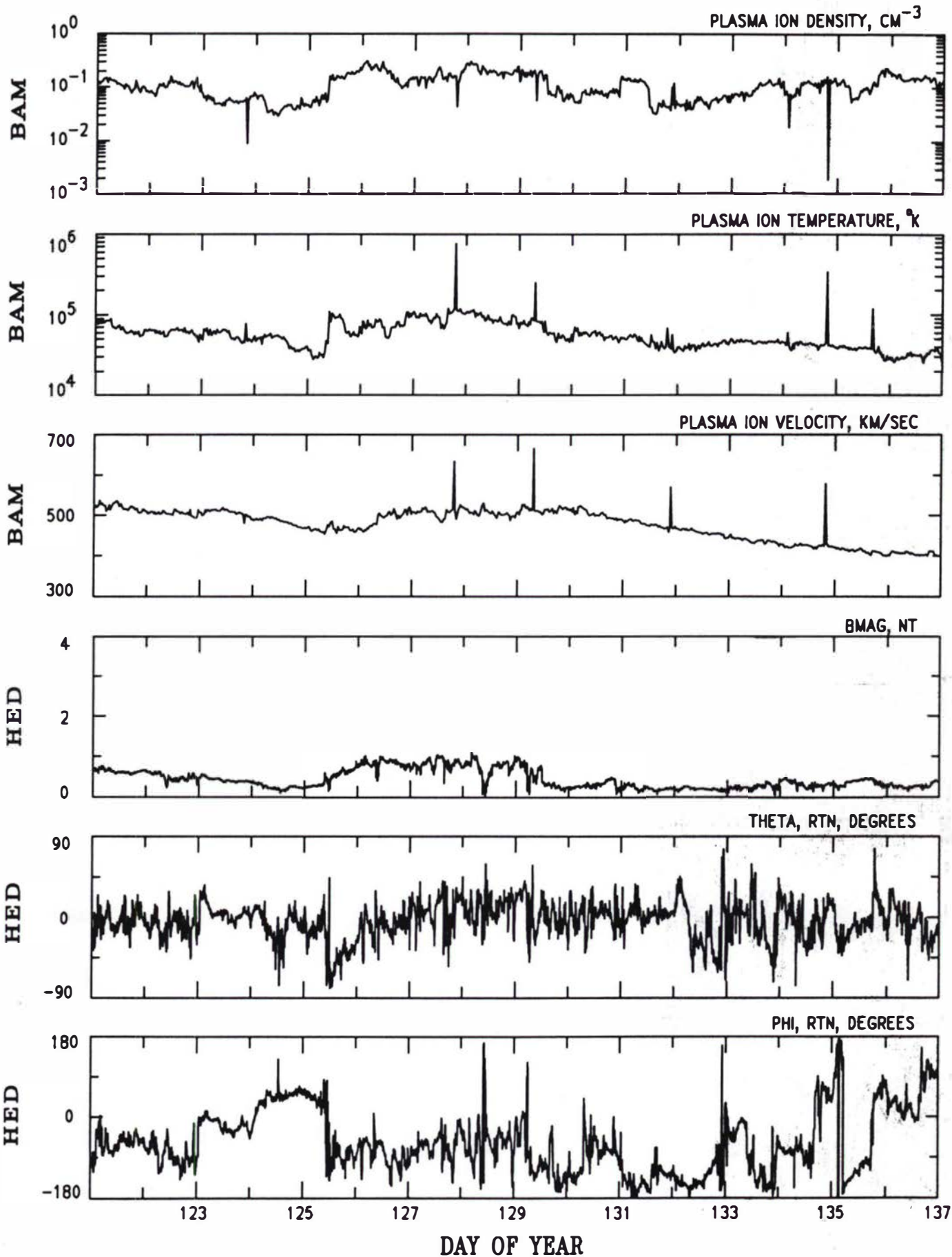


ULYSSES CDR - SOLAR WIND PLASMA AND MAGNETIC FIELD

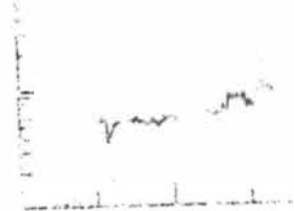
97 121 MAY 1 00:00:00.000 - 97 137 MAY 17 00:00:00.000



1000



1000



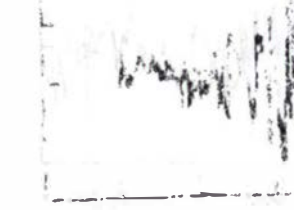
1000



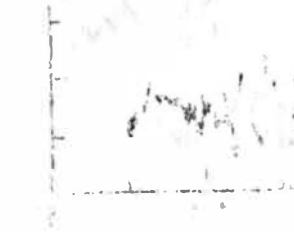
1000



1000

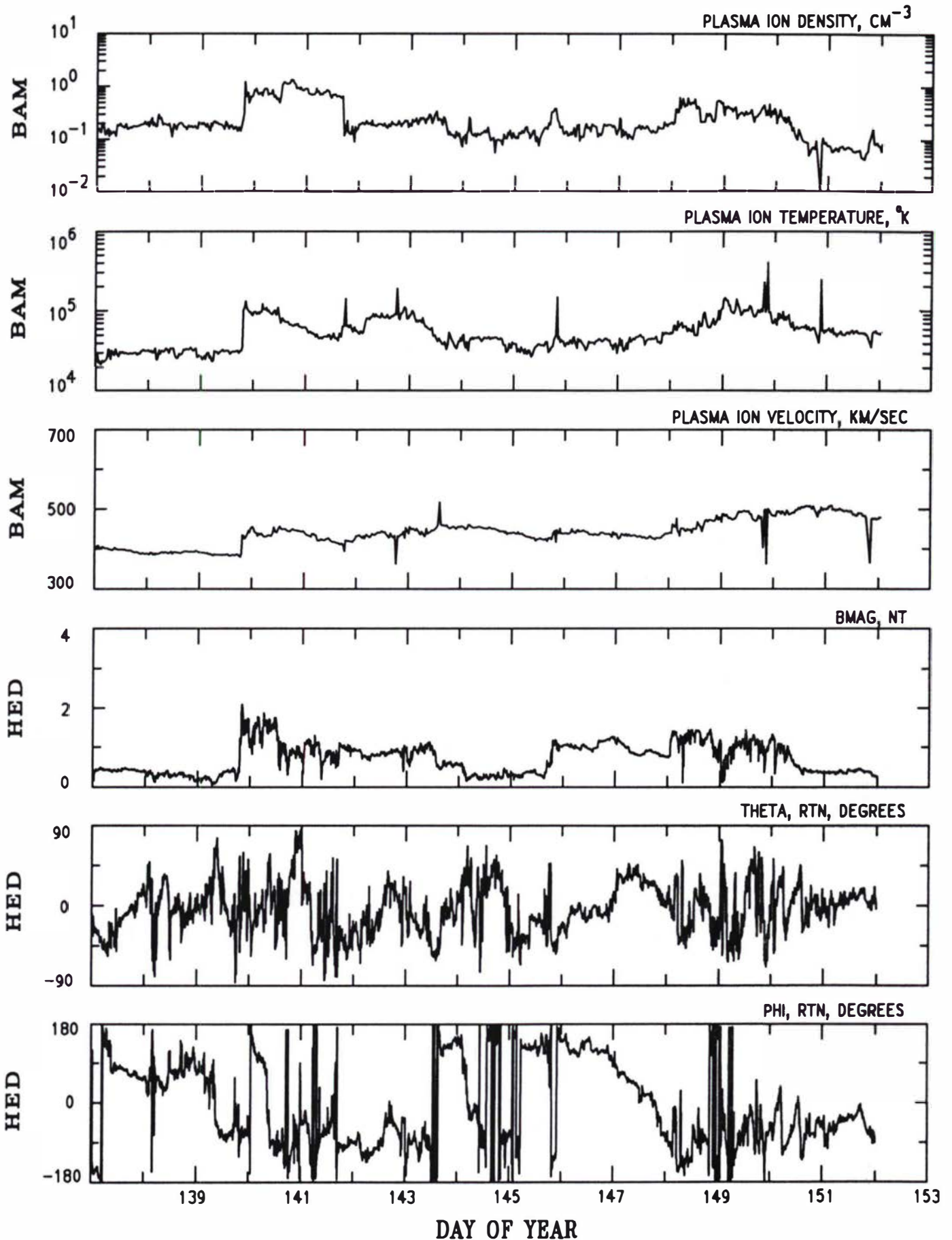


1000



ULYSSES CDR - SOLAR WIND PLASMA AND MAGNETIC FIELD

97 137 MAY 17 00:00:00.000 - 97 153 JUN 2 00:00:00.000



100-100000

100-100000

100-100000

100-100000

100-100000

100-100000

100-100000

100-100000

100-100000

100-100000

100-100000

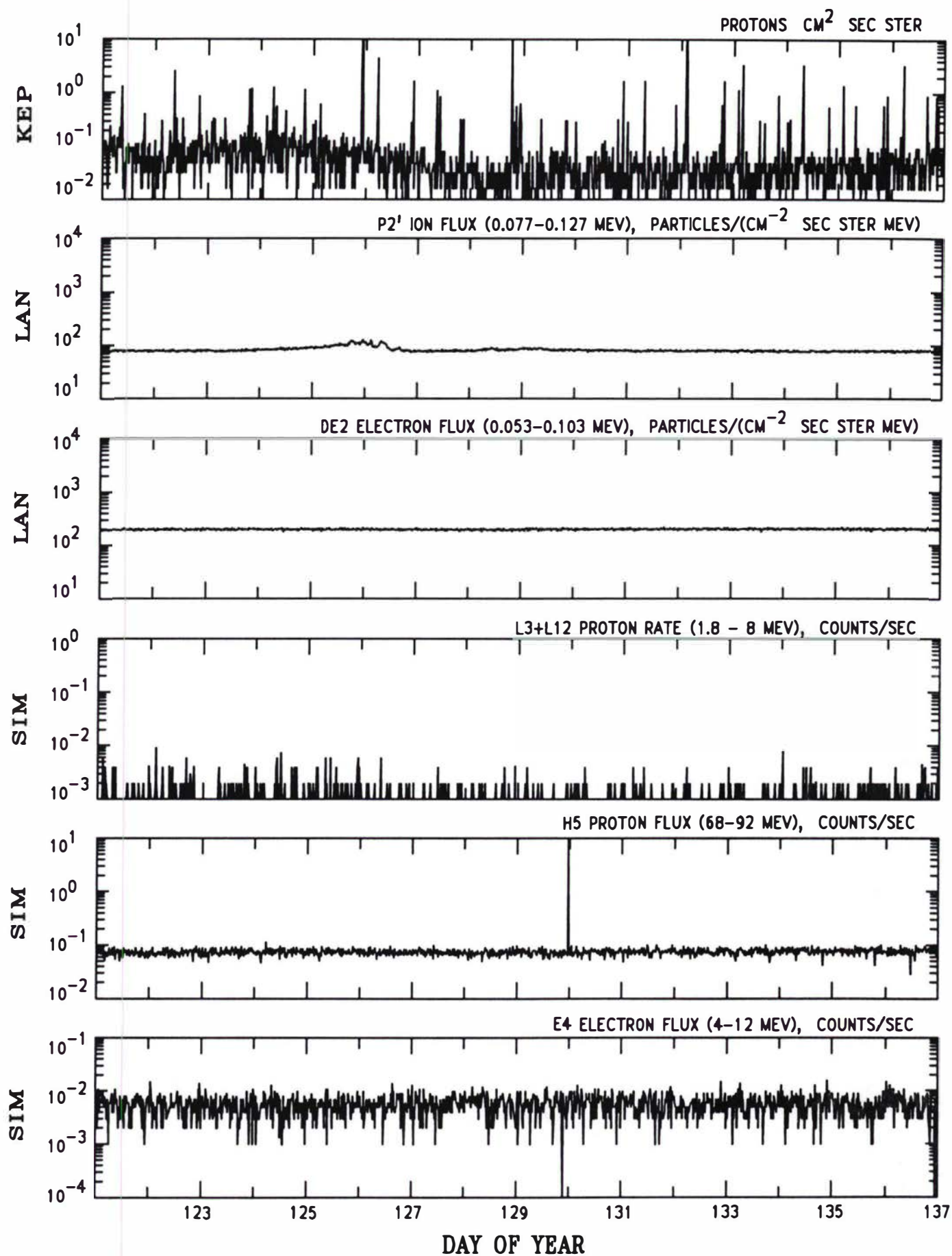
100-100000

100-100000

100-100000

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

97 121 MAY 1 00:00:00.000 - 97 137 MAY 17 00:00:00.000



1992

1. *CT* = 1

Downloaded from <http://ajphaphysiol.physiology.org/> at University of California, San Diego on May 12, 2015

1. *W. L. G. 1911*

Figure 1

[illegible]

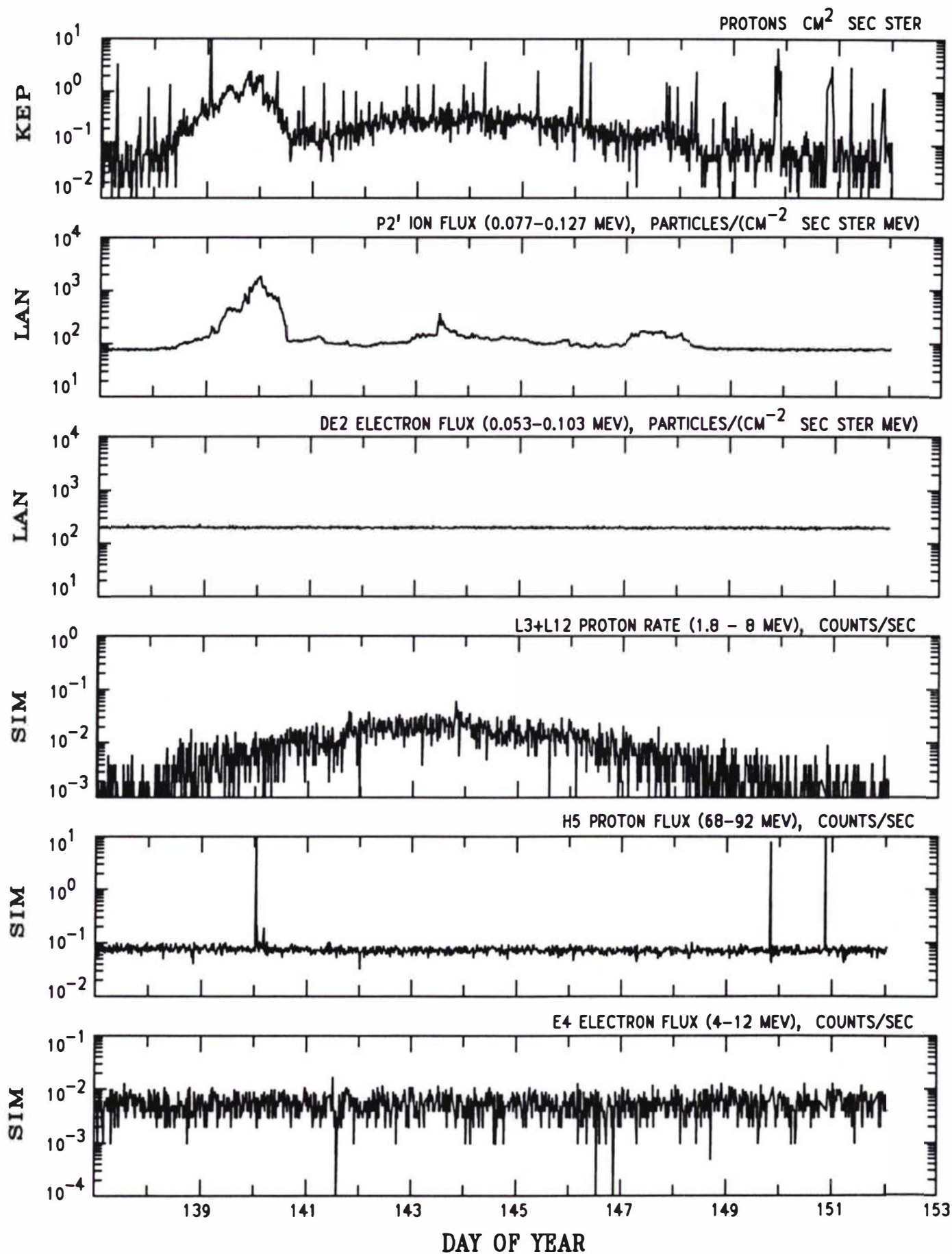
2. 46 1. 2

Mr. Z. J. J.

Figure 1

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

97 137 MAY 17 00:00:00.000 - 97 153 JUN 2 00:00:00.000



21

181

182

183

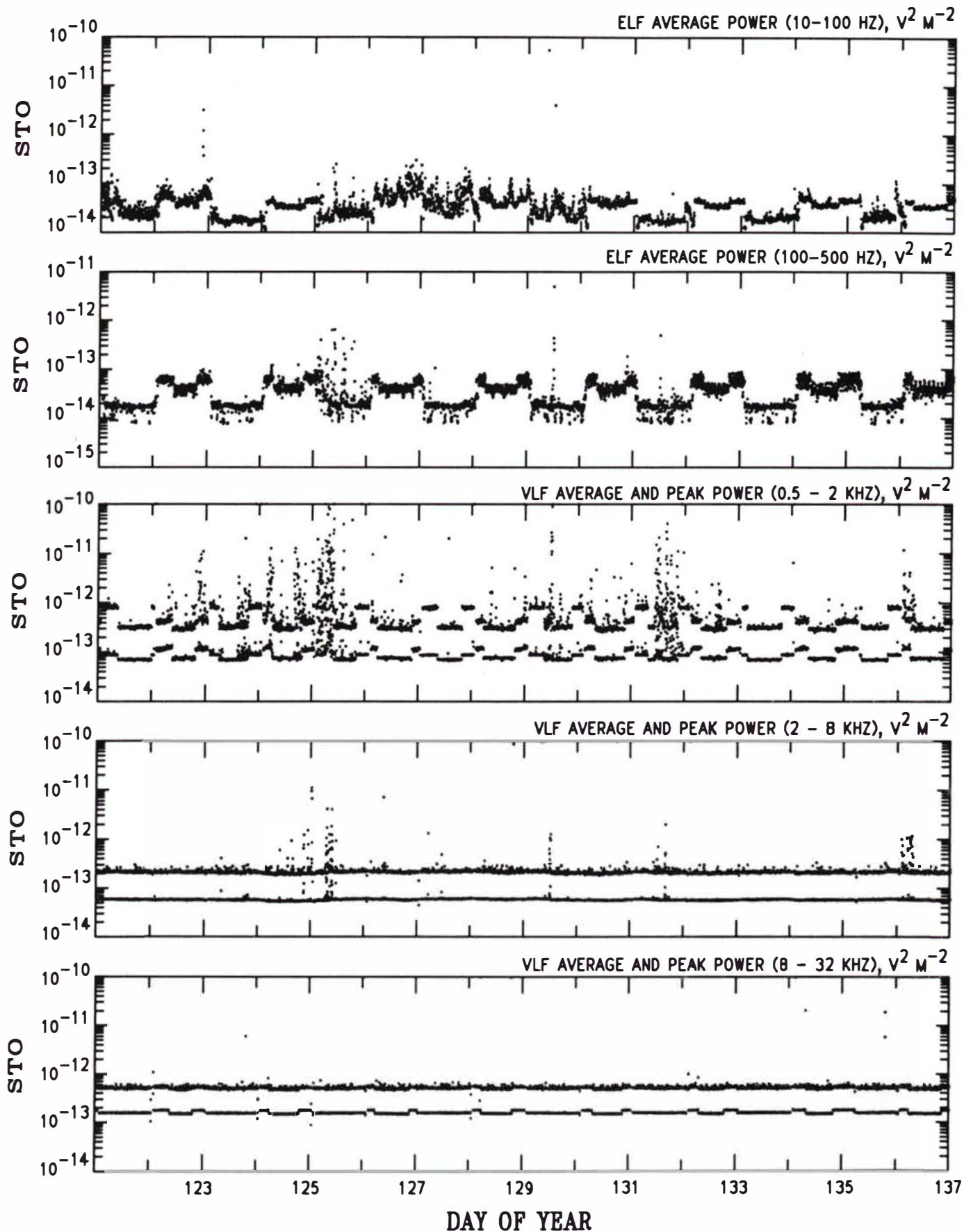
184

185

186

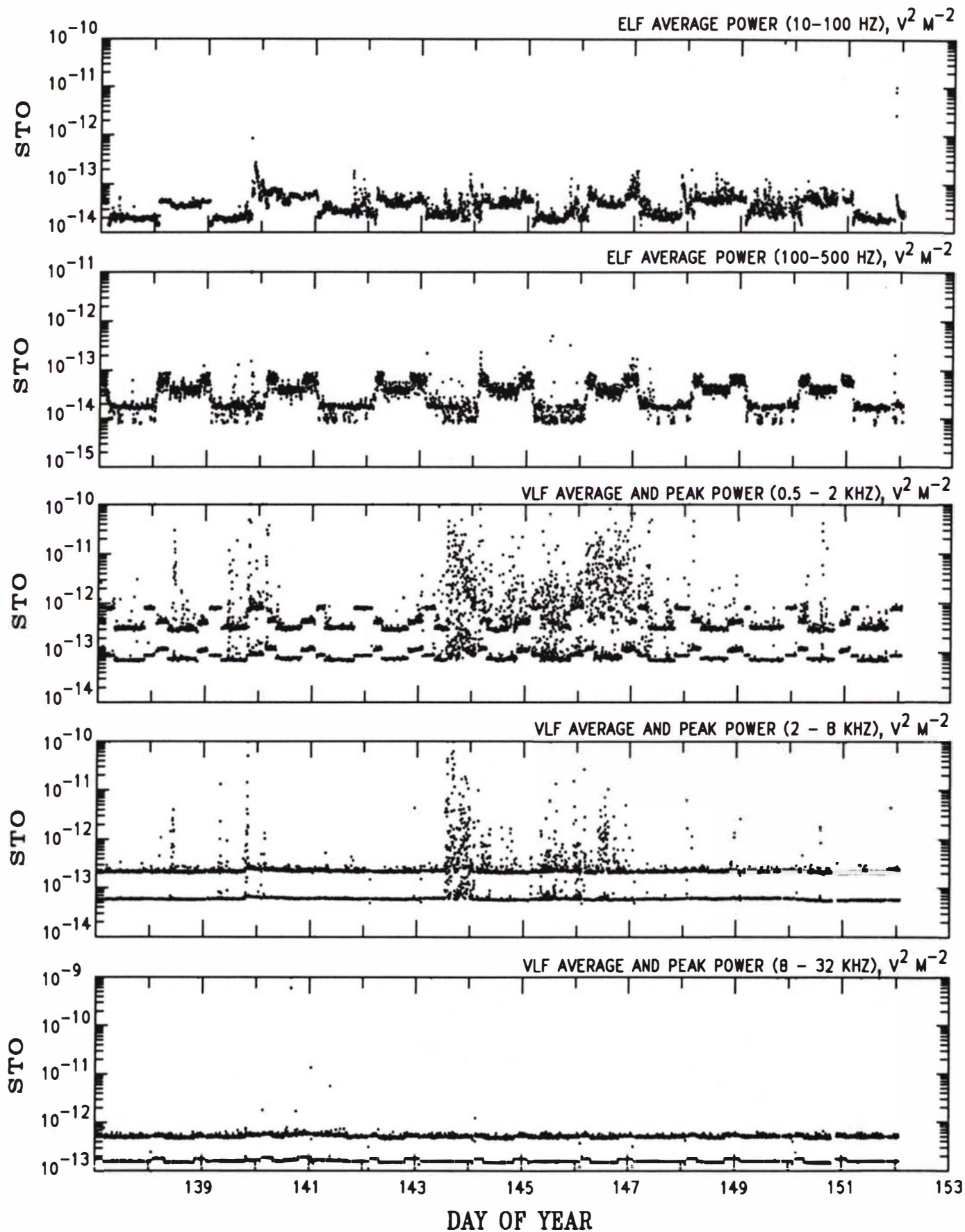
ULYSSES CDR - PLASMA WAVE

97 121 MAY 1 00:00:00.000 - 97 137 MAY 17 00:00:00.000



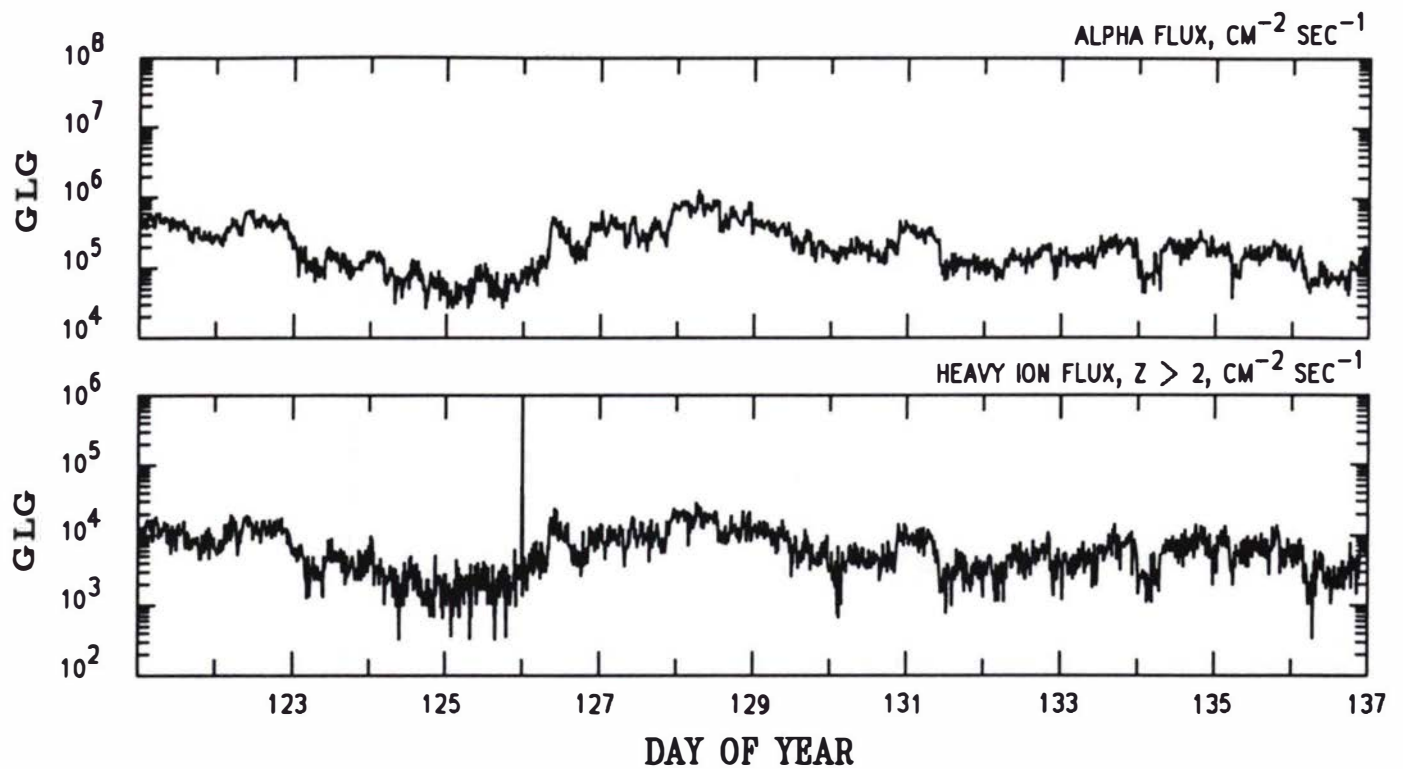
ULYSSES CDR - PLASMA WAVE

97 137 MAY 17 00:00:00.000 - 97 153 JUN 2 00:00:00.000



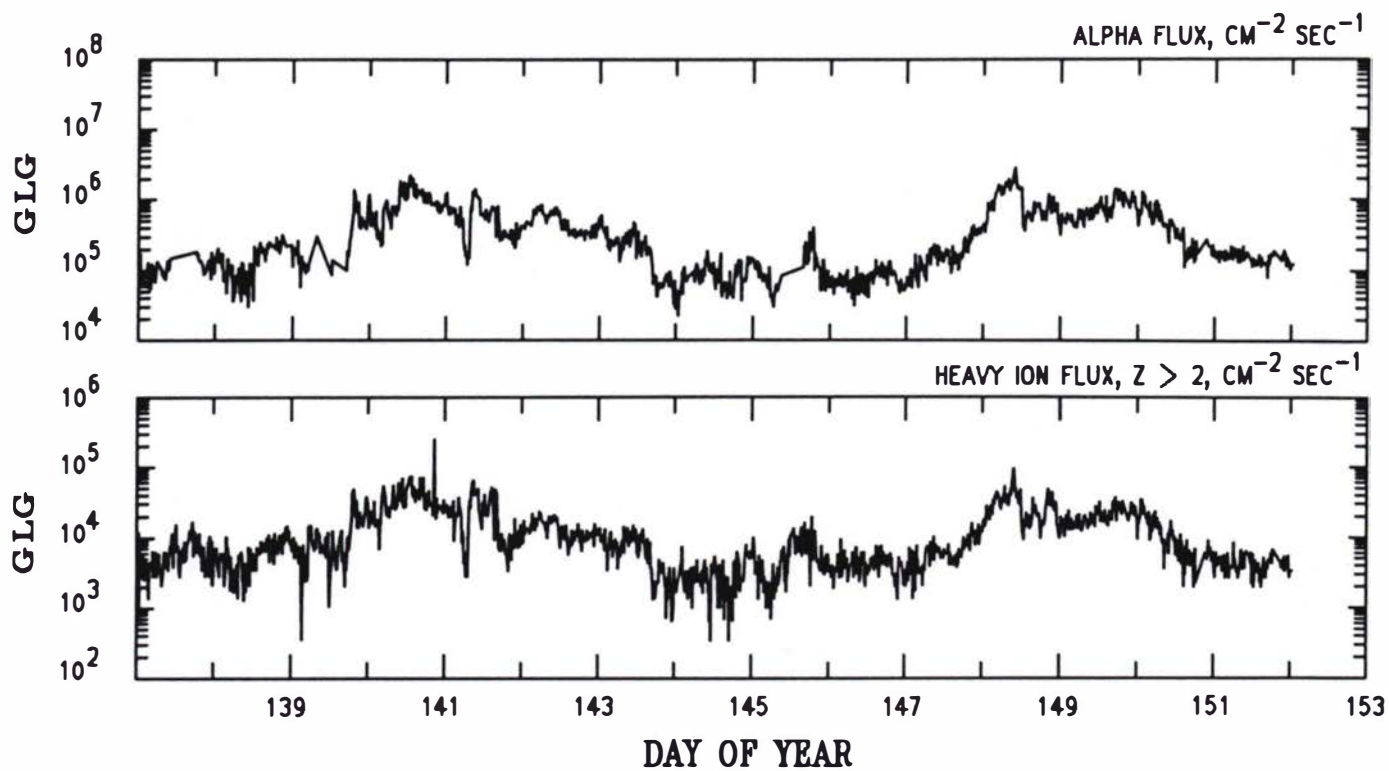
ULYSSES CDR - SOLAR WIND ION COMPOSITION

97 121 MAY 1 00:00:00.000 - 97 137 MAY 17 00:00:00.000



ULYSSES CDR - SOLAR WIND ION COMPOSITION

97 137 MAY 17 00:00:00.000 - 97 153 JUN 2 00:00:00.000



From SAHI@fender.msfc.nasa.gov Fri May 2 09:26 PDT 1997
Return-Path: <SAHI@fender.msfc.nasa.gov>
Received: from FENDER.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id JAA06343; Fri, 2 May 1997 09:26:10 -0700
From: SAHI@fender.msfc.nasa.gov
Date: Fri, 2 May 1997 11:23:34 -0500 (CDT)
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970502112334.20c04130@fender.msfc.nasa.gov>
Subject: Crossing Windows for BATSE Burst 6216
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6216
EVENT OF 1997 MAY 1 DAY OF YEAR=121
EVENT CROSSING TIME AT BATSE : 31697. S. OR 08:48:17.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 149.000 -22.000
BATSE PEAK COUNTING RATE: 11500 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 1/ 5/ 97 IS:
RA= 151.600 DEC= 33.039 DIST= 4.759 AU
BATSE-ULYSSES DISTANCE = 711969700. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=124.90 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-1358.93 SECS.
CROSSING TIME AT ULYSSES IS 30338. S. OR 08:25:38 +/- 367.50 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 1/ 5/ 97 IS:
RA= 168.640 DEC= 7.051 DIST= 0.813 AU
MARS-BATSE DISTANCE = 121607864. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION=145.15 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -332.89 SECS.
CROSSING TIME AT MARS IS 31364. S. OR 08:42:44 +/- 35.19 SECONDS

BATSE BURST TRIGGER

NO.: 6216

TIME: TJD=0569 SECONDS=31697

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=32.0 AZIMUTH=251.6 ERROR=1.87 DEGREES

COMMENTS:

BURST, SINGLE PULSE WITH SUBSTRUCTURE, DUR.~2.8 SECS. NOT VISIBLE ABOVE 300 KEV.

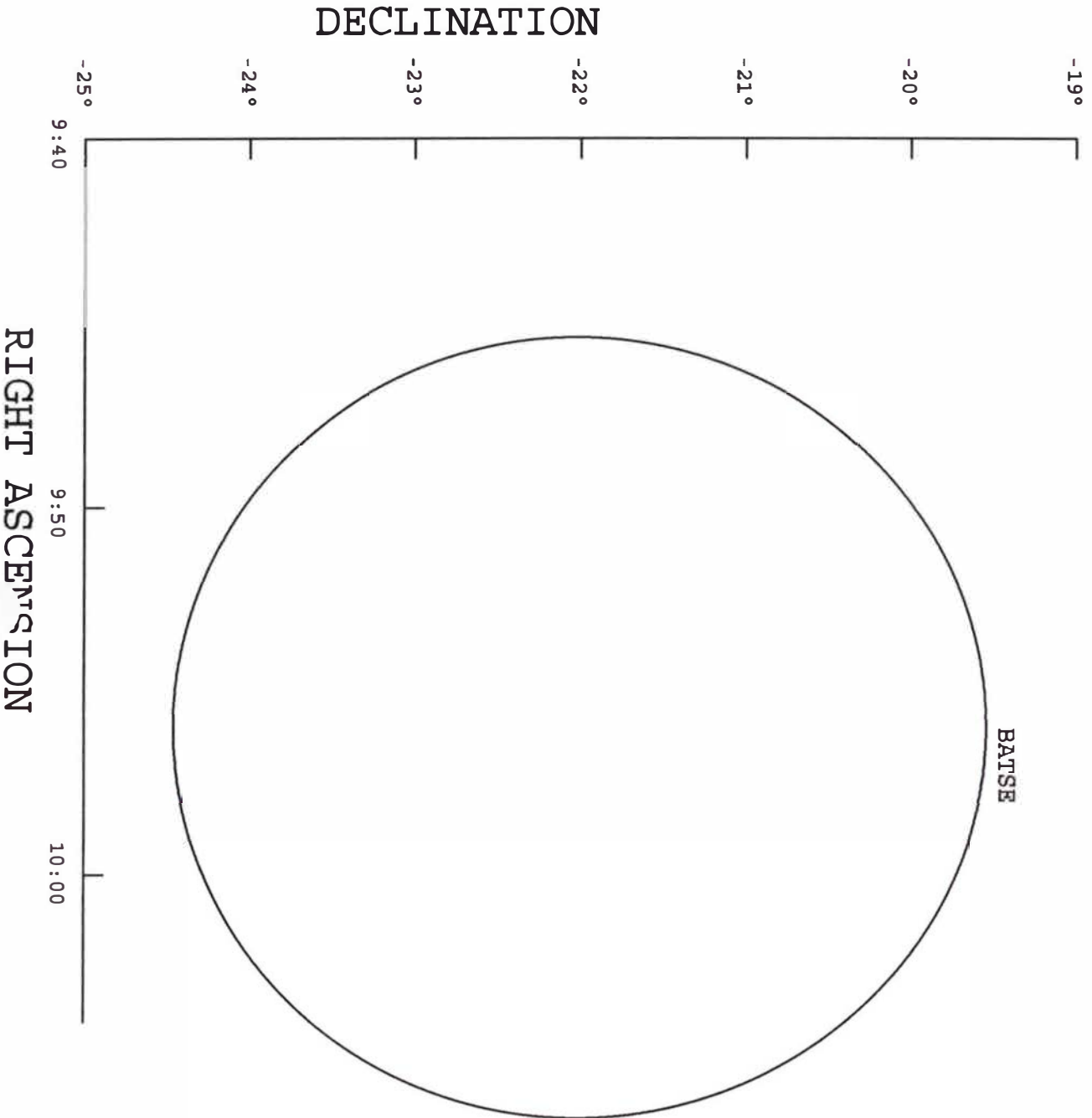
BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6216	970501	10569	31697	11500	149	-22	2.8

*Probably not observed
There is a peak in
the data, but triangulation
is way off*

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

EVENT OF MAY 1, 1997 8:15

17/ 5/97



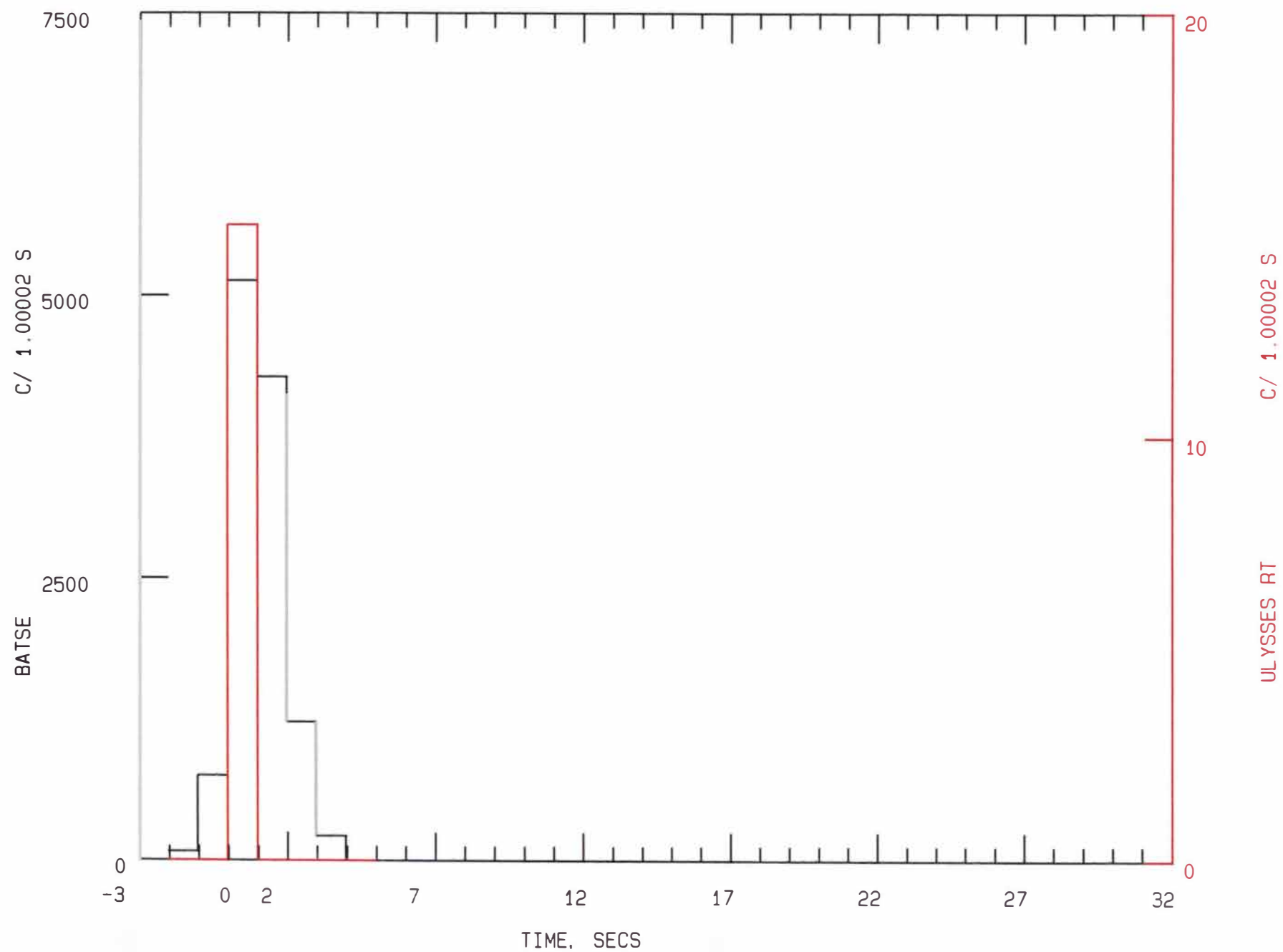
BATSE

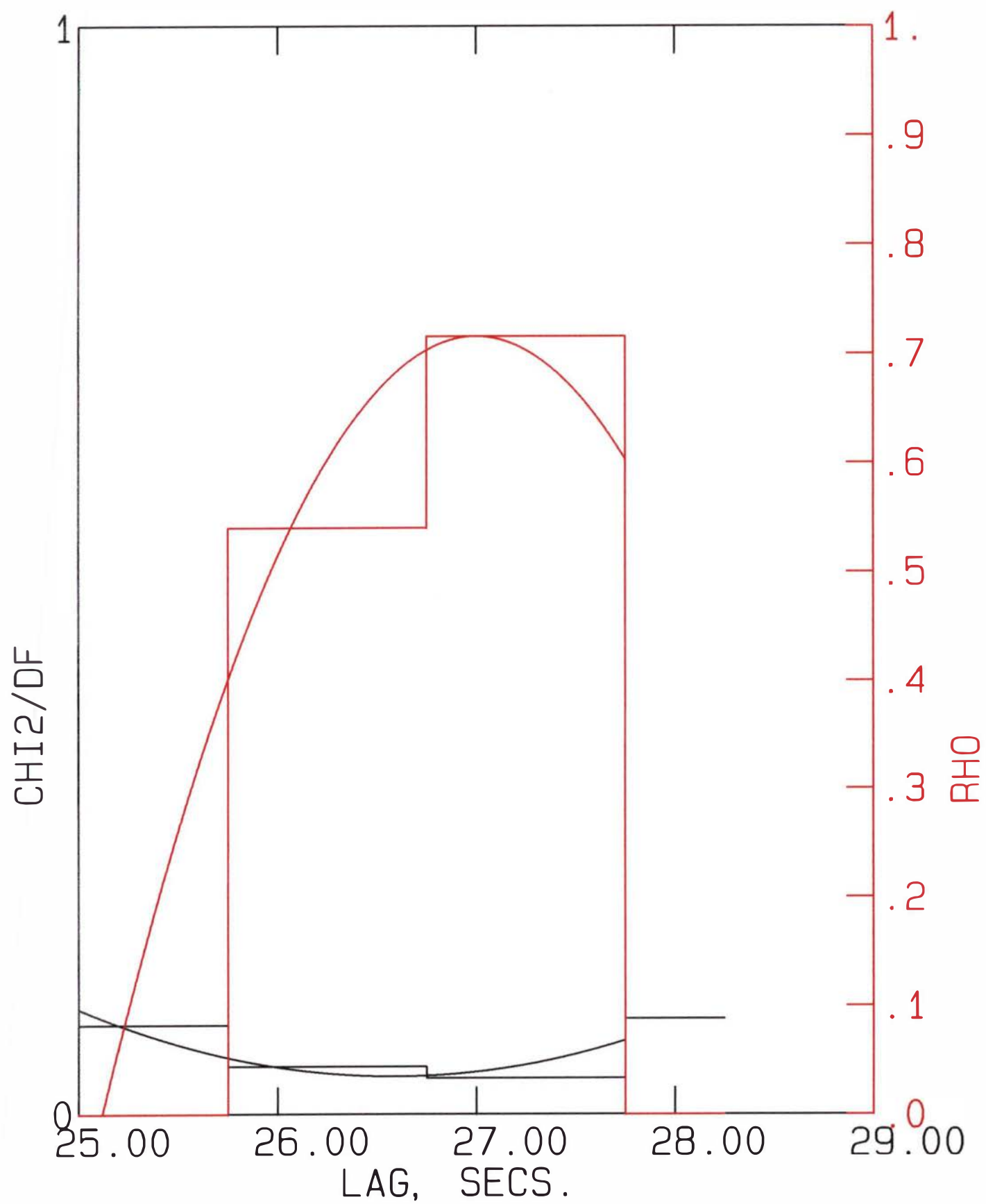
-ULYSSES RT CORRELATION

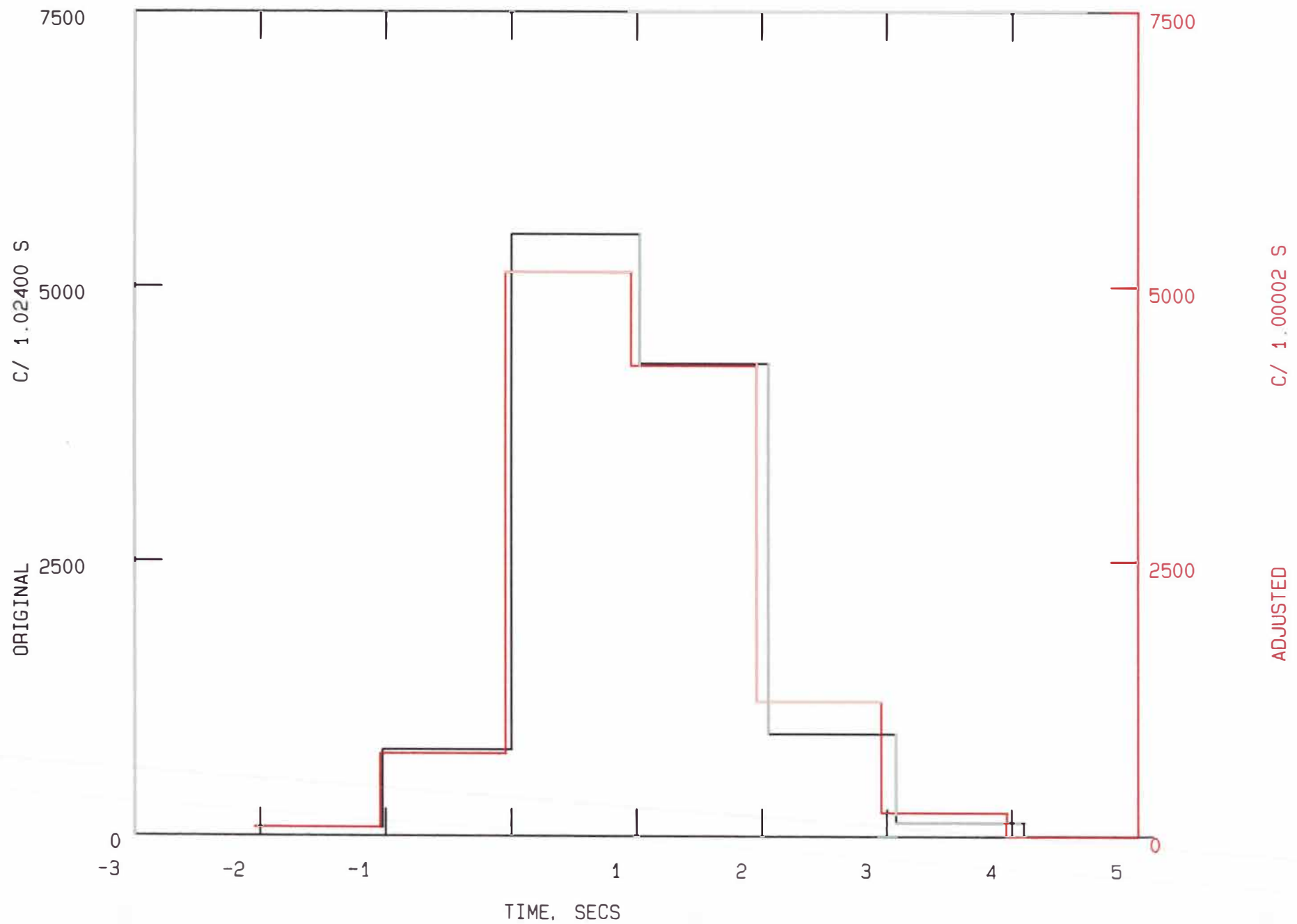
1/ 5/97

31697.802

17/ 5/97







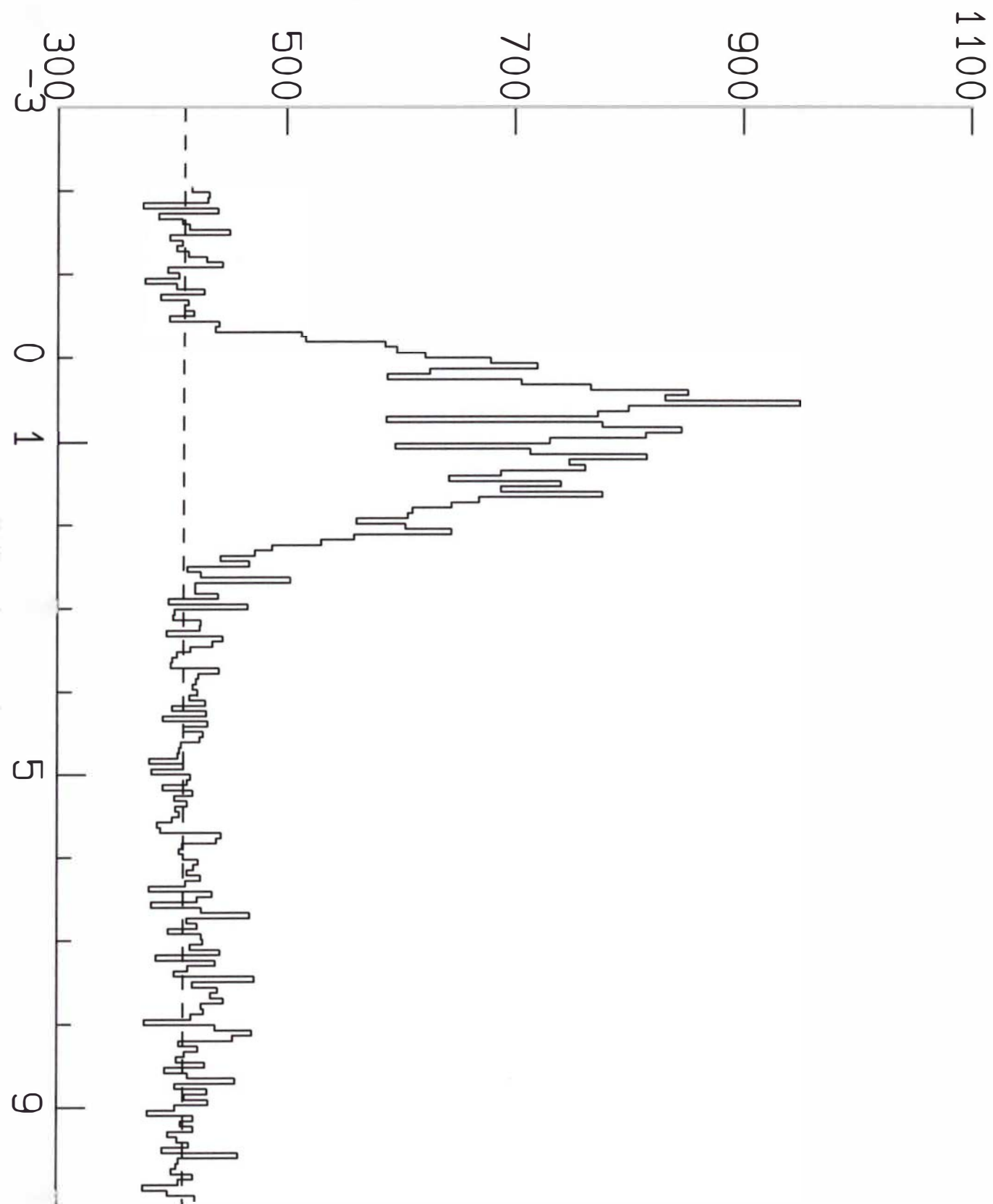
BATSE

01/05/97

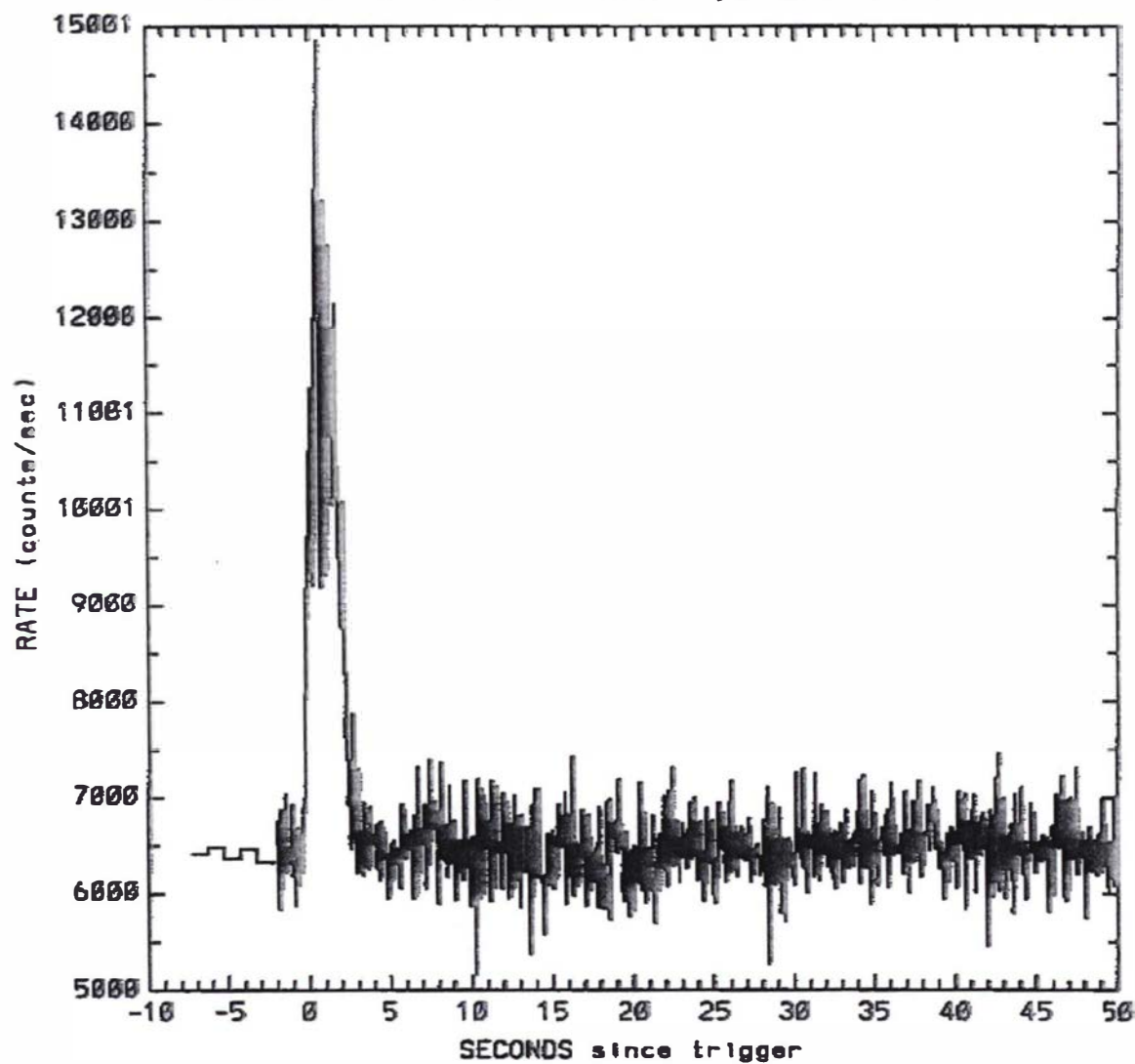
31697.802

25- 100 keV

COUNTS/0.064 S



DISCSC Data for K. Hurley, No. 6216



8-MAY-1997 11:21:56

Created by KOPS 80
(Burst Display)
Version 12.25

Trigger # = 6216

Trigger Time:
18560 / 31697.881Burst Data Type:
DISCSCDeadtime
Corrected: K
Background Data
Type: PRES = DISCLA
Minimum Integ. Time:
0.064 secondsDetectors [7..8]:
-6---2-Discriminators:
(1..2)Quality Mask:
80ISP1

ULYSSES RT

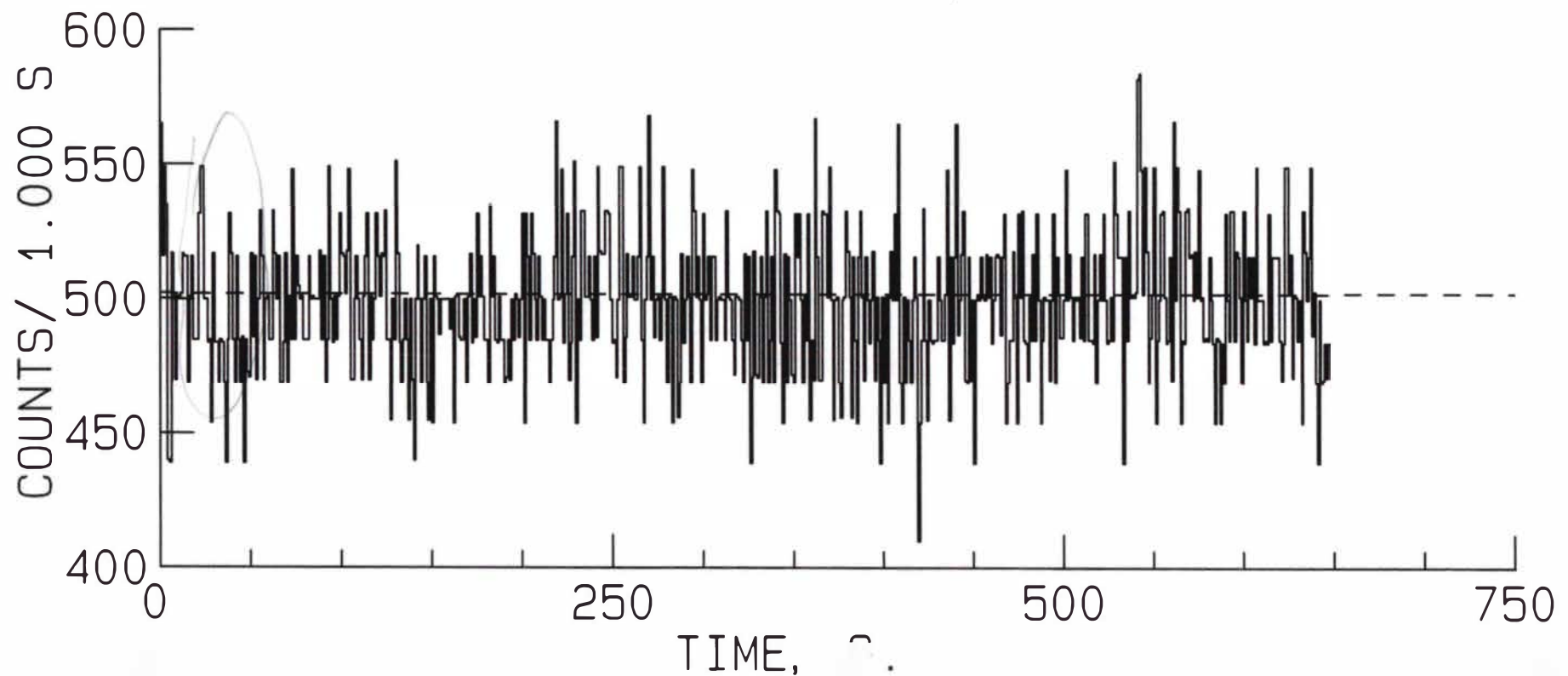
17 / 5 / 97

1 / 5 / 97 29736.005 s

0.250 S INTERVALS REGROUPED BY 4

21- 145 keV

N= 10 M= 1
>3.0 SIGMA FLUCTUATIONS



BATSE BURST# 6216

ULYSSES RT

2 / 5 / 97

1 / 5 / 97 29988.008 s

INTERVALS REGROUPED BY 2

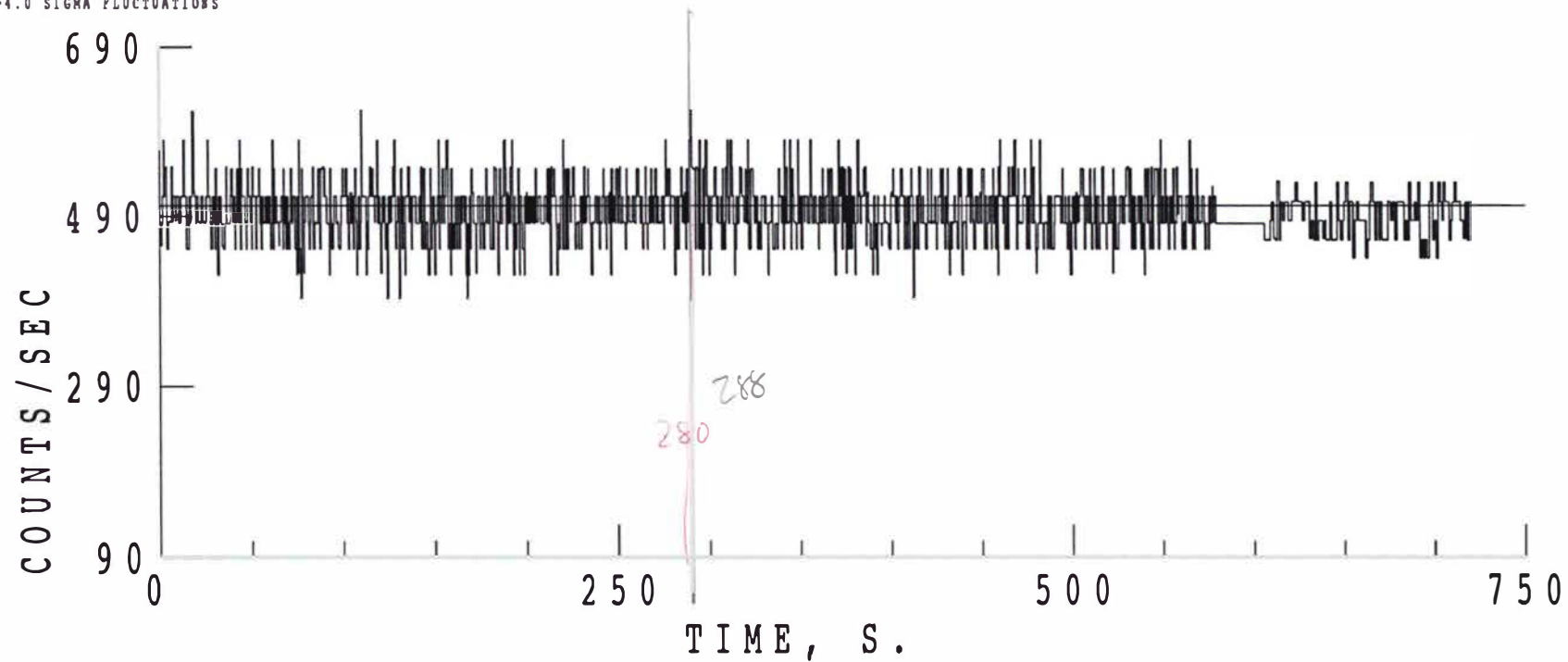
0 - 0 keV

N= 10 M=10

>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS



KONUS

ULYSSES RT

15 / 02 / 00

01 / 05 / 97 34200.309 s

0.500 S INTERVALS REGROUPED BY 7

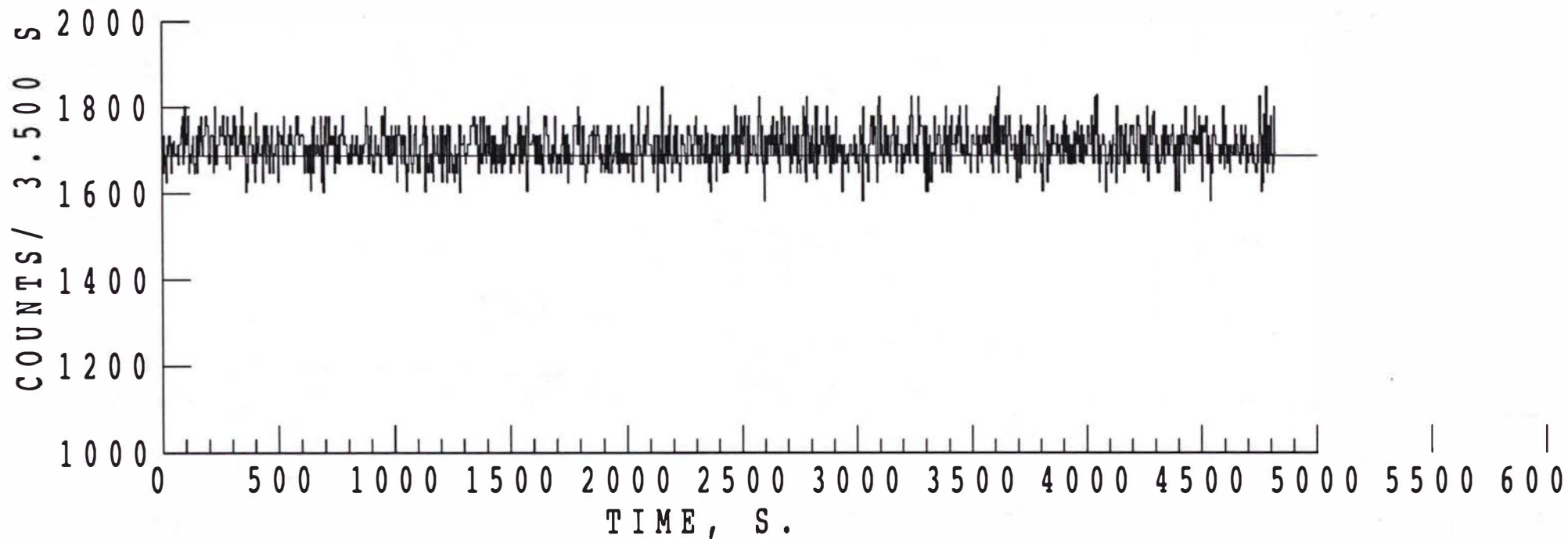
0 - 0 keV

N= 10 M= 10

>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS



SAX

HUS DATA

19 / 07 / 05

ULYSSES RT

01 / 05 / 97 75096.281 s

0.500 S INTERVALS REGROUPED BY 7

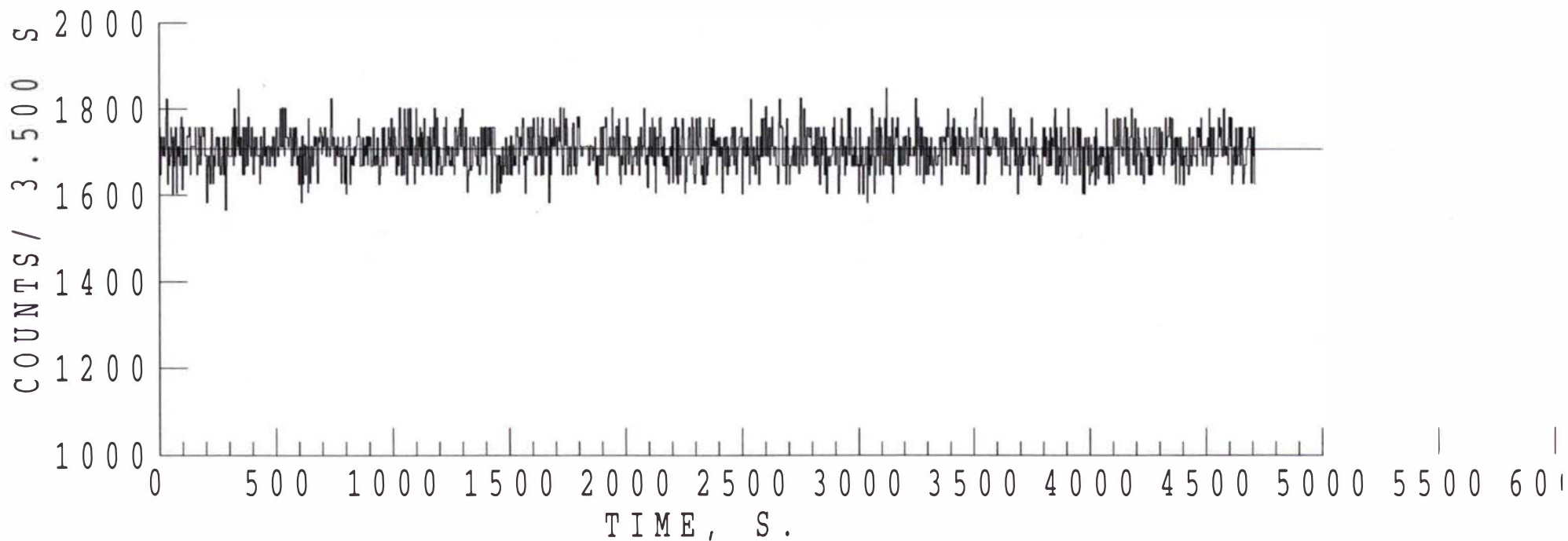
0 - 0 keV

N= 10 M= 10

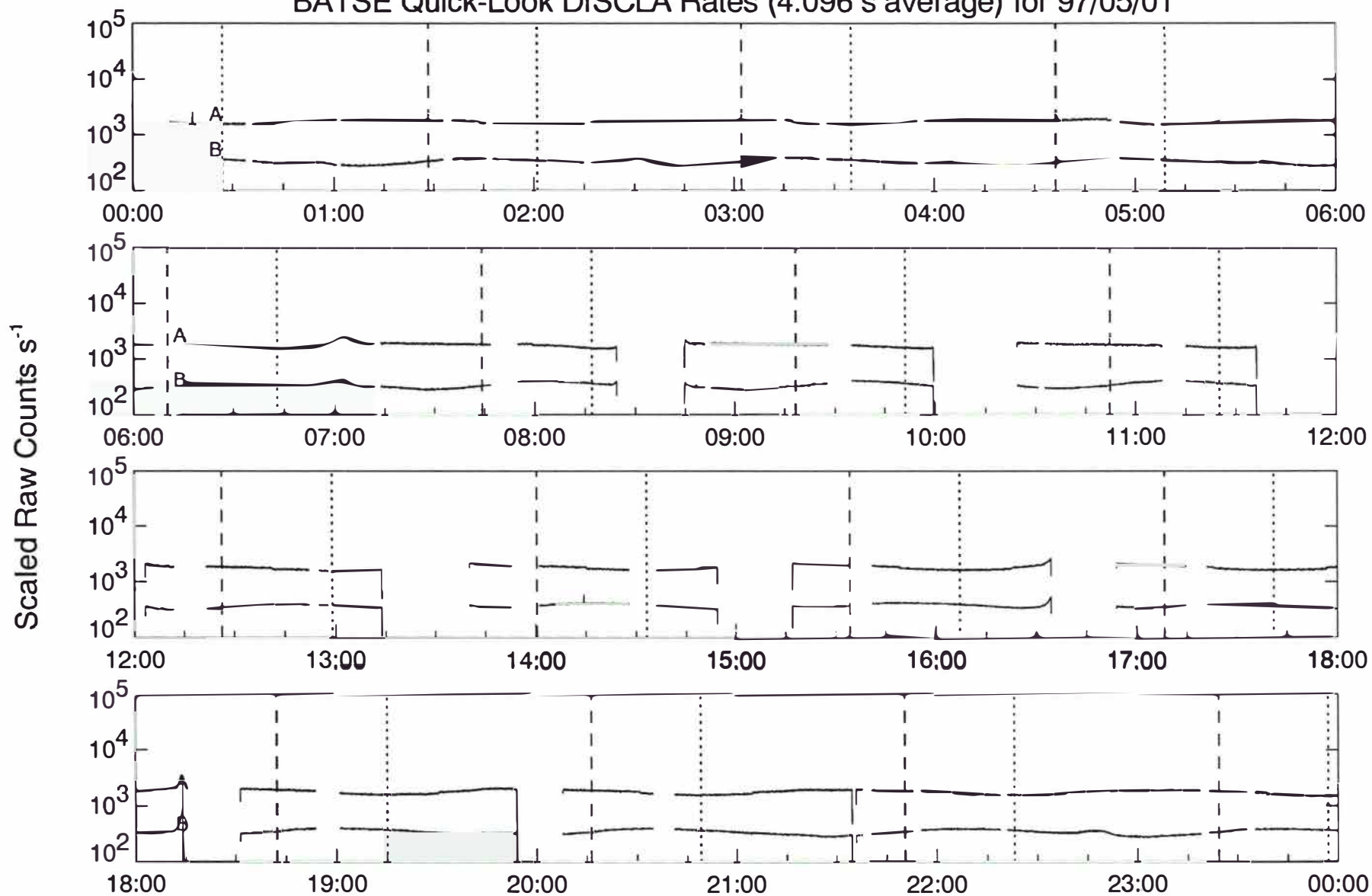
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS



BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/01



Current Time: 97/05/05, 1008 EDT

A: Channel 0 Most Sunward LAD

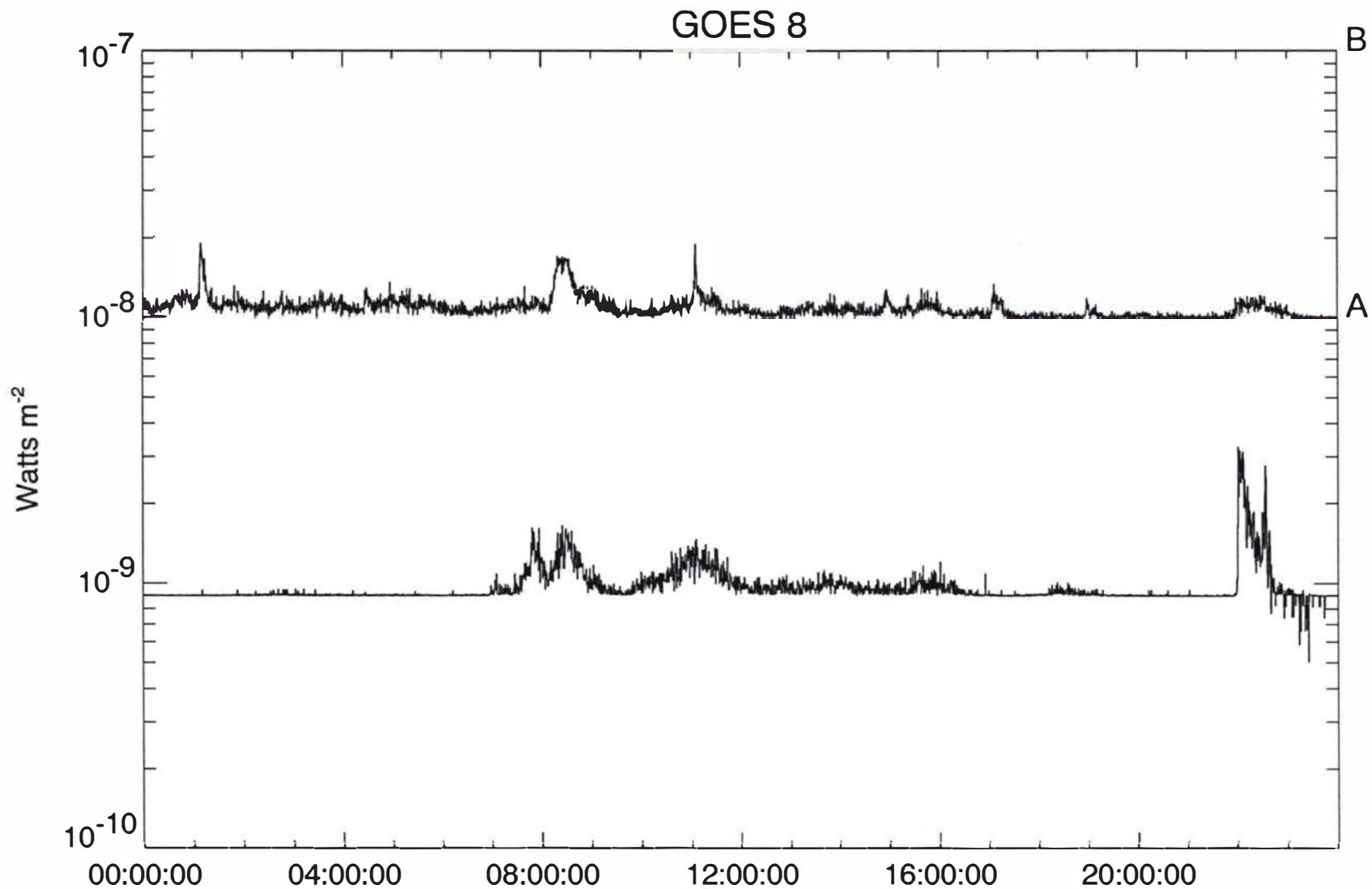
B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry

Dashed line: Night entry

* Solar Burst Trigger

+ Solar Flare



Data Start: 97/05/01, 0000:00

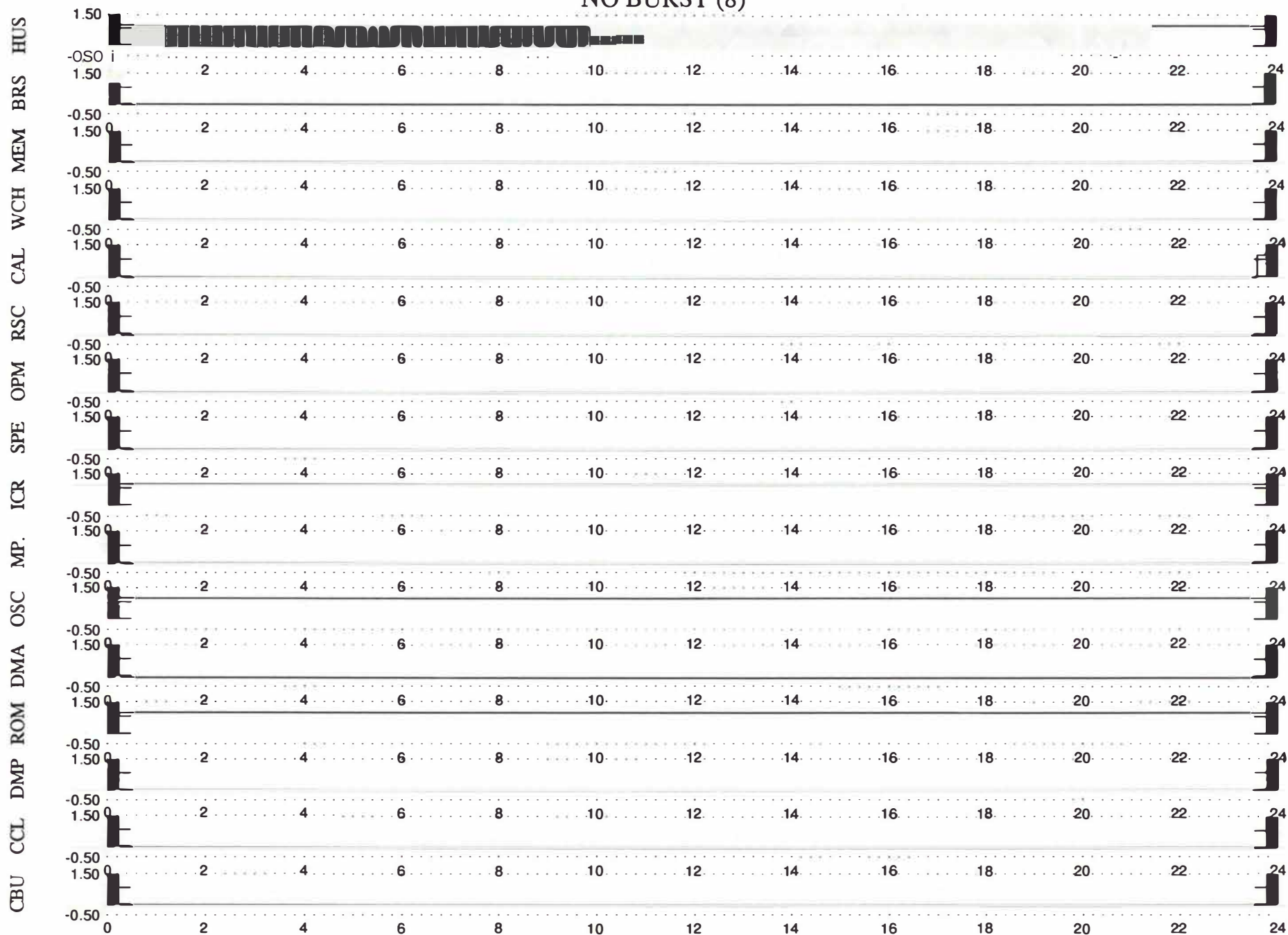
Plot created: 97/05/05, 1007

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

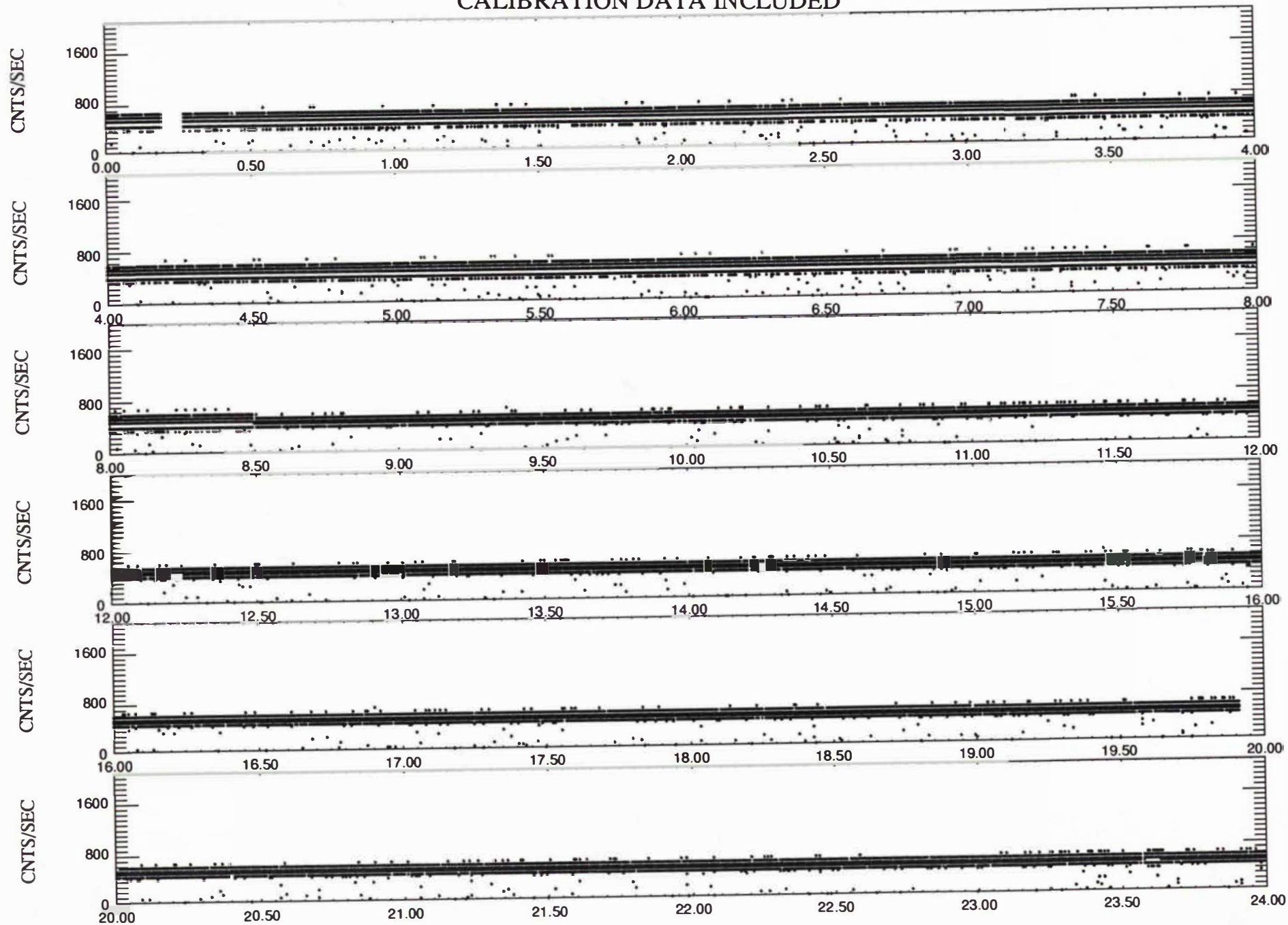
Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

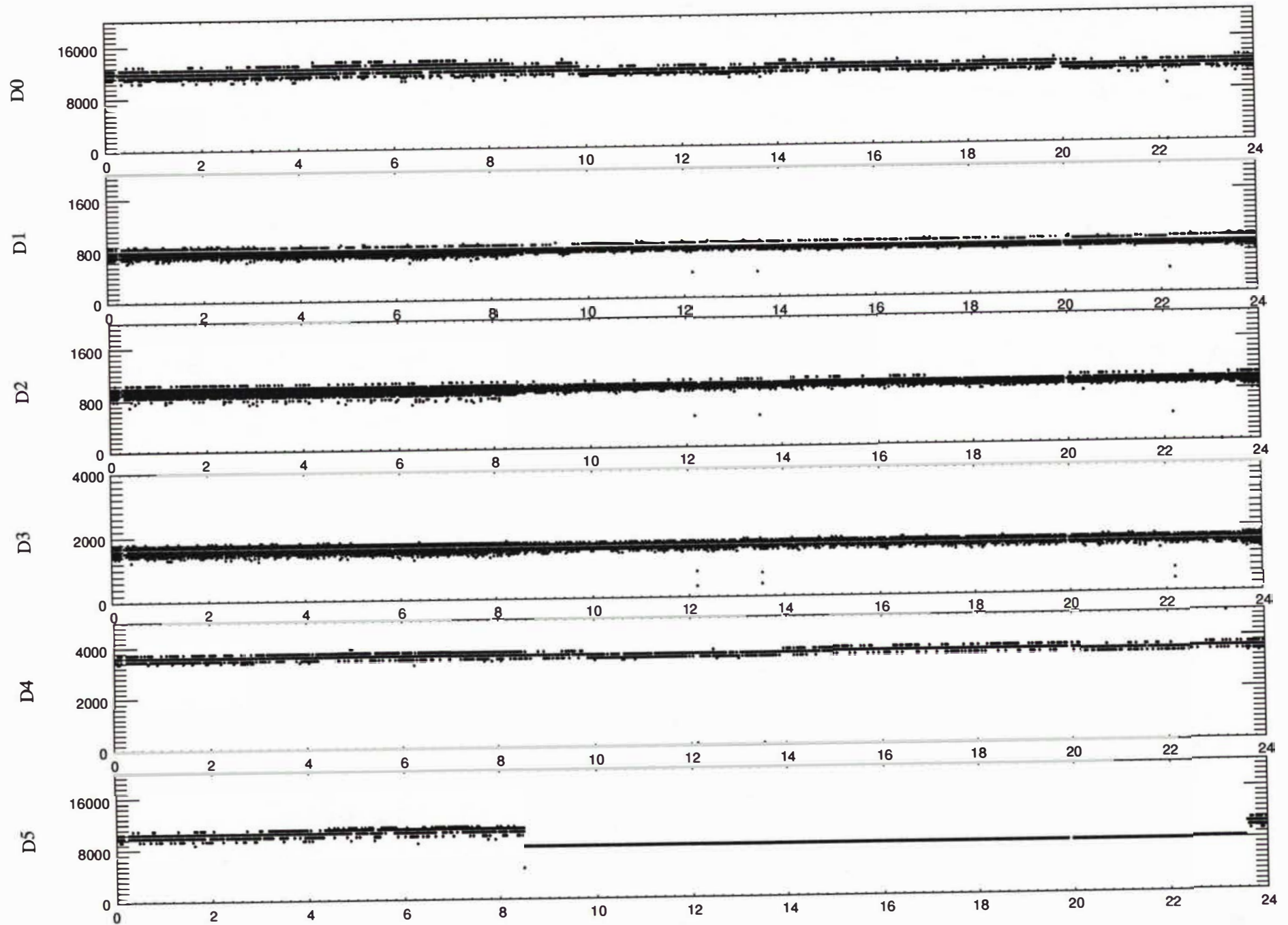
UNIVI AL TIME



CALIBRATION DATA INCLUDED



UNIVERSAL TIME



UNIV AL TIME

HUS DATA

ULYSSES RT

19 / 07 / 05

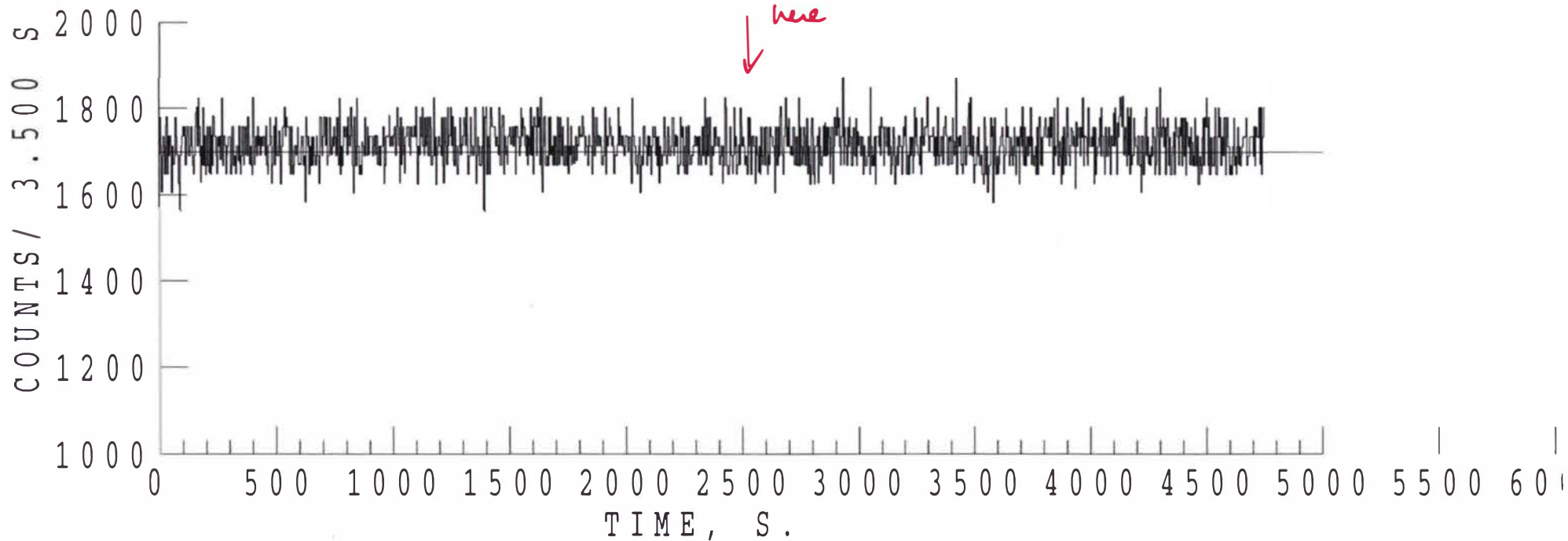
02 / 05 / 97 34236.320 s

0.500 S INTERVALS REGROUPED BY 7

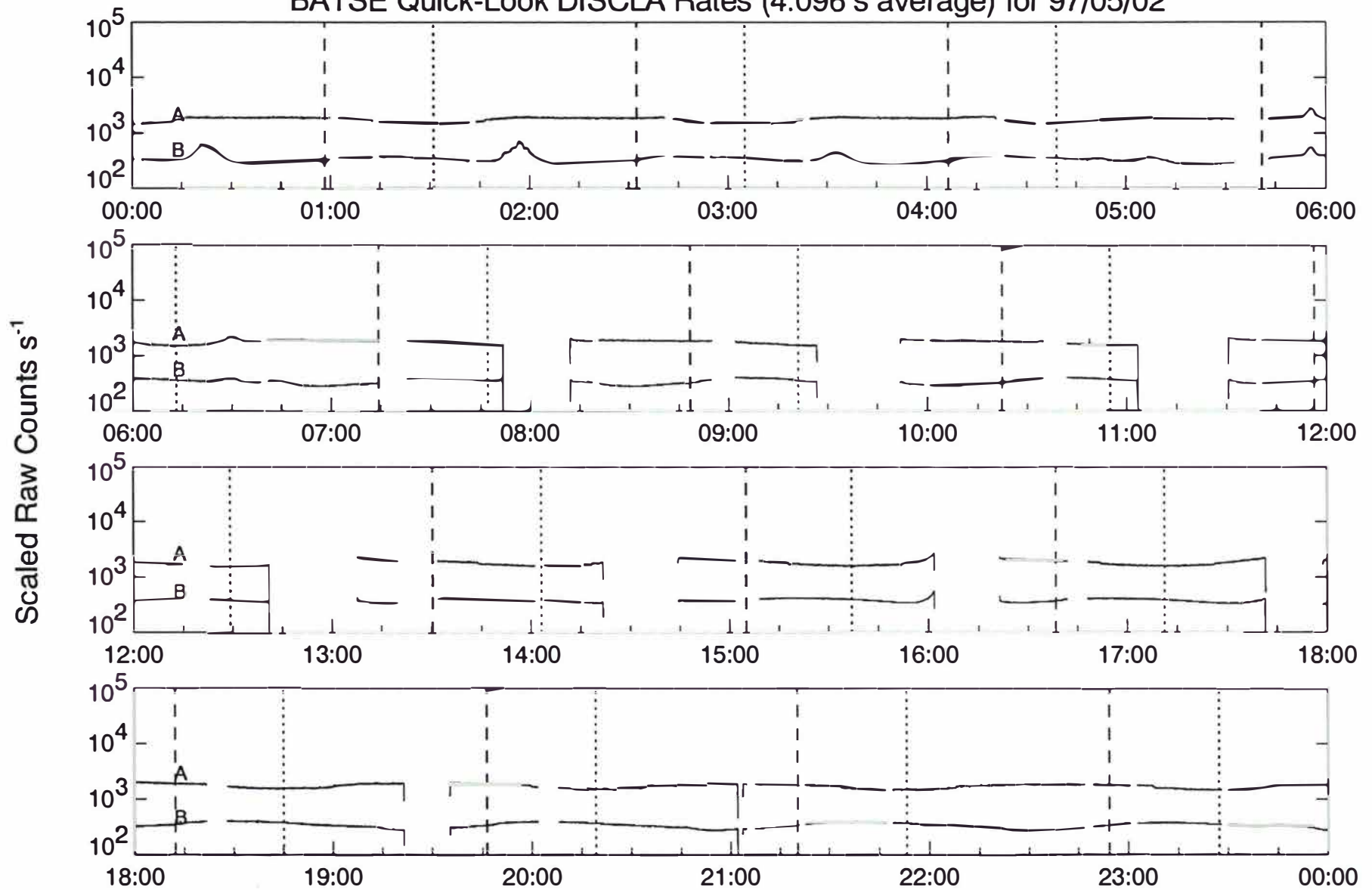
0 - 0 keV

N= 10 M= 10
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/02

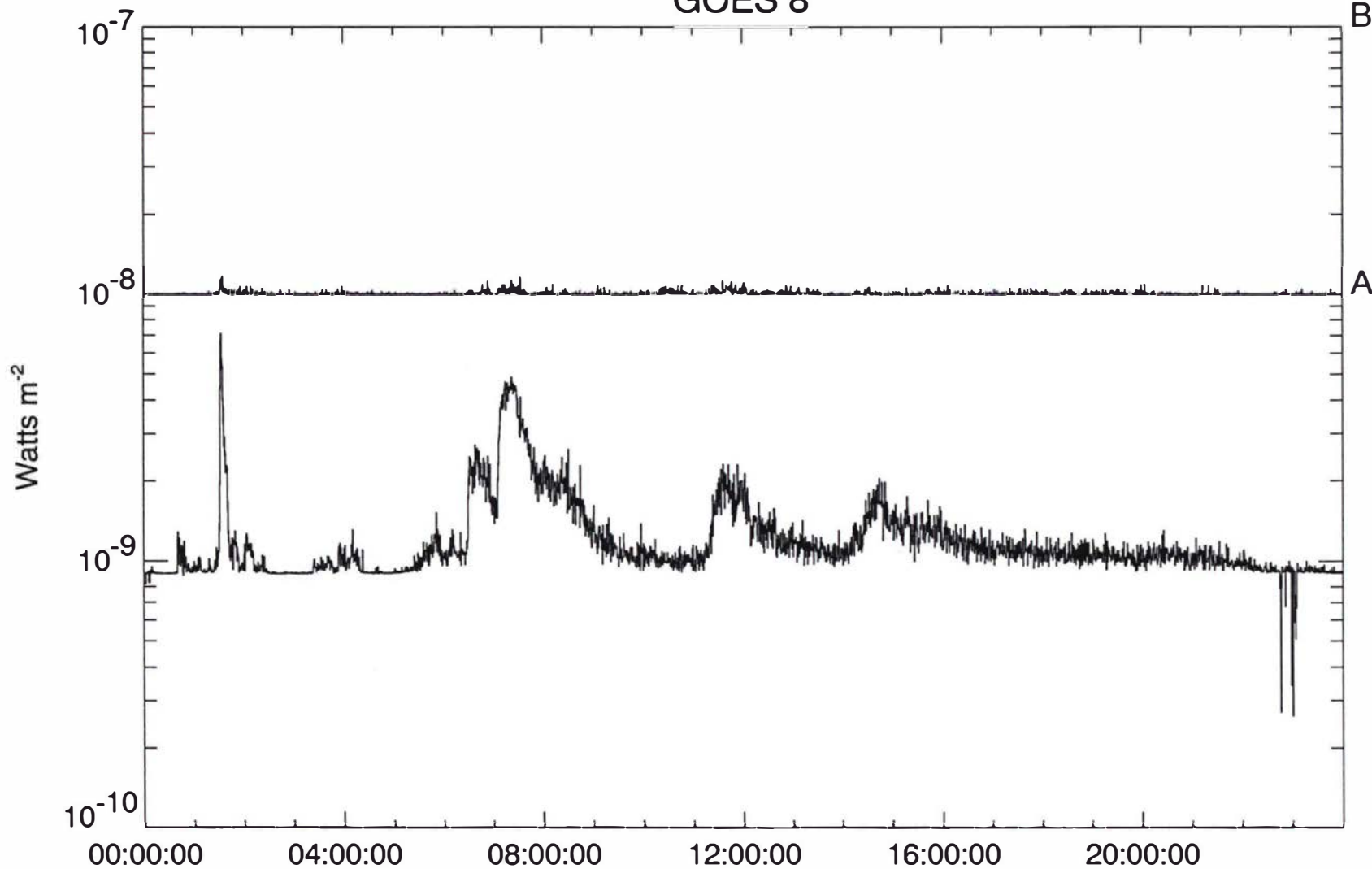


Current Time: 97/05/06, 1008 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

GOES 8



Data Start: 97/05/02, 0000:00

Plot created: 97/05/06, 1007

Channel

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

Background not subtracted
Background not subtracted
Sample average = 10

From HENZE@fender.msfc.nasa.gov Sat May 3 10:28 PDT 1997
Date: Sat, 3 May 1997 12:27:45 -0500 (CDT)
From: Bill Henze (205-544-7616) <HENZE@fender.msfc.nasa.gov>
To: burst@comptel.sr.unh.edu, grobad@ests2.estec.esa.nl,
cline@lheavx.gsfc.nasa.gov, barthelmy@lheavx.gsfc.nasa.gov,
bacodine@pandora.gsfc.nasa.gov, scott@circe.gsfc.nasa.gov,
butterworth@lheavx.gsfc.nasa.gov, band@cass09.ucsd.edu,
gruber@cass09.ucsd.edu, matteson@cass09.ucsd.edu,
PACIESAS@fender.msfc.nasa.gov, HORACK@fender.msfc.nasa.gov,
khurley@sunspot.ssl.berkeley.edu, lmm@egret.gsfc.nasa.gov,
mops@osse.nrl.navy.mil, grove@osse.nrl.navy.mil,
matz@osse.nrl.navy.mil, share@osse.nrl.navy.mil,
messina@osse.nrl.navy.mil, sandora@osse.nrl.navy.mil
Subject: Burst Trigger Message

BATSE BURST TRIGGER

NO.: 6217

TIME: TJD=0570 SECONDS=01245

TYPE: PARTICL SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH= AZIMUTH= ERROR= DEGREES

COMMENTS:

PARTICLES (OVER AUSTRALIA)

From HENZE@fender.msfc.nasa.gov Sat May 3 10:30 PDT 1997
Date: Sat, 3 May 1997 12:30:12 -0500 (CDT)
From: Bill Henze (205-544-7616) <HENZE@fender.msfc.nasa.gov>
To: burst@comptel.sr.unh.edu, grobad@ests2.estec.esa.nl,
cline@lheavx.gsfc.nasa.gov, barthelmy@lheavx.gsfc.nasa.gov,
bacodine@pandora.gsfc.nasa.gov, scott@circe.gsfc.nasa.gov,
butterworth@lheavx.gsfc.nasa.gov, band@cass09.ucsd.edu,
gruber@cass09.ucsd.edu, matteson@cass09.ucsd.edu,
PACIESAS@fender.msfc.nasa.gov, HORACK@fender.msfc.nasa.gov,
khurley@sunspot.ssl.berkeley.edu, lmm@egret.gsfc.nasa.gov,
mops@osse.nrl.navy.mil, grove@osse.nrl.navy.mil,
matz@osse.nrl.navy.mil, share@osse.nrl.navy.mil,
messina@osse.nrl.navy.mil, sandora@osse.nrl.navy.mil
Subject: Burst Trigger Message

BATSE BURST TRIGGER

NO.: 6218

TIME: TJD=0570 SECONDS=06981

TYPE: PARTICL SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

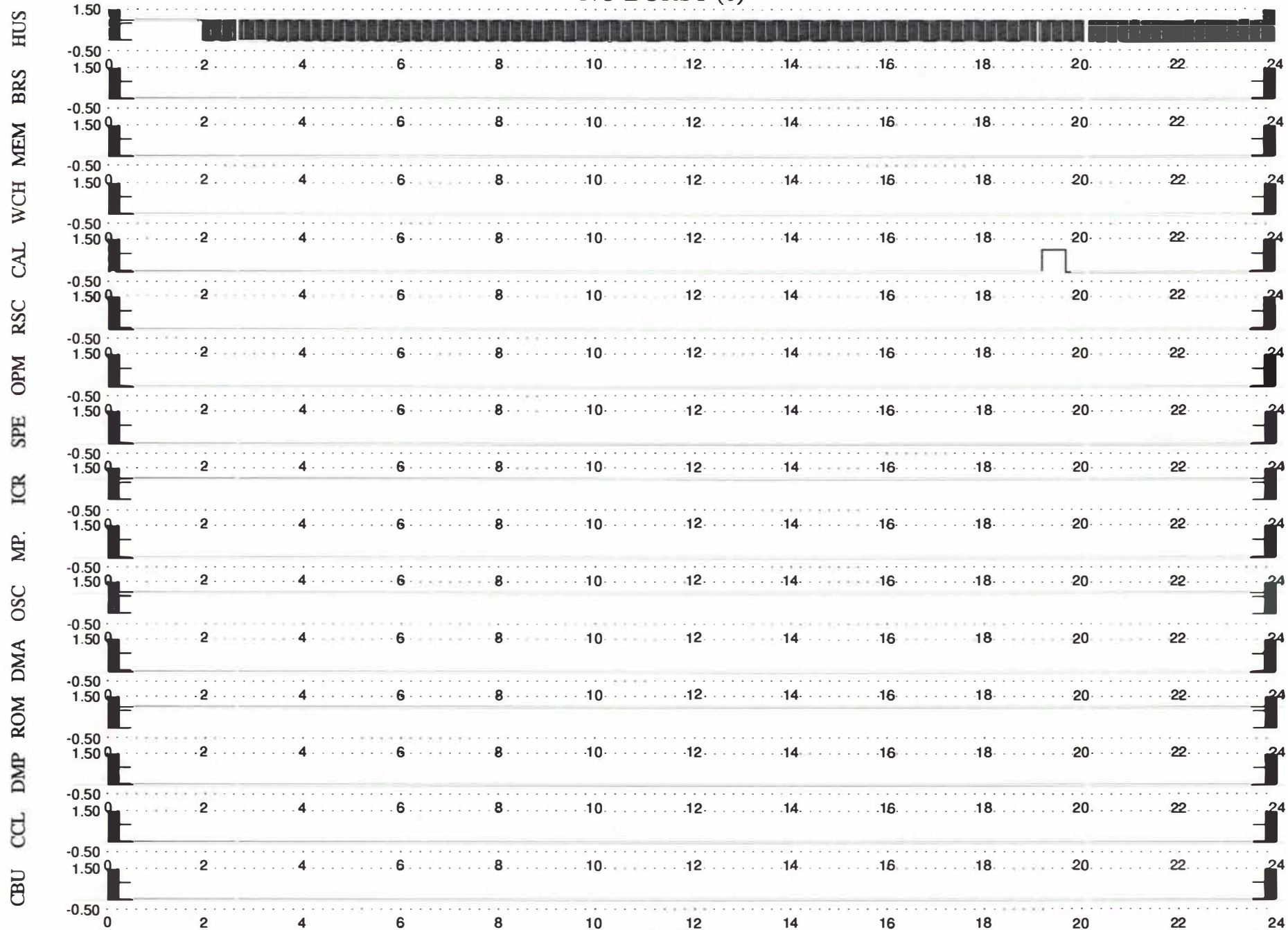
INTENSITY: COUNTS/CM2

LOCATION: ZENITH= AZIMUTH= ERROR= DEGREES

COMMENTS:

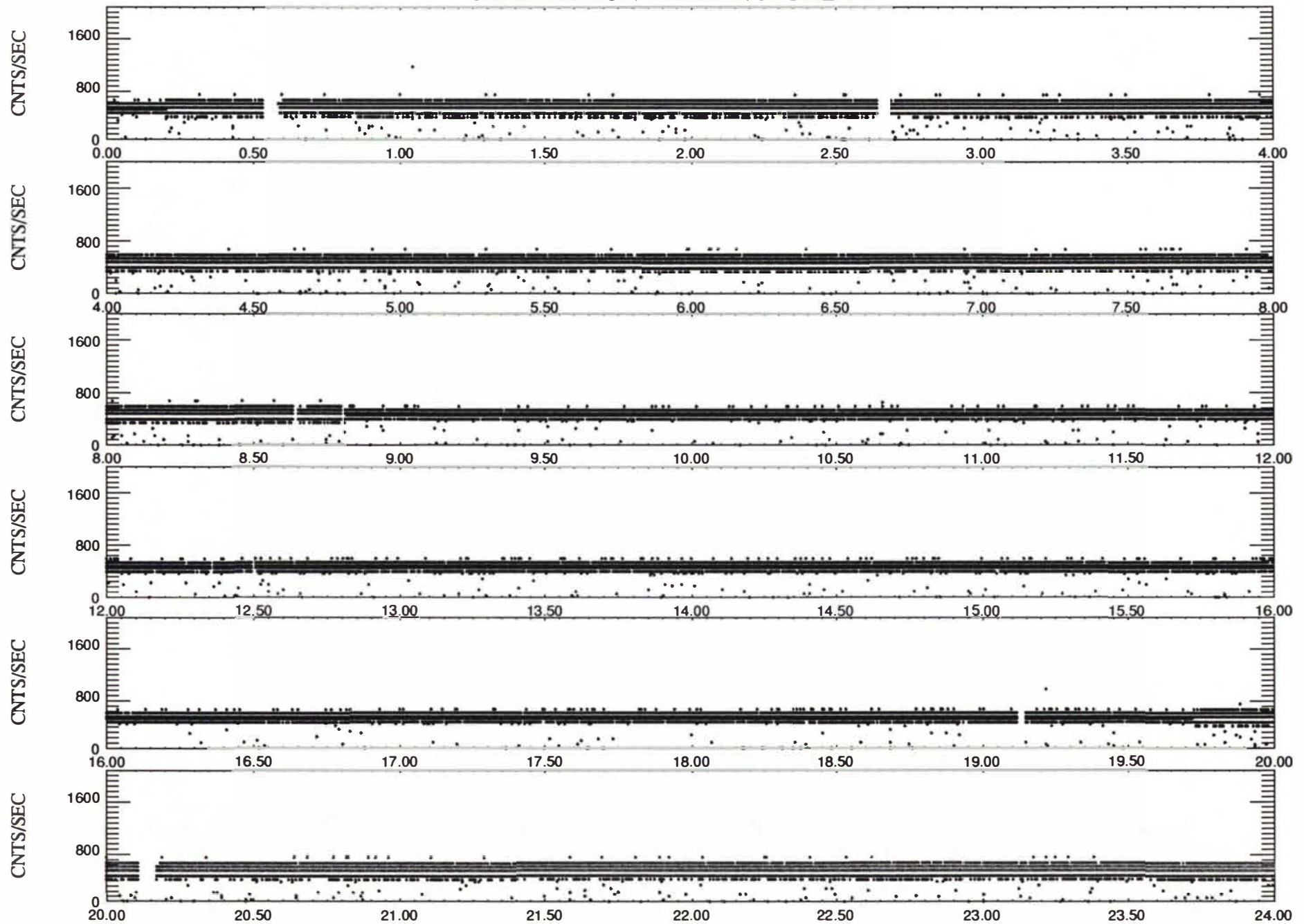
PARTICLES (OVER AUSTRALIA)

NO BURST (8)

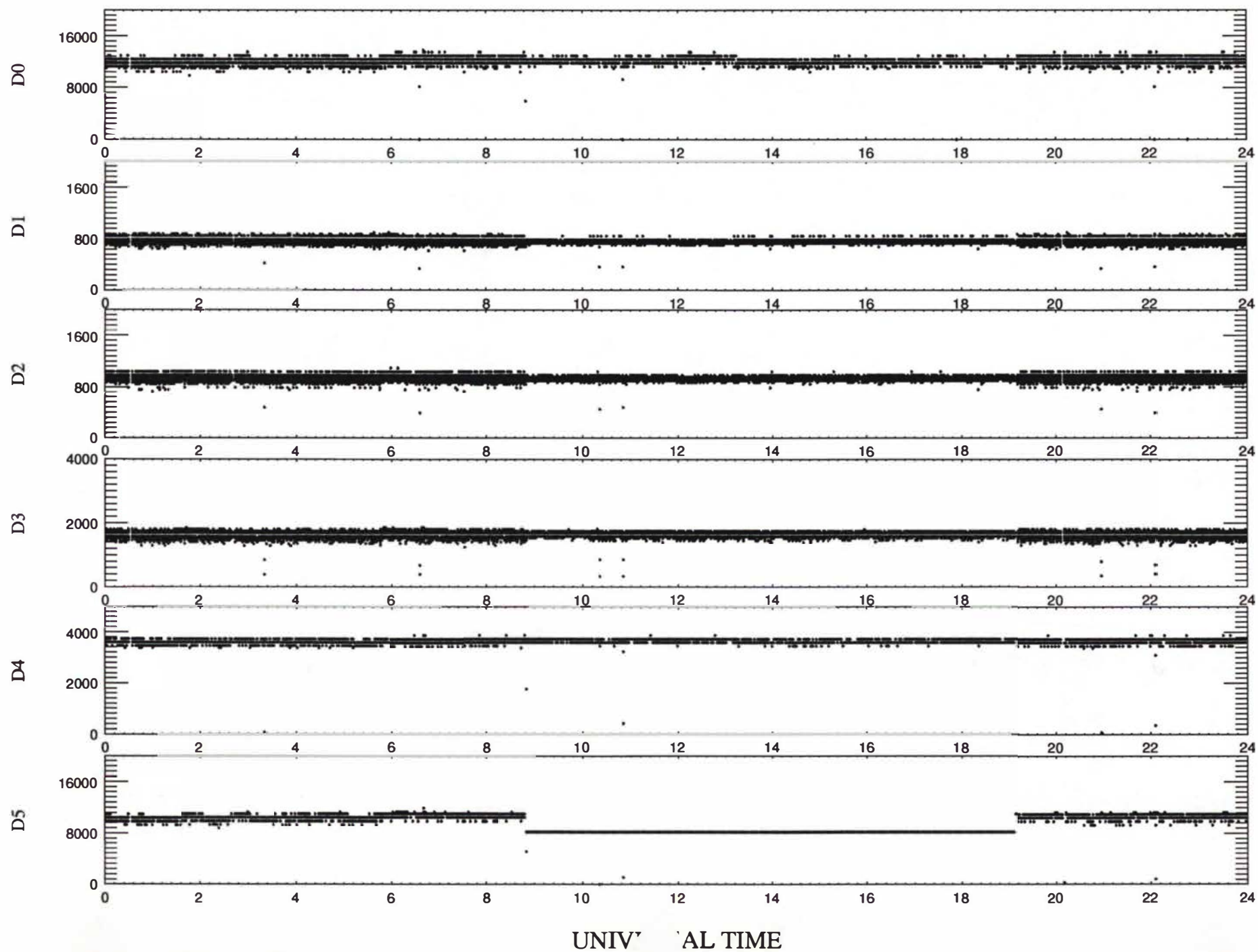


UNIV AL TIME

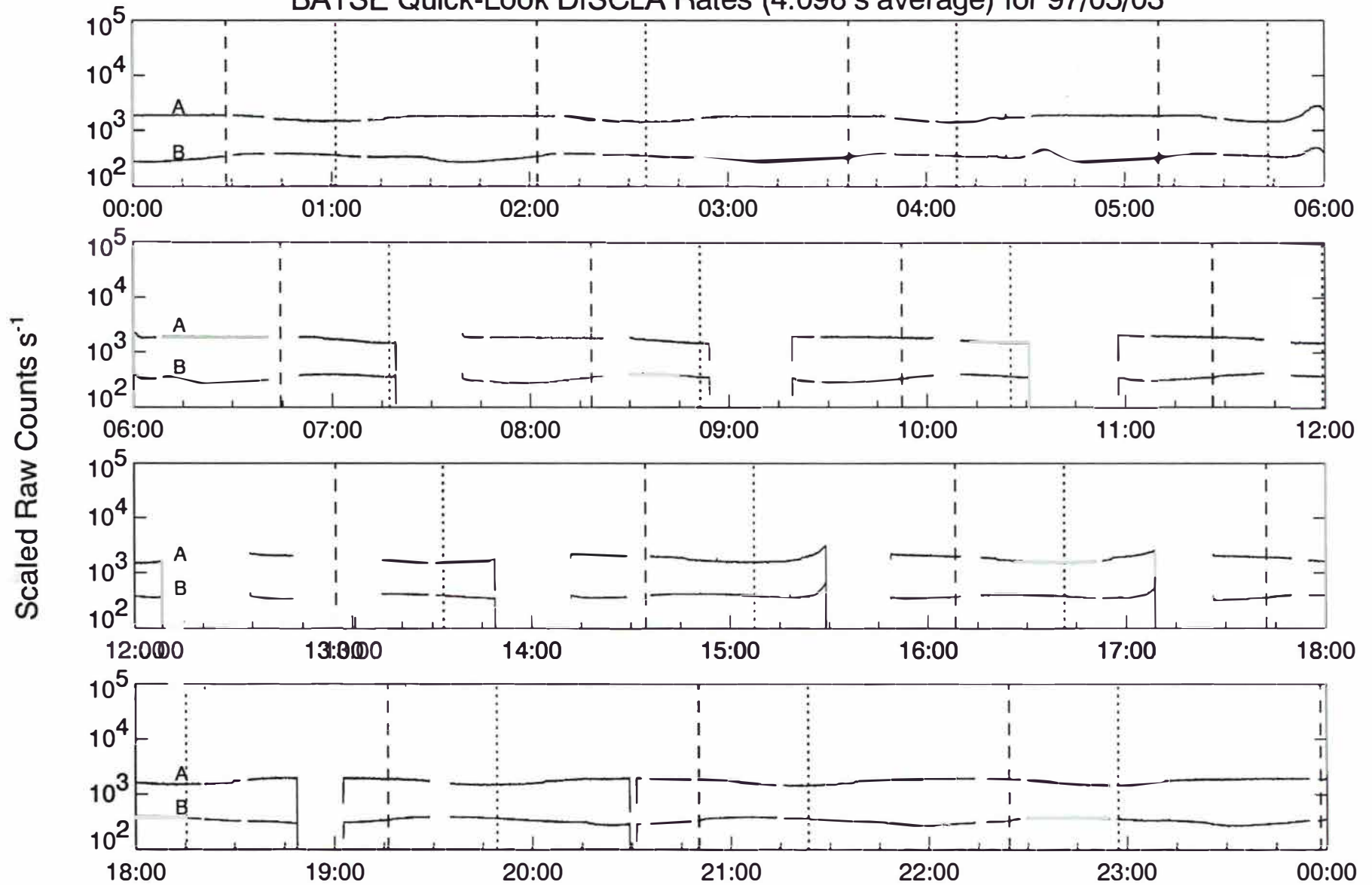
CALIBRATION DATA INCLUDED



UNIV AL TIME



BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/03

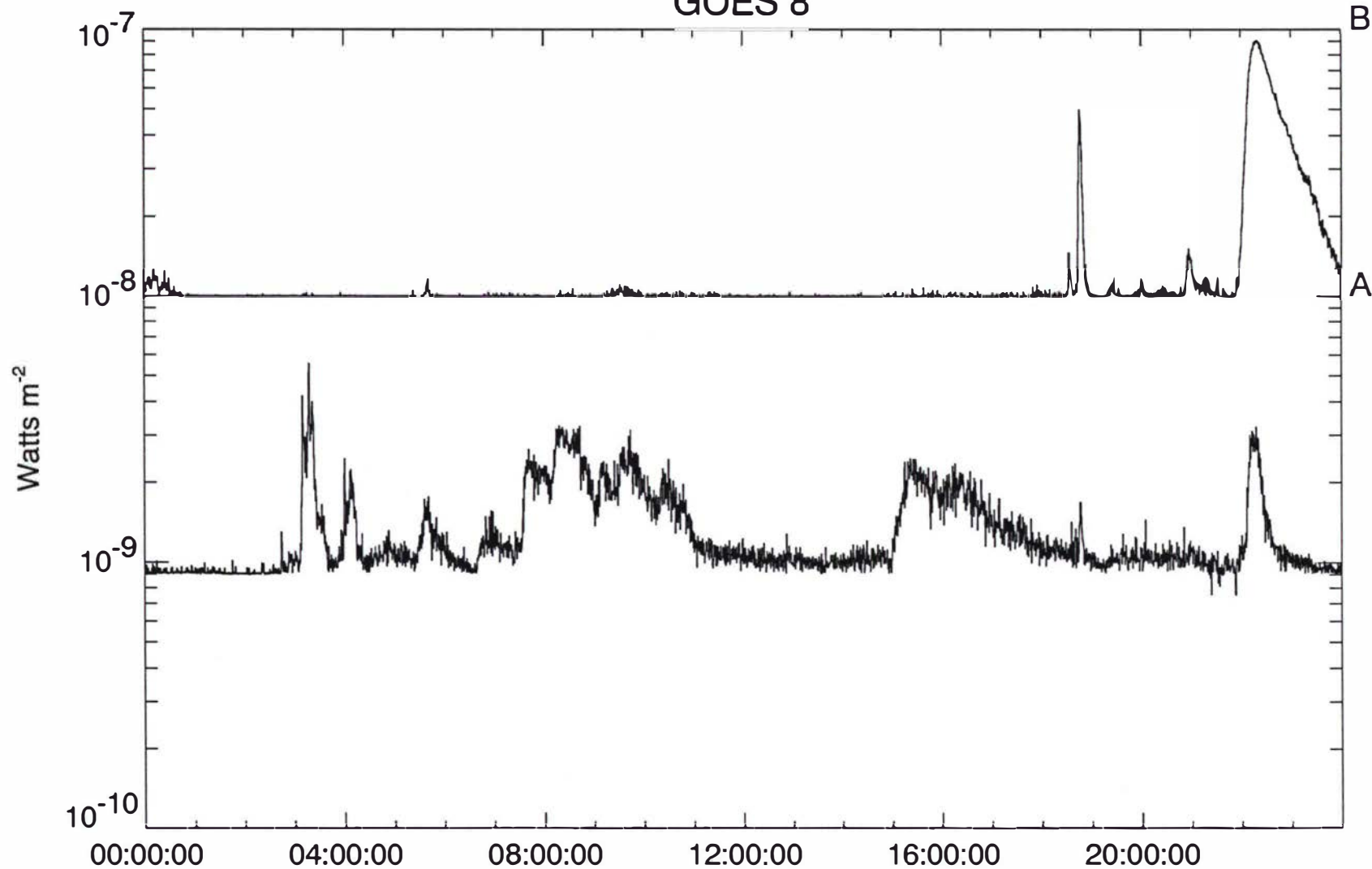


Current Time: 97/05/07, 1008 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

GOES 8



Data Start: 97/05/03, 0000:00

Plot created: 97/05/07, 1007

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

From SAHI@fender.msfc.nasa.gov Mon May 5 09:32 PDT 1997
Return-Path: <SAHI@fender.msfc.nasa.gov>
Received: from FENDER.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id JAA11607; Mon, 5 May 1997 09:32:15 -0700
From: SAHI@fender.msfc.nasa.gov
Date: Mon, 5 May 1997 11:30:46 -0500 (CDT)
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970505113046.21e078b6@fender.msfc.nasa.gov>
Subject: Crossing Windows for BATSE Burst 6219
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6219
EVENT OF 1997 MAY 3 DAY OF YEAR=123
EVENT CROSSING TIME AT BATSE : 20769. S. OR 05:46:09.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 171.000 70.000
BATSE PEAK COUNTING RATE: 6000 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 3/ 5/ 97 IS:
RA= 151.462 DEC= 32.830 DIST= 4.792 AU
BATSE-ULYSSES DISTANCE = 716908639. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=141.29 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-1865.97 SECS.
CROSSING TIME AT ULYSSES IS 18903. S. OR 05:15:03 +/- 281.32 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 3/ 5/ 97 IS:
RA= 168.702 DEC= 6.936 DIST= 0.826 AU
MARS-BATSE DISTANCE = 123536936. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION=116.92 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -186.55 SECS.
CROSSING TIME AT MARS IS 20582. S. OR 05:43:02 +/- 60.96 SECONDS

BATSE BURST TRIGGER

NO.: 6219

TIME: TJD=0571 SECONDS=20769

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=125.7 AZIMUTH=255.7 ERROR=9.5 DEGREES

COMMENTS:

BURST, SINGLE SPIKE, DUR.~0.05 SECS. WEAKLY VISIBLE ABOVE 300 KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6219	970503	10571	20769	6000	171	+70	.05

BATSE BURST# 6219

ULYSSES RT

5 / 5 / 97

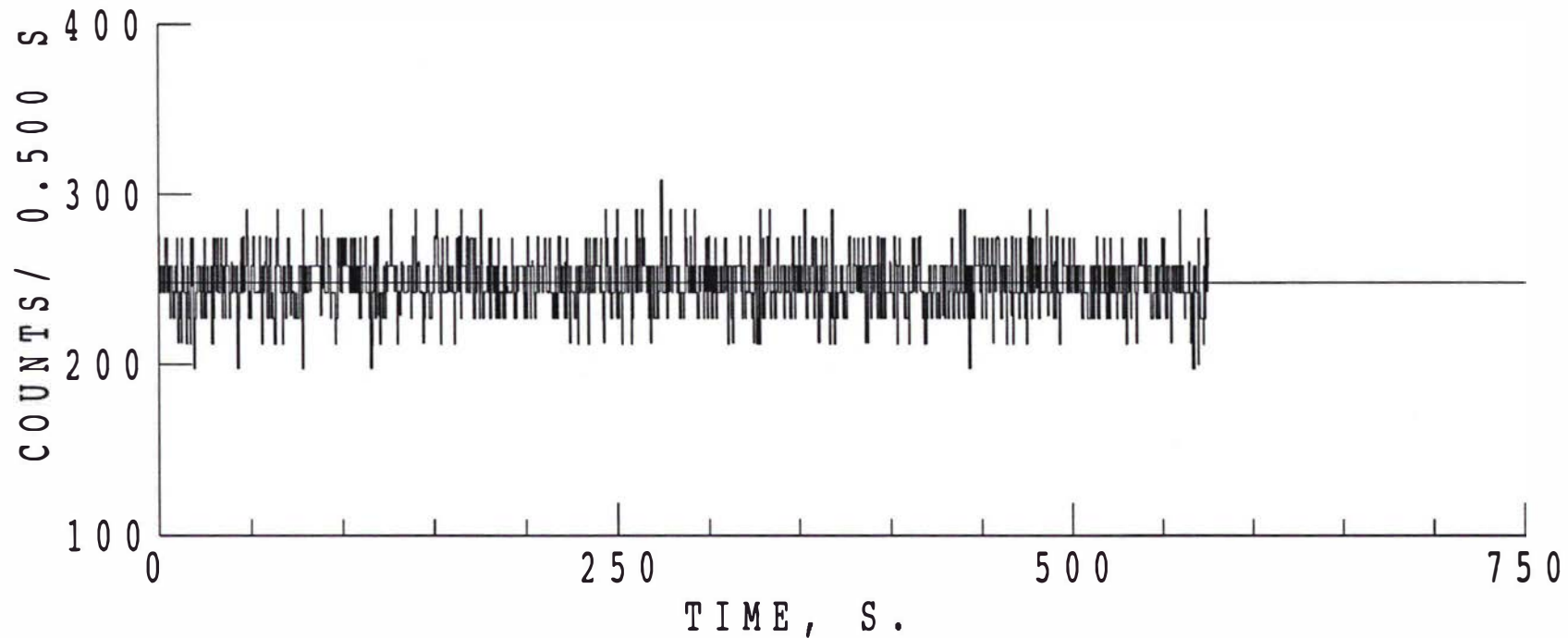
3 / 5 / 97 18612.154 s

0.250 S INTERVALS REGROUPED BY 2

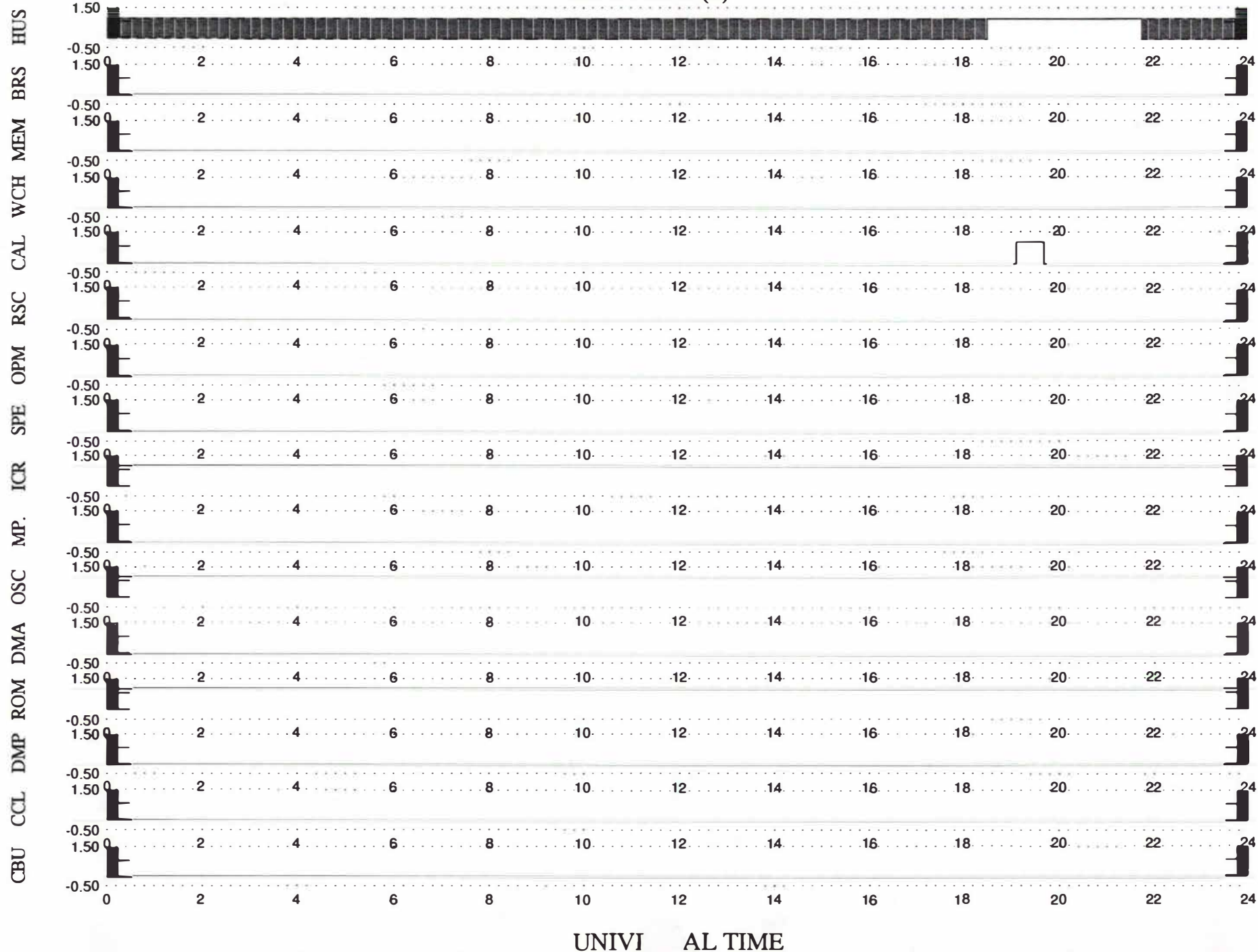
0 - 0 keV

W= 10 M=10
>4.0 SIGMA FLUCTUATIONS

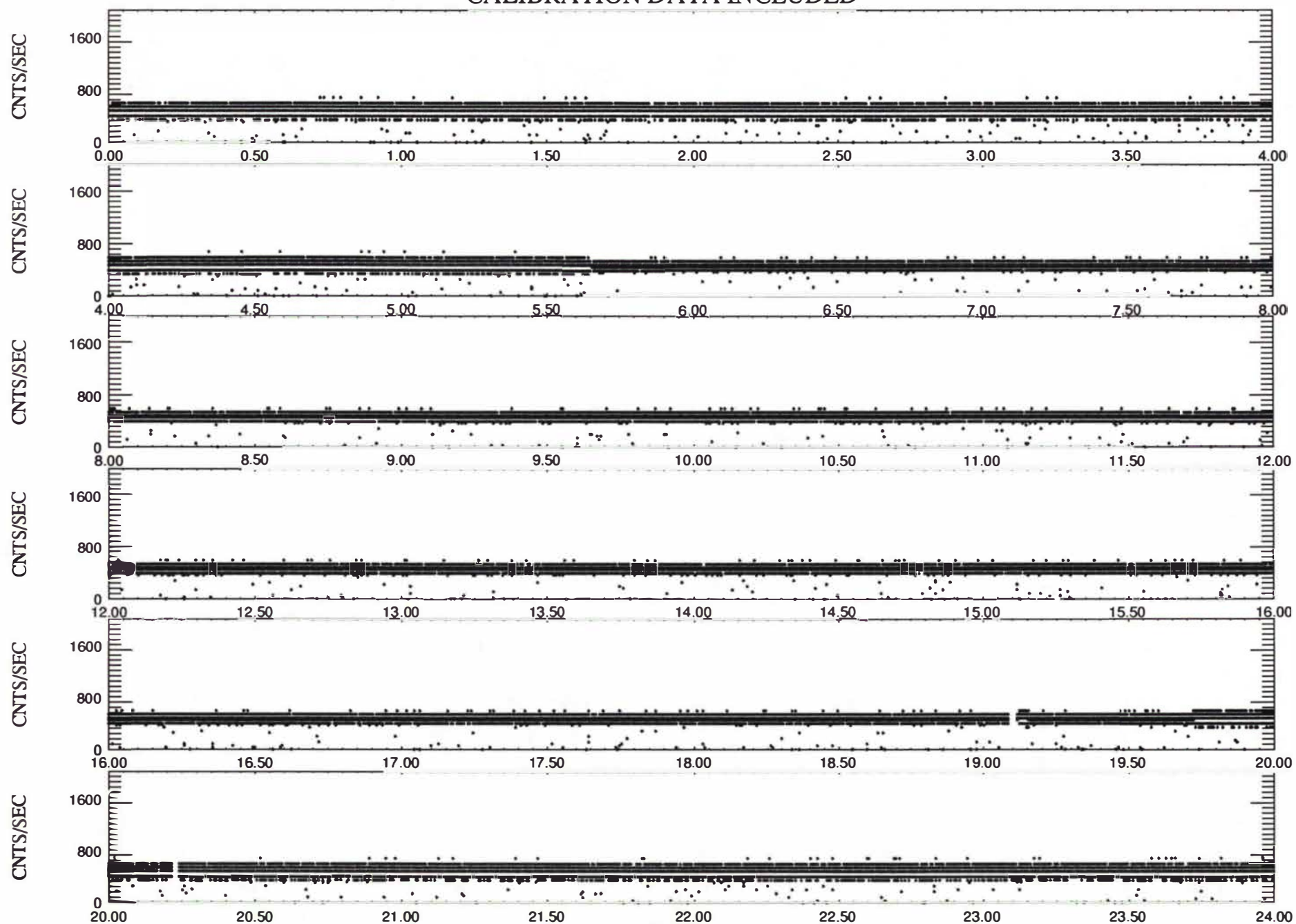
W= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



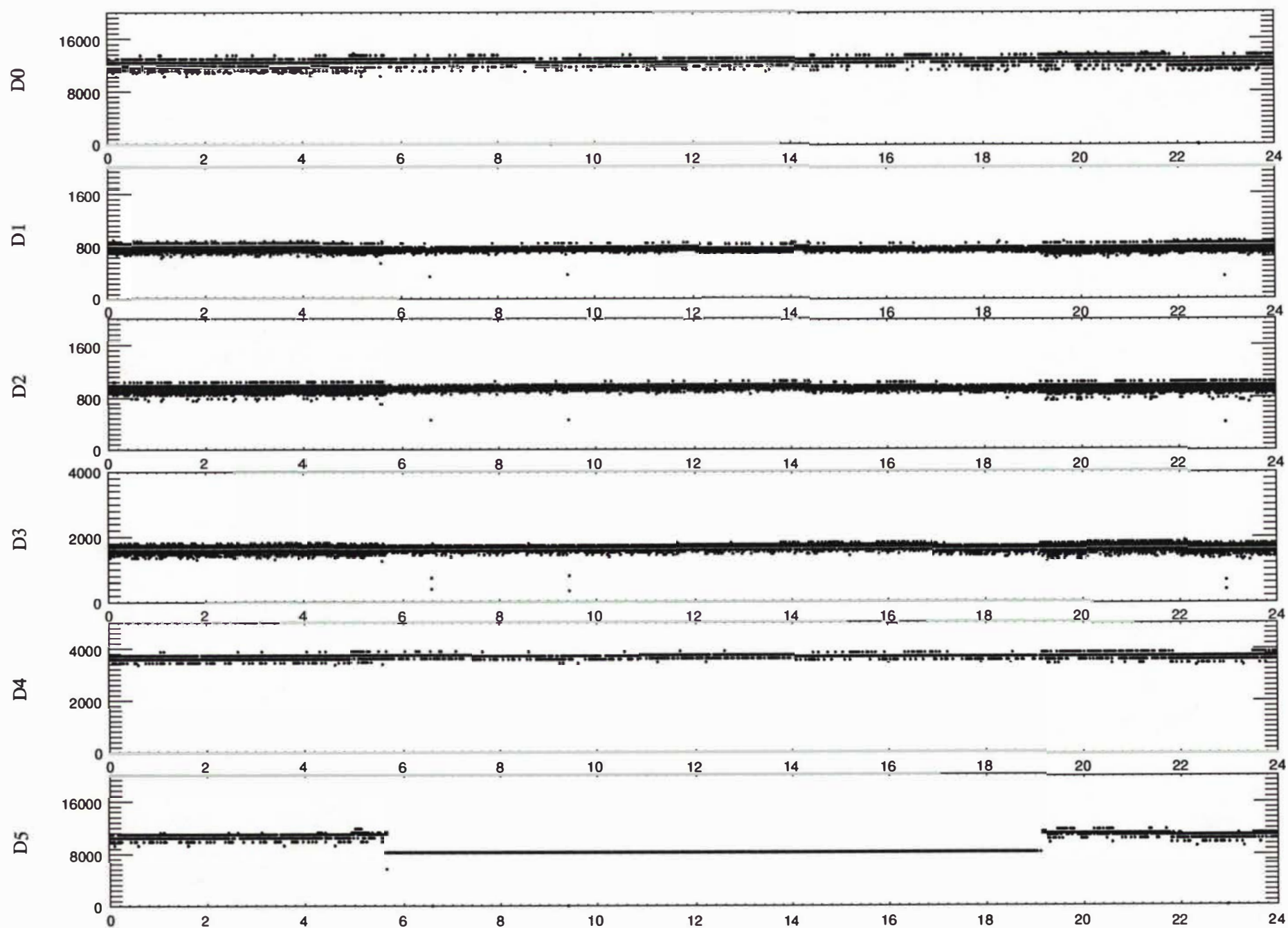
NO BURST (8)



CALIBRATION DATA INCLUDED



UNIV AL TIME



UNIV. AL TIME

SAX

HUS DATA

19 / 07 / 05

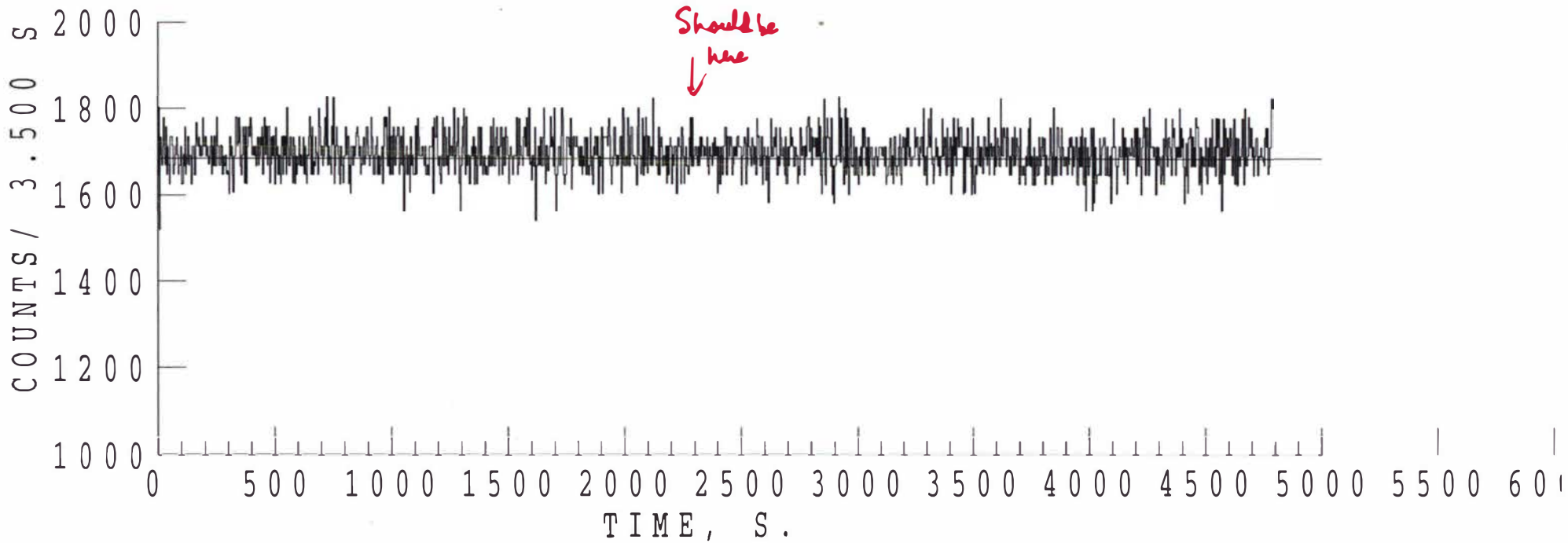
ULYSSES RT

04 / 05 / 97 27216.268 s

0.500 S INTERVALS REGROUPED BY 7

0 - 0 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



From HENZE@ssl.msfc.nasa.gov Tue May 6 11:05 PDT 1997
Return-Path: <HENZE@ssl.msfc.nasa.gov>
Received: from SSLMOR.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id LAA23227; Tue, 6 May 1997 11:04:57 -0700
From: HENZE@ssl.msfc.nasa.gov
Date: Tue, 6 May 1997 13:04:53 -0500 (CDT)
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970506130453.21c0a663@ssl.msfc.nasa.gov>
Subject: Crossing Windows for BATSE Burst 6220
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6220
EVENT OF 1997 MAY 4 DAY OF YEAR=124
EVENT CROSSING TIME AT BATSE : 46491. S. OR 12:54:51.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 165.000 -30.000
BATSE PEAK COUNTING RATE: 4000 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 4/ 5/ 97 IS:
RA= 151.376 DEC= 32.684 DIST= 4.815 AU
BATSE-ULYSSES DISTANCE = 720348976. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=116.00 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-1053.37 SECS.
CROSSING TIME AT ULYSSES IS 45438. S. OR 12:37:17 +/- 408.95 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 4/ 5/ 97 IS:
RA= 168.749 DEC= 6.871 DIST= 0.832 AU
MARS-BATSE DISTANCE = 124517584. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION=142.95 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -331.51 SECS.
CROSSING TIME AT MARS IS 46159. S. OR 12:49:19 +/- 38.41 SECONDS

BATSE BURST TRIGGER

NO.: 6220

TIME: TJD=0572 SECONDS=46491

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=030.1 AZIMUTH=220.5 ERROR=004.9 DEGREES

COMMENTS:

SINGLE PULSE, TOTAL DUR. ~8 S. NOT VISIBLE ABOVE 300 KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6220	970504	10572	46491	4000	165	-30	8

BATSE BURST# 6220

ULYSSES RT

6 / 5 / 97

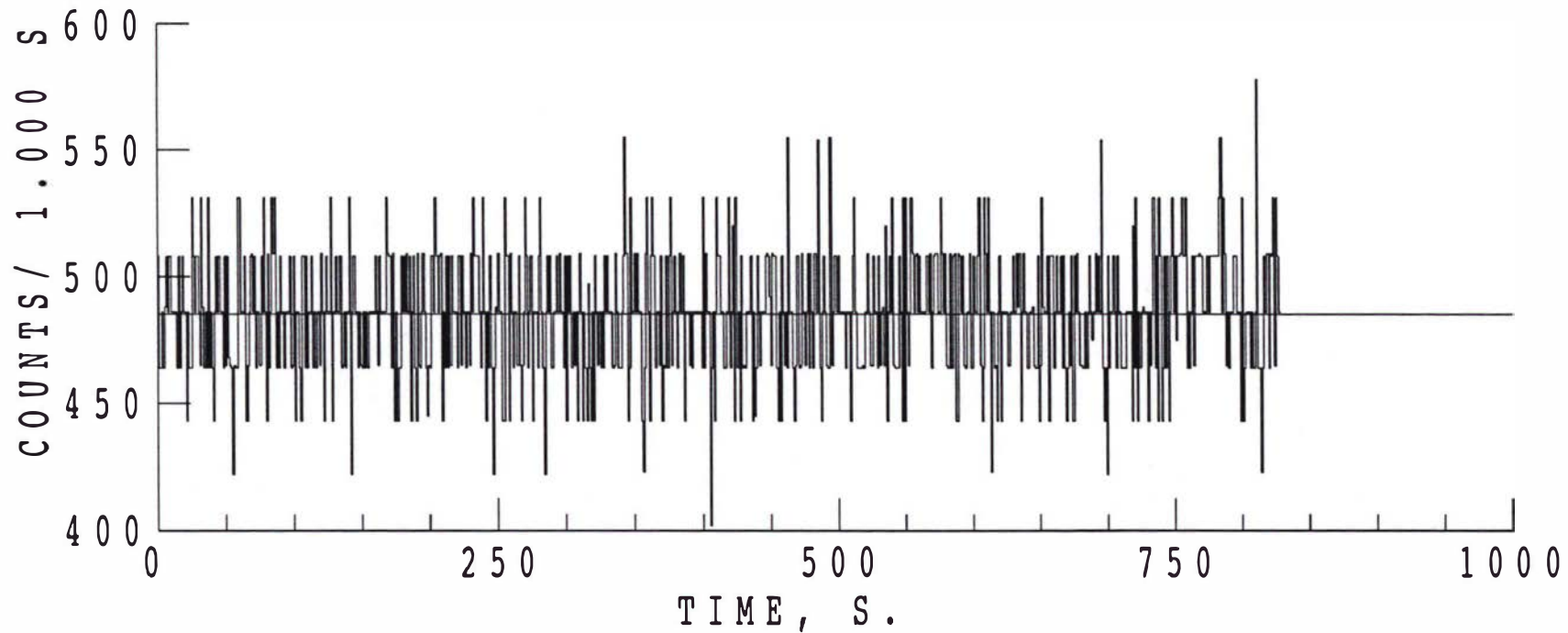
4 / 5 / 97 45036.480 s

0.500 S INTERVALS REGROUPED BY 2

0 - 0 keV

N= 10 M=10
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



From HENZE@ssl.msfc.nasa.gov Tue May 6 11:08 PDT 1997
Return-Path: <HENZE@ssl.msfc.nasa.gov>
Received: from SSLMOR.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id LAA23274; Tue, 6 May 1997 11:08:12 -0700
From: HENZE@ssl.msfc.nasa.gov
Date: Tue, 6 May 1997 13:08:08 -0500 (CDT)
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970506130808.21c0a663@ssl.msfc.nasa.gov>
Subject: Crossing Windows for BATSE Burst 6221
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6221
EVENT OF 1997 MAY 4 DAY OF YEAR=124
EVENT CROSSING TIME AT BATSE : 84644. S. OR 23:30:44.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 157.000 -10.000
BATSE PEAK COUNTING RATE: 3400 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 4/ 5/ 97 IS:
RA= 151.347 DEC= 32.633 DIST= 4.823 AU
BATSE-ULYSSES DISTANCE = 721524431. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=137.03 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-1760.94 SECS.
CROSSING TIME AT ULYSSES IS 82883. S. OR 23:01:23 +/- 308.09 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 4/ 5/ 97 IS:
RA= 168.749 DEC= 6.871 DIST= 0.832 AU
MARS-BATSE DISTANCE = 124517584. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION=159.47 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -388.96 SECS.
CROSSING TIME AT MARS IS 84255. S. OR 23:24:15 +/- 19.39 SECONDS

BATSE BURST TRIGGER

NO.: 6221

TIME: TJD=0572 SECONDS=84644

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=045.8 AZIMUTH=243.2 ERROR=004.6 DEGREES

COMMENTS:

MULTIPLE PEAKS, TOTAL DUR. ~29 S, STARTS AT ~T-5 S.
NOT VISIBLE ABOVE 300 KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6221	970504	10572	84644	3400	157	-10	29

BATSE BURST# 6221

ULYSSES RT

6 / 5 / 97

4 / 5 / 97 82584.172 s

0.250 S INTERVALS REGROUPED BY 2

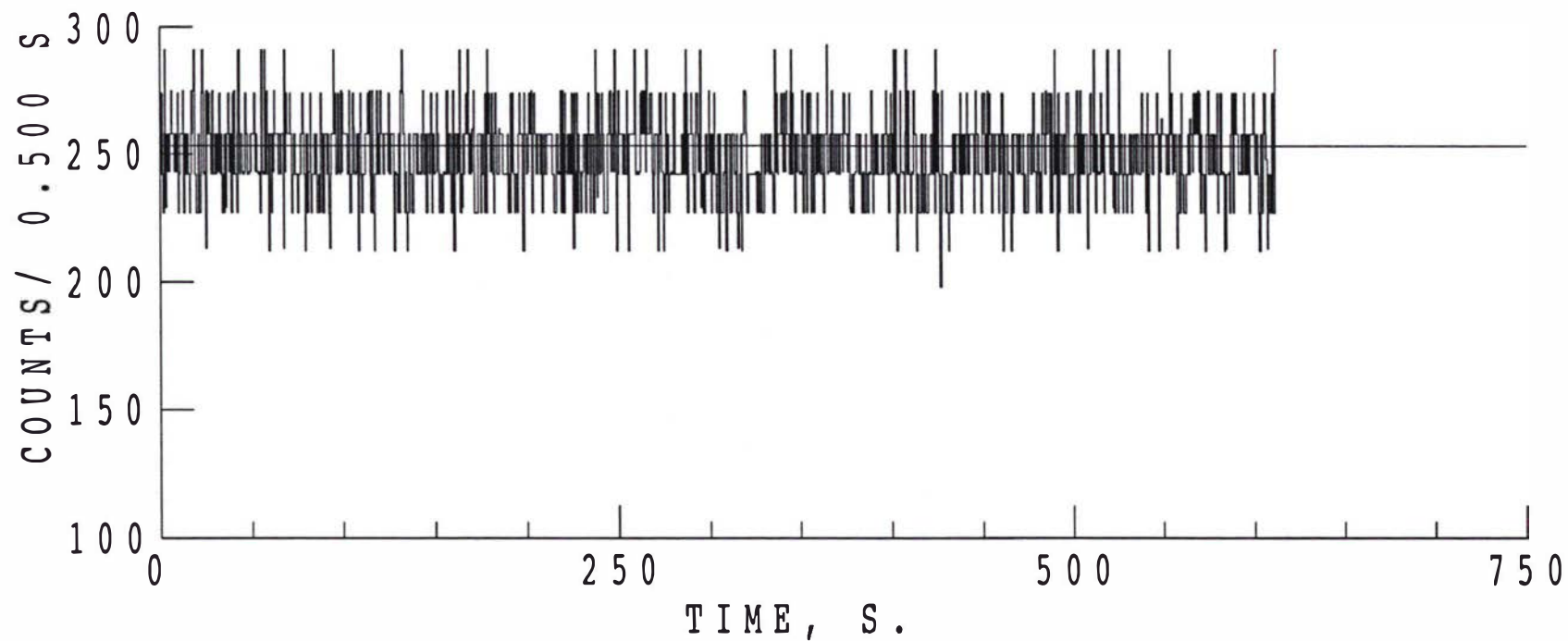
0 - 0 keV

N= 10 M=10

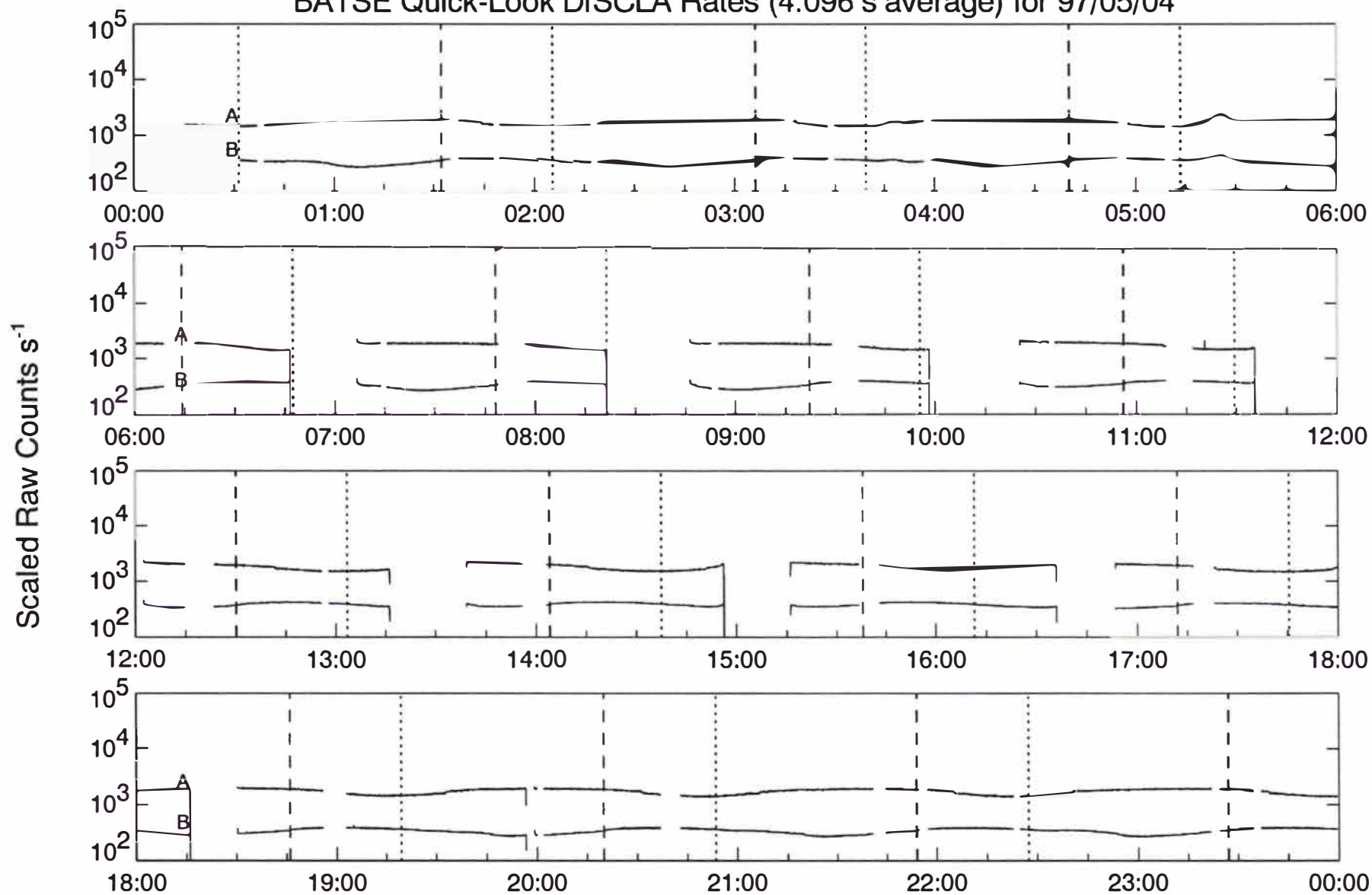
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS



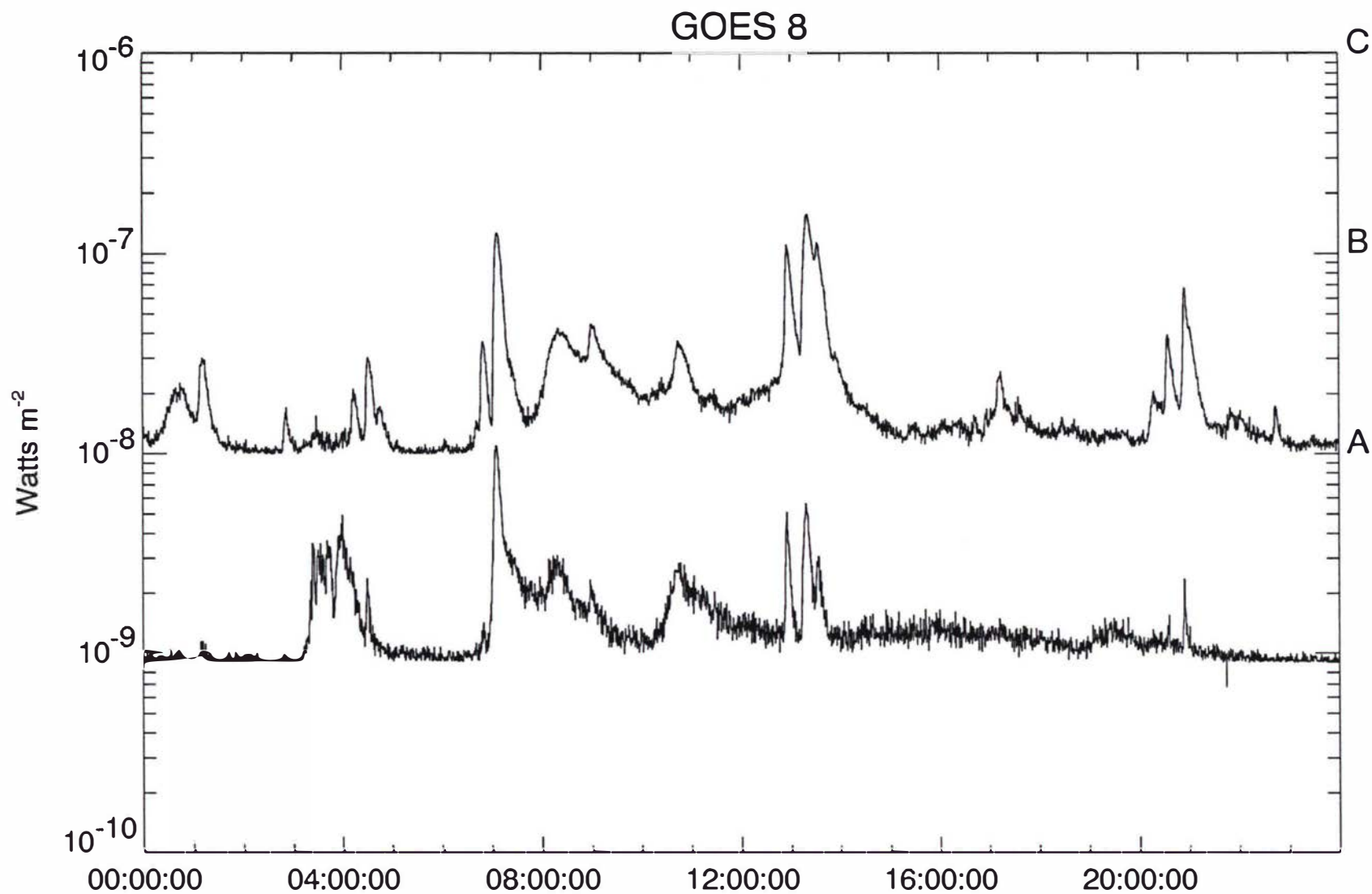
BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/04



Current Time: 97/05/08, 1008 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare



Data Start: 97/05/04, 0000:00

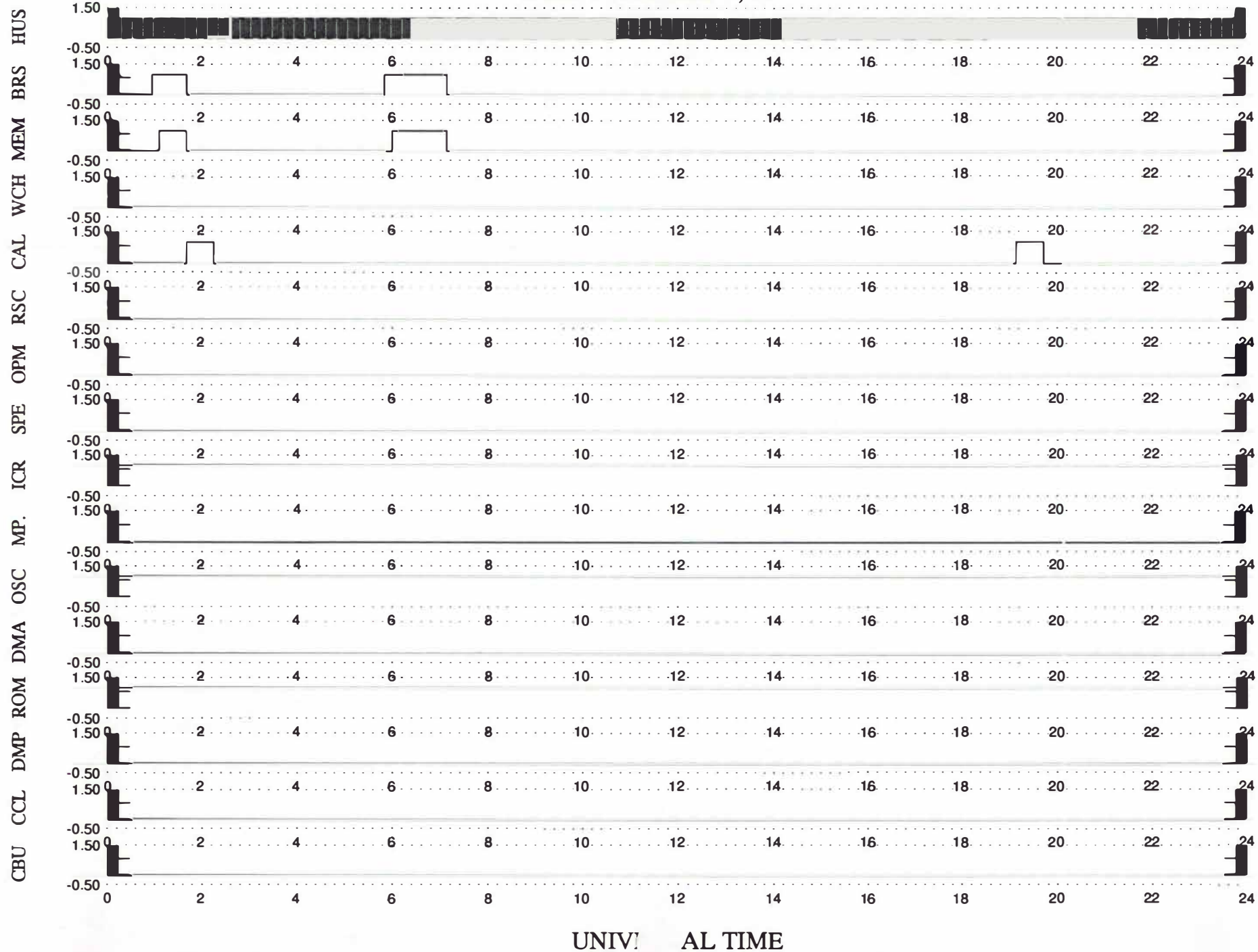
Plot created: 97/05/09, 1455

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

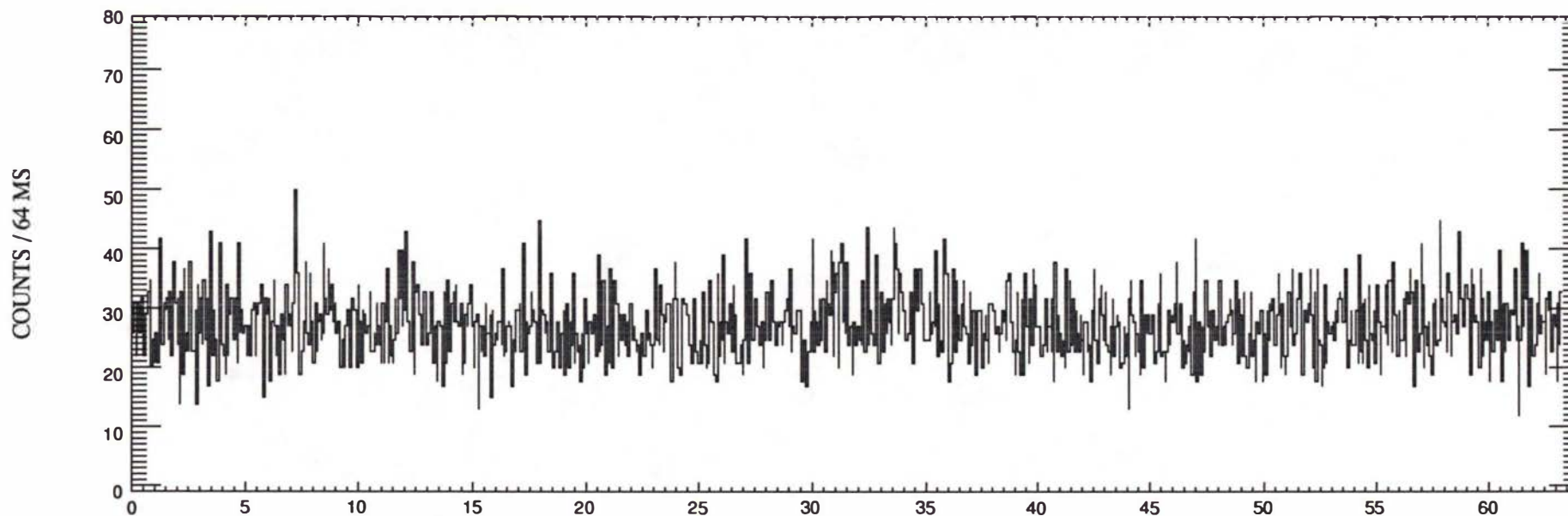
Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

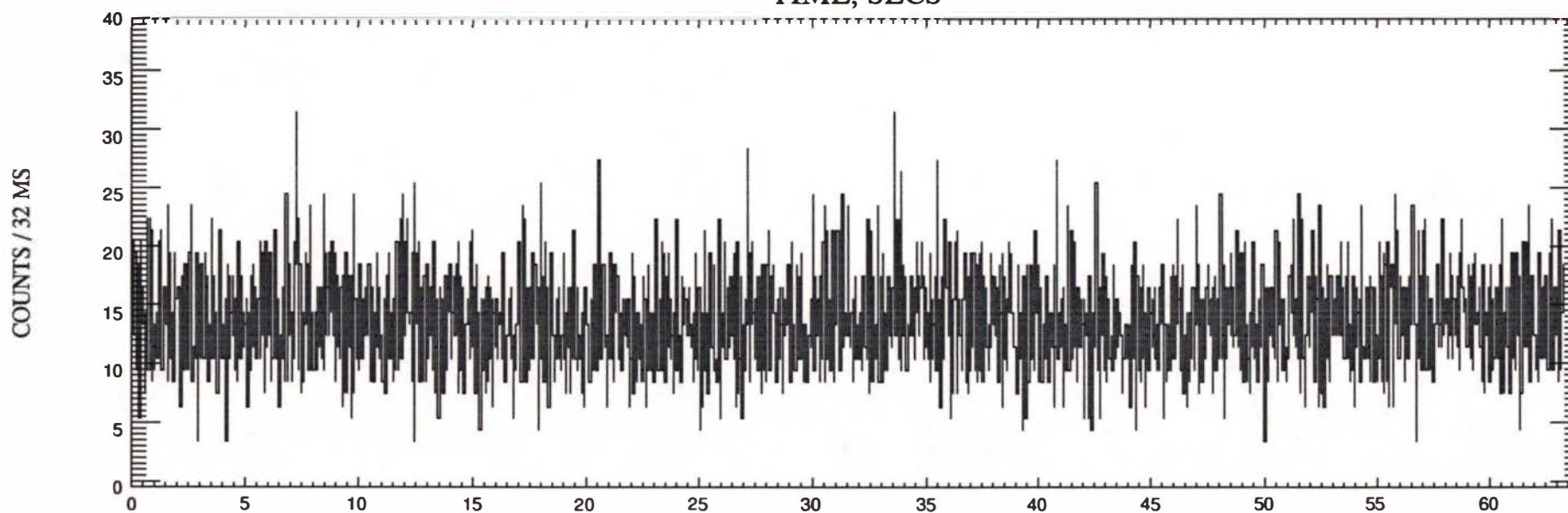
BURST NUMBER 9, 10



Burst Counter 9 at UT= 0.932321298387 h= 3356.357 s 00:55:56.357

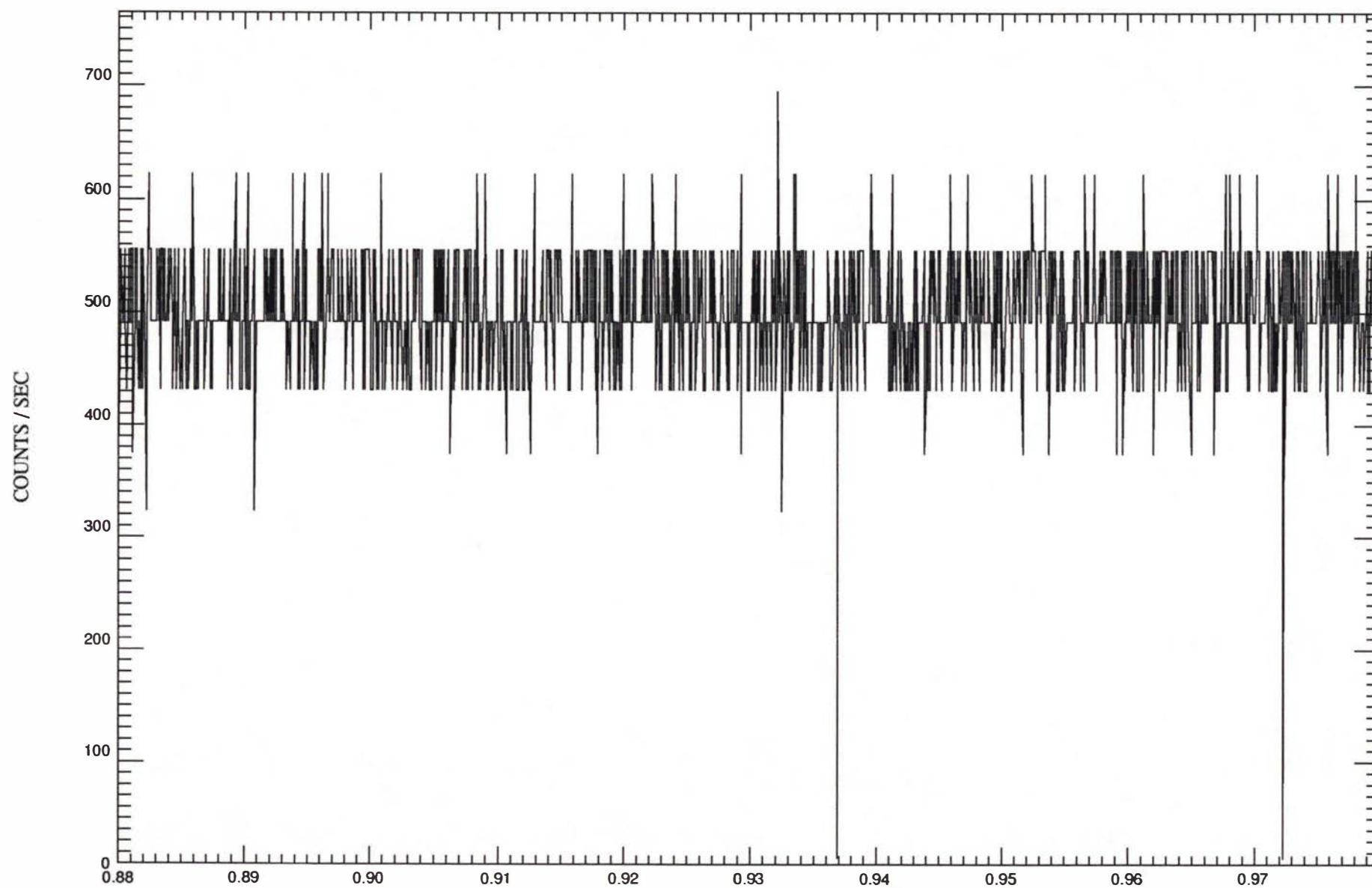


TIME, SECS

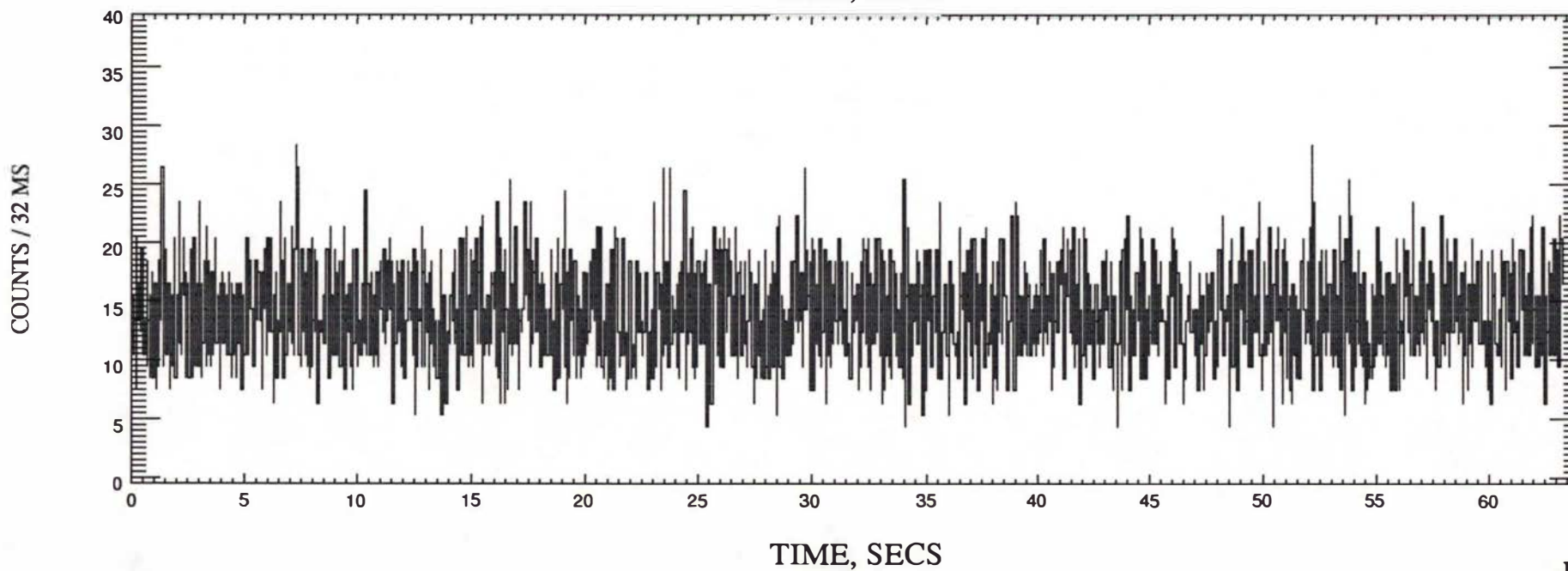
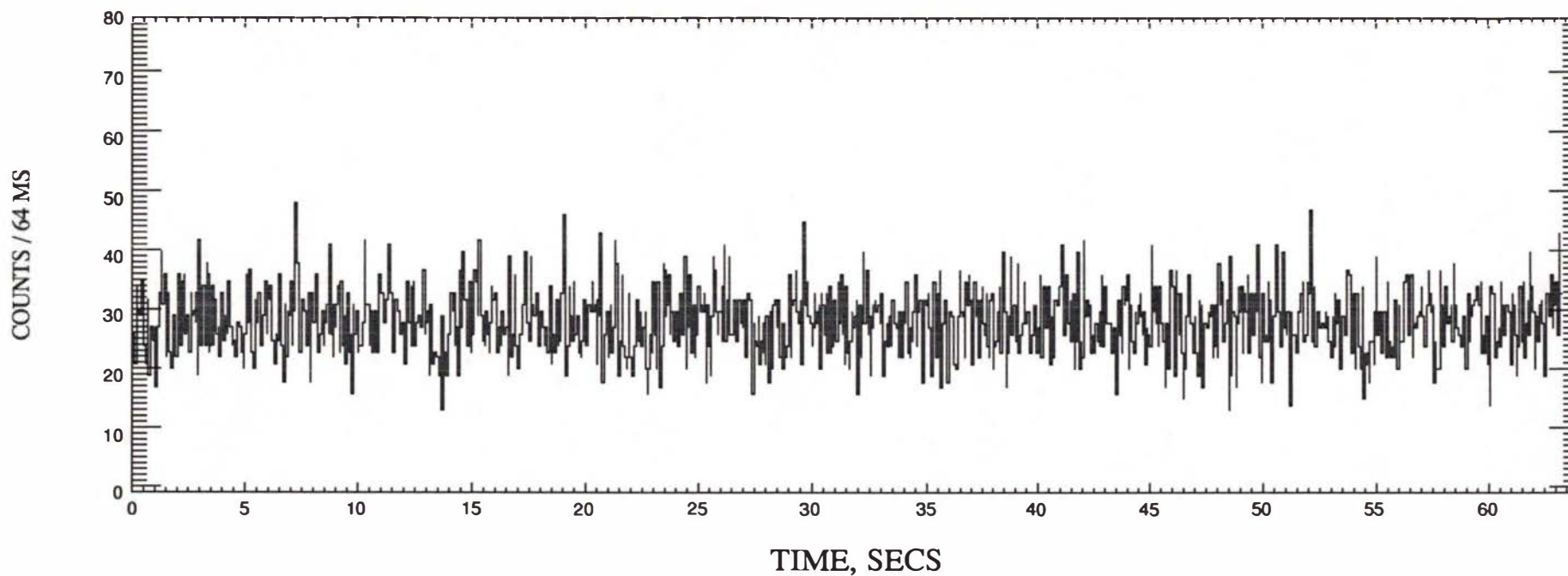


TIME, SECS

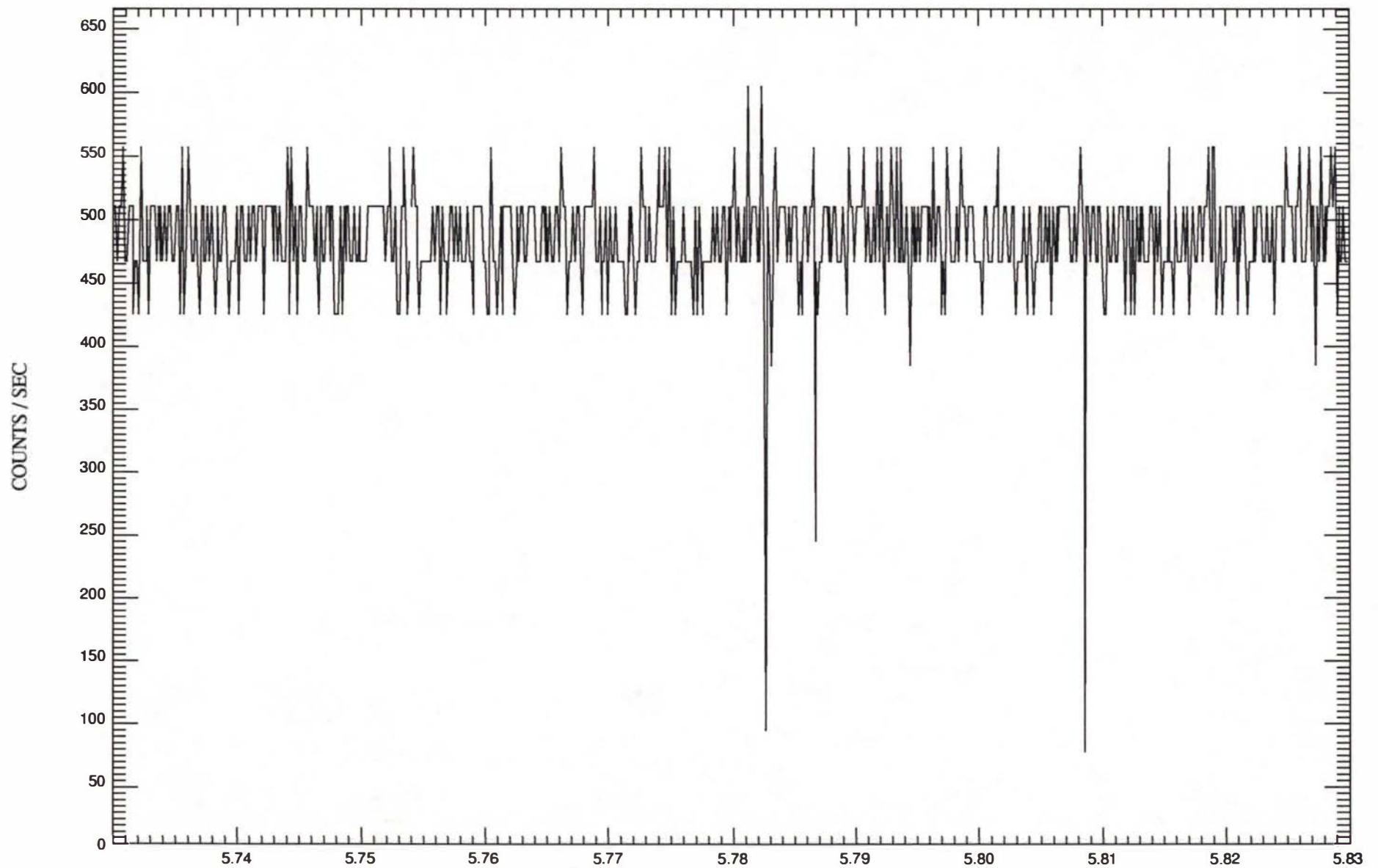
CALIBRATION DATA INCLUDED



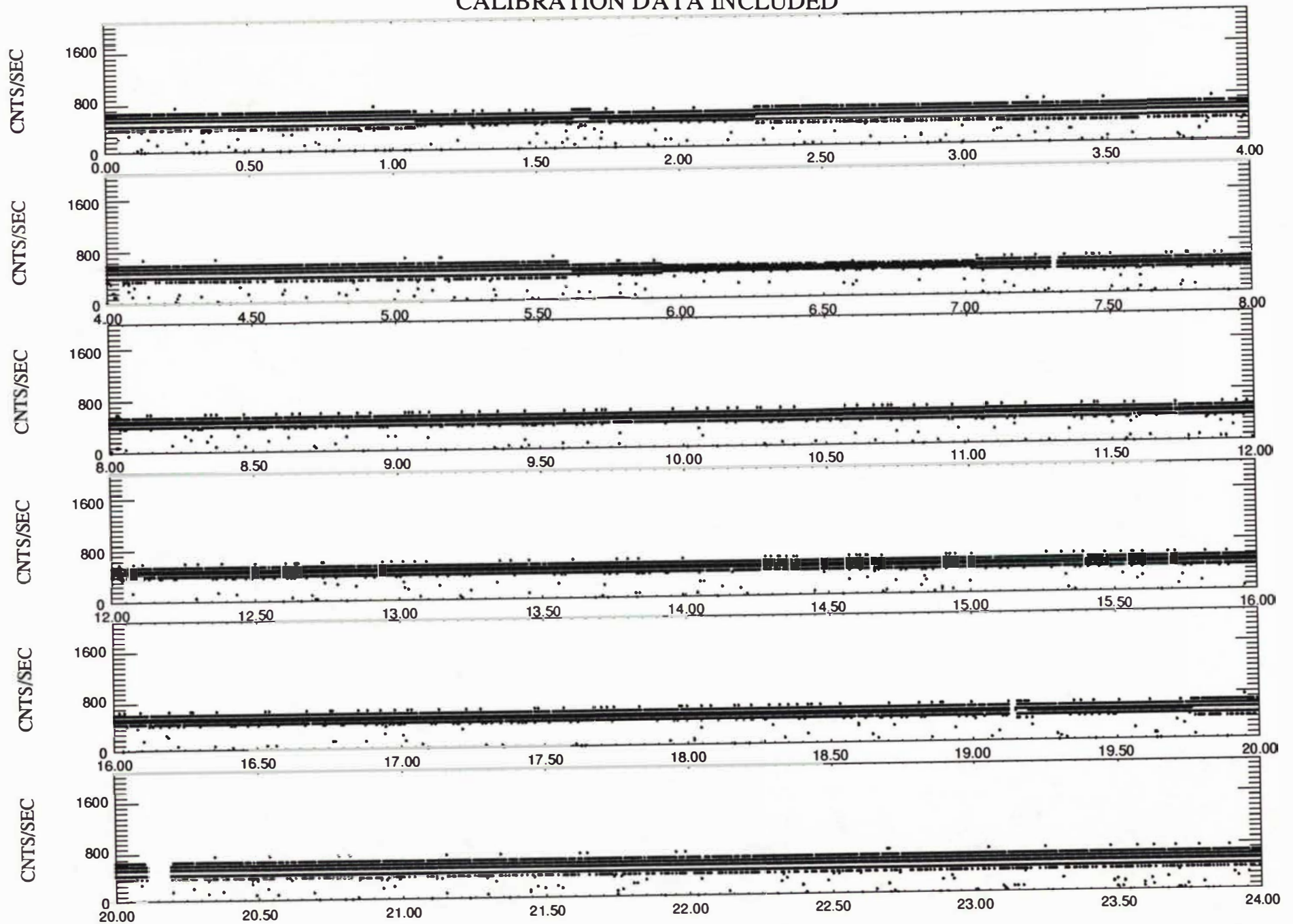
Burst Counter 10 at UT= 5.781404914856 h=20813.058 s 05:46:53.058



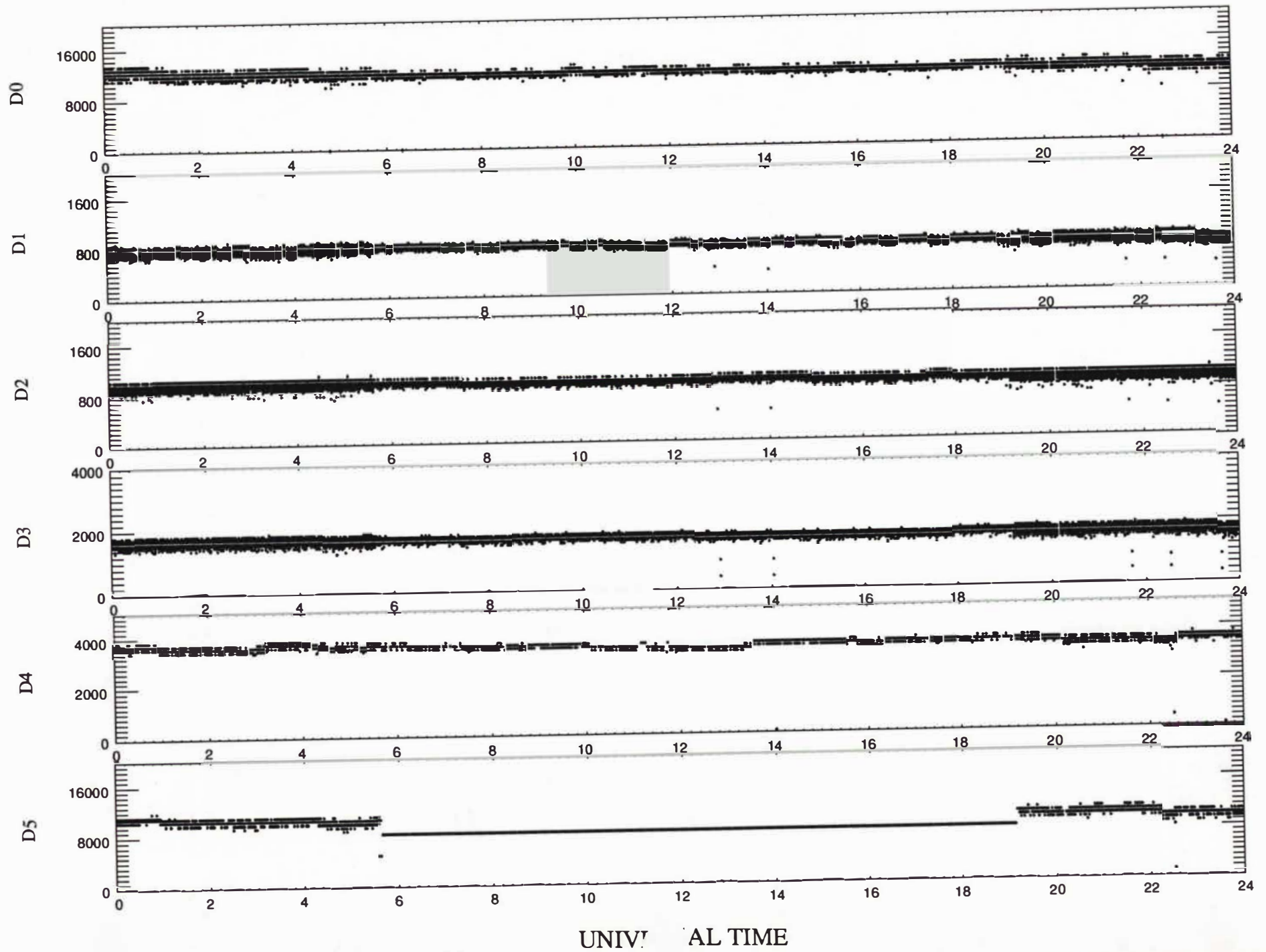
CALIBRATION DATA INCLUDED



CALIBRATION DATA INCLUDED



UNIVERSAL TIME



From WOODSP@SSLLES.MSFC.NASA.GOV Thu May 8 06:37 PDT 1997
Return-Path: <WOODSP@SSLLES.MSFC.NASA.GOV>
Received: from SSLLES.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id GAA09874; Thu, 8 May 1997 06:37:26 -0700
Date: Thu, 8 May 1997 8:37:14 -0500 (CDT)
From: WOODSP@ssl.msfc.nasa.gov
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970508083714.21c0fb18@ssl.msfc.nasa.gov>
Subject: Crossing Windows for BATSE Burst 6222
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6222
EVENT OF 1997 MAY 5 DAY OF YEAR=125
EVENT CROSSING TIME AT BATSE : 5358. S. OR 01:29:18.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 265.000 18.000
BATSE PEAK COUNTING RATE: 3500 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 5/ 5/ 97 IS:
RA= 151.342 DEC= 32.624 DIST= 4.824 AU
BATSE-ULYSSES DISTANCE = 721739220. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 81.09 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 372.73 SECS.
CROSSING TIME AT ULYSSES IS 5731. S. OR 01:35:30 +/- 468.59 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 5/ 5/ 97 IS:
RA= 168.808 DEC= 6.803 DIST= 0.839 AU
MARS-BATSE DISTANCE = 125508320. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 86.26 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 27.32 SECS.
CROSSING TIME AT MARS IS 5385. S. OR 01:29:45 +/- 72.94 SECONDS

BATSE BURST TRIGGER

NO.: 6222

TIME: TJD=0573 SECONDS=5358

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=125.6 AZIMUTH=160.0 ERROR=3.2 DEGREES

COMMENTS:

GRB LASTING ~ 50 SEC. SINGLE PULSE WITH MULTIPLE PEAKS AND AN
EXTENDED SOFT TAIL. NOT VISIBLE ABOVE 300 KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6222	970505	10573	05358	3500	265	+18	50

BATSE BURST# 6222

ULYSSES RT

8 / 5 / 97

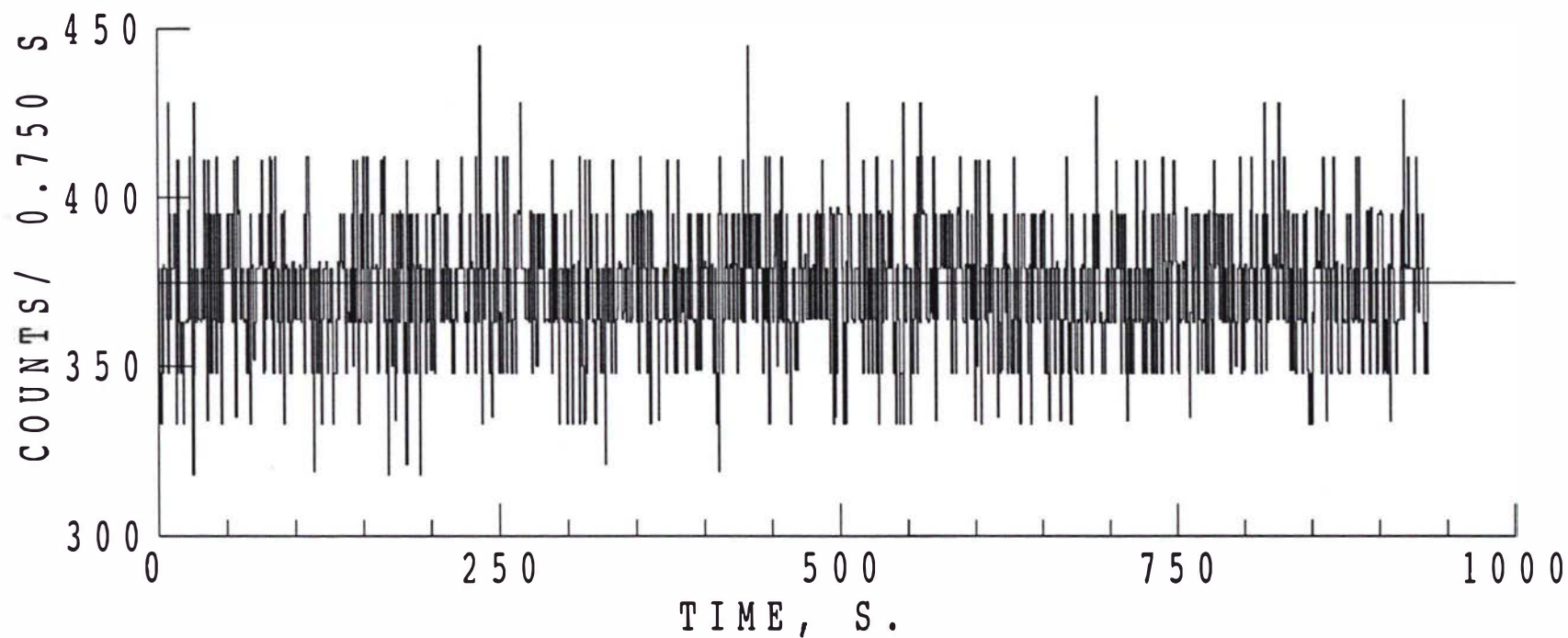
5 / 5 / 97 5256.029 s

0.250 S INTERVALS REGROUPED BY 3

0 - 0 keV

W= 10 M=10
>4.0 SIGMA FLUCTUATIONS

W= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



KONUS

ULYSSES RT

15 / 02 / 00

05 / 05 / 97 43848.477 s

0.500 S INTERVALS REGROUPED BY 7

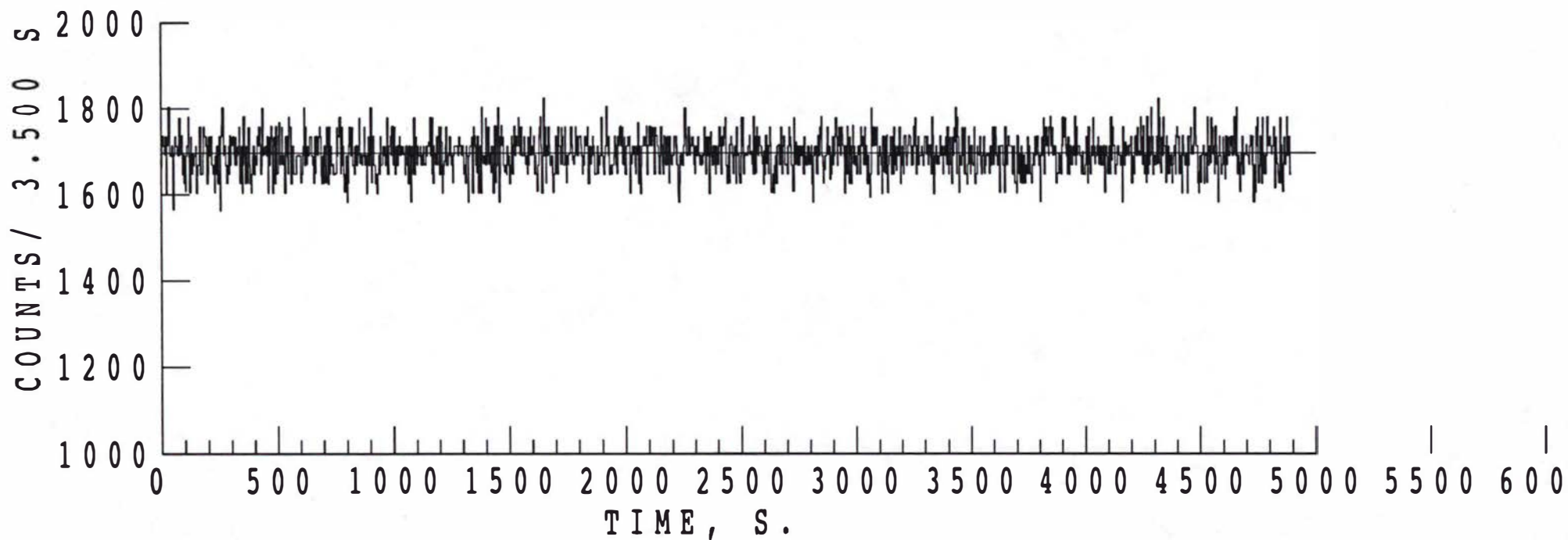
0 - 0 keV

N= 10 M= 10

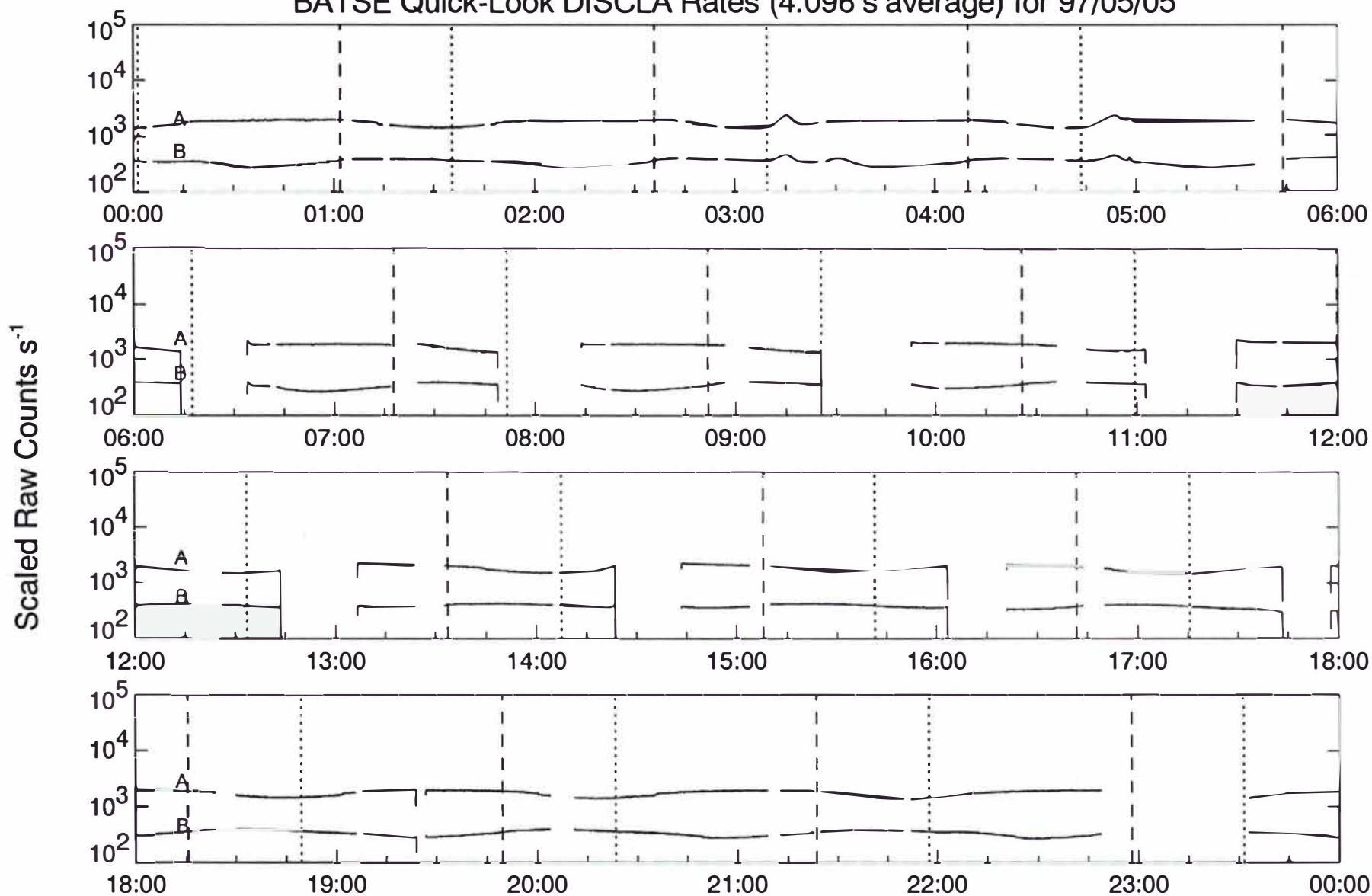
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS



BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/05

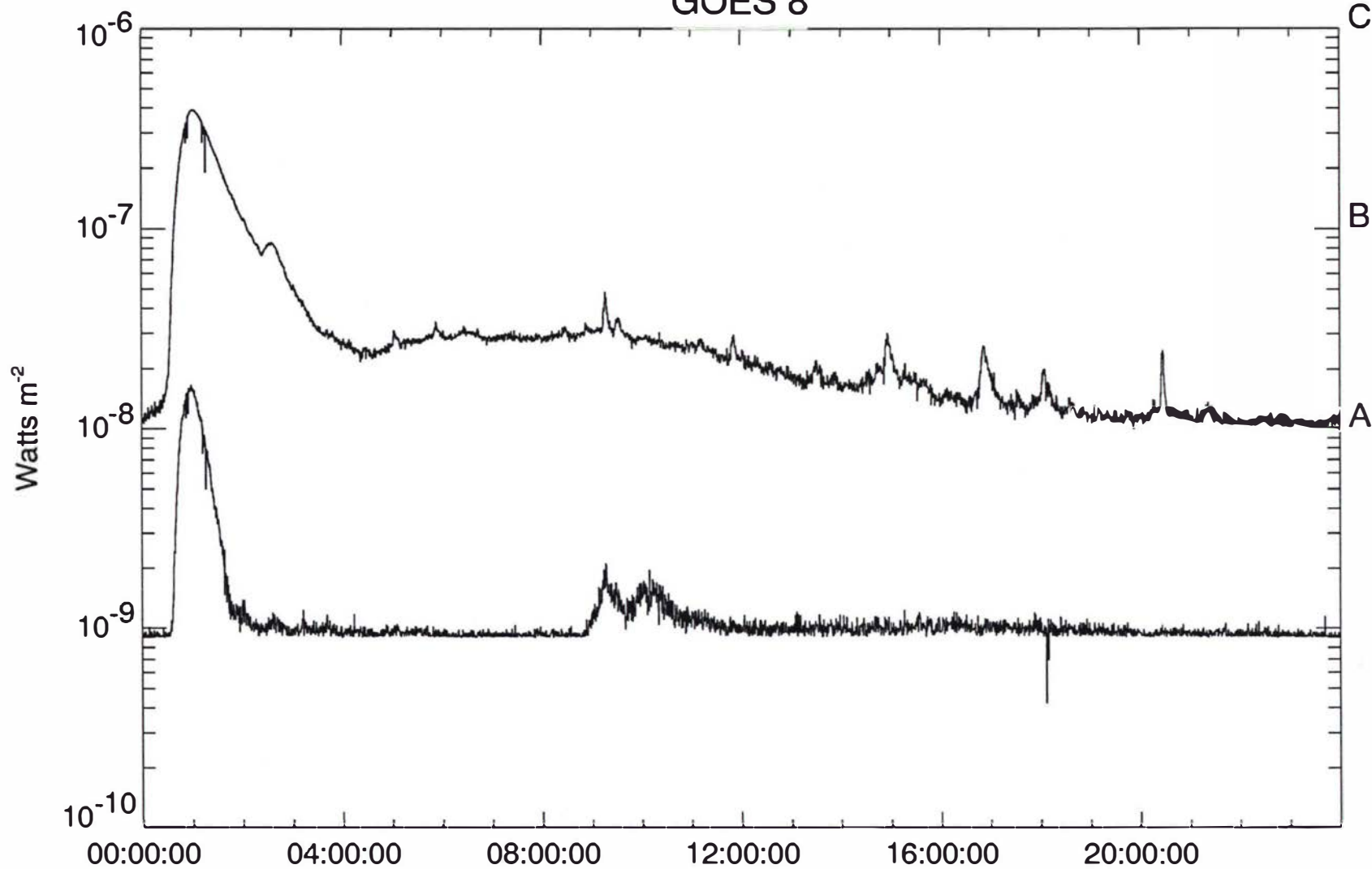


Current Time: 97/05/09, 1008 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

GOES 8



Data Start: 97/05/05, 0000:00

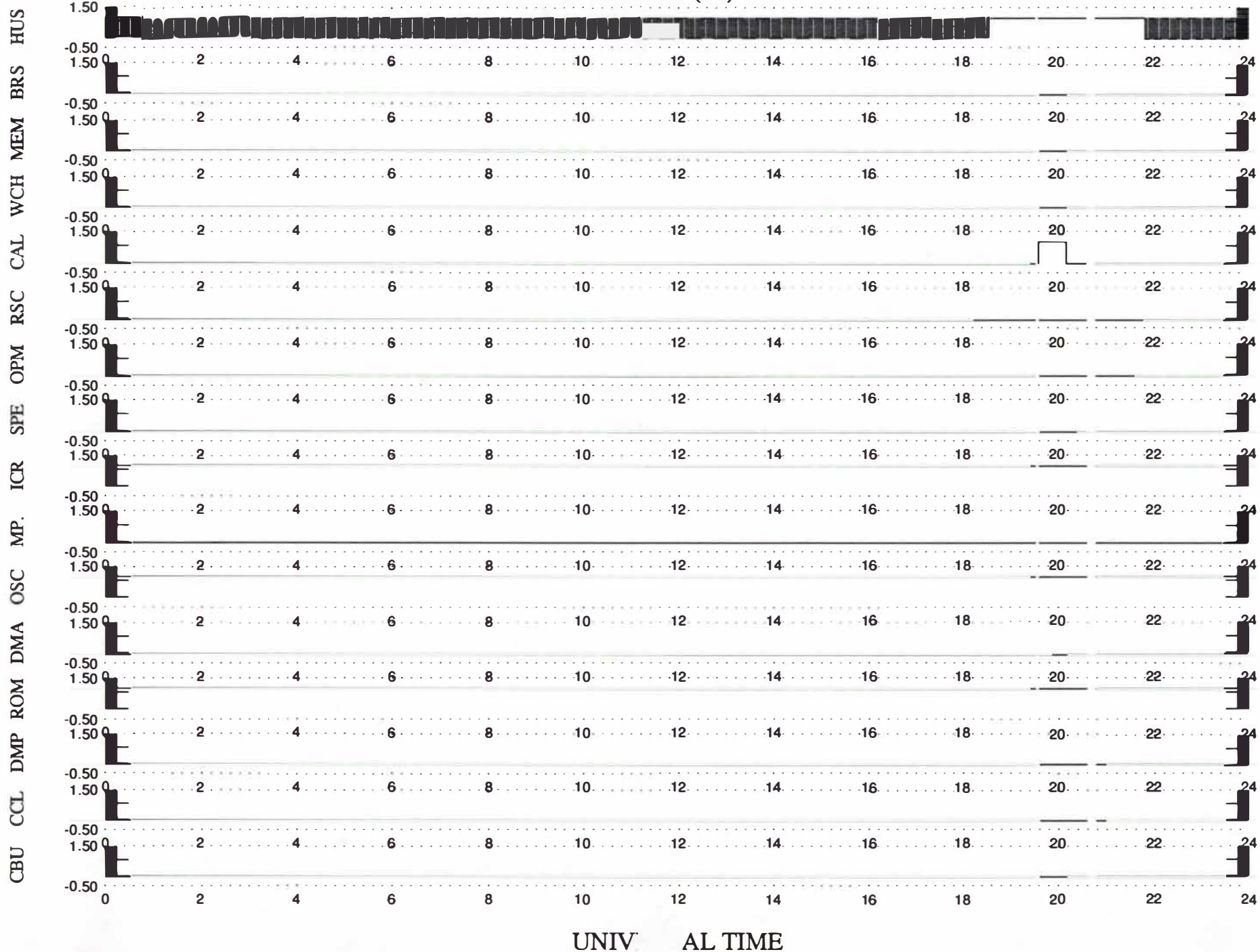
Plot created: 97/05/09, 1007

Channel

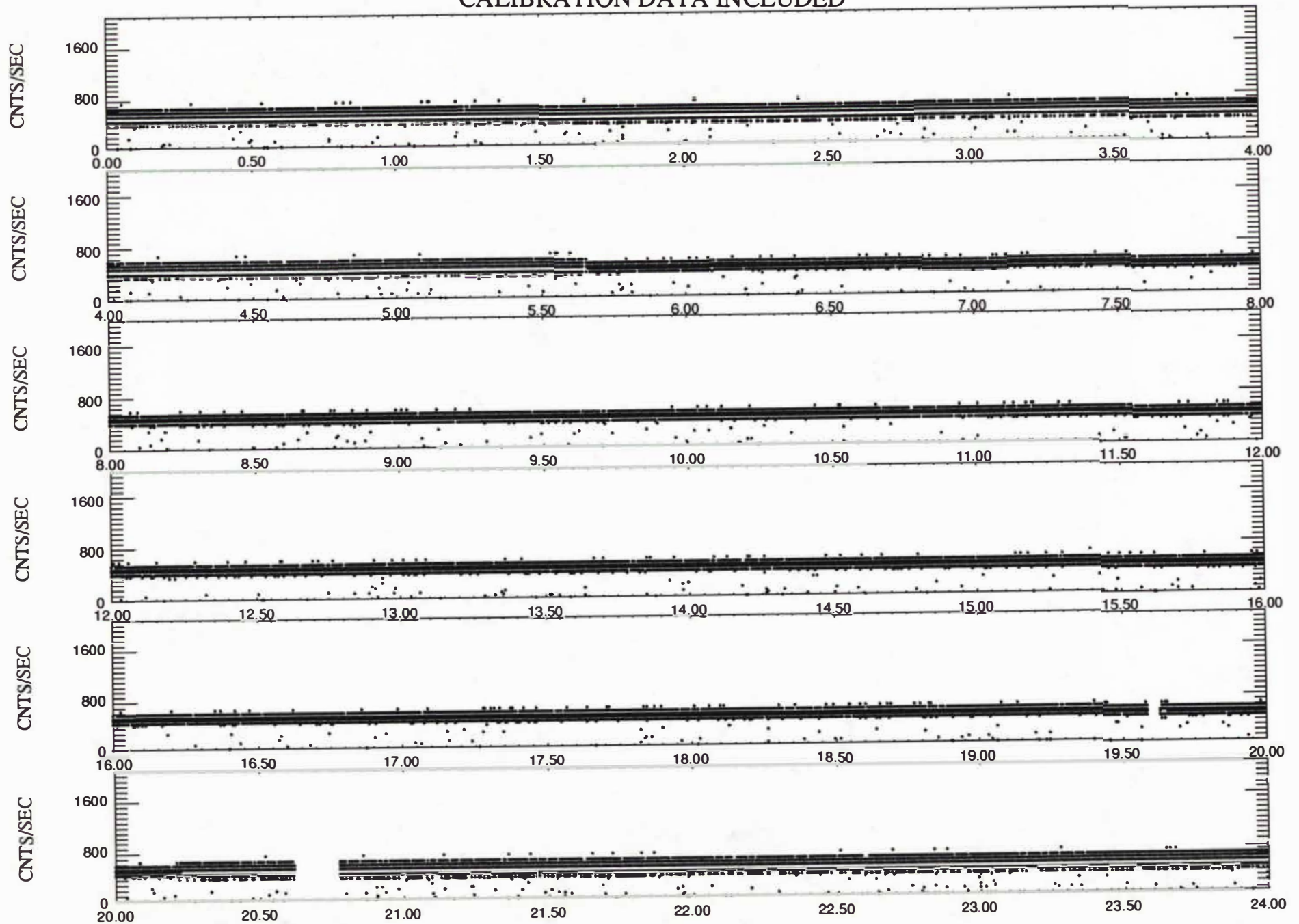
1 {1.0 - 8.0 Angstroms}
2 {0.5 - 4.0 Angstroms}

Background not subtracted
Background not subtracted
Sample average = 10

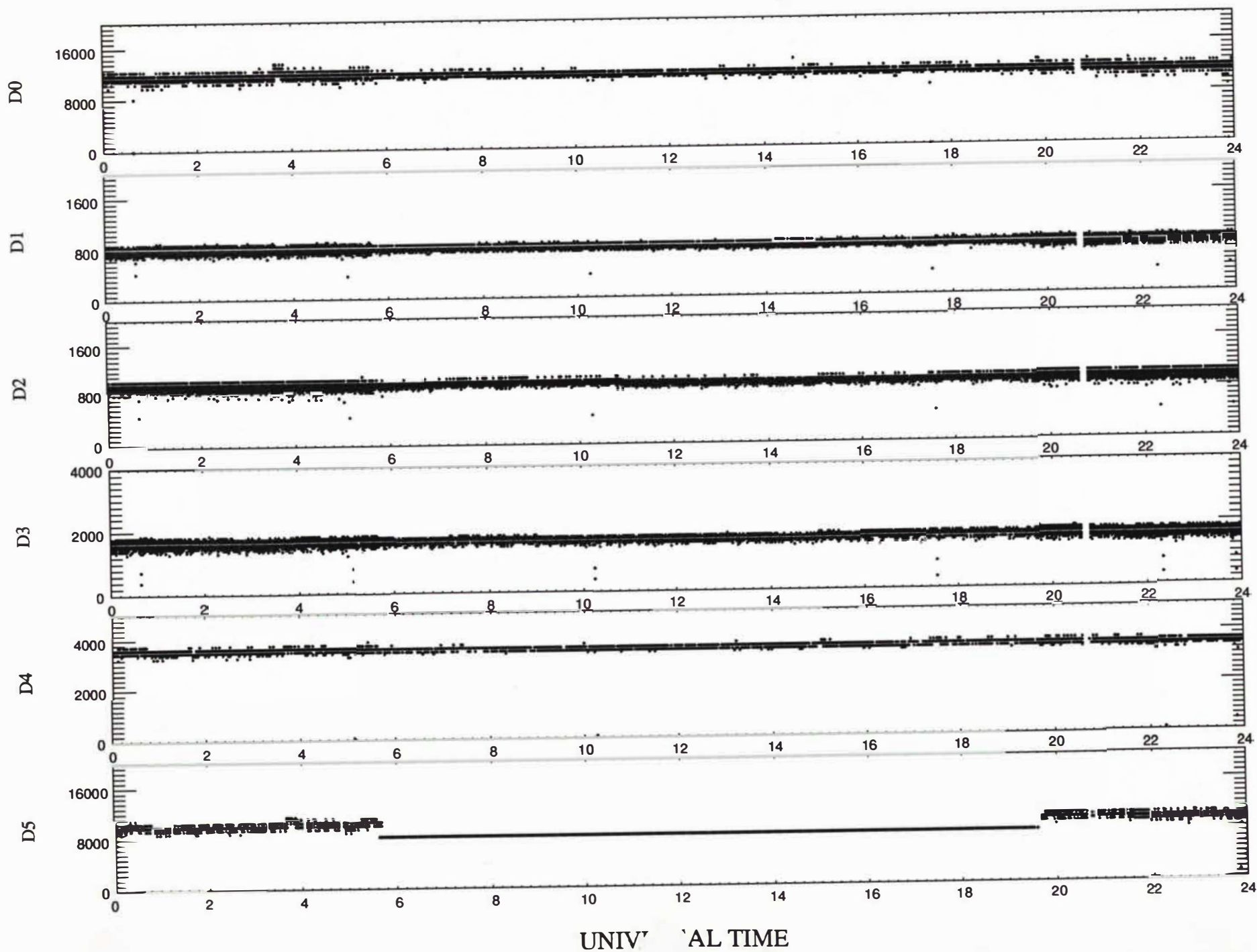
NO BURST (10)



CALIBRATION DATA INCLUDED



UNIV' AL TIME



Date: Mar 27 2007

BURST TRIANGULATION CHECKLIST

1. Ulysses Data

- ☒ Jim Schmidling's stat file correction applied?
- ☒ Final ephemeris used?
- ☒ Final, CDROM data used?
- ☒ Is the order of the data in CORREL such that a vernier is done on the data with the best time resolution?

2. For Konus events

- ☒ Konus ecliptic latitude used with latest calibration?

2. For Odyssey events *N/A*

- ☐ Was CHECKMO run to eliminate data gaps?
- ☐ Did the Odyssey ephemeris correspond to the event time? (When there is data in the database, the ephemeris is for the start of record, usually ~1320 s prior to the request time; when there is no data in the database, the ephemeris is for the request time in the e-mail, so the request time in mosearch should be equal to the GRB time. Note that the time in the return e-mail will be ~1320 s prior to the time requested, in the line "no HEND data...")
- ☐ Was Mars-blocking used?
- ☐ For cruise phase data (April – October 2001), was the updated data used? (Old data has timing errors)
- ☐ GRS database searched for triggered data? Database data between August 2005 and January 2006 should be re-extracted, due to timing errors. (E-mailed data should be OK).
- ☐ GRS and HEND data cross-correlated to check timing?

2. For 3 or More Spacecraft events *N/A*

- ☐ $\Sigma 3\Delta t$'s calculated, and/or BMAPSUM executed?

3. For INTEGRAL events *N/A*

- ☐ INTEGRAL SPI-ACS website checked for bursts that weren't transmitted automatically?
- ☐ 125 ms added to INTEGRAL SPI-ACS time for bursts prior to April 2 2004 11:00 UT?
- ☐ Updated ephemeris used for bursts prior to September 30, 2003?

-
- ☒ ACCESS and MBL4 databases updated?

N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

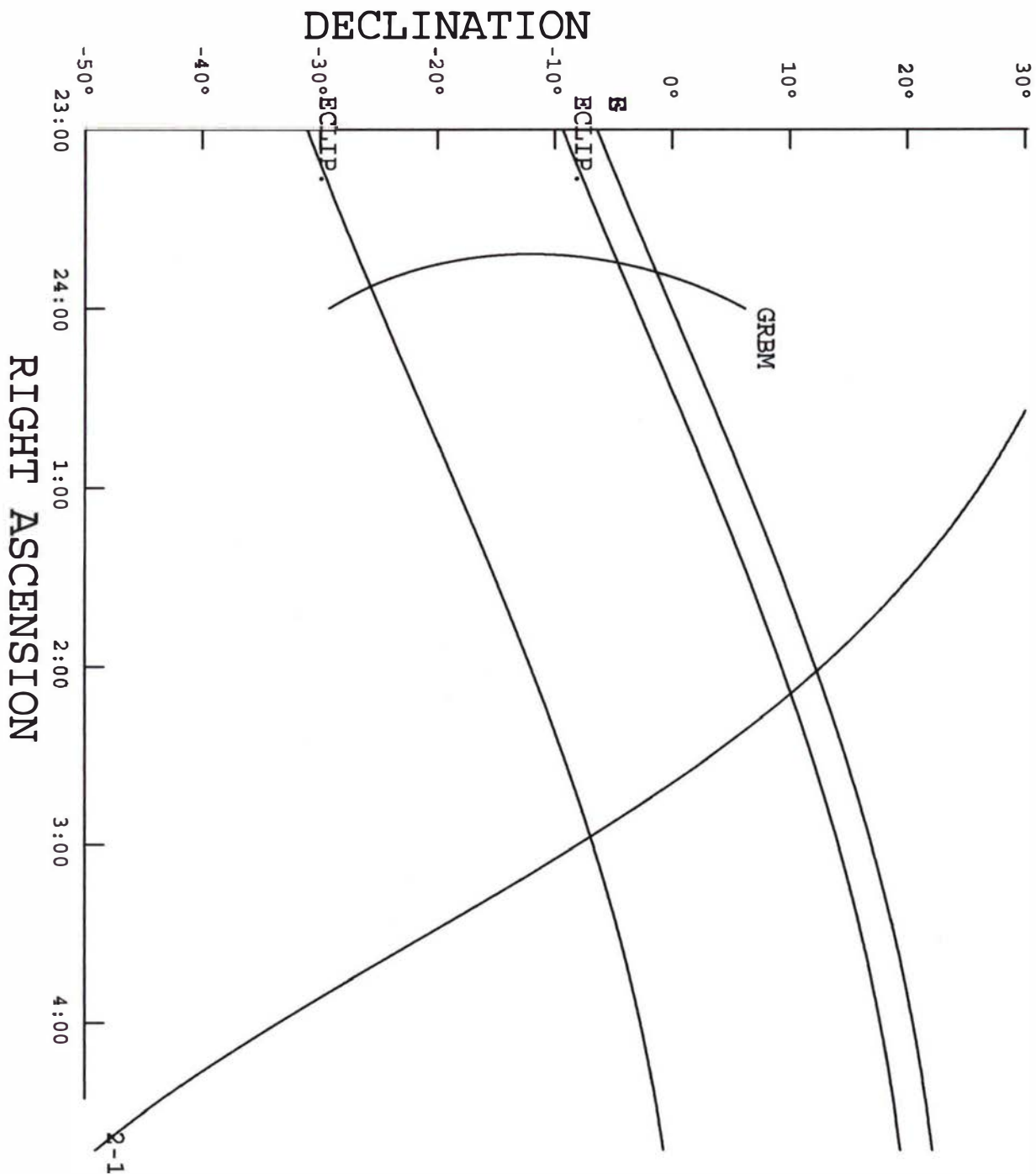
G=GALACTIC EQUATOR

1 KONUS1

2 ULYSSES

EVENT OF MAY 6, 1997 15:41

27/ 3/ 7



KONUS1

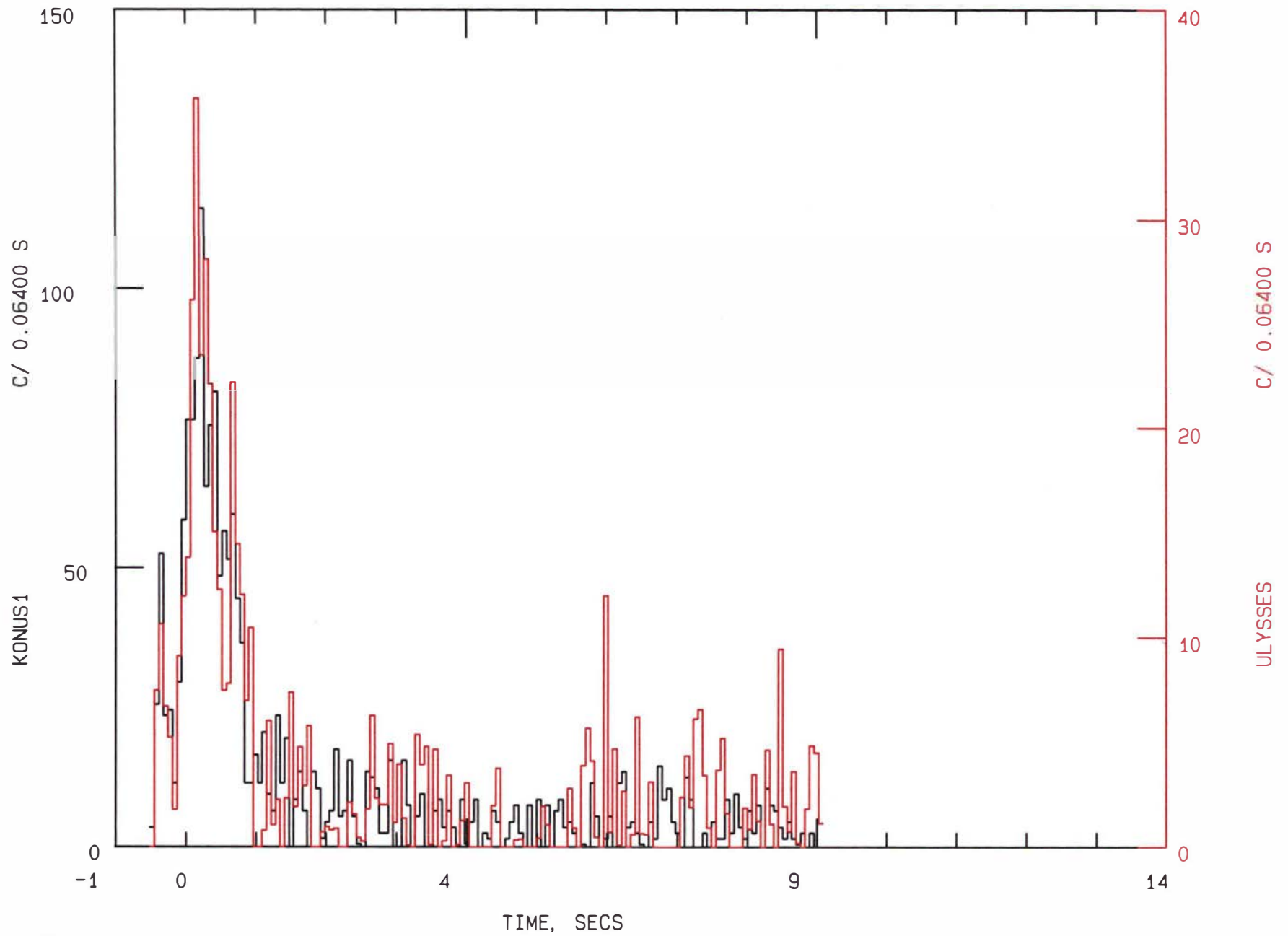
-ULYSSES

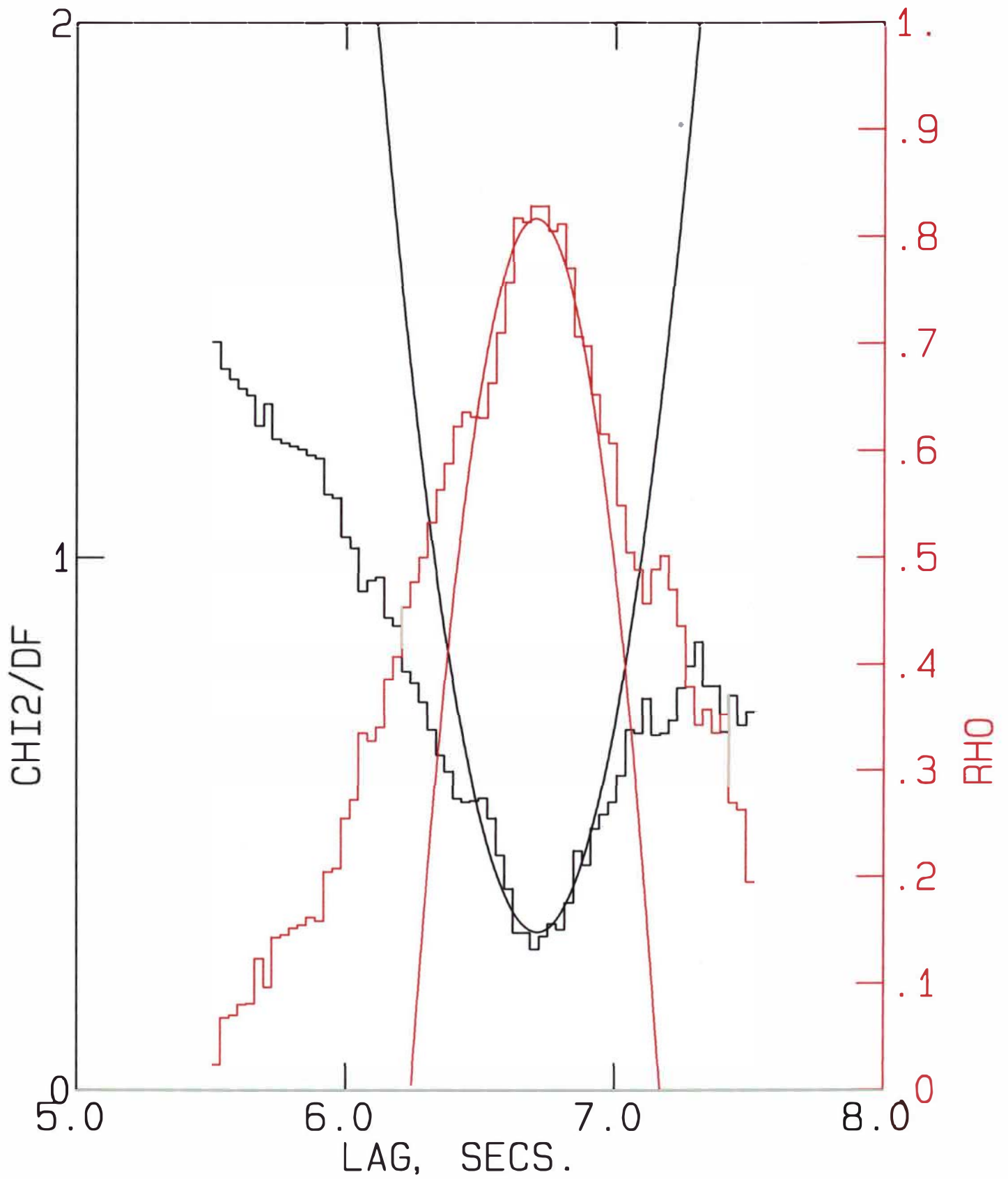
CORRELATION

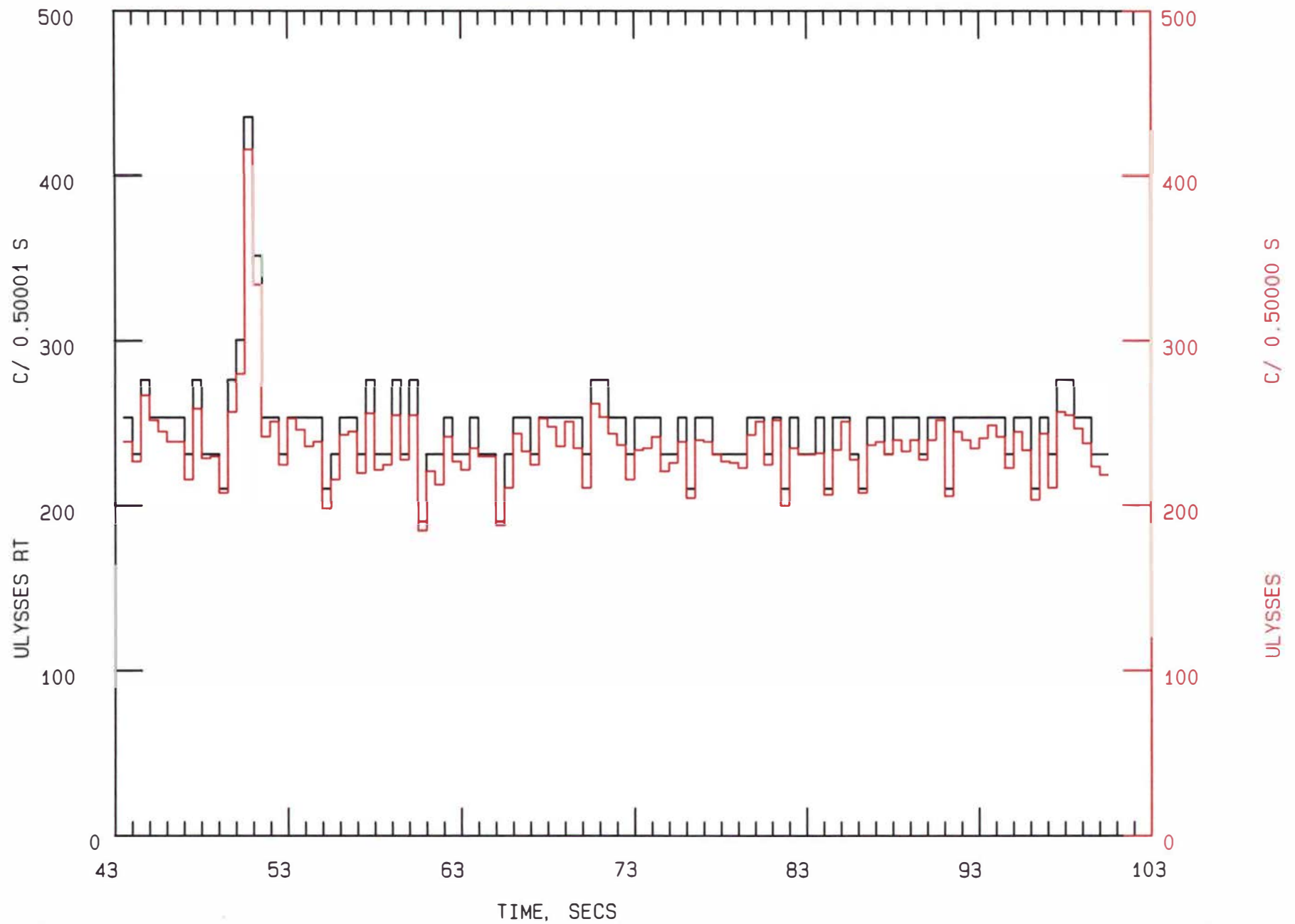
06/05/97

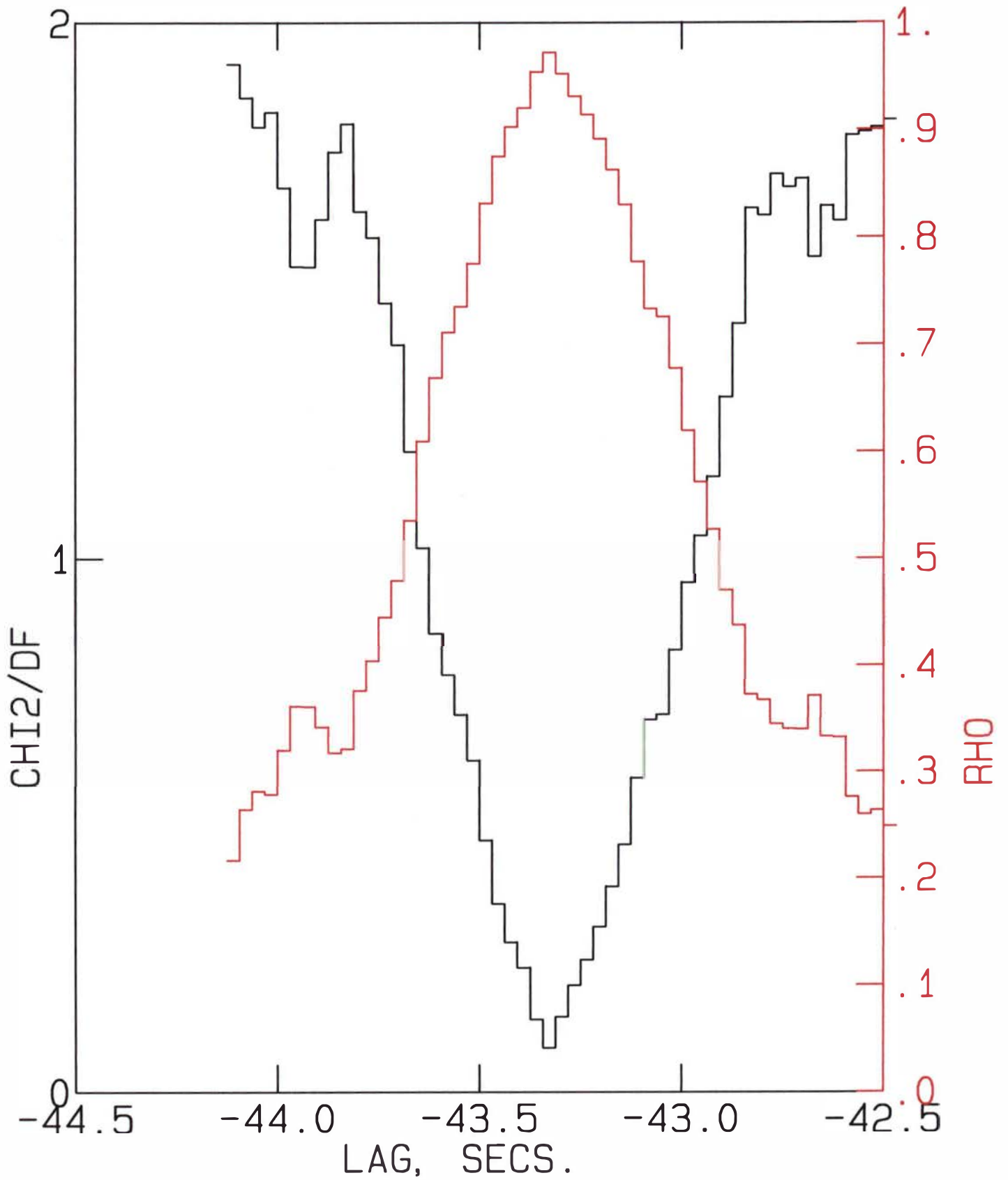
56503.264

27/ 3/ 7







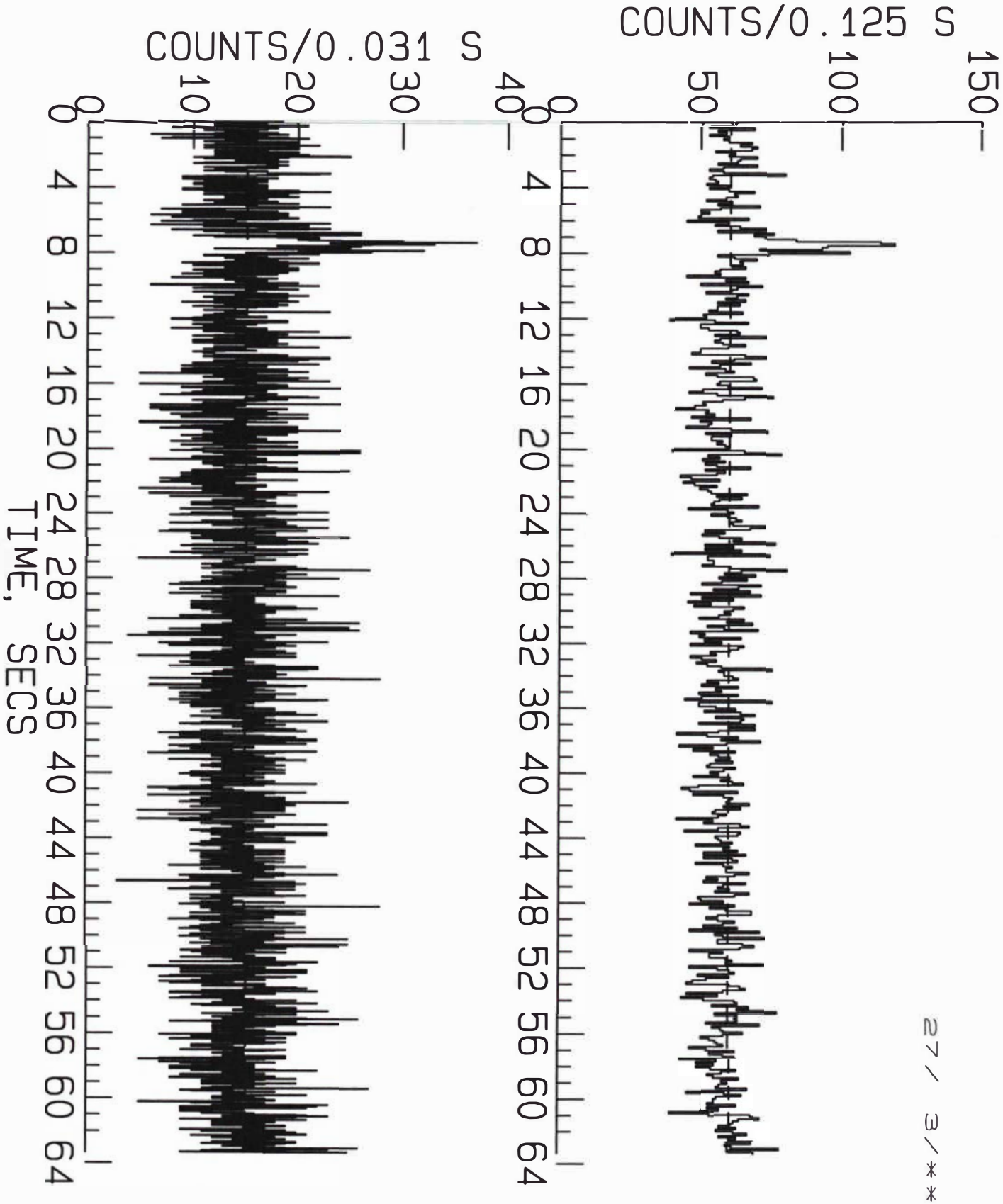


ULYSSES

06/05/97

Ttrig=57278.842

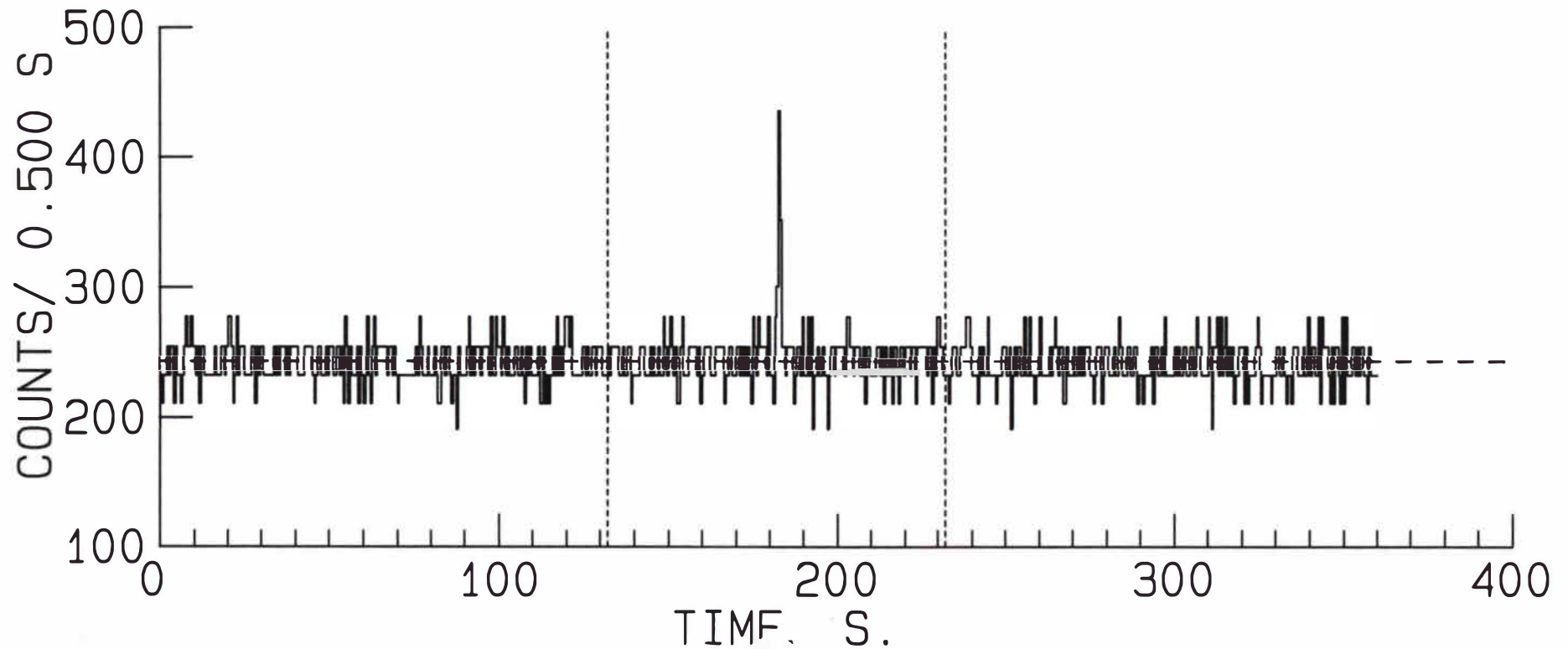
22- 147 keV



ULYSSES RT
6/ 5/97 57096.117 s
22- 147 keV

27 / 3 / 7

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



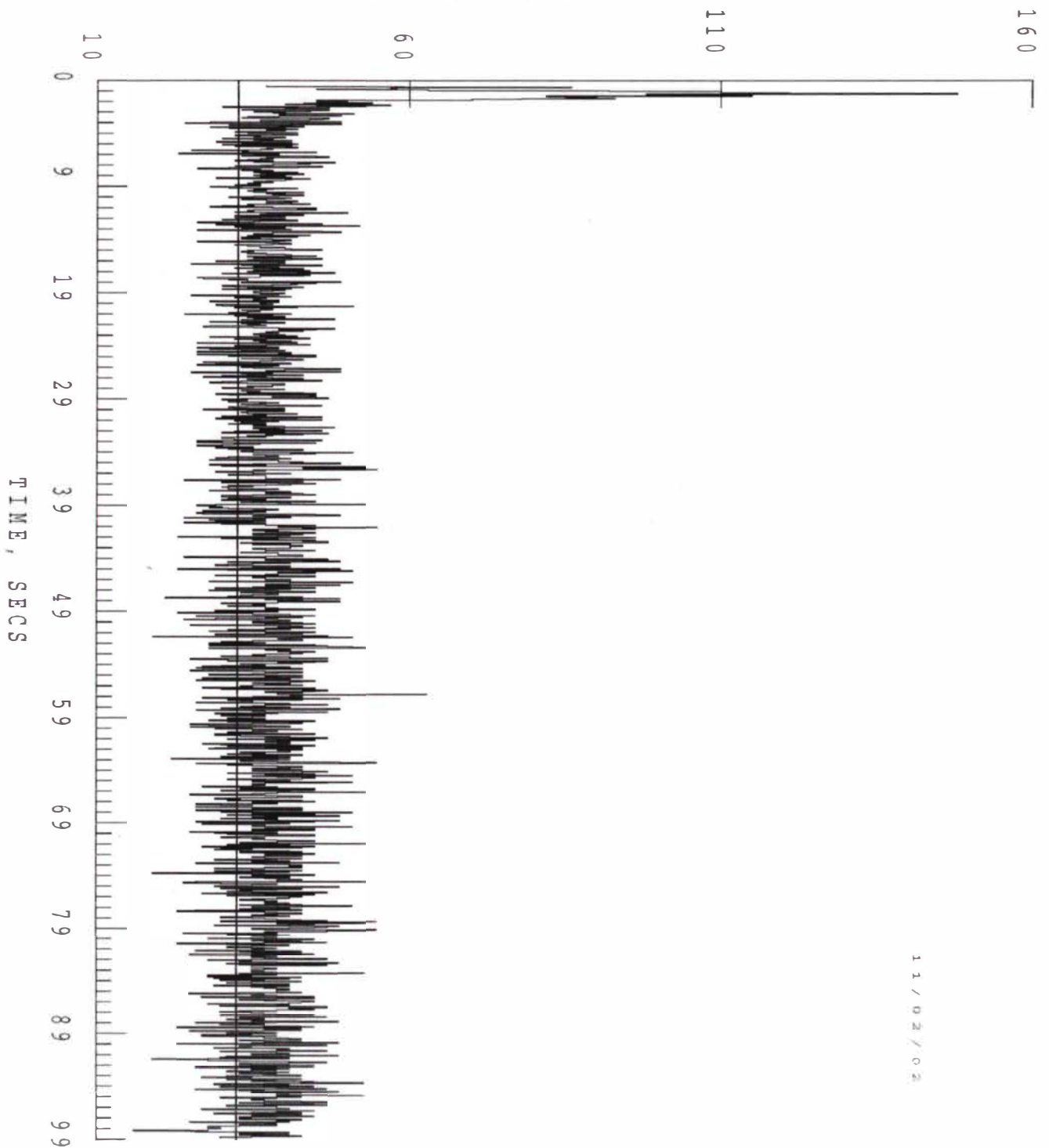
KONUS1

06/05/97

56503.264

50 - 200 keV

COUNTS/0.064 S



11/02/02

970315 074 56454.2 BATSE GRB#6124 (4264/S) (5.69,62.18J) (+UL)
 13 074 56454.9 PKS,462.9(50/S,90/S,<16S) (@85DEG)

970325 084 63382.8 KONUS(+UL@64176,MOD,15S),2 PEAKS(UL REPORT 8/9/97) (13SR)

970405 095U85440 UL@23:44@2200LS,MOD BURST, 5SEC (SEE NEXT LINE)
 970406 096 1060.9 KONUS (MOD.STRONG,MULT.PKS,15S) (13:NR, SECONDARY PEAKS?)

970411 101 35565.2 KONUS(25SEC,35556?)+UL@35040,2200LS(MOD,10S) +TGR (13NR)

970420 110 72842.2 BATSE GRB#6198 (7316/S) (209.08,-21.09J) (+UL)
 13 110 72847.8 PEAK (740/S,<12S,HARD) @85 DEG

970421 111U24420 UL@06:47@2250LS INT BURST, 20SEC
 13 111 25691.6 PEAKS (60/S),711.6(60),721.6(40),<30SEC REP0624

970428 14 118 FIRST DATA, DMSP14 (LAUNCHED 970404;DELAY CORR=5.87S)

970506 126 56503.3 KONUS (+UL@57300,2400LS,MOD,10S) (13NO,14NO,NOTRIG)

970506A14 126 45619.1 STRONGPKS45619.1(7700/S,<6S,SOFT),633.1,655.1,NOTRIG;13NO ??

970602 153 58855.7 KONUS>150S,COMPLEX,PK58953(+UL@56580,MOD,60S) (+TGRS/WIND)
 14 153 58917.0 PK(150/S),953.0(950,>58S,VERY HARD, INTENSE (13 NO) REP0624
 14 153 58916.7 TRIGGER PK, +58944.3,58952.0

970607 158 33384.7 KONUS, HARD PEAK FOR 7SEC (+UL@33360,MOD,10S)
 13 158 33388.6 PEAK(180/S,<6S) REP0723
 14 158 33388.7 PEAK(200/S,<6S, NOTRIG) REP0723

970616 167 65390.3 BATSE#6274 STRONG,MULTIPEAK.X-RAY AFTER,IAU6683(13NO@127)
 167 65390.3 BATSE(20.46,-7.16J),X-RAY(19.72,-5.50J) (14NO@112,NOTRIG)
 167 65390.3 BATSE (X-RAY DUBIOUS,IAU6722. NO OPT VARIABLE, IAU6723)

970625 176 43993.7 KONUS (UL@46200,2900LS,MOD,15SEC,REPORTED 10/30/97)
 13 178 44002.0 PEAK(80/S,<4S) (14SA)

970627 178 79608.8 KONUS STRONG, MULTIPEAK, 20SEC (+UL@77340,STRONG,20S)
 178 79610 BEPPPOSAX (13SR,14NO,NO TRIG)

970629 180 14424. KONUS VERY SOFT(+UL@15960,STRONG. NEW SGR (SEE 970912)
 13 180 14429.0 PEAK(50/S,<2S,SOFT) (14NR) REP0903

970715 196 51674.3 KONUS STRONG,HARD PK@+20(+UL@54060,MOD,5S)
 13 196 51693.6 PEAK(190/S,<4S) (14NR,NOTRIG) REP0903

970721 202 84667.1 KONUS(+UL@81720,MOD,10S,@3000LS)
 13 202 84671.9 PEAKS(HARD,1-SIDE,200/S,<8S),691.9(1-SIDE,240/S,<10S) REP0903
 14 202 84672.1 PEAK (HARD,1-SIDE,470/S,<10S),692.1(1-SIDE,240/S,<10S) REP0903
 14 202 84671.5 TRIGGER PEAK (EVT14)(84671.46) REP0903

970802 214 12328.2 BATSE GRB#6322,5750/2S (13NO@32,14NO@40,GAP,NOTRIG)

970815 227 43624.4 BATSE GRB#6335,10395/2S (IAU6718 XRAYs;6721+NOOPT)
 227 43624.4 CONTINUED: 13NO@160DEG, 14NO@146DEG

970915 258 32870.9 KONUS 25S,HARD (+UL@30900,3100LS,MOD,10S)
 14 258 32873.2 PEAK (200/S,<2S,NO TRIG) (13NO)

970919 262 65669.5 BATSE#6389 (8048/S)

From TERRELL@nisdp0.lanl.gov Fri Feb 27 15:11 PST 1998

From: TERRELL@nisdp0.lanl.gov

Date: Fri, 27 Feb 1998 16:11:55 -0700

To: khurley@sunspot.ssl.berkeley.edu, bonnard@milkyway.gsfc.nasa.gov,
butterworth@lheavx.gsfc.nasa.gov, cline@lheavx.gsfc.nasa.gov,
henze@fender.msfc.nasa.gov, filippo@botes1.tesre.bo.cnr.it,
kmarar@isac.ernet.in

X-Vmsmail-To: @MAILOUTUL.DIS

Subject: DMSP GRB: 1997(many), 980109, 980113, 980119, 980124, 980125, 980202, 980203

From: jterrell@lanl.gov (James Terrell) 980227

To: khurley@sunspot.ssl.berkeley.edu, bonnard@milkyway.gsfc.nasa.gov,
butterworth@lheavx.gsfc.nasa.gov, cline@lheavx.gsfc.nasa.gov,
filippo@botes1.tesre.bo.cnr.it, henze@fender.msfc.nasa.gov,
kmarar@isac.ernet.in, kraken@crosserv.gsfc.nasa.gov,
scott@milkyway.gsfc.nasa.gov, teegarden@lheavx.gsfc.nasa.gov,
vnp@isac.ernet.in, yosimori@rikkyo.ac.jp

Subj: DMSP GRB detections: 1997(many), 980109, 980113, 980119, 980124, 980125, 980202, 980203

The following GRB were detected by DMSP13 or DMSP14 (or NOT detected, if indicated).

No detection can occur for bursts more than 118 degrees from spacecraft zenith,

or if in the presence of very high counting rates (SAA,SR,NR).

Data are normally in 2-sec counts, except when the DMSP14 trigger circuit is

tripped, giving 12.8ms data, usually reported here as 102.4ms counts.

Numerous other BATSE GRB were also detected, but not reported here; numerous

weak detections by Ulysses have not been checked because of low counting

rates expected at an indefinite time.

DATE	FL	DAY	TIME	NOTES	---	(ND=NO DATA, NA=NOT APPARENT & NOT ANALYZED) -----	REPORTED
				(NO=DATA CHECKED--SHOWS NO DETECTION)	(SR=S. RADIATION BELT)		
				(NR=NORTH RADIATION BELT)	(SAA=SOUTH ATLANTIC ANOMALY)		
970111	011	35040.2	BATSE GRB#5773 (8727CTS/2S)	(SEE IAU6569,6571,6574,6598)			
	011	35040.2	BEPPPO SAX TRIG, INTENSE, 50S, 3 PEAKS (232.10, 19.67J)	IAU6533			
	13	011	35040.0	PEAKS (40/S), 48.0 (50/S), 58.0 (60/S), @24DEG, @848KM, SOFT			REP0313
970111	011	85744.6	KONUS (HARD, SLOW RISE) +TGR (UL:NO)	(DMSP13:NO)			
970117	017	53211	TGR+SAX GRB (KONUS INOP) +UL@54420 (STRONG, 20S)	(13:NO)			
970124	024	44343.4	KONUS (MULT PKS) +UL@46253@2100LS, STRONG+TGR	(13SAA)			
970201	032	57250.7	BATSE GRB#5989 (53612/SEC)	+UL			
	13	032	57222.1	PEAK (100/S, ~30S, SOFT, BROAD) (@111DEG)	UNCONVINCING		
970218	049	50996.1	KONUS (STRONG, 5SEC) +UL@51274, 2000LS (STRONG, 8SEC)				
	13	049	51001.0	PEAK (320/S, <6S)			REP0624
970222	053	86006.6	KONUS (MOD.STRONG, SEV.SEC) +UL@85873, 2000LS, MOD, 2S (13NO)				
970226	057	31585.9	KONUS (STRONG, SOFT PK@+39) +UL@30547, 2000LS (V.INT, 40S)				
	13	057	31595.8	PEAK (270/S, 10SEC) (MODERATELY STRONG)			REP0313
970228	059	10680.8	BEPPPOSAX (IAU6572) MOD.INT., 80S, 4 PKS (75.46, 11.75J)	IAU6578			
	059	10680.8	INT.X-RAY, RADIO (IAU6576, 6577), OPTICAL (6584), MOTION (6629)	OPTICAL			
	13	059	10659.1	PKS, 667.1 (60/S, ONE-SIDED, SOFT, @74DEG)	DOUBTFUL (+UL, WIND)		
970313	072	30096.5	KONUS (MOD.STRONG, PK@+11, 40S) +UL@28380, 2000LS (MOD.INT, 10S)				
	13	072	28355.8	PEAK (180/S, <2S, SOFT) (NO PEAK AT 30096!)	(CONFLICT)		REP0501

From BUTTERWORTH@lheavx.gsfc.nasa.gov Tue May 20 11:56 PDT 1997
From: BUTTERWORTH@lheavx.gsfc.nasa.gov
Date: Tue, 20 May 1997 14:54:58 -0400 (EDT)
To: khurley@sunspot.ssl.berkeley.edu, kmarar@isac.ernet.in, jterrell@lanl.gov,
yosimori@rikkyo.ac.jp, filippo@botes1.tesre.bo.cnr.it,
henze@fender.msfc.nasa.gov, cline@apache.gsfc.nasa.gov
CC: BUTTERWORTH@lheavx.gsfc.nasa.gov
X-Vmsmail-To: @ULYSSES
X-Vmsmail-Cc: BUTTERWORTH
Subject: Ulysses event of 970506 was seen by Konus

Hi Everyone,

Konus triggered at 15:41:43.264 in the detector facing south of the ecliptic. The burst was weak and quite hard. It was close to the ecliptic (being almost equally bright in the waiting-mode data of the south- and north-facing detectors). It consisted of a single broad peak, with substructure, lasting about 2.5 seconds, with the maximum intensity 0.2 seconds after the trigger time.

Paul.

Date: Fri, 9 May 1997 08:29:05 -0700
From: khurley@sunspot.ssl.berkeley.edu (Kevin Hurley)
Message-Id: <199705091529.IAA05883@scylla.berkeley.edu>
To: scott@lheamail.gsfc.nasa.gov, khurley@sunspot.ssl.berkeley.edu,
butterworth@lheavx.gsfc.nasa.gov, cline@lheavx.gsfc.nasa.gov,
kmarar@isac.ernet.in, bonnard@lheamail.gsfc.nasa.gov,
jterrell@lanl.gov, yosimori@rikkyo.ac.jp,
filippo@botes1.tesre.bo.cnr.it, henze@fender.msfc.nasa.gov
Subject: GRB970506
X-Sun-Charset: US-ASCII

ULYSSES GAMMA-RAY BURST NOT REPORTED BY BATSE:

Ulysses observed the following burst:

May 6 1997 15:55 Ulysses time; moderate burst, 10 s long

The spacecraft was about 2400 light-seconds from Earth.
Was this event detected by anyone else?

CC: ulyssesbursts alias list
(barthelmy, butterworth, cline, frontera, henze, marar, teegarden, terrell, yoshimori)

From kraken@rosserv.gsfc.nasa.gov Mon May 19 15:08 PDT 1997
X-Sender: kraken@lheapop.gsfc.nasa.gov
Mime-Version: 1.0
Date: Mon, 19 May 1997 18:09:39 -0500
khurley@sunspot.ssl.berkeley.edu (Kevin Hurley)
From: kraken@rosserv.gsfc.nasa.gov (Peter Kurczynski)
Subject: Recent TGRS/Ulysses bursts
Cc: bonnard@iolanthe.gsfc.nasa.gov (Bonnard Teegarden),
kraken@rosserv.gsfc.nasa.gov

Hi Kevin,

Here are the results of a search through TGRS data for some recent Ulysses bursts that you've sent emails about. Of the list below, TGRS sees one of your bursts in waiting mode data, and one as a bona fide triggered event.

Ulysses date/time	TGRS sees?	TGRS characteristics
970513 18:37	NO	
<u>970506 15:55</u>	YES (waiting mode)	at 970506:56500s (~15:40) <10 s long 450 cts/s 35-100 keV ~2s long 260 cts/s 100-300 keV (peak count rates)
961219 19:42	NO	
970411 9:44	YES (TGRS #553)	at 970411:35566 (~9:50) 10s long 430 cts/s 35-100 keV 10s long 410 cts/s 100-300 keV (peak count rates)
970405 23:49	NO*	
970405 11:35	NO*	

*there was a TGRS triggered event (#551) at 50507s, but this is outside the +/- 2200s time window from the time of the Ulysses burst.

I hope these are helpful,

Pete Kurczynski

From WOODSP@SSLLES.MSFC.NASA.GOV Thu May 8 11:39 PDT 1997
Return-Path: <WOODSP@SSLLES.MSFC.NASA.GOV>
Received: from SSLLES.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id LAA12207; Thu, 8 May 1997 11:38:42 -0700
Date: Thu, 8 May 1997 13:37:14 -0500 (CDT)
From: WOODSP@ssl.msfc.nasa.gov
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970508133714.21c11122@ssl.msfc.nasa.gov>
Subject: Crossing Windows for BATSE Burst 6223
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6223
EVENT OF 1997 MAY 7 DAY OF YEAR=127
EVENT CROSSING TIME AT BATSE : 61304. S. OR 17:01:44.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 89.000 84.000
BATSE PEAK COUNTING RATE: 3600 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 7/ 5/ 97 IS:
RA= 151.196 DEC= 32.322 DIST= 4.872 AU
BATSE-ULYSSES DISTANCE = 728802796. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=124.96 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-1392.85 SECS.
CROSSING TIME AT ULYSSES IS 59911. S. OR 16:38:31 +/- 374.77 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 7/ 5/ 97 IS:
RA= 168.956 DEC= 6.654 DIST= 0.852 AU
MARS-BATSE DISTANCE = 127518104. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 97.66 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -56.72 SECS.
CROSSING TIME AT MARS IS 61247. S. OR 17:00:47 +/- 72.33 SECONDS

BATSE BURST TRIGGER

NO.: 6223

TIME: TJD=0575 SECONDS=61304

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=154.5 AZIMUTH=215.7 ERROR=8.2 DEGREES

COMMENTS:

GRB LASTING ~ 16 SEC. WEAK EVENT WITH MULTIPLE PEAKS. NOT VISIBLE
ABOVE 300 KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6223	970507	10575	61304	3600	089	+84	16

BATSE BURST# 6223

ULYSSES RT

8 / 5 / 97

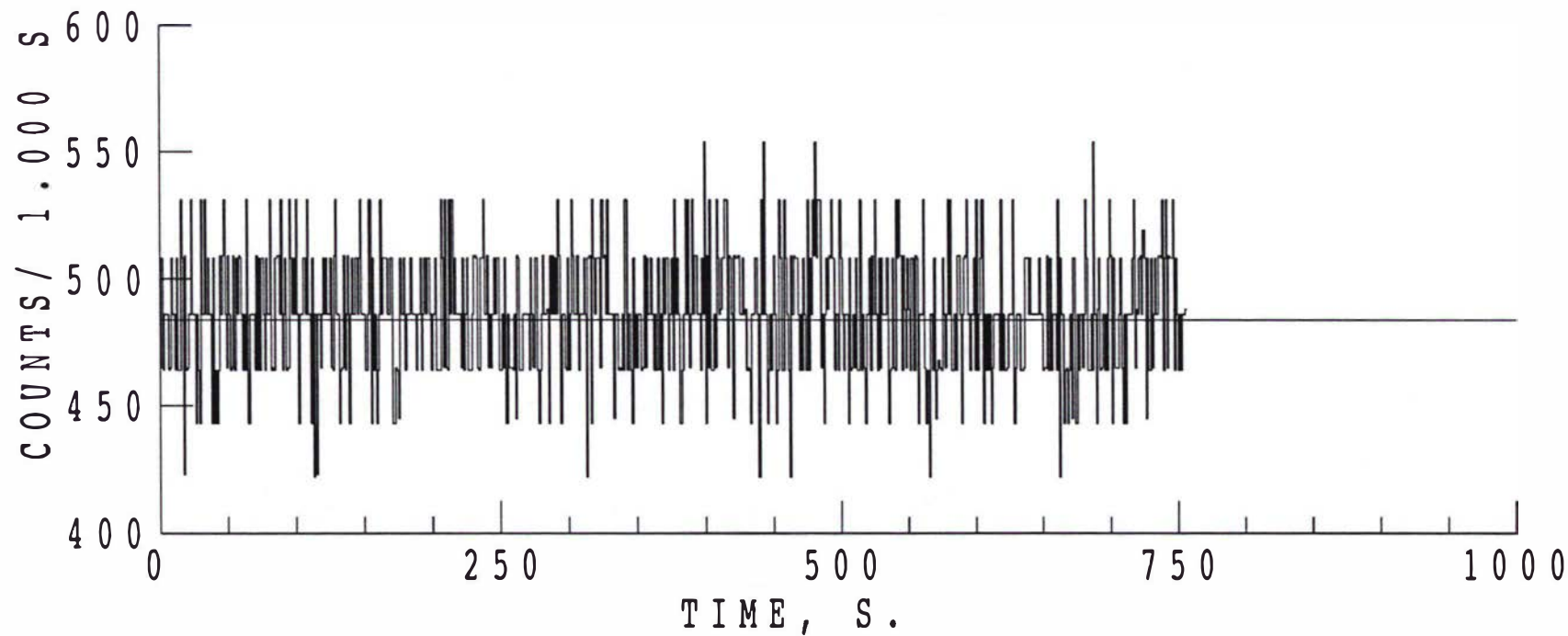
7 / 5 / 97 59544.152 s

0.500 S INTERVALS REGROUPED BY 2

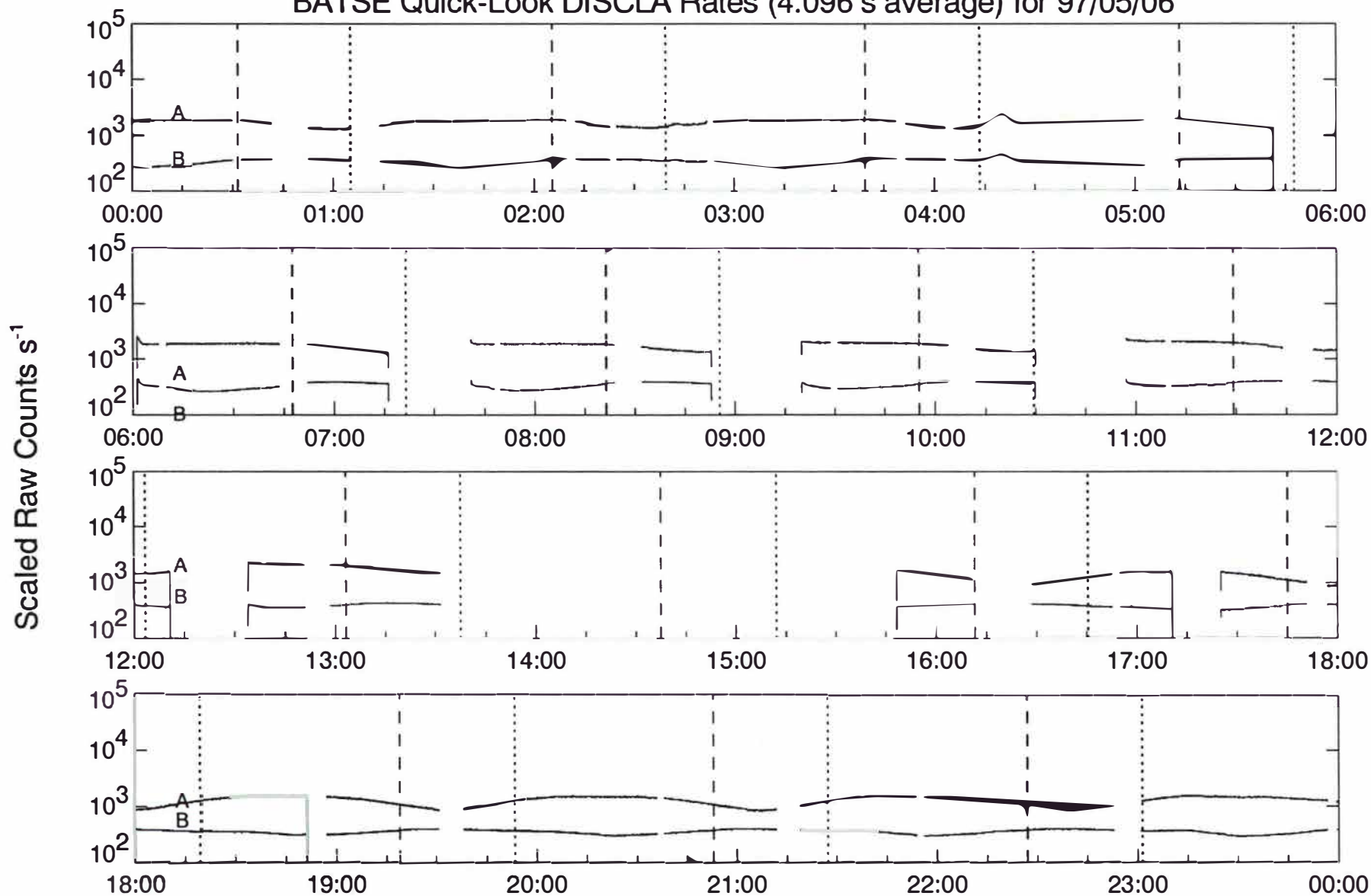
0 - 0 keV

W= 10 M=10
>4.0 SIGMA FLUCTUATIONS

W= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/06



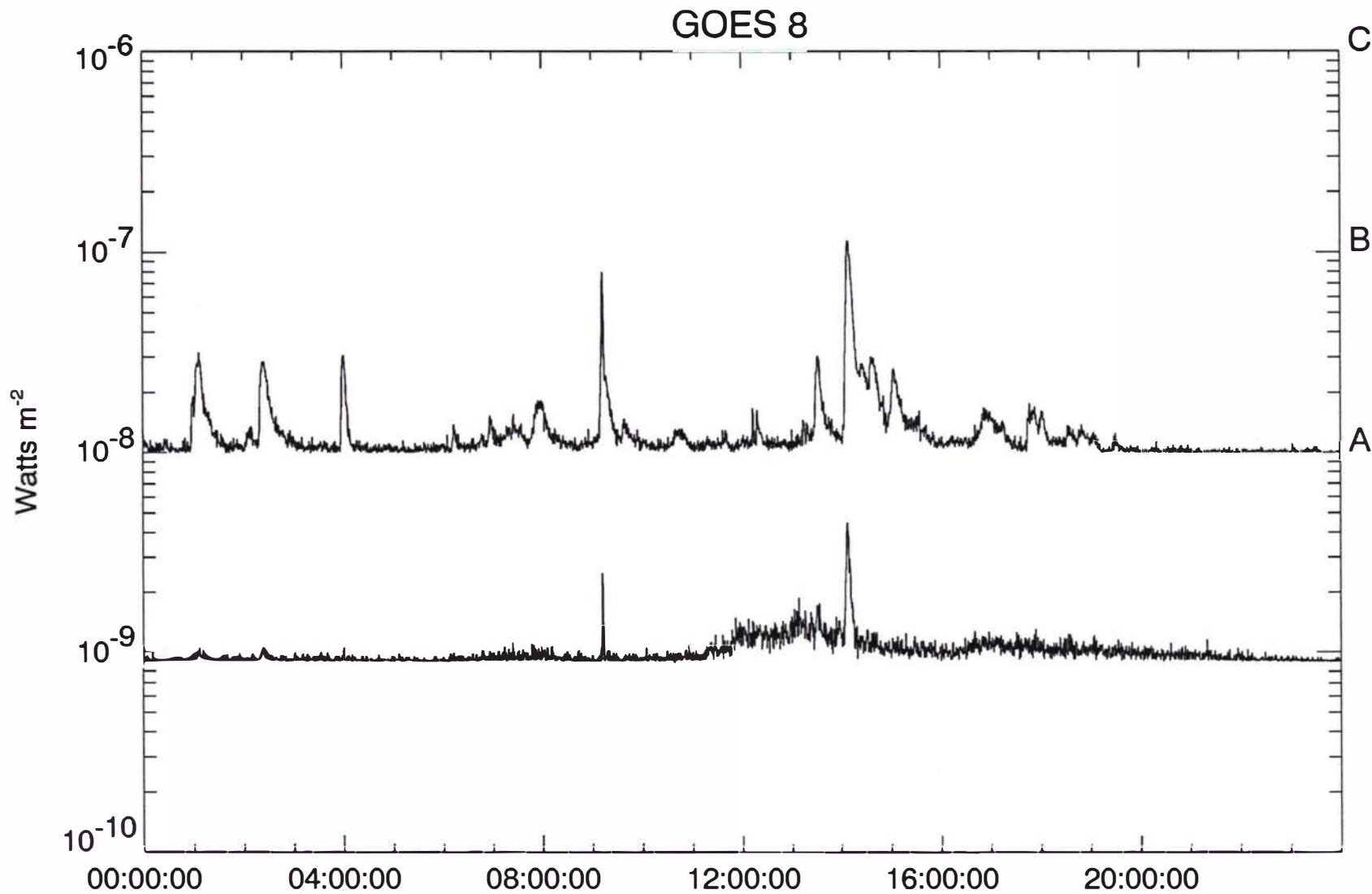
Current Time: 97/05/10, 1008 EDT

A: Channel 0 Most Sunward LAD

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

Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare



Data Start: 97/05/06, 0000:00

Plot created: 97/05/10, 1007

Channel

1 (1.0 - 8.0 Angstroms)

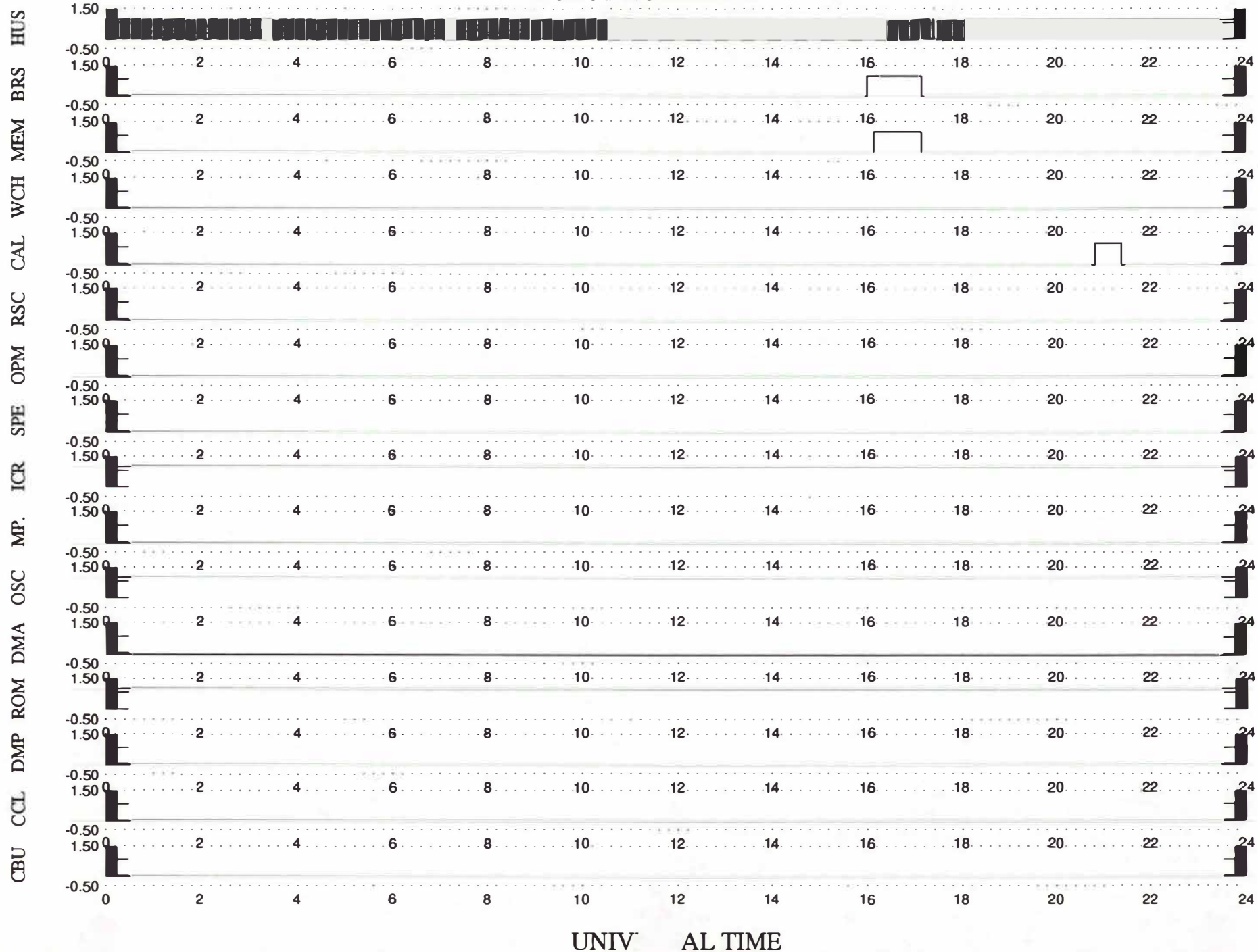
2 (0.5 - 4.0 Angstroms)

Background not subtracted

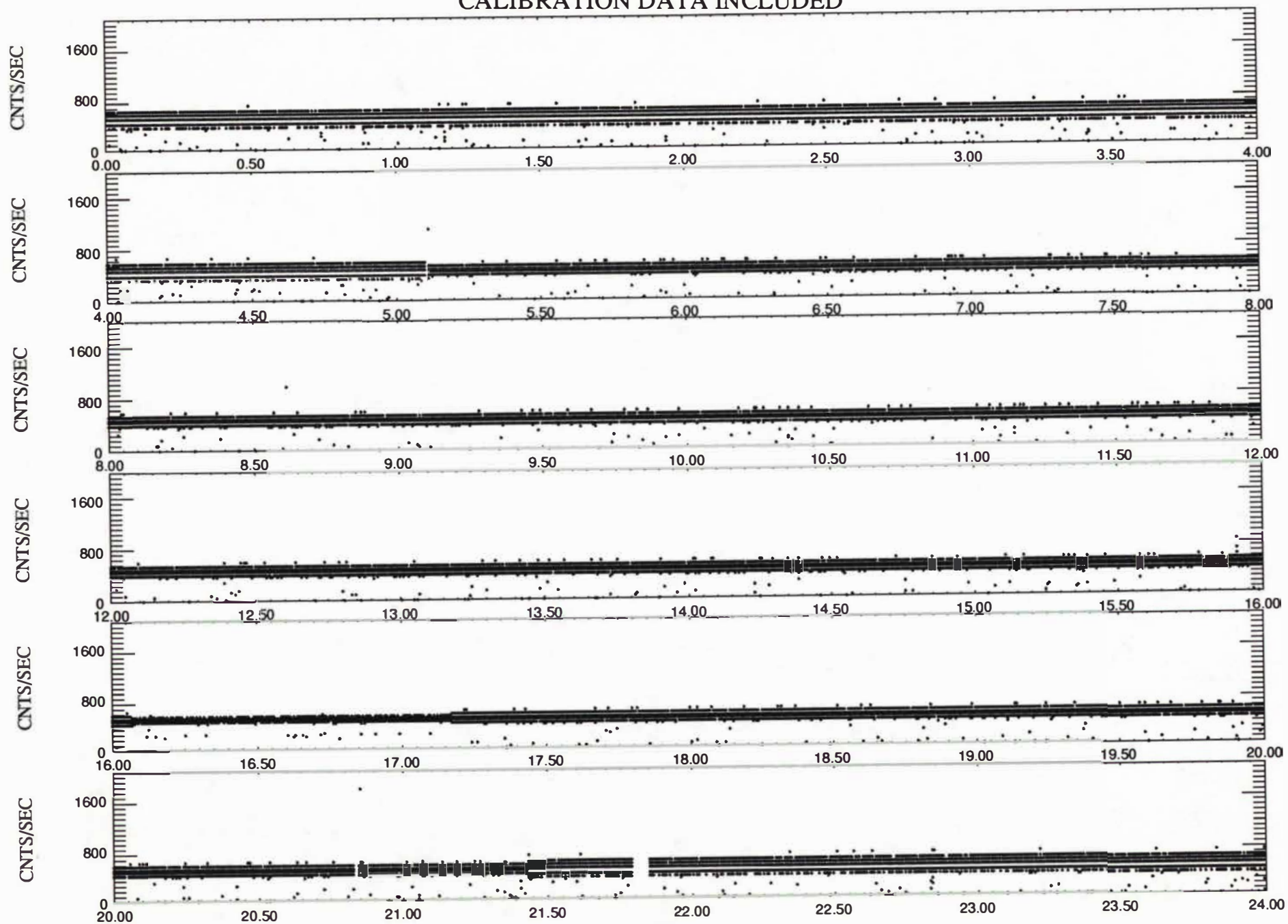
Background not subtracted

Sample average = 10

BURST NUMBER 11

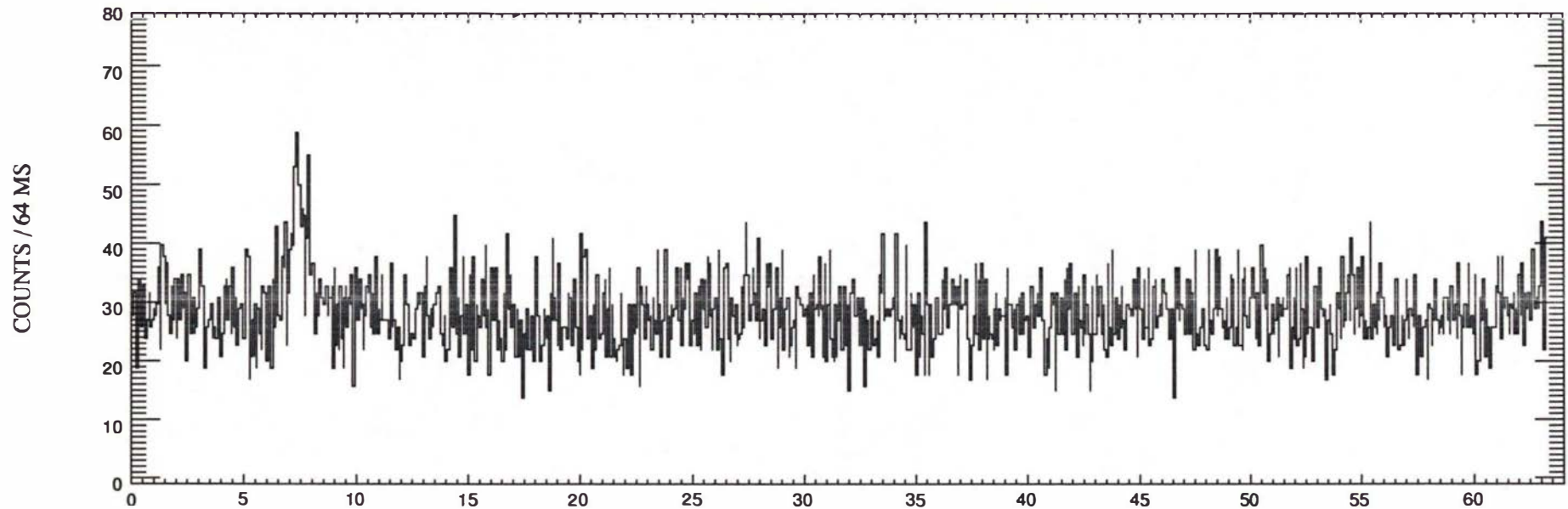


CALIBRATION DATA INCLUDED

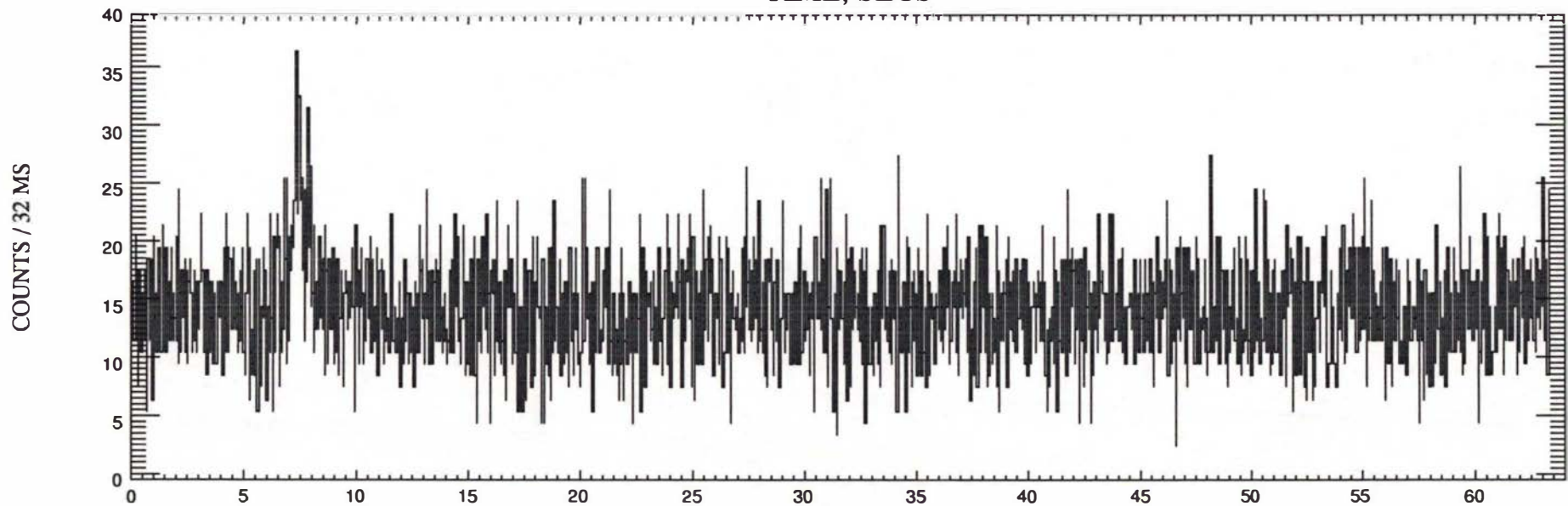


UNIV 'AL TIME

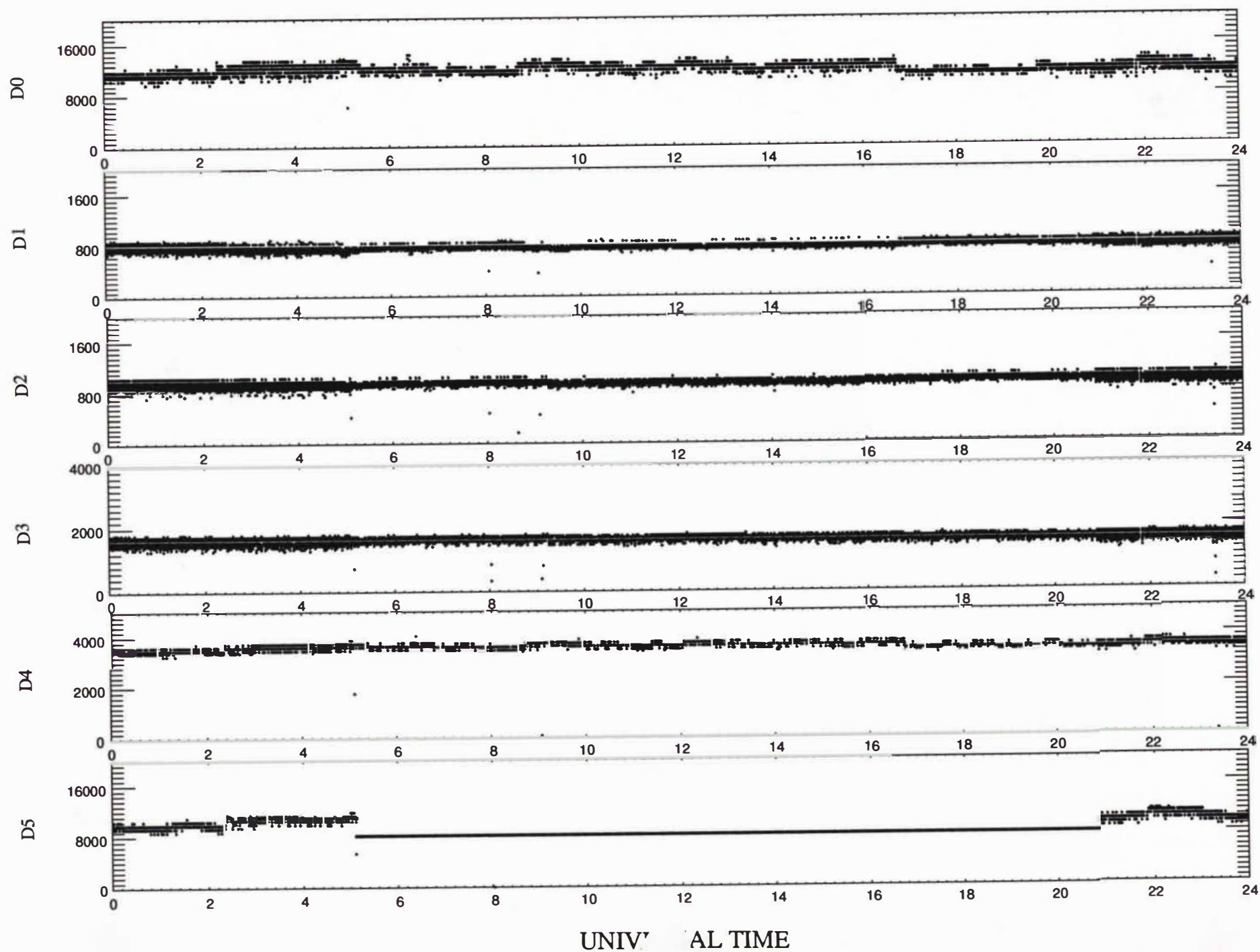
Burst Counter 11 at UT=15.910789472792 h=57278.842 s 15:54:38.842



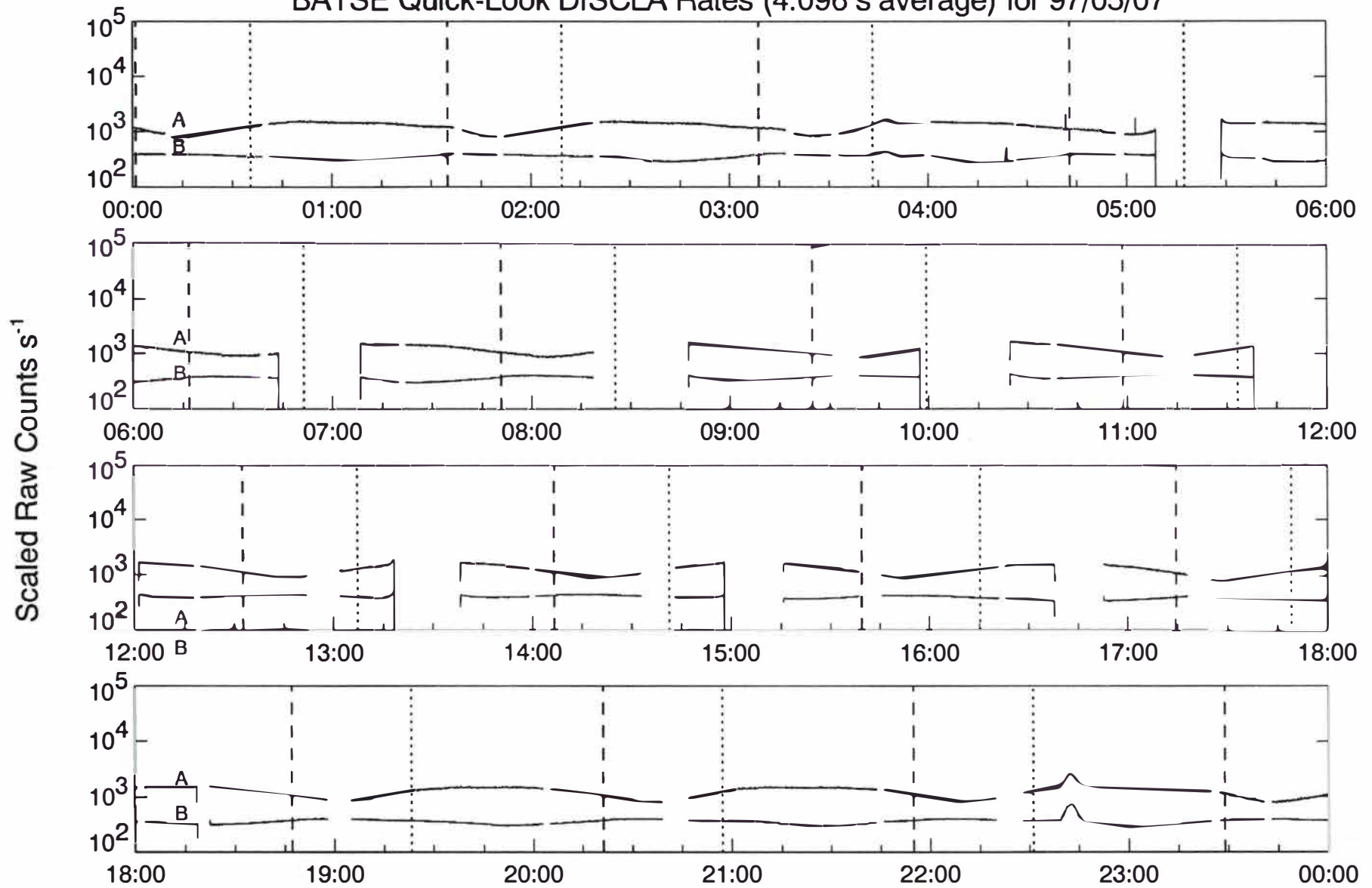
TIME, SECS



TIME, SECS



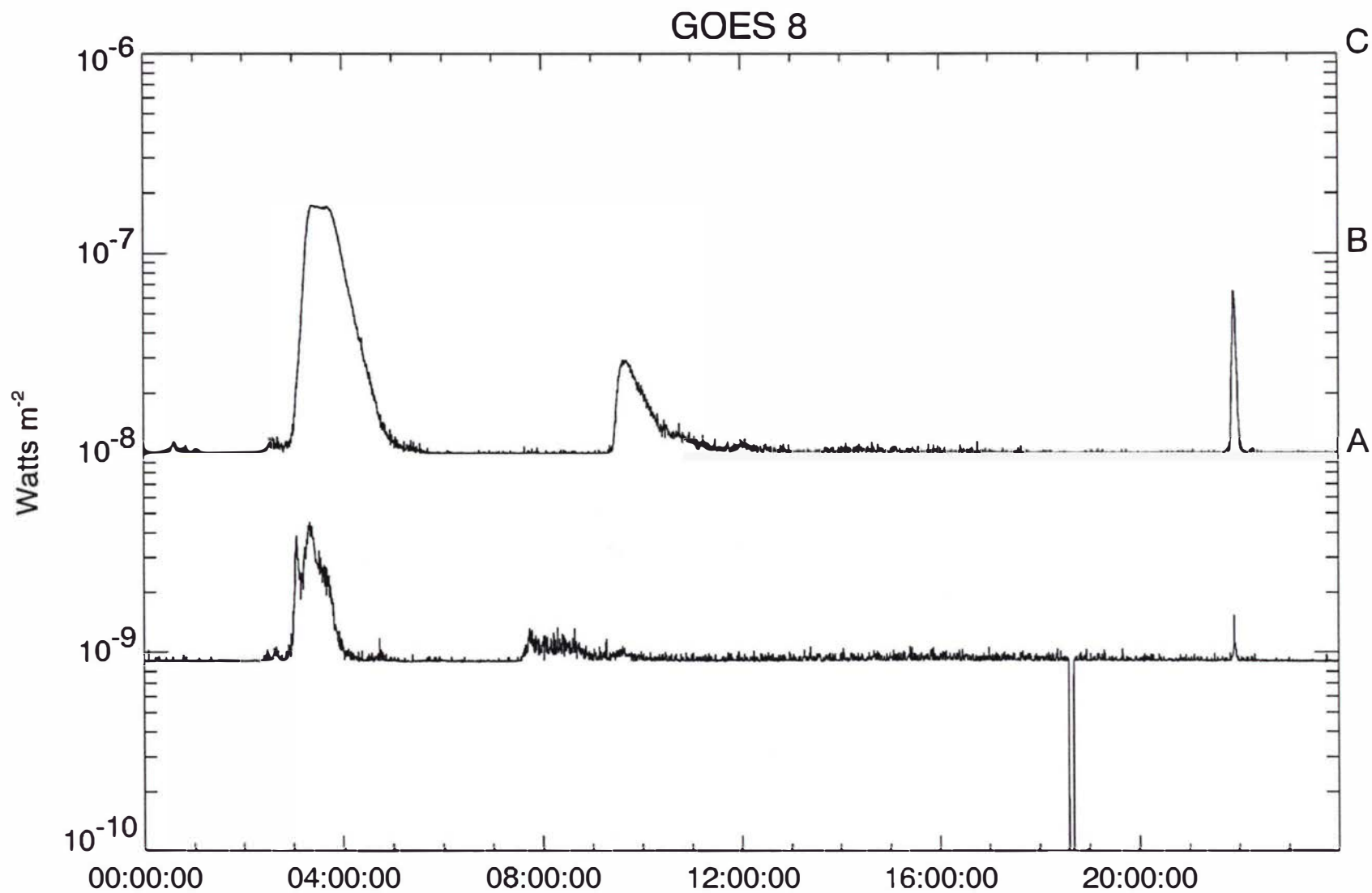
BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/07



Current Time: 97/05/11, 1008 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare



Data Start: 97/05/07, 0000:00

Plot created: 97/05/11, 1007

Channel

1 (1.0 - 8.0 Angstroms)

Background not subtracted

2 (0.5 - 4.0 Angstroms)

Background not subtracted

Sample average = 10

From WOODSP@SSLLES.MSFC.NASA.GOV Thu May 8 11:35 PDT 1997
Date: Thu, 8 May 1997 13:35:00 -0500 (CDT)
From: WOODSP@ssl.msfc.nasa.gov
To: burst@comptel.sr.unh.edu, grobad@ests2.estec.esa.nl,
cline@lheavx.gsfc.nasa.gov, barthelmy@lheavx.gsfc.nasa.gov,
bacodine@pandora.gsfc.nasa.gov, scott@circe.gsfc.nasa.gov,
butterworth@lheavx.gsfc.nasa.gov, band@cass09.ucsd.edu
X-Vmsmail-To: @mops\$send_msg:BURST_SPAN.DIS
Subject: Burst Trigger Message

BATSE BURST TRIGGER

NO.: 6224

TIME: TJD=0575 SECONDS=81608

TYPE: PARTICL SOLAR FLARE TRIGGER SIGNAL:N

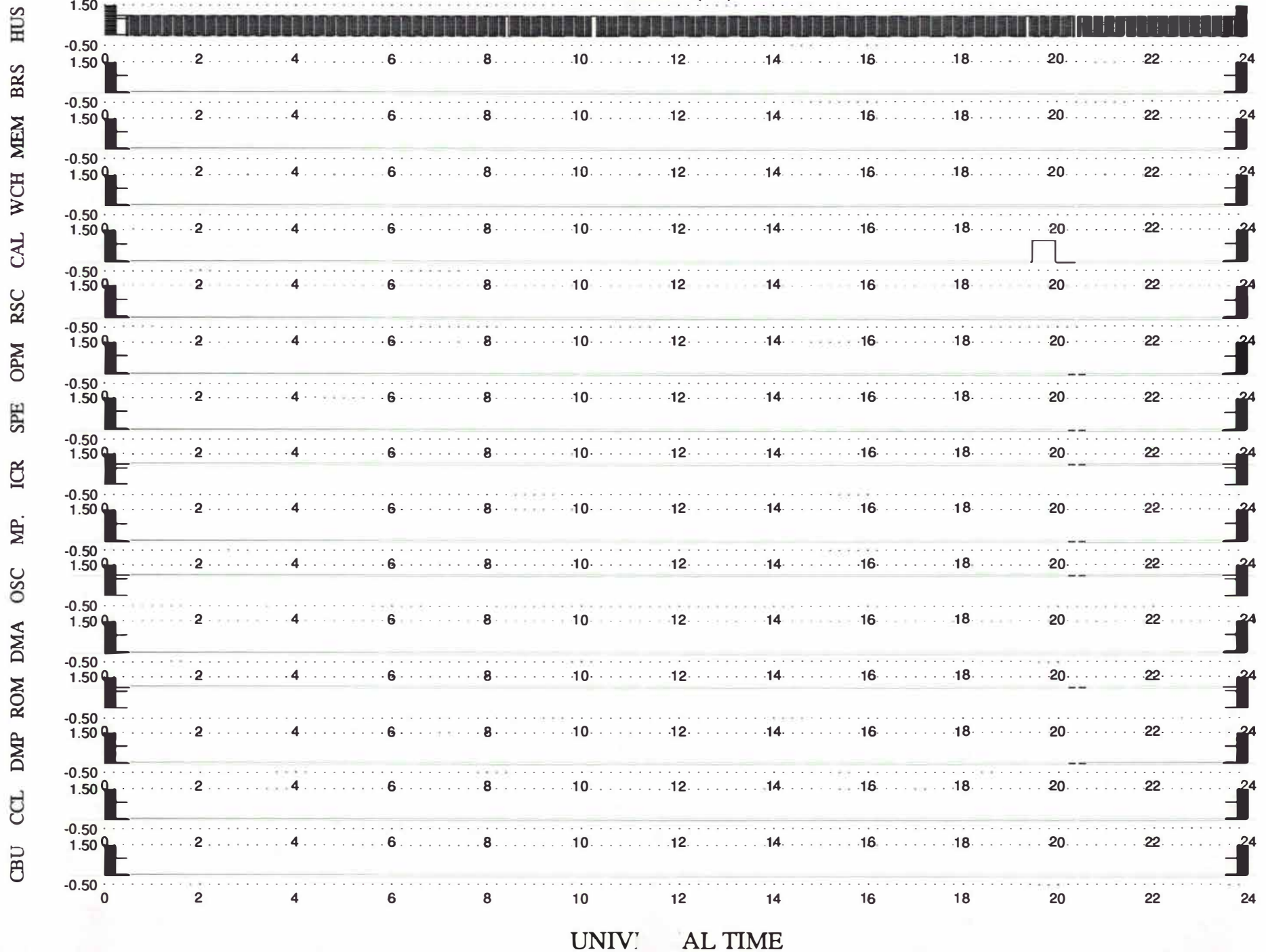
SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

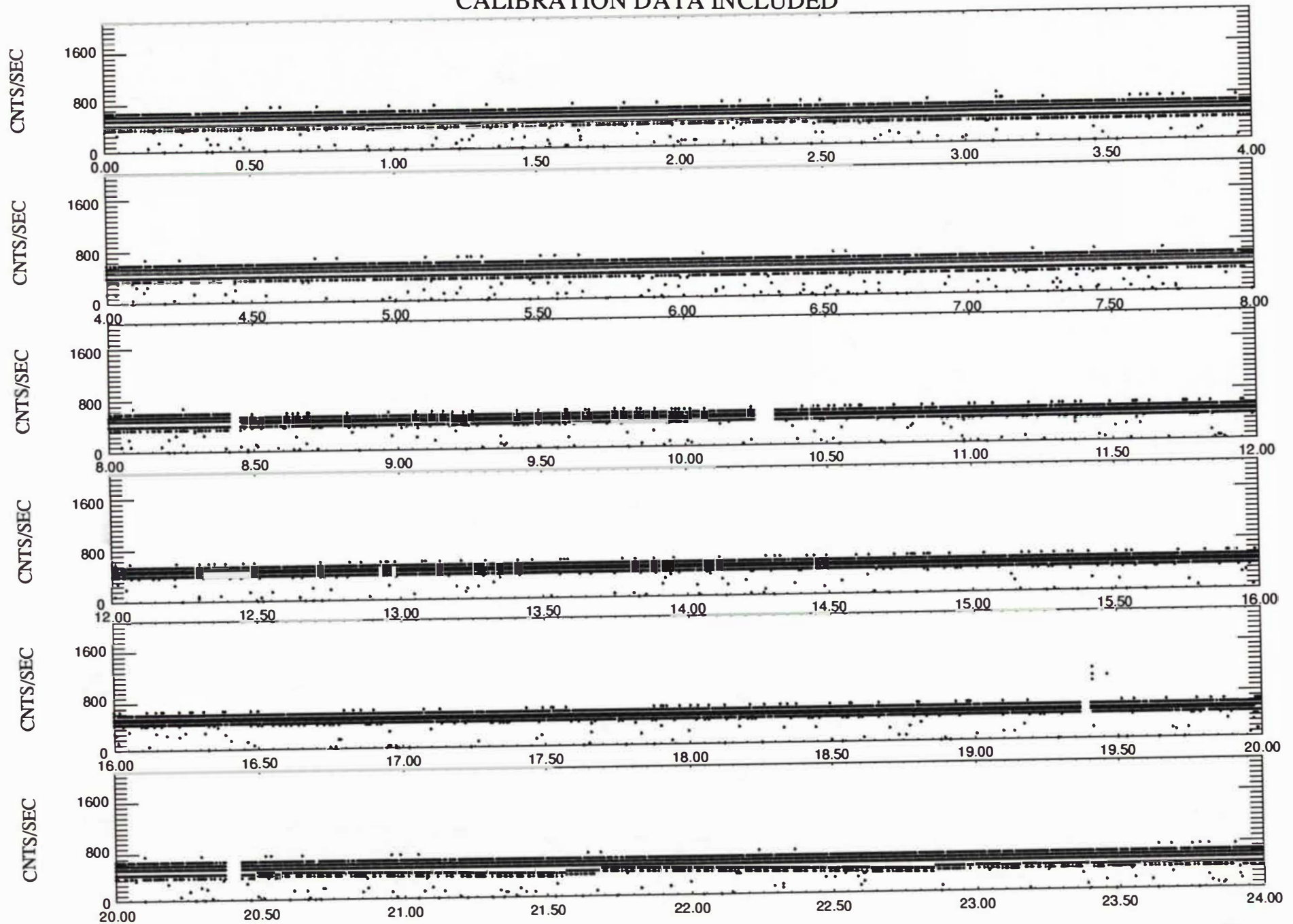
LOCATION: ZENITH= AZIMUTH= ERROR= DEGREES

COMMENTS:
PARTICLE EVENT.

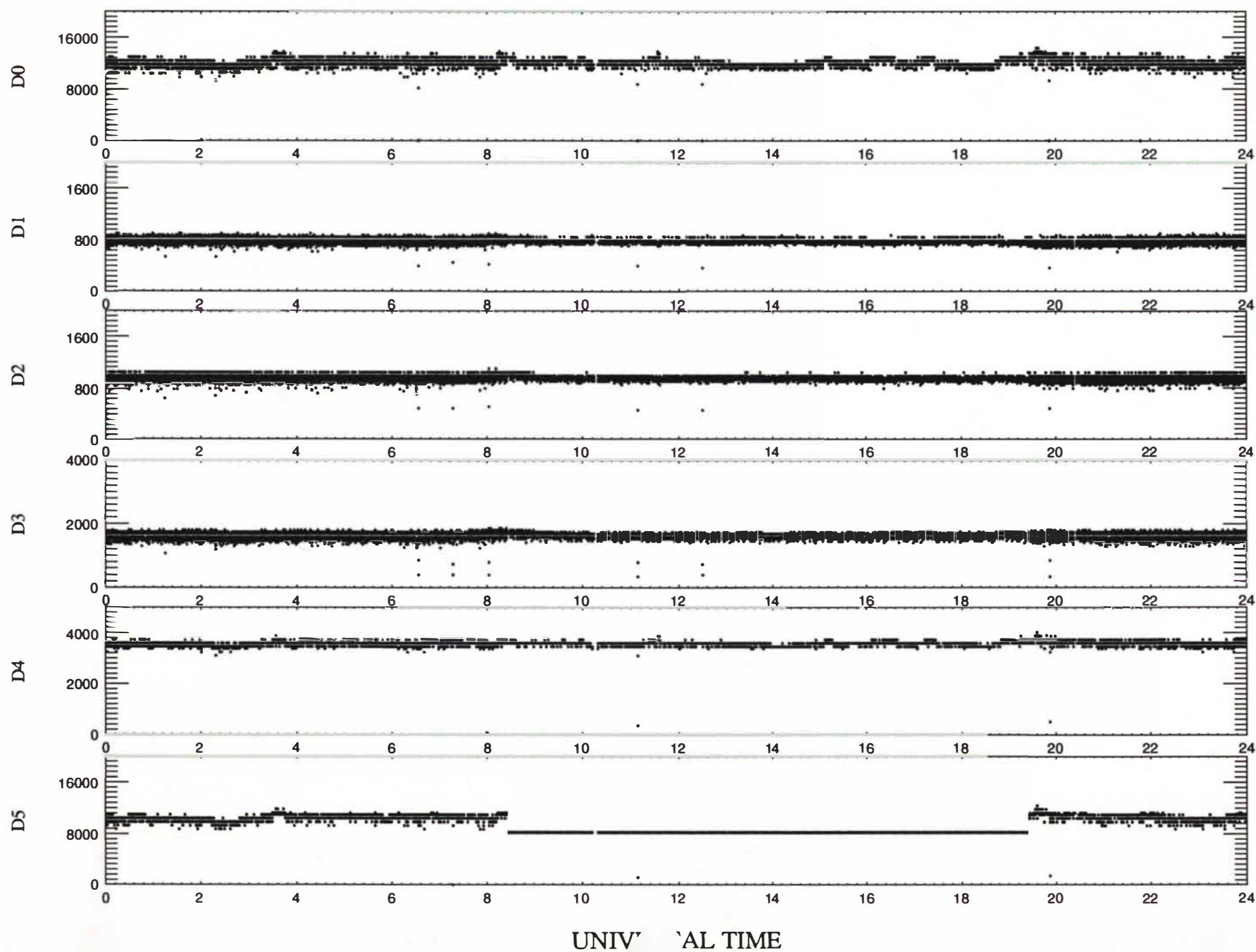
NO BURST (11)



CALIBRATION DATA INCLUDED



UNIV 'AL TIME



From SAHI@ssl.msfc.nasa.gov Fri May 9 09:25 PDT 1997
Return-Path: <SAHI@ssl.msfc.nasa.gov>
Received: from SSLMOR.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id JAA19348; Fri, 9 May 1997 09:24:44 -0700
From: SAHI@ssl.msfc.nasa.gov
Date: Fri, 9 May 1997 11:24:34 -0500 (CDT)
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970509112434.21c1389d@ssl.msfc.nasa.gov>
Subject: Crossing Windows for BATSE Burst 6225
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6225
EVENT OF 1997 MAY 8 DAY OF YEAR=128
EVENT CROSSING TIME AT BATSE : 78106. S. OR 21:41:46.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 132.000 81.000
BATSE PEAK COUNTING RATE: 4000 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 8/ 5/ 97 IS:
RA= 151.138 DEC= 32.184 DIST= 4.893 AU
BATSE-ULYSSES DISTANCE = 731999667. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=130.63 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-1589.93 SECS.
CROSSING TIME AT ULYSSES IS 76516. S. OR 21:15:16 +/- 347.58 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 8/ 5/ 97 IS:
RA= 169.046 DEC= 6.573 DIST= 0.859 AU
MARS-BATSE DISTANCE = 128536176. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION=103.72 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -101.65 SECS.
CROSSING TIME AT MARS IS 78004. S. OR 21:40:04 +/- 70.77 SECONDS

BATSE BURST TRIGGER

NO.: 6225

TIME: TJD=0576 SECONDS=78106

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=149.5 AZIMUTH=224.4 ERROR=2.3 DEGREES

COMMENTS:

BURST, MAIN PULSE DUR.~10 SECS, TOTAL DUR.~35 SECS, STARTING AT ~T-10 SECS. VISIBLE ABOVE 300 KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6225	970508	10576	78106	4000	132	+81	35

Helio corr removed 18/2/00
Date: Mar 30 '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 - best starts*

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*
- ☒ 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*

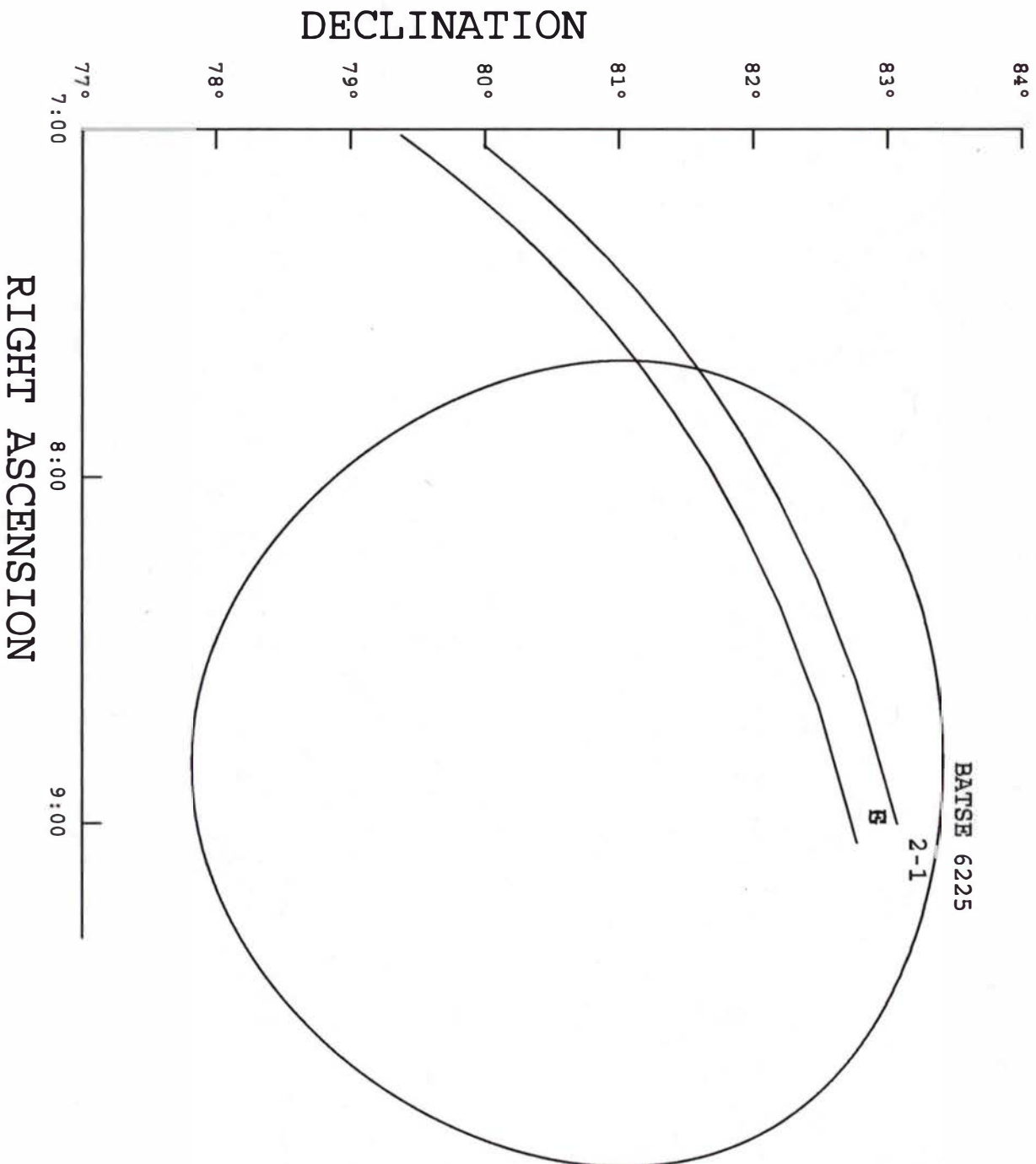
3. PVO Data

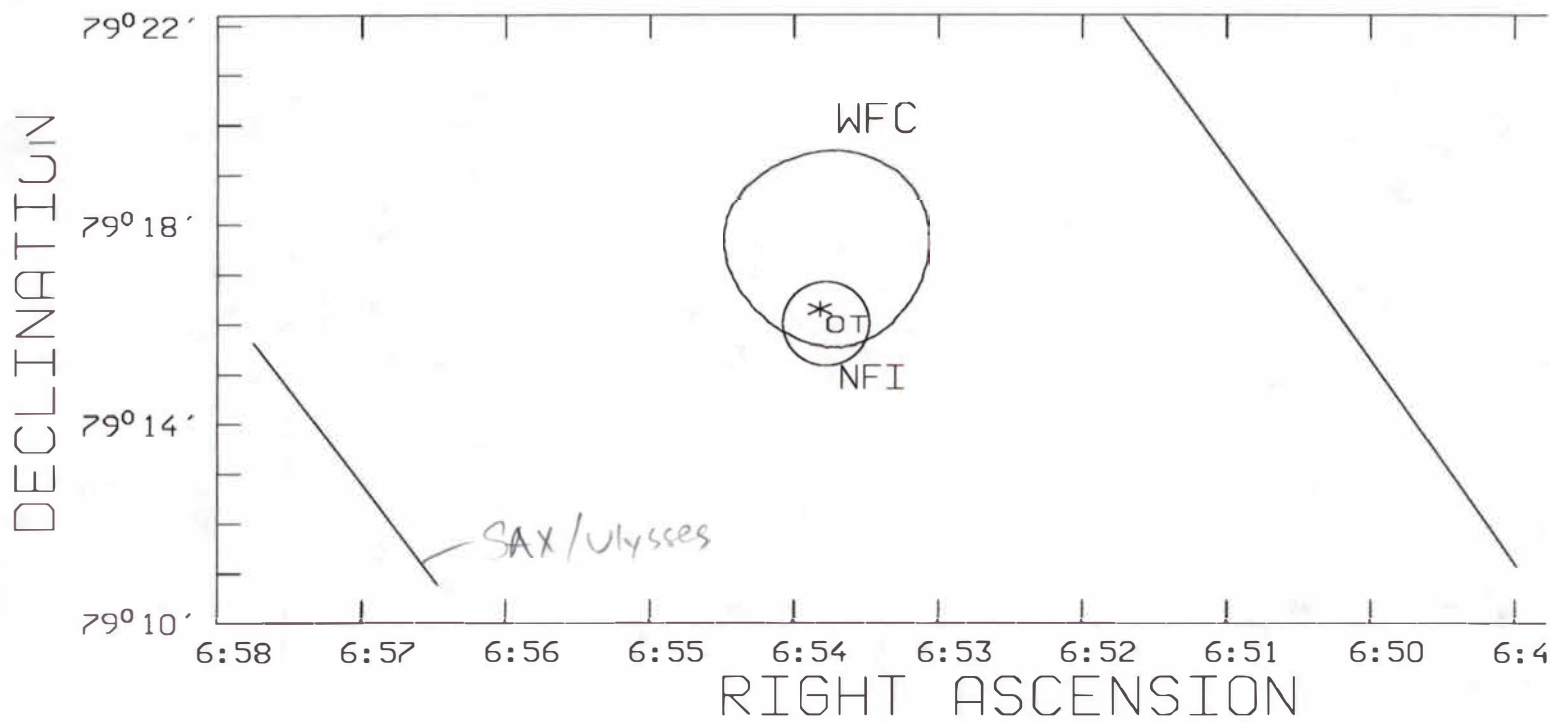
- ☐ Ephemeris of PVO used (not Venus)?
- ☐ 2000 coordinates used?
- ☐ Geocentric time used?
- ☒ ACCESS database updated?

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 MAY 8, 1997 21:15

18/ 2/ 0





970508

Radio Fluence of 970508

Trail says $\sim 300 \mu\text{Jy}$ for 1 yr, 10 GHz bandwidth

$$1 \mu\text{Jy} = 10^{-11} \text{ erg/cm}^2 \text{ s}^{-1} \text{ Hz}^{-1}$$

$$\times 300 \times 365 \times 86400 \times 10 \times 10^{-9} = 9.46 \times 10^{-10} \text{ erg/cm}^2$$

The optical fluence is given by Djorgovski as $> 4.6 \times 10^{-8}$, and $\sim 3\%$ of the GRB fluence. So the radio is $\sim .02$ of the optical

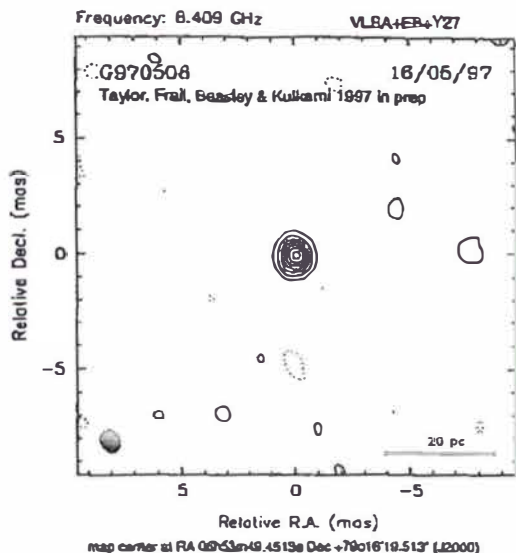
NRAO Background Information

National Radio Astronomy Observatory

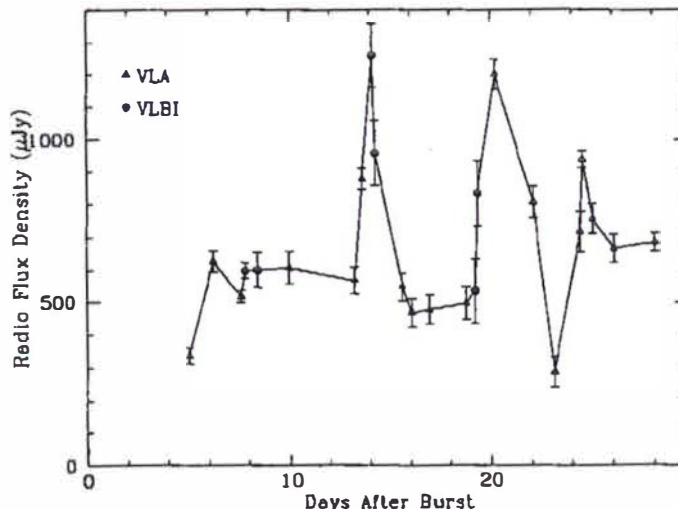


→ To: Kevin Hurley

Radio Observations of Gamma-Ray Burster GRB 970508



Radio contour image of GRB 970508 made using VLBI.



Graph of variations of radio intensity of GRB 970508 shows unexpected large variations over short time spans.

First Radio Detections of a Gamma-Ray Burst Counterpart

GRB 970508 was detected on 8 May 1997 by the Italian-Dutch satellite, BeppoSAX. Within four hours of the gamma-ray burst, the Very Large Array (VLA) radio telescope near Socorro, New Mexico, was observing the region of the burst. Initial radio observations revealed no object at the location of the burst. However, on 13 May, the VLA detected a source of radio emission at the position of the burst. This object was re-observed late on 14 May, confirming that detection. This is the first detection of a gamma-ray burster at radio wavelengths.

On 16 May, the continent-wide Very Long Baseline Array (VLBA) observed the object and made a detection. GRB 970508 is the object with the faintest radio emission ever detected by the technique of Very Long Baseline Interferometry (VLBI). Since then, both instruments, facilities of the National Science Foundation, have made repeated observations.

Early Lessons from These Observations: Behavior of the Object at Radio Wavelengths

The VLBA has provided a super-accurate position for GRB 970508. The position is now known to within less than a thousandth of a second of arc, more than 50 times the precision provided by the Hubble Space Telescope. Over some 20 days of observations, the object has not been seen to move.

Intensity measurements made by the VLA and VLBA agree quite well with one another. The VLBA is able to confirm that all the radio emission is coming from a small region of space -- about three one-thousandths of a second of arc, or 6 to 9 light-years at the distance of this object. Even with the extremely great resolving power of the VLBA, there is not yet any structure discernible in this object. We are continuing to monitor this object with both instruments.

The intensity of radio emission has varied greatly on short time scales. This behavior was completely unexpected in an object whose optical counterpart has declined steadily.

NRAO Investigators

Dr. Dale Frail, (505) 835-7338, dfrail@nrao.edu

Dr. Greg Taylor, (505)-835-7237, gtaylor@nrao.edu

National Radio Astronomy Observatory (NRAO), Socorro, NM.

The National Radio Astronomy Observatory is a facility of the National Science Foundation, operated under cooperative agreement by Associated Universities, Inc.

970228 They got 34 000 s obs - 10 ks of good
time - 10 photons!

Germans

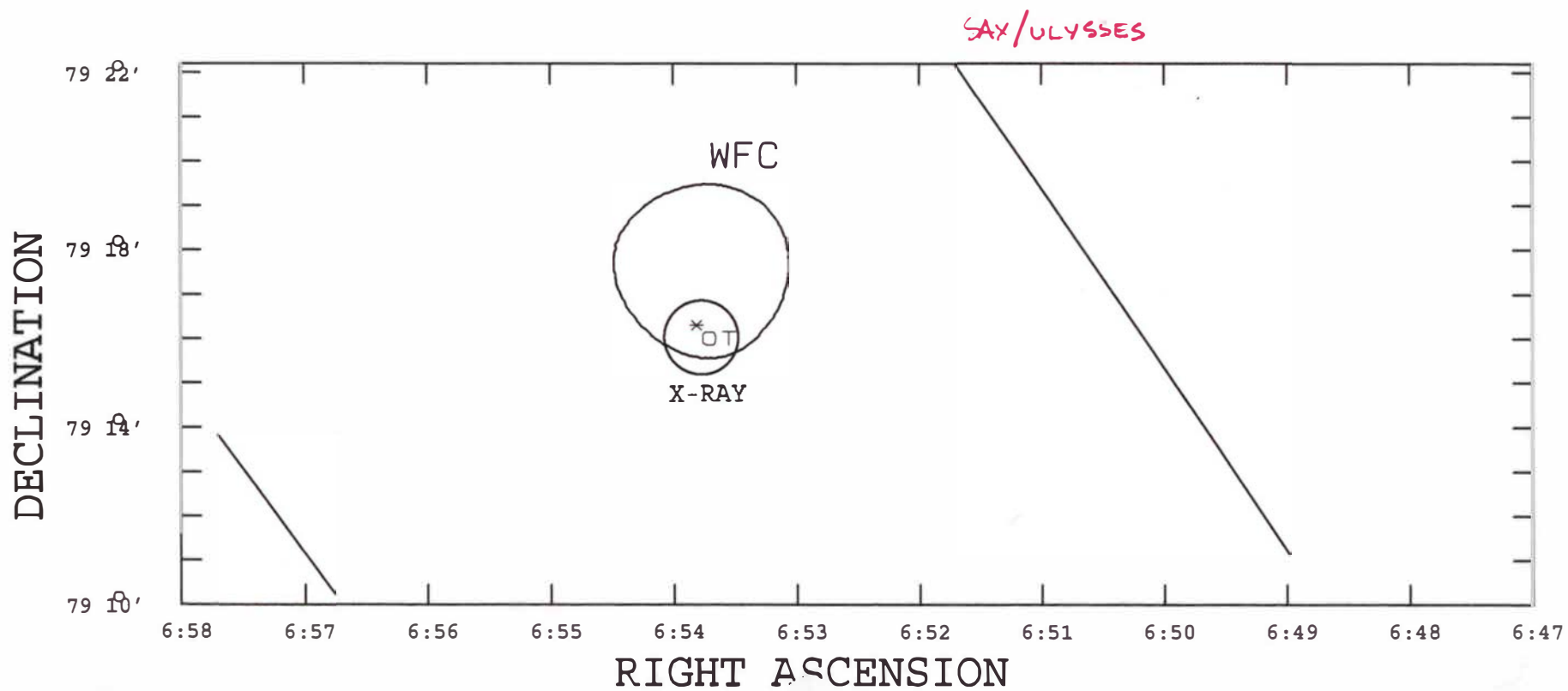
Title

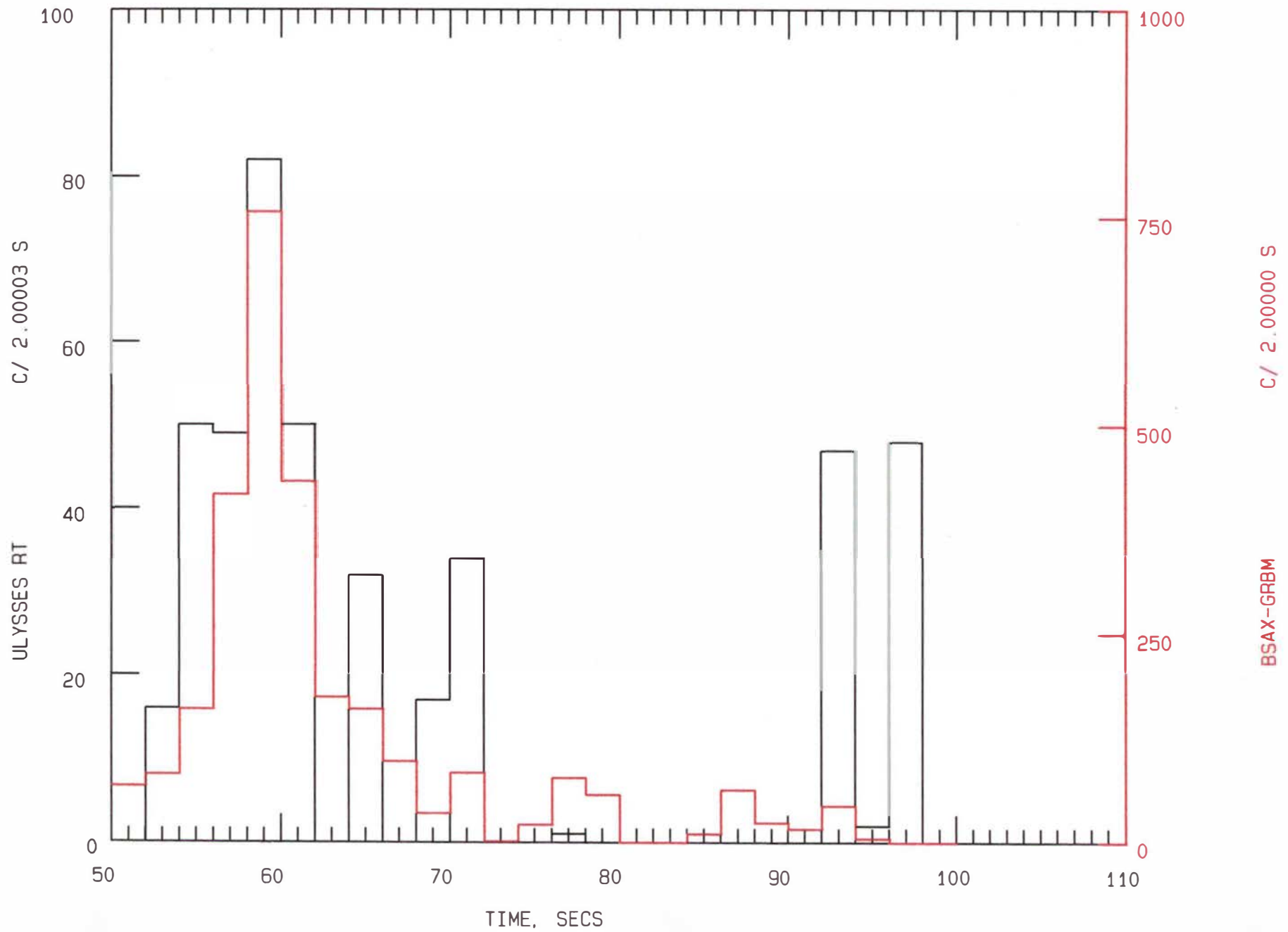
Collaborators

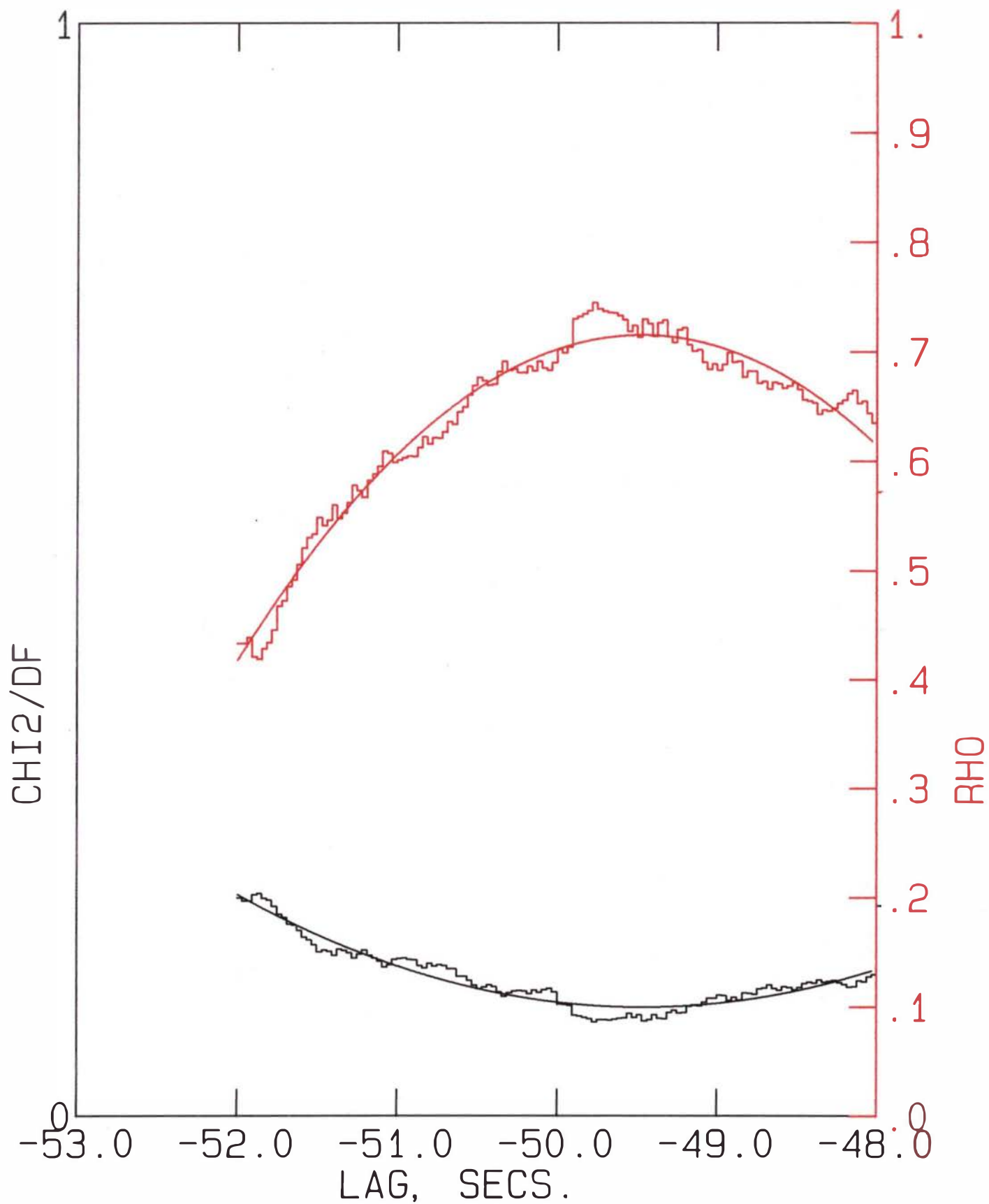
May 8

1.5×10^{-13} 2-10 keV uncorrected for abs

$n_H \sim 5 \cdot 10^{20} \rightarrow 10^{21}$ we 10^{21} for prop







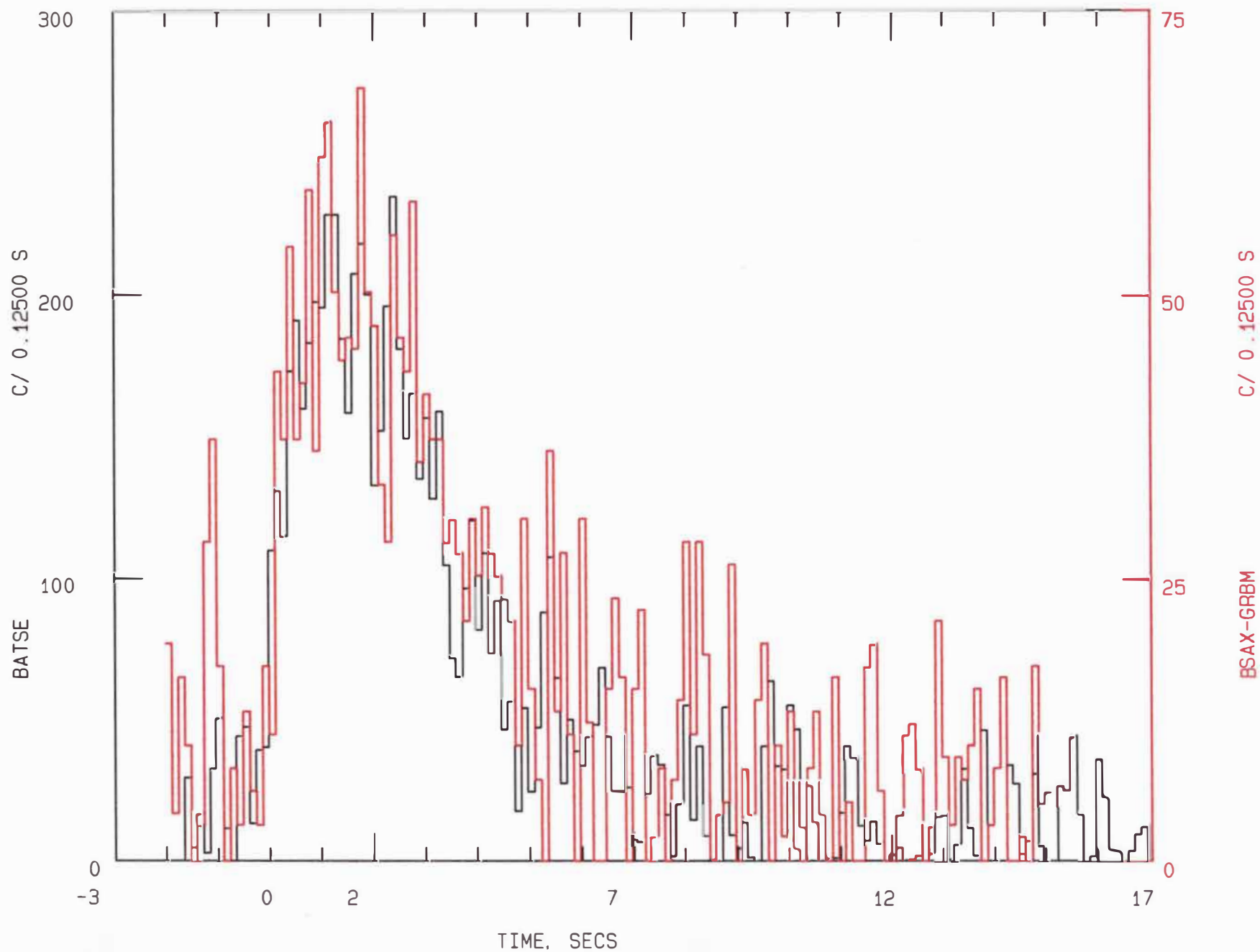
BATSE

-BSAX-GRBM CORRELATION

8/ 5/97

78106.826

4/12/97



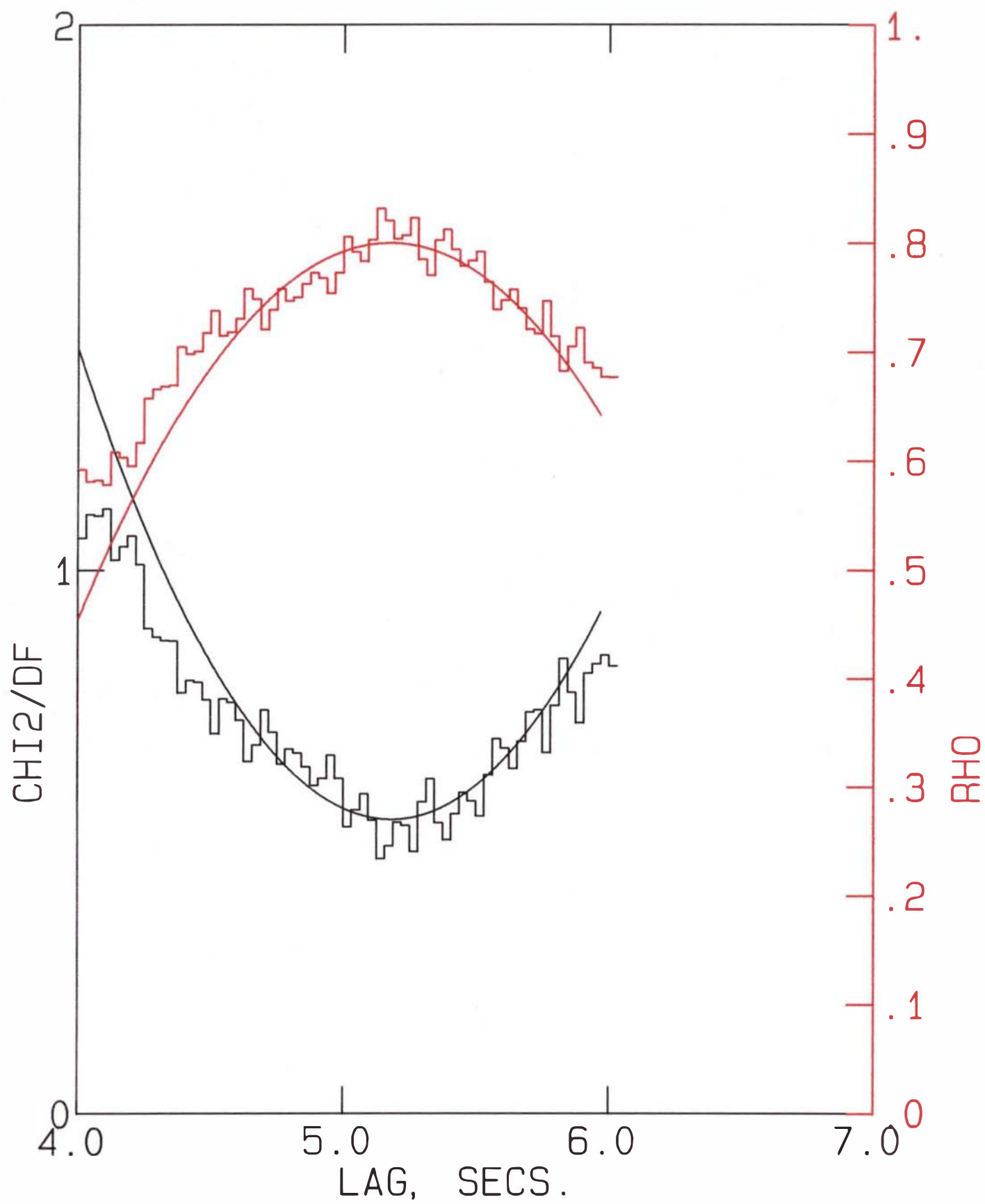
4/12/97

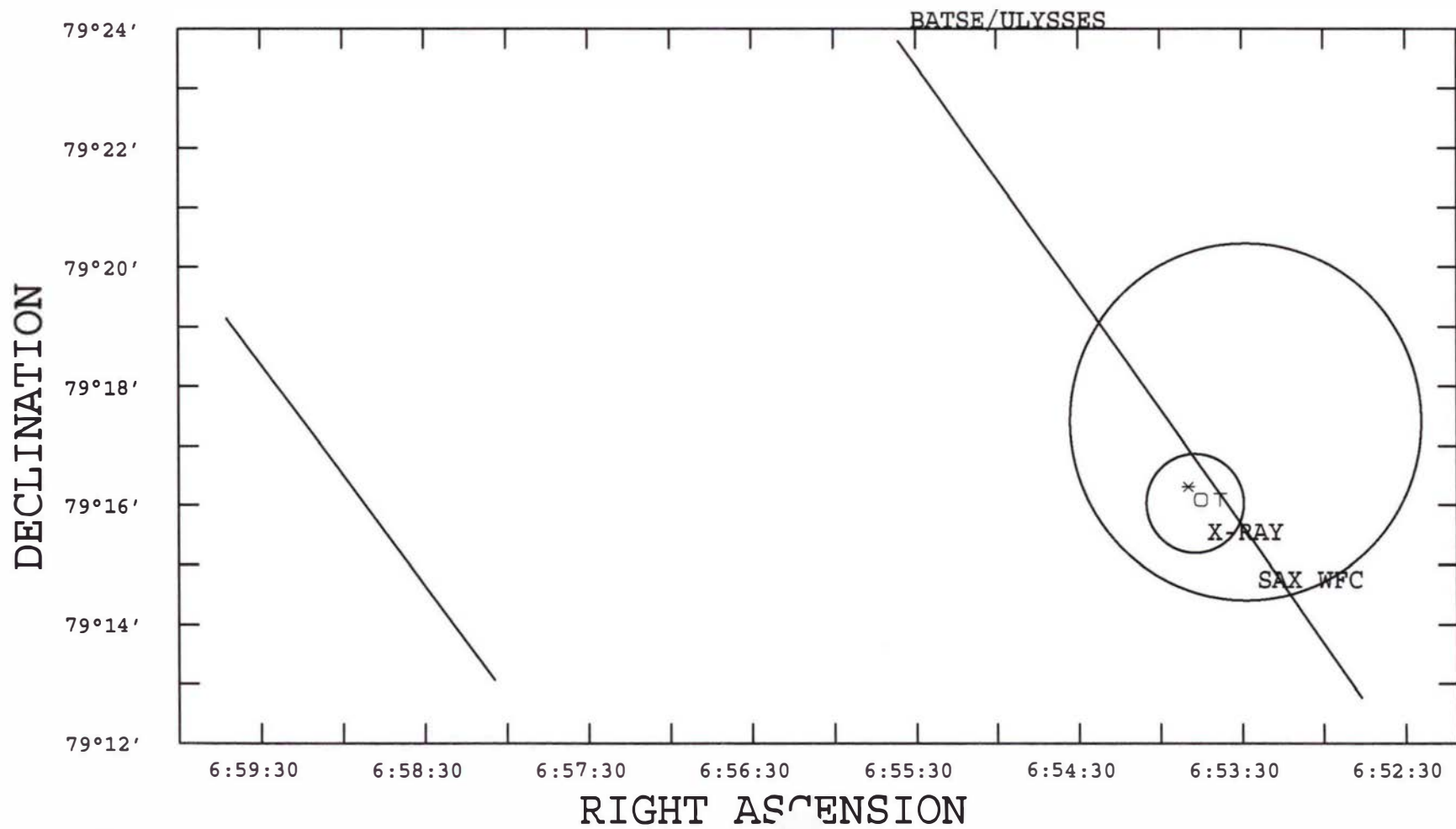
BATSE

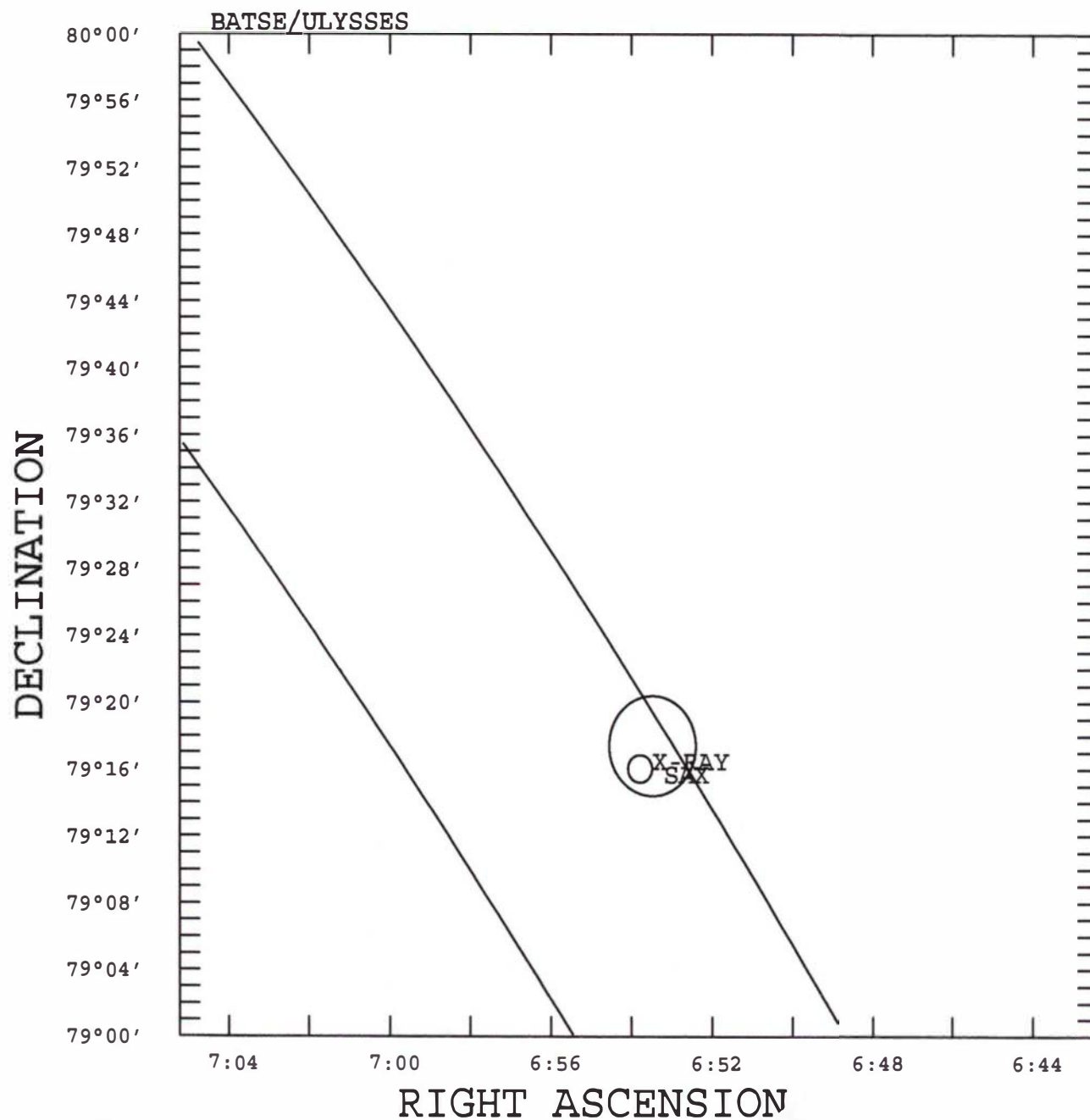
-BSAX-GRBM CORRELATION

8/ 5/97

78106.826

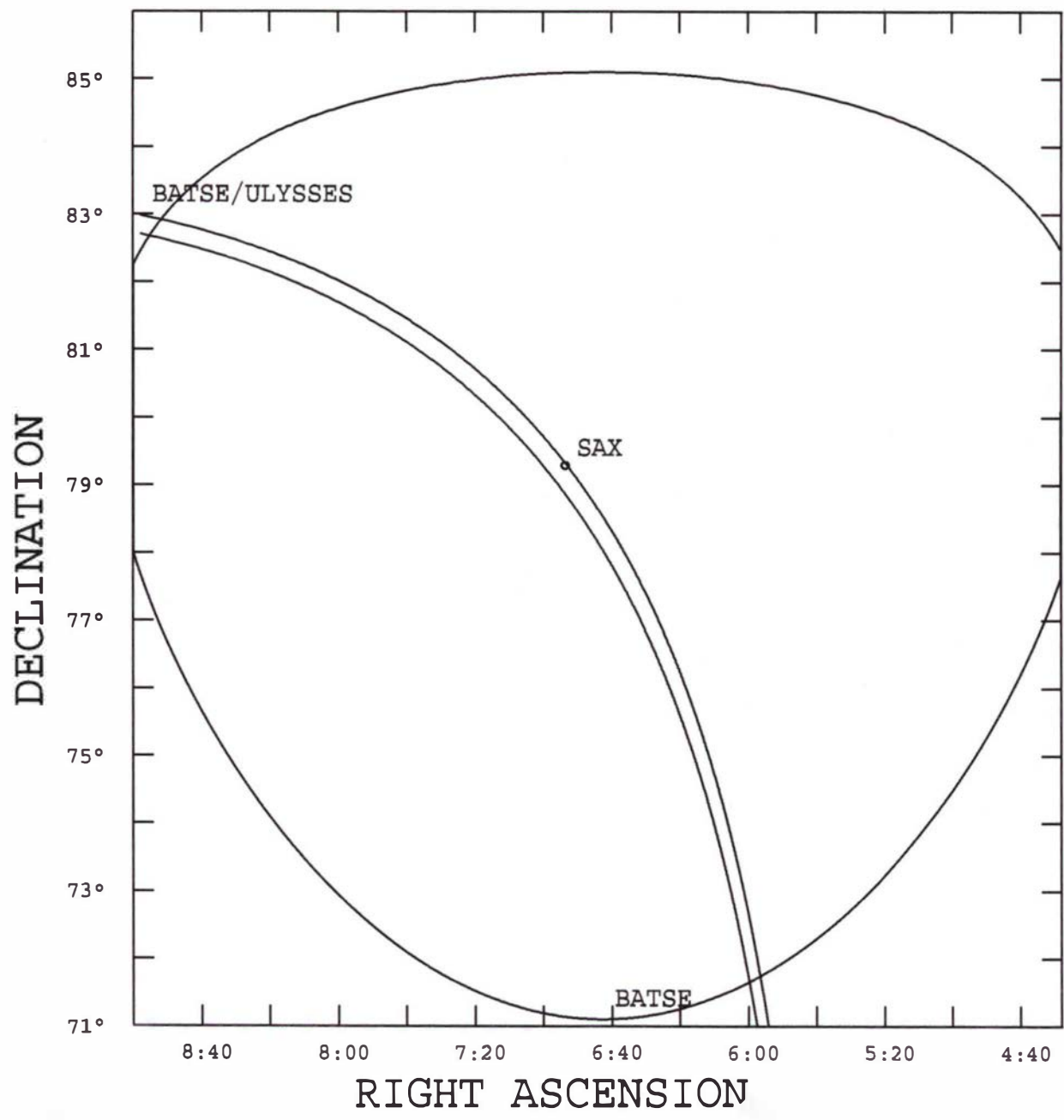






22

OLD



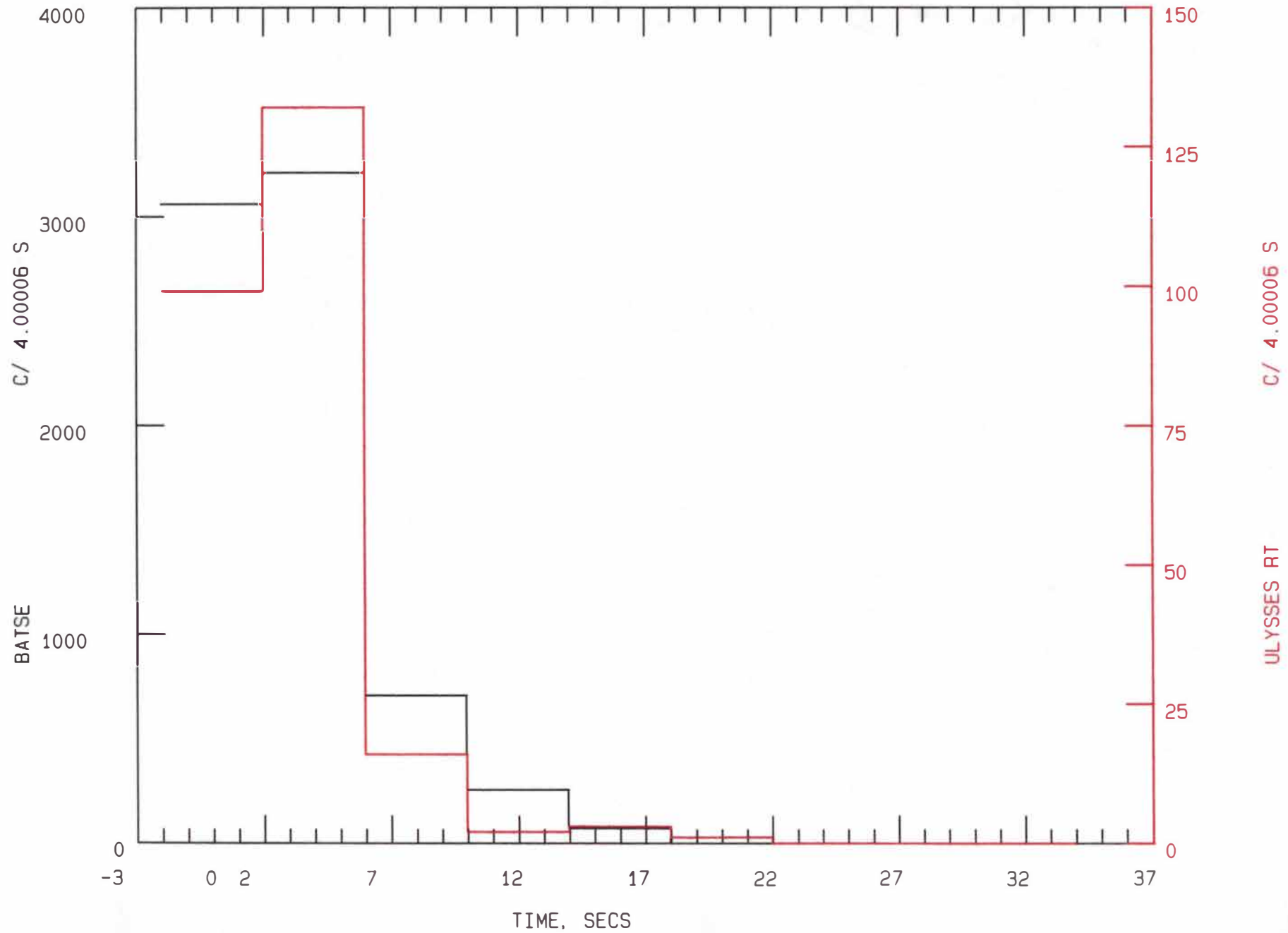
BATSE

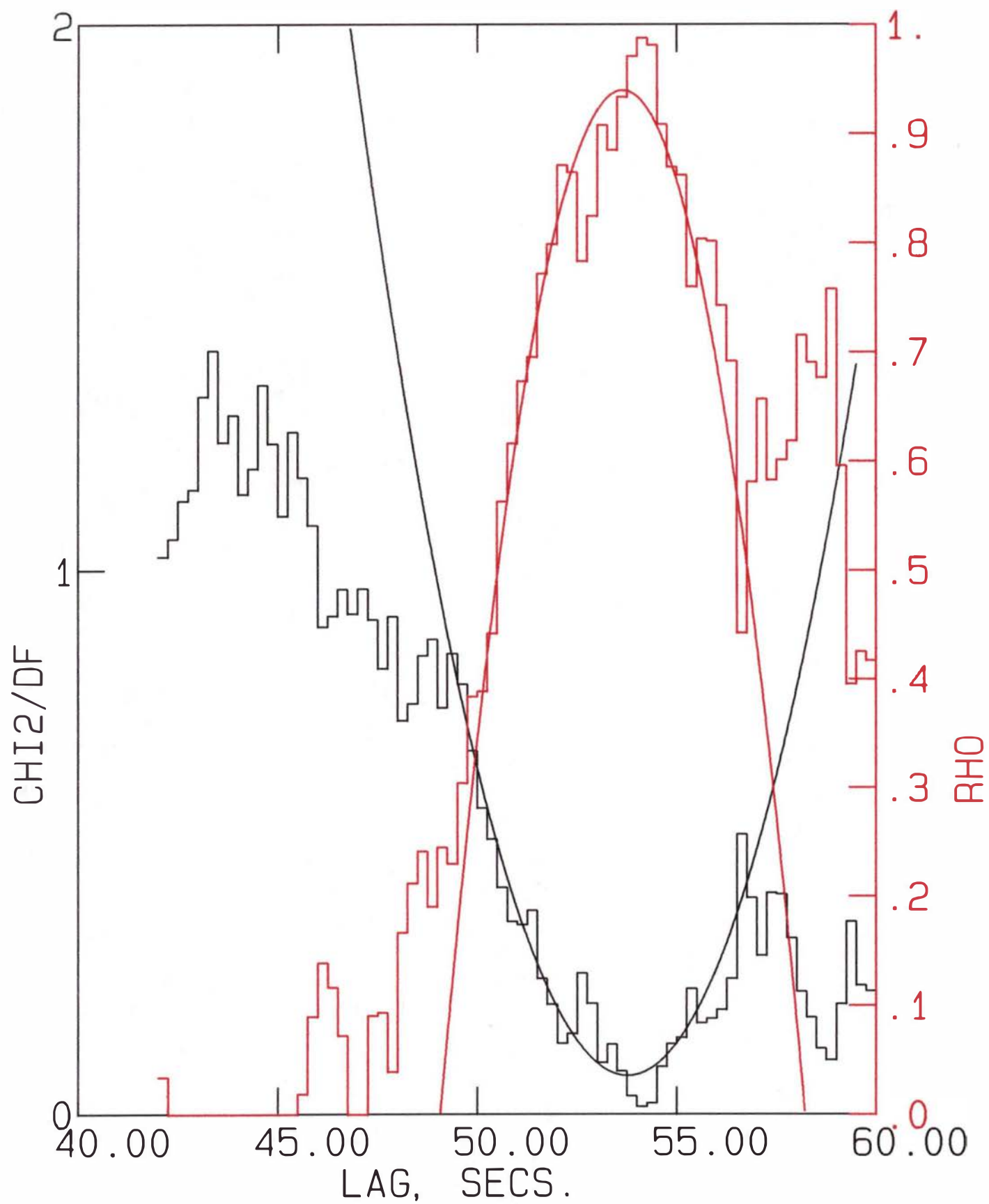
-ULYSSES RT CORRELATION

8/ 5/97

78106.826

30/ 3/98





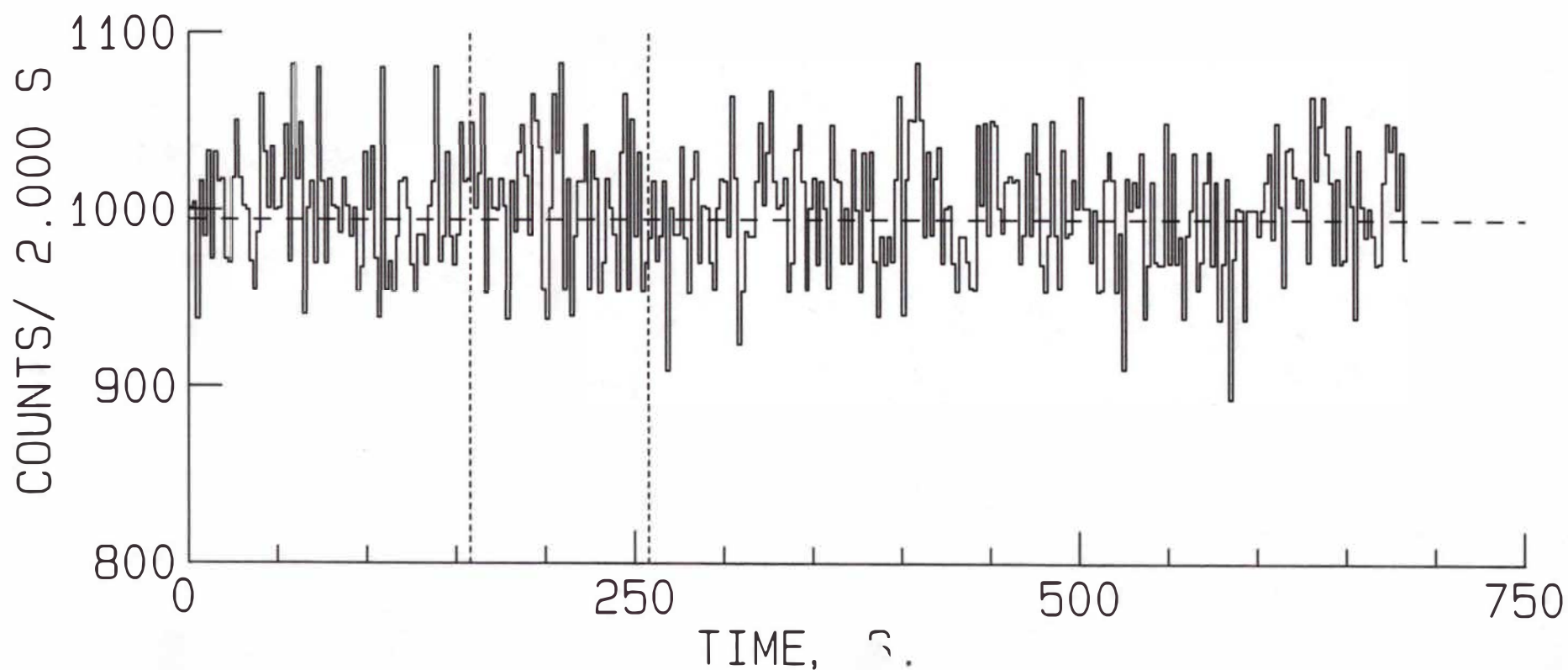
ULYSSES RT

30 / 3 / 98

8 / 5 / 97 76176.105 s

0.250 S INTERVALS REGROUPED BY 8

22- 147 keV



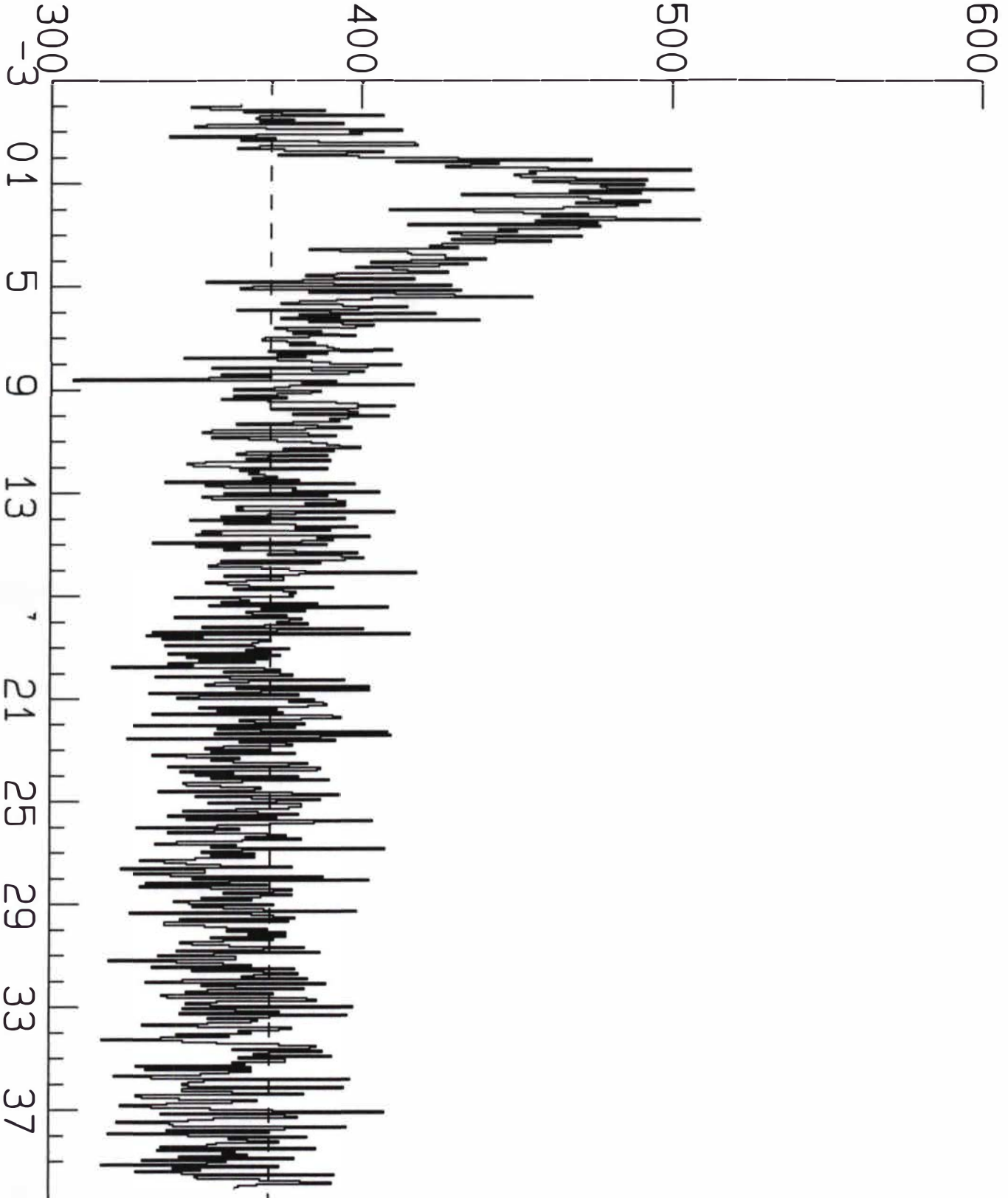
BATSE

08/05/97

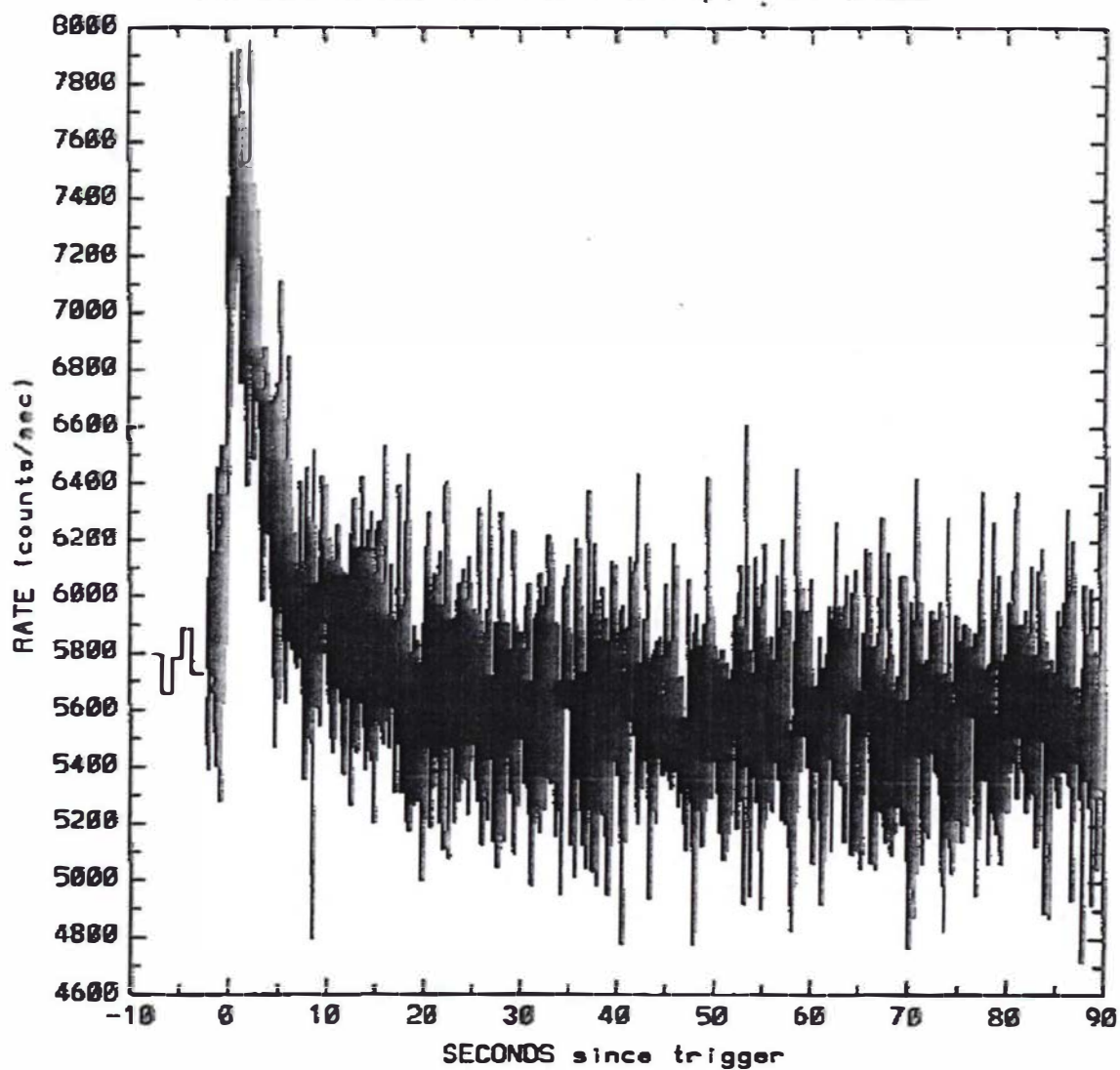
78106.826

25- 100 keV

COUNTS/0.064 S



DISCSC Data for K. Hurley, No. 6225



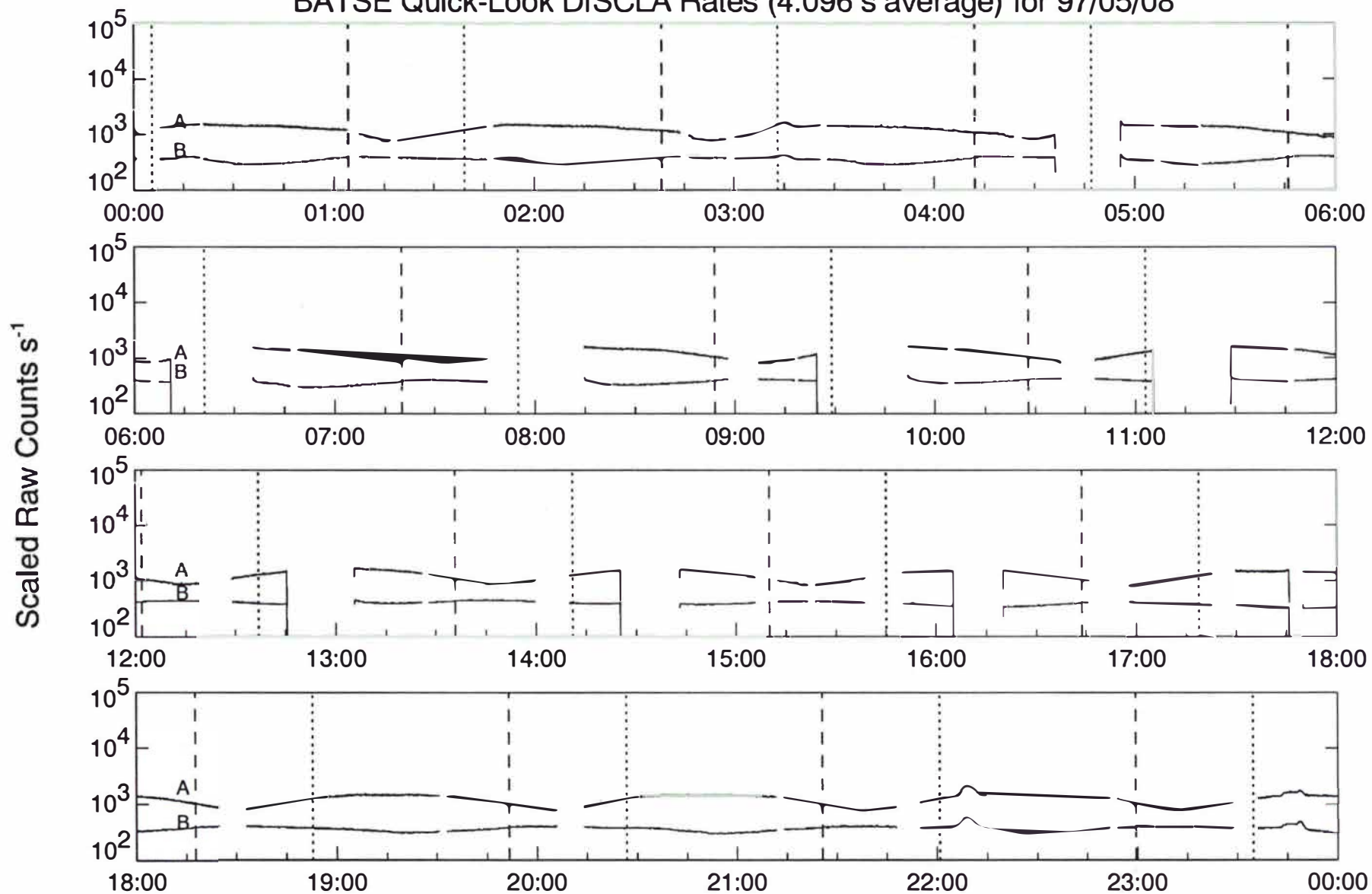
13-MAY-1997 18:49:59

Created by MOPS BD
(Burst Display)
Version 12.25

Trigger = . 6225

Trigger Time:
10576 / 78166.825Burst Data Type:
DISCSCDeadtime
Corrected: K
Background Data
Type: PREB + DISCLAMinimum Integ. Time:
8.064 secondsDetectors [7..8].
7---3---Discriminators:
(1 . 2)Quality Mask:
BDISP1

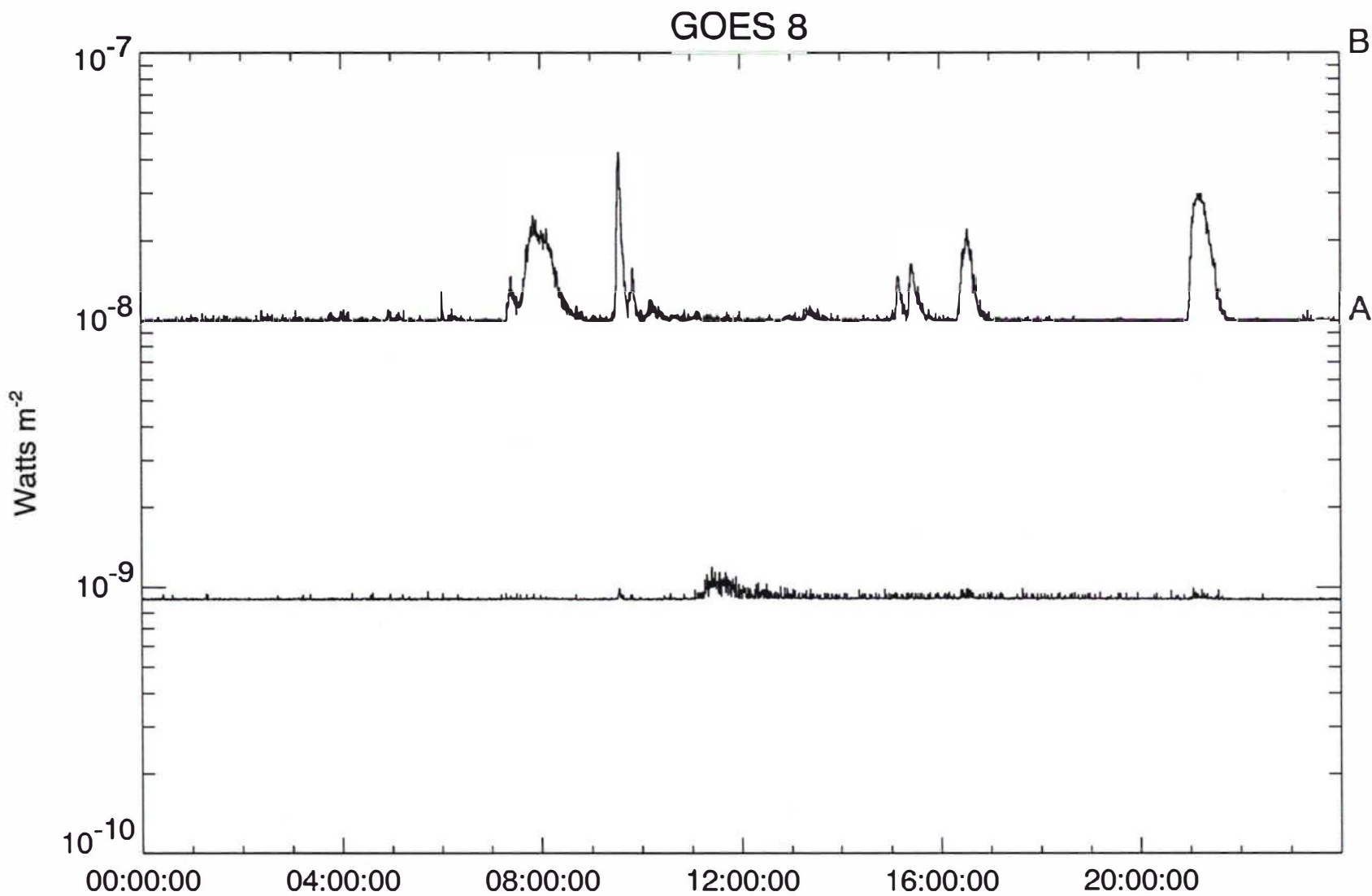
BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/08



Current Time: 97/05/12, 1008 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare



Data Start: 97/05/08, 0000:00

Plot created: 97/05/12, 1007

Channel

1 (1.0 - 8.0 Angstroms)

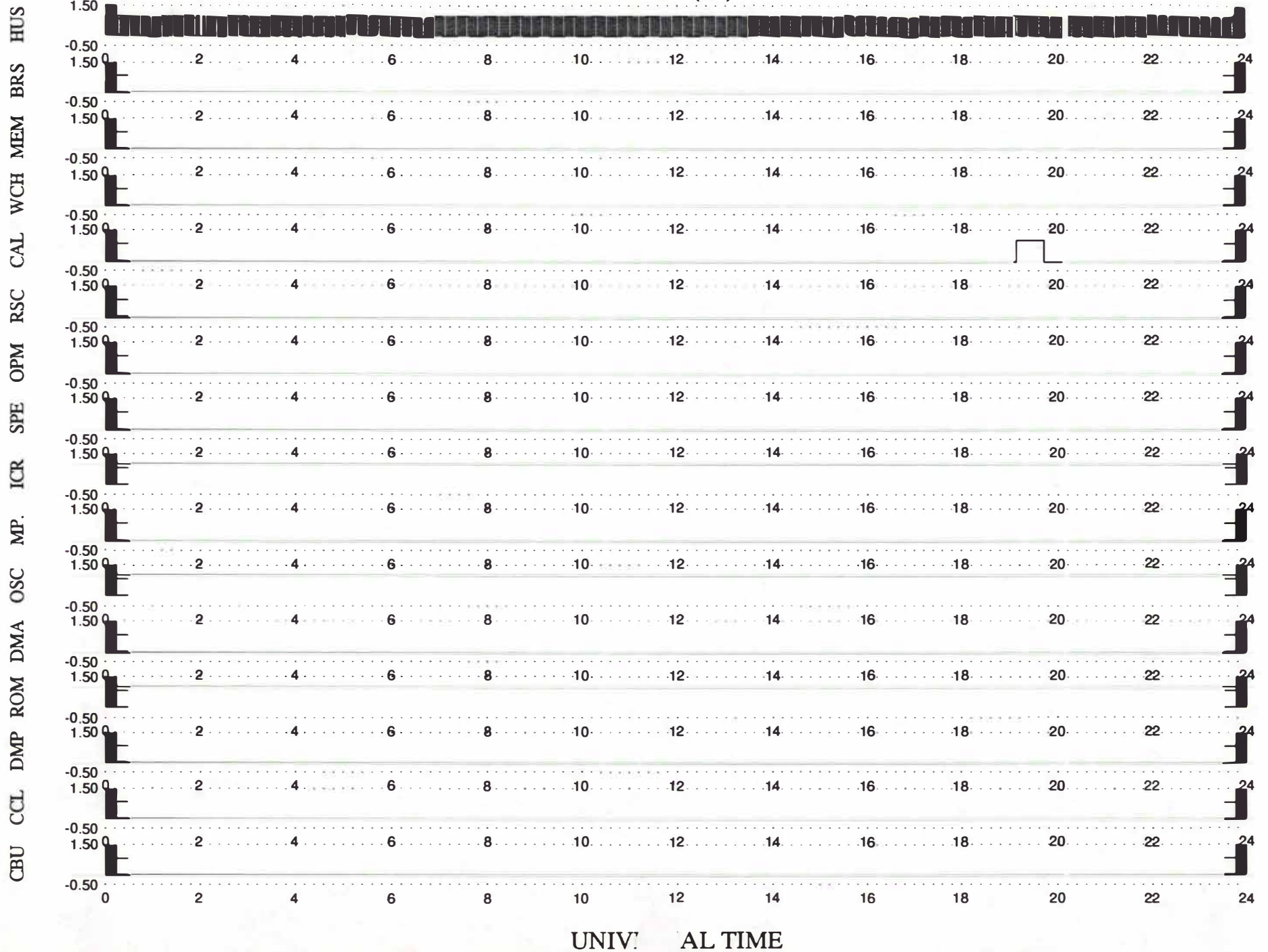
Background not subtracted

2 (0.5 - 4.0 Angstroms)

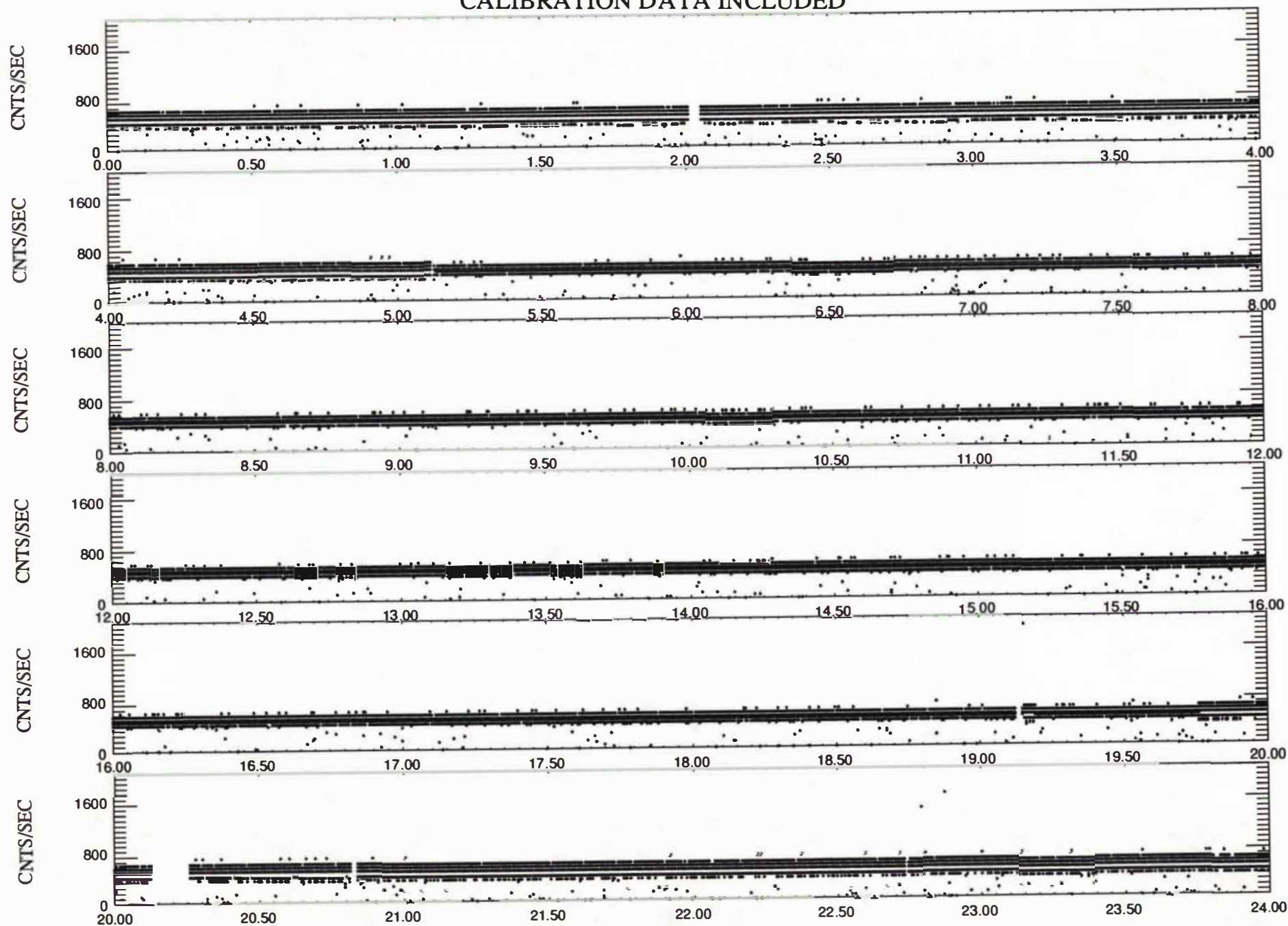
Background not subtracted

Sample average = 10

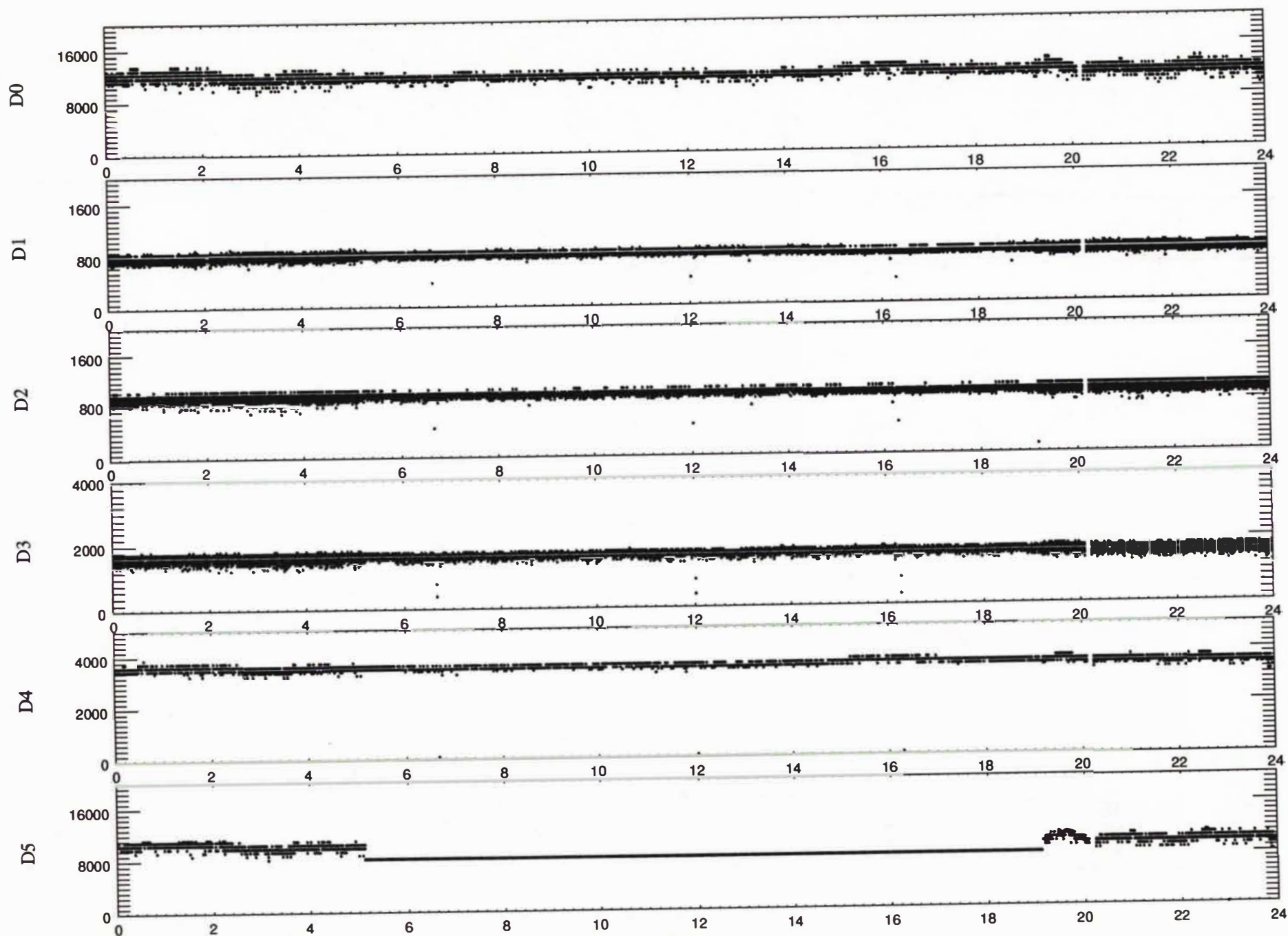
NO BURST (11)



CALIBRATION DATA INCLUDED



UNIVERSAL TIME



UNIVERSAL TIME

From HENZE@fender.msfc.nasa.gov Mon May 12 11:52 PDT 1997
Return-Path: <HENZE@fender.msfc.nasa.gov>
Received: from FENDER.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id LAA07152; Mon, 12 May 1997 11:52:12 -0700
From: HENZE@fender.msfc.nasa.gov
Date: Mon, 12 May 1997 13:51:28 -0500 (CDT)
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970512135128.21e183e4@fender.msfc.nasa.gov>
Subject: Crossing Windows for BATSE Burst 6226
Content-Type: text
Content-Length: 1135
X-Lines: 26

BATSEARCH PROGRAM

BATSE BURST # 6226
EVENT OF 1997 MAY 9 DAY OF YEAR=129
EVENT CROSSING TIME AT BATSE : 48206. S. OR 13:23:26.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 192.000 20.000
BATSE PEAK COUNTING RATE: 9000 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 9/ 5/ 97 IS:
RA= 151.110 DEC= 32.108 DIST= 4.905 AU
BATSE-ULYSSES DISTANCE = 733754076. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=141.58 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-1917.67 SECS.
CROSSING TIME AT ULYSSES IS 46288. S. OR 12:51:28 +/- 284.92 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 9/ 5/ 97 IS:
RA= 169.147 DEC= 6.488 DIST= 0.866 AU
MARS-BATSE DISTANCE = 129562400. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION=154.03 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -388.54 SECS.
CROSSING TIME AT MARS IS 47817. S. OR 13:16:57 +/- 26.95 SECONDS

BATSE BURST TRIGGER

NO.: 6226

TIME: TJD=0577 SECONDS=48206

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=085.0 AZIMUTH=238.8 ERROR=010.4 DEGREES

COMMENTS:

DOUBLE PULSE, TOTAL DUR. ~100 S. FIRST IS WEAKER, MAX AT ~T. SECOND IS
STRONGER, STARTS AT ~T+28 S, HAS MAX AT ~T+33 S, ~T+39 S.
WEAKLY VISIBLE ABOVE 300 KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6226	970509	10577	48206	9000	192	+20	70

Helio corr removed

Date: Mar 30 '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

- ☐ 2.042 s subtracted for bursts prior to June 25 1992 and DISCSC programs prior to Version 2.16 (August 28 1992)? *N/A*
- ☒ 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*

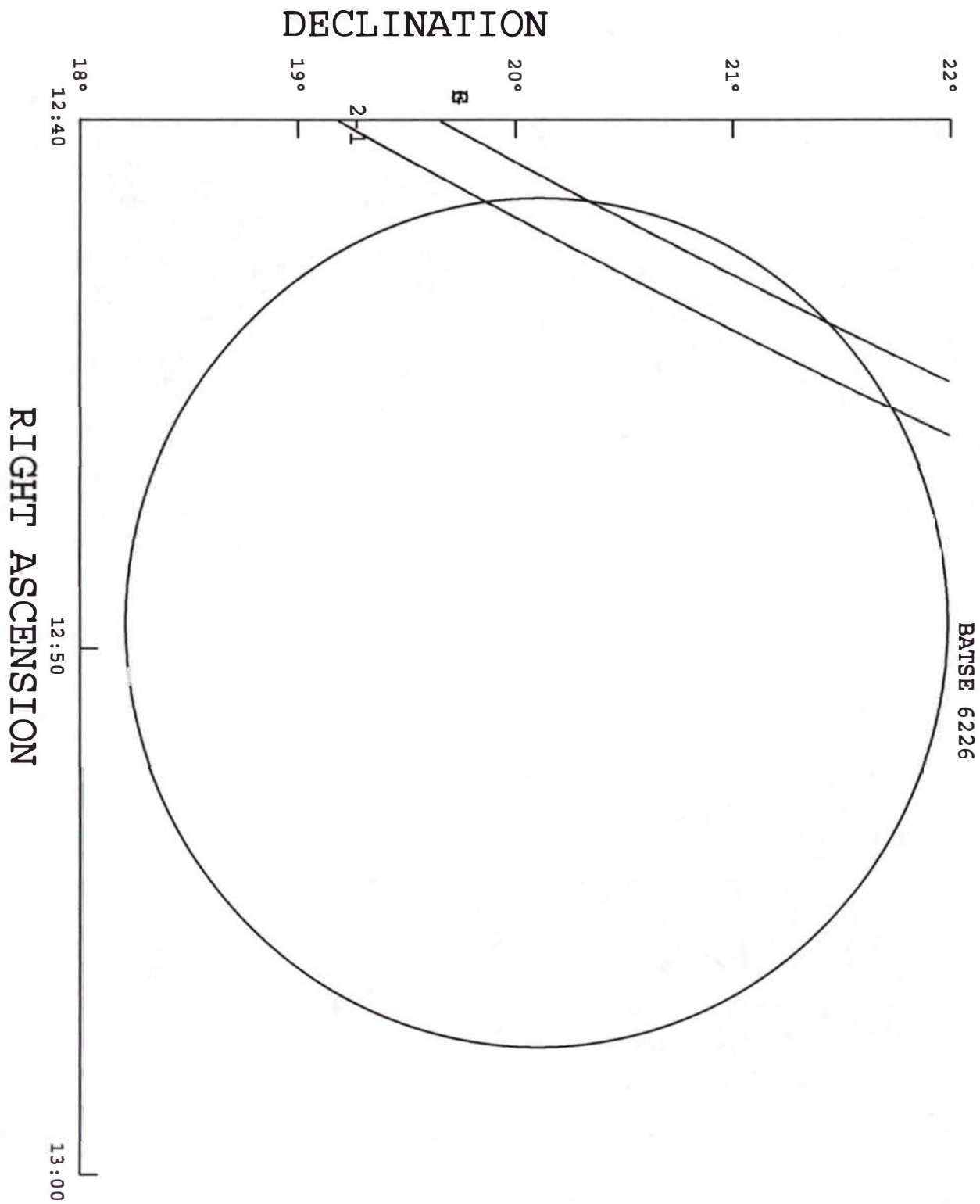
3. PVO Data

- ☐ 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 MAY 9, 1997 12:50

18 / 2 / 0



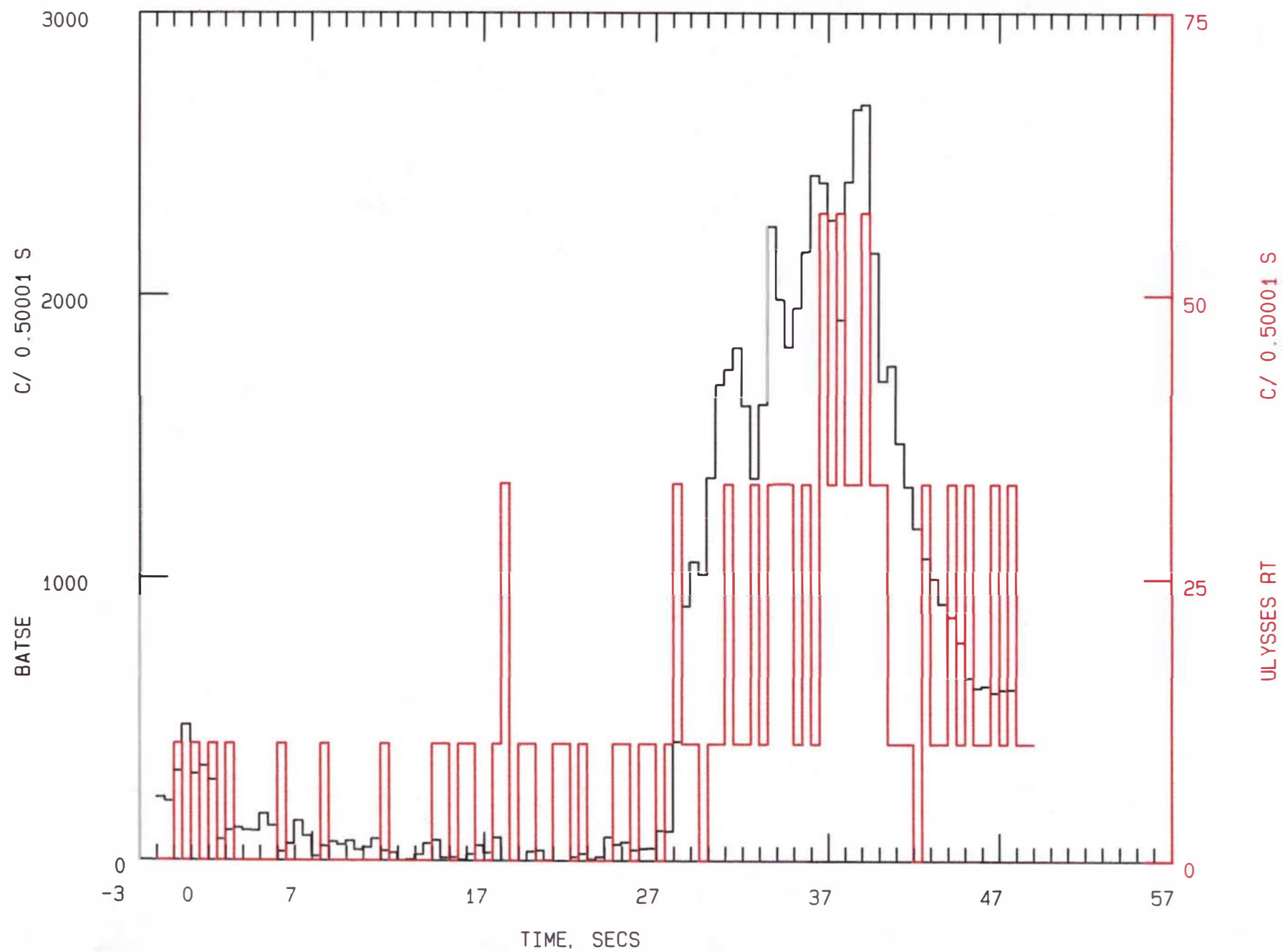
BATSE

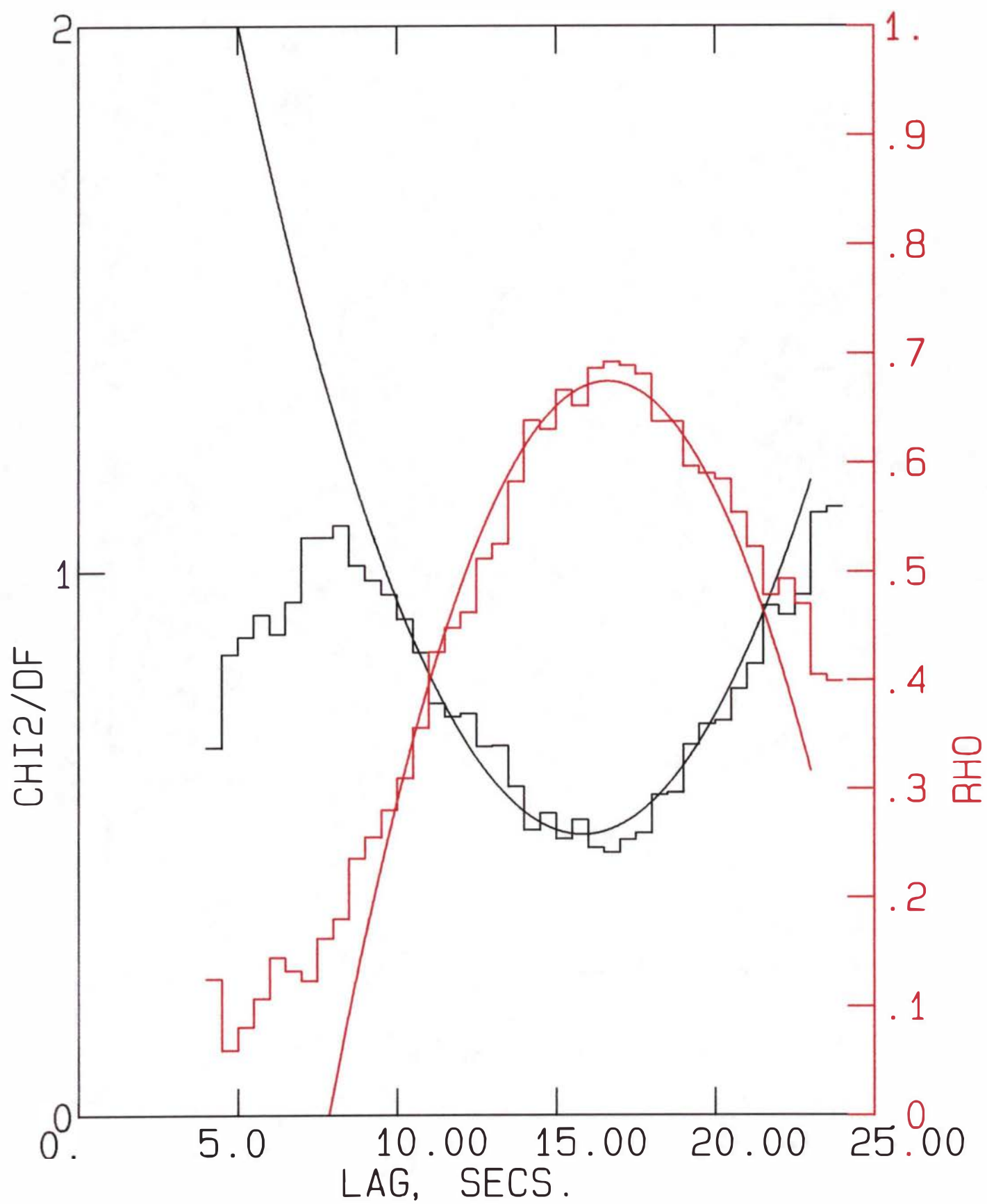
-ULYSSES RT CORRELATION

9/ 5/97

48206.537

30/ 3/98



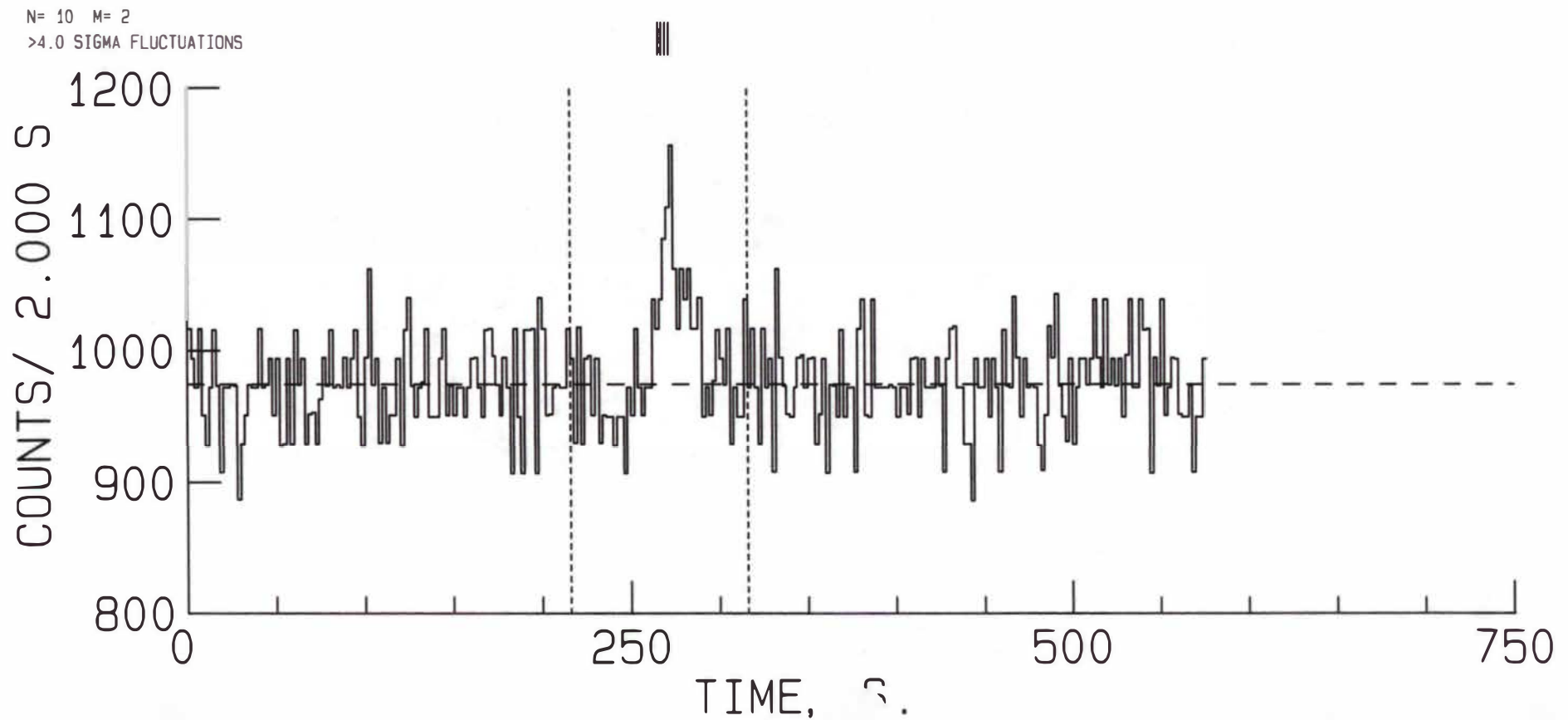


ULYSSES RT

30 / 3 / 98

9 / 5 / 97 46008.010 s

0.500 S INTERVALS REGROUPED BY 4
22- 148 keV



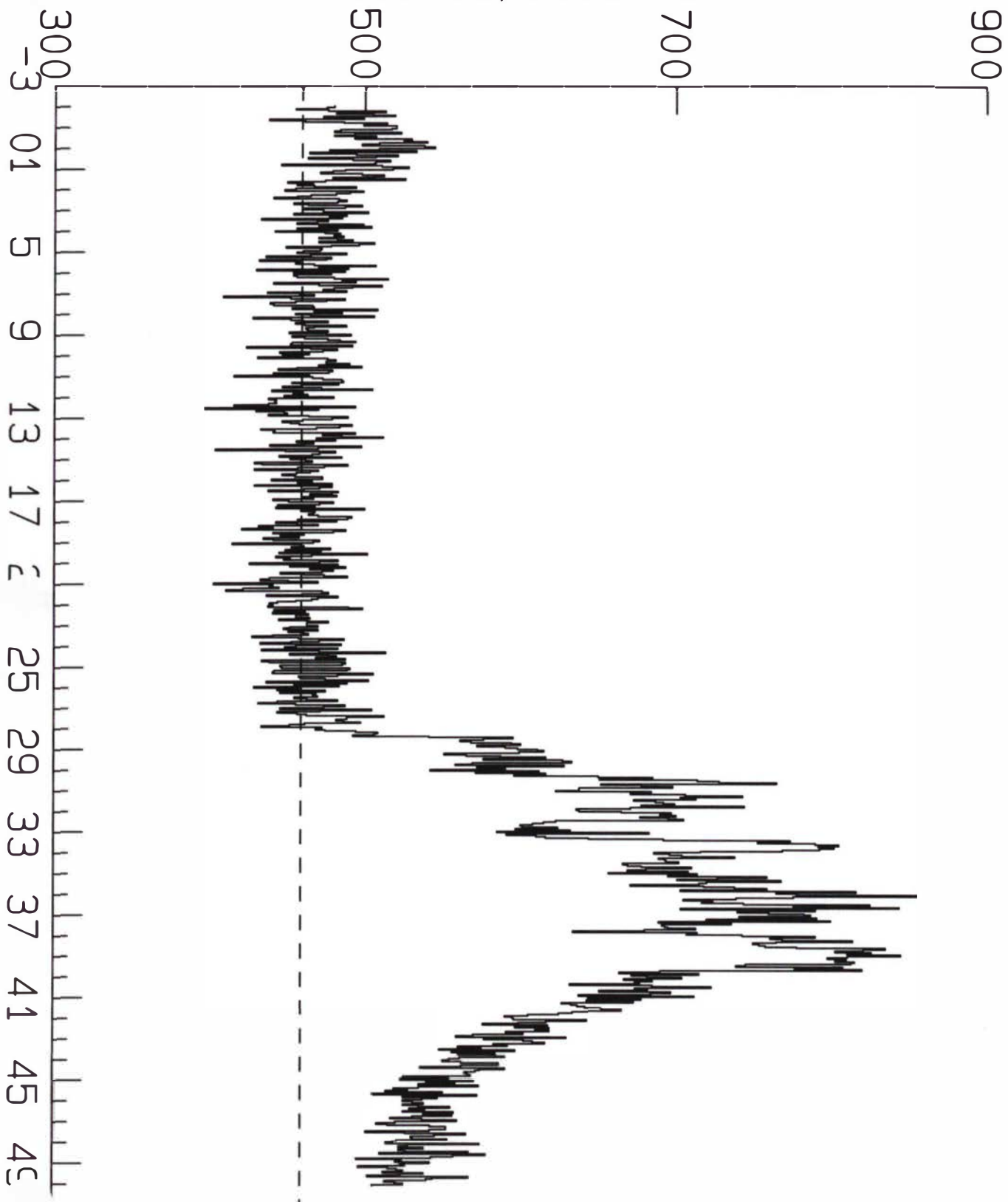
BATSE

09/05/97

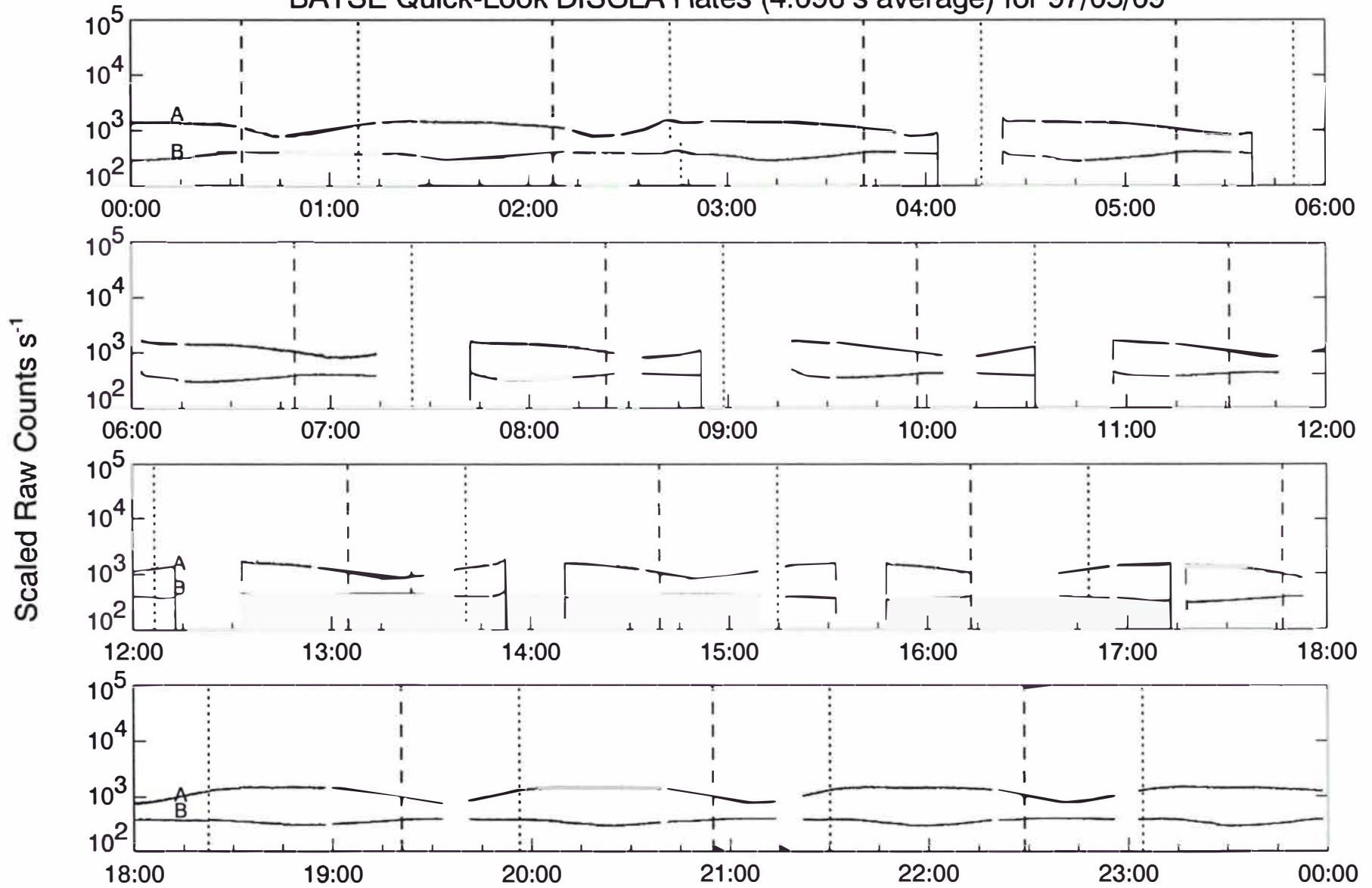
48206.537

25- 100 keV

COUNTS/0.064 S



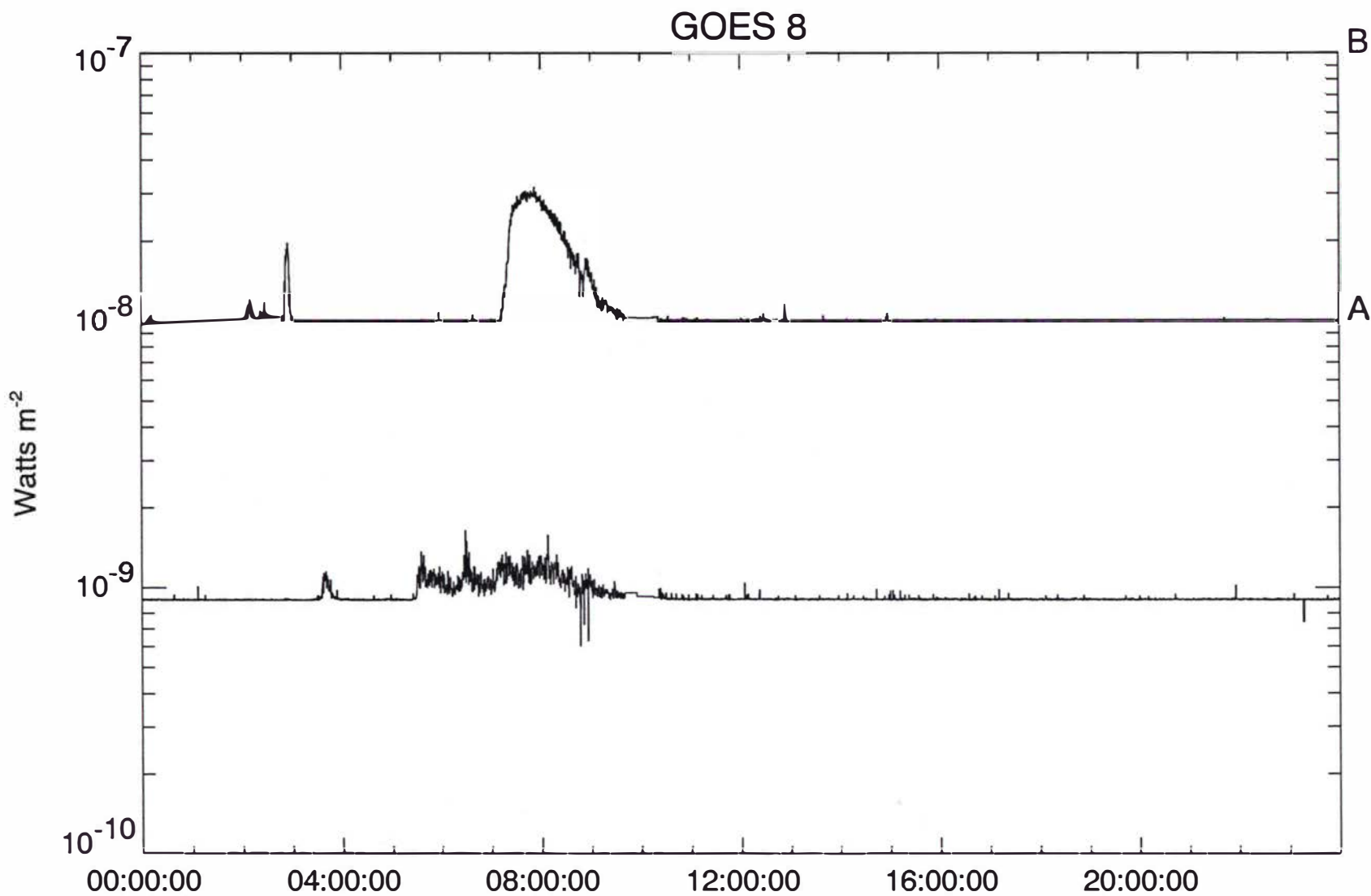
BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/09



Current Time: 97/05/13, 1008 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare



Data Start: 97/05/09, 0000:00

Plot created: 97/05/13, 1007

Channel

1 (1.0 - 8.0 Angstroms)

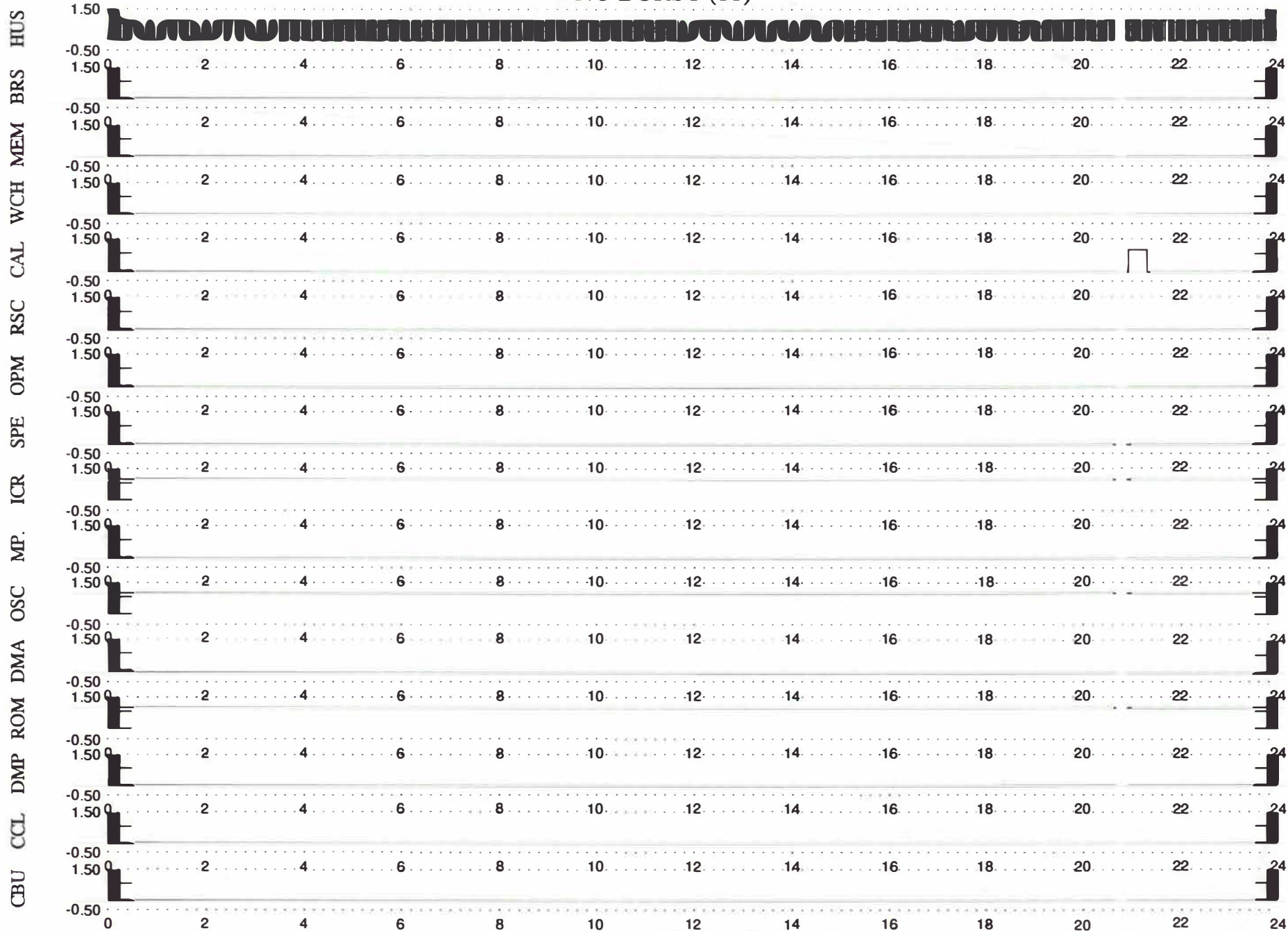
Background not subtracted

2 (0.5 - 4.0 Angstroms)

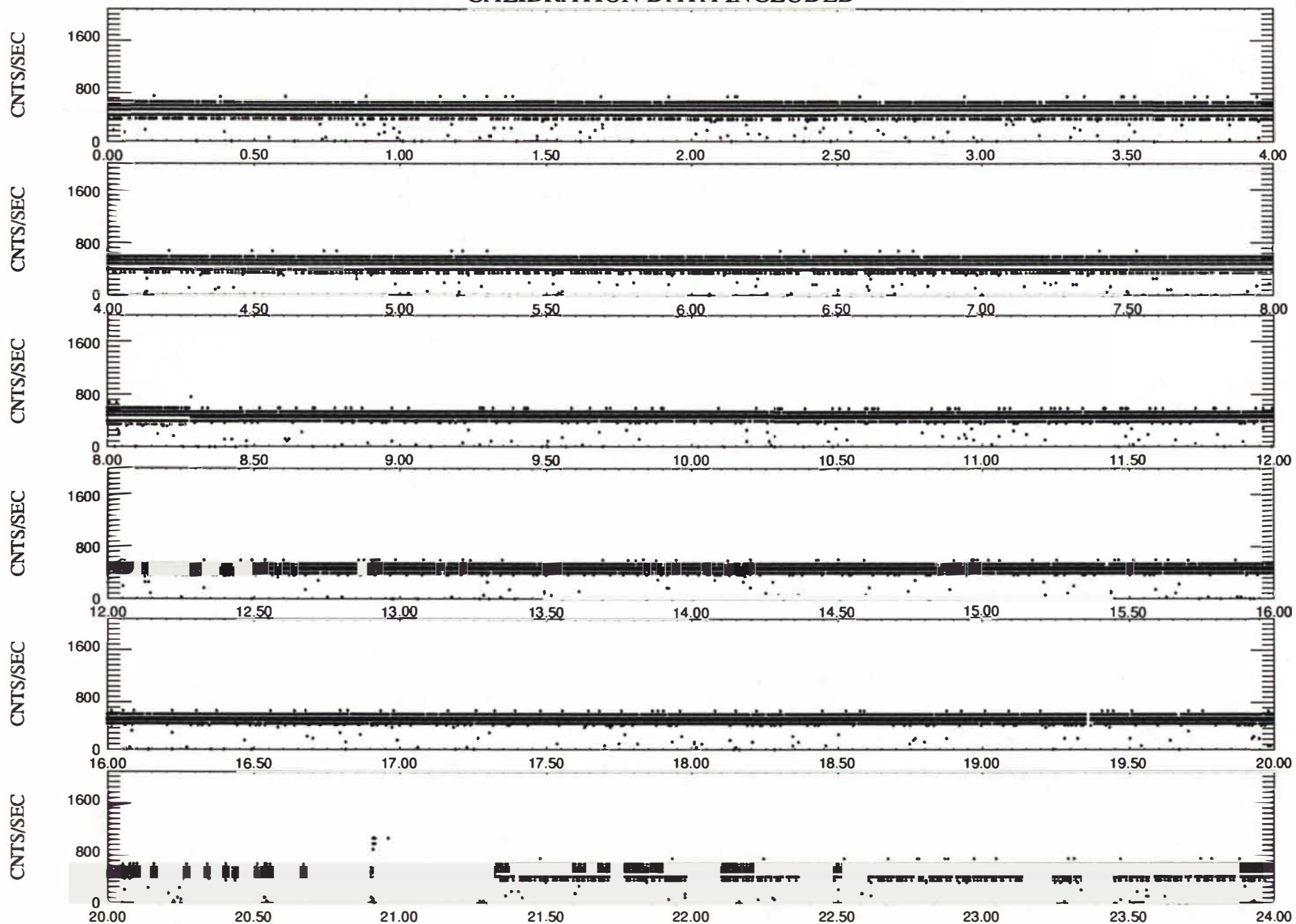
Background not subtracted

Sample average = 10

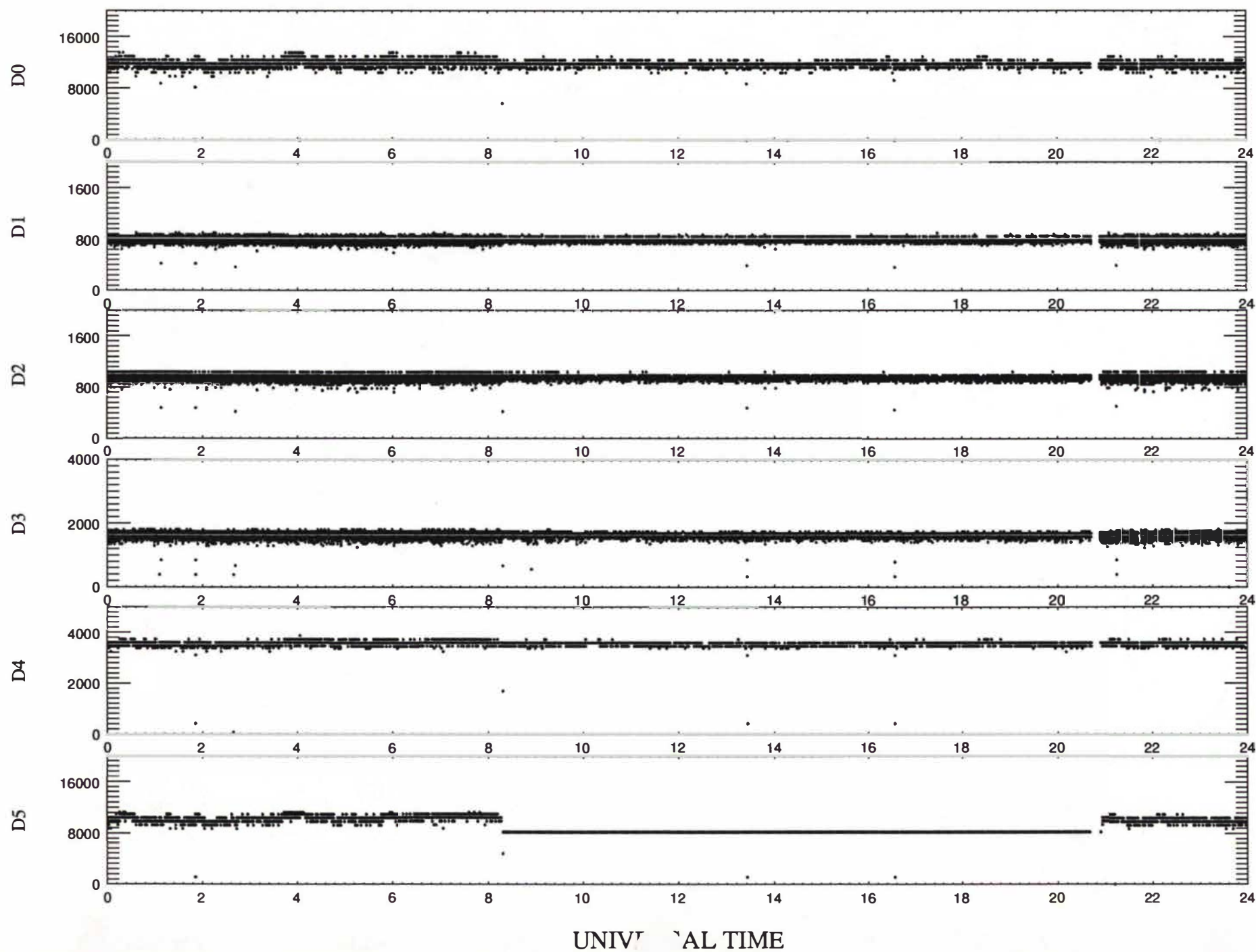
UNIVERSAL TIME



CALIBRATION DATA INCLUDED



UNIV AL TIME



From DEAL@fender.msfc.nasa.gov Tue May 13 07:33 PDT 1997
Return-Path: <DEAL@fender.msfc.nasa.gov>
Received: from FENDER.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id HAA02897; Tue, 13 May 1997 07:33:33 -0700
From: DEAL@fender.msfc.nasa.gov
Date: Tue, 13 May 1997 9:32:09 -0500 (CDT)
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970513093209.21e1b03a@fender.msfc.nasa.gov>
Subject: Crossing Windows for BATSE Burst 6227
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6227
EVENT OF 1997 MAY 10 DAY OF YEAR=130
EVENT CROSSING TIME AT BATSE : 10328. S. OR 02:52:08.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 285.000 69.000
BATSE PEAK COUNTING RATE: 2000 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 10/ 5/ 97 IS:
RA= 151.086 DEC= 32.043 DIST= 4.915 AU
BATSE-ULYSSES DISTANCE = 735255246. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=106.54 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -698.06 SECS.
CROSSING TIME AT ULYSSES IS 9630. S. OR 02:40:29 +/- 447.59 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 10/ 5/ 97 IS:
RA= 169.257 DEC= 6.400 DIST= 0.873 AU
MARS-BATSE DISTANCE = 130596312. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 87.10 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 22.05 SECS.
CROSSING TIME AT MARS IS 10350. S. OR 02:52:30 +/- 75.87 SECONDS

BATSE BURST TRIGGER

NO.: 6227

TIME: TJD=0578 SECONDS=10328

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=134.9 AZIMUTH=180.1 ERROR=13.4 DEGREES

COMMENTS:

GRB LASTING 12 S. FOLLOWED AT T+46S, BY A PHOSPHORESCENT SPIKE. NOT VISIBLE ABO
VE 300 KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6227	970510	10578	10328	2000	285	+69	12

BATSE BURST# 6227

ULYSSES RT

13 / 5 / 97

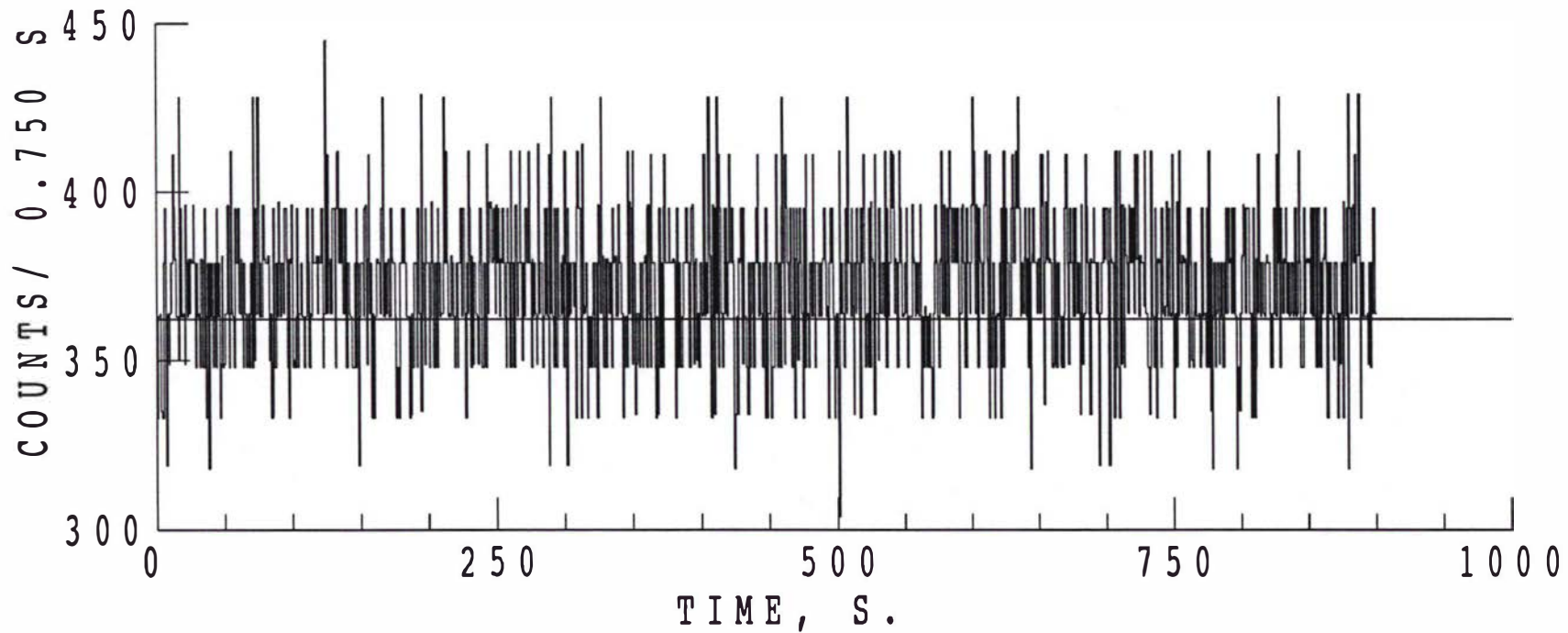
10 / 5 / 97 9180.091 s

0.250 S INTERVALS REGROUPED BY 3

0 - 0 keV

N= 10 M=10
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



From DEAL@fender.msfc.nasa.gov Tue May 13 09:27 PDT 1997
Return-Path: <DEAL@fender.msfc.nasa.gov>
Received: from FENDER.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id JAA03740; Tue, 13 May 1997 09:27:24 -0700
From: DEAL@fender.msfc.nasa.gov
Date: Tue, 13 May 1997 11:26:11 -0500 (CDT)
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970513112611.21e1b03a@fender.msfc.nasa.gov>
Subject: Crossing Windows for BATSE Burst 6228
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6228
EVENT OF 1997 MAY 10 DAY OF YEAR=130
EVENT CROSSING TIME AT BATSE : 66519. S. OR 18:28:39.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 15.000 0.000
BATSE PEAK COUNTING RATE: 3100 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 10/ 5/ 97 IS:
RA= 151.062 DEC= 31.967 DIST= 4.926 AU
BATSE-ULYSSES DISTANCE = 737003592. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 52.35 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 1501.79 SECS.
CROSSING TIME AT ULYSSES IS 68021. S. OR 18:53:40 +/- 410.72 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 10/ 5/ 97 IS:
RA= 169.257 DEC= 6.400 DIST= 0.873 AU
MARS-BATSE DISTANCE = 130596312. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 26.47 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 389.94 SECS.
CROSSING TIME AT MARS IS 66909. S. OR 18:35:08 +/- 39.64 SECONDS

BATSE BURST TRIGGER

NO.: 6228

TIME: TJD=0578 SECONDS=66519

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=114.8 AZIMUTH=62.6 ERROR=7.1 DEGREES

COMMENTS:

WEAK GRB LASTING ~35 S. NOT VISIBLE ABOVE 30 KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6228	970510	10578	66519	3100	015	0	35

BATSE BURST# 6228

ULYSSES RT

13 / 5 / 97

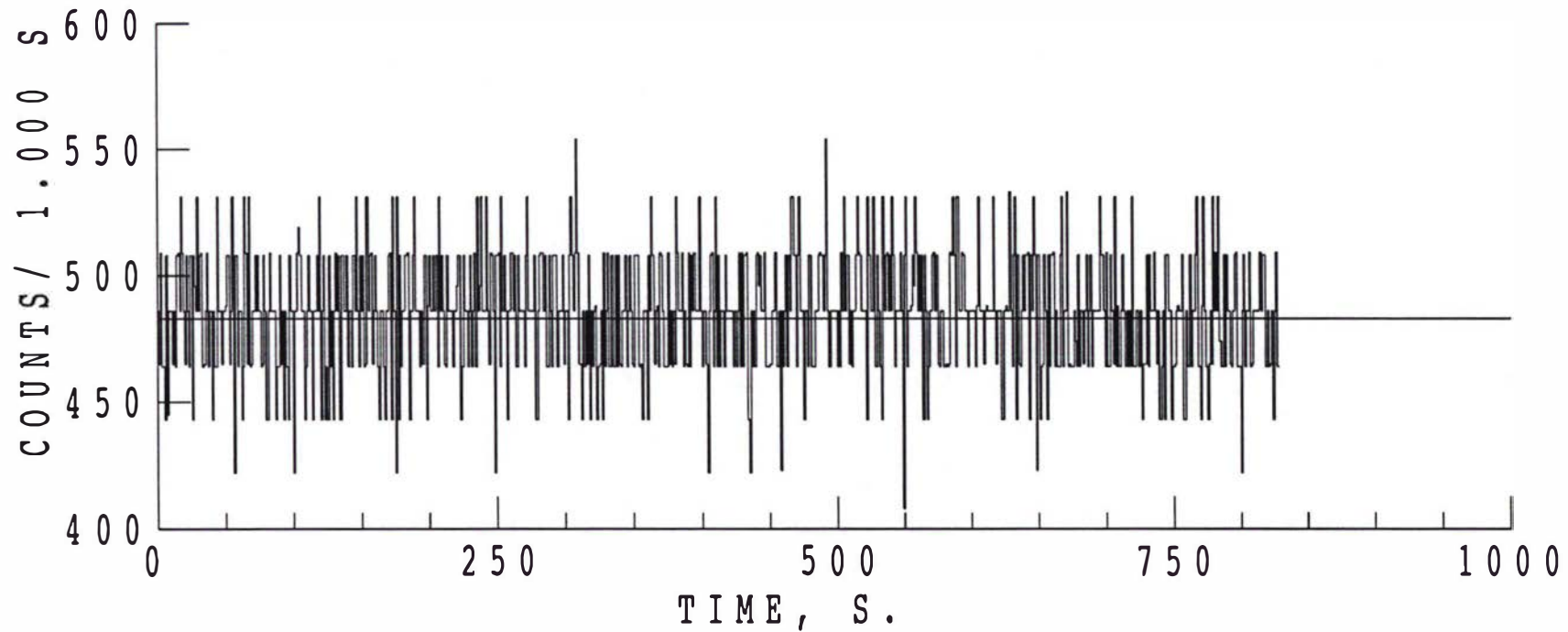
10 / 5 / 97 67608.273 s

0.500 S INTERVALS REGROUPED BY 2

0 - 0 keV

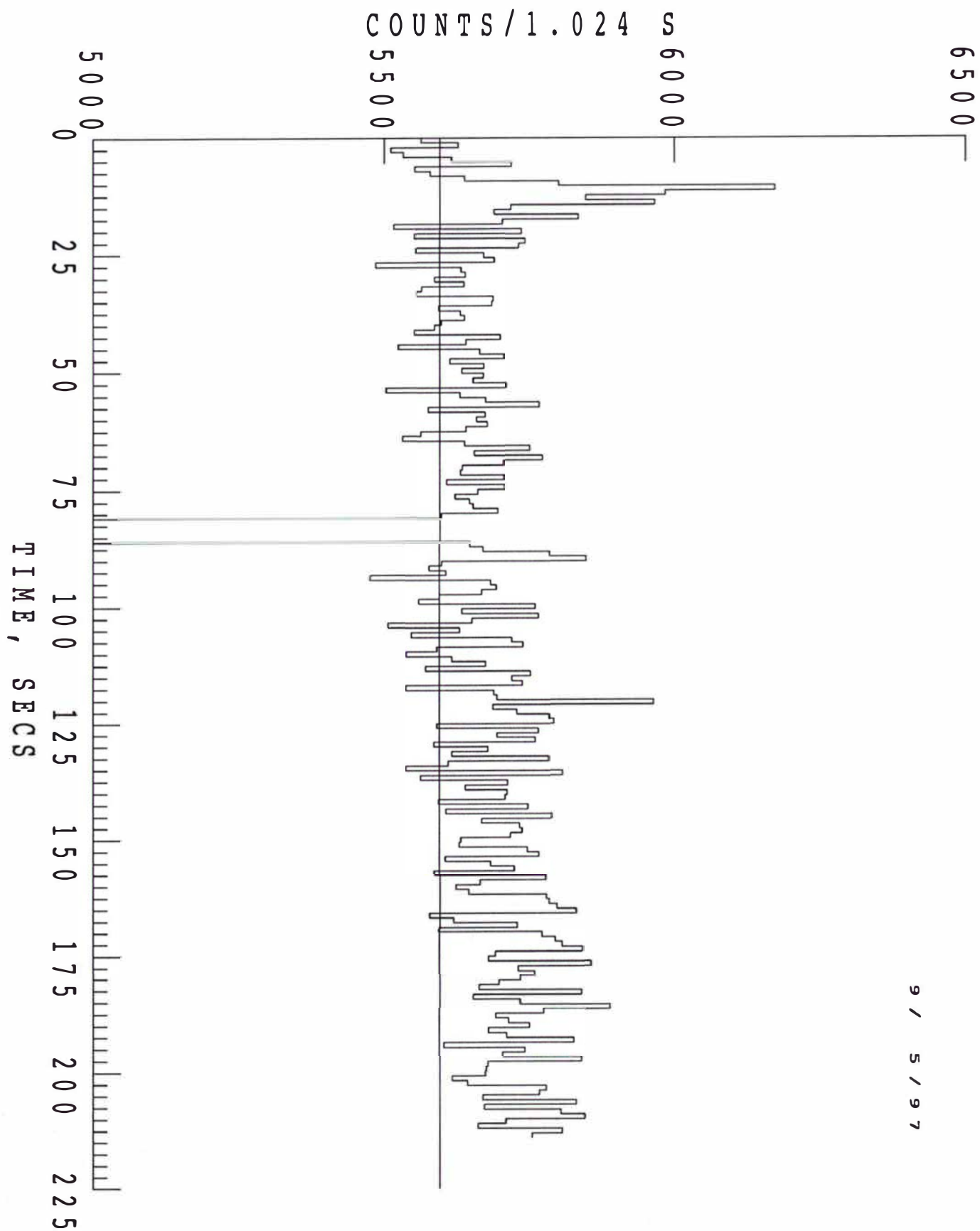
N= 10 M=10
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS

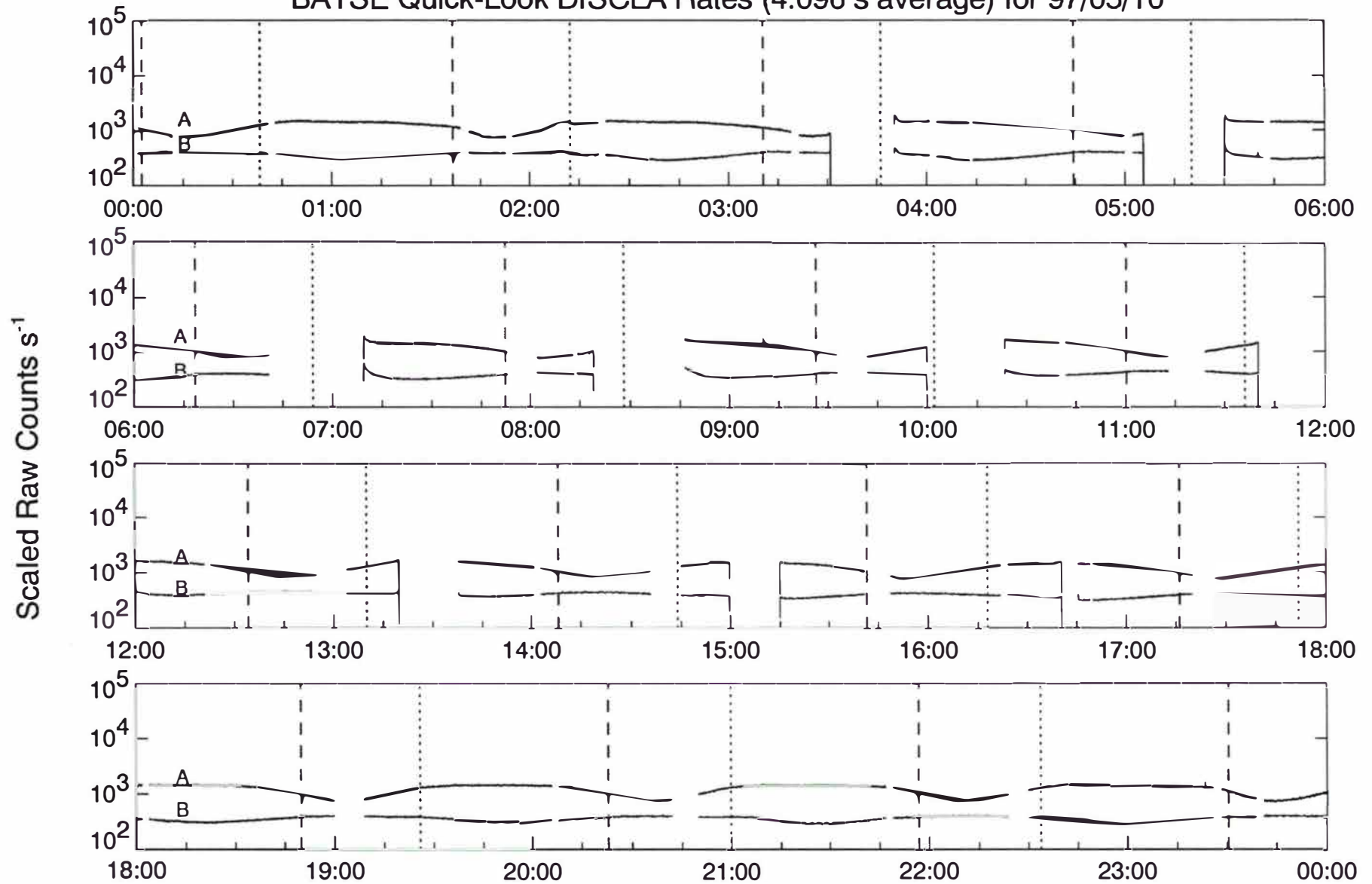


BACODINE 6227 10/05/97 10317.513

25- 100 keV



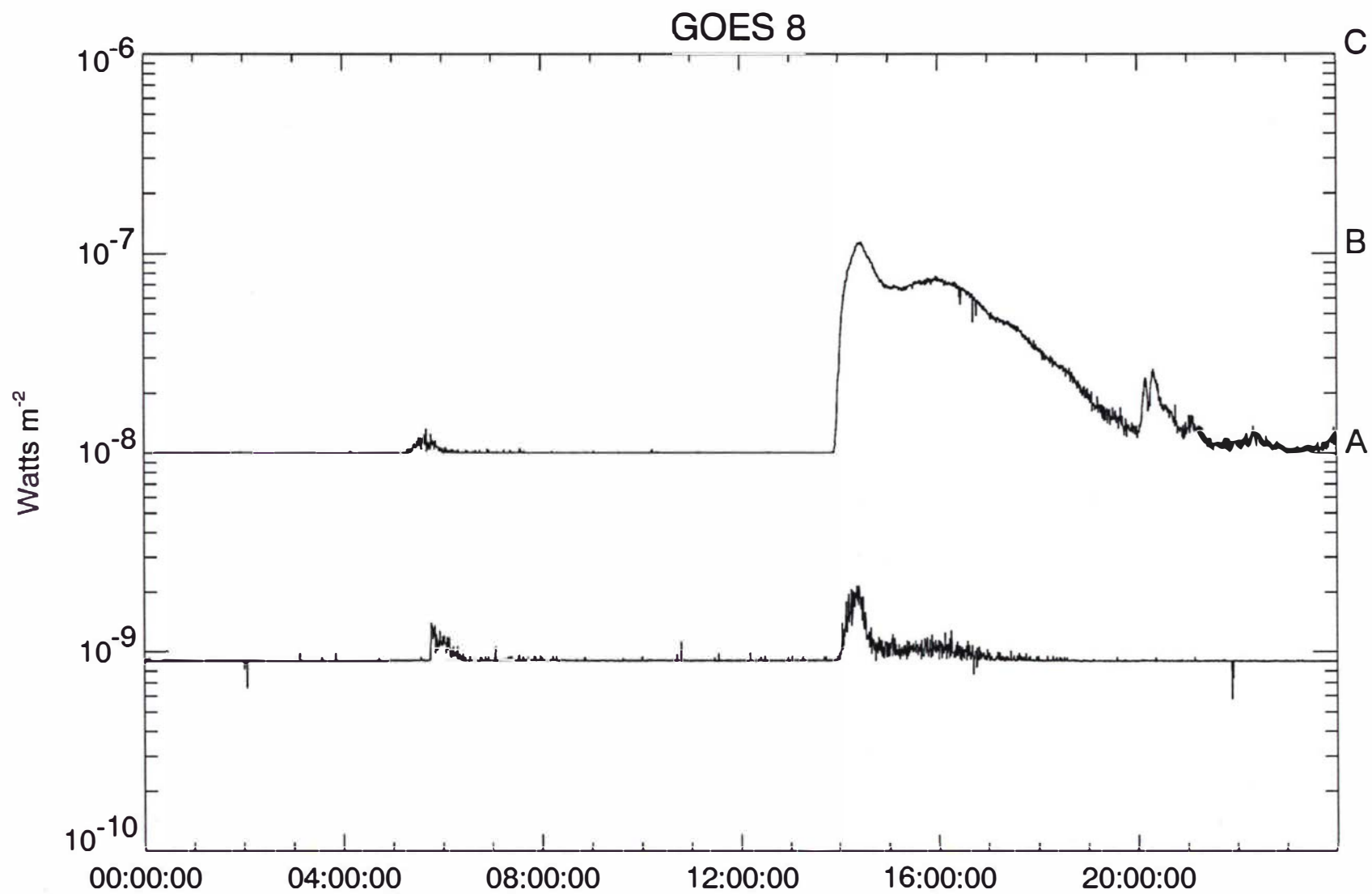
BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/10



Current Time: 97/05/14, 1008 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare



Data Start: 97/05/10, 0000:00

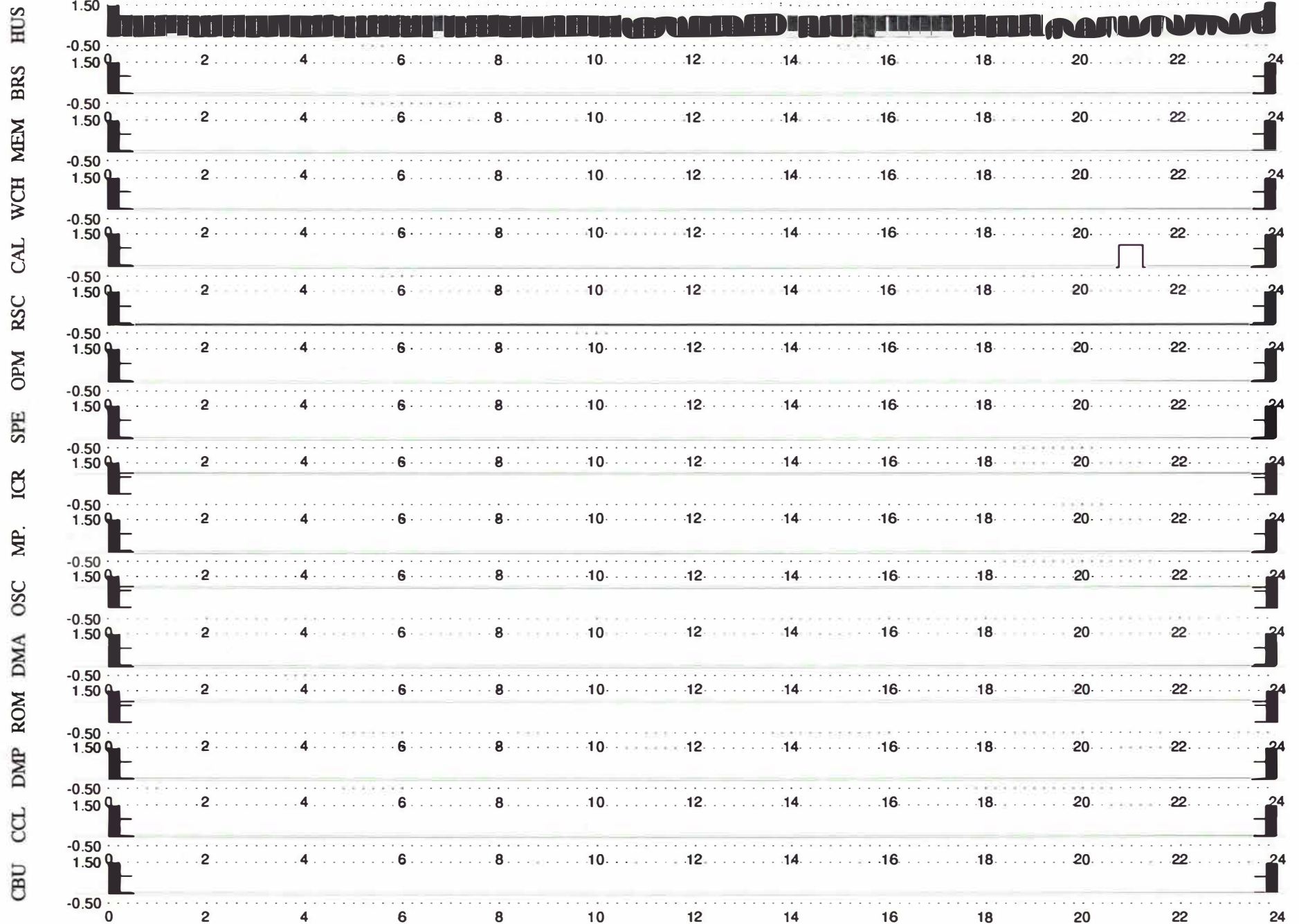
Plot created: 97/05/14, 1007

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

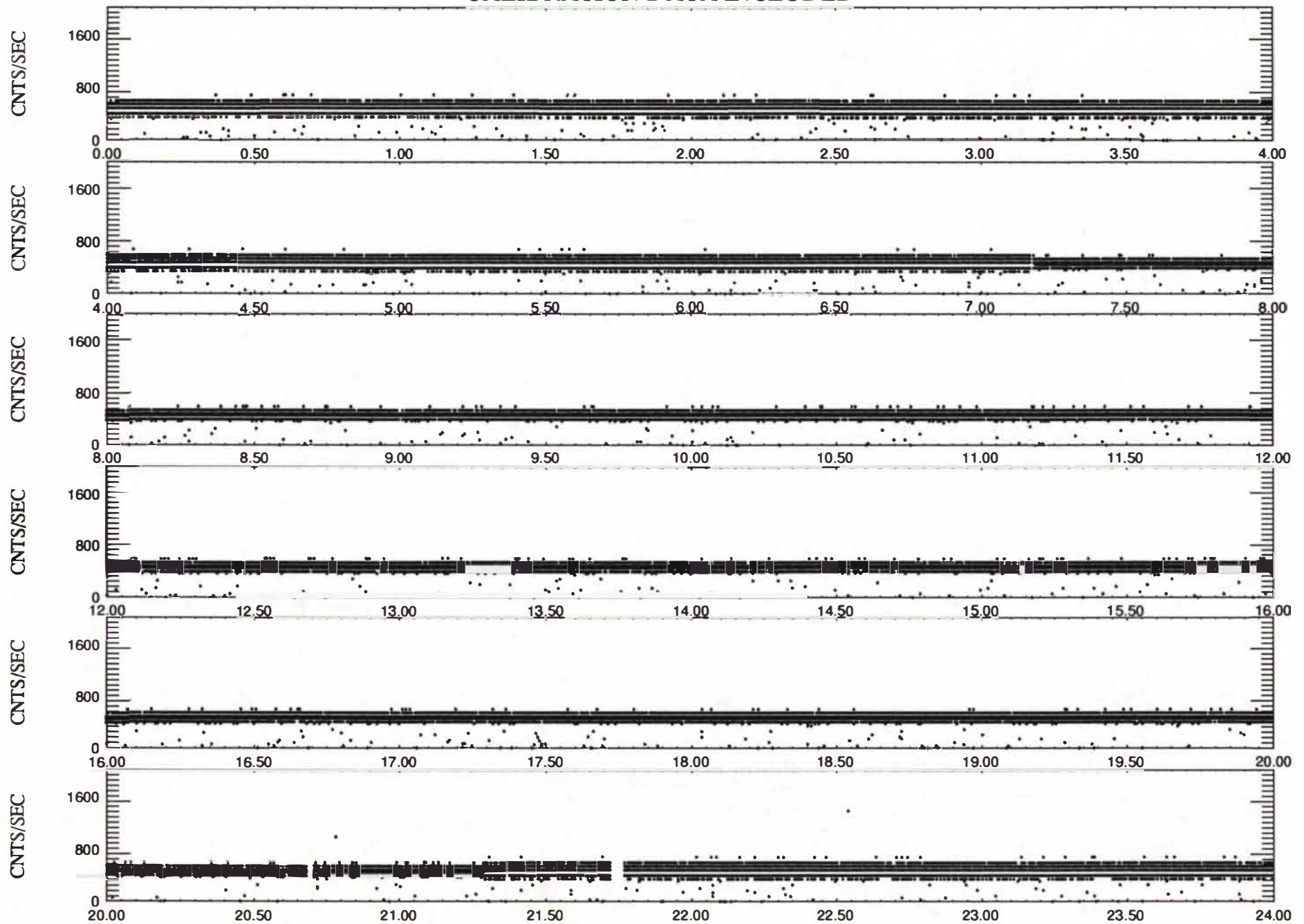
Sample average = 10

NO BURST (11)

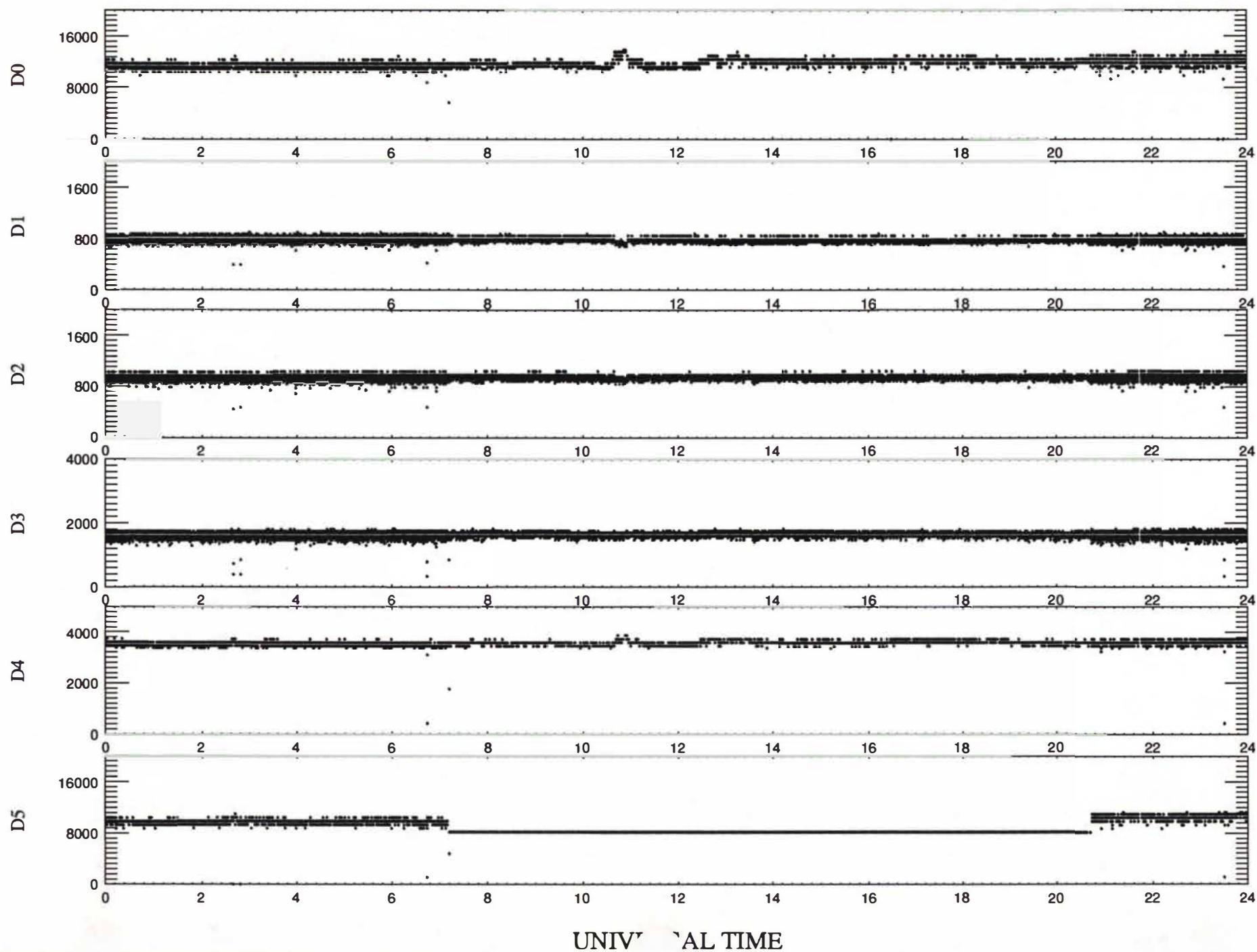


UNIV! AL TIME

CALIBRATION DATA INCLUDED



UNIV AL TIME



From WOODSP@ssl.msfc.nasa.gov Mon May 12 12:34 PDT 1997
Return-Path: <WOODSP@ssl.msfc.nasa.gov>
Received: from SSLMOR.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id MAA07667; Mon, 12 May 1997 12:34:46 -0700
From: WOODSP@ssl.msfc.nasa.gov
Date: Mon, 12 May 1997 14:34:40 -0500 (CDT)
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970512143440.21c1b47b@ssl.msfc.nasa.gov>
Subject: Crossing Windows for BATSE Burst 6229
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6229
EVENT OF 1997 MAY 11 DAY OF YEAR=131
EVENT CROSSING TIME AT BATSE : 54007. S. OR 15:00:07.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 1.000 20.000
BATSE PEAK COUNTING RATE: 15000 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 11/ 5/ 97 IS:
RA= 151.031 DEC= 31.868 DIST= 4.942 AU
BATSE-ULYSSES DISTANCE = 739294653. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 59.28 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 1259.57 SECS.
CROSSING TIME AT ULYSSES IS 55267. S. OR 15:21:06 +/- 437.21 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 11/ 5/ 97 IS:
RA= 169.377 DEC= 6.308 DIST= 0.880 AU
MARS-BATSE DISTANCE = 131637432. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 28.68 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 385.21 SECS.
CROSSING TIME AT MARS IS 54392. S. OR 15:06:32 +/- 42.44 SECONDS

BATSE BURST TRIGGER

NO.: 6229

TIME: TJD=0579 SECONDS=54007

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=127.7 AZIMUTH=86.7 ERROR=1.5 DEGREES

COMMENTS:

GRB LASTING ~ 50 SEC. BRIGHT SPIKEY EVENT. VISIBLE ABOVE 300 KEV.
UNTRIGGERED EVENT @ T + 5120 SEC. LOCATION OF THIS EVENT IS NOT
CONSISTENT WITH TRIGGER.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6229	970511	10579	54007	15000	001	+20	50

Helio corr removed 18/2/00

Date: Mar 30 '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

- ☐ 2.042 s subtracted for bursts prior to June 25 1992 and DISCSC programs prior to Version 2.16 (August 28 1992)? *N/A*
- ☒ 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

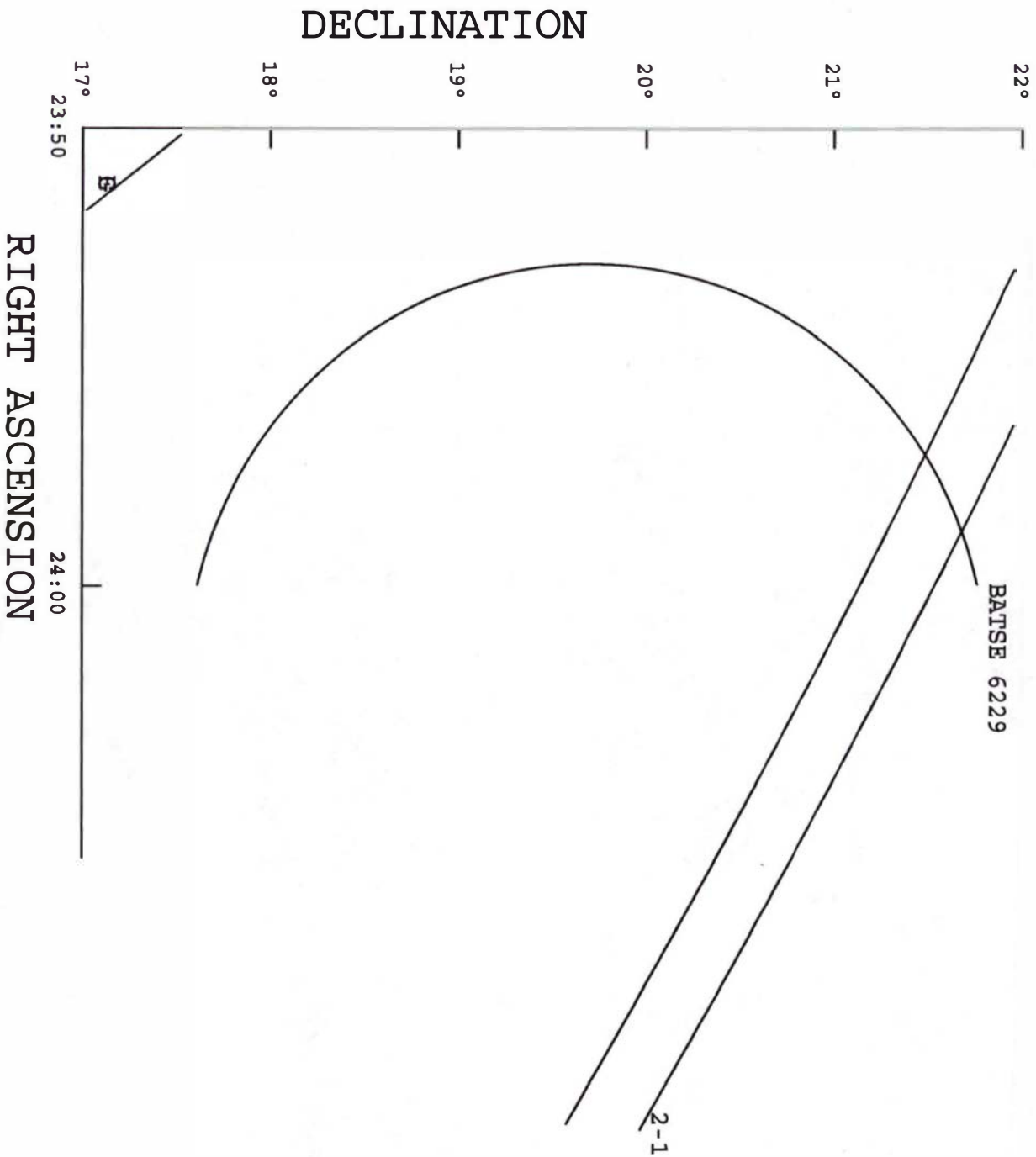
- ☐ Ephemeris of PVO used (not Venus)?
- ☐ 2000 coordinates used?
- ☐ Geocentric time used?

- ☒ 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 MAY 11, 1997 15:20

18 / 2 / 0



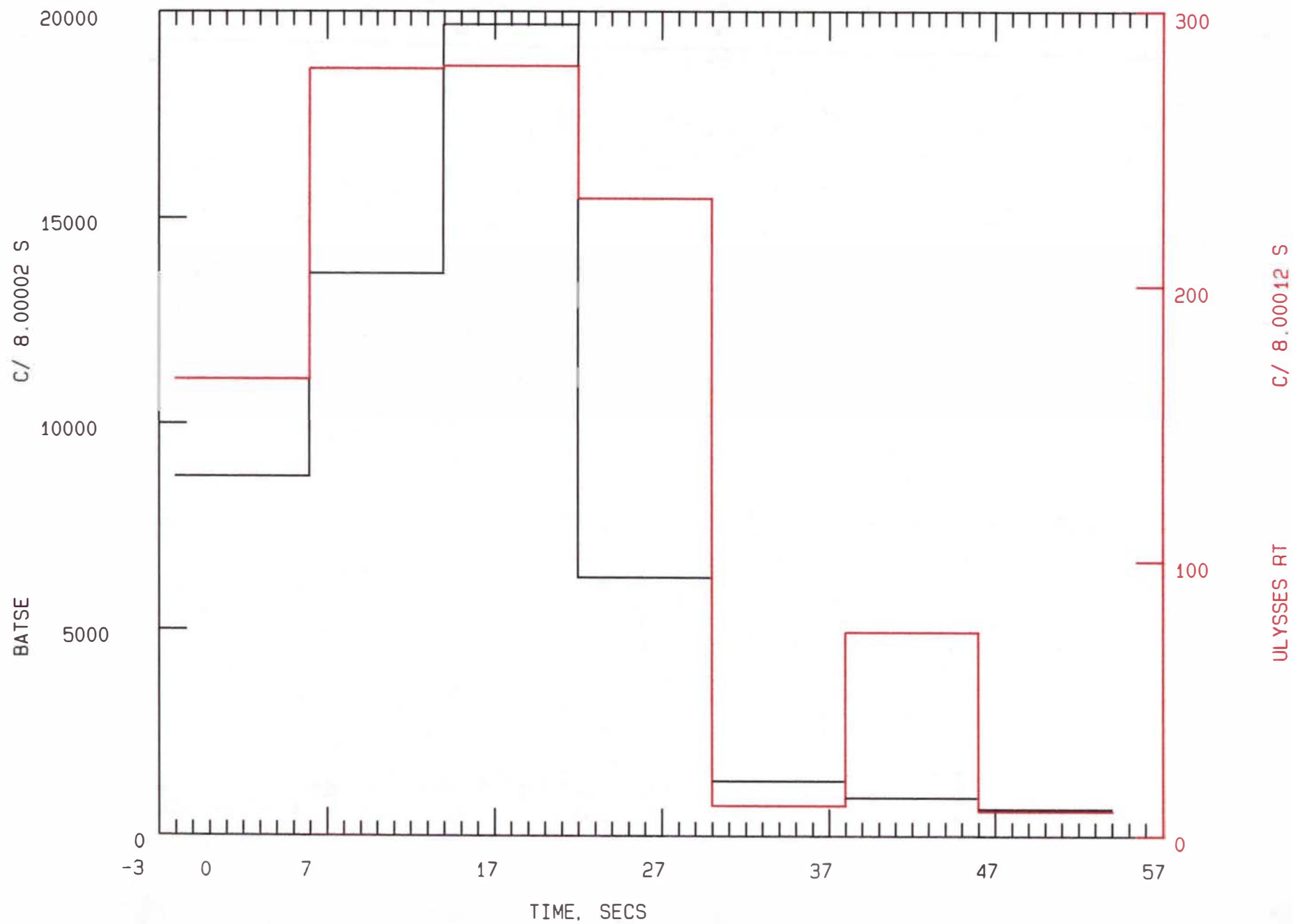
BATSE

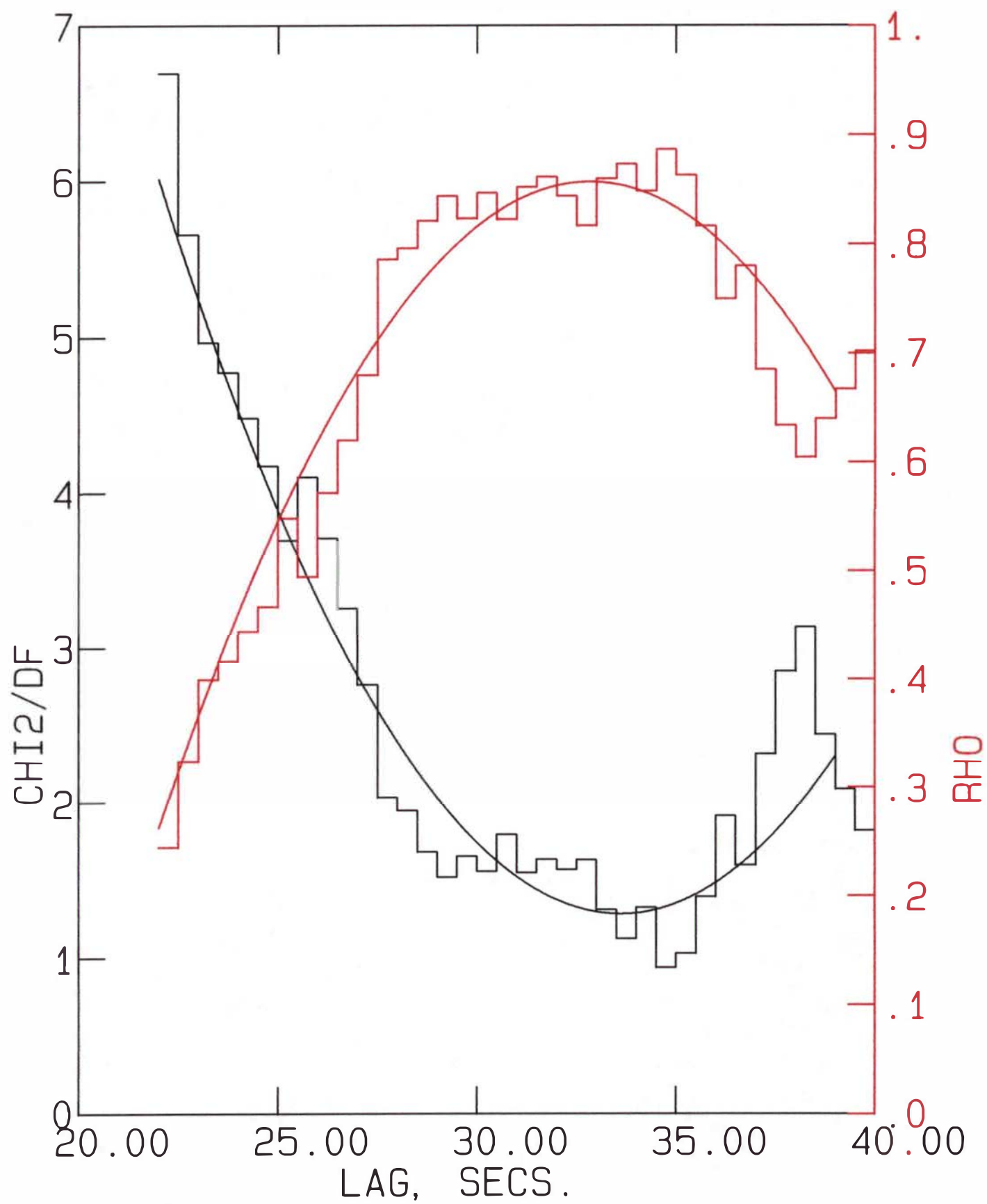
-ULYSSES RT CORRELATION

11/ 5/97

54007.882

30/ 3/98





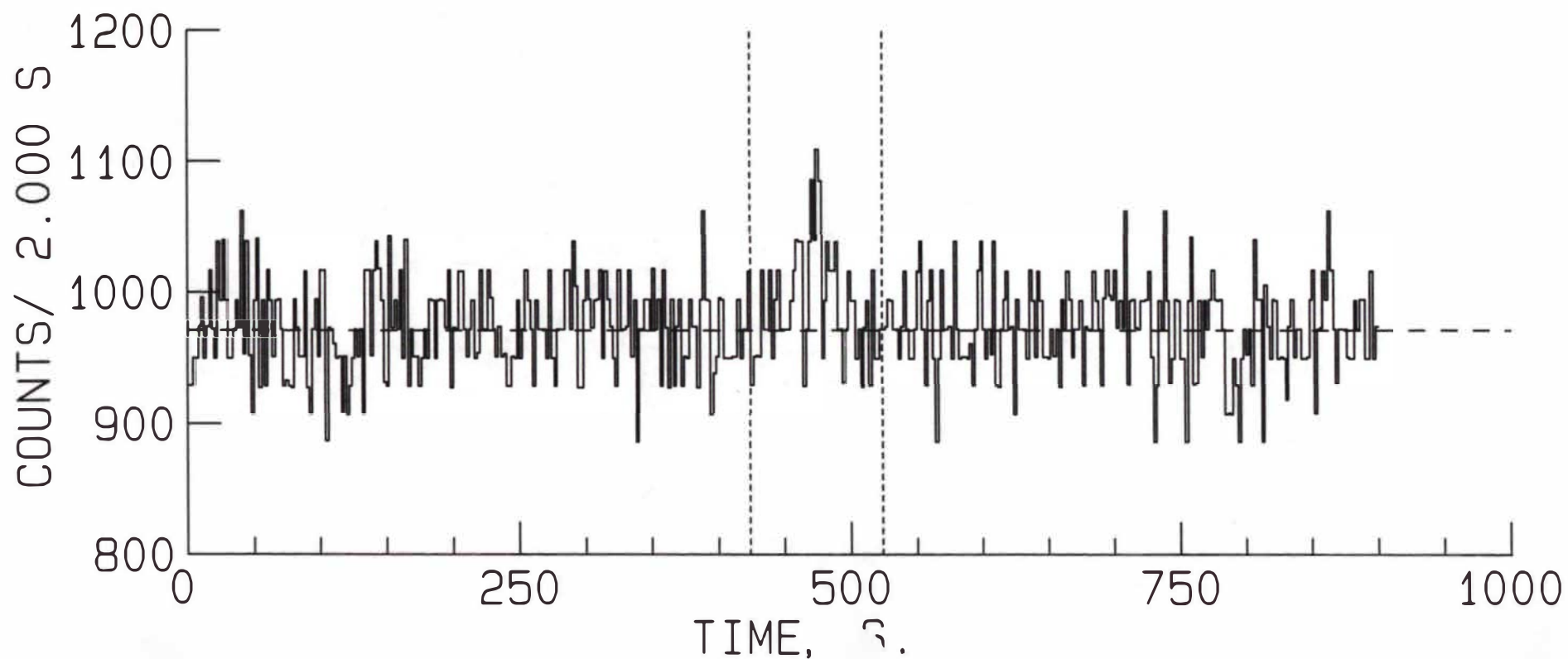
ULYSSES RT

30 / 3 / 98

11 / 5 / 97 54792.132 s

0.500 S INTERVALS REGROUPED BY 4

22- 147 keV



BATSE

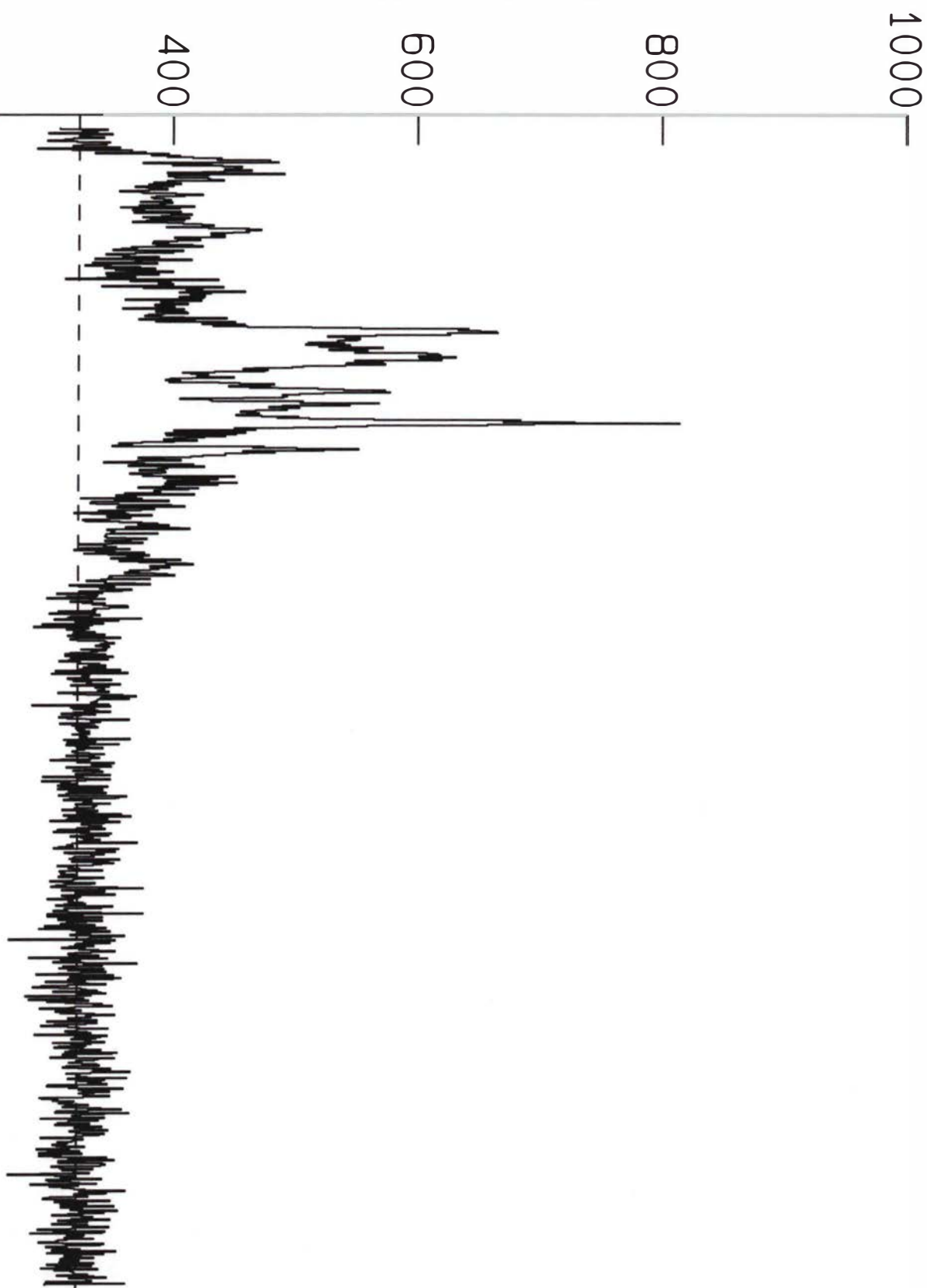
11/05/97

54007.882

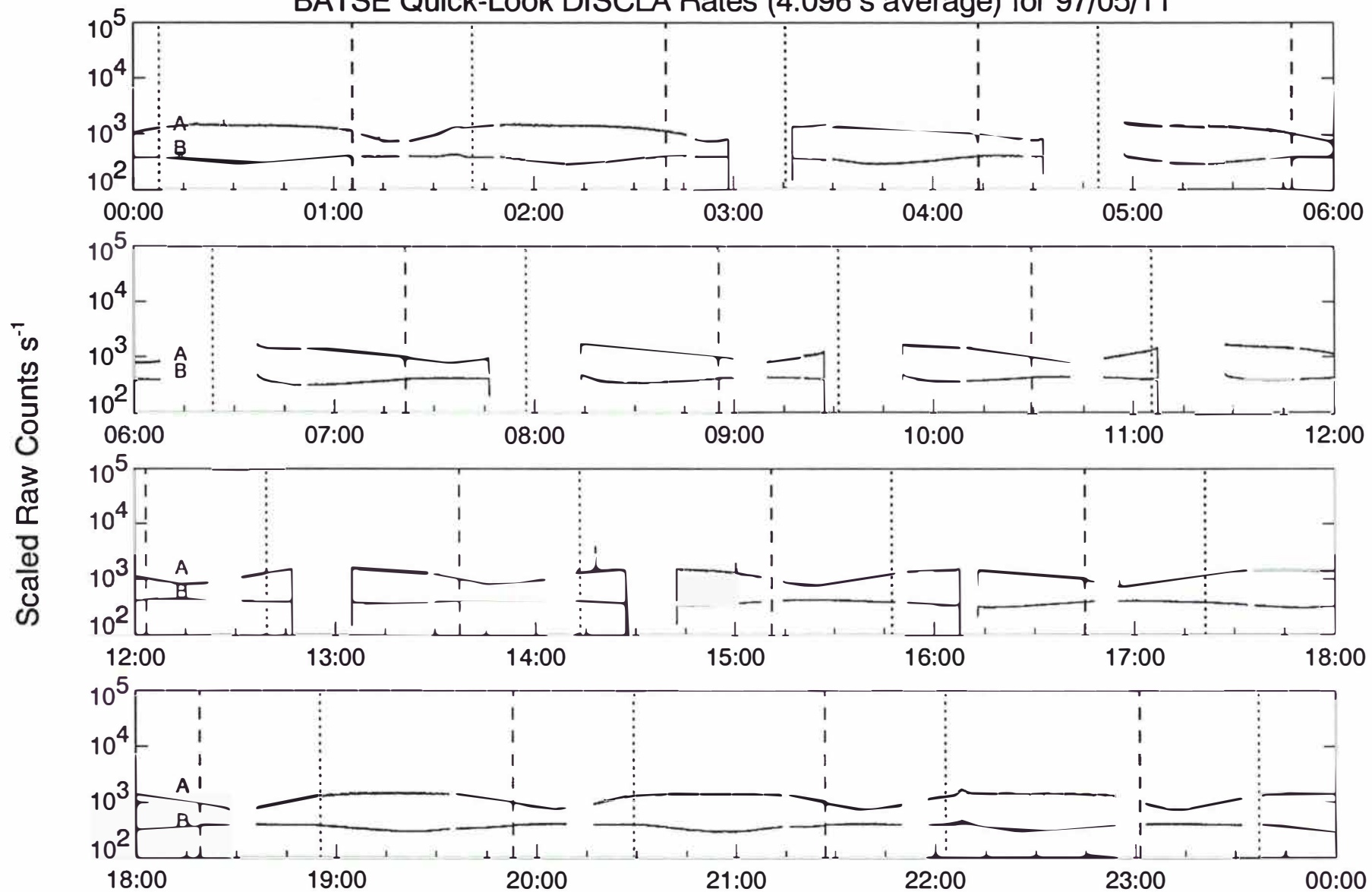
25- 100 keV

COUNTS/0.064 S

22 / 5 / 97



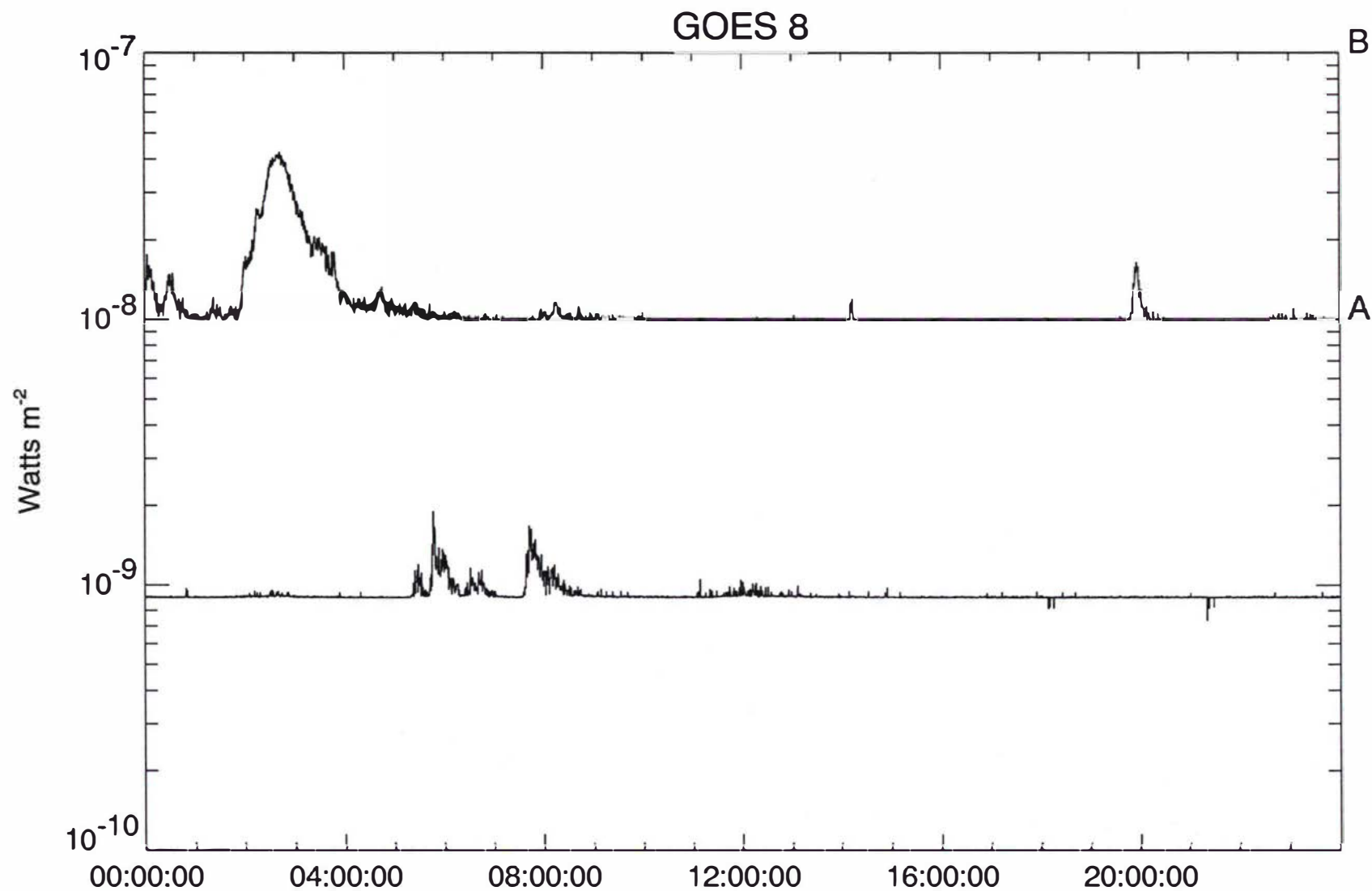
BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/11



Current Time: 97/05/15, 1008 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare



Data Start: 97/05/11, 0000:00

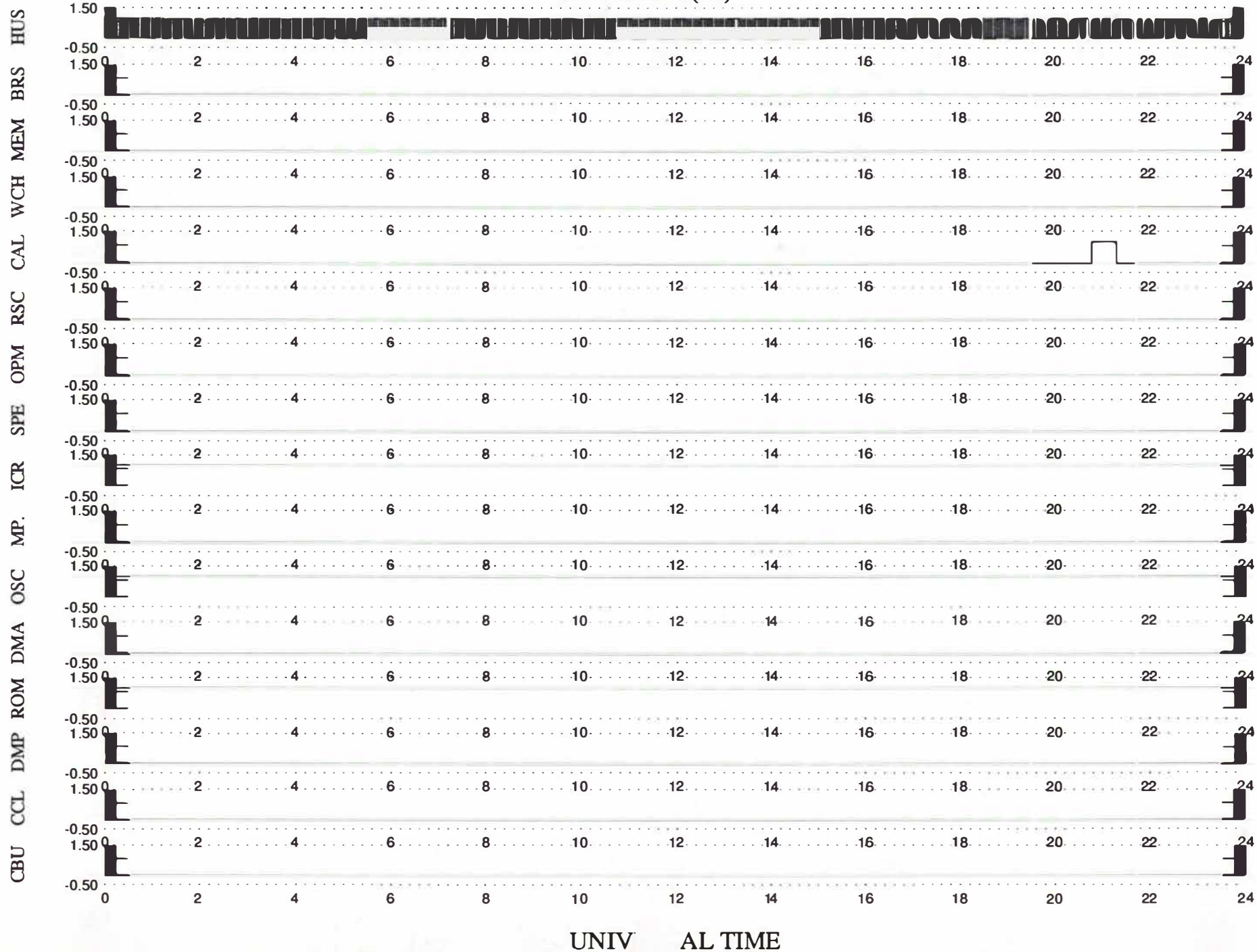
Plot created: 97/05/15, 1007

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

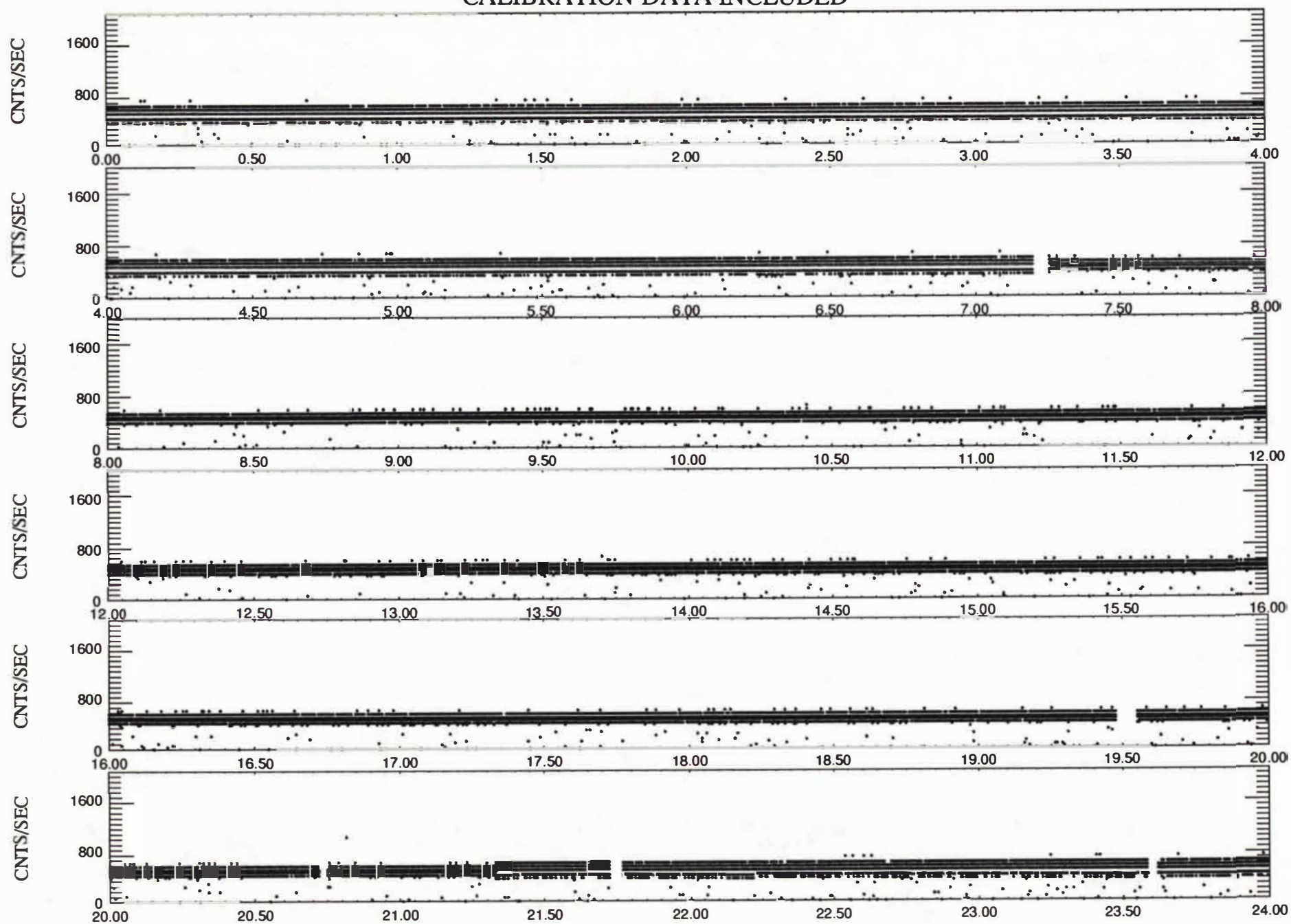
Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

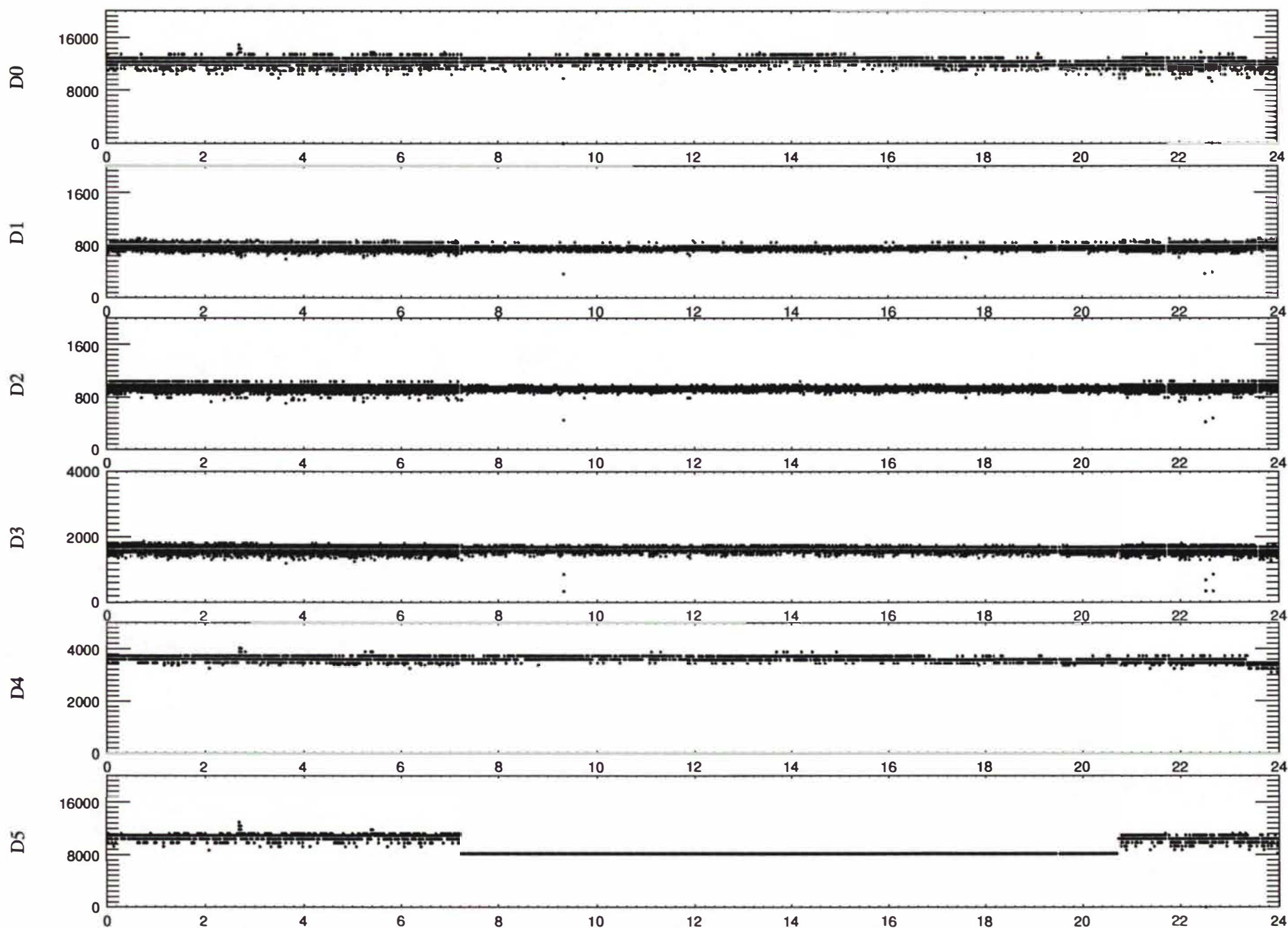
NO BURST (11)



CALIBRATION DATA INCLUDED

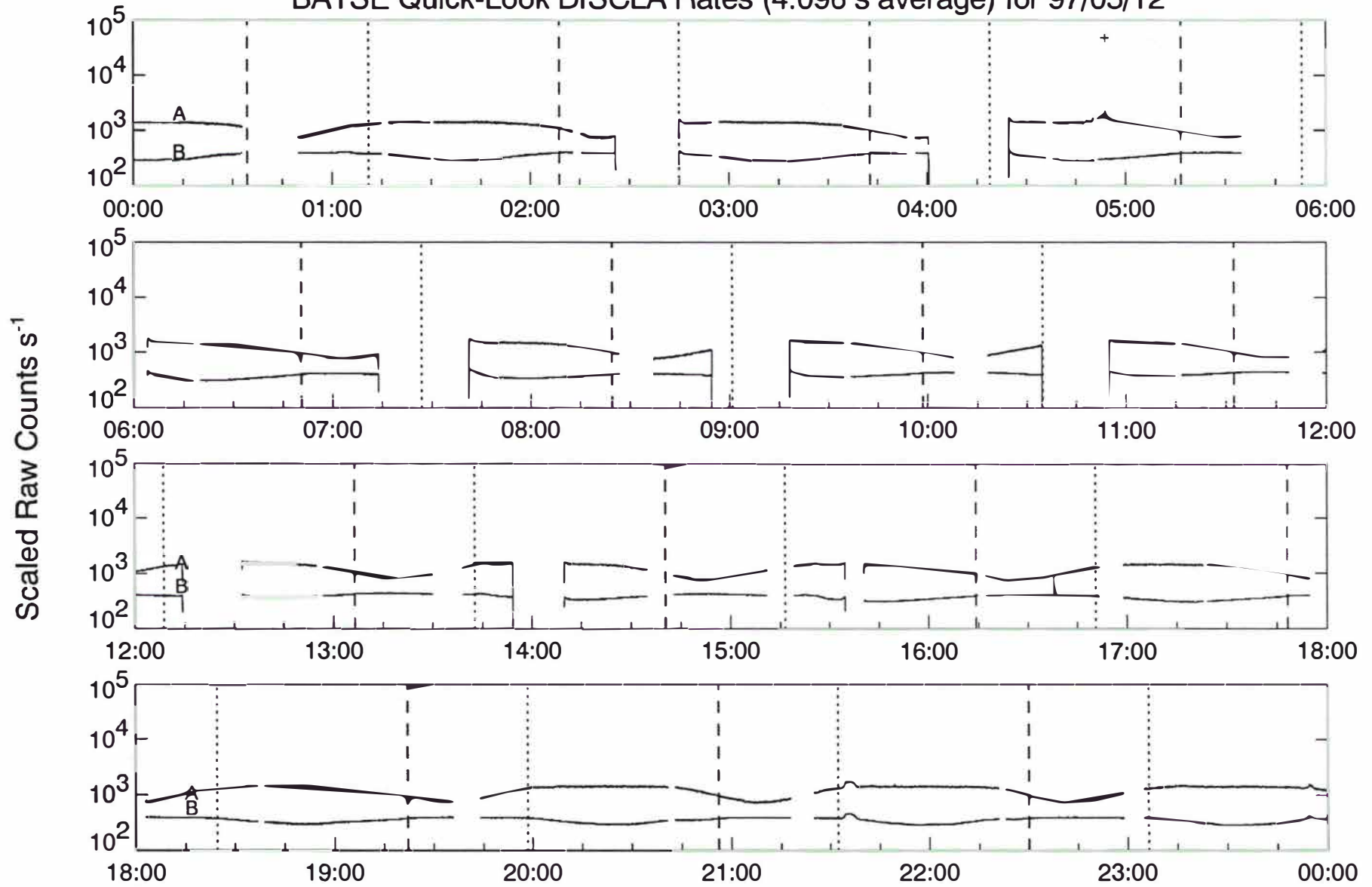


UNIV' AL TIME



UNIV AL TIME

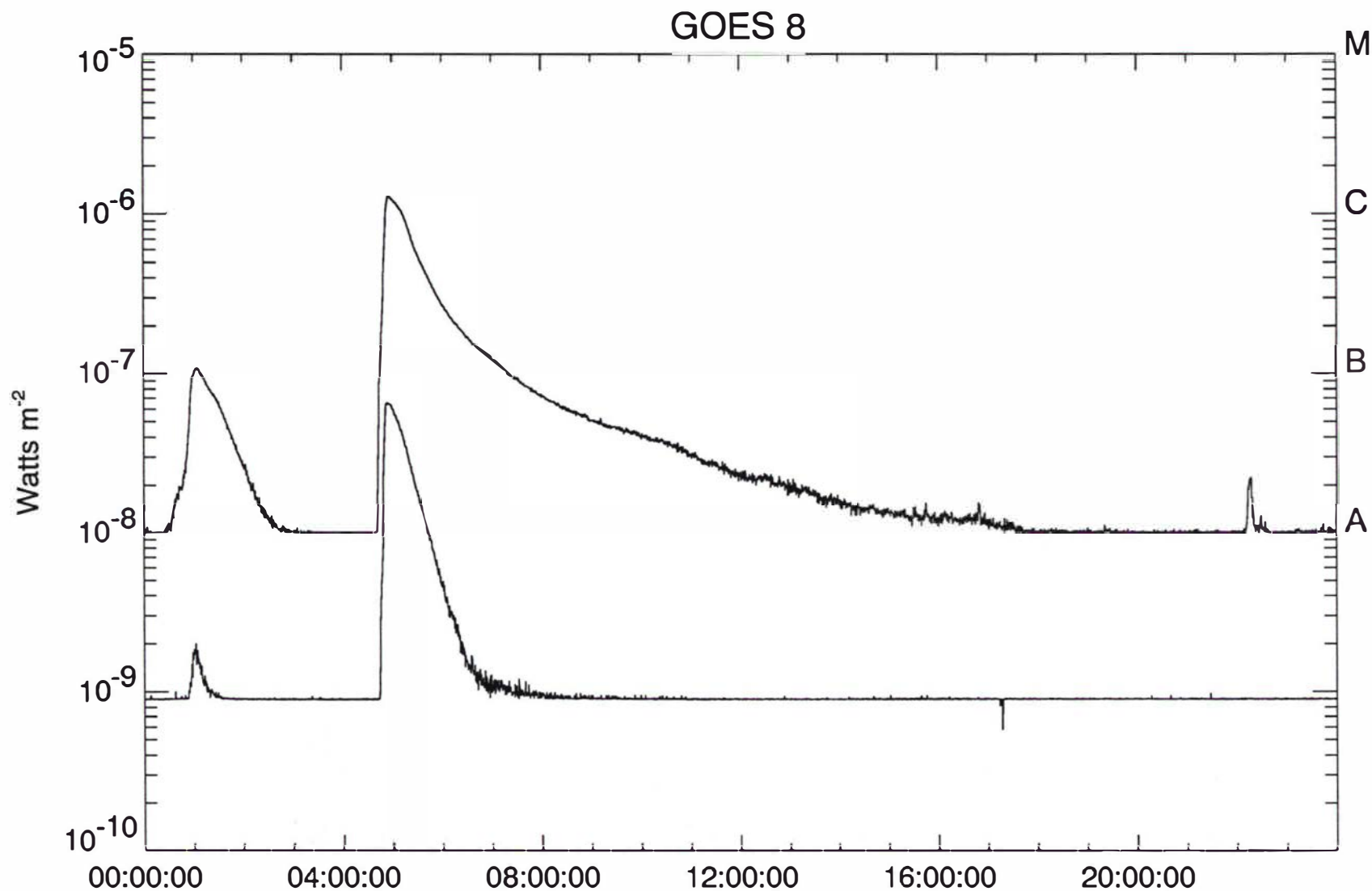
BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/12



Current Time: 97/05/16, 1008 EDT
A: Channel 0 Most Sunward LAD
B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare



Data Start: 97/05/12, 0000:00

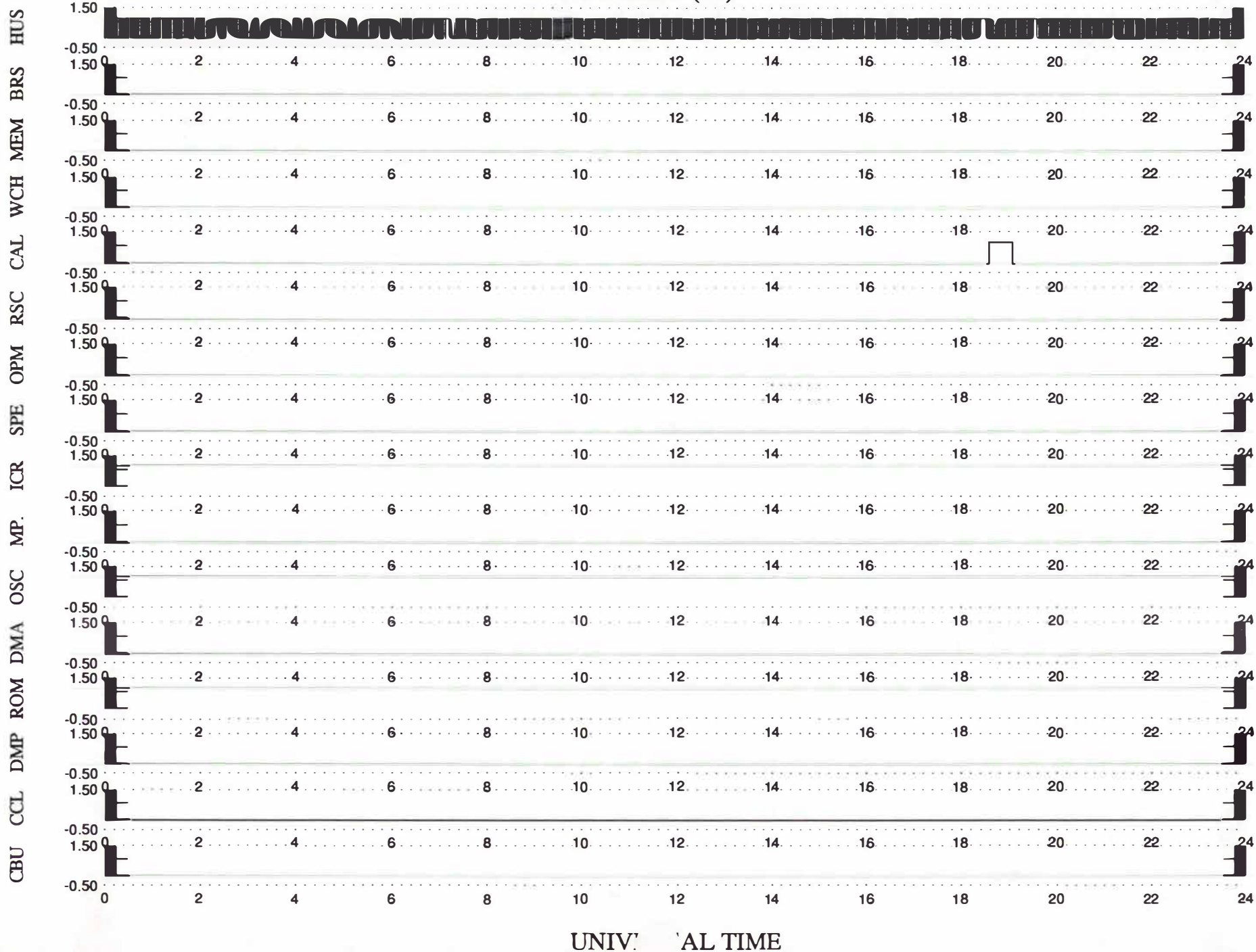
Plot created: 97/05/16, 1007

Channel

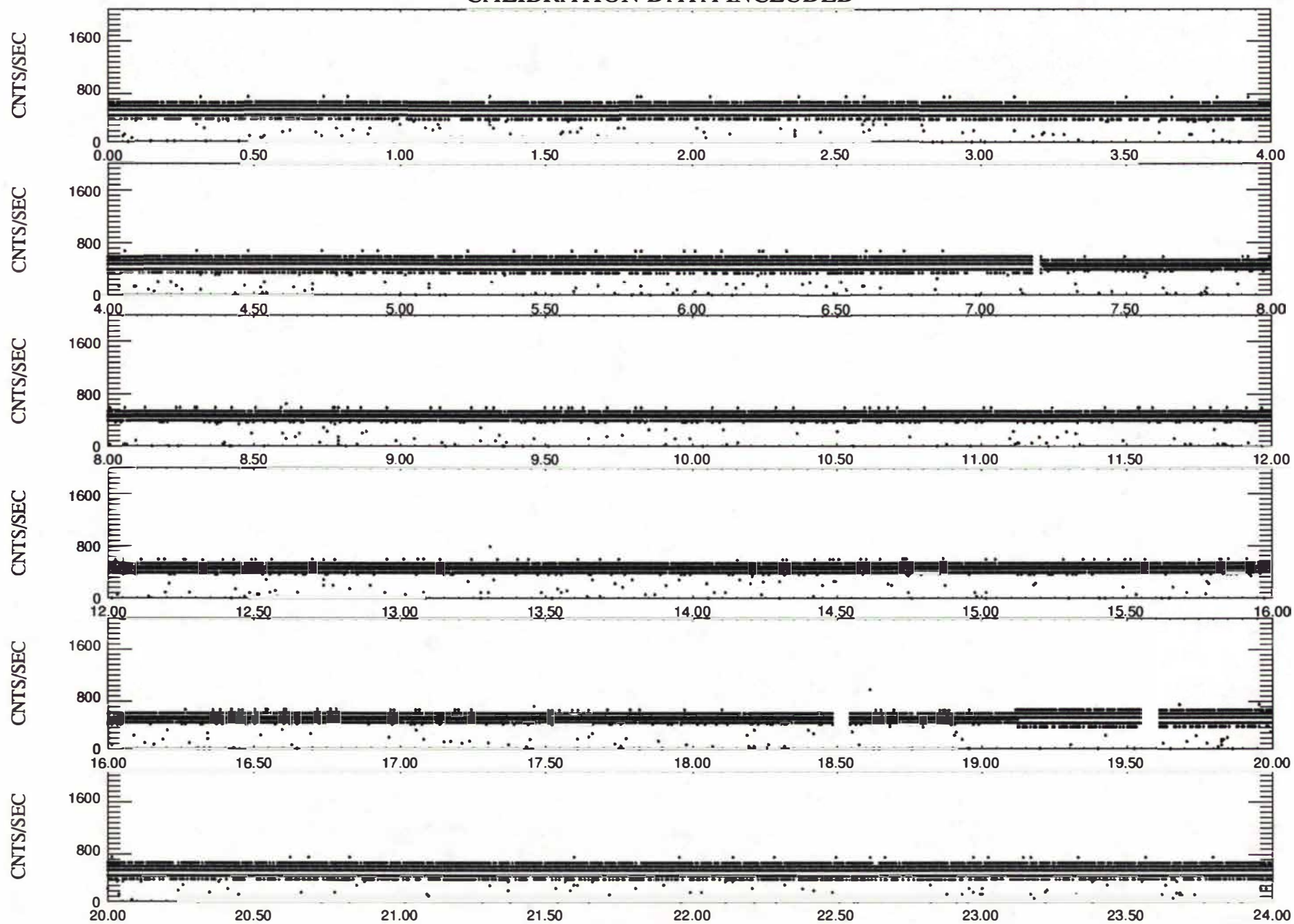
1 (1.0 - 8.0 Angstroms)
2 (0.5 - 4.0 Angstroms)

Background not subtracted
Background not subtracted
Sample average = 10

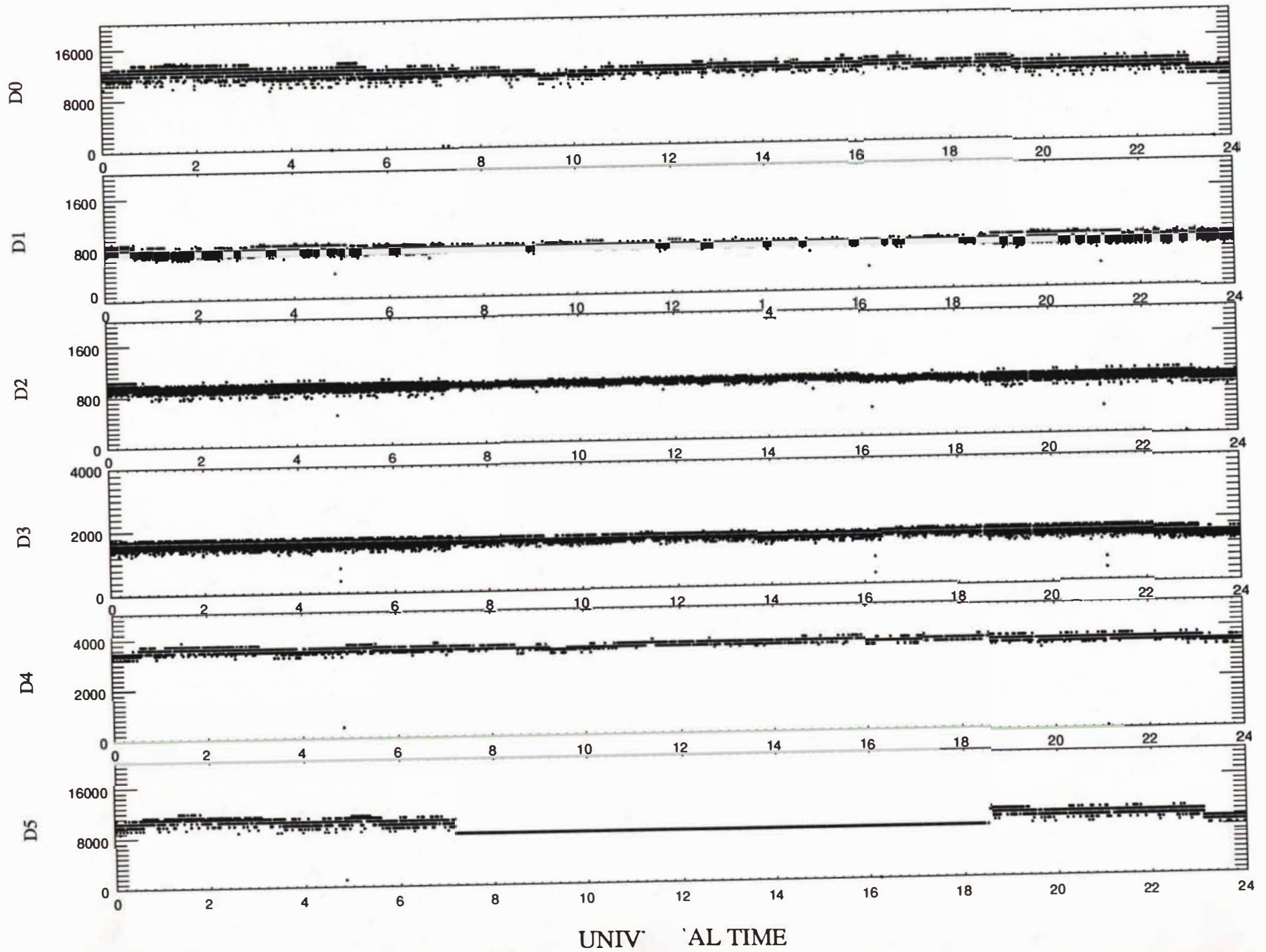
NO BURST (11)



CALIBRATION DATA INCLUDED



UNIV AL TIME



From BUTTERWORTH@lheavx.gsfc.nasa.gov Tue May 20 12:05 PDT 1997
From: BUTTERWORTH@lheavx.gsfc.nasa.gov
Date: Tue, 20 May 1997 15:04:39 -0400 (EDT)
To: khurley@sunspot.ssl.berkeley.edu, kmarar@isac.ernet.in, jterrell@lanl.gov,
yosimori@rikkyo.ac.jp, filippo@botes1.tesre.bo.cnr.it,
henze@fender.msfc.nasa.gov, cline@apache.gsfc.nasa.gov
CC: BUTTERWORTH@lheavx.gsfc.nasa.gov
X-Vmsmail-To: @ULYSSES
X-Vmsmail-Cc: BUTTERWORTH
Subject: Ulysses event of 970513 was not detected by Konus

Hi Everyone,

This event was not detected by Konus,

Paul.

Date: Fri, 16 May 1997 09:06:11 -0700
From: khurley@sunspot.ssl.berkeley.edu (Kevin Hurley)
Message-Id: <199705161606.JAA14552@scylla.berkeley.edu>
To: scott@lheamail.gsfc.nasa.gov, khurley@sunspot.ssl.berkeley.edu,
butterworth@lheavx.gsfc.nasa.gov, cline@lheavx.gsfc.nasa.gov,
kmarar@isac.ernet.in, bonnard@lheamail.gsfc.nasa.gov,
jterrell@lanl.gov, yosimori@rikkyo.ac.jp,
filippo@botes1.tesre.bo.cnr.it, henze@fender.msfc.nasa.gov
Subject: GRB970513
"Sun-Charset: US-ASCII

ULYSSES GAMMA-RAY BURST NOT REPORTED BY BATSE:

Ulysses observed the following burst:

May 13 1997 18:37 Ulysses time; moderate burst, 64 ms long

The spacecraft was about 2450 light-seconds from Earth.
Was this event detected by anyone else?

CC: ulyssesbursts alias list
(barthelmy, butterworth, cline, frontera, henze, marar, teegarden, terrell, yoshimori)

From kraken@rosserv.gsfc.nasa.gov Mon May 19 15:08 PDT 1997
X-Sender: kraken@lheapop.gsfc.nasa.gov
Mime-Version: 1.0
Date: Mon, 19 May 1997 18:09:39 -0500
khurley@sunspot.ssl.berkeley.edu (Kevin Hurley)
From: kraken@rosserv.gsfc.nasa.gov (Peter Kurczynski)
Subject: Recent TGRS/Ulysses bursts
Cc: bonnard@iolanthe.gsfc.nasa.gov (Bonnard Teegarden),
kraken@rosserv.gsfc.nasa.gov

Hi Kevin,

Here are the results of a search through TGRS data for some recent Ulysses bursts that you've sent emails about. Of the list below, TGRS sees one of your bursts in waiting mode data, and one as a bona fide triggered event.

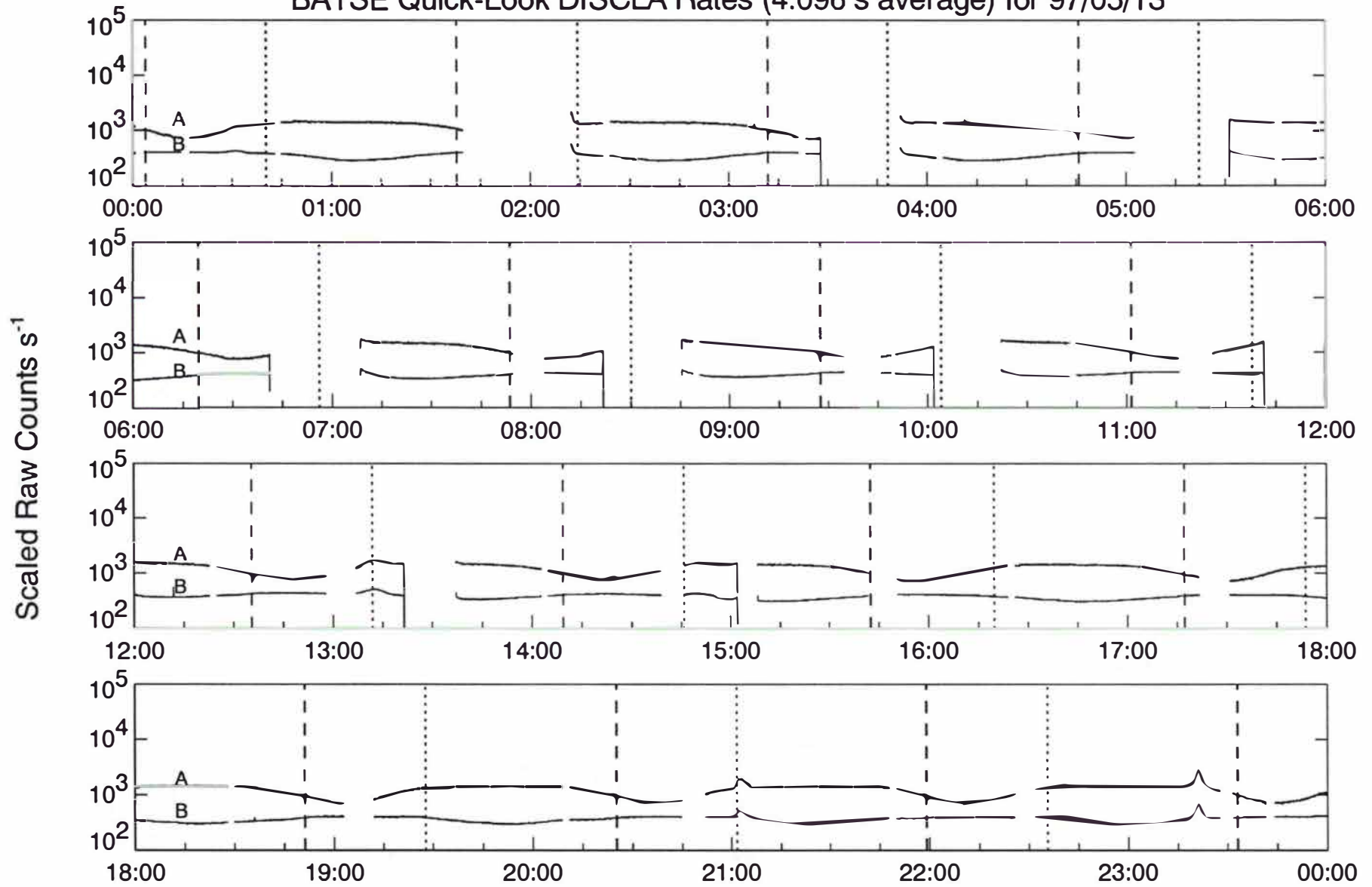
Ulysses date/time	TGRS sees?	TGRS characteristics
<u>970513 18:37</u>	NO	
970506 15:55	YES (waiting mode)	at 970506:56500s (~15:40) <10 s long 450 cts/s 35-100 keV ~2s long 260 cts/s 100-300 keV (peak count rates)
961219 19:42	NO	
970411 9:44	YES (TGRS #553)	at 970411:35566 (~9:50) 10s long 430 cts/s 35-100 keV 10s long 410 cts/s 100-300 keV (peak count rates)
970405 23:49	NO*	
970405 11:35	NO*	

*there was a TGRS triggered event (#551) at 50507s, but this is outside the +/- 2200s time window from the time of the Ulysses burst.

I hope these are helpful,

Pete Kurczynski

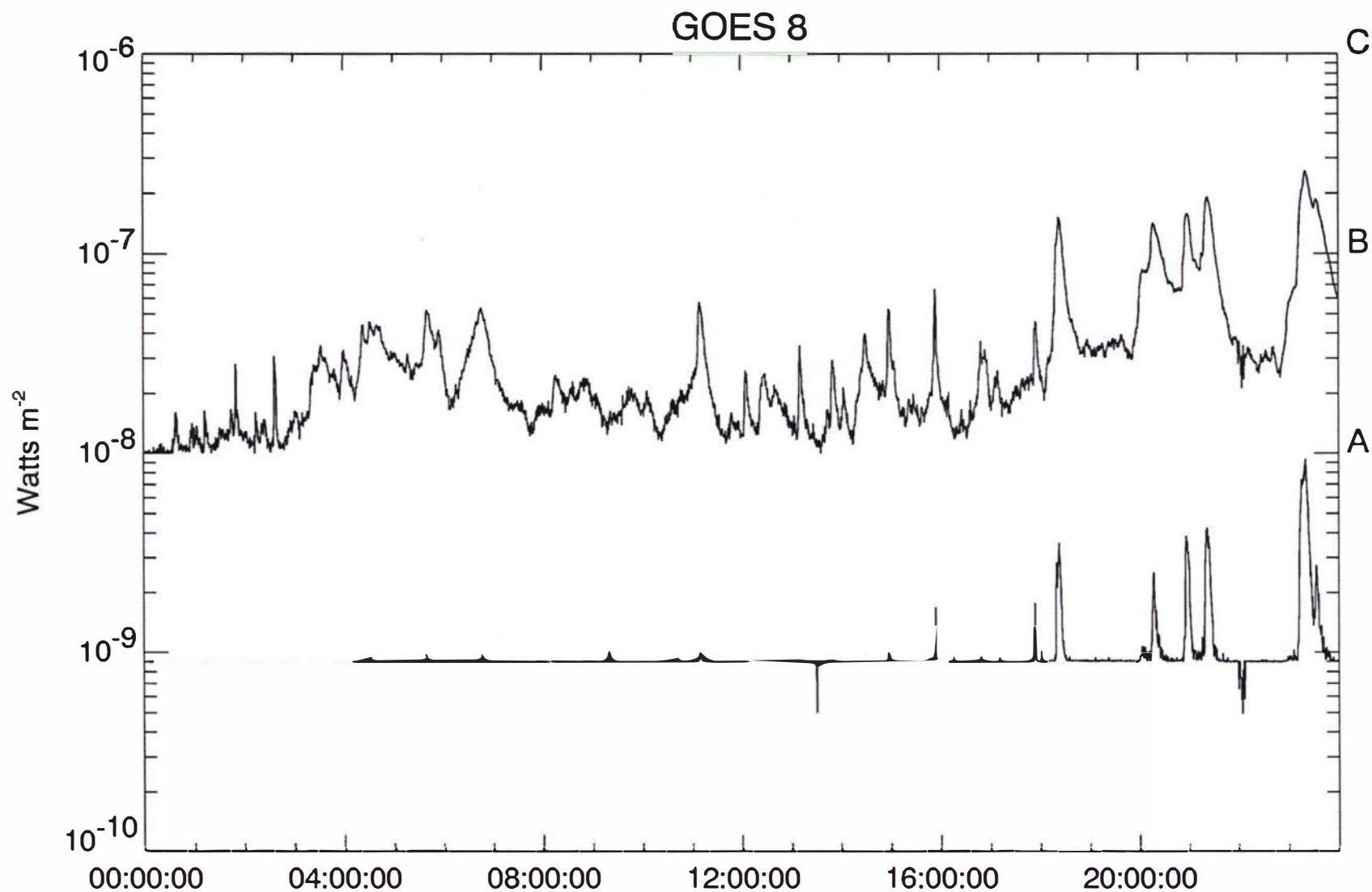
BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/13



Current Time: 97/05/17, 1008 EDT
A: Channel 0 Most Sunward LAD
B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare



Data Start: 97/05/13, 0000:00

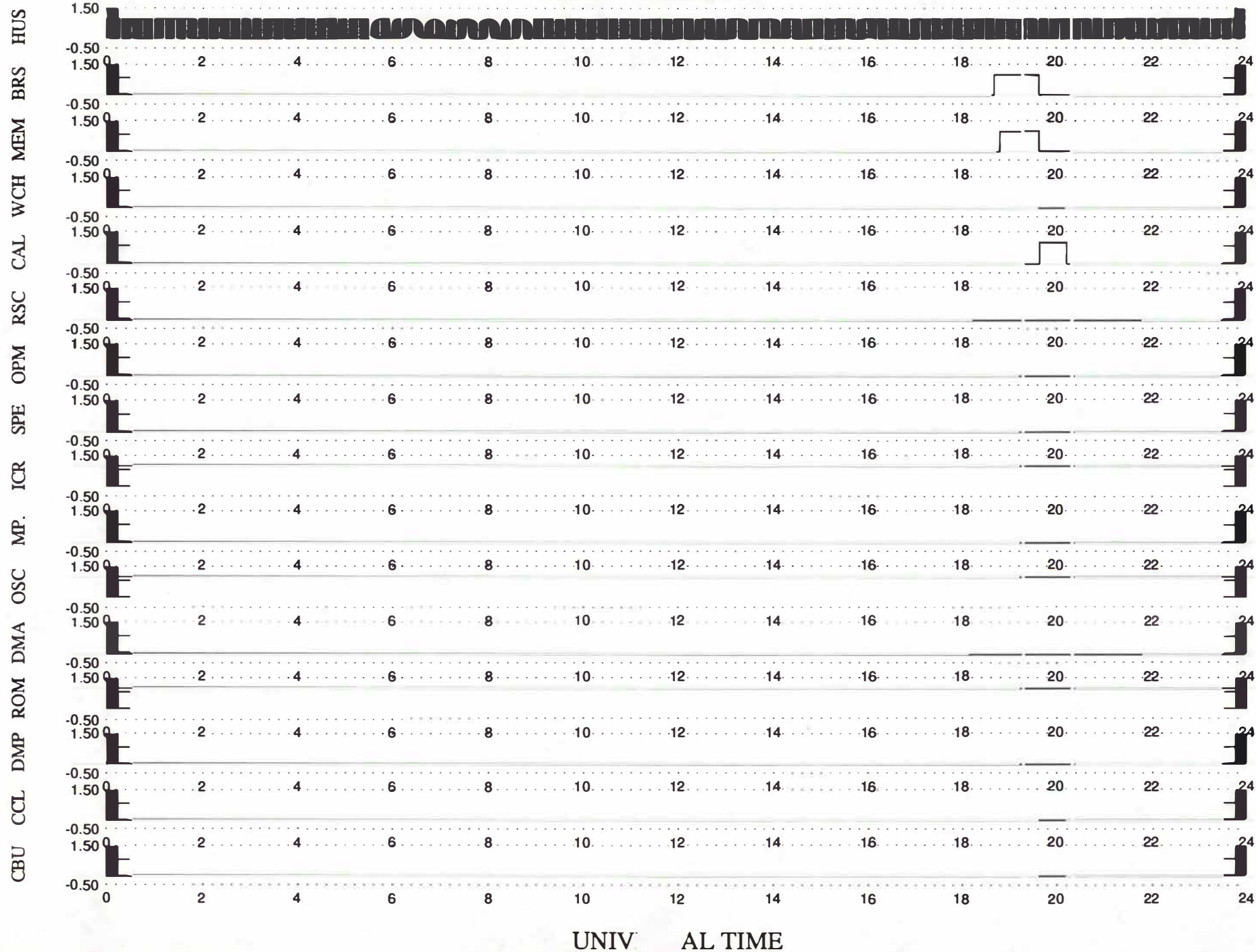
Plot created: 97/05/17, 1007

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

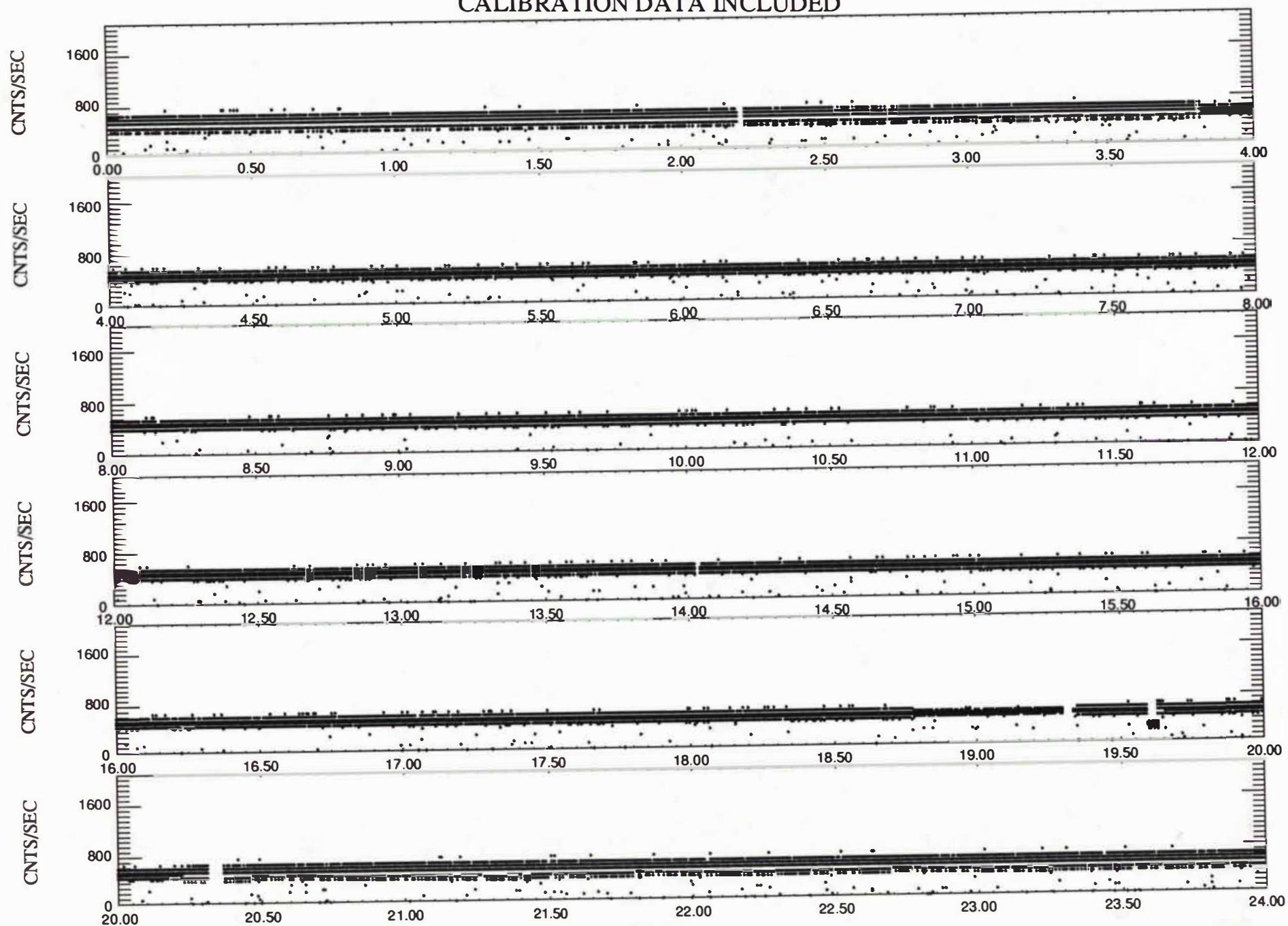
Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

BURST NUMBER 12

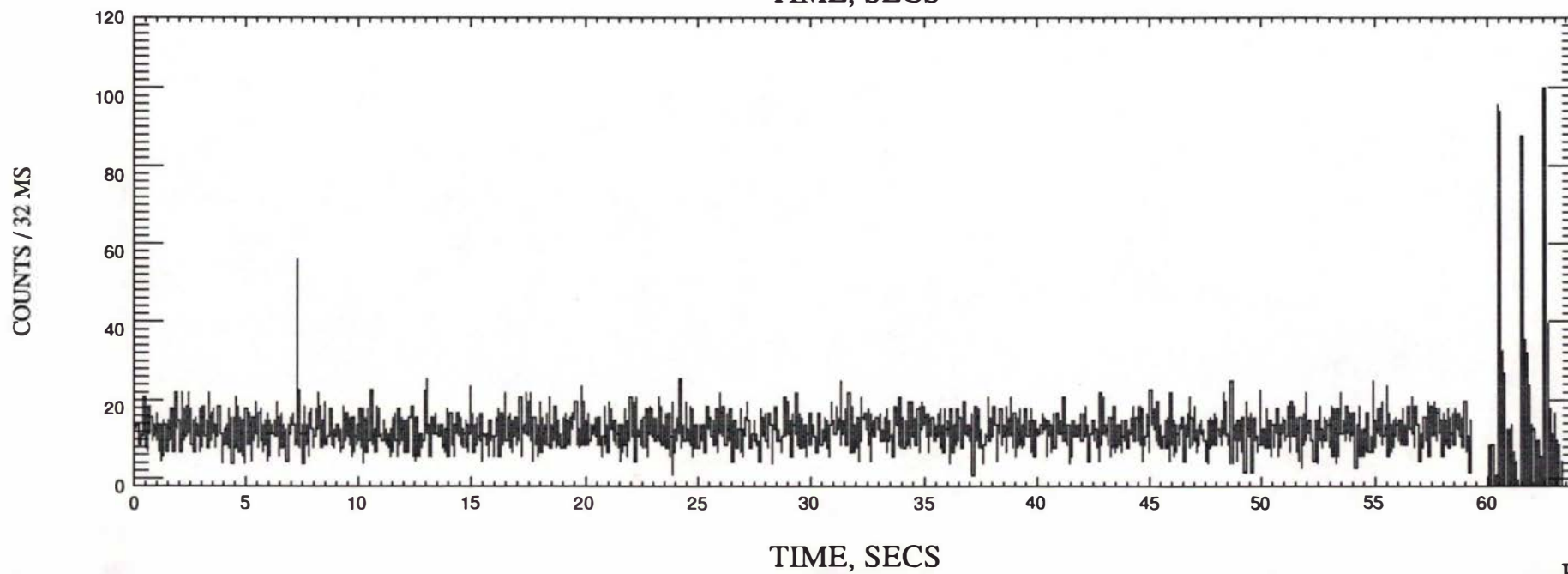
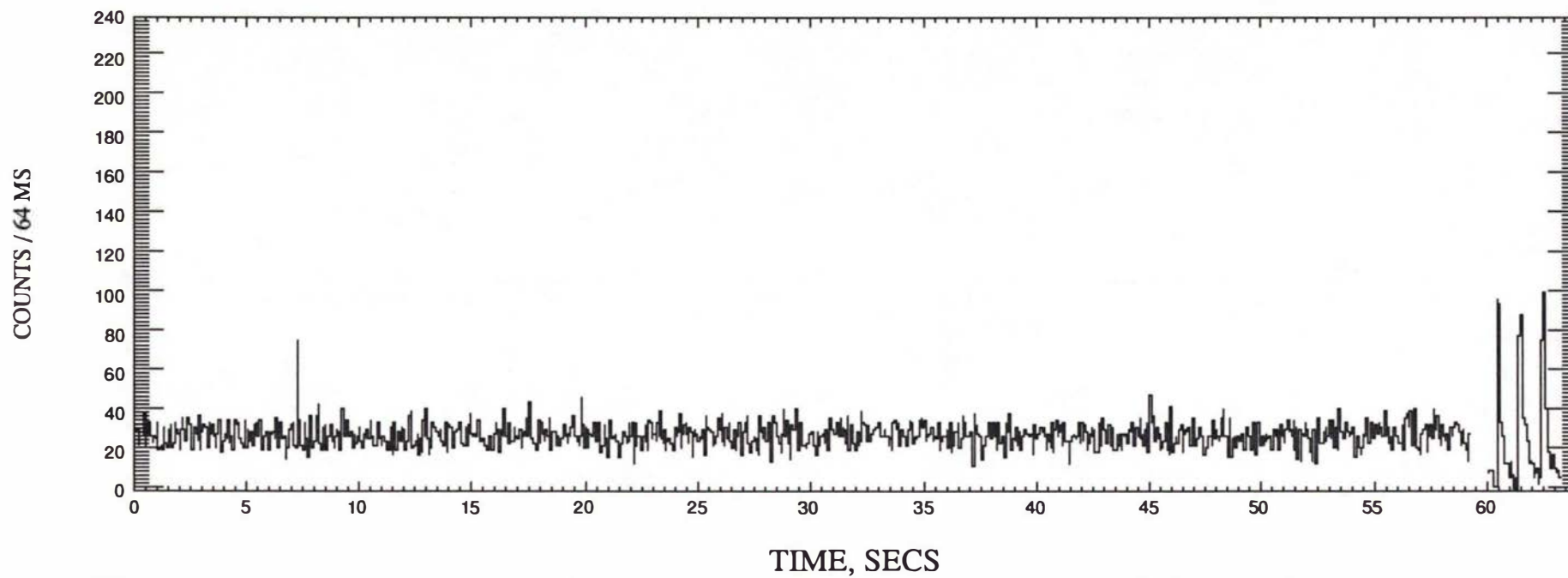


CALIBRATION DATA INCLUDED

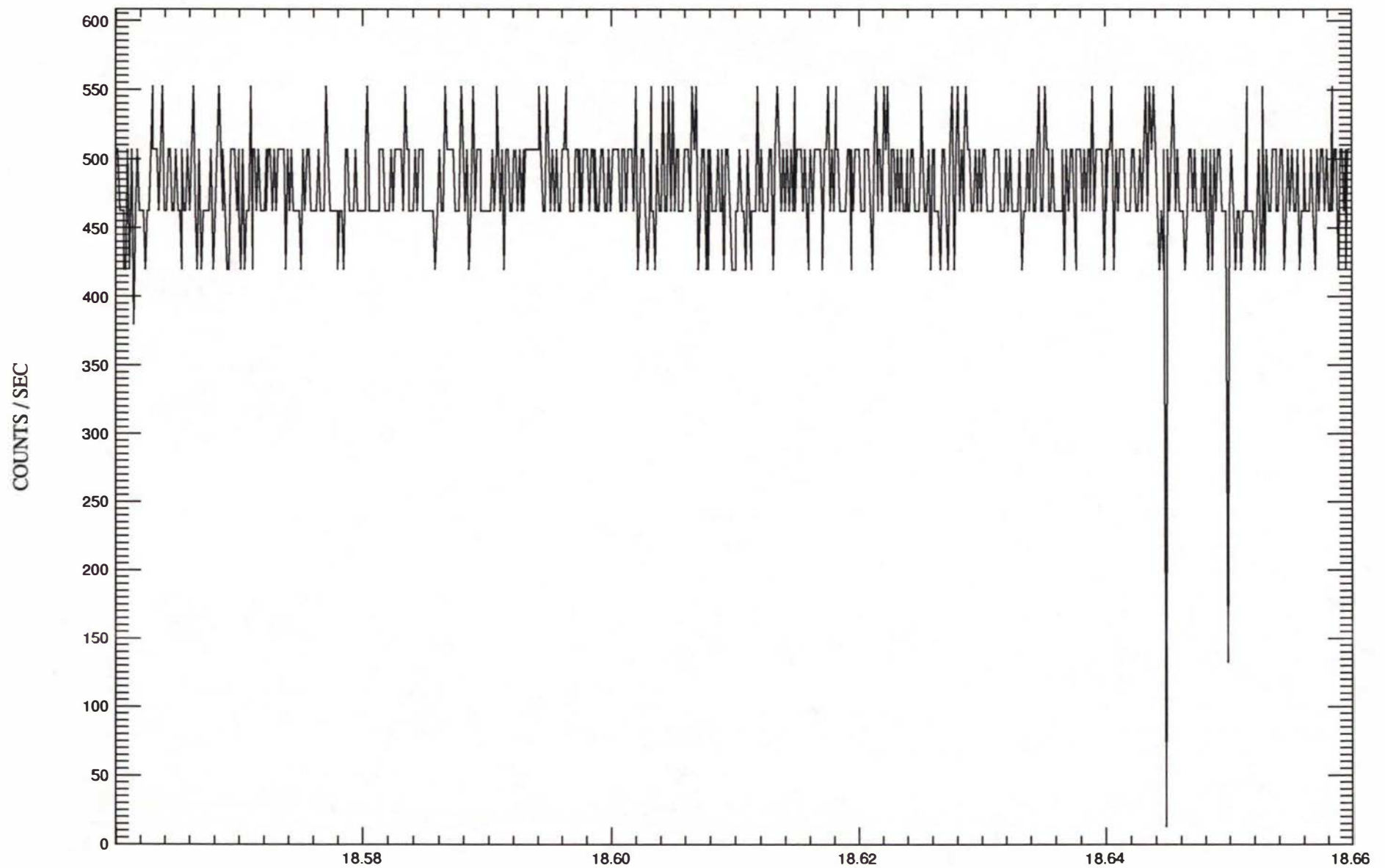


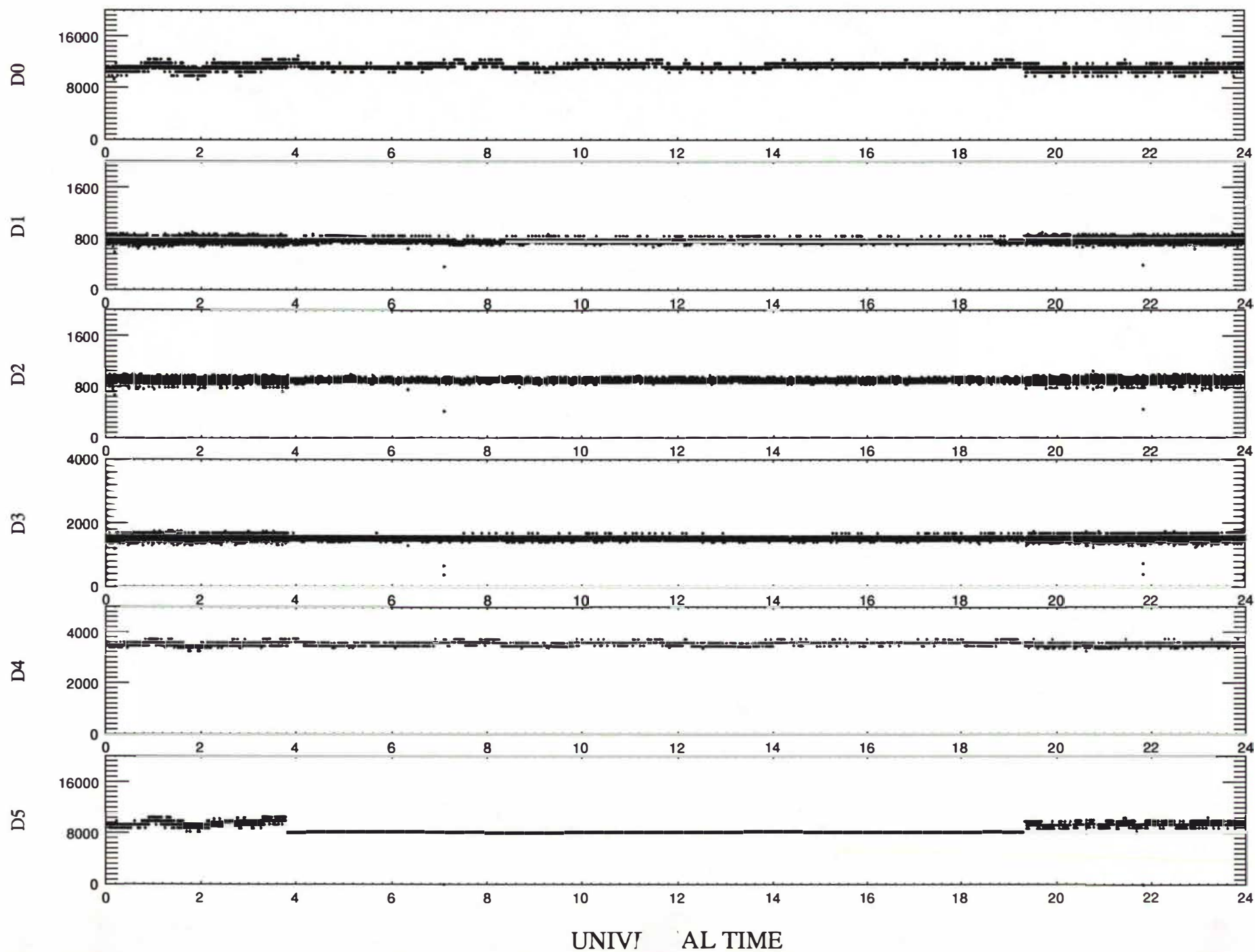
UNIV AL TIME

Burst Counter 12 at UT=18.614880315993 h=67013.569 s 18:36:53.569



CALIBRATION DATA INCLUDED





From DEAL@fender.msfc.nasa.gov Thu May 15 11:35 PDT 1997
Return-Path: <DEAL@fender.msfc.nasa.gov>
Received: from FENDER.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id LAA26573; Thu, 15 May 1997 11:35:22 -0700
From: DEAL@fender.msfc.nasa.gov
Date: Thu, 15 May 1997 13:34:29 -0500 (CDT)
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970515133429.21eld335@fender.msfc.nasa.gov>
Subject: Crossing Windows for BATSE Burst 6230
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6230
EVENT OF 1997 MAY 14 DAY OF YEAR=134
EVENT CROSSING TIME AT BATSE : 8056. S. OR 02:14:16.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 68.000 -61.000
BATSE PEAK COUNTING RATE: 15000 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 14/ 5/ 97 IS:
RA= 150.959 DEC= 31.579 DIST= 4.986 AU
BATSE-ULYSSES DISTANCE = 745920803. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 65.96 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 1013.64 SECS.
CROSSING TIME AT ULYSSES IS 9070. S. OR 02:31:09 +/- 459.90 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 14/ 5/ 97 IS:
RA= 169.796 DEC= 6.009 DIST= 0.901 AU
MARS-BATSE DISTANCE = 134799696. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 79.04 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 85.49 SECS.
CROSSING TIME AT MARS IS 8141. S. OR 02:15:41 +/- 77.94 SECONDS

BATSE BURST TRIGGER

NO.: 6230

TIME: TJD=0582 SECONDS=8056

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=58.2 AZIMUTH=14.5 ERROR=3.7 DEGREES

COMMENTS:

GRB LASTING ~ 0.25 S. VISIBLE ABOVE 300 KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6230	970514	10582	08056	15000	068	-61	.25

BATSE BURST# 6230

ULYSSES RT

15 / 5 / 97

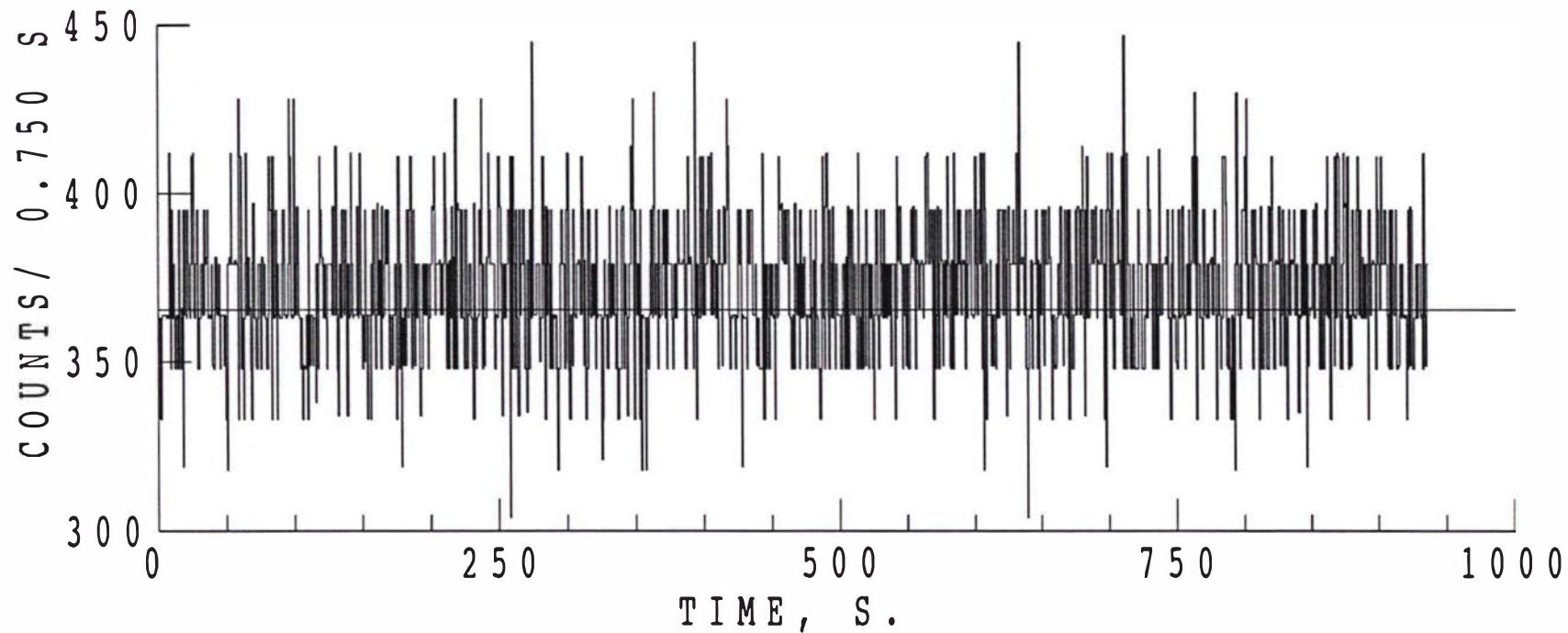
14 / 5 / 97 8604.115 s

0.250 S INTERVALS REGROUPED BY 3

0 - 0 keV

N= 10 M=10
>4.0 SIGMA FLUCTUATIONS

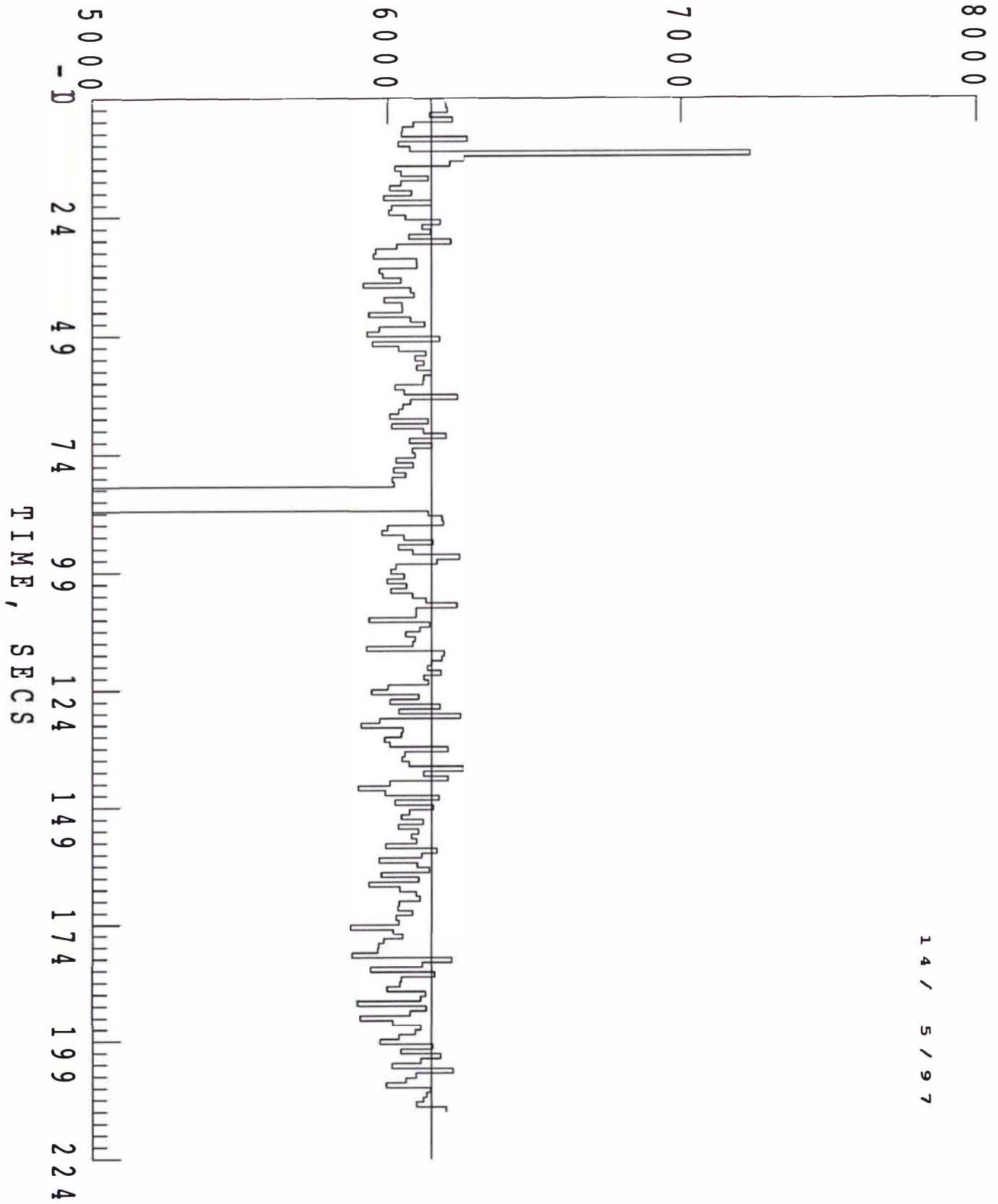
N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



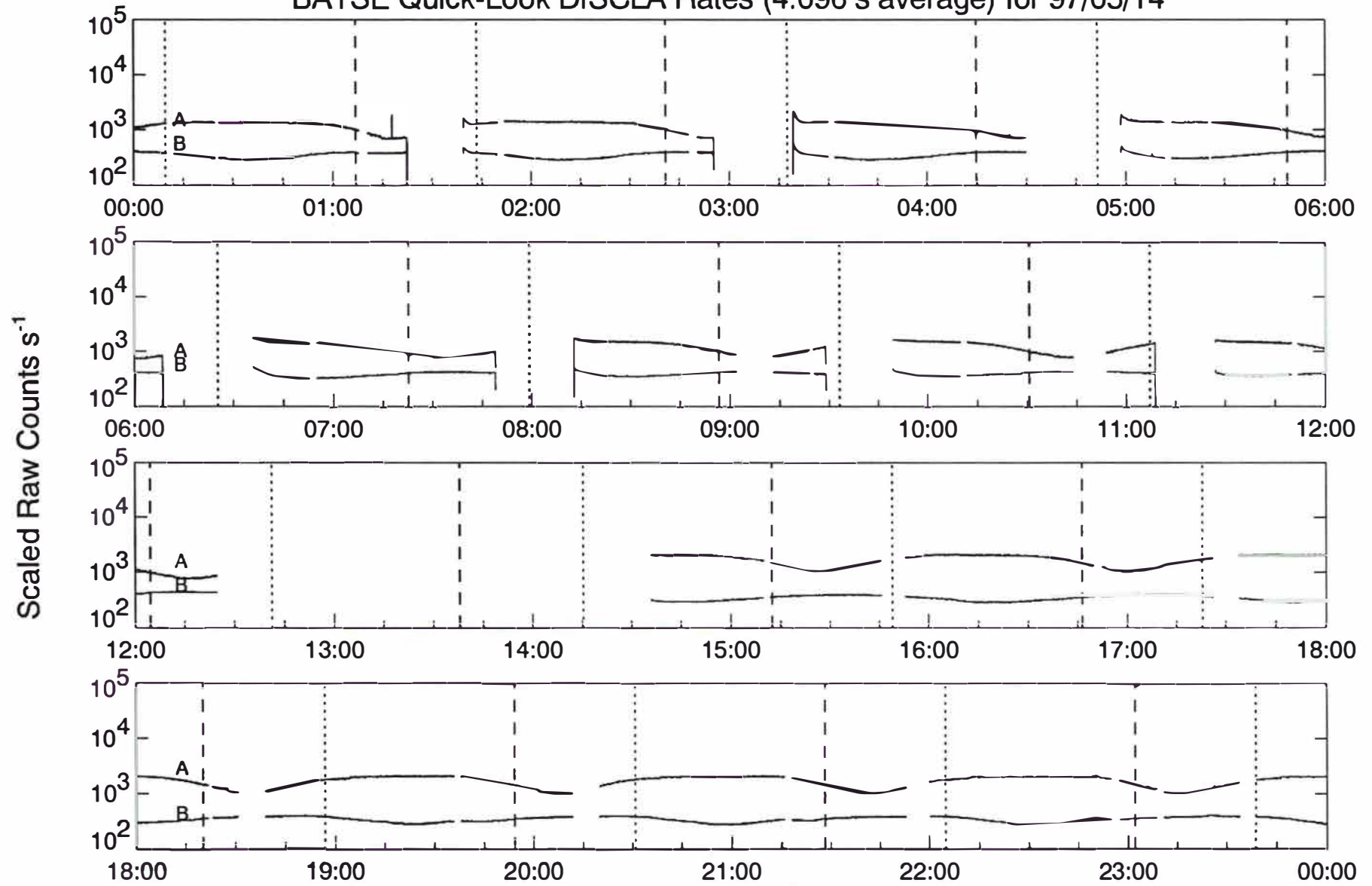
BACODINE 6230 14/05/97 8046.281

25 - 100 keV

COUNTS/1.024 S



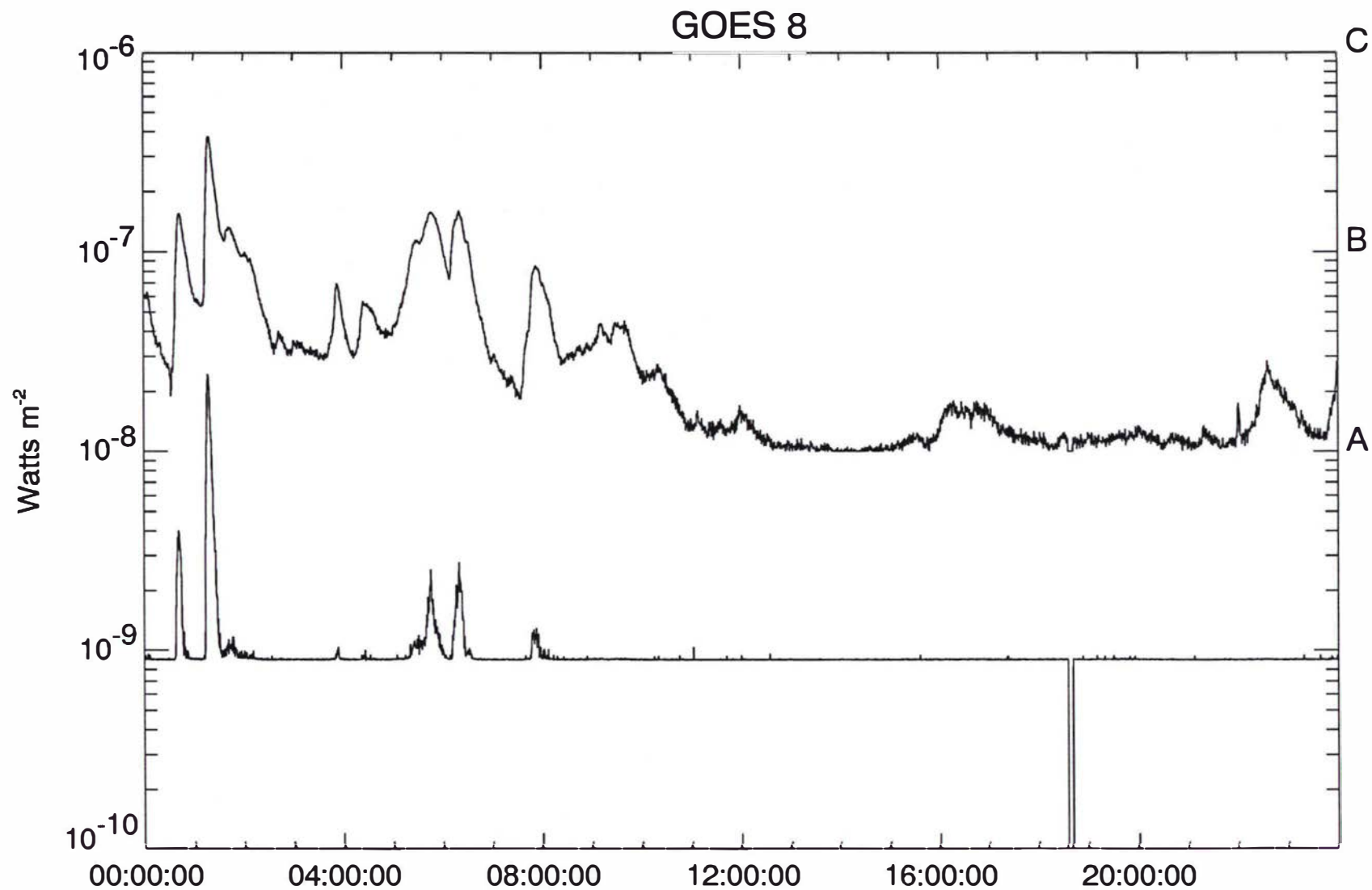
BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/14



Current Time: 97/05/18, 1008 EDT
A: Channel 0 Most Sunward LAD
B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare



Data Start: 97/05/14, 0000:00

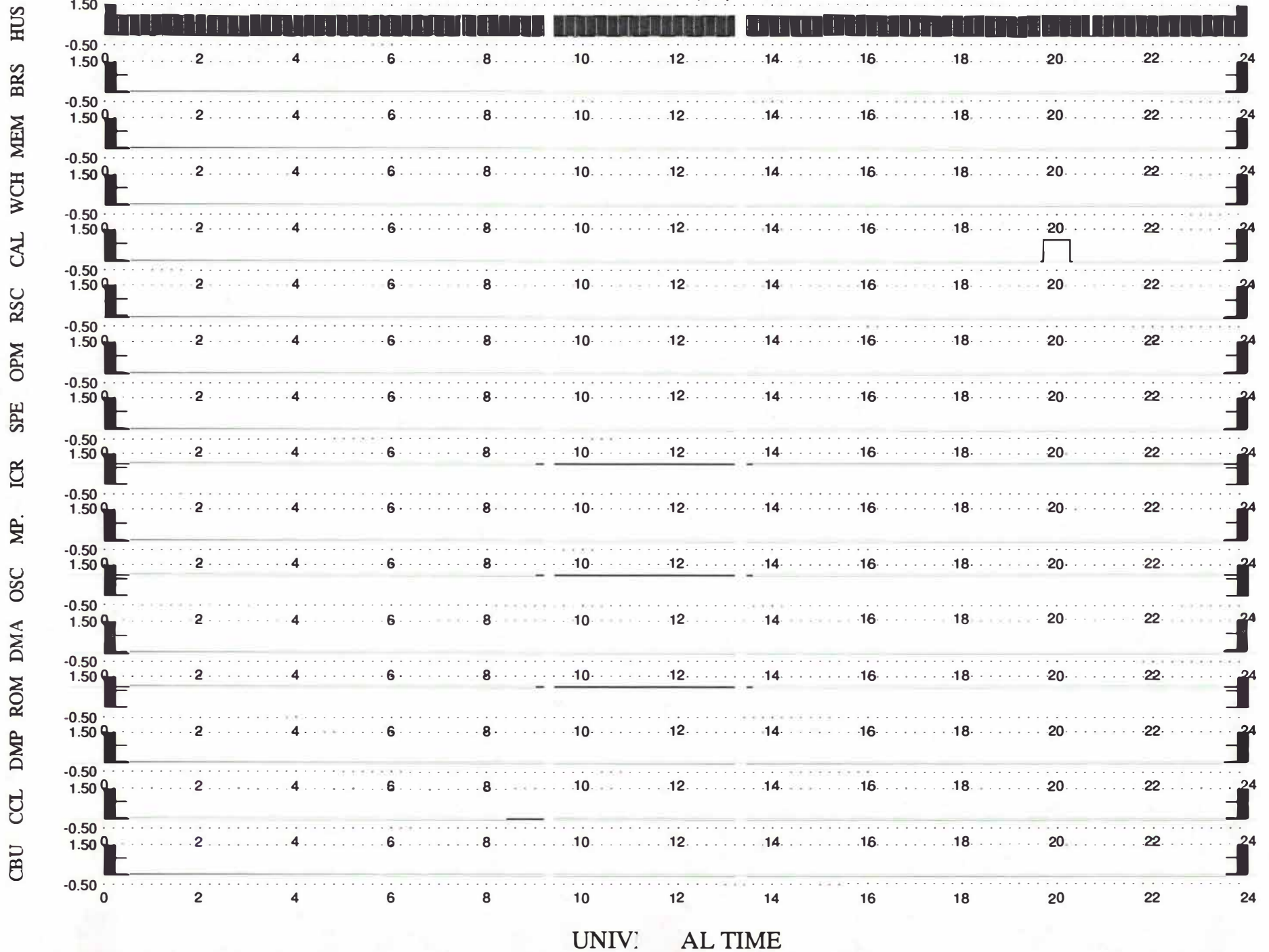
Plot created: 97/05/18, 1007

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

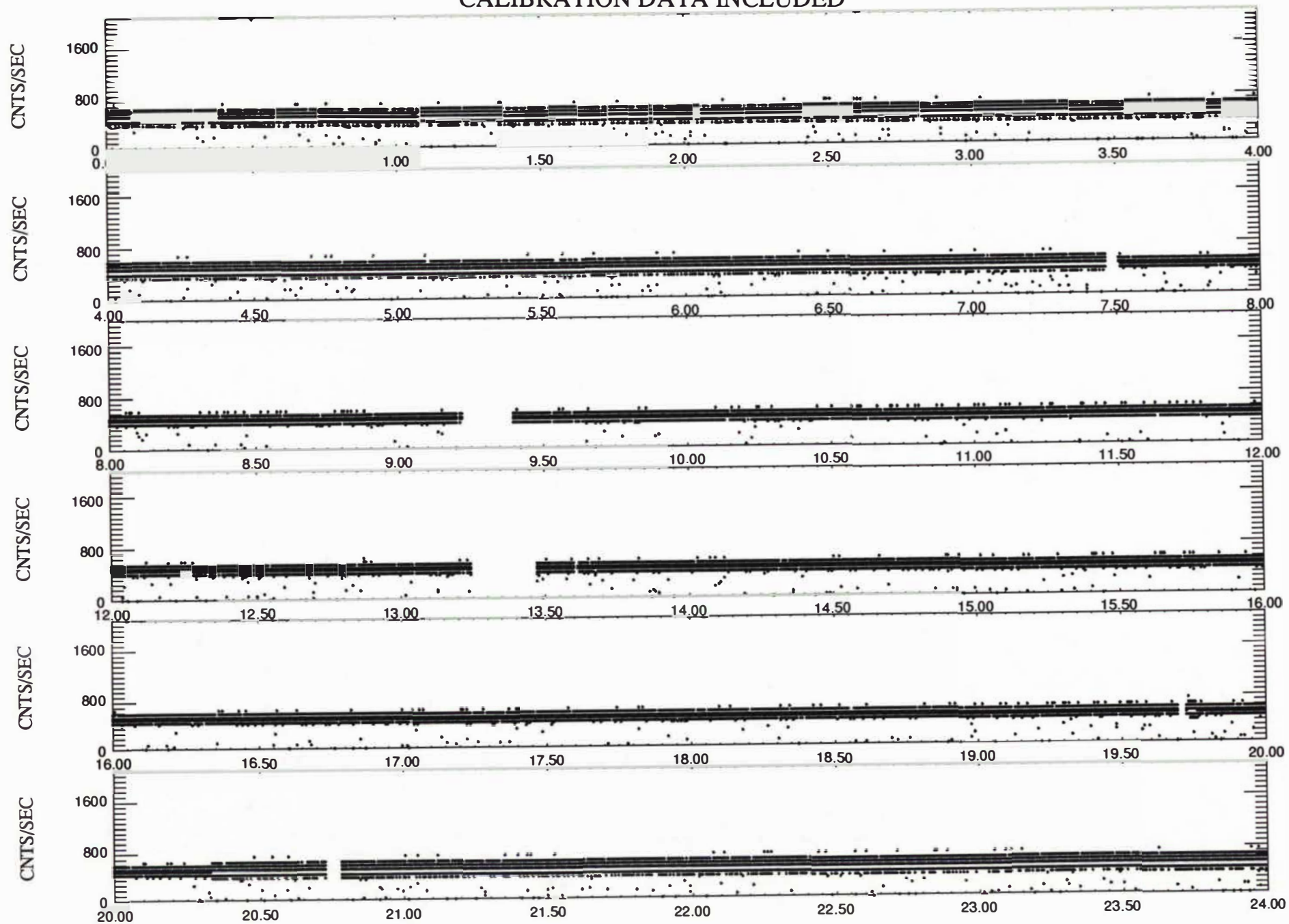
Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

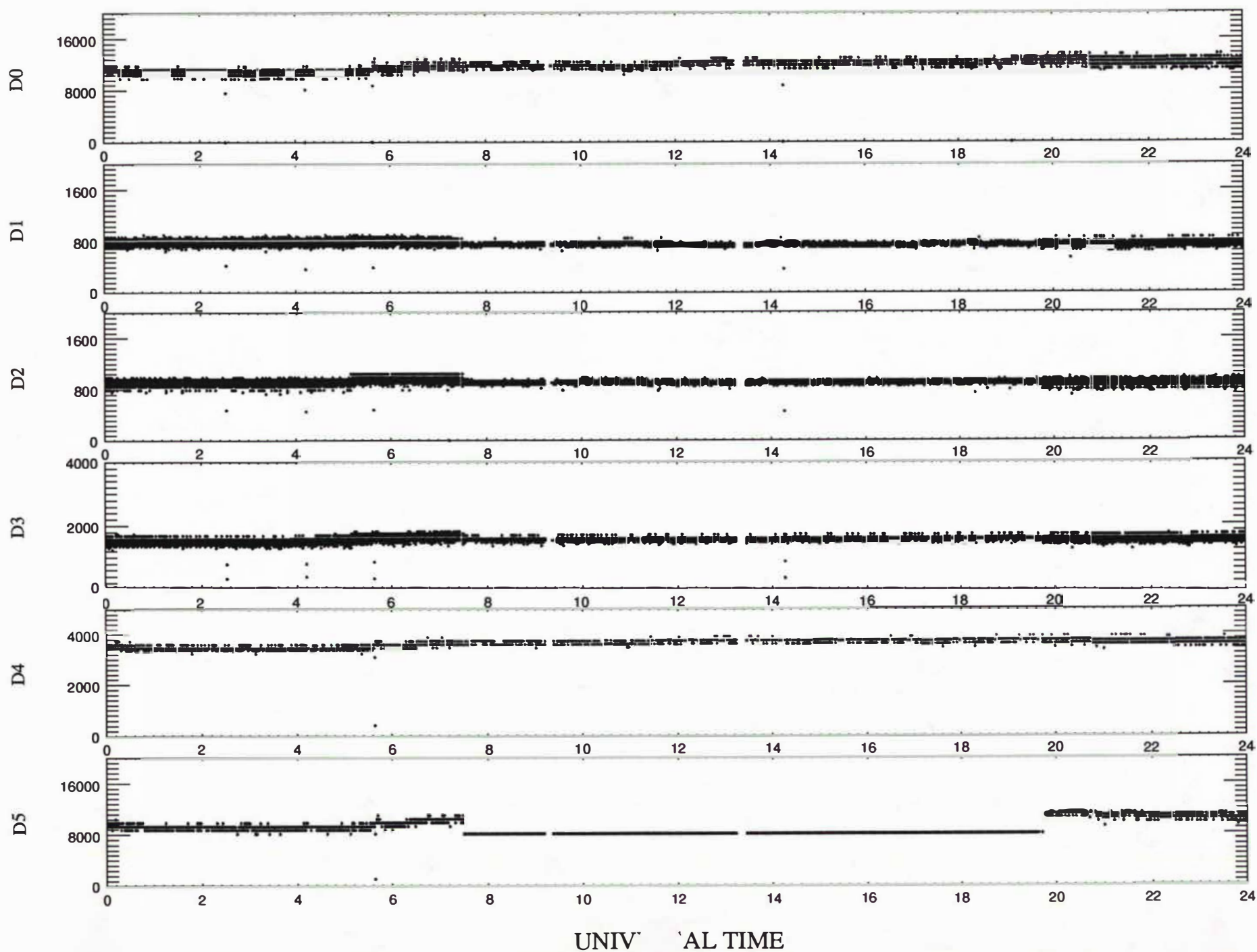
NO BURST (12)



CALIBRATION DATA INCLUDED



UNIV AL TIME



SAX 19970515 03341

ULYSSES RT

25 / 08 / 09

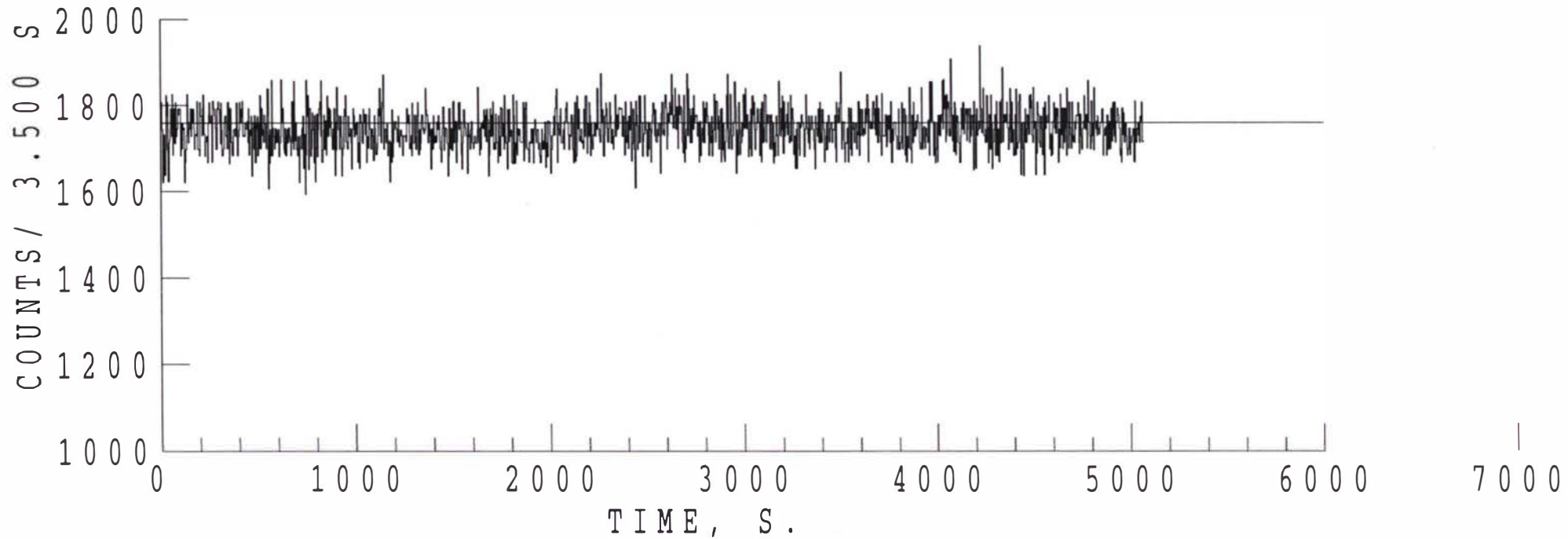
15/05/97 792.104 s

0.250 S INTERVALS REGROUPED BY 14

0 - 0 keV

N= 10 M= 10
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



From WOODSP@ssl.msfc.nasa.gov Mon May 19 07:23 PDT 1997
From: WOODSP@ssl.msfc.nasa.gov
Date: Mon, 19 May 1997 9:22:31 -0500 (CDT)
To: burst@comptel.sr.unh.edu, grobad@ests2.estec.esa.nl,
cline@lheavx.gsfc.nasa.gov, barthelmy@lheavx.gsfc.nasa.gov,
bacodine@pandora.gsfc.nasa.gov, scott@circe.gsfc.nasa.gov,
butterworth@lheavx.gsfc.nasa.gov, band@cass09.ucsd.edu
X-Vmsmail-To: @mops\$send_msg:BURST_SPAN.DIS
Subject: Burst Trigger Message

BATSE BURST TRIGGER

NO.: 6231

TIME: TJD=0583 SECONDS=37878

TYPE: PARTICL SOLAR FLARE TRIGGER SIGNAL:

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH= AZIMUTH= ERROR= DEGREES

COMMENTS:
PARTICLE EVENT.

From WOODSP@SSLLES.MSFC.NASA.GOV Mon May 19 07:24 PDT 1997
Date: Mon, 19 May 1997 9:23:28 -0500 (CDT)
From: WOODSP@ssl.msfc.nasa.gov
To: burst@comptel.sr.unh.edu, grobad@ests2.esa.nl,
cline@lheavx.gsfc.nasa.gov, barthelmy@lheavx.gsfc.nasa.gov,
bacodine@pandora.gsfc.nasa.gov, scott@circe.gsfc.nasa.gov,
butterworth@lheavx.gsfc.nasa.gov, band@cass09.ucsd.edu
X-Vmsmail-To: @mops\$send msg:BURST_SPAN.DIS
Subject: Burst Trigger Message

BATSE BURST TRIGGER

NO.: 6232

TIME: TJD=0583 SECONDS=49754

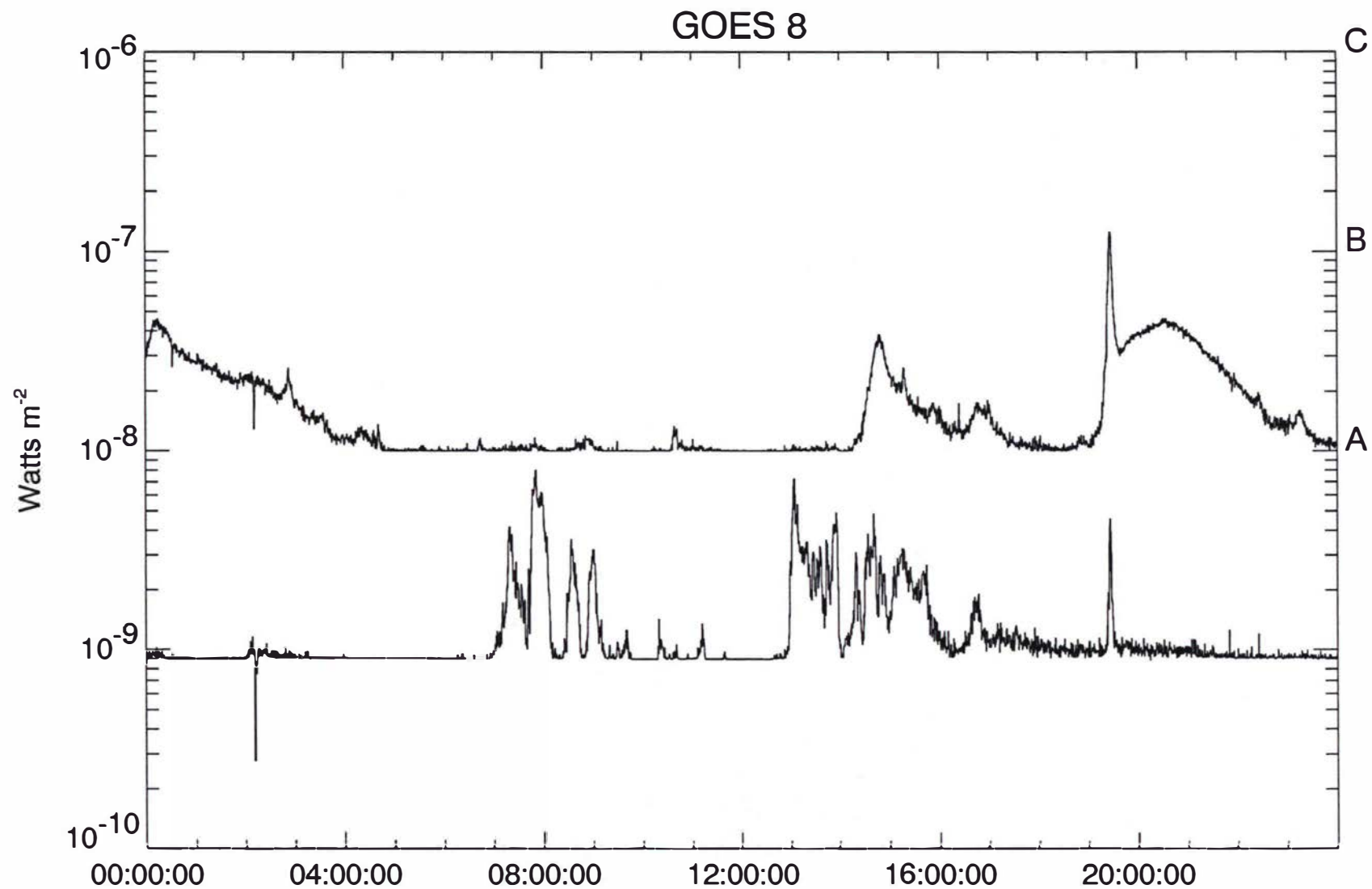
TYPE: PARTICL SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH= AZIMUTH= ERROR= DEGREES

COMMENTS:
PARTICLE EVENT.



Data Start: 97/05/15, 0000:00

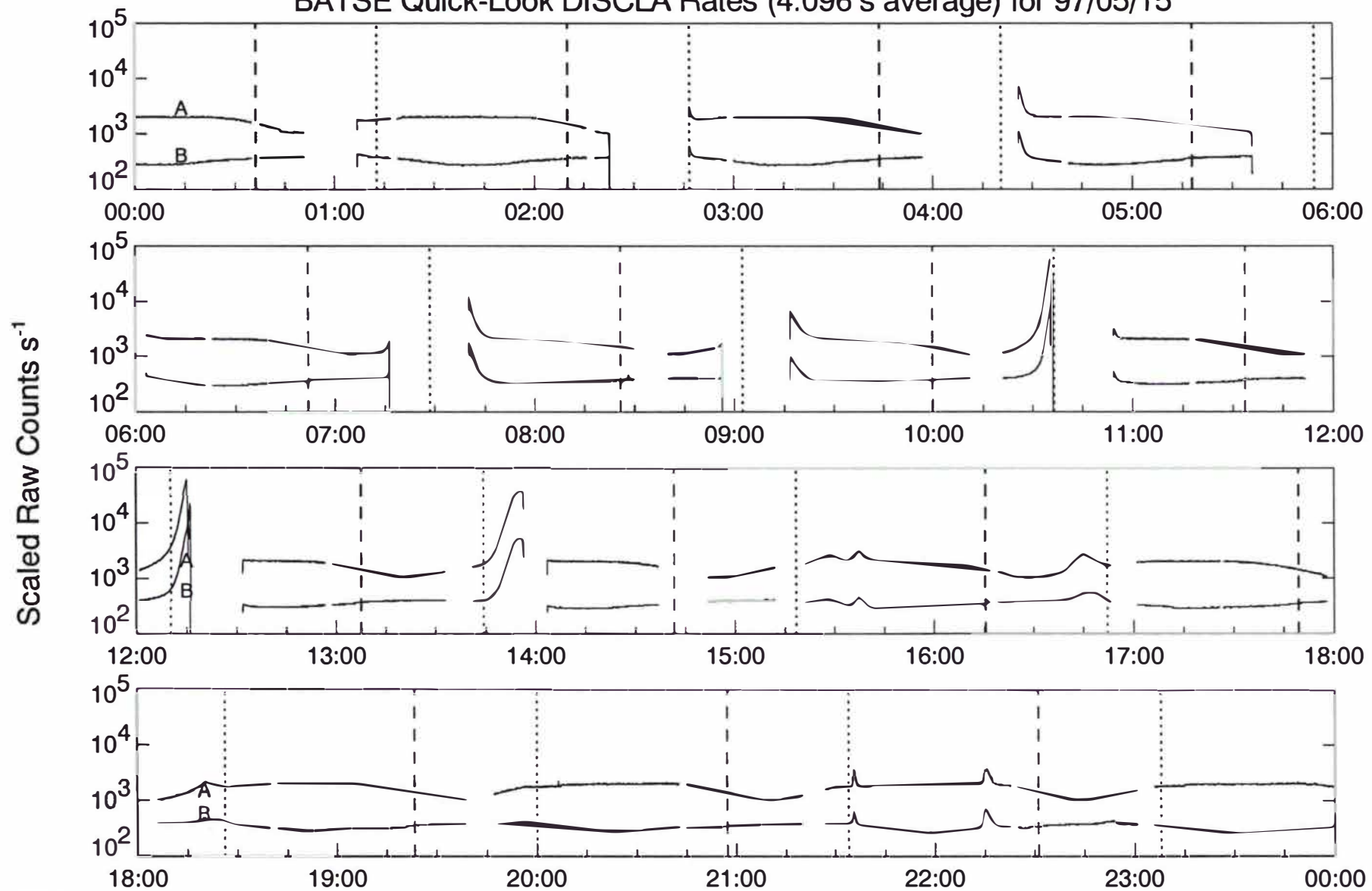
Plot created: 97/05/19, 1007

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/15



Current Time: 97/05/19, 1008 EDT
A: Channel 0 Most Sunward LAD
B: Sum Channel 0 Anti-Sunward LADs X .05

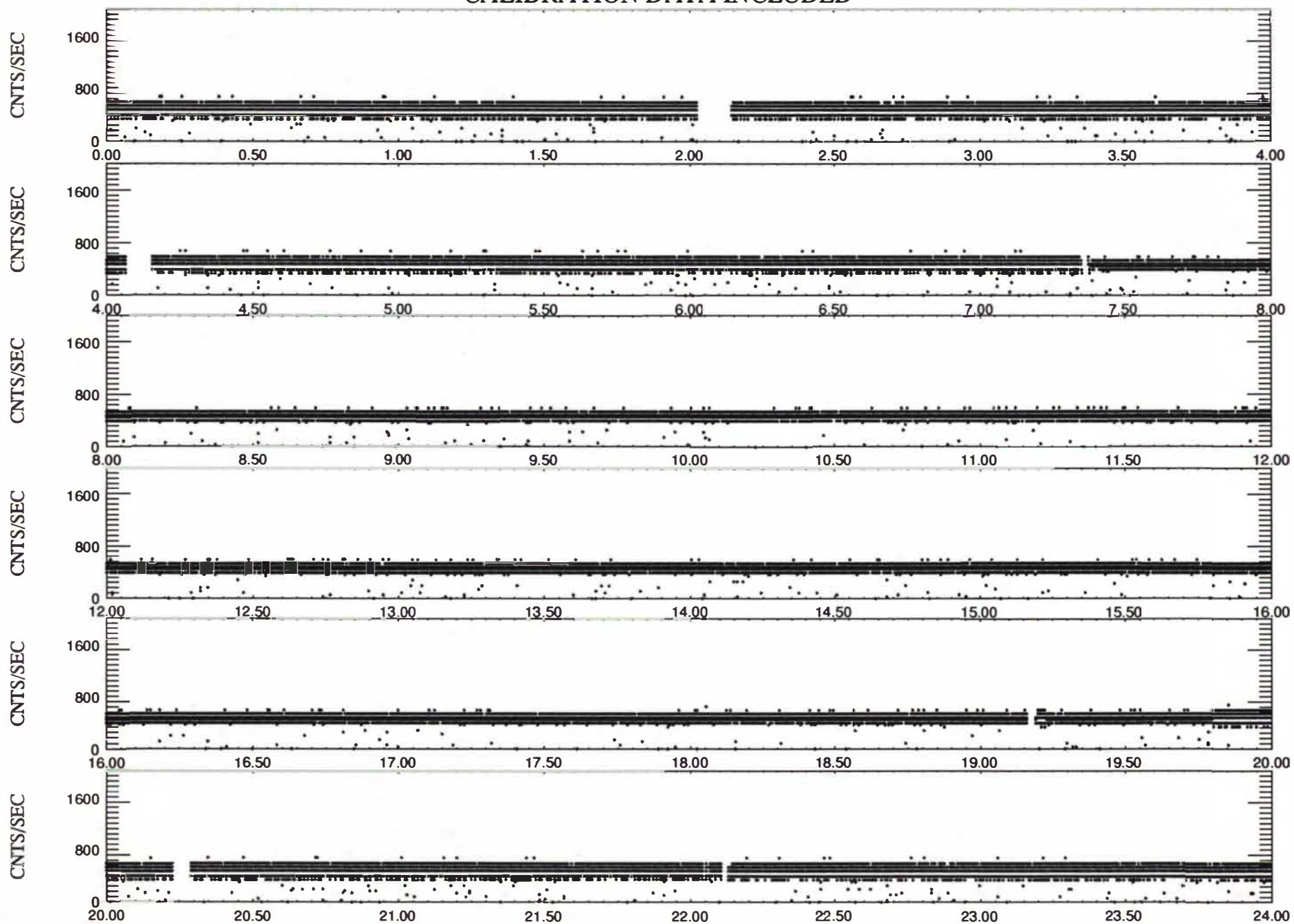
Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare

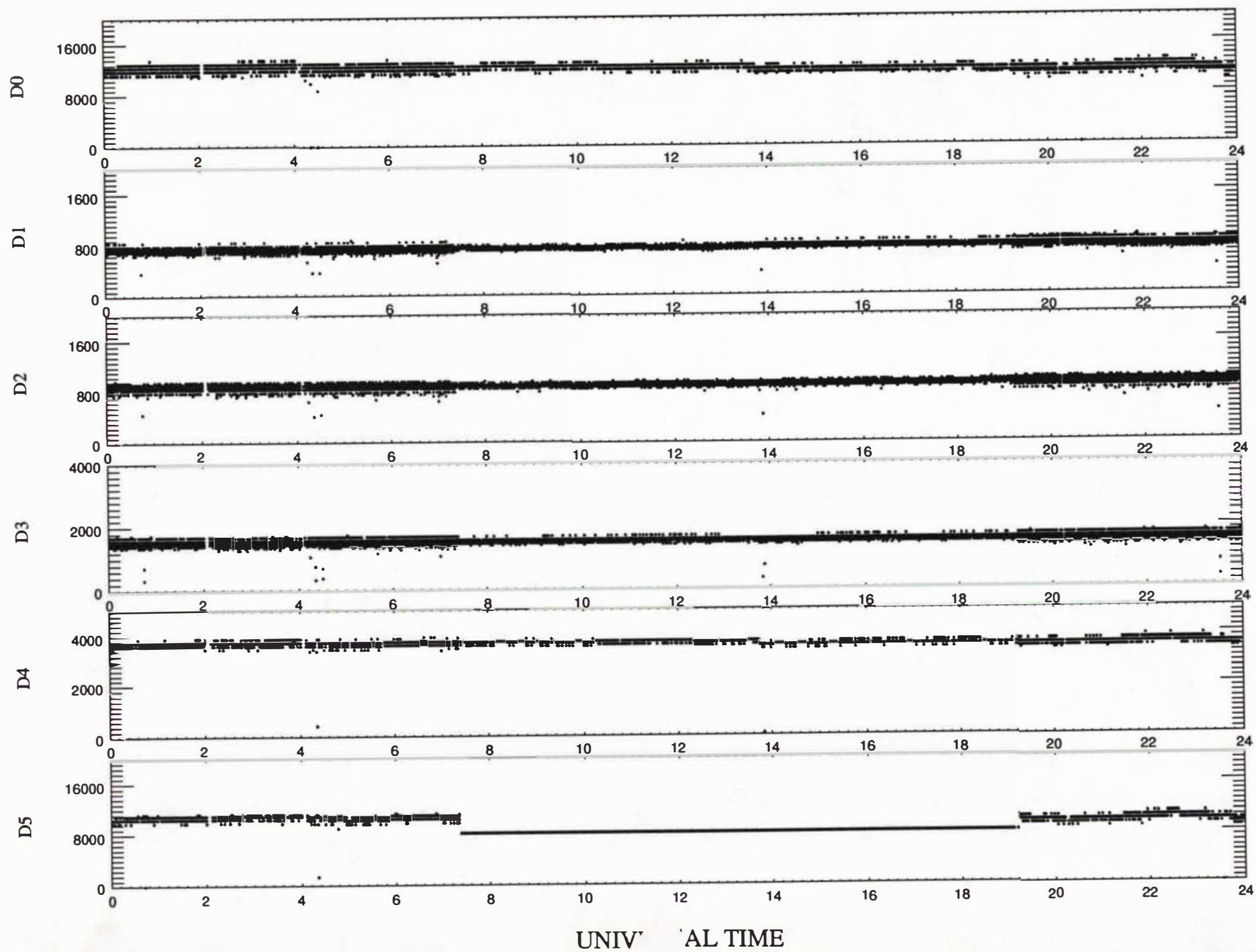
	CPU	CCL	DMP	ROM	DMA	OSC	MP.	ICR	SPE	OPM	RSC	CAL	WCH	MEM	BRS	HUS
--	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----



CALIBRATION DATA INCLUDED



UNIV AL TIME



From SAHI@fender.msfc.nasa.gov Mon May 19 12:23 PDT 1997
Return-Path: <SAHI@fender.msfc.nasa.gov>
Received: from FENDER.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id MAA24439; Mon, 19 May 1997 12:23:19 -0700
m: SAHI@fender.msfc.nasa.gov
Date: Mon, 19 May 1997 14:22:00 -0500 (CDT)
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970519142200.21e0b01d@fender.msfc.nasa.gov>
Subject: Crossing Windows for BATSE Burst 6233
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6233
EVENT OF 1997 MAY 16 DAY OF YEAR=136
EVENT CROSSING TIME AT BATSE : 71597. S. OR 19:53:17.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 65.000 -18.000
BATSE PEAK COUNTING RATE: 4000 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 16/ 5/ 97 IS:
RA= 150.907 DEC= 31.256 DIST= 5.035 AU
BATSE-ULYSSES DISTANCE = 753276424. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 84.13 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 257.06 SECS.
CROSSING TIME AT ULYSSES IS 71854. S. OR 19:57:34 +/- 487.85 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 16/ 5/ 97 IS:
RA= 170.121 DEC= 5.793 DIST= 0.915 AU
MARS-BATSE DISTANCE = 136936304. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 73.86 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 126.99 SECS.
CROSSING TIME AT MARS IS 71724. S. OR 19:55:23 +/- 78.10 SECONDS

BATSE BURST TRIGGER

NO.: 6233

TIME: TJD=0584 SECONDS=71597

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=136.2 AZIMUTH=307.4 ERROR=6.2 DEGREES

COMMENTS:

F T, SINGLE SPIKE, DUR.~0.6 SECS. NOT VISIBLE ABOVE 300 KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6233	970516	10584	71597	4000	065	-18	.6

BATSE BURST# 6233

ULYSSES RT

19 / 5 / 97

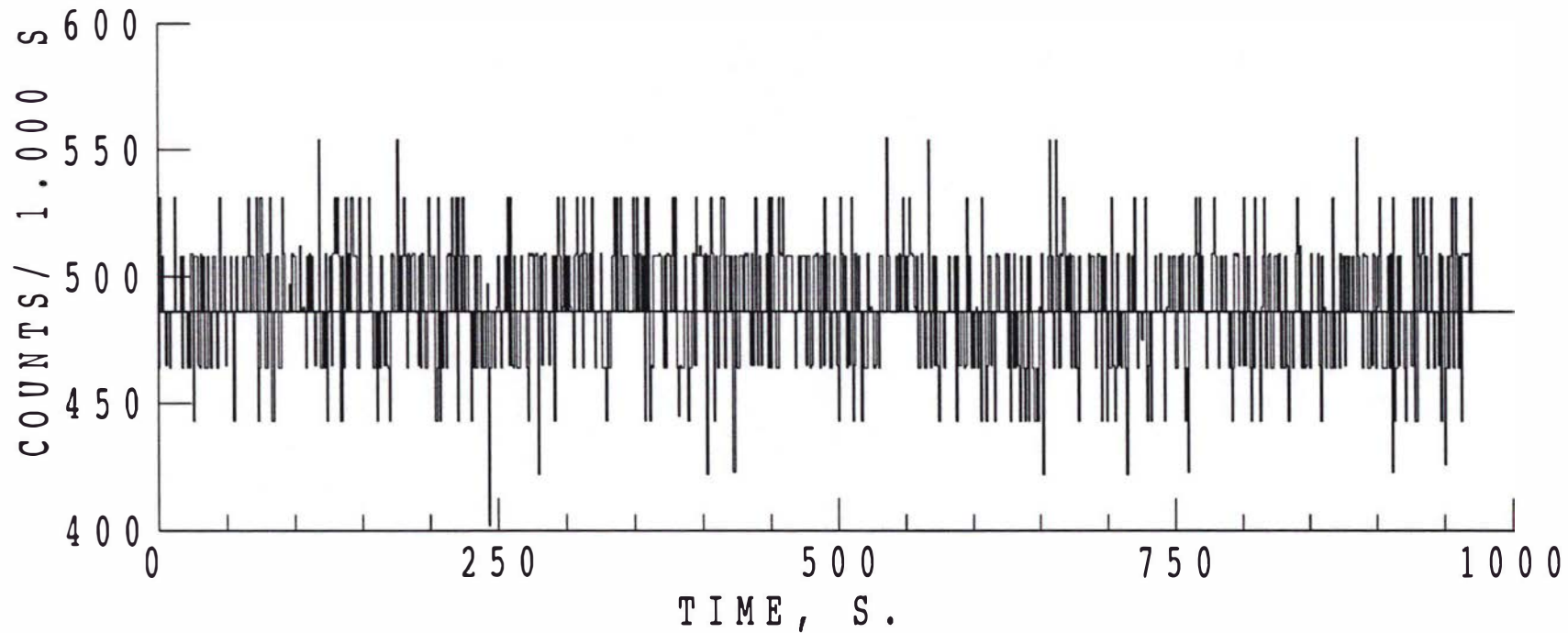
16 / 5 / 97 71352.359 s

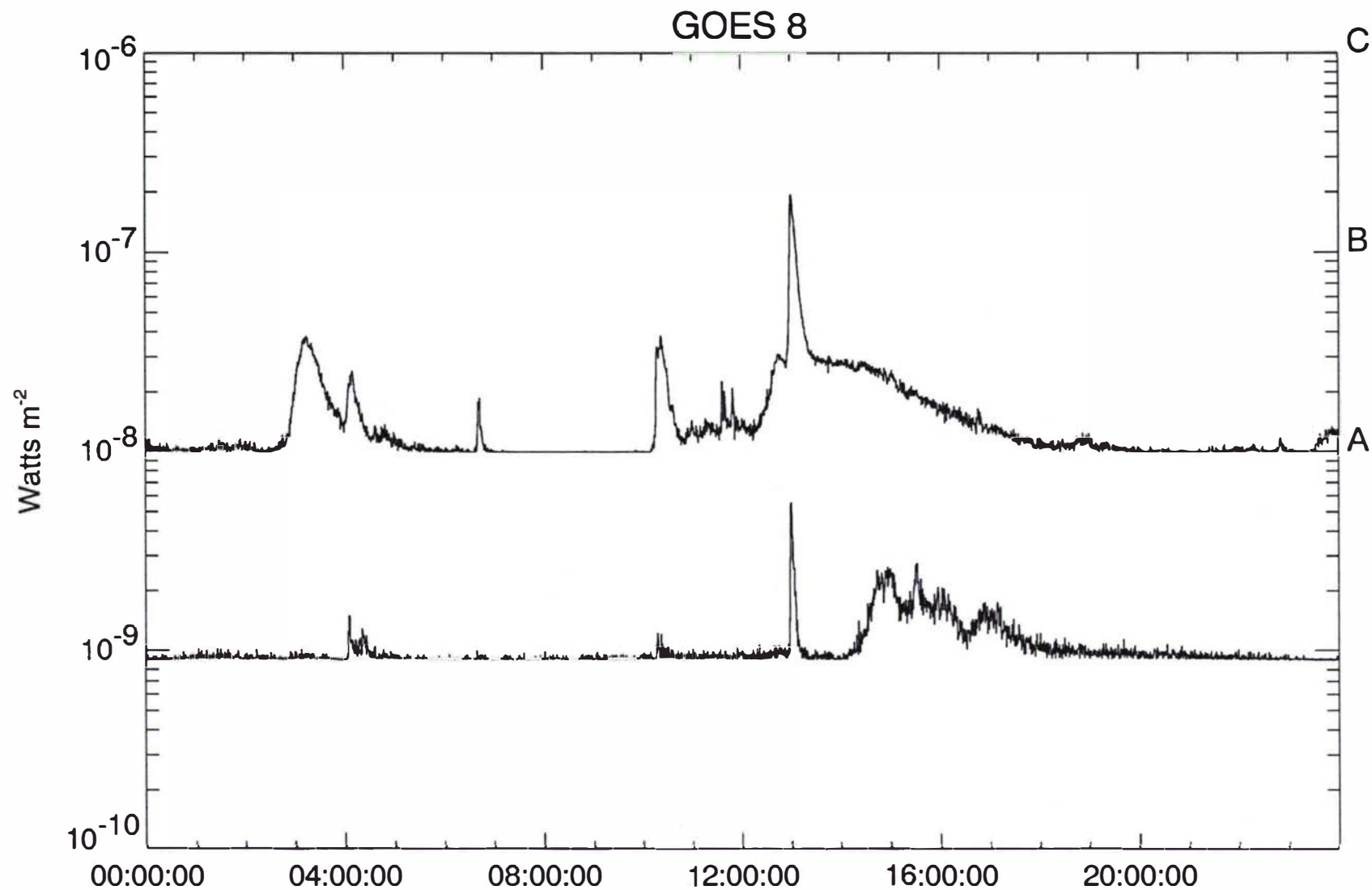
0.500 S INTERVALS REGROUPED BY 2

0 - 0 keV

N= 10 M=10
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS





Data Start: 97/05/16, 0000:00

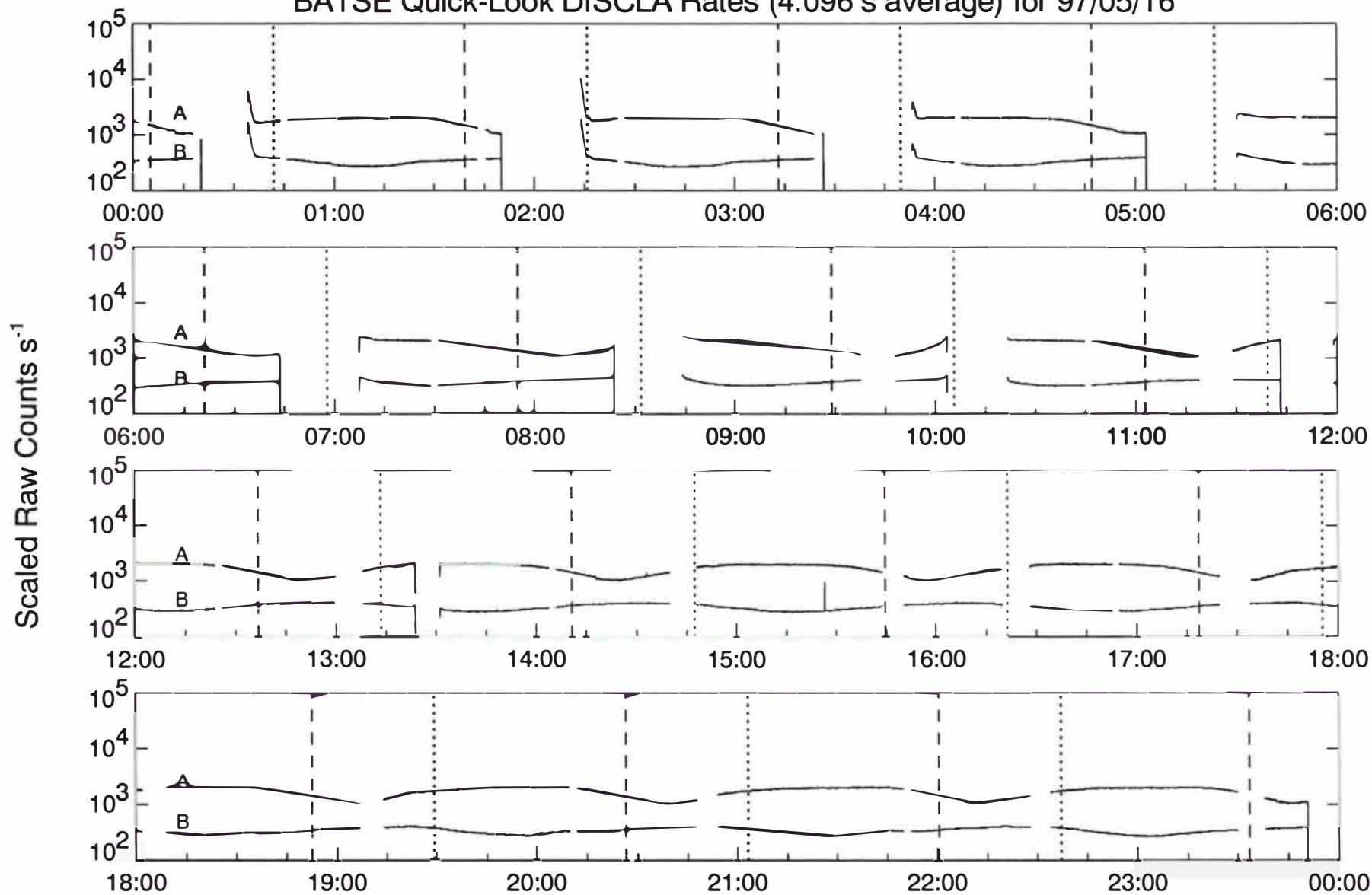
Plot created: 97/05/20, 1007

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/16

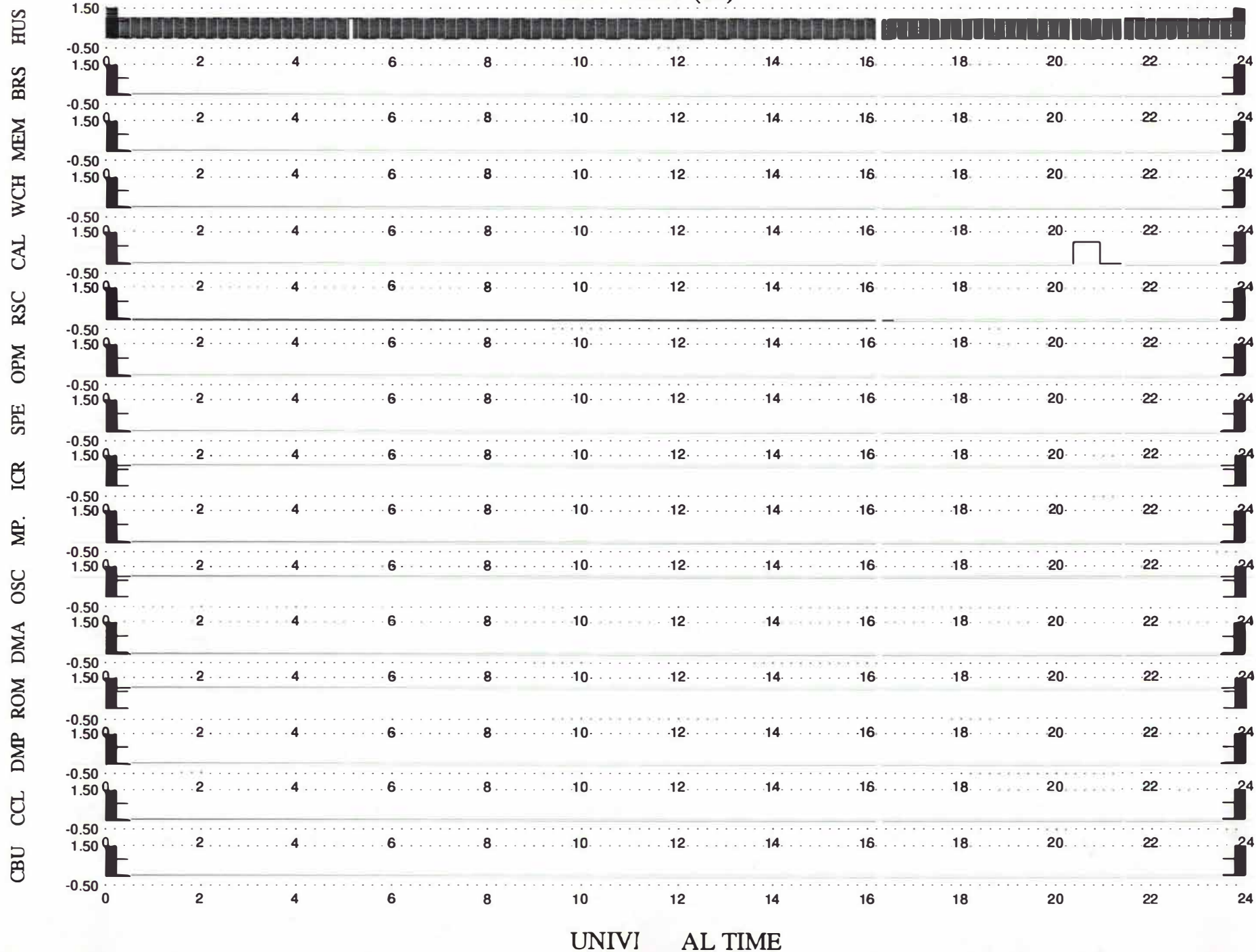


Current Time: 97/05/20, 1008 EDT
A: Channel 0 Most Sunward LAD
B: Sum Channel 0 Anti-Sunward LADs X .05

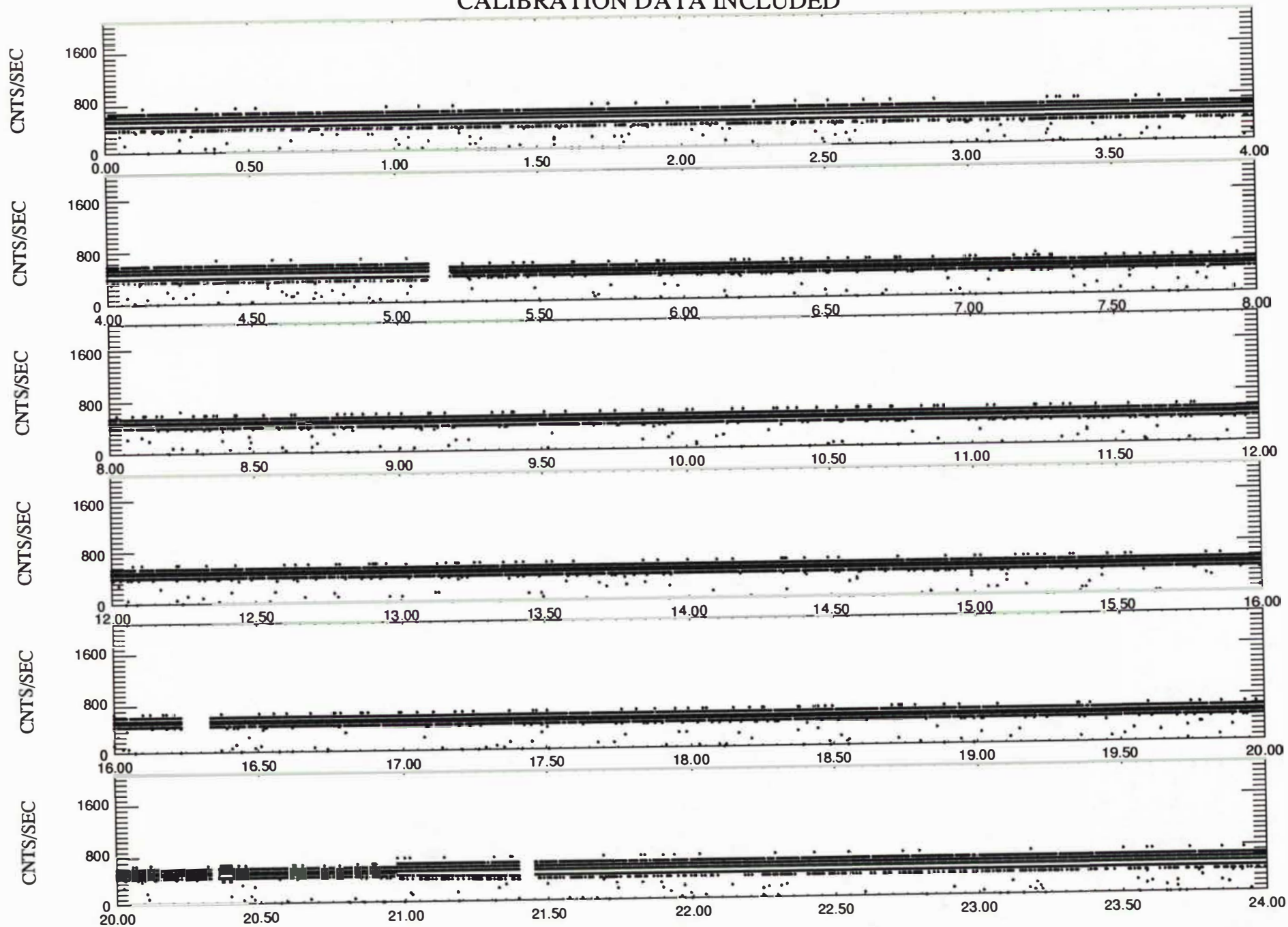
Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare

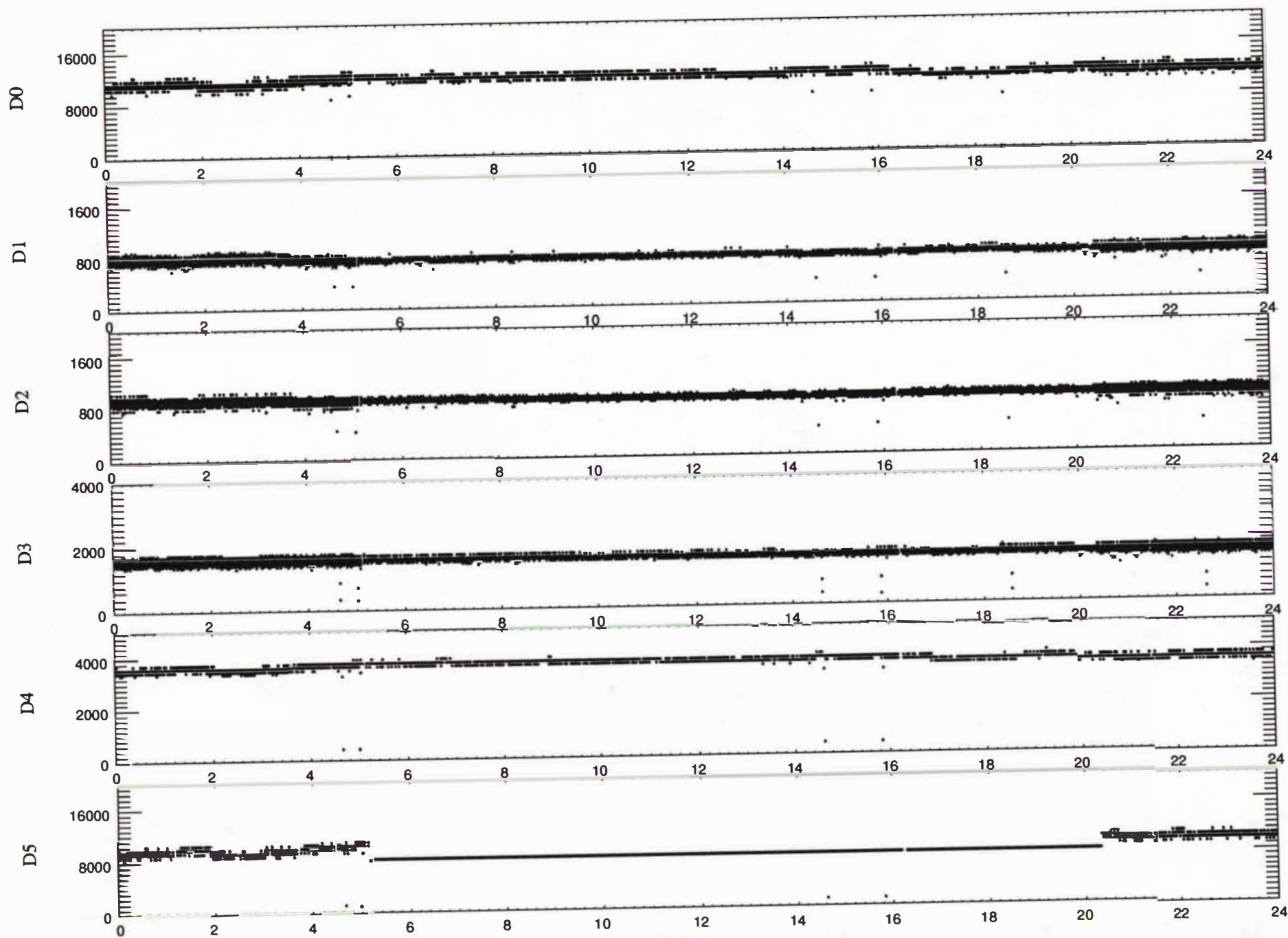
NO BURST (12)



CALIBRATION DATA INCLUDED



UNIV! AL TIME



UNIV' AL TIME

From: SAHI@fender.msfc.nasa.gov
Date: Mon, 19 May 1997 14:23:48 -0500 (CDT)
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970519142348.21e0b01d@fender.msfc.nasa.gov>
Subject: Crossing Windows for BATSE Burst 6234
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6234
EVENT OF 1997 MAY 17 DAY OF YEAR=137
EVENT CROSSING TIME AT BATSE : 1139. S. OR 00:18:59.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 334.000 17.000
BATSE PEAK COUNTING RATE: 2500 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 17/ 5/ 97 IS:
RA= 150.904 DEC= 31.234 DIST= 5.039 AU
BATSE-ULYSSES DISTANCE = 753770061. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 48.33 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 1671.75 SECS.
CROSSING TIME AT ULYSSES IS 2811. S. OR 00:46:50 +/- 401.44 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 17/ 5/ 97 IS:
RA= 170.297 DEC= 5.680 DIST= 0.923 AU
MARS-BATSE DISTANCE = 138011920. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 27.82 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 407.16 SECS.
CROSSING TIME AT MARS IS 1546. S. OR 00:25:46 +/- 43.48 SECONDS

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6234	970517	10585	01139	2500	334	+17	30

BATSE BURST TRIGGER

NO.: 6234

TIME: TJD=0585 SECONDS=1139

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=42 AZIMUTH=332.5 ERROR=4.6 DEGREES

COMMENTS:

1. SINGLE PULSE WITH SUBSTRUCTURE, DUR.~30 SECS. NOT VISIBLE ABOVE 300 KEV.

BATSE BURST# 6234

ULYSSES RT

19 / 5 / 97

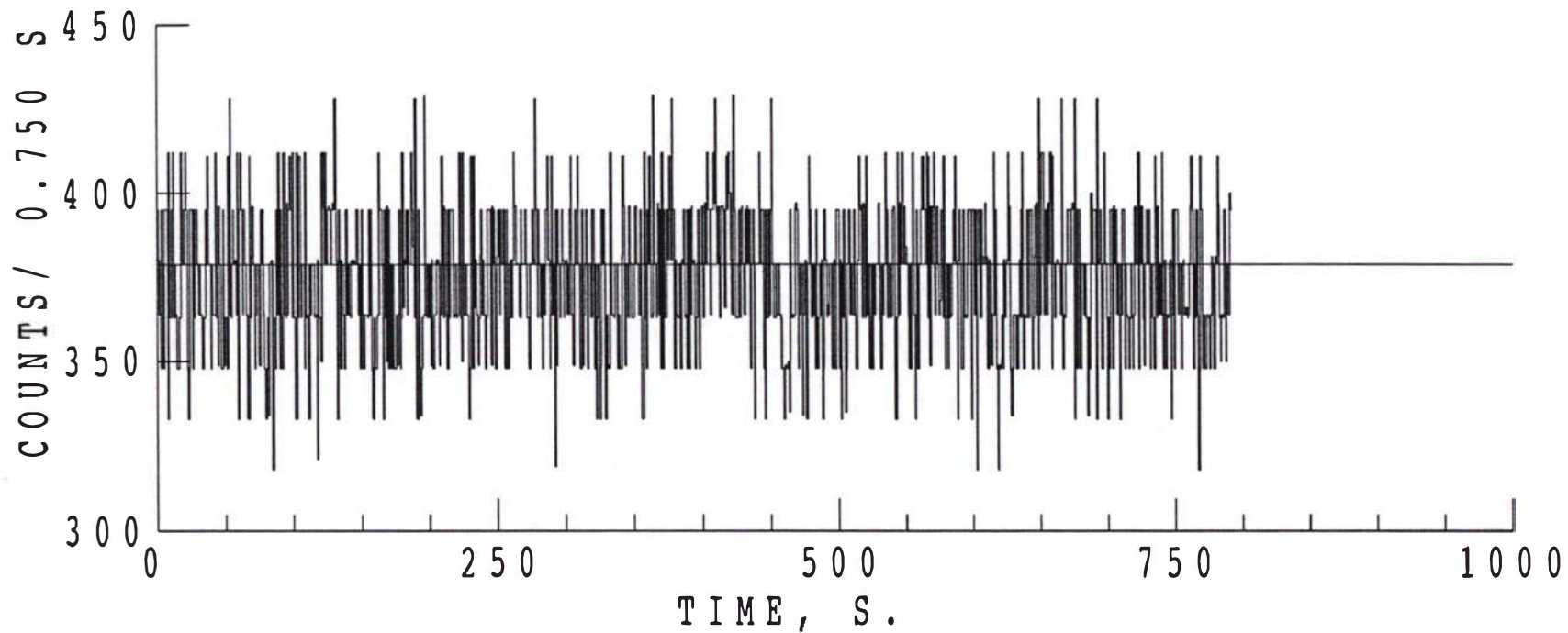
17 / 5 / 97 2412.069 s

0.250 S INTERVALS REGROUPED BY 3

0 - 0 keV

N= 10 M=10
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



From SAHI@fender.msfc.nasa.gov Mon May 19 12:27 PDT 1997
Return-Path: <SAHI@fender.msfc.nasa.gov>
Received: from FENDER.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id MAA24525; Mon, 19 May 1997 12:27:26 -0700
From: SAHI@fender.msfc.nasa.gov
Date: Mon, 19 May 1997 14:26:57 -0500 (CDT)
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970519142657.21e0b01d@fender.msfc.nasa.gov>
Subject: Crossing Windows for BATSE Burst 6235
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6235
EVENT OF 1997 MAY 17 DAY OF YEAR=137
EVENT CROSSING TIME AT BATSE : 32682. S. OR 09:04:42.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 112.000 -15.000
BATSE PEAK COUNTING RATE: 100000 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 17/ 5/ 97 IS:
RA= 150.900 DEC= 31.191 DIST= 5.045 AU
BATSE-ULYSSES DISTANCE = 754749417. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=120.60 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-1281.49 SECS.
CROSSING TIME AT ULYSSES IS 31401. S. OR 08:43:20 +/- 406.77 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 17/ 5/ 97 IS:
RA= 170.297 DEC= 5.680 DIST= 0.923 AU
MARS-BATSE DISTANCE = 138011920. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION=118.65 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -220.74 SECS.
CROSSING TIME AT MARS IS 32461. S. OR 09:01:01 +/- 66.79 SECONDS

BATSE BURST TRIGGER

NO.: 6235

TIME: TJD=0585 SECONDS=32682

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=176.5 AZIMUTH=201.9 ERROR=0.04 DEGREES

COMMENTS:

BURST, SINGLE PULSE WITH SPIKEY SUBSTRUCTURE, DUR.~7 SECS.
VISIBLE ABOVE 300 KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6235	970517	10585	32682	100000	112	-15	7

Helio corr removed 18/2/00

Date: Mar 30 '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?

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
- ☒ 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

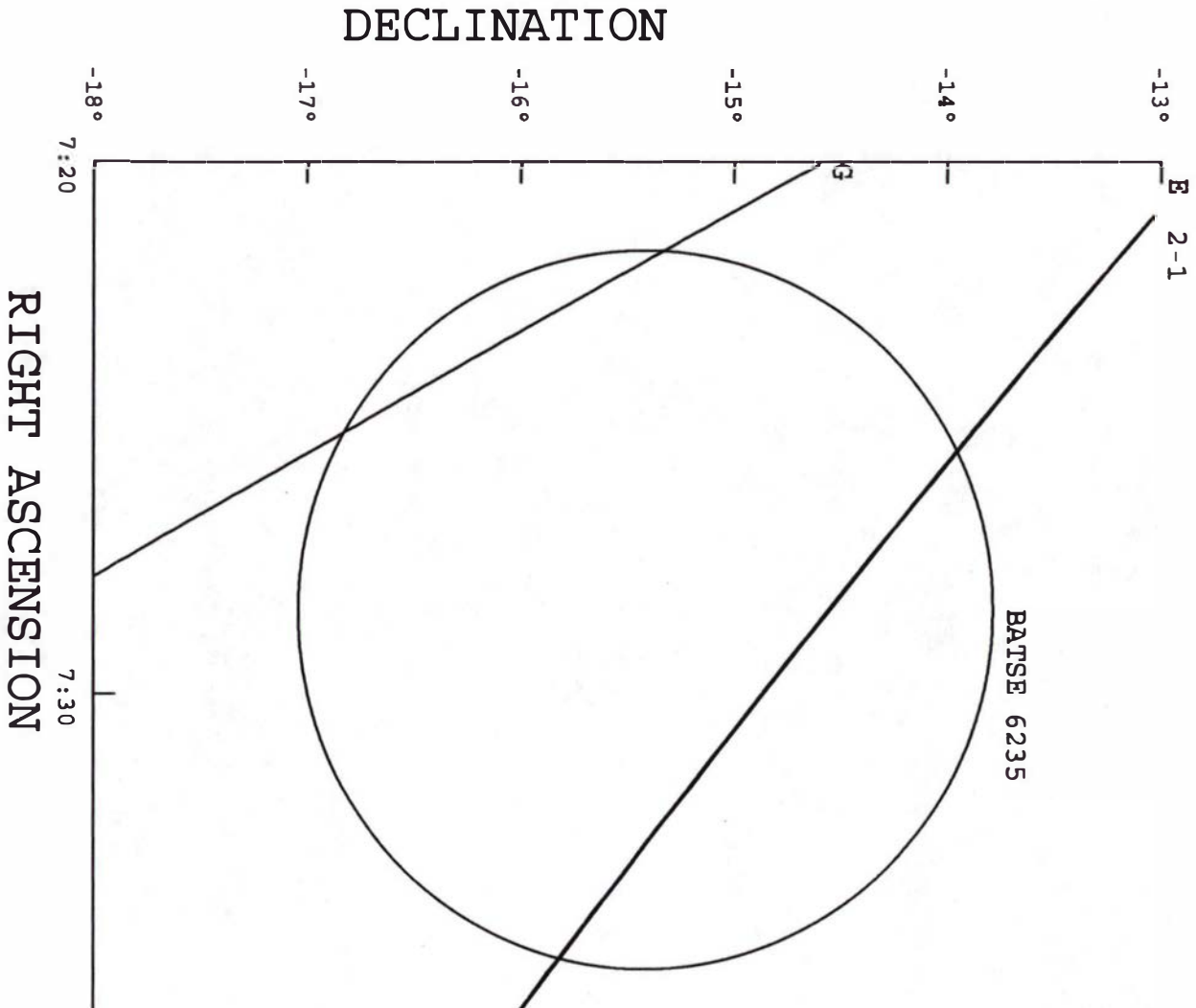
3. PVO Data

- ☐ 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 MAY 17, 1997 8:43

18 / 2 / 0



BATSE

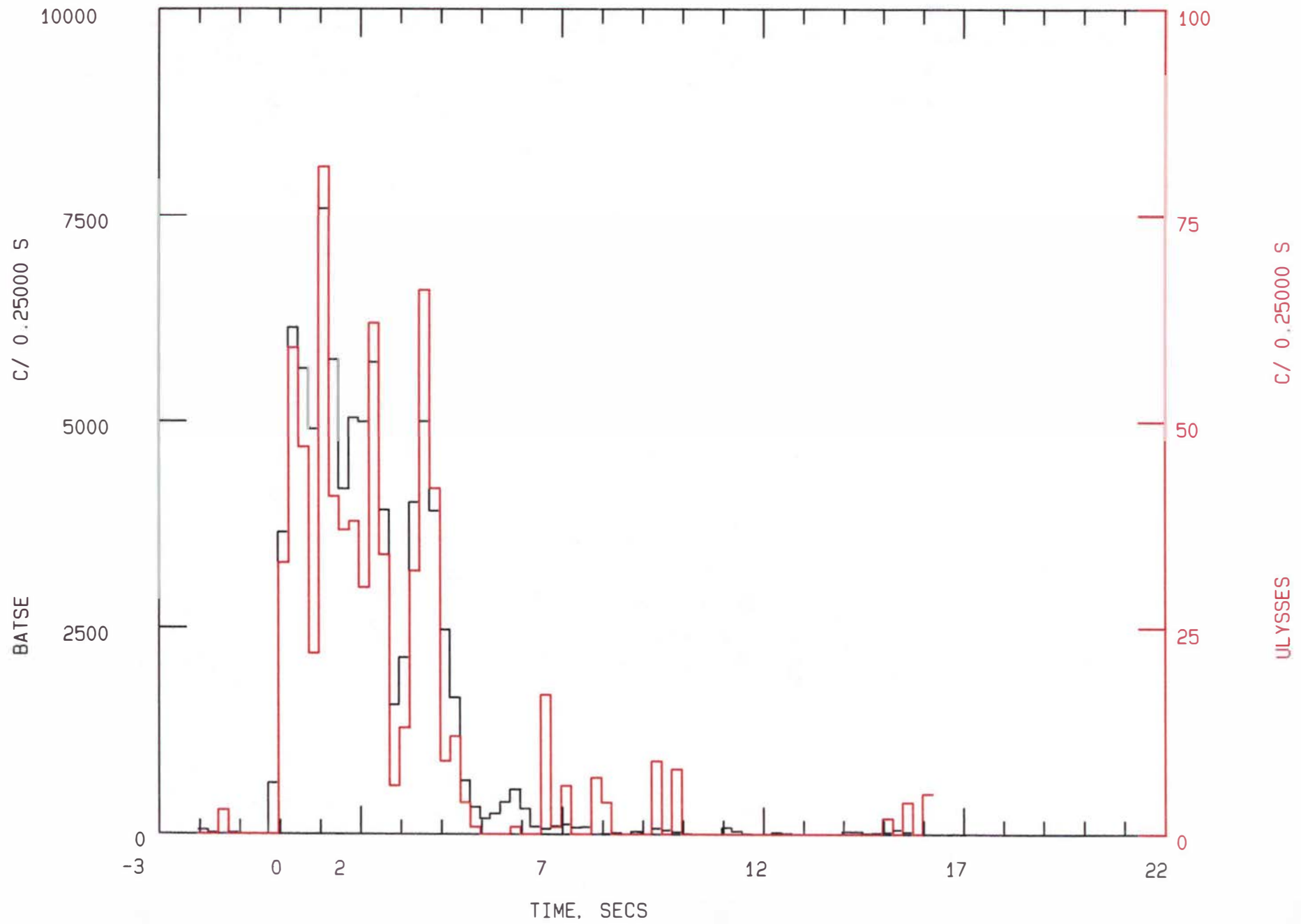
-ULYSSES

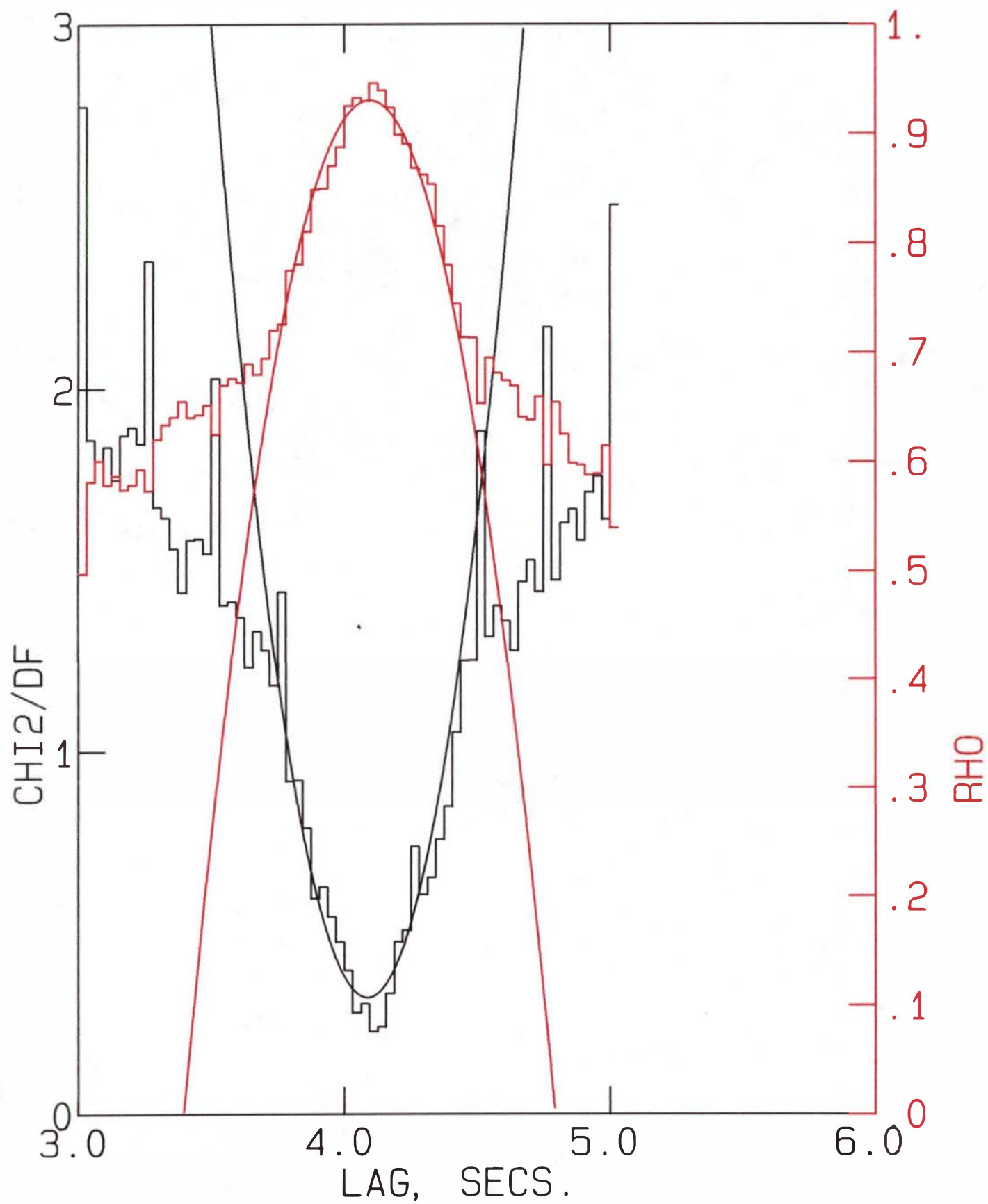
CORRELATION

17/ 5/97

32682.314

30/ 3/98





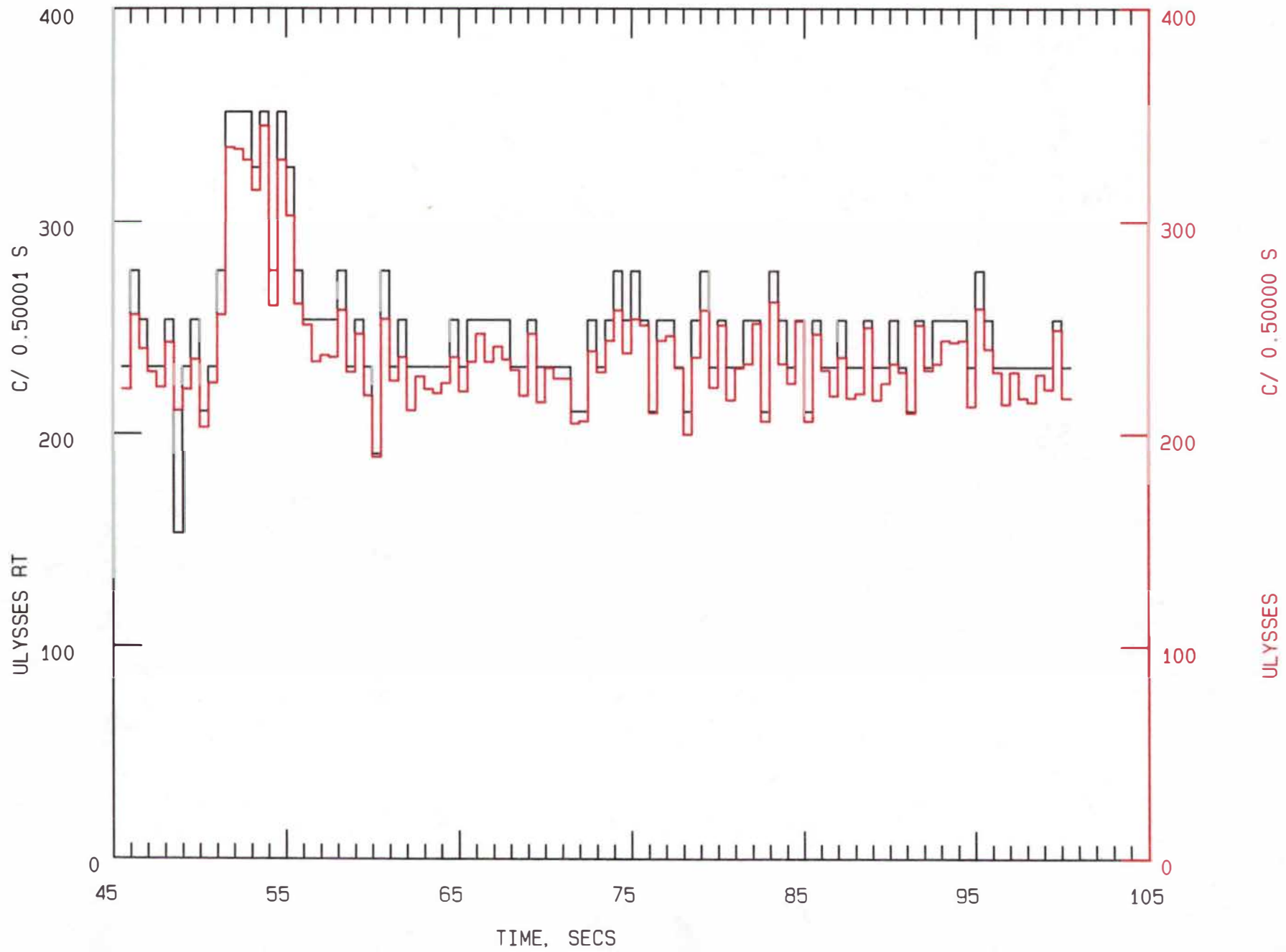
ULYSSES RT-ULYSSES

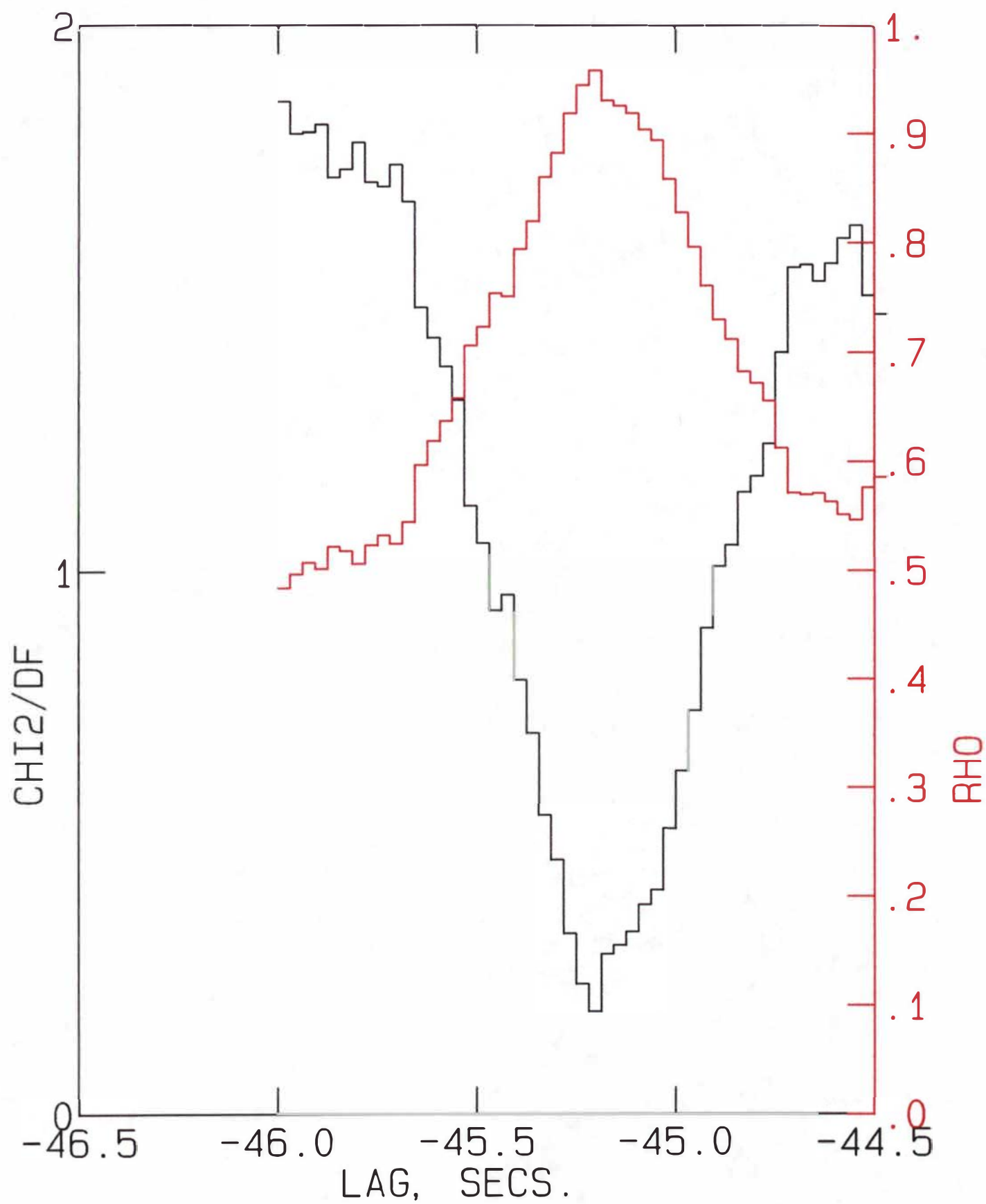
CORRELATION

17/ 5/97

31351.750

30/ 3/98

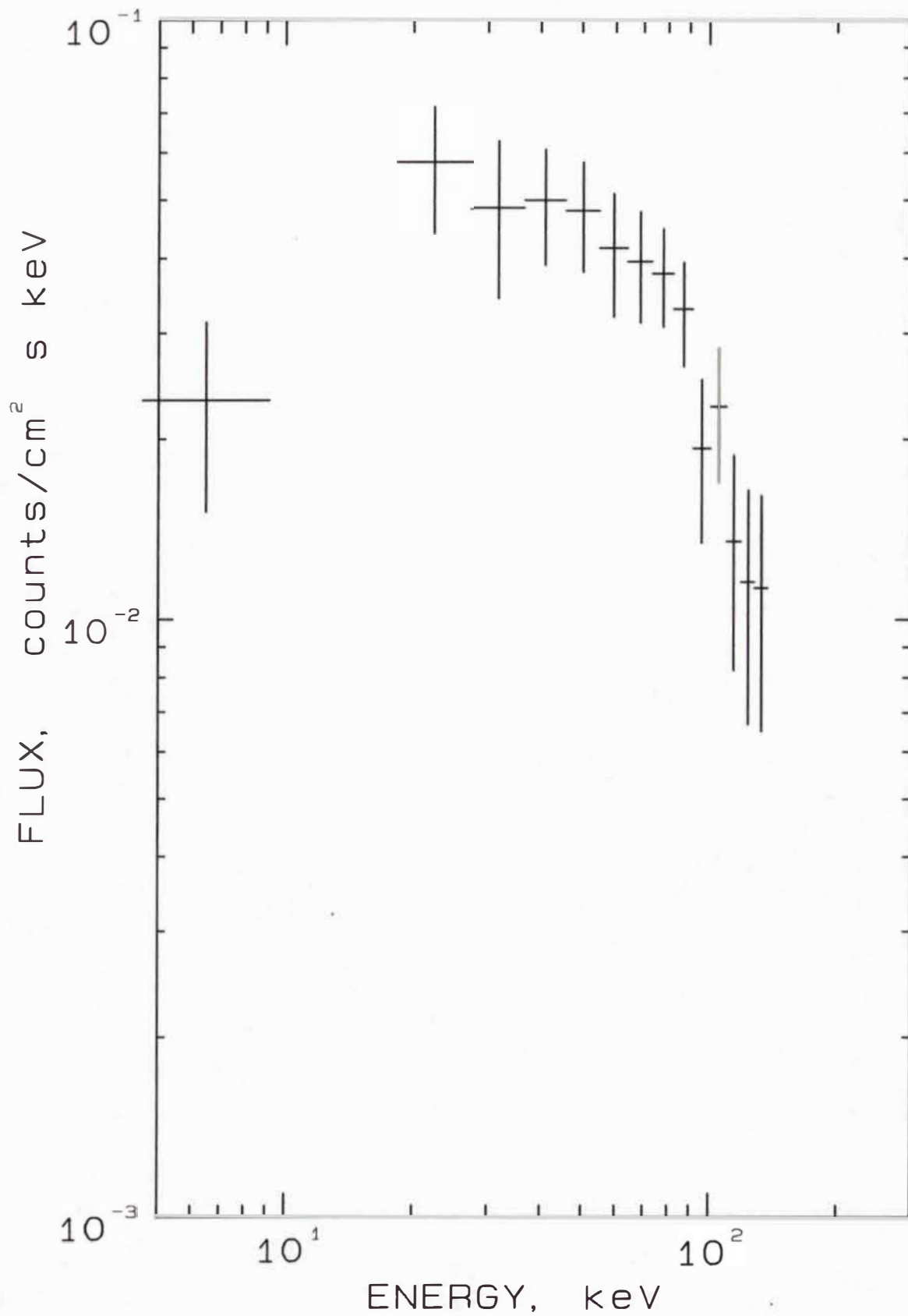




ULYSSES 17/05/97 31404.613

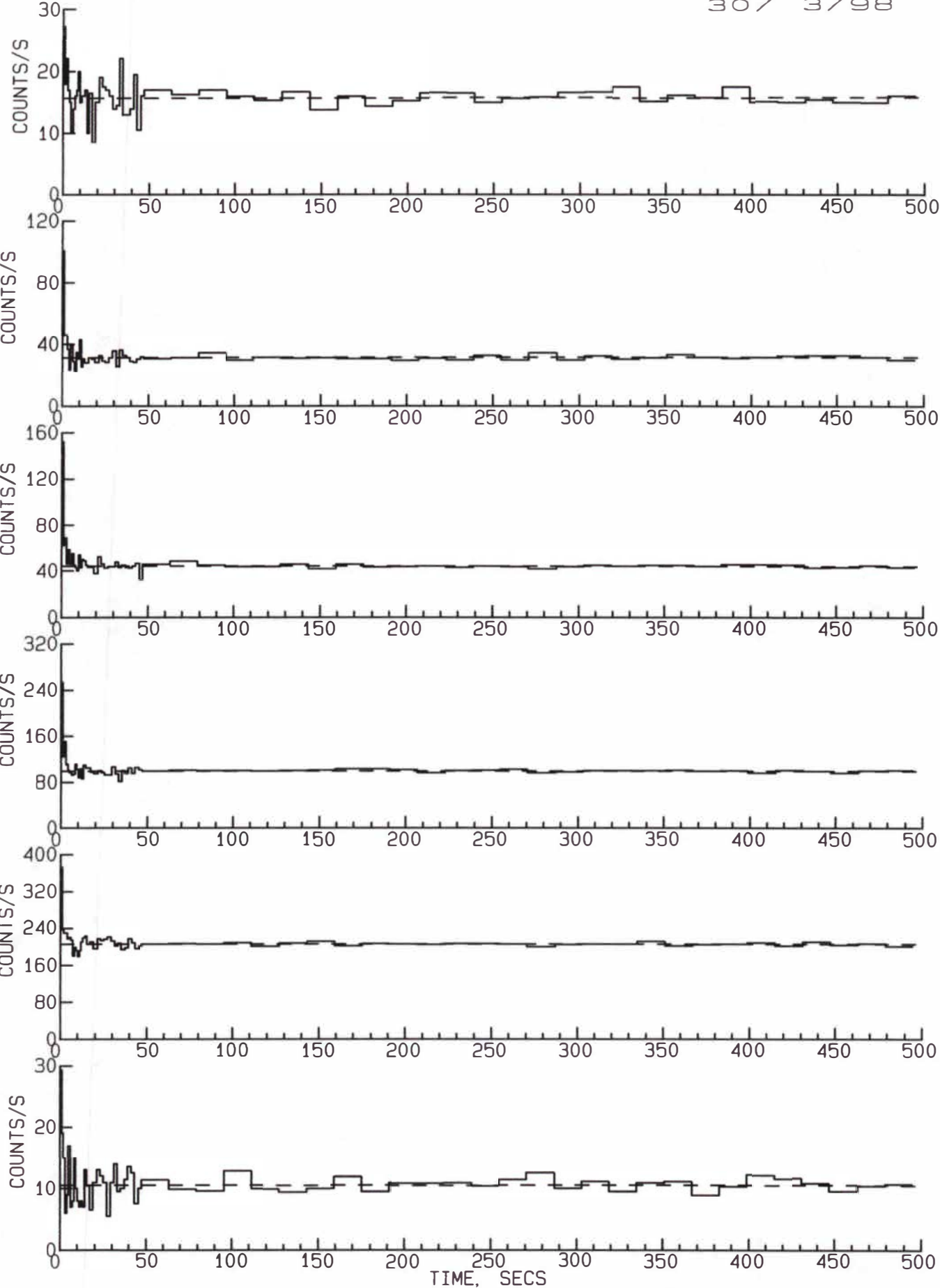
30/ 3/98

SPECTRUM INTEGRATED OVER 20.9 SECONDS, INTERVALS 2 TO 20



ULYSSES 17/05/97 31404.613 BURST SPECTRAL COUNT RATES

4- 18 keV



30 / 3 / 98

ULYSSES

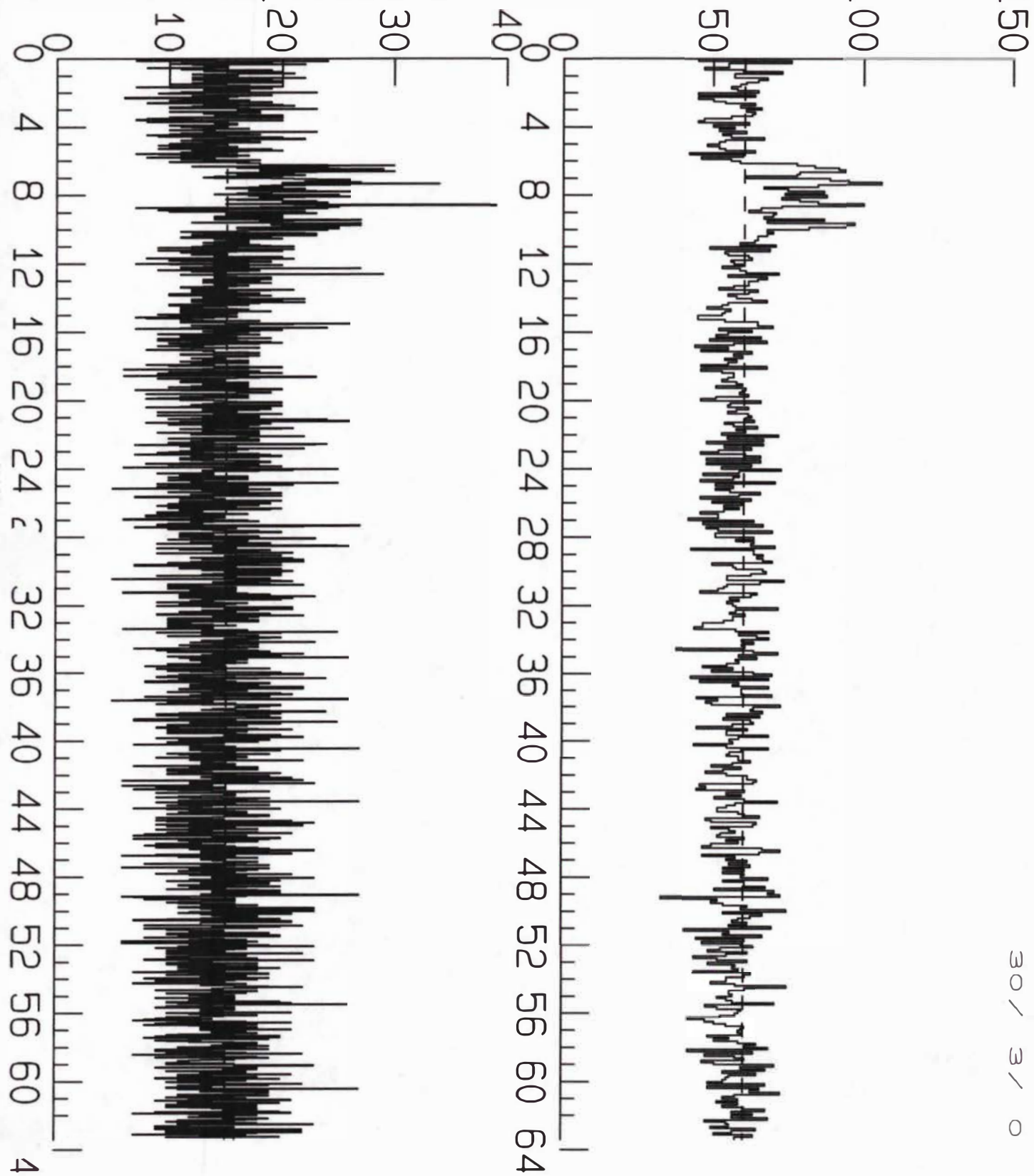
17/05/97

Ttrig=31404.374

21- 147 keV

COUNTS/0.031 S

COUNTS/0.125 S



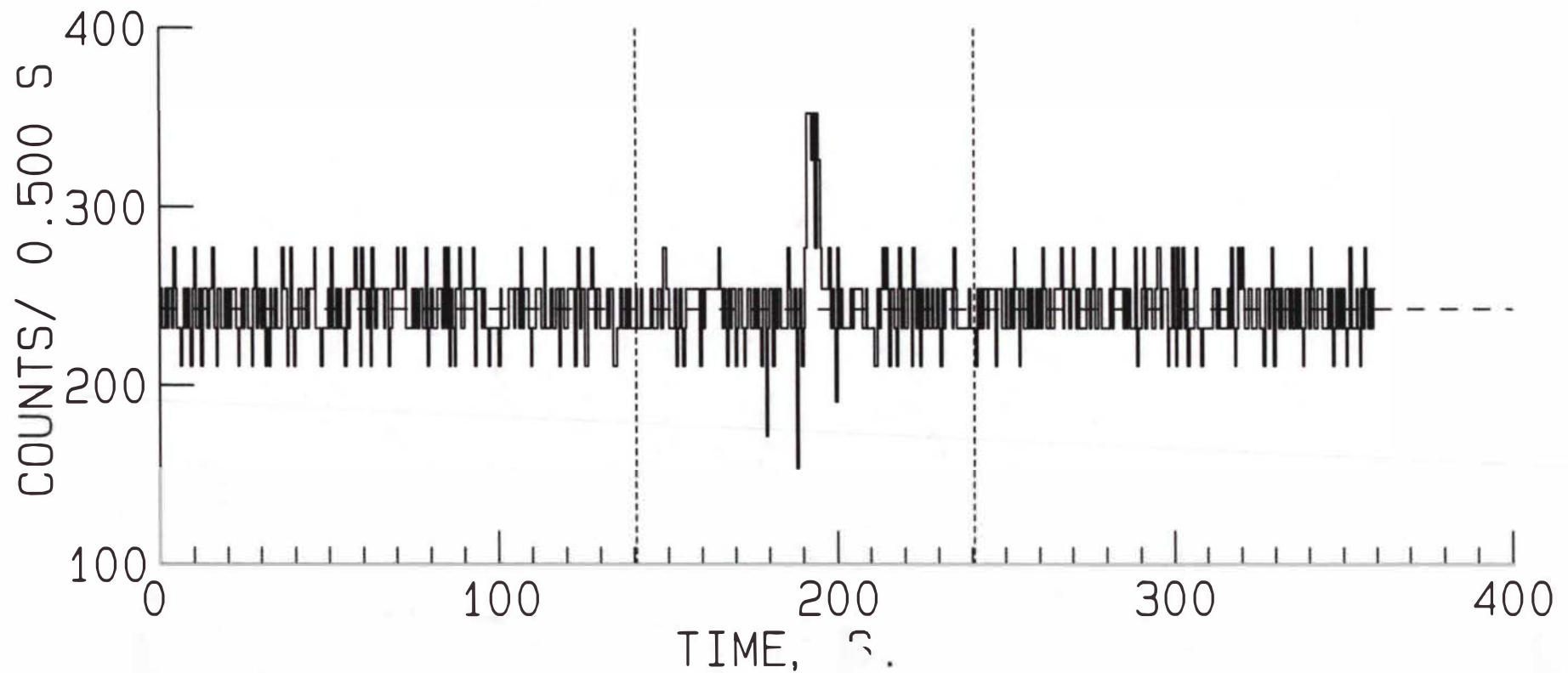
ULYSSES RT

30 / 3 / 98

17 / 5 / 97 31212.496 s

21- 147 keV

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



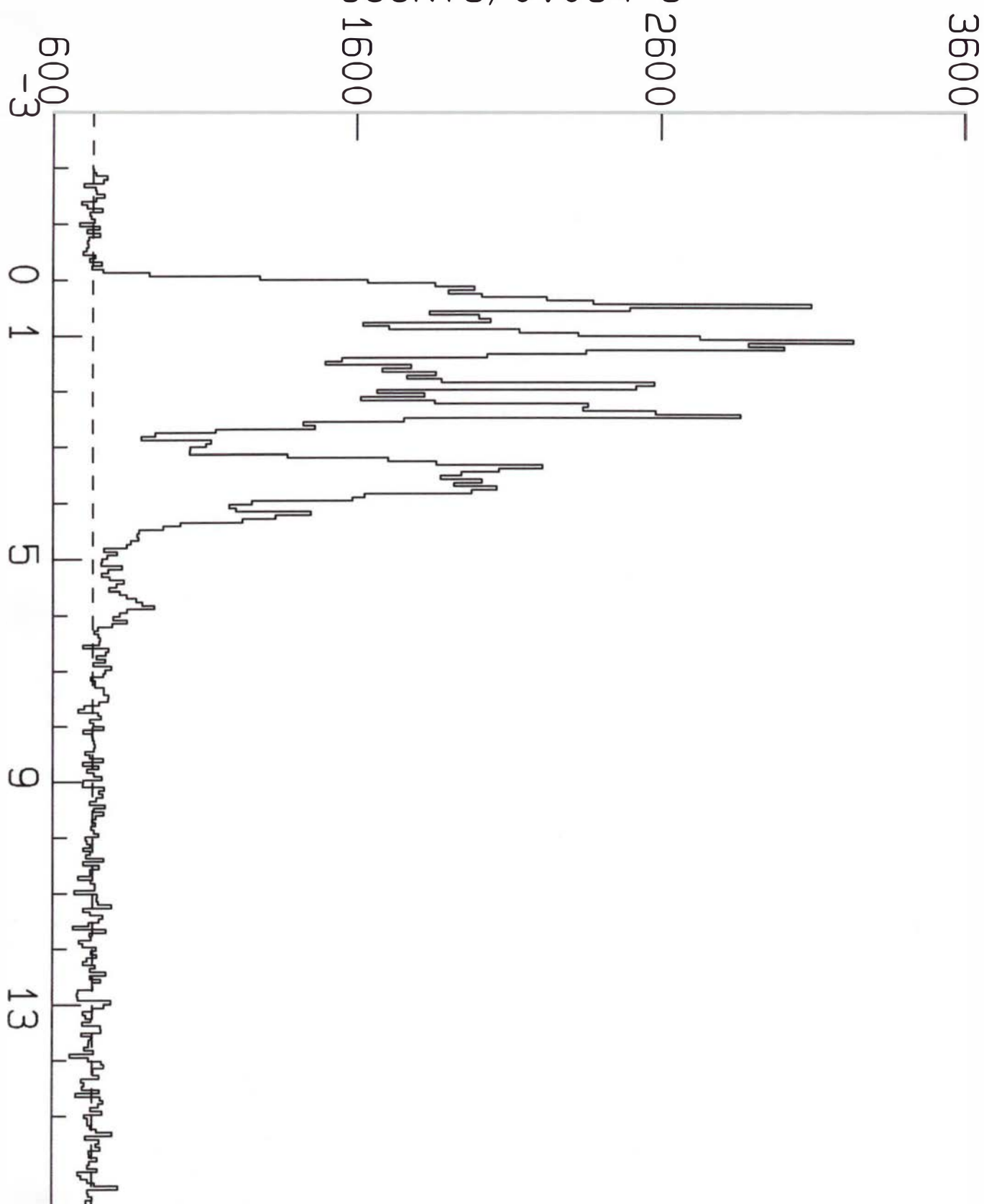
BATSE

17/05/97

32682.314

25- 100 keV

COUNTS/0.064 S



From yosimori@rikkyo.ac.jp Tue Dec 8 02:01 PST 1998
Date: Tue, 8 Dec 1998 19:00:54 +0900 (JST)
From: "M. Yoshimori" <yosimori@rikkyo.ac.jp>
To: khurley@sunspot.ssl.berkeley.edu
Subject: Yohkoh gamma-ray burst events

Dear Dr.Hurley,

Yohkoh recorded the following four gamma-ray burst events.

1. 1996 Nov.30 05:13:52 UT
2. 1997 May 17 09:13:52 UT
3. 1997 July 21 23:31:12 UT
4. 1998 Jan. 25 20:39:28 UT

If you obtained their locations, please let me know.

Thank you in advance for it.

Regards,

M.Yoshimori

YOHKOH

8 / 12 / 98

ULYSSES RT

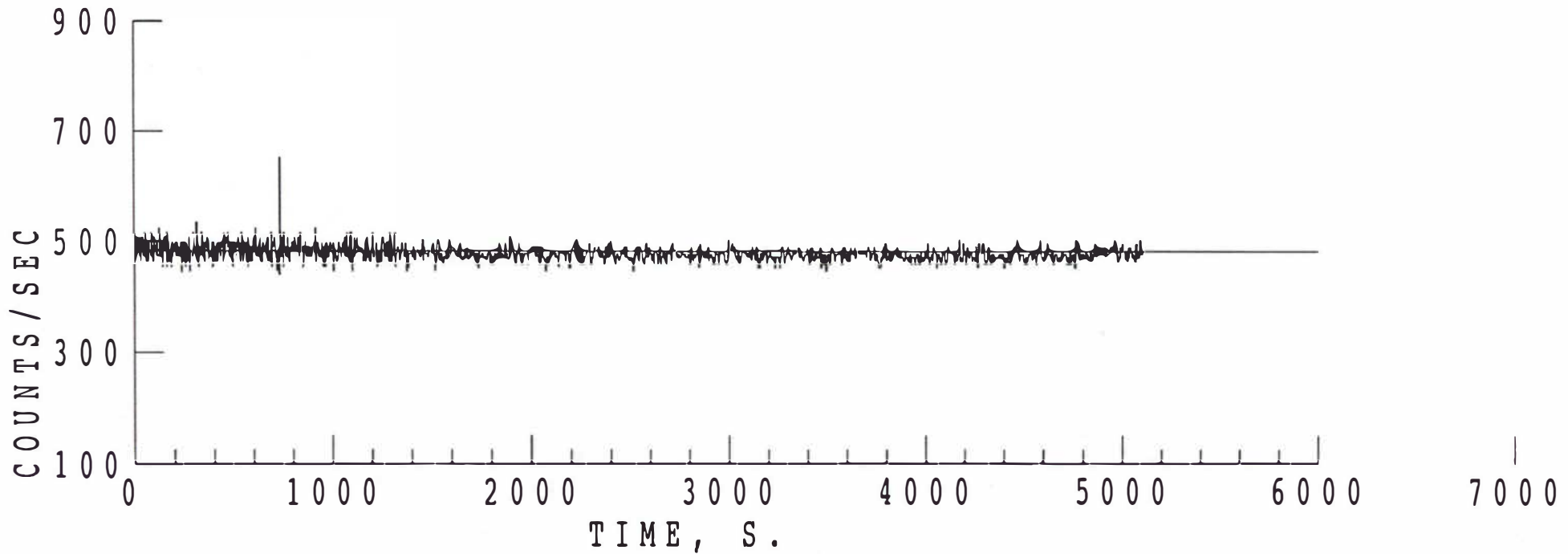
17 / 5 / 97 30672.490 s

INTERVALS REGROUPED BY 5

0 - 0 keV

N= 10 M= 10
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



HUS DATA

ULYSSES RT

19 / 07 / 05

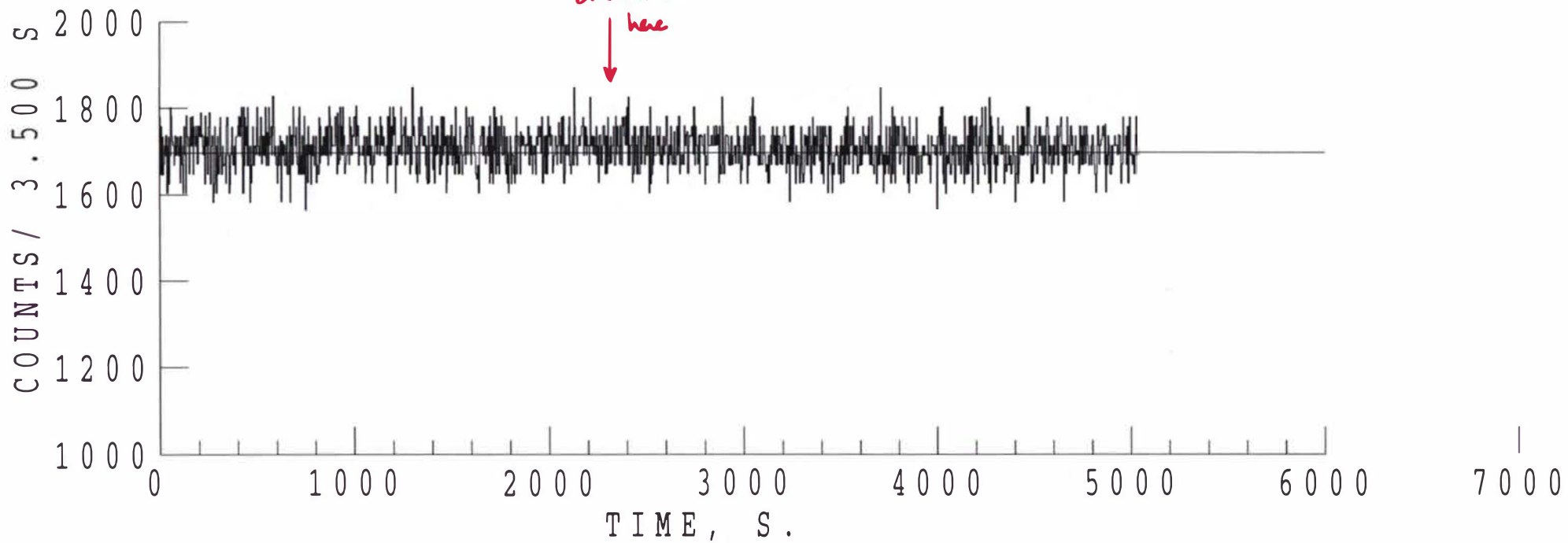
17 / 05 / 97 43848.145 s

0.500 S INTERVALS REGROUPED BY 7

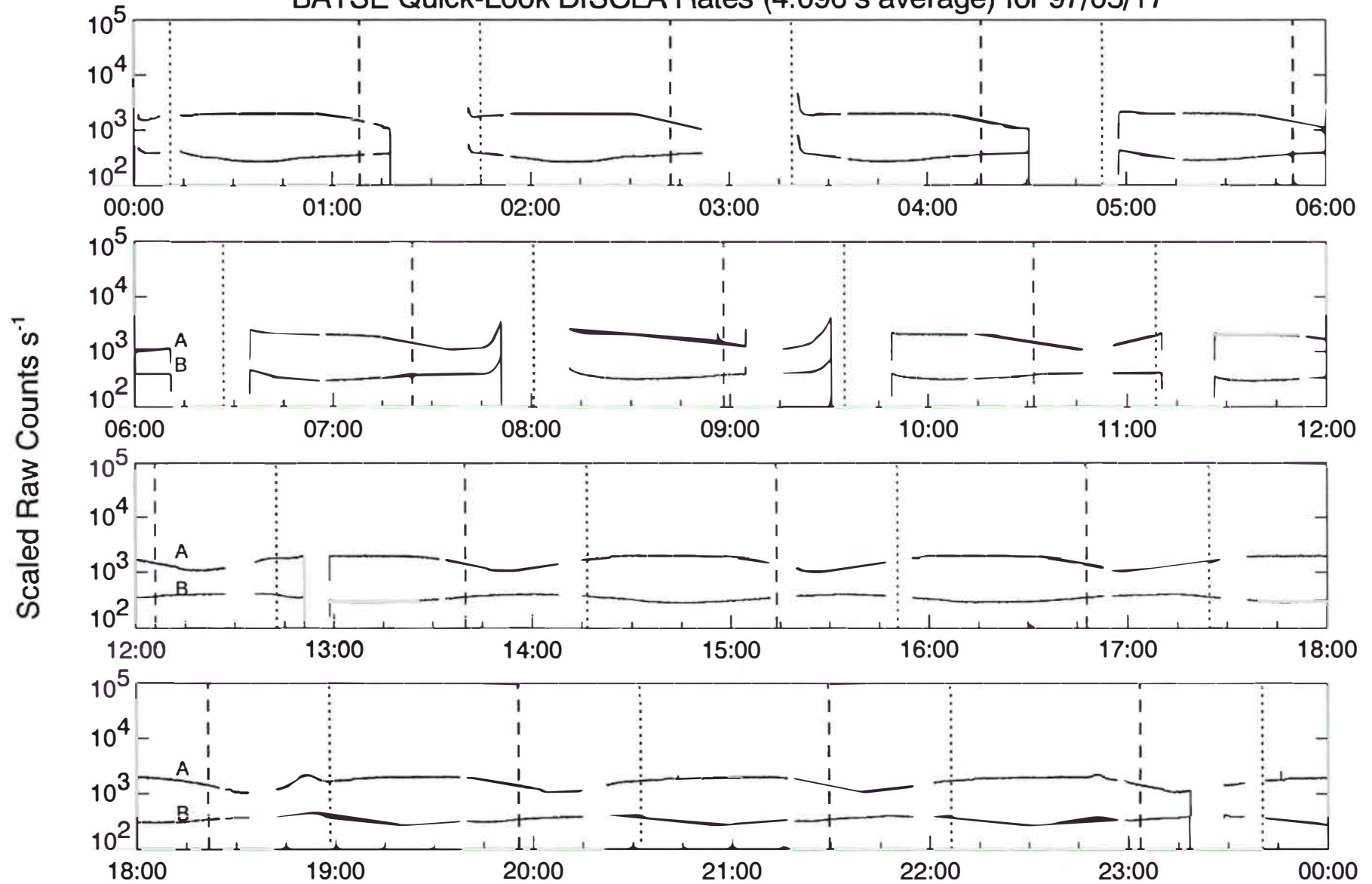
0 - 0 keV

N= 10 M= 10
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



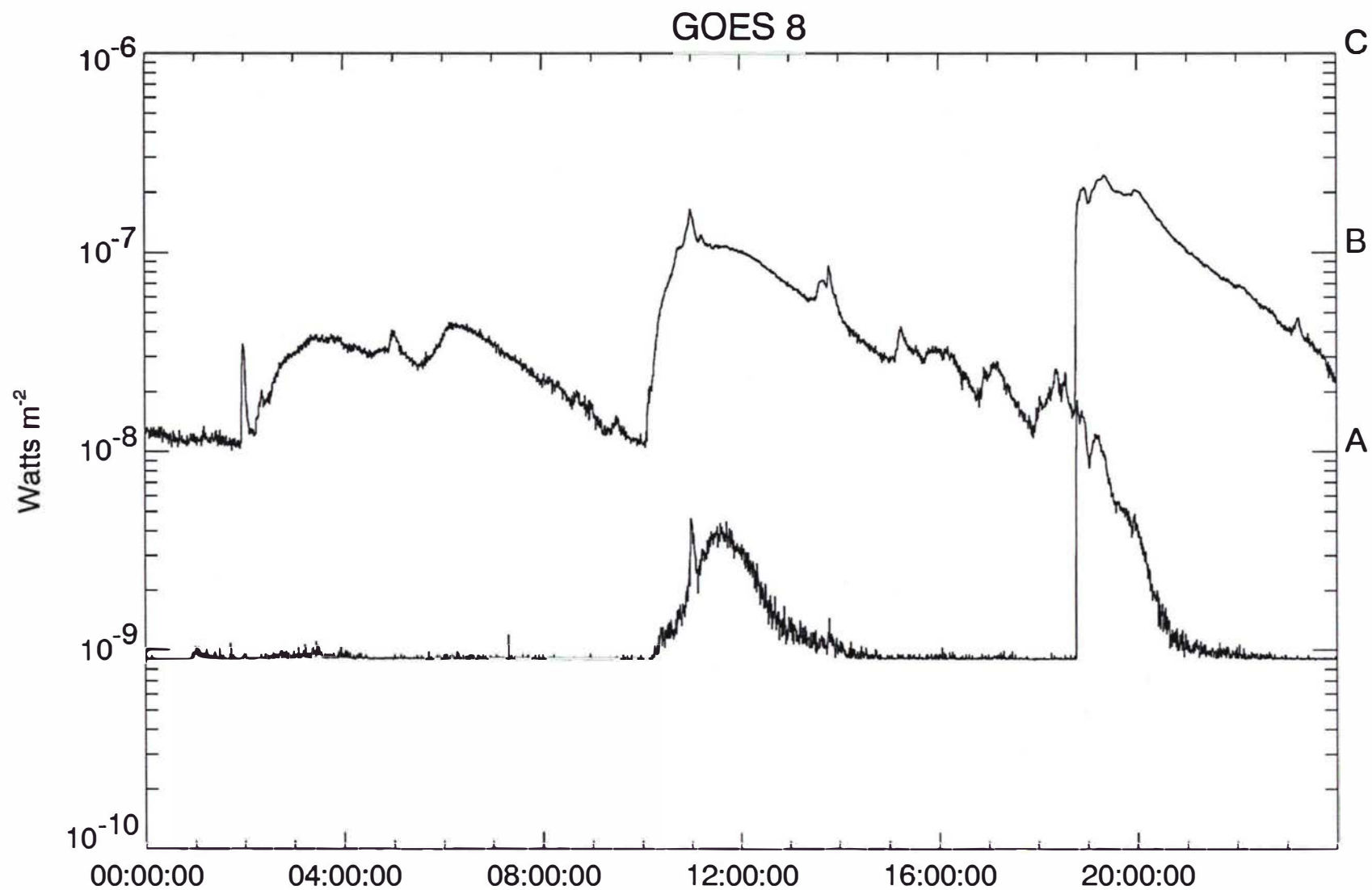
BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/17



Current Time: 97/05/21, 1008 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare



Data Start: 97/05/17, 0000:00

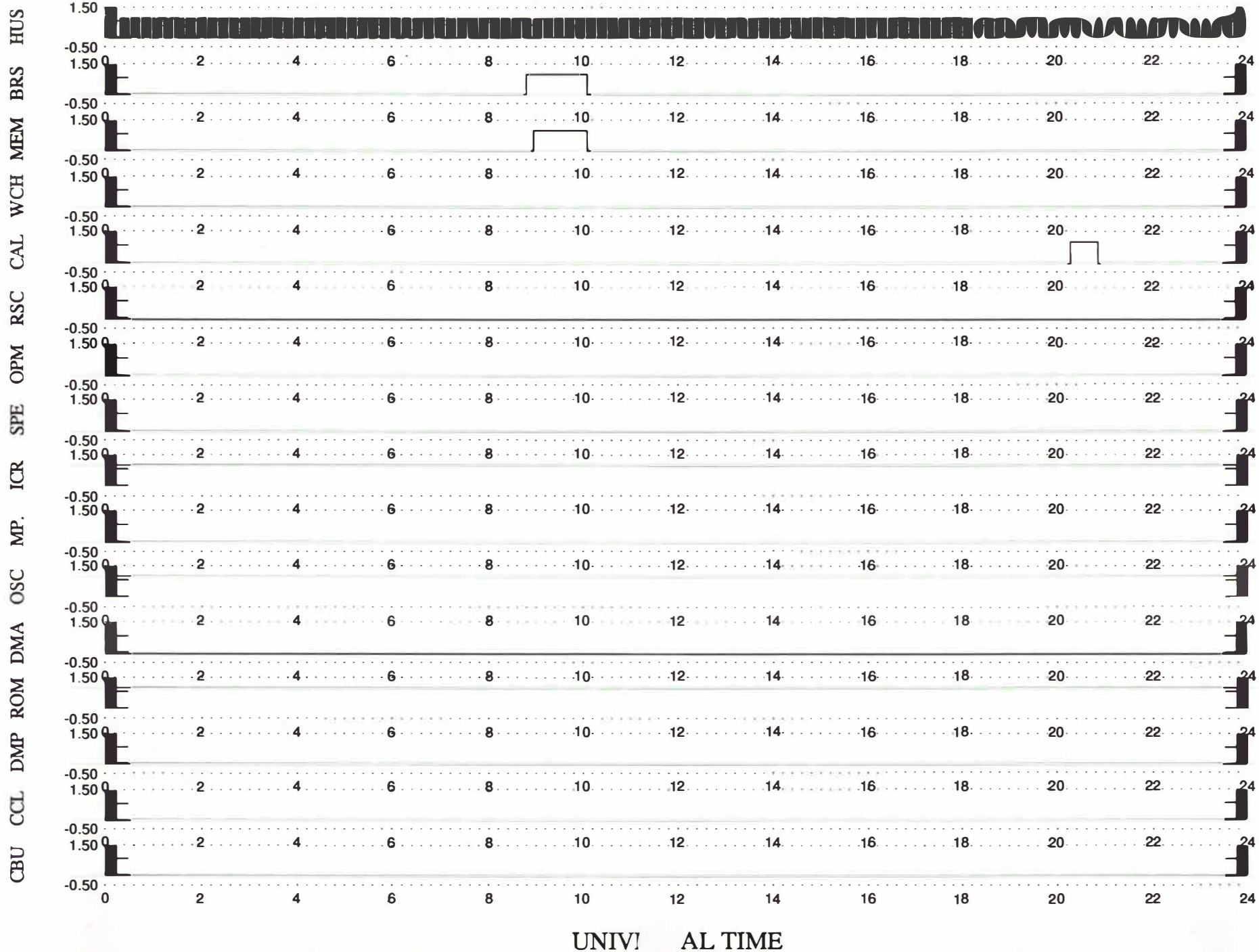
Plot created: 97/05/21, 1007

Channel

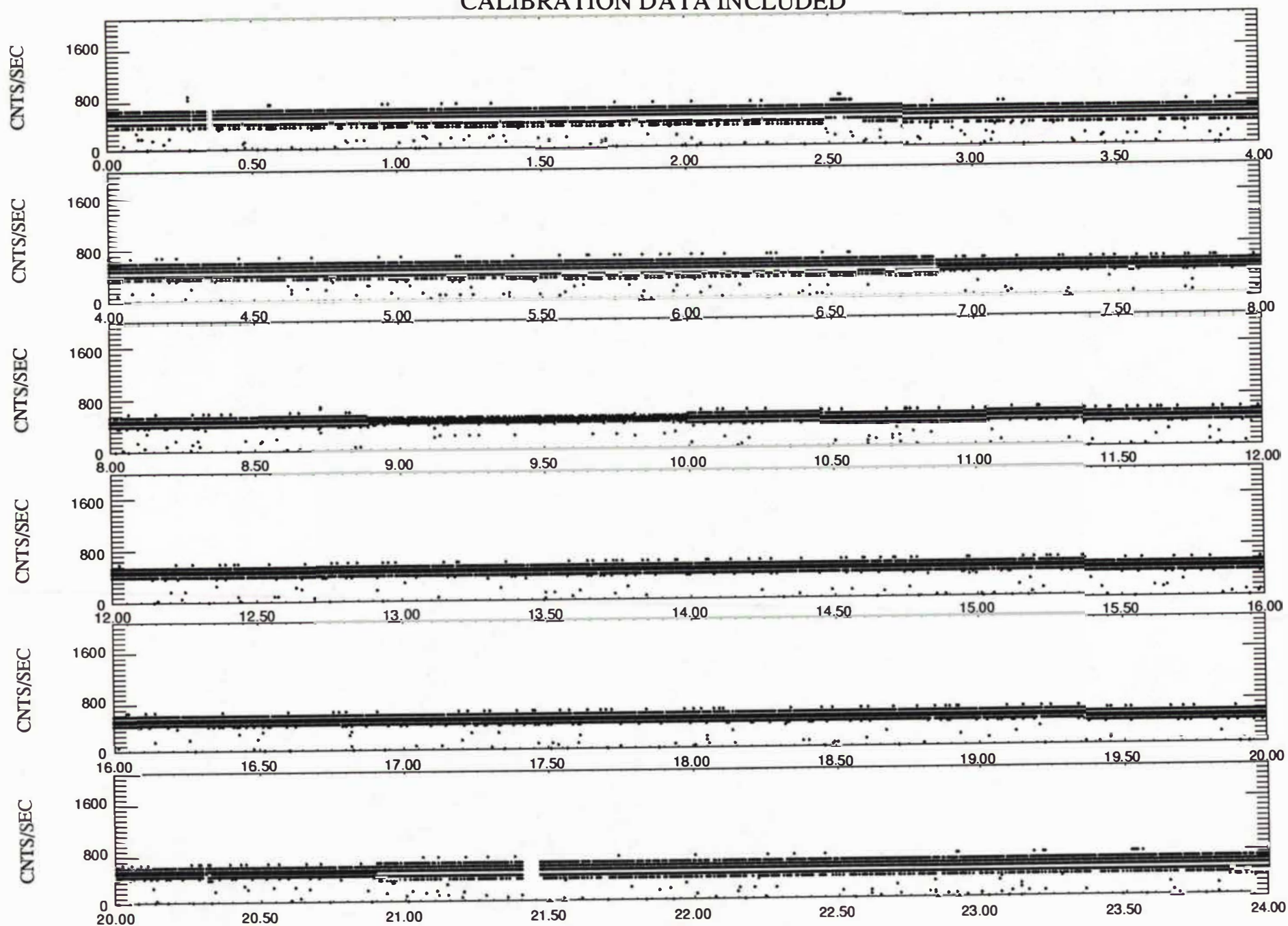
1 (1.0 - 8.0 Angstroms)
2 (0.5 - 4.0 Angstroms)

Background not subtracted
Background not subtracted
Sample average = 10

BURST NUMBER 13

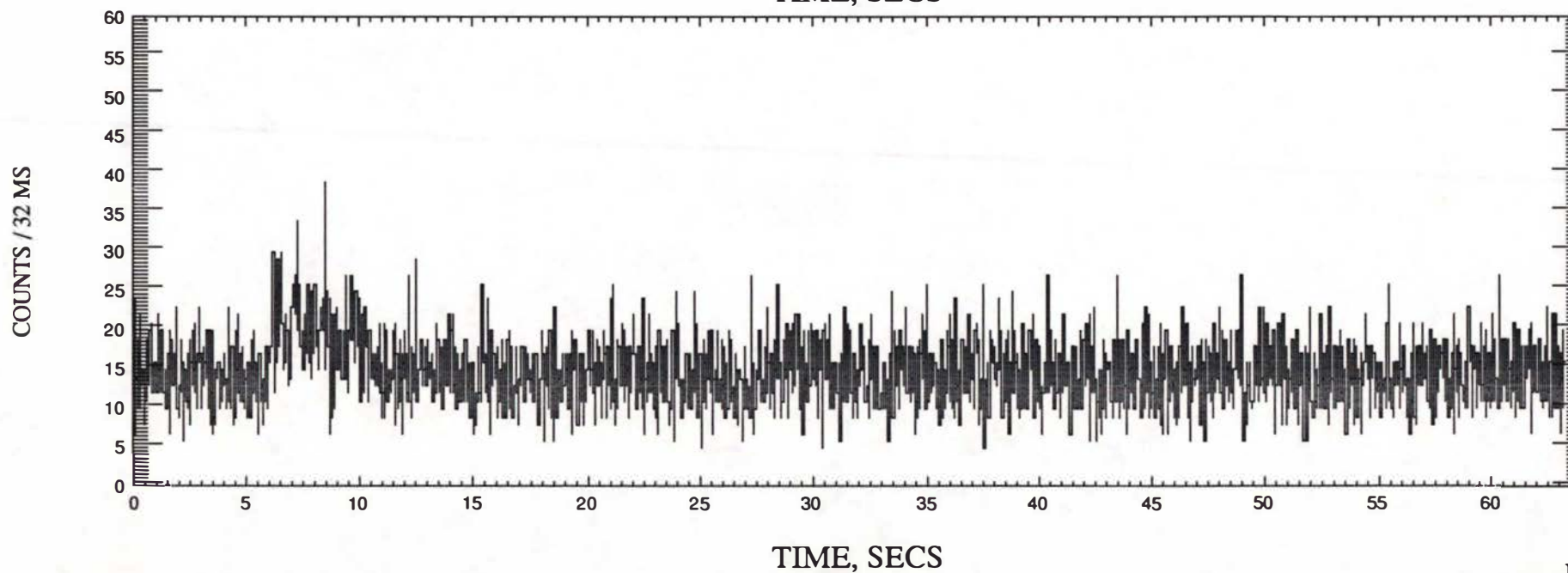
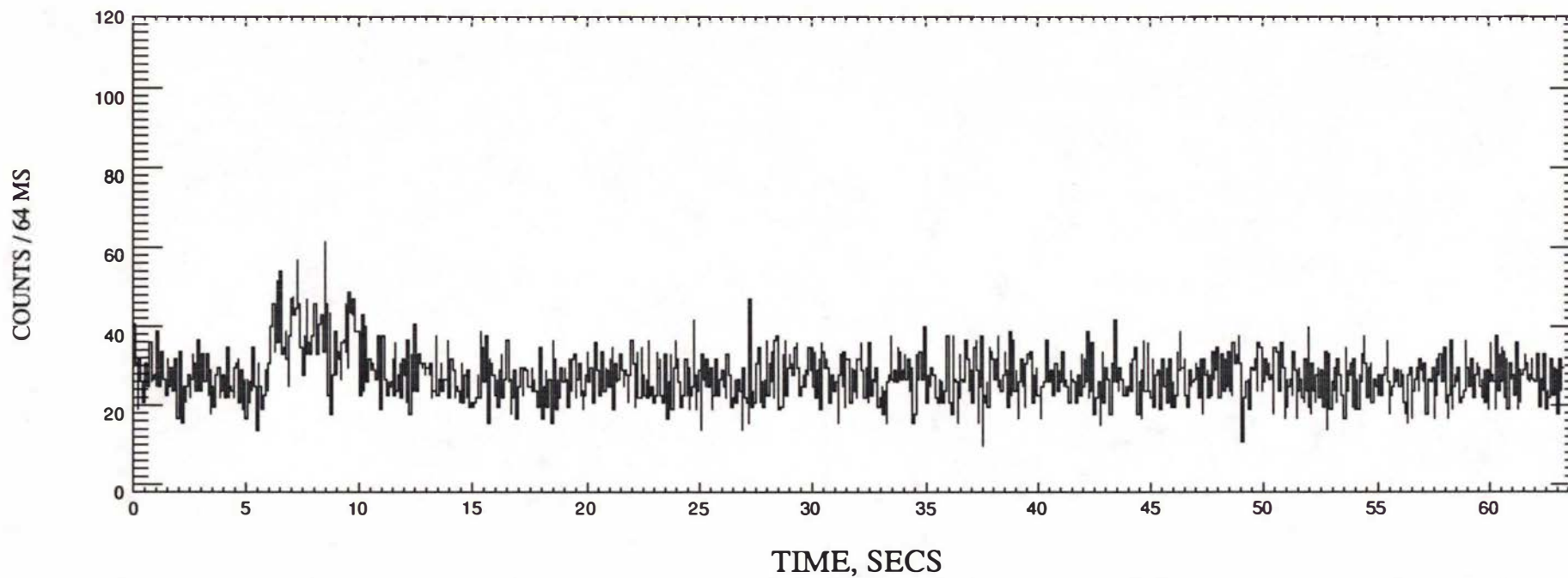


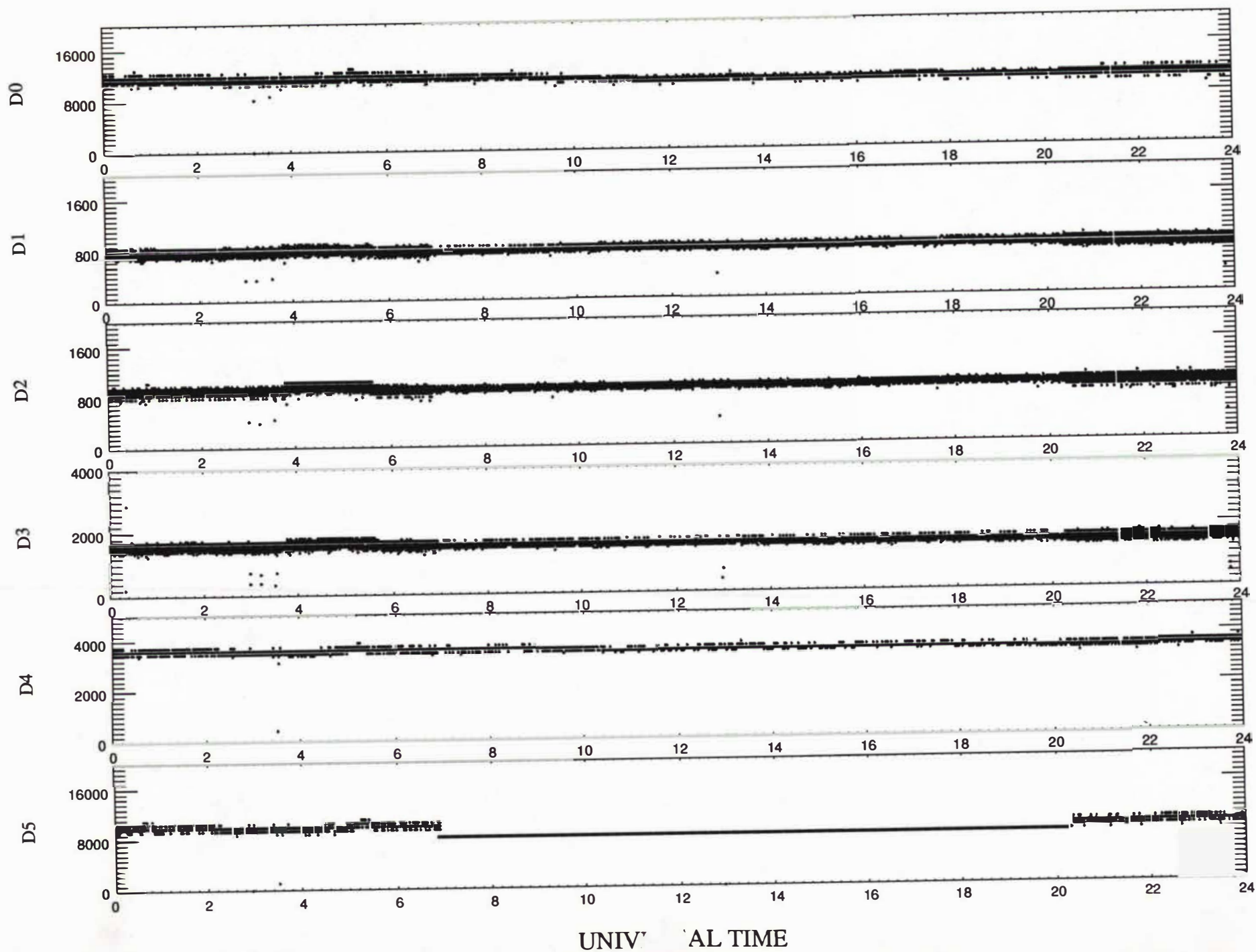
CALIBRATION DATA INCLUDED



UNIV' AL TIME

Burst Counter 13 at UT= 8.723503693475 h=31404.613 s 08:43:24.613





Date: Mar 28 2007

BURST TRIANGULATION CHECKLIST

1. Ulysses Data

- ☒ Jim Schmidling's stat file correction applied?
- ☒ Final ephemeris used?
- ☒ Final, CDROM data used?
- ☒ Is the order of the data in CORREL such that a vernier is done on the data with the best time resolution?

2. For Konus events

- ☒ Konus ecliptic latitude used with latest calibration?

2. For Odyssey events *N/A*

- ☐ Was CHECKMO run to eliminate data gaps?
- ☐ Did the Odyssey ephemeris correspond to the event time? (When there is data in the database, the ephemeris is for the start of record, usually ~1320 s prior to the request time; when there is no data in the database, the ephemeris is for the request time in the e-mail, so the request time in mosearch should be equal to the GRB time. Note that the time in the return e-mail will be ~1320 s prior to the time requested, in the line "no HEND data...")
- ☐ Was Mars-blocking used?
- ☐ For cruise phase data (April – October 2001), was the updated data used? (Old data has timing errors)
- ☐ GRS database searched for triggered data? Database data between August 2005 and January 2006 should be re-extracted, due to timing errors. (E-mailed data should be OK).
- ☐ GRS and HEND data cross-correlated to check timing?

2. For 3 or More Spacecraft events *N/A*

- ☐ $\Sigma 3\Delta t$'s calculated, and/or BMAPSUM executed?

3. For INTEGRAL events *N/A*

- ☐ INTEGRAL SPI-ACS website checked for bursts that weren't transmitted automatically?
- ☐ 125 ms added to INTEGRAL SPI-ACS time for bursts prior to April 2 2004 11:00 UT?
- ☐ Updated ephemeris used for bursts prior to September 30, 2003?

-
- ☒ ACCESS and MBL4 databases updated?

N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

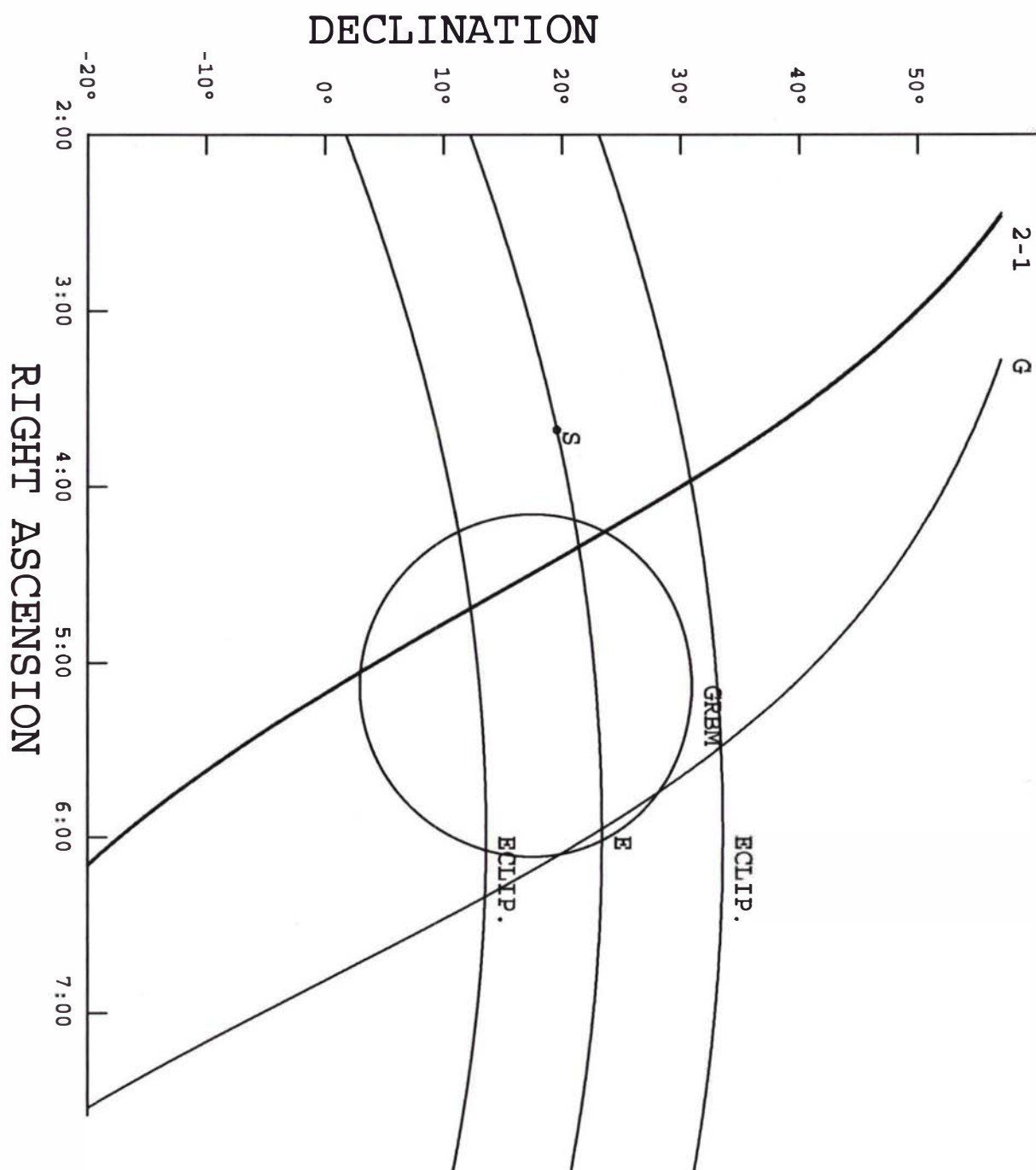
G=GALACTIC EQUATOR

1 KONUS

2 ULYSSES

EVENT OF MAY 18, 1997 7:05

28/ 3/ 7



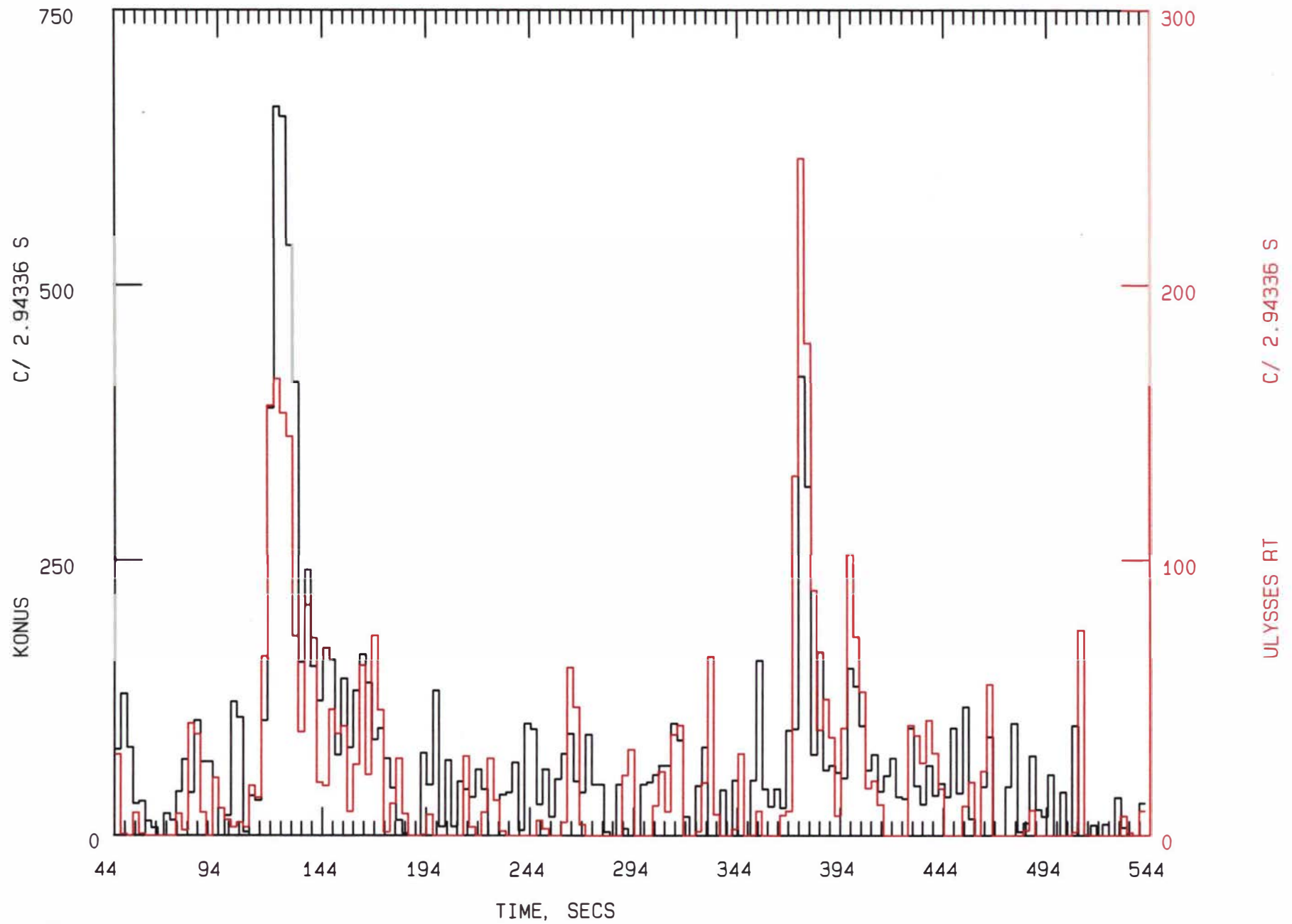
KONUS

-ULYSSES RT CORRELATION

18/05/97

25552.984

28/ 3/ 7

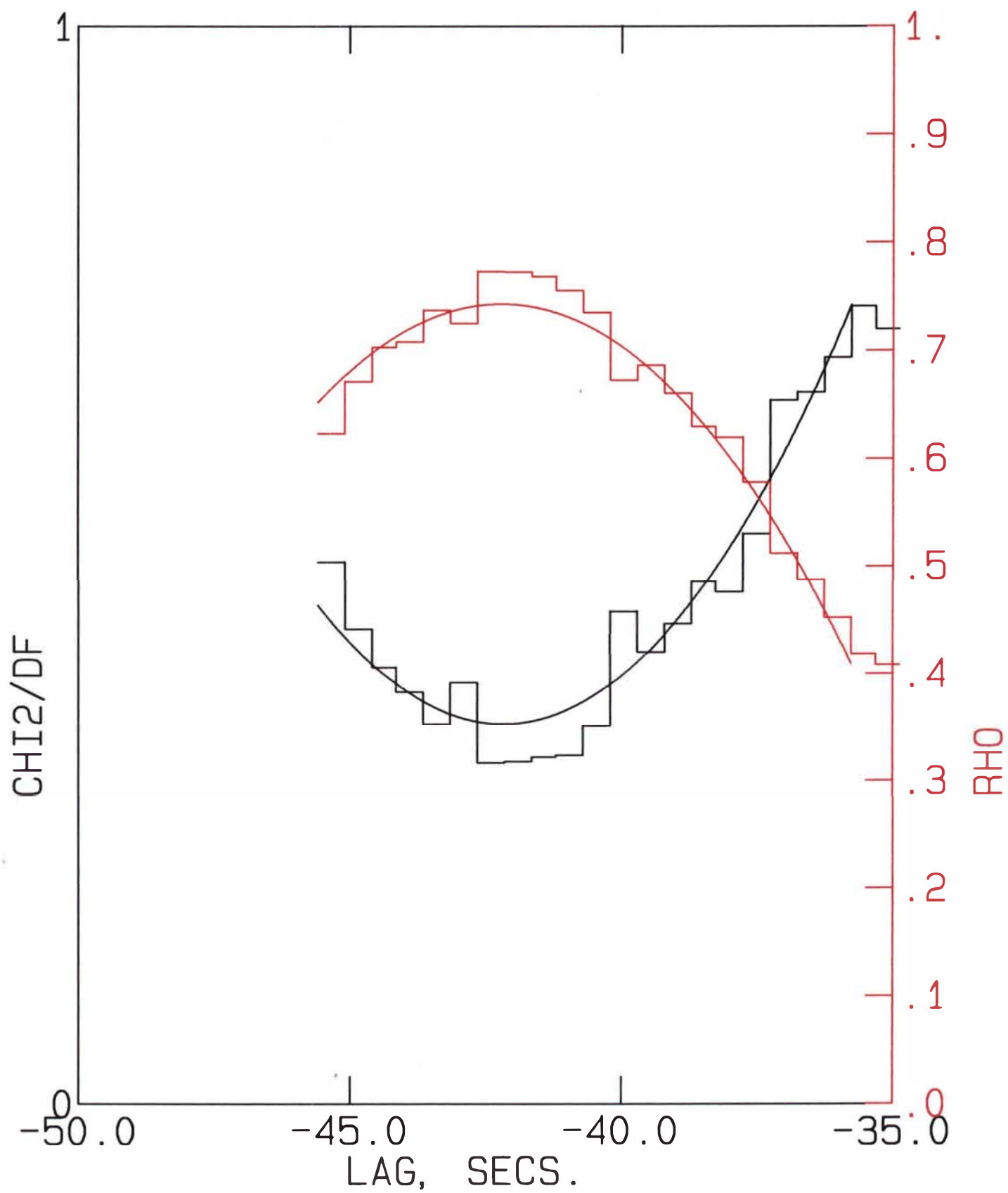


KONUS

-ULYSSES RT CORRELATION

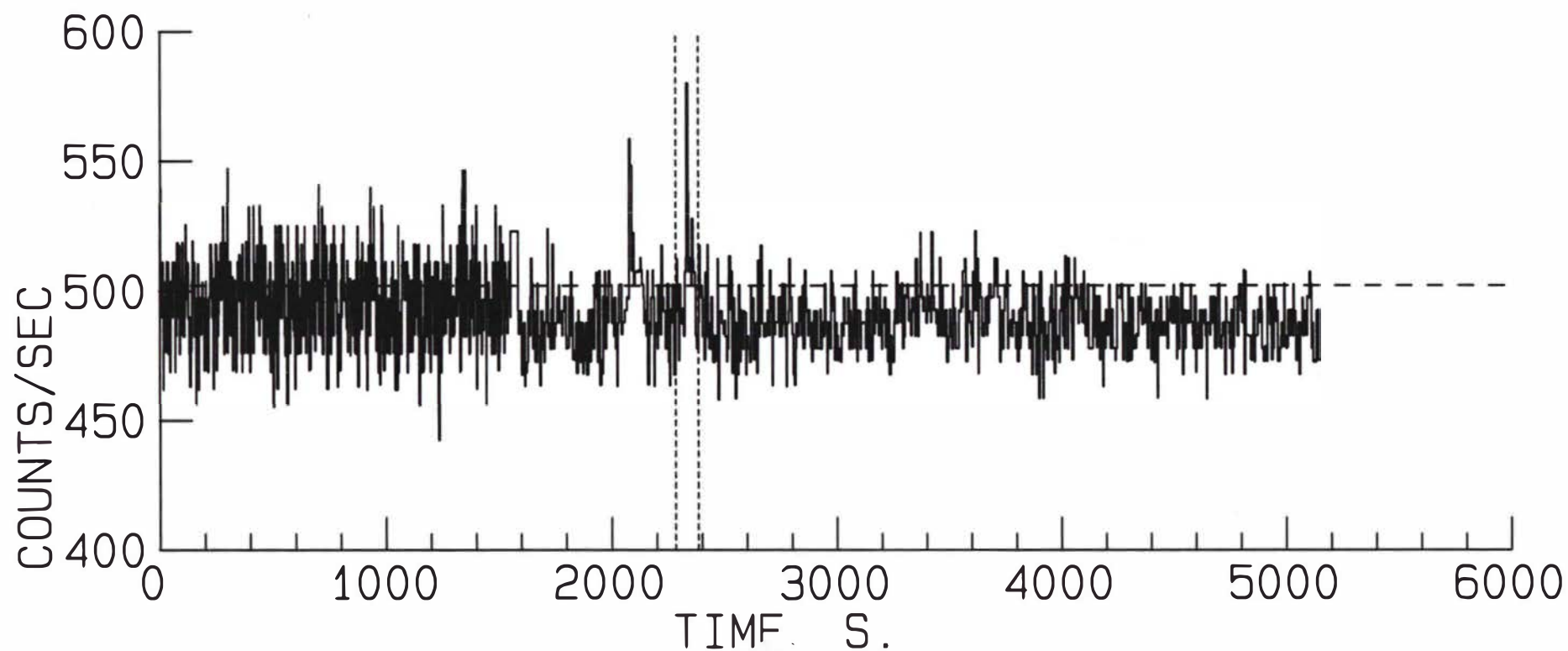
18/05/97

25552.984



ULYSSES RT
18/ 5/97 23004.170 s
INTERVALS REGROUPED BY 9
21- 146 keV

28/ 3/ 7



KONUS

18/05/97 25552.984

10- 50 keV

50- 200 keV

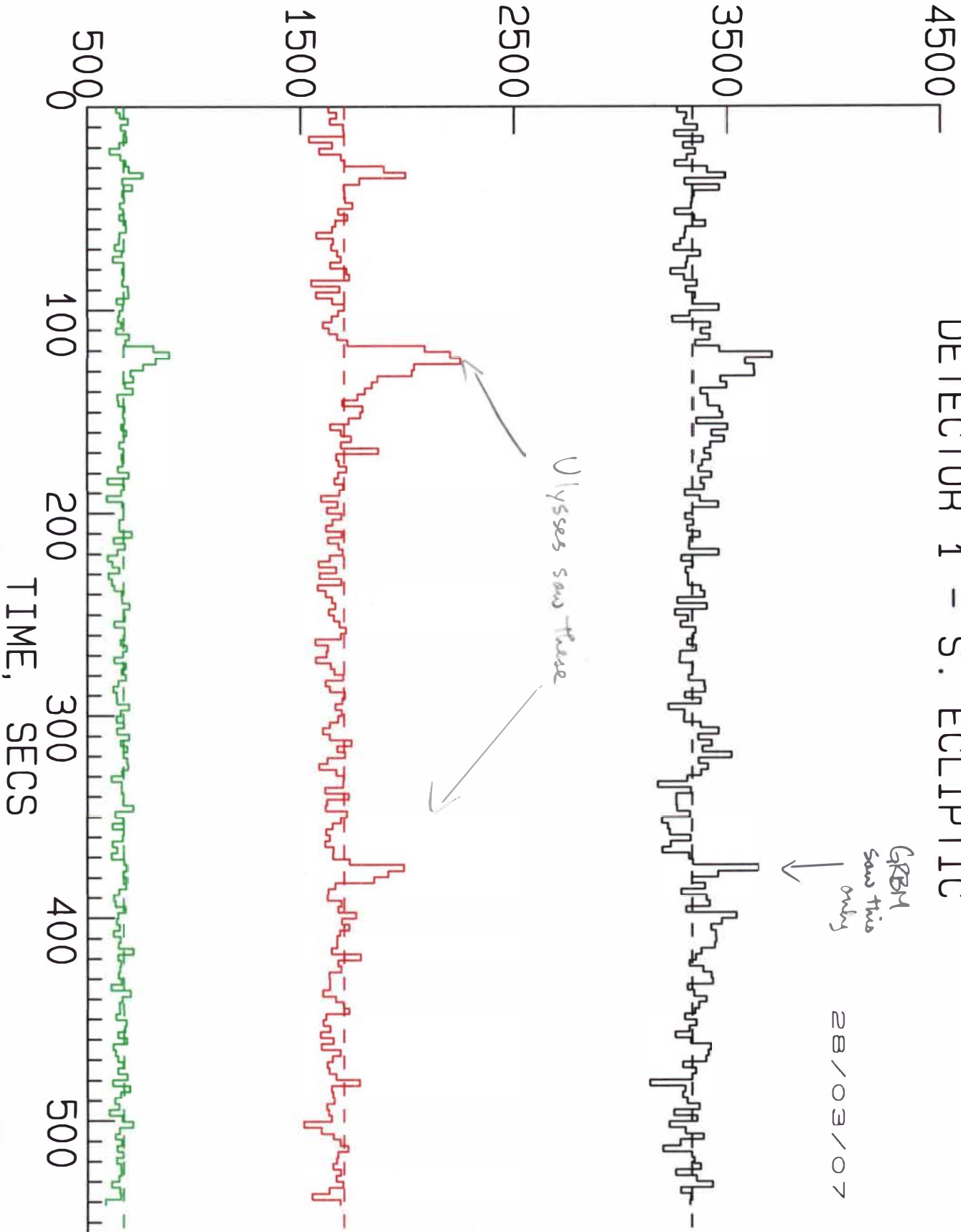
200- 750 keV

COUNTS/2.943 S

DETECTOR 1 - S. ECLIPPTIC

GRB
Saw this
only

28/03/07



KONUS

18/05/97 25552.984

10- 50 keV

50- 200 keV

200- 750 keV

COUNTS/2.943 S

4400

DETECTOR 2 - N. ECLIPHTIC

3400

2400

1400

400

100

200

300

400

500

TIME, SECS

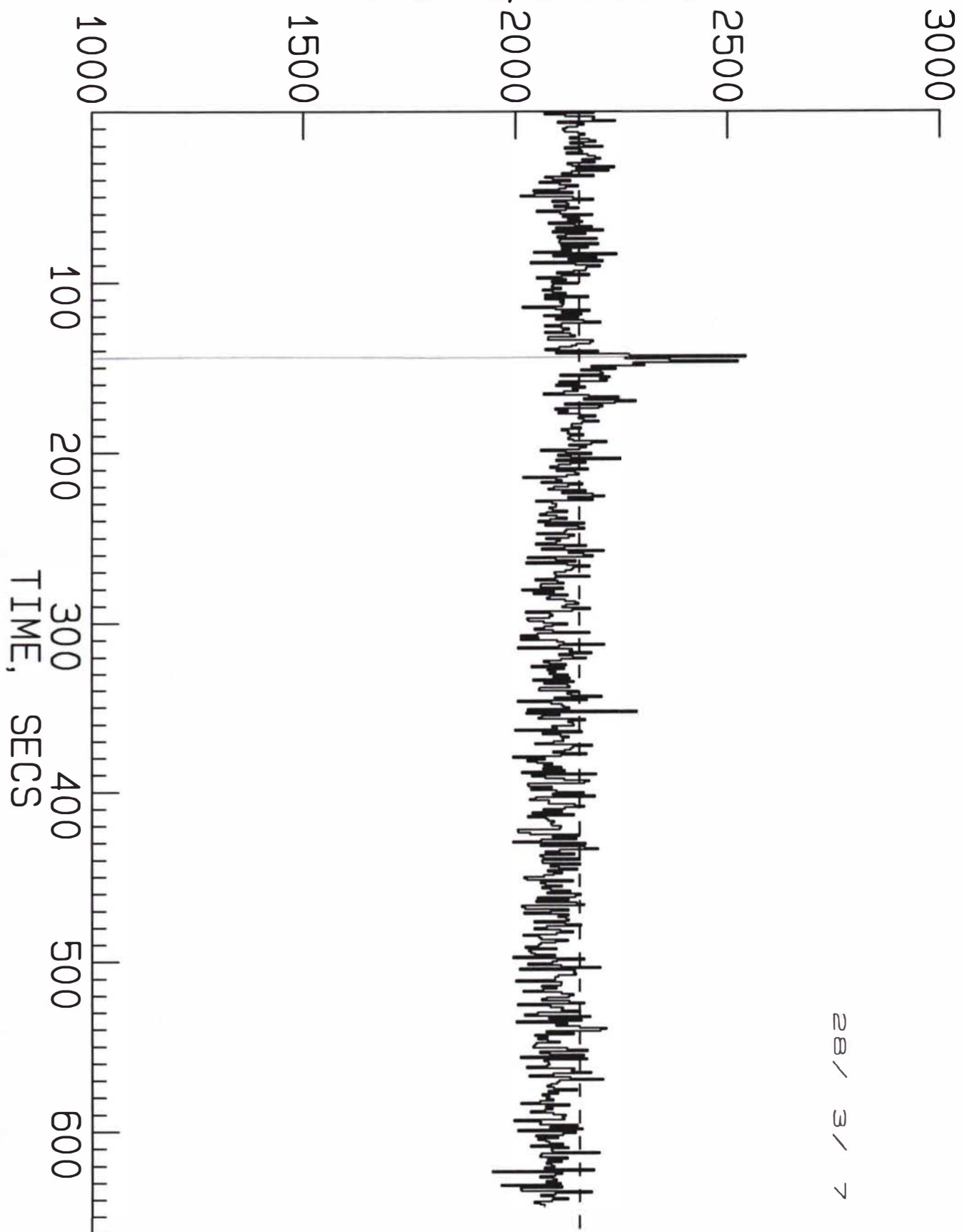
28/03/07

SAX GRBM

18/05/97 25787.831

40- 700 keV

COUNTS/1.000 S



From kraken@rosserv.gsfc.nasa.gov Tue Jun 3 10:54 PDT 1997
X-Sender: kraken@lheapop.gsfc.nasa.gov
Mime-Version: 1.0
Date: Tue, 3 Jun 1997 13:56:18 -0500
To: khurley@sunspot.ssl.berkeley.edu (Kevin Hurley)
From: kraken@rosserv.gsfc.nasa.gov (Peter Kurczynski)
Subject: Bursts not seen by TGRS
Cc: TEEGARDEN@tgrs2.gsfc.nasa.gov, kraken@rosserv.gsfc.nasa.gov

Hi Kevin,

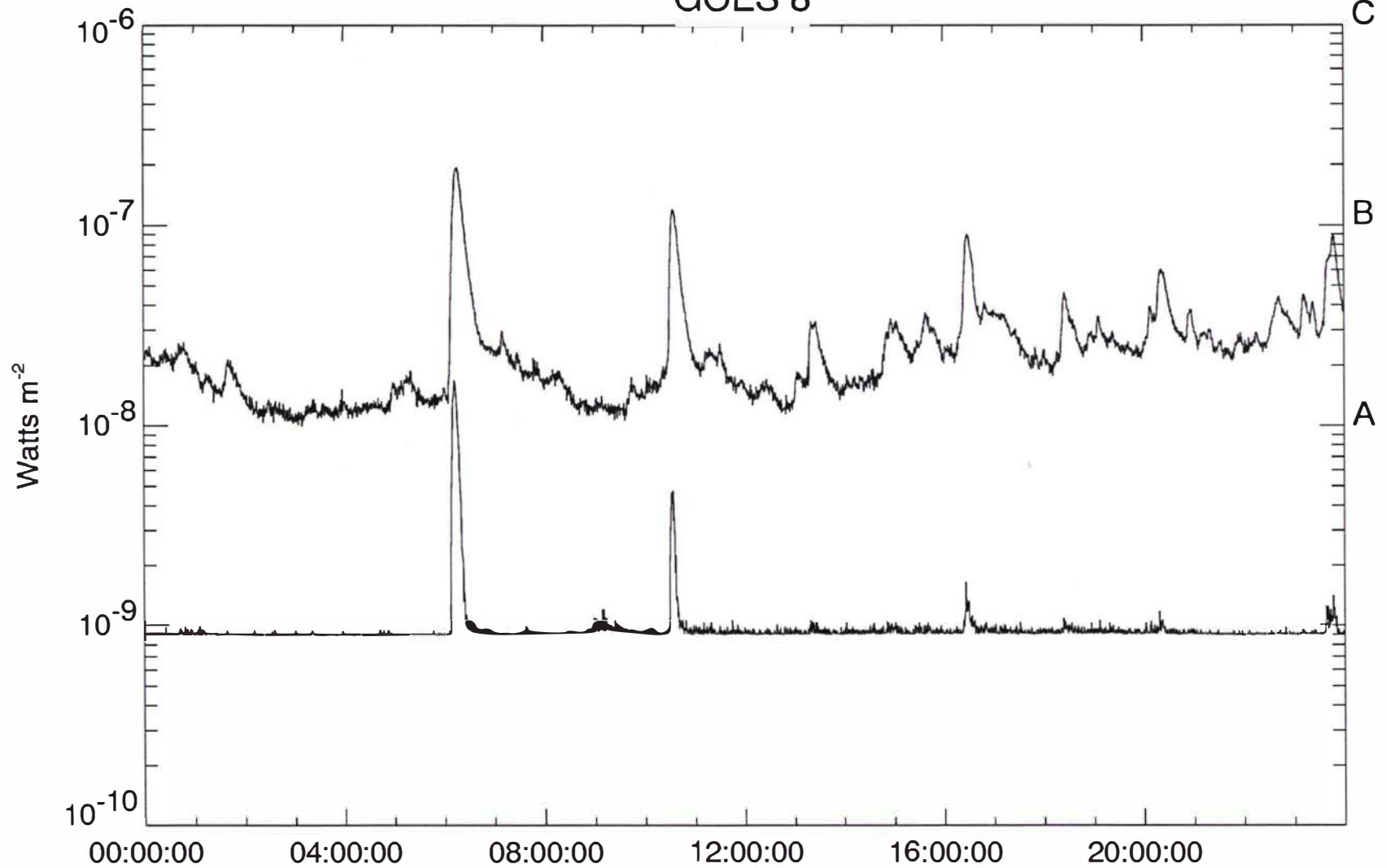
TGRS does not see the following Ulysses bursts:

May 18 1997 18:37 Ulysses time; weak burst, 100 ms long
May 21 1997 15:23 Ulysses time; weak burst, 100 ms long

I checked both waiting mode and burst mode data. Sorry for the delay,
but TGRS data from this time period only became available within the
past 24 hours.

Pete

GOES 8



Data Start: 97/05/18, 0000:00

Plot created: 97/05/22, 1007

Channel

1 (1.0 - 8.0 Angstroms)

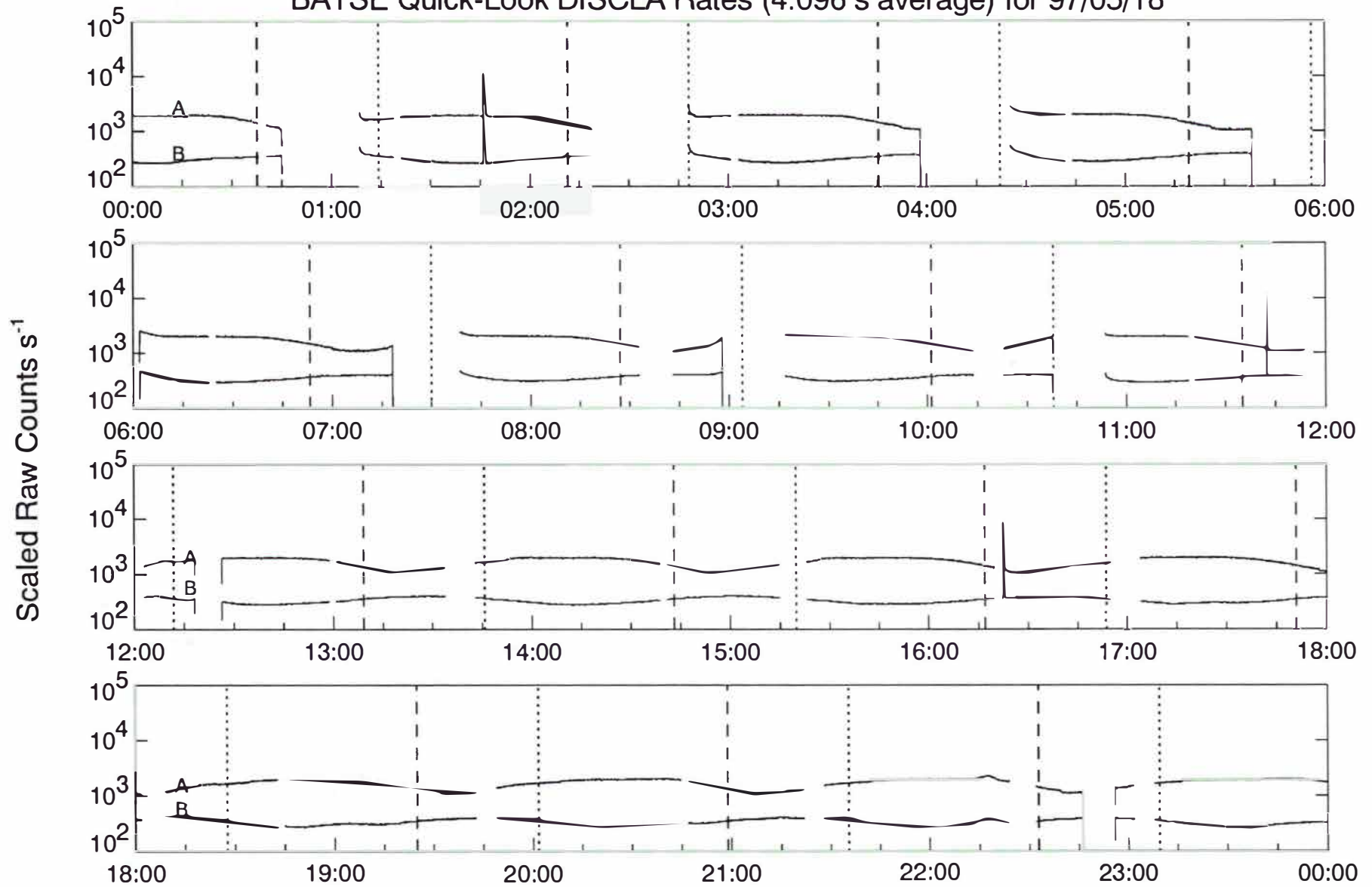
Background not subtracted

2 (0.5 - 4.0 Angstroms)

Background not subtracted

Sample average = 10

BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/18

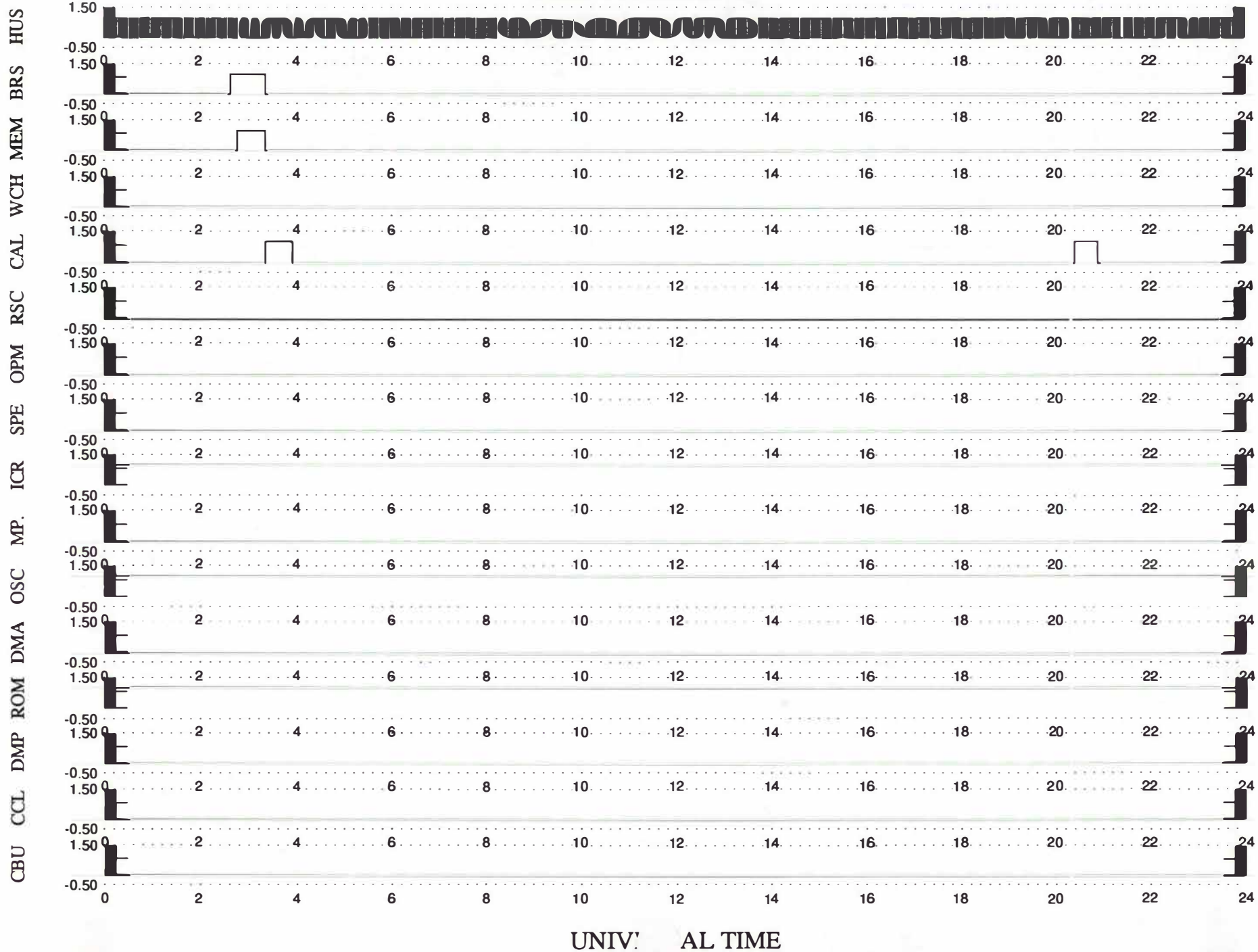


Current Time: 97/05/22, 1008 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

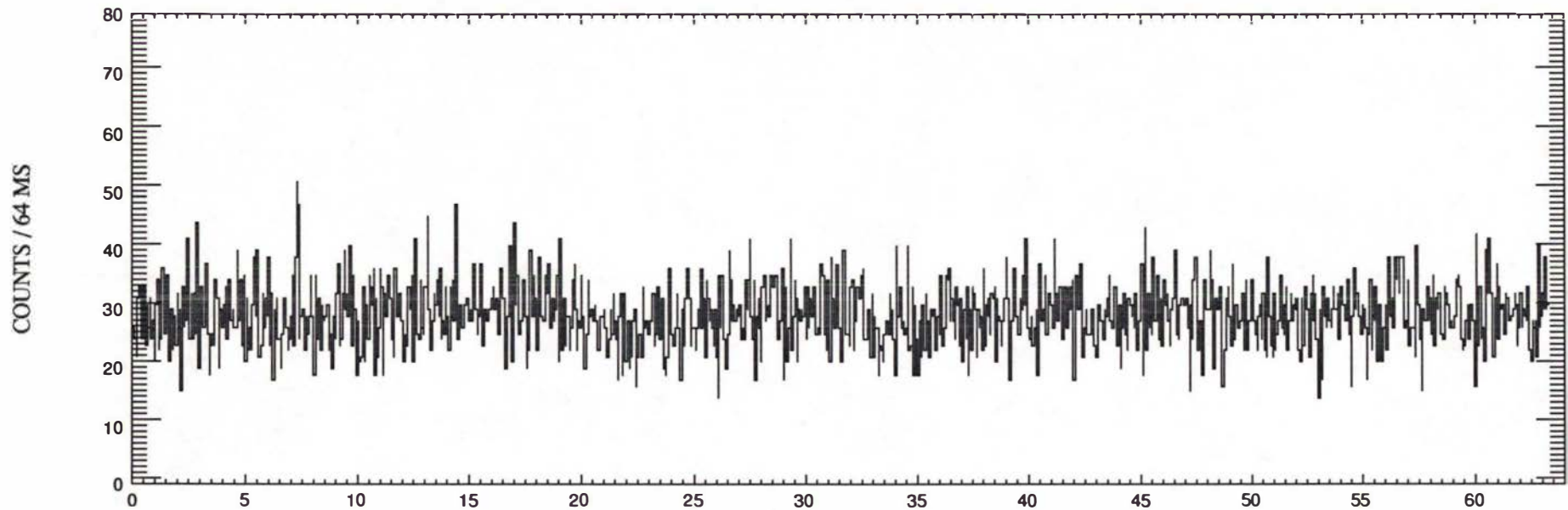
Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

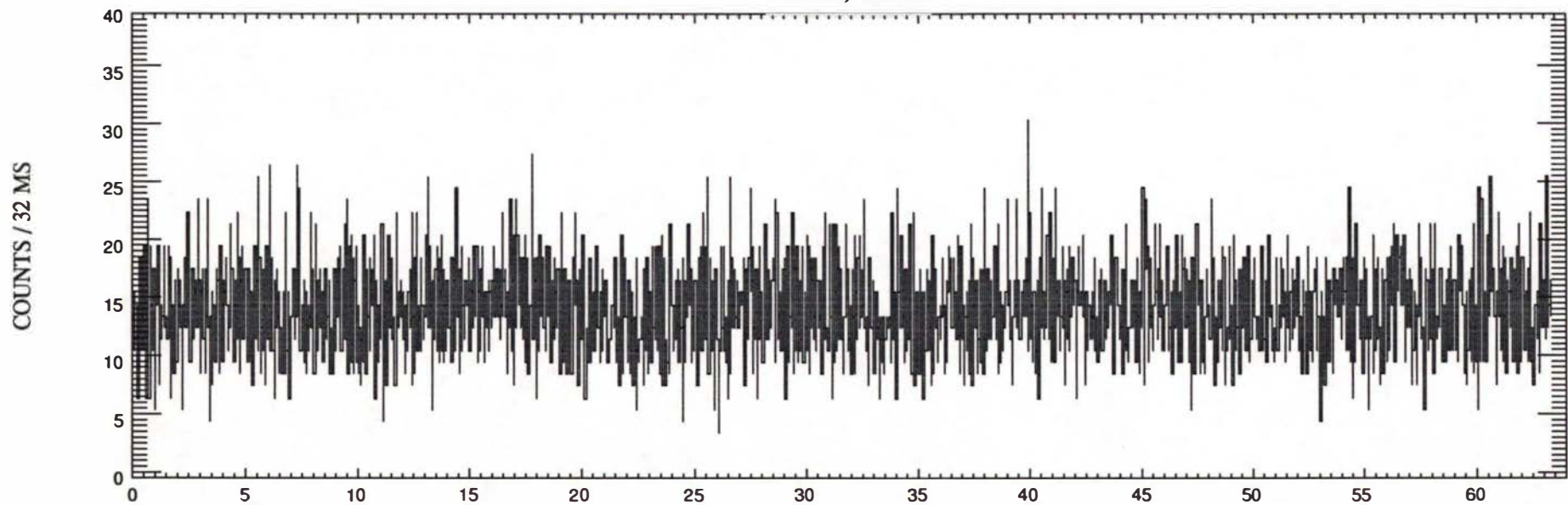
BURST NUMBER 14



Burst Counter 14 at UT= 2.619586156209 h= 9430.510 s 02:37:10.510

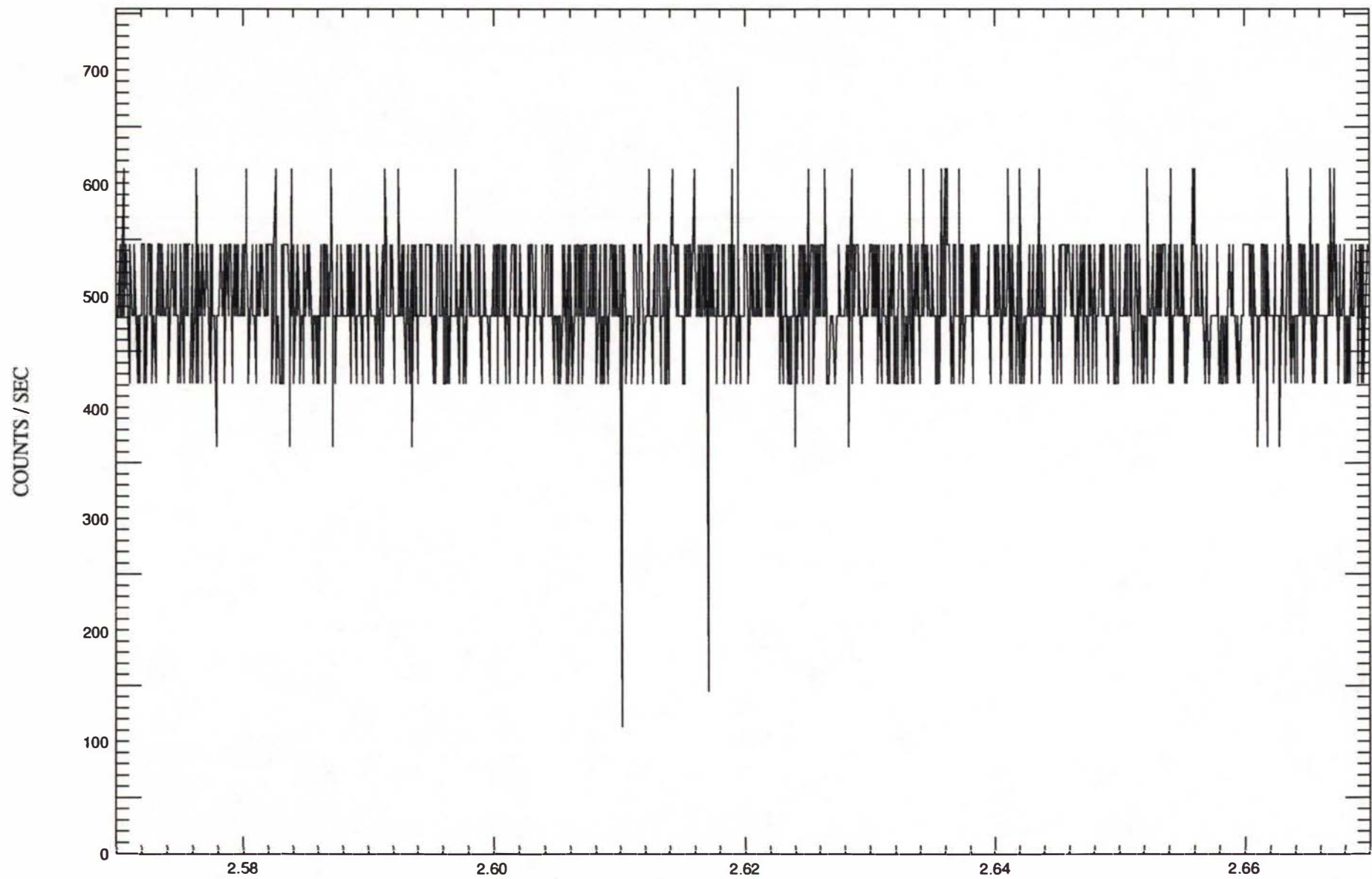


TIME, SECS

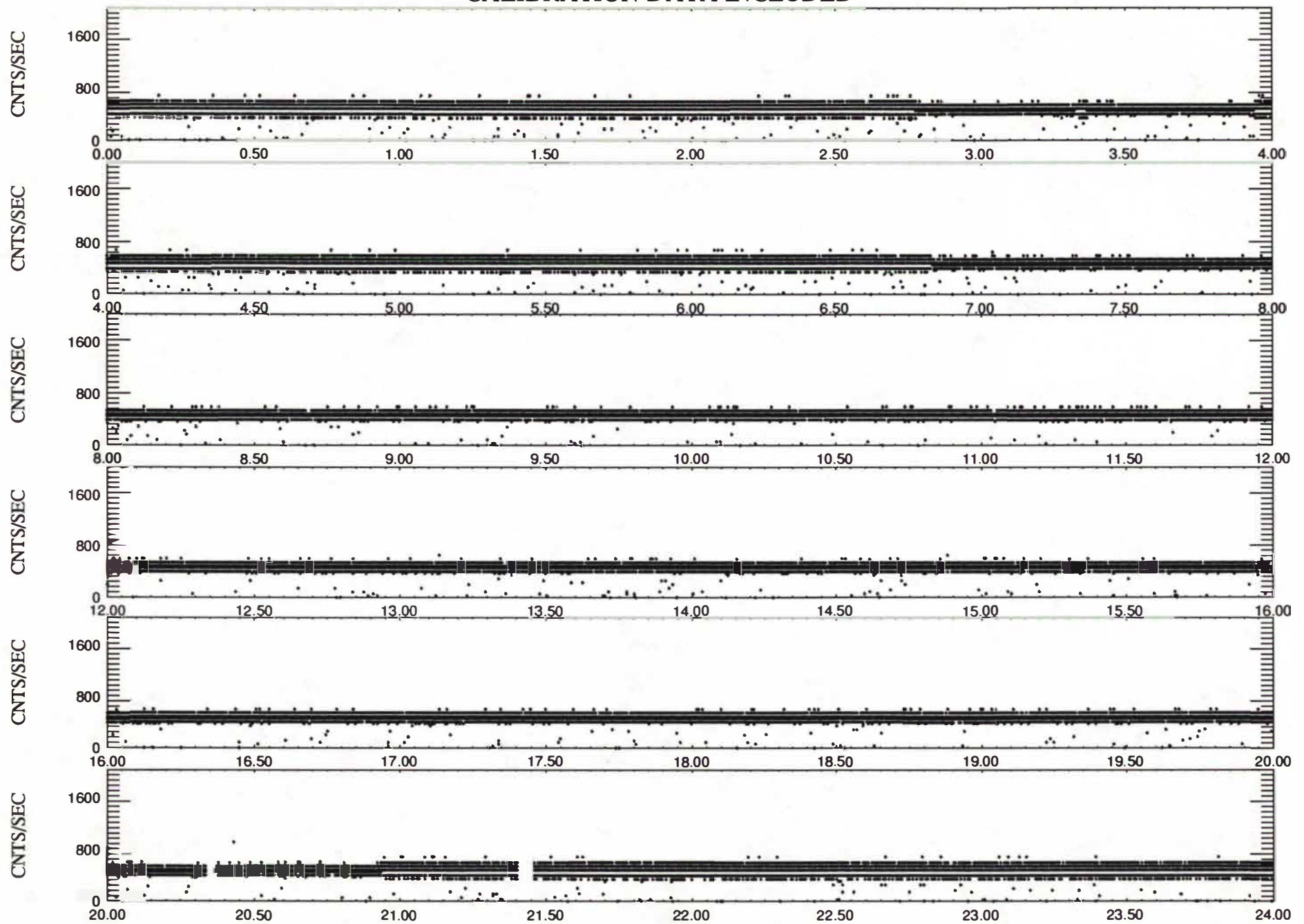


TIME, SECS

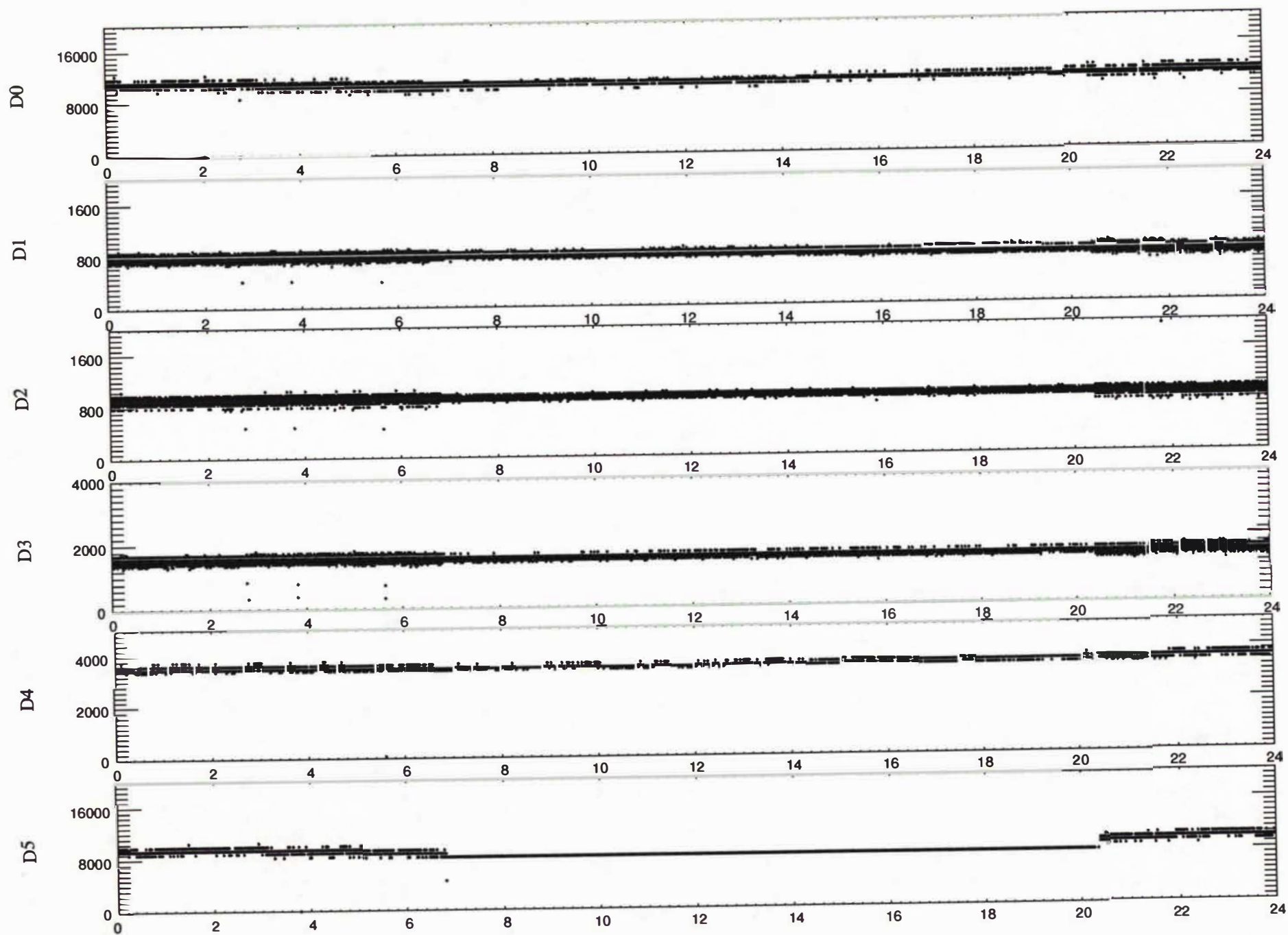
CALIBRATION DATA INCLUDED



CALIBRATION DATA INCLUDED



UNIV AL TIME



UNIV AL TIME

From RICHARDSON@ssl.msfc.nasa.gov Wed May 21 11:07 PDT 1997
Return-Path: <RICHARDSON@ssl.msfc.nasa.gov>
Received: from SSLMOR.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id LAA13461; Wed, 21 May 1997 11:07:07 -0700
Date: Wed, 21 May 1997 13:06:30 -0500 (CDT)
From: RICHARDSON@SSLLES.MSFC.NASA.GOV
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970521130630.21634b12@SSLLES.MSFC.NASA.GOV>
Subject: Crossing Windows for BATSE Burst 6236
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

No

BATSEARCH PROGRAM

BATSE BURST # 6236
EVENT OF 1997 MAY 19 DAY OF YEAR=139
EVENT CROSSING TIME AT BATSE : 46887. S. OR 13:01:27.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 214.000 -64.000
BATSE PEAK COUNTING RATE: 16000 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 19/ 5/ 97 IS:
RA= 150.882 DEC= 30.934 DIST= 5.084 AU
BATSE-ULYSSES DISTANCE = 760551080. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 73.02 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 740.81 SECS.
CROSSING TIME AT ULYSSES IS 47628. S. OR 13:13:47 +/- 482.50 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 19/ 5/ 97 IS:
RA= 170.674 DEC= 5.443 DIST= 0.937 AU
MARS-BATSE DISTANCE = 140176208. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION=103.43 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -108.57 SECS.
CROSSING TIME AT MARS IS 46778. S. OR 12:59:38 +/- 77.31 SECONDS

BATSE BURST TRIGGER

NO.: 6236

TIME: TJD=0587 SECONDS=46887

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=95.3 AZIMUTH=204.4 ERROR=7.1 DEGREES

COMMENTS:

GRB. SHORT AND SPIKEY. DUR.~0.7 SEC. VISIBLE ABOVE 300KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6236	970519	10587	46887	16000	214	-64	.7

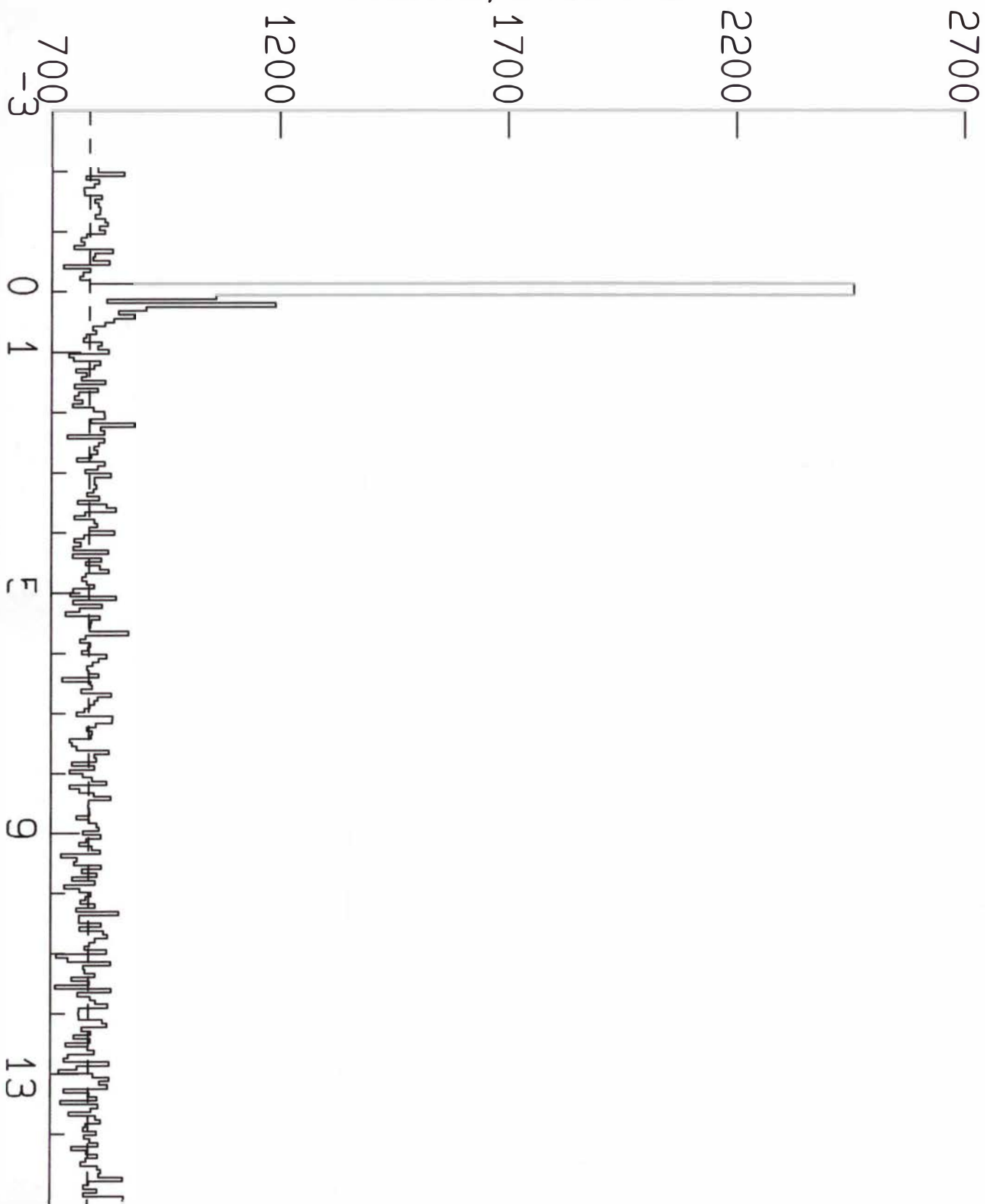
BATSE

19/05/97

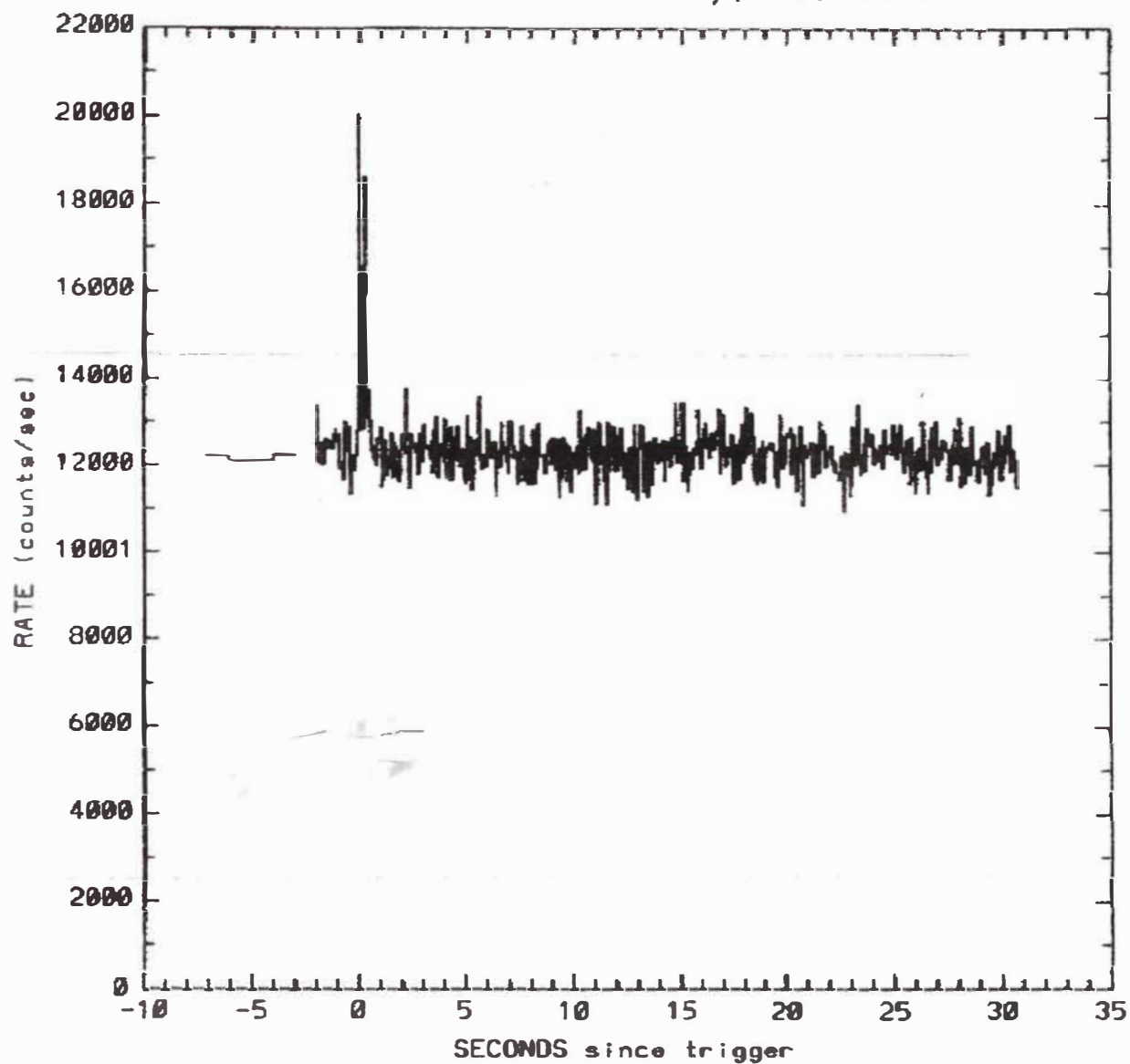
46887.562

25- 100 keV

COUNTS/0.064 S



DISCSC Data for K. Hurley, No. 6236



5-JUN-1997 12:11:06

Created by MDPS 80
(Burst Display)
Version 12.25

Trigger * 6236

Trigger Time:
10587 / 46887.561

Burst Data Type:
DISCSC

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

Detectors (7..8).
765-3---

Discriminators:
(1 , 2)

Quality Mask:
80ISP1

BATSE BURST# 6236

ULYSSES RT

21 / 5 / 97

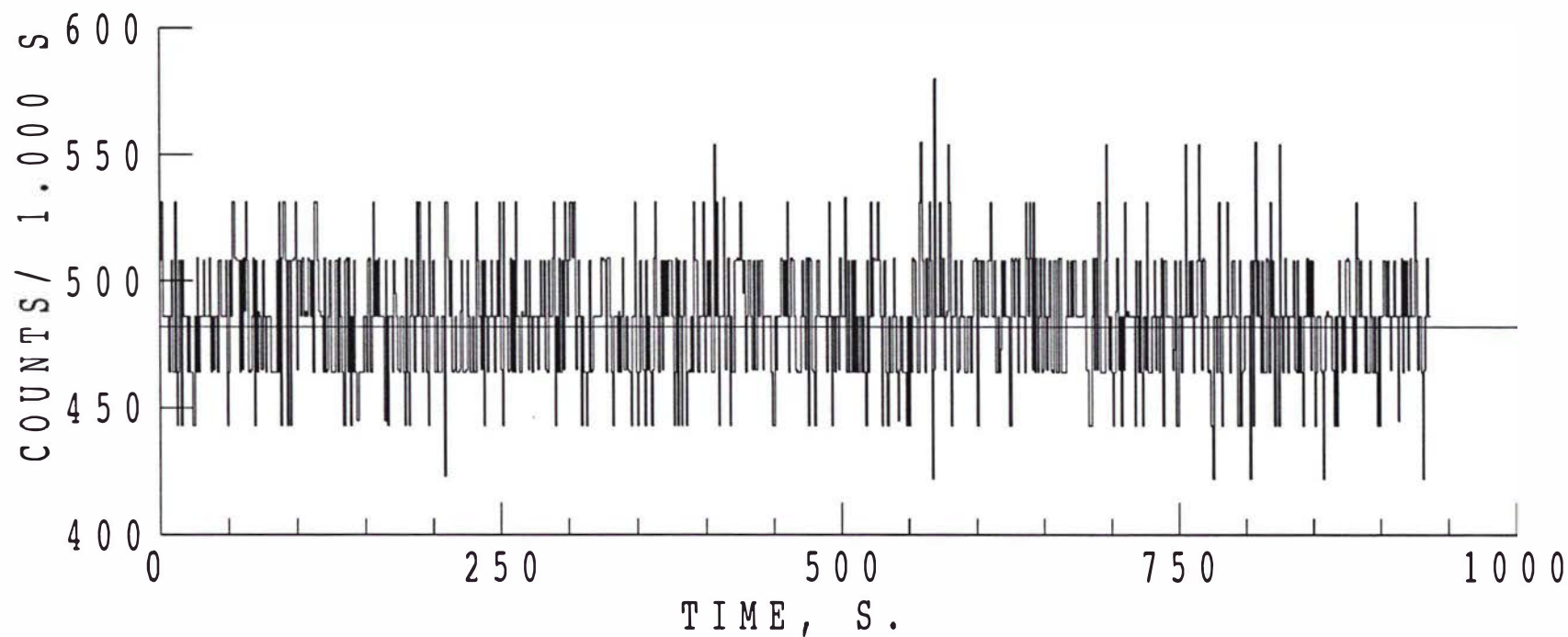
19 / 5 / 97 47160.105 s

0.500 S INTERVALS REGROUPED BY 2

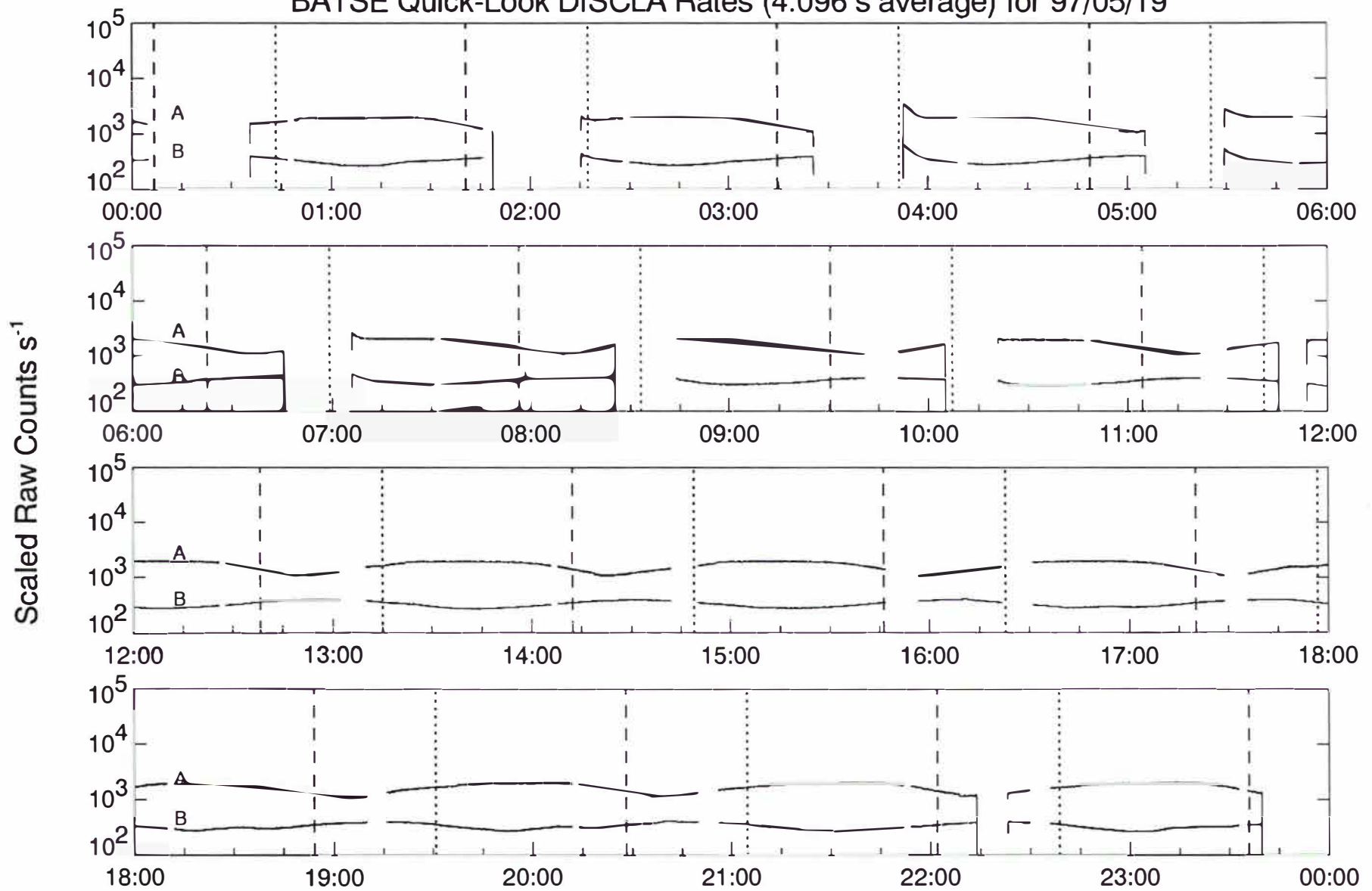
0 - 0 keV

N= 10 M=10
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



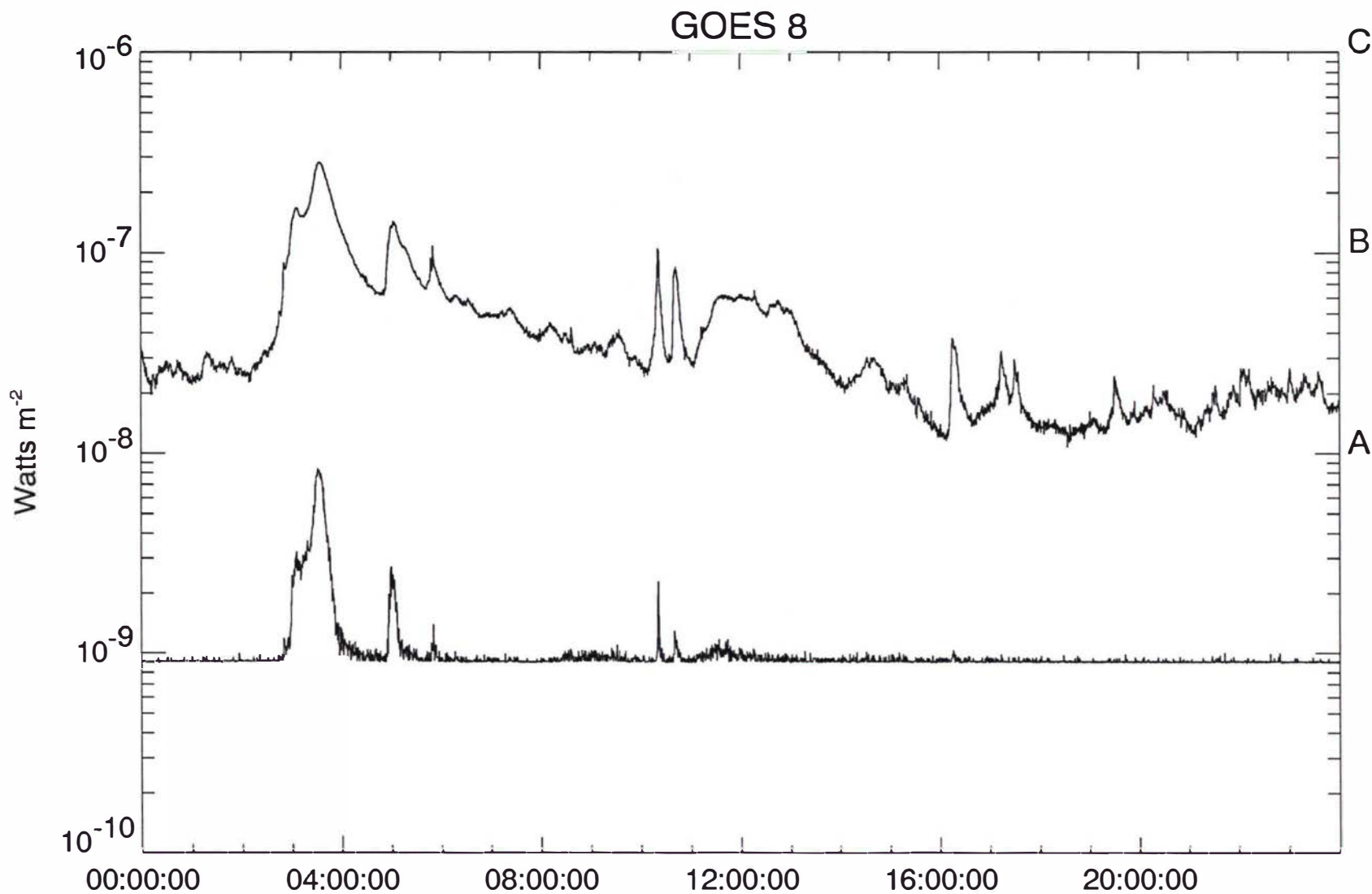
BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/19



Current Time: 97/05/23, 1008 EDT
A: Channel 0 Most Sunward LAD
B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare



Data Start: 97/05/19, 0000:00

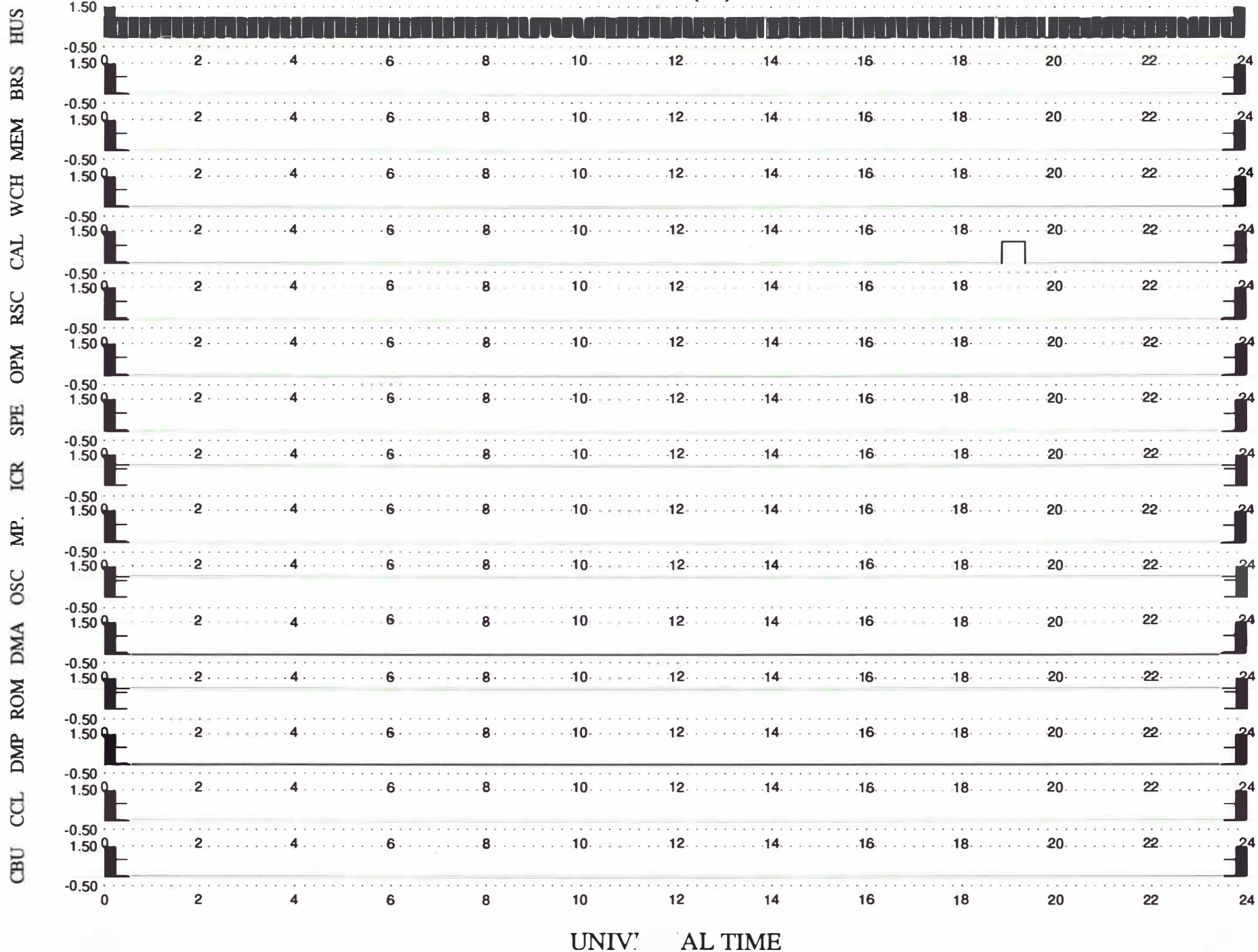
Plot created: 97/05/23, 1007

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

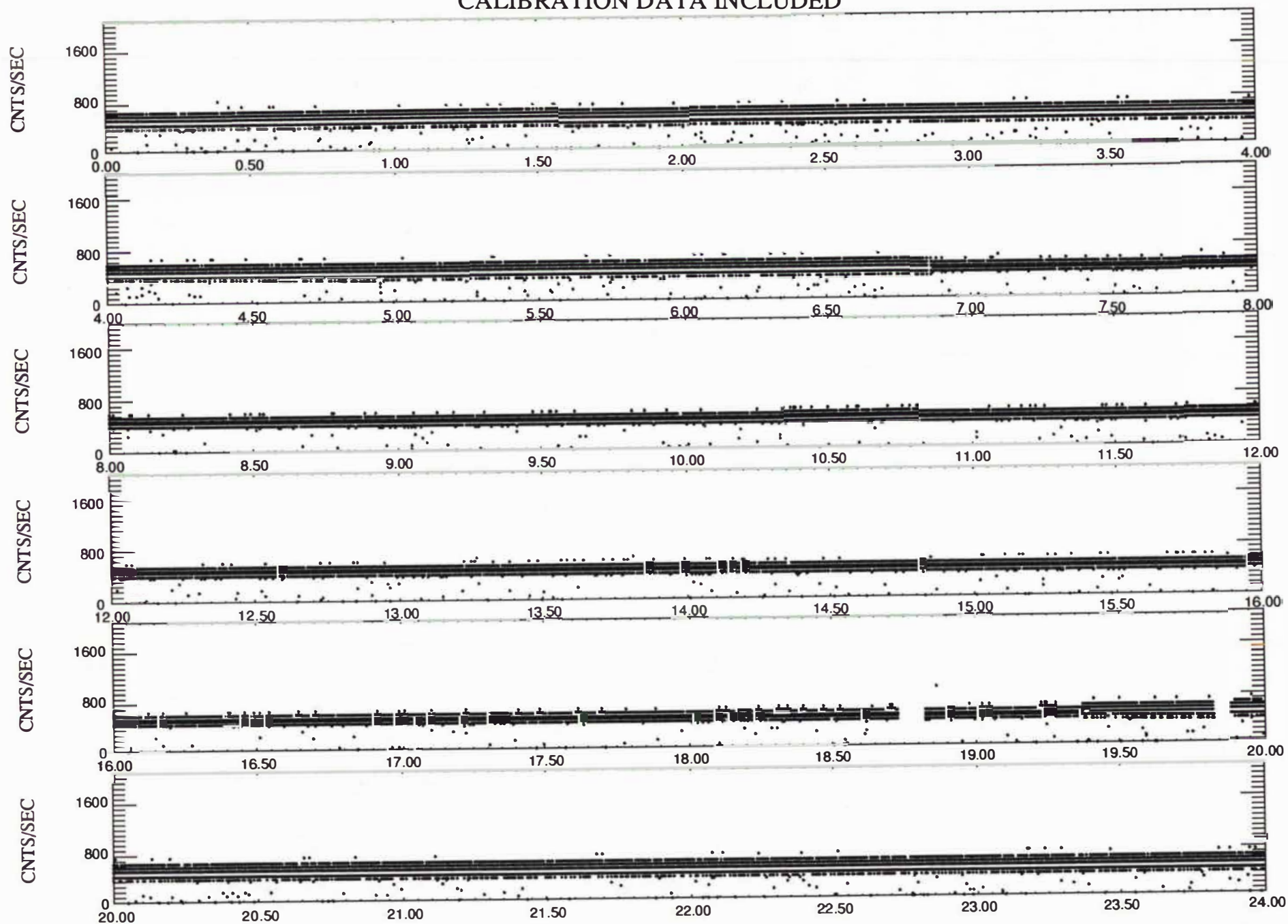
Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

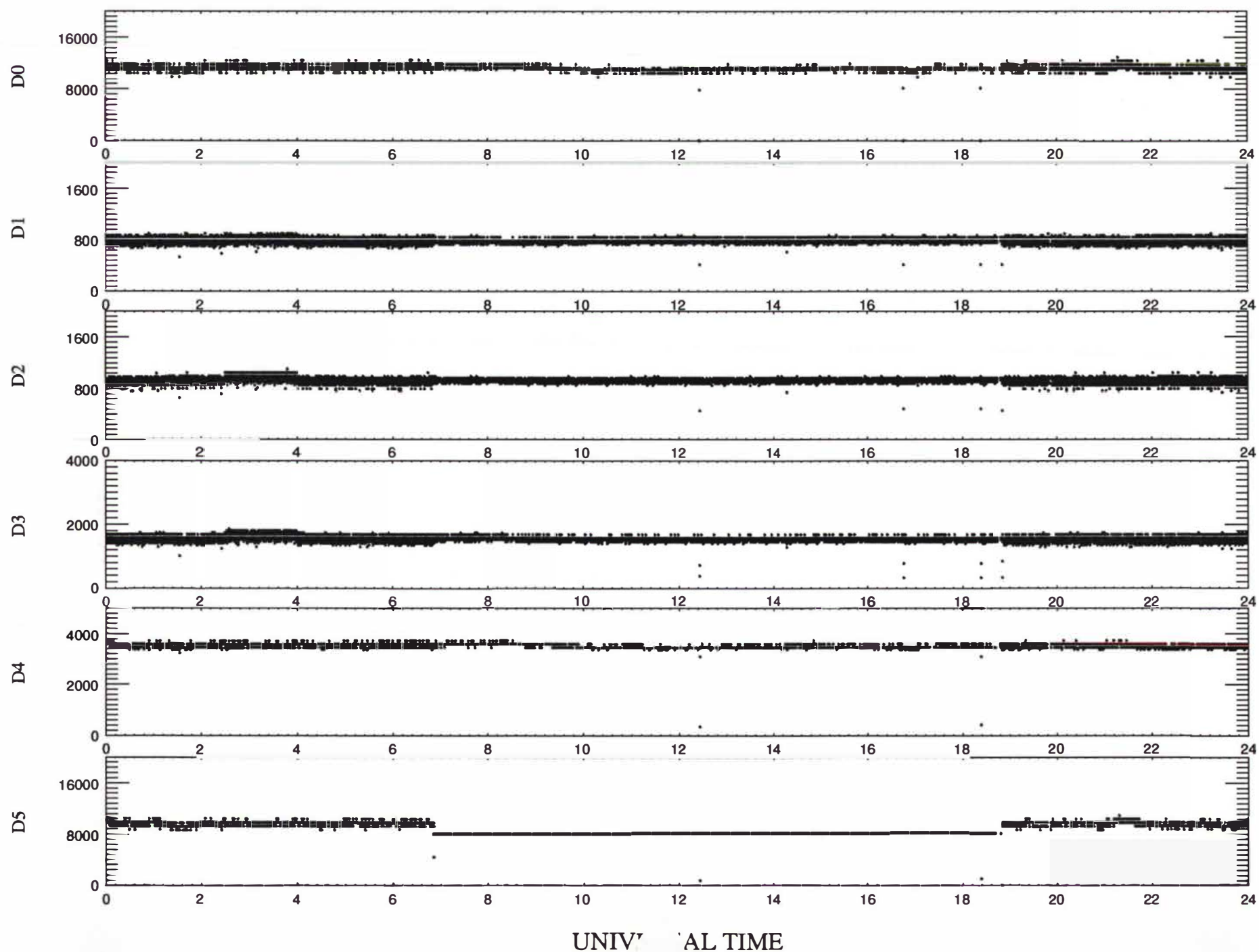
NO BURST (14)



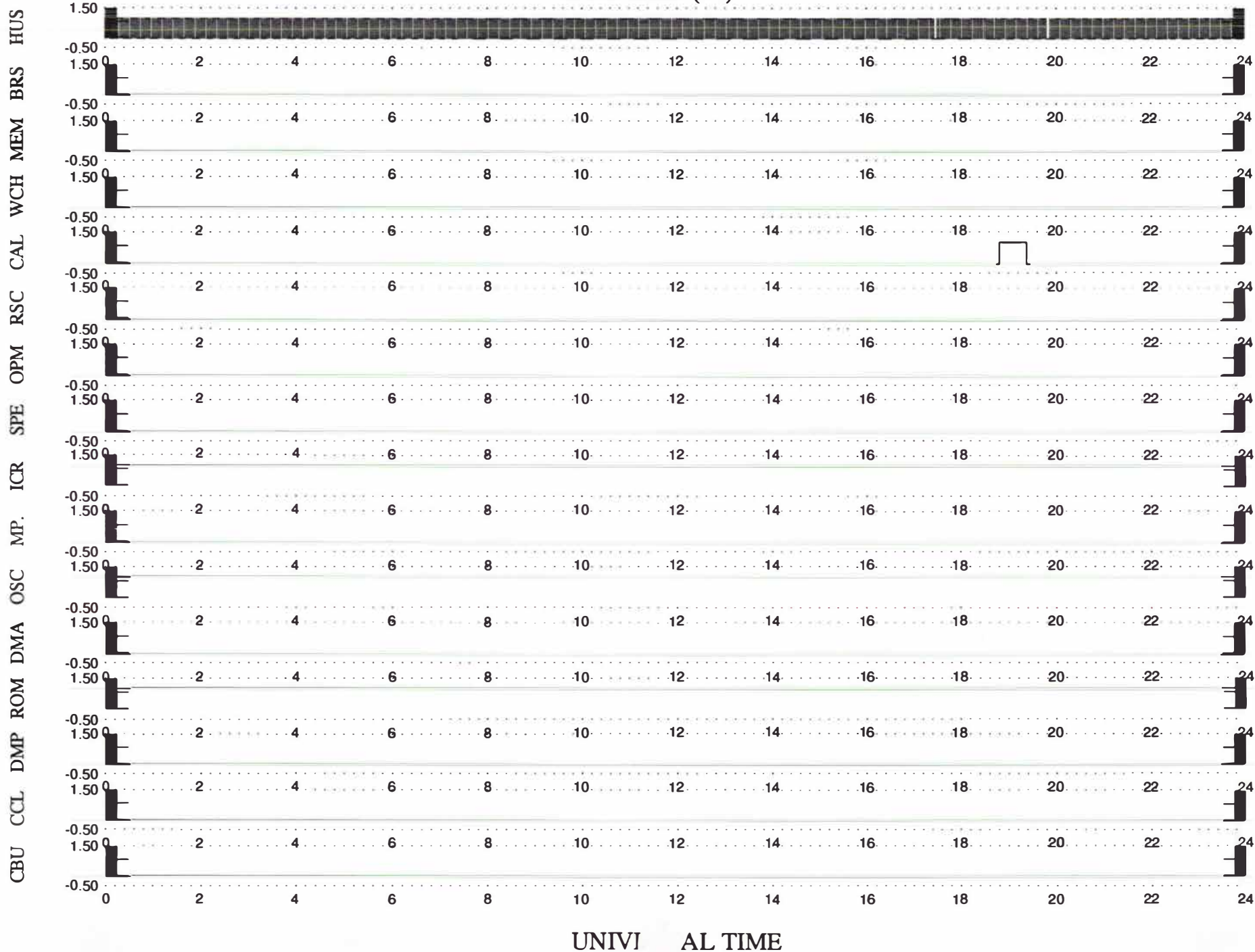
CALIBRATION DATA INCLUDED



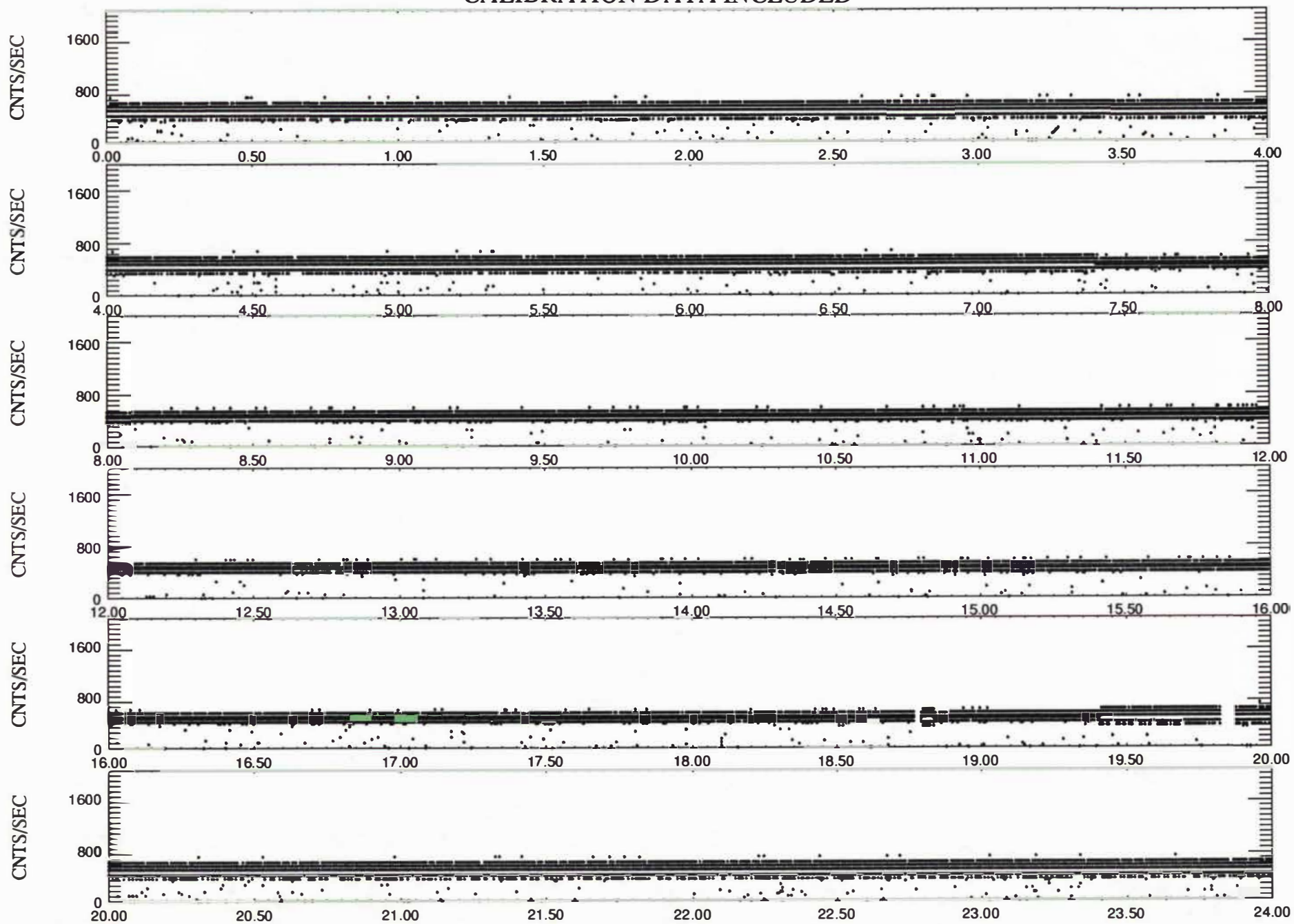
UNIV AL TIME



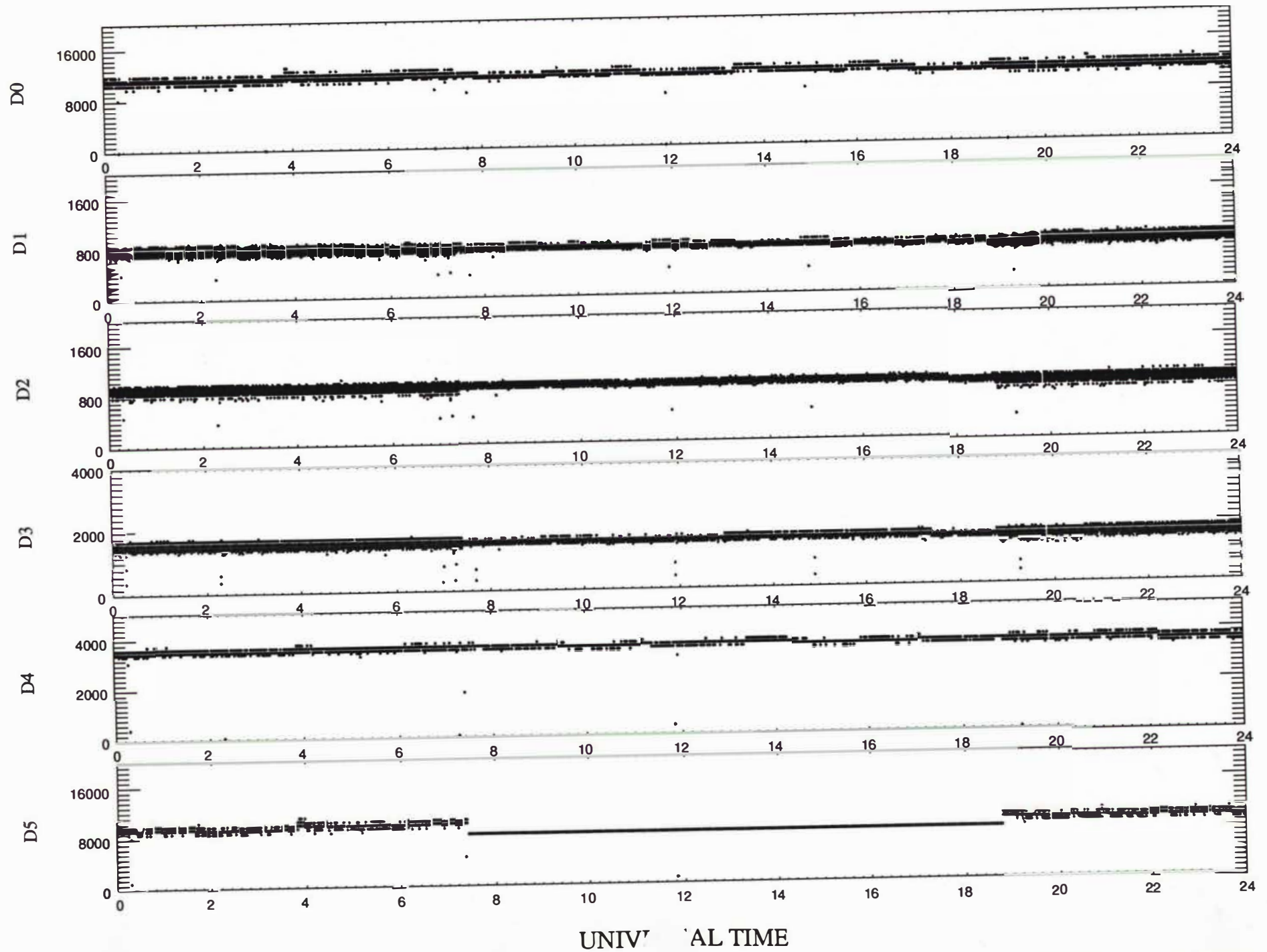
NO BURST (14)



CALIBRATION DATA INCLUDED



UNIV. TIME



From BUTTERWORTH@lheavx.gsfc.nasa.gov Fri Aug 22 13:34 PDT 1997
 From: BUTTERWORTH@lheavx.gsfc.nasa.gov
 Date: Fri, 22 Aug 1997 16:27:57 -0400 (EDT)
 To: khurley@sunspot.ssl.berkeley.edu, kmarar@isac.ernet.in, vnp@isac.ernet.in,
 jterrell@lanl.gov, yosimori@rikkyo.ac.jp,
 filippo@botes1.tesre.bo.cnr.it, henze@fender.msfc.nasa.gov,
 kraken@rosserv.gsfc.nasa.gov
 CC: BUTTERWORTH@lheavx.gsfc.nasa.gov
 X-Vmsmail-To: @ULYSSES
 X-Vmsmail-Cc: BUTTERWORTH
 Subject: Konus summary for recent Ulysses events not seen by BATSE

Konus report on recent Ulysses events not seen by BATSE

Ulysses event (1997)	Konus observation
Mar 25 17:49 moderate 15 s long	trigger at 17:36:22.800 North detector two peaks, with the first stronger and harder. each peak lasted 20 s, separated by 20 s without emission
Mar 29 12:23 weak 100 ms long	not detected
<u>May 21 15:23</u> weak 100 ms long	not detected
June 1 00:17 weak 100 ms long	not detected
June 1 19:33 moderate 25 s long	trigger at 19:19:30.567 North detector two strong peaks, 20 s apart first peak much harder event lasted 50 seconds in total
June 2 15:43 moderate 60 s long	trigger at 16:20:55.684 South detector complex, with strongest peak at 16:22:33 event lasted over 150 s
June 4 19:23 weak 100 ms long	trigger at 19:49:05.369 South detector weak, hard FRED lasting about 1 s
June 7 09:16 moderate 10 s long	trigger at 09:16:24.688 South detector strong, hard peak lasting 7 s, followed by softer, weaker emission for 10 s
June 8 01:44 weak 2 s long	not detected
June 18 19:51 weak 100 ms long	not detected
June 26 04:28 weak 100 ms long	not detected
June 27 21:29 strong 20 s long	trigger at 22:06:48.806 North detector strong, multi-peaked event lasting 20 s strongest peak 7.1 s after trigger
June 29 04:26 strong 100 ms long	visible in waiting-mode data at 04:00:24 very soft, near ecliptic
July 2 11:49 weak 100 ms long	not detected

July 5 15:31	weak 100 ms long	not detected
July 9 10:56	weak 100 ms long	not detected
July 14 03:48	weak 100 ms long	not detected
July 15 15:01	moderate 5 s long	trigger at 14:21:14.349 North detector strong, hard, main peak 20 s after trigger. main peak bell-shaped with 3 s half-width
July 21 22:42	moderate 10 s long	trigger at 23:31:07.124 North detector two peaks, with the first stronger, harder. each peak lasted 10 s separated by 10 without emission
July 23 02:29	weak 100 ms long	instrument off
July 29 18:14	weak 100 ms long	not detected
Aug 1 17:34	weak 100 ms long	not detected
Aug 9 18:46	weak 100 ms long	not detected

From vnp@isac.ernet.in Thu Jul 3 05:18 PDT 1997
From: vnp@isac.ernet.in
>Received: from sx07 by isac.ernet.in (AIX 3.2/UCB 5.64/4.03)
id AA32207; Thu, 3 Jul 1997 16:39:08 GMT
>: Thu, 3 Jul 1997 16:39:07 +0000 (CUT)
^ Sender: vnp@sx07
To: khurley@sunspot.ssl.berkeley.edu
Subject: SROSS-C2 GRBs
Mime-Version: 1.0

Dear Prof. Hurley,
Thank you for the messages about GRBs on Jun 18 and Jun 26. We have no GRB event on these dates. SROSS-C2 has recorded events on
21 May 97 at 13: 52:08 UT and
7 Jun 97 at 9 16 27.8 UT
We would like to know whether these events were recorded on Ulysses or BATSE.
I shall be grateful if you could kindly include me on your regular mailing list for GRB messages.
thanking you
regards
padmini

From sinha@isac.ernet.in Fri Aug 11 06:11 PDT 2000
From: sinha@isac.ernet.in
Date: Fri, 11 Aug 2000 15:24:30 +0530 (IST)
Sender: sinha@sx08
: Kevin Hurley <khurley@sunspot.ssl.berkeley.edu>
subject: Confirmation for SROSS C-2 GRB events (probably SGRs)
MIME-Version: 1.0

Dear Prof. Hurley,

We have now obtained good estimates of some parameters of our GRB data. Below I am listing the derived parameters for few short events.

DATE	EVENT TIME (UT SEC)	T90 (SEC)	HARDNESS RATIO (100-1024keV) / (20-100 keV)	FLUENCE ERGS CM-2
22.02.97	86007.392	0.142	1.02+-0.21	7.91.10-6
21.05.97	49988.655	0.335	0.53+-0.13	1.47.10-5
24.07.99	77354.837	1.152	0.44+-0.07	4.03.10-5
07.04.00	37496.548	0.759	0.05+-0.01	1.05.10-5

(A) The event times given in UT may be off by as much as 200 ms.

(B) The true T90 for the first event would be somewhat larger than the quoted value.

) Since we do not know the source direction, the fluence value is not corrected for the sec (theta) factor.

Will it be possible for you to kindly go through your archive and let us know whether ULYSSES or any other IPN spacecrafts detected these events and particularly do any of these match with any known SGR ? The reason I thought they may be related to SGRs is their very short durations (often two or three short sub-bursts within the main profile) and their soft spectra (small values of H_R). None of these four events match with any of BATSE events (according to Dr. Peter Woods- post. doc working with Dr. Kouveliotou).

If some match is found I would like to send our high time resolution data to you and jointly carry out further work with you, if something more can be done.

Thanking you.

With warm regards.

SRIKANTA SINHA

HUS DATA

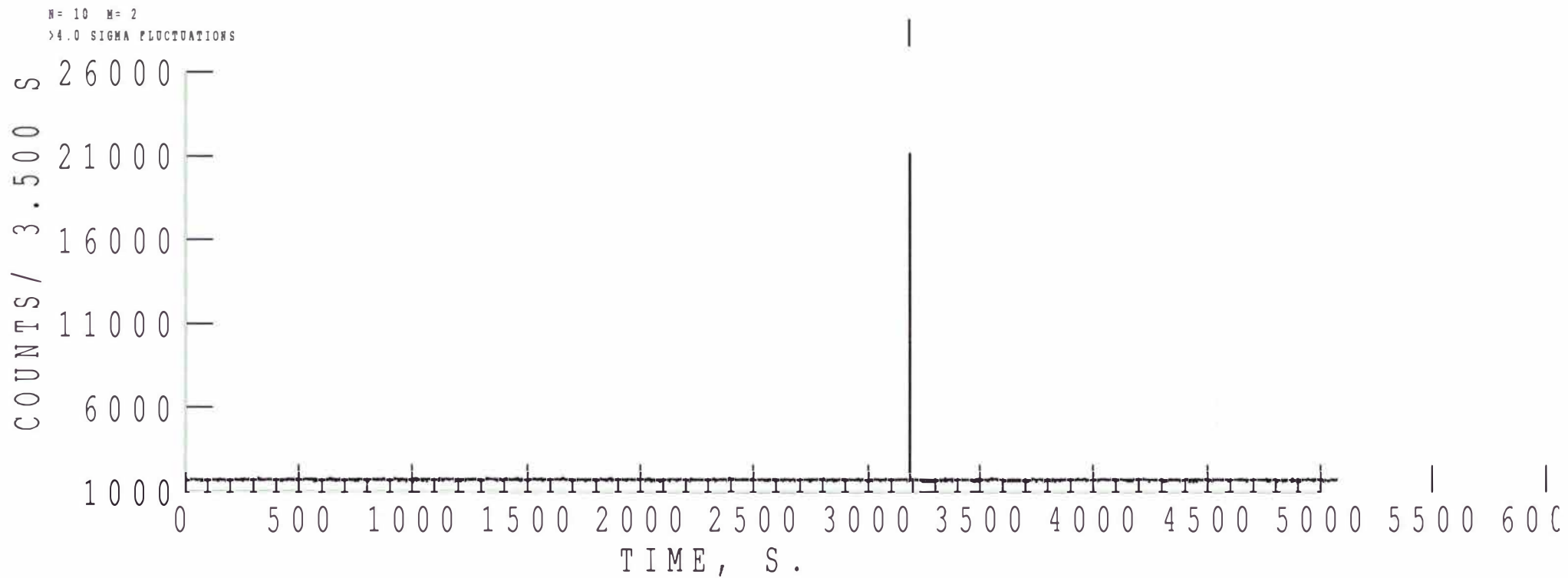
ULYSSES RT

3 / 7 / 97

21 / 5 / 97 47376.125 s

0.500 S INTERVALS REGROUPED BY 7

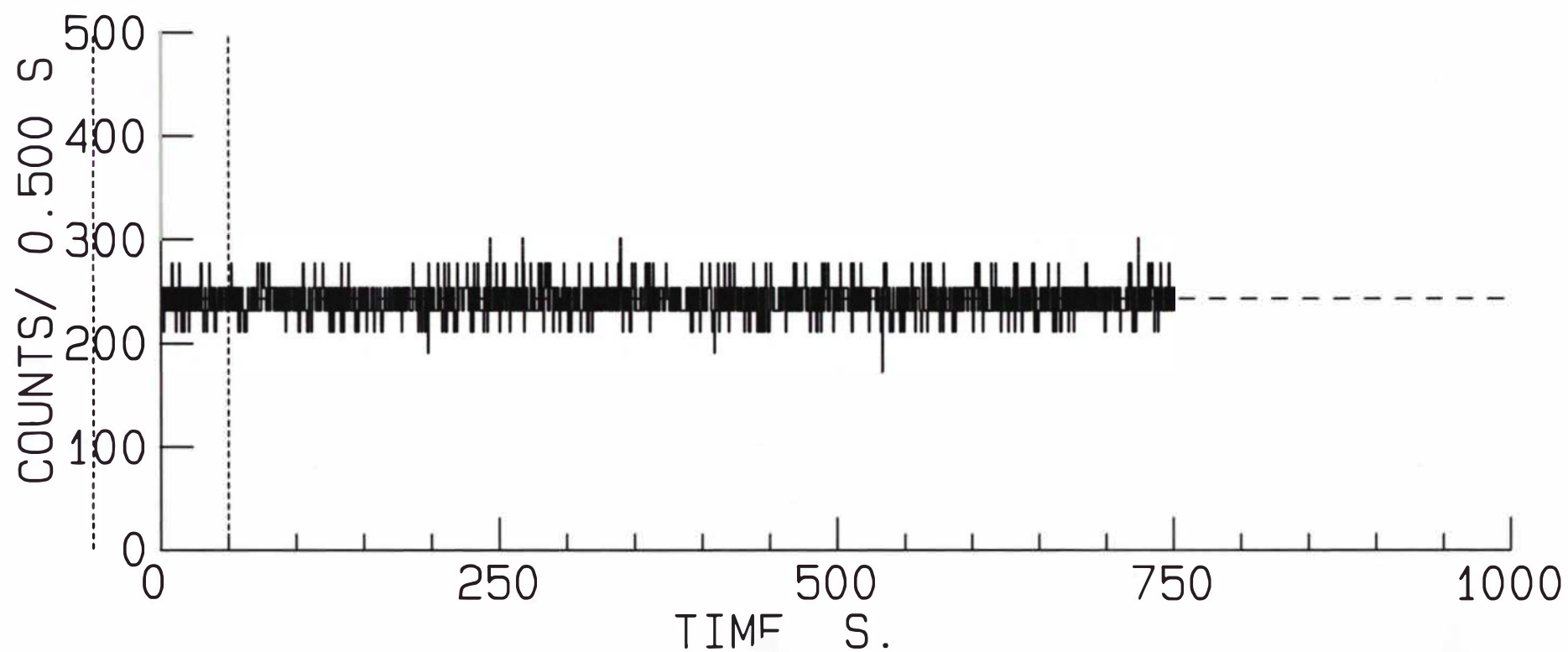
0 - 0 keV



Konus
0.4 s long

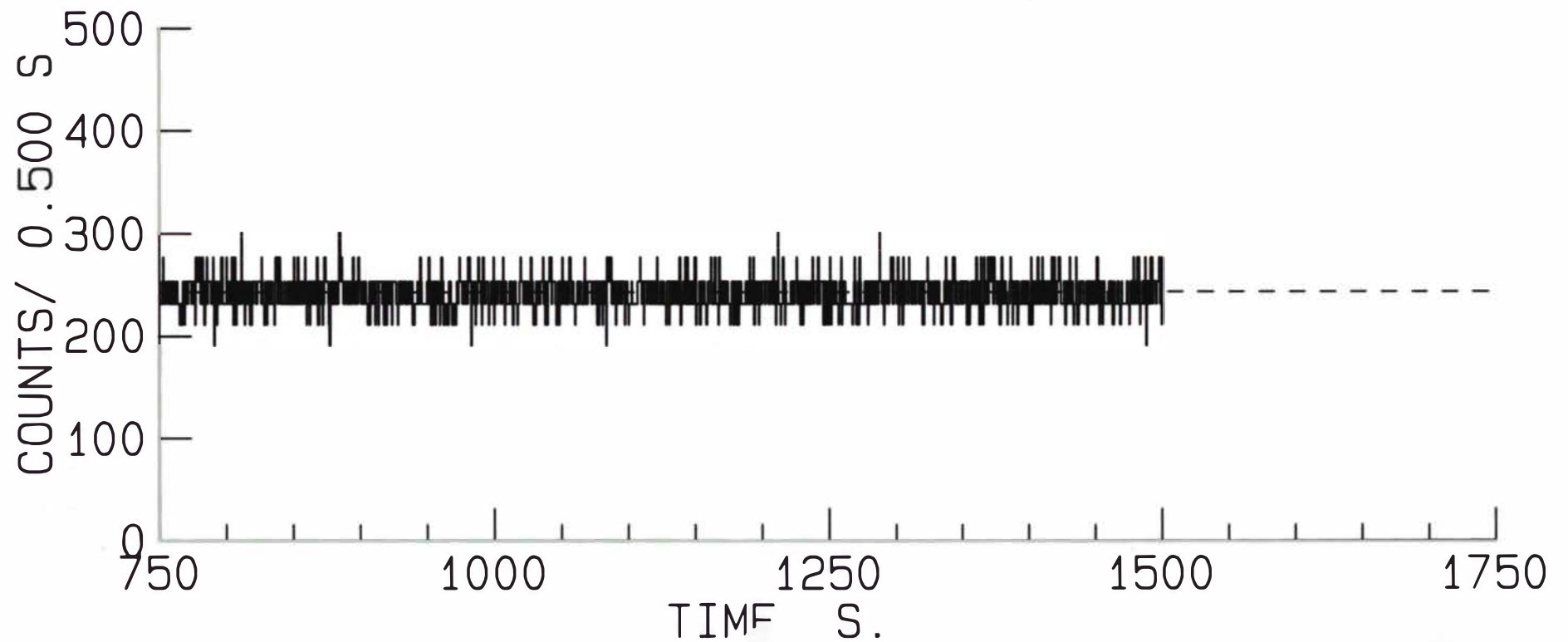
ULYSSES RT
21/ 5/97 47412.262 s
22- 147 keV

11 / 8 / 0



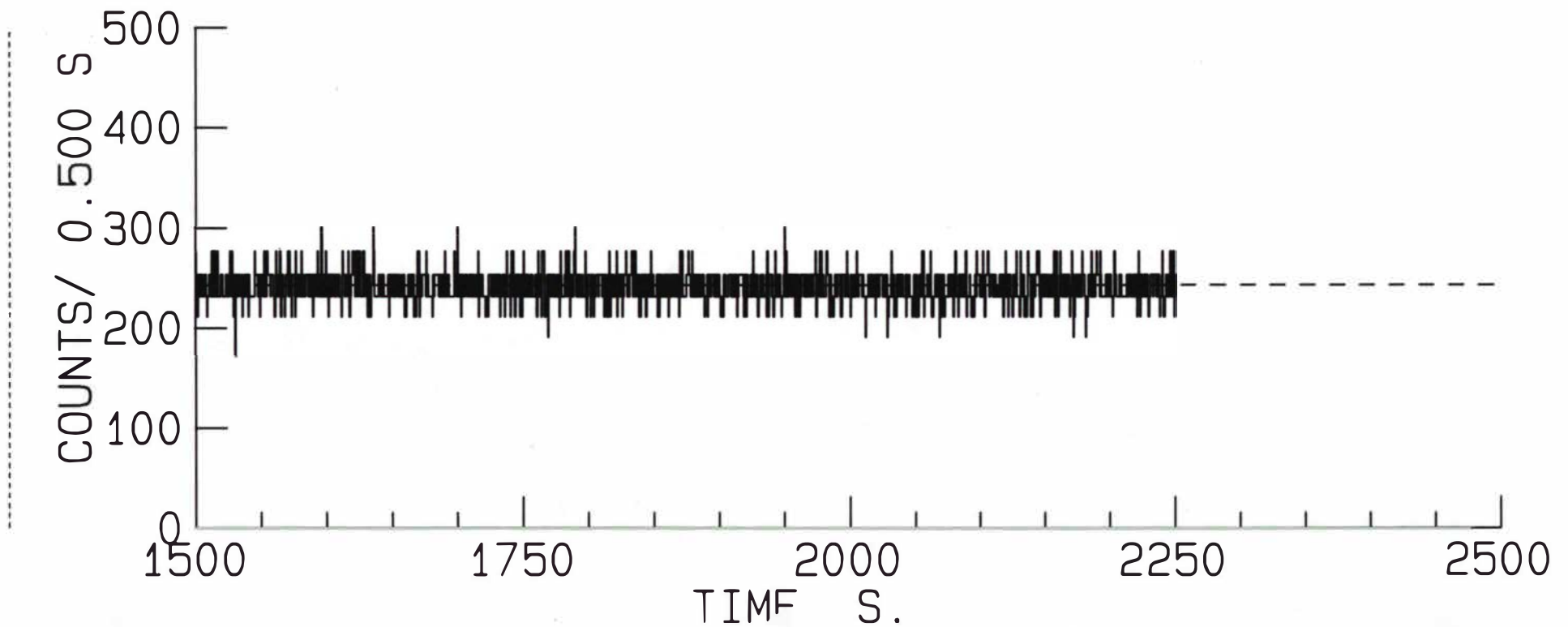
ULYSSES RT
21/ 5/97 47412.262 s
22- 147 keV

11 / 8 / 0



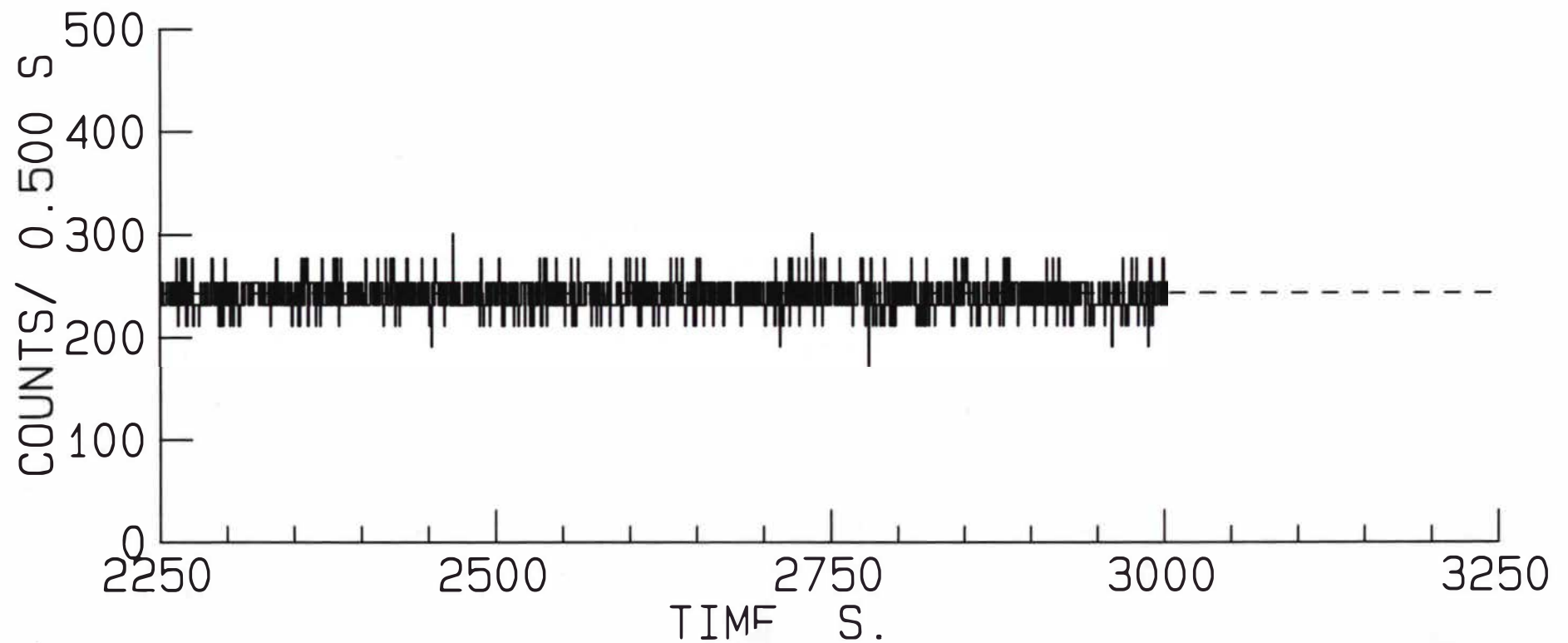
ULYSSES RT
21/ 5/97 47412.262 s
22- 147 keV

11 / 8 / 0



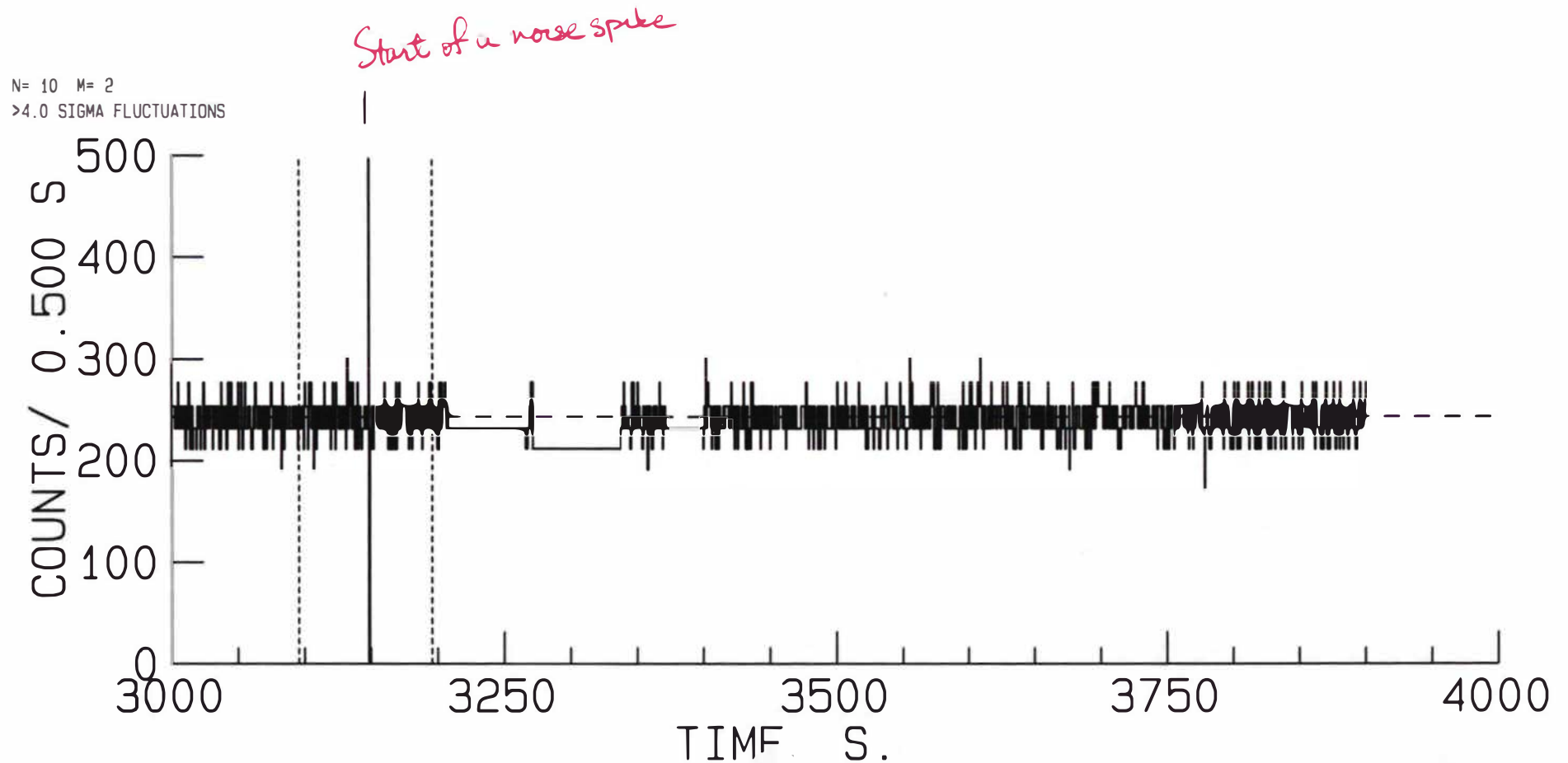
ULYSSES RT
21/ 5/97 47412.262 s
22- 147 keV

11 / 8 / 0



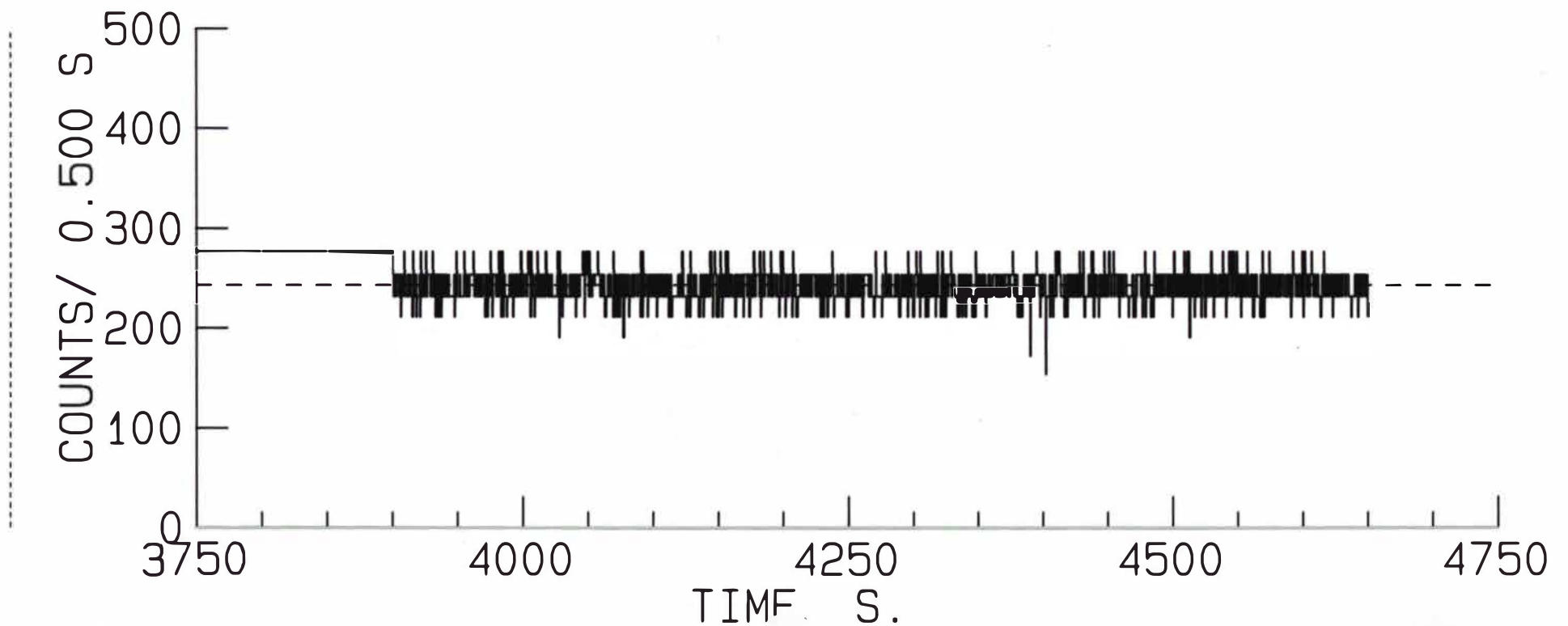
ULYSSES RT
21/ 5/97 47412.262 s
22- 147 keV

11 / 8 / 0



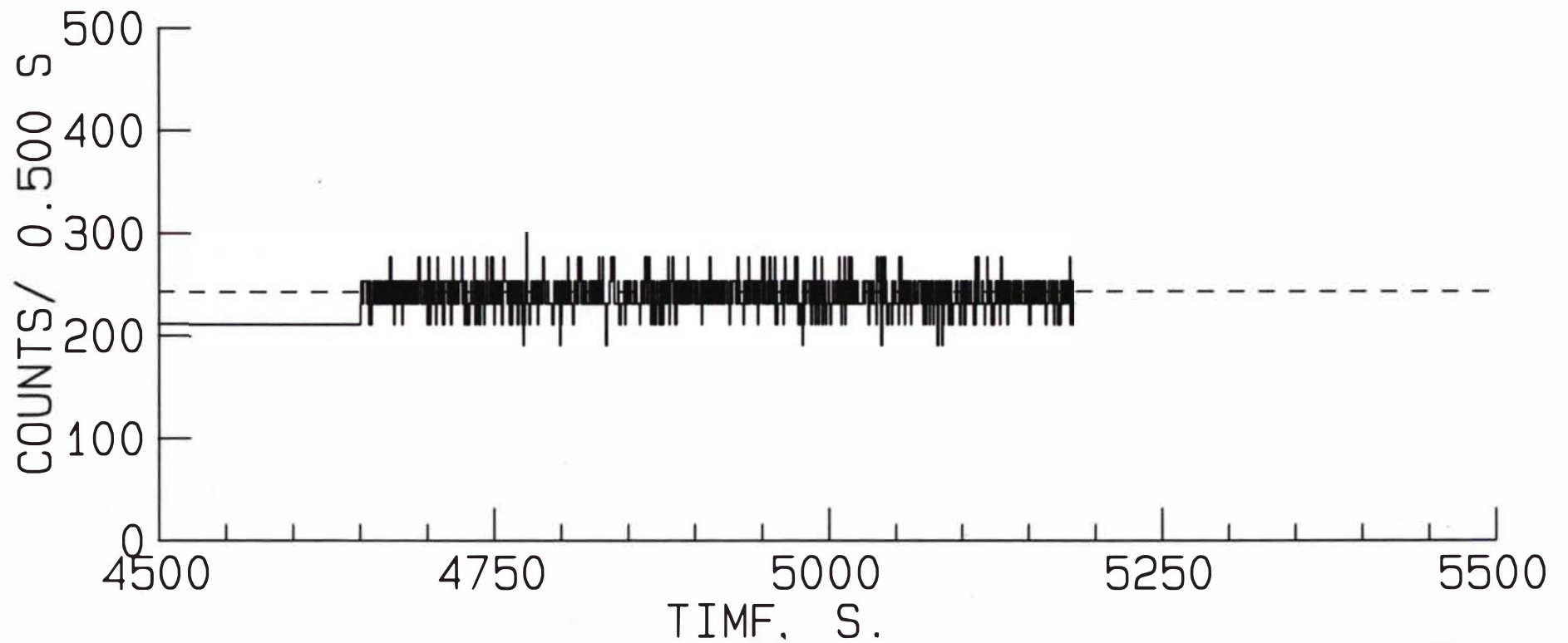
ULYSSES RT
21/ 5/97 47412.262 s
22- 147 keV

11 / 8 / 0



ULYSSES RT
21/ 5/97 47412.262 s
22- 147 keV

11 / 8 / 0



From kraken@rosserv.gsfc.nasa.gov Tue Jun 3 10:54 PDT 1997
X-Sender: kraken@lheapop.gsfc.nasa.gov
Mime-Version: 1.0
Date: Tue, 3 Jun 1997 13:56:18 -0500
khurley@sunspot.ssl.berkeley.edu (Kevin Hurley)
From: kraken@rosserv.gsfc.nasa.gov (Peter Kurczynski)
Subject: Bursts not seen by TGRS
Cc: TEEGARDEN@tgrs2.gsfc.nasa.gov, kraken@rosserv.gsfc.nasa.gov

Hi Kevin,

TGRS does not see the following Ulysses bursts:

May 18 1997 18:37 Ulysses time; weak burst, 100 ms long
May 21 1997 15:23 Ulysses time; weak burst, 100 ms long

I checked both waiting mode and burst mode data. Sorry for the delay,
but TGRS data from this time period only became available within the
past 24 hours.

Pete

From RICHARDSON@ssl.msfc.nasa.gov Fri May 23 11:30 PDT 1997
Return-Path: <RICHARDSON@ssl.msfc.nasa.gov>
Received: from SSIMOR.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id LAA05438; Fri, 23 May 1997 11:30:12 -0700
Date: Fri, 23 May 1997 13:30:09 -0500 (CDT)
From: RICHARDSON@SSLLES.MSFC.NASA.GOV
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970523133009.2163a499@SSLLES.MSFC.NASA.GOV>
Subject: Crossing Windows for BATSE Burst 6237
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6237
EVENT OF 1997 MAY 21 DAY OF YEAR=141
EVENT CROSSING TIME AT BATSE : 34668. S. OR 09:37:48.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 34.000 51.000
BATSE PEAK COUNTING RATE: 4100 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 21/ 5/ 97 IS:
RA= 150.880 DEC= 30.713 DIST= 5.117 AU
BATSE-ULYSSES DISTANCE = 765523475. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 98.76 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -388.87 SECS.
CROSSING TIME AT ULYSSES IS 34279. S. OR 09:31:19 +/- 482.25 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 21/ 5/ 97 IS:
RA= 171.084 DEC= 5.195 DIST= 0.952 AU
MARS-BATSE DISTANCE = 142355968. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 67.13 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 184.54 SECS.
CROSSING TIME AT MARS IS 34853. S. OR 09:40:52 +/- 78.76 SECONDS

BATSE BURST TRIGGER

NO.: 6237

TIME: TJD=0589 SECONDS=34668

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=168.1 AZIMUTH=73.6 ERROR=5.5 DEGREES

COMMENTS:

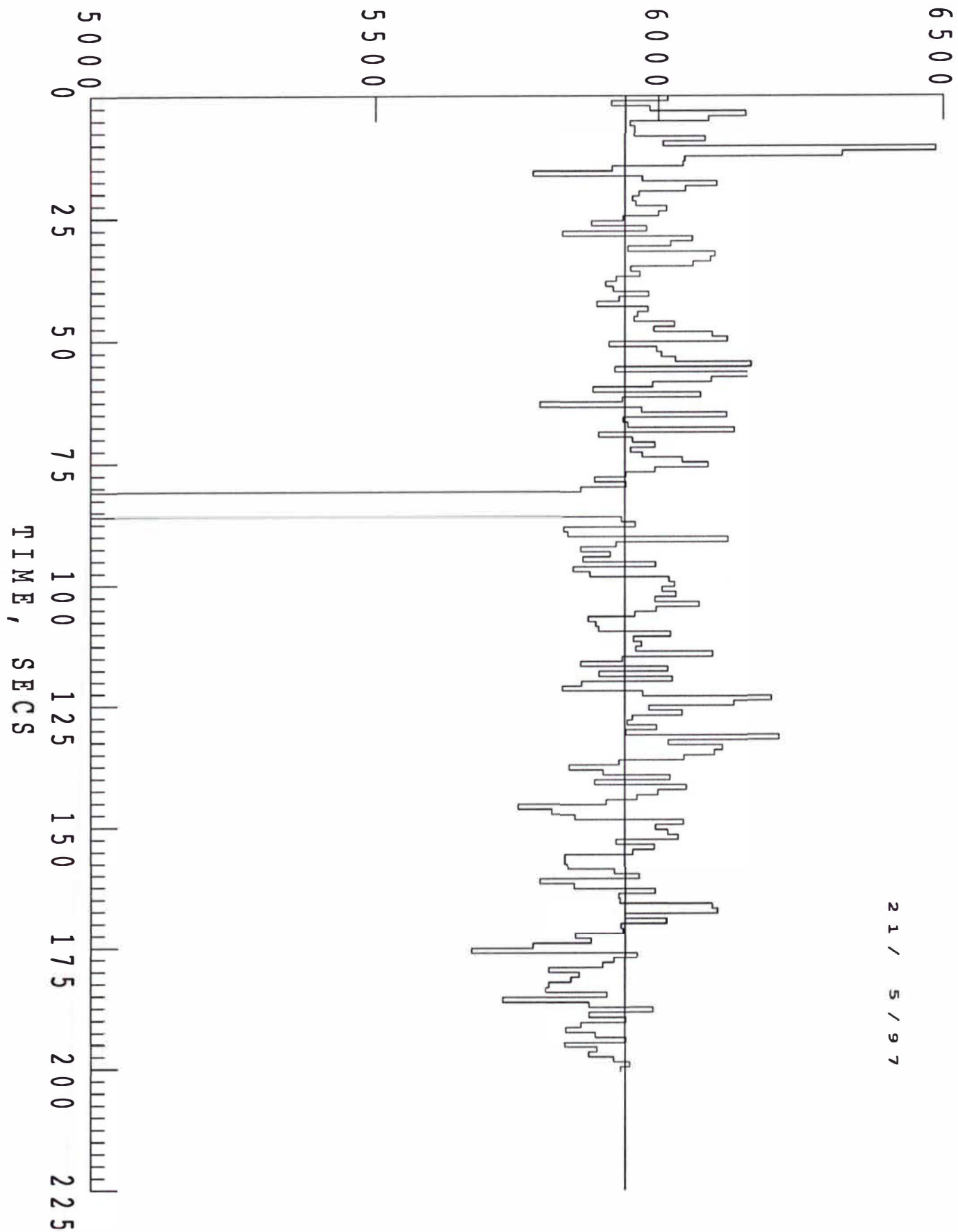
GRB. SHORT PULSE. DUR.~1.3 SEC. NOT VISIBLE ABOVE 300KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6237	970521	10589	34668	4100	034	+51	1.3

BACODINE 6237 21/05/97 34656.969

25- 100 keV

COUNTS/1.024 S



21 / 5 / 97

BACODINE# 6237

ULYSSES RT

22 / 5 / 97

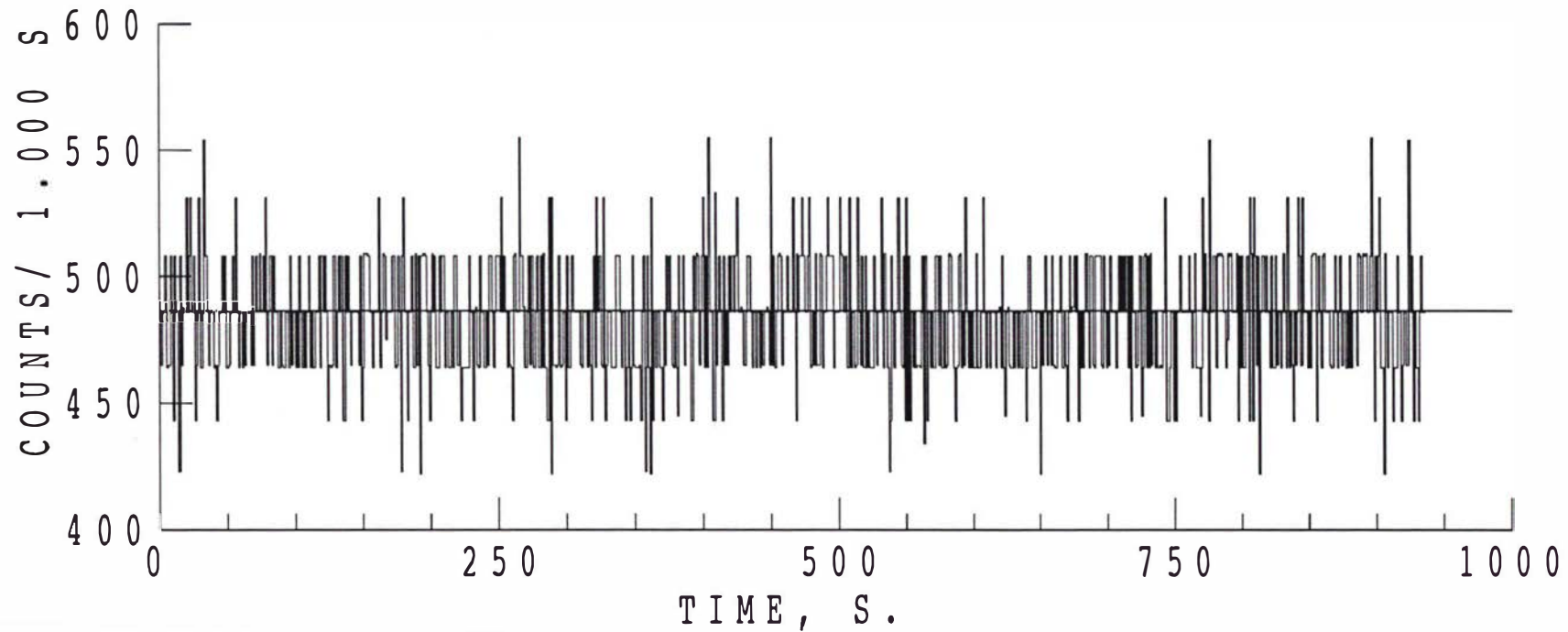
21 / 5 / 97 33660.465 s

0.500 S INTERVALS REGROUPED BY 2

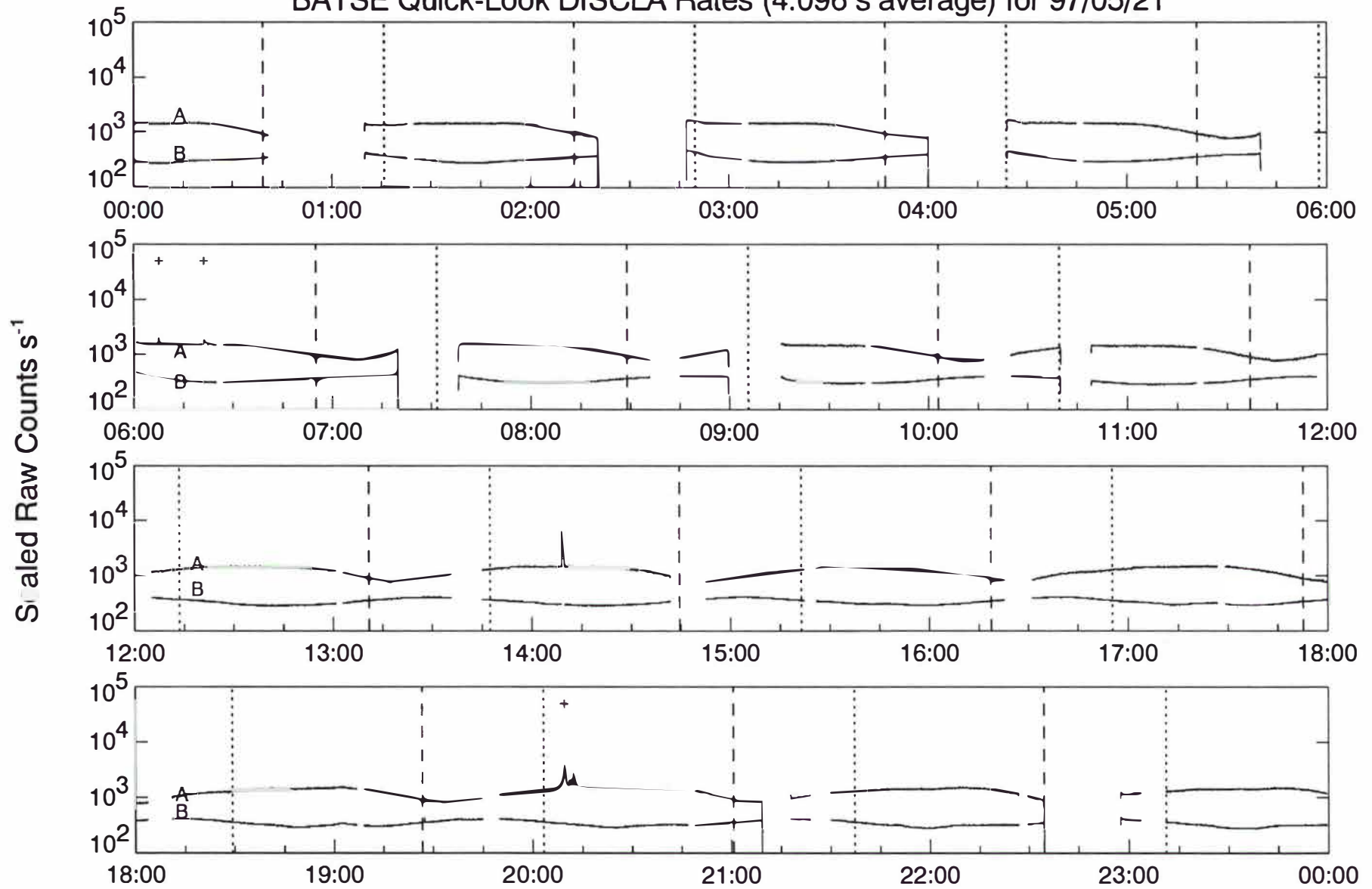
0 - 0 keV

N= 10 M=10
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



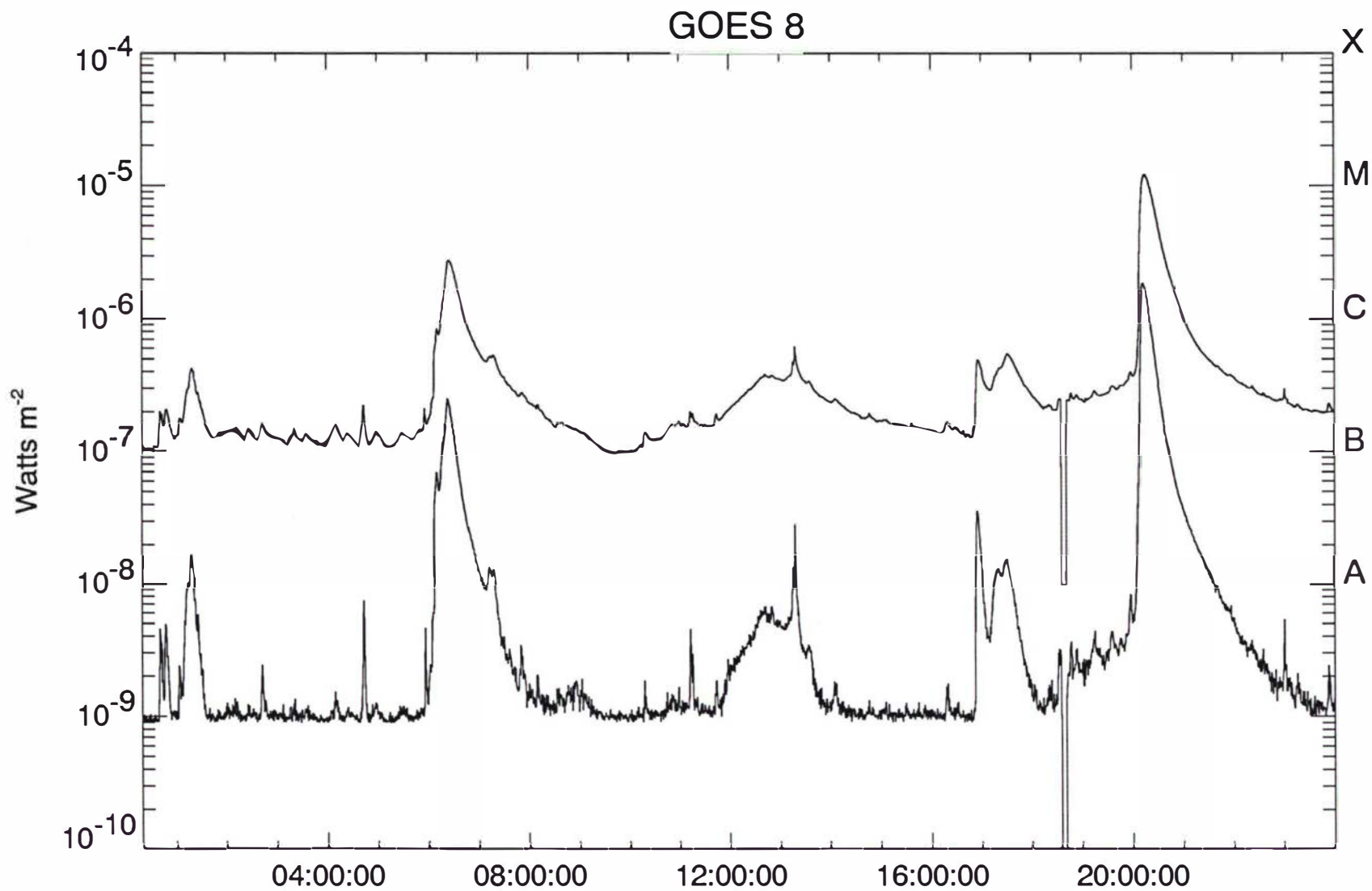
BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/21



Current Time: 97/05/25, 1008 EDT
A: Channel 0 Most Sunward LAD
B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry
Dashed line: Night entry

* Solar Burst Trigger
+ Solar Flare



Data Start: 97/05/21, 0019:54

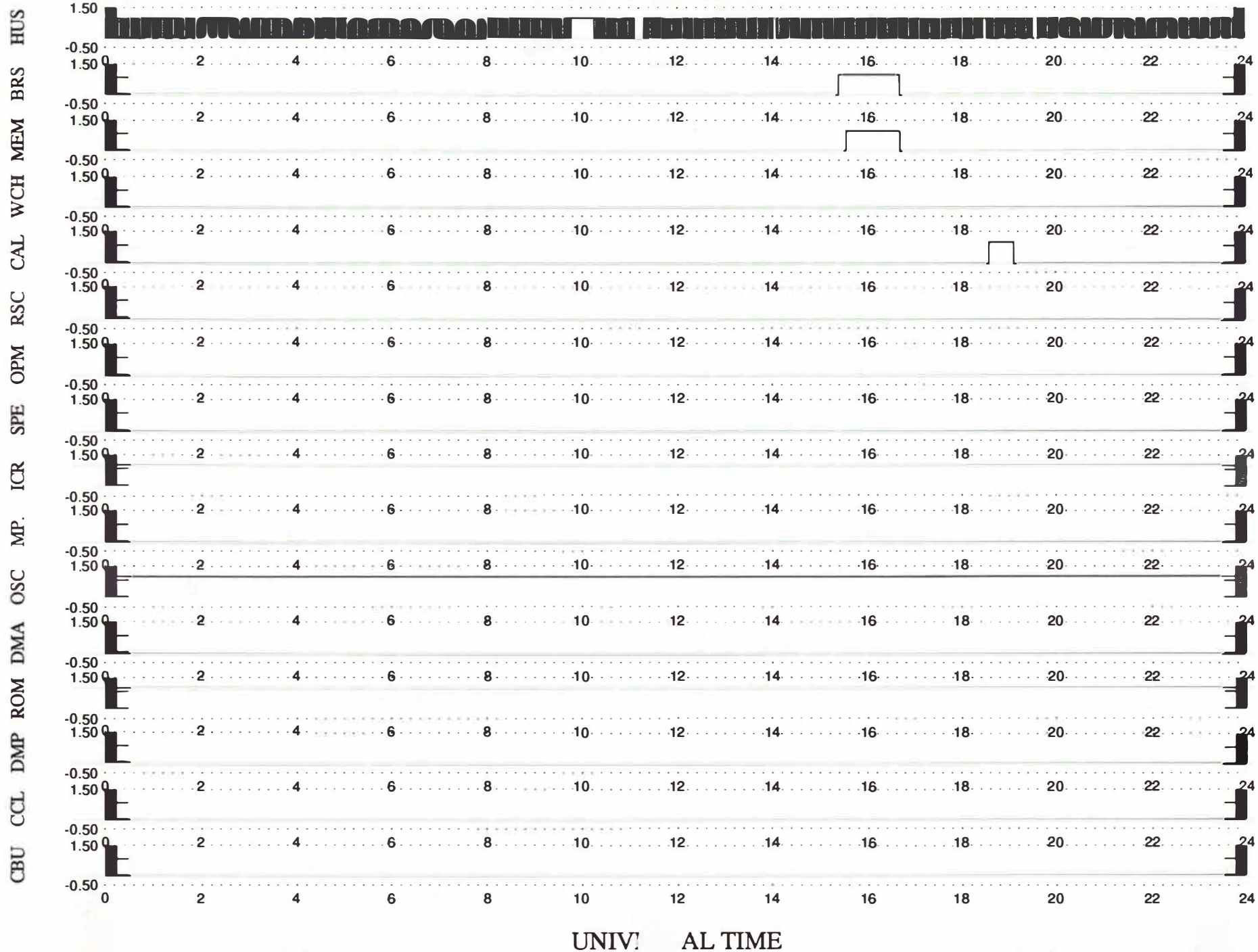
Plot created: 97/05/25, 1007

Channel 1 (1.0 - 8.0 Angstroms) Background not subtracted

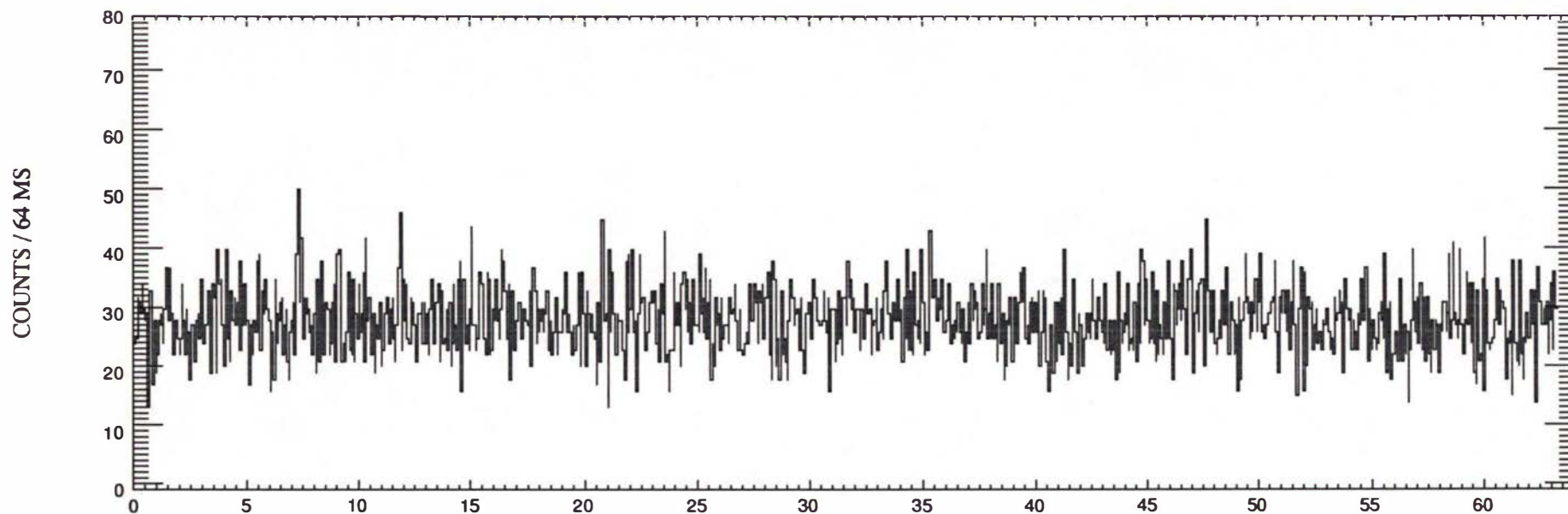
Channel 2 (0.5 - 4.0 Angstroms) Background not subtracted

Sample average = 10

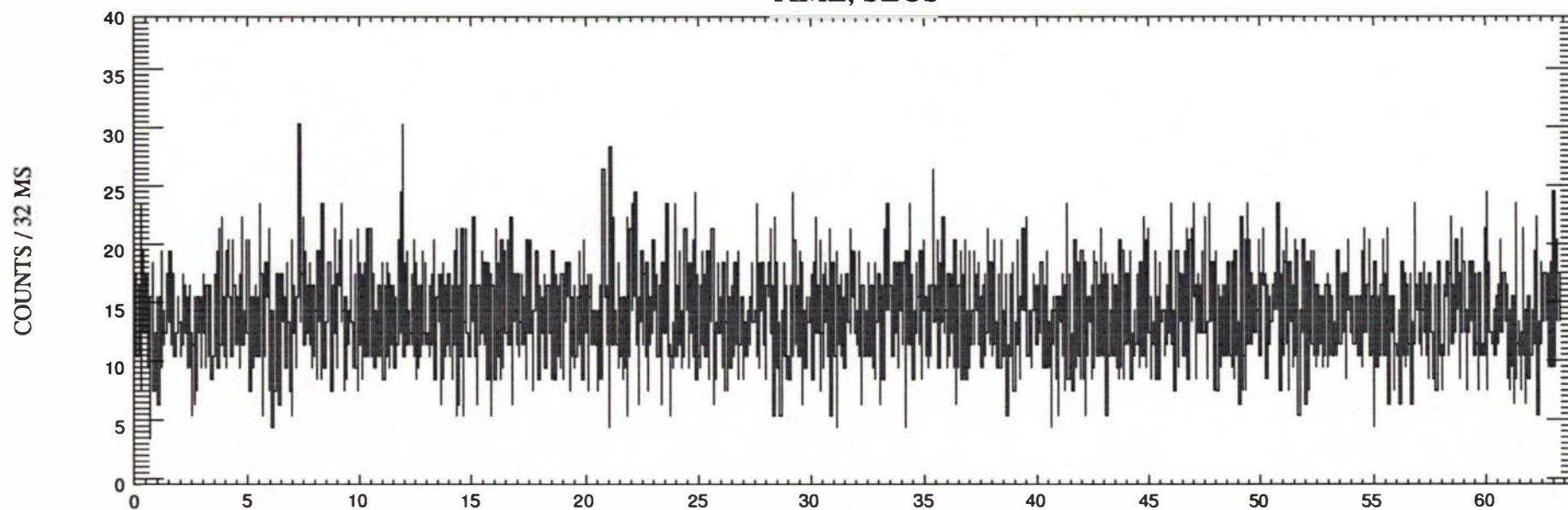
BURST NUMBER 15



Burst Counter 15 at UT=15.380025494893 h=55368.092 s 15:22:48.092

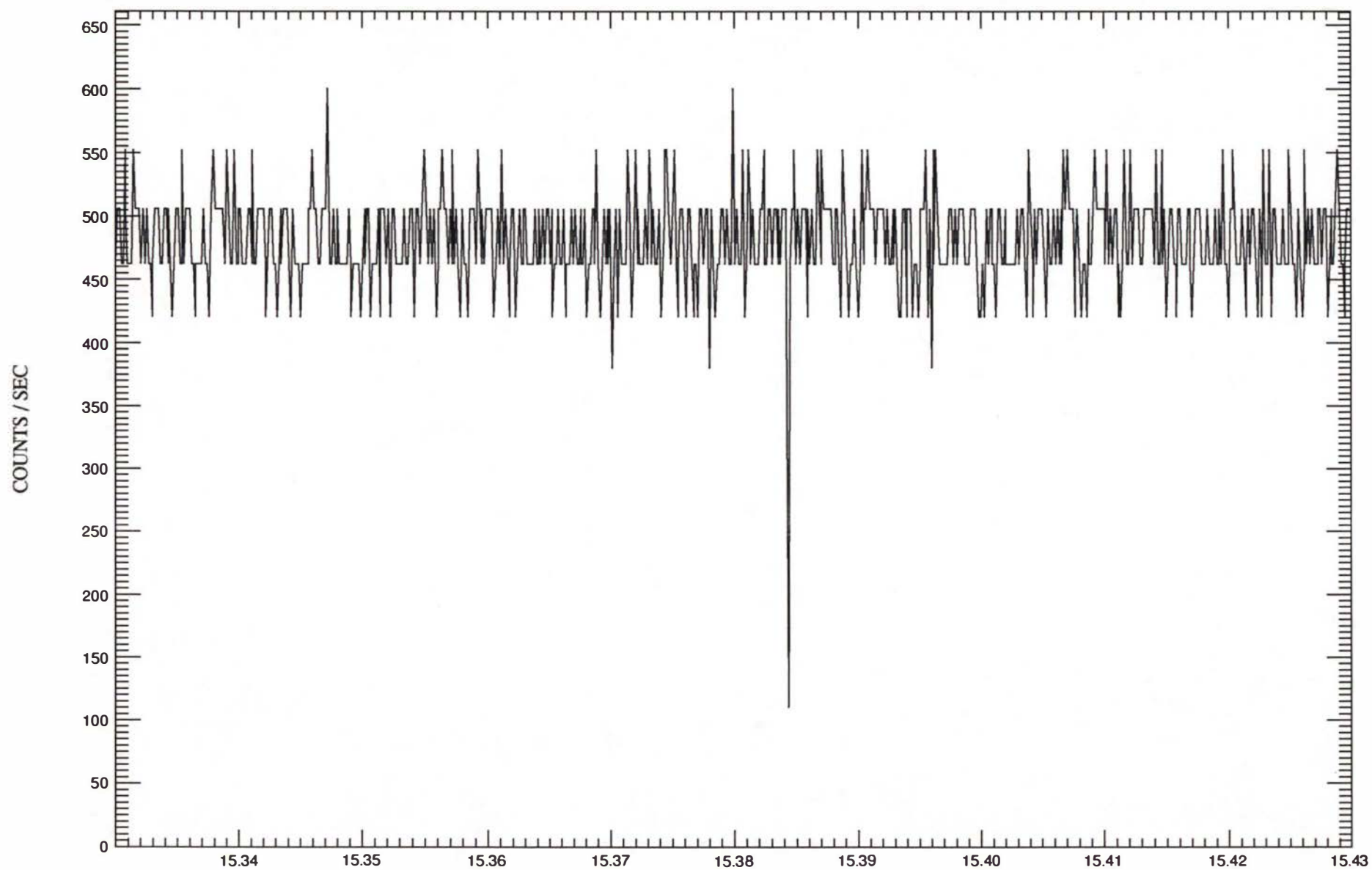


TIME, SECS

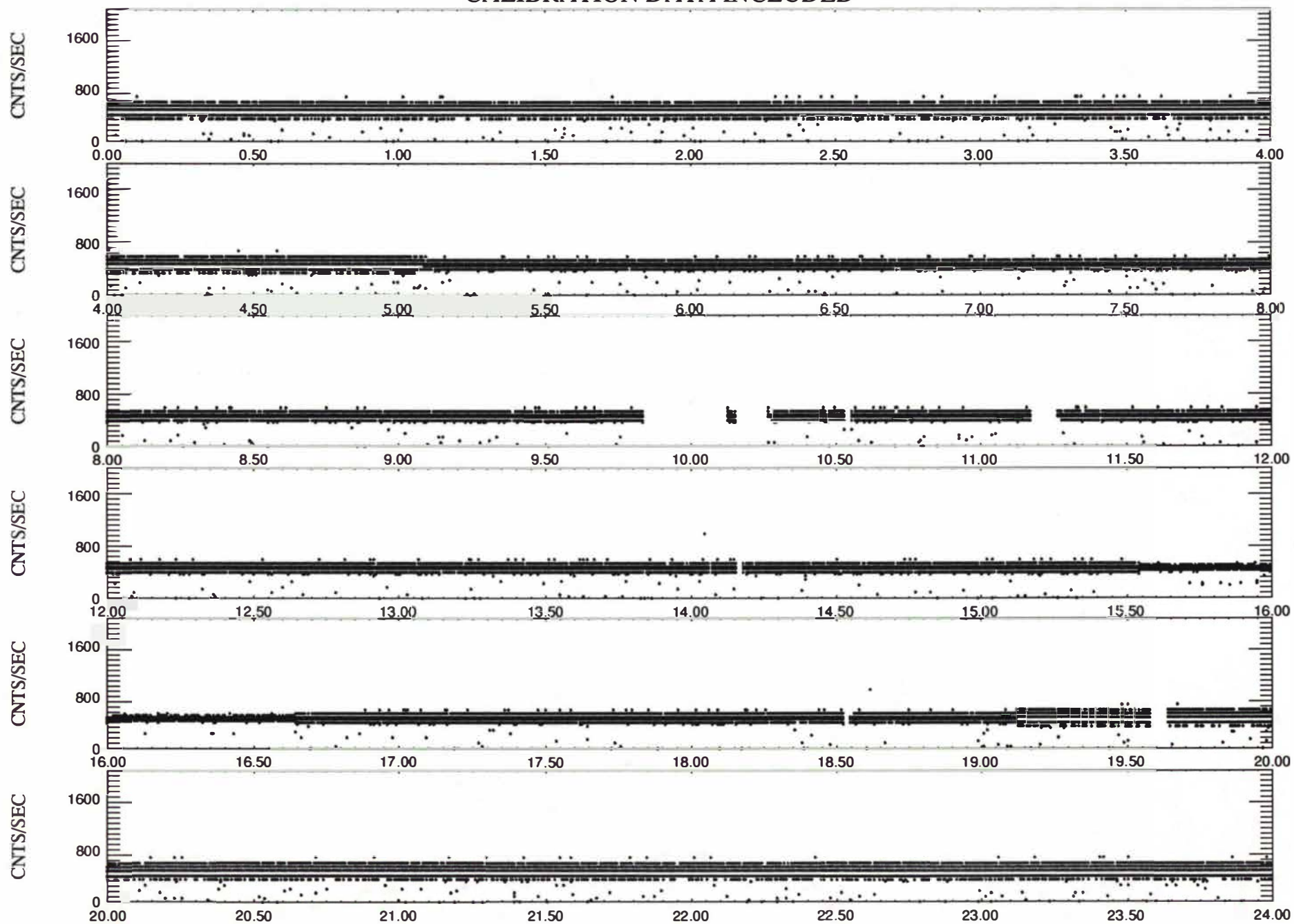


TIME, SECS

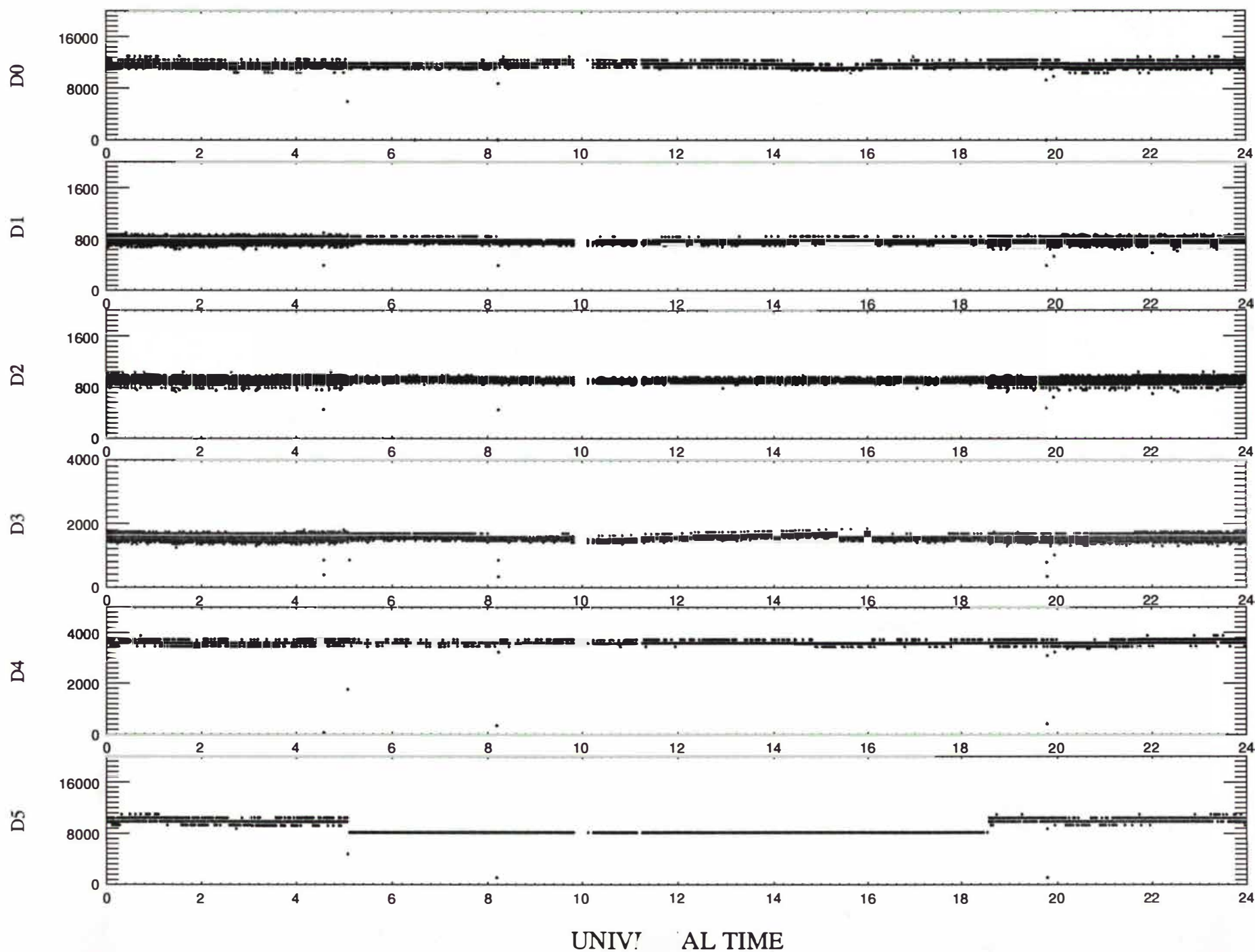
CALIBRATION DATA INCLUDED



CALIBRATION DATA INCLUDED



UNIV' AL TIME



From RICHARDSON@ssl.msfc.nasa.gov Fri May 23 11:32 PDT 1997
Return-Path: <RICHARDSON@ssl.msfc.nasa.gov>
Received: from SSLMOR.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id LAA05469; Fri, 23 May 1997 11:31:54 -0700
Date: Fri, 23 May 1997 13:31:50 -0500 (CDT)
From: RICHARDSON@SSLLES.MSFC.NASA.GOV
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970523133150.2163a499@SSLLES.MSFC.NASA.GOV>
Subject: Crossing Windows for BATSE Burst 6238
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6238
EVENT OF 1997 MAY 22 DAY OF YEAR=142
EVENT CROSSING TIME AT BATSE : 73597. S. OR 20:26:37.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 236.000 -13.000
BATSE PEAK COUNTING RATE: 6500 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 22/ 5/ 97 IS:
RA= 150.887 DEC= 30.540 DIST= 5.143 AU
BATSE-ULYSSES DISTANCE = 769380977. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 87.55 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 109.88 SECS.
CROSSING TIME AT ULYSSES IS 73707. S. OR 20:28:26 +/- 496.82 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 22/ 5/ 97 IS:
RA= 171.301 DEC= 5.066 DIST= 0.959 AU
MARS-BATSE DISTANCE = 143450976. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION=113.26 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -188.97 SECS.
CROSSING TIME AT MARS IS 73408. S. OR 20:23:28 +/- 73.45 SECONDS

BATSE BURST TRIGGER

NO.: 6238

TIME: TJD=0590 SECONDS=73597

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=47.3 AZIMUTH=195.1 ERROR=6.8 DEGREES

COMMENTS:

GRB. SHORT PULSE. DUR.~0.6 SEC. NOT VISIBLE ABOVE 300KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6238	970522	10590	73597	6500	236	-13	.6

BACODINE# 6238

ULYSSES RT

23 / 5 / 97

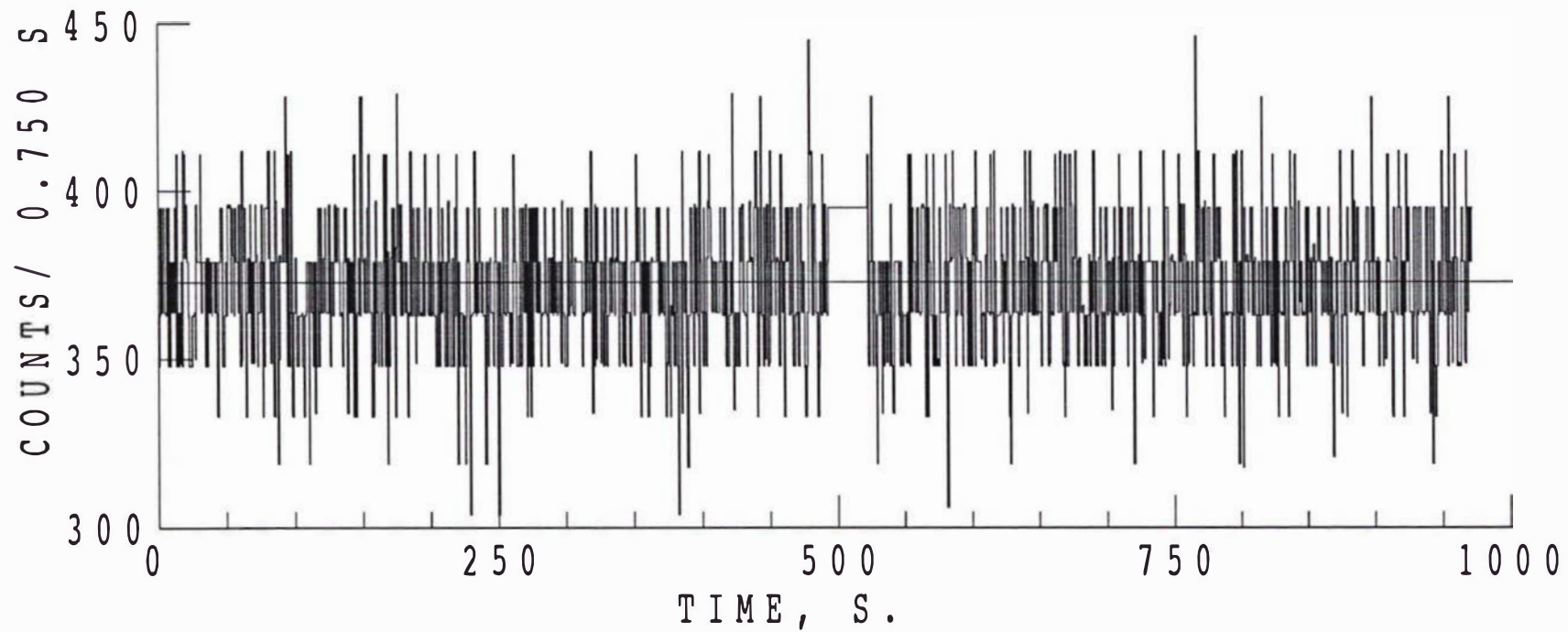
22 / 5 / 97 72756.180 s

0.250 S INTERVALS REGROUPED BY 3

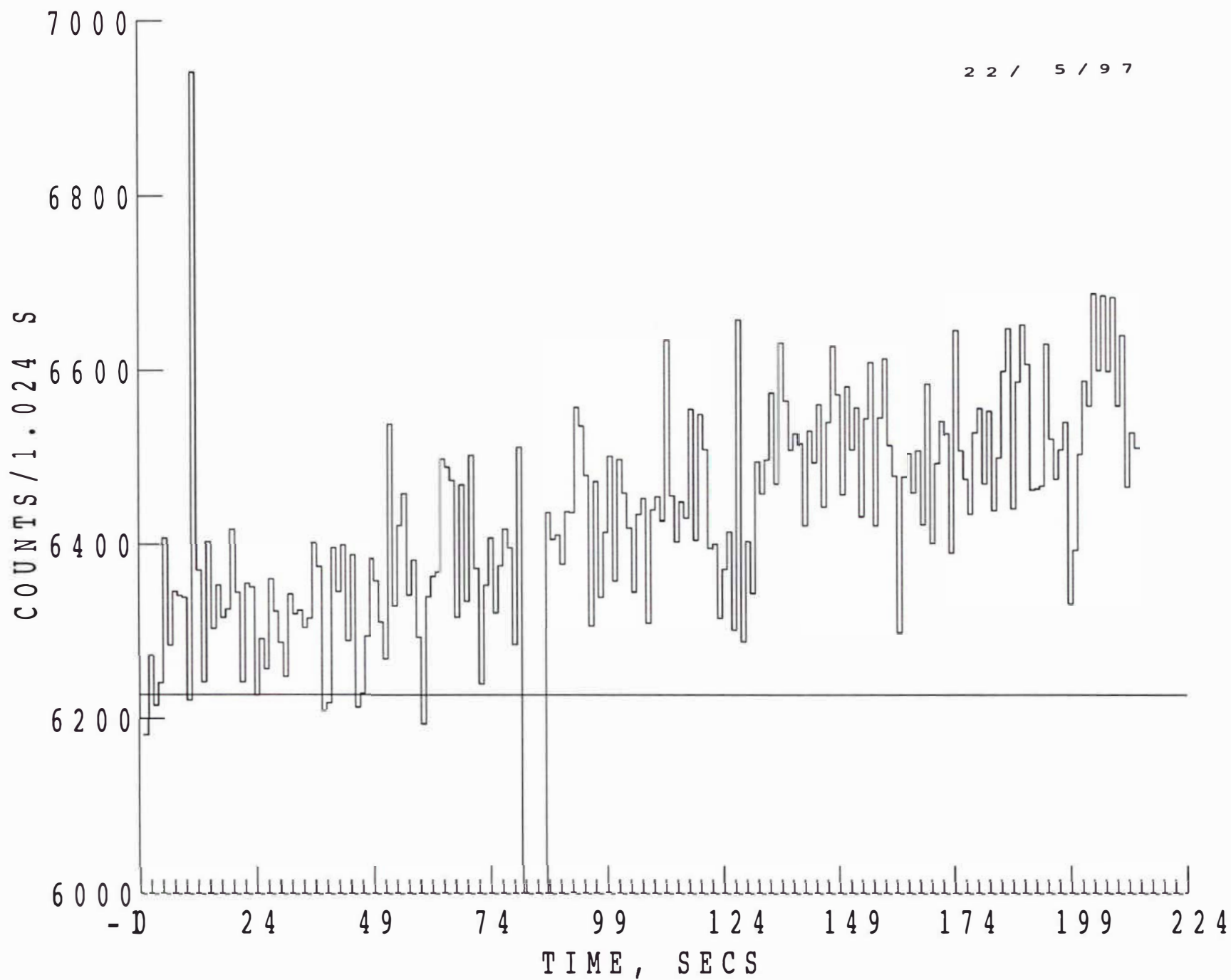
0 - 0 keV

N= 10 M=10
>4.0 SIGMA FLUCTUATIONS

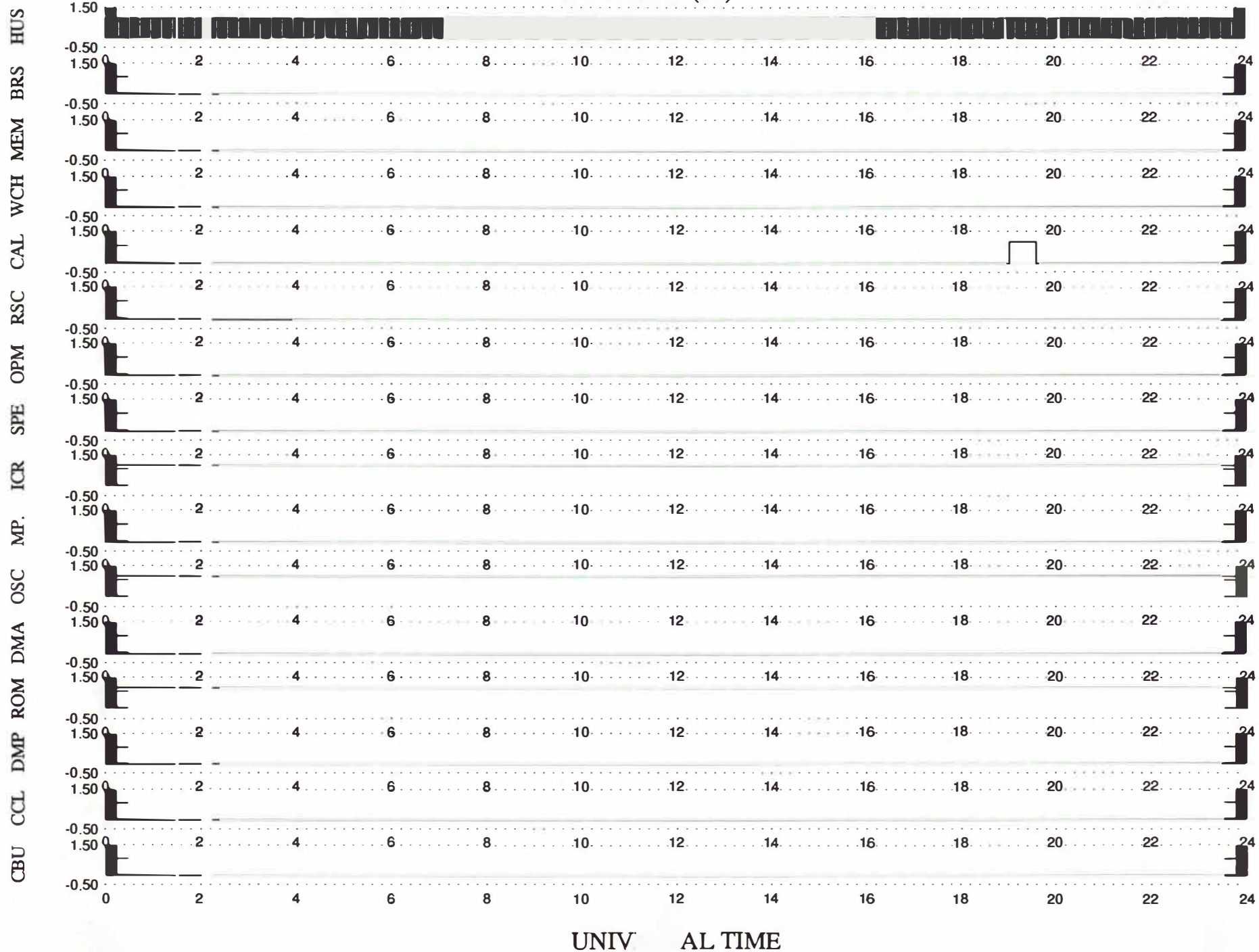
N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



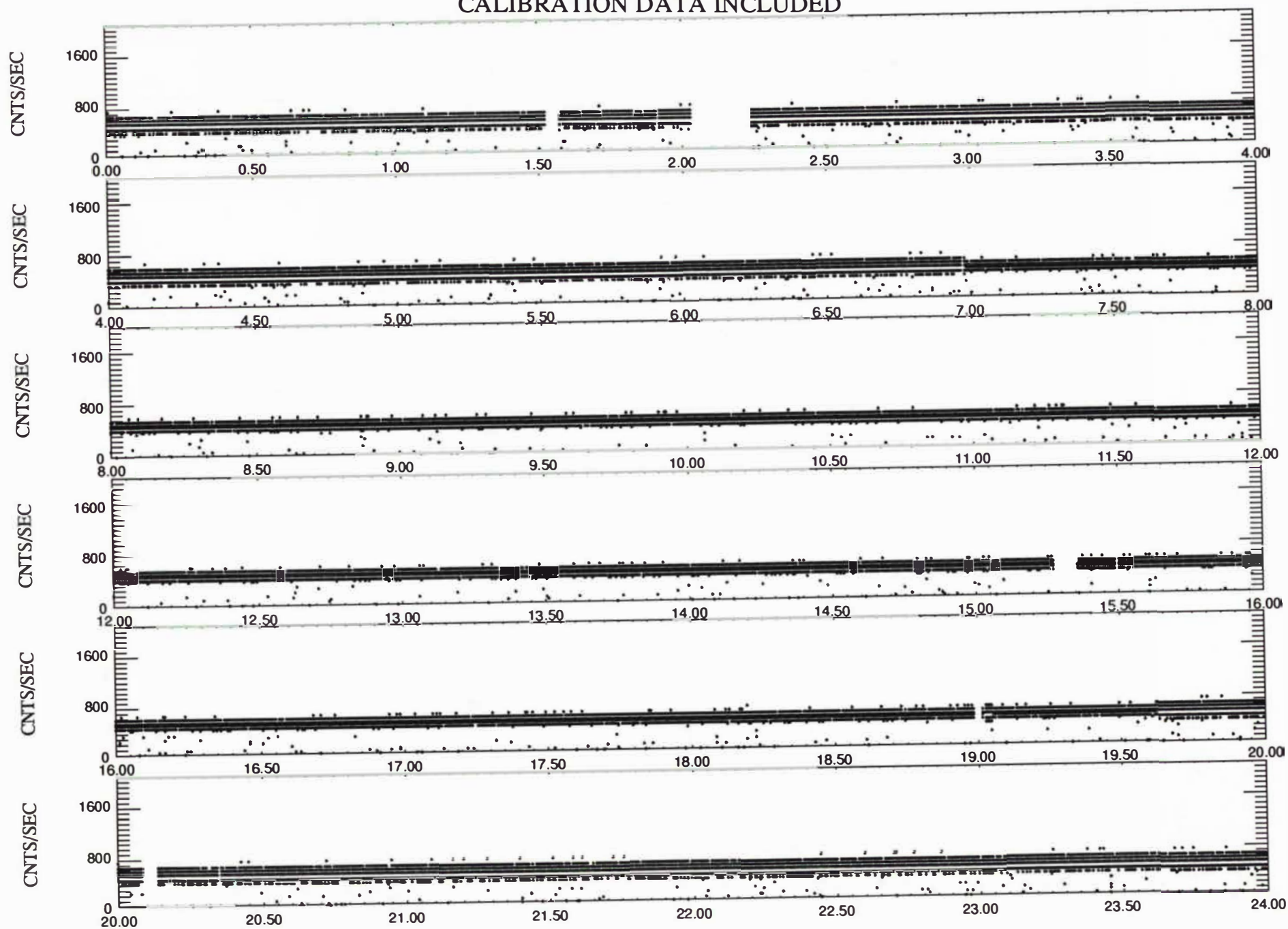
BACODINE 6238 22/05/97 73586.377
25- 100 keV



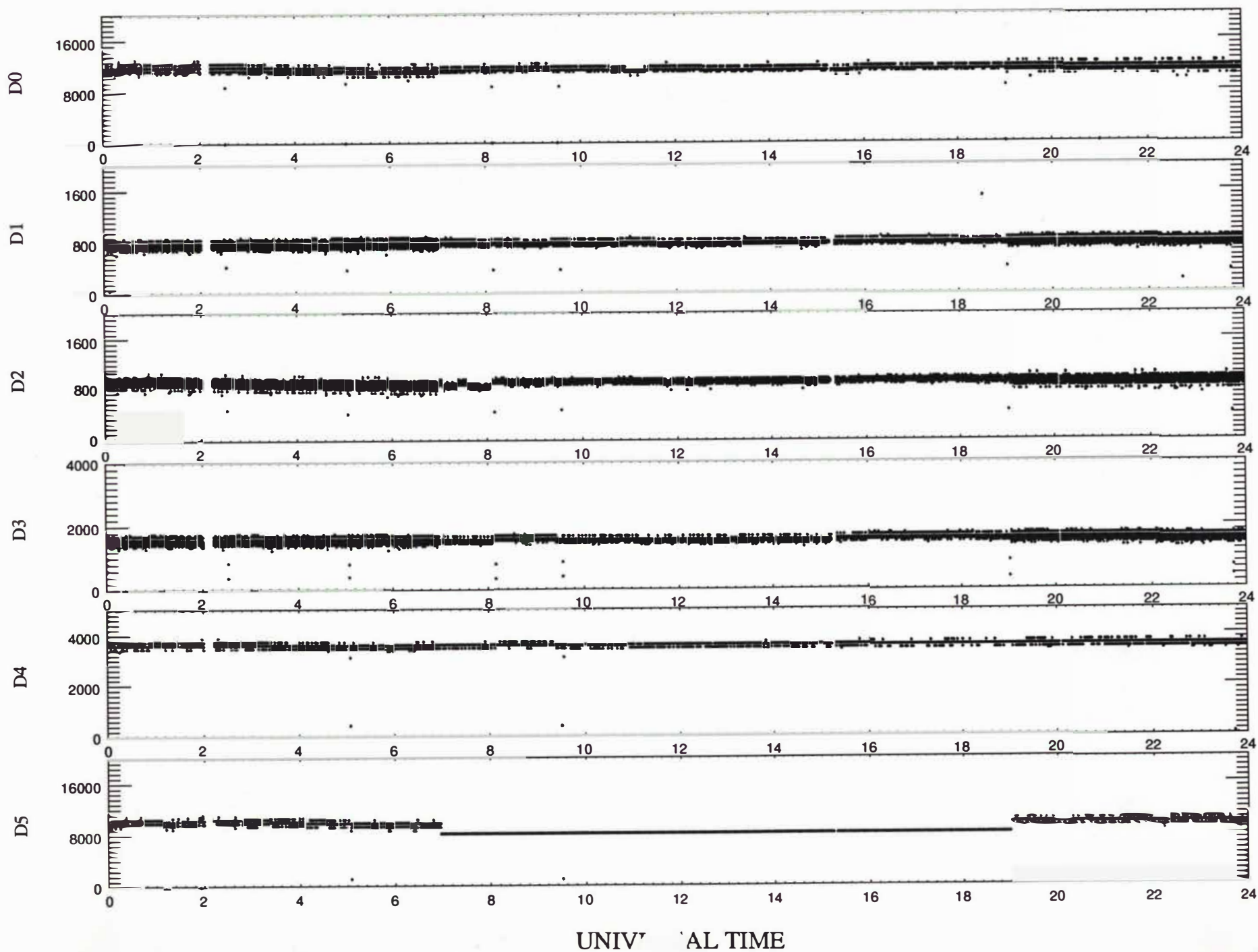
NO BURST (15)



CALIBRATION DATA INCLUDED



UNIV AL TIME



From SURASAK@SSLLES.MSFC.NASA.GOV Tue May 27 14:18 PDT 1997
Return-Path: <SURASAK@SSLLES.MSFC.NASA.GOV>
Received: from SSLLES.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id OAA28080; Tue, 27 May 1997 14:18:28 -0700
From: SURASAK@SSLLES.MSFC.NASA.GOV
Date: Tue, 27 May 1997 16:18:00 -0500 (CDT)
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970527161800.21645635@SSLLES.MSFC.NASA.GOV>
Subject: Crossing Windows for BATSE Burst 6239
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6239
EVENT OF 1997 MAY 23 DAY OF YEAR=143
EVENT CROSSING TIME AT BATSE : 44990. S. OR 12:29:50.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 39.000 -38.000
BATSE PEAK COUNTING RATE: 1400 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 23/ 5/ 97 IS:
RA= 150.893 DEC= 30.459 DIST= 5.155 AU
BATSE-ULYSSES DISTANCE = 771167273. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 55.57 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 1454.34 SECS.
CROSSING TIME AT ULYSSES IS 46444. S. OR 12:54:04 +/- 440.46 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 23/ 5/ 97 IS:
RA= 171.525 DEC= 4.934 DIST= 0.966 AU
MARS-BATSE DISTANCE = 144549104. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 54.30 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 281.39 SECS.
CROSSING TIME AT MARS IS 45271. S. OR 12:34:31 +/- 72.25 SECONDS

BATSE BURST TRIGGER

NO.: 6239

TIME: TJD=0591 SECONDS=44990

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=81.8 AZIMUTH=32.3 ERROR=8.258 DEGREES

COMMENTS:

GRB in DATA GAP. DUR~14S. SINGLE PULSE. NOT VISIBLE ABOVE 300 KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6239	970523	10591	44990	1400	039	-38	14

BATSE BURST# 6239

ULYSSES RT

29 / 5 / 97

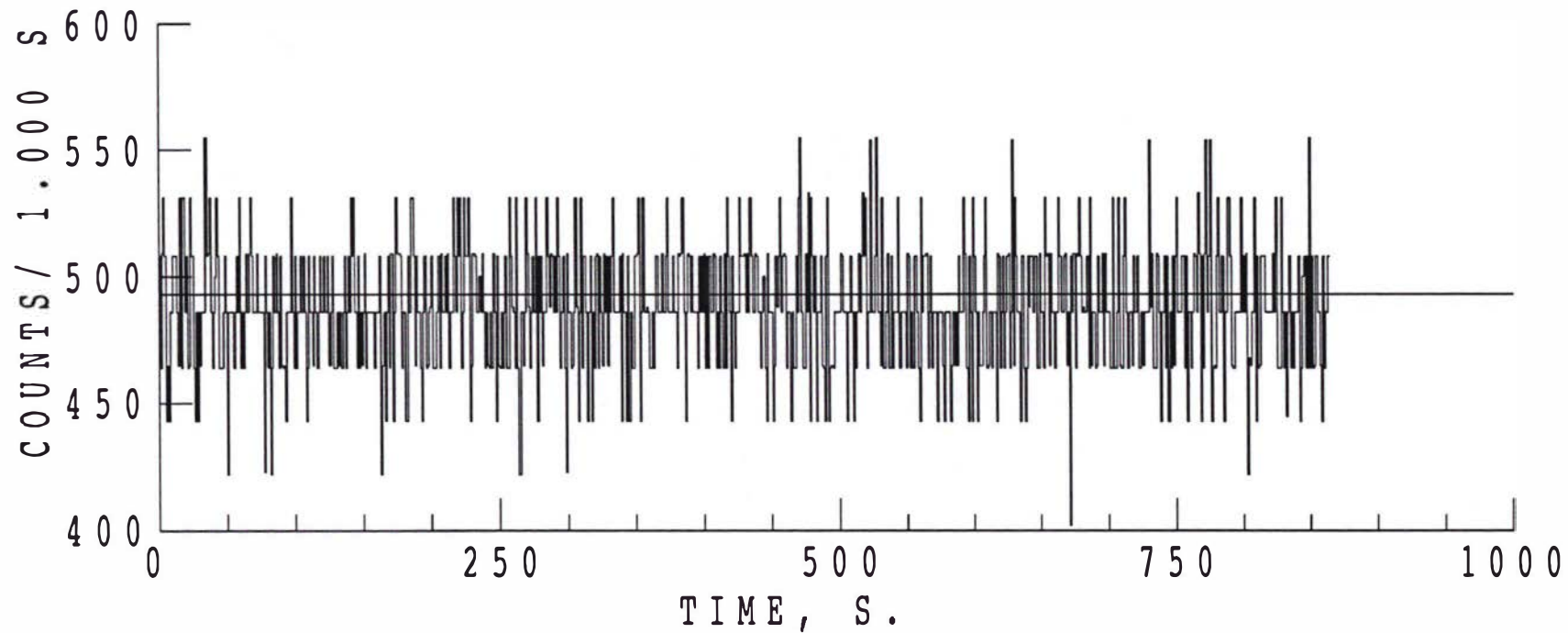
23 / 5 / 97 46008.258 s

0.500 S INTERVALS REGROUPED BY 2

0 - 0 keV

N= 10 M=10
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



From SURASAK@ssl.msfc.nasa.gov Tue May 27 14:35 PDT 1997
Return-Path: <SURASAK@ssl.msfc.nasa.gov>
Received: from SSLMOR.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id OAA28238; Tue, 27 May 1997 14:34:54 -0700
Date: Tue, 27 May 1997 16:34:49 -0500 (CDT)
From: SURASAK@SSLLES.MSFC.NASA.GOV
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970527163449.21645635@SSLLES.MSFC.NASA.GOV>
Subject: Crossing Windows for BATSE Burst 6240
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6240
EVENT OF 1997 MAY 23 DAY OF YEAR=143
EVENT CROSSING TIME AT BATSE : 82890. S. OR 23:01:30.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 111.000 44.000
BATSE PEAK COUNTING RATE: 4400 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 23/ 5/ 97 IS:
RA= 150.898 DEC= 30.407 DIST= 5.163 AU
BATSE-ULYSSES DISTANCE = 772330530. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=145.85 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-2131.96 SECS.
CROSSING TIME AT ULYSSES IS 80758. S. OR 22:25:58 +/- 268.71 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 23/ 5/ 97 IS:
RA= 171.525 DEC= 4.934 DIST= 0.966 AU
MARS-BATSE DISTANCE = 144549104. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION=114.35 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -198.83 SECS.
CROSSING TIME AT MARS IS 82691. S. OR 22:58:11 +/- 73.24 SECONDS

BATSE BURST TRIGGER

NO.: 6240

TIME: TJD=0591 SECONDS=82890

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=139.7 AZIMUTH=289.7 ERROR=2.284 DEGREES

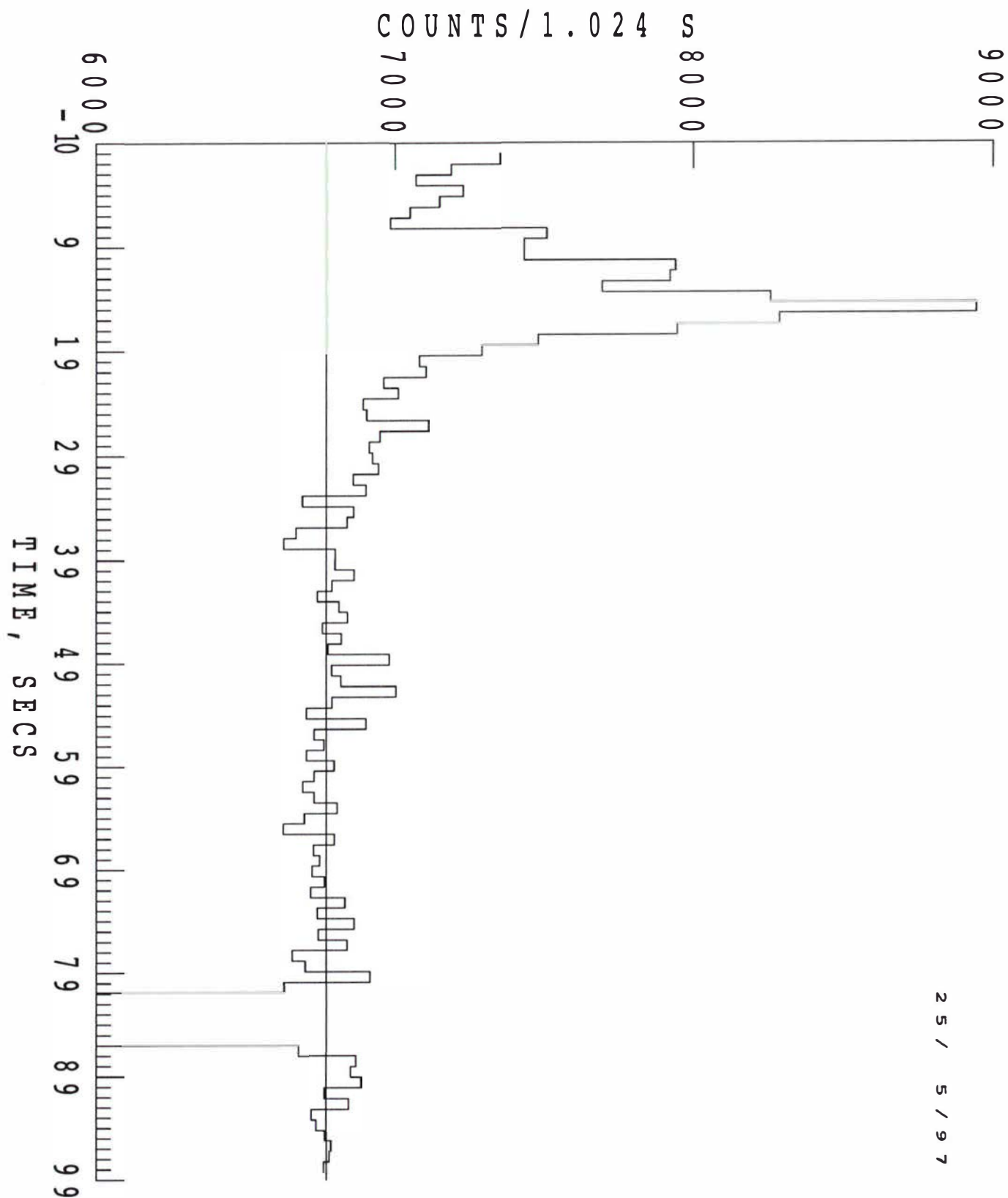
COMMENTS:

GRB. DUR~55S WITH PRETRIGGER AT~T-140 AND T-230. MULTIPLE PULSES.
NOT VISIBLE ABOVE 300 KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6240	970523	10591	82890	4400	111	+44	55

BACODINE 6240 23/05/97 82879.177

25- 100 keV



BATSE BURST# 6240

ULYSSES RT

29 / 5 / 97

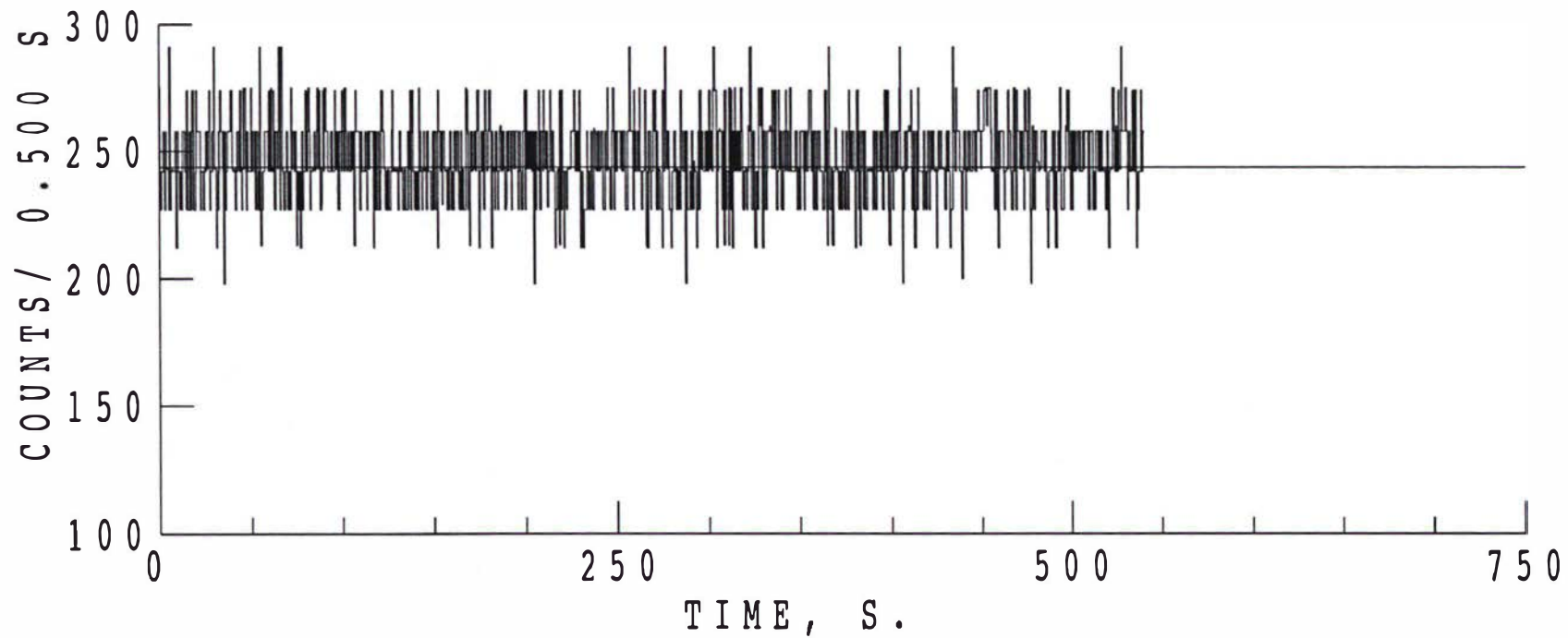
23 / 5 / 97 80496.156 s

0.250 S INTERVALS REGROUPED BY 2

0 - 0 keV

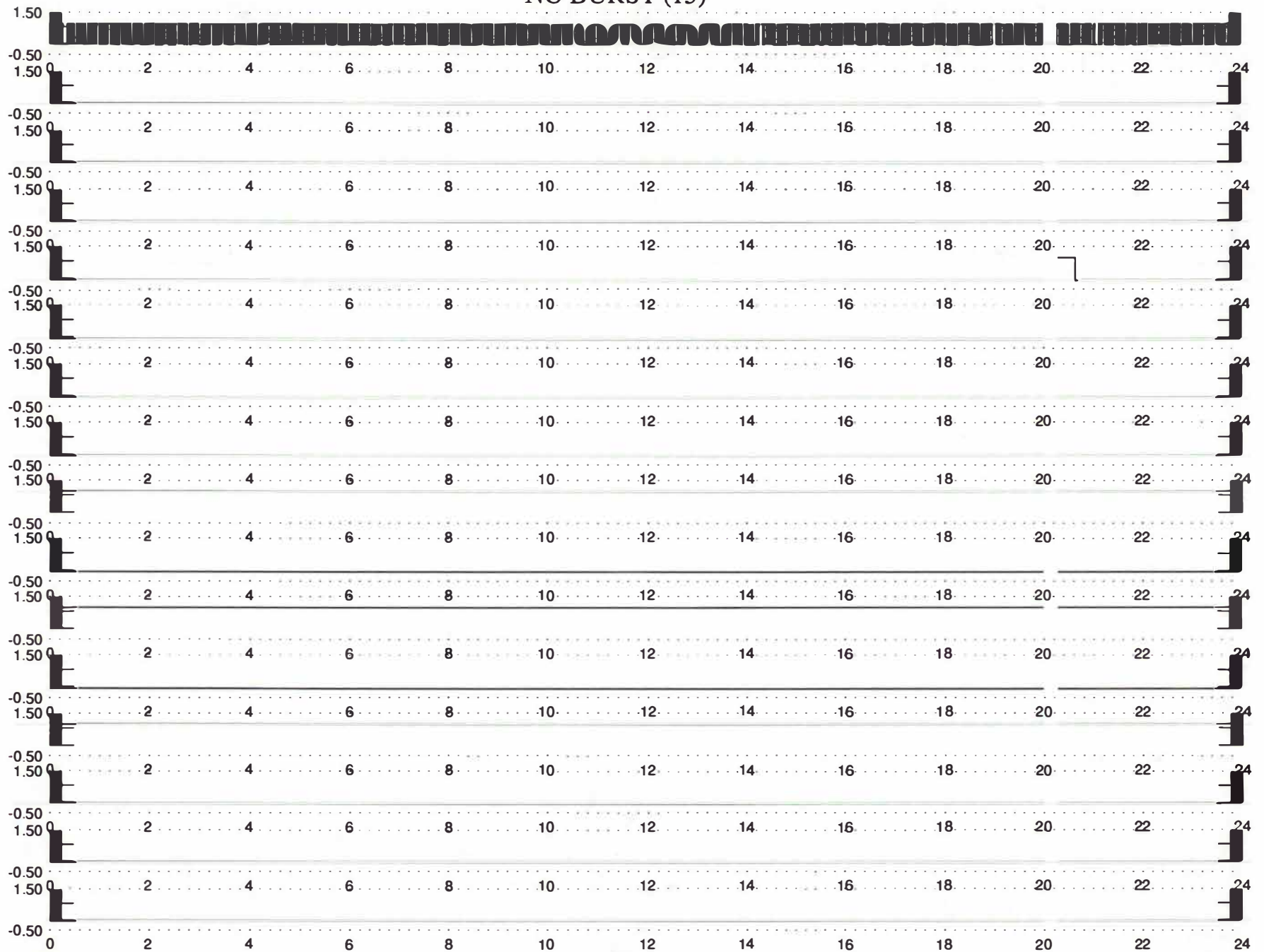
N= 10 M=10
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



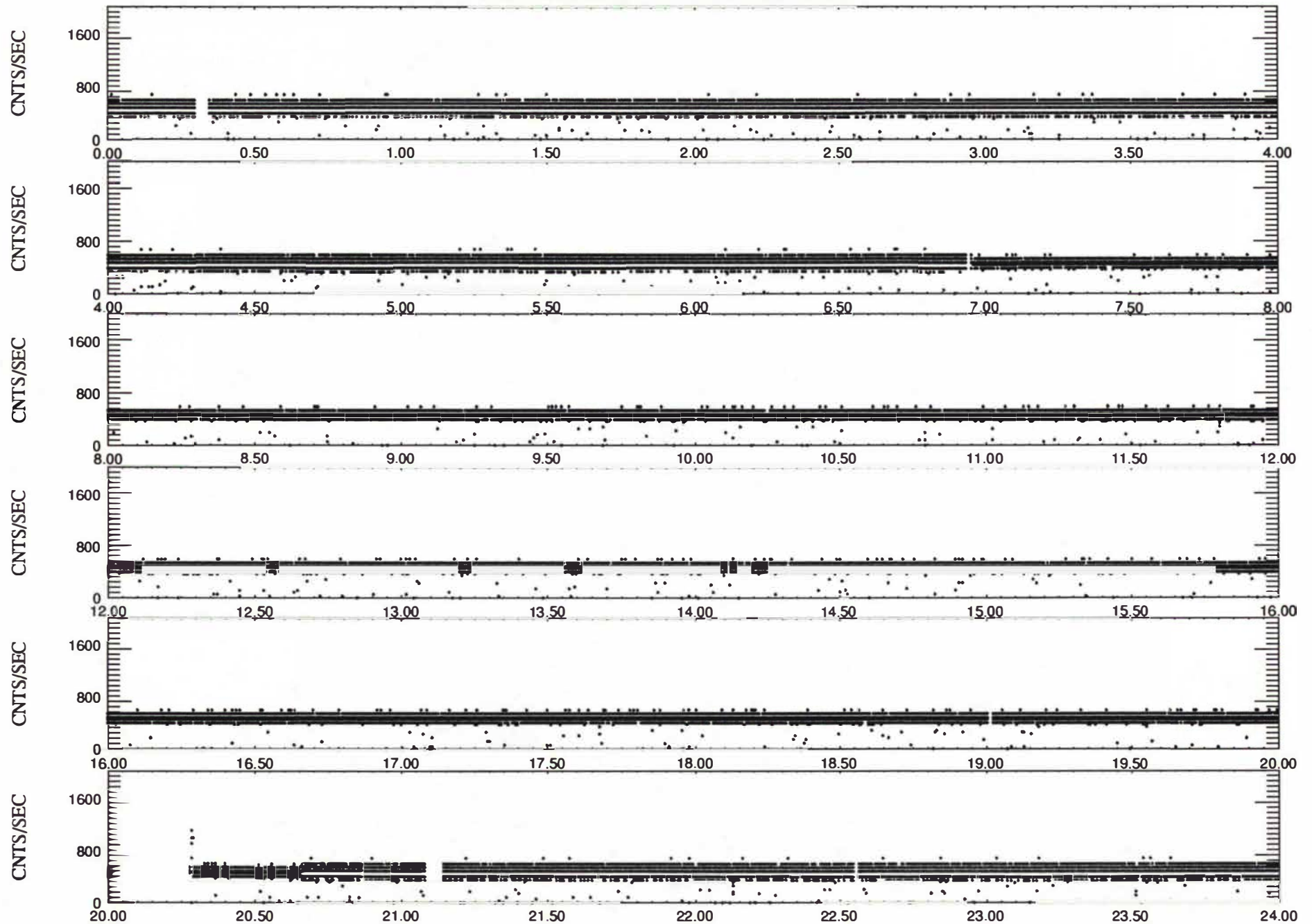
NO BURST (15)

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

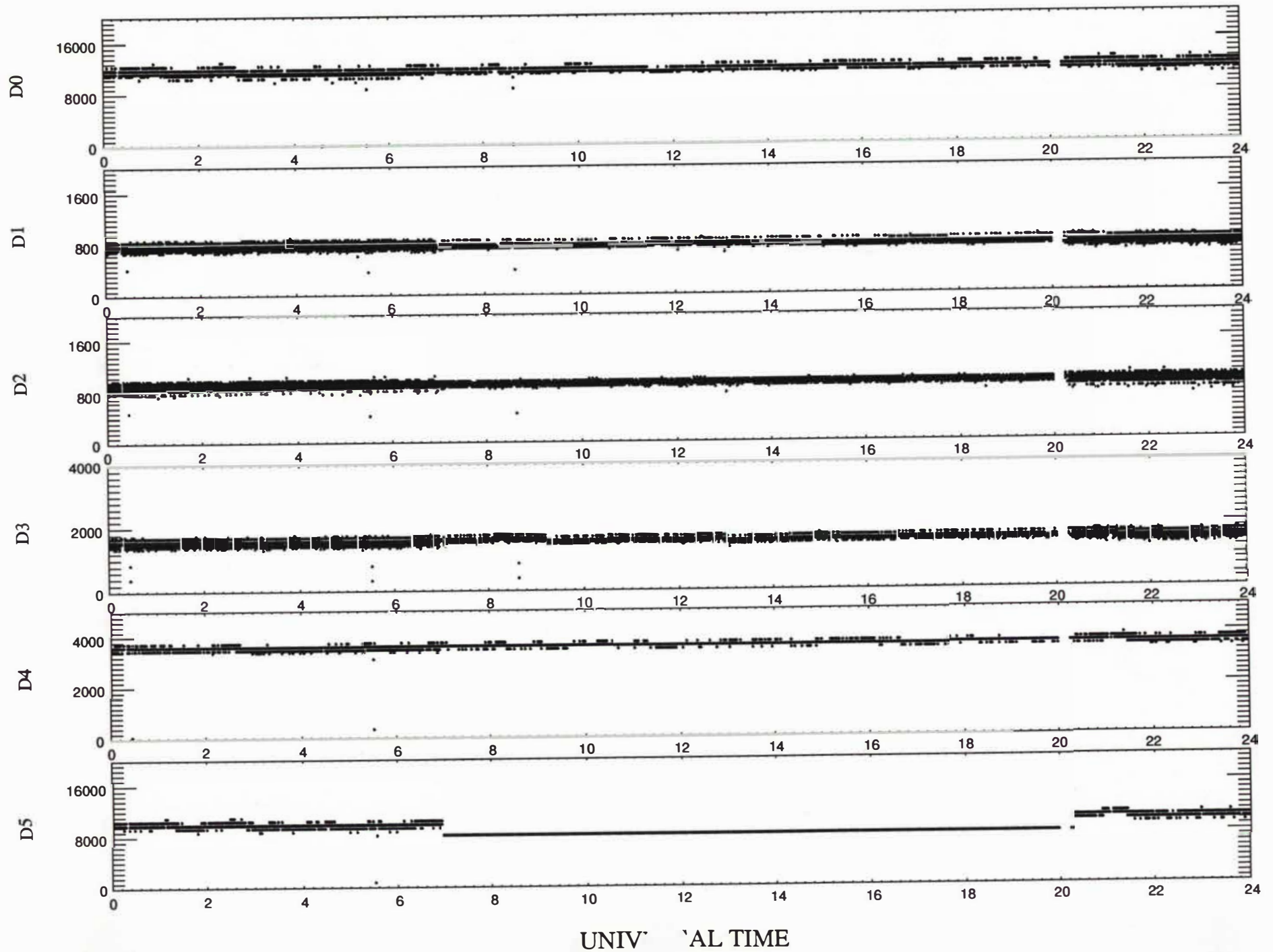


UNIVI AL TIME

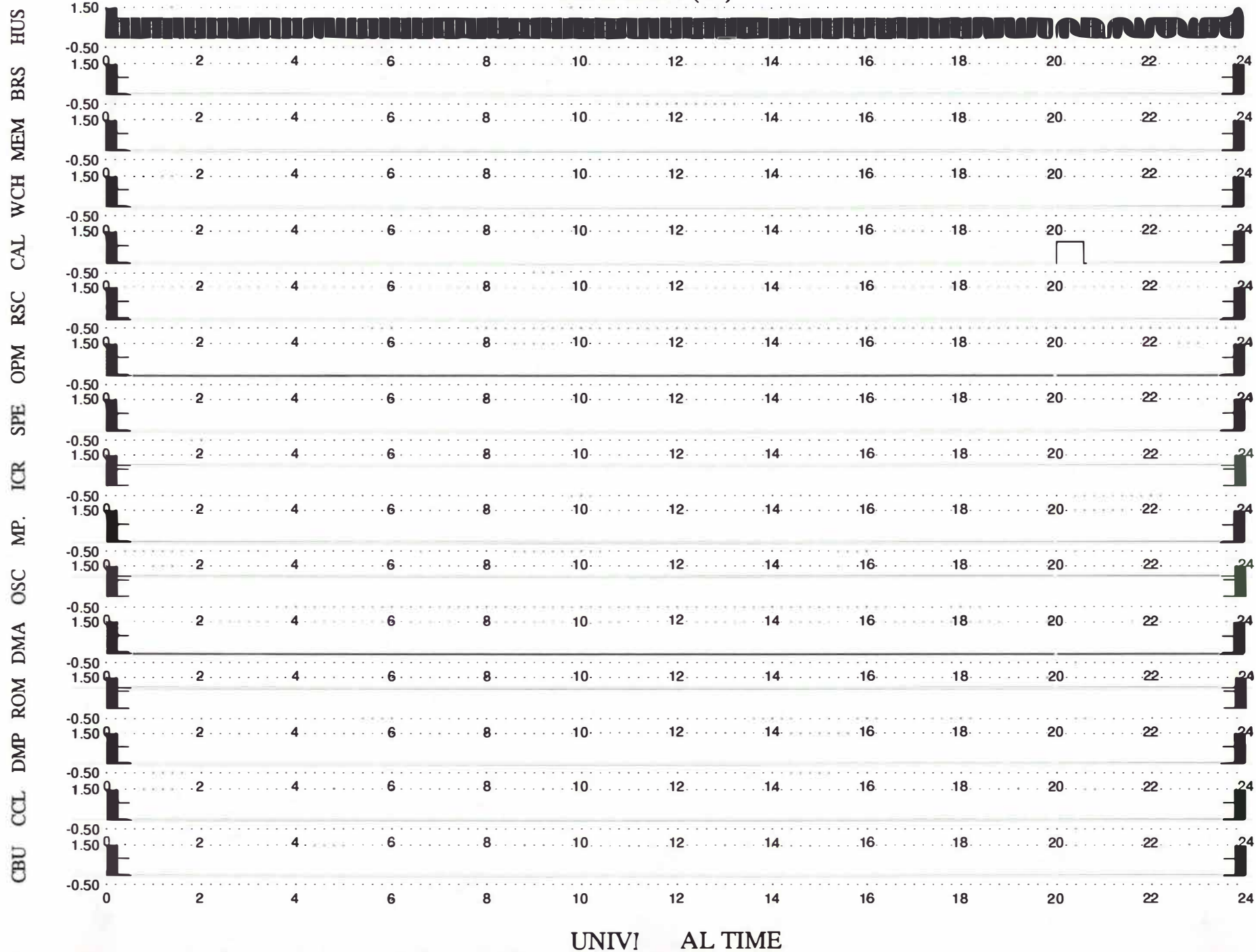
CALIBRATION DATA INCLUDED



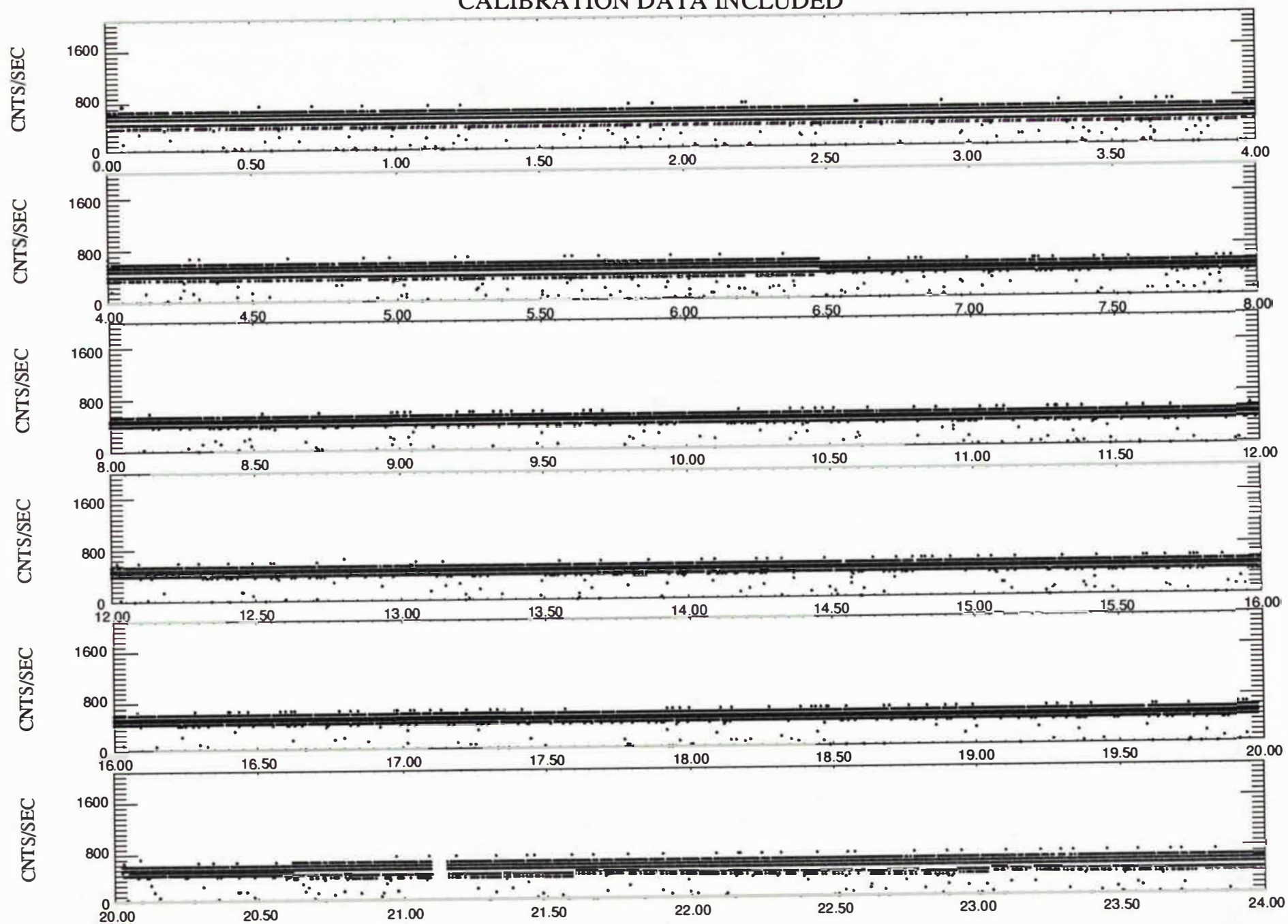
UNIV AL TIME



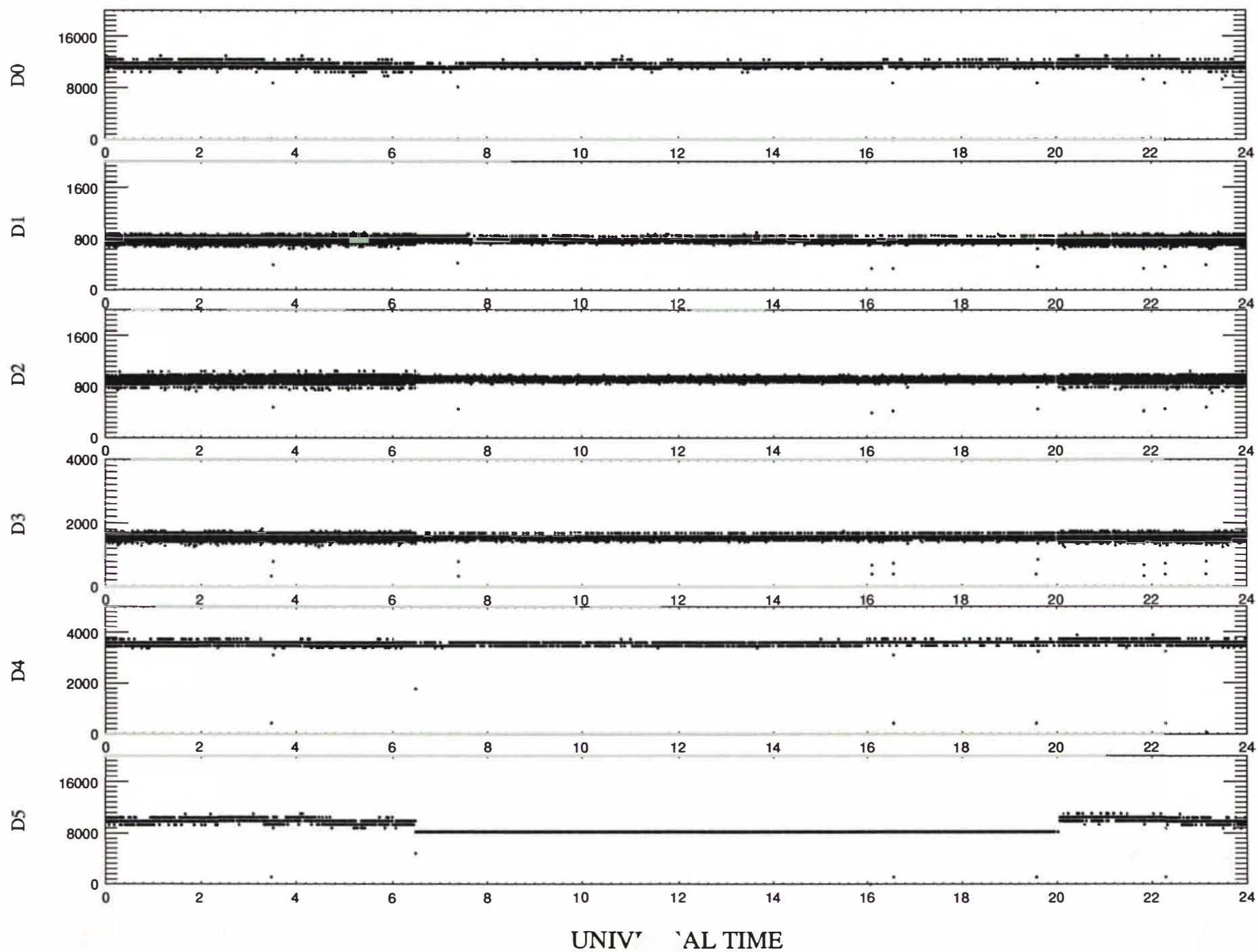
NO BURST (15)



CALIBRATION DATA INCLUDED



UNIV! AL TIME



From RICHARDSON@ssl.msfc.nasa.gov Tue May 27 10:39 PDT 1997
Return-Path: <RICHARDSON@ssl.msfc.nasa.gov>
Received: from SSLMOR.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id KAA26082; Tue, 27 May 1997 10:39:40 -0700
Date: Tue, 27 May 1997 12:39:30 -0500 (CDT)
From: RICHARDSON@SSLLES.MSFC.NASA.GOV
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970527123930.2164587b@SSLLES.MSFC.NASA.GOV>
Subject: Crossing Windows for BATSE Burst 6241
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6241
EVENT OF 1997 MAY 25 DAY OF YEAR=145
EVENT CROSSING TIME AT BATSE : 9602. S. OR 02:40:02.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 262.000 33.000
BATSE PEAK COUNTING RATE: 4500 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 25/ 5/ 97 IS:
RA= 150.912 DEC= 30.269 DIST= 5.183 AU
BATSE-ULYSSES DISTANCE = 775388940. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 90.80 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -35.97 SECS.
CROSSING TIME AT ULYSSES IS 9566. S. OR 02:39:26 +/- 498.45 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 25/ 5/ 97 IS:
RA= 171.997 DEC= 4.662 DIST= 0.981 AU
MARS-BATSE DISTANCE = 146753744. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 92.53 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -21.65 SECS.
CROSSING TIME AT MARS IS 9580. S. OR 02:39:40 +/- 84.58 SECONDS

BATSE BURST TRIGGER

NO.: 6241

TIME: TJD=0593 SECONDS=9602

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=97.4 AZIMUTH=177.6 ERROR=2.2 DEGREES

COMMENTS:

GRB. VERY SPIKEY. DUR.~10SEC. NOT VISIBLE ABOVE 300KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6241	970525	10593	09602	4500	262	+33	10

BATSE BURST# 6241

ULYSSES RT

29 / 5 / 97

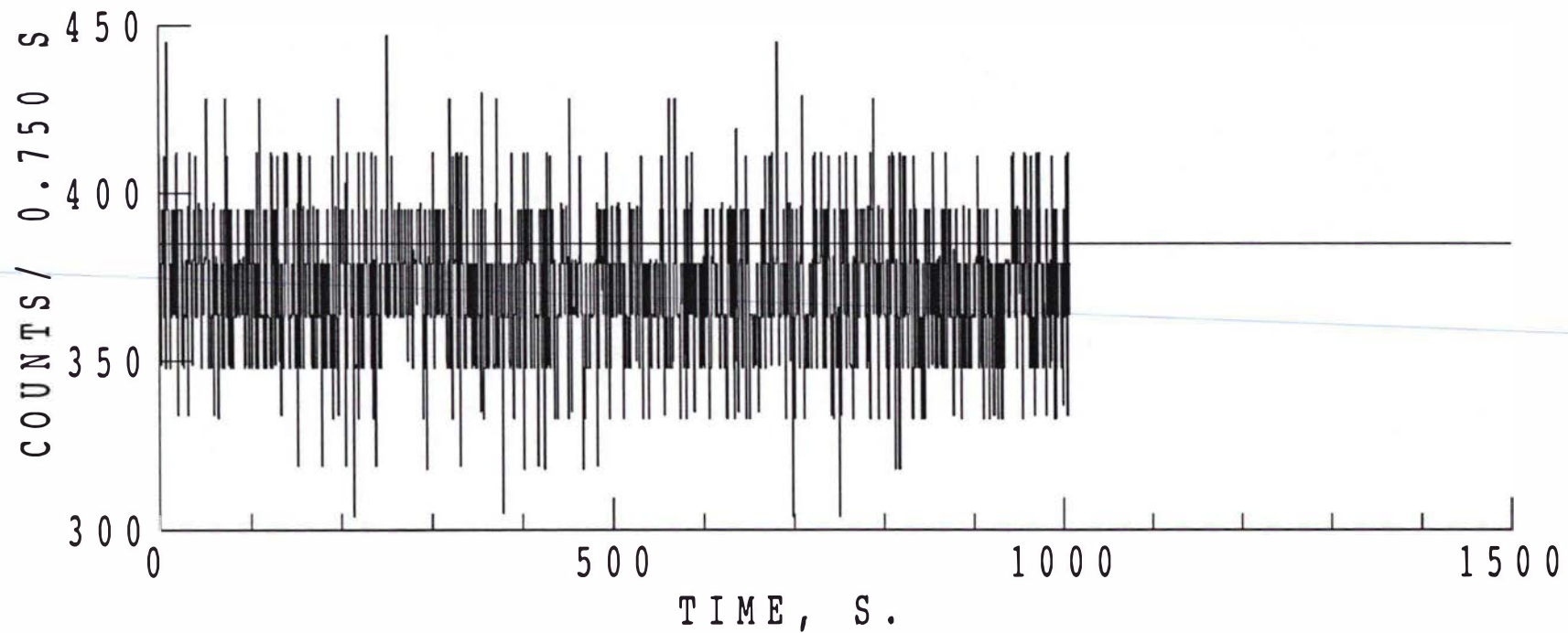
25 / 5 / 97 9072.098 s

0.250 S INTERVALS REGROUPED BY 3

0 - 0 keV

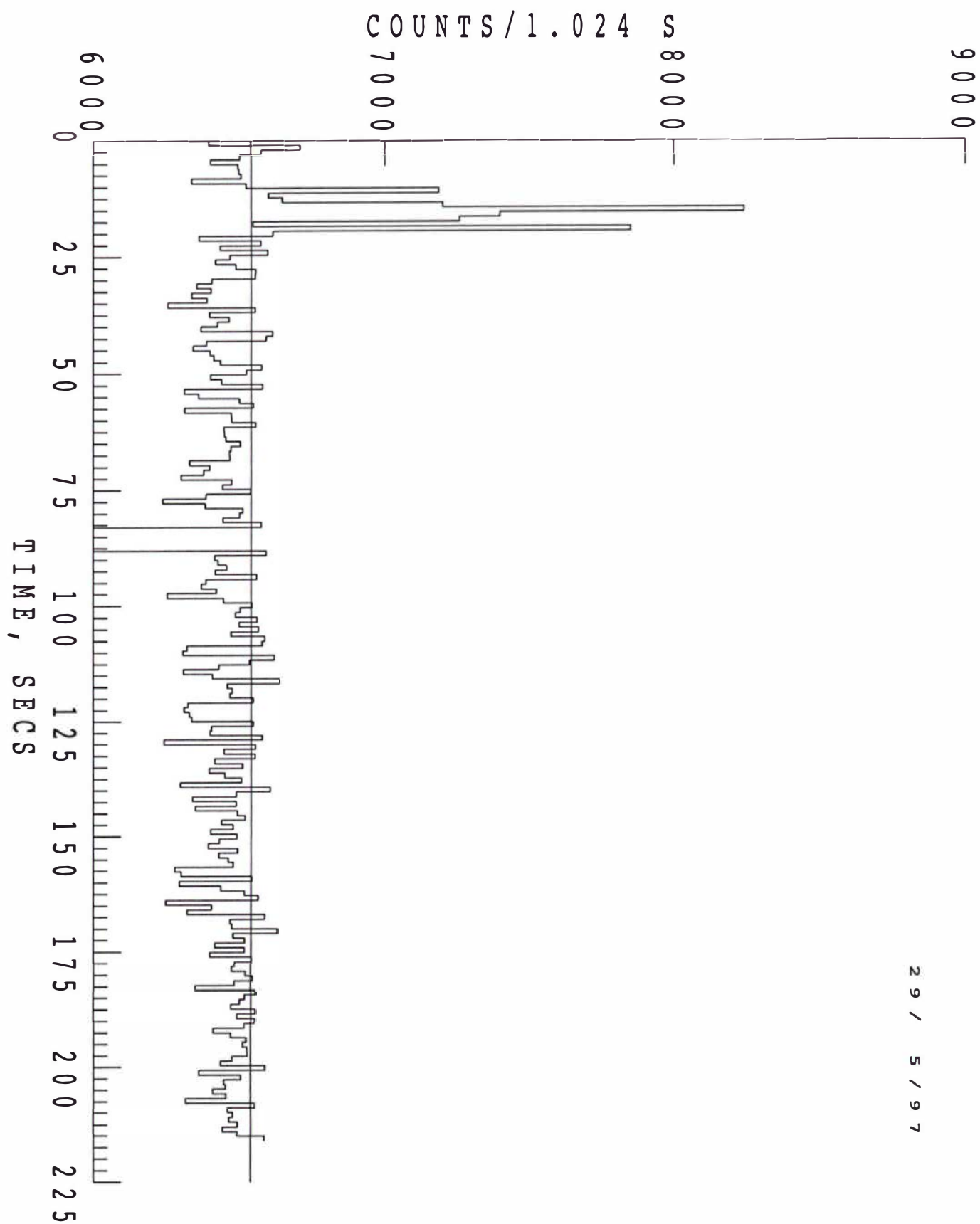
W= 10 M=10
>4.0 SIGMA FLUCTUATIONS

W= 10 M= 2
>4.0 SIGMA FLUCTUATIONS

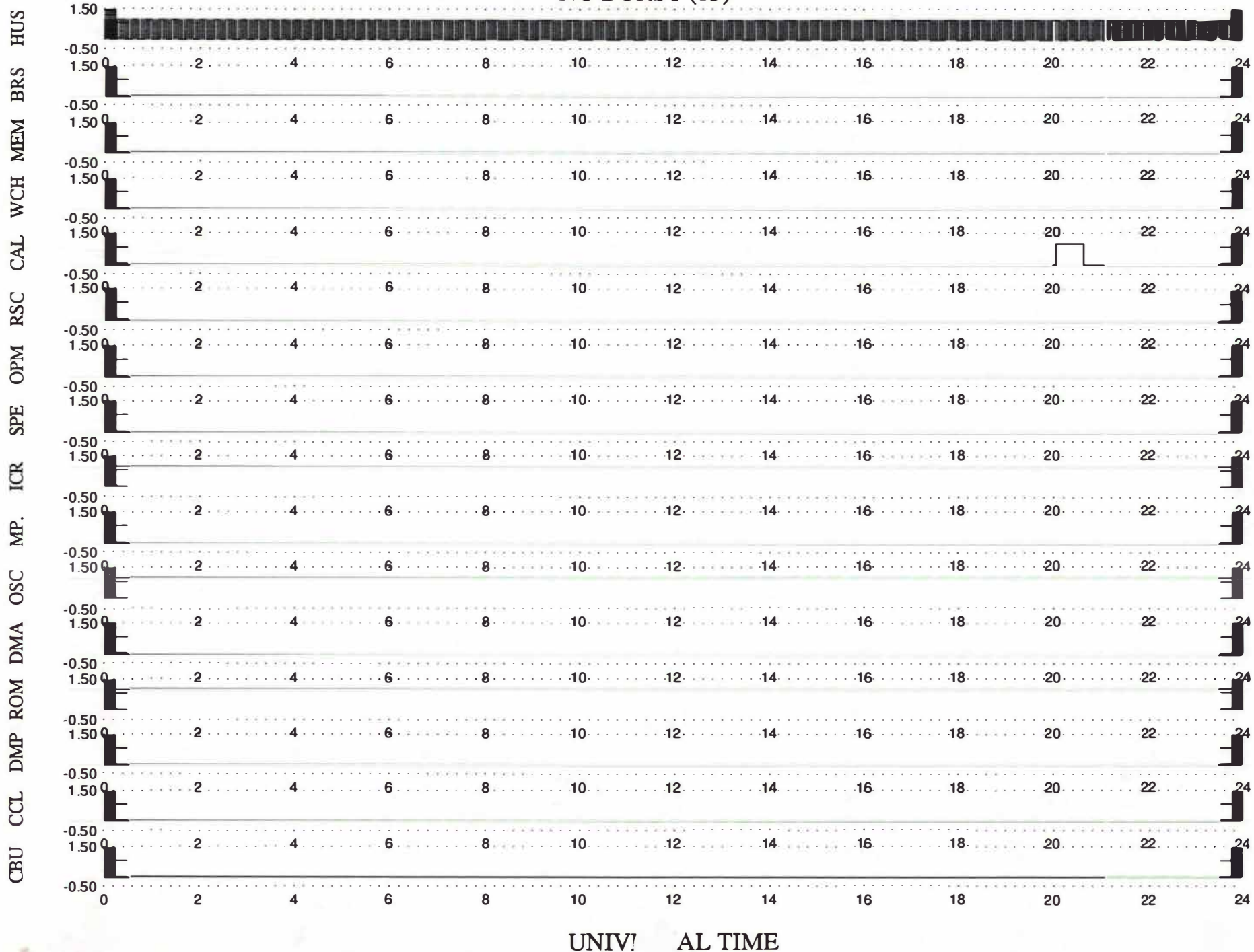


BACODINE 6241 25/05/97 9591.497

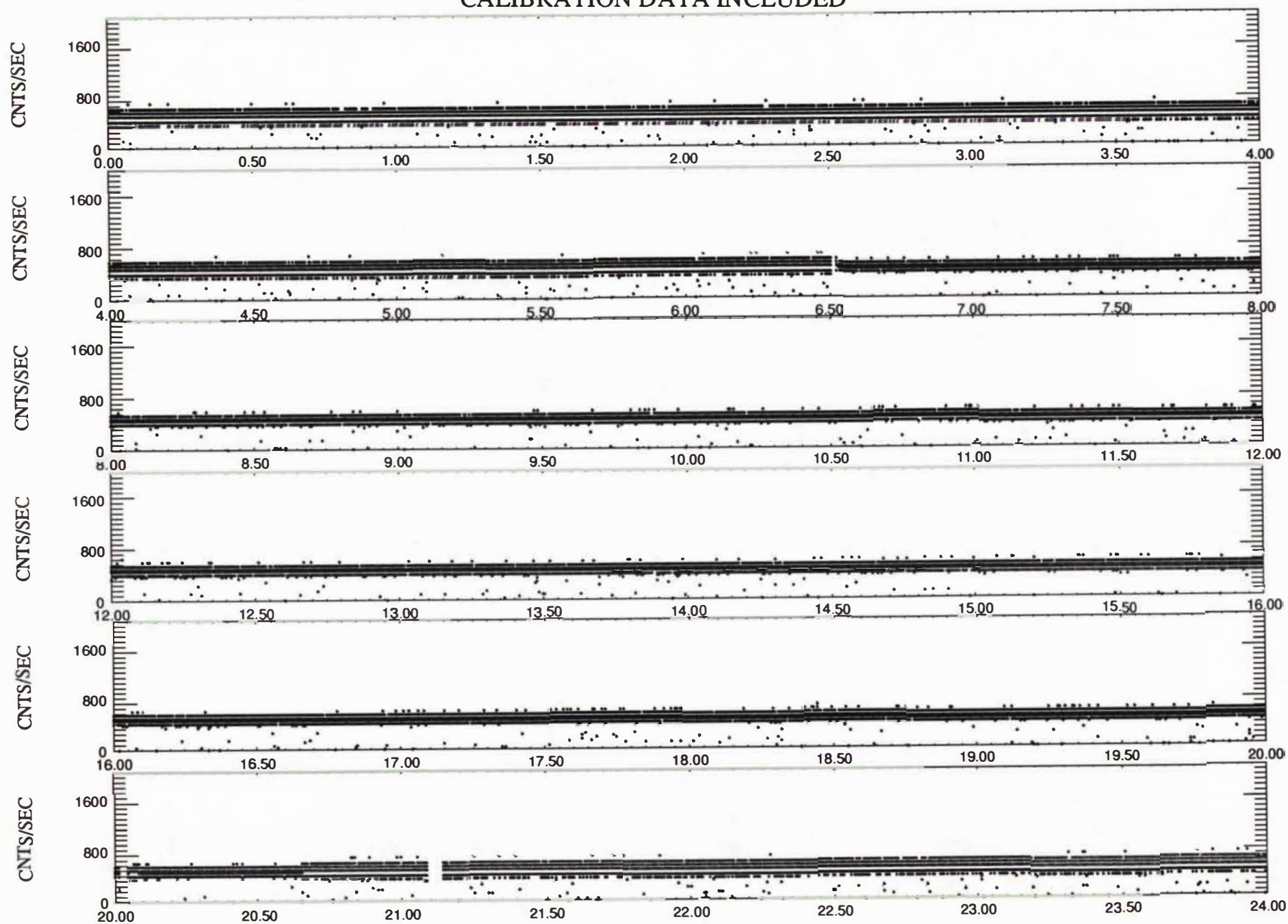
25 - 100 keV



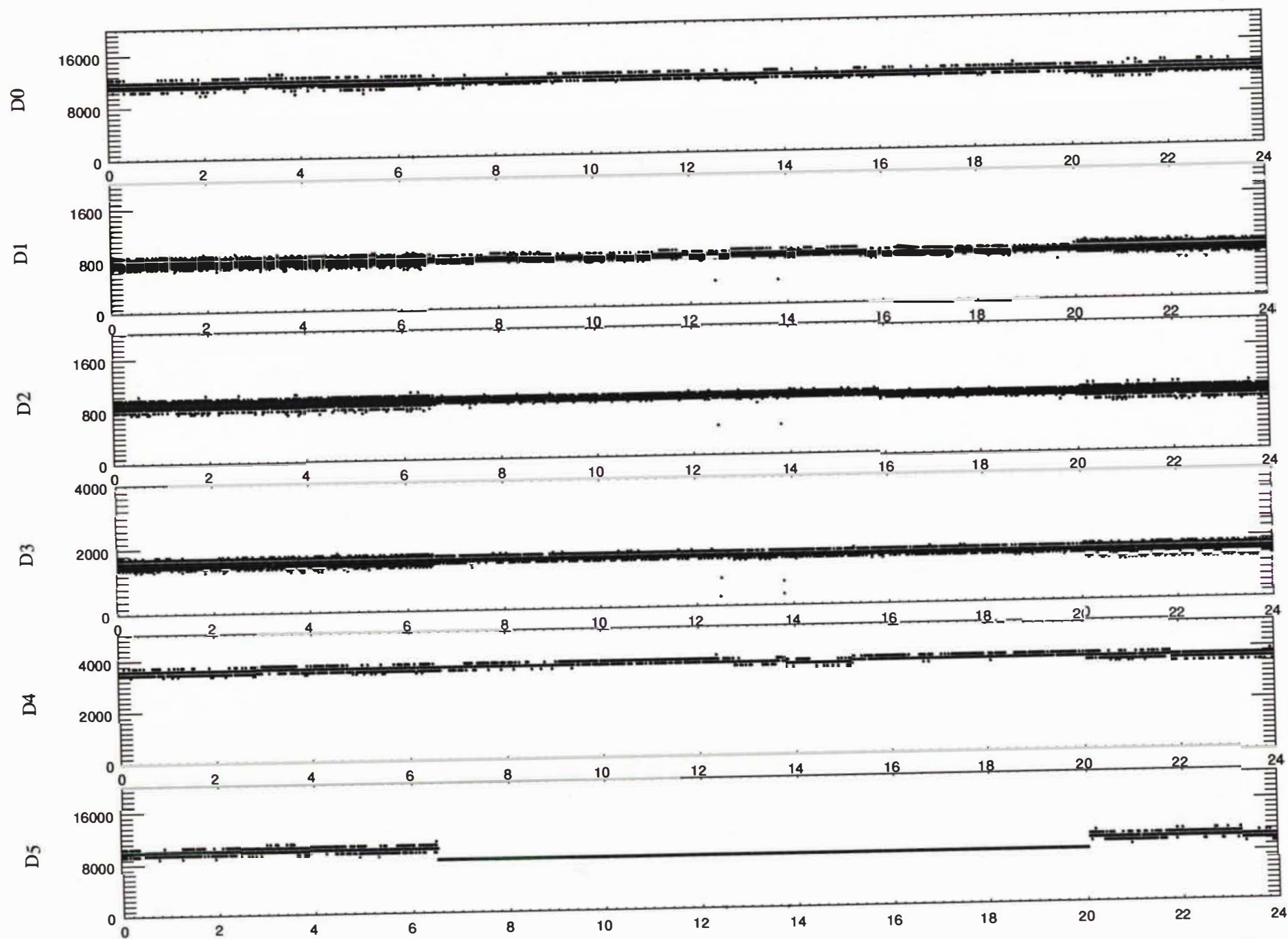
NO BURST (15)



CALIBRATION DATA INCLUDED



UNIV. TIME



UNIV AL TIME

Date: Feb 9 2010

BURST TRIANGULATION CHECKLIST

1. Suzaku Data

- ☐ 1 second timing error corrected? (Jan 1 – Apr 24 2009)

2. AGILE Data

- ☐ 1 second timing error corrected?

3. MESSENGER Data

- ☐ Coarse or fine oscillator?
- ☐ Timing checked after ~ 1 week?

4. For Konus events

- ☒ Konus ecliptic latitude used with latest calibration?

5. For Odyssey events

- ☐ Was CHECKMO run to eliminate data gaps?
- ☐ Did the Odyssey ephemeris correspond to the event time? (When there is data in the database, the ephemeris is for the start of record, usually ~1320 s prior to the request time; when there is no data in the database, the ephemeris is for the request time in the e-mail, so the request time in mosearch should be equal to the GRB time. Note that the time in the return e-mail will be ~1320 s prior to the time requested, in the line “no HEND data...”)
- ☐ Was Mars-blocking used?
- ☐ For cruise phase data (April – October 2001), was the updated data used? (Old data has timing errors)
- ☐ GRS database searched for triggered data? Database data between August 2005 and January 2006 should be re-extracted, due to timing errors. (E-mailed data should be OK).
- ☐ GRS and HEND data cross-correlated to check timing?

6. For 3 or More Spacecraft events

- ☐ $\Sigma 3\Delta t$'s calculated, and/or BMAPSUM executed?

7. For INTEGRAL events

- ☐ INTEGRAL SPI-ACS website checked for bursts that weren't transmitted automatically?
- ☐ 125 ms added to INTEGRAL SPI-ACS time for bursts prior to April 2 2004 11:00 UT?
- ☐ Updated ephemeris used for bursts prior to September 30, 2003?

-
- ☒ ACCESS and MBL4 databases updated, with identical times?

N-M = CORRELATION BETWEEN SATELLITES N AND M

EARTH-N = EARTH AS SEEN FROM SATELLITE N

S=SUN

E=ECLIPTIC

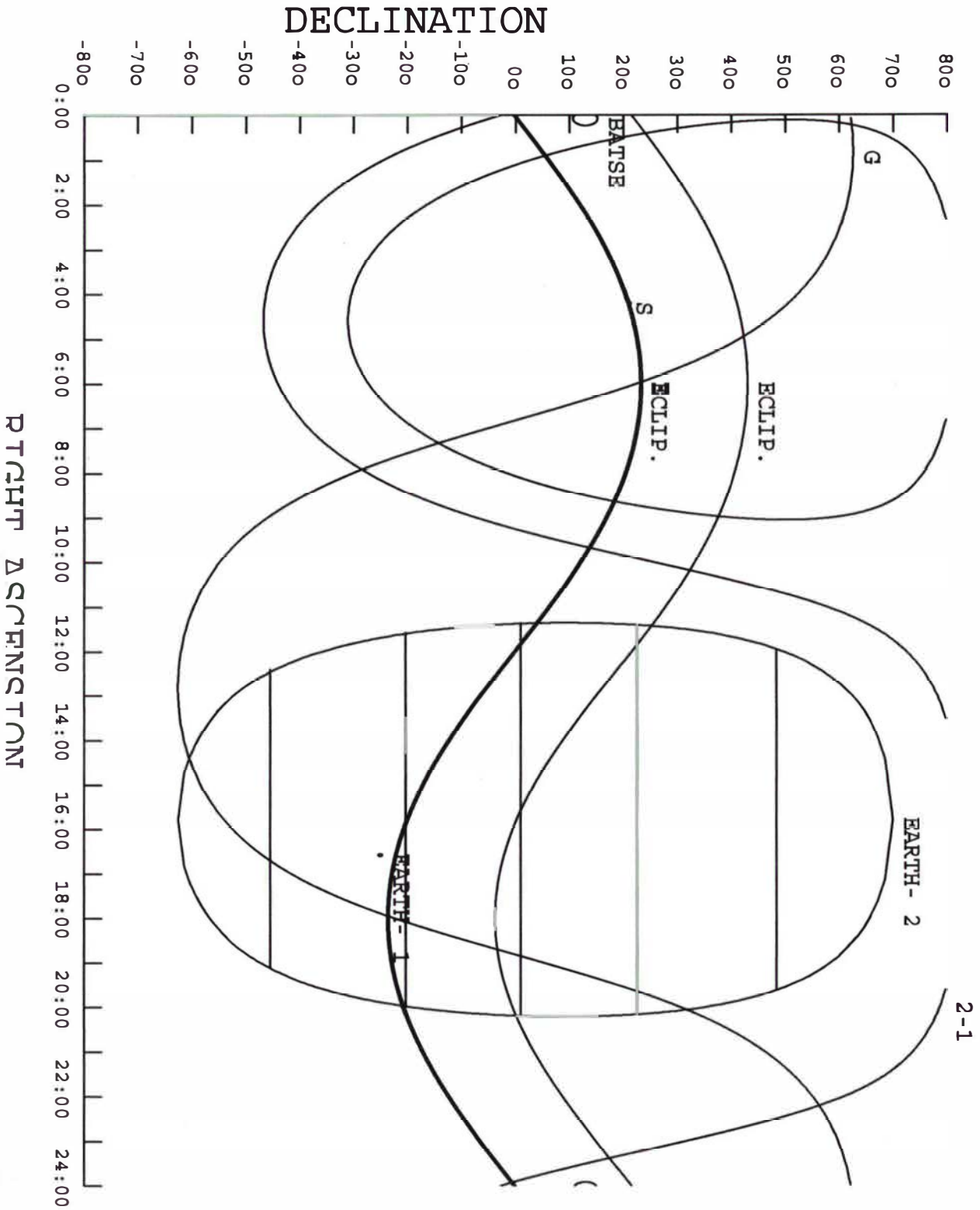
G=GALACTIC EQUATOR

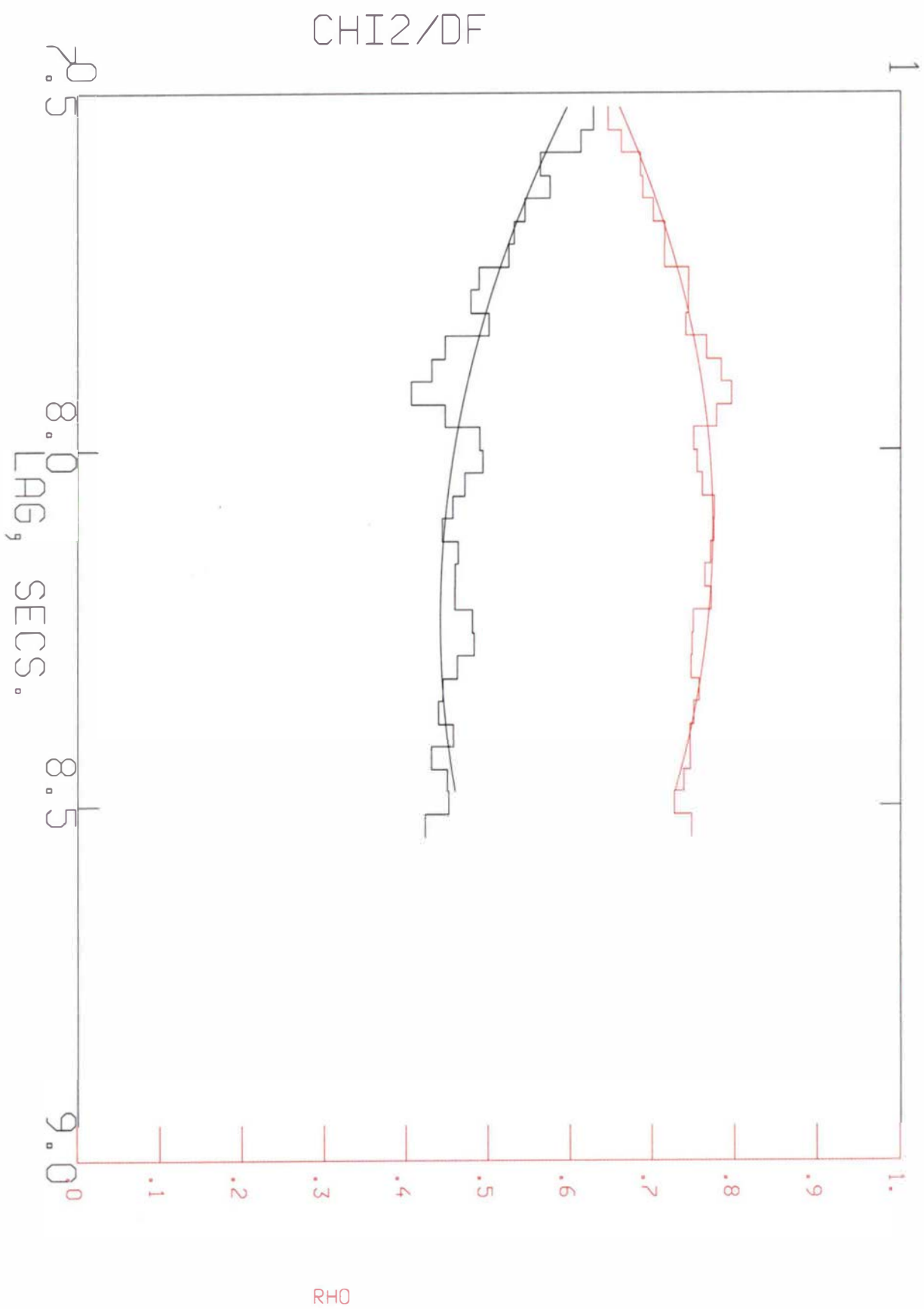
1 KONUS2

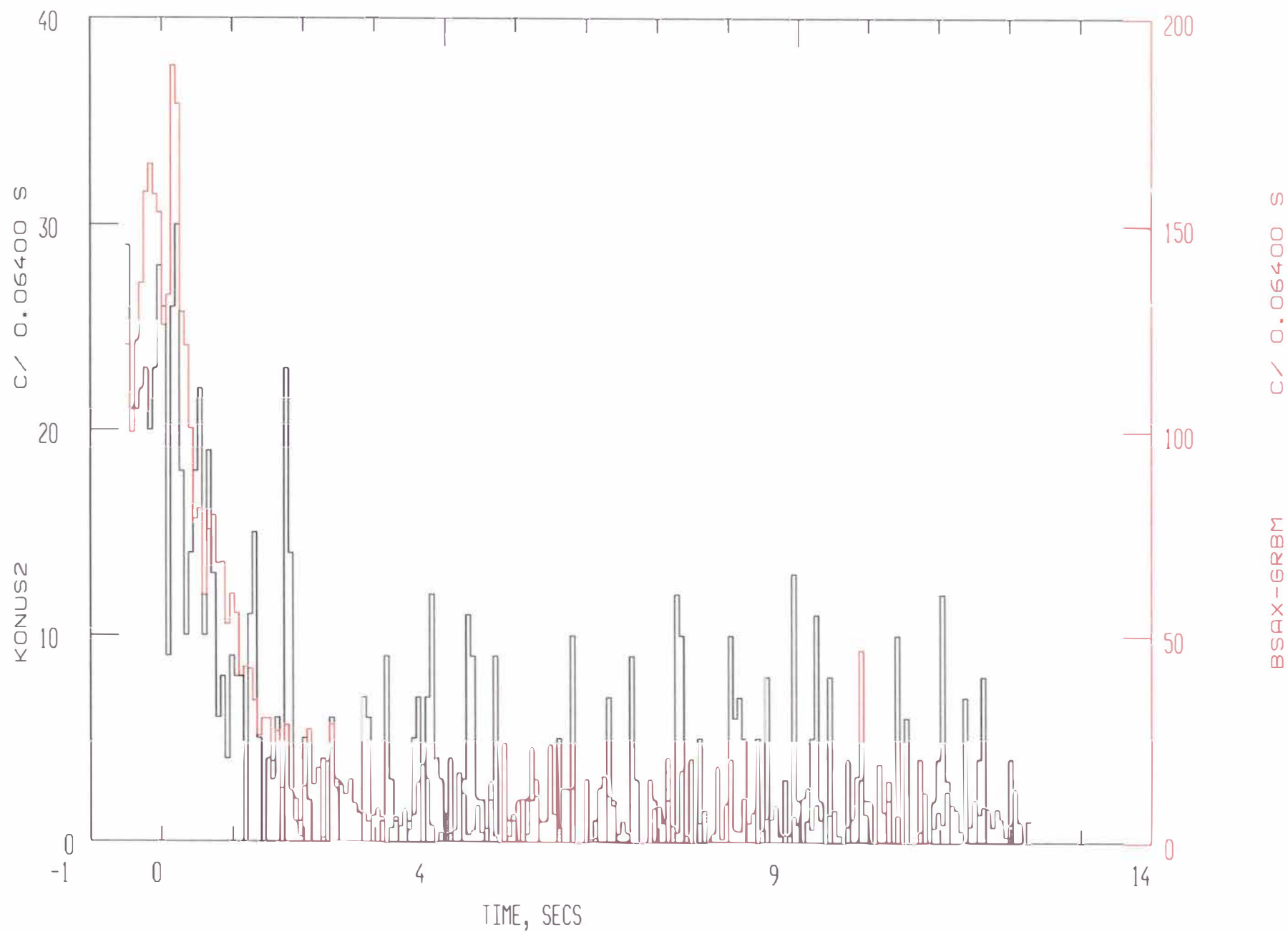
2 SAX

EVENT OF MAY 26, 1997 1:53

09/02/2010





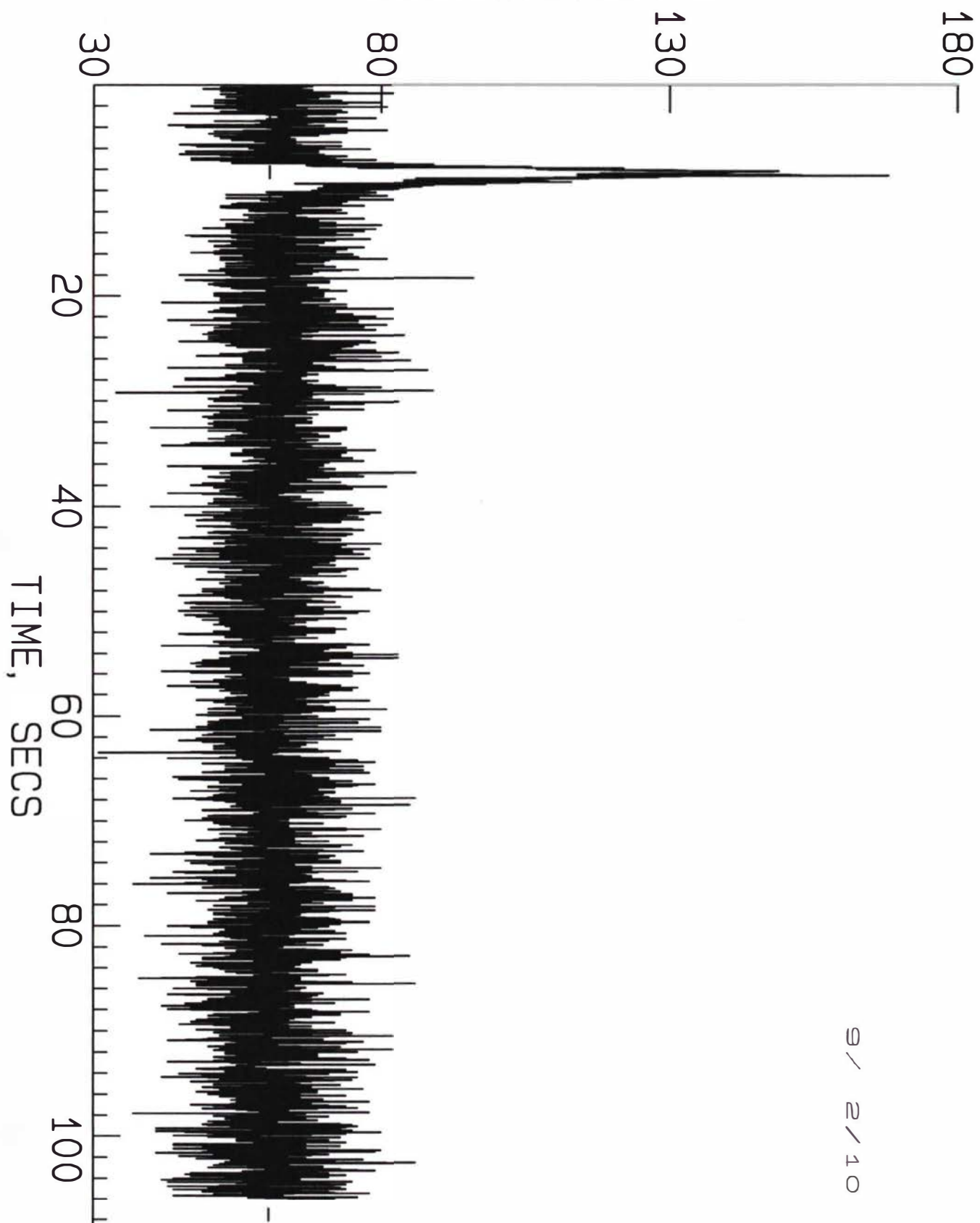


SAX GRBM

26/05/97 6799.716

40- 700 keV

COUNTS/0.031 S

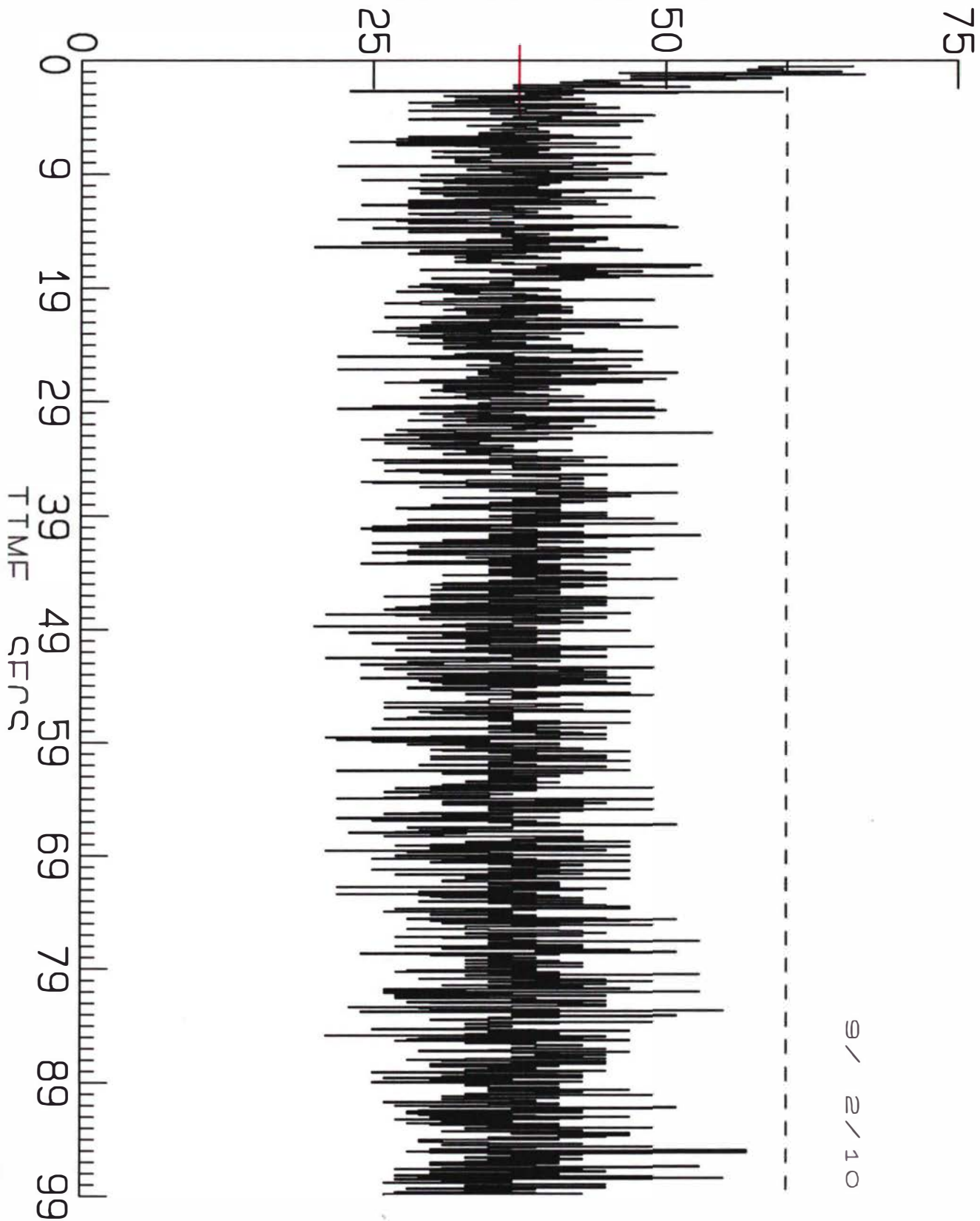


KONUS

26/05/97 6806.700

50- 200 keV

COUNTS/0.064 S



From RICHARDSON@SSLLES.MSFC.NASA.GOV Wed May 28 11:27 PDT 1997
Return-Path: <RICHARDSON@SSLLES.MSFC.NASA.GOV>
Received: from SSLLES.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id LAA05242; Wed, 28 May 1997 11:27:10 -0700
From: RICHARDSON@SSLLES.MSFC.NASA.GOV
Date: Wed, 28 May 1997 13:25:32 -0500 (CDT)
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970528132532.21647670@SSLLES.MSFC.NASA.GOV>
Subject: Crossing Windows for BATSE Burst 6242
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6242
EVENT OF 1997 MAY 26 DAY OF YEAR=146
EVENT CROSSING TIME AT BATSE : 6769. S. OR 01:52:49.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 1.000 13.000
BATSE PEAK COUNTING RATE: 14000 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 26/ 5/ 97 IS:
RA= 150.928 DEC= 30.153 DIST= 5.200 AU
BATSE-ULYSSES DISTANCE = 777946294. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 51.97 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 1598.83 SECS.
CROSSING TIME AT ULYSSES IS 8368. S. OR 02:19:27 +/- 429.13 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 26/ 5/ 97 IS:
RA= 172.244 DEC= 4.521 DIST= 0.988 AU
MARS-BATSE DISTANCE = 147859856. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 19.56 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 464.74 SECS.
CROSSING TIME AT MARS IS 7234. S. OR 02:00:33 +/- 35.73 SECONDS

BATSE BURST TRIGGER

NO.: 6242

TIME: TJD=0594 SECONDS=6769

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=122.0 AZIMUTH=82.3 ERROR=1.6 DEGREES

COMMENTS:

GRB. FOUR MAIN PULSES. 1 @ ~T-2SEC. WITH DUR.~5SEC. 2 @ ~T+3SEC. WITH DUR.
~13SEC. 3 (STRONGEST PULSE) @ ~T+45SEC. WITH DUR.~10SEC. 4 @ ~T+62SEC. WITH
DUR.~10SEC. EVENT HAS EXTENDED EMISSION TO ~T+100SEC. TOTAL DUR.~100SEC.
VISIBLE ABOVE 300KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6242	970526	10594	06769	14000	001	+13	100

BATSE BURST# 6242

ULYSSES RT

29 / 5 / 97

26 / 5 / 97 7956.100 s

0.250 S INTERVALS REGROUPED BY 3

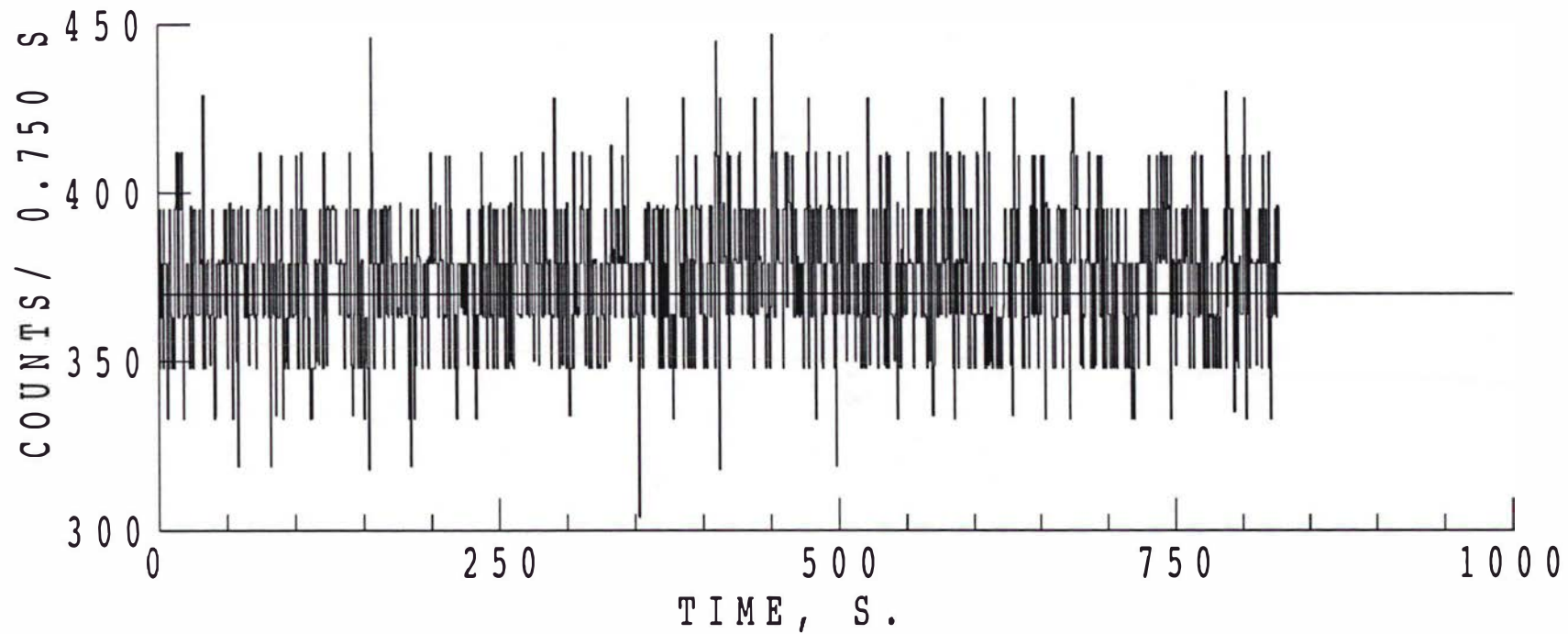
0 - 0 keV

N= 10 M=10

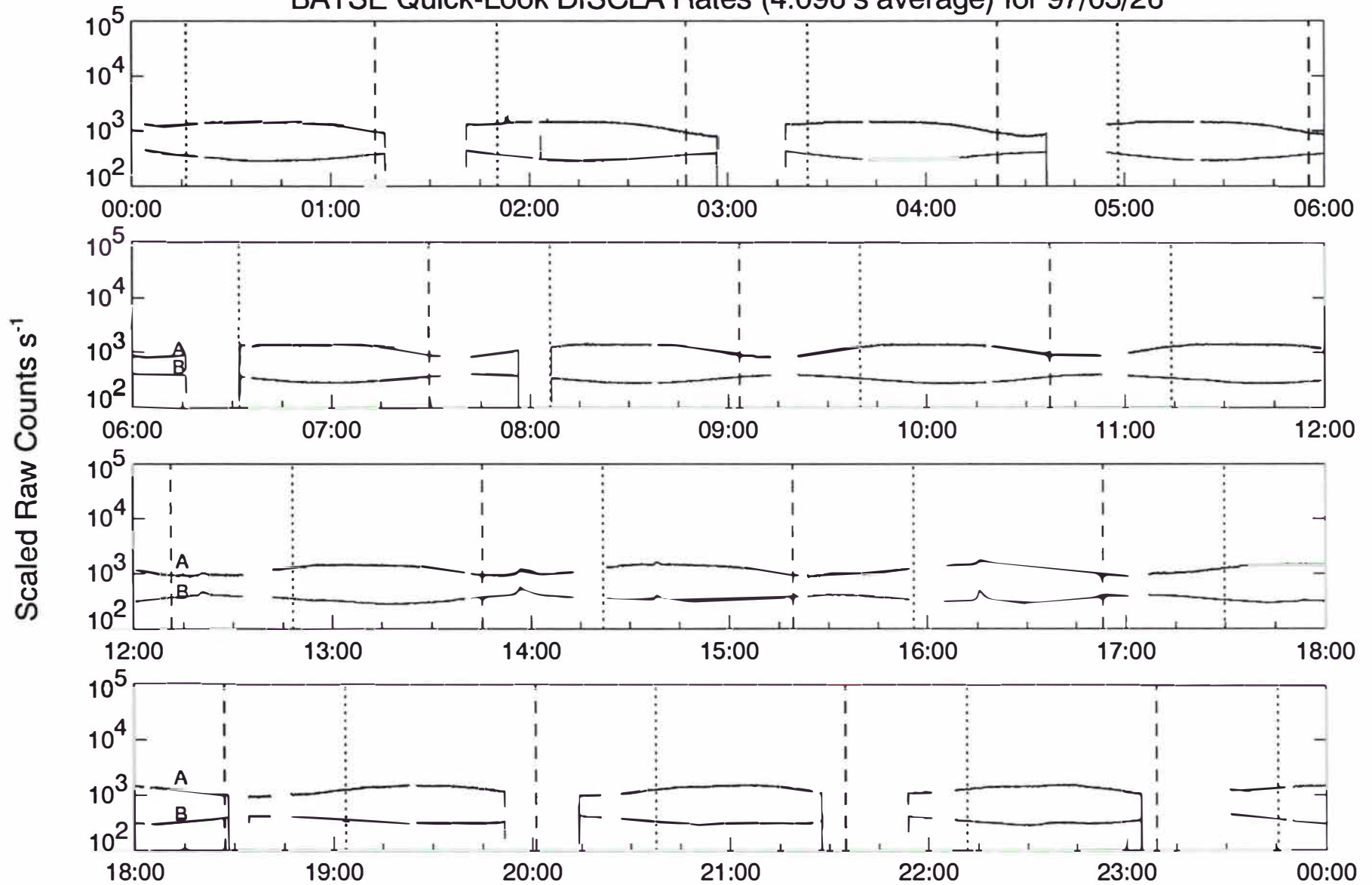
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2

>4.0 SIGMA FLUCTUATIONS



BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/26

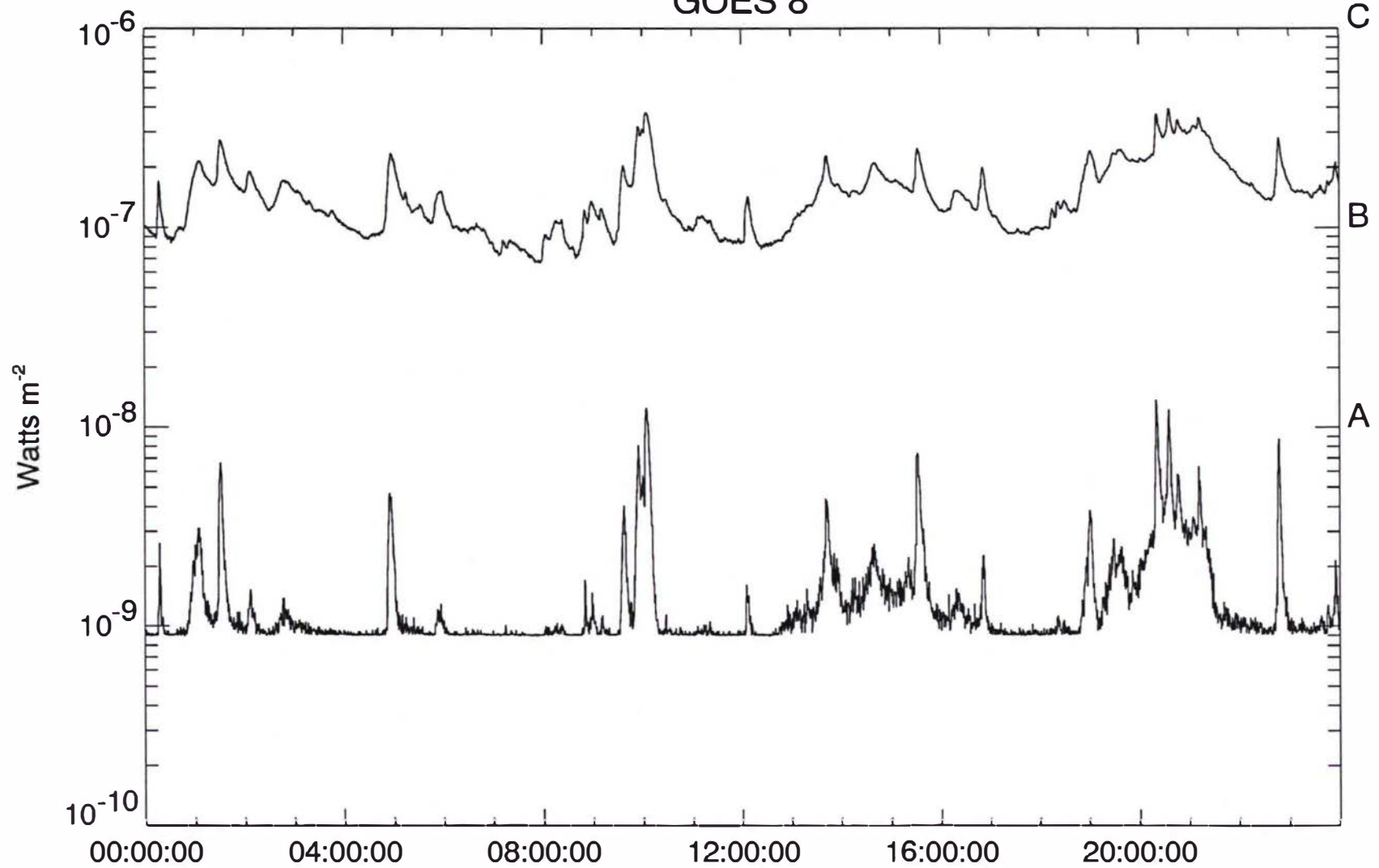


Current Time: 97/05/30, 1008 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

GOES 8



Data Start: 97/05/26, 0000:00

Plot created: 97/05/30, 1007

Channel 1 (1.0 - 8.0 Angstroms)

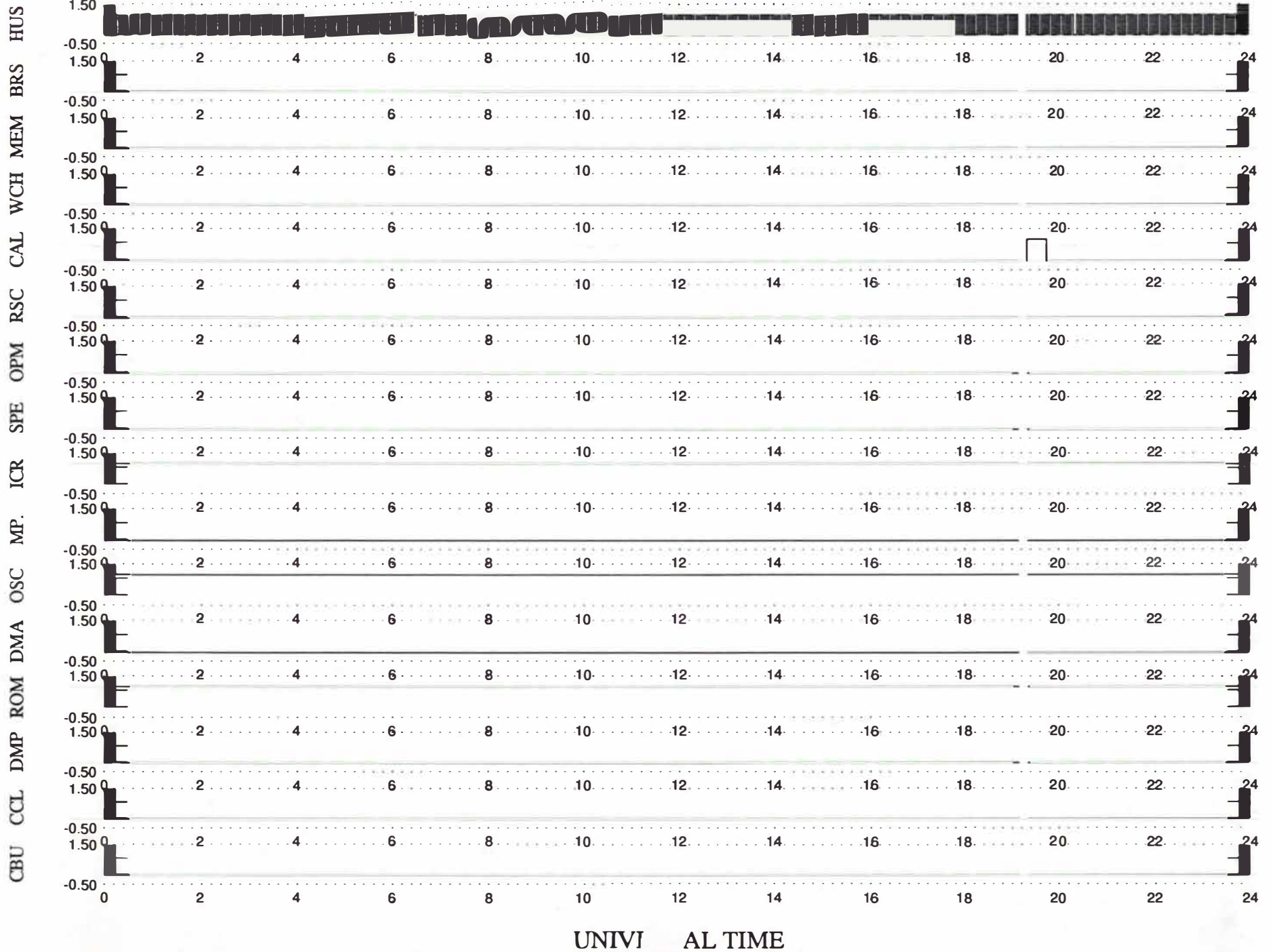
Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms)

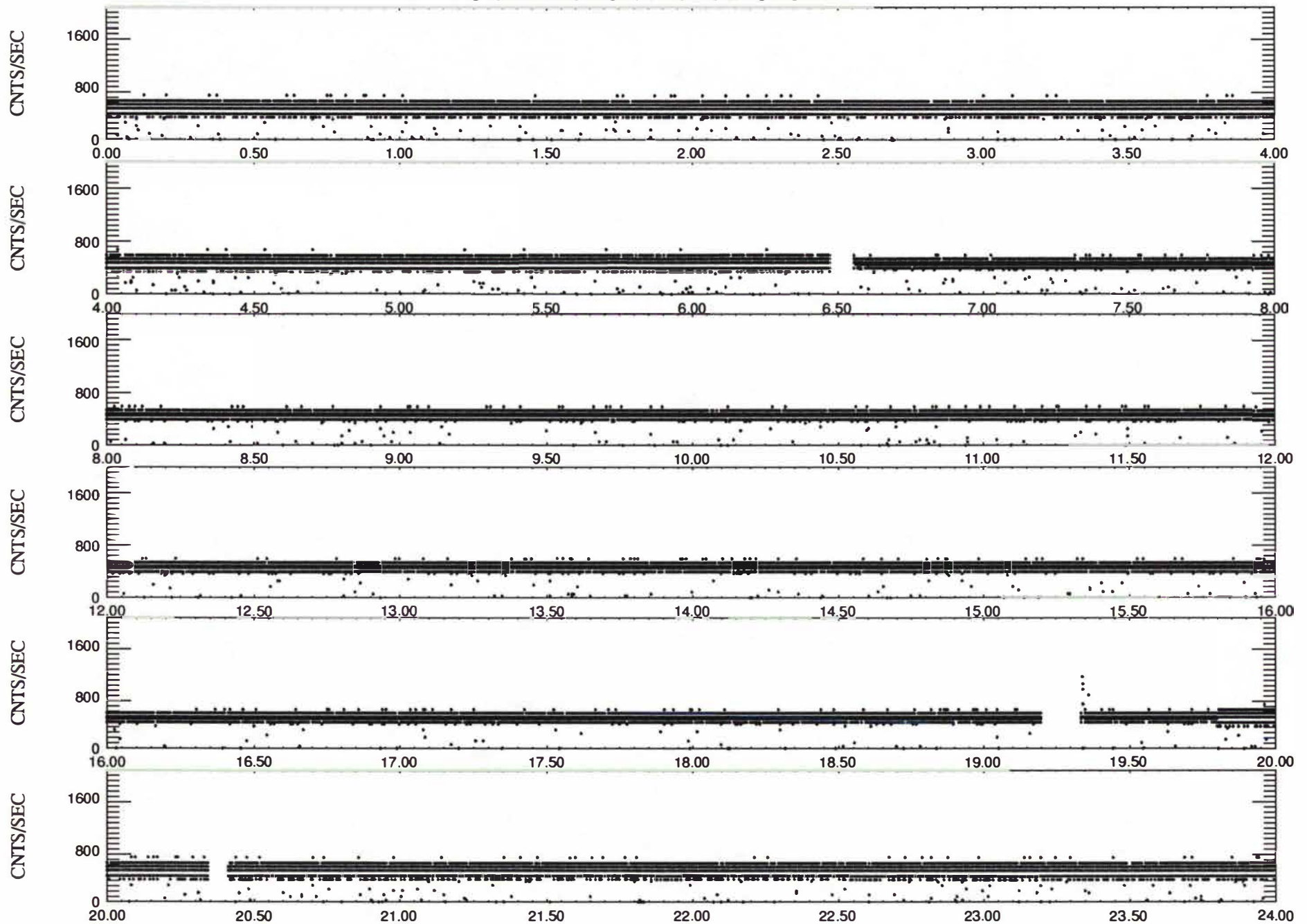
Background not subtracted

Sample average = 10

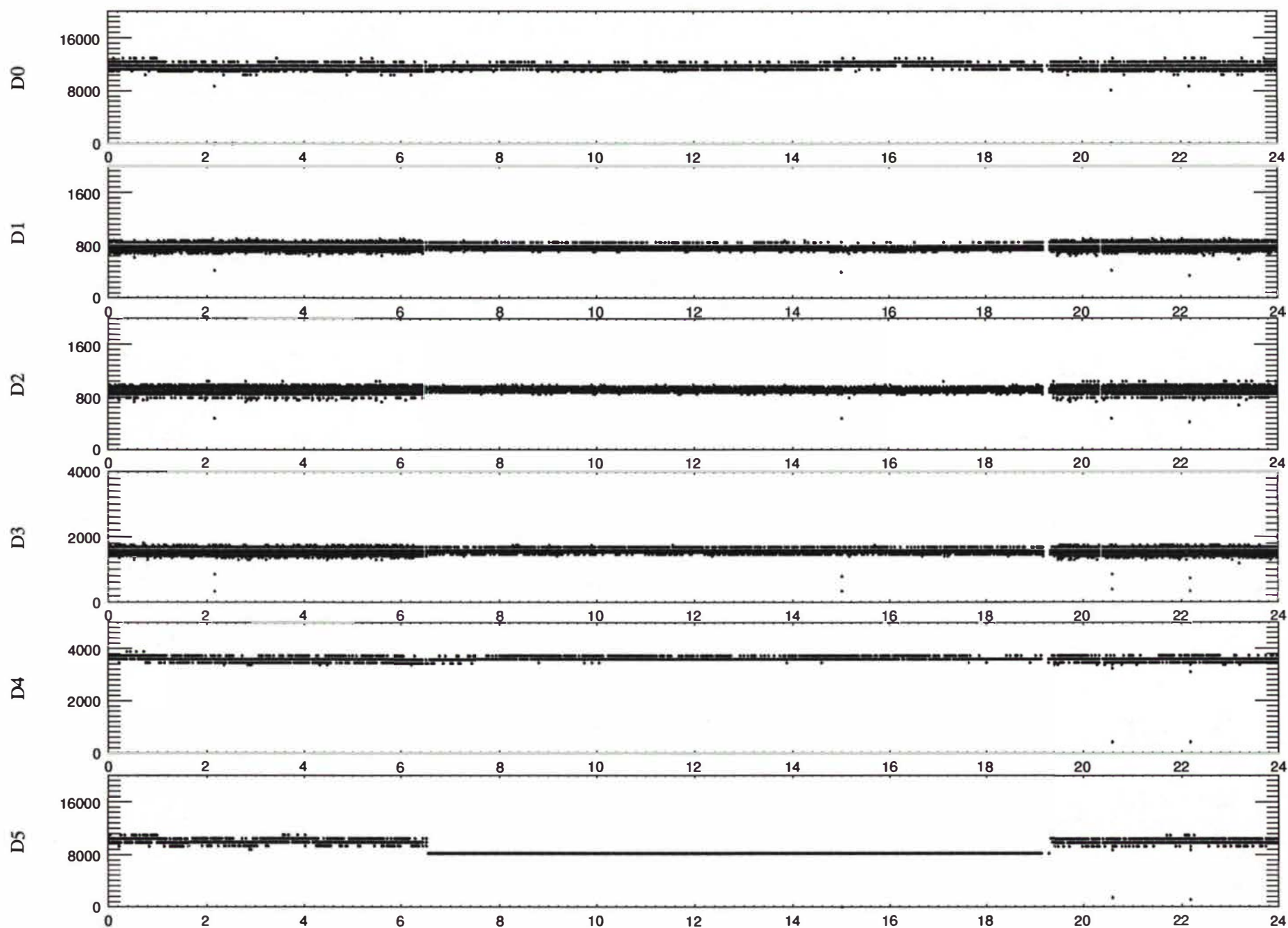
NO BURST (15)



CALIBRATION DATA INCLUDED



UNIV AL TIME



UNIVERSAL TIME

K O N U S

U L Y S S E S R T

1 5 / 0 2 / 0 0

2 7 / 0 5 / 9 7 1 2 6 0 0 . 1 6 7 s

0 . 2 5 0 s I N T E R V A L S R E G R O U P E D B Y 1 5

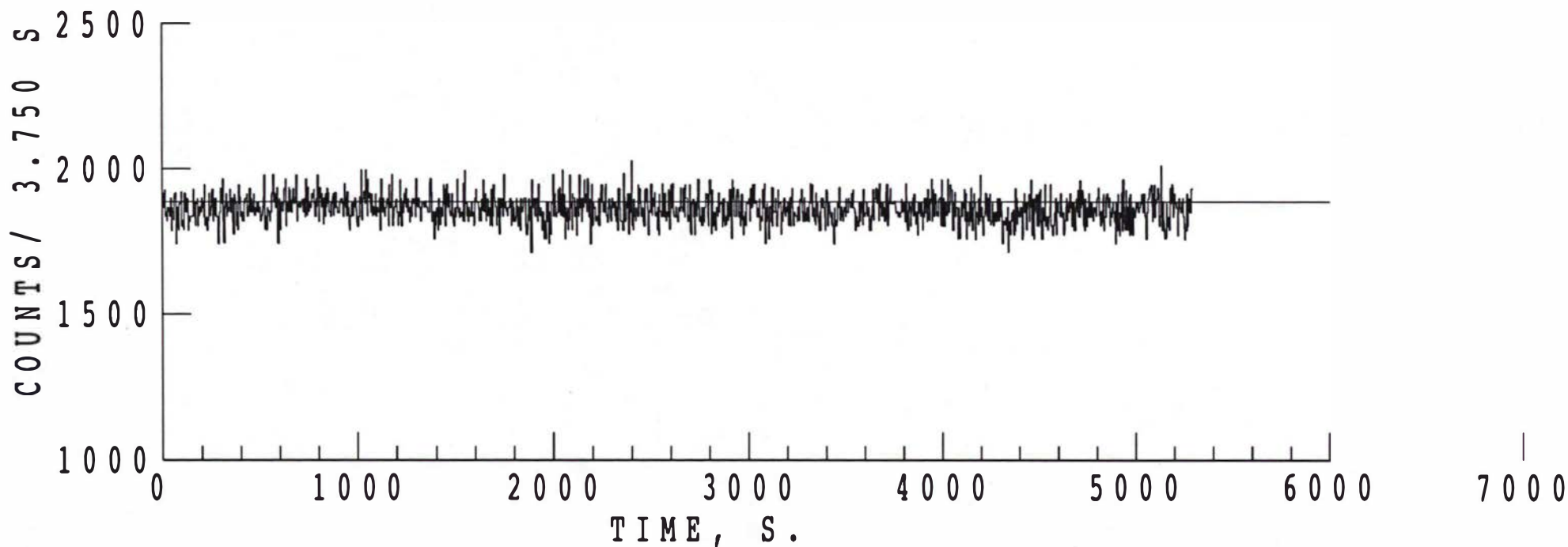
0 - 0 k e V

W= 10 M= 10

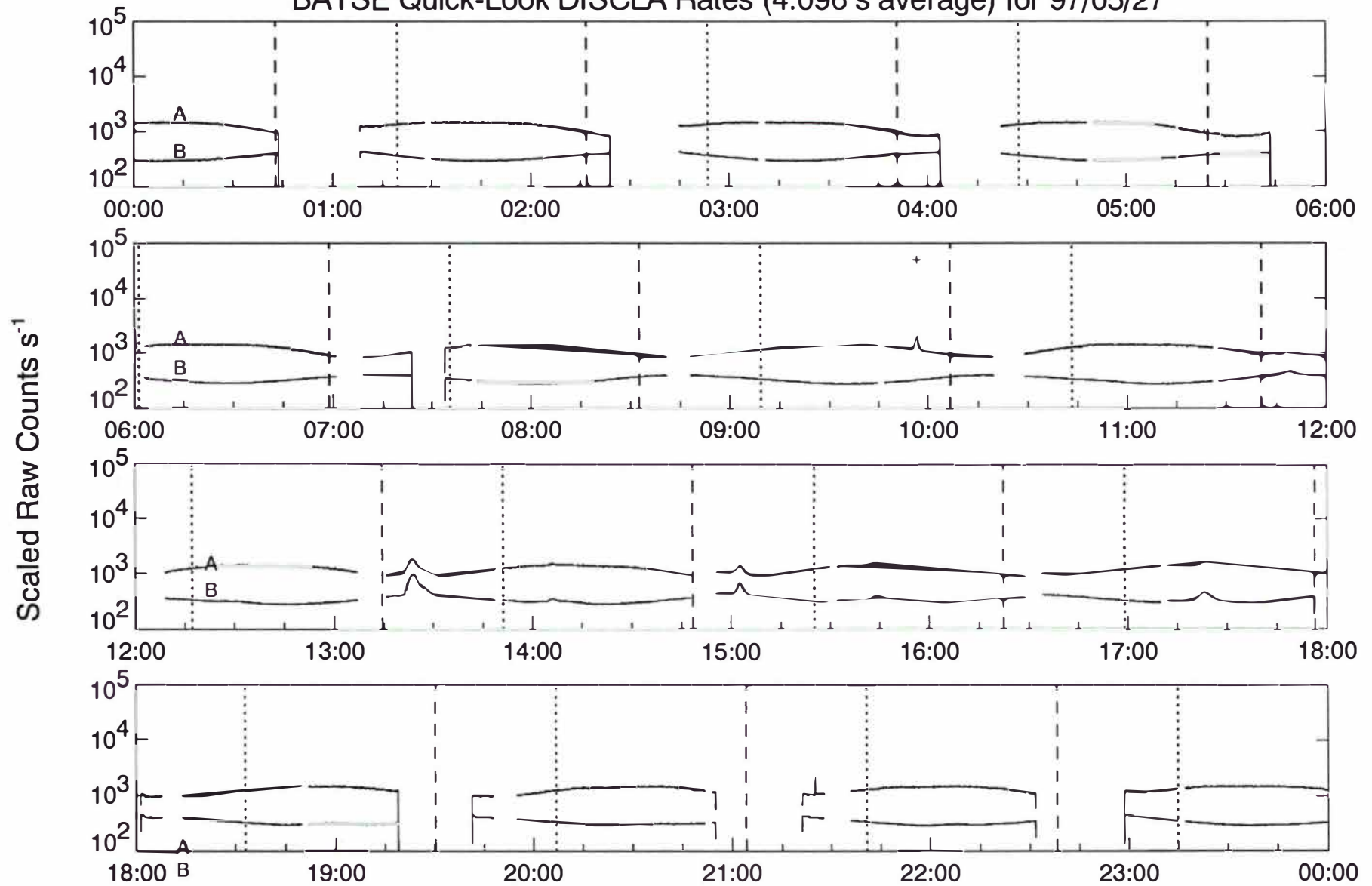
>4.0 SIGMA FLUCTUATIONS

W= 10 M= 2

>4.0 SIGMA FLUCTUATIONS



BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/27

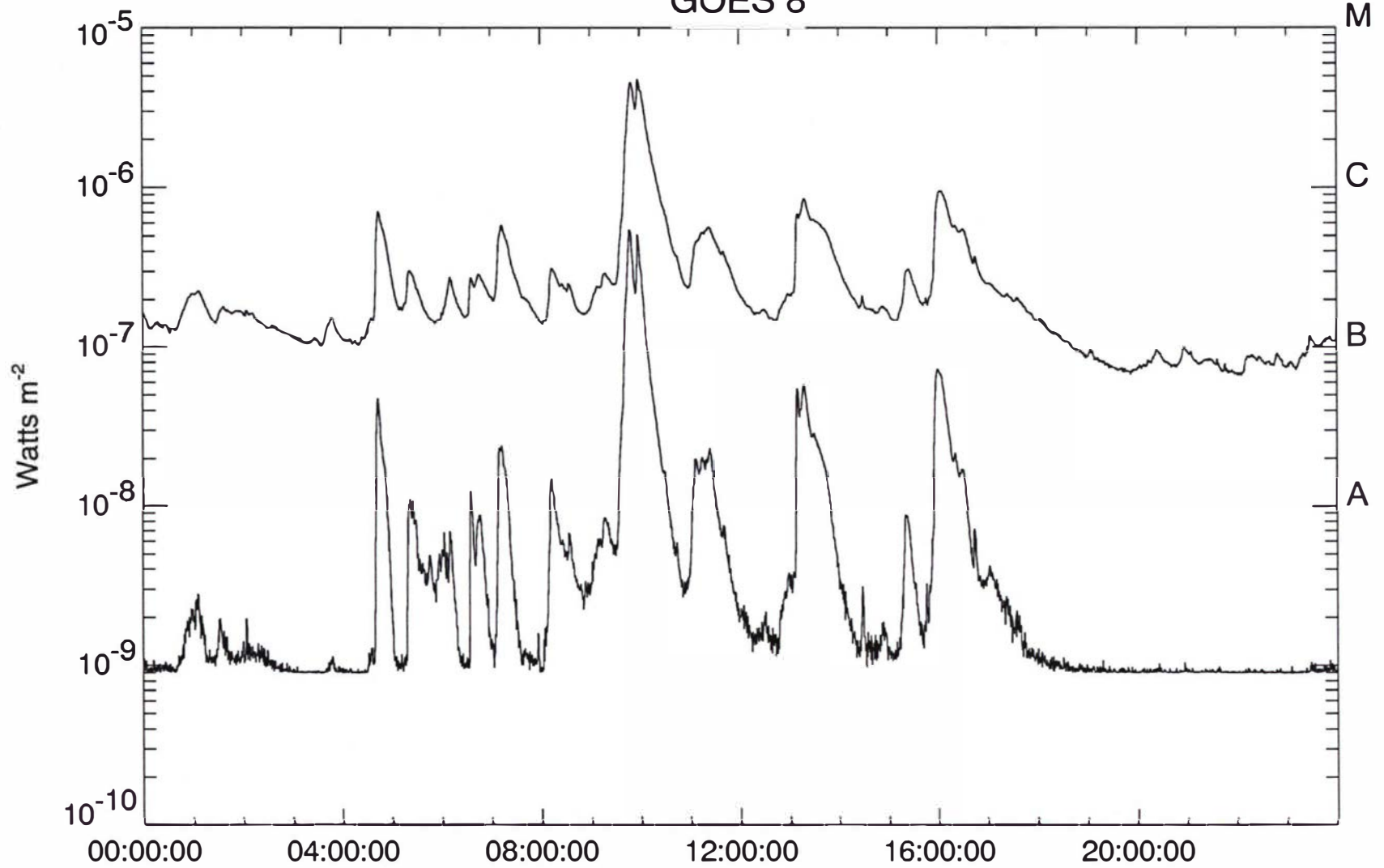


Current Time: 97/05/31, 1008 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

GOES 8



Data Start: 97/05/27, 0000:00

Plot created: 97/05/31, 1007

Channel 1 (1.0 - 8.0 Angstroms)

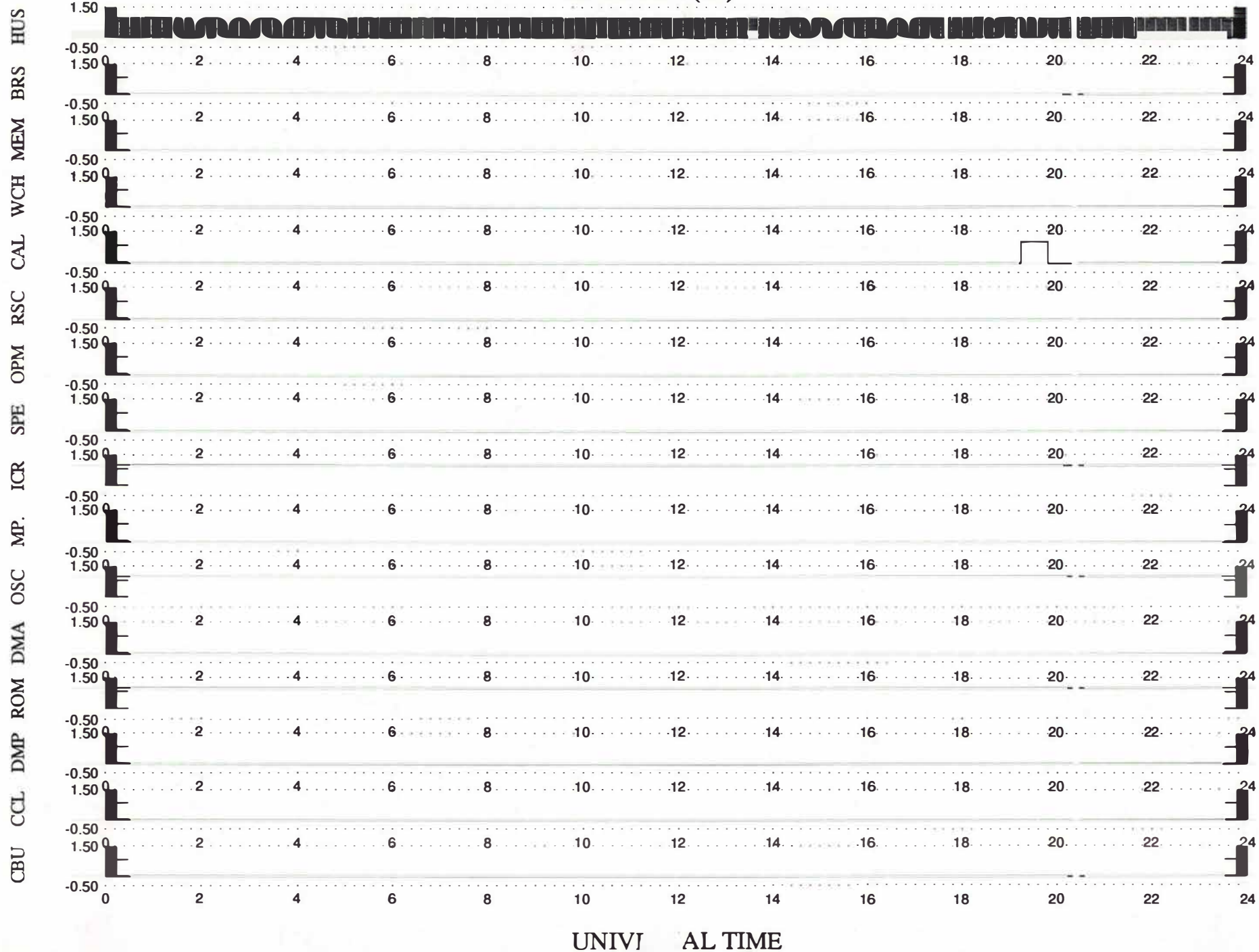
Background not subtracted

Channel 2 (0.5 - 4.0 Angstroms)

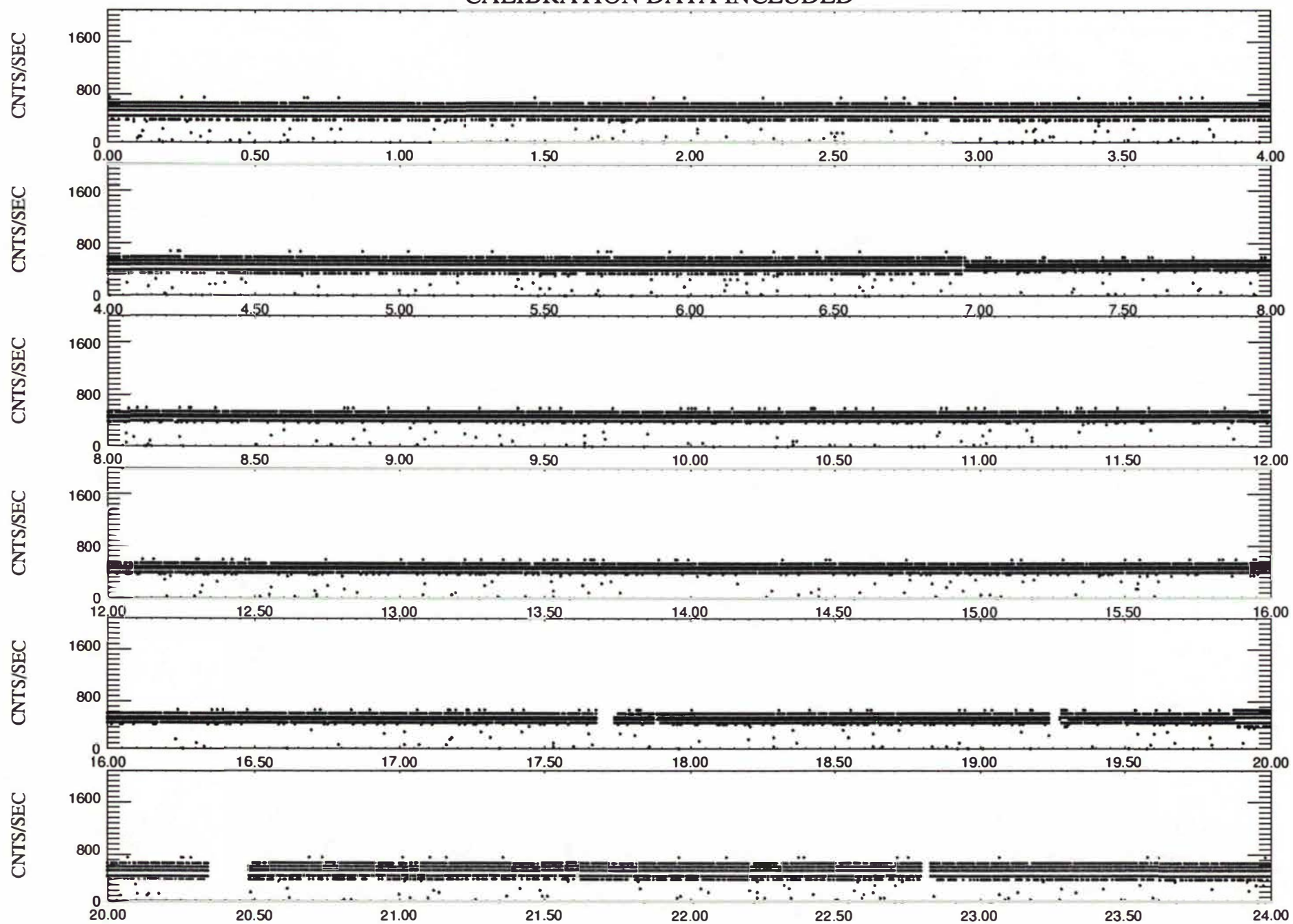
Background not subtracted

Sample average = 10

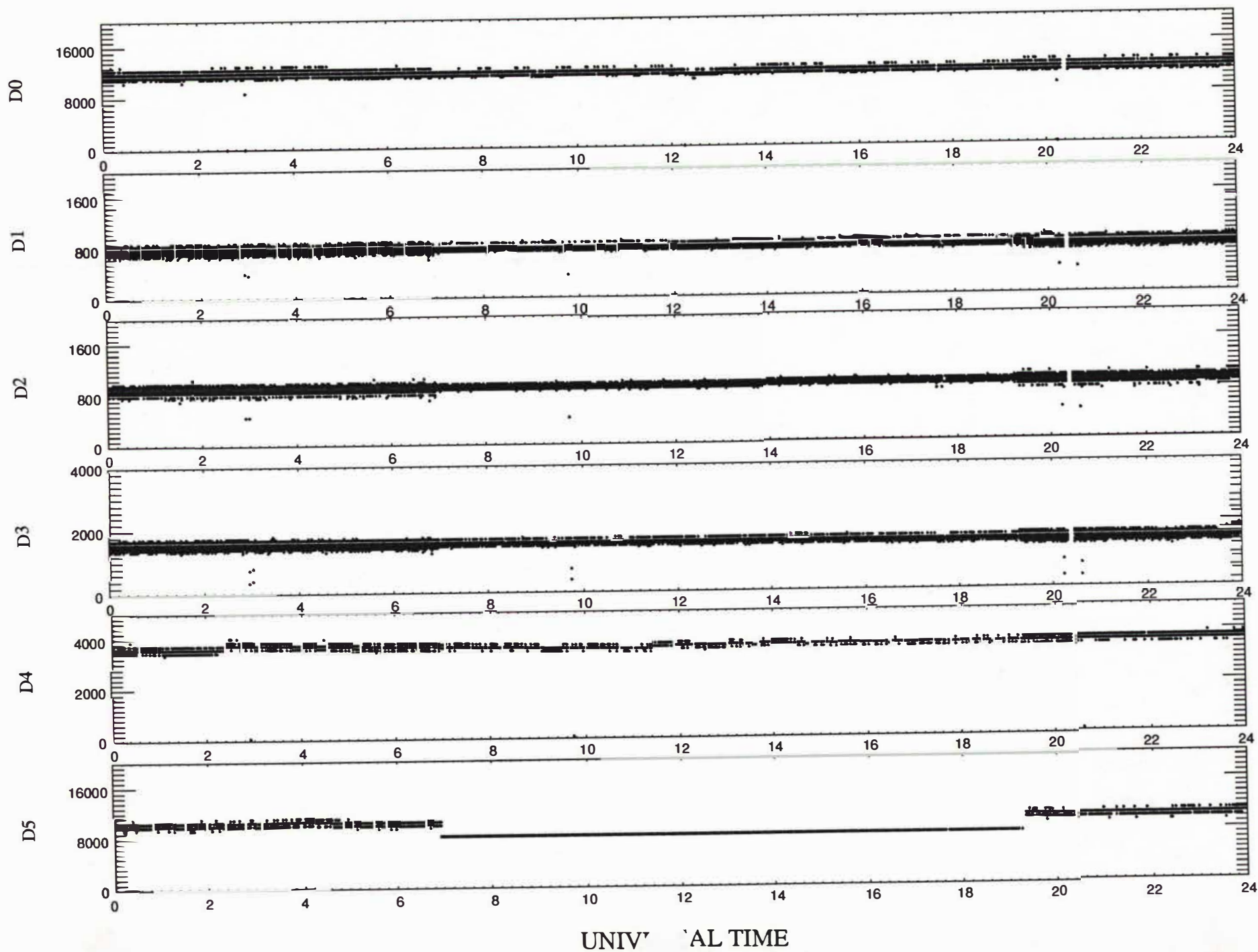
NO BURST (15)



CALIBRATION DATA INCLUDED



UNIV'AL TIME



KONUS

ULYSSES RT

04 / 02 / 00

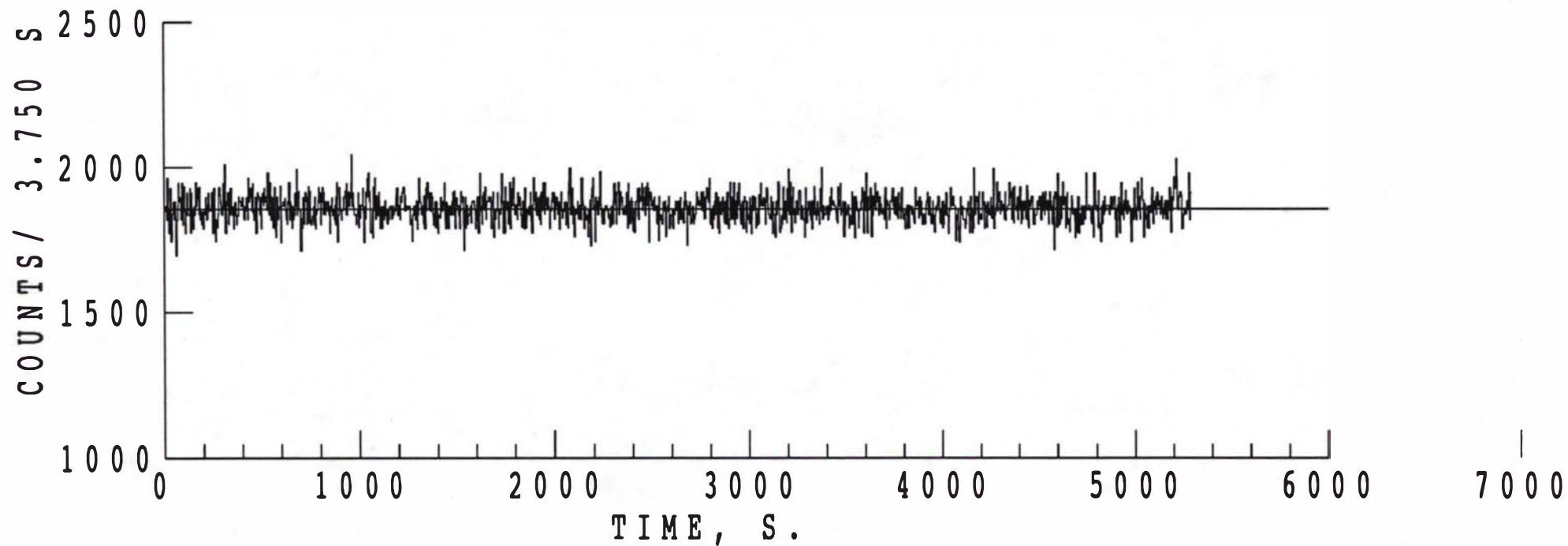
28/05/97 79164.219 s

0.250 S INTERVALS REGROUPED BY 15

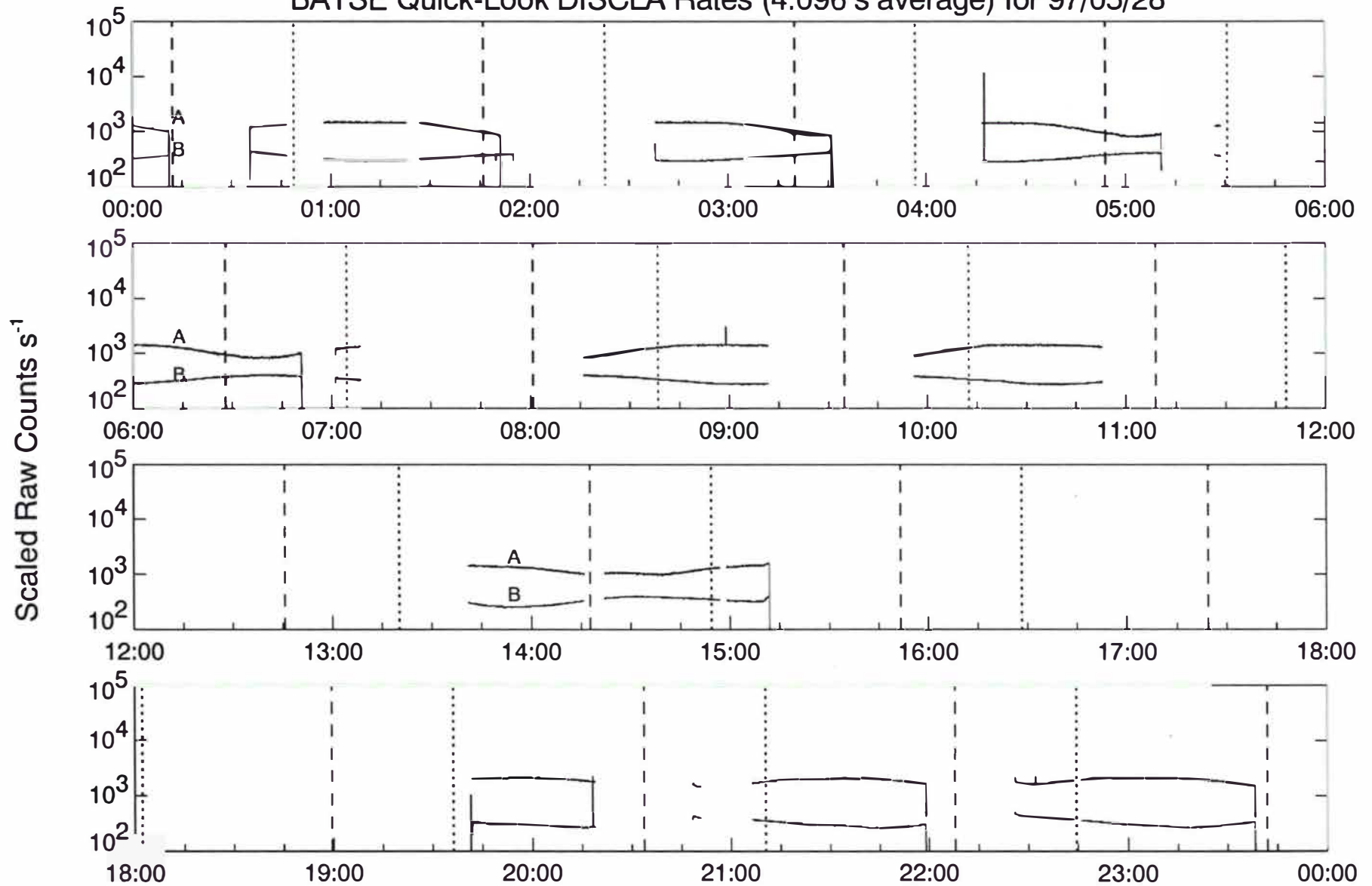
0 - 0 keV

N= 10 M= 10
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/28

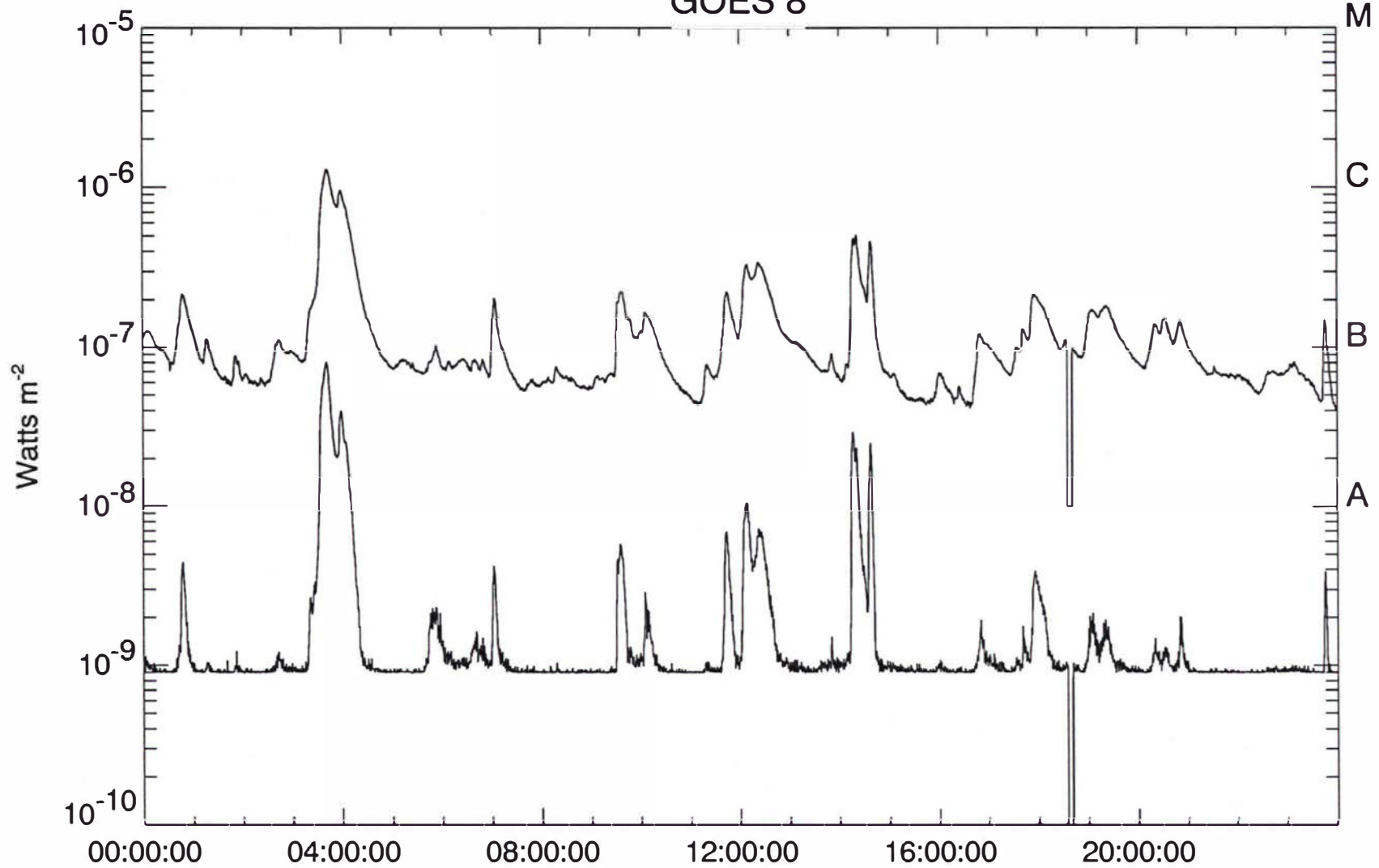


Current Time: 97/06/01, 1008 EDT
 A: Channel 0 Most Sunward LAD
 B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry
 Dashed line: Night entry

* Solar Burst Trigger
 + Solar Flare

GOES 8



Data Start: 97/05/28, 0000:00

Plot created: 97/06/01, 1007

Channel

1 (1.0 - 8.0 Angstroms)

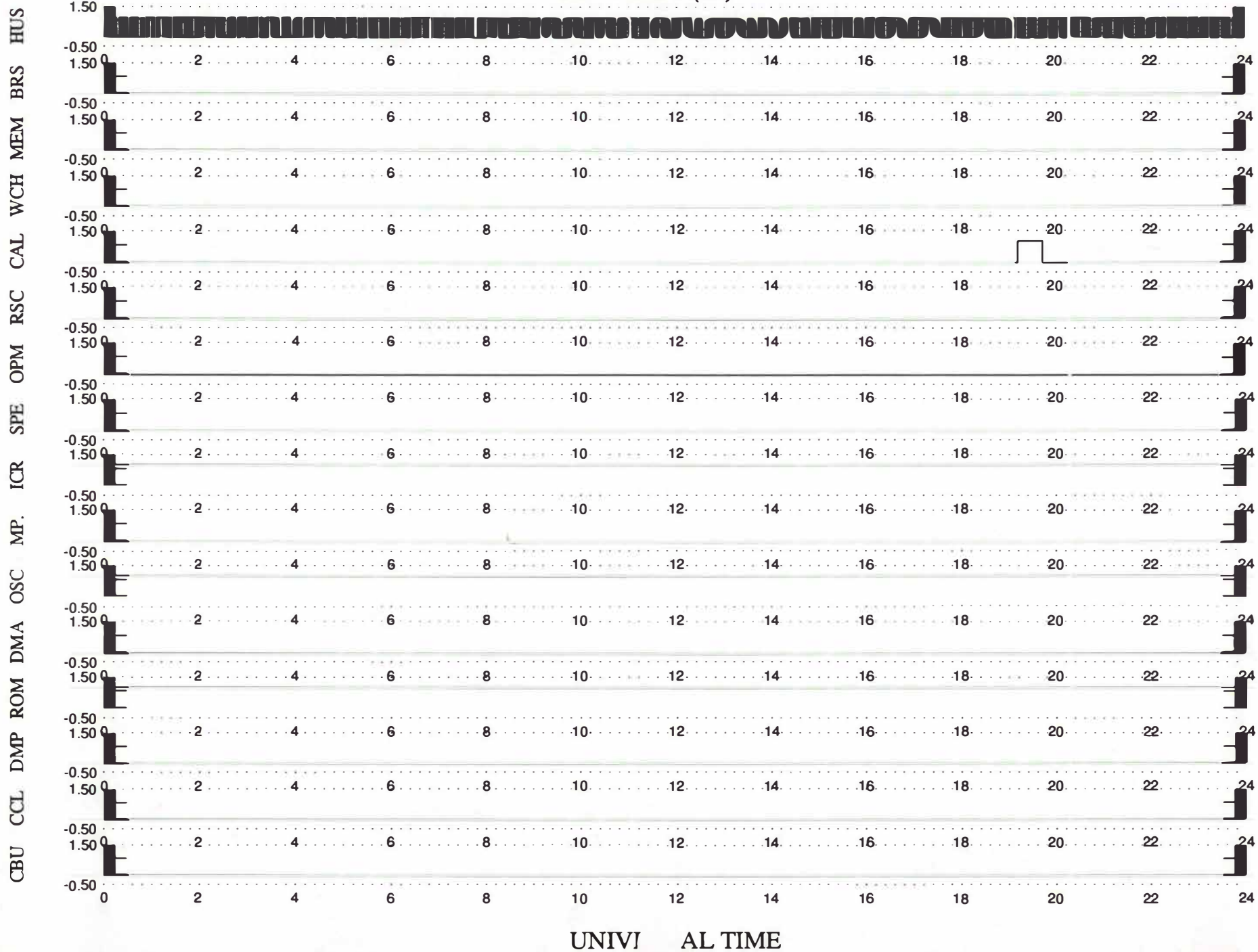
Background not subtracted

2 (0.5 - 4.0 Angstroms)

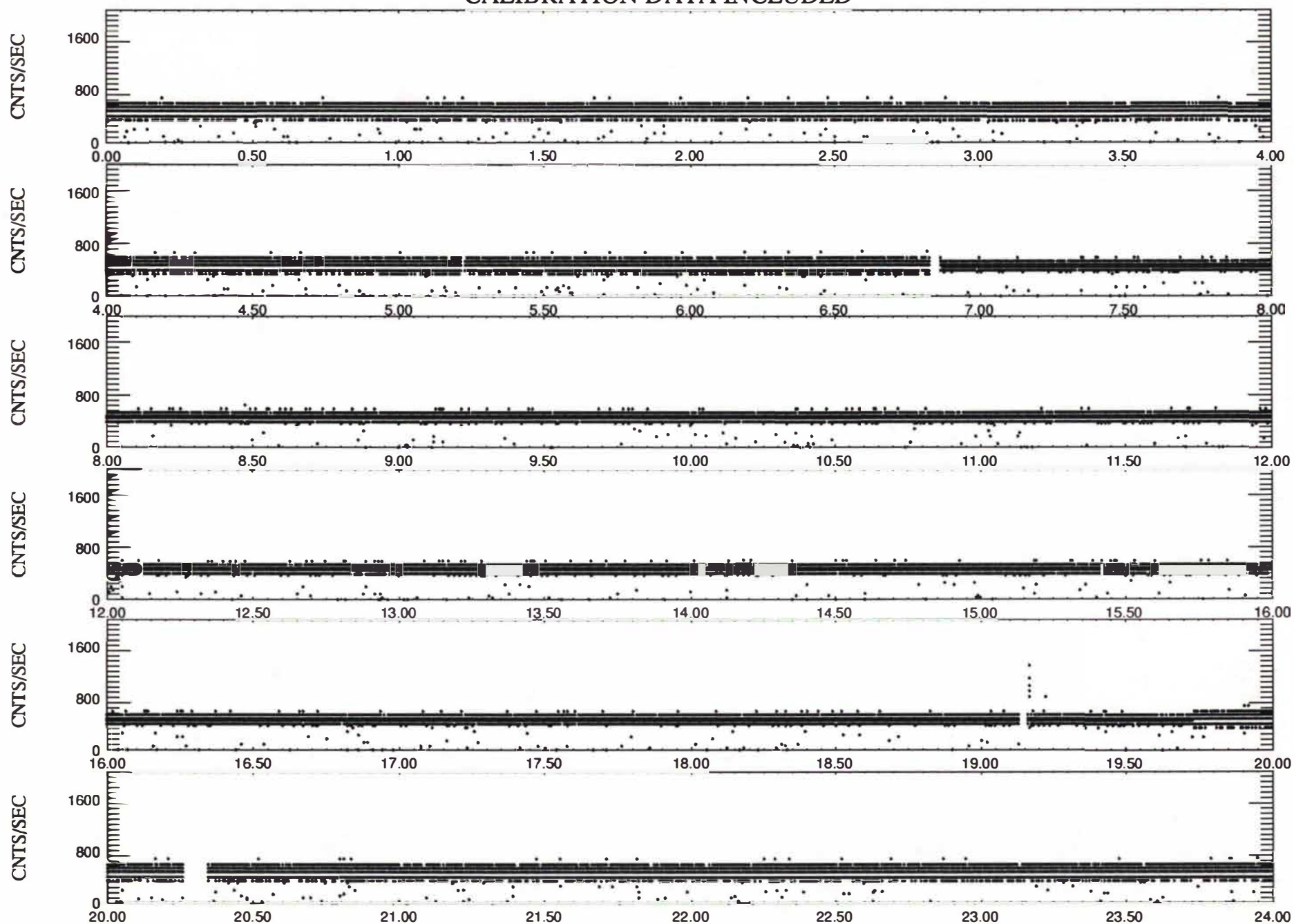
Background not subtracted

Sample average = 10

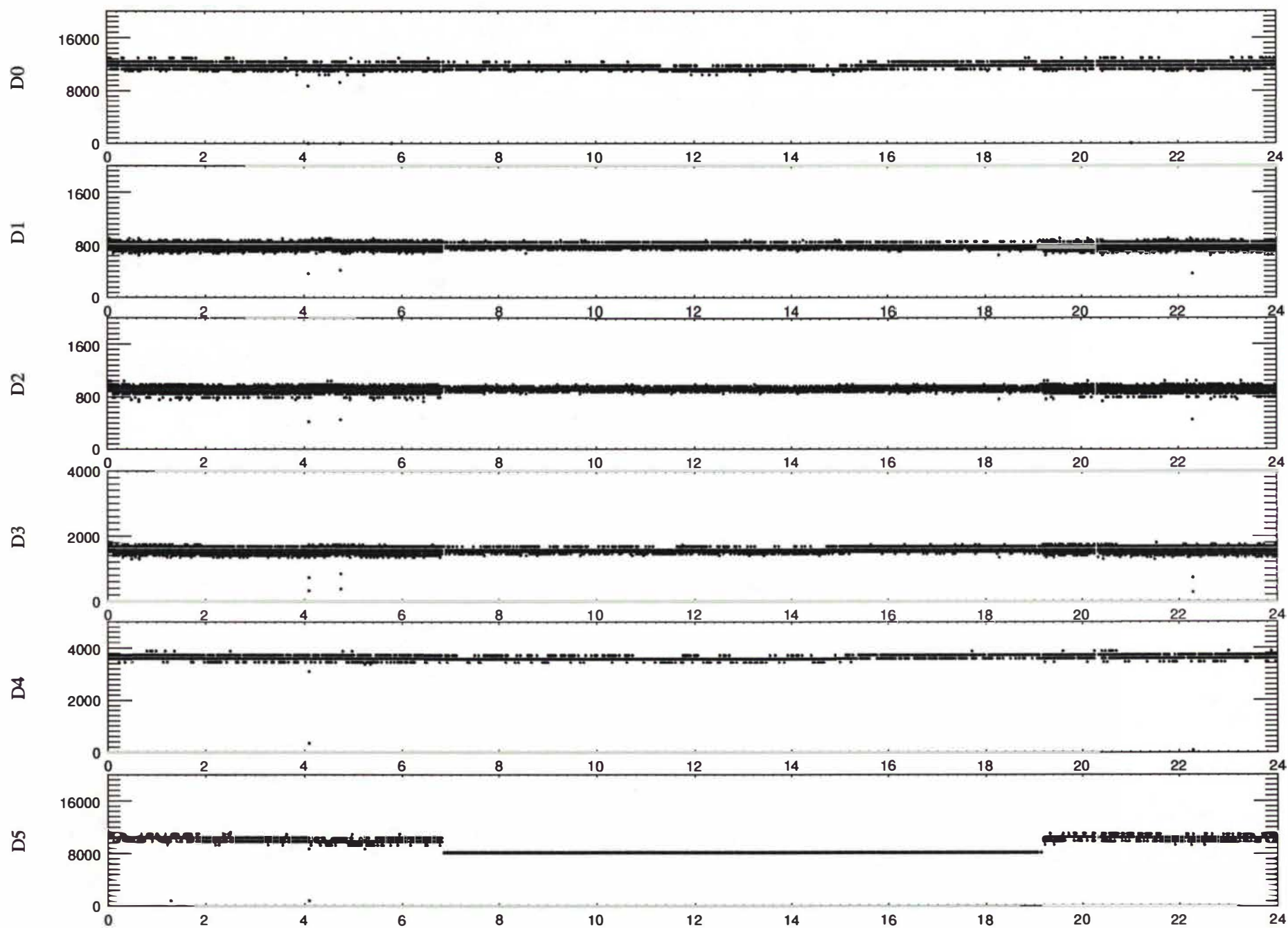
NO BURST (15)



CALIBRATION DATA INCLUDED



UNIV AL TIME



UNIVERSAL TIME

From WOODSP@SSLLES.MSFC.NASA.GOV Mon Jun 2 12:18 PDT 1997
Return-Path: <WOODSP@SSLLES.MSFC.NASA.GOV>
Received: from SSLLES.MSFC.NASA.GOV by sunspot.ssl.berkeley.edu (SMI-8.6/SMI-SVR4)
id MAA15001; Mon, 2 Jun 1997 12:18:17 -0700
Date: Mon, 2 Jun 1997 14:17:41 -0500 (CDT)
From: WOODSP@ssl.msfc.nasa.gov
To: khurley@sunspot.ssl.berkeley.edu
Message-Id: <970602141741.21c5c877@ssl.msfc.nasa.gov>
Subject: Crossing Windows for BATSE Burst 6243
Content-Type: text
Content-Length: 1135
X-Lines: 26
Status: RO

BATSEARCH PROGRAM

BATSE BURST # 6243
EVENT OF 1997 MAY 29 DAY OF YEAR=149
EVENT CROSSING TIME AT BATSE : 54265. S. OR 15:04:25.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 156.000 13.000
BATSE PEAK COUNTING RATE: 4900 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 29/ 5/ 97 IS:
RA= 151.012 DEC= 29.726 DIST= 5.263 AU
BATSE-ULYSSES DISTANCE = 787281100. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION=162.65 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH=-2506.57 SECS.
CROSSING TIME AT ULYSSES IS 51758. S. OR 14:22:38 +/- 147.91 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 29/ 5/ 97 IS:
RA= 173.026 DEC= 4.084 DIST= 1.011 AU
MARS-BATSE DISTANCE = 151190752. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION=160.97 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= -476.74 SECS.
CROSSING TIME AT MARS IS 53788. S. OR 14:56:28 +/- 21.32 SECONDS

BATSE BURST TRIGGER

NO.: 6243

TIME: TJD=0597 SECONDS=54265

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=37.8 AZIMUTH=303.3 ERROR=4.6 DEGREES

COMMENTS:

GRB LASTING ~ 4 SEC. POSSIBLE SOFT, EXTENDED EMISSION LASTING ~ 125 SEC.
WEAK, SPIKEY EVENT. NOT VISIBLE ABOVE 300 KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6243	970529	10597	54265	4900	156	+13	4

BATSE BURST# 6243

ULYSSES RT

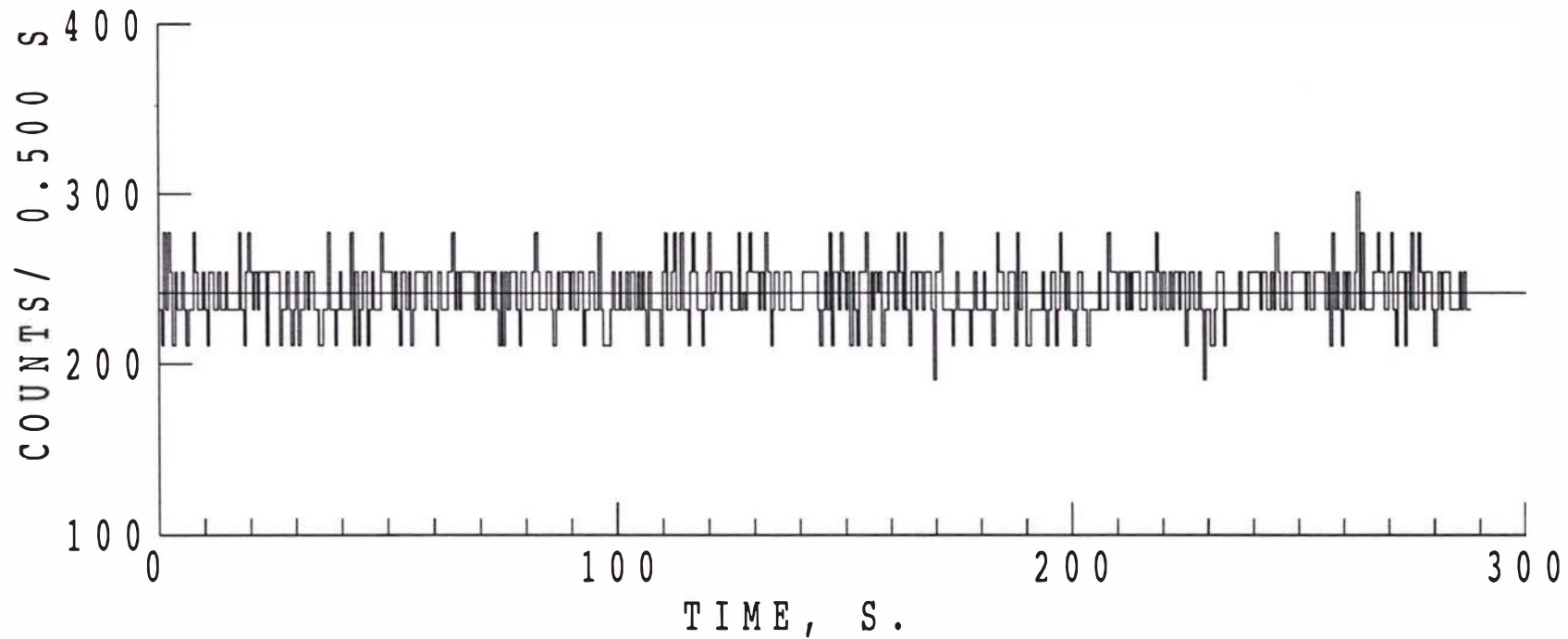
2 / 6 / 97

29 / 5 / 97 51624.398 s

0 - 0 keV

W= 10 M=10
>4.0 SIGMA FLUCTUATIONS

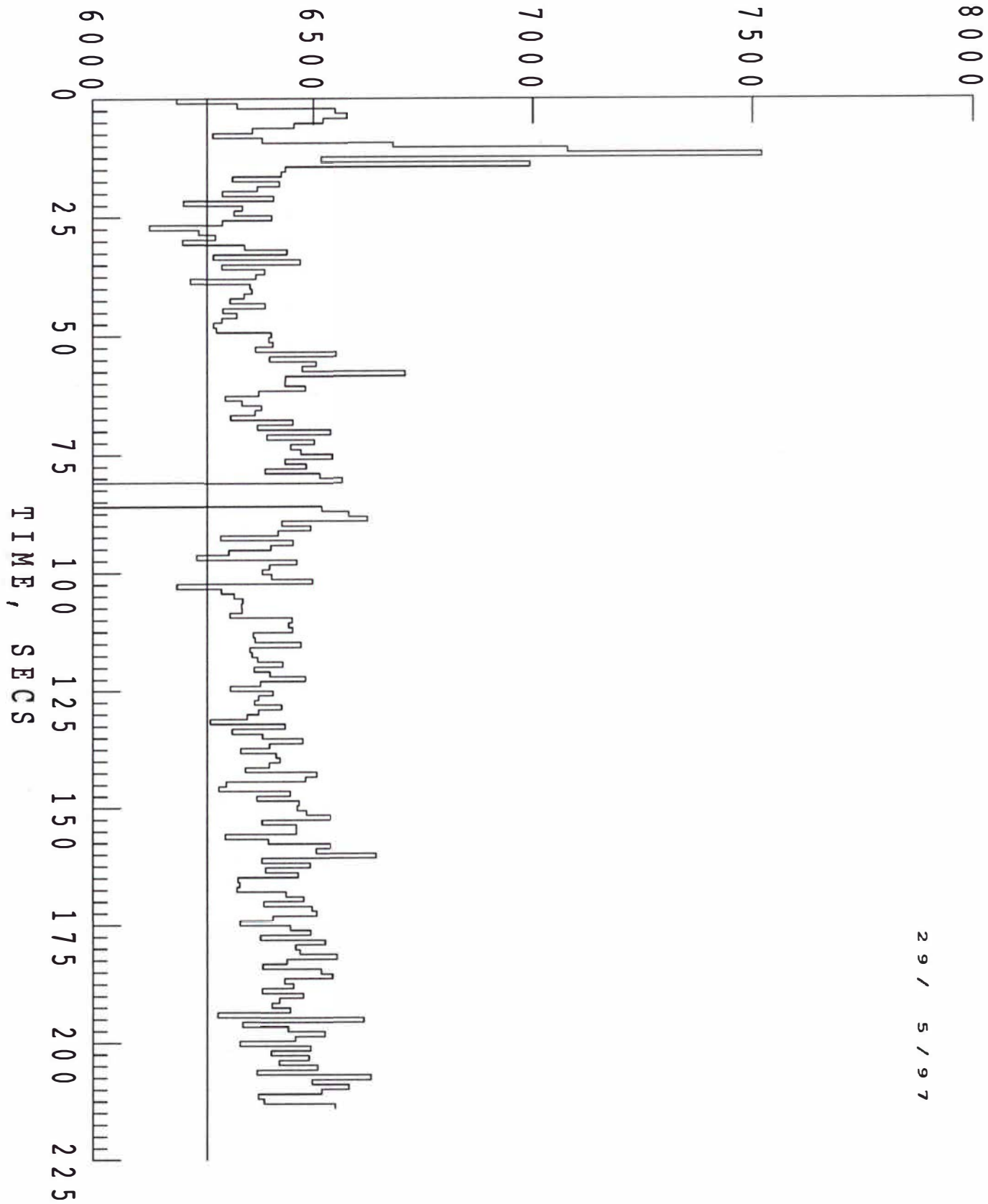
W= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



BACODINE 6243 29/05/97 54254.281

25 - 100 keV

COUNTS/1.024 S



KONUS

ULYSSES RT

04 / 02 / 00

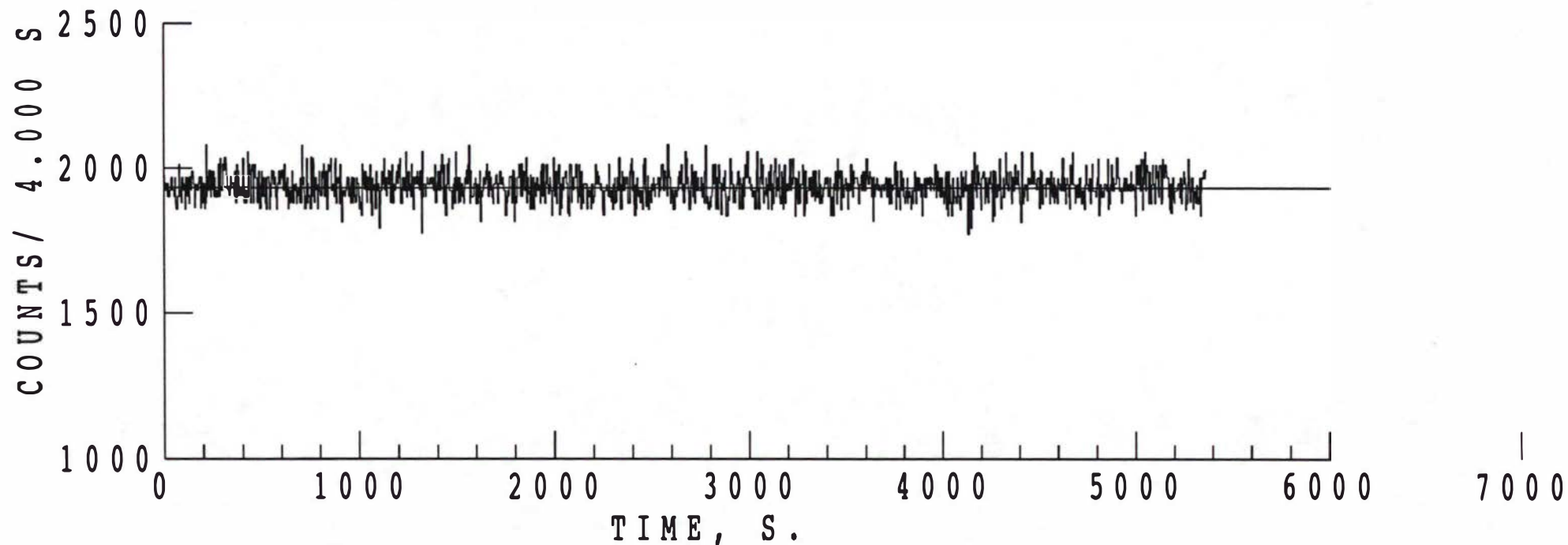
29/05/97 60156.000 s

0.500 S INTERVALS REGROUPED BY 8

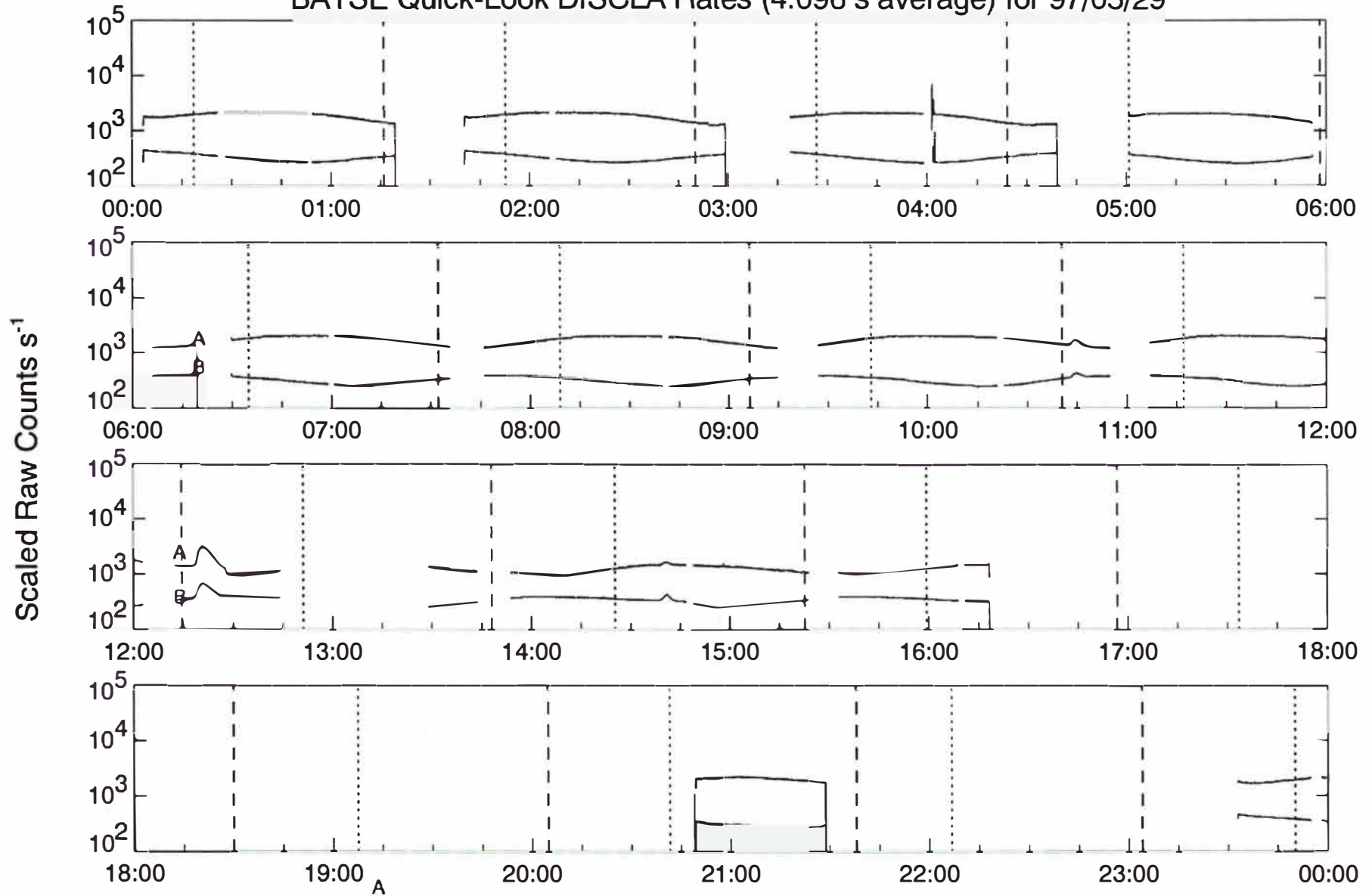
0 - 0 keV

N= 10 M= 10
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



BATSE Quick-Look DISCLA Rates (4.096 s average) for 97/05/29



Current Time: 97/06/02, 1008 EDT

A: Channel 0 Most Sunward LAD

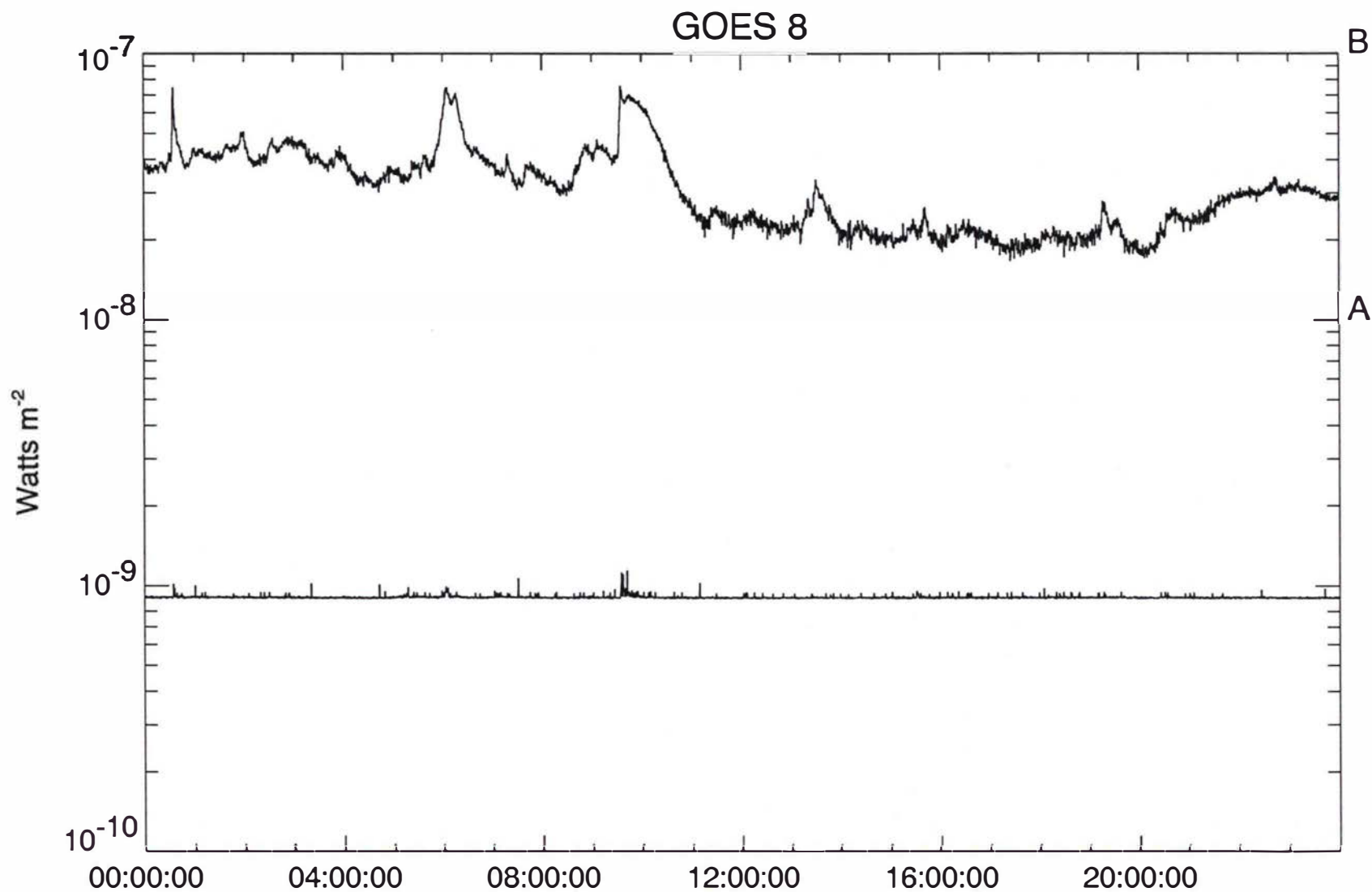
B: Sum Channel 0 Anti-Sunward LADs X .05

Dotted line: Day entry

Dashed line: Night entry

* Solar Burst Trigger

+ Solar Flare



Data Start: 97/05/29, 0000:00

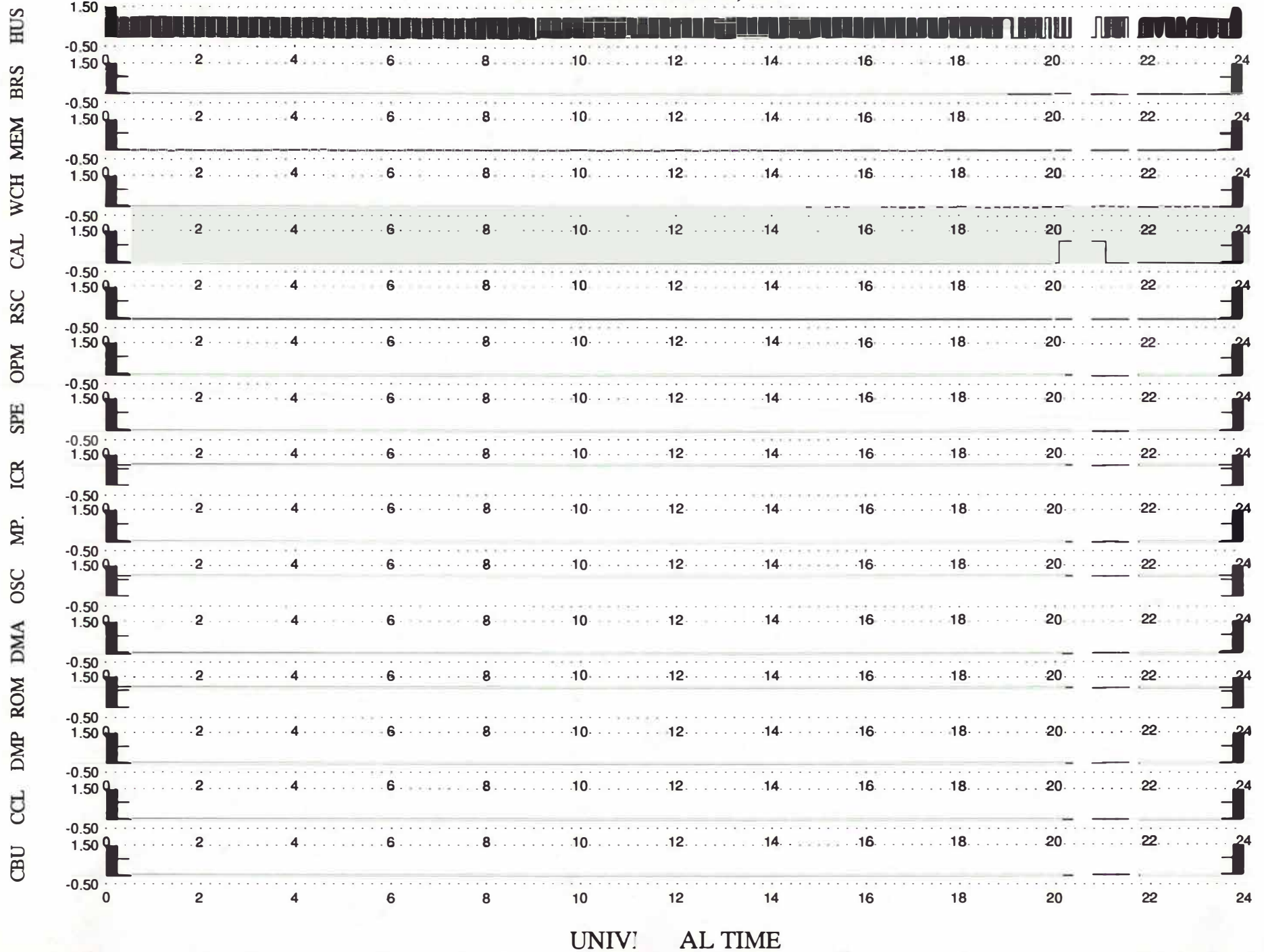
Plot created: 97/06/02, 1007

Channel

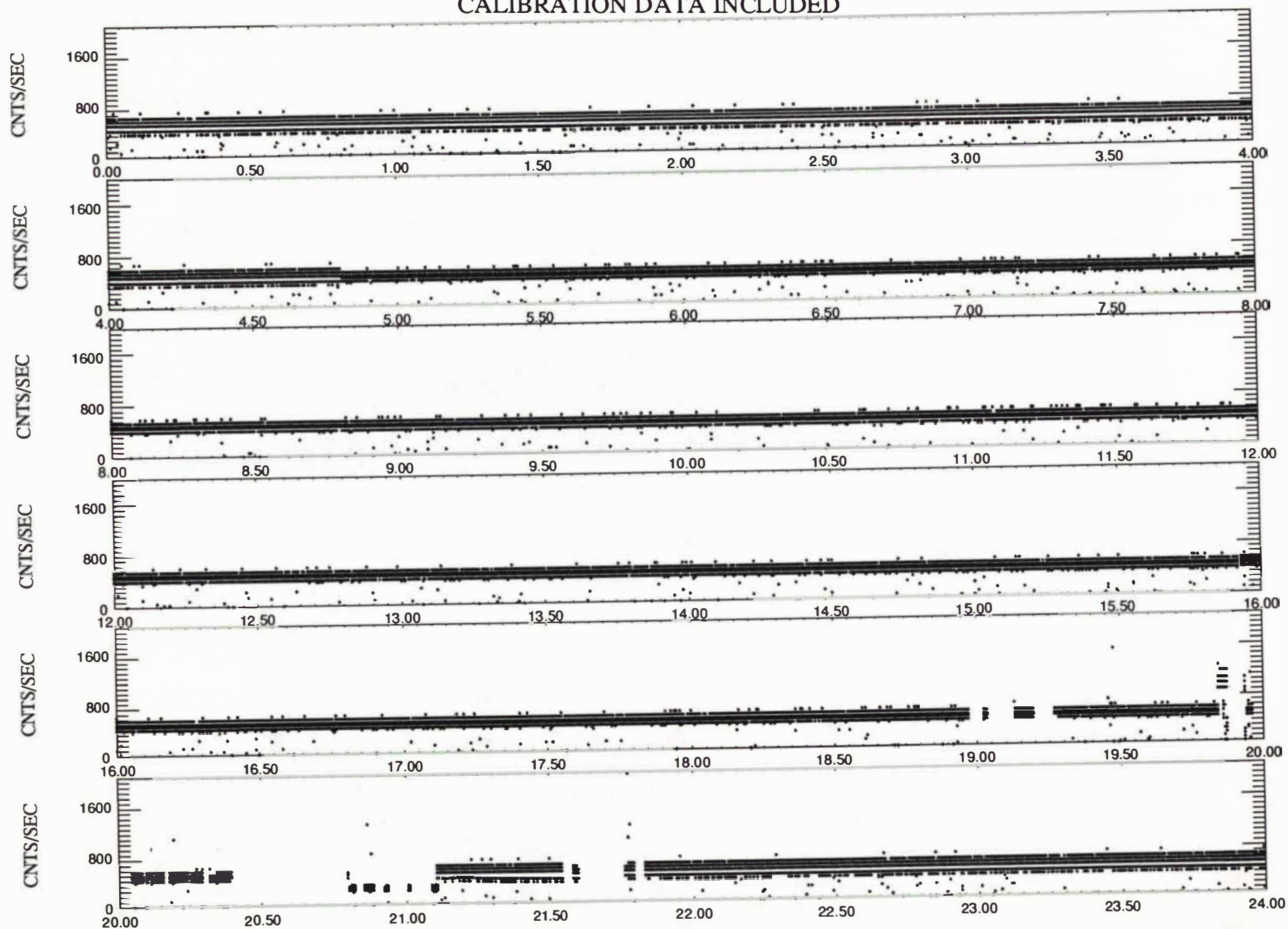
1 (1.0 - 8.0 Angstroms)
2 (0.5 - 4.0 Angstroms)

Background not subtracted
Background not subtracted
Sample average = 10

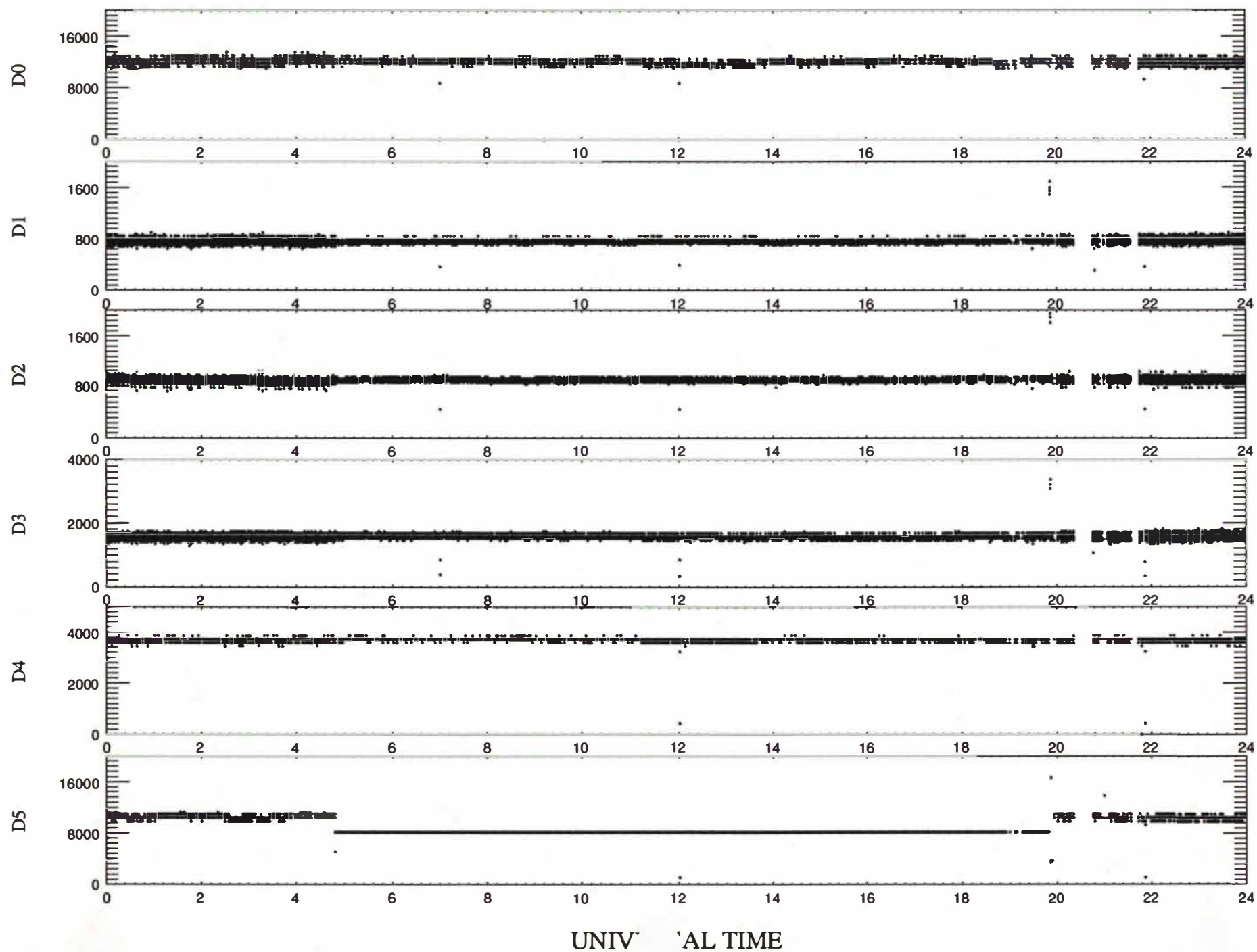
BURST NUMBER 3, 15



CALIBRATION DATA INCLUDED



UNIVERSAL TIME



From SAHI@fender.msfc.nasa.gov Wed Jun 4 08:41 PDT 1997
From: SAHI@fender.msfc.nasa.gov
Date: Wed, 4 Jun 1997 10:40:21 -0500 (CDT)
To: khurley@sunspot.ssl.berkeley.edu
Subject: Crossing Windows for BATSE Burst 6244

BATSEARCH PROGRAM

BATSE BURST # 6244
EVENT OF 1997 MAY 30 DAY OF YEAR=150
EVENT CROSSING TIME AT BATSE : 16804. S. OR 04:40:04.0
COORDINATES ARE 0.000 0.000 6800. (RA, DEC, DIST.)
BURST ARRIVAL DIRECTION: 323.000 -76.000
BATSE PEAK COUNTING RATE: 2500 C/S

EVENT CROSSING TIME AT ULYSSES WILL BE FOUND
INTERPOLATED POSITION OF ULYSSES ON 30/ 5/ 97 IS:
RA= 151.029 DEC= 29.658 DIST= 5.272 AU
BATSE-ULYSSES DISTANCE = 788757731. KM.
ANGLE WHICH BATSE-ULYSSES VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 46.51 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 1810.90 SECS.
CROSSING TIME AT ULYSSES IS 18615. S. OR 05:10:14 +/- 408.87 SECONDS

EVENT CROSSING TIME AT MARS WILL BE FOUND
POSITION OF MARS ON 30/ 5/ 97 IS:
RA= 173.300 DEC= 3.934 DIST= 1.018 AU
MARS-BATSE DISTANCE = 152304560. KM.
ANGLE WHICH BATSE-MARS VECTOR MAKES WITH GRB ARRIVAL DIRECTION= 74.04 DEG.
LIGHT TRAVEL TIME ALONG PROJECTED PATH= 139.68 SECS.
CROSSING TIME AT MARS IS 16944. S. OR 04:42:23 +/- 86.92 SECONDS

BATSE BURST TRIGGER

NO.: 6244

TIME: TJD=0598 SECONDS=16804

TYPE: BURST SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH=79.9 AZIMUTH=112.5 ERROR=2.62 DEGREES

COMMENTS:

BURST, SINGLE PULSE, DUR.~160 SEC MAX. AT ~T+10 SEC, RISE FASTER THAN FALL.
MARGINALLY VISIBLE ABOVE 300 KEV.

BATSE #	Date	TJD	SoD	Max ct/s	RA	Dec	Dur (s)
6244	970530	10598	16804	2500	323	-76	160

BATSE BURST# 6244

ULYSSES RT

2 / 6 / 97

30 / 5 / 97 18216.023 s

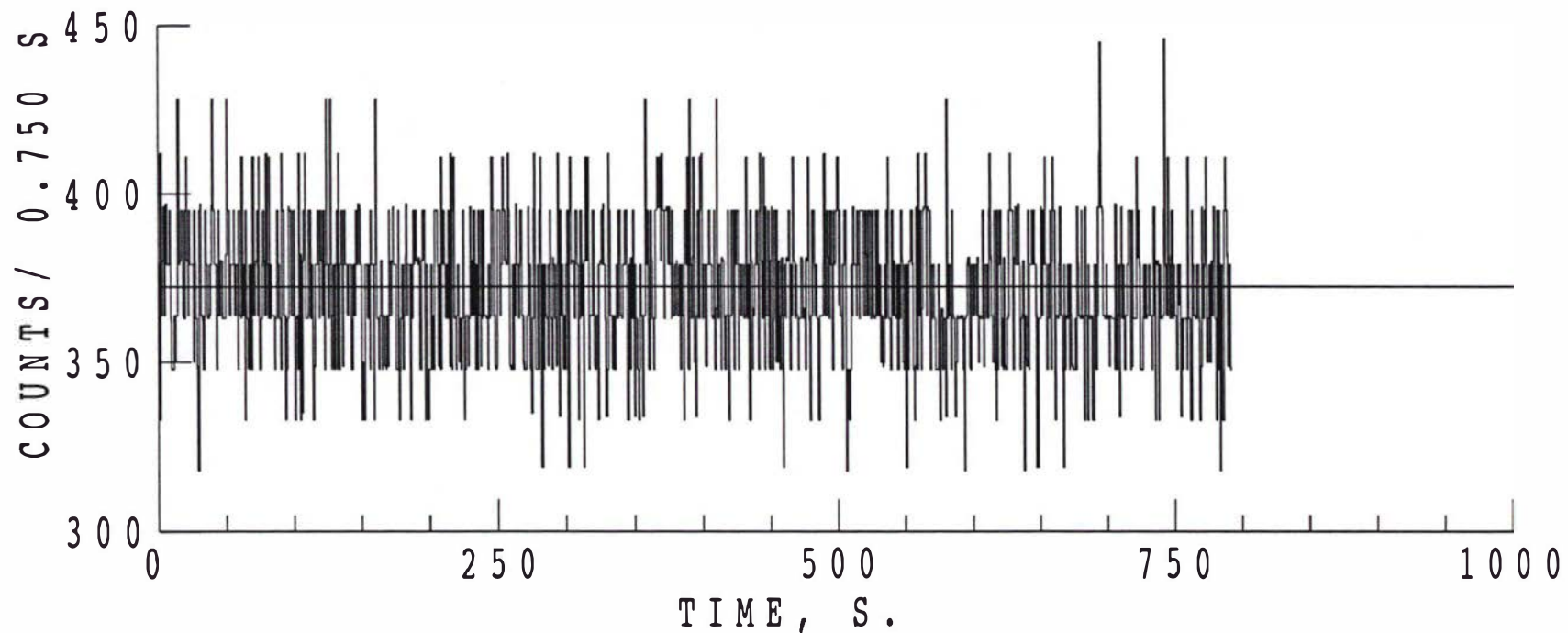
0.250 S INTERVALS REGROUPED BY 3

0 - 0 keV

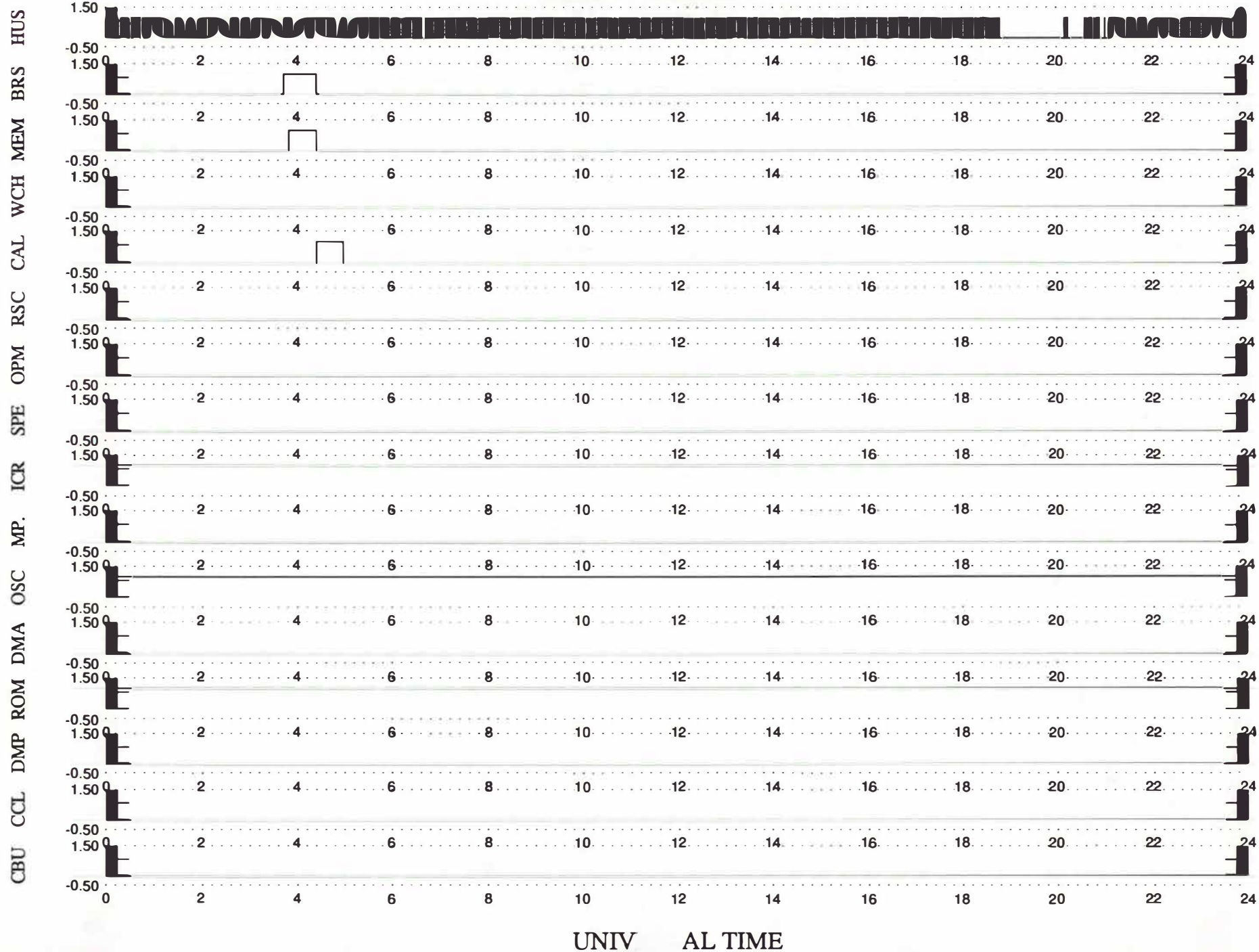
|

W= 10 M=10
>4.0 SIGMA FLUCTUATIONS

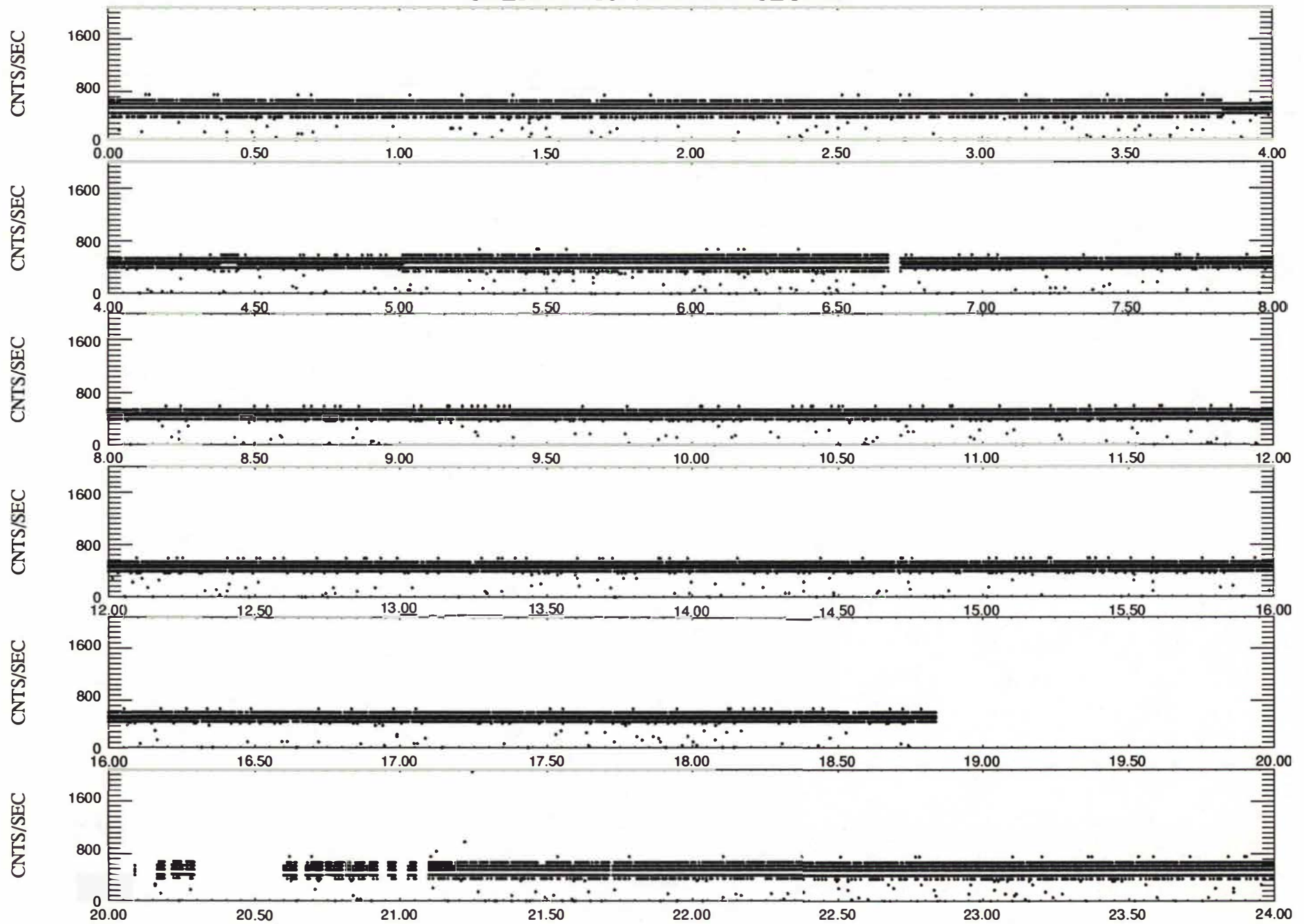
W= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



BURST NUMBER 0

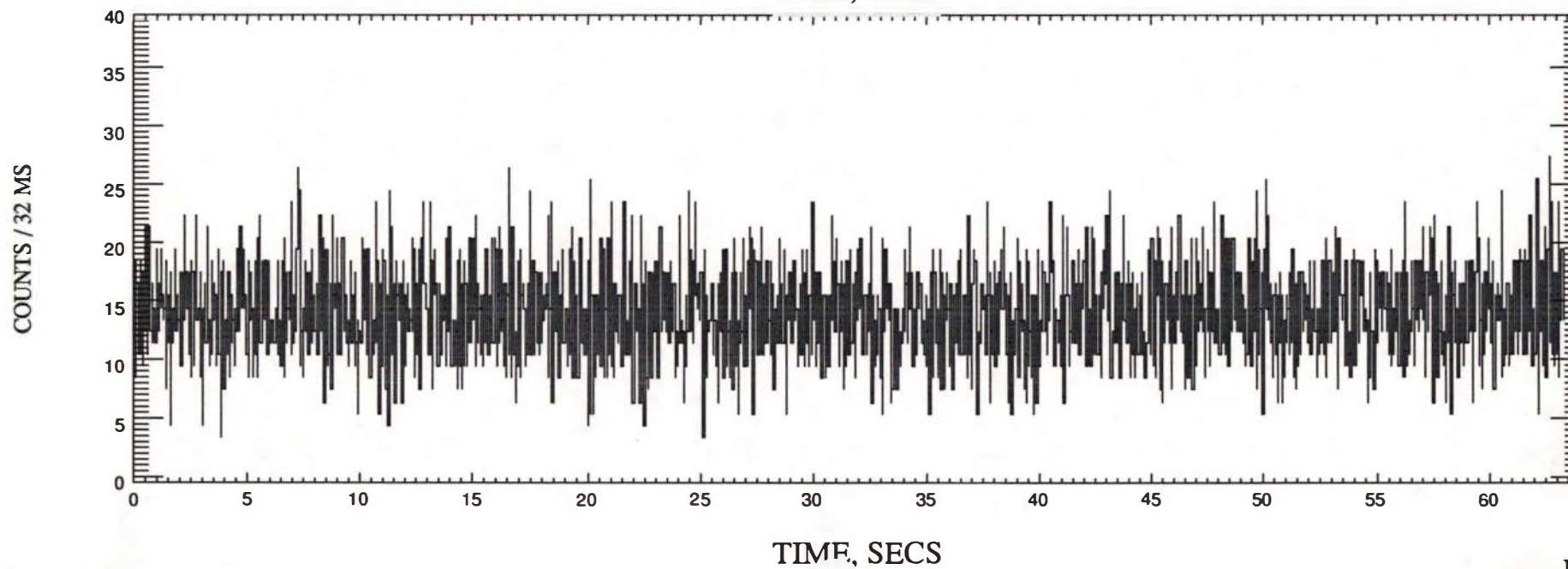
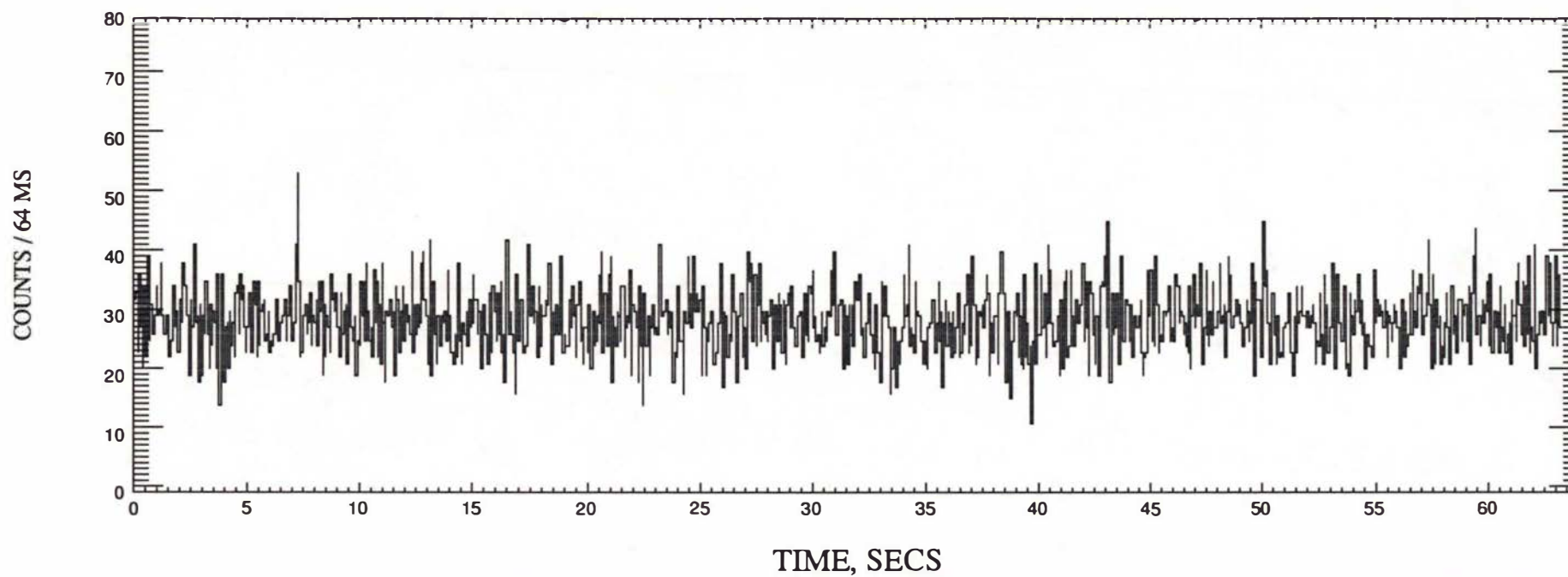


CALIBRATION DATA INCLUDED

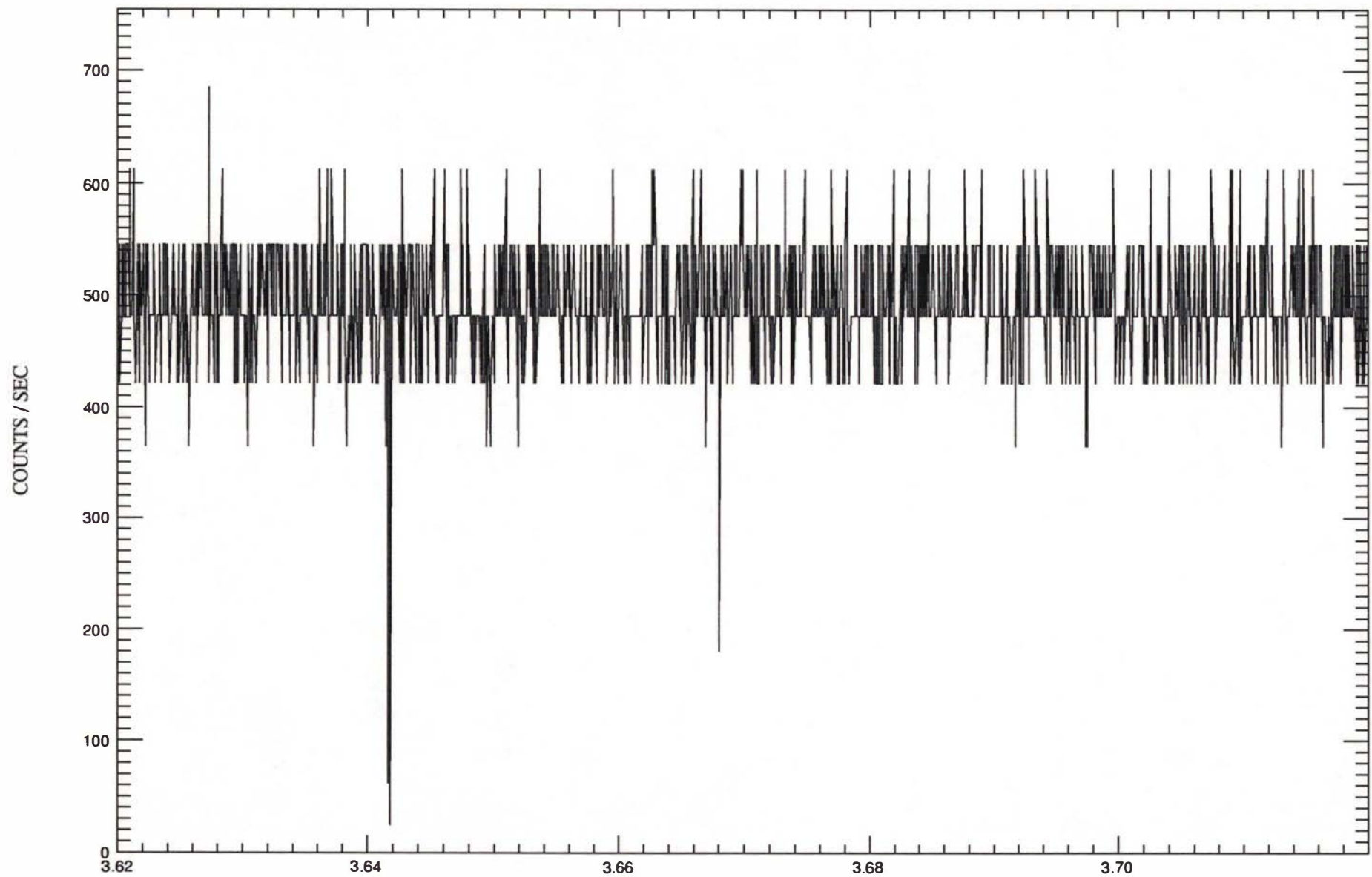


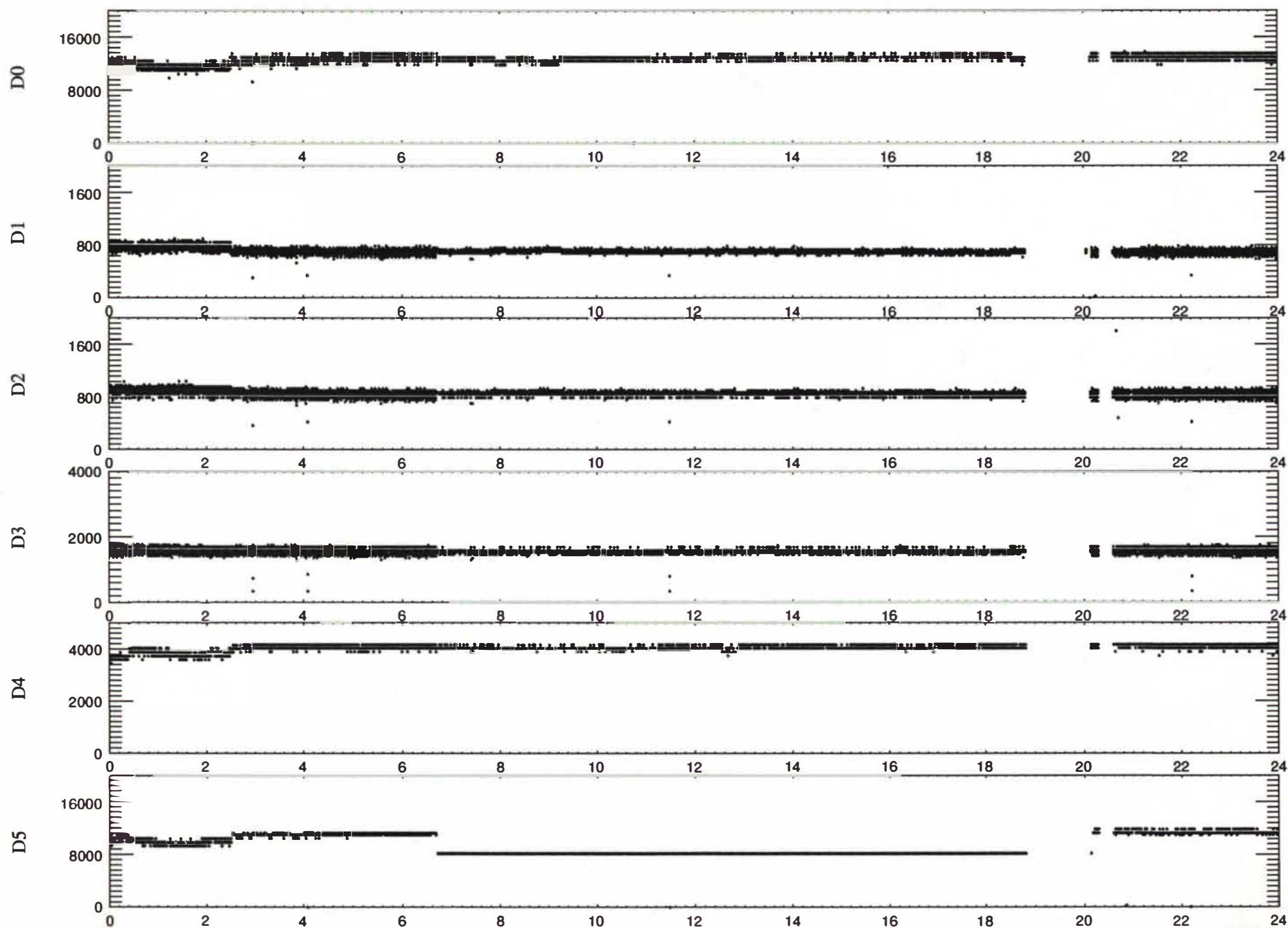
UNIV' AL TIME

Burst Counter 0 at UT= 3.673356412252 h=13224.083 s 03:40:24.083



CALIBRATION DATA INCLUDED





UNIV' AL TIME

From SAHI@fender.msfc.nasa.gov Mon Jun 2 10:58 PDT 1997
From: SAHI@fender.msfc.nasa.gov
Date: Mon, 2 Jun 1997 12:57:30 -0500 (CDT)
To: burst@comptel.sr.unh.edu, grobad@ests2.estec.esa.nl,
cline@lhev.gsfc.nasa.gov, barthelmy@lhev.gsfc.nasa.gov,
bacodine@pandora.gsfc.nasa.gov, scott@circe.gsfc.nasa.gov,
butterworth@lhev.gsfc.nasa.gov, band@cass09.ucsd.edu,
gruber@cass09.ucsd.edu, matteson@cass09.ucsd.edu,
PACIESAS@fender.msfc.nasa.gov, HORACK@fender.msfc.nasa.gov,
khurley@sunspot.ssl.berkeley.edu, lmm@egret.gsfc.nasa.gov,
mops@osse.nrl.navy.mil, grove@osse.nrl.navy.mil,
matz@osse.nrl.navy.mil, share@osse.nrl.navy.mil,
messina@osse.nrl.navy.mil, sandora@osse.nrl.navy.mil
Subject: Burst Trigger Message

BATSE BURST TRIGGER

NO.: 6245

TIME: TJD=0599 SECONDS=40905

TYPE: ELECTRO SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH= AZIMUTH= ERROR= DEGREES

COMMENTS:
ELECTRON EVENT.

From SAHI@fender.msfc.nasa.gov Mon Jun 2 11:00 PDT 1997
From: SAHI@fender.msfc.nasa.gov
Date: Mon, 2 Jun 1997 12:59:24 -0500 (CDT)
To: burst@comptel.sr.unh.edu, grobad@ests2.estec.esa.nl,
cline@lheavx.gsfc.nasa.gov, barthelmy@lheavx.gsfc.nasa.gov,
bacodine@pandora.gsfc.nasa.gov, scott@circe.gsfc.nasa.gov,
butterworth@lheavx.gsfc.nasa.gov, band@cass09.ucsd.edu,
gruber@cass09.ucsd.edu, matteson@cass09.ucsd.edu,
PACIESAS@fender.msfc.nasa.gov, HORACK@fender.msfc.nasa.gov,
khurley@sunspot.ssl.berkeley.edu, lmm@egret.gsfc.nasa.gov,
mops@osse.nrl.navy.mil, grove@osse.nrl.navy.mil,
matz@osse.nrl.navy.mil, share@osse.nrl.navy.mil,
messina@osse.nrl.navy.mil, sandora@osse.nrl.navy.mil
Subject: Burst Trigger Message

BATSE BURST TRIGGER

NO.: 6246

TIME: TJD=0599 SECONDS=55353

TYPE: ELECTRO SOLAR FLARE TRIGGER SIGNAL:N

SIGNIFICANCE: SIGMA

INTENSITY: COUNTS/CM2

LOCATION: ZENITH= AZIMUTH= ERROR= DEGREES

COMMENTS:
ELECTRON EVENT.

SAX
HUS DATA

19 / 07 / 05

ULYSSES RT

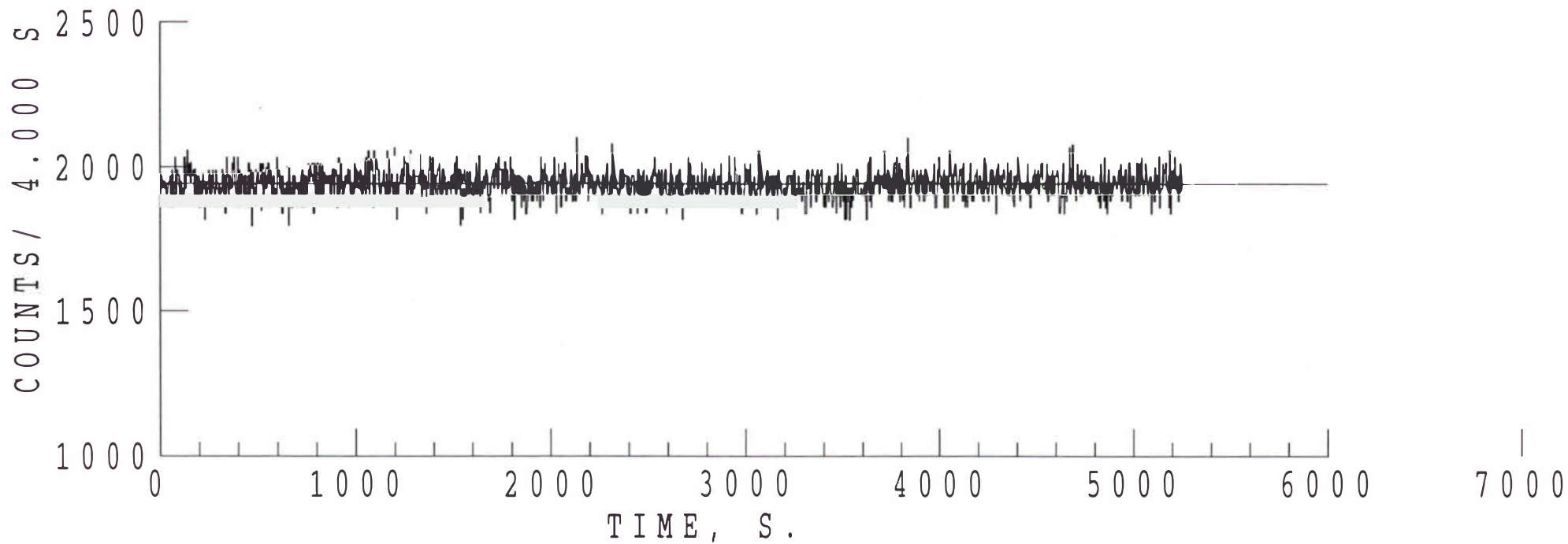
31 / 05 / 97 61632.047 s

0.500 S INTERVALS REGROUPED BY 8

0 - 0 keV

N= 10 M= 10
>4.0 SIGMA FLUCTUATIONS

N= 10 M= 2
>4.0 SIGMA FLUCTUATIONS



111

112

113

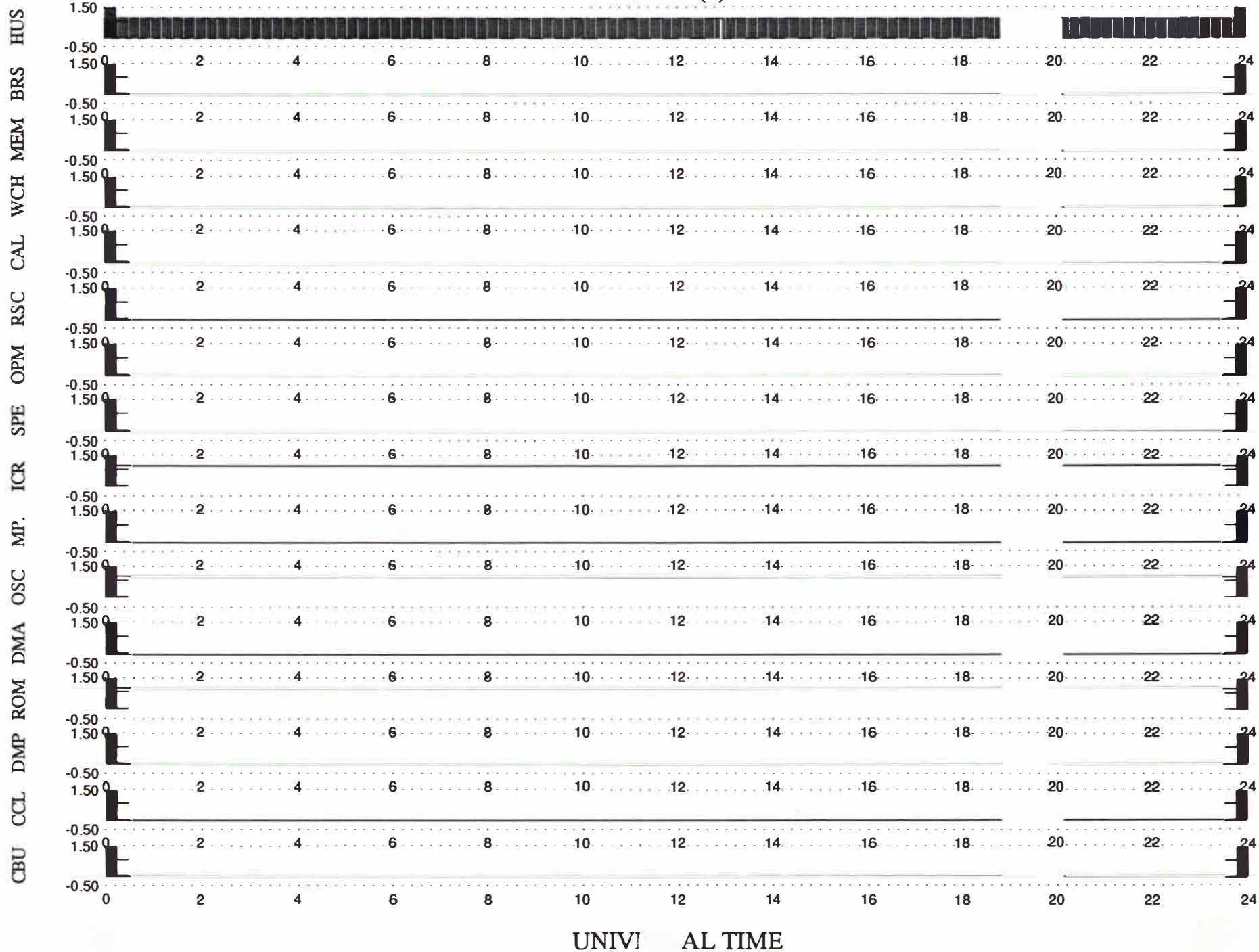
114

115

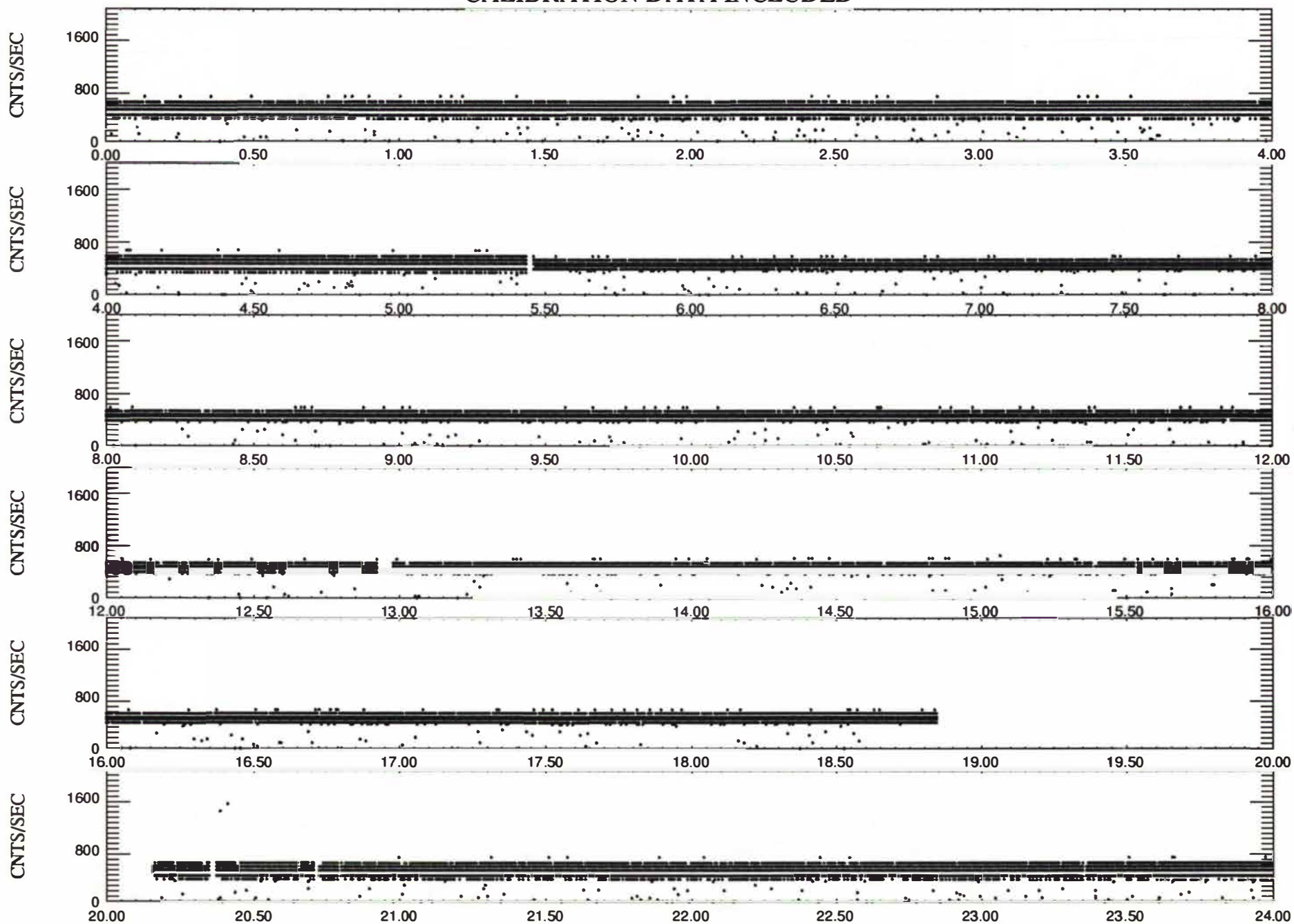
116

117

NO BURST (0)



CALIBRATION DATA INCLUDED



UNIV AL TIME

1870-1871

1872

1873

1874

1875

1876

1877

1878

1879

1880

1881

1882

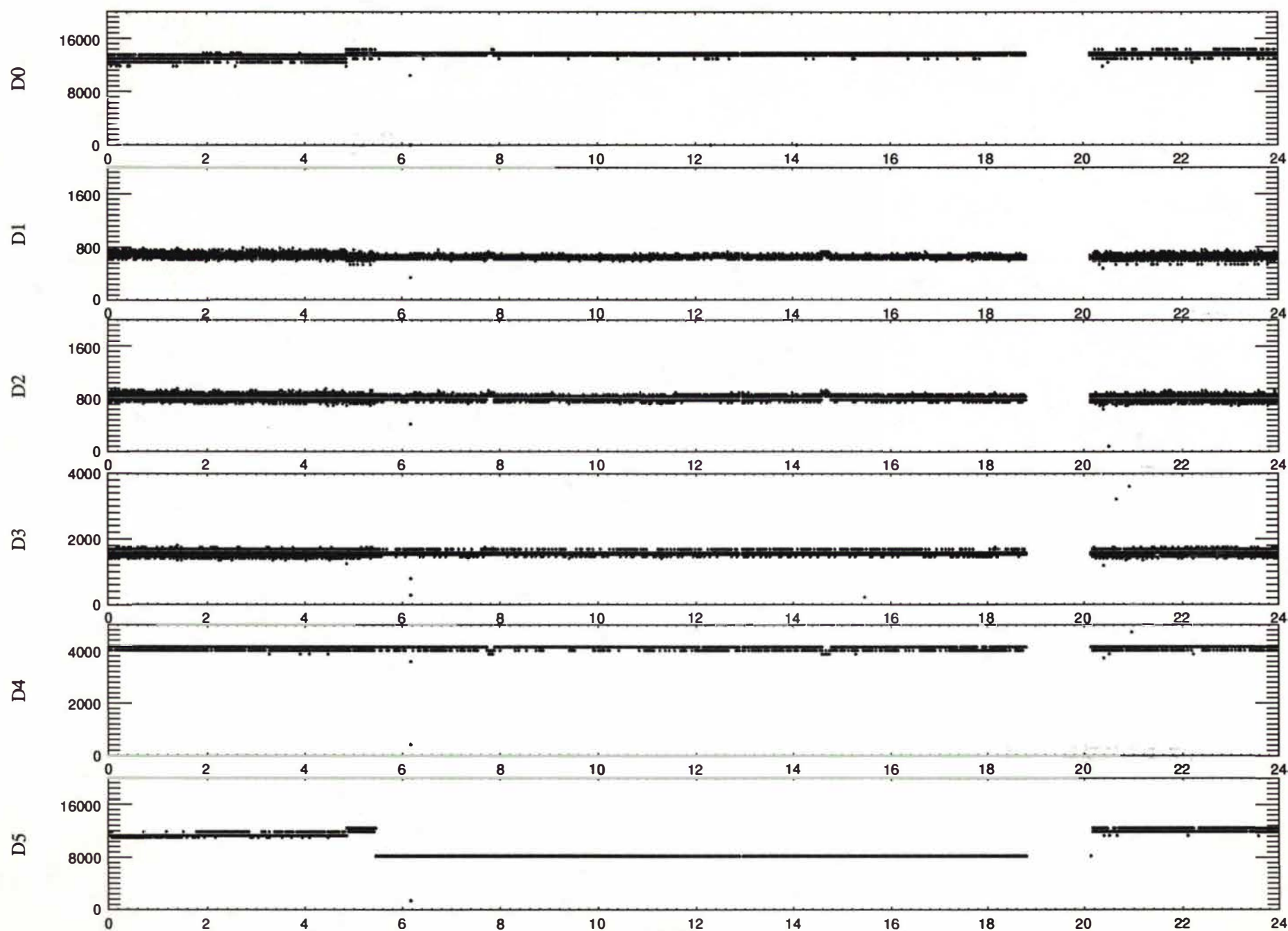
1883

1884

1885

1886

1887



UNIV' AL TIME