

THE FIRST BATSE GAMMA-RAY BURST CATALOG

GERALD J. FISHMAN, CHARLES A. MEEGAN, ROBERT B. WILSON, MARTIN N. BROCK, AND JOHN M. HORACK
NASA/Marshall Space Flight Center, Huntsville, AL 35812

CHRYSSA KOUVELIOTOU AND SETHANNE HOWARD¹
Universities Space Research Association, American City Building, Suite 212, Columbia, MD 21044

WILLIAM S. PACIESAS, MICHAEL S. BRIGGS, GEOFFREY N. PENDLETON, THOMAS M. KOSHUT,
ROBERT S. MALLOZZI, AND MARK STOLLBERG
Department of Physics, University of Alabama in Huntsville, Huntsville, AL 35899

AND

JOHN PATRICK LESTRADE
Department of Physics, Mississippi State University, MS 39762
Received 1993 June 24; accepted 1993 September 21

ABSTRACT

The Burst and Transient Source Experiment on the *Compton Gamma-Ray Observatory* detected 260 cosmic gamma-ray bursts during the period 1991 April 19 to 1992 March 5. This paper presents the occurrence times, locations, peak count rates, peak fluxes, fluences, durations, and plots of time histories for these bursts. The angular distribution is consistent with isotropy. The intensity distribution shows a deficit in the number of weak bursts, which is not consistent with a homogeneous distribution of burst sources in Euclidean space. The duration distribution shows evidence for a separate class of bursts with durations less than about 2 seconds.

Subject headings: catalogs — gamma rays: bursts

1. INTRODUCTION

In spite of two decades of study, the origin of gamma-ray bursts remains an enigma. The bursts last from a few milliseconds to several hundred seconds, often exhibiting complex temporal structure on many timescales. Their spectra are nonthermal, with almost all of the luminosity in the low-energy gamma-ray band. No unambiguous counterparts have been found at any other wavelength.

The Burst and Transient Source Experiment (BATSE) was designed primarily to investigate gamma-ray bursts with unprecedented sensitivity. BATSE is one of four instruments on the *Compton Gamma-Ray Observatory* (CGRO), launched into Earth orbit by the Space Shuttle on 1991 April 5. On April 19, the burst trigger (see below) was enabled, and BATSE began to record gamma-ray bursts at a rate of about 0.8 per day. An early and quite unexpected finding was that the distribution of burst sources is isotropic, but that there is a deficiency of weak bursts, implying a lower density of sources at larger distances (Meegan et al. 1992). No known Galactic population has such a distribution, suggesting that the sources either reside in a previously unknown very large Galactic corona (Brainerd 1992a; Eichler & Silk 1992; Hartmann 1992; Li & Dermer 1992; Katz 1993), or they are at cosmological distances (Paczynski 1986, 1991; Piran 1992; Mochkovitch et al. 1992; Brainerd 1992b; Melia & Fatuzzo 1992; Paczyński 1992; Mao & Paczyński 1992; Usov 1992; Mészáros & Rees 1993; Woosley 1993).

Presented here is the first catalog of gamma-ray bursts observed with BATSE. This catalog contains the 260 bursts that satisfied the on-board trigger criteria from 1991 April 19 until 1992 March 5.

2. INSTRUMENTATION

BATSE consists of eight detector modules, placed at the corners of the CGRO spacecraft (Fig. 1). Each module consists of a Large Area Detector (LAD), a Spectroscopy Detector (SD), and associated electronics. The data presented here are derived only from the LADs, which are 50.8 cm diameter by 1.27 cm thick sodium iodide scintillators, covered by a plastic scintillator for charged particle rejection. Photons detected by the LADs are pulse-height analyzed into 128 energy channels covering the energy range of ~ 25 keV to ~ 2 MeV. There are also four broad discriminator channels: 25–50 keV, 50–100 keV, 100–300 keV, and > 300 keV. Data from the eight modules are sent to a Central Electronics Unit (CEU), where they are compiled into a number of different data types. The CEU also controls the triggering of the burst memory, and manages the command and telemetry interface to the spacecraft. Additional details of the BATSE hardware can be found in Fishman et al. (1989).

A burst trigger is generated by the BATSE on-board software if two or more detectors register significant increases in count rate in any of three time intervals: 64 ms, 256 ms, or 1024 ms. The required increase is specified by command in terms of standard deviations above background. These thresholds were set at 5.5σ in each of the three time scales for most ($\sim 88\%$) of

¹ Postal address: BDM International, Washington, DC.

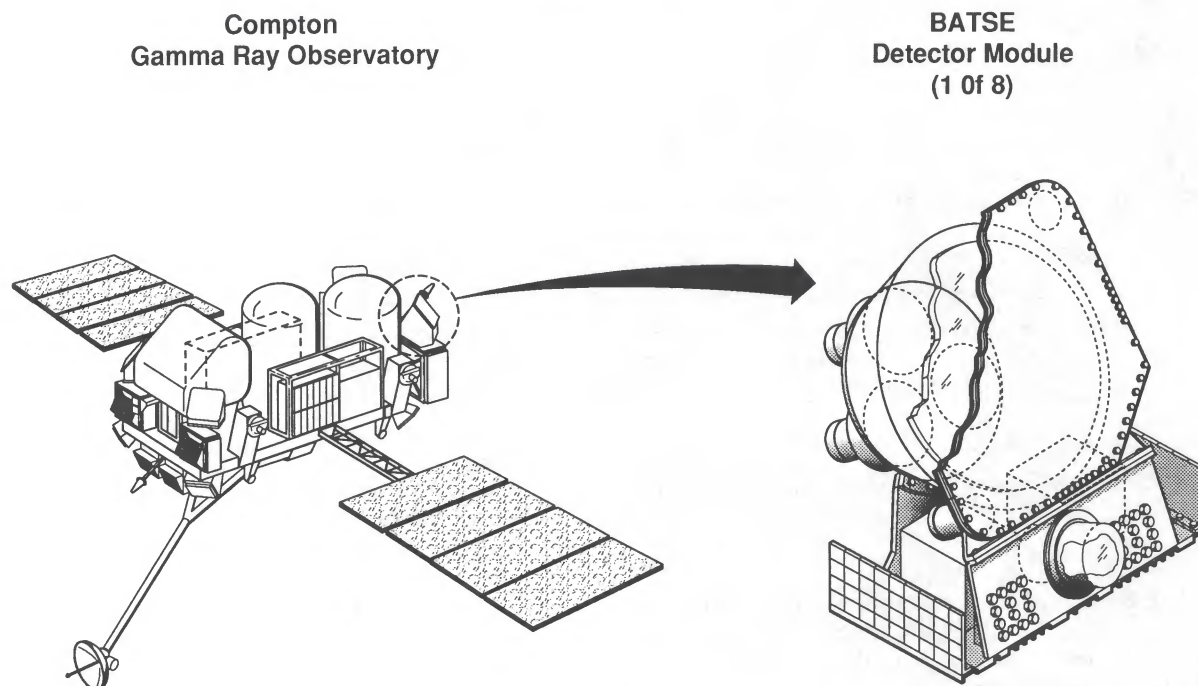


FIG. 1.—*Gamma-Ray Observatory* showing the eight BATSE detectors on the corners of the spacecraft

the flight. The average background is computed every 17 seconds. When a burst trigger occurs, data are stored at a high rate into memory for 240 seconds. These data accumulations, consisting of several combinations of temporal and energy resolution, are then read out over the next 90 minutes. During the readout period, triggering is disabled on the 256 and 1024 ms timescales, and the threshold on the 64 ms timescale is revised to the maximum rate of the burst currently being read out. If a subsequent trigger (referred to as an overwrite) exceeds this higher threshold, the current readout is aborted, and data from the overwrite are stored in the burst memories. Both overwriting and overwritten bursts are included in the burst catalog. However, overwriting bursts are excluded from any analyses that require intensity dependent corrections for exposure because the sky exposure matrix (described below) does not include burst readout intervals. All overwritten bursts transmit enough data to determine peak flux and location.

The *CGRO* is in a circular orbit, with an inclination of 28.5 degrees. The initial altitude was 450 km, and decreased to ~410 km by 1992 March 5. Burst triggering is disabled whenever the spacecraft passes through the South Atlantic Anomaly (SAA), and whenever the spacecraft is within one of several high latitude regions identified as having a high probability of triggers caused by particle precipitation.

3. GROUND DATA PROCESSING

Data covering a 24 hour period are delivered daily from the NASA/Goddard Space Flight Center to the BATSE Operations at the NASA/Marshall Space Flight Center. Burst triggers are usually processed within one day of receipt. This section describes the ground processing of burst data.

3.1. Burst Recognition

Besides gamma-ray bursts, other types of events may give rise to a burst trigger. During the period covered by this catalog there were a total of 1362 triggers, of which 261 were cosmic gamma-ray bursts (one long burst generated two triggers), 455 were solar flares, 434 were caused by particle precipitation events, 129 were caused by entrance into the SAA, 36 were caused by Cygnus X-1 rising above the Earth's limb, 39 were caused by large fluctuations from Cygnus X-1, and eight were of unknown origin. Several methods, described below, are used to separate true cosmic gamma-ray bursts from other sources of triggers. Mallozzi et al. (1992) have analyzed the various classes of events and have shown that misidentifications occur at about the 1%–2% level.

Solar flares are distinguished by their locations near the sun, their generally soft spectra, and their coincidence with solar X-ray events detected by the *GOES* satellite.

Some false triggers are caused by passage of the spacecraft through or near regions where quasi-trapped charged particles (primarily electrons) are precipitating (Horack & Fishman 1991). This occurs most often during geomagnetically disturbed periods, usually after high solar activity. Since the electrons are confined to circular orbits, electron precipitation around the spacecraft produces bremsstrahlung radiation that results in nearly equal counting rates in oppositely facing detectors. Such triggers are thus easily identified.

At other times, bremsstrahlung radiation is detected as electrons precipitate into the atmosphere at some distance from the spacecraft. This is also readily detectable as radiation consistent with a localized source, coming from near the horizon at higher geomagnetic regions of the orbit. A common charac-

teristic of these events is that the time profile will be different in different detectors, due to spacecraft motion past the source region.

Both causes of false triggers from precipitating electrons have characteristic soft spectra and are confined to energies below 300 keV. Many of these electron precipitation events have been traced to a VLF transmitter in Western Australia which is capable of scattering trapped electrons. Some false triggers are also caused by charged particles in regions adjacent to the SAA, especially after this region expands following high solar activity. Such events are easily distinguished as a gradual increase in count rate in all detectors.

False triggers can occur when Cygnus X-1 either rises above the Earth's limb or produces a large fluctuation. Cygnus X-1 rises are apparent as steps in the count rate that occur at the predicted time of emergence. Fluctuations of Cygnus X-1 are distinguished from gamma-ray bursts using a Bayesian statistical analysis described by Meegan et al. (1993). This technique relies on the observation that Cygnus X-1 fluctuations are very close to threshold and have computed locations within 30 degrees of the location of Cygnus X-1.

3.2. Burst Locations

The orientation of the BATSE detectors permits determining the direction to the source of each trigger. The count rate on each of the LAD's varies approximately as the cosine of the angle between the direction to the burst source and the detector normal. Since the detector faces are oriented as the faces of an octahedron, any burst will illuminate four detectors, allowing the direction and intensity to be computed using chi-squared minimization of the difference between expected and observed counts. The location algorithm, described in more detail by Brock et al. (1992a) and in Appendix A, exhibits systematic errors of about 4 degrees, and statistical errors that depend on the burst intensity. Near the trigger threshold, the statistical errors are about 13 degrees (Meegan et al. 1993).

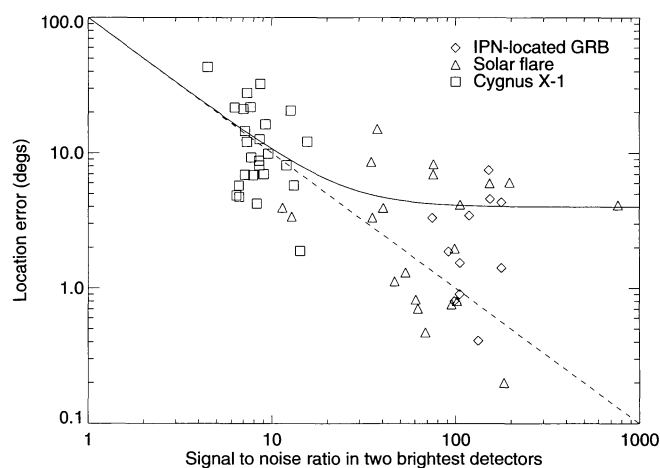


FIG. 2.—Location errors for events with known locations. Shown are the actual errors for solar flares, IPN located bursts, and fluctuations from Cygnus X-1. These are plotted as a function of burst intensity, as measured by the signal-to-noise in the two most brightly illuminated detectors.

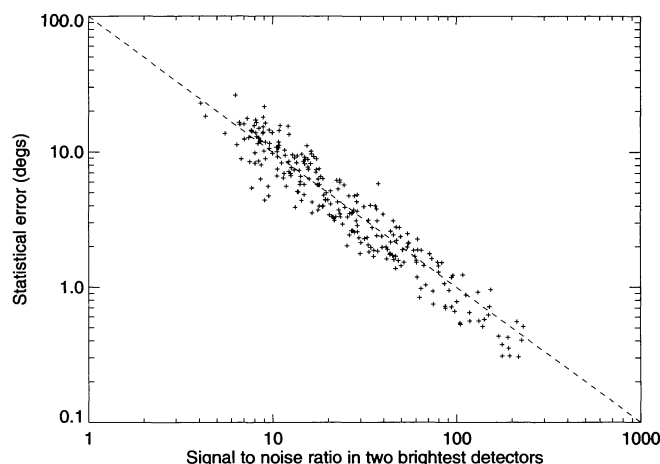


FIG. 3.—Estimated statistical error for burst locations. The error represents the radius of the 1σ (68% probability) error circle.

The location algorithm uses the detector response as a function of energy and angle of incidence as determined by calibrations, and corrects for scattering from the Earth's atmosphere.

Figure 2 shows the location errors for events with known celestial coordinates. Included are solar flares, weak fluctuations from Cygnus X-1, and strong bursts localized by the Interplanetary Network (IPN). The actual error is plotted as a function of signal-to-noise in the two most brightly illuminated detectors. The dashed line represents a rough estimate of the statistical error that is inversely proportional to the signal-to-noise. The solid line is the total error, i.e., the statistical error plus a systematic error of 4 degrees (68% error circle radius), determined from the actual errors of the IPN-located strong bursts (K. Hurley 1993, private communication). Figure 3 shows a similar plot for bursts, where each point is the computed statistical error of the burst location, as determined by the location algorithm. The dashed line is the same estimate of the statistical error as shown in Figure 2. The estimated errors cluster closely to this line. These plots demonstrate that the estimated statistical and systematic errors are consistent with known actual errors.

3.3. Sky Exposure Matrix

A detailed sky exposure matrix $T(\alpha, \delta, f, \tau)$ has been produced that specifies the total time that BATSE is sensitive to bursts as a function of burst peak flux f (on each of the three trigger timescales τ), and the right ascension α and declination δ of the burst (Brock et al. 1992b). The matrix is generated from trigger threshold data available every 5 minutes, converted to fluxes for 422 points distributed over the celestial sphere. Near threshold, the exposure vs location exhibits an octahedral pattern for a fixed *CGRO* orientation. Since the spacecraft is reoriented on average every 2 weeks, this pattern smooths out over time. When the burst trigger is enabled (i.e., outside of the SAA and particle event regions), a strong burst occurring anywhere above the horizon will result in a trigger. Because of the spacecraft orbital precession, the exposure for strong bursts becomes a function only of declination. The ex-

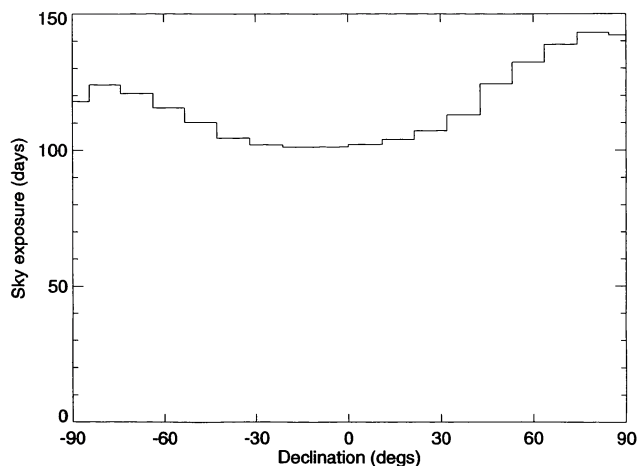


FIG. 4.—BATSE sky exposure for strong bursts vs. declination, showing the decreased sensitivity near the equator due to Earth blockage, and the decreased sensitivity in the southern hemisphere due to disabling of the instrument while in the SAA. Data are summed over 322 days of the catalog, TJD 8365 to TJD 8686.

posure can be expressed with good accuracy as a product of a function of declination and an efficiency that depends on peak flux f :

$$T(\alpha, \delta, f, \tau) = T(\delta)\epsilon(f, \tau).$$

The function $T(\delta)$ is shown in Figure 4. The increased exposure near the celestial poles is due to reduced Earth blockage. The decreased exposure at negative declinations is due to the South Atlantic Anomaly. The total exposure of BATSE for bright bursts is $\int T(\delta)d\Omega = 1.2 \times 10^8$ s sr for this catalog. The efficiency $\epsilon(f, \tau)$ as a function of peak flux f is shown for each of the three trigger timescales τ in Figure 5. At fluxes close to the trigger threshold, the efficiency is underestimated because atmospheric scattering is not included. Further details of the sky exposure calculation are provided in Appendix B. The data in Figures 4 and 5 are available in tabular form from the CGRO Science Support Center (see § 4).

3.4. $V/V_{\max}$

The $V/V_{\max}$ statistic (Schmidt 1968; Schmidt, Higdon, & Heuter 1988) provides a test for the hypothesis that the burst sources are homogeneously distributed in Euclidean space. This test accounts for varying instrument thresholds by comparing the peak count rate in a burst to the trigger threshold count rate at the time of the trigger. This statistic is computed for each burst in which there are sufficient data to determine the peak rate and the threshold. Details of the computation of $V/V_{\max}$ with BATSE data are provided in Appendix C.

3.5. Peak Flux

The peak fluxes in units of photons $\text{cm}^{-2} \text{s}^{-1}$ were computed for each of the three trigger timescales. These data are pro-

duced by a direct inversion spectral analysis technique applied to four energy channel data. The data incorporated in this analysis consisted of the summed data for the detectors that detected the burst at greater than 5.5σ at the time of the burst trigger, binned in 64 ms bins covering the time range from -2 s before the burst trigger to 240 s after the burst trigger. These data had four broad energy bins spanning the ranges 25–50 keV, 50–100 keV, 100–300 keV, and $E > 300$ keV. The data were background subtracted and then the peak burst rate in counts in the energy range 50–300 keV was selected using a sliding window on the 64 ms binned data.

The selected peak count rate spectrum was then inverted from counts s^{-1} bin to photons s^{-1} bin using the inverse of four-channel detector response matrices calculated for each detector that contributed to the summed data set. These matrices were created with bin widths equivalent to the data binning and burst viewing angle for each detector. Atmospheric scattering corrections were applied to these matrices as well. The matrices were summed and then inverted. Multiplying a counts spectrum by this inverted matrix produced a photon spectrum with the same binning as the counts spectrum described above. The 50–100 keV and 100–300 keV bins were then summed to produce the peak rates presented in the flux table.

3.6. Fluence

The fluence in the traditional units of ergs cm^{-2} , integrated over the duration of the burst, was computed for each of the four discriminator energy channels. The major uncertainty in computing fluence lies in the conversion of counts to energy, which is sensitive to the slope of the spectrum present in the channel. In order to derive an estimate of the spectral shape in each energy channel a simple model was fit to each of the four channel spectra. Here the photon fluxes in each channel were expressed in $\log(\text{flux})$ vs. $\log(\text{energy})$ coordinates. In these coordinates the data were linearly interpolated to 12 points

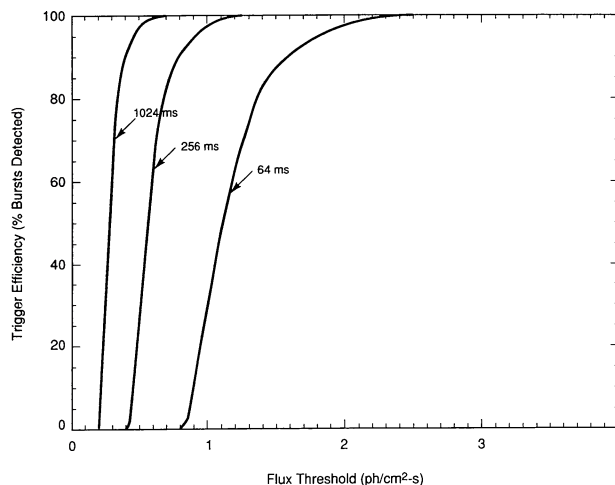


FIG. 5.—Trigger efficiency vs. peak flux for each of the trigger timescales.

total. Then a quadratic polynomial was fit to the data in these coordinates using a linear least-squares algorithm. This model was used to calculate the spectral shape across each channel. This spectral form multiplied by the energy was used to calculate the average energy per photon in this channel. Then the total energy in the channel was calculated from this average energy times the number of photons per channel obtained in the direct inversion.

4. THE CATALOG

Table 1 presents the 260 BATSE bursts triggers between 1991 April 19 and 1992 March 5. The first column is the BATSE trigger number, which begins with 105. The next column specifies the burst name in the format 1B yymmdd, where yy is year, mm is month, and dd is day of month. If more than one burst occurs in a day, a single letter suffix (B, C, D, ...) is added to the name. The suffix A is not normally used; it may be added to the nonsuffixed burst if required for subsequent automated processing (e.g., 1B 910928 = 1B 910928A). The next column specifies the time of the trigger expressed as the Truncated Julian Day (TJD = Julian Day - 2,440,000.5) and the seconds of day (SOD). The next column specifies the trigger time in the format day of year and Universal Time (UT). The next four columns give the computed location in equatorial (epoch 2000) and Galactic coordinates and the error in location. The tabulated error radius represents the radius of a circle that has the same area as the 1σ statistical error box. The actual 1σ contours are not necessarily circular. These radii represent errors due to photon counting statistics only; each location also has a systematic error of approximately 4 degrees that is not folded into the table entries. The next column specifies the largest of the three values of $C_{\max}/C_{\min}$, the maximum count rate divided by the threshold count rate. Some entries are missing because of telemetry gaps. The next two columns specify the threshold number of counts $C_{\min}$ and the relevant trigger timescale. Note that the latter is not necessarily the timescale for the trigger, but the timescale for which $C_{\max}/C_{\min}$ is the largest. The $V/V_{\max}$ statistic is simply $(C_{\max}/C_{\min})^{-3/2}$. The column labeled T_{90} is a measure of the burst duration. It is the time during which the burst integrated counts increases from 5% to 95% of the total counts. Several of the bursts have no entry in this column because of telemetry gaps. The next two columns specify the peak flux and error. The energy interval for the peak flux is ~ 50 to ~ 300 keV (the burst trigger range), and the integration time is 256 ms. The next two columns specify the fluence in the ~ 50 to ~ 300 keV energy range and the error on this fluence. The next two columns specify a hardness ratio and its error. This hardness ratio is defined as the fluence in channel 3 (~ 100 to ~ 300 keV) divided by the fluence in channel 2 (~ 50 to ~ 100 keV). The last two columns specify the total fluence (above ~ 25 keV) and error over the duration of the burst.

Tables 2 through 7 provide subsets of the burst catalog, sorted by peak flux, fluence, and duration. Tables 2 and 3 lists the 20 most intense and the 20 least intense bursts, respectively, as measured by peak flux. Tables 4 and 5 are similar lists for total fluence. Tables 6 and 7 list the longest and shortest bursts, as measured by T_{90} .

More extensive data on each of these bursts may be obtained from the *Compton Observatory Science Support Center*.²

5. TIME HISTORY PLOTS

Figure 6 is a compilation of the time histories of all the bursts. The count rate (in units of 1000 counts per second) is plotted against time in seconds. The count rate is a sum over the triggered detectors (two to four), and covers the burst trigger channels (~ 50 keV to ~ 300 keV). Due to the wide range of temporal structure in bursts, the plot duration and temporal resolution are individually selected. Occasional gaps in the plots result from bit errors or gaps in the telemetry.

6. ANGULAR DISTRIBUTION

Figure 7 shows the distribution of all the bursts in Galactic coordinates. The isotropy of the burst distribution is apparent. Several measures of anisotropy are given in Table 8. The best statistics for detecting a Galactic association are $\langle \cos \theta \rangle$ and $\langle \sin^2 b - \frac{1}{3} \rangle$, where θ is the angle between the direction to the burst and the Galactic center and b is the Galactic latitude. These are measures of the dipole and quadrupole moments, respectively, in Galactic coordinates. Two statistics that measure dipole and quadrupole anisotropies in any direction are $\mathcal{B}$ and $\mathcal{W}$ (Briggs 1993). The statistics $\langle \sin \delta \rangle$ and $\langle \sin^2 \delta - \frac{1}{3} \rangle$ are measures of the dipole and quadrupole moments in equatorial coordinates. In this case, the dipole is measured with respect to the north celestial pole. These two statistics are the most sensitive for detecting BATSE's nonuniform sky coverage. Table 8 presents each of these statistics and the values that would be expected for an isotropic distribution, with and without correction for the nonuniform sky coverage $T(\delta)$. The errors on the expected values arise from the finite number of bursts observed. The errors on the observed value arise only from uncertainties in the computed burst locations. A deviation from isotropy would appear as a significant difference between the last two columns. The table indicates that there is no statistically significant evidence for anisotropy and that the nonuniform sky coverage is not yet an important effect. However, it will become more important as more bursts are observed, resulting in a reduced statistical error. A more complete analysis of the isotropy of bursts is presented by Briggs et al. (1994).

7. INTENSITY DISTRIBUTION

The distribution of burst intensities provides information on the radial distribution of burst sources. Specifically, if the sources are distributed homogeneously in Euclidean space throughout the volume sampled, then the integral brightness distribution will be a power law with slope $-3/2$. Since instrument threshold effects can severely bias brightness distributions, the accepted statistic for testing homogeneity is $V/V_{\max}$

² To access the burst database, INTERNET users type "telnet grossc.gsfc.nasa.gov", DECNET users type "set host grossc". The login name is "gronews", and no password is required.

TABLE 1A
GAMMA-RAY BURST PARAMETERS—FIRST BATSE CATALOG

Trigger Number	Burst Name	Time (TJD:s)	Time (DOY:h:m:s)	α ($^{\circ}$)	δ ($^{\circ}$)	l^{II} ($^{\circ}$)	b^{II} ($^{\circ}$)	Stat. Loc. Error ($^{\circ}$)	C/C_{min}	C_{min}	Time Scale (ms)
105	1B 910421	8367:33243.8	111:09:14: 3.8	269.3	26.5	52.0	23.0	0.6	34.1	286	1024
107	1B 910423	8369:71684.8	113:19:54:44.8	196.7	-5.2	310.1	57.5	13.9	1.1	264	1024
108	1B 910424	8370:71006.6	114:19:43:26.6	171.9	-24.9	279.8	34.2	12.1	1.0	60	64
109	1B 910425	8371: 2265.7	115:00:37:45.7	92.4	-18.6	225.4	-17.4	1.0	13.1	286	1024
110	1B 910425B	8371:20253.3	115:05:37:33.3	346.9	22.6	93.6	-34.3	6.4	1.6	264	1024
111	1B 910426	8372:80046.7	116:22:14: 6.7	77.8	-2.1	202.9	-23.2	5.7	1.4	264	1024
114	1B 910427	8373:32720.8	117:09:05:20.8	78.7	-5.1	206.2	-23.8	8.5	1.6	264	1024
121	1B 910429	8375:11509.8	119:03:11:49.8	180.1	18.1	247.8	75.2	2.1	2.1	70	64
130	1B 910430	8376:61719.2	120:17:08:39.2	135.3	-0.2	229.3	28.4	0.9	9.8	242	1024
133	1B 910501	8377:30014.1	121:08:20:14.1	133.3	-0.7	228.6	26.4	4.8	2.4	264	1024
138	1B 910502B	8378:40667.4	122:11:17:47.4	134.2	-10.2	237.9	22.0	26.2	1.7	121	256
142	1B 910502	8378:81443.4	122:22:37:23.4	56.9	-52.0	262.3	-48.9	0.6	2.3	233	64
143	1B 910503	8379:25452.7	123:07:04:12.7	87.2	37.6	172.9	5.0	0.6	130.0	264	1024
148	1B 910505	8381:72916.1	125:20:15:16.1	178.6	33.2	183.2	76.3	2.8	5.0	264	1024
160	1B 910507	8383:52275.9	127:14:31:15.9	299.5	-44.2	355.4	-30.0	0.7	5.5	264	1024
171	1B 910509	8385:11010.7	129:03:03:30.7	340.2	39.6	97.2	-16.7	2.0	2.1	242	1024
179	1B 910511	8387: 7907.7	131:02:11:47.7	266.5	57.2	85.5	31.3	3.1	12.4	132	256
185	1B 910512	8388:54909.4	132:15:15: 9.4	93.6	71.7	142.6	22.8	4.4	1.3	66	64
204	1B 910517B	8393:38927.2	137:10:48:47.2	107.2	52.1	164.9	23.7	3.6	1.6	336	1024
206	1B 910517	8393:86135.2	137:23:55:35.2	344.6	25.1	92.9	-31.1	5.7	—	—	—
207	1B 910518	8394:12331.5	138:03:25:31.5	218.3	57.9	99.8	54.4	6.0	3.5	66	64
211	1B 910518B	8394:53725.8	138:14:55:25.8	246.8	-8.7	6.3	26.7	4.3	1.7	336	1024
214	1B 910521B	8397:18877.1	141:05:14:37.1	115.0	-34.9	249.2	-6.2	9.4	1.6	143	256
218	1B 910521	8397:76453.3	141:21:14:13.3	208.1	-38.5	315.8	22.8	14.5	2.3	336	1024
219	1B 910522	8398:43929.7	142:12:12: 9.7	137.9	-51.8	272.5	-2.4	0.7	41.7	336	1024
222	1B 910523	8399:68604.6	143:19:03:24.6	109.7	1.3	214.9	6.7	1.6	10.4	336	1024
223	1B 910523B	8399:85129.1	143:23:38:49.1	352.0	27.5	101.1	-31.8	12.0	1.2	364	1024
226	1B 910525	8401:69988.0	145:19:26:28.0	229.6	-60.0	320.3	-2.2	1.4	4.6	308	1024
228	1B 910526B	8402:12744.3	146:03:32:24.3	110.1	0.6	215.7	6.7	7.8	2.2	364	1024
229	1B 910526	8402:16750.2	146:04:39:10.2	57.3	-51.0	260.8	-49.0	9.8	1.0	93	64
235	1B 910528	8404:77215.4	148:21:26:55.4	242.7	47.1	73.9	46.4	5.3	1.3	336	1024
237	1B 910529	8405:63360.9	149:17:36: 0.9	216.7	-27.3	327.7	30.9	3.9	1.8	336	1024
249	1B 910601	8408:69734.5	152:19:22:14.5	311.4	33.7	75.7	-5.8	0.7	102.6	336	1024
253	1B 910602B	8409:38406.8	153:10:40: 6.8	115.6	48.4	170.2	28.1	21.6	1.3	143	256
257	1B 910602	8409:82501.1	153:22:55: 1.1	142.2	54.1	162.4	44.4	1.2	6.5	336	1024
269	1B 910604	8411:75654.5	155:21:00:54.5	25.6	-34.3	249.3	-76.9	3.3	—	—	—
289	1B 910607	8414:16261.3	158:04:31: 1.3	138.9	54.7	162.2	42.4	14.1	1.1	132	256
297	1B 910608	8415:83640.7	159:23:14: 0.7	246.2	-63.8	324.0	-10.1	7.4	4.6	66	64
298	1B 910609	8416: 2907.1	160:00:48:27.1	108.9	-41.7	253.2	-13.5	0.6	60.4	66	64
332	1B 910612	8419:31755.9	163:08:49:15.9	334.7	13.2	75.5	-35.3	1.3	5.4	264	1024
351	1B 910614B	8421: 6864.5	165:01:54:24.5	173.6	-25.5	281.8	34.2	4.0	5.5	264	1024
353	1B 910614	8421:35247.0	165:09:47:27.0	20.7	-15.7	157.0	-76.4	7.5	—	—	—
373	1B 910616	8423:38364.8	167:10:39:24.8	301.3	4.9	46.0	-14.0	8.9	2.7	264	1024
394	1B 910619	8426:51272.8	170:14:14:32.8	22.0	-37.3	268.0	-77.2	1.5	17.6	286	1024
398	1B 910620	8427:20250.4	171:05:37:30.4	69.5	23.9	175.3	-15.2	1.0	—	—	—
401	1B 910620B	8427:66168.5	171:18:22:48.5	62.1	67.4	140.2	11.4	12.5	1.0	264	1024
404	1B 910621B	8428: 7037.6	172:01:57:17.6	327.1	-8.2	47.8	-42.8	2.5	4.9	242	1024
408	1B 910621	8428:58604.9	172:16:16:44.9	221.2	-5.8	346.9	47.2	4.3	3.5	264	1024
414	1B 910622	8429:59643.5	173:16:34: 3.5	2.3	-58.2	313.4	-58.1	13.5	1.9	264	1024
432	1B 910625	8432:19714.1	176:05:28:34.1	318.9	51.6	92.8	1.8	3.3	5.0	66	64
444	1B 910626	8433:26113.5	177:07:15:13.5	135.4	8.6	220.4	32.8	1.4	12.9	138	64
451	1B 910627	8434:16157.8	178:04:29:17.8	200.0	-3.2	316.8	58.9	0.3	30.9	264	1024
465	1B 910629B	8436:18945.7	180:05:15:45.7	101.4	-50.5	259.8	-21.5	15.4	1.0	264	1024
467	1B 910629	8436:71748.3	180:19:55:48.3	68.5	2.0	193.7	-29.1	1.1	18.4	264	1024
469	1B 910630	8437:27422.3	181:07:37: 2.3	305.1	33.2	72.1	-1.8	0.7	15.7	264	1024

TABLE 1B
GAMMA-RAY BURST PARAMETERS—FIRST BATSE CATALOG

Trigger Number	Burst Name	T_{90} (s)	Peak Flux ($\text{ph cm}^{-2} \text{s}^{-1}$)	Fluence 50–300 keV (erg cm^{-2})	Hardness Ratio	Fluence > 20 keV (erg cm^{-2})	Comments
105	1B 910421	(5.18±0.18)E+0	11.86±0.26	(3.37±0.18)E-6	1.55±0.14	(5.27±0.25)E-6	A(U),H
107	1B 910423	(3.63±0.22)E+1	0.30±0.11	(1.16±0.23)E-7	1.04±0.40	(< 1.1) E-6	
108	1B 910424	(3.14±0.59)E+0	0.44±0.11	(4.69±1.34)E-8	—	(1.52±0.42)E-6	
109	1B 910425	(9.02±0.03)E+1	3.62±0.17	(2.50±0.01)E-5	2.42±0.02	(5.89±0.09)E-5	A(UPC)
110	1B 910425B	(4.30±0.01)E+2	0.48±0.11	(2.24±0.15)E-6	3.80±0.45	(3.09±0.72)E-6	
111	1B 910426	(9.82±0.23)E+1	0.60±0.11	(3.91±0.10)E-6	1.07±0.05	(5.02±0.45)E-6	
114	1B 910427	(5.75±1.48)E+1	0.72±0.12	(1.42±0.17)E-6	1.03±0.25	(< 2.4) E-6	
121	1B 910429	(7.50±0.13)E+1	1.50±0.14	(7.42±0.11)E-6	1.81±0.05	(1.72±0.11)E-5	A(U)
130	1B 910430	(6.20±0.05)E+1	3.47±0.18	(1.84±0.01)E-5	2.76±0.03	(3.87±0.08)E-5	A(UE)
133	1B 910501	(1.82±0.01)E+2	0.66±0.12	(3.17±0.13)E-6	3.24±0.25	(5.75±0.83)E-6	A(E)
138	1B 910502B	(3.15±0.23)E-1	0.72±0.11	(7.68±0.80)E-8	3.31±0.70	(1.36±0.64)E-7	
142	1B 910502	—	8.60±0.26	(5.71±0.04)E-6	3.30±0.05	(7.62±0.18)E-6	A(U),T(6),F
143	1B 910503	(5.08±0.02)E+1	47.57±0.68	(5.32±0.01)E-5	6.01±0.04	(2.92±0.01)E-4	A(UPCE)
148	1B 910505	(3.98±0.73)E+1	1.40±0.13	(1.46±0.04)E-6	1.27±0.07	(2.10±0.22)E-6	
160	1B 910507	(1.70±0.14)E+1	3.00±0.19	(3.90±0.06)E-6	3.65±0.10	(4.86±0.23)E-6	
171	1B 910509	(2.48±0.44)E+1	0.65±0.16	(1.23±0.06)E-6	1.75±0.16	(1.84±0.26)E-6	
179	1B 910511	(7.23±0.18)E+0	4.74±0.18	(7.82±0.22)E-7	1.82±0.09	(1.11±0.14)E-6	
185	1B 910512	(1.92±2.02)E-1	0.73±0.12	(4.24±0.53)E-8	3.98±0.90	(< 1.3) E-7	
204	1B 910517B	(6.27±0.15)E+1	0.67±0.11	(5.92±0.24)E-7	9.73±1.51	(2.10±0.23)E-6	
206	1B 910517	—	1.66±0.15	(1.23±0.17)E-7	4.27±1.35	(5.57±1.42)E-7	T(.5)
207	1B 910518	(8.50±0.30)E-2	1.02±0.15	(6.66±0.65)E-8	6.88±1.93	(4.04±1.18)E-7	
211	1B 910518B	(5.59±0.15)E+1	0.51±0.12	(1.15±0.06)E-6	1.90±0.19	(1.52±0.44)E-6	
214	1B 910521B	(4.57±0.45)E+1	0.75±0.12	(8.54±0.59)E-7	0.94±0.13	(1.26±0.32)E-6	
218	1B 910521	(1.22±0.09)E+0	0.87±0.12	(1.58±0.15)E-7	3.49±0.75	(5.18±1.29)E-7	X
219	1B 910522	(2.97±0.14)E+1	18.06±0.30	(1.48±0.01)E-5	2.50±0.03	(3.26±0.07)E-5	A(UP),B
222	1B 910523	(7.31±0.05)E+1	3.99±0.17	(3.80±0.07)E-6	2.66±0.09	(7.13±0.52)E-6	
223	1B 910523B	(2.92±0.12)E+1	0.46±0.12	(2.32±0.36)E-7	2.58±0.78	(< 4.1) E-7	
226	1B 910525	(2.21±0.00)E+2	1.30±0.12	(1.26±0.01)E-5	2.94±0.04	(3.94±0.13)E-5	
228	1B 910526B	(1.24±0.27)E+1	1.05±0.13	(3.01±0.31)E-7	1.42±0.26	(4.81±1.63)E-7	G
229	1B 910526	(4.48±1.43)E-1	0.67±0.10	(6.54±0.76)E-8	4.84±1.23	(< 1.4) E-7	
235	1B 910528	(2.64±0.31)E+1	0.55±0.12	(1.19±0.07)E-6	4.51±0.48	(2.96±0.36)E-6	
237	1B 910529	(4.05±0.35)E+1	0.82±0.12	(4.64±0.31)E-7	4.60±0.85	(9.13±2.97)E-7	
249	1B 910601	(2.85±0.09)E+1	34.62±0.40	(5.42±0.01)E-5	3.47±0.01	(1.50±0.01)E-4	A(UGC)
253	1B 910602B	(8.96±3.26)E-1	0.50±0.12	(4.64±0.77)E-8	1.09±0.35	(< 3.4) E-7	F
257	1B 910602	(8.08±0.42)E+1	1.71±0.14	(5.48±0.07)E-6	3.24±0.08	(3.67±0.09)E-5	
269	1B 910604	—	1.37±0.12	(5.09±0.25)E-7	3.85±0.34	(8.02±1.43)E-7	T(4),H
289	1B 910607	(6.70±1.20)E-2	0.51±0.10	(3.35±0.49)E-8	8.22±3.35	(< 1.2) E-7	
297	1B 910608	(9.60±1.43)E-1	2.19±0.14	(1.89±0.08)E-7	4.68±0.49	(1.07±0.10)E-6	
298	1B 910609	(4.48±0.91)E-1	22.05±0.38	(1.44±0.02)E-6	4.86±0.15	(6.29±0.12)E-6	X
332	1B 910612	(5.06±0.44)E+1	1.19±0.11	(2.80±0.05)E-6	2.15±0.07	(4.02±0.31)E-6	
351	1B 910614B	(1.47±0.04)E+2	1.23±0.13	(1.29±0.02)E-5	2.41±0.05	(3.50±0.15)E-5	
353	1B 910614	—	0.96±0.12	(4.89±1.20)E-8	1.43±0.64	(< 1.3) E-7	T(.1),F
373	1B 910616	(1.54±0.18)E+0	0.82±0.14	(2.12±0.19)E-7	—	(2.76±1.03)E-7	X
394	1B 910619	(1.06±0.02)E+2	4.78±0.18	(3.12±0.01)E-5	3.54±0.03	(7.20±0.12)E-5	
398	1B 910620	(2.56±0.45)E+1	1.71±0.19	(3.29±0.08)E-6	2.61±0.11	(5.95±0.43)E-6	
401	1B 910620B	(5.06±0.18)E+0	0.33±0.11	(1.44±0.22)E-7	2.39±0.61	(< 2.8) E-7	
404	1B 910621B	(1.23±0.03)E+2	1.01±0.11	(2.89±0.05)E-6	1.89±0.07	(5.22±0.52)E-6	G
408	1B 910621	(8.54±0.31)E+1	1.43±0.13	(4.84±0.11)E-6	1.65±0.07	(6.44±0.64)E-6	G
414	1B 910622	(1.55±0.65)E+1	1.01±0.11	(3.76±0.33)E-7	2.21±0.36	(5.96±2.84)E-7	
432	1B 910625	(3.40±0.50)E-2	1.34±0.15	(8.20±0.43)E-8	7.46±1.17	(7.09±1.02)E-7	
444	1B 910626	(2.56±1.43)E-1	16.60±0.30	(8.42±0.18)E-7	2.25±0.09	(1.50±0.11)E-6	
451	1B 910627	(1.52±0.24)E+1	16.92±0.47	(1.12±0.01)E-5	1.67±0.02	(2.13±0.05)E-5	A(UC)
465	1B 910629B	(1.38±0.26)E+1	0.29±0.10	(2.97±0.46)E-7	3.82±1.13	(< 5.7) E-7	
467	1B 910629	(3.77±0.38)E+1	7.73±0.24	(2.56±0.04)E-6	4.36±0.16	(6.74±0.24)E-6	
469	1B 910630	(1.54±0.13)E+1	4.22±0.20	(3.30±0.04)E-6	4.25±0.14	(1.07±0.04)E-5	A(UG)

TABLE 1A—Continued

Trigger Number	Burst Name	Time (TJD:s)	Time (DOY:h:m:s)	α ($^{\circ}$)	δ ($^{\circ}$)	l^{II} ($^{\circ}$)	b^{II} ($^{\circ}$)	Stat. Loc. Error ($^{\circ}$)	$C/C_{\min}$	$C_{\min}$	Time Scale (ms)
472	1B 910701	8438:13899.4	182:03:51:39.4	25.6	-56.5	289.2	-59.2	12.8	1.6	264	1024
473	1B 910702B	8439:17195.7	183:04:46:35.7	256.5	27.7	49.4	34.2	4.3	1.0	264	1024
474	1B 910702	8439:25193.2	183:06:59:53.2	90.0	25.0	185.0	0.8	2.3	9.6	66	64
480	1B 910703	8440:18223.8	184:05:03:43.8	36.9	26.9	148.1	-31.2	2.6	5.9	66	64
486	1B 910705B	8442: 542.9	186:00:09: 2.9	29.0	-68.0	294.0	-48.0	7.1	1.8	264	1024
491	1B 910705	8442:70459.6	186:19:34:19.6	201.8	-42.5	309.9	19.9	15.0	1.3	66	64
493	1B 910706	8443:18289.0	187:05:04:49.0	254.8	-44.5	341.9	-1.2	2.3	4.6	264	1024
501	1B 910708	8445:34900.6	189:09:41:40.6	12.5	16.9	122.4	-46.0	2.6	2.7	264	1024
503	1B 910709	8446:41602.1	190:11:33:22.1	64.2	50.0	153.1	-0.5	14.5	1.4	290	64
508	1B 910710	8447:16419.5	191:04:33:39.5	251.4	-24.5	355.9	13.5	5.6	1.6	264	1024
512	1B 910711	8448:34312.4	192:09:31:52.4	212.7	-15.7	329.5	43.0	4.4	4.0	66	64
516	1B 910712	8449:29745.7	193:08:15:45.7	305.5	-56.2	341.6	-34.7	4.0	3.6	264	1024
526	1B 910713	8450:73834.1	194:20:30:34.1	187.4	29.7	183.5	84.6	5.4	1.0	132	256
537	1B 910714	8451:74777.1	195:20:46:17.1	245.7	18.5	34.5	40.9	2.6	1.0	105	64
540	1B 910715	8452:42842.2	196:11:54: 2.2	318.5	54.3	94.6	3.9	3.9	2.5	242	1024
543	1B 910717	8454:16384.2	198:04:33: 4.2	250.3	-59.8	328.3	-8.8	0.9	8.8	96	64
547	1B 910717B	8454:37383.5	198:10:23: 3.5	304.9	4.0	47.1	-17.5	6.2	2.8	95	64
548	1B 910718B	8455: 8697.2	199:02:24:57.2	347.3	59.8	110.4	-0.6	0.8	9.0	264	1024
549	1B 910718C	8455:21708.4	199:06:01:48.4	74.0	23.8	178.2	-11.8	5.1	1.4	264	1024
550	1B 910718D	8455:40157.8	199:11:09:17.8	305.1	-45.3	354.8	-34.1	13.9	1.4	308	1024
551	1B 910718	8455:76049.4	199:21:07:29.4	273.7	-12.1	18.0	2.5	3.1	4.6	66	64
555	1B 910719	8456:39182.3	200:10:53: 2.3	264.3	43.9	69.8	31.4	14.4	1.7	78	64
559	1B 910721B	8458:12101.3	202:03:21:41.3	296.7	-35.3	4.7	-25.9	11.6	—	—	—
563	1B 910721	8458:70212.5	202:19:30:12.5	311.0	-14.1	32.4	-31.2	1.0	—	—	—
568	1B 910722	8459:41926.2	203:11:38:46.2	130.4	1.2	225.2	24.9	9.7	3.0	66	64
575	1B 910725	8462: 7627.6	206:02:07: 7.6	126.8	3.1	221.4	22.7	11.5	3.0	66	64
577	1B 910725B	8462:47526.5	206:13:12: 6.5	274.2	12.8	40.6	13.4	3.1	2.4	286	1024
591	1B 910730B	8467:15498.9	211:04:18:18.9	252.6	-72.9	318.4	-17.7	3.9	2.8	286	1024
593	1B 910730C	8467:51109.0	211:14:11:49.0	131.4	60.9	155.4	37.2	3.3	1.5	264	1024
594	1B 910730	8467:80834.2	211:22:27:14.2	313.8	18.4	64.7	-16.9	1.9	4.4	264	1024
603	1B 910802	8470: 2716.3	214:00:45:16.3	76.7	-43.8	248.9	-36.8	7.5	4.0	125	64
606	1B 910802B	8470:55276.7	214:15:21:16.7	199.6	-52.3	307.1	10.4	1.9	4.3	264	1024
612	1B 910803	8471:30804.6	215:08:33:24.6	312.2	18.9	64.1	-15.4	1.8	13.4	286	1024
630	1B 910805	8473:38485.6	217:10:41:25.6	323.9	-34.4	10.6	-47.7	2.9	—	—	—
640	1B 910806	8474:55471.6	218:15:24:31.6	151.2	37.8	185.2	53.6	16.6	1.2	66	64
647	1B 910807	8475:26432.8	219:07:20:32.8	154.2	6.1	235.6	47.7	0.3	23.2	264	1024
658	1B 910809C	8477: 3505.8	221:00:58:25.8	236.3	37.7	60.4	52.2	1.6	1.1	60	64
659	1B 910809B	8477:22500.2	221:06:15: 0.2	197.3	17.0	325.9	79.1	1.6	3.8	264	1024
660	1B 910809	8477:70545.5	221:19:35:45.5	289.3	61.7	92.7	20.7	1.5	11.9	264	1024
666	1B 910811	8479:52432.5	223:14:33:52.5	80.3	-72.2	283.4	-32.6	4.2	3.9	143	256
673	1B 910813	8481:48984.7	225:13:36:24.7	32.5	-67.6	291.9	-47.8	3.5	1.1	264	1024
676	1B 910814C	8482:40180.4	226:11:09:40.4	60.4	44.0	155.2	-6.6	0.6	18.8	286	1024
677	1B 910814B	8482:50338.5	226:13:58:58.5	206.9	-70.2	307.7	-7.8	10.8	8.6	71	64
678	1B 910814	8482:69273.0	226:19:14:33.0	352.1	32.3	103.2	-27.4	0.5	40.8	264	1024
680	1B 910815	8483:34247.3	227:09:30:47.3	141.7	-38.6	264.9	8.7	2.1	3.2	242	1024
685	1B 910816B	8484:43921.6	228:12:12: 1.6	224.4	-63.8	316.3	-4.3	6.6	1.2	66	64
686	1B 910816	8484:53443.5	228:14:50:43.5	168.1	-0.8	258.5	53.3	7.5	2.3	286	1024
690	1B 910817	8485:61225.6	229:17:00:25.6	90.1	29.9	180.8	3.3	16.0	—	—	—
692	1B 910818	8486:49486.0	230:13:44:46.0	267.8	-27.0	2.3	-0.1	1.9	3.1	264	1024
704	1B 910821	8489: 6158.9	233:01:42:38.9	290.3	-72.8	322.3	-28.0	2.8	4.0	264	1024
711	1B 910822	8490:49858.8	234:13:50:58.8	274.8	41.4	69.0	23.3	5.6	1.2	286	1024
717	1B 910823	8491:75684.5	235:21:01:24.5	111.9	2.7	214.7	9.3	16.4	1.1	286	1024
727	1B 910826	8494:73018.5	238:20:16:58.5	67.8	50.2	154.5	1.3	4.0	2.8	286	1024
729	1B 910827	8495:27090.4	239:07:31:30.4	122.5	-0.3	222.5	17.3	9.2	1.6	66	64
734	1B 910828	8496:29819.6	240:08:16:59.6	51.3	-33.3	233.0	-56.4	9.2	1.3	60	64

TABLE 1B—*Continued*

Trigger Number	Burst Name	T_{90} (s)	Peak Flux (ph cm ⁻² s ⁻¹)	Fluence 50–300 keV (erg cm ⁻²)	Hardness Ratio	Fluence > 20 keV (erg cm ⁻²)	Comments
472	1B 910701	(8.22±0.57)E+1	0.77±0.19	(3.07±0.24)E-6	1.81±0.25	(3.99±1.88)E-6	
473	1B 910702B	(3.11±0.37)E+1	0.55±0.12	(7.74±0.63)E-7	1.32±0.20	(1.07±0.34)E-6	
474	1B 910702	(1.52±0.32)E-1	5.78±0.23	(4.23±0.11)E-7	11.73±1.14	(5.27±0.17)E-6	G
480	1B 910703	(1.28±0.91)E-1	1.95±0.16	(1.31±0.08)E-7	7.14±0.96	(1.15±0.12)E-6	G,X
486	1B 910705B	(3.20±0.66)E-1	1.09±0.12	(7.92±0.78)E-8	4.70±1.07	(< 9.4) E-8	
491	1B 910705	(1.00±0.59)E-1	0.39±0.12	(3.02±0.50)E-8	—	(1.18±0.17)E-6	
493	1B 910706	(4.86±1.58)E+0	1.10±0.12	(5.07±0.29)E-7	1.79±0.19	(6.77±3.14)E-7	
501	1B 910708	(3.37±0.20)E+1	1.10±0.12	(5.11±0.27)E-7	2.40±0.21	(6.49±1.05)E-7	
503	1B 910709	(4.67±0.13)E+1	5.05±0.22	(7.80±0.20)E-7	4.56±0.28	(5.77±0.24)E-6	F
508	1B 910710	(1.09±0.36)E+0	0.55±0.11	(7.48±1.52)E-8	—	(5.10±1.94)E-7	
512	1B 910711	(1.83±0.65)E-1	1.10±0.15	(7.20±0.72)E-8	6.07±1.34	(4.27±0.90)E-7	F
516	1B 910712	(1.27±0.31)E+1	0.77±0.11	(6.22±0.36)E-7	0.94±0.11	(1.15±0.41)E-6	
526	1B 910713	(6.59±4.97)E+0	0.49±0.12	(1.08±0.41)E-7	—	(< 6.9) E-7	
537	1B 910714	(4.29±0.33)E+0	1.46±0.16	(6.23±0.29)E-7	7.75±1.25	(2.06±0.28)E-6	
540	1B 910715	(3.20±0.16)E+1	0.76±0.11	(2.05±0.17)E-7	0.96±0.16	(3.31±0.76)E-7	
543	1B 910717	(4.86±0.20)E+0	10.56±0.25	(4.40±0.04)E-6	2.20±0.03	(7.73±0.20)E-6	A(UP)
547	1B 910717B	(5.12±0.91)E-1	2.69±0.16	(2.19±0.11)E-7	5.82±0.67	(5.51±0.68)E-7	
548	1B 910718B	(3.62±0.09)E+1	2.00±0.14	(4.63±0.06)E-6	2.35±0.06	(6.14±0.33)E-6	
549	1B 910718C	(1.44±0.28)E+1	0.33±0.12	(3.39±0.44)E-7	2.00±0.52	(1.35±0.46)E-6	
550	1B 910718D	—	0.50±0.13	(2.64±0.38)E-7	1.31±0.35	(< 4.6) E-7	T(3)
551	1B 910718	(3.84±1.81)E-1	3.67±0.19	(2.59±0.11)E-7	5.45±0.66	(1.01±0.08)E-6	X
555	1B 910719	(4.16±0.45)E+0	1.31±0.14	(9.56±1.34)E-8	7.06±3.48	(6.32±1.87)E-7	
559	1B 910721B	(3.42±0.43)E+1	0.40±0.11	(6.77±1.23)E-7	1.95±0.61	(1.07±0.25)E-5	
563	1B 910721	(2.25±0.15)E+1	1.89±0.14	(4.27±0.08)E-6	2.46±0.09	(6.66±0.47)E-6	
568	1B 910722	(1.28±1.43)E-1	1.43±0.18	(1.04±0.08)E-7	11.04±2.82	(8.77±1.36)E-7	X
575	1B 910725	(4.13±0.22)E-1	2.75±0.21	(2.46±0.14)E-7	4.61±0.65	(4.25±0.62)E-7	
577	1B 910725B	(1.80±0.08)E+2	0.79±0.12	(1.80±0.06)E-6	2.18±0.14	(2.98±0.38)E-6	
591	1B 910730B	(5.61±0.54)E+1	0.84±0.13	(1.74±0.08)E-6	2.35±0.18	(3.17±0.75)E-6	
593	1B 910730C	—	0.88±0.13	(7.44±0.48)E-7	1.42±0.17	(1.35±0.24)E-6	T(70),G
594	1B 910730	(2.69±0.03)E+1	0.87±0.10	(2.47±0.05)E-6	3.88±0.15	(4.93±0.42)E-6	
603	1B 910802	(1.47±0.14)E+0	3.49±0.22	(4.48±0.28)E-7	3.22±0.39	(8.93±1.67)E-7	
606	1B 910802B	(2.07±0.04)E+1	1.05±0.12	(1.85±0.05)E-6	2.70±0.14	(3.13±0.41)E-6	
612	1B 910803	—	2.74±0.15	(3.48±0.05)E-6	2.57±0.07	(7.10±0.51)E-6	T(15),G
630	1B 910805	(1.82±0.14)E+1	0.60±0.15	(9.80±0.76)E-7	1.80±0.24	(1.19±0.35)E-6	
640	1B 910806	—	0.43±0.11	(2.15±1.60)E-8	—	(< 3.6) E-7	T(.2)
647	1B 910807	(5.96±0.06)E+1	7.07±0.26	(1.51±0.01)E-5	2.68±0.03	(2.08±0.03)E-5	A(P)
658	1B 910809C	(2.07±0.17)E+1	1.28±0.15	(1.54±0.06)E-6	1.72±0.12	(3.00±0.54)E-6	
659	1B 910809B	(1.02±0.02)E+2	1.03±0.12	(4.49±0.07)E-6	0.98±0.03	(7.60±0.34)E-6	G
660	1B 910809	(2.02±0.08)E+1	4.55±0.19	(2.64±0.04)E-6	3.28±0.10	(7.35±0.34)E-6	G
666	1B 910811	—	1.66±0.13	(2.85±0.20)E-7	2.23±0.29	(4.30±1.91)E-7	T(4),G
673	1B 910813	(2.75±0.23)E+1	0.30±0.11	(9.25±0.50)E-7	1.42±0.14	(1.06±0.49)E-6	
676	1B 910814C	(7.78±0.12)E+1	4.20±0.19	(1.51±0.01)E-5	5.31±0.08	(4.19±0.06)E-5	
677	1B 910814B	(5.50±0.80)E-2	1.87±0.15	(1.10±0.05)E-7	8.63±1.11	(1.61±0.15)E-6	
678	1B 910814	(5.39±0.07)E+1	6.18±0.26	(2.07±0.01)E-5	5.23±0.05	(2.51±0.02)E-4	A(UPC)
680	1B 910815	(1.09±0.10)E+1	0.81±0.11	(5.56±0.26)E-7	1.26±0.11	(8.03±1.22)E-7	
685	1B 910816B	(7.25±0.22)E+1	0.96±0.13	(4.31±0.52)E-7	0.39±0.15	(1.20±0.33)E-6	
686	1B 910816	(1.11±0.07)E+1	0.93±0.14	(7.51±0.70)E-7	3.28±0.55	(2.25±0.57)E-6	G
690	1B 910817	(3.20±0.37)E+0	0.41±0.10	(1.47±0.38)E-7	—	(< 3.9) E-7	
692	1B 910818	(6.25±0.17)E+1	1.31±0.14	(2.92±0.13)E-6	1.27±0.11	(4.34±0.76)E-6	
704	1B 910821	(4.59±0.29)E+1	1.37±0.14	(2.46±0.07)E-6	3.57±0.22	(4.55±0.71)E-6	G
711	1B 910822	(2.43±0.83)E+0	1.05±0.15	(8.87±3.41)E-8	—	(< 9.1) E-7	G
717	1B 910823	(3.72±0.50)E+1	0.38±0.12	(4.47±0.54)E-7	1.03±0.25	(< 7.7) E-7	
727	1B 910826	—	0.87±0.12	(7.18±0.34)E-7	2.49±0.23	(1.39±0.28)E-6	T(4)
729	1B 910827	(1.83±0.31)E-1	0.61±0.15	(4.74±0.61)E-8	—	(5.74±0.99)E-7	
734	1B 910828	(1.79±0.23)E+0	0.89±0.12	(1.44±0.44)E-7	—	(8.83±3.80)E-7	

TABLE 1A—Continued

Trigger Number	Burst Name	Time (TJD:s)	Time (DOY:h:m:s)	α ($^{\circ}$)	δ ($^{\circ}$)	l^{II} ($^{\circ}$)	b^{II} ($^{\circ}$)	Stat. Loc. Error ($^{\circ}$)	$C/C_{\min}$	$C_{\min}$	Time Scale (ms)
741	1B 910829	8497:81582.7	241:22:39:42.7	61.5	23.2	170.6	-21.2	15.7	1.2	264	1024
752	1B 910902	8501:82535.0	245:22:55:35.0	298.4	-8.3	32.5	-17.6	4.7	3.2	264	1024
753	1B 910903	8502:35100.3	246:09:45: 0.3	238.2	11.8	22.2	44.9	4.1	1.4	264	1024
755	1B 910904	8503:56090.2	247:15:34:50.2	344.7	-16.8	48.7	-62.0	9.5	1.8	132	256
761	1B 910905	8504:85735.3	248:23:48:55.3	0.0	-83.2	304.7	-33.7	0.7	7.3	264	1024
764	1B 910907	8506: 3922.6	250:01:05:22.6	134.9	-28.4	253.4	11.4	1.4	1.2	66	64
773	1B 910908	8507:39635.1	251:11:00:35.1	224.4	-15.2	342.6	37.8	2.8	3.4	264	1024
788	1B 910912	8511:21371.9	255:05:56:11.9	73.4	36.5	167.5	-4.6	7.2	2.1	71	64
795	1B 910914	8513:34797.7	257:09:39:57.7	169.7	-34.7	282.1	24.4	2.2	3.5	264	1024
799	1B 910916	8515:59510.7	259:16:31:50.7	22.6	-33.1	250.6	-79.7	8.8	2.8	66	64
803	1B 910918	8517: 1722.0	261:00:28:42.0	297.3	-29.9	10.6	-24.8	1.7	4.0	264	1024
809	1B 910919	8518:82436.1	262:22:53:56.1	159.0	46.2	168.3	57.2	9.0	5.7	132	256
815	1B 910923	8522:66206.4	266:18:23:26.4	50.6	-23.6	215.6	-55.8	1.8	1.3	242	1024
816	1B 910925	8524:12906.1	268:03:35: 6.1	268.1	-22.7	6.1	1.9	3.5	1.8	286	1024
820	1B 910926	8525:14440.1	269:04:00:40.1	160.1	-1.3	249.7	47.6	4.8	1.7	264	1024
824	1B 910926B	8525:66356.9	269:18:25:56.9	349.9	23.3	97.0	-34.9	1.8	2.6	264	1024
825	1B 910927B	8526:12347.0	270:03:25:47.0	184.2	8.0	278.1	69.2	4.7	1.0	286	1024
829	1B 910927	8526:84412.8	270:23:26:52.8	50.3	-38.7	242.9	-56.8	0.4	19.1	264	1024
830	1B 910928	8527:31817.0	271:08:50:17.0	203.4	48.2	104.4	67.4	3.6	5.0	66	64
834	1B 910928B	8527:82067.1	271:22:47:47.1	125.0	31.6	190.9	31.6	14.2	1.1	264	1024
836	1B 910929	8528:61916.9	272:17:11:56.9	356.5	30.1	106.5	-30.7	8.9	1.1	60	64
840	1B 910930B	8529:26662.7	273:07:24:22.7	94.4	46.1	167.9	13.8	2.9	3.5	264	1024
841	1B 910930	8529:42929.8	273:11:55:29.8	131.0	-21.8	245.9	12.7	2.4	12.2	132	256
845	1B 911001	8530:32175.8	274:08:56:15.8	270.0	66.7	96.5	29.8	6.7	3.4	264	1024
856	1B 911002	8531:31971.8	275:08:52:51.8	181.3	-50.0	295.4	12.2	11.2	1.4	79	64
867	1B 911004	8533: 5229.8	277:01:27: 9.8	352.2	59.3	112.5	-1.9	1.9	—	—	—
869	1B 911005	8534:27464.8	278:07:37:44.8	237.1	13.1	23.2	46.4	1.5	9.5	264	1024
871	1B 911006	8535:32513.9	279:09:01:53.9	29.6	-31.9	235.1	-74.7	3.5	5.5	264	1024
878	1B 911007	8536:55929.2	280:15:32: 9.2	312.5	44.0	84.2	0.0	17.2	2.6	71	64
906	1B 911016B	8545:21169.7	289:05:52:49.7	316.1	11.4	60.1	-22.8	3.3	3.8	143	256
907	1B 911016	8545:39694.2	289:11:01:34.2	303.0	0.6	43.0	-17.6	1.7	14.1	242	1024
909	1B 911019	8548:25151.6	292:06:59:11.6	237.6	34.4	55.0	51.2	8.5	1.1	132	256
914	1B 911022	8551:15238.0	295:04:13:58.0	115.5	68.2	147.6	29.7	3.3	5.0	264	1024
927	1B 911024	8553:72606.4	297:20:10: 6.4	199.9	33.4	80.5	81.3	4.5	1.6	242	1024
936	1B 911025	8554:77114.8	298:21:25:14.8	336.9	31.0	89.9	-22.5	6.6	8.1	66	64
938	1B 911026	8555:47220.9	299:13:07: 0.9	70.0	-20.1	218.3	-37.6	2.6	4.5	264	1024
942	1B 911027	8556: 6311.6	300:01:45:11.6	261.2	78.2	110.1	30.9	11.1	1.5	264	1024
946	1B 911027B	8556:37910.4	300:10:31:50.4	139.3	75.1	137.6	35.2	10.2	1.0	132	256
973	1B 911031	8560:34580.6	304:09:36:20.6	282.6	22.0	52.6	10.1	0.9	4.5	107	64
974	1B 911031B	8560:44357.3	304:12:19:17.3	297.3	-29.9	10.6	-24.8	15.7	1.2	264	1024
981	1B 911101	8561:10134.2	305:02:48:54.2	98.0	-49.8	258.4	-23.4	13.7	1.1	264	1024
999	1B 911104	8564:54281.7	308:15:04:41.7	213.1	35.8	64.7	70.7	0.5	26.1	264	1024
1008	1B 911106	8566:13320.8	310:03:42: 0.8	345.2	-37.2	2.6	-64.6	1.2	22.0	264	1024
1009	1B 911106B	8566:46374.5	310:12:52:54.5	162.3	-73.2	294.3	-12.4	4.4	5.0	264	1024
1025	1B 911109	8569:12457.9	313:03:27:37.9	111.4	-26.3	240.1	-4.8	0.5	29.9	374	1024
1036	1B 911110	8570:68182.7	314:18:56:22.7	305.5	18.9	60.4	-10.2	2.4	1.5	286	1024
1042	1B 911111	8571:52638.7	315:14:37:18.7	77.3	-41.6	246.3	-36.1	6.0	1.3	71	64
1046	1B 911111B	8571:80387.3	315:22:19:47.3	122.2	-21.1	240.6	6.4	1.7	1.2	66	64
1051	1B 911113	8573:49304.0	317:13:41:44.0	343.4	-48.8	341.4	-58.6	11.9	1.7	66	64
1071	1B 911117C	8577: 5158.8	321:01:25:58.8	256.7	34.5	57.5	35.6	1.9	3.5	242	1024
1073	1B 911117B	8577:16541.1	321:04:35:41.1	225.9	2.3	0.5	49.8	10.1	3.1	66	64
1076	1B 911117	8577:53329.7	321:14:48:49.7	280.7	25.4	55.0	13.1	5.1	7.0	71	64
1085	1B 911118	8578:68258.0	322:18:57:38.0	165.0	-15.6	267.3	39.4	0.7	28.7	71	64
1086	1B 911118B	8578:85159.6	322:23:39:19.6	264.2	7.3	31.0	19.9	8.3	—	—	—
1087	1B 911119B	8579:20367.8	323:05:39:27.8	273.2	0.3	28.8	8.7	6.4	1.8	264	1024

TABLE 1B—Continued

Trigger Number	Burst Name	T_{90} (s)	Peak Flux ($\text{ph cm}^{-2} \text{s}^{-1}$)	Fluence 50–300 keV (erg cm^{-2})	Hardness Ratio	Fluence > 20 keV (erg cm^{-2})	Comments
741	1B 910829	(1.25±0.22)E+1	0.33±0.11	(4.11±0.65)E-7	4.97±1.95	(< 1.5) E-6	
752	1B 910902	(5.44±0.52)E+0	0.83±0.12	(4.28±0.33)E-7	2.17±0.33	(7.25±2.65)E-7	G
753	1B 910903	(1.82±0.21)E+1	0.56±0.11	(6.36±0.54)E-7	2.30±0.34	(7.90±2.34)E-7	F
755	1B 910904	(6.46±0.37)E+0	0.93±0.13	(2.59±0.26)E-7	2.73±0.56	(7.34±3.24)E-7	
761	1B 910905	(8.15±0.11)E+1	3.21±0.18	(1.58±0.01)E-5	2.84±0.05	(3.35±0.10)E-5	
764	1B 910907	(2.08±0.13)E+1	0.97±0.12	(1.93±0.06)E-6	1.72±0.10	(2.33±0.33)E-6	A(U)
773	1B 910908	(6.10±0.21)E+1	0.90±0.12	(1.98±0.06)E-6	2.06±0.10	(2.60±0.27)E-6	
788	1B 910912	(3.03±0.27)E-1	1.37±0.13	(6.70±0.80)E-8	1.51±0.33	(1.43±0.49)E-7	G
795	1B 910914	(5.84±0.15)E+1	1.12±0.13	(1.91±0.06)E-6	1.96±0.11	(3.62±0.35)E-6	
799	1B 910916	(1.73±0.08)E-1	0.99±0.11	(5.22±0.44)E-8	2.47±0.39	(< 1.6) E-7	
803	1B 910918	(7.23±0.34)E+0	1.18±0.14	(1.07±0.05)E-6	2.91±0.29	(1.73±0.33)E-6	
809	1B 910919	(6.40±2.31)E-1	3.14±0.16	(2.25±0.10)E-7	3.62±0.30	(5.29±0.60)E-7	X
815	1B 910923	(2.54±0.25)E+1	0.65±0.13	(1.41±0.10)E-6	1.21±0.16	(2.28±0.60)E-6	
816	1B 910925	(9.09±0.32)E+1	0.33±0.12	(1.32±0.17)E-6	0.95±0.24	(3.10±1.05)E-6	G
820	1B 910926	(3.17±0.21)E+1	0.56±0.11	(1.94±0.09)E-6	8.21±1.15	(4.72±0.64)E-6	
824	1B 910926B	(4.01±0.17)E+1	0.69±0.12	(1.87±0.08)E-6	1.06±0.09	(2.58±0.39)E-6	A(U)
825	1B 910927B	(7.49±0.30)E+1	0.41±0.11	(1.34±0.07)E-6	2.57±0.24	(3.48±0.57)E-6	
829	1B 910927	(1.73±0.08)E+1	6.49±0.20	(8.55±0.05)E-6	1.44±0.02	(1.00±0.01)E-5	
830	1B 910928	(1.31±0.15)E-1	2.22±0.14	(1.46±0.06)E-7	7.53±0.89	(6.54±0.88)E-7	
834	1B 910928B	(1.54±0.91)E+0	0.36±0.10	(5.60±3.07)E-8	—	(< 5.3) E-7	
836	1B 910929	(3.20±1.43)E-1	0.57±0.13	(3.76±0.83)E-8	3.39±1.65	(< 1.3) E-7	X
840	1B 910930B	(7.65±0.56)E+1	1.30±0.13	(1.07±0.04)E-6	5.76±0.63	(4.19±0.37)E-6	
841	1B 910930	(1.74±0.05)E+1	6.08±0.21	(2.87±0.05)E-6	1.71±0.05	(5.95±0.34)E-6	
845	1B 911001	(2.37±0.14)E+0	0.69±0.13	(2.18±0.32)E-7	5.89±2.74	(1.35±0.56)E-6	
856	1B 911002	(5.76±7.81)E-1	0.77±0.13	(3.68±0.80)E-8	1.27±0.52	(< 8.7) E-8	
867	1B 911004	(2.37±0.34)E+0	2.36±0.15	(7.73±0.20)E-7	5.08±0.34	(4.20±0.24)E-6	
869	1B 911005	(1.11±0.01)E+2	3.52±0.21	(7.41±0.12)E-6	2.97±0.09	(1.88±0.11)E-5	
871	1B 911006	—	1.24±0.12	(2.63±0.11)E-6	2.80±0.20	(4.94±0.99)E-6	T(50),G
878	1B 911007	(3.84±1.43)E-1	1.10±0.15	(1.03±0.10)E-7	12.61±6.09	(4.94±1.31)E-7	F
906	1B 911016B	(3.98±0.20)E-1	2.40±0.17	(2.53±0.14)E-7	7.52±1.05	(5.82±0.70)E-7	
907	1B 911016	(1.58±0.02)E+2	3.57±0.17	(1.17±0.01)E-5	2.36±0.04	(1.63±0.06)E-5	A(G)
909	1B 911019	(1.60±5.82)E+0	0.41±0.12	(1.23±0.35)E-7	—	(< 3.8) E-7	
914	1B 911022	(6.66±0.65)E+0	2.53±0.16	(1.15±0.04)E-6	2.26±0.15	(1.98±0.23)E-6	A(G)
927	1B 911024	(2.80±0.12)E+1	0.59±0.12	(3.97±0.46)E-7	0.65±0.18	(6.31±2.03)E-7	F
936	1B 911025	(1.47±0.14)E+0	3.81±0.18	(3.67±0.24)E-7	4.45±0.57	(1.47±0.26)E-6	
938	1B 911026	(3.10±0.14)E+1	1.05±0.11	(1.61±0.05)E-6	1.52±0.09	(2.09±0.46)E-6	A(G)
942	1B 911027	(4.99±1.36)E+0	0.29±0.10	(2.72±0.31)E-7	11.68±4.94	(8.40±2.36)E-7	
946	1B 911027B	(4.85±0.34)E+1	0.61±0.12	(7.79±0.60)E-7	6.08±1.18	(1.65±0.60)E-6	
973	1B 911031	(9.00±0.21)E+1	5.29±0.20	(1.66±0.01)E-5	3.89±0.04	(4.47±0.08)E-5	
974	1B 911031B	(3.20±1.12)E+0	0.34±0.12	(1.64±0.35)E-7	2.70±1.06	(1.11±0.48)E-6	
981	1B 911101	—	0.46±0.11	(2.48±0.34)E-7	1.23±0.32	(< 4.4) E-7	H
999	1B 911104	(6.66±0.53)E+0	11.55±0.31	(3.33±0.05)E-6	3.67±0.12	(1.13±0.04)E-5	A(UP)
1008	1B 911106	—	4.82±0.18	(9.72±0.05)E-6	3.14±0.03	(1.73±0.03)E-5	H
1009	1B 911106B	(3.57±0.04)E+2	0.69±0.11	(4.85±0.12)E-6	1.92±0.09	(1.06±0.10)E-5	C
1025	1B 911109	(2.62±0.14)E+0	16.27±0.36	(4.41±0.05)E-6	2.10±0.05	(7.33±0.28)E-6	A(U)
1036	1B 911110	(1.00±0.02)E+2	0.94±0.12	(4.50±0.11)E-6	2.50±0.12	(5.47±0.47)E-6	
1042	1B 911111	(2.50±0.13)E+1	1.24±0.13	(1.45±0.08)E-6	0.99±0.11	(2.04±0.46)E-6	
1046	1B 911111B	(1.14±0.03)E+2	0.94±0.13	(3.84±0.12)E-6	1.52±0.09	(7.41±0.88)E-6	
1051	1B 911113	(1.92±2.31)E-1	0.59±0.11	(3.15±0.44)E-8	2.35±0.62	(< 1.5) E-7	X
1071	1B 911117C	—	1.67±0.15	(3.38±0.12)E-6	2.06±0.13	(6.27±0.73)E-6	T(12),G
1073	1B 911117B	(4.48±8.54)E-1	2.12±0.15	(1.42±0.10)E-7	3.30±0.46	(2.89±0.62)E-7	X
1076	1B 911117	(1.61±0.16)E-1	2.71±0.16	(1.78±0.08)E-7	7.65±0.83	(1.12±0.14)E-6	G
1085	1B 911118	(1.92±0.02)E+1	30.35±0.40	(4.05±0.01)E-5	2.20±0.01	(5.89±0.03)E-5	A(U)
1086	1B 911118B	(2.26±0.49)E+1	0.32±0.12	(5.95±0.83)E-7	2.15±0.55	(< 1.3) E-6	
1087	1B 911119B	(2.76±0.21)E+1	0.85±0.17	(6.83±1.38)E-7	1.95±0.67	(1.40±0.67)E-6	

TABLE 1A—Continued

Trigger Number	Burst Name	Time (TJD:s)	Time (DOY:h:m:s)	α ($^{\circ}$)	δ ($^{\circ}$)	l^{II} ($^{\circ}$)	b^{II} ($^{\circ}$)	Stat. Loc. Error ($^{\circ}$)	C/C_{min}	C_{min}	Time Scale (ms)
1088	1B 911119	8579:23341.6	323:06:29: 1.6	49.2	69.3	135.2	10.0	1.6	16.2	66	64
1096	1B 911120C	8580:28379.5	324:07:52:59.5	7.8	56.6	120.1	-6.2	8.3	1.9	66	64
1097	1B 911120B	8580:40945.3	324:11:22:25.3	248.2	36.8	59.2	42.7	6.3	2.3	60	64
1102	1B 911120	8580:80853.1	324:22:27:33.1	283.5	34.1	64.2	14.3	5.7	—	—	—
1110	1B 911122	8582:55134.9	326:15:18:54.9	106.3	-24.8	236.7	-8.2	2.7	1.7	264	1024
1112	1B 911123B	8583:15867.7	327:04:24:27.7	53.7	75.1	133.0	15.5	3.6	4.2	220	1024
1114	1B 911123	8583:29733.1	327:08:15:33.1	23.9	31.3	133.9	-30.6	2.4	5.8	242	1024
1118	1B 911124	8584:38512.3	328:10:41:52.3	291.1	0.7	37.3	-7.0	7.4	2.3	242	1024
1120	1B 911125	8585:82154.1	329:22:49:14.1	190.9	15.7	293.5	78.4	4.7	—	—	—
1121	1B 911126	8586:46127.8	330:12:48:47.8	158.7	5.7	240.1	51.1	0.4	26.1	286	1024
1122	1B 911127	8587:15728.3	331:04:22: 8.3	270.8	49.8	77.3	27.9	0.3	24.3	242	1024
1123	1B 911127C	8587:25280.1	331:07:01:20.1	292.7	4.4	41.4	-6.7	8.2	1.7	286	1024
1125	1B 911127B	8587:83314.3	331:23:08:34.3	158.8	-79.7	296.9	-18.5	4.0	1.5	242	1024
1126	1B 911128	8588:31364.0	332:08:42:44.0	332.3	-8.8	50.7	-47.6	3.5	2.1	286	1024
1128	1B 911129B	8589:35811.2	333:09:56:51.2	314.3	6.9	55.0	-24.0	17.7	1.1	66	64
1129	1B 911129	8589:64791.2	333:17:59:51.2	44.5	-2.9	179.7	-51.2	10.1	1.0	132	256
1141	1B 911202	8592:73729.7	336:20:28:49.7	173.0	-24.7	280.9	34.7	0.9	—	—	—
1142	1B 911202B	8592:85891.4	336:23:51:31.4	237.3	-0.8	7.2	39.0	8.0	—	—	—
1145	1B 911204	8594:62502.8	338:17:21:42.8	69.1	-24.4	223.2	-39.7	16.1	3.6	264	1024
1148	1B 911205	8595:83081.0	339:23:04:41.0	101.5	-28.4	238.1	-13.6	1.2	—	—	—
1150	1B 911207	8597:35445.4	341:09:50:45.4	304.0	28.3	67.5	-3.8	0.8	5.8	264	1024
1152	1B 911208	8598: 345.7	342:00:05:45.7	113.8	-1.7	219.5	8.9	22.9	1.0	286	1024
1153	1B 911208B	8598:75901.6	342:21:05: 1.6	29.9	-45.8	271.5	-66.9	13.8	1.1	264	1024
1154	1B 911209B	8599: 3408.0	343:00:56:48.0	86.4	10.0	196.3	-9.7	7.1	2.9	143	256
1156	1B 911209C	8599:58962.6	343:16:22:42.6	79.2	-35.1	238.7	-33.7	3.8	2.9	286	1024
1157	1B 911209	8599:66957.9	343:18:35:57.9	262.8	-45.7	344.3	-6.5	0.4	31.8	264	1024
1159	1B 911210	8600:75947.4	344:21:05:47.4	294.2	-19.4	20.1	-18.5	1.4	6.9	286	1024
1167	1B 911213	8603:74137.2	347:20:35:37.2	218.0	-43.0	321.8	16.2	15.5	1.4	264	1024
1190	1B 911217	8607:30125.7	351:08:22: 5.7	12.8	20.3	122.9	-42.6	1.8	6.0	264	1024
1192	1B 911217B	8607:81598.1	351:22:39:58.1	7.4	-18.1	92.7	-79.7	7.7	—	—	—
1196	1B 911219B	8609:32534.2	353:09:02:14.2	347.2	19.2	91.9	-37.4	6.2	1.8	242	1024
1197	1B 911219	8609:79038.1	353:21:57:18.1	220.4	-4.4	347.3	48.7	2.0	3.6	286	1024
1200	1B 911221	8611:79405.7	355:22:03:25.7	209.8	-45.6	315.2	15.7	1.7	4.8	264	1024
1204	1B 911223	8613:20217.6	357:05:36:57.6	322.7	-51.6	345.7	-45.4	12.7	5.1	143	256
1211	1B 911224	8614:21944.2	358:06:05:44.2	255.3	11.4	30.9	29.6	8.5	2.9	143	256
1212	1B 911224B	8614:39777.9	358:11:02:57.9	53.3	-36.4	238.4	-54.7	6.7	2.1	264	1024
1213	1B 911224C	8614:56133.3	358:15:35:33.3	339.9	-18.2	42.3	-58.4	5.8	1.1	264	1024
1218	1B 911225	8615:32734.9	359:09:05:34.9	334.8	25.9	85.0	-25.5	1.5	5.1	264	1024
1221	1B 911225B	8615:61717.5	359:17:08:37.5	255.0	-33.0	351.1	5.8	8.6	2.7	264	1024
1223	1B 911226	8616:13001.5	360:03:36:41.5	121.2	-30.0	247.6	0.8	10.6	1.7	264	1024
1235	1B 911227	8617: 3953.3	361:01:05:53.3	347.1	-72.4	313.2	-42.6	2.1	9.6	264	1024
1244	1B 911228	8618:62526.1	362:17:22: 6.1	278.8	45.7	74.3	21.7	3.7	3.6	242	1024
1279	1B 920105	8626:63677.1	5:17:41:17.1	332.6	-47.2	349.4	-52.8	2.0	2.3	264	1024
1288	1B 920110	8631:33478.3	10:09:17:58.3	58.8	-19.4	212.6	-47.3	0.5	16.1	264	1024
1289	1B 920110C	8631:39851.4	10:11:04:11.4	156.3	1.6	242.8	46.7	6.9	3.5	132	256
1291	1B 920110B	8631:80499.0	10:22:21:39.0	342.3	7.4	77.9	-44.5	2.4	2.9	66	64
1297	1B 920113	8634:75138.8	13:20:52:18.8	72.2	67.2	143.0	14.2	8.3	2.4	264	1024
1298	1B 920114	8635:62626.4	14:17:23:46.4	221.7	67.7	107.7	45.9	12.4	1.0	242	1024
1301	1B 920116B	8637:10457.7	16:02:54:17.7	142.0	13.1	218.9	40.6	10.3	1.0	264	1024
1303	1B 920116	8637:66634.9	16:18:30:34.9	155.7	-76.0	294.2	-15.7	2.0	3.0	242	1024
1306	1B 920120	8641:81040.0	20:22:30:40.0	331.3	-84.0	307.6	-31.5	3.7	1.4	286	1024
1307	1B 920121B	8642:16380.3	21:04:33: 0.3	263.5	-71.3	321.7	-19.7	10.9	1.7	286	1024
1308	1B 920121	8642:79009.1	21:21:56:49.1	42.9	31.7	150.9	-24.6	11.8	3.7	66	64
1310	1B 920122	8643:33782.7	22:09:23: 2.7	61.0	54.1	148.8	1.2	8.9	—	—	—
1311	1B 920123	8644:41694.9	23:11:34:54.9	89.2	6.5	200.8	-9.0	5.7	1.9	264	1024

TABLE 1B—*Continued*

Trigger Number	Burst Name	T_{90} (s)	Peak Flux (ph cm ⁻² s ⁻¹)	Fluence 50–300 keV (erg cm ⁻²)	Hardness Ratio	Fluence > 20 keV (erg cm ⁻²)	Comments
1088	1B 911119	(1.28±1.43)E-1	5.36±0.20	(3.71±0.09)E-7	9.30±0.73	(3.05±0.16)E-6	X
1096	1B 911120C	(3.20±3.45)E-1	0.89±0.12	(4.74±0.69)E-8	2.17±0.63	(< 8.2) E-8	
1097	1B 911120B	(7.94±4.67)E-1	1.03±0.12	(6.29±0.89)E-8	2.82±0.73	(1.61±0.46)E-7	G
1102	1B 911120	(1.92±1.43)E-1	1.63±0.13	(9.29±0.60)E-8	3.52±0.42	(3.06±0.84)E-7	A(U),G,X
1110	1B 911122	—	0.51±0.10	(1.05±0.05)E-6	3.10±0.27	(1.10±0.19)E-6	
1112	1B 911123B	(4.42±0.17)E-1	1.44±0.14	(1.73±0.09)E-7	4.47±0.55	(1.53±0.10)E-6	G
1114	1B 911123	(4.80±0.55)E+0	2.54±0.15	(1.07±0.02)E-6	1.44±0.05	(1.45±0.12)E-6	A(U)
1118	1B 911124	—	0.78±0.11	(2.00±0.08)E-6	3.77±0.29	(3.82±0.44)E-6	
1120	1B 911125	(9.09±3.92)E+0	0.30±0.12	(3.12±0.58)E-7	1.89±0.64	(< 8.0) E-7	
1121	1B 911126	—	11.06±0.31	(2.27±0.01)E-5	2.75±0.03	(6.28±0.09)E-5	A(U),T(65)
1122	1B 911127	(1.88±0.10)E+1	11.60±0.25	(1.43±0.01)E-5	3.19±0.03	(2.51±0.03)E-5	A(U)
1123	1B 911127C	(3.21±0.36)E+1	0.48±0.12	(7.22±0.59)E-7	4.11±0.57	(1.22±0.52)E-6	
1125	1B 911127B	(1.81±0.58)E+1	0.47±0.11	(6.13±0.53)E-7	1.44±0.23	(7.21±3.58)E-7	
1126	1B 911128	(2.03±0.17)E+1	0.80±0.13	(1.12±0.07)E-6	3.92±0.40	(2.22±0.50)E-6	
1128	1B 911129B	(2.95±0.30)E-1	0.34±0.10	(2.47±0.72)E-8	—	(< 5.7) E-8	
1129	1B 911129	(9.60±1.81)E-1	0.60±0.12	(7.14±0.81)E-8	3.31±0.78	(1.44±0.53)E-7	
1141	1B 911202	(2.01±0.05)E+1	9.01±0.26	(1.48±0.01)E-5	2.46±0.02	(5.75±0.07)E-5	
1142	1B 911202B	—	0.56±0.11	(4.18±1.69)E-8	—	(< 1.8) E-7	T(.3)
1145	1B 911204	(3.22±0.42)E+1	1.76±0.15	(3.37±0.26)E-7	1.33±0.19	(5.36±1.63)E-7	
1148	1B 911205	(4.93±0.30)E+1	1.47±0.16	(4.99±0.10)E-6	5.37±0.30	(1.12±0.06)E-5	
1150	1B 911207	(6.16±0.61)E+1	1.71±0.18	(4.59±0.10)E-6	1.79±0.07	(6.72±0.65)E-6	A(U)
1152	1B 911208	(2.75±0.04)E+2	0.28±0.14	(8.81±0.73)E-7	2.71±0.40	(3.31±0.73)E-6	
1153	1B 911208B	(9.02±5.92)E+0	0.34±0.10	(2.82±0.43)E-7	1.46±0.41	(< 1.1) E-6	
1154	1B 911209B	(1.93±0.20)E-1	1.63±0.14	(1.10±0.07)E-7	8.04±1.29	(1.20±0.15)E-6	A(U),G
1156	1B 911209C	(1.89±0.03)E+2	0.62±0.12	(1.15±0.02)E-5	3.15±0.11	(3.70±0.25)E-5	
1157	1B 911209	(1.71±0.02)E+2	10.04±0.26	(8.87±0.06)E-6	3.45±0.04	(2.19±0.05)E-5	A(UG)
1159	1B 911210	(1.82±0.26)E+1	3.50±0.18	(1.28±0.03)E-6	4.22±0.20	(2.47±0.17)E-6	
1167	1B 911213	(2.46±0.25)E+1	0.41±0.10	(3.24±0.36)E-7	2.35±0.46	(< 4.8) E-7	
1190	1B 911217	(7.17±1.09)E+0	3.39±0.18	(1.13±0.03)E-6	2.09±0.11	(2.10±0.20)E-6	A(U),F
1192	1B 911217B	(4.22±0.97)E+1	0.61±0.11	(9.31±0.74)E-7	1.88±0.26	(1.29±0.39)E-6	
1196	1B 911219B	(1.63±0.04)E+2	0.55±0.10	(1.27±0.06)E-6	4.12±0.41	(2.09±0.35)E-6	
1197	1B 911219	(2.37±0.22)E+1	1.19±0.13	(2.45±0.06)E-6	1.49±0.07	(3.28±0.34)E-6	
1200	1B 911221	(2.77±0.24)E+1	1.17±0.12	(2.59±0.05)E-6	1.57±0.06	(3.78±0.27)E-6	
1204	1B 911223	(3.71±1.55)E+0	3.30±0.18	(3.52±0.24)E-7	2.30±0.31	(4.90±1.06)E-7	
1211	1B 911224	(7.63±5.36)E-1	1.68±0.14	(1.44±0.09)E-7	3.29±0.46	(2.08±0.40)E-7	G
1212	1B 911224B	—	0.88±0.14	(3.93±0.15)E-6	0.49±0.05	(8.38±1.73)E-6	
1213	1B 911224C	(2.02±0.09)E+1	0.43±0.11	(6.86±0.45)E-7	5.25±0.85	(1.03±0.30)E-6	
1218	1B 911225	(9.47±0.69)E+0	1.25±0.12	(1.20±0.04)E-6	1.89±0.10	(1.79±0.16)E-6	
1221	1B 911225B	(6.08±0.57)E+0	1.00±0.13	(3.40±0.27)E-7	1.00±0.16	(6.53±1.96)E-7	
1223	1B 911226	(1.28±1.03)E+0	0.80±0.11	(5.93±1.85)E-8	—	(< 3.6) E-7	G
1235	1B 911227	(1.90±0.00)E+2	2.53±0.15	(7.44±0.12)E-6	2.51±0.07	(1.02±0.06)E-5	A(U)
1244	1B 911228	(5.73±0.88)E+1	0.86±0.11	(1.69±0.09)E-6	1.32±0.13	(3.12±0.46)E-6	
1279	1B 920105	(3.78±0.15)E+1	1.20±0.15	(1.23±0.05)E-6	1.89±0.13	(1.84±0.35)E-6	G
1288	1B 920110	(3.19±0.02)E+2	6.55±0.22	(2.88±0.02)E-5	4.19±0.05	(3.63±0.12)E-5	A(U)
1289	1B 920110C	(6.81±0.43)E-1	1.44±0.14	(1.46±0.09)E-7	3.22±0.42	(3.24±0.79)E-7	
1291	1B 920110B	(1.53±0.08)E+1	1.90±0.14	(1.83±0.04)E-6	5.42±0.30	(4.63±0.29)E-6	
1297	1B 920113	—	0.90±0.13	(2.57±0.29)E-7	8.98±3.98	(9.63±2.42)E-7	T(6)
1298	1B 920114	(3.90±0.23)E+0	0.32±0.11	(8.69±2.08)E-8	1.65±0.73	(< 3.3) E-7	
1301	1B 920116B	—	0.36±0.11	(6.04±0.69)E-7	2.25±0.45	(7.74±3.79)E-7	T(20),G
1303	1B 920116	(2.13±0.21)E+1	0.83±0.12	(1.43±0.04)E-6	4.81±0.35	(1.44±0.08)E-5	
1306	1B 920120	(7.30±2.83)E+0	0.54±0.12	(3.06±0.27)E-7	1.46±0.24	(7.76±2.18)E-7	
1307	1B 920121B	—	0.71±0.13	(6.24±0.82)E-7	3.13±0.67	(3.48±0.88)E-6	
1308	1B 920121	(2.15±0.26)E-1	1.60±0.14	(9.08±0.57)E-8	3.66±0.48	(< 1.5) E-7	G
1310	1B 920122	—	0.67±0.13	(3.57±0.53)E-7	0.74±0.25	(9.09±4.17)E-7	T(65)
1311	1B 920123	—	0.55±0.12	(1.13±0.08)E-6	1.05±0.15	(1.54±0.69)E-6	T(85)

TABLE 1A—Continued

Trigger Number	Burst Name	Time (TJD:s)	Time (DOY:h:m:s)	α ($^{\circ}$)	δ ($^{\circ}$)	l^{II} ($^{\circ}$)	b^{II} ($^{\circ}$)	Stat. Loc. Error ($^{\circ}$)	C/C_{min}	C_{min}	Time Scale (ms)
1318	1B 920127	8648:77217.4	27:21:26:57.4	320.0	−6.4	45.3	−35.8	18.3	1.4	286	1024
1319	1B 920128	8649:11487.9	28:03:11:27.9	103.9	10.8	203.8	5.8	11.3	1.5	264	1024
1321	1B 920130	8651: 1777.3	30:00:29:37.3	6.3	−51.7	312.6	−64.9	1.7	5.4	308	1024
1328	1B 920130B	8651:82202.1	30:22:50: 2.1	60.3	−33.3	233.5	−48.9	2.3	1.2	76	64
1346	1B 920203	8655:56207.6	34:15:36:47.6	272.8	−11.6	18.0	3.5	4.0	1.2	66	64
1359	1B 920205	8657:54271.4	36:15:04:31.4	27.7	−18.4	183.5	−73.8	18.1	2.6	66	64
1365	1B 920207	8659: 6261.4	38:01:44:21.4	292.5	27.3	61.5	4.4	4.4	3.8	264	1024
1379	1B 920209	8661:58889.6	40:16:21:29.6	312.2	−5.7	41.7	−28.6	9.3	—	—	—
1382	1B 920209B	8661:78044.8	40:21:40:44.8	286.7	59.8	90.3	21.4	7.3	1.1	264	1024
1384	1B 920210C	8662: 8155.0	41:02:15:55.0	303.8	−35.7	5.9	−31.6	13.0	1.9	330	1024
1385	1B 920210	8662:35623.8	41:09:53:43.8	152.2	47.6	169.0	52.4	0.4	14.4	264	1024
1388	1B 920210B	8662:82336.6	41:22:52:16.6	327.8	20.7	75.9	−25.3	3.4	3.0	286	1024
1390	1B 920212	8664:15226.5	43:04:13:46.5	42.1	9.0	165.1	−44.1	4.8	1.1	286	1024
1396	1B 920214	8666:62162.6	45:17:16: 2.6	42.3	5.0	168.9	−47.1	1.7	3.4	143	256
1404	1B 920216B	8668:49371.8	47:13:42:51.8	342.1	54.5	105.6	−4.2	16.5	1.0	264	1024
1406	1B 920216	8668:80300.4	47:22:18:20.4	156.6	1.1	243.6	46.6	1.2	9.1	242	1024
1413	1B 920218C	8670:24084.4	49:06:41:24.4	125.0	−21.1	242.0	8.6	2.2	1.3	79	64
1416	1B 920218B	8670:39791.9	49:11:03:11.9	144.0	58.2	156.5	44.1	6.3	4.0	121	256
1419	1B 920218	8670:67343.0	49:18:42:23.0	40.7	24.9	152.7	−31.5	1.9	14.5	264	1024
1422	1B 920220	8672:46832.3	51:13:00:32.3	352.2	−0.2	83.1	−56.5	2.1	4.9	286	1024
1425	1B 920221	8673:22472.4	52:06:14:32.4	182.4	48.3	141.2	67.3	0.6	20.0	242	1024
1430	1B 920222	8674:32719.2	53:09:05:19.2	289.9	−38.5	359.6	−21.7	6.3	1.7	308	1024
1432	1B 920224	8676: 9818.8	55:02:43:38.8	166.8	−63.2	291.5	−2.7	3.1	1.4	264	1024
1435	1B 920224B	8676:77881.0	55:21:38: 1.0	200.8	9.3	327.2	70.7	8.9	1.2	264	1024
1439	1B 920226B	8678:28449.4	57:07:54: 9.4	106.4	53.2	163.6	23.5	5.1	1.3	308	1024
1440	1B 920226	8678:29728.5	57:08:15:28.5	272.6	18.7	45.5	17.2	0.4	12.0	66	64
1443	1B 920227	8679:21650.6	58:06:00:50.6	69.7	64.5	144.5	11.7	5.0	9.2	121	256
1446	1B 920227C	8679:63976.1	58:17:46:16.1	239.3	11.8	22.9	43.9	2.0	2.1	264	1024
1447	1B 920227B	8679:75000.5	58:20:50: 0.5	199.8	50.6	112.1	65.9	0.7	5.4	264	1024
1449	1B 920228	8680:53947.0	59:14:59: 7.0	148.3	26.7	203.0	50.5	1.6	6.0	242	1024
1452	1B 920229B	8681:54248.1	60:15:04: 8.1	335.1	−5.5	57.1	−48.1	2.6	1.5	264	1024
1453	1B 920229	8681:69677.2	60:19:21:17.2	195.4	−44.8	304.8	18.0	2.4	10.0	66	64
1456	1B 920301	8682:41662.1	61:11:34:22.1	338.0	22.9	85.6	−29.7	7.0	1.2	286	1024
1458	1B 920302B	8683: 884.1	62:00:14:44.1	122.1	−63.8	277.2	−16.2	1.8	2.0	242	1024
1459	1B 920302	8683:22585.0	62:06:16:25.0	345.7	17.2	89.1	−38.4	3.1	1.5	264	1024
1461	1B 920303B	8684:28289.9	63:07:51:29.9	163.9	40.8	175.6	62.6	9.4	1.8	66	64
1462	1B 920303	8684:84778.6	63:23:32:58.6	234.6	−10.3	355.9	34.9	9.9	—	—	—
1463	1B 920305B	8686: 3642.2	65:01:00:42.2	268.4	59.8	88.6	30.4	3.7	4.5	66	64
1465	1B 920305C	8686:35275.4	65:09:47:55.4	263.5	−58.5	333.4	−13.6	10.7	1.0	264	1024
1466	1B 920305	8686:36174.1	65:10:02:54.1	106.8	52.6	164.3	23.5	8.2	2.1	66	64

TABLE 1B—*Continued*

Trigger Number	Burst Name	T_{90} (s)	Peak Flux ($\text{ph cm}^{-2} \text{s}^{-1}$)	Fluence 50–300 keV (erg cm^{-2})	Hardness Ratio	Fluence > 20 keV (erg cm^{-2})	Comments
1318	1B 920127	$(1.86 \pm 0.08)\text{E}+2$	0.85 ± 0.18	$(1.03 \pm 0.11)\text{E}-6$	2.15 ± 0.41	$(< 1.5) \text{E}-6$	
1319	1B 920128	—	0.73 ± 0.12	$(3.08 \pm 0.23)\text{E}-7$	0.87 ± 0.14	$(5.01 \pm 2.13)\text{E}-7$	
1321	1B 920130	—	2.56 ± 0.17	$(7.39 \pm 0.08)\text{E}-6$	1.49 ± 0.03	$(1.33 \pm 0.05)\text{E}-5$	T(170),G
1328	1B 920130B	—	1.18 ± 0.13	$(3.45 \pm 0.15)\text{E}-6$	1.29 ± 0.11	$(4.99 \pm 0.88)\text{E}-6$	T(70)
1346	1B 920203	$(4.54 \pm 0.23)\text{E}+0$	1.42 ± 0.16	$(3.85 \pm 0.27)\text{E}-7$	2.97 ± 0.41	$(8.65 \pm 1.46)\text{E}-7$	
1359	1B 920205	$(2.58 \pm 1.54)\text{E}-1$	1.25 ± 0.15	$(7.97 \pm 0.96)\text{E}-8$	6.06 ± 1.95	$(6.56 \pm 0.97)\text{E}-7$	G
1365	1B 920207	—	1.17 ± 0.13	$(3.14 \pm 0.13)\text{E}-6$	2.44 ± 0.19	$(3.38 \pm 0.93)\text{E}-6$	T(210)
1379	1B 920209	—	0.46 ± 0.11	$(8.50 \pm 1.13)\text{E}-8$	—	$(< 6.9) \text{E}-7$	T(2)
1382	1B 920209B	$(7.81 \pm 6.94)\text{E}+0$	0.51 ± 0.12	$(3.99 \pm 0.32)\text{E}-7$	2.26 ± 0.34	$(7.93 \pm 2.00)\text{E}-7$	
1384	1B 920210C	$(4.91 \pm 0.21)\text{E}+1$	1.32 ± 0.17	$(1.51 \pm 0.61)\text{E}-7$	—	$(< 9.0) \text{E}-7$	
1385	1B 920210	$(5.18 \pm 0.21)\text{E}+1$	3.62 ± 0.17	$(2.32 \pm 0.01)\text{E}-5$	4.36 ± 0.05	$(9.44 \pm 0.15)\text{E}-5$	
1388	1B 920210B	—	1.41 ± 0.15	$(5.35 \pm 0.23)\text{E}-7$	1.30 ± 0.11	$(8.04 \pm 1.54)\text{E}-7$	T(4)
1390	1B 920212	$(1.77 \pm 0.26)\text{E}+1$	0.34 ± 0.11	$(5.29 \pm 0.46)\text{E}-7$	1.88 ± 0.29	$(3.83 \pm 0.66)\text{E}-6$	
1396	1B 920214	$(2.10 \pm 0.04)\text{E}+1$	1.68 ± 0.15	$(1.50 \pm 0.06)\text{E}-6$	2.12 ± 0.13	$(2.61 \pm 0.45)\text{E}-6$	
1404	1B 920216B	$(1.41 \pm 0.83)\text{E}+0$	0.56 ± 0.12	$(1.06 \pm 0.15)\text{E}-7$	5.43 ± 2.22	$(1.59 \pm 0.74)\text{E}-7$	
1406	1B 920216	$(2.00 \pm 0.05)\text{E}+1$	1.97 ± 0.13	$(3.19 \pm 0.04)\text{E}-6$	1.67 ± 0.04	$(1.02 \pm 0.04)\text{E}-5$	
1413	1B 920218C	—	1.20 ± 0.12	$(1.95 \pm 0.07)\text{E}-6$	1.74 ± 0.11	$(2.45 \pm 0.56)\text{E}-6$	T(50)
1416	1B 920218B	$(3.46 \pm 0.97)\text{E}+0$	1.50 ± 0.12	$(2.87 \pm 0.13)\text{E}-7$	1.45 ± 0.12	$(4.21 \pm 0.99)\text{E}-7$	
1419	1B 920218	$(1.23 \pm 0.01)\text{E}+2$	4.51 ± 0.18	$(1.28 \pm 0.01)\text{E}-5$	2.46 ± 0.04	$(2.18 \pm 0.07)\text{E}-5$	
1422	1B 920220	—	2.10 ± 0.17	$(3.86 \pm 0.10)\text{E}-6$	1.10 ± 0.05	$(1.01 \pm 0.08)\text{E}-5$	A(U),T(80),G
1425	1B 920221	$(1.04 \pm 0.07)\text{E}+1$	9.23 ± 0.27	$(5.18 \pm 0.05)\text{E}-6$	1.62 ± 0.03	$(1.12 \pm 0.04)\text{E}-5$	
1430	1B 920222	—	0.72 ± 0.14	$(1.44 \pm 0.18)\text{E}-7$	1.22 ± 0.29	$(3.31 \pm 1.15)\text{E}-7$	T(2)
1432	1B 920224	$(3.87 \pm 0.32)\text{E}+1$	0.50 ± 0.11	$(1.76 \pm 0.08)\text{E}-6$	1.49 ± 0.12	$(2.69 \pm 0.47)\text{E}-6$	G
1435	1B 920224B	$(1.34 \pm 0.27)\text{E}+0$	0.36 ± 0.10	$(8.14 \pm 1.10)\text{E}-8$	—	$(2.06 \pm 0.92)\text{E}-7$	G
1439	1B 920226B	$(8.32 \pm 1.99)\text{E}+0$	0.53 ± 0.14	$(2.27 \pm 0.43)\text{E}-7$	1.02 ± 0.38	$(< 1.2) \text{E}-6$	
1440	1B 920226	$(2.44 \pm 0.10)\text{E}+1$	11.50 ± 0.27	$(7.50 \pm 0.07)\text{E}-6$	4.17 ± 0.07	$(1.48 \pm 0.04)\text{E}-5$	
1443	1B 920227	$(2.30 \pm 0.91)\text{E}+0$	4.49 ± 0.18	$(1.08 \pm 0.02)\text{E}-6$	2.78 ± 0.10	$(1.79 \pm 0.12)\text{E}-6$	
1446	1B 920227C	$(3.35 \pm 0.60)\text{E}+1$	0.48 ± 0.11	$(1.94 \pm 0.08)\text{E}-6$	3.38 ± 0.25	$(2.73 \pm 0.36)\text{E}-6$	
1447	1B 920227B	$(2.27 \pm 0.06)\text{E}+1$	1.74 ± 0.16	$(4.15 \pm 0.06)\text{E}-6$	3.38 ± 0.10	$(8.64 \pm 0.48)\text{E}-6$	
1449	1B 920228	$(3.32 \pm 0.05)\text{E}+1$	1.47 ± 0.13	$(2.10 \pm 0.05)\text{E}-6$	2.02 ± 0.09	$(4.76 \pm 0.57)\text{E}-6$	G
1452	1B 920229B	$(1.22 \pm 0.10)\text{E}+1$	0.78 ± 0.15	$(9.04 \pm 0.51)\text{E}-7$	2.58 ± 0.27	$(1.22 \pm 0.25)\text{E}-6$	
1453	1B 920229	$(1.92 \pm 5.16)\text{E}-1$	7.31 ± 0.21	$(4.68 \pm 0.10)\text{E}-7$	6.68 ± 0.33	$(1.18 \pm 0.11)\text{E}-6$	X
1456	1B 920301	$(4.79 \pm 0.29)\text{E}+1$	0.53 ± 0.12	$(1.40 \pm 0.09)\text{E}-6$	2.21 ± 0.25	$(2.79 \pm 1.00)\text{E}-6$	G
1458	1B 920302B	$(8.17 \pm 0.34)\text{E}+1$	0.58 ± 0.11	$(1.26 \pm 0.08)\text{E}-6$	1.17 ± 0.13	$(2.05 \pm 0.39)\text{E}-6$	G
1459	1B 920302	—	0.52 ± 0.11	$(2.16 \pm 0.06)\text{E}-6$	1.32 ± 0.07	$(2.94 \pm 0.31)\text{E}-6$	
1461	1B 920303B	$(4.61 \pm 4.49)\text{E}-1$	0.63 ± 0.15	$(3.64 \pm 0.88)\text{E}-8$	—	$(3.78 \pm 1.03)\text{E}-7$	
1462	1B 920303	—	1.36 ± 0.14	$(7.68 \pm 0.39)\text{E}-7$	2.74 ± 0.24	$(3.58 \pm 0.25)\text{E}-6$	
1463	1B 920305B	$(1.92 \pm 0.91)\text{E}-1$	1.96 ± 0.14	$(8.65 \pm 0.49)\text{E}-8$	1.30 ± 0.14	$(< 1.3) \text{E}-7$	G
1465	1B 920305C	—	0.33 ± 0.11	$(3.85 \pm 0.38)\text{E}-7$	3.49 ± 0.65	$(1.03 \pm 0.27)\text{E}-6$	T(10),G
1466	1B 920305	—	1.32 ± 0.13	$(3.68 \pm 0.12)\text{E}-6$	4.69 ± 0.35	$(1.25 \pm 0.12)\text{E}-5$	T(120),G

NOTES.—Explanation of comments:

(A) Also detected by other instruments: U—*Ulysses*, P—*PVO*, G—*GRANAT*, C—*COMPTEL*, E—*EGRET*.(B) BATSE triggered on a precursor event; main event starts ~ 105 s after trigger.

(C) Event triggered BATSE twice: 1009 and 1010.

(F) Flare or particle event occurs during burst accumulation interval.

(G) Data gap occurs during burst accumulation interval.

(H) High voltage turned off during burst accumulation interval.

(T) Duration estimated visually; value (s) in parentheses.

(X) High time resolution (TTE) data not available.

TABLE 2
THE 20 HIGHEST PEAK FLUX BURSTS

Rank	Trigger Number	Peak Flux
1	143	47.6
2	249	34.6
3	1085	30.4
4	298	22.0
5	219	18.1
6	451	16.9
7	444	16.6
8	1025	16.3
9	105	11.9
10	1122	11.6
11	999	11.5
12	1140	11.5
13	1121	11.1
14	543	10.6
15	1157	10.0
16	1425	9.23
17	1141	9.01
18	142	8.60
19	467	7.73
20	1453	7.31

NOTES.—Flux is measured in photons $\text{cm}^{-2} \text{s}^{-1}$ in 256 ms time bins in the 50 to 300 keV energy band.

(Schmidt et al. 1988). For the BATSE bursts, the average value $\langle V/V_{\text{max}} \rangle$ is 0.34 ± 0.02 , versus $\frac{1}{2}$ for a homogeneous distribution. This evidence for inhomogeneity has also been seen in several other experiments with sufficient sensitivity: *Ginga* (Ogasaka et al. 1991), *Signe/Lilas/Apex* (Atteia et al. 1991), and *SMM* (Higdon et al. 1992).

TABLE 3
THE 20 LOWEST PEAK FLUX BURSTS

Rank	Trigger Number	Peak Rate
1	1152	0.285
2	942	0.288
3	465	0.291
4	1120	0.297
5	676	0.299
6	107	0.299
7	1298	0.322
8	1086	0.323
9	741	0.326
10	816	0.329
11	401	0.333
12	549	0.334
13	1465	0.334
14	974	0.337
15	1153	0.339
16	1390	0.344
17	1128	0.344
18	834	0.359
19	1301	0.360
20	1435	0.364

NOTES.—Flux is measured in photons $\text{cm}^{-2} \text{s}^{-1}$ in 256 ms time bins in the 50 to 300 keV energy band. Errors on fluxes are typically $0.1 \text{ photons cm}^{-2} \text{s}^{-1}$.

TABLE 4
THE 20 HIGHEST FLUENCE BURSTS

Rank	Trigger Number	Fluence
1	249	5.42E-05
2	143	5.32E-05
3	1085	4.05E-05
4	394	3.12E-05
5	1288	2.88E-05
6	109	2.50E-05
7	1385	2.32E-05
8	1121	2.27E-05
9	678	2.07E-05
10	130	1.84E-05
11	973	1.66E-05
12	761	1.58E-05
13	676	1.51E-05
14	647	1.51E-05
15	1141	1.48E-05
16	219	1.48E-05
17	1122	1.43E-05
18	351	1.29E-05
19	1419	1.28E-05
20	226	1.26E-05

NOTE.—Fluence is measured in ergs cm^{-2} from 50 to 300 keV.

The V/V_{max} distribution is not appropriate for fitting models of spatial distributions of burst sources, since V/V_{max} is affected throughout its range by the varying trigger threshold (Band 1993; Petrosian 1993; Hartmann & The 1993). Model-fitting requires a measure of intensity that uses physical units for which threshold effects can be corrected. The peak flux P ,

TABLE 5
THE 20 LOWEST FLUENCE BURSTS

Rank	Trigger Number	Fluence
1	640	2.15E-08
2	1128	2.47E-08
3	491	3.02E-08
4	1051	3.15E-08
5	289	3.35E-08
6	1461	3.64E-08
7	856	3.68E-08
8	836	3.76E-08
9	1142	4.18E-08
10	185	4.24E-08
11	253	4.64E-08
12	108	4.69E-08
13	1096	4.74E-08
14	729	4.74E-08
15	353	4.89E-08
16	799	5.22E-08
17	834	5.60E-08
18	1223	5.93E-08
19	1097	6.29E-08
20	229	6.54E-08

NOTE.—Fluence is measured in ergs cm^{-2} from 50 to 300 keV.

TABLE 6
THE 20 LONGEST DURATION BURSTS

Rank	Trigger Number	T_{90} (s)
1	110	430.0
2	1009	356.7
3	1288	318.6
4	1152	274.9
5	226	221.2
6	1235	190.0
7	1156	189.1
8	1318	185.9
9	133	182.0
10	577	179.8
11	1157	170.6
12	1196	162.9
13	907	158.1
14	351	146.9
15	404	123.4
16	1419	122.5
17	1046	114.4
18	869	110.5
19	394	106.1
20	659	102.1

TABLE 7
THE 20 SHORTEST DURATION BURSTS

Rank	Trigger Number	T_{90} (s)
1	432	0.034
2	677	0.055
3	289	0.067
4	207	0.085
5	491	0.100
6	480	0.128
7	568	0.128
8	1088	0.128
9	830	0.131
10	474	0.152
11	1076	0.161
12	799	0.173
13	512	0.183
14	729	0.183
15	1102	0.192
16	1051	0.192
17	185	0.192
18	1463	0.192
19	1453	0.192
20	1154	0.193

NOTE.—For most of these bursts, the duration is quantized to 64 ms steps.

measured on a single trigger timescale, is the preferred measure, since threshold effects can be confined to a relatively narrow range of values, and correction factors can be determined over most of this range. Figures 8, 9, and 10 show the integral $\log N$ - $\log P$ distributions for peak fluxes P as measured on each of the three trigger timescales. The dashed line represents the $-3/2$ power law expected for a homogeneous distribution. The deviation from the $-3/2$ line is evident in each of the plots. The effects of trigger inefficiency appear as an uncertainty at fluxes very close to the threshold.

The differential $\log N$ - $\log P$ distributions are shown in Figures 11, 12, and 13. The crosses represent the number of bursts in each flux bin, which are equally spaced logarithmically. The diamonds represent the number of bursts corrected for trigger efficiency. In each case, the lowest flux point is seen to be overcorrected, due to the effects of atmospheric scattering, and must be considered only as an upper limit. Since N is expressed as the number per logarithmic bin, the differential distribution

is also a $-3/2$ power law (shown as the dashed line) if the sources are homogeneous. Again, the deviation from homogeneity is evident. Note that the deviation from the $-3/2$ line occurs at fluxes far enough above threshold that efficiency corrections are negligible.

8. DURATION DISTRIBUTION

The distributions of duration as measured by T_{50} and T_{90} are shown in Figure 14. The plots show evidence for two components, with a division at around 2 seconds, consistent with the hints of bimodality that were present in data drawn from a large variety of experiments (Hurley 1992). The shorter bursts are also found to have harder spectra (Kouveliotou et al. 1994). Similar results were seen on the PHEBUS experiment (Dezalay et al. 1992).

TABLE 8
DIPOLE AND QUADRUPOLE STATISTICS FOR 260 BATSE GAMMA-RAY BURSTS

Statistic	Moment Tested	Coordinate System	Value Expected for Isotropy with Uniform Sky Exposure	Value Expected for Isotropy with BATSE's Sky Exposure	Observed Value, with Propagation of Location Errors
$\langle \cos \theta \rangle$	dipole	Galactic	0 ± 0.036	-0.013 ± 0.035	0.019 ± 0.005
$\langle \sin^2 \theta - \frac{1}{3} \rangle$	quadrupole	Galactic	0 ± 0.018	-0.005 ± 0.018	-0.028 ± 0.004
$\mathcal{W}$	dipole	independent	3 ± 2.4	3.5 ± 2.9	1.1 ± 0.3
$\mathcal{B}$	quadrupole	independent	5 ± 3.2	7.0 ± 4.3	6.6 ± 1.2
$\langle \sin \delta \rangle$	dipole	equatorial	0 ± 0.036	0.026 ± 0.037	0.014 ± 0.005
$\langle \sin^2 \delta - \frac{1}{3} \rangle$	quadrupole	equatorial	0 ± 0.018	0.026 ± 0.019	0.003 ± 0.005

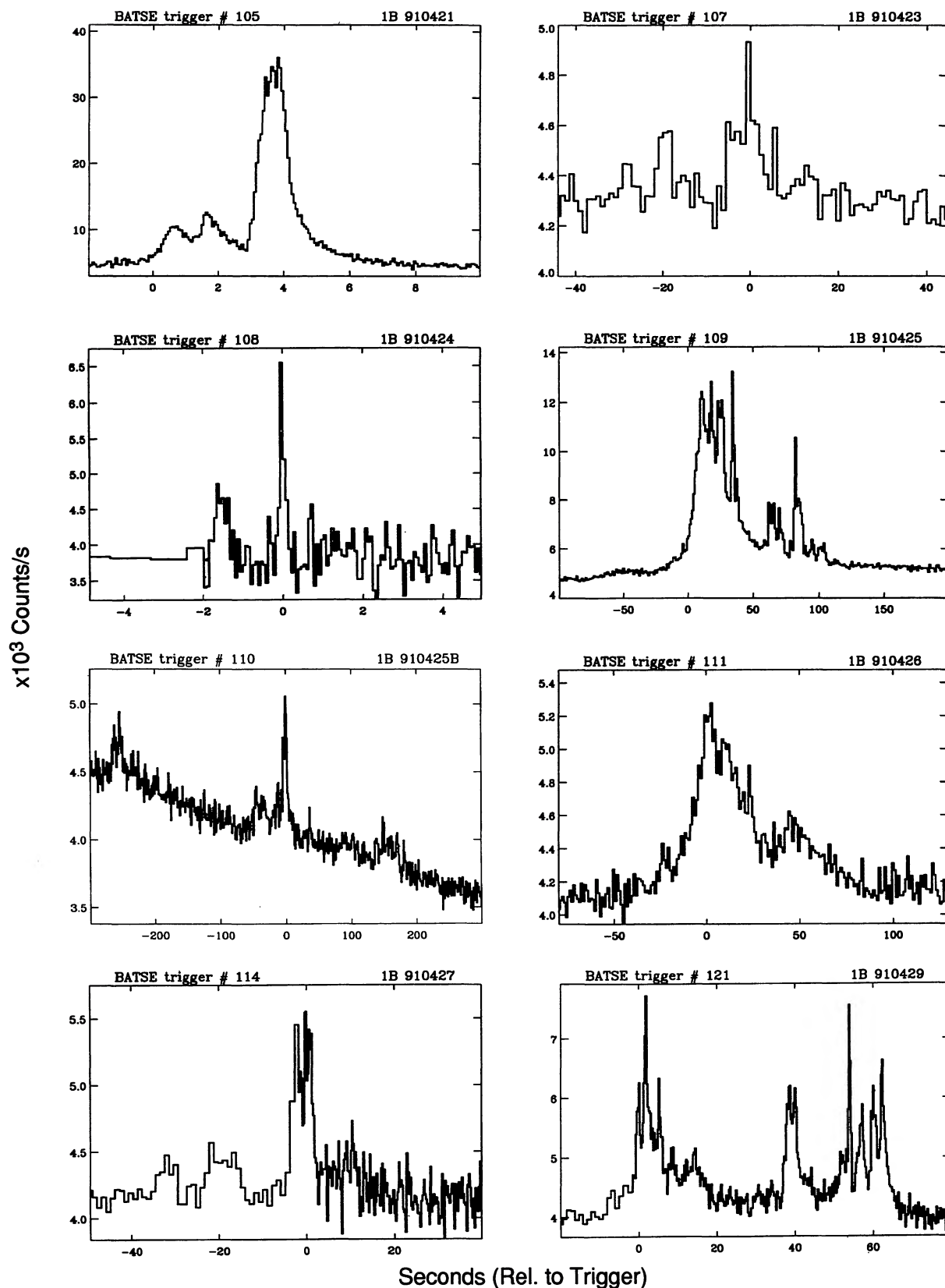


FIG. 6.—Time histories for each of the 260 bursts in the catalog. Shown are the summed rates of the triggered large-area detectors (2 to 4) in the approximate energy range 50–300 keV. The time resolution and duration of each plot were selected as appropriate for display purposes. Additional data exist for these bursts.

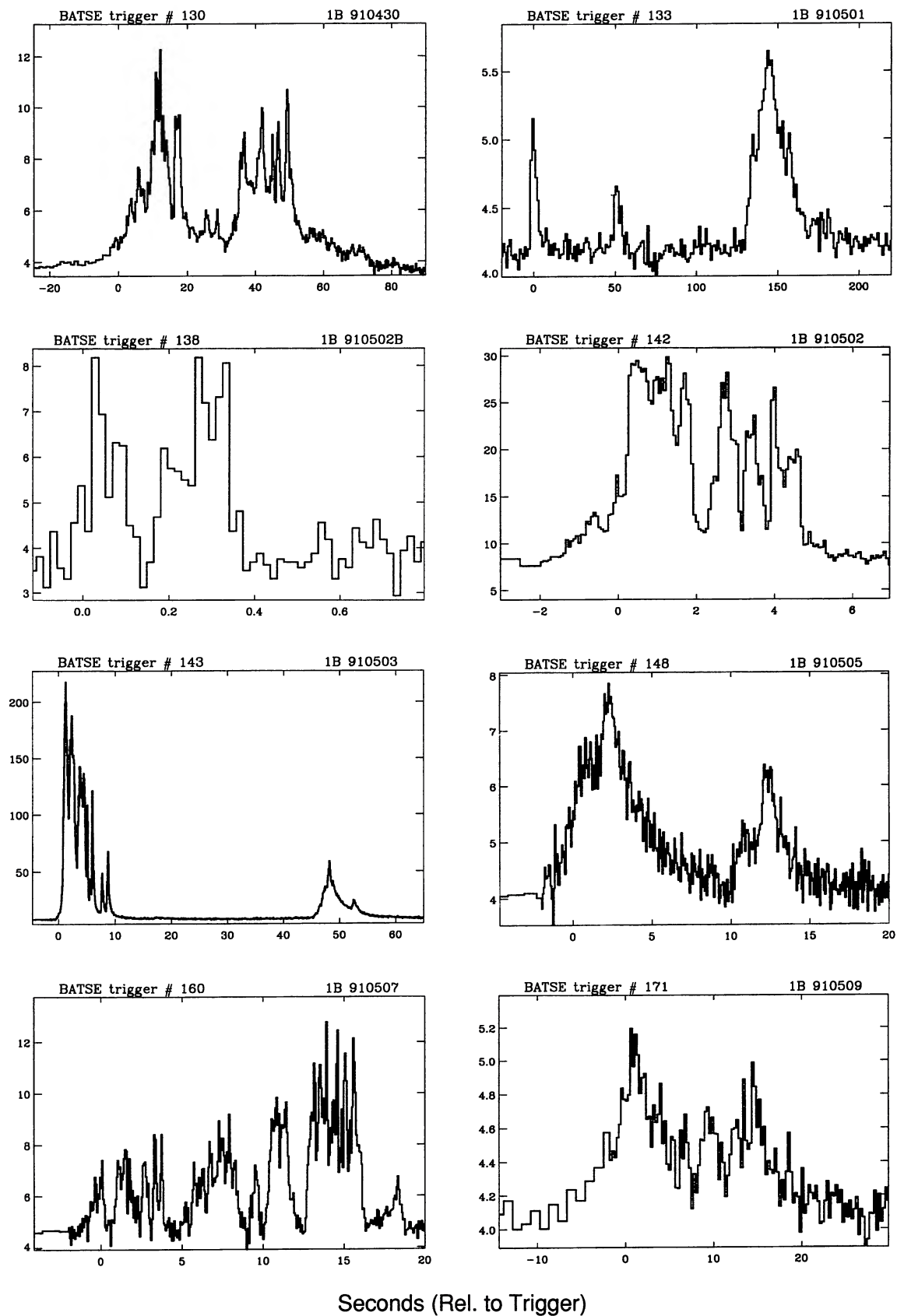
x10³ Counts/s

FIG. 6—Continued

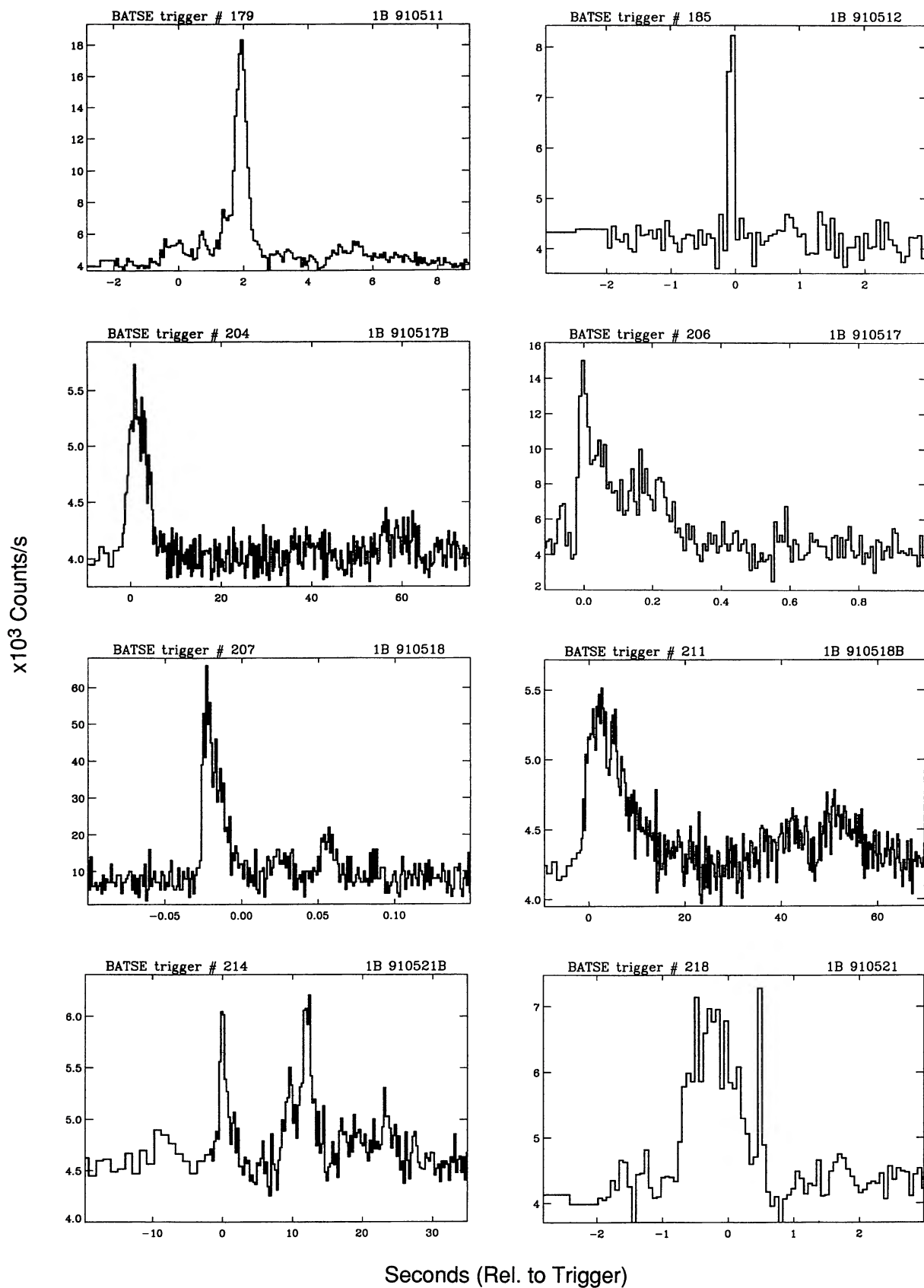


FIG. 6—Continued

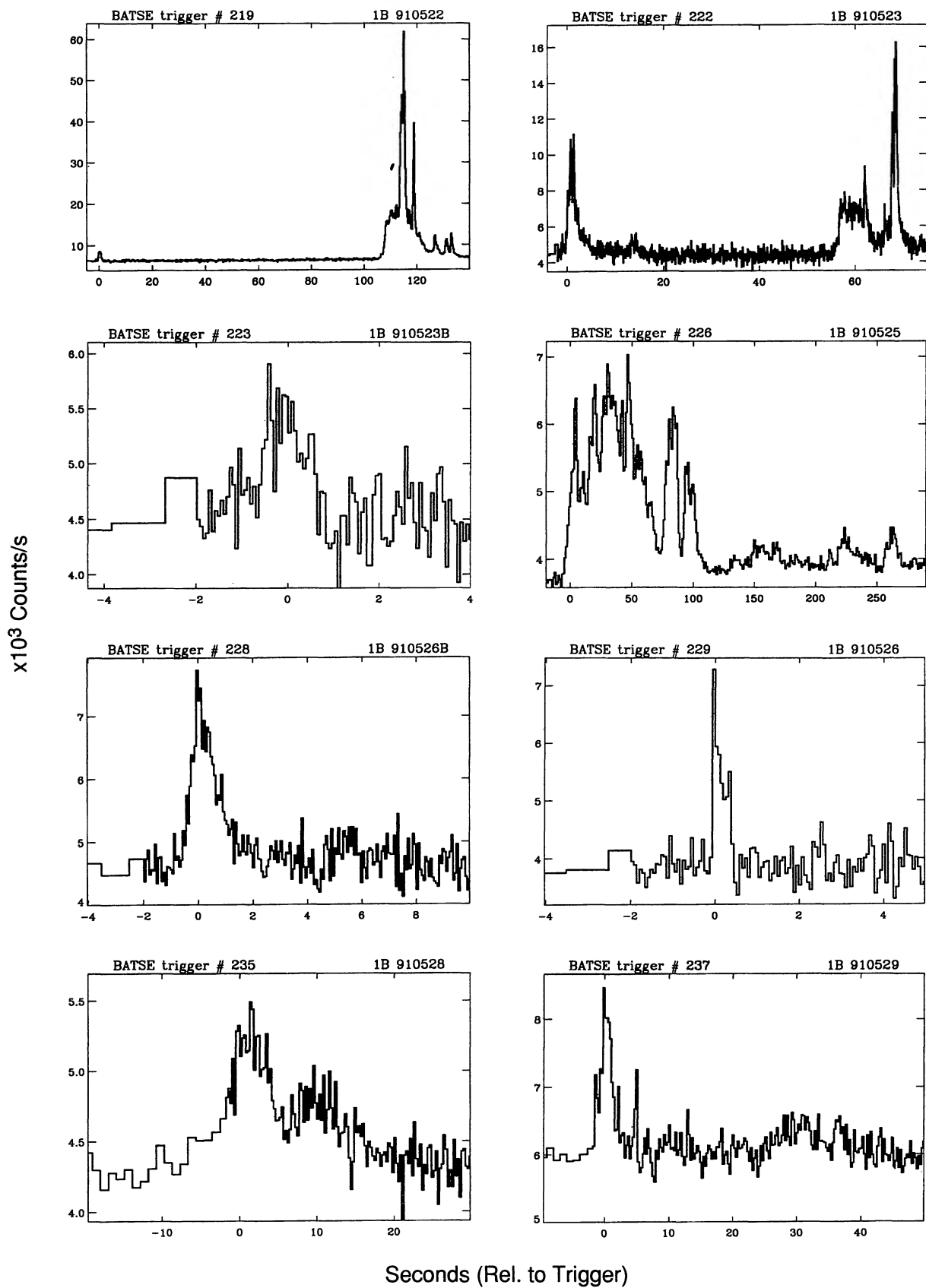


FIG. 6—Continued

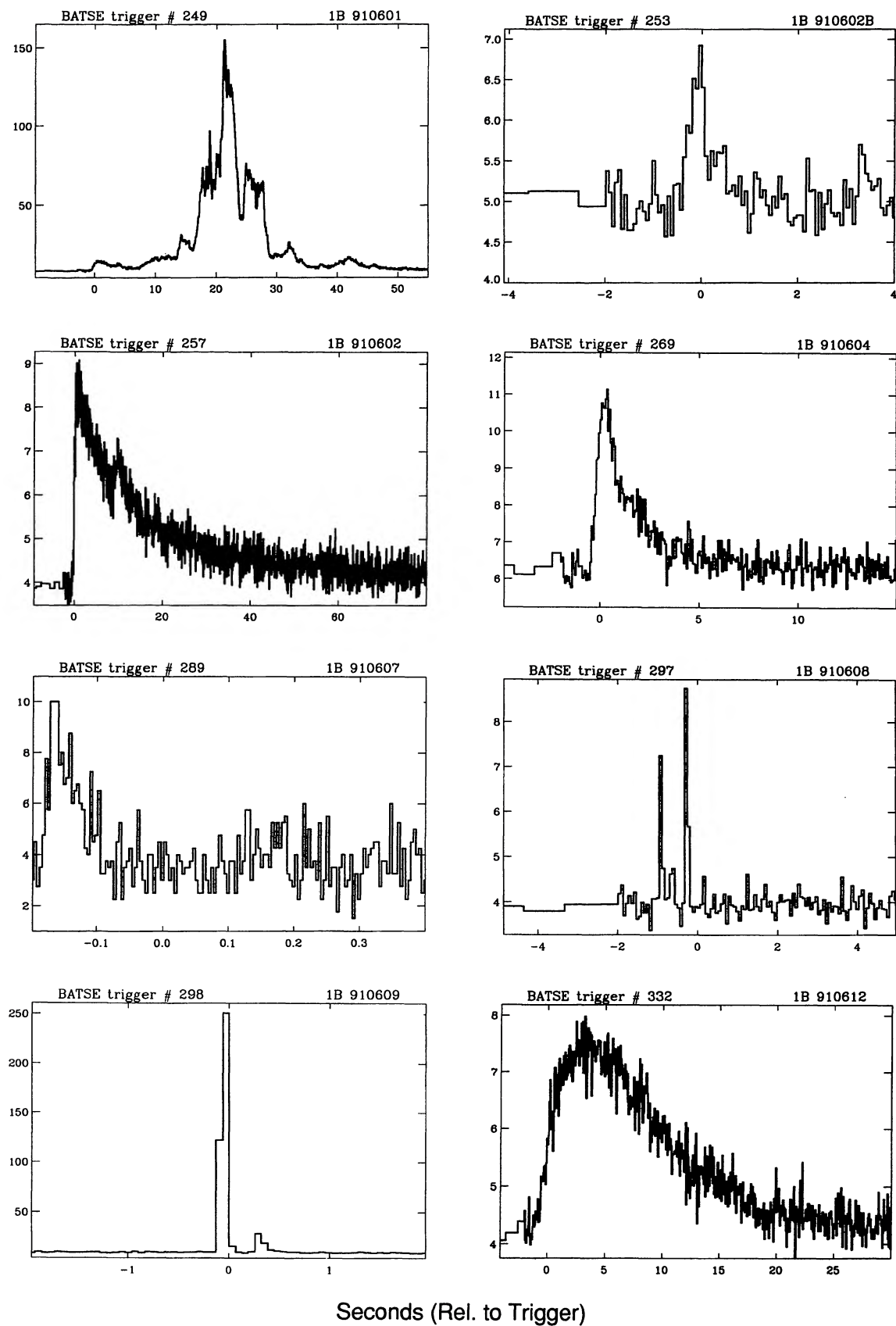
x10³ Counts/s

FIG. 6—Continued

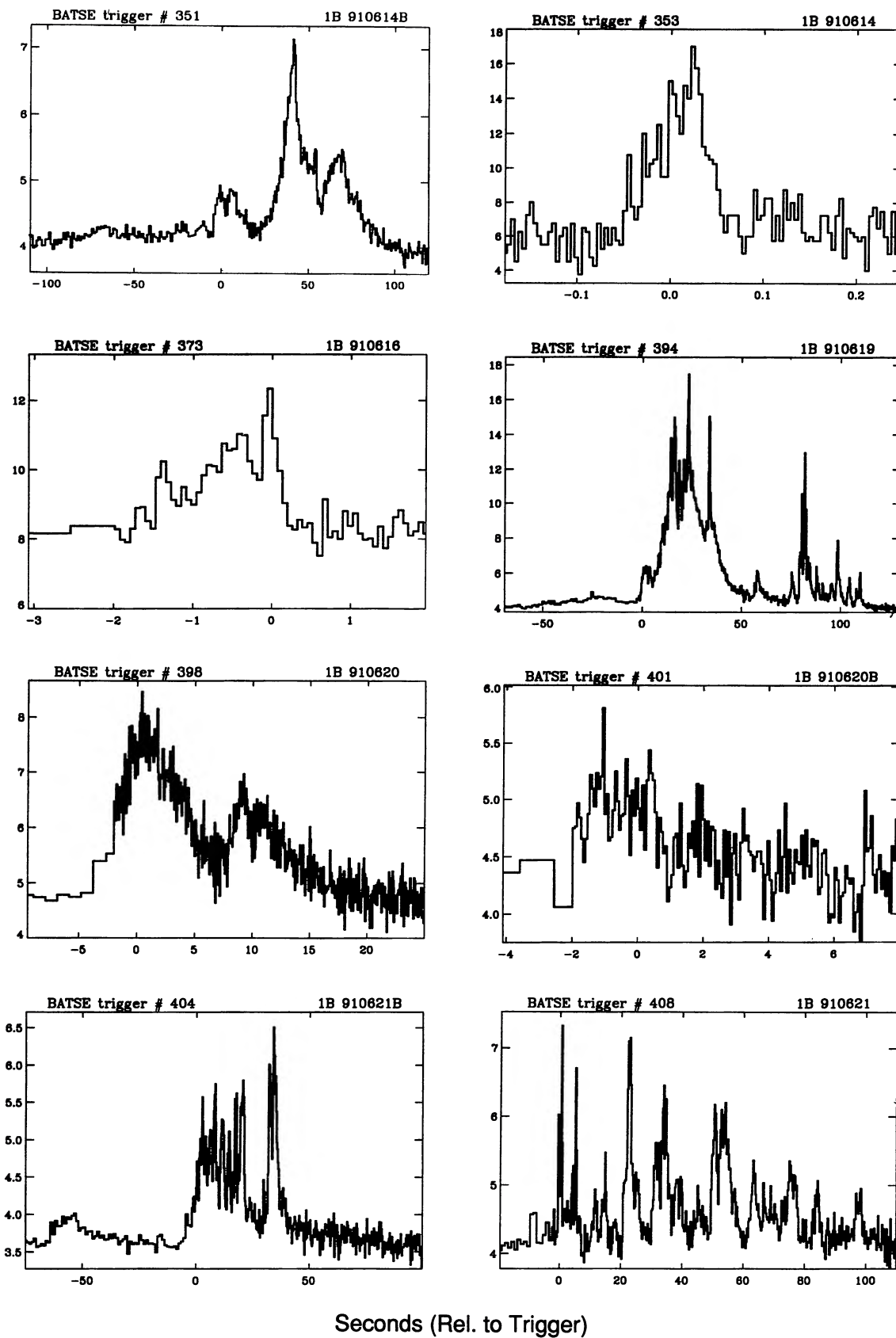
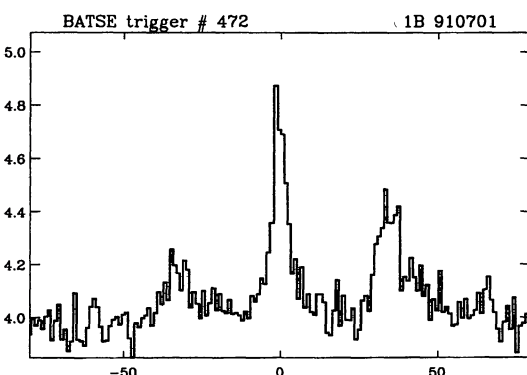
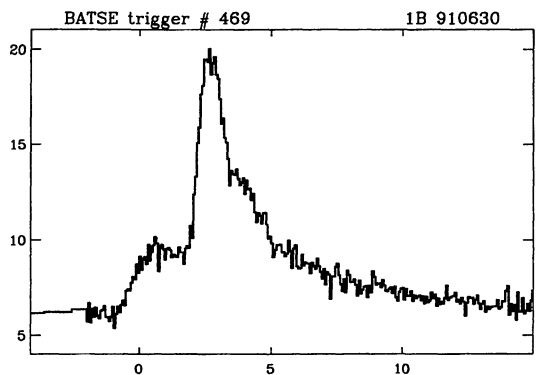
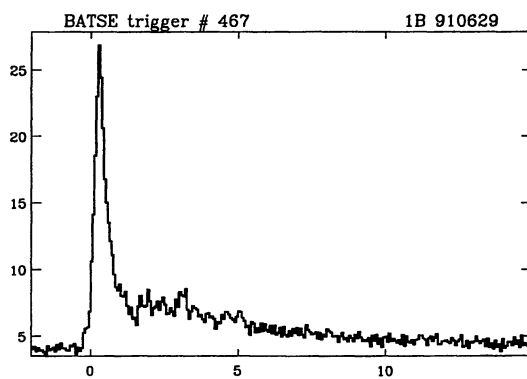
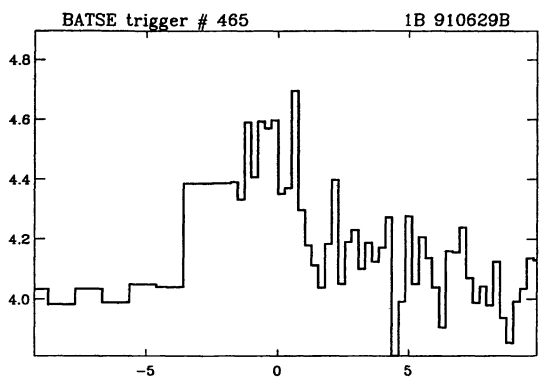
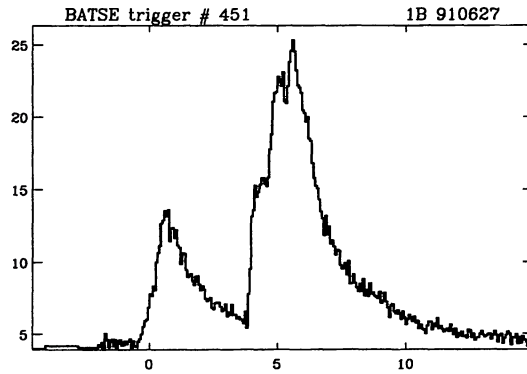
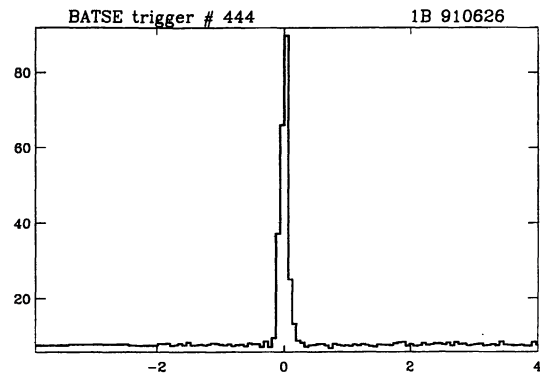
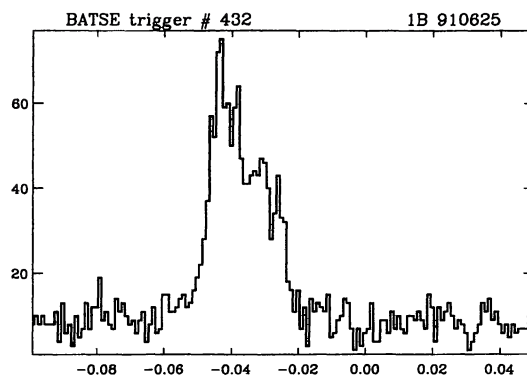
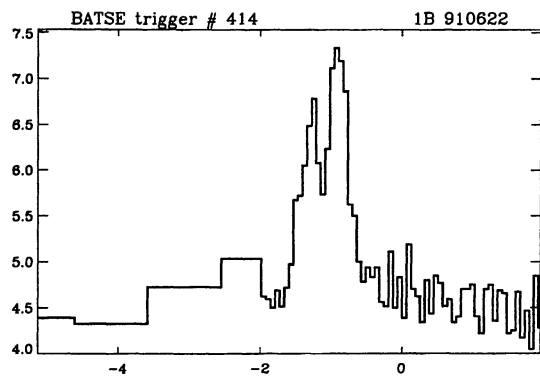
x10³ Counts/s

FIG. 6—Continued

x10³ Counts/s

Seconds (Rel. to Trigger)

FIG. 6—Continued

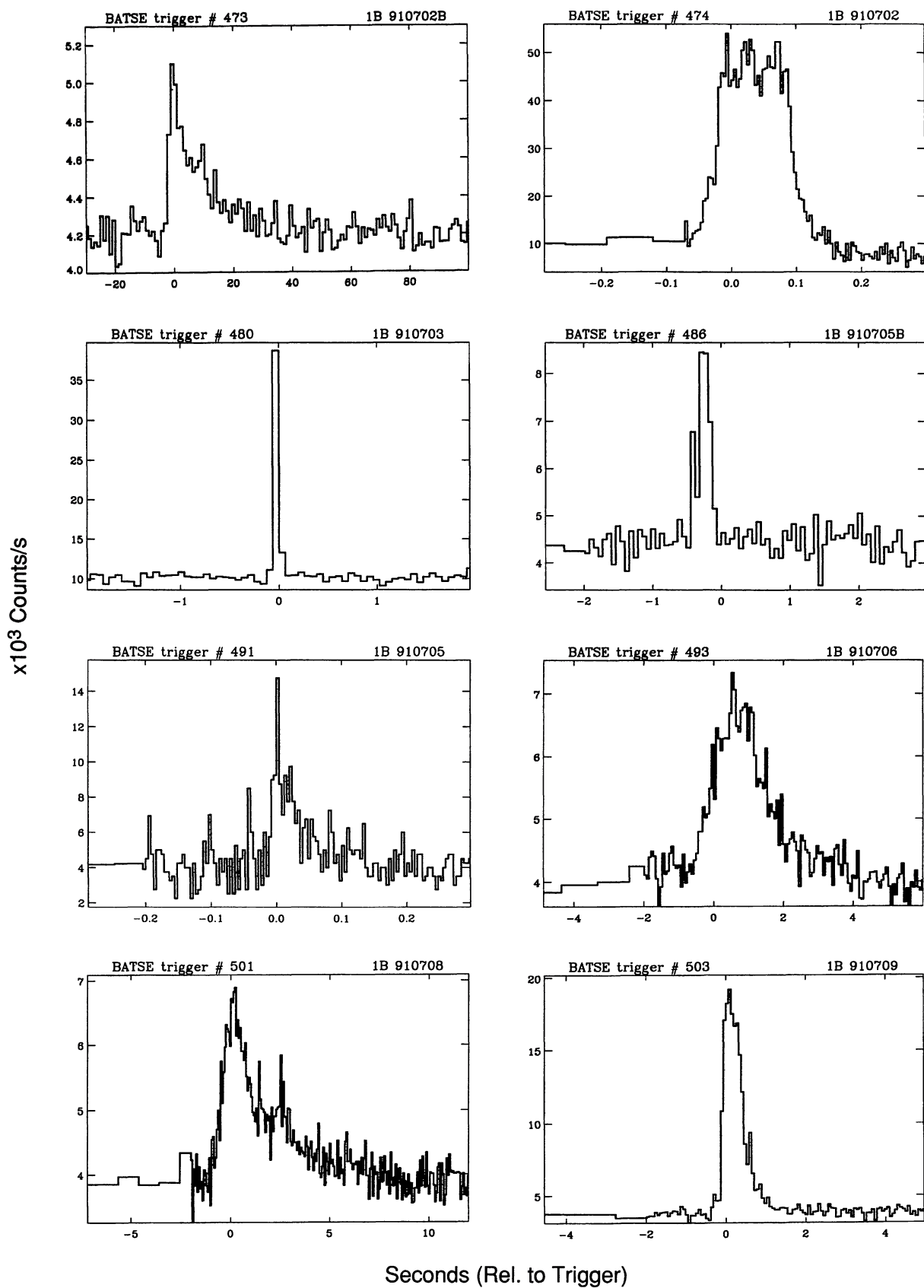


FIG. 6—Continued

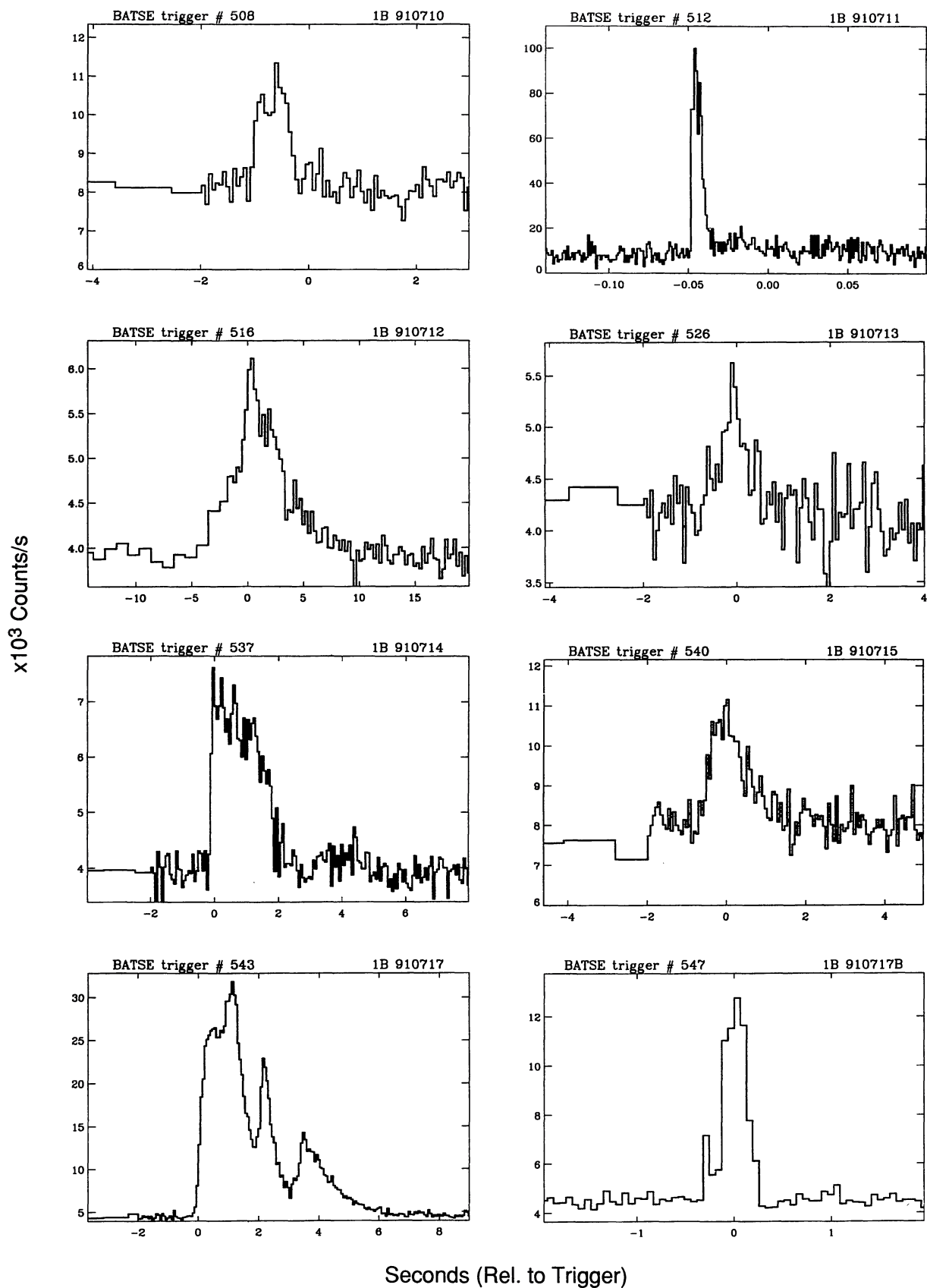


FIG. 6—Continued

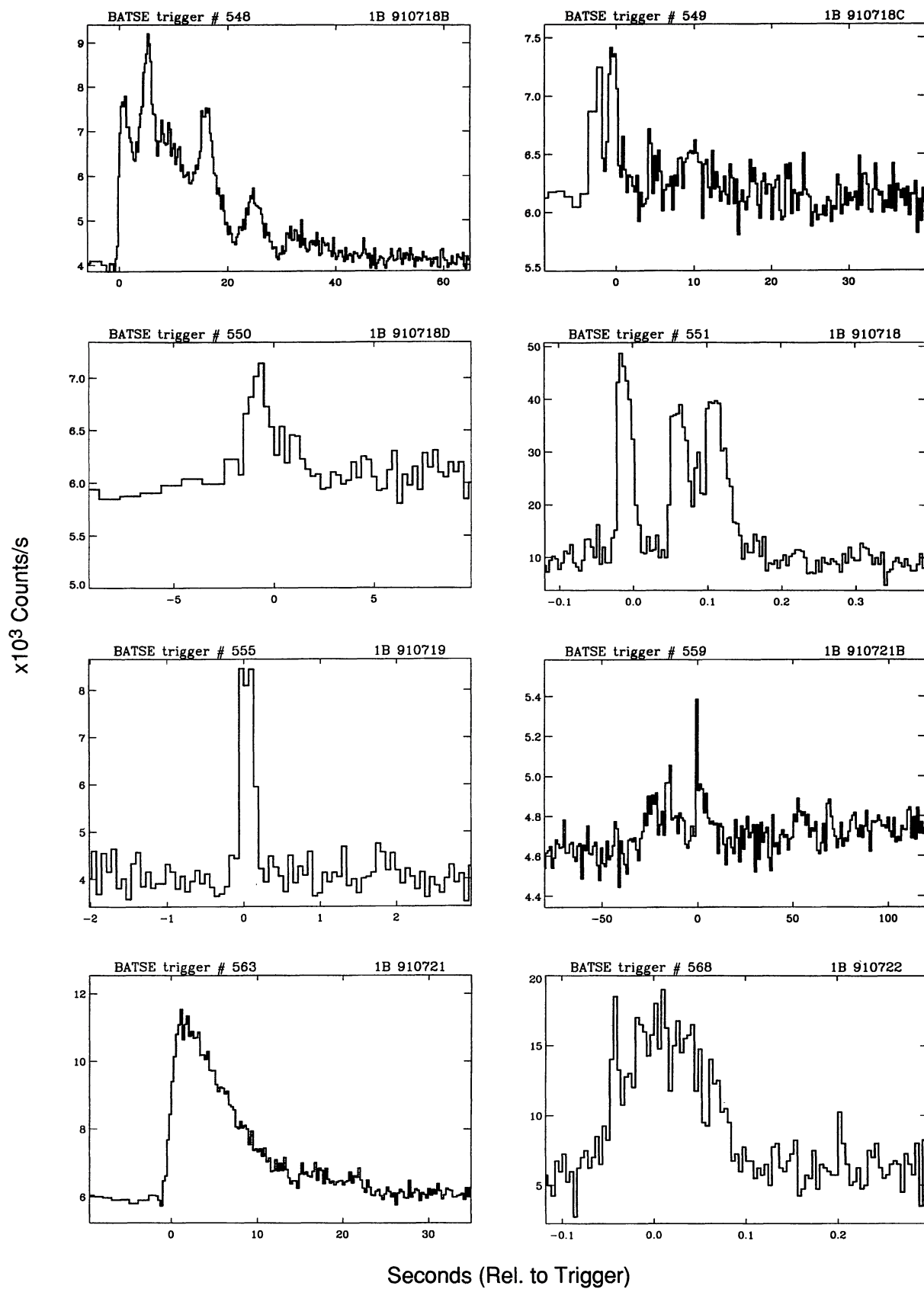
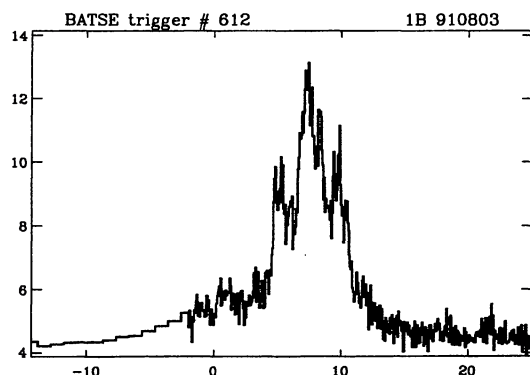
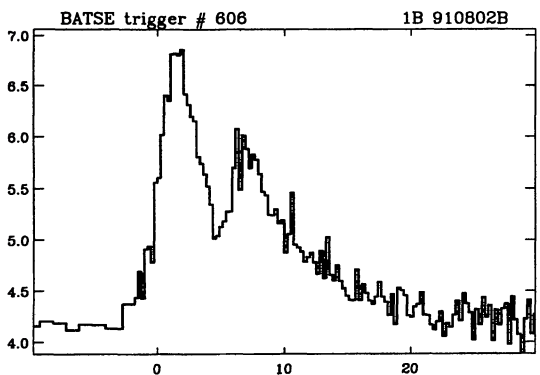
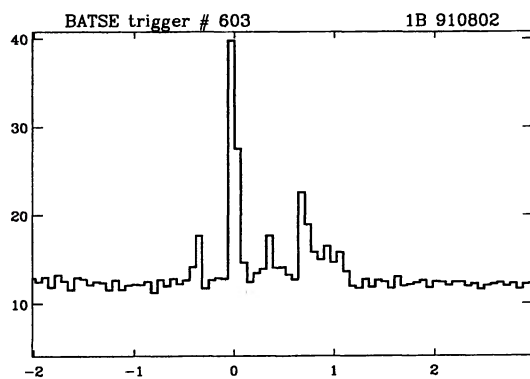
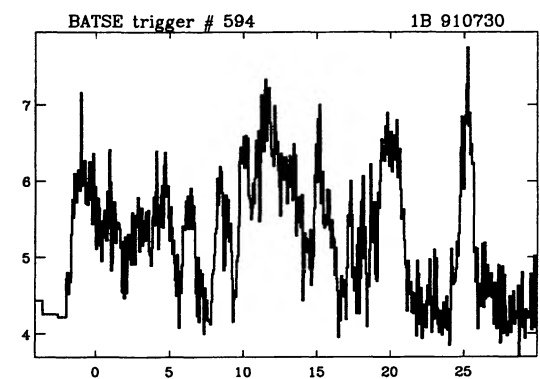
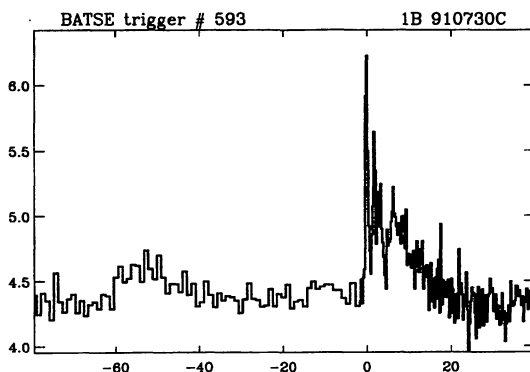
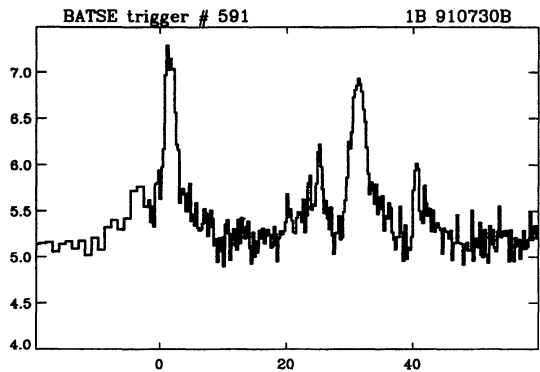
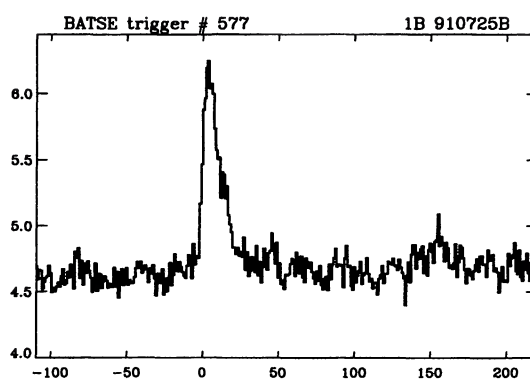
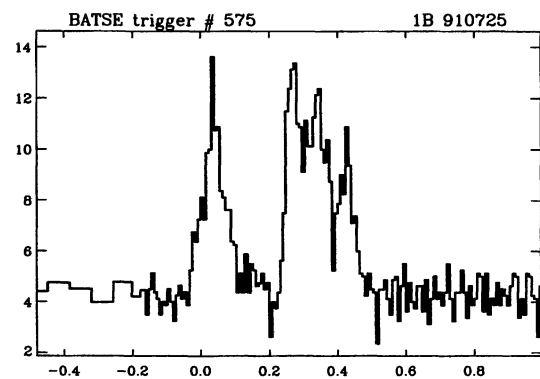


FIG. 6—Continued

x10³ Counts/s

Seconds (Rel. to Trigger)

FIG. 6—Continued

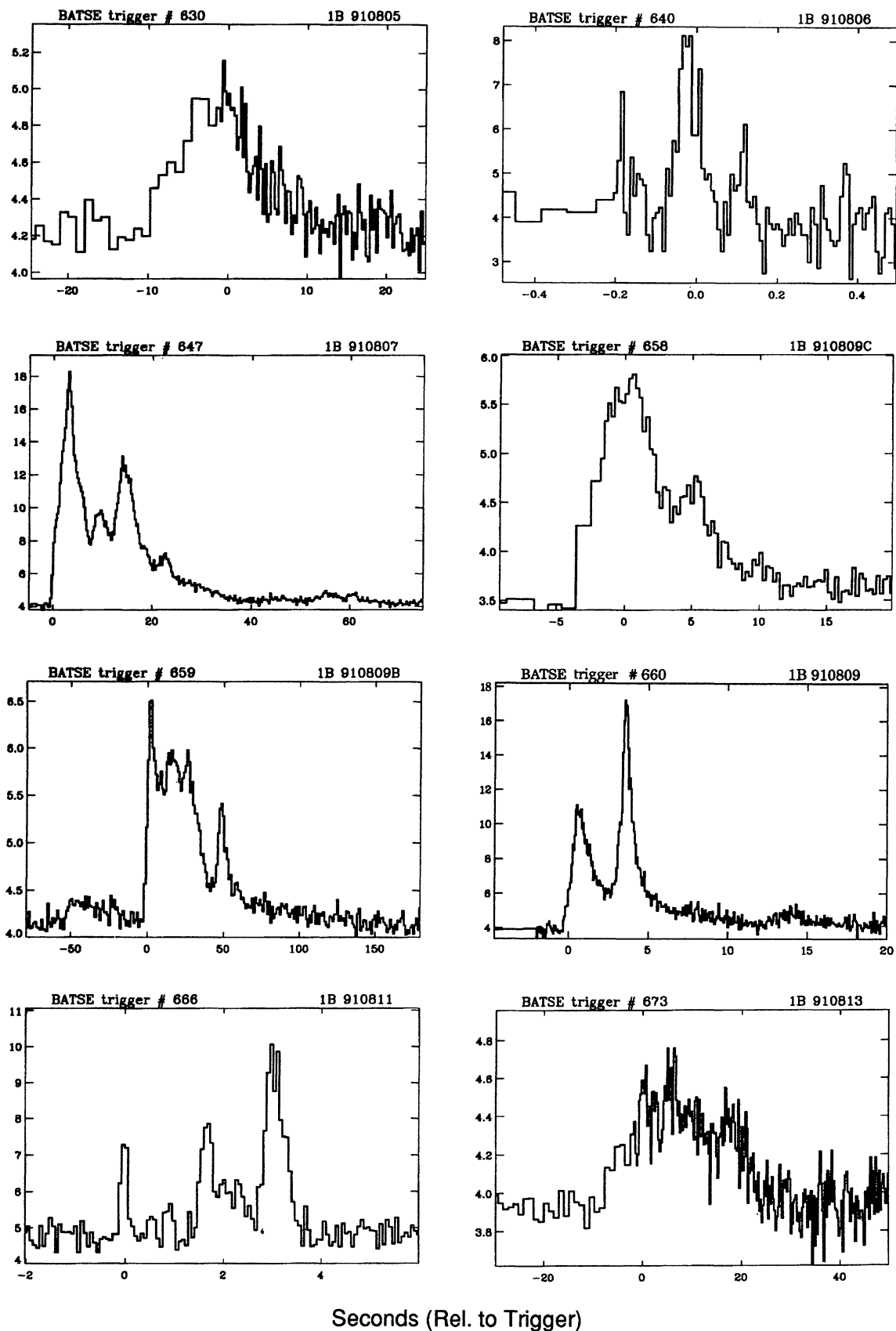
x10³ Counts/s

FIG. 6—Continued

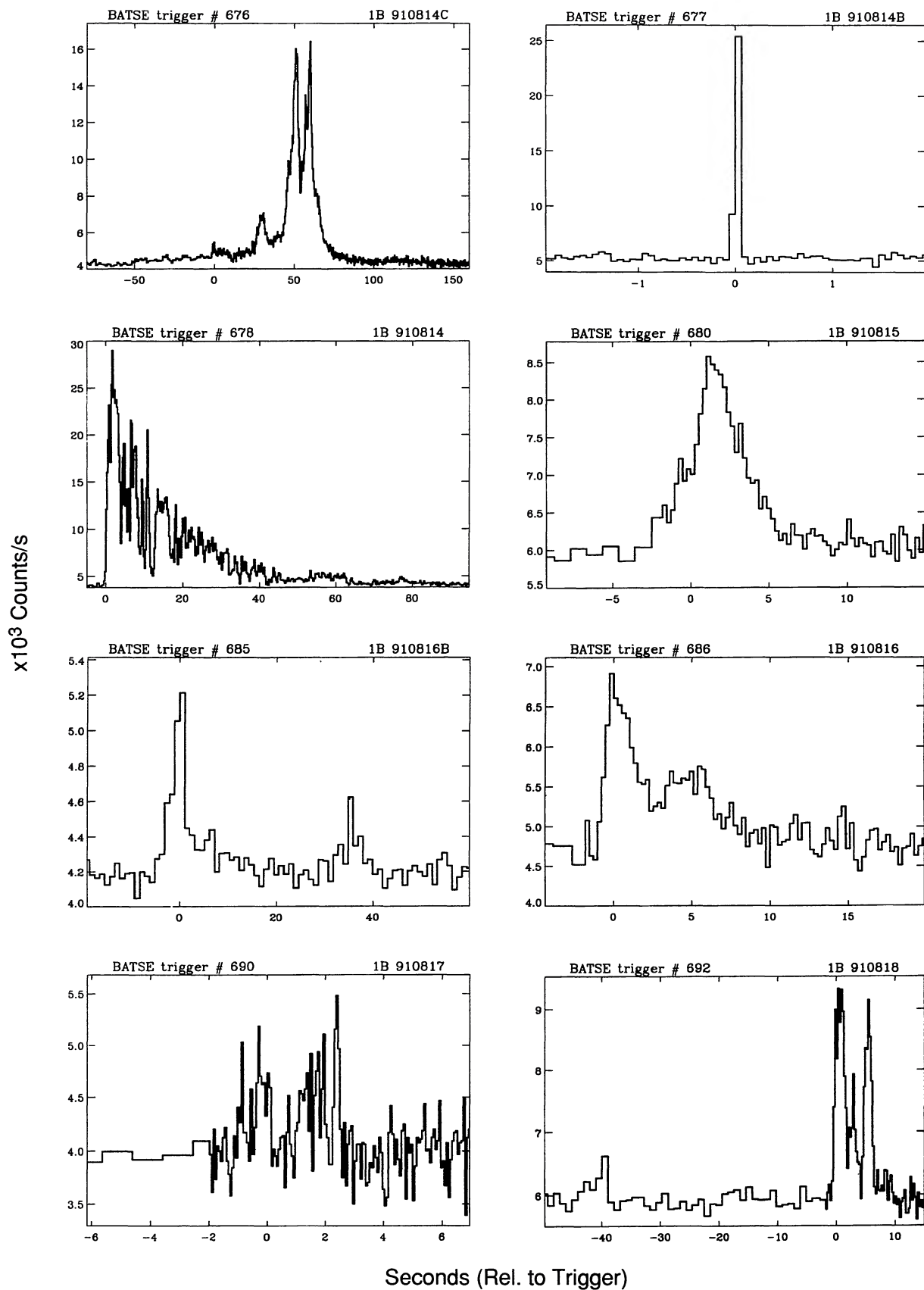
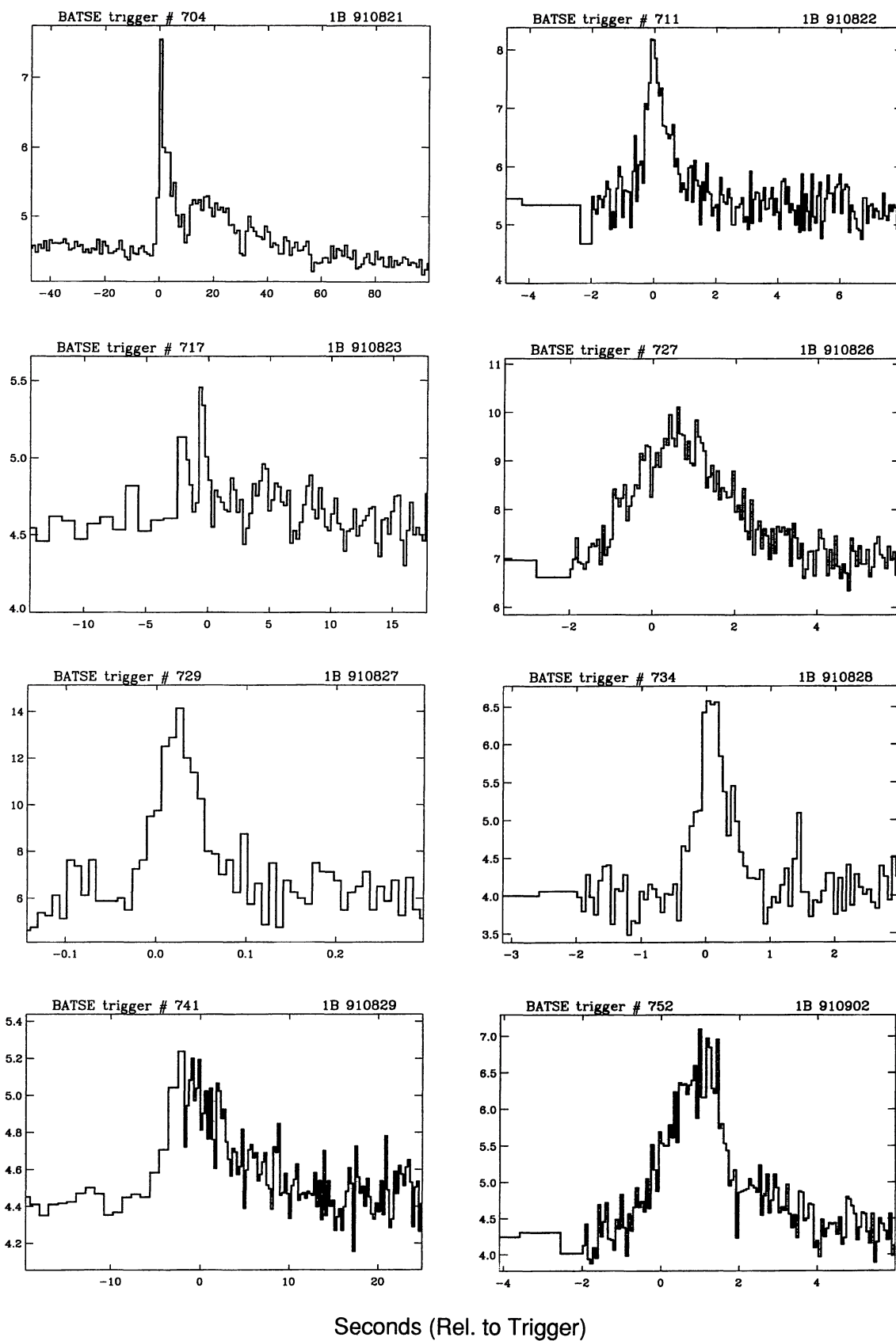
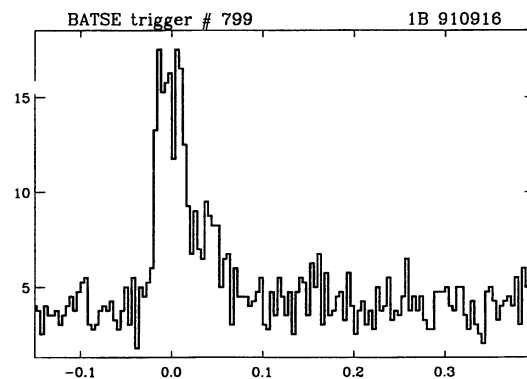
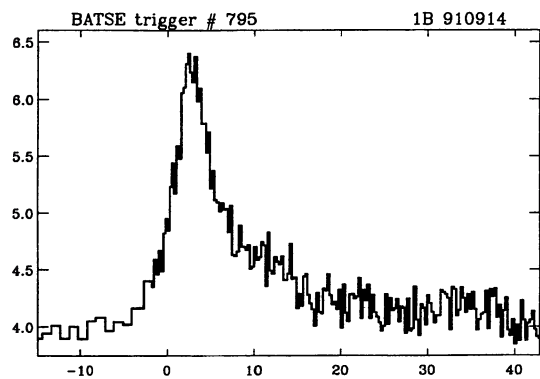
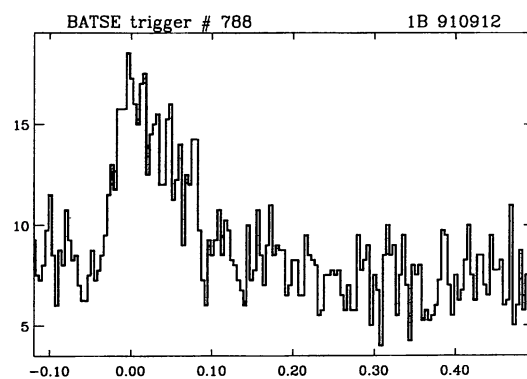
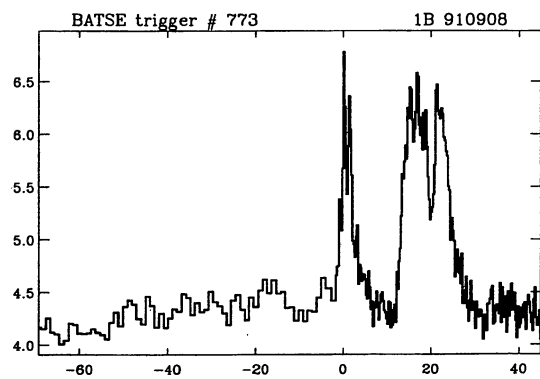
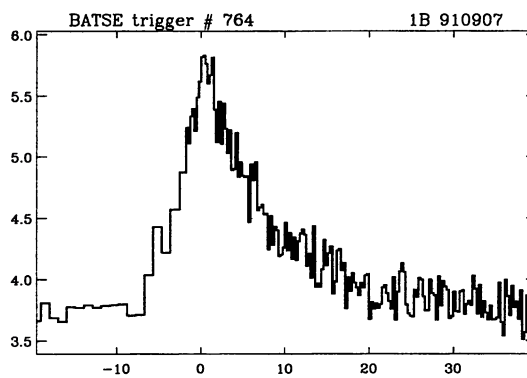
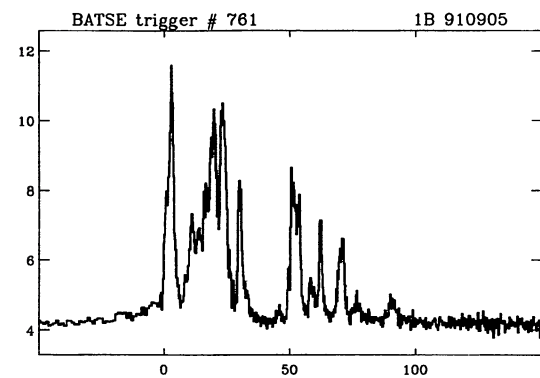
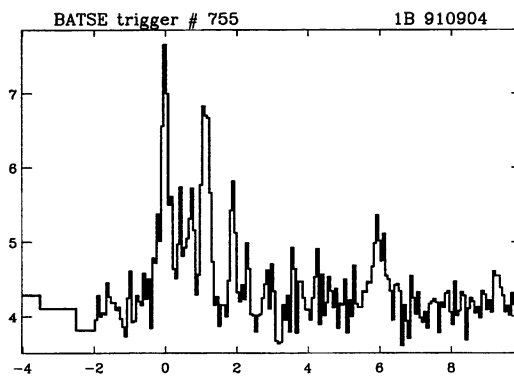
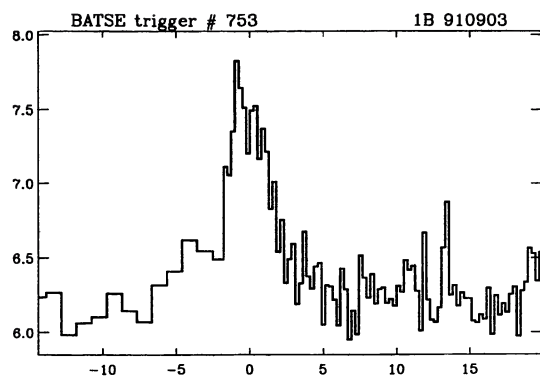


FIG. 6—Continued

x10³ Counts/s

Seconds (Rel. to Trigger)

FIG. 6—Continued

x10³ Counts/s

Seconds (Rel. to Trigger)

FIG. 6—Continued

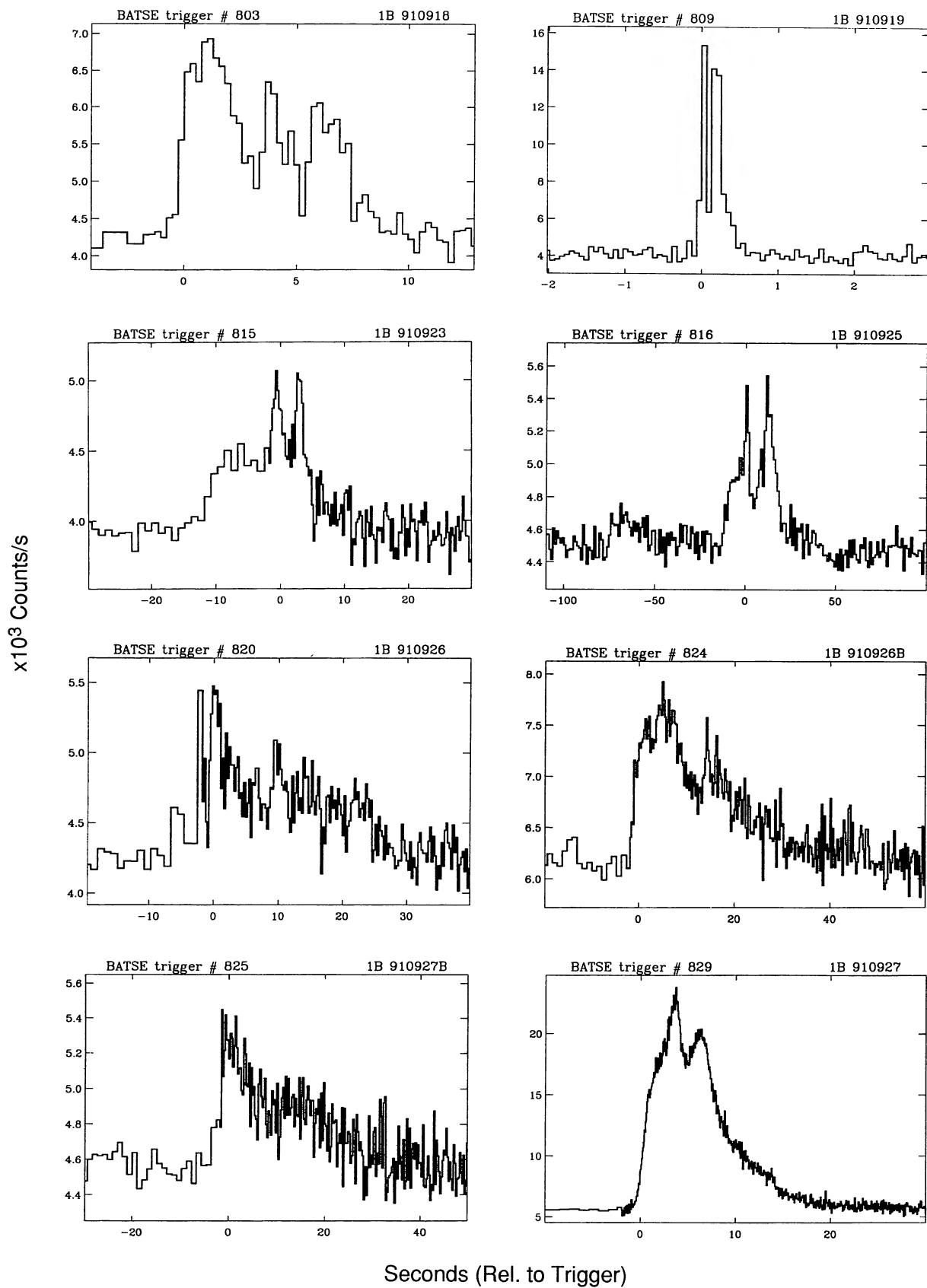


FIG. 6—Continued

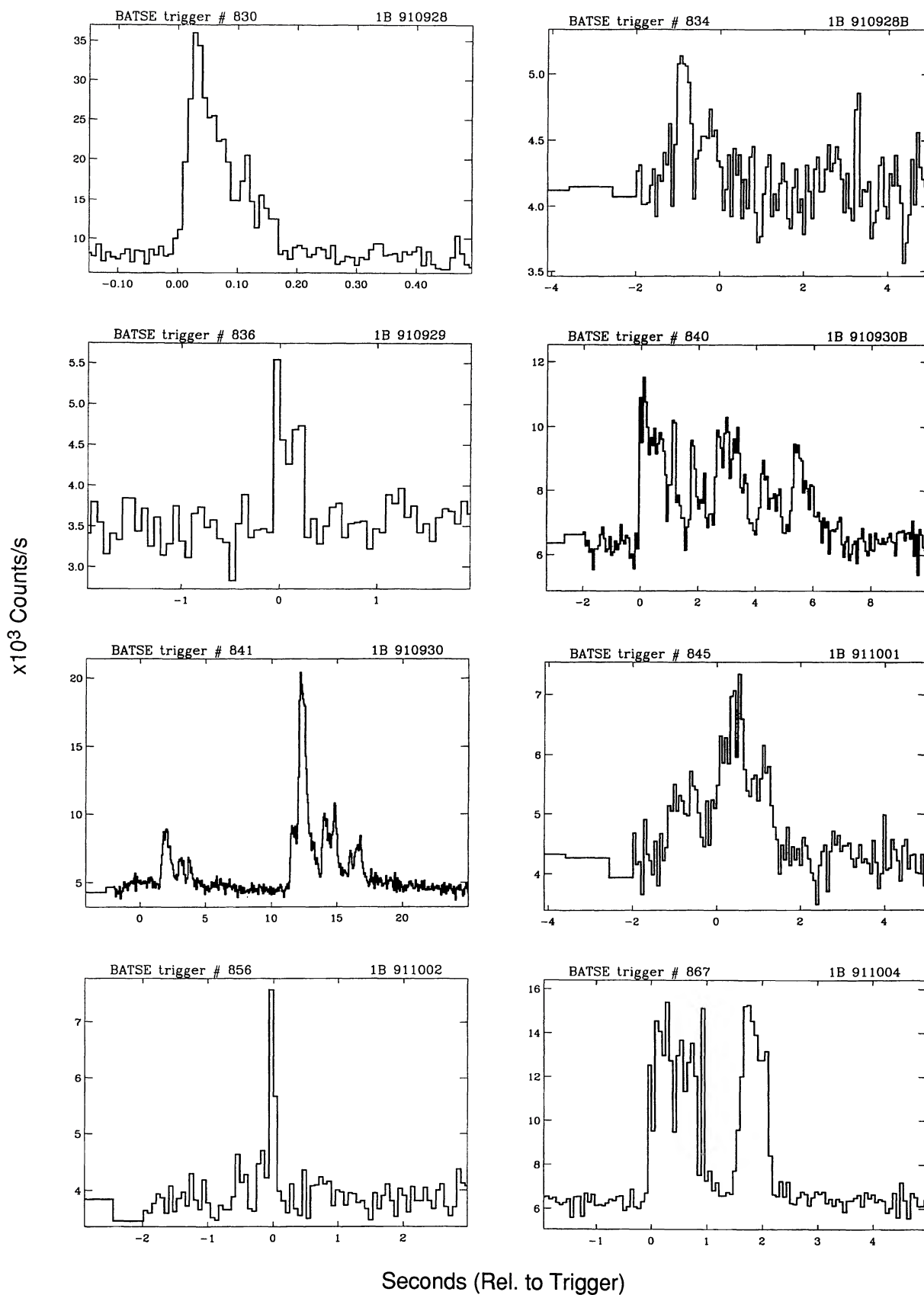


FIG. 6—Continued

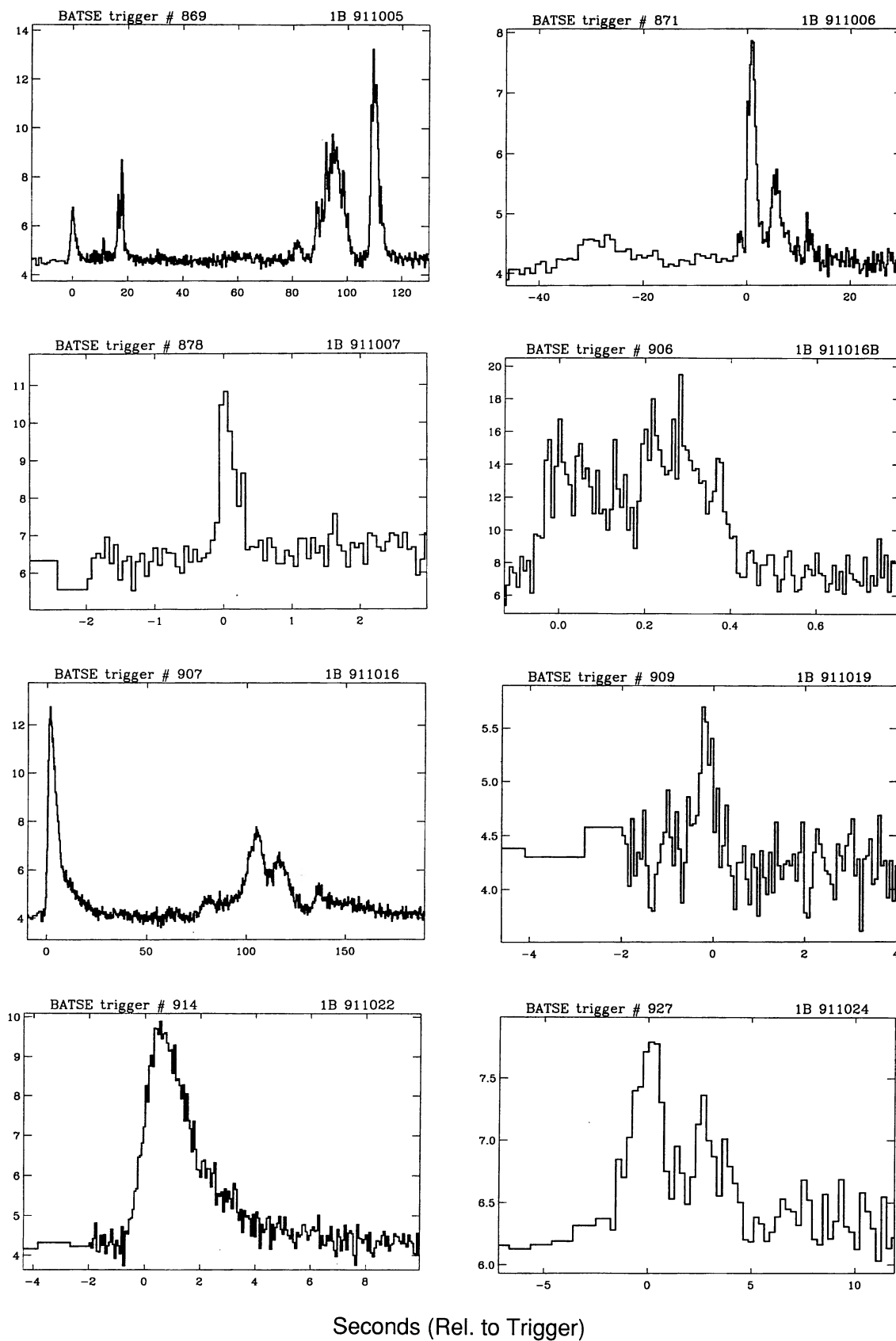
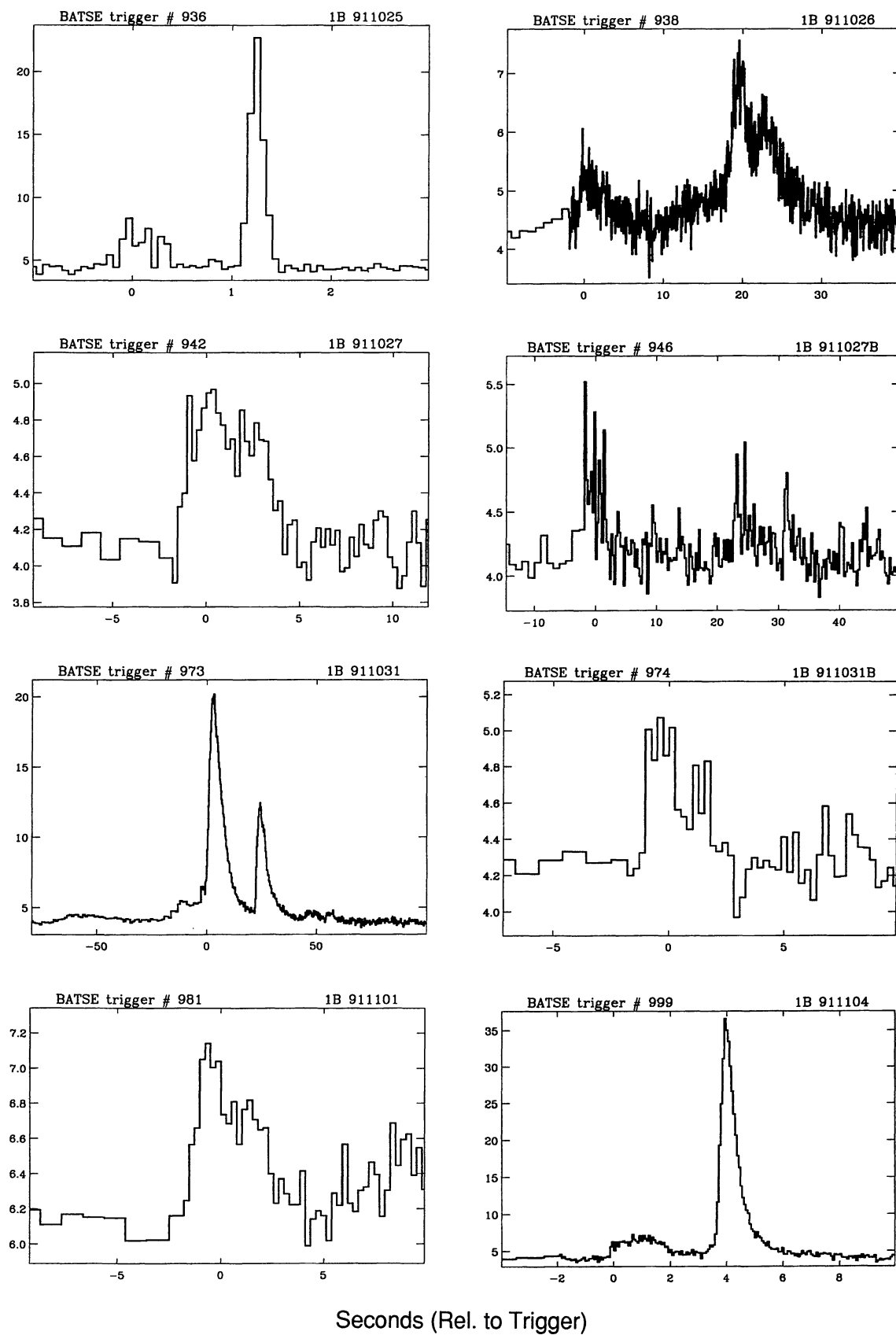
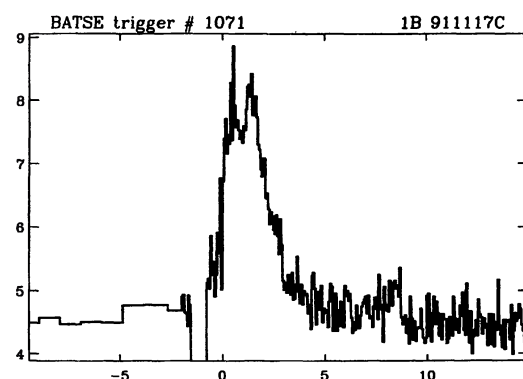
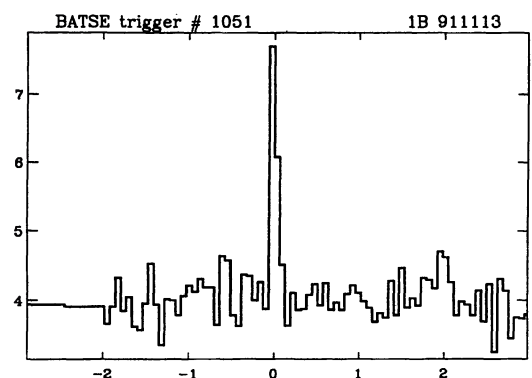
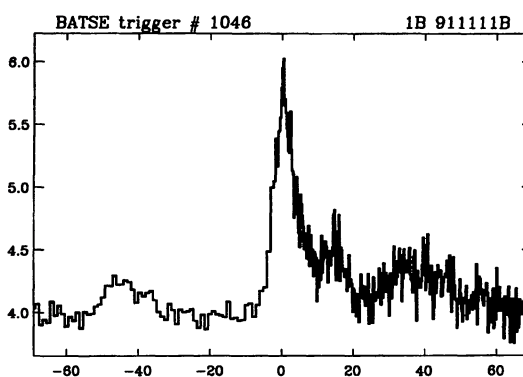
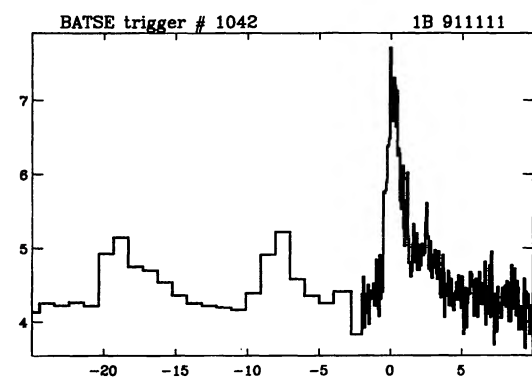
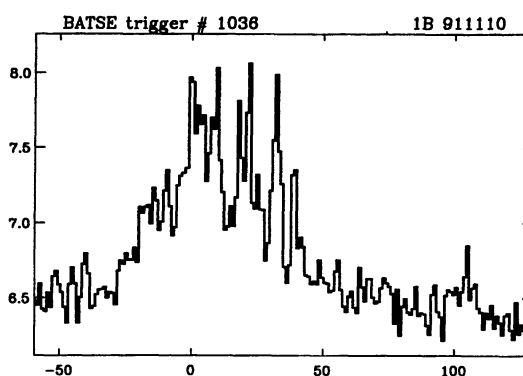
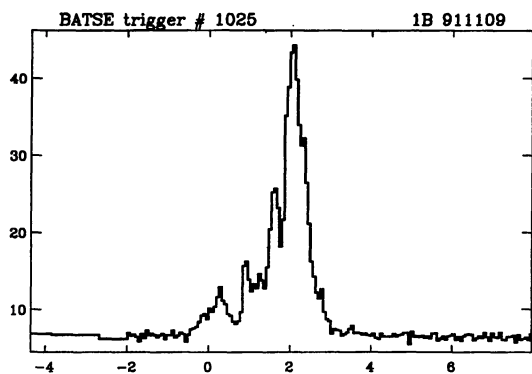
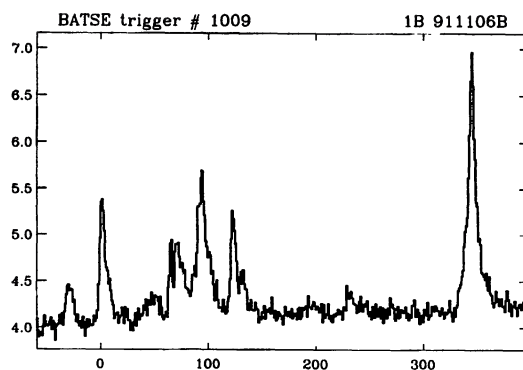
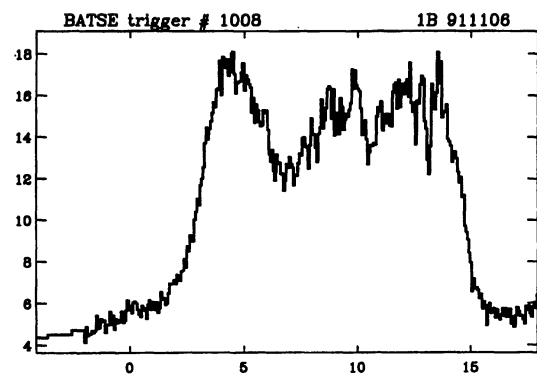
x10³ Counts/s

FIG. 6—Continued

x10³ Counts/s

Seconds (Rel. to Trigger)

FIG. 6—Continued

x10³ Counts/s

Seconds (Rel. to Trigger)

FIG. 6—Continued

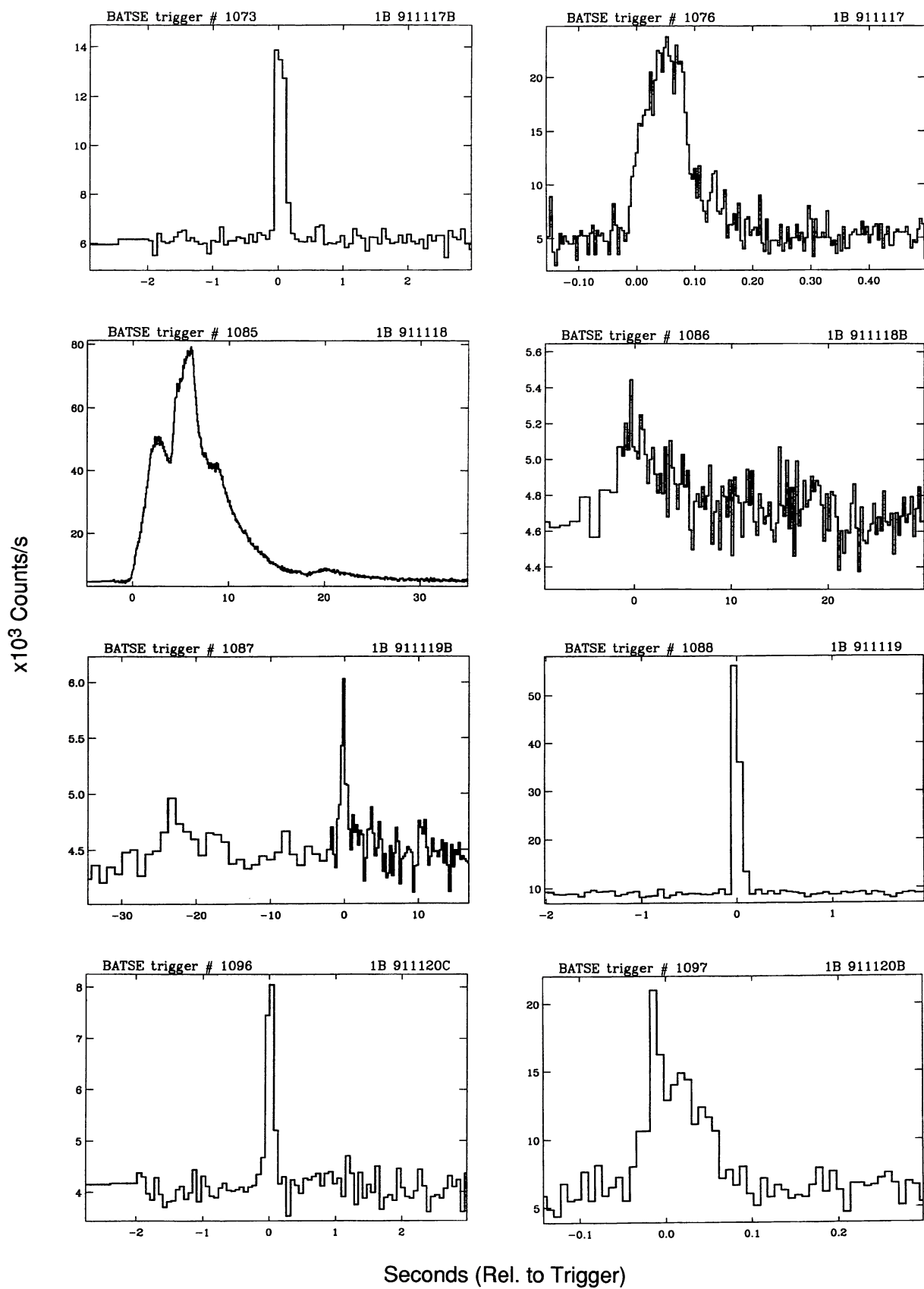
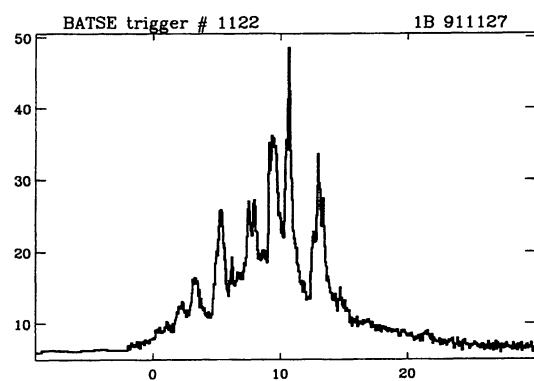
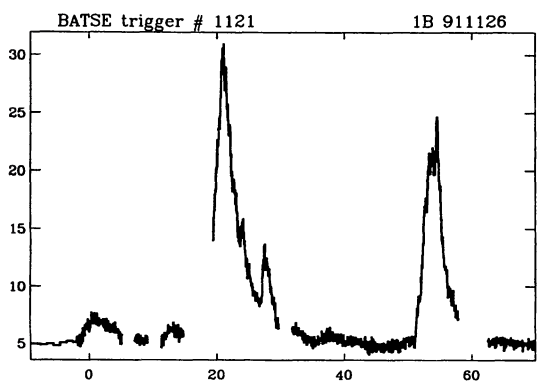
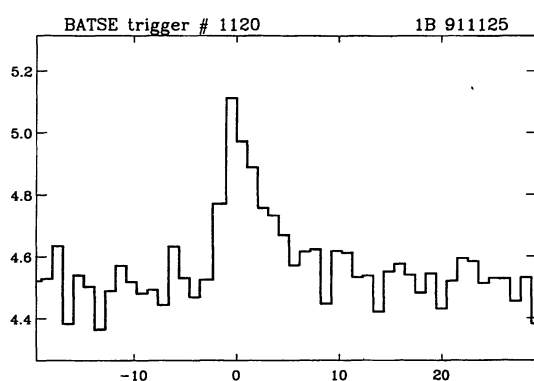
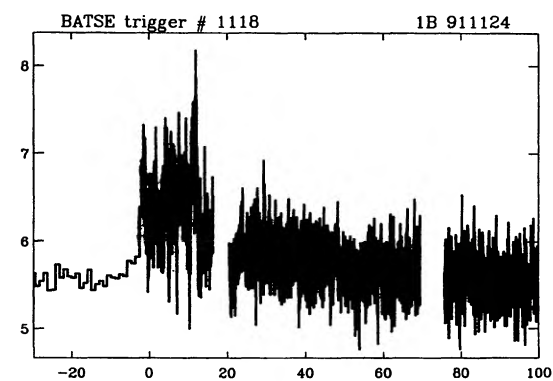
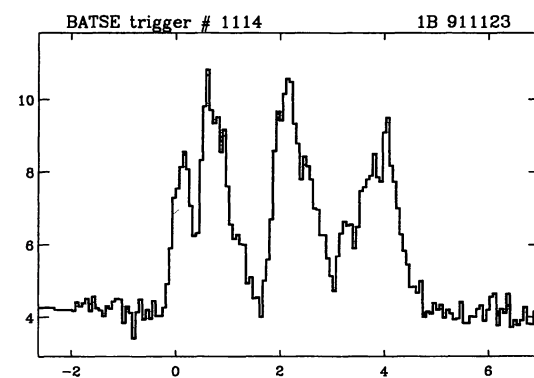
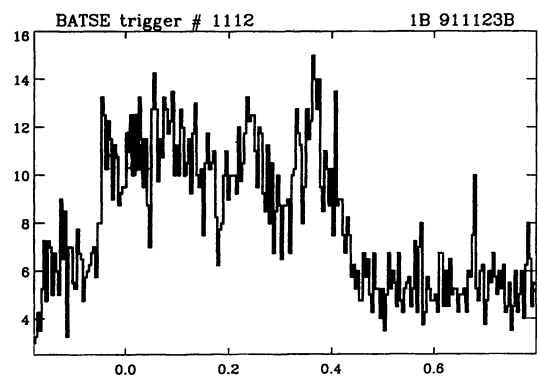
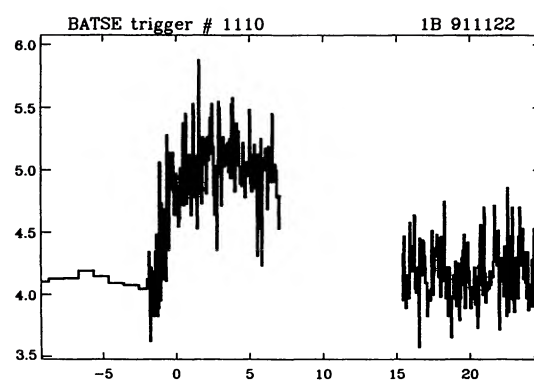
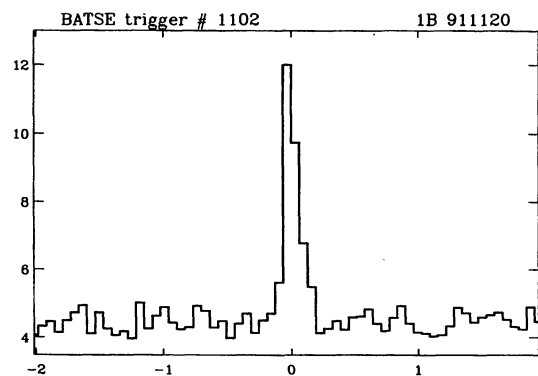


FIG. 6—Continued

x10³ Counts/s

Seconds (Rel. to Trigger)

FIG. 6—Continued

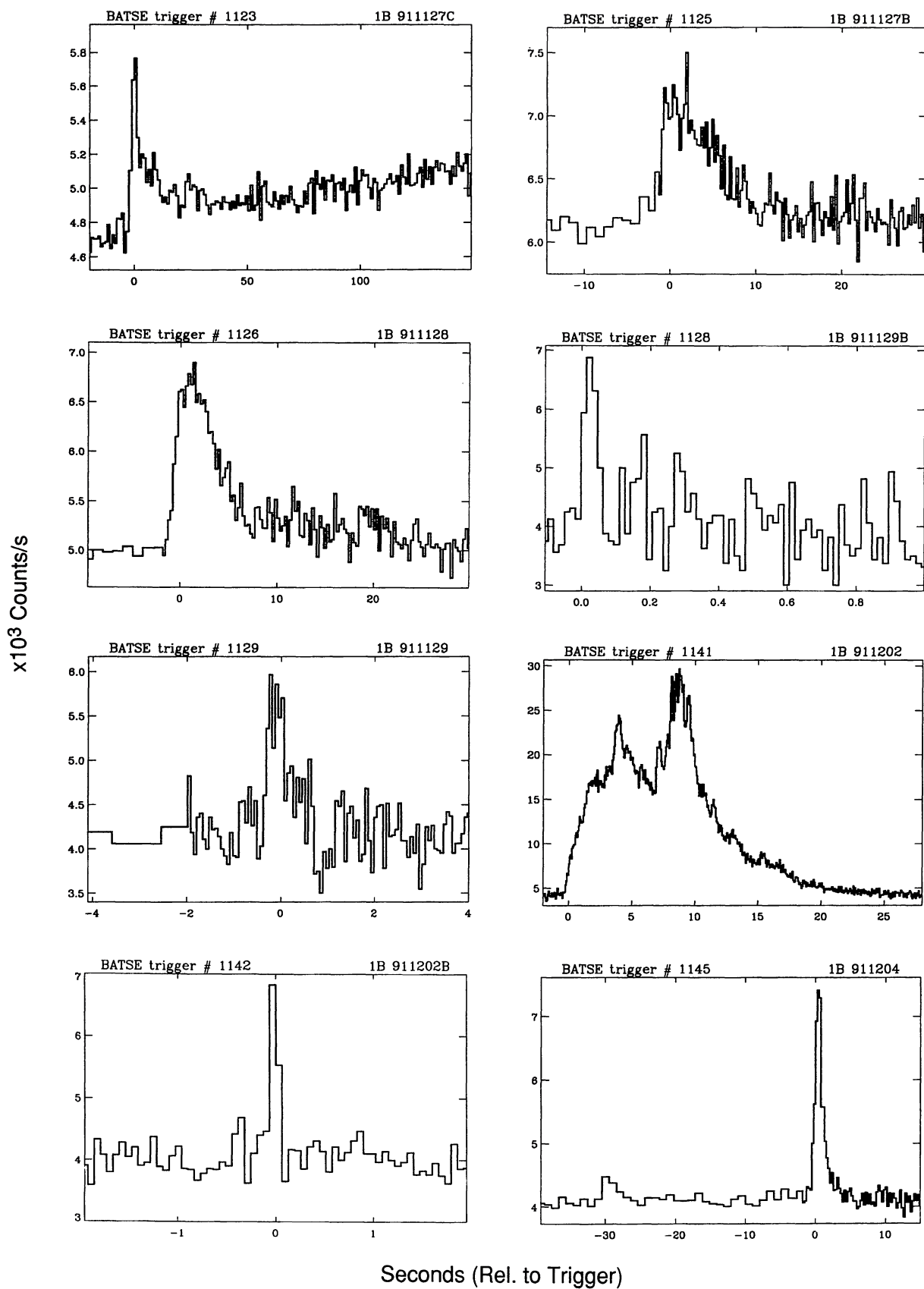


FIG. 6—Continued

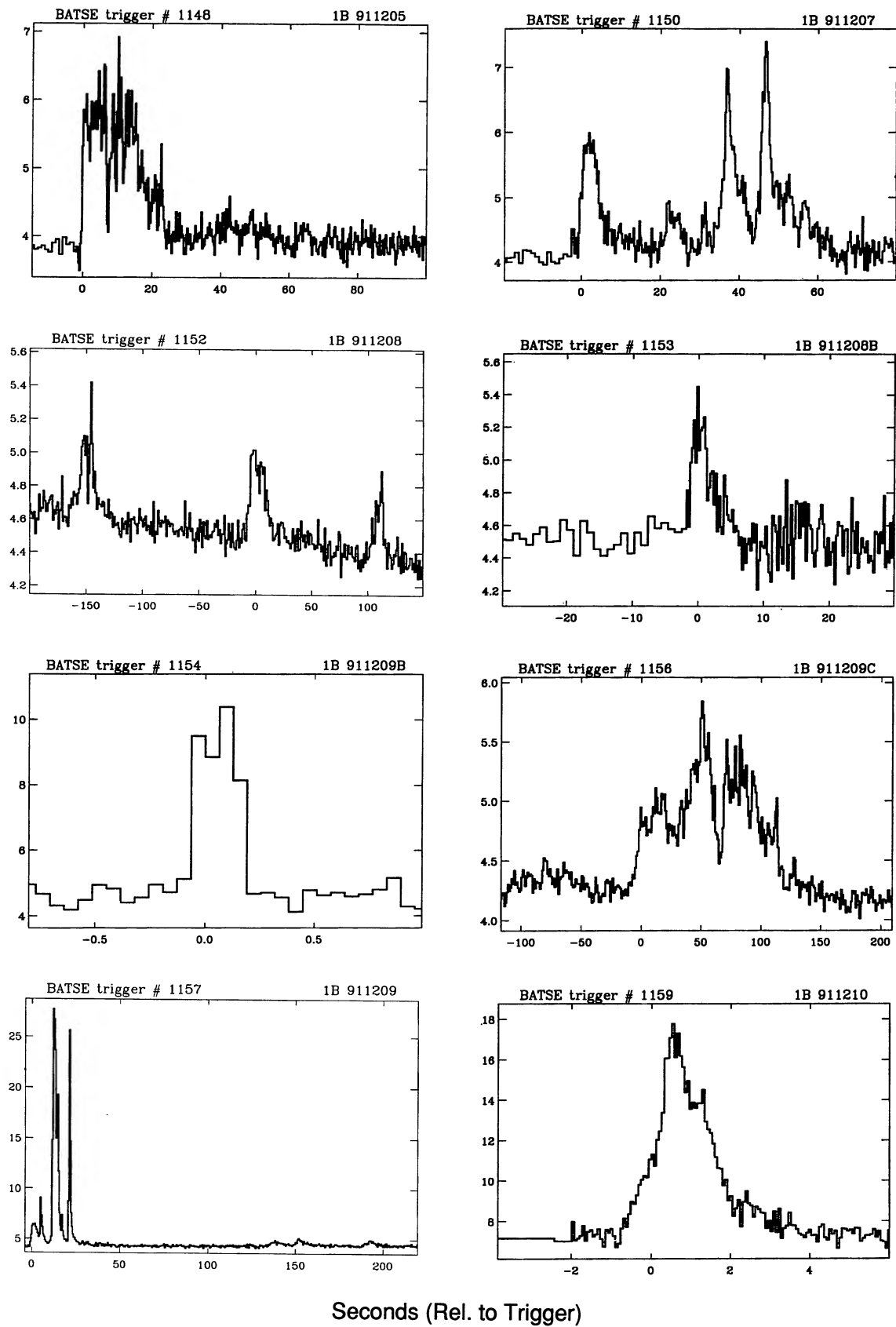
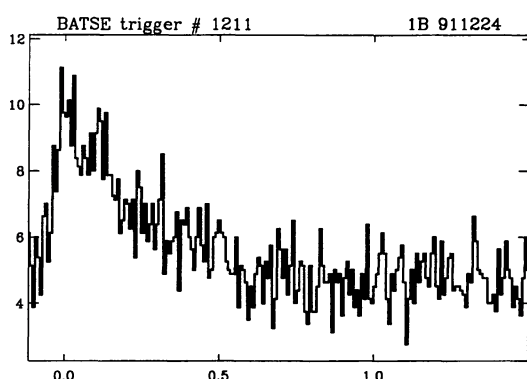
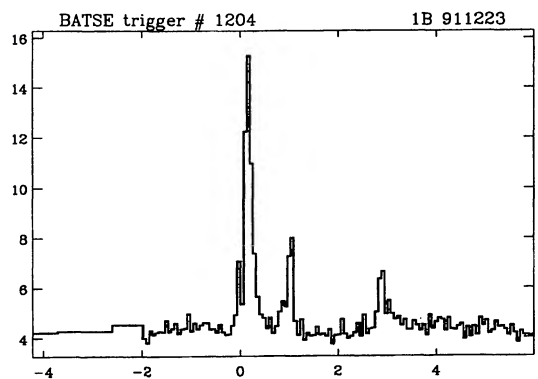
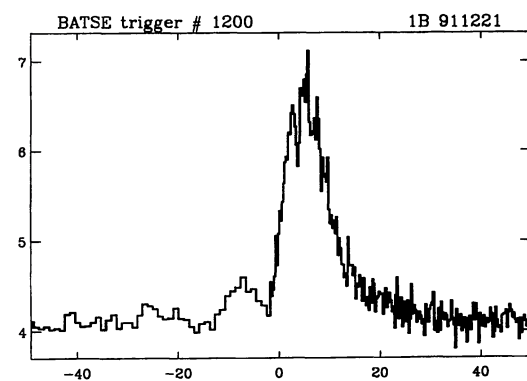
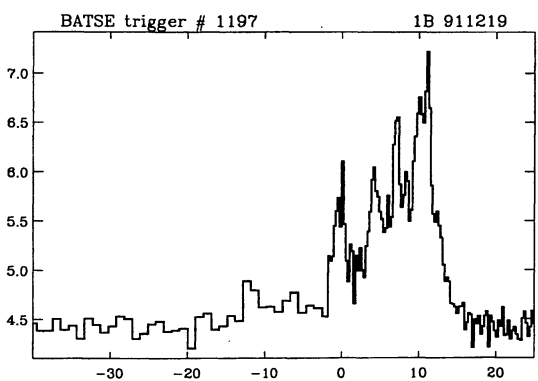
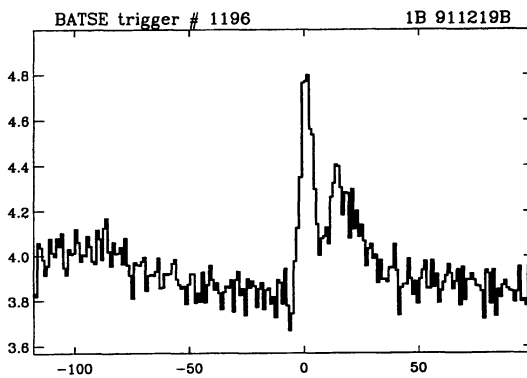
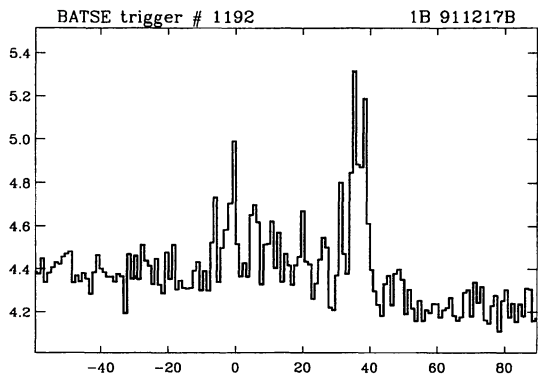
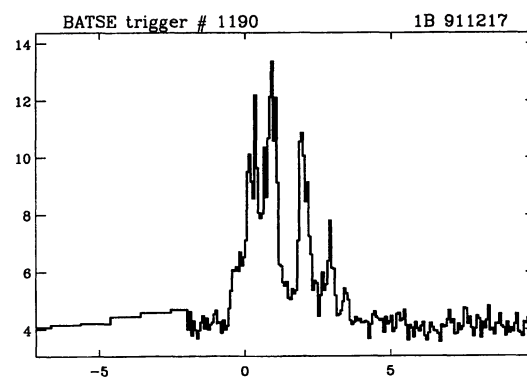
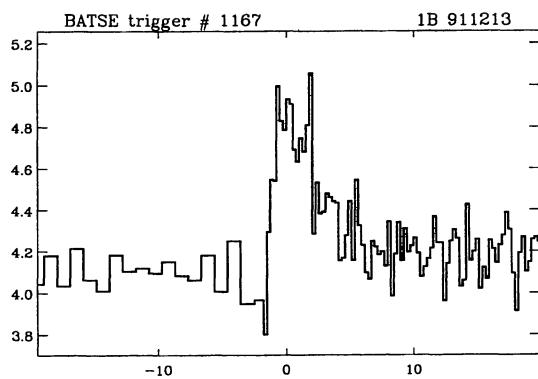
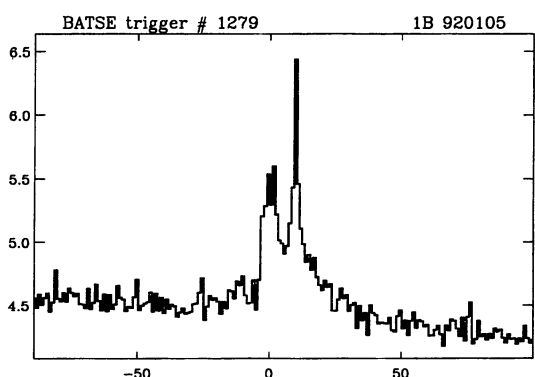
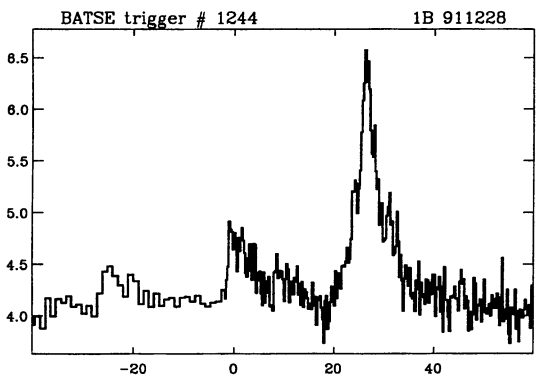
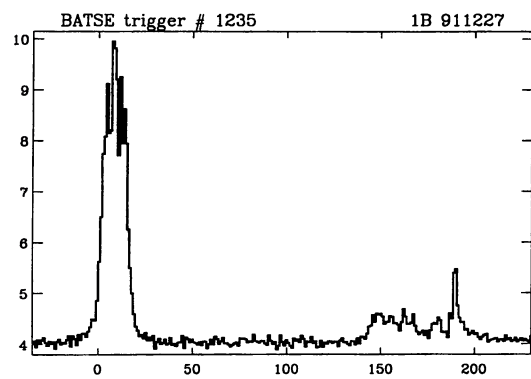
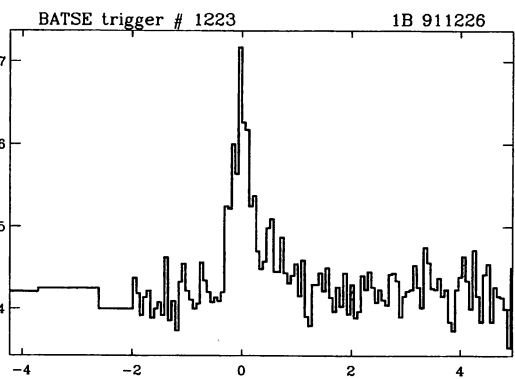
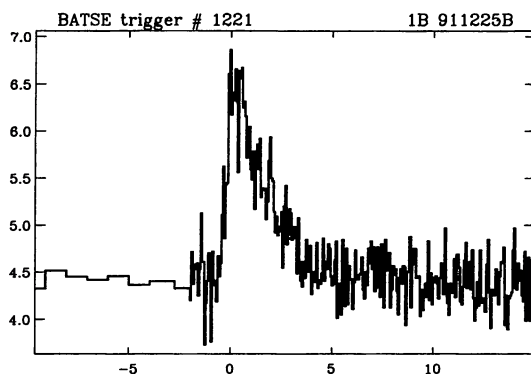
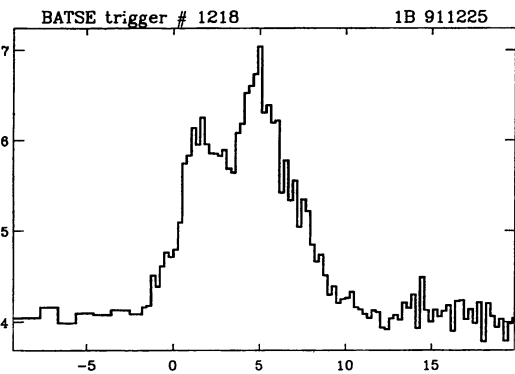
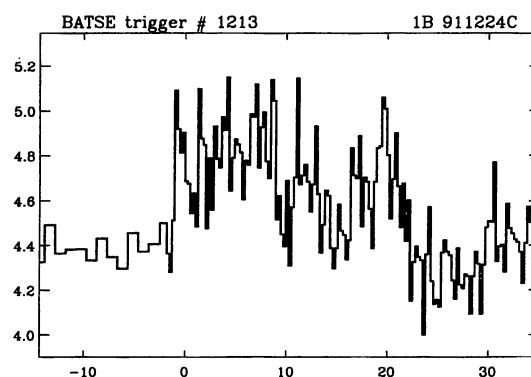
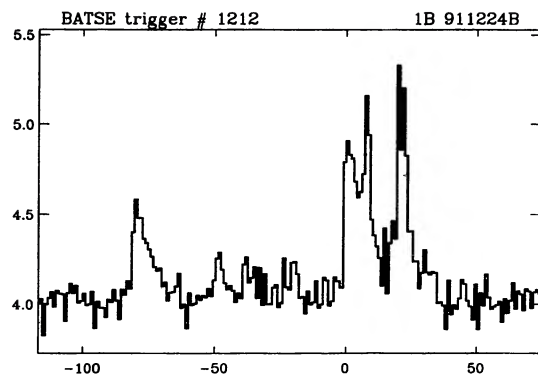
x10³ Counts/s

FIG. 6—Continued

x10³ Counts/s

Seconds (Rel. to Trigger)

FIG. 6—Continued

x10³ Counts/s

Seconds (Rel. to Trigger)

FIG. 6—Continued

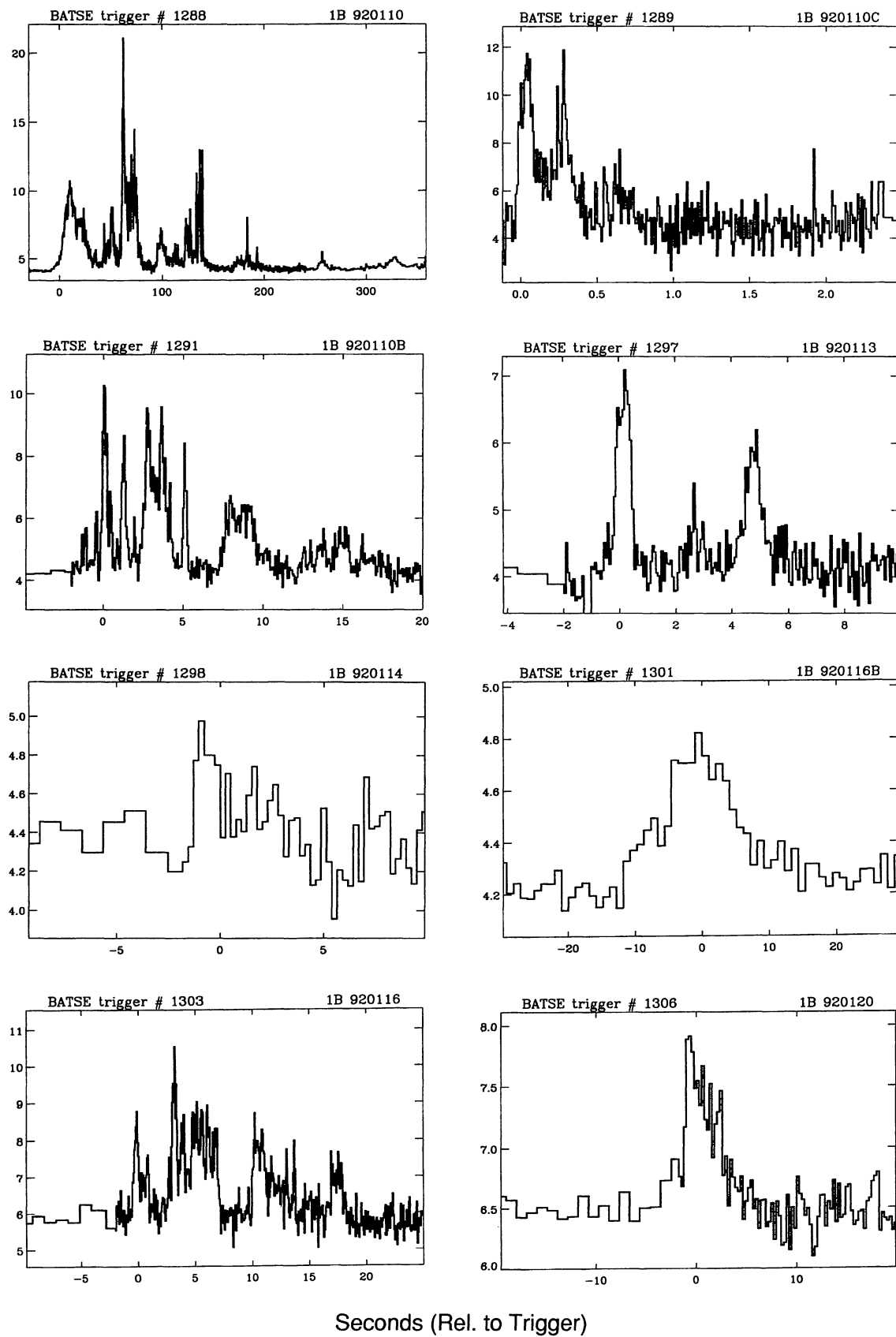
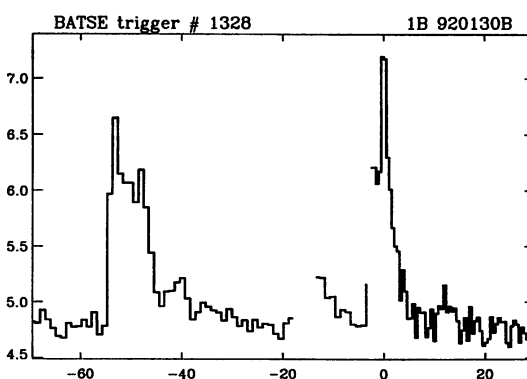
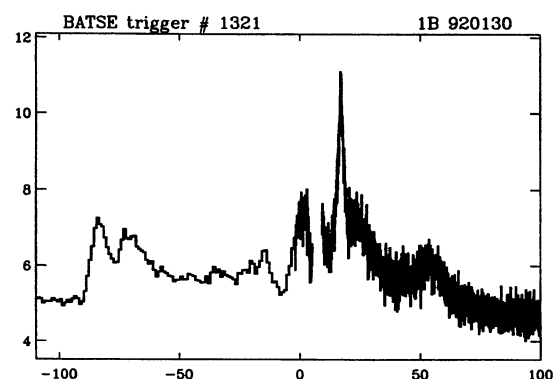
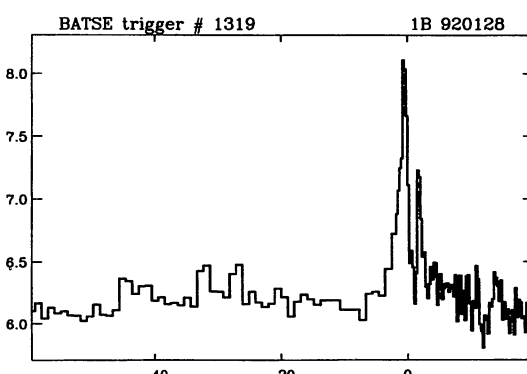
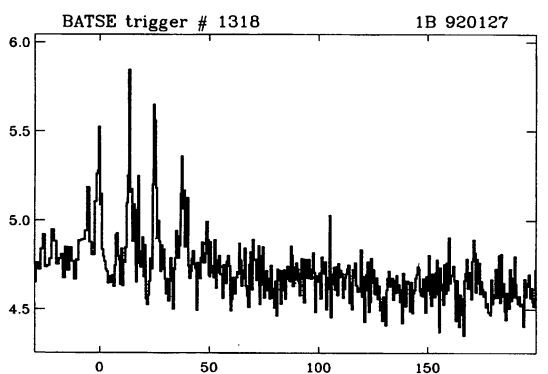
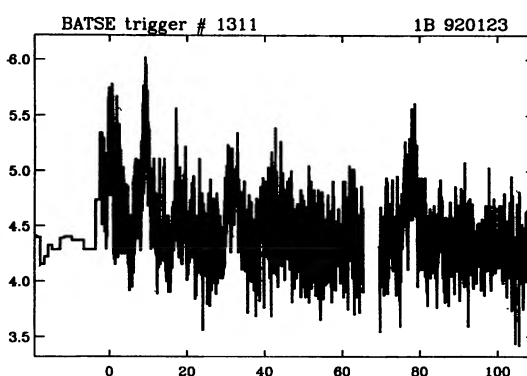
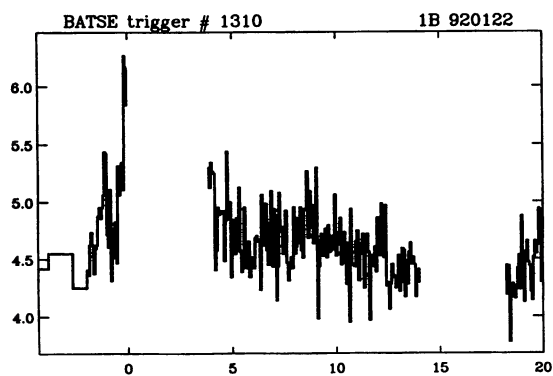
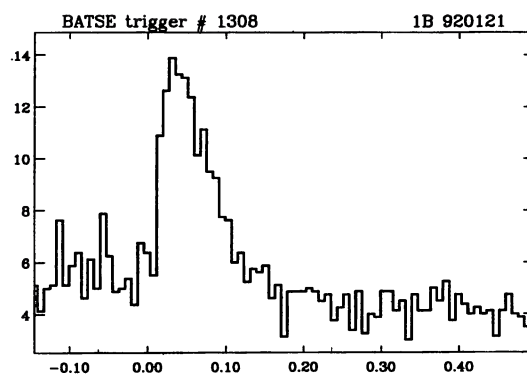
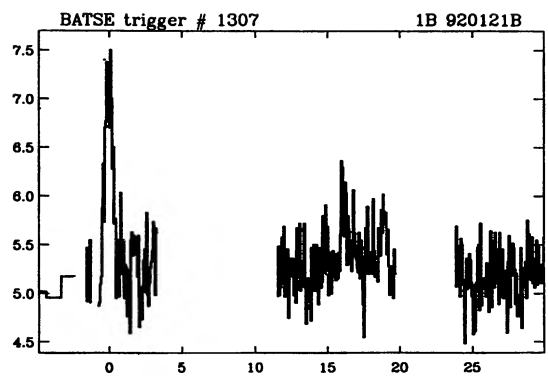
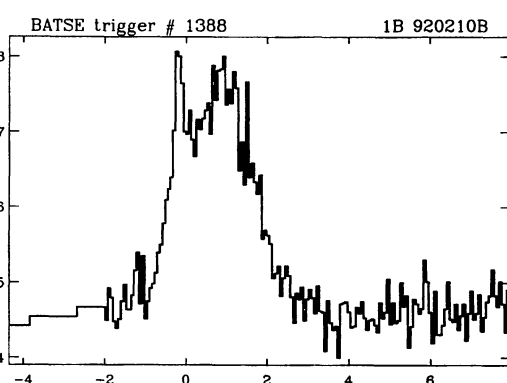
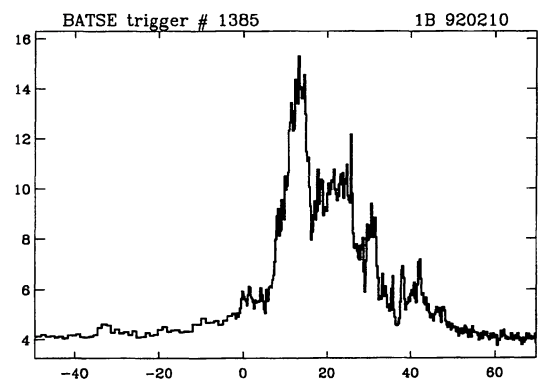
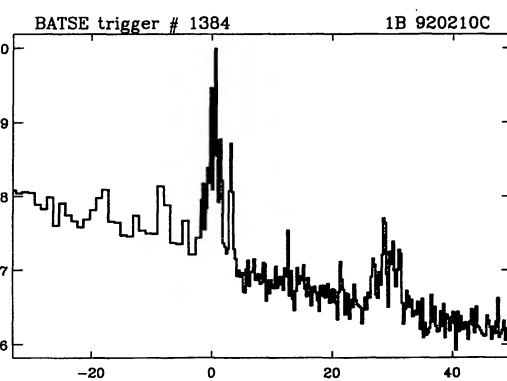
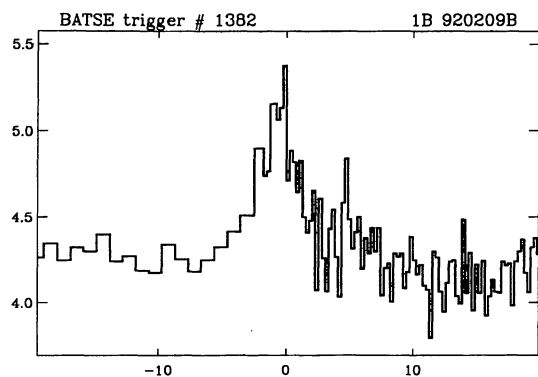
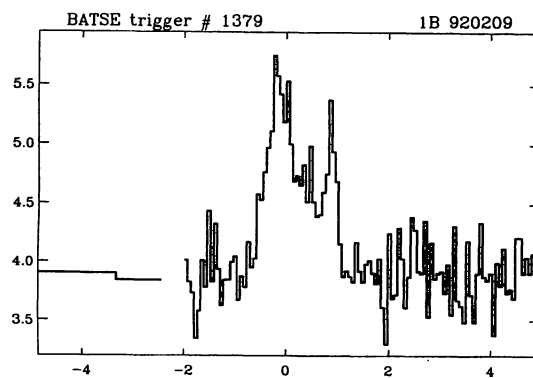
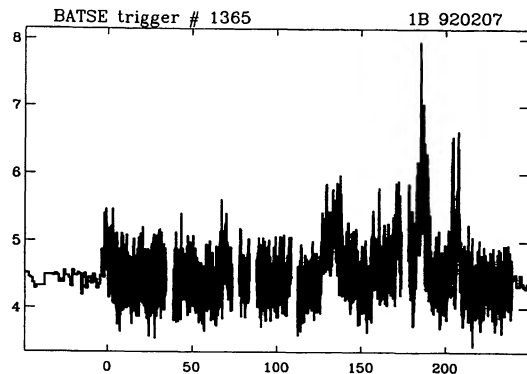
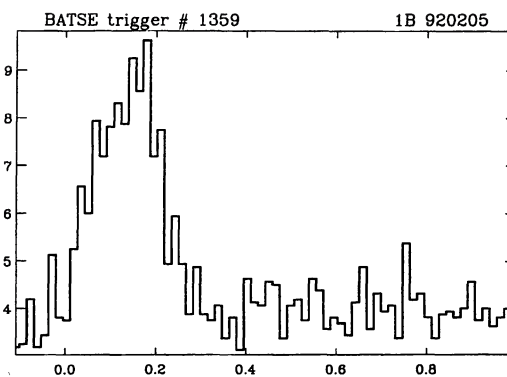
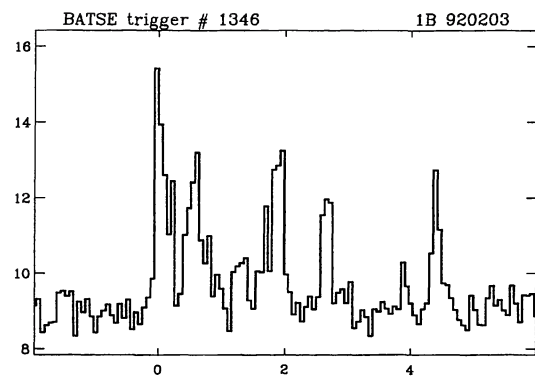
x10³ Counts/s

FIG. 6—Continued

x10³ Counts/s

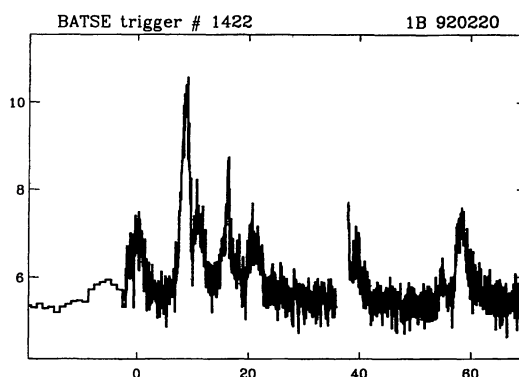
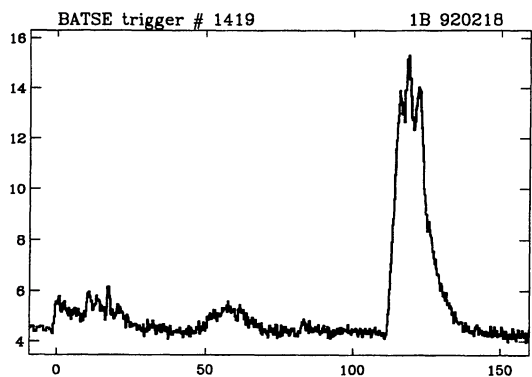
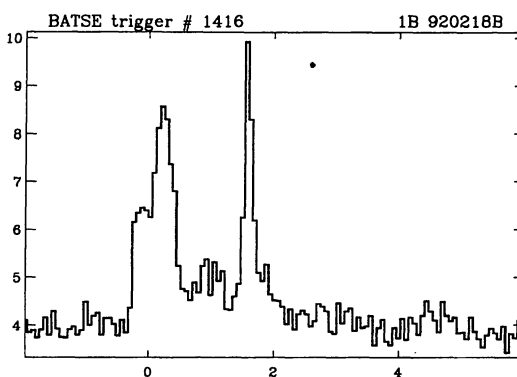
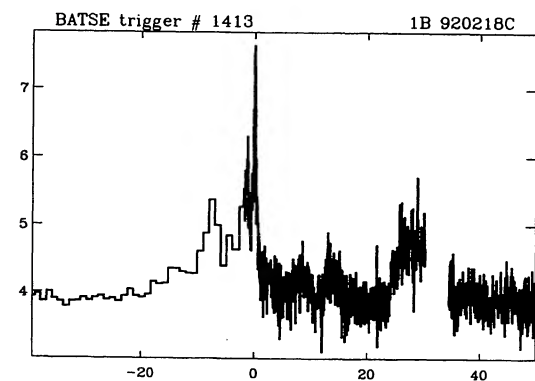
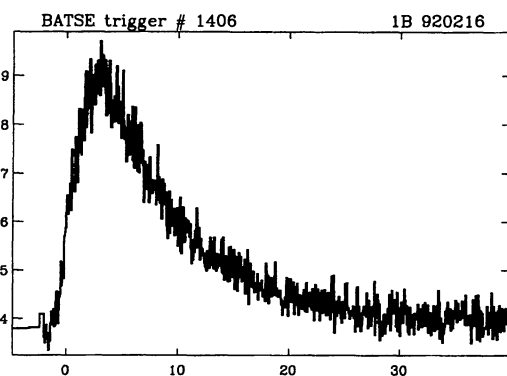
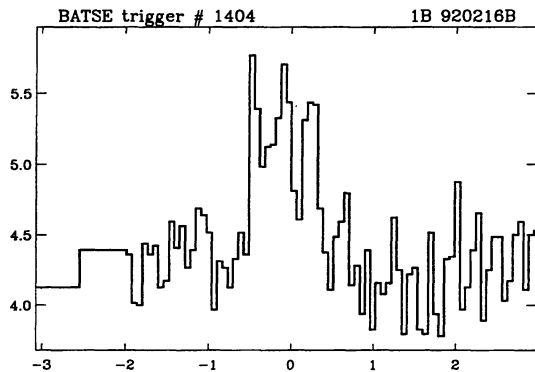
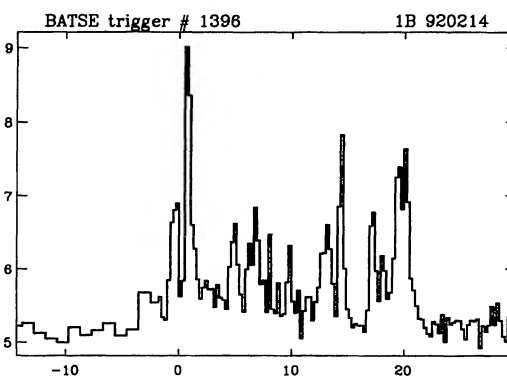
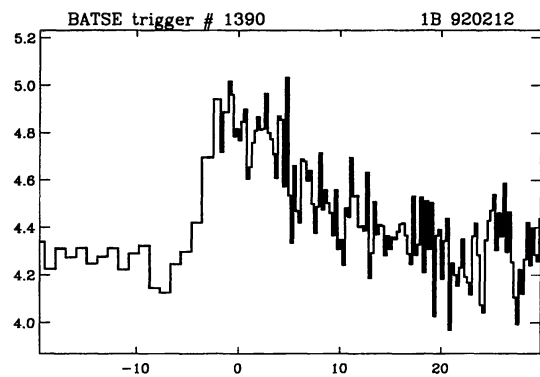
Seconds (Rel. to Trigger)

FIG. 6—Continued

x10³ Counts/s

Seconds (Rel. to Trigger)

FIG. 6—Continued

x10³ Counts/s

Seconds (Rel. to Trigger)

FIG. 6—Continued

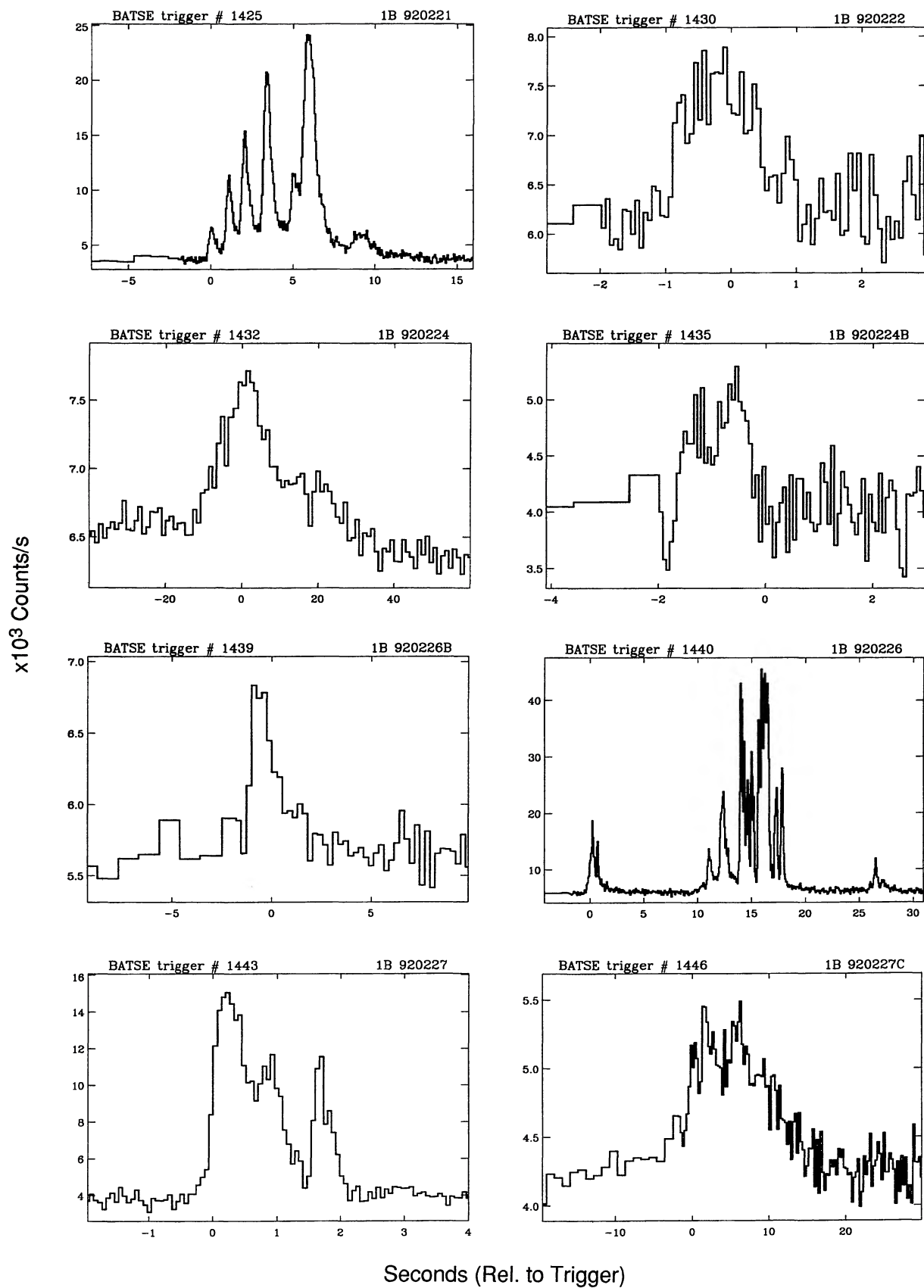
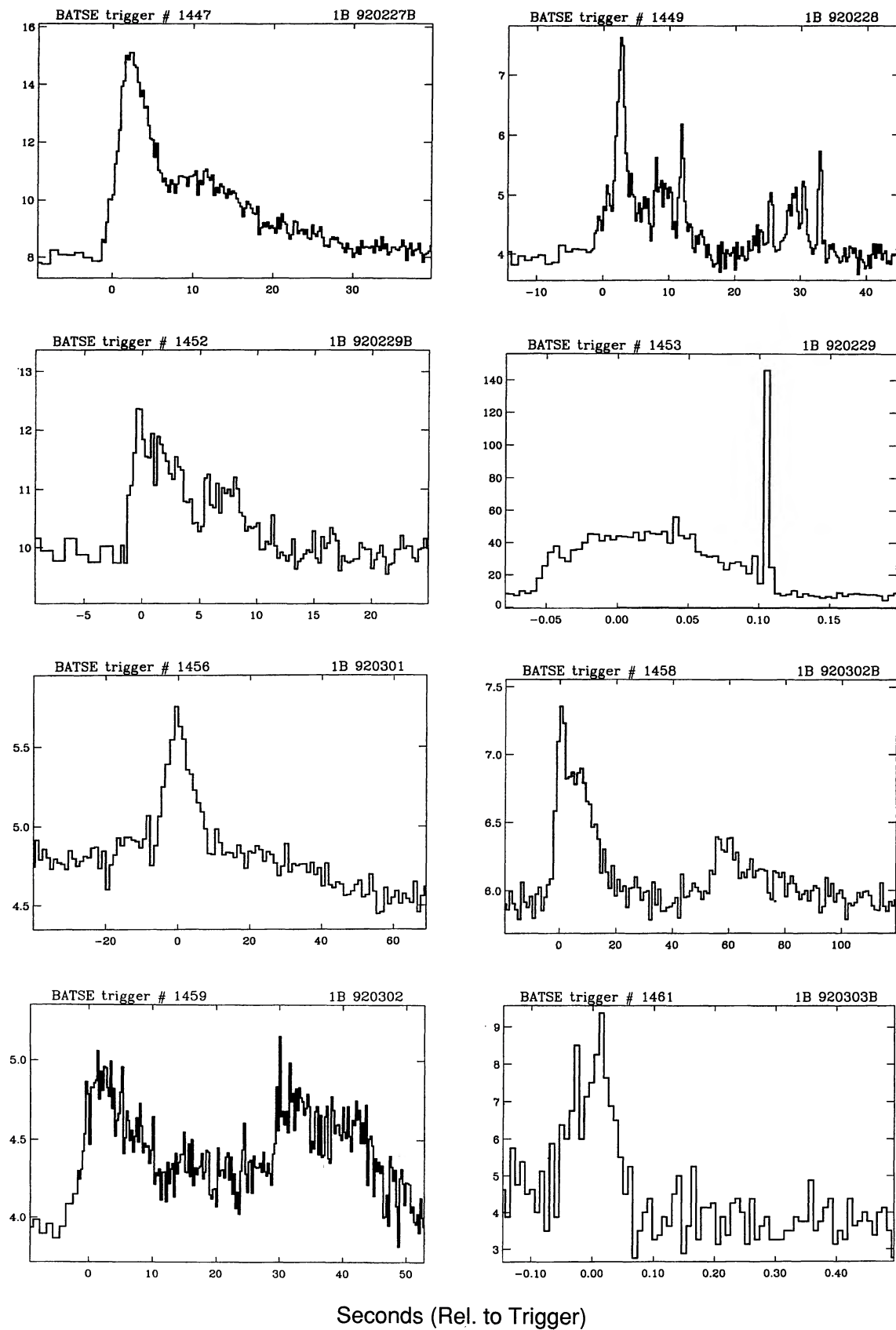


FIG. 6—Continued

x10³ Counts/s

Seconds (Rel. to Trigger)

FIG. 6—Continued

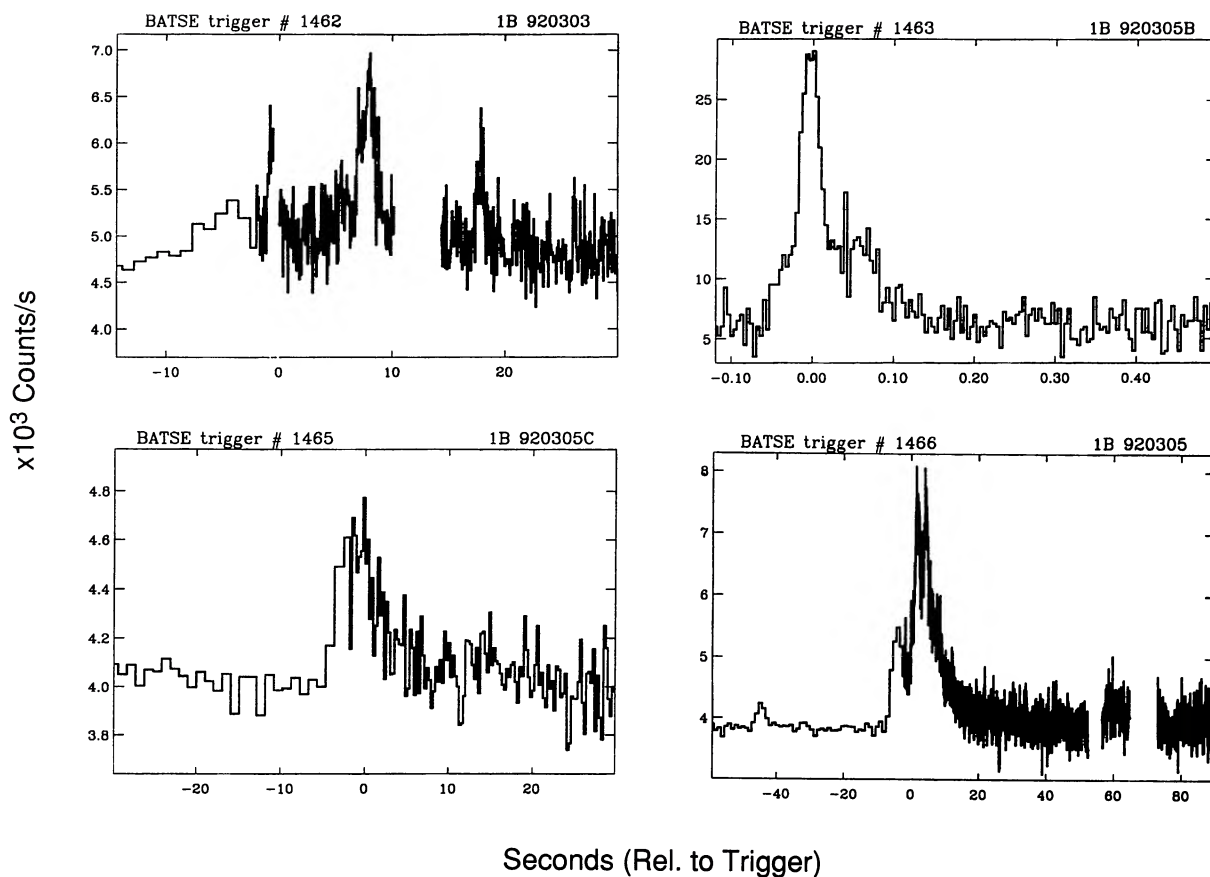


FIG. 6—Continued

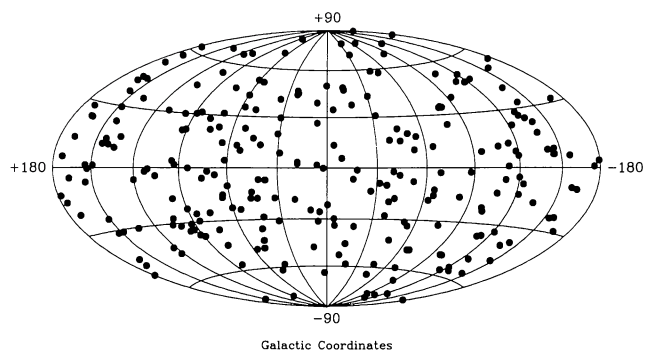


FIG. 7.—Distribution of 260 BATSE bursts in Galactic coordinates

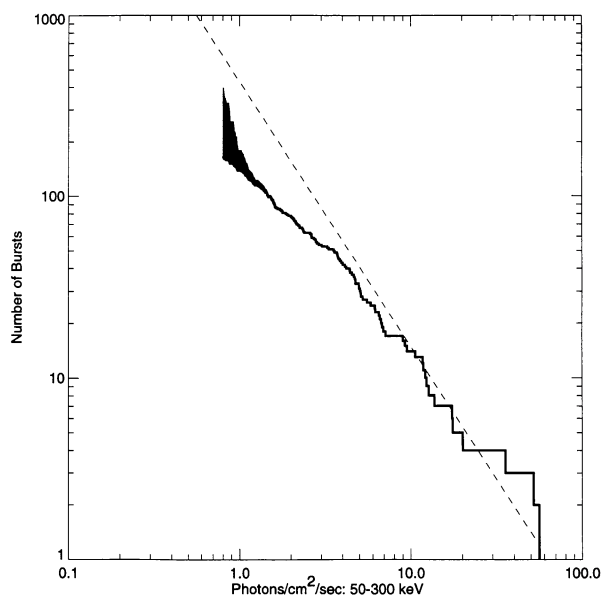


FIG. 8.—Log N -log P integral distribution, where P is measured on the 64 ms timescale. The dashed line represents the $-3/2$ power law expected for a homogeneous distribution of sources. The range of values near the threshold includes the uncertainty in the efficiency due to atmospheric scattering.

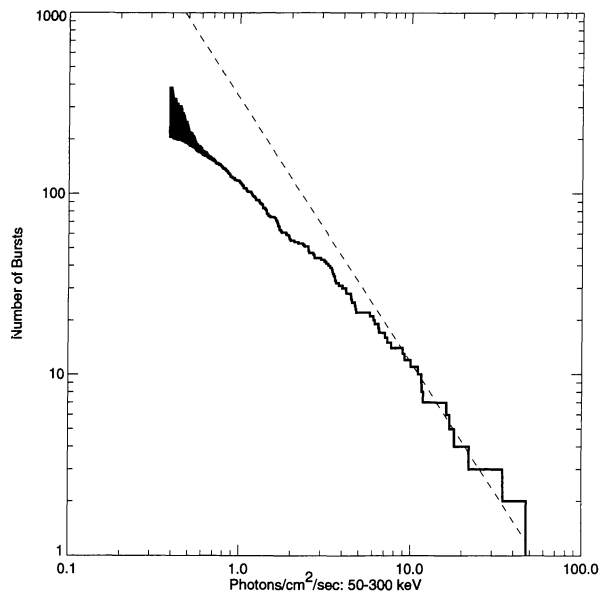


FIG. 9.—Same as Fig. 8 for the 256 ms timescale

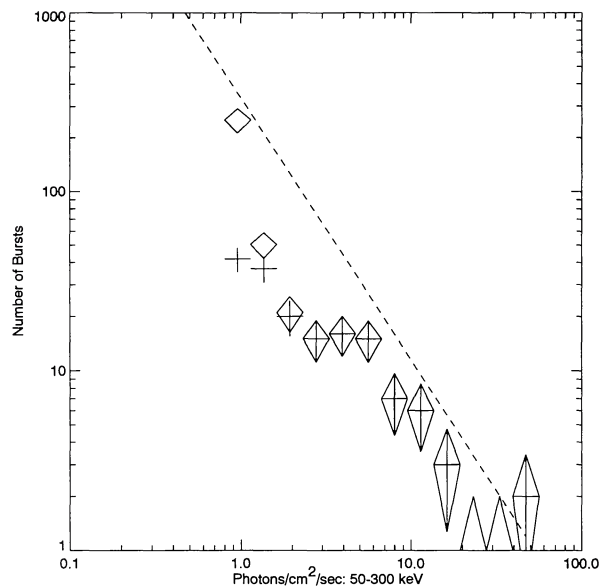
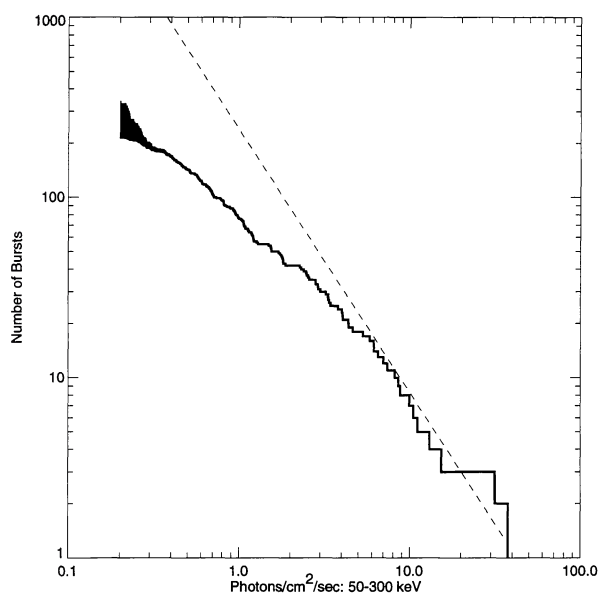
FIG. 11.—Log N -log P differential distribution, where P is measured on the 64 ms timescale, and the number of bursts are binned into equal logarithmic intervals of P . The dashed line represents the $-3/2$ power law expected for a homogeneous distribution of sources. The diamonds represent the observed number of bursts, and the crosses represent the number of bursts as corrected for exposure.

FIG. 10.—Same as Fig. 8 for the 1024 ms timescale

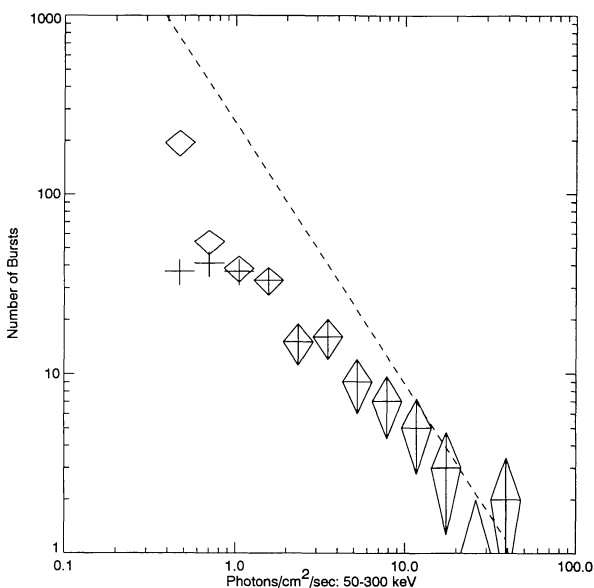


FIG. 12.—Same as Fig. 11 for the 256 ms timescale

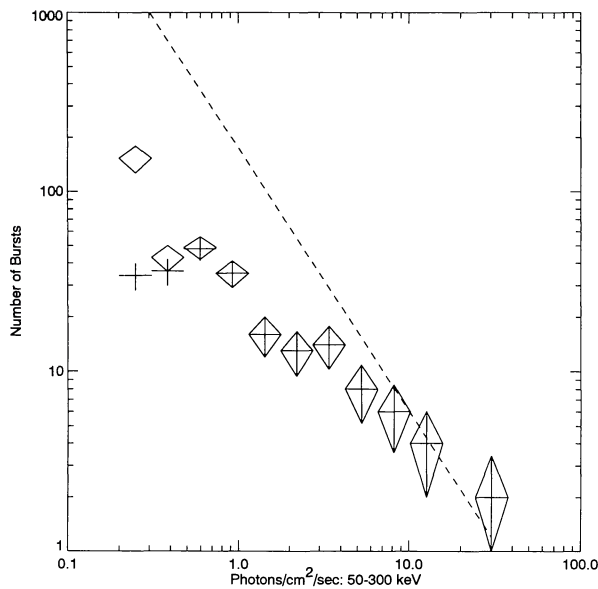
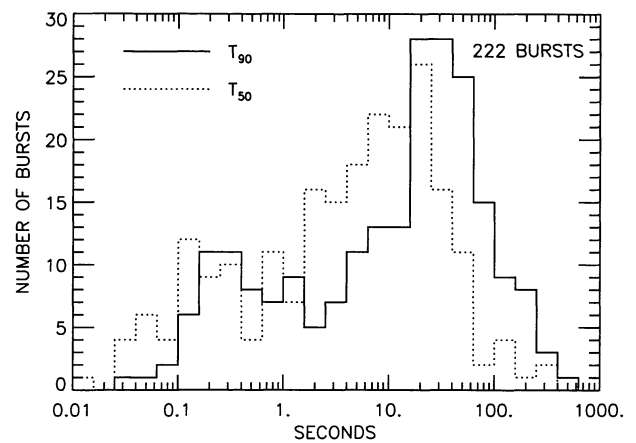


FIG. 13.—Same as Fig. 11 for the 1024 ms timescale

FIG. 14.—Distribution of burst durations. Shown are the durations, as measured by both T_{90} and T_{50} (see text) for 222 bursts which could be measured.

Many people contributed to the success of BATSE. We are grateful to the team of engineers and technicians at MSFC who built and tested the instrument. The LAD's were a joint effort of MSFC, UCSD, and the Bicorn Corp. An outstanding team at TRW built the spacecraft and integrated the experiments. The Flight Operations Team at GSFC has provided excellent support since launch. We are particularly thankful for the excellent work of the BATSE data operations team and the pro-

grammers who provided the software for ground operations and data analysis. A few of the many individuals who deserve special recognition are Tom Parnell, Dennis Ellsworth, Bill Henze, Scott Storey, and Byron Schrick at MSFC; Ron Cline, Terry Watson, Billy Breshears, and Barbara Meehan at TRW; Jerry Madden, Karl Schauer, Marty Davis, Robert E. Wilson, and Neil Gehrels at GSFC.

APPENDIX A BURST LOCATION ALGORITHM

This appendix describes the algorithm used to derive burst locations from the detector count rates, and the statistical and systematic errors in these computed locations. We use a numerical technique to compute the burst direction from BATSE's angular response as determined from calibration and computer modeling.

A detector's *response* is the counting rate in a specified energy channel when a detector is exposed to a unit of flux from a monochromatic plane wave of photons. The response $R_i^d(E, \theta, \phi)$ in channel i of detector d is a function of the energy E of the photons and the direction (θ, ϕ) of the plane wave.

Let C_i^d denote the counting rate in channel i and detector d , and let $f(E; A, \alpha)$ describe the flux distribution of a burst, where A is the burst intensity and α is a spectral index. Then, if θ and ϕ are the azimuth and elevation of the source direction in *CGRO*-fixed coordinates, the counting rate we expect is

$$C_i^d(\beta) = \int_0^\infty R_i^d(E; \theta, \phi) f(E; A, \alpha) dE,$$

where $\beta \equiv (A, \alpha, \theta, \phi)$ represents the parameters of a burst model. In our burst location software, $f(E; A, \alpha)$ is a power law above 10 keV, and A is the total flux (photons $\text{cm}^{-2} \text{s}^{-1}$) above 10 keV. BATSE is assumed insensitive below 10 keV.

Rates in three burst facing detectors uniquely determine a burst direction, but a variety of statistical and systematic effects make the direction uncertain. Our burst location software computes an estimate, $\hat{\beta}$, of the parameters (and associated errors) of a burst producing an observation, $\tilde{C}_i^d$ (and its measurement errors), in BATSE. The software minimizes the following measure of goodness-of-fit:

$$\chi^2(\beta) = \sum_{i,d} \frac{[\tilde{C}_i^d - C_i^d(\beta)]^2}{\sigma_{i,d}^2},$$

where $\sigma_{i,d}^2$ is the variance in $\tilde{C}_i^d$.

The software computes $\tilde{\beta}$ in two stages. First, it computes a direction using three BATSE detectors chosen for their high counting rates. For an assumed value of α , the rates in three detectors uniquely determine $\tilde{\gamma}$, $\tilde{\theta}$, and $\tilde{\phi}$. With the three detector direction as a starting point, a standard algorithm developed by Levenberg and Marquardt (Press et al. 1992) seeks $\tilde{\beta}$ which minimizes $\chi^2(\beta)$.

When the rates, $\tilde{C}_i^d$, have normally distributed errors and $C_i^d(\beta)$ is a sufficiently smooth function of β , the standard covariance matrix for the parameters $\tilde{\beta}$ is related to the Hessian (matrix of second derivatives) of $\chi^2(\beta)$ near the minimum, $\tilde{\beta}$. Specifically, the standard error in a burst's *CGRO* elevation is $1.5\sigma_\phi$ and the standard error in the burst's *CGRO* azimuth is $1.5\sigma_\theta$, where σ_ϕ^2 and σ_θ^2 are diagonal elements of the inverse Hessian corresponding to the burst's elevation and azimuth. The factor of 1.5 ensures that an error ellipse encloses a 68% confidence region (Press et al. 1992). The single location error, σ_r , associated with each burst in the catalog is the radius of that circle having the same area as the ellipse with axes taken from the standard errors associated with the burst's azimuth and elevation in the *CGRO* coordinate system.

$$\sigma_r = 1.5\sqrt{\sigma_\phi\sigma_\theta \cos \phi}.$$

The factor of $\cos \phi$ corrects the difference in units of elevation and azimuth error. The error reflects only the direction uncertainty resulting from uncertainty in our measurement of photon counting rates in the BATSE detectors.

For weaker bursts the error in measuring photon arrival rates dominates the error in our directions, but other sources of error contribute significantly. Other sources of error include: (1) background subtraction, (2) response calibration, (3) channel threshold measurement, (4) burst flux reflected by the Earth's atmosphere, (5) detector deadtime, and (6) deviation of the burst spectrum from the assumed power law. We compute background counting rates during a burst by fitting a first or second degree polynomial to rates before and after a burst. We iteratively remove reflection from the atmosphere using Monte Carlo derived estimates of scattered flux. We continuously monitor variations in the gain of the detectors. Counting rates are corrected for deadtime and gain variations. Selecting the four detectors which face a burst is difficult in some cases where there is considerable scattering from the atmosphere and/or transmission through the rear of the detectors. The largest location errors occur in those cases. Our analysis indicates that systematic errors average approximately four degrees. Adding four degrees in quadrature to the direction error in the BATSE catalog yields our best estimate of the error in each burst direction. With $\sigma^2 = \sigma_r^2 + 16$, an analysis of 11 GRBs located by the Interplanetary Network (K. Hurley 1993, private communication), 22 hard solar flares and 26 fluctuations in Cygnus X-1 suggests that σ represents a 63% confidence radius, and 2σ represents a 92% confidence radius.

APPENDIX B SKY EXPOSURE MATRIX

BATSE's exposure to bursts is not uniform across the sky. The *Compton Observatory's* low orbit places the Earth between BATSE and a large fraction of the sky, and the anisotropic sensitivity of the instrument's eight Large Area Detectors, by which the instrument determines burst direction, blinds it to weak bursts from some directions. The former effect is large enough to eventually affect our measurement of the distribution of burst directions at all intensities. Because the orientation of the observatory changes frequently, the latter effect will not significantly affect our measurement of the distribution of burst directions over the duration of the experiment; however, the effect distorts the distribution of burst intensities by decreasing the number of weak bursts detected relative to the number of strong bursts.

During intervals of time much shorter than the precession period of the *Compton Observatory's* orbit, BATSE's exposure to the sky is symmetric with respect to the orbital plane. Directions out of the plane receive greater exposure than directions in the plane which are blocked by the Earth a large fraction (39%) of the time. Directions nearly perpendicular to the orbital plane are not blocked by the Earth and receive full exposure. As the pole of the observatory's orbital plane precesses around the North Pole, BATSE's exposure to the sky becomes symmetric with respect to the Earth's equatorial plane, except for reduced exposure in the southern hemisphere which results from disabling the instrument over the SAA and over regions of high electron precipitation activity.

BATSE's burst trigger is partially disabled during the 90 minutes after a burst is detected, when the instrument transmits burst data to the ground. During this time, only strong bursts (stronger than the burst being transmitted) will trigger the instrument. Because burst triggers occur uniformly in time, the burst readout deadtime should not affect the direction distribution, $T(\delta)$, of sky exposure over the course of the mission.

For a given background γ -ray level, BATSE has two important burst intensity thresholds, an all sky threshold and an absolute threshold. The instrument detects bursts with intensities above the all sky threshold from any point on the sky which is not occulted by the Earth. BATSE detects bursts beneath that threshold from only a fraction of the sky, and that fraction decreases sharply with decreasing burst intensity. BATSE does not detect bursts with intensities beneath its absolute threshold. The number of bursts which the instrument observes between the absolute and all sky thresholds does not reflect the number of bursts occurring at those intensities, but we use knowledge of the instrument's sky exposure to correct those observations. Roughly 30% of detected bursts are beneath the instrument's all sky threshold.

BATSE detects only those bursts with rates at least $5\frac{1}{2}$ times the uncertainty in the background rate in at least two of the eight detectors. Because the detectors are highly anisotropic, a weak burst at one location on the sky may create acceptable rates in the detectors while an identical burst at another location will not. BATSE is least sensitive to weak bursts from the direction faced by a single LAD. A triangular, blind region in front of each LAD becomes larger as burst intensity decreases. The instrument's absolute threshold is reached when the blind regions encompass the entire sky. The growth of the blind region with decreasing intensity is evident in Figure 5.

We compute BATSE's exposure to the sky by sampling the instrument's trigger threshold in each LAD at 5 minute intervals. For each of 422 points on the sky, we determine at those intervals the weakest burst intensity which will produce a signal exceeding the threshold in at least two detectors, and we increase by 5 minutes the total exposure time for intensities above the weakest. We omit intervals during which the instrument's trigger is disabled during SAA passage, etc., and we omit points on the sky occulted by the Earth. The instrument's threshold is different on each of its three timescales, and the instrument's response to a given flux differs with photon energy. We have therefore produced a separate map for each time scale and for a sequence of power-law spectral indices. Sky exposure maps are illustrated elsewhere (Brock et al. 1992b).

Anisotropy in the exposure of BATSE to the sky will distort the distribution of burst directions which the instrument observes; however, at this point in the experiment, the effect of sky exposure on moments of the burst direction distribution is not significant. We have computed quadrupole and dipole moments with respect to the Galactic plane and center corrected for exposure (Table 8), and the corrections remain below the level of uncertainty resulting from the size of the burst sample. As more bursts are observed, the sky exposure correction will become more important.

APPENDIX C COMPUTATION OF $V/V_{\max}$

The $V/V_{\max}$ statistic provides the most direct evidence in the BATSE data for inhomogeneity of the burst sources. As described in § 7, the BATSE observation that $\langle V/V_{\max} \rangle$ is significantly less than $\frac{1}{2}$ is in agreement with observations obtained with several other instruments. Nevertheless, the measurement has such important implications that it is worthwhile to provide details of the procedure used to compute this statistic for the BATSE burst data.

The value of $V/V_{\max}$ for any burst is determined by the trigger criteria. For BATSE, a trigger requires at least two detectors above threshold on any of the three trigger timescales. To determine $V/V_{\max}$ for any BATSE burst, it is necessary to know the peak count rates P , background rates B , and the trigger thresholds T for each of the eight detectors for each of the three trigger timescales. If any of these 72 values are not available (e.g., due to telemetry gaps) for a particular burst, then $V/V_{\max}$ is not computed.

The trigger thresholds for each detector and timescale are computed on-board from the background rates, updated every 17 s. When a burst occurs, the thresholds and backgrounds in effect at the time of a trigger are saved and output as part of the burst readout. These thresholds are specified in units of counts and are precisely known.

The determination of the peak rates on the 1024 ms timescale is straightforward, since rates on all detectors are always available. The ground software tests each 1024 ms interval to find the detector with the second-highest value of background-subtracted counts. The second-highest value is used because two detectors must be above threshold. Each interval during the burst accumulation period (the interval during which no burst overwrite may occur) is tested and the maximum for the burst is the peak rate P . The maximum count rate divided by the minimum count rate for triggering is then $C_{\max}/C_{\min} = (P - B)/(T - B)$, and $V/V_{\max} = (C_{\max}/C_{\min})^{-3/2}$.

The determination of the peak rates on the 64 and 256 ms timescales is complicated by the fact that rates on these timescales are not available for each detector individually. What is transmitted during the burst is the 64 ms rate summed over the detectors that exceeded threshold at the time of the trigger. Normally, only two detectors trigger, but sometimes three or four detectors can trigger and be included in the summed data. An estimate of the individual detector rates is obtained by prorating the rate among the summed detectors according to the relative rates in the 1024 ms data. This computation is done for the 64 and 256 ms timescales. Computation of $C_{\max}/C_{\min}$ and $V/V_{\max}$ then proceeds as for the 1024 ms timescale. The minimum value of $V/V_{\max}$ among the three timescales is taken as the $V/V_{\max}$ for the burst, since any of the three timescales can generate a trigger.

There is a weakness in the algorithm that can occasionally lead to incorrect values of $V/V_{\max}$ for the 256 ms time scale. If the trigger occurs on the 64 ms timescale, during the time interval that the 256 ms rate is at its peak, then the peak 256 ms rate will not be found. This happens because the 256 ms peak includes both pre-trigger and post-trigger data. There is no single data type that can be used to determine the rate in this case. Such events are identified by inspection of the data and the output from the program. The 256 ms value of $V/V_{\max}$ is deleted for these cases, which amount to 23 out of 260 bursts in the catalog. In most of these cases, the $V/V_{\max}$ for the burst will not be affected. In some cases, however, $V/V_{\max}$ will be overestimated. Note that this effect will generate a bias in the BATSE data toward homogeneity.

The peak location algorithm assumes a constant background level in each of the detectors over the duration of the burst. This is an adequate approximation over the few tens of seconds that most bursts last. Since backgrounds will be increasing or decreasing with equal likelihood, there should be no first-order bias to the computed $V/V_{\max}$. For weak bursts, however, the background can sometimes increase sufficiently over the burst accumulation time of ~ 240 s that the background late in this interval will be found as the peak rate. This is easily recognized and corrected by inspection of the program output.

REFERENCES

- Atteia, J. L., et al. 1991, *Nature*, 351, 296
- Band, D. 1993, *ApJ*, 400, L63
- Brainerd, J. J. 1992a, *Nature*, 355, 522
- . 1992b, *ApJ*, 394, L33
- Briggs, M. S. 1993, *ApJ*, 407, 126
- Briggs, M. S., et al. 1994, in preparation
- Brock, M. N., et al. 1992a, *Proc. Huntsville Gamma-Ray Burst Workshop*, ed. W. S. Paciesas & G. J. Fishman (New York: AIP), 383
- . 1992b, *Proc. Huntsville Gamma-Ray Burst Workshop*, ed. W. S. Paciesas & G. J. Fishman (New York: AIP), 399
- Dezalay, J.-P., Barat, C., Talon, R., Sunyaev, R., Terekhov, O., & Kuznetsov, A. 1992, *Proc. Huntsville Gamma-Ray Burst Workshop*, ed. W. S. Paciesas & G. J. Fishman (New York: AIP), 304
- Eichler, D., & Silk, J. 1992, *Science*, 257, 937
- Fishman, G. J., et al. 1989, *Proc. of the GRO Science Workshop* ed. W. N. Johnson (Greenbelt: NASA/GSFC), 2-39
- Hartmann, D. 1992, *Comm. Astrophys.*, 16, 231
- Hartmann, D., & The, L. 1993, *Ap&SS*, 201, 347
- Higdon, J. C., Matz, S. M., Share, G. H., Messina, D. C., & Iadicicco, A. 1992, *Proc. Huntsville Gamma-Ray Burst Workshop*, ed. W. S. Paciesas & G. J. Fishman (New York: AIP), 89
- Horack, J. M., & Fishman, G. J. 1991, *NASA Tech. Memo. TM-103546*
- Hurley, K. 1992, *Proc. Huntsville Gamma-Ray Burst Workshop*, ed. W. S. Paciesas & G. J. Fishman (New York: AIP), 3
- Katz, J. I. 1993, *Ap&SS*, in press
- Kouveliotou, K., et al. 1994, in preparation
- Li, H., & Dermer, C. D. 1992, *Nature*, 359, 514
- Mallozzi, R., et al. 1993, *Proc. Compton Symposium*, ed. N. Gehrels (New York: AIP), in press
- Mao, S., & Paczyński, B. 1992, *ApJ*, 388, L45
- Meegan, C. A., et al. 1992, *Nature*, 355, 143
- . 1993, *Proc. Compton Symposium*, ed. N. Gehrels (New York: AIP), in press
- Melia, F., & Fatuzzo, M. 1992, *ApJ*, 398, L85
- Mészáros, P., & Rees, M. J. 1993, *ApJ*, 405, 278
- Mochkovitch, R., Hernanz, M., Isern, J., & Martin, X. 1993, *Nature*, 361, 236
- Ogasaka, Y., Murakami, T., Nishimura, J., Yoshida, A., & Fenimore, E. E. 1991, *ApJ*, 383, L61
- Paczynski, B. 1986, *ApJ*, 308, L43
- . 1991, *Acta Astron.*, 41, 257
- . 1992, *Proc. Huntsville Gamma-Ray Burst Workshop*, ed. W. S. Paciesas & G. J. Fishman (New York: AIP), 144
- Petrosian, V. 1993, *ApJ*, 402, L33
- Piran, T. 1992, *ApJ*, 389, L45
- Press, W. H., Teukolsky, S. A., Vetterling, W. T., & Flannery, B. P. 1992, *Numerical Recipes in FORTRAN*, 2d ed. (Cambridge: Cambridge Univ. Press)
- Schmidt, M. 1968, *ApJ*, 151, 393
- Schmidt, M., Higdon, J. C., & Heuter, G. 1988, *ApJ*, 329, L85
- Usov, V. 1992, *Nature*, 357, 472
- Woosley, S. E. 1993, *ApJ*, 405, 273