Known issues with full sample cutouts

Producing a catalogue of sources quiet at 160 μm returns 4015 clumps, and a variety of errors. The problems encountered are below, with any changes made to the code to account for these. Some of these changes will introduce unnecessary problems when working with other catalogues, such as matching non-exact file names to catalogued map names.

Single wavelength catalogue input

0.172+0.211	2	0.1866	0.2281	266.2939	-28.6580
0.172+0.211	3	0.1951	0.2258	266.3011	-28.6520
0.173+0.338	1	0.1762	0.3203	266.1981	-28.6187
0.173+1 70mu	1	0.1728	1.0098	265.5287	-28.2598
0.181-0.285	1	0.1893	-0.3168	266.8267	-28.9390
0.181-0.285	2	0.1979	-0.3267	266.8415	-28.9367
0.181-0.285	3	0.1764	-0.2569	266.7605	-28.9190
0.181-0.285	4	0.2094	-0.2542	266.7774	-28.8894
0.181-0.285	5	0.2031	-0.2401	266.7599	-28.8874
0.181-0.285	6	0.2154	-0.2485	266.7754	-28.8813
0.183-0.416	1	0.1671	-0.4458	266.9397	-29.0248
0.183-0.416	2	0.2438	-0.4564	266.9955	-28.9646
0.183-0.416	3	0.2450	-0.4428	266.9828	-28.9566
0.184-0.066	1	0.1958	-0.0616	266.5814	-28.8010
0.186-0.179	1	0.1903	-0.1679	266.6818	-28.8609

Figure 1: **hyper_photometry_sig_var_FWHM_all_IRDC_run_70_350_sources_only_250.dat**: IRDC map names with integer coordinates

The map name strings in the single wavelength catalogues introduce some issues that require manual adjustments before running as well as changes to the method used by the cutout code. Map strings in the catalogues are not set to show a fixed number of decimal places, and therefore coordinates that are integer to 3 decimal places appear without a decimal point. As shown in Figure 1, this appears to cause problems when trimming strings and the string is left with an additional '70mu'. This results in no FITS files matched to the source during cutout production. As such, these extra strings have been manually removed from relevant catalogues.

In addition to this, all map names in the single wavelength catalogues have a maximum length of 12 characters, resulting in the last digit being clipped from some coordinate strings. Therefore, some map names in the catalogue ($\sim 50\%$) do not have an exact match to the coordinates appearing in filenames of IRDCs. It was therefore assumed that it was unlikely that two clouds would share coordinates that would be identical without the last digit, and all FITS filenames containing the 12-character substring were assumed to be the correct cloud. As shown in Figure 2, there are sources that do require this last digit to be assigned to a unique cloud.

351.588+0.59	38	351.5427	0.6984	260.2569	-35.6500
351.588+0.59	39	351.6126	0.5967	260.4089	-35.6504
351.588+0.59	40	351.6068	0.6066	260.3947	-35.6496
351.588+0.59	41	351.5533	0.6918	260.2710	-35.6450
351.588+0.59	42	351.6568	0.5460	260.4910	-35.6429
351.588+0.59	43	351.6020	0.6317	260.3659	-35.6392
351.588+0.59	44	351.6169	0.6191	260.3891	-35.6341
351.588+0.59	45	351.6636	0.5632	260.4784	-35.6276
351.588+0.59	46	351.5741	0.7006	260.2767	-35.6230
351.588+0.59	47	351.5654	0.7134	260.2577	-35.6228
351.588+0.59	48	351.6021	0.6674	260.3299	-35.6188
351.588+0.59	49	351.5881	0.6994	260.2878	-35.6121
351.588+0.59	50	351.5787	0.7175	260.2629	-35.6095
351.588+0.59	51	351.6248	0.6749	260.3381	-35.5959
351.588+0.59	52	351.6209	0.6822	260.3281	-35.5950
351.588+0.59	53	351.6863	0.6419	260.4146	-35.5641
351.588+0.59	54	351.6971	0.6381	260.4260	-35.5574
351.588+0.59	55	351.7021	0.6418	260.4258	-35.5512
351.588+0.59	56	351.6961	0.6510	260.4122	-35.5509
351.588+0.59	57	351.6737	0.6886	260.3586	-35.5479
351.588+0.59	58	351.6981	0.6572	260.4073	-35.5457
351.588+0.59	1	351.5726	0.5838	260.3939	-35.6907
351.588+0.59	2	351.5678	0.6035	260.3705	-35.6834
351.588+0.59	3	351.5930	0.5740	260.4181	-35.6795
351.588+0.59	4	351.5874	0.5915	260.3965	-35.6741
351.588+0.59	5	351.5963	0.5821	260.4121	-35.6721
351.588+0.59	6	351.5843	0.6026	260.3831	-35.6703
351.588+0.59	7	351.6035	0.5985	260.4006	-35.6569
351.599-0.85	1	351.5995	-0.8598	261.8896	-36.4804
351.599-0.85	2	351.6061	-0.8553	261.8895	-36.4724
351.599-0.85	3	351.6066	-0.8401	261.8741	-36.4636

Figure 2: **hyper_photometry_sig_var_FWHM_all_IRDC_run_70_350_sources_only_250.dat**: IRDC map coordinates clipped to 12 characters

Errors with map regions when producing cutouts

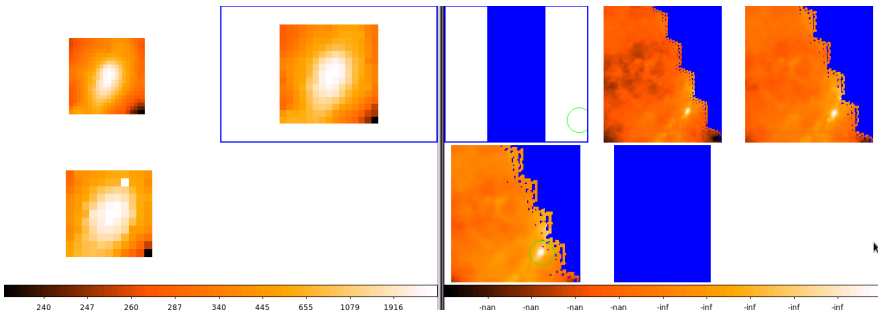

Figure 3: **HGL297.535-0.748**: source outside region in 70 and 160 μm. Cutouts are ordered as 250, 350, 500 μm, and the FITS images are 160, 250, 350, 500 and 70 μm.

Figure 3 is the first example of Montage failing to produce a cutout as the entire cutout region requested lies outside the IRDC map at 160 and 70 μm. The source is visible in the 250, 350 and 500 μm maps, and the circled region in the 160 μm map corresponds to this position. This error is not caused by the presence of NaN pixels as cutouts containing only NaNs are still produced.

For the source shown in Figure 4, the cutout code fails at 70 μm. The circled region in each map marks the source location. It should be noted that the 160 μm cutout is produced without error as some of the requested cutout region overlaps with the map. This results in cutouts produced in which the source is not visible, corresponding to the sources in Category IV(i) in the sorted set.

The third region error is caused by the 12-character clipping of map strings as mentioned earlier. Some sources are incorrectly matched to the wrong IRDC FITS file, and therefore appear outside the map bound-

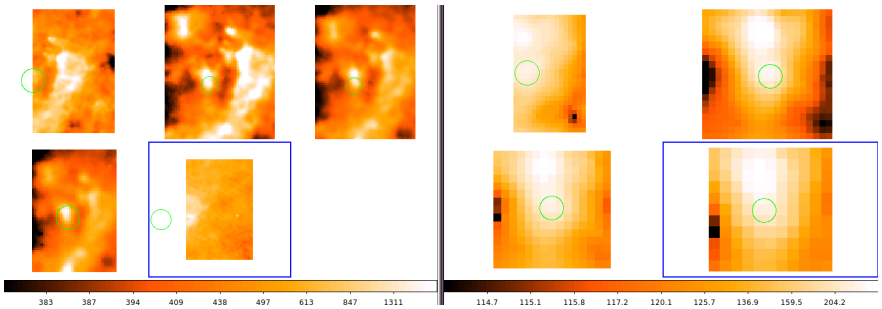

Figure 4: **HGL337.515-1.091**: sources outside region in 70 and 160 μm. Source shown only fails on 70 μm

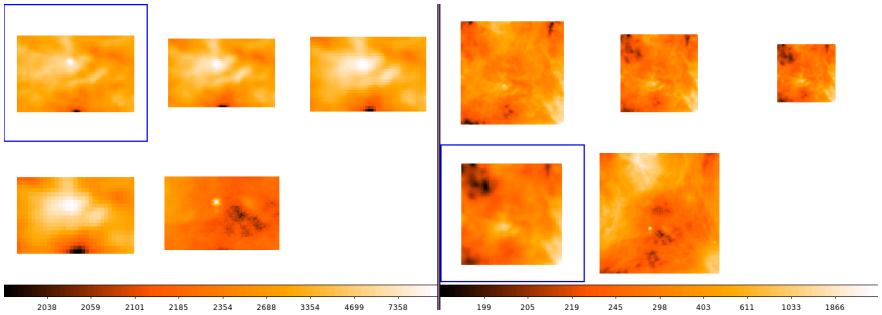

Figure 5: **HGL351.558+0.592 and HGL351.558+0.593**: sources outside region in 70 due to incorrectly matching sources to both clouds as a result of clipping catalogued map names to 12 characters

aries. Figure 5 shows the two IRDCs highlighted in Figure 2, with +0.593 on the left and +0.592 on the right. One cloud appears to be a subregion of the other, and to remove this error and produce cutouts, +0.593 has been temporarily removed from the list of clouds available for producing cutouts as there is no way of determining the correct cloud to assign each source to from the catalogue map names.

Log scale limit errors

The creation of pdf files from cutouts fails in 26 cases where the maps at 70 and/or 160 μm only contains Inf or NaN values, and the FITS image cannot be displayed correctly when setting log scale limits. Such images have been checked and appear as the 160 and 70 μm maps shown in Figure 3.