

The SDP Catalogue for the -ATLAS Survey

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The Herschel-ATLAS Survey

- The Herschel-ATLAS (H-ATLAS) is the largest of the Open Time Key Programmes in both time (~600 hours) & area (~550 deg²)
- FIR-submm counterpart of SDSS - it will cover 100-500 μ m and detect ~200,000 sources with a median redshift of 1
- It will be the first unbiased survey of cool dust & obscured star formation in the Local Universe
- Other science goals range from debris disks to quasars as described in Eales et al. (2010)
- 4x4 deg² H-ATLAS field observed as part of Science Demonstration Phase (SDP) observations

Creating the SDP Catalogue

- Sources extracted from the 3 SPIRE maps together, using the Multi-band Algorithm for source eXtraction (MADX; Maddox et al. 2010); 6878 sources detected at $>5\sigma$ in any of the SPIRE bands
- Flux densities for extended sources at 250 & 350 μ m replaced with aperture flux density, measured using an aperture-radius based on optical size - Figure 1.
- PACS sources identified using the SExtractor package (Bertin & Arnouts, 1996), measured using aperture photometry & matched to SPIRE catalogue
- Catalogue values in good agreement with those found previously, e.g. Figure 2

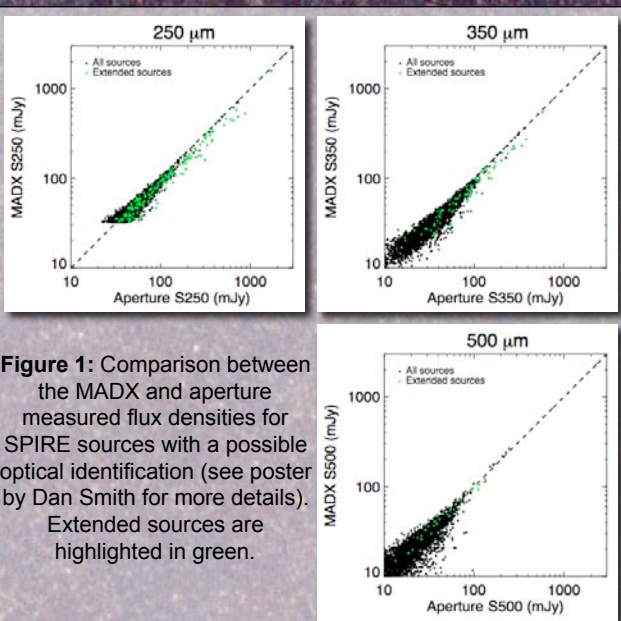


Figure 1: Comparison between the MADX and aperture measured flux densities for SPIRE sources with a possible optical identification (see poster by Dan Smith for more details). Extended sources are highlighted in green.

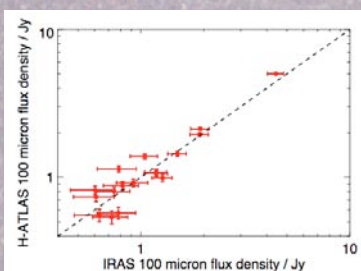


Figure 2: Comparison between the PACS & IRAS 100 μ m flux densities (Wang & Rowan-Robinson, 2009) for the 18 common sources

Assessing Catalogue Reliability

- Realistic SPIRE simulations of the SDP field are needed to assess the catalogue - created using noise properties of maps, & populated using models of Negrello et al. (2007) which match the real data (Figure 3 & see poster by Dave Clements on the H-ATLAS source counts)
- The simulations also contain IRAS cirrus & realistic source sizes
- Simulated extracted catalogue again created using combination of MADX & aperture photometry
- These catalogues are used to determine completeness, contamination and boosting in the real SD data, as illustrated in Figures 4, 5 & 6

Figure 3: Integrated source counts for the extracted & true simulated catalogues, compared with those calculated using the SDP data

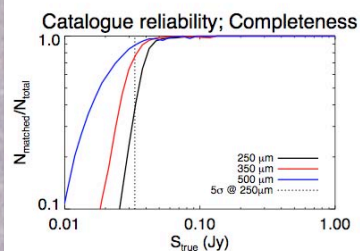
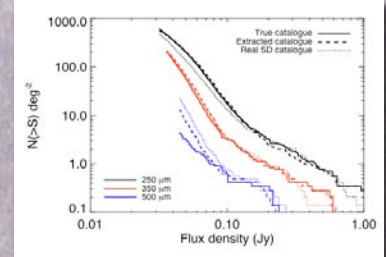


Figure 4: Completeness, the ratio of the number of detected sources to the total number present in the input (true) catalogue, determined from the simulations

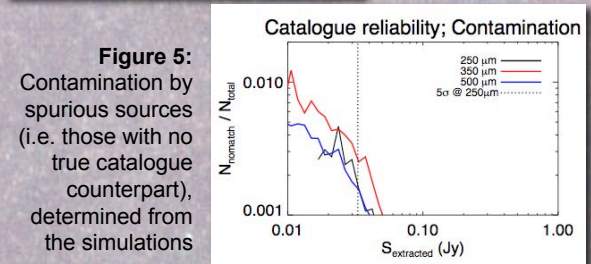


Figure 5: Contamination by spurious sources (i.e. those with no true catalogue counterpart), determined from the simulations

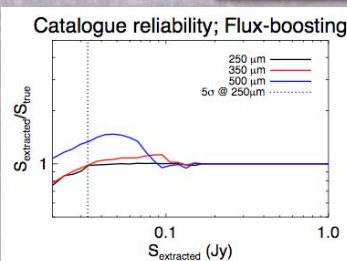


Figure 6: The ratio of flux densities in the true (S_{true}) and extracted ($S_{extracted}$) catalogues, showing the level of flux-boosting present in the simulations

Conclusions

- This poster has presented the SDP catalogue created for the first observations of the H-ATLAS survey, along with a description of the realistic simulations of the SDP field that have been created to assess the reliability of these data
- Full details of the catalogue, along with the corrections determined from the simulations, can be found in Rigby et al., (2010)