

GRAVITY Data Reduction with Reflex

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Preparations

- Install EsoReflex and the GRAVITY pipeline, download demo data
 - Use the RPM package installation (<http://www.eso.org/sci/software/pipelines/installation/rpm.html>)
 - The demo data will be in /usr/share/esopipes/datademo/gravity-1.4.0
 - Alternatively, download ftp://ftp.eso.org/pub/dfs/reflex/install_esoreflex and install pipeline manually calling “./install_esoreflex”, selecting pipeID #11
- Download the GRAVITY consortium python tools
 - `svn co https://version-lesia.obspm.fr:/repos/DRS_gravity/python_tools`

Demo data

dfits */*.fits | fitsort FT.ROBJ.NAME OBS.NAME DPR.TYPE INS.SPEC.RES INS.POLA.MODE DET2.SEQ1.DIT DET2.NDIT TPL.EXPNO

FILE	FT.ROBJ.NAME	OBS.NAME	DPR.TYPE	INS.SPEC.RES	INS.POLA.MODE	DET2.SEQ1.DIT	DET2.NDIT	TPL.EXPNO
CALIBRATOR/GRAVI.2016-10-09T00:44:37.509.fits	HD_184349	CAL_HD184349_GRAVITY_A0G1J2K0_HIGH-SPLIT_noFT	STD,SINGLE	MEDIUM	COMBINED	1.0000000	150	1
CALIBRATOR/GRAVI.2016-10-09T00:47:49.520.fits	HD_184349	CAL_HD184349_GRAVITY_A0G1J2K0_HIGH-SPLIT_noFT	SKY,SINGLE	MEDIUM	COMBINED	1.0000000	150	2
CALIBRATOR/GRAVI.2016-10-09T00:51:13.531.fits	HD_184349	CAL_HD184349_GRAVITY_A0G1J2K0_HIGH-SPLIT_noFT	STD,SINGLE	MEDIUM	COMBINED	1.0000000	150	3
CALIBRATOR/GRAVI.2016-10-09T02:00:31.766.fits	HD_184349	CAL_HD184349_GRAVITY_A0G1J2K0_HIGH-SPLIT_noFT	STD,SINGLE	MEDIUM	COMBINED	1.0000000	150	1
CALIBRATOR/GRAVI.2016-10-09T02:03:46.776.fits	HD_184349	CAL_HD184349_GRAVITY_A0G1J2K0_HIGH-SPLIT_noFT	SKY,SINGLE	MEDIUM	COMBINED	1.0000000	150	2
CALIBRATOR/GRAVI.2016-10-09T02:07:07.788.fits	HD_184349	CAL_HD184349_GRAVITY_A0G1J2K0_HIGH-SPLIT_noFT	STD,SINGLE	MEDIUM	COMBINED	1.0000000	150	3
DARK/GRAVI.2016-10-12T11:47:15.658.fits		Calibration	DARK	MEDIUM	COMBINED	1.0000000	100	1
MASTER_P2VM/GRAVI.2016-10-12T11:10:57.536_dark_bad.fits		Calibration		MEDIUM	COMBINED	0.3	100	1
MASTER_P2VM/GRAVI.2016-10-12T11:12:15.540_flat.fits		Calibration		MEDIUM	COMBINED	0.3	25	2
MASTER_P2VM/GRAVI.2016-10-12T11:15:00.550_wave.fits		Calibration		MEDIUM	COMBINED	0.3	512	6
MASTER_P2VM/GRAVI.2016-10-12T11:25:30.584_p2vm.fits		Calibration		MEDIUM	COMBINED	0.3	256	8
P2VM/GRAVI.2016-10-12T11:10:57.536.fits		Calibration	DARK	MEDIUM	COMBINED	0.3000000	100	1
P2VM/GRAVI.2016-10-12T11:12:15.540.fits		Calibration	FLAT	MEDIUM	COMBINED	0.3000000	25	2
P2VM/GRAVI.2016-10-12T11:12:54.542.fits		Calibration	FLAT	MEDIUM	COMBINED	0.3000000	25	3
P2VM/GRAVI.2016-10-12T11:13:33.544.fits		Calibration	FLAT	MEDIUM	COMBINED	0.3000000	25	4
P2VM/GRAVI.2016-10-12T11:14:12.547.fits		Calibration	FLAT	MEDIUM	COMBINED	0.3000000	25	5
P2VM/GRAVI.2016-10-12T11:15:00.550.fits		Calibration	WAVE,SC	MEDIUM	COMBINED	0.3000000	512	6
P2VM/GRAVI.2016-10-12T11:20:42.568.fits		Calibration	WAVE	MEDIUM	COMBINED	0.3000000	512	7
P2VM/GRAVI.2016-10-12T11:25:30.584.fits		Calibration	P2VM	MEDIUM	COMBINED	0.3000000	256	8
P2VM/GRAVI.2016-10-12T11:28:09.594.fits		Calibration	P2VM	MEDIUM	COMBINED	0.3000000	256	9
P2VM/GRAVI.2016-10-12T11:30:48.603.fits		Calibration	P2VM	MEDIUM	COMBINED	0.3000000	256	10
P2VM/GRAVI.2016-10-12T11:33:27.612.fits		Calibration	P2VM	MEDIUM	COMBINED	0.3000000	256	11
P2VM/GRAVI.2016-10-12T11:36:06.621.fits		Calibration	P2VM	MEDIUM	COMBINED	0.3000000	256	12
P2VM/GRAVI.2016-10-12T11:38:45.629.fits		Calibration	P2VM	MEDIUM	COMBINED	0.3000000	256	13
SCIENCE/GRAVI.2016-10-09T01:21:04.633.fits	ksi_Tel	SCI_ksiTel_GRAVITY_A0G1J2K0_HIGH-SPLIT_FT	OBJECT,SINGLE	MEDIUM	COMBINED	1.0000000	150	1
SCIENCE/GRAVI.2016-10-09T01:24:22.643.fits	ksi_Tel	SCI_ksiTel_GRAVITY_A0G1J2K0_HIGH-SPLIT_FT	SKY,SINGLE	MEDIUM	COMBINED	1.0000000	150	2
SCIENCE/GRAVI.2016-10-09T01:27:40.655.fits	ksi_Tel	SCI_ksiTel_GRAVITY_A0G1J2K0_HIGH-SPLIT_FT	OBJECT,SINGLE	MEDIUM	COMBINED	1.0000000	150	3
VIS_UNCAL/GRAVI.2016-10-09T00:44:37.509_singlecalvis.fits		HD_184349	CAL_HD184349_GRAVITY_A0G1J2K0_HIGH-SPLIT_noFT	MEDIUM	COMBINED	1.	150	1
VIS_UNCAL/GRAVI.2016-10-09T01:21:04.633_singlecalvis.fits		ksi_Tel	SCI_ksiTel_GRAVITY_A0G1J2K0_HIGH-SPLIT_FT	MEDIUM	COMBINED	1.	150	1
VIS_UNCAL/GRAVI.2016-10-09T02:00:31.766_singlecalvis.fits		HD_184349	CAL_HD184349_GRAVITY_A0G1J2K0_HIGH-SPLIT_noFT	MEDIUM	COMBINED	1.	150	1



Gravity Science Workflow (v. 1.4.0)

This is a basic workflow to help with data organisation and execution of the pipeline. The workflow was generated without a review of the quality of the science products.

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 cntrl-R to start the workflow.

To run on a different data set:

- Click on RAW_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_PRODUCTS_DIR should not be a subdirectory of the RAW_DATA_DIR, otherwise it will be searched for raw data!**
- Press the "Run" button OR cntrl-R to start the workflow.

The general concepts of Reflex are described in *Astron. Astrophys.*, 559, A96. Please credit this paper in publications on research that used Reflex.

Setup Directories

- ROOT_DATA_DIR: \$HOME/reflex_data/
- Input:**
- RAW_DATA_DIR: /usr/share/esopipes/datademo/gravity/
 - Only change CALIB_DATA_DIR if you do NOT want to use the calibration data delivered with the pipeline:
 - CALIB_DATA_DIR: /usr/share/esopipes/datastatic/gravity-1.4.0/
 - 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/gravity
 - LOGS_DIR: \$ROOT_DATA_DIR/reflex_logs/gravity
 - TMP_PRODUCTS_DIR: \$ROOT_DATA_DIR/reflex_tmp_products/gravity
 - BOOKKEEPING_DB: \$BOOKKEEPING_DIR/bookkeeping.db

Global Parameters

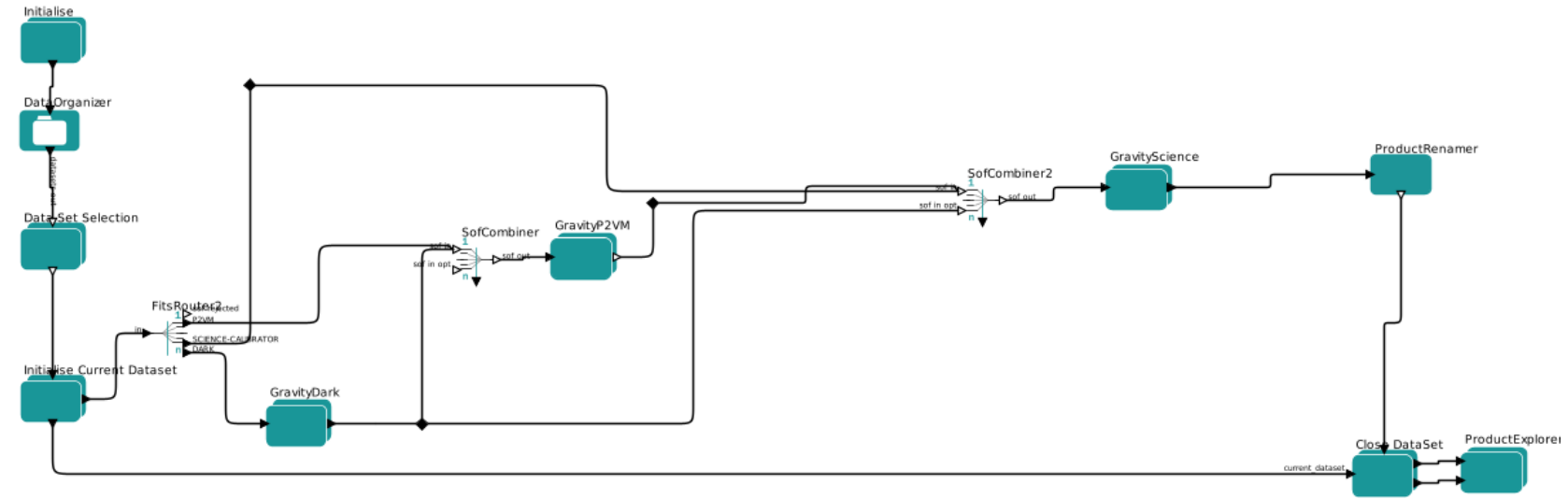
- RecipeFailureMode: Ask
 - Global parameter for the behaviour when a recipe fails. 'Ask' means that each time a recipe fails, the choice to continue or stop will be presented. 'Continue' means that the workflow will ignore errors and continue. 'Stop' means the workflow will stop.
- EraseDirs: false
 - 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
- GlobalPlotInteractivity: true
 - Set to "false" to disable interactive GUIs for the whole workflow. Each interactive actor can specify its own setting, which overwrites the choice given here.
- SelectDatasetMethod: Interactive
 - Specify how datasets for processing are selected ("All", "New" = never tried before, "Reduced" = successful run before. "Failed"=unsuccessfully run before), or set to "Interactive" for interactive selection.
- ProductExplorerMode: Triggered
 - Specify when you want to see the ProductExplorer GUI. "Triggered" = show it after all data sets have been reduce. "Enabled" = show it after each dataset. "Disabled" = never show it

Step 1: Data Organisation and Selection

Step 2: Calibration

Step 3: Data reduction

Step 4: Output Organisation



Results from reflex_logs

```
cd reflex_logs/gravity/gravity_vis_1/2020-08-25T14:53:13.893
vi esorex.log
```

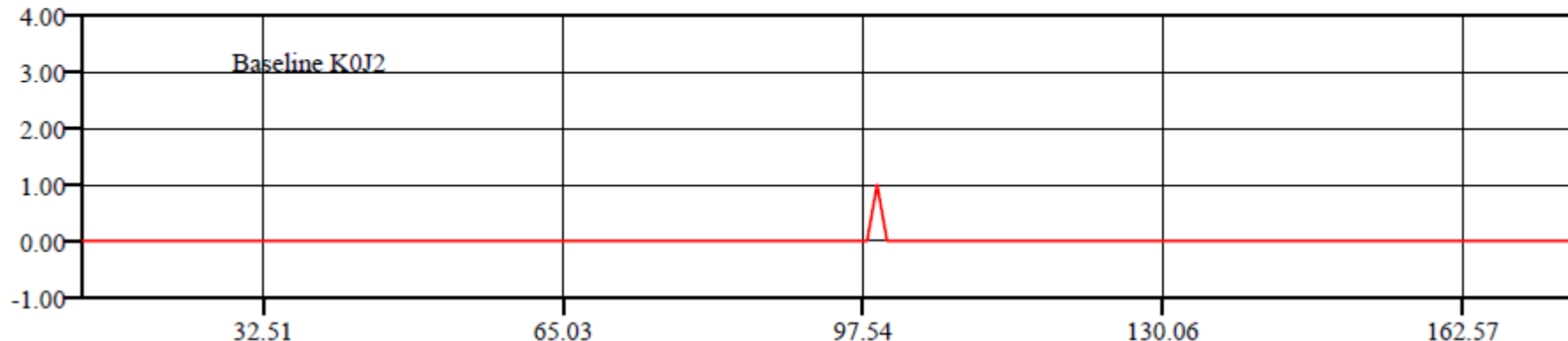
```
14:54:20 [ INFO ] gravi_compute_vis: [tid=000] Compute OIVIS2 and OIVIS for SC
14:54:20 [ INFO ] Stat: [tid=000] 150 valid frames over 150 (100.0%), make 150 seg. of 1 (miss 0), add 0 MonteCarlo
14:54:20 [ INFO ] Stat: [tid=000] 150 valid frames over 150 (100.0%), make 150 seg. of 1 (miss 0), add 0 MonteCarlo
14:54:20 [ INFO ] Stat: [tid=000] 150 valid frames over 150 (100.0%), make 150 seg. of 1 (miss 0), add 0 MonteCarlo
14:54:20 [ INFO ] Stat: [tid=000] 150 valid frames over 150 (100.0%), make 150 seg. of 1 (miss 0), add 0 MonteCarlo
14:54:20 [ INFO ] Stat: [tid=000] 150 valid frames over 150 (100.0%), make 150 seg. of 1 (miss 0), add 0 MonteCarlo
14:54:20 [ INFO ] gravi_vis_compute_column_mean: [tid=000] Average column: OPD_MET_FC (with REJECTION_FLAG)
14:54:20 [ INFO ] gravi_vis_compute_column_mean: [tid=000] Average column: PHASE_REF_COEFF (with REJECTION_FLAG)
14:54:20 [ INFO ] gravi_vis_compute_column_mean: [tid=000] Average column: E_U (with REJECTION_FLAG)
14:54:20 [ INFO ] gravi_vis_compute_column_mean: [tid=000] Average column: E_V (with REJECTION_FLAG)
14:54:20 [ INFO ] gravi_vis_compute_column_mean: [tid=000] Average column: E_W (with REJECTION_FLAG)
14:54:20 [ INFO ] gravi_vis_compute_column_mean: [tid=000] Average column: E_AZ (with REJECTION_FLAG)
14:54:20 [ INFO ] gravi_vis_compute_column_mean: [tid=000] Average column: E_ZD (with REJECTION_FLAG)
14:54:20 [ INFO ] gravi_compute_vis: [tid=000] Compute OIT3 for SC
14:54:20 [ INFO ] Stat: [tid=000] 150 valid frames over 150 (100.0%), make 150 seg. of 1 (miss 0), add 0 MonteCarlo
14:54:20 [ INFO ] Stat: [tid=000] 150 valid frames over 150 (100.0%), make 150 seg. of 1 (miss 0), add 0 MonteCarlo
14:54:20 [ INFO ] Stat: [tid=000] 150 valid frames over 150 (100.0%), make 150 seg. of 1 (miss 0), add 0 MonteCarlo
14:54:20 [ INFO ] Stat: [tid=000] 150 valid frames over 150 (100.0%), make 150 seg. of 1 (miss 0), add 0 MonteCarlo
14:54:20 [ INFO ] gravi_compute_vis: [tid=000] Compute OI_FLUX for SC
14:54:20 [ INFO ] Stat: [tid=000] 150 valid frames over 150 (100.0%), make 150 seg. of 1 (miss 0), add 0 MonteCarlo
14:54:20 [ INFO ] Stat: [tid=000] 150 valid frames over 150 (100.0%), make 150 seg. of 1 (miss 0), add 0 MonteCarlo
14:54:20 [ INFO ] Stat: [tid=000] 150 valid frames over 150 (100.0%), make 150 seg. of 1 (miss 0), add 0 MonteCarlo
14:54:20 [ INFO ] Stat: [tid=000] 150 valid frames over 150 (100.0%), make 150 seg. of 1 (miss 0), add 0 MonteCarlo
```

Results from run_gravi_visual.py

- cd reflex_tmp_products/gravity/gravity_vis_1/2020-08-25T14:53:13.893
- Look at, e.g., GRAVI.2016-10-09T01_27_40.655_singlescip2vmred-P2VMRED.pdf
 - Derived from GRAVI.2016-10-09T01:27:40.655_singlescip2vmred.fits
- Look for FT REJECTION_FLAG per baseline and SC REJECTION_FLAG per baseline
 - 0= accepted frame, 1= Low FT tracking, 2= Low FT vFactor, 3= both

SC REJECTION_FLAG per baseline

0= accepted frame, 1= Low FT tracking, 2= Low FT vFactor, 3= both





Gravity Visibility Calibration Workflow (v. 1.4.0)

This is a basic workflow to help with data organisation and execution of the pipeline. The workflow was generated without a review of the quality of the science products.

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 cntrl-R to start the workflow.

To run on a different data set:

- Click on RAW_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_PRODUCTS_DIR should not be a subdirectory of the RAW_DATA_DIR, otherwise it will be searched for raw data!**
- Press the "Run" button OR cntrl-R to start the workflow.

The general concepts of Reflex are described in Astron. Astrophys., 559, A96. Please credit this paper in publications on research that used Reflex.

Setup Directories

- ROOT_DATA_DIR: \$HOME/reflex_data/
- Input:**
- RAW_DATA_DIR: \$ROOT_DATA_DIR/reflex_end_products
Only change CALIB_DATA_DIR if you do NOT want to use the calibration data delivered with the pipeline:
- CALIB_DATA_DIR: /usr/share/esopes/datastatic/gravity-1.4.0/
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/gravity_viscal
- LOGS_DIR: \$ROOT_DATA_DIR/reflex_logs/gravity_viscal
- TMP_PRODUCTS_DIR: \$ROOT_DATA_DIR/reflex_tmp_products/gravity_viscal
- BOOKKEEPING_DB: \$BOOKKEEPING_DIR/bookkeeping.db

Global Parameters

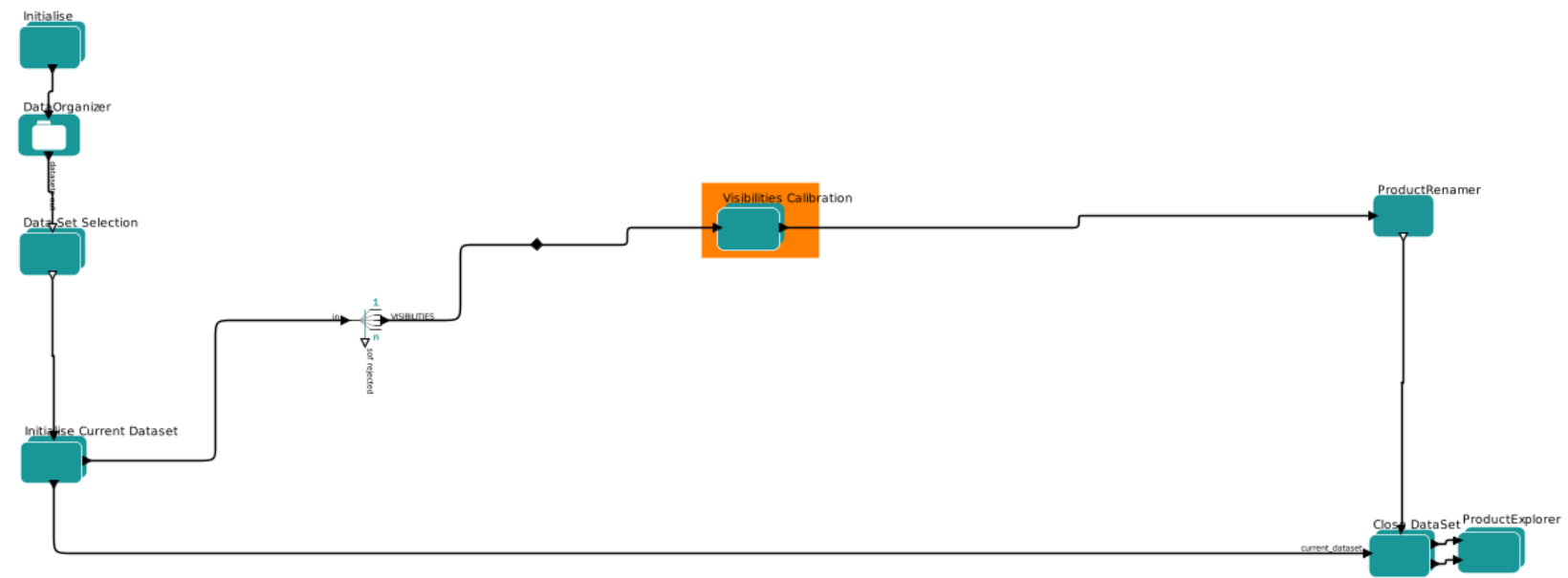
= actor with interactive option

- 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
Program to use for the inspection of input/output products. Use full path name if it is not in the standard path.
- GlobalPlotInteractivity: true
Set to "false" to disable interactive GUIs for the whole workflow. Each interactive actor can specify its own setting, which overwrites the choice given here.
- SelectDatasetMethod: Interactive
Specify how datasets for processing are selected ("All", "New" = never tried before, "Reduced" = successful run before, "Failed"=unsuccessfully run before), or set to "Interactive" for interactive selection.
- ProductExplorerMode: Triggered
Specify when you want to see the ProductExplorer GUI. "Triggered" = show it after all data sets have been reduced. "Enabled" = show it after each dataset. "Disabled" = never show it

Step 1: Data Organisation and Selection

Step 2: Visibilities Calibration

Step 4: Output Organisation



Calibrated OIFITS file structure

File Edit Tools Help				
Index	Extension	Type	Dimension	View
■ 0	Primary	Image	0	Header Image Table
■ 1	OI_ARRAY	Binary	6 cols X 4 rows	Header Hist Plot All Select
■ 2	OI_TARGET	Binary	17 cols X 1 rows	Header Hist Plot All Select
■ 3	OI_WAVELENGTH	Binary	2 cols X 210 rows	Header Hist Plot All Select
■ 4	OI_WAVELENGTH	Binary	2 cols X 5 rows	Header Hist Plot All Select
■ 5	OI_VIS	Binary	20 cols X 12 rows	Header Hist Plot All Select
■ 6	OI_VIS2	Binary	12 cols X 12 rows	Header Hist Plot All Select
■ 7	OI_T3	Binary	16 cols X 8 rows	Header Hist Plot All Select
■ 8	OI_FLUX	Binary	10 cols X 8 rows	Header Hist Plot All Select
■ 9	OI_VIS	Binary	29 cols X 12 rows	Header Hist Plot All Select
■ 10	OI_VIS2	Binary	12 cols X 12 rows	Header Hist Plot All Select
■ 11	OI_T3	Binary	16 cols X 8 rows	Header Hist Plot All Select
■ 12	OI_FLUX	Binary	15 cols X 8 rows	Header Hist Plot All Select

VIS2DATA (1)

File Edit Tools Help						
Select	TARGET_ID	TIME	MJD	INT_TIME	VIS2DATA	VIS2ERR
<input checked="" type="checkbox"/> All	1I	1D	1D	1D	210D	210D
<input type="checkbox"/> Invert	Modify	Modify	Modify	Modify	Modify	Modify
1	1	4.958832499408E+03	5.767005739389E+04	1.500000000000E+02	Plot	Plot
2	1	4.958832499408E+03	5.767005739389E+04	1.500000000000E+02	Plot	Plot
3	1	4.958832499408E+03	5.767005739389E+04	1.500000000000E+02	Plot	Plot
4	1	4.958832499408E+03	5.767005739389E+04	1.500000000000E+02	Plot	Plot
5	1	4.958832499408E+03	5.767005739389E+04	1.500000000000E+02	Plot	Plot
6	1	4.958832499408E+03	5.767005739389E+04	1.500000000000E+02	Plot	Plot
[Redacted]				1.490000000000E+02	Plot	Plot
				1.500000000000E+02	Plot	Plot
				1.500000000000E+02	Plot	Plot
				1.490000000000E+02	Plot	Plot
				1.490000000000E+02	Plot	Plot
[Redacted]				1.490000000000E+02	Plot	Plot
				1.500000000000E+02	Plot	Plot

Go to: Edit cell:

VIS2DATA (2)

File Edit Tools Help							
Select	<input type="checkbox"/> VIS2ERR 210D	<input type="checkbox"/> UCOORD 1D m	<input type="checkbox"/> VCOORD 1D m	<input type="checkbox"/> STA_INDEX 2I	<input type="checkbox"/> FLAG 210L	<input type="checkbox"/> NDIT 1J	<input type="checkbox"/> NVALID 1J
<input type="checkbox"/> All	Modify	Modify	Modify	Modify	Modify	Modify	Modify
1	Plot	-1.705789872968E+00	-4.348653275316E+01	Plot	F	150	150
2	Plot	-5.068488951078E+01	-5.482765164415E+01	Plot	F	150	150
3	Plot	-1.162395051846E+02	7.552092282012E+00	Plot	F	150	150
4	Plot	-4.897909963782E+01	-1.134111889098E+01	Plot	F	150	150
5	Plot	-1.145337153117E+02	5.103862503518E+01	Plot	F	150	150
6	Plot	-6.555461567384E+01	6.237974392616E+01	Plot	F	150	150
7	Plot	-2.318731029782E+00	-4.342265239238E+01	Plot	F	150	149
8	Plot	-5.103357451929E+01	-5.365927937652E+01	Plot	F	150	150
9	Plot	-1.150923082342E+02	1.021174601720E+01	Plot	F	150	150
10	Plot	-4.871481423040E+01	-1.023672418068E+01	Plot	F	150	149
11	Plot	-1.127736721401E+02	5.363417690195E+01	Plot	F	150	149
12	Plot	-6.405873371495E+01	6.387102539372E+01	Plot	F	150	150

Go to: Edit cell:

OI_ARRAY and STA_INDEX of OI_VIS2

The image shows two overlapping windows from a software application. The top window displays a table with the following data:

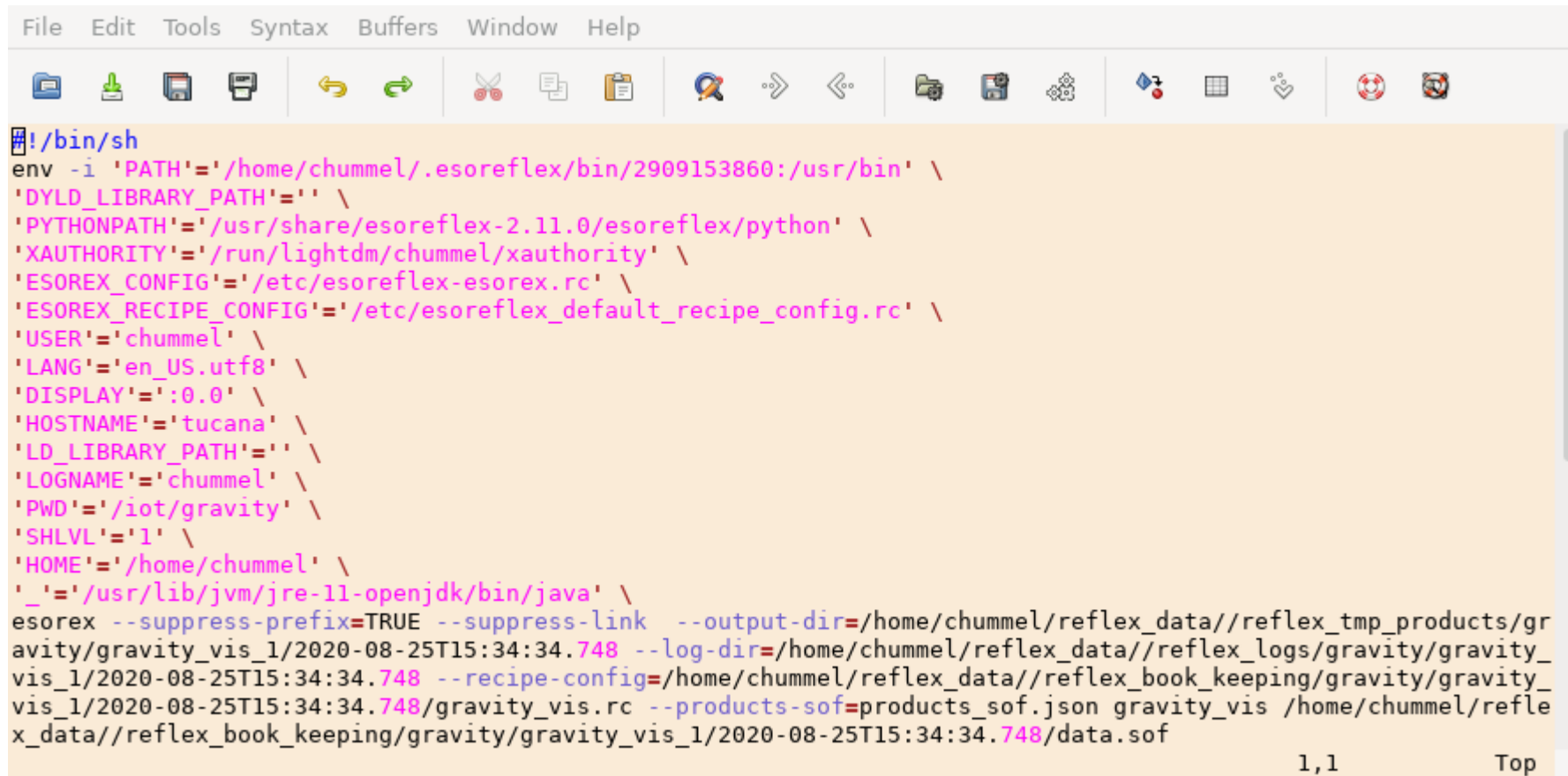
	TEL_NAME	STA_NAME	STA_INDEX	DIAMETER	STAXYZ	MNTSTA
1	AT1	A0	1	1.800000E+00	Plot	0
2	AT2	G1	18	1.800000E+00	Plot	0
3	AT3	J2	23	1.800000E+00	Plot	0
4	AT4	K0	28	1.800000E+00	Plot	0

The bottom window displays a table with three columns of numerical data:

1	28	23
2	28	18
3	28	1
4	23	18
5	23	1
6	18	1
7	28	23
8	28	18
9	28	1
10	23	18
11	23	1
12	18	1

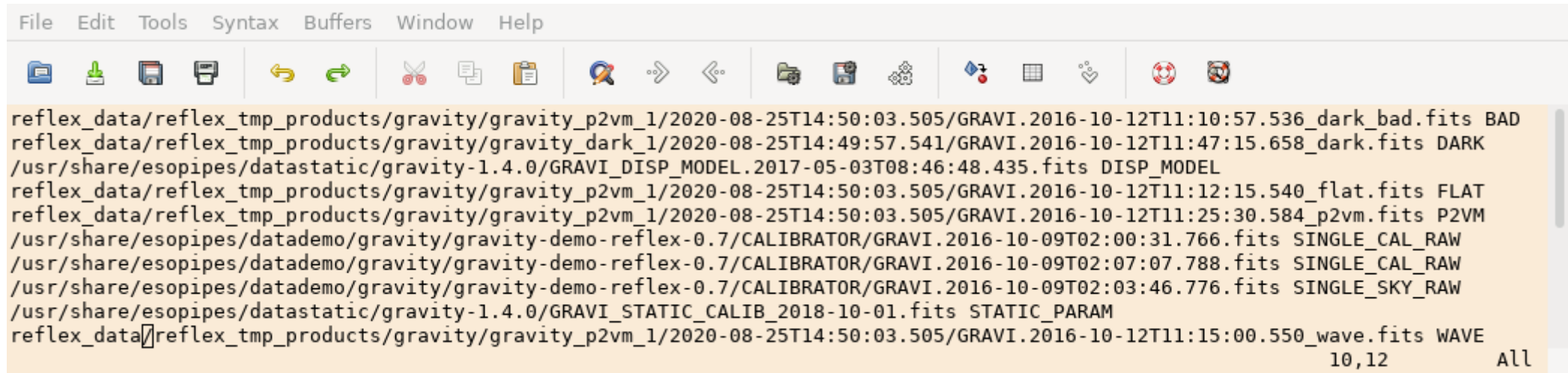
For esorex fans...cmdline.sh

- `cd reflex_data/reflex_book_keeping/gravity/gravity_vis_1/2020-08-25T15:34:34.748`



```
File Edit Tools Syntax Buffers Window Help
! /bin/sh
env -i 'PATH'='/home/chummel/.esoreflex/bin/2909153860:/usr/bin' \
'DYLD_LIBRARY_PATH'='' \
'PYTHONPATH'='/usr/share/esoreflex-2.11.0/esoreflex/python' \
'XAUTHORITY'='/run/lightdm/chummel/xauthority' \
'ESOREX_CONFIG'='/etc/esoreflex-esorex.rc' \
'ESOREX_RECIPE_CONFIG'='/etc/esoreflex_default_recipe_config.rc' \
'USER'='chummel' \
'LANG'='en_US.utf8' \
'DISPLAY'=':0.0' \
'HOSTNAME'='tucana' \
'LD_LIBRARY_PATH'='' \
'LOGNAME'='chummel' \
'PWD'='/iot/gravity' \
'SHLVL'='1' \
'HOME'='/home/chummel' \
'_='/usr/lib/jvm/jre-11-openjdk/bin/java' \
esorex --suppress-prefix=TRUE --suppress-link --output-dir=/home/chummel/reflex_data//reflex_tmp_products/gravity/gravity_vis_1/2020-08-25T15:34:34.748 --log-dir=/home/chummel/reflex_data//reflex_logs/gravity/gravity_vis_1/2020-08-25T15:34:34.748 --recipe-config=/home/chummel/reflex_data//reflex_book_keeping/gravity/gravity_vis_1/2020-08-25T15:34:34.748/gravity_vis.rc --products-sof=products_sof.json gravity_vis /home/chummel/reflex_data//reflex_book_keeping/gravity/gravity_vis_1/2020-08-25T15:34:34.748/data.sof
1,1 Top
```

...and data.sof



The image shows a screenshot of a text editor window with a menu bar (File, Edit, Tools, Syntax, Buffers, Window, Help) and a toolbar containing various icons for file operations and editing. The main text area contains a list of FITS files and their associated status labels. The files are listed in a directory structure, and the status labels are in all caps. The last line of the list is highlighted in orange.

```
reflex_data/reflex_tmp_products/gravity/gravity_p2vm_1/2020-08-25T14:50:03.505/GRAVI.2016-10-12T11:10:57.536_dark_bad.fits BAD
reflex_data/reflex_tmp_products/gravity/gravity_dark_1/2020-08-25T14:49:57.541/GRAVI.2016-10-12T11:47:15.658_dark.fits DARK
/usr/share/esopipes/datastatic/gravity-1.4.0/GRAVI_DISP_MODEL.2017-05-03T08:46:48.435.fits DISP_MODEL
reflex_data/reflex_tmp_products/gravity/gravity_p2vm_1/2020-08-25T14:50:03.505/GRAVI.2016-10-12T11:12:15.540_flat.fits FLAT
reflex_data/reflex_tmp_products/gravity/gravity_p2vm_1/2020-08-25T14:50:03.505/GRAVI.2016-10-12T11:25:30.584_p2vm.fits P2VM
/usr/share/esopipes/datademo/gravity/gravity-demo-reflex-0.7/CALIBRATOR/GRAVI.2016-10-09T02:00:31.766.fits SINGLE_CAL_RAW
/usr/share/esopipes/datademo/gravity/gravity-demo-reflex-0.7/CALIBRATOR/GRAVI.2016-10-09T02:07:07.788.fits SINGLE_CAL_RAW
/usr/share/esopipes/datademo/gravity/gravity-demo-reflex-0.7/CALIBRATOR/GRAVI.2016-10-09T02:03:46.776.fits SINGLE_SKY_RAW
/usr/share/esopipes/datastatic/gravity-1.4.0/GRAVI_STATIC_CALIB_2018-10-01.fits STATIC_PARAM
reflex_data/reflex_tmp_products/gravity/gravity_p2vm_1/2020-08-25T14:50:03.505/GRAVI.2016-10-12T11:15:00.550_wave.fits WAVE
10,12 All
```