24+Radio Catalog Manual

(GOODS-North)

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Contents

1 Abstract

This is the manual for the 24+radio catalog. We select sources from the GOODS-Spitzer IRAC catalog in GOODS-North field using 24 and radio images.

We use Monte-Carlo simulation to validate and correct measurements. The output is a catalog contains IRAC, Ks, 24 and radio band flux and uncertainties. Additional, we measure 16um based on this catalog, and append 16um flux and uncertainty to our final 24+radio catalog.

With the final 24+radio catalog, we do a panchromatic SED fitting to derive SFR, dust mass, and to predict the far-infrared band fluxes, which will be used for the next step "super-deblending" photometry.

Hints: black text are our method and procedures, blue text are notes, and red text are unsolved issues.

2 Band 24

2.1 Galfit at band 24

We use these commands to run the galfit photometry at band 24:

```
1  # run first-pass without varying source position
2  ./do_Galfit 24 201500 -catalog irac_mips_fluxes_hdfn.dat
3  cd boxgalfit; do_GalfitRunqsub; cd ..
4  ./do_Galfit 24 201500 -catalog irac_mips_fluxes_hdfn.dat -postparallel
5  # then second-pass varying source position
6  ./do_Galfit 24 201500 -catalog irac_mips_fluxes_hdfn.dat -vary
7  cd boxgalfit_vary; do_GalfitRunqsub; cd ..
8  ./do_Galfit 24 201500 -catalog irac_mips_fluxes_hdfn.dat -vary -postparallel
```

2.2 Galsim at band 24

We use these commands to run the Monte-Carlo simulation at band 24:

```
1   # first estimate magnitude range
2   convert_flux2mag goodsn 24 $(0.0044*01) 1 # (mBias -0.2036 fBias -0.000553)
3   convert_flux2mag goodsn 24 $(0.0044*25) 1 # (mBias -0.2036 fBias -0.000553)
4   # then do the simulation
5   # ./do_Galsim 24 201500 -mag0 -2.8416 -mag1 0.530157 -number 6000 -vary \
6   -catalog RadioOwenMIPS24_priors_April18_2014.txt
7   ./do_Galsim 24 201500 -mag0 -2.8416 -mag1 0.530157 -number 6000 -vary \
8   -catalog irac_mips_fluxes_hdfn.dat
9   cd boxgalsim; do_GalsimRunqsub; cd ..
10  ./do_Galsim 24 201500 -mag0 -2.8416 -mag1 0.530157 -number 6000 -vary \
11  -catalog irac_mips_fluxes_hdfn.dat -postparallel
```

2.3 Galsim Analysis at band 24

We use these commands to run the simulation analysis at band 24:

```
1  sm
2  macro read run_simu_stats_v7.sm run_simu_stats_v7 24 201500
```
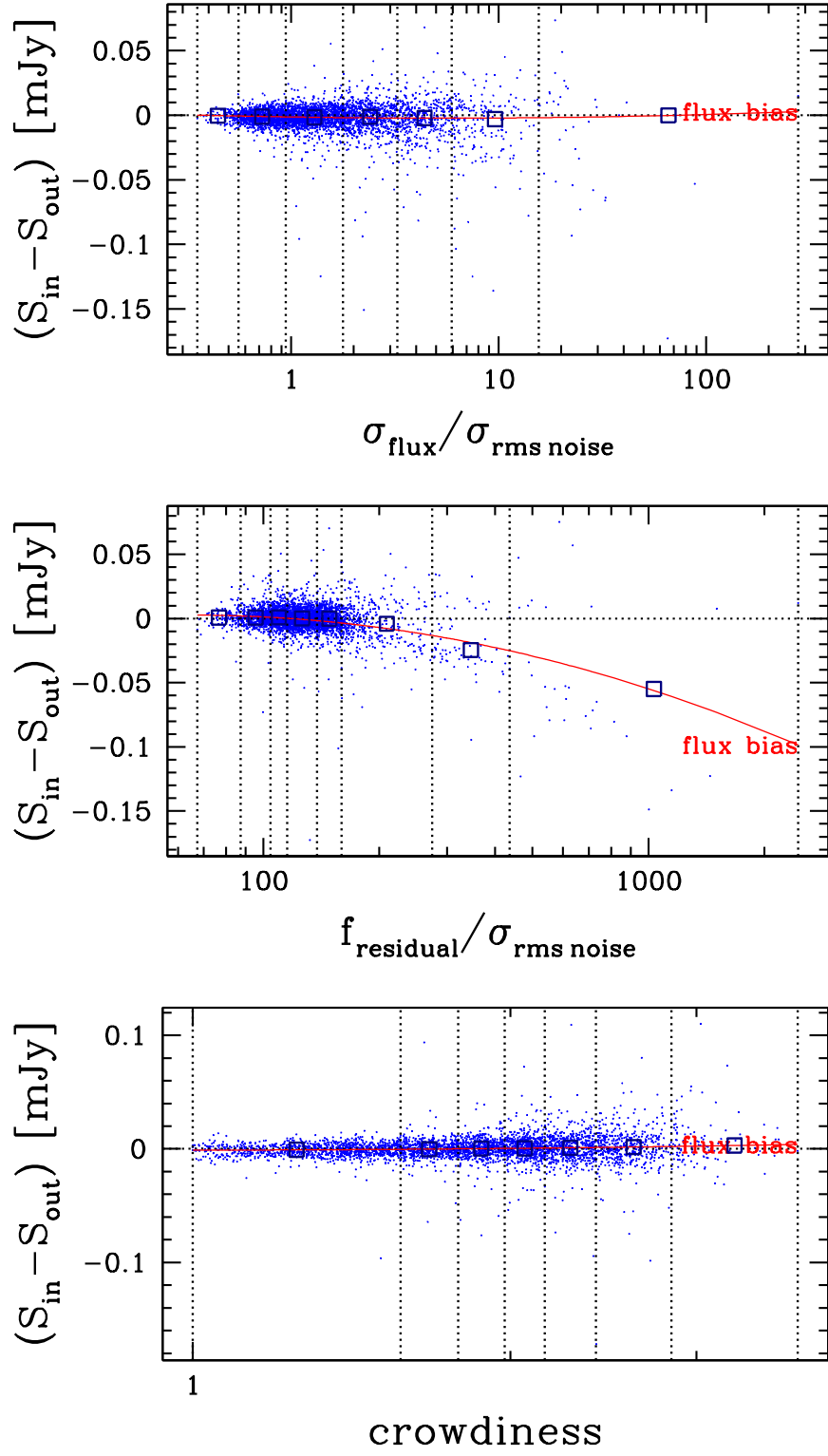
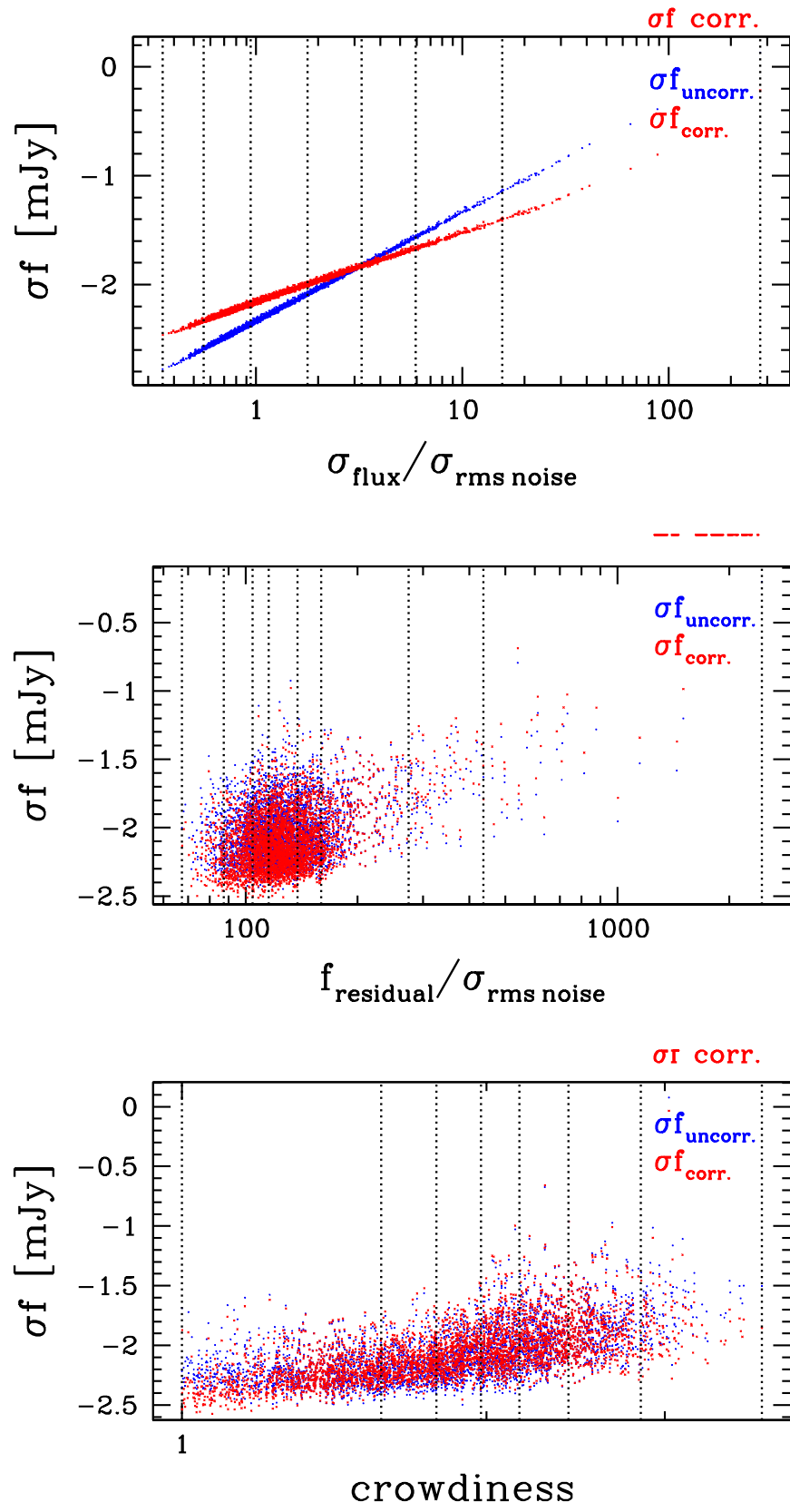Figure 1: Flux bias analysis from simulation.
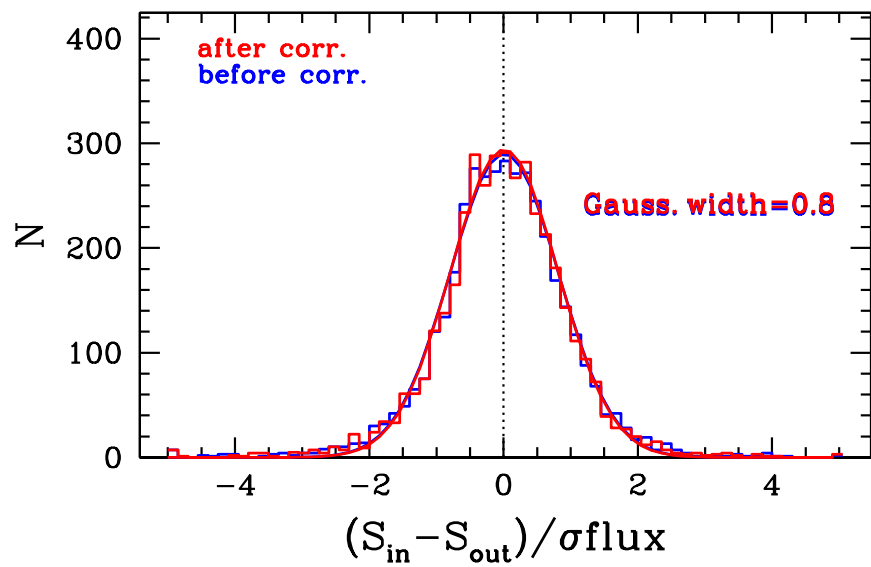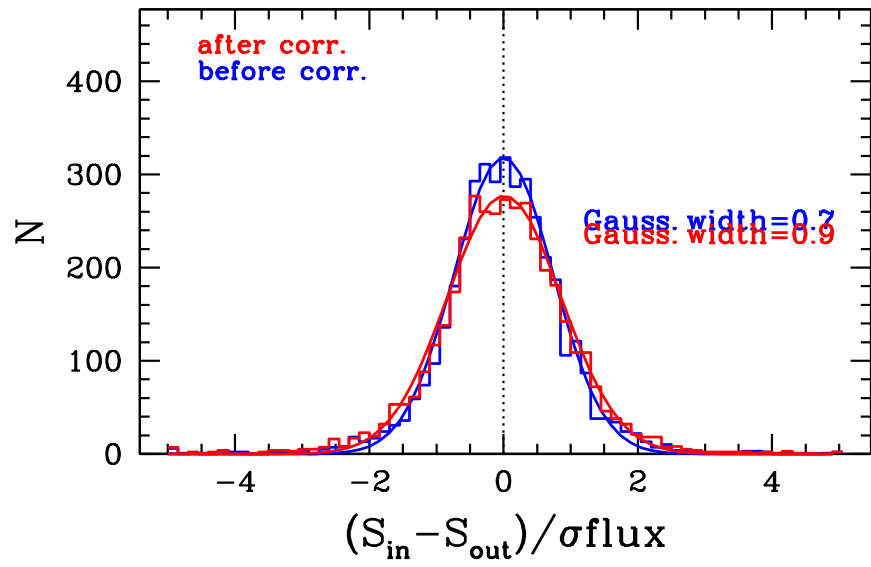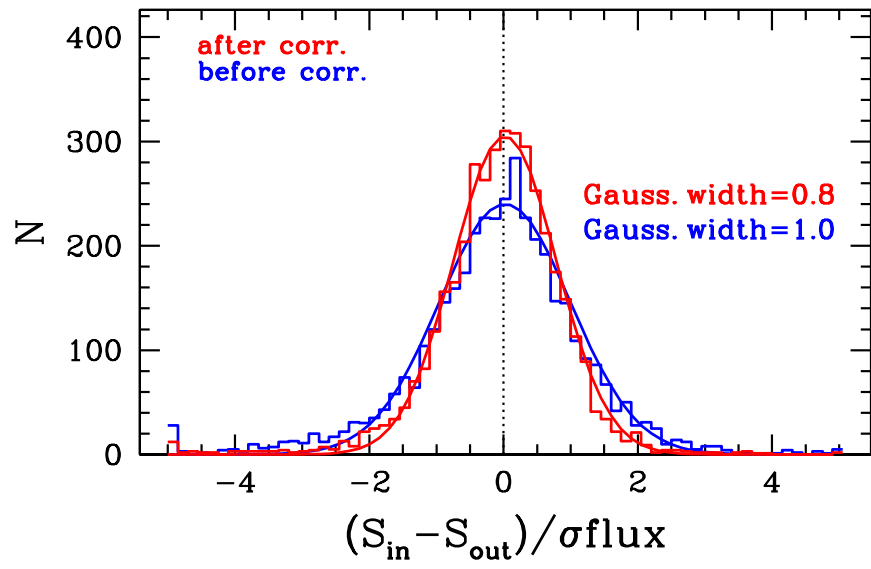
Figure 2: Flux uncertainty analysis from simulation.

Figure 3: Statistical behavior of input minus output differences before and after correction.