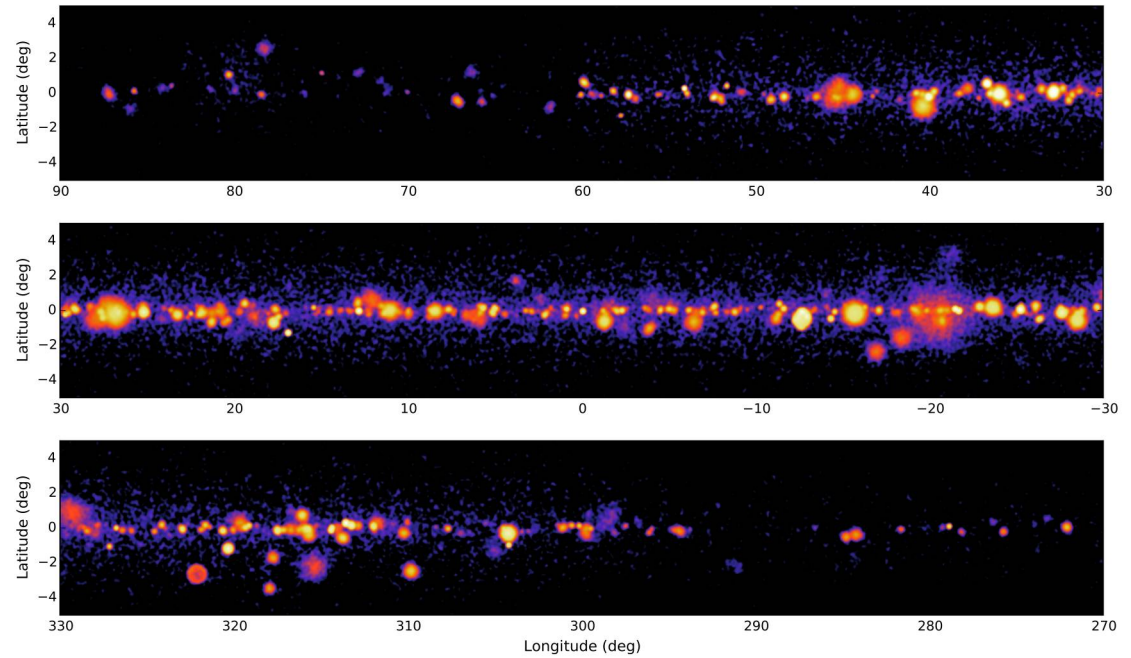




CTA data hands-on
workshop
2-3 October 2017

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Installing ctools

```
$ tar xfvz gammalib-1.4.2.tar.gz
$ cd gammalib
$ ./configure
$ make
$ make check
$ make install

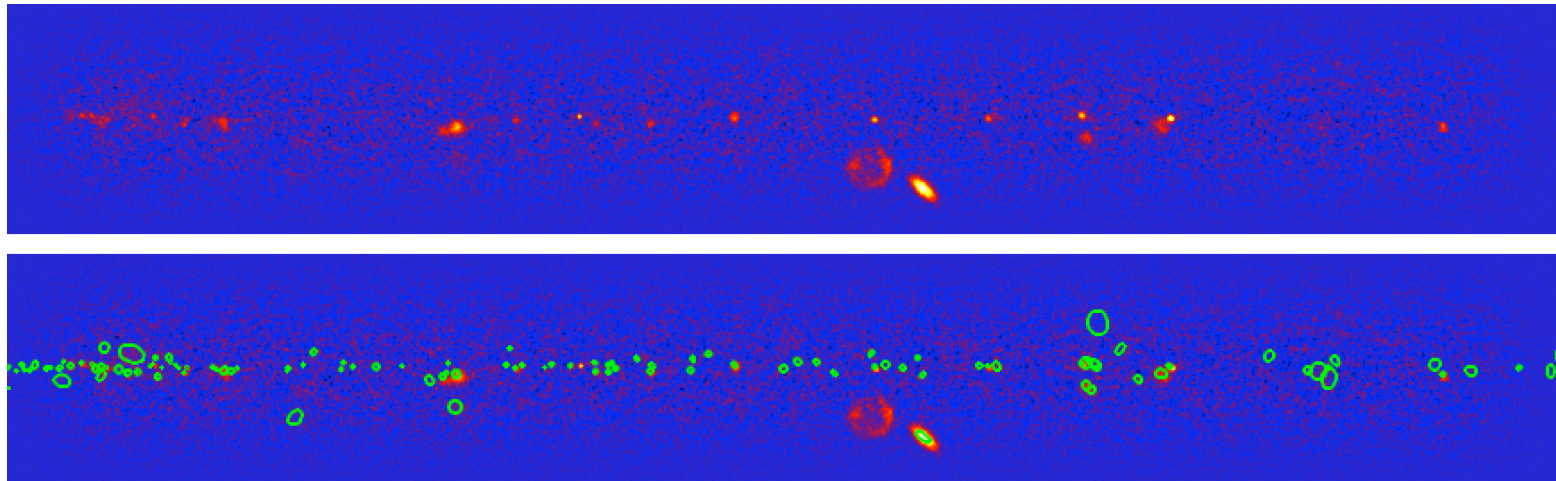
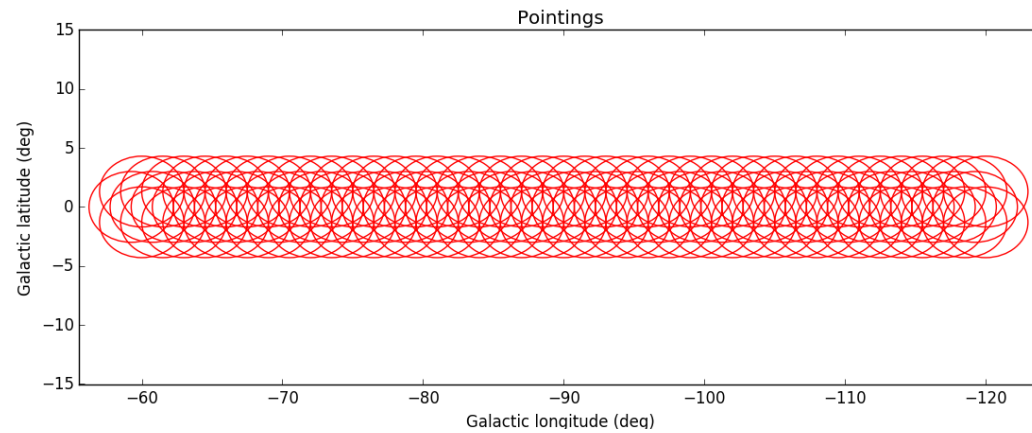
$ export GAMMALIB=/usr/local/bin
$ source $GAMMALIB/bin/gammalib-init.sh

$ tar xfvz ctools-1.4.2.tar.gz
$ cd ctools
$ ./configure
$ make
$ make check
$ make install

$ export CTOOLS=/usr/local/bin
$ source $CTOOLS/bin/ctools-init.sh
```

The hands-on dataset

Dedicated hands-on dataset prepared for this workshop



The hands-on dataset

```
$ tar xfvz handson.tar.gz
handson/
handson/caldb
handson/data
handson/data/obs_110000.fits
handson/data/obs_110001.fits
...
handson/data/obs_110122.fits
handson/models
handson/models/models_handson.xml
...
handson/obs
handson/obs/obs_handson.xml
```

```
$ export CTADATA=/Users/jurgen/analysis/cta/handson/handson
$ export CALDB=$CTADATA/caldb
```

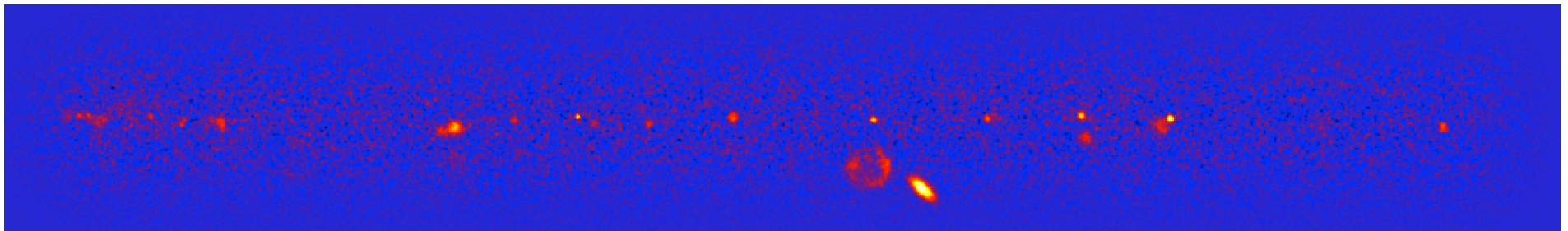
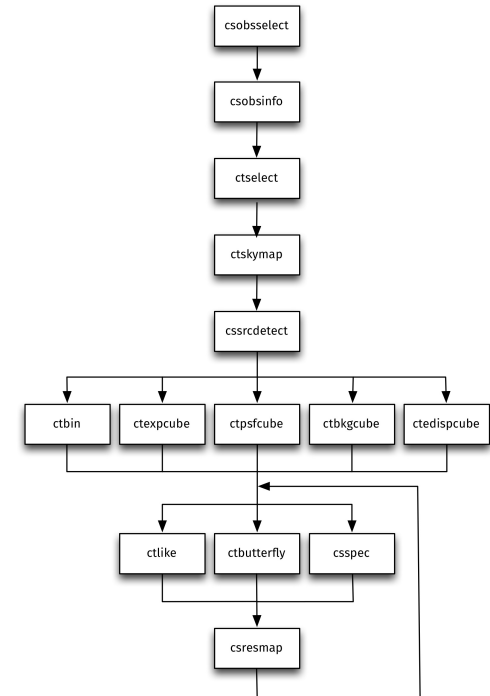
What you should try now

If you never have used ctools

- Try to reproduce the work-flow shown yesterday
- You may do this in teams of 2-3 people
- For a detailed description of the workflow see <http://cta.irap.omp.eu/ctools/users/tutorials/1dc/first.html>

If you have already some experience

- Try to perform an analysis on a different region
- Try to implement the work-flow in Python



Using ctools from Python

```
$ python
>>> import gammalib
>>> import ctools
>>> import cscripts
>>> info = cscripts.csobsinfo()
>>> info.execute()
Input event list, counts cube, or observation definition XML file [obs.xml] $CTADATA/obs/
obs_handson.xml
Output DS9 region file [ds9.reg]
>>>
```

Using ctools from Python

```
$ python
>>> import gammalib
>>> import ctools
>>> import cscripts
>>> info = cscripts.csobsinfo()
>>> info['inobs'] = '$CTADATA/obs/obs_handson.xml'
>>> info['outds9file'] = 'ds9.reg'
>>> info['debug'] = True
>>> info.execute()
2017-10-03T06:38:37: === Observations ===
2017-10-03T06:38:37:   Unbinned observations .....: 123
2017-10-03T06:38:37:   Binned observations .....: 0
2017-10-03T06:38:37: === Events ===
2017-10-03T06:38:37:   Number of events .....: 6062856
2017-10-03T06:38:37:   Number of bins .....: 0
2017-10-03T06:38:37: === Pointings ===
2017-10-03T06:38:37:   Mean offset angle .....: Unknown
2017-10-03T06:38:37:   Mean zenith angle .....: 0.00 deg
2017-10-03T06:38:37:   Mean azimuth angle .....: 0.00 deg
2017-10-03T06:38:37: === Energy range ===
2017-10-03T06:38:37:   Minimum energy .....: 30 GeV
2017-10-03T06:38:37:   Maximum energy .....: 160 TeV
2017-10-03T06:38:37: === Time range ===
2017-10-03T06:38:37:   MJD (days) .....: 59215.500 - 59221.699
2017-10-03T06:38:37:   UTC .....: 2021-01-01T11:58:51 - 2021-01-07T16:44:51
2017-10-03T06:38:37:   MET (seconds) .....: 662774400.000 - 663309960.000
2017-10-03T06:38:37:   Total ontime .....: 221400.00 s = 3690.00 min = 61.50 h
2017-10-03T06:38:37:   Total livetime .....: 216972.00 s = 3616.20 min = 60.27 h
>>>
```