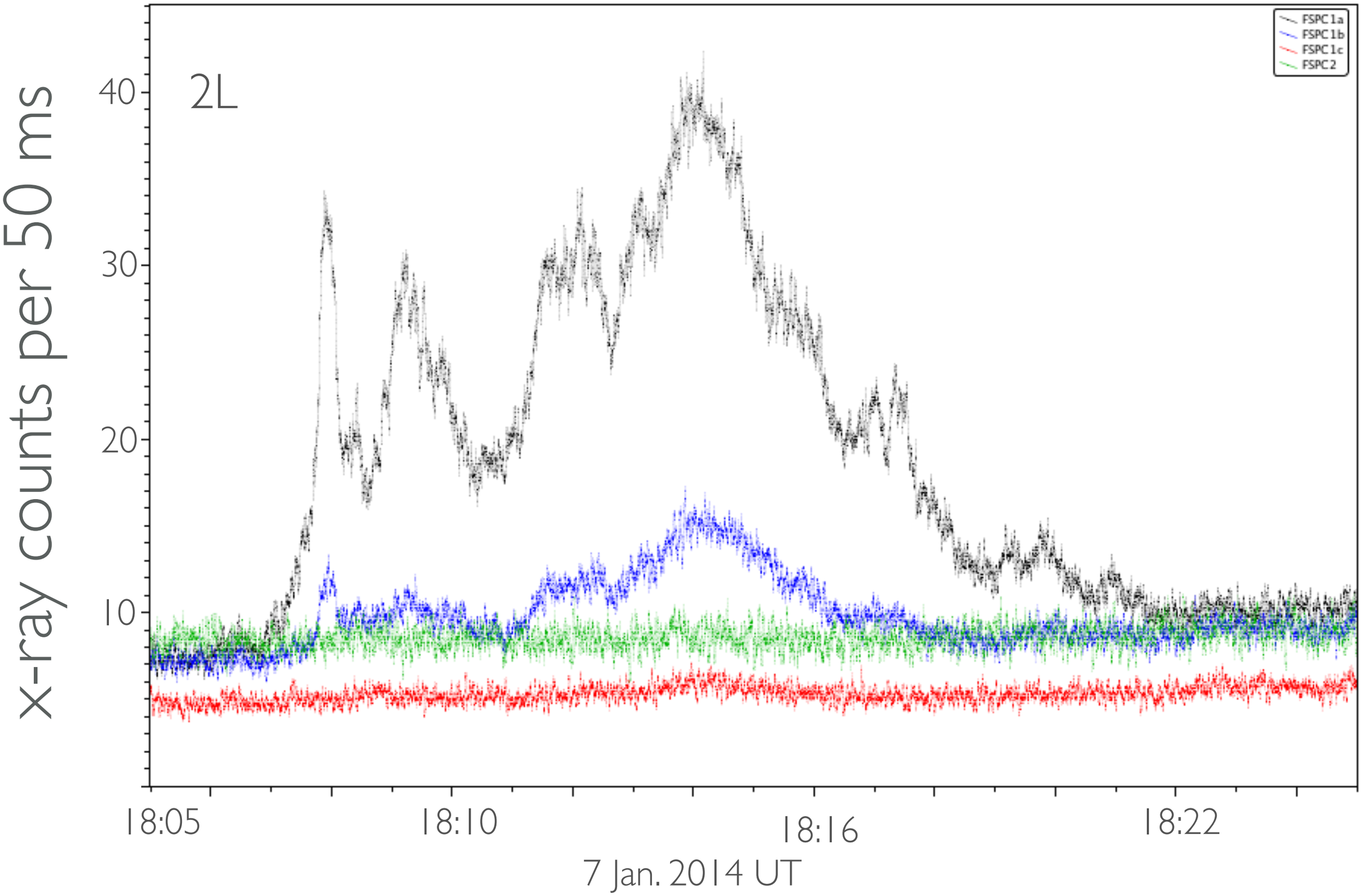
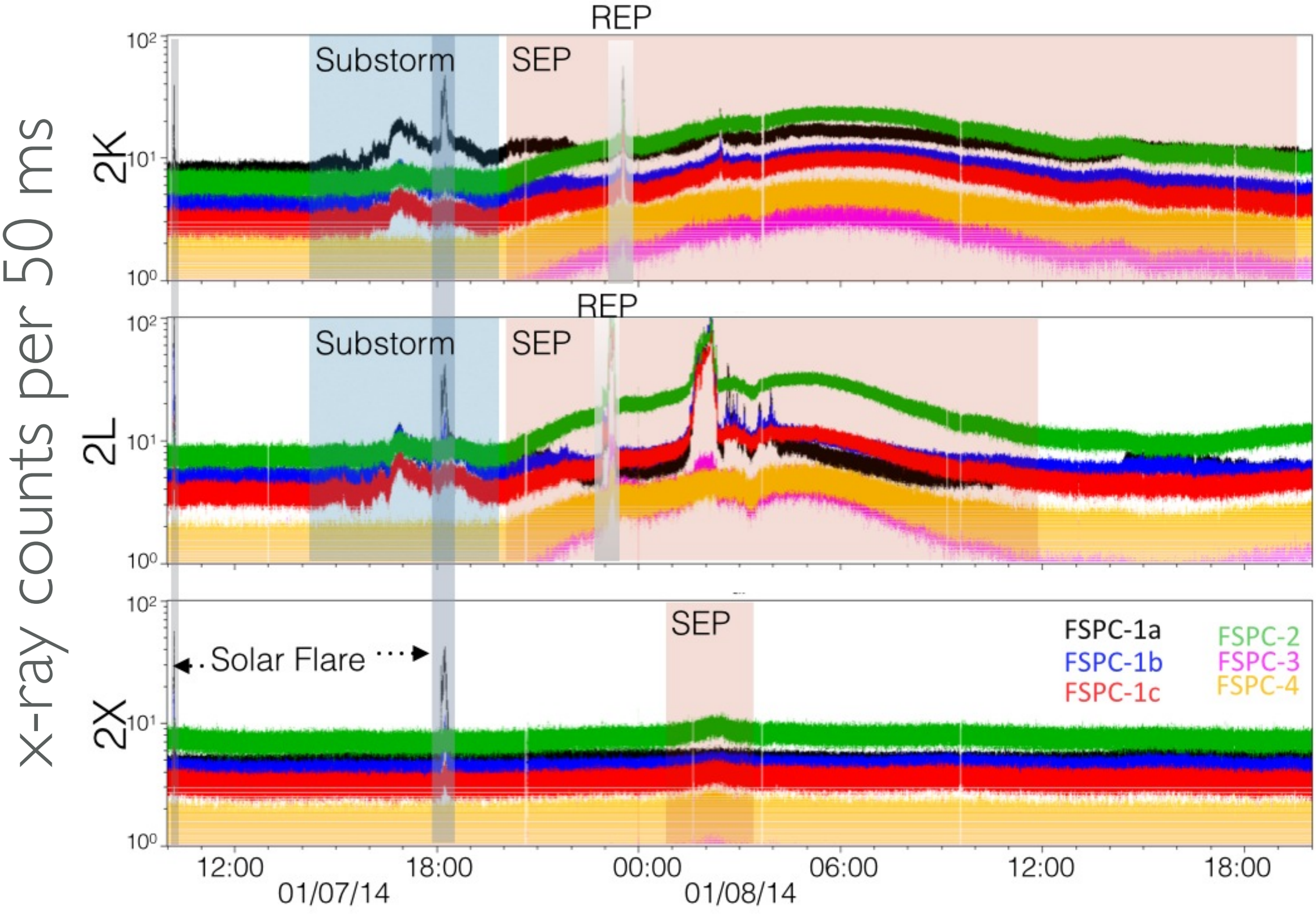
# BDAS

Now apart of the bleeding edge TDas
TDas/spdsw_date/idl/projects/barrel

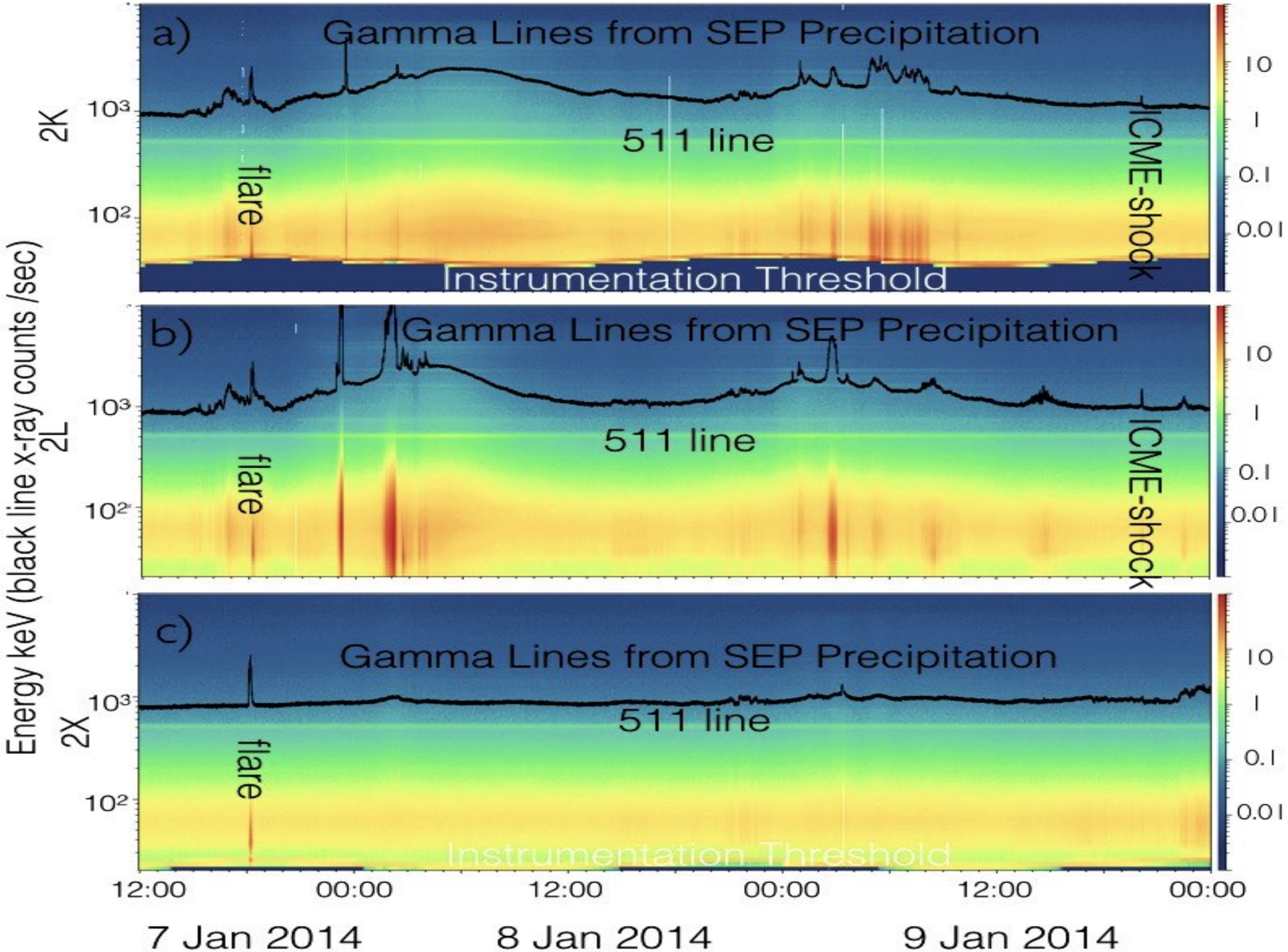
# BARREL OBSERVES A FLARE



# BARREL OBSERVES A SEP



# BARREL OBSERVES A SEP



modeled electron population

Counts

energy

Precipitating Electron

GEANT model through Atmosphere

GEANT model through BARREL detector

Ionospheric/ Atmospheric Particles

**Bremsstrahlung x-ray**

Modeled expected x-ray response

Counts

energy

Atmospheric Absorption of x-rays

~27 km

BARREL summary paper submitted JGR

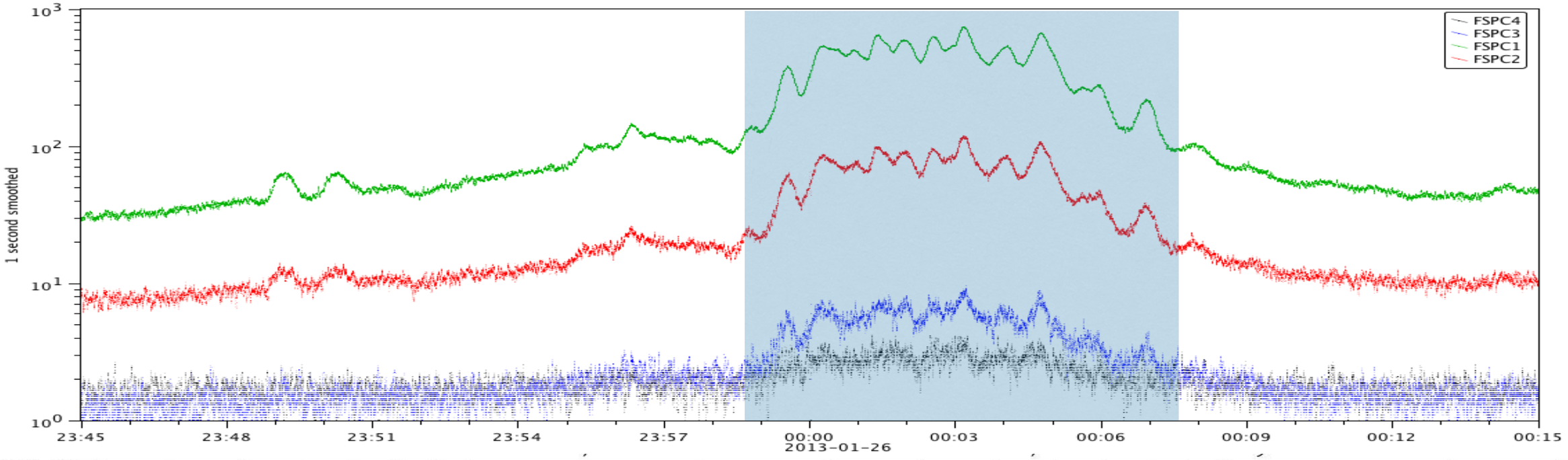
# input values

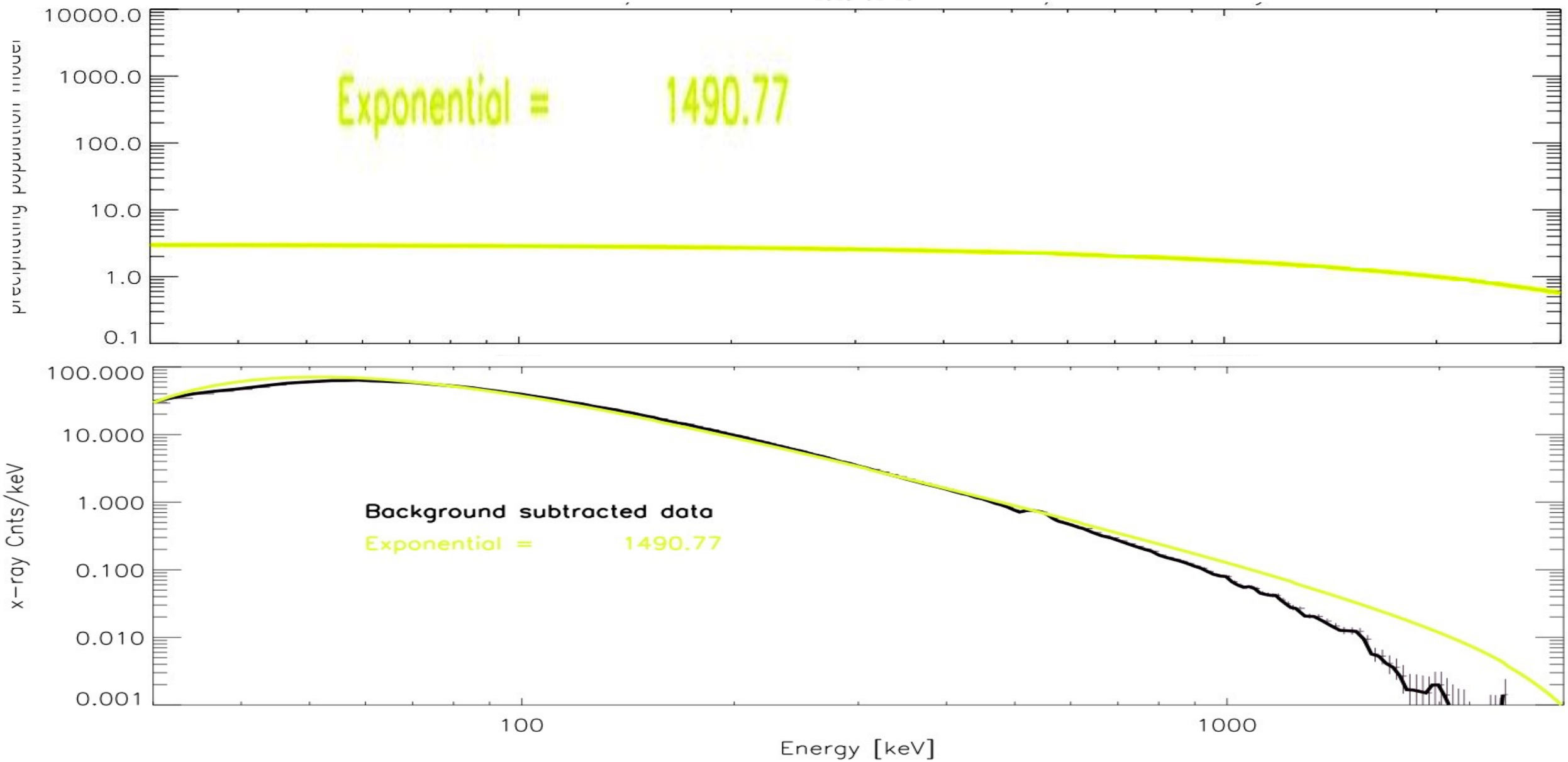
day = '2013-01-25/00:00:00'
len = 48.
ID = '1H'
ver = 'v04'
fit = [50., 2000.]
bkgstart = ['2013-01-25/22:10:00', '2013-01-26/02:00:00']
bkgend = ['2013-01-25/23:15:00', '2013-01-26/04:00:00']
startstring = '2013-01-26/00:10:00'
endstring = '2013-01-26/00:30:00'

Assume exponential precipitating population

default model or model = 1

```
barrel_spectroscopy,spectest1, day,len,ID,/slow,version = ver,$
numbkg=n_elements(bkgstart),$
fitrange=fit,saveme='efold.sav', $
starttimes=startstring,$
endtimes=endstring, $
startbkgs = bkgstart, $
endbkgs = bkgend, maxcycles = 1000, /quiet
```

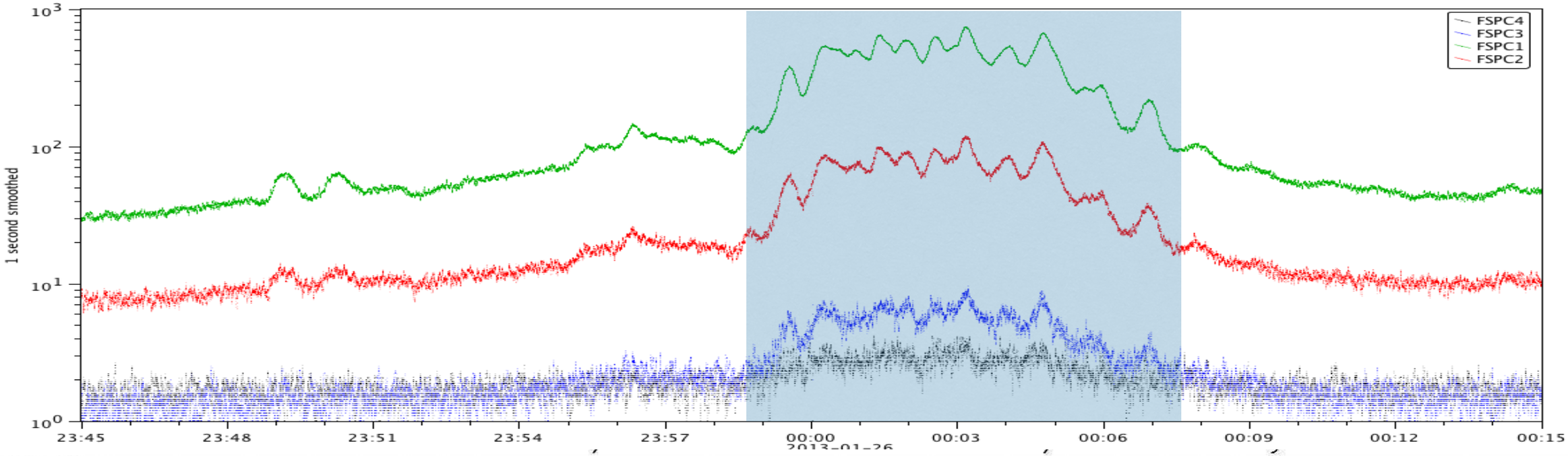

FSPC4
FSPC3
FSPC1
FSPC2
1 second smoothed
$10^3$
$10^2$
$10^1$
$10^0$
23:45
23:48
23:51
23:54
23:57
00:00
2013-01-26
00:03
00:06
00:09
00:12
00:15

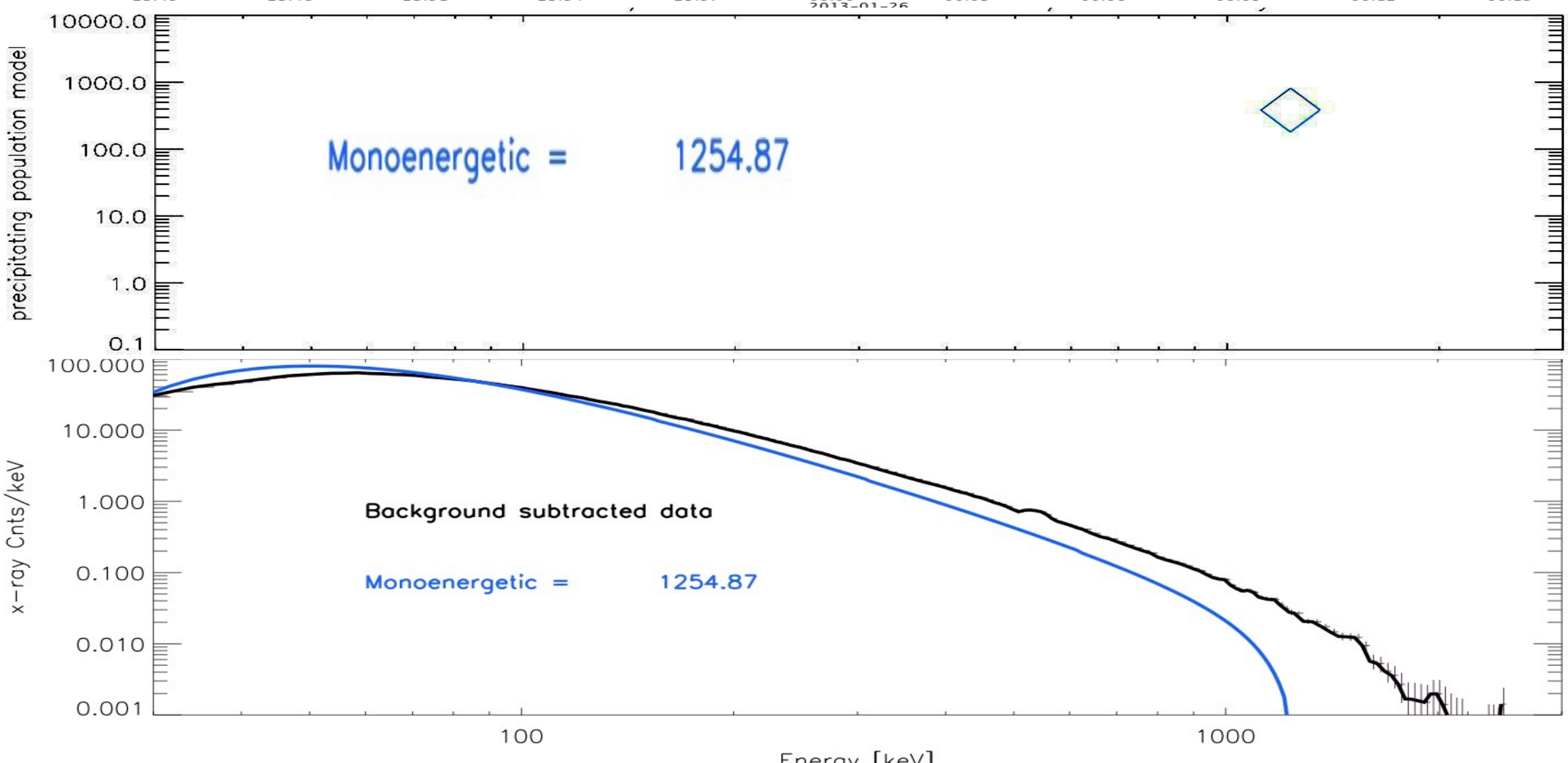

Probability Density
10000.0
1000.0
100.0
10.0
1.0
0.1
Exponential = 1490.77
x-ray Cnts/keV
100.000
10.000
1.000
0.100
0.010
0.001
Background subtracted data
Exponential = 1490.77
100
1000
Energy [keV]

# Assume mono-energetic precipitating population

# default model or model = 2

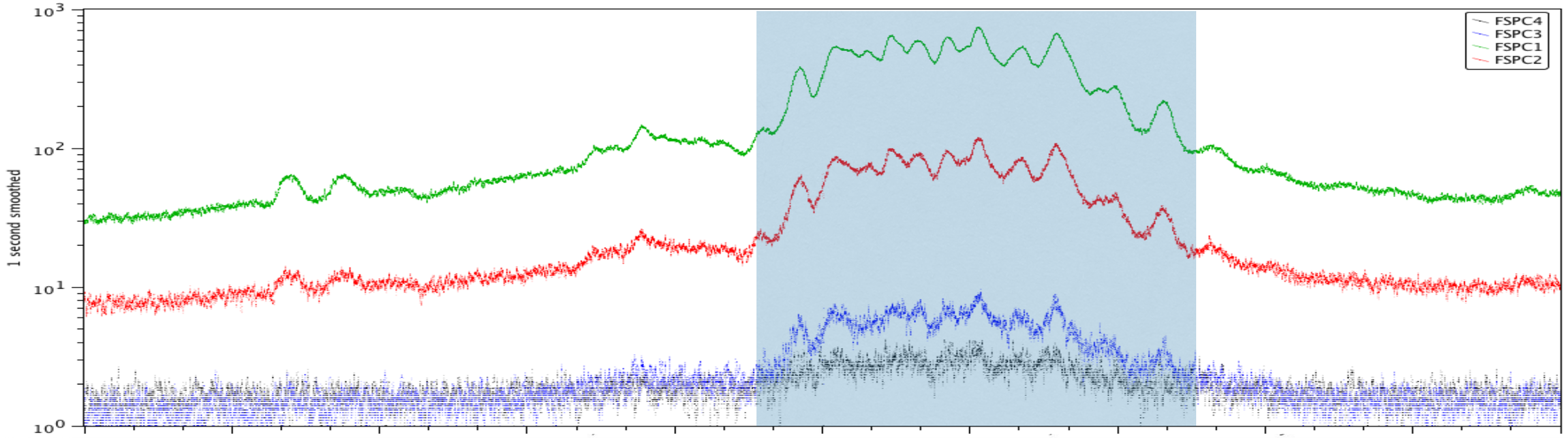
```
barrel_spectroscopy,spectest1, day, len, ID,/slow,version = ver,$
        numbkg=n_elements(bkgstart),fitrange=fit,$
        saveme='mono.sav', model = 2, $
        starttimes=startstring,$
        endtimes=endstring, $
        startbkgs = bkgstart, $
        endbkgs = bkgend, maxcycles = 1000, /quiet
```

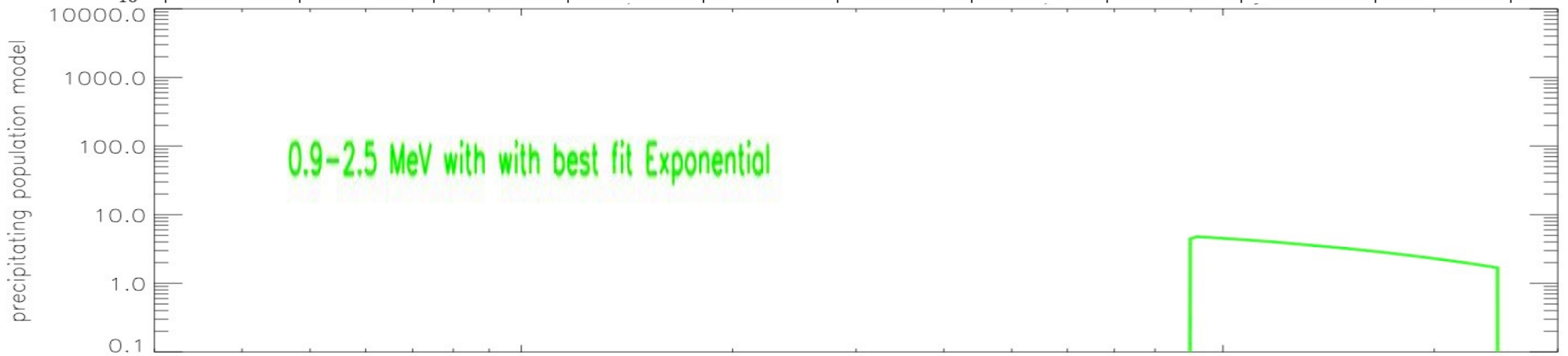

FSPC4
FSPC3
FSPC1
FSPC2
1 second smoothed
$10^3$
$10^2$
$10^1$
$10^0$
23:45
23:48
23:51
23:54
23:57
00:00
2013-01-26
00:03
00:06
00:09
00:12
00:15

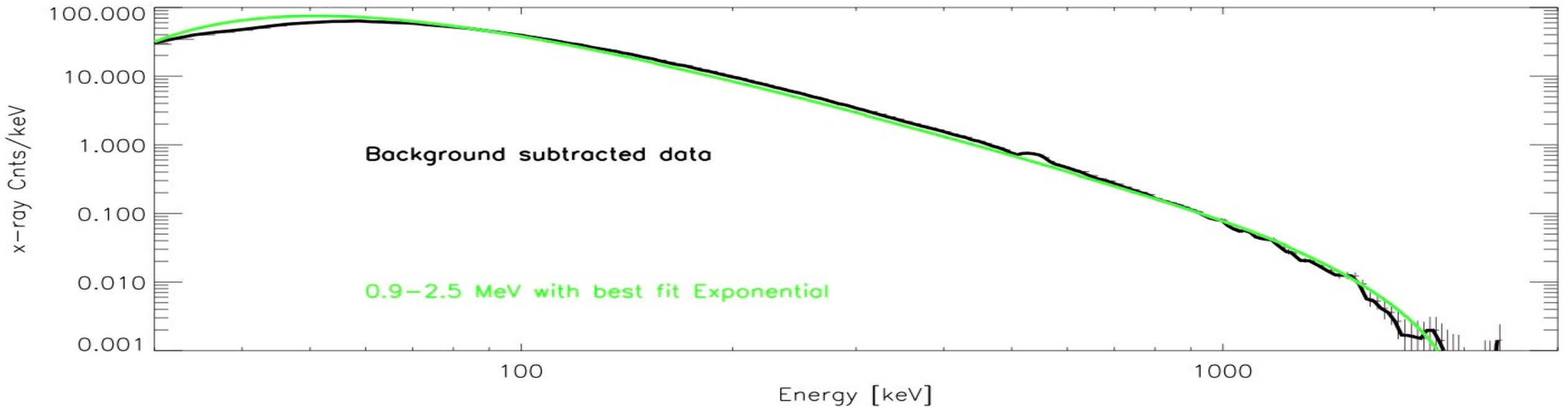

precipitating population model
10000.0
1000.0
100.0
10.0
1.0
0.1
Monoenergetic = 1254.87
x-ray Cnts/keV
100.000
10.000
1.000
0.100
0.010
0.001
Background subtracted data
Monoenergetic = 1254.87
100
1000
Energy [keV]

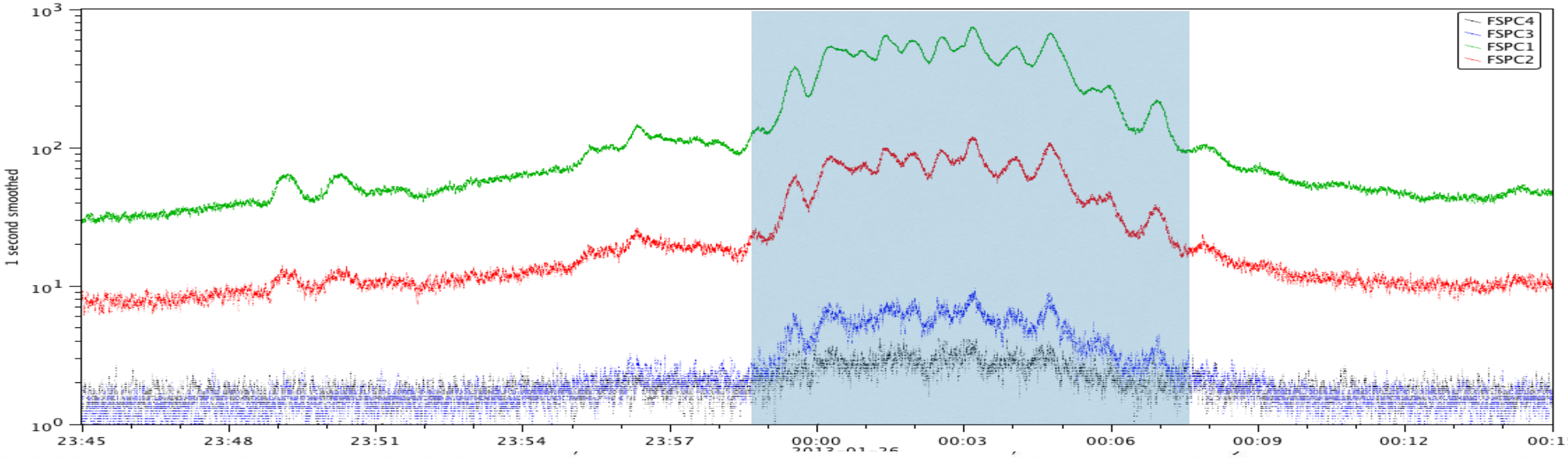
```
restore,'efold.sav'
efold=specstruct

e=findgen(10001)+10.
edge_products,e,mean=mean
index = where((mean ge 850) and (mean le 1250))
y1 = make_array(n_elements(mean), value =1*10^(-21))
y1[index] = exp(-1*mean[index]/( efold.params[1]))

openw,1,'REP1.txt'
for i=0,n_elements(e)-2 do printf,1,e[i],e[i+1],y1[i]
close,1             ;

barrel_spectroscopy,spectest1,day, len, ID,/slow, version = ver, $
                    numbkg=n_elements(bkgstart),method=2,$
                    fitrange=fit,modlfile='REP1.txt',saveme = 'REP1.sav',$
                     starttimes=startstring,$
                     endtimes=endstring, $
                     startbkgs = bkgstart, $
                     endbkgs = bkgend, maxcycles = 1000, /quiet
```

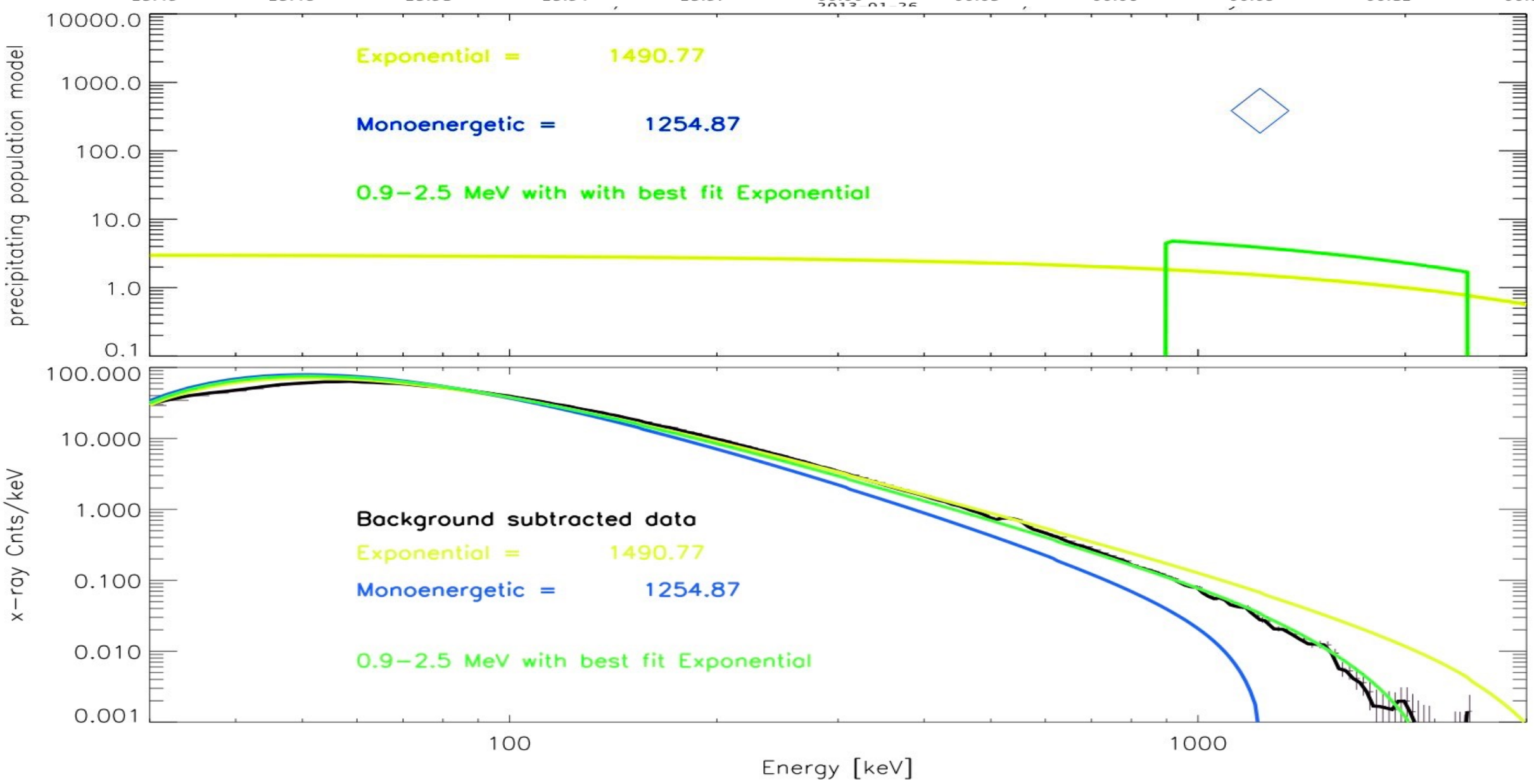
Use modeled spectra - e.g. best fit exponential with a lower and higher energy cut off.


FSPC4
FSPC3
FSPC1
FSPC2
1 second smoothed
$10^3$
$10^2$
$10^1$
$10^0$


precipitating population model
10000.0
1000.0
100.0
10.0
1.0
0.1
0.9-2.5 MeV with with best fit Exponential


x-ray Cnts/keV
100.000
10.000
1.000
0.100
0.010
0.001
Background subtracted data
0.9-2.5 MeV with best fit Exponential
100
1000
Energy [keV]


FSPC4
FSPC3
FSPC1
FSPC2
1 second smoothed
$10^3$
$10^2$
$10^1$
$10^0$
23:45
23:48
23:51
23:54
23:57
00:00
00:03
00:06
00:09
00:12
00:15


precipitating population model
10000.0
1000.0
100.0
10.0
1.0
0.1
Exponential = 1490.77
Monoenergetic = 1254.87
0.9–2.5 MeV with with best fit Exponential
x-ray Cnts/keV
100.000
10.000
1.000
0.100
0.010
0.001
Background subtracted data
Exponential = 1490.77
Monoenergetic = 1254.87
0.9–2.5 MeV with best fit Exponential
100
1000
Energy [keV]