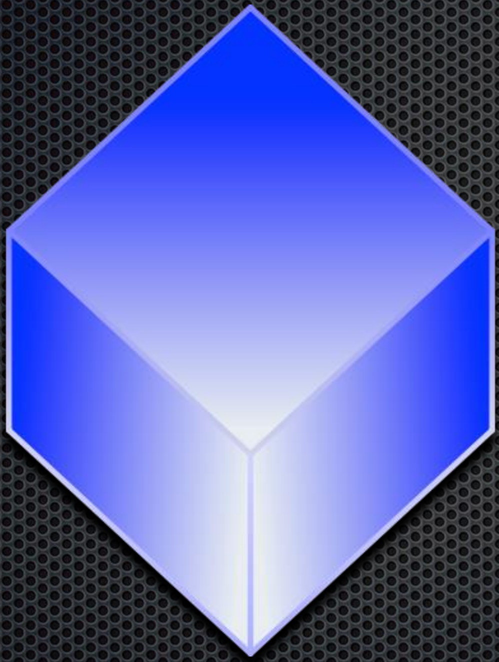
RCE Paris
1 – 3 novembre 2018

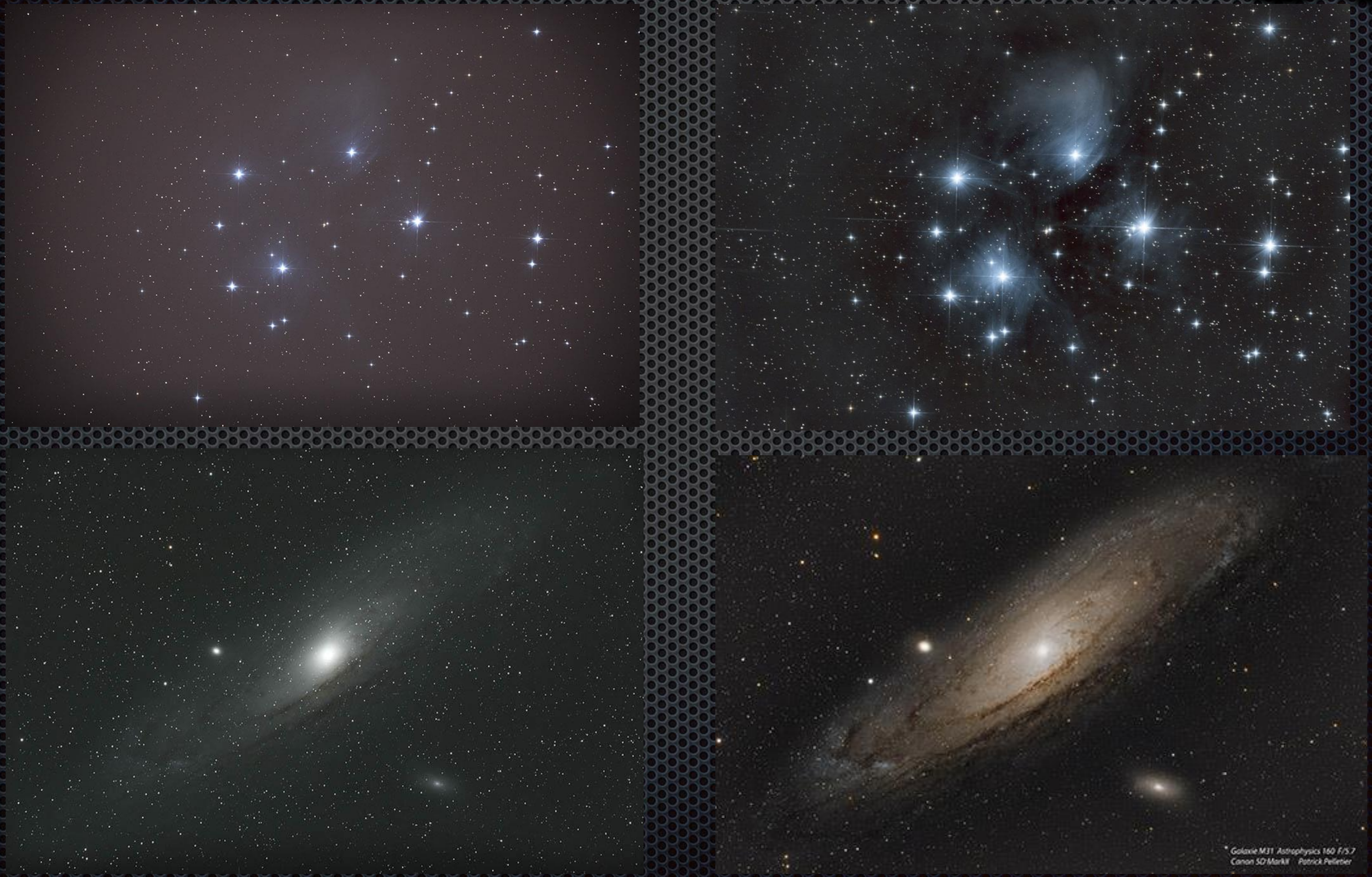


Prétraitement des images APN

PixInsight

Patrick Pelletier

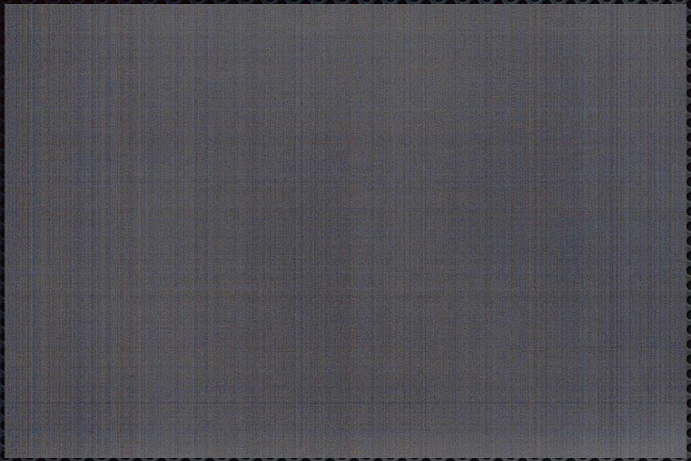
Pourquoi un prétraitement des images ?



Galaxie M31 Astrophysics 160 F/5.7
Canon 5D MarkII Patrick Pelletier

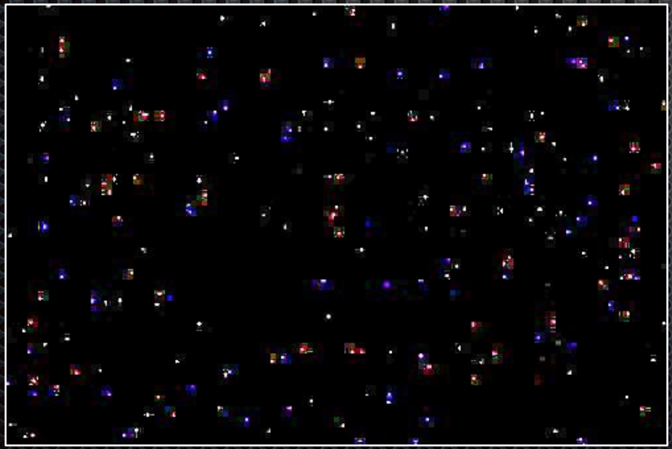
Parasites contenus sur les images

Bias

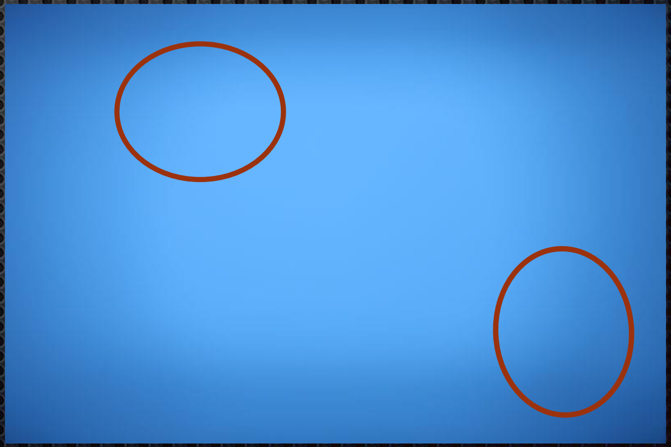


Vignetage

Pixels chauds, pixels froids



Poussières sur le capteur



Les parasites contenus dans l'image

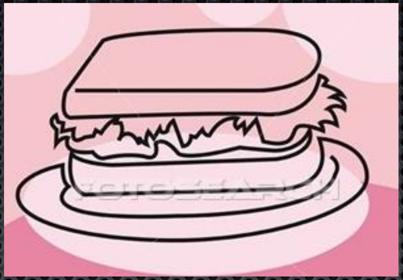
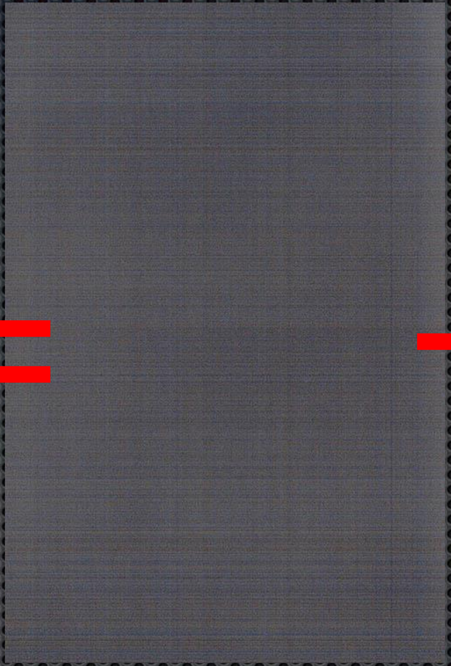


Image brute

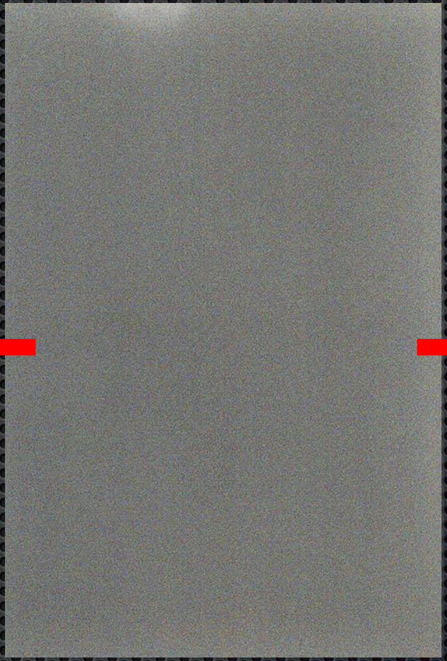
=



Signal du Bias

Transfert de données

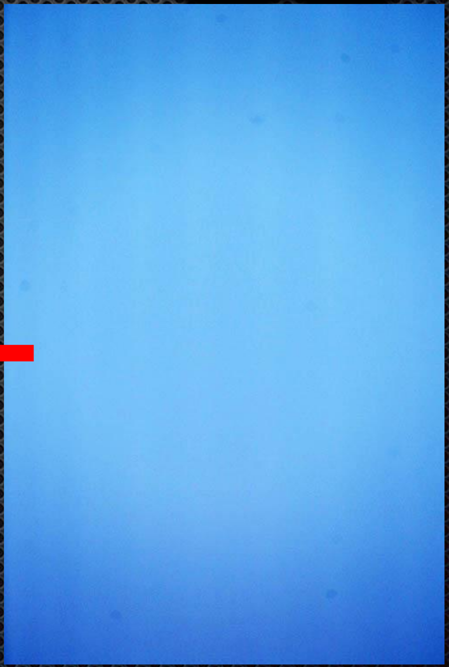
+



Bruit thermique

pixels chauds et froids

+



Défaut d'homogénéïté

défaut d'uniformité du capteur

poussières, interférences

L ’acquisition des images APN consiste aussi à réaliser des images pour isoler « proprement » les parasites:

- Bias ou offset
- Signal thermique
- Flat ou PLU
- Images brutes
- Toutes les images en RAW ou RAW+ jpg

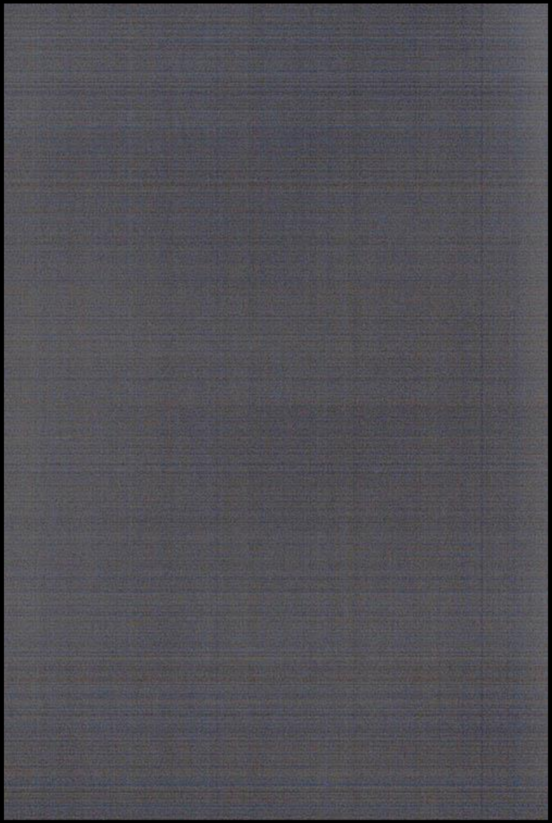
Particularités du prétraitement avec PixInsight

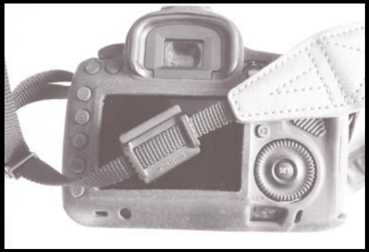
- Travail en mode linéaire
- Calculs et traitement sur les images en 32 bits
- STF développement artificiel des niveaux de l'image
- Utilisation d'une séquence chronologique des process icons
- Paramétrage personnalisé des process icons

Comment réaliser un master bias ?

- *Comment réaliser un bias :*
  Bouchon objectif fermé, occultation du viseur ou isoler le boitier APN sous un tissu noir.
  Réaliser une centaine d'images « rapide » (1/4000$^{\text{ème)}}$ de seconde à 200 ISO pour isoler le signal de l'offset (bias).
  Ces images seront empilées et moyennées pour créer un Master Bias
  Cas particulier pour les boitiers APN à très faible bruit de lecture.

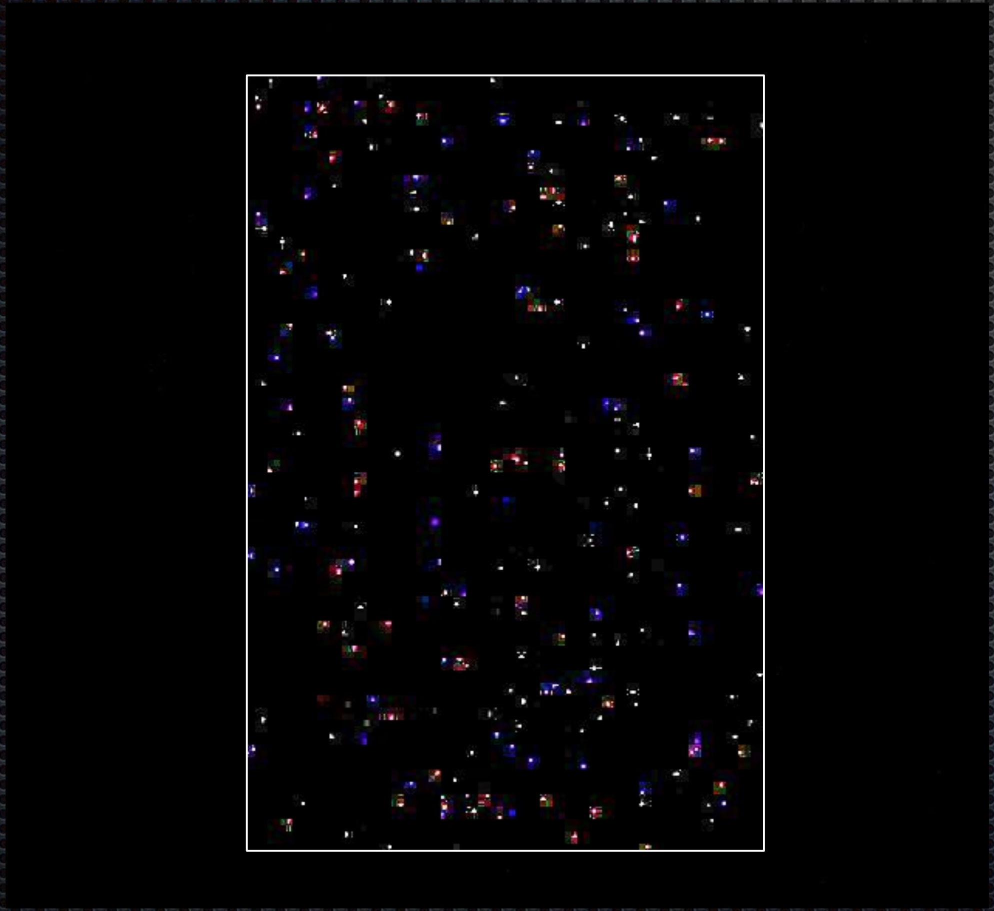
  Le master bias ou super bias est propre à chaque boitier APN, il est stable et reste identique au fil des mois voir des années.

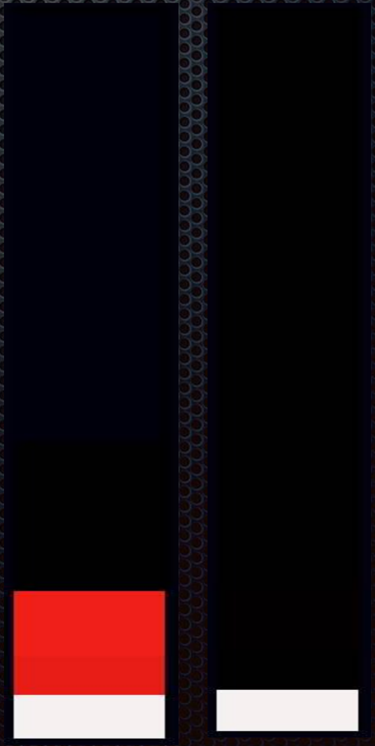




Comment réaliser un master dark ?

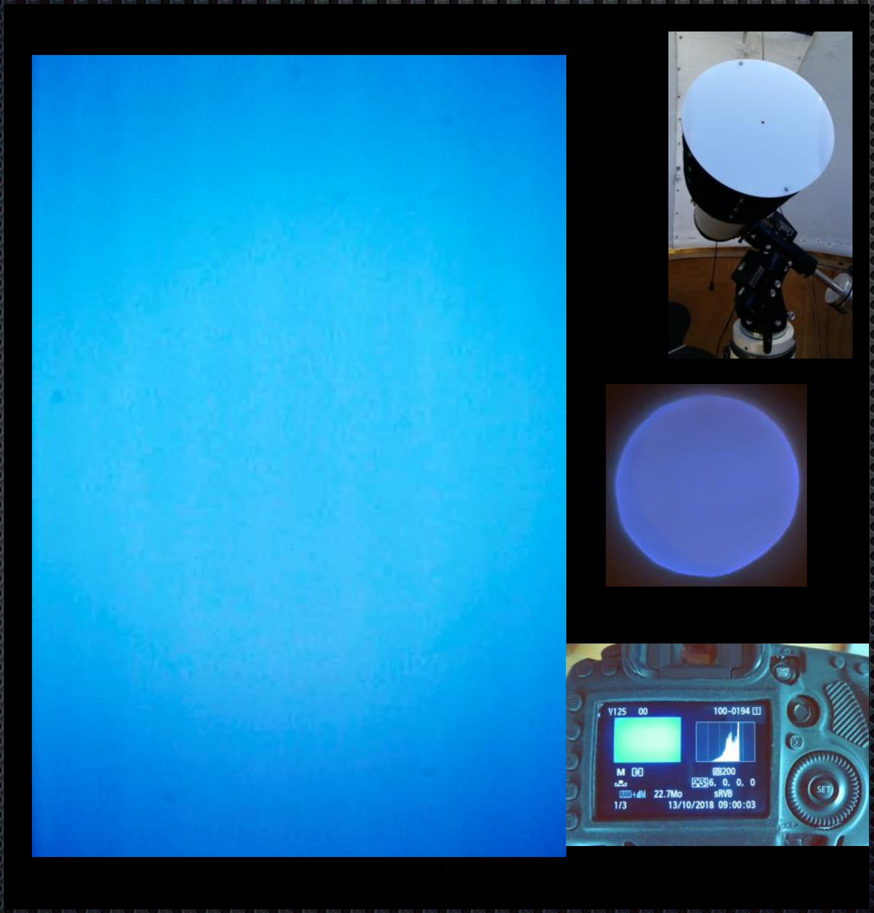
- *Comment réaliser un dark :*
  Faire une série d'images noires avec le même temps de pose que l'image réelle et dans les mêmes conditions de température ambiante.
  Combien d'images ? Le même nombre que les brutes sans dithering, 20 à 30% du nombre des images brutes avec dithering.
  Ces images seront ensuite empilées et moyennées pour créer un **Master Dark**

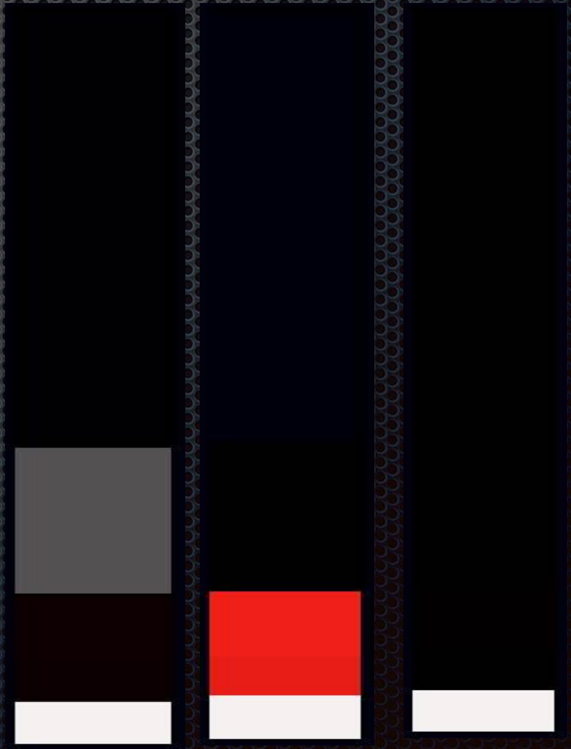




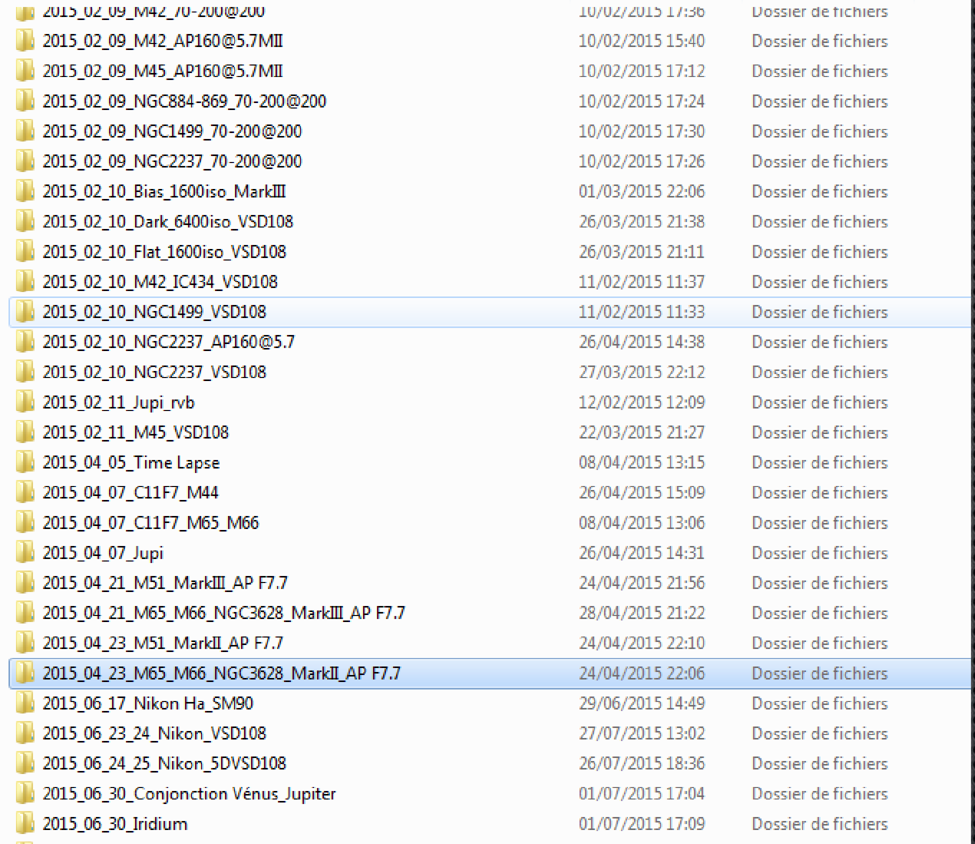
Comment réaliser un master flat ?

- *Comment réaliser un Flat :*
  Conserver l'assemblage optique, ne pas modifier la focalisation, faire des images d'une surface avec un éclairage uniforme à 200 ISO. Vérifier la position de l'histogramme.(centre droite)
  Empiler et moyenner les images pour créer un **Master Flat**


1/125 00
100-0194
M
200
6. 0. 0. 0
22.7Mo
sRVB
1/3
13/10/2018 09:00:03
SET

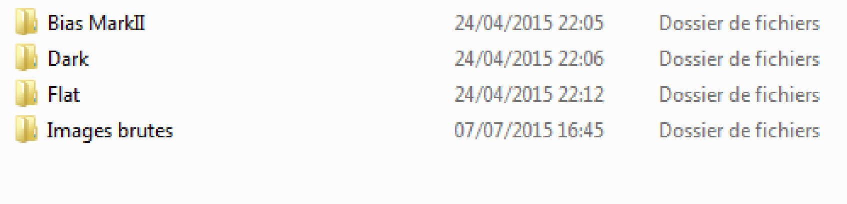


De la discipline dans les fichiers !



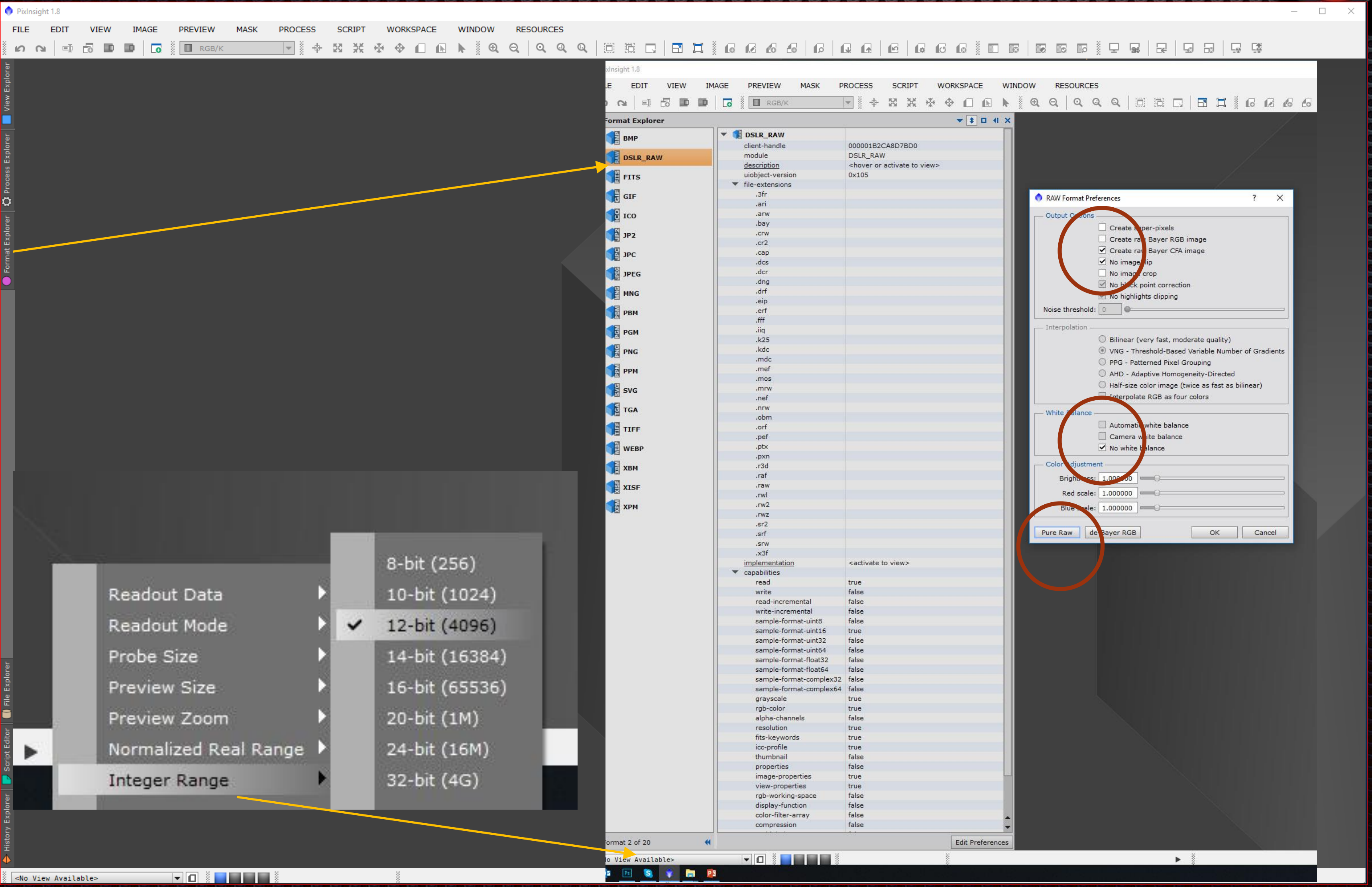
2015_02_09_M42_70-200@200	10/02/2015 17:36	Dossier de fichiers
2015_02_09_M42_AP160@5.7MII	10/02/2015 15:40	Dossier de fichiers
2015_02_09_M45_AP160@5.7MII	10/02/2015 17:12	Dossier de fichiers
2015_02_09_NGC884-869_70-200@200	10/02/2015 17:24	Dossier de fichiers
2015_02_09_NGC1499_70-200@200	10/02/2015 17:30	Dossier de fichiers
2015_02_09_NGC2237_70-200@200	10/02/2015 17:26	Dossier de fichiers
2015_02_10_Bias_1600iso_MarkIII	01/03/2015 22:06	Dossier de fichiers
2015_02_10_Dark_6400iso_VSD108	26/03/2015 21:38	Dossier de fichiers
2015_02_10_Flat_1600iso_VSD108	26/03/2015 21:11	Dossier de fichiers
2015_02_10_M42_IC434_VSD108	11/02/2015 11:37	Dossier de fichiers
2015_02_10_NGC1499_VSD108	11/02/2015 11:33	Dossier de fichiers
2015_02_10_NGC2237_AP160@5.7	26/04/2015 14:38	Dossier de fichiers
2015_02_10_NGC2237_VSD108	27/03/2015 22:12	Dossier de fichiers
2015_02_11_Jupi_rvb	12/02/2015 12:09	Dossier de fichiers
2015_02_11_M45_VSD108	22/03/2015 21:27	Dossier de fichiers
2015_04_05_Time Lapse	08/04/2015 13:15	Dossier de fichiers
2015_04_07_C11F7_M44	26/04/2015 15:09	Dossier de fichiers
2015_04_07_C11F7_M65_M66	08/04/2015 13:06	Dossier de fichiers
2015_04_07_Jupi	26/04/2015 14:31	Dossier de fichiers
2015_04_21_M51_MarkIII_AP F7.7	24/04/2015 21:56	Dossier de fichiers
2015_04_21_M65_M66_NGC3628_MarkIII_AP F7.7	28/04/2015 21:22	Dossier de fichiers
2015_04_23_M51_MarkII_AP F7.7	24/04/2015 22:10	Dossier de fichiers
2015_04_23_M65_M66_NGC3628_MarkII_AP F7.7	24/04/2015 22:06	Dossier de fichiers
2015_06_17_Nikon Ha_SM90	29/06/2015 14:49	Dossier de fichiers
2015_06_23_24_Nikon_VSD108	27/07/2015 13:02	Dossier de fichiers
2015_06_24_25_Nikon_5DVSD108	26/07/2015 18:36	Dossier de fichiers
2015_06_30_Conjonction Vénus_Jupiter	01/07/2015 17:04	Dossier de fichiers
2015_06_30_Iridium	01/07/2015 17:09	Dossier de fichiers

Dossier Images brutes Raw & JPG
Dossier Dark
Dossier Flat
Dossier Bias



Bias MarkII	24/04/2015 22:05	Dossier de fichiers
Dark	24/04/2015 22:06	Dossier de fichiers
Flat	24/04/2015 22:12	Dossier de fichiers
Images brutes	07/07/2015 16:45	Dossier de fichiers

Paramétrage APN avec PixInsight



PixInsight 1.8
FILE
EDIT
VIEW
IMAGE
PREVIEW
MASK
PROCESS
SCRIPT
WORKSPACE
WINDOW
RESOURCES
RGB/K
View Explorer
Process Explorer
Format Explorer
File Explorer
Script Editor
History Explorer
Format Explorer
BMP
DSLR_RAW
FITS
GIF
ICO
JP2
JPC
JPEG
MNG
PBM
PGM
PNG
PPM
SVG
TGA
TIFF
WEBP
XBM
XISF
XPM
Format 2 of 20
Edit Preferences
<No View Available>
Readout Data
Readout Mode
Probe Size
Preview Size
Preview Zoom
Normalized Real Range
Integer Range
8-bit (256)
10-bit (1024)
12-bit (4096)
14-bit (16384)
16-bit (65536)
20-bit (1M)
24-bit (16M)
32-bit (4G)
RAW Format Preferences
Pure Raw
de-Bayer RGB
OK
Cancel

Integer Range: ✓ 12-bit (4096)

DSLR_RAW	
client-handle	000001B2CA8D7BD0
module	DSLR_RAW
description	<hover or activate to view>
uiobject-version	0x105
file-extensions	
.3fr	
.ari	
.arw	
.bay	
.crw	
.cr2	
.cap	
.dcs	
.dcr	
.dng	
.drf	
.eip	
.erf	
.fff	
.iiq	
.k25	
.kdc	
.mdc	
.mef	
.mos	
.mrw	
.nef	
.nrw	
.obm	
.orf	
.pef	
.ptx	
.pxn	
.r3d	
.raf	
.raw	
.rwl	
.rw2	
.rwz	
.sr2	
.srf	
.srw	
.x3f	
implementation	<activate to view>
capabilities	
read	true
write	false
read-incremental	false
write-incremental	false
sample-format-uint8	false
sample-format-uint16	true
sample-format-uint32	false
sample-format-uint64	false
sample-format-float32	false
sample-format-float64	false
sample-format-complex32	false
sample-format-complex64	false
grayscale	true
rgb-color	true
alpha-channels	false
resolution	true
fits-keywords	true
icc-profile	true
thumbnail	false
properties	false
image-properties	true
view-properties	true
rgb-working-space	false
display-function	false
color-filter-array	false
compression	false

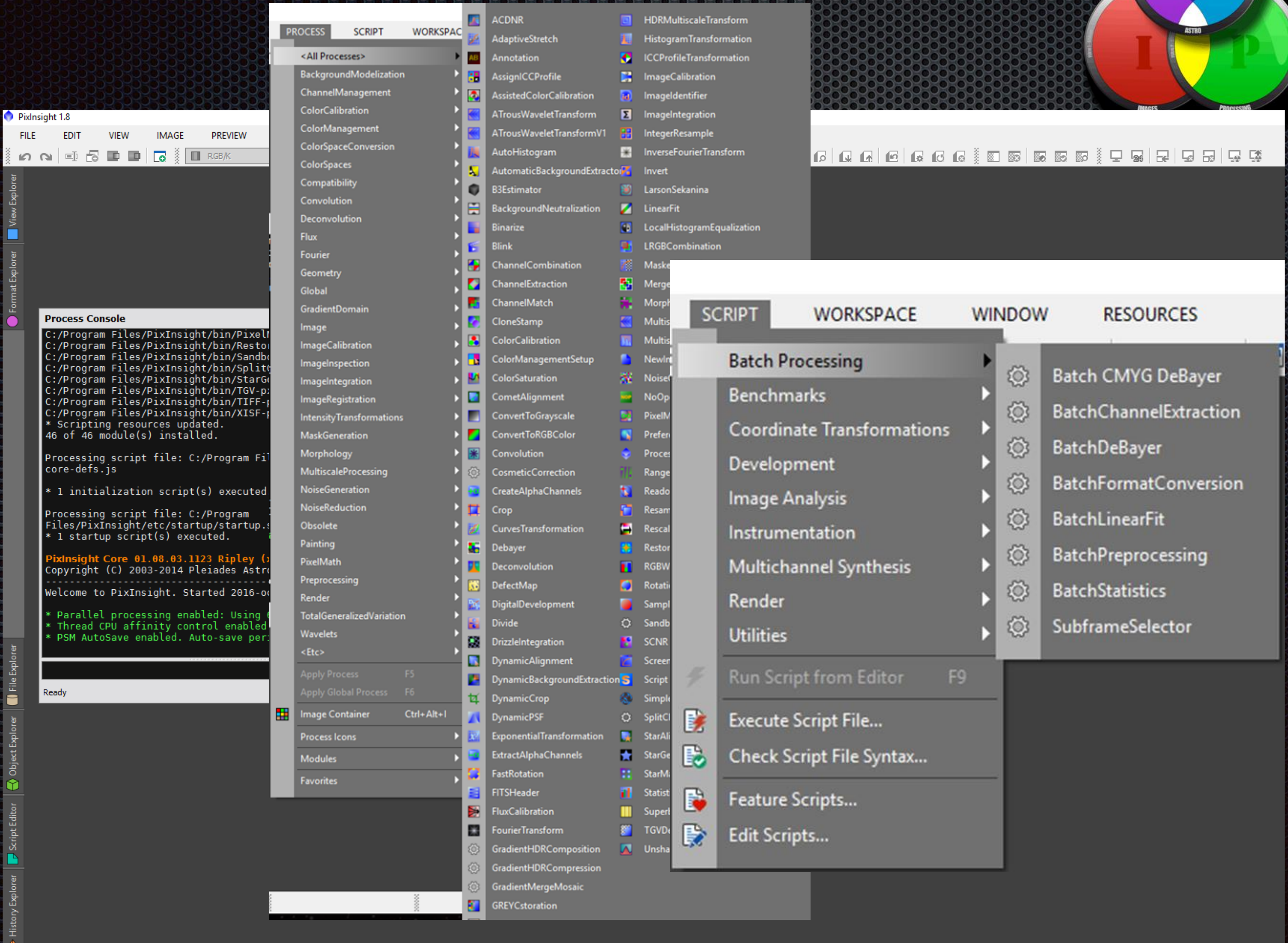
Output Options
☐ Create super-pixels
☐ Create raw Bayer RGB image
☑ Create raw Bayer CFA image
☑ No image flip
☐ No image crop
☑ No black point correction
☑ No highlights clipping
Noise threshold: 0

Interpolation
○ Bilinear (very fast, moderate quality)
● VNG - Threshold-Based Variable Number of Gradients
○ PPG - Patterned Pixel Grouping
○ AHD - Adaptive Homogeneity-Directed
○ Half-size color image (twice as fast as bilinear)
☐ Interpolate RGB as four colors

White Balance
☐ Automatic white balance
☐ Camera white balance
☑ No white balance

Color Adjustment
Brightness: 1.000000
Red scale: 1.000000
Blue scale: 1.000000

Interface Pixinsight


PixInsight 1.8
FILE
EDIT
VIEW
IMAGE
PREVIEW
RGB/K
View Explorer
Format Explorer
File Explorer
Object Explorer
Script Editor
History Explorer
Process Console
Ready
PROCESS
SCRIPT
WORKSPAC
<All Processes>
BackgroundModelization
ChannelManagement
ColorCalibration
ColorManagement
ColorSpaceConversion
ColorSpaces
Compatibility
Convolution
Deconvolution
Flux
Fourier
Geometry
Global
GradientDomain
Image
ImageCalibration
ImageInspection
ImageIntegration
ImageRegistration
IntensityTransformations
MaskGeneration
Morphology
MultiscaleProcessing
NoiseGeneration
NoiseReduction
Obsolete
Painting
PixelMath
Preprocessing
Render
TotalGeneralizedVariation
Wavelets
<Etc>
Apply Process F5
Apply Global Process F6
Image Container Ctrl+Alt+I
Process Icons
Modules
Favorites
ACDNR
AdaptiveStretch
Annotation
AssignICCProfile
AssistedColorCalibration
ATrousWaveletTransform
ATrousWaveletTransformV1
AutoHistogram
AutomaticBackgroundExtractor
B3Estimator
BackgroundNeutralization
Binarize
Blink
ChannelCombination
ChannelExtraction
ChannelMatch
CloneStamp
ColorCalibration
ColorManagementSetup
ColorSaturation
CometAlignment
ConvertToGrayscale
ConvertToRGBColor
Convolution
CosmeticCorrection
CreateAlphaChannels
Crop
CurvesTransformation
Debayer
Deconvolution
DefectMap
DigitalDevelopment
Divide
DrizzleIntegration
DynamicAlignment
DynamicBackgroundExtraction
DynamicCrop
DynamicPSF
ExponentialTransformation
ExtractAlphaChannels
FastRotation
FITSHeader
FluxCalibration
FourierTransform
GradientHDRComposition
GradientHDRCompression
GradientMergeMosaic
GREYCstoration
HDRMultiscaleTransform
HistogramTransformation
ICCProfileTransformation
ImageCalibration
ImageIdentifier
ImageIntegration
IntegerResample
InverseFourierTransform
Invert
LarsonSekanina
LinearFit
LocalHistogramEqualization
LRGBCombination
Maske
Merge
Morph
Multis
Multis
NewIn
Noise
NoOp
PixelM
Prefer
Proces
Range
Reado
Resam
Rescal
Restor
RGBW
Rotati
Sampl
Sandb
SCNR
Screen
Script
Simpl
SplitC
StarAli
StarGe
StarM
Statist
Super
TGVD
Unsha
SCRIPT
WORKSPACE
WINDOW
RESOURCES
Batch Processing
Benchmarks
Coordinate Transformations
Development
Image Analysis
Instrumentation
Multichannel Synthesis
Render
Utilities
Run Script from Editor F9
Execute Script File...
Check Script File Syntax...
Feature Scripts...
Edit Scripts...
Batch CMYG DeBayer
BatchChannelExtraction
BatchDeBayer
BatchFormatConversion
BatchLinearFit
BatchPreprocessing
BatchStatistics
SubframeSelector

```
C:/Program Files/PixInsight/bin/PixelM
C:/Program Files/PixInsight/bin/Restor
C:/Program Files/PixInsight/bin/Sandbo
C:/Program Files/PixInsight/bin/SplitC
C:/Program Files/PixInsight/bin/StarGe
C:/Program Files/PixInsight/bin/TGV-px
C:/Program Files/PixInsight/bin/TIFF-p
C:/Program Files/PixInsight/bin/XISF-p
* Scripting resources updated.
46 of 46 module(s) installed.

Processing script file: C:/Program Fil
core-defs.js

* 1 initialization script(s) executed.

Processing script file: C:/Program
Files/PixInsight/etc/startup/startup.s
* 1 startup script(s) executed.

PixInsight Core 01.08.03.1123 Ripley (x
Copyright (C) 2003-2014 Pleiades Astro
--------------------------------------
Welcome to PixInsight. Started 2016-oc

* Parallel processing enabled: Using 6
* Thread CPU affinity control enabled.
* PSM AutoSave enabled. Auto-save peri
```

A l'aide !!!
Ou trouver les process icons, des méthodes, des tutos et de l'aide ?

Site PixInsight: http://pixinsight.com/

Association AIP: www.astro-images-processing.fr

Articles astronomie magazine: Nicolas Outters, Pierre Walcho
http://outters.fr/wp/articles-astrosurf-magazine/

Site Laurent Bourgon: http://www.felopaul.com/

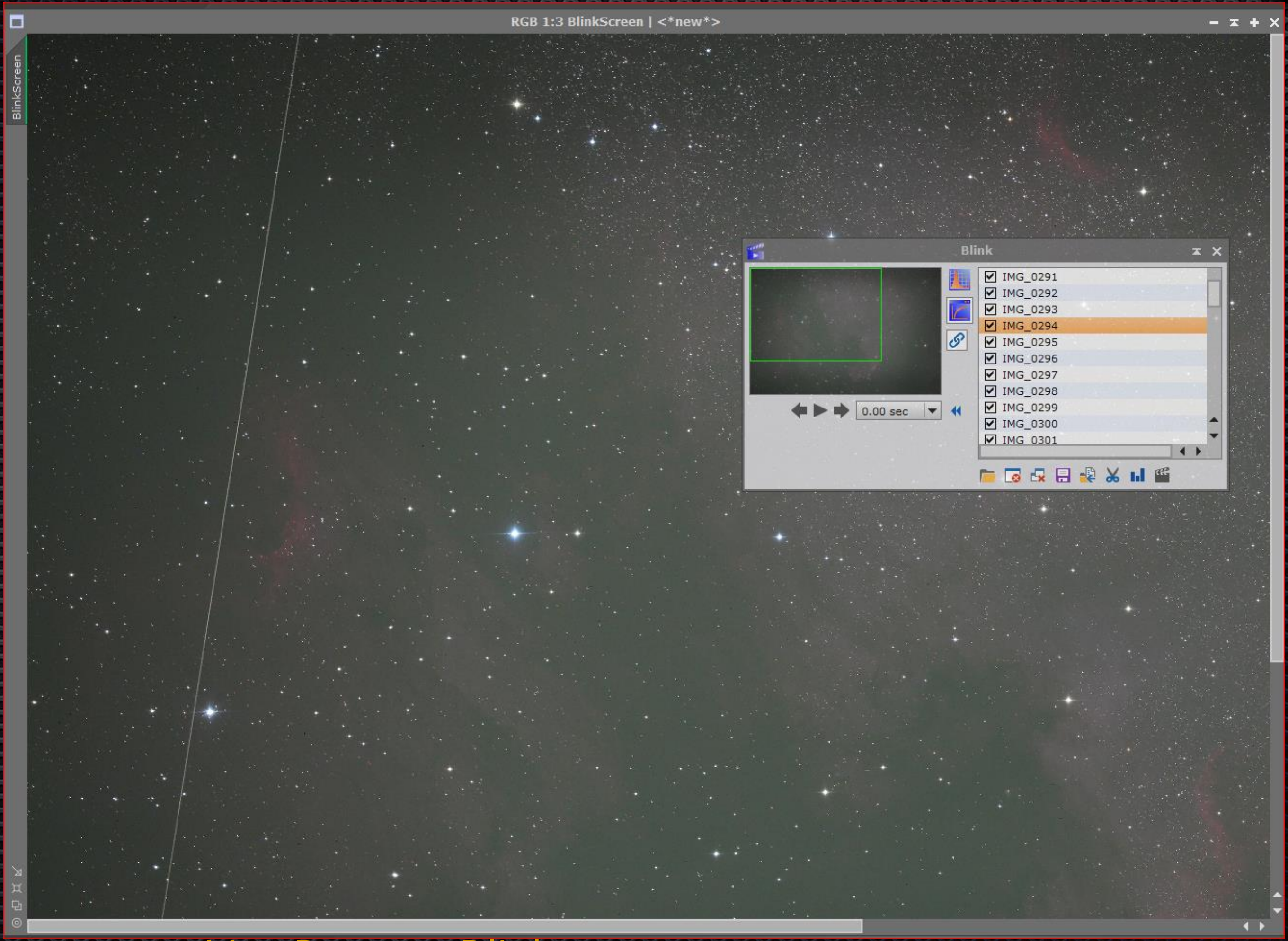
Site Philippe Bernhard: http://www.astro-photographie.fr

Site Dominique Arnaud: http://www.arnaudom.fr/pixinsight.php

Coup d’œil sur les images brutes: Process Blink

Dans le fichier images brutes Raw + Jpg, sélectionner les images *.jpg

Les traces de satellites, avions,?? seront éliminées avec les réjections
Attention aux gradients changeant: diffusion éclairage, lune, etc..
Eliminer les défauts de suivi, turbulence, lumière accidentelle, etc…


RGB 1:3 BlinkScreen | <*new*>
BlinkScreen
Blink
0.00 sec

☑ IMG_0291
☑ IMG_0292
☑ IMG_0293
☑ IMG_0294
☑ IMG_0295
☑ IMG_0296
☑ IMG_0297
☑ IMG_0298
☑ IMG_0299
☑ IMG_0300
☑ IMG_0301

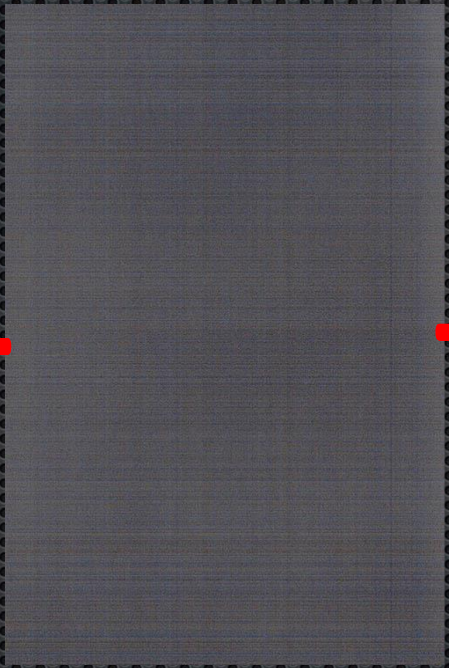
Lien Process_Blink

But du prétraitement des images

- Extraire les parasites contenus dans l'image avec un logiciel de traitement adapté aux images du ciel

Image brute

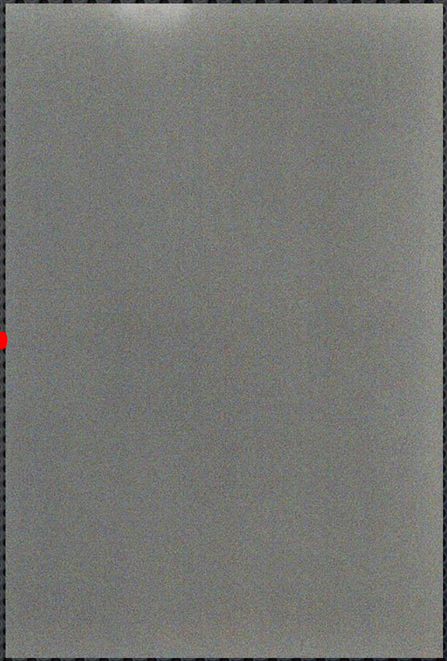
−



Master Bias

Transfert de données

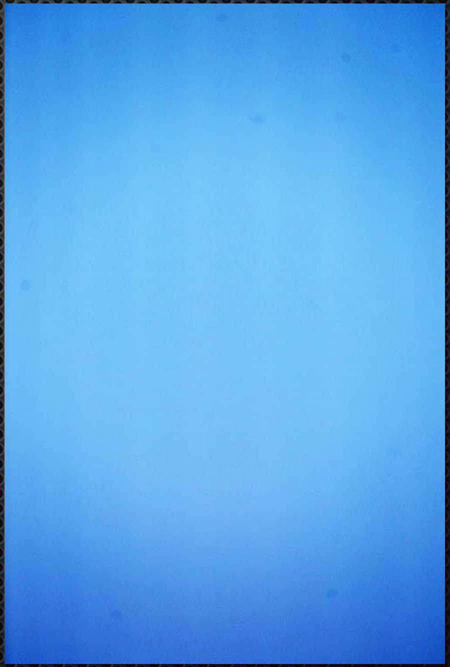
−



Master Dark

bruit thermique:
pixels chauds et froids

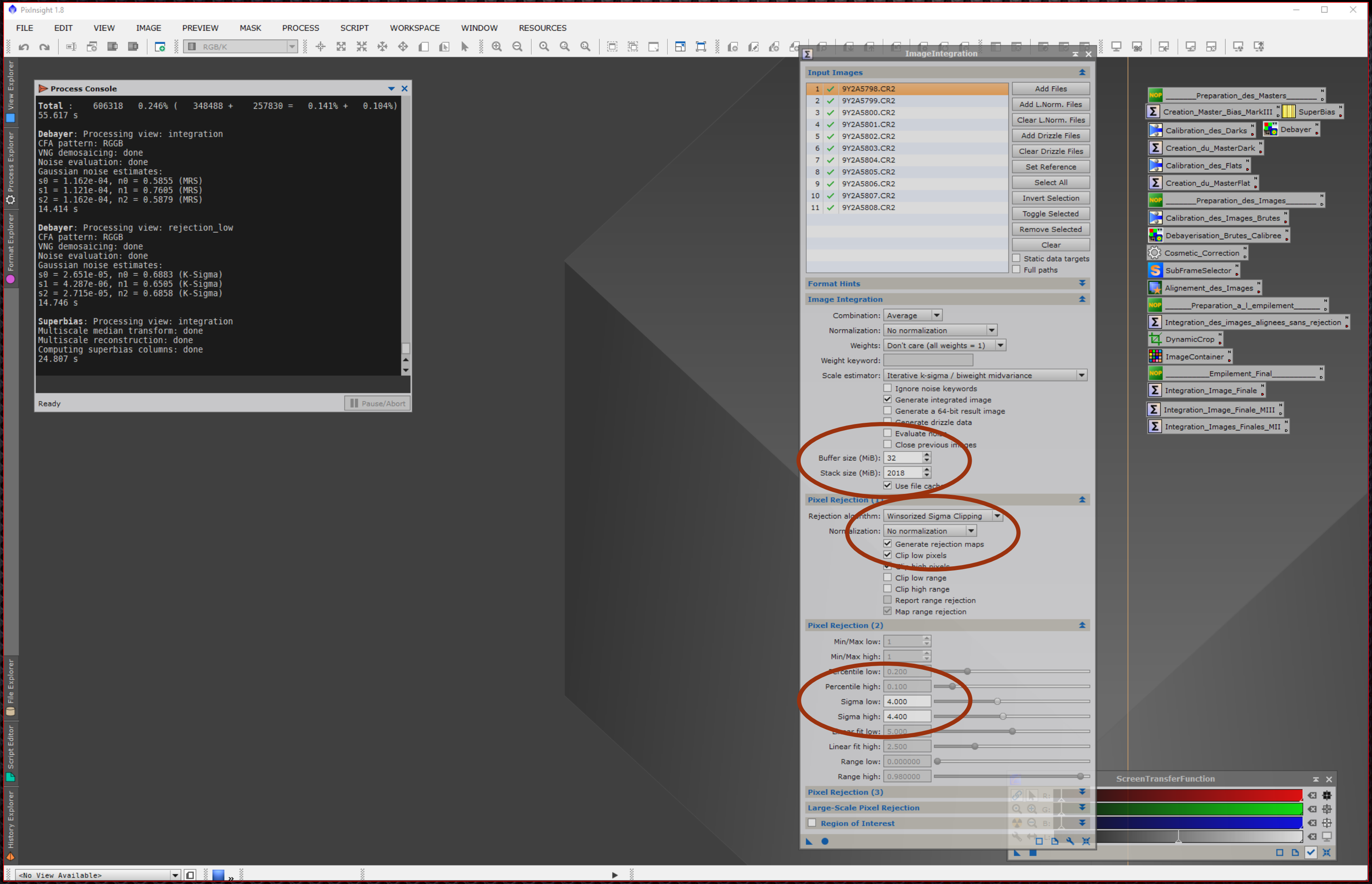
:



Master Flat

défaut d'uniformité du capteur
poussières, interférences

Créer un bias et le bonus « super bias »


PixInsight 1.8
FILE EDIT VIEW IMAGE PREVIEW MASK PROCESS SCRIPT WORKSPACE WINDOW RESOURCES
RGB/K
View Explorer
Process Explorer
Format Explorer
File Explorer
Script Editor
History Explorer
Process Console
ImageIntegration
Add Files
Add L.Norm. Files
Clear L.Norm. Files
Add Drizzle Files
Clear Drizzle Files
Set Reference
Select All
Invert Selection
Toggle Selected
Remove Selected
Clear
Preparation_des_Masters
Creation_Master_Bias_MarkIII
SuperBias
Calibration_des_Darks
Debayer
Creation_du_MasterDark
Calibration_des_Flats
Creation_du_MasterFlat
Preparation_des_Images
Calibration_des_Images_Brutes
Debayerisation_Brutes_Calibree
Cosmetic_Correction
SubFrameSelector
Alignement_des_Images
Preparation_a_l_empilement
Integration_des_images_alignees_sans_rejection
DynamicCrop
ImageContainer
Empilement_Final
Integration_Image_Finale
Integration_Image_Finale_MIII
Integration_Images_Finales_MII
ScreenTransferFunction
<No View Available>

Process Console

```
Total :    606318   0.246% (   348488 +    257830 =   0.141% +   0.104%)
55.617 s

Debayer: Processing view: integration
CFA pattern: RGGB
VNG demosaicing: done
Noise evaluation: done
Gaussian noise estimates:
s0 = 1.162e-04, n0 = 0.5855 (MRS)
s1 = 1.121e-04, n1 = 0.7605 (MRS)
s2 = 1.162e-04, n2 = 0.5879 (MRS)
14.414 s

Debayer: Processing view: rejection_low
CFA pattern: RGGB
VNG demosaicing: done
Noise evaluation: done
Gaussian noise estimates:
s0 = 2.651e-05, n0 = 0.6883 (K-Sigma)
s1 = 4.287e-06, n1 = 0.6505 (K-Sigma)
s2 = 2.715e-05, n2 = 0.6858 (K-Sigma)
14.746 s

Superbias: Processing view: integration
Multiscale median transform: done
Multiscale reconstruction: done
Computing superbias columns: done
24.807 s
```

Ready

Input Images

1 ✓ 9Y2A5798.CR2
2 ✓ 9Y2A5799.CR2
3 ✓ 9Y2A5800.CR2
4 ✓ 9Y2A5801.CR2
5 ✓ 9Y2A5802.CR2
6 ✓ 9Y2A5803.CR2
7 ✓ 9Y2A5804.CR2
8 ✓ 9Y2A5805.CR2
9 ✓ 9Y2A5806.CR2
10 ✓ 9Y2A5807.CR2
11 ✓ 9Y2A5808.CR2

☐ Static data targets
☐ Full paths

Format Hints

Image Integration

Combination: Average
Normalization: No normalization
Weights: Don't care (all weights = 1)
Weight keyword:
Scale estimator: Iterative k-sigma / biweight midvariance
☐ Ignore noise keywords
☑ Generate integrated image
☐ Generate a 64-bit result image
☐ Generate drizzle data
☐ Evaluate noise
☐ Close previous images
Buffer size (MiB): 32
Stack size (MiB): 2018
☑ Use file cache

Pixel Rejection (1)

Rejection algorithm: Winsorized Sigma Clipping
Normalization: No normalization
☑ Generate rejection maps
☑ Clip low pixels
☑ Clip high pixels
☐ Clip low range
☐ Clip high range
☐ Report range rejection
☑ Map range rejection

Pixel Rejection (2)

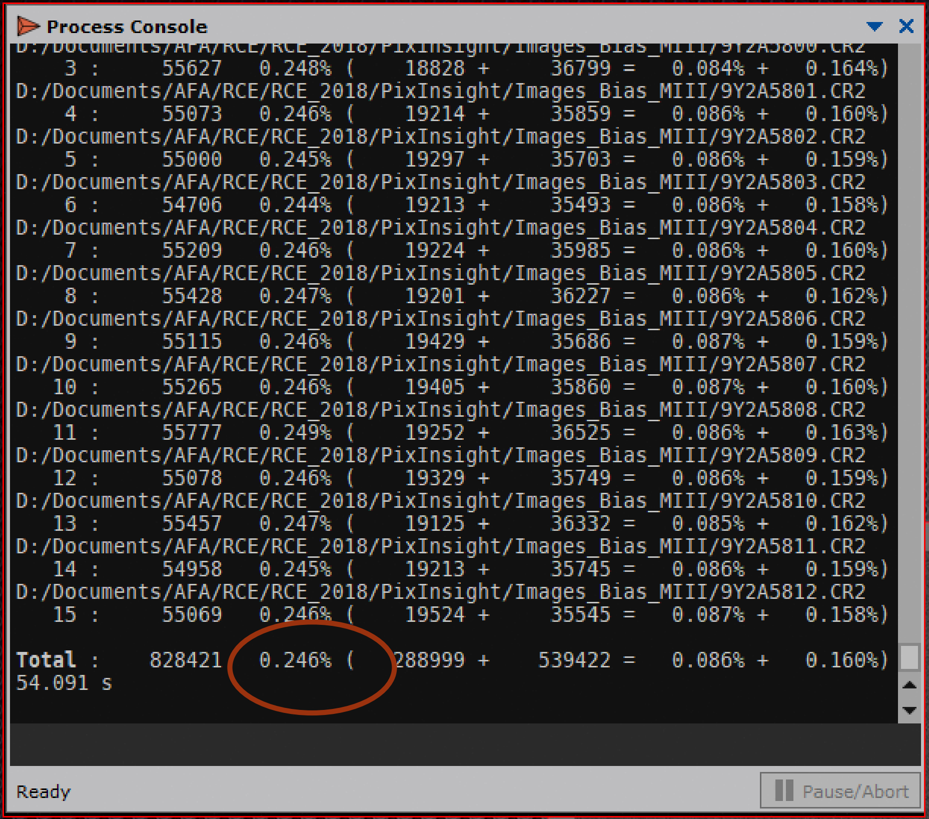
Min/Max low: 1
Min/Max high: 1
Percentile low: 0.200
Percentile high: 0.100
Sigma low: 4.000
Sigma high: 4.400
Linear fit low: 5.000
Linear fit high: 2.500
Range low: 0.000000
Range high: 0.980000

Pixel Rejection (3)

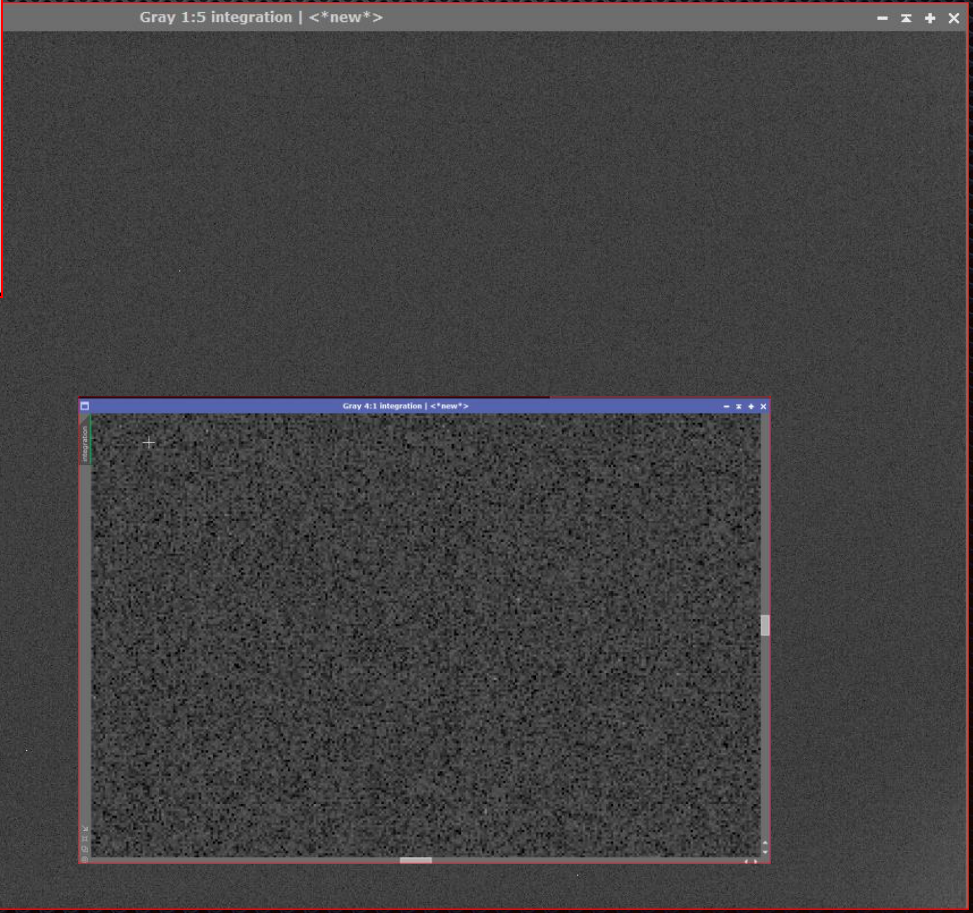
Large-Scale Pixel Rejection

☐ **Region of Interest**

Image du bias



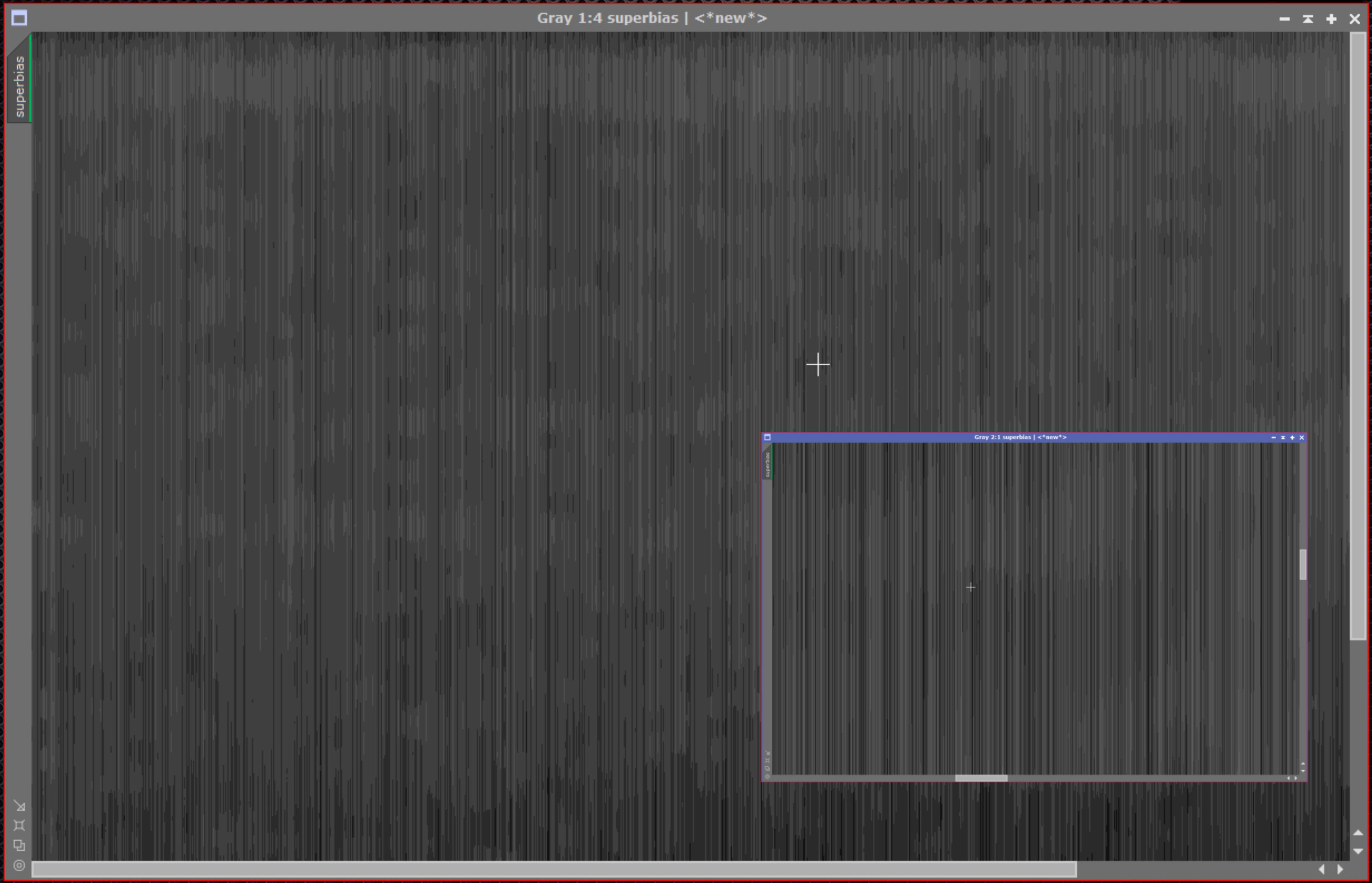
```
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Bias_MIII/9Y2A5800.CR2
   3 :     55627   0.248% (     18828 +     36799 =   0.084% +   0.164%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Bias_MIII/9Y2A5801.CR2
   4 :     55073   0.246% (     19214 +     35859 =   0.086% +   0.160%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Bias_MIII/9Y2A5802.CR2
   5 :     55000   0.245% (     19297 +     35703 =   0.086% +   0.159%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Bias_MIII/9Y2A5803.CR2
   6 :     54706   0.244% (     19213 +     35493 =   0.086% +   0.158%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Bias_MIII/9Y2A5804.CR2
   7 :     55209   0.246% (     19224 +     35985 =   0.086% +   0.160%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Bias_MIII/9Y2A5805.CR2
   8 :     55428   0.247% (     19201 +     36227 =   0.086% +   0.162%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Bias_MIII/9Y2A5806.CR2
   9 :     55115   0.246% (     19429 +     35686 =   0.087% +   0.159%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Bias_MIII/9Y2A5807.CR2
  10 :     55265   0.246% (     19405 +     35860 =   0.087% +   0.160%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Bias_MIII/9Y2A5808.CR2
  11 :     55777   0.249% (     19252 +     36525 =   0.086% +   0.163%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Bias_MIII/9Y2A5809.CR2
  12 :     55078   0.246% (     19329 +     35749 =   0.086% +   0.159%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Bias_MIII/9Y2A5810.CR2
  13 :     55457   0.247% (     19125 +     36332 =   0.085% +   0.162%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Bias_MIII/9Y2A5811.CR2
  14 :     54958   0.245% (     19213 +     35745 =   0.086% +   0.159%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Bias_MIII/9Y2A5812.CR2
  15 :     55069   0.246% (     19524 +     35545 =   0.087% +   0.158%)

Total :    828421   0.246% (    288999 +    539422 =   0.086% +   0.160%)
54.091 s
```


Gray 1:5 integration | <*new*>
Gray 4:1 integration | <*new*>

Réjection 0,1 à 0,25%

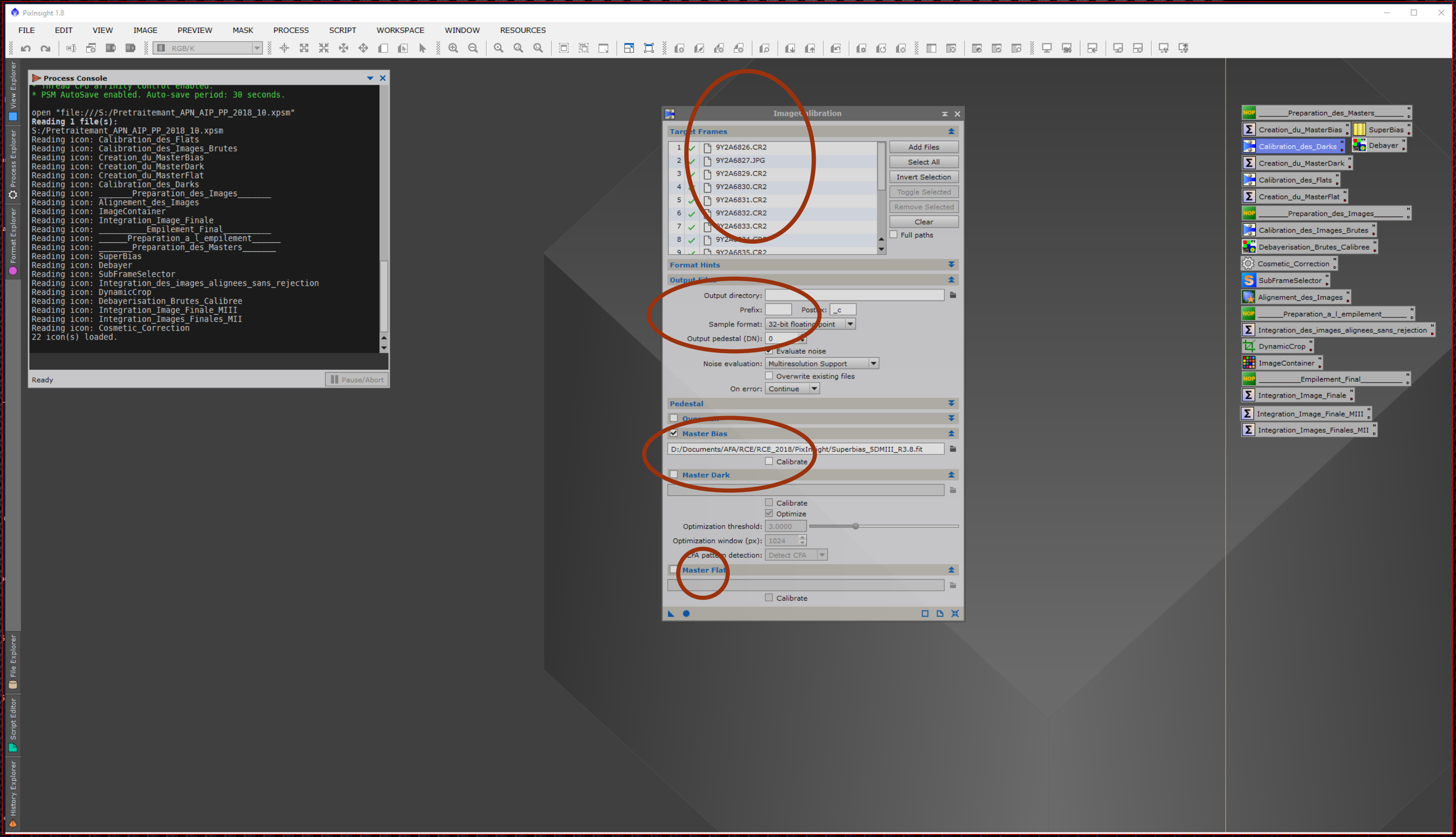
PixInsight

Image super bias


Gray 1:4 superbias | <*new*>
superbias
Gray 2:1 superbias | <*new*>
superbias

Créer un master dark

Calibrer les images sombres


PixInsight 1.8
FILE
EDIT
VIEW
IMAGE
PREVIEW
MASK
PROCESS
SCRIPT
WORKSPACE
WINDOW
RESOURCES
RGB/K
View Explorer
Process Explorer
Format Explorer
File Explorer
Script Editor
History Explorer
Process Console
_______Preparation_des_Masters_______
Creation_du_MasterBias
SuperBias
Calibration_des_Darks
Debayer
Creation_du_MasterDark
Calibration_des_Flats
Creation_du_MasterFlat
_______Preparation_des_Images_______
Calibration_des_Images_Brutes
Debayerisation_Brutes_Calibree
Cosmetic_Correction
SubFrameSelector
Alignement_des_Images
______Preparation_a_l_empilement______
Integration_des_images_alignees_sans_rejection
DynamicCrop
ImageContainer
__________Empilement_Final__________
Integration_Image_Finale
Integration_Image_Finale_MIII
Integration_Images_Finales_MII

```
* Thread CPU affinity control enabled.
* PSM AutoSave enabled. Auto-save period: 30 seconds.

open "file:///S:/Pretraitemant_APN_AIP_PP_2018_10.xpsm"
Reading 1 file(s):
S:/Pretraitemant_APN_AIP_PP_2018_10.xpsm
Reading icon: Calibration_des_Flats
Reading icon: Calibration_des_Images_Brutes
Reading icon: Creation_du_MasterBias
Reading icon: Creation_du_MasterDark
Reading icon: Creation_du_MasterFlat
Reading icon: Calibration_des_Darks
Reading icon: _______Preparation_des_Images_______
Reading icon: Alignement_des_Images
Reading icon: ImageContainer
Reading icon: Integration_Image_Finale
Reading icon: __________Empilement_Final__________
Reading icon: ______Preparation_a_l_empilement______
Reading icon: _______Preparation_des_Masters_______
Reading icon: SuperBias
Reading icon: Debayer
Reading icon: SubFrameSelector
Reading icon: Integration_des_images_alignees_sans_rejection
Reading icon: DynamicCrop
Reading icon: Debayerisation_Brutes_Calibree
Reading icon: Integration_Image_Finale_MIII
Reading icon: Integration_Images_Finales_MII
Reading icon: Cosmetic_Correction
22 icon(s) loaded.
```

Ready

ImageCalibration

Target Frames

1 ✓ 9Y2A6826.CR2
2 ✓ 9Y2A6827.JPG
3 ✓ 9Y2A6829.CR2
4 ✓ 9Y2A6830.CR2
5 ✓ 9Y2A6831.CR2
6 ✓ 9Y2A6832.CR2
7 ✓ 9Y2A6833.CR2
8 ✓ 9Y2A6834.CR2
9 ✓ 9Y2A6835.CR2

Add Files | Select All | Invert Selection | Toggle Selected | Remove Selected | Clear
☐ Full paths

Format Hints

Output Files

Output directory:
Prefix: Postfix: _c
Sample format: 32-bit floating point
Output pedestal (DN): 0
☑ Evaluate noise
Noise evaluation: Multiresolution Support
☐ Overwrite existing files
On error: Continue

Pedestal

☐ **Overscan**

☑ **Master Bias**

D:/Documents/AFA/RCE/RCE_2018/PixInsight/Superbias_5DMIII_R3.8.fit
☐ Calibrate

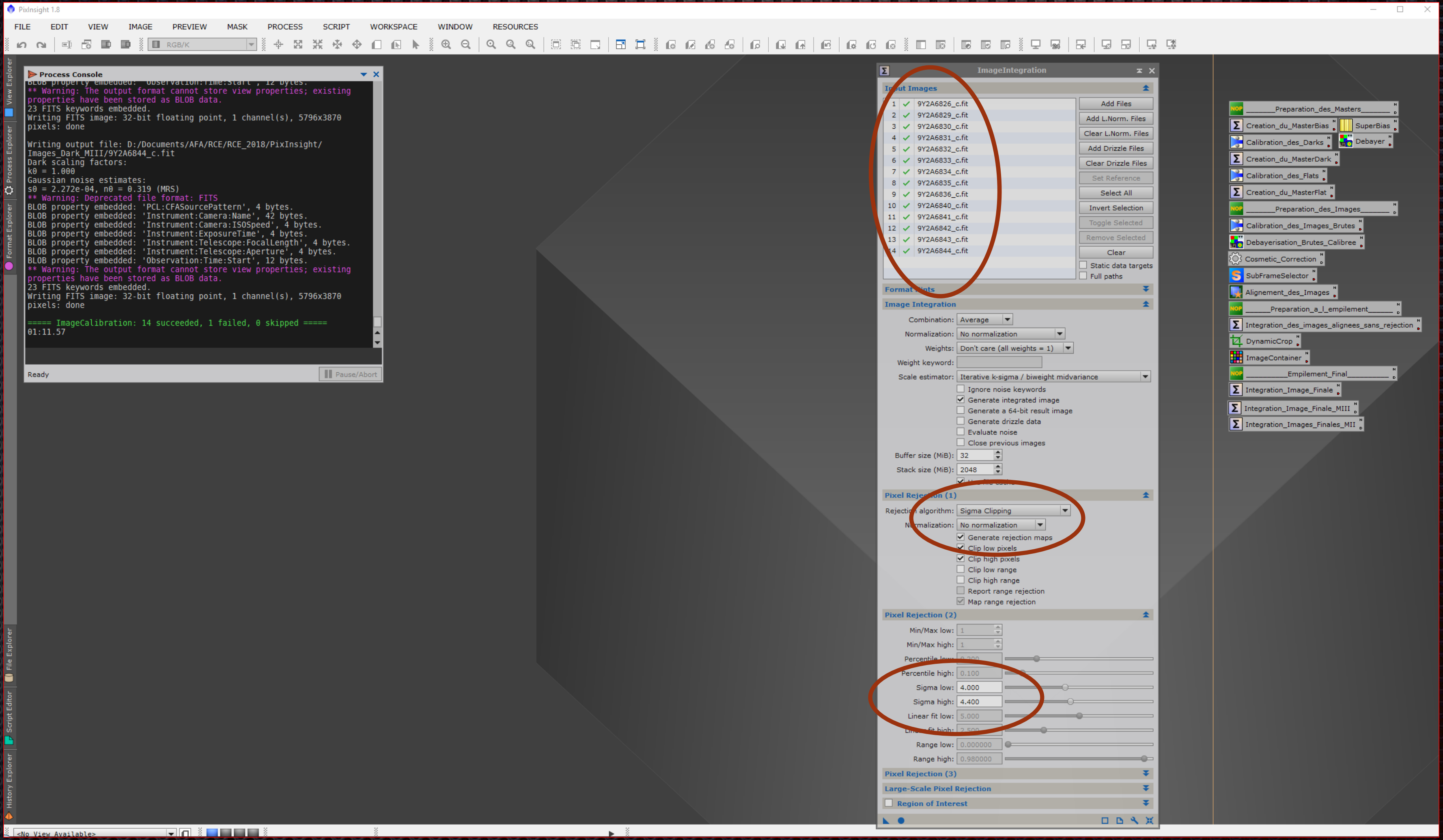
☐ **Master Dark**

☐ Calibrate
☑ Optimize
Optimization threshold: 3.0000
Optimization window (px): 1024
CFA pattern detection: Detect CFA

☐ **Master Flat**

☐ Calibrate

Créer le master dark


PixInsight 1.8
FILE
EDIT
VIEW
IMAGE
PREVIEW
MASK
PROCESS
SCRIPT
WORKSPACE
WINDOW
RESOURCES
RGB/K
View Explorer
Process Explorer
Format Explorer
File Explorer
Script Editor
History Explorer
Process Console
Ready
Pause/Abort
<No View Available>
ImageIntegration
Add Files
Add L.Norm. Files
Clear L.Norm. Files
Add Drizzle Files
Clear Drizzle Files
Set Reference
Select All
Invert Selection
Toggle Selected
Remove Selected
Clear
Format Hints
Pixel Rejection (3)
Large-Scale Pixel Rejection
Region of Interest
____Preparation_des_Masters____
Creation_du_MasterBias
SuperBias
Calibration_des_Darks
Debayer
Creation_du_MasterDark
Calibration_des_Flats
Creation_du_MasterFlat
____Preparation_des_Images____
Calibration_des_Images_Brutes
Debayerisation_Brutes_Calibree
Cosmetic_Correction
SubFrameSelector
Alignement_des_Images
____Preparation_a_l_empilement____
Integration_des_images_alignees_sans_rejection
DynamicCrop
ImageContainer
____Empilement_Final____
Integration_Image_Finale
Integration_Image_Finale_MIII
Integration_Images_Finales_MII

```
BLOB property embedded: 'Observation:Time:Start', 12 bytes.
** Warning: The output format cannot store view properties; existing
properties have been stored as BLOB data.
23 FITS keywords embedded.
Writing FITS image: 32-bit floating point, 1 channel(s), 5796x3870
pixels: done

Writing output file: D:/Documents/AFA/RCE/RCE_2018/PixInsight/
Images_Dark_MIII/9Y2A6844_c.fit
Dark scaling factors:
k0 = 1.000
Gaussian noise estimates:
s0 = 2.272e-04, n0 = 0.319 (MRS)
** Warning: Deprecated file format: FITS
BLOB property embedded: 'PCL:CFASourcePattern', 4 bytes.
BLOB property embedded: 'Instrument:Camera:Name', 42 bytes.
BLOB property embedded: 'Instrument:Camera:ISOSpeed', 4 bytes.
BLOB property embedded: 'Instrument:ExposureTime', 4 bytes.
BLOB property embedded: 'Instrument:Telescope:FocalLength', 4 bytes.
BLOB property embedded: 'Instrument:Telescope:Aperture', 4 bytes.
BLOB property embedded: 'Observation:Time:Start', 12 bytes.
** Warning: The output format cannot store view properties; existing
properties have been stored as BLOB data.
23 FITS keywords embedded.
Writing FITS image: 32-bit floating point, 1 channel(s), 5796x3870
pixels: done

===== ImageCalibration: 14 succeeded, 1 failed, 0 skipped =====
01:11.57
```

Input Images

1	✓	9Y2A6826_c.fit
2	✓	9Y2A6829_c.fit
3	✓	9Y2A6830_c.fit
4	✓	9Y2A6831_c.fit
5	✓	9Y2A6832_c.fit
6	✓	9Y2A6833_c.fit
7	✓	9Y2A6834_c.fit
8	✓	9Y2A6835_c.fit
9	✓	9Y2A6836_c.fit
10	✓	9Y2A6840_c.fit
11	✓	9Y2A6841_c.fit
12	✓	9Y2A6842_c.fit
13	✓	9Y2A6843_c.fit
14	✓	9Y2A6844_c.fit

☐ Static data targets
☐ Full paths

Image Integration

Combination: Average
Normalization: No normalization
Weights: Don't care (all weights = 1)
Weight keyword:
Scale estimator: Iterative k-sigma / biweight midvariance
☐ Ignore noise keywords
☑ Generate integrated image
☐ Generate a 64-bit result image
☐ Generate drizzle data
☐ Evaluate noise
☐ Close previous images
Buffer size (MiB): 32
Stack size (MiB): 2048

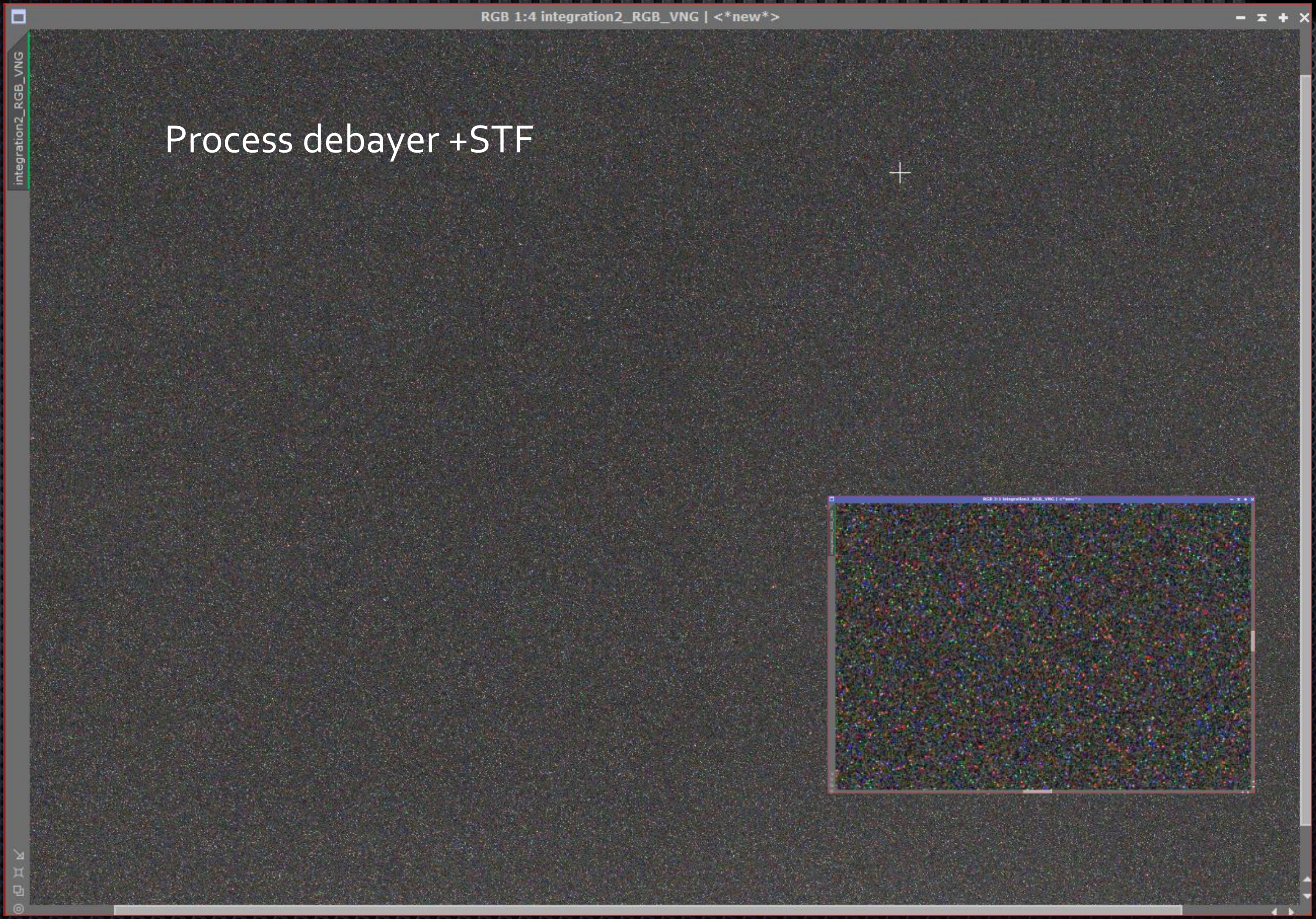
Pixel Rejection (1)

Rejection algorithm: Sigma Clipping
Normalization: No normalization
☑ Generate rejection maps
☑ Clip low pixels
☑ Clip high pixels
☐ Clip low range
☐ Clip high range
☐ Report range rejection
☑ Map range rejection

Pixel Rejection (2)

Min/Max low: 1
Min/Max high: 1
Percentile low: 0.200
Percentile high: 0.100
Sigma low: 4.000
Sigma high: 4.400
Linear fit low: 5.000
Linear fit high: 2.500
Range low: 0.000000
Range high: 0.980000

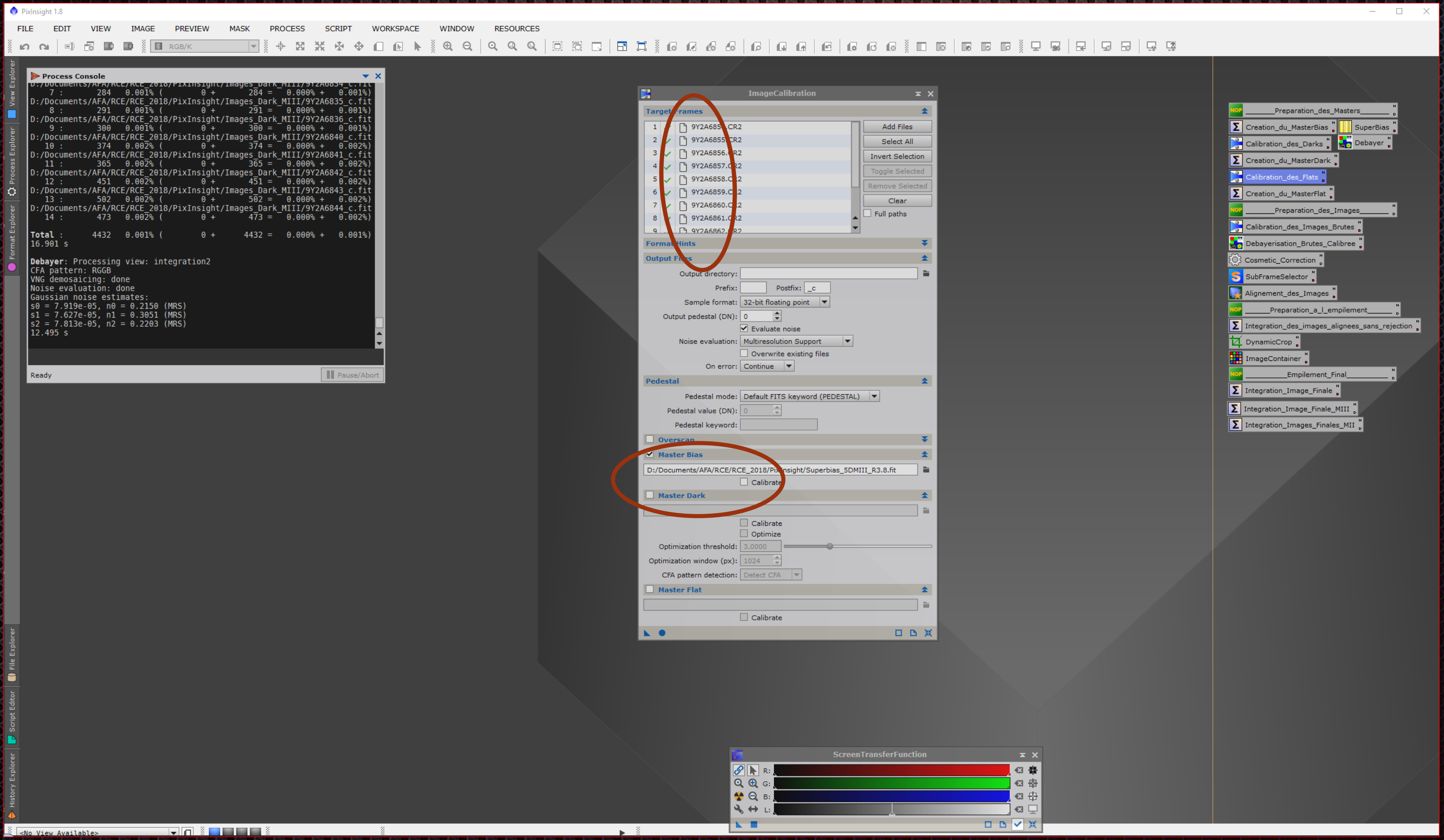
Coup d’œil sur l’image du master dark


RGB 1:4 integration2_RGB_VNG | <*new*>
integration2_RGB_VNG

Process debayer +STF

Créer un master flat

Calibrer les images flat


PixInsight 1.8
FILE
EDIT
VIEW
IMAGE
PREVIEW
MASK
PROCESS
SCRIPT
WORKSPACE
WINDOW
RESOURCES
RGB/K
View Explorer
Process Explorer
Format Explorer
File Explorer
Script Editor
History Explorer
Process Console
Ready
Pause/Abort
ImageCalibration
Add Files
Select All
Invert Selection
Toggle Selected
Remove Selected
Clear
ScreenTransferFunction
R:
G:
B:
L:
<No View Available>
_______Preparation_des_Masters_______
Creation_du_MasterBias
SuperBias
Calibration_des_Darks
Debayer
Creation_du_MasterDark
Calibration_des_Flats
Creation_du_MasterFlat
_______Preparation_des_Images_______
Calibration_des_Images_Brutes
Debayerisation_Brutes_Calibree
Cosmetic_Correction
SubFrameSelector
Alignement_des_Images
______Preparation_a_l_empilement______
Integration_des_images_alignees_sans_rejection
DynamicCrop
ImageContainer
__________Empilement_Final__________
Integration_Image_Finale
Integration_Image_Finale_MIII
Integration_Images_Finales_MII

```
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Dark_MIII/9Y2A6834_c.fit
    7 :       284   0.001% (         0 +        284 =   0.000% +   0.001%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Dark_MIII/9Y2A6835_c.fit
    8 :       291   0.001% (         0 +        291 =   0.000% +   0.001%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Dark_MIII/9Y2A6836_c.fit
    9 :       300   0.001% (         0 +        300 =   0.000% +   0.001%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Dark_MIII/9Y2A6840_c.fit
   10 :       374   0.002% (         0 +        374 =   0.000% +   0.002%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Dark_MIII/9Y2A6841_c.fit
   11 :       365   0.002% (         0 +        365 =   0.000% +   0.002%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Dark_MIII/9Y2A6842_c.fit
   12 :       451   0.002% (         0 +        451 =   0.000% +   0.002%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Dark_MIII/9Y2A6843_c.fit
   13 :       502   0.002% (         0 +        502 =   0.000% +   0.002%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Dark_MIII/9Y2A6844_c.fit
   14 :       473   0.002% (         0 +        473 =   0.000% +   0.002%)

Total :      4432   0.001% (         0 +       4432 =   0.000% +   0.001%)
16.901 s

Debayer: Processing view: integration2
CFA pattern: RGGB
VNG demosaicing: done
Noise evaluation: done
Gaussian noise estimates:
s0 = 7.919e-05, n0 = 0.2150 (MRS)
s1 = 7.627e-05, n1 = 0.3051 (MRS)
s2 = 7.813e-05, n2 = 0.2203 (MRS)
12.495 s
```

Target Frames

1 9Y2A685 .CR2
2 ✓ 9Y2A6855.CR2
3 ✓ 9Y2A6856.CR2
4 ✓ 9Y2A6857.CR2
5 ✓ 9Y2A6858.CR2
6 ✓ 9Y2A6859.CR2
7 ✓ 9Y2A6860.CR2
8 ✓ 9Y2A6861.CR2
9 ✓ 9Y2A6862.CR2

☐ Full paths

Format Hints

Output Files

Output directory:
Prefix:
Postfix: _c
Sample format: 32-bit floating point
Output pedestal (DN): 0
☑ Evaluate noise
Noise evaluation: Multiresolution Support
☐ Overwrite existing files
On error: Continue

Pedestal

Pedestal mode: Default FITS keyword (PEDESTAL)
Pedestal value (DN): 0
Pedestal keyword:

☐ **Overscan**

☑ **Master Bias**

D:/Documents/AFA/RCE/RCE_2018/PixInsight/Superbias_5DMIII_R3.8.fit
☐ Calibrate

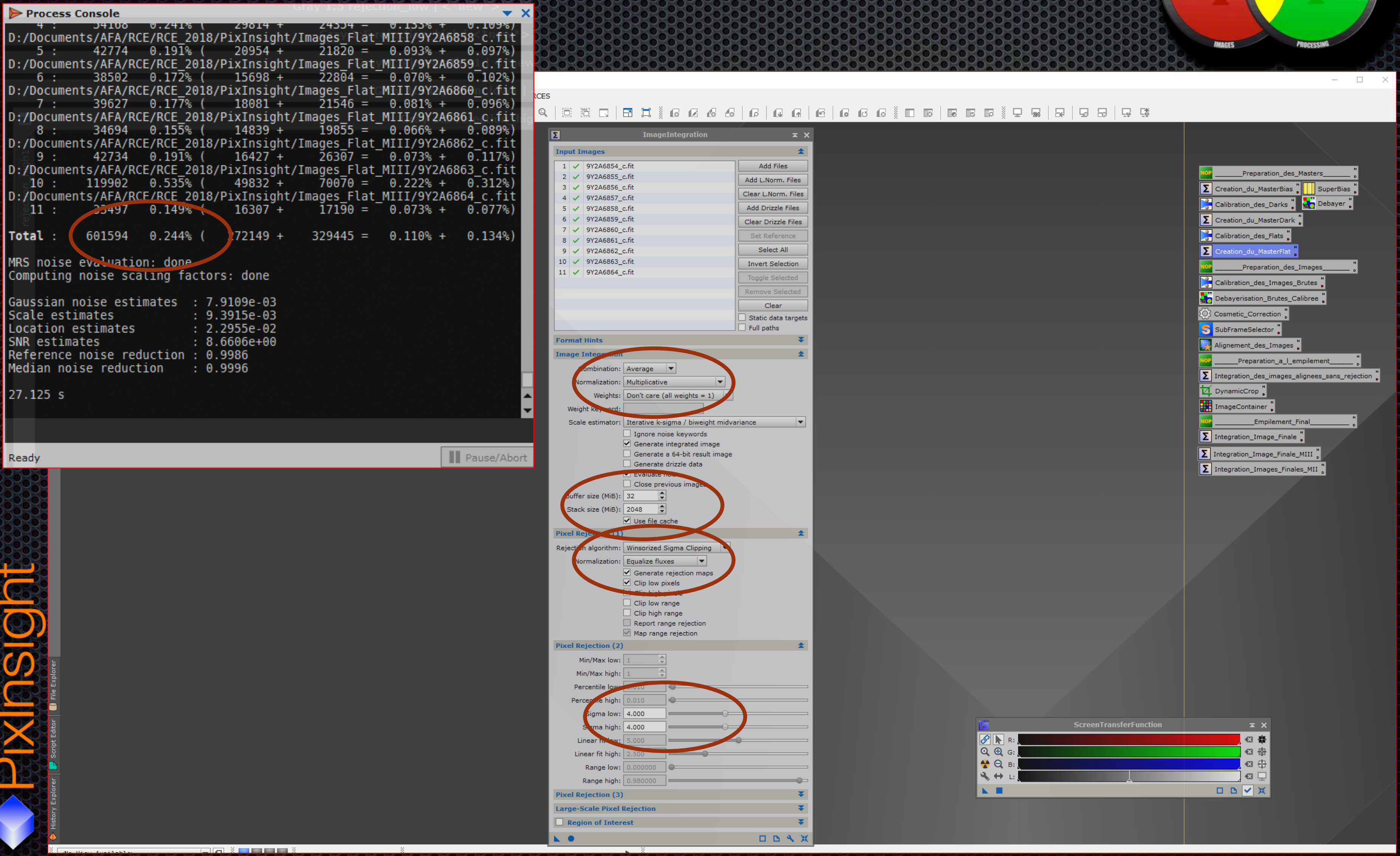
☐ **Master Dark**

☐ Calibrate
☐ Optimize
Optimization threshold: 3.0000
Optimization window (px): 1024
CFA pattern detection: Detect CFA

☐ **Master Flat**

☐ Calibrate

Créer un master flat



Process Console

```
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Flat_MIII/9Y2A6858_c.fit
   5 :     42774   0.191% (    20954 +     21820 =   0.093% +   0.097%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Flat_MIII/9Y2A6859_c.fit
   6 :     38502   0.172% (    15698 +     22804 =   0.070% +   0.102%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Flat_MIII/9Y2A6860_c.fit
   7 :     39627   0.177% (    18081 +     21546 =   0.081% +   0.096%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Flat_MIII/9Y2A6861_c.fit
   8 :     34694   0.155% (    14839 +     19855 =   0.066% +   0.089%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Flat_MIII/9Y2A6862_c.fit
   9 :     42734   0.191% (    16427 +     26307 =   0.073% +   0.117%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Flat_MIII/9Y2A6863_c.fit
  10 :    119902   0.535% (    49832 +     70070 =   0.222% +   0.312%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Flat_MIII/9Y2A6864_c.fit
  11 :     33497   0.149% (    16307 +     17190 =   0.073% +   0.077%)

Total :    601594   0.244% (   272149 +    329445 =   0.110% +   0.134%)

MRS noise evaluation: done
Computing noise scaling factors: done

Gaussian noise estimates  : 7.9109e-03
Scale estimates           : 9.3915e-03
Location estimates        : 2.2955e-02
SNR estimates             : 8.6606e+00
Reference noise reduction : 0.9986
Median noise reduction    : 0.9996

27.125 s
```

Ready

ImageIntegration

Input Images

1	✓	9Y2A6854_c.fit
2	✓	9Y2A6855_c.fit
3	✓	9Y2A6856_c.fit
4	✓	9Y2A6857_c.fit
5	✓	9Y2A6858_c.fit
6	✓	9Y2A6859_c.fit
7	✓	9Y2A6860_c.fit
8	✓	9Y2A6861_c.fit
9	✓	9Y2A6862_c.fit
10	✓	9Y2A6863_c.fit
11	✓	9Y2A6864_c.fit

☐ Static data targets
☐ Full paths

Image Integration

Combination: Average
Normalization: Multiplicative
Weights: Don't care (all weights = 1)
Weight keyword:
Scale estimator: Iterative k-sigma / biweight midvariance
☐ Ignore noise keywords
☑ Generate integrated image
☐ Generate a 64-bit result image
☐ Generate drizzle data
☑ Evaluate noise
☐ Close previous images
Buffer size (MiB): 32
Stack size (MiB): 2048
☑ Use file cache

Pixel Rejection (1)

Rejection algorithm: Winsorized Sigma Clipping
Normalization: Equalize fluxes
☑ Generate rejection maps
☑ Clip low pixels
Clip high pixels
☐ Clip low range
☐ Clip high range
☐ Report range rejection
☑ Map range rejection

Pixel Rejection (2)

Min/Max low: 1
Min/Max high: 1
Percentile low: 0.010
Percentile high: 0.010
Sigma low: 4.000
Sigma high: 4.000
Linear fit low: 5.000
Linear fit high: 2.500
Range low: 0.000000
Range high: 0.980000

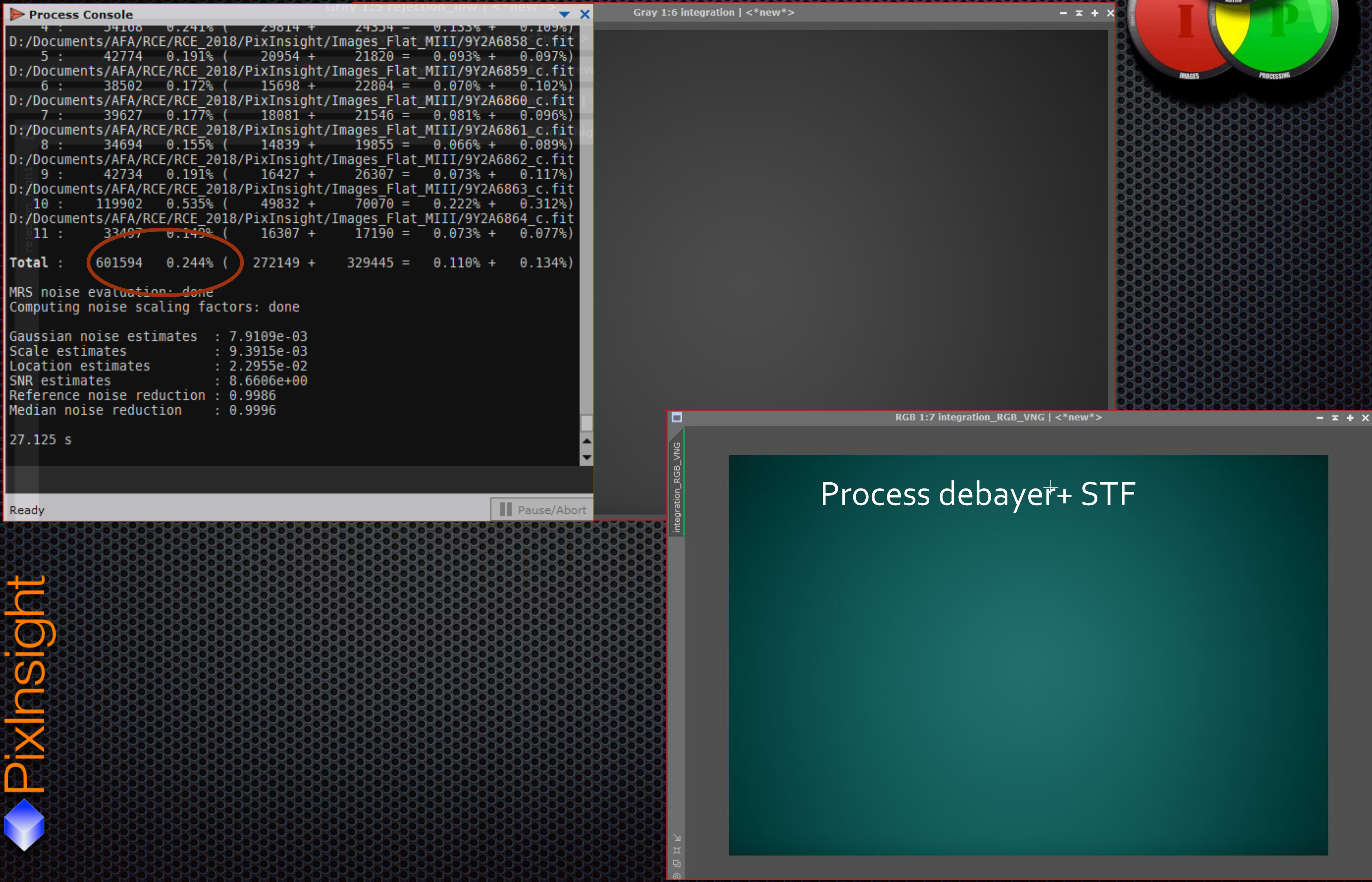
Pixel Rejection (3)

Large-Scale Pixel Rejection

☐ **Region of Interest**

Process Console
Pause/Abort
RCES
Add Files
Add L.Norm. Files
Clear L.Norm. Files
Add Drizzle Files
Clear Drizzle Files
Set Reference
Select All
Invert Selection
Toggle Selected
Remove Selected
Clear
Format Hints
_____Preparation_des_Masters_____
Creation_du_MasterBias
SuperBias
Calibration_des_Darks
Debayer
Creation_du_MasterDark
Calibration_des_Flats
Creation_du_MasterFlat
_____Preparation_des_Images_____
Calibration_des_Images_Brutes
Debayerisation_Brutes_Calibree
Cosmetic_Correction
SubFrameSelector
Alignement_des_Images
_____Preparation_a_l_empilement_____
Integration_des_images_alignees_sans_rejection
DynamicCrop
ImageContainer
_____Empilement_Final_____
Integration_Image_Finale
Integration_Image_Finale_MIII
Integration_Images_Finales_MII
ScreenTransferFunction
R:
G:
B:
L:

Coup d'œil sur le Master flat


Process Console
Gray 1:6 integration | <*new*>
RGB 1:7 integration_RGB_VNG | <*new*>
integration_RGB_VNG
Ready
Pause/Abort

```
    4 :      54168   0.241% (     29814 +      24354 =    0.133% +    0.109%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Flat_MIII/9Y2A6858_c.fit
    5 :      42774   0.191% (     20954 +      21820 =    0.093% +    0.097%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Flat_MIII/9Y2A6859_c.fit
    6 :      38502   0.172% (     15698 +      22804 =    0.070% +    0.102%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Flat_MIII/9Y2A6860_c.fit
    7 :      39627   0.177% (     18081 +      21546 =    0.081% +    0.096%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Flat_MIII/9Y2A6861_c.fit
    8 :      34694   0.155% (     14839 +      19855 =    0.066% +    0.089%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Flat_MIII/9Y2A6862_c.fit
    9 :      42734   0.191% (     16427 +      26307 =    0.073% +    0.117%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Flat_MIII/9Y2A6863_c.fit
   10 :     119902   0.535% (     49832 +      70070 =    0.222% +    0.312%)
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Images_Flat_MIII/9Y2A6864_c.fit
   11 :      33497   0.149% (     16307 +      17190 =    0.073% +    0.077%)

Total :     601594   0.244% (    272149 +     329445 =    0.110% +    0.134%)

MRS noise evaluation: done
Computing noise scaling factors: done

Gaussian noise estimates  : 7.9109e-03
Scale estimates           : 9.3915e-03
Location estimates        : 2.2955e-02
SNR estimates             : 8.6606e+00
Reference noise reduction : 0.9986
Median noise reduction    : 0.9996

27.125 s
```

Process debayer+ STF

Dépouiller les parasites de l'image

- Extraire les parasites contenus dans l'image avec un logiciel de traitement adapté aux images du ciel

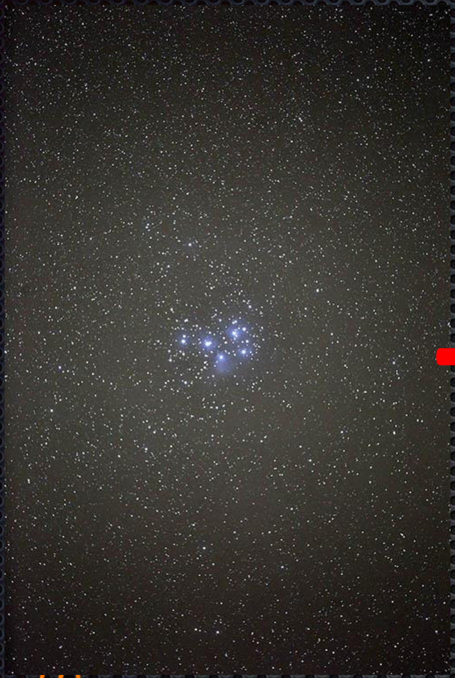
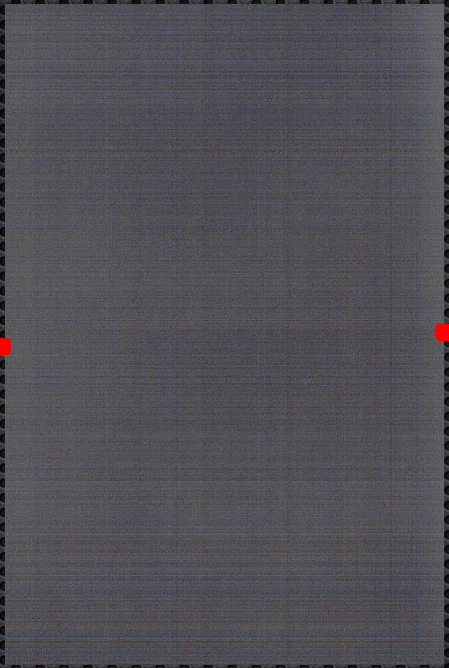


Image brute

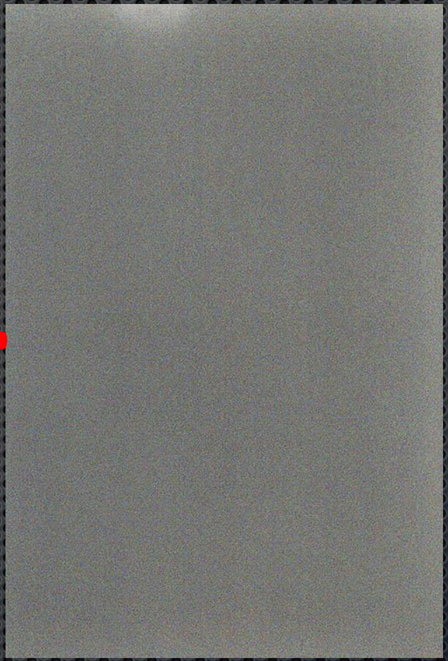
−



Master Bias

Transfert de données

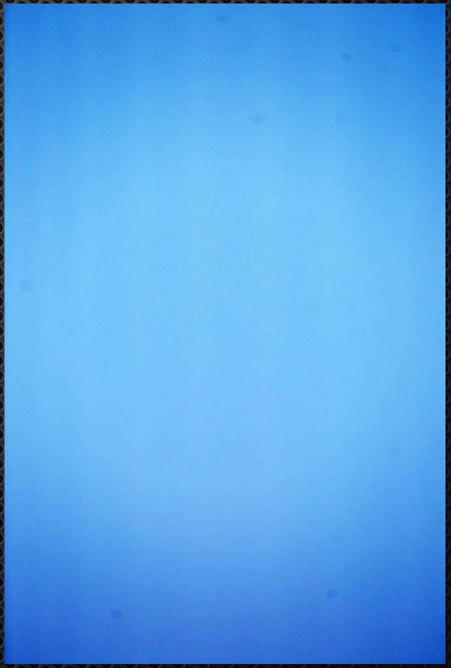
−



Master Dark

bruit thermique:
pixels chauds et froids

:

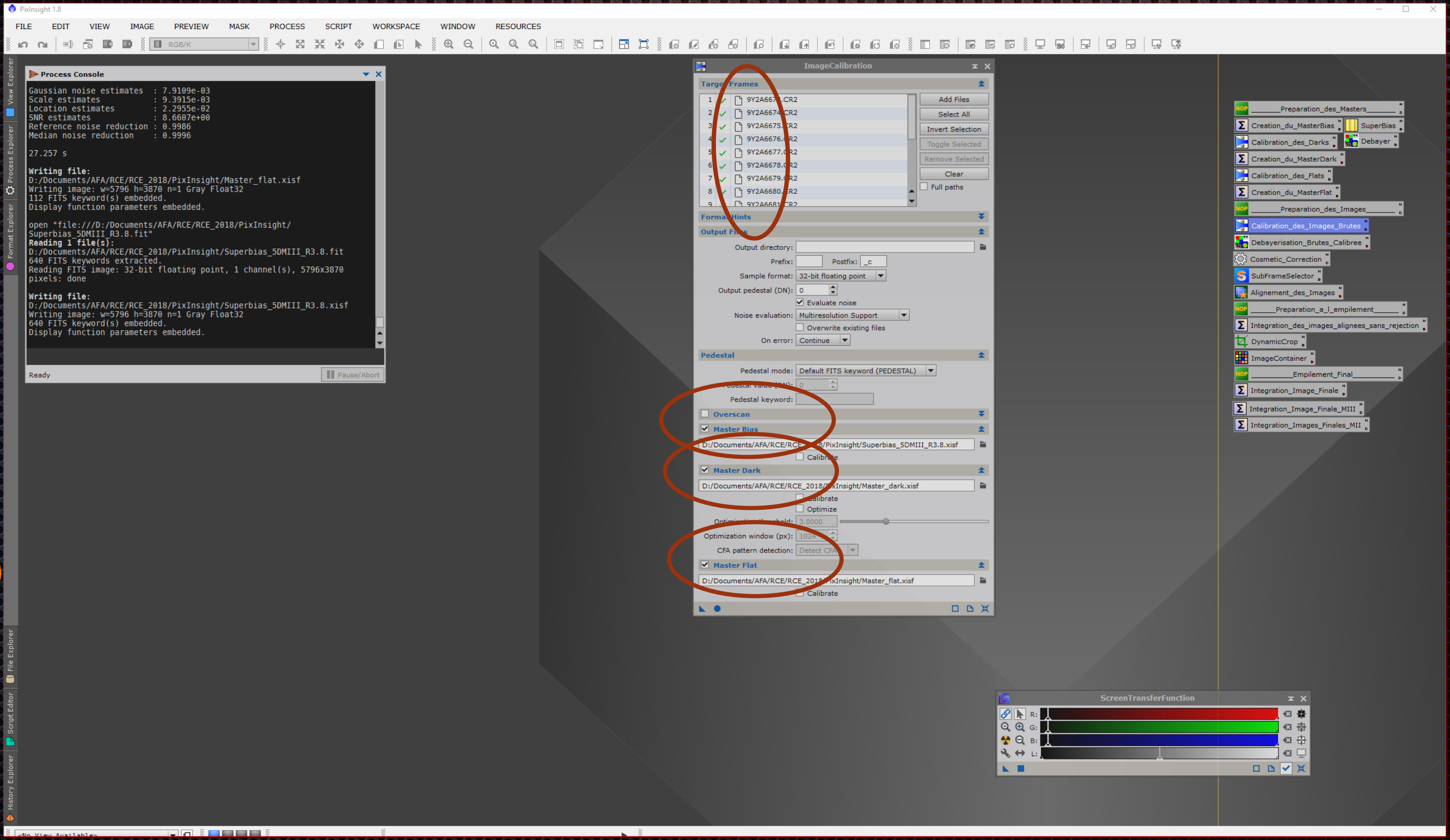


Master Flat

défaut d'uniformité du capteur
poussières, interférences

Calibration des images brutes

Attention à la réjection ! Contrôle de la console Une bonne réjection se situe entre 0,1% et 0,25%
Modifier la valeur de Σ low et Σ high pour atteindre cette valeur


PixInsight 1.8
FILE
EDIT
VIEW
IMAGE
PREVIEW
MASK
PROCESS
SCRIPT
WORKSPACE
WINDOW
RESOURCES
RGB/K
View Explorer
Process Explorer
Format Explorer
File Explorer
Script Editor
History Explorer
Process Console
Ready
Pause/Abort
ImageCalibration
Target Frames
Add Files
Select All
Invert Selection
Toggle Selected
Remove Selected
Clear
☐ Full paths
Format Hints
Output Files
Pedestal
ScreenTransferFunction
R:
G:
B:
L:
<No View Available>

```
Gaussian noise estimates  : 7.9109e-03
Scale estimates           : 9.3915e-03
Location estimates        : 2.2955e-02
SNR estimates             : 8.6607e+00
Reference noise reduction : 0.9986
Median noise reduction    : 0.9996

27.257 s

Writing file:
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Master_flat.xisf
Writing image: w=5796 h=3870 n=1 Gray Float32
112 FITS keyword(s) embedded.
Display function parameters embedded.

open "file:///D:/Documents/AFA/RCE/RCE_2018/PixInsight/
Superbias_5DMIII_R3.8.fit"
Reading 1 file(s):
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Superbias_5DMIII_R3.8.fit
640 FITS keywords extracted.
Reading FITS image: 32-bit floating point, 1 channel(s), 5796x3870
pixels: done

Writing file:
D:/Documents/AFA/RCE/RCE_2018/PixInsight/Superbias_5DMIII_R3.8.xisf
Writing image: w=5796 h=3870 n=1 Gray Float32
640 FITS keyword(s) embedded.
Display function parameters embedded.
```

Target Frames

1 ✓ 9Y2A667 .CR2
2 ✓ 9Y2A6674 CR2
3 ✓ 9Y2A6675. R2
4 ✓ 9Y2A6676. R2
5 ✓ 9Y2A6677. R2
6 ✓ 9Y2A6678. R2
7 ✓ 9Y2A6679. R2
8 ✓ 9Y2A6680. R2
9 9Y2A6681 CR2

Output Files

Output directory:
Prefix:
Postfix: _c
Sample format: 32-bit floating point
Output pedestal (DN): 0
☑ Evaluate noise
Noise evaluation: Multiresolution Support
☐ Overwrite existing files
On error: Continue

Pedestal

Pedestal mode: Default FITS keyword (PEDESTAL)
Pedestal value (DN): 0
Pedestal keyword:

☐ **Overscan**

☑ **Master Bias**

D:/Documents/AFA/RCE/RCE 8/PixInsight/Superbias_5DMIII_R3.8.xisf
☐ Calibrate

☑ **Master Dark**

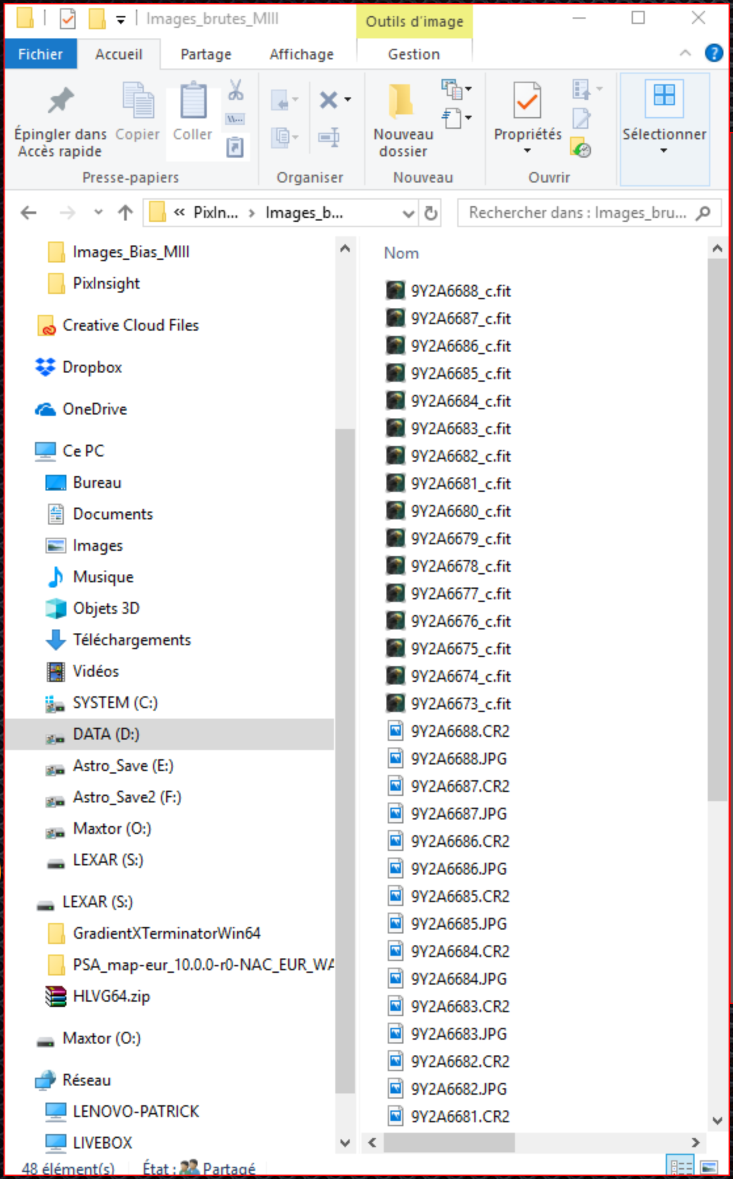
D:/Documents/AFA/RCE/RCE_2018/ xInsight/Master_dark.xisf
☐ Calibrate
☐ Optimize
Optimization threshold: 3.0000
Optimization window (px): 1024
CFA pattern detection: Detect CFA

☑ **Master Flat**

D:/Documents/AFA/RCE/RCE_2018 ixInsight/Master_flat.xisf
☐ Calibrate

________Preparation_des_Masters________
Creation_du_MasterBias
SuperBias
Calibration_des_Darks
Debayer
Creation_du_MasterDark
Calibration_des_Flats
Creation_du_MasterFlat
________Preparation_des_Images________
Calibration_des_Images_Brutes
Debayerisation_Brutes_Calibree
Cosmetic_Correction
SubFrameSelector
Alignement_des_Images
_______Preparation_a_l_empilement_______
Integration_des_images_alignees_sans_rejection
DynamicCrop
ImageContainer
___________Empilement_Final___________
Integration_Image_Finale
Integration_Image_Finale_MIII
Integration_Images_Finales_MII

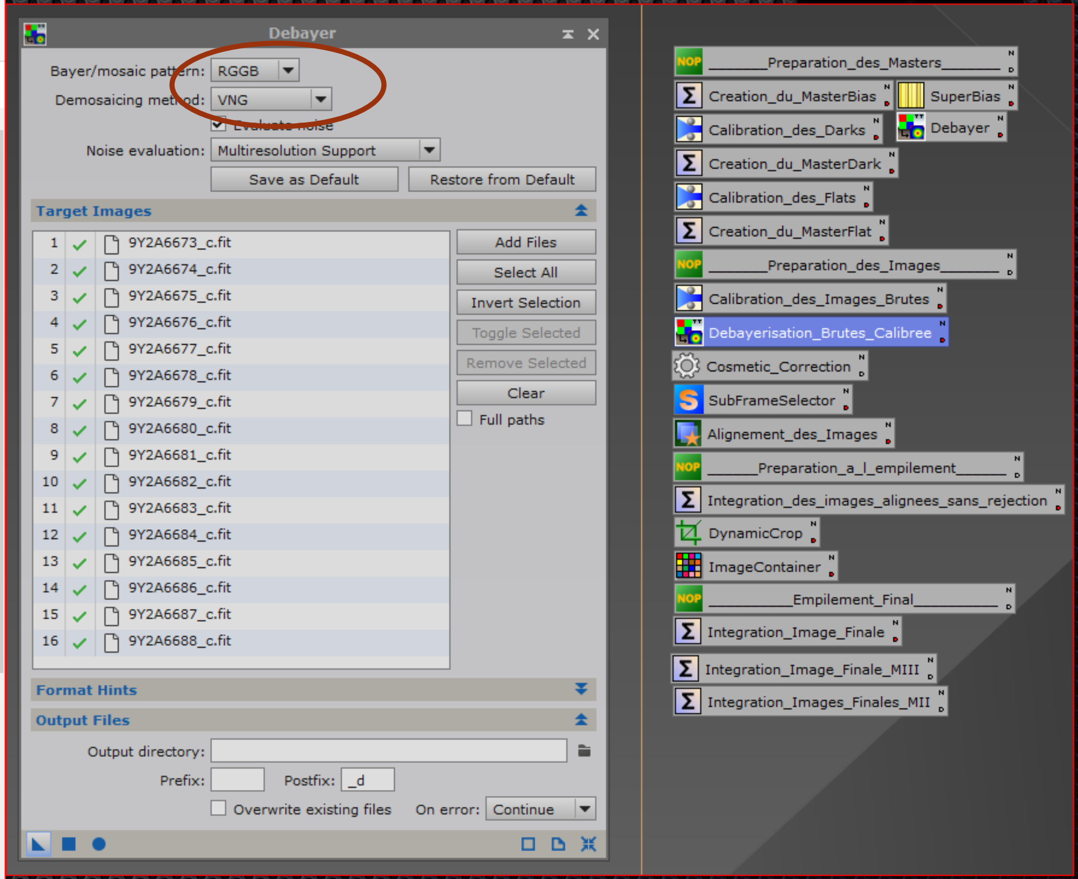
Process Debayer


Images_brutes_MIII
Outils d'image
Fichier
Accueil
Partage
Affichage
Gestion
Épingler dans Accès rapide
Copier
Coller
Presse-papiers
Organiser
Nouveau dossier
Nouveau
Propriétés
Ouvrir
Sélectionner
« PixIn... › Images_b...
Rechercher dans : Images_bru...
Nom

- Images_Bias_MIII
- PixInsight
- Creative Cloud Files
- Dropbox
- OneDrive
- Ce PC
  - Bureau
  - Documents
  - Images
  - Musique
  - Objets 3D
  - Téléchargements
  - Vidéos
  - SYSTEM (C:)
  - DATA (D:)
  - Astro_Save (E:)
  - Astro_Save2 (F:)
  - Maxtor (O:)
  - LEXAR (S:)
- LEXAR (S:)
  - GradientXTerminatorWin64
  - PSA_map-eur_10.0.0-r0-NAC_EUR_WA
  - HLVG64.zip
- Maxtor (O:)
- Réseau
  - LENOVO-PATRICK
  - LIVEBOX

9Y2A6688_c.fit
9Y2A6687_c.fit
9Y2A6686_c.fit
9Y2A6685_c.fit
9Y2A6684_c.fit
9Y2A6683_c.fit
9Y2A6682_c.fit
9Y2A6681_c.fit
9Y2A6680_c.fit
9Y2A6679_c.fit
9Y2A6678_c.fit
9Y2A6677_c.fit
9Y2A6676_c.fit
9Y2A6675_c.fit
9Y2A6674_c.fit
9Y2A6673_c.fit
9Y2A6688.CR2
9Y2A6688.JPG
9Y2A6687.CR2
9Y2A6687.JPG
9Y2A6686.CR2
9Y2A6686.JPG
9Y2A6685.CR2
9Y2A6685.JPG
9Y2A6684.CR2
9Y2A6684.JPG
9Y2A6683.CR2
9Y2A6683.JPG
9Y2A6682.CR2
9Y2A6682.JPG
9Y2A6681.CR2

48 élément(s) État : Partagé


Debayer
Save as Default
Restore from Default
Target Images
Add Files
Select All
Invert Selection
Toggle Selected
Remove Selected
Clear
Format Hints
Output Files

Bayer/mosaic pattern: RGGB
Demosaicing method: VNG
☑ Evaluate noise
Noise evaluation: Multiresolution Support

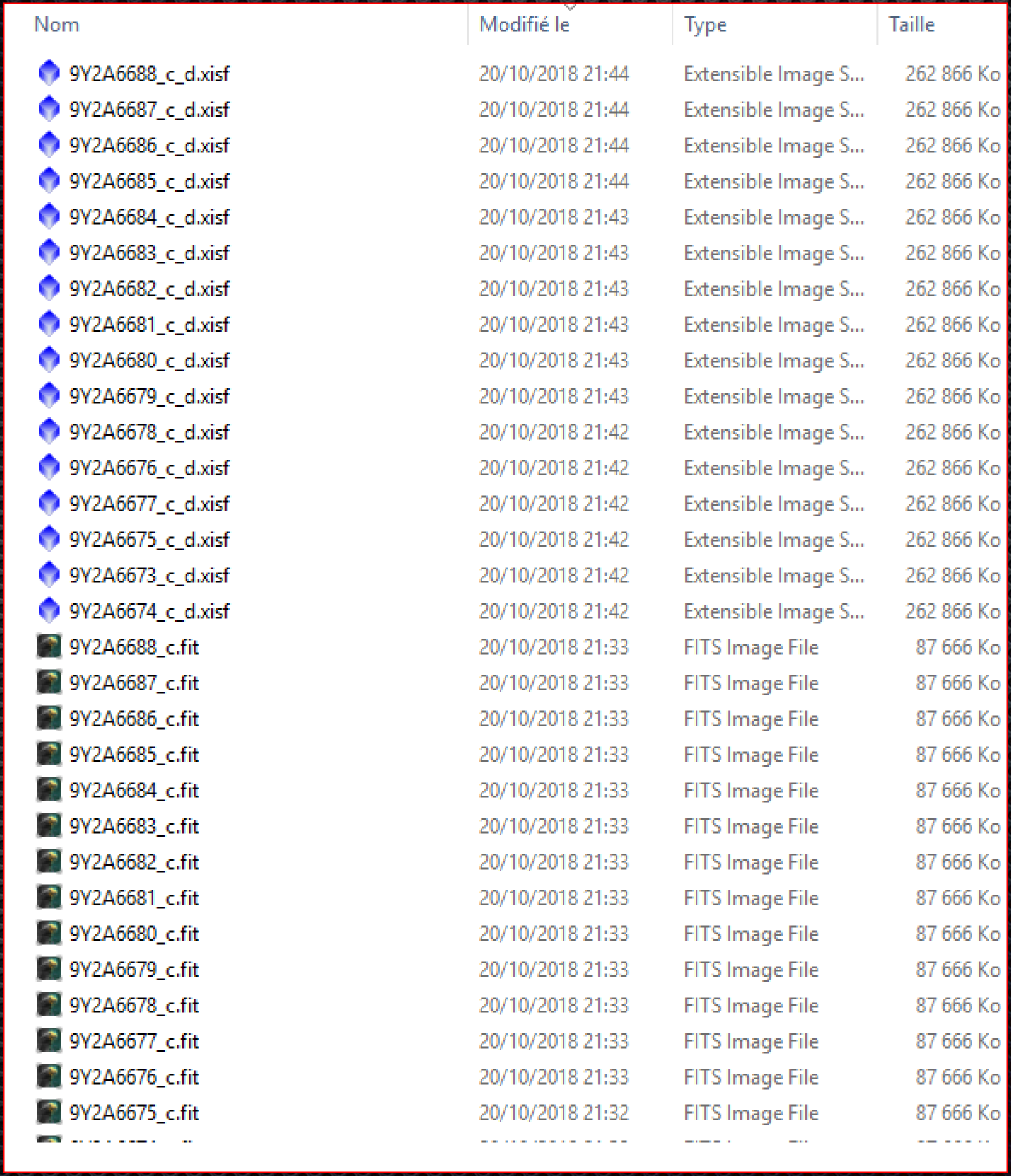
1	✓	9Y2A6673_c.fit
2	✓	9Y2A6674_c.fit
3	✓	9Y2A6675_c.fit
4	✓	9Y2A6676_c.fit
5	✓	9Y2A6677_c.fit
6	✓	9Y2A6678_c.fit
7	✓	9Y2A6679_c.fit
8	✓	9Y2A6680_c.fit
9	✓	9Y2A6681_c.fit
10	✓	9Y2A6682_c.fit
11	✓	9Y2A6683_c.fit
12	✓	9Y2A6684_c.fit
13	✓	9Y2A6685_c.fit
14	✓	9Y2A6686_c.fit
15	✓	9Y2A6687_c.fit
16	✓	9Y2A6688_c.fit

☐ Full paths

Output directory:
Prefix: Postfix: _d
☐ Overwrite existing files On error: Continue

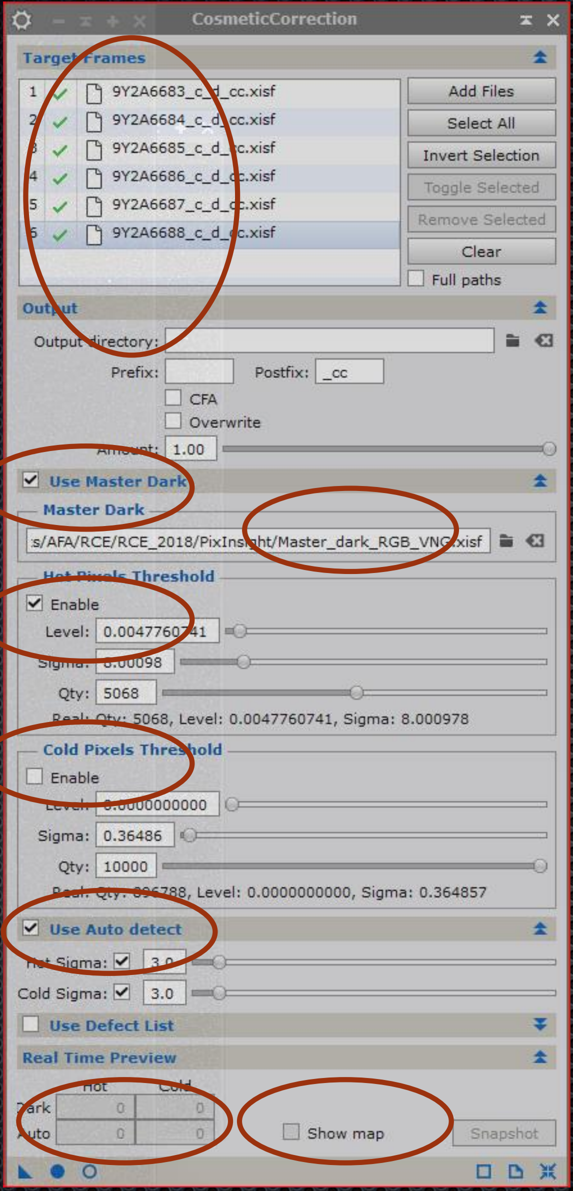
NOP ______Preparation_des_Masters______
Creation_du_MasterBias
SuperBias
Calibration_des_Darks
Debayer
Creation_du_MasterDark
Calibration_des_Flats
Creation_du_MasterFlat
NOP ______Preparation_des_Images______
Calibration_des_Images_Brutes
Debayerisation_Brutes_Calibree
Cosmetic_Correction
SubFrameSelector
Alignement_des_Images
NOP ______Preparation_a_l_empilement______
Integration_des_images_alignees_sans_rejection
DynamicCrop
ImageContainer
NOP ______Empilement_Final______
Integration_Image_Finale
Integration_Image_Finale_MIII
Integration_Images_Finales_MII

Fichiers après Process Debayer: _d



Nom	Modifié le	Type	Taille
9Y2A6688_c_d.xisf	20/10/2018 21:44	Extensible Image S...	262 866 Ko
9Y2A6687_c_d.xisf	20/10/2018 21:44	Extensible Image S...	262 866 Ko
9Y2A6686_c_d.xisf	20/10/2018 21:44	Extensible Image S...	262 866 Ko
9Y2A6685_c_d.xisf	20/10/2018 21:44	Extensible Image S...	262 866 Ko
9Y2A6684_c_d.xisf	20/10/2018 21:43	Extensible Image S...	262 866 Ko
9Y2A6683_c_d.xisf	20/10/2018 21:43	Extensible Image S...	262 866 Ko
9Y2A6682_c_d.xisf	20/10/2018 21:43	Extensible Image S...	262 866 Ko
9Y2A6681_c_d.xisf	20/10/2018 21:43	Extensible Image S...	262 866 Ko
9Y2A6680_c_d.xisf	20/10/2018 21:43	Extensible Image S...	262 866 Ko
9Y2A6679_c_d.xisf	20/10/2018 21:43	Extensible Image S...	262 866 Ko
9Y2A6678_c_d.xisf	20/10/2018 21:42	Extensible Image S...	262 866 Ko
9Y2A6676_c_d.xisf	20/10/2018 21:42	Extensible Image S...	262 866 Ko
9Y2A6677_c_d.xisf	20/10/2018 21:42	Extensible Image S...	262 866 Ko
9Y2A6675_c_d.xisf	20/10/2018 21:42	Extensible Image S...	262 866 Ko
9Y2A6673_c_d.xisf	20/10/2018 21:42	Extensible Image S...	262 866 Ko
9Y2A6674_c_d.xisf	20/10/2018 21:42	Extensible Image S...	262 866 Ko
9Y2A6688_c.fit	20/10/2018 21:33	FITS Image File	87 666 Ko
9Y2A6687_c.fit	20/10/2018 21:33	FITS Image File	87 666 Ko
9Y2A6686_c.fit	20/10/2018 21:33	FITS Image File	87 666 Ko
9Y2A6685_c.fit	20/10/2018 21:33	FITS Image File	87 666 Ko
9Y2A6684_c.fit	20/10/2018 21:33	FITS Image File	87 666 Ko
9Y2A6683_c.fit	20/10/2018 21:33	FITS Image File	87 666 Ko
9Y2A6682_c.fit	20/10/2018 21:33	FITS Image File	87 666 Ko
9Y2A6681_c.fit	20/10/2018 21:33	FITS Image File	87 666 Ko
9Y2A6680_c.fit	20/10/2018 21:33	FITS Image File	87 666 Ko
9Y2A6679_c.fit	20/10/2018 21:33	FITS Image File	87 666 Ko
9Y2A6678_c.fit	20/10/2018 21:33	FITS Image File	87 666 Ko
9Y2A6677_c.fit	20/10/2018 21:33	FITS Image File	87 666 Ko
9Y2A6676_c.fit	20/10/2018 21:33	FITS Image File	87 666 Ko
9Y2A6675_c.fit	20/10/2018 21:32	FITS Image File	87 666 Ko

Process Cosmetic_Correction



CosmeticCorrection

Target Frames

1	✓	9Y2A6683_c_d_cc.xisf
2	✓	9Y2A6684_c_d_cc.xisf
3	✓	9Y2A6685_c_d_cc.xisf
4	✓	9Y2A6686_c_d_cc.xisf
5	✓	9Y2A6687_c_d_cc.xisf
6	✓	9Y2A6688_c_d_cc.xisf

☐ Full paths

Output

Output directory:

Prefix:

Postfix: _cc

☐ CFA

☐ Overwrite

Amount: 1.00

☑ **Use Master Dark**

Master Dark

s/AFA/RCE/RCE_2018/PixInsight/Master_dark_RGB_VNG.xisf

Hot Pixels Threshold

☑ Enable

Level: 0.0047760741

Sigma: 8.00098

Qty: 5068

Real: Qty: 5068, Level: 0.0047760741, Sigma: 8.000978

Cold Pixels Threshold

☐ Enable

Level: 0.0000000000

Sigma: 0.36486

Qty: 10000

Real: Qty: 996788, Level: 0.0000000000, Sigma: 0.364857

☑ **Use Auto detect**

Hot Sigma: ☑ 3.0

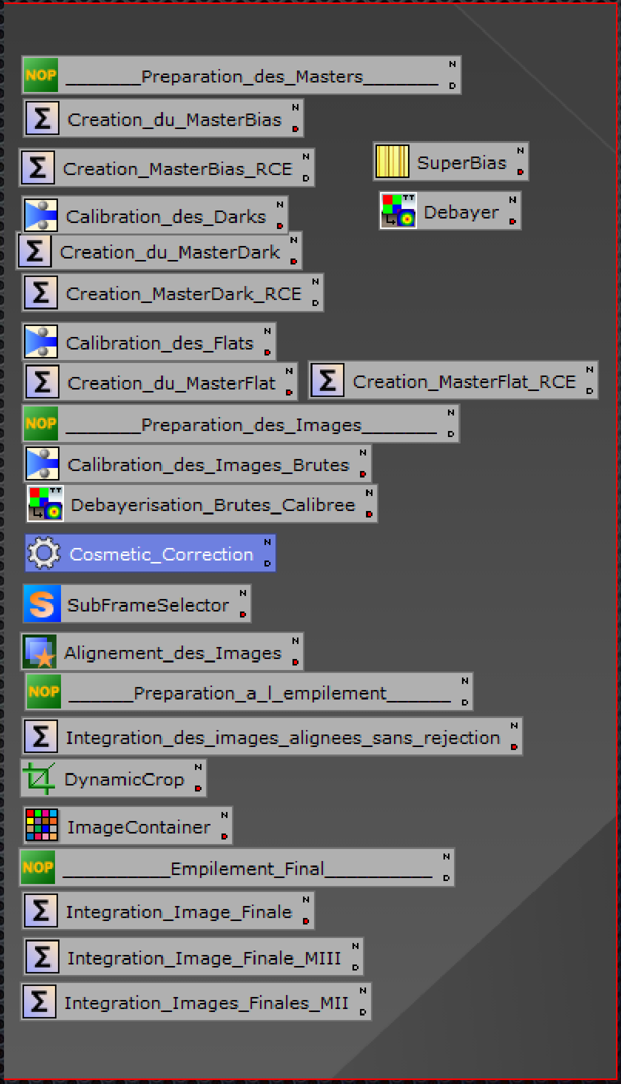
Cold Sigma: ☑ 3.0

☐ **Use Defect List**

Real Time Preview

	Hot	Cold
Dark	0	0
Auto	0	0

☐ Show map



- NOP ______Preparation_des_Masters________
- Creation_du_MasterBias
- Creation_MasterBias_RCE
- SuperBias
- Debayer
- Calibration_des_Darks
- Creation_du_MasterDark
- Creation_MasterDark_RCE
- Calibration_des_Flats
- Creation_du_MasterFlat
- Creation_MasterFlat_RCE
- NOP ______Preparation_des_Images________
- Calibration_des_Images_Brutes
- Debayerisation_Brutes_Calibree
- Cosmetic_Correction
- SubFrameSelector
- Alignement_des_Images
- NOP ______Preparation_a_l_empilement______
- Integration_des_images_alignees_sans_rejection
- DynamicCrop
- ImageContainer
- NOP _________Empilement_Final__________
- Integration_Image_Finale
- Integration_Image_Finale_MIII
- Integration_Images_Finales_MII

Comparatif des images

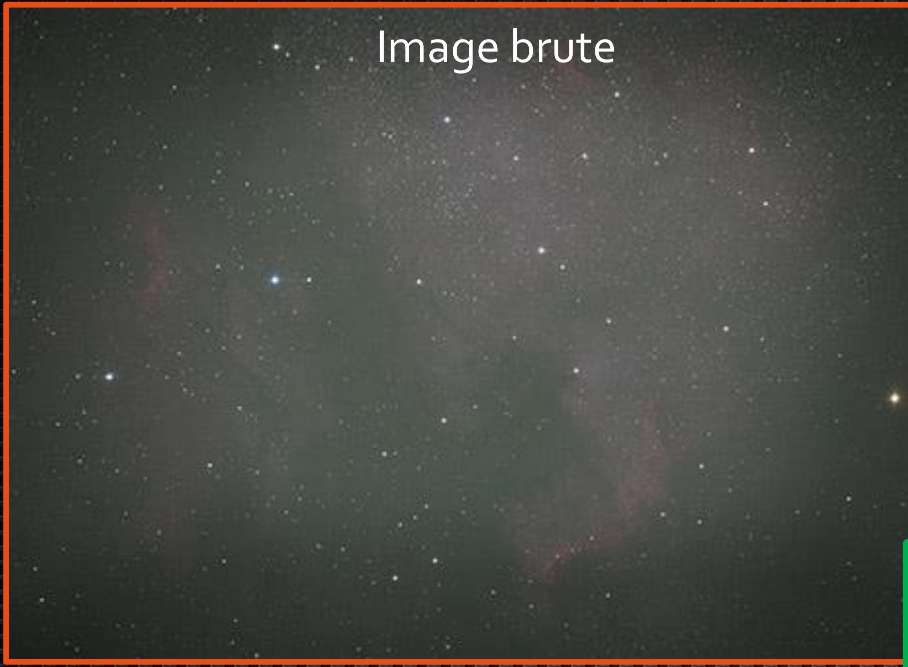


Image brute

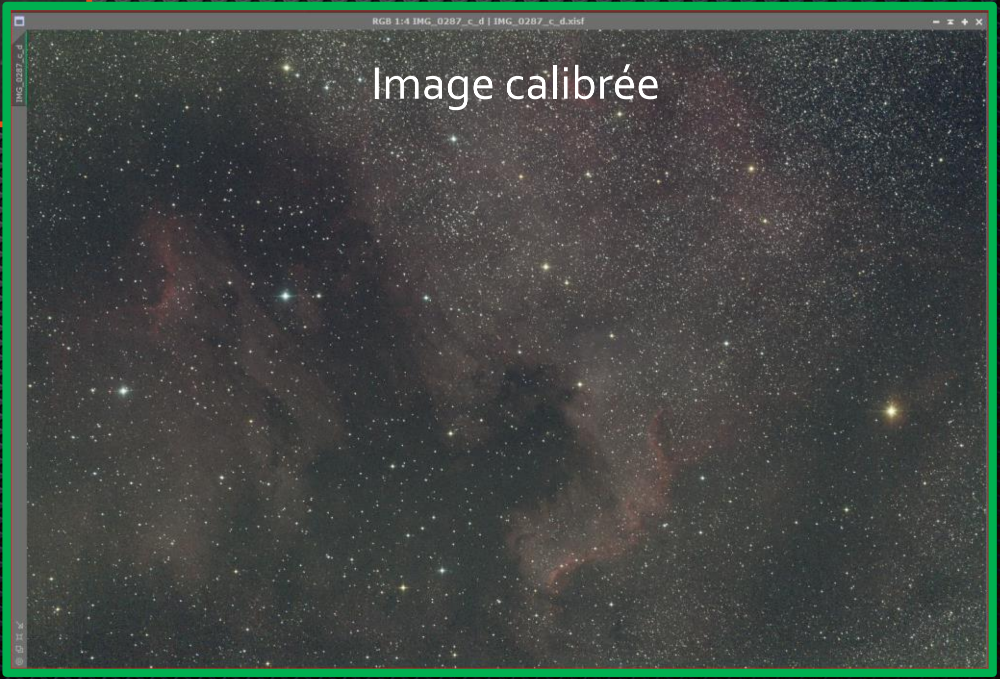
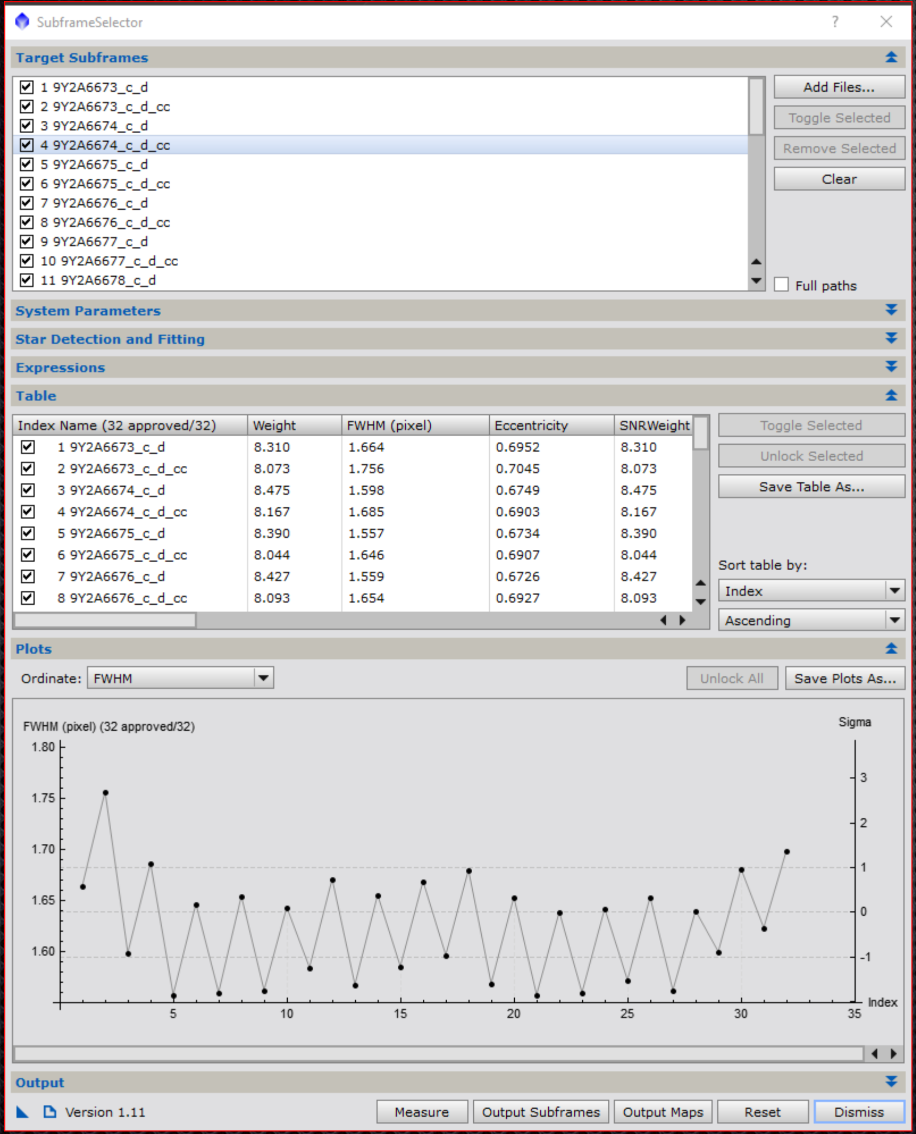


Image calibrée

RGB 1:4 IMG_0287_c_d | IMG_0287_c_d.xisf
IMG_0287_c_d

PixInsight

Identifier la meilleure image de la séquence: Process SubFrameSelector
Process StarAlignement pour aligner toutes les images



SubframeSelector

Target Subframes

- ☑ 1 9Y2A6673_c_d
- ☑ 2 9Y2A6673_c_d_cc
- ☑ 3 9Y2A6674_c_d
- ☑ 4 9Y2A6674_c_d_cc
- ☑ 5 9Y2A6675_c_d
- ☑ 6 9Y2A6675_c_d_cc
- ☑ 7 9Y2A6676_c_d
- ☑ 8 9Y2A6676_c_d_cc
- ☑ 9 9Y2A6677_c_d
- ☑ 10 9Y2A6677_c_d_cc
- ☑ 11 9Y2A6678_c_d

☐ Full paths

System Parameters

Star Detection and Fitting

Expressions

Table

	Index Name (32 approved/32)	Weight	FWHM (pixel)	Eccentricity	SNRWeight
☑	1 9Y2A6673_c_d	8.310	1.664	0.6952	8.310
☑	2 9Y2A6673_c_d_cc	8.073	1.756	0.7045	8.073
☑	3 9Y2A6674_c_d	8.475	1.598	0.6749	8.475
☑	4 9Y2A6674_c_d_cc	8.167	1.685	0.6903	8.167
☑	5 9Y2A6675_c_d	8.390	1.557	0.6734	8.390
☑	6 9Y2A6675_c_d_cc	8.044	1.646	0.6907	8.044
☑	7 9Y2A6676_c_d	8.427	1.559	0.6726	8.427
☑	8 9Y2A6676_c_d_cc	8.093	1.654	0.6927	8.093

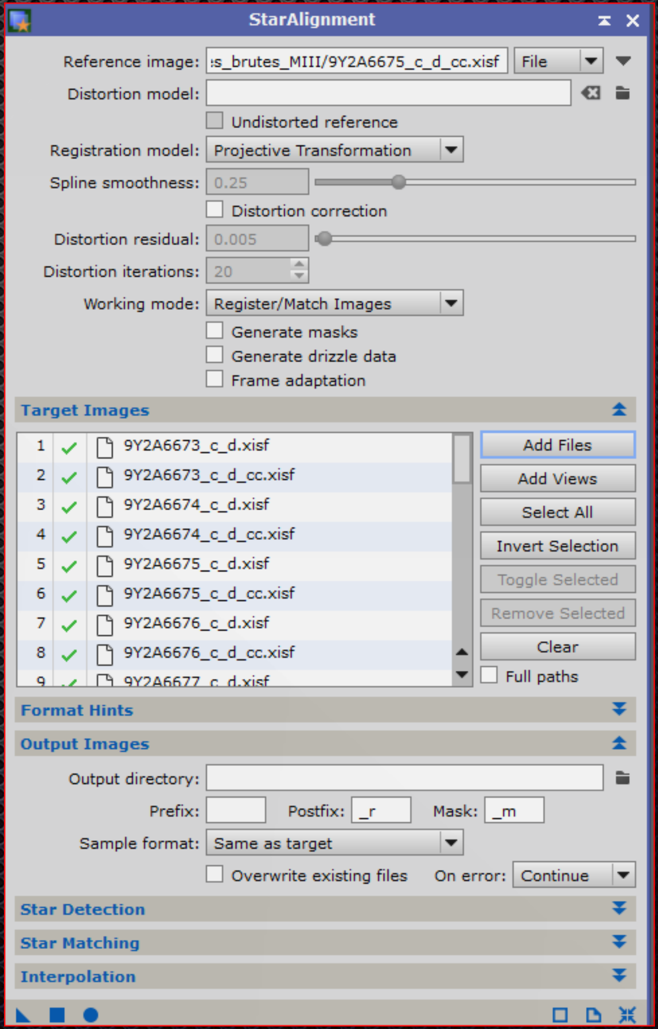
Sort table by: Index

Ascending

Plots

Ordinate: FWHM

Add Files...
Toggle Selected
Remove Selected
Clear
Toggle Selected
Unlock Selected
Save Table As...
Unlock All
Save Plots As...
FWHM (pixel) (32 approved/32)
Sigma
1.80
1.75
1.70
1.65
1.60
3
2
1
0
-1
5
10
15
20
25
30
35
Index
Output
Version 1.11
Measure
Output Subframes
Output Maps
Reset
Dismiss



StarAlignment

Reference image: :s_brutes_MIII/9Y2A6675_c_d_cc.xisf File

Distortion model:

☐ Undistorted reference

Registration model: Projective Transformation

Spline smoothness: 0.25

☐ Distortion correction

Distortion residual: 0.005

Distortion iterations: 20

Working mode: Register/Match Images

☐ Generate masks

☐ Generate drizzle data

☐ Frame adaptation

Target Images

1	✓	9Y2A6673_c_d.xisf
2	✓	9Y2A6673_c_d_cc.xisf
3	✓	9Y2A6674_c_d.xisf
4	✓	9Y2A6674_c_d_cc.xisf
5	✓	9Y2A6675_c_d.xisf
6	✓	9Y2A6675_c_d_cc.xisf
7	✓	9Y2A6676_c_d.xisf
8	✓	9Y2A6676_c_d_cc.xisf
9	✓	9Y2A6677_c_d.xisf

☐ Full paths

Format Hints

Output Images

Output directory:

Prefix: Postfix: _r Mask: _m

Sample format: Same as target

☐ Overwrite existing files On error: Continue

Star Detection

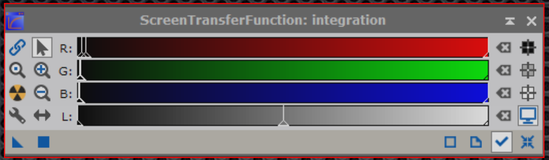
Star Matching

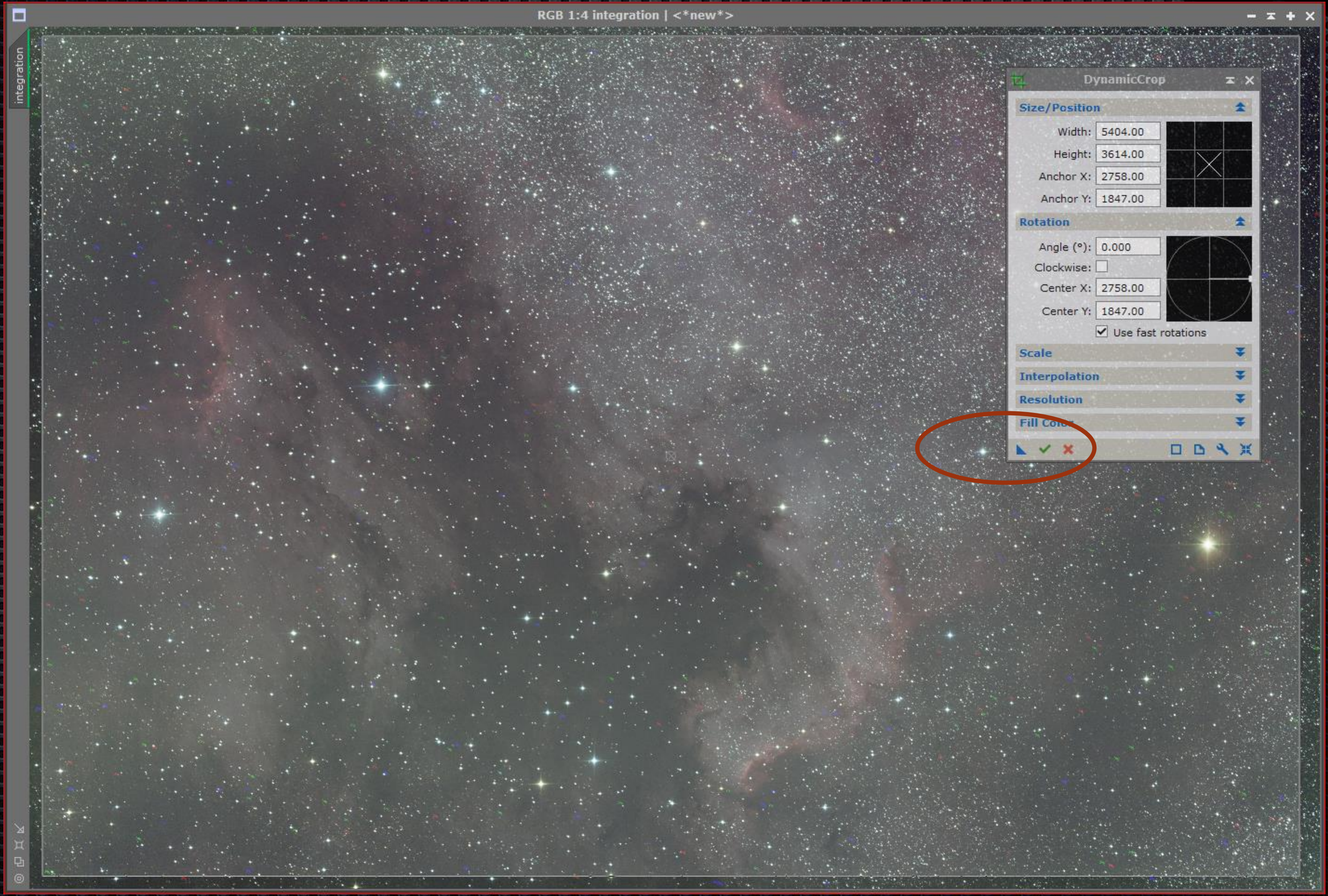
Interpolation

Add Files
Add Views
Select All
Invert Selection
Toggle Selected
Remove Selected
Clear

PixInsight

Process Intégration sans réjection pour éliminer les bordures noires.
Process Dynamic Crop
Image Container


ScreenTransferFunction: integration
R:
G:
B:
L:

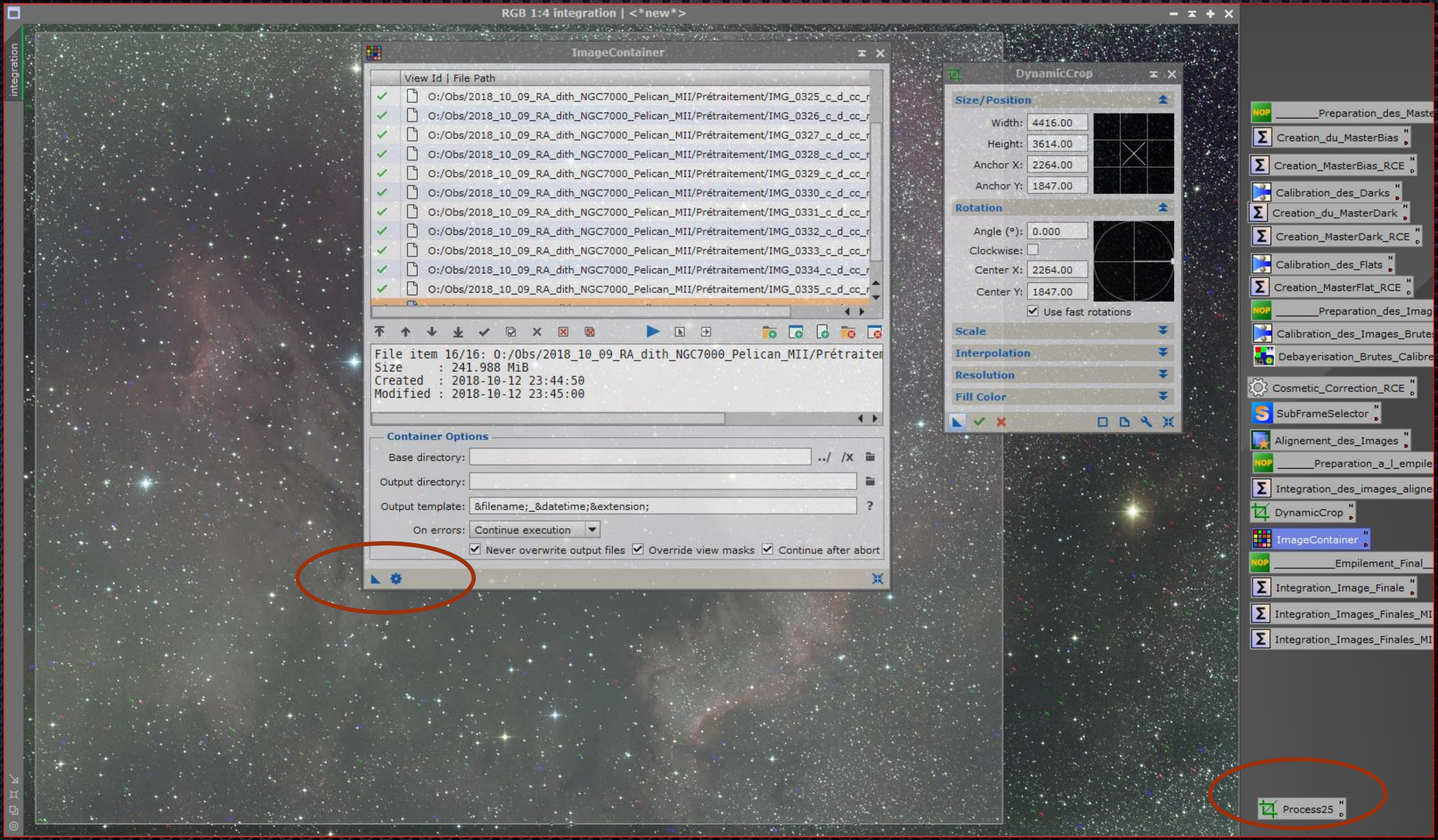

RGB 1:4 integration | <*new*>
integration
DynamicCrop

Size/Position
Width: 5404.00
Height: 3614.00
Anchor X: 2758.00
Anchor Y: 1847.00

Rotation
Angle (°): 0.000
Clockwise: ☐
Center X: 2758.00
Center Y: 1847.00
☑ Use fast rotations

Scale
Interpolation
Resolution
Fill Color

Process image container



RGB 1:4 integration | <*new*>

ImageContainer

View Id | File Path

- ✓ O:/Obs/2018_10_09_RA_dith_NGC7000_Pelican_MII/Prétraitement/IMG_0325_c_d_cc_r
- ✓ O:/Obs/2018_10_09_RA_dith_NGC7000_Pelican_MII/Prétraitement/IMG_0326_c_d_cc_r
- ✓ O:/Obs/2018_10_09_RA_dith_NGC7000_Pelican_MII/Prétraitement/IMG_0327_c_d_cc_r
- ✓ O:/Obs/2018_10_09_RA_dith_NGC7000_Pelican_MII/Prétraitement/IMG_0328_c_d_cc_r
- ✓ O:/Obs/2018_10_09_RA_dith_NGC7000_Pelican_MII/Prétraitement/IMG_0329_c_d_cc_r
- ✓ O:/Obs/2018_10_09_RA_dith_NGC7000_Pelican_MII/Prétraitement/IMG_0330_c_d_cc_r
- ✓ O:/Obs/2018_10_09_RA_dith_NGC7000_Pelican_MII/Prétraitement/IMG_0331_c_d_cc_r
- ✓ O:/Obs/2018_10_09_RA_dith_NGC7000_Pelican_MII/Prétraitement/IMG_0332_c_d_cc_r
- ✓ O:/Obs/2018_10_09_RA_dith_NGC7000_Pelican_MII/Prétraitement/IMG_0333_c_d_cc_r
- ✓ O:/Obs/2018_10_09_RA_dith_NGC7000_Pelican_MII/Prétraitement/IMG_0334_c_d_cc_r
- ✓ O:/Obs/2018_10_09_RA_dith_NGC7000_Pelican_MII/Prétraitement/IMG_0335_c_d_cc_r

```
File item 16/16: O:/Obs/2018_10_09_RA_dith_NGC7000_Pelican_MII/Prétraiten
Size     : 241.988 MiB
Created  : 2018-10-12 23:44:50
Modified : 2018-10-12 23:45:00
```

Container Options

Base directory:
Output directory:
Output template: &filename;_&datetime;&extension;
On errors: Continue execution
☑ Never overwrite output files ☑ Override view masks ☑ Continue after abort

DynamicCrop

Size/Position

Width: 4416.00
Height: 3614.00
Anchor X: 2264.00
Anchor Y: 1847.00

Rotation

Angle (°): 0.000
Clockwise: ☐
Center X: 2264.00
Center Y: 1847.00
☑ Use fast rotations

Scale

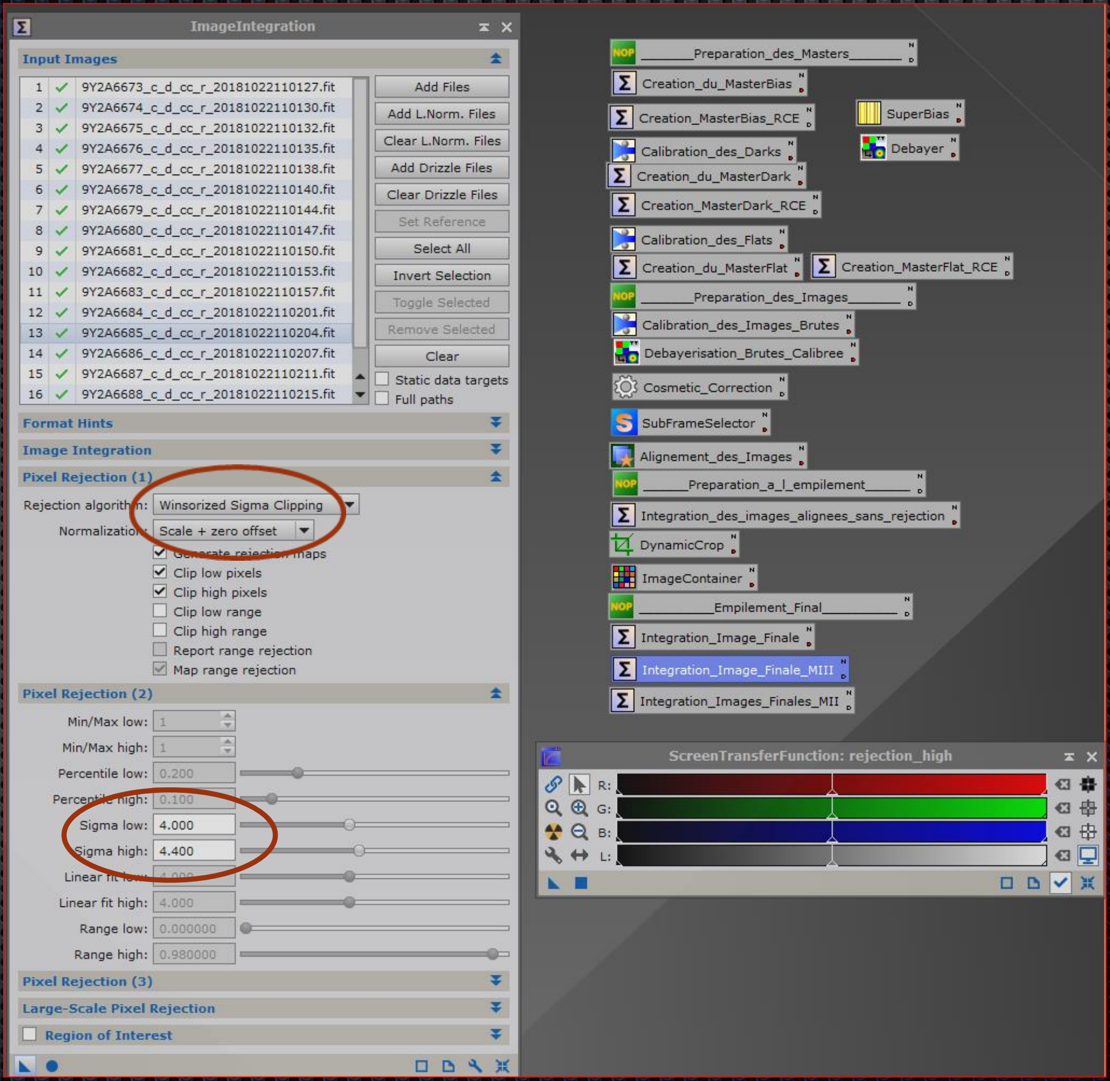
Interpolation

Resolution

Fill Color

integration
_______Preparation_des_Maste
Creation_du_MasterBias
Creation_MasterBias_RCE
Calibration_des_Darks
Creation_du_MasterDark
Creation_MasterDark_RCE
Calibration_des_Flats
Creation_MasterFlat_RCE
_______Preparation_des_Imag
Calibration_des_Images_Brute
Debayerisation_Brutes_Calibre
Cosmetic_Correction_RCE
SubFrameSelector
Alignement_des_Images
______Preparation_a_l_empile
Integration_des_images_aligne
DynamicCrop
ImageContainer
__________Empilement_Final_
Integration_Image_Finale
Integration_Images_Finales_MI
Integration_Images_Finales_MI
Process25

Créer une image finale: Process Intégration Image_finale
Paramètres en fonction du nombre d'images



ImageIntegration

Input Images

1	✓	9Y2A6673_c_d_cc_r_20181022110127.fit
2	✓	9Y2A6674_c_d_cc_r_20181022110130.fit
3	✓	9Y2A6675_c_d_cc_r_20181022110132.fit
4	✓	9Y2A6676_c_d_cc_r_20181022110135.fit
5	✓	9Y2A6677_c_d_cc_r_20181022110138.fit
6	✓	9Y2A6678_c_d_cc_r_20181022110140.fit
7	✓	9Y2A6679_c_d_cc_r_20181022110144.fit
8	✓	9Y2A6680_c_d_cc_r_20181022110147.fit
9	✓	9Y2A6681_c_d_cc_r_20181022110150.fit
10	✓	9Y2A6682_c_d_cc_r_20181022110153.fit
11	✓	9Y2A6683_c_d_cc_r_20181022110157.fit
12	✓	9Y2A6684_c_d_cc_r_20181022110201.fit
13	✓	9Y2A6685_c_d_cc_r_20181022110204.fit
14	✓	9Y2A6686_c_d_cc_r_20181022110207.fit
15	✓	9Y2A6687_c_d_cc_r_20181022110211.fit
16	✓	9Y2A6688_c_d_cc_r_20181022110215.fit

Add Files
Add L.Norm. Files
Clear L.Norm. Files
Add Drizzle Files
Clear Drizzle Files
Set Reference
Select All
Invert Selection
Toggle Selected
Remove Selected
Clear

☐ Static data targets
☐ Full paths

Format Hints

Image Integration

Pixel Rejection (1)

Rejection algorithm: Winsorized Sigma Clipping
Normalization: Scale + zero offset
☑ Generate rejection maps
☑ Clip low pixels
☑ Clip high pixels
☐ Clip low range
☐ Clip high range
☐ Report range rejection
☑ Map range rejection

Pixel Rejection (2)

Min/Max low: 1
Min/Max high: 1
Percentile low: 0.200
Percentile high: 0.100
Sigma low: 4.000
Sigma high: 4.400
Linear fit low: 4.000
Linear fit high: 4.000
Range low: 0.000000
Range high: 0.980000

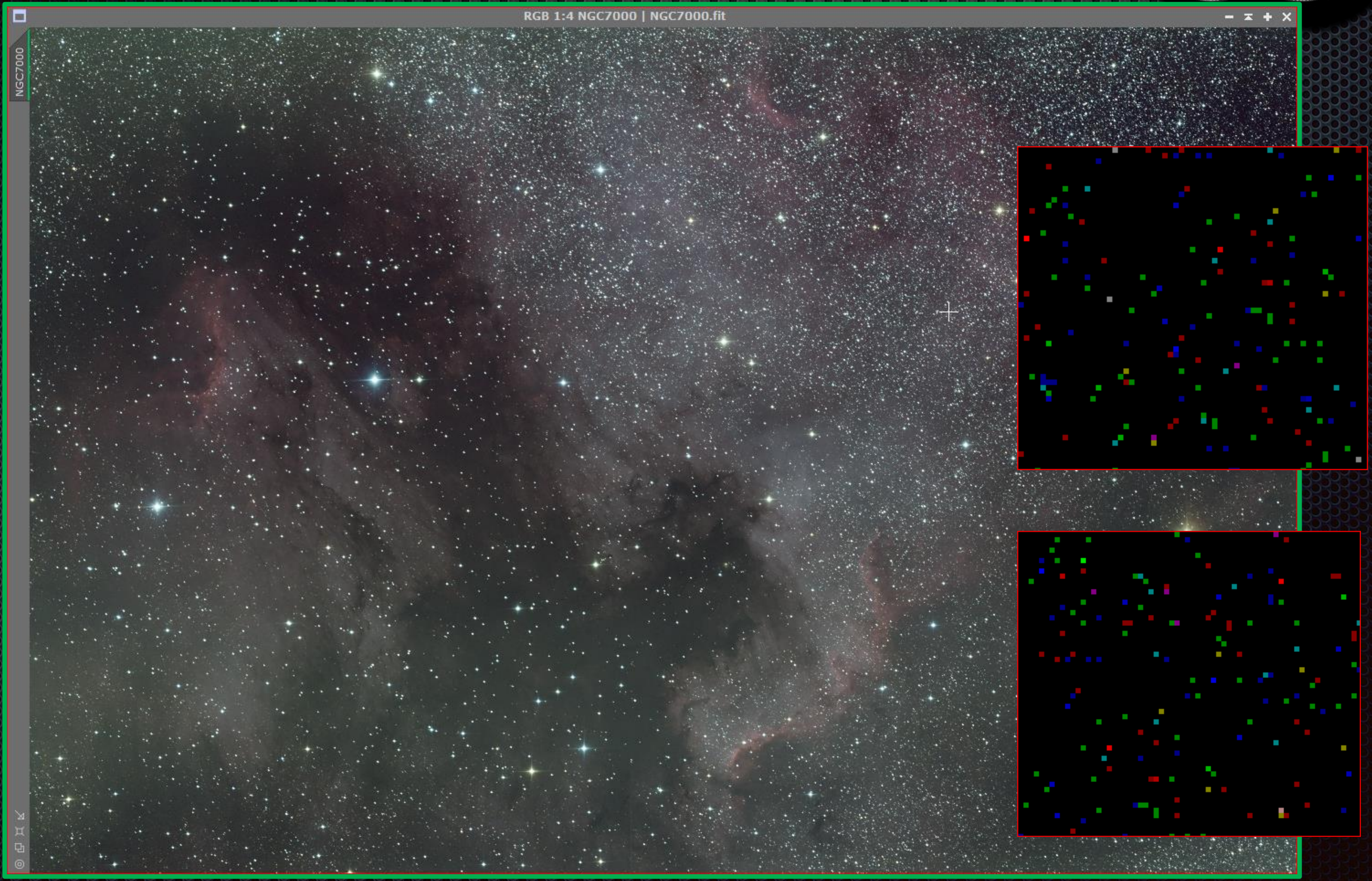
Pixel Rejection (3)

Large-Scale Pixel Rejection

☐ **Region of Interest**

____Preparation_des_Masters____
Creation_du_MasterBias
Creation_MasterBias_RCE
SuperBias
Calibration_des_Darks
Debayer
Creation_du_MasterDark
Creation_MasterDark_RCE
Calibration_des_Flats
Creation_du_MasterFlat
Creation_MasterFlat_RCE
____Preparation_des_Images____
Calibration_des_Images_Brutes
Debayerisation_Brutes_Calibree
Cosmetic_Correction
SubFrameSelector
Alignement_des_Images
____Preparation_a_l_empilement____
Integration_des_images_alignees_sans_rejection
DynamicCrop
ImageContainer
____Empilement_Final____
Integration_Image_Finale
Integration_Image_Finale_MIII
Integration_Images_Finales_MII
ScreenTransferFunction: rejection_high
R:
G:
B:
L:

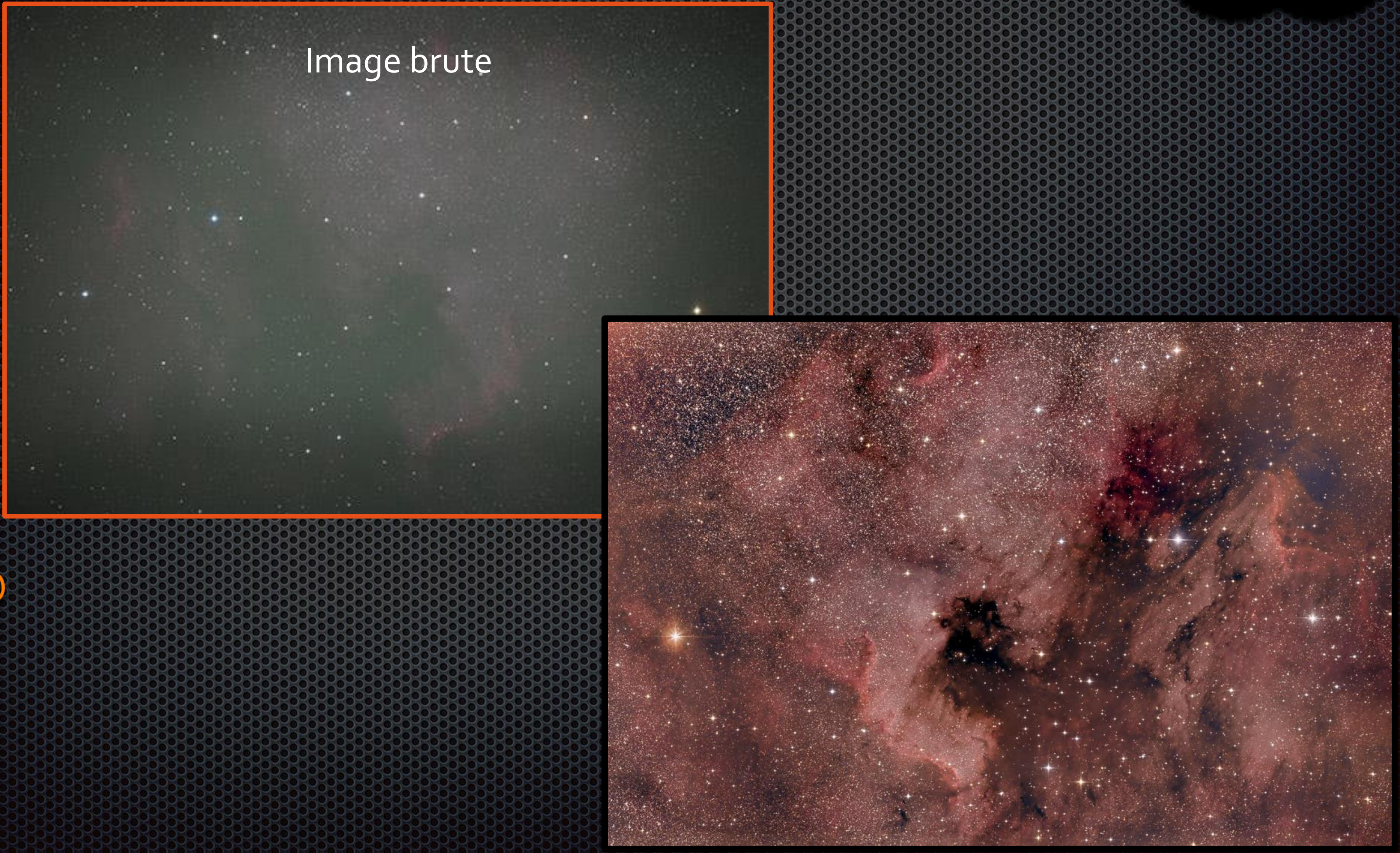
Créer une image finale: Process Intégration Image_finale
Paramètres en fonction du nombre d'images


RGB 1:4 NGC7000 | NGC7000.fit
NGC7000

PixInsight

Après le prétraitement, le traitement…

Gradients, déconvolution des étoiles, fond de ciel, calibration des couleurs, passage en mode non linéaire, correction de la couleur verte, réduction des étoiles, etc..



PixInsight

Ou trouver les process icons, des méthodes, des tutos et de l’aide ?

Site PixInsight: http://pixinsight.com/

Association AIP: www.astro-images-processing.fr

Articles astronomie magazine: Nicolas Outters, Pierre Walcho
http://outters.fr/wp/articles-astrosurf-magazine/

Site Laurent Bourgon: http://www.felopaul.com/

Site Philippe Bernhard: http://www.astro-photographie.fr

Site Dominique Arnaud: http://www.arnaudom.fr/pixinsight.php

RCE Paris
1 – 3 novembre 2018

PixInsight

Prétraitement des images APN

Merci pour écoute

Patrick Pelletier