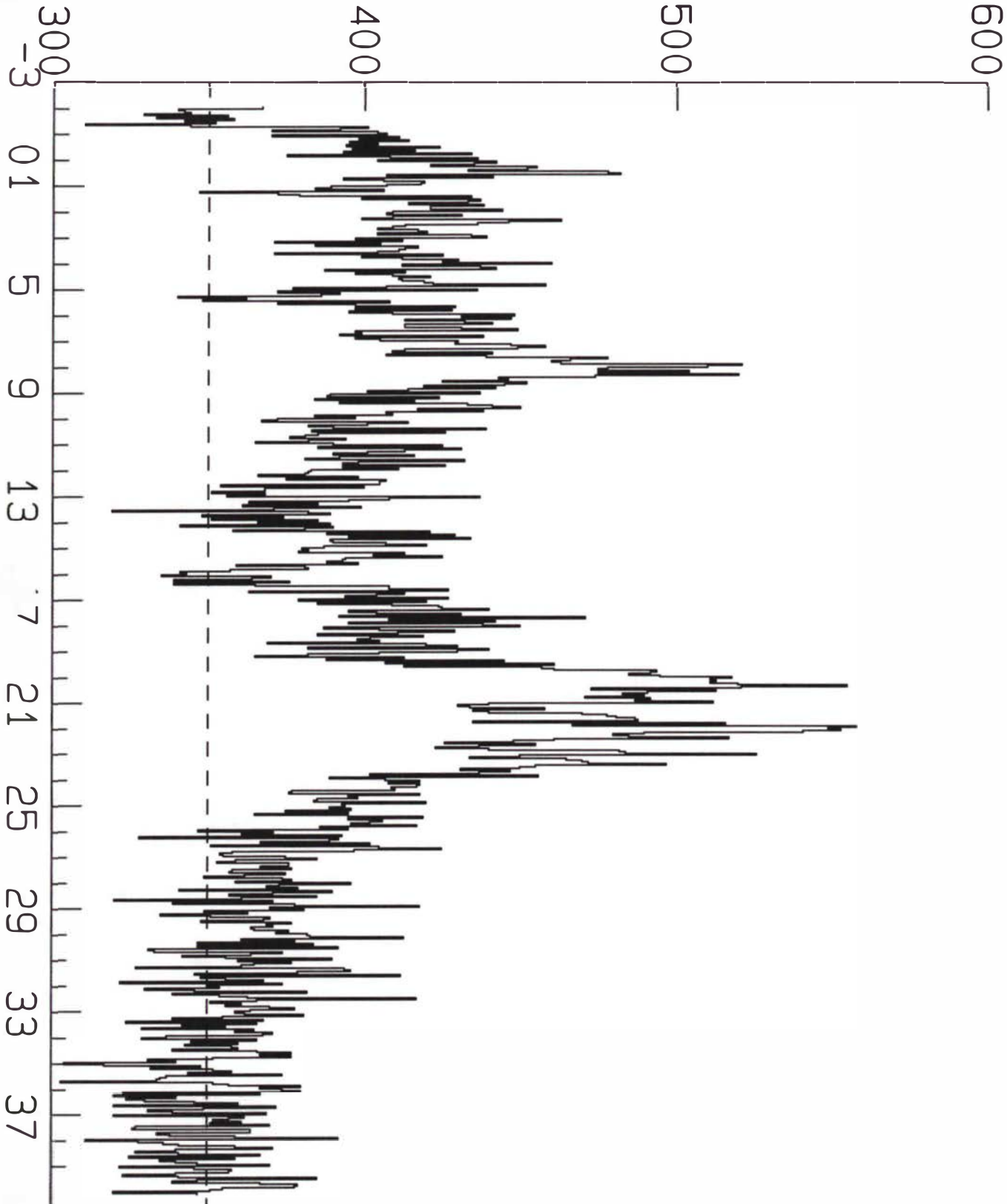
BATSE

24/12/91

39777.899

25- 100 keV

COUNTS/0.064 S



CATSEARCH PROGRAM

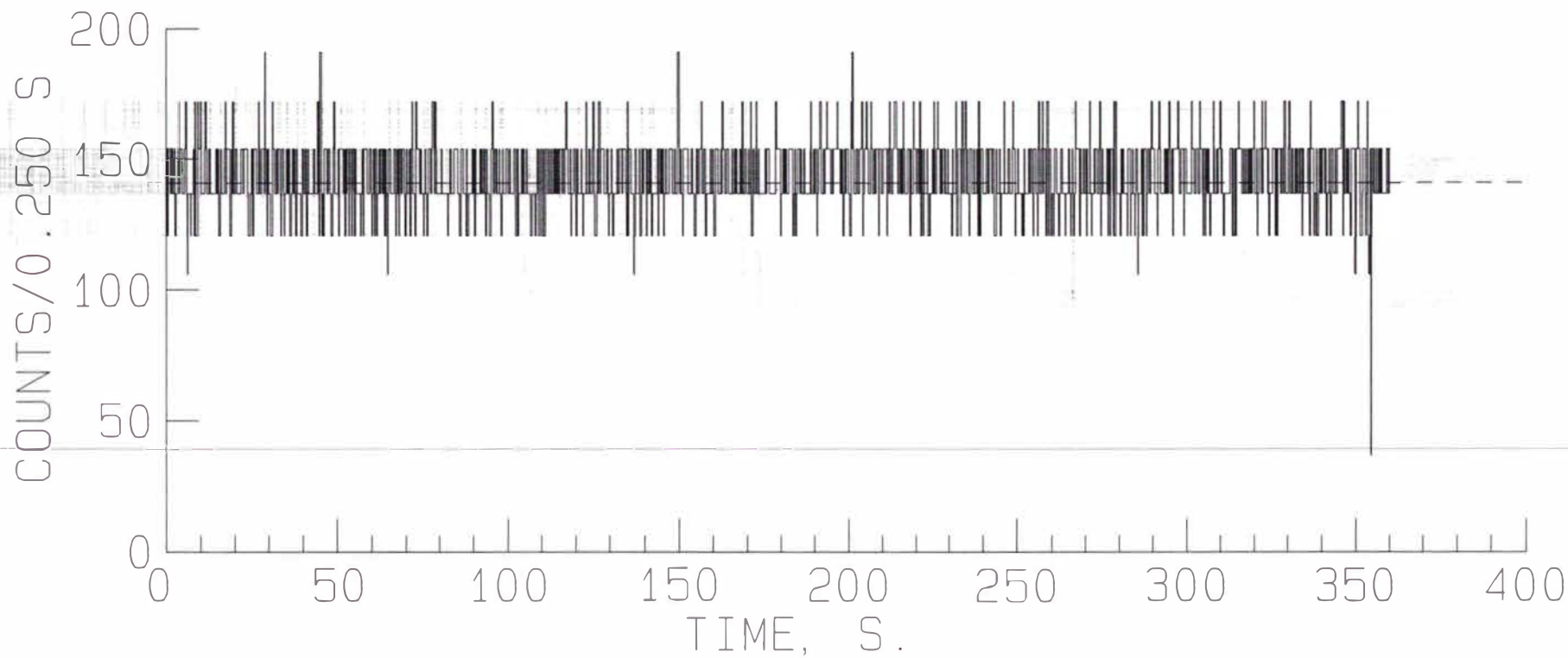
BATSE BURST # 1213
EVENT OF 1991 DEC 24 DAY OF YEAR=358
EVENT CROSSING TIME AT BATSE : 56133. S. OR 15:35:33.2
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 339.900 -18.200
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 24/12/ 91 IS:
RA= 167.804 DEC= 6.645 DIST= 4.680 AU
BATSE-ULYSSES DISTANCE = 700189336. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 13.89 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 2267.31 SECS.
CROSSING TIME AT ULYSSES IS 58401. S. OR 16:13:20 +/- 181.76 SECONDS

1b

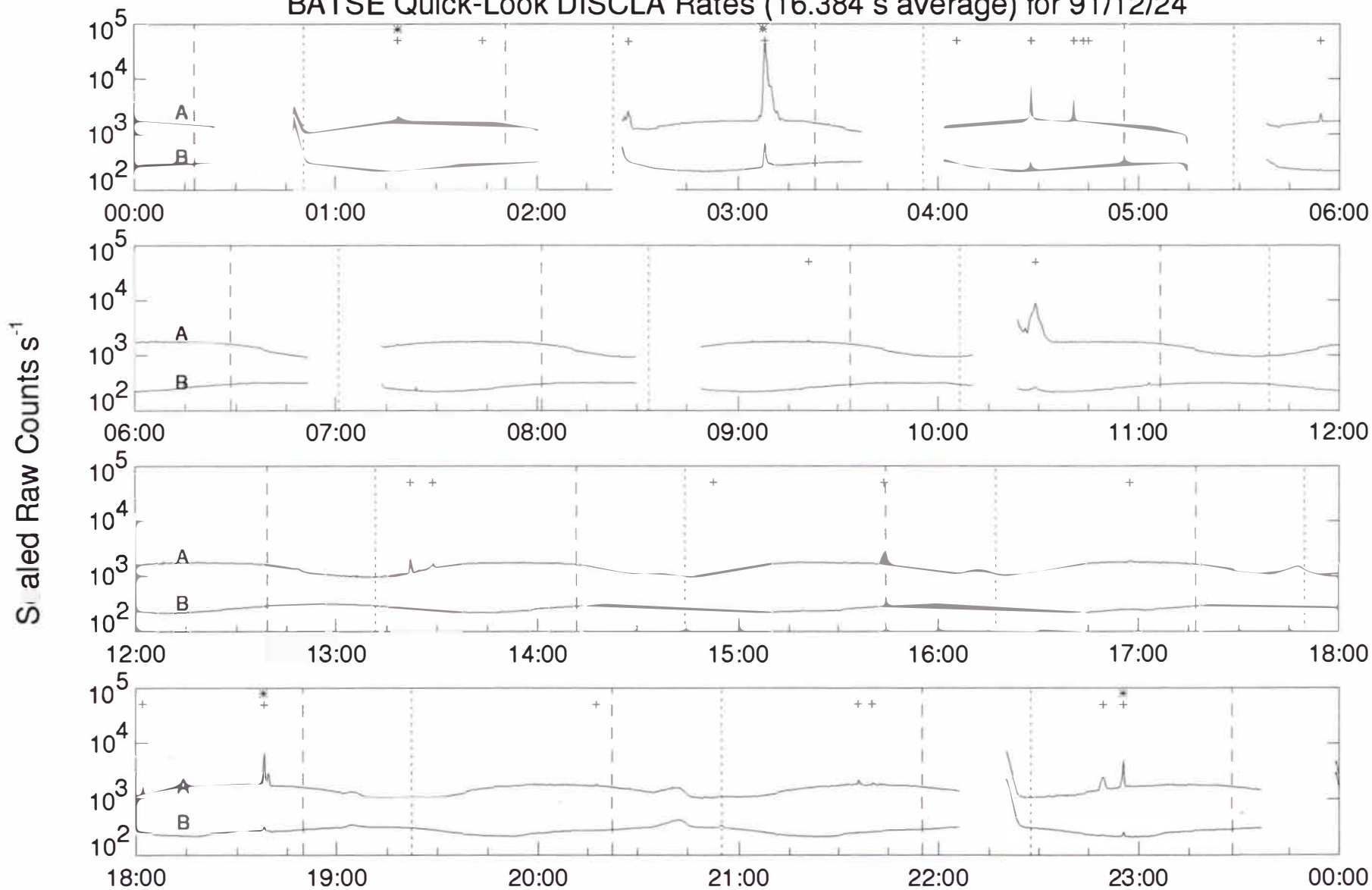
14 / 4 / 93

ULYSSES RT
24/12/91 58212.051 s
0- 0 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/24

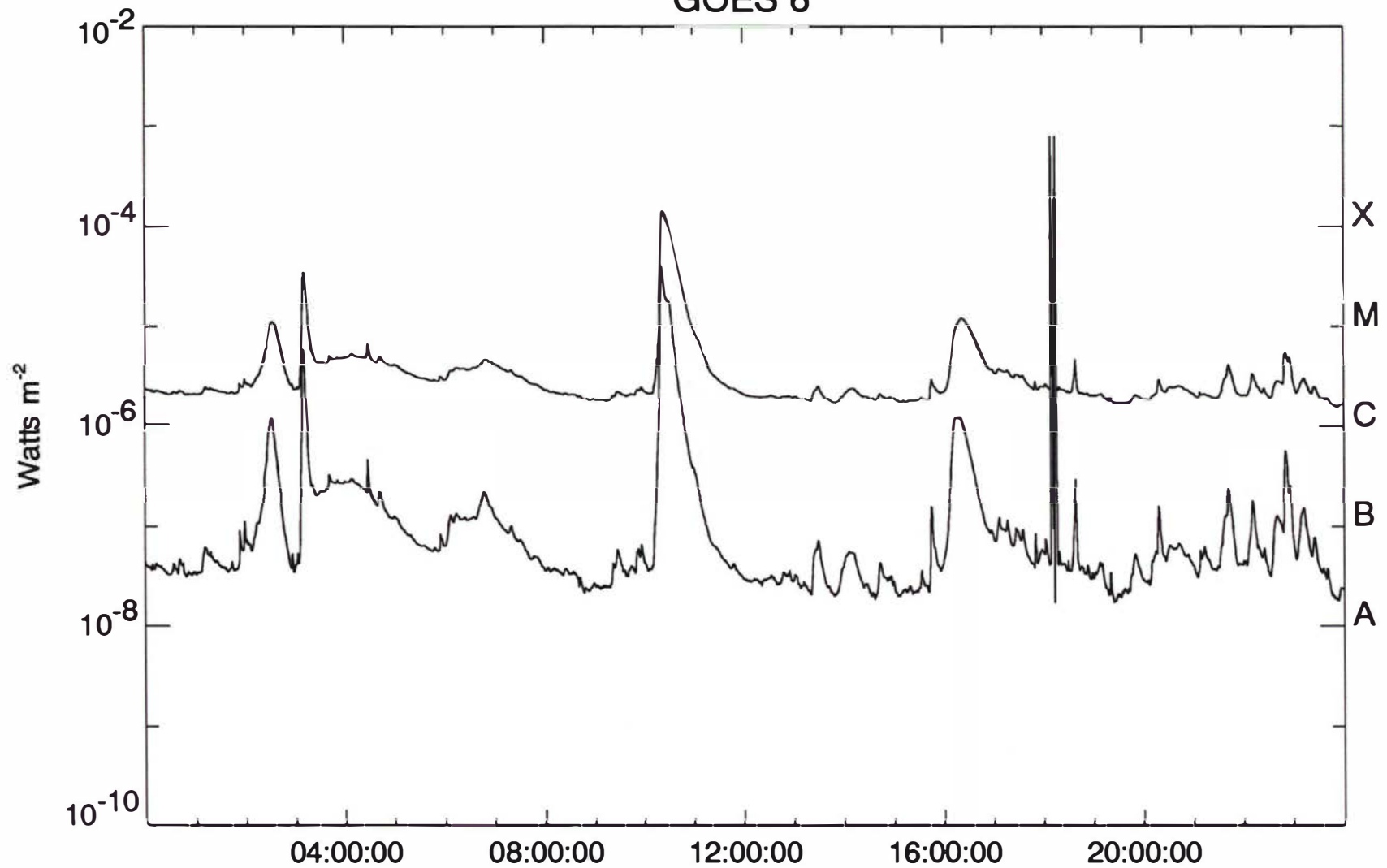


Current Time: 92/10/18, 1917 EDT
 A: Channel 1 Most Sunward LAD
 B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

GOES 6



Data Start: 91/12/24, 0000:01

Plot created: 97/10/20, 1555

Channel

1 (1.0 - 8.0 Angstroms)

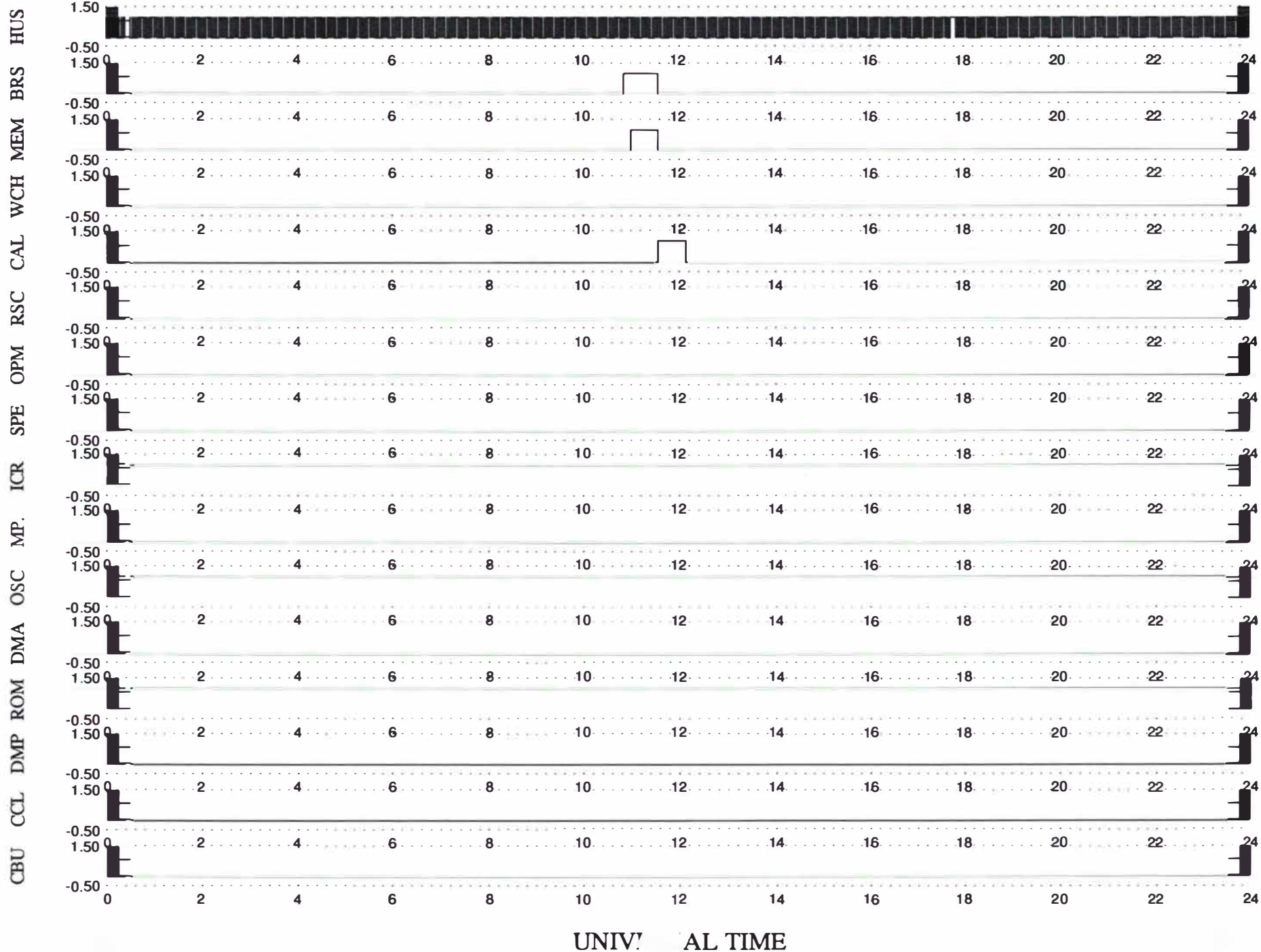
Background not subtracted

2 (0.5 - 4.0 Angstroms)

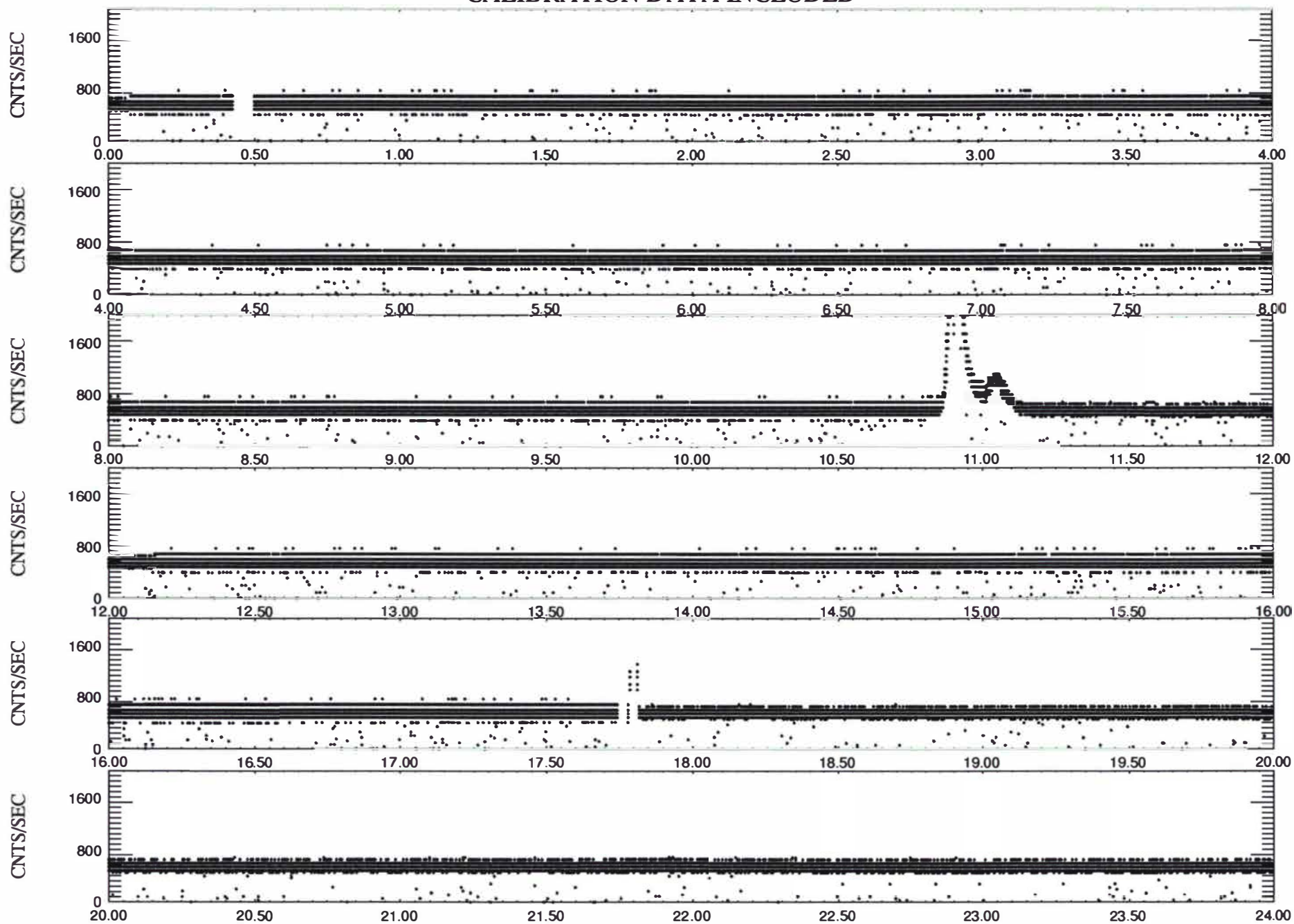
Background not subtracted

Sample average = 10

BURST NUMBER 5

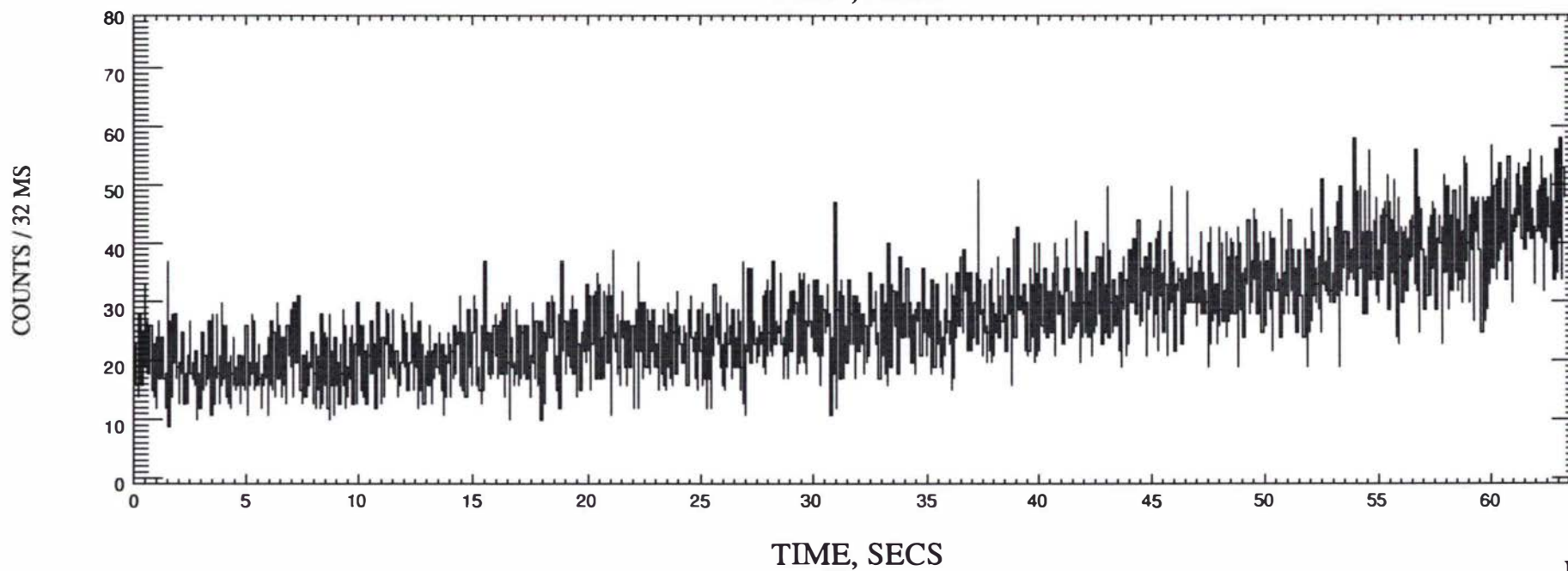
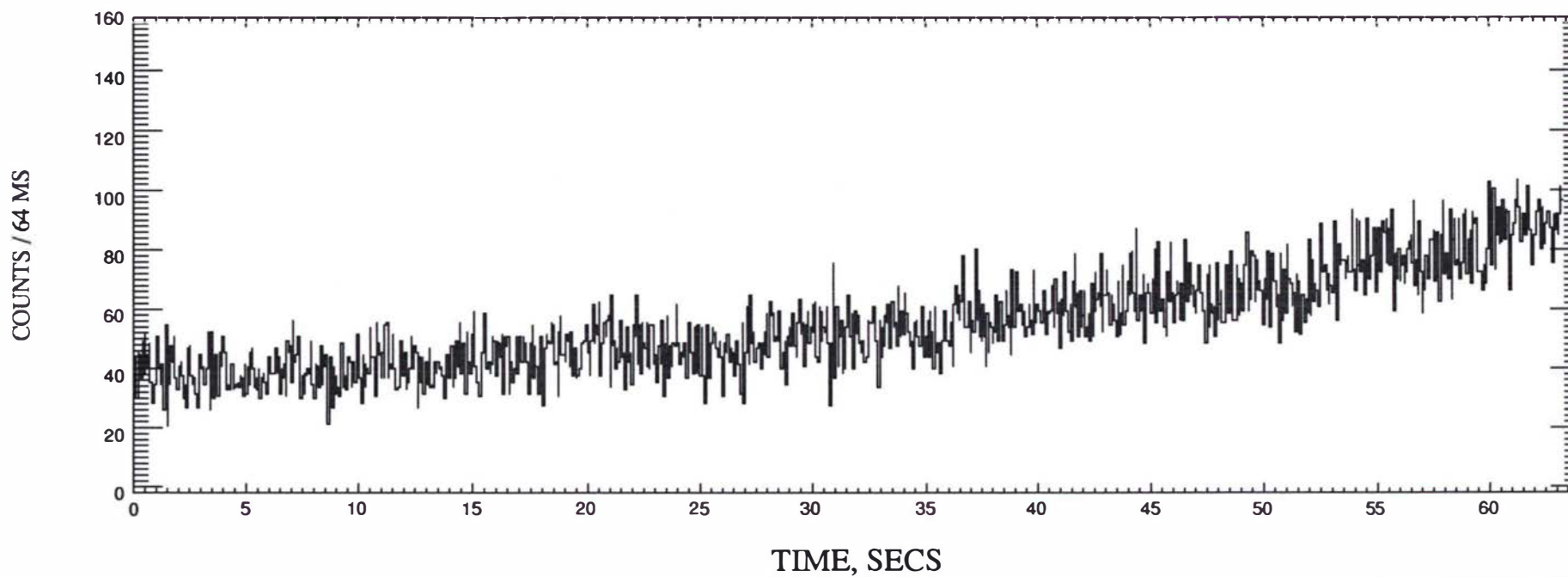


CALIBRATION DATA INCLUDED

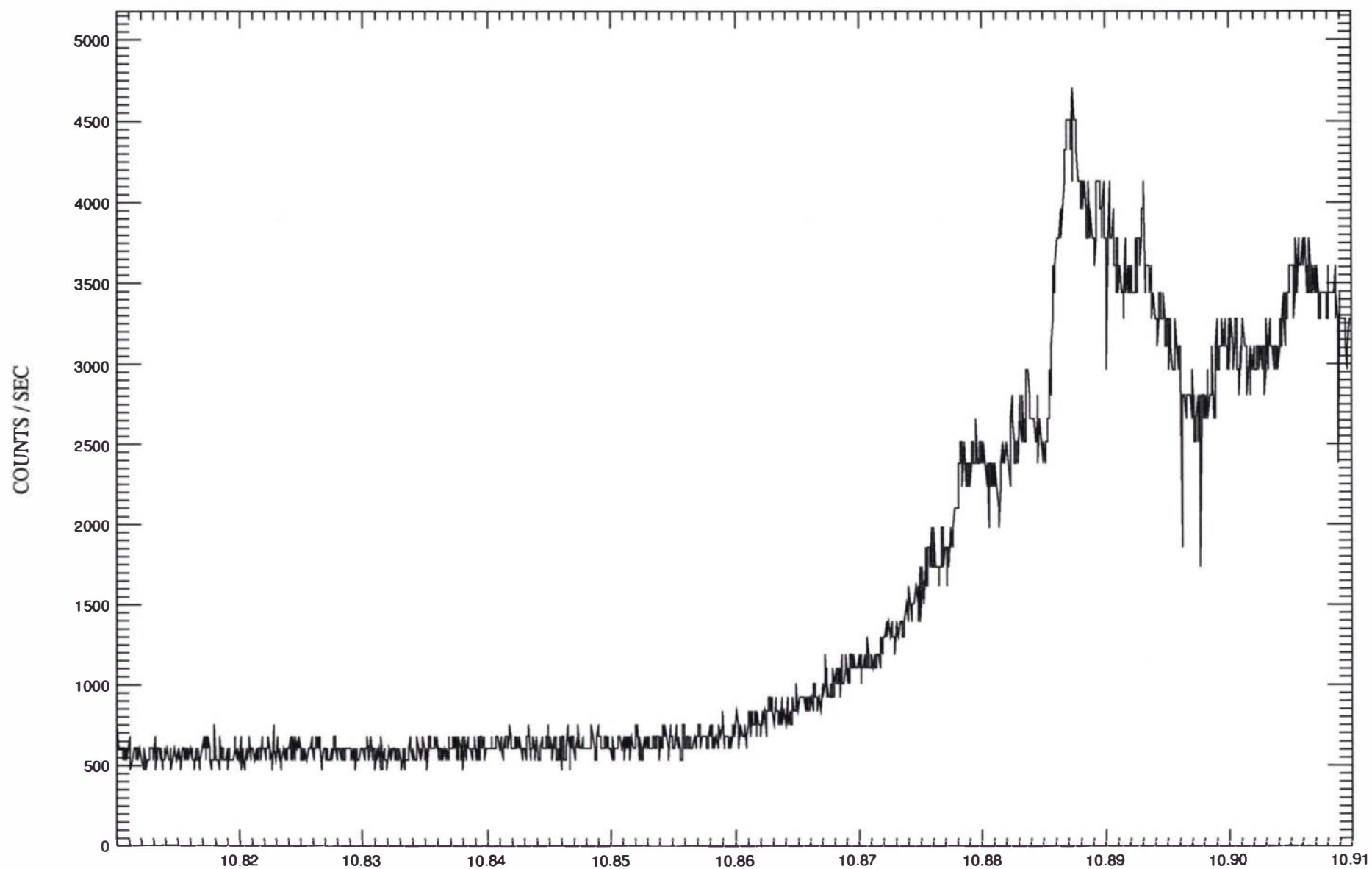


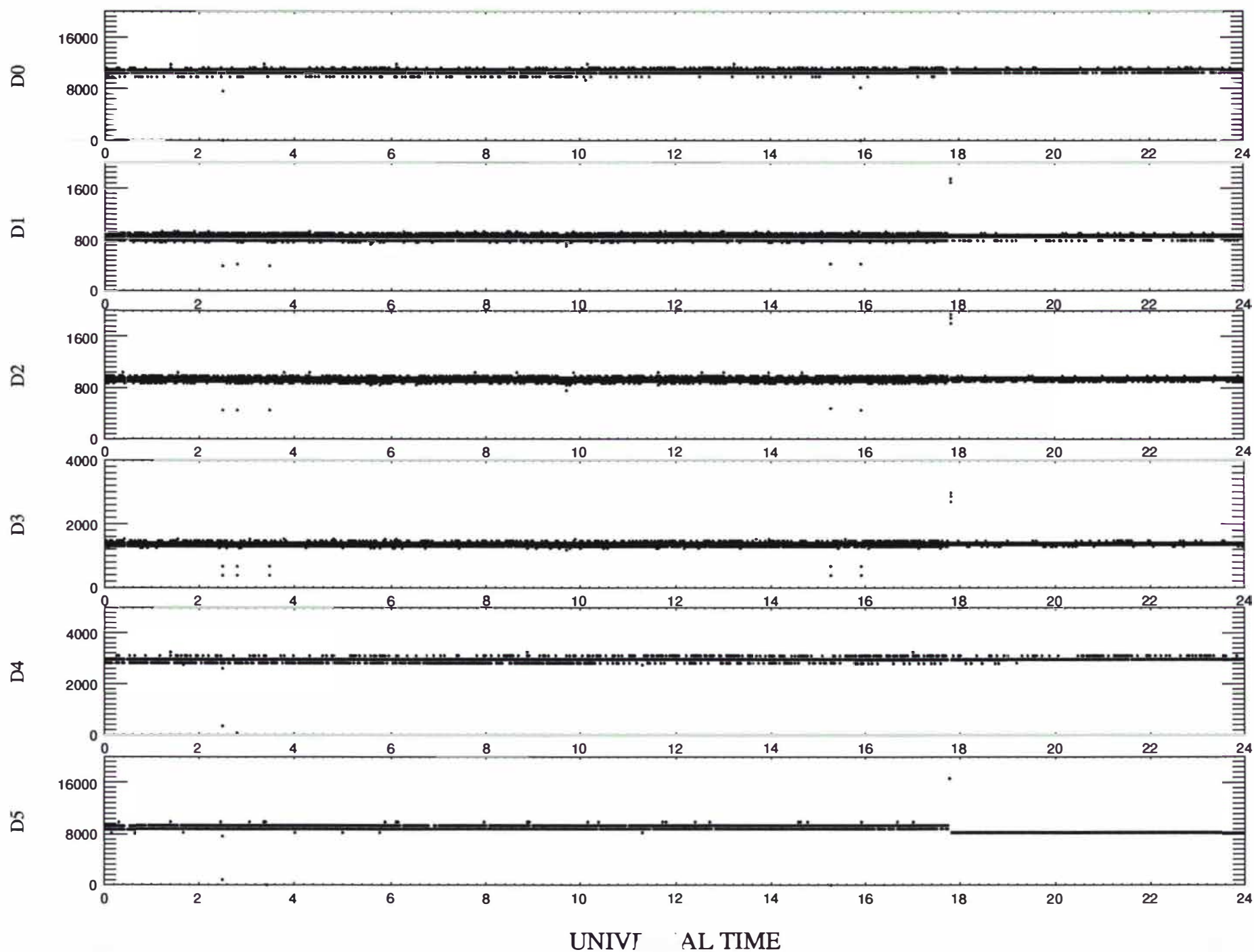
UNIV. TIME

Burst Counter 5 at UT=10.859156803555 h=39092.964 s 10:51:32.964



CALIBRATION DATA INCLUDED





BATSEARCH PROGRAM

BATSE BURST #

EVENT OF 1991 DEC 25 DAY OF YEAR=359

EVENT CROSSING TIME AT BATSE : 8279. S. OR 02:17:59.0

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

BURST ARRIVAL DIRECTION: 273.000 -23.000

BATSE PEAK COUNTING RATE: 0 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND

POSITION OF ULYSSES ON 25/12/ 91 IS:

RA= 167.787 DEC= 6.655 DIST= 4.672 AU

BATSE-ULYSSES DISTANCE = 698977576. KM.

ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 73.43 DEG.

LIGHT TRAVEL TIME ALONG PROJECTED PATH= 664.96 SECS.

CROSSING TIME AT ULYSSES IS 8944. S. OR 02:29:03 +/- 448.08 SECONDS

Ulysses crossing if solar: $8279 + 1830 = 10109 S$

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
 .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)	Bkgd - subtracted			Ulysses crossing if Solar	Factor*
					chan 1 (c/s)	chan 2 (c/s)	chan 3 (c/s)		
230	8403	20250	27 May 91	8	4000	1400	200	215483	5.7
288	8414	730	7 Jun 91	40	350	400	300	21275	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

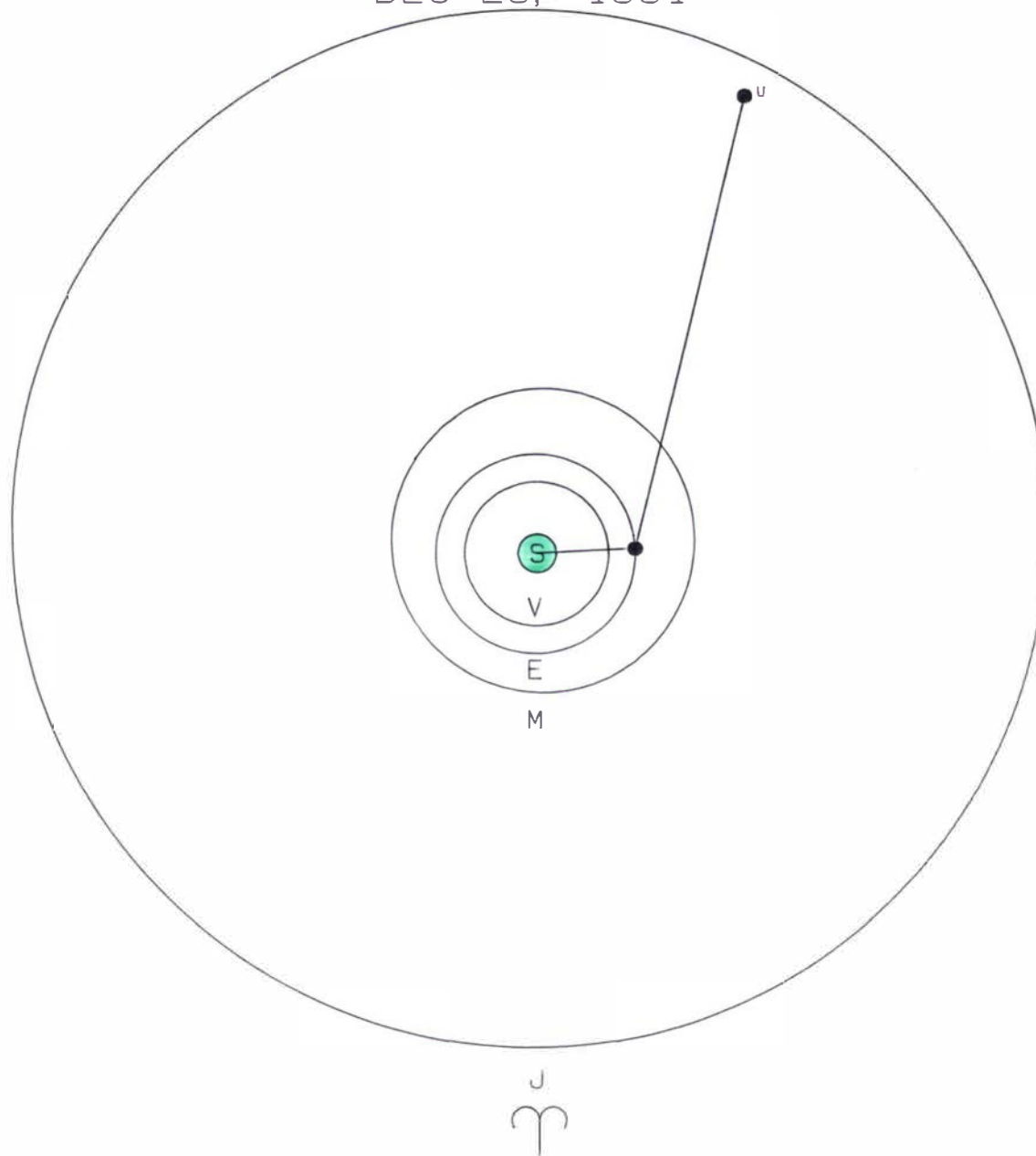
DAY, MONTH, YEAR, AND HELIOCENTRIC ECLIPTIC LONGITUDE OF VENUS
DAY, MONTH, YEAR, AND HELIOCENTRIC ECLIPTIC LONGITUDE OF EARTH
25 12 1991 92.68

DAY, MONTH, YEAR, AND HELIOCENTRIC ECLIPTIC LONGITUDE OF ULYSSES
POSITION OF ULYSSES ON 25/12/1991 IS:
RA= 167.766 DEC= 6.667 DIST= 4.664 AU
25 12 1991 155.35

INTERSPACECRAFT DISTANCES IN AU
VENUS-ULYSSES 4.721
EARTH-ULYSSES 4.664
EARTH-VENUS .266

Ulysses-BASE 3.66 AU = 1830s

ULYSSES ORBIT - ECLIPTIC PLANE PROJECTION
DEC 25, 1991



9 / 9 / 92

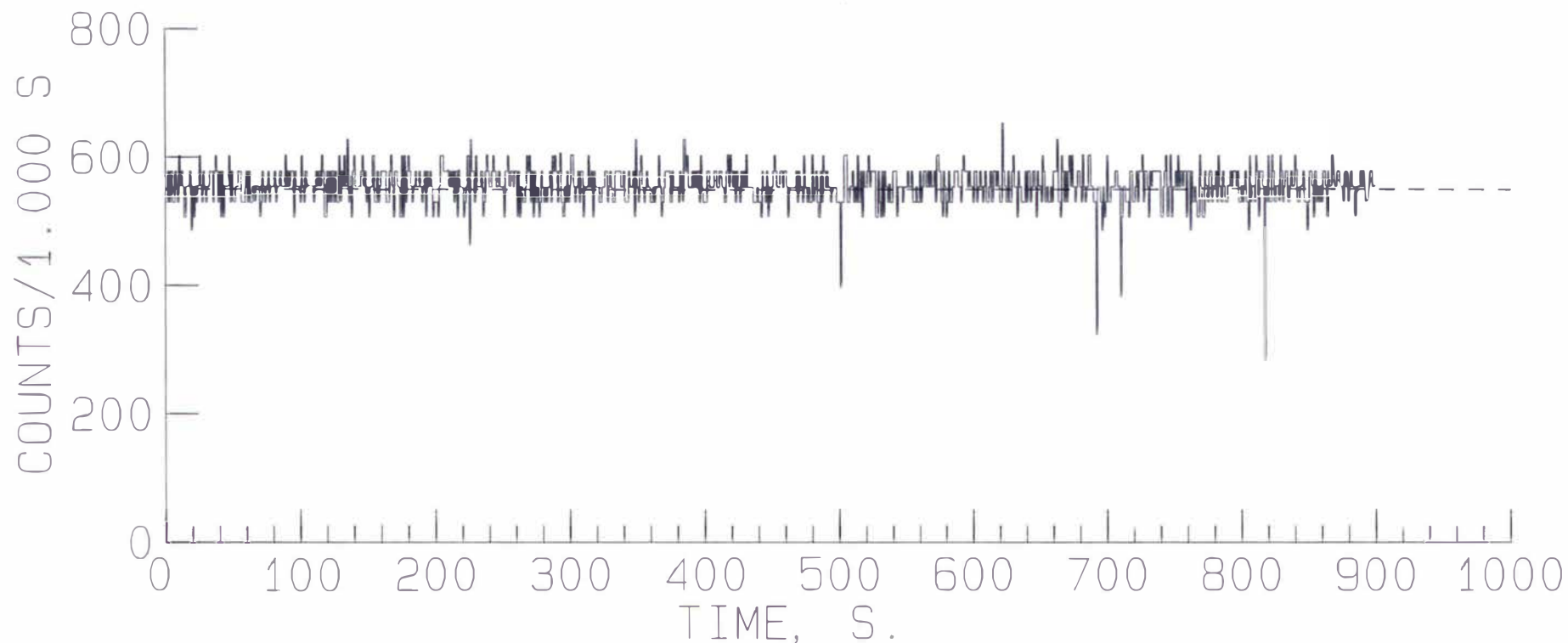
ULYSSES RT

25/12/91 8496.433 s (*Cosmic origin*)

.500 S INTERVALS REGROUPED BY 2

18- 162 keV

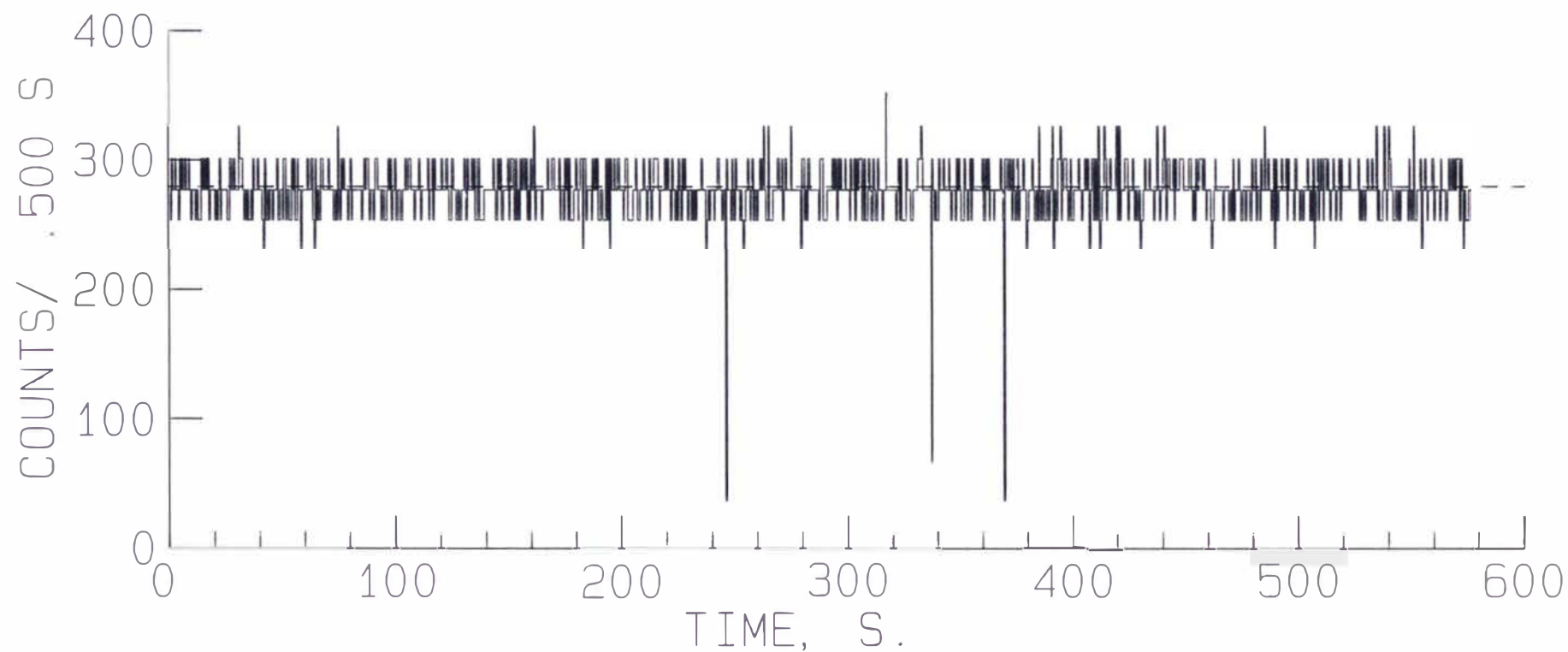
N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



19 / 9 / 92

ULYSSES RT
25/12/91 9828.450 s (*Solar origin*)
18- 162 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



CATSEARCH PROGRAM

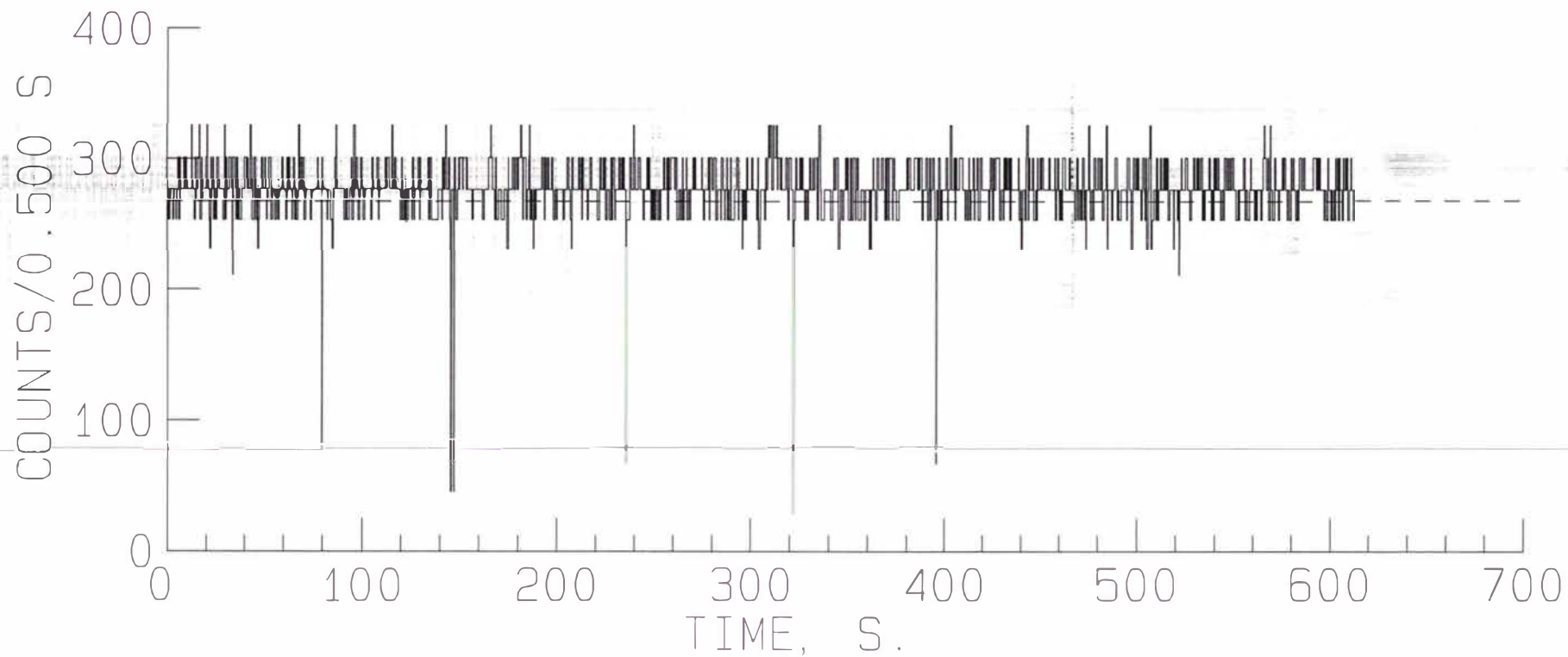
BATSE BURST # 1218
EVENT OF 1991 DEC 25 DAY OF YEAR=359
EVENT CROSSING TIME AT BATSE : 32735. S. OR 09:05:34.8
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 334.800 25.900
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 25/12/ 91 IS:
RA= 167.787 DEC= 6.655 DIST= 4.672 AU
BATSE-ULYSSES DISTANCE = 698977576. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 34.91 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 1911.91 SECS.
CROSSING TIME AT ULYSSES IS 34647. S. OR 09:37:26 +/- 310.71 SECONDS

NO

14 / 4 / 93

ULYSSES RT
25/12/91 34344.371 s
0- 0 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



CATSEARCH PROGRAM

BATSE BURST # 1221
EVENT OF 1991 DEC 25 DAY OF YEAR=359
EVENT CROSSING TIME AT BATSE : 61718. S. OR 17:08:37.5
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 255.000 -33.000
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 25/12/ 91 IS:
RA= 167.787 DEC= 6.655 DIST= 4.672 AU
BATSE-ULYSSES DISTANCE = 698977576. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 88.70 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 52.73 SECS.
CROSSING TIME AT ULYSSES IS 61770. S. OR 17:09:30 +/- 455.49 SECONDS

ND

14 / 4 / 93

ULYSSES RT

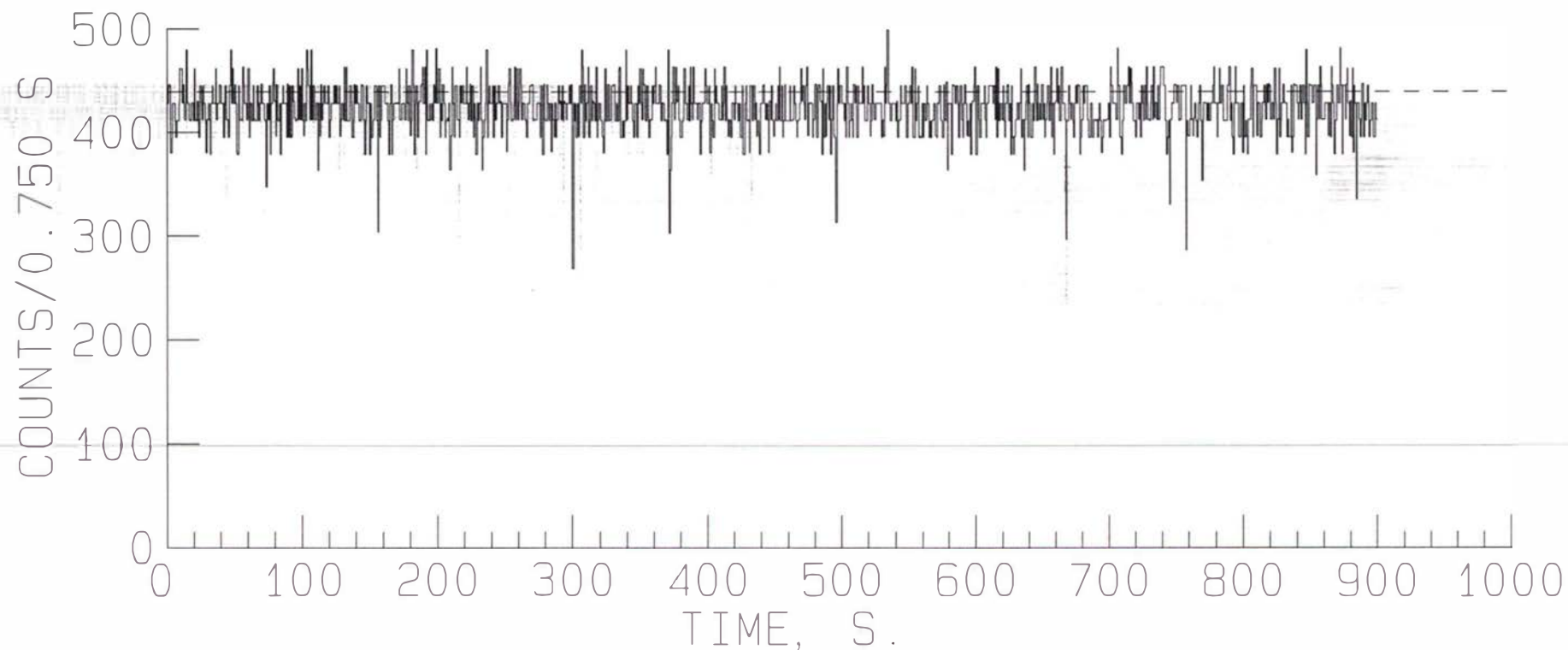
25/12/91 61308.090 s

0.250 S INTERVALS REGROUPED BY 3

0- 0 keV

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS



FAX MESSAGE

DATE: November 5, 1991

TO: JOHN LAROS, LANL, (505) 665 4414

FROM: Kevin Hurley
University of California
Space Sciences Laboratory
Berkeley, CA 94720
Phone: (510) 643-9173
Fax: (510) 643-7629
E-mail: khurley@sunspot.ssl.berkeley.edu

11-6
FAXED

TOTAL NUMBER OF PAGES: 1

PLEASE NOTE AREA CODE CHANGE

I HAVEN'T BEEN ABLE TO REACH YOU BY PHONE - HERE IS WHAT I WANTED TO ASK/TELL YOU.

1. I SUBMITTED A LETTER OF INTENT FOR THE GRO PHASE 2 GI PROGRAM - YOUR NAME IS ON IT. WE CAN WORK OUT THE DETAILS LATER.

2. WE ARE HAVING TROUBLE FINDING A CONSISTENT POSITION FOR THE AUGUST 14 EVENT, I.E. ONE THAT IS CONSISTENT WITH THE BATSE AND COMPTON LOCATIONS. THERE SEEMS TO BE AN ERROR OF ABOUT 10 SECONDS SOMEWHERE. OUR PVO TRIGGER TIME IS 69378.466, DERIVED FROM MY SOFTWARE. IS THIS CONSISTENT WITH YOUR TIME?

T₀₀ = 69394.176 according to RK's article

3. DO YOU HAVE A PVO TRIGGER LIST FOR NOVEMBER/DECEMBER 1990? I HAVE A RECORD OF ONLY ONE EVENT, DECEMBER 4, AND WE WOULD LIKE TO LOOK FOR MORE ULYSSES/PVO EVENTS.

+ 19th + 25th.

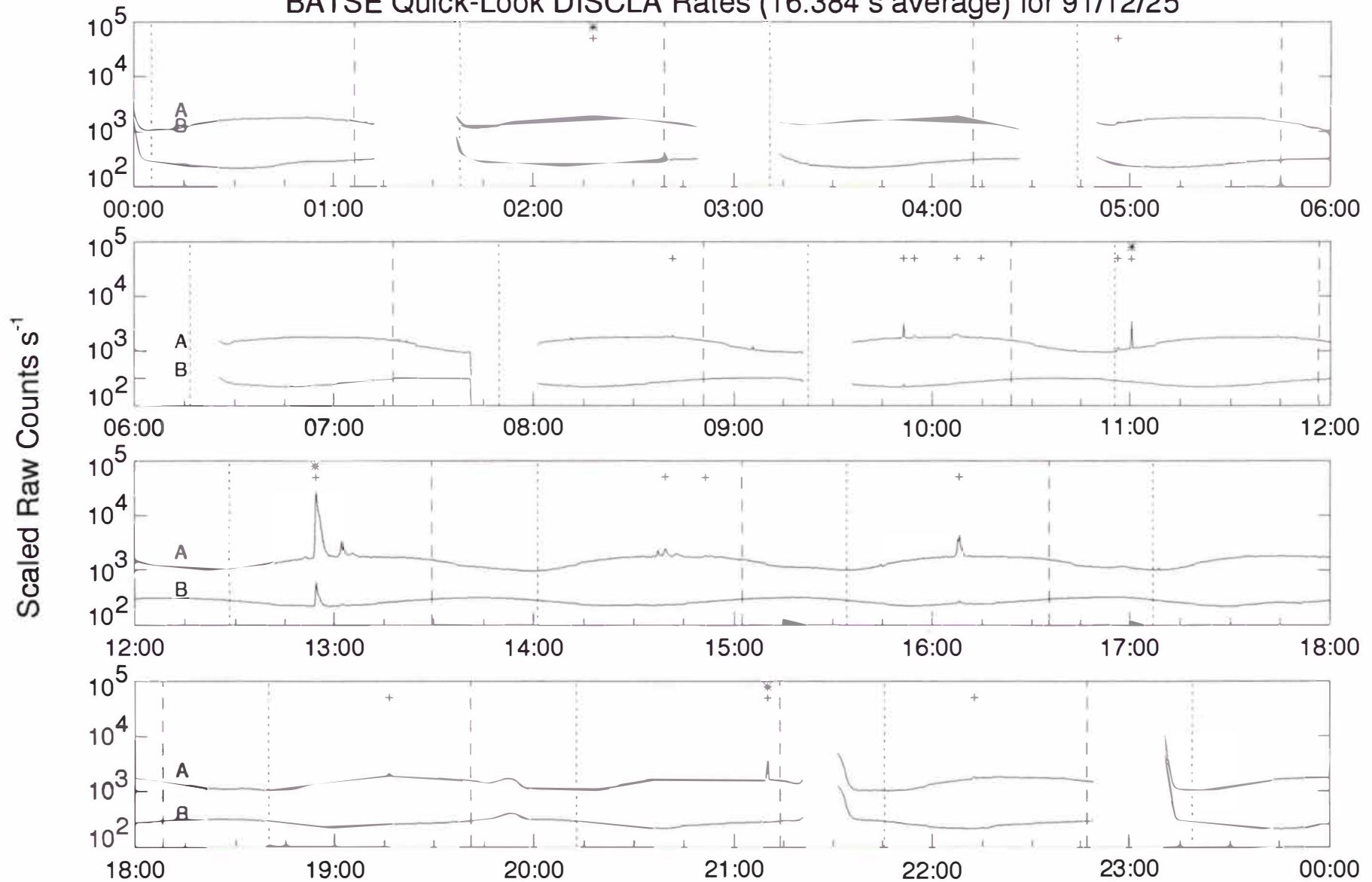
4. WE ARE TRYING TO CONFIRM AN EVENT ON APRIL 2, 1991, OBSERVED BY ULYSSES AT 51120 SECONDS. VENUS CROSSING TIME WOULD HAVE BEEN +/- 1000 SECS. DO YOU HAVE IT?

Real time - will send e-mail

5. THE FOLLOWING REQUEST COMES FROM THE SIGMA PEOPLE IN TOULOUSE. THEY ARE TRYING TO CONFIRM THE FOLLOWING BURSTS: 11 JAN 90 02:34; 27 MAR 90 10:25; 11 APR 90 16:43; 24 JUL 90 18:20; 6 DEC 90 20:33 (NO ULYSSES DATA FOR THIS ONE); 16 DEC 90 17:44 (POSSIBLE ULYSSES RATE INCREASE). DID YOU OBSERVE ANY OF THESE WITH PVO OR GINGA?

*100
COVERAGE
for any*

BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/25



Current Time: 92/10/18, 1918 EDT

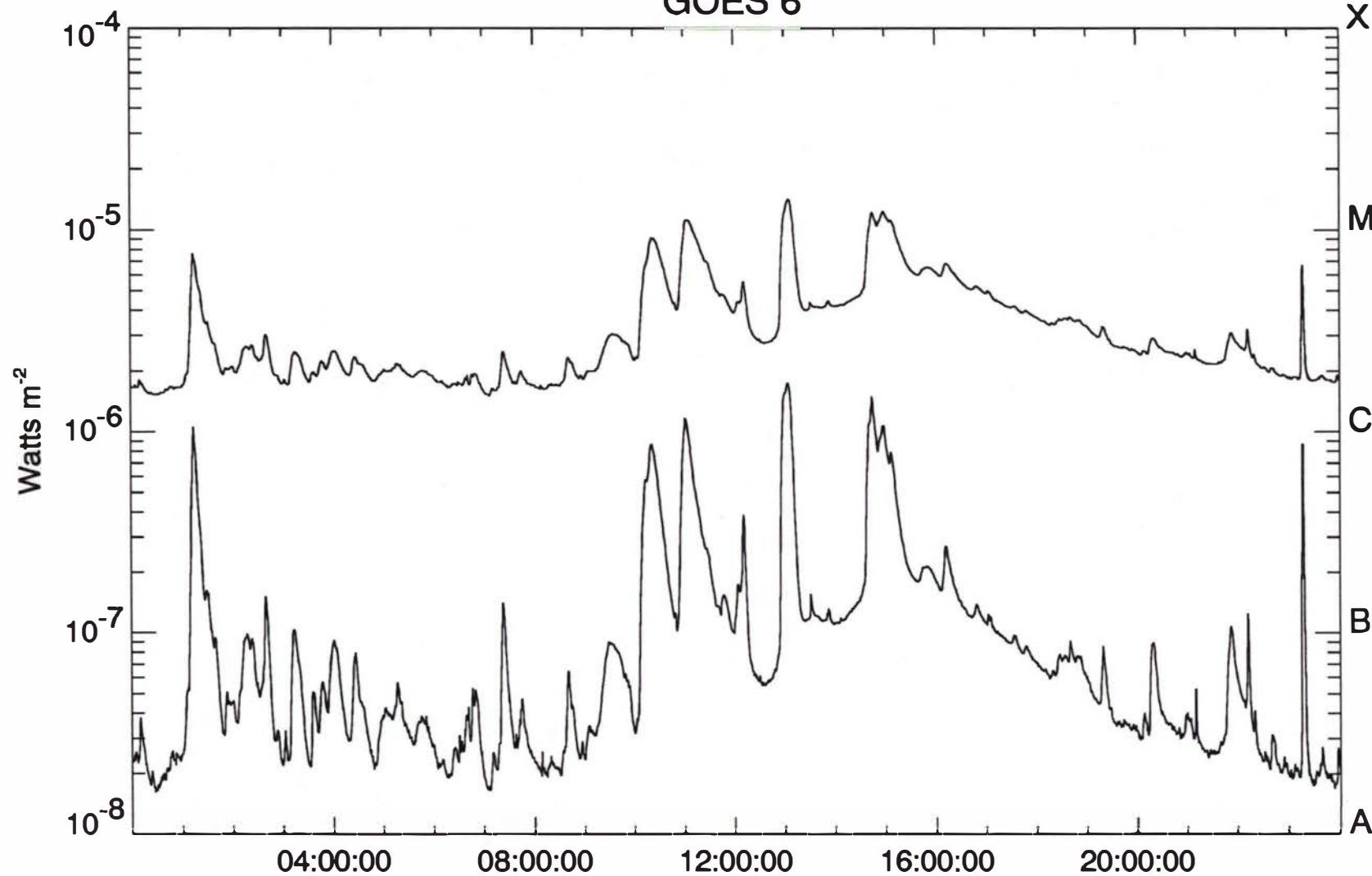
A: Channel 1 Most Sunward LAD

B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare

GOES 6



Data Start: 91/12/25, 0000:02

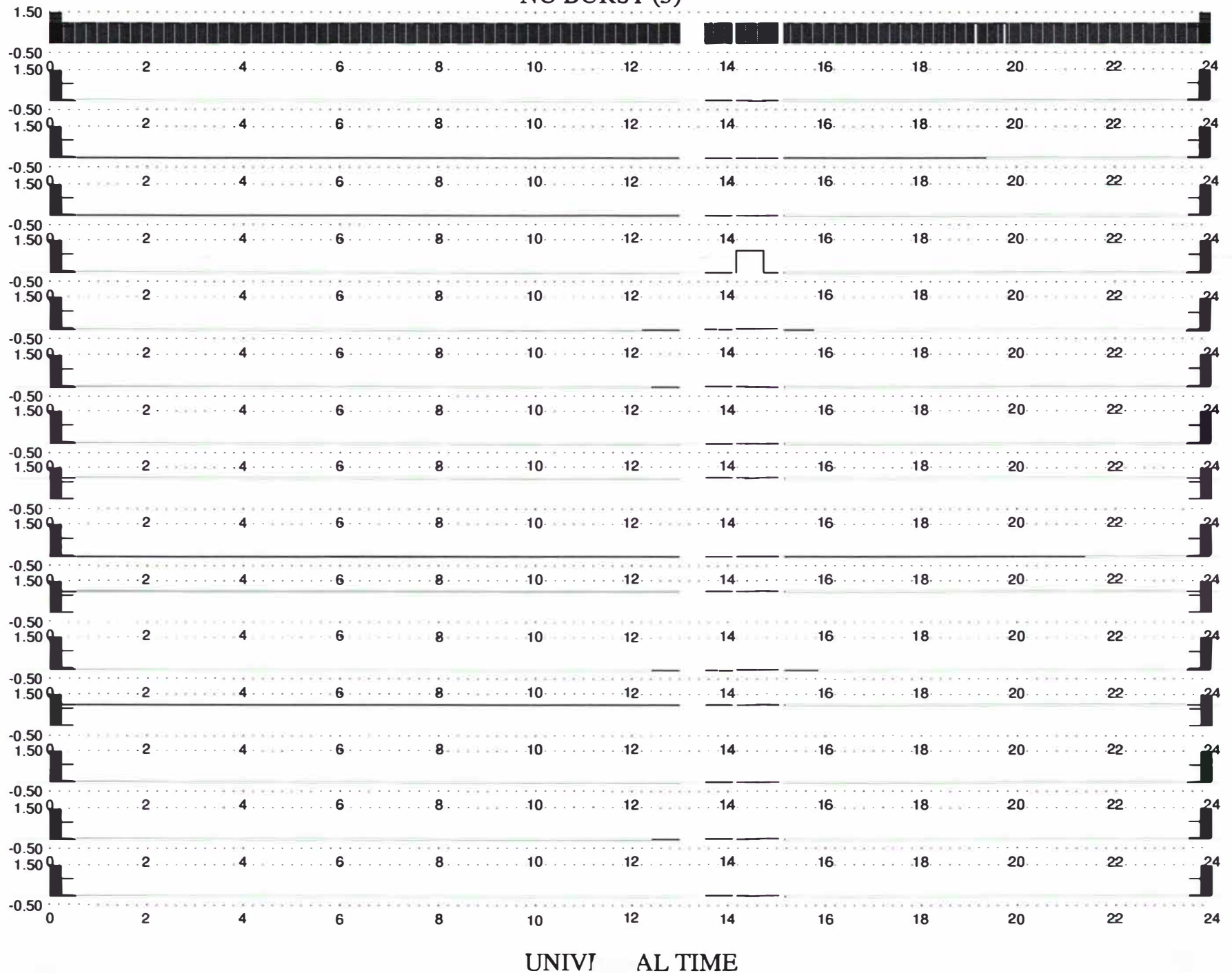
Plot created: 97/10/20, 1600

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

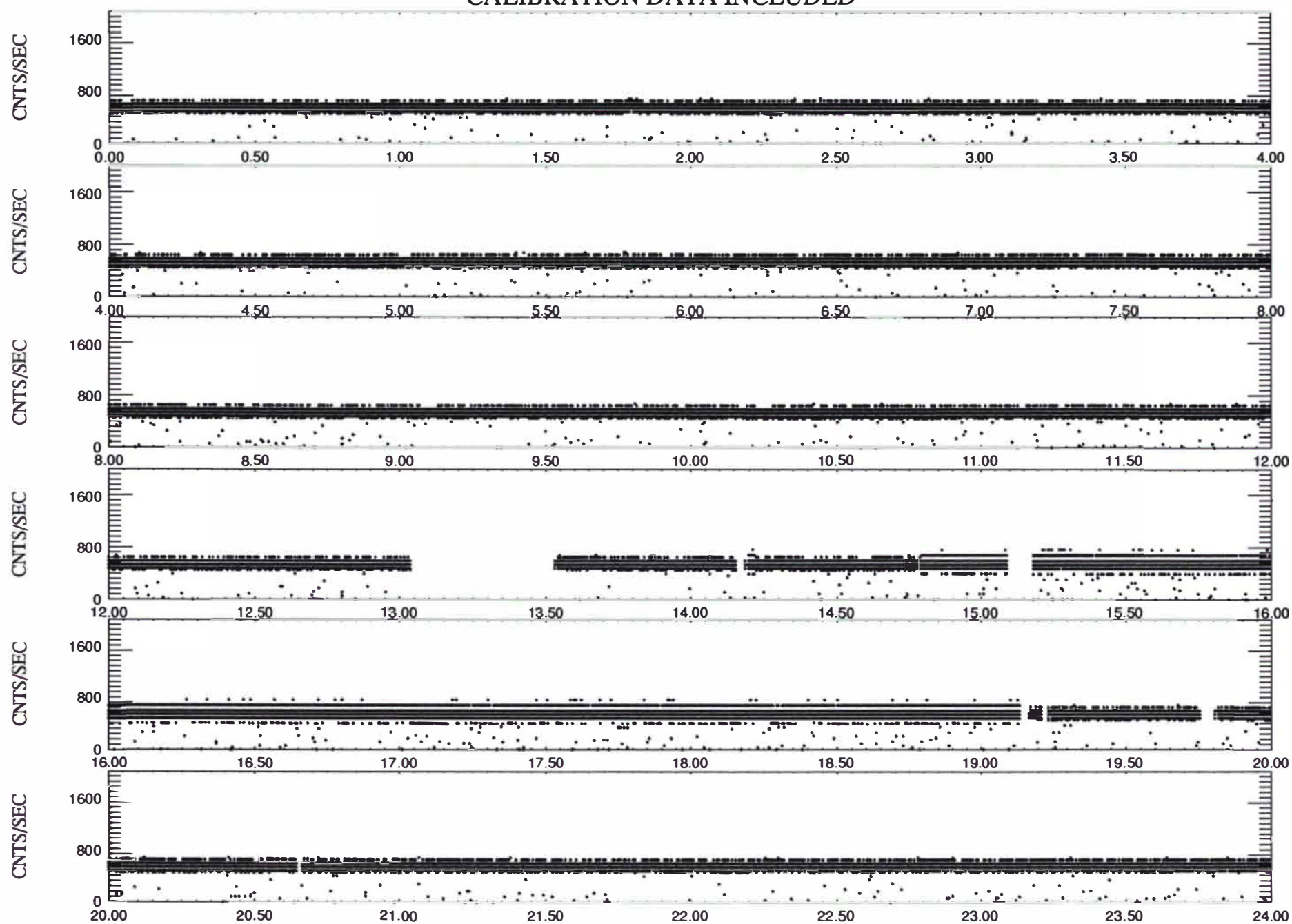
Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

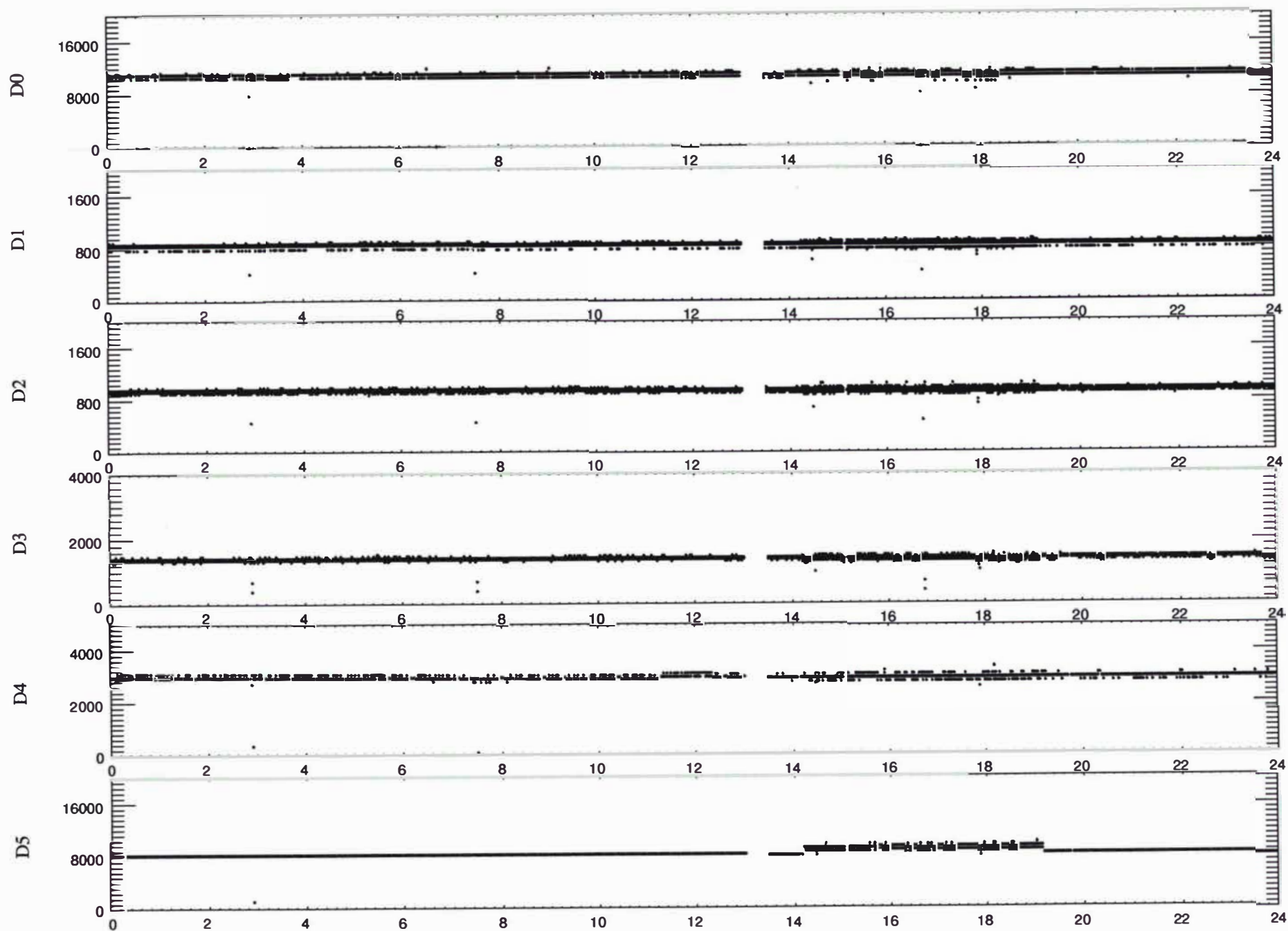
CPU	CCL	DMP	ROM	DMA	OSC	MP.	ICR	SPE	OPM	RSC	CAL	WCH	MEM	BRS	HUS
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----



CALIBRATION DATA INCLUDED



UNIV AL TIME

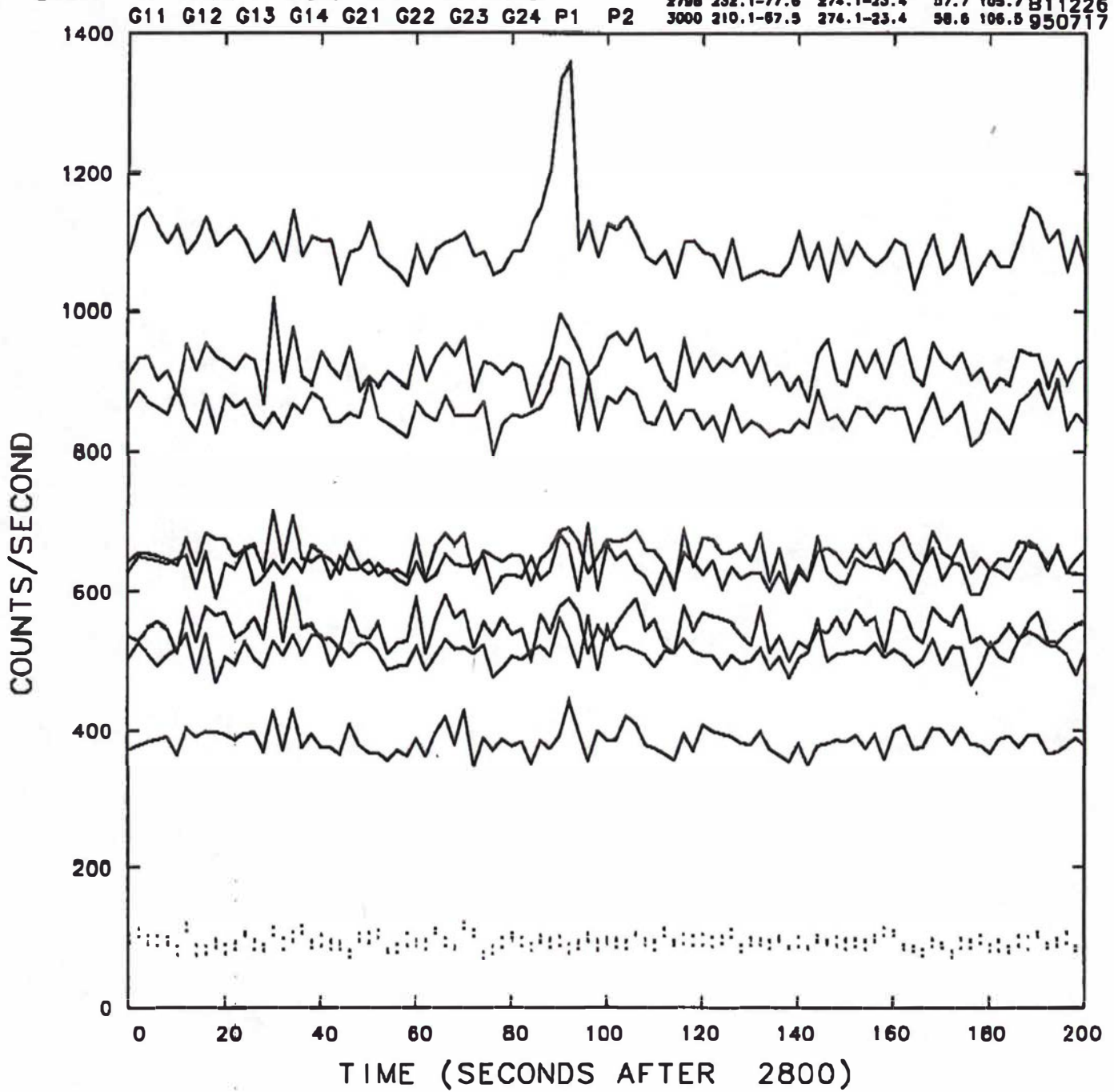


UNIV' AL TIME

DMSP 8 1991 DEC 26 91360

UT	SCRA	DEC	SUNRA	DEC	ANGSUN	GHAA
2798	232.1-77.6		274.1-23.4		57.7	105.7
3000	210.1-57.5		274.1-23.4		58.6	106.5

811226
950717



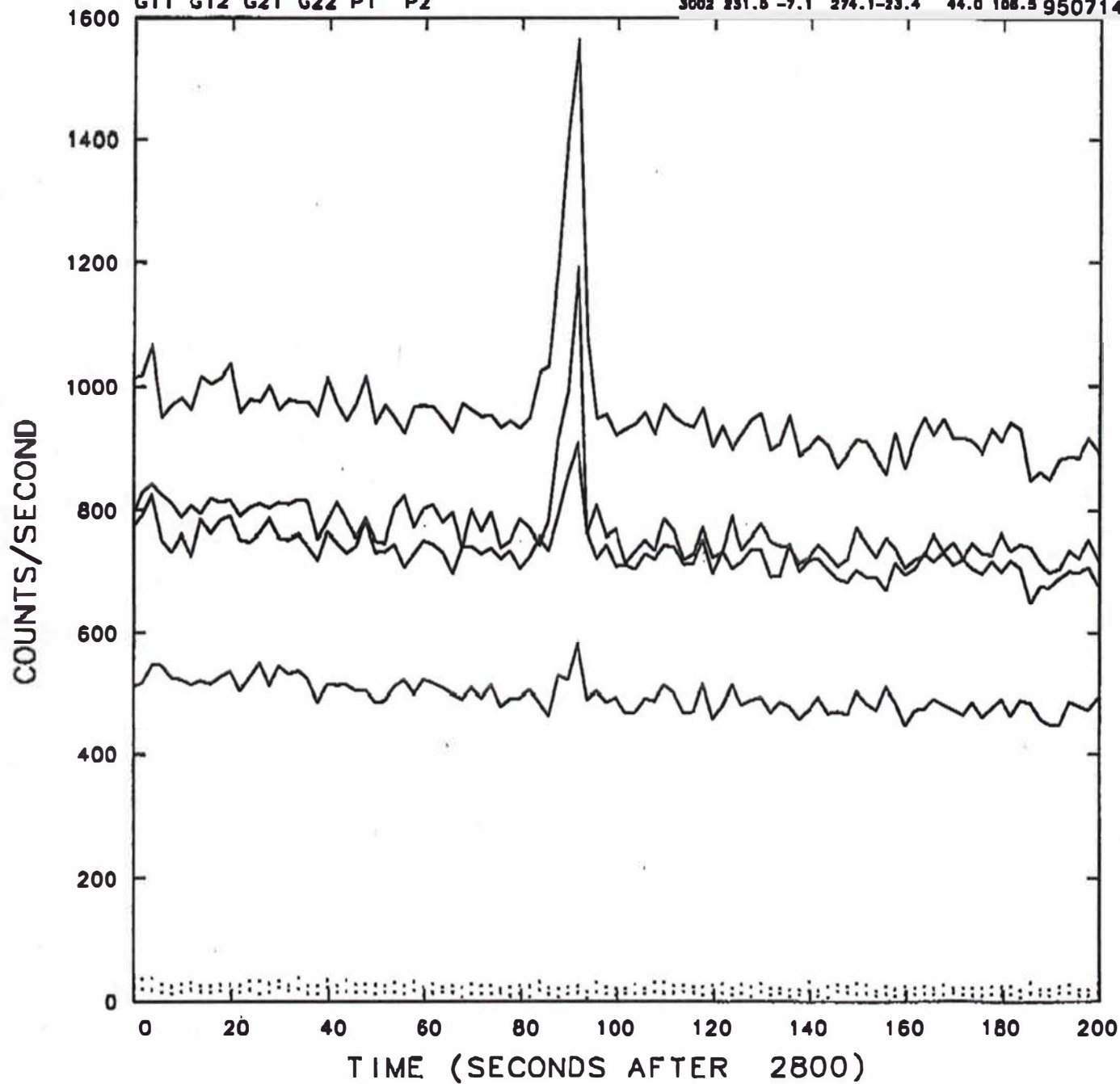
2888.4
PEAK

DMSP 9 1991 DEC 26 91360

G11 G12 G21 G22 P1 P2

UT	SCRA	DEC	SUNRA	DEC	ANGSUM	GNAA
2800	233.4	-18.8	274.1	-23.4	38.1	108.7
3002	231.8	-7.1	274.1	-23.4	44.0	108.5

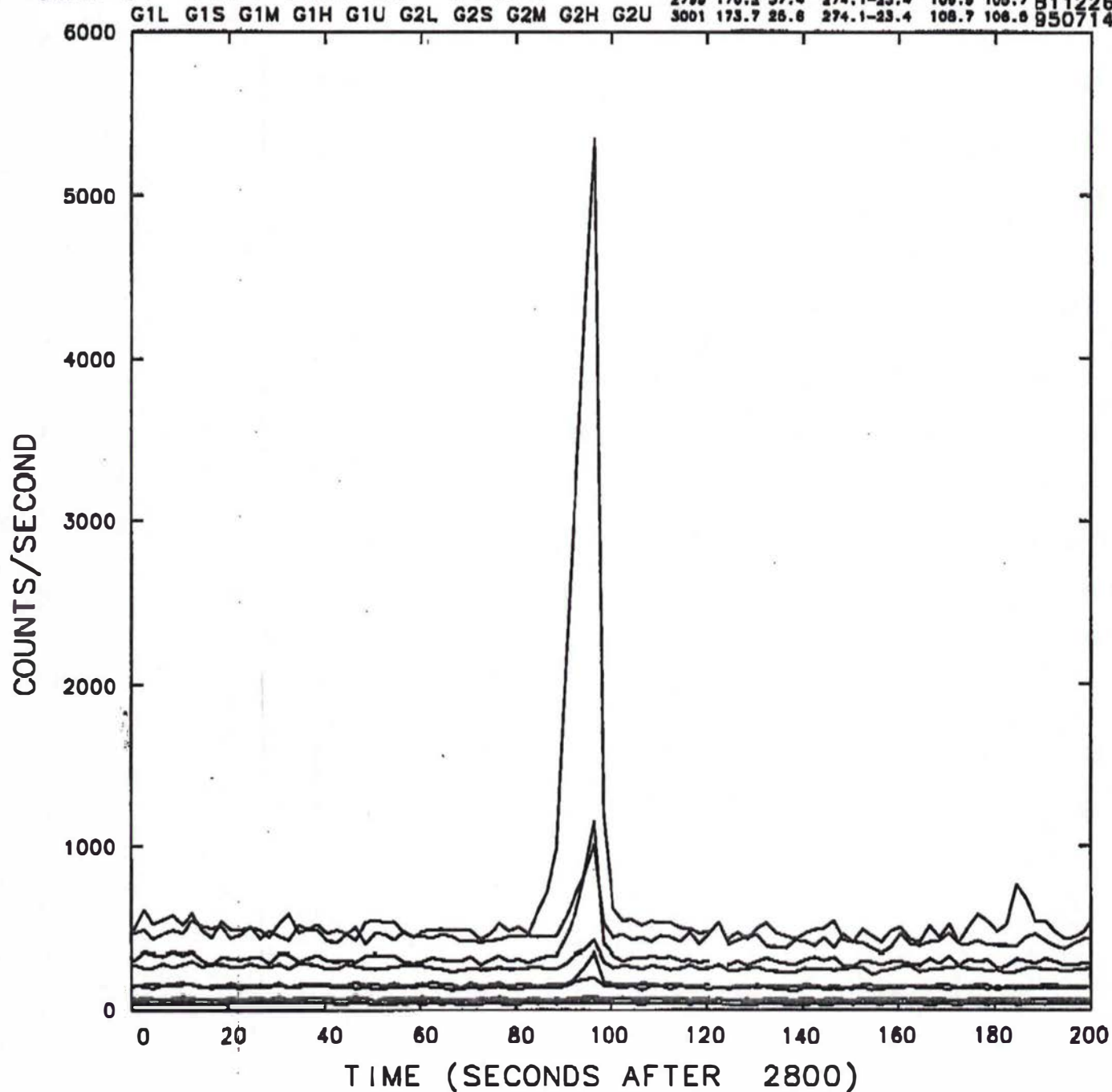
B11226
950714



2889.7
PEAK

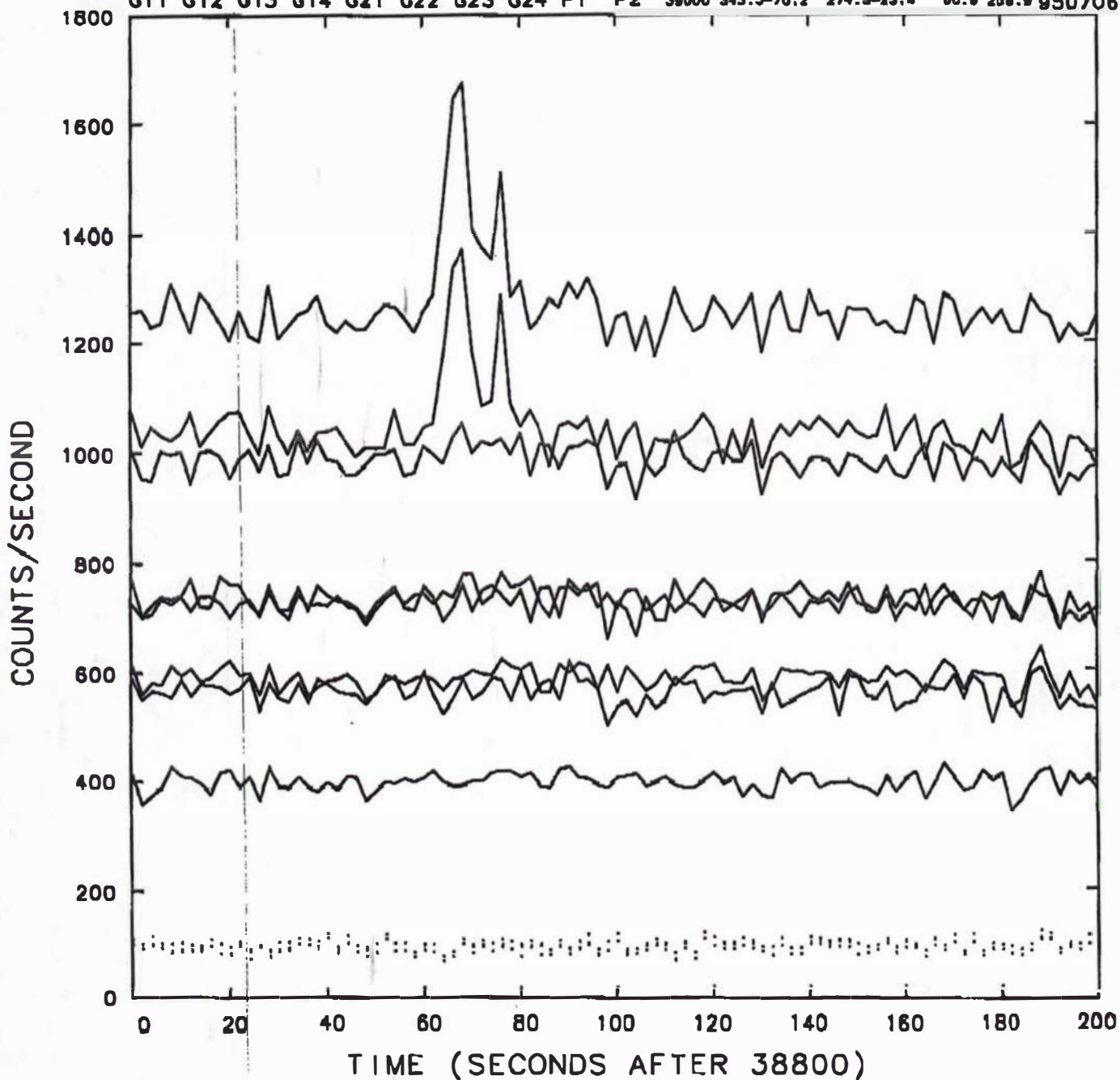
DMSP11 1991 DEC 26 91360

UT	SCRA	DEC	SUNRA	DEC	ANGSUN	GHAA
2700	176.2	37.4	274.1-23.4	100.0	105.7	811226
3001	173.7	26.6	274.1-23.4	108.7	106.6	950714



DMSP 8 1991 DEC 26 91360

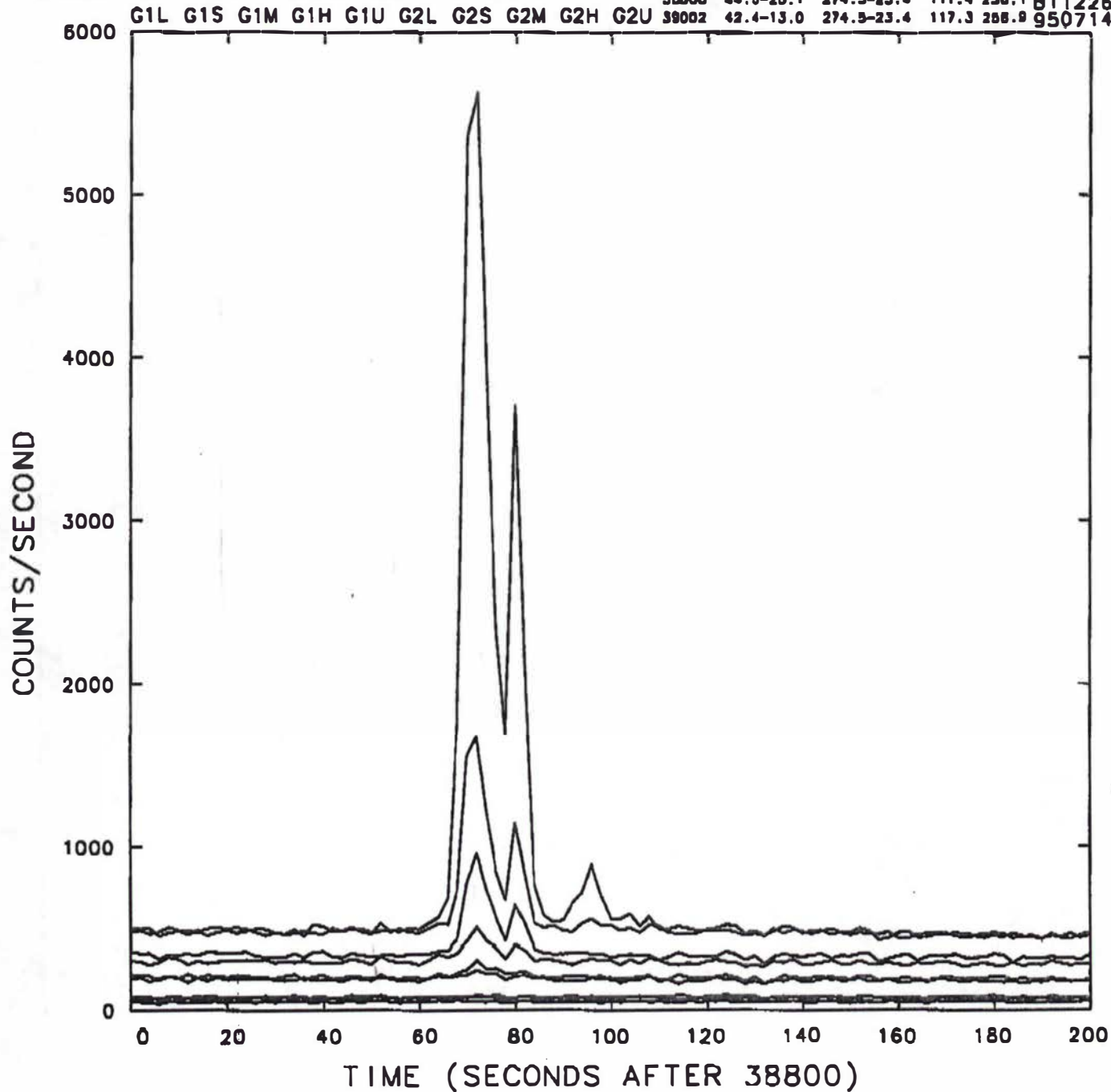
UT	SCRA	DEC	SUNRA	DEC	ANGSUN	GMAA
38800	363.8-89.3	274.6-23.4	64.6	236.1	811226	
39000	343.3-70.2	274.6-23.4	60.9	258.9	950706	



38866.4
38874.4

DMSP10 1991 DEC 26 91360

UT	SCRA	DEC	SUNRA	DEC	ANGSUN	GMAA
38800	44.5-25.1	274.9-23.4	111.4	256.1	811226	
39002	42.4-13.0	274.5-23.4	117.3	258.9	950714	



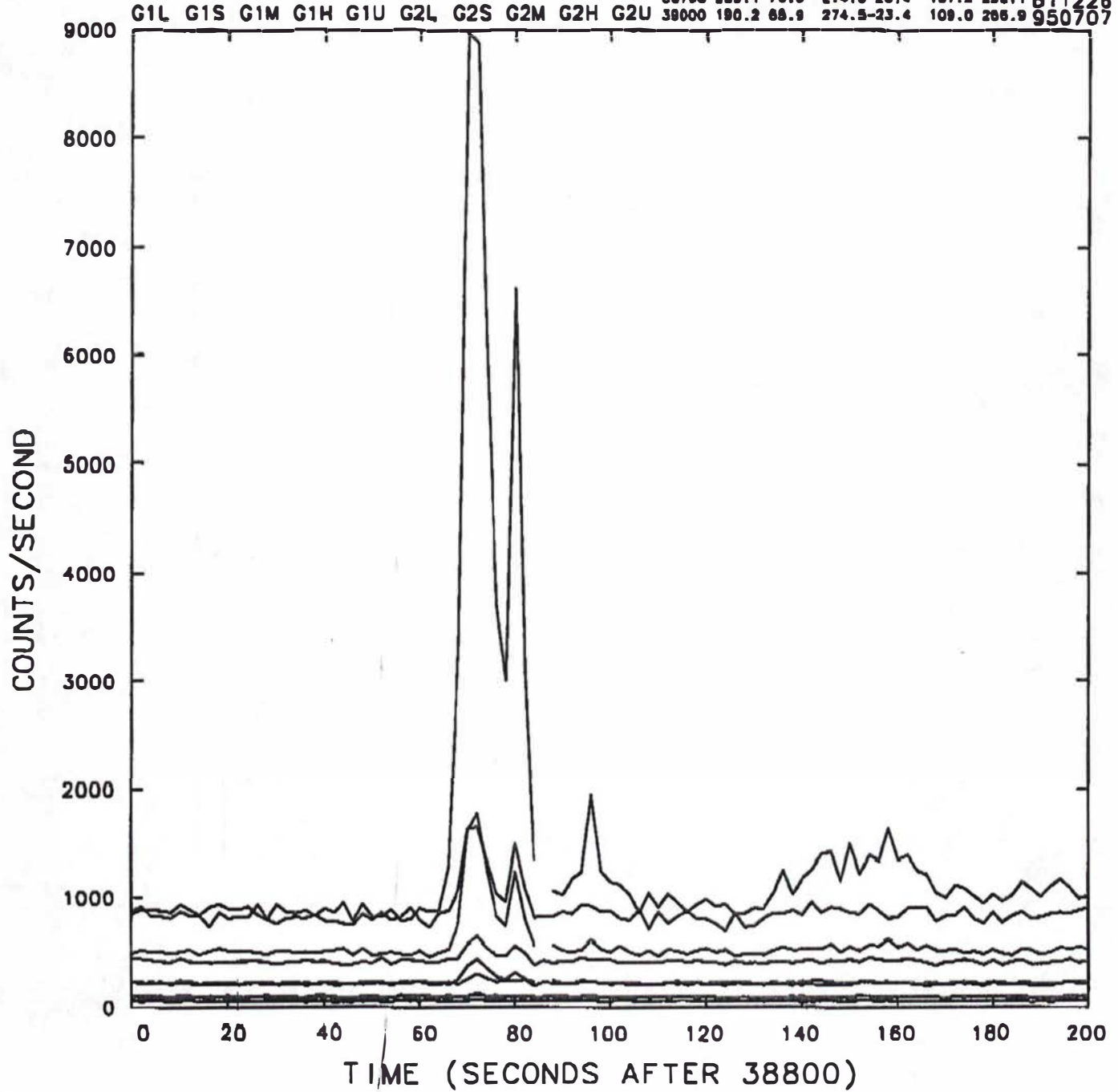
38866.4

38874.4

38890.4

DMSP11 1991 DEC 26 91360

UT SCRA DEC SUMRA DEC ANOSUN QMAA
38798 209.1 76.3 274.8-23.4 107.2 256.1 811226
38000 190.2 68.9 274.5-23.4 109.0 266.9 950707



38864.6
38874.6
38890.6

CATSEARCH PROGRAM

BATSE BURST # 1223
EVENT OF 1991 DEC 26 DAY OF YEAR=360
EVENT CROSSING TIME AT BATSE : 13001. S. OR 03:36:41.4
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 121.200 -30.000
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 26/12/ 91 IS:
RA= 167.766 DEC= 6.667 DIST= 4.664 AU
BATSE-ULYSSES DISTANCE = 697777784. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=122.23 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-1241.35 SECS.
CROSSING TIME AT ULYSSES IS 11760. S. OR 03:16:00 +/- 372.98 SECONDS

NO

14 / 4 / 93

ULYSSES RT

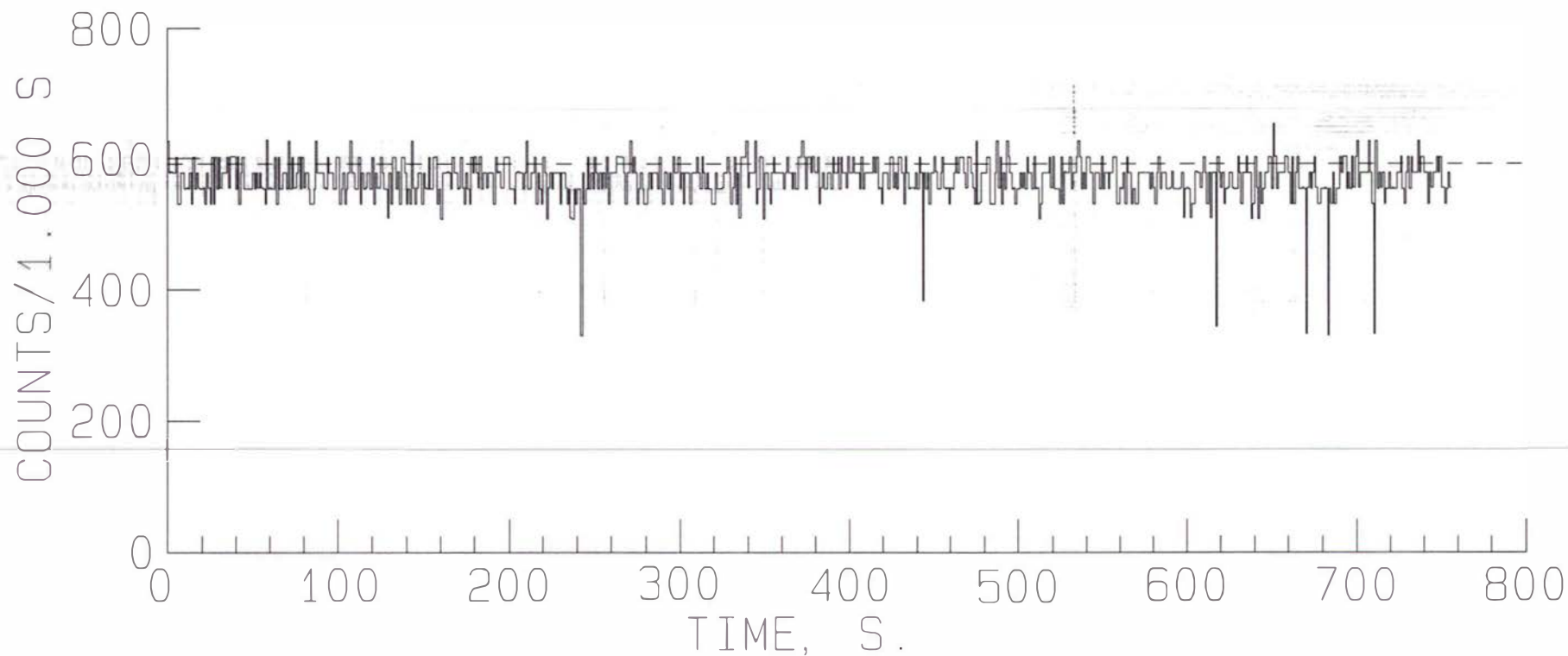
26/12/91 11376.458 s

0.500 S INTERVALS REGROUPED BY 2

0- 0 keV

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS



From FENIMORE@nisdp0.lanl.gov Fri Jul 14 11:21 PDT 1995
Date: Fri, 14 Jul 1995 12:20:57 -0600 (MDT)
From: "pls reply to efenimore@lanl.gov" <FENIMORE@nisdp0.lanl.gov>
To: khurley@sunspot.ssl.berkeley.edu, jlaros@gammal.lpl.arizona.edu,
rklebesadel@lanl.gov
Subject: 91/12/26

Kevin:

Here are some numbers to check if the Ulysses signal is 50 times smaller than the PVO as it would be if they were solar.

	p/cm ² /sec (100-500 kev)	p/cm ² /sec (50-300 estimate)
ut 2754	75.8	125 - <i>x 10 higher or so</i>
ut 38731.77	142.9	232

I assume that Ray sent you a message that said that we agrees with my best estimate for the UT of the second event

Ed

From FENIMORE@nisdp0.lanl.gov Thu Jul 6 14:20 PDT 1995
Date: Thu, 6 Jul 1995 15:13:43 -0600 (MDT)
From: "pls reply to efenimore@lanl.gov" <FENIMORE@nisdp0.lanl.gov>
To: khurley@sunspot.ssl.berkeley.edu, rklebesadel@lanl.gov,
jlaros@gammal.lpl.arizona.edu
Subject: dmsp sees one

Folks:

10:48

Terrell tells me tjhat DMSP saw an GRB at 38866 UT and one at 2890.
Terrell says that the second one was listed as a solar flare in batse.
Ed

From FENIMORE@nisdp0.lanl.gov Thu Jul 6 14:20 PDT 1995
Date: Thu, 6 Jul 1995 15:17:23 -0600 (MDT)
From: "pls reply to efenimore@lanl.gov" <FENIMORE@nisdp0.lanl.gov>
To: khurley@sunspot.ssl.berkeley.edu, rklebesadel@lanl.gov,
jlaros@gammal.lpl.arizona.edu
Subject: that's both

Folks:

I meant to say that DMSP saw both. The difference in time is nearly exactly the same as the difference in PVO. Even if the source is near the sun (hopefully you guys can estimate that from the crude DMSP times) we can use r^{*-2} to see if it came from the sun.

Ed

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

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

24 12 1991 167.27

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

24 12 1991 91.66

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

POSITION OF ULYSSES ON 24/12/1991 IS:

RA= 167.804 DEC= 6.645 DIST= 4.680 AU

24 12 1991 155.34

.7 AU for Venus

INTERSPACECRAFT DISTANCES IN AU

VENUS-ULYSSES 4.332

EARTH-ULYSSES 4.680

EARTH-VENUS 1.065

3.98 AU = 1986 L-S

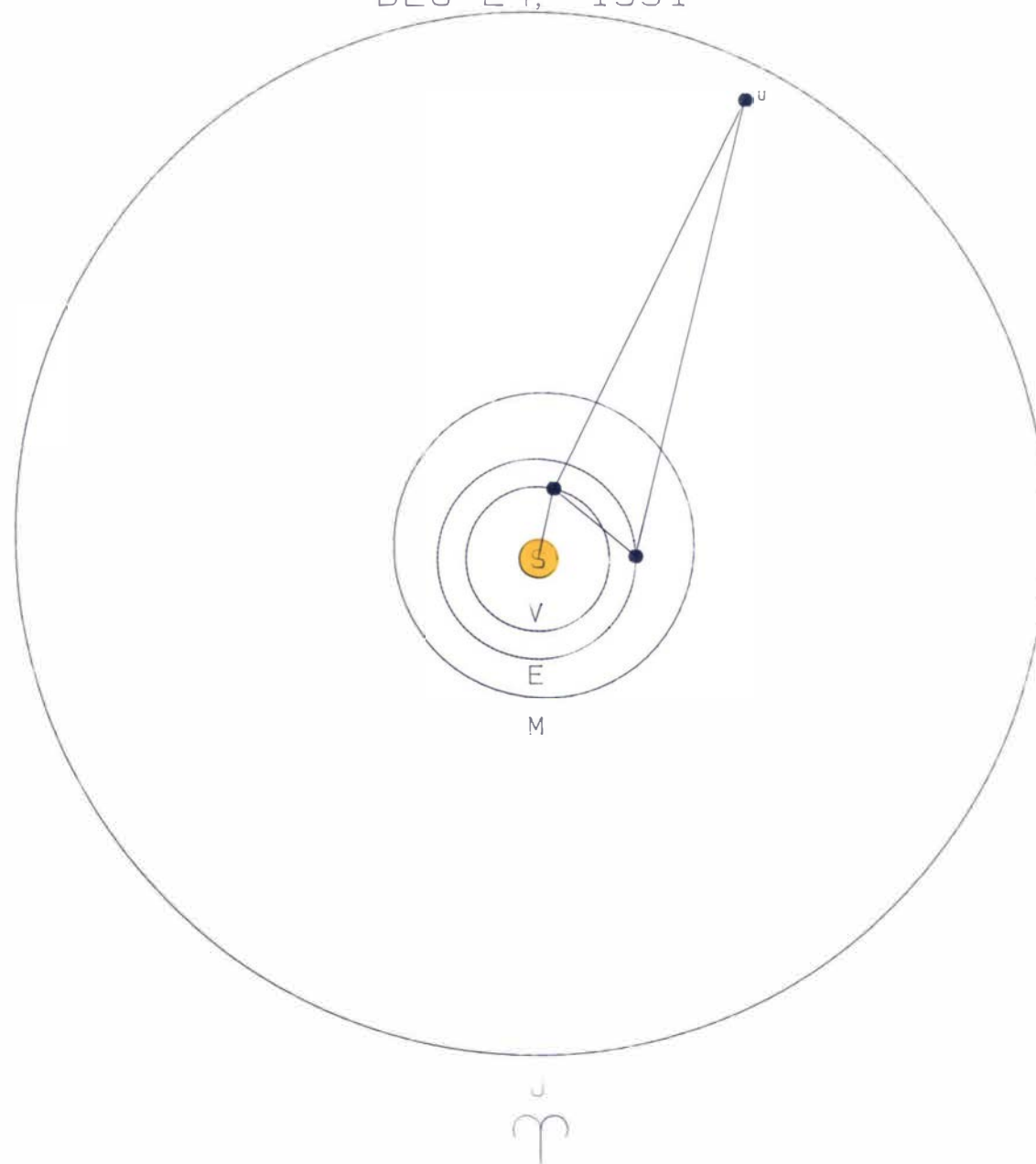
→ Flux down by $\times 16$ if solar

PVO event at 84574 : 86560 at Ulysses if solar

73842 : 75828

The following 2 PVO events were first identified as
taking place on the 24th. Now it looks like they are
on the 28th
... and now they're on the 26th!

ULYSSES ORBIT - ECLIPTIC PLANE PROJECTION
DEC 24, 1991

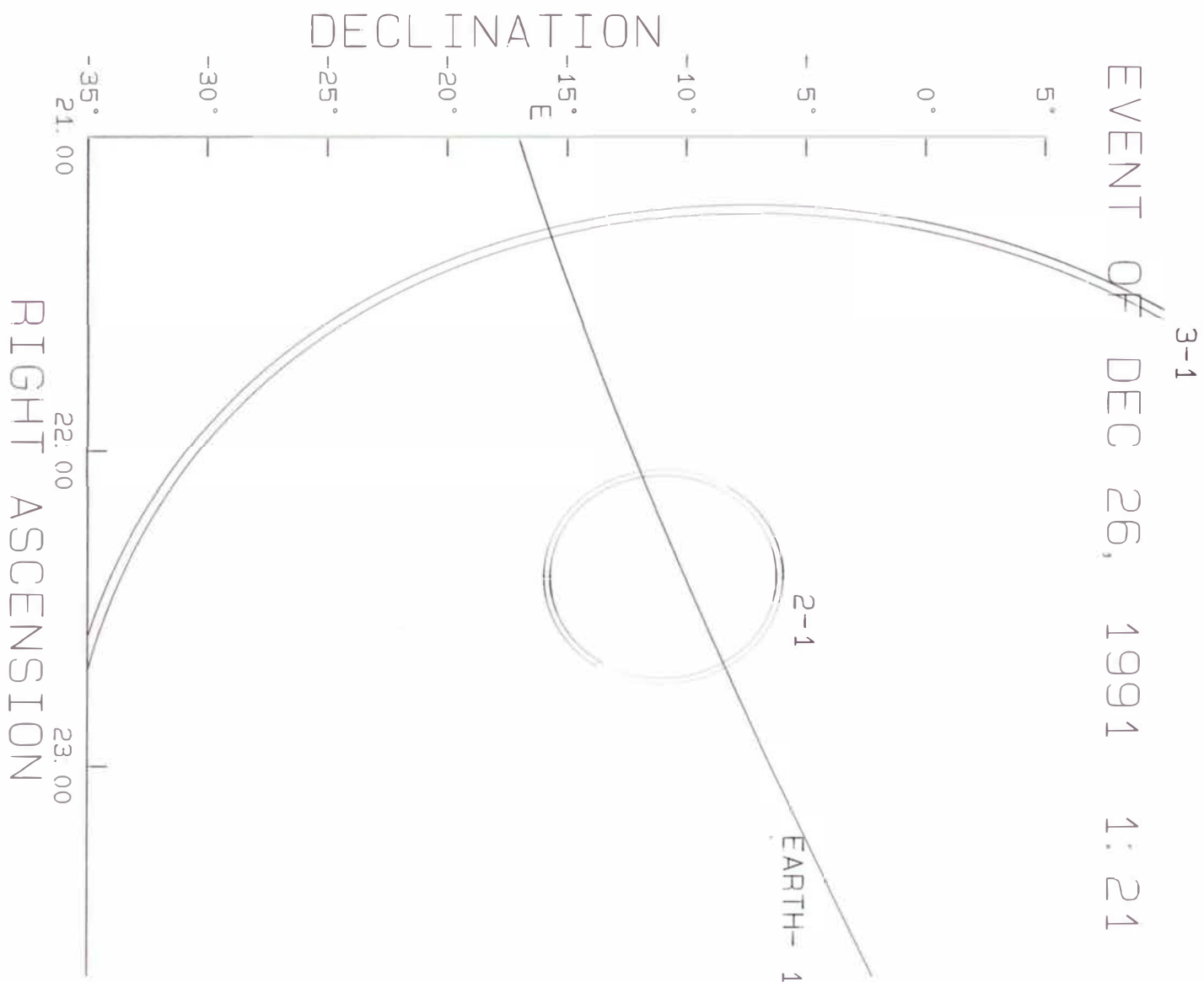


EARTH-N = EARTH AS SEEN FROM SATELLITE N
 S=SUN E=ECLIPTIC G=GALACTIC EQUATOR
 1 ULYSSES 2 PVO 3 DMSP

EVENT OF DEC 26, 1991 1:21

Solar

15/ 7/95



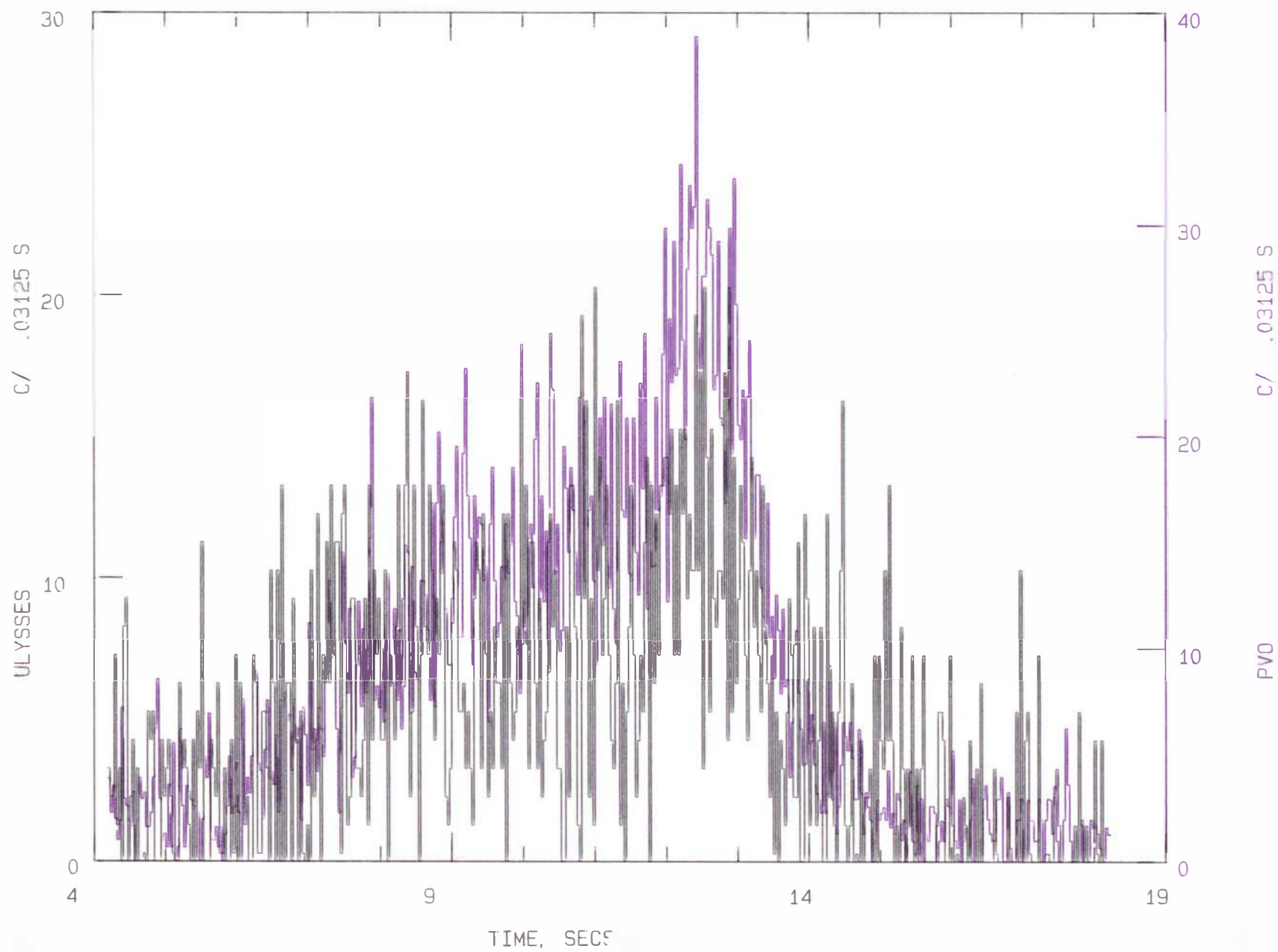
ULYSSES -PV0

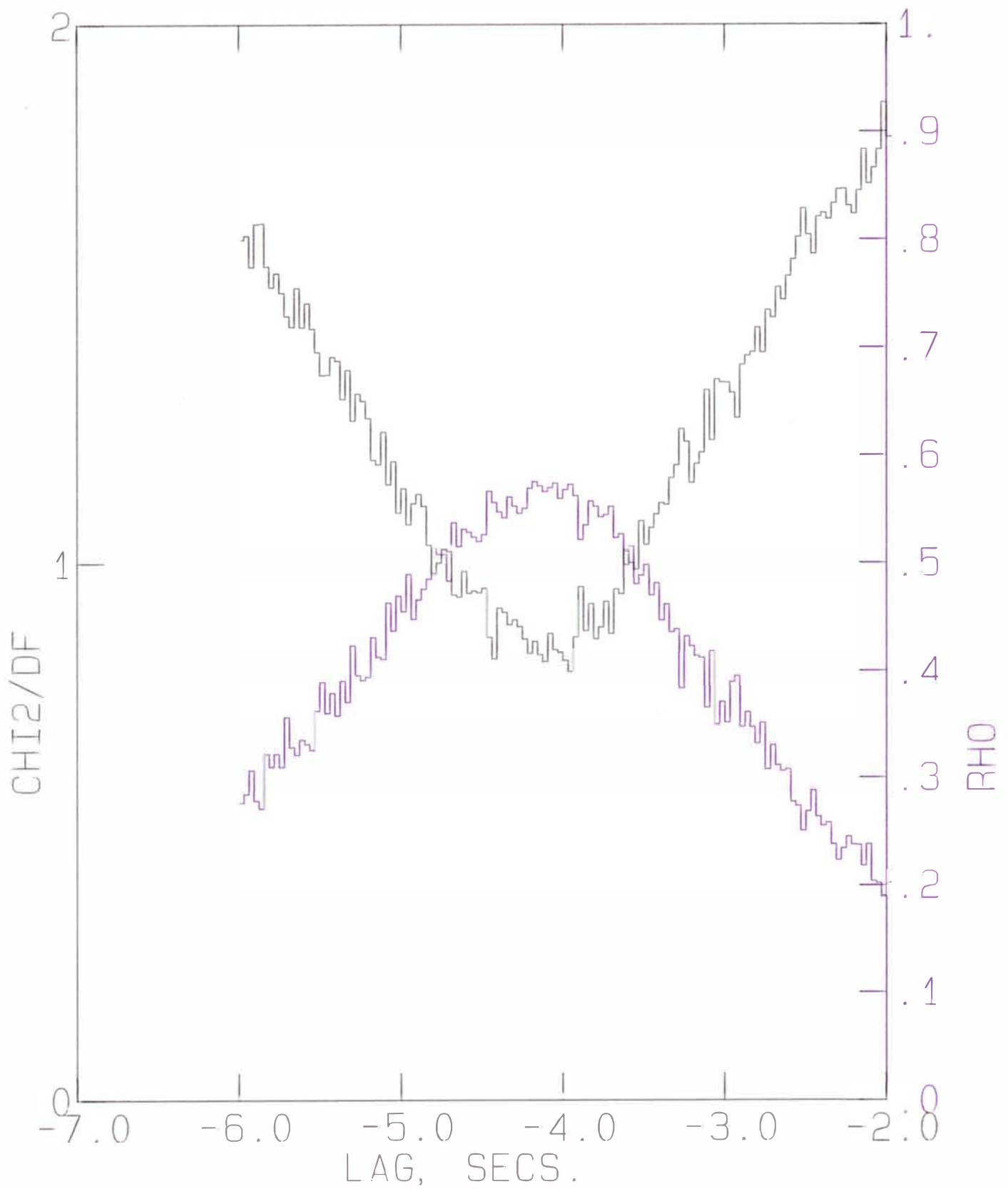
CORRELATION

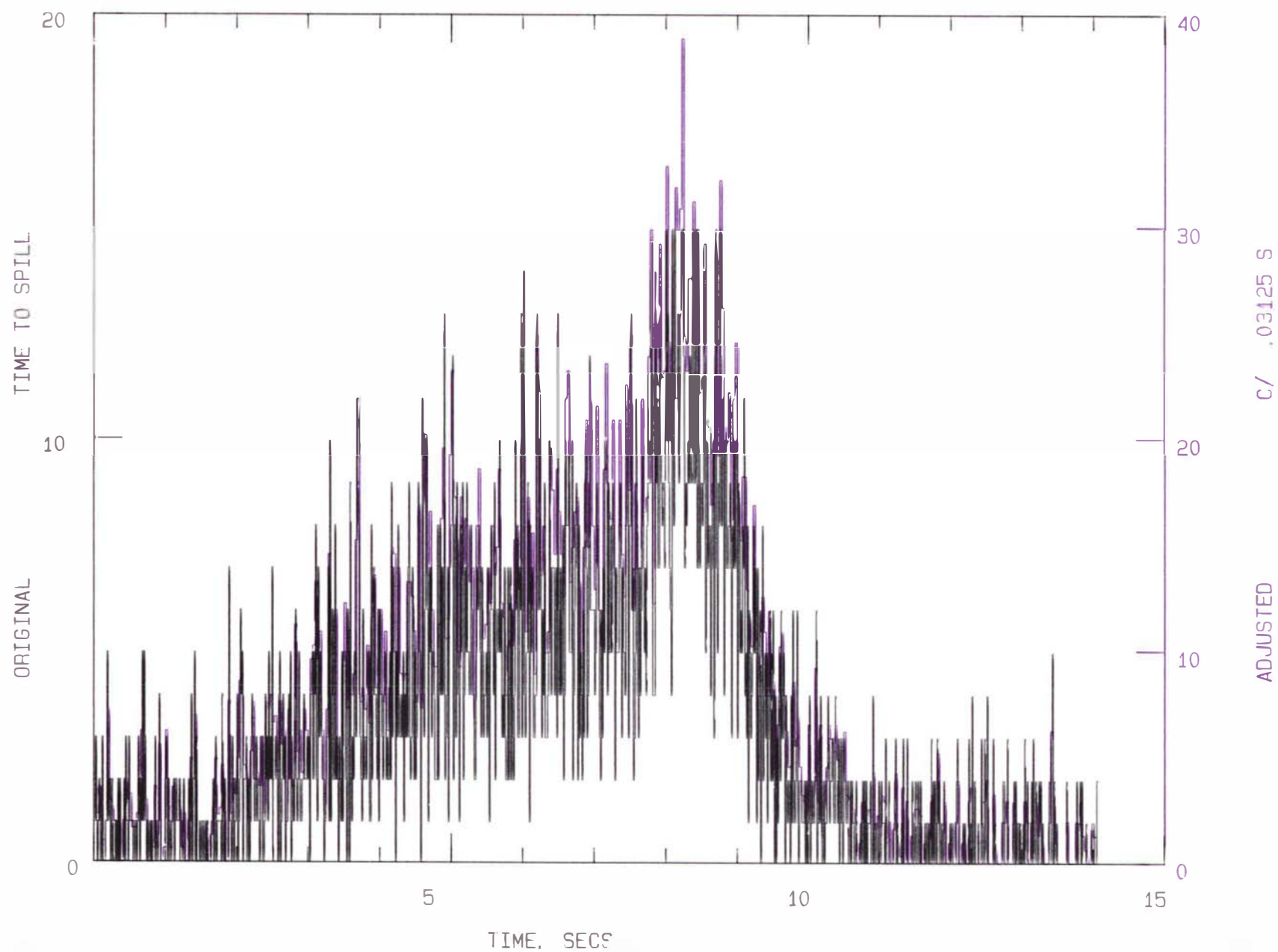
26/12/91

4910.603

15/ 7/95



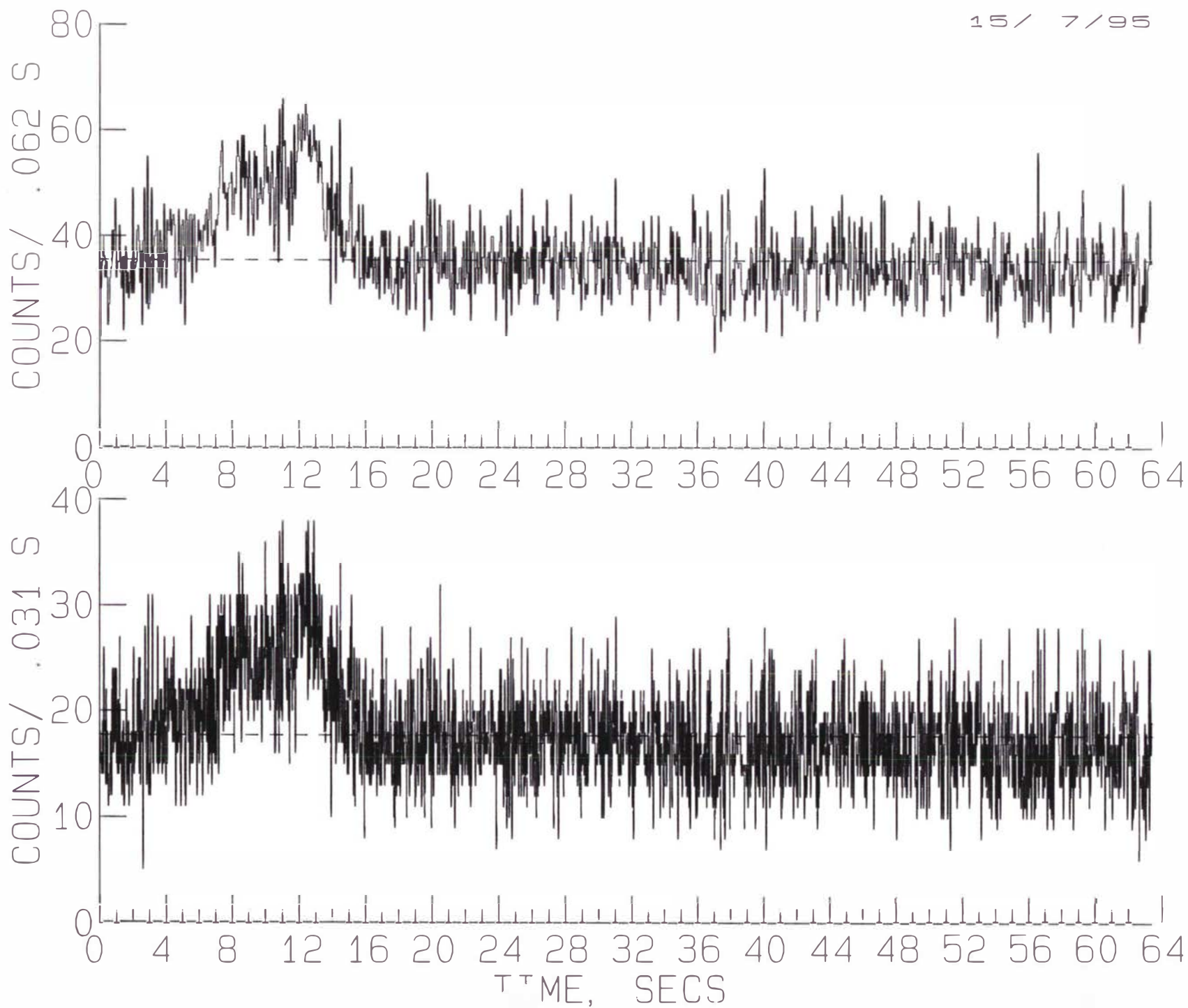




ULYSSES

26/12/91

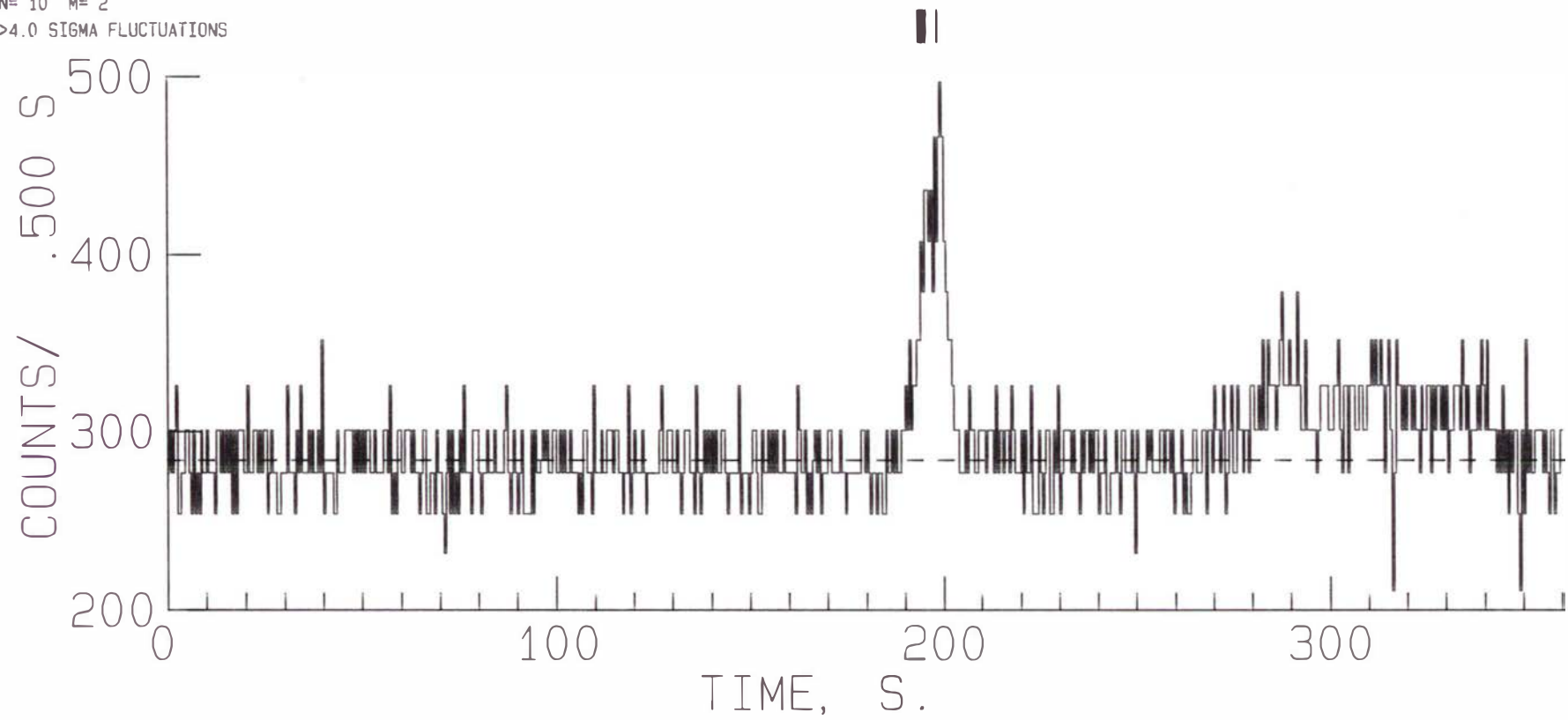
Ttrig= 4910.603



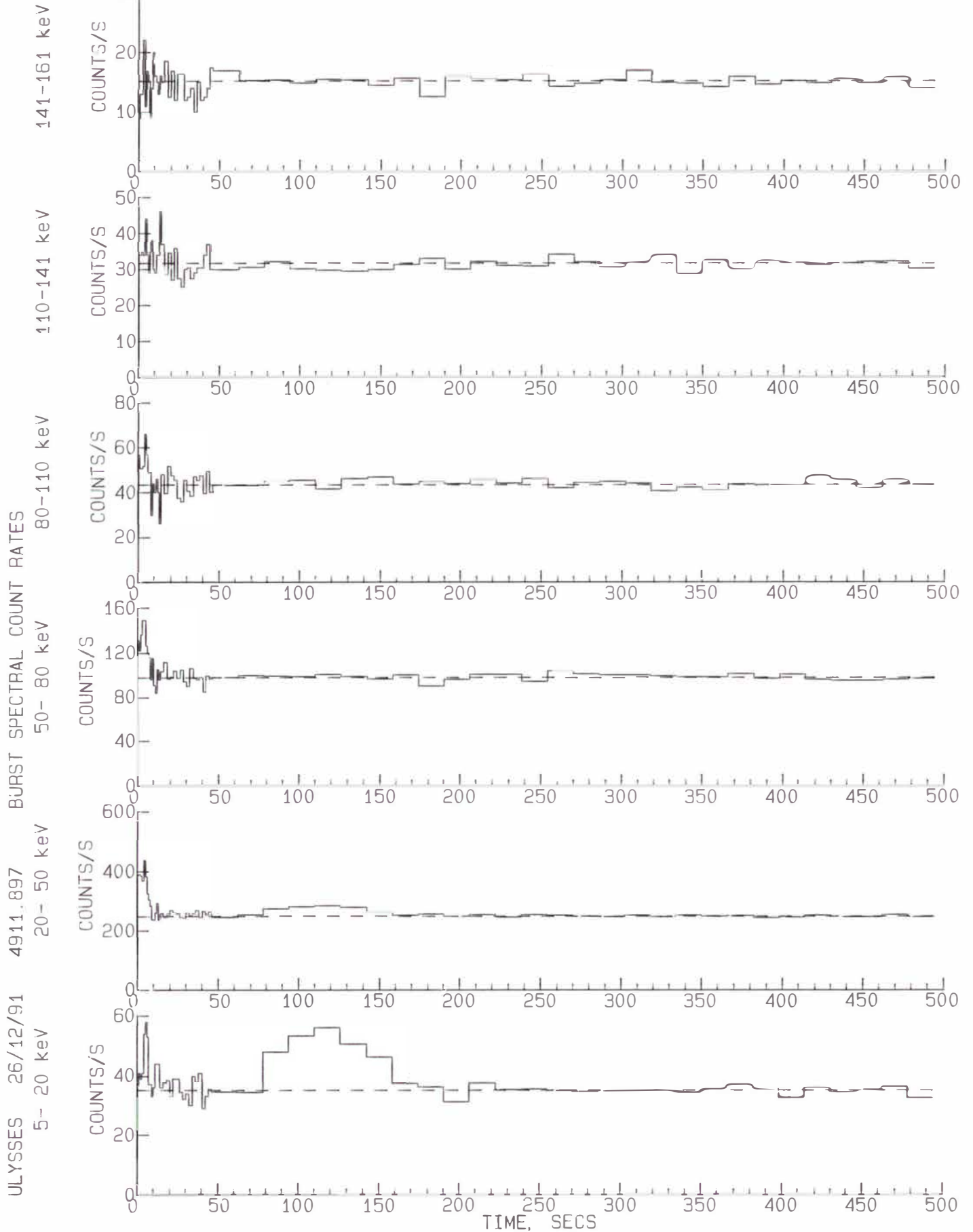
ULYSSES RT
26/12/91 4716.344 s
18- 161 keV

15 / 7 / 95

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



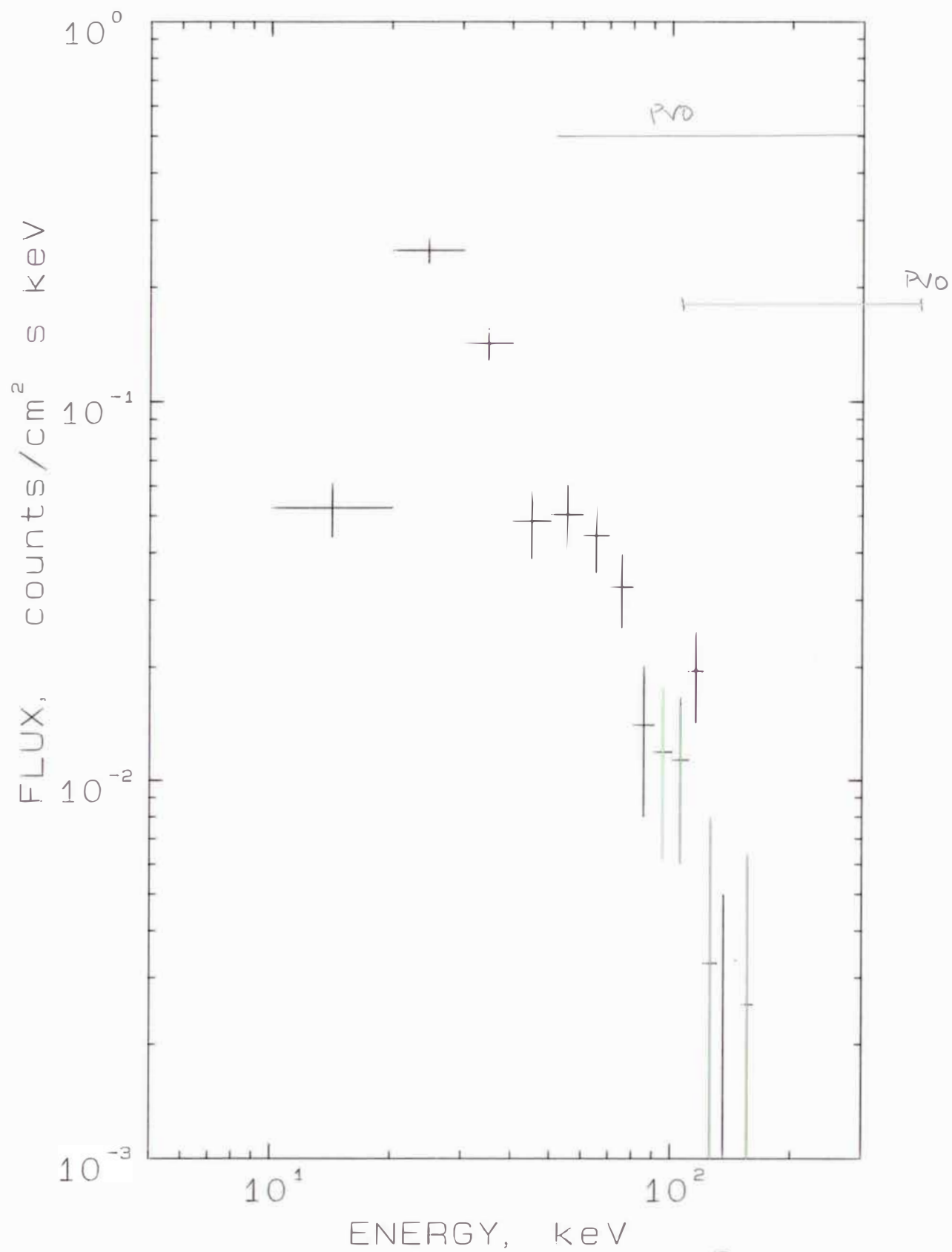
15 / 7 / 95



ULYSSES 26/12/91 4911.897

15/ 7/95

SPECTRUM INTEGRATED OVER 20.0 SECONDS, INTERVALS 2 TO 19



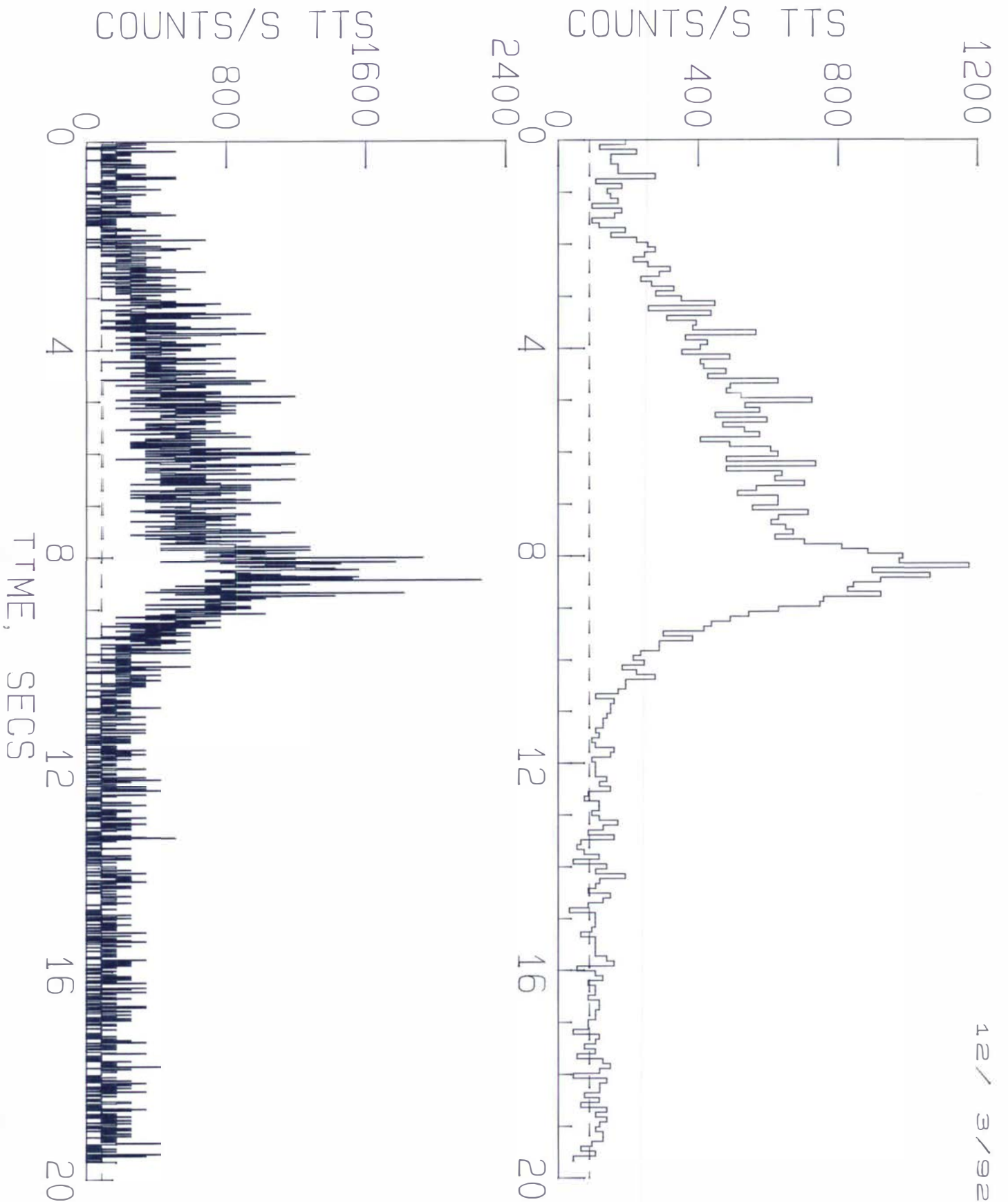
02754.901

73842.565

~~8~~ 24/12/91

PV0

100-2000 keV

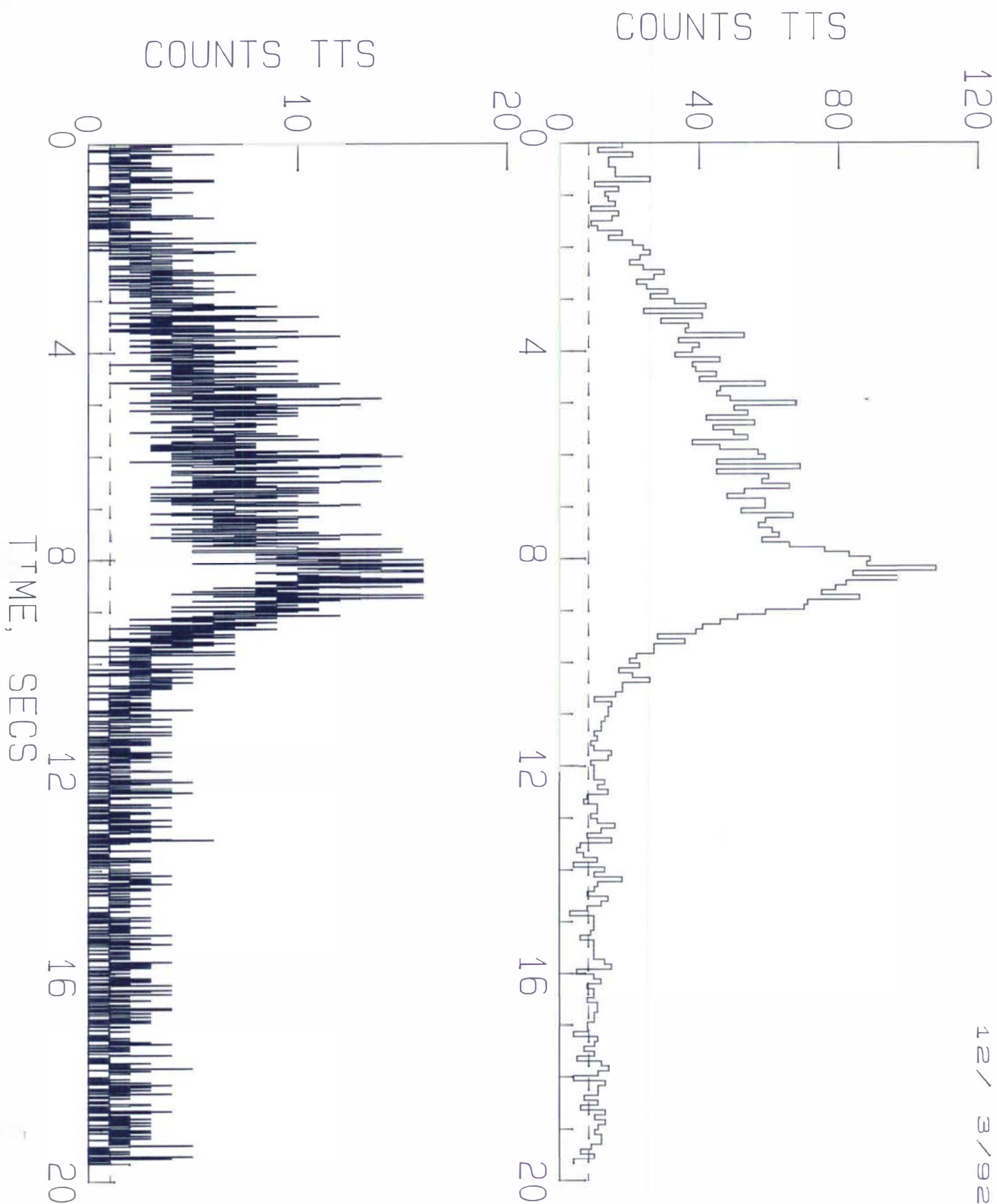


PVO

~~86~~
24/12/91

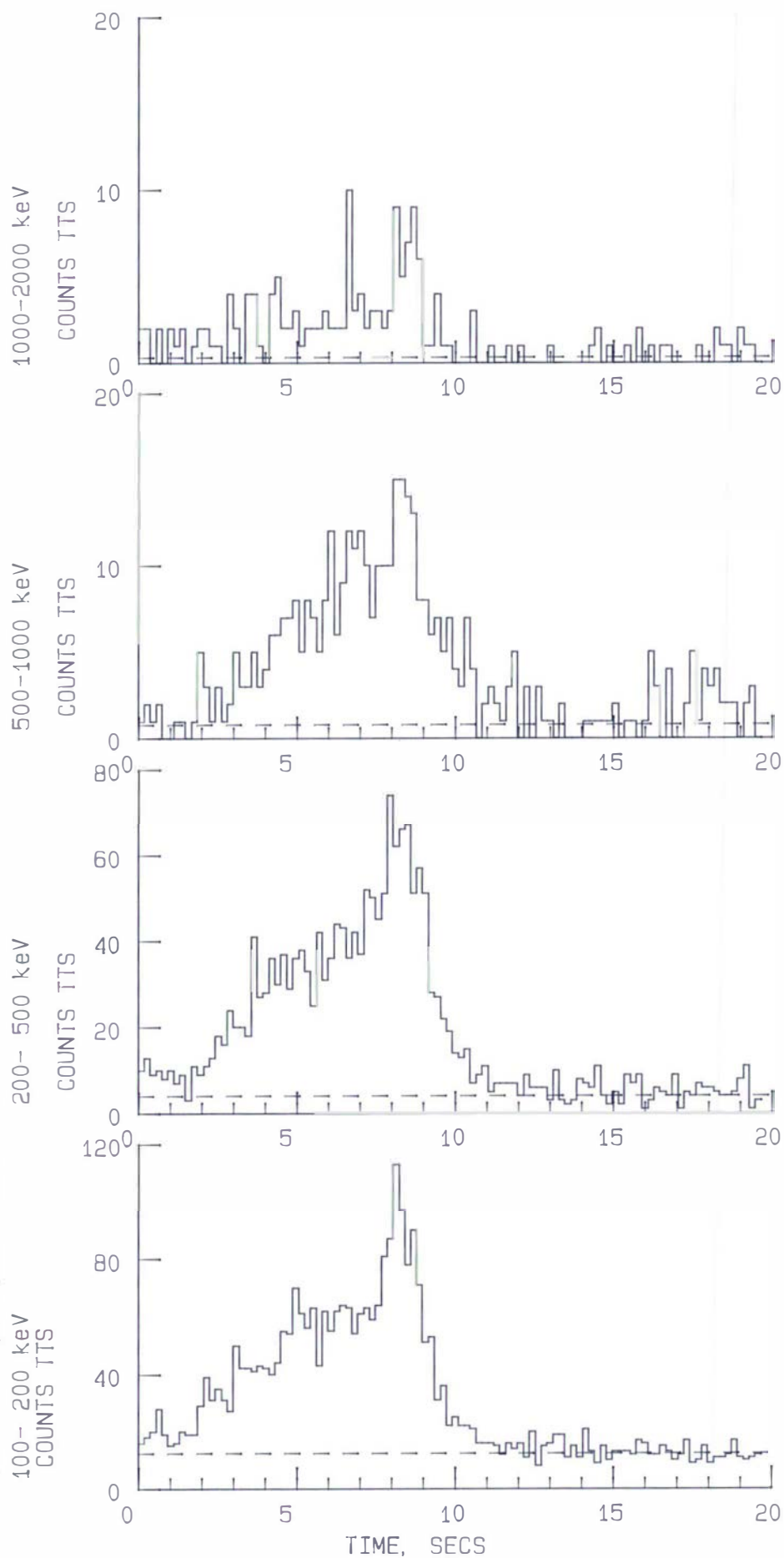
02754.901
73842.565

100-2000 keV

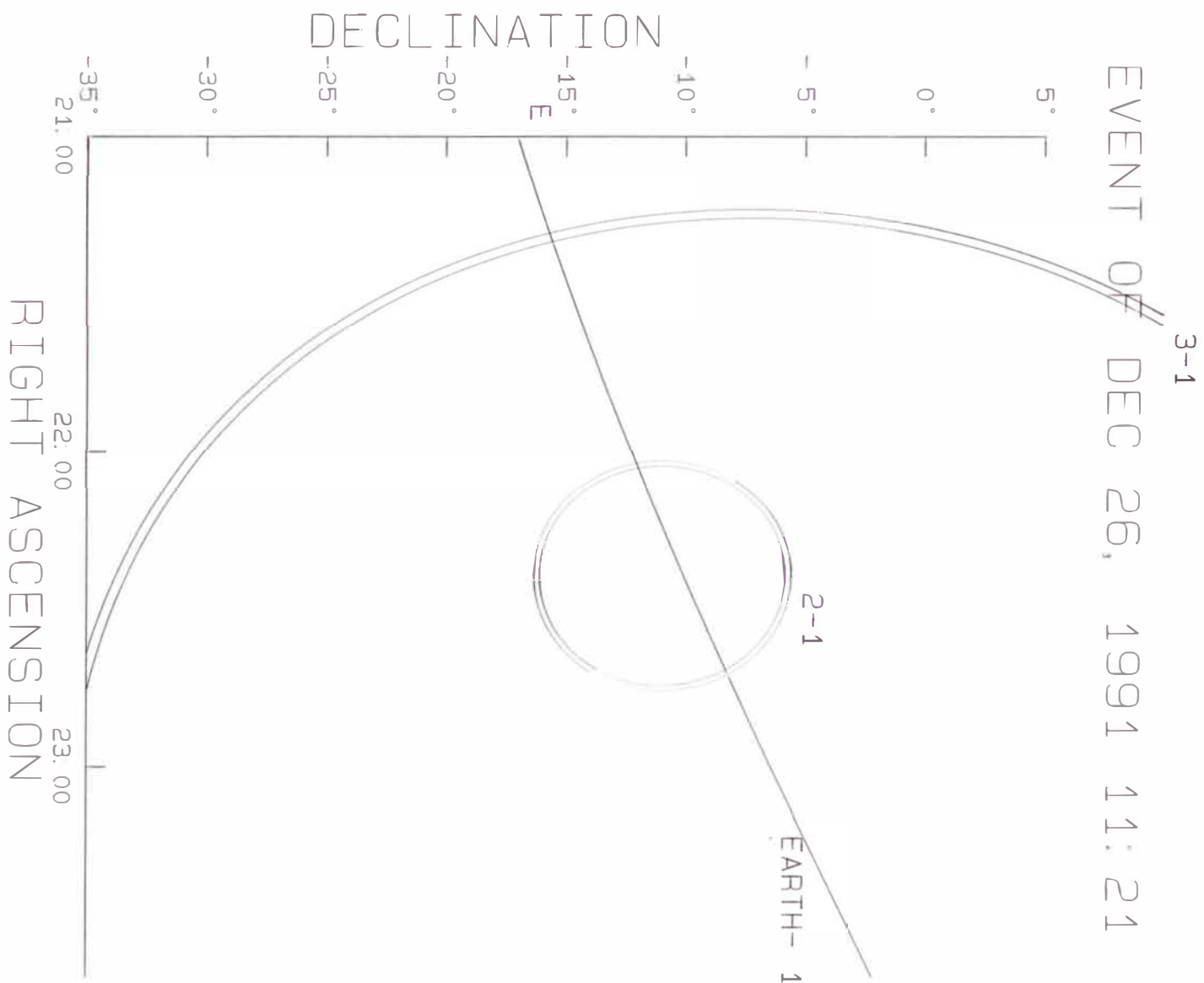


12 / 3 / 92

PVO 2A/12/91 73842.565
02754.701



EARTH-N = EARTH AS SEEN FROM SATELLITE N
 S=SUN E=ECLIPTIC G=GALACTIC EQUATOR
 1 ULYSSES 2 PVO 3 DMSP



Solar

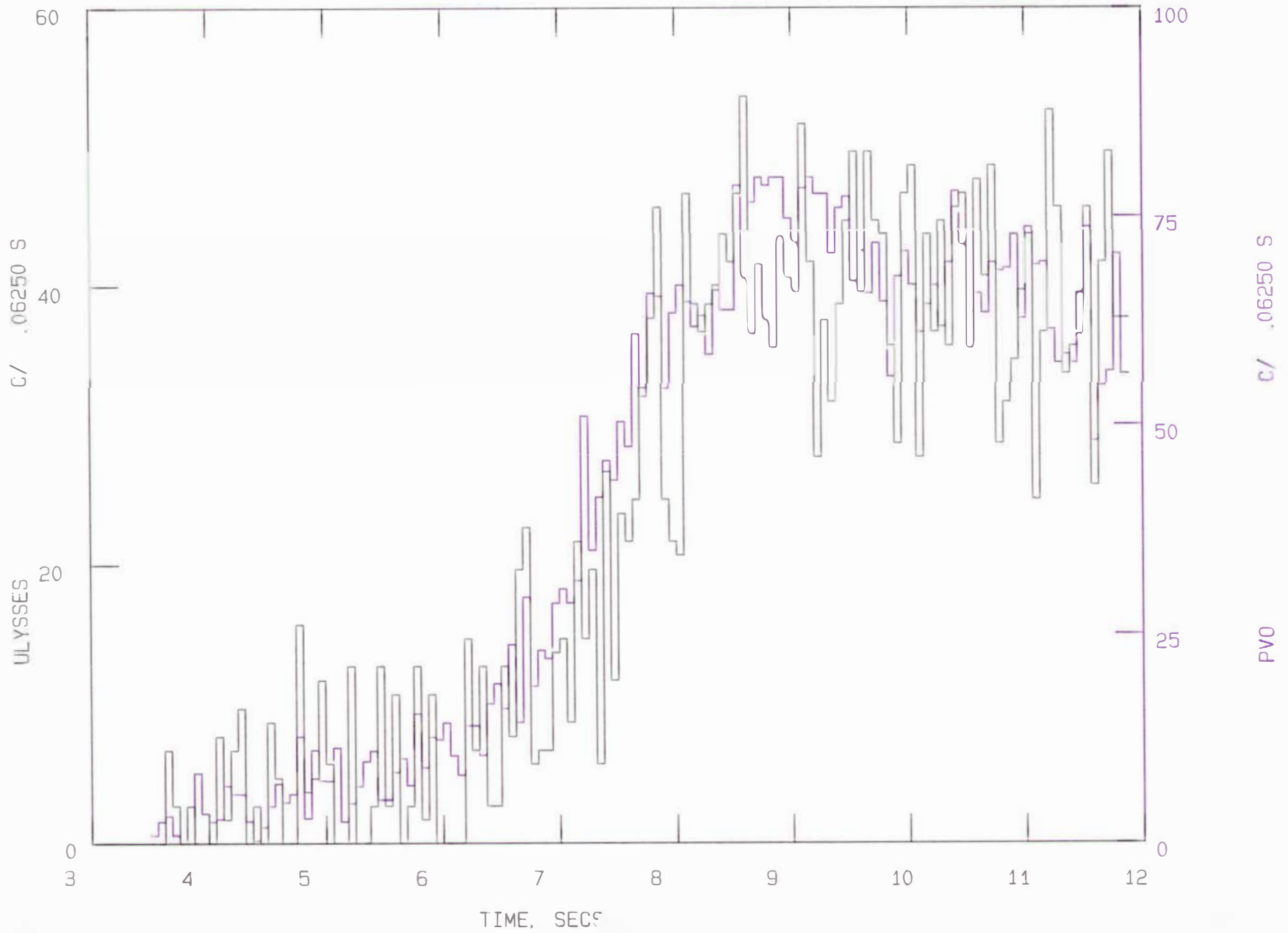
ULYSSES -PVO

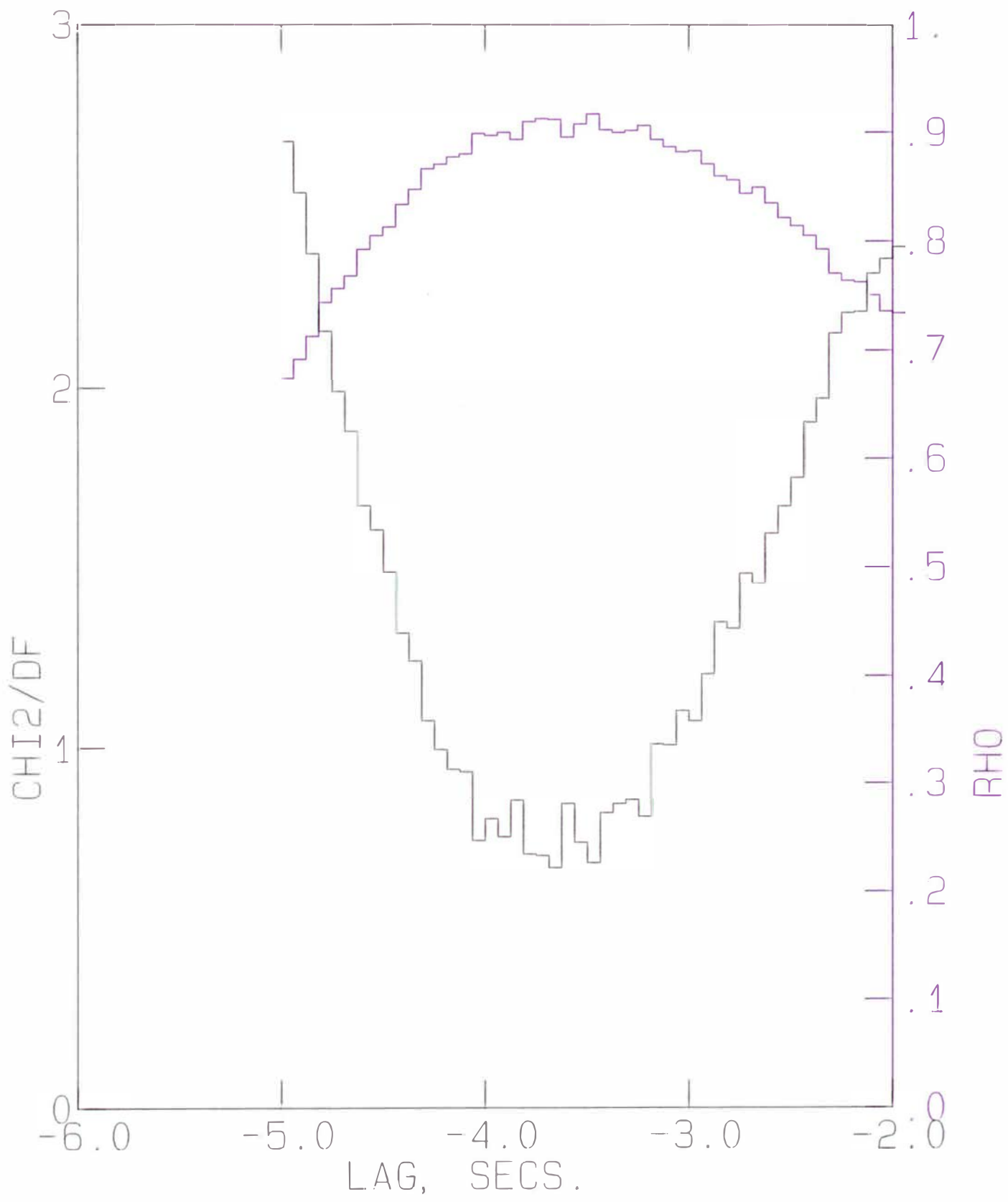
CORRELATION

26/12/91

40889.455

15/ 7/95





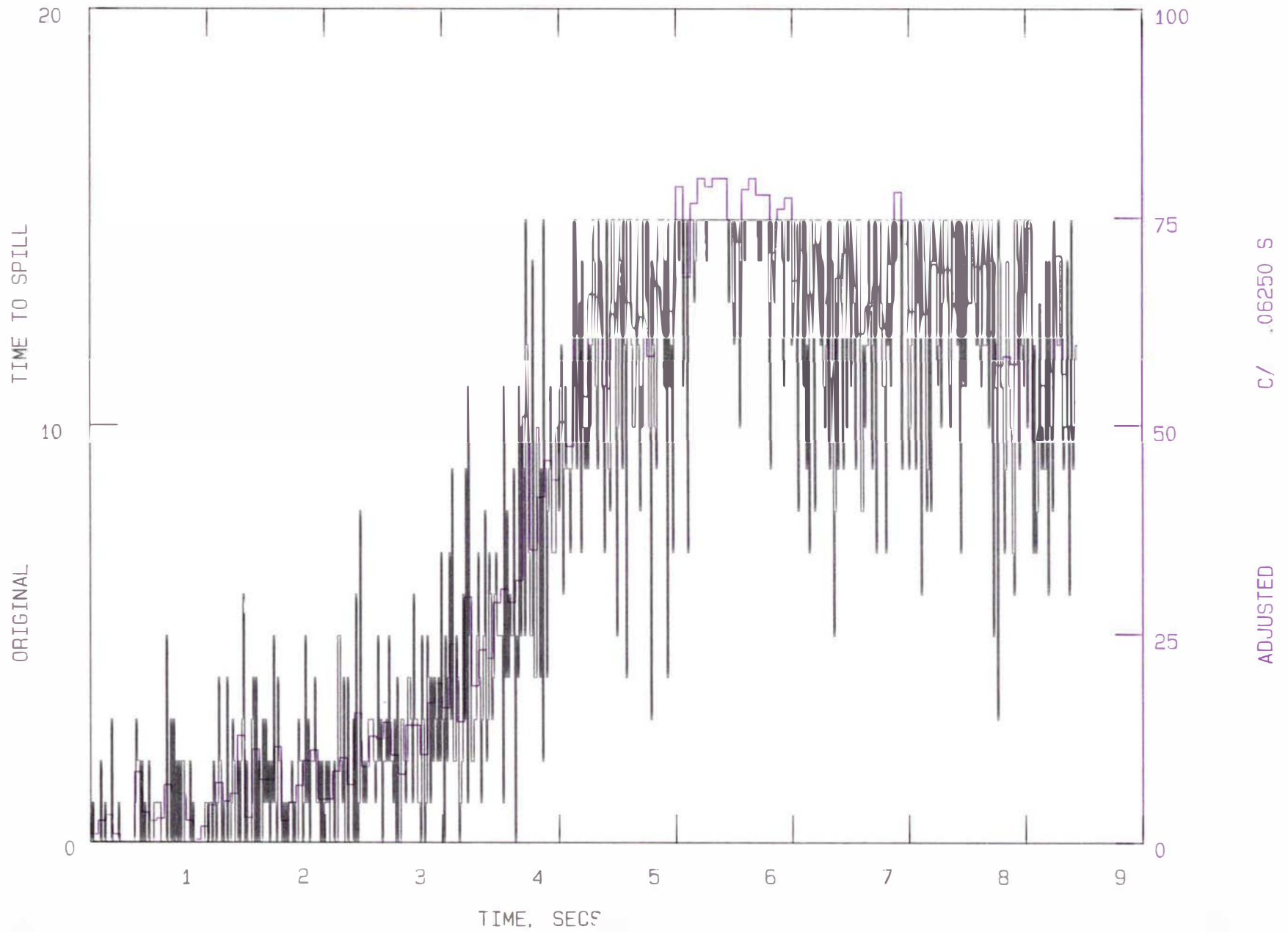
ORIGINAL AND ADJUSTED PVO

TIME HISTORIES

24/12/91

38731.773

15/ 7/95

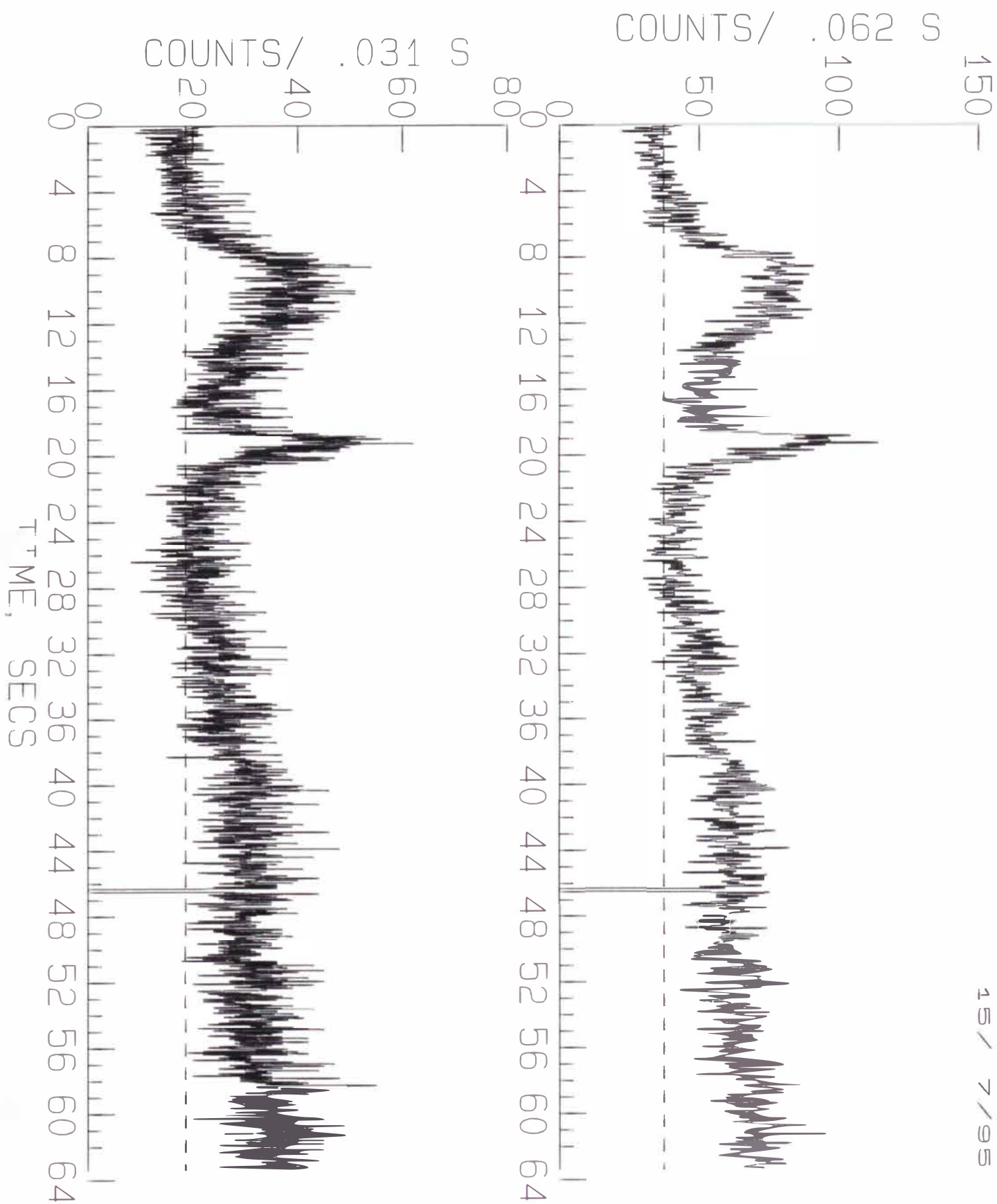


ULYSSES

26/12/91

Ttrig=40889.455

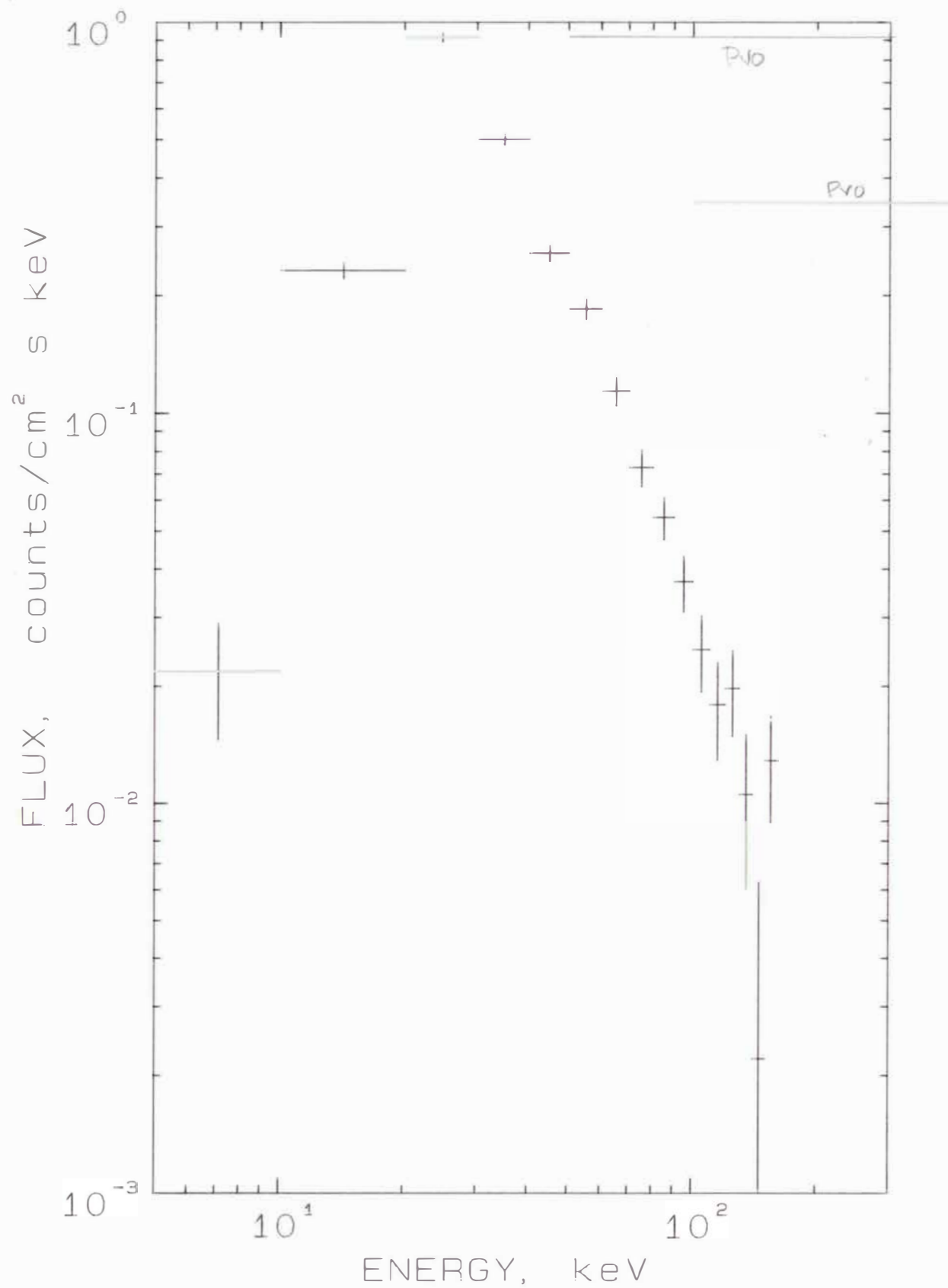
15 / 795



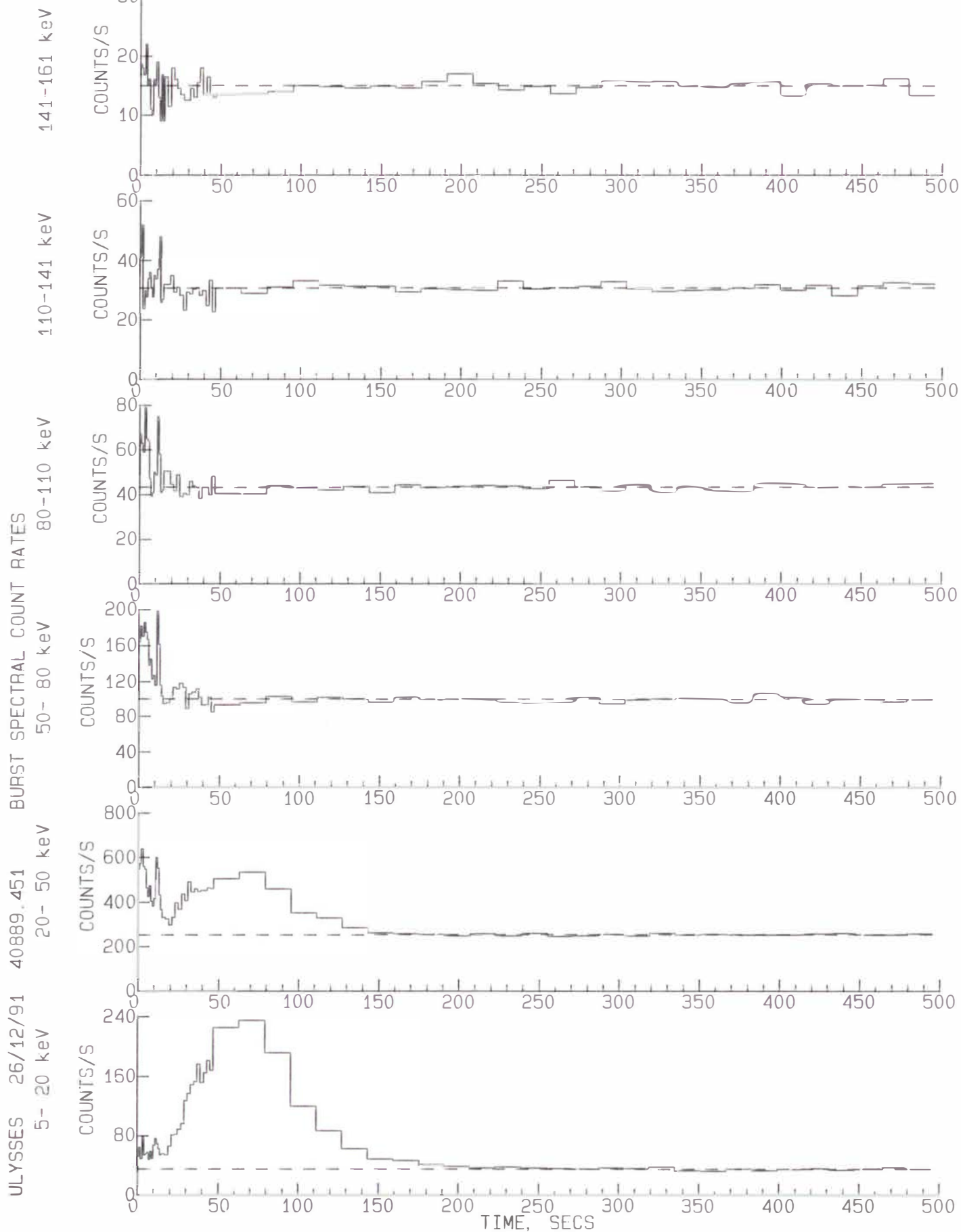
ULYSSES 26/12/91 40889.451

15/ 7/95

SPECTRUM INTEGRATED OVER 21.1 SECONDS, INTERVALS 2 TO 20



15 / 7 / 95

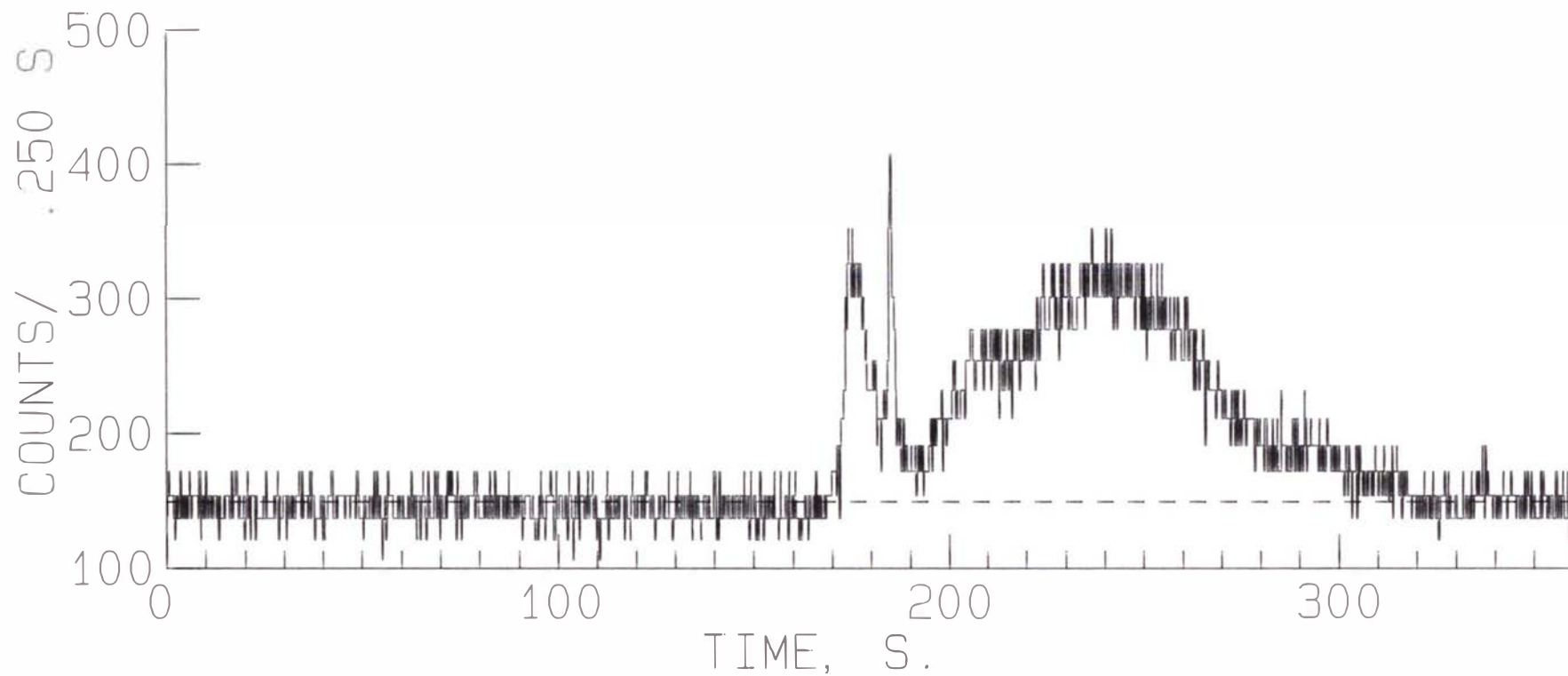


ULYSSES RT
26/12/91 40716.215 s
18- 161 keV

15 / 7 / 95

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS

||

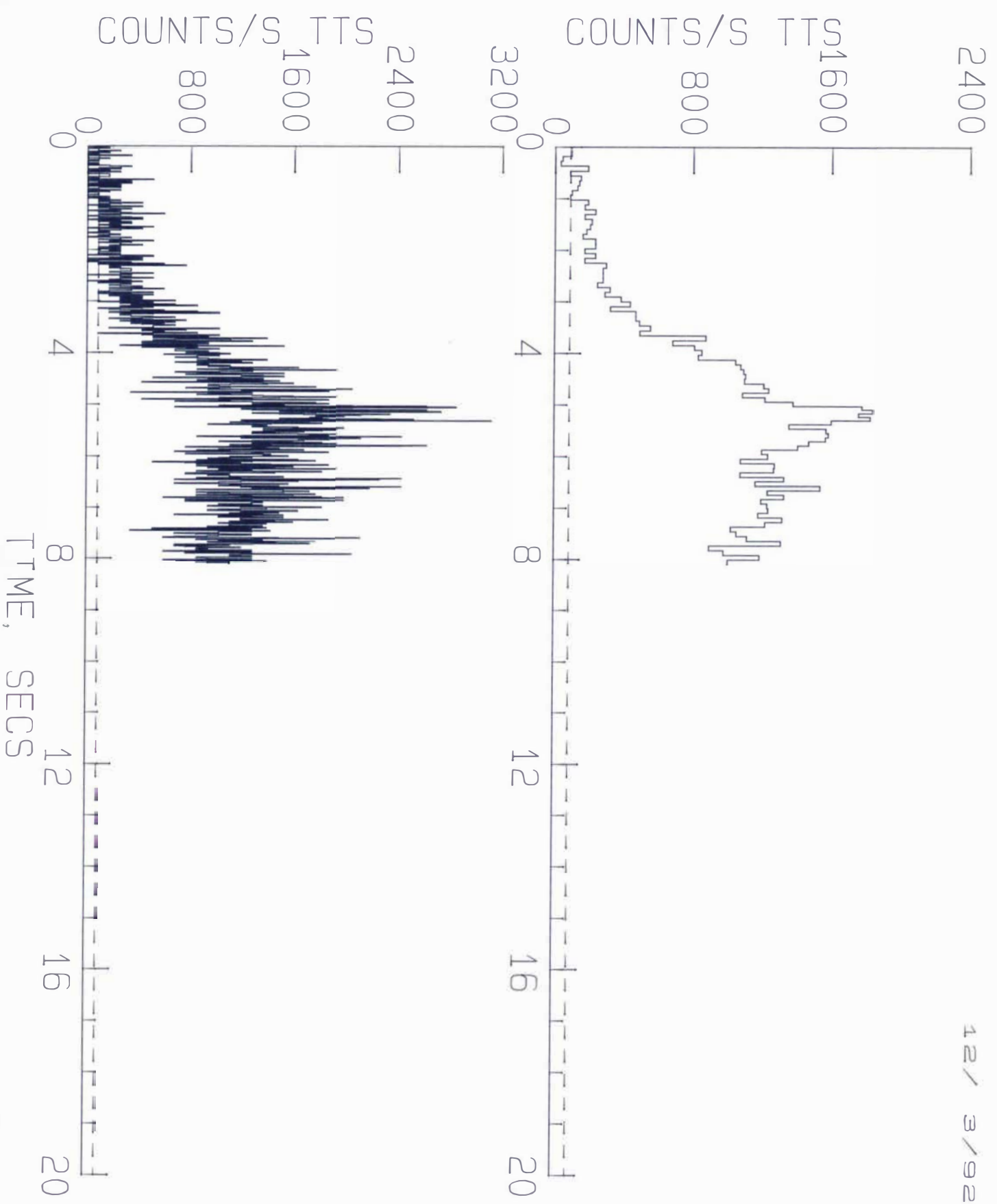


38731.773
~~84574.438~~

28
24/12/91

PVO

100-2000 keV



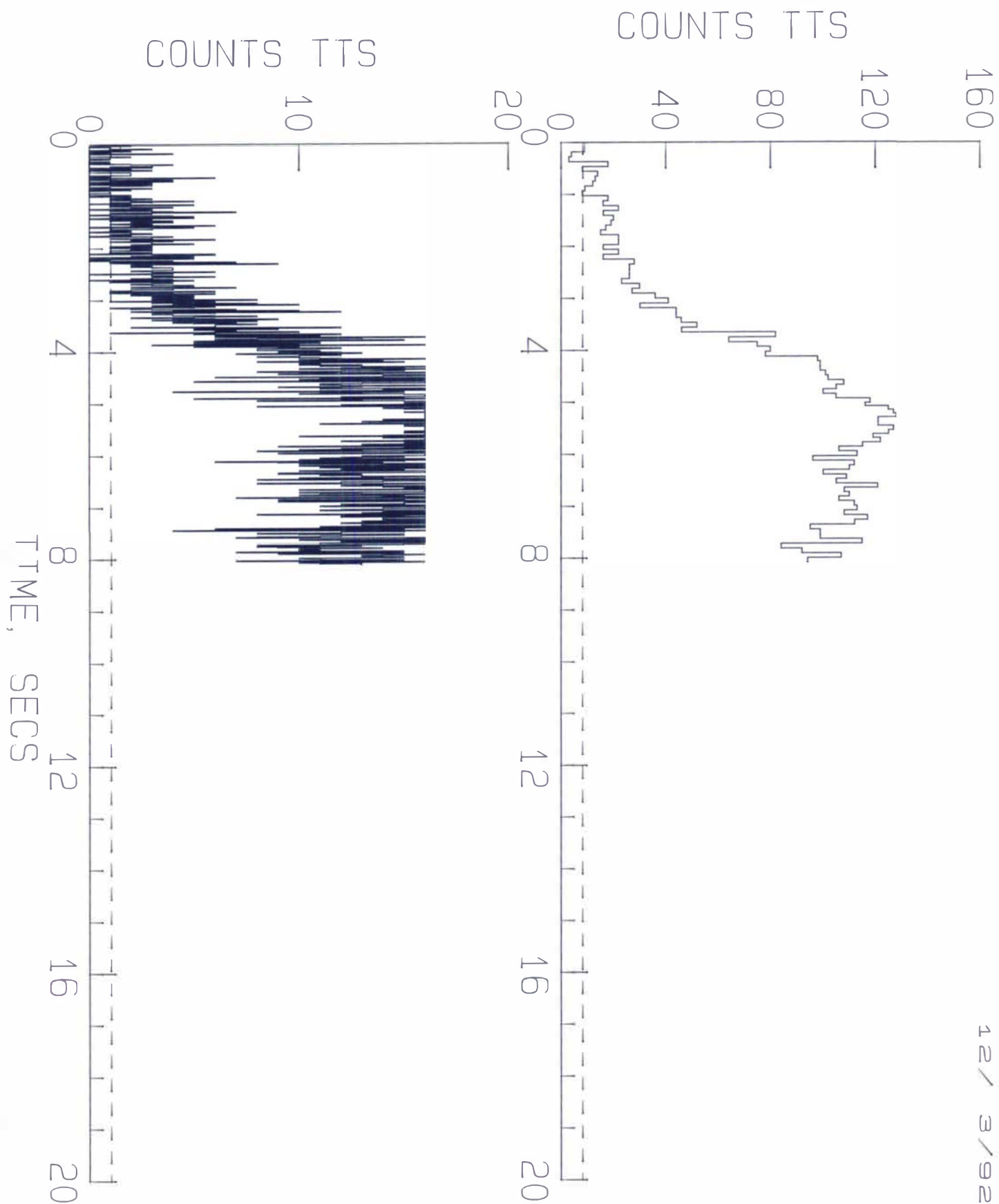


PV0

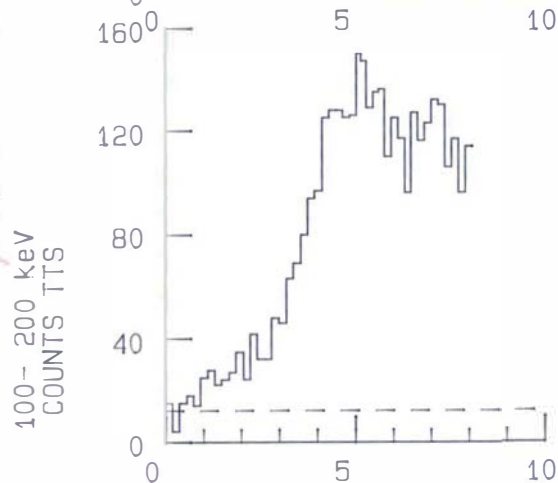
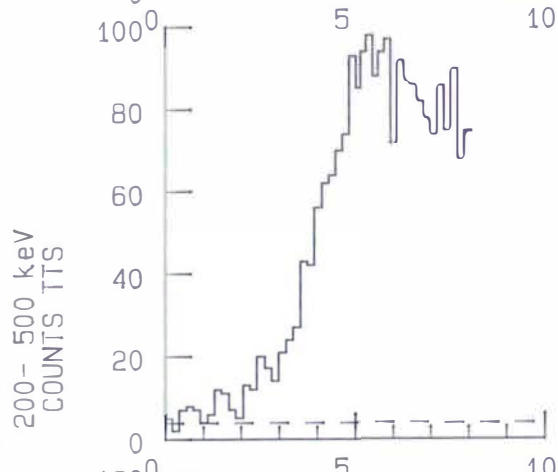
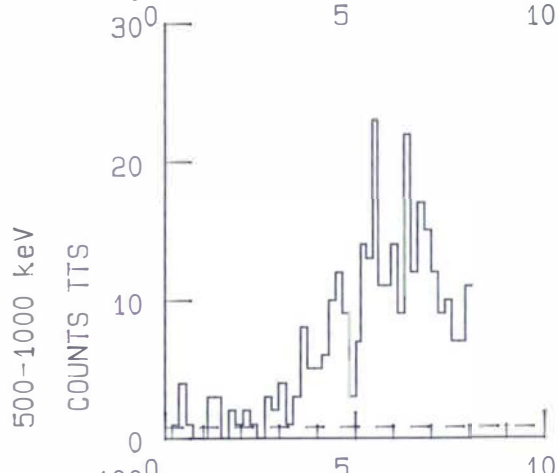
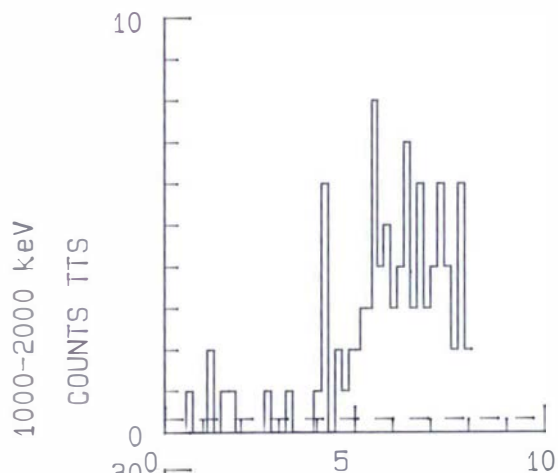
8
24/12/91

38731.773
~~84574.438~~

100-2000 keV



12 / 3 / 92



TIME, SECS

38731.773

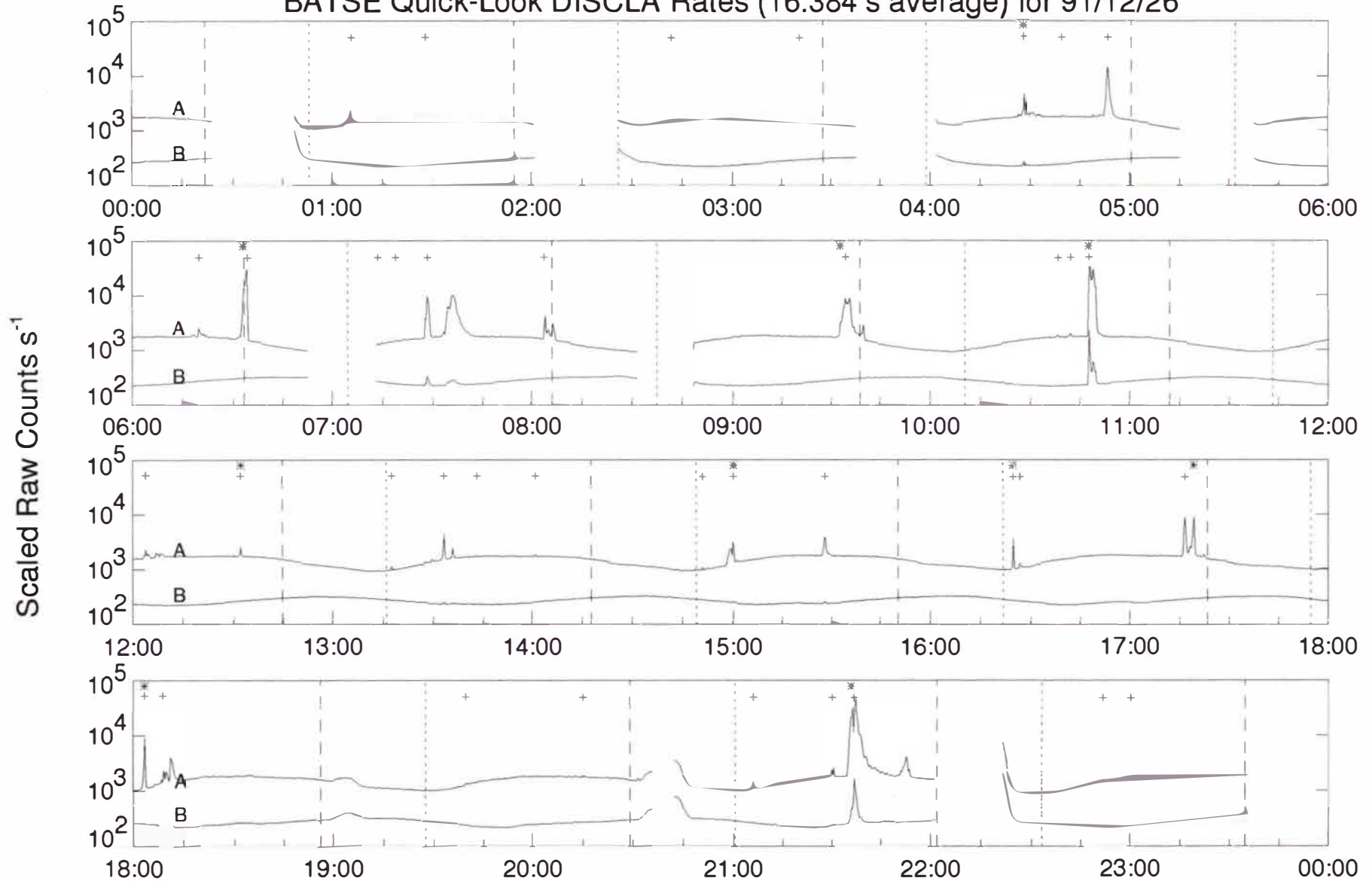
84574.438

6

24/12/91

PV0

BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/26



Current Time: 92/10/18, 1919 EDT

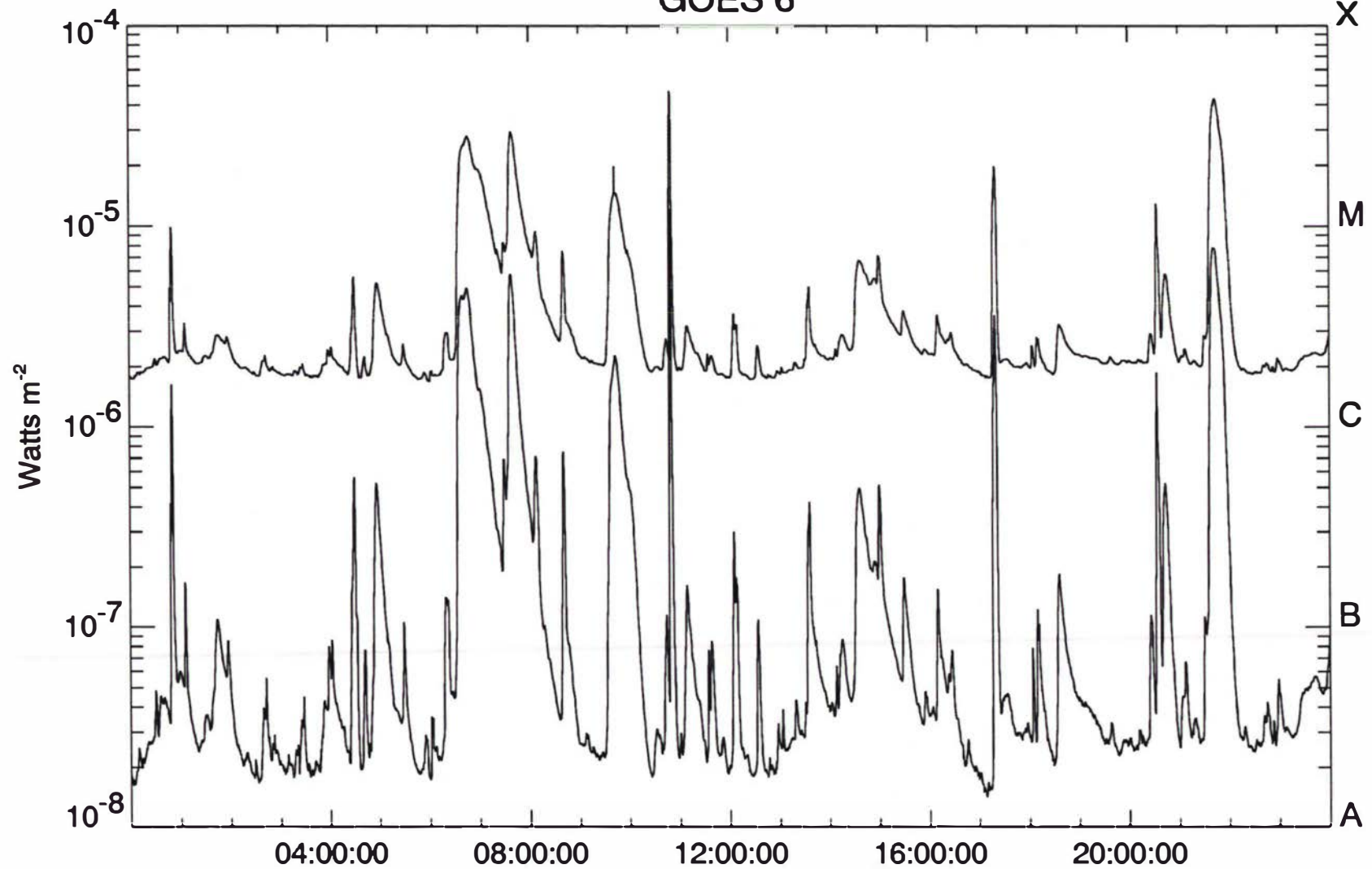
A: Channel 1 Most Sunward LAD

B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare

GOES 6



Data Start: 91/12/26, 0000:00

Plot created: 97/10/20, 1604

Channel

1 (1.0 - 8.0 Angstroms)

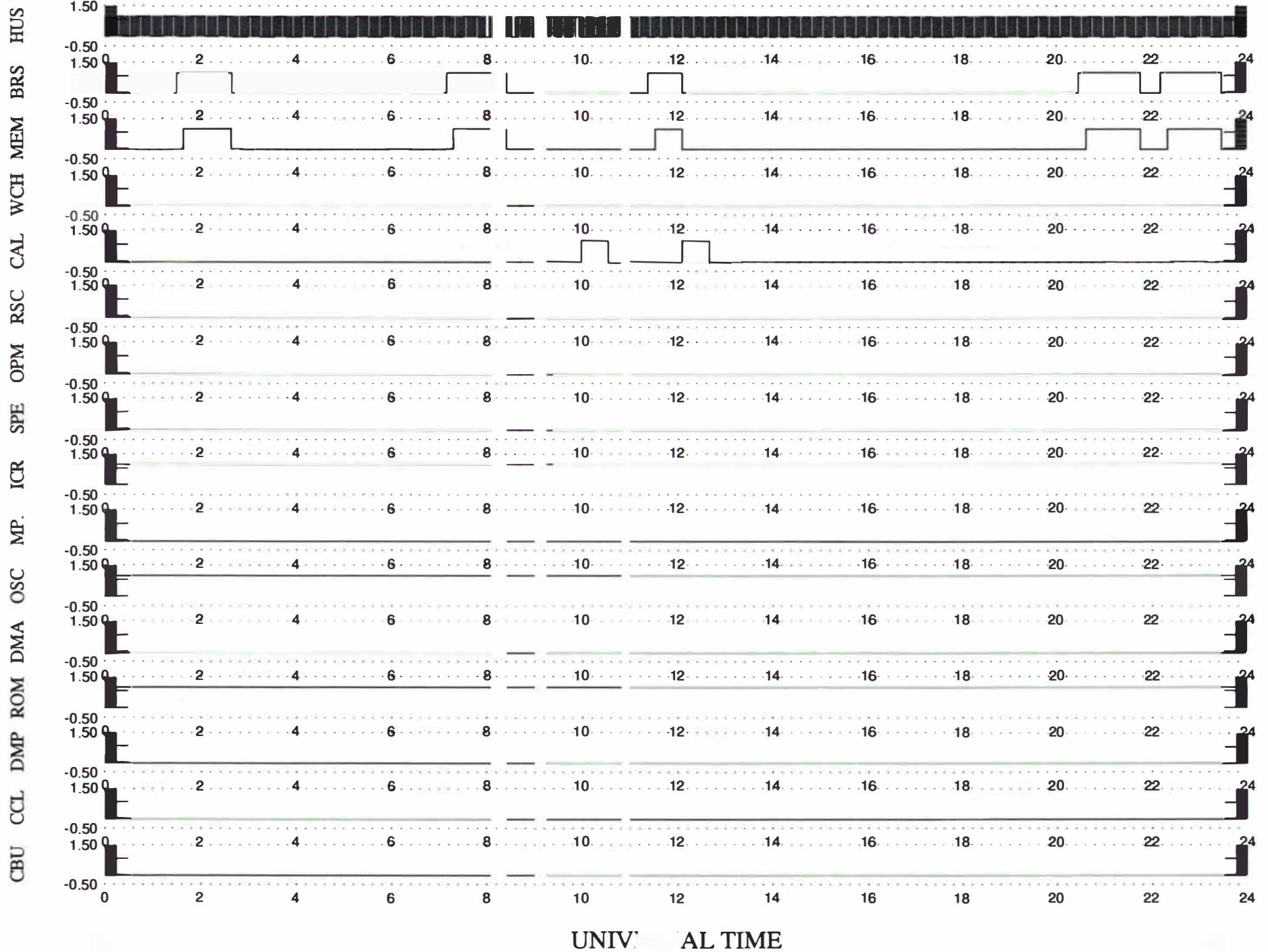
Background not subtracted

2 (0.5 - 4.0 Angstroms)

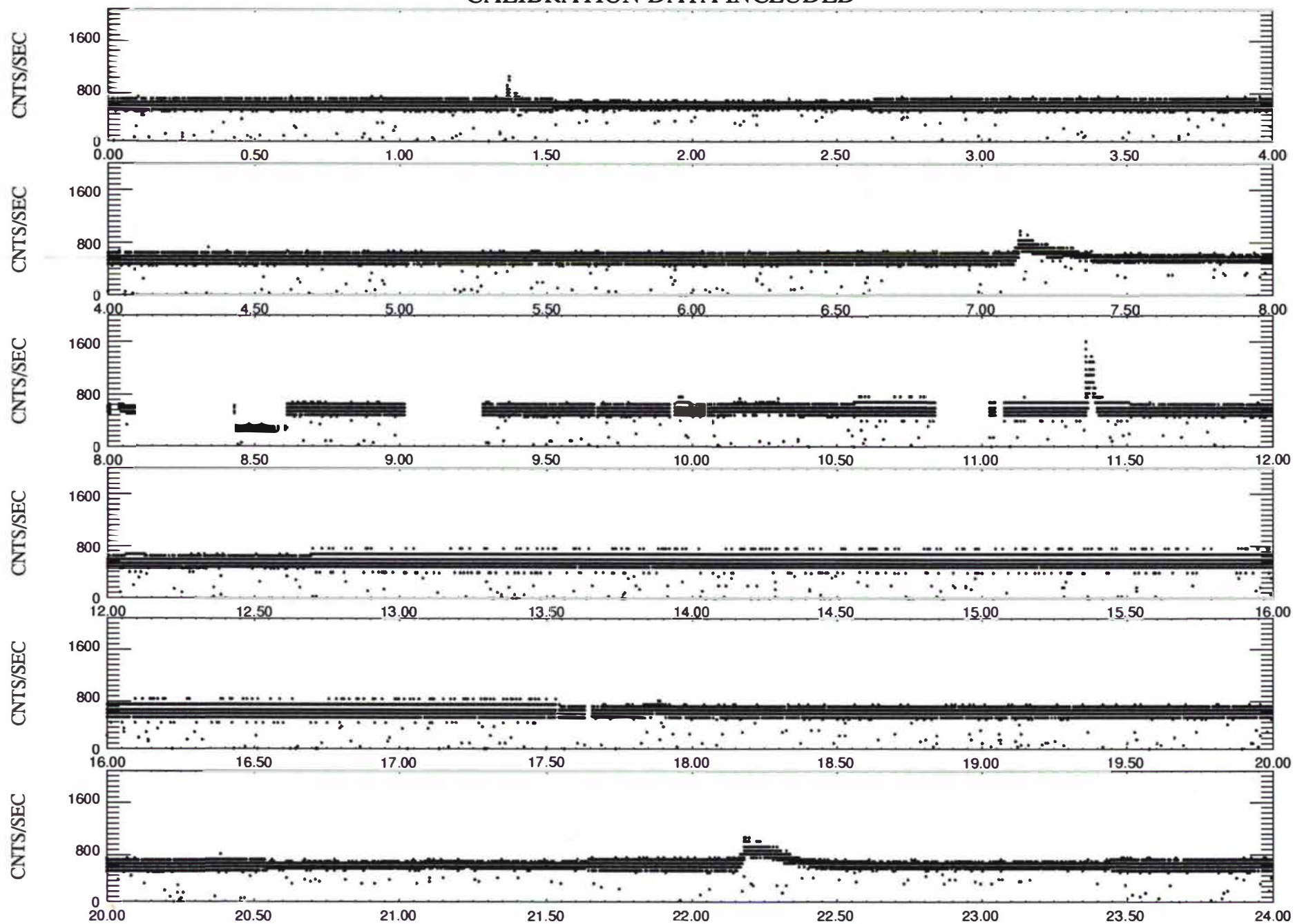
Background not subtracted

Sample average = 10

BURST NUMBER 6 - 10

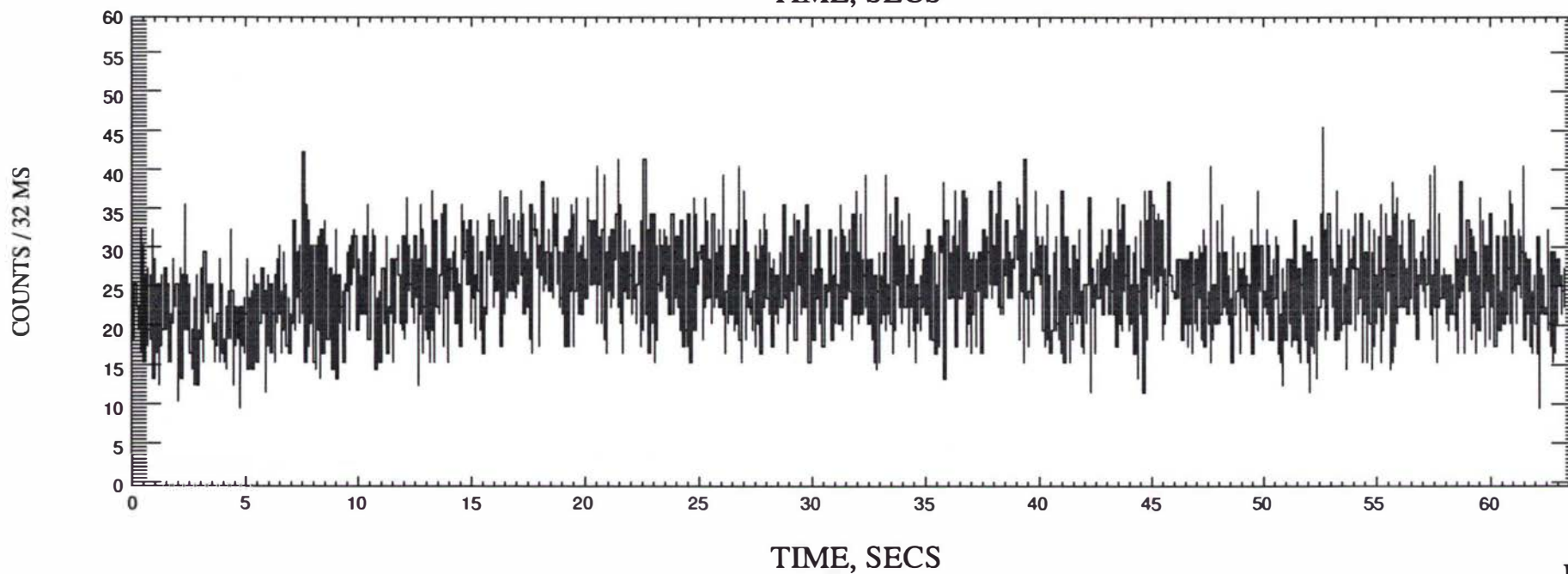
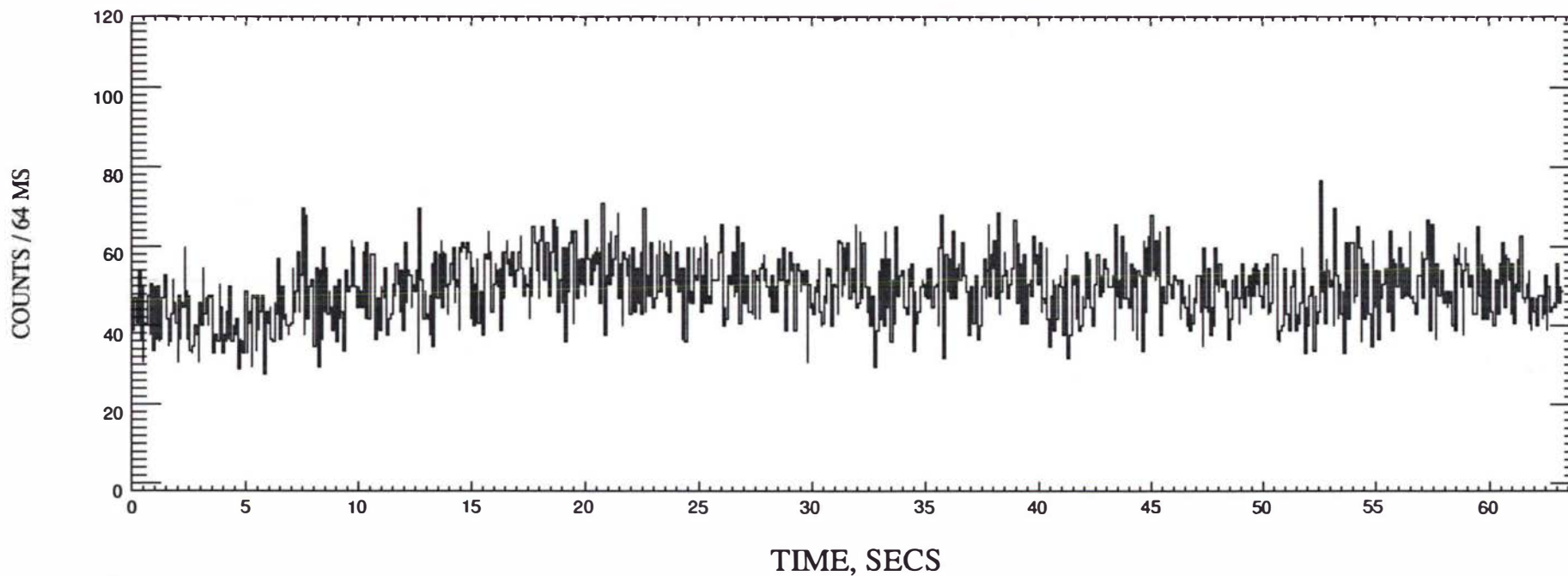


CALIBRATION DATA INCLUDED

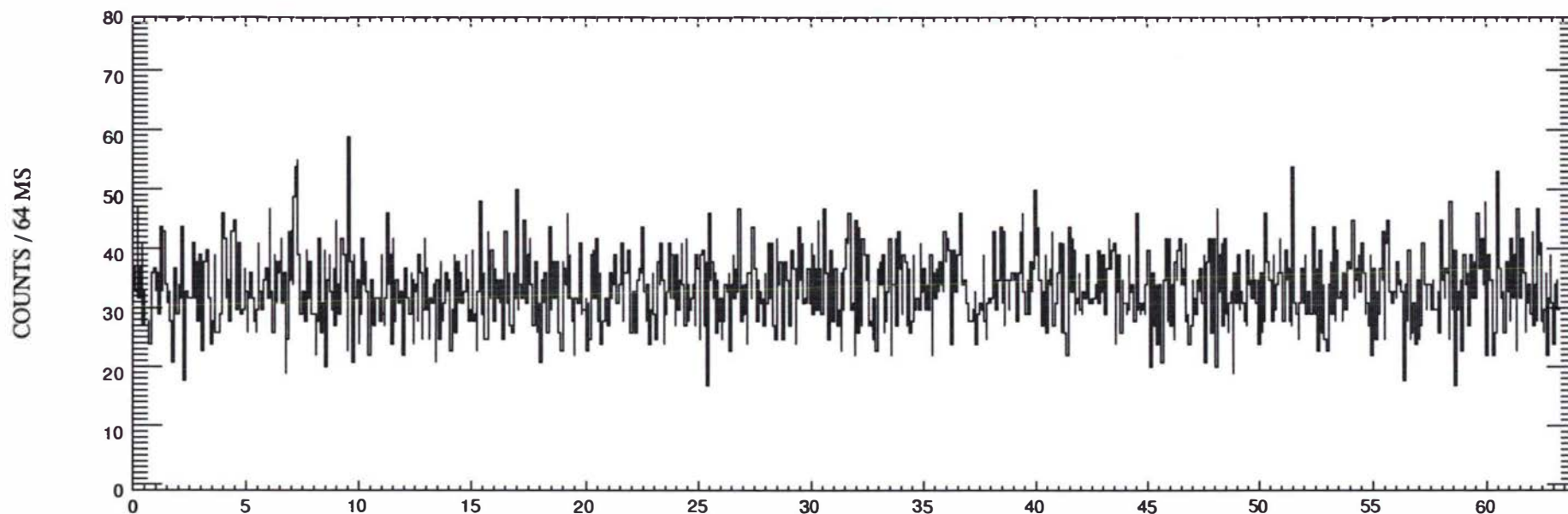


UNIV' AL TIME

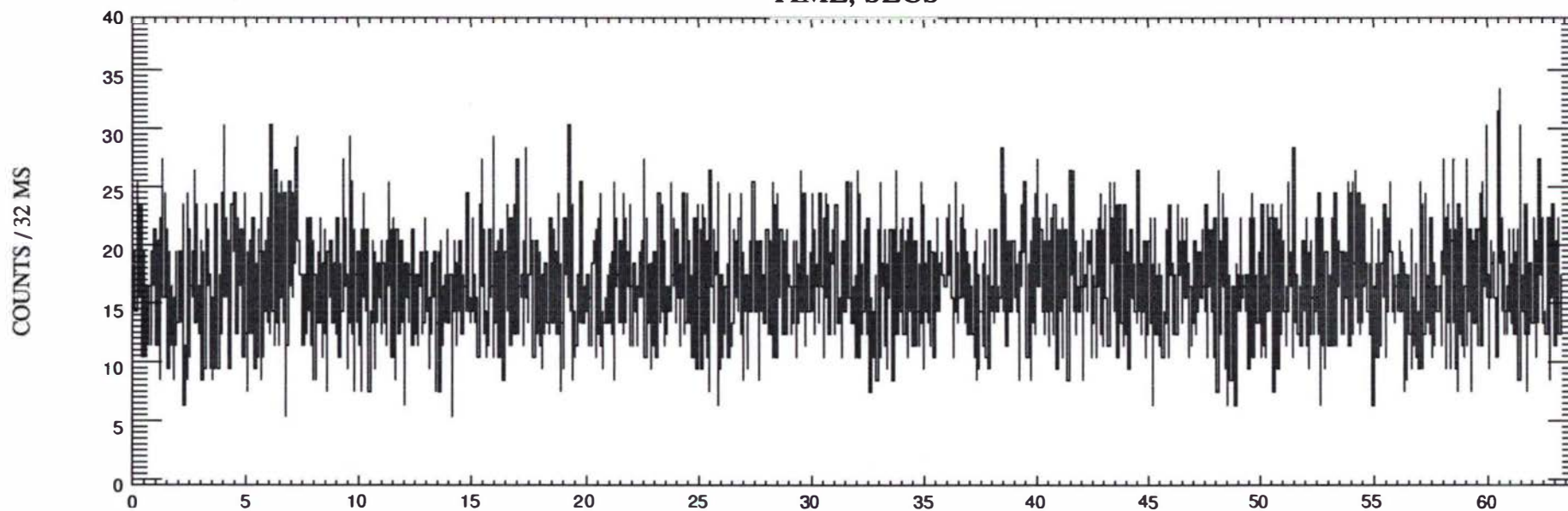
Burst Counter 10 at UT=22.176490097046 h=79835.364 s 22:10:35.364



Burst Counter 9 at UT=20.380699111091 h=73370.517 s 20:22:50.517

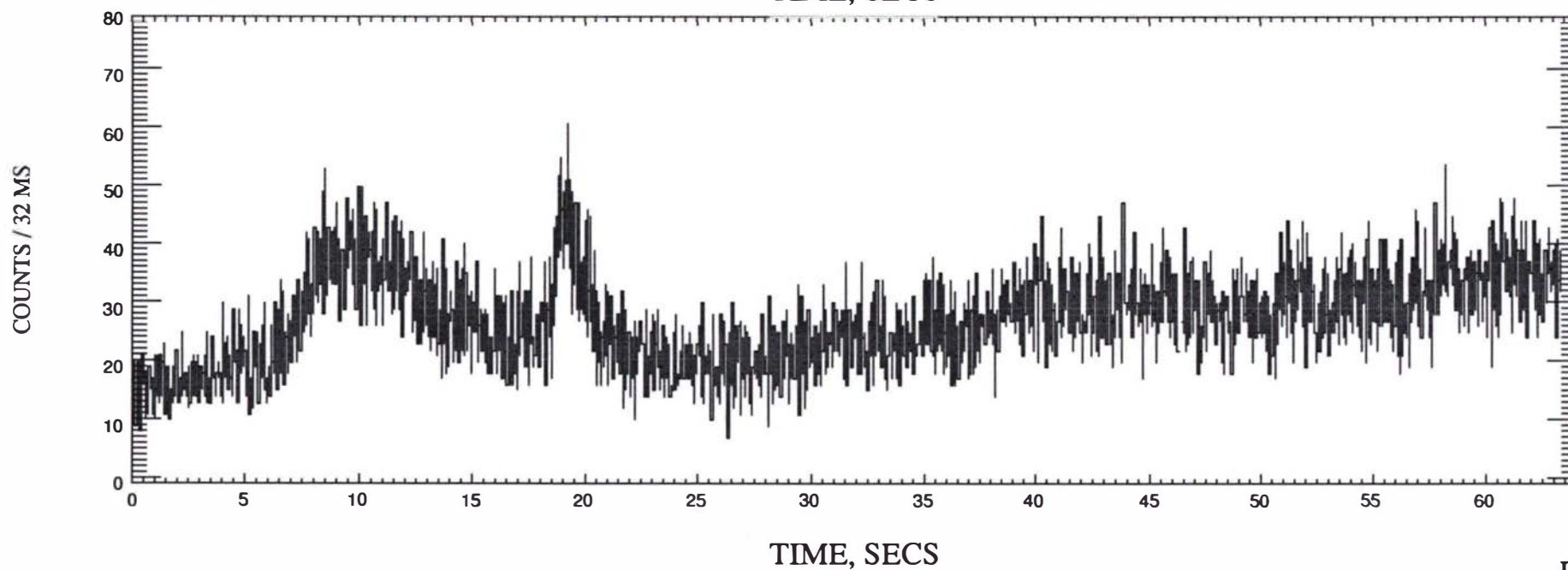
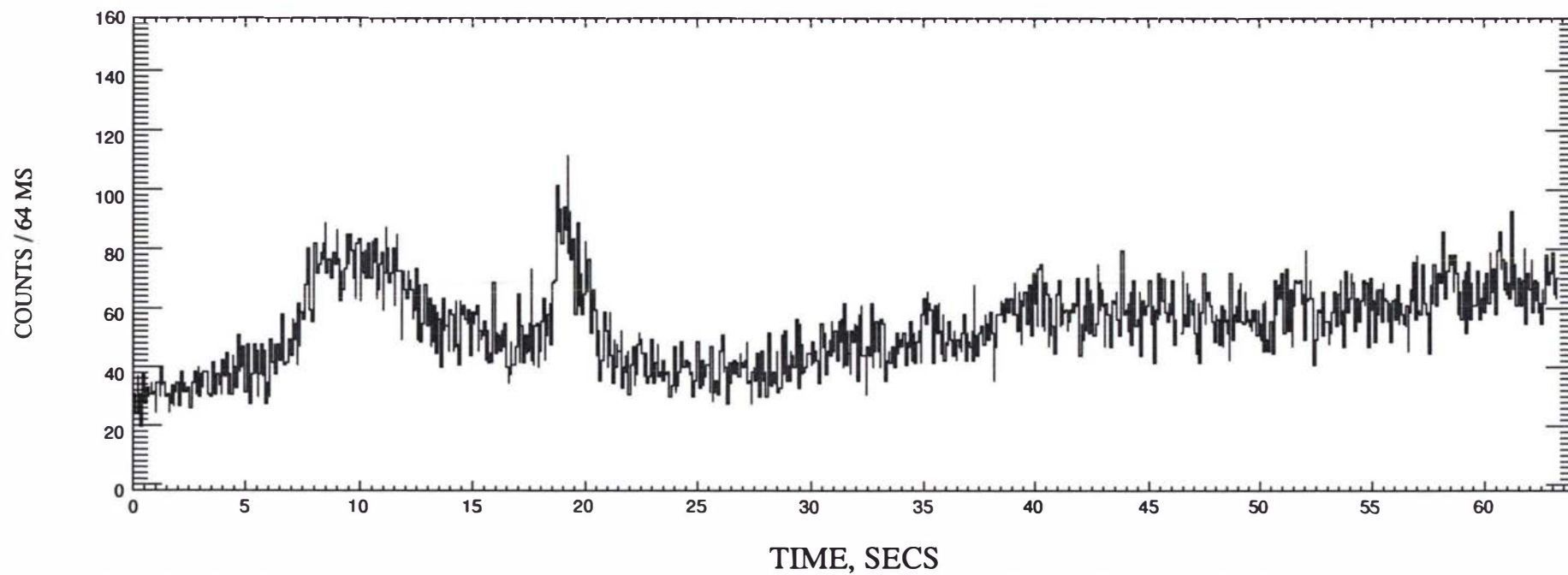


TIME, SECS

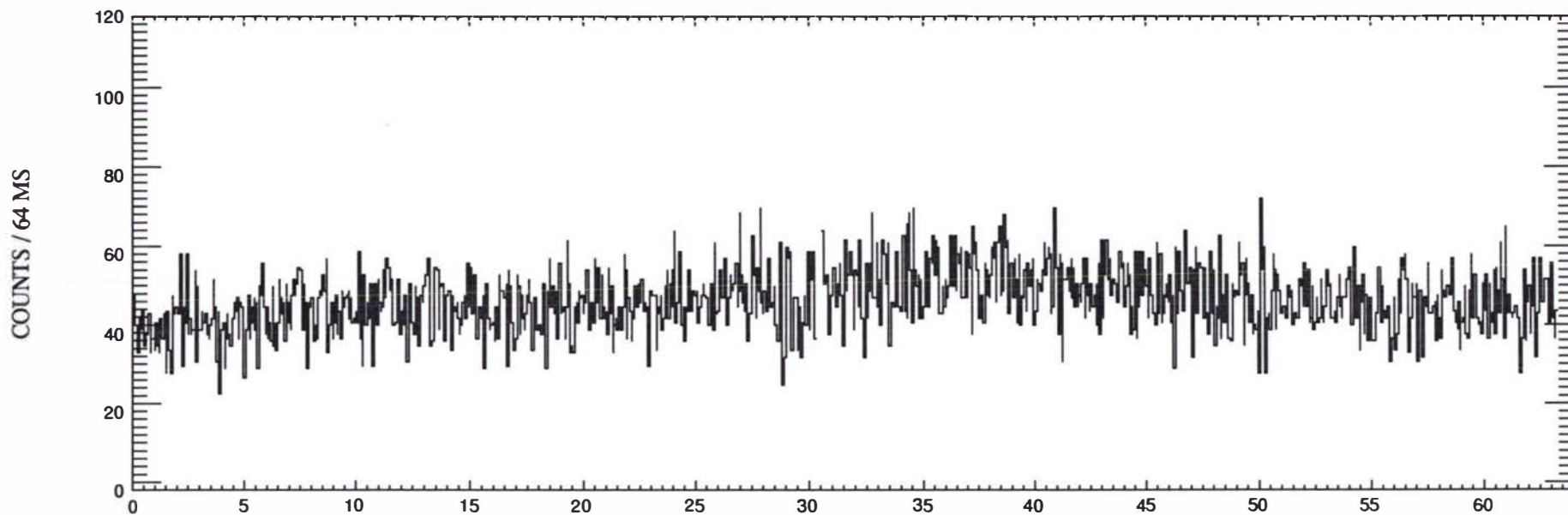


TIME, SECS

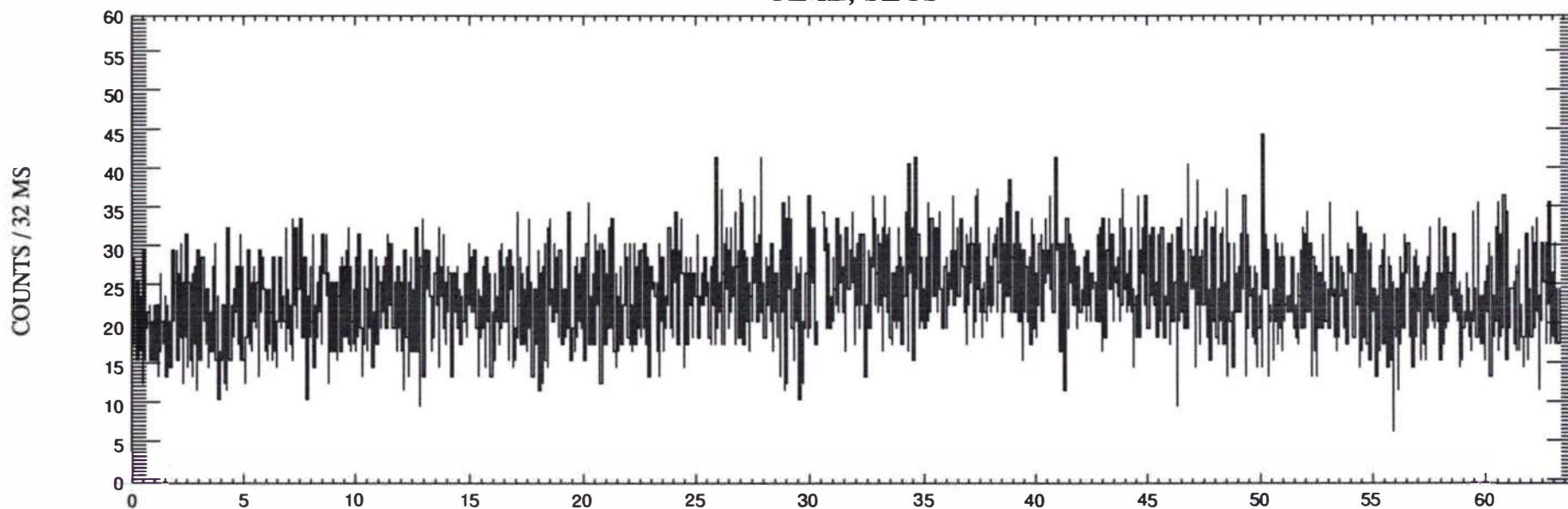
Burst Counter 8 at UT=11.358180669149 h=40889.450 s 11:21:29.450



Burst Counter 7 at UT= 7.125887760586 h=25653.196 s 07:07:33.196

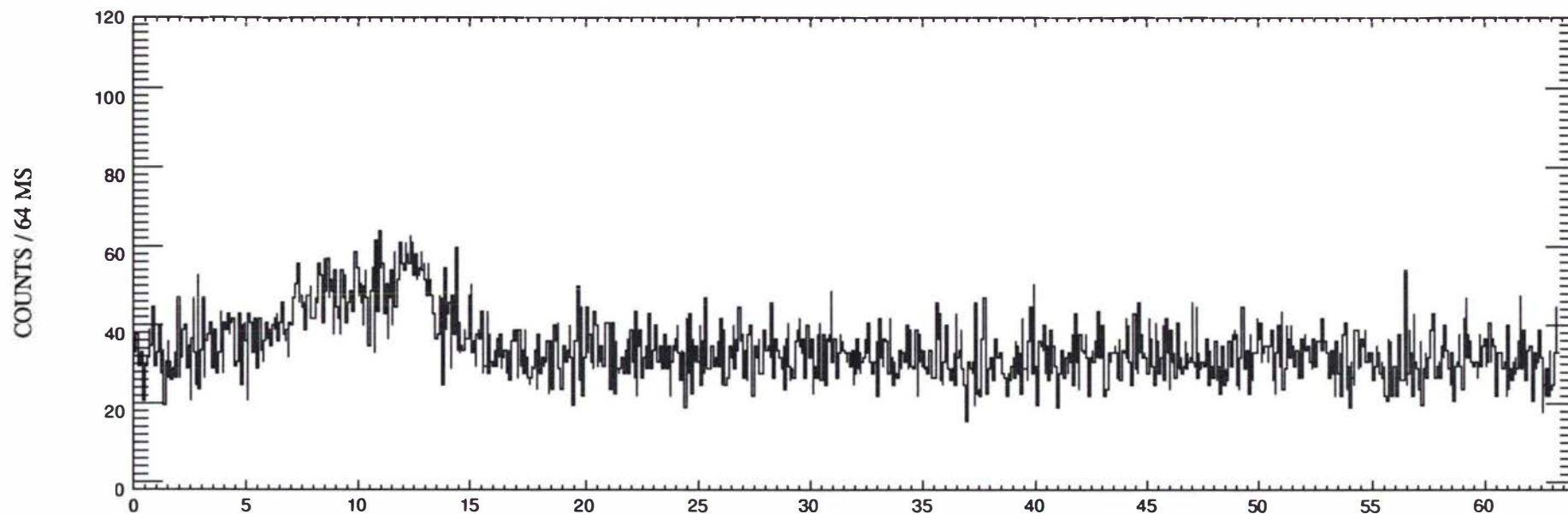


TIME, SECS

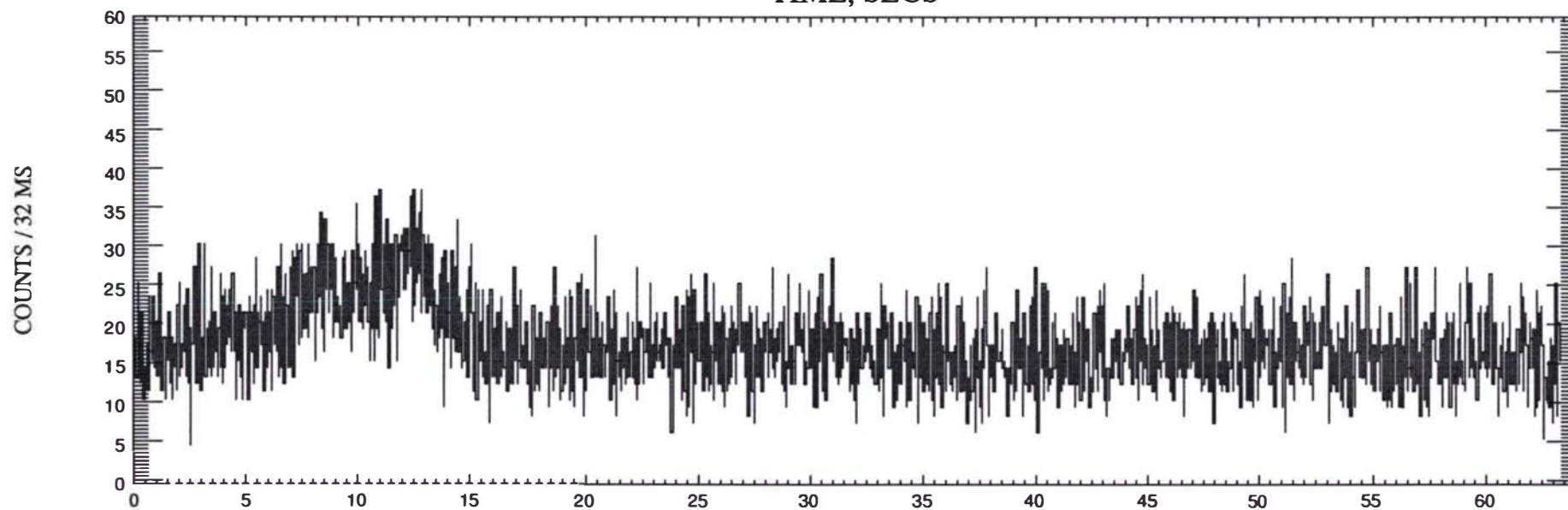


TIME, SECS

Burst Counter 6 at UT= 1.364054103427 h= 4910.595 s 01:21:50.595

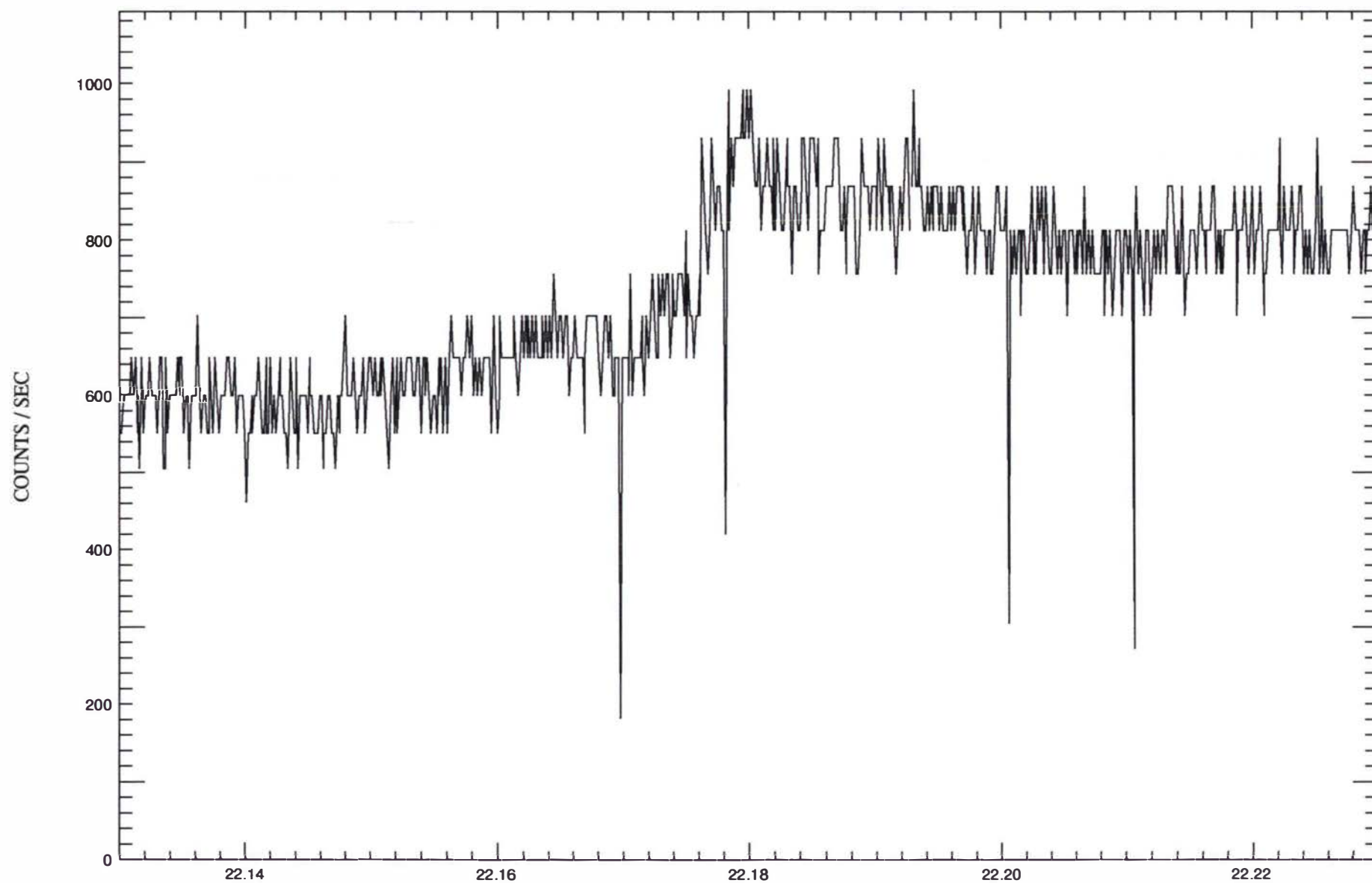


TIME, SECS

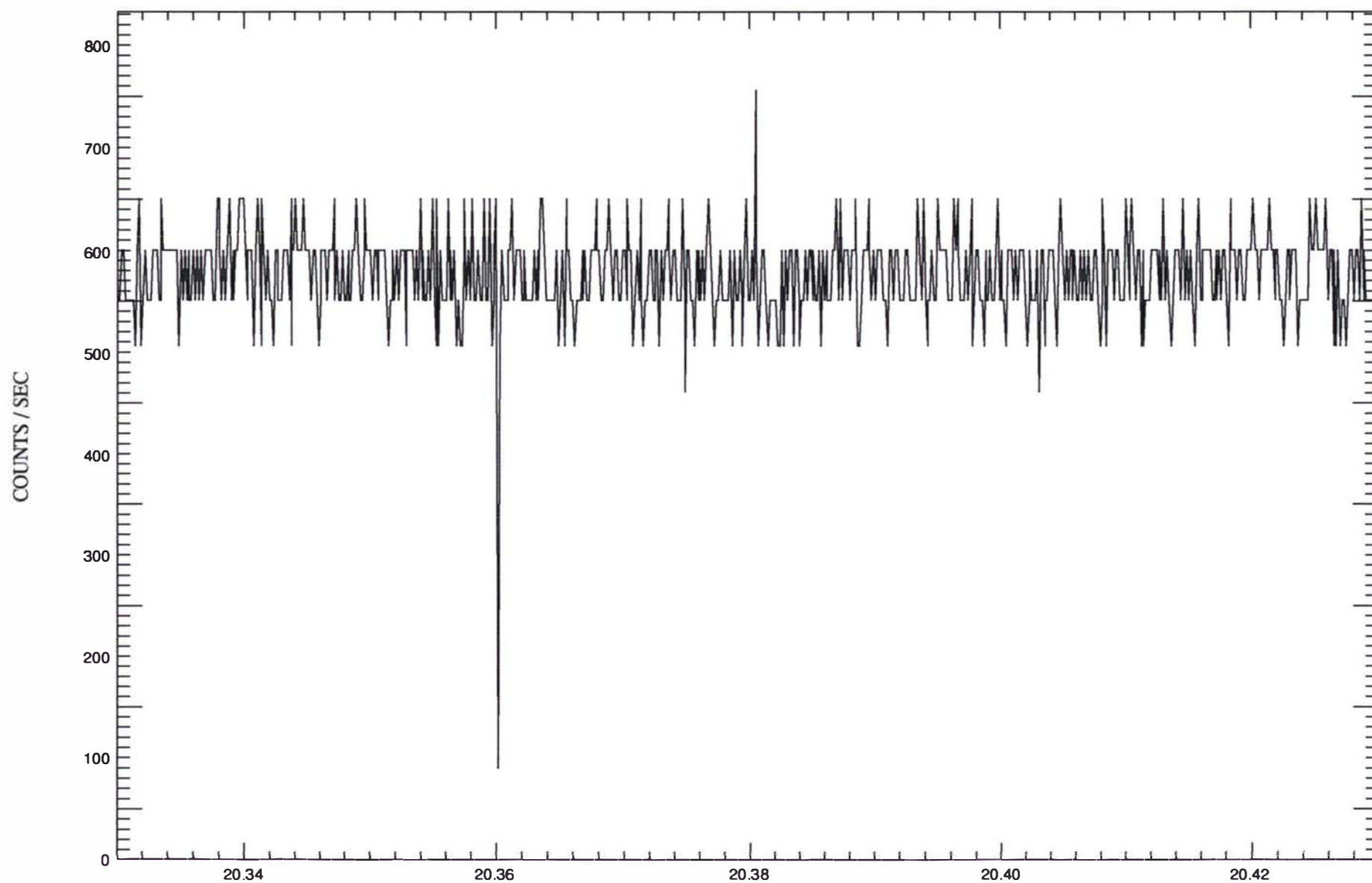


TIME, SECS

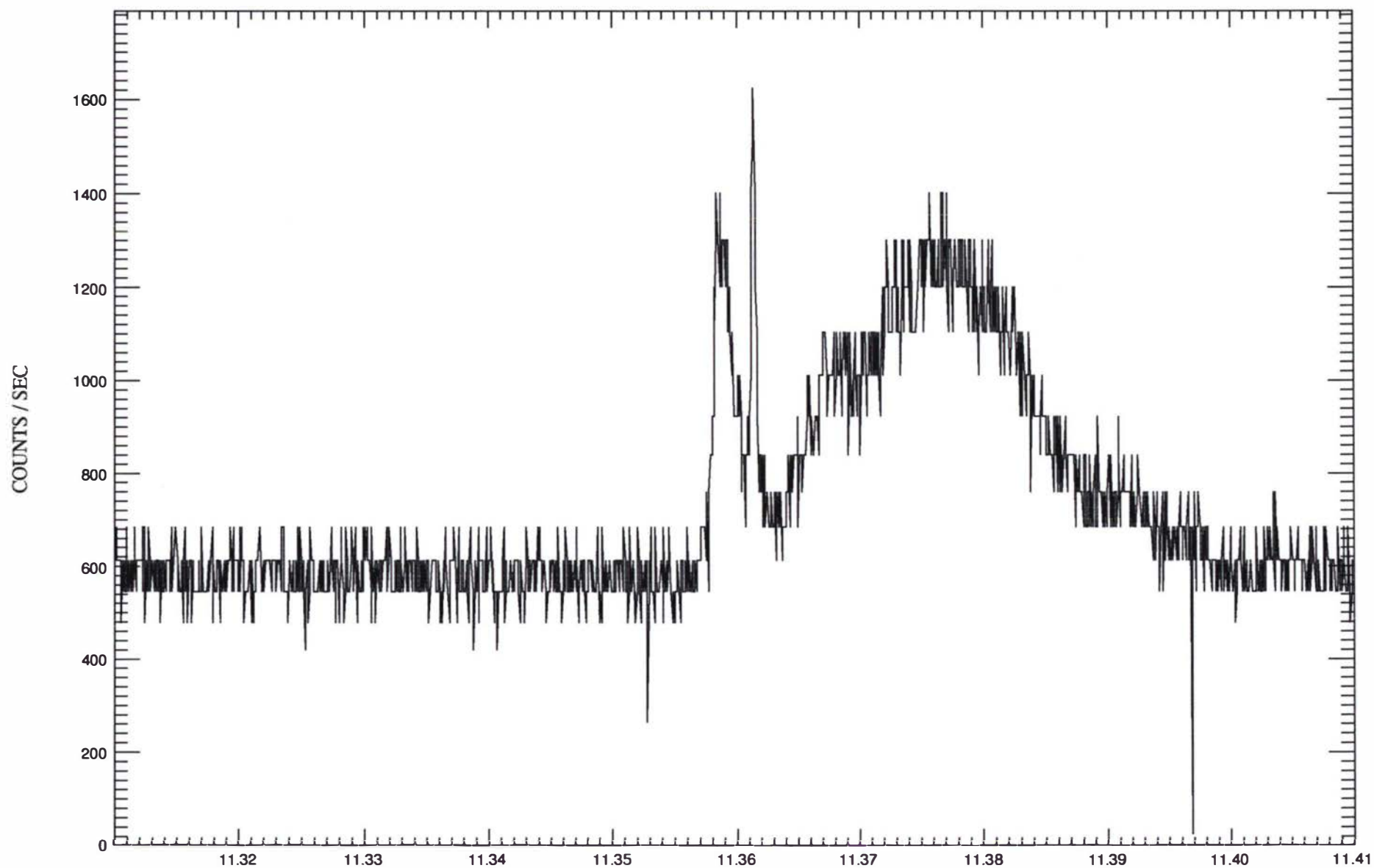
CALIBRATION DATA INCLUDED



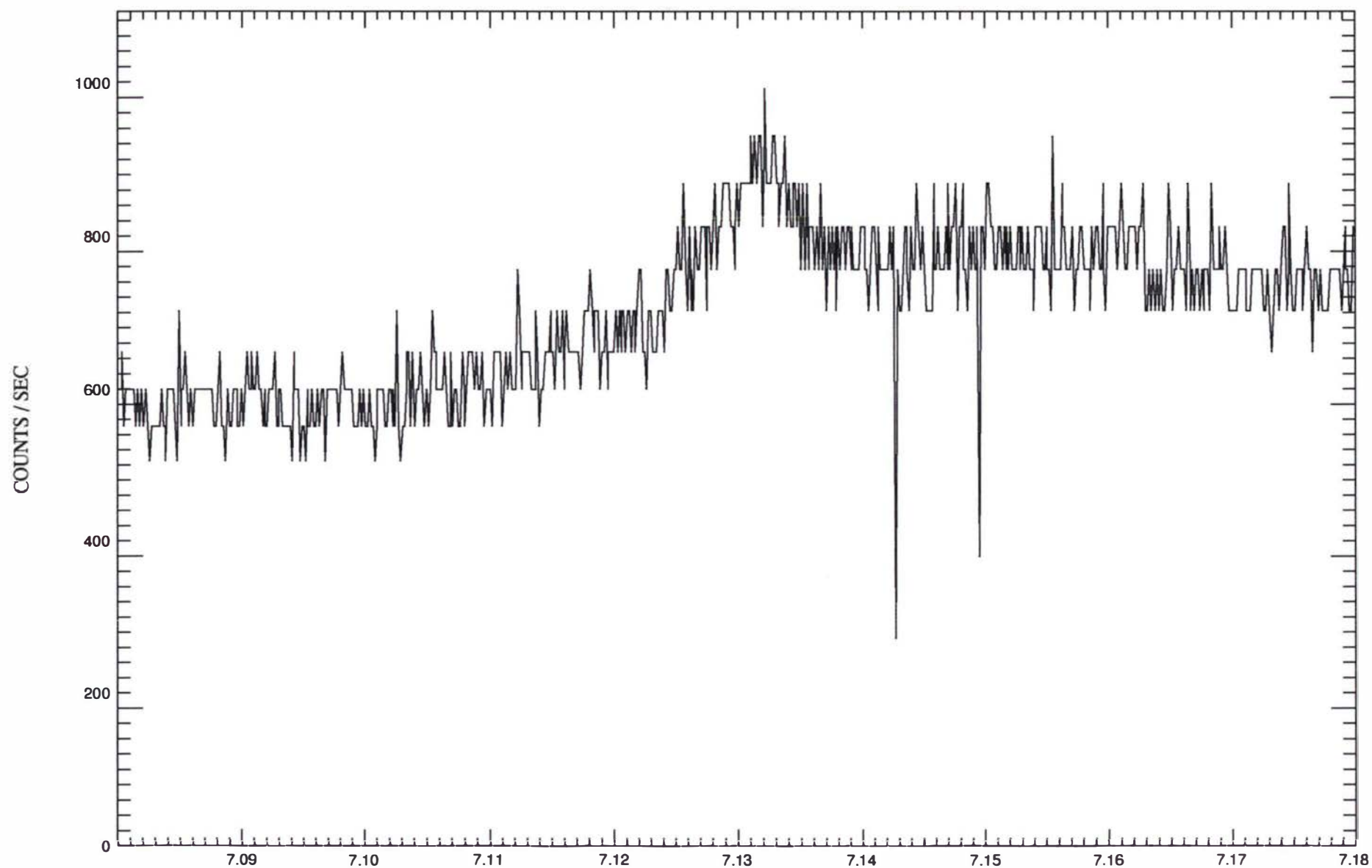
CALIBRATION DATA INCLUDED



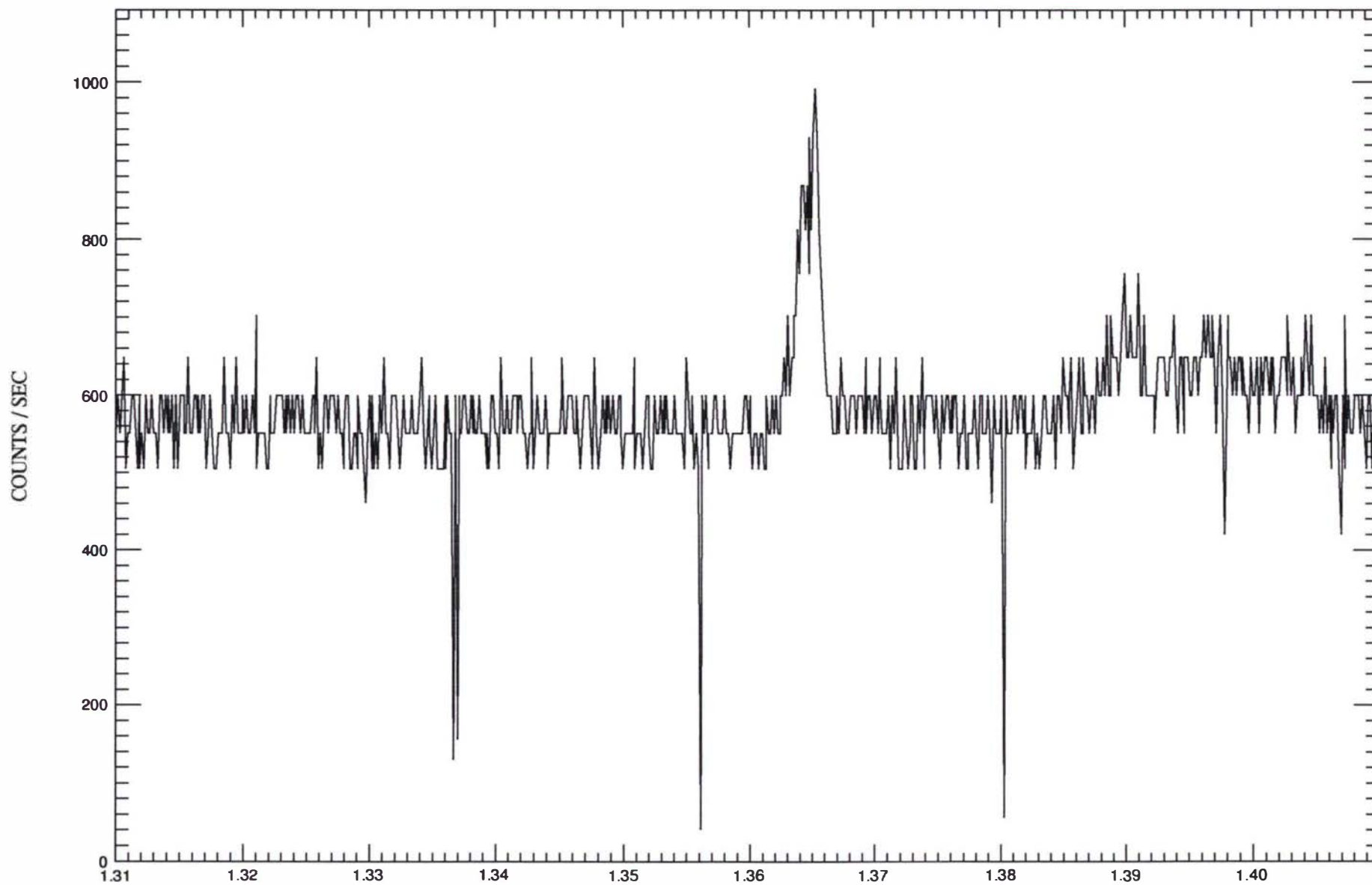
CALIBRATION DATA INCLUDED

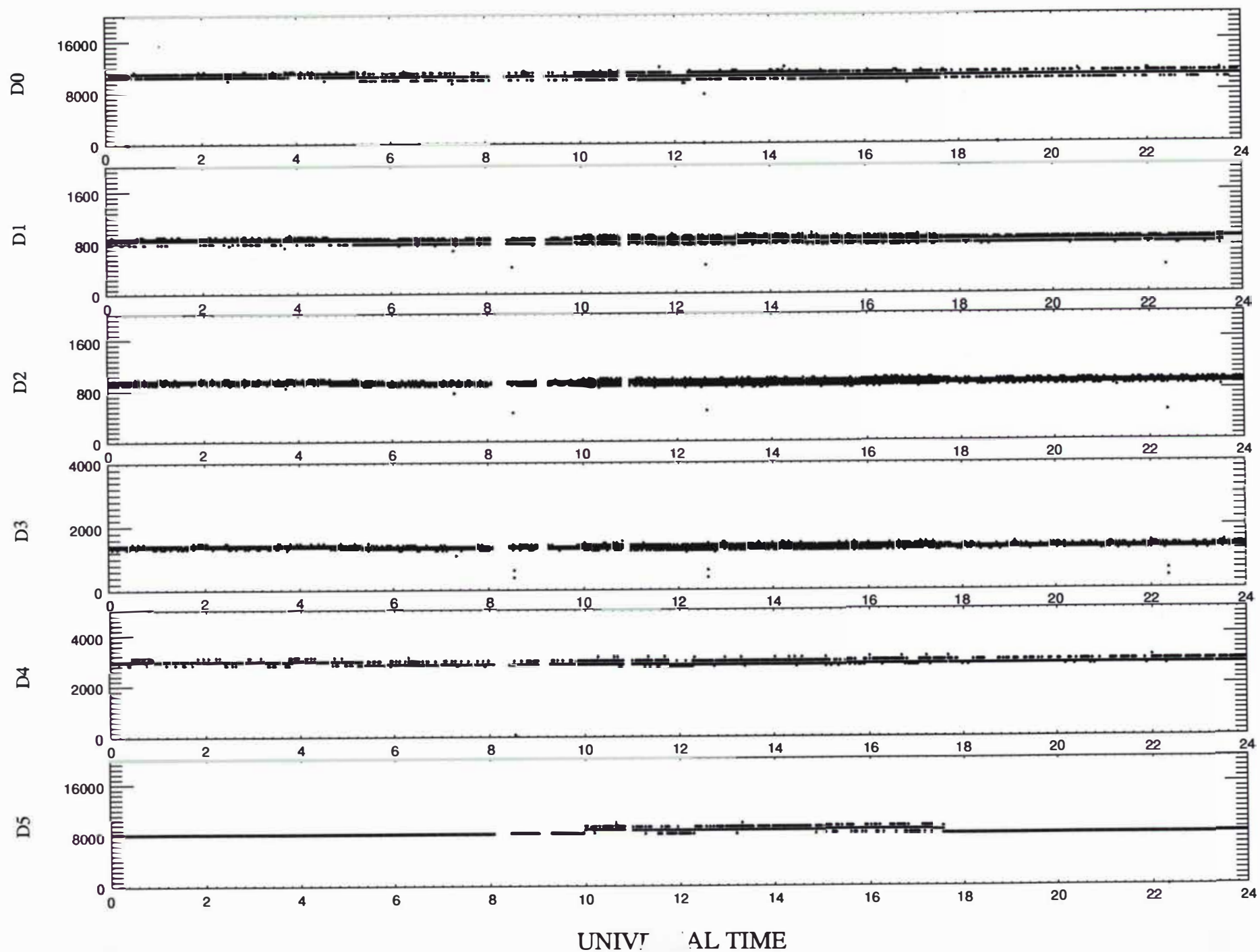


CALIBRATION DATA INCLUDED



CALIBRATION DATA INCLUDED





CATSEARCH PROGRAM

BATSE BURST # 1235
EVENT OF 1991 DEC 27 DAY OF YEAR=361
EVENT CROSSING TIME AT BATSE : 3953. S. OR 01:05:53.2
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 347.100 -72.400
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 27/12/ 91 IS:
RA= 167.742 DEC= 6.680 DIST= 4.656 AU
BATSE-ULYSSES DISTANCE = 696589960. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 65.72 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 955.41 SECS.
CROSSING TIME AT ULYSSES IS 4909. S. OR 01:21:48 +/- 432.24 SECONDS

Helio. corr removed
Date: Nov 25 '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?
- ☒ 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)?
- ☒ 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*

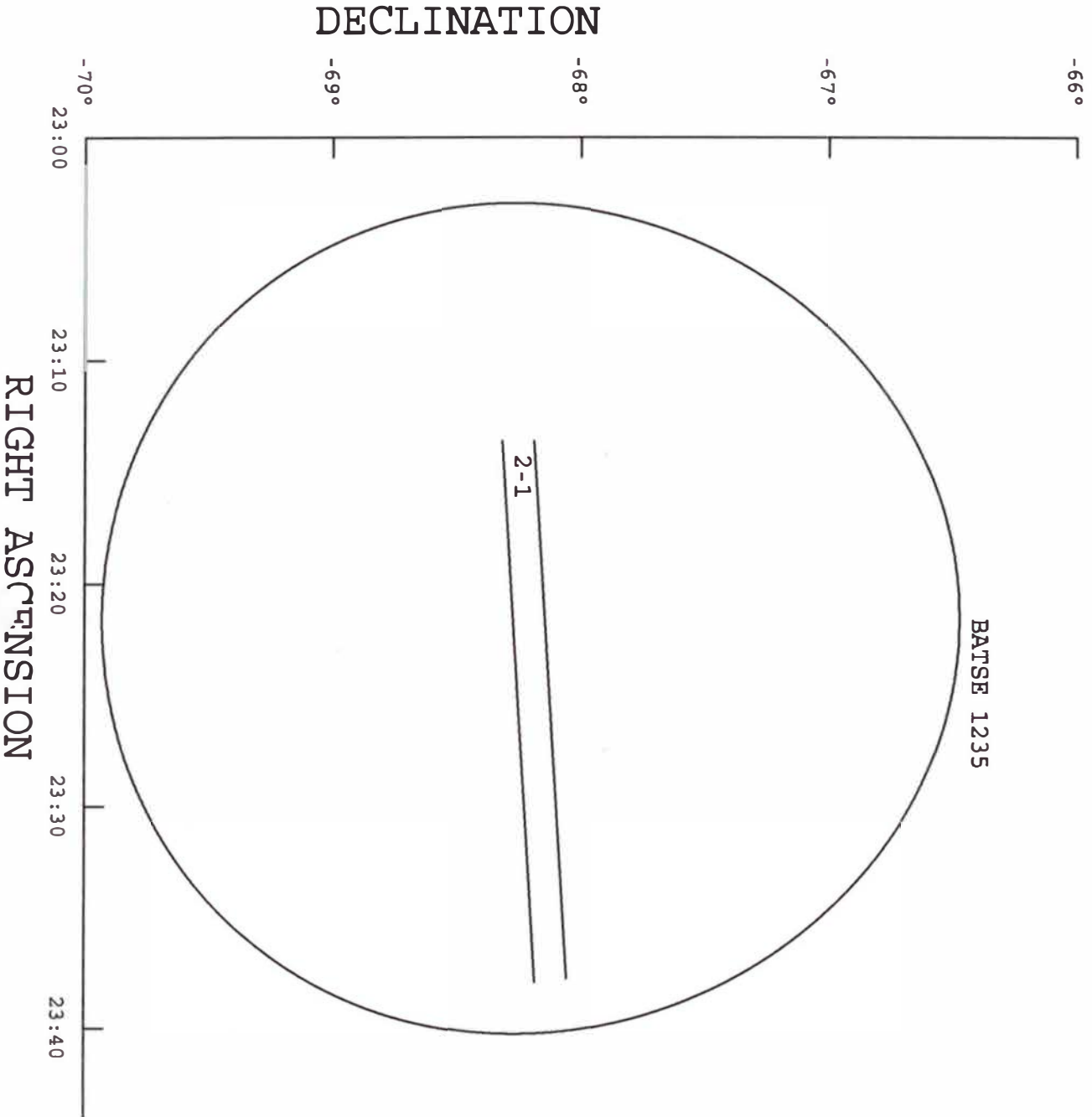
3. PVO Data

- ☐ Ephemeris of PVO used (not Venus)?
- ☐ 2000 coordinates used?
- ☐ Geocentric time used?
- ☒ 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 DEC 27, 1991 1:23

25/11/97



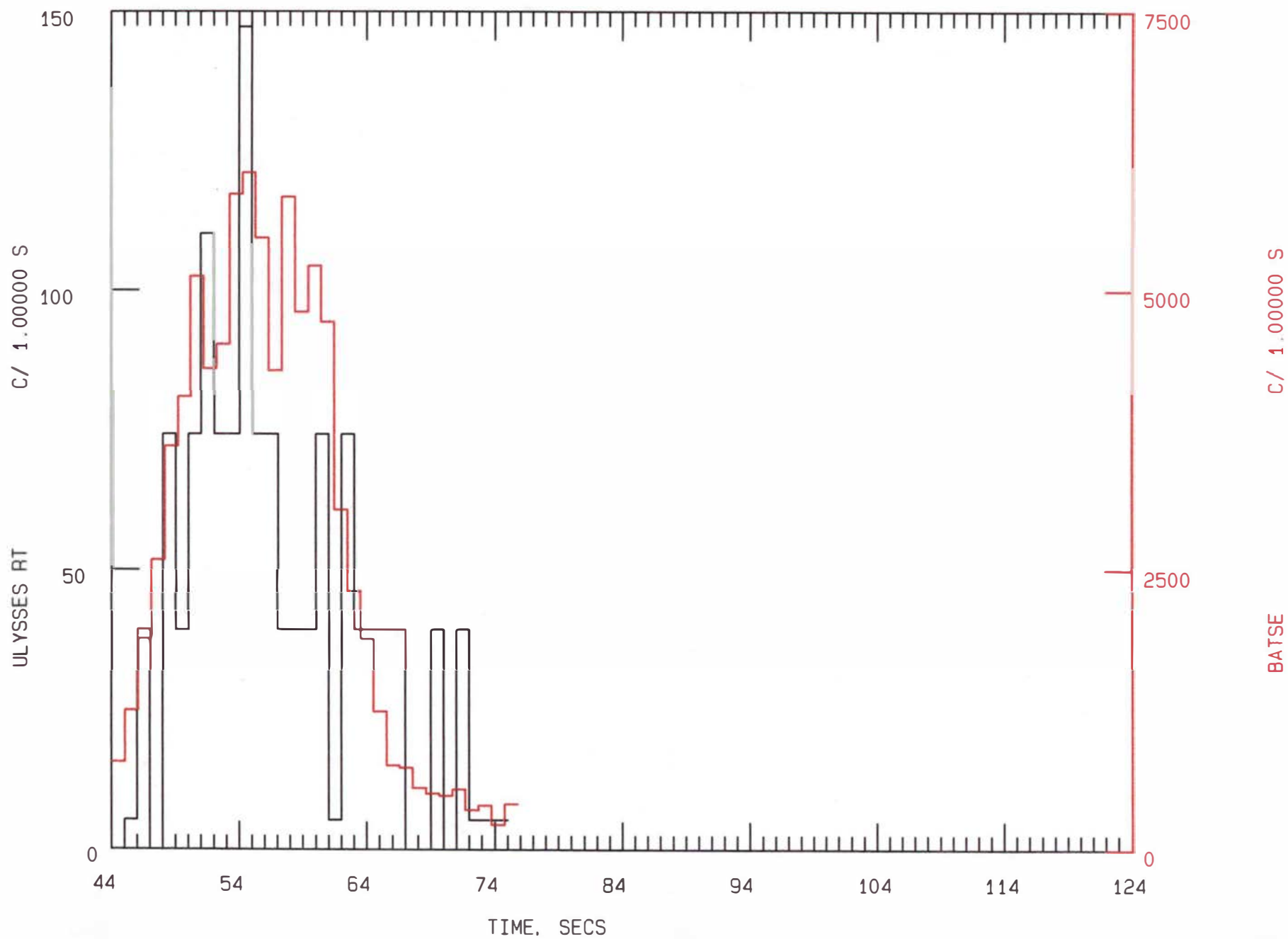
ULYSSES RT-BATSE

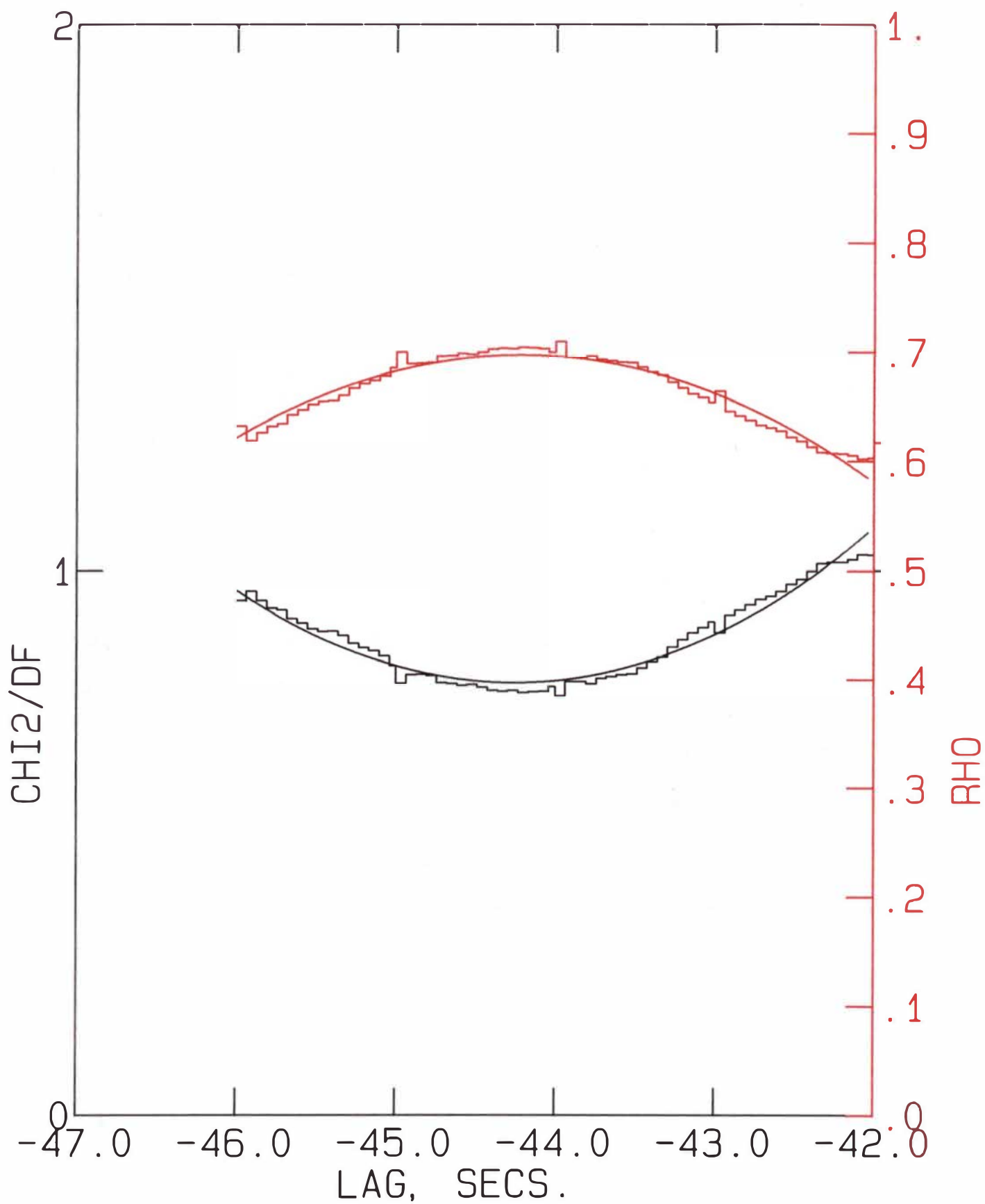
CORRELATION

27/12/91

5003.513

25/11/97





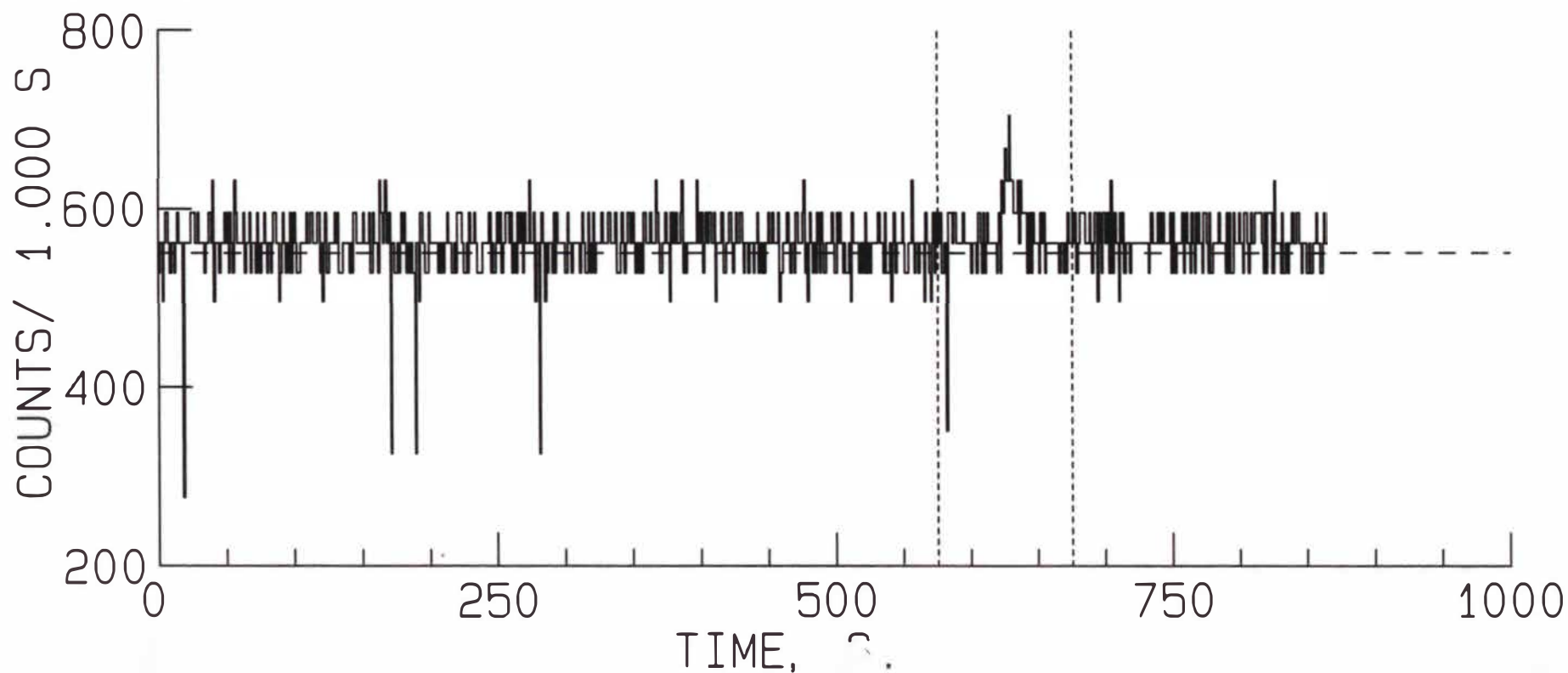
ULYSSES RT

25 / 11 / 97

27/12/91 4428.323 s

18- 162 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



Facsimile Cover Sheet

To: JOHN LAROS
Company: LOS ALAMOS NATL. LAB.
Phone:
Fax: 505 665 4414

From: KEVIN HURLEY
Company: UC BERKELEY
Phone:
Fax:

Date: April 15, 1992

**Pages including this
cover page:** 1

Comments: Here are the dates and times of some Ulysses/BATSE bursts which you might have as real-time events on PVO. Times are Venus crossing, and are fairly accurate (to a few hundred seconds) since they were computed using the BATSE arrival directions.

Dec 7, 1991 35559 secs
Dec 27, 1991 03893 secs
Jan 10, 1992 34277 secs

} No R/T data for any of these
JL 4/20

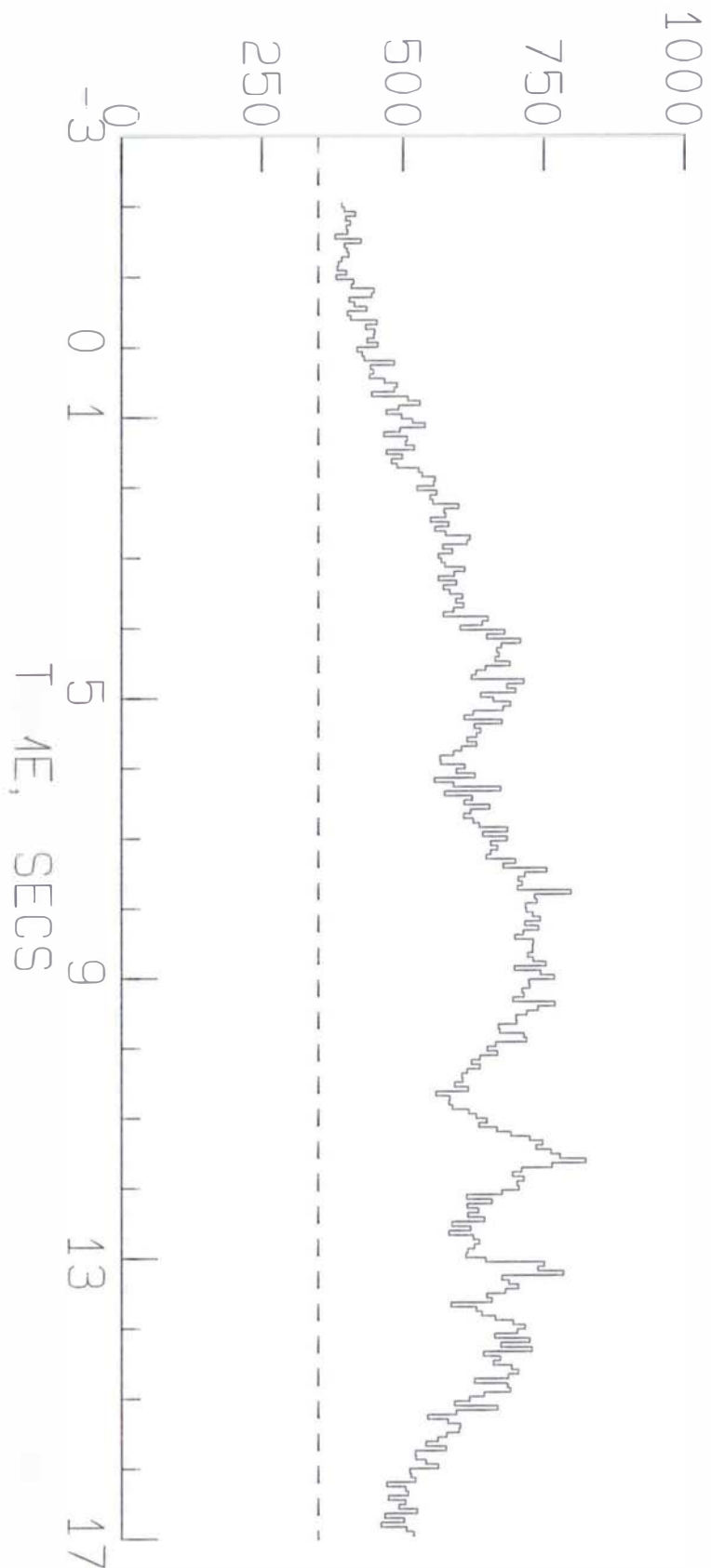
BATSE

27/12/91

3955.301

25- 100 keV

COUNTS/ .064 S



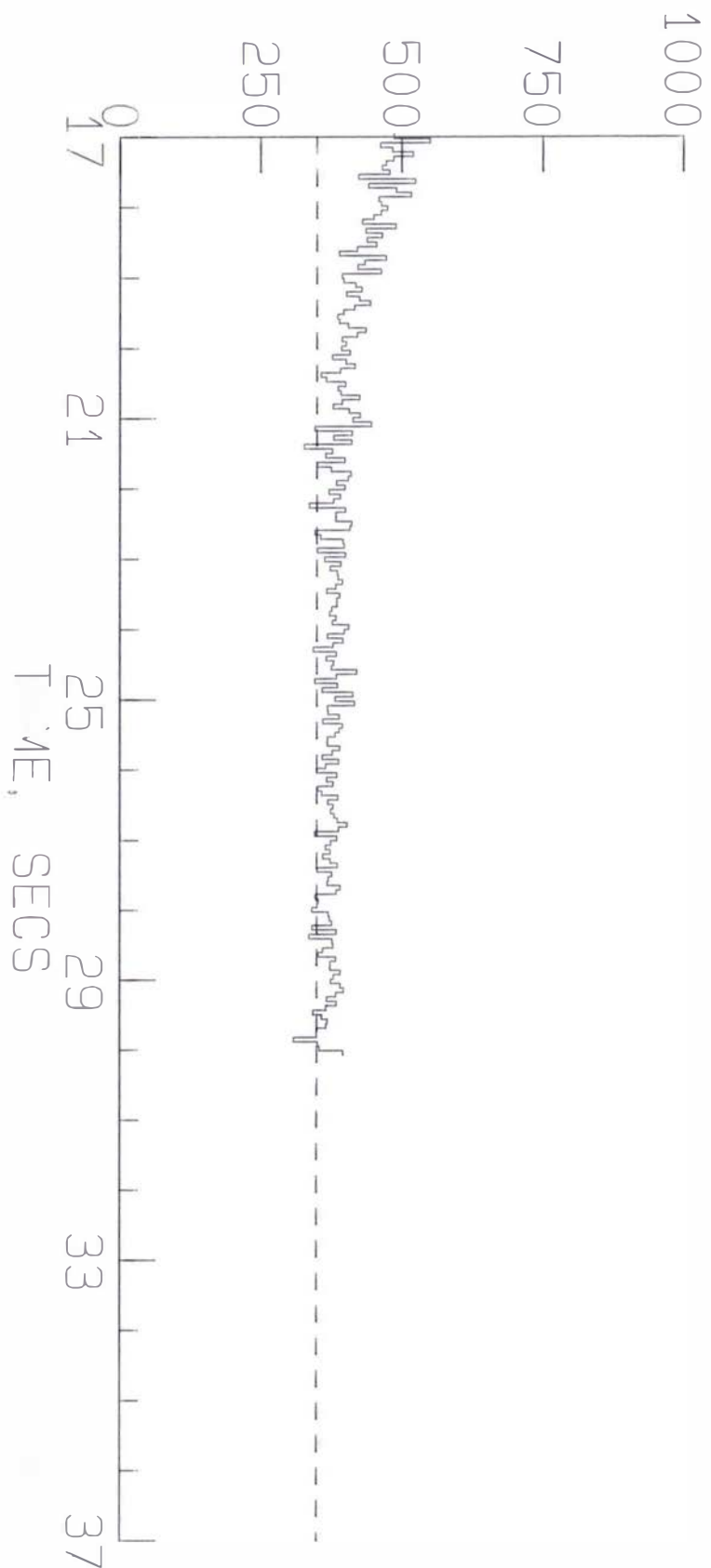
BATSE

27/12/91

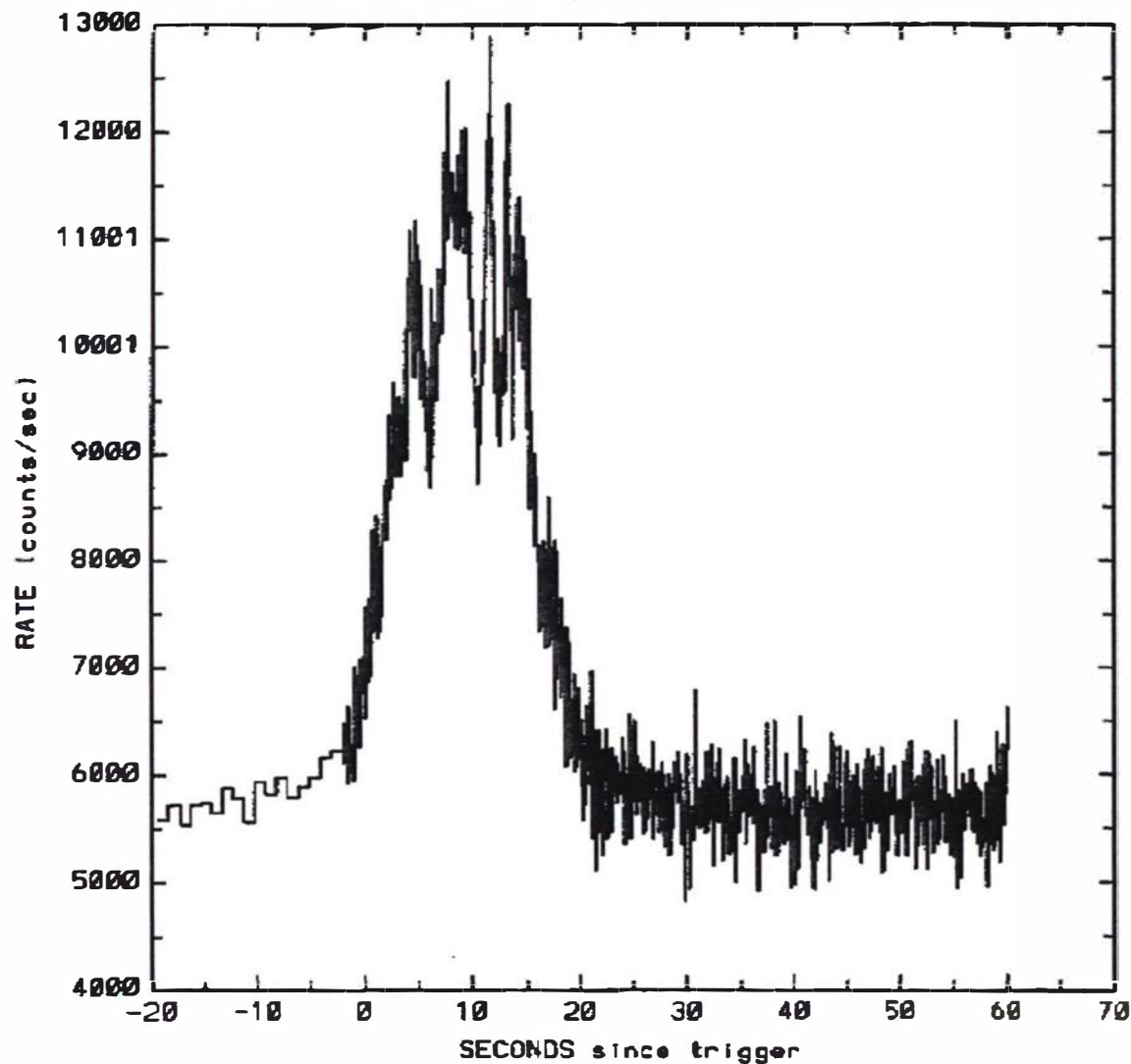
3955.301

25- 100 keV

COUNTS/ .064 S



Data for K. Hurley



Dec 27 '91 got file
17-MAY-1992 17:38:53 + 12 phm

Created by HOPS 80
(Burst Display)
Version 2.11

Trigger # : 1235

Trigger Time:
8617 / 3955.301 - 2.042 =

Burst Data Type: DISCSC 3953.259

Deadtime
Corrected: N
Background Data
Type: PREB + DISCLA
Minimum Integ. Time:
0.064 seconds

Detectors [7..8]:
00001100

Discriminators:
(1, 2)

Quality Mask:
BDISPO

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

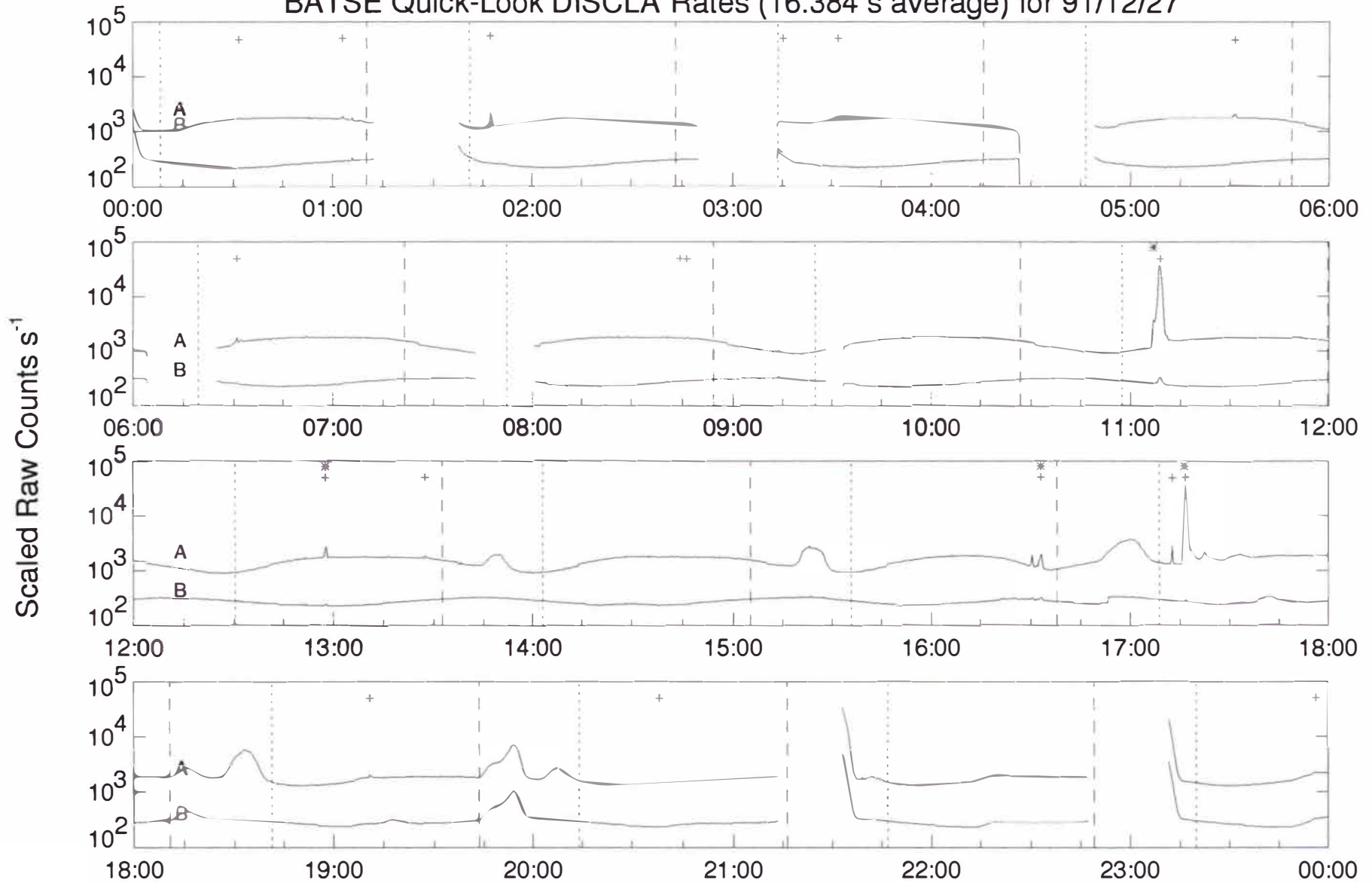
From root Wed Dec 8 07:58 1993
 Received: by space6.ssl.berkeley.edu (AIX 2.1 2/4.03)
 id AA08899; Wed, 8 Dec 93 07:57:44
 Received: from mx.nsi.nasa.gov by sunspot.ssl.berkeley.edu (4.1/1.30.1)
 id AA22497; Wed, 8 Dec 93 07:00:41 PST
 Received: Wed, 8 Dec 93 07:03:53 PST from ESSDP2.dnet by mx.nsi.nasa.gov (4.1/1.2)
 Message-Id: <9312081503.AA10272@mx.nsi.nasa.gov>
 Received: from ESSDP2.dnet by AMES.dnet with MAIL-11
 (utk-maillld vl.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

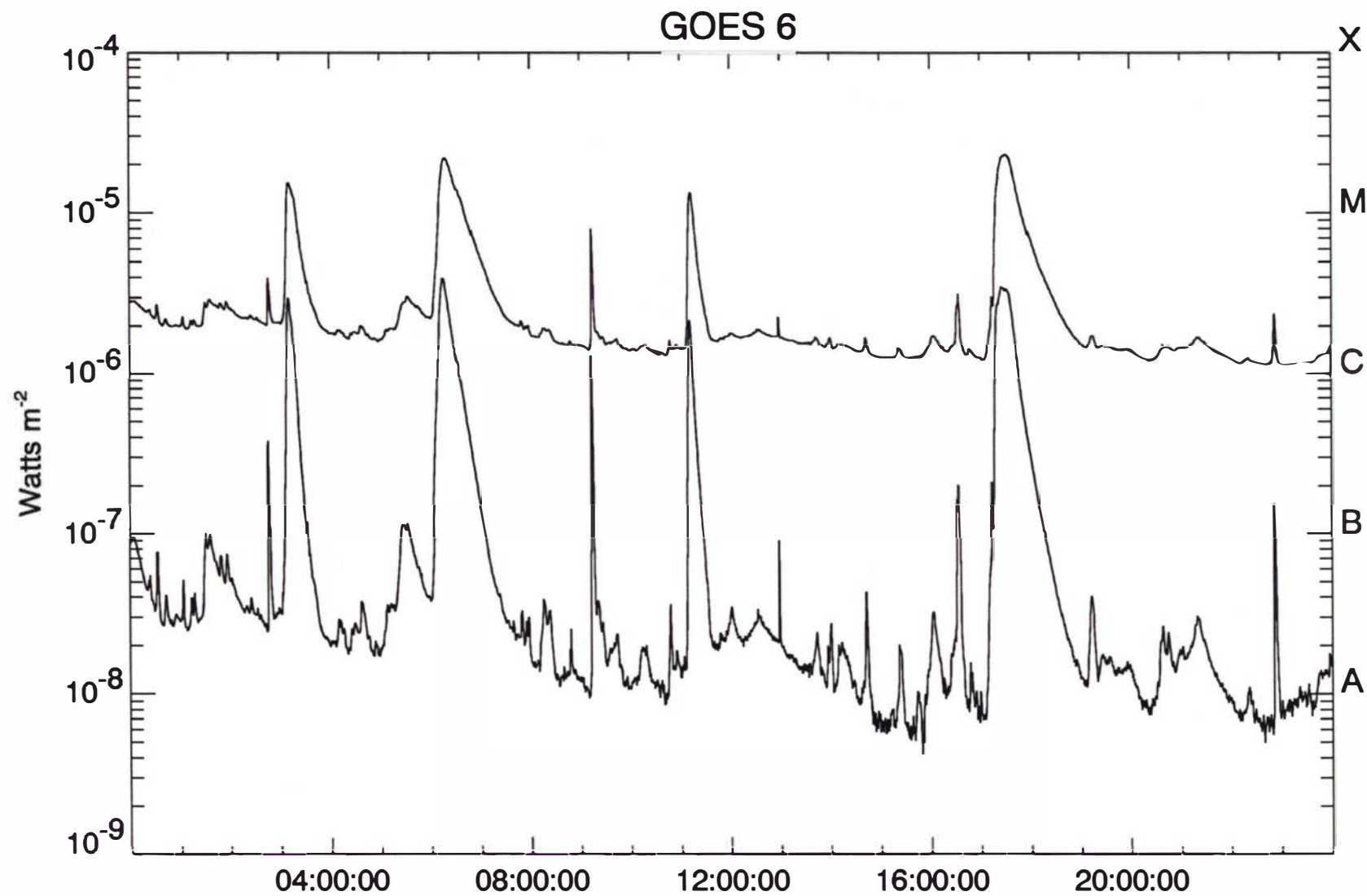
BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/27



Current Time: 92/10/18, 1920 EDT
 A: Channel 1 Most Sunward LAD
 B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare



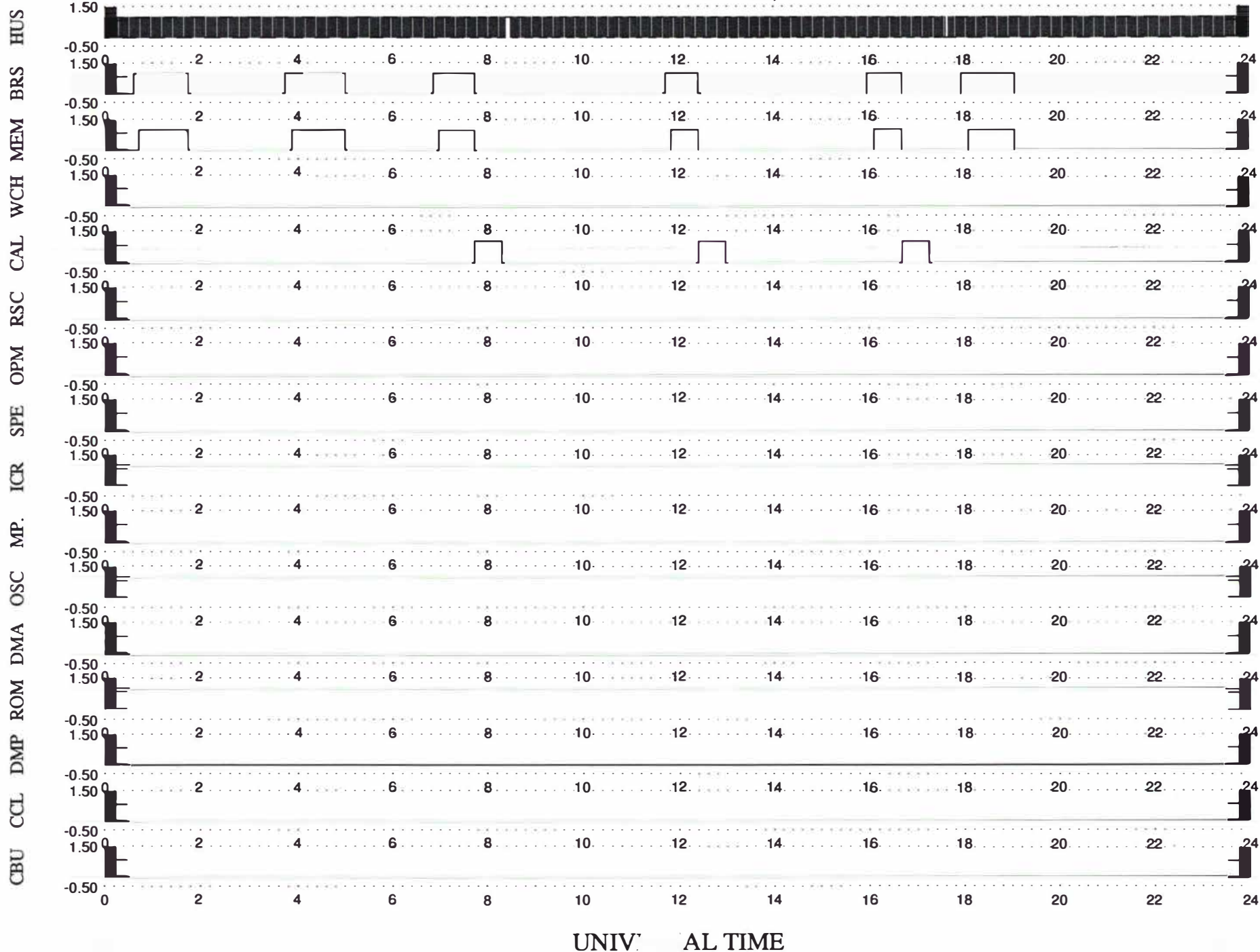
Data Start: 91/12/27, 0000:01

Plot created: 97/10/20, 1609

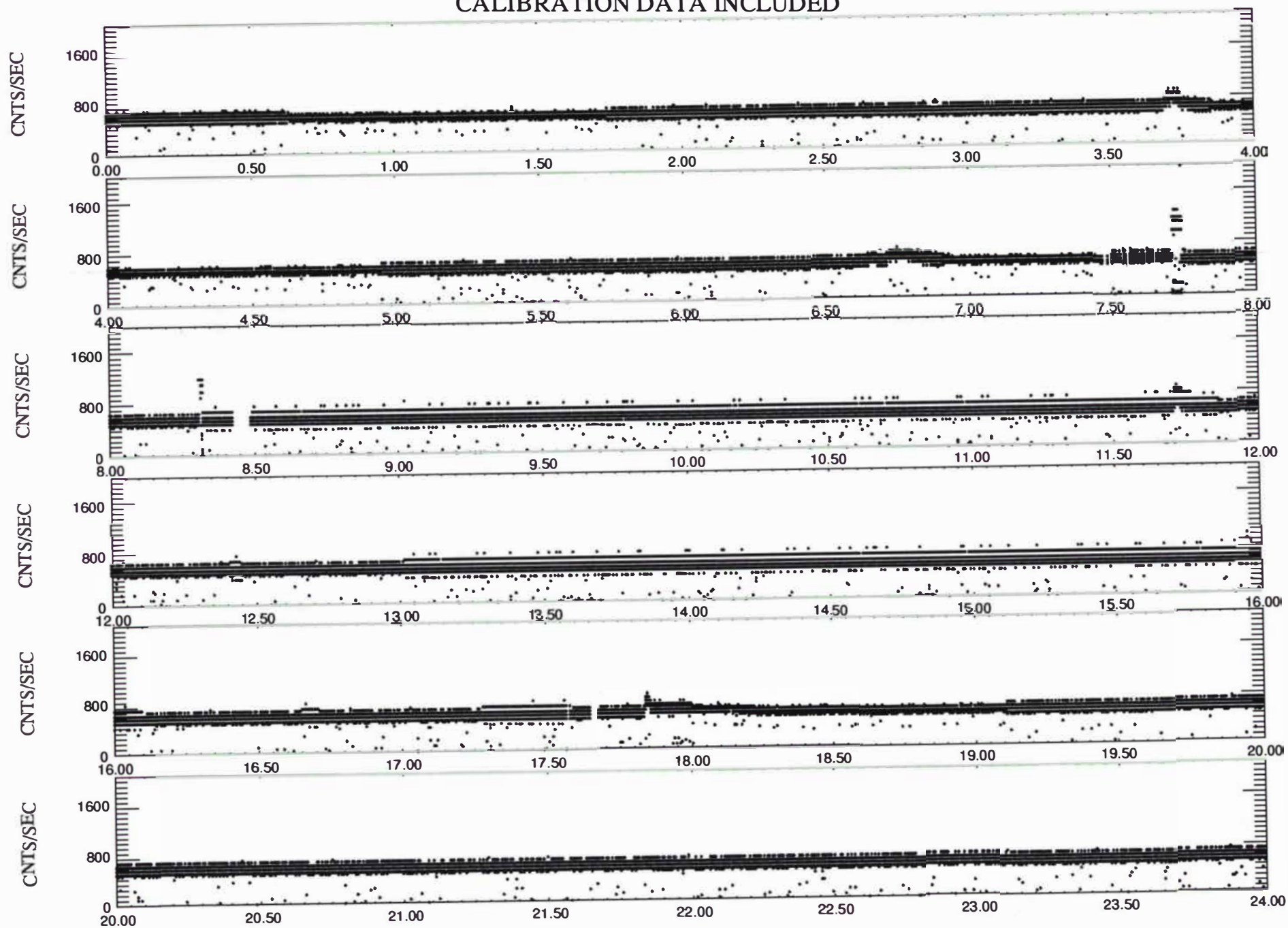
Channel 1 (1.0 - 8.0 Angstroms)
2 (0.5 - 4.0 Angstroms)

Background not subtracted
Background not subtracted
Sample average = 10

BURST NUMBER 11 - 15, 0

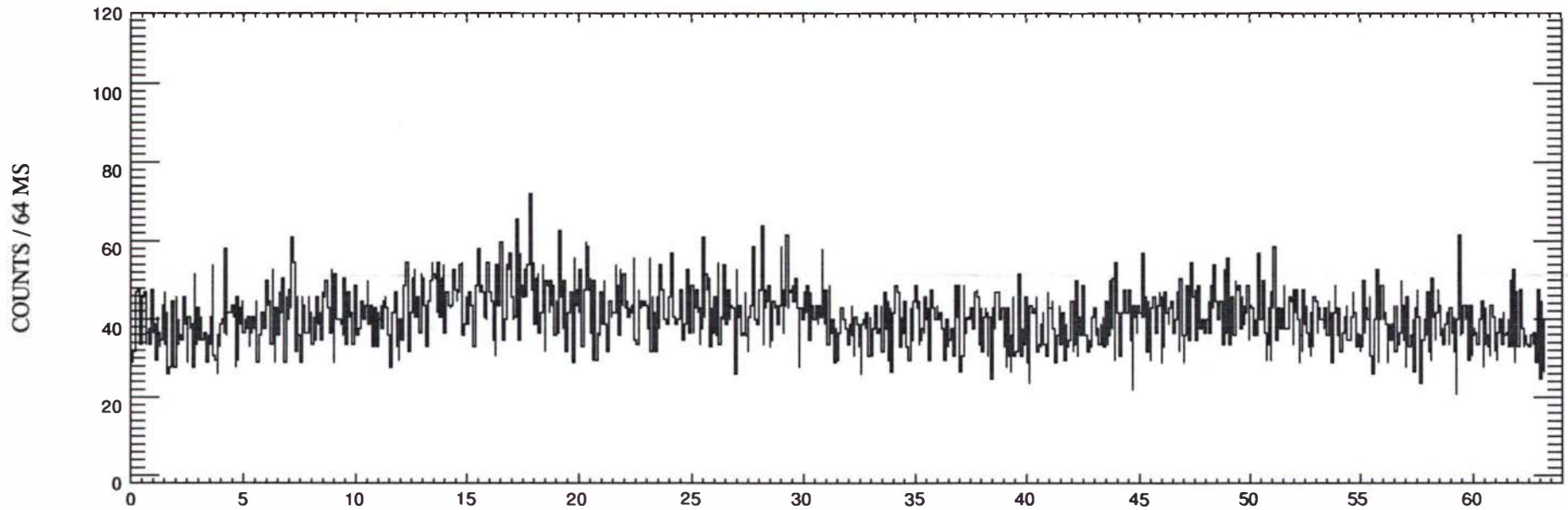


CALIBRATION DATA INCLUDED

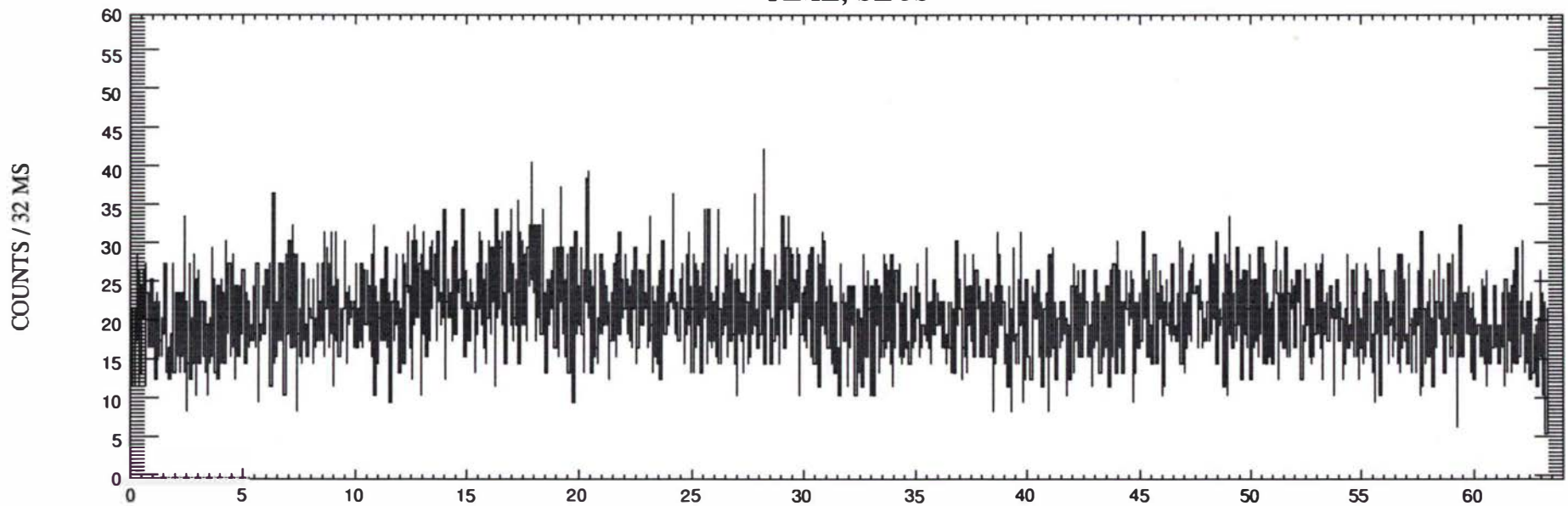


UNIV' 'AL TIME

Burst Counter 0 at UT=17.837872907850 h=64216.342 s 17:50:16.342

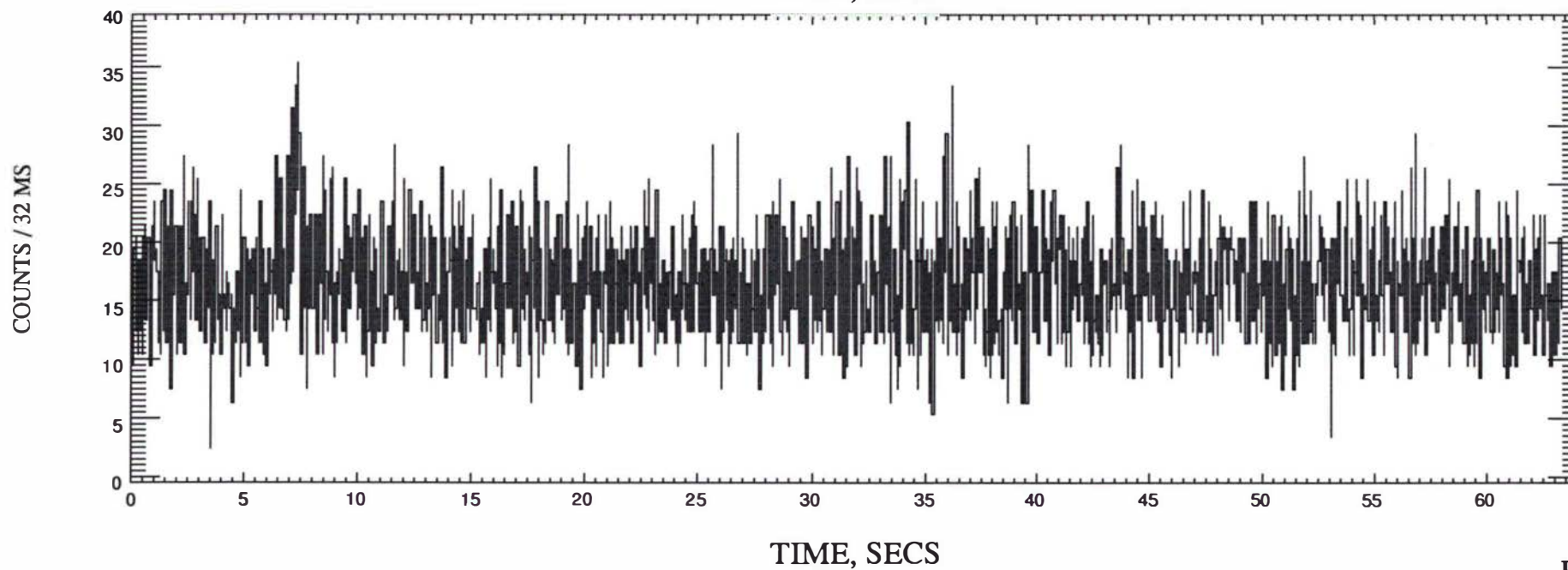
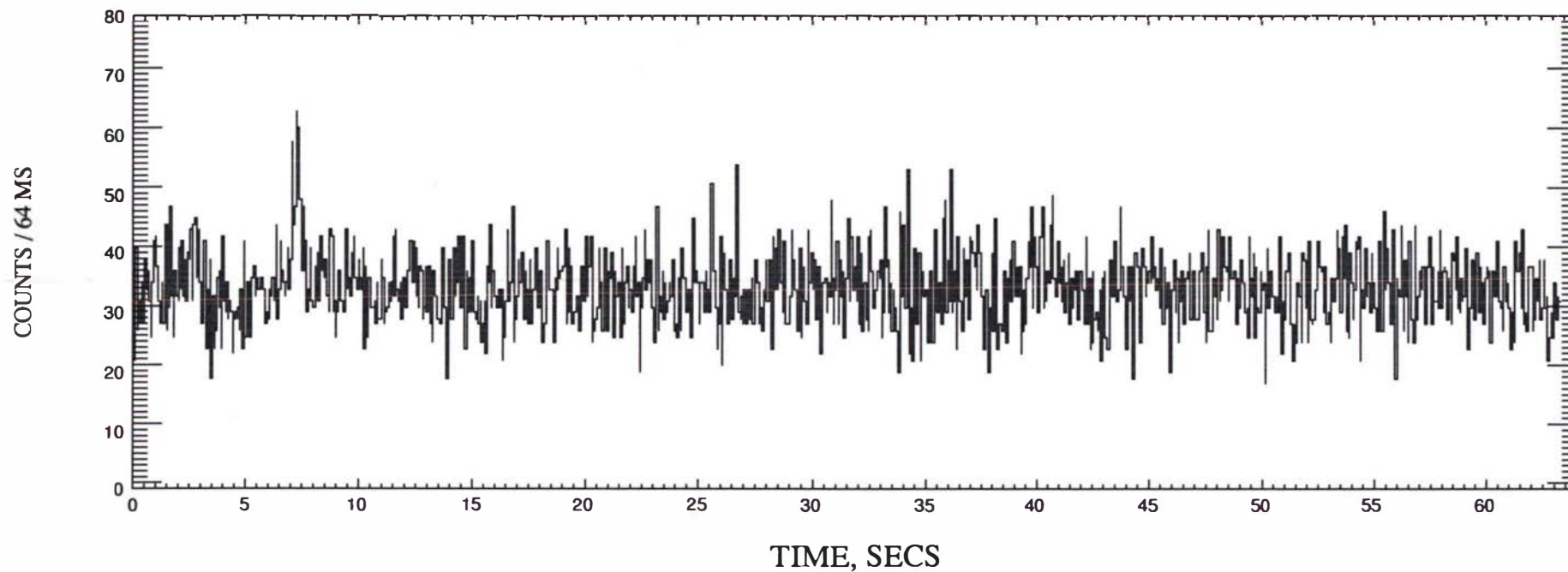


TIME, SECS

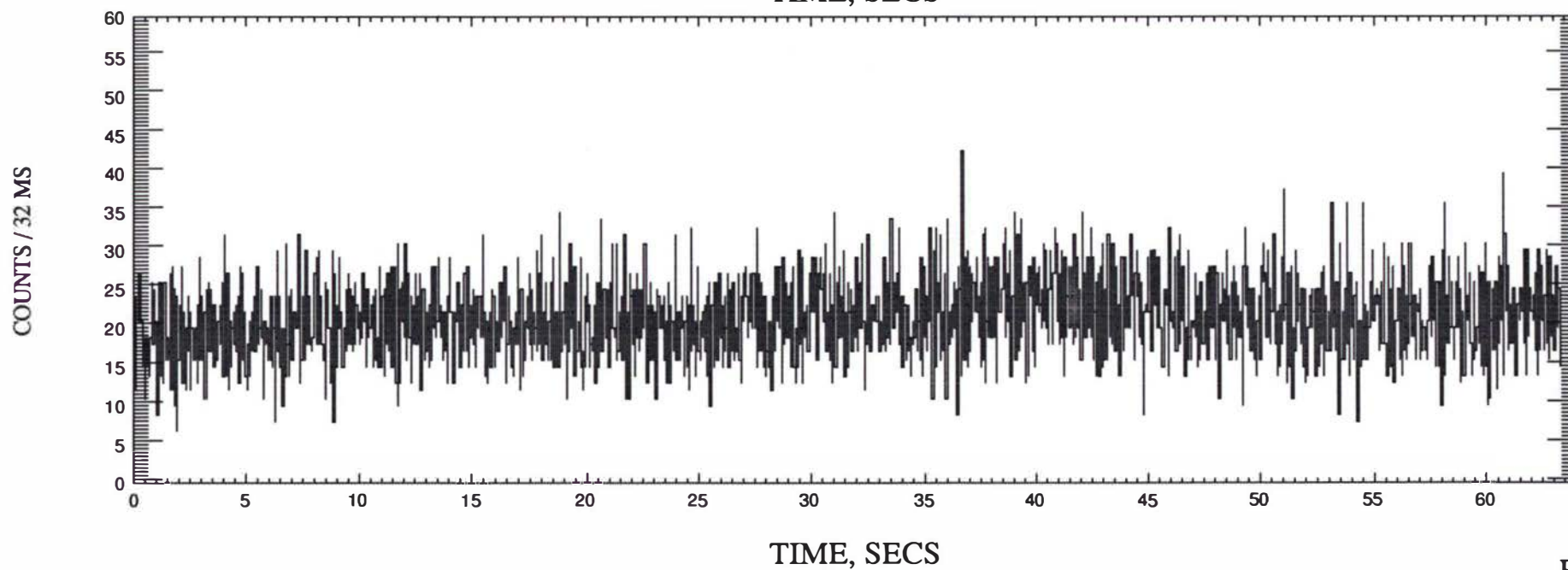
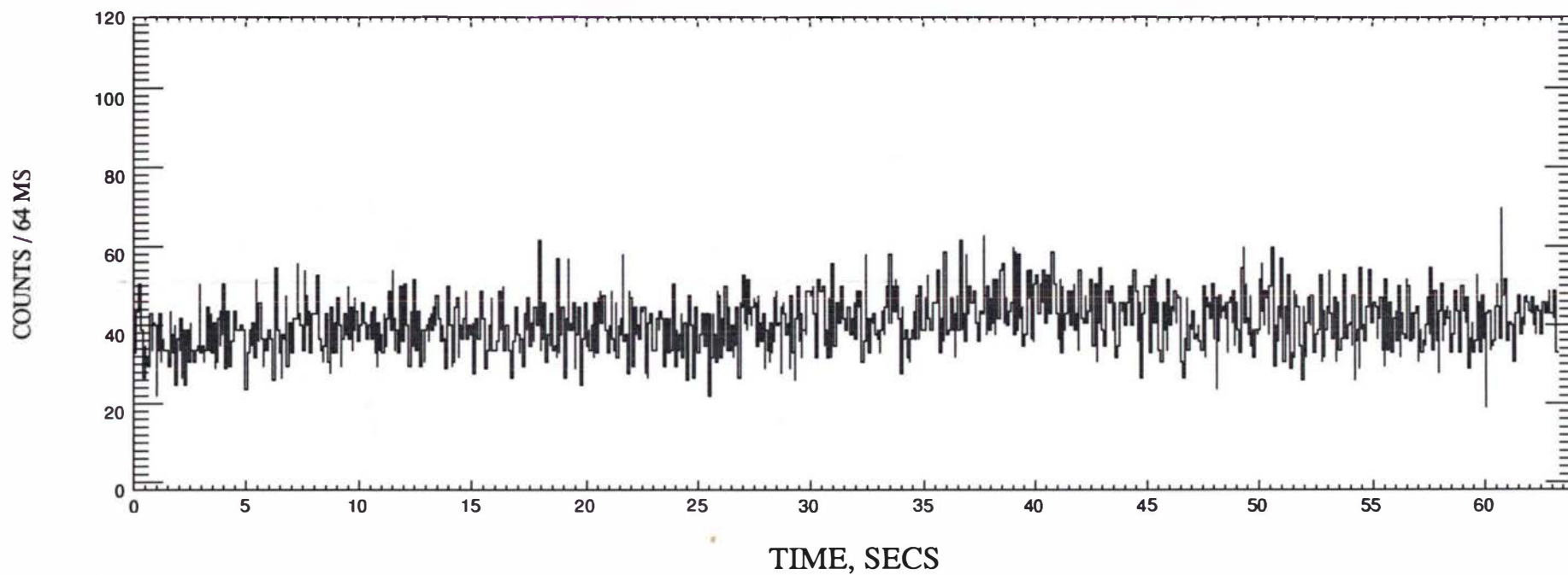


TIME, SECS

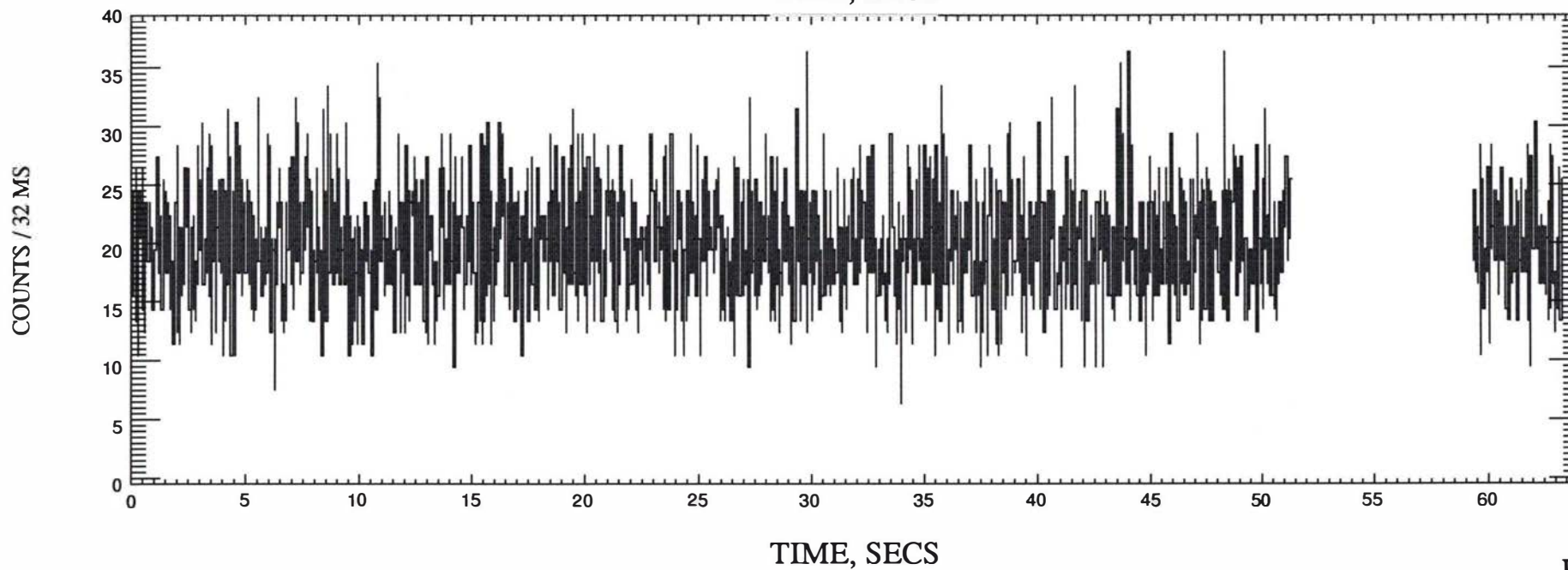
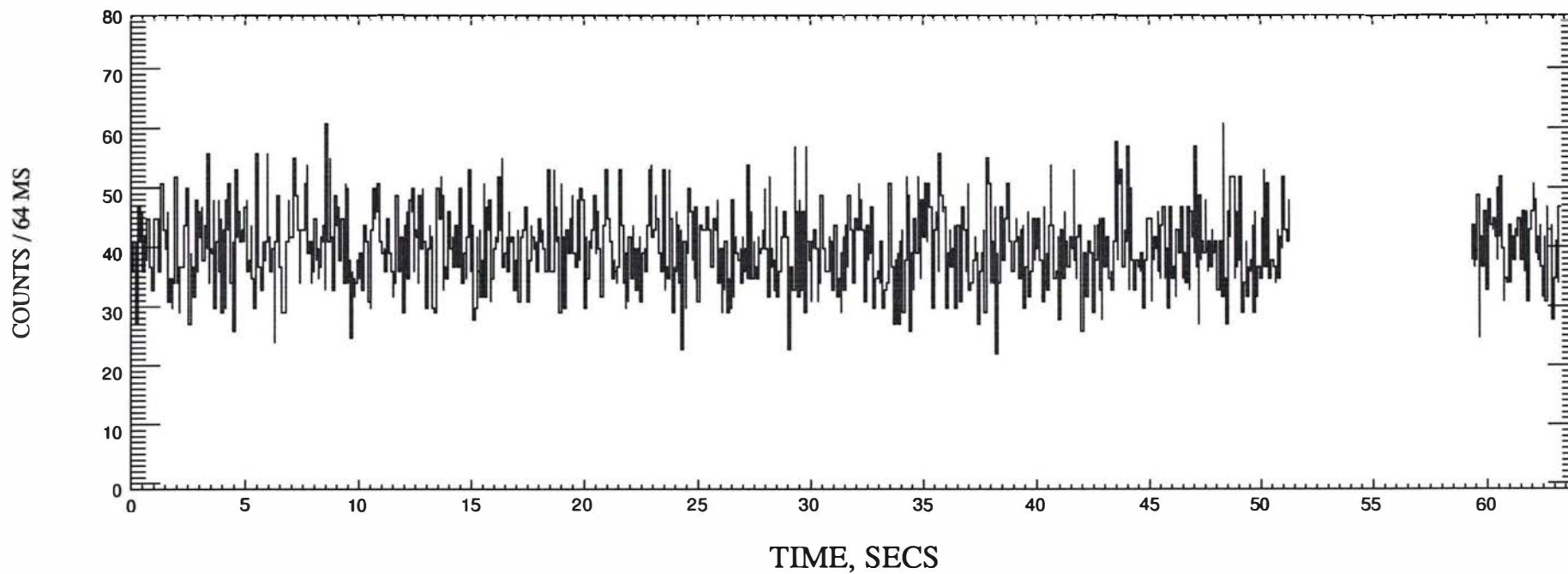
Burst Counter 15 at UT=15.948738119337 h=57415.457 s 15:56:55.457



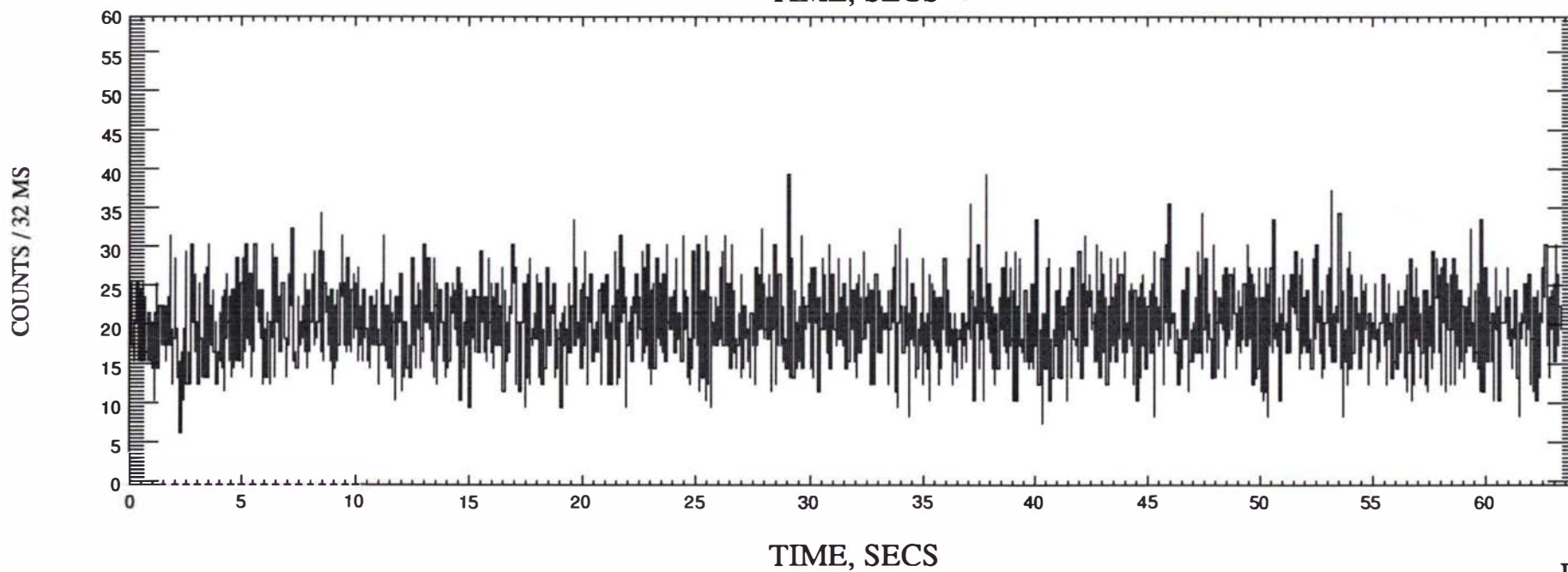
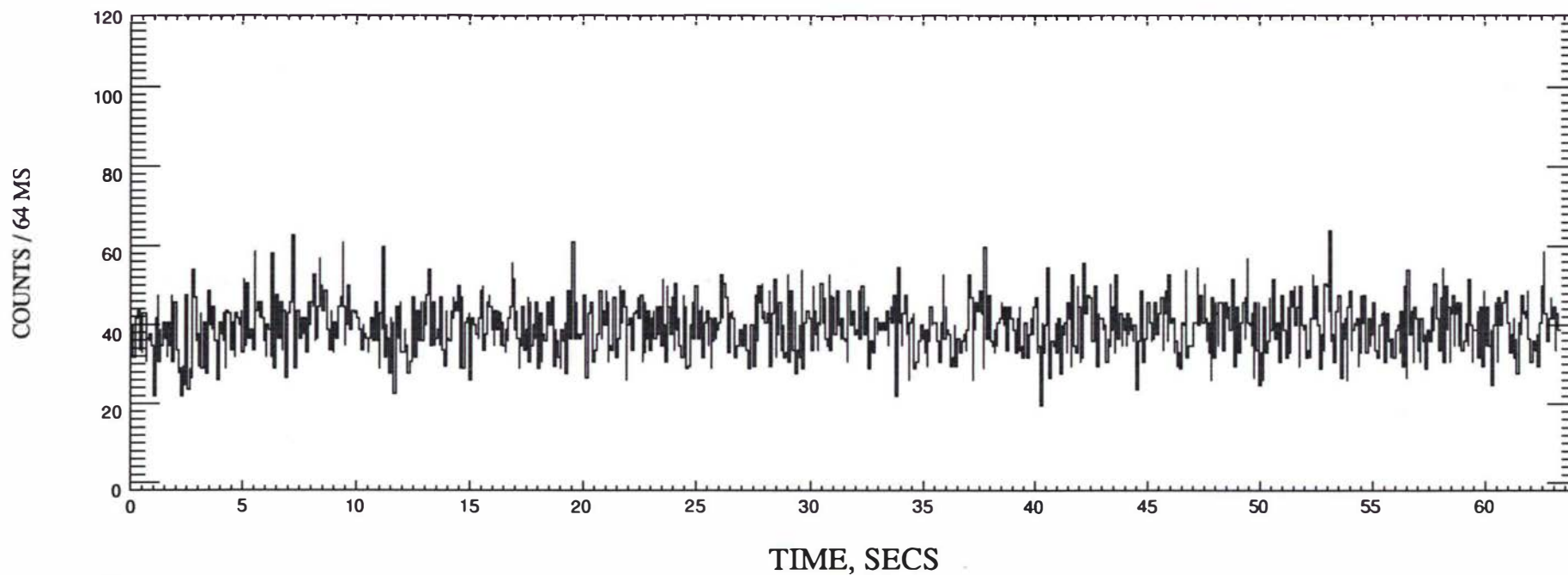
Burst Counter 14 at UT=11.704572075738 h=42136.459 s 11:42:16.459



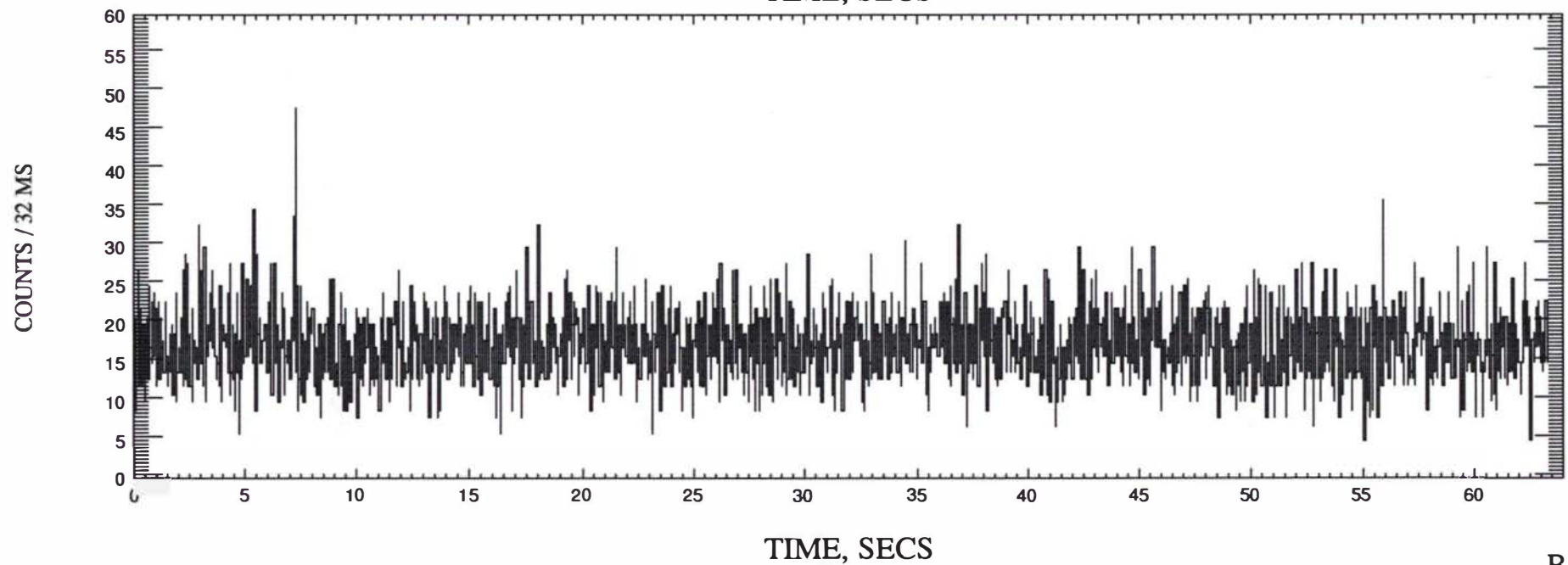
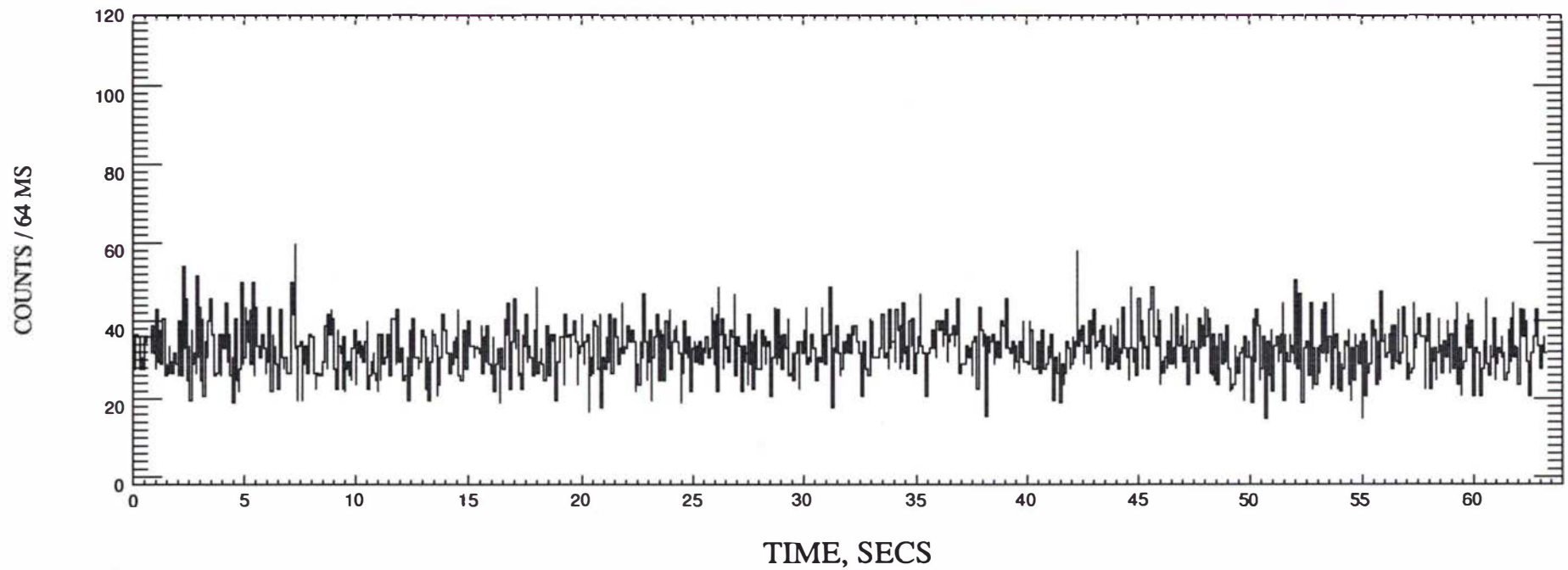
Burst Counter 13 at UT= 6.744349356757 h=24279.658 s 06:44:39.658



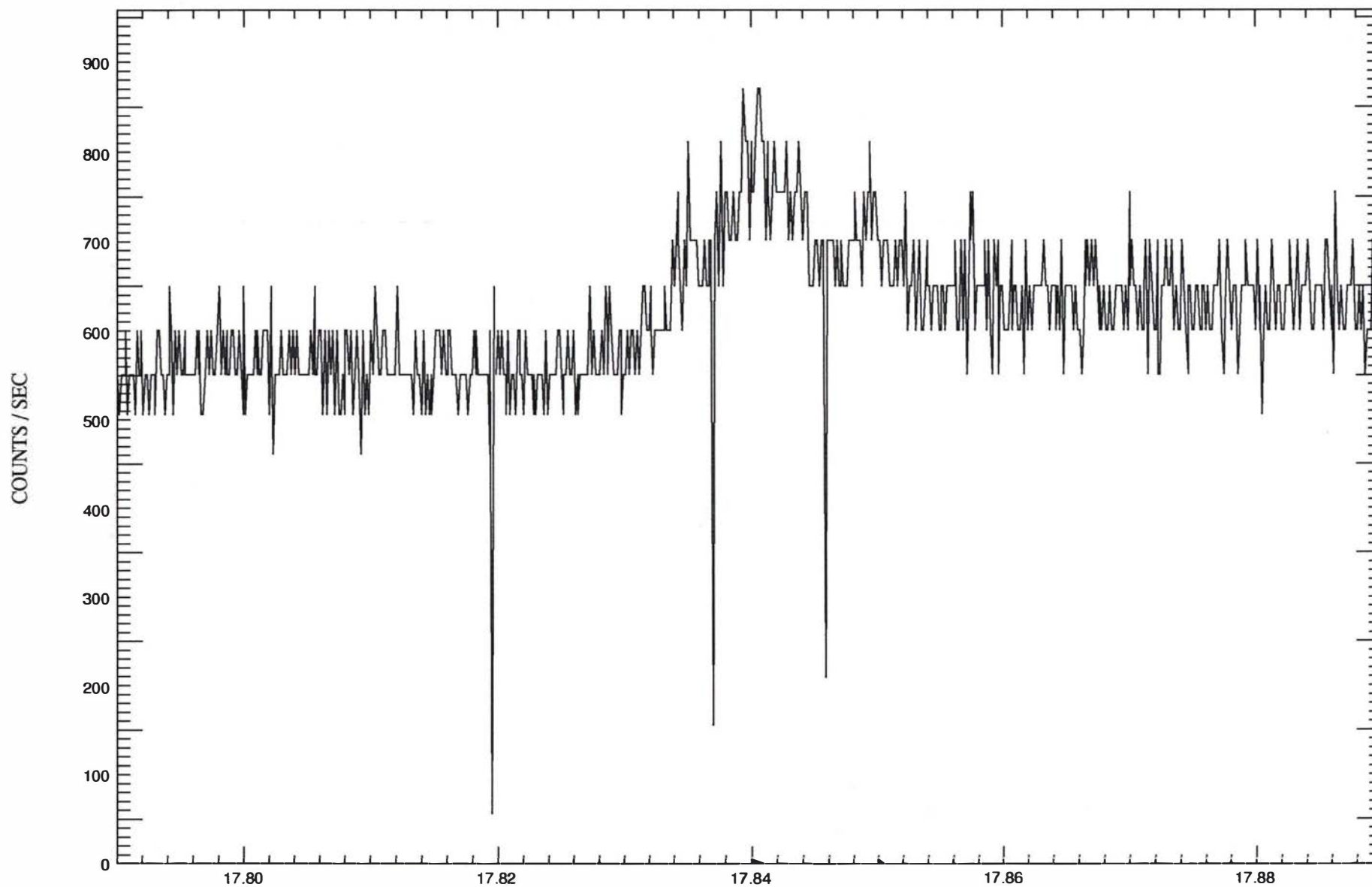
Burst Counter 12 at UT= 3.697490149604 h=13310.965 s 03:41:50.965



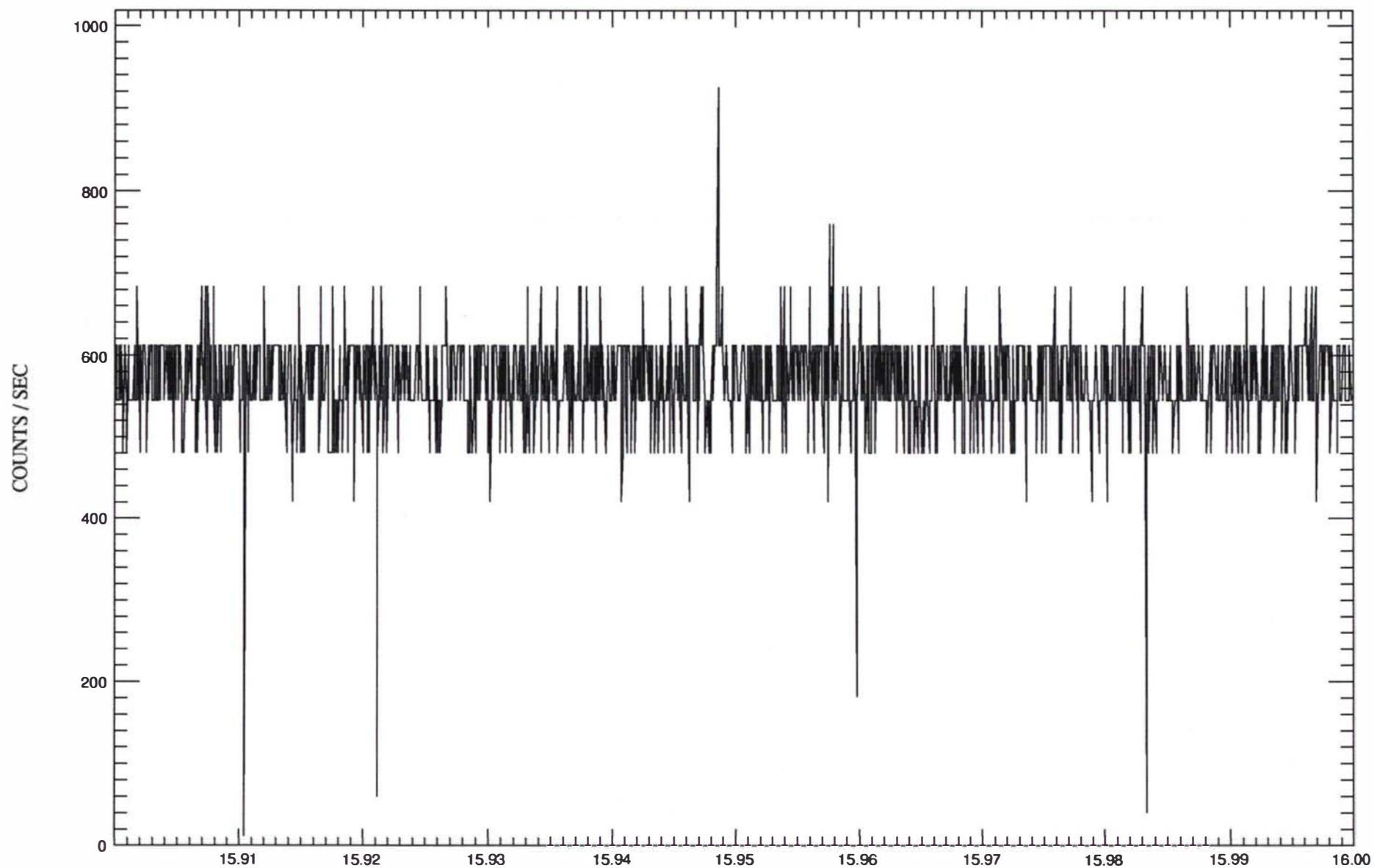
Burst Counter 11 at UT= 0.478617057800 h= 1723.021 s 00:28:43.021



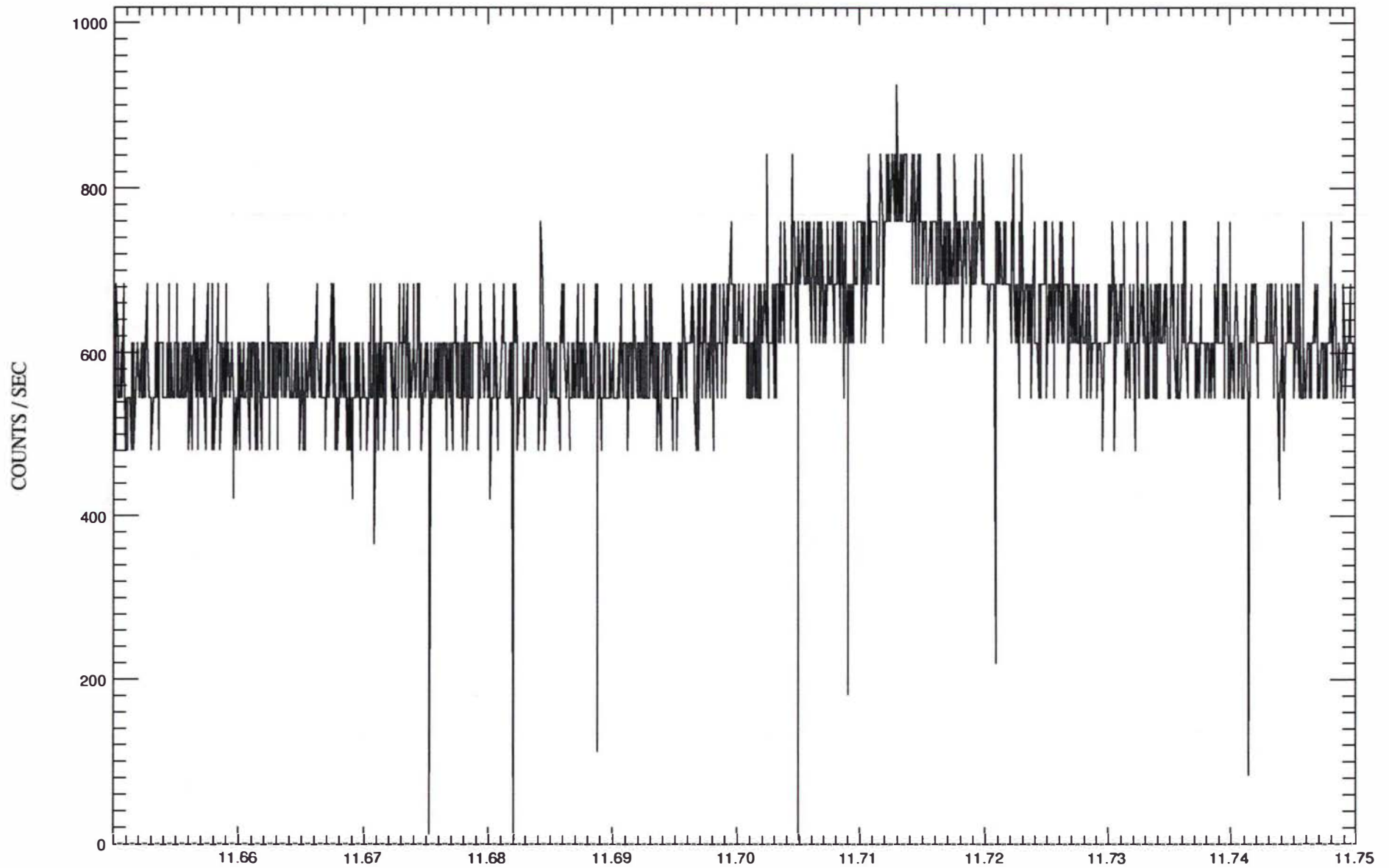
CALIBRATION DATA INCLUDED



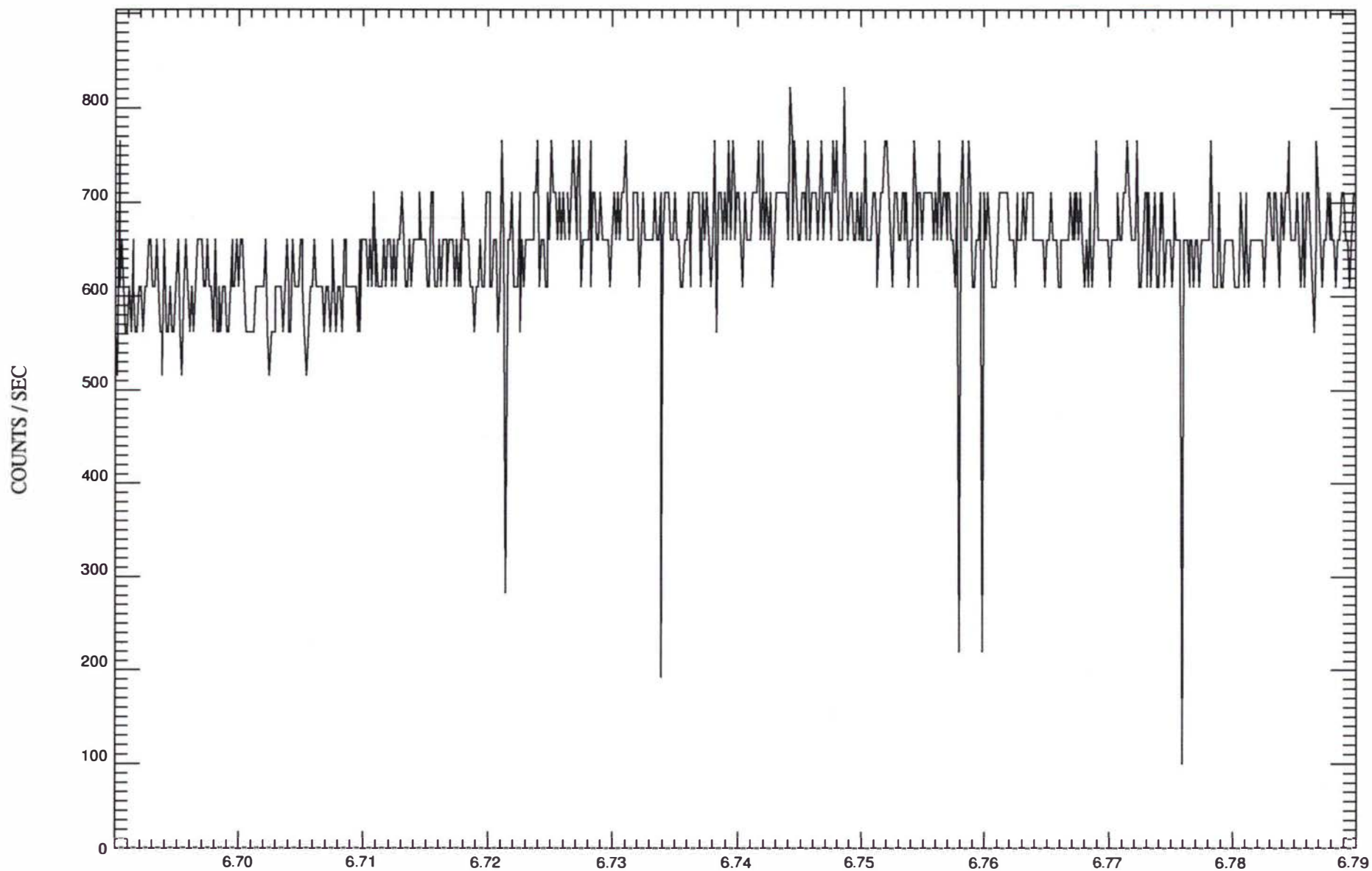
CALIBRATION DATA INCLUDED



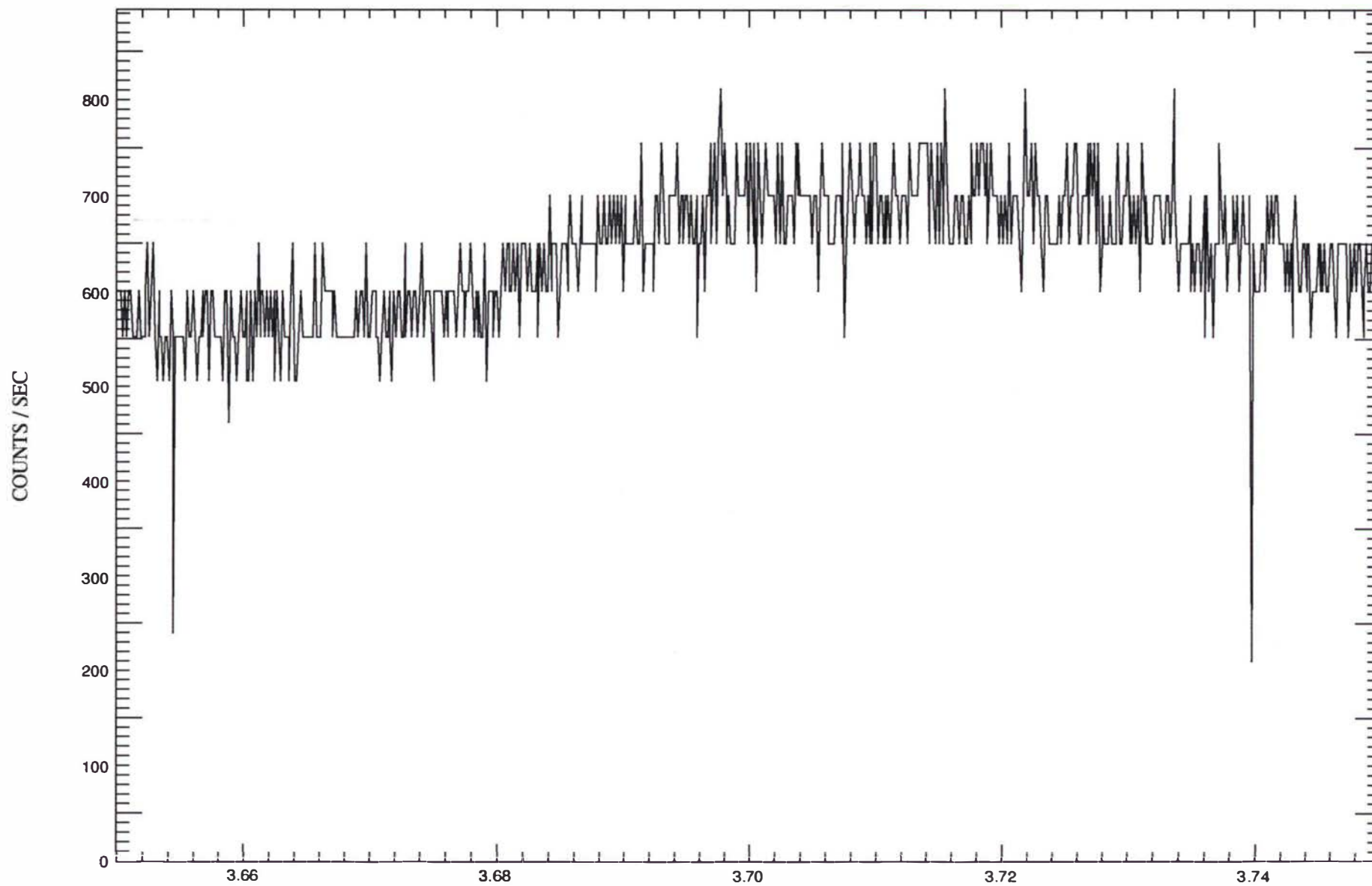
CALIBRATION DATA INCLUDED



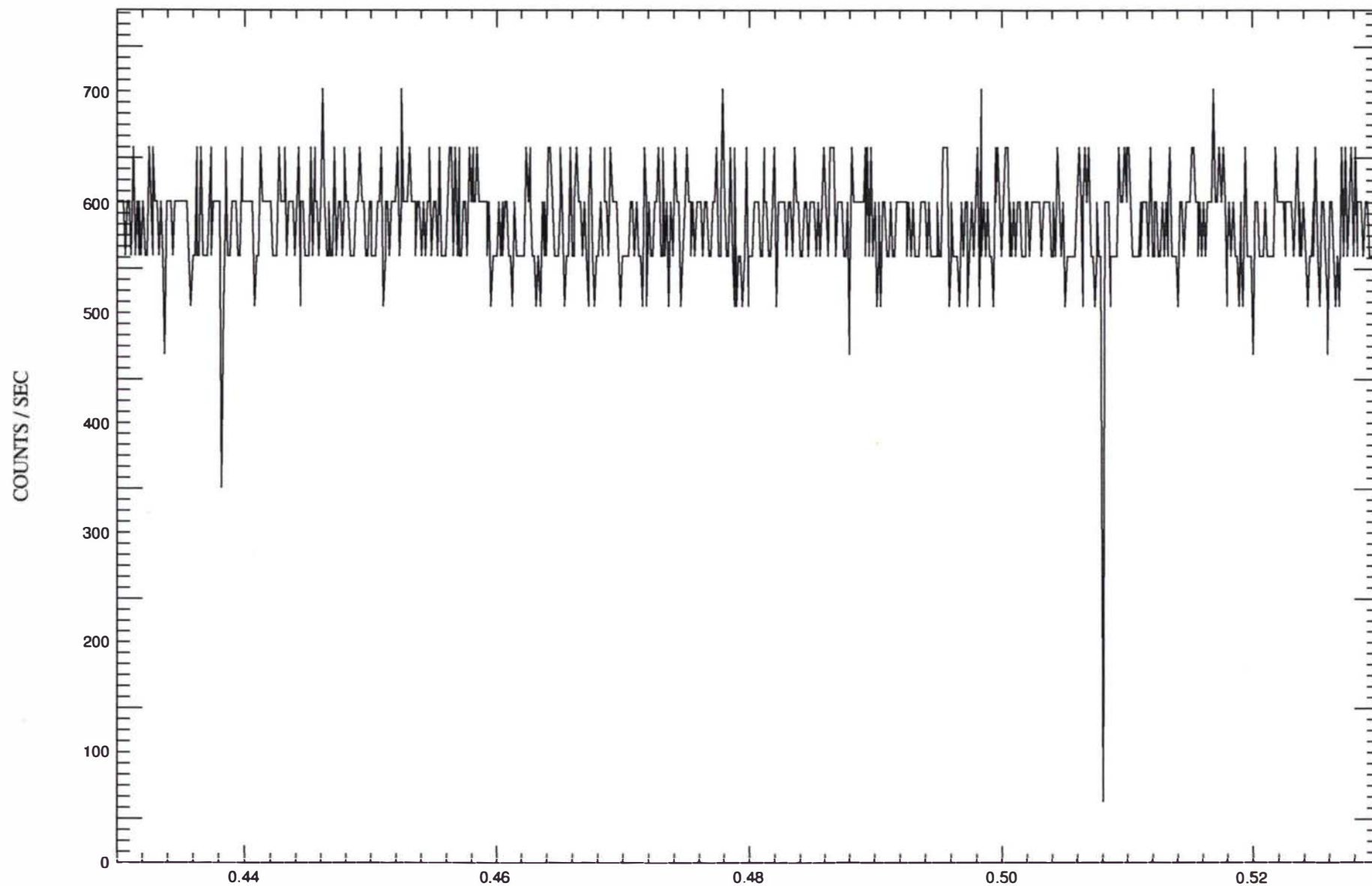
CALIBRATION DATA INCLUDED

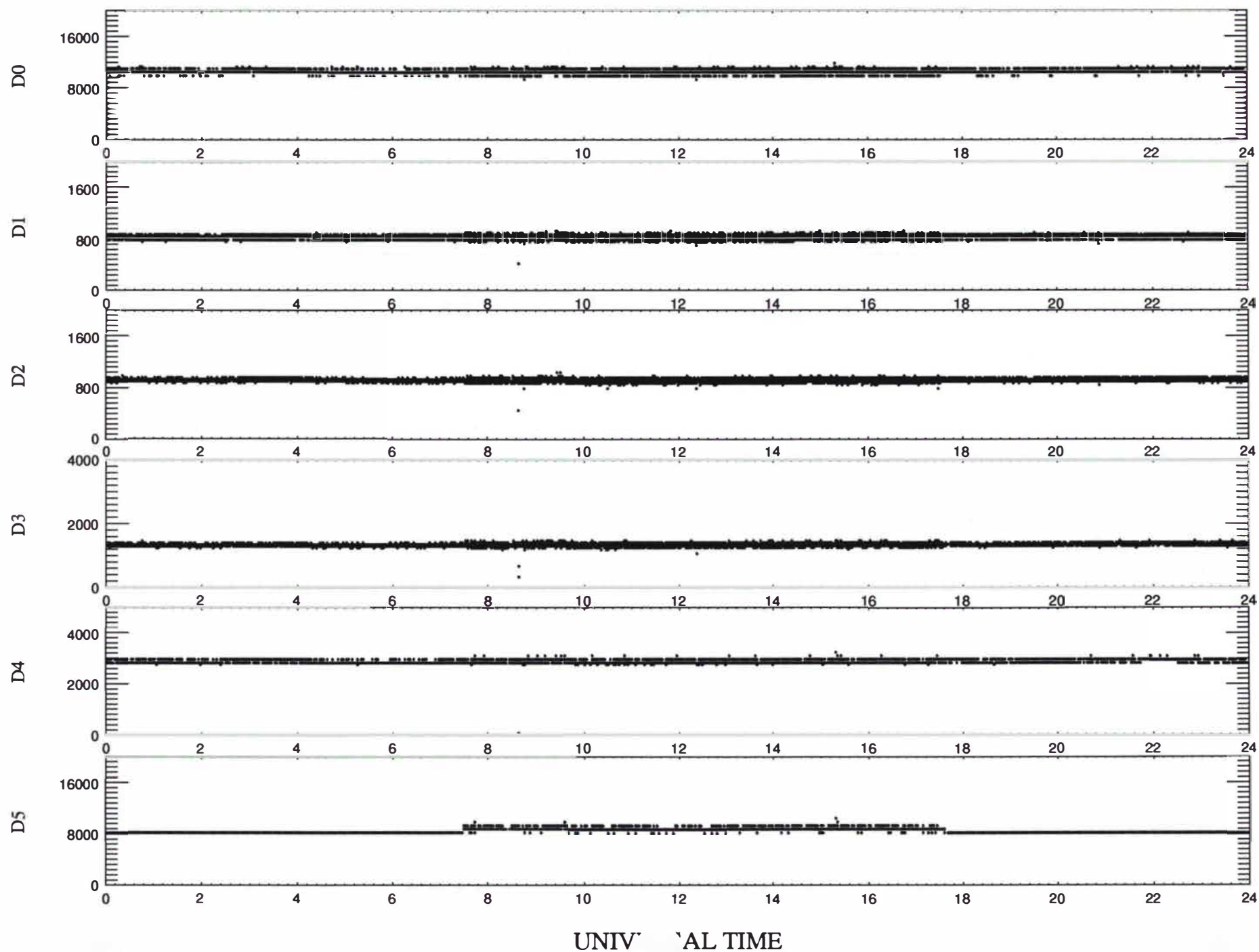


CALIBRATION DATA INCLUDED



CALIBRATION DATA INCLUDED





CATSEARCH PROGRAM

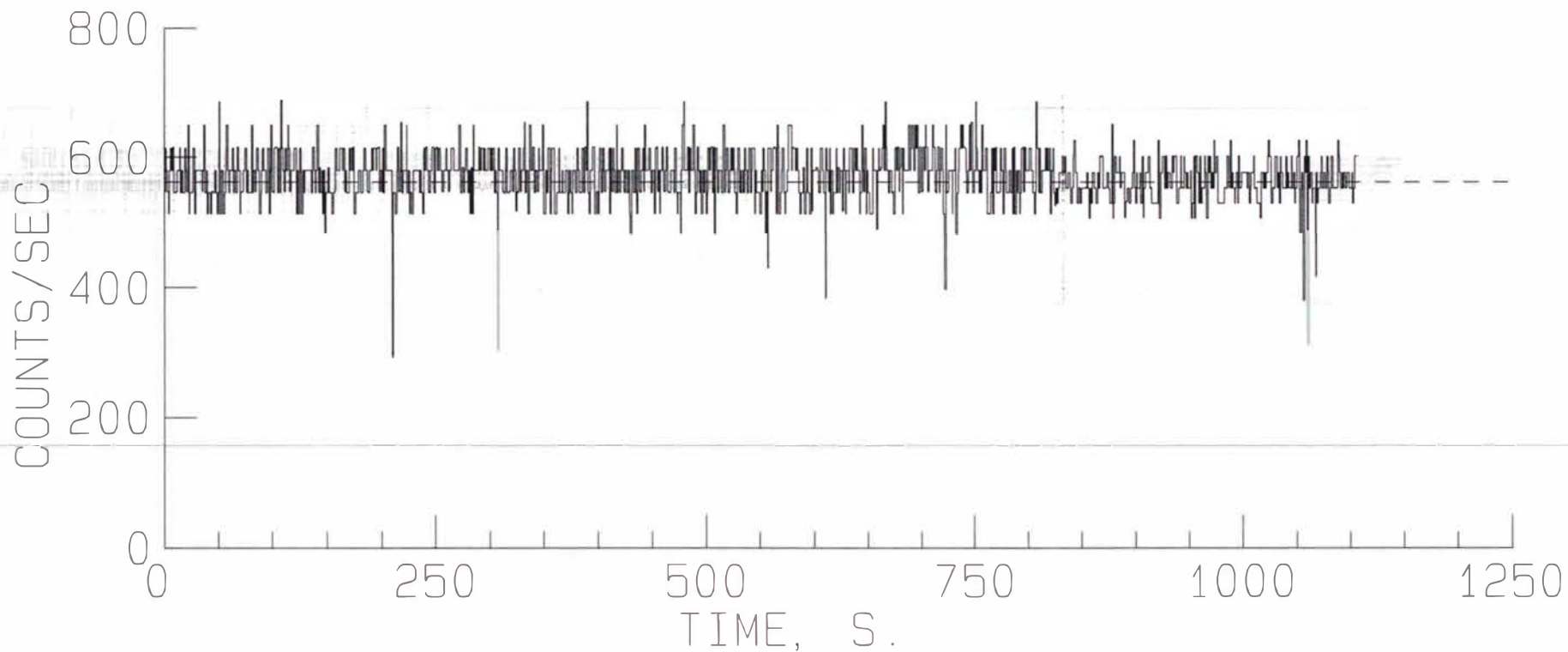
BATSE BURST # 1244
EVENT OF 1991 DEC 28 DAY OF YEAR=362
EVENT CROSSING TIME AT BATSE : 62526. S. OR 17:22:06.0
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 278.800 45.700
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 28/12/ 91 IS:
RA= 167.715 DEC= 6.694 DIST= 4.648 AU
BATSE-ULYSSES DISTANCE = 695414104. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 80.44 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 385.34 SECS.
CROSSING TIME AT ULYSSES IS 62911. S. OR 17:28:31 +/- 452.98 SECONDS

NO

14 / 4 / 93

ULYSSES RT
28/12/91 62460.230 s
0.500 S INTERVALS REGROUPED BY 2
0- 0 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



From khurley@space6.ssl.berkeley.edu Mon Oct 12 08:21:07 1992
Date: Mon, 12 Oct 92 07:16:15
From: khurley@space6.ssl.berkeley.edu
Content-Length: 321

MESSAGE FOR RENE HUDEC

Dear Rene,

I have now searched the Ulysses data for events corresponding to the following BATSE bursts:

Aug 29, Sep2, Nov29, Dec 28, 1991; Jan 21, Feb24, Feb27, and Mar 5, 1992.

As I suspected, there were no corresponding Ulysses bursts, no doubt because the BATSE events were too weak.

Kevin

From kouveliotou%8868.span@Sdsc.Edu Fri Oct 2 16:32:09 1992

Date: Fri, 2 Oct 92 23:34:49 GMT

From: kouveliotou%8868.span@Sdsc.Edu (Chryssa Kouveliotou NASA/MSFC (205) 544-7711)

To: khurley@sunspot.ssl.berkeley.edu

X-St-Vmsmail-To: HURLEY

Content-Length: 461

Dear kevin,

here is a partial answer to your request. The remaining I will get from M. Brock, and send it on Monday (hopefully).

The trigger #, times (corrected for the 2 sec delay), RA and dec of Rene's events are:

910829	741	81582	57	22
910902	752	82535	300	-2
911129	1129	64791	44	1
911228	1244	62526	281	40
920121	1308	79009	31	34
920224	1435	77880	170	14
920227	1446	63976	243	15
920227	1447	75000	198	46
920305	1463	3642	294	57

Chryssa

BATSEARCH PROGRAM

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1 3E BURST #
EVENT OF 1991 DEC 28 DAY OF YEAR=362
EVENT CROSSING TIME AT BATSE : 62526. S. OR 17:22:06.0
COORDINATES ARE .000 .000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 281.000 40.000
BATSE PEAK COUNTING RATE: 0 C/S
EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
POSITION OF ULYSSES ON 28/12/ 91 IS:
RA= 167.715 DEC= 6.694 DIST= 4.648 AU
BATSE-ULYSSES DISTANCE = 695414104. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 76.95 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 523.85 SECS.
CROSSING TIME AT ULYSSES IS 63050. S. OR 17:30:49 +/- 450.28 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 (
.4 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 interest but ~~not for search~~

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 " "

From @space6.ssl.berkeley.edu,@cmsa.berkeley.edu:ASTMPH@CSEARN.BITNET Thu Sep 3 22:10:38 199
Date: Fri, 04 Sep 92 07:10:41 MDT
From: "R.Hudec" <ASTMPH@CSEARN.BITNET@cmsa.berkeley.edu>
To: khurley@space6.ssl.berkeley.edu
Content-Length: 1333

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

Dear Kevin,

thanks for your message from Aug 31.

Today, I got an e-mail message from Martha Hazen <martha@cfa3>. She is ready to prepare the HCO plates for the trip. So now Roland should contact Martha and give a concrete date when the plates should be released. The problem is that, although I have send him many messages and even letters in the last months, I never got answer from him. Could you please try to help here ? Martha is informed and kindly agrees to release and prepare the plates.

Regarding the GRB detected by BATSE, here is a list of events for which we have some hints for coincidences and/or simultaneous optical data:

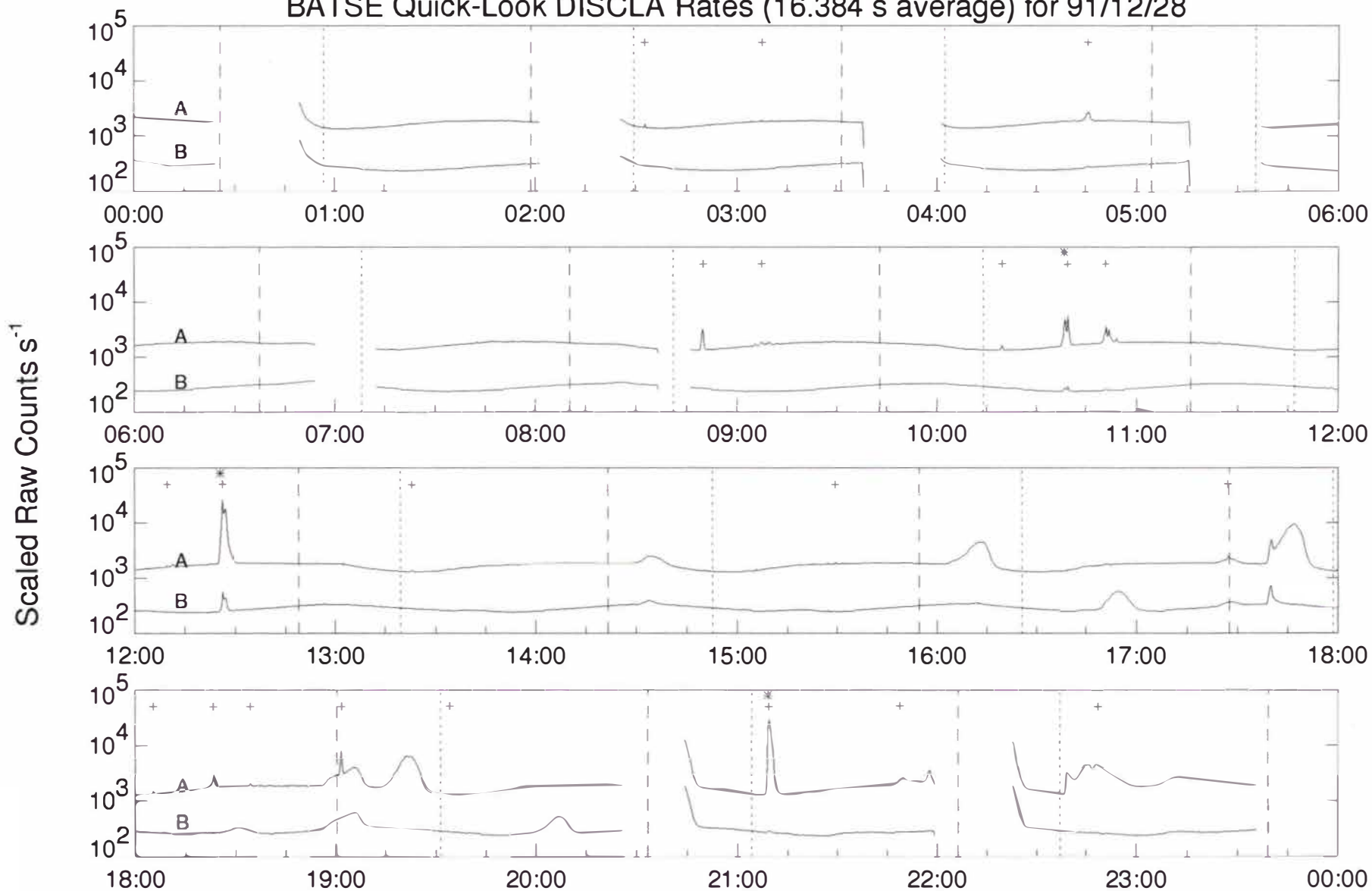
GRB date	UT,s	
910511	79390	NO
910809 # 658	03507	Request BATSE α δ
911025	77116	NO
911027 # 342	06313	Request BATSE α δ
911127	15730	YES
911209	03410	NO
910505	72918	OT candidate NO
910823 # 717	75686	Get BATSE α δ
910829 # 741	81584	Get BATSE α δ
910902 # 752	82537	Get BATSE α δ
911129 # 1129	64793	Get BATSE α δ
911228 # 1244	62528	CC Get BATSE α δ
920121	79011	C Get BATSE α δ
920209	78046	Get BATSE α δ
920224	77882	C Get BATSE α δ
920227	75002	Get BATSE α δ
920305	3644	Get BATSE α δ
920505	78891	C Get BATSE α δ

C denotes that positional coincidence with previously mentioned OT has been found. CC denotes that 2 such coincidences were found.

Kinde regards, Rene Hudec

Requested Sep 9

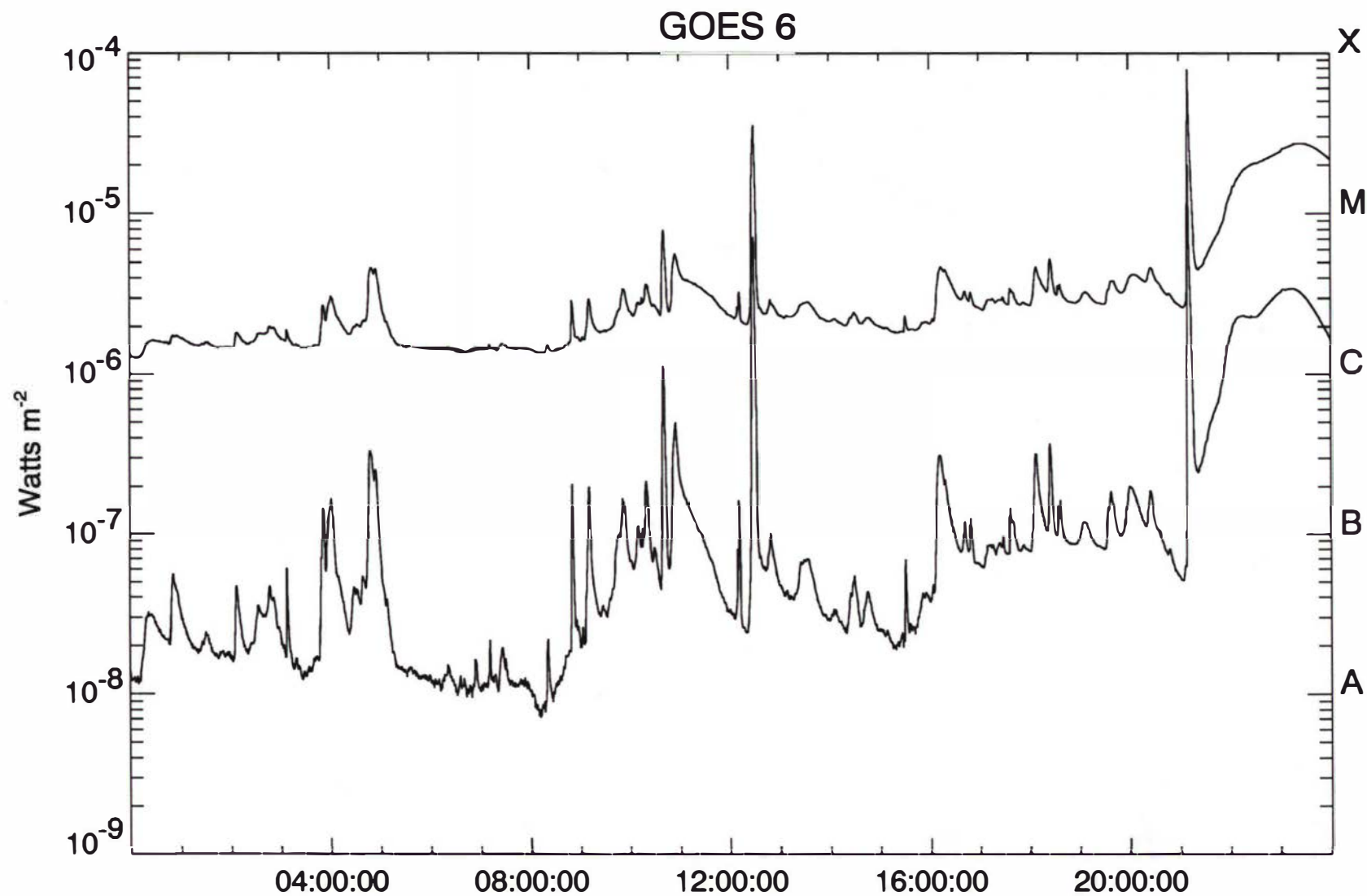
BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/28



Current Time: 92/10/18, 1921 EDT
 A: Channel 1 Most Sunward LAD
 B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare



Data Start: 91/12/28, 0000:02

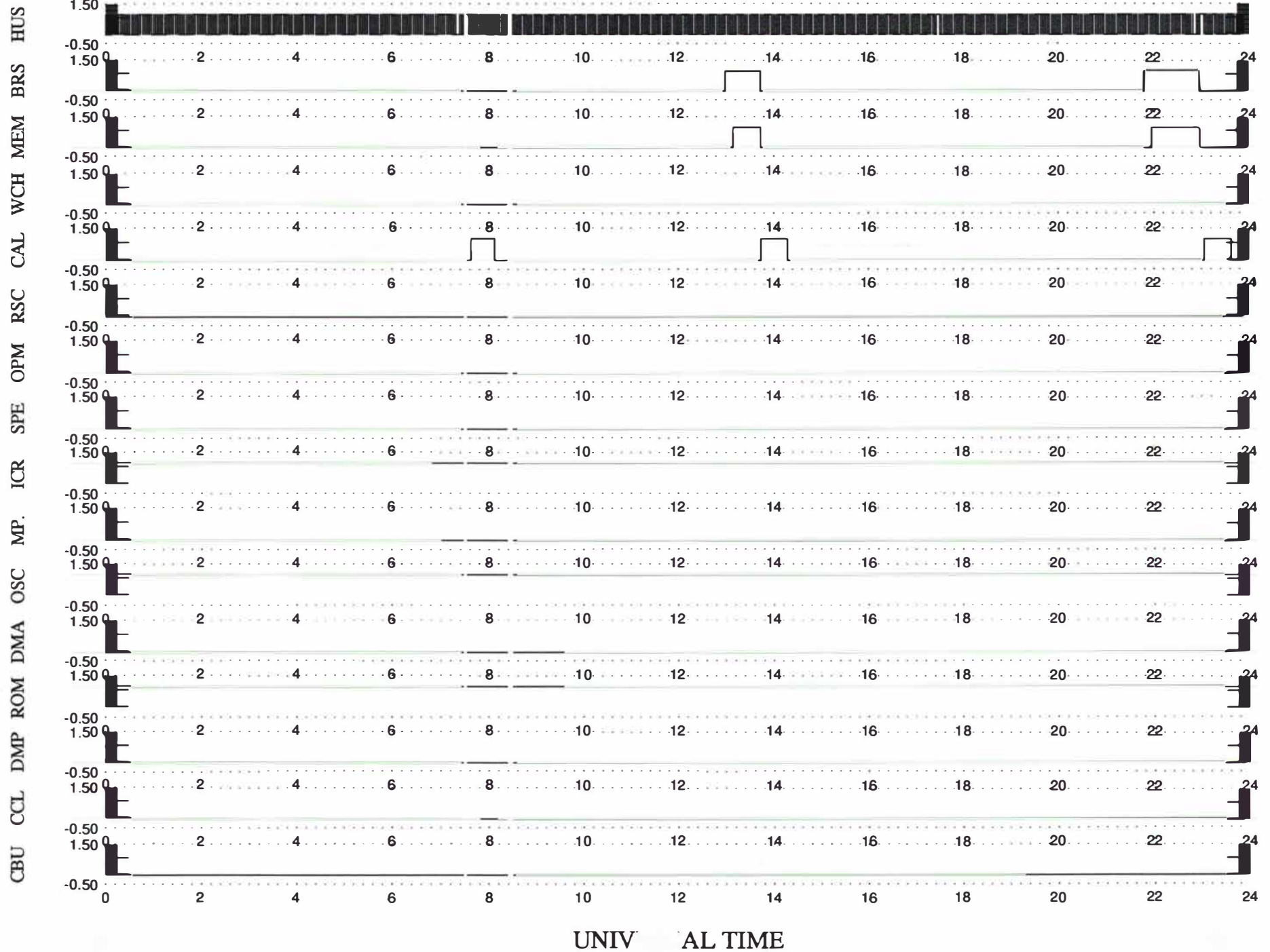
Plot created: 97/10/20, 1614

Channel

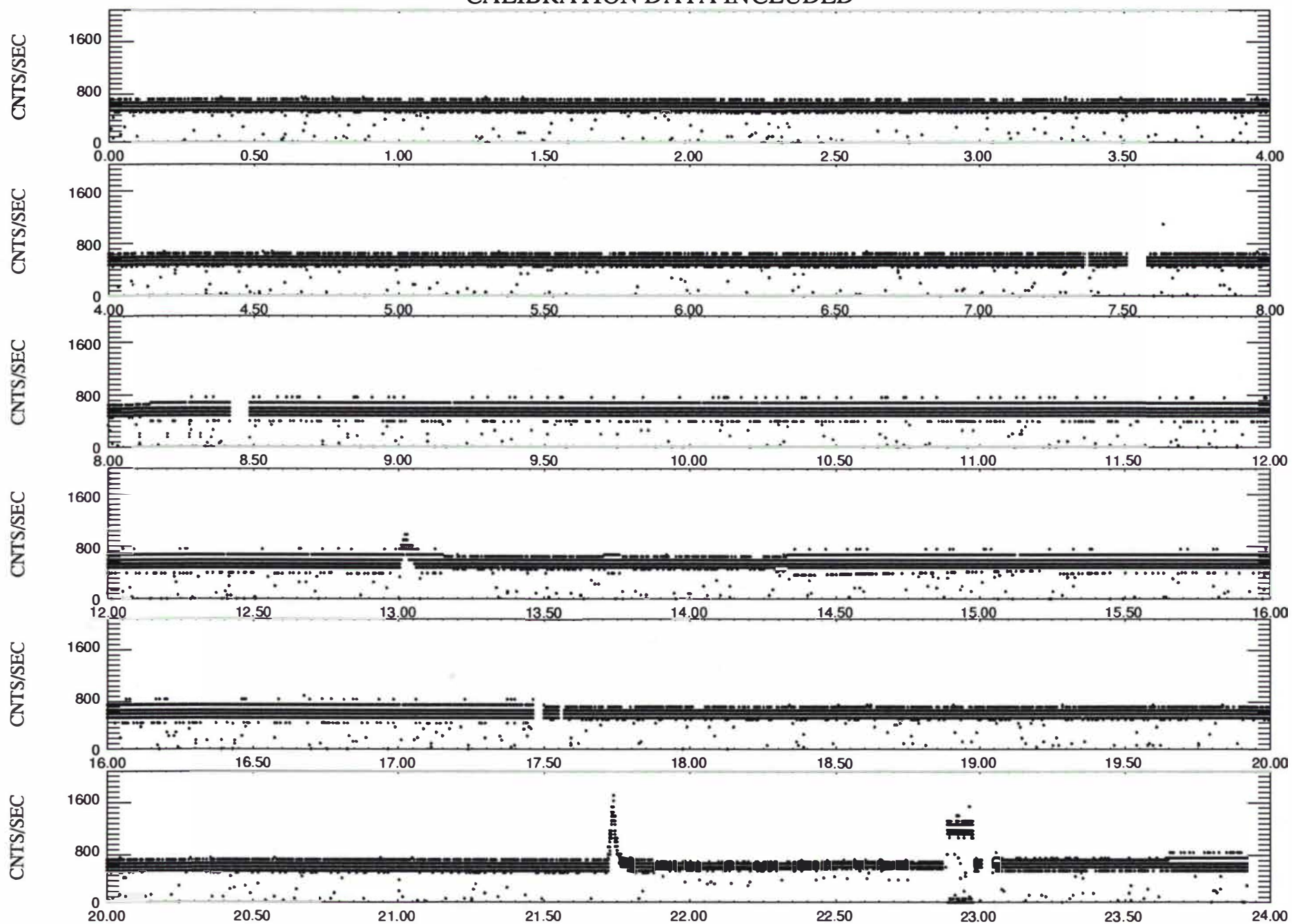
1 (1.0 - 8.0 Angstroms)
2 (0.5 - 4.0 Angstroms)

Background not subtracted
Background not subtracted
Sample average = 10

BURST NUMBER 1, 2

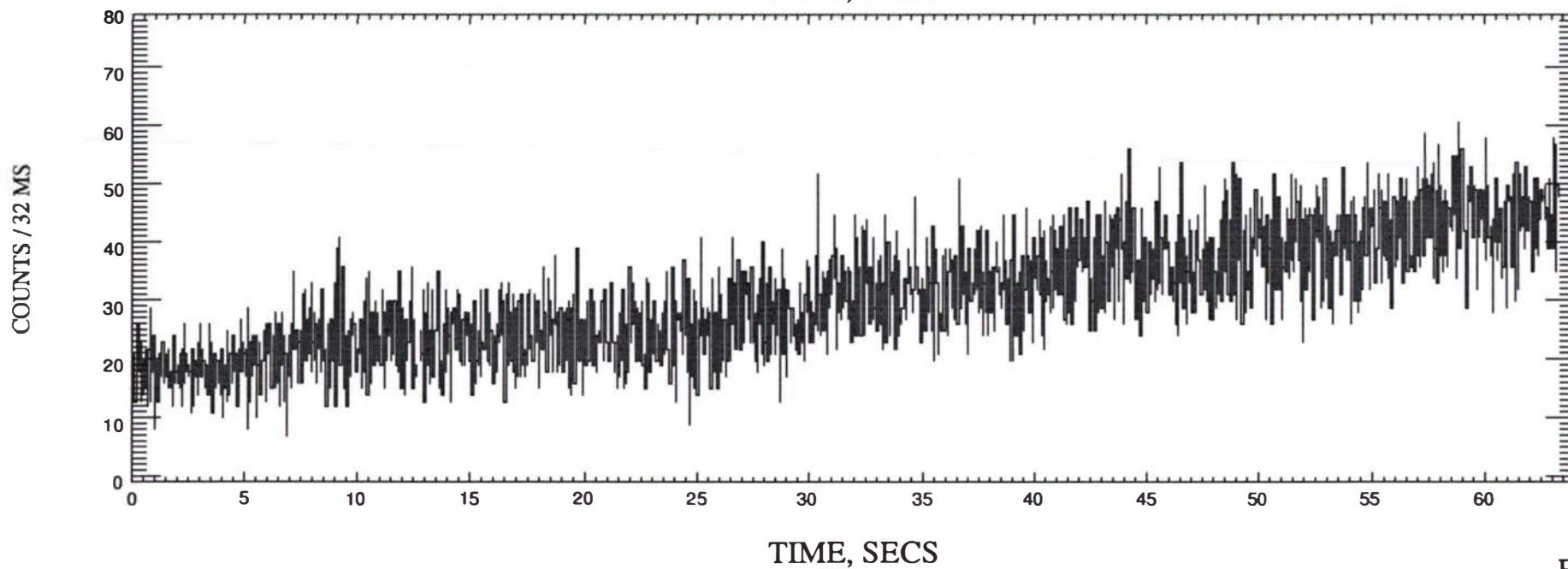
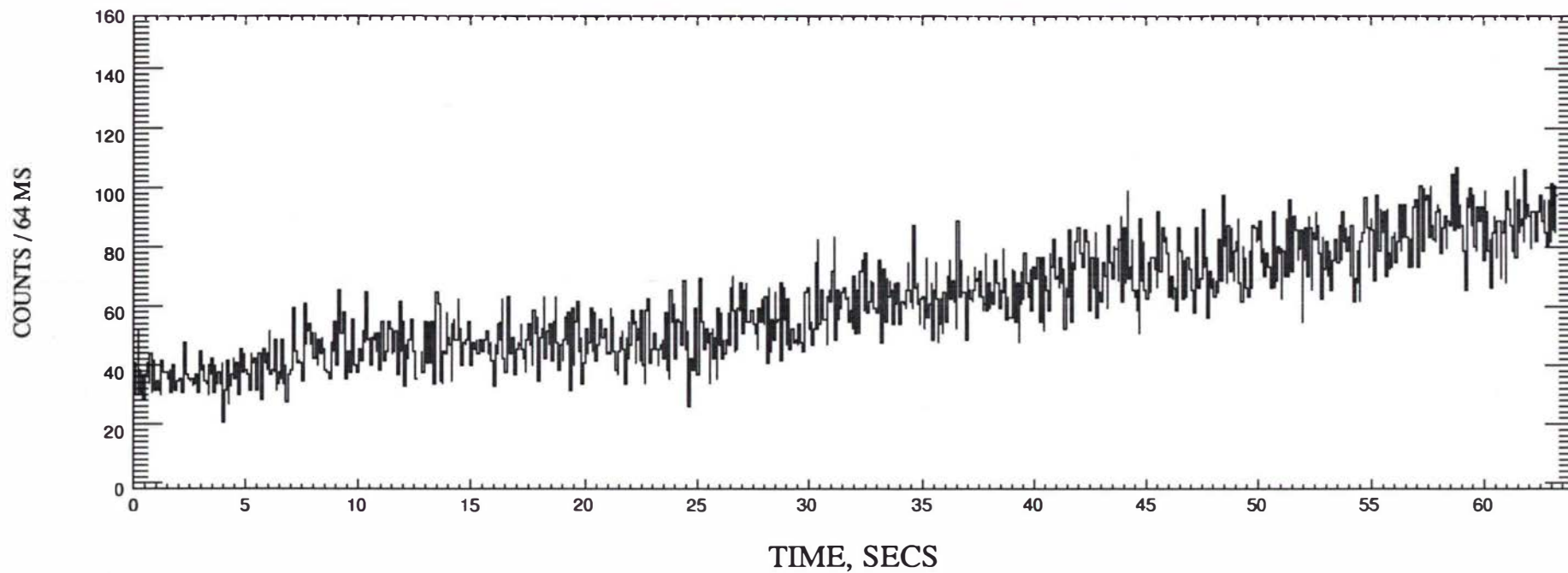


CALIBRATION DATA INCLUDED

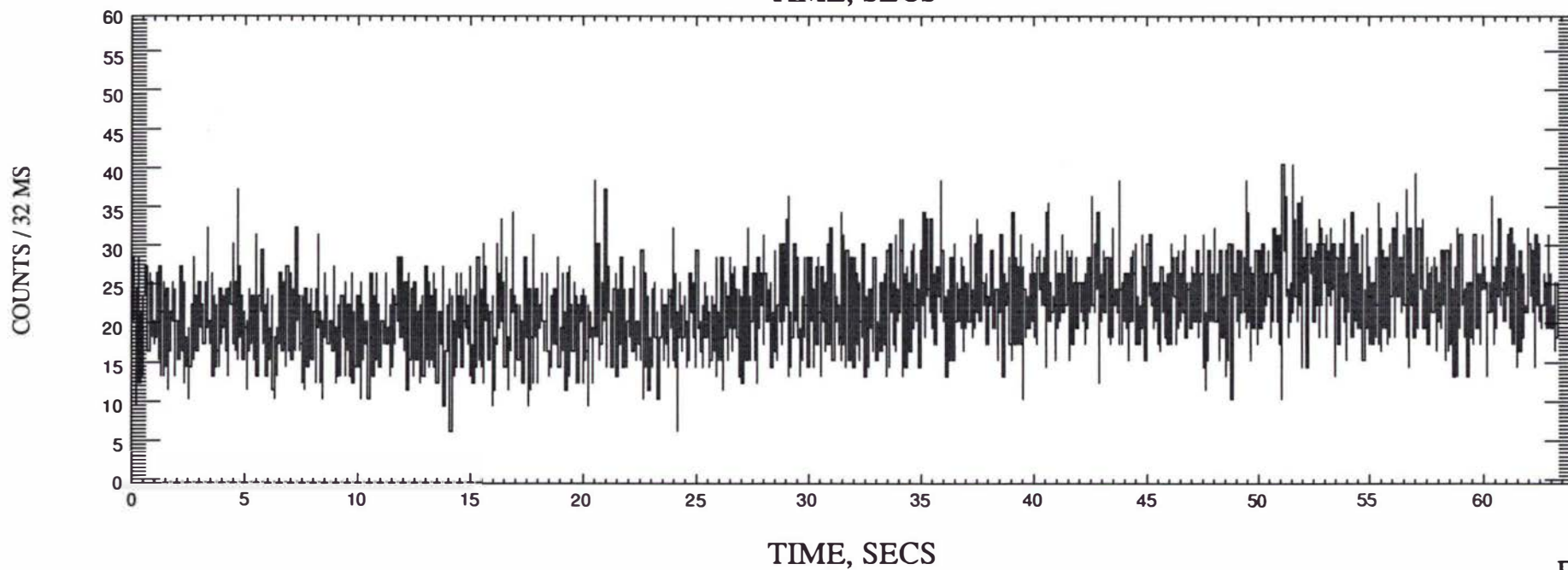
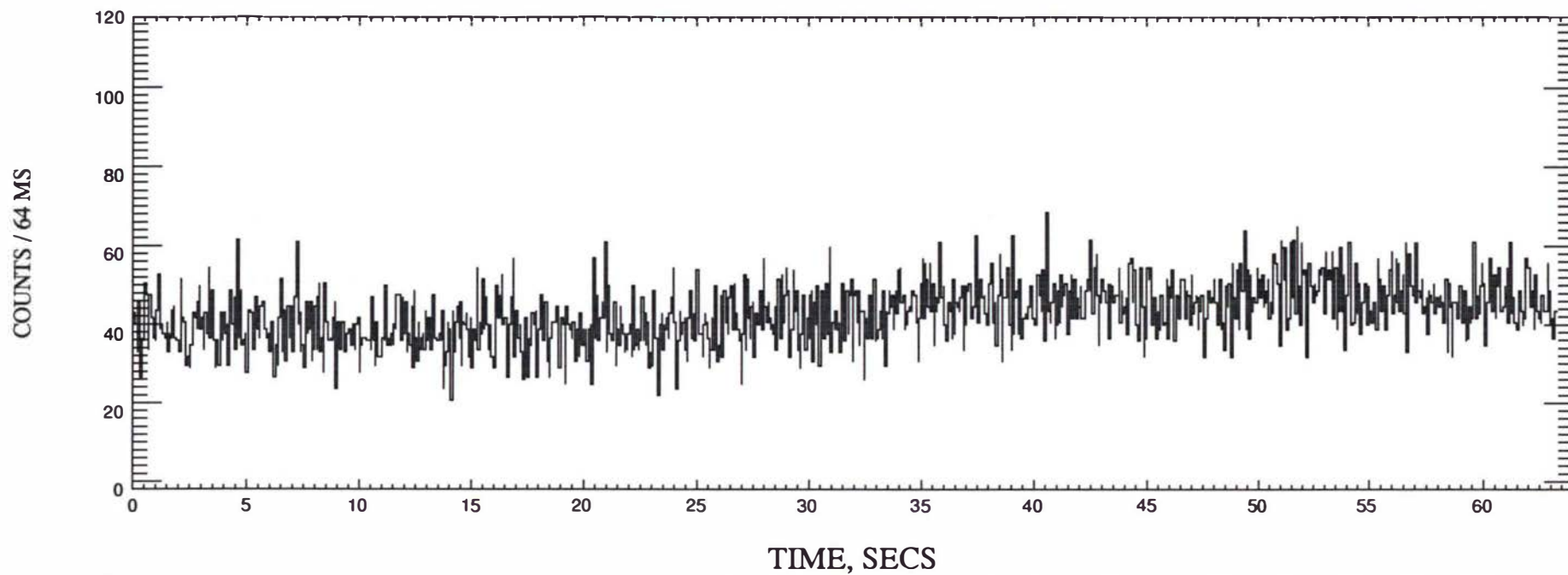


UNIV AL TIME

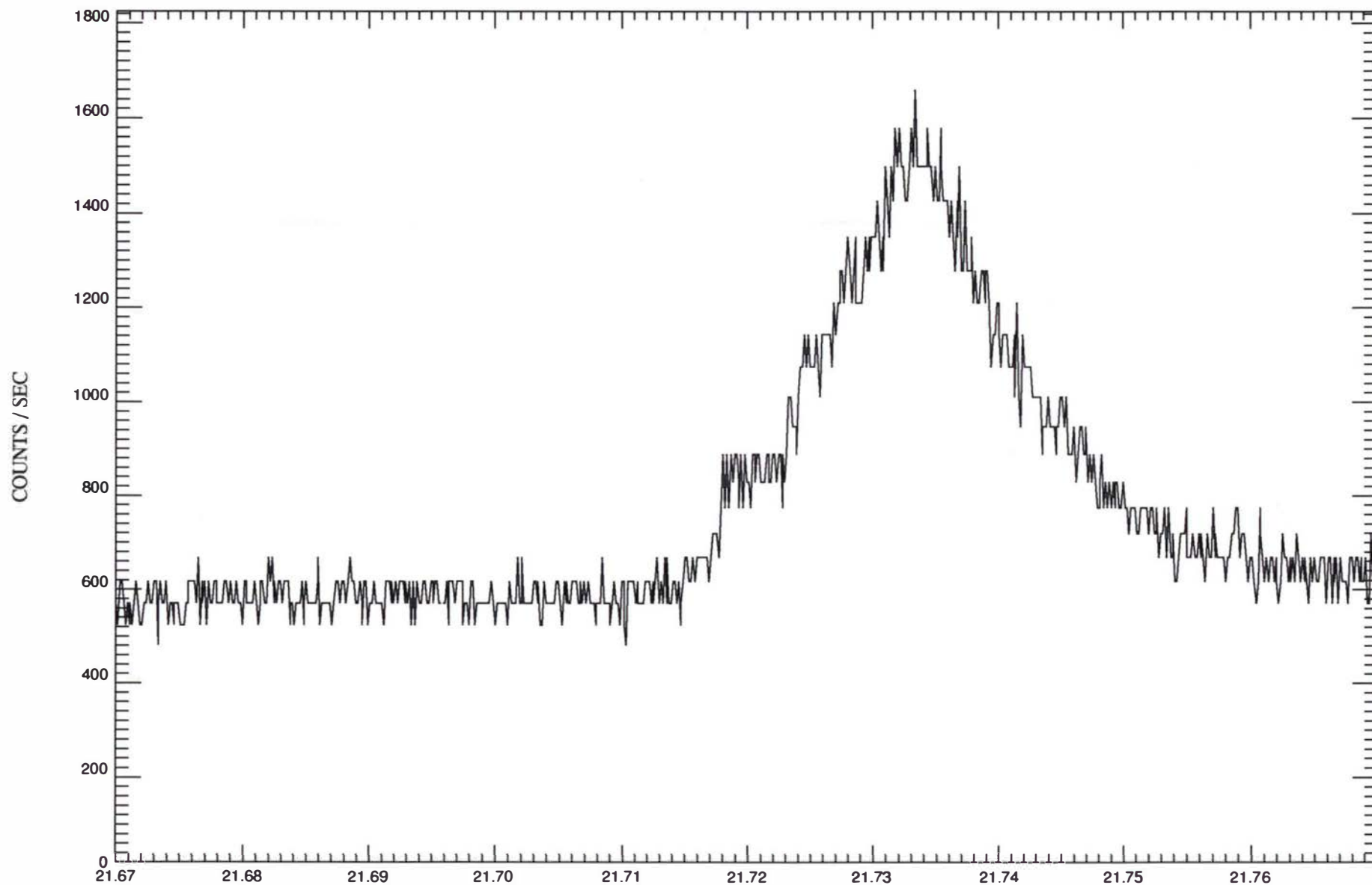
Burst Counter 2 at UT=21.717982359992 h=78184.736 s 21:43:04.736



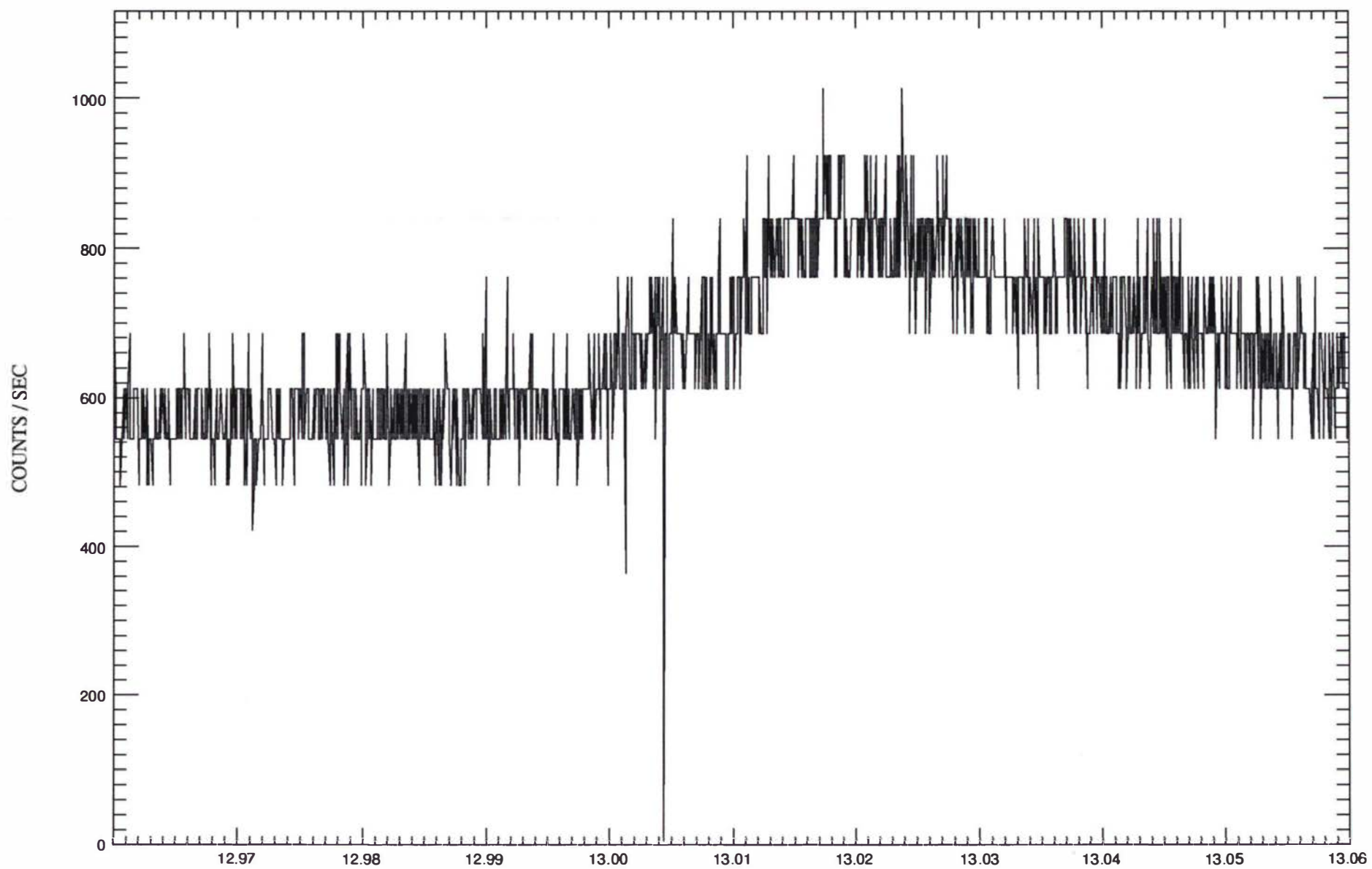
Burst Counter 1 at UT=13.005267024570 h=46818.961 s 13:00:18.961

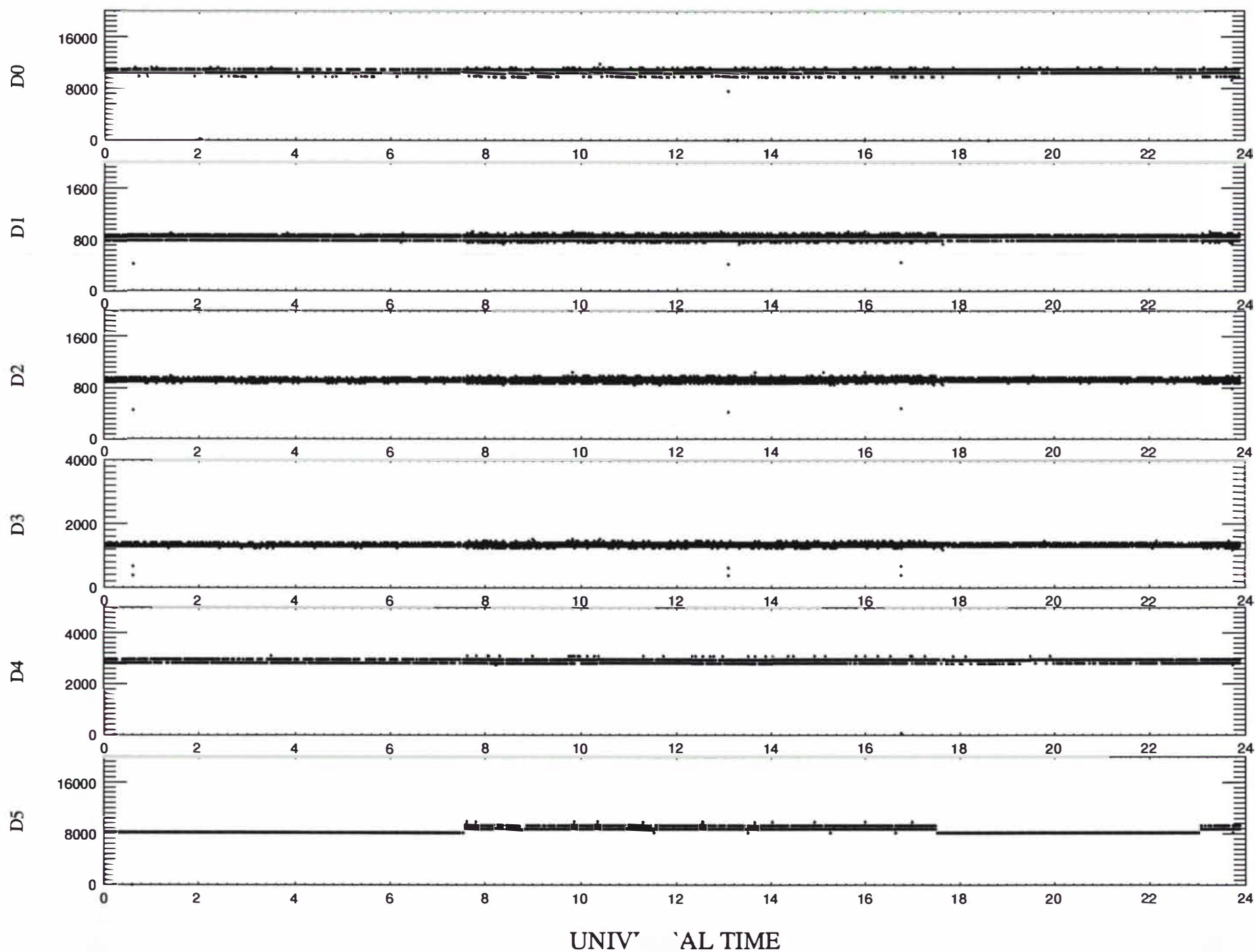


CALIBRATION DATA INCLUDED

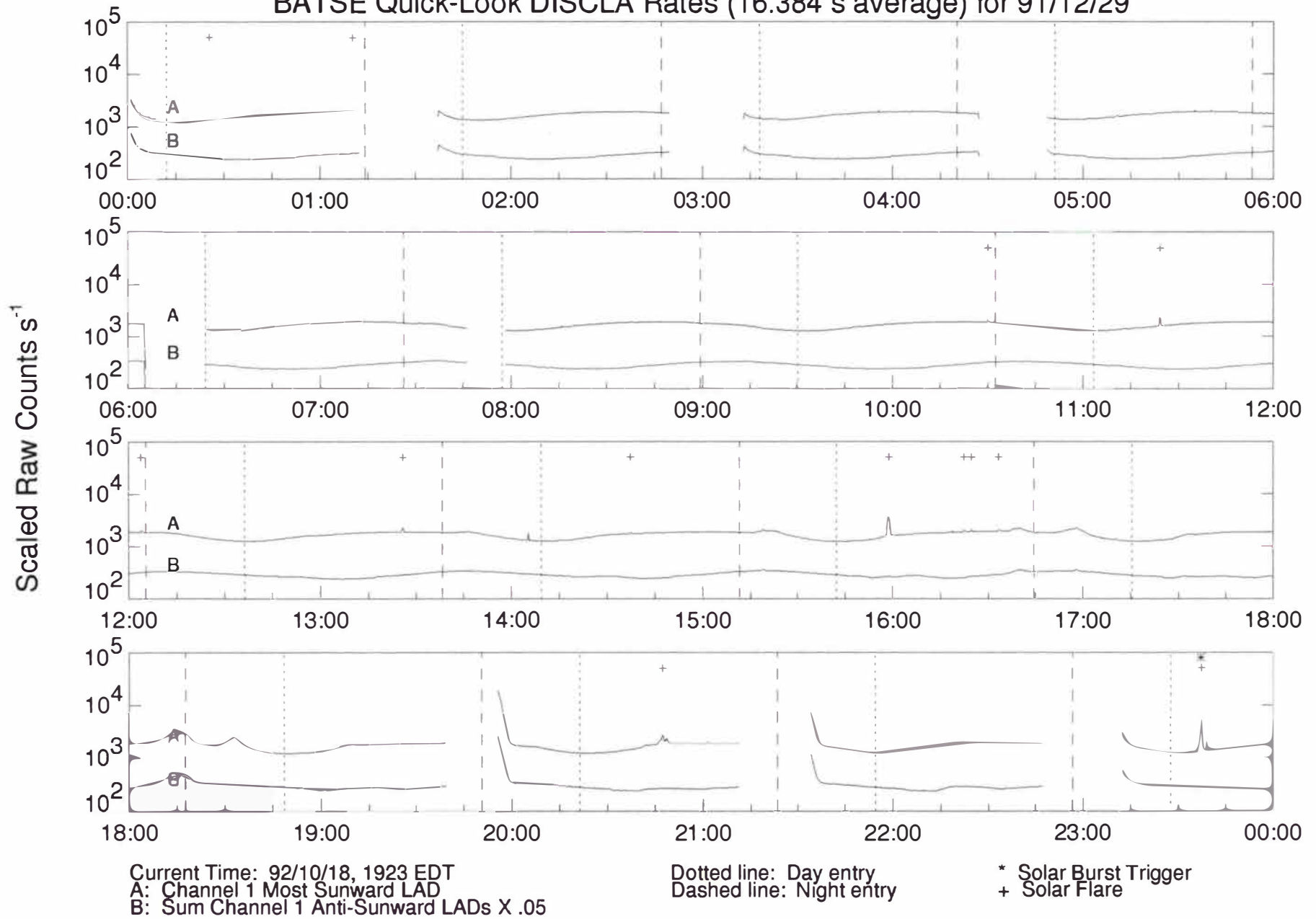


CALIBRATION DATA INCLUDED



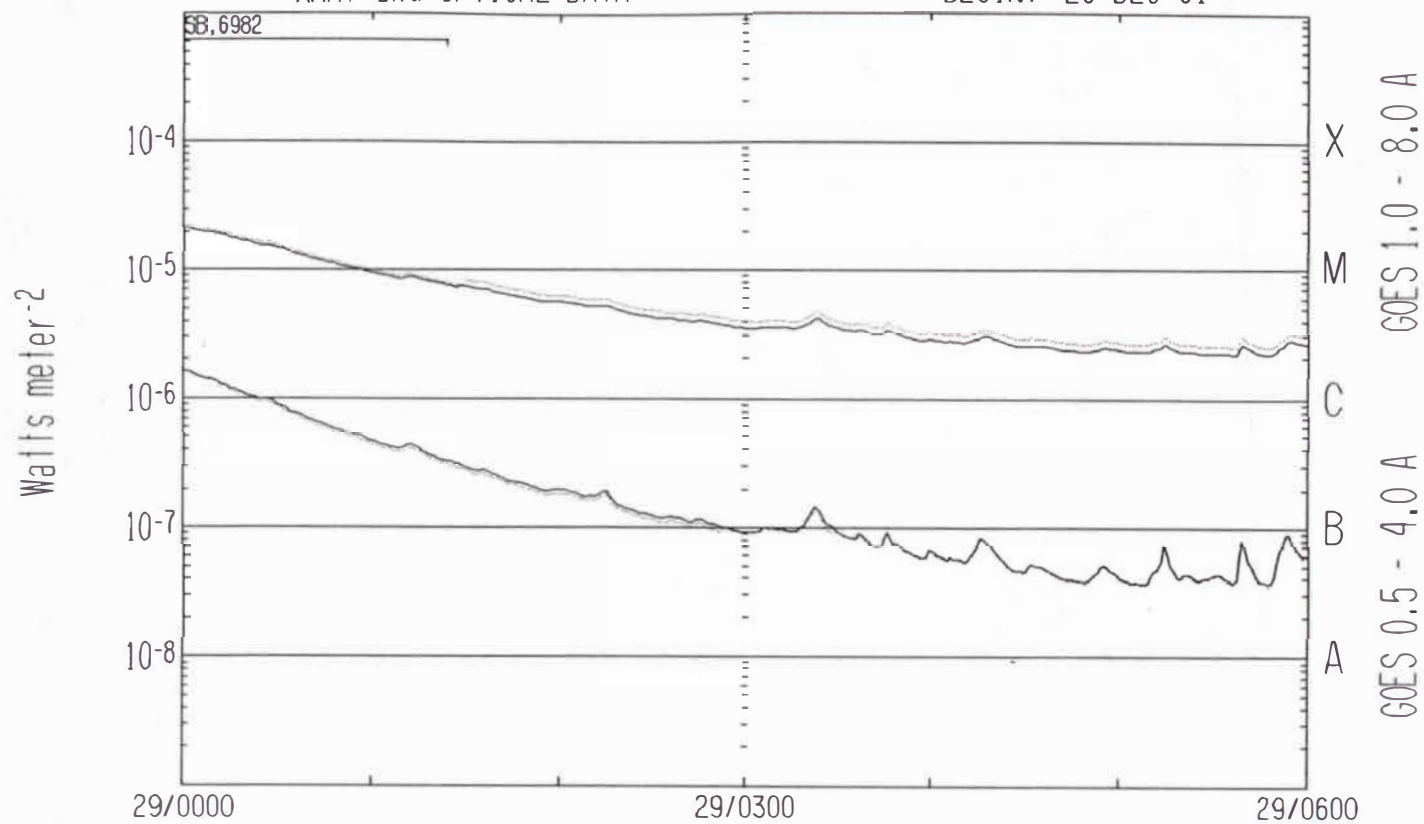


BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/29



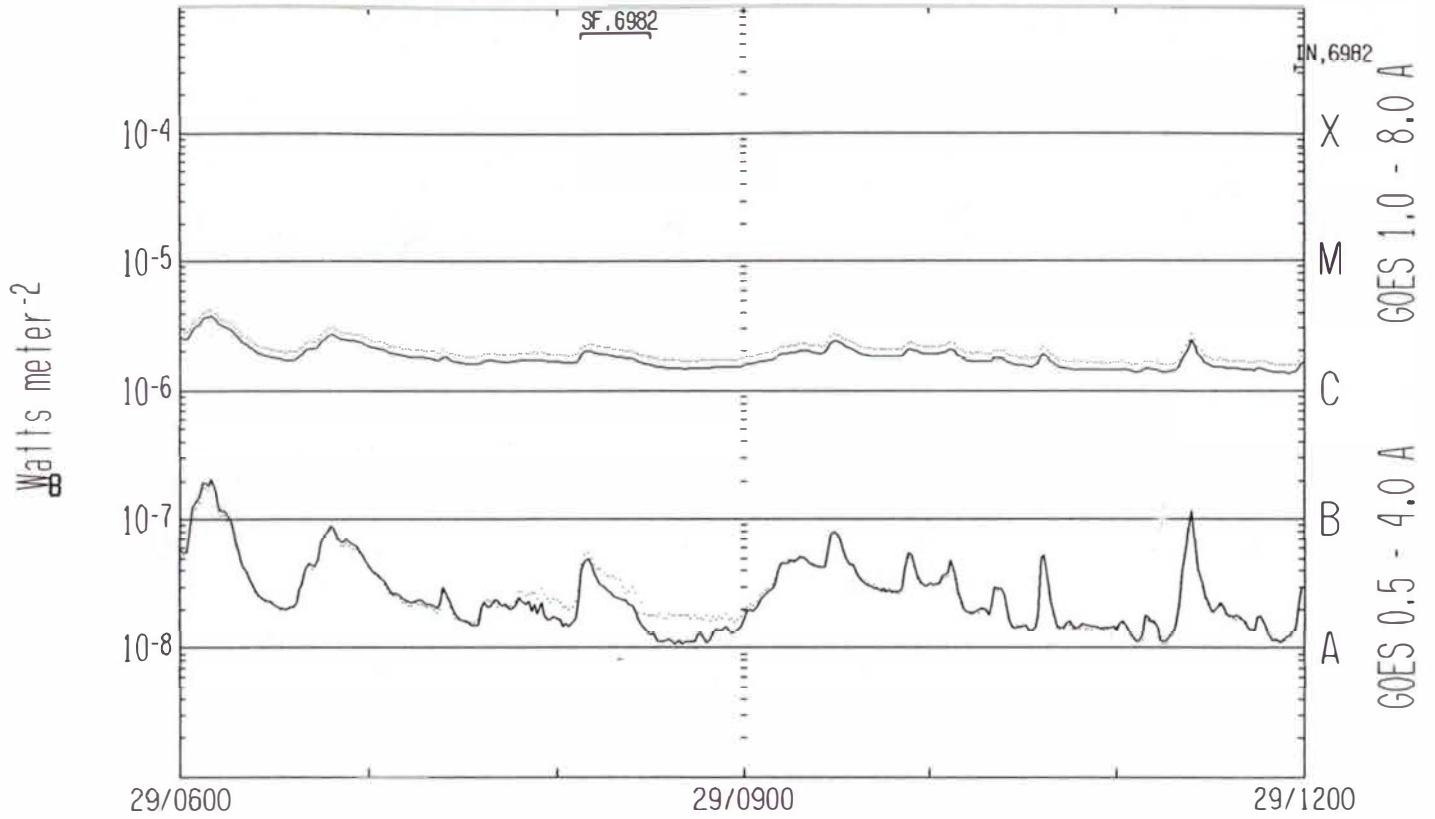
XRAY and OPTICAL DATA

BEGIN: 29 DEC 91



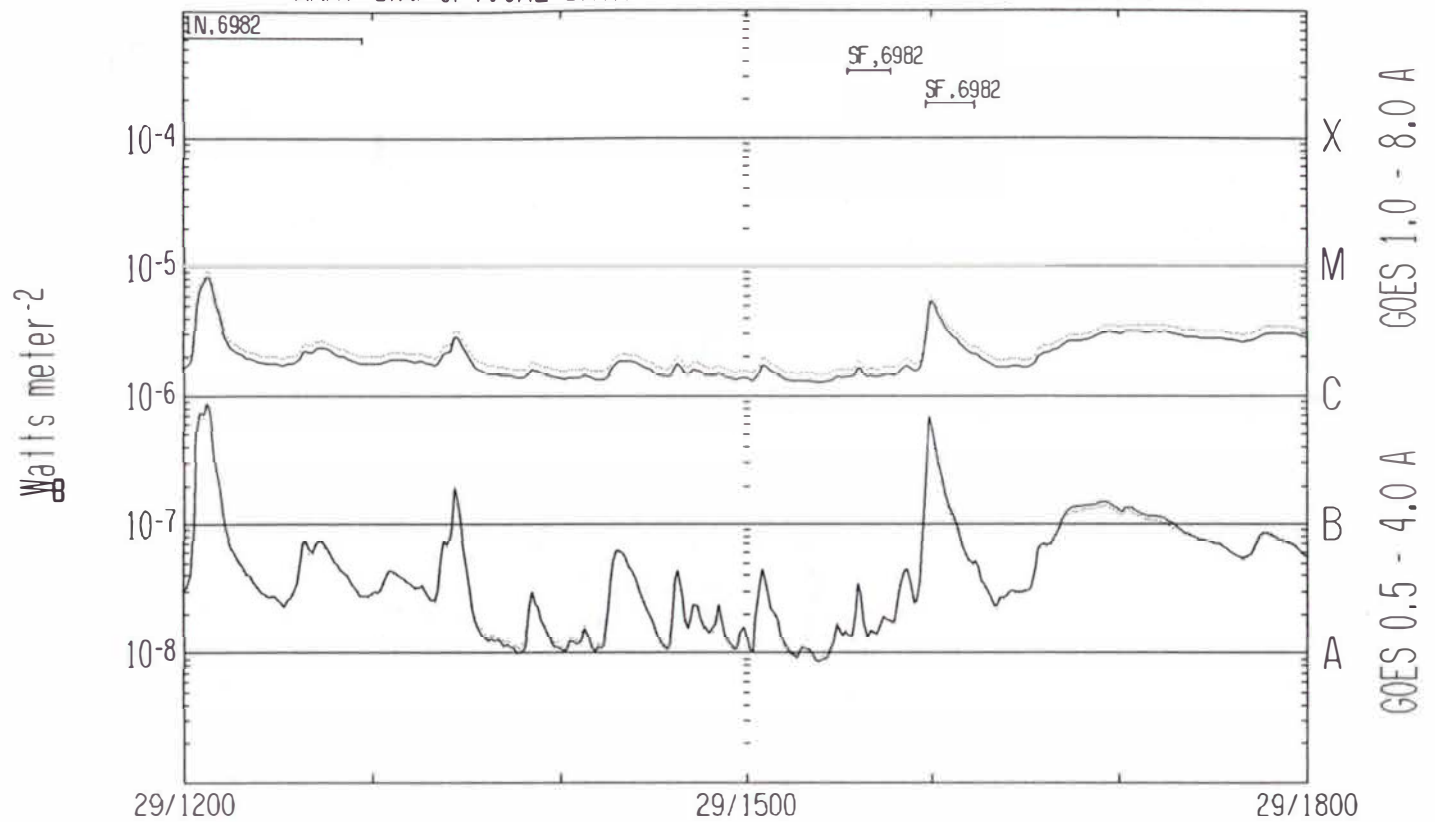
XRAY and OPTICAL DATA

BEGIN: 29 DEC 91



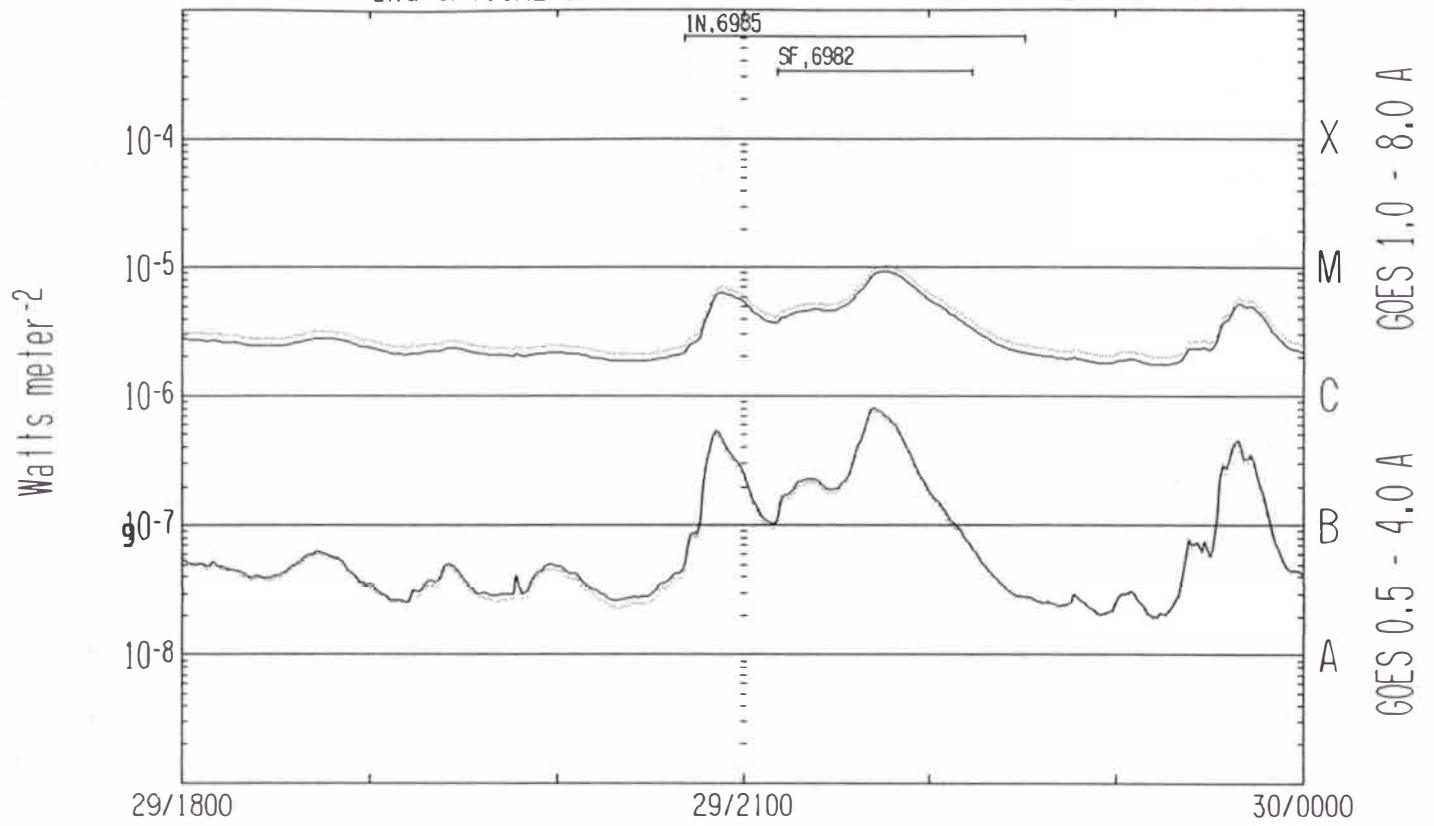
XRAY and OPTICAL DATA

BEGIN: 29 DEC 91

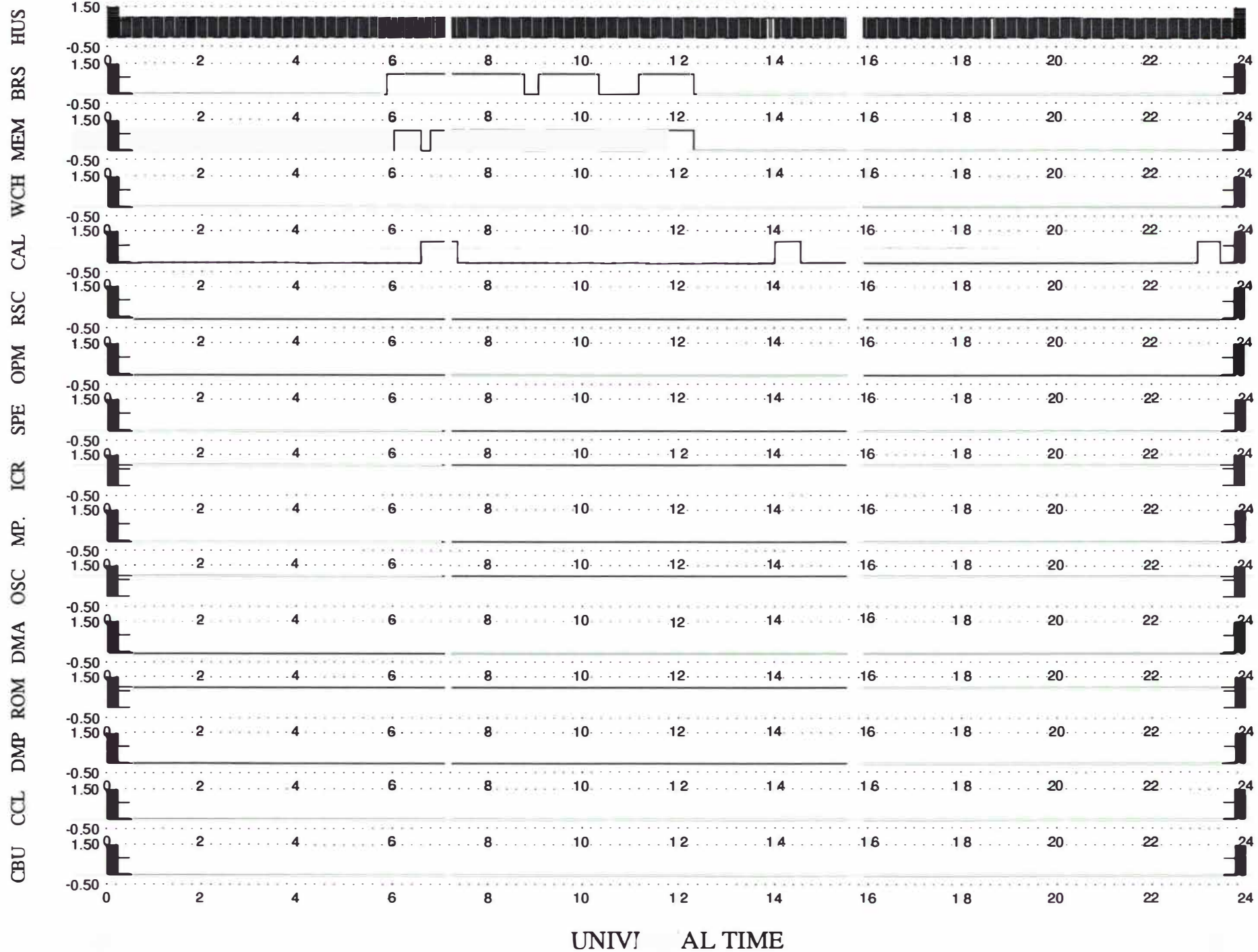


XRAY and OPTICAL DATA

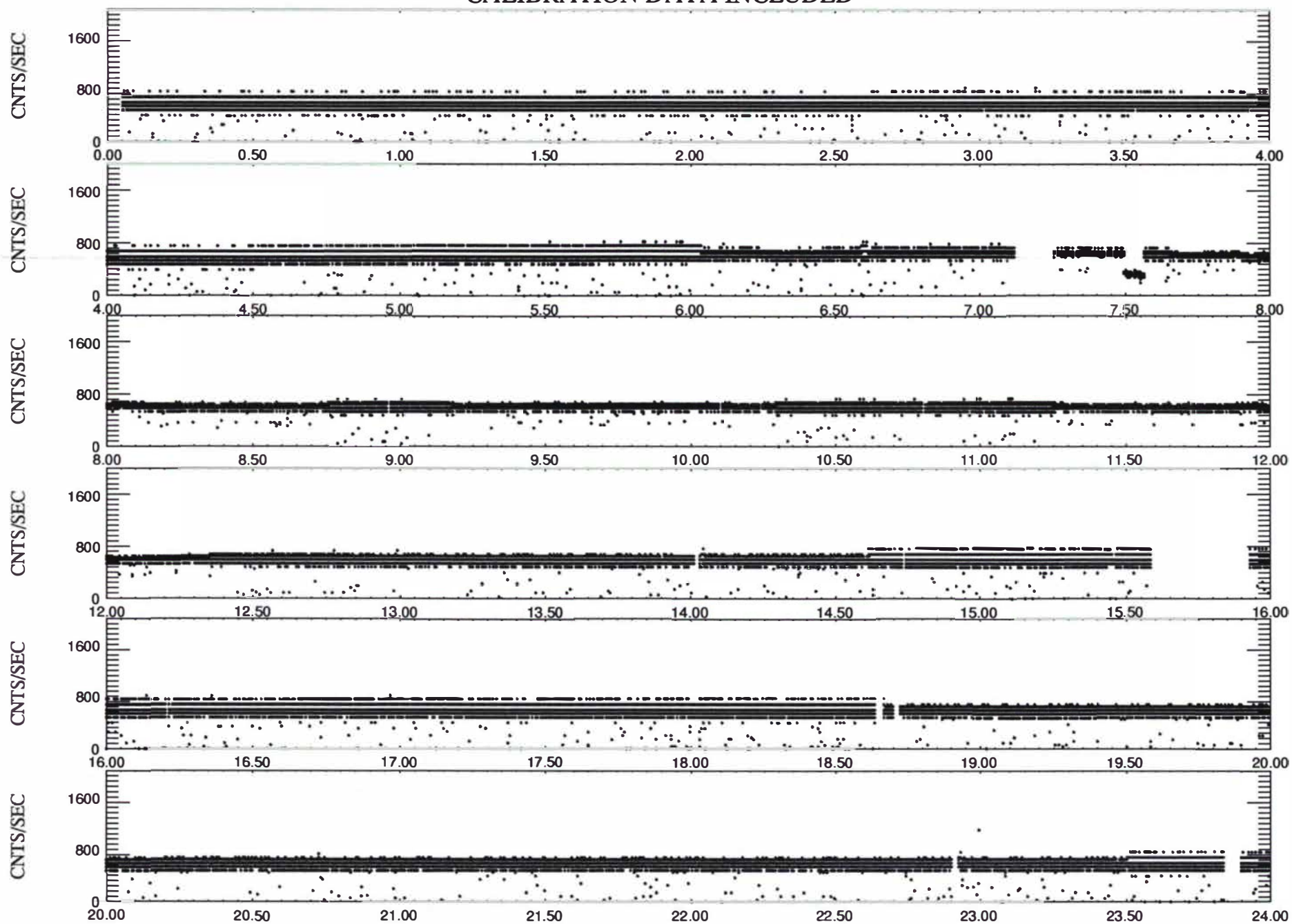
BEGIN: 29 DEC 91



BURST NUMBER 3 - 7

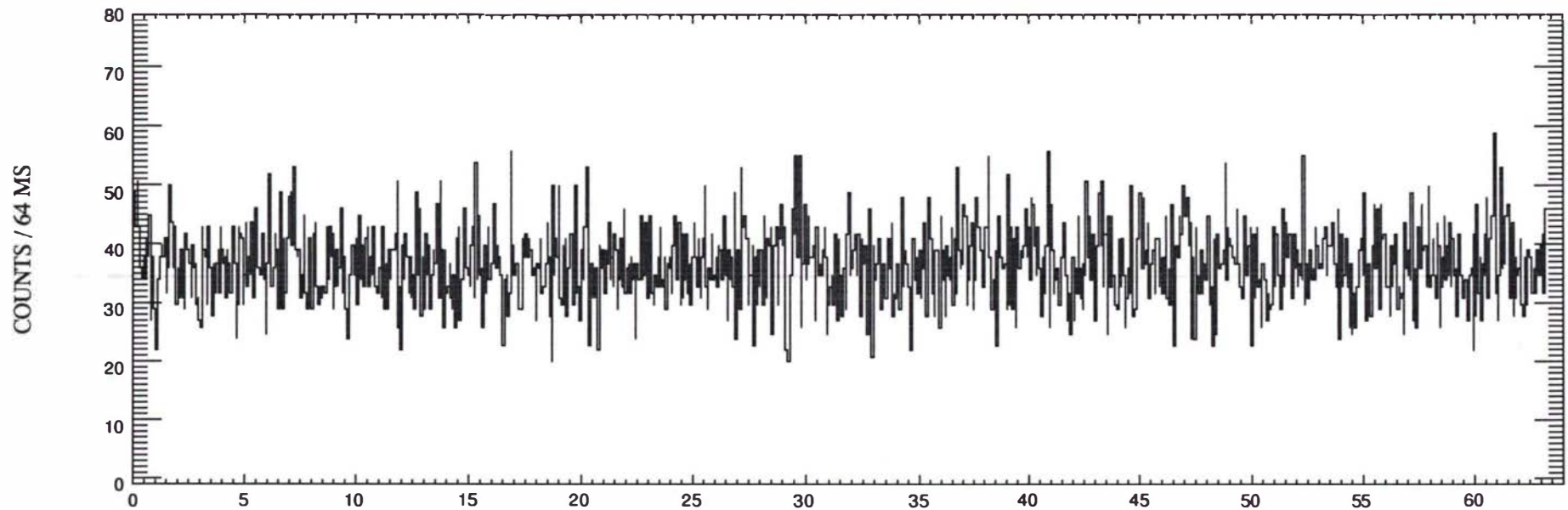


CALIBRATION DATA INCLUDED

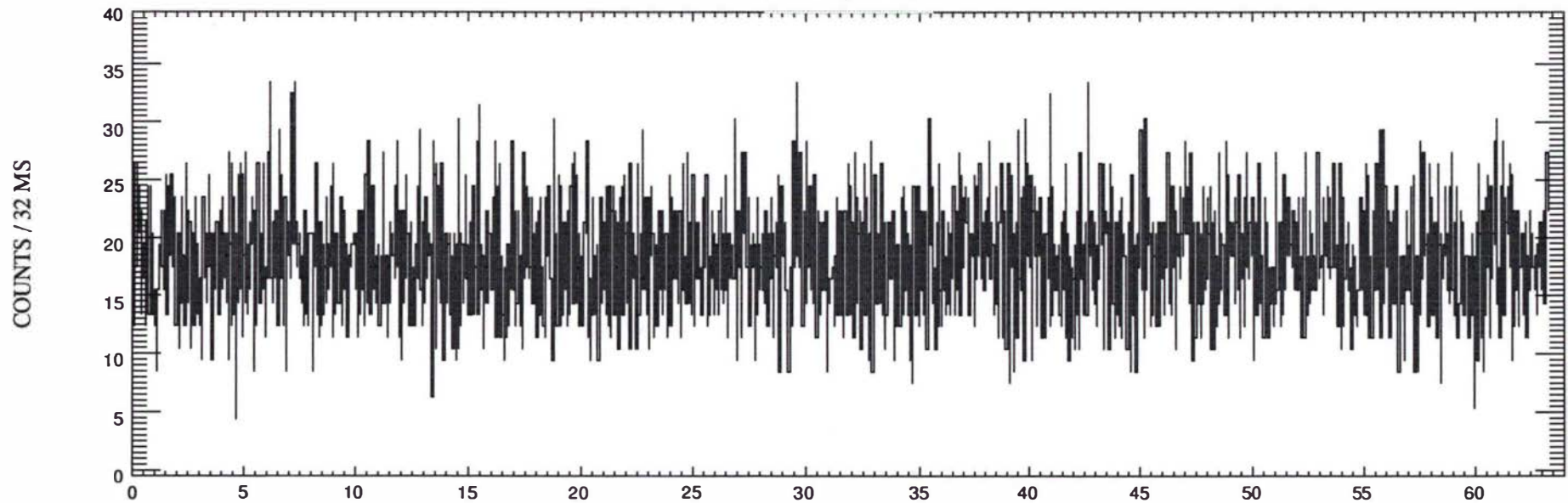


UNIV 'AL TIME

Burst Counter 7 at UT=11.092582312690 h=39933.296 s 11:05:33.296

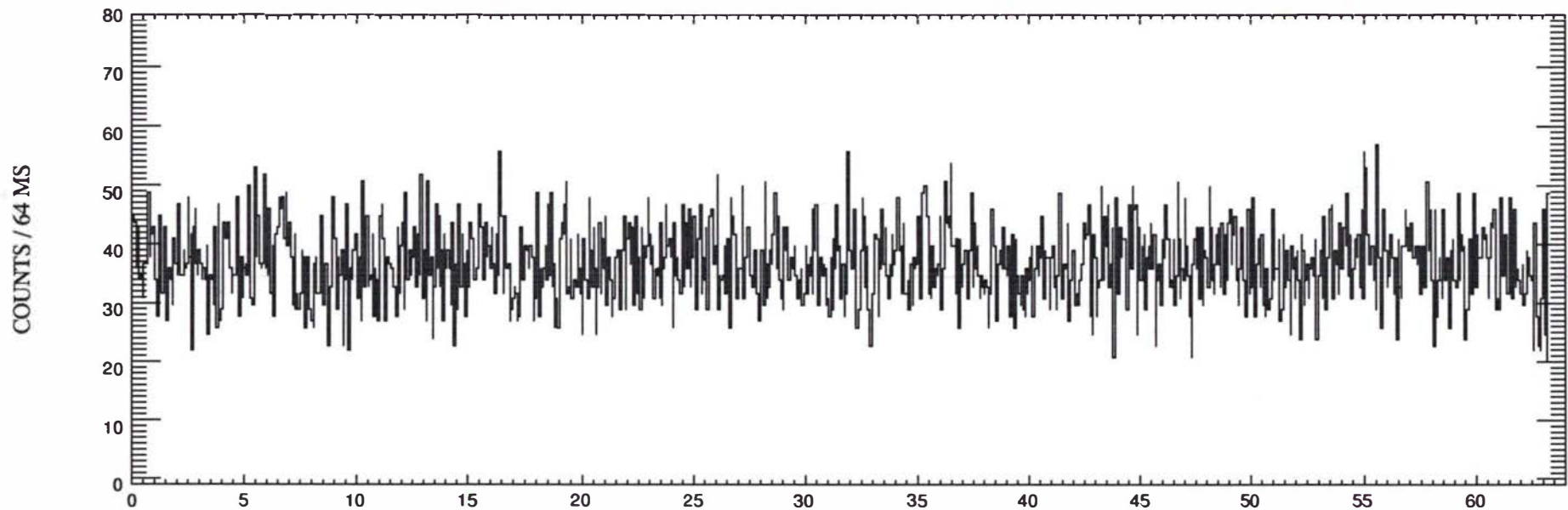


TIME, SECS

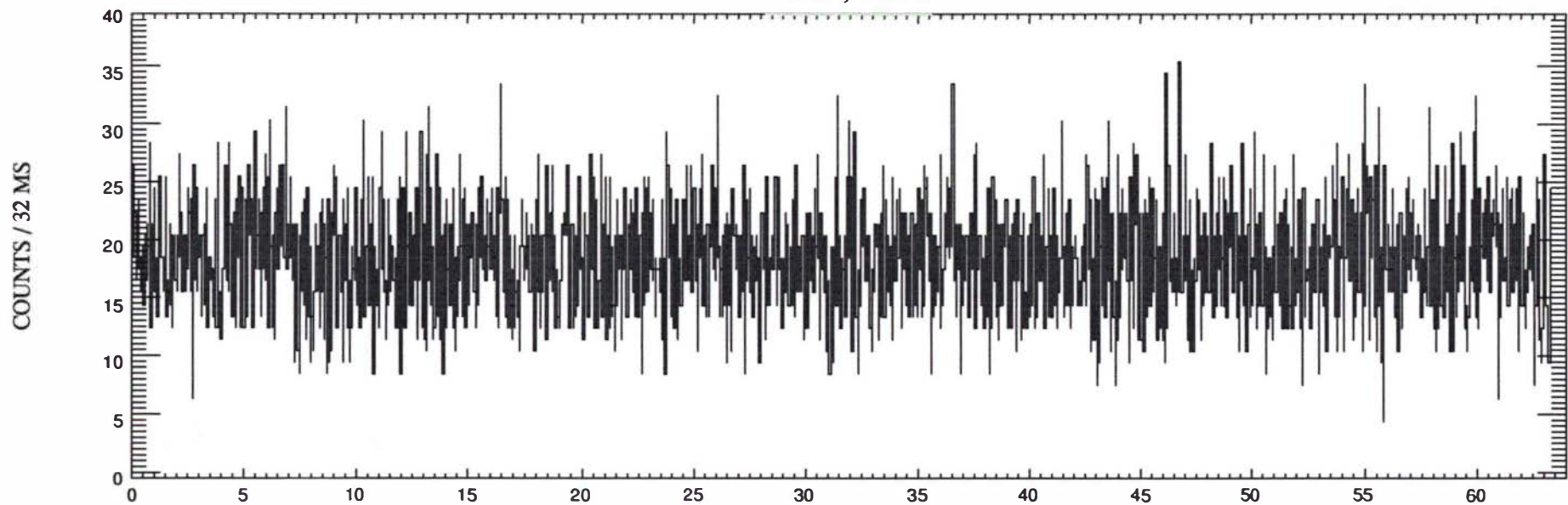


TIME, SECS

Burst Counter 6 at UT= 9.025464964973 h=32491.674 s 09:01:31.674

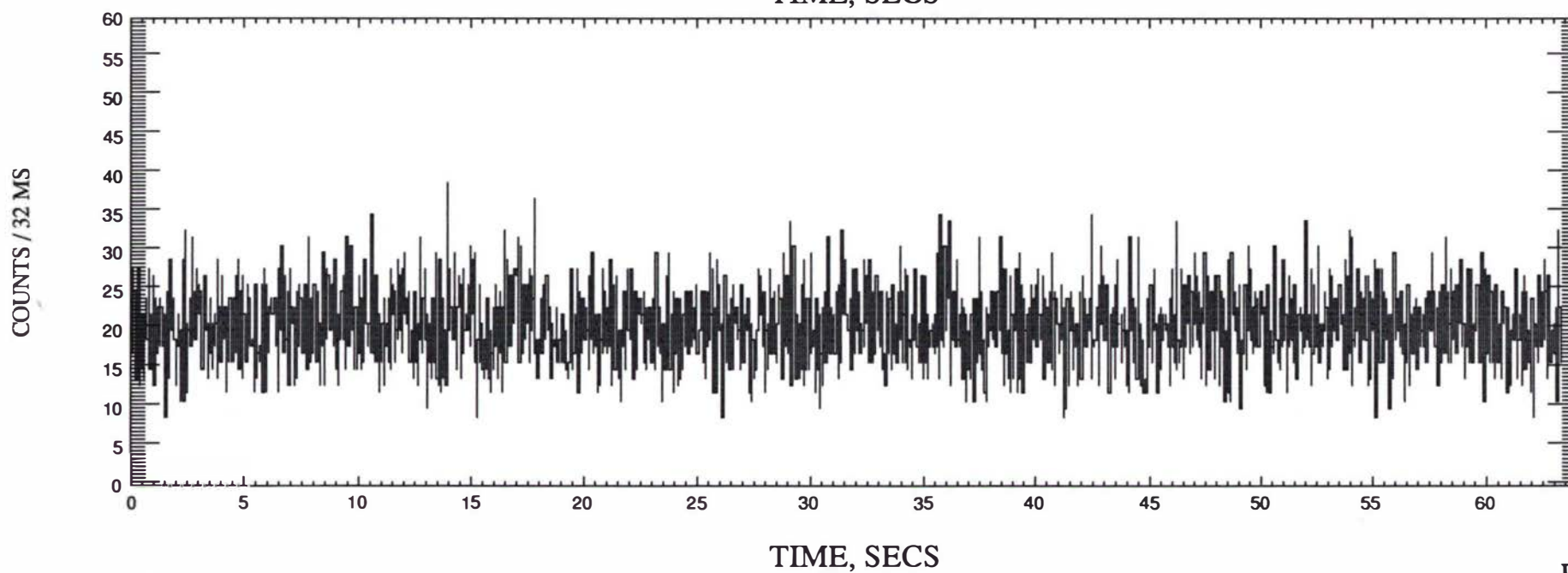
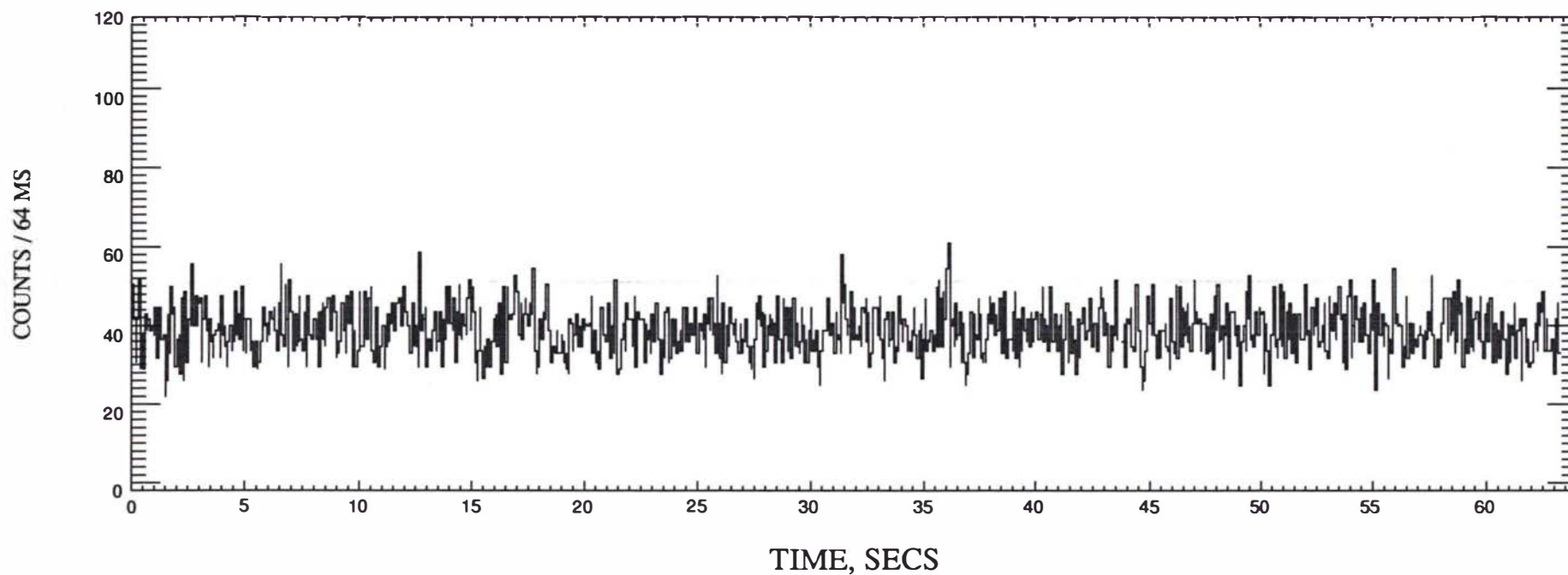


TIME, SECS

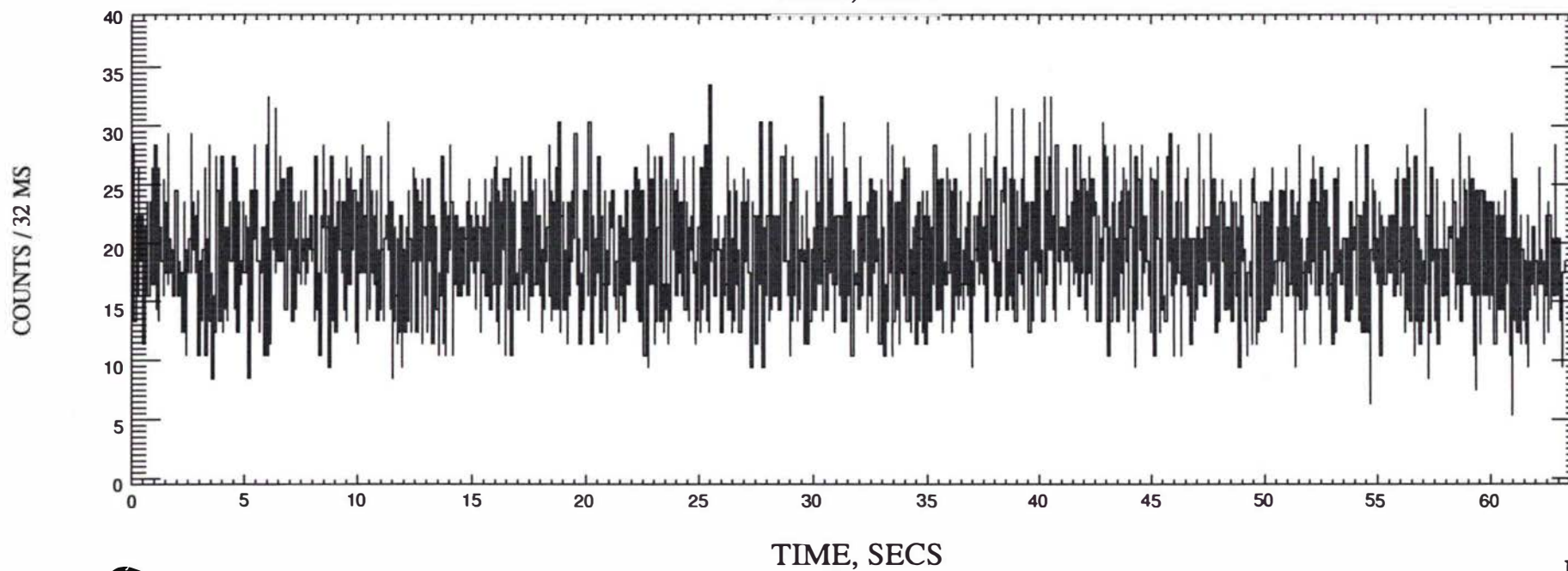
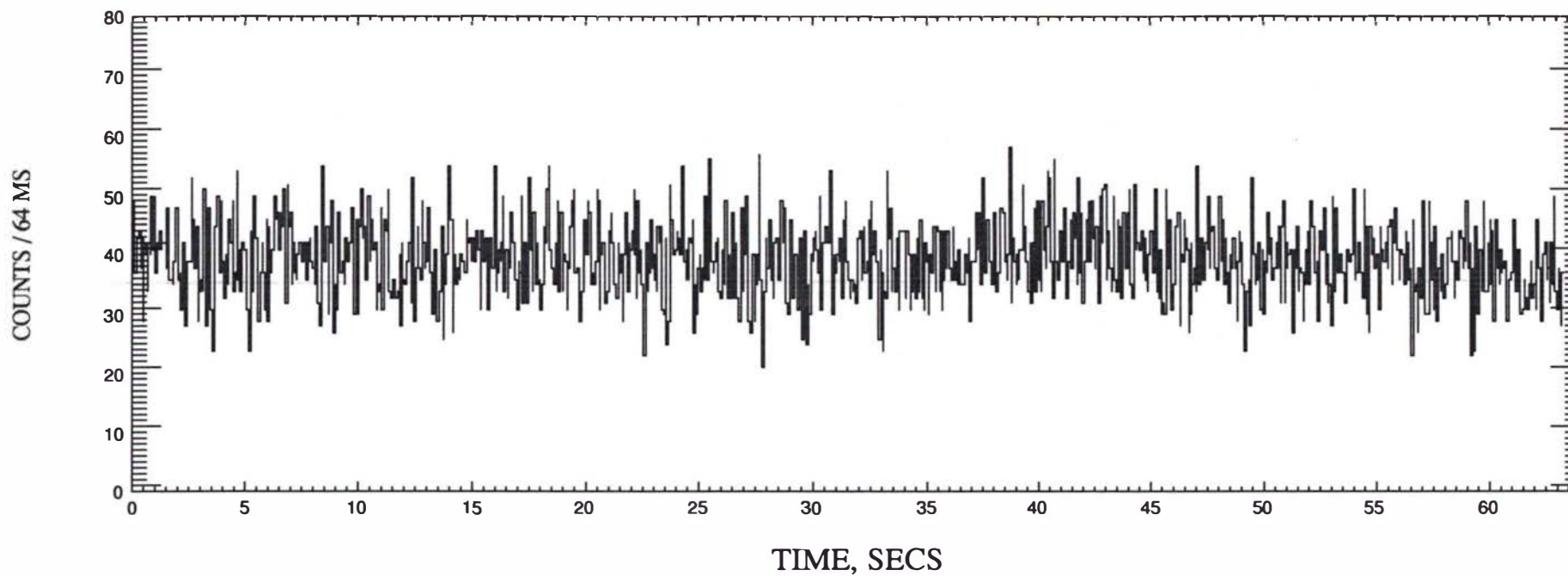


TIME, SECS

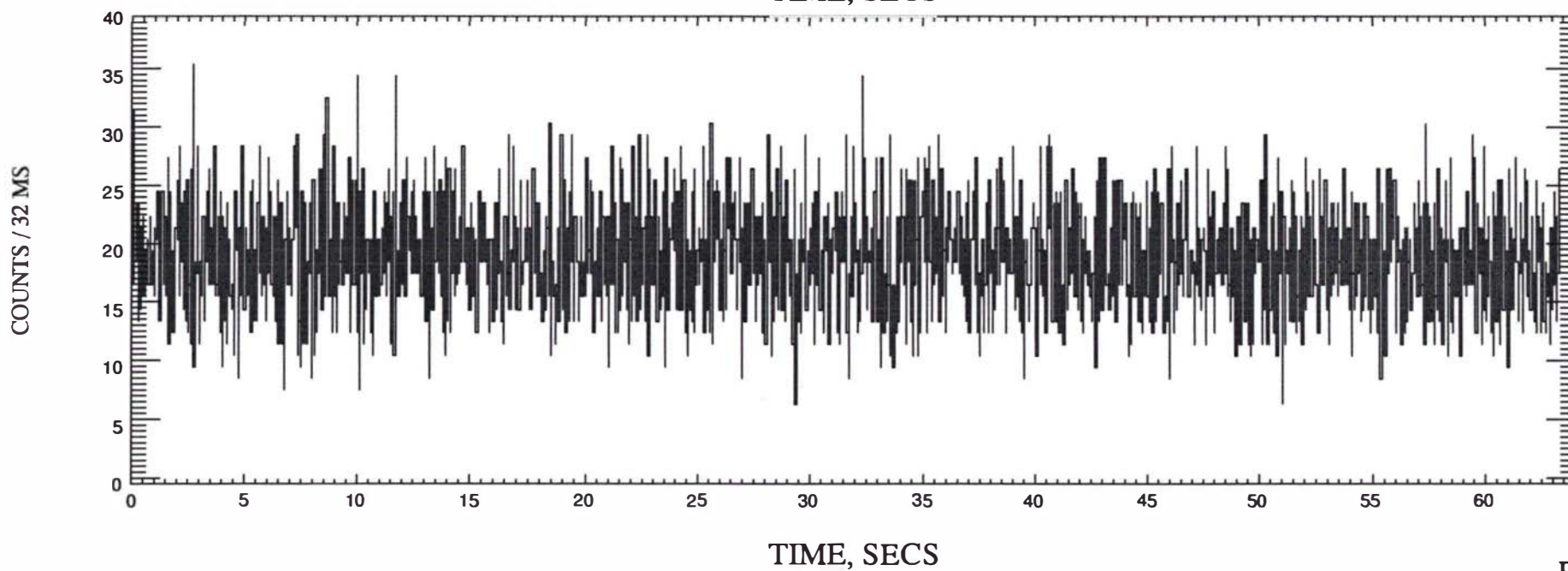
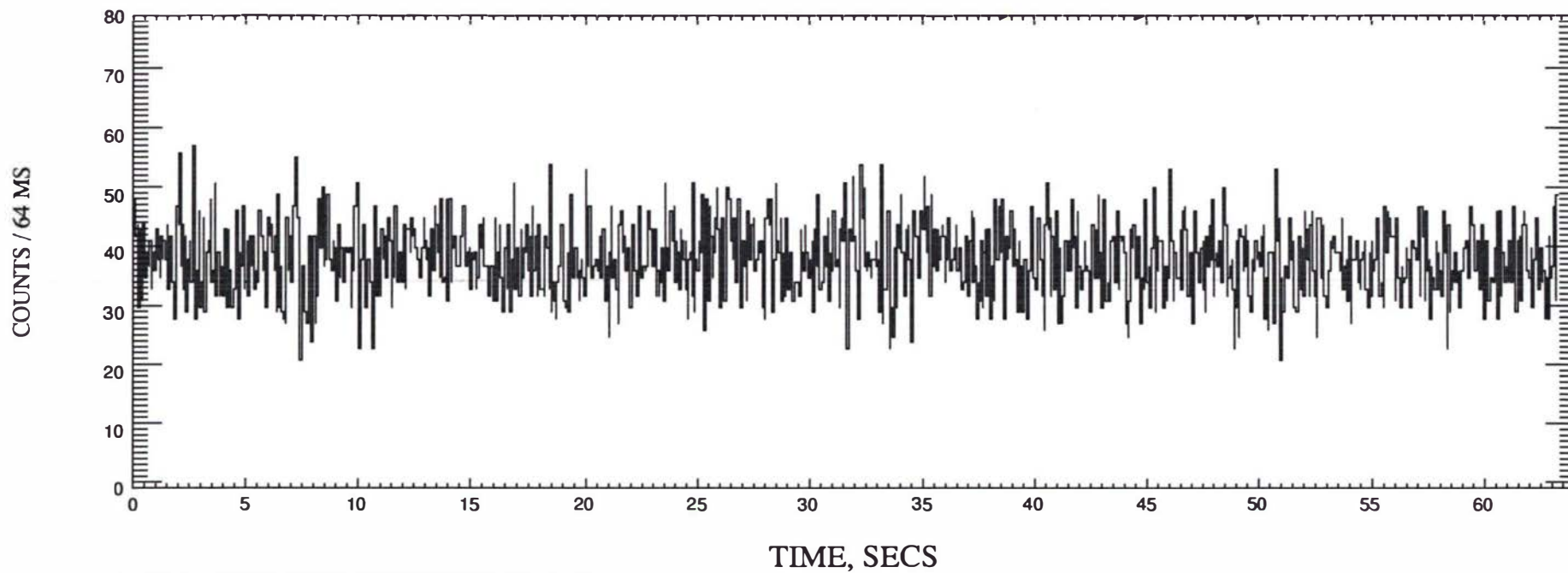
Burst Counter 5 at UT= 7.492656309340 h=26973.563 s 07:29:33.563



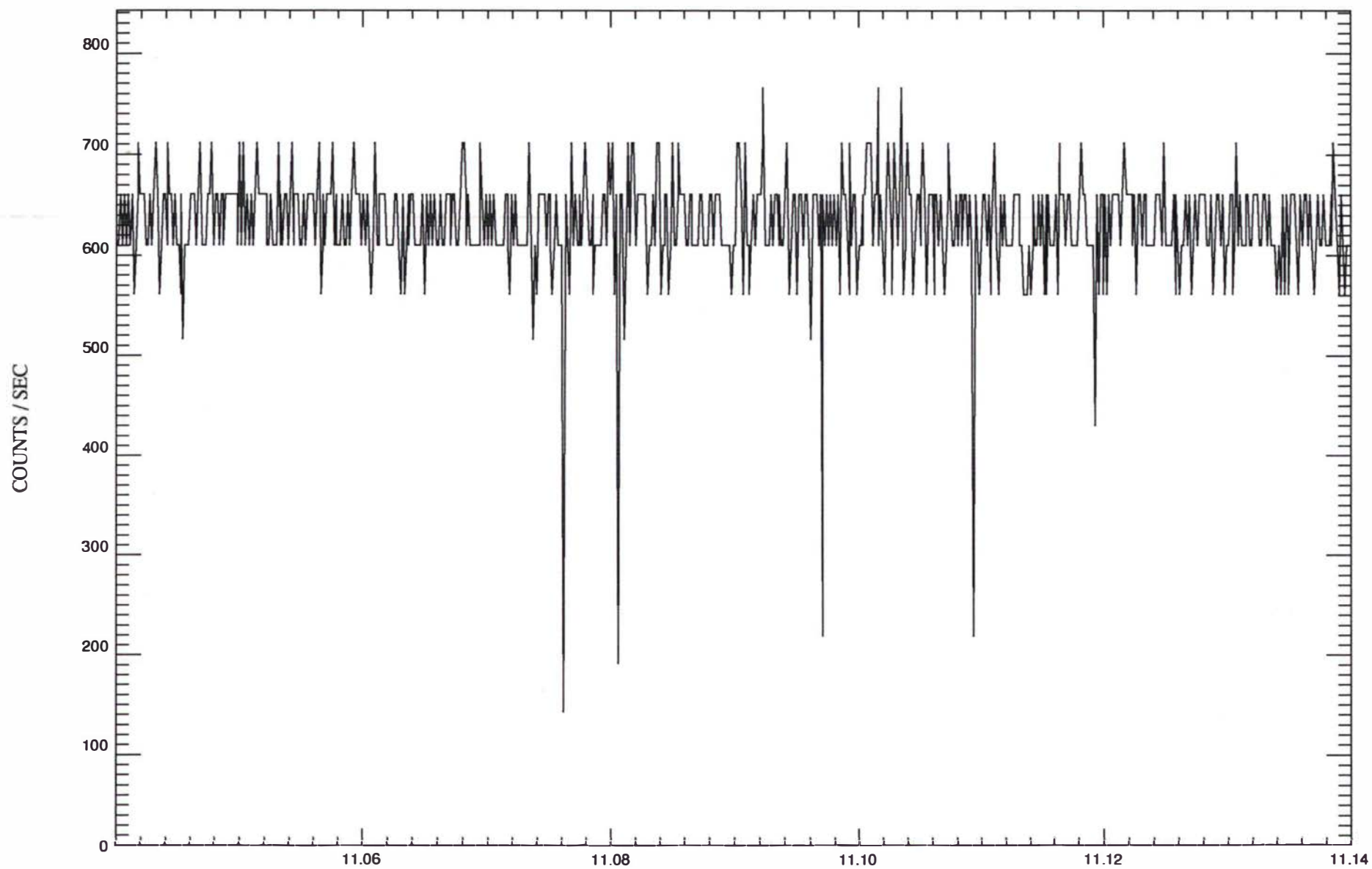
Burst Counter 4 at UT= 6.599308141073 h=23757.509 s 06:35:57.509



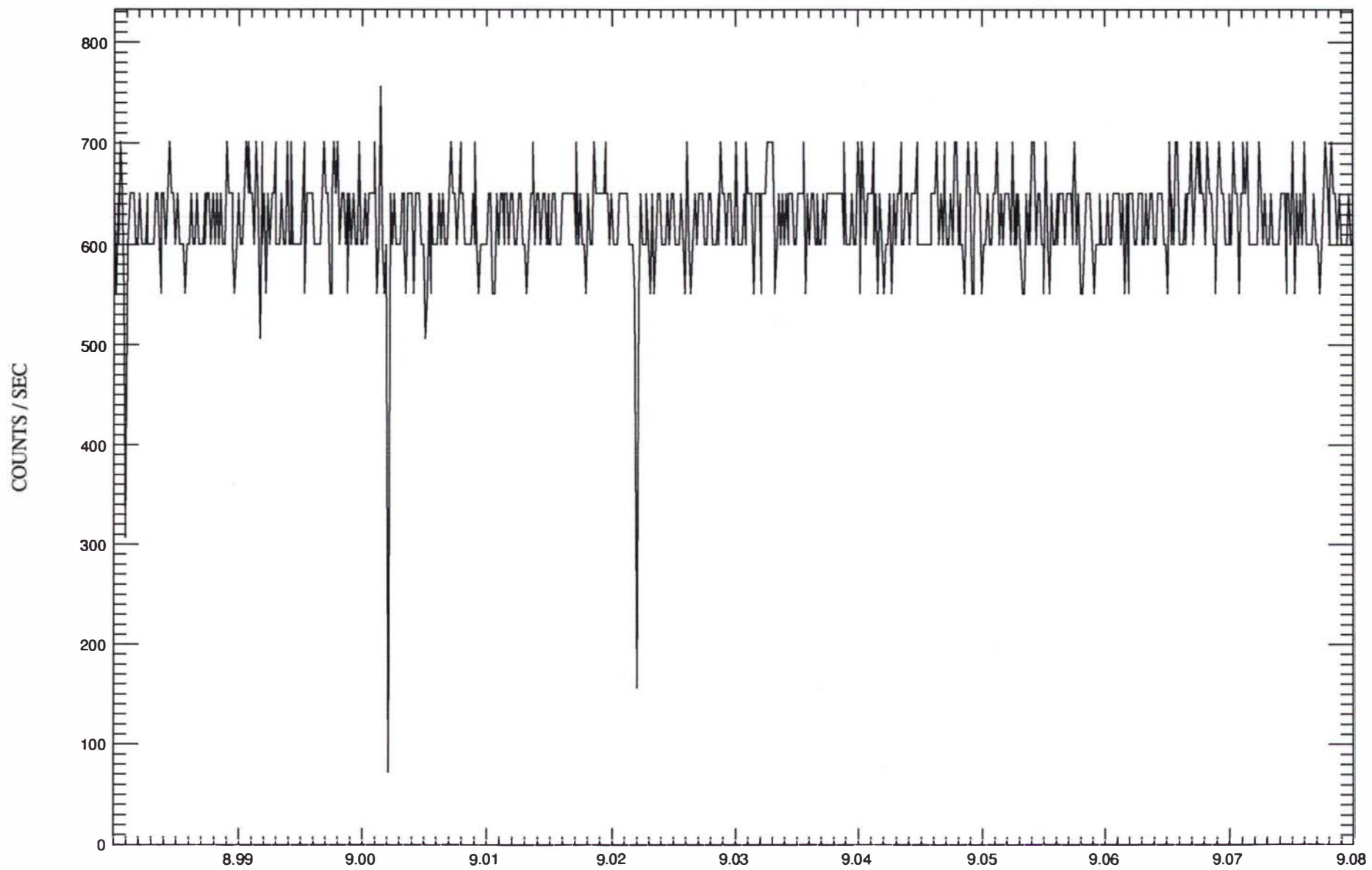
Burst Counter 3 at UT= 5.879649810791 h=21166.739 s 05:52:46.739



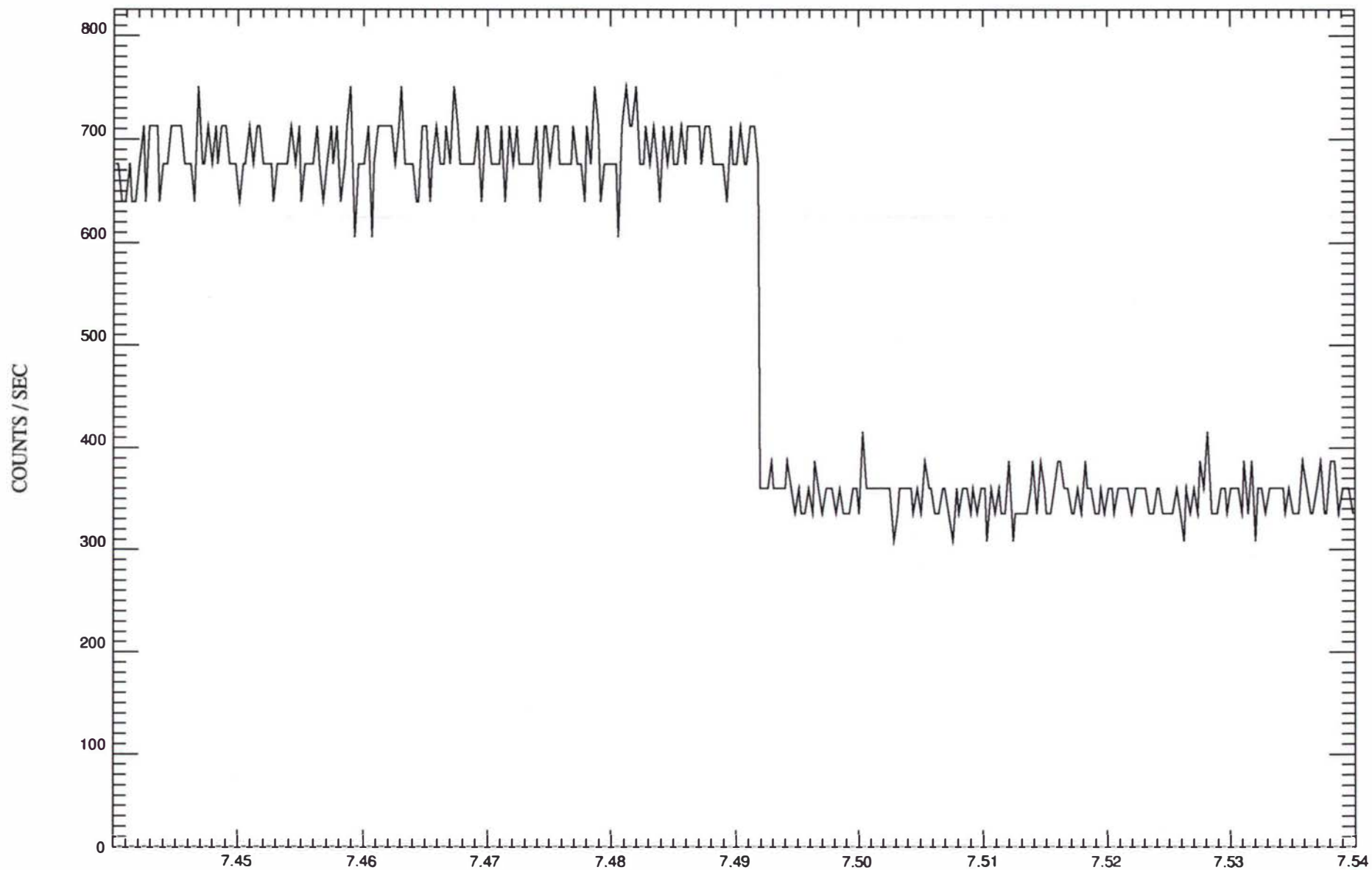
CALIBRATION DATA INCLUDED



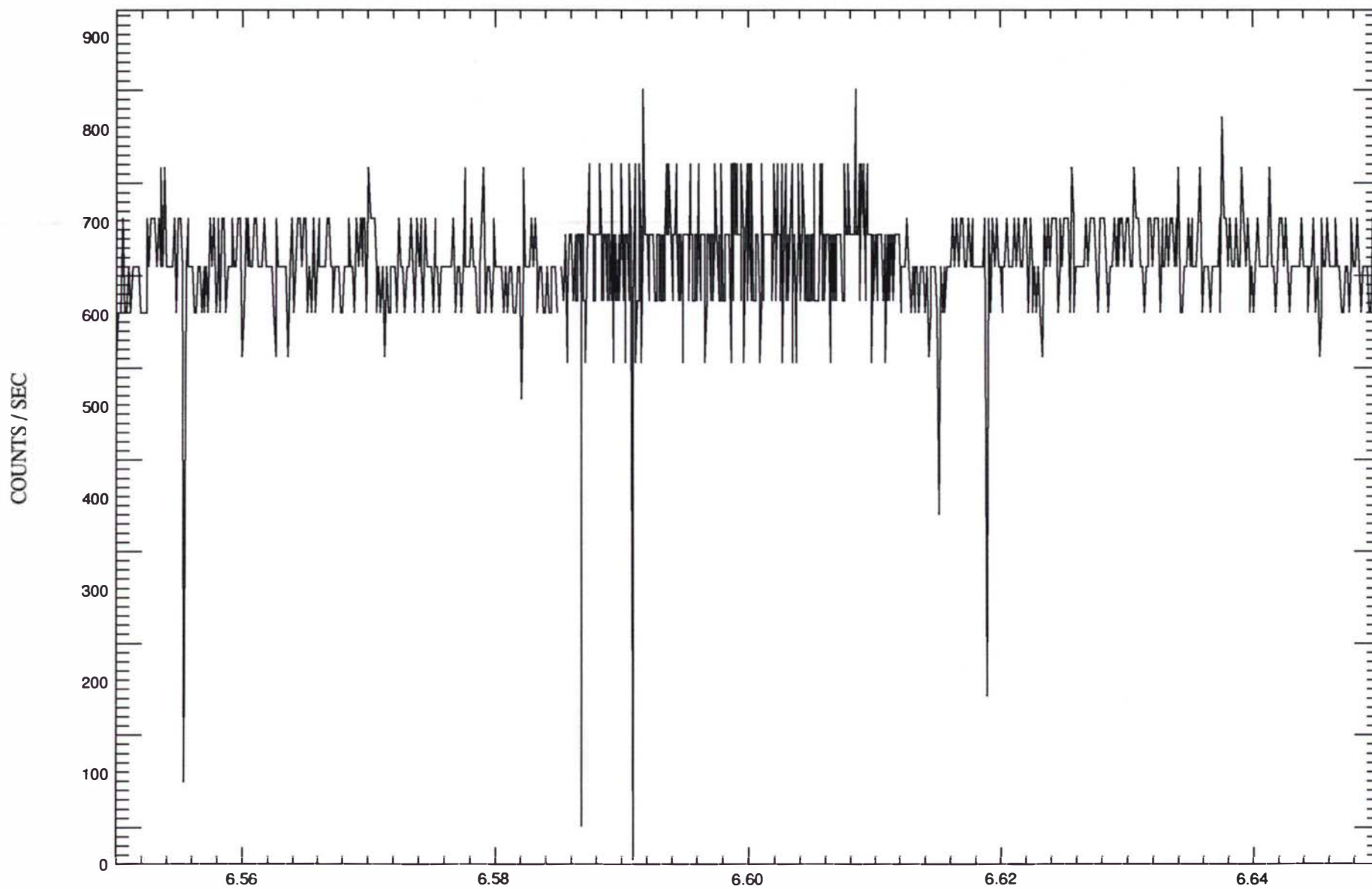
CALIBRATION DATA INCLUDED



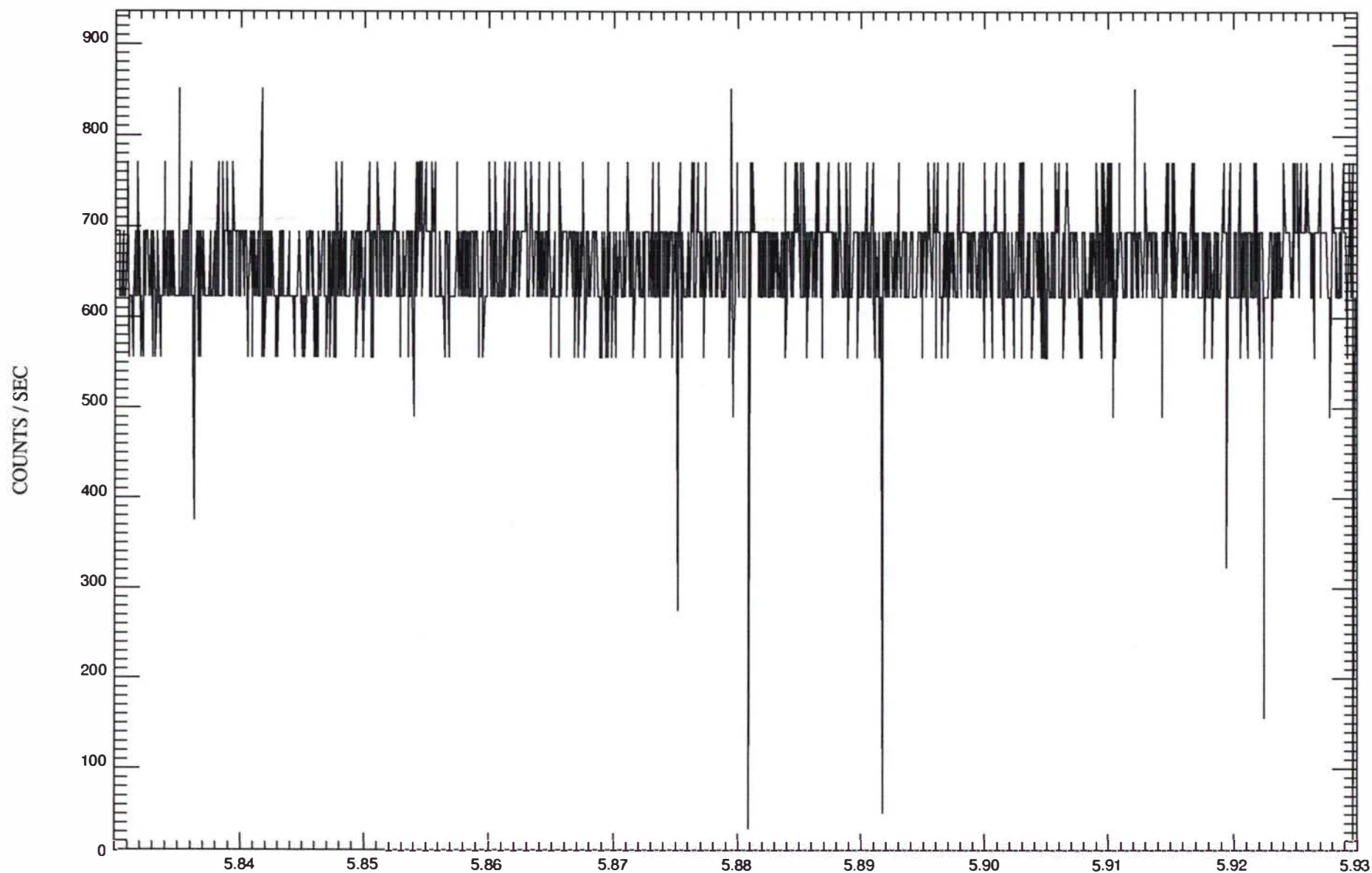
CALIBRATION DATA INCLUDED

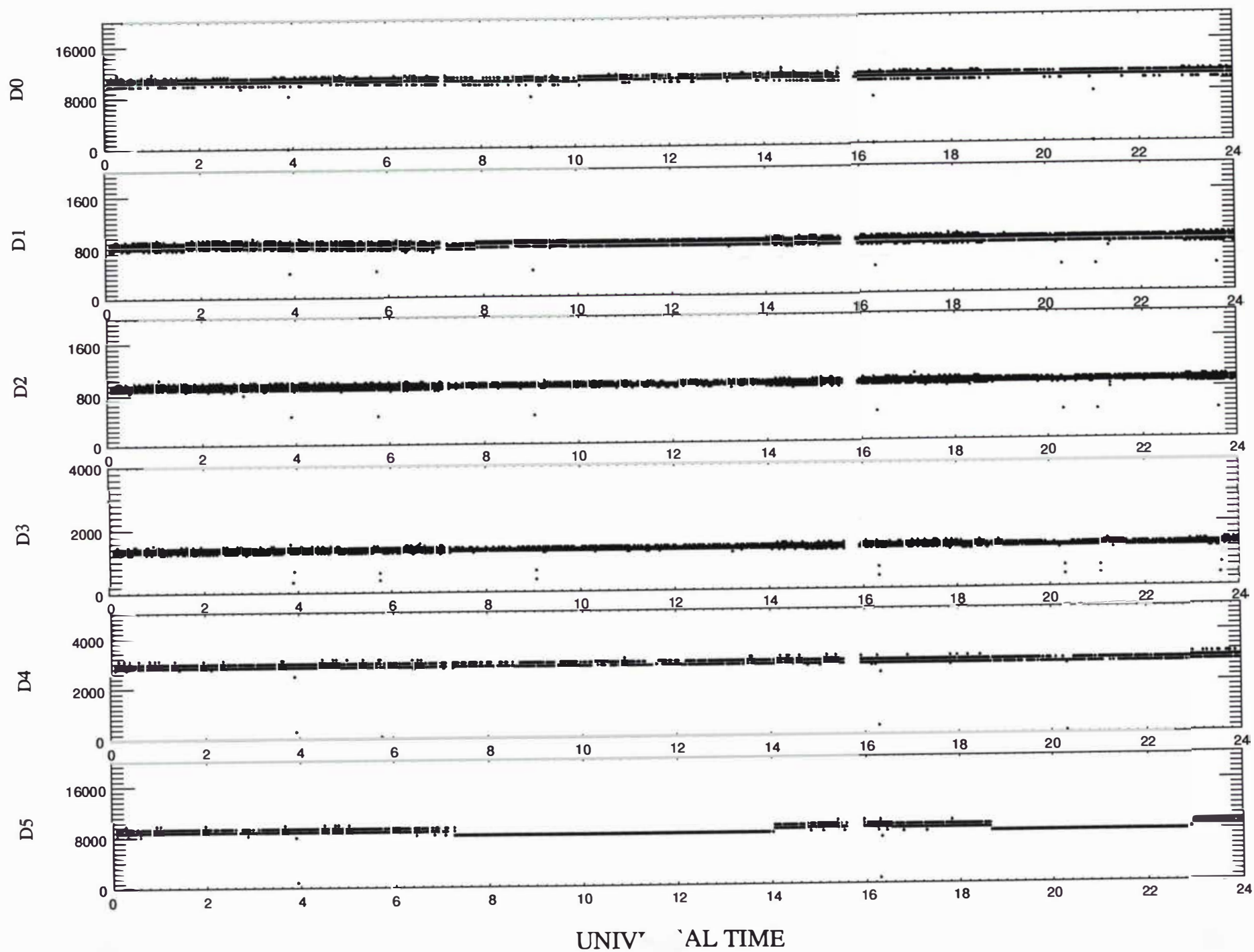


CALIBRATION DATA INCLUDED



CALIBRATION DATA INCLUDED





Solar Flares

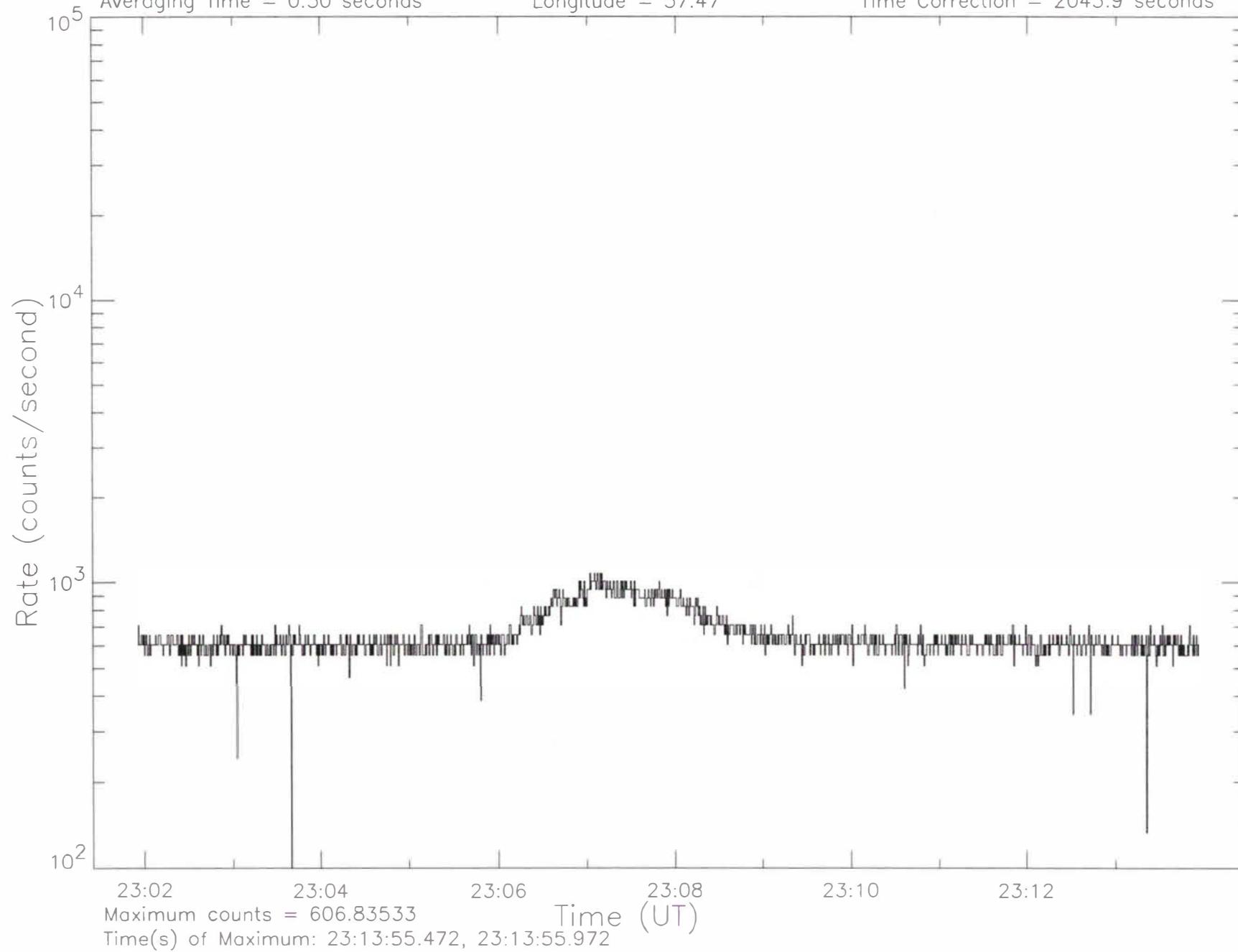
Ulysses

30 December 91

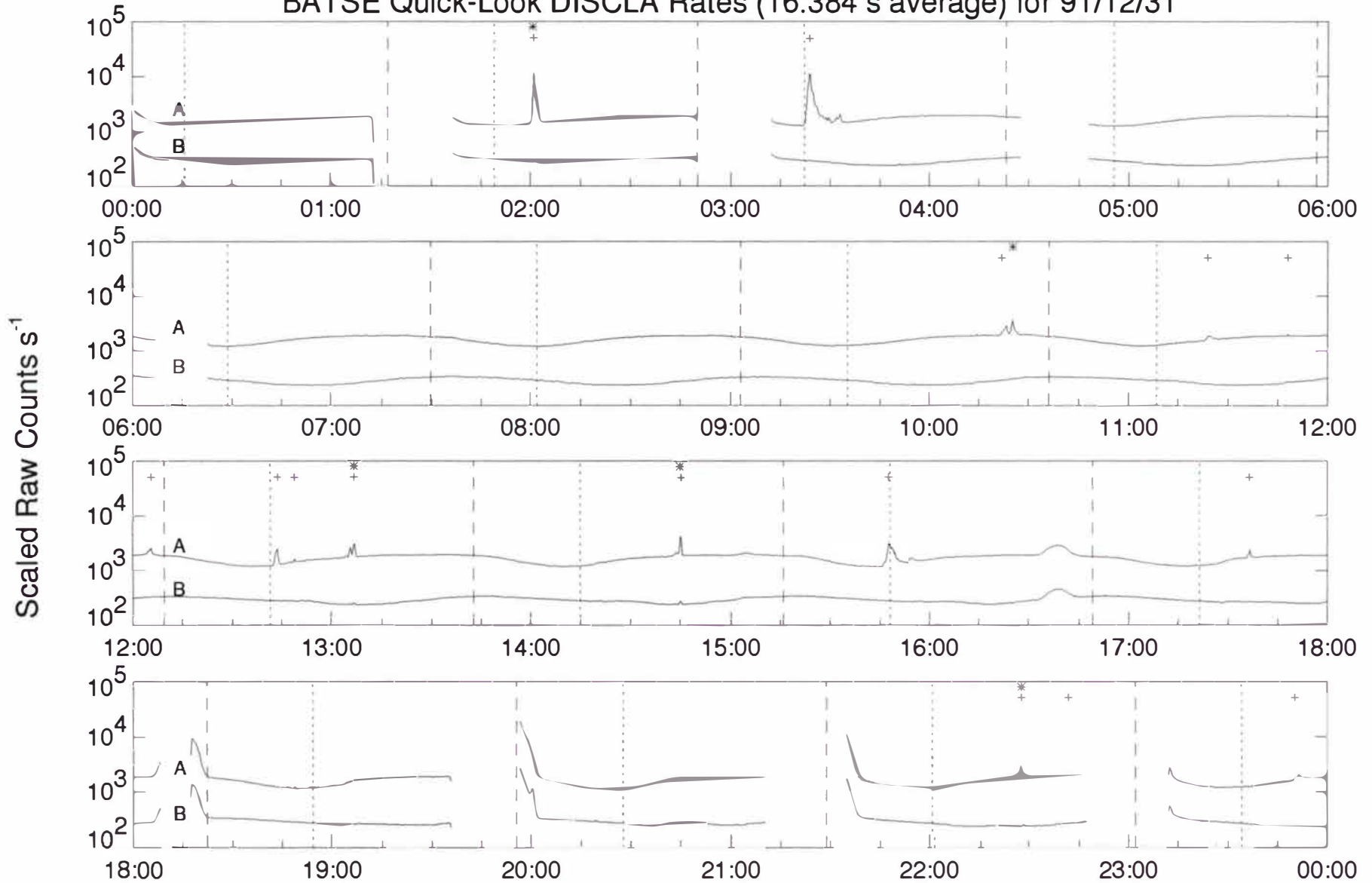
Averaging Time = 0.50 seconds

Longitude = 57.47

Time Correction = 2043.9 seconds



BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/31

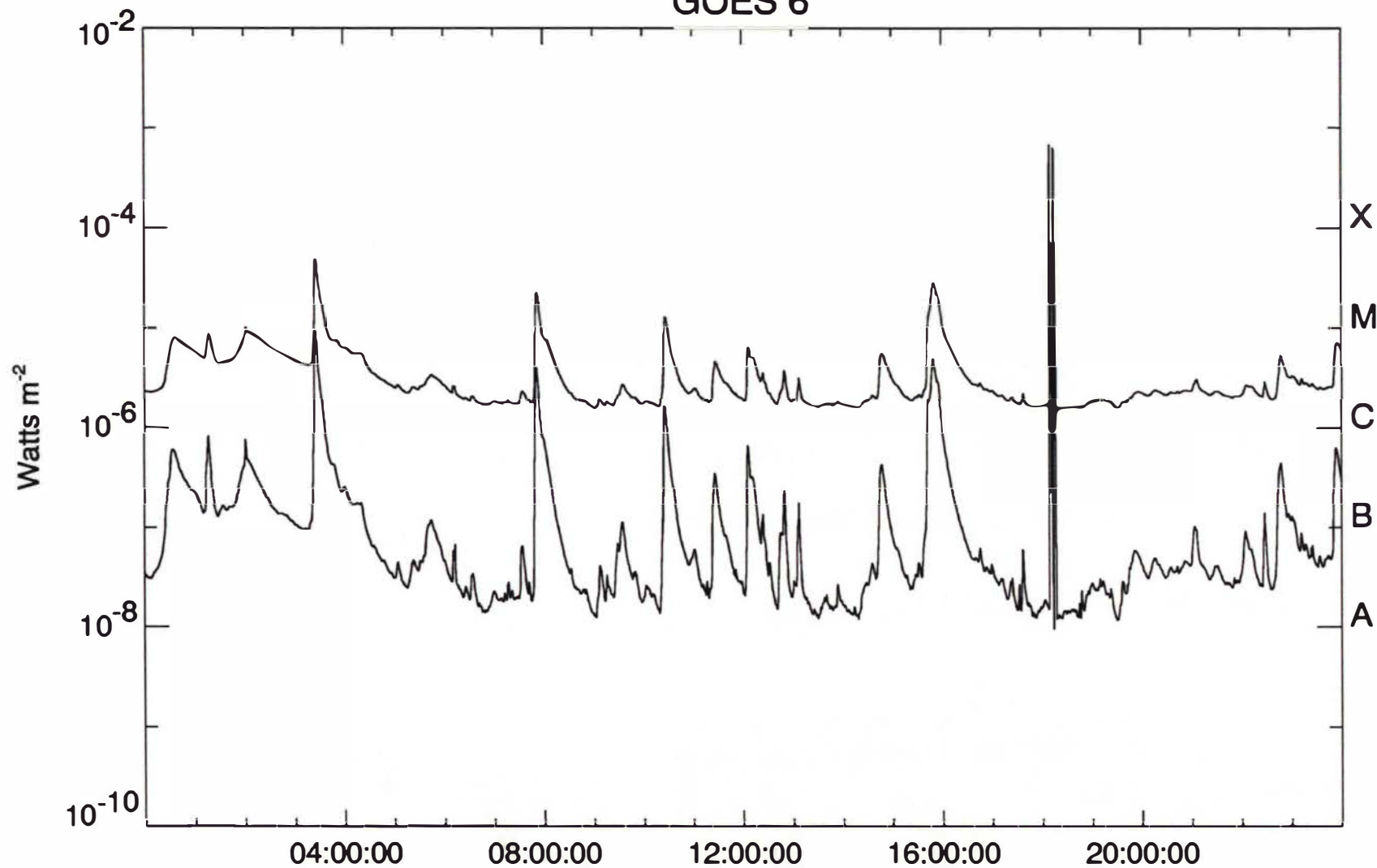


Current Time: 92/10/18, 1925 EDT
 A: Channel 1 Most Sunward LAD
 B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

GOES 6



Data Start: 91/12/31, 0000:02

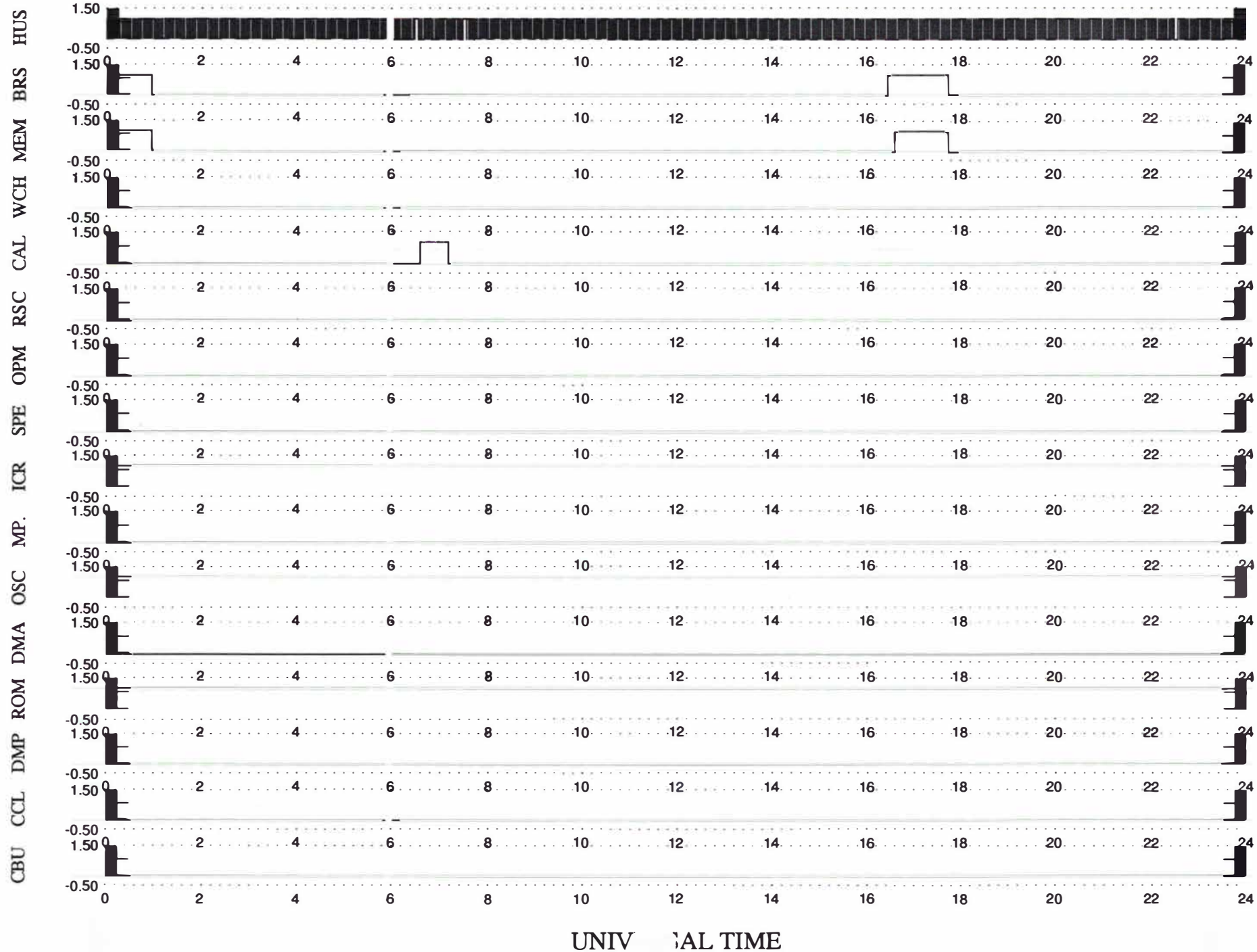
Plot created: 97/10/20, 1628

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

BURST NUMBER 11



THE FUTURE OF THE FUTURE

1000

11:10

STRENGTH

PM?

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72
73
74
75

30

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1. $\vec{a}$

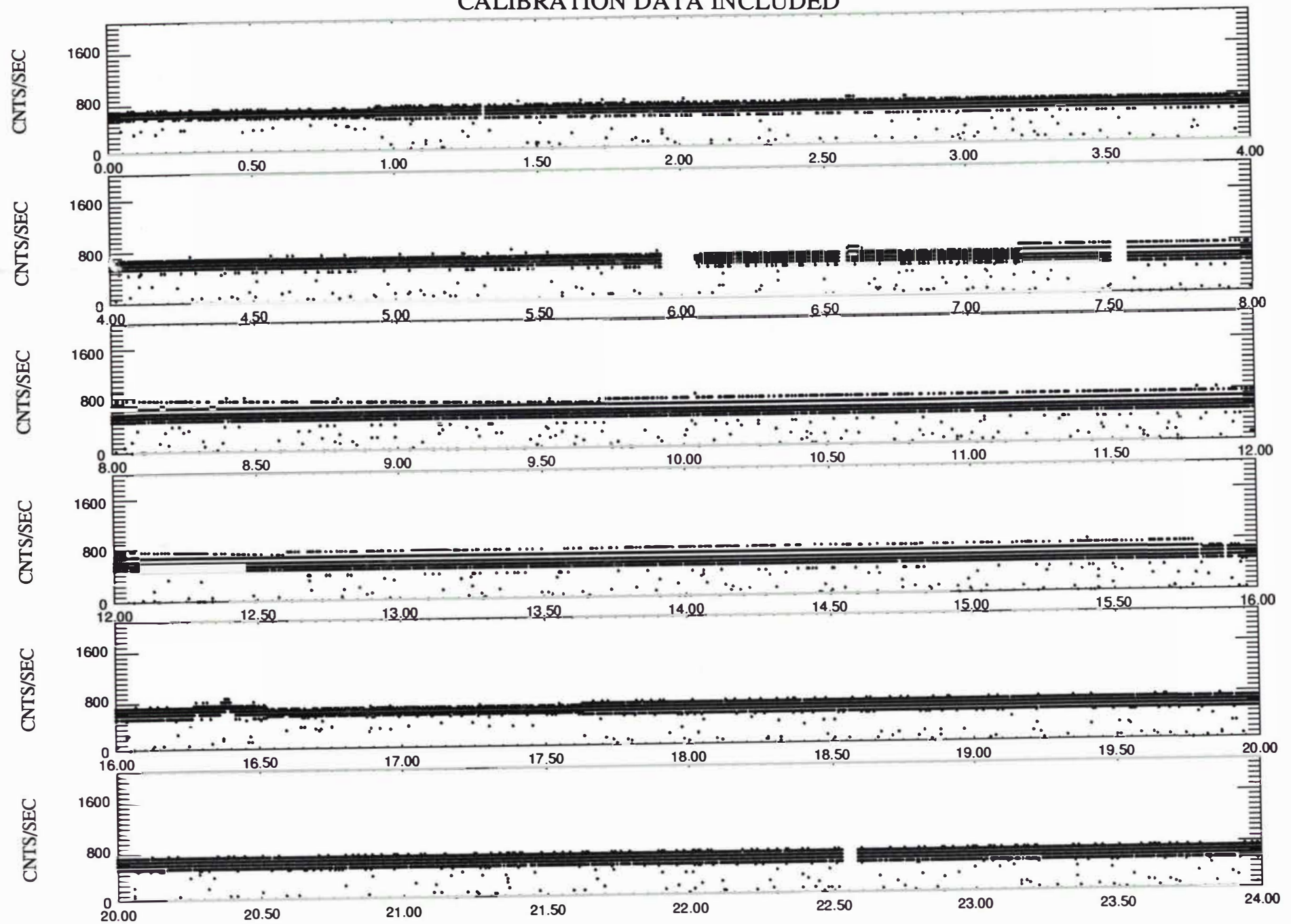
0000

5

2

12

CALIBRATION DATA INCLUDED



UNIV AL TIME

100-5-1

100-5-1

100-5-1

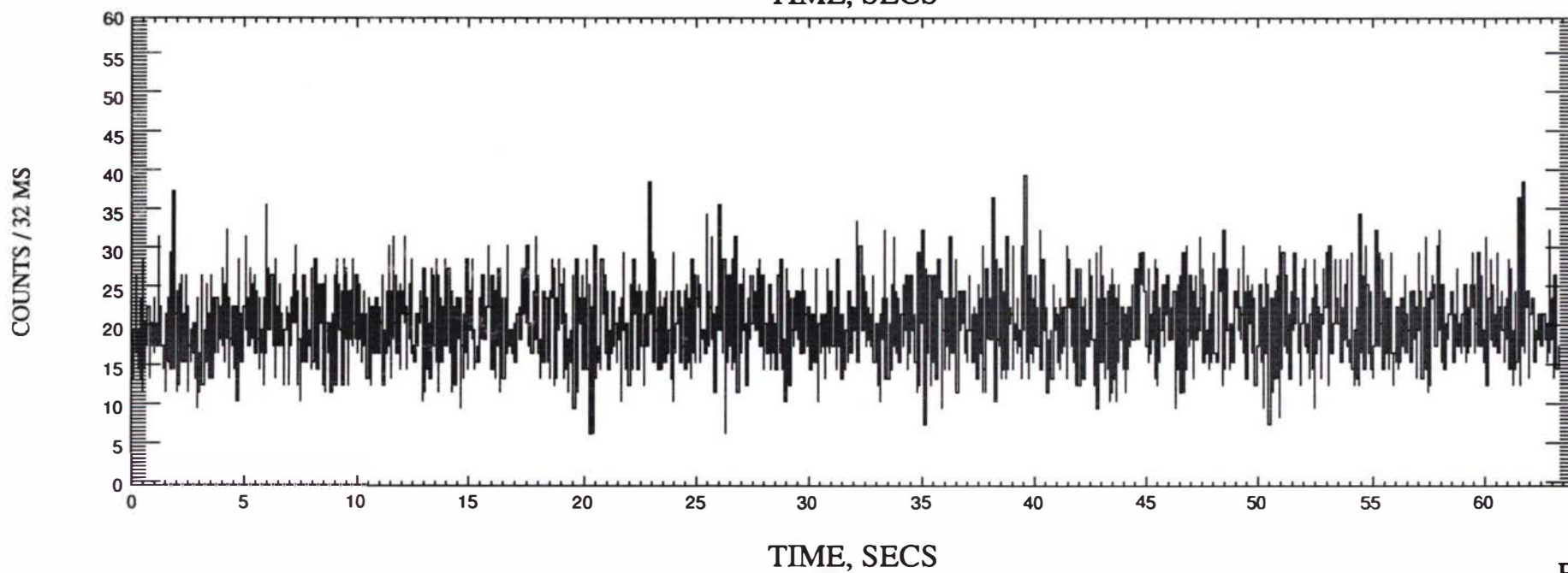
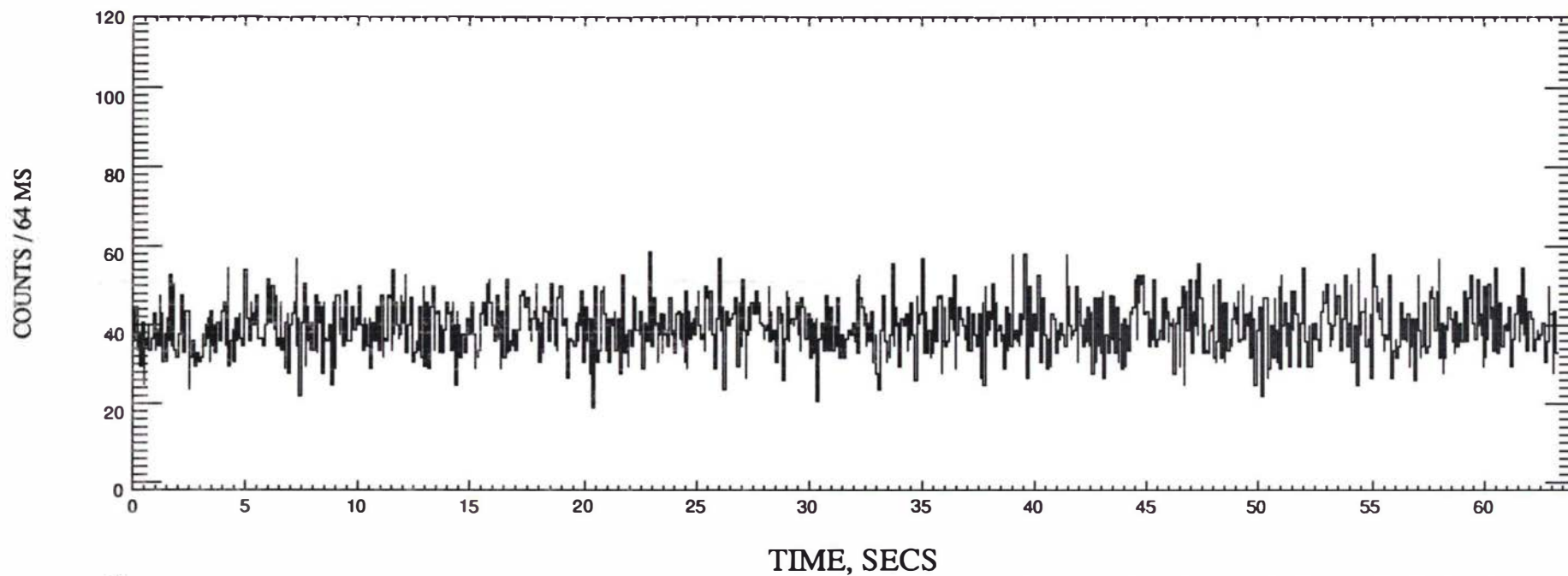
100-5-1

100-5-1

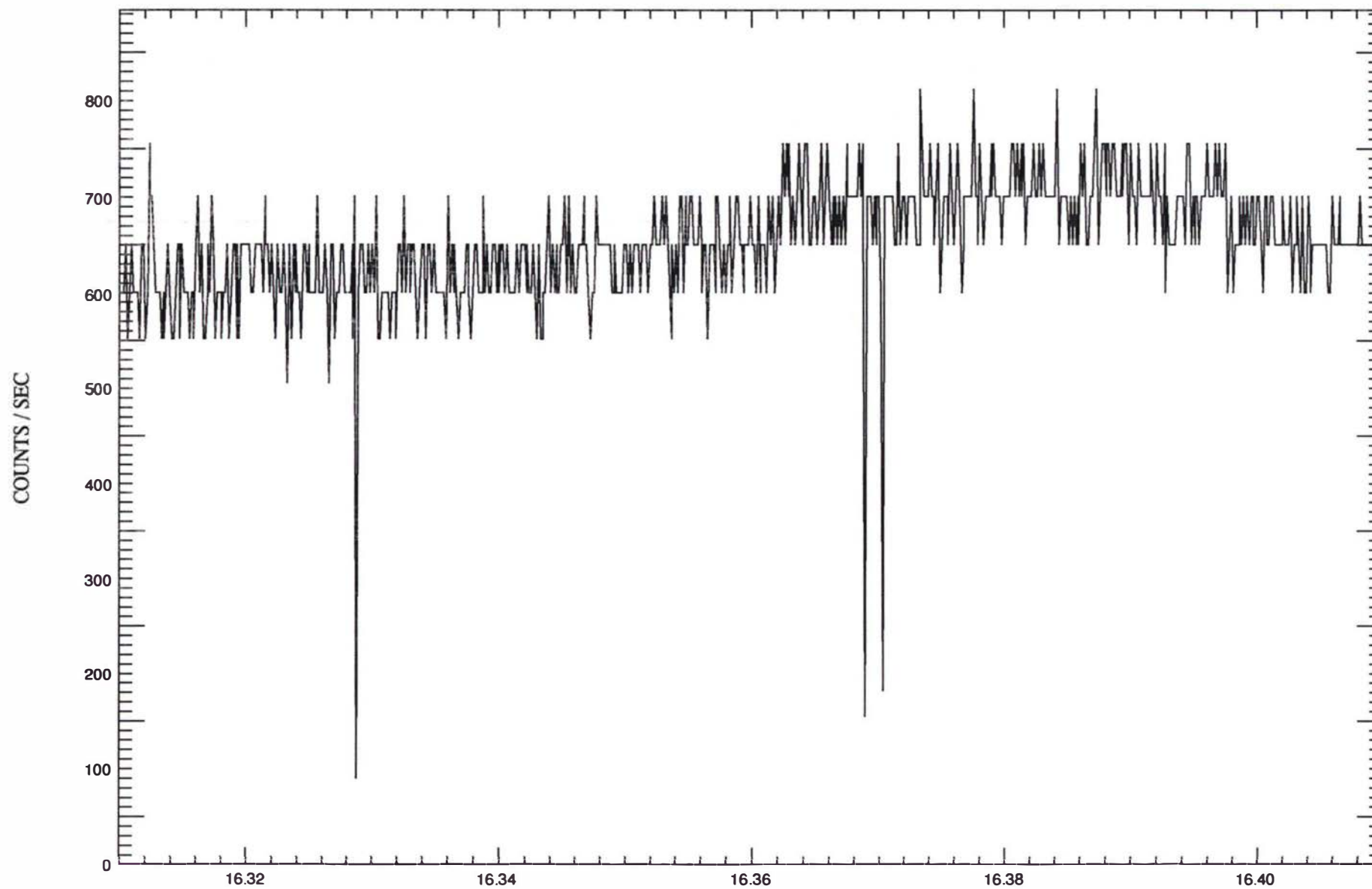
100-5-1

100-5-1

Burst Counter 11 at UT=16.363211949666 h=58907.563 s 16:21:47.563



CALIBRATION DATA INCLUDED



α

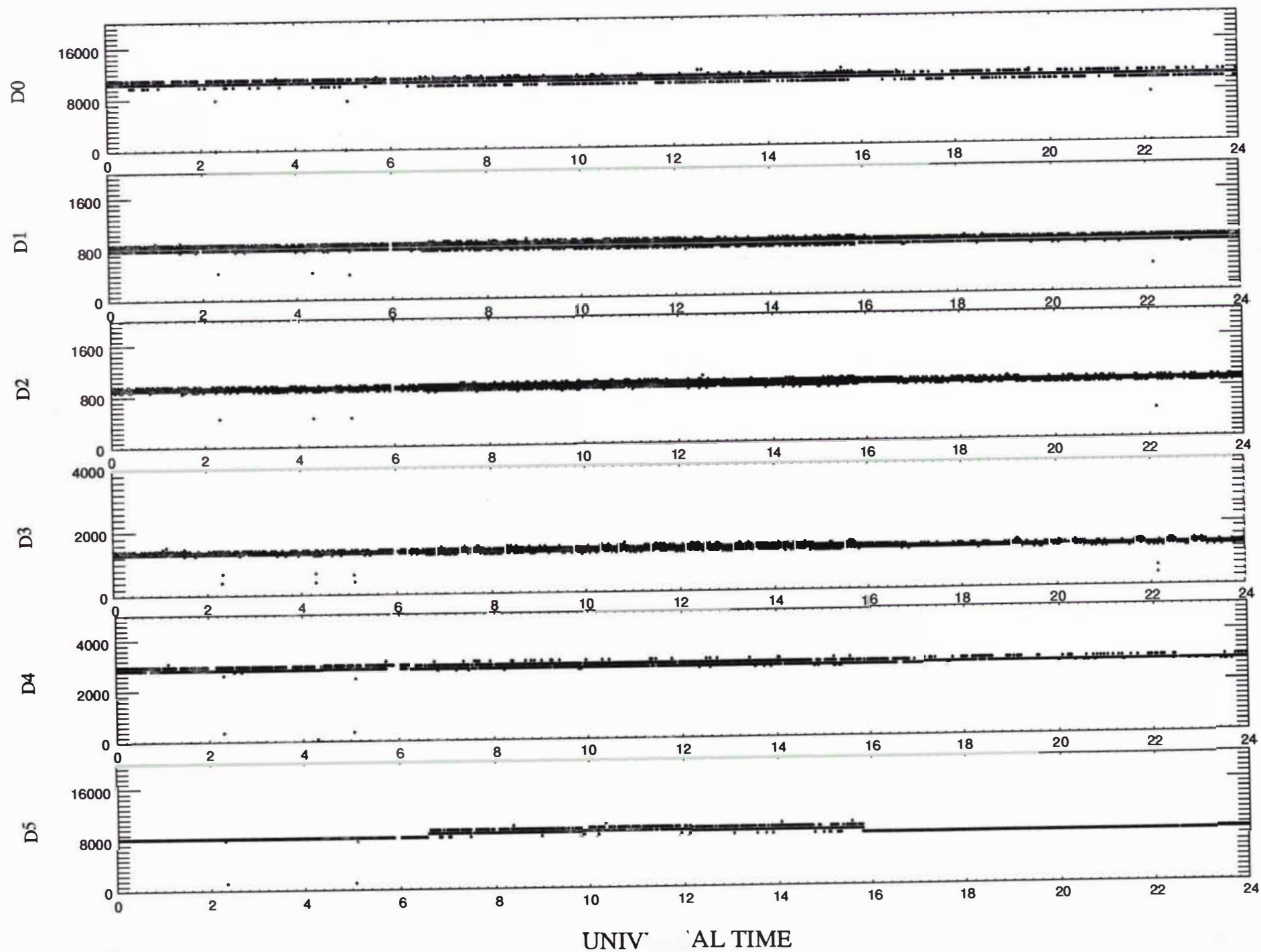
41

1570

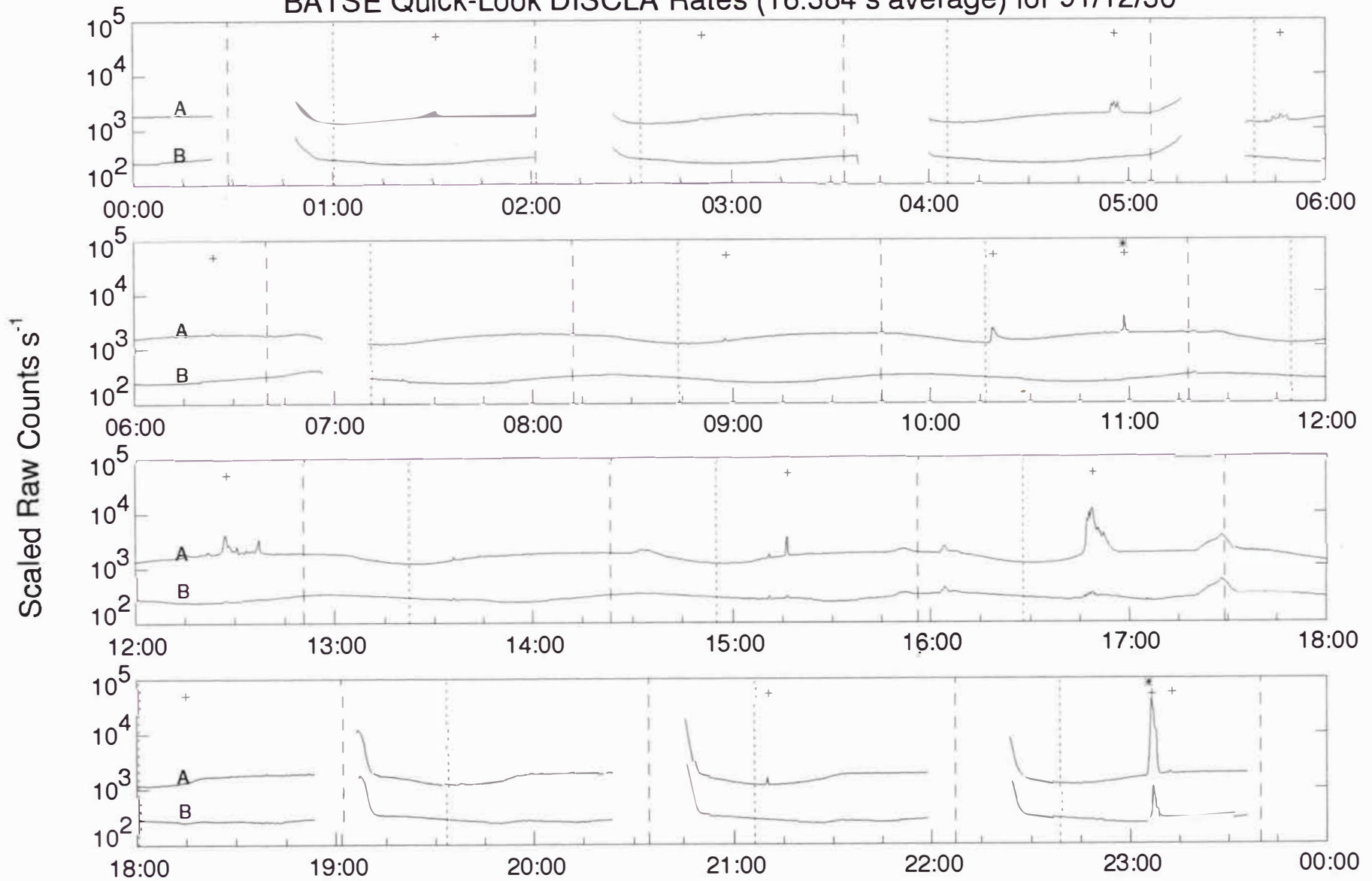
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2000

121102



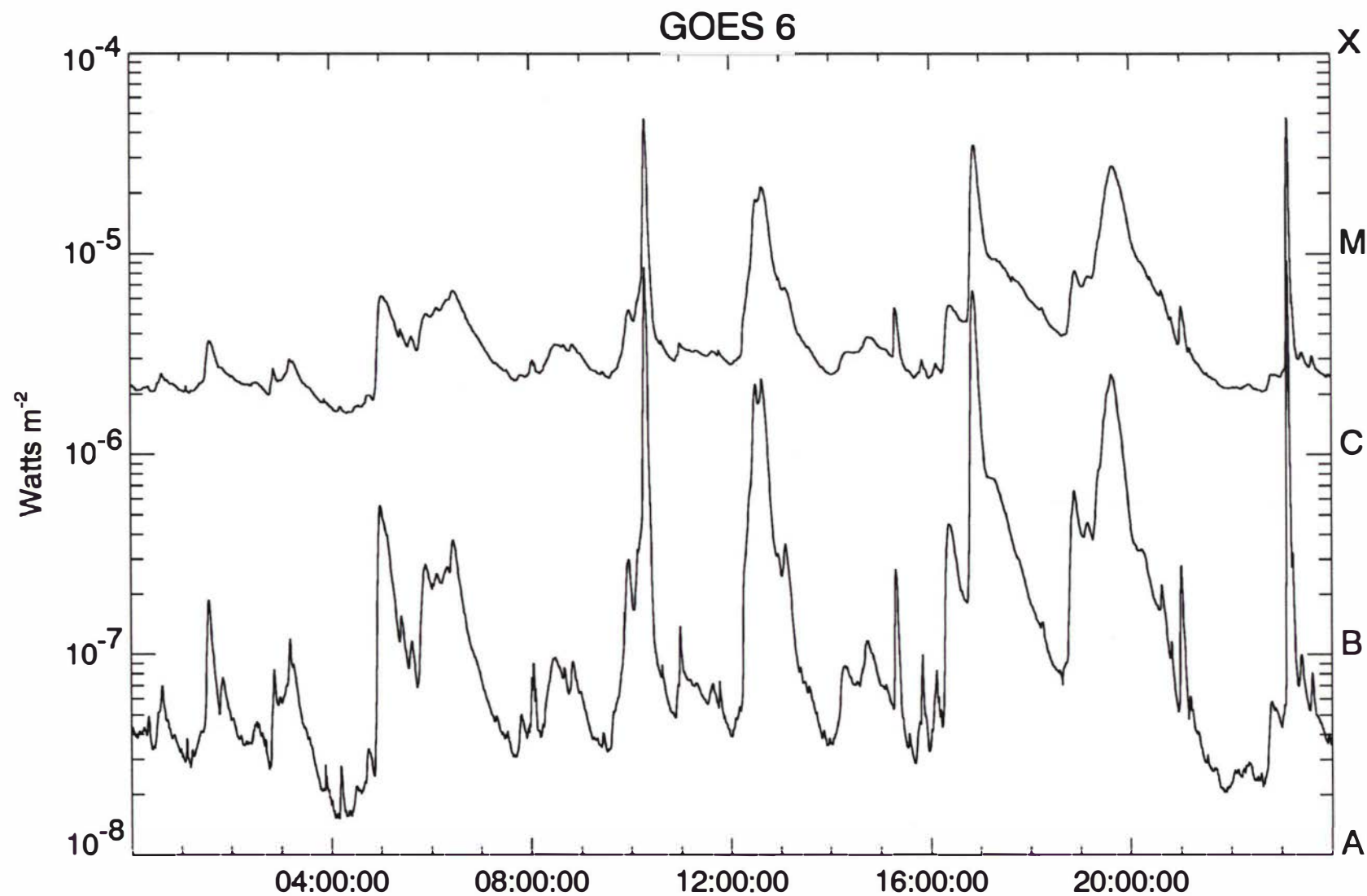
BATSE Quick-Look DISCLA Rates (16.384 s average) for 91/12/30



Current Time: 92/10/18, 1924 EDT
 A: Channel 1 Most Sunward LAD
 B: Sum Channel 1 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare



Data Start: 91/12/30, 0000:01

Plot created: 97/10/20, 1623

Channel

1 (1.0 - 8.0 Angstroms)

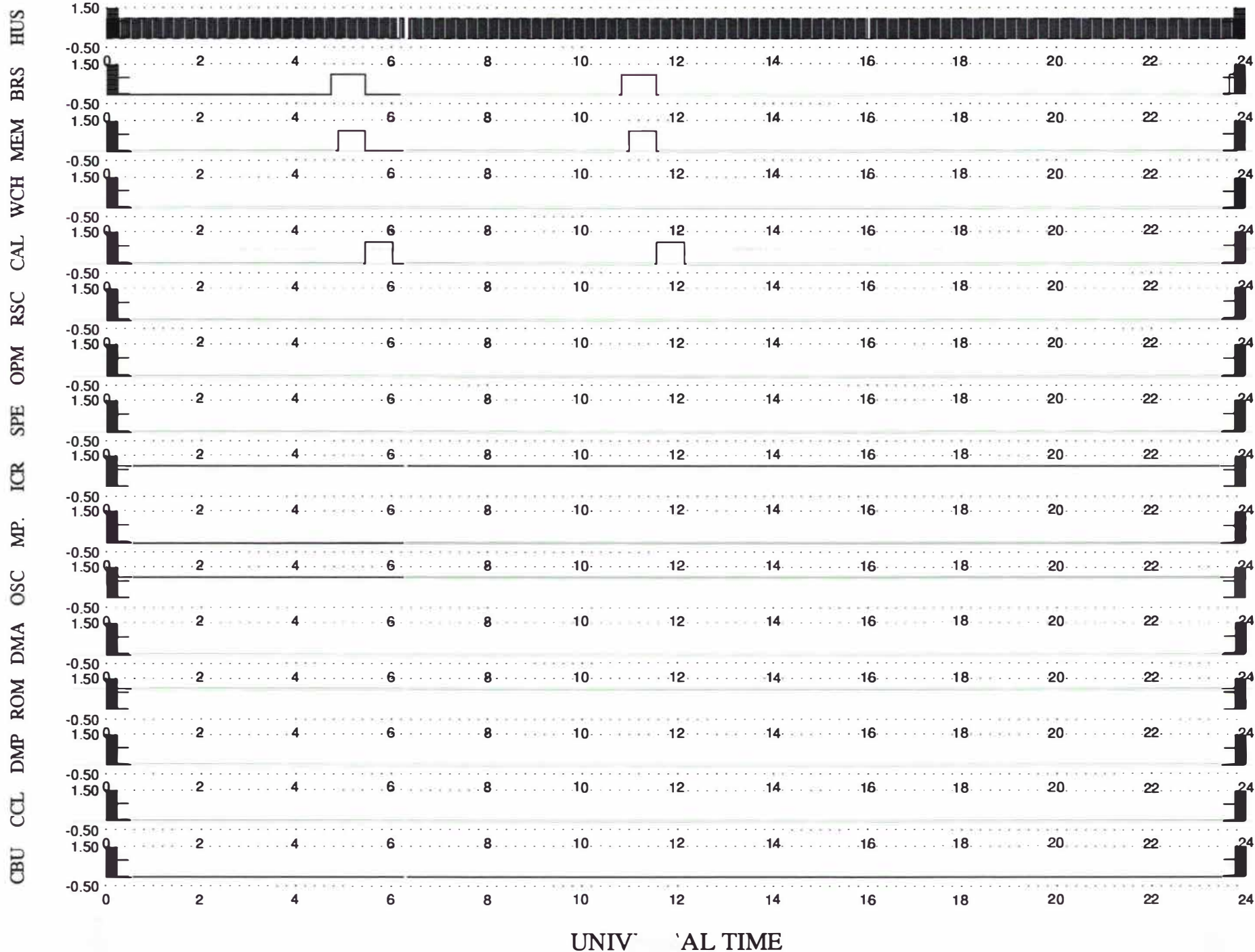
Background not subtracted

2 (0.5 - 4.0 Angstroms)

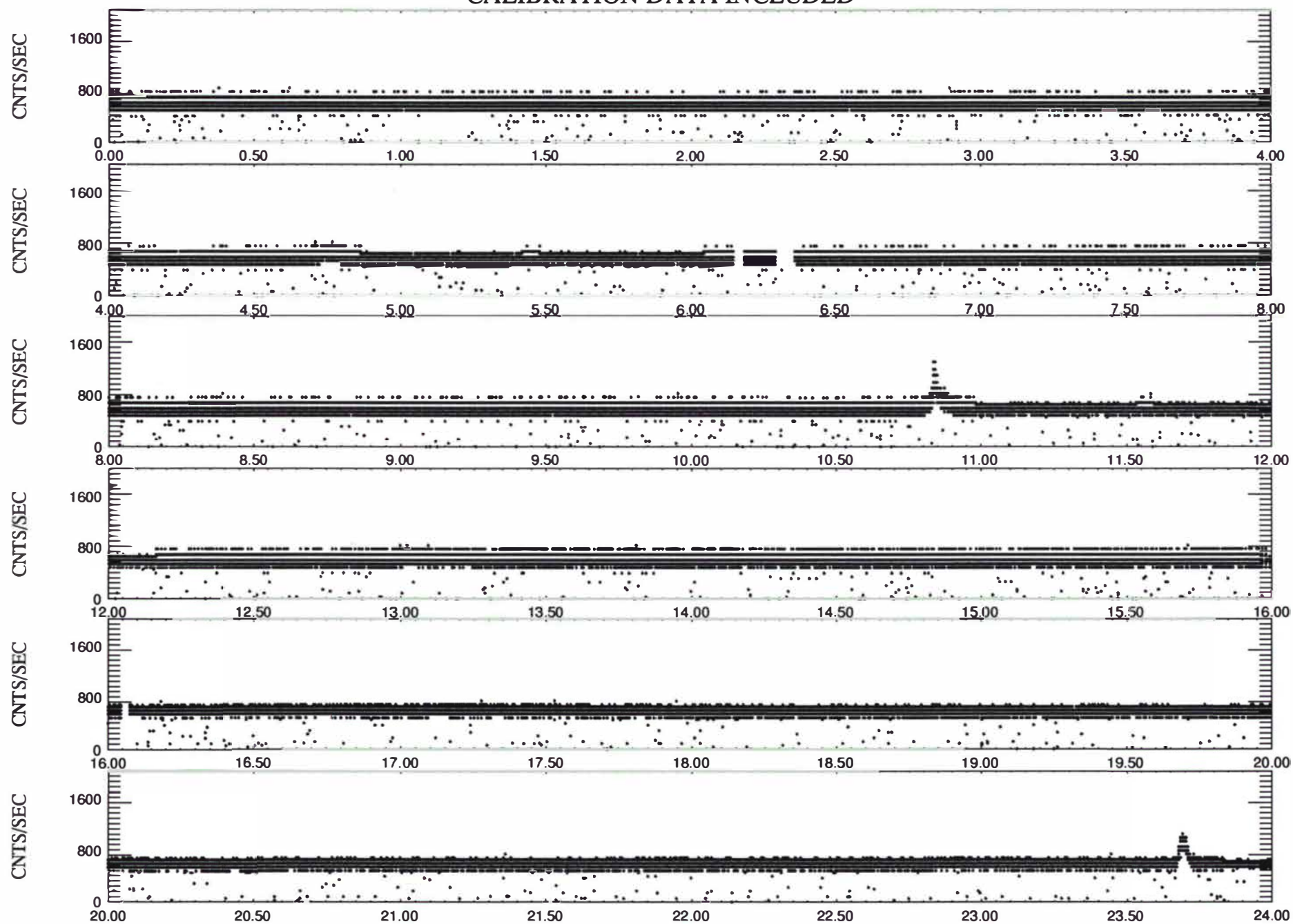
Background not subtracted

Sample average = 10

BURST NUMBER 8 - 10

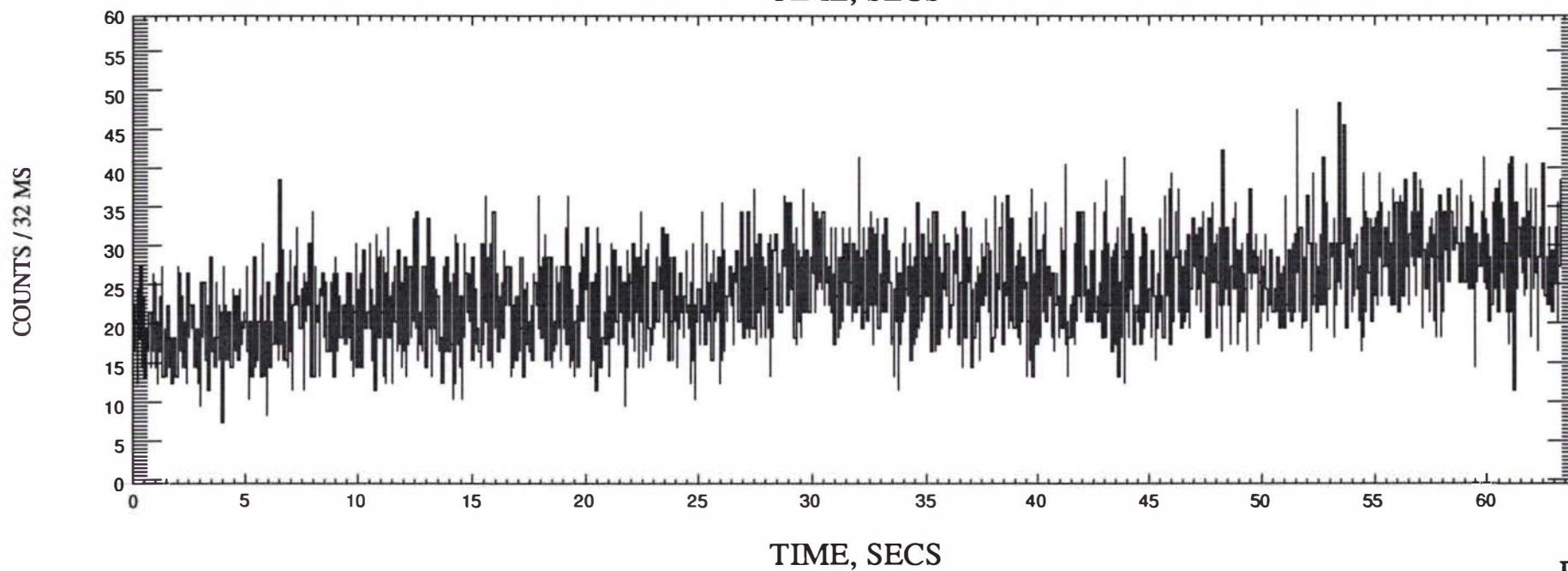
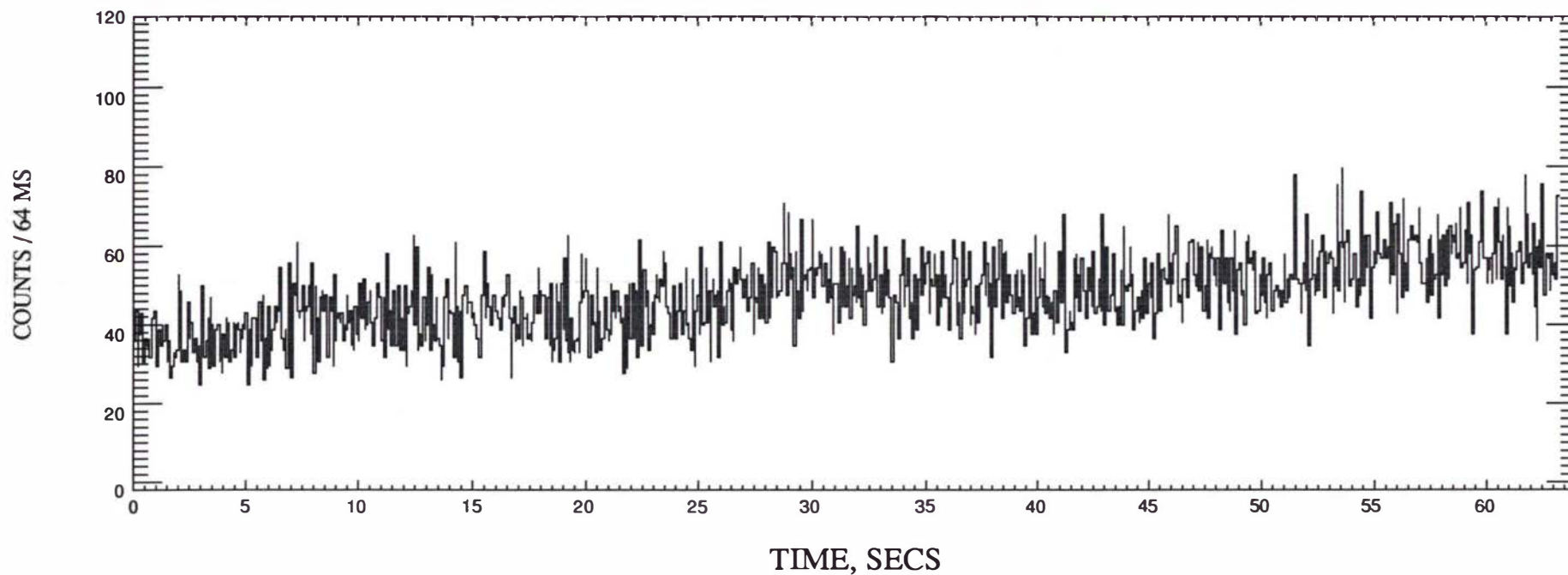


CALIBRATION DATA INCLUDED

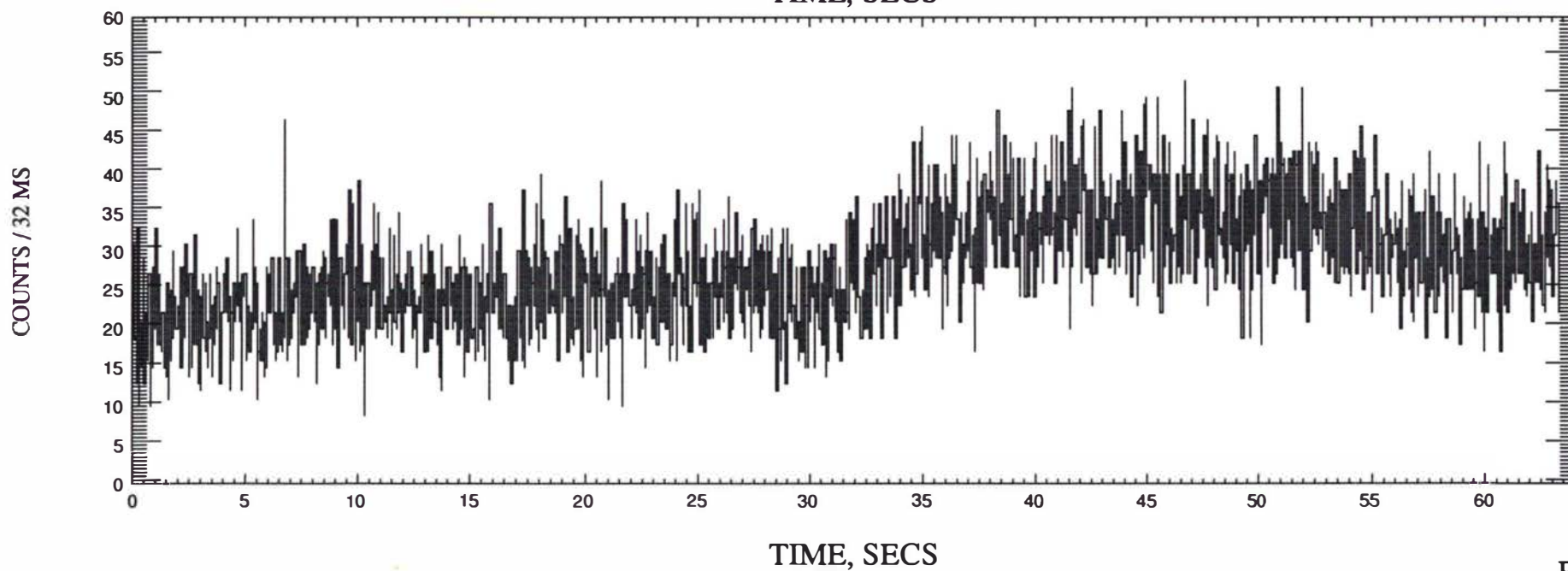
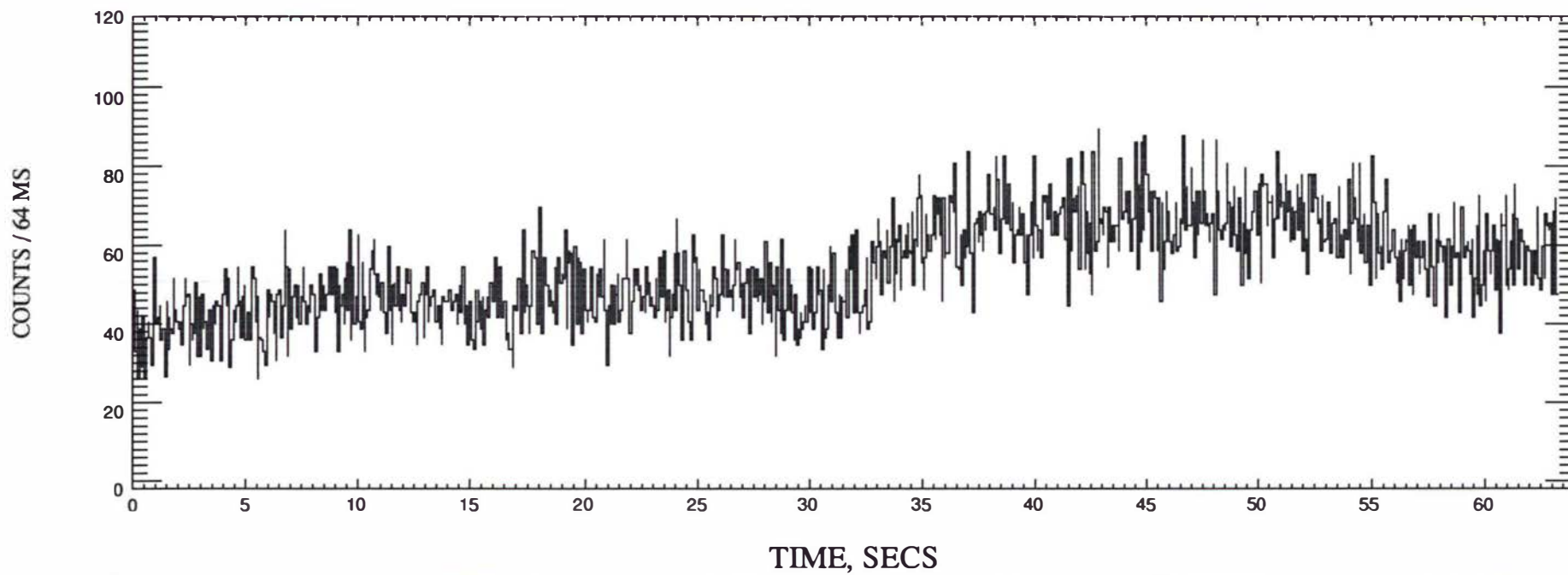


UNIV AL TIME

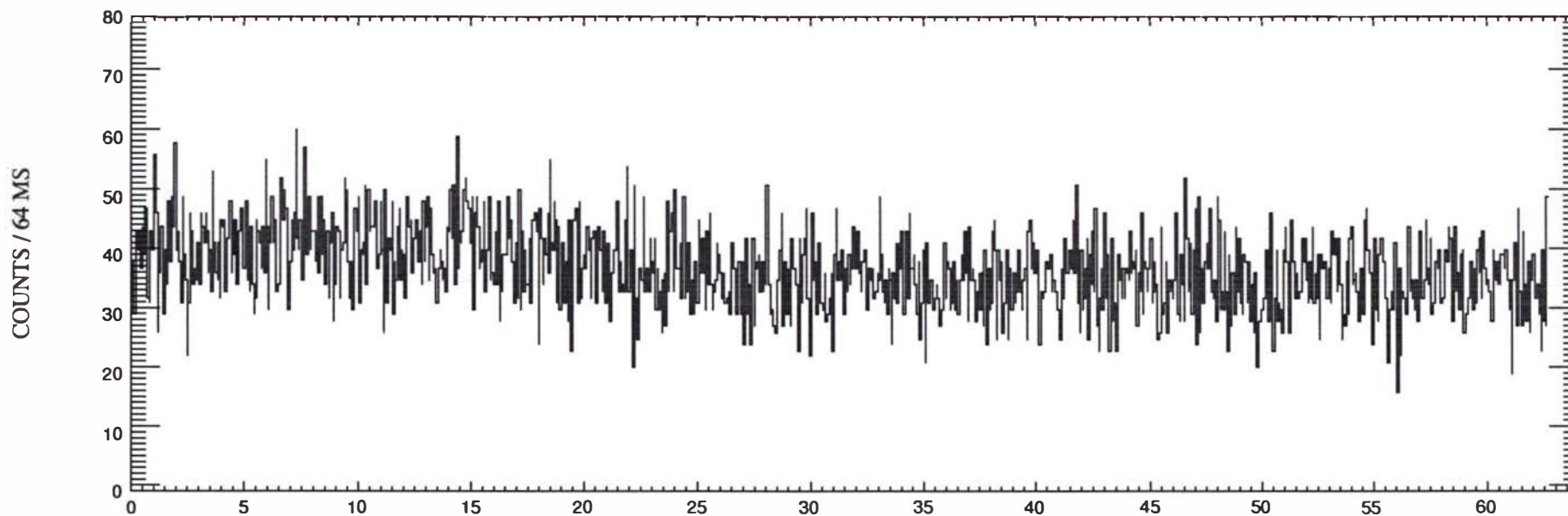
Burst Counter 10 at UT=23.672088406881 h=85219.518 s 23:40:19.518



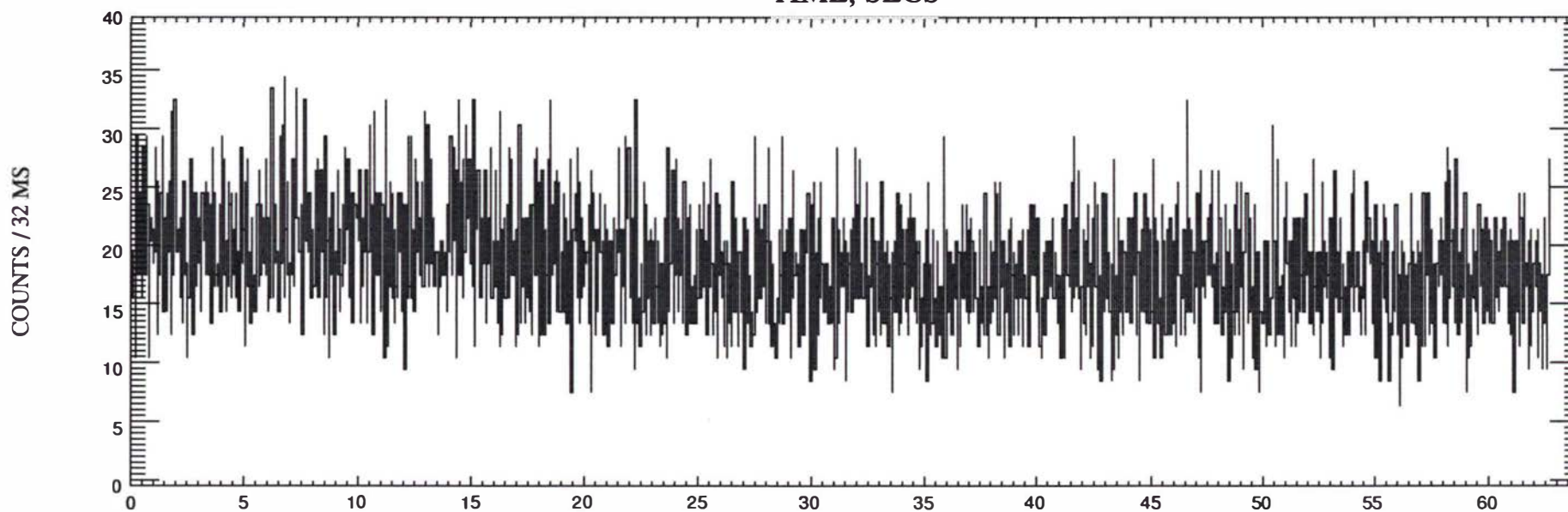
Burst Counter 9 at UT=10.826182700263 h=38974.258 s 10:49:34.258



Burst Counter 8 at UT= 4.710940377977 h=16959.385 s 04:42:39.385

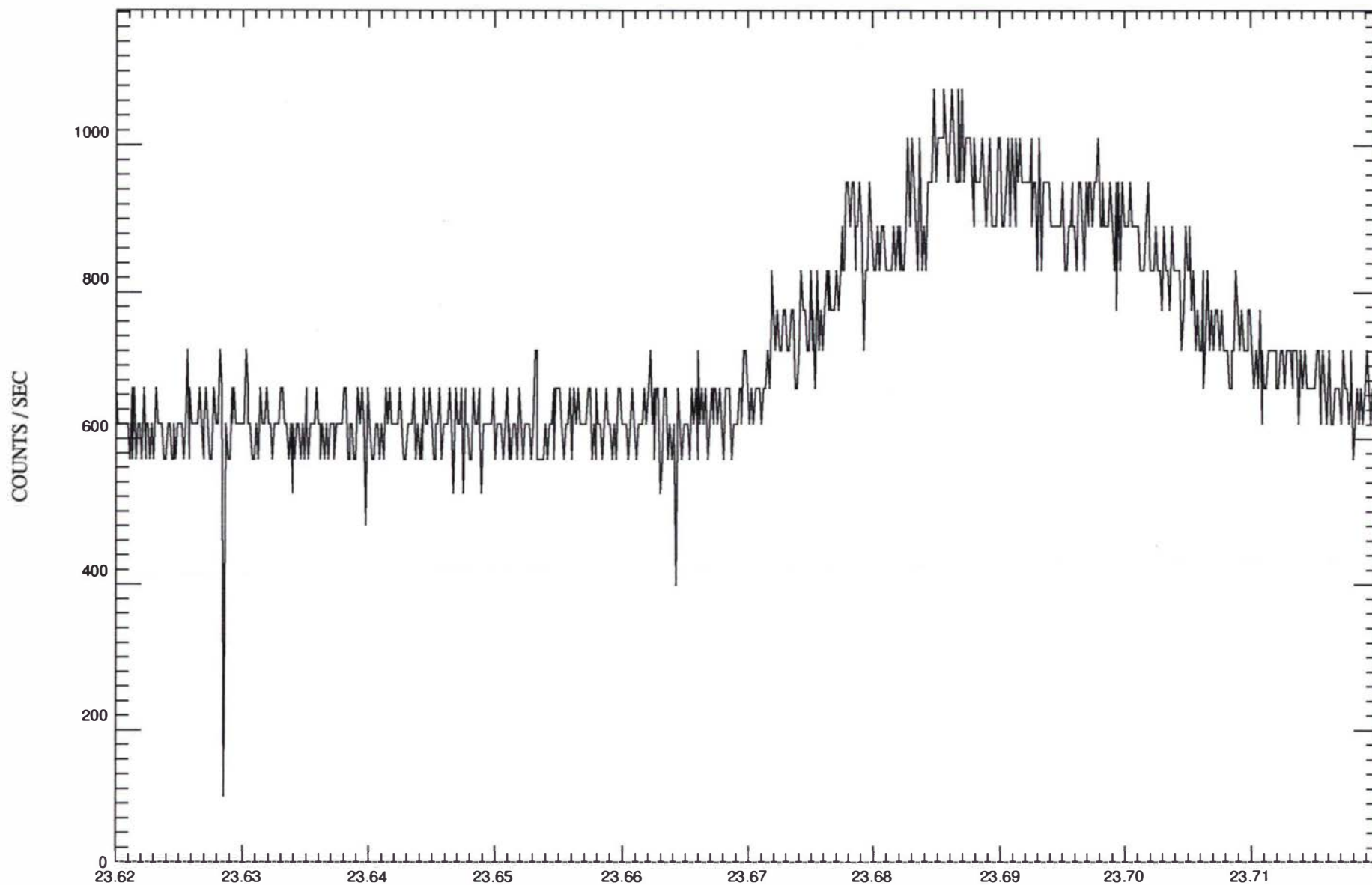


TIME, SECS

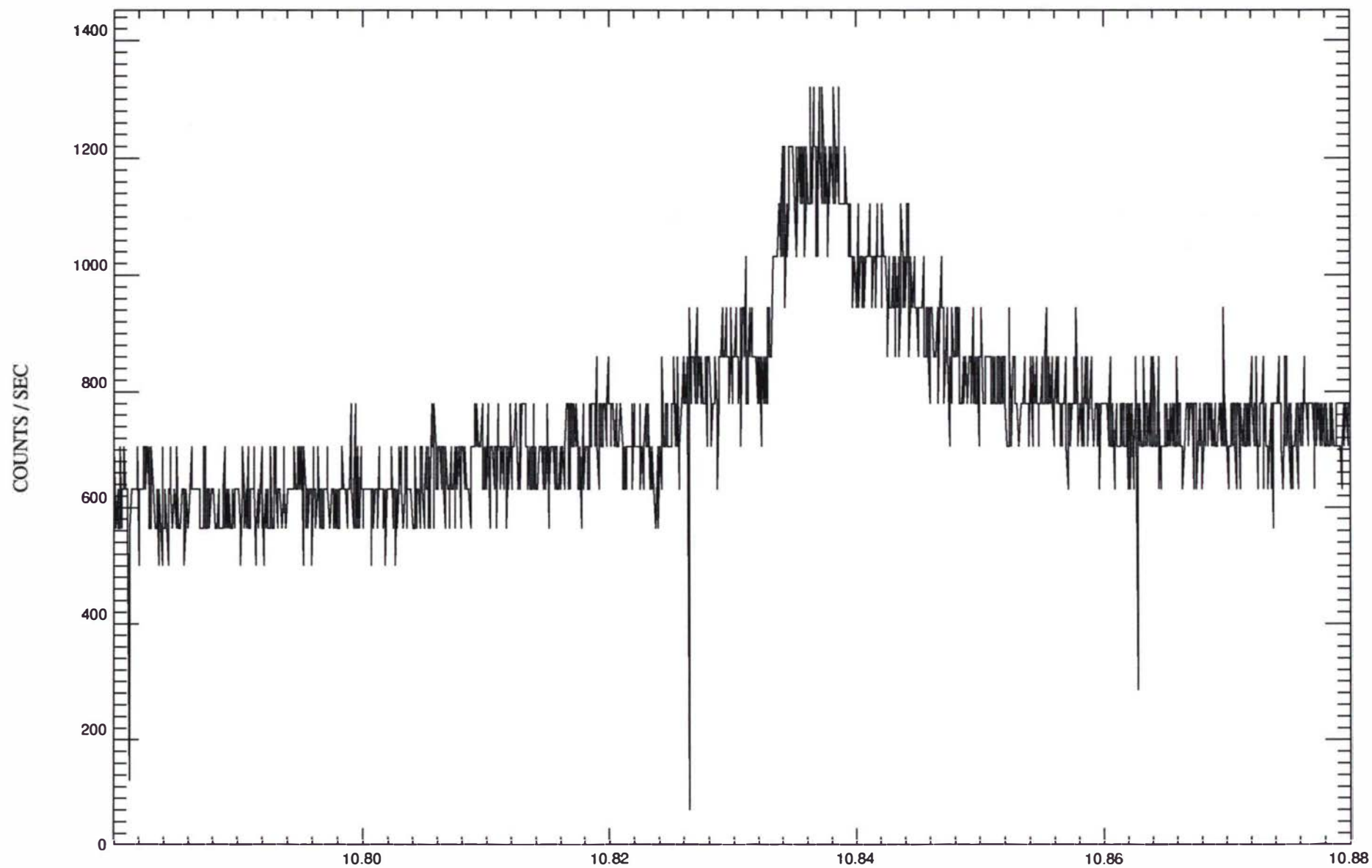


TIME, SECS

CALIBRATION DATA INCLUDED



CALIBRATION DATA INCLUDED



CALIBRATION DATA INCLUDED

