BDAS

Now apart of the bleeding edge TDas
TDas/spdsw_date/idl/projects/barrel
BARREL OBSERVES A FLARE

FSPC-1a 40 keV ~ 0.3 Å
FSPC-1b 40 - 80 keV ~ 0.3 - 0.15 Å
FSPC-1c 80 - 180 keV ~ 0.15 - 0.06 Å

7 Jan. 2014 UT

x-ray counts per 50 ms

2L

7 Jan. 2014 UT
BARREL OBSERVES A SEP
BARREL OBSERVES A SEP

Gamma Lines from SEP Precipitation

Energy keV (black line x-ray counts/sec)

Instrumentation Threshold

511 line

flare

ICME-shock

SSPC cts/keV/sec

7 Jan 2014  8 Jan 2014  9 Jan 2014
Ionospheric/
Atmospheric
Particles

Precipitating
Electron

Atmospheric
Absorption of x-rays

~27 km
energy
Counts

Ionospheric/
Atmospheric
Particles

Bremsstrahlung
x-ray

Modeled expected
x-ray response

GEANT model through
BARREL detector

GEANT model through
Atmosphere

Modeled electron population

BARREL summary paper
submitted JGR
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'
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

Assume exponential precipitating population
default model or model = 1
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
Monoenergetic = 1254.87
Use modeled spectra - e.g. best fit exponential with a lower and higher energy cut off.

```plaintext
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
```
0.9–2.5 MeV with best fit Exponential

precipitating population model

x-ray Cts/keV

Background subtracted data

0.9–2.5 MeV with best fit Exponential
Exponential = 1490.77

Monoenergetic = 1254.87

0.9–2.5 MeV with best fit Exponential

Background subtracted data

Exponential = 1490.77

Monoenergetic = 1254.87

0.9–2.5 MeV with best fit Exponential