

*Ulisses Barres de Almeida & Paolo Giommi
for the BSDC collaborators*

Brazilian Science Data Center

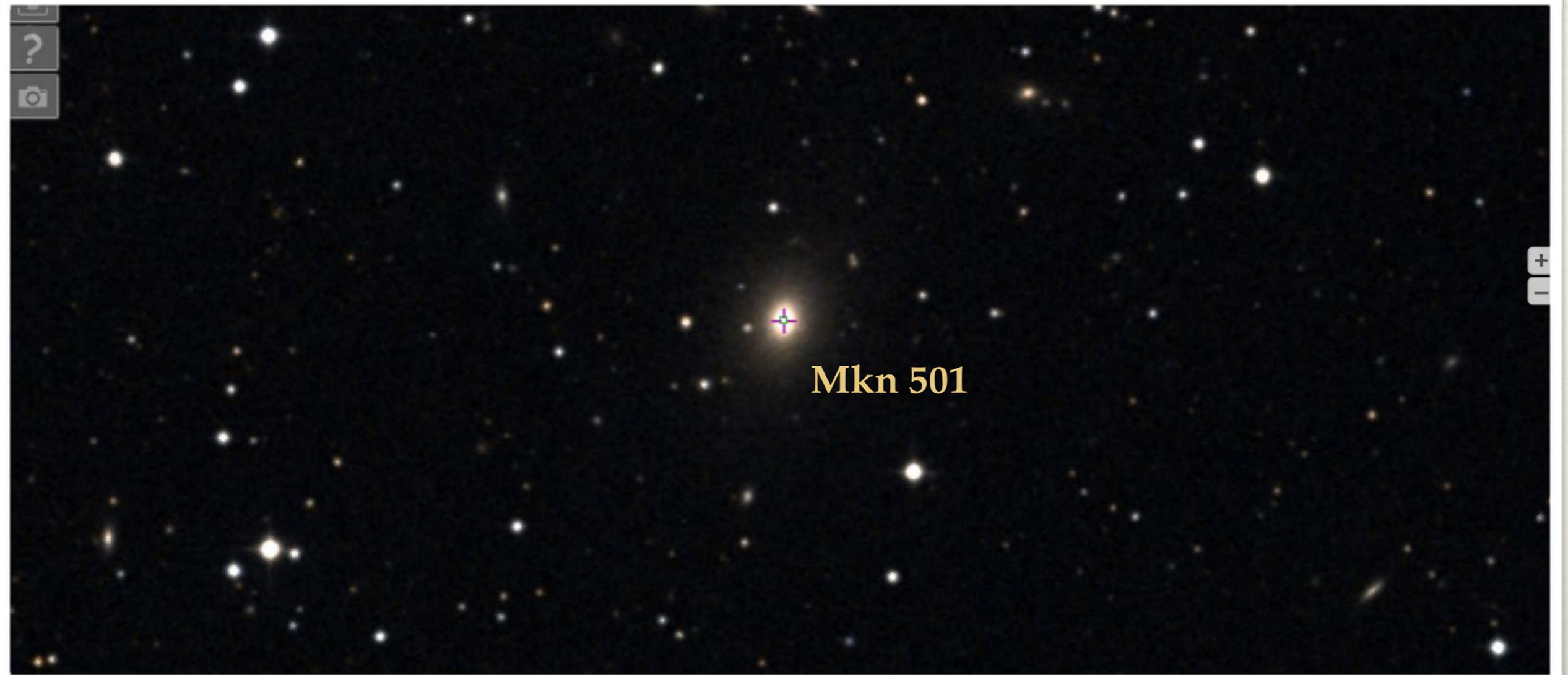
Presentation of the concept
and proposal for a “science-
ready” Astronomical database
in Brazil.



Contents

- Motivation : a view of two well-know blazars
 - Proposal for a “Science-ready” Astronomy data center in Brazil
 - The example of ASI
 - The United Nations Open Universe Initiative
 - Future prospects and implementation plan
-





To study a well-know AGN such as Mkn501 or Mkn 421

- Timing variability
- Spectral Energy Distribution
- Cross-matching maps with multi messengers

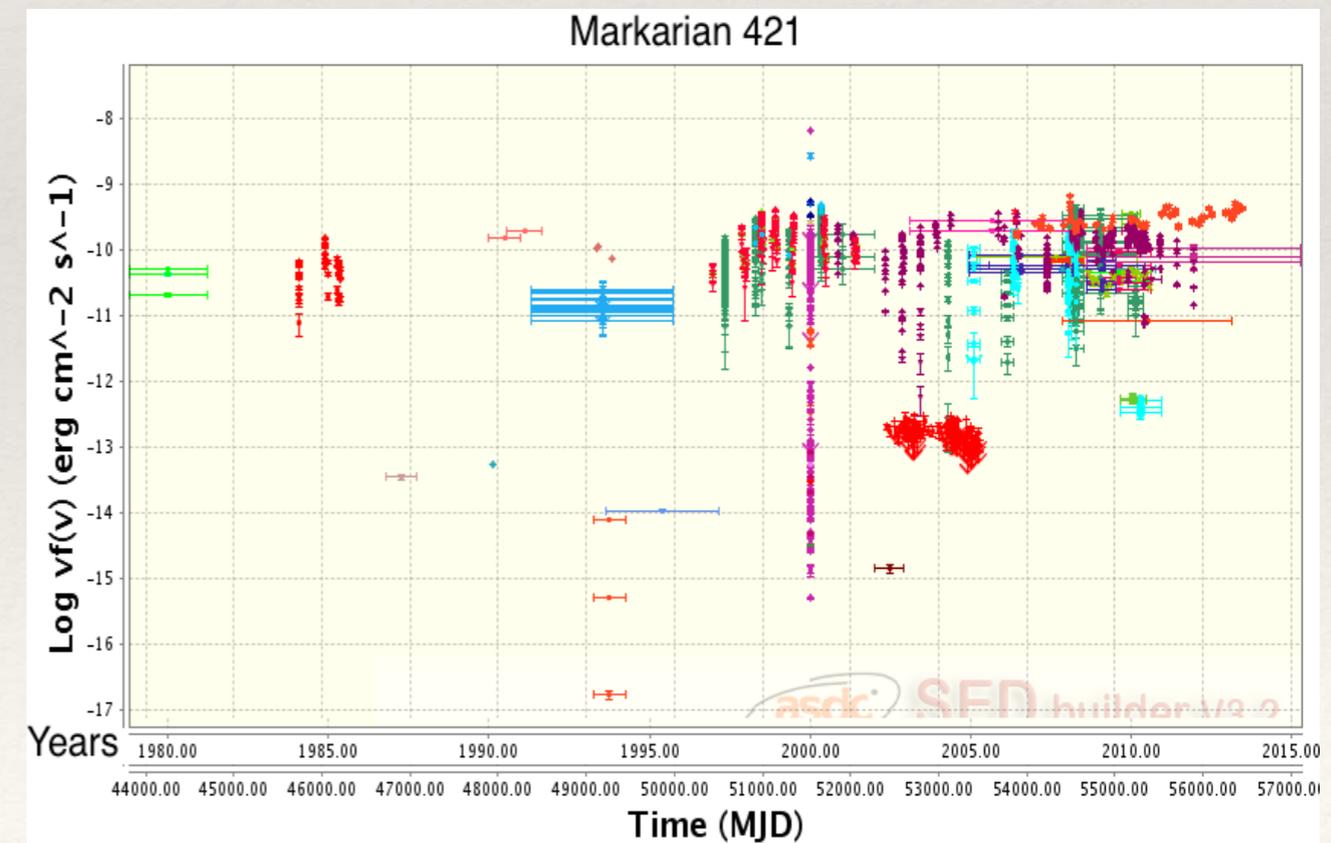
Δt_{var} : 4 orders mag.

SED : 20 orders mag.

Many specialised fields.

AGN SED and light curves

- Data from over 10 satellites and 12 catalogues
- Over 500 pointed observations
- About 20 years of data collection and archival



AGN SED and light curves

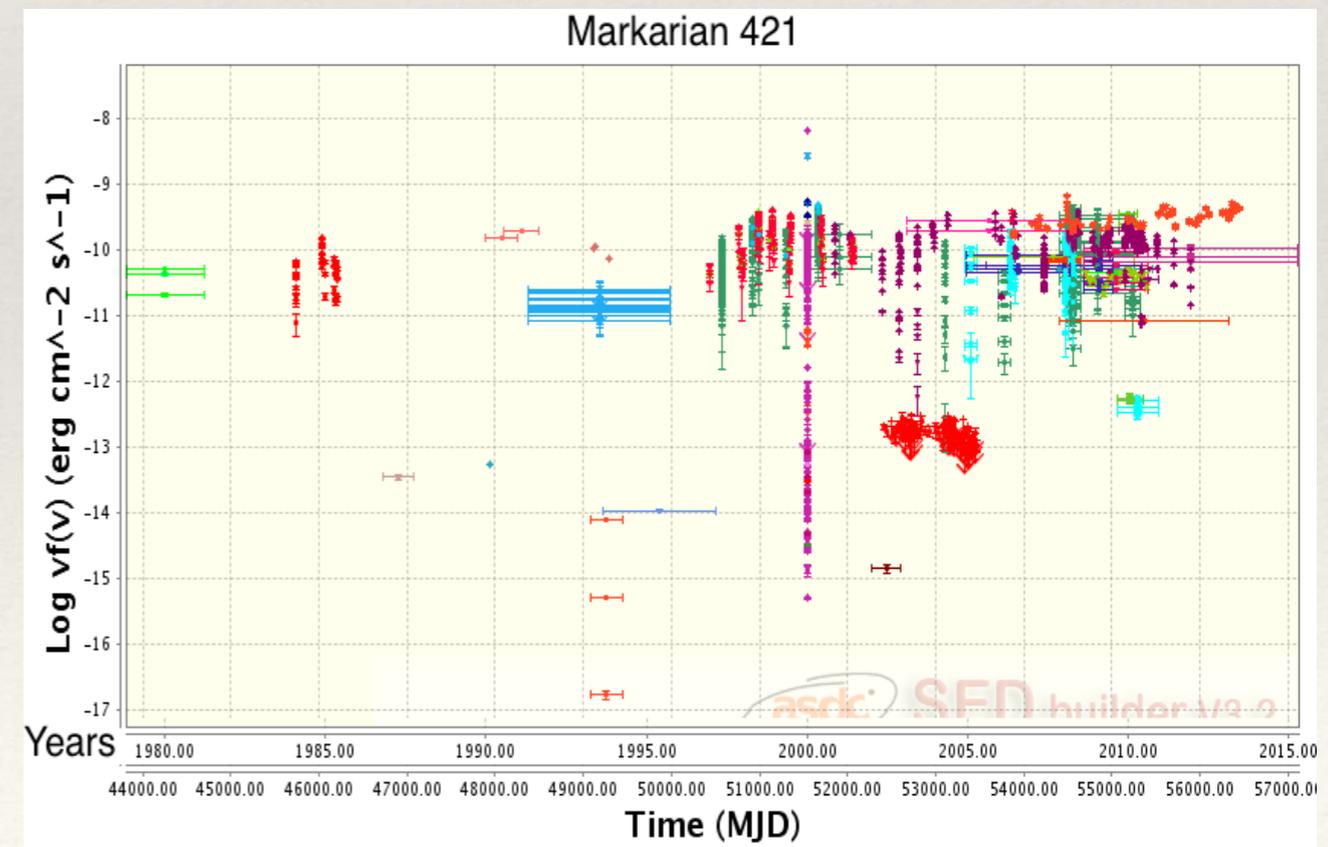
- Data from over 10 satellites and 12 catalogues
- Over 500 pointed observations
- About 20 years of data collection and archival

Traditionally, such data collection and analysis would require coordination and the specialist knowledge from every field of observational astrophysics.

A single well-sampled campaign of \sim week length would require direct collaboration of 10+ scientists worldwide.

Do we take the most of this data?

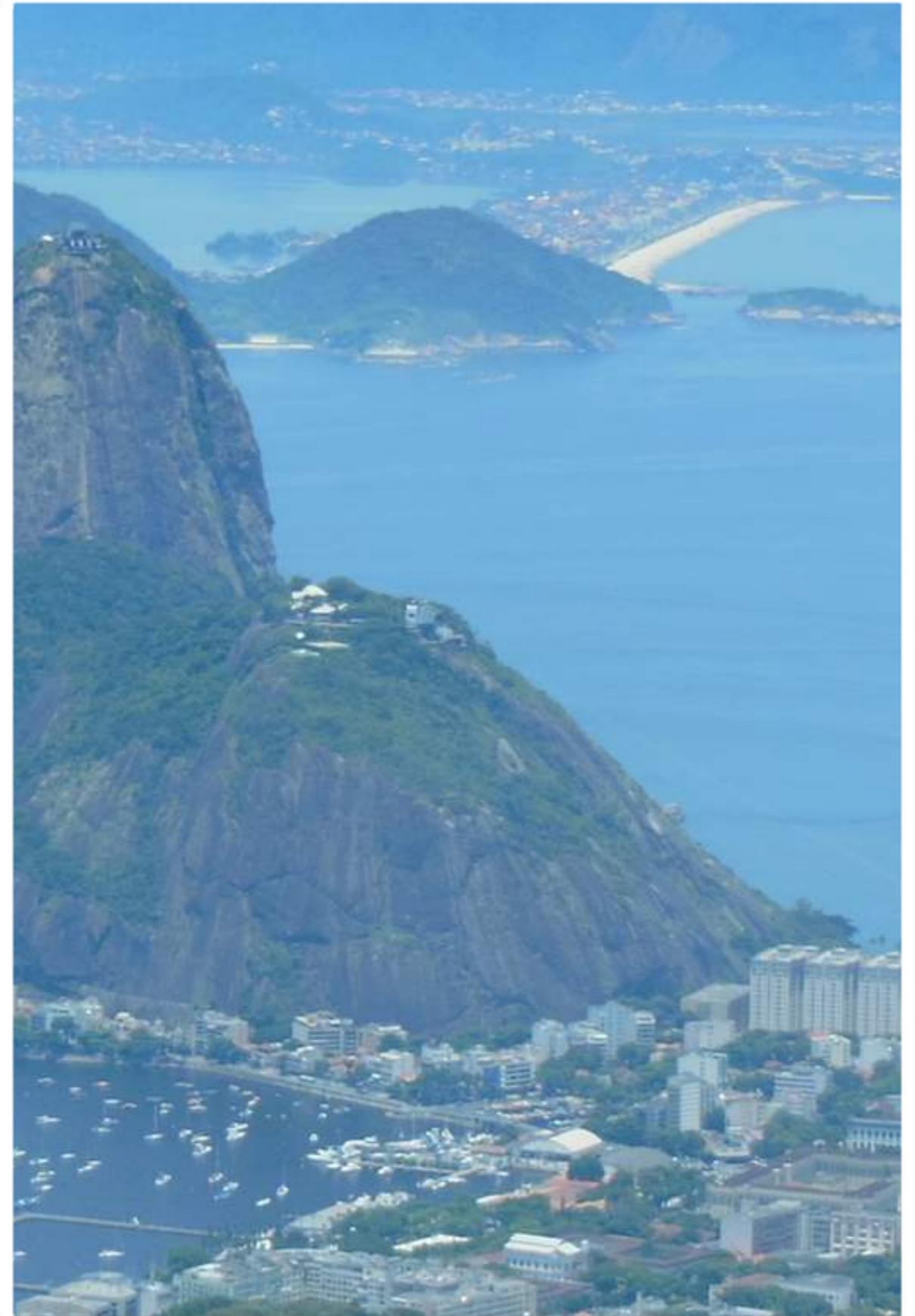
How much of it is never converted into real scientific information?

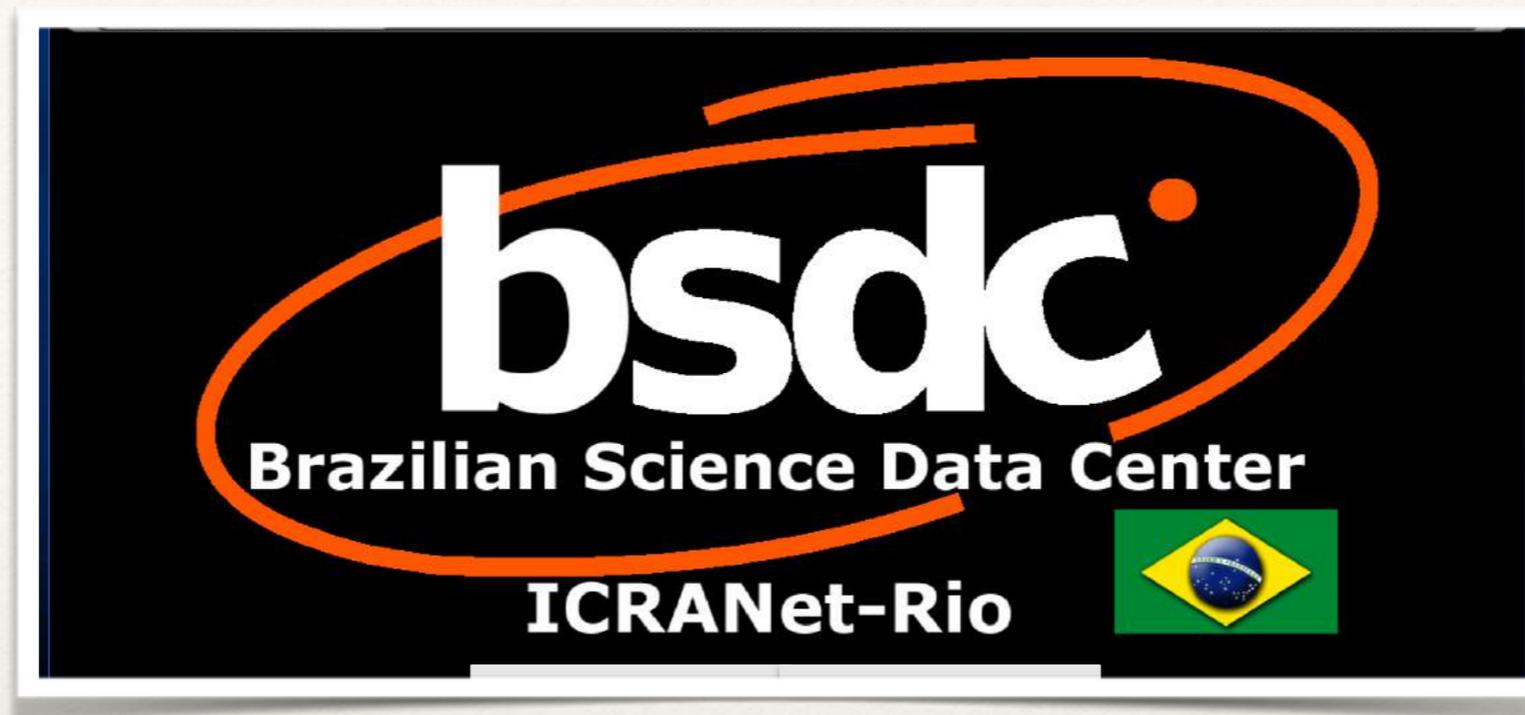


The concept

*BSDC : A “science-ready”
astronomical data center in Brazil*

- Hosting a multi-instrument, multi-messenger archive open to community
- Containing final ready-products and, when possible, online data reduction tools
- Web-based data interaction tools
- Participation to virtual observatory and other worldwide repositories
- Science and Data Center Research





*BSDC : A “science-ready” Astronomical
Data Center in Brazil*

DEMOCRATIC ACCESS

IMPROVED SCIENTIFIC OUTPUT OF DATA

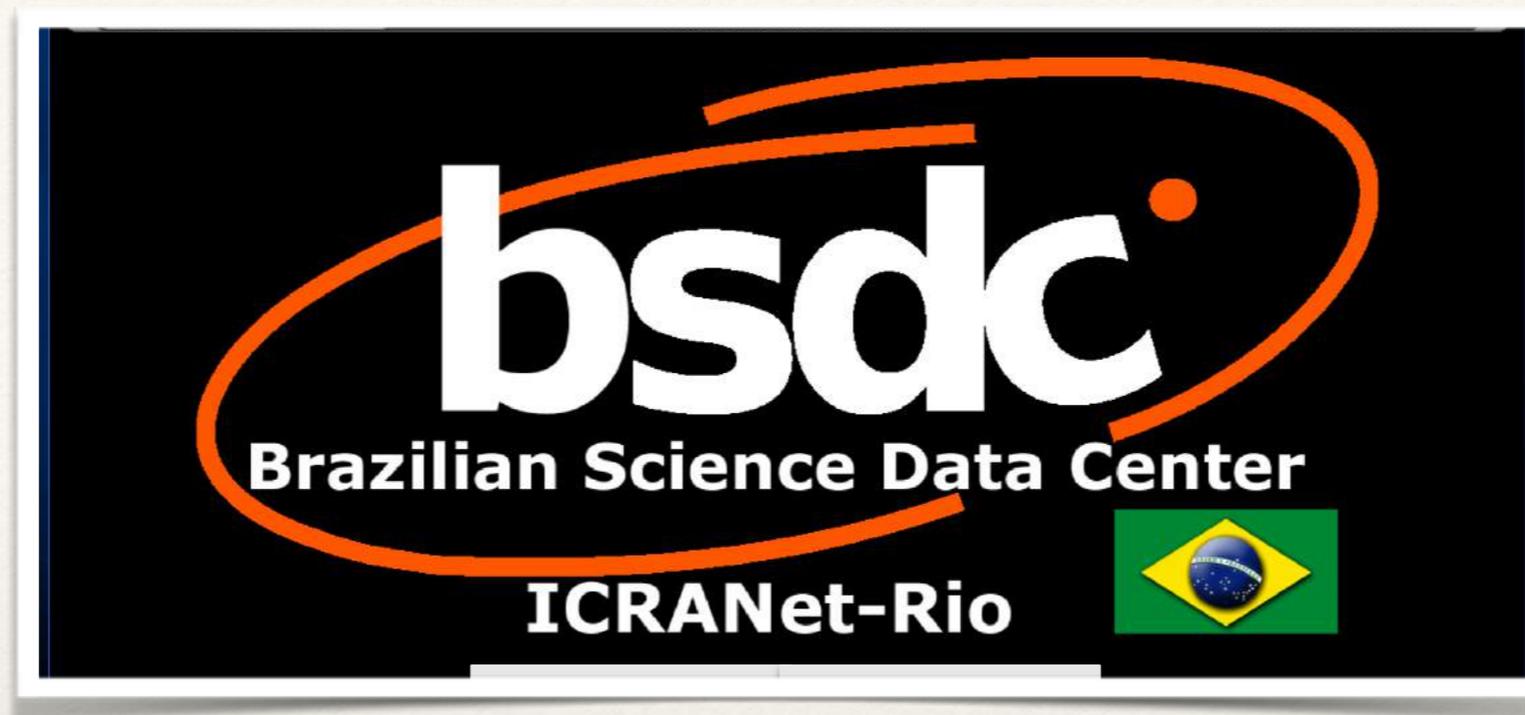
INCREASE VISIBILITY BY INTEGRATION

ASTROPHYSICS

ASTROPARTICLES

COSMOLOGY

PLANETOLOGY ...



*BSDC : A “science-ready” Astronomical
Data Center in Brazil*

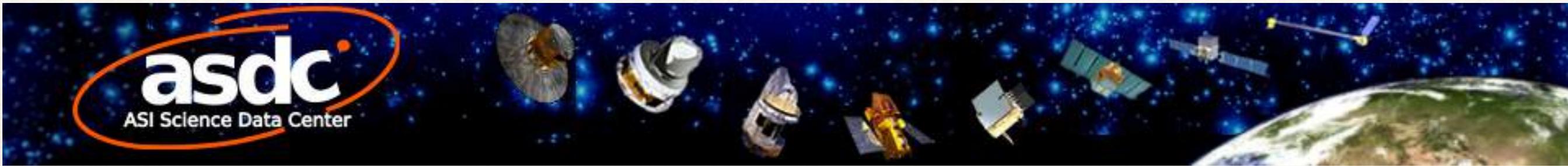
DEMOCRATIC ACCESS

IMPROVED SCIENTIFIC OUTPUT OF DATA

INCREASE VISIBILITY BY INTEGRATION

THESE ARE SPECIALLY STRATEGIC
ACTIONS FOR SCIENCE IN
DEVELOPING COUNTRIES

The example of ASI



The ASI Science Data Center (ASDC)

- Data-distribution, multi-mission archive maintained by ASI for 23 space missions, 13 being currently operational
- Web based interactive data analysis and data fusion: timing and spatial domain, multi-messenger, imaging.
- On-the-fly data reduction software for some missions: Swift, NuSTAR, etc.
- Participation to virtual observatory and other web-based archives

The cooperation with ASI

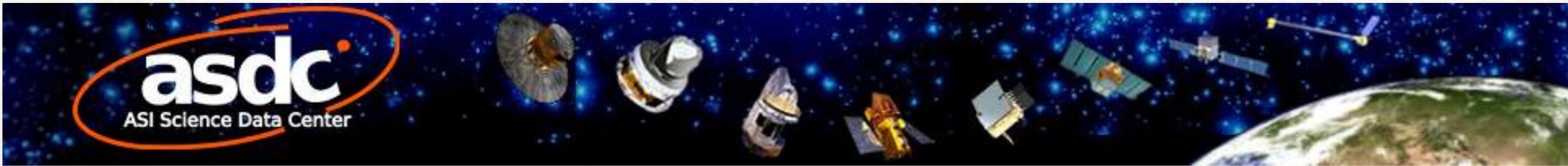


The BSDC is to be partner



BR-focused branch for the work of ASDC

The cooperation with ASI



The BSDC is to be partner



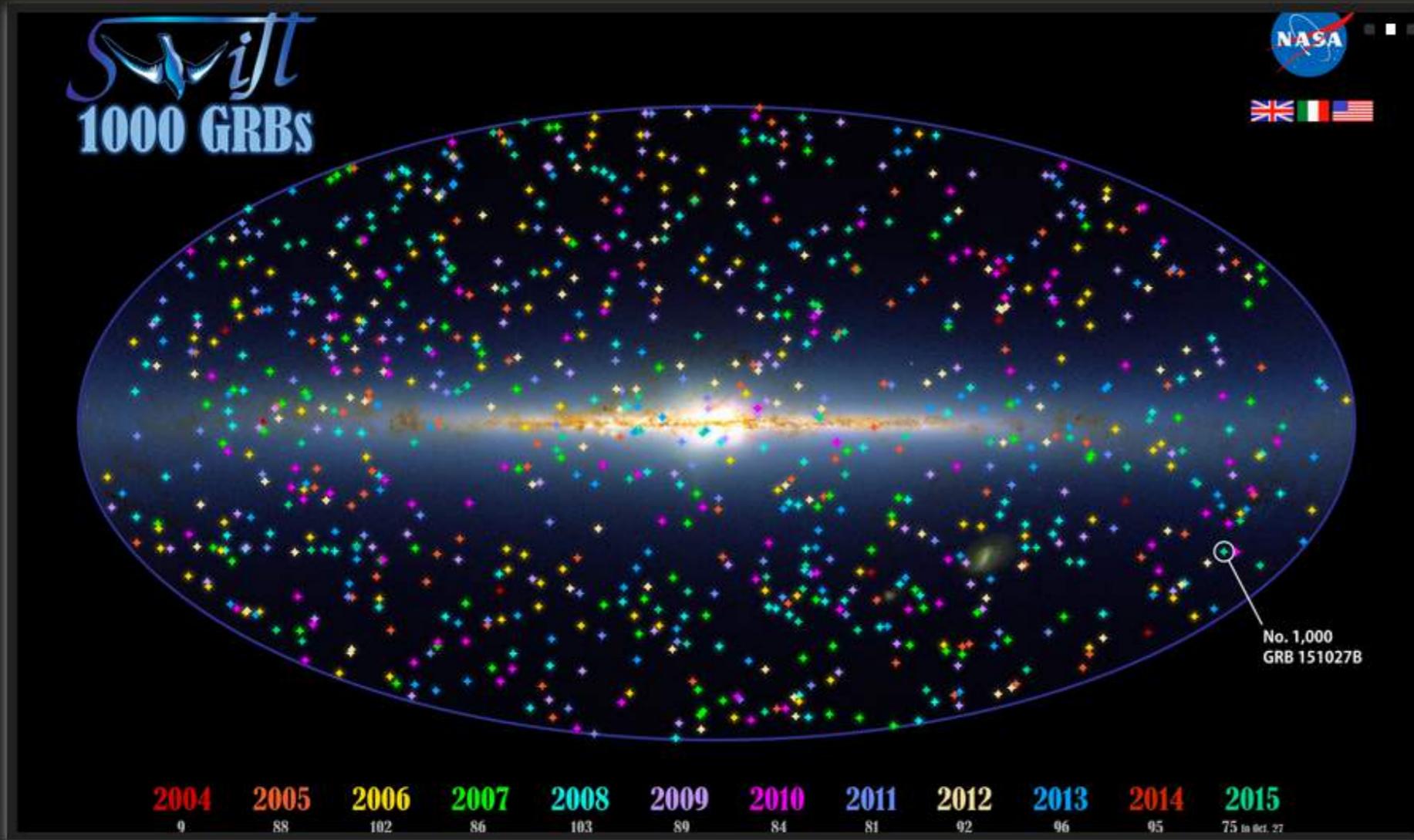
function as a collaborator /
sister institute



BR-focused branch for the work of ASDC



special interest on serving BR community
and integrating BR-produced / owned data




- AGILE
- SWIFT
- FERMI
- RUSTAR
- AMS-02
- PLANCK
- SOLAR SYSTEM
- PAMELA
- GAIA
- HERSCHEL
- BEPPICOLEX
- SIMBOL X
- CHEOPS
- EUCLID
- PLATO



SEDTM BUILDER



SKY EXPLORER



MATISSE



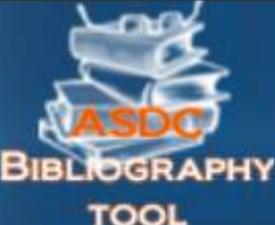
COSMIC RAY DATABASE



ASDC MULTIMISSION ARCHIVE FOR SPACE SCIENCE



ASDC CATALOGS



ASDC BIBLIOGRAPHY TOOL

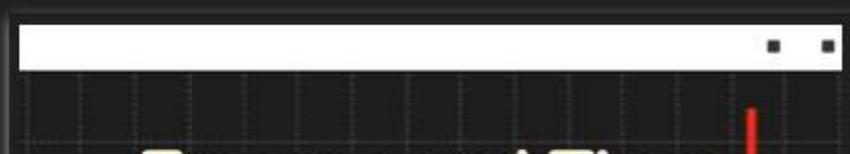


NEWSLETTER

MEDIA

TOP NEWS

EVENTS




14th AGILE Workshop "Agile on the Wave"
Rome - ASI Headquarters
June 20-21, 2016

ASDC ASI Science Data Center agenzia spaziale italiana
 Home About ASDC Public Outreach Quick Look Missions Multimission Archive Catalogs Tools Links Bibliographic services Helpdesk
 Privacy

Multi-Mission Interactive Archive for Space Science

Astrophysics/Cosmology

Astrophysics/Cosmology

all missions

Radio-Micro wave

- Planck

IR-Optic-UV

- Herschel
- Swift-UVOT

X ray

- ASCA
- BeppoSAX
- Einstein
- Exosat
- NuSTAR
- ROSAT
- Swift-XRT

Gamma ray

- Agile
- Egret
- Fermi
- Swift-BAT

Exploration of the Solar System

all missions

- Rosetta
- Dawn
- Chang'E 1
- Chang'E 2
- Messenger

Particle Astrophysics Cosmic rays

all missions

- Pamela
- AMS-02
- Chang'E 1 (soon available)
- Chang'E 2 (soon available)

Atmospheric Physics TGF

all missions

- Agile

Spectral band (Energy (keV)): from **1e-7** (1.00e-7 keV) to **1e8** (1.00e+8 keV) **Submit**

Source name: **Name Resolver:** ASDC Name Server SIMBAD NED
 (e.g. CYGX-1)

Multi-mission interactive archive, separated per field of knowledge: Astrophysics, Solar system, Astroparticles,

Here, an example of an object-specific query into the multi-mission archive.

Multi-Mission Interactive Archive

Query results for: **3C279** (by ASDC)
 Details: query with RA = **194.046309** (deg); DEC = **-5.789235** (deg); EQUINOX = **2000**; sort by **RA**;

[Source Names](#)

Bibliographic search

in time range between and

NUSTAR
2 entries (0%)

MISSION	ENTRIES
PLANCK	0
HERSCHEL	1
SWIFT	389
ASCA	0
BeppoSax NFI	5
BeppoSax WFC	23
EINSTEIN	0
EXOSAT	0
NUSTAR	2
ROSAT	42
AGILE	51
EGRET	8



- Help
- Show/hide columns
- Advanced filtering
- Print current view of table
- Print complete table
- Reset all filters

Query results for: **bllac(LOCAL)**

Details: query by **COORDINATE** with **RA** = 330.680417; **DEC** = 42.277500; **EQUINOX** = 2000; **RADIUS** = 5 arcmin; sort by **RA**; max lines retrieved: 1000 (on BROWSE catalog **numaster**)

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

◀ Previous Page Next Page ▶ Page Size (# of lines) 50 Refresh page Reset all filters Show all entries

Entry number	Archive	Interactive Analysis	Target Name	obsid	RA (J2000) hh mm ss.d	Dec (J2000) dd mm ss.d	time	public_date	exposure_a	exposure_b	Dist. from searched position arcmin
1	ASDC Data Explorer	Data Access	Interactive Analysis	BL_LAC	60001001002	22 02 44.3 +42 14 33.7					
2	ASDC Data Explorer	Data Access	Interactive Analysis	BL_LAC	60001001001	22 02 47.8 +42 14 43.0					

◀ Previous Page Next Page ▶ Page Size (# of lines) 50 Refresh

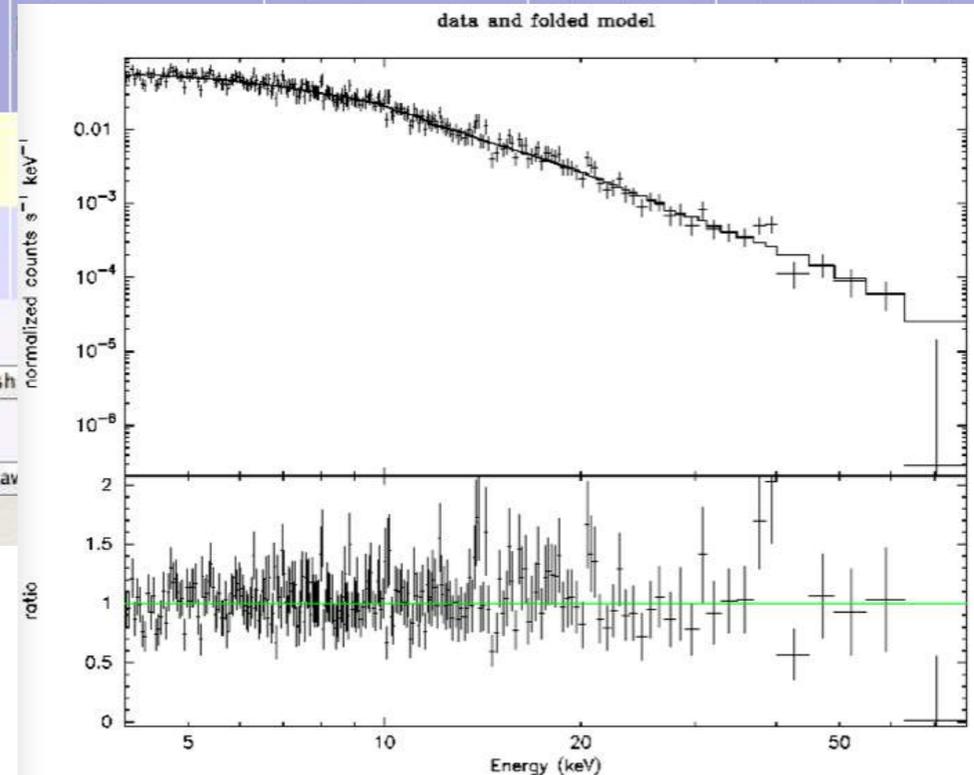
Export Current view of Table in: [Latex format](#) [FITS format](#) [Raw](#)

Spectral Energy Distribution (SED):

1.18237467E+18	2.10338756E+17	1.20990587E-11	2.74179496E-13
1.69408257E+18	3.01369128E+17	1.33162691E-11	2.91182334E-13
2.42724723E+18	4.31795568E+17	1.34440853E-11	3.46936428E-13
3.47771075E+18	6.1866798E+17	1.50269311E-11	5.30840671E-13
4.98279373E+18	8.86414936E+17	1.58526872E-11	7.74971396E-13
7.13924555E+18	1.27003736E+18	1.43058022E-11	1.33081415E-12
1.02289667E+19	1.81968391E+18	1.95793902E-11	2.53545514E-12
1.46558578E+19	2.60720623E+18	1.04843946E-11	4.25994309E-12

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

[Add data to SED](#)



Model	Model Component	Parameter	Unit	Active/On	Value
1	1	wabs	nH	10^22	0.173000 frozen
2	2	powerlaw	PhoIndex		1.88443 +/- 2.45938E-02
3	2	powerlaw	norm		6.25717E-03 +/- 3.33419E-04

www.asdc.asi.it/scratch/26566.html

Google Calendar | Ultime notizie | Notizie | ASI-ASDC | Fermi | Bibliography | Google Maps | Menu Segnalibri | Trenitalia | Segnalibri

FERMI Imaging Tool @ ASDC

Image parameters:

Source Name: APM08279K2B

RA: 127.923333, Dec: 52.7547222

LII: 165.75493, BII: 36.240243

Image size (deg): []

Emin: 100, Emax: 300000

Catalog Overlay: []

Radio | Infrared | X-Ray | Gamma

NVSS | SUMSS | FIRST | GB6

Run | Reset to default

Ximage smoothing parameters:

Smoothing filter: wave

sigma: 3, back: 4

Ximage display parameters:

Color scaling: linear, Minimum level displayed: 4

Ximage detect parameters:

Probability threshold: 5.e-3, Source box size (deg): 0.3, Signal-to-noise ratio threshold: 2.

Source Details:
Source Name= SOURCE 1
RA= 122.07 DEC= 52.43
LII= 166.10 BII= 32.68

Skymaps query and visualisation, multimission and multi-messenger



SED^(t) builder V 3.2

A tool to build and handle Spectral Energy Distributions, time-resolved SEDs and multi-frequency light-curves

Version 3.2.2

giommi (Logout) Feedback

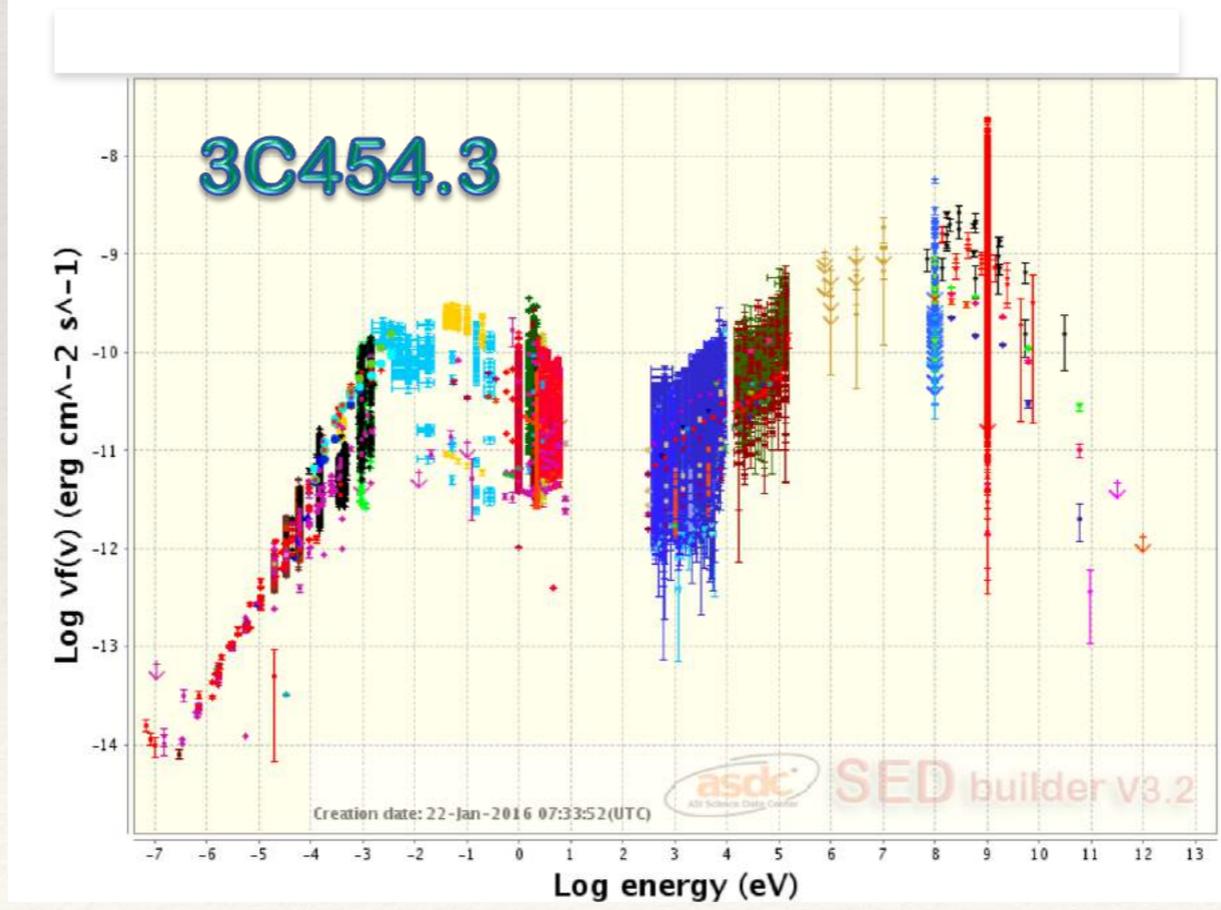
Tutorial | User Data | Current SED | Show source names

DATA EXPLORER | Existing SEDs | Search and build new SEDs

asdc ASI Science Data Center

Data citation policy - please read

The SED builder, for spectral + temporal visualisation and analysis of large AGN datasets.



Load Data | Show Data | Save | Duplicate Sed

Bibliographic search

Redshift: 0.0 | Frame: Observed

X Axis: Energy (eV) | Y Axis: nuFnu (erg/cm2/s)

Plot Type: Default | Update Plot

Input Data | Time Filtering | Energy Filtering | Models

Fit Functions | Templates | Instr Sensitivity | Plot options

Existing SEDs | Export | VO Tools

ASDC-resident Catalogs

Expand all Collapse all

Energy Band / Catalog Name		Options	Help
▶ Radio	<input checked="" type="checkbox"/>		
▶ Infrared	<input checked="" type="checkbox"/>		
▶ Optical UV	<input checked="" type="checkbox"/>		
▶ Soft X Ray	<input checked="" type="checkbox"/>		
▶ Hard X Ray	<input checked="" type="checkbox"/>		
▶ Gamma Ray	<input checked="" type="checkbox"/>		
▶ VHE	<input checked="" type="checkbox"/>		



UNITED NATIONS
Office for Outer Space Affairs

Open Universe

An initiative under the auspices of COPUOS announced by the ASI president
and described in a conference room paper presented by Italy
for expanding availability of and accessibility to open source space science data

Approved by the general assembly of COPUOS at its 59th session (June 2016)

BY
PAOLO GIOMMI
ITALIAN SPACE AGENCY

Open Universe

14 June 2016

English only

Committee on the Peaceful Uses of Outer Space

Fifty-ninth session

Vienna, 8-17 June 2016

“Open Universe” proposal, an initiative under the auspices of the Committee on the Peaceful Uses of Outer Space for expanding availability of and accessibility to open source space science data.

Proposal by Italy

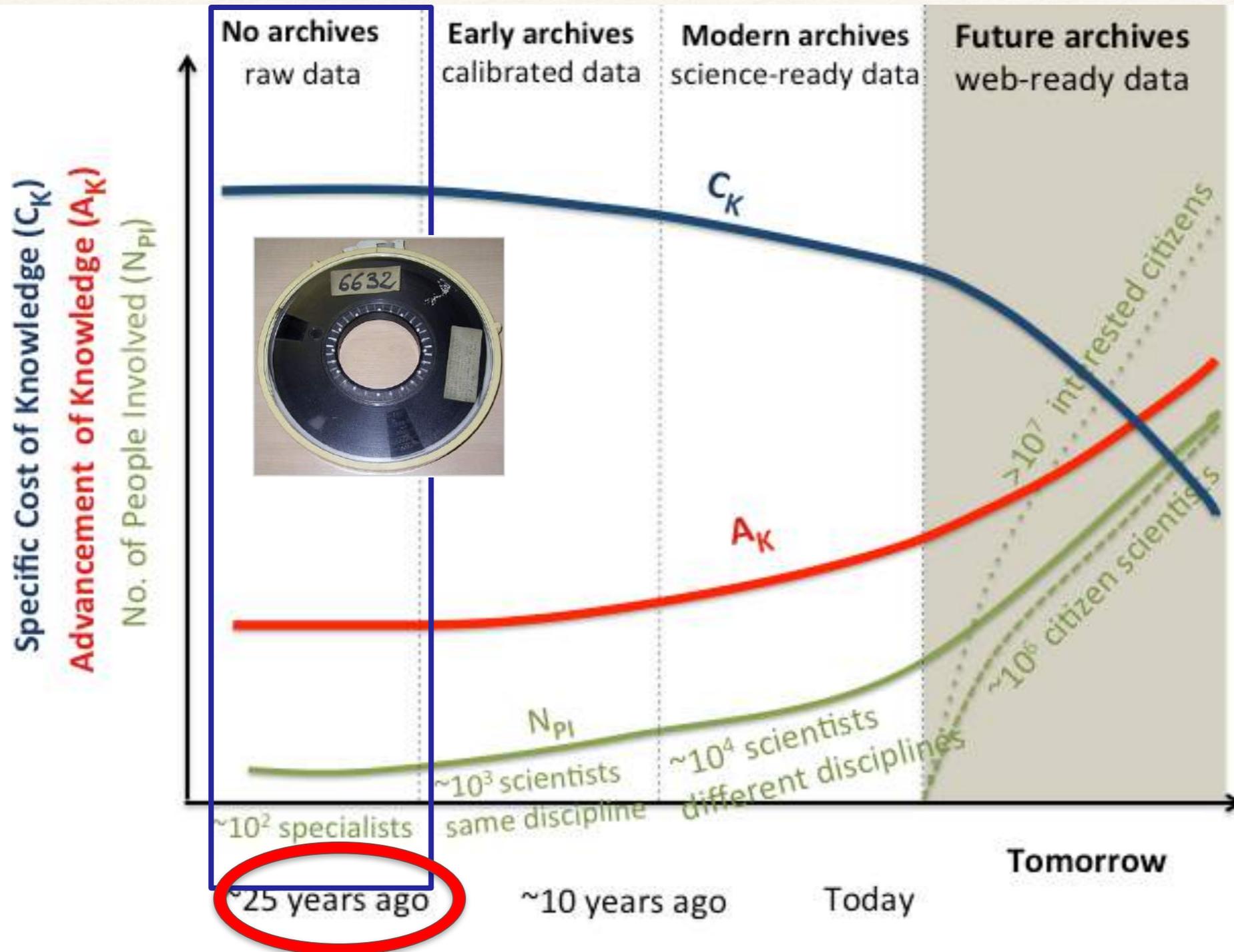
I. Background

1. The 2030 Agenda for Sustainable Development will require effective, enhanced and innovative tools to support its implementation. Among those tools are the ones offered by space science and technology, which could act as both an enabler and a catalyst for the efforts of countries with regard to progressing towards internationally agreed development goals and for sustainable development. Advancing international cooperation in the peaceful uses of space science and technology and increasing the use of space-derived data and information are at the core of international efforts for harnessing the benefits of outer space for development in the post-2015 framework.

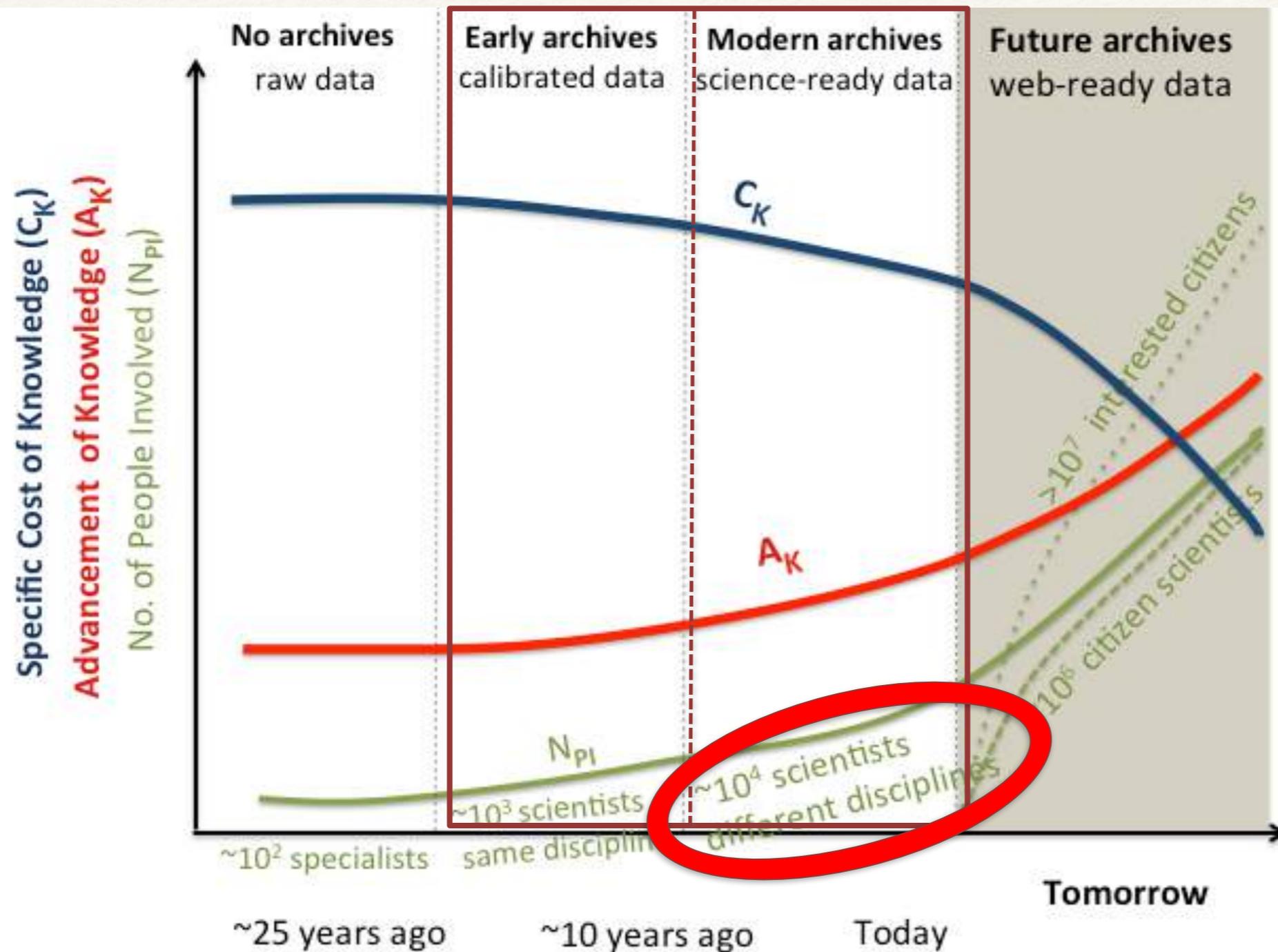
2. The General Assembly, in its resolution 66/71, emphasized the significant progress that has enabled humans to explore the universe, and the extraordinary achievements made over the past fifty years in space exploration efforts, including deepening the understanding of the planetary system and the Sun and the Earth itself, in the use of space science and technology for the benefit of all humankind. Also in that resolution, the General Assembly stressed the need to look more closely into how advanced space research and exploration systems and technologies could increase benefits, in particular for developing countries. Moreover, in that resolution, the General Assembly recognized that the Committee on the Peaceful

Approved by the general
assembly of COPUOS at its
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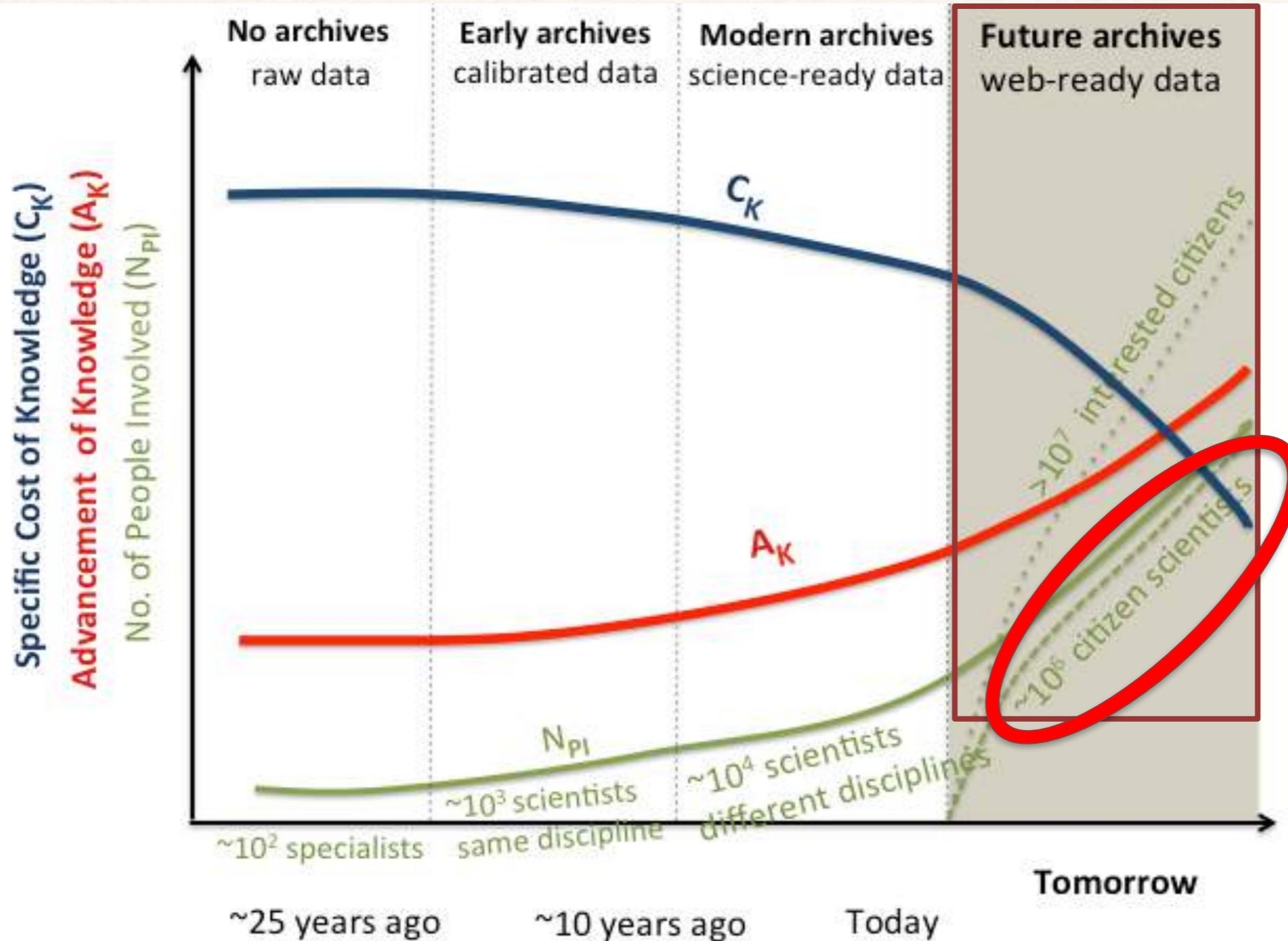
Open Universe



Open Universe



Open Universe



Specific Activities in Brazil

- ❖ Implementation of a complete **VHE gamma-ray extragalactic database**, integrated to SED builder, for the study of high-energy AGNs.
- ❖ **Development of associated tools** for temporal cross-correlation analysis, SED fits
- ❖ Implementation of a **polarimetry database** within ASDC/BSDC system, which is still inexistent.
- ❖ **Development of software tools** for visualisation and processing / analysis of polarimetry information (initially excluding imaging)

Specific Activities in Brazil

- ❖ Seek **partnership with other institutions** / observatories in Brazil, to provide a service of integration of Nationally-produced or owned astrophysical data of all kinds within BSDC / ASDC, thus seeking to enhance visibility of BR-owned data and cooperation in research world-wide for BR groups.
- ❖ All data present in ASDC / BSDC is properly **referenced** to give credit to the author / original owner.
- ❖ **Create projects and tools for schools and outreach**, with a special focus on BR astrophysical science and BR astronomical instruments.
- ❖ All this to be carried out in cooperation with interested partners, in a **horizontal cooperation** plan with CBPF.

What's in for the BRICS?

A reproducible model and a platform for effective collaboration

- ❖ The science-ready astrophysical ASDC / BSDC database initiative can be expanded to any partners in the BRICS.
- ❖ To create a horizontal, cooperative and integrated network seeking to increase data sharing and collaboration among BRIC countries.
- ❖ To be build under the auspices and developed under the guidance of UN “Open Universe” initiative, with the support of ASI/ASDC.

For interest in collaboration, write us:

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Paolo Giommi (ASI) - paolo.giommi@asi.it