



IASI general status

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IASI Conference EVIAN

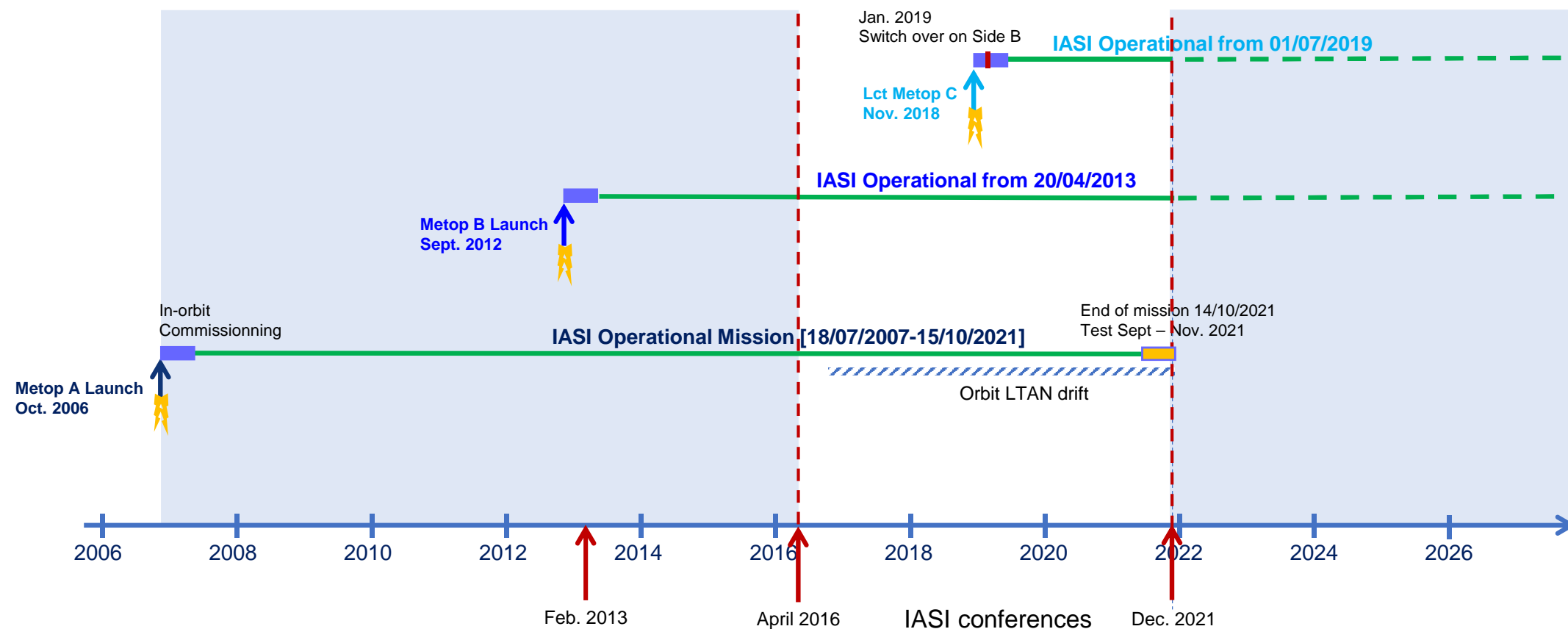
2021/12/06

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- Global Time frame
- A revisite of IASI-C
- Main In-orbit events
- Instrument performances
- Radiometric Inter-comparisons
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Global time frame

3 instruments simultaneously
in operational mission
01/07/2019 - 15/10/2021



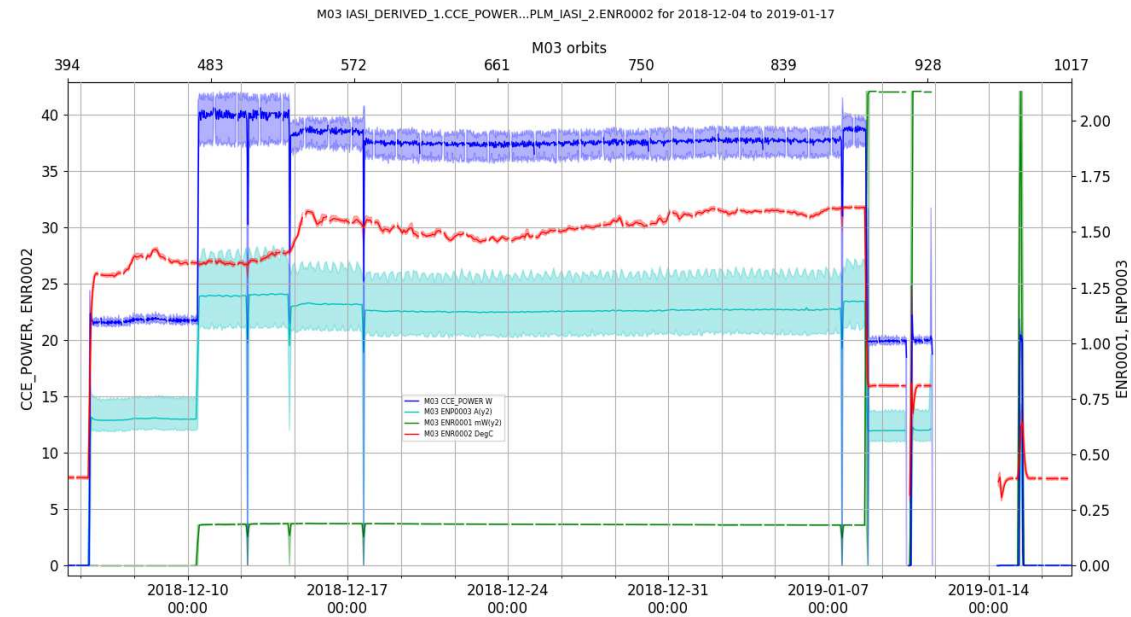
IASI-C : from repair to launch

- Coating peeling anomaly on magnets
- > New Scan Mechanism
- > New CCFD motor



Metop-C launch on 07 Nov. 2018

IASI-C : A disrupting anomaly shortly after launch



⇒ **Loss of the Laser metrology function on the Side-A 08/01/2019**

⇒ **Recovered by the switch over on Side-B end of January 2019**

Main in-orbit events

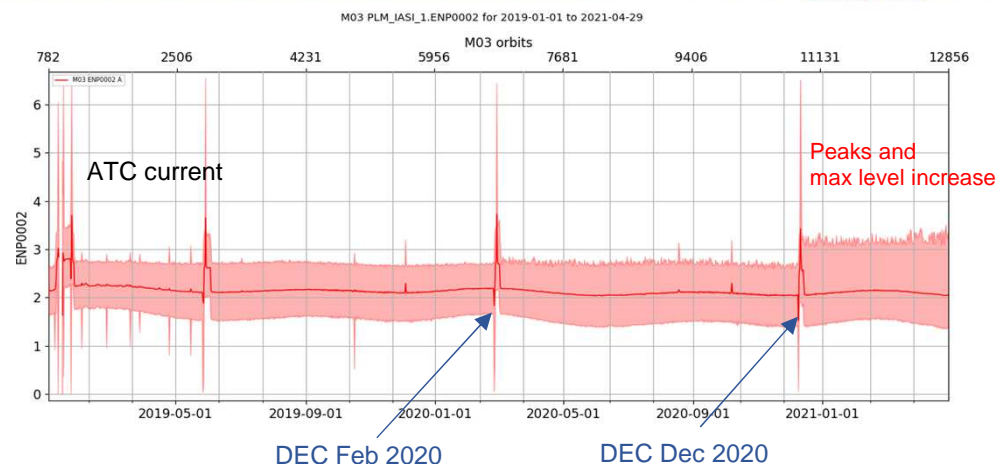
	IASI-A	IASI-B	IASI-C
Declared Operational	18/07/2007 - 15/10/2021	From 20/04/2013	From 01/07/2019
Use of redundancy	Yes Side A -> Side B In April 2015	No Configured on Side A Side B not exercised	Yes Side A Lost in Jan. 2019 On Side B since Feb. 2019
Permanent CD Stop	07/10/2015	07/10/2015	Off
Update of the B1 NL On-board correction	30/09/2019	02/08/2017	None
Writing of SW patches in the IMS EEPROMs	13/11/2019 (side B)	20/10/2020 (side A)	Not needed
EOL test campaign	From 07/09/2021 to 27/11/2021		

In-orbit unexpected issues

IASI-C : Thermal Control anomaly on IASI-C

Anomaly detected after the 200K decontamination of December 2020 => **no impact on the data quality** (detector temperature not impacted and other temperature variations always compliant with needs of stability).

Recovered by switch Off and On (27 to 29 July 2021).



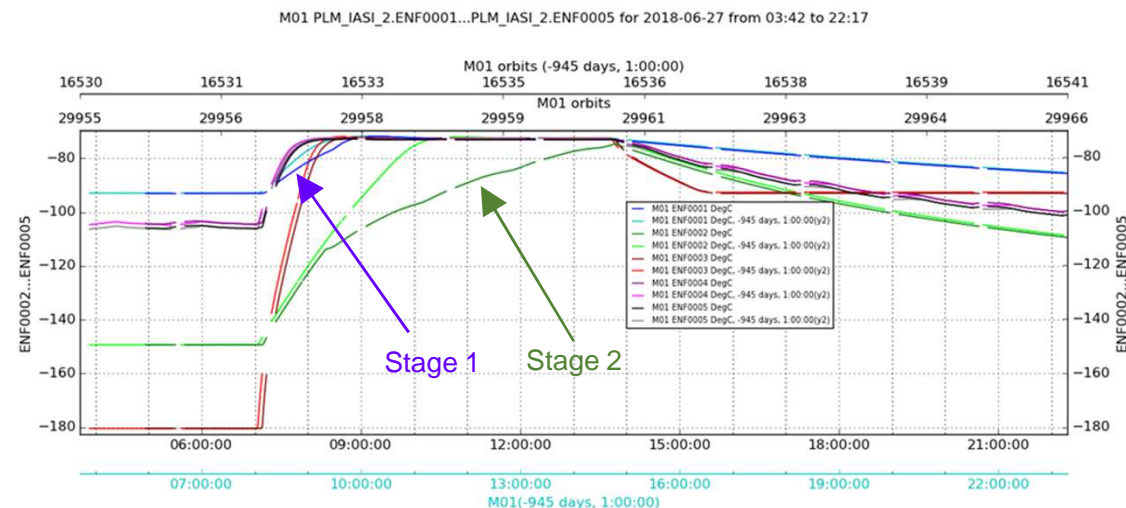
IASI-B : 200K DEC anomaly (June 2018)

Probably due to a partial unstuck of heaters of DEC1 and DEC2 stages.

The efficiency of decontamination in terms of instrument performance was not impacted.

The 3rd stage reached a temperature above -120°C allowing the outgassing of water.

Next decontamination expected by mid of 2022.



In-orbit unexpected issues (bis)

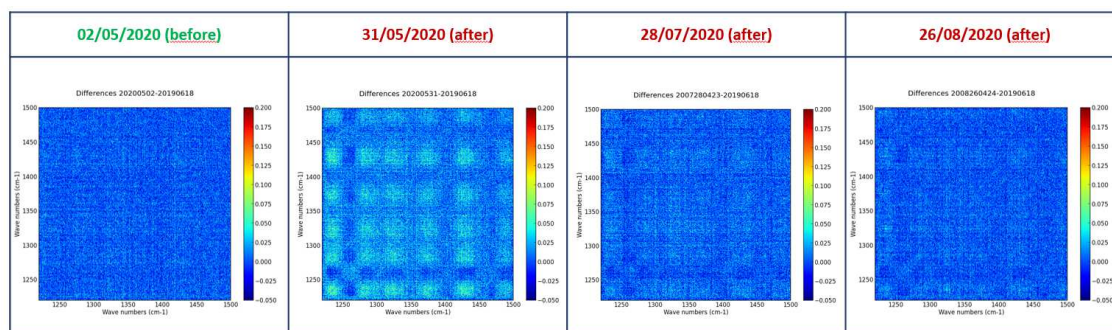
IASI-B : Stability of the NZPD quality index

Change of behavior observed in May 2020 on Cold space views

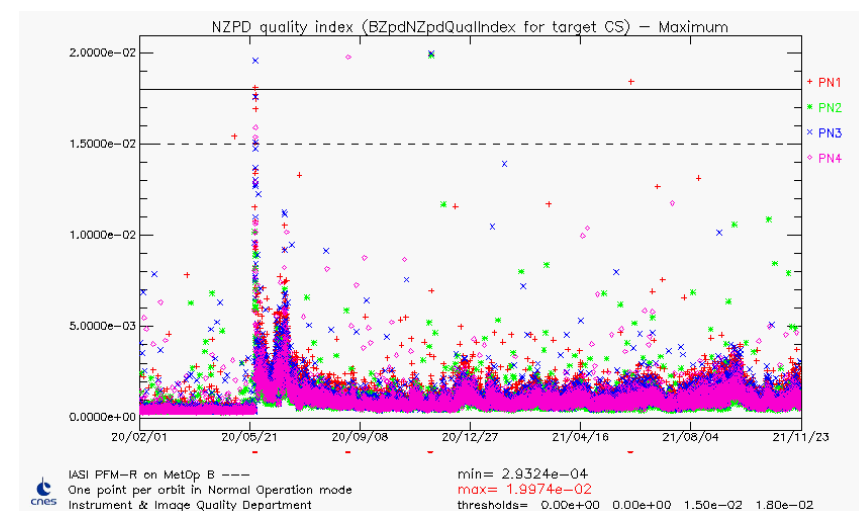
Effect of microvibrations external to the instrument suspected but not proven

The level of perturbations has decreased

No impact on the radiometric calibration

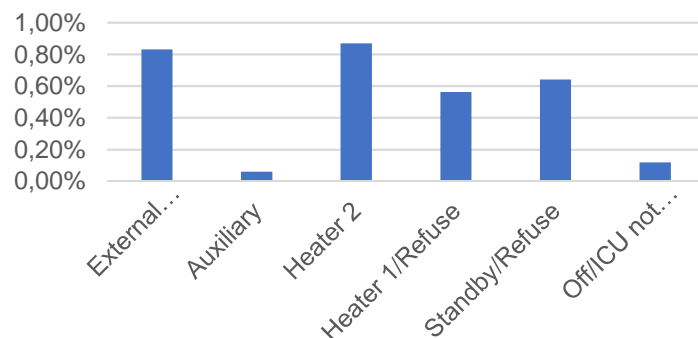


Evolution of the NCM (zoom in SB2) over time : exemple PN1

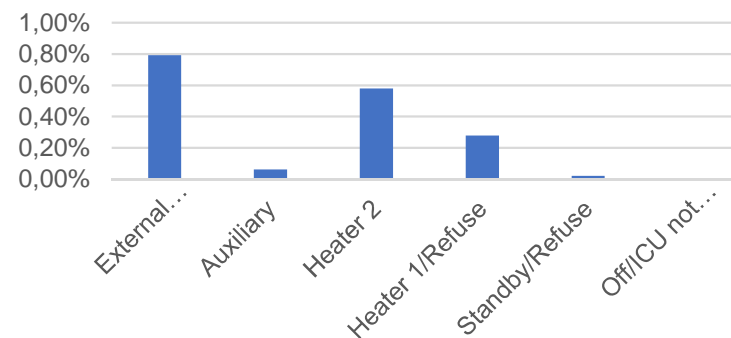


Instrument availability

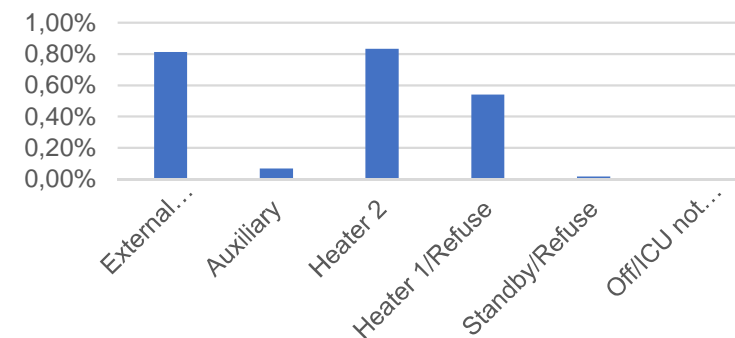
IASI A outage -3,08%- full period
18/07/2007 to 15/10/2021



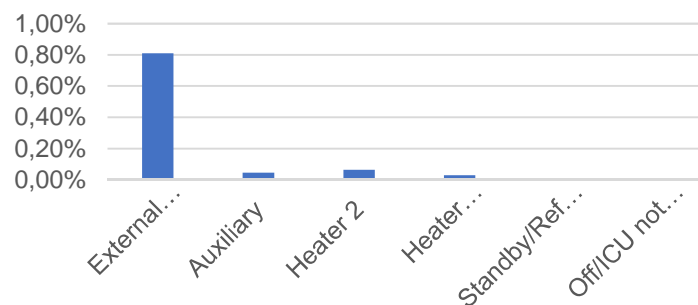
IASI-B outage -1,74%- full period
20/04/2013 to 15/10/2021



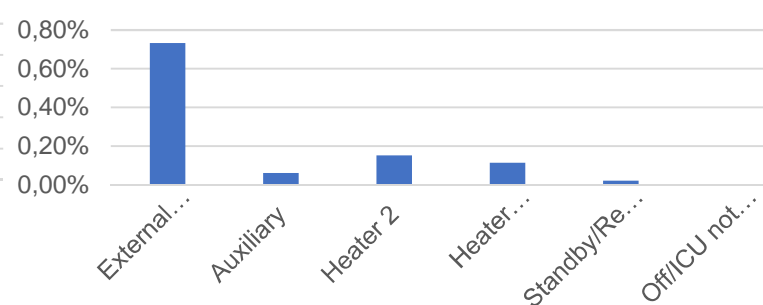
IASI-C outage -2,27%- full period
01/07/2019 to 15/10/2021



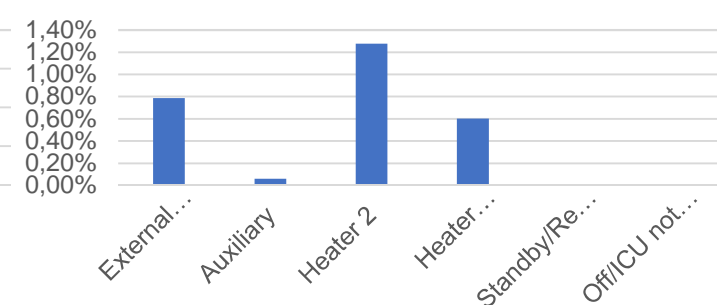
IASI A outage -0,96%- one year
01/03/2020 to 01/03/2021



IASI-B outage -1,08%- one year
01/03/2020 to 01/03/2021



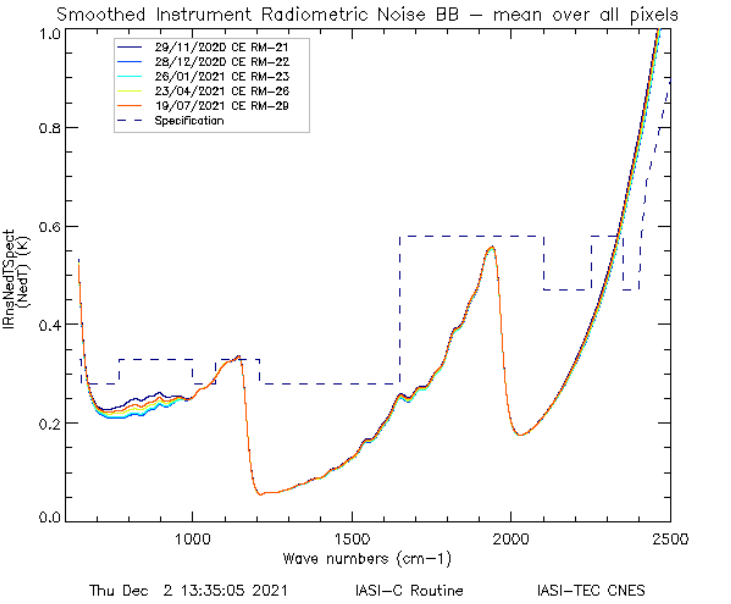
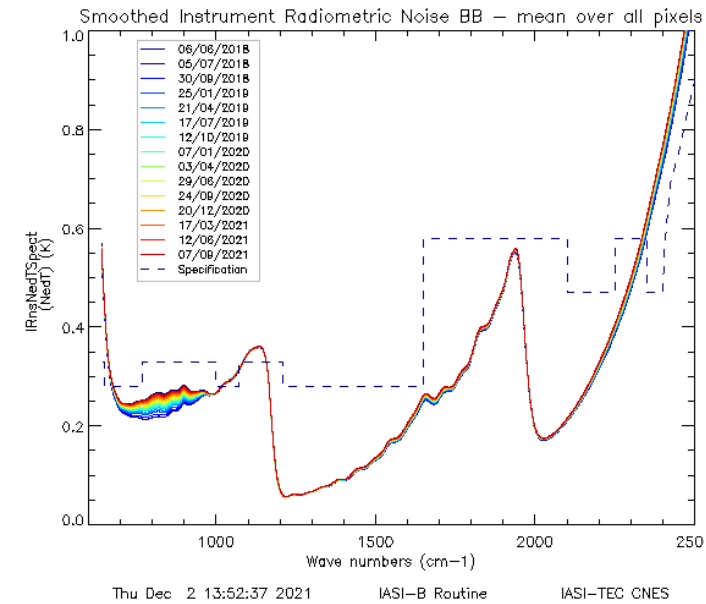
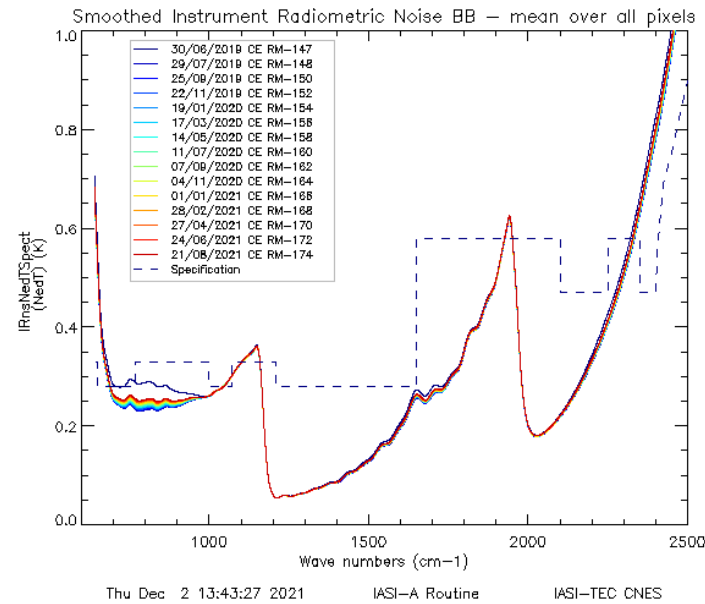
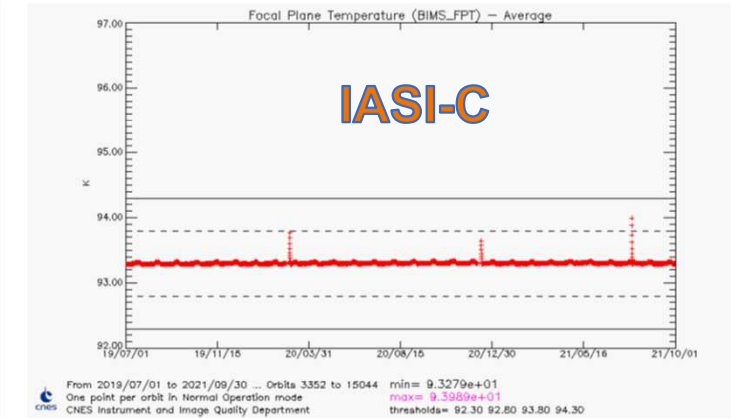
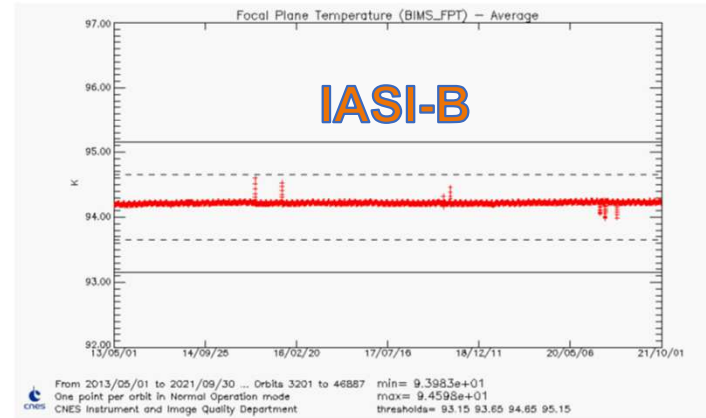
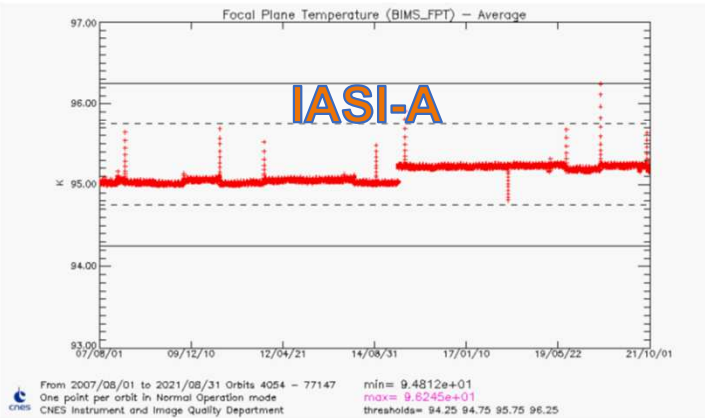
IASI-C outage -2,72%- one year
01/03/2020 to 01/03/2021



Performances

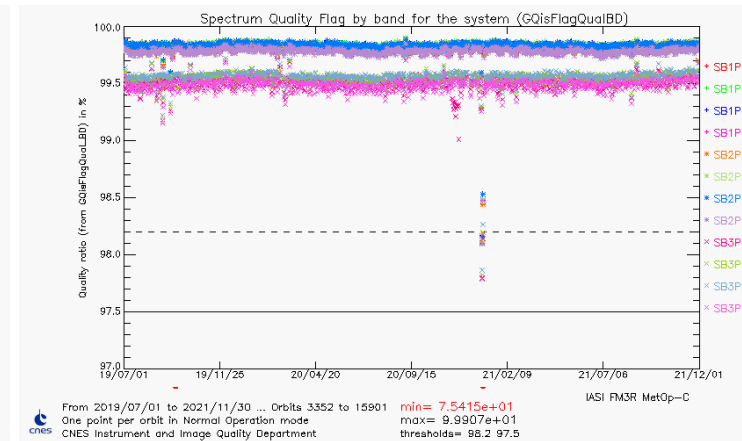
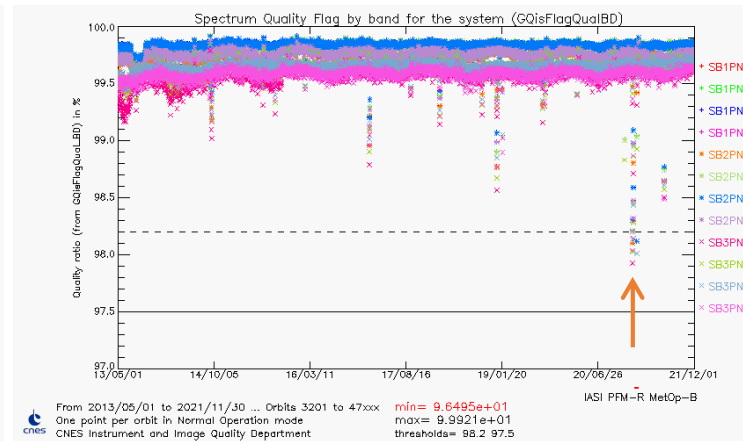
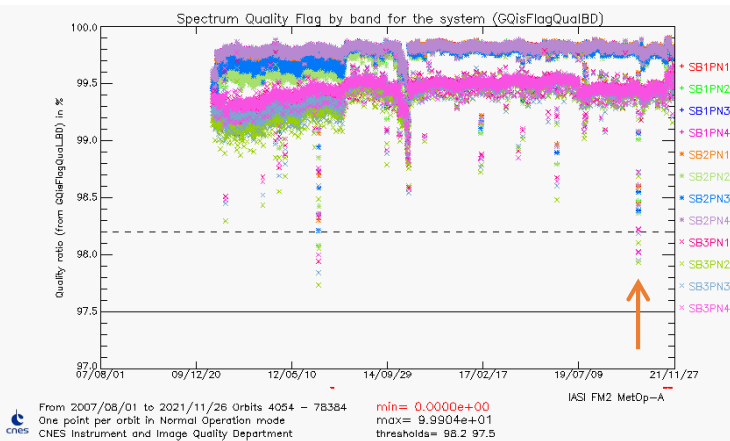


Focal Plane temperature : **STABLE**



Performances

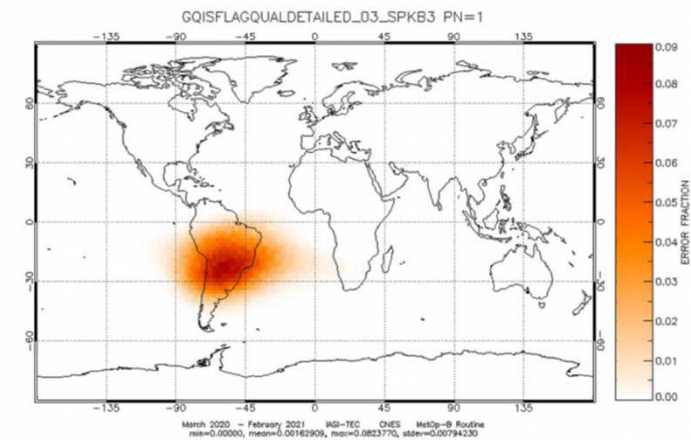
Quality ratio (L1) : **STABLE**



Same Overflows detected by the 3 IASI

- Peaks due to high stratospheric temperature related to the polar vortex collapse
- On-board coding table is not able to encode

Spectral Band 3 is more impacted by spikes mainly located over SAA

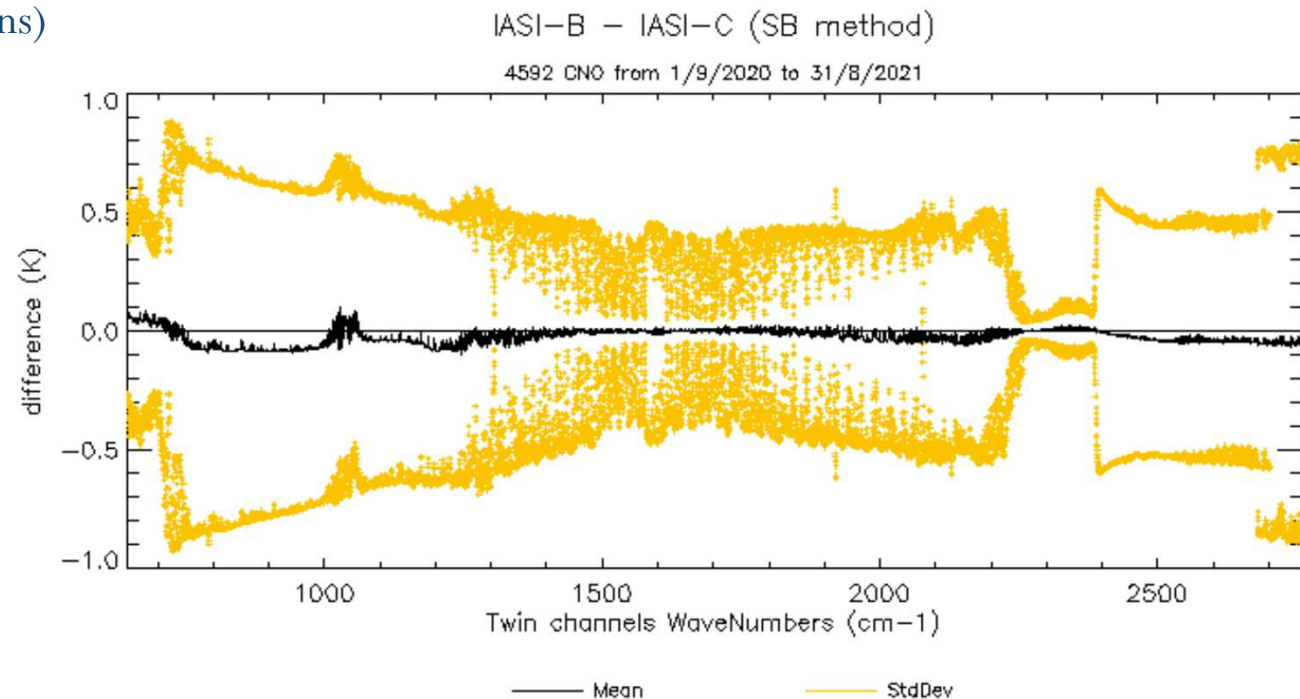


INTER-COMPARISON BETWEEN IASI-B AND IASI-C

❖ Scene selection for performing the inter-comparisons

- ⇒ Never simultaneous observations and Off-nadir geometry = the lines of sight for the 3 IASI are never the same
- ⇒ Using geolocation (IIS, AVHRR)
- ⇒ Focus on the central area = same atmospheric thickness
- ⇒ Selection of homogeneous scene (typical size $\approx 16\text{km}$) : ocean at night, same amount of clouds, etc.
- ⇒ Same amount of “after” and “before” observations for each IASI is needed to reduce method bias (due to modifications of geophysical conditions)

⇒ Very good inter-comparisons $\leq \pm 0,1 \text{ K}$ ✓



INTER-COMPARISON BETWEEN IASI VS CRIS

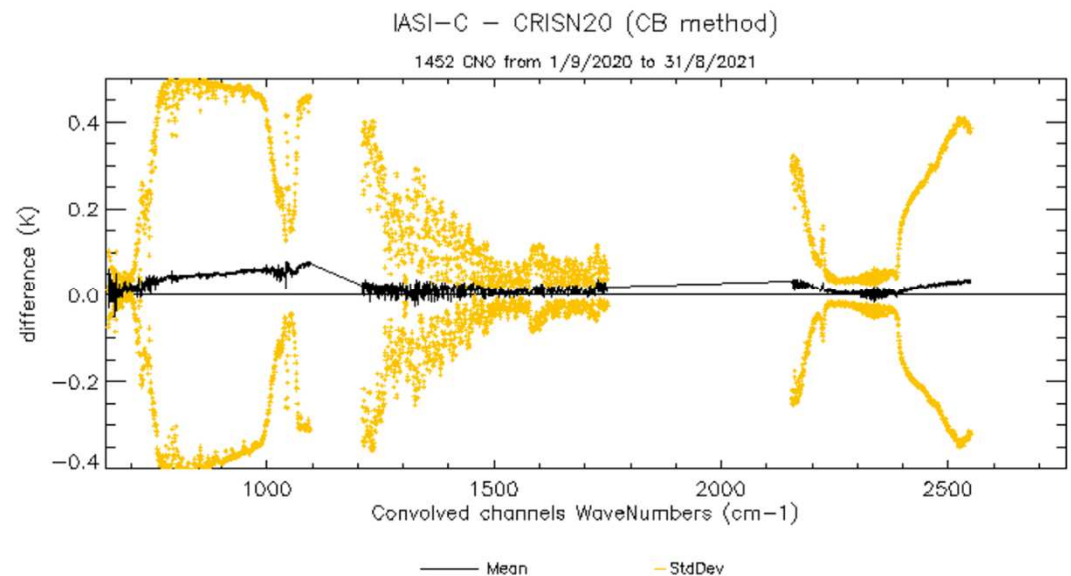
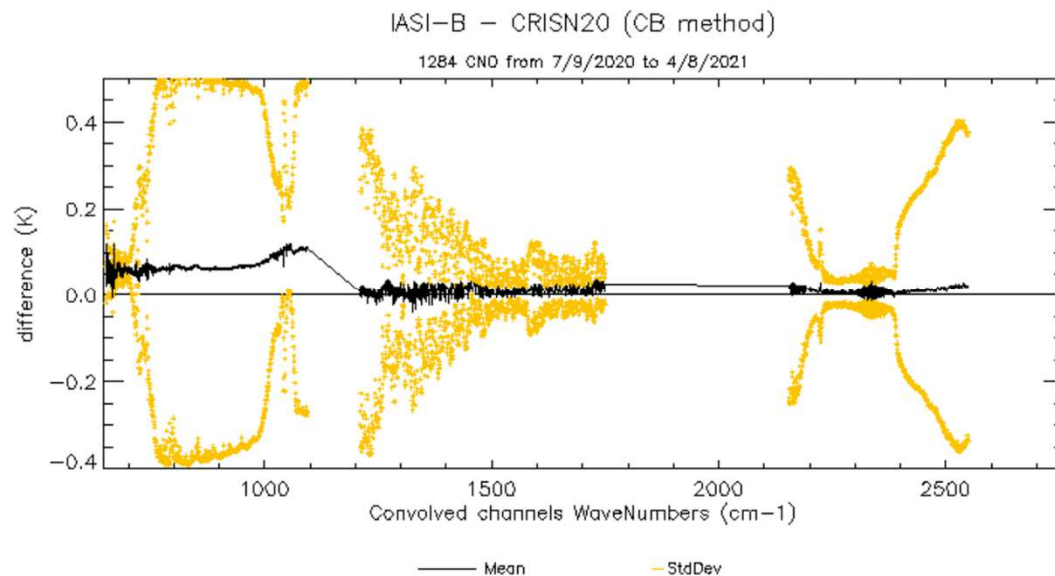


Instrument	IASI	CRIS-NPP HR	CRIS-N20 HR
Platform + launch date	METOP-A (2006) METOP-B (2012) METOP-C (2018)	Suomi-NPP (2011)	NOAA20 (2017)
Techno	Fourier Transform Spectrometer		
Spectral range	645 – 2760 cm ⁻¹		
Spectral coverage	Continuous	Partial	
Spatial resolution (nadir)	12 km	14 km	
Spectral resolution	0,5 cm ⁻¹	0,625 cm ⁻¹	0,625 cm ⁻¹
Number of channels	8461	2211	2211

INTER-COMPARISON BETWEEN IASI VS CRIS

❖ Method to obtain CRIS-like spectra from IASI spectra :

- ⇒ Applying a Fourier transform to IASI spectra, and dividing by the IASI apodisation function (this is equivalent to a deconvolution of the spectra by the IASI instrument function)
- ⇒ Interferogram resampling to the CrIs Optical Path Difference max;
- ⇒ Multiply by the CrIS apodisation function (Hamming function)



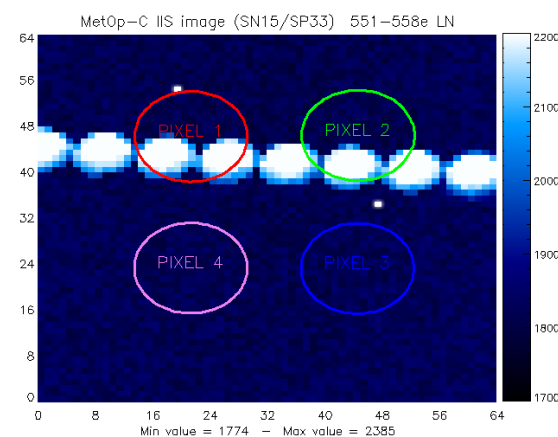
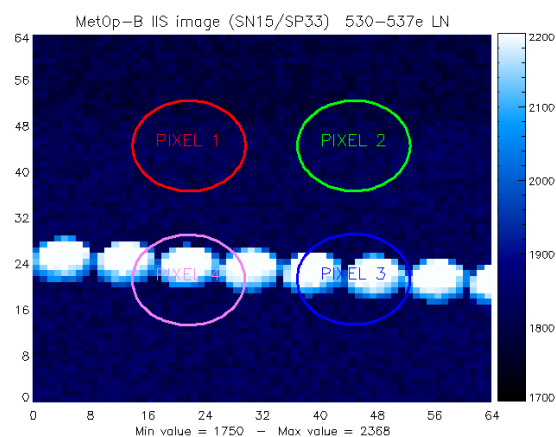
⇒ Very good inter-comparisons $\leq \pm 0,1$ K ✓

Specific activities : Acquisitions of Lunar data

Monthly acquisitions by IASI-B and IASI-C sounders of Lunar data from Jan. 2021 to Jan. 2022

Objective : study the potential of the Moon as a complementary radiometric source for inter comparison with other IR sounders.

=> More details on the study given in the talk given by Bojan Sic « Potential of the Moon as a calibration target for IASI instruments ».



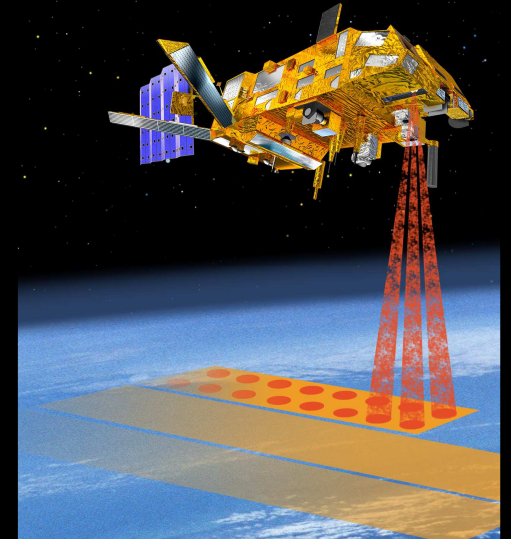
Conclusion

IASI-B (9 years IO) and IASI-C (3 years IO)

- in excellent state for the continuation of the mission
- On going activities to keep on top for the data quality

IASI-A (15 years)

- Instrument definitely switched off on Nov. 29
- After successful EOL test campaign



In IASI we trust !

Thank you for attention