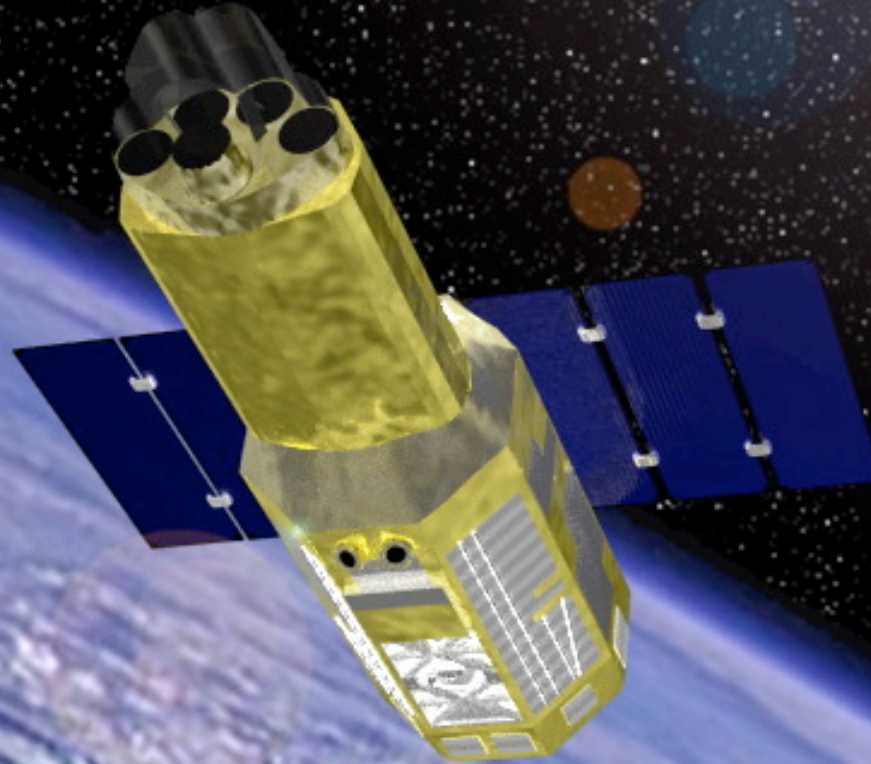


Suzaku Status



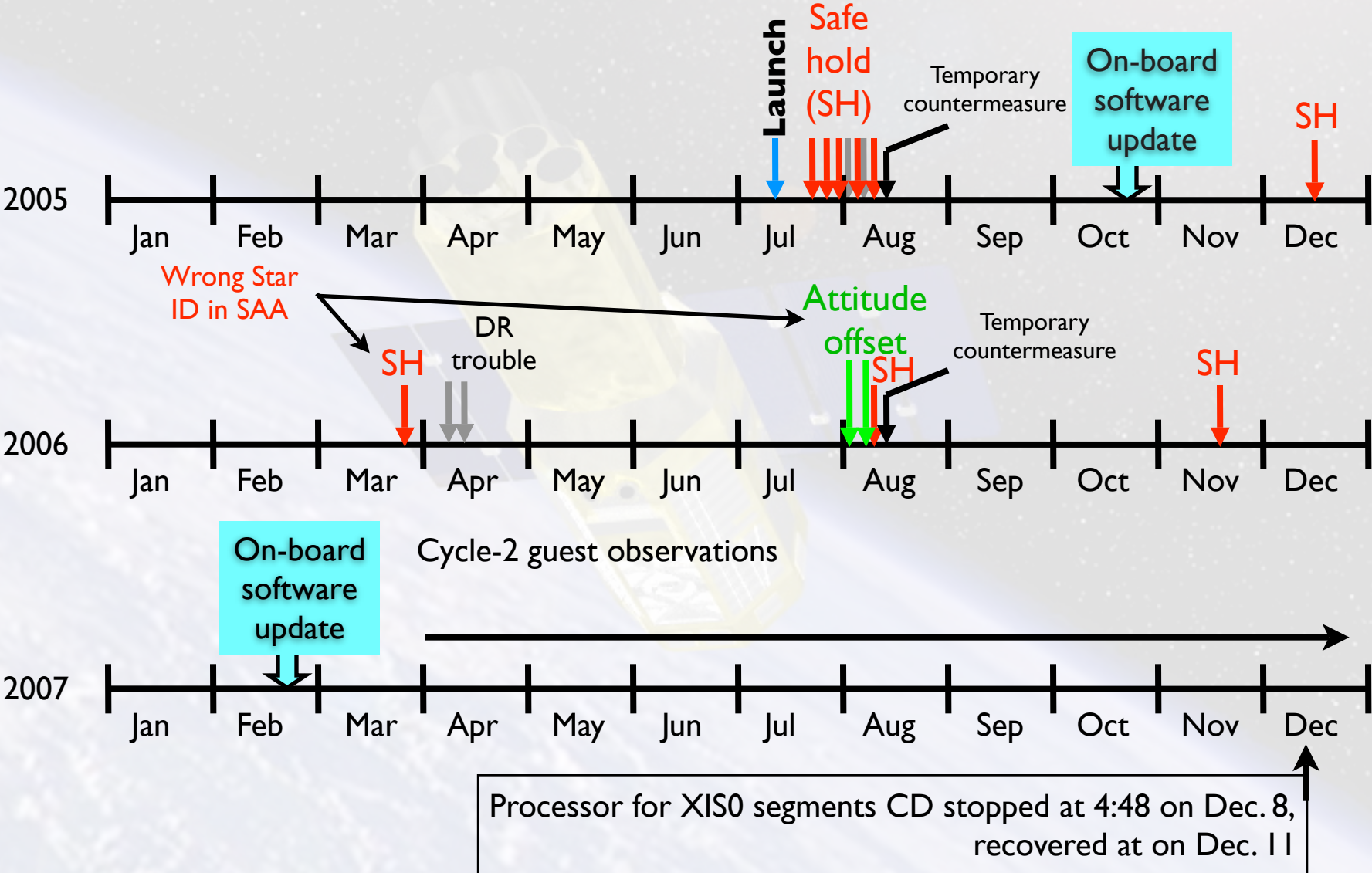
K. Mitsuda (ISAS/JAXA)
on behalf of operation/processing/hardware teams
December 12, 2007

Outline

- Satellite status
 - Overall status of Suzaku since the launch
- Operational status
 - Status of the tracking station
 - Conflict with other satellites
- Detector status
 - Summary of XIS/HXD status
- Observational status
 - Cycle 1 (AO1) and Cycle 2 (AO2) observations

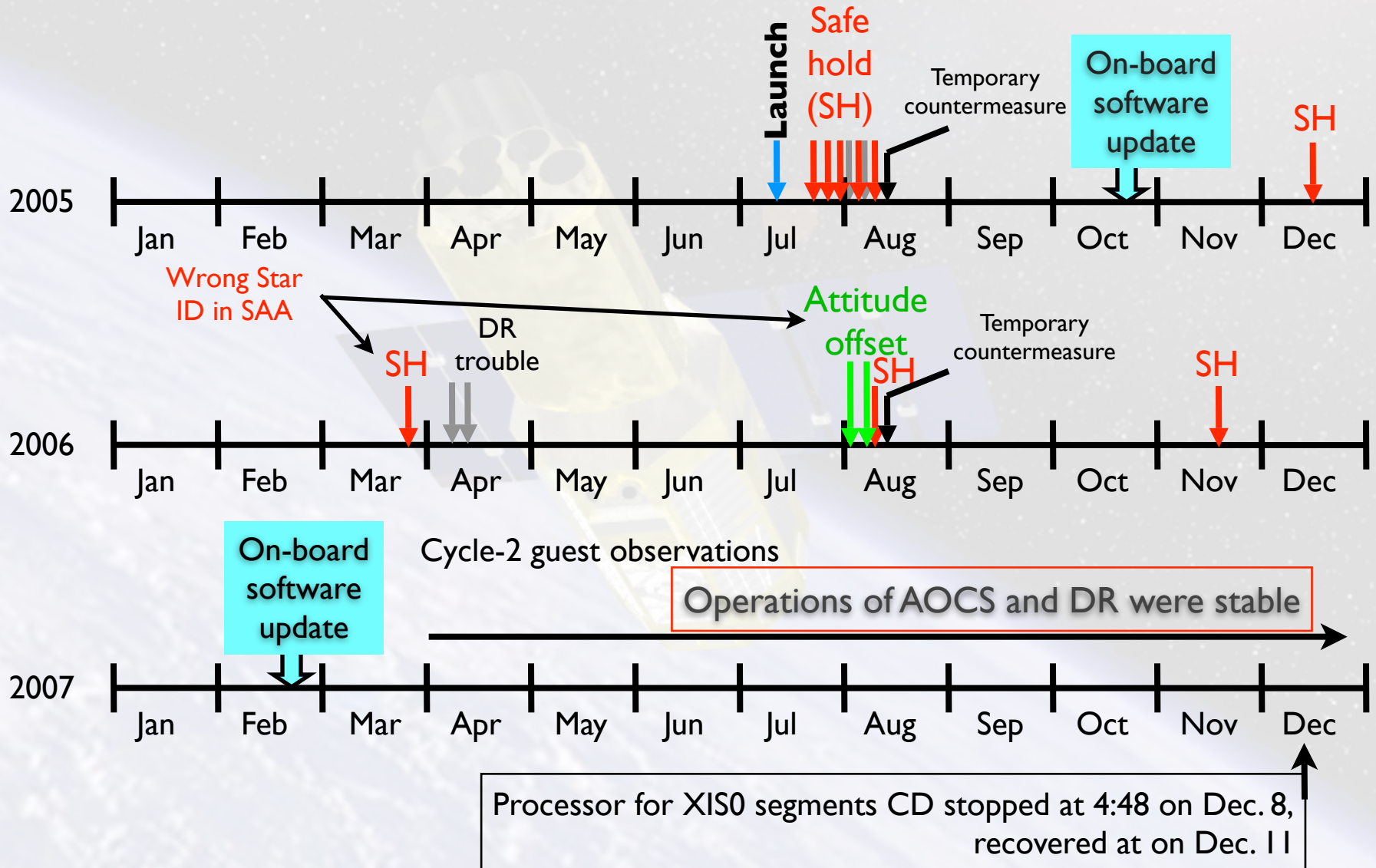
Satellite status

Troubles in Attitude control system & Data recorder



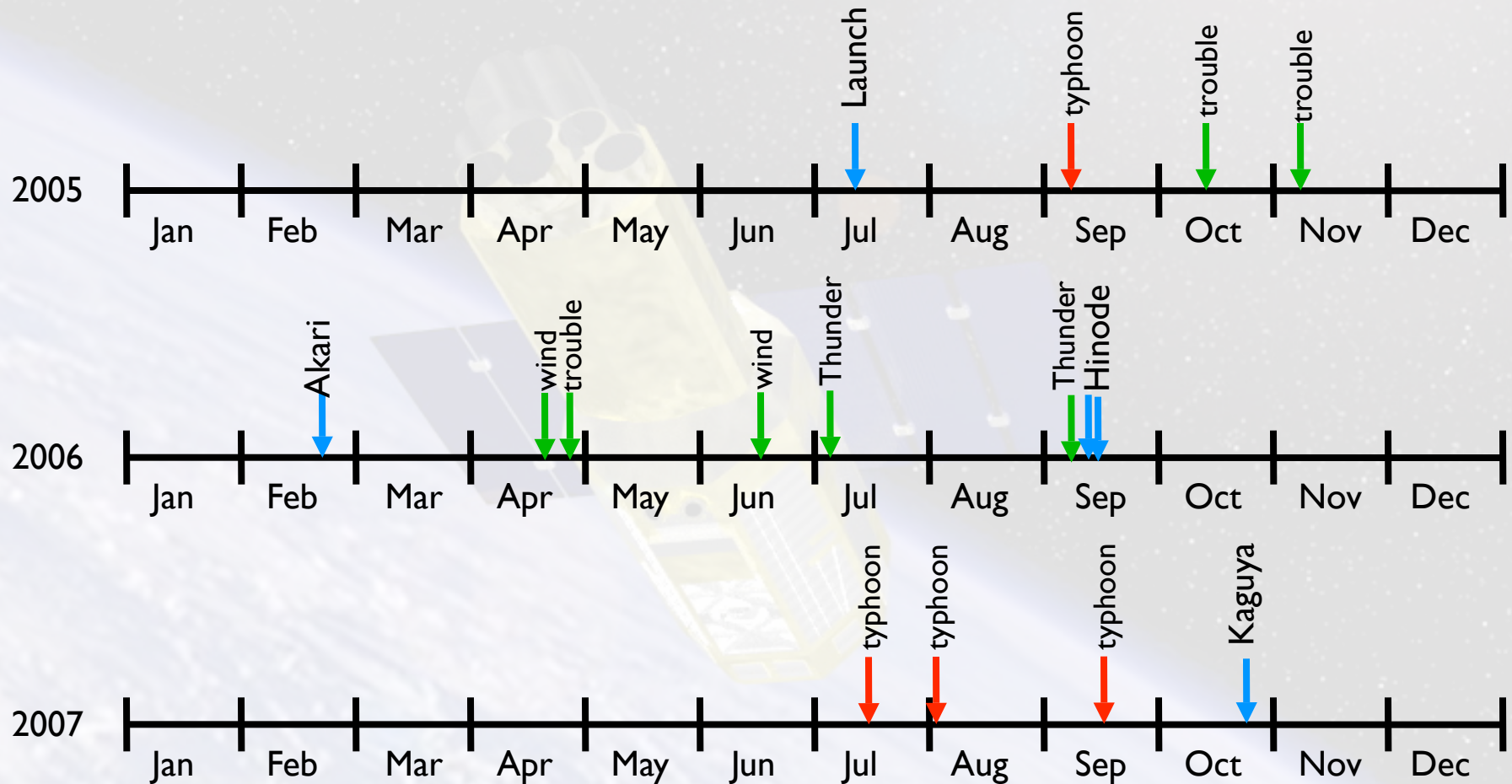
Satellite status

Troubles in Attitude control system & Data recorder



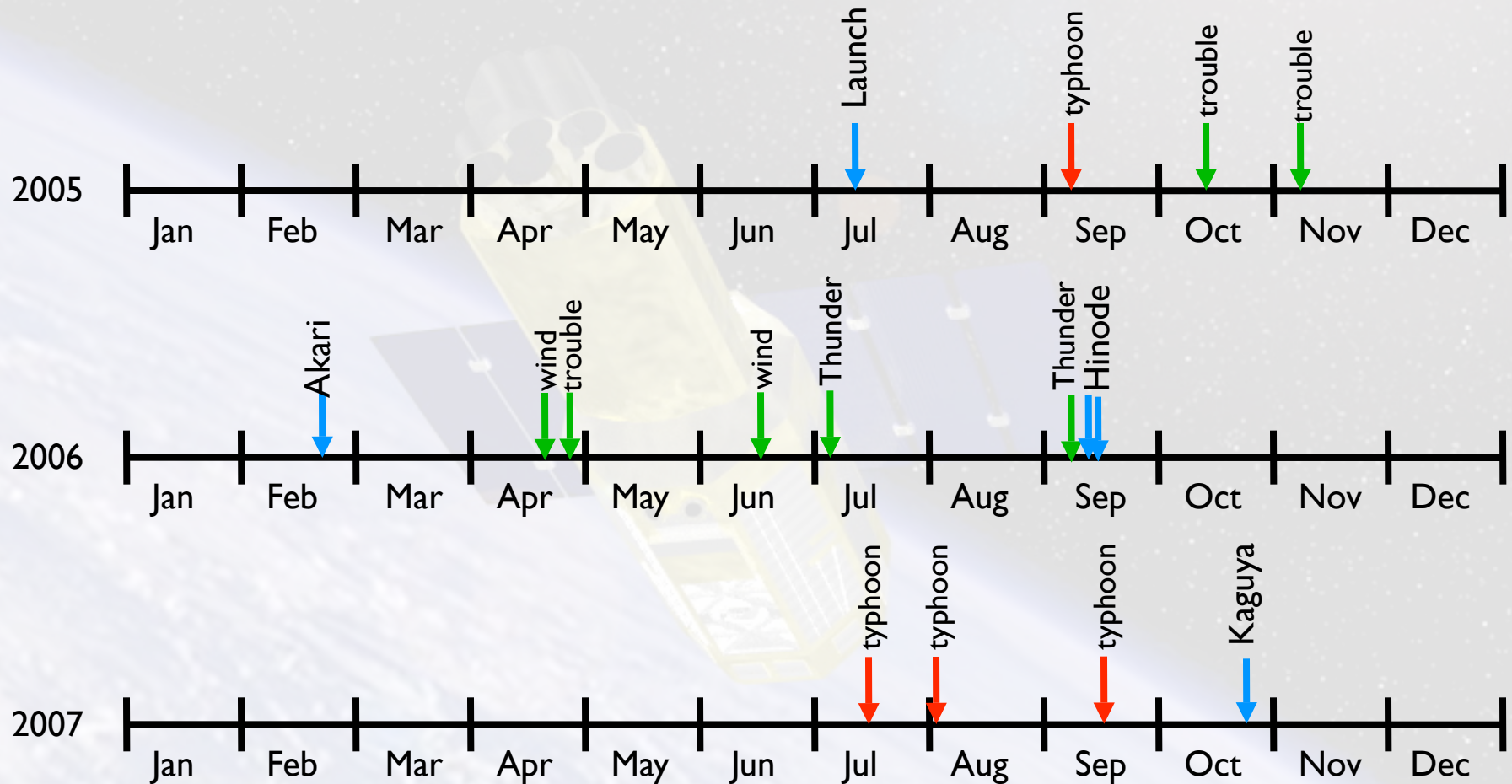
Satellite status: Daily operations

Losses of satellite contacts



Satellite status: Daily operations

Losses of satellite contacts

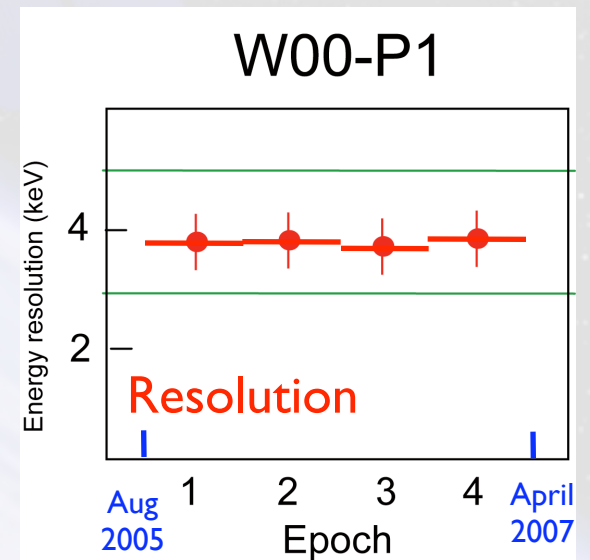
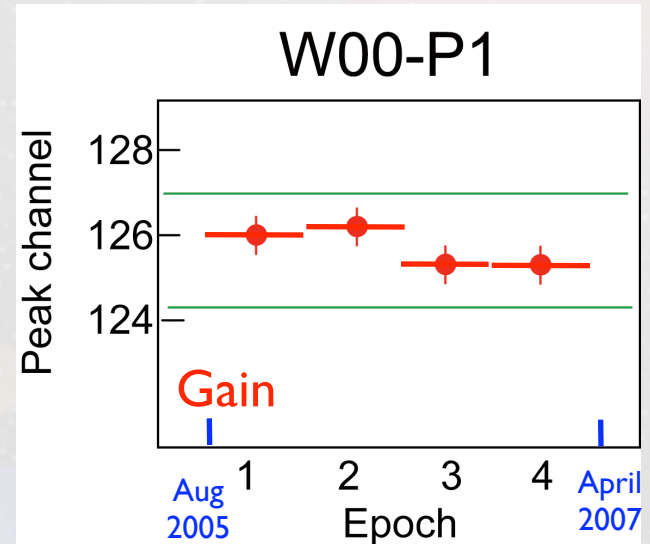
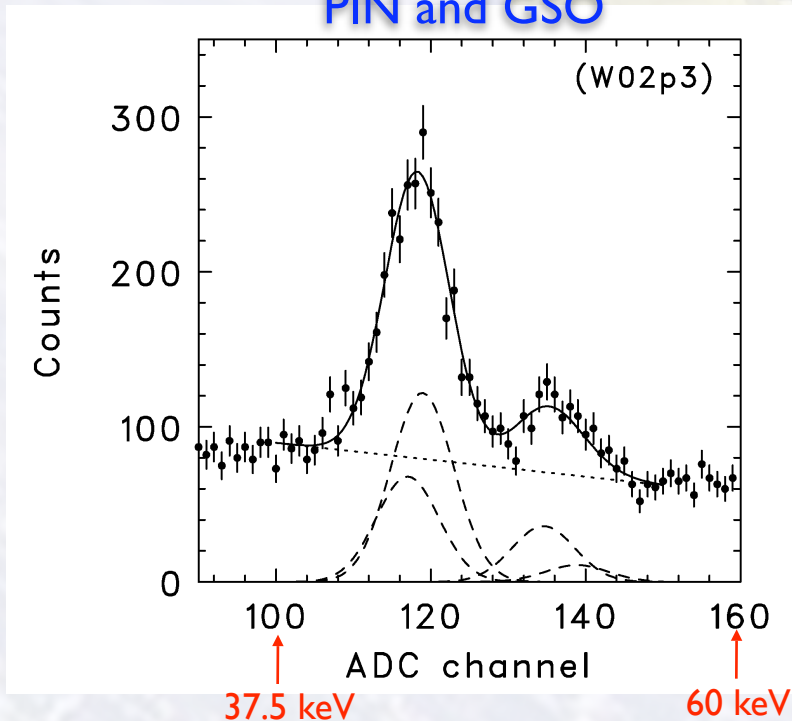


Hardware troubles of the tracking station are much reduced in 2007.

HXD PIN: Long-term stability

Both the energy scale and resolution of HXD/PIN are monitored using the fluorescent lines from Gd.

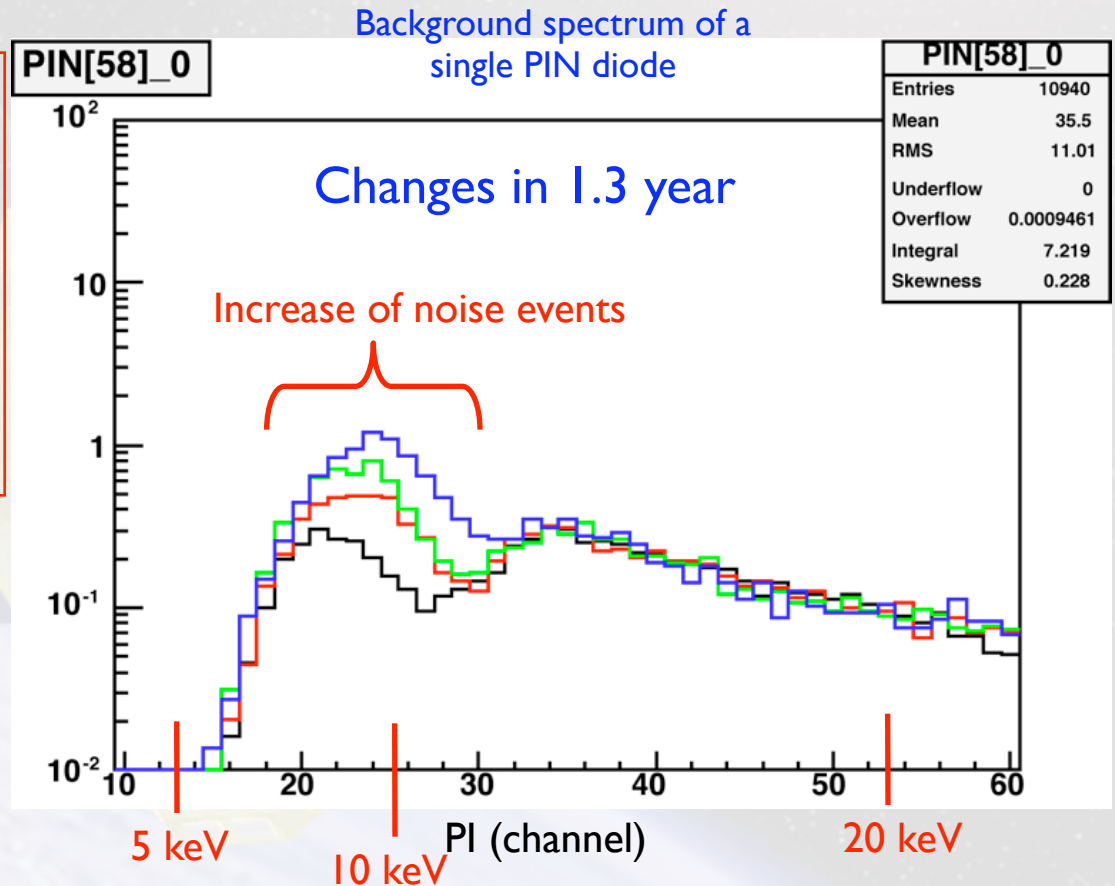
Energy spectrum of a single PIN diode obtained with the coincident events of PIN and GSO



HXD PIN: In-Orbit Degradation

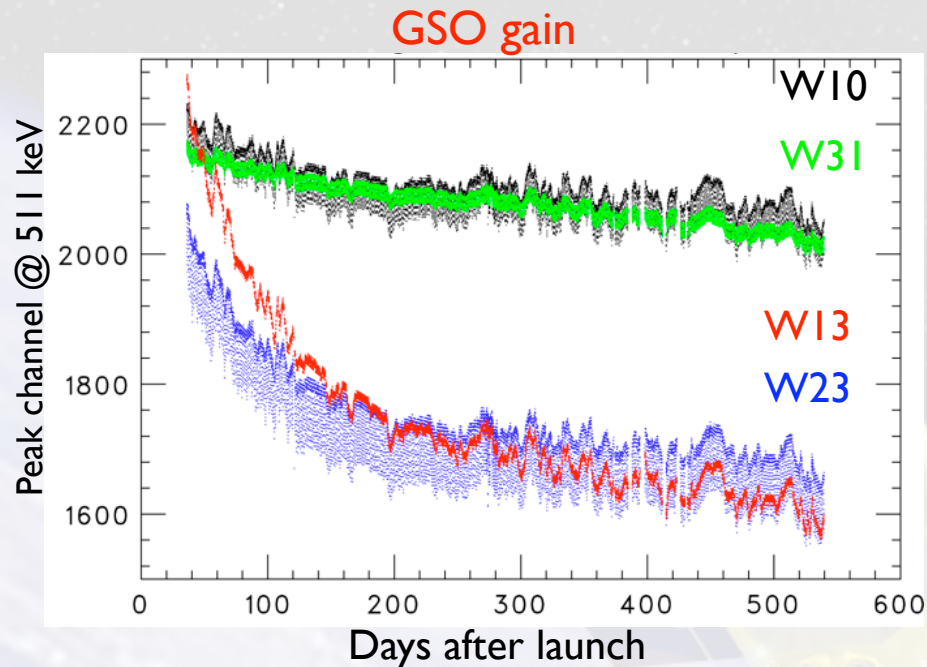
Due to the radiation damage in the space environment, significant increase of the noise events is observed in the Si PIN diodes.

epoch1 : 2005.08.19 -- 2005.12.30
epoch2 : 2006.01.04 -- 2006.05.31
epoch3 : 2006.06.04 -- 2006.10.31
epoch4 : 2006.11.02 -- 2007.03.31

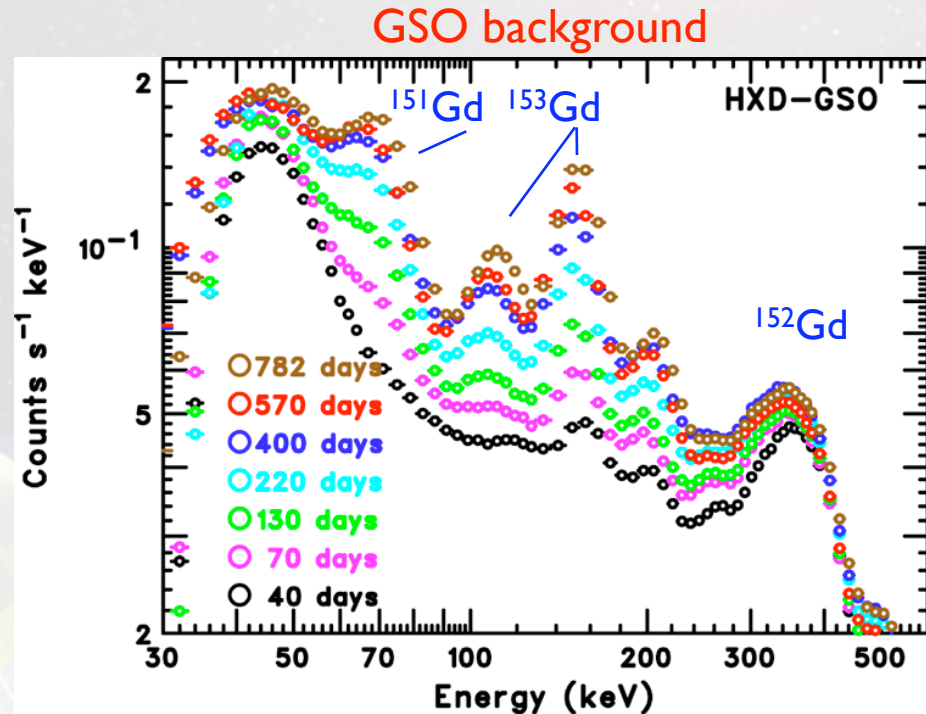


The increase of the noise events is suppressed by reducing the bias voltage from 500V to 400V.

HXD GSO: Long-term changes of gain and background



Some of the PMTs show significant decrease in gain due to the in-orbit radiation damage. Short-term variations due to the temperature fluctuations are also observed.

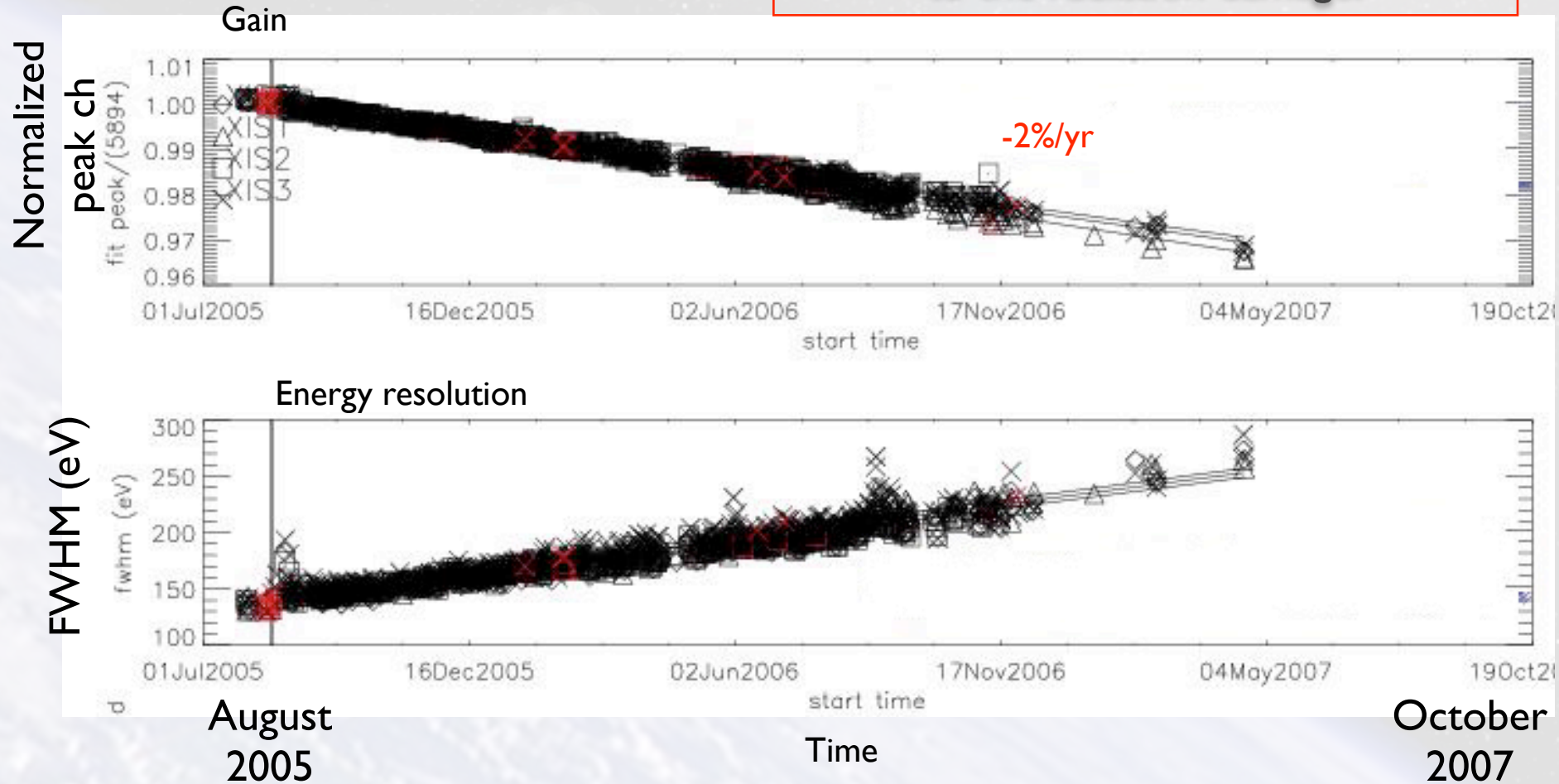


The activation background of GSO scintillators has increased gradually (as expected before launch), but is close to saturation.

Long-term change of the CCD performance

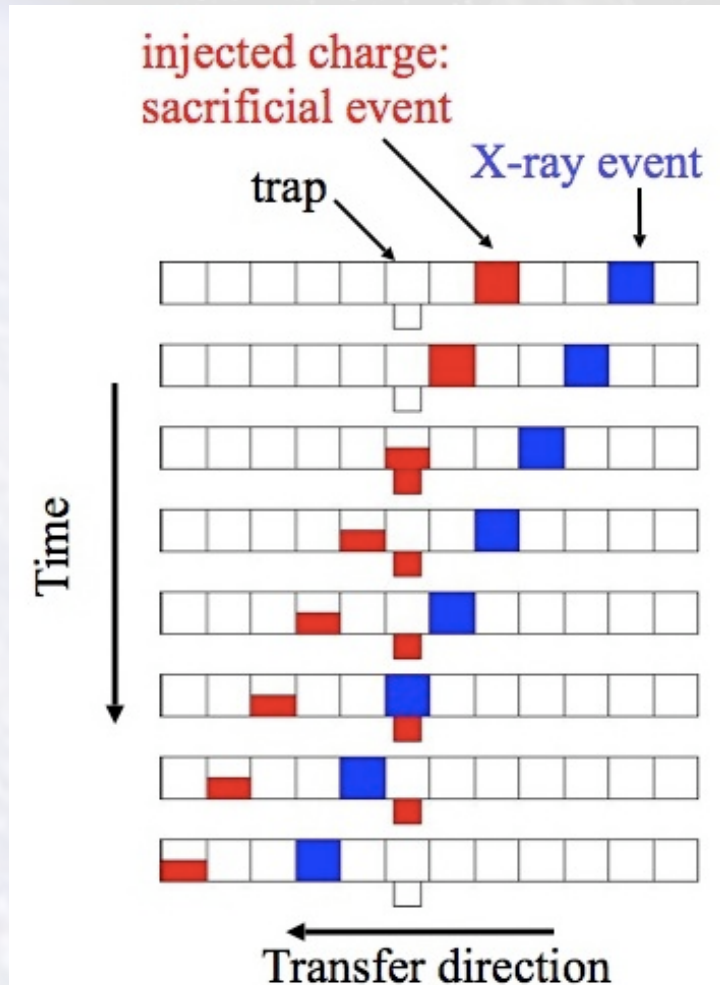
Monitoring data of ^{55}Fe

Performance is gradually degrading due to the radiation damage.

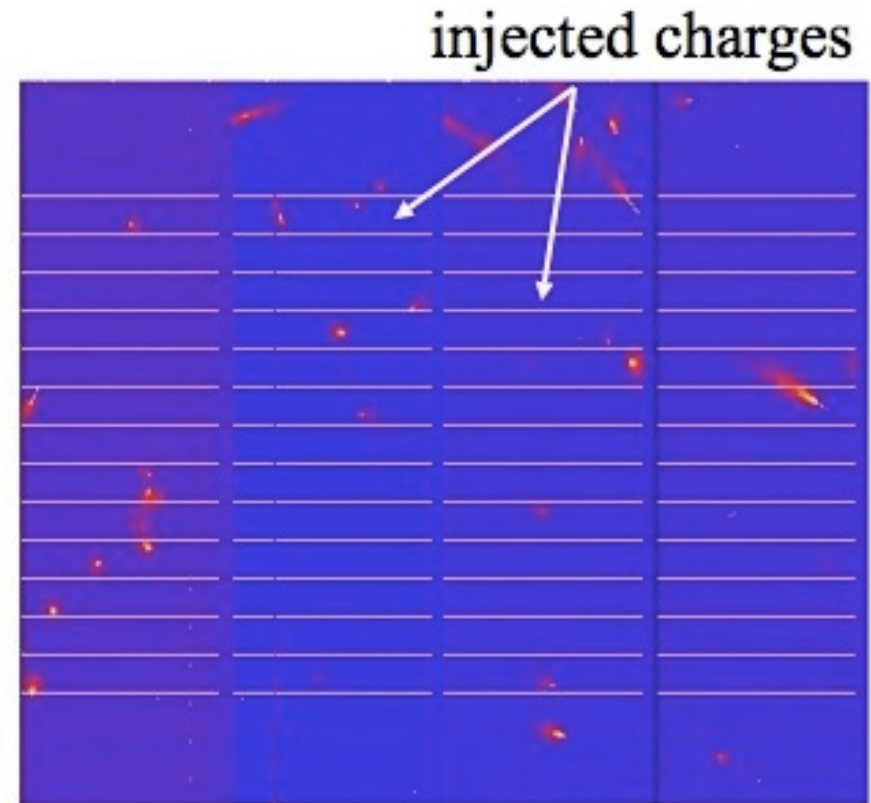


Spaced-row Charge Injection (SCI)

Injected charge will fill the traps to improve the charge transfer efficiency.



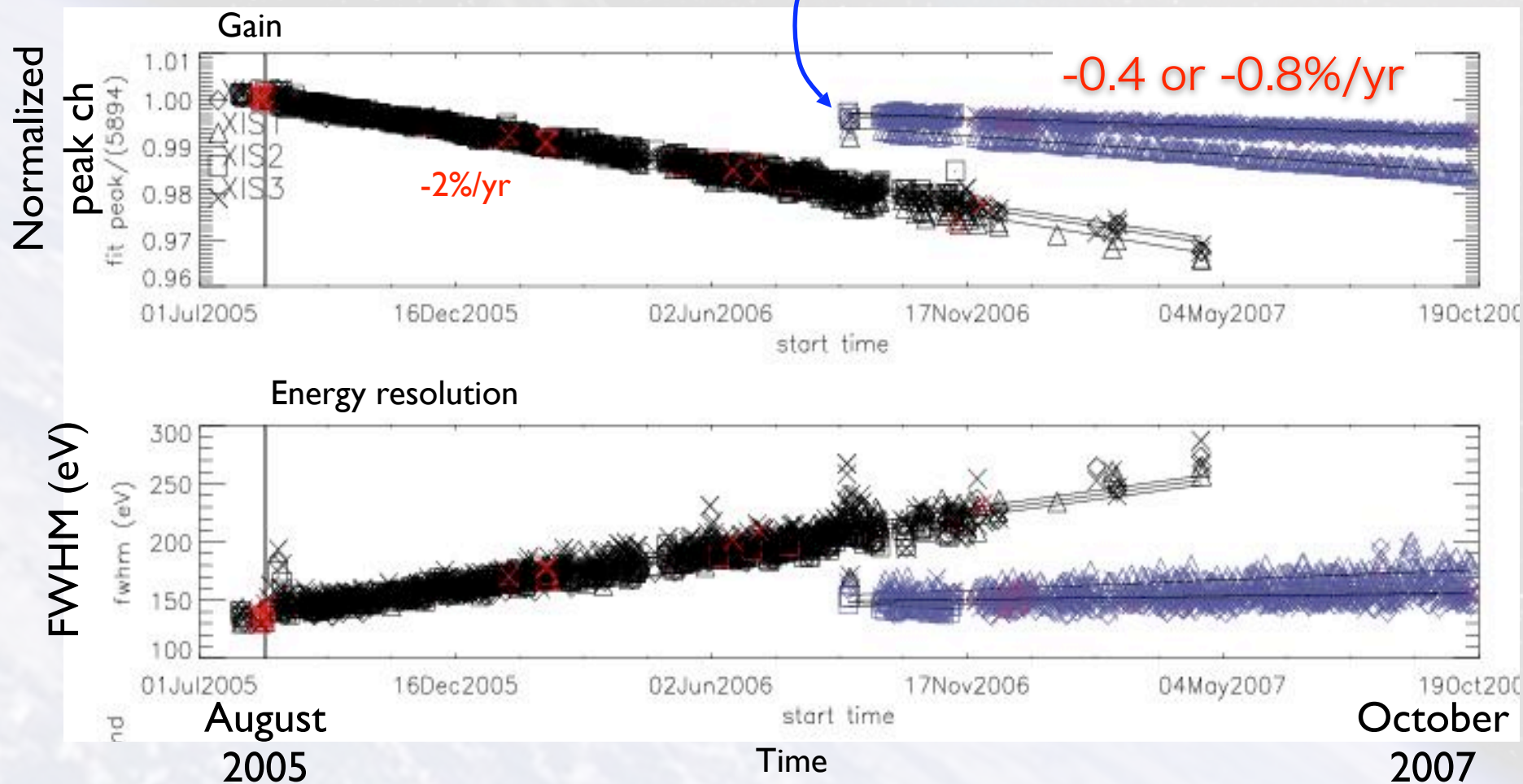
Sample image of XIS with SCI



Injected charge will not be read out in normal operation.

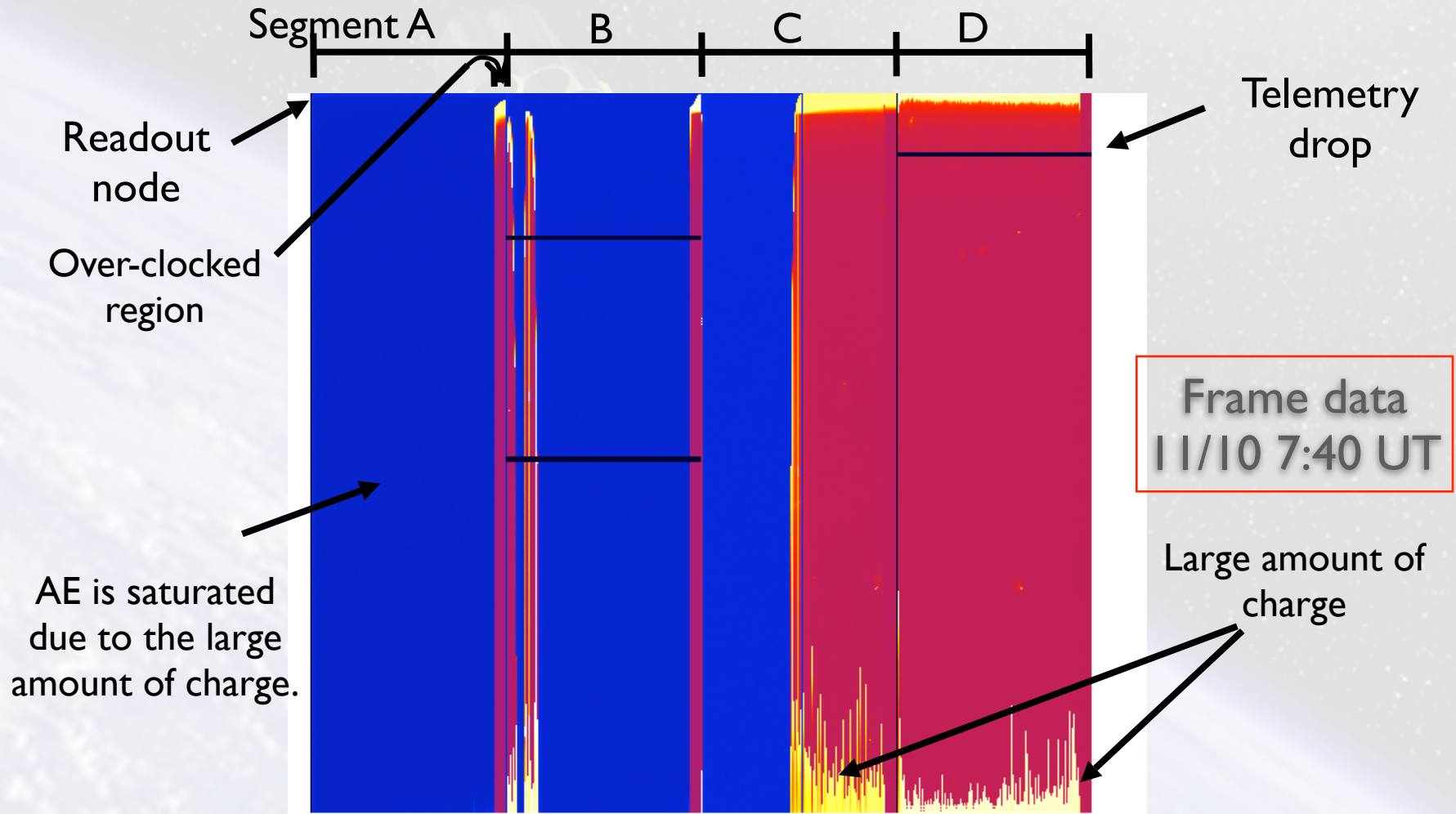
Effectiveness of the charge injection

Monitoring data of ^{55}Fe

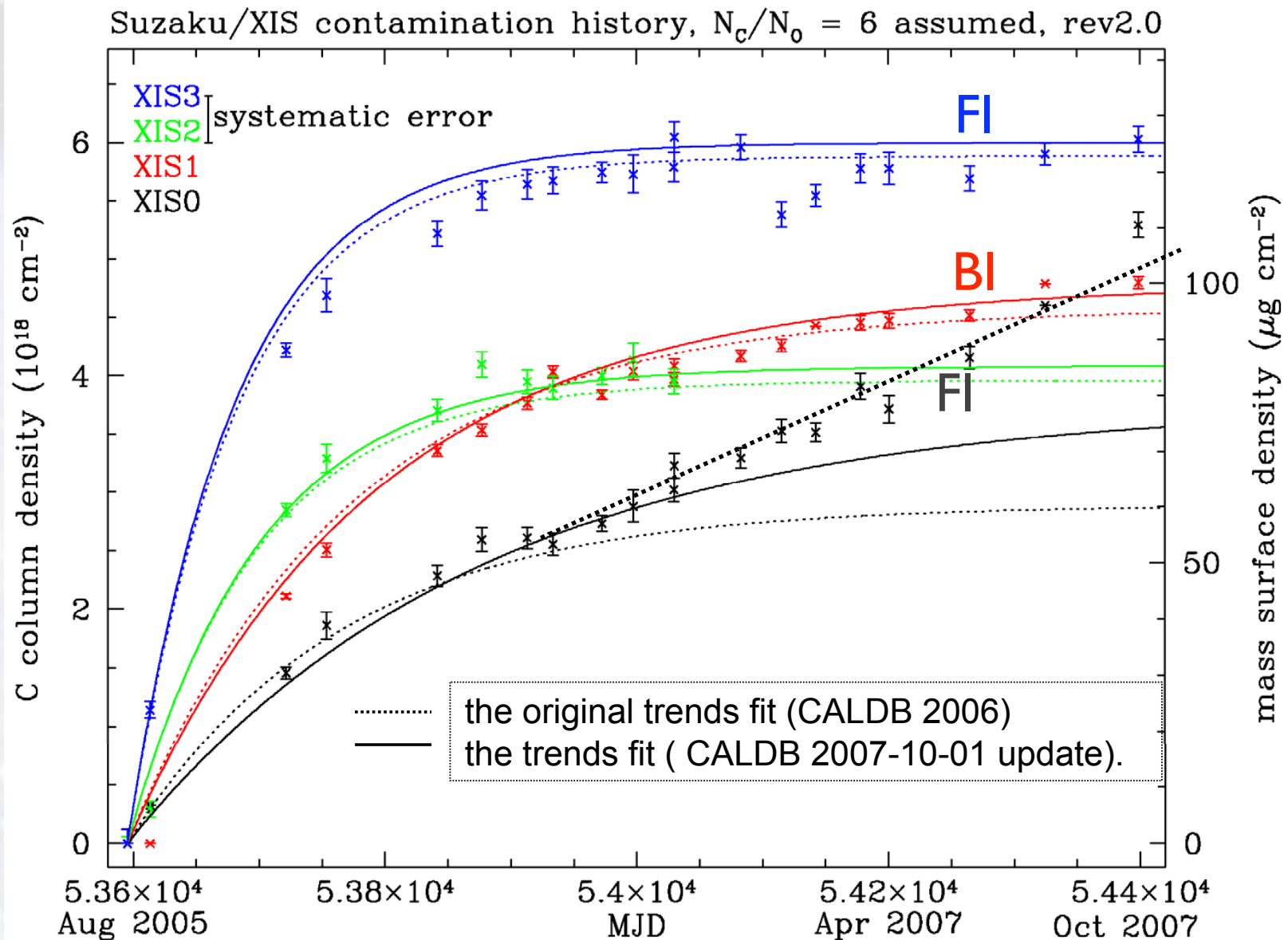


Anomaly of XIS2 on November 9, 2006

Large amount of charge suddenly started to leak in the imaging region. Cause is unknown; impact of micro-meteoroid is one of the possibilities.

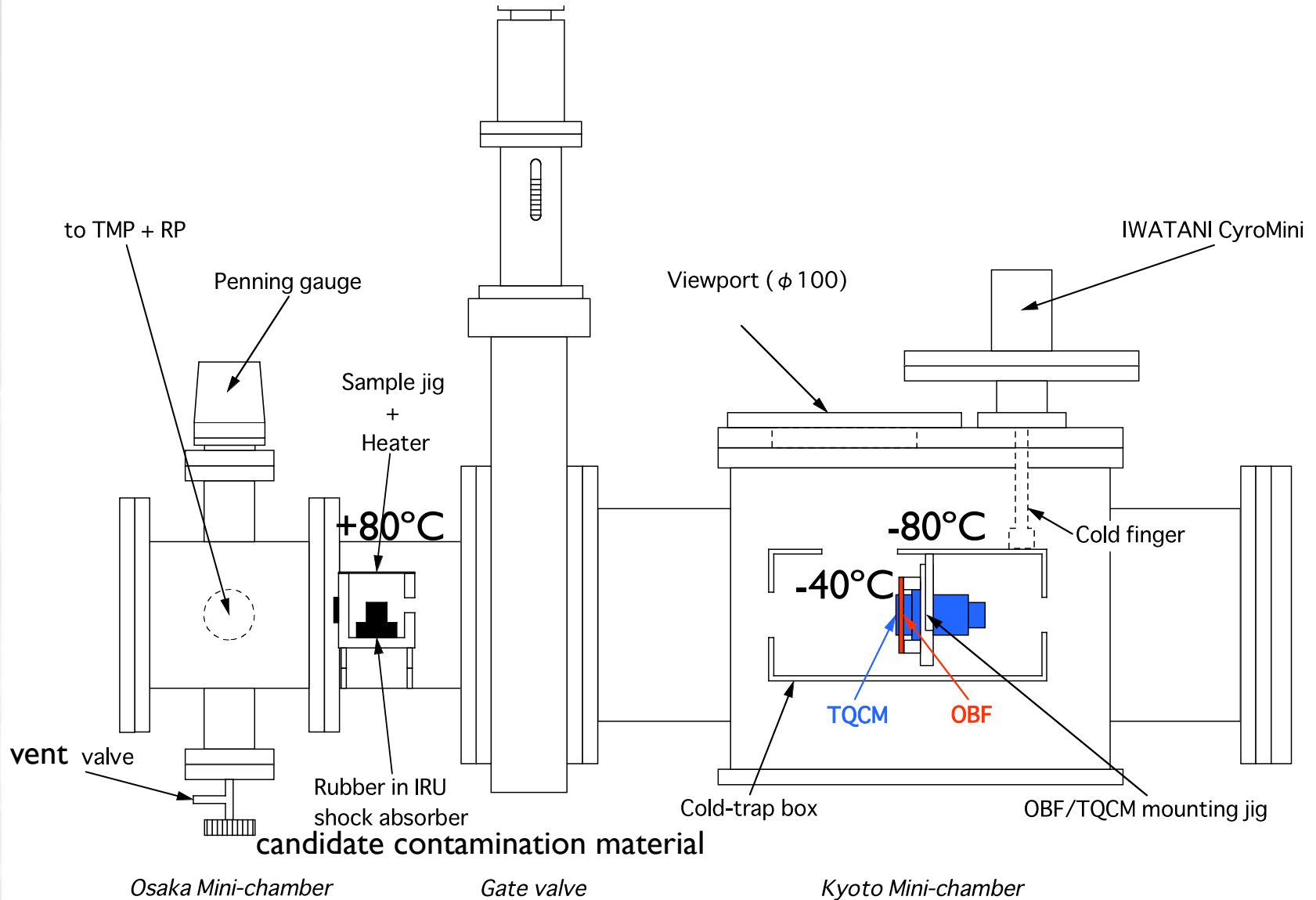


Contamination on OBF

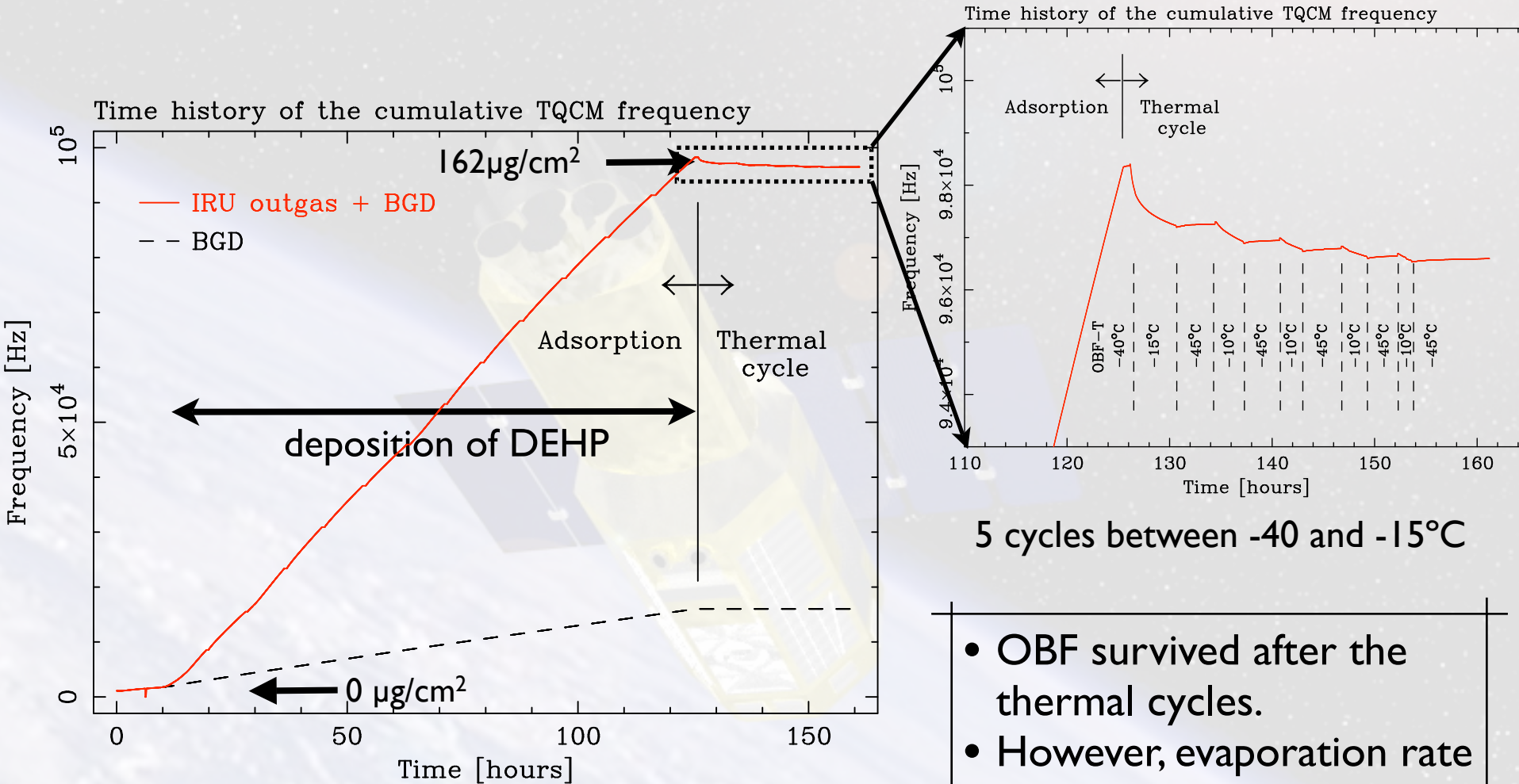


OBF annealing test at Kyoto University

on August 28, 2007, by, Mori, Tsuru, & Matsumoto



Result (I)



5 cycles between -40 and -15°C

- OBF survived after the thermal cycles.
- However, evaporation rate of DEHP is very low at -15°C

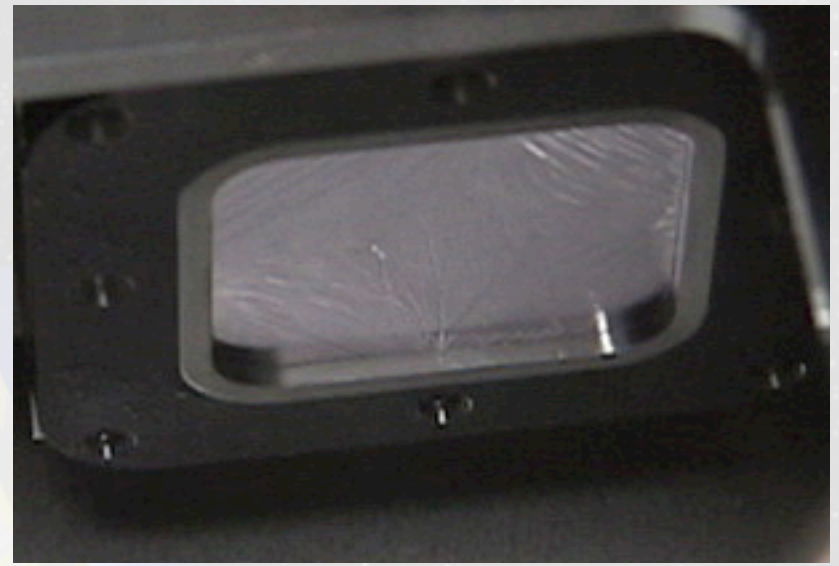
Result (2)

Wrinkles in the OBF

Before the test



After the test



- Patterns of wrinkles have changed, in particular, near the OBF frame.
- Difference in the spatial frequencies of the wrinkles.
- ➔ A possibility: the glue on the frame dissolved in DEHP, and the OBF slipped between the two frame plates (??)

Recommendation from the XIS team

- The XIS baking should not be done, because of the following reasons.
 - (1) Origin and nature of the contamination are not well understand.
 - (2) Cause and their stress of the wrinkles developed during the thermal cycle are not understood.
 - (3) OBF temperature can be raised only up to -15°C . It is not clear whether the contamination can be removed quickly enough.
 - (4) It is not clear whether we can raise the OBF temperature safely.
 - (5) Contamination thickness of XIS3 is already saturated, and that of XIS1 is close to saturation. The transmission is about 30 % at Oxygen K line energy.
 - (6) We have already (effectively) lost XIS2. We need to avoid an operation with even a slight risk not to loose the sensor any more.

Data processing

- Version 1.x processing
 - Official data release for guest observers
 - May 30, 2006
 - HEAsoft 6.0.6 released on May 16, 2006
- Version 2.x processing
 - SCI mode of XIS
 - August 14, 2007
 - HEAsoft 6.3.1 on July 30, 2007

AO-I observations

	Priority-A		Priority-B		Priority-C		Public
	#Seq	ksec ⁽¹⁾	#Seq	ksec	#Seq	ksec	#Seq
Cal	40	762	0	0	0	0	40
G.P.	30 ⁽²⁾	1141	17	886	8	449	18
G.D.	61	1873	24	1110	7	335	32
E.G.P.	42	2402	18	1445	12	635	30
E.G.D.	15	885	32	1259	26	1413	25
ToO ⁽³⁾	5	185	-	-	-	-	5
Total	193	7248	91	4700	53	2852	150

(1) after anomaly in XIS2, we increased the integration times of Priority-A targets by 25%

(2) Including 3 reserved ToO.

(3) Generic ToO

2006/9/4	GRB060904A	30.3k/30k
2006/9/23	CXOU J164710.2-455216	38.7k/35k
2006/9/25	IGR J17497-2821	53.4k/50k
2007/3/19	XTE J1856+053	24.5k/25k
2007/03/28	GRB070328	52.5k/45k

AO-2 observation status

	Priority-A		Priority-B		Priority-C	
	Done	Not yet	Done	Not yet	Done	Not yet
Cal	13	3	0	0	0	0
G.P.	34 ⁽¹⁾	19	8	3	6	21
G.D.	22	6	21	7	1	20
E.G.P.	32 ⁽²⁾	17	17	4	11	37
E.G.D.	14	1	13	4	10	16
ToO ⁽³⁾	3	-	-	-	-	-
Total	193	7248	91	4700	53	2852

As of December 5, 2007

(1) Including 2 reserved ToO.

(2) Including 1 reserved ToO.

(3) Generic ToO

Nova Vul

2007/11/4

Data is public

GROJ1008-57

2007/11/30

Data processing in progress

3C454.3

2007/12/5

Just observed

AO-3 proposals

- Japan (JAXA)
 - 146 proposals (2 LP), 22 Msec
(AO-2: 135 proposals, 18Ms)
- US (NASA)
 - 120 proposals (9LP), 21 Msec
(AO-2: 156 proposals, 26Msec)
- ESA
 - 30 proposals, 3Msec
(AO-2: 39 proposals)

- 
- A yellow satellite is shown in space, oriented vertically. It has a cylindrical top section with four circular openings. Two large solar panels are extended horizontally from the middle of the satellite. The background is a bright, hazy space with a large, glowing sun in the upper right corner and a curved horizon line at the bottom. The satellite is semi-transparent, revealing internal components.
- Continue stable operations
 - Continue to produce good scientific results