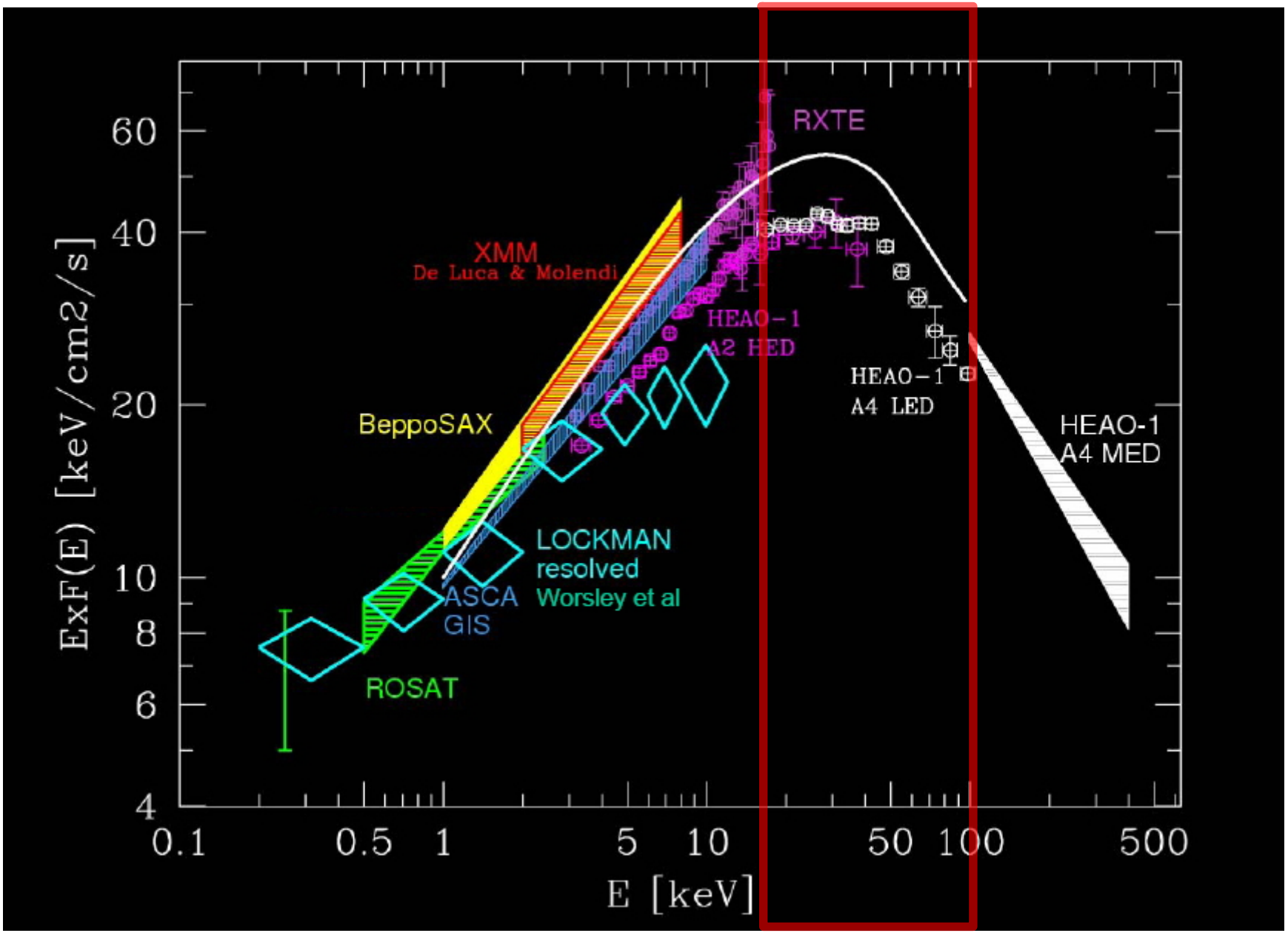
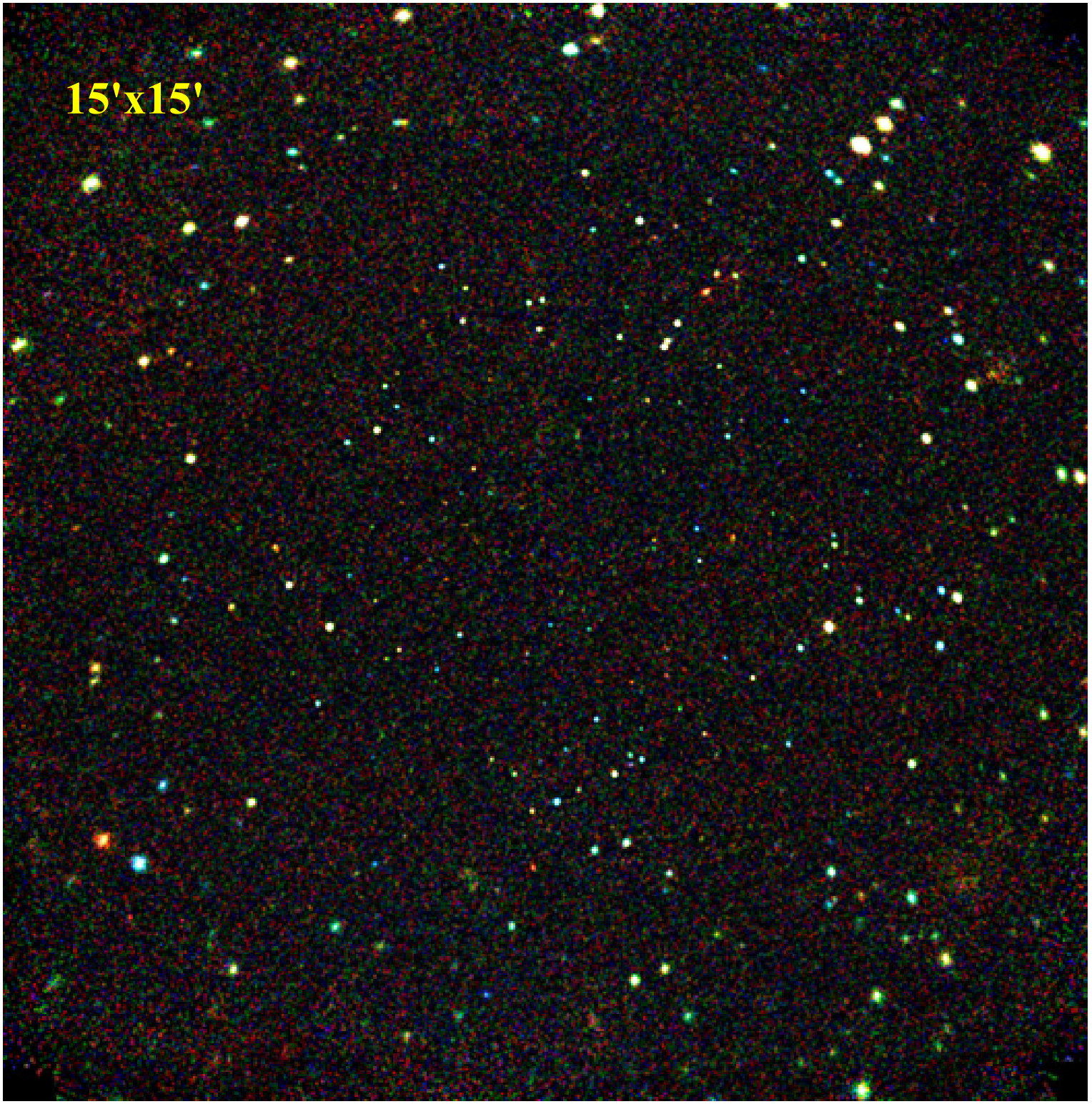
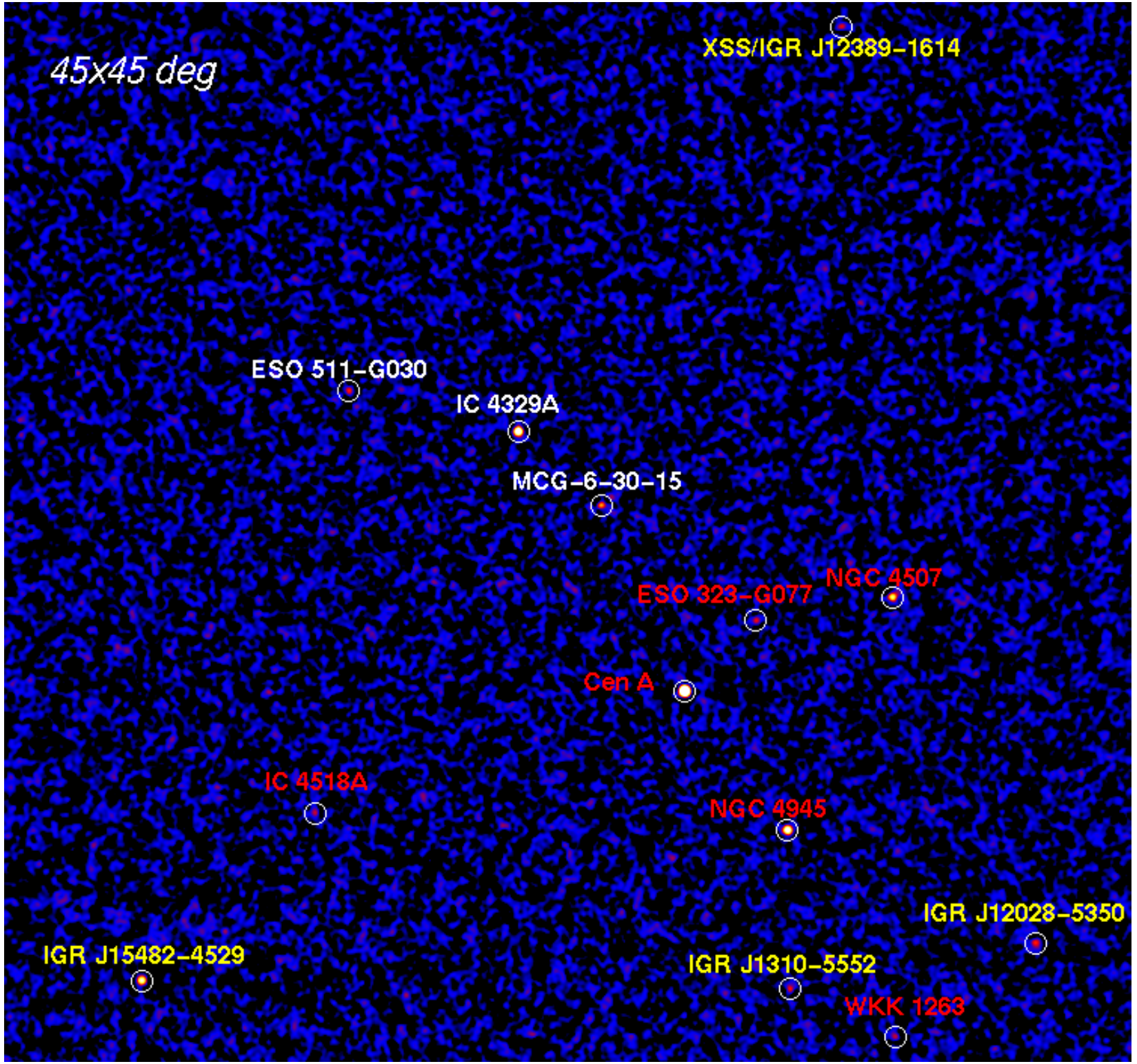
INTEGRAL observations of the Earth

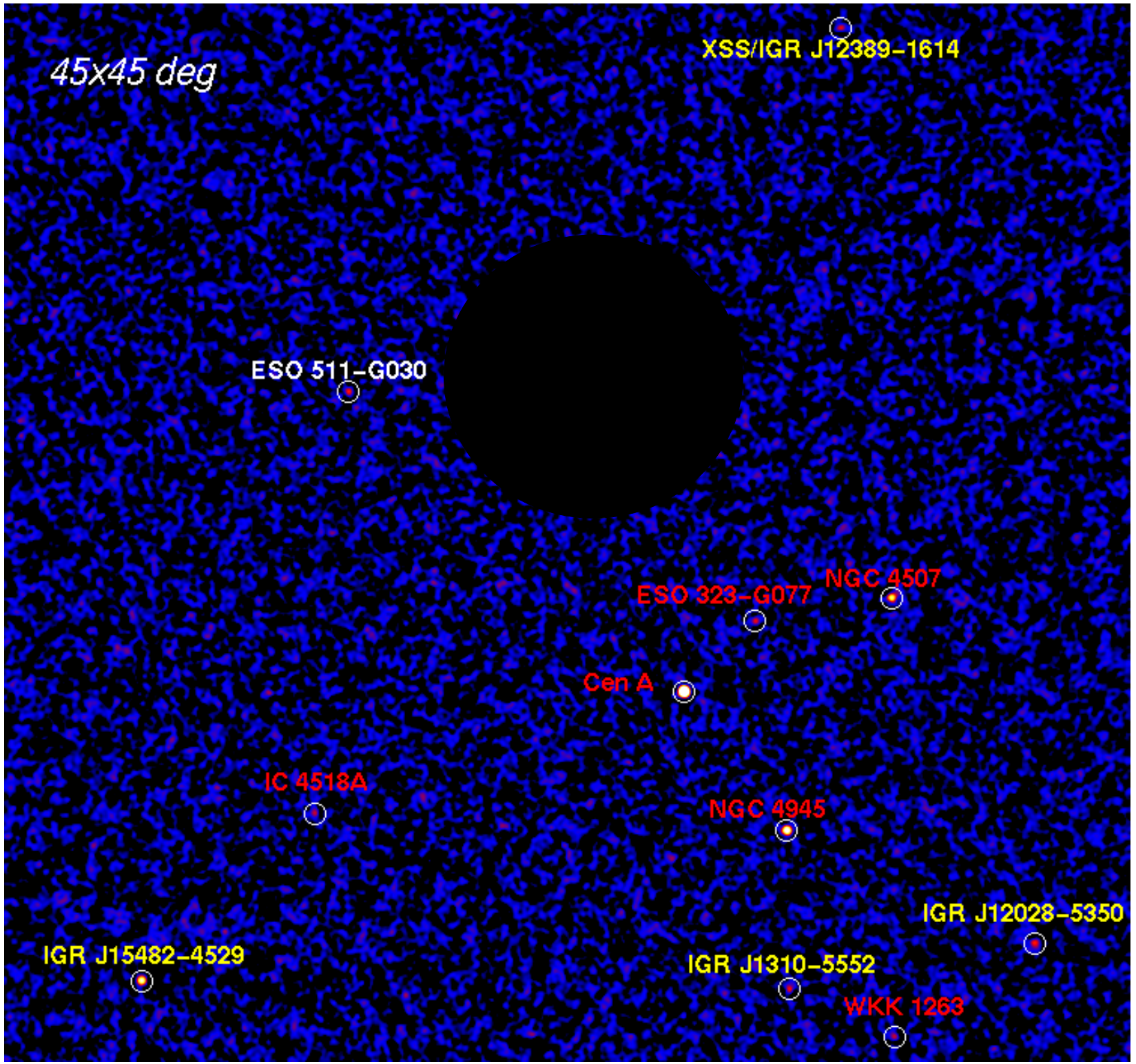




Chandra
0.5-2 keV
80-90% resolved

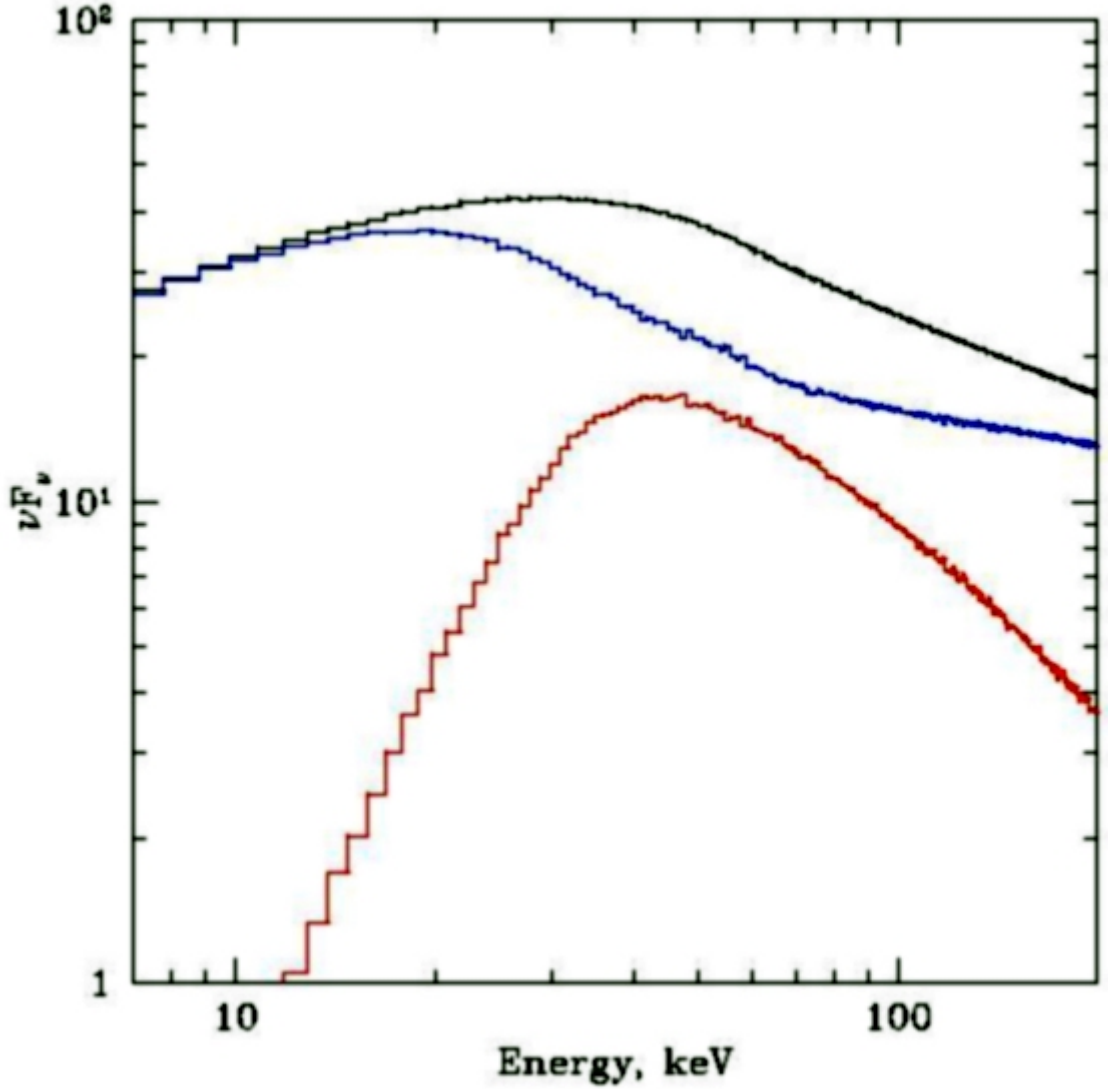


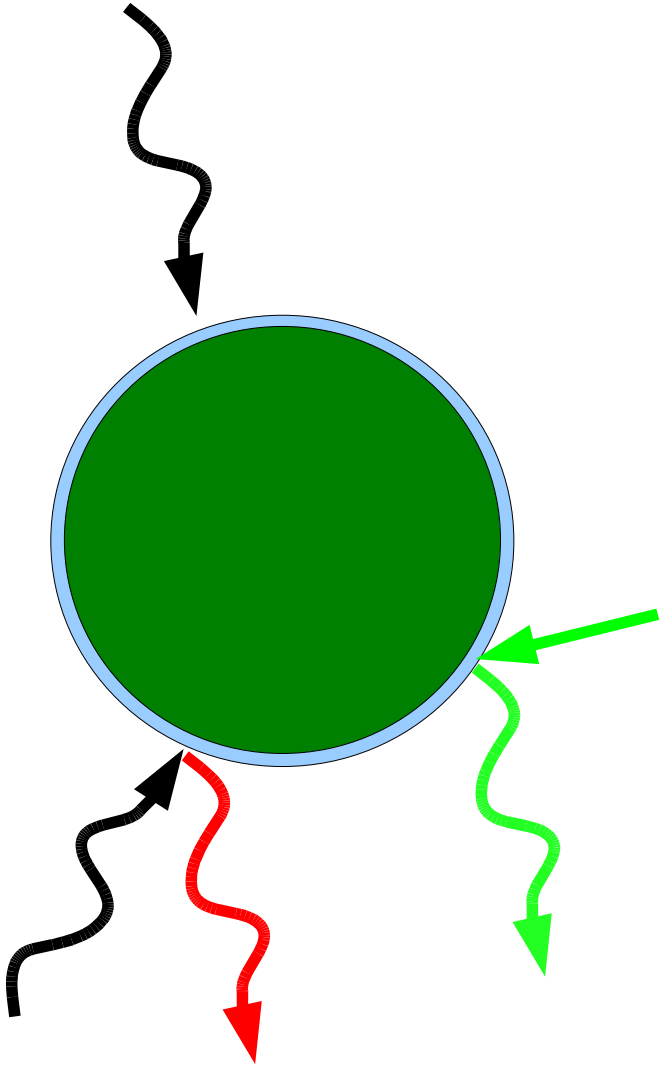
INTEGRAL
20-60 keV
3% resolved



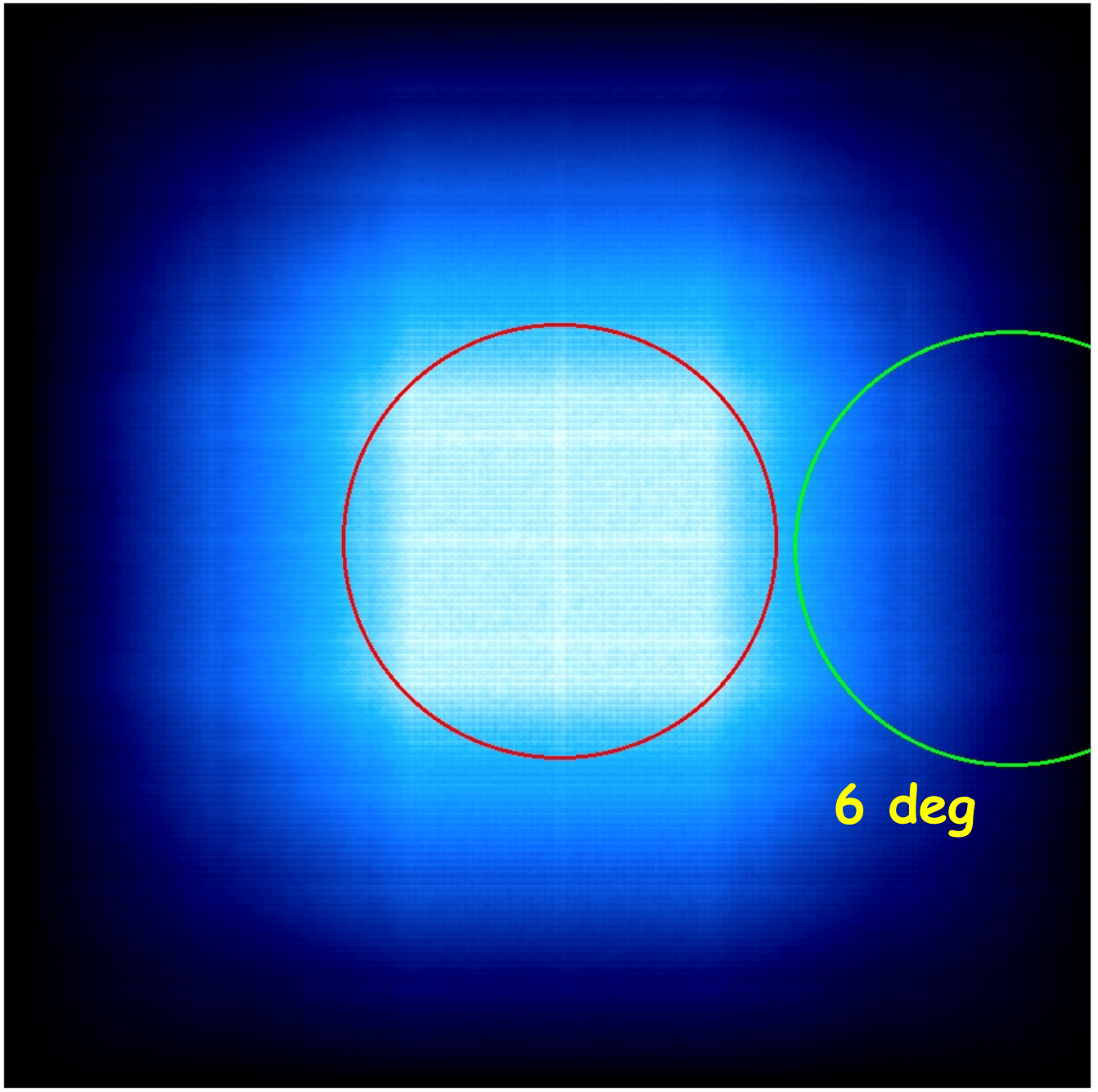
INTEGRAL
20-60 keV
3% resolved

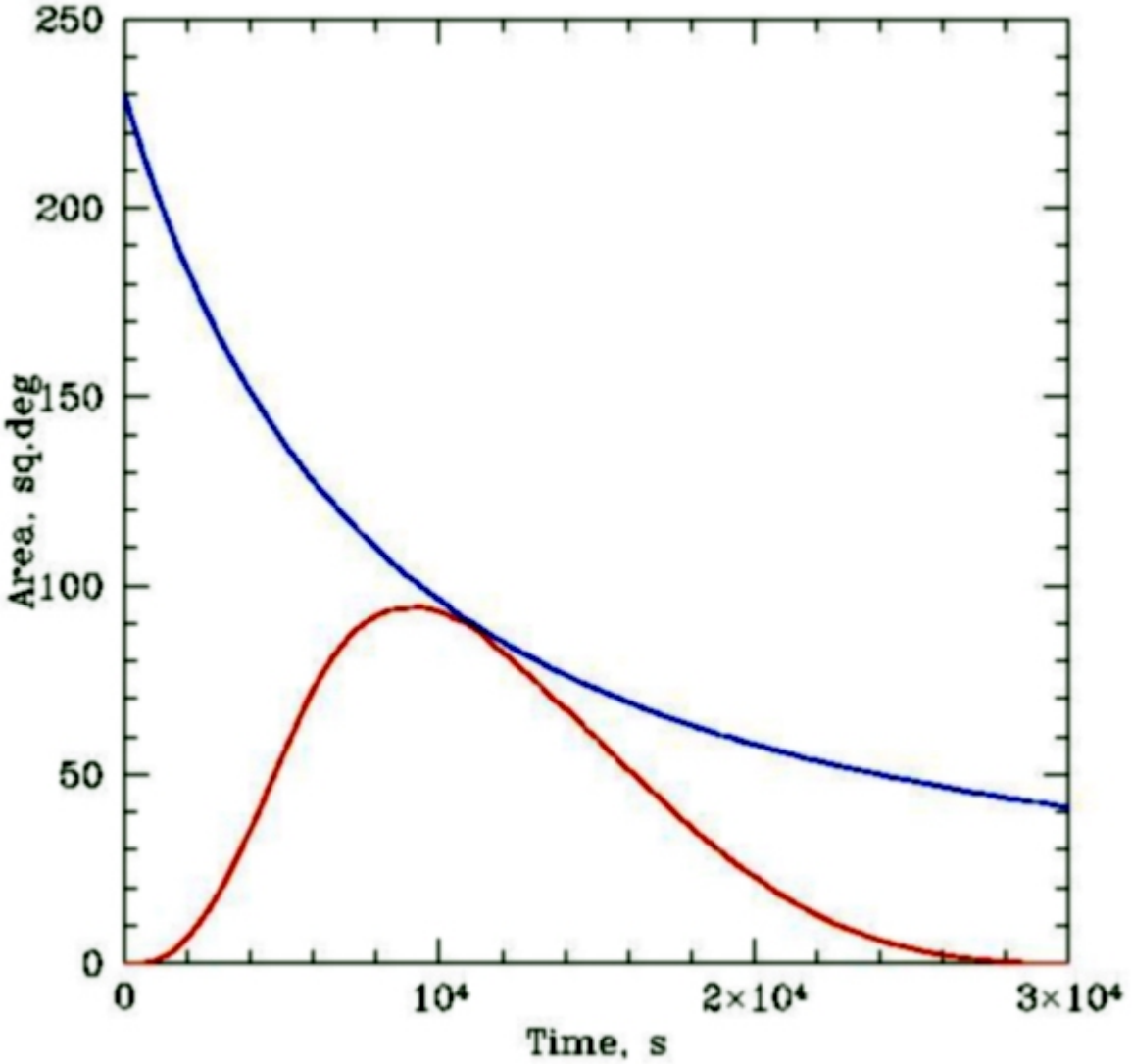
X-ray albedo for N+O atmosphere



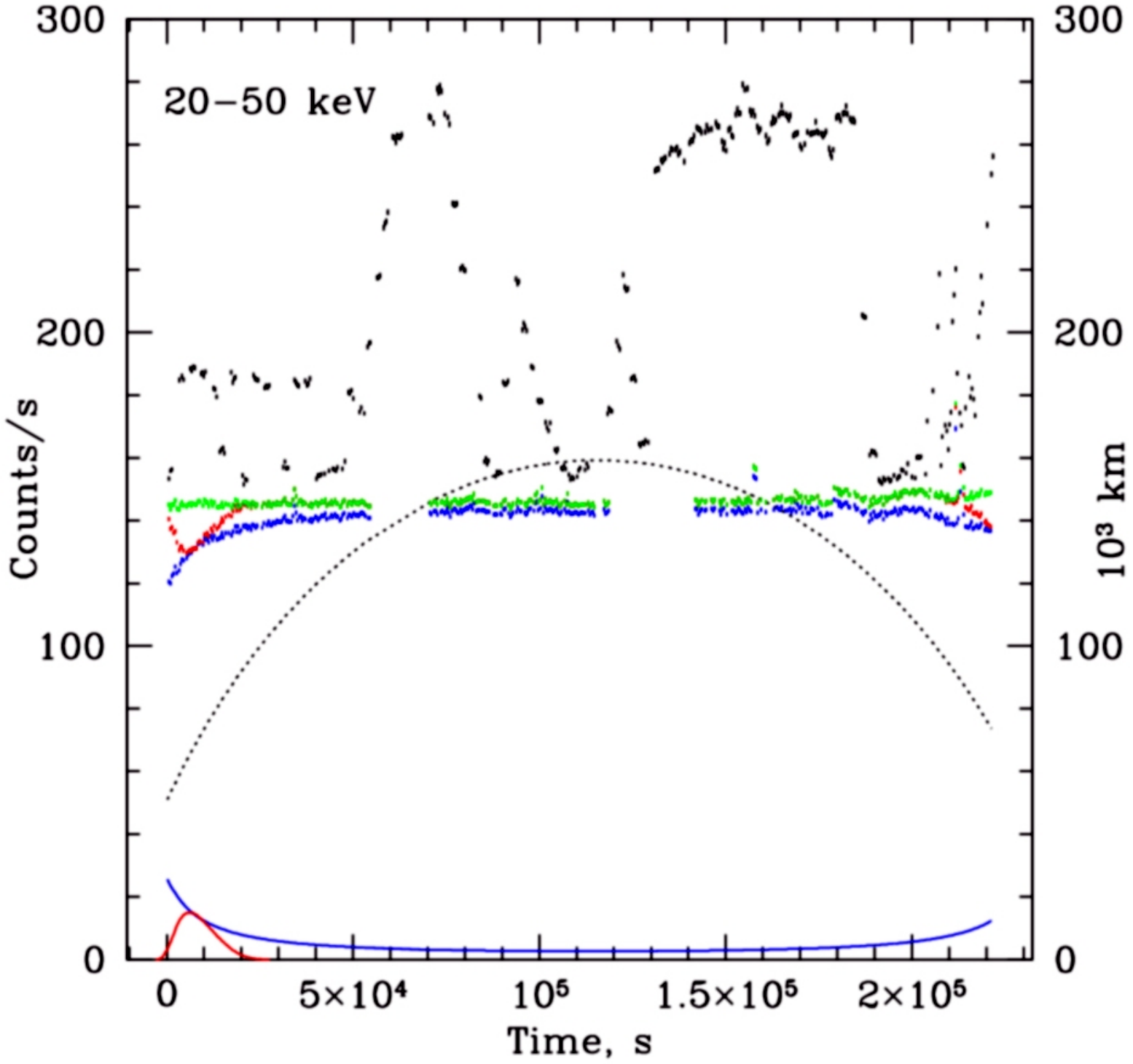


30 degrees



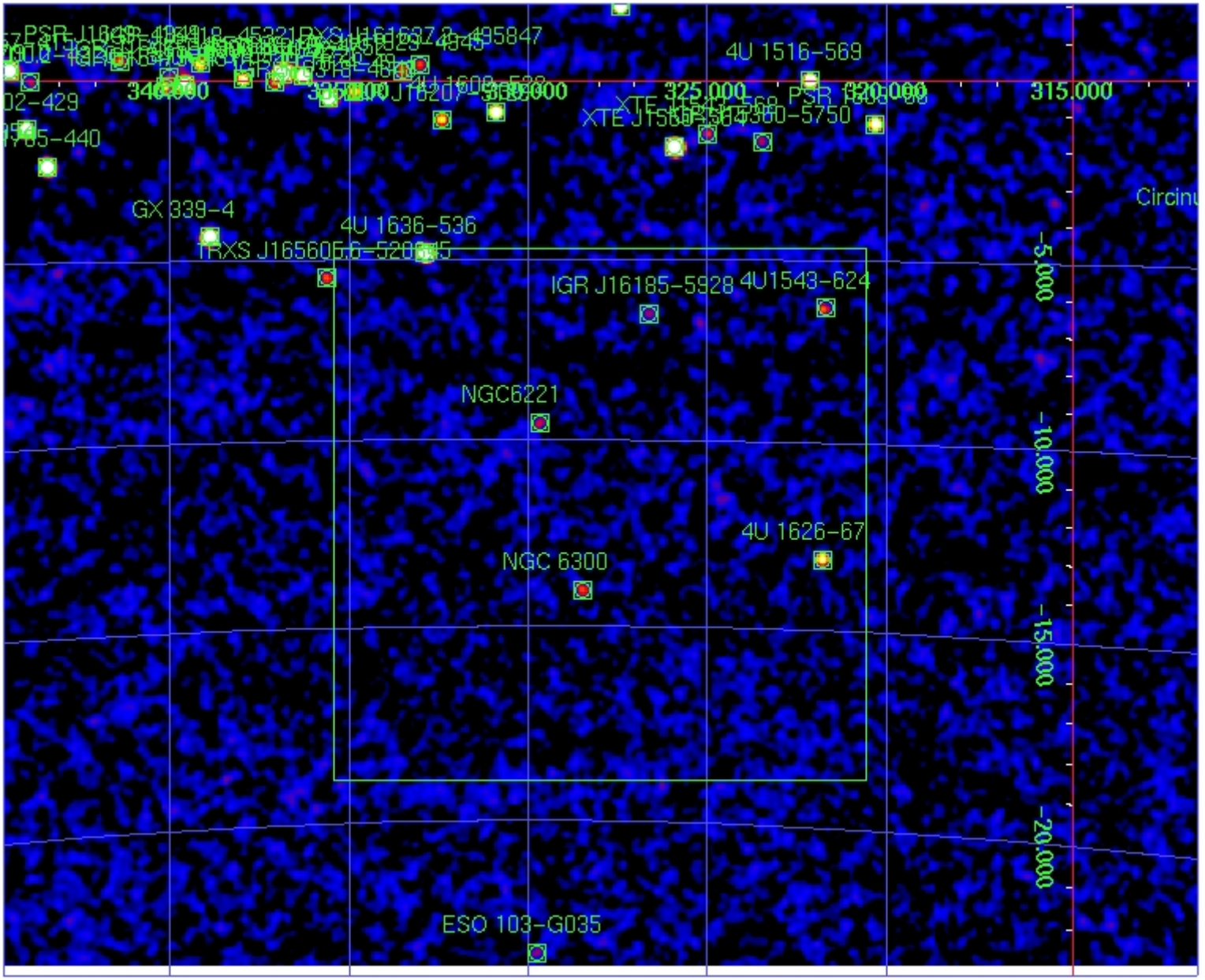


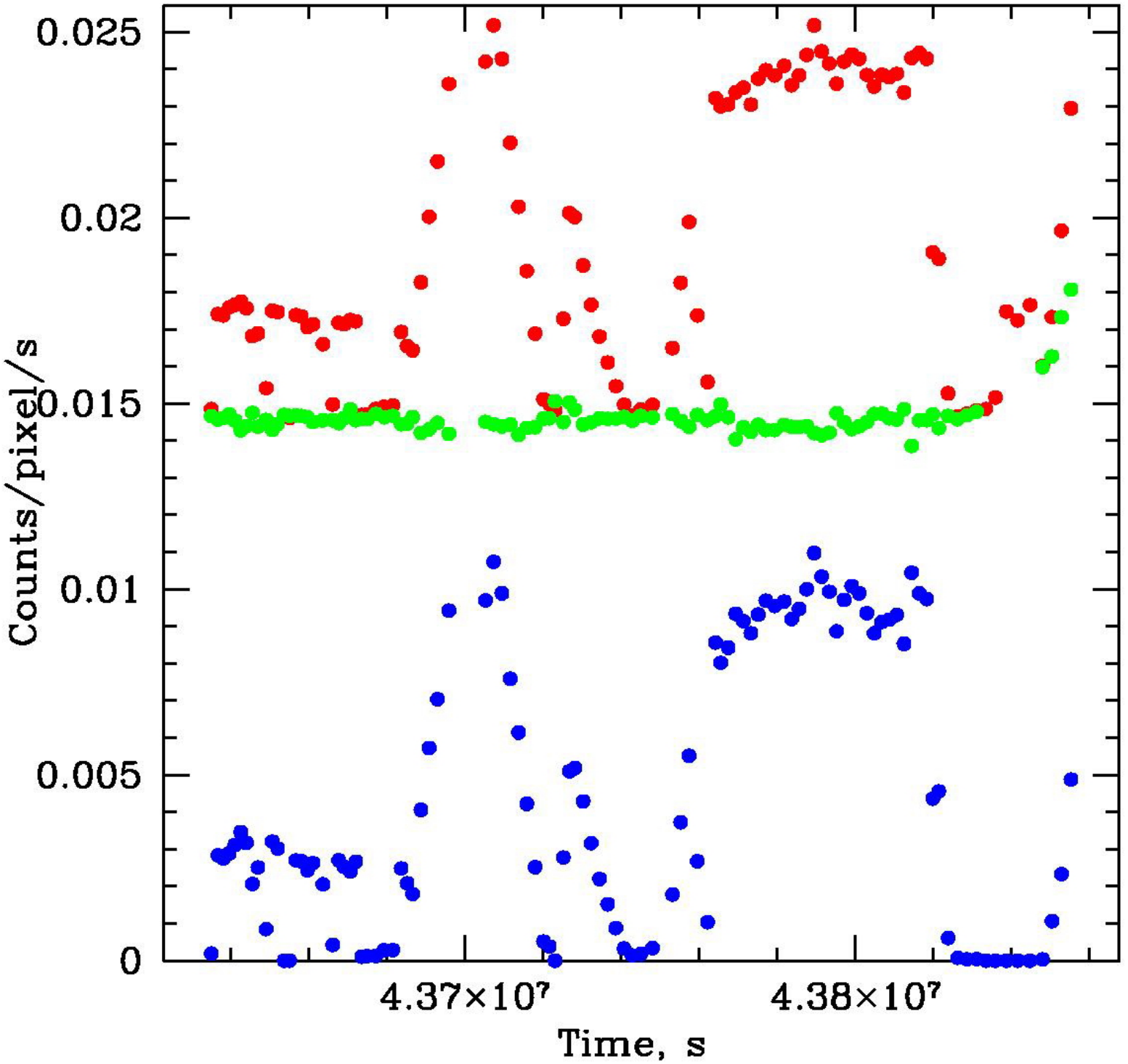
30 ksec observation
equivalent to:
8 ks of on-Earth pointing
@ 60000 km

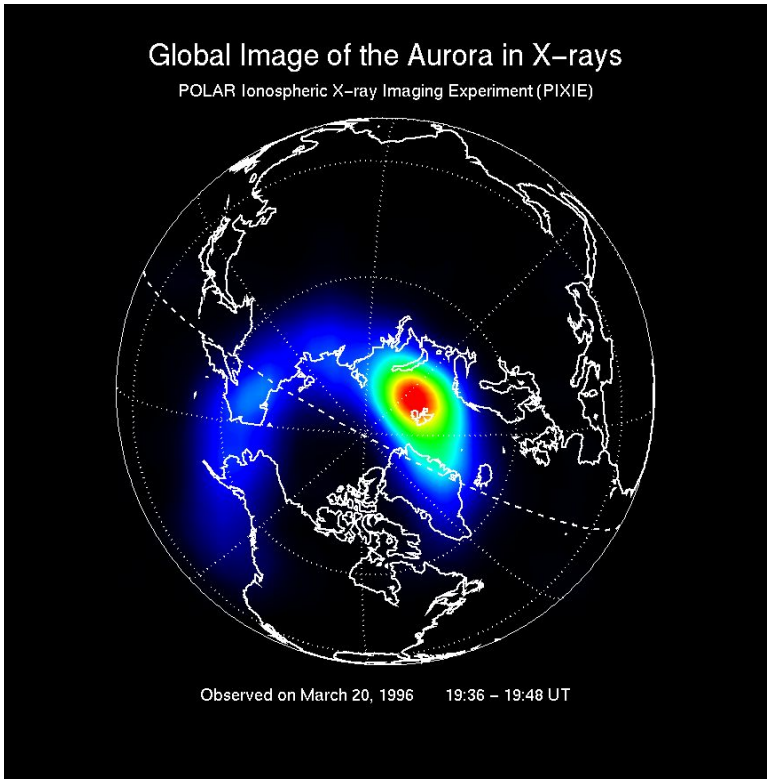

20–50 keV
Counts/s
10^3 km
Time, s
0
100
200
300
0
5×10⁴
10⁵
1.5×10⁵
2×10⁵

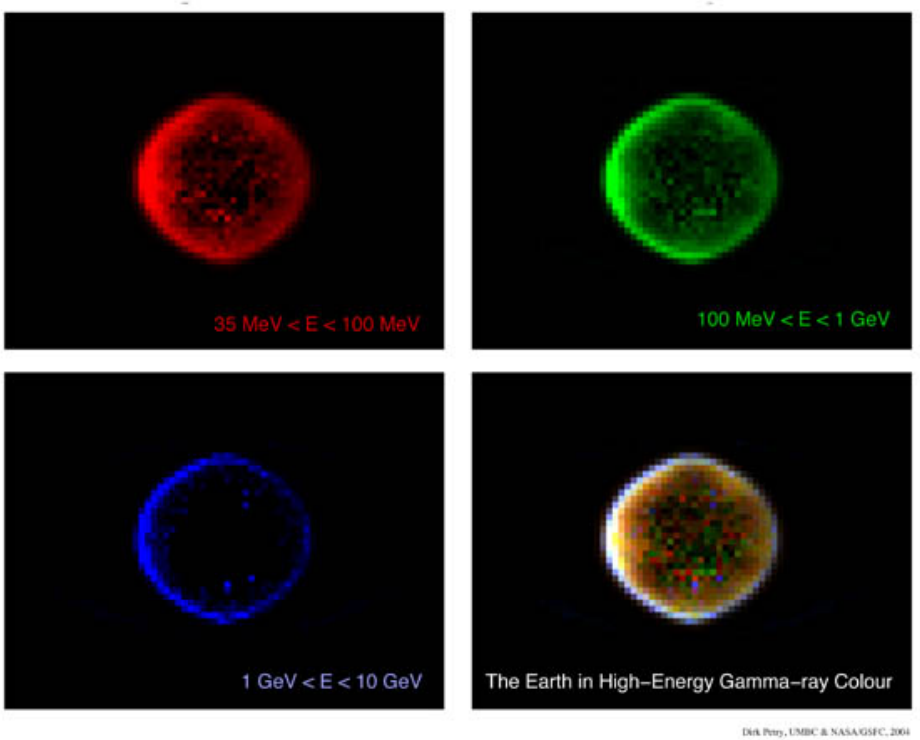
S/N (with X-ray albedo, but without atmospheric emission)

E1	E2	S/N (8 ksec)	S/N (50 ksec)
17	22	70	173
22	29	63	156
29	37	49	122
37	49	37	92
49	63	21	53
63	82	12	30
82	106	10	25
106	138	7	18
138	180	2.8	7


4U 1516-569
325.000
315.000
XTE J1550-564
4U 1543-624
GX 339-4
4U 1636-536
IGR J16185-5928
NGC6221
4U 1626-67
NGC 6300
ESO 103-G035
-5.000
-10.000
-15.000
-20.000

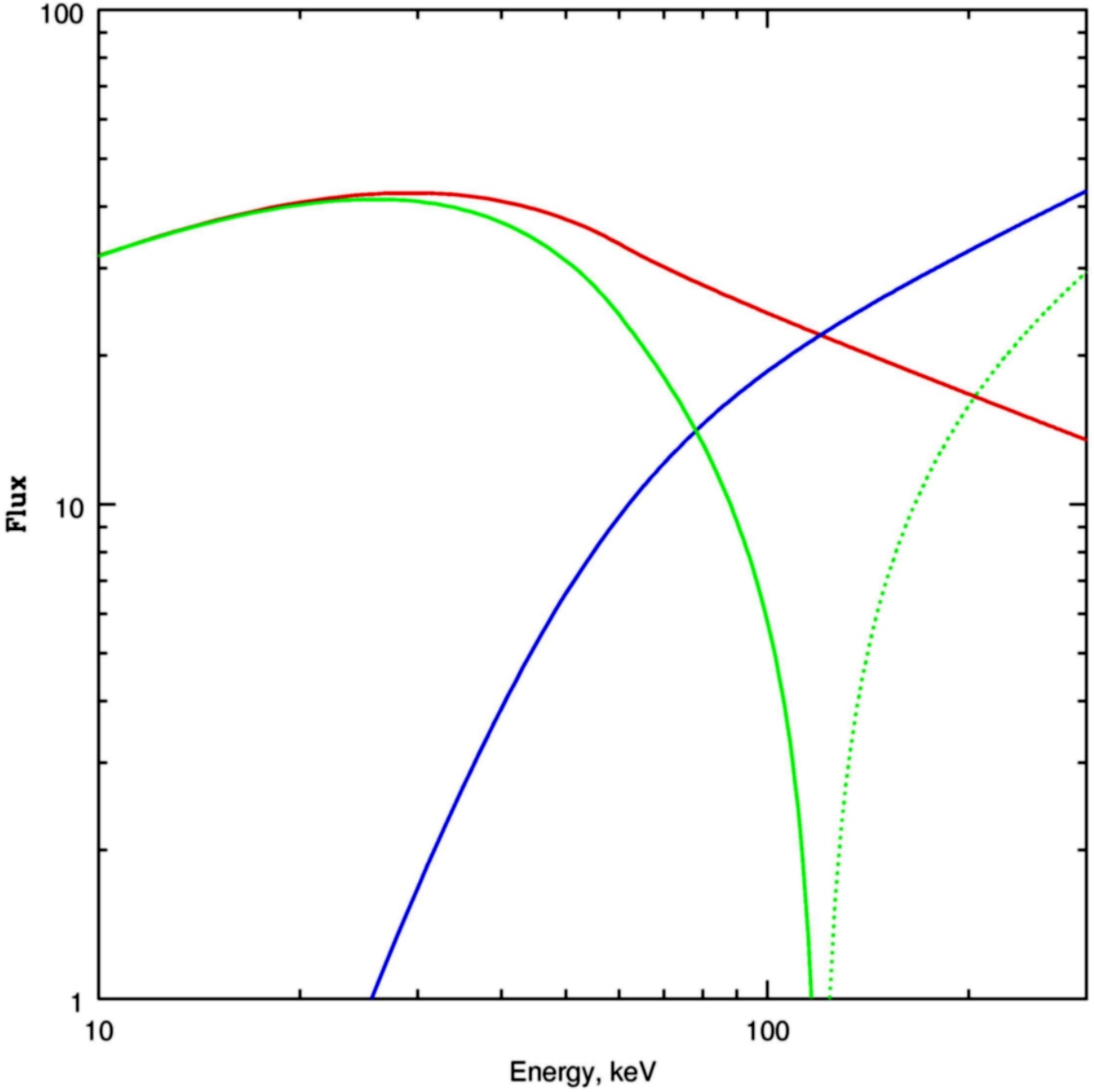

0.025
0.02
0.015
0.01
0.005
0
Counts/pixel/s
4.37×10⁷
4.38×10⁷
Time, s





E < 100 keV: negative CXB

E > 100 keV: positive (atm.emission)



CXB: dark disk

Atmospheric emission: F(Rigidity,r/R,Day/Night)

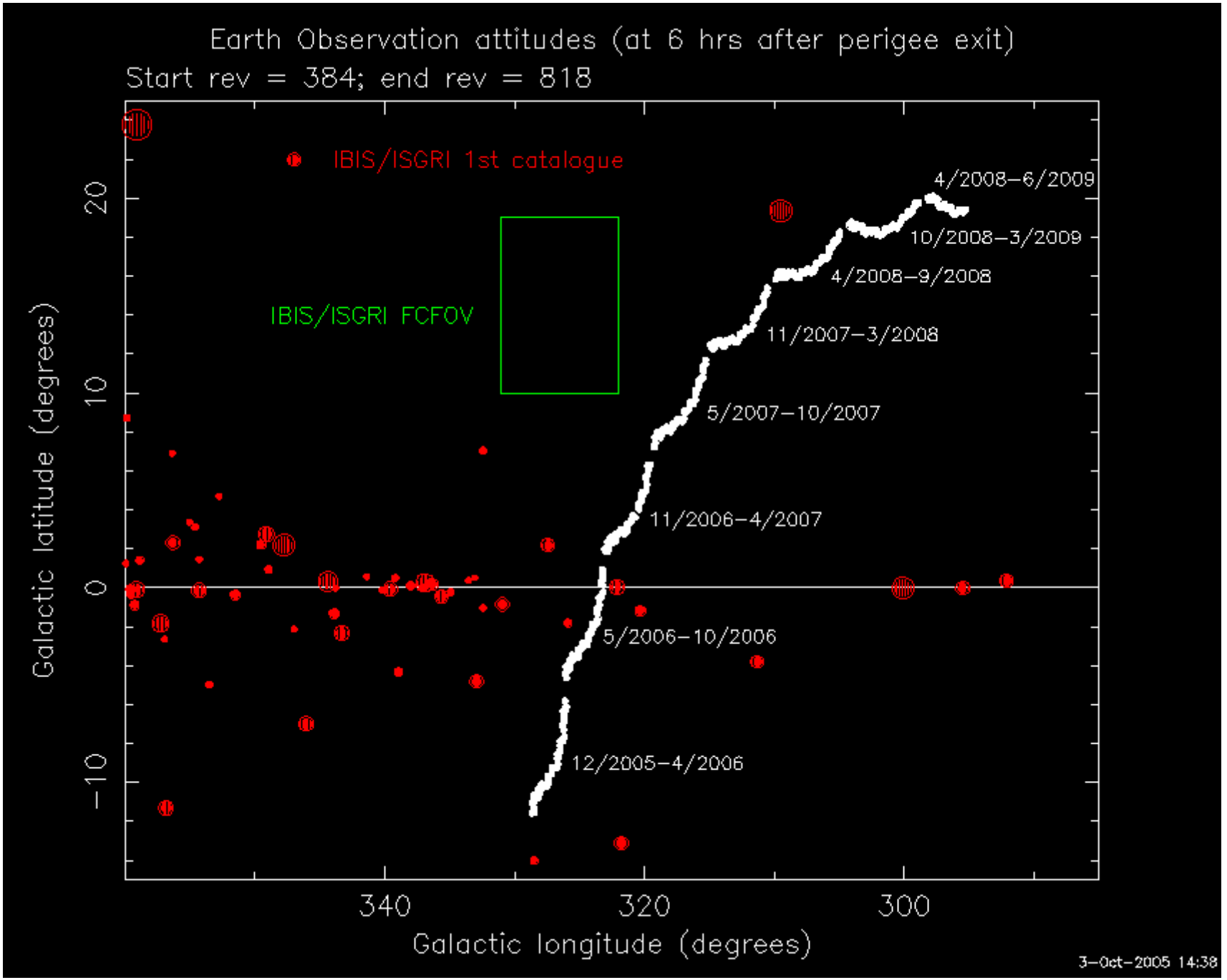
Pseudo-imaging at energies > 50 keV; errors increase by a factor 3-5, depending on the model

511 keV line: $\sim 4\,10^{-3}$ *phot/s/cm*^{2}

E1	E2	S/N (8 ksec)	S/N (50 ksec)
17	22	70	173
22	29	63	156
29	37	49	122
37	49	37	92
49	63	21	53
63	82	12	30
82	106	10	25
106	138	7	18
138	180	2.8	7

Divide by 3-5

- 50 ks at the beginning of revolution
- “Empty field” as the background (behind the Earth)
- Any orientation with respect to the Sun
- Orientation is needed aposteriory
- JEM-X+ISGRI + SPI (~100 mCrab @ 100 keV @ 50000 km
  ~ 50 mCrab @ 500 keV
  ~10-20 mCrab @ 2 MeV)
- Above ~100 keV positive source


Earth Observation attitudes (at 6 hrs after perigee exit)
Start rev = 384; end rev = 818
IBIS/ISGRI 1st catalogue
IBIS/ISGRI FCFOV
4/2008–6/2009
10/2008–3/2009
4/2008–9/2008
11/2007–3/2008
5/2007–10/2007
11/2006–4/2007
5/2006–10/2006
12/2005–4/2006
Galactic latitude (degrees)
20
10
0
−10
340
320
300
Galactic longitude (degrees)
3–Oct–2005 14:38