

SOFIA Archival Research

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December 6, 2021

Archival Research

Goal: “to encourage the use of available SOFIA archival data and to realize the full potential of the SOFIA data archive”

How do we achieve this goal?

- SOFIA Archival Research Program (SARP)
- Increased visibility and usability of the SOFIA archive at IRSA

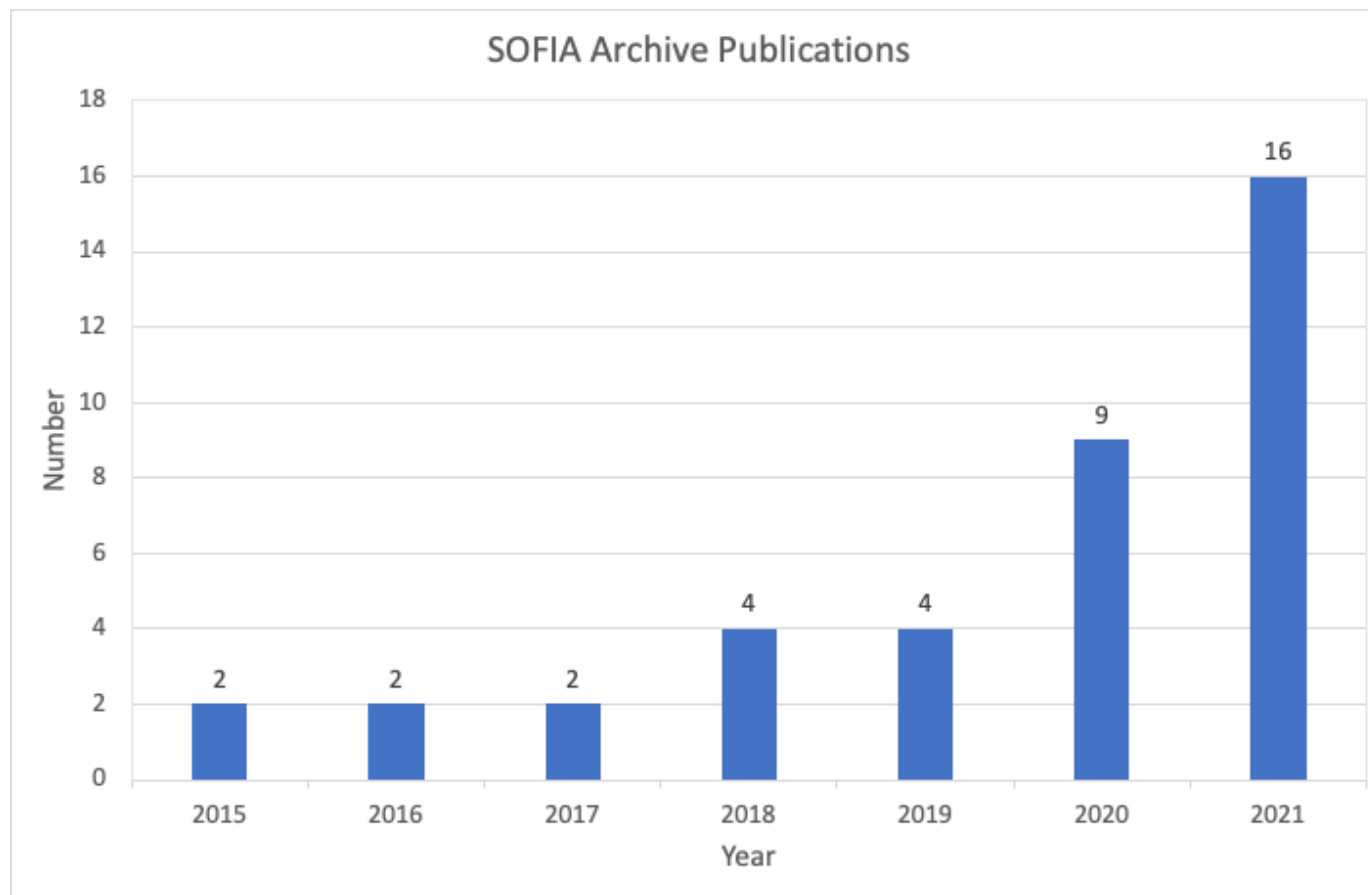
How do we measure success? Publications!

SOFIA Archival Publications

39 papers based on archival data have been published

SARP:

- 11 Accepted proposals
- 0 Published papers (to date) based on those proposals



2021 includes 2 accepted but not yet published

SOFIA Archive Usage

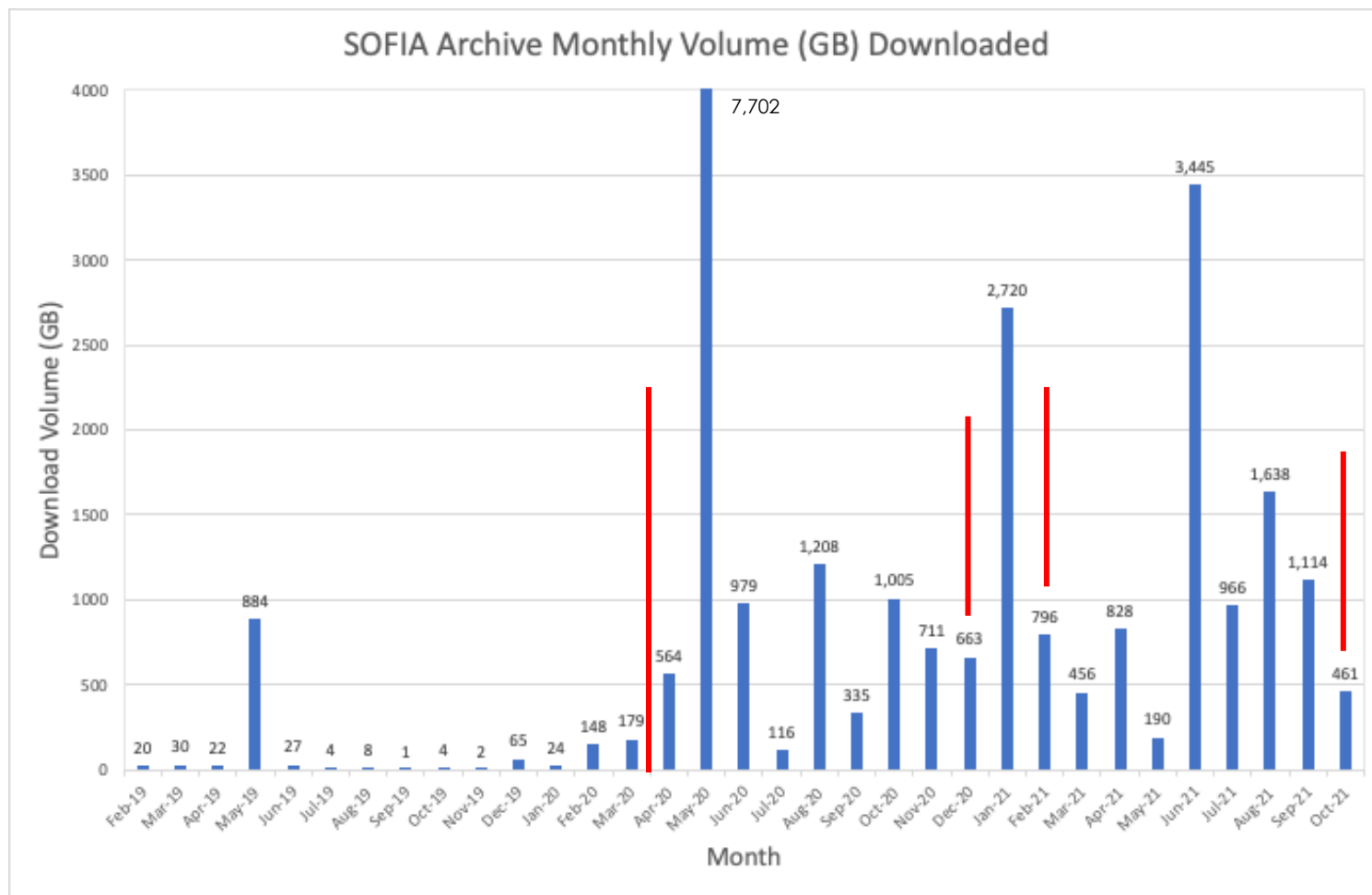
In addition to counting papers, we also track the volume of data downloaded at IRSA.

IRSA does *not* track:

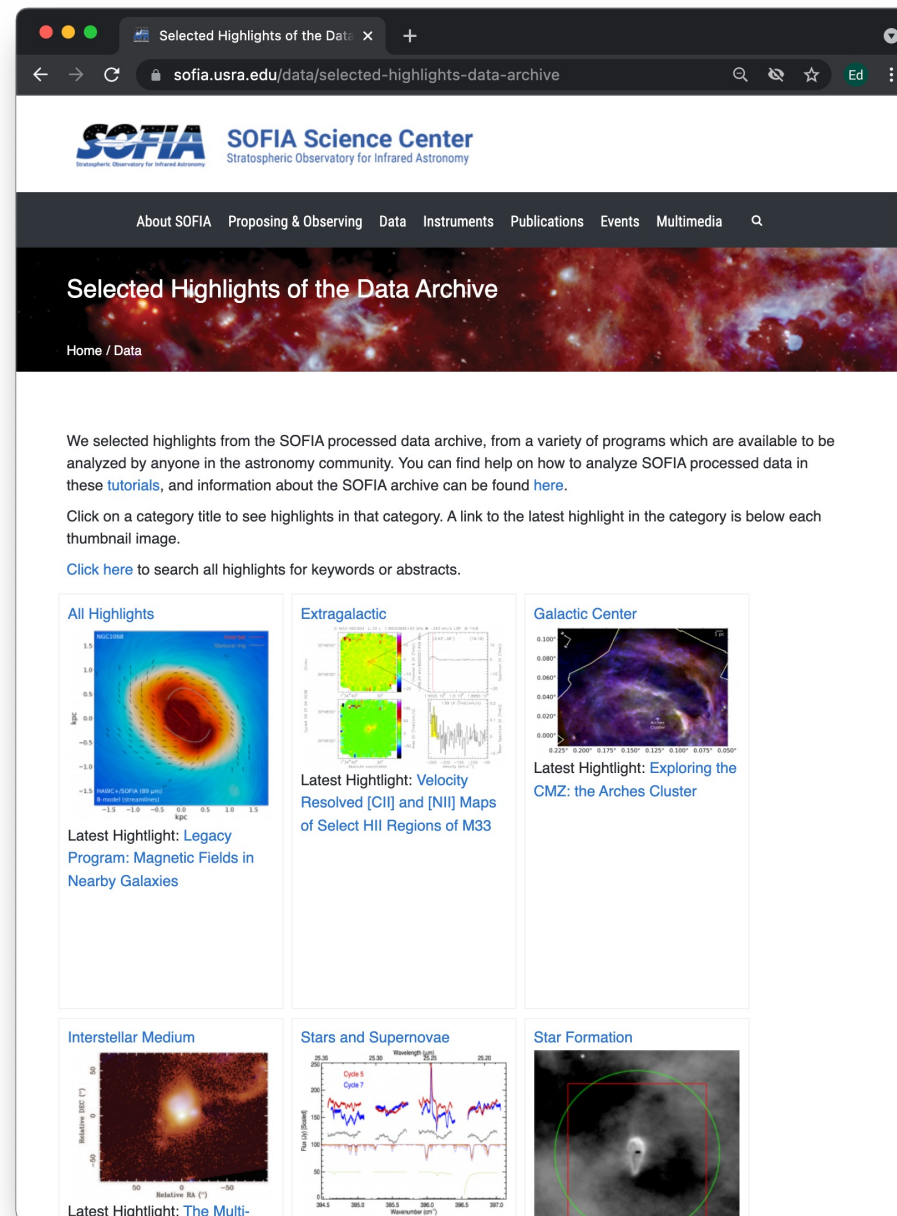
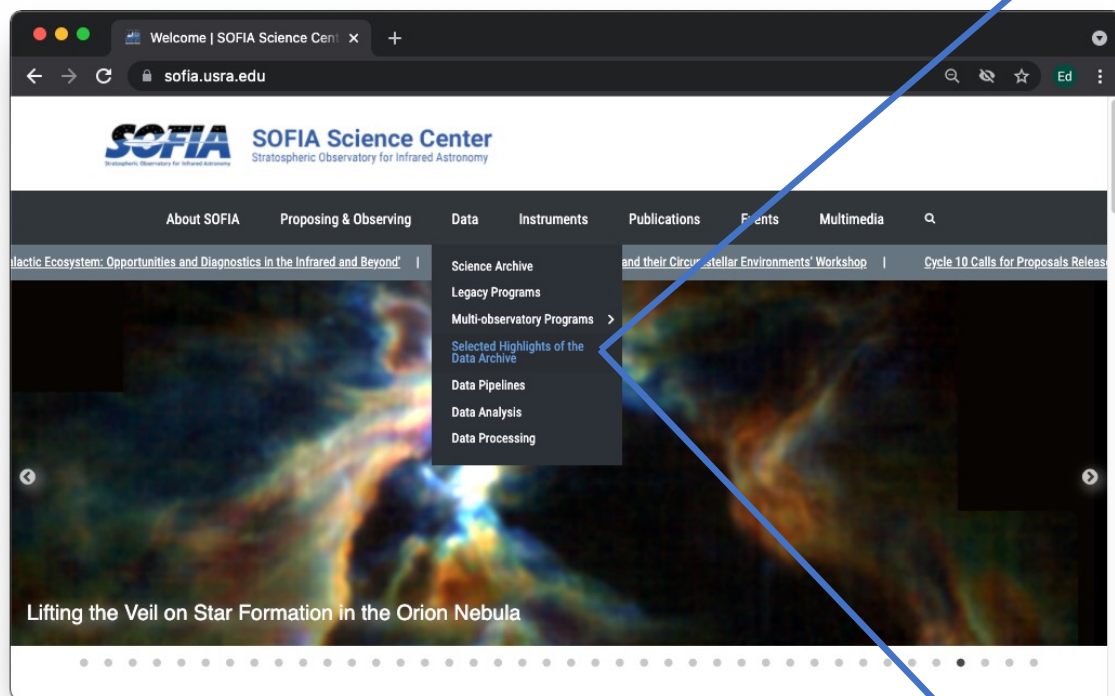
- Which users download data
- Which data are downloaded

Significant dates (marked in red):

- 3/2020: Transition to IRSA complete, external access to DCS Closed
- 12/2020: Archive Release 3 at IRSA
- 2/2021: SARP Deadline
- 10/2021 Archive Release 4 at IRSA



Archive Visibility



A collection of searchable archive highlights (museum pages) advertising underutilized data

Archive Visibility

Direct links to the data from SOFIA Legacy Programs

Abstract searches allow users to search for observing programs using keywords, PI name, project ID, and/or abstract text

The screenshot shows the NASA/IPAC Infrared Science Archive (IRSA) website. The main navigation bar includes 'IRSA', 'DATA SETS', 'SEARCH', 'TOOLS', and 'HELP'. The page title is 'Stratospheric Observatory for Infrared Astronomy (SOFIA)'. Below the title are three icons: 'SOFIA Archive', 'Abstract Search' (circled in red), and 'Documentation'. The 'Mission Characteristics' section includes a description of the SOFIA aircraft, wavelength range (0.35 - 655 μm), area coverage (Targeted), and a list of instruments such as FORCAST, GREAT, FIFI-LS, EXES, FPI+, HAWC+, and FLITECAM. The 'IRSA Services' section lists links for 'NASA SOFIA Archive (Help)', 'HIPO Data', and 'Abstract Search'. The 'SOFIA Legacy Programs' table is circled in red and contains the following data:

Program Name	Instrument	Data Access
Radiative and Mechanical Feedback in Regions of Massive Star Formation	GREAT spectra	Data Access
Constraining Recent Star Formation in the Galactic Center	FORCAST imaging	Data Access
HyGAL: Characterizing the Galactic Interstellar Medium with Hydrides	GREAT spectra	Data Access
FIELDMAPS: Filaments Extremely Long and Dark: A Magnetic Polarization Survey	HAWC+ imaging	Data Access
SOFIA Heralds a New Era of Measuring the Magnetic Fields of Galaxies	HAWC+ imaging	Data Access

Archive Visibility

irsa NASA/IPAC INFRARED SCIENCE ARCHIVE
IRSA | DATA SETS | SEARCH | TOOLS | HELP

SOFIA Abstract/Keyword Search

Find SOFIA proposals of interest by entering space-separated keywords in the search bar below. You can search on abstract text, proposal ID, author, and/or science keywords. Proposal IDs in the filtered list are linked to the data archive. Some links will show no results, usually because the observations for the proposal have not yet been executed. Questions should be directed to the IRSA Help Desk.

Show 10 entries Search: m51

Proposal ID	Principal Investigator	Title
+ 04_0116	Jorge Pineda	Joint Impact Proposal: A complete velocity resolved 3-D [CII] map of the M51 grand-design spiral galaxy: Unraveling the impact of spiral density waves on the evolution of the ISM and star formation.
+ 06_0028	Jorge Pineda	Tracing the evolution of the interstellar medium and star formation across the spiral arms of M51 with [NII]
+ 07_0173	Christof Buchbender	Tracing the evolution of the interstellar medium and star formation across the spiral arms of M51 with [NII]
+ 08_0260	C. Darren Dowell	Magnetic Field Structure of the Grand-Design Spiral Galaxy M51
+ 09_0170	Jorge Pineda	Testing Theories of Spiral Arm Formation and Evolution in Galaxies.
+ 09_0201	C. Darren Dowell	Magnetic Field Structure of the Grand-Design Spiral Galaxy M51
+ 83_0606	Rolf Guesten	Experimental [OI] detection in M51
+ 83_0631	Christof Buchbender	Experimental NII observations in M51

Showing 1 to 8 of 8 entries (filtered from 1,063 total entries) Previous 1 Next

Contact Privacy Policy Acknowledge IRSA Search IRSA ipac Caltech JPL NASA

irsa NASA/IPAC INFRARED SCIENCE ARCHIVE
IRSA | DATA SETS | SEARCH | TOOLS | HELP

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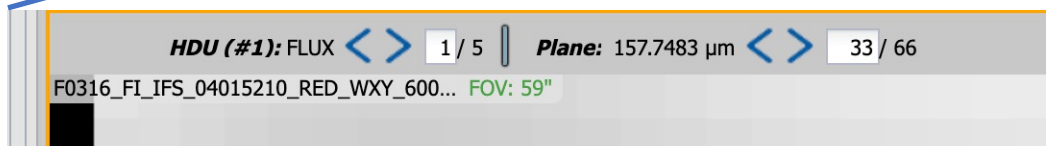
Category
GALAXIES

Keywords
STAR FORMATION
INTERSTELLAR AND INTERGALACTIC MEDIUM
GALAXY FORMATION AND EVOLUTION

Abstract
We propose to obtain the first complete, velocity resolved [CII] 158um image of the M51 grand-design spiral galaxy with the upGREAT and FIFI-LS instruments on SOFIA. Spiral density waves play a fundamental role on the conversion of atomic to molecular gas, leading to gravitational contraction and thus to star formation. Understanding the impact of spiral density waves on the lifecycle of the interstellar medium and on star formation in galaxies is thus critical for our understanding of galaxy evolution. The [CII] line (in combination with the low-J CO lines and HI 21 cm) is an important tool to diagnose the physical state of the ISM. It can reveal the distribution of the gas that is making a transition between atomic and molecular phases, including the CO-dark H2 gas (hydrogen molecular but carbon ionized, and thus not traced by either HI or CO) in the spiral arms and interarm regions of M51. We will use the high spectral resolution of the upGREAT instrument to resolve spiral arms in velocity, allowing us to study the flow of gas through spiral arms and measure line widths and determine the dynamical state of prominent interarm clouds. The significantly more sensitive FIFI-LS will be used to detect extended faint [CII] emission in the interarm regions and outskirts of the galaxy, including the gas connection to the companion galaxy. The 3-D data cube of velocity-resolved [CII] in this nearby galaxy, combined with the wealth of ancillary data, can be used for a large set of investigations by the broader astronomical community. It will provide for the first time the link between the detailed physical processes in the star-forming ISM in the Milky Way and the average properties of distant external galaxies. This complete map will be also an excellent showcase of SOFIA's capabilities for years to come.

Archive Usability

Central plane of cube is displayed



Plane is labelled with spectral unit

IRSA | DATA SETS | SEARCH | TOOLS | HELP

Pixel Size: 2.000 arcsec EQ-J2000: 16h52m49.62s, -43d54m31.9s F0316_FI_IFS_04015...
Flux: 1.457197 Jy Image Pixel: 26.4, 10.5

Search Catalogs Help Background Monitor

Prepare Download

AOR ID	Mission ID
char	char
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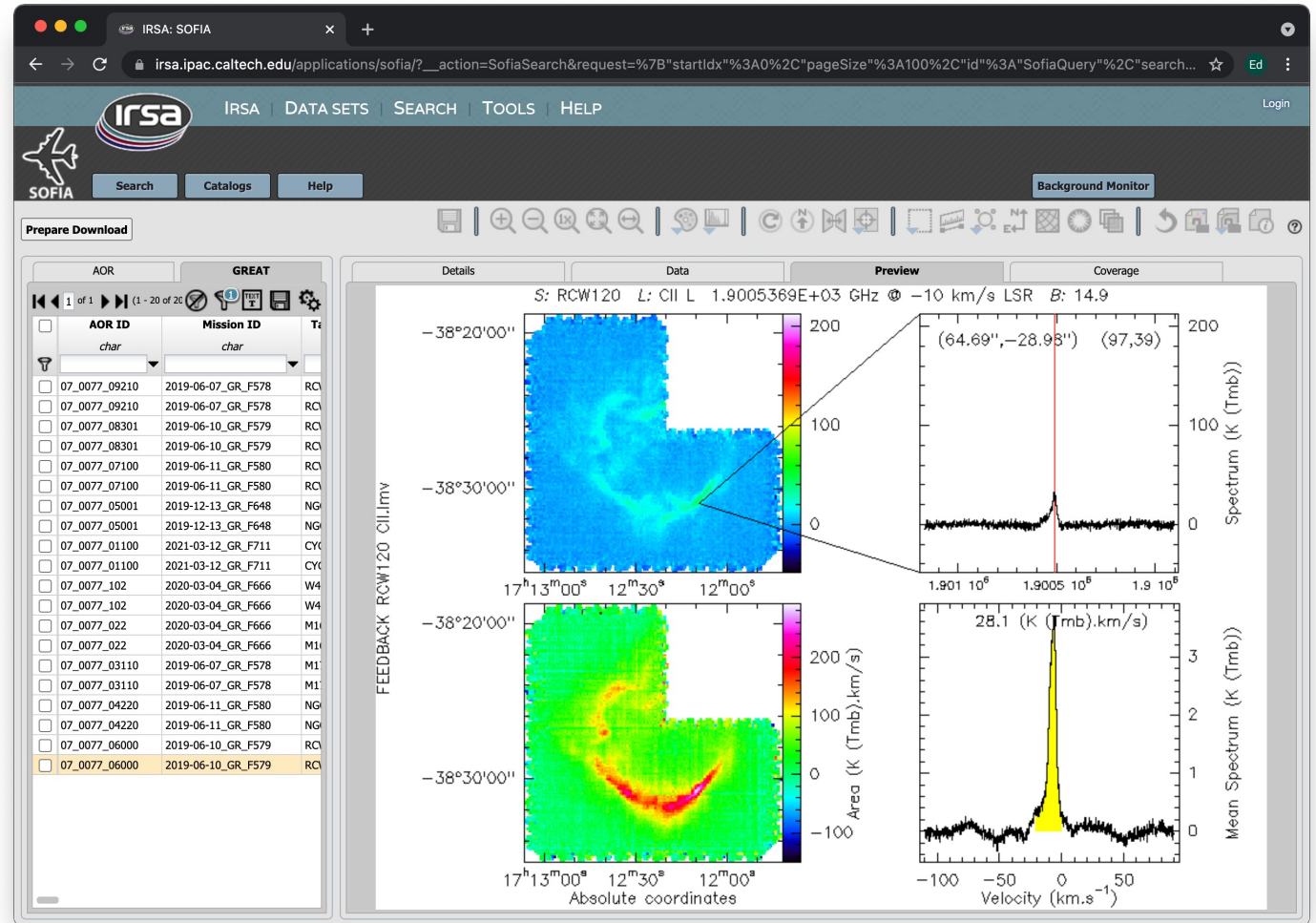
Details Data Preview Coverage

File Contents

HDU (#1): FLUX <> 1 / 5 | Plane: 157.7483 μm <> 33 / 66
F0316_FI_IFS_04015210_RED_WXY_600... FOV: 59"

Archive Usability

Preview images for high-level data products are displayed at IRSA.



Archive Usability

Publication and Quality Assessment information are displayed on the AOR tab.

AOR FORCAST

1 of 27 (1 - 100 of 2,645)

<input type="checkbox"/>	AOR ID <i>char</i>	Target Name <i>char</i>	Instrument <i>char</i>	Plan ID <i>char</i>	Proposal PI <i>char</i>	Abstract Link <i>char</i>	Publications <i>char</i>	Quality Assessment <i>char</i>
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<input type="checkbox"/>	01_0017_1	V339 Del - Visit 1	FORCAST	01_0017	Robert Gehrz	abstract	publications	
<input type="checkbox"/>	01_0017_101	V339 Del - Visit 1	FORCAST	01_0017	Robert Gehrz	abstract	publications	
<input type="checkbox"/>	01_0017_2	V339 Del - Visit 1	FORCAST	01_0017	Robert Gehrz	abstract	publications	
<input type="checkbox"/>	01_0017_201	V339 Del - Visit 1	FORCAST	01_0017	Robert Gehrz	abstract	publications	
<input type="checkbox"/>	01_0017_3	V339 Del - Visit 1	FORCAST	01_0017	Robert Gehrz	abstract	publications	
<input type="checkbox"/>	01_0034_1	G29.96-0.02	FORCAST	01_0034	Alexander Tielens	abstract		Quality Assessment
<input type="checkbox"/>	01_0034_13	NGC_7538_IRS_1	FORCAST	01_0034	Alexander Tielens	abstract		
<input type="checkbox"/>	01_0034_14	NGC_7538_IRS_1	FORCAST	01_0034	Alexander Tielens	abstract		Quality Assessment
<input type="checkbox"/>	01_0034_15	NGC_7538_IRS_1	FORCAST	01_0034	Alexander Tielens	abstract		Quality Assessment
<input type="checkbox"/>	01_0034_16	G45.45+0.06	FORCAST	01_0034	Alexander Tielens	abstract		
<input type="checkbox"/>	01_0034_17	G45.45+0.06	FORCAST	01_0034	Alexander Tielens	abstract		

Details Coverage

Name <i>char</i>	Value <i>char</i>
AOR ID	00_0000_1
Target Name	hip_112712
NAIF ID	
Instrument	FORCAST
Plan ID	00_0000
Proposal PI	
Abstract Link	
Publications	
Quality Assessment	Quality Assessment

Summary

- Archive publications are increasing
- We continue to track:
 - Publications based on archival research, and are awaiting the first publications from the SARP
 - Archive usage through the volume of data downloaded
- We promote archive research through improved:
 - Archive visibility (museum pages, keyword/abstract search capability, links to prominent data sets on IRSA page)
 - Archive usability (preview images, enhanced data cube visualization, display of QA and publication information)