

FLIX

Sensitivity estimator

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FLIX: *Flux Limits from Images from XMM-Newton*

Goal

- Produce estimates of the detection threshold of the X-ray flux at a given point in the sky where no source was detected in the 4XMM survey.
- Replace and update existing FLIX sensitivity estimator
- Modern web application with simple and intuitive user interface.
- Ability to handle large user requests through files

FLIX: Flux Limits from Images from XMM-Newton using DR7 data

FLIX is an upper limit server for XMM-Newton data, provided by the XMM-Newton Survey Science Centre at the University of Leicester. It is based on 3XMM Data Release 7 data provided by the [XMM-Newton Survey Science Centre Consortium](#).

New: a portable version of FLIX called Pflix is now available to run on your own computer, it downloads the data it needs from ESAC. See [details here](#) and download the [pflix_source.f90](#) (Note: use a right-click and choose save-as on most browsers).

- The ECFs (energy conversion factors) for bands 1-5, 8, and 9 are taken from the [catalogue documentation](#) (except for the pseudo-bands 6 and 7 which just take the appropriate arithmetic mean, so are probably inaccurate).
- The FITS file has a set of additional columns providing the ECF value used, so that the count-rate upper-limit may be computed from the flux upper-limit.
- The latest version (2021 March 8) includes the data processing date for each observation.

What FLIX does: if you provide a position of interest on the sky (or a text file with a list of positions) FLIX scans the public data products from XMM-Newton to determine whether each point was observed. If so FLIX:

- Estimates an upper limit to the X-ray flux at that point in various energy bands,
- Provides a crude estimate of the actual flux within a circle centred on that point,
- Scans the [3XMM catalogue](#) listing any detections within 2 arc-minutes, and extracts a thumbnail X-ray image centred on the point.

Results are returned in the form of HTML tables and as a downloadable FITS file. For further information on input and outputs, see the online [FLIX help file](#)

Enter either: RA and DEC of point of interest For example: 12:34:56 -12:34:56 optional identifier

Or: Text file with one position per line: Choisir le fichier aucun fichier sélectionné

Detection likelihood threshold for upper-limits (default 10.0 means ? 4-sigma, see [help](#) for more details)

Radius of circle [arcsec] for the flux estimation

For HTML output: select energy bands for upper-limits

And select energy bands for encircled flux and error

0.2-0.5 keV	0.5-1.0 keV	1.0-2.0 keV	2.0-4.5 keV	4.5-12 keV	0.2-0.5 keV	0.5-1.0 keV	1.0-2.0 keV	2.0-4.5 keV	4.5-12 keV
band 1 <input type="checkbox"/>	band 2 <input type="checkbox"/>	band 3 <input type="checkbox"/>	band 4 <input type="checkbox"/>	band 5 <input type="checkbox"/>	band 1 <input type="checkbox"/>	band 2 <input type="checkbox"/>	band 3 <input type="checkbox"/>	band 4 <input type="checkbox"/>	band 5 <input type="checkbox"/>
band 6 <input checked="" type="checkbox"/>		band 7 <input checked="" type="checkbox"/>			band 6 <input type="checkbox"/>		band 7 <input type="checkbox"/>		
band 8 <input checked="" type="checkbox"/>					band 8 <input checked="" type="checkbox"/>				
band 9 <input type="checkbox"/>				band 9 <input type="checkbox"/>					

Thumbnail images: none 2 4 8 16 (arcmins)

Image overlays: none circle at specified position also 3XMM sources and SRCID numbers

Show nearest field centre when position is not in field-of-view yes no

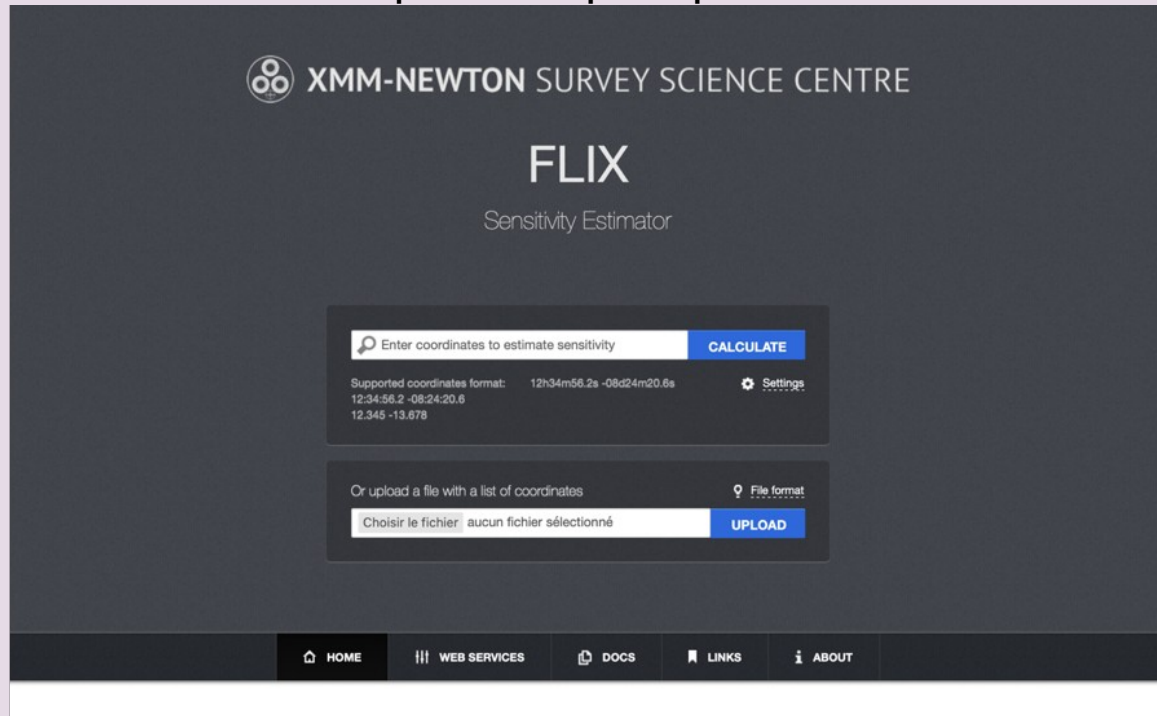
(Note: FLIX may take several seconds per source position, please be patient).

This version writes a row to the FITS file even if there are no data from XMM-Newton for the specified position, so that for a list of N positions, there will be at least N rows in the FITS file produced. The FITS file now includes columns

- Sensitivity estimate based on algorithm from Carrera et al. (2007)
- Uses exposure and background maps together with empirical relationship between observed count rates of detected sources and expected Poisson count rate
- Additionally: computes estimate of actual (background subtracted) flux as measured from XMM images
- Soon: sensitivity estimates based on stacked catalogue and data products

THE FLIX INTERFACE

<http://flix.irap.omp.eu/>



Will be open source





Query coordinates: 12h33m34.1904s -10d10m26.598s

Detection maximum likelihood threshold: 10

Radius of circle for flux estimation: 30"

Nearest sources in XMM catalogue:

- [208301909010018](#) (15.91")
- [208301909010078](#) (31.01")
- [208301909010026](#) (70.6")
- [208301909010121](#) (82.56")
- [208301909010119](#) (91.35")
- [208301909010010](#) (103.04")

Average detection threshold - band 8: 5.1×10^{-15} erg/cm²/s


Average encircled flux - band 8: 7.7×10^{-14} erg/cm²/s

Observations of this field at different epochs

Download full results as: [FITS](#)

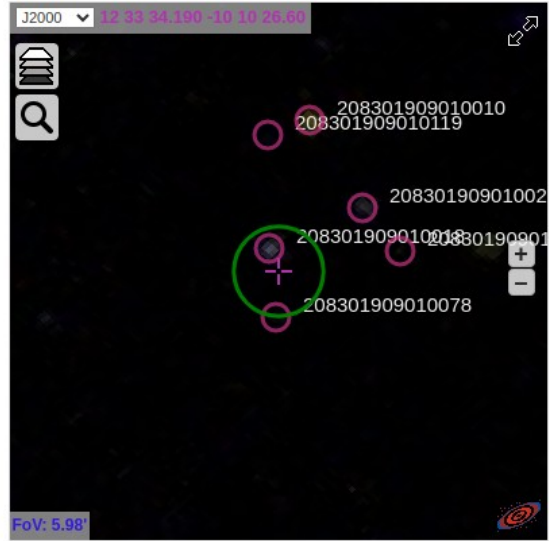
Obsid	Date Obs	Axis Offset (arcmin)	Instrument	Filter	Exposure (sec)	Detection Threshold - band 8 (erg/cm ² /s)	Encircled Flux - band 8 (erg/cm ² /s)
0830190901	2018-06-22	0.0	M1	Thin1	56935	6.28e-15	8.00e-14 ± 5.89e-15
			M2	Thin1	59942	5.53e-15	6.96e-14 ± 5.38e-15
			PN	Thin1	47339	3.48e-15	8.06e-14 ± 3.39e-15

[More bands](#)


FLIX
 SENSITIVITY ESTIMATOR

Choose settings for sensitivity calculations

Detection maximum likelihood threshold: (default: 10)
 Radius of circle for flux estimation (arcsec): (default: 30")



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Link to info for each source in <http://xmm-catalogue.irap.omp.eu>

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Link to observation in XSA

4XMM J123334.6-101011



sc_ep_1_flux	1.43798e-15 ± 1.99948e-16	sc_ep_2_flux	2.68946e-15 ± 2.60393e-16
mjd_first	58291.8172917	sc_ep_3_flux	3.38158e-15 ± 3.242e-16
mjd_last	58292.5089931	sc_ep_4_flux	4.24514e-15 ± 6.63356e-16
sc_chi2prob	0.0647304	sc_ep_5_flux	5.75868e-15 ± 2.202e-15
sc_ra	188.394189004	sc_ep_8_flux	1.84135e-14 ± 2.40056e-15
sc_dec	-10.1699777979	sc_ep_8_fmax	1.84135e-14 ± 2.40056e-15
sc_poserr	0.496602	sc_ep_8_fmin	1.84135e-14 ± 2.40056e-15
sc_det_ml	458.296	sc_ep_9_flux	1.11031e-14 ± 6.88658e-16
sc_ext_ml	-2.04828	sc_extent	0.0
sc_fvar	0.25186 ± 0.11206	sc_hr1	0.275411 ± 0.0774341
sc_hr2	0.0410334 ± 0.066036	sc_hr3	-0.401906 ± 0.0764612
sc_hr4	-0.430345 ± 0.133786	sc_sum_flag	0
sc_var_flag	False	confused	False

This source in external databases: [XCatDB](#), [Chandra CSC 20" VOTable](#), [Swift 2SXPS 20"](#), [RCSED](#), [Simbad 2'](#), [Vizier 20"](#), [NED 2'](#), [Gaia 20" VOTable](#)

Detections (observations of this source at different epochs)

detid	revolut	obs_id	src_num	poserr	ep_8_flux	utc_start	exptime	ep_offax	spectrum
108301909010018	3395	0830190901	18	0.496602	1.84135e-14	2018-06-22 19:36:54.000	59763	0.556002	True (Fit spectrum)



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Detection threshold in other energy bands

Inst	Band 1	Band 2	Band 3	Band 4	Band 5	Band 6	Band 7	Band 9
M1	1.44e-15	1.31e-15	1.66e-15	3.65e-15	2.96e-14	2.43e-15	1.14e-14	3.35e-15
M2	1.23e-15	1.17e-15	1.44e-15	3.25e-15	2.61e-14	2.25e-15	1.03e-14	2.90e-15
PN	5.87e-16	6.37e-16	9.24e-16	2.97e-15	1.61e-14	1.17e-15	8.40e-15	1.98e-15

THANK YOU