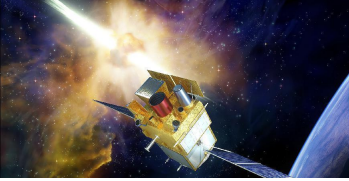
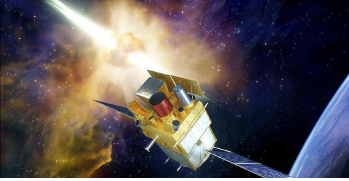


Validate the GRB origin of a
SVOM trigger



KEY MESSAGES

- ***None of the individual diagnostics are 100% sure, some are stronger than others***
- ***You will have to combine several diagnostics to be confident enough for validating the trigger***
- ***We should be able to generate a high-energy GCN Circular within an hour after the trigger time (15 min goal when we will be experienced enough)***



WHICH *Tools*





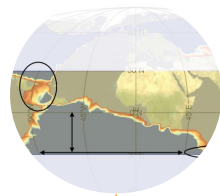
**WHICH
data**

ECLAIRs



GRM

VHF trigger



SAA

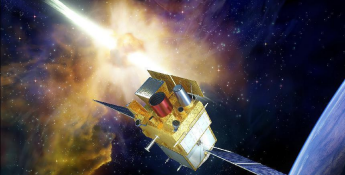


Space weather

**ECLAIRs and GPM
Count rates**

MXT

VHF follow-up



VHF TRIGGER alert data

Burst ID : sb23062199

ObsId: 2568089714, ObsType: 153, ObsNum: 1175666 **ECL**
ObsId: 3876712702, ObsType: 231, ObsNum: 1175806 **GRM**

SAMP access

Register to a SAMP-hub

Slew Accepted



ECL/GRM



MXT



VT



GFT



Localisation



Products



Packets



Notices

ECLAIRs & GRM data products

Trigger Time

1 Pck

ECL T_{BUTC}: 2023-06-21T23:59:56.410

1 Pck

GRM T_{BUTC}: 2023-06-21T23:59:57.674

Confidence Level

1 Pck

ECL SNR: 10.00

1 Pck

GRM SNR: 6.553.50

Quick Position

1 Pck

ECL RA,Dec : 169.765, 3.301 R90: 7.70°

1 Pck

GRM RA,Dec : 121.669, 13.339

Duration

ECL T90 [s]: 33.11 ERR [s]: -3.58/+13.88

GRM T90 [s]: 21.42 ERR [s]: -0.27/+0.28

Display plot Hardness Ratio vs. Duration

Peak Fluxes

ECL [4-20] keV 969.3684 ERR: 83.0709

GRM [50-300] keV 3,640.5912 ERR: 70.2842

Display plot Peak Fluxes for all GRB

Crude classification

LONG 97.0% / SHORT 3.0%

Slew accepted?

Event with a high proba of being real



BUT Slew for false alarms can occur

Multiple detection GRM/ECLAIRs?



Some burst will be only detected by ECLAIRs (the softest) or GRM (the harder)

If yes, already a good indication of a positive detection

Is the trigger a GRB ? Is it rather long or short ?



VHF TRIGGER alert data

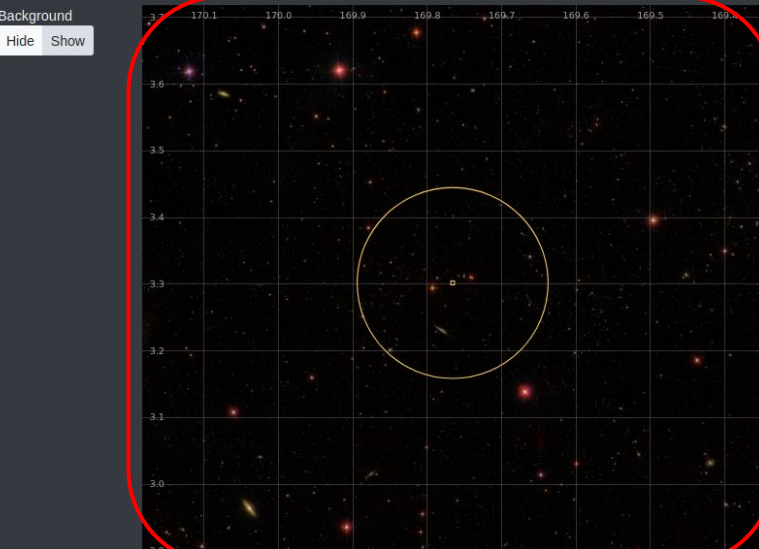
Burst ID : **sb23062199**

ObsId: 2568089714, ObsType: 153, ObsNum: 1175666 **ECL**
ObsId: 3876712702, ObsType: 231, ObsNum: 1175806 **GRM**

SAMP access

Localisation Display

RaJ2000 / DecJ2000



Quick Position values

ECLAIRs Best ErrBox All ErrBox

▼ Show 1 QPO

Any bright x-ray/gamma-ray catalog source close to the ECLAIRs position ?

▼ Show 8 QPO

MXT-S1 Best ErrBox All ErrBox

▼ Show 8 QPO

MXT-S2 Best ErrBox All ErrBox

▼ Show 8 QPO

MXT-S3 Best ErrBox All ErrBox

**If no,
already a good indication of positive
detection of a new transient**



VHF TRIGGER

light curve data

Burst ID : **sb23062199**

ObsId: 2568089714, ObsType: 153, ObsNum: 1175666 **ECL**

ObsId: 3876712702, ObsType: 231, ObsNum: 1175806 **GRM**

SAMP access

Register to a SAMP-hub

Slew Accepted



ECL/GRM



MXT



VT



GFT



Localisation



Products



Packets

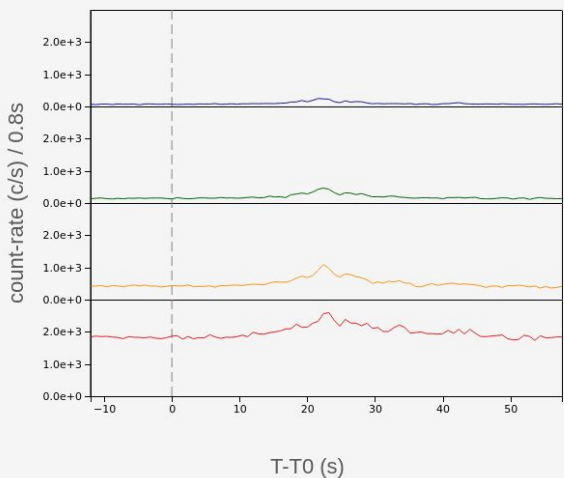


Notices

Light Curves - ECLAIRs

On Board Light Curve

On Ground Light Curve



How is the background ? Does the light curve look like something "real"?

we should have example of artefacts light curves (if it helps)



If yes

again a good indication of a positive detection

not coming from a spike artefact at a given energy

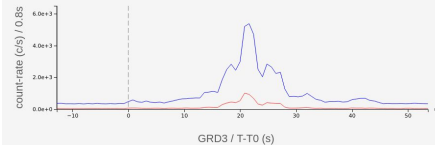
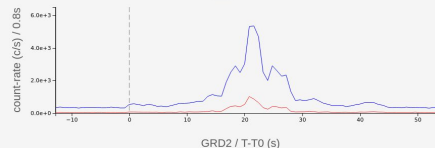
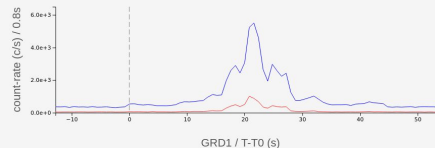


Is it detected in several energy bands in ECLAIRs (4) and GRM/GRDs (2) ?

Light Curves - GRM

On Board Light Curve

On Ground Light Curve





VHF DATA

ECLAIRs counts



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2023-09-13 10:08 AM (UT)



Mission Informations

Spacecraft

Gamma-Ray Instruments

Visu not available yet

the specs must be written here

it should look like a plot of the count rate as function of time

ECLAIRs saturants

Events that have saturated the energy coding and therefore correspond to large deposits of energy in a pixel.

ECLAIRs multiple

Events which have affected several pixels at the same time and which correspond either to photons propagated by the compton effect or to cascades of charged particles

Entry into the SAA or a solar flare should significantly increase these two count rates.

Any Saturants and/or multiples excesses coincident in time with a trigger ?

If no,

the confidence about the astro origin of the trigger is high



VHF DATA

GRM Particle Monitor (GPM)

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2023-09-13 10:08 AM (UT)



Mission Informations

[Spacecraft](#)[Gamma-Ray Instruments](#)

Visu not available yet

the specs must be written here

it should look like a plot of the count rate as function of time

GPM

Particle count rates are monitored on real-time. Any strong count rate excess in coincidence with a GRM or an ECLAIRs trigger time is very suspicious!

Any GPM excesses coincident in time with a trigger ?

If no,

the confidence about the astro origin of the trigger is high



SPACE WEATHER *data*

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Gamma-Ray Instruments

Current space weather conditions ▾

Planetary K-index

Proton Flux

X-RAY Flux



The display will be updated in a near future

K-index

It is an excellent indicator of disturbances in the Earth's magnetic field and is used by SWPC to decide whether geomagnetic alerts and warnings need to be issued for users who are affected by these disturbances.

Sun weather

- *Solar x-ray Flares detected by GOES*
- *Proton Event products are issued for several thresholds and for two particle energy levels (>10MeV and >100MeV)*



SPACE WEATHER data



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Spacecraft

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Current space weather conditions

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Proton Flux

X-RAY Flux

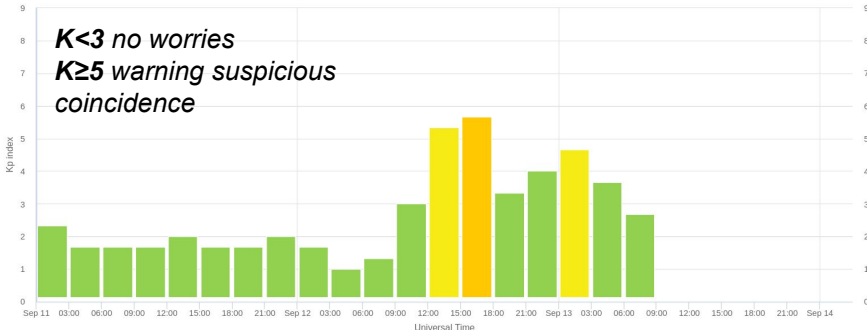


The display will be updated in a near future

Estimated Planetary K index (3 hour data)

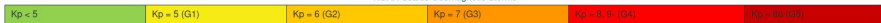
Begin: Mon, 11 Sep 2023 00:00:00 GMT

$K < 3$ no worries
 $K \geq 5$ warning suspicious coincidence

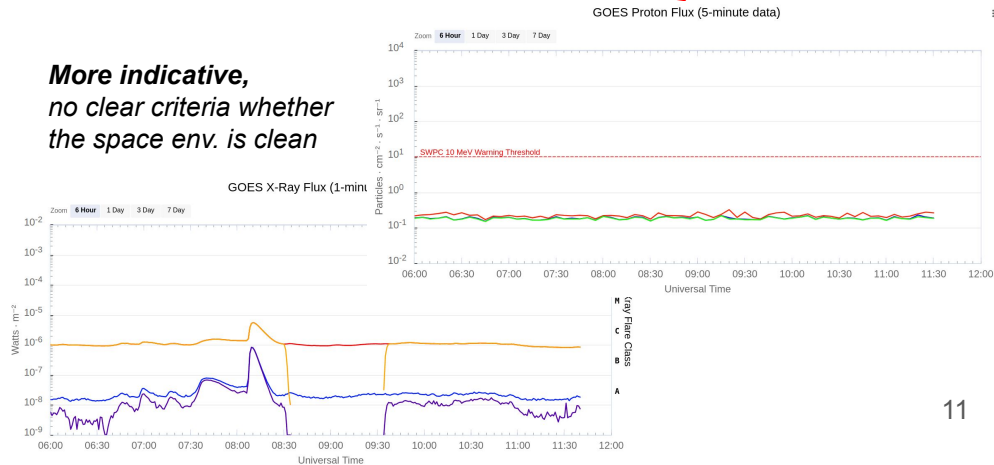


Updated Time: 2023-09-13T06:00:00.000Z

NOAA Scales Geomagnetic Storms



**More indicative,
no clear criteria whether
the space env. is clean**

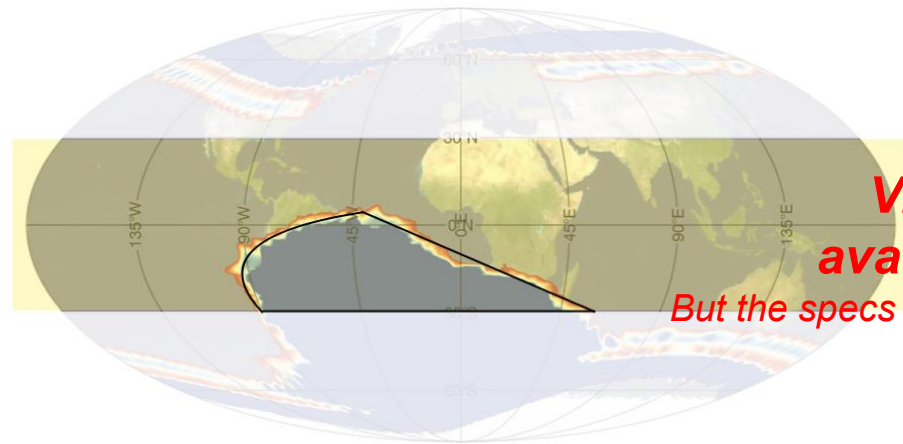




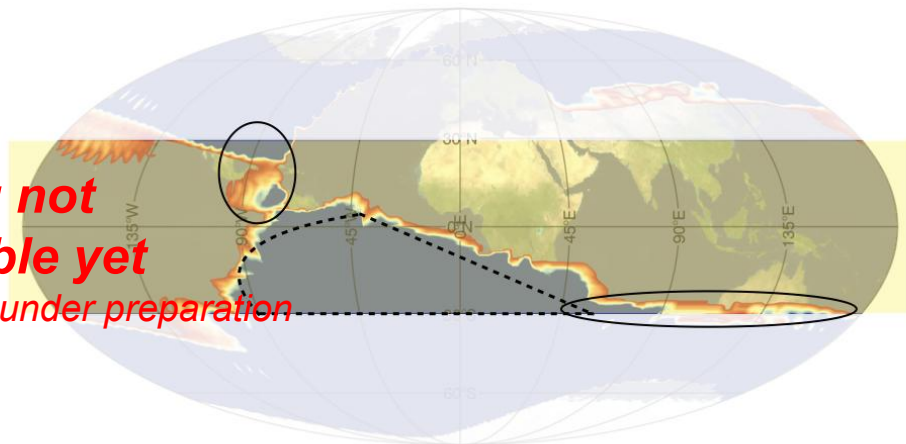
SAA data

Quiet Sun / Quiet SAA

Active Sun / Active SAA



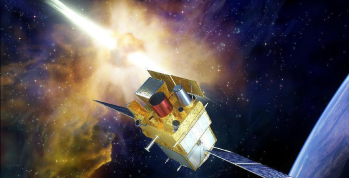
'Standard' contour



Larger SAA + check also Central America and Eastward of South Africa

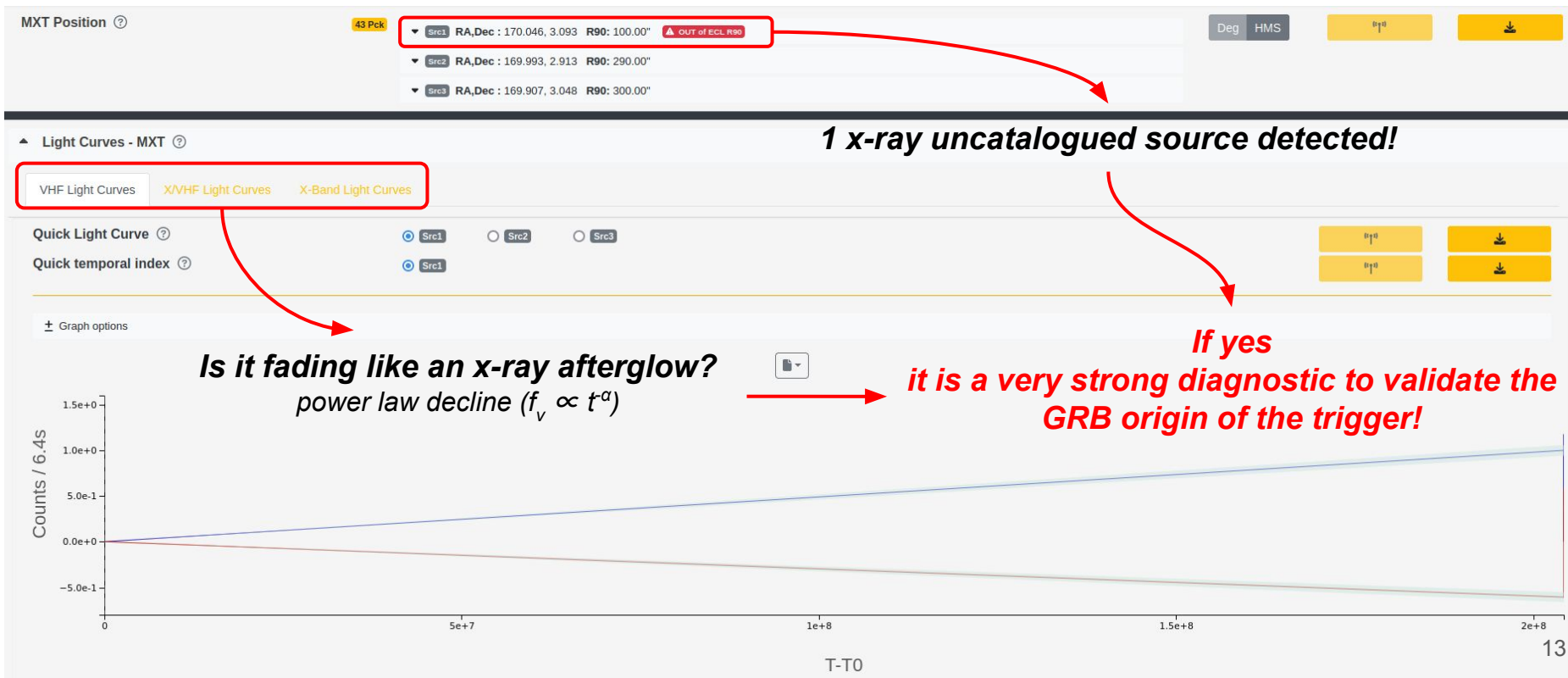
*Visu not available yet
But the specs are under preparation*

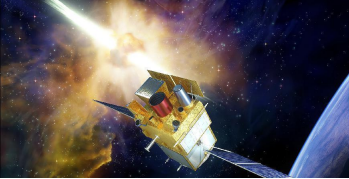
- If leaving the core of SAA, possible increase of the instrumental background
- In case of **known strong geomagnetic activity**, close to **Central America** (near N 30° latitude) or **South Africa** (near S 30° latitude towards the East)?
 - same risk as for the SAA but without spacecraft activation
 - warning, do not depends only on the position after the SAA but of previous track inside SAA ; check the date of the most recent switch-ON of ECLAIRS



VHF X-RAY FOLLOW-UP

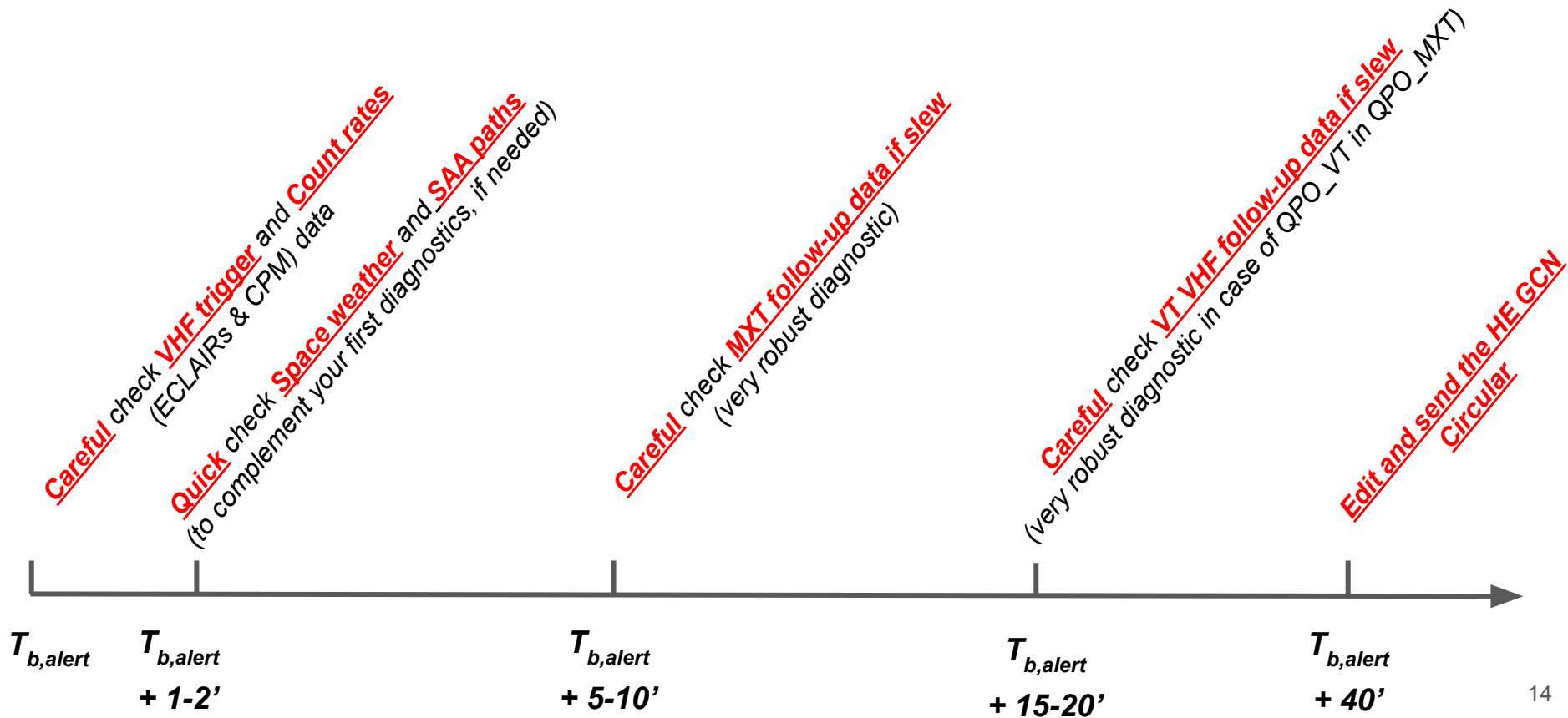
MXT data





SUMMARY

the diagnostics to help you validate the trigger before editing you GCN Circular





CHECK LIST & VALIDATION

VHF trigger data	checks (<i>basic diagnostics</i>)	status
	Multiple gamma-ray inst. detection ?	
	Slew or not ?	
	Is the trigger a GRB (Crude Class)?	
	Is the trigger loc. close to a known x/γ-ray source ?	
	Was the background “anomalously” fluctuating prior to the trigger time?	
ECLAIRs and CPM monitoring	checks (<i>important diagnostic</i>)	status
	Any count rate excess in the ECLAIRs saturants ?	
	Any count rate excess in the ECLAIRs multiples ?	
	Any count rate excess in the particle monitor?	15



CHECK LIST & VALIDATION

Space weather data	checks (<u>no clear criteria but more indicative</u>)	status
	Any K_p -index excess?	
	Any Solar activity?	
	SVOM in or close to the SAA?	
Follow-up data	checks (<u>strong diagnostic</u>)	status
	Any x-ray uncatalogued source detected ?	
	If yes, is it fast evolving (can be a rising flare or a power law flux decline) ?	
	Any VHF VT candidate (but late latencies and more chance for non-detection)?	