



THE AGILE GAMMA-RAY LEGACY ARCHIVE AND THE EASY AGILE-LV3 WEB TOOL

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on behalf of **C. Pittori, F. Verrecchia**

ASI Space Science Data Center (SSDC)

INAF - Astr. Obs. of Rome





OUTLINE



- The AGILE gamma-ray mission
- The AGILE gamma-ray data analysis
- The online interactive analysis tool and the AGILE-LV3 archive
- Summary and conclusions



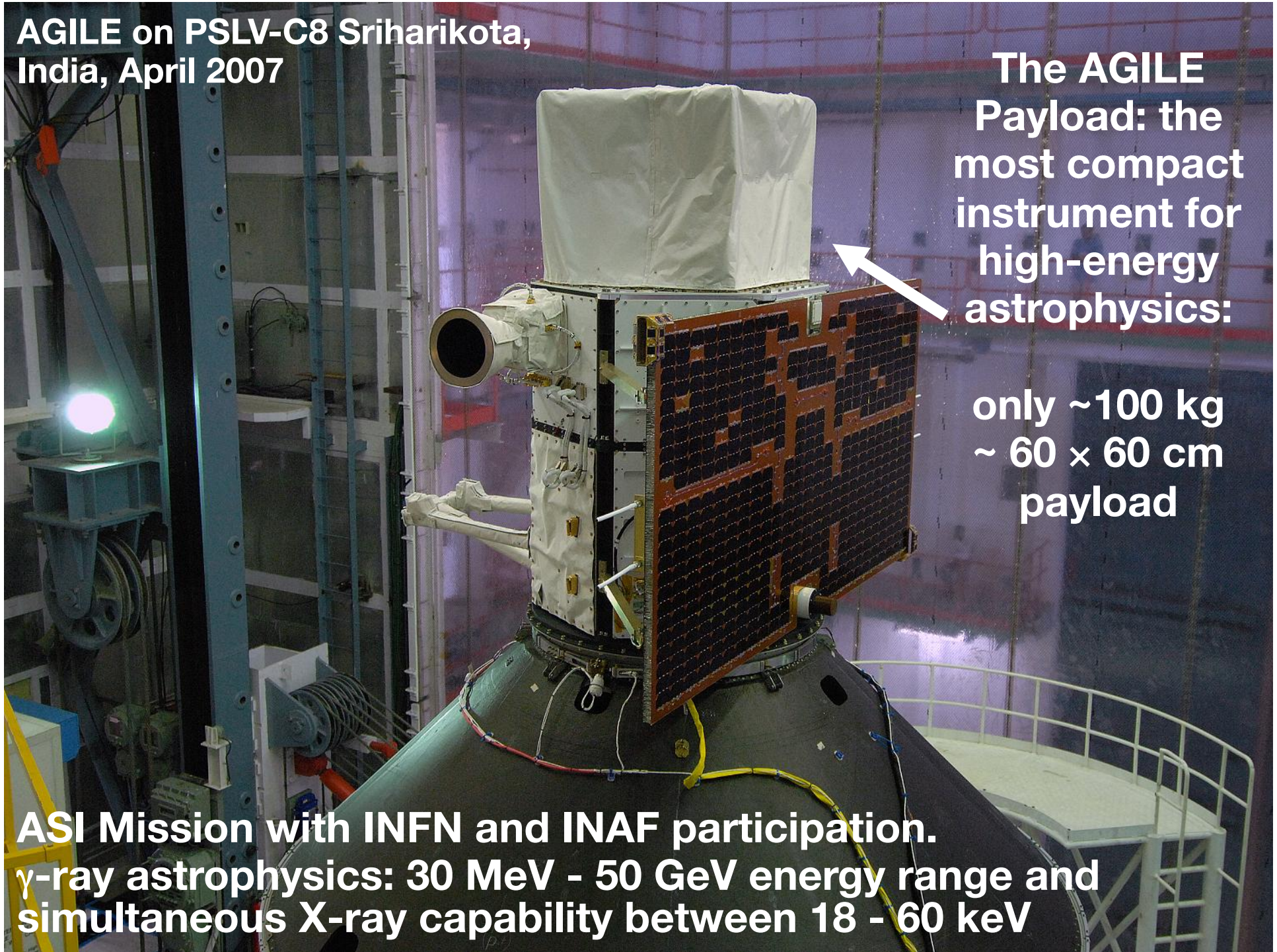
THE AGILE GAMMA-RAY MISSION

**AGILE on PSLV-C8 Sriharikota,
India, April 2007**

**The AGILE
Payload: the
most compact
instrument for
high-energy
astrophysics:**

**only ~100 kg
~ 60 × 60 cm
payload**

**ASI Mission with INFN and INAF participation.
γ-ray astrophysics: 30 MeV - 50 GeV energy range and
simultaneous X-ray capability between 18 - 60 keV**



**ANTICOINCIDENCE
SHIELD**

**HARD X-RAY IMAGER
(SUPER-AGILE):
18-60 keV**

**GAMMA-RAY IMAGER
DETECTOR (GRID):
30MeV-50GeV
SILICON TRACKER**

**(MINI) CALORIMETER:
0.3-100MeV**

GRID performances:

$A_{\text{eff}} = 300\text{-}350 \text{ cm}^2 @ 100 \text{ MeV}$ ($\sim 500 \text{ cm}^2$ above 400 MeV)

Angular Res. (68% cont.radius) = $3.5^\circ @ 100 \text{ MeV}$ ($1.2^\circ @ 400 \text{ MeV}$)



TWO “LIFES” OF AGILE



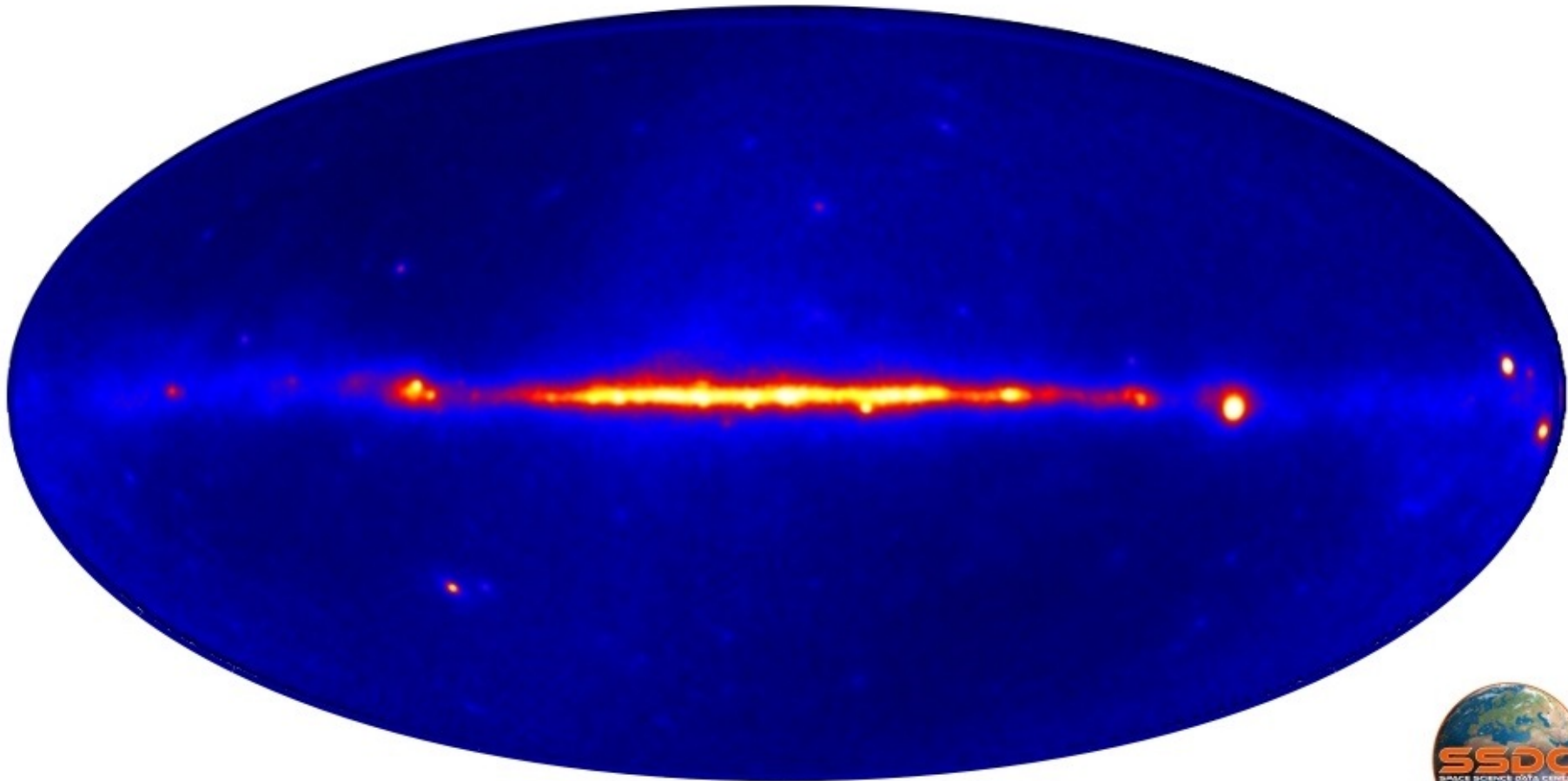
	AGILE-POINT	AGILE-SPIN
time period	Jul.07 – Oct.09	Nov. 2009 - today
attitude	fixed	variable (spinning ~ 1°/sec)
sky coverage	1/5	~ 70-80 %
1-day exposure (≤ 30 deg off-axis, @ 100 MeV)	~ 2x10⁷ (cm² sec)	(0.5-1)x10⁷ (cm² sec)

2-day Flux sensitivity in spinning (E>100 MeV, @5σ): 2÷4 x 10⁻⁶ ph cm⁻² s⁻¹

1-yr Flux sensitivity in spinning (E>100 MeV, @5σ): 1÷8 x 10⁻⁷ ph cm⁻² s⁻¹



THE AGILE GAMMA-RAY SKY ($E > 100$ MEV)



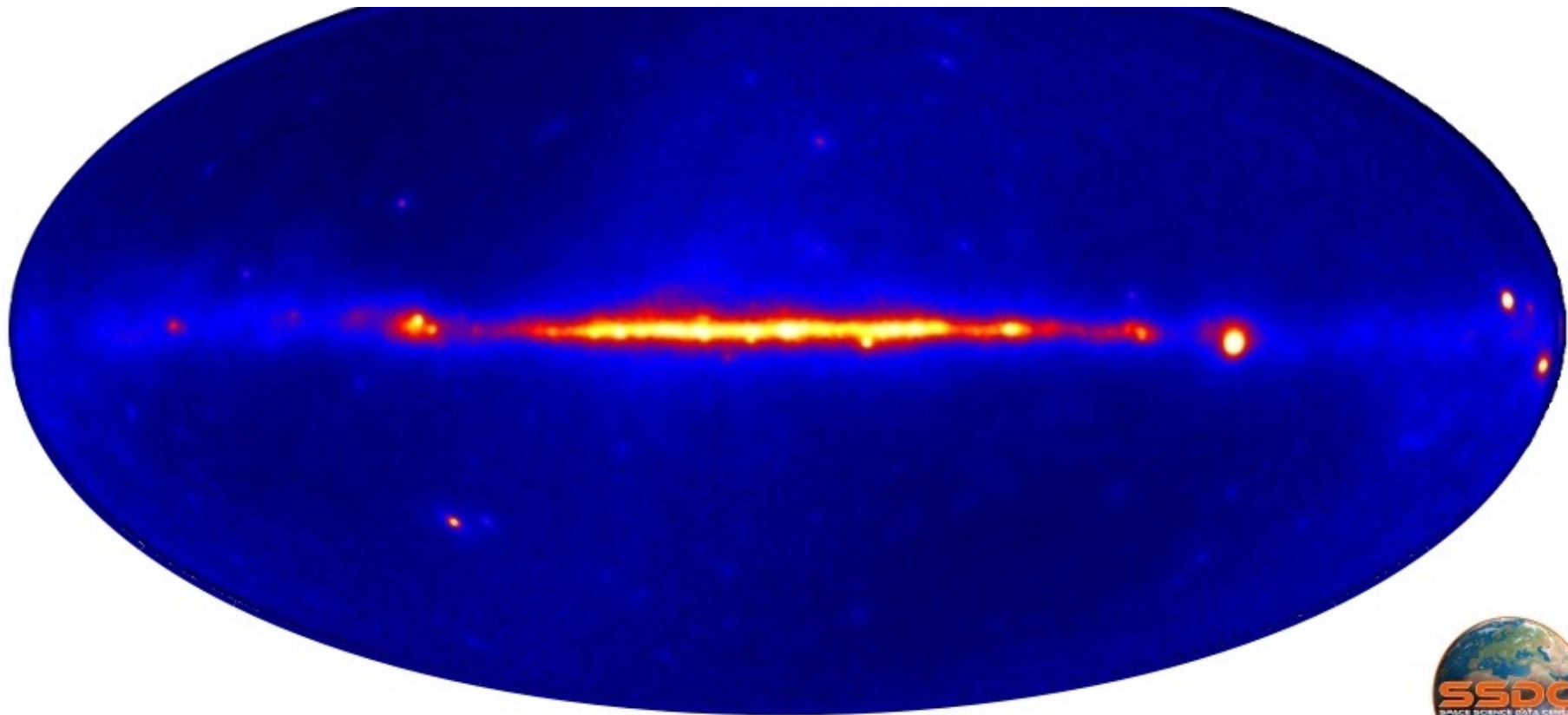
AGILE INTENSITY MAP ABOVE 100 MeV (up to Sept. 2017)



THE AGILE GAMMA-RAY SKY ($E > 100$ MEV)



MORE THAN 11 YEAR OPERATING IN ORBIT!



AGILE INTENSITY MAP ABOVE 100 MeV (up to Sept. 2017)



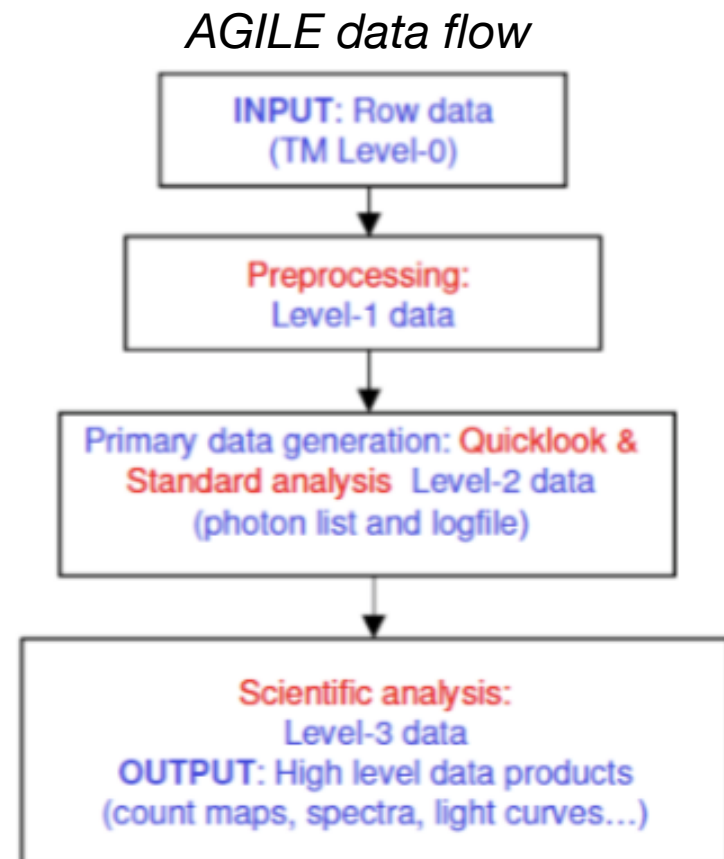
THE AGILE DATA CENTER (ADC)



- The **AGILE Data Center (ADC)** hosted at the SSDC is in charge of all the activities related to the archiving and analysis of the AGILE data:

From the raw scientific telemetry (Level-0):

- ✓ Pre-processing → Level-1 data
- ✓ Quick Look analysis (transient detection) and Standard analysis → Level-2 data (photon list + auxiliary information)
- ✓ Archiving and distributing all L2 data + official AGILE analysis s/w and calibrations (IRFs)
- ✓ Server of high-level data products (general AGILE catalogues, see Verrecchia's Talk.)





THE SSDC WEB PORTAL





THE SSDC WEB PORTAL



SSDC
SPACE SCIENCE DATA CENTER

Space Science Data Center

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(AGILE, FERMI, SWIFT,
NUSTAR, ...)

AGILE SWIFT FERMI
NUSTAR AMS-02 PLANCK
SOLAR SYSTEM PAMELA GAIA
HERSCHEL BEPPO SAX SIMBOL X
CHEOPS EUCLID PLATO

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THE AGILE GAMMA-RAY DATA ANALYSIS



THE AGILE MULTI-SOURCE ANALYSIS



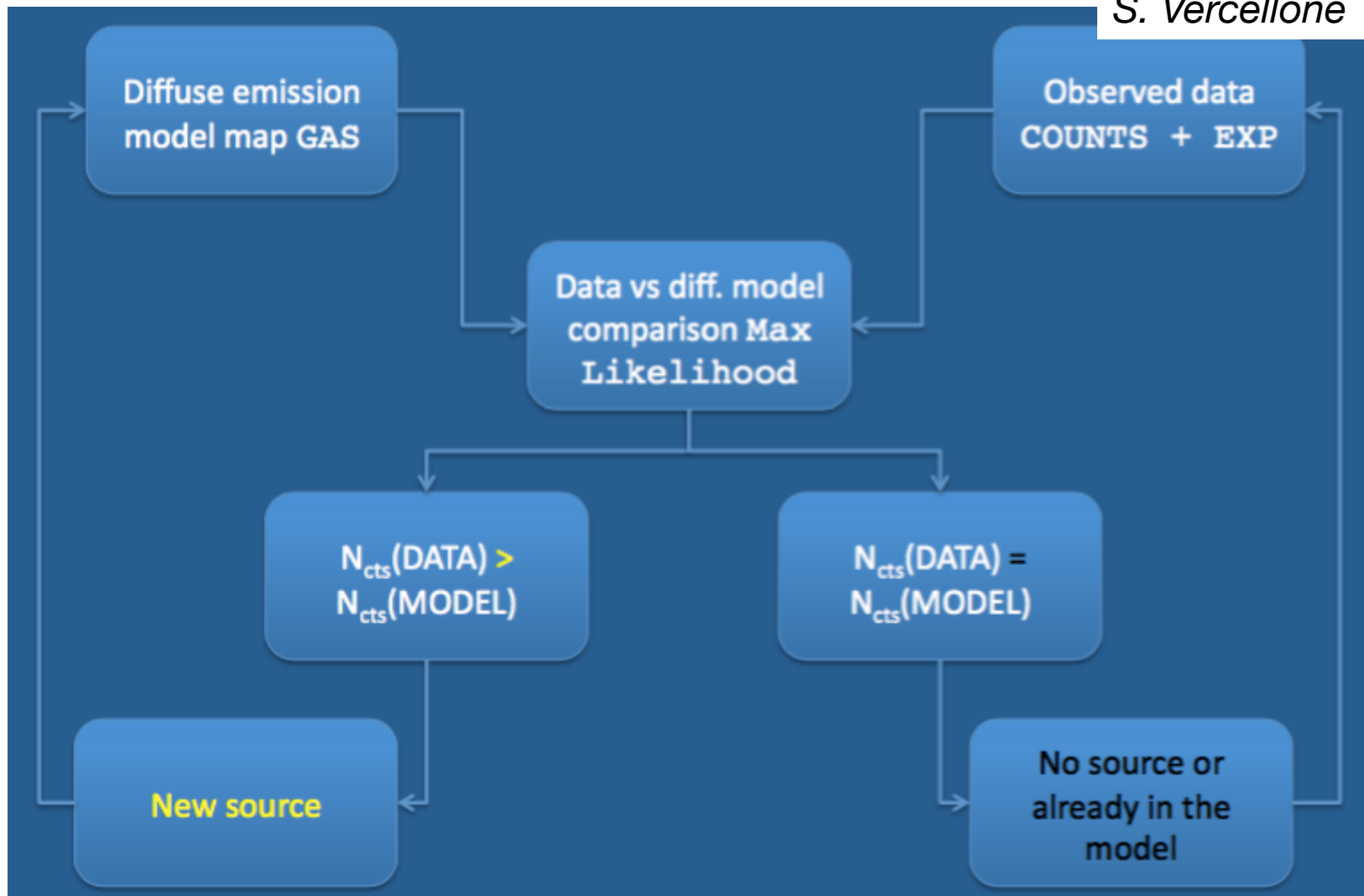
- Based on the Maximum Likelihood (ML) algorithm developed by EGRET (Mattox et. al (1998), Chen et al. (2010)).
- Basic input to the AGILE analysis:
 - LV2 data: photons list (EVT) and logfiles (LOG) (HK, attitude, ratemeters info, ...) in FITS file format.
- Count, exposure and background FITS maps, centered at the location of interest (within an energy ($E > 100$ MeV) and time interval), are then produced from the LV2 data using the tasks of the AGILE s/w.
- The ML method: testing the *Null* hypothesis (only signal from background) against the *True* hypothesis (gamma-ray source at the input position).



AGILE S/W FUNCTIONAL SCHEME



S. Vercellone

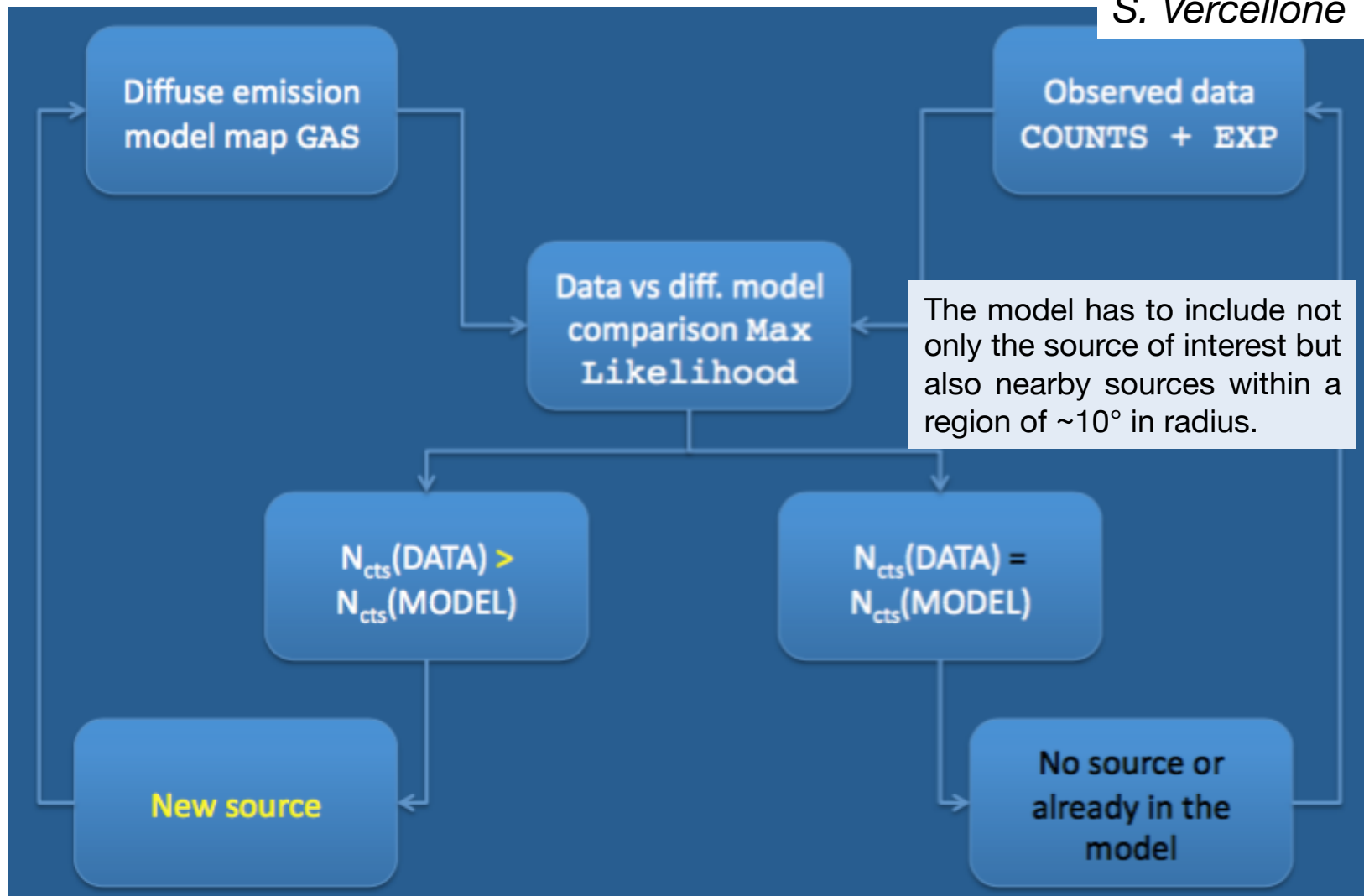




AGILE S/W FUNCTIONAL SCHEME



S. Vercellone





ACCESS TO AGILE DATA AND S/W



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ACCESS TO AGILE DATA AND S/W



The screenshot shows the Space Science Data Center website. The main navigation bar includes links for Home, About SSDC, Public Outreach, Quick Look, Missions, Multimission Archive, Catalogs, Tools, Links, Bibliographic services, and Helpdesk. The 'Missions' link is circled in white. Below the navigation bar is a large image of a satellite and a colorful astronomical map. A white box with the text 'MISSION WEB PAGES' has two arrows pointing to the 'Missions' link and the 'AGILE' mission icon in a grid of mission icons. The grid also includes icons for SWIFT, FERMI, NUSTAR, AMS-02, PLANCK, SOLAR SYSTEM, PAMELA, GAIA, HERSCHEL, BEPPO, SAX, SIMBOL X, CHEOPS, EUCLID, and PLATO. At the bottom of the page, there are sections for MEDIA (SED BUILDER, SKY EXPLORER, MATISSE), TOP NEWS (GAIA PORTAL, COSMIC RAY DATABASE, SSDC MULTIMISSION ARCHIVE FOR SPACE SCIENCE), and EVENTS (SSDC CATALOGS, BIBLIOGRAPHY TOOL, NEWSLETTER).



ACCESS TO AGILE DATA AND S/W



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AGILE
Science Data Center

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Welcome to the AGILE Data Center Home Page at SSDC

These pages provide updated information and services in support to the general scientific community for the mission AGILE, which is a small Scientific Mission of the Italian Space Agency (ASI) with participation of INFN, IASF/INAF and CIFS .

AGILE is devoted to gamma-ray astrophysics and it is a first and unique combination of a gamma-ray (AGILE-GRID) and a hard X-ray (SuperAGILE) instrument, for the simultaneous detection and imaging of photons in the 30 MeV - 50 GeV and in the 18 - 60 keV energy ranges.

The AGILE Mission Board (AMB) has executive power overseeing all the scientific matters of the AGILE Mission and is composed of:

- AGILE Principal Investigator: Marco Tavani, INAF-IAPS Rome (Chair)
- ASI Project Scientist: Paolo Giommi, ASI-SSDC
- ASI Mission Director: Fabio D'Amico, ASI
(Former ASI Mission Directors: Luca Salotti, up to September 20, 2010 and Giovanni Valentini up to January 22, 2015)
- AGILE Co-Principal Investigator: Guido Barbiellini, INFN Trieste
- 1 ASI representative: Elisabetta Tommasi di Vignano
(Former ASI representative: Sergio Colafrancesco up to June, 2010)

Bruno Rossi Prize 2012
Marco Tavani and the AGILE team

AGILE current spinning sky view

(Click here for previous pointing details)

Click here to access to AGILE Spinning FOV plotter

AGILE total intensity map up to Sep. 30, 2017.



THE AGILE ONLINE INTERACTIVE ANALYSIS TOOL



WHY AN ONLINE ANALYSIS TOOL?



- AGILE gamma-ray data analysis above 100 MeV is an event-by-event analysis that requires many steps and it can be **time-consuming** (especially in case of deep studies or generation of light-curves over long time intervals).
- The **generation of the exposure maps** is the task requiring more computation time (few hours to generate a 6-month expmap on a PC with medium capability).
- Downloading of LV2 data can also requires enough locally data space, especially for LOG files (~2 GB per 15 days of AGILE observations).
- Users from the astronomical community might want to have a quick and robust result to be inserted in their MWL papers without performing the full AGILE data analysis.



THE AGILE ONLINE ANALYSIS



- The ADC @ SSCDC provides then an online interactive AGILE data analysis tool.
- The tool is a web interface for official interactive on-line Maximum Likelihood analysis on AGILE data. **It does neither require any locally installed s/w or calibrations nor LV2 data retrieval!**
- The tool provides the estimate of flux and significance of a source in the selected period, taking into account all other known gamma-ray sources in the region, the diffuse gamma-ray background and other sources of background (such as the Earth albedo).



ACCESS TO THE TOOL



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Mission Selected
AGILE-LV3

AGILE-LV3 Tutorials:

- [pdf](#)
- [video 1](#), [video 2](#)

AGILE Software Manual

[WARNINGS and PLANNED UPDATES](#)

Enter source name or coordinates: RA, DEC L, B Lon, Lat
(e.g. CYGX-1 or 19 58 21.7, +35 12 05.8 or 299.590333, 35.201611 or 71.334960, 3.066917)

Name Resolver: SSDC Name Server SIMBAD NED

Start Date: (dd-mm-yyyy) **End Date:** (dd-mm-yyyy)

Duration: Day(s) **Min EXP:** (cm² s sr)

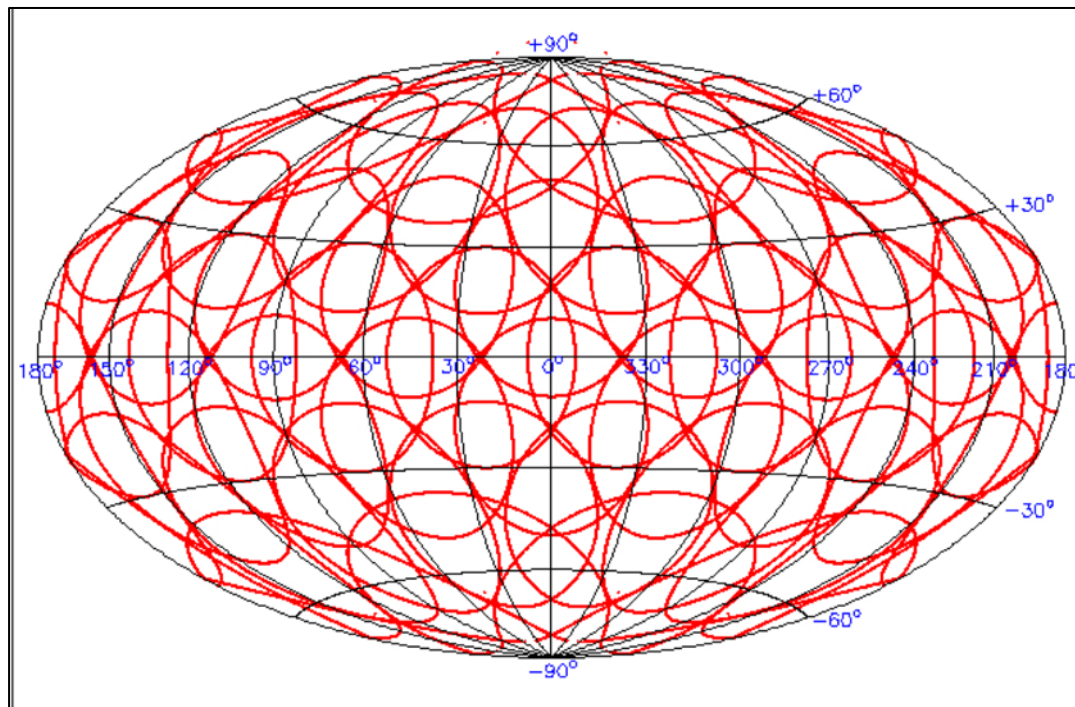
Max lines retrieved: **Equinox:** 2000 1950



THE AGILE LEVEL-3 (LV3) ARCHIVE



- The basic blocks of the AGILE online interactive analysis is the **AGILE Level-3 archive**, composed by counts, exposure, and diffuse gamma-ray background FITS maps generated on predefined sky positions (48 centers/rings).
- Each LV3 map covers 1 day of integration, starting from the beginning of the mission until the last published AGILE-LV2 (photon list and LOG) data.

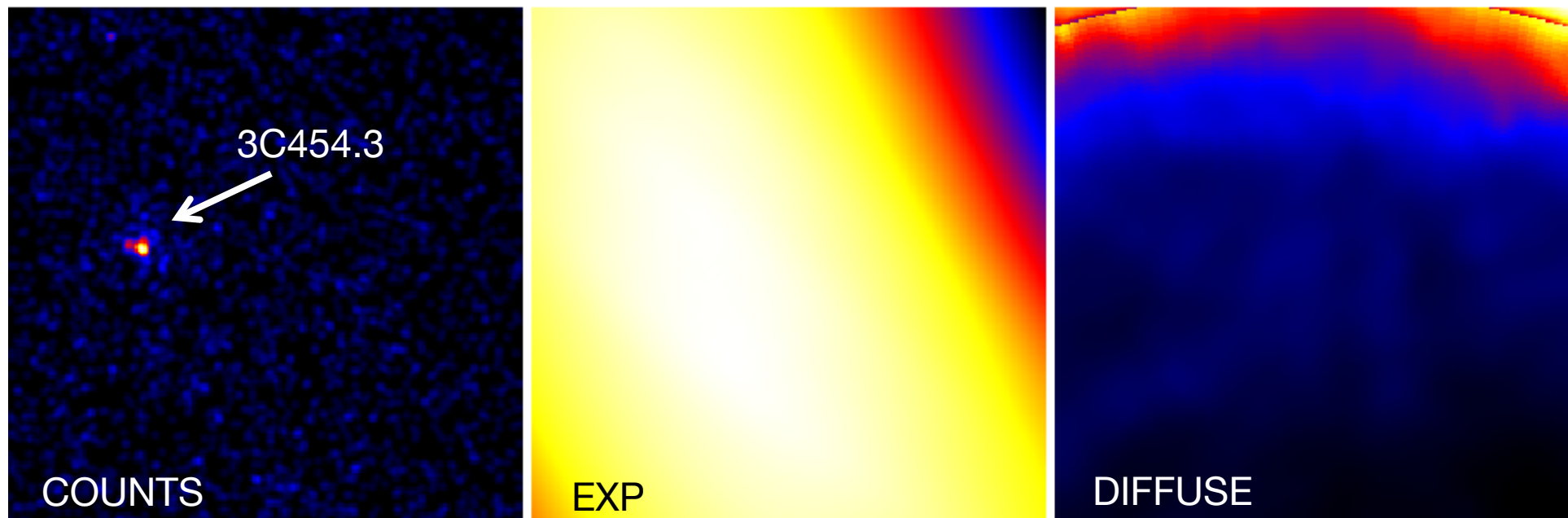




THE AGILE LEVEL-3 (LV3) ARCHIVE



- The 1-day LV3 FITS maps are then merged to form an archive of different time integrations: **2, 7 and 28 days** → possibility to perform variability studies on different time-intervals, over long timescales, within a few minutes.
- The map parameters (binning, maximum off-axis angle, cut on Earth albedo, ...) are chosen to guarantee the most robust analysis results.



AGILE-LV3 MERGED MAPS ON THE 7-DAY INTERVAL 9-16/12/2009. CENTER @ $l,b=(67, -41)$ deg



INPUT QUERY TO THE LV3 ARCHIVE



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Mission Selected
AGILE-LV3

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Enter source name or coordinates: RA, DEC L, B Lon, Lat
(e.g. CYGX-1 or 19 58 21.7, +35 12 05.8 or 299.590333, 35.201611 or 71.334960, 3.066917)

Name Resolver: SSDC Name Server SIMBAD NED

Start Date: (dd-mm-yyyy) **End Date:** (dd-mm-yyyy)

Duration: Day(s) **Min EXP:** (cm² s sr)

Max lines retrieved: **Equinox:** 2000 1950



INPUT QUERY TO THE LV3 ARCHIVE



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Query input: source name or sky coordinates

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AGILE-LV3

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Enter source name or coordinates: RA, DEC L, B Lon, Lat
(e.g. CYGX-1 or 19 58 21.7, +35 12 05.8 or 299.590333, 35.201611 or 71.334960, 3.066917)

Name Resolvers: SSDC Name Server SIMBAD NED

Start Date: (dd-mm-yyyy) **End Date:** (dd-mm-yyyy)

Duration: Day(s) **Min EXP:** (cm² s sr)

Max lines retrieved: **Equinox:** 2000 1950



INPUT QUERY TO THE LV3 ARCHIVE



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Select AGILE-LV3 bin duration (2,7,28 days) and interval of interest

AGILE-LV3 Interactive Archive

Mission Selected
AGILE-LV3

AGILE-LV3 Tutorials:
• [pdf](#)
• [video 1](#), [video 2](#) CREDITS

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Enter source name or coordinates: RA, DEC L, B Lon, Lat
(e.g. CYGX-1 or 19 58 21.7, +35 12 05.8 or 299.590333, 35.201611 or 71.334960, 3.066917)

Name Resolver: SSDC Name Server SIMBAD NED

Start Date: « » (dd-mm-yyyy) End Date: « » (dd-mm-yyyy)

Duration: Day(s) Min EXP: (cm² s sr)

Max lines retrieved: Equinox: 2000 1950

Submit



EXAMPLE OF ONLINE ANALYSIS

AGILE-LV3 Data

Query results for: 3c454.3(SSDC)

Details: query by **COORDINATE & TIME** with **RA** = 343.490417; **DEC** = 16.148056; **L** = 86.110748; **B** = -38.183841; **Lon** = 351.367785; **Lat** = 21.330631; **EQUINOX** = 2000; **RADIUS** = 30 degree 01-09-2009; **End date** = 17-11-2011; **Duration** = 28 day(s); **Min EXP** = 100 cm² s sr; sort by **START DATE**; max lines retrieved 1000;

[Modify AGILE-LV3 query parameters](#)

Make Light Curve:

Export Current view of Table in:

◀ Previous Page Next Page ▶ Page Size (# of lines)

29 entries

Entry number	Selection mode:	SSDC Data Explorer	GRID LV3 data retrieval	GRID Interactive Analysis	START DATE	STOP DATE	RA (J2000)	DEC (J2000)	MEAN EXP (cm ² s sr)	Dist. from searched position
							hh mm ss.d	dd mm ss.d		degrees
1	<input checked="" type="checkbox"/>	<input type="button" value="Select"/>	Data Access	<input type="button" value="Interactive Analysis"/>	2009-08-31 12:00:00	2009-09-28 12:00:00	22 19 31.19	+04 09 04.67	510.342	14.67
2	<input checked="" type="checkbox"/>	<input type="button" value="Select"/>	Data Access	<input type="button" value="Interactive Analysis"/>	2009-09-28 12:00:00	2009-10-26 12:00:00	22 19 31.19	+04 09 04.67	1764.04	14.67
3	<input checked="" type="checkbox"/>	<input type="button" value="Select"/>	Data Access	<input type="button" value="Interactive Analysis"/>	2009-11-04 12:00:00	2009-12-02 12:00:00	22 19 31.19	+04 09 04.67	1593.62	14.67
4	<input checked="" type="checkbox"/>	<input type="button" value="Select"/>	Data Access	<input type="button" value="Interactive Analysis"/>	2009-12-02 12:00:00	2009-12-30 12:00:00	22 19 31.19	+04 09 04.67	1659.58	14.67
5	<input checked="" type="checkbox"/>	<input type="button" value="Select"/>	Data Access	<input type="button" value="Interactive Analysis"/>	2009-12-30 12:00:00	2010-01-27 12:00:00	22 19 31.19	+04 09 04.67	893.177	14.67
6	<input checked="" type="checkbox"/>	<input type="button" value="Select"/>	Data Access	<input type="button" value="Interactive Analysis"/>	2010-01-27 12:00:00	2010-02-24 12:00:00	22 19 31.19	+04 09 04.67	309.808	14.67
7	<input checked="" type="checkbox"/>	<input type="button" value="Select"/>	Data Access	<input type="button" value="Interactive Analysis"/>	2010-02-24 12:00:00	2010-03-24 12:00:00	22 19 31.19	+04 09 04.67	296.794	14.67
8	<input checked="" type="checkbox"/>	<input type="button" value="Select"/>	Data Access	<input type="button" value="Interactive Analysis"/>	2010-03-24 12:00:00	2010-04-21 12:00:00	22 19 31.19	+04 09 04.67	751.005	14.67
9	<input checked="" type="checkbox"/>	<input type="button" value="Select"/>	Data Access	<input type="button" value="Interactive Analysis"/>	2010-04-21 12:00:00	2010-05-19 12:00:00	22 19 31.19	+04 09 04.67	1577.38	14.67
10	<input checked="" type="checkbox"/>	<input type="button" value="Select"/>	Data Access	<input type="button" value="Interactive Analysis"/>	2010-05-19 12:00:00	2010-06-16 12:00:00	22 19 31.19	+04 09 04.67	1634.33	14.67
11	<input checked="" type="checkbox"/>	<input type="button" value="Select"/>	Data Access	<input type="button" value="Interactive Analysis"/>	2010-06-16 12:00:00	2010-07-14 12:00:00	22 19 31.19	+04 09 04.67	1419.2	14.67
12	<input checked="" type="checkbox"/>	<input type="button" value="Select"/>	Data Access	<input type="button" value="Interactive Analysis"/>	2010-07-14 12:00:00	2010-08-11 12:00:00	22 19 31.19	+04 09 04.67	718.88	14.67
13	<input checked="" type="checkbox"/>	<input type="button" value="Select"/>	Data Access	<input type="button" value="Interactive Analysis"/>	2010-08-11 12:00:00	2010-09-08 12:00:00	22 19 31.19	+04 09 04.67	245.569	14.67
14	<input checked="" type="checkbox"/>	<input type="button" value="Select"/>	Data Access	<input type="button" value="Interactive Analysis"/>	2010-09-08 12:00:00	2010-10-06 12:00:00	22 19 31.19	+04 09 04.67	367.271	14.67
15	<input checked="" type="checkbox"/>	<input type="button" value="Select"/>	Data Access	<input type="button" value="Interactive Analysis"/>	2010-10-06 12:00:00	2010-11-03 12:00:00	22 19 31.19	+04 09 04.67	1029.19	14.67
16	<input checked="" type="checkbox"/>	<input type="button" value="Select"/>	Data Access	<input type="button" value="Interactive Analysis"/>	2010-11-03 12:00:00	2010-12-01 12:00:00	22 19 31.19	+04 09 04.67	1666.48	14.67



EXAMPLE OF ONLINE ANALYSIS

AGILE-LV3 Data

Query results for: 3c454.3(SSDC)

RA = 22.193119; L = 86.110748; B = -38.183841; Lon = 351.367785; Lat = 21.330631; EQUINOX = 2000; RADIUS = 30 degree
Duration = 28 day(s); Min EXP = 100 cm² s sr; sort by START DATE; max lines retrieved 1000;

[Modify AGILE-LV3 query parameters](#)

Interactive analysis on single time-bin

Make Light Curve: LC likelihood

Export Current view of Table in: [Latex format](#) [FITS format](#) [Raw text format](#) [CSV text format](#) [Browse table](#)

[Previous Page](#) [Next Page](#) Page Size (# of lines) 200 [Reset all filters](#) [Show all entries](#)

29 entries

Entry number		GRID LV3 data retrieval	GRID Interactive Analysis	START DATE	STOP DATE	RA (J2000) hh mm ss.d	DEC (J2000) dd mm ss.d	MEAN EXP (cm ² s sr)	Dist. from searched position degrees	
1	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access	Interactive Analysis	2009-09-31 12:00:00	2009-09-28 12:00:00	22 19 31.19	+04 09 04.67	510.342	14.67
2	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access	Interactive Analysis	2009-09-28 12:00:00	2009-10-26 12:00:00	22 19 31.19	+04 09 04.67	1764.04	14.67
3	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access	Interactive Analysis	2009-11-04 12:00:00	2009-12-02 12:00:00	22 19 31.19	+04 09 04.67	1593.62	14.67
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6	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access	Interactive Analysis	2010-01-27 12:00:00	2010-02-24 12:00:00	22 19 31.19	+04 09 04.67	309.808	14.67
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EXAMPLE OF ONLINE ANALYSIS



Details: query by COORDINAT

able

s 29 entries

Entry number	GR
1	
2	
3	
4	
5	
6	
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8	
9	
10	
11	
12	
13	
14	
15	
16	

Selection mode:
Include
 All

AGILE Imaging Tool @ SSDC

Set Image parameters:

Image Centered On:
RA (deg) 343.49 Dec (deg) 16.15
LII (deg) 86.11 BII (deg) -38.18

Source name: Search

Image half size (deg) 10.00
Emin (MeV) 100
Emax (MeV) 50000

Catalog Overlay
Radio IR X-Ray Gamma Sources cats

AT20G
ATCAPMN
B3
CRATES

JS9 display:
Run (JS9) Reset to default

Ximage display parameters:
Run (Ximage) Reset to default

GRID ML Interactive Analysis

Reference AGILE catalog aglali
Spectral index -2.1
Galactic -999
Isotropic -999
Source ML fixflag 1

Run GRID ML Reset GRID ML to default

AGILE GRID 2009 Jun 8

Start Time: 2009-06-08 End Time: 2009-07-06



EXAMPLE OF ONLINE ANALYSIS



Details: query by COORDINAT

AGILE Imaging Tool @ SSDC

Set Image parameters:

Image Centered On:
RA (deg) 343.49 Dec (deg) 16.15
-38.18
Search

0.00
0
0000

Sources cats

AT20G
ATCAPMN
B3
CRATES

JS9 display:
Run (JS9) Reset to default

Ximage display parameters:
Run (Ximage) Reset to default

GRID ML Interactive Analysis

Reference AGILE catalog aglali

Spectral index -2.1
Galactic -999
Isotropic -999
Source ML fixfla 1

Run GRID ML Reset GRID ML to default

AGILE GRID 2009 Jun 8

90 85 80 75
-30
-32
-34
-36
-38
-40
-42
-44
-46
-48

Start Time: 2009-06-08 End Time: 2009-07-06

Run AGILE GRID ML analysis on this LV3 timebin

Entry number	Selection mode	Source
1	<input checked="" type="checkbox"/> All	SSDC Data Explorer
2	<input checked="" type="checkbox"/> Select	SSDC Data Explorer
3	<input checked="" type="checkbox"/> Select	SSDC Data Explorer
4	<input checked="" type="checkbox"/> Select	SSDC Data Explorer
5	<input checked="" type="checkbox"/> Select	SSDC Data Explorer
6	<input checked="" type="checkbox"/> Select	SSDC Data Explorer
7	<input checked="" type="checkbox"/> Select	SSDC Data Explorer
8	<input checked="" type="checkbox"/> Select	SSDC Data Explorer
9	<input checked="" type="checkbox"/> Select	SSDC Data Explorer
10	<input checked="" type="checkbox"/> Select	SSDC Data Explorer
11	<input checked="" type="checkbox"/> Select	SSDC Data Explorer
12	<input checked="" type="checkbox"/> Select	SSDC Data Explorer
13	<input checked="" type="checkbox"/> Select	SSDC Data Explorer
14	<input checked="" type="checkbox"/> Select	SSDC Data Explorer
15	<input checked="" type="checkbox"/> Select	SSDC Data Explorer
16	<input checked="" type="checkbox"/> Select	SSDC Data Explorer



EXAMPLE OF ONLINE ANALYSIS



Details: query by **COORDINAT**

able

as 29 entries

Entry number	GR
1	SSDC Data Explorer
2	SSDC Data Explorer
3	SSDC Data Explorer
4	SSDC Data Explorer
5	SSDC Data Explorer
6	SSDC Data Explorer
7	SSDC Data Explorer
8	SSDC Data Explorer
9	SSDC Data Explorer
10	SSDC Data Explorer
11	SSDC Data Explorer
12	SSDC Data Explorer
13	SSDC Data Explorer
14	SSDC Data Explorer
15	SSDC Data Explorer
16	SSDC Data Explorer

Set Image parameters:

Image Centered On:

RA (deg) 343.49
 LII (deg) 86.11

Source name:

Image half size (deg)

Emin (MeV)

Emax (MeV)

Catalog Overlay

Radio IR X-Ray

AT20G
 ATCAPMN
 B3
 CRATES

JS9 display:
 Run (JS9) Reset to

Ximage display parameters:
 Run (Ximage) Reset

GRID ML Interactive Anal

Reference AGILE ca

Spectral index

Galactic

Isotropic

Source ML fixflag

Run GRID ML Reset GRID ML to default

Result (html format) of ML analysis in each time-bin, to estimate flux and significance of the source, taking into account all other known sources in the region and the diffuse γ -ray background:

Input

Psf /data/agile/agile3/parameter_files/B21_AG_GRID_G0017_SFMG_I0023.psd.gz
 Raeff /data/agile/agile3/parameter_files/B21_AG_GRID_G0017_SFMG_I0023.sar.gz
 Edp /data/agile/agile3/parameter_files/B21_AG_GRID_G0017_SFMG_I0023.edp.gz

Gal Mode	Iso Mode	Radius	ulcl	loccl
1	1	10	2	5.99147

Map Name	Theta	GalCoeff	IsoCoeff
1 /data/agile/agile3/lv3merged/0906081200_0907061200-194770/agsci0906081200_0907061200_LV3MERGED2_167_b-41.COUNTS.gz	30	0.7 fixed	999 free

Map Counts	Date start	Date end	Energy	FOV Center	Albedo	BinSize	Step	PhCode		
1	20901	2009-06-08 12:00:00	2009-07-06 12:00:00	100..50000	0..60	67.5, -41.8103	90	0.25	4	90

Source	Flux	Index	L	B	sqrt(minTS)	FixFlag
1AGLRJ2254+1602-ORIG	1.2e-06	2.1	86.106	-38.178	2	1

Output

DiffName	Coeff	Err	+Err	-Err
Galactic	0.7	0	0	0
Isotropic	8.96604	0.211629	0.212941	-0.21033

SrcName	sqrt(TS)	L	B	Radius	Exp	Counts	Err	Flux	Err	Flux UL	Index	Err
1AGLRJ2254+1602-ORIG	4.69433	86.106	-38.178	0	2.59355e+08	80.8877	20.9905	3.1188e-07	8.09333e-08	4.85358e-07	2.1	0



EXAMPLE OF ONLINE ANALYSIS: LC

AGILE-LV3 Data

Query results for: 3c454.3(SSDC)

Details: query by **COORDINATE & TIME** with **RA** = 343.490417; **DEC** = 16.148056; **L** = 86.110748; **B** = -38.183841; **Lon** = 351.367785; **Lat** = 21.330631; **EQUINOX** = 2000; **RADIUS** = 30 degree 01-09-2009; **End date** = 17-11-2011; **Duration** = 28 day(s); **Min EXP** = 100 cm² s sr; sort by **START DATE**; max lines retrieved 1000;

[Modify AGILE-LV3 query parameters](#)

Make Light Curve:

Export Current view of Table in:

◀ Previous Page Next Page ▶ Page Size (# of lines) 200

29 entries

Entry number		GRID LV3 data retrieval	GRID Interactive Analysis	START DATE	STOP DATE	RA (J2000) hh mm ss.d	DEC (J2000) dd mm ss.d	MEAN EXP (cm ² s sr)	Dist. from searched position degrees	
1	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	SSDC Data Explorer	Data Access	Interactive Analysis	200				14.67	
2	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	SSDC Data Explorer	Data Access	Interactive Analysis	200				14.67	
3	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	SSDC Data Explorer	Data Access	Interactive Analysis	200				14.67	
4	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	SSDC Data Explorer	Data Access	Interactive Analysis	200				14.67	
5	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	SSDC Data Explorer	Data Access	Interactive Analysis	2009-12-30 12:00:00	2010-01-27 12:00:00	22 19 31.19	+04 09 04.67	893.177	14.67
6	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	SSDC Data Explorer	Data Access	Interactive Analysis	2010-01-27 12:00:00	2010-02-24 12:00:00	22 19 31.19	+04 09 04.67	309.808	14.67
7	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	SSDC Data Explorer	Data Access	Interactive Analysis	2010-02-24 12:00:00	2010-03-24 12:00:00	22 19 31.19	+04 09 04.67	296.794	14.67
8	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	SSDC Data Explorer	Data Access	Interactive Analysis	2010-03-24 12:00:00	2010-04-21 12:00:00	22 19 31.19	+04 09 04.67	751.005	14.67
9	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	SSDC Data Explorer	Data Access	Interactive Analysis	2010-04-21 12:00:00	2010-05-19 12:00:00	22 19 31.19	+04 09 04.67	1577.38	14.67
10	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	SSDC Data Explorer	Data Access	Interactive Analysis	2010-05-19 12:00:00	2010-06-16 12:00:00	22 19 31.19	+04 09 04.67	1634.33	14.67
11	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	SSDC Data Explorer	Data Access	Interactive Analysis	2010-06-16 12:00:00	2010-07-14 12:00:00	22 19 31.19	+04 09 04.67	1419.2	14.67
12	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	SSDC Data Explorer	Data Access	Interactive Analysis	2010-07-14 12:00:00	2010-08-11 12:00:00	22 19 31.19	+04 09 04.67	718.88	14.67
13	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	SSDC Data Explorer	Data Access	Interactive Analysis	2010-08-11 12:00:00	2010-09-08 12:00:00	22 19 31.19	+04 09 04.67	245.569	14.67
14	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	SSDC Data Explorer	Data Access	Interactive Analysis	2010-09-08 12:00:00	2010-10-06 12:00:00	22 19 31.19	+04 09 04.67	367.271	14.67
15	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	SSDC Data Explorer	Data Access	Interactive Analysis	2010-10-06 12:00:00	2010-11-03 12:00:00	22 19 31.19	+04 09 04.67	1029.19	14.67
16	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	SSDC Data Explorer	Data Access	Interactive Analysis	2010-11-03 12:00:00	2010-12-01 12:00:00	22 19 31.19	+04 09 04.67	1666.48	14.67

Generate a gamma-ray lightcurve above 100 MeV



EXAMPLE OF ONLINE ANALYSIS: LC



Details: query by **COORDINATE & TIME** with **RA = 343.490417; DEC = 16.148**
 01-09-2009; **End date = 17-11-2011**; D

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is 29 entries

Entry number		GRID LV3 data retrieval	GRID Interactive Analy
Selection mode:			
<input type="button" value="Include"/>			
<input checked="" type="checkbox"/> All			
1	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
2	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
3	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
4	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
5	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
6	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
7	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
8	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
9	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
10	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
11	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
12	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
13	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
14	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
15	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
16	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>

L: 86.11, B: -38.18, 28 day(s) Time binning

[lc_1AGLRJ2254+1602-ORIG_28d-timebin.qdp](#)

1AGLRJ2254+1602-ORIG - 28 day(s) Time binning

Time (MJD)

DOWNLOAD: [1AGLRJ2254+1602-ORIG_28d-timebin_input_for_SED.dat](#)

Total number of GOOD bins in the lightcurve: 19/29

ASDC SED Builder access:
(click below to include SED data points)

2010-11-03 12:00:00 2010-12-01 12:00:00 22 19 31.19 +04 09 04.67 1666.48 14.67

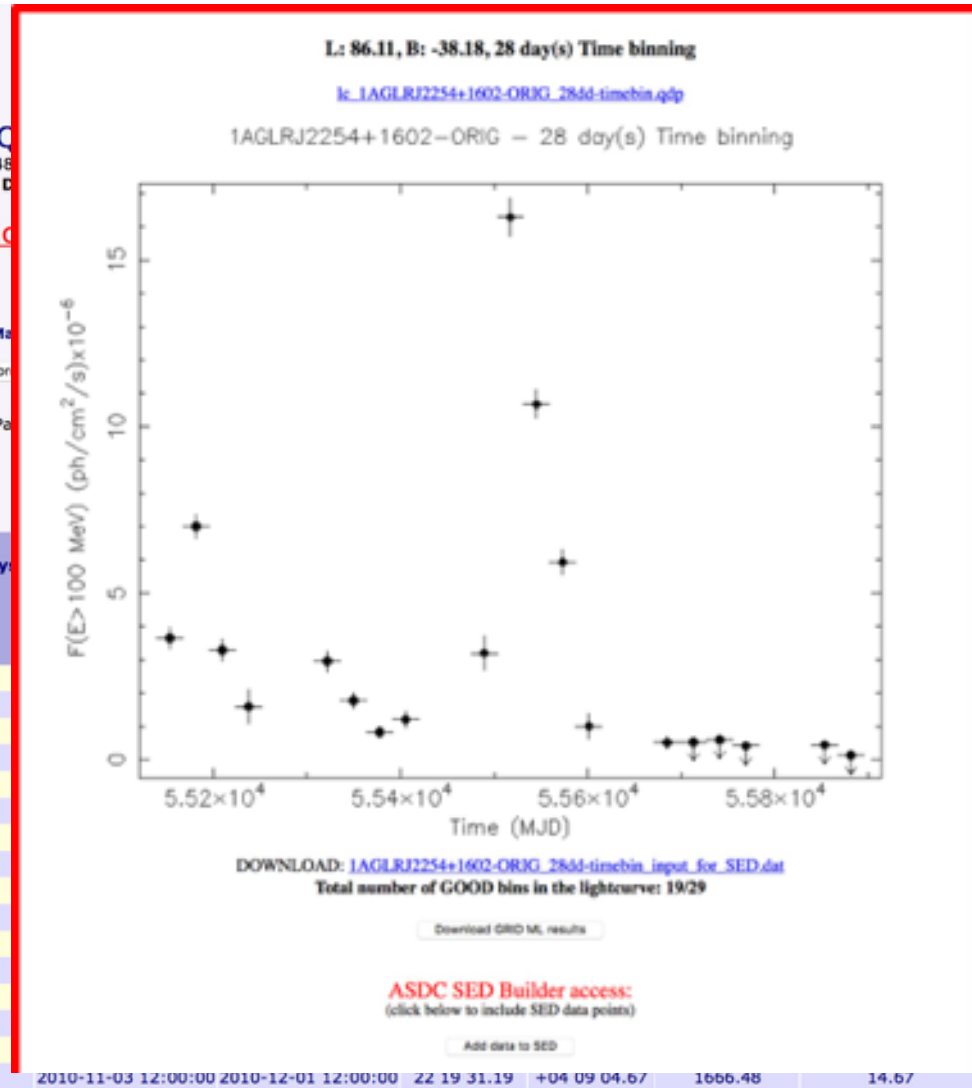


EXAMPLE OF ONLINE ANALYSIS: LC



Waiting time: from few seconds to few minutes
(depends on # of selected bins).

Entry number	Selection mode:	GRID LV3 data retrieval	GRID Interactive Analy
	Include		↑ ↓
	<input checked="" type="checkbox"/> All		
1	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access
2	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access
3	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access
4	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access
5	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access
6	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access
7	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access
8	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access
9	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access
10	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access
11	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access
12	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access
13	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access
14	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access
15	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access
16	<input checked="" type="checkbox"/> Select	SSDC Data Explorer	Data Access





EXAMPLE OF ONLINE ANALYSIS: LC



Details: query by **COORDINATE & TIME** with **RA** = 343.490417; **DEC** = 16.148
01-09-2009; **End date** = 17-11-2011; D

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is 29 entries

Entry number		GRID LV3 data retrieval	GRID Interactive Analy
Selection mode:			
<input type="button" value="Include"/>			
<input checked="" type="checkbox"/> All			
			<input type="button" value="↑"/> <input type="button" value="↓"/>
1	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
2	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
3	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
4	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
5	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
6	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
7	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
8	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
9	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
10	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
11	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
12	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
13	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
14	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
15	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>
16	<input checked="" type="checkbox"/> <input type="button" value="Select"/>	<input type="button" value="SSDC Data Explorer"/>	<input type="button" value="Data Access"/> <input type="button" value="Interactive Analysis"/>

L: 86.11, B: -38.18, 28 day(s) Time binning

[lc_1AGLRJ2254+1602-ORIG_28dd-timebin.qdp](#)

1AGLRJ2254+1602-ORIG - 28 day(s) Time binning

Time (MJD)

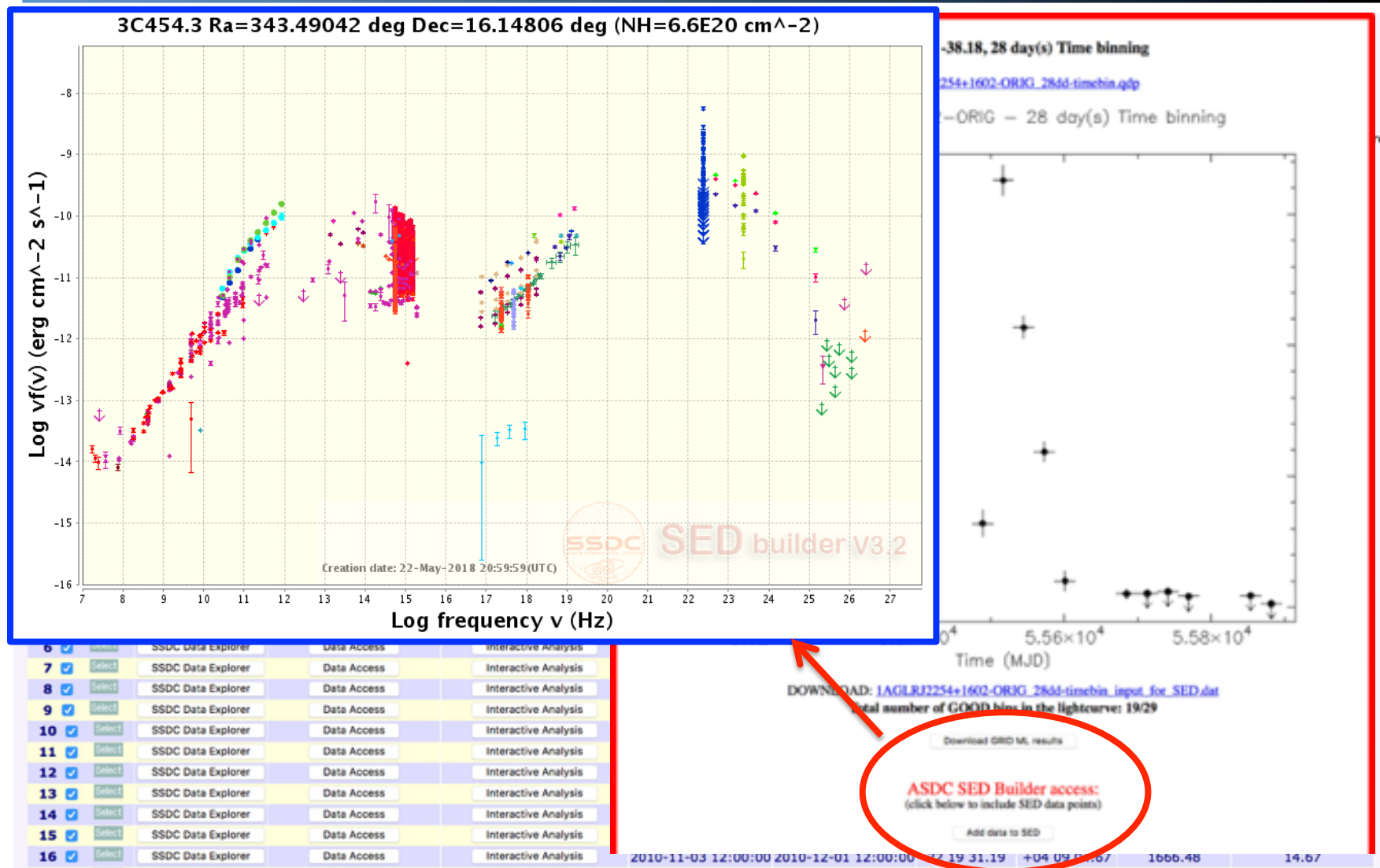
DOWNLOAD: 1AGLRJ2254+1602-ORIG_28dd-timebin_input_for_SED.dat
Total number of GOOD bins in the lightcurve: 1929

ASDC SED Builder access:
(click below to include SED data points)

2010-11-03 12:00:00 2010-12-01 12:00:00 12 19 31.19 +04 09 53.67 1666.48 14.67

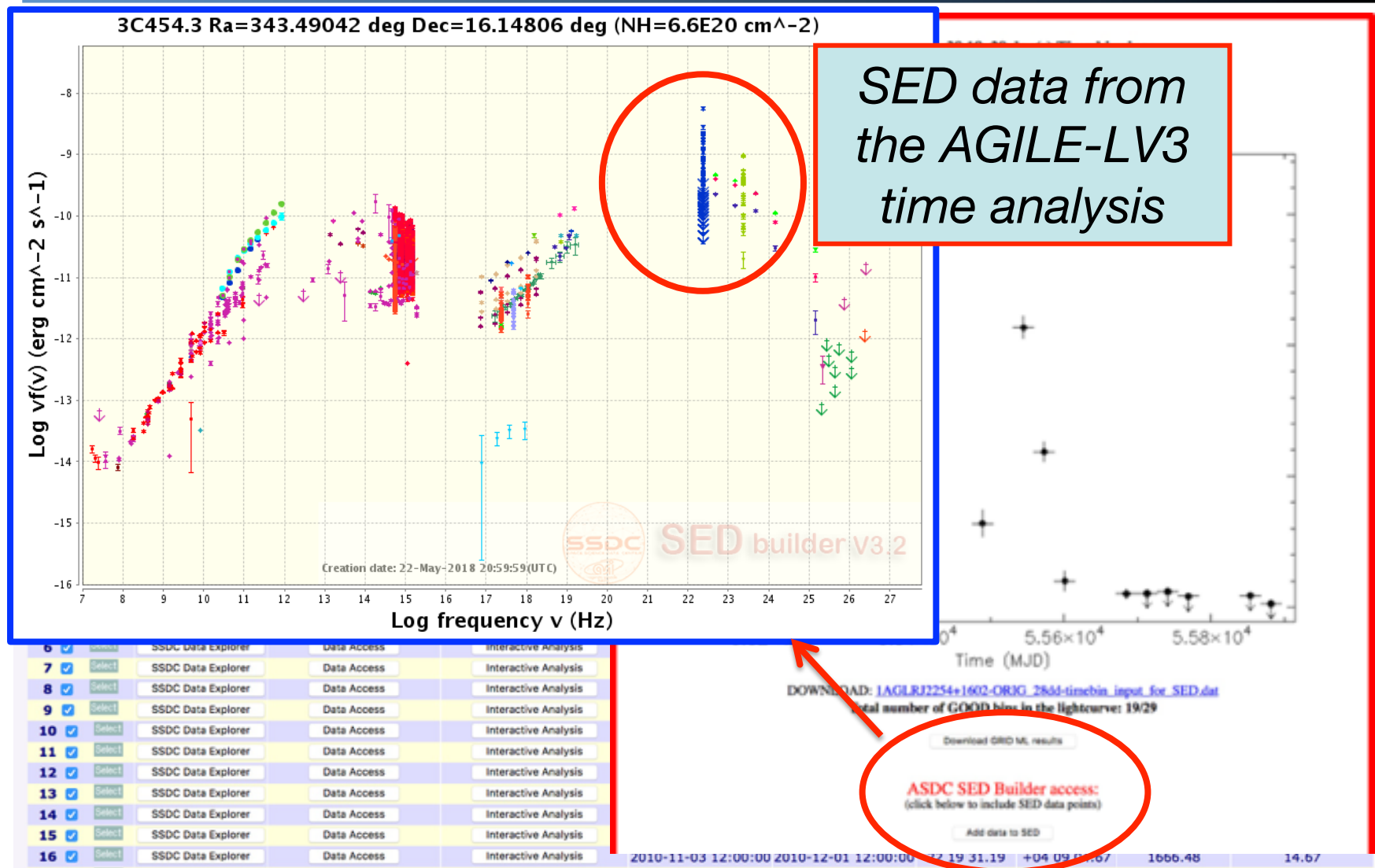


EXAMPLE OF ONLINE ANALYSIS: LC





EXAMPLE OF ONLINE ANALYSIS: LC





HIDDEN TREASURES IN THE AGILE-LV3 ARCHIVE



- The AGILE-LV3 archive (and the online analysis tool) have been already used by the AGILE Team in a several papers, i.e.:
 - ✓ MWL paper on PKS 1510-089 (AGILE Coll., A&A 569, 2014)
 - ✓ AGILE paper on 3C 279 (Pittori et al., ApJ 856, 2017)
- The possibility to perform variability studies in a few minutes over the whole AGILE lifetime has been also used in recent papers on multi-messenger studies of IceCube neutrino events (Lucarelli et al., ApJ 846, 2017).
- By downloading the LV3 maps, it is also possible to produce very deep map over any desired sky location.



SUMMARY AND OUTLOOK



- The AGILE gamma-ray online and interactive analysis tool is a service of the AGILE data center, providing quick and robust AGILE data analysis using the official AGILE s/w and calibrations.
- No need to download any data (photon lists/logfiles) and s/w installation.
- The online analysis is based on the AGILE Level-3 archive of pre-computed counts, exp and background FITS maps, produced by the ADC.



SUMMARY AND OUTLOOK



- Future AGILE-LV3 Tool planned improvements (work in progress):
 - ✓ updated list of known AGILE sources with the publication of new AGILE catalogues (2AGL (see next talk by F. Verrecchia));
 - ✓ updated scientific s/w and calibrations;
 - ✓ updated AGILE diffuse background model in the Galactic Center region.

WARNINGS: for sources located in crowded regions of the Galactic plane and in the region of 5x5 degrees around the Galactic Center the interactive AGILE-LV3 online analysis might not be reliable at the moment.



STAY TUNED!

**[http://www.ssdsc.asi.it/mmia/
index.php?mission=agilelv3mmia](http://www.ssdsc.asi.it/mmia/index.php?mission=agilelv3mmia)**



BACKUP SLIDES