Swift Observation of the Possible GRB 081211B

S. T. Holland (CRESST/USRA/GSFC), A. Copete (Harvard), K. L. Page (U Leicester), & V. Pal'shin (Ioffe Inst.) for the Swift *Team*

1 Introduction

Swift observed the field of the possible BAT Slew Survey (BATSS) gamma-ray burst GRB 081211B starting approximately one day after the start of the slew that the source was detected in (Copete, *et al.*, GCN Circ. 8661). The XRT began follow-up observations at $T + 81.6$ ks. UVOT began follow-up observations at $T + 81.7$ ks. Our best position is the UVOT-enhanced XRT location, RA, Dec (J2000.0) = 168.°2646, +53.°8300, which corresponds to

RA (J2000.0) = $11^{\rm h}13^{\rm m}03\overset{\rm s}{.}49$
Dec (J2000.0) = $+53°49'48\overset{''}{.}1$

with an uncertainty of $2\overset{''}{.}0$ (radius, 90% confidence).

Konus–Wind detected a short spike on 2008-12-11 at 06:12:58 UT, ≈120 s before the BATSS slew started. The burst was seen as a single 2.9 s spike in the G1 (20–70 keV) and G2 (70–300 keV) bands. The BAT also detected this burst at 06:12:55.1 UT as a weak single pulse that did not produce a significant on-board image. The measured propagation time delay from *Swift* to *Wind*, as well as the *Konus–Wind* ecliptic latitude response for a short spike, are consistent with the position of GRB 081211B. It is likely that the short spike detected by *Konus–Wind* and BAT is the main burst, followed by a long tail (extended emission) seen as the BATSS GRB 081211B.

The Burst Advocate for this burst is Stephen Holland (`Stephen.T.Holland@nasa.gov`). Please contact the Burst Advocate by e-mail if you require additional information regarding *Swift* follow-up observations of this burst. In extremely urgent cases, after trying the Burst Advocate, you can contact the *Swift* PI by phone (see the *Swift* ToO Web site for information: `http://www.swift.psu.edu/too.html`).

2 BAT Slew Survey Observation and Analysis

The BATSS detected a likely GRB candidate in a slew starting on 2008-12-11 at 06:15:02 UT and lasting 121 s. The BAT ground-calculated position is RA, Dec (J2000.0) = 168.°231, +53.°845, which corresponds to

RA(J2000.0) = $11^{\rm h}12^{\rm m}55^{\rm s}$
Dec(J2000.0) = $+53°50'43''$

with an uncertainty of $3\overset{'}{.}04$, (90% confidence, including systematics). The detection was triggered by simultaneous detections of 7.4-σ and 8.3-σ from imaging in the overlapping energy bands of 15–50 keV and 15–150 keV respectively. The burst mask-tagged light curve in the 15–150 keV band shows two possible broad peaks in its emission profile that span the entire 102 s that the source remains within the BAT field of view, starting at $T + 18$ s and peaking $T + 34$ s and $T + 69$ s, suggesting that this is possibly the tail end of the prompt emission of a burst at that location (see Figure 1).

The time-averaged spectrum over the 102 s of exposure on the source is best fit by a simple power law with photon index 1.73. The fluence in the 15–150 keV band is 6.1×10^{-7} erg cm^2.

3 XRT Observations and Analysis

The *Swift*/XRT began observing the possible GRB 081211B at 81.6 ks after the start of the slew in which it was detected. The UVOT-enhanced position is RA, Dec (J2000.0) = 168.°2646, +53.°8300,

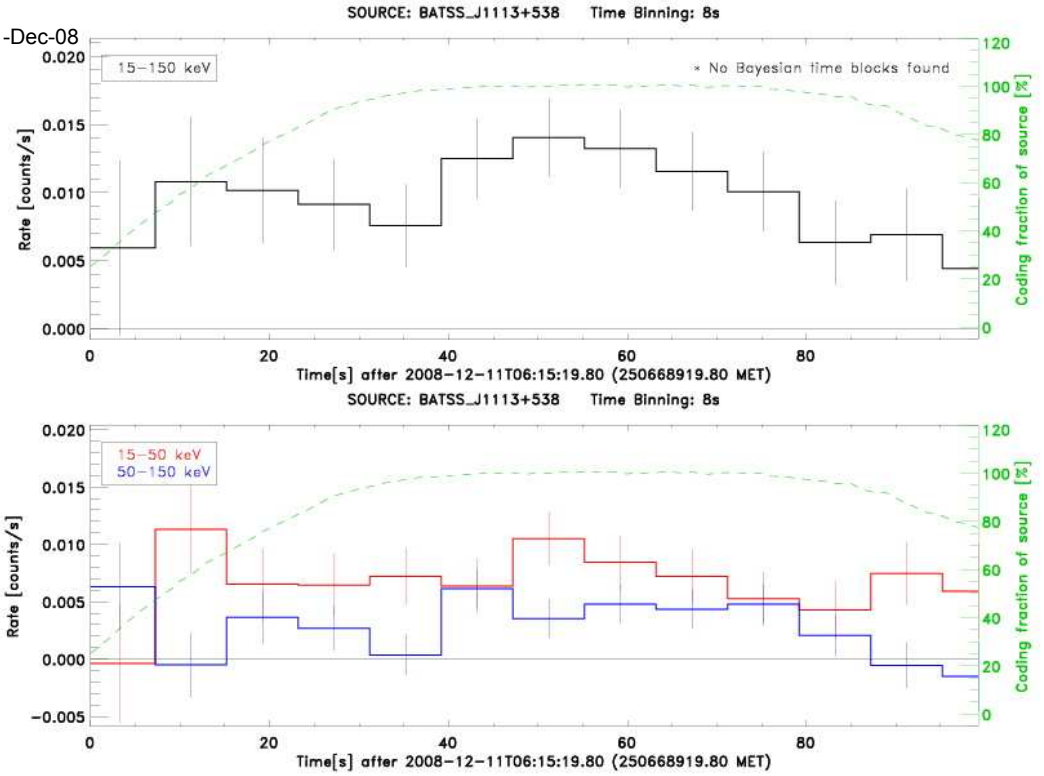

Figure 1: The BATSS 8 s binned light curves.

which corresponds to

RA (J2000.0) = $11^{\rm h}13^{\rm m}03\overset{\rm s}{.}49$
Dec (J2000.0) = $+53°49'48\overset{''}{.}1$

with an uncertainty of $2\overset{''}{.}0$ (radius, 90% confidence).

During the initial observation ($T+81.6$ ks to $T+92$ ks), the mean X-ray count rate was 0.035 ± 0.005 count s^{-1}. This source is not detected in a second observation, taken eight days after the first. The source, therefore, appears to have faded, with a power-law index of at least $\alpha_X = 1.6^{+0.9}_{-0.6}$ (see Fig. 2).

4 UVOT Observation and Analysis

The Swift/UVOT observed the field of the possible BATSS burst GRB 081211B starting at $T+81.7$ ks. No source is detected in any of the UVOT observations at the location of the UVOT-enhanced XRT afterglow. The UVOT 3-σ upper limits are given in Table 1. These upper limits have not corrected for the Galactic extinction along the line of sight to the source corresponding to a reddening of $E_{B-V} = 0.01$ mag (Schlegel *et al.*, 1998, ApJS, 500, 525). The photometry is on the UVOT photometry system described in Poole *et al.*, (2008, MNRAS, 383,627).

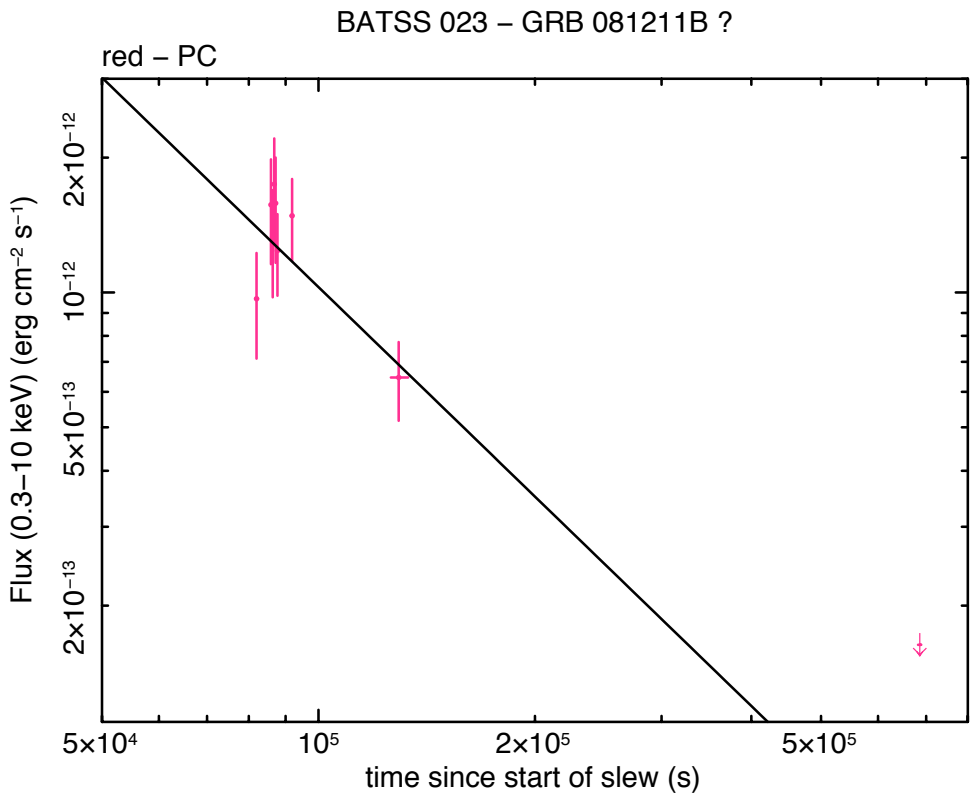

Figure 2: XRT light curve in erg cm^{-2} s^{-1} in the 0.3–10 keV band: Photon Counting mode (red).

Filter	$T_{\rm start}$	$T_{\rm stop}$	Exp(s)	UL	
v	81 651	132 774	2318	> 21.4	3-σ UL
b	85 687	126 980	1770	> 22.5	3-σ UL
uvm2	132 780	133 265	478	> 20.8	3-σ UL
uvw2	87 513	128 664	1426	> 21.8	3-σ UL
white	86 600	127 893	1770	> 23.1	3-σ UL

Table 1: UVOT 3-σ upper limits. $T_{\rm start}$ and $T_{\rm stop}$ are the times, in seconds since the start of the BAT slew that the source was detected in, of the start and stop of the observations. Exp is the total exposure time during the observation.