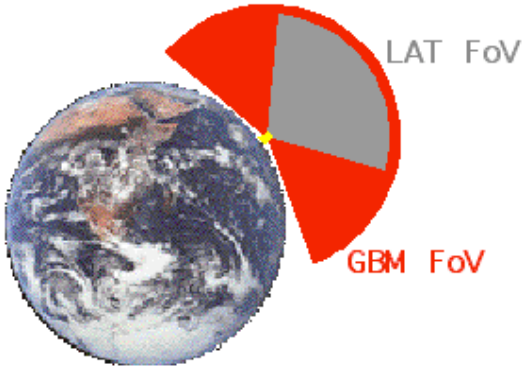
GRBs with GLAST and Swift

Numerology



GBM expects ~215 bursts/year
LAT ~50 bursts/year

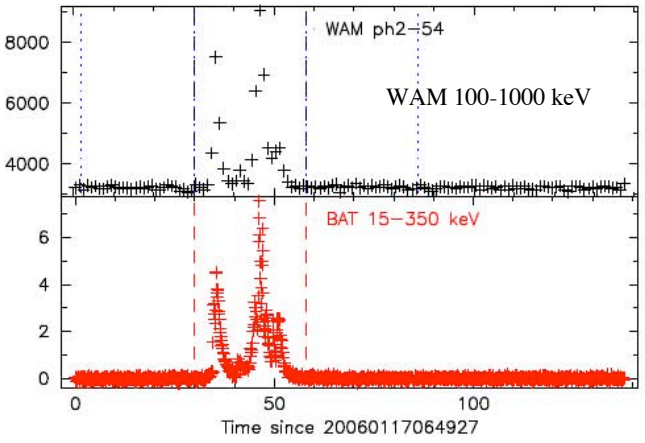
GBM is ~9 sr (LAT 2.4 sr)
BAT is 2 sr (partially coded)

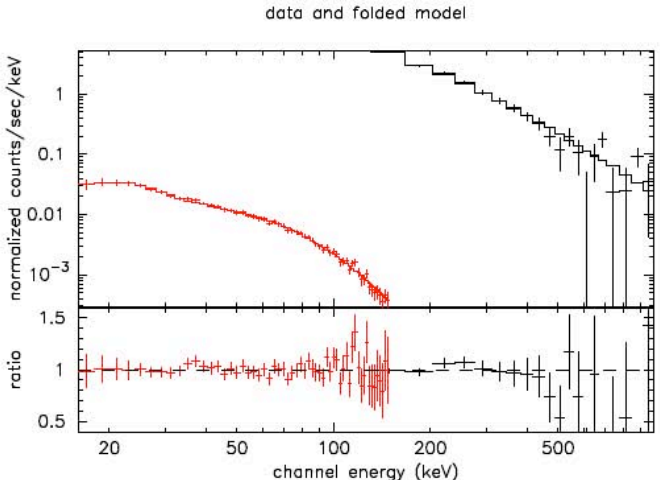
So for GBM-BAT coincidences we expect
$215\ yr^{-1} \times (2\ sr / 9\ sr) \approx 48\ yr^{-1} \approx 4$/month (~ 1/month in LAT FoV)
Expect BAT to see all the GBM bursts that are in its FOV.

We currently see ~1/month coincident with WIND/Konus and ~1-2/month coincident with Suzaku/WAM.

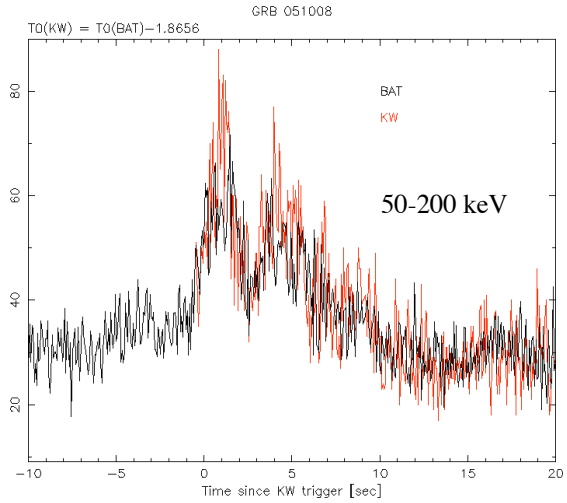
Examples of joint fits with Konus and WAM

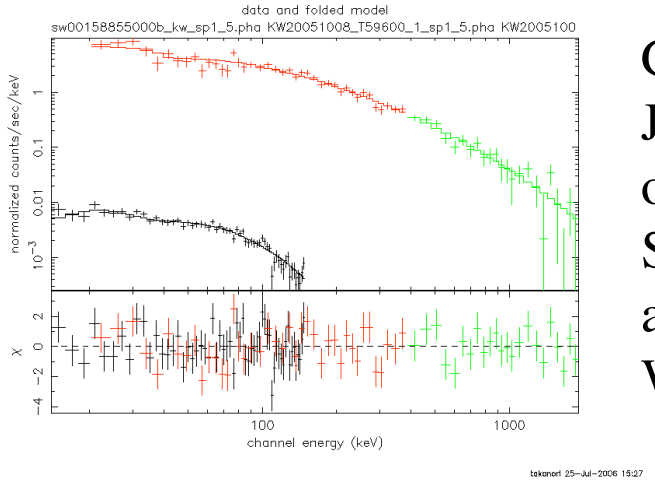
WAM: Shield for Suzaku HXD -- 100 keV -- 5 MeV





GRB 06117
Jointly
observed with
Swift/BAT
and
Suzaku/WAM

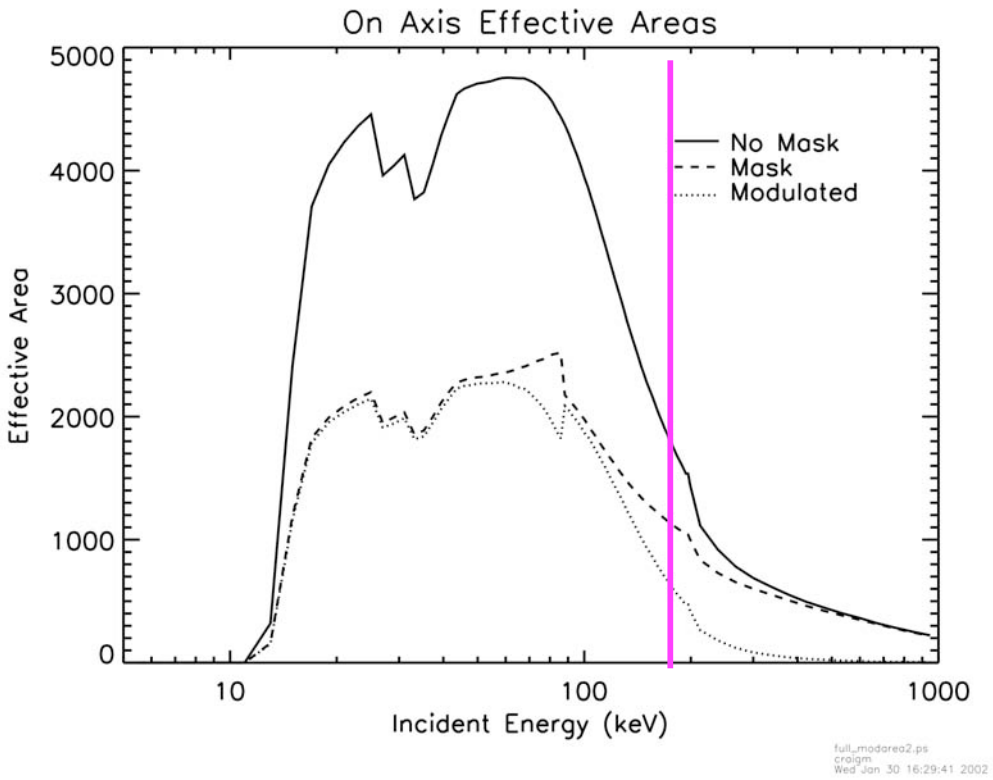




GRB 051008
Jointly
observed with
Swift/BAT
and
WIND/Konus

Konus: Scintillator detectors -- 10 keV -- 10 MeV

Importance of extended energy range



BATSE E_{peak} distribution

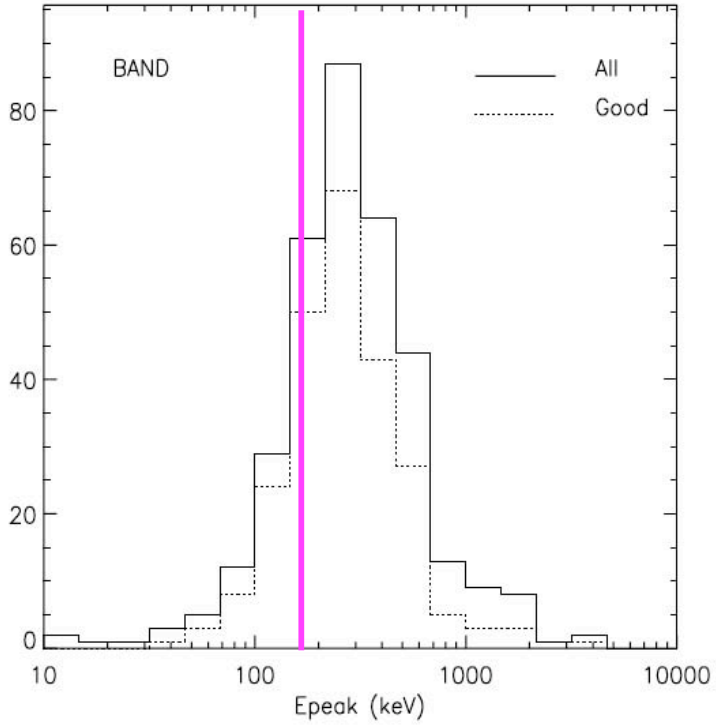


Figure from Y. Kaneko et al 2006, ApJS **166**, 298

Most GRBs have Epeak above BAT energy range

Need to determine validity of Epeak relations for Swift/GLAST bursts

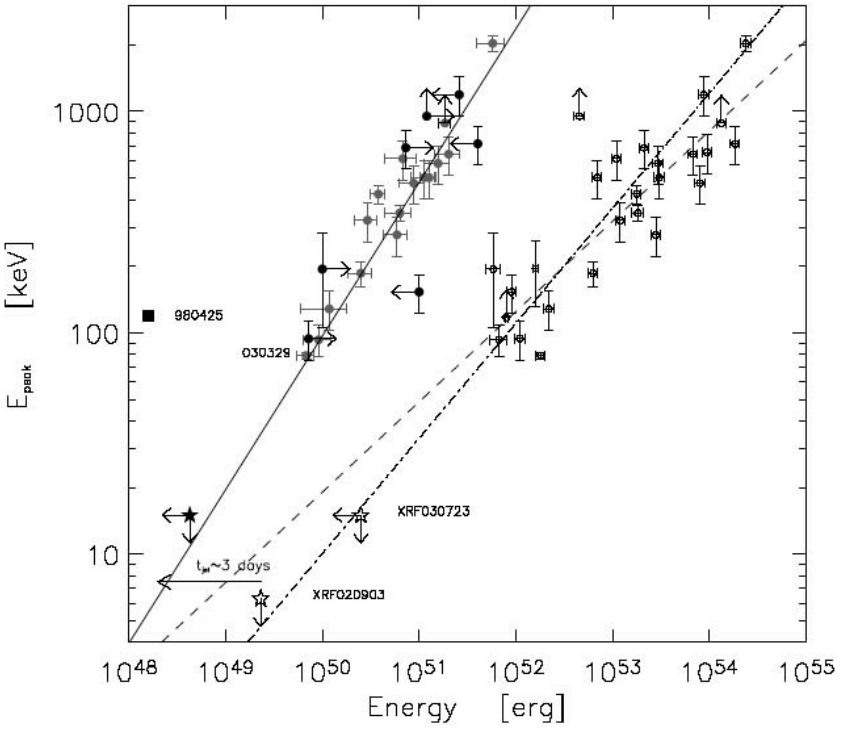
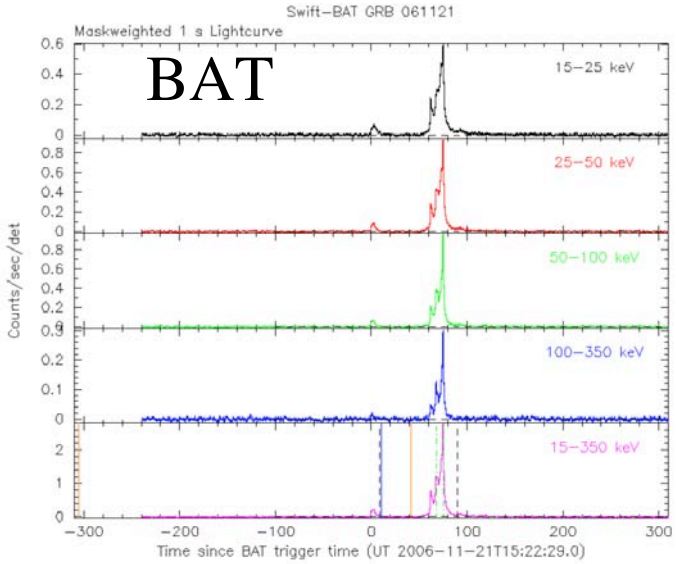
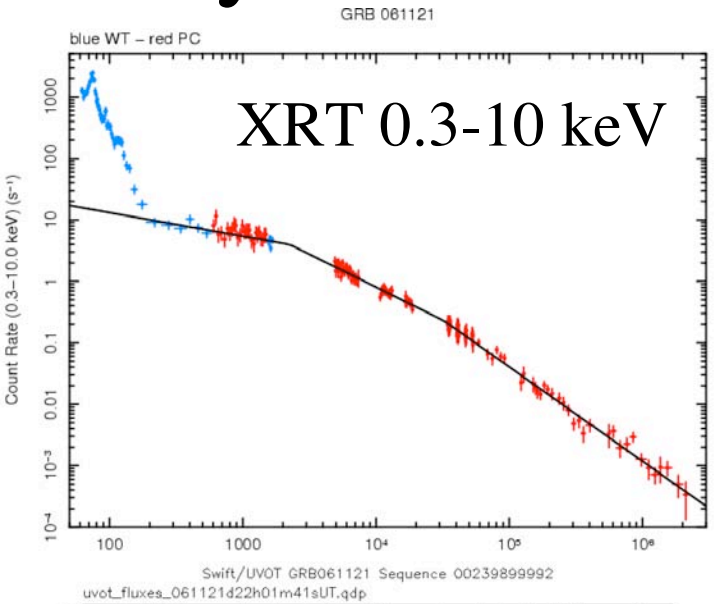


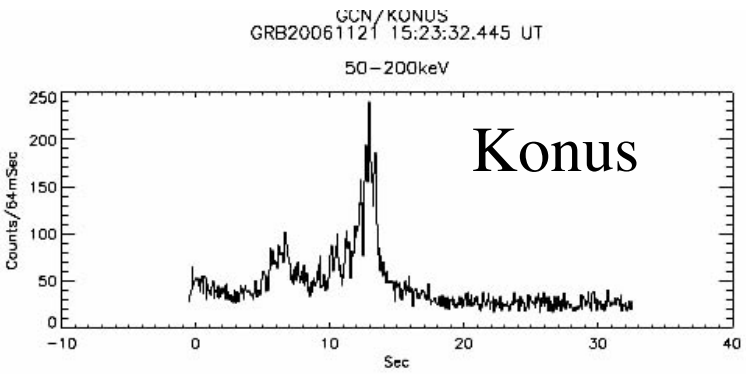
Figure from G. Ghirlanda et al 2004, ApJ **616**, 331

Swift doesn't see jet breaks, but we do have redshifts for ~40% of bursts, so we can determine E_{iso}.

Possibility for very broad coverage







GRB 061121

VLA (8.46 GHz) radio detection

With LAT high energy detection could cover 16 orders of magnitude

z = 1.314

Conclusions

- Swift and GLAST to both operate for ≥ 3 years
- Expect ~3 coincident bursts per month with GBM.
- Swift/BAT team has developed experience with joints fits with Konus and Suzaku/WAM.
- Can constrain E_{peak} for all coincident bursts and use redshift to determine burst luminosity, etc.
- Some bursts will have simultaneous detections from R band to > 1 GeV.