Energetic particle environment as seen by RESIK

Szymon Gburek
SRC-PAS

Royal Observatory of Belgium 04-05-2012

RESIK

REntgenovsky Spektrometr
s
Izognutymi Kristalami

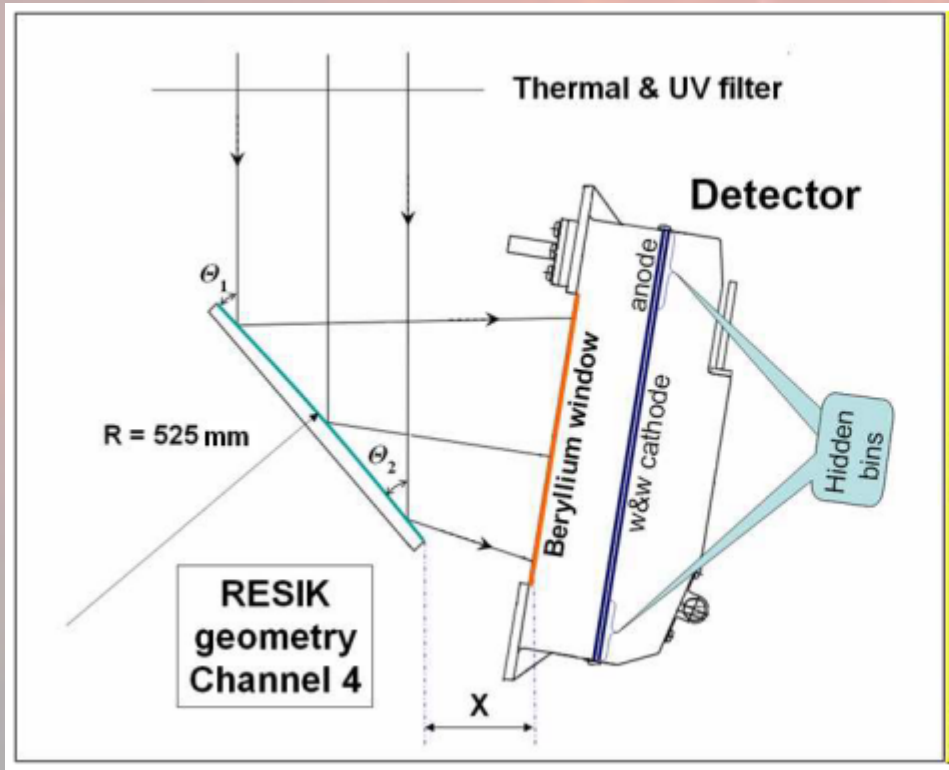
X-ray Spectrometer
with bent cristals

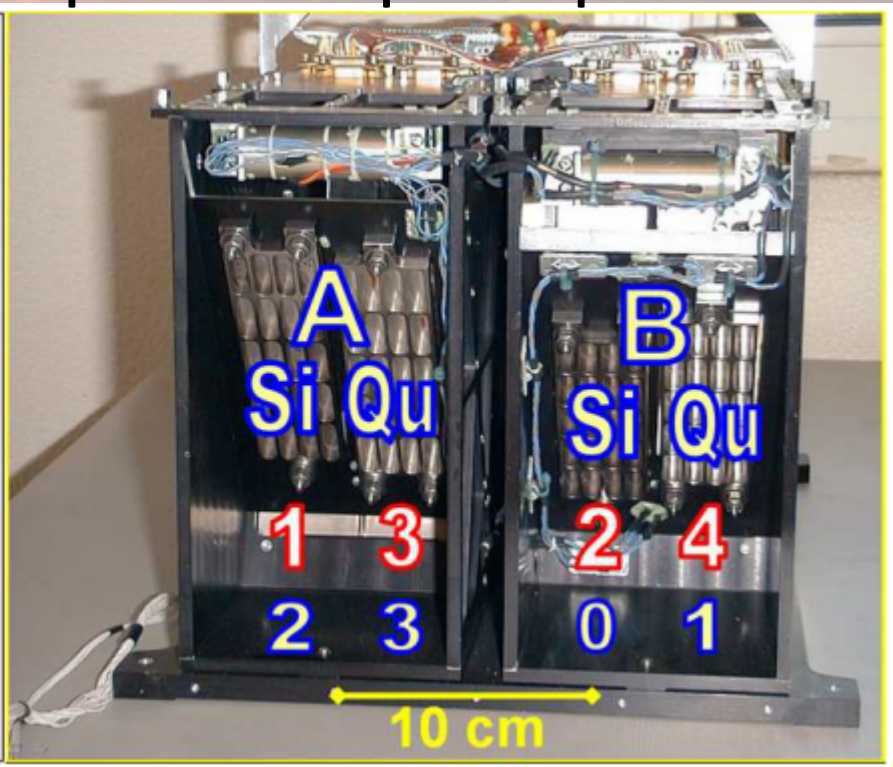
Primary scientific objectives of RESIK

- the chemical composition of X-ray flare and active region plasmas using emission line and continuum intensities

- the temperature & differential emission measure studies.

RESIK Detectors and operation principle



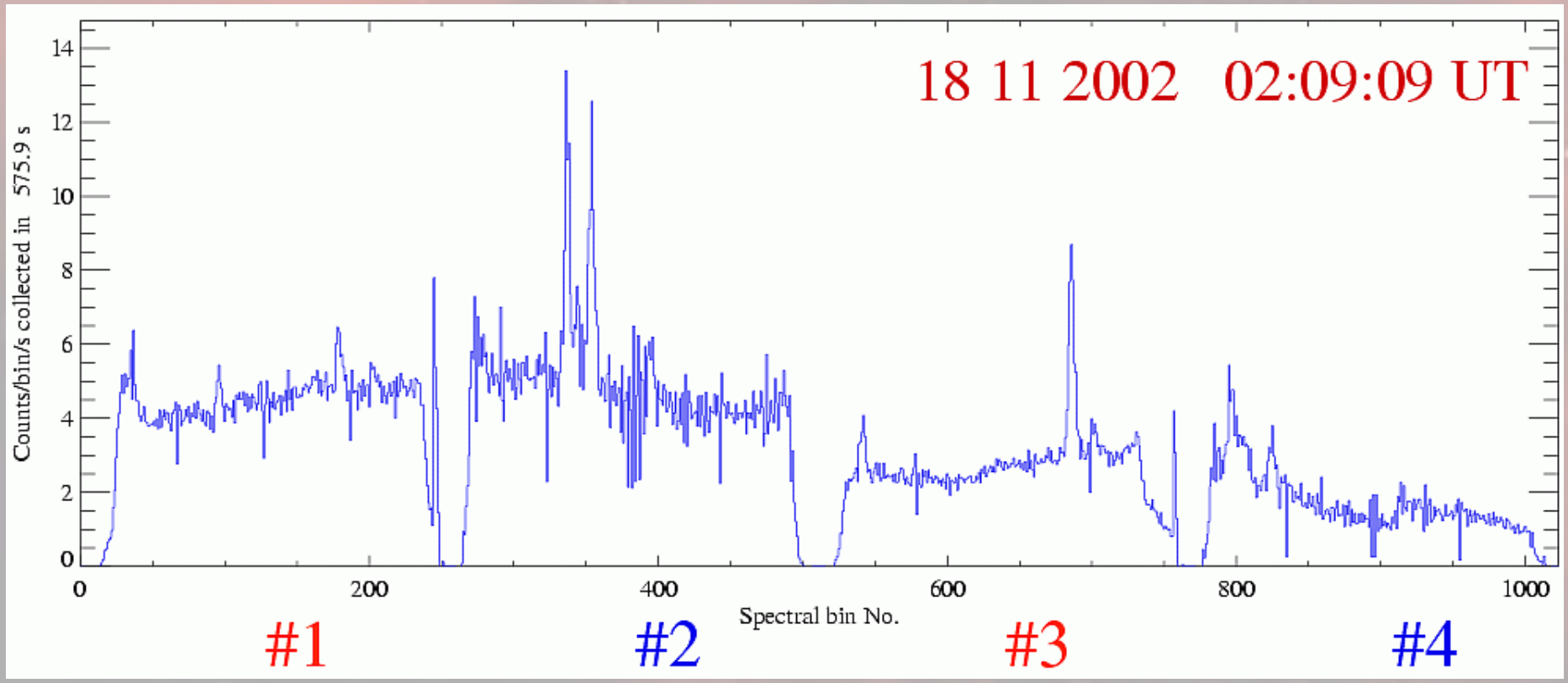


Gas filled proportional counters
The same as for BCS on Yohkoh

Fe55 Calibration source

+ Four PIN diods behind the thick Al shield
Particle detectors

X-ray data obtained from RESIK
spectra, lightcurves 2.0 keV - 3.8 keV (3.3 Å - 6.1 Å)
resolving power (λ/Δλ) of ~1000 (10 m Å)
Aug 24, 2001 - May 22, 2003



RESIK WWW data visualization catalogue

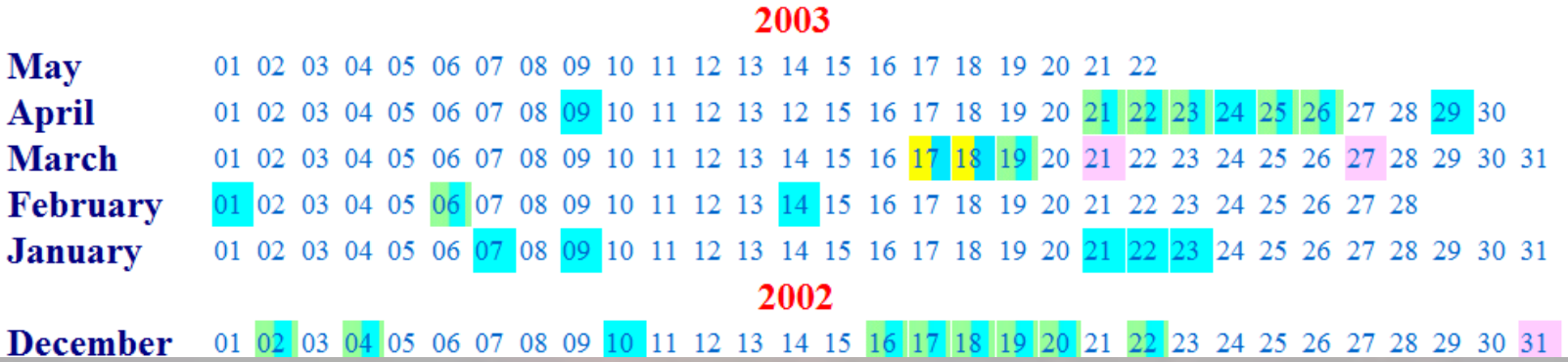
http://www.cbk.pan.wroc.pl/experiments/resik/resik_catalogue.htm

RESIK CATALOGUE

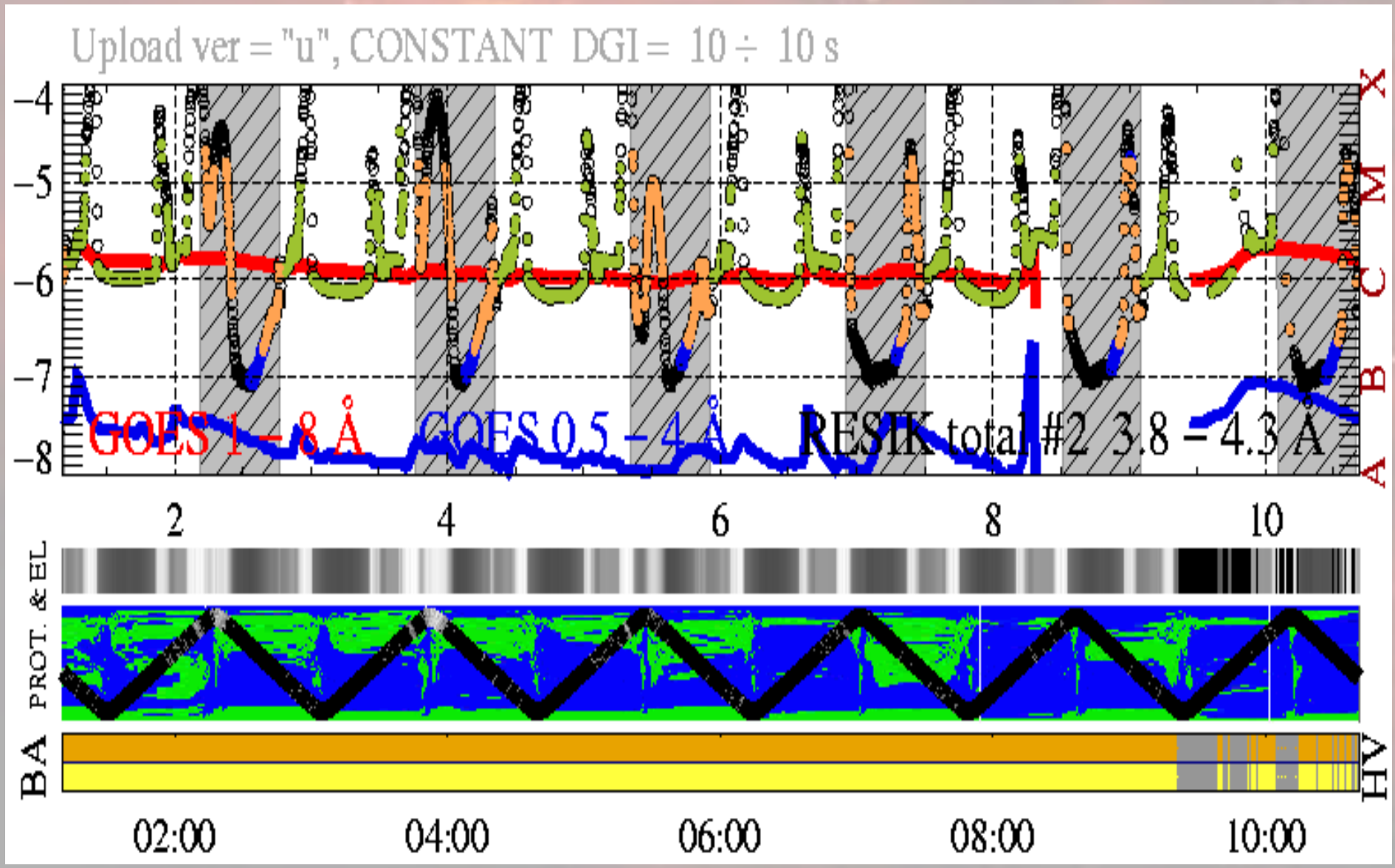
RESIK is the Bragg bent crystal spectrometer aboard Russian CORONAS-F Solar Observatory

Detector Calibration | Discriminator calibration | GOES class -M | GOES class -X | Higher orders-ORD3 | Instrument switch off

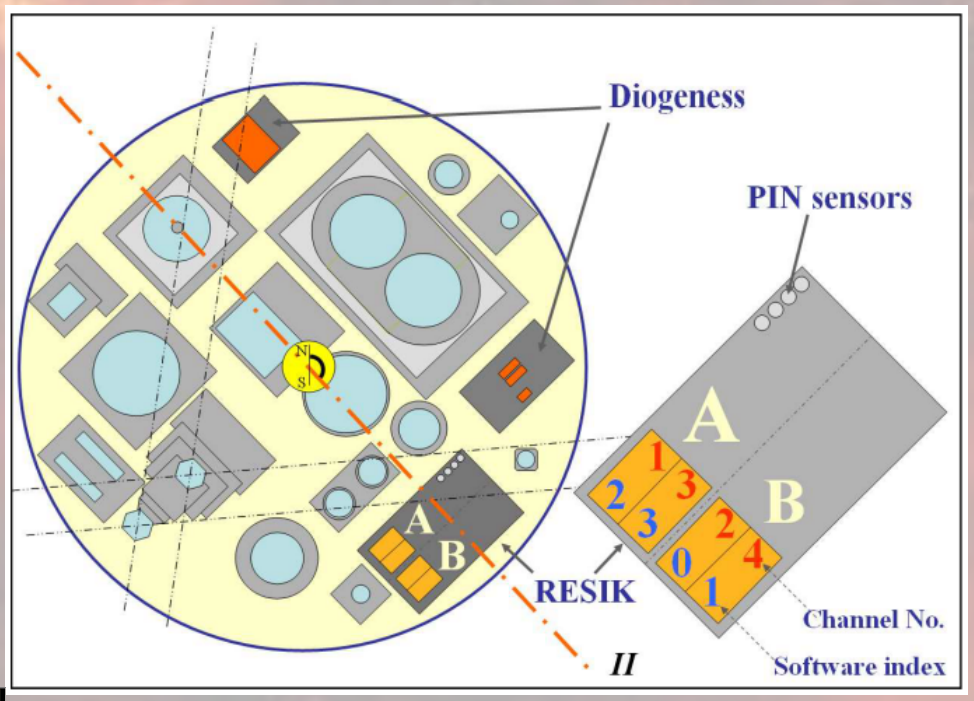
LEGEND 2002 **LEGEND 2003**

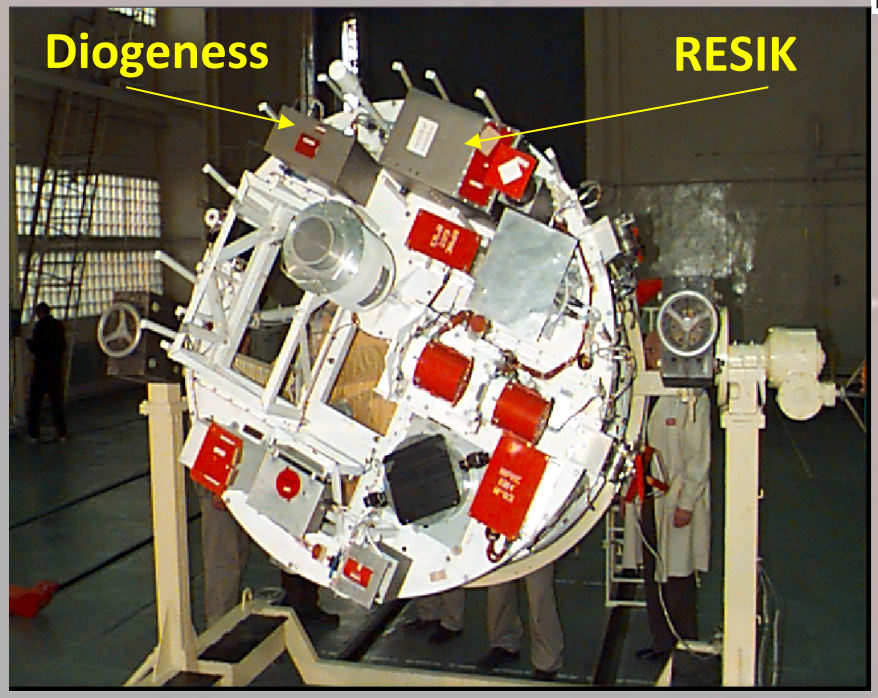


A sample plot from RESIK daily pages of WWW catalogue

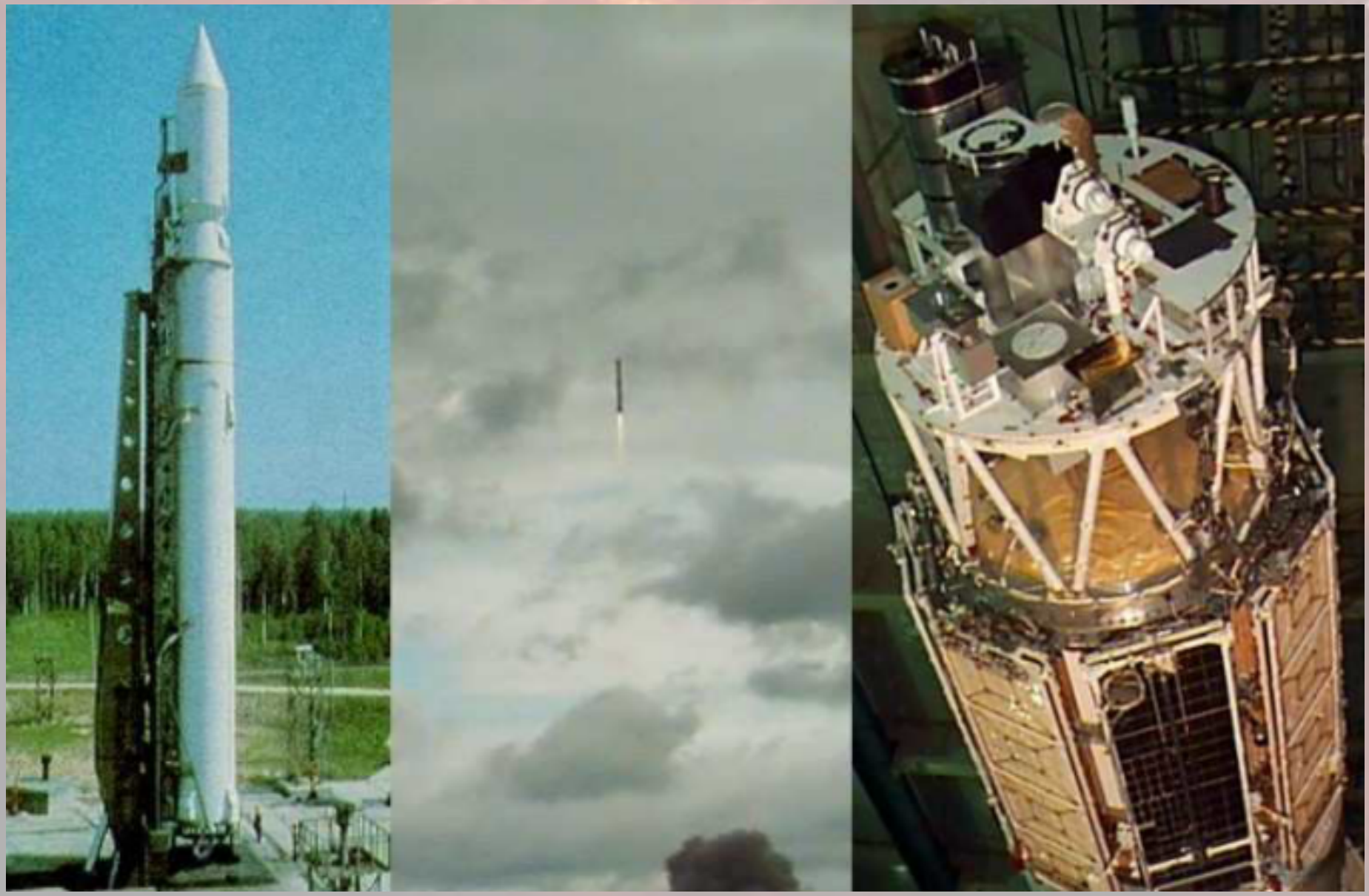


Location of RESIK & DIOGENESS instruments on the satellite platform





Drawing of the CORONAS-F payload

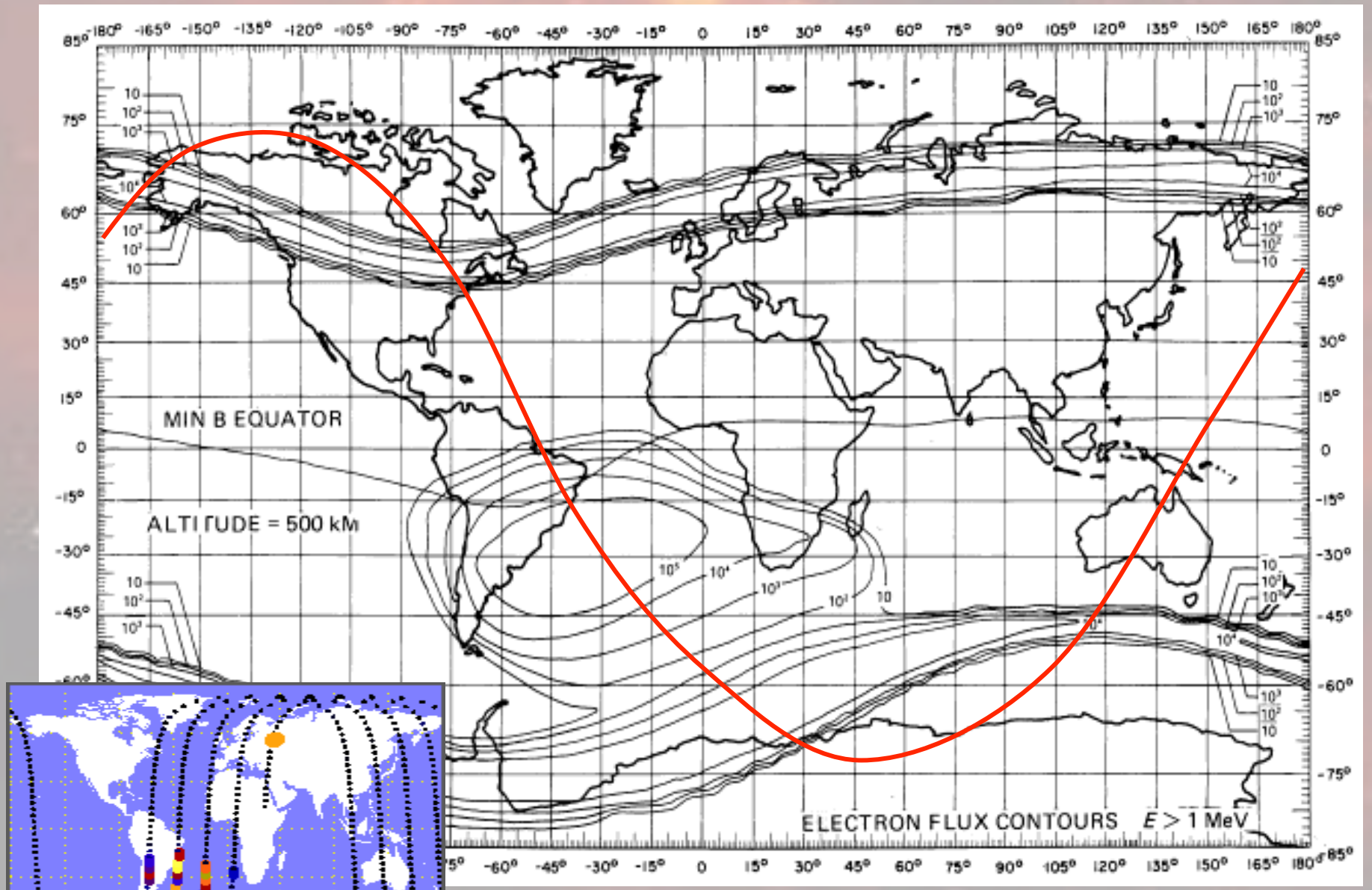


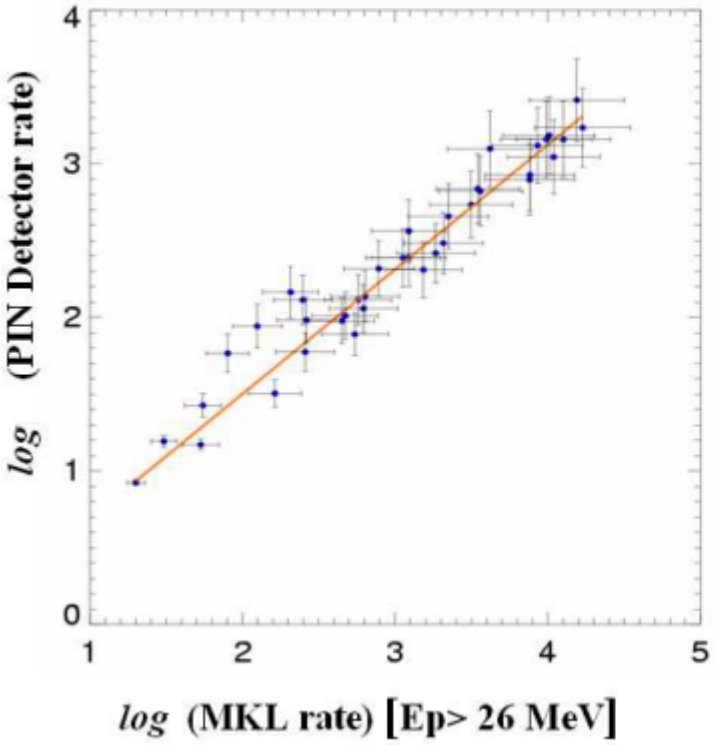
CORONAS-F launch, 2001 July 31

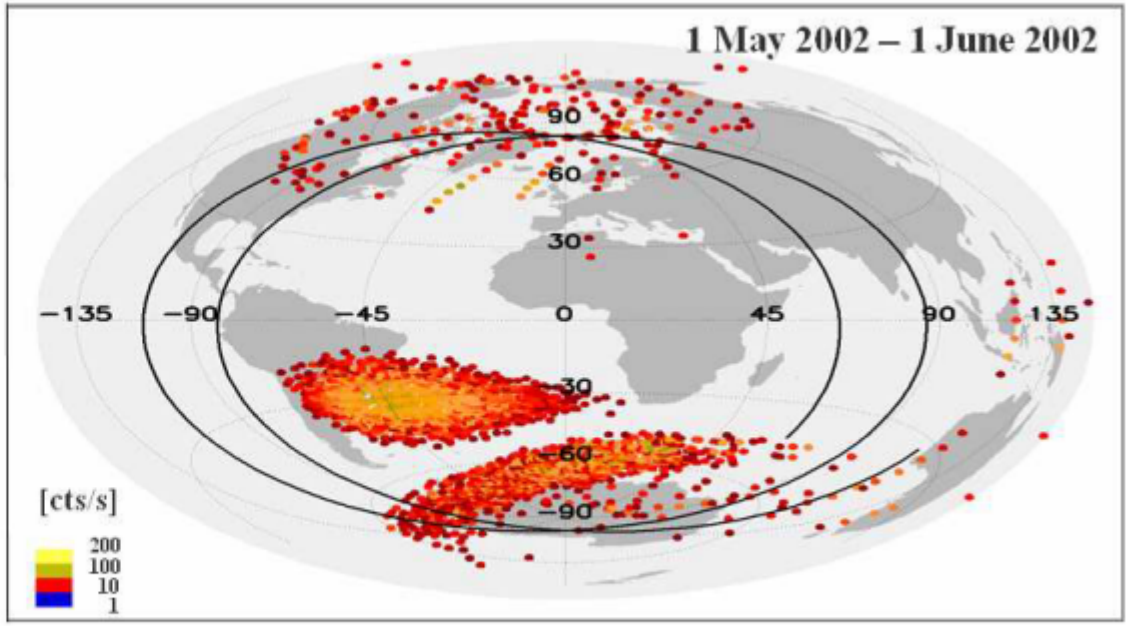
ORBIT

- Near-circular orbit around the
- Altitude from ~501 km to ~ 549 km
- Inclined at 82.5°
- Period is 94.9 min

- SAA + Rad Belt
- Nights up to ~35 min ,
- Long days ~2 – 3 weeks


MIN B EQUATOR
ALTITUDE = 500 kM
ELECTRON FLUX CONTOURS $E > 1$ MeV



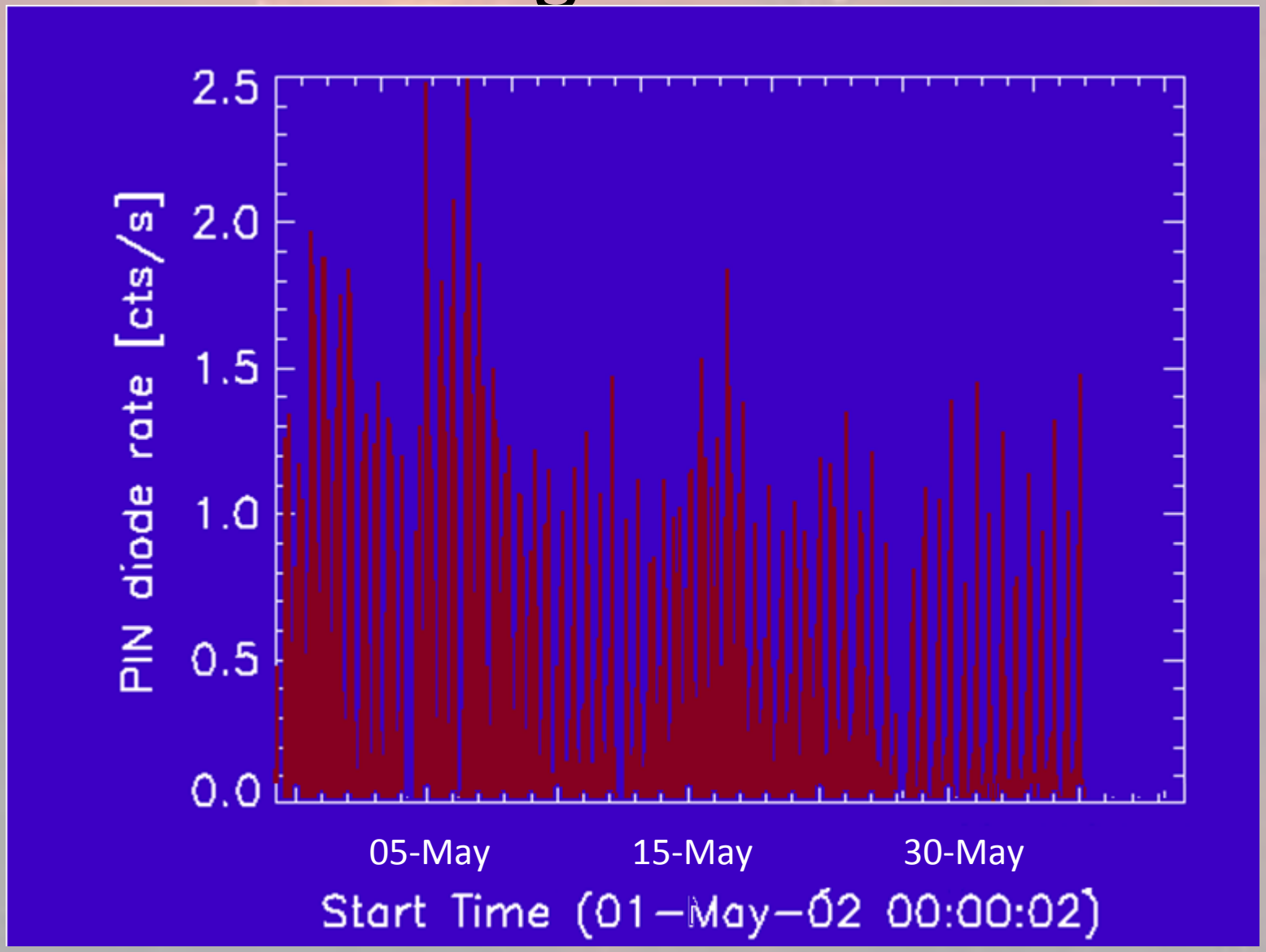


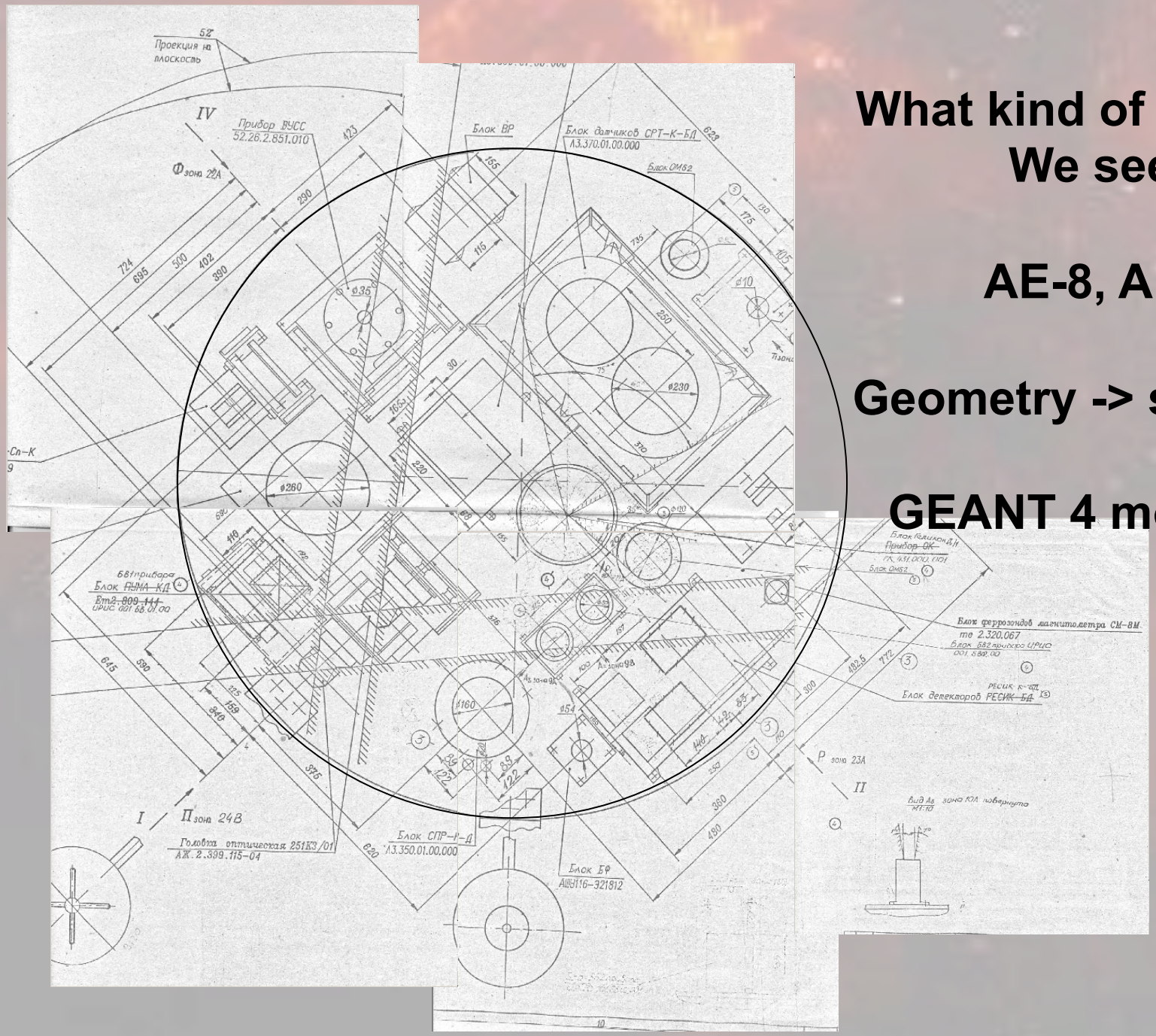
Map of PIN rate

Correlation diagram between PIN and MKL rates.

Distri-bution of rates as seen by RESIK PIN detectors in May 2002.

Changes in time



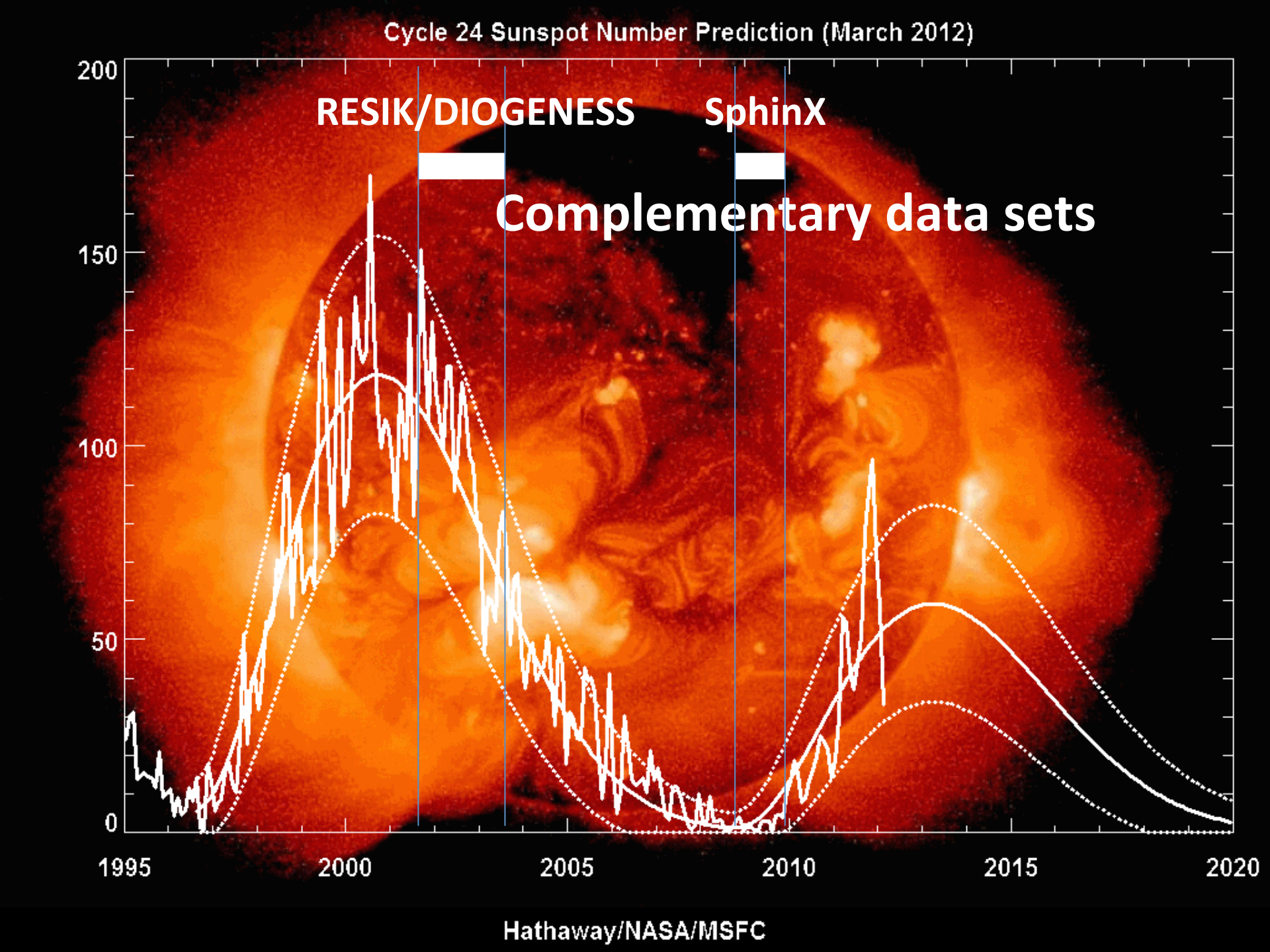


What kind of particles We see?

AE-8, AP-8

Geometry -> shielding

GEANT 4 modeling


Cycle 24 Sunspot Number Prediction (March 2012)
RESIK/DIOGENESS
SphinX
Complementary data sets
200
150
100
50
0
1995
2000
2005
2010
2015
2020
Hathaway/NASA/MSFC