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# A comparison of the gamma-ray bursts detected by BATSE and Swift⋆

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**ABSTRACT**

*Aims.* The durations of 388 gamma-ray bursts detected by the Swift satellite, are analyzed statistically to search for subgroups. The results are then compared with results obtained earlier for data from the BATSE database.
*Methods.* We apply the standard $\chi^2$ test.
*Results.* As for data in the BATSE database, short and long subgroups are also reliably identified in the Swift data. An intermediate subgroup is also seen in the Swift database.
*Conclusions.* The analysis of the entire sample of 388 GRBs provides a support for the existence of three subgroups.

**Key words.** gamma rays: bursts

## 1. Introduction

During the years 1991-2000, 2704 gamma-ray bursts (GRBs) were detected by the BATSE instrument onboard the Compton Gamma-Ray Observatory (Meegan et al. 2001). After the launch of the Swift satellite (in November 2004), the frequency of GRBs detected by this instrument has been cca 100/year (Gehrels et al. 2005). Any comparison of different databases is highly useful. For example, in the BATSE database, three subgroups (short, intermediate, and long GRBs) have been robustly identified (Horváth et al. 2006; Chattopadhyay et al. 2007, and references therein). The short and long subgroups are physically different phenomena (Balázs et al. 2003). However, in contrast to this, it remains possible that the intermediate subgroup is not a true physically independent subgroup and it is present in the BATSE database because of e.g. some observational biases caused by the BATSE triggering procedure (Horváth et al. 2006). The most reliably way, to resolve the debate concerning whether subgroups or bias are present is to analyze an independent database acquired by another instrument. Hence, it is natural to ask whether these subgroups are also seen in the Swift data-set?

The purpose of this article is the statistical analysis of the Swift database, which may answer this question. We proceed in an identical way to the successful statistical analysis completed for the BATSE catalog (Horváth 1998) leading to the discovery of the third subgroup (Mukherjee et al. 1998; Bagoly et al. 1998; Horvath 1999; Hakkila et al. 2000; Rajaniemi & Mähönen 2002; Horváth 2002, 2003; Balázs et al. 2003; Horváth et al. 2006; Chattopadhyay et al. 2007). A statistical study of the Swift database – using the maximum likelihood method – has already shown evidence of a third subgroup (Horváth et al. 2008). The $\chi^2$ fitting was not used because of the smallness of the population. However, historically, the first evidence of the third subgroup in the BATSE database came from the simple $\chi^2$ method (Horváth 1998), and the number of 388 data points not should be too small for this testing. In all cases, one has to probe this fitting also for the Swift data sample. Since approximately one third of the Swift's bursts have already well determined redshifts (in contrast to the BATSE's GRBs, for which only a few objects have measured redshifts, Ramirez-Ruiz & Fenimore 2000; Norris 2002; Bagoly et al. 2003), some additional tests can also be done on samples with and without redshifts.

The paper is organized as follows. The samples are defined in Sect. 2 and also listed in detail at the end of the article. Section 3 presents the $\chi^2$ fitting of these samples. Section 4 discusses the results of this paper, and Sect. 5 summarizes them.

## 2. The samples

We define two samples from the Swift data-set (Gehrels et al. 2005): the sample of GRBs without measured redshifts ($z$) and the sample with measured redshifts. These two samples are collected in Tables 4 and 5. We compiled these tables for convenience; each table contains the name of the GRB, its BAT duration $T_{90}$, and BAT fluence at range 15−150 keV, BAT 1-sec peak photon flux at range 15−150 keV, and Table 5 also provides its redshift. Only these bursts were taken into account, of which the GRB duration was measured. The combined data sets cover the period from November 2004 to the end of February 2009; the first (last) object is GRB041217 (GRB090205). Table 4 (5) contain 258 (130) GRBs, and hence the total number of GRBs, which are studied in this paper, is 388.

In this paper, we study both samples separately and also together as one single set (the complete sample).

⋆ Tables 4 and 5 are only available in electronic form at http://www.aanda.org

**Table 1.** Results of the $\chi^2$ fitting of the complete sample of 388 GRBs.

| Fit | I. | II. | III. | IV. | V. | VI. | VII. |
|---|---|---|---|---|---|---|---|
| No. of bins | 30 | 34 | 35 | 36 | 25 | 15 | 31 |
| 1 G | | | | | | | |
| $\chi^2_1$ | 90.5 | 105.6 | 97.4 | 112.3 | 97.5 | 56.6 | 94.5 |
| si.[%] | $10^{-6}$ | $10^{-8}$ | $10^{-6}$ | $10^{-8}$ | $10^{-9}$ | $10^{-5}$ | $10^{-7}$ |
| $\mu$ | 1.45 | 1.52 | 1.45 | 1.45 | 1.45 | 1.47 | 1.44 |
| $\sigma$ | 0.87 | 0.88 | 0.89 | 0.87 | 0.93 | 0.83 | 0.89 |
| 2 G | | | | | | | |
| $\chi^2_2$ | 30.9 | 40.1 | 31.3 | 47.7 | 17.3 | 7.5 | 23.1 |
| si.[%] | 15.6 | 6.5 | 34.4 | 2.1 | 58.8 | 58.6 | 57.1 |
| $\mu_1$ | 0.48 | 0.46 | 0.41 | 0.32 | 0.06 | 0.42 | 0.33 |
| $\sigma_1$ | 0.93 | 0.99 | 0.98 | 0.95 | 1.09 | 0.92 | 0.97 |
| $\mu_2$ | 1.63 | 1.68 | 1.62 | 1.61 | 1.60 | 1.62 | 1.62 |
| $\sigma_2$ | 0.51 | 0.52 | 0.52 | 0.53 | 0.54 | 0.53 | 0.52 |
| $w_2$ | 0.84 | 0.76 | 0.85 | 0.88 | 0.85 | 0.83 | 0.82 |
| F[%] | $10^{-3}$ | $10^{-4}$ | $10^{-5}$ | $10^{-4}$ | $10^{-5}$ | $10^{-2}$ | $10^{-6}$ |
| 3 G | | | | | | | |
| $\chi^2_3$ | 21.4 | 29.7 | 22.6 | 35.9 | 10.0 | 2.4 | 16.7 |
| si.[%] | 43.6 | 23.7 | 65.5 | 11.6 | 86.7 | 88.2 | 78.0 |
| $\mu_1$ | 0.34 | 0.91 | 0.11 | 0.19 | −0.01 | 1.07 | 0.28 |
| $\sigma_1$ | 0.94 | 1.27 | 0.98 | 0.91 | 1.13 | 0.97 | 0.97 |
| $\mu_2$ | 1.19 | 1.18 | 1.24 | 1.04 | 1.06 | 1.12 | 1.62 |
| $\sigma_2$ | 0.39 | 0.36 | 0.45 | 0.32 | 0.35 | 0.53 | 0.52 |
| $w_2$ | 0.35 | 0.28 | 0.44 | 0.26 | 0.29 | 0.30 | 0.18 |
| $\mu_3$ | 1.91 | 1.93 | 1.94 | 1.84 | 1.85 | 1.84 | 1.84 |
| $\sigma_3$ | 0.36 | 0.34 | 0.35 | 0.38 | 0.37 | 0.33 | 0.38 |
| $w_3$ | 0.47 | 0.47 | 0.42 | 0.60 | 0.56 | 0.60 | 0.58 |
| F[%] | **4.04** | **4.66** | **3.07** | **4.50** | **2.52** | **3.63** | 5.41 |

## 3. $\chi^2$ fitting of the GRB durations

### 3.1. The entire sample

Since the $\chi^2$ fitting of the GRB duration distribution and the F-test were successfully used in the work Horváth (1998) (presenting the first evidence of three GRB subgroups), we proceed in a identical way, but with the Swift's data.

The complete sample consists of 388 events with measured $T_{90}$. We fitted the histogram of their decimal log $T_{90}$ values seven times (fits I.–VII.). The results are collected in Table 1, and the fit No.VI. is seen in Fig. 1. We chose different binnings for independent fittings of various numbers of bins, with different bin edges. The bin widths also differ. In each bin, we applied the sole restriction that the theoretically expected number of GRBs should be higher than 5.

The histogram was first fitted with one single theoretical Gaussian curve of two free parameters (mean $\mu$ and standard deviation $\sigma$). The best-fit model parameters corresponding to the minimal $\chi^2$ fit are, e.g., for fit No.VI the following: $\mu = 1.47$, $\sigma = 0.83$ with $\chi^2_1 = 56.6$. The goodness-of-fit for $15-2-1 = 12$ degrees of freedom (dof) provides a rejection at the level of $10^{-5}$% (Trumpler & Weaver 1953; Kendall & Stuart 1973). This represents a rejection of the null-hypothesis (i.e. one Gaussian curve is sufficient) that it is correct, because the probability of the mistake for this rejection is not higher than $10^{-5}$%. The complete sample cannot be described by one single Gaussian curve. The same situation is also true for the remaining six fittings.

The fitting with the sum of two Gaussian curves (five free parameters: two means, two standard deviations, and one weight $w_2$ (since the first weight is equal to $1 - w_2$)) gave for the fit No.VI $\chi^2 = 7.5$. (Note that the value of $w_2$ requires that 17% (83%) of GRBs should belong to the short (long) subgroup.) Here d.o.f. $= 15 - 5 - 1 = 9$ and we obtained an excellent fit with

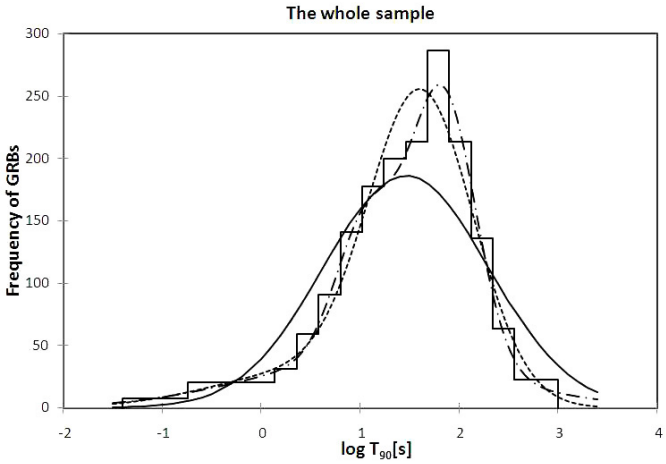


**Fig. 1.** Fitting of the log $T_{90}$ histogram for the complete sample with 15 bins (fit No.VI.). The number of GRBs per bin is given by the product of the frequency and width. There are two equally populated bins between $-0.74 < \log T_{90} < 0.14$, divided at $\log T_{90} = -0.30$. For these bins, the frequencies are 20.45, and hence the number of GRBs in these bins equal to $20.45 \times 0.44 = 9$. The theoretical curves show the best fits: full line = 1 Gaussian curve; dotted line = sum of 2 Gaussian curves; dash-dotted line = sum of 3 Gaussian curves.

the significance level 58.6% (i.e., if we suppose that the fit is incorrect, then the probability that this assumption is wrong is higher than 58.6%). The assumption that the duration distribution is represented by the sum of two Gaussian curves cannot be – from the statistical point of view – rejected. The best-fit curve is also presented in Fig. 1, showing a good correspondence with measured data. The remaining six fits again provide similar results.

We also performed the fitting with the sum of three Gaussian curves (eight parameters: three means, three standard deviations, and two independent weights), and obtained an excellent fit with $\chi^2_3 = 2.4$ for fit no.VI, because the goodness-of-fit implies that for d.o.f. $= 15 - 8 - 1 = 6$, the significance level is 88.2%. The best-fit curve is also seen in Fig. 1, which indicate closer correspondence with the measured data. The same excellent fits are also obtained for the remaining six binnings.

The key question is whether the decreasing $\Delta\chi^2 = 7.5-2.4 = 5.1$ statistically significant? To answer this question, we proceed similarly to Horváth (1998) and used the test proposed by Band et al. (1997) in Appendix A. The significance level from the F-test is 3.63%. This implies that the rejection of the null-hypothesis (i.e. that the sum of the two Gaussian curves is enough) is adequate, because the probability of the mistake at this rejection level is not higher than 3.63%. We arrive at the conclusion that the strengthening of $\chi^2$ need not be a fluctuation. Similar results were obtained for the remaining six fits – only for fit No.VII was the significance just above the usual 5% limit. (The significances lower than 5% are denoted by boldface.) In other words, the introduction of the third subgroup – purely from the statistical point of view – is significant for six of the seven fits completed. We note that the same F-test can also be applied to the difference $\chi^2_1 - \chi^2_2$, and we always obtain the conclusion that the introduction of the second subgroup – instead of the one single group – is strongly supported.

### 3.2. The sample with z

The sample contains 130 events with duration information. We also performed seven fits, but the number of bins had to be

**Table 2.** Results of the $\chi^2$ fitting of the sample of 130 GRBs with the known redshifts.

| Fit | I. | II. | III. | IV. | V. | VI. | VII. |
|---|---|---|---|---|---|---|---|
| No. of bins | 10 | 11 | 12 | 15 | 16 | 17a | 17b |
| 1 G | | | | | | | |
| $\chi^2_1$ | 9.7 | 12.2 | 13.9 | 11.8 | 14.8 | 16.8 | 11.9 |
| si.[%] | 20.9 | 14.4 | 12.6 | 46.0 | 31.8 | 26.5 | 61.2 |
| $\mu$ | 1.55 | 1.52 | 1.53 | 1.69 | 1.54 | 1.54 | 1.53 |
| $\sigma$ | 0.74 | 0.77 | 0.74 | 0.78 | 0.76 | 0.75 | 0.76 |
| 2 G | | | | | | | |
| $\chi^2_2$ | 2.6 | 6.7 | 7.7 | 4.7 | 7.9 | 10.1 | 5.3 |
| si.[%] | 62.4 | 24.0 | 26.0 | 86.0 | 64.0 | 51.8 | 91.8 |
| $\mu_1$ | 1.47 | -0.50 | 0.17 | 0.22 | 0.70 | -0.69 | -0.66 |
| $\sigma_1$ | 0.77 | 1.00 | 0.88 | 0.94 | 0.86 | 0.10 | 0.15 |
| $\mu_2$ | 1.97 | 1.58 | 1.62 | 1.77 | 1.68 | 1.59 | 1.58 |
| $\sigma_2$ | 0.10 | 0.63 | 0.58 | 0.60 | 0.55 | 0.62 | 0.63 |
| $w_2$ | 0.12 | 0.97 | 0.91 | 0.91 | 0.82 | 0.97 | 0.97 |
| F[%] | 6.97 | 28.21 | 22.19 | **2.20** | 6.50 | 9.74 | **1.70** |
| 3 G | | | | | | | |
| $\chi^2_3$ | 2.0 | 2.0 | 1.9 | 2.2 | 4.0 | 5.4 | 2.8 |
| si.[%] | 15.4 | 49.8 | 59.1 | 89.9 | 77.8 | 71.4 | 94.8 |
| $\mu_1$ | 1.04 | –0.13 | 1.16 | 0.17 | 1.07 | –0.57 | –0.12 |
| $\sigma_1$ | 0.30 | 1.00 | 1.05 | 0.50 | 0.92 | 0.05 | 0.14 |
| $\mu_2$ | 1.17 | 0.94 | 1.61 | 1.14 | 1.32 | 1.12 | 0.95 |
| $\sigma_2$ | 1.10 | 0.26 | 0.25 | 0.26 | 0.12 | 0.42 | 0.33 |
| $w_2$ | 0.25 | 0.24 | 0.53 | 0.24 | 0.49 | 0.48 | 0.28 |
| $\mu_3$ | 1.94 | 1.85 | 1.91 | 2.00 | 1.88 | 2.00 | 1.86 |
| $\sigma_3$ | 0.34 | 0.44 | 0.18 | 0.43 | 0.33 | 0.34 | 0.43 |
| $w_3$ | 0.49 | 0.69 | 0.25 | 0.67 | 0.41 | 0.49 | 0.67 |
| F[%] | 89.64 | 24.41 | 10.51 | 13.29 | 12.66 | 11.40 | 10.96 |

reduced because of the lower number of objects in the sample. We again in a different way binned data – fits VI. and VII. had 17 bins, but the structure was different. In each bin again the number of GRBs was higher than 5. The results are collected in Table 2, and fit No.II. is shown in Fig. 2.

Here the results, compared with the entire sample, differ for two reasons. First, the fits with one single Gaussian curve are also acceptable, and only for two fits does the F-test show that the introduction of the second subgroup is adequate. Second, the introduction of the third subgroup is not needed from the F-test. All this indicates that this sample can be defined by one single group, and even the separation between short and long GRBs is not needed.

### 3.3. The sample without z

This sample contains 258 events with duration information. We also completed seven fits with different binnings. In each bin, the number of GRBs was again higher than 5. The results are presented in Table 3, and fit No.I. is shown in Fig. 3.

Compared with the entire sample, the results are similar – except that, the introduction of the third subgroup is not needed according to the F-test. All of this shows that this sample can be described well by the sum of two and only two subgroups.

## 4. Discussion of the results

We first highlight that we have proven that short and long subgroups also exist in the Swift data-set. Both the complete sample and the sample with no redshifts have been found to contain these two subgroups, because fits attempted with one single Gaussian curve are clearly wrong. It is also remarkable that

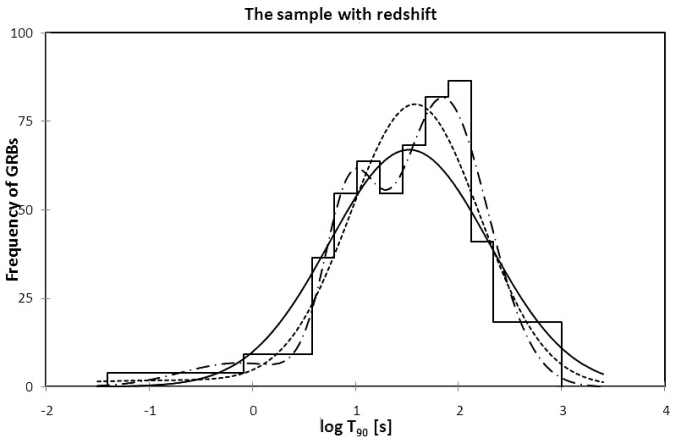


**Fig. 2.** Fitting of $\log T_{90}$ in the sample with known redshifts. The theoretical curves show the best-fit curves. The notation of the lines is the same as in Fig. 1.

**Table 3.** Results of the $\chi^2$ fitting of the sample without the known redshift with 258 GRBs.

| Fit | I. | II. | III. | IV. | V. | VI. | VII. |
|---|---|---|---|---|---|---|---|
| No. of bins | 11 | 14 | 16 | 18 | 20 | 22 | 23 |
| 1 G | | | | | | | |
| $\chi^2_1$ | 57.8 | 66.8 | 67.3 | 71.4 | 76.0 | 83.8 | 76.2 |
| si.[%] | $10^{-7}$ | $10^{-8}$ | $10^{-7}$ | $10^{-7}$ | $10^{-7}$ | $10^{-8}$ | $10^{-6}$ |
| $\mu$ | 1.47 | 1.41 | 1.41 | 1.41 | 1.41 | 1.42 | 1.41 |
| $\sigma$ | 0.83 | 0.90 | 0.86 | 0.90 | 0.87 | 0.90 | 0.88 |
| 2 G | | | | | | | |
| $\chi^2_2$ | 6.9 | 9.5 | 15.1 | 13.7 | 18.2 | 23.2 | 19.5 |
| si.[%] | 22.8 | 30.6 | 13.0 | 31.8 | 20.0 | 10.9 | 30.0 |
| $\mu_1$ | -0.04 | 0.09 | 0.36 | 0.22 | 0.38 | 0.28 | 0.48 |
| $\sigma_1$ | 0.81 | 1.07 | 0.98 | 1.06 | 1.00 | 1.03 | 1.03 |
| $\mu_2$ | 1.58 | 1.60 | 1.60 | 1.61 | 1.62 | 1.62 | 1.63 |
| $\sigma_2$ | 0.51 | 0.51 | 0.49 | 0.50 | 0.48 | 0.49 | 0.48 |
| $w_2$ | 0.86 | 0.83 | 0.80 | 0.81 | 0.79 | 0.80 | 0.76 |
| F[%] | 0.36 | 0.04 | 0.07 | 0.01 | 0.01 | 0.01 | $10^{-3}$ |
| 3 G | | | | | | | |
| $\chi^2_3$ | 2.9 | 3.1 | 10.6 | 9.2 | 14.8 | 18.3 | 17.0 |
| si.[%] | 23.3 | 68.2 | 15.8 | 42.1 | 19.1 | 14.5 | 25.9 |
| $\mu_1$ | –0.46 | –0.55 | –0.52 | –0.38 | 0.97 | –0.38 | –0.12 |
| $\sigma_1$ | 0.40 | 0.82 | 0.59 | 0.80 | 1.13 | 0.78 | 0.86 |
| $\mu_2$ | 0.86 | 1.47 | 1.37 | 1.51 | 1.15 | 1.48 | 1.52 |
| $\sigma_2$ | 0.33 | 0.56 | 0.57 | 0.57 | 0.19 | 0.56 | 0.55 |
| $w_2$ | 0.20 | 0.77 | 0.67 | 0.78 | 0.17 | 0.74 | 0.74 |
| $\mu_3$ | 1.72 | 1.97 | 1.89 | 1.91 | 1.82 | 1.94 | 1.88 |
| $\sigma_3$ | 0.43 | 0.15 | 0.28 | 0.15 | 0.29 | 0.20 | 0.20 |
| $w_3$ | 0.72 | 0.13 | 0.25 | 0.11 | 0.45 | 0.15 | 0.13 |
| F[%] | 40.20 | 6.81 | 39.50 | 23.87 | 47.00 | 33.60 | 53.60 |

the weight of the short subgroup agrees with this expectation. As follows from Horváth et al. (2006), in the BATSE catalog the populations of the short, intermediate, and long bursts are have in terms of number the ratio 20:10:70. Nevertheless, because the short bursts are harder and Swift is more sensitive to softer GRBs, one may expect that in the Swift database the population of short GRBs should be comparable to or lower than 20% because of instrumental reasons. The weights derived for the entire sample (being between 10 and 26%) agree with this expectation. Entire the other values of the best-fit model parameters – i.e. two means and two standard deviations – are also roughly in

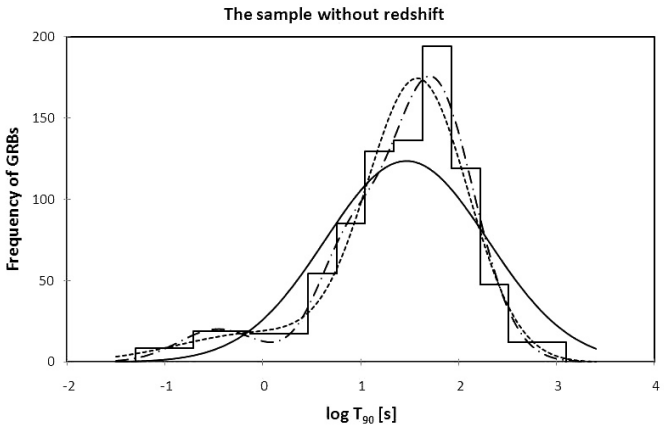


**Fig. 3.** Fitting of log $T_{90}$ to the sample with unknown redshifts. The theoretical curves show the best fits. The notation of the lines is the same as in Fig. 1.

the ranges expected on the basis of the BATSE values. The differences can be given by the different instrumentations. For example, the mean values of the log $T_{90}$ should be slightly longer in the Swift database than for the BATSE data (Barthelmy et al. 2005; Band 2006). In Horváth (1998), the BATSE's means are –0.35 (short) and 1.52 (long), respectively. We obtained for the complete sample values from –0.01 to 0.91 (short) and from 1.60 to 1.94 (long), respectively. In terms of short and long GRBs, all this implies that the situation is almost identical to that of the BATSE data-set.

For the sample with known redshifts, the situation is different, because the fits still allow one single Gaussian curve. This result can be easily explained by selection effects. It is well-known that the observational determination of the redshifts in the Swift data sample is easier for long than short bursts because of observational strategies, i.e., it is more complicated to detect and follow the afterglows of short GRBs (Gehrels et al. 2005).

Concerning the third intermediate subgroup, the complete sample also supports its existence six out of seven tests inferred significances of below 5%. Hence, strictly speaking, the third subclass does exist and the probability of the mistake in this claim is not higher than $x$%, where $2.52 < x < 5.41$. This result agrees with expectations, once a comparison with the BATSE database is provided. As stated in the Introduction, for the BATSE database the first evidence of a third subgroup was provided by this $\chi^2$ method, and hence for the Swift database this test should also provide positive support for this subgroup, if the two datasets are comparable. It is the key result of this article that this expectation is fulfilled. Our study has shown that the classical $\chi^2$ fitting – in combination with F-test – may well also work in the Swift database as for the BATSE database (Horváth 1998).

Horváth et al. (2008) confirmed the existence of a third subgroup in the Swift dataset by applying the maximum likelihood (ML) method. Our significance of between 2.52% and 5.41% is weaker than the 0.46% significance obtained by Horváth et al. (2008), as expected, because the ML method is a more robust statistical test. This is seen from new two studies, too: the ML test applied to the databases of RHESSI (Řípa et al. 2009) and BeppoSAX (Horváth 2009) satellites, respectively, confirmed the existence of the third intermediate subclass; on the other hand, the $\chi^2$ test was either not of high enough significance for RHESSI data (Řípa et al. 2009) or was not used at all for BeppoSAX data (Horváth 2009).

It is also expected that the mean log $T_{90}$ for the intermediate group should be much higher in the Swift database because of the different redshift distributions (Band 2006; Jakobsson et al. 2006; Bagoly et al. 2006). The mean value of the BATSE's intermediate subgroup is 0.64 (Horváth 1998), but here the value is between 1.02 and 1.64. Horváth et al. (2008) also obtained a similar value of (1.107). Hence, the typical durations also agree with expectations.

The sample with no redshifts exhibited to sign of a third subgroup, which may be due to the lower number of objects in the sample. The sample with known redshifts is strongly biased by selection effects, and even here the existence of the short subgroup was unclear. Hence, we conclude that the existence of a third subgroup is unclear.

## 5. Conclusions

Since the $\chi^2$ fitting of the GRB duration distribution and the F-test were successfully used in the work Horváth (1998), which presented the first evidence of three GRB subgroups, we have proceeded identically, but with the Swift's data.

The results may be summarized in the following four points:

1. For the short and long subgroups, all of our findings agree with expectations: they are also detected in the Swift database and weight of the short subgroup is lower, which may be because of the Swift's higher effective sensitivity to softer bursts.
2. The complete sample of 388 objects appears to contain three subgroups, because from seven fits the complete sample, six have confirmed the existence of the intermediate subgroup on a lower than 5% significance level. Hence, for the Swift database, the situation is similar to that of the BATSE dataset, although our signficances are lower than the measurement of >0.02% of Horváth (1998).
3. The samples with and without known redshifts are separately either not enough populated, or strongly biased. Hence, no far reaching conclusions can be drawn about them.
4. As for the BATSE database, it is shown again that the classical $\chi^2$ test – in combination with the F-test – is also effective for the Swift GRB sample.

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**Table 4.** Swift GRBs with no measured redshifts; Part I.

| GRB | $T_{90}$ s | fluence $10^{-7}$ erg/cm$^2$ | peak-flux ph/(cm$^2$ s) |
|---|---|---|---|
| 090201 | 83.0 | 300.00 | 14.70 |
| 090129 | 17.5 | 21.00 | 3.70 |
| 090123 | 131.0 | 29.00 | 1.70 |
| 090118 | 16.0 | 4.00 | n/a |
| 090113 | 9.1 | 7.60 | 2.50 |
| 090111 | 24.8 | 6.20 | 0.90 |
| 090107A | 12.2 | 2.30 | 1.10 |
| 081230 | 60.7 | 8.20 | 0.70 |
| 081228 | 3.0 | 0.89 | 0.60 |
| 081226A | 0.4 | 0.99 | 2.40 |
| 081221 | 34.0 | 181.00 | 18.20 |
| 081211A | 3.5 | 1.30 | 0.80 |
| 081210 | 146.0 | 18.00 | 2.50 |
| 081203B | 23.4 | 21.00 | n/a |
| 081128 | 100.0 | 23.00 | 1.30 |
| 081127 | 37.0 | 4.90 | 0.60 |
| 081126 | 54.0 | 33.00 | 3.70 |
| 081109A | 190.0 | 36.00 | 1.10 |
| 081104 | 59.1 | 20.00 | 1.00 |
| 081102 | 63.0 | 23.00 | 1.40 |
| 081101 | 0.2 | 0.62 | 3.60 |
| 081025 | 23.0 | 19.00 | 1.30 |
| 081024A | 1.8 | 1.20 | 1.10 |
| 081022 | 160.0 | 25.00 | 0.60 |
| 081017 | 320.0 | 14.00 | 0.07 |
| 081016B | 2.6 | 0.99 | 0.50 |
| 081012 | 29.0 | 11.00 | 1.00 |
| 081011 | 9.0 | 1.60 | 0.40 |
| 080919 | 0.6 | 0.72 | 1.20 |
| 080916B | 32.0 | 6.30 | 0.60 |
| 080915B | 3.9 | 9.90 | 8.50 |
| 080915A | 14.0 | 2.30 | 0.50 |
| 080905A | 1.0 | 1.40 | 1.30 |
| 080903 | 66.0 | 14.00 | 0.80 |
| 080822B | 64.0 | 1.70 | 0.06 |
| 080802 | 176.0 | 13.00 | 0.30 |
| 080727C | 79.7 | 52.00 | 2.30 |
| 080727B | 8.6 | 31.00 | 7.60 |
| 080727A | 4.9 | 1.30 | 0.30 |
| 080725 | 120.0 | 37.00 | 2.30 |
| 080723A | 17.3 | 3.30 | 0.90 |
| 080714 | 33.0 | 25.00 | 4.20 |
| 080703 | 3.4 | 2.00 | 1.00 |
| 080702B | 20.0 | 5.00 | 0.50 |
| 080702A | 0.5 | 0.36 | 0.70 |
| 080701 | 18.0 | 7.10 | 2.20 |

**Table 4.** Swift GRBs with no measured redshifts; Part II.

| GRB | $T_{90}$ s | fluence $10^{-7}$ erg/cm$^2$ | peak-flux ph/(cm$^2$ s) |
|---|---|---|---|
| 080623 | 15.2 | 10.00 | 2.00 |
| 080613B | 105.0 | 58.00 | 2.70 |
| 080602 | 74.0 | 32.00 | 2.90 |
| 080524 | 9.0 | 2.90 | 0.40 |
| 080523 | 102.0 | 8.80 | 0.50 |
| 080517 | 64.6 | 5.60 | 0.60 |
| 080515 | 21.0 | 20.00 | 3.90 |
| 080506 | 150.0 | 13.00 | 0.40 |
| 080503 | 170.0 | 20.00 | 0.90 |
| 080426 | 1.7 | 3.70 | 4.80 |
| 080409 | 20.2 | 6.10 | 3.70 |
| 080405 | 40.0 | 12.00 | n/a |
| 080328 | 90.6 | 94.00 | 5.50 |
| 080325 | 128.4 | 49.00 | 1.40 |
| 080320 | 14.0 | 2.70 | 0.60 |
| 080319D | 24.0 | 3.20 | 0.10 |
| 080319A | 64.0 | 48.00 | 1.20 |
| 080315 | 65.0 | 1.40 | 0.04 |
| 080307 | 125.9 | 8.70 | 0.40 |
| 080303 | 67.0 | 6.60 | 1.40 |
| 080229A | 64.0 | 90.00 | 5.70 |
| 080218B | 6.2 | 5.10 | 3.10 |
| 080218A | 27.6 | 6.30 | 1.40 |
| 080212 | 123.0 | 29.00 | 1.20 |
| 080207 | 340.0 | 61.00 | 1.00 |
| 080205 | 106.5 | 21.00 | 1.40 |
| 080130 | 65.0 | 7.70 | 0.20 |
| 080129 | 48.0 | 8.90 | 0.20 |
| 080123 | 115.0 | 5.70 | 1.80 |
| 080121 | 0.7 | 0.30 | n/a |
| 071129 | 420.0 | 35.00 | 0.90 |
| 071118 | 71.0 | 5.00 | 0.30 |
| 071112B | 0.3 | 0.48 | 1.30 |
| 07110 | 19.0 | 0.76 | 0.40 |
| 071028B | 55.0 | 2.50 | 1.40 |
| 071028A | 27.0 | 3.00 | 0.30 |
| 071025 | 109.0 | 65.00 | 1.60 |
| 071018 | 376.0 | 10.00 | 0.20 |
| 071013 | 26.0 | 3.20 | 0.40 |
| 071011 | 61.0 | 22.00 | 1.70 |
| 071008 | 18.0 | 2.40 | 0.50 |
| 071006 | 50.0 | 1.40 | 13.00 |
| 071001 | 58.5 | 7.70 | 0.90 |
| 070923 | 0.1 | 0.10 | 2.40 |
| 070920B | 20.2 | 6.60 | 0.80 |
| 070920A | 56.0 | 5.10 | 0.30 |
| 070917 | 7.3 | 20.00 | 8.50 |
| 070913 | 3.2 | 2.50 | 1.40 |
| 070911 | 162.0 | 120.00 | 3.90 |

**Table 4.** Swift GRBs with no measured redshifts; Part III.

| GRB | $T_{90}$ s | fluence $10^{-7}$ erg/cm$^2$ | peak-flux ph/(cm$^2$ s) |
|---|---|---|---|
| 070810B | 80.0 | 0.12 | 1.80 |
| 070809 | 1.3 | 1.00 | 1.20 |
| 070808 | 32.0 | 12.00 | 2.00 |
| 070805 | 31.0 | 7.20 | 0.70 |
| 070731 | 2.9 | 1.60 | 1.20 |
| 070729 | 0.9 | 1.00 | 1.00 |
| 070721A | 3.4 | 0.71 | 0.70 |
| 070714A | 2.0 | 1.50 | 1.80 |
| 070704 | 380.0 | 59.00 | 2.10 |
| 070628 | 39.1 | 35.00 | 5.10 |
| 070621 | 33.3 | 43.00 | 2.50 |
| 070616 | 402.0 | 192.00 | 1.90 |
| 070612B | 13.5 | 17.00 | 2.60 |
| 070610 | 4.6 | 2.40 | 0.90 |
| 070531 | 44.0 | 11.00 | 1.00 |
| 070520B | 66.0 | 9.20 | 0.40 |
| 070520A | 18.0 | 2.50 | 0.40 |
| 070518 | 5.5 | 1.60 | 0.70 |
| 070517 | 9.0 | 2.60 | 0.80 |
| 070509 | 7.7 | 1.70 | 0.70 |
| 070429B | 0.5 | 0.63 | 1.80 |
| 070429A | 163.0 | 9.20 | 0.40 |
| 070427 | 11.0 | 7.20 | 1.30 |
| 070420 | 77.0 | 140.00 | 7.10 |
| 070419B | 236.5 | 75.00 | 1.40 |
| 070412 | 34.0 | 4.80 | 0.70 |
| 070406 | 0.7 | 0.45 | 0.70 |
| 070330 | 9.0 | 1.80 | 0.90 |
| 070328 | 69.0 | 89.00 | 4.20 |
| 070227 | 7.0 | 16.00 | 2.70 |
| 070224 | 34.0 | 3.10 | 0.30 |
| 070223 | 89.0 | 17.00 | 0.70 |
| 070220 | 129.0 | 106.00 | 5.88 |
| 070219 | 17.0 | 3.20 | 0.70 |
| 070209 | 0.1 | 0.11 | 2.40 |
| 070129 | 460.0 | 31.00 | 0.60 |
| 070126 | 51.0 | 1.60 | 0.20 |
| 070103 | 19.0 | 3.40 | 1.10 |
| 061222A | 72.0 | 83.00 | 9.20 |
| 061218 | 4.1 | 0.20 | 0.41 |
| 061202 | 91.0 | 35.00 | 2.60 |
| 061126 | 191.0 | 72.00 | 9.80 |
| 061102 | 17.6 | 1.90 | 0.20 |
| 061028 | 106.0 | 9.70 | 0.70 |
| 061027 | 150.0 | 4.70 | 0.08 |
| 061021 | 46.0 | 30.00 | 6.10 |
| 061019 | 191.0 | 17.00 | 2.20 |
| 061006 | 130.0 | 14.30 | 5.36 |
| 061004 | 6.2 | 5.70 | 2.50 |
| 061002 | 17.6 | 6.80 | 0.80 |
| 060929 | 12.4 | 2.80 | 0.40 |
| 060923C | 76.0 | 16.00 | 1.00 |
| 060923B | 8.8 | 4.80 | 1.50 |
| 060923A | 51.7 | 8.70 | 1.30 |
| 060919 | 9.1 | 5.50 | 2.20 |
| 060904A | 80.0 | 79.00 | 4.90 |

**Table 4.** Swift GRBs with no measured redshifts; Part IV.

| GRB | $T_{90}$ s | fluence $10^{-7}$ erg/cm$^2$ | peak-flux ph/(cm$^2$ s) |
|---|---|---|---|
| 060825 | 8.1 | 9.80 | 2.70 |
| 060813 | 14.9 | 55.00 | 9.00 |
| 060807 | 34.0 | 7.30 | 0.80 |
| 060805 | 5.4 | 0.74 | 0.30 |
| 060804 | 16.0 | 5.10 | 1.20 |
| 060801 | 0.5 | 0.81 | 1.30 |
| 060728 | 60.0 | 2.40 | n/a |
| 060719 | 55.0 | 16.00 | 2.30 |
| 060717 | 3.0 | 0.65 | 0.50 |
| 060712 | 26.0 | 13.00 | 1.70 |
| 060607B | 31.0 | 17.00 | 1.50 |
| 060602A | 60.0 | 16.00 | 0.50 |
| 060516 | 160.0 | 11.00 | 0.30 |
| 060515 | 52.0 | 14.00 | 0.80 |
| 060510A | 21.0 | 98.00 | 17.00 |
| 060507 | 185.0 | 45.00 | 1.30 |
| 060501 | 26.0 | 12.00 | 1.90 |
| 060428B | 58.0 | 7.20 | 0.60 |
| 060428A | 39.4 | 14.00 | 2.40 |
| 060427 | 64.0 | 5.00 | 0.30 |
| 060424 | 37.0 | 6.80 | 1.60 |
| 060421 | 11.0 | 12.00 | 3.00 |
| 060413 1 | 50.0 | 36.00 | 0.90 |
| 060403 | 30.0 | 14.00 | 1.00 |
| 060323 | 18.0 | 5.70 | 0.80 |
| 060322 | 213.0 | 51.00 | 2.10 |
| 060319 | 12.0 | 2.70 | 1.10 |
| 060313 | 0.7 | 11.30 | 12.10 |
| 060312 | 43.0 | 18.00 | 1.50 |
| 060306 | 61.0 | 22.00 | 6.10 |
| 060223B | 10.2 | 16.00 | 2.90 |
| 060219 | 62.0 | 4.20 | 0.60 |
| 060211B | 29.0 | 4.70 | 0.70 |
| 060211A | 126.0 | 15.00 | 0.40 |
| 060204B | 134.0 | 30.00 | 1.30 |
| 060203 | 60.0 | 8.50 | 0.60 |
| 060202 | 203.7 | 24.00 | 0.50 |
| 060117 | 16.0 | 204.00 | 48.90 |
| 060111B | 59.0 | 16.00 | 1.40 |
| 060111A | 13.0 | 11.80 | 1.72 |
| 060110 | 17.0 | 14.00 | 1.90 |
| 060109 | 116.0 | 6.40 | 0.50 |
| 060105 | 55.0 | 182.00 | 7.50 |
| 060102 | 21.0 | 2.40 | 0.40 |
| 051227 | 8.0 | 2.30 | 0.97 |
| 051221B | 61.0 | 11.30 | 0.54 |
| 051213 | 70.0 | 8.00 | 0.51 |
| 051210 | 1.4 | 0.83 | 0.75 |
| 051117B | 8.0 | 1.40 | 0.46 |
| 051117A | 140.0 | 46.00 | 0.93 |
| 051114 | 2.2 | 1.32 | 0.73 |
| 051113 | 94.0 | 26.00 | 2.40 |
| 051105A | 0.3 | 0.20 | 2.00 |
| 051021B | 47.0 | 9.10 | 0.63 |
| 051016A | 22.0 | 8.80 | 1.60 |
| 051012 | 13.0 | 2.90 | 0.60 |
| 051008 | 16.0 | 58.00 | 5.50 |
| 051006 | 26.0 | 12.80 | 1.90 |
| 051001 | 190.0 | 18.00 | 0.51 |

**Table 4.** Swift GRBs with no measured redshifts; Part V.

| GRB | $T_{90}$ s | fluence $10^{-7}$ erg/cm$^2$ | peak-flux ph/(cm$^2$ s) |
|---|---|---|---|
| 050925 | 0.1 | 0.75 | 1.50 |
| 050922B | 250.0 | 26.00 | 1.02 |
| 050916 | 90.0 | 11.00 | 0.69 |
| 050915B | 40.0 | 34.00 | 2.34 |
| 050915A | 53.0 | 8.80 | 0.80 |
| 050911 | 16.0 | 3.01 | 1.31 |
| 050906 | 0.1 | 0.07 | 1.15 |
| 050827 | 49.0 | 21.20 | 1.86 |
| 050822 | 102.0 | 26.10 | 2.47 |
| 050820B | 13.0 | 21.20 | 4.06 |
| 050819 | 36.0 | 3.52 | 0.39 |
| 050815 | 2.8 | 0.92 | 0.56 |
| 050801 | 20.0 | 3.12 | 1.47 |
| 050721 | 39.0 | 30.80 | 3.08 |
| 050717 | 86.0 | 61.70 | 6.34 |
| 050715 | 52.0 | 14.40 | 1.07 |
| 050713A | 70.0 | 52.50 | 4.78 |
| 050712 | 48.0 | 11.00 | 0.55 |
| 050701 | 22.0 | 13.60 | 2.77 |
| 050607 | 26.5 | 6.05 | 0.99 |
| 050528 | 10.8 | 4.40 | 1.23 |
| 050509A | 11.6 | 3.38 | 0.88 |
| 050502B | 17.5 | 4.72 | 1.43 |
| 050422 | 59.2 | 6.15 | 0.57 |
| 050421 | 10.3 | 1.18 | 0.44 |
| 050418 | 83.0 | 53.90 | 3.80 |
| 050416B | 5.4 | 11.30 | 5.85 |
| 050412 | 26.0 | 5.66 | 0.49 |
| 050410 | 43.0 | 43.00 | 1.80 |
| 050326 | 29.5 | 90.50 | 12.40 |
| 050306 | 160.0 | 120.00 | 3.64 |
| 050219B | 27.0 | 164.00 | 25.40 |
| 050219A | 23.0 | 42.10 | 3.61 |
| 050215B | 8.0 | 2.33 | 0.68 |
| 050215A | 6.0 | 7.29 | 0.51 |
| 050202 | 0.1 | 0.33 | 2.98 |
| 050128 | 13.8 | 51.70 | 7.59 |
| 050124 | 4.1 | 12.30 | 5.57 |
| 050117 | 169.0 | 91.20 | 2.40 |
| 041228 | 62.0 | 36.10 | 1.65 |
| 041226 | 15.0 | 3.23 | 0.34 |
| 041224 | 235.0 | 75.30 | 2.95 |
| 041223 | 107.0 | 171.00 | 7.49 |
| 041220 | 5.0 | 3.82 | 1.83 |
| 041219C | 40.0 | 20.00 | 1.50 |
| 041219B | 30.0 | n/a | 10.00 |
| 041219A | 520.0 | 1000.00 | 25.00 |
| 041217 | 7.5 | 65.70 | 4.40 |

**Table 5.** Swift GRBs with known redshifts; Part I.

| GRB | $T_{90}$ s | fluence $10^{-7}$ erg/cm$^2$ | peak-flux ph/(cm$^2$ s) | z |
|---|---|---|---|---|
| 090205 | 8.8 | 1.90 | 0.50 | 4.6749 |
| 090102 | 27.0 | 0.68 | 5.50 | 1.5477 |
| 081222 | 24.0 | 48.00 | 7.70 | 2.7467 |
| 081203A | 294.0 | 77.00 | 2.90 | 2.1000 |
| 081121 | 14.0 | 41.00 | 4.40 | 2.5120 |
| 081118 | 67.0 | 12.00 | 0.60 | 2.5800 |
| 081029 | 270.0 | 21.00 | 0.50 | 3.8474 |
| 081028A | 260.0 | 37.00 | 0.50 | 3.03800 |
| 081008 | 185.5 | 43.00 | 1.30 | 1.96775 |
| 081007 | 10.0 | 7.10 | 2.60 | 0.52950 |
| 080928 | 280.0 | 25.00 | 2.10 | 1.6910 |
| 080916A | 60.0 | 40.00 | 2.70 | 0.68900 |
| 080913 | 8.0 | 5.60 | 1.40 | 6.57000 |
| 080906 | 147.0 | 35.00 | 1.00 | 2.00000 |
| 080905B | 128.0 | 18.00 | 0.50 | 2.37400 |
| 080810 | 106.0 | 46.00 | 2.00 | 3.35000 |
| 080805 | 78.0 | 25.00 | 1.10 | 1.50500 |
| 080804 | 34.0 | 36.00 | 3.10 | 2.20225 |
| 080721 | 16.2 | 120.00 | 20.90 | 2.59650 |
| 080710 | 120.0 | 14.00 | 1.00 | 0.84500 |
| 080707 | 27.1 | 5.20 | 1.00 | 1.23000 |
| 080607 | 79.0 | 240.00 | 23.10 | 3.03600 |
| 080605 | 20.0 | 133.00 | 19.90 | 1.63980 |
| 080604 | 82.0 | 8.00 | 0.40 | 1.41600 |
| 080603B | 60.0 | 24.00 | 3.50 | 2.69000 |
| 080520 | 2.8 | 0.55 | 0.50 | 1.54500 |
| 080516 | 5.8 | 2.60 | 1.80 | 3.20000 |
| 080430 | 16.2 | 12.00 | 2.60 | 0.75850 |
| 080413B | 8.0 | 32.00 | 18.70 | 1.10000 |
| 080413A | 46.0 | 35.00 | 5.60 | 2.43300 |
| 080411 | 56.0 | 264.00 | 43.20 | 1.03000 |
| 080330 | 61.0 | 3.40 | 0.90 | 1.51000 |
| 080319C | 34.0 | 36.00 | 5.20 | 1.95000 |
| 080319B | 50.0 | 810.00 | 24.80 | 0.93700 |
| 080310 | 365.0 | 23.00 | 1.30 | 2.42580 |
| 080210 | 45.0 | 18.00 | 1.60 | 2.64100 |

**Table 5.** Swift GRBs with known redshifts; Part II.

| GRB | $T_{90}$ s | fluence $10^{-7}$ erg/cm$^2$ | peak-flux ph/(cm$^2$ s) | z |
|---|---|---|---|---|
| 071227 | 1.8 | 2.20 | 1.60 | 0.3835 |
| 071122 | 68.7 | 5.80 | 0.40 | 1.14 |
| 071117 | 6.6 | 24.00 | 11.30 | 1.331 |
| 071112C | 15.0 | 30.00 | 8.00 | 0.82 |
| 071031 | 180.0 | 9.00 | 0.50 | 2.692 |
| 071021 | 225.0 | 13.00 | 0.70 | 5.0 |
| 071020 | 4.2 | 23.00 | 8.40 | 2.1435 |
| 071010B | 35.7 | 44.00 | 7.70 | 0.947 |
| 071010A | 6.0 | 2.00 | 0.80 | 0.98 |
| 071003 | 150.0 | 83.00 | 6.30 | 1.0185 |
| 070810A | 11.0 | 6.90 | 1.90 | 2.17 |
| 070802 | 16.4 | 2.80 | 0.40 | 2.45 |
| 070724A | 0.4 | 0.80 | 1.00 | 0.457 |
| 070721B | 340.0 | 36.00 | 1.50 | 3.626 |
| 070714B | 64.0 | 7.20 | 2.70 | 0.92 |
| 070612A | 370.0 | 110.00 | 1.50 | 0.617 |
| 070611 | 12.0 | 39.00 | 0.80 | 2.04 |
| 070529 | 109.0 | 26.00 | 1.40 | 2.4996 |
| 070521 | 37.9 | 80.00 | 6.70 | 0.553 |
| 070508 | 21.0 | 200.00 | 24.70 | 0.82 |
| 070506 | 4.3 | 2.10 | 1.00 | 2.31 |
| 070419A | 116.0 | 5.60 | 2.80 | 0.97 |
| 070411 | 101.0 | 25.00 | 1.00 | 2.954 |
| 070318 | 63.0 | 23.00 | 1.60 | 0.838 |
| 070306 | 210.0 | 55.00 | 4.20 | 1.497 |
| 070208 | 48.0 | 4.30 | 0.90 | 1.165 |
| 070110 | 85.0 | 16.00 | 0.60 | 2.352 |
| 061222B | 40.0 | 22.00 | 1.50 | 3.355 |
| 061217 | 0.3 | 0.46 | 1.30 | 0.827 |
| 061210 | 85.0 | 11.00 | 5.30 | 0.41 |
| 061201 | 0.8 | 3.30 | 3.90 | 0.111 |
| 061121 | 81.0 | 137.00 | 21.10 | 1.314 |
| 061110B | 128.0 | 13.00 | 0.40 | 3.44 |
| 061110A | 41.0 | 11.00 | 0.50 | 0.758 |
| 061007 | 75.0 | 450.00 | 15.30 | 1.2615 |
| 060927 | 22.6 | 11.00 | 2.80 | 5.6 |
| 060926 | 8.0 | 2.20 | 1.10 | 3.208 |
| 060912 | 5.0 | 13.00 | 8.50 | 0.937 |
| 060908 | 19.3 | 29.00 | 3.20 | 2.43 |
| 060906 | 43.6 | 22.10 | 2.00 | 3.685 |
| 060904B | 192.0 | 17.00 | 2.50 | 0.703 |
| 060814 | 146.0 | 150.00 | 7.40 | 0.84 |
| 060729 | 116.0 | 27.00 | 1.40 | 0.54 |
| 060714 | 115.0 | 30.00 | 1.40 | 2.71 |
| 060708 | 9.8 | 5.00 | 2.00 | 2.3 |
| 060707 | 68.0 | 17.00 | 1.10 | 3.43 |

**Table 5.** Swift GRBs with known redshifts; Part III.

| GRB | $T_{90}$ s | fluence $10^{-7}$ erg/cm$^2$ | peak-flux ph/(cm$^2$ s) | z |
|---|---|---|---|---|
| 060614 | 102.0 | 217.00 | 11.60 | 0.1275 |
| 060607A | 100.0 | 26.00 | 1.40 | 3.082 |
| 060605 | 15.0 | 4.60 | 0.50 | 3.76 |
| 060604 | 10.0 | 1.30 | 0.60 | 2.68 |
| 060526 | 13.8 | 4.90 | 1.70 | 3.21 |
| 060522 | 69.0 | 11.00 | 0.60 | 5.11 |
| 060512 | 8.6 | 2.30 | 0.90 | 0.4428 |
| 060510B | 276.0 | 42.00 | 0.60 | 4.9 |
| 060505 | 4.0 | 6.20 | 1.90 | 0.089 |
| 060502B | 90.0 | 0.40 | 4.40 | 0.287 |
| 060502A | 33.0 | 22.00 | 1.70 | 1.51 |
| 060418 | 52.0 | 81.00 | 6.70 | 1.4895 |
| 060223A | 11.0 | 6.80 | 1.40 | 4.41 |
| 060210 | 255.0 | 77.00 | 2.80 | 3.91 |
| 060206 | 7.0 | 8.40 | 2.80 | 4.048 |
| 060123 | 900.0 | 3.00 | 0.04 | 1.099 |
| 060116 | 113.0 | 26.00 | 1.10 | 5.3 |
| 060115 | 142.0 | 18.00 | 0.90 | 3.53 |
| 060108 | 14.4 | 3.70 | 0.70 | 2.03 |
| 051221A | 1.4 | 11.60 | 12.10 | 0.547 |
| 051111 | 47.0 | 39.00 | 2.50 | 1.549 |
| 051109B | 15.0 | 2.70 | 0.50 | 0.08 |
| 051109A | 36.0 | 21.00 | 3.70 | 2.346 |
| 051016B | 4.0 | 1.70 | 1.32 | 0.9364 |
| 050922C | 5.0 | 17.00 | 7.36 | 2.198 |
| 050908 | 20.0 | 4.91 | 0.70 | 3.3459 |
| 050904 | 225.0 | 50.70 | 0.66 | 6.29 |
| 050826 | 35.0 | 4.51 | 0.43 | 0.297 |
| 050824 | 25.0 | 2.92 | 0.52 | 0.83 |
| 050820A | 26.0 | 40.10 | 2.50 | 2.61335 |
| 050814 | 65.0 | 18.30 | 0.75 | 5.3 |
| 050813 | 0.6 | 0.43 | 0.92 | 1.80 |
| 050803 | 85.0 | 22.30 | 1.08 | 0.422 |
| 050802 | 13.0 | 22.00 | 2.65 | 1.71 |
| 050730 | 155.0 | 24.20 | 0.57 | 3.9669 |
| 050724 | 3.0 | 11.80 | 3.29 | 0.2575 |
| 050603 | 13.0 | 76.30 | 27.60 | 2.821 |
| 050525A | 8.8 | 156.00 | 42.30 | 0.606 |
| 050509B | 0.04 | 0.13 | 1.33 | 0.225 |
| 050505 | 60.0 | 24.90 | 1.81 | 4.27 |
| 050416A | 2.4 | 4.31 | 4.97 | 0.6535 |
| 050406 | 3.0 | 0.81 | 0.38 | 2.44 |
| 050401 | 33.0 | 85.50 | 12.60 | 2.9 |
| 050319 | 10.0 | 6.25 | 1.45 | 3.24 |
| 050318 | 32.0 | 13.10 | 3.20 | 1.44 |
| 050315 | 96.0 | 32.30 | 1.98 | 1.949 |
| 050223 | 23.0 | 6.40 | 0.70 | 0.58775 |
| 050126 | 26.0 | 8.60 | 0.70 | 1.29 |