

ASKAP Early Science Public Data Release

In this update, we announce the public release of a new ASKAP early science data set – a subset of fields from the “cosmology survey”. This document provides an overview of the released observations, along with some important notes for users.

The ASKAP early science program

These data were observed during the ASKAP early science program using a sub-array of 16 antennas equipped with Mk II phased array feeds. Observations occurred during installation and commissioning of additional hardware and do not represent the full capability of the telescope.

Cosmology observations

The cosmology survey was designed by the EMU science team as a first attempt at a wide-area continuum survey, with the primary goal of using radio galaxy population statistics to measure cosmological parameters.

The planned survey covered 2000 square degrees, using 68 fields to tile a rectangular region in equatorial coordinates (RA 20:30 to 05:30 and Dec -60 to -45).

Observations began in February 2018. The first round of observing captured 16 of these fields and then paused to assess the quality of the resulting images. This revealed that we were not reaching the required RMS noise level and the survey was not continued in its initial form.

However, 10 of the 16 observed fields produced good quality images, released with the expectation that they will be useful for other science projects.

Telescope configuration

This data release consists of 10 fields of roughly 30 square degrees each. They were selected according to hour angle from the full set of 68 survey fields (see below) and do not form a continuous region. ASKAP was configured with 240

MHz of bandwidth at a centre frequency of 912 MHz using 36 beams in a 6x6 square configuration with 0.9-degree beam spacing. Visibilities were recorded with 18.5 kHz frequency resolution and 10 second time resolution.

Each field was observed for 200 minutes without interleaving. The RMS noise level is 150 μ Jy/beam using the default ASKAPsoft pipeline and robust -0.5 weighting.

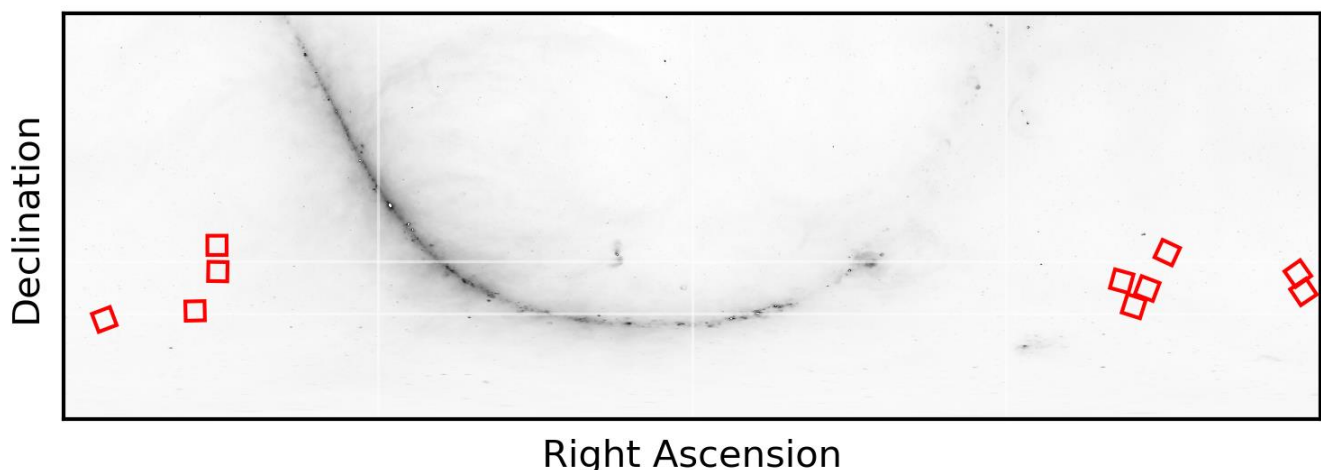
In the interests of allowing additional spectral line processing, this release includes the calibrated visibilities as CASA measurement sets at 18.5 kHz resolution. This is possible due to the small number of antennas available for early science and may not be possible with larger file sizes from the full array in future.

Image processing strategy

Data were calibrated for flux and bandpass shape using observations of the reference source PKS B1934-638. Phase calibration was performed using self-calibration on sources in each beam before mosaicking together the full field using an idealised Gaussian primary beam correction.

Accessing the data archive

Released ASKAP data can be obtained from the [CSIRO Data Access Portal](#). Users can find the cosmology survey by searching for project ID AS034. It is also possible to access the archive via a Virtual Observatory Table Access Protocol interface. Some quick instructions are given below and more detailed documentation is [available in the CASDA Users Guide](#).



Web interface instructions

Once a search query has returned, tabs at the top of the listing page can be selected to view different types of data products. The list currently includes *catalogues* created by the Selavy source finding software, *continuum images* in FITS format and tar archives of calibrated *visibilities* stored as CASA measurement sets (one file per beam).

The CASDA index can be viewed by anyone but users must obtain an [OPAL](#) account to download files.

Users can select data products of interest using the check boxes on the left of the table and download associated files by selecting the “Download” link at the top.

Aside from the data products listed above, the summary page of each image allows the user to download a tar file of additional information that includes log files, parameter files, validation output and other information that should be sufficient to reproduce all operations performed on the original measurement set.

Database access using Virtual Observatory tools

CASDA has been designed to support Virtual Observatory Table Access Protocols and is tested using [TOPCAT](#). Users can search for CASDA in the table access protocol query dialog, which should find the service CSIRO ASKAP TAP.

Scheduling blocks and early science project codes

All observations are assigned a Scheduling Block ID (SBID) when first created. This identifier is associated with everything from the observing parameters through to the processing parameters and final output. Each SBID is associated with an OPAL project code. This release corresponds to project code AS034.

Validation and quality metrics

CASDA uses a three-state model (**good**, **bad** or **uncertain**) to rate data quality. Products marked as good have passed all our internal validation metrics. Data that are classified as bad will not be released.

Products that are free of obvious problems but receive one or more quality metric scores outside the expected range may be released under the uncertain classification.

These data may be suitable for some science goals but not others. It is up to the user to consider the validation metrics in more detail or perform their own analysis and use the data at their own risk.

Most early science data will fall into the uncertain category while we are in the process of developing the ASKAP pipelines and characterising the telescope itself.

Known issues

Aside from not reaching the thermal noise limit, there are no known issues with the data that cannot be explained by lack of UV coverage or imperfect calibration.

Astrometry errors encountered in previous data releases are now understood (a result of a subtle error in the fringe tracking model) and have been corrected at the source, so they should not be present in this or any future release.

Data ownership and publication policy

All ASKAP data taken during the early science period are owned by CSIRO and will be made public as soon as they pass quality control. Data products released on CASDA may be used for any purpose, including publication.

In accordance with the [ASKAP publication policy](#), we ask that any publications resulting from these data include the statement of acknowledgement as written in the policy.

Collaboration opportunities

We welcome opportunities to collaborate with and receive feedback from the science community. Enquiries can be directed to the ASKAP project scientist atnf-askap-ps@csiro.au or science team lead investigators. Science team members are encouraged to attend monthly [early science forum](#) teleconferences hosted by CASS.

Future data releases

ASKAP is nearing completion of its construction phase and will soon begin full-scale test observations. As we progress into pilot surveys in 2019, we expect that data will be released on a much more regular basis.

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FOR FURTHER INFORMATION

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