

ALMA Science Archive Query

Query Form Results Table

Search Reset [Query Help](#)

Position Source name (Resolver) Source name (ALMA) RA Dec Spatial resolution	Energy Frequency Bandwidth Spectral resolution Band	Time Observation date Integration time	Polarisation Polarisation type
Observation Water vapour	Project Project code Project title PI name		Options View: <input checked="" type="radio"/> raw data <input type="radio"/> project <input checked="" type="checkbox"/> public data only <input checked="" type="checkbox"/> science observations only

Using the ALMA Science Archive data

**Ji-hyun Kang
(KASI)**

Ref : EU Archive science file



Reasons to use archived data

- Check if data are already available for a target
- Check the feasibility of a project looking for similar targets
- Retrieving information on a large sample of objects (e.g. statistics of populations, stacking, ...)
- Retrieving information on a single object but with different configuration (e.g. multifrequency studies) or in different epochs (e.g. variability studies)
- Extracting unpublished information from existing data (e.g. finding additional spectral lines, targets in the same region/time of other observations,)
- **For ALMA in particular avoid the stress of competition and oversubscription**

	Proposal submission	Archive mining
Time to get data	✗	+
Amount of data	✗	+
Data homogeneity	+	✗
Adherence to idea	+	✗



ALMACAL I: FIRST DUAL-BAND NUMBER COUNTS FROM A DEEP AND WIDE ALMA SUBMILLIMETER SURVEY, FREE FROM COSMIC VARIANCE

I. OTEO^{1,2}, M. A. ZWAAN², R. J. IVISON^{1,2}, I. SMAIL³, AND A. D. BIGGS²

¹ Institute for Astronomy, University of Edinburgh, Royal Observatory, Blackford Hill, Edinburgh EH9 3HJ UK; ivanoteogomez@gmail.com

² European Southern Observatory, Karl-Schwarzschild-Strasse 2, D-85748 Garching, Germany

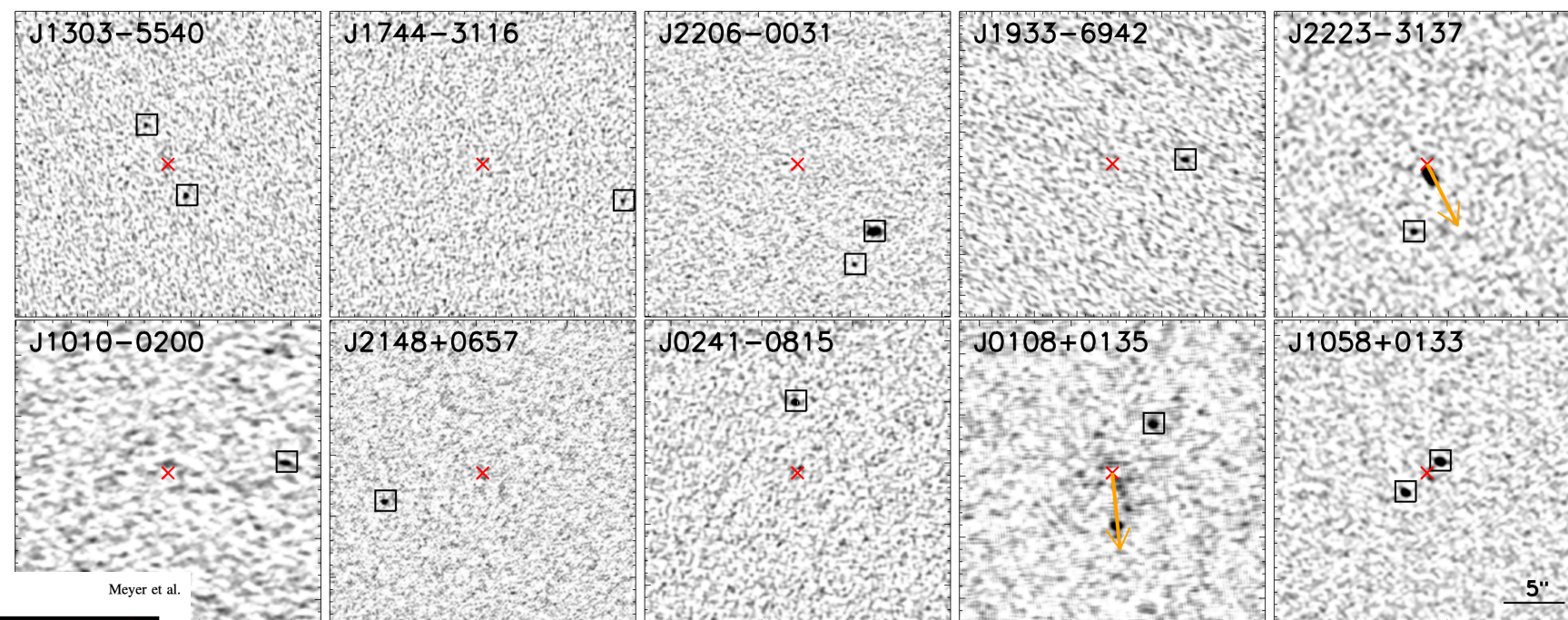
³ Centre for Extragalactic Astronomy, Department of Physics, Durham University, South Road, Durham DH1 3LE UK

Received 2015 August 20; accepted 2016 February 17; published 2016 May 2

ABSTRACT

We have exploited ALMA calibration observations to carry out a novel, wide, and deep submillimeter (submm) survey, ALMACAL. These calibration data comprise a large number of observations of calibrator fields in a variety of frequency bands and array configurations. By gathering together data acquired during multiple visits to many ALMA calibrators, it is possible to reach noise levels which allow the detection of faint, dusty, star-forming galaxies (DSFGs) over a significant area. In this paper, we present the first results from this survey. We have analyzed data for 69 calibrators, reaching depths of $\sim 100 \mu\text{Jy}$ at 870 μm . Using a conservative approach based on $\geq 5\sigma$ detections, we have identified 13 DSFGs. The fair deepest *Herschel* surveys. Our cumulative number counts at 870 μm from a sparse sampling of the astronomical sky, and are lower than reported previously by a factor of at least $2\times$ for DSFGs with redshifts determined via the detection of submm morphological studies of very faint DSFGs—representative of conventional submm galaxies—in fields where self-calibrating resolution.

Key words: galaxies: evolution – galaxies: high-redshift – galaxies: submillimeter



THE ASTROPHYSICAL JOURNAL LETTERS, 835:L35 (6pp), 2017 February 1

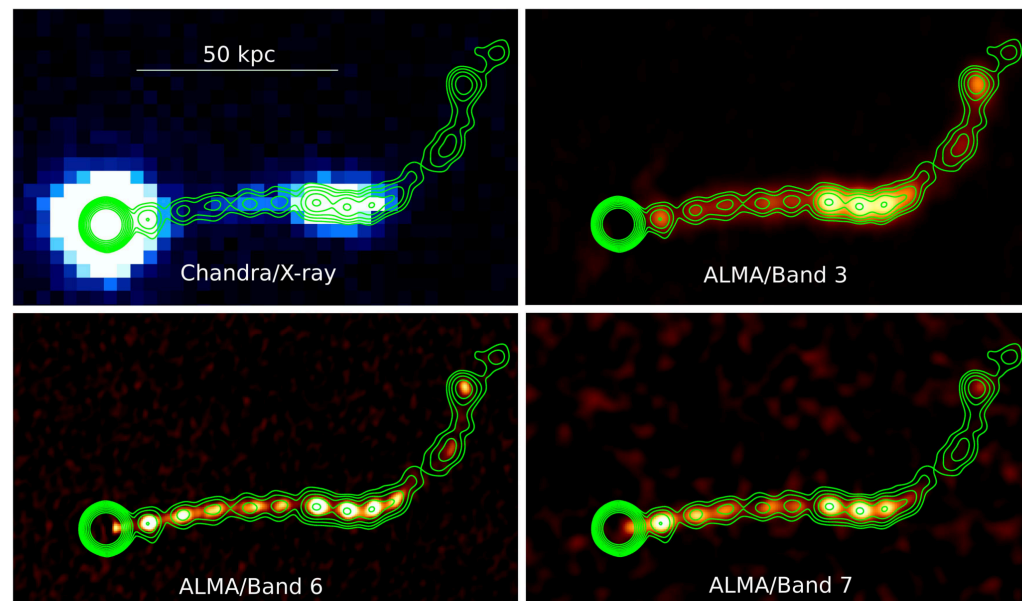


Figure 1. Top left: an archival *Chandra* X-ray image of PKS 0637–752 with 17 GHz radio contours (Godfrey et al. 2012) overlaid. The same contours are shown in all four images. The other panels show the ALMACAL program images (uncorrected for primary beam) for PKS 0637–752 in bands 3, 6, and 7. In the ALMA imaging, the core has been subtracted to allow for higher contrast in the fainter knots. Primary-beam correction was applied before measuring individual knot fluxes.

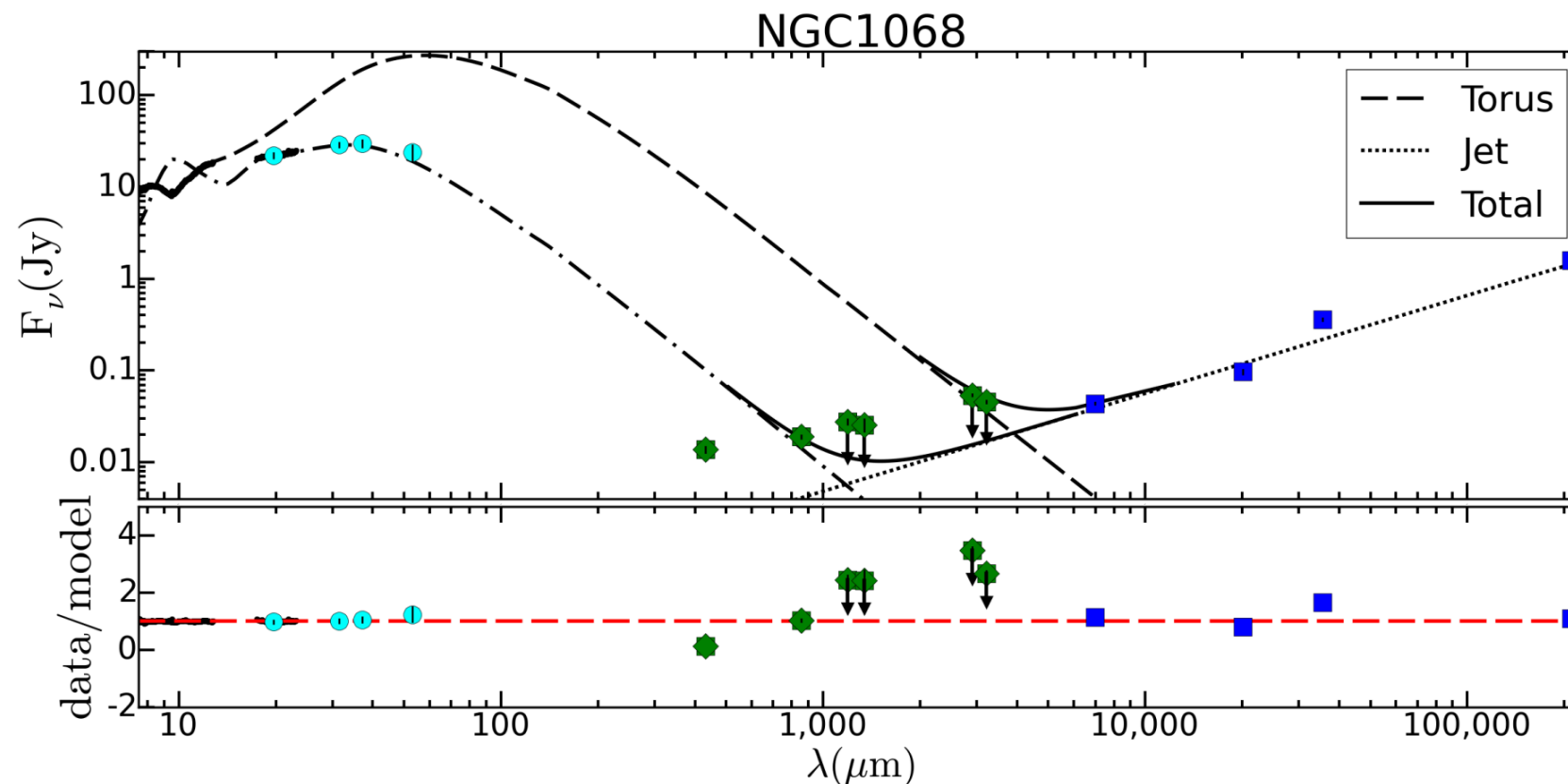
Images of the 13 DSFGs detected around calibrators (represented by the black squares). The calibrators lie at the center of each map, represented by a black square. The DSFGs have been subtracted in the uv plane, using point-source models, prior to imaging. Orange arrows indicate the jets emanating from the calibrators, shown in the ALMA band-3 imaging and flux density ratios (see details in the main text). These are 870 μm (ALMA band-7) images, except in the two cases where band-6 images are available, shown prior to the correction for PB attenuation. For J0108+0135 we also use the ALMA band 6 image in order to show the jet emanating from the calibrator. Each image is $25''$ on each side ($\sim 1.5\times$ the FWHM of the band-7 PB). The jet from the calibrator, J2223–3137, is clearly visible. N is up; E is to the left.

AGN Torus Detectability at Submillimeter Wavelengths: What to Expect from ALMA Continuum Data

Show affiliations

Pasetto, Alice; González-Martín, Omaira; Esparza-Arredondo, Donaji; Osorio-Clavijo, Natalia; Victoria-Ceballos, César Ivan; Martínez-Paredes, Mariela

X-ray and the radio fundamental plane scaling relations. We find that it is more likely to detect bigger and denser dusty tori at the highest ALMA frequency (666 GHz/450 μm). We also find that with 1h at 353 GHz/850 μm and 10h at 666 GHz/450 μm we can detect, with a high detection limit, a 1 mJy torus (characteristic of bright AGN).



**T-ReCS/Gemini,
SOFIA
ALMA,
JVLA**

Figure 9. SED fit for NGC 1068 to the mid-IR spectra (black spectrum) with the torus model (long-dashed and dot-dashed lines show the fit to the N- and Q-band respectively, see text) and to the cm wavelengths (blue points) with synchrotron emission (dotted line). Cyan circles are the SOFIA data points. Green stars are sub-mm and far-infrared data. Arrows indicate plausible upper limits when the spatial resolution is worse than 0.3'' (see text). Note that residuals for the sub-mm data are computed using the Q-band mid-IR fit to the torus together with the VLA fit to the jet.

Data structure

Sensitivity goals are defined on SG basis



Science goal:

Sources in the same sky region that share the same calibration, spectral setup and PI requests

OUS= Observing Unit Set

Smallest unit for data processing

A **Group** can contain several configurations to be combined in data processing (e.g. several arrays), each of them is a Member.

Now for ALMA there is 1 Group/SG

A **Member** can contain multiple executions of Scheduling Blocks. It is the minimum scheduling entity. Pipeline operates at this level

The **Scheduling Block** is the smallest entity used for observing

Each repetition of a SB is an **Execution Block**

Data Quality Assessment

The goal of ALMA Quality Assurance (QA) is to deliver to the PI a reliable final data product that has reached the desired control parameters outlined in the SG, that is calibrated to the desired accuracy and free of calibration or imaging artifacts i.e. ALMA performs **science-goal-oriented service data analysis**

ALMA QA happens on 4 levels:

QA0: near-real time verification of weather and hardware issues carried out on each execution block immediately after the observation.

QA1: verification of longer-term observatory health issues like absolute pointing and flux calibration.

QA2: offline calibration and imaging (using CASA) of a completely observed MOUS.

- Performed by expert analysts with the help of a semi-automatic procedures, based on common practice.
- Calibration can be "Manual" or based on the "Pipeline"
- Imaging so far is always manual (partially depends upon the analyst "taste")
- It is limited to verify the achievement of the PI requests for each MOUS (do not even consider other data possibilities)
- Results are archived and given to the PI.

QA3: (optional) PIs may request rereduction, problem fixes, possibly reobservation

What is in the archive?

**For each project the main deliverables are
Raw Data, Calibration Scripts and Tables**

**Users need to run the proper version of CASA to generate the Calibrated Data.
The resulting calibrated data is considered science-ready.**

**As a consequence of the process only data that passed QA2 (at least in part)
are in the archive**

Some Imaging Products are delivered too, as result of QA2 processing

(in Early Science provided on a best effort basis, not necessarily science-ready)

a) for Line Observations:

- continuum-subtracted (where needed) image cubes at the requested resolution
- a continuum image for all line-free channels (where possible)

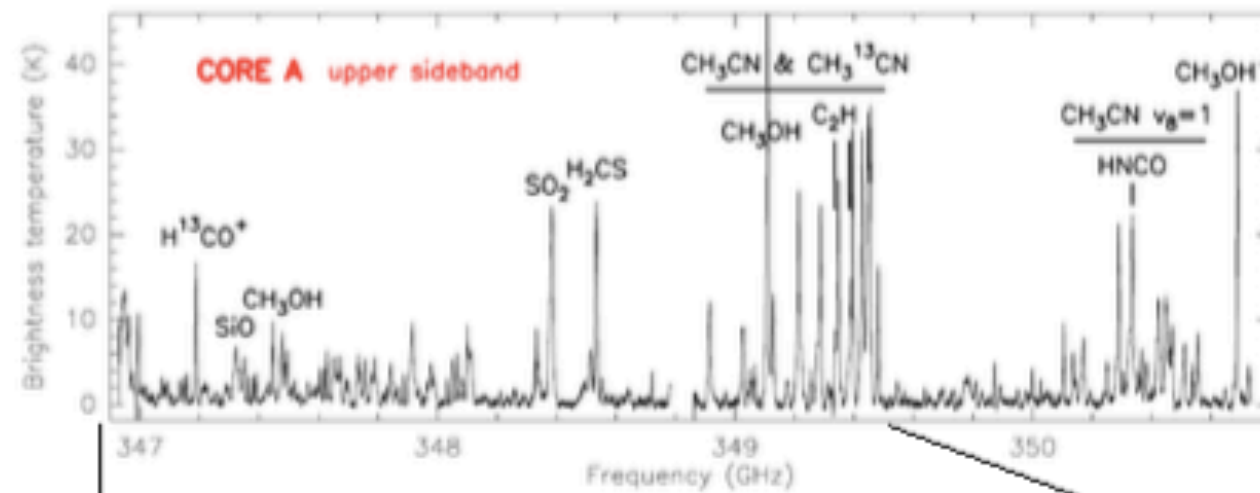
b) for Continuum Observations:

- a continuum image combining all SPWs

**Images in the archive are provided as starting point on the way to obtain the final
images and a valuable basis for archive researchers**

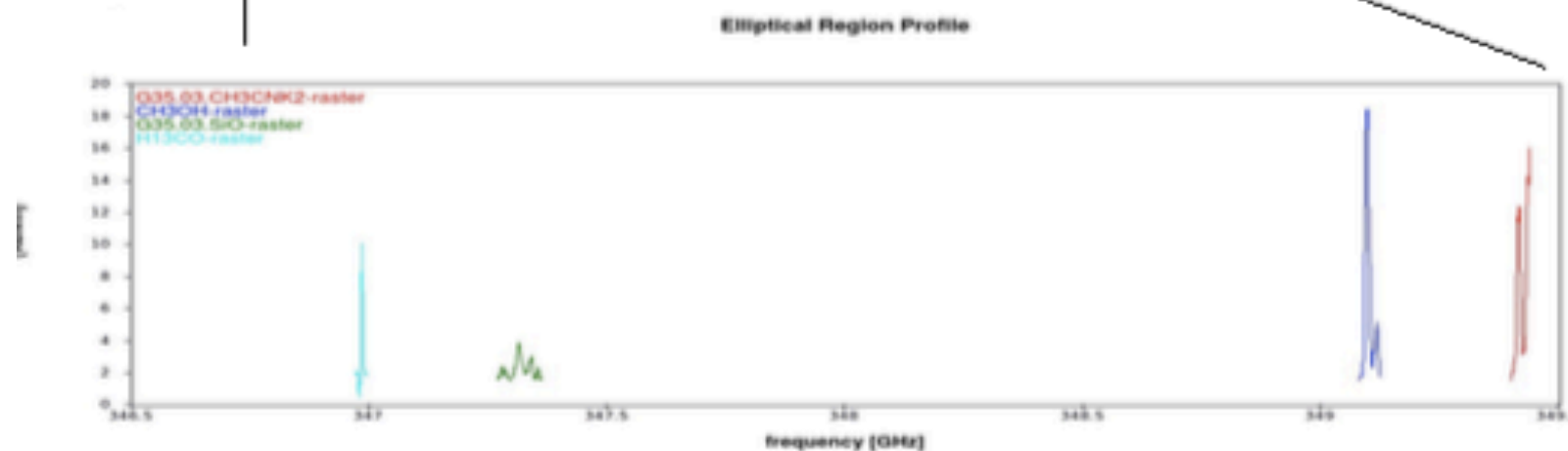
(i.e. they are not considered science-ready!!!)

What is in the archive?



Images in the archive might cover only a fraction of the spectrum available

Spectrum observed (and available in the raw data)



Imaged data for QA2



Different data and PI requests on different sources generate different products In the archived images but raw data contain the full spectral windows

The ALMA archive: help

1) Search with the criteria you need and click Search

ALMA Science Archive Query

[Query Form](#) [Results Table](#)

[Search](#) [Reset](#) [Query Help](#)

Position

Source name (Resolver)
NGC1614 ✓

Source name (ALMA)

RA Dec

Spatial resolution

Energy

Source name (Resolver)
Case-insensitive search for source name, to be resolved with Sesame. Wildcard matching is disabled.

Usage.
Use Sesame (via. NED, Simbad and VizieR) to parse names commonly found throughout literature. A green tick indicates a successful search, otherwise, a red cross is returned.

Example
[Cen A](#)
[NGC3375](#)
[ARP220](#)

Time

Source
NGC 1614

Coordinates (RA Dec)
04:34:00.02 -08:34:44.5

Object type
AGN (Active Galaxy Nucleus)

Morphology Type
Sbc:

Resolver
Sesame using [Simbad](#)

Polarisation

Polarisation type

Options

View: ☒ raw data ☐ project

☒ public data only

☒ science observations only

Contextual help for each tab

The ALMA archive: result table

- 2) Select the project/execution blocks you need and click "Submit the download request"

ALMA Science Archive Query

Query FormResults Table

Submit download request

Results BookmarkExport TableResults Help

Showing 7 rows (7 before filtering).More columns

	Project code	Source name	RA	Dec	Band	Integration	Release date	Velocity resolution	Frequency support
Filter:								<div>m/s</div>	
<input type="checkbox"/>	2011.0.00020.S	NGC 1614	04:34:00.03	-08:34:44.6	7	484.557	2013-01-12	834.09	344.15_357.85GHz
<input type="checkbox"/>	2011.0.00020.S	NGC 1614	04:34:00.03	-08:34:44.6	7	382.854	2013-01-12	851.55	336.17_351.86GHz
<input type="checkbox"/>	2011.0.00768.S	NGC1614	04:34:00.03	-08:34:44.6	7	463.612	2013-10-15	846.76	337.97_353.59GHz
<input type="checkbox"/>	2011.0.00768.S	NGC1614	04:34:00.03	-08:34:44.6	7	464.391	2013-10-15	846.76	337.97_353.59GHz
<input type="checkbox"/>	2011.0.00768.S	NGC1614	04:34:00.03	-08:34:44.6	7	463.991	2013-10-15	846.76	337.97_353.59GHz
<input checked="" type="checkbox"/>	2011.0.00182.S	NGC 1614	04:34:00.03	-08:34:45.2	9	697.859	2013-12-21	13784.20	675.83_683.30GHz
<input checked="" type="checkbox"/>	2011.0.00182.S	NGC 1614	04:34:00.03	-08:34:45.2	9	702.437	2013-12-21	13784.20	675.83_683.30GHz

The query runs on the raw data so returns one entry per target per Execution Block.

It is possible that for a project several rows are displayed for the same source.

Projects that contain many sources, many Sbs or mosaics might returns many lines.

Columns values are only indicative. Data structure can be more complex than what shown.

The ALMA archive: download manager

3) Select the data you want

ALMA Request Handler

Marcella Massardi: Request #998100324 ✓
Request Title: [Click to edit](#)

[Download Selected](#)

☐ Include Raw

Project / OUSet / Executionblock	File	Size	Accessible
Request 998100324			
Project 2013.1.00278.S			
Science Goal OUS uid//A001/X120/X100			
Group OUS uid//A001/X120/X101			
Member OUS uid//A001/X120/X102			
<input checked="" type="checkbox"/> product	2013.1.00278.S uid_A001_X120_X102_001_of_001.tar	701.3MB	✓
<input type="checkbox"/> raw	2013.1.00278.S uid_A002_Xa0b40d_X3cb8.asdm.sdm.tar	11.4GB	✓
Member OUS uid//A001/X120/X104			
<input checked="" type="checkbox"/> product	2013.1.00278.S uid_A001_X120_X104_001_of_001.tar	346.8MB	✗
<input type="checkbox"/> raw	2013.1.00278.S uid_A002_X839000_X122f.asdm.sdm.tar	1.3GB	✗
		Total: 13.8GB	

Download products only for quick view of images


Product data are typically <1GB

Raw data for whole projects are typically >10GB

Processing might increase folder size by factors 2-8

The ALMA archive: download manager

4) Choose the download method



Choose one of the following download methods:

Download Script	The downloads are scripted for you. You just need to execute the script from the command line. Help
Download Manager	ALMA's download manager is launched as a browser applet. This is a simpler, more user-friendly way to download files in parallel, allowing you to pause and resume.
Web Start Download Manager	ALMA's download manager is launched as a desktop application via Java Web Start. It will not stop if you close your browser.
File List	View a text file containing a list of URLs. This is useful for using third-party download manager's such as <i>DownThemAll</i> .

What is in the packages?

When untarred, the Product Package standard directory structure contains

Untarred
products
only

```
|-- project_id/
| |-- sg_ouss_id/
| | |-- group_ouss_id/
| | | |-- member_ouss_id/
| | | | |-- README .....important summary of the contents
| | | | |-- product/ .....all the imaging products as result of QA2
| | | | |-- calibration/ .....calibration and flagging tables
| | | | |-- qa/ .....diagnostic plots generated during QA2
| | | | |-- script/ .....the scripts necessary to regenerate the products
| | | | |-- log/ .....CASA log files from QA2 calibration and imaging
```

Untarred
ASDM
(raw data)

```
| | | | |-- raw/ .....for calibration move it in the products folder at the
                        right level (follow the README)
```

File Edit View Go Bookmarks Help

iranet homesarc massardi ALMA scuola2016 project2013_278 proj Search



2013.1.00278.S (2)

Untarred
ASDM
(Raw data)



2013.1.00278.S

Untarred
products



2013.1.00278.S_
uid_...A001_X120_
X102_001_of_001.
tar



2013.1.00278.S_
uid_...A002_
Xa0b40d_X3cb8.
asdm.sdm.tar



downloadRequest9
98112925.sh

What to do after download?

```
[massardi@arcbl02 member.uid___A001_X120_X102]$ cd script/  
[massardi@arcbl02 script]$ casapy-setup 42.2.30986-pipe-1-64b  
[massardi@arcbl02 script]$ casapy --pipeline  
...  
CASA <2>: execfile('scriptForPI.py')
```

- 1) Untar the packages
- 2) Look at weblog and/or QA reports
- 3) Read the README file and follow the instructions: typically
 - Launch the correct CASA (with pipeline) version in the script folder
 - Run the "Script_for_PI" to generate the calibrated MS
 - Run the "Script_for_Imaging" to regenerate the images
- 4) Edit the scripts where needed according to your purposes

What is in the packages?

After running the ScriptForPI.py

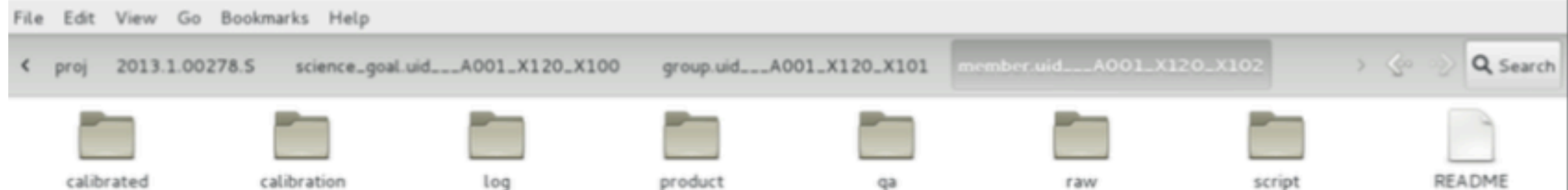
Down
loaded
data

```
-- project_id/
|-- sg_ouss_id/
| |-- group_ouss_id/
| | |-- member_ouss_id/
| | | |-- README .....important summary of the contents
| | | |-- product/ .....all the imaging products as result of QA2
| | | |-- calibration/ .....calibration and flagging tables
| | | |-- qa/ .....diagnostic plots generated during QA2
| | | |-- script/ .....the scripts necessary to regenerate the products
| | | |-- log/ .....CASA log files from QA2 calibration and imaging

| | | |-- raw/ .....moved in the main folder from raw data download

| | | |-- calibrated/ .....calibrated ms, flagging and calibration tables
```

New
folder
produced
by script



Caveats

- **There are differences between cycles**
- **There are differences between pipeline and manual data reduction, calibration and imaging**
- **Images are not science-ready!!!**

In publications with ALMA data!

Acknowledgement Statement:

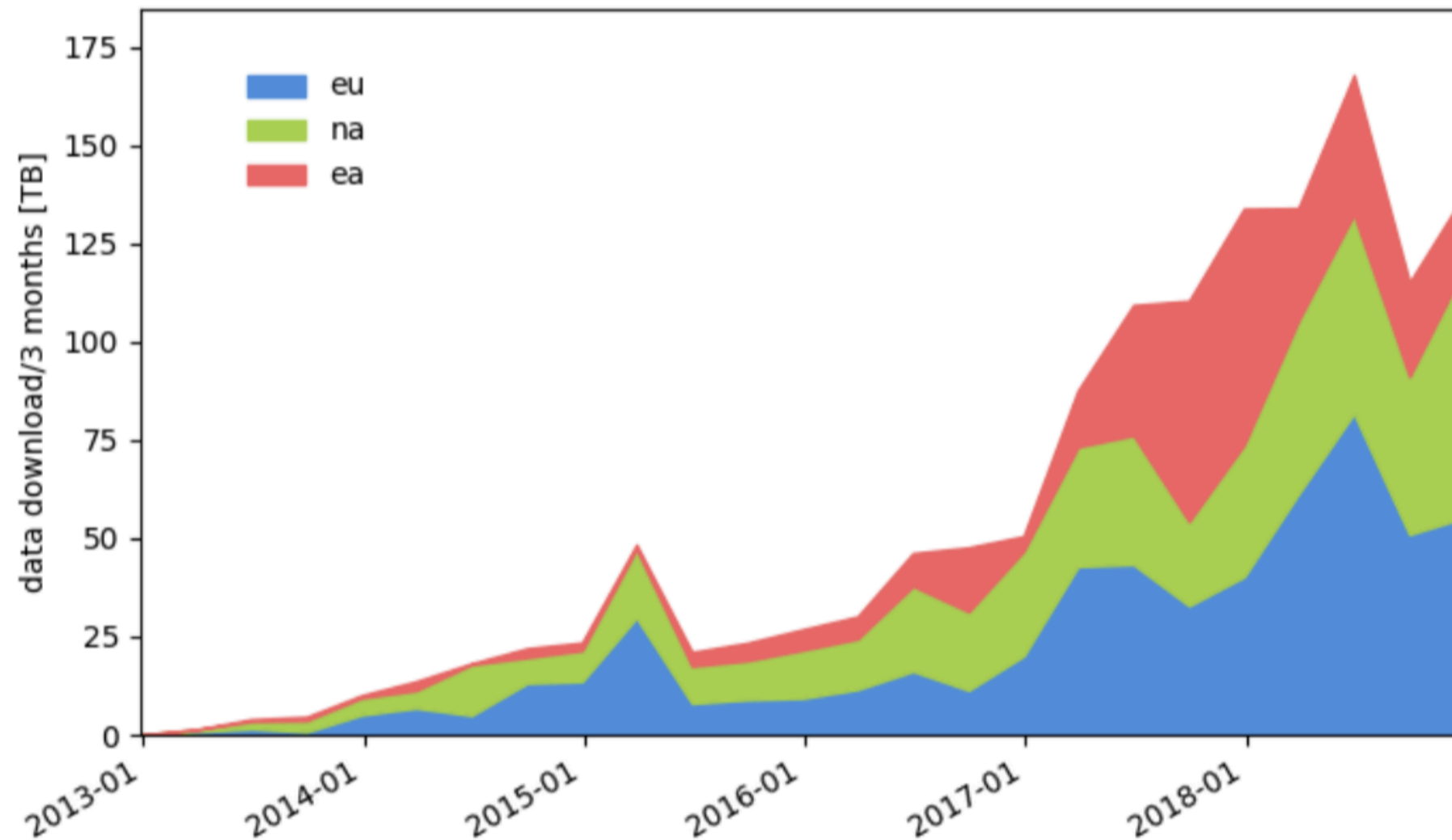
“This paper makes use of the following ALMA data:

ADS/JAO.ALMA#2011.0.01234.S. ALMA is a partnership of ESO (representing its member states), NSF (USA) and NINS (Japan), together with NRC (Canada), NSC and ASIAA (Taiwan), and KASI (Republic of Korea), in cooperation with the Republic of Chile. The Joint ALMA Observatory is operated by ESO, AUI/NRAO and NAOJ.”

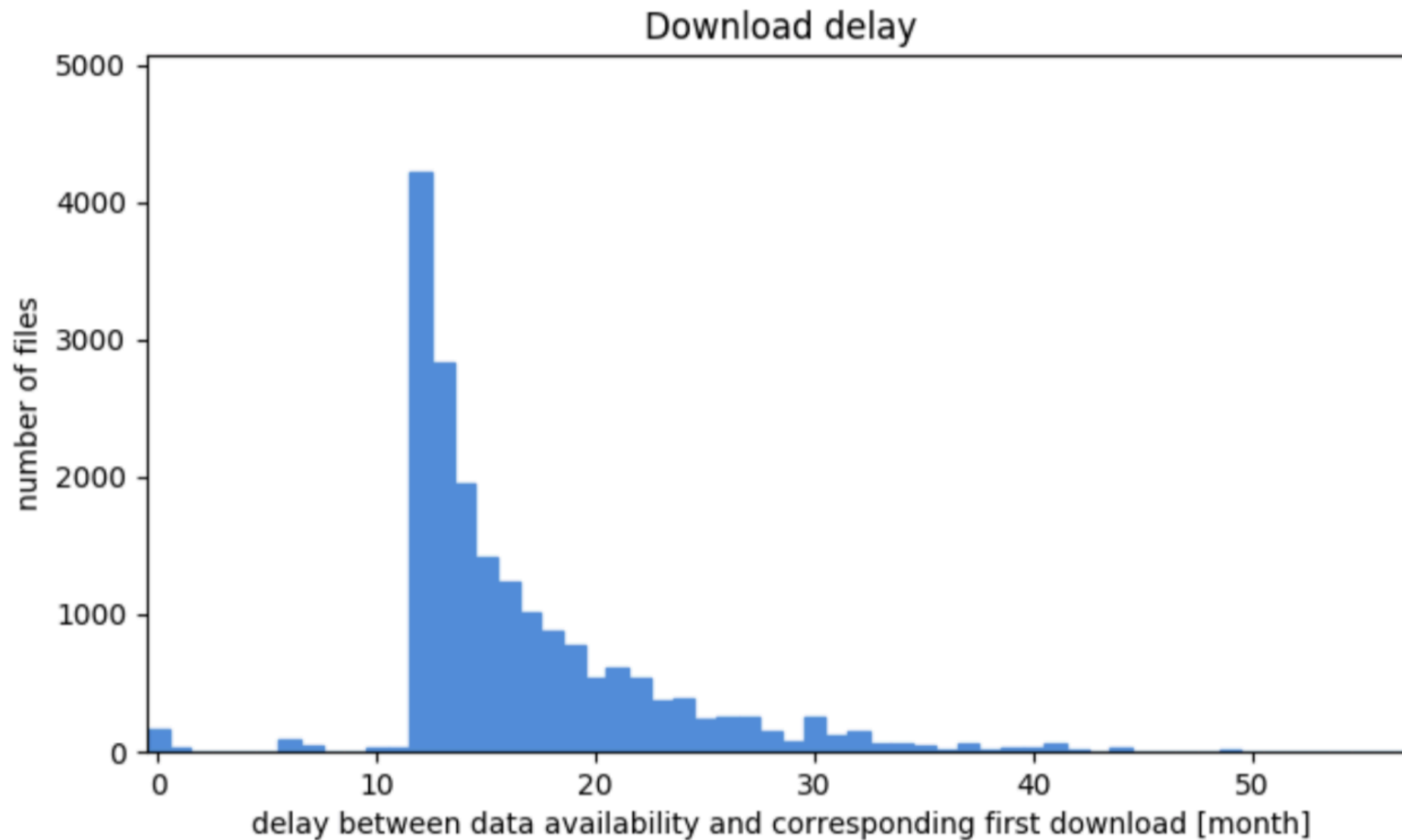
(Can be found in the SP, on the ‘ALMA-Data’ page or in the Archive)

ARC Evolution

ALMA data download (total: 1389 TB)



Download Delay: after becoming public



Archive & JVO