BGWG blank sky data analysis

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Update current status

- Files released
  - Two types of blank sky files, unfilled and refilled
- Website updated – comments, software
- Feedback from users
- Plans for the future

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Blank Sky files release

- Files first released in: May 2006
  - React to feedback

    - **TSTART, TSTOP keyword required**
    - **problem with GTI extensions**
    - **GTI extensions added, essential changes to software made**

- Secondary release in: August 2006
  - Current feedback being dealt with

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Feedback – through Matthias/ESAC

- **May:** TSTART, TSTOP keywords in EXPOSU0n extensions of event files
- **June:** SelectRADec script error. One missing file in BlankSky.tgz bundle.
- **July:** LIVETIME calculation error of last CCD.
- **July:** DATAMODE keyword gets removed after some processing in primary header
- **August:** Skycast script user problem, space issue
- **Sept.:** DATE-OBS required when using arfgen

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Blank s[...]

- Basic te[...]
- Small co[...]
  - [...]
- Re-relea[...] added to[...]

Changes

XMM-Newton EPIC 'Blank Sky' Background

New XMM-Newton background 'blank sky' events files for the 3 EPIC instruments in their different instrument mode/filter combinations have been constructed using a superposition of many pointed observations of pipeline product data from the 2XMM reprocessing (Second XMM-Newton Serendipitous Source Catalogue) and have been processed with the latest version of the SAS, SAS 6.5. Exposure maps in the different instrument/mode/filter combinations have also been produced. A link to the paper by Carter and Read (in preparation) will appear here shortly. On these web pages, details can be found on how to obtain these background products together with related software.

Contents:

- Latest updates to these web pages
- XMM-Newton blank sky event files
- Available XMM-Newton background files
- Software available relating to background files
- Using these background event files (some brief guidance)
- Properties of the background files

Latest Updates

- Aug-2006: GTI extensions revised for all event lists. Modified BlankSky.tgz
- Jun-2006: TSTART and TSTOP keywords added to EXPOSURE extensions of unfilled event lists
- May-2006: Initial web site

XMM-Newton blank sky event files

Usage with SAS tasks: Blank sky files and keywords

The blank sky files are constructed from several different event lists, spanning a large range in time over the mission. Date-related keywords, for example DATE-OBS, have therefore been removed. A few SAS tasks require date and time stamp keywords. It is recommended that these keywords be added by the user as required. Missing date and time keywords could be e.g. set to that of the user's source spectrum. This can be achieved for example using the FTOOLS viewer/editor fv.
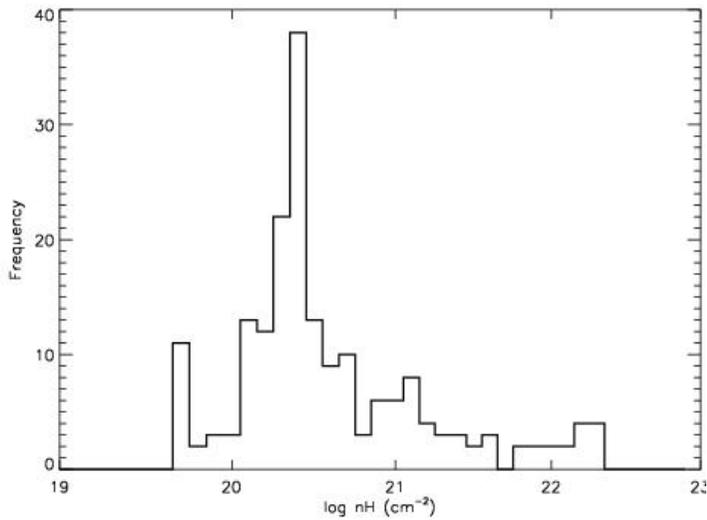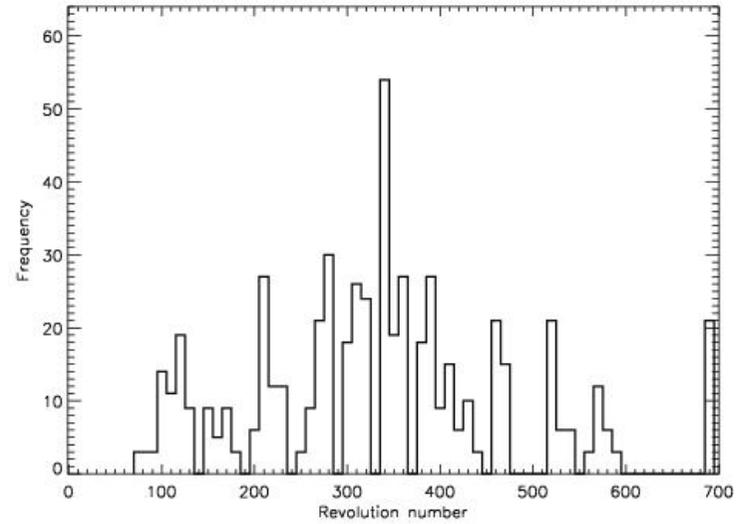
Paper on Blank Sky files

- Submitted June 2006

- Contains summary current knowledge of EPIC background components

- Comments back late July 2006
  - Main issue: referee requires some reliability test of the background files, cross-validation.
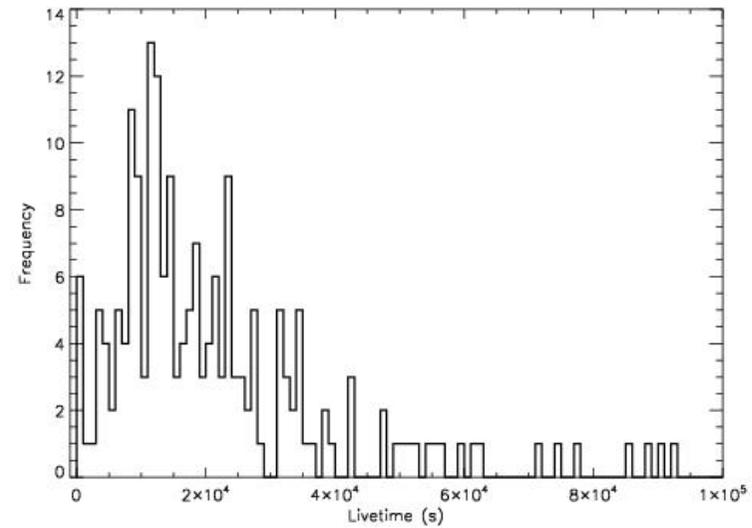
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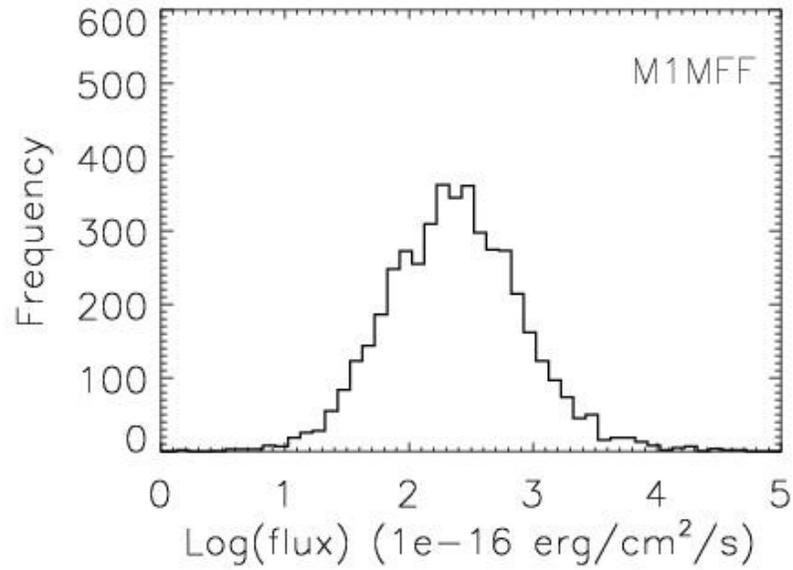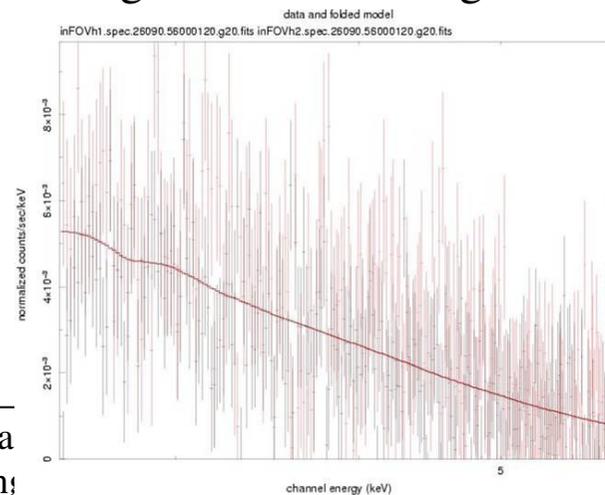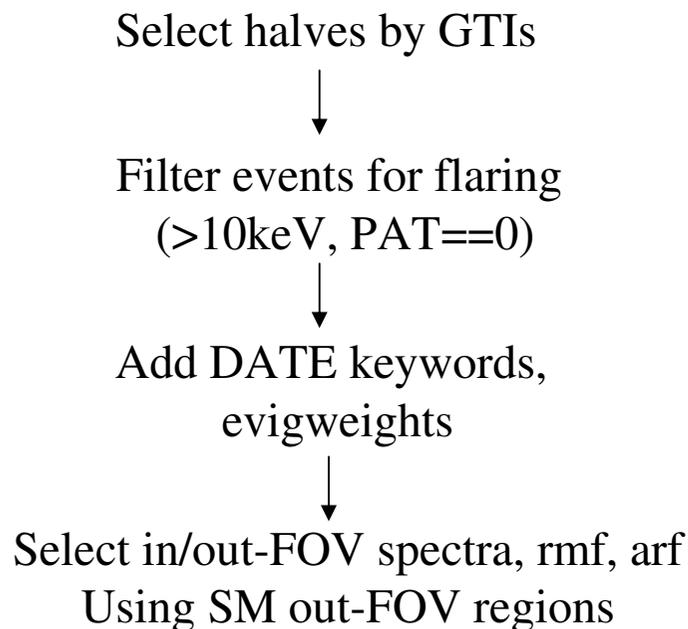4th EPIC BG WG Meeting
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Additional section to paper

- Split test blank sky event file, half in time/loc/size

- Follow a 'normal' reduction path

- Look at high energy range, 2.5 – 6.0 keV

- Fit power law, index ~1.4, to resultant 'normal' extragalactic background

- Test the two halves

Select halves by GTIs

↓

Filter events for flaring (>10keV, PAT==0)

↓

Add DATE keywords, evigweights

↓

Select in/out-FOV spectra, rmf, arf Using SM out-FOV regions

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Future plans

- Possible increase number of datasets that makes up blank sky fields – depending on 2XMM catalogue processing and reprocessing on my part

- Act on comments from Jean Ballet – issues of brightened row in PN exposure maps, yet to be investigated

- Software improvements, in particular with regards to the selection by location tool

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Possible additions/Other issues

- Ghosting script - in progress

- Count rate selection tool

- nH selection (by galactic coords.)

- Exposure time of ind. observation selection

- DATE-OBS set at default value – what are the implications of this/possible dangers?

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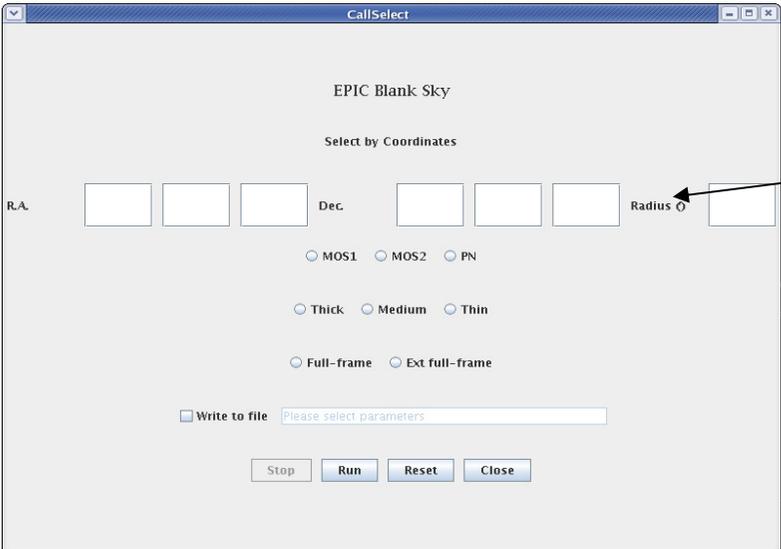Leicester

Current select by location tool

- SelectRADec tool available on web site

- Takes region around a user-specified location on sky and extracts events and exposures within a search radius.

- Returns a scaled down version of the large blank sky file

- Huge disadvantage – requires download script and of all exposure files of blank sky set

- Could split: event and exposure selection

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New selection by location tool

- Could be integrated into miniscule version of XSA – user fills in form, request is sent, file is returned

- Avoids the need to download many datasets, which is clumsy and requires much space

User selection

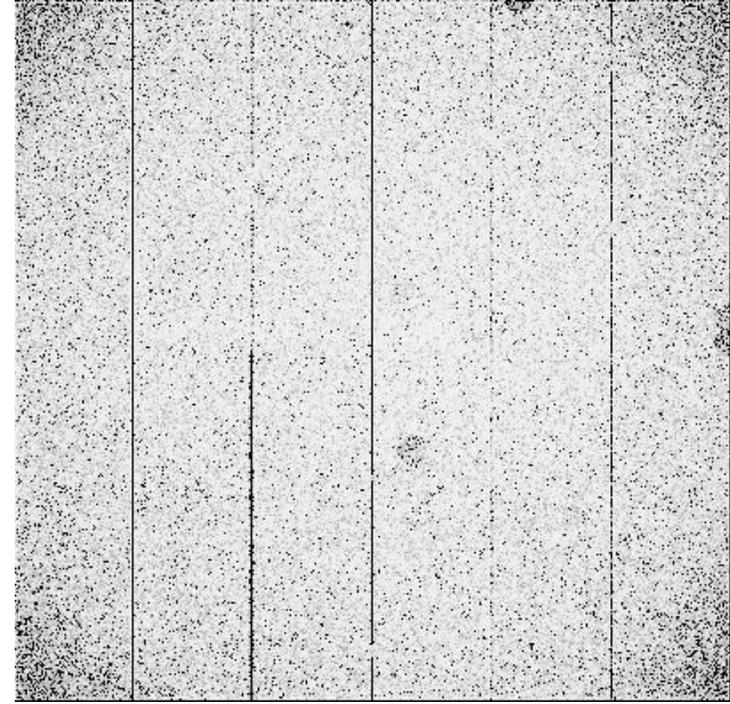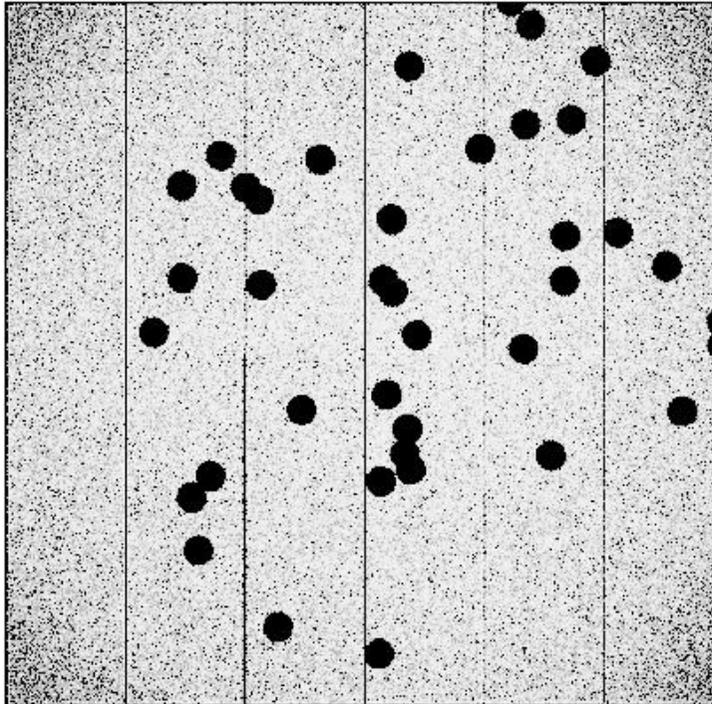Coords., radius, etc.

Could be used for all blank sky file delivery

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Plan – review

- Aim: Creation of long exposure blank sky EPIC BG event files

    1 – Writing of the tasks/scripts

    2 – Compiling list(s) of observations

    3 – Creating BG event and other files

    4 – Stacking BG event and other files

    - low BG, long duration observations, no diffuse sources, few central targets

- At last stage aims achieved:

    Using 2XMM pipeline products

    Script 1 – creates event files and exposure maps

    Script 2 – merges created event files

    Script 3 – merges created exposure maps

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Major changes to the files (obsolete)

- June 2006 – TSTART, TSTOP keywords required

- August 2006 – GTI extensions added for all Blank Sky event files

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Unresolved issues (obsolete)

Jean Ballet comments

- Exposure maps in detector coordinates. For MOS, offset occurs between count maps and exposure maps, when count maps are projected on the same det. coordinates of exp maps.

- PN, a row appears to have an exposure > LIVETIME

- PN exposure maps are generated with default options, which gives peaks near CCD edges when dividing a count map by an exposure map. This will require new exposure maps with CLOSE_TO_CCD_WINDOW within the expression.

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