



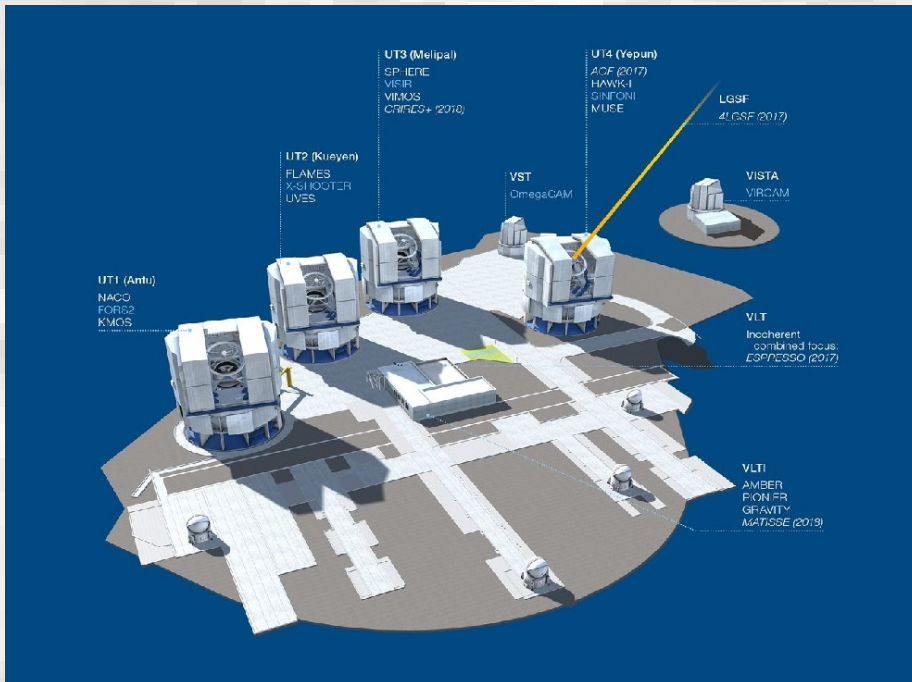
ESO instrument pipelines: what are they and how to use them

Instrument	Release Notes	Package	User Manual	Cookbook	Additional Documents	Additional Datasets	EsoReflex	Status
AMBER	2015-03-06	4.3.3	4.3.2					Operational on hold
CRIRES	2015-08-04	2.3.3	1.13	Cookbook				Operational on hold
DETMON	2015-03-06	1.3.0	1.3.0					Operational on hold
EFOSC	2015-07-10	2.2.4	1.0			Demo Data		End of maintenance
FORS	2015-09-18	5.1.4	5.2			Demo Data (29 MB)	Tutorial: 1.0 (FORS-IMG) Tutorial: 1.0 (FORS-PMOS) Tutorial: 1.9 (FORS-SPEC) Demo Data: 0.8	Active
GIRAFFE	2015 11 02	2.14.2	2.14.2	Cookbook		Standard Calibration Files page		Operational on hold
HAWKI	2015-04-20	1.8.18	1.11			Demonstration Package (2,5 GB)		Operational on hold
ISAAC	2015-04-17	6.1.5	1.4			Static Calibration Files (50 MB)		End of maintenance
KMOS	2016-01-22	1.3.17	2.17				Tutorial: 1.6 Demo Data: 1.2	Active
MIDI	2015-04-15	2.8.4	2.8.3					End of maintenance
MUSE	2015-10-06	1.2.1	1.2.1			MUSE IFU 6 trace tables Legacy MUSE: static calibrations	Tutorial: 7.0 Demo Data: 1.3	Active
NACO	2015-06-01	4.4.1	1.1					Operational on hold
SINFONI	2015-10-26	2.7.0	19.5		ADA IV 2006 paper	Calibration Database Example (255 MB) Demonstration Package (1.2 GB)	Tutorial: 1.5 Demo Data: 0.2	Operational on hold
SOFI	2015-04-17	1.5.6	1.2					End of maintenance
SPHERE	2015-03-10	0.15.0						Active
UVES	2015-09-14	5.5.7	22.11 (UVES) 18.5 (UVES-FIRRE)			Demonstration Package (2.0 GB)	Tutorial: 6.6 (UVES) Tutorial: 1.5 (UVES-FIBRE) Demo Data: 4.4	Operational on hold
VIMOS	2015-10-05	3.0.6	7.0			Demonstration Package (1.7 GB)	Tutorial: 2.3 (VIMOS-IFU) Tutorial: 2.9 (VIMOS-MOS) Demo Data: 0.4	Active
VISIR	2016 02 26	4.1.7	1.6				Demo Data: 0.1	Operational on hold
XSHOOTER	2015-09-14	2.6.8	12.7			Additional NIR telluric model catalog (100 MB)	Tutorial: 2.6 Demo Data: 1.2	Operational on hold

24 pipelines
22 instruments
(16 reflex-based)

<http://www.eso.org/sci/software/pipelines/>

Telescopes, instruments and pipelines



Instrument	Release Notes	Source Kit	User Manual	Cookbook	Additional Documents	Additional Datasets	Reflex Tutorials	Status
AMBER	2017-04-01	4.3.7	4.3.4					Operational on hold
CRISPES	2016-10-12	2.3.4	1.13	Cookbook				Operational on hold
DETMON	2016-02-15	1.3.0	1.3.0					Operational on hold
EFOSC	2016-04-01	2.2.5	1.0			Demo Data		End of maintenance
FORS	2017-02-24	5.3.23	5.5.1			Demo Data (29 MB)	Tutorial: 1.1 (FORS-IMG) Tutorial: 1.1 (FORS-FMOS) Tutorial: 1.10 (FORS-SPEC) Demo Data: 0.8	Operational on hold
GIRAFFE	2017-04-26	2.16.2	2.16	Cookbook		Standard Calibration Files page	Tutorial: 1.2 Demo Data: 0.3	Operational on hold
GRAVITY	2017-04-24	1.0.5	0.4				Tutorial: 0.2 Demo Data: 0.5	Active
HAWKI	2017-04-01	2.2.0	2.2.0			Demonstration Package (2.5 GB)	Tutorial: 2.2.0 Demo Data: 0.8	Operational on hold
ISAAC	2016-02-15	6.1.5	1.4			Static Calibration Files (50 MB)		End of maintenance
KMOS	2017-02-24	1.4.3	3.1				Tutorial: 3.0 Demo Data: 1.2	Active
MIDI	2017-04-01	2.8.9	2.8.5					End of maintenance
MUSE	2017-10-01	2.2	2.2			MUSE IFU 6 trace tables Legacy MUSE static calibrations	Tutorial: 10.0 (muse) Tutorial: 2.0 (muse-zap) Demo Data: 1.5	Active
NACO	2017-02-24	4.4.3	1.1					Operational on hold
SINFONI	2017-04-19	3.0.0	19.8.1		ADA IV 2006 paper	Calibration Database Example (255 MB) Demonstration Package (1.2 GB)	Tutorial: 1.0 Demo Data: 0.2	Operational on hold
SOFI	2017-05-15	1.5.8	1.2					End of maintenance
SPHERE	2017-03-14	0.24.0	1.22				Tutorial: 1.0 (fs) Tutorial: 1.0 (fd-img) Tutorial: 1.0 (fd-iss) Tutorial: 1.0 (zpl-img) Tutorial: 1.0 (zpl-pol) Demo Data: 1.0	Active
UVES	2017-10-19	5.8.2	22.15 (UVES) 18.9 (UVES-FIBRE)			Demonstration Package (2.0 GB)	Tutorial: 6.10 (UVES) Tutorial: 1.3 (UVES-FIBRE) Demo Data: 4.4	Operational on hold
VCAM	2017-04-01	2.3.1	2.3.1				Tutorial: 2.3.1 Demo Data: 0.1	Operational on hold
VIMOS	2017-04-24	3.1.9	7.0			Demonstration Package (1.7 GB)	Tutorial: 2.3 (VIMOS-IFU) Tutorial: 2.0 (VIMOS-MOS) Demo Data: 0.4	Operational on hold
VISIR	2017-02-24	4.3.3	1.7				Tutorial: 1.1 Demo Data: 0.3	Operational on hold
XSHOOTER	2017-10-19	2.9.3	12.17			Additional NIR telluric model catalog (190 MB)	Tutorial: 2.16 Demo Data: 1.2	Operational on hold

Instruments are complex! Therefore we need pipelines.
 Pipelines (instrument-specific data processing software) are:
 - designed, developed and delivered by the instrument consortia
 - maintained and upgraded by ESO
 Pipelines can be executed via: esorex, Gasgano and Reflex.



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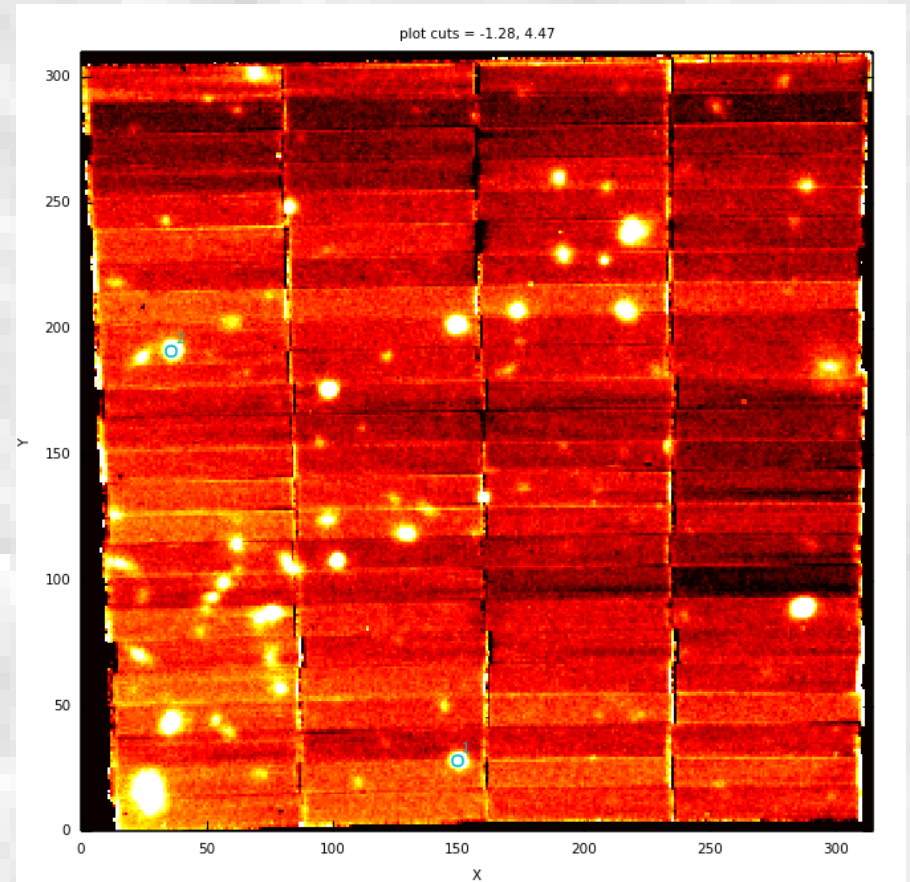
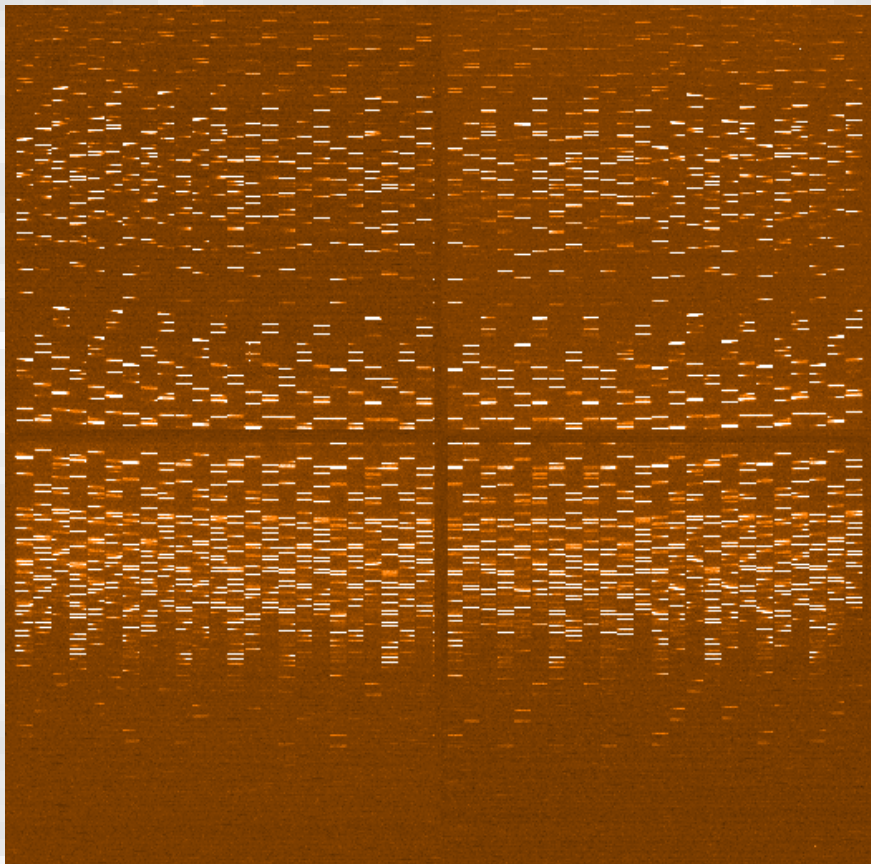
Classical data processing paradigm

- write scripts to sort, select, and process the data (shell+esorex, IDL, IRAF, python, C++, etc.).
- burn the HDD of your laptop
- realize that you have done it all wrong
- read the manual
- re-write the scrips (a few times)
- re-reduce the data (a few times)



Classical data processing paradigm

Now try this with KMOS or MUSE...





Three ways to run the pipelines:

- PRO: scripting
- CON: human labor intensive

```
vivanov@pc018251$ ./esorex --recipes

***** ESO Recipe Execution Tool, version 3.13.2 *****

List of Available Recipes :

efosc_photometry      : Compute corrected flatfield
efosc_calib           : Determination of the extraction mask
efosc_img_science    : Reduce scientific exposure
efosc_img_screen_flat : Compute master screen flat frame
efosc_science         : Extraction of scientific spectra
efosc_extract         : Extraction of scientific spectra
efosc_img_sky_flat    : Compute master img_sky_flat frame
efosc_bias            : Compute the master bias frame
efosc_zeropoint       : Compute zeropoint
```

<https://www.eso.org/sci/software/cpl/esorex.html>



Three ways to run the pipelines:

```
vivanov@pc018251$ ./esorex --help efosc_bias

***** ESO Recipe Execution Tool, version 3.13.2 *****

Recipe: efosc_bias -- Compute the master bias frame

Usage: esorex [esorex-options] efosc_bias [efosc_bias-options] sof

Options:

  --stack_method      : Frames combination method. <average | median | minmax
                       | ksigma> [minmax]
  --minrejection      : Number of lowest values to be rejected. [1]
  --maxrejection      : Number of highest values to be rejected. [1]
  --klow              : Low threshold in ksigma method. [3.0]
  --khigh             : High threshold in ksigma method. [3.0]
  --kiter             : Max number of iterations in ksigma method. [999]
  --qc               : Compute QC1 parameters. [TRUE]
```

```
vivanov@pc018251$
vivanov@pc018251$ ./esorex efosc_bias list_bias_01.sof

***** ESO Recipe Execution Tool, version 3.13.2 *****
```

<https://www.eso.org/sci/software/cpl/esorex.html>



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Three ways to run the pipelines:

```
vivanov@pc018251$ /scratch/Duties/Sofi_pipeline_Mod/bin/esorex sofi_spc_arc arcs.sof

***** ESO Recipe Execution Tool, version 3.12.3 *****
[ INFO ] sofi_spc_arc: Reducing set 1/4
[ INFO ] sofi_spc_arc: Xenon lamp: [SOFI.2018-07-19T13:12:54.009.fits]
[ INFO ] sofi_spc_arc: Apply the reduction
[ INFO ] sofi_spc_arc: Estimate the distortion
[ INFO ] sofi_spc_arc: Purged 154 of 173 arcs (1st purged=1)
[ INFO ] sofi_spc_arc: 19 detected arcs
[ INFO ] sofi_spc_arc: Create deformation grid
[ INFO ] sofi_spc_arc: Line 1 has center gradient -0.000297753
[ INFO ] sofi_spc_arc: Line 2 has center gradient -0.000305544
[ INFO ] sofi_spc_arc: Line 3 has center gradient -0.000180431
[ INFO ] sofi_spc_arc: Line 4 has center gradient -0.00047511
[ INFO ] sofi_spc_arc: Line 5 has center gradient -0.000153735
[ INFO ] sofi_spc_arc: Line 6 has center gradient -0.000174978
[ INFO ] sofi_spc_arc: Line 7 has center gradient -0.000153965
[ INFO ] sofi_spc_arc: Line 8 has center gradient -8.59044e-05
[ INFO ] sofi_spc_arc: Line 9 has center gradient -0.000104888
[ INFO ] sofi_spc_arc: Line 10 has center gradient -8.89941e-05
[ INFO ] sofi_spc_arc: Line 11 has center gradient -8.71959e-06
```

<https://www.eso.org/sci/software/cpl/esorex.html>



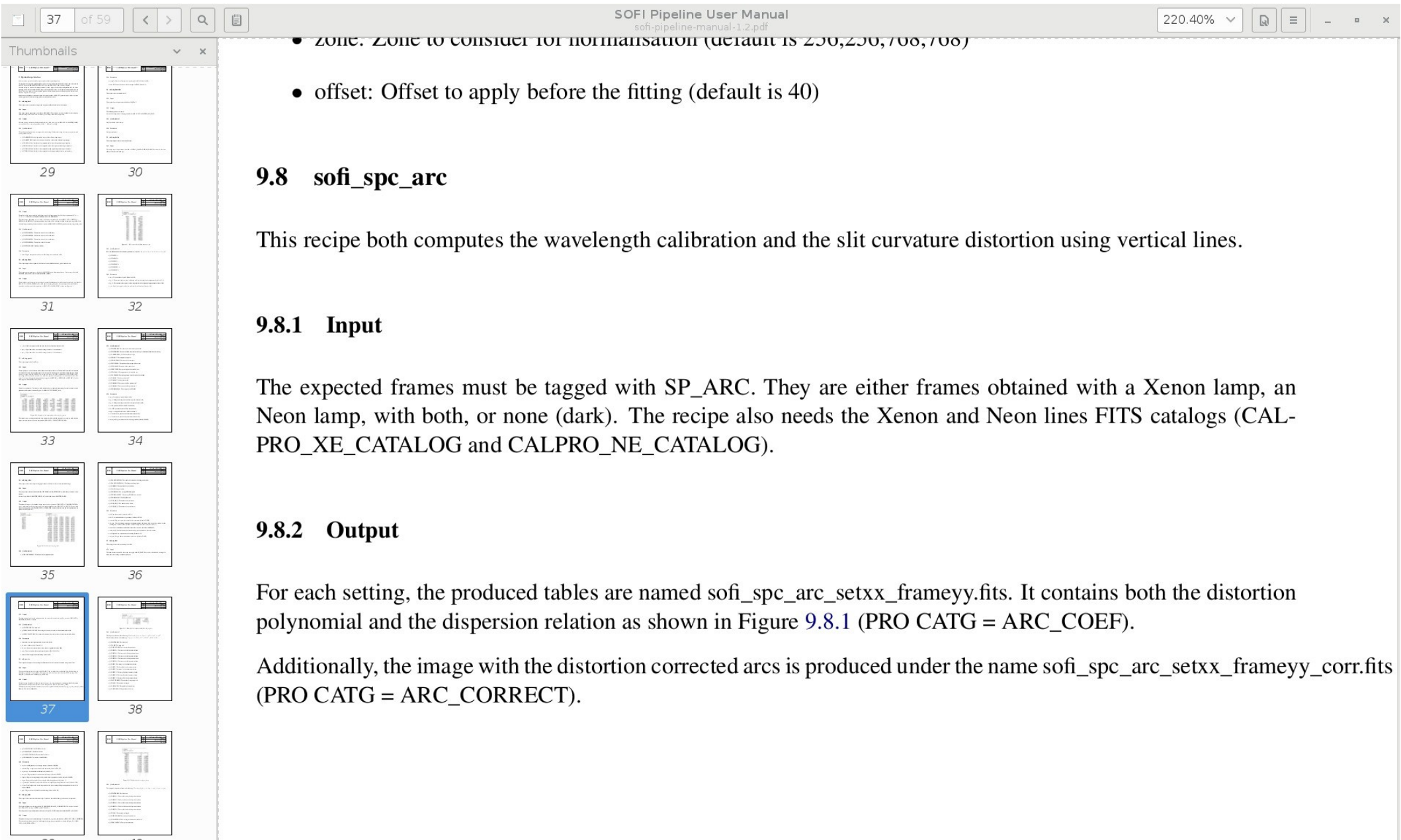
Three ways to run the pipelines:

```
vivanov@pc018251$ /scratch/Duties/Sofi_pipeline_Mod/bin/esorex sofi_spc_arc arcs.sof
**** ESO Pipeline Execution Tool version 3.12.2 ****
SOFI.2018-07-19T13:12:54.009.fits SP_ARC
SOFI.2018-07-19T13:14:07.913.fits SP_ARC
SOFI.2018-07-19T13:15:21.808.fits SP_ARC
SOFI.2018-07-19T20:04:40.916.fits SP_ARC
SOFI.2018-07-19T20:05:55.163.fits SP_ARC
SOFI.2018-07-19T20:07:08.998.fits SP_ARC
SOFI.2018-07-20T00:34:53.494.fits SP_ARC
SOFI.2018-07-20T21:28:22.227.fits SP_ARC
SOFI.2018-07-25T21:22:50.935.fits SP_ARC
SOFI.2018-07-25T21:24:17.831.fits SP_ARC
SOFI.2018-07-25T21:27:14.856.fits SP_ARC
SOFI.2018-07-25T21:29:05.601.fits SP_ARC
/scratch/Duties/Sofi_pipeline_Mod/calib/sofi-1.5.8/cal/ne.fits CALPRO_NE_CATALOG
/scratch/Duties/Sofi_pipeline_Mod/calib/sofi-1.5.8/cal/xe.fits CALPRO_XE_CATALOG
[ INFO ] sofi_spc_arc: Line 10 has center gradient -8.89941e-05
[ INFO ] sofi_spc_arc: Line 11 has center gradient -8.71959e-06
```

<https://www.eso.org/sci/software/cpl/esorex.html>



Three ways to run the pipelines:



- zone: Zone to consider for normalisation (default is 250,250,700,700)

- offset: Offset to apply before the fitting (default is 40)

9.8 sofi_spc_arc

This recipe both computes the wavelength calibration and the slit curvature distortion using vertical lines.

9.8.1 Input

The expected frames must be tagged with SP_ARC. They are either frames obtained with a Xenon lamp, an Neon lamp, with both, or none (dark). The recipe also needs the Xenon and Neon lines FITS catalogs (CALPRO_XE_CATALOG and CALPRO_NE_CATALOG).

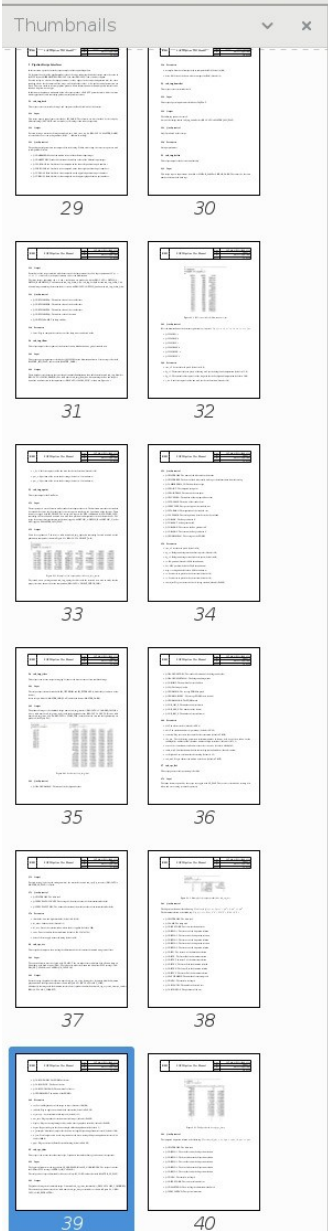
9.8.2 Output

For each setting, the produced tables are named sofi_spc_arc_setxx_frameyy.fits. It contains both the distortion polynomial and the dispersion relation as shown in Figure 9.8.1 (PRO CATG = ARC_COEF).

Additionally, the image with the distortion corrected arcs is produced under the name sofi_spc_arc_setxx_frameyy_corr.fits (PRO CATG = ARC_CORRECT).



Three ways to run the pipelines:



- QC ARCSi FWHM: The FWHM of the arcs
- QC ARCSi FLUX: The flux of the arcs
- QC ARCS NUMGOOD: The number of valid arcs
- QC FWHM MED: The median of the FWHMs

9.8.4 Parameters

- rej: Left and Right zones of the image to reject (default is 100,100)
- subdark: Flag to apply an automatic dark subtraction (default is FALSE)
- arc_max_w: Arc maximum width in pixels (default is 33)
- out_corr: Flag to produce distortion corrected images (default is FALSE)
- display: Flag to activate plotting facility (only works if gnuplot is installed) (default is FALSE)
- degree: Requested degree for the wavelength calibration polynomial (default is 2)
- wl_nsamples: Number of samples for the best wavelength dispersion polynomial search (default is 100)
- wl_err: Wavelength search size in Angstroms for the best wavelength dispersion polynomial search (default is 1000.0)
- ppm: Flag to activate the Point Pattern Matching (default is FALSE)



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Three ways to run the pipelines:

```
Terminal - vivanov@pc018251:/scratch/Duties/Sofi_arc/W02
File Edit View Terminal Tabs Help
vivanov@pc018251$ /scratch/Duties/Sofi_pipeline_Mod/bin/esorex --help sofi_spc_arc

***** ESO Recipe Execution Tool, version 3.12.3 *****
Recipe: sofi_spc_arc -- SOFI Spectro arc recipe

Usage: esorex [esorex-options] sofi_spc_arc [sofi_spc_arc-options] sof

Options:

--rej           : Left, right rejections [pixel]. [100,100]
--subdark       : Enable dark subtraction. [FALSE]
--arc_max_w     : Maximum supported arc width [pixel]. [33]
--out_corr      : Enable correction of output images. [FALSE]
--display       : Enable plotting. [FALSE]
--degree        : Degree of the wavelength dispersion polynomial. [2]
--wl_nsamples   : Number of samples for the wavelength calibration. [100]
--wl_err        : The wavelength error [Angstrom]. [1e+03]
--lines         : Lines ASCII-file. []
--ppm          : Enable Point Pattern Matching. [FALSE]

For help on the options of esorex itself, please use the command 'esorex --help'
(that is, without specifying any recipe name). For more information about the
recipe, one can also use the command 'esorex --man-page sofi_spc_arc'.
vivanov@pc018251$
```



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Three ways to run the pipelines:

GASGANO v2.1 n Kornwei / Linux

File Selected files Tools Help

Default grouping expand Find entry: find 1

Displaying 50 files Unfiltered.

File	CLASSIFICATION	TPL.ID	ORIGFILE	TPL.E...	TPL.N...
168.A-0322(B) VIMOS	555555555				
60.A-9022(B) GIRAFFE					
60.A-9050(A) VIMOS					
60.A-9120(A) WFI UNKNOWN					
100120929 SkyFlatHalp...					
WFI.2003-04-15T10:39:55.363.1.fits	SKY FLAT		WFI_img_cal_SkyFlat	WFI_Fl...	3 3
WFI.2003-04-15T10:39:55.363.fits	SKY FLAT		WFI_img_cal_SkyFlat	WFI_Fl...	3 3

/home/nkornwei/fits/WFI.2003-04-15T10:39:55.363.1.fits WFI_FlatSkyIma.15.fits SKY FLAT

Extension: HEADER Find in header: find Load Filter Filter Auto Disp

Keyword	Value
SIMPLE	T
BITPIX	16
NAXIS	0
ORIGIN	ESO
DATE	2003-04-15T10:40:45.493
MJD-OBS	52744.44439078
DATE-OBS	2003-04-15T10:39:55.363
EXPTIME	48.5397
EXTEND	T
OBJECT	FLAT,SKY
INSTRUME	WFI
OBSERVER	UNKNOWN
PI-COI	UNKNOWN
TELESCOP	MPI-2.2

vmmosbstare v10200

File Help

Current Queued Executing Tab pane with Current, Queued and Executing tabs

Name	Value	Default	Range
vimos.Parameters.bias.removing.m...	Zmaster	Zmaster	
vimos.Parameters.sky.method	Fit	Fit	
vimos.Parameters.sky.order	PARAMETERS PANEL	2	
vimos.Parameters.sampling	Linear	Linear	
vimos.Parameters.extraction.fuzz	5	5	
vimos.Parameters.detection.exclude	2	2	

INPUT FRAMES PANEL

Product Naming
Product Root Directory: /diska/home/v Browse Naming Scheme: Numeric

Execute

OUTPUT FRAMES PANEL

LOG MESSAGES PANEL

Request Pool

Execute Selected

Clear

Save Clear

<https://www.eso.org/sci/software/gasgano.html>



Three ways to run the pipelines:

Workflow Instructions

To run this workflow on the demo data:
- Turn on highlighting. Choose "Tools" -> "Animate at Runtime" from top menu and set it to "1".
- Press the "Run" button OR **ctrl-R** to start the workflow.
To run on a different data set:
- Click on **ROOT_DATA_DIR** and set as appropriate.
All subdirectories of **RAW_DATA_DIR** will be searched for data.
- If desired, change **END_PRODUCTS_DIR** (IMPORTANT: **END...** should not be a subdirectory of the **RAW_DATA_DIR**, otherwise it will be searched for raw data!)
- Press the "Run" button OR **ctrl-R** to start the workflow.
To monitor the progress of the workflow in more detail:
- Open "Window" -> "Runtime Window" in top menu before starting the workflow.
Reflex is described in A&A, 559, A96, credit it in publications that used the workflows. Workflow & VISIR pipeline manual are located at: http://www.eso.org/sci/software/pipelines/#reflex_workflows

Setup Directories

Input:

- **ROOT_DATA_DIR:** /run/media/vvanov/Backups/VISIR/Reduced
- **RAW_DATA_DIR:** /run/media/vvanov/Backups/VISIR/Raw (change it only if you do NOT want to use the calibration database delivered with the pipeline)
- **CALIB_DATA_DIR:** /scratch/Duties/VISIR_pipeline/install/calib/visir-4.3.3
None of the directories below should be a subdirectory of **RAW_DATA_DIR** or **CALIB_DATA_DIR**

Working Directories:

- **TMP_PRODUCTS_DIR:** \$ROOT_DATA_DIR/products/TMP_PRODUCTS_DIR
- **BOOKKEEPING_DIR:** \$ROOT_DATA_DIR/products/BOOKKEEPING_DIR
- **LOGS_DIR:** \$ROOT_DATA_DIR/products/LOGS_DIR
- **BOOKKEEPING_DB:** \$BOOKKEEPING_DIR/bookkeeping.db

Output:

- **END_PRODUCTS_DIR:** \$ROOT_DATA_DIR/products/END_PRODUCTS_DIR

Global Parameters = actor with interactive option

- **FITS_VIEWER:** /usr/bin/afwview (fits viewer for product inspection (may require full path))
- **EraseDirs:** false ("true" erases **BOOKKEEPING_DIR**, **TMP_PRODUCTS_DIR** & **LOGS_DIR** (Lazy Mode will not work). "false" does not erase them)
- **GlobalPlotInteractivity:** true (Disable interactive GUIs for the whole workflow (Lazy Mode will not work). Overrides in subworkflows have precedence.)
- **SelectDataSetMethod:** Interactive (Specify how datasets for processing are selected: "All" = all datasets, "New" = never reduced before, "Reduced" = successfully reduced before, "Failed" = unsuccessfully reduced before, "Interactive" = interactive selection.)
- **ProductExplorerMode:** Triggered (Specify when to show the ProductExplorer GUI "Triggered" = after all data sets were reduced. "Enabled" = shows it after each dataset. "Disabled" = never show it)

Step 1: Data Organisation and Selection

Step 2: Image Registration Coaddition

Step 3: Optional Photometry

Step 4: Calibration Output Organization

Auxiliary and debug parameters, please do not change: ● GLOBAL_TIMESTAMP: 2017-09-25T12:44:26 ● ESORexArgs: --suppress-prefix TRUE ● END_PRODUCTS_SUBDIR: 2015-10-15T17:35:34/VISIR_IMG_OBS215_2_0001_tpl ● N_SELECTED_DATASETS: 3



Three ways to run the pipelines:

Pro:

- intuitive
- interactive
- configurable
- open to user routines
- optimized execution
- data organization
- bookkeeping
- designed by experts
- tested and improved
- documents, tutorials

Con:

- N.A.



Three ways to run the pipelines:

Pro:

- intuitive
- interactive
- configurable
- open to user routines
- optimized execution
- data organization
- bookkeeping
- designed by experts
- tested and improved
- documents, tutorials

Con:

- steep learning curve
- tolerates black-box style usage
- Java

Workflow driven Data Reduction

A&A 559, A96 (2013)

A&A 559, A96 (2013)
DOI: [10.1051/0004-6361/201322494](https://doi.org/10.1051/0004-6361/201322494)
© ESO 2013

**Astronomy
&
Astrophysics**

Automated data reduction workflows for astronomy

The ESO Reflex environment

W. Freudling, M. Romaniello, D. M. Bramich, P. Ballester, V. Forchi, C. E. García-Dabłó, S. Moehler, and M. J. ...

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Received 16 August 2013 / Accepted 14 October 2013

ABSTRACT

Context. Data from complex modern astronomical instruments often consist of multiple files and their reduction requires a variety of software tools. The execution of these tools requires a complex workflow that needs to be designed, often by individual researchers that are not experts in workflow design. This process can be improved by using automated workflow management systems. To realise our goals, we designed a system that allows the user to create an executable flowchart-like representation of the data reduction process. The European Southern Observatory (ESO) has developed Reflex, an environment for automated astronomical data reduction. Reflex is implemented as a package of customized components for the Kepler workflow engine. It provides a graphical user interface to create an executable flowchart-like representation of the data reduction process. Reflex includes novel concepts to exploit information created during data organisation for the workflow execution. *Results.* Automated workflows can greatly increase the efficiency of astronomical data reduction. In Reflex, workflows can be run non-interactively as a first step. Subsequent optimization can then be carried out while transparently re-using all previously generated products. We found that such workflows enable the reduction of complex data by non-expert users and minimize book-keeping errors. *Conclusions.* Reflex includes novel concepts to increase the efficiency of astronomical data processing. While Reflex is a specific

Reflex tutorials
<http://eso.org/reflex>

Forchi, V., Reflex User
Manual, VLT-MAN-
ESOs-19000-5037

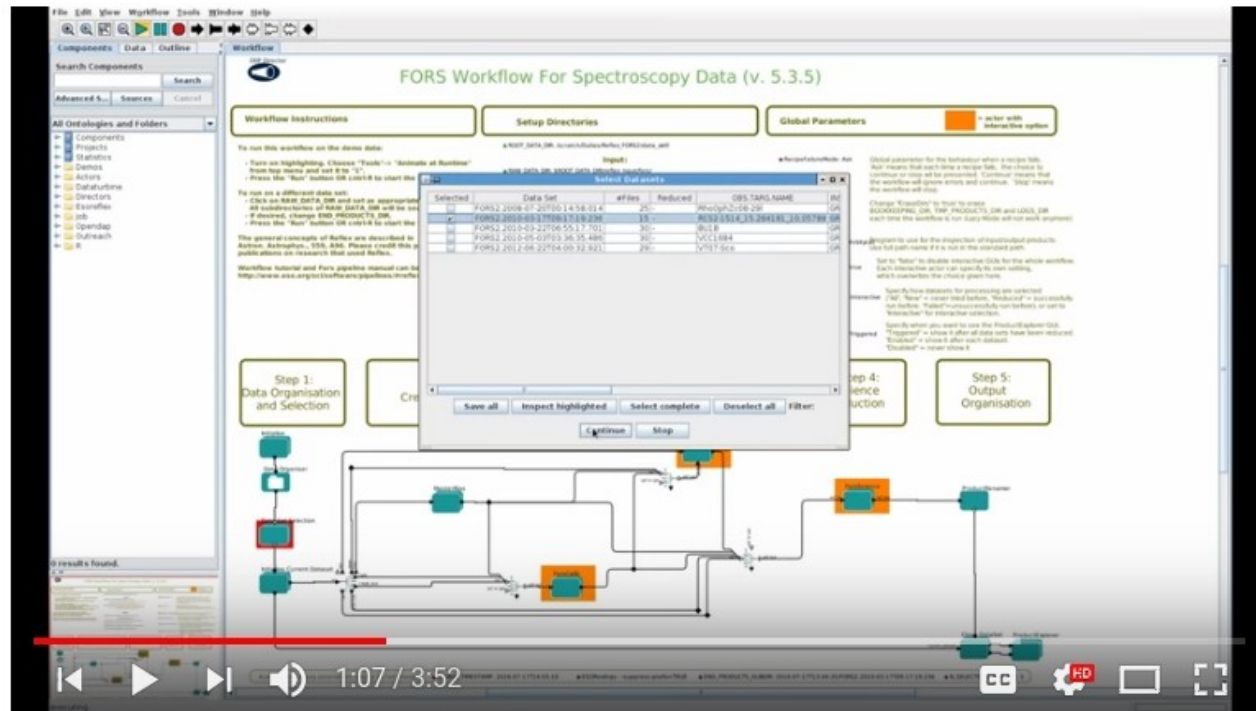
Pipeline
manuals



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Seeking help



ESO Reflex pipeline tutorials

ESO Reflex Tutorial - 4 / 5

- 2  **ESO Reflex pipeline tutorial - 1b: Download and installation for Mac (Ver. 2016-07-25)**
ESO Reflex Tutorial 4:03
- 3  **ESO Reflex pipeline tutorial - 2: Preparations before starting the**
ESO Reflex Tutorial 4:28
- ▶  **ESO Reflex pipeline tutorial - 3: Execution (Ver. 2017-05-02)**
ESO Reflex Tutorial 3:53
- 5  **ESO Reflex pipeline tutorial - 4: Lazymode (Ver. 2016-07-25)**
ESO Reflex Tutorial 3:02

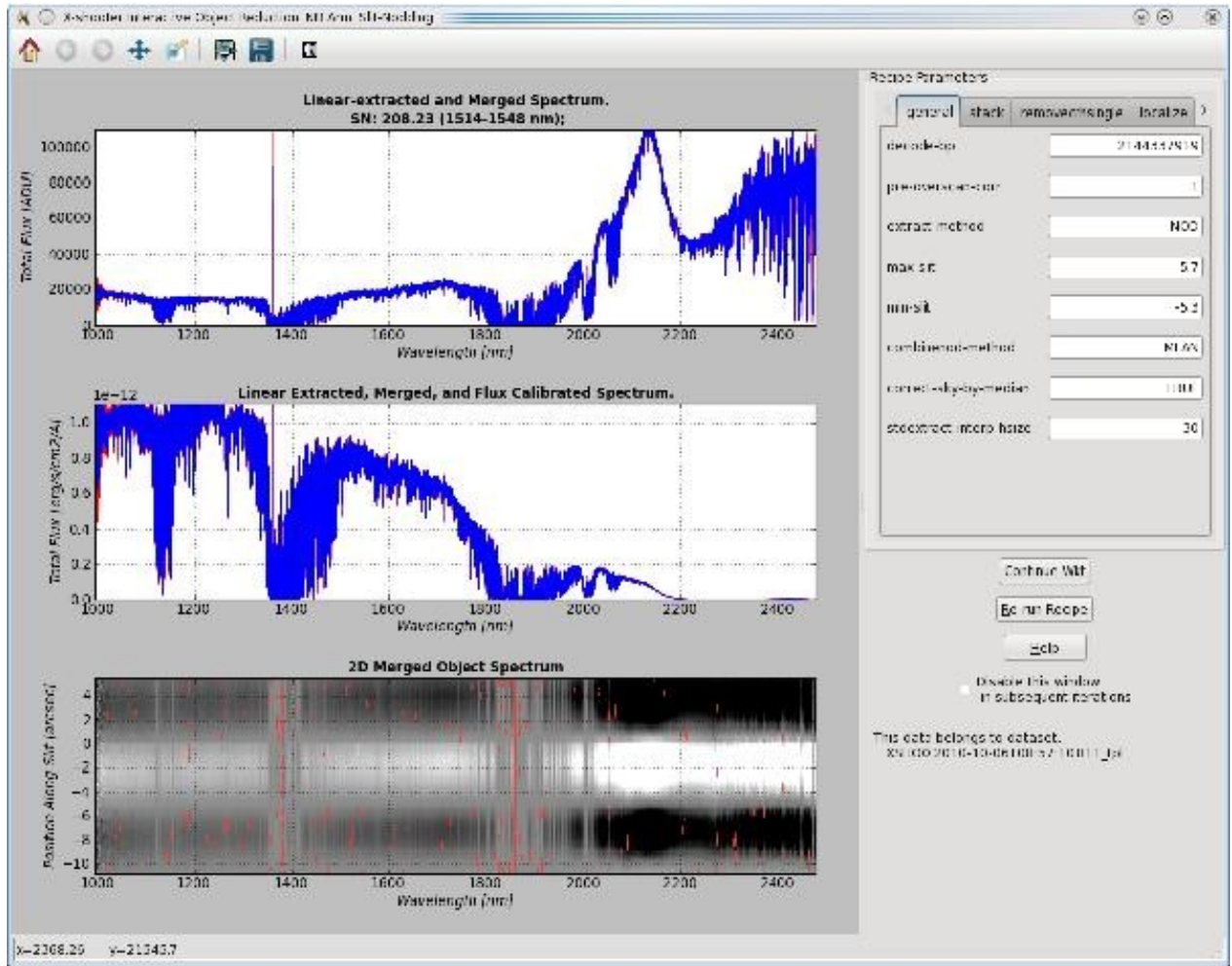
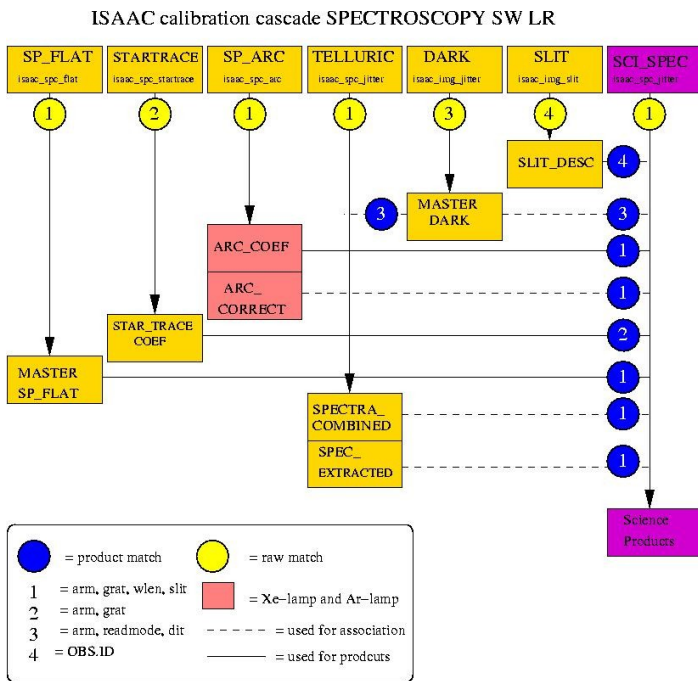
ESO Reflex pipeline tutorial - 3: Execution (Ver. 2017-05-02) Share

 ESO Reflex pipeline tutorial - 2:

<https://www.youtube.com/channel/UCCq4rxr30ydNyV94OWmLrMA>



Reflex highlights





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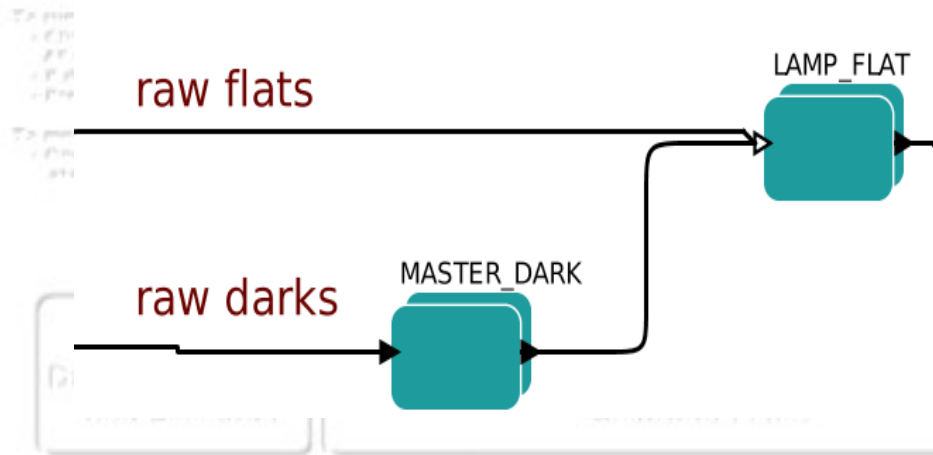
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Reflex highlights

```
vivanov@nbl018531$ ./esoreflex -l
      Workflow name      Full path
      -----
ClosingDatasetWithEmailNotification /scratch/Duties/Pipeline_UVES/inst
tasetWithEmailNotification.xml
      ProductExplorer    /scratch/Duties/Pipeline_UVES/inst
plorer.xml
      ChangingRecipeParamsBasedOnInput /scratch/Duties/Pipeline_UVES/inst
ecipeParamsBasedOnInput.xml
      uves                /scratch/Duties/Pipeline_UVES/inst
      uves-fibre         /scratch/Duties/Pipeline_UVES/inst
vivanov@nbl018531$
vivanov@nbl018531$ ./esoreflex uves &
```

Quick start

Basic Reflex Workflow



Workflow components:

- actors – basic data organization or processing “units”
- relations – lines of communication between actors (black lines)

- Reflex uses SOFs (Set Of Files) and SOPs (Set of Parameters) as tokens
- SOFs include files, categories (e.g. darks, flats, etc) + purpose
- Data Organizer organizes data in “DataSets” (saves a lot of time!)
- A DataSets are SOFs that include everything needed to process one set of science observations + relevant recipe parameters



Components Data Outline

Search Components
[Search]
Advanced... Sources Cancel

- All Ontologies and Folders
- Components
 - Projects
 - Statistics
 - Demos
 - Actors
 - Daturbine
 - Directors
 - Eso-reflex
 - Job
 - Opendap
 - Outreach
 - R

0 results found.

KMOS Workflow (v. 1.3.0b1)

Workflow Parameters

- GLOBAL_TIMESTAMP: 2014-03-05T16:02:45
- ESORexArgs: --suppress-prefix=TRUE
- END_PRODUCTS_SUBDIR: 2014-03-05T13:40:20/KMOS.2013-06-30T23:48:06.049_tpl
- N_SELECTED_DATASETS: 1

Workflow Progress: Step 2: Creation of Master Calibration Files

Workflow



KMOS Workflow (v. 1.3.0b1)

Workflow Instructions

In order to run this workflow:

- Turn on highlighting. Choose "Tools"-> "Animate at Runtime" from top menu and set it to "1".
- Open "Window" -> "Runtime Window" in top menu before starting the workflow if you wish to monitor the reduction.
- Press the "Run" button OR cntrl-R to start the workflow.

The workflow is initially set to run on a default data set. In order to run on a different data set, the following variables have to be set:

- ROOT_DATA_DIR is the root directory containing the workflow related directories defined below
- RAWDATA_DIR contains the RAW data.
- CALIB_DATA_DIR contains the STAYC calibration files (REF_LINES, ARC_LIST, WACE_BAND, etc...)
- BOOKKEEPING_DIR contains various informations about reduction process (esorex.cfg file, SOFS, parameters used, etc...)
- LOGS_DIR contains the esorex logs.
- TMP_PRODUCTS_DIR contains the products as they are generated by esorex.
- END_PRODUCTS_DIR contains the renamed products.

Setup Directories

Input:

- ROOT_DATA_DIR: /scratch/mneuser/SDP/KMOS/install/bin/data_wkf
- RAW_DATA_DIR: \$ROOT_DATA_DIR/reflex_input/kmos
- CALIB_DATA_DIR: /scratch/mneuser/SDP/KMOS/install/bin/install/calib/kmos...

Working Directories:

- BOOKKEEPING_DIR: \$ROOT_DATA_DIR/reflex_book_keeping/kmos
- LOGS_DIR: \$ROOT_DATA_DIR/reflex_logs/kmos
- TMP_PRODUCTS_DIR: \$ROOT_DATA_DIR/reflex_tmp_products/kmos

Output:

- END_PRODUCTS_DIR: \$ROOT_DATA_DIR/reflex_end_products

Global Parameters

RecipeFailureMode: Ask = actor with interactive option

Defines the workflow behaviour for a failing recipe. Possible values are:

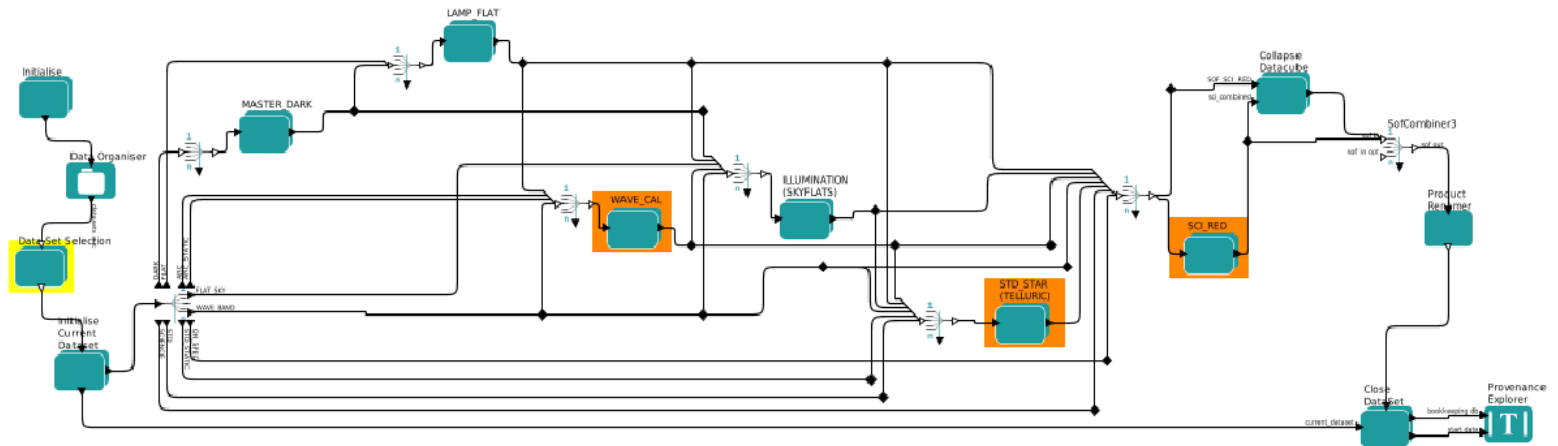
- Ask: the choice to continue or stop is left to the user
- Continue: the error is ignored and the workflow continues
- Stop: the workflow stops

EraseDirs: FALSE
Erases BOOKKEEPING_DIR, TMP_PRODUCTS_DIR and LOGS_DIR each time the workflow is run (Lazy Mode won't work anymore)

FITS_VIEWER: qtv
FITS viewer used for the files inspection

GlobalPlotInteractivity: True
Global interactivity control Point

SelectDatasetMethod: Interactive
Data Selection Method (Interactive, All, Complete, Incomplete)

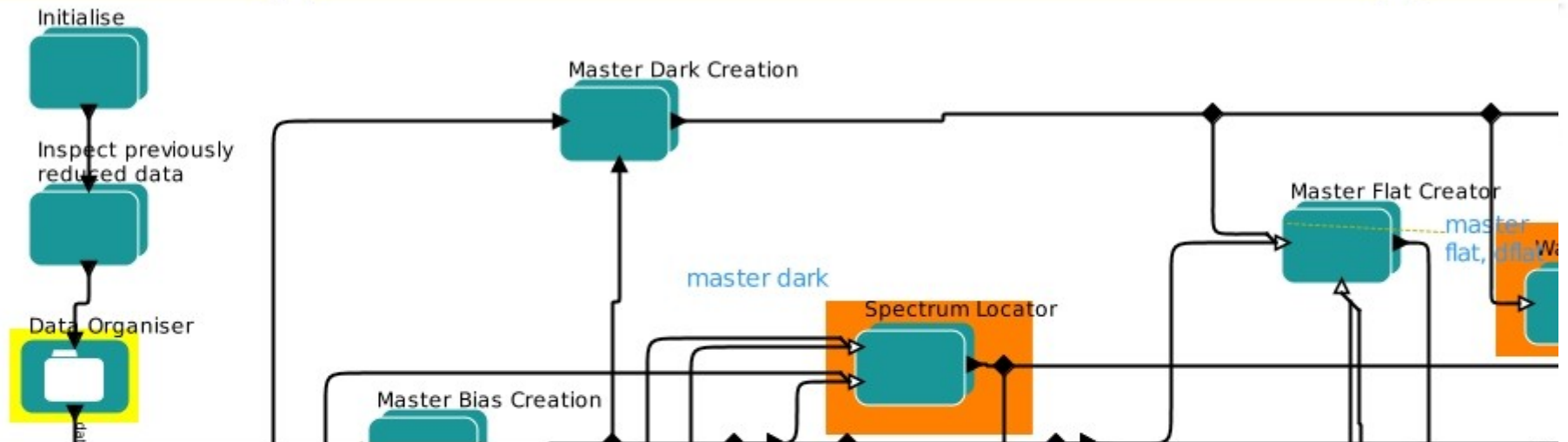


Auxiliary and debug parameters, please do not change: ● GLOBAL_TIMESTAMP: 2014-03-05T16:02:45 ● ESORexArgs: --suppress-prefix=TRUE ● END_PRODUCTS_SUBDIR: 2014-03-05T13:40:20/KMOS.2013-06-30T23:48:06.049_tpl ● N_SELECTED_DATASETS: 1

Step 1: Data Organisation and Selection

Step 2: Creation of Master Calibration Files

Wavel



Edit parameters for DataOrganizer

OCA File: /scratch/Duties/Pipeline_UVES/install/share/esopipes/uves-5.10.4/reflex/uves_wkf.oca **Browse**

Keywords to be displayed: OBJECT,INS.PATH,DET.CHIPS,DET.WIN1.BINX,DET.WIN1.BINY,DET.READ.SPEED,INS.MODE,INS.SLIT1.NAME,INS.

Lazy Mode:

Use CalSelector associations:

Association preference: NONE

Bookkeeping Dir: \$BOOKKEEPING_DIR **Browse** **Configure**

class: org.eso.DataOrganizer **Configure**

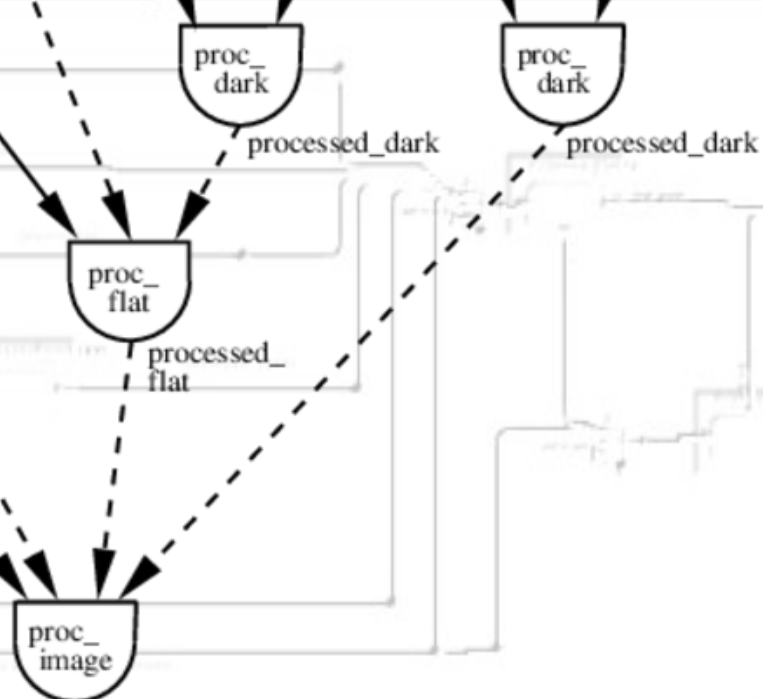
Commit **Add** **Remove** **Defaults** **Preferences** **Help** **Cancel**

REFLEX Data Organisation



Dataset

science file associated calibration files



REFLEX OCA Rules

Data organisation defined in “OCA rules” (text file)

- Three types of rules:

– Classification (“This is a **Raw Dark**”)

– Organization (“These **Raw Darks** are processed together”)

– Association (“Processing of **Raw Darks** need these **Biases**”)

- DO produces DataSets

- Each file in DataSet has a **category** (e.g. “raw bias”) and a **purpose** action1/action2/... (e.g. „bias subtract:, :flatfield“, etc)

```

//Classification
if DPR.CATG=="CALIB" and DPR.TYPE=="BIAS" and DET.CHIPS==1 and INSTRUME=="UVES" then
{
  RAW.TYPE = "BIAS_BLUE";
  REFLEX.CATG = "BIAS_BLUE";
  PACK.DIR = "DET";
  CATG = "CALIB";
}

if DPR.CATG=="CALIB" and DPR.TYPE=="BIAS" and DET.CHIPS==2 and INSTRUME=="UVES" then
{
  RAW.TYPE = "BIAS_RED";
  REFLEX.CATG = "BIAS_RED";
  PACK.DIR = "DET";
  CATG = "CALIB";
}

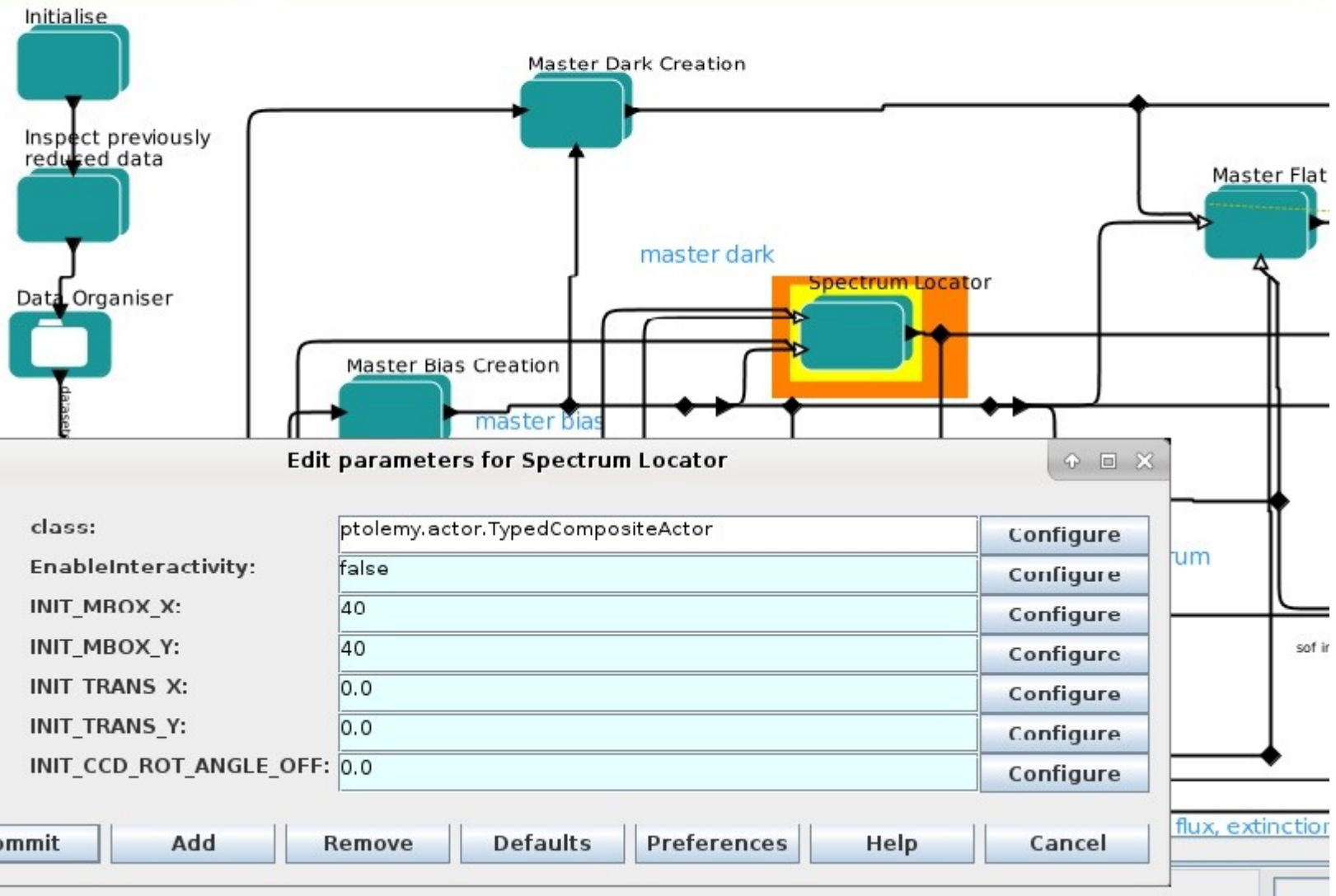
if DPR.CATG=="CALIB" and (
  ( DPR.TYPE=="BIAS,DETCHAR" and TPL.ID=="UVES_blue_tec_ccdflat" )
) and DET.CHIPS==1 and INSTRUME=="UVES" then
{
  RAW.TYPE = "CCDTEST_BLUE";
  REFLEX.CATG = "BIAS_DETCHAR_BLUE";
  PACK.DIR = "NONE";
}

```

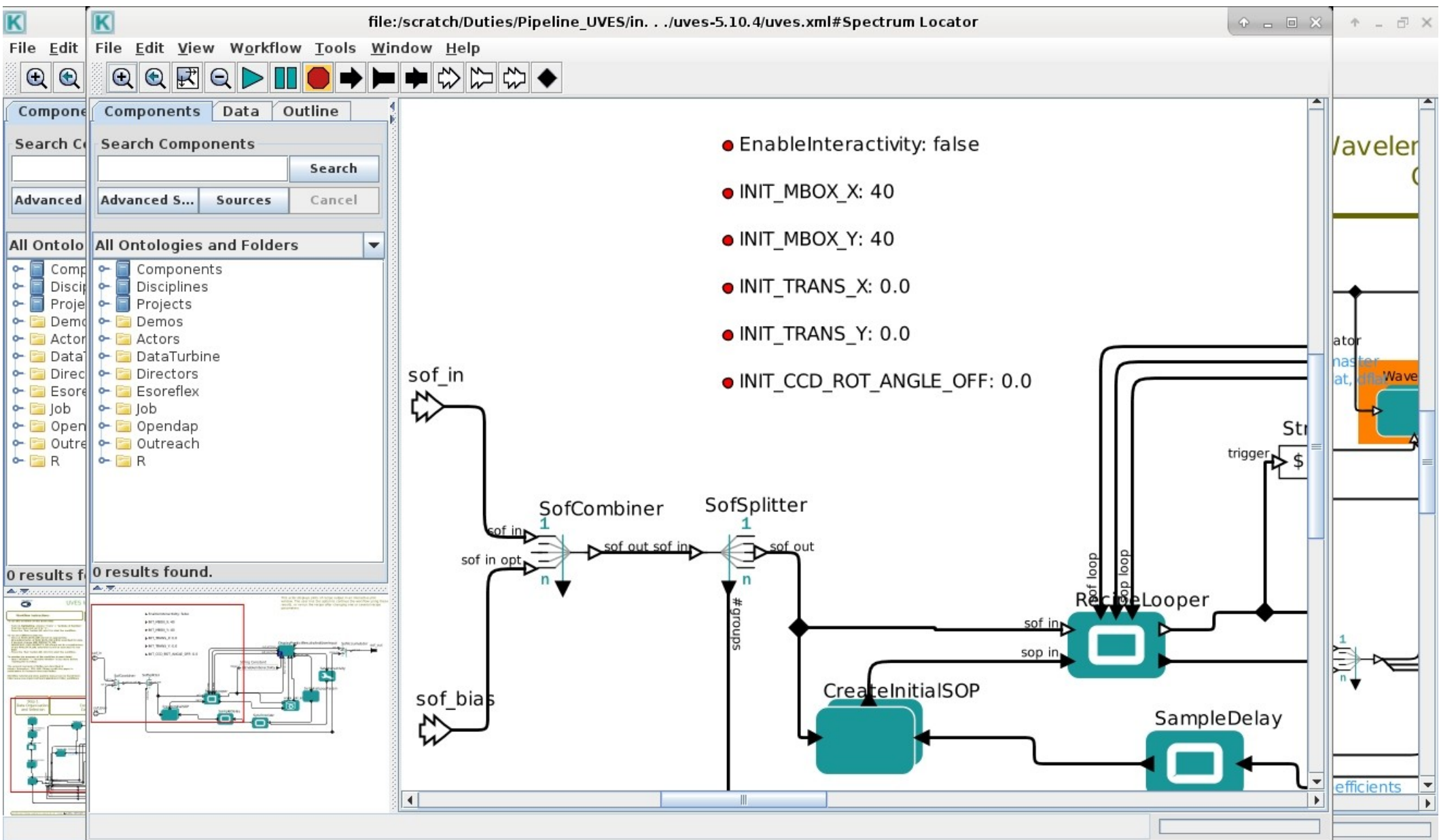
OCA rules file

Step 1: Data Organisation and Selection

Step 2: Creation of Master Calibration Files



Editing parameters



Hierarchical structure – sub-workflows

The image displays an IDE window with a Java source file and a workflow diagram. The Java code, located in `file:/scratch/Duties/Pipeline_UVES/in...reflex/src/org/eso/RecipeExecuter.java`, implements a recipe execution logic. It handles different execution modes: `RUN`, `SKIP`, and `DISABLED`. In `RUN` mode, it sorts input files and executes a recipe, updating purposes if `d_lazyMode` is enabled. In `SKIP` mode, it simply returns the input files. In `DISABLED` mode, it logs a message and returns an empty list. The workflow diagram on the right shows a sequence of components: a start node (blue circle with '\$'), an input node (teal rectangle), a 'uvex' component (teal rectangle with a circular arrow icon), a 'SetInitiall' component (teal rectangle), and an output node (teal rectangle). Arrows indicate the flow of data and control between these components, with labels like 'in sof rec orig', 'set init sop', 'uvex_sop out', and 'sops_sciored'.

```
629 else {
630     String msg = getName() + ": sof empty after filtering, please check the input filter t
631     logger.error(msg);
632     fail(msg);
633     /* produce an empty output sof */
634     products = new ArrayList<FitsFile>();
635 }
636
637 if (executionMode.equals(ExecutionMode.RUN.toString())) {
638     try {
639         Collections.sort(inputFiles, new FitsFileComparator());
640         /* execute the recipe */
641         String extraParams = Util.stripStringParameter(d_esorexArgs);
642         String purposeMode = d_purposeMode.getExpression();
643         Set<String> newPurposes = Util.updatePurpose(purposeMode, inputPurposes);
644         if (((BooleanToken) d_lazyMode.getToken()).booleanValue())
645             products = d_cplInvoker.executeRecipeLazy(d_recipeName, this.getName(),
646                 parameters, extraParams, inputFiles, newPurposes);
647         else
648             products = d_cplInvoker.executeRecipe(d_recipeName, this.getName(),
649                 parameters, extraParams, inputFiles, newPurposes);
650     } catch (ReflexException e) {
651         logger.error(e.getMessage());
652         /* wrap the message in case it's too long */
653         fail(e.getMessage());
654         /* produce an empty output sof */
655         products = new ArrayList<FitsFile>();
656     }
657 } else if (executionMode.equals(ExecutionMode.SKIP.toString())) {
658     logger.info(getName() + " - skipping recipe");
659     String purposeMode = d_purposeMode.getExpression();
660     Set<String> newPurposes = Util.updatePurpose(purposeMode, inputPurposes);
661     products = inputFiles;
662     /* update purpose */
663     for (FitsFile f: products)
664         f.setPurposes(newPurposes);
665 } else if (executionMode.equals(ExecutionMode.DISABLED.toString())) {
666     logger.info(getName() + " - actor is disabled");
667     products = new ArrayList<FitsFile>();
668 }
```

Hierarchical structure – sub-workflows

Setup Directories

Input:

- ROOT_DATA_DIR: \$HOME/reflex_data
- RAW_DATA_DIR: /scratch/Duties/Pipeline_UVES/data_wkf/reflex_input/uves

Only change CALIB_DATA_DIR if you do NOT want to use the calibration data delivered with the pipeline:

- CALIB_DATA_DIR: /scratch/Duties/Pipeline_UVES/install/share/esopipes/datastatic/uves-5.10.4/

None of the directories below should be a subdirectory of RAW_DATA_DIR or CALIB_DATA_DIR

Output:

- END_PRODUCTS_DIR: \$ROOT_DATA_DIR/reflex_end_products

Working Directories:

- BOOKKEEPING_DIR: \$ROOT_DATA_DIR/reflex_book_keeping/uves
- LOGS_DIR: \$ROOT_DATA_DIR/reflex_logs/uves
- TMP_PRODUCTS_DIR: \$ROOT_DATA_DIR/reflex_tmp_products/uves
- BOOKKEEPING_DB: \$BOOKKEEPING_DIR/bookkeeping.db

Global Parameters

= actor with interactive option

- RecipeFailureMode: Ask Global parameter for the behaviour when a recipe fails. 'Ask' means that each time a recipe fails, the choice to continue or stop will be presented. 'Continue' means that the workflow will ignore errors and continue. 'Stop' means the workflow will stop.
- EraseDirs: false Change "EraseDirs" to 'true' to erase BOOKKEEPING_DIR, TMP_PRODUCTS_DIR and LOGS_DIR each time the workflow is run (Lazy Mode will not work anymore)
- FITS_VIEWER: fv fits viewer to use for the inspection of input/output products
- GlobalReduceFFmethod: extract Flat-fielding method. If set to 'pixel', flat-fielding is performed in pixel space. If set to 'extract', flat-fielding is performed in product space. If set to 'no', no flat-field correction is done. <
- GlobalPlotInteractivity: true Disable interactive GUIs for the whole workflow. Overrides in subworkflows have precedence.
- SelectDatasetMethod: Interactive Selection method for the Data Set Chooser
- ProductExplorerEnabled: true Show Product Explorer window
- ProductExplorerMode: Triggered ProductExplorer pops up after all datasets are finished
- MaximumFlatNumber: 12 Maximum number of input raw flats tolerated by the workflow. You may increase this value if you have more than 12 flats in a single input file.

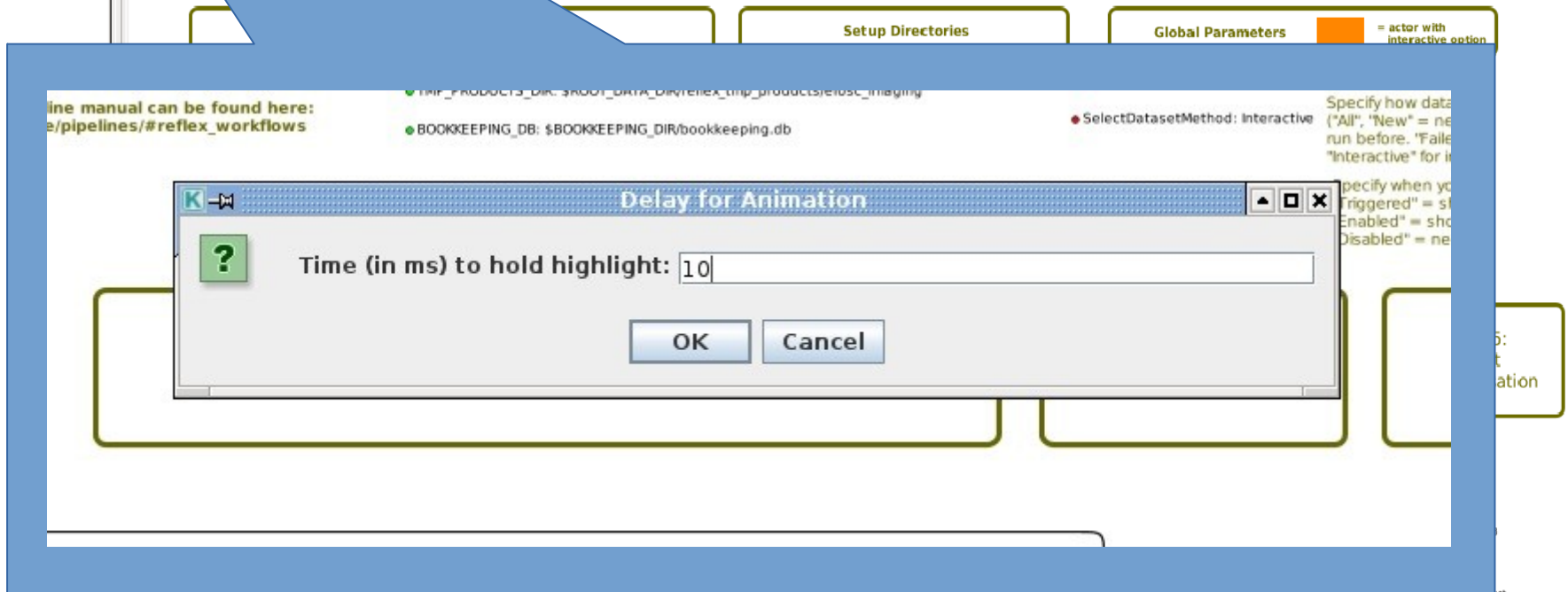
Configurable!



Search Components
Search
Advanced ... Sources Cancel

- All Ontologies and Folders
- Components
 - Projects
 - Statistics
 - Demos
 - Actors
 - Dataturbine
 - Directors
 - Eso-reflex
 - Job
 - Opendap
 - Outreach
 - R

KMOS Workflow (v. 1.3.0b1)



0 results found.

KMOS Workflow (v. 1.3.0b1)

Workflow visualization showing steps: Step 1: Data Selection, Step 2: ...

Auxiliary and debug parameters, please do not change: ● GLOBAL_TIMESTAMP: 2014-03-05T16:02:45 ● ESORexArgs: --suppress-prefix=TRUE ● END_PRODUCTS_SUBDIR: 2014-03-05T13:40:20/KMOS.2013-06-30T23:48:06.049_tpl ● N_SELECTED_DATASETS: 1

Select Datasets

Selected	Data Set	Reduced	Descriptions	OBJECT	INS.PATH	DET.CHIPS	DET.W
<input checked="" type="checkbox"/>	UVES.2008-10-26T00:24:47.790	-	-	9Sgr	RED	2	1
<input checked="" type="checkbox"/>	UVES.2009-01-21T03:41:58.063	-	-	HE0932-0346	BLUE	1	2
<input checked="" type="checkbox"/>	UVES.2009-02-04T00:47:11.636	-	-	J051624.60-690001.1	BLUE	1	2
<input checked="" type="checkbox"/>	UVES.2009-02-13T00:57:58.546	-	-	RN-LMC-2009	BLUE	1	2
<input checked="" type="checkbox"/>	UVES.2009-03-11T07:30:35.949	-	-	1ES-1553+113	RED	2	2
<input checked="" type="checkbox"/>	UVES.2009-03-13T04:00:31.835	-	-	Hen-3-847	BLUE	1	1
<input checked="" type="checkbox"/>	UVES.2009-03-20T05:05:09.533	-	-	LTT-4816	RED	2	2
<input checked="" type="checkbox"/>	UVES.2009-04-05T09:43:47.822	-	-	HR7355	BLUE	1	1
<input type="checkbox"/>	UVES.2009-04-07T02:38:15.960	-	-	V1052_Cen	RED	2	1

Filter:

Add description to the current execution of the workflow:

Execution

Select Frames

	Sel	Category	Keyword	Value
UVES.2009-03-11T07:30:35.949.fits	<input checked="" type="checkbox"/>	SCI_POINT_RED	SIMPLE	T
UV_GMRE_040927A_master_response_REDL580.fits	<input checked="" type="checkbox"/>	MASTER_RESPONSE_RED	BITPIX	16
UV_GMRE_040927A_master_response_REDU580.fits	<input checked="" type="checkbox"/>	MASTER_RESPONSE_RED	NAXIS	0
UV_GEXT_031013A_extcoeff_table.fits	<input checked="" type="checkbox"/>	EXTCOEFF_TABLE	EXTEND	T
ORDERDEF_ECH_RED	<input checked="" type="checkbox"/>		COMMENT	NOST 100-2.0: Hanisch,R. et a...
UVES.2009-03-11T12:16:58.901.fits	<input checked="" type="checkbox"/>	ORDER_FLAT_RED		
BIAS_RED	<input checked="" type="checkbox"/>		ORIGIN	ESO-MIDAS
FMTCHK_ECH_RED	<input checked="" type="checkbox"/>		DATE	2015-01-15T10:14:36
WAVE_ECH_RED	<input checked="" type="checkbox"/>		FILENAME	x_x0000.bdf
UVES.2009-03-11T12:26:28.470.fits	<input checked="" type="checkbox"/>	ARC_LAMP_RED	RA	234.77687
UV_GLRE_070222A_line_refer_table.fits	<input checked="" type="checkbox"/>	LINE_REFER_TABLE	DEC	-33.91738
BIAS_RED	<input checked="" type="checkbox"/>		EQUINOX	2000
EFLAT_ECH_RED	<input checked="" type="checkbox"/>		DATE-OBS	2009-03-11
ORDERDEF_ECH_RED	<input checked="" type="checkbox"/>		MJD-OBS	54901.45488616
FMTCHK_ECH_RED	<input checked="" type="checkbox"/>		TM-START	39302.16422507
BIAS_RED	<input checked="" type="checkbox"/>		EXPTIME	0
UVES.2009-03-11T10:51:32.626.fits	<input checked="" type="checkbox"/>	BIAS_RED	TELESCOP	ESO-VLT-U2
UVES.2009-03-11T10:52:25.010.fits	<input checked="" type="checkbox"/>	BIAS_RED	INSTRUME	UVES
UVES.2009-03-11T10:53:17.395.fits	<input checked="" type="checkbox"/>	BIAS_RED	RADECSYS	FK5
UVES.2009-03-11T10:54:09.780.fits	<input checked="" type="checkbox"/>	BIAS_RED	OBSERVER	
UVES.2009-03-11T10:55:02.164.fits	<input type="checkbox"/>	BIAS_RED	AIRMASS	1
EFLAT_ECH_RED	<input checked="" type="checkbox"/>		COMMENT	HOTF_version: HOTF-1.00
UVES.2009-03-11T12:20:07.437.fits	<input checked="" type="checkbox"/>	FLAT_RED	COMMENT	FTU-2_5_1/2009-03-31T09:49:...
UVES.2009-03-11T12:21:22.064.fits	<input checked="" type="checkbox"/>	FLAT_RED	OBJECT	BIAS
UVES.2009-03-11T12:22:36.781.fits	<input checked="" type="checkbox"/>	FLAT_RED	HISTORY	Empty primary header of: UVE...
UVES.2009-03-11T12:23:51.577.fits	<input checked="" type="checkbox"/>	FLAT_RED	HISTORY	
UVES.2009-03-11T12:25:06.353.fits	<input checked="" type="checkbox"/>	FLAT_RED	UTC	39295
BIAS_RED	<input checked="" type="checkbox"/>		LST	63015.294
ORDERDEF_ECH_RED	<input checked="" type="checkbox"/>		PI-COI	UVES Operation Team
			ORIGFILE	UVES_RED_BIAS070_0010.fits
			ARCFILE	UVES.2009-03-11T10:55:02.1...
			UT	10:54:55.000
			ST	17:30:15.294
			IMAGETYP	BIAS
			CHECKSUM	ZYU4bYR2ZYR2bYR2
			DATASUM	0
			HIERARC...	ESO-VLT-DIC.OBS-1.11
			HIERARC...	0

Select All

Deselect All

Save as...

Inspect

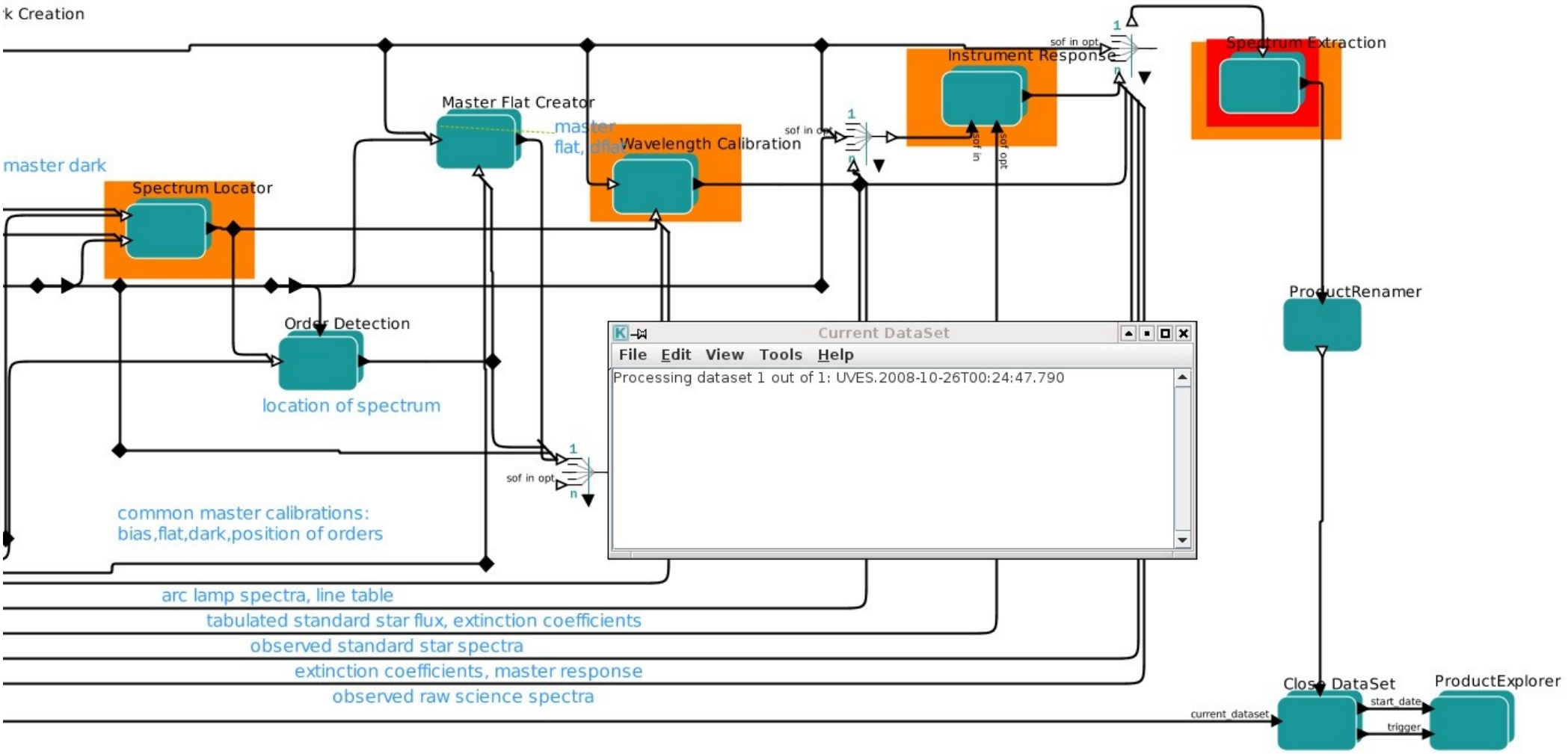
Continue

Step 2: Creation of Master Calibration Files

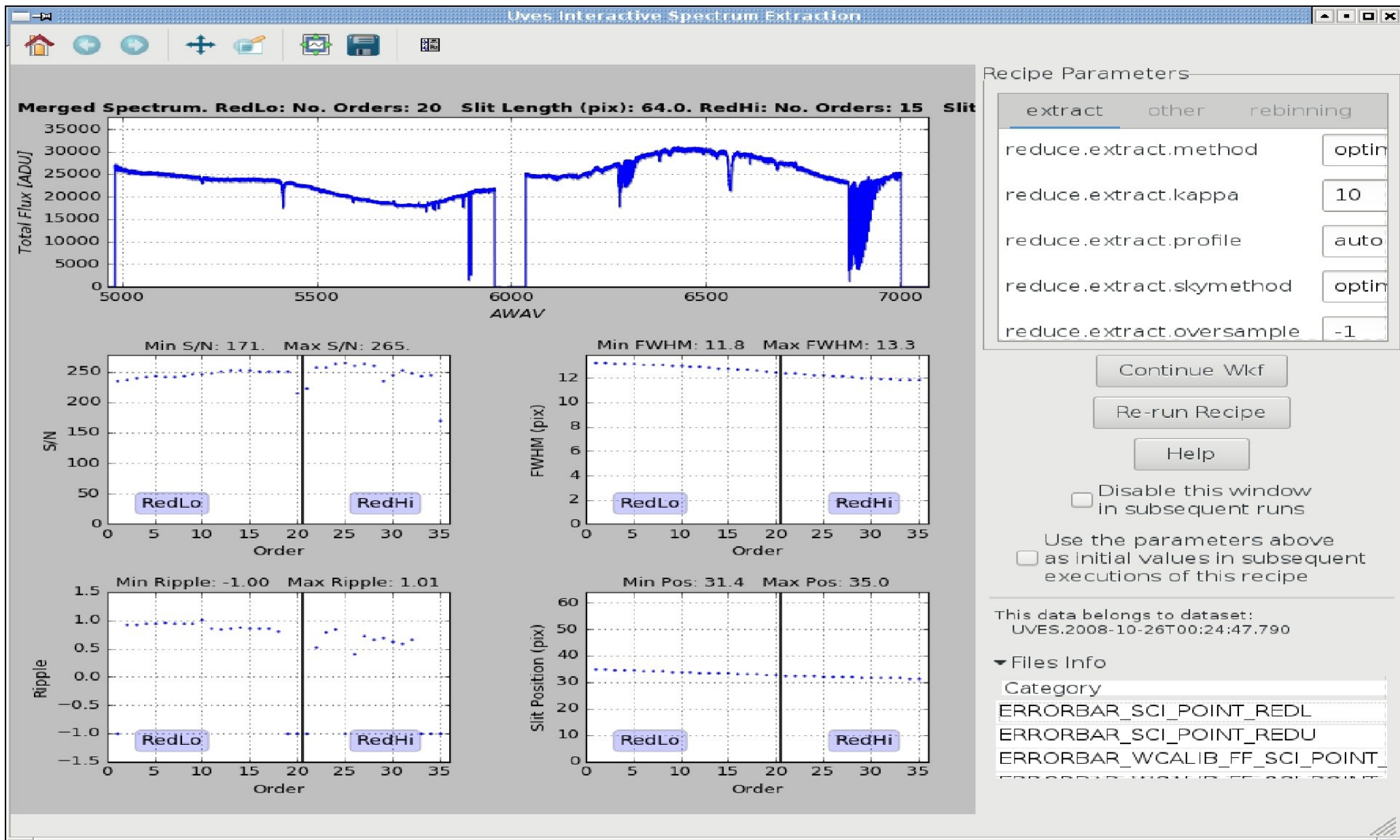
Step 3: Wavelength and Response Calibration

Step 4: Spectrum Extraction

Step 5: Output Organisation



● DatasetName: UVES.2009-04-05T09:43:47.822



Execution

Product Explorer

Search products

Show: All
 Last: Hour
 All: 05/02/20 16:35:22
 From: 05/02/20 16:41:23
 To: 05/02/20 16:41:23

Dataset	#Exec	Description	OBJECT	INS.PATH	DET.CHIP
UVES.2008-10-26T00:24:47.790	1		9Sgr	RED	2
2020-02-05T16:35:22.000	OK	...	9Sgr	RED	2

Provenance Tree

- 9Sgr_obs1_red_ERRORBAR_SCI_POINT_REDL.fits
- 9Sgr_obs1_red_ERRORBAR_SCI_POINT_REDU.fits
- 9Sgr_obs1_red_ERRORBAR_WCALIB_FF_SCI_POINT_REDL.fits
- 9Sgr_obs1_red_ERRORBAR_WCALIB_FF_SCI_POINT_REDU.fits
- 9Sgr_obs1_red_MERGED_SKY_REDL.fits
 - merged_sky_redl.fits
 - UVES.2008-10-26T00:24:47.790.fits
 - UV_GEXT_031013A_extcoeff_table.fits
 - linetable_redl.fits
 - linetable_redu.fits
 - masterbias_redl.fits
 - masterbias_redu.fits
 - masterdark_redl.fits
 - UVES.2008-11-05T17:14:51.667.fits
 - UVES.2008-11-05T18:15:39.222.fits
 - UVES.2008-11-05T19:16:25.377.fits
 - masterbias_redl.fits
 - masterbias_redu.fits
 - masterdark_redl.fits
 - masterflat_redl.fits
 - masterflat_redu.fits
 - ordertable_redl.fits
 - ordertable_redu.fits
 - 9Sgr_obs1_red_MERGED_SKY_REDU.fits
 - 9Sgr_obs1_red_ORDER_EXTRACT_QC_REDL.fits
 - 9Sgr_obs1_red_ORDER_EXTRACT_QC_REDU.fits
 - 9Sgr_obs1_red_RED_SCI_POINT_REDL.fits
 - 9Sgr_obs1_red_RED_SCI_POINT_REDU.fits
 - 9Sgr_obs1_red_WCALIB_FF_SCI_POINT_REDL.fits
 - 9Sgr_obs1_red_WCALIB_FF_SCI_POINT_REDU.fits

Category

- MERGED_SKY_REDL
- SCI_POINT_RED
- EXTCOEFF_TABLE
- LINE_TABLE_REDL
- LINE_TABLE_REDU
- MASTER_BIAS_REDL
- MASTER_BIAS_REDU
- MASTER_DARK_REDL
- DARK_RED
- DARK_RED
- DARK_RED
- MASTER_BIAS_REDL
- MASTER_BIAS_REDU
- MASTER_DARK_REDL
- MASTER_DARK_REDU
- MASTER_FLAT_REDL
- MASTER_FLAT_REDU
- ORDER_TABLE_REDL
- ORDER_TABLE_REDU

Keyword

Value

SIMPLE	T
BITPIX	-32
NAXIS	1
NAXIS1	68356
EXTEND	T
COMMENT	FITS (Flexible Image Transport System) format...
COMMENT	and Astrophysics', volume 376, page 359; bib...
DATE	2020-02-05T15:38:22
CTYPE1	AWAV
CUNIT1	Angstrom
BUNIT	ADU
CRVAL1	4959.46267997318
CRPIX1	1
CDEL1	0.0148277808239673
LAMRMS	0.001504
LAMNLIN	595
CRDER1	0.0000617
CSYER1	0.000182
EXTNAME	Error reduced spectrum
ORIGIN	ESO
RA	270.96861
DEC	-24.36077
EQUINOX	2000
DATE-OBS	2008-10-26
MJD-OBS	54765.01721979
TELESCOP	ESO-VLT-U2
INSTRUME	UVES
RADECSYS	FK5
OBSERVER	UNKNOWN
OBJECT	9Sgr
UTC	1480
LST	79324.144
PI-COI	UNKNOWN
ARCFILE	UVES.2008-10-26T00:24:47.790.fits
DATAMD5	e847aa43d4abd90dc54efb993a30f724
PIPEFILE	merged_sky_redl.fits
DATAMIN	0
DATAMAX	11916.9752601842
AIRMASS	1.682
IMAGETYP	OBJECT.POINT
UT	00:24:40.000
ST	22:02:04.144
EXPTIME	34.9979
FILTER1	FREE
FILTER3	SHP700
GRAT2	CD#3
WLEN2	600
CD1_1	0.0148277808239673
HIERARCH.ESO.OBS...	ESO-VLT-DIC.OBS-1.11
HIERARCH.ESO.OBS...	930
HIERARCH.ESO.OBS...	0

Continue

Execution

```
vivanov@pc018251$ pwd
/scratch/Duties/Pipeline_VISIR/data_wkf
vivanov@pc018251$ ls -l
total 20
drwxr-xr-x 3 vivanov SG-HQ-CADPlot 4096 Jan  7 17:02 reflex_book_keeping
drwxr-xr-x 9 vivanov SG-HQ-CADPlot 4096 Jan 10 17:07 reflex_end_products
drwxr-xr-x 4 vivanov SG-HQ-CADPlot 4096 Jan 10 16:46 reflex_input
drwxr-xr-x 3 vivanov SG-HQ-CADPlot 4096 Jan  7 17:02 reflex_logs
drwxr-xr-x 3 vivanov SG-HQ-CADPlot 4096 Jan  7 17:02 reflex_tmp_products
```

```
vivanov@pc018251$ pwd
/scratch/Duties/Pipelines2/data_wkf/reflex_book_keeping/iinstrument/kmos_median_re
sponse_1/2019-04-09T19:14:15.563
vivanov@pc018251$ ls -l
total 32
-rwxr--r-- 1 vivanov SG-HQ-CADPlot 1730 Apr  9 2019 cmdline.sh
-rw-r--r-- 1 vivanov SG-HQ-CADPlot 248 Apr  9 2019 data.sof
-rw-r--r-- 1 vivanov SG-HQ-CADPlot 1 Apr  9 2019 exitcode.txt
-rw-r--r-- 1 vivanov SG-HQ-CADPlot 533 Apr  9 2019 input_sof.json
-rw-r--r-- 1 vivanov SG-HQ-CADPlot 0 Apr  9 2019 kmos_median_response.rc
lrwxrwxrwx 1 vivanov SG-HQ-CADPlot 107 Apr  9 2019 log_dir -> /scratch/Duties/Pip
elines2/data_wkf/reflex_logs/iinstrument/kmos_median_response_1/2019-04-09T19:14:1
5.563
-rw-r--r-- 1 vivanov SG-HQ-CADPlot 2 Apr  9 2019 output_sof.json
-rw-r--r-- 1 vivanov SG-HQ-CADPlot 2 Apr  9 2019 parameters.json
lrwxrwxrwx 1 vivanov SG-HQ-CADPlot 115 Apr  9 2019 products_dir -> /scratch/Dutie
s/Pipelines2/data_wkf/reflex_tmp_products/iinstrument/kmos_median_response_1/2019-
04-09T19:14:15.563
```

More goodies

cmdline.sh



```
#!/bin/sh
env -i 'DYLD_LIBRARY_PATH'='/scratch/Duties/Pipelines2/install/lib' \
'PATH'='/scratch/Duties/Pipelines2/install/bin:/usr/bin' \
'XAUTHORITY'='/run/user/3407/gdm/Xauthority' \
'PYTHONPATH'='/scratch/Duties/Pipelines2/install/esoreflex-2.9.1/esoreflex/python:/scisoft/share/gildas/x86_64-fedora24-
gfortran/python:/scisoft/lib64/python2.7/site-packages:/scisoft/share/gildas/x86_64-fedora24-gfortran/python:/scisoft/
lib64/python2.7/site-packages:/scisoft/share/gildas/x86_64-fedora24-gfortran/python:/scisoft/lib64/python2.7/site-
packages' \
'ESOREX_CONFIG'='/scratch/Duties/Pipelines2/install/etc/esoreflex-esorex.rc' \
'ESOREX_RECIPE_CONFIG'='/scratch/Duties/Pipelines2/install/etc/esoreflex_default_recipe_config.rc' \
'XFILESEARCHPATH'='/usr/dt/app-defaults/%L/Dt' \
'USER'='vivanov' \
'LANG'='en_US.utf8' \
'DISPLAY'=':0.0' \
'HOSTNAME'='pc018251.ads.eso.org' \
'LD_LIBRARY_PATH'='/scratch/Duties/Pipelines2/install/lib' \
'NLSPATH'='/usr/dt/lib/nls/msg/%L/%N.cat' \
'LOGNAME'='vivanov' \
'PWD'='/scratch/Duties/Pipelines2/install/bin' \
'HOME'='/home/vivanov' \
'SHLVL'='1' \
'_='/usr/bin/java' \
esorex --suppress-prefix=TRUE --output_dir=/scratch/Duties/Pipelines2/data_wkf//reflex_tmp_products/iinstrument/
kmos_median_response_1/2019-04-09T19:14:15.563 --log_dir=/scratch/Duties/Pipelines2/data_wkf//reflex_logs/iinstrument/
kmos_median_response_1/2019-04-09T19:14:15.563 --recipe_config=/scratch/Duties/Pipelines2/data_wkf//reflex_book_keeping/
iinstrument/kmos_median_response_1/2019-04-09T19:14:15.563/kmos_median_response.rc --products-sof=products_sof.json
kmos_median_response /scratch/Duties/Pipelines2/data_wkf//reflex_book_keeping/iinstrument/
kmos_median_response_1/2019-04-09T19:14:15.563/data.sof
```

More goodies

A few final words

- All data is different.
- The best results will be obtained trying various data reduction approaches. Again. And again. And again.
- Don't trust your first try, especially in the infrared where the observing conditions vary much more than in the optical.
- There is so much more...
- Cry for help at: usd-help@eso.org