

How to practice with SAS during the Workshop

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European Space Agency

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- SAS 13.0.0: xmmsas_20130501_1901-13.0.0
- Released May 8th, 2013.
- SAS public web page: <u>http://xmm.esac.esa.int/sas/</u>



External Software Tools



- > Any installation of perl (e.g. OpenSuSE 12.3 includes perl 5.16.2 that works fine).
 - <u>http://www.cpan.org/src/</u>
- > SAO ds9 7.2 + xpa 2.1.14.
 - <u>http://hea-www.harvard.edu/RD/ds9/</u>
- Grace 5.1.23 (xmgrace)
 - <u>http://plasma-gate.weizmann.ac.il/Grace/</u>
- Heasoft 6.13
 - <u>http://heasarc.nasa.gov/lheasoft/</u>
- wcstools 3.8.7
 - http://tdc-www.harvard.edu/wcstools/



Data to practice with



- A set of example observations (ODF) for selected objects. These are the same that are used for the Scientific Validation of the public release of SAS (~4 GB).
- > Where to find these example ODFs ?
 - Linux Desktops: /SAS_Workshop/<objectname>/ODF
 - ftp: ftp://xmm.esac.esa.int/pub/sasdev/SAS_Workshop_Example_ODF
- You can download specific public ODF from XMM-Newton Science Archive (XSA) via a tool named `getodf', available in <u>ftp://xmm.esac.esa.int/pub/sasdev/GetOdf/</u>
 - getodf -i ObsId (getodf -h to get help)
- > You may use your own data, if you have any.



Example Observations



- AB-Dor: K-type Zero-Age-Main-Sequence star, RGS calibration target with lot of emission lines, ObsId = 0133120201.
- BPM 16274: White Dwarf, OM calibration target (many OM exposures in different modes and filters), ObsId=0125320701.
- G21.5-09: Crab-like SNR, all EPICs in Full Frame, suited for spectral fitting (both individual and combined), ObsId=0122700101.
- Lockman Hole: the popular observation field in all wavelengths. EPIC source searching, population, hardness ratios, ObsId=0123700101.
- Mkn 421: BL Lac, RGS effective area calibration target, very bright continuum with almost no lines, suited for RGS spectral fitting, ObsId=0099280201.
- PKS0558-304: bright quasar, different EPIC window modes, specially suited for EPIC spectral fitting, ObsId=0129360201.
- HD 13499: F-Type star, OM Calibration target (wavelength calibration of grism), ObsId=0125911301.
- Hz2: OM Calibration target (grism and UV flux), ObsId=0125910901.
- Timing: Data for timing analysis (PSRB1509), ObsId=0128120401.

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GUI and command line



Common SAS GUI (sas)

Individual GUI (e.g. dselect –d)

000	X d	select			
set	test.dat				
table	events				
х	х				
у	У				
selected	selected				
Run	Cancel	Save	Defaults		

Command line

SAS						
<u>F</u> ile <u>T</u> ask <u>C</u> ustom <u>S</u> tyle <u>H</u> elp						
j 🖆 🖨 📢						
task	group	history	description 🔺			
backscale	epic		Calculation and setting of the BACKSCAL keyword			
badpix	epic		Generates bad pixel extension, and appends it to inp			
badpixfind	epic		Creates file identifying type and location of bad pixe			
barycen	timing		Barycentric correction			
bkgfit	utility		This task makes a background map for EPIC cameras			
bkgoptrate	pps		Output the optimum background level.			
calview	calibration		An interactive viewer of the XMM calibration databas			
catcorr	experimental		Perform the correction of the positions based on exte			
checkoffsets	om		Combines OSW source list into an observation source			
cifbuild	utility		Creates a Calibration Index File for a given observati			
cifdiff	utility		Lists the differences between two Calibration Index F			
cifinsert	utility		Insert CCF constituents in an existing Calibration Inde			
cifremove	utility		Remove entries from an existing Calibration Index Fi			
colimplot	utility		Plots 3-band colour EPIC or OM images using PGPLO			
combi	<unknown></unknown>		<no file="" info="" present=""></no>			
comparermf	spectral		compares RMF with that obtained from the CAL			
-1			▲ · · · · · · · · · · · · · · · · · · ·			
XMM Science Analysis System - GUI version 1.52.9						
Started on Thu May	30 12:20:12 2	013				
 @@ SAS_SUPPRESS_WARNING=1; export SAS_SUPPRESS_WARNING @@ SAS_CCF=.; export SAS_CCF @@ SAS_CCFPATH=/ccf/pub; export SAS_CCFPATH @@ cd /home/sasws1 @@ d /home/sasws1; export HOME @@ HOME=/home/sasws1; export HOME @@ SAS_MEMORY_MODEL=high; export SAS_MEMORY_MODEL @@ SAS_ODF=.; export SAS_ODF @@ SAS_VERBOSITY=1; export SAS_VERBOSITY 						

belongs to groups: utility



Identifying the SAS



> sasversion

```
sasversion: - XMM-Newton SAS release and build information:
```

```
SAS release: xmmsas 20130501 1901-13.0.0
Compiled on: Thu May 2 19:37:01 GMT 2013
Compiled by: sasbuild@sasbld02.net4.lan
Platform : RHEL5.8 64
```

SAS-related environment variables that are set:

SAS DIR = /sas/Linux/RHEL 5.8Client/64/sas13 0 0 SAS PATH = /sas/Linux/RHEL 5.8Client/64/sas13 0 0 SAS CCFPATH = /ccf/pub

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Common task options



- > Besides their specific parameters all SAS tasks have a common set of options.
- Command line format:
 - <task> [options] --<param>=<value>
- Common options:

-a <dir1>[:<dir2>...] --ccfpath <dir1>[:<dir2>...] -c --noclobber -d --dialog -f <f1> [<f2> ...] --ccffiles <f1> [<f2> ...] -h --help --ccf <cifname> -i <cifname> -m --manpage --odf <odfname> -o <odfname> --param -p -t --trace --verbosity <level> -V <level> --version $-\mathbf{v}$ --warning [code | n] -w [code n]

http://xmm.esac.esa.int/sas/current/doc/taskmain/node2.html

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Identify SAS Packages and Tasks



- > SAS uses tasks. They are grouped into packages.
- > A Package might include one or several tasks related to each other.
- > A task is a single executable. It could be a real binary or an executable perl script.
- How to identify the version and package for a given task:



xmm-newton

Help and Documentation



- sashelp command
 - SAS_BROWSER to change the browser (default firefox)
- > sashelp --doc=<task>
- <task> --manpage (do not use -help; instead it will list information on parameters)
- SAS 13.0.0 On-line help (html): <u>http://xmm.esac.esa.int/sas/current/doc/</u>
- SAS 13.0.0 User's Guide (html): <u>http://xmm.esac.esa.int/external/xmm_user_support/documentation/sas_usg/USG/</u>



SAS Threads



> A SAS Thread is an example of a sequence of several SAS tasks which allow us to reduce specific XMM-Newton data.

> All threads are available in http://xmm.esac.esa.int/sas/current/documentation/threads/





Computers and CCFs



Linux Desktops

Hostnames	Operating System	Accounts (Bash shell)
scil01 - scil10	Red Hat Enterprise Linux	u.: sasws1-sasws10
(.net4.lan)	(RHEL) 5.8 64-bit	p.: saswks07

- Personal Laptops
 - SAS 13 installed
 - Required tools installed (perl, ds9, xmgrace, heasoft, wcstools)
 - CCF reduced set available.
- ➢ Reduced CCF set (∼ 3.5 GB).
 - rsync: rsync -a xmm.esac.esa.int::XMM_RED_CCF .
 - ftp: <u>ftp://xmm.esac.esa.int/pub/ccf/red_constituents</u>

