LYRA on-board PROBA2

in-orbit operations and achievements

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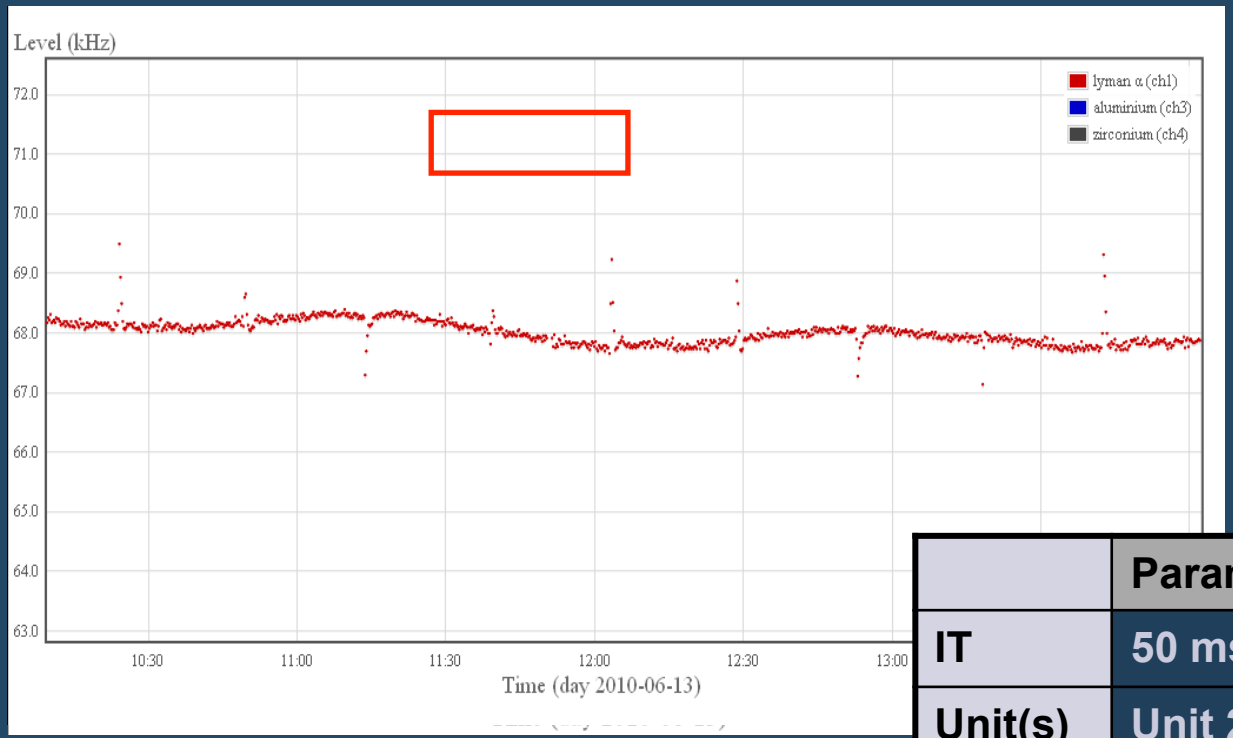
PROBA2 Workshop
ESTEC, 2010/06/22

Routine activities

- Nominal acquisition: **Nominal**
  - Unit2
  - Integration time = 50 ms
- Calibration **Weekly**
  - Dark current
  - LED signal
- Back-up acquisition **Monthly**
  - Acquisition with units1 and 3
- Flat-field analysis **Monthly**
  - Off-pointing sequence
- Bake out - decontamination **Once every 6 months**
  - Switch on of heaters
    (temperature reaches 50°C)

Nominal acquisition



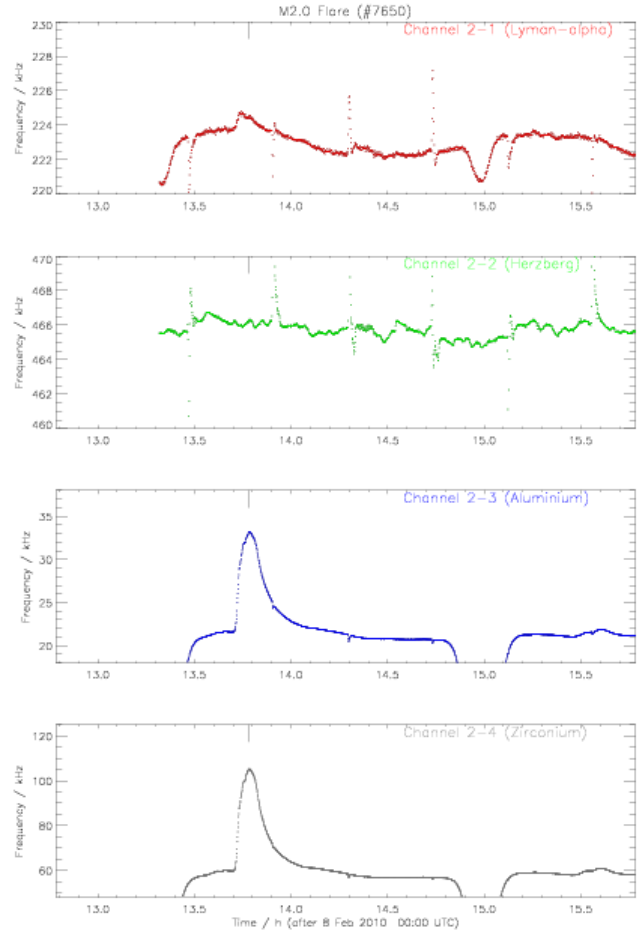
	Parameters of the mode
IT	50 ms
Unit(s)	Unit 2
LED	No
Remark	IT up to 10ms have been tested

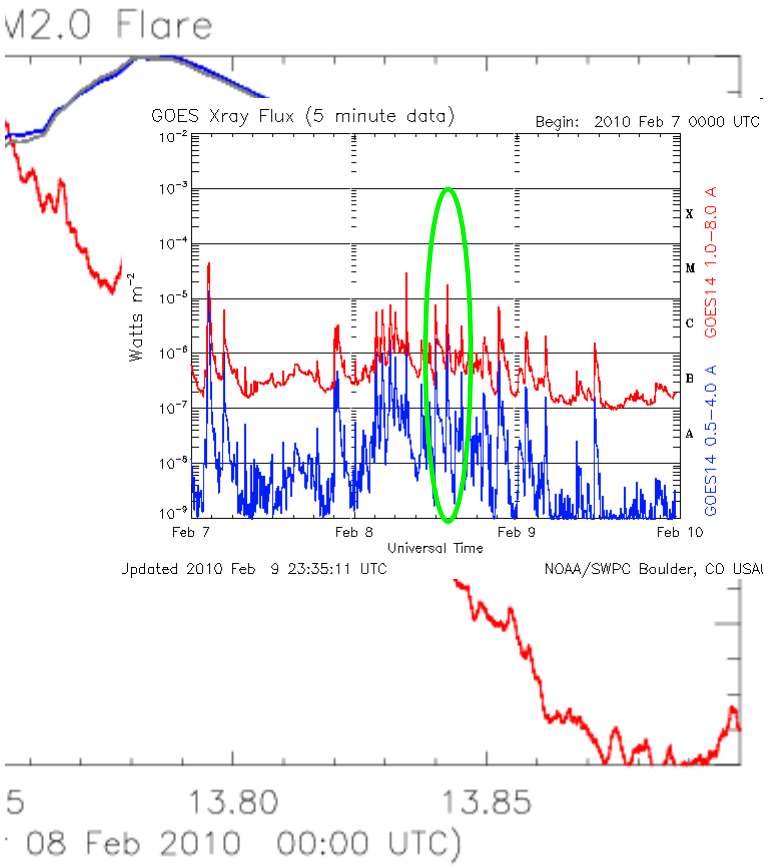
Flares

- Lyra senses flares down to B1.5 at least
- LYRA list of flares is in agreement with the one of GOES
- Always visible in the two XUV-EUV channels
- Some strong and impulsive flares are also visible in Lyman-alpha, which can then be used as a precursor

Flares

- M2.0 flare 2010/02/08 – 22h33

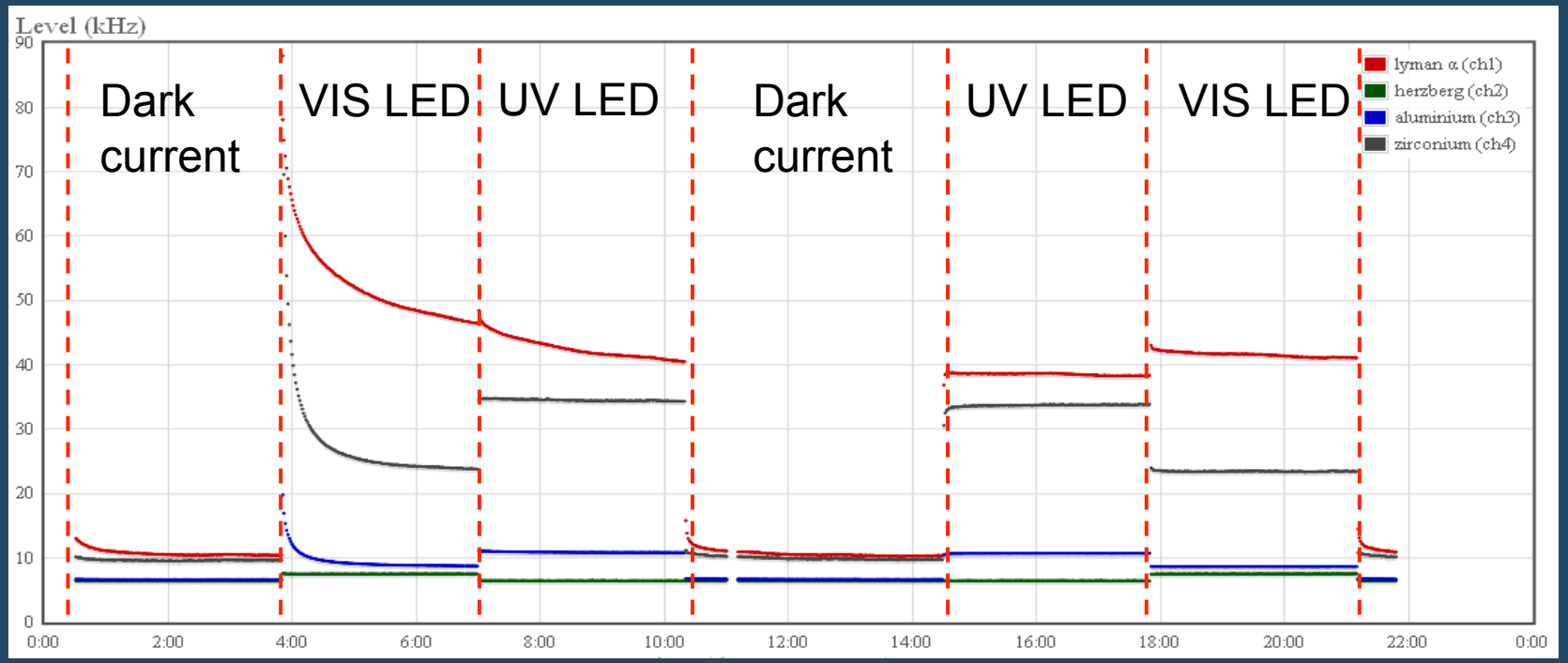




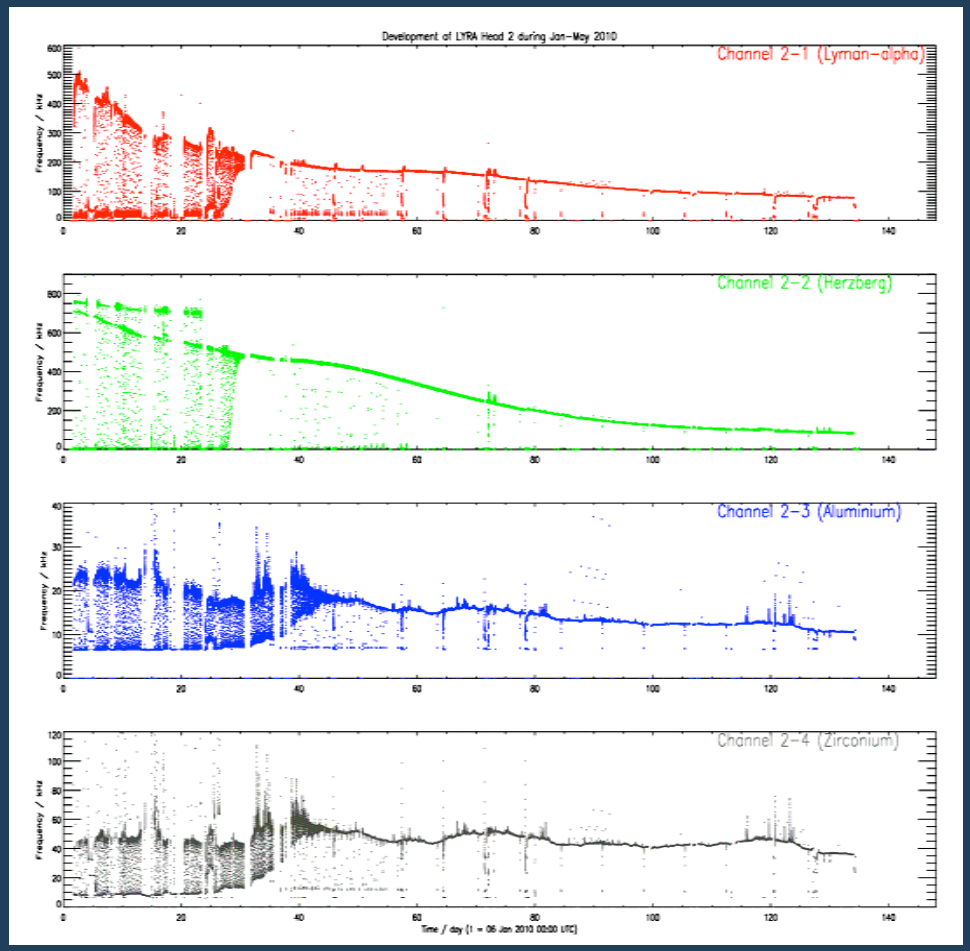
Calibration sequence

- More than one orbit needed to MSM detectors to reach stabilization.
- No significant difference between the LED signal at the beginning of the mission and the current one

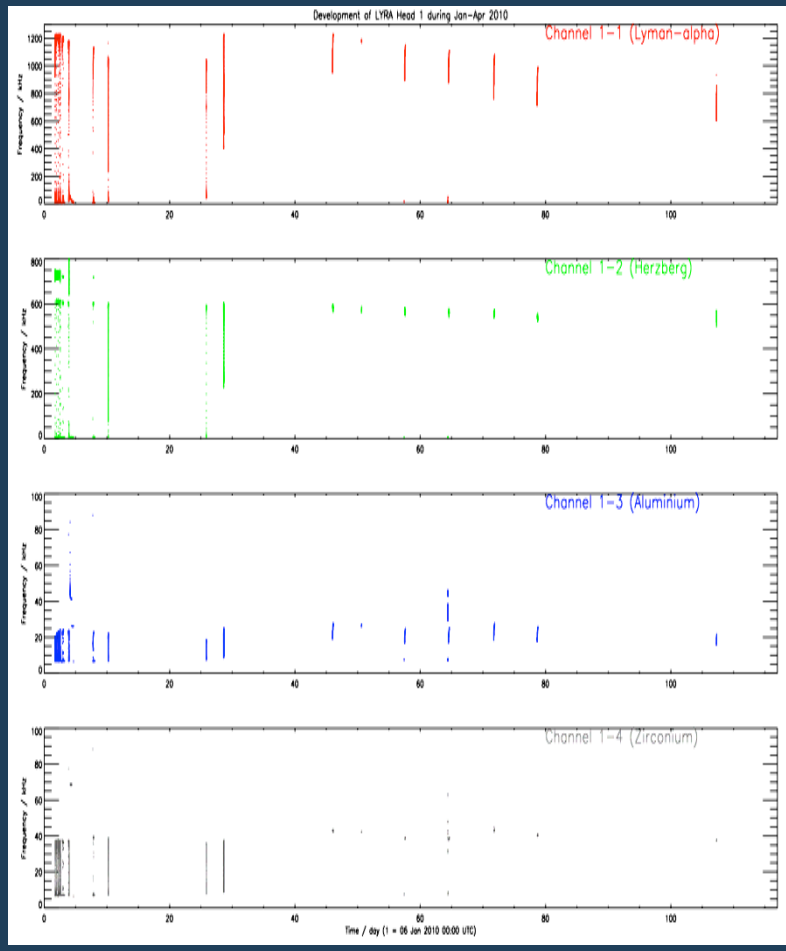
  → the degradation is affecting the filters and not the detectors



Back-up acquisition

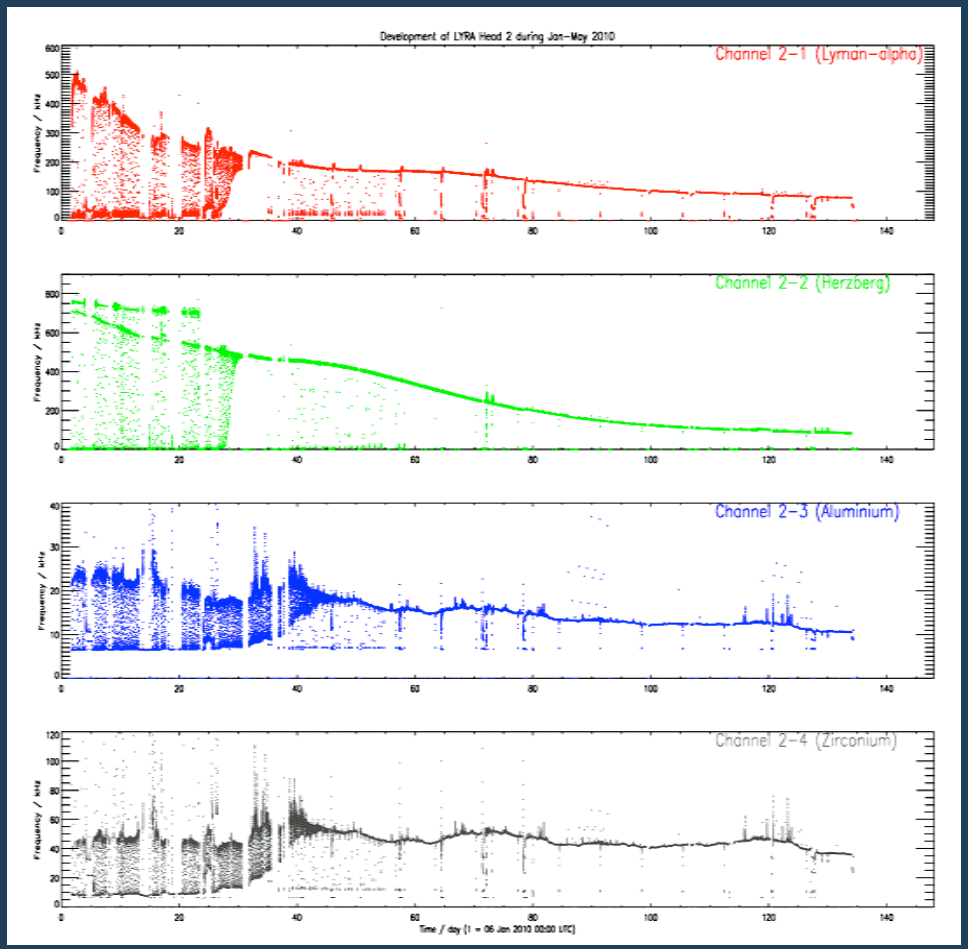


UNIT 2

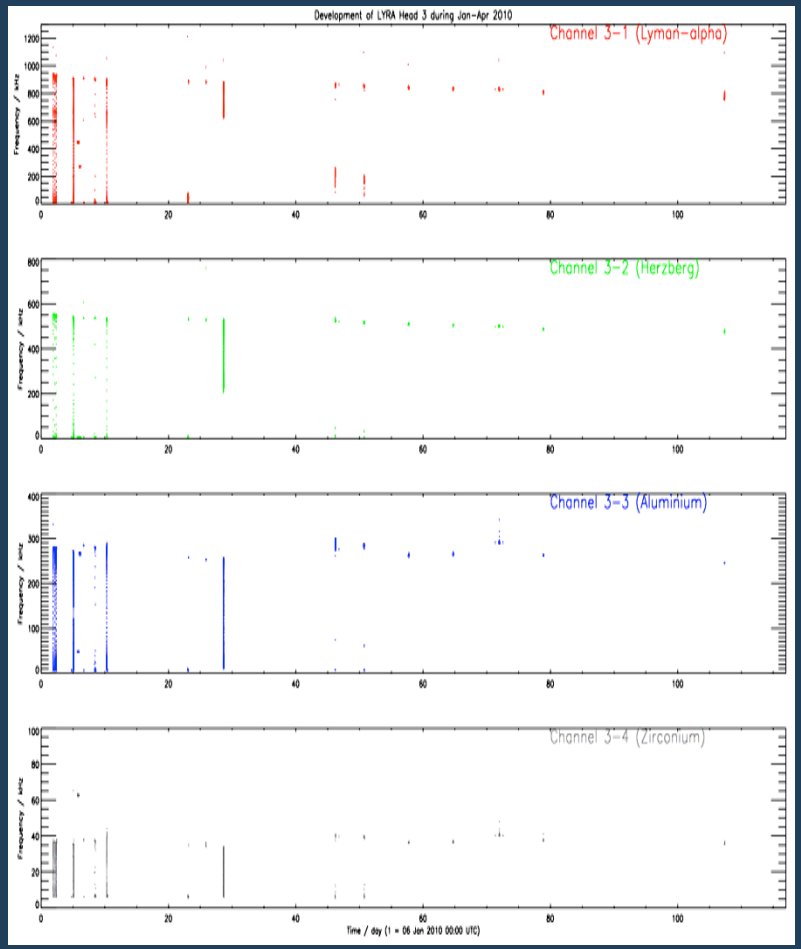


UNIT 1

Back-up acquisition



UNIT 2

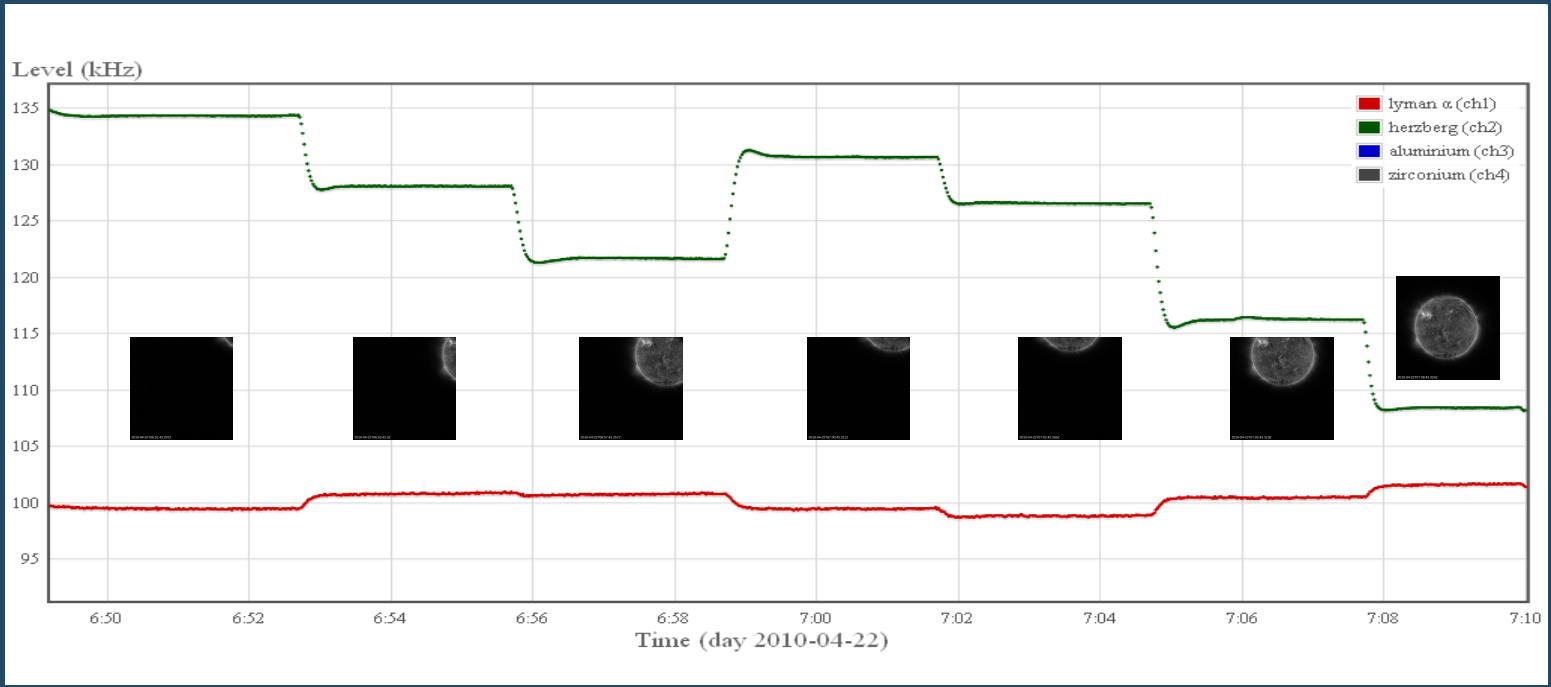


UNIT 3

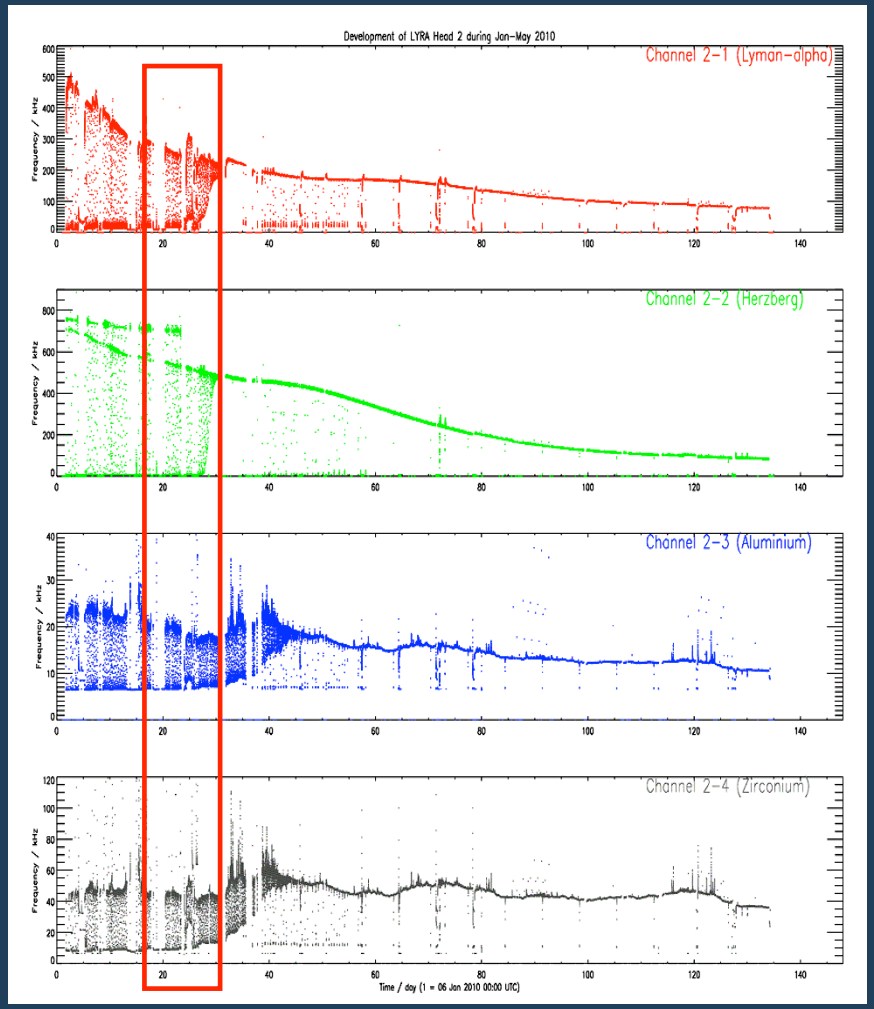
Flat-field paving

- Paving step : 0.3°
- The Hz channel signal doesn't fit the modeled behavior based on pre-launch flat-field measurements

⇨ slight imprinted degradation ???



Bake-out



- AB + CD heaters on for 24h
- Temperature increase of 10°

No significant effect on the data

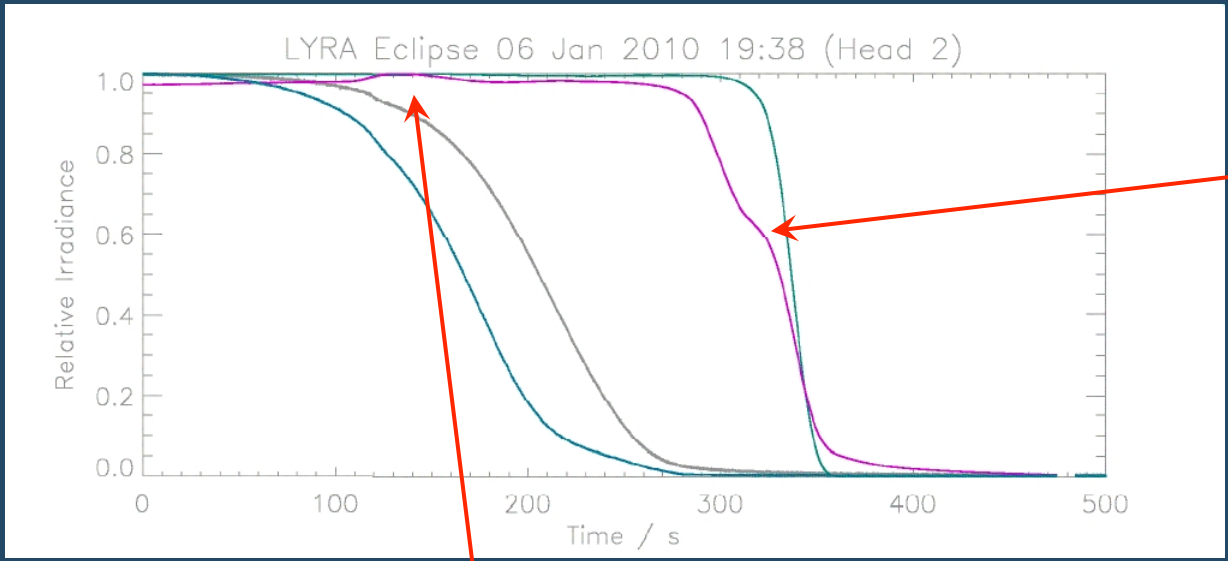
Next attempt: July 01

Specific campaigns

❑ Occultations	**Every orbit till March**
❑ Sun-Moon eclipses	**January 15** (annular from LYRA) **July 11** (partial from LYRA)
❑ Stray light analysis	**March 18-19** (still under analysis)
❑ SDO/EVE cross-calibration campaign	**May 3** (still under analysis)

Occultations

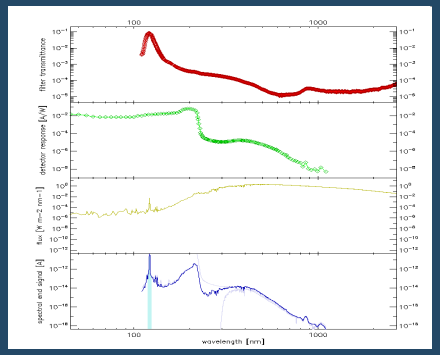
Ly alpha
Hz
Al
Zr



Lyman alpha completely absorbed

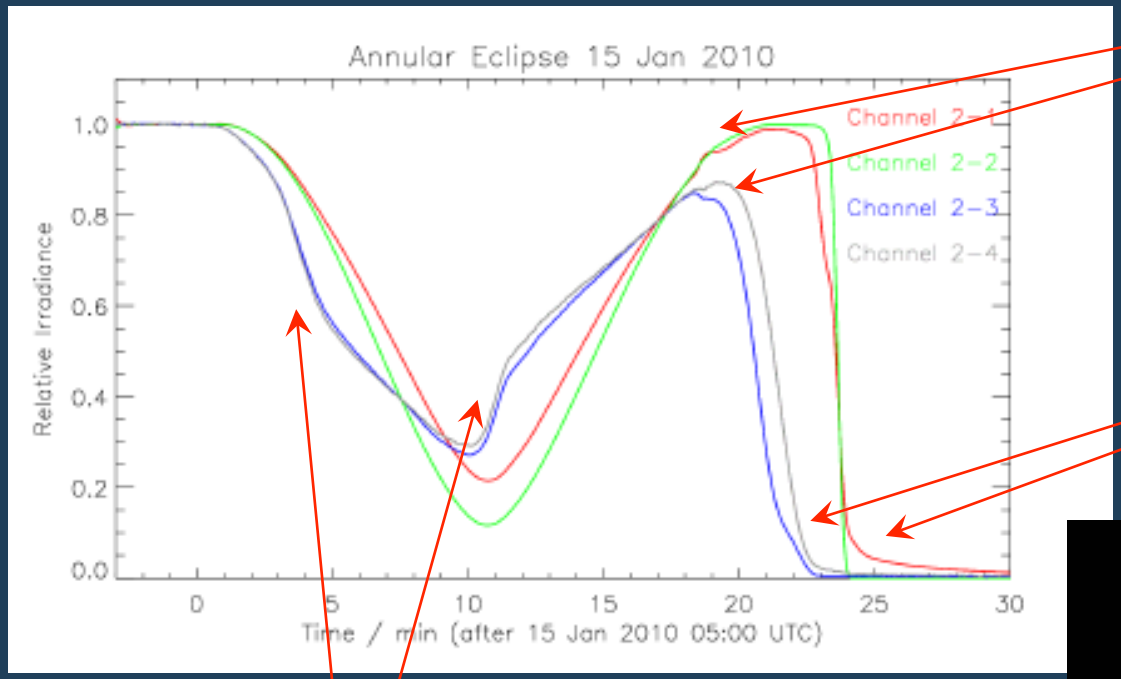
⇩

Contribution of longer wavelengths



Attitude change

Sun-Moon eclipse



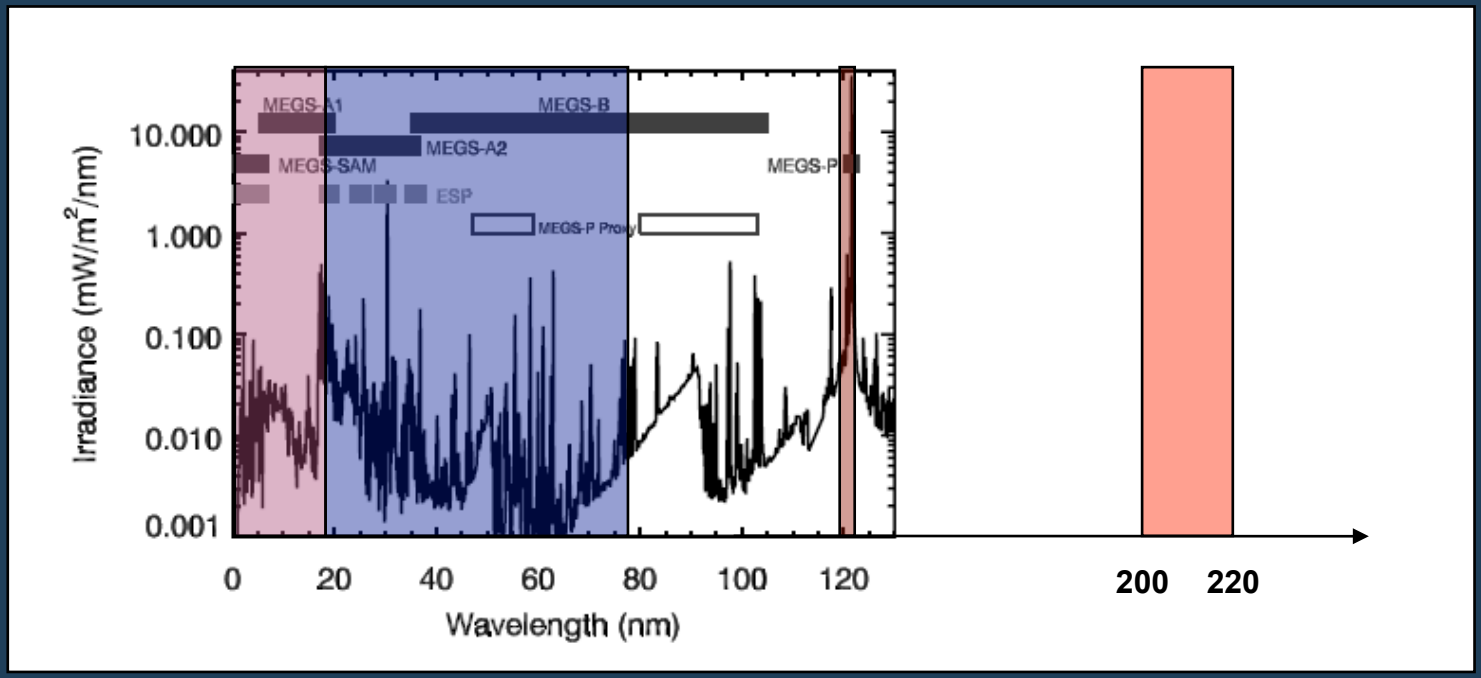
Attitude change

Occultation

Disappearance and appearance of
the active region behind the lunar disk

Cross-calibration with SDO/EVE

- EVE aging effects are tracked by flying the same instruments on-board a rocket 1x/year
- LYRA cross-calibration campaign was scheduled during the first rocket flight

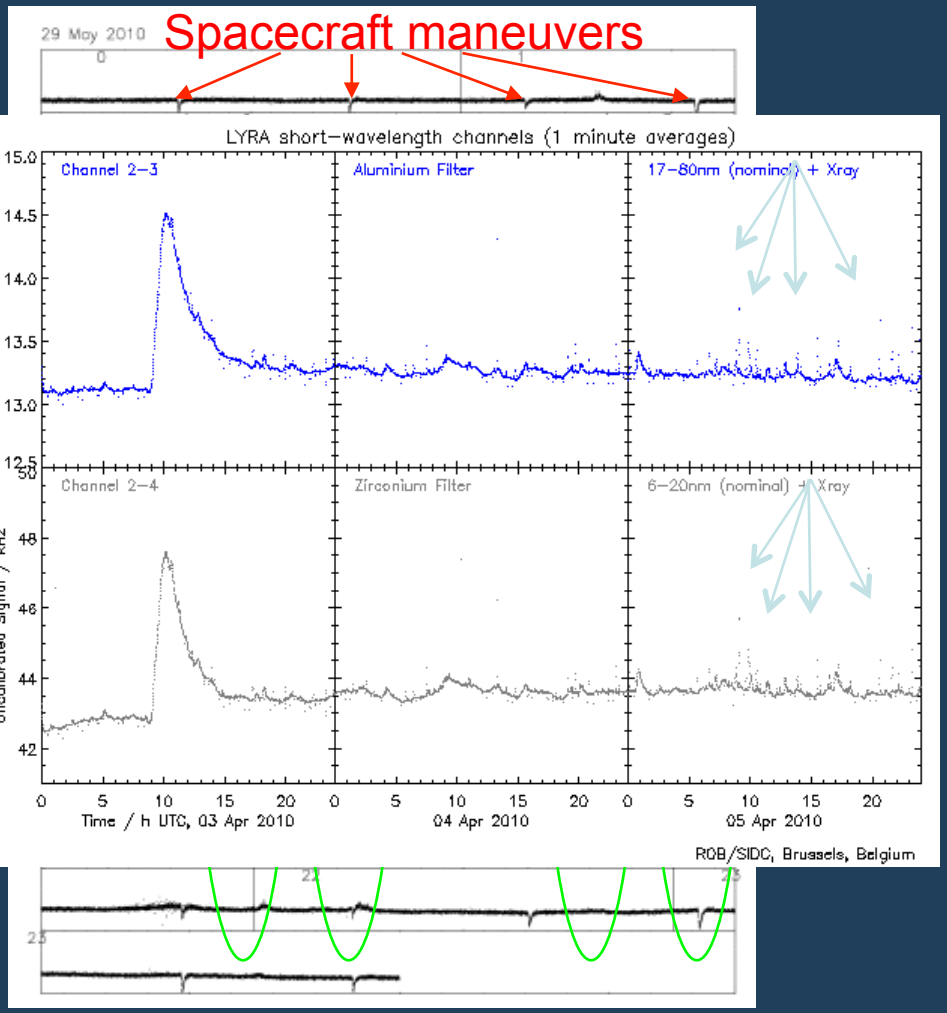


LYRA on-board PROBA2

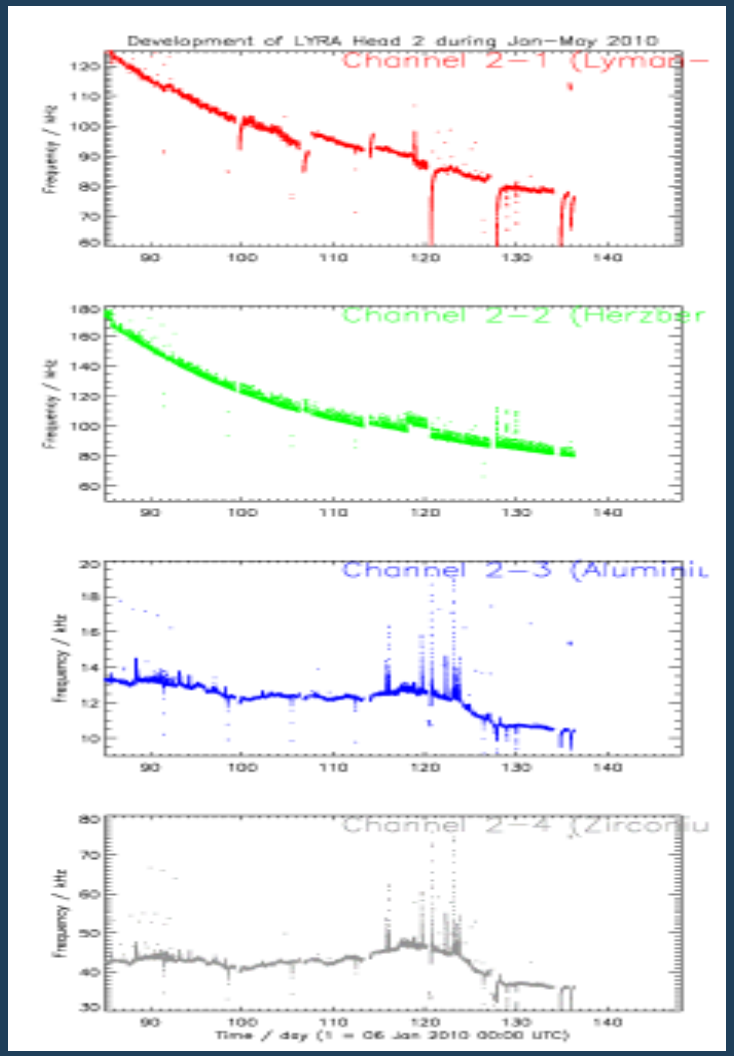
ANNEXES

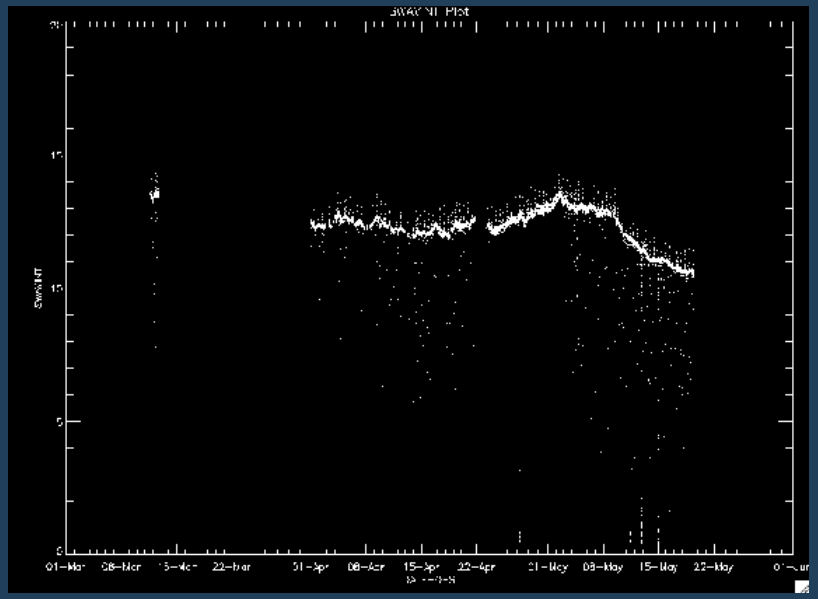
Auroral Oval

- Perturbations appearing around 75° latitude
- 2-3 days after a CME, flare ...
- Associated to geomagnetic perturbations
- Only in Al and Zr



And a fifth channel at 17.4nm...





... called SWAP!

State of the data processing pipeline

Telemetry packets

		Current state	In the future
LY-TMR:	Raw data (in counts)	Not distributed	Not distributed
LY-EDG	Lv1: Engineering data (in Hz)	Daily basis	After each contact
LY-BSDG	Lv2: Calibrated data (in W/m²)	Not available	After each contact
Other tools	Higher level data products	Plots + flare list available irregular	systematic