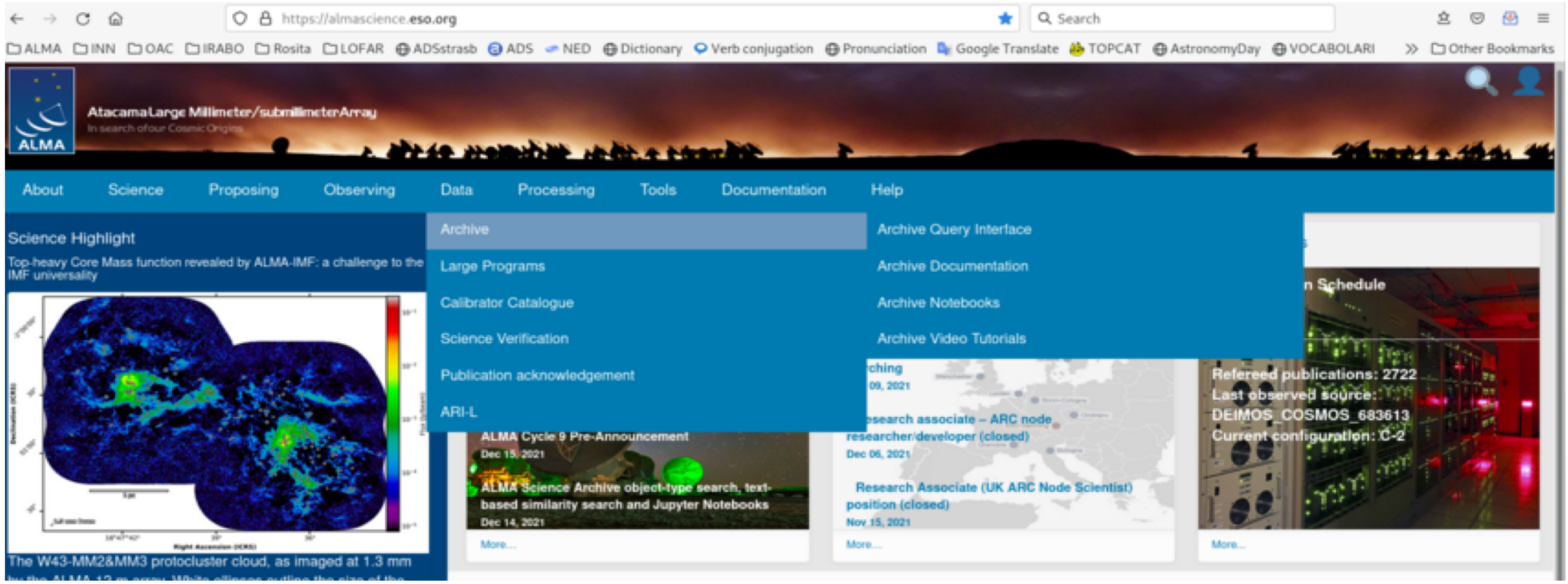
EUROPEAN ARC
ALMA Regional Centre || Italian

Part V
ALMA Science Archive

Photo credit C. Malin (ESO)

Why check the ALMA Science Archive (ASA) before proposing?



- **Do not duplicate observations** unless scientifically justified.

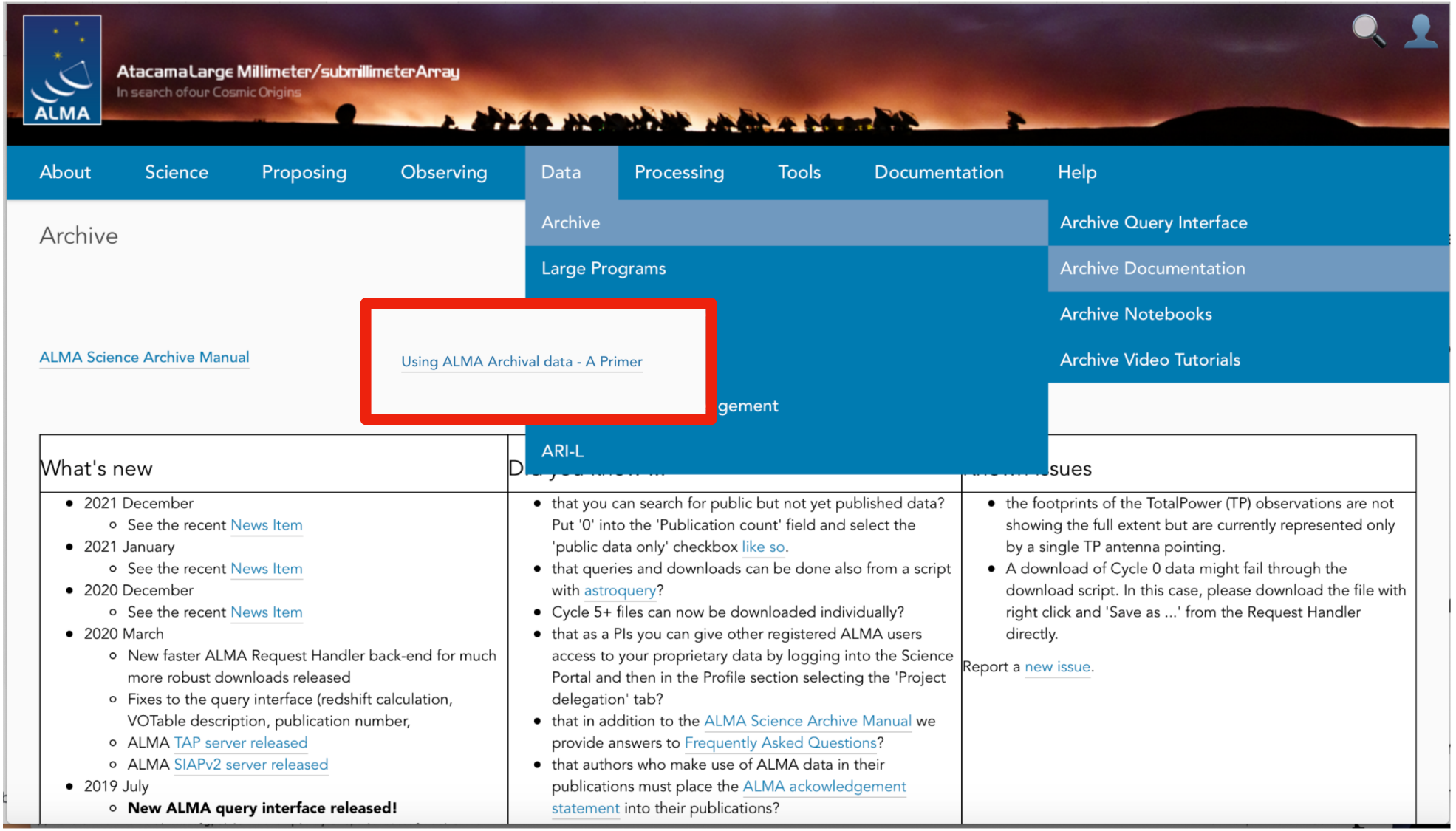
  → **check projects in the Queue**

  https://almascience.nrao.edu/proposing/duplications

- get archival data for **better sensitivity and angular resolution justification**

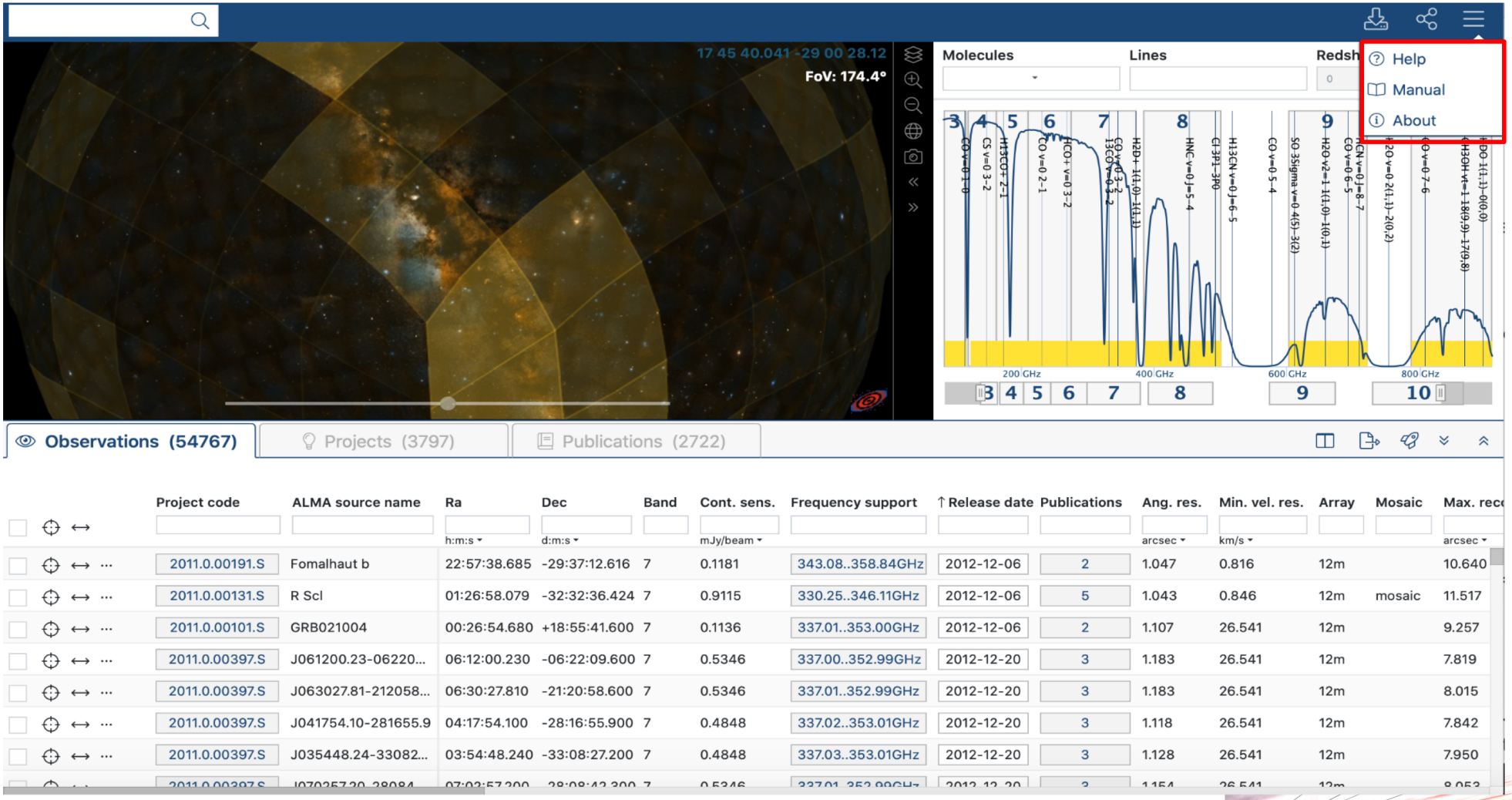
A primer for the use of the ALMA Science Archive

https://almascience.eso.org/documents-and-tools/cycle9/archive-primer



The ALMA Science Archive: the look

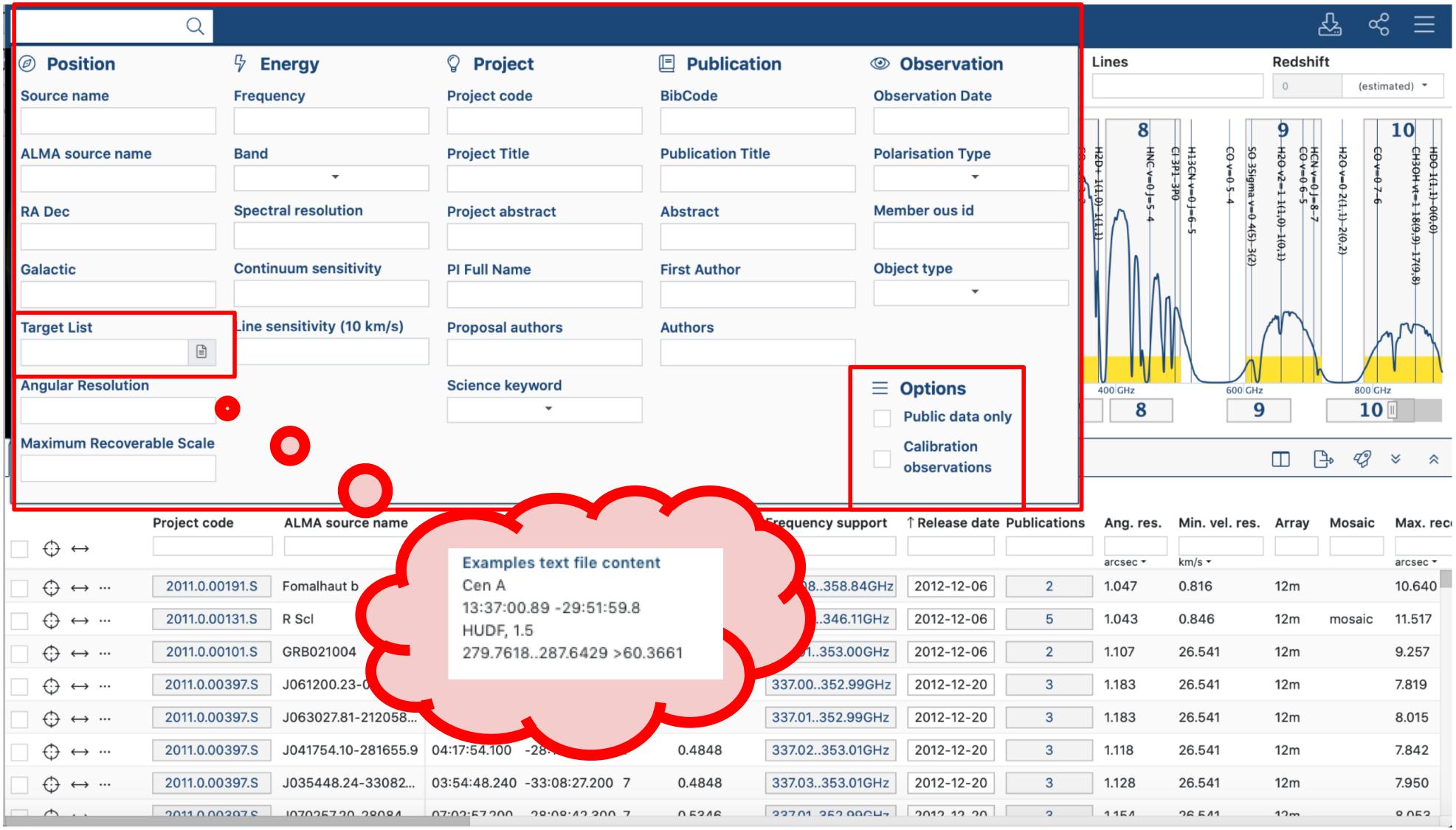
https://almascience.eso.org/asax/



Project code	ALMA source name	Ra	Dec	Band	Cont. sens.	Frequency support	↑ Release date	Publications	Ang. res.	Min. vel. res.	Array	Mosaic	Max. rec
		h:m:s	d:m:s		mJy/beam				arcsec	km/s			arcsec
2011.0.00191.S	Fomalhaut b	22:57:38.685	-29:37:12.616	7	0.1181	343.08..358.84GHz	2012-12-06	2	1.047	0.816	12m		10.640
2011.0.00131.S	R Scl	01:26:58.079	-32:32:36.424	7	0.9115	330.25..346.11GHz	2012-12-06	5	1.043	0.846	12m	mosaic	11.517
2011.0.00101.S	GRB021004	00:26:54.680	+18:55:41.600	7	0.1136	337.01..353.00GHz	2012-12-06	2	1.107	26.541	12m		9.257
2011.0.00397.S	J061200.23-06220...	06:12:00.230	-06:22:09.600	7	0.5346	337.00..352.99GHz	2012-12-20	3	1.183	26.541	12m		7.819
2011.0.00397.S	J063027.81-212058...	06:30:27.810	-21:20:58.600	7	0.5346	337.01..352.99GHz	2012-12-20	3	1.183	26.541	12m		8.015
2011.0.00397.S	J041754.10-281655.9	04:17:54.100	-28:16:55.900	7	0.4848	337.02..353.01GHz	2012-12-20	3	1.118	26.541	12m		7.842
2011.0.00397.S	J035448.24-33082...	03:54:48.240	-33:08:27.200	7	0.4848	337.03..353.01GHz	2012-12-20	3	1.128	26.541	12m		7.950

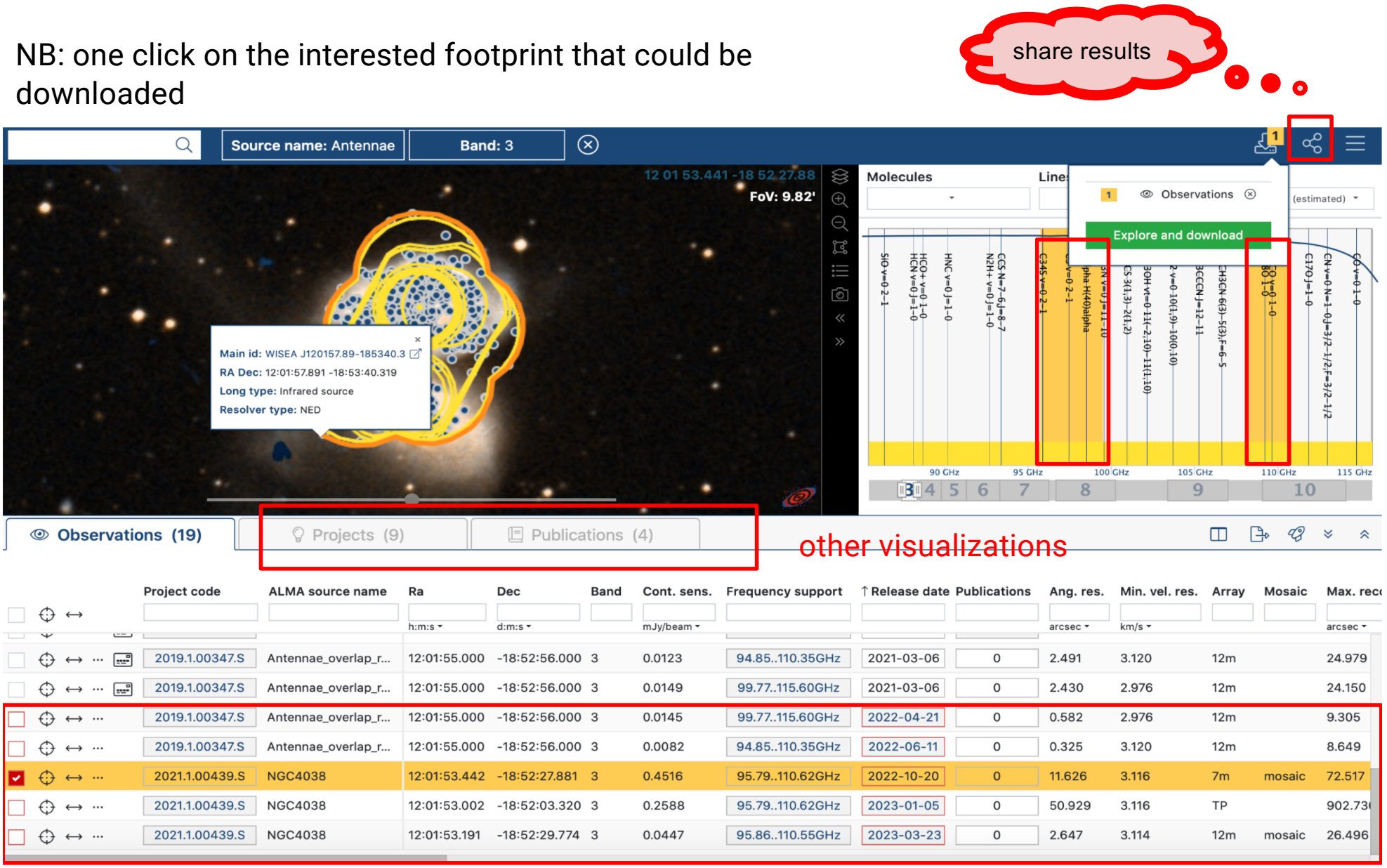
- It is not enough that people can do what they need to do. **It has to be fast→** I scientists concentrate on science

The ALMA Science Archive: the search interface



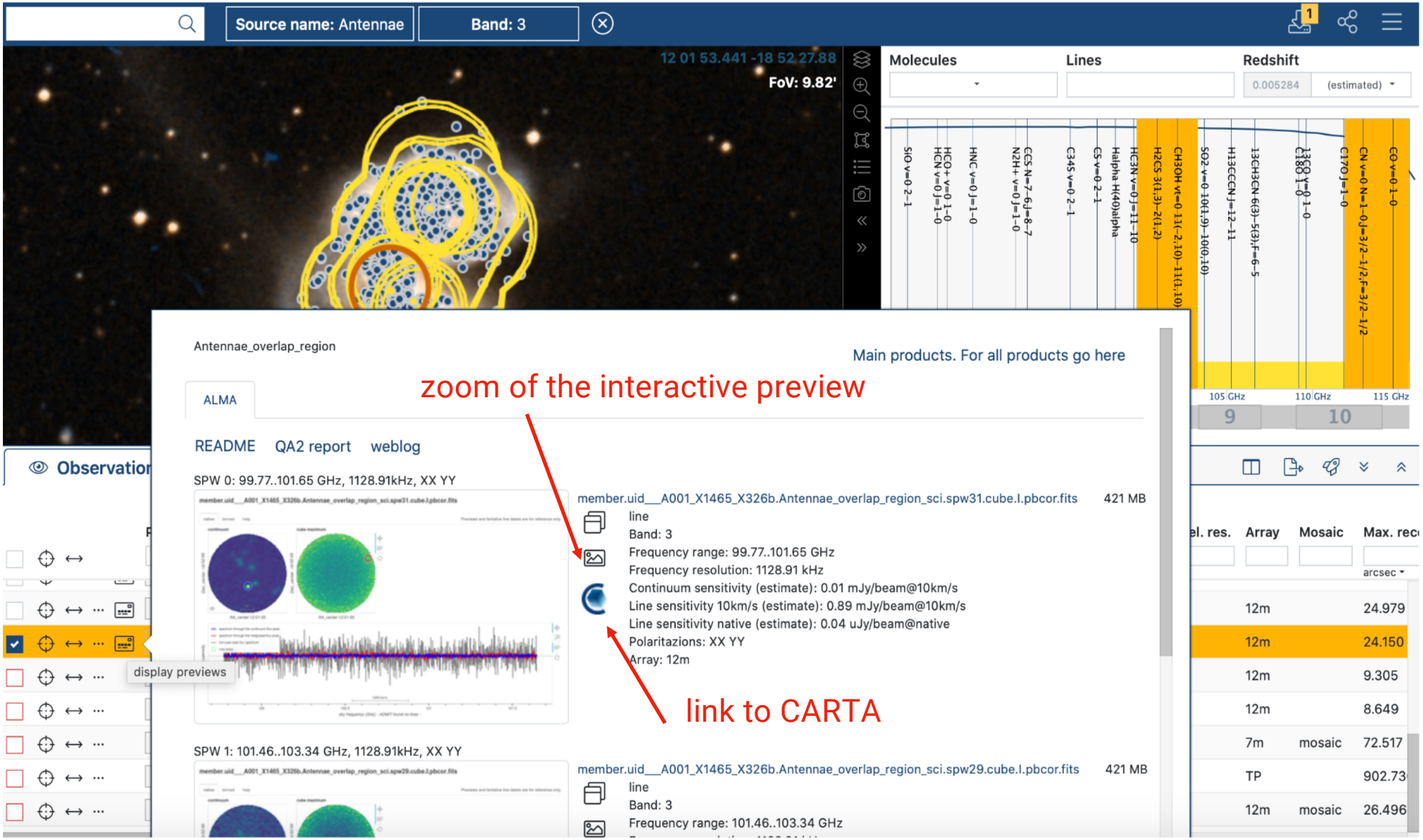
The ALMA Science Archive: search results

NB: one click on the interested footprint that could be downloaded

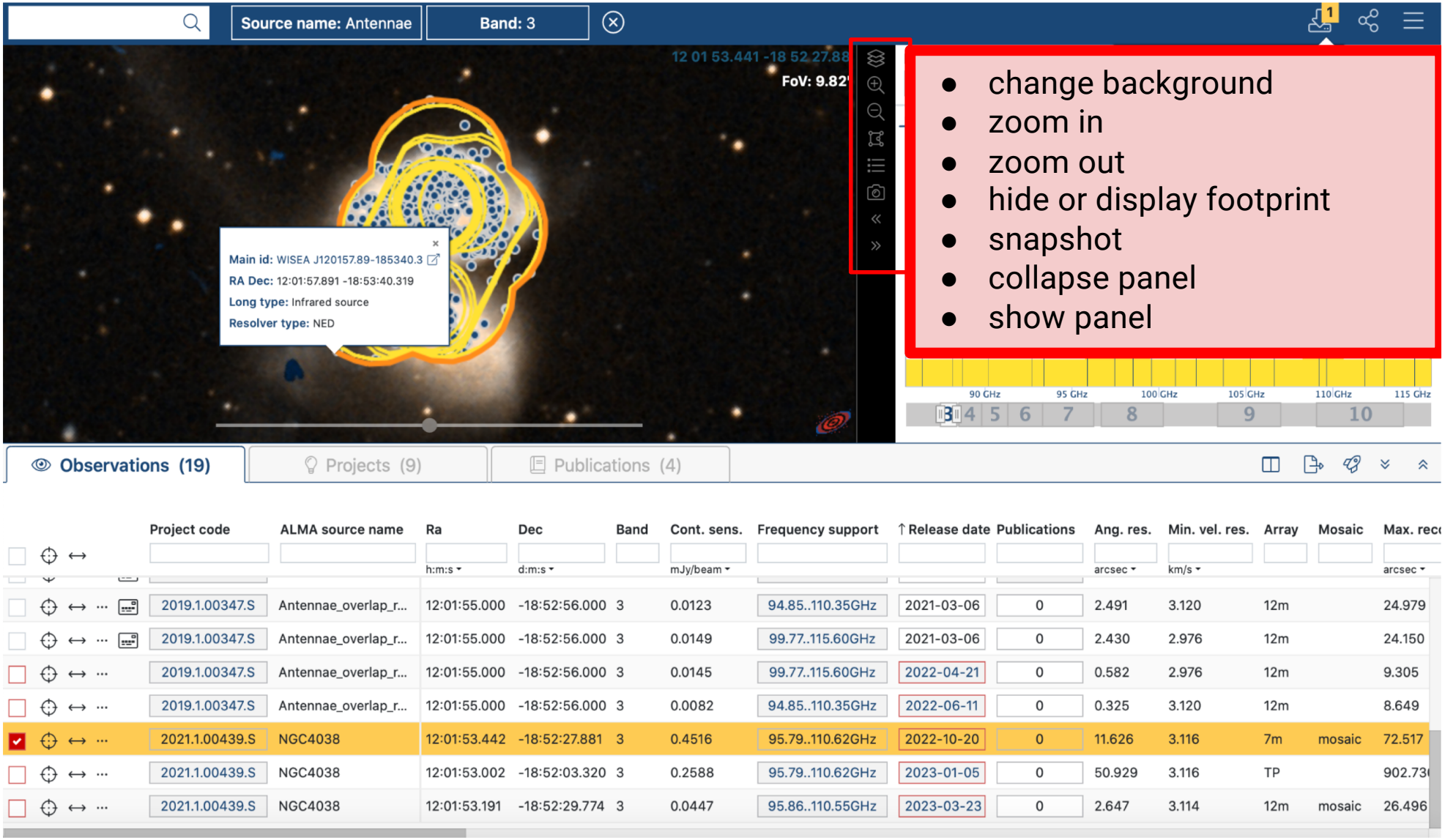


Project code	ALMA source name	Ra (h:m:s)	Dec (d:m:s)	Band	Cont. sens. (mJy/beam)	Frequency support	Release date	Publications	Ang. res. (arcsec)	Min. vel. res. (km/s)	Array	Mosaic	Max. rec (arcsec)
2019.1.00347.S	Antennae_overlap_r...	12:01:55.000	-18:52:56.000	3	0.0123	94.85..110.35GHz	2021-03-06	0	2.491	3.120	12m		24.979
2019.1.00347.S	Antennae_overlap_r...	12:01:55.000	-18:52:56.000	3	0.0149	99.77..115.60GHz	2021-03-06	0	2.430	2.976	12m		24.150
2019.1.00347.S	Antennae_overlap_r...	12:01:55.000	-18:52:56.000	3	0.0145	99.77..115.60GHz	2022-04-21	0	0.582	2.976	12m		9.305
2019.1.00347.S	Antennae_overlap_r...	12:01:55.000	-18:52:56.000	3	0.0082	94.85..110.35GHz	2022-06-11	0	0.325	3.120	12m		8.649
2021.1.00439.S	NGC4038	12:01:53.442	-18:52:27.881	3	0.4516	95.79..110.62GHz	2022-10-20	0	11.626	3.116	7m	mosaic	72.517
2021.1.00439.S	NGC4038	12:01:53.002	-18:52:03.320	3	0.2588	95.79..110.62GHz	2023-01-05	0	50.929	3.116	TP		902.73
2021.1.00439.S	NGC4038	12:01:53.191	-18:52:29.774	3	0.0447	95.86..110.55GHz	2023-03-23	0	2.647	3.114	12m	mosaic	26.496

The ALMA Science Archive: search results

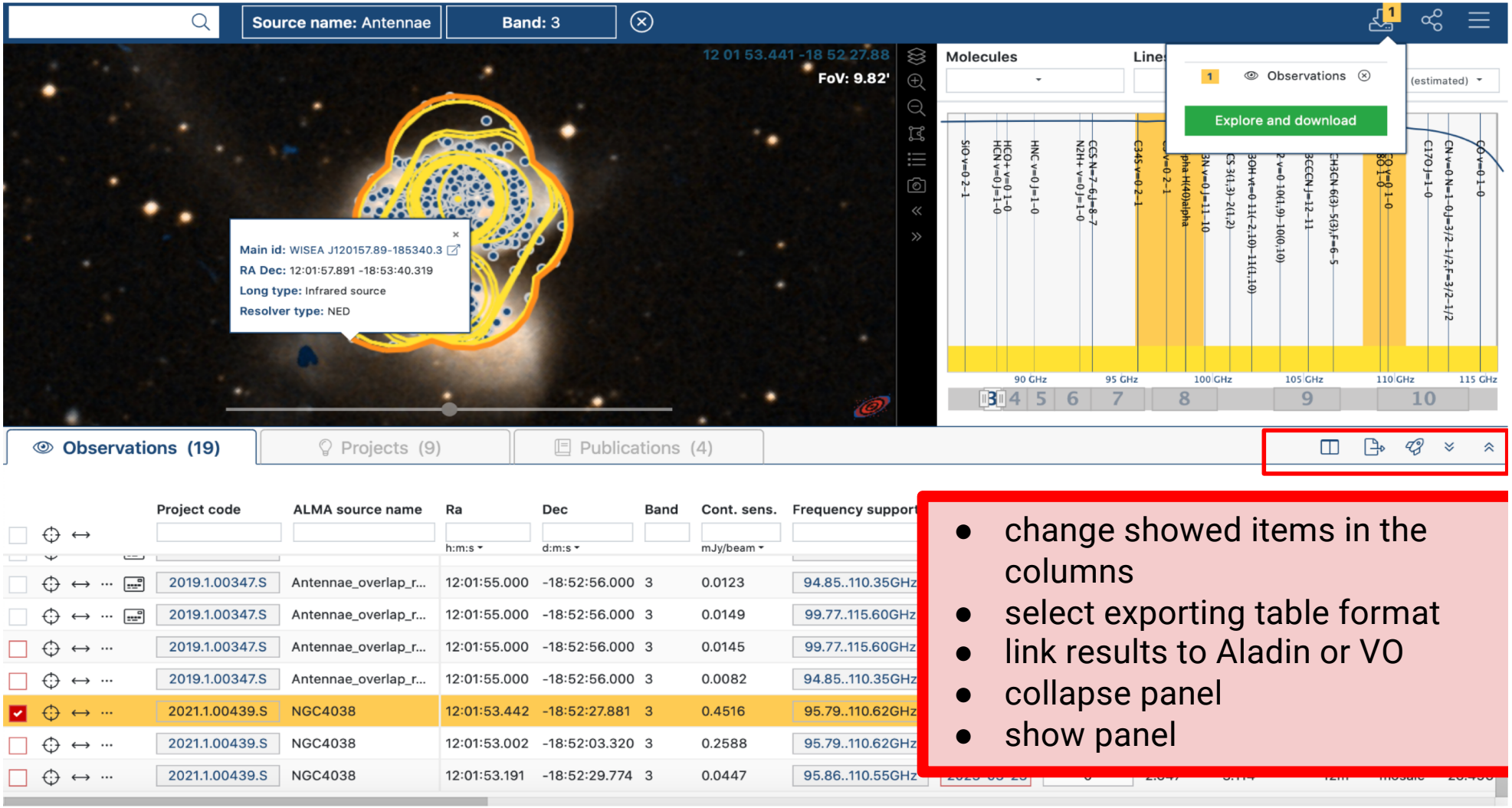


The ALMA Science Archive: the search results



Project code	ALMA source name	Ra (h:m:s)	Dec (d:m:s)	Band	Cont. sens. (mJy/beam)	Frequency support	↑Release date	Publications	Ang. res. (arcsec)	Min. vel. res. (km/s)	Array	Mosaic	Max. rec (arcsec)
2019.1.00347.S	Antennae_overlap_r...	12:01:55.000	-18:52:56.000	3	0.0123	94.85..110.35GHz	2021-03-06	0	2.491	3.120	12m		24.979
2019.1.00347.S	Antennae_overlap_r...	12:01:55.000	-18:52:56.000	3	0.0149	99.77..115.60GHz	2021-03-06	0	2.430	2.976	12m		24.150
2019.1.00347.S	Antennae_overlap_r...	12:01:55.000	-18:52:56.000	3	0.0145	99.77..115.60GHz	2022-04-21	0	0.582	2.976	12m		9.305
2019.1.00347.S	Antennae_overlap_r...	12:01:55.000	-18:52:56.000	3	0.0082	94.85..110.35GHz	2022-06-11	0	0.325	3.120	12m		8.649
2021.1.00439.S	NGC4038	12:01:53.442	-18:52:27.881	3	0.4516	95.79..110.62GHz	2022-10-20	0	11.626	3.116	7m	mosaic	72.517
2021.1.00439.S	NGC4038	12:01:53.002	-18:52:03.320	3	0.2588	95.79..110.62GHz	2023-01-05	0	50.929	3.116	TP		902.73
2021.1.00439.S	NGC4038	12:01:53.191	-18:52:29.774	3	0.0447	95.86..110.55GHz	2023-03-23	0	2.647	3.114	12m	mosaic	26.496

The ALMA Science Archive: the search results

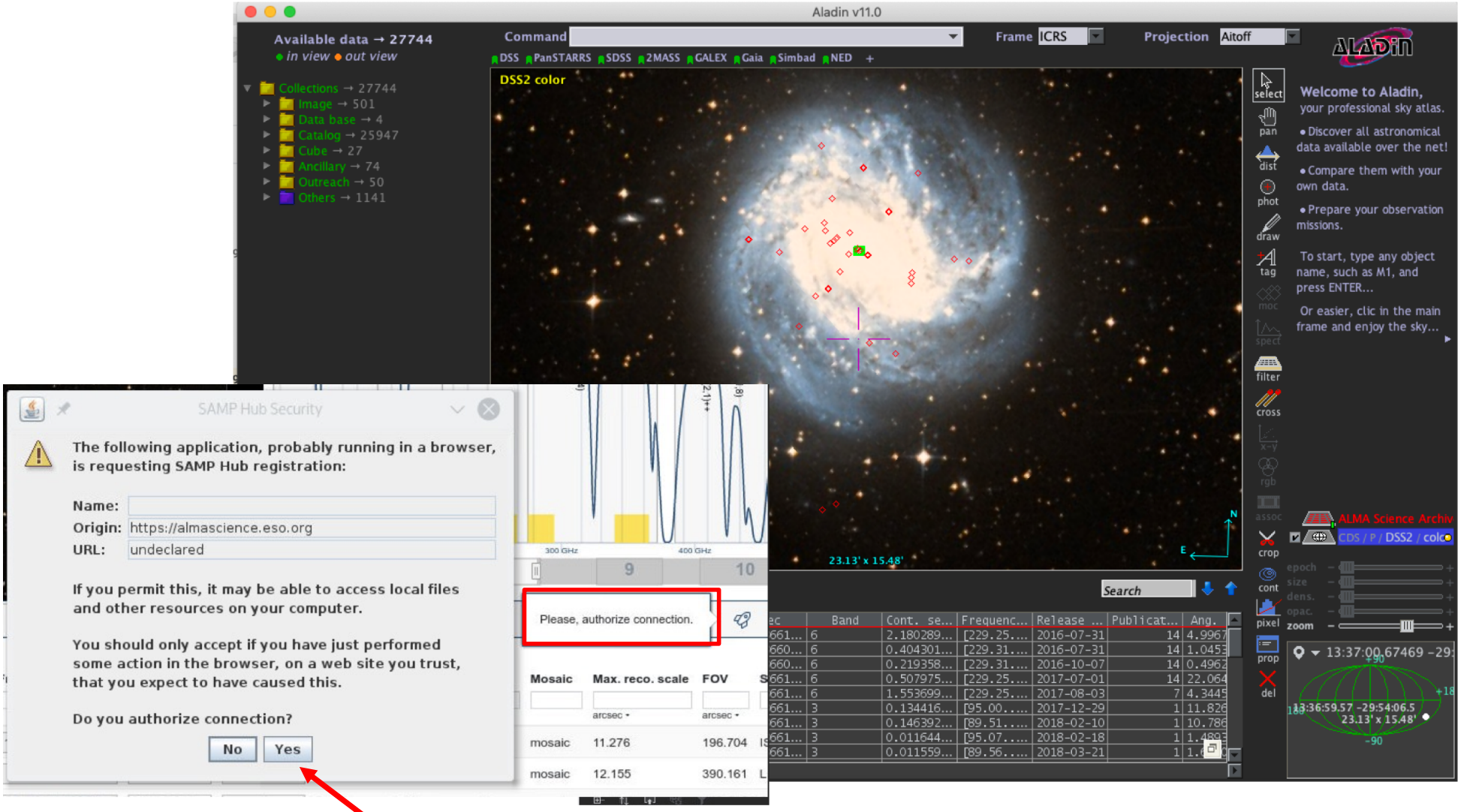


- change showed items in the columns
- select exporting table format
- link results to Aladin or VO
- collapse panel
- show panel

Note:

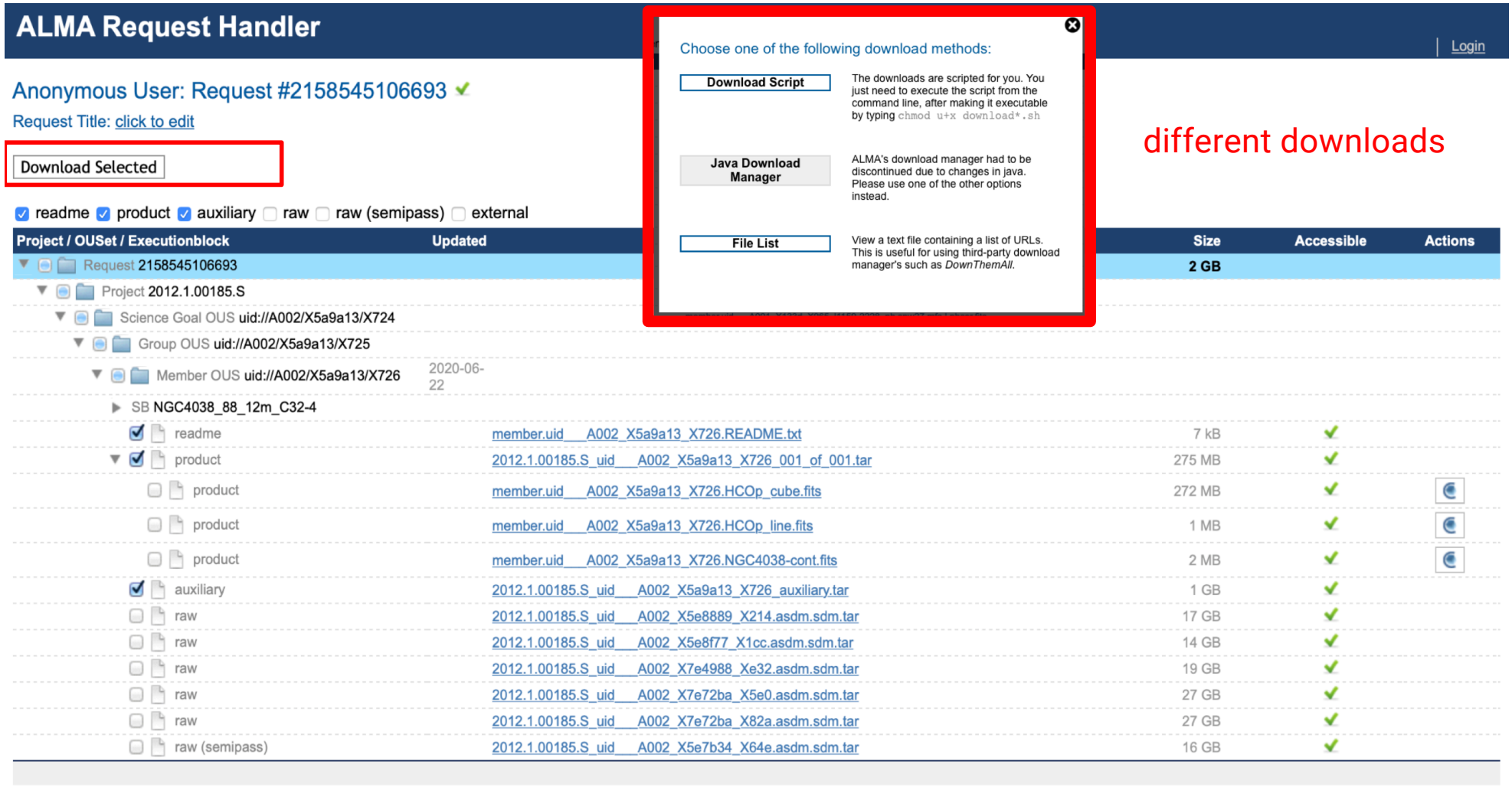
- To link results to Aladin or VO, you have to open before them

The ALMA Science Archive: VO services



Please authorize connection

The ALMA Science Archive: the download



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Group OUS uid://A002/X5a9a13/X725					
Member OUS uid://A002/X5a9a13/X726	2020-06-22				
SB NGC4038_88_12m_C32-4					
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product		member.uid___A002_X5a9a13_X726.HCOp_line.fits	1 MB	✓	
product		member.uid___A002_X5a9a13_X726.NGC4038-cont.fits	2 MB	✓	
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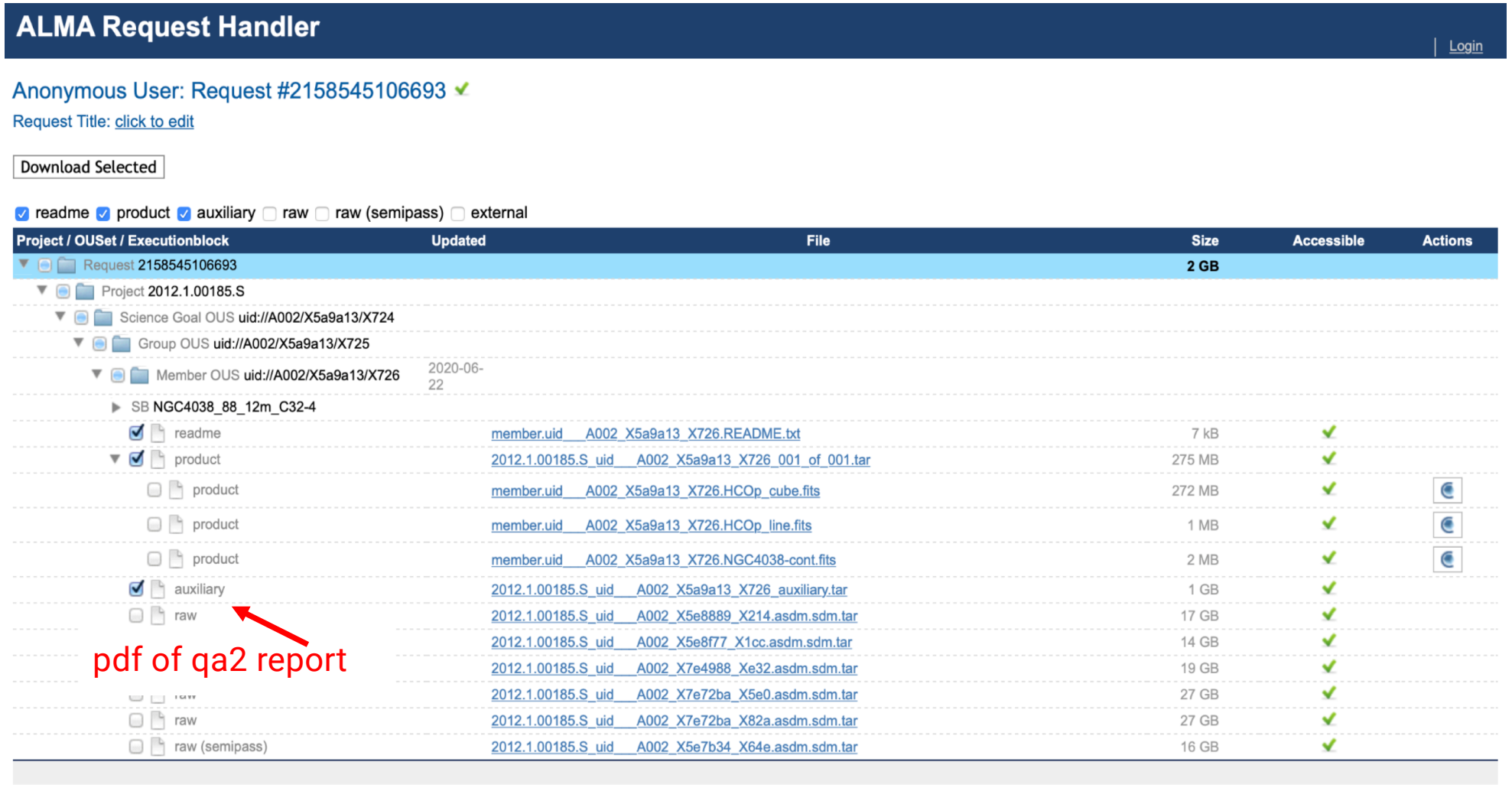
raw (semipass)		2012.1.00185.S_uid___A002_X5e7b34_X64e.asdm.sdm.tar	16 GB	✓	

The ALMA Science Archive: the download



The ALMA Science Archive: the download

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Anonymous User: Request #2158545106693 ✓

Request Title: click to edit

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☑ readme ☑ product ☑ auxiliary ☐ raw ☐ raw (semipass) ☐ external

Project / OUSet / Executionblock	Updated	File	Size	Accessible	Actions
Request 2158545106693			2 GB		
Project 2012.1.00185.S					
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☐ raw (semipass)		2012.1.00185.S_uid___A002_X5e7b34_X64e.asdm.sdm.tar	16 GB	✓	

selected images to download

Note: the image name contains the information on the spw not frequency

☐ product	member.uid___A001_X133d_X965.J1159-2228_ph.spw27.mfs.I.mask.fits	360 KiB	✓
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☐ product	member.uid___A001_X133d_X965.J1159-2228_ph.spw27.mfs.I.pbcor.fits	360 KiB	✓

The ALMA Science Archive: the products

More details in Using ALMA Archival data - A Primer (Sect. 4.3)

https://almascience.eso.org/documents-and-tools/cycle9/archive-primer

science targets ***_sci.*** , bandpass calibrators ***_bp.***, phase calibrators ***_ph.*,** check sources ***_ch.***, polarisation calibrator ***_polleak.*, *_Pol_Cal* , *_pol***

***pbcor.fits:** primary-beam corrected image or data cube.
***sd.im.fits:** single-dish images.

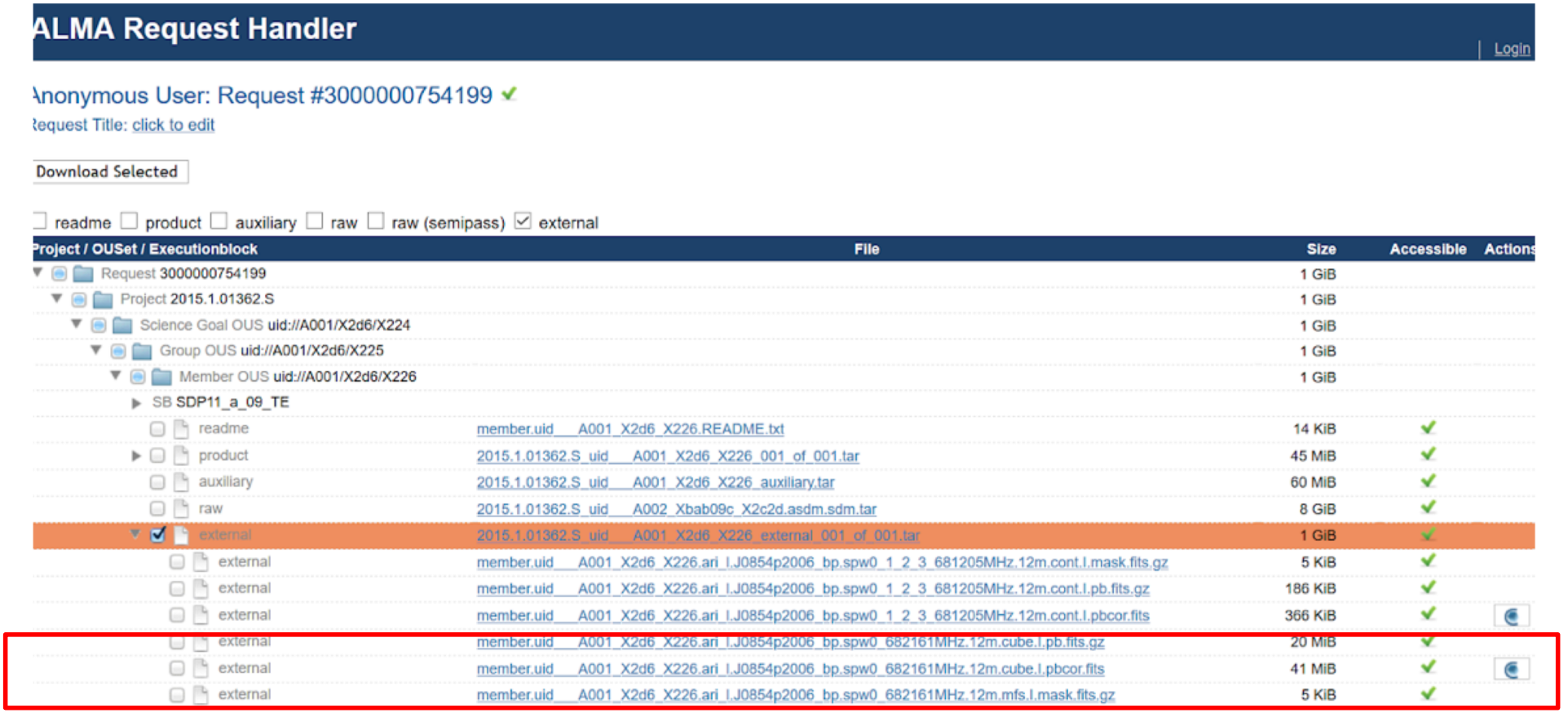
mfs.A.* or *mfs.POLA: polarisation angle map.
mfs.P.* or mfs.POLI: linear polarisation intensity map, which is defined as U + Q
.

spw##.cube.I.: spectral image cube of a single spectral window.
spw##.mfs.I.: multi-frequency synthesis (mfs) continuum I image a
single spw

spw##_##_##_##.cont.I.: aggregate bandwidth or continuum I image on listed spws.
***spw##_##_##_##.cont.I.alpha.*:** spectral index image, which is defined as tt1/tt0
***spw##_##_##_##.cont.I.tt0.*:** I cont image from the mtmfs deconvolver containing the 0th Taylor
term
spw##_##_##_##.cont.I.tt1.: I cont image from the mtmfs deconvolver containing the first Taylor
term

***spw##_##_##_##.cont.IQUV.*:** aggregate bandwidth or continuum full Stokes cube from listed spws

The ALMA Science Archive: External products



Two types:

- ARI-L https://almascience.eso.org/alma-data/aril
- Large Programs https://almascience.eso.org/alma-data/lp

Note:

- ARI-L and Large Programs are also present in the Collections Column in the Query Interface

The ARI-L development project (PI M. Massardi)

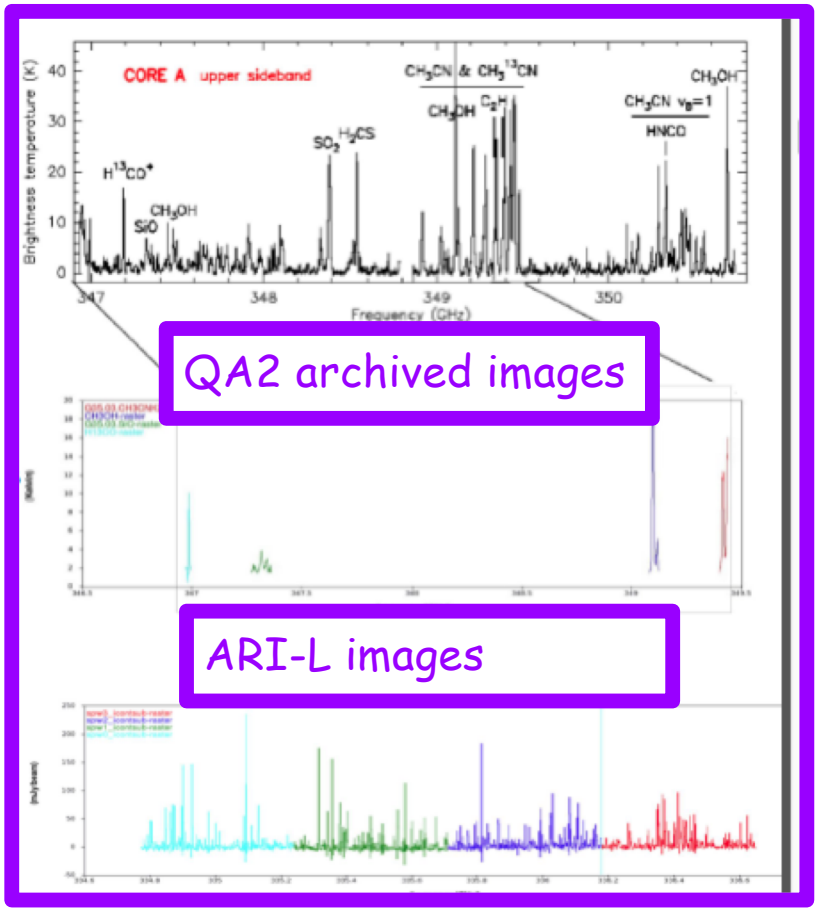
https://almascience.eso.org/alma-data/aril
(Massardi et al. 2022)

It will produce and ingest into the ASA a set of additional image products representative of the **whole data content for more than 70% of the observing projects in cycles 2-4** that can be processed through the ALMA Imaging Pipeline, to complement the QA2-generated images.

In addition **calibrated MS** of
the processed dataset will be released.

ARI-L philosophy

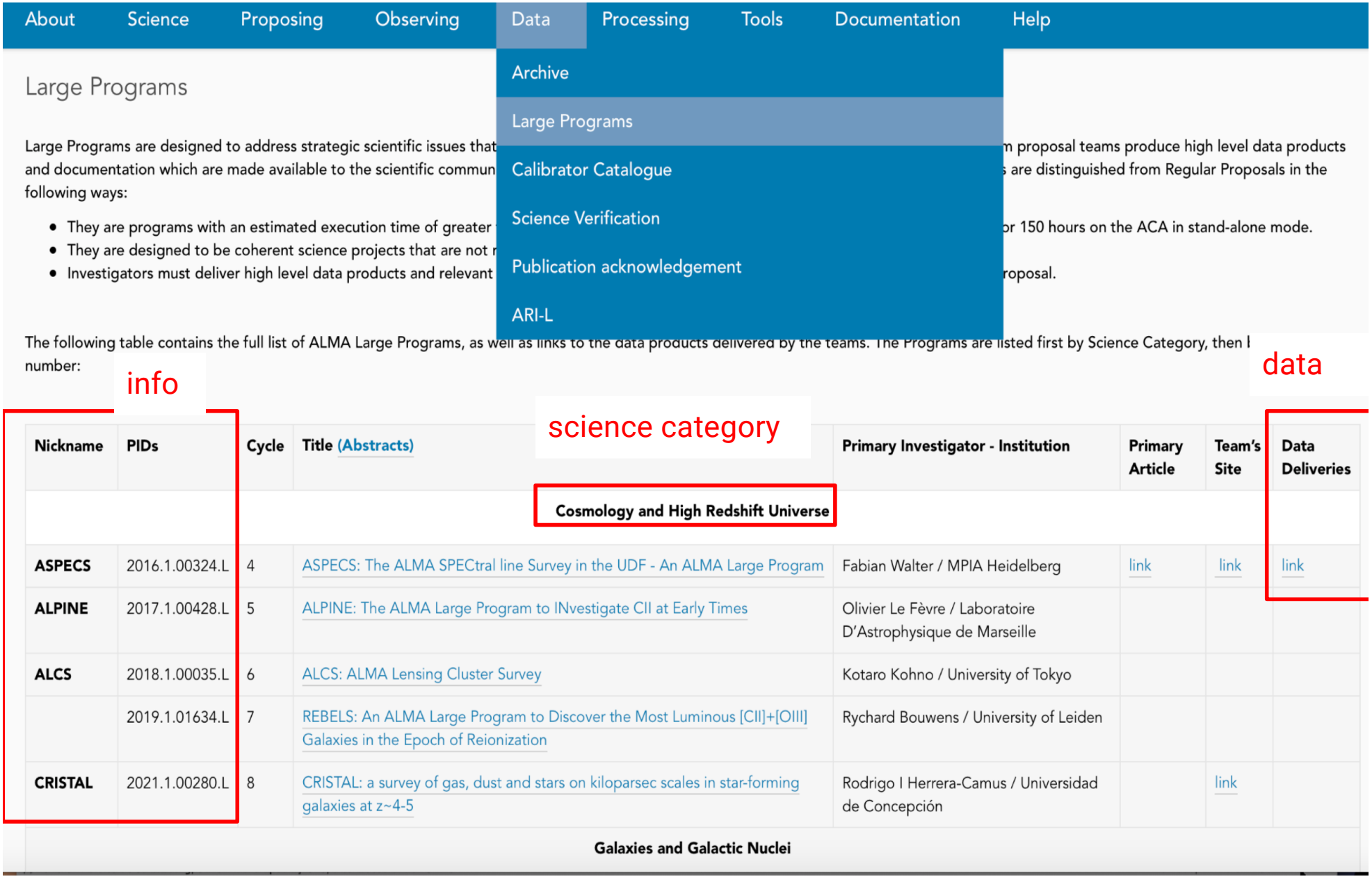
- think of the miners
- homogeneity
- completeness
- add value to the ASA



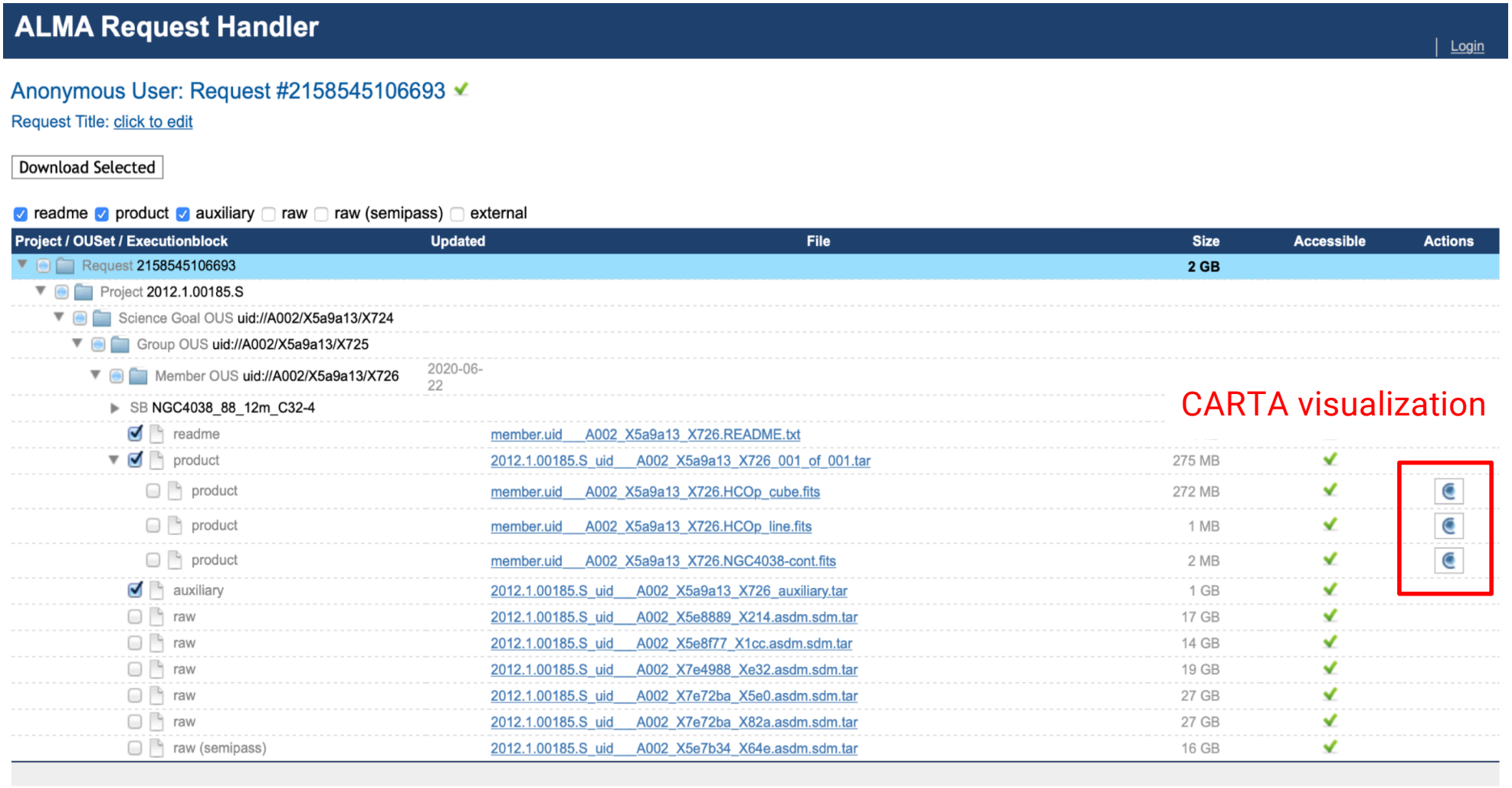
For support help-desk@alma.inaf.it

ALMA Large Programs

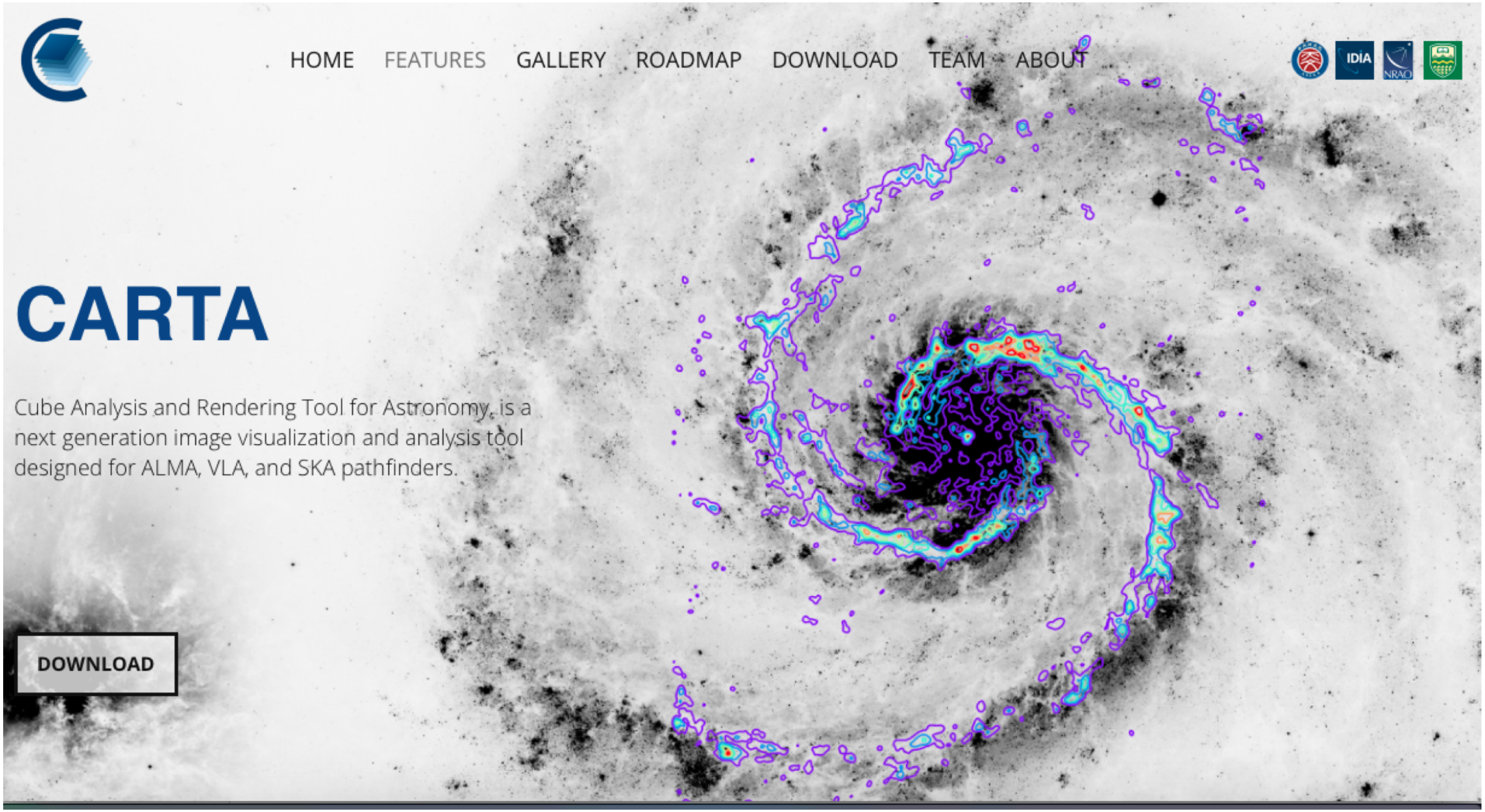
https://almascience.eso.org/alma-data/lp



The ALMA Science Archive: the CARTA Preview



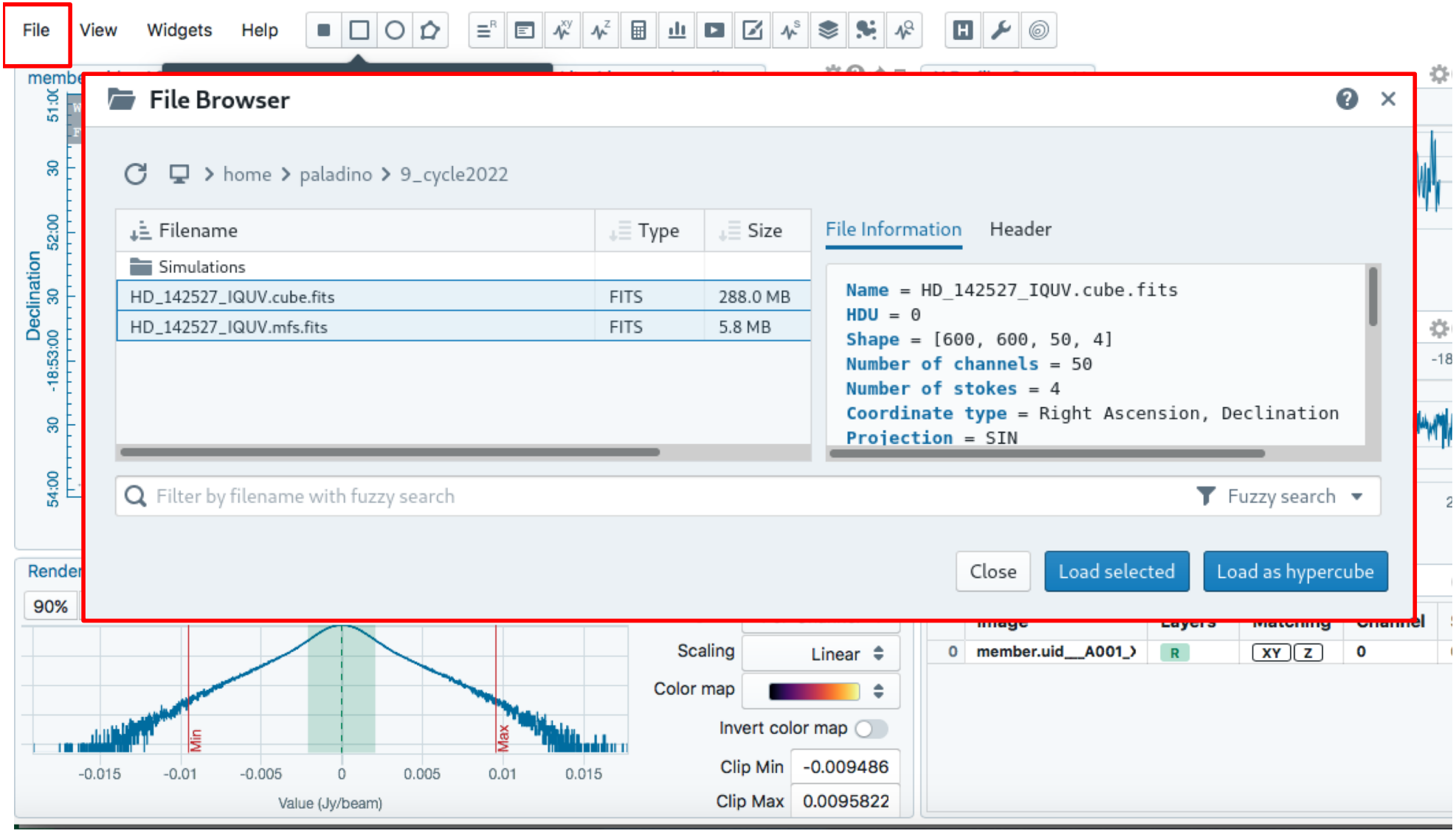
CARTA: the Cube Analysis and Rendering Tool for Astronomy



- CARTA homepage https://cartavis.github.io
- EU ARC i-TRAIN https://www.youtube.com/watch?v=K71rFeAhQ5o
- if you need help write to help-desk@alma..inaf.it

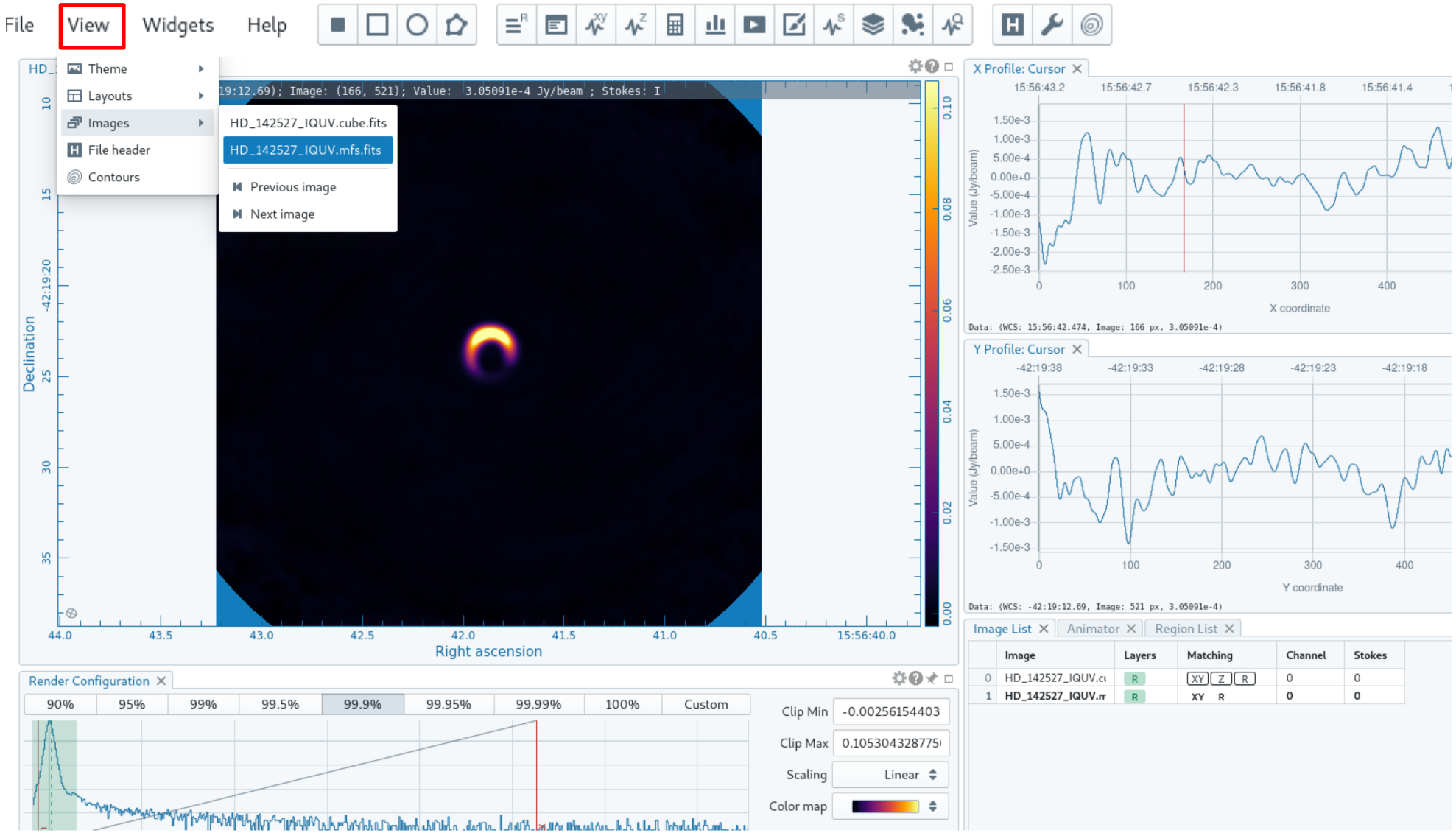
CARTA preview

select one or more fits



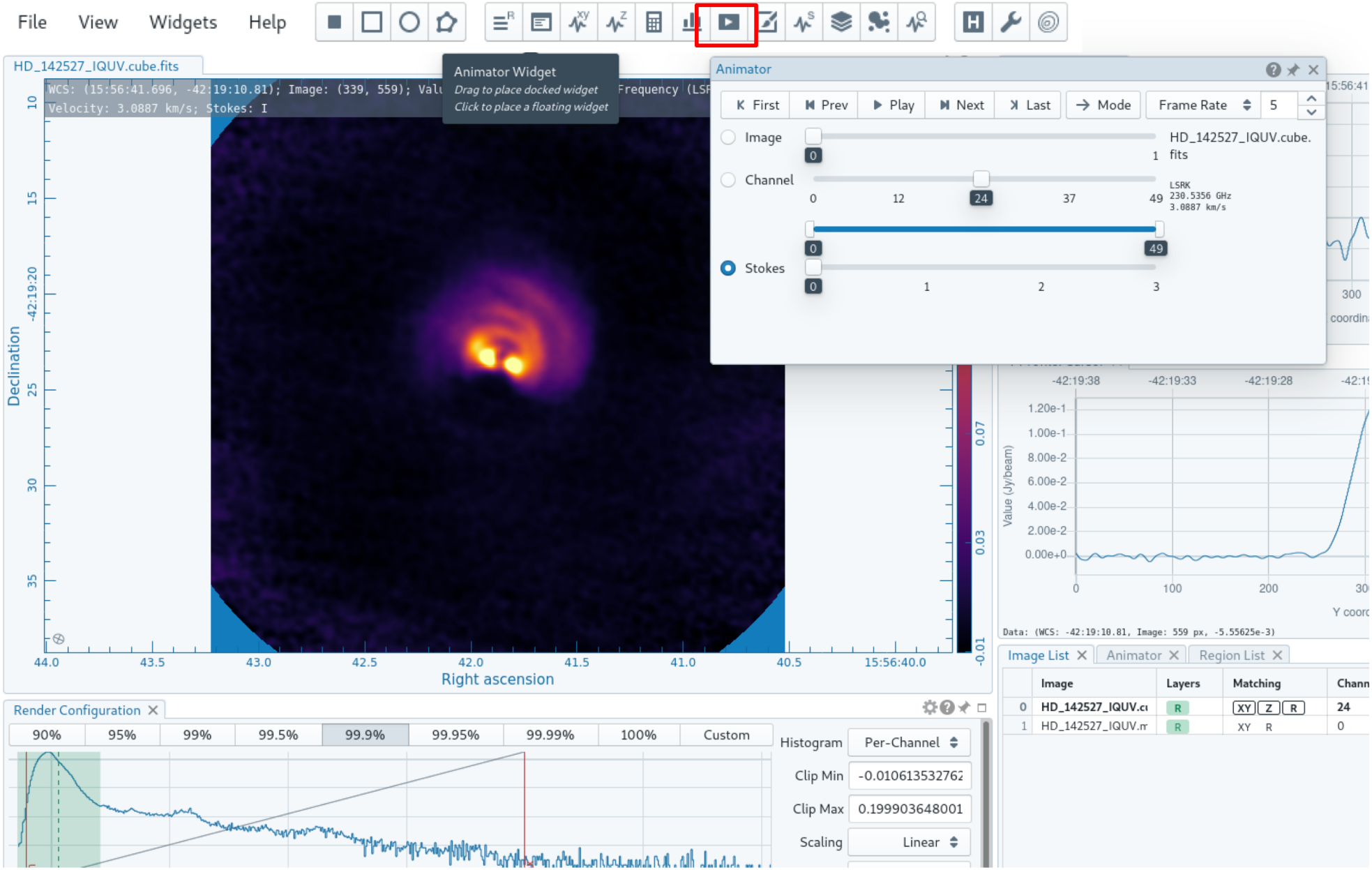
CARTA preview

switch between them



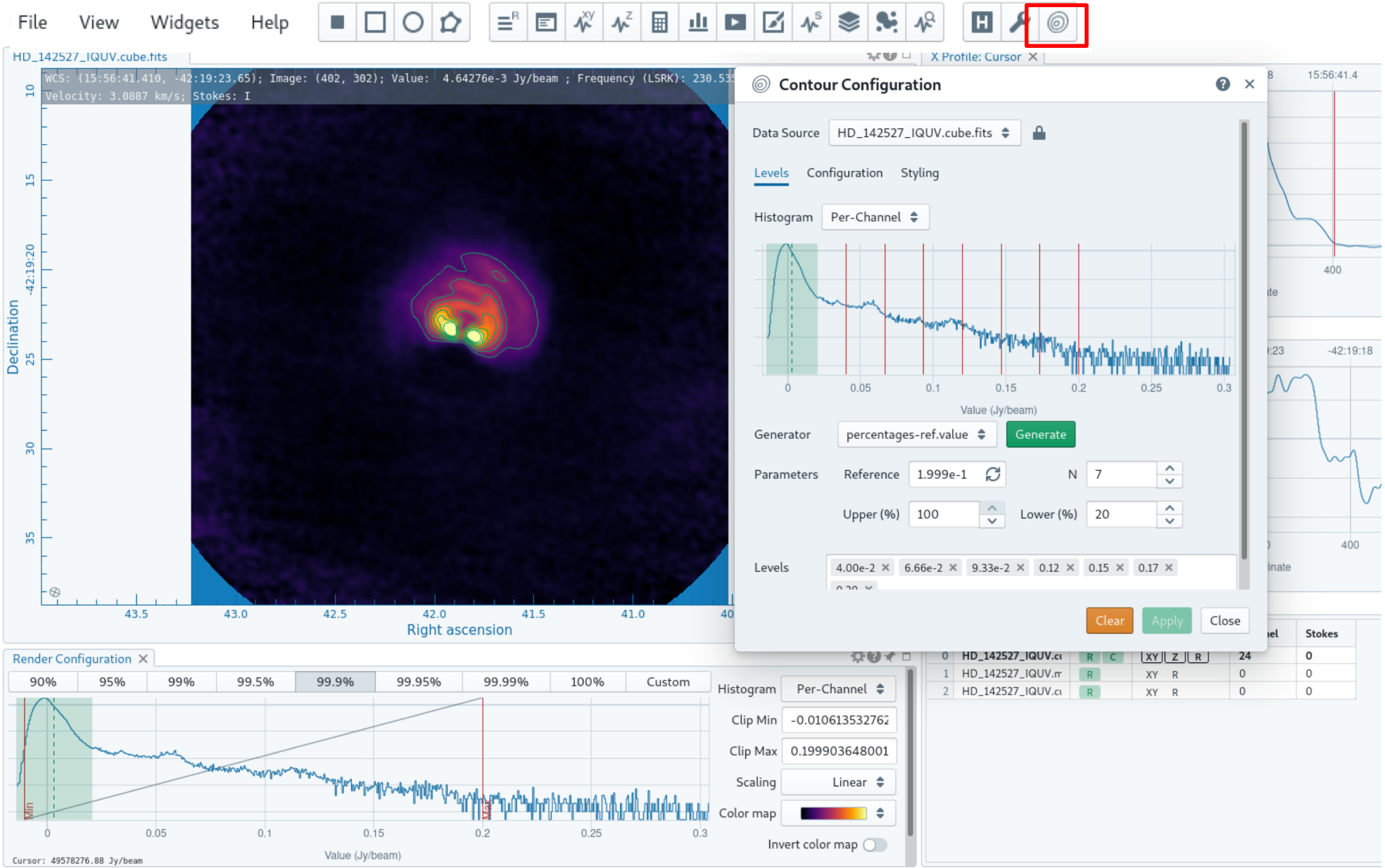
CARTA preview

switch between images channels and Stokes



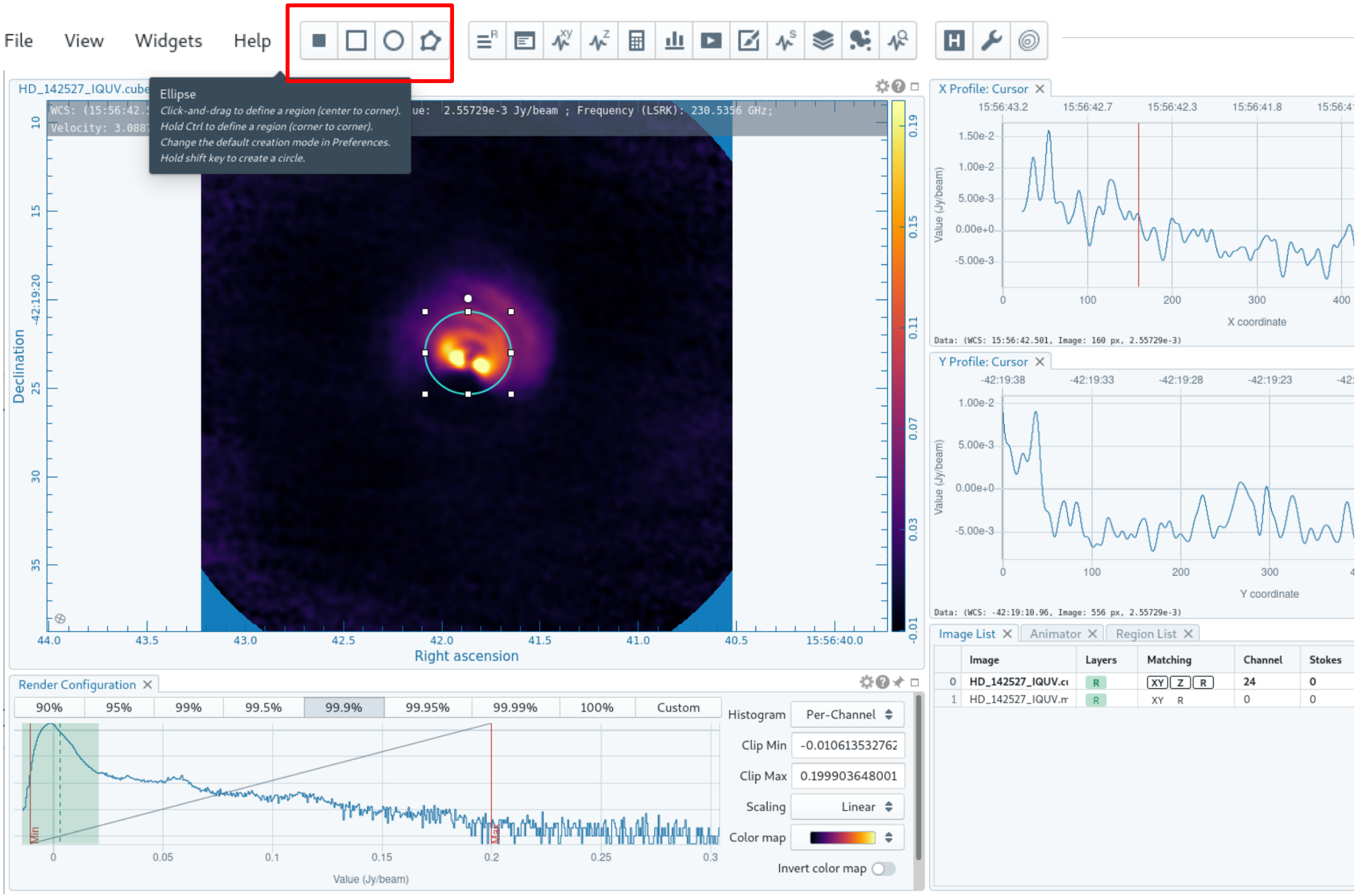
CARTA preview

draw contours



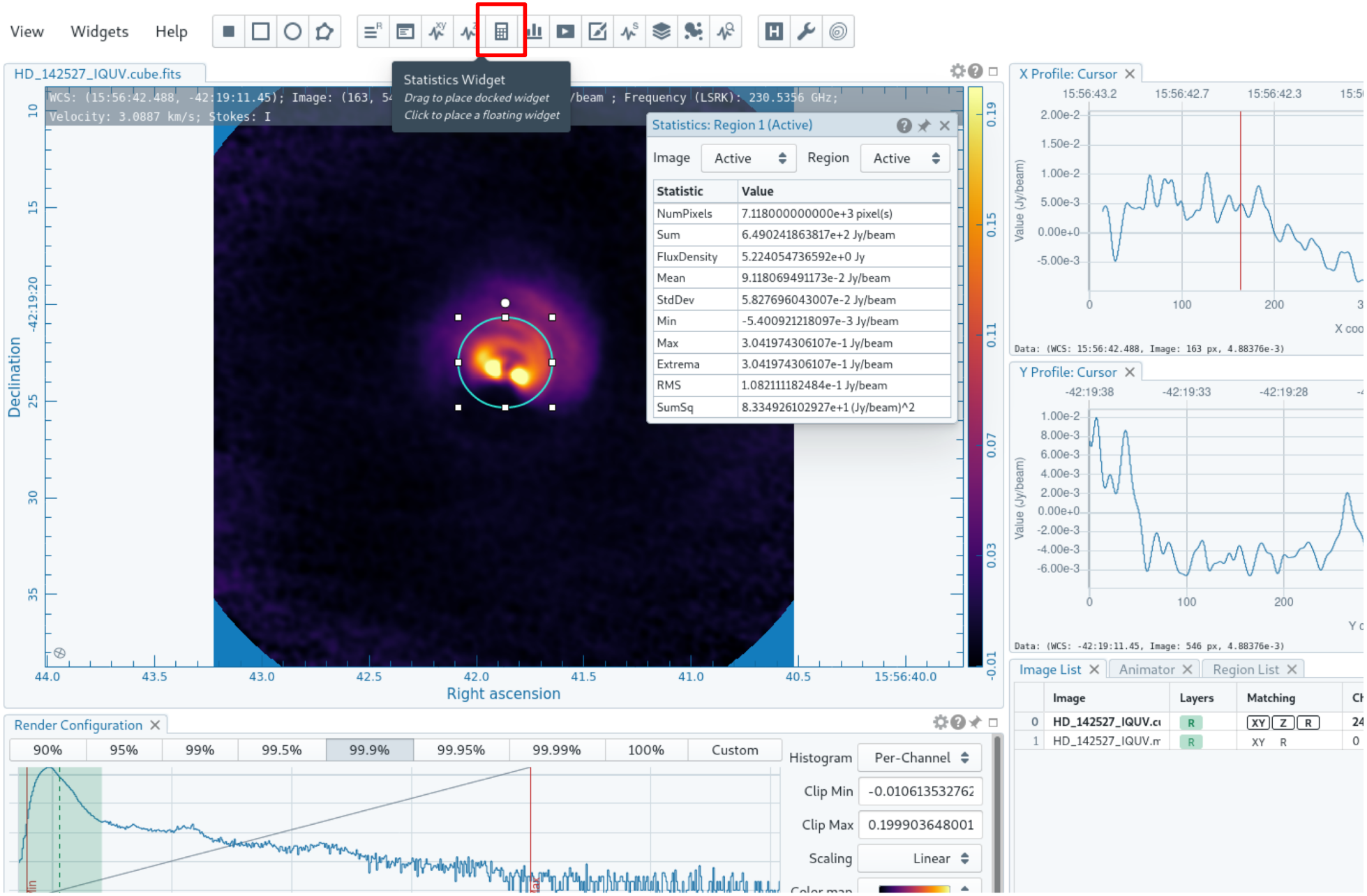
CARTA preview

draw regions



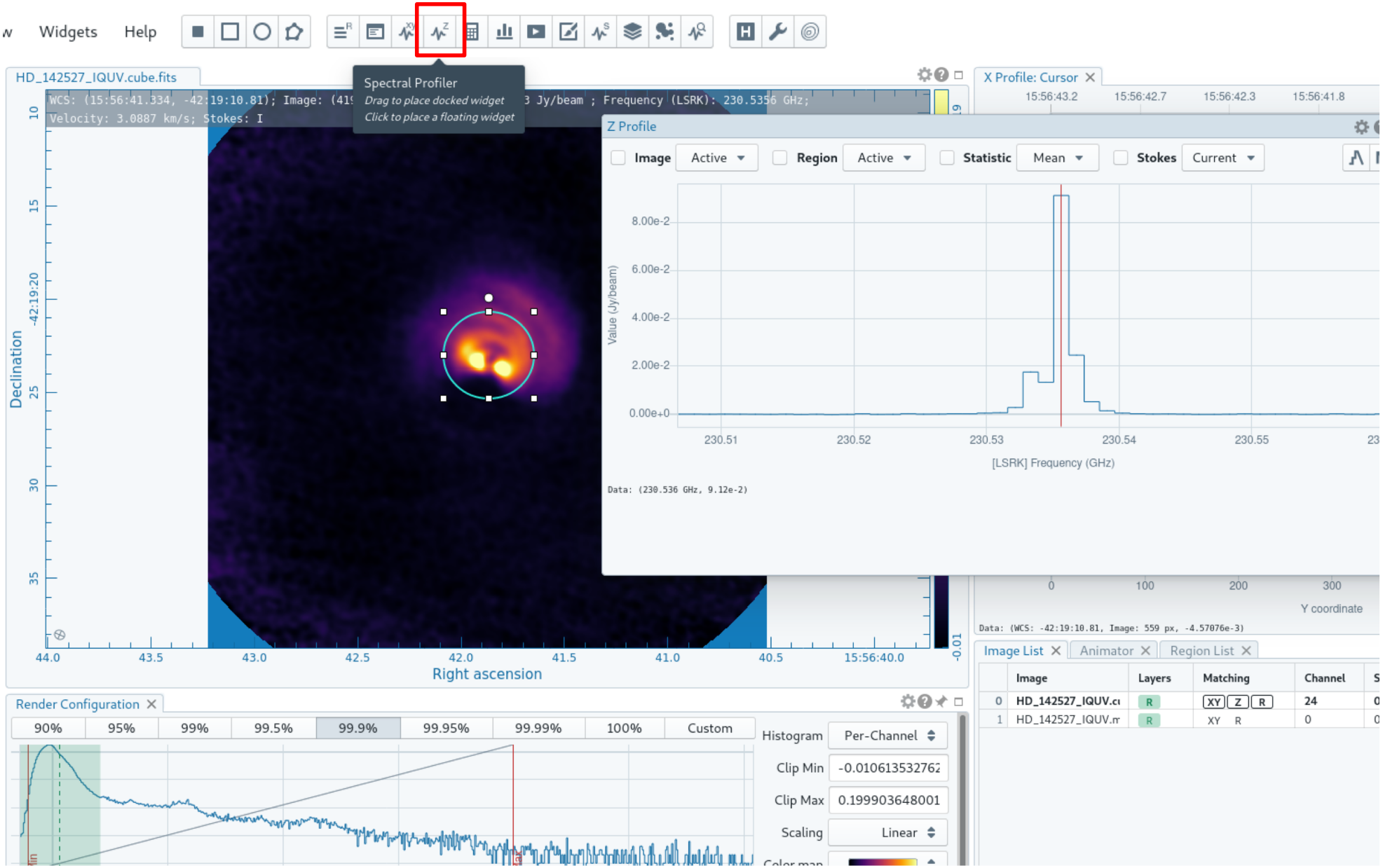
CARTA preview

compute statistics in the regions



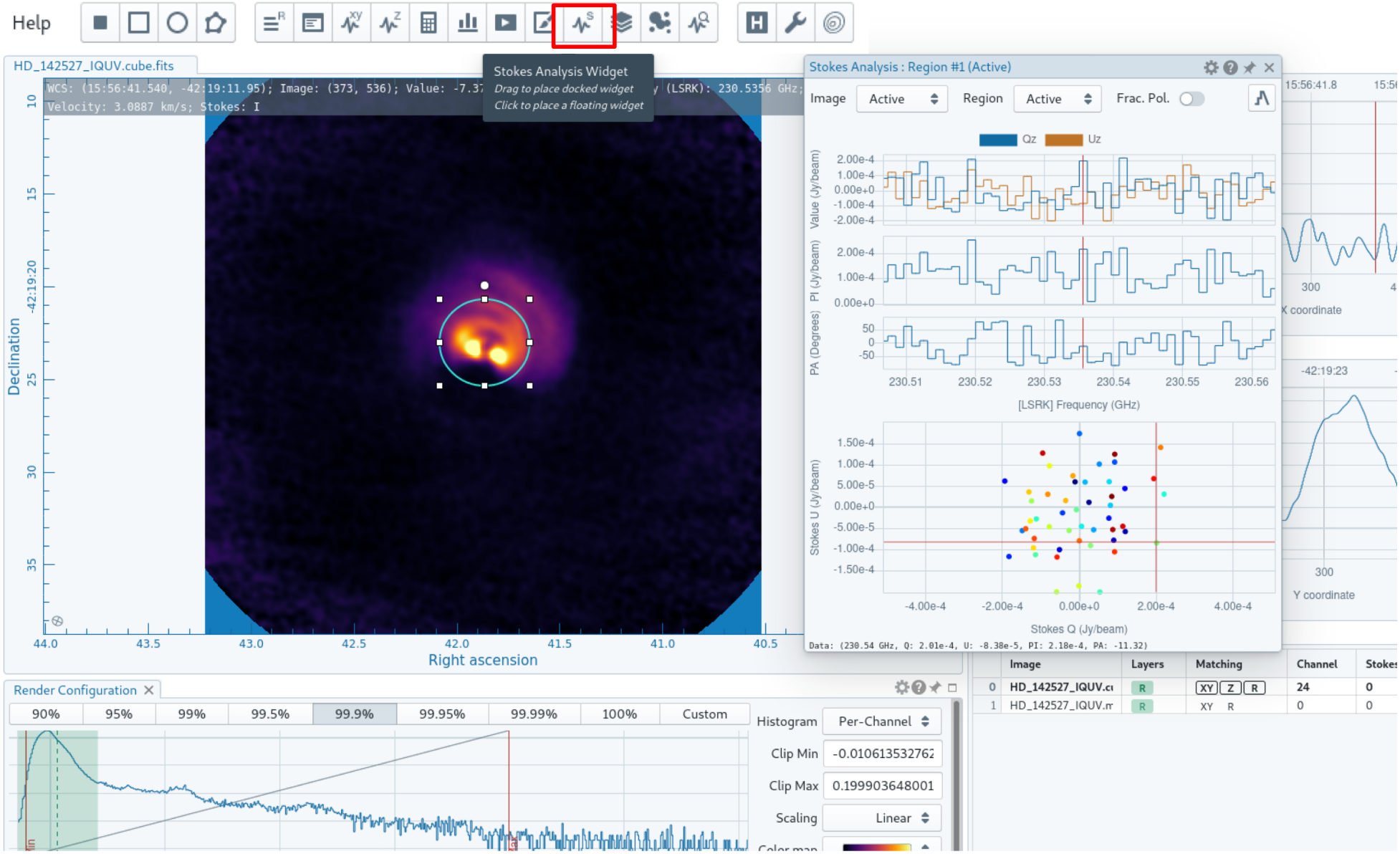
CARTA preview

extract spectrum from the region



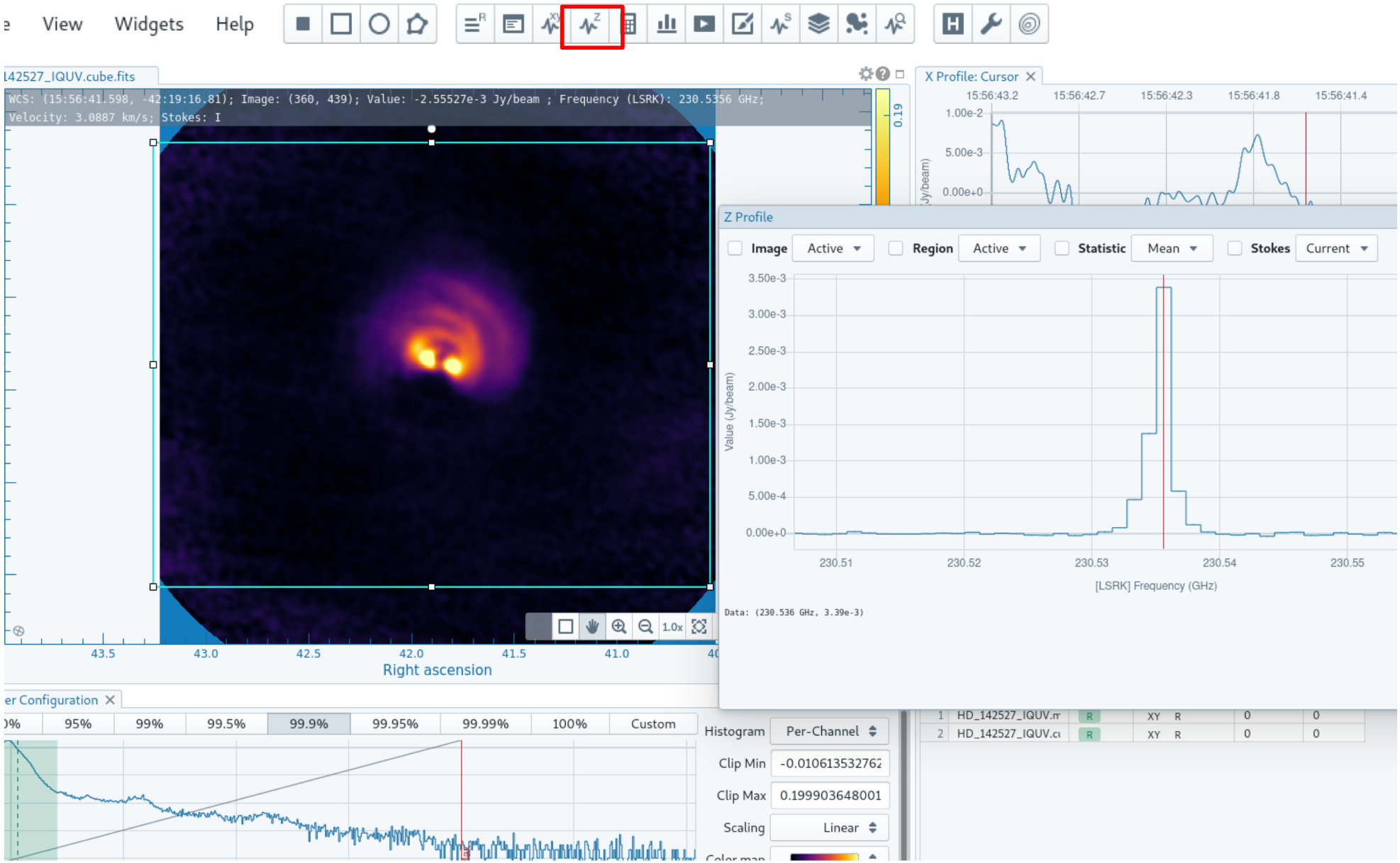
CARTA preview

Perform Stokes analysis in the region



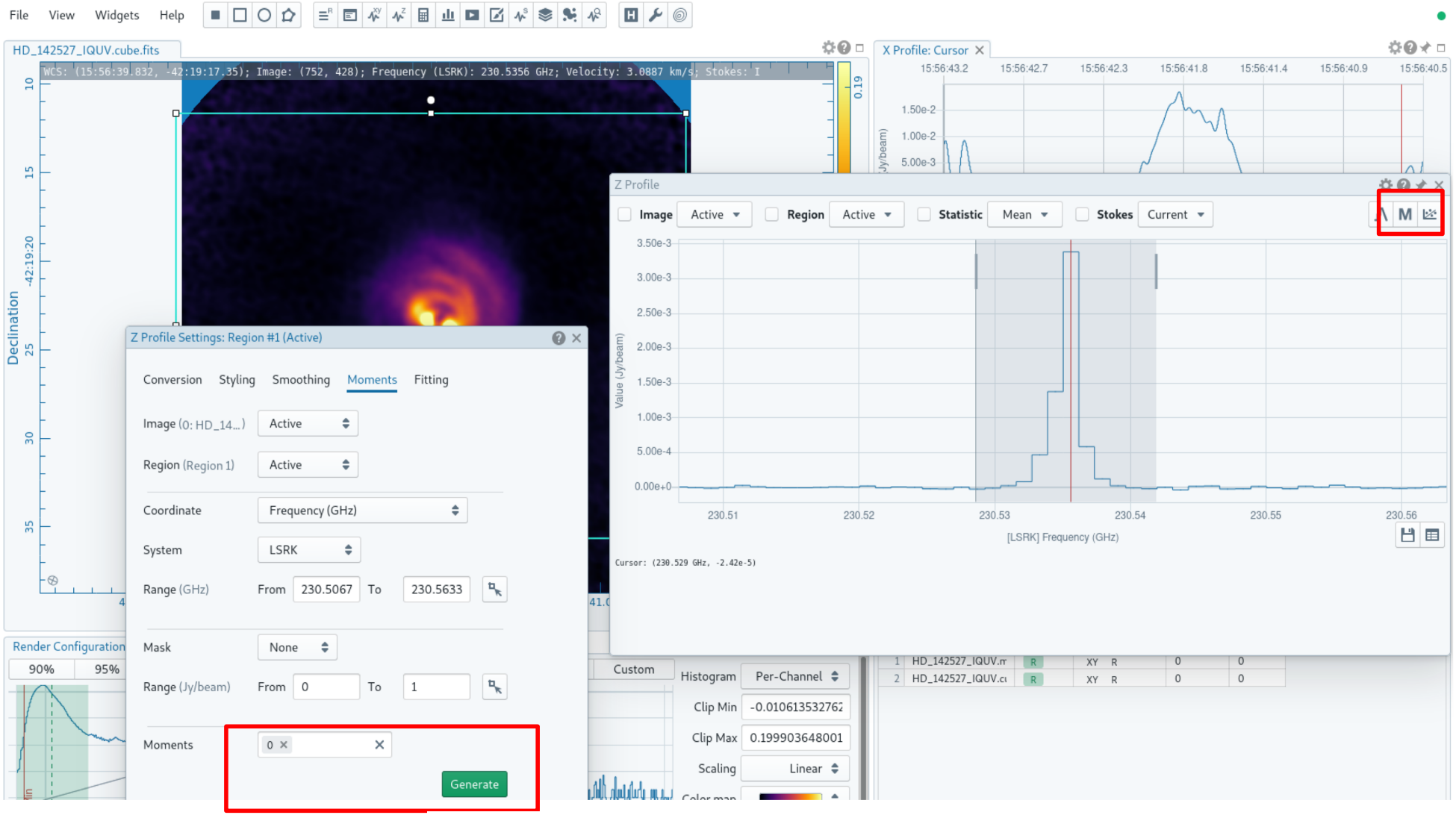
CARTA preview

Extract moments



CARTA preview

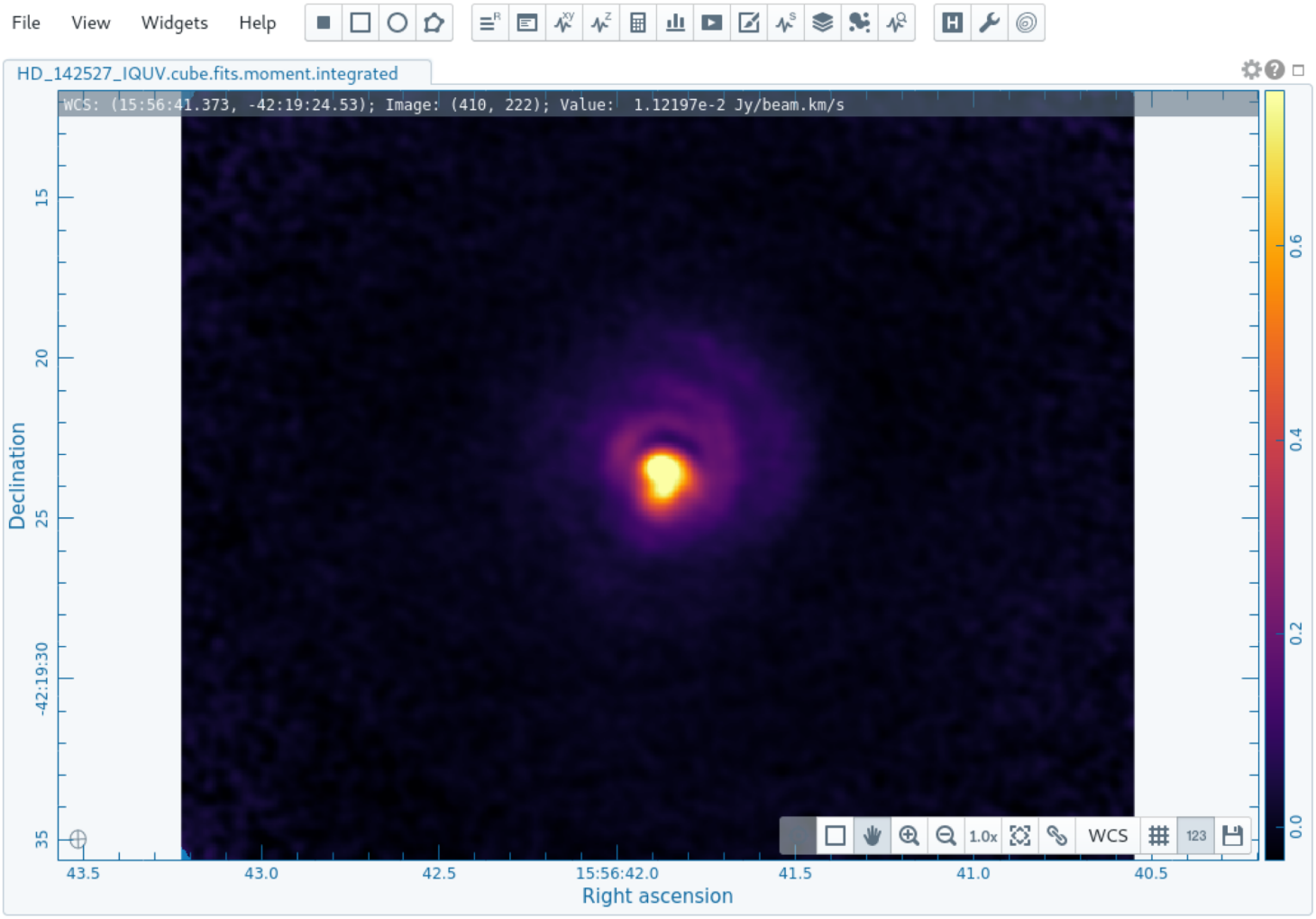
Extract moments
select interactively the frequency range



Generate moments

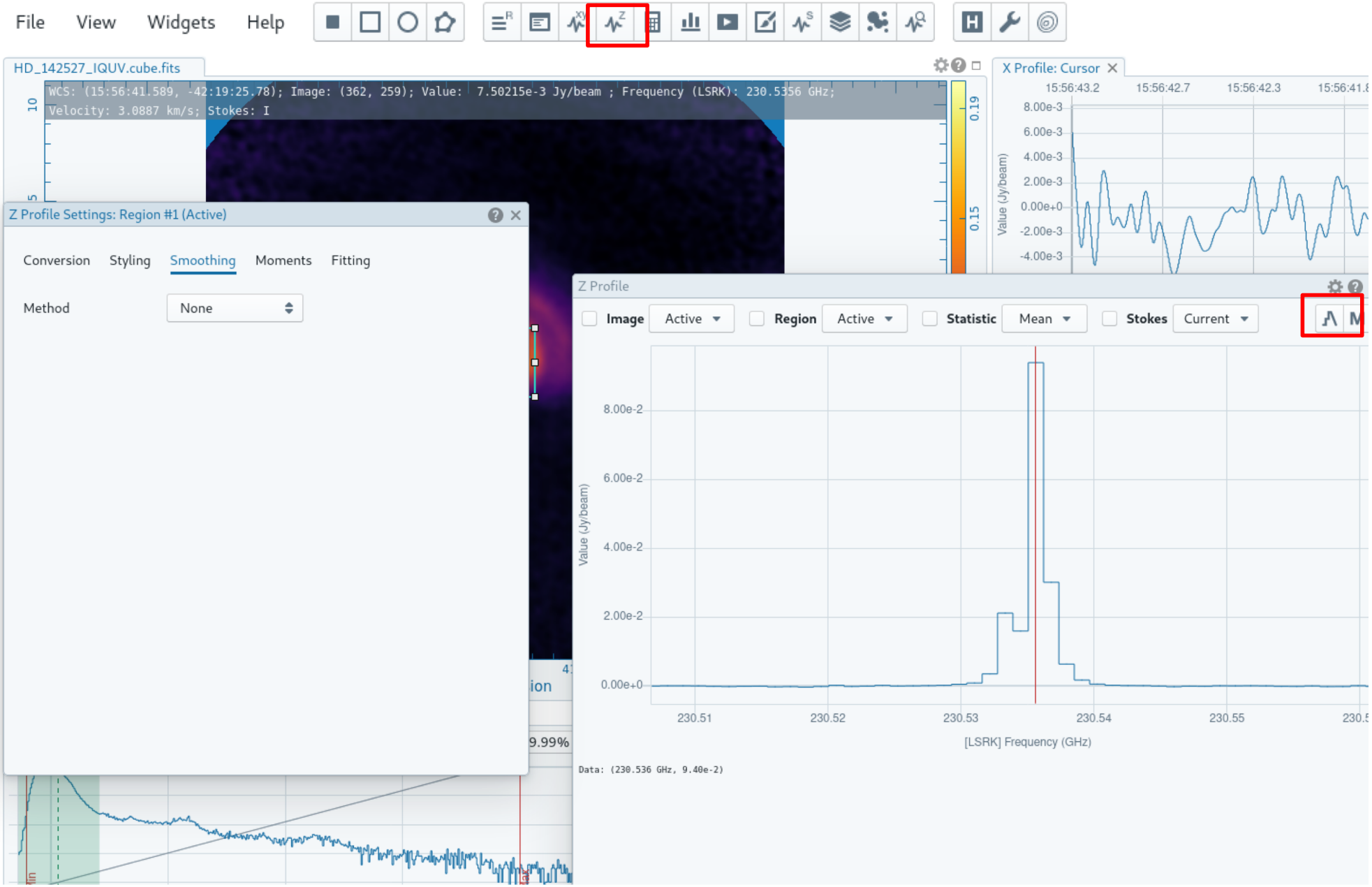
CARTA preview

The generated moment opens in the viewer



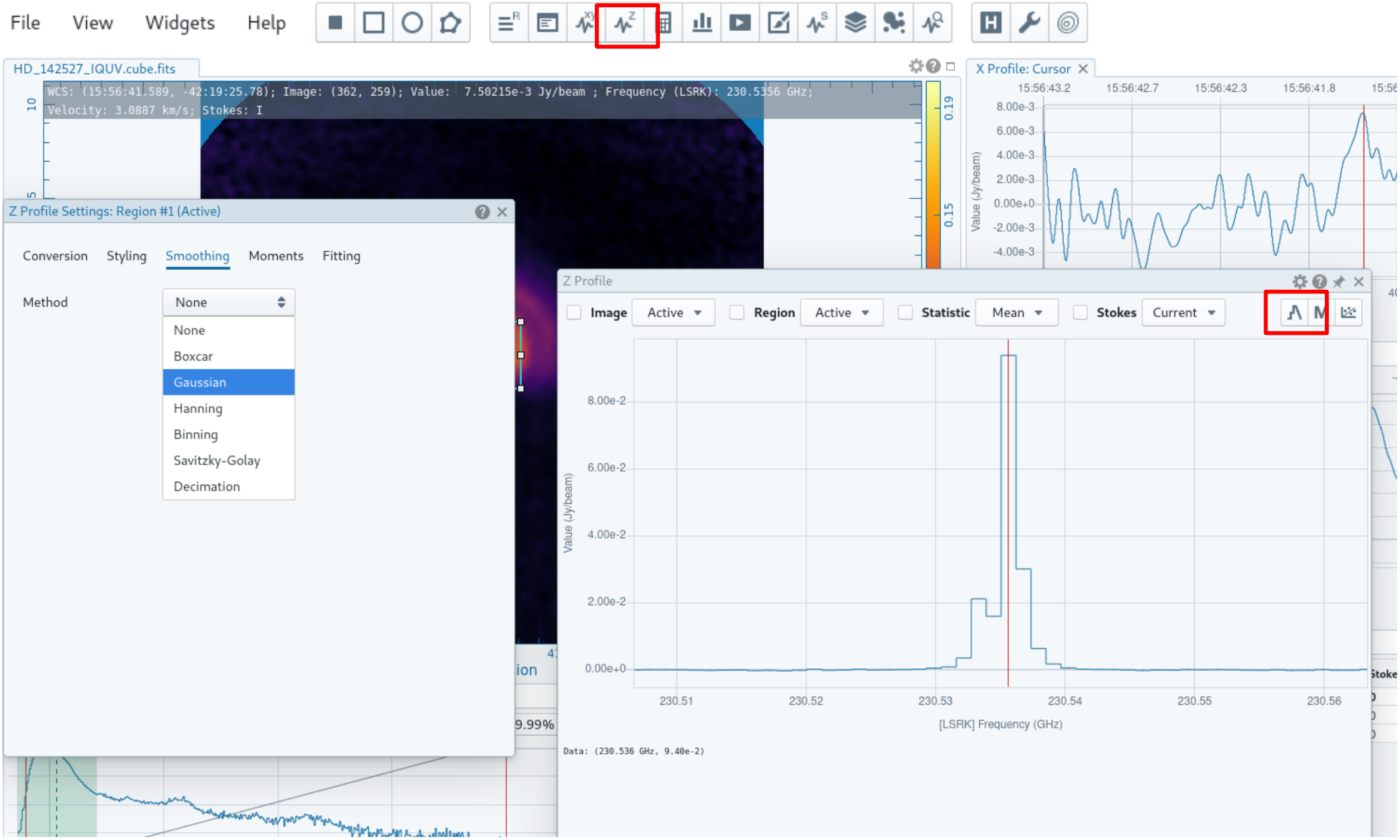
CARTA preview

Smooth spectral profile



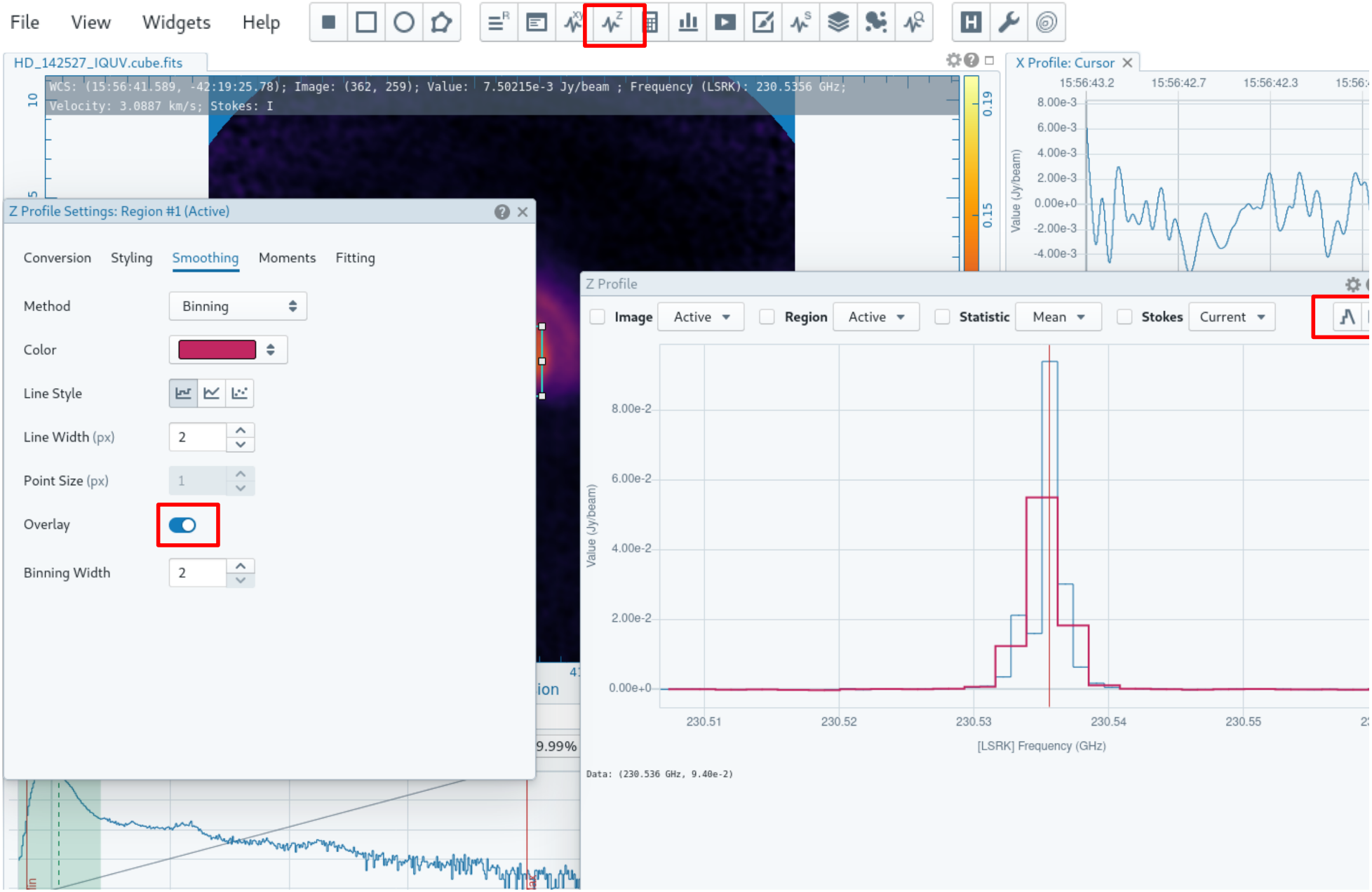
CARTA preview

Select smoothing method



CARTA preview

Overlay original and smoothed profile



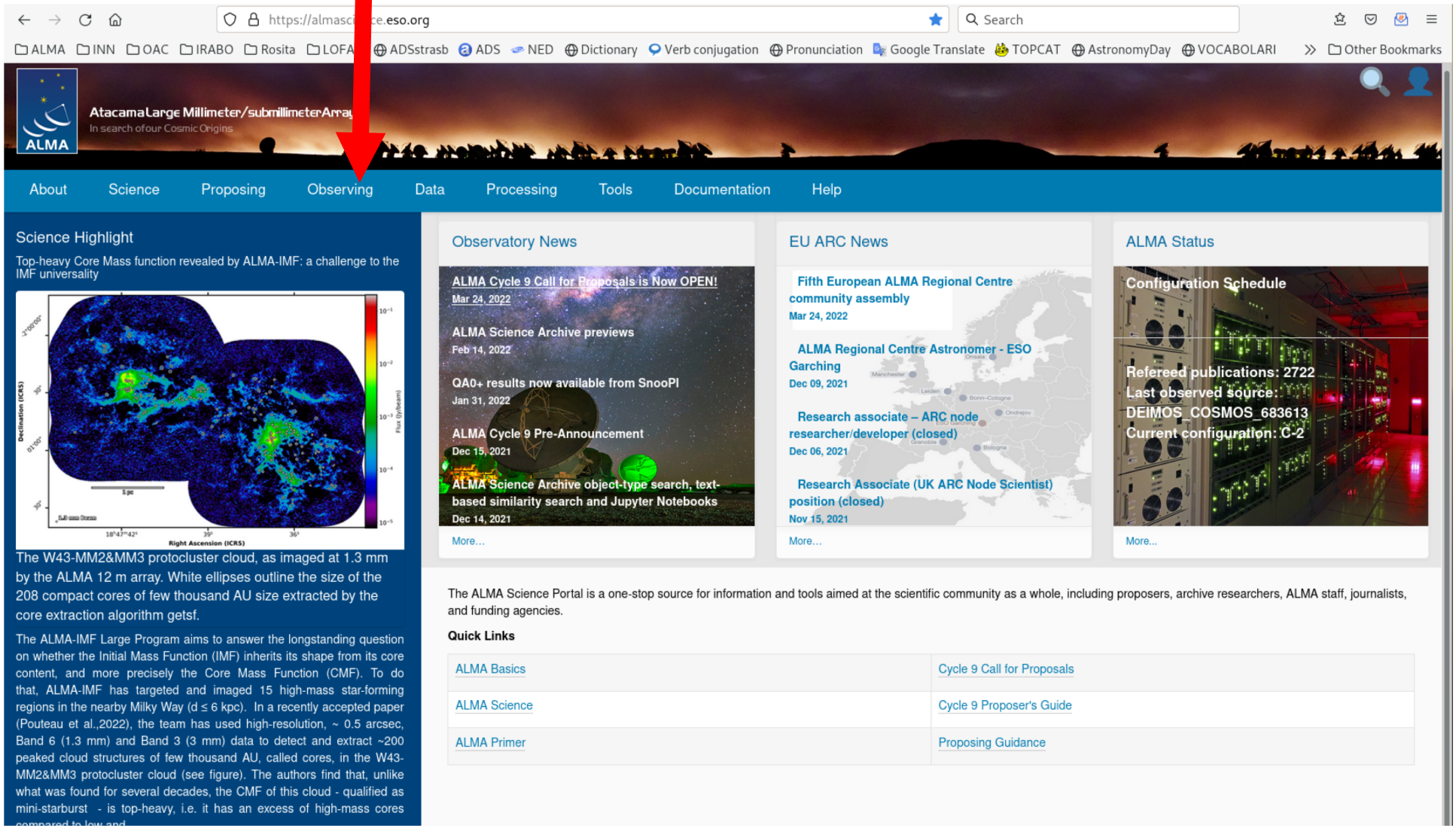
Important dates	Event
24 March 2022 15:00 UT	Proposal submission opens + Release of Docs & Tools
21 April 2022 15:00 UT	**Proposal submission deadline**
1 June 2022 15:00 UT	Review submission deadline
August 2022	Results of proposal review sent to proposers
October 2022	**Begin Cycle 9 observations**
September 2023	End of Cycle 9 observations

There will NOT be a supplemental CfP for stand-alone ACA

The ALMA Science Portal

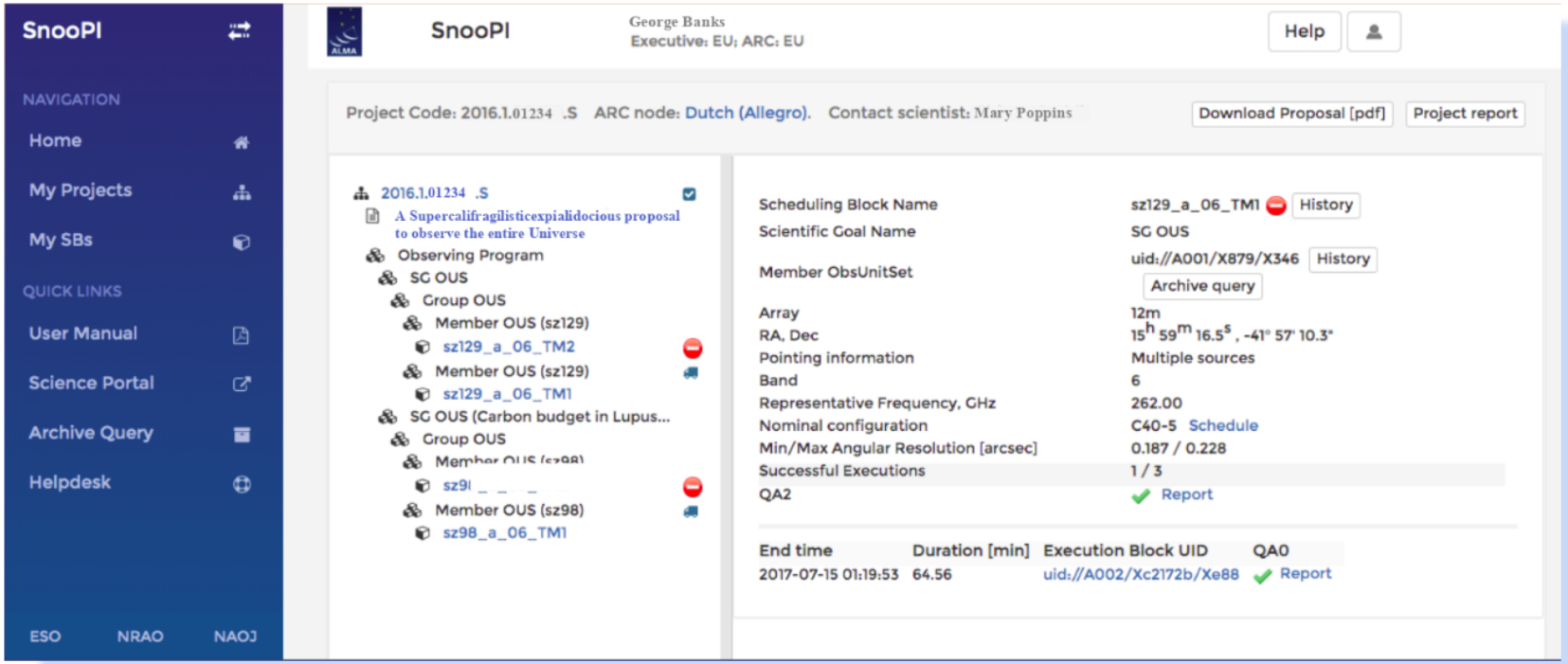
https://almascience.eso.org

Access SnooPI



SnooPI - The Snooping Project Interface

A software tool that allows PIs, Co-Is and Delegees to track the observational and processing status of their ALMA science projects



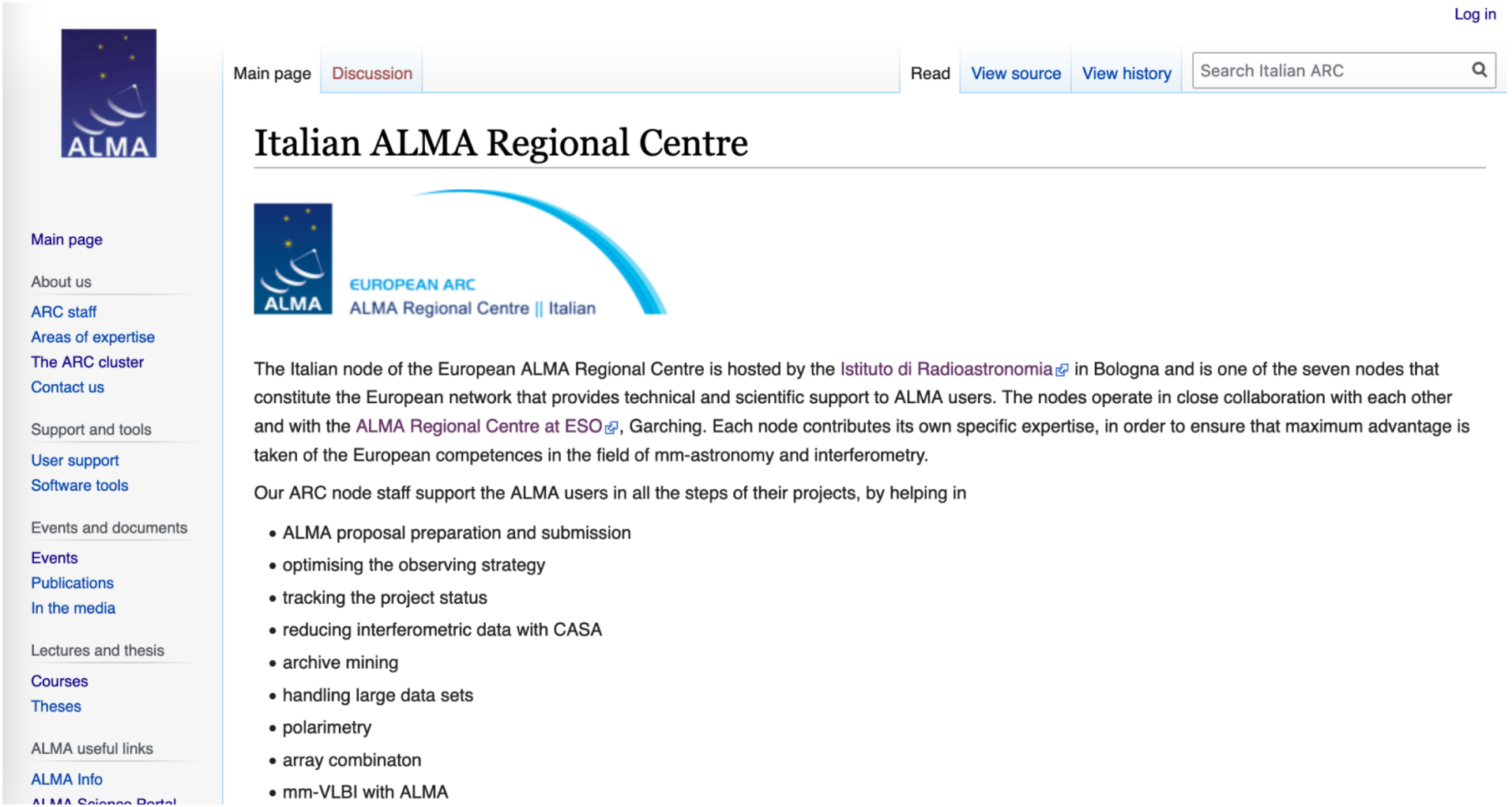
Use SnooPI to follow the progress of your ALMA Projects!

You can find SnooPI on the ALMA Science Portal under “Observing”

Please, send inputs and feedbacks at **amiotell@eso.org** or through the ALMA Helpdesk

USEFUL LINKS

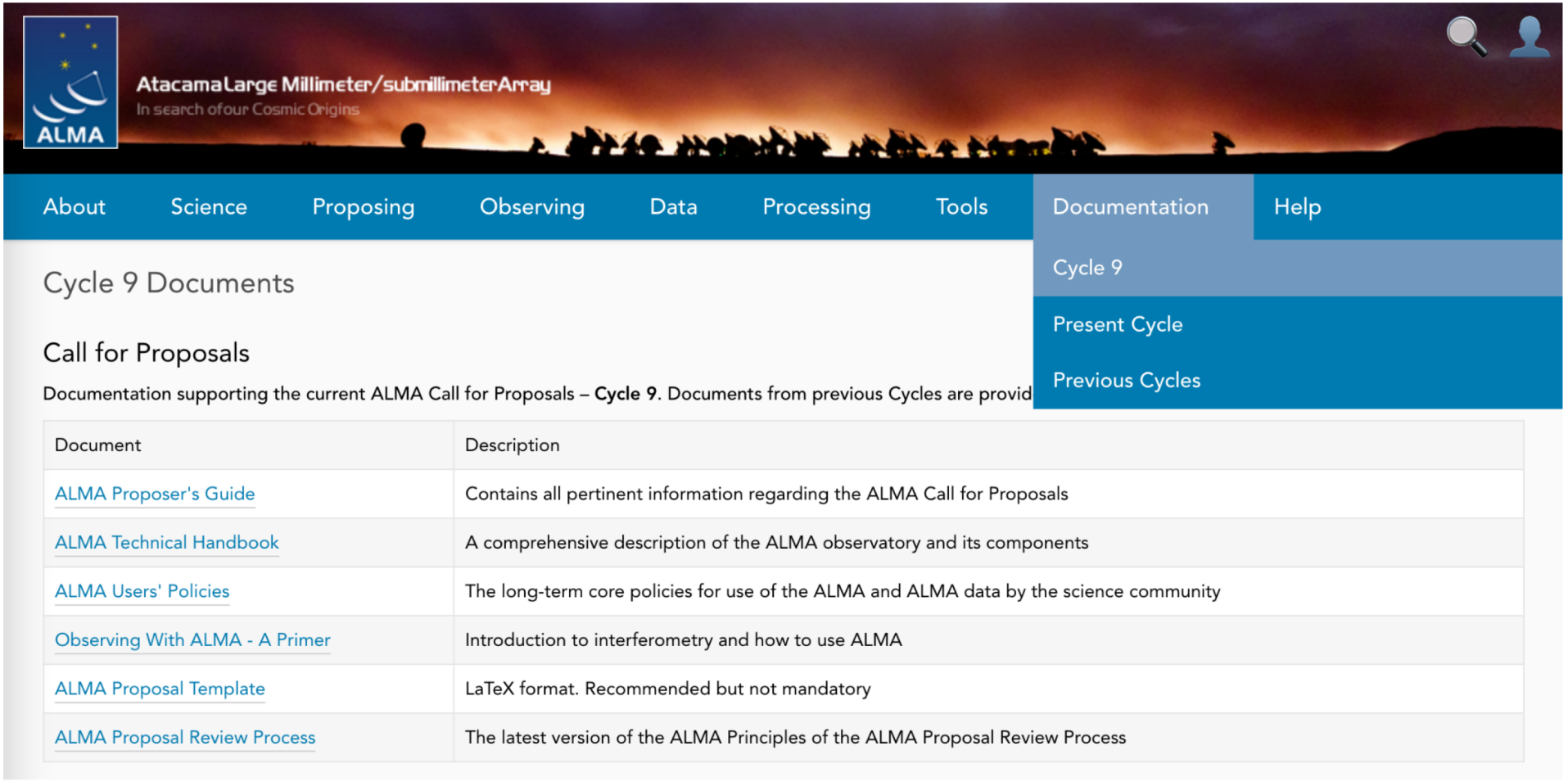
http://www.alma.inaf.it



Italian ALMA Regional Centre @ INAF-IRA Bologna

USEFUL LINKS

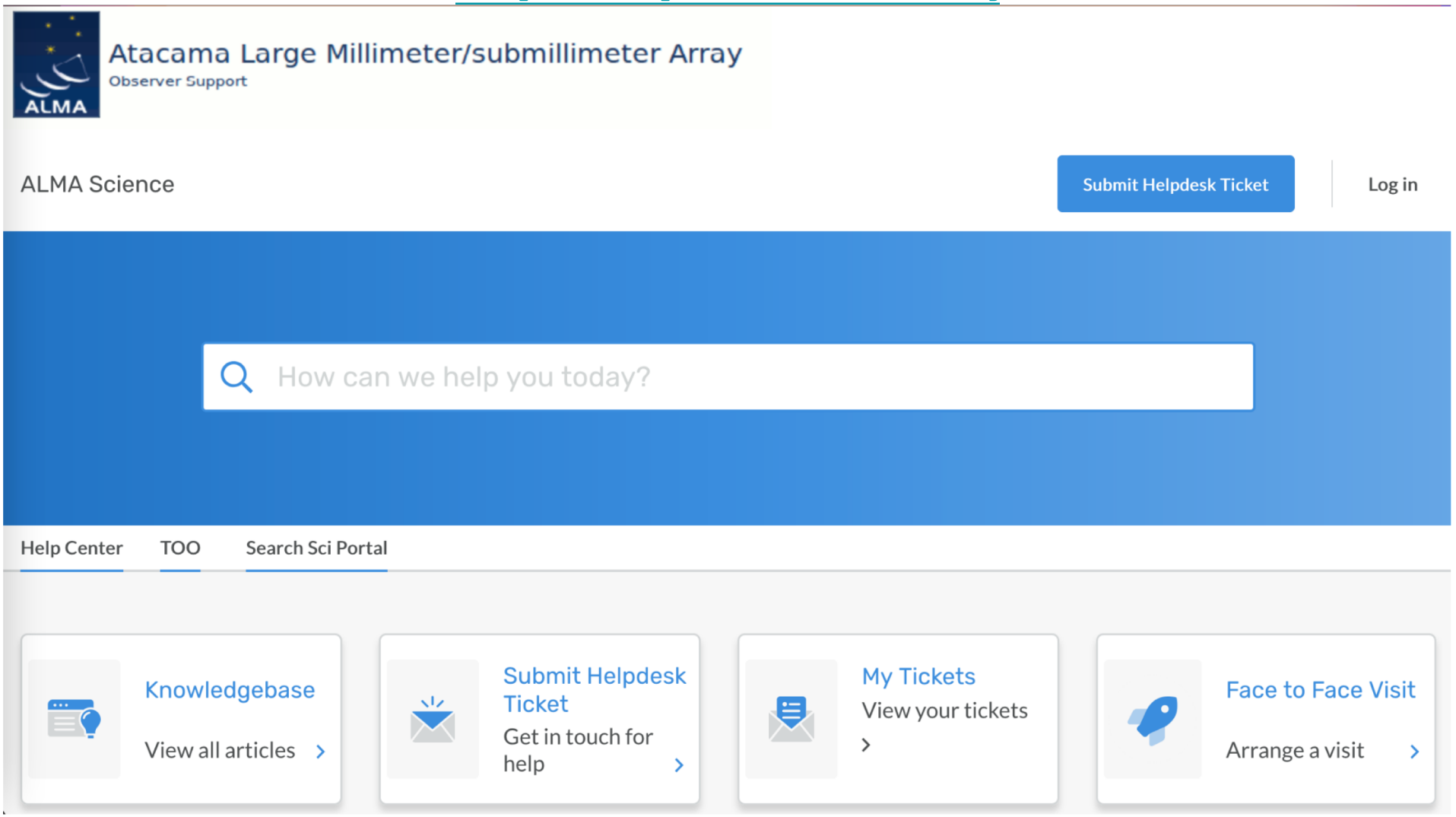
https://almascience.eso.org/documents-and-tools/cycle-9-documents



Cycle 9 documentation supporting the ALMA CfP

USEFUL LINKS

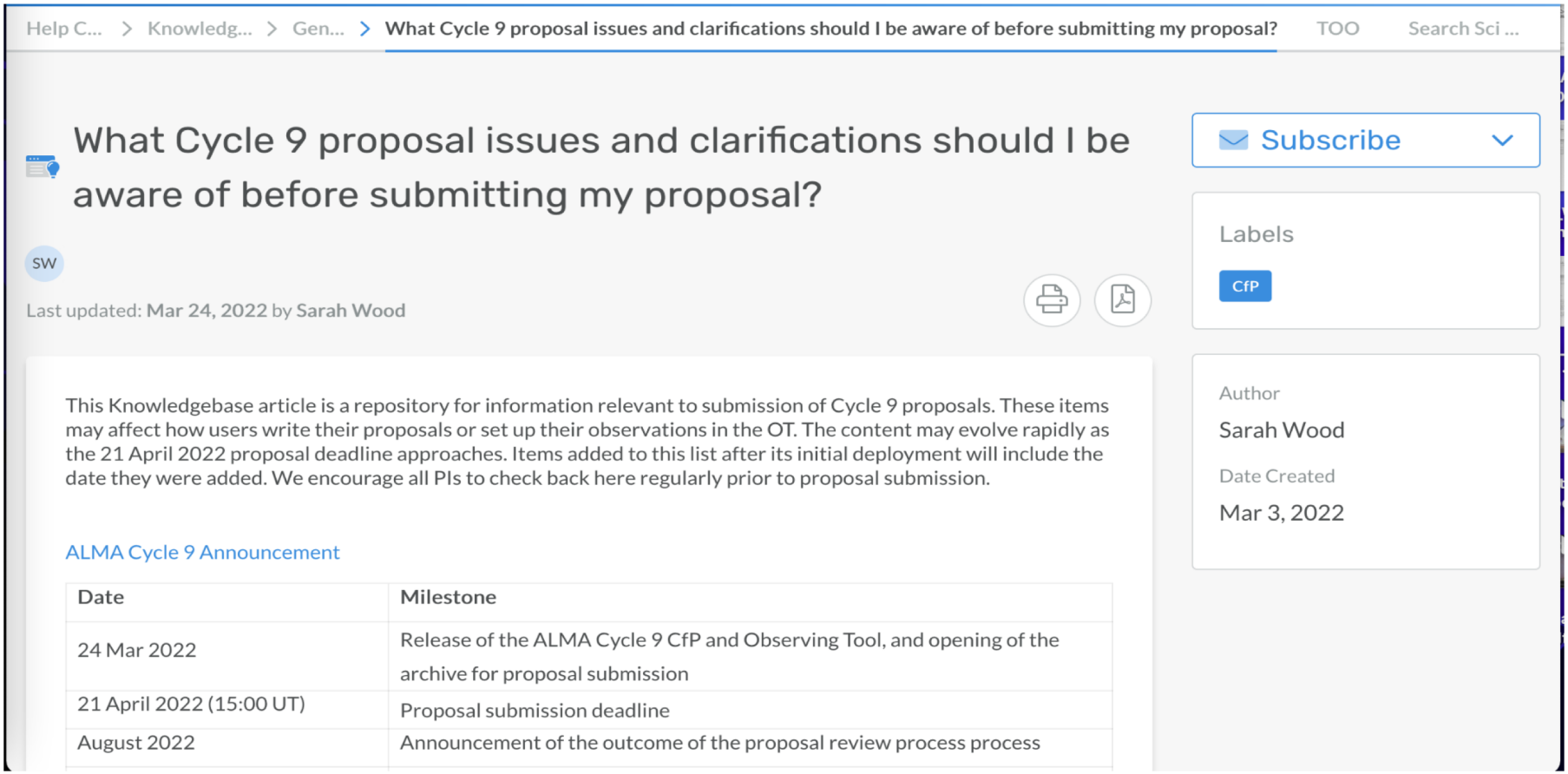
http://help.almascience.org



The ALMA Helpdesk website

USEFUL LINKS

https://help.almascience.org/kb/articles/what-cycle-9-proposal-issues-and-clarifications-should-i-be-aware-of-before-submitting-my-prop

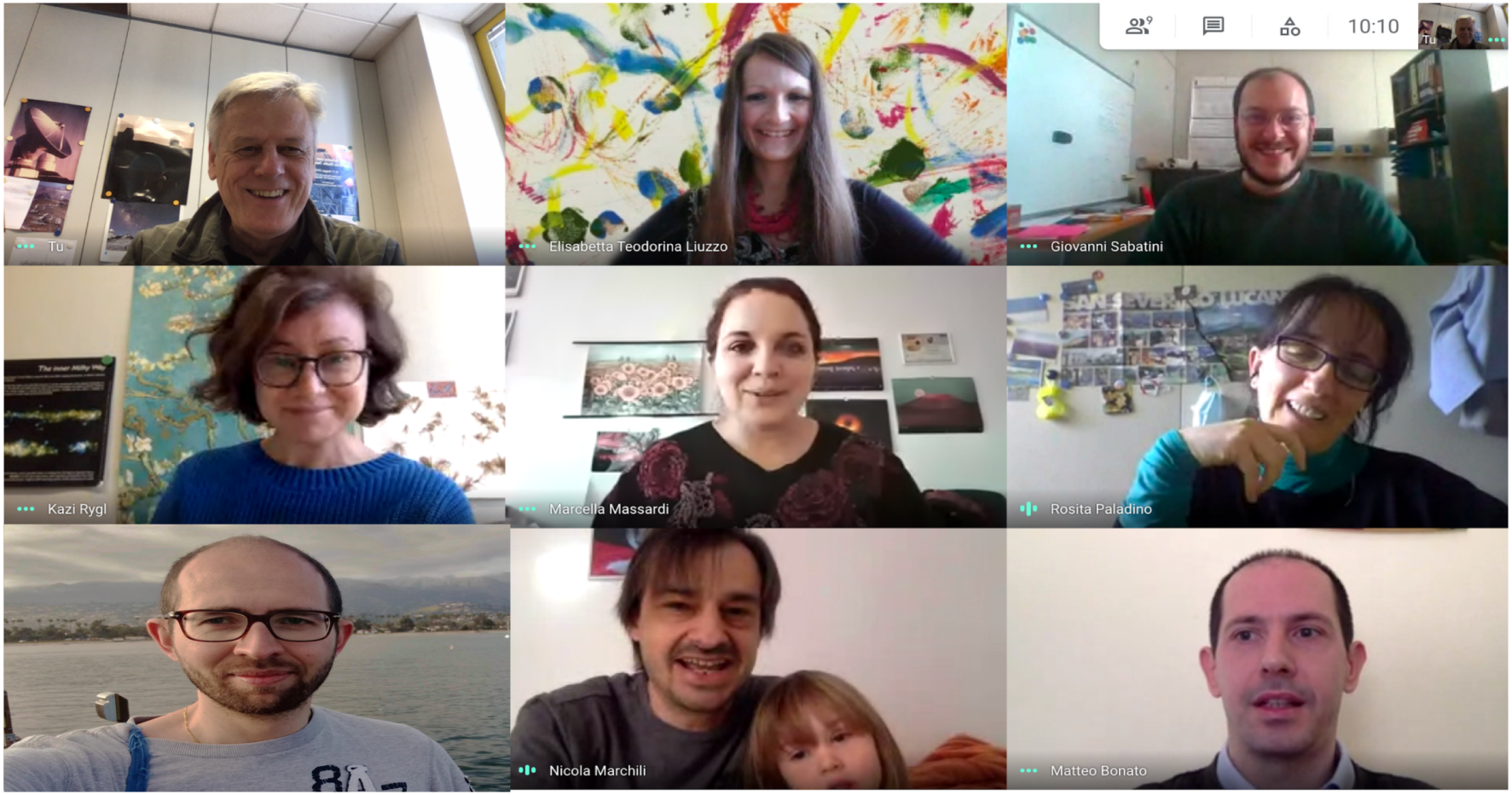


Knowledgebase: Cycle 9 proposal issues & clarifications

EUROPEAN ARC
ALMA Regional Centre || Italian

Q & A session

thank you for attending



http://www.alma.inaf.it

help-desk@alma.inaf.it