CLUSTERING REDSHIFT WITHIN MICE2

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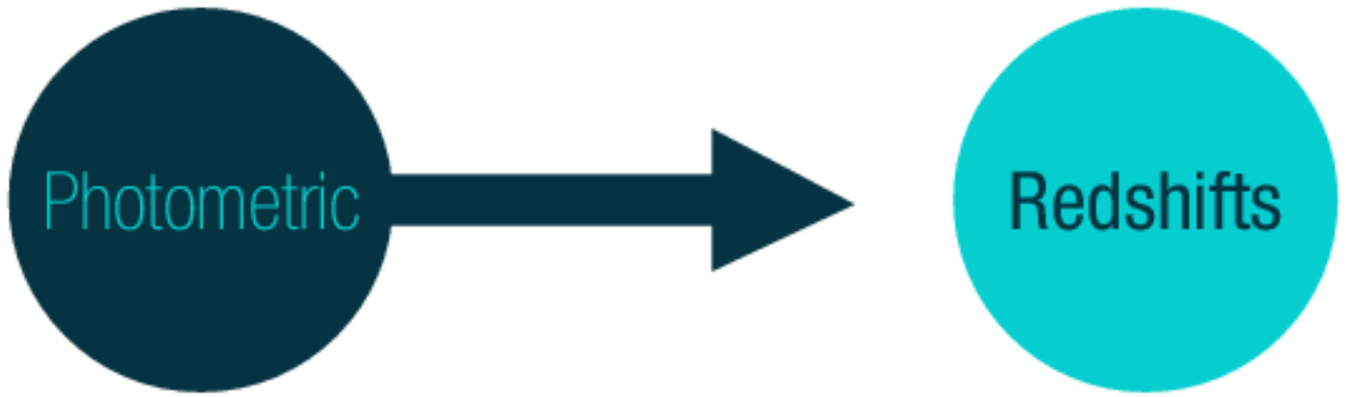
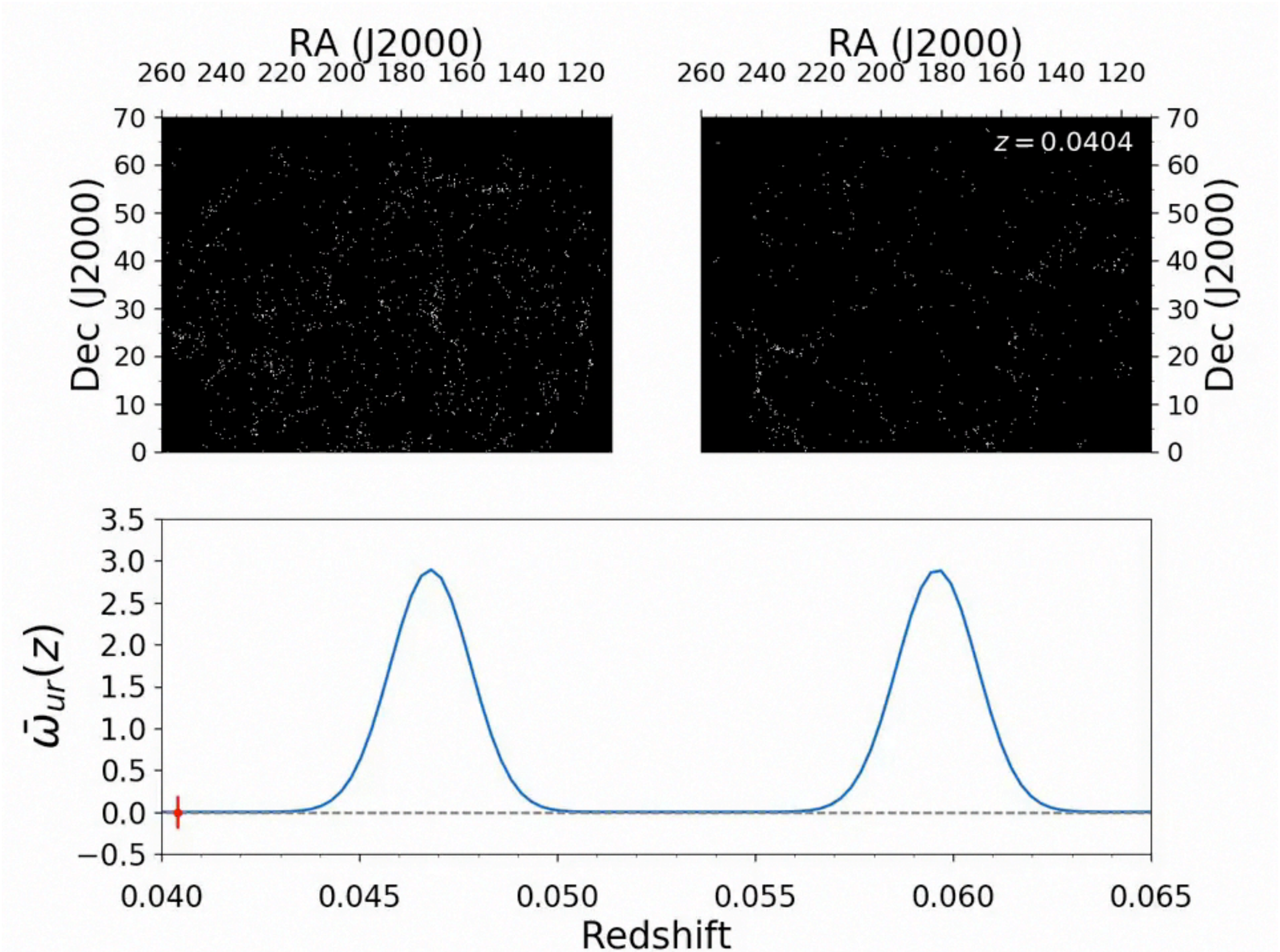
Photometric Redshifts

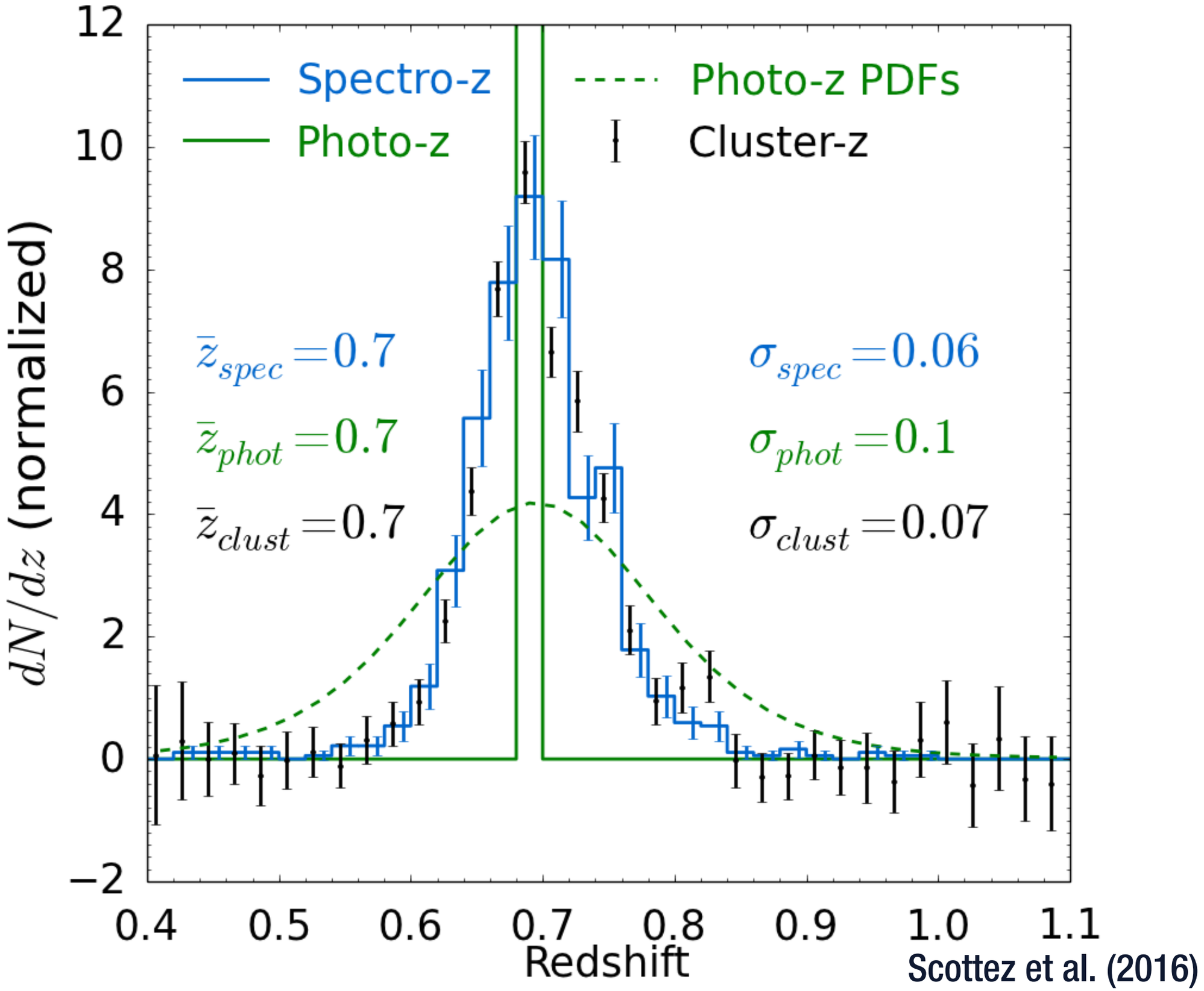
SEDs or Training Sets



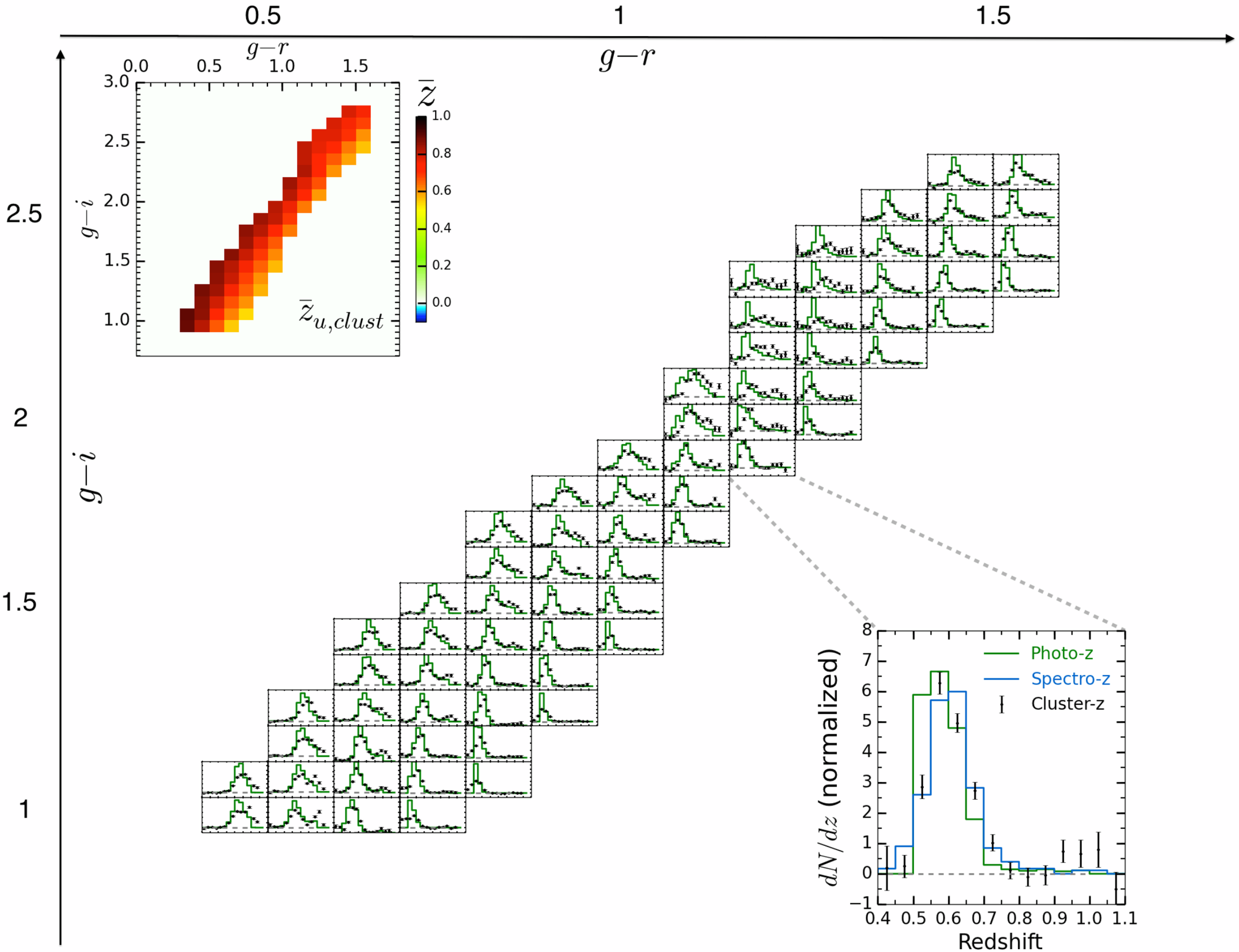
Clustering Redshifts

Spatial correlation with reference set


RA (J2000)
260 240 220 200 180 160 140 120
Dec (J2000)
70
60
50
40
30
20
10
0
RA (J2000)
260 240 220 200 180 160 140 120
$z = 0.0404$
Dec (J2000)
$\bar{\omega}_{ur}(z)$
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
−0.5
0.040
0.045
0.050
0.055
0.060
0.065
Redshift



Scottez et al. (2016)



Scottez et al. (2016)

EUCLID MICE2 SIMULATION

- Hibrid HOD and HAM simulation
- ~ 500M galaxies from $0.07 < z < 1.4$ over 5k deg²
- We choose to focus on 100deg² -> ~ 8M objects

Simulate Euclid photometry

Depths used: u=24.2, g=24.5, r=23.9, i=23.6, z=23.4, Y=23, J=23, H=23

Scottez et al. arxiv:1705.02629

CLUSTERING REDSHIFT
ACCURACY TESTING

Reference sample

200k sources

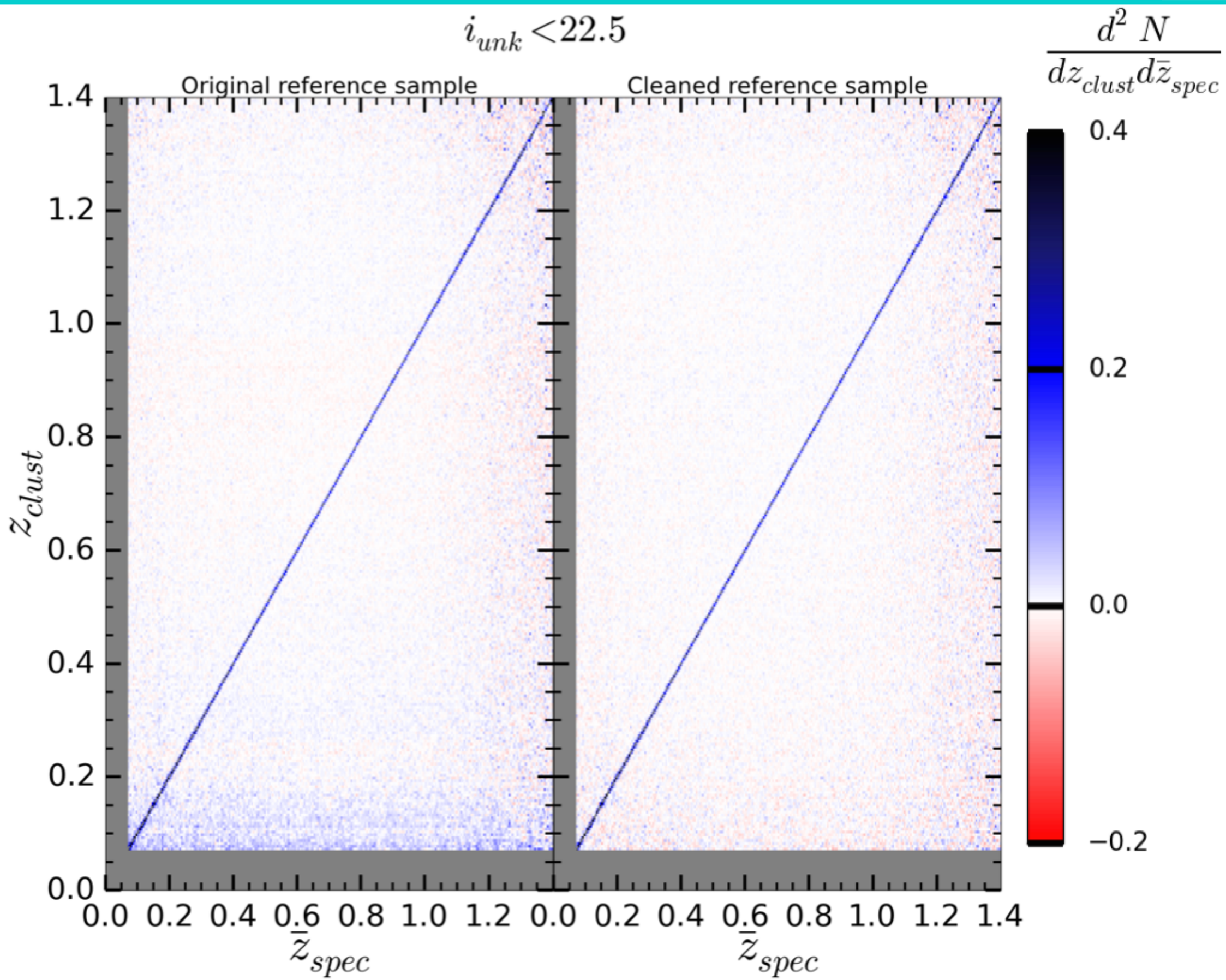
$i < 22.5$

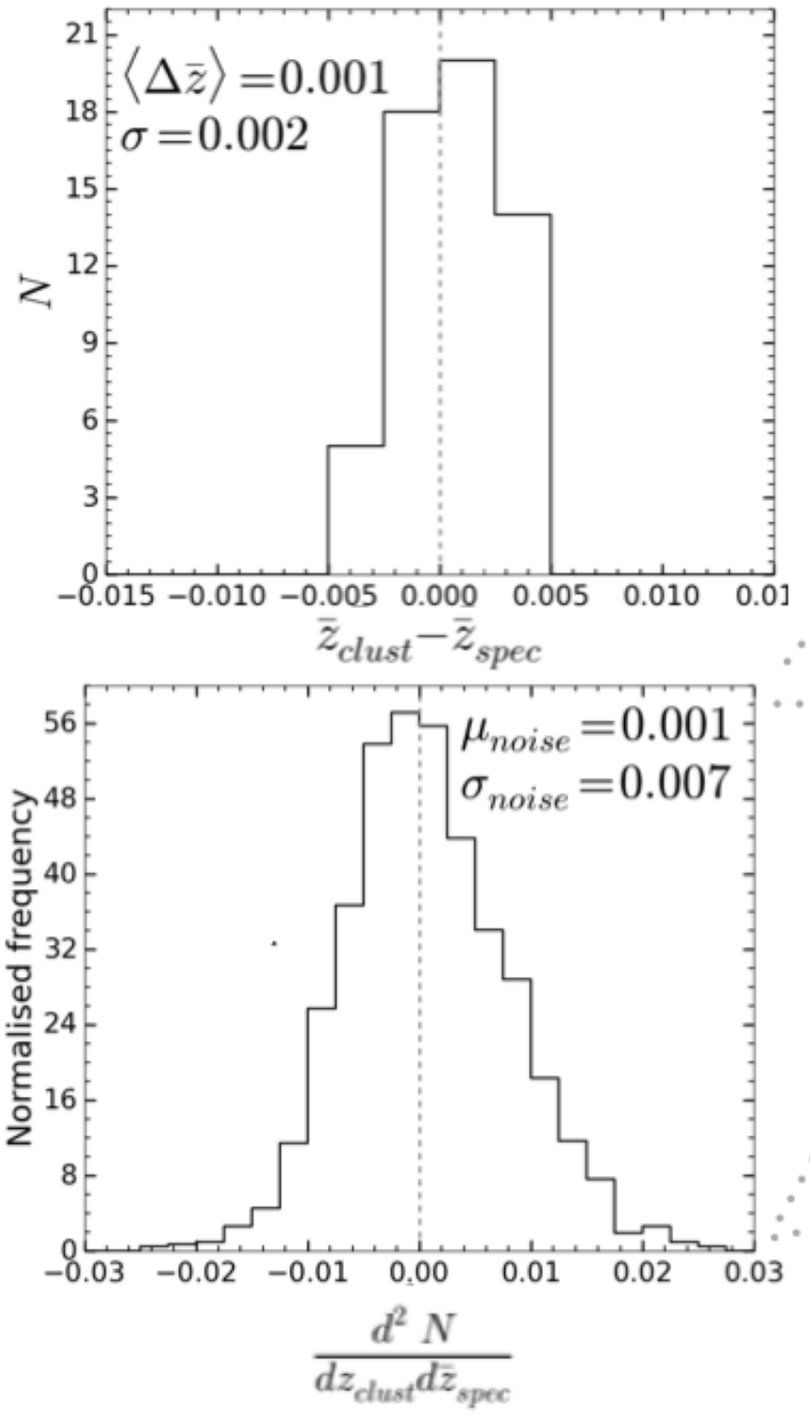
Unknown sample

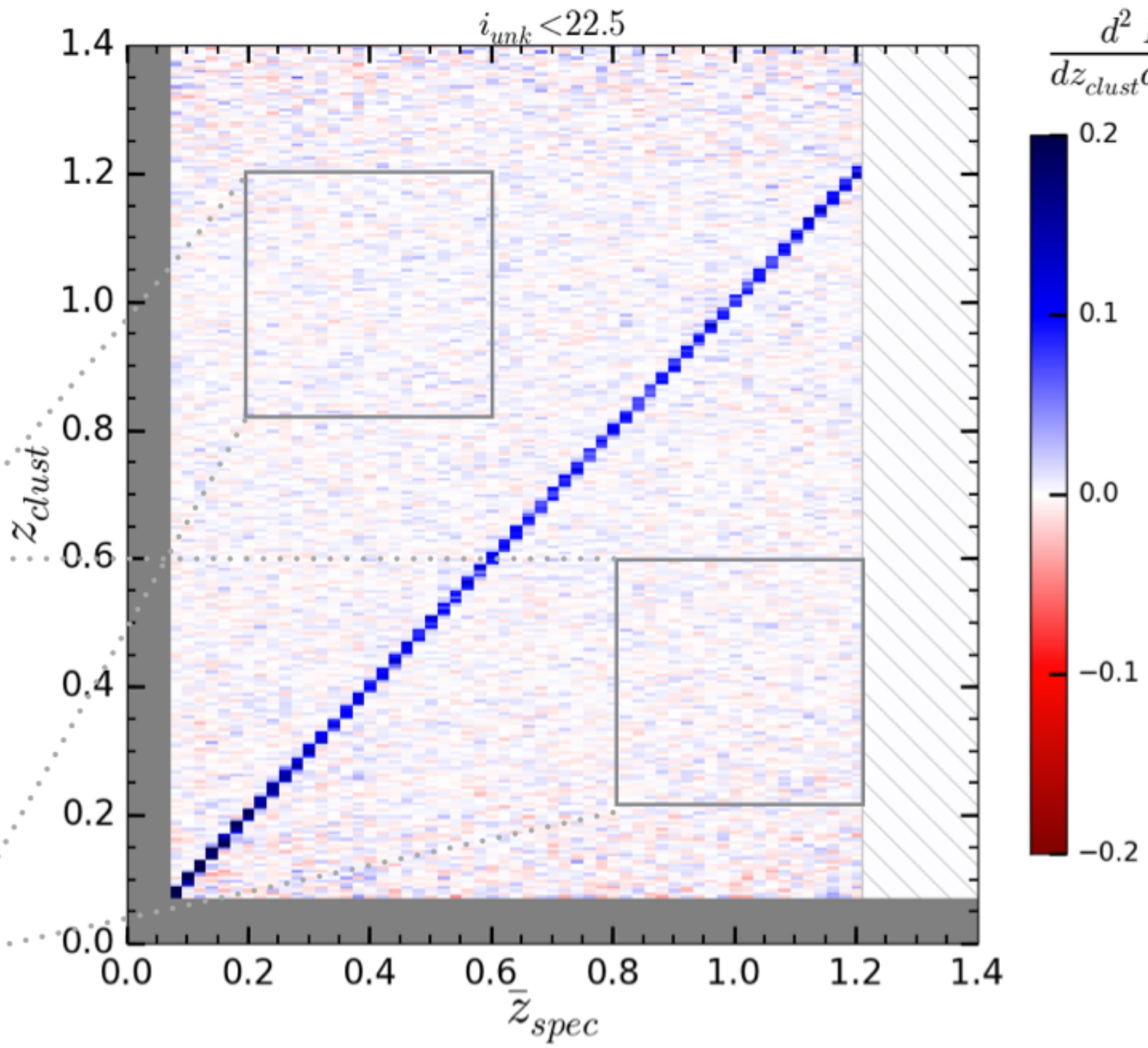
~114k galaxies

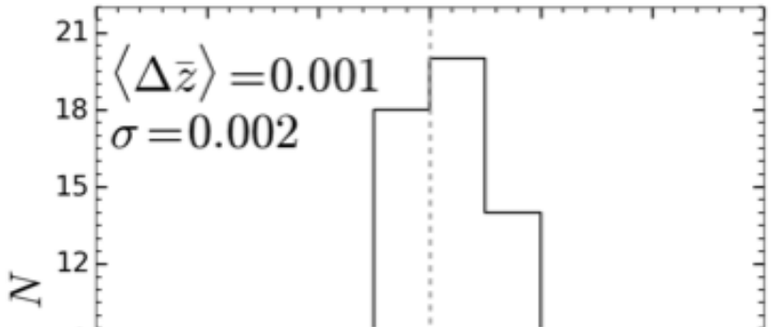
$i < 22.5$

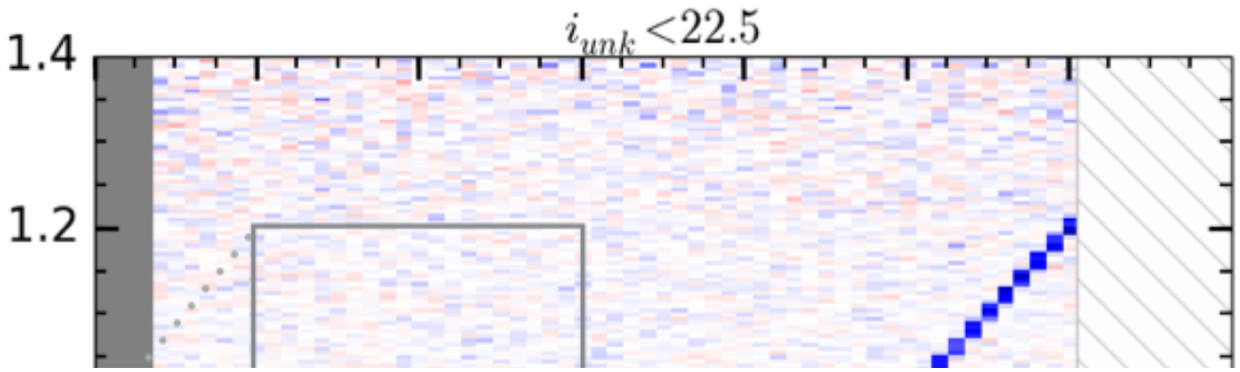
Samples are selected on their spec-z

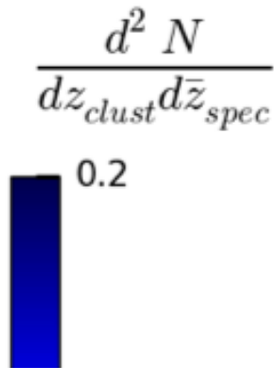

i_{unk} <22.5
Original reference sample
Cleaned reference sample
z_{clust}
$\bar{z}_{spec}$
$\bar{z}_{spec}$
$\frac{d^2 N}{dz_{clust} d\bar{z}_{spec}}$
0.4
0.2
0.0
−0.2
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4


$\langle \Delta\bar{z} \rangle = 0.001$
$\sigma = 0.002$
N
$\bar{z}_{clust} - \bar{z}_{spec}$
$\mu_{noise} = 0.001$
$\sigma_{noise} = 0.007$
Normalised frequency
$\frac{d^2 N}{dz_{clust} d\bar{z}_{spec}}$

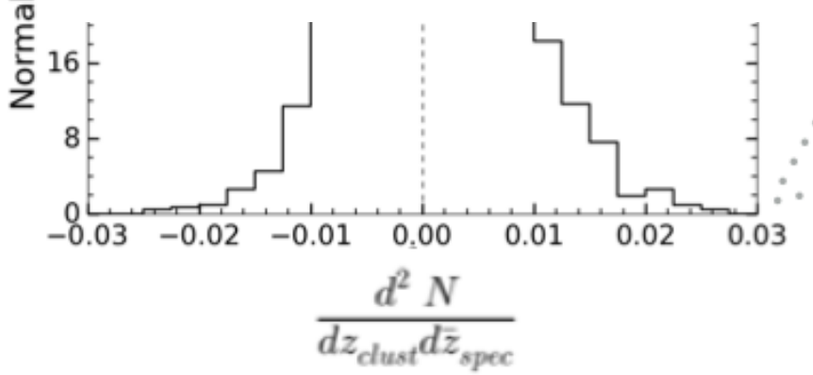

$i_{unk} < 22.5$
z_{clust}
$\bar{z}_{spec}$
$\frac{d^2 N}{dz_{clust} d\bar{z}_{spec}}$

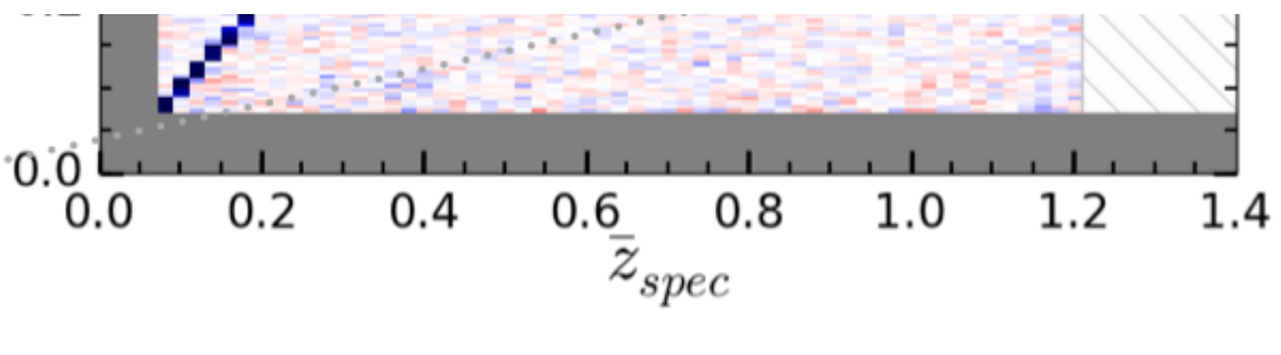


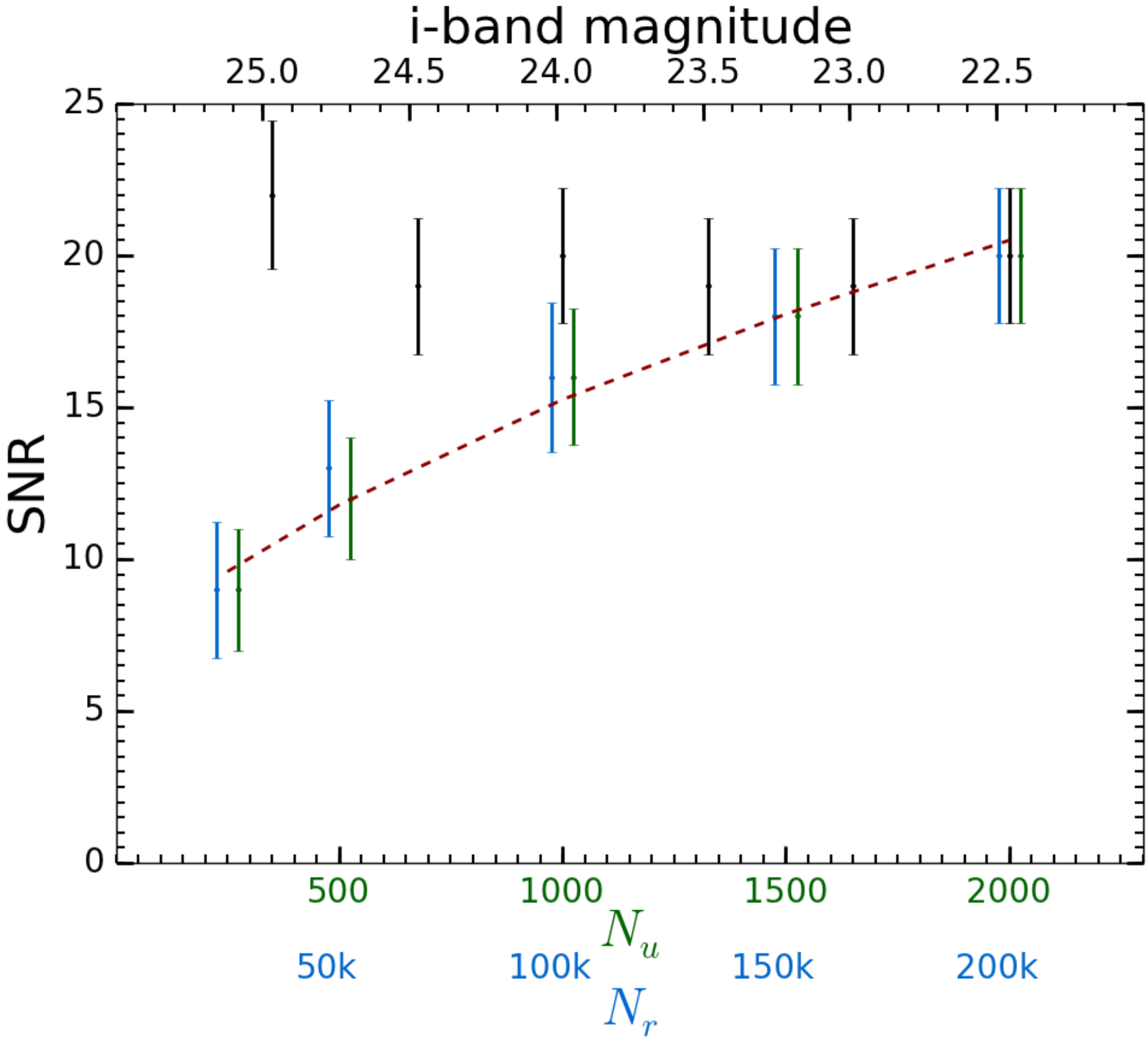


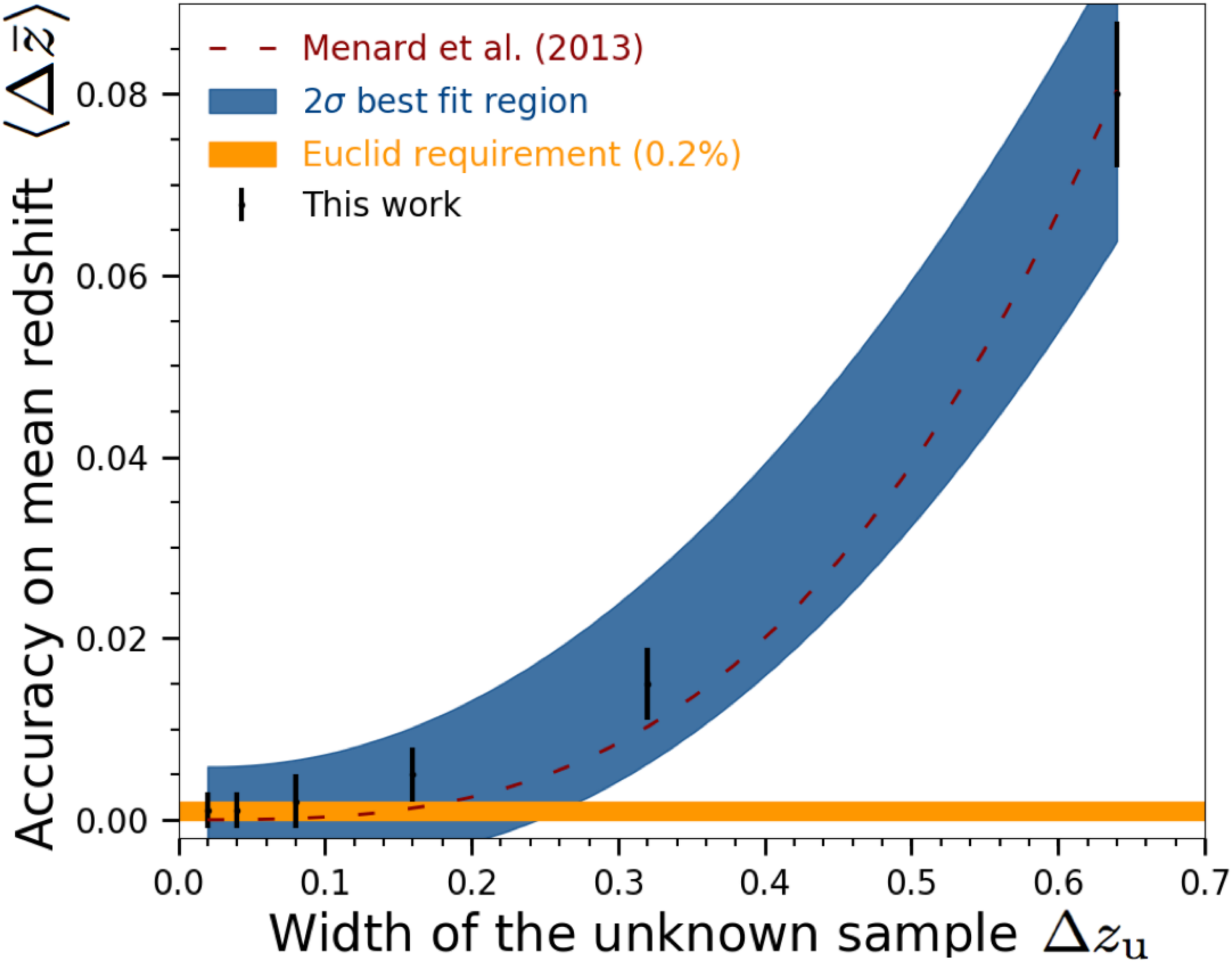


Magnitude	$\langle \Delta\bar{z} \rangle$	σ	$\mu_{\rm noise}$	$\sigma_{\rm noise}$	$\langle$SNR$\rangle$
$i_{\rm unk} < 22.5$	0.001	0.002	0.001	0.007	20
$22.5 \leqslant i_{\rm unk} < 23$	0.001	0.002	0.001	0.007	19
$23 \leqslant i_{\rm unk} < 23.5$	0.001	0.002	0.001	0.007	19
$23.5 \leqslant i_{\rm unk} < 24$	0.001	0.002	0.001	0.007	20
$24 \leqslant i_{\rm unk} < 24.5$	0.001	0.002	0.001	0.008	19
$24.5 \leqslant i_{\rm unk} < 25$	0.001	0.002	0.001	0.007	22






i-band magnitude
25.0
24.5
24.0
23.5
23.0
22.5
SNR
25
20
15
10
5
0
500
1000
1500
2000
N_u
50k
100k
150k
200k
N_r


Menard et al. (2013)
2σ best fit region
Euclid requirement (0.2%)
This work
Accuracy on mean redshift $\langle \Delta \bar{z} \rangle$
0.00
0.02
0.04
0.06
0.08
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Width of the unknown sample Δz_{u}

ACCURACY TESTING
SUMMARY

- Reference sample cleaning ($z<0.2$)
- Cluster-z do not require representative reference sample
- SNR and accuracy seems to follow Poisson statistic

Accuracy on $< z >$ ——> narrow distribute
Δz_u=0.08 & BOSS like QSOs ref survey —> $\Delta< z >$ ~0.2%

INDIV-Z & TOMOGRAPHY

PRACTICING

Reference sample

200k sources

$i < 22.5$

Unknown sample

~ 8M

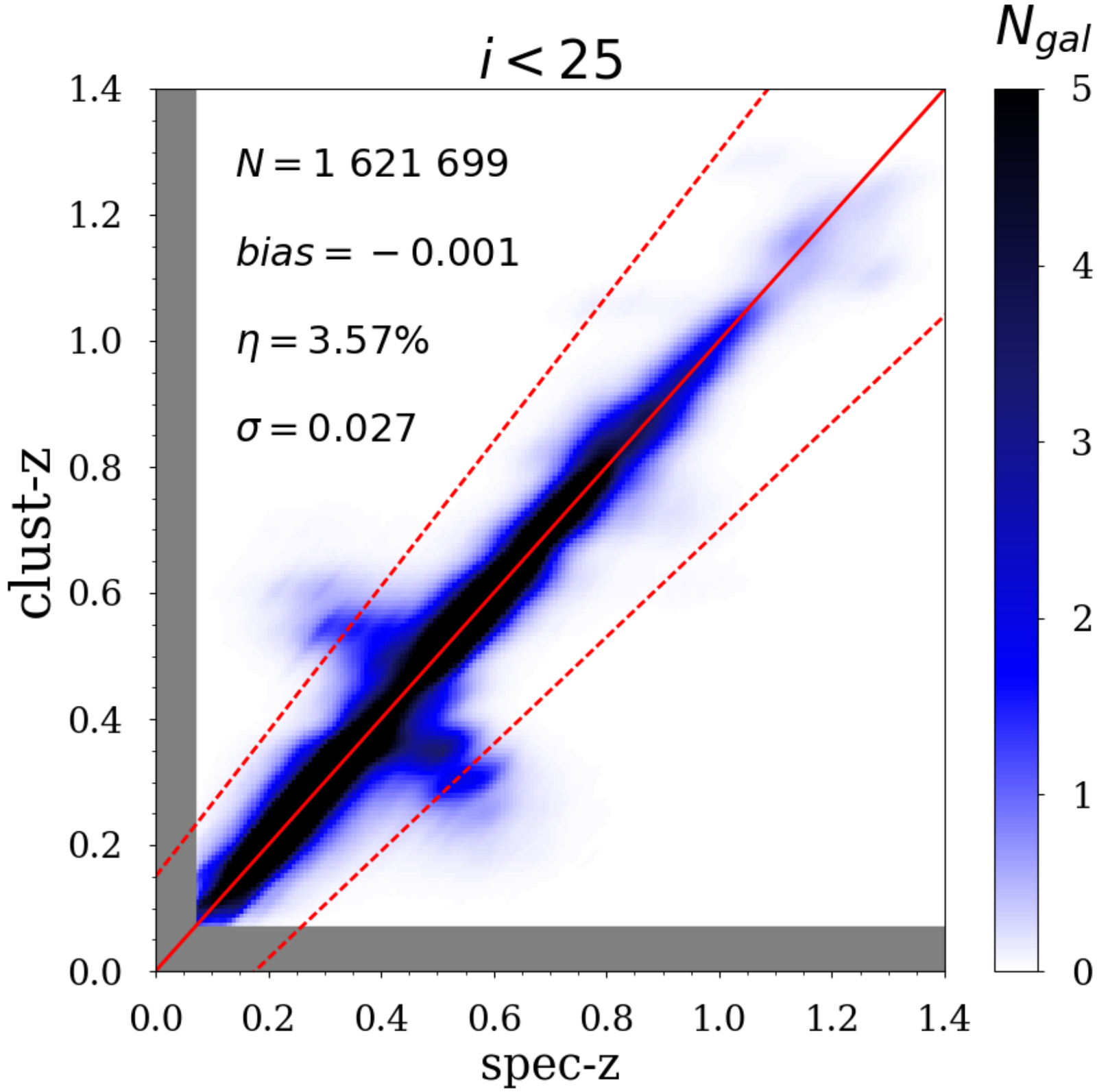
$i < 25$

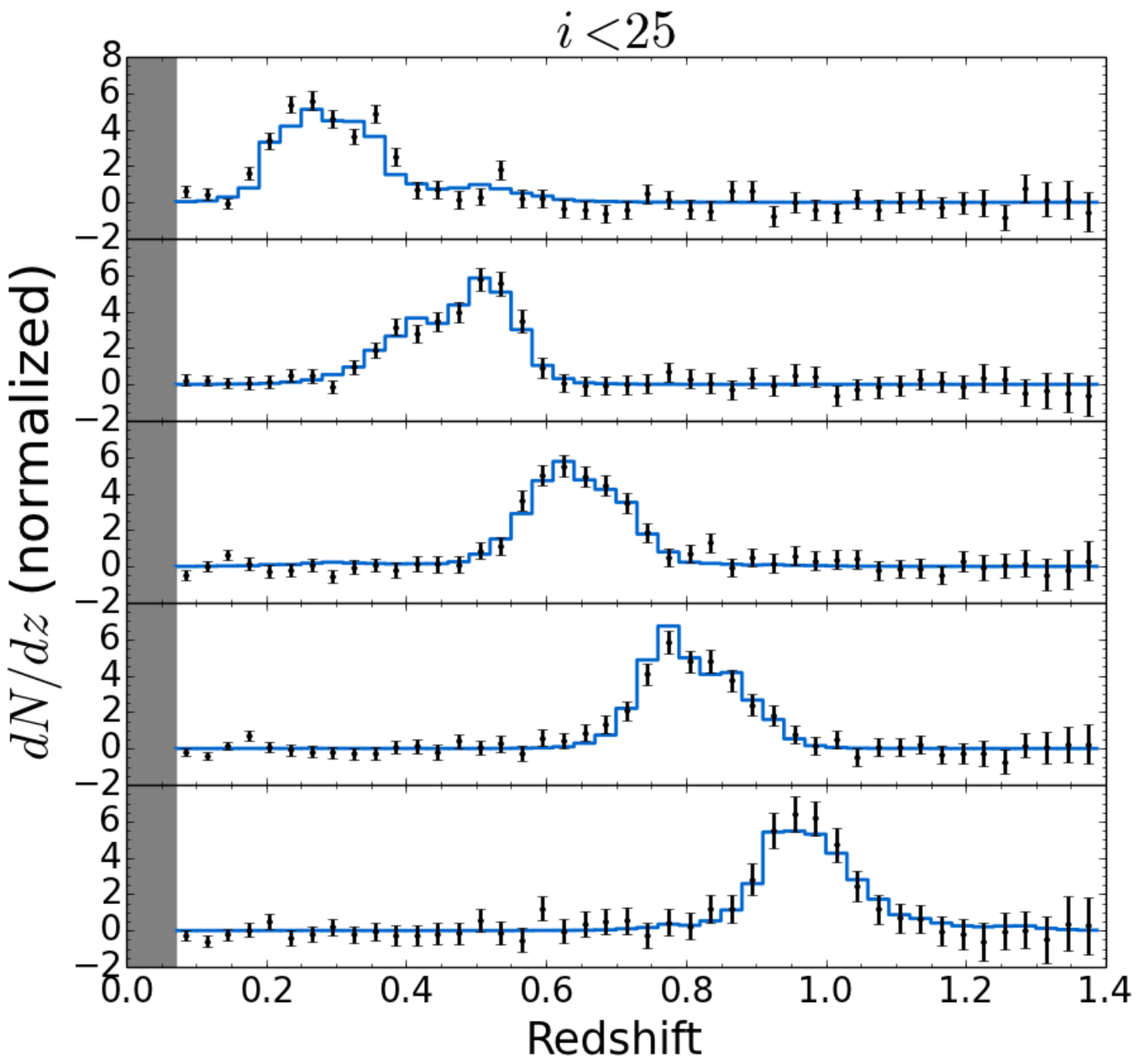
We split the unknown sample in:
u-g, g-r, r-i, i-z, z-Y, Y-J, J-H

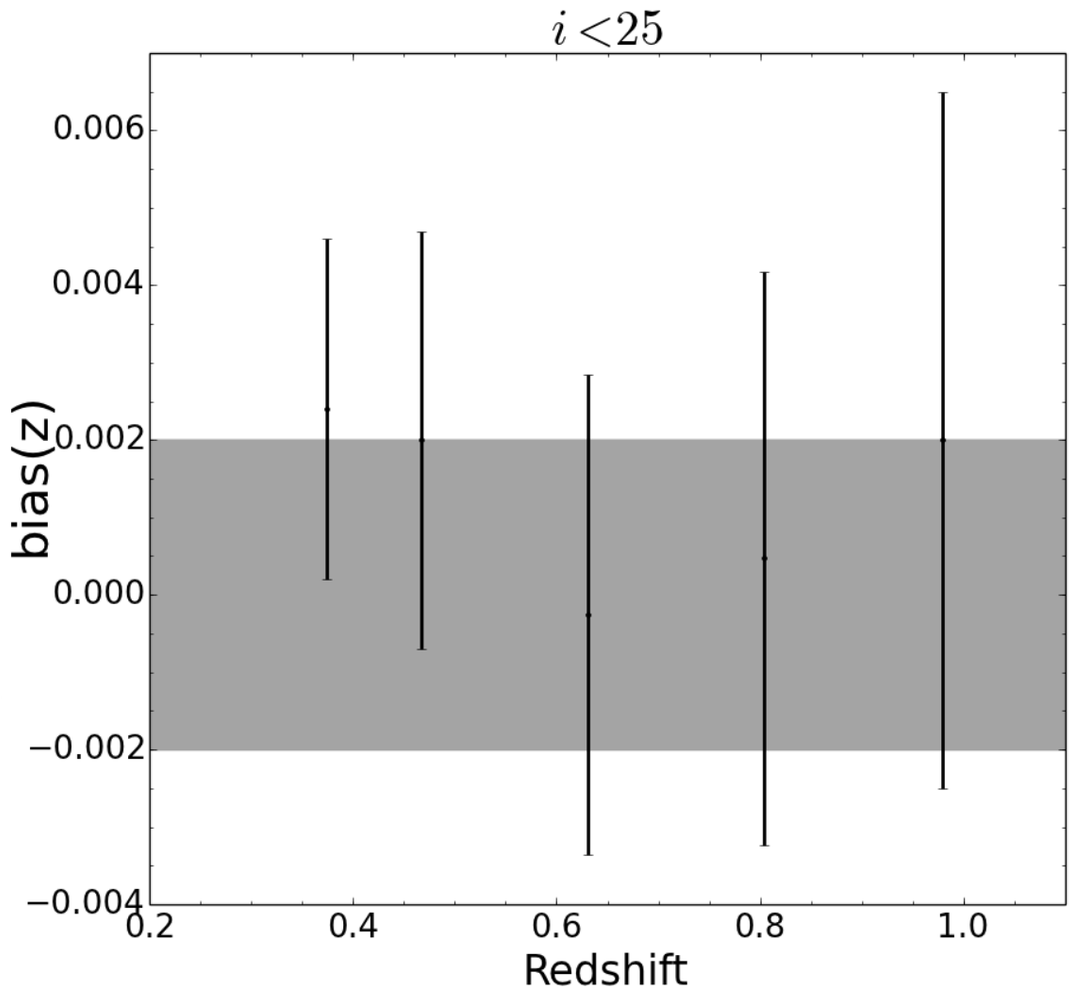
Requirement on N_u =1000

More than 60% of lost objects

Will generalized this to the full color space in future work




$i < 25$
dN/dz (normalized)
Redshift


$i < 25$
bias(z)
Redshift

LIMITATIONS

Photometric accuracy, completeness

Z range to 1.4, densest region of color space

Thank you