

**MITAKA USER'S MEETING**

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**JCMT LEGACY RELEASE**

## JCMT SCIENCE ARCHIVE

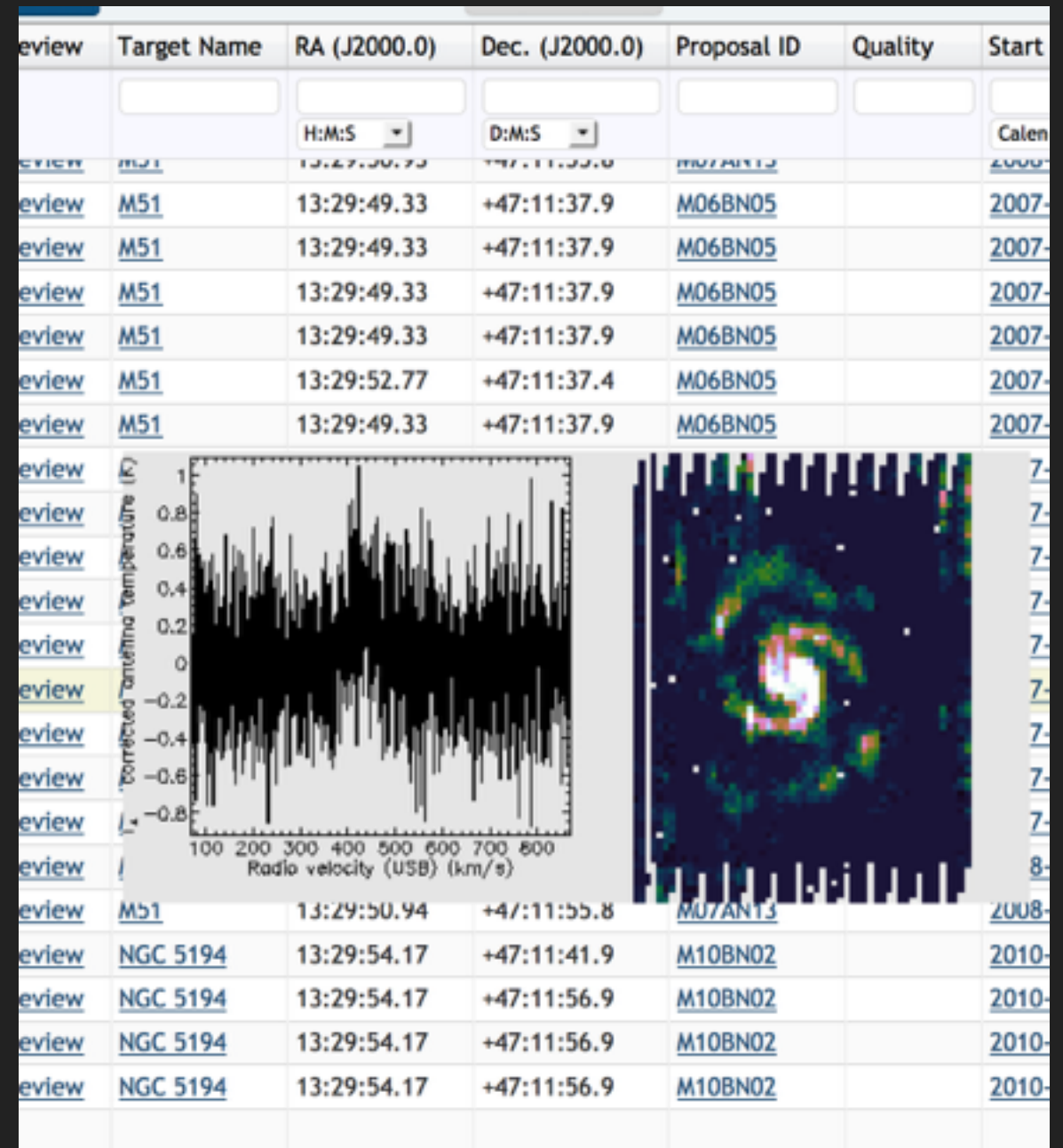
~8 years of public HARP data and RxA3 with ACSIS data, and ~3 years of public SCUBA-2 data

- ▶ raw observations in instrumental time series format
- ▶ reduced individual observations (FITS format)
- ▶ night products – co-add of obs taken by one project towards a single source on one night

Detailed (searchable) meta data, including position, wavelength, transition, weather info, data quality, etc.

VO enabled – can search with TAP e.g. through TOPCAT on all meta data, not just those visible in advanced search.

<http://www.cadc-ccda.hia-ihp.nrc-cnrc.gc.ca/en/search>



### WHY DO WE DO LEGACY RELEASES?

- ▶ Raw data is always available, but for non experienced JCMT users this presents a significant barrier to use (even with ORAC-DR).
- ▶ Normal reduced products in archive are reduced using the PI's chosen config.
  - ▶ sometimes they picked an unusual configuration.
  - ▶ should not usually combine data reduced with different configs.

## WHY DO WE DO LEGACY RELEASES?

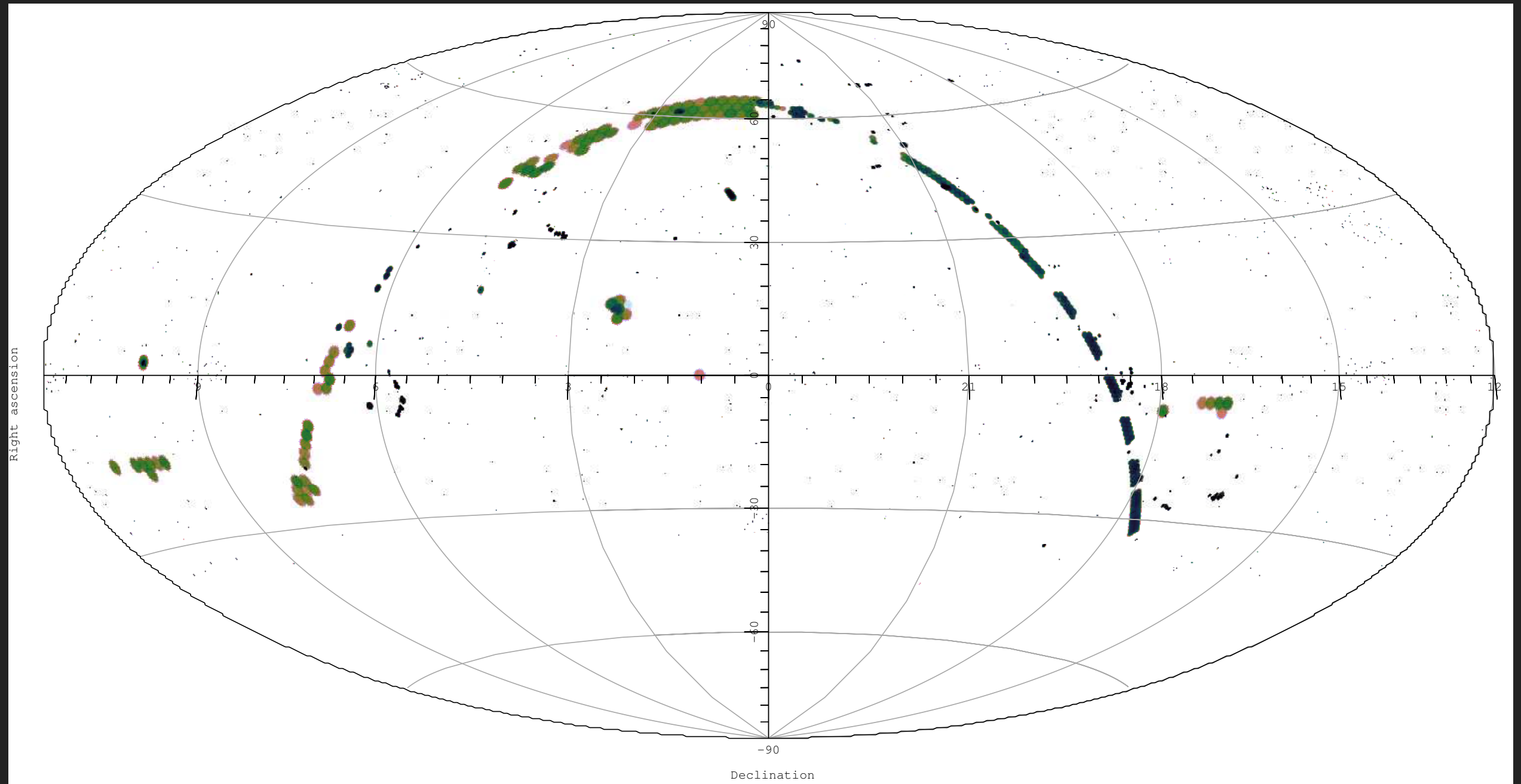
We want the astronomical community to get the most science possible from all of our observations.

- ▶ Providing consistent reduction and co-adds of all public data towards a given region will enable users to easily see where we have observed, what noise levels we've reached, and what we've detected.

## JCMT LEGACY RELEASE 1: SCUBA-2 850 OBSERVATIONS

- ▶ First batch of products released September 2015  
<http://www.eaobservatory.org/jcmt/science/archive/lr1/>
- ▶ Reduction of all public 850um observations taken between 2011 February 2 and 2013 August 1.
- ▶ 2261 hours/5161 science observations reduced using this config.
- ▶ 40% of all STFC-era SCUBA-2 science observations.
- ▶ Includes calibrations, PI data from all the STFC-era country queues, UH observations and JCMT Legacy Survey data

# JCMT LR1: 850 SCUBA-2 OBSERVATIONS





## PRODUCTS

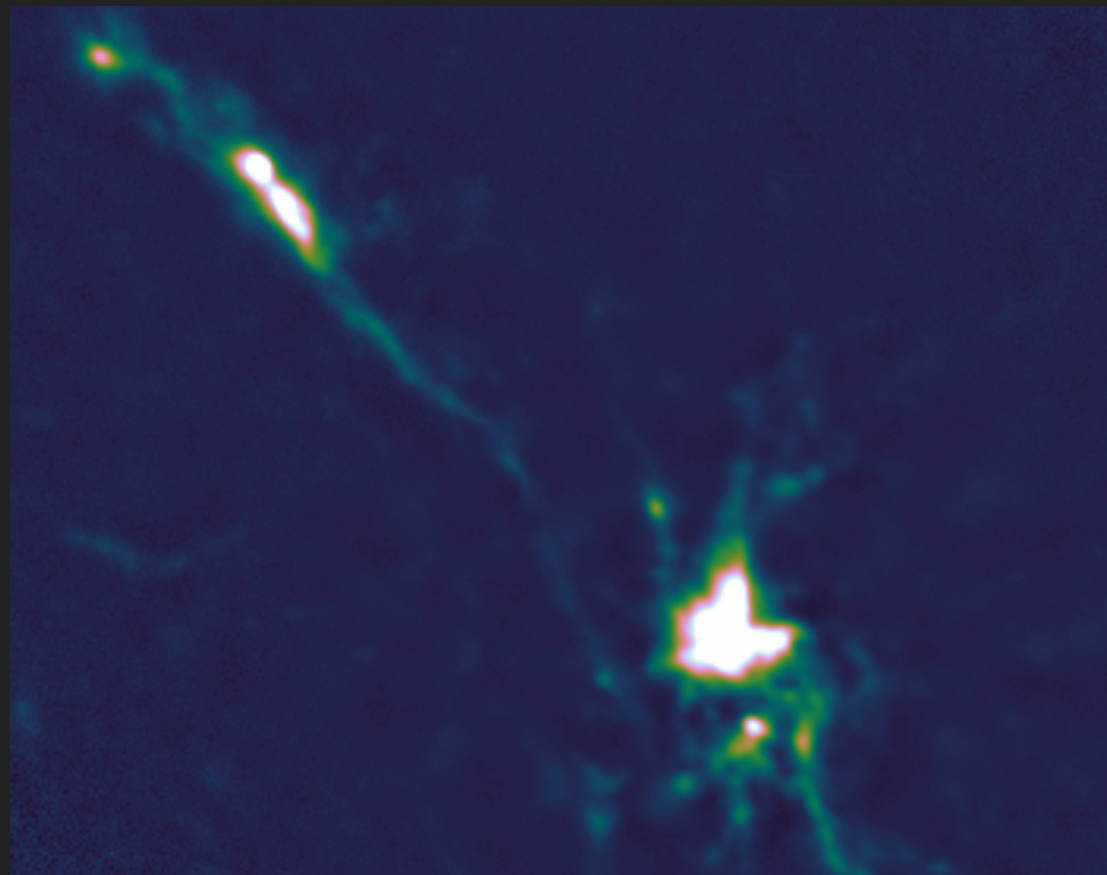
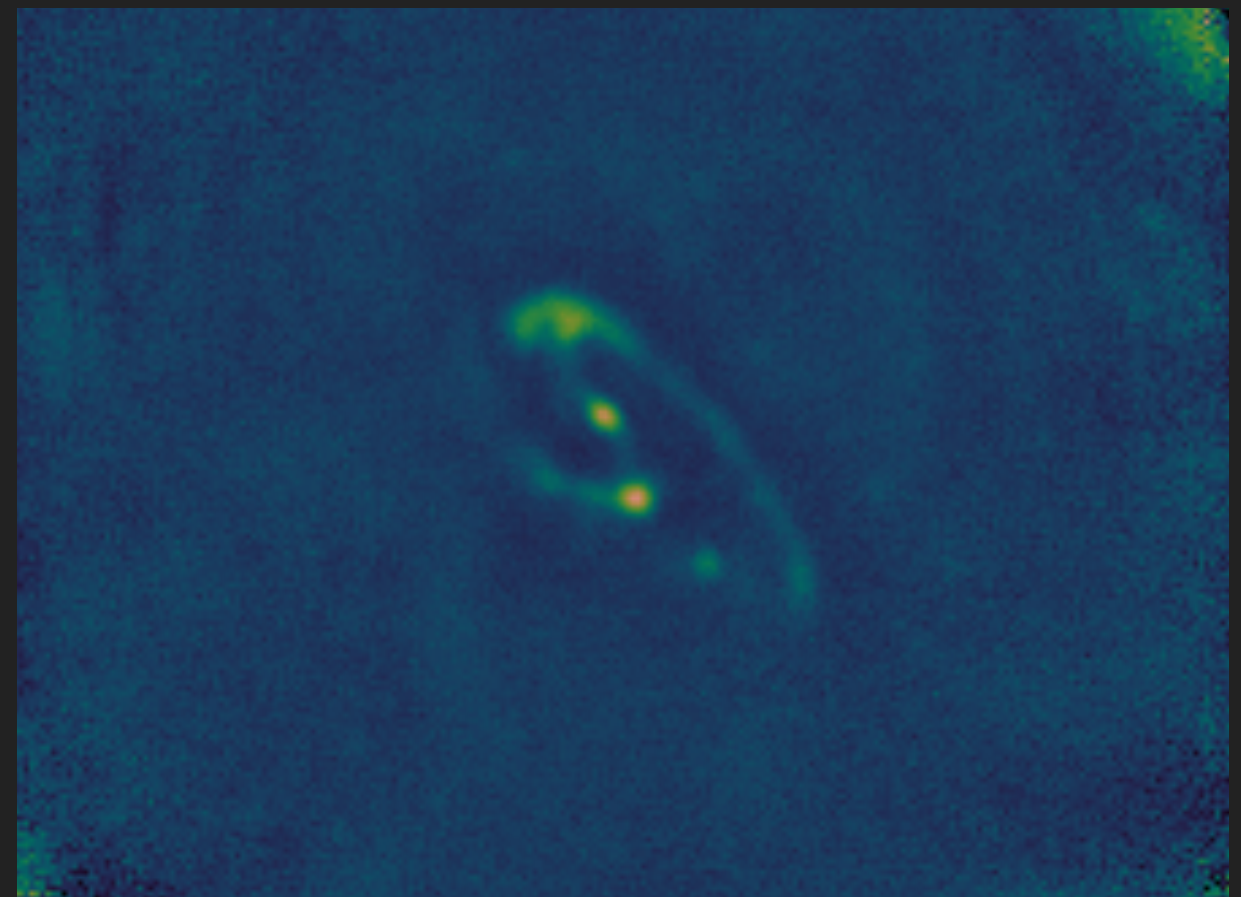
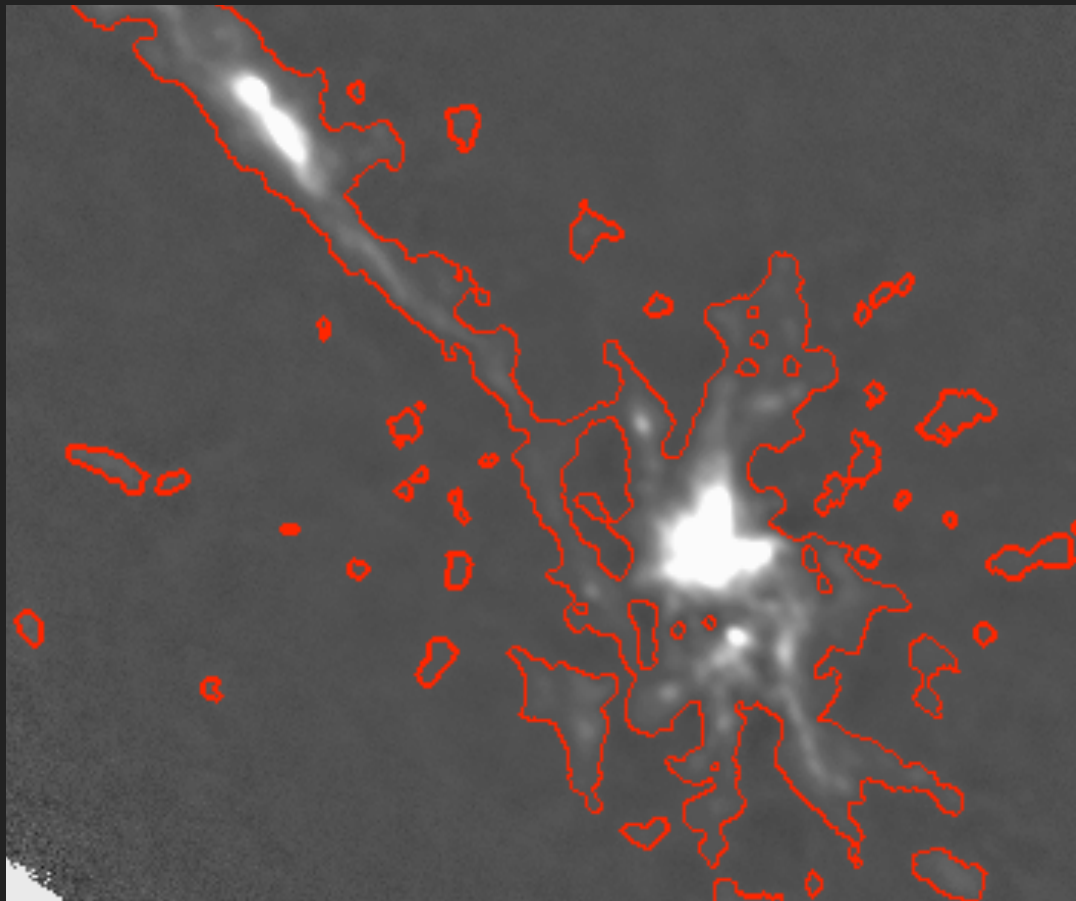
1. Science and pointing observations individually reduced, on HPX grid.
2. Coadds of science observations (that passed QA) towards the same tile.
3. **Extent Catalog:** contiguous regions of detected emission ( $>5\sigma$ ) – peak flux in a pixel, position of the peak, outline of detection, total flux contained in area.
4. **Peak Catalog:** (only within regions in the extent catalog) position of local maxima ( $>5\sigma$  difference from neighbouring maxima) – peak flux, position, parent extent ID.









## DETAILS OF REDUCTION PROCESS USED

- ▶ Uses `dimconfig jsa_generic` (in star-2015B release)
- ▶ Does not attempt to recover the largest scale structures (`com.perarray=1`)
- ▶ limited number of iterations used due to computational resources.
- ▶ Auto-masked reduction.
  - ▶ See Mairs+ 2015 for detailed comparison of effect of position within or without masks on source recovery.
- ▶ HEALPix reduction— maps are gridded on to HPX projection and tiled in HEALPix tiles.

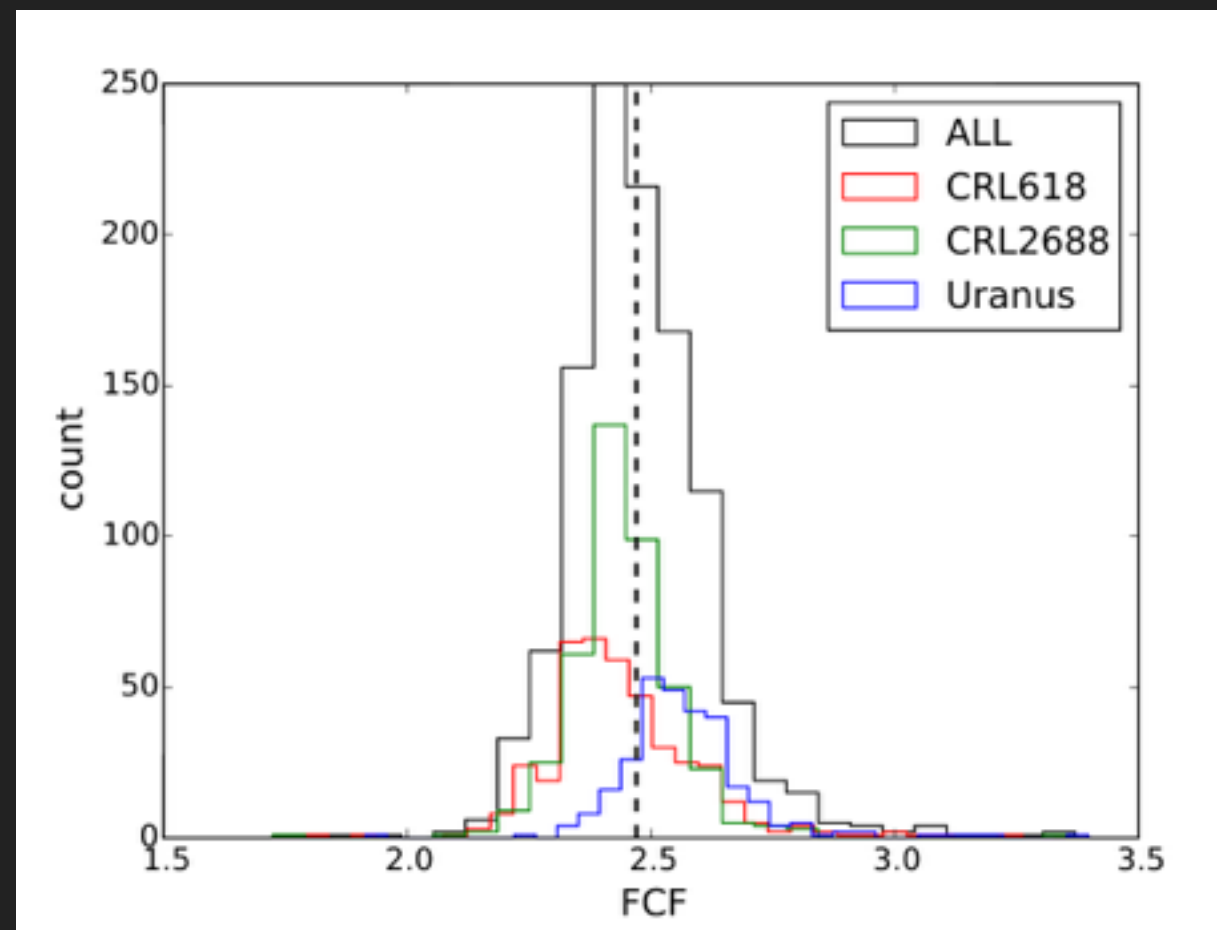
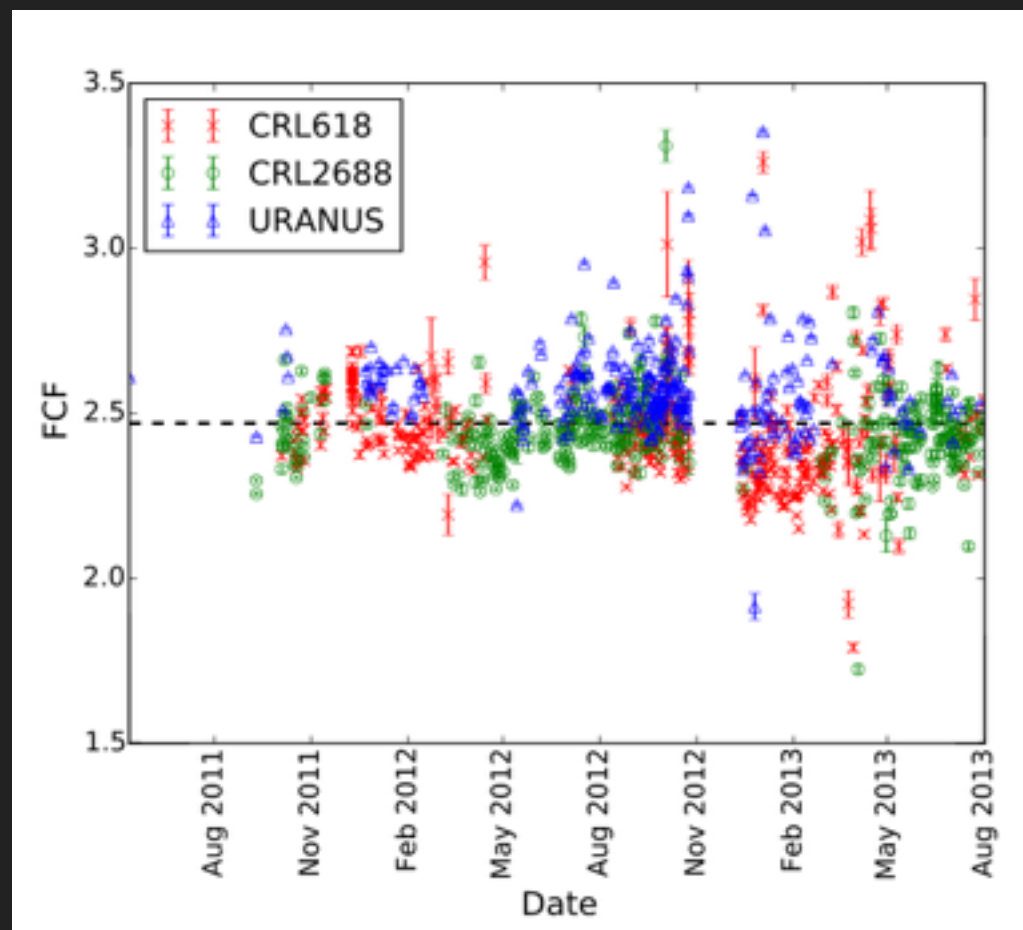




<b>Waiting to ingest</b> 107408 JAC 	<b>Waiting to ingest</b> 107622 JAC 	<b>Waiting to ingest</b> 108121 JAC 
<b>Waiting to ingest</b> 108210 JAC 	<b>Waiting to ingest</b> 108211 JAC 	<b>Waiting to ingest</b> 108212 JAC 

## CALIBRATION

- ▶ FCFs calculated for all observations of Uranus, CRL 618 and CRL 2688
- ▶ Average value then used:  $\text{FCF}_{\text{arcsec},850} = 2.47 \pm 0.14 \text{ Jy pW}^{-1} \text{ arcsec}^2$
- ▶ 5% higher than 'canonical' JCMT arc second FCF derived in Dempsey et al 2013

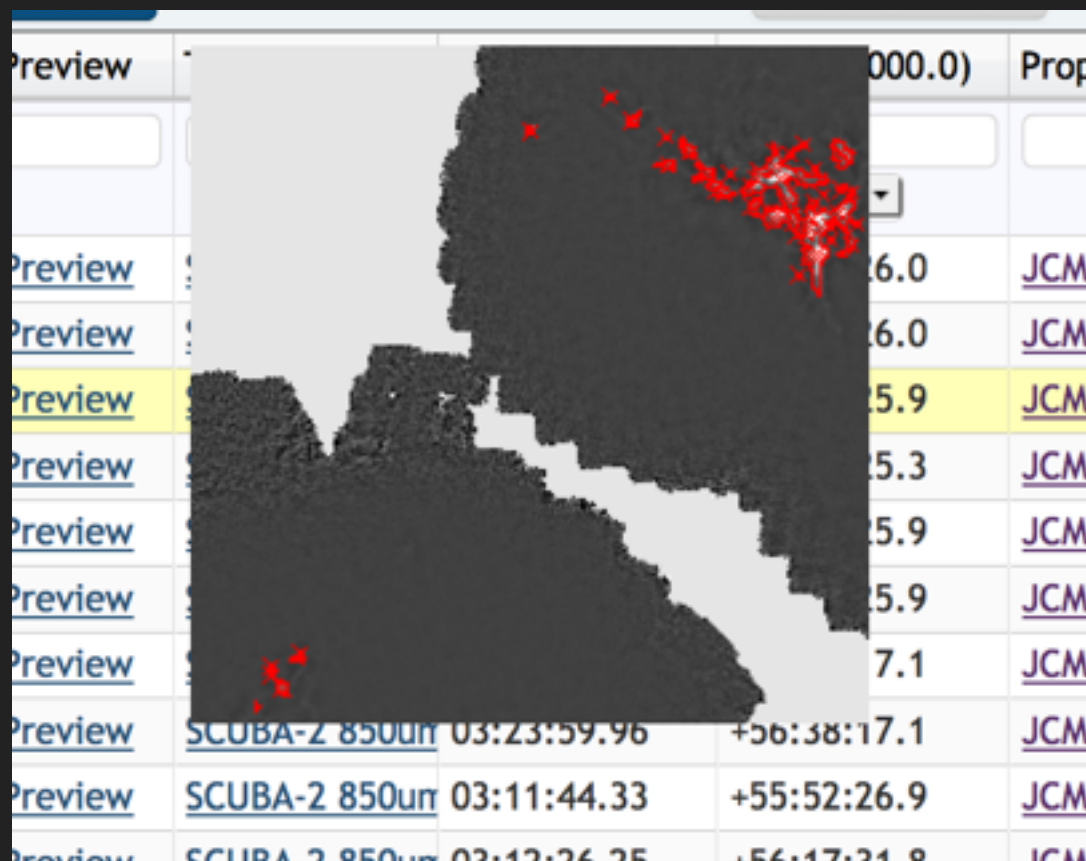


## USING THE JCMT LEGACY RELEASE

- ▶ Search CADC with proposal ID='JCMT-LR1' to view the coadds and catalogues.

<http://www.cadc-ccda.hia-ihp.nrc-cnrc.gc.ca/en/search/?Observation.proposal.id=JCMT-LR1&Observation.collection=JCMT#resultTableTab>

- ▶ Preview images for catalogs show you if there are any detections.
- ▶ MOC footprints of co-adds and sources also available.



			H:M:S	D:M:S	
<input type="checkbox"/>	<a href="#">Preview</a>	<a href="#">SCUBA-2 850um</a>	03:30:56.25	+31:23:26.0	<a href="#">JCMT-LR1</a>
<input type="checkbox"/>	<a href="#">Preview</a>	<a href="#">SCUBA-2 850um</a>	03:30:56.25	+31:23:26.0	<a href="#">JCMT-LR1</a>
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<input type="checkbox"/>	<a href="#">Preview</a>	<a href="#">SCUBA-2 850um</a>	04:24:15.22	+55:06:33.1	<a href="#">JCMT-LR1</a>



# FUTURE RELEASES

- ▶ Update to SCUBA-2 850um: observations taken up to March 2015
  - ▶ All individual observations reduced, and are awaiting available effort to finish the QA , do co-adds and analysis. **Release expected later this year**
- ▶ 450um data: from start to March 2015:
  - ▶ Individual observations reduced, QA on first half complete.
- ▶ HARP legacy release:
  - ▶ Most observations reduced, co-adding not yet investigated and QA plan still to be defined.
- ▶ In future, we would like to move to a mode where 'Legacy Release' products are a regular, and expected part of the JCMT data releases – updated at end of every semester with newly public data.

## SURVEY AND PI PRODUCTS IN THE JSA

- ▶ (Not part of the legacy release)
- ▶ We want to help the JLS and PI teams make their scientifically focused reductions easily findable and searchable.
- ▶ Currently working with the Gould Belt Survey to include the published products from their latest data release in the archive. SCUBA-2 and HARP.
- ▶ These will be fully searchable and available from CADC via the collection 'JCMTLS'.
- ▶ Search results should include link to webpage showing papers/DOIs etc.