ESPaDOnS Data Reduction Cookbook

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1. Installation

Download opera-1.0.tar.gz

http://sourceforge.net/projects/opera-pipeline/

```
$ cd $HOME
$ cp /data/world/eder/opera-1.0_Nov03-2014.zip .
```

Unpack

```
$ unzip (or gunzip) opera-1.0_Nov03-2014.zip
```

Installation

```
$ cd $HOME/opera-1.0/
$ aclocal
$ libtoolize (or glibtoolize on Mac)
$ automake --add-missing
$ autoconf
$ ./configure --prefix=$HOME/opera-1.0
$ make clean
$ rm $HOME/opera-1.0/bin/*
$ rm $HOME/opera-1.0/lib/*
$ make install
```

$HOME should be replaced by a directory path.

E.g.: my $HOME is /h/eder/

Set up Pipeline config file

Edit file:

```
$HOME/opera-1.0/pipeline/pyScripts/config.espadonspipeline
```

To the following:

```
ESPADONSPIPELINEDIR = /$HOME/opera-1.0/
ROOTDATADIR = /data/uhane5/opera/
ROOTPRODUCTDIR = /data/uhane5/opera/reductions/
DEFAULTCALIBRATIONDIR = /$HOME/opera-1.0/DefaultCalibration/
NIGHT = 13BQ08-Nov25
```

In fact for my tests I've used the following product dir:

```
ROOTPRODUCTDIR = /h/eder/Reductions/Espadons/
```

Configure main Pipeline script

Edit script:

```
$HOME/opera-1.0/pipeline/pyScripts/opera.py
```

Lines 43, 44, 45:

```
pipelinehomedir = "$HOME/opera-1.0/"
datarootdir ="/data/uhane5/opera/"
productrootdir = "/data/uhane5/opera/reductions/"
```

Make sure Data and Product directories exist

For example to reduce

the Night 13BQ08-Nov25:

```
$ ls /data/uhane5/opera/13BQ08-Nov25
$ ls /data/uhane5/opera/reductions/13BQ08-Nov25
```

Both commands above must return something

One may have to create the product directory:

```
$ mkdir /data/uhane5/opera/reductions/13BQ08-Nov25
```

* this will be done automatically later, but let's keep it simple for the moment

2. Data Reduction

How to reduce the data?

There are two options:

1. opera.py script

or

2. espadonspipelineGUI.py GUI

Running opera.py script

First try the help page:

```
$ $HOME/opera-1.0/pipeline/pyScripts/opera.py -h

Usage: opera.py [options]

Options:
  -h, --help            show this help message and exit
  -N NIGHT, --night=NIGHT
                        night directory
  -T PRODUCT, --product=PRODUCT
                        target product: "CALIBRATIONS", "OBJECTS" (default) or
                        "LIBRE-ESPRIT"
  -a                    JUST clean all products
  -c                    clean products
  -s                    simulate
  -p                    plots
  -v                    verbose
  -t                    trace
Error: check usage with opera.py -h
```

Understanding the opera.py script

```
$ $HOME/opera-1.0/pipeline/pyScripts/opera.py -h

Usage: opera.py [options]

Options:
  -h, --help            show this help message and exit
  -N NIGHT, --night=NIGHT
                        night directory
  -T PRODUCT, --product=PRODUCT
                        target product: "CALIBRATIONS", "OBJECTS" (default) or
                        "LIBRE-ESPRIT"
  -a                    JUST clean all products
  -c                    clean products
  -s                    simulate
  -p                    plots
  -v                    verbose
  -t                    trace
```

same name as in the night directory

pipeline will produce a product that matches this string

OPERA products *spc.gz

run calibrations

LE spectra *s.gz

This option won't run pipeline, it will just delete product files

This option will run the pipeline and at the end will clean all products except the last produced

This option will print out all command lines exactly how it would run but it won't execute them

This option will generate plots and associated plot files (*.eps, *.gnu, *.dat) only for certain modules

Examples

To simulate calibrations for NIGHT 13BQ08-Nov25:

```
$ ~/opera.py --night=13BQ08-Nov25 --product="CALIBRATIONS" -vps
```

To reduce all data for NIGHT 13BQ02-Aug16 to obtain OPERA products (*.spc.gz) and delete all calibrations at the end:

```
$ ~/opera.py --night=13BQ02-Aug16 --product="OBJECTS" -vtc
```

To reduce all data for NIGHT 11AQ14-Jul08-Normal to obtain Libre-Esprit products (*.s.gz) and do not delete files:

```
$ ~/opera.py --night=11AQ14-Jul08-Normal --product="LIBRE-ESPRIT" -vtp
```

To delete all products from NIGHT StaronlyData:

```
$ ~/opera.py --night=StarOnlyData -pa
```

To reduce image 1655397.fits from NIGHT 13BQ04-Sep20:

```
$ ~/opera.py --night=13BQ04-Sep20 --product="1655397" -vtp
```

Understanding the GUI

espadonspipelineGUI.py

where is it?

```
$HOME/opera-1.0/pipeline/pyScripts/espadonspipelineGUI.py
```

Before running it for the first time:

Edit line 27:

```
self.operaDirVariable.set("$HOME/opera-1.0")
```

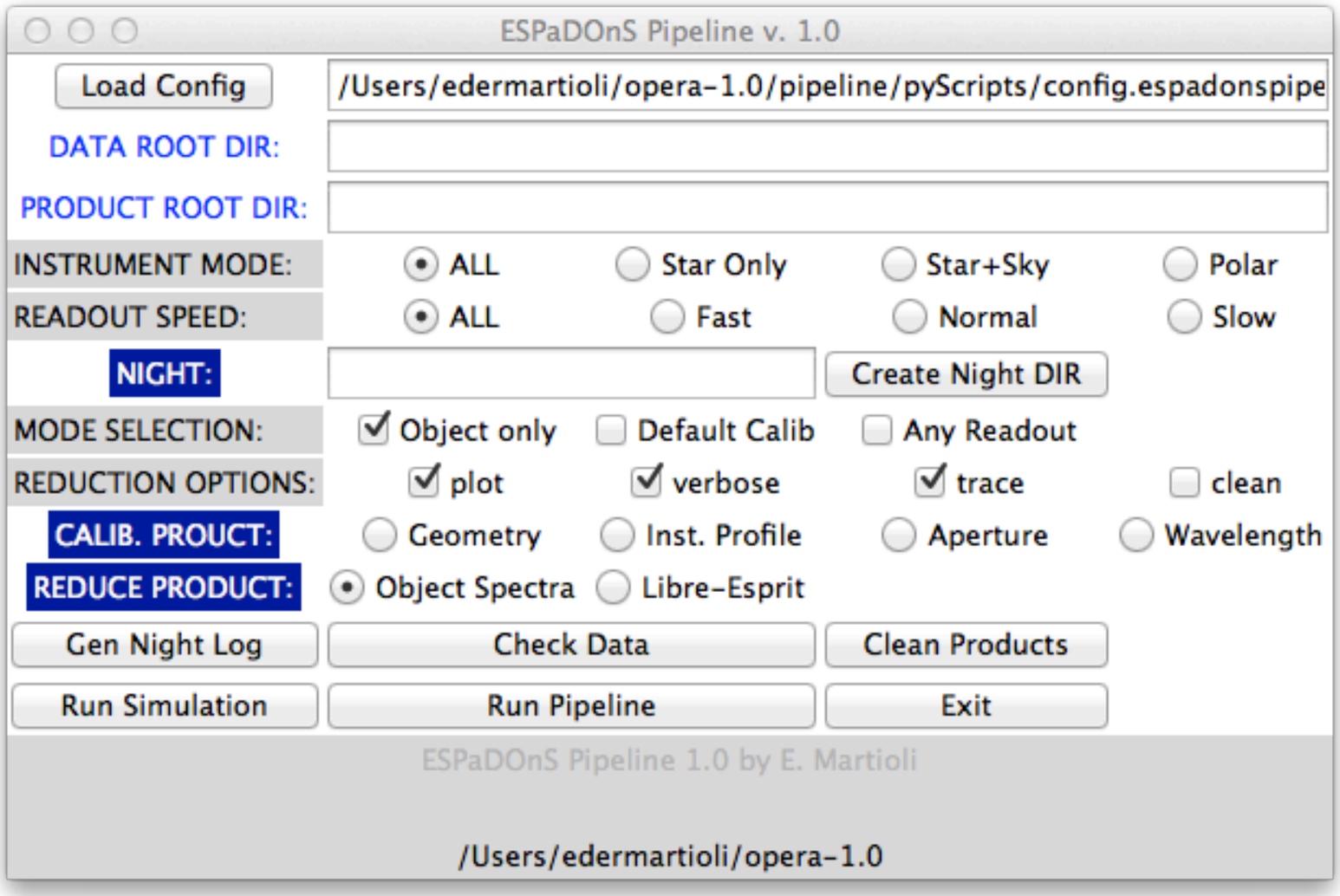
Make sure Tkinter library is installed

https://wiki.python.org/moin/TkInter

Understanding the GUI

Run it from terminal:

```
$ $HOME/opera-1.0/pipeline/pyScripts/espadonspipelineGUI.py &
```

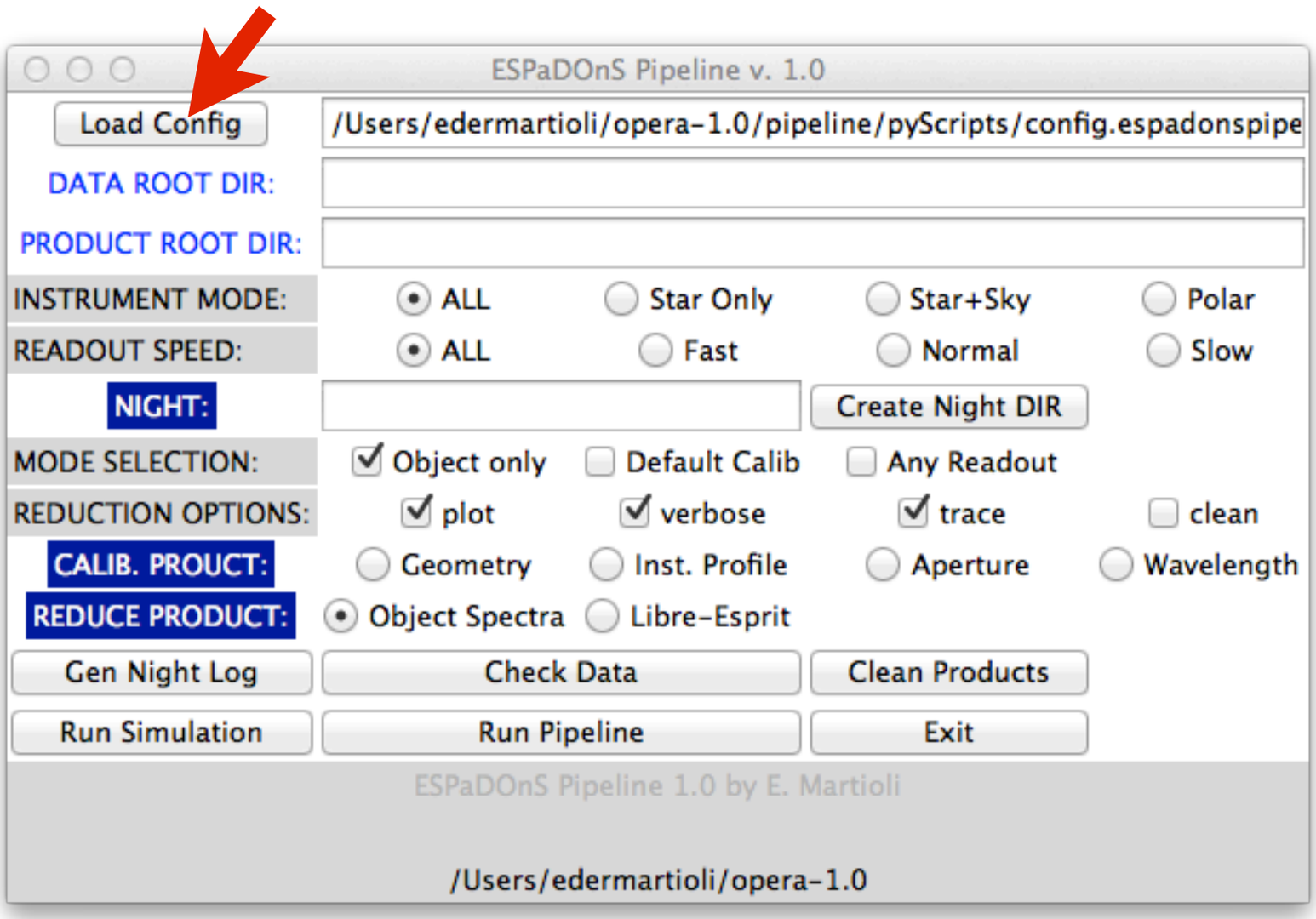


It is possible to run it remotely via ssh, but one needs to add the option -X:

```
$ ssh -X user@machine.cfht.hawaii.edu
```

Step 1

Load config file by clicking on "Load config" button

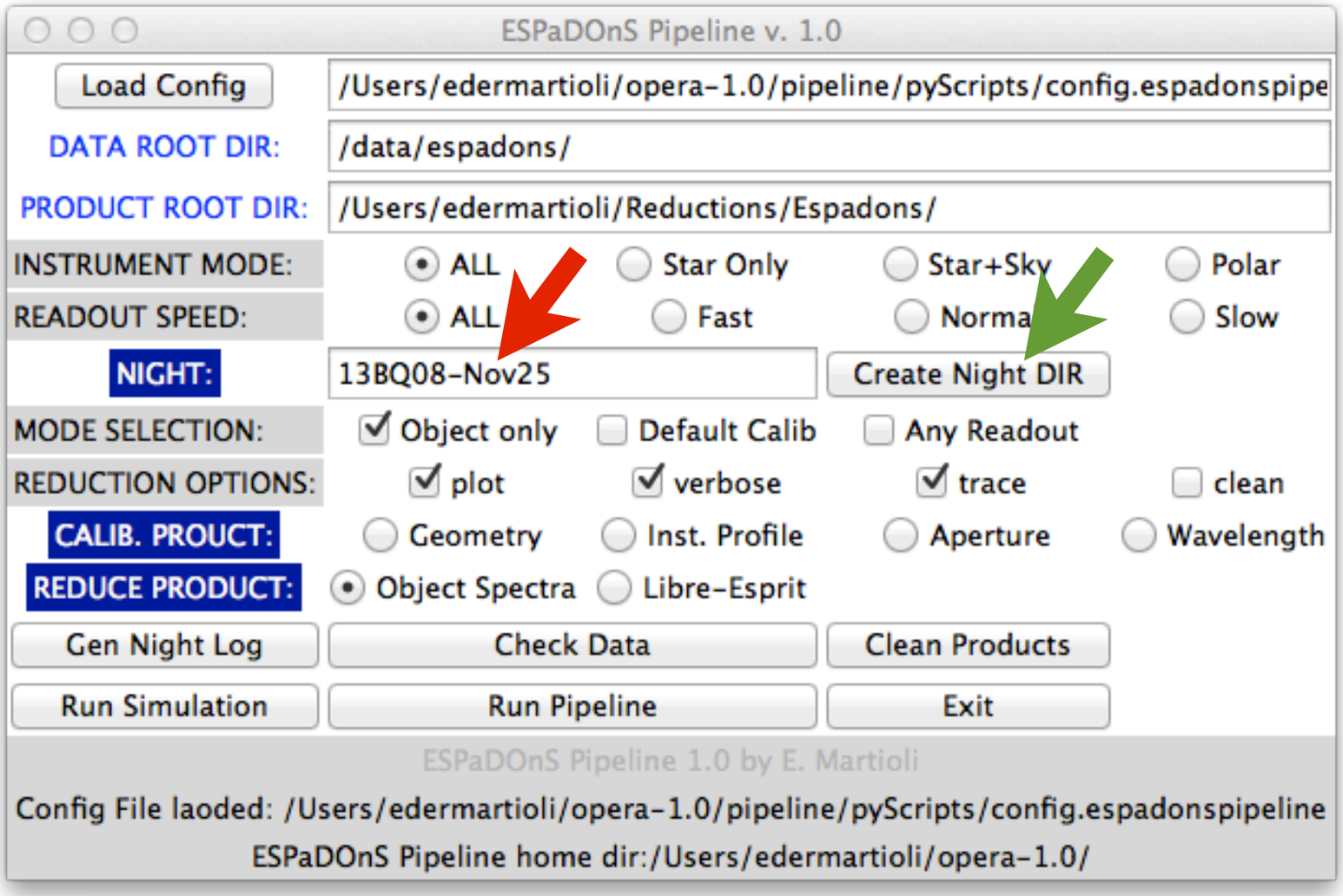


Step 2

Insert NIGHT to be reduced and,

if necessary, create products directory by clicking

on "create Night DIR" button

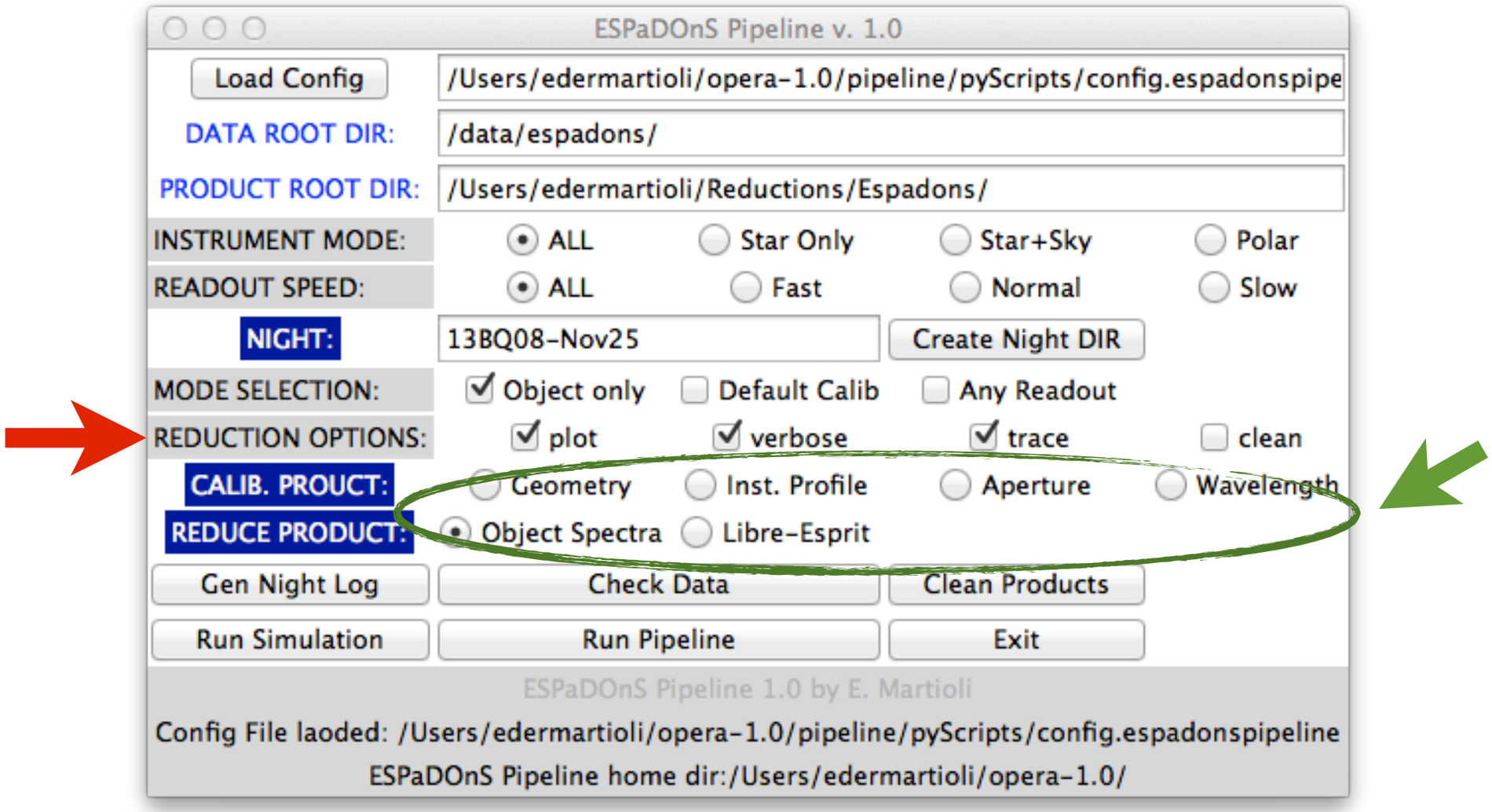


Tip: to check if directory exists, press enter on directory field

and check console output (bottom gray area)

Step 3

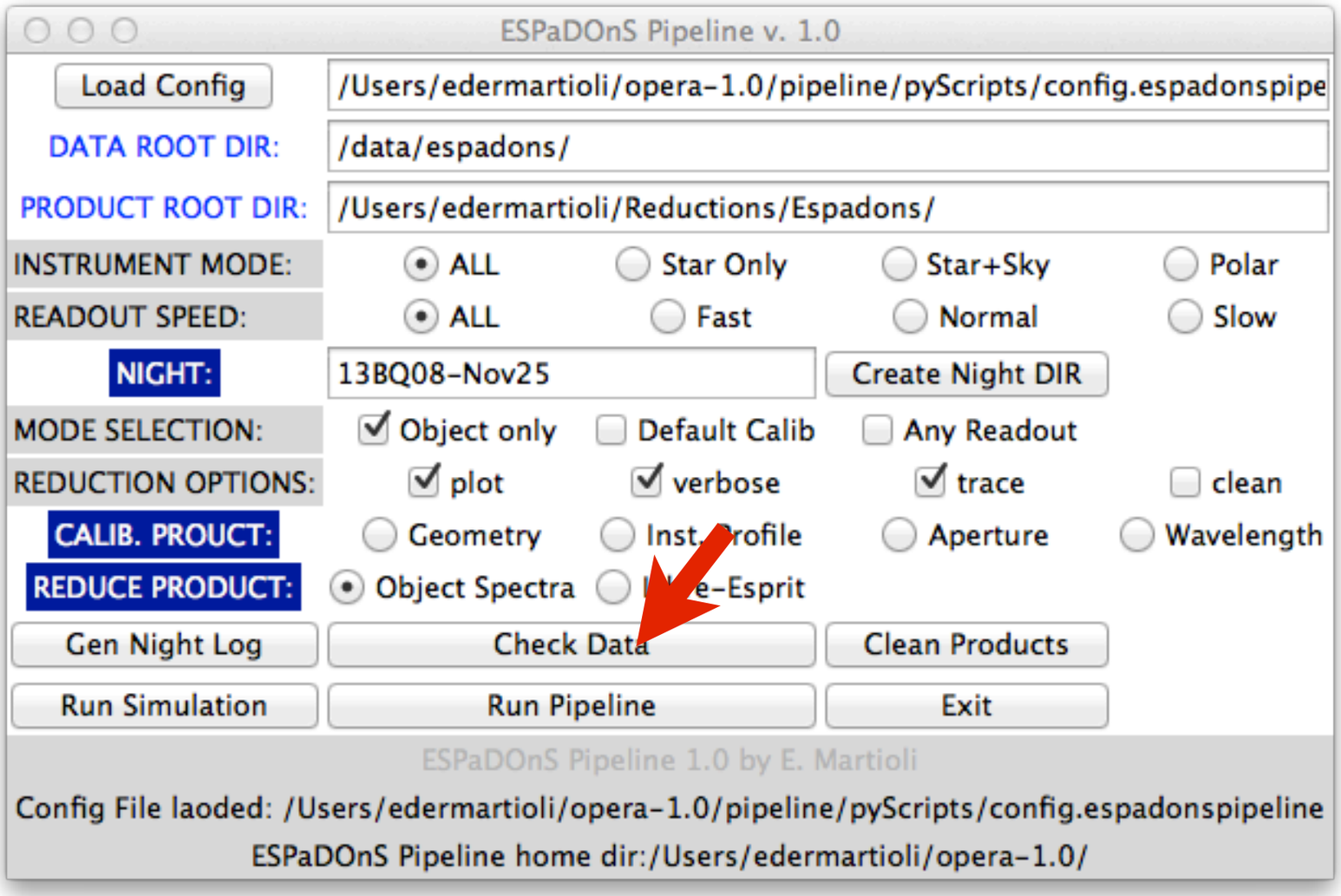
choose Reduction options and one of the wanted Products



Note: if option "object only" is selected, it means that it will only reduce data for observing modes containing at least one OBJECT FITS file. For example, when one wants to run afternoon calibrations this option must be unselected.

Step 4

click on "check Data" button



and go check output on terminal ...

This is what I got for NIGHT = 13BQ04-Sep20

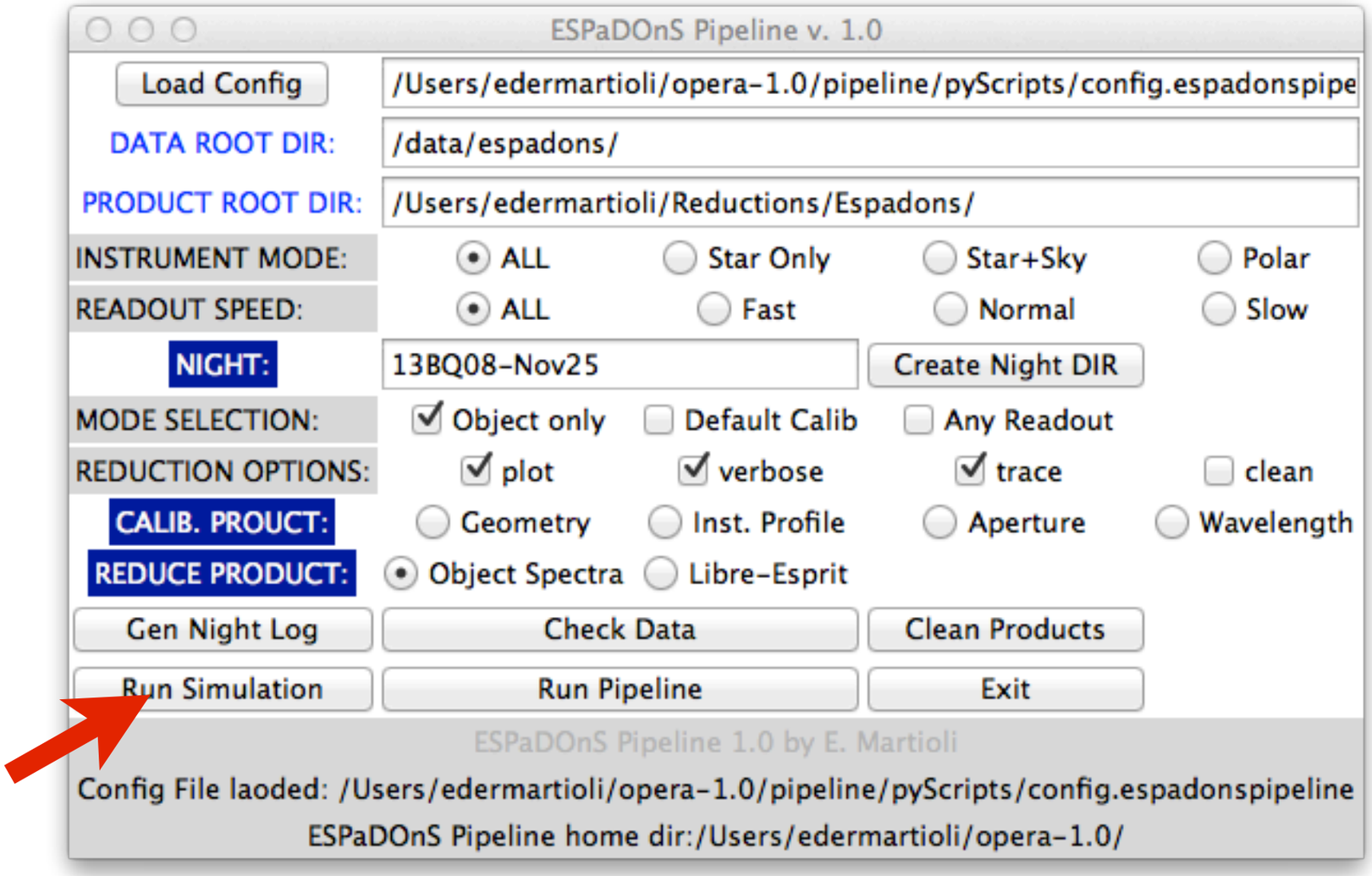
```
------------------------------------------------------------
Running Check DATA for NIGHT: 13BQ04-Sep20
------------------------------------------------------------
---
STATISTICS for DATA in DIR: /data/espadons//13BQ04-Sep20/
Allow any readout? False
Include mode for calibration alone? False
---
InstMode    Readout object  bias    flat    comp    align   SELECTED?
------------------------------------------------------------
StarOnly    fast    0   0   0   0   0   NO
StarOnly    normal  0   0   0   0   0   NO
StarOnly    slow    0   3   0   0   0   NO
StarPlusSky fast    0   0   0   0   0   NO
StarPlusSky normal  0   0   0   0   0   NO
StarPlusSky slow    7   3   19  11  0   YES
Polar       fast    0   0   0   0   0   NO
Polar       normal  0   0   0   0   0   NO
Polar       slow    0   3   0   0   0   NO
------------------------------------------------------------
```

"Object only" option

The only mode selected based on data files in data directory and options selected in the GUI

Step 5

click on "Run Simulation" button

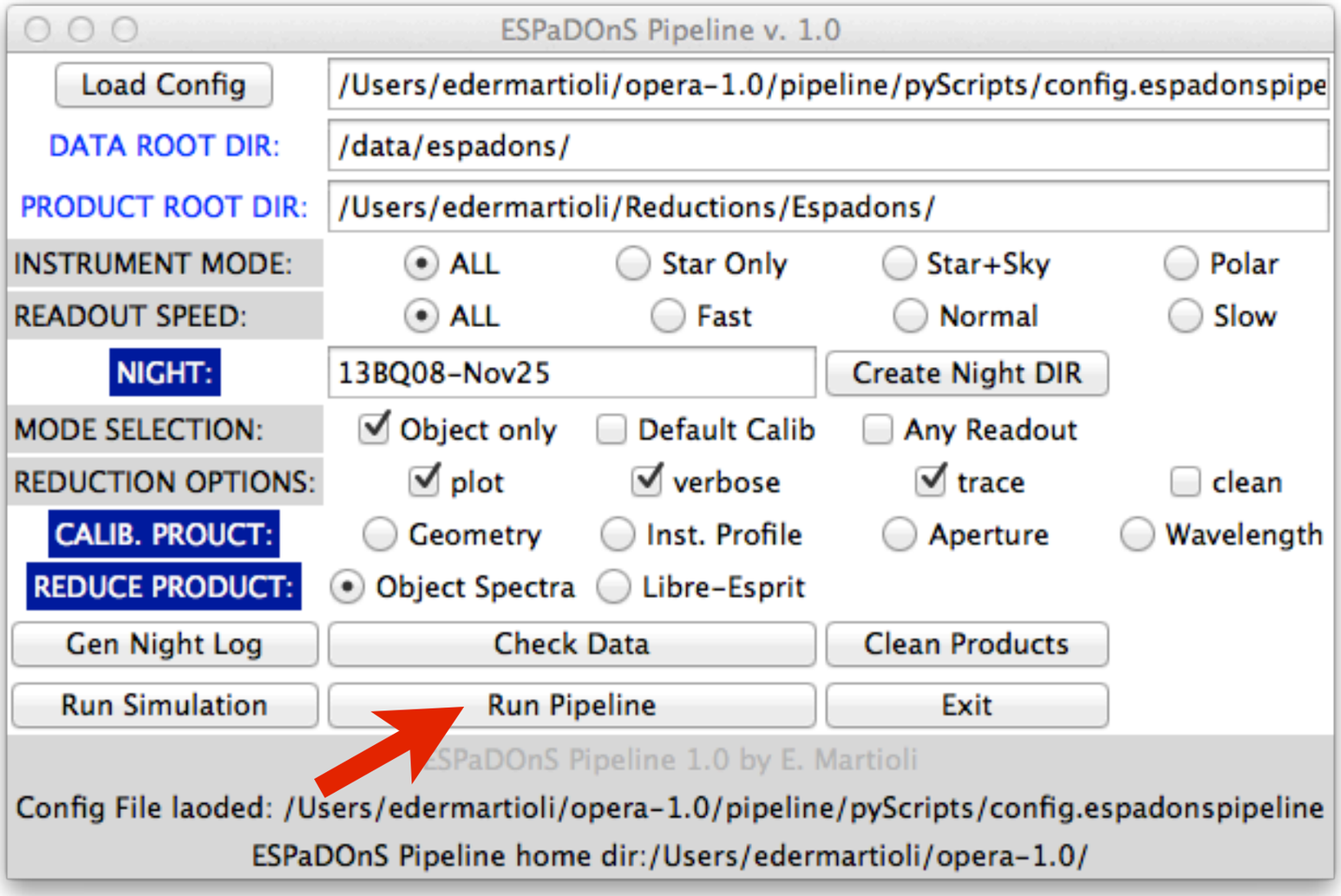


and go check output on terminal ...

This will print out all command lines exactly how they would have been run if clicked on "Run Pipeline" button

Step 6

click on "Run Pipeline" button



voila .. this will run the pipeline!

options "verbose" and "trace" are helpful.

option "clean" will clean all products except the last one produced.