

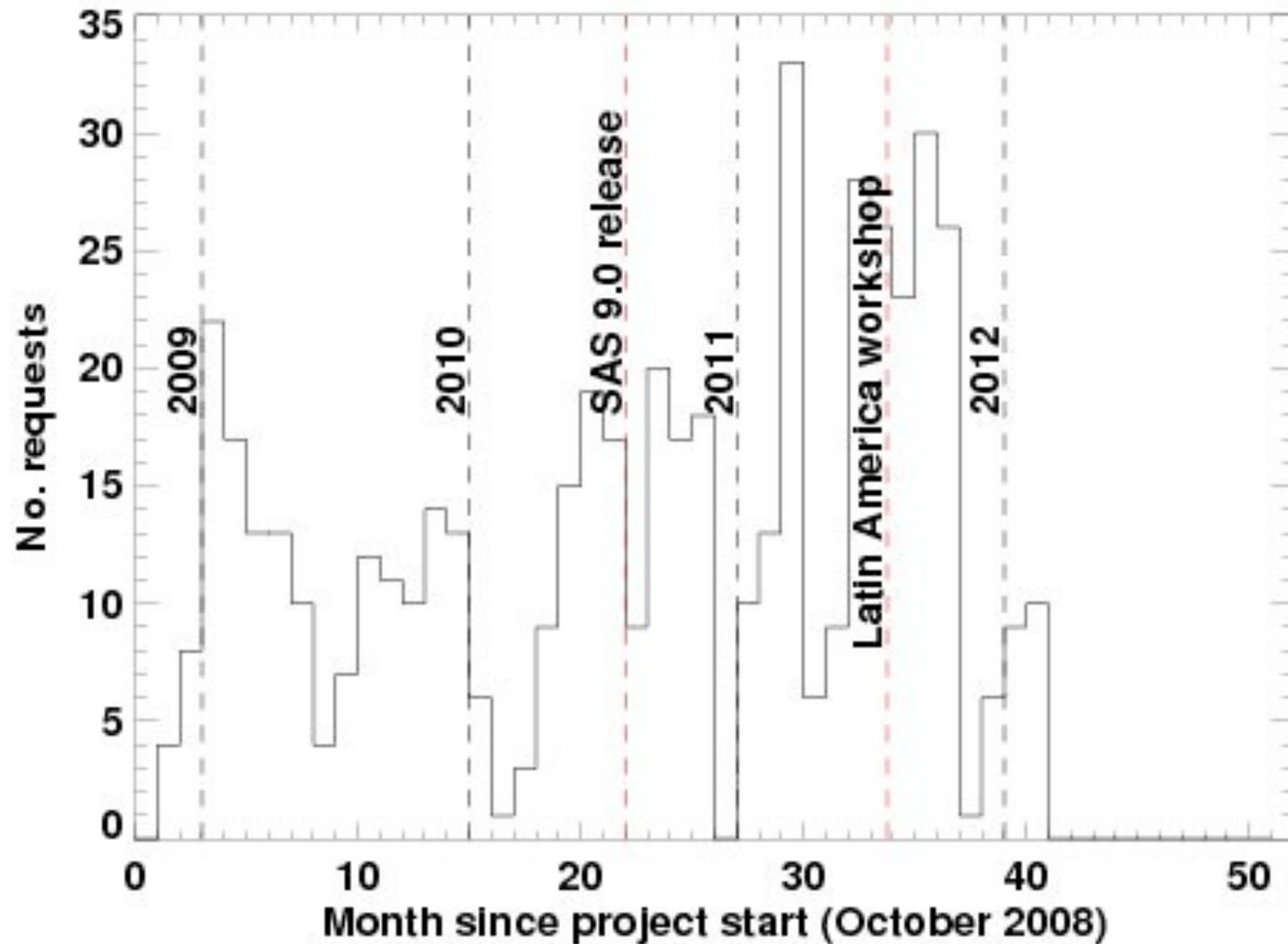
Updates to the EPIC blank sky & SWCX projects

Jenny Carter & Andy Read
University of Leicester
BGWG Leicester, March 2012

Action items; 2011

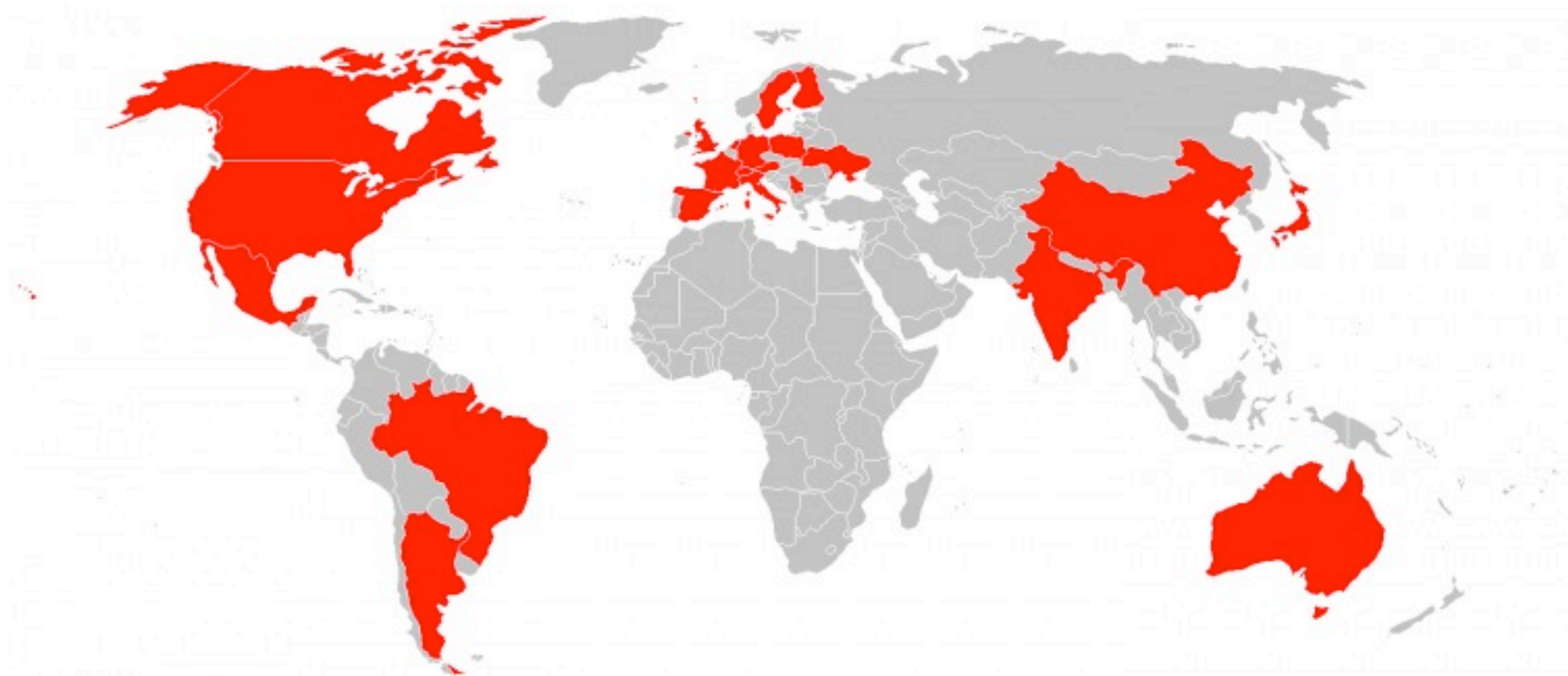
- AI_EPIC_BGWG_08_01: add previously submitted to web page - **completed**
- AI_EPIC_BGWG_08_04: consider the long term plan for the blank sky project - **ongoing**
- AI_EPIC_BGWG_09_06/08 and AI_EPIC_BGWG_10_02: AR/JC how to present likelihood of SWCX contamination - **completed? (this talk)**
- AI_EPIC_BGWG_10_01: make selection regarding noisy CCDs available through web form - **not yet implemented**

Requests by month, up to 1st March 2012



Users

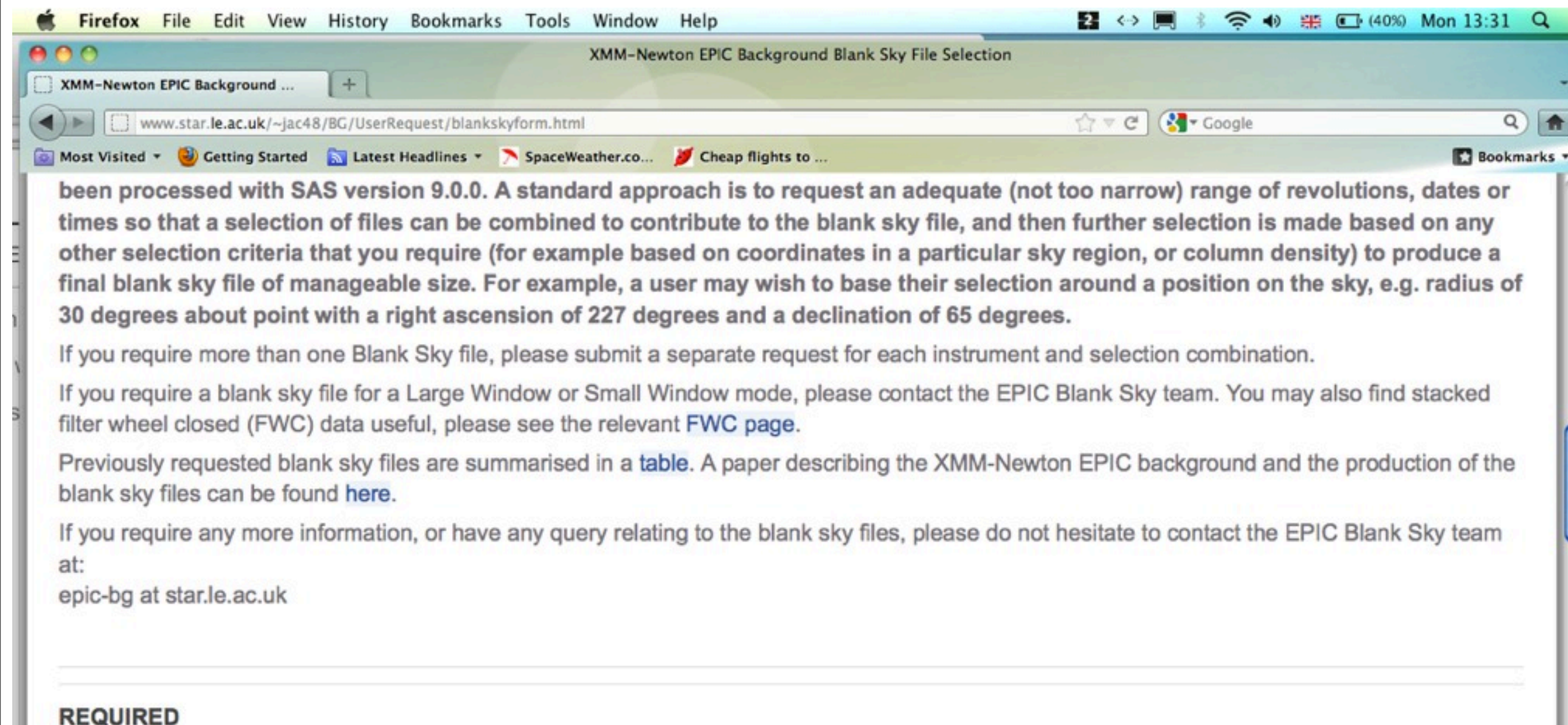
- 99 individual users from 22 different countries, 5.27 mean no. requests per user



- By instrument: 37% pn, 34% MOS1, 29% MOS2
- By mode: 92% FF mode (~80% all pn), 7.6% eFF (~20% all pn), 0.4% LW
- By filter: 32% thin, 66% medium, 2% thick
- By filled status: 69% ghosted, 31% unfilled

Table of all requests: AI_BGWG_EPIC_08_01 completed

- Link from blank sky pages
- Table on web: http://www.star.le.ac.uk/~jac48/BG/UserRequest/bs_allfiles.html



The screenshot shows a Firefox browser window with the title "XMM-Newton EPIC Background Blank Sky File Selection". The address bar displays the URL "www.star.le.ac.uk/~jac48/BG/UserRequest/blankskyform.html". The page content includes instructions on how to request blank sky files, mentioning SAS version 9.0.0 and providing contact information for the EPIC Blank Sky team.

been processed with SAS version 9.0.0. A standard approach is to request an adequate (not too narrow) range of revolutions, dates or times so that a selection of files can be combined to contribute to the blank sky file, and then further selection is made based on any other selection criteria that you require (for example based on coordinates in a particular sky region, or column density) to produce a final blank sky file of manageable size. For example, a user may wish to base their selection around a position on the sky, e.g. radius of 30 degrees about point with a right ascension of 227 degrees and a declination of 65 degrees.

If you require more than one Blank Sky file, please submit a separate request for each instrument and selection combination.

If you require a blank sky file for a Large Window or Small Window mode, please contact the EPIC Blank Sky team. You may also find stacked filter wheel closed (FWC) data useful, please see the relevant [FWC page](#).

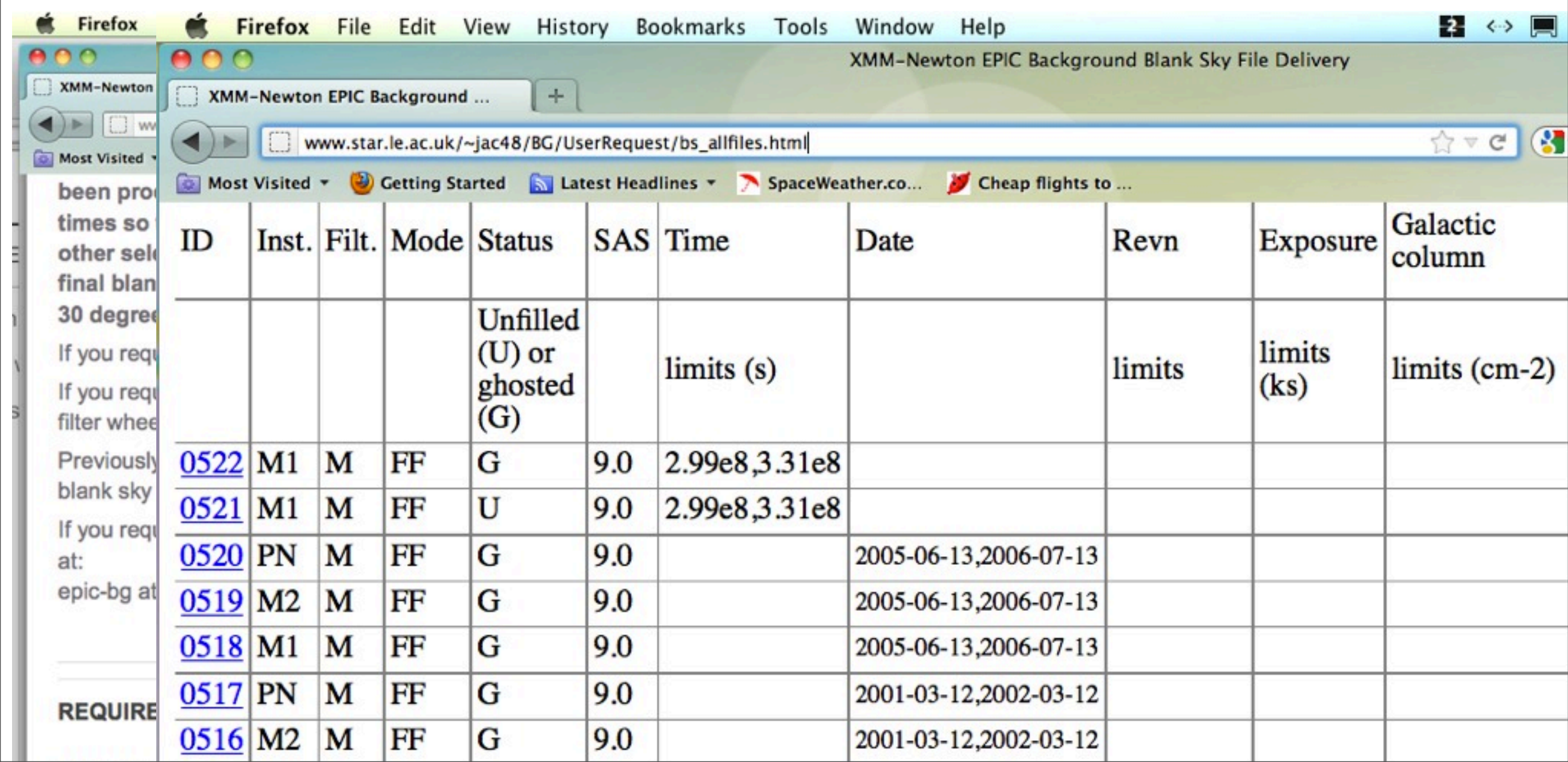
Previously requested blank sky files are summarised in a [table](#). A paper describing the XMM-Newton EPIC background and the production of the blank sky files can be found [here](#).

If you require any more information, or have any query relating to the blank sky files, please do not hesitate to contact the EPIC Blank Sky team at:
epic-bg at star.le.ac.uk

REQUIRED

Table of all requests: AI_BGWG_EPIC_08_01 completed

- Link from blank sky pages
- Table on web: http://www.star.le.ac.uk/~jac48/BG/UserRequest/bs_allfiles.html



ID	Inst.	Filt.	Mode	Status	SAS	Time	Date	Revn	Exposure	Galactic column
				Unfilled (U) or ghosted (G)		limits (s)		limits	limits (ks)	limits (cm-2)
0522	M1	M	FF	G	9.0	2.99e8,3.31e8				
0521	M1	M	FF	U	9.0	2.99e8,3.31e8				
0520	PN	M	FF	G	9.0		2005-06-13,2006-07-13			
0519	M2	M	FF	G	9.0		2005-06-13,2006-07-13			
0518	M1	M	FF	G	9.0		2005-06-13,2006-07-13			
0517	PN	M	FF	G	9.0		2001-03-12,2002-03-12			
0516	M2	M	FF	G	9.0		2001-03-12,2002-03-12			

SWCX-affected observations: AI_BGWG_EPIC_09_06/08 and AI_BGWG_EPIC_10_02 completed

- Link from EPIC BGWG main pages
- Table on web: www.star.le.ac.uk/~jac48/SWCX/swcx_cases_web.html
- Links to spectra and lightcurve

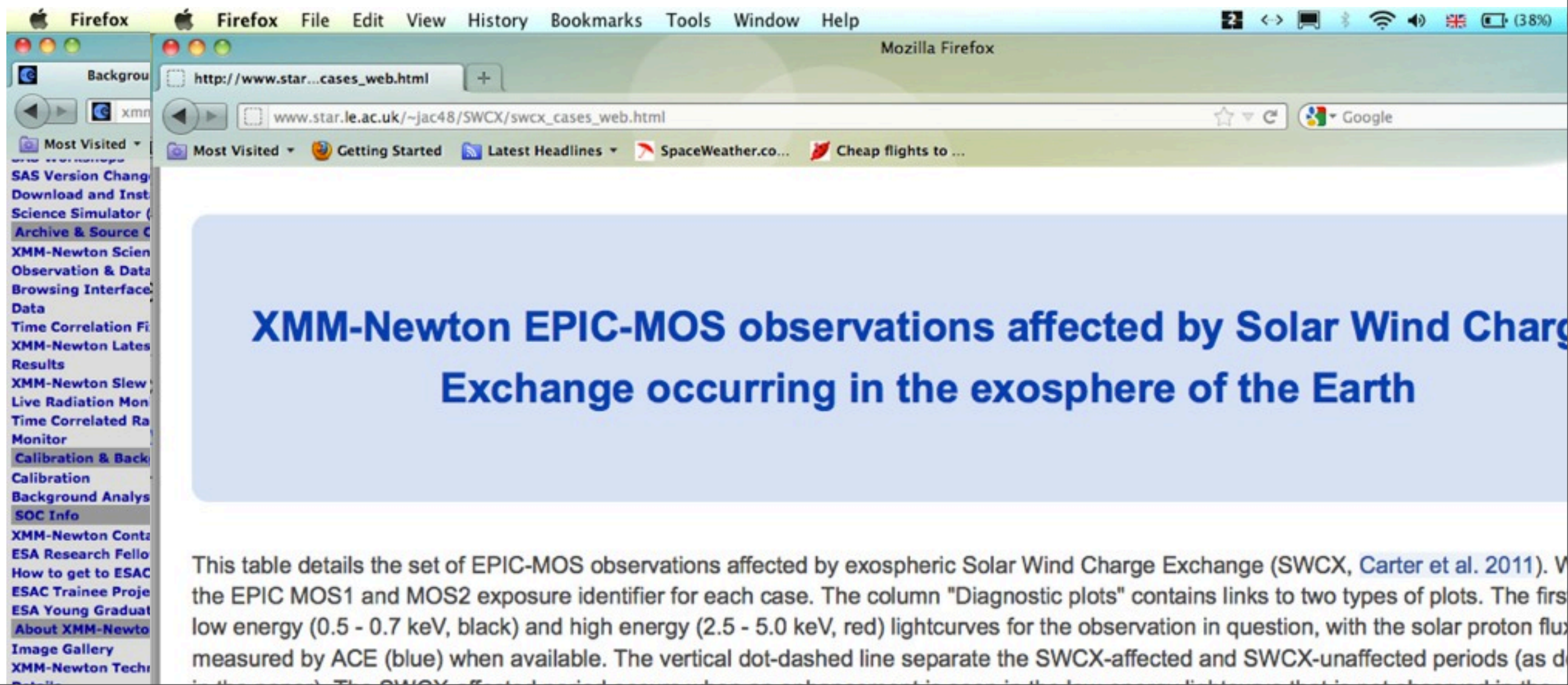
The screenshot shows a Firefox browser window with the address bar displaying `xmm2.esac.esa.int/external/xmm_sw_cal/background/`. The page title is "Background Analysis". The left sidebar contains a navigation menu with the following items: "SAS Version Changes", "Download and Install SAS Science Simulator (SciSim)", "Archive & Source Catalogues", "XMM-Newton Science Archive", "Observation & Data Status", "Browsing Interface for RGS Data", "Time Correlation Fix", "XMM-Newton Latest Slew Results", "XMM-Newton Slew Survey", "Live Radiation Monitor Data", "Time Correlated Radiation Monitor", "Calibration & Background", "Calibration", "Background Analysis", "SOC Info", "XMM-Newton Contact Details", "ESA Research Fellowships", "How to get to ESAC", "ESAC Trainee Projects", "ESA Young Graduate Trainees", "About XMM-Newton", "Image Gallery", and "XMM-Newton Technical". The main content area has the following text: "the EPIC Background and (SAS)-Tools (TBD) to treat the EPIC Background correctly for various TBD scenarios. Current progress of the XMM-Newton EPIC Background working group can be monitored [here](#)." Below this is a section titled "Products" with a bulleted list:

- [XMM-Newton Extended Source Analysis Software package, XMM-ESAS](#)
As of SAS version 9.0, the XMM-ESAS package is integrated in SAS. XMM-ESAS allows the user to model the quiescent particle background for both spectral and spatial analysis of EPIC pn and EPIC MOS observations.
- [XMM-Newton 'blank sky' background event files](#)
XMM-Newton EPIC blank sky user facility released in August 2010 following a processing of the XMM-Newton archive (up to revolution 1789) using SAS 9.0. Users within the community are invited to request blank sky files specifically catered for, and precisely tuned to their own particular needs.
- [Filter Wheel Closed data](#)
Updated in April 2011 by the EPIC Background Working Group the stacked collections of Filter Wheel Closed (FWC) data are available for the MOS and pn cameras.
- [Exospheric solar wind charge exchange affected observations](#)
Lines-of-sight to XMM-Newton targets sometimes traverse regions of X-ray emission in the vicinity of the Earth. This emission results from a charge transfer process between ions in the solar wind and neutral gas (primarily hydrogen) close to the Earth, and can exhibit temporal signatures that make it possible to identify affected observations.
- [Further EPIC Background Scripts](#)
 - [Estimation of the residual Soft Proton flare contamination](#)
 - [Background correction for faint extended EPIC PN emission](#)
 - [Specific scripts to be used with Blank Sky event files](#)

 At the bottom of the page, there is a section titled "Other Useful Information".

SWCX-affected observations: AI_BGWG_EPIC_09_06/08 and AI_BGWG_EPIC_10_02 completed

- Link from EPIC BGWG main pages
- Table on web: www.star.le.ac.uk/~jac48/SWCX/swcx_cases_web.html
- Links to spectra and lightcurve



The screenshot shows a Mozilla Firefox browser window. The address bar displays the URL http://www.star.le.ac.uk/~jac48/SWCX/swcx_cases_web.html. The page content includes a blue header with the title "XMM-Newton EPIC-MOS observations affected by Solar Wind Charge Exchange occurring in the exosphere of the Earth". Below the header, a paragraph of text reads: "This table details the set of EPIC-MOS observations affected by exospheric Solar Wind Charge Exchange (SWCX, Carter et al. 2011). V the EPIC MOS1 and MOS2 exposure identifier for each case. The column "Diagnostic plots" contains links to two types of plots. The first low energy (0.5 - 0.7 keV, black) and high energy (2.5 - 5.0 keV, red) lightcurves for the observation in question, with the solar proton flux measured by ACE (blue) when available. The vertical dot-dashed line separate the SWCX-affected and SWCX-unaffected periods (as d".

SWCX-affected observations: AI_BGWG_EPIC_09_06/08 and AI_BGWG_EPIC_10_02 completed

- Link from EPIC BGWG main pages
- Table on web: www.star.le.ac.uk/~jac48/SWCX/swcx_cases_web.html
- Links to spectra and lightcurve

overlaps with the EPIC-MOS exposures. A list of all 3012 observations analysed in this study, detailing the exposure identifiers and filters used in the exposures, can be found [here](#).

Index	Revn.	Obsn.	Date	Expn MOS1	Expn MOS2	Xu	Rx	Diagnostic plots
1	0342	0085150301	2001-10-21T21:20:41	U003	U003	27.2	10.3	lightcurve & spectrum
2	0209	0093552701	2001-01-28T15:09:09	S001	S002	23.0	4.0	lightcurve & spectrum
3	1014	0305920601	2005-06-23T07:32:57	S001	S002	15.0	30.9	lightcurve & spectrum
4	0690	0149630301	2003-09-16T09:57:29	S001	S002	14.1	21.6	lightcurve & spectrum
5	0623	0150610101	2003-05-04T14:27:34	U002	U002	13.5	4.8	lightcurve & spectrum
6	0339	0054540501	2001-10-16T04:44:32	S002	S003	13.2	22.4	lightcurve & spectrum
7	0422	0113050401	2002-03-29T22:56:05	S001	S002	12.7	12.3	lightcurve & spectrum

SWCX: all observations used in study table: pdf

w Go Tools Bookmarks Window Help
 swcx_obsn_all-2.pdf (page 1 of 19)

Table 1: Table of all observations used in the archival search for XMM-Newton observations affected by SWCX, as described in Carter, Sembay and Read, A&A, 527, 115C, 2011. Each observation is listed with a resolution (revn) and observation (obsn) identifier. This is followed by the exposure identifiers used for either or both the MOS1 or MOS2 (Expn M1, Expn M2) and a key to the filter used for MOS1 and MOS2 (Filr M1, Filr M2); T=thin, M=medium, K=thick.

Ind.	Revn	Obsn	Expn M1	Expn M2	Filr M1	Filr M2	Ind.	Revn	Obsn	Expn M1	Expn M2	Filr M1	Filr M2	Ind.	Revn	Obsn	Expn M1	Expn M2	Filr M1	Filr M2
1	0028	0116340601	S002	S004	M	M	1005	0561	0141751101	S001	S001	T	T	2009	1122	0312190101	S002	S002	M	M
2	0035	0117730501	S014	S015	M	M	1006	0561	0125911101	S010	S010	M	M	2010	1122	0312190101	S002	S002	M	M
3	0038	0117900901	S006	S007	M	M	1007	0561	0111282401	S001	S001	T	T	2011	1122	0300930101	S001	S001	M	M
4	0043	0119700301	U009	U004	K	K	1008	0562	0112522701	S001	S001	T	T	2012	1122	0300330501	U002	U002	T	T
5	0044	0119710201	U013	U013	M	M	1009	0562	0057740301	S001	S001	T	T	2013	1124	0312190701	S002	S002	T	T
6	0047	0113490601	S002	S003	K	K	1010	0563	0142770101	S001	S001	M	M	2014	1124	0312190601	S002	S002	M	M
7	0049	0094810301	S002	S003	T	T	1011	0563	0133940101	S002	S002	T	T	2015	1124	0312190401	S002	S002	M	M
8	0052	0099760201	S001	S002	M	M	1012	0563	0105860101	S001	S001	T	T	2016	1124	0302630601	S001	S001	T	T
9	0053	0121500401	S003	S004	M	M	1013	0564	0154350201	S001	S001	T	T	2017	1125	0305780101	S001	S001	M	M
10	0053	0121500301	S003	S004	M	M	1014	0564	0112372001	S002	S002	T	T	2018	1126	0312191901	S002	S002	T	T
11	0056	0122340501	S003	S004	M	M	1015	0564	0110930901	S002	S002	M	M	2019	1126	0304071701	S001	S001	T	T
12	0056	0122340101	S003	S004	M	M	1016	0565	0152360101	S001	S001	T	T	2020	1127	0302070101	S001	S001	M	M
13	0057	0122520201	S001	S002	K	K	1017	0565	0112880101	S001	S001	M	M	2021	1127	0300230401	S001	S001	T	T
14	0057	0122340601	S003	S004	M	M	1018	0565	0108480101	S001	S001	M	M	2022	1128	0305370101	S001	S001	M	M
15	0058	0122340701	S003	S004	M	M	1019	0566	0110940101	S001	S001	T	T	2023	1129	0306490101	S001	S001	M	M
16	0059	0122321101	U002	U002	T	T	1020	0566	0057740401	S001	S001	T	T	2024	1129	0300240501	S001	S001	T	T
17	0060	0122700101	S002	S003	M	M	1021	0567	0109070201	S001	S001	T	T	2025	1130	0311590401	S001	S001	T	T
18	0060	0113491101	S002	S003	K	K	1022	0567	0105261301	S001	S001	T	T	2026	1130	0307001101	S001	S001	M	M
19	0061	0122700201	S002	S003	M	M	1023	0568	0112840201	S001	S001	T	T	2027	1130	0306490201	S001	S001	M	M
20	0061	0122340201	S003	S004	M	M	1024	0568	0112270701	S001	S001	M	M	2028	1130	0300780301	S003	S003	M	M
21	0062	0122700301	S002	S003	M	M	1025	0568	0111282501	S001	S001	T	T	2029	1131	0305690401	S001	S001	T	T
22	0062	0122340401	S003	S004	M	M	1026	0568	0108480101	S001	S001	T	T	2030	1131	0305690301	S001	S001	T	T
23	0065	0122700501	S002	S003	M	M	1027	0568	0101640901	S002	S002	M	M	2031	1131	0305690101	S001	S001	T	T
24	0067	0121900101	S004	S007	M	M	1028	0569	0157360401	S003	S003	T	T	2032	1131	0300320101	S001	S001	T	T
25	0068	0123510101	S004	S007	T	T	1029	0569	0151370101	S001	S001	M	M	2033	1132	0307001901	S001	S001	M	M
26	0068	0123510101	S006		K		1030	0569	0111280701	S003	S003	T	T	2034	1132	0307001401	S001	S001	M	M
27	0070	0123700101	U002		T		1031	0570	0146500101	S001	S001	T		2035	1132	0306490301	S001	S001	M	M
28	0070	0123700101	S001		T		1032	0570	0141751101	S001	S001	T	T	2036	1132	0301330401	S001	S001	M	M
29	0073	0123700401	S001		T		1033	0570	0112880501	S001	S001	K	K	2037	1133	0307002501	S001	S001	K	
30	0075	0124110101	S004	S005	M	M	1034	0570	0112880301	S001	S001	T	T	2038	1133	0306490401	S001	S001	M	M
31	0077	0123900101	S003	S004	T	T	1035	0571	0146500201	S001	S001	T		2039	1134	0302030101	S001	S001	T	T
32	0078	0124100101	S001		T		1036	0571	0109480401	S001	S001	K	K	2040	1135	0307000701	S001	S001	M	M
33	0081	0123701001	S001		T		1037	0571	0109484901	S001	S001	T	T	2041	1135	0304160401	U002	U002	M	M
34	0082	0124900101	S001	S002	T	T	1038	0571	0103261701	S001	S001	M	M	2042	1135	03001170101	S001	S001	M	M
35	0082	0096020101	U017	U009	M	M	1039	0572	0141980701	S001	S001	M	M	2043	1137	0312191601	S002	S002	M	M
36	0083	0125100101	S009	S010	M	M	1040	0572	0141980601	S001	S001	M	M	2044	1139	0302883101	S001	S001	M	M
37	0085	0125120201	S008		M		1041	0573	0145740101	S002	S002	K	K	2045	1139	0302883001	S001	S001	M	M
38	0085	0125120101	S008		M		1042	0573	0143830801	S001	S001	T	T	2046	1139	0302882801	S001	S001	M	M
39	0086	0124711401	S002	S003	M	M	1043	0573	0093060401	S001	S001	M	M	2047	1139	0302882501	S001	S001	M	M
40	0086	0124710501	S002	S003	M	M	1044	0573	0037982501	S002	S002	T	T	2048	1140	0306700501	S001	S001	M	M
41	0088	0125310101	U009	U009	M	M	1045	0573	0037982401	S002	S002	T	T	2049	1141	0403200101	U002	U002	M	M
42	0089	0125960101	S012		M		1046	0574	0145740301	S002	S002	K	K	2050	1142	0301730101	S001	S001	K	K
43	0090	0125920201	U002	U002	T	T	1047	0574	0110910201	S002	S002	M	M	2051	1143	0312190801	S002	S002	M	M
44	0092	0126511201	S002	S003	K	K	1048	0574	0037982301	S002	S002	T	T	2052	1143	0301860101	S001	S001	M	M
45	0092	0126500101	U002	U002	M	M	1049	0575	0145740501	S002	S002	K	K	2053	1144	0305980701	S001	S001	M	M
46	0093	0124710901	S002	S003	M	M	1050	0575	0145740401	S002	S002	K	K	2054	1144	0304720201	S001	S001	T	T
47	0093	0124710601	S002	S003	M	M	1051	0575	0092821201	S001	S001	M	M	2055	1144	0301481001	U002	U002	M	M
48	0094	0126700201	S001	S002	M	M	1052	0576	0148830101	S001	S001	M	M	2056	1146	0311590601	S002	S002	T	T
49	0094	0126700101	S008	S009	M	M	1053	0576	0147670201	S001	S001	T	T	2057	1148	0311591001	S001	S001	M	M

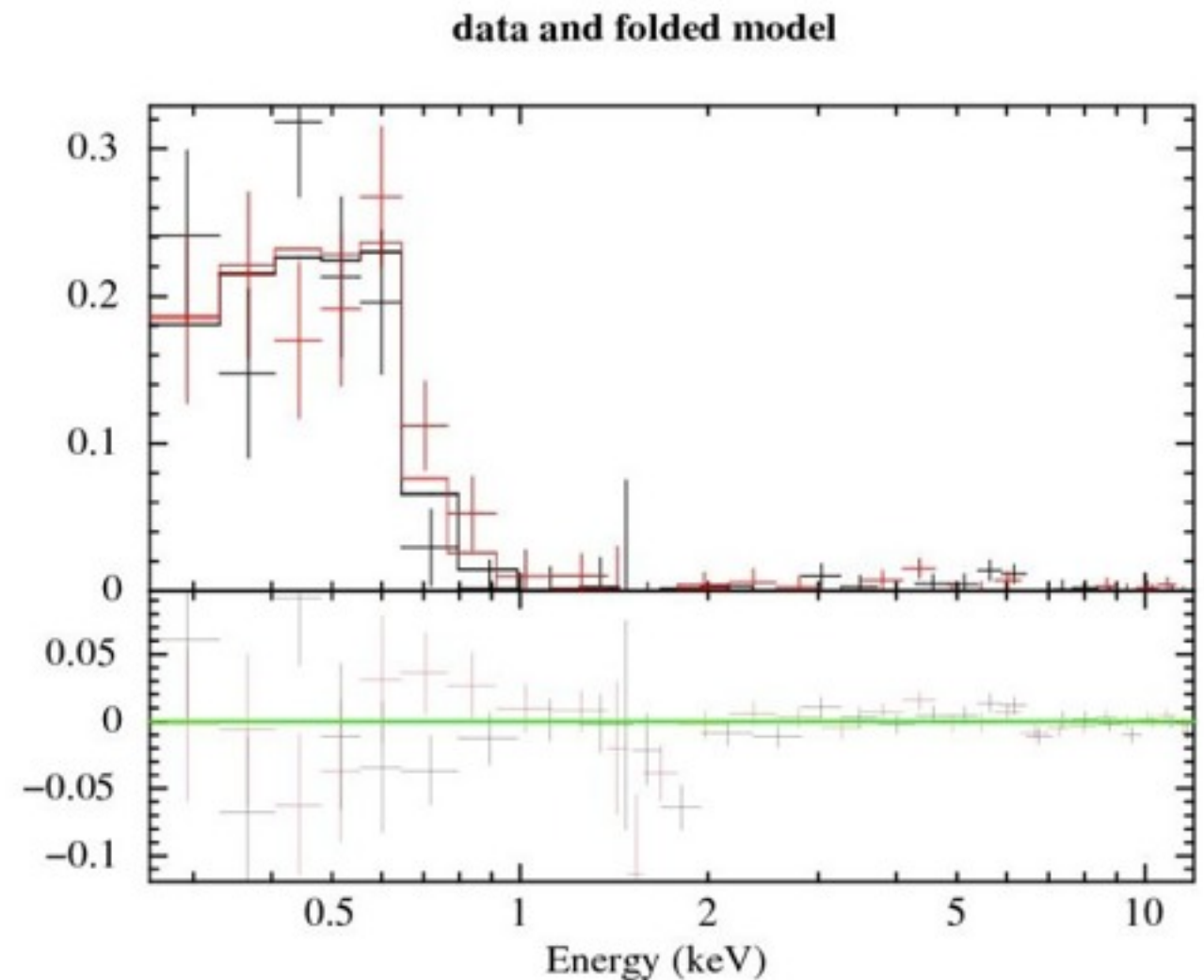
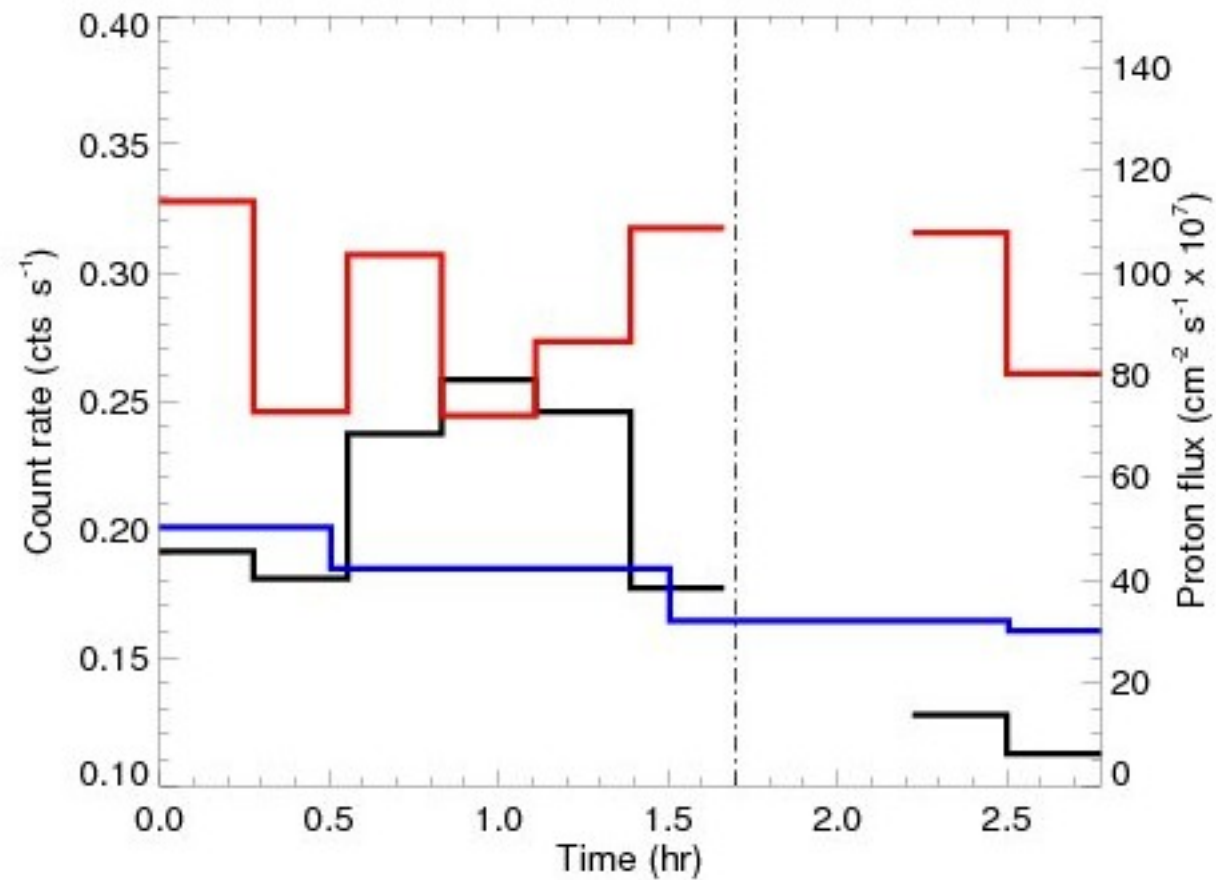
swcx_obsn_all-...

2

3

4

SWCX example; lightcurve and spectrum: AIs 09_06/08 and 10_02



Long term plan for blank sky: AI_BGWG_EPIC_08_04: postpone?

- Possible future steps:

1) Process with SAS 11.0 (~5 months): completed

2) Verification, cleaning (~2 months): current stage

3) Re-release: currently not considering for release in near future

4) Documentation

5) Table of all previous requests already available - need to monitor usage, probably using Google Analytics

6) Discuss again in 1 year

Action items outstanding and potential; 2012

- AI_EPIC_BGWG_08_04: consider the long term plan for the blank sky project
- ongoing/postpone
- AI_EPIC_BGWG_10_01: make selection regarding noisy MOS CCDs available through web form - ongoing; concerned all users will take up this option if available. Would have to make simple. We have run SAS script emtaglenoise to identify (non CCD1) noisy CCDs on database of cleaned blank sky files, see talk by Andy Read (MOS1 CCD4 - 30 % observations identified as noisy).
- AI_EPIC_BGWG_12_XX: install Google Analytics code to monitor download from table of all previous requests