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:

```
# run first-pass without varying source position
./do_Galfit 24 201500 -catalog irac_mips_fluxes_hdfn.dat
cd boxgalfit; do_GalfitRunqsub; cd ..
./do_Galfit 24 201500 -catalog irac_mips_fluxes_hdfn.dat -postparallel
# then second-pass varying source position
./do_Galfit 24 201500 -catalog irac_mips_fluxes_hdfn.dat -vary
cd boxgalfit_vary; do_GalfitRunqsub; cd ..
./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:

```
# first estimate magnitude range
convert_flux2mag goodsn 24 $(0.0044*01) 1 # (mBias -0.2036 fBias -0.000553)
convert_flux2mag goodsn 24 $(0.0044*25) 1 # (mBias -0.2036 fBias -0.000553)
# then do the simulation
# ./do_Galsim 24 201500 -mag0 -2.8416 -mag1 0.530157 -number 6000 -vary \
-catalog RadioOwenMIPS24_priors_April18_2014.txt
./do_Galsim 24 201500 -mag0 -2.8416 -mag1 0.530157 -number 6000 -vary \
-catalog irac_mips_fluxes_hdfn.dat
cd boxgalsim; do_GalsimRunqsub; cd ..
./do_Galsim 24 201500 -mag0 -2.8416 -mag1 0.530157 -number 6000 -vary \
-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:

```
sm
macro read run_simu_stats_v7.sm run_simu_stats_v7 24 201500
```

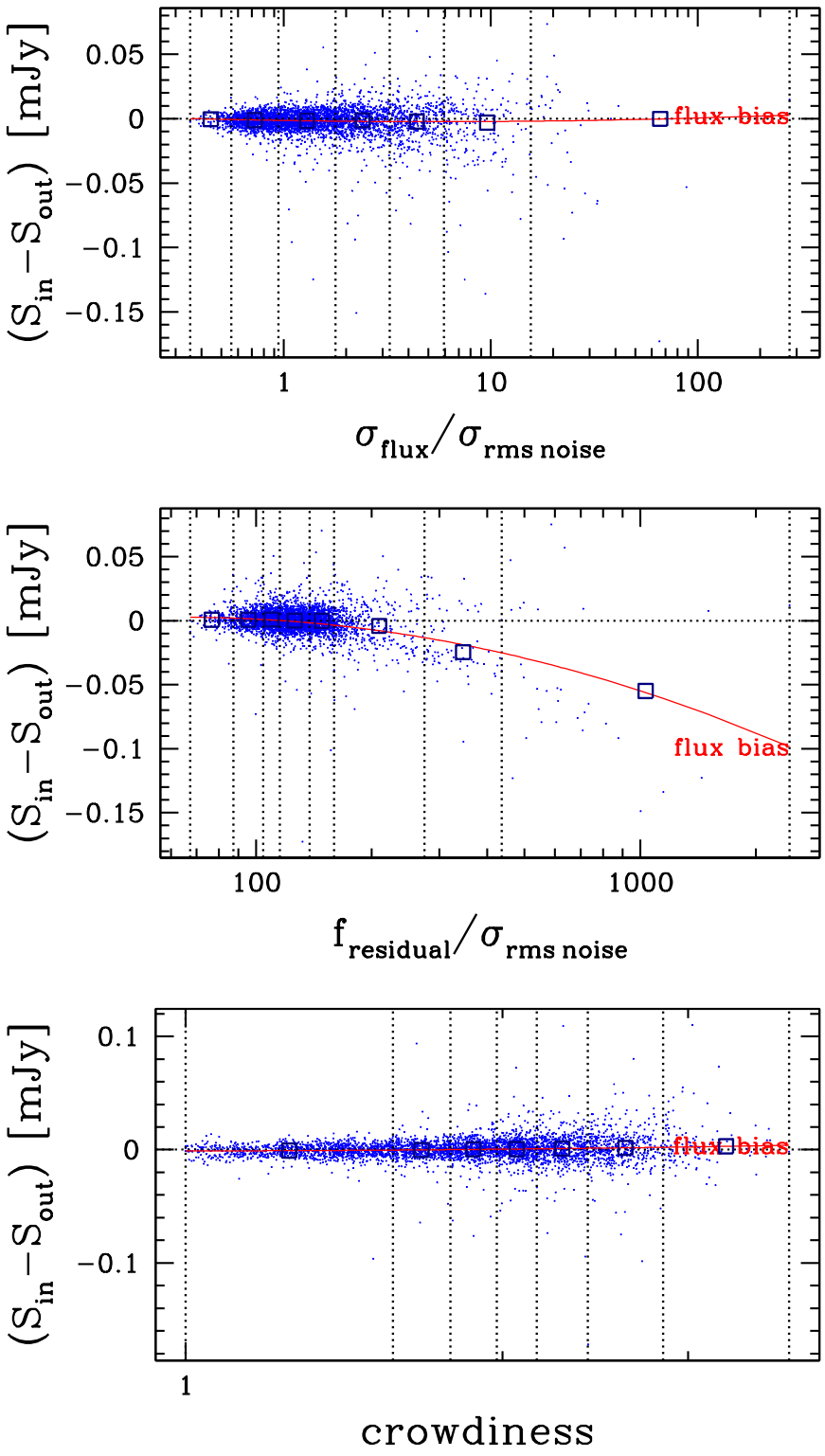

Figure 1: Flux bias analysis from simulation.

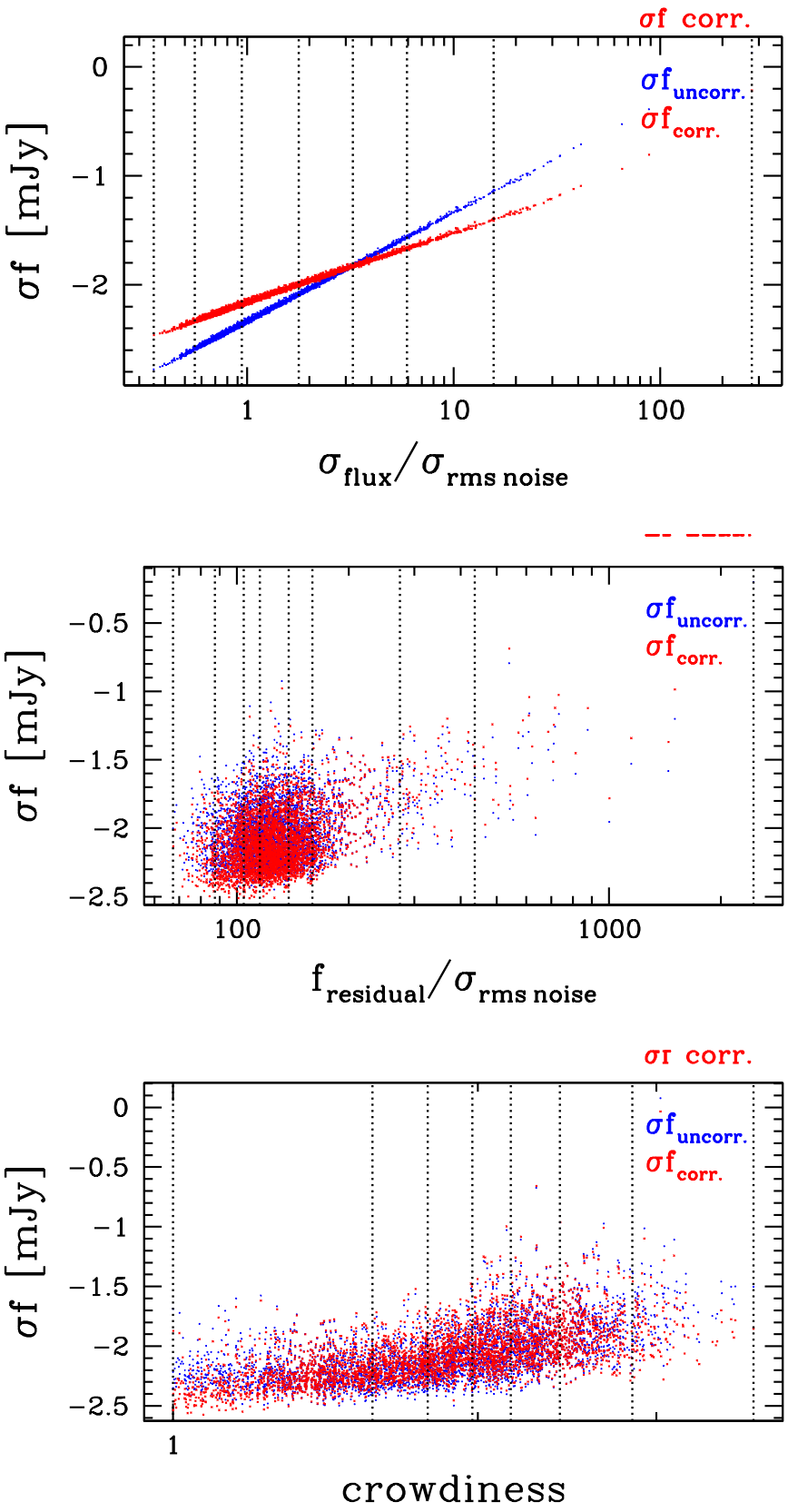

Figure 2: Flux uncertainty analysis from simulation.

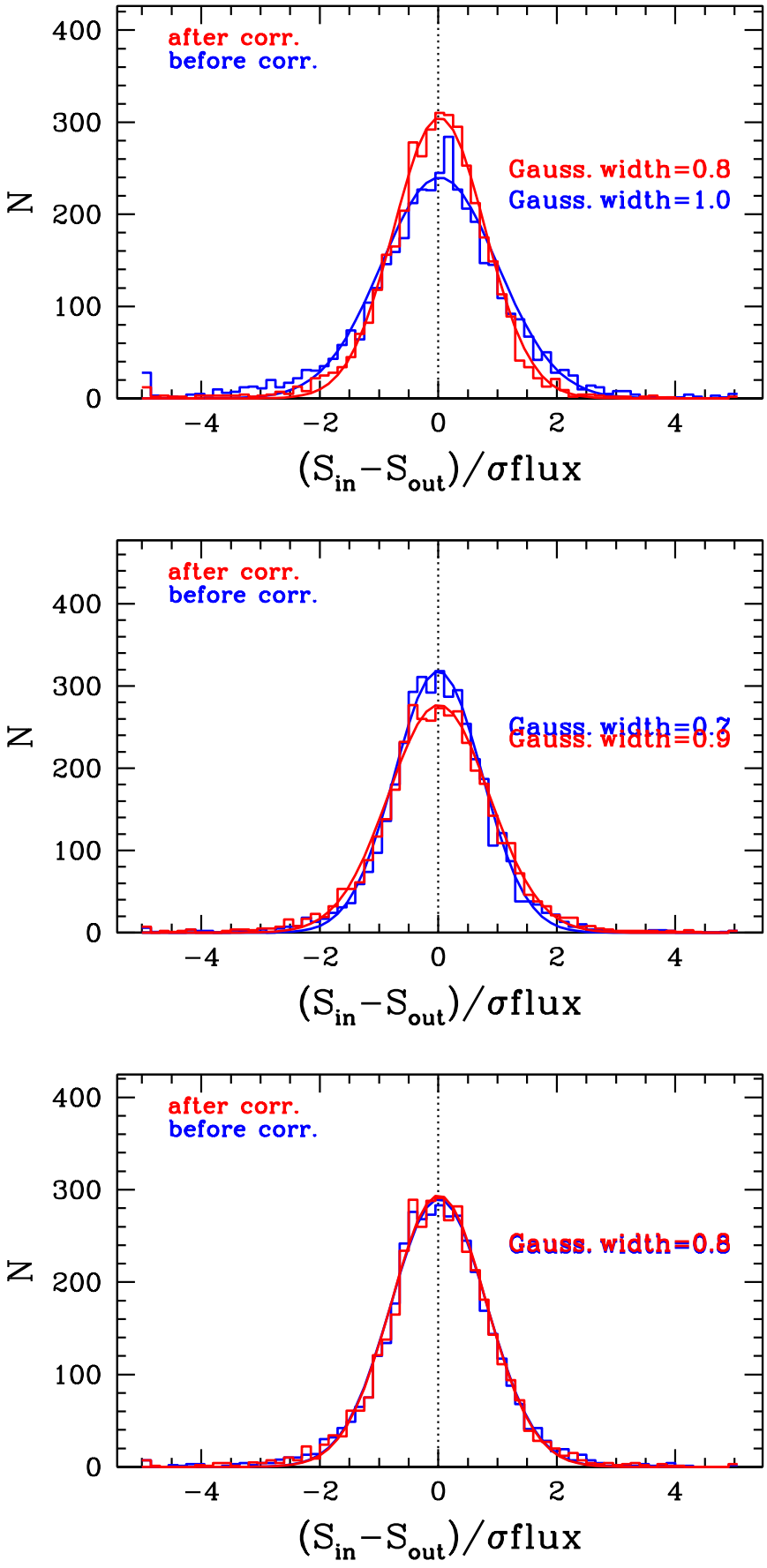

Figure 3: Statistical behavior of input minus output differences before and after correction.

3 Band 20cm

3.1 Galfit at band 20cm

We use these commands to run the galfit photometry at band 20cm:

```
# run first-pass without varying source position
./do_Galfit 20cm 201500 -catalog irac_mips_fluxes_hdfn.dat
cd boxgalfit; do_GalfitRunqsub; cd ..
./do_Galfit 20cm 201500 -catalog irac_mips_fluxes_hdfn.dat -postparallel
# then second-pass varying source position
./do_Galfit 20cm 201500 -catalog irac_mips_fluxes_hdfn.dat -vary
cd boxgalfit_vary; do_GalfitRunqsub; cd ..
./do_Galfit 20cm 201500 -catalog irac_mips_fluxes_hdfn.dat -vary -postparallel
```

3.2 Galsim at band 20cm

We use these commands to run the Monte-Carlo simulation at band 20cm:

```
# first estimate magnitude range
convert_flux2mag goodsn 20cm $(0.0044*01) 1 # (mBias -0.2036 fBias -0.000553)
convert_flux2mag goodsn 20cm $(0.0044*25) 1 # (mBias -0.2036 fBias -0.000553)
# then do the simulation
# ./do_Galsim 20cm 201500 -mag0 -2.8416 -mag1 0.530157 -number 6000 -vary \
-catalog RadioOwenMIPS20cm_priors_April18_2014.txt
./do_Galsim 20cm 201500 -mag0 -2.8416 -mag1 0.530157 -number 6000 -vary \
-catalog irac_mips_fluxes_hdfn.dat
cd boxgalsim; do_GalsimRunqsub; cd ..
./do_Galsim 20cm 201500 -mag0 -2.8416 -mag1 0.530157 -number 6000 -vary \
-catalog irac_mips_fluxes_hdfn.dat -postparallel
```

3.3 Galsim Analysis at band 20cm

We use these commands to run the simulation analysis at band 20cm:

```
sm
macro read run_simu_stats_v7.sm run_simu_stats_v7 20cm 201500
```