MAPS

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-- REGION_DATE_SCAN_WAVELENGTH_CR3.sdf.gz

CR3 = Spatially aligned with the offsets derived using the Cross-Correlation method developed by Colton Broughton

Unsmoothed

No Relative Flux Calibration Applied

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-- REGION_DATE_SCAN_WAVELENGTH_CR3_mJybmsm_Wcal.sdf.gz

CR3 = Spatially aligned with the offsets derived using the Cross-Correlation method developed by Colton Broughton

mJybmsm = Units of milliJanskys per beam (mJybm) and spatially smoothed by a Gaussian kernel with FWHM = 2 pixels (sm)

Wcal = Relative flux calibration using the factors derived by the weighted lightcurves of each source

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-- REGION_DATE_SCAN_WAVELENGTH_CR3_*_coadd.sdf.gz

DATE_SCAN = Most recent date and scan included in the coadd

CR3 = Spatially aligned with the offsets derived using the Cross-Correlation method developed by Colton Broughton

mJybmsm = Units of milliJanskys per beam (mJybm) and spatially smoothed by a Gaussian kernel with FWHM = 2 pixels (sm)

Information on Maps and Source Lightcurves

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-- REGION_DATE_SCAN_WAVELENGTH_Wcal_sourceinfo.txt

DATE_SCAN = Most recent date and scan included in the file

This file is a catalogue of the sources that have been identified in the coadd using the FellWalker sourcefinding algorithm. It includes RA/DEC information, fluxes for each source at each date along, fiducial (expected) lightcurve information, and a measurement of each datapoint's distance from the mean peak flux of the light curve in units of the standard deviation of the light curve.

The weighted calibration (Wcal) was applied to generate the fluxes in this file.
-
The fiducial standard deviation model at 850 microns is:

sd_fiducial = sqrt[0.14^2 + (0.02*MeanFlux)^2]

The first term represents the typical noise in a given map.

At 450 microns, the fiducial SD model is:

sd_fiducial = 0.05*MeanFlux
-
Note: As of 2021-05-25, the "proto_dist" and "disk_dist" columns should be ignored. These are the distance to known protostars and disks,
but they are referring to YSO catalogues drawn form the Gould Belt. The YSO catalogues for the new 6 Transient Survey regions need to be
included in the pipeline.

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-- REGION_DATE_SCAN_WAVELENGTH_Wcal_metadata.txt

DATE_SCAN = Most recent date and scan included in the file

Includes information such as the UT, JD, Elevation, Opacity at 225 GHz (Tau225), and RMS of every map at this WAVELENGTH.

The weighted calibration (Wcal) was applied to these maps before the metadatafile was generated (affecting the RMS measurement).

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-- light_curves/ (directory)

Light curves of each source in the "*sourceinfo.txt" file, described above.

The grey data points show the uncalibrated fluxes while the blue datapoints show the fluxes after the weighted calibration (Wcal) was applied.

Information on alignment and relative flux calibration

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-- REGION_DATE_SCAN_WAVELENGTH_CalFactors.txt

Final applied Pointing Offset and Relative Flux Calibration factors for each epoch:

Date_Scan = The date and scan number of this observation.

dx, dy = x and y offsets (arcseconds) derived for this map using the Cross-Correlation Method (850 micron data = 450 micron data)

dx_check, dy_check = residual x and y offsets derived using point source peak identification and comparison (arcseconds)

WeightedCal = The relative flux calibration factor derived by Doug Johnstone's weighted source algorithm. This is the value by which the original data was DIVIDED to bring the maps into relative flux calibration.

WeightedCal_unc = The uncertainty in the weighted calibration factor

ACcal/WeightedCal = The derived auto-correlation relative flux calibration factor (normalised to the first map) divided by the Wcal calibration factor.

PScal/WeightedCal = The Point Source Family method's derived relative calibration factor divided by the Weighted Calibration method's relative calibration factor.

PScal_unc = The uncertainty in the Point Source Family calibration factor. A PScal value of "nan" indicates the RMS was too high to derive an appropriate relative flux calibration factor for this map.

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-- REGION_DATE_SCAN_WAVELENGTH_sourceinfo_calepoch_weightedmean.txt

Information on the weighted relative flux calibration algorithm results:

DateScan = The Date and Scan number of this observation

Divisor = The weighted relative calibration factor by which the original (uncalibrated) data should be **DIVIDED**

FormalUnc = Assuming all epochs have the same uncertainty (DO NOT USE)

WeighedCalUnc = The appropriate calibration uncertainty that takes into consideration differences in each epoch

NumCal = The number of calibrator sources used to derive these results

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-- REGION_DATE_SCAN_WAVELENGTH_sourceinfo_calsource_weightedmean.txt

Information on individual sources considered in the weighted relative flux calibration algorithm:

SourceInd = Matches the *sourceinfo.txt index

WMeanFlux = The weighted Mean Flux of the Source

WFluxSD = The weighted flux standard deviation across epochs. If the calculated weighted flux standard deviation is less than the fiducial flux standard deviation, this value will be set to the fiducial value to prevent runaway sources with very low standard deviation from dominating the calibration calculation.
-
The fiducial standard deviation model at 850 microns is:

sd_fiducial = sqrt[0.14^2 + (0.02*MeanFlux)^2]

The first term represents the typical noise in a given map.

At 450 microns, the fiducial SD model is:

sd_fiducial = 0.05*MeanFlux
-

WFidSD = The weighted fiducial flux standard deviation.

WFluxSD_div_WFidSD = WFluxSD divided by WFidSD

wt = The final weight of the source used in the calibration calculation

Note: the source indices are the same as those provided in the *sourceinfo.txt file. **Source indices differ for 450 and 850 microns as these source lists were compiled independently based on the distinct co-added maps at each wavelength.**

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--REGION_DATE_SCAN_WAVELENGTH_weightedcal_plots.pdf

Four plots describing the weighted relative flux calibration results:

Top left : Source flux/Source Uncertainty as a function of Source Flux

Top Right : The derived weight for each source as a function of source flux

Bottom Left : The Calibration factor as a function of epoch

Bottom Right: The Calibration factor uncertainty as a function of Epoch

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--family_members_DATE_WAVELENGTH.txt

DATE = When the sources that are included in the calculations of the Point Source calibration were finalised.

File includes a list of sources used to perform the Point Source relative flux calibration. The source indices correspond to the source indices presented the:

REGION_DATE_SCAN_WAVELENGTH_sourceinfo.txt files (see above).

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REGION_850_local_pointing_corrections*

PDF and text versions of the Residual point source checks performed by identifying and comparing bright point sources form epoch to epoch. The results are the same at 450 and 850 microns, so the 850 micron data is shown. In the text file are the values used to create the *.pdf plots. All maps are aligned to the first image.

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"GoodMaps"

At 450 microns, the RMS noise can differ by more than an order of magnitude. Therefore, not every observation is useful for extracting fluxes (when the atmospheric transmission is too high due to a low elevation or a large amount of water vapour, the 450 micron data can yield no detectable sources).

We have determined that robust flux measurements can be obtained when:

1. The uncertainty in the weighted calibration (WeightedCal_Unc in the *CalFactors.txt file) is < 0.05, and

2. The opacity at 225GHz (proxy for atmospheric water vapour) multiplied by the airmass (1/sin[Elevation]) is < 0.14. The weather information can be found in the *metadata.txt files.