Exploring the evolution of the stellar mass function in the redshift range z=0.5-3.5

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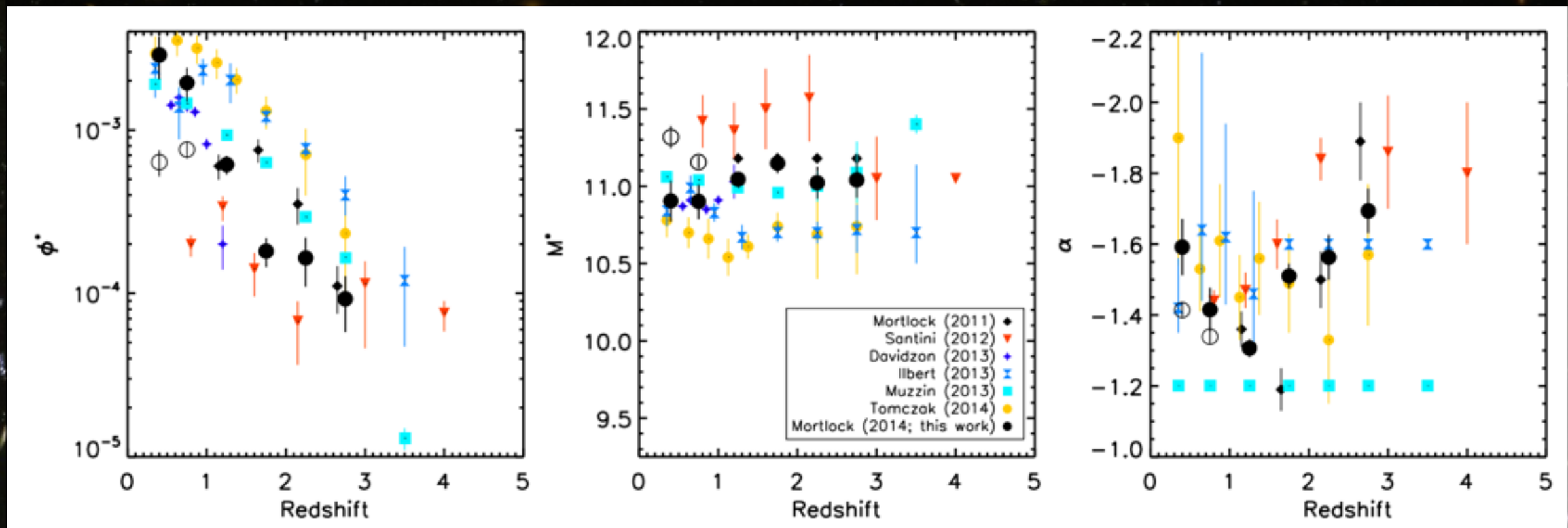
Motivation

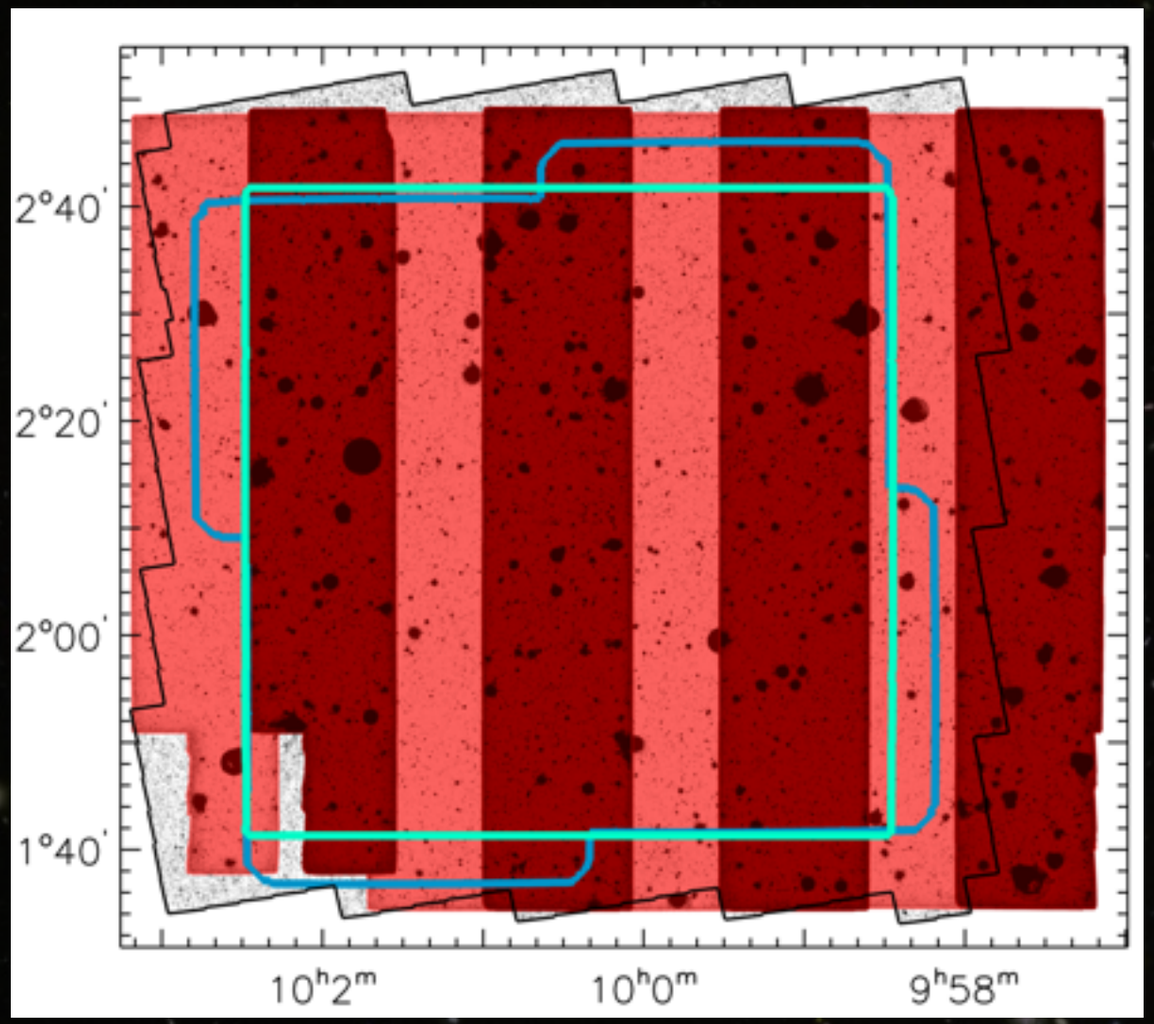
Huge amount of work in the literature, but still disagreement on the form of the MF



- Often disagreements arise from:
  - survey area
  - depth
  - fitting the form of the MF
  - differences in galaxy selection

Mortlock et al. 2015

UltraVISTA DR2 data



CFHT/MegaCam
Subaru/Suprime-Cam
HST/ACS
DR1
DR2

Bowler et al. 2014

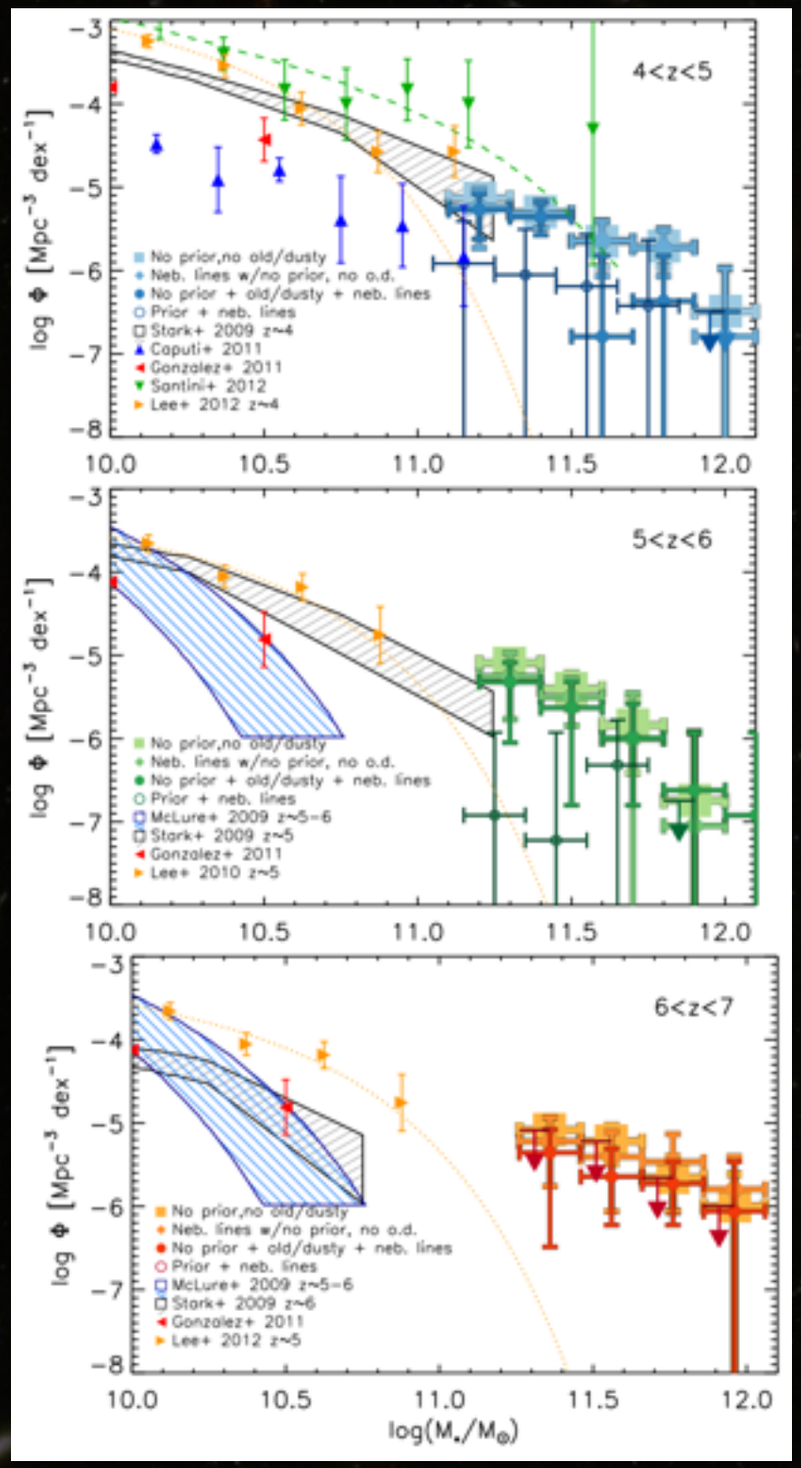
- Deep strips
  - Area ~0.4 deg^2
  - K(AB)=24.5 (5σ 2”)
- Interstrip gaps
  - Area ~0.4 deg^2
  - K(AB)=23.5 (5σ 2”)
- Deep 3.6 and 4.5μm
  - SPLASH (Capak)
  - SEDS (Ashby 2013)

Issues at the high mass end?

1) Completeness due to selection band

2) Eddington Bias

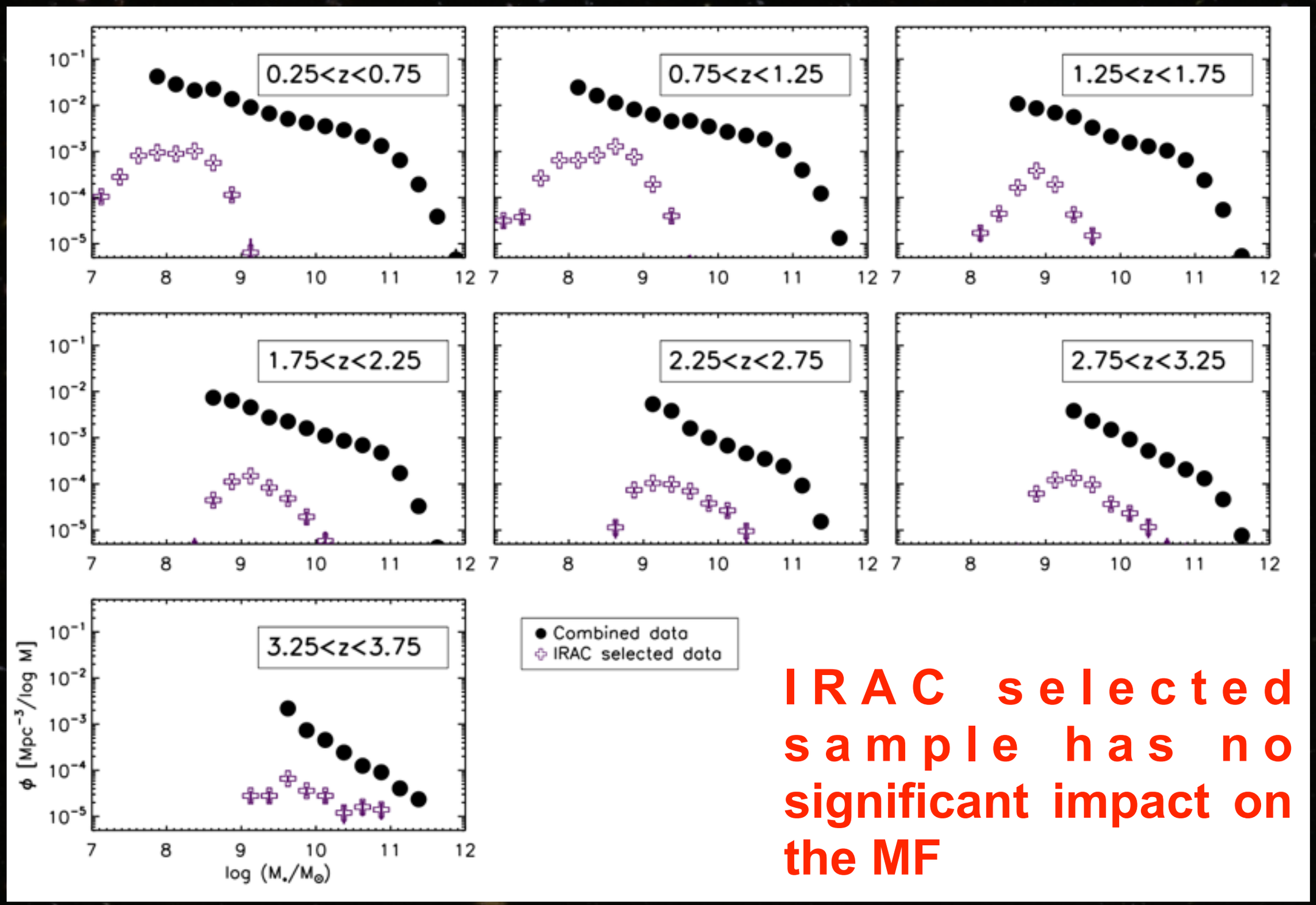
The IRAC selected MF in UVISTA
Motivation



Various studies uncovering samples of massive galaxies at high-z detected at wavelengths redder than K.

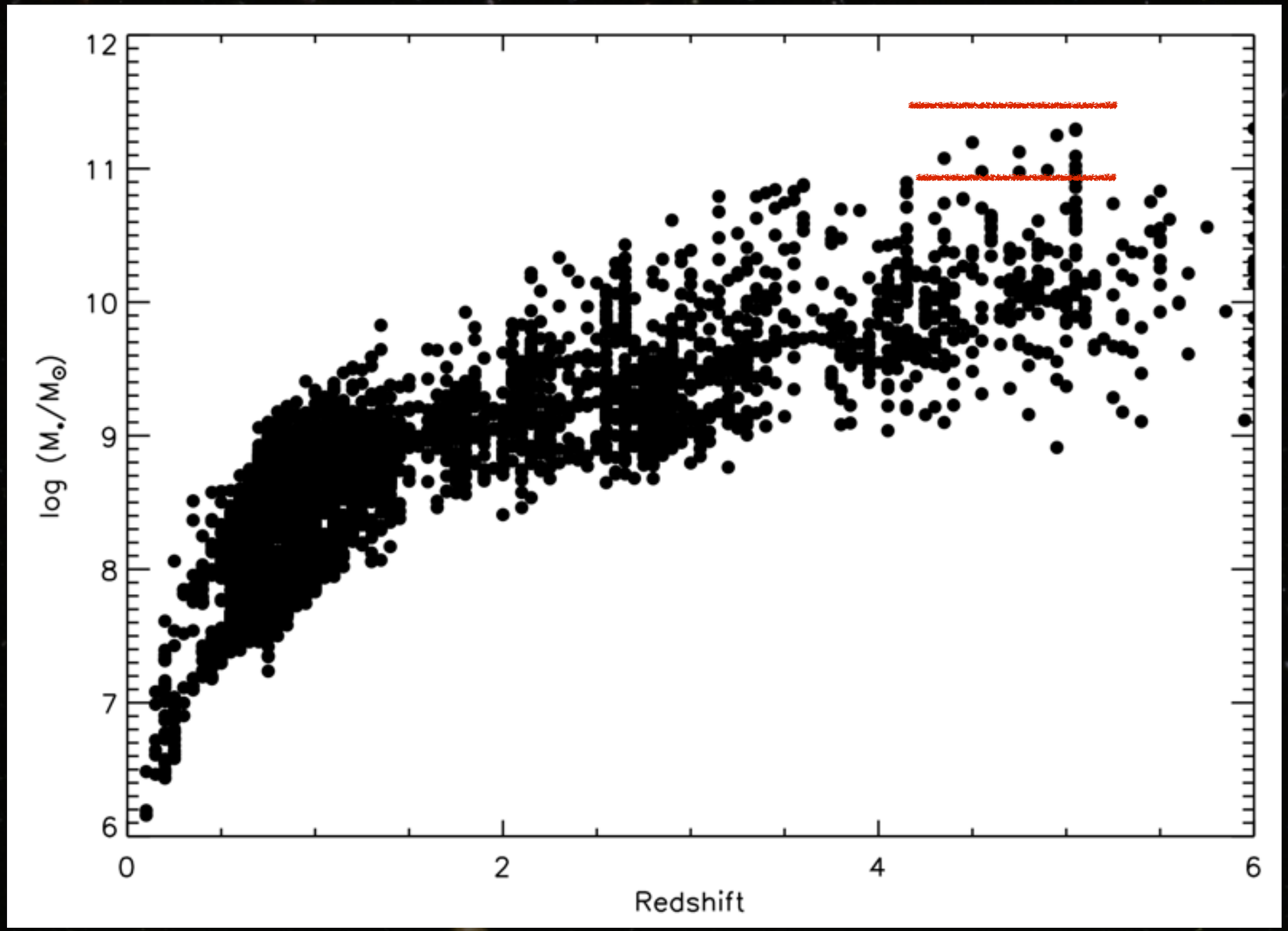
e.g. Caputi (2011)
Caputi (2012)
Stefanon (2014)

The IRAC selected MF in UVISTA

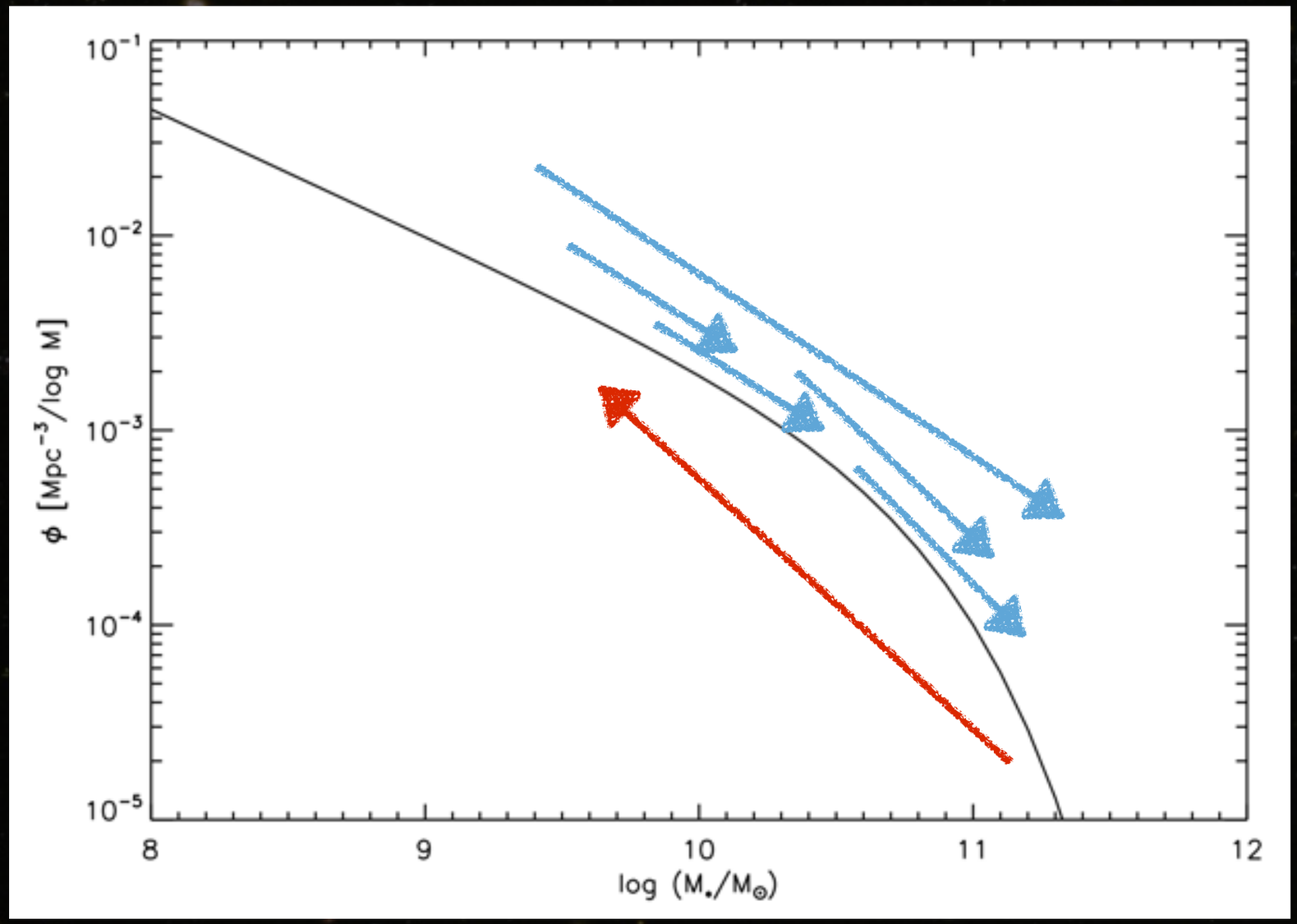


IRAC selected sample has no significant impact on the MF

…maybe some massive objects at higher redshift?



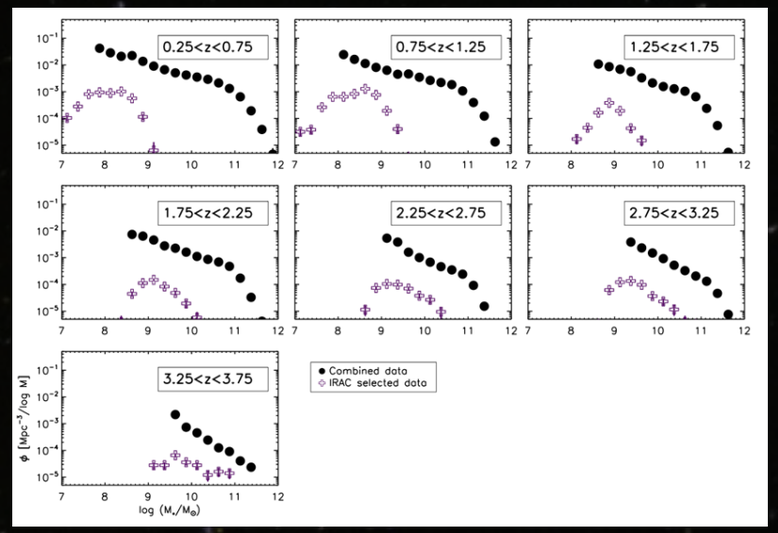
Eddington Bias

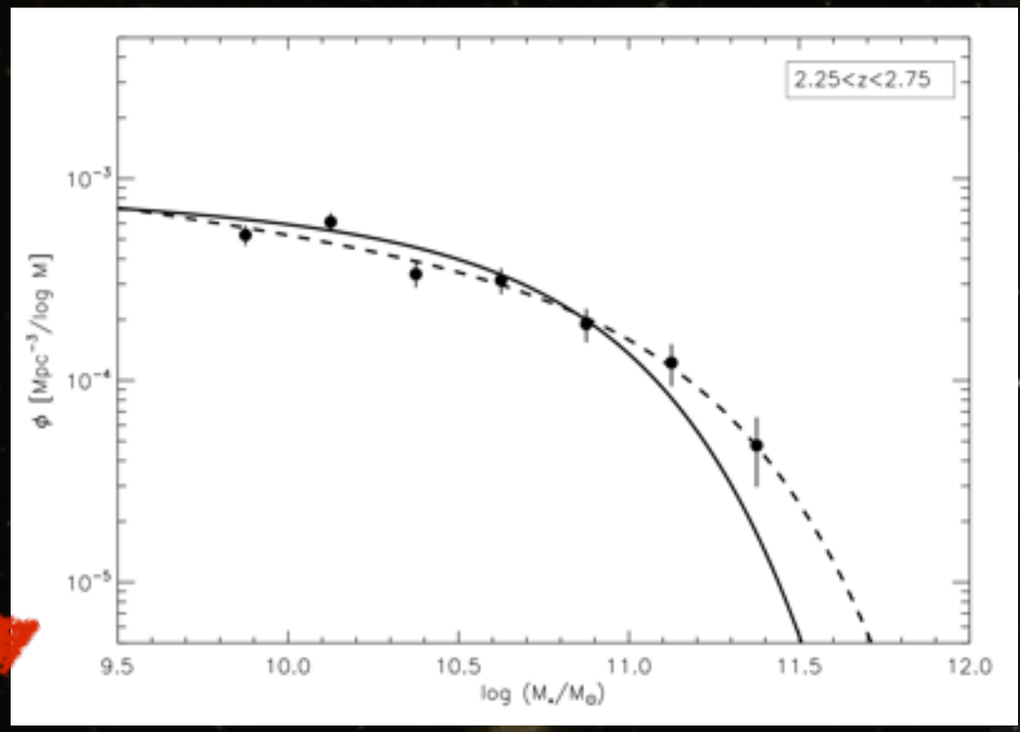


A consequence of the errors on fluxes, and the fact there are many more faint objects compared to bright objects (Eddington 1913)

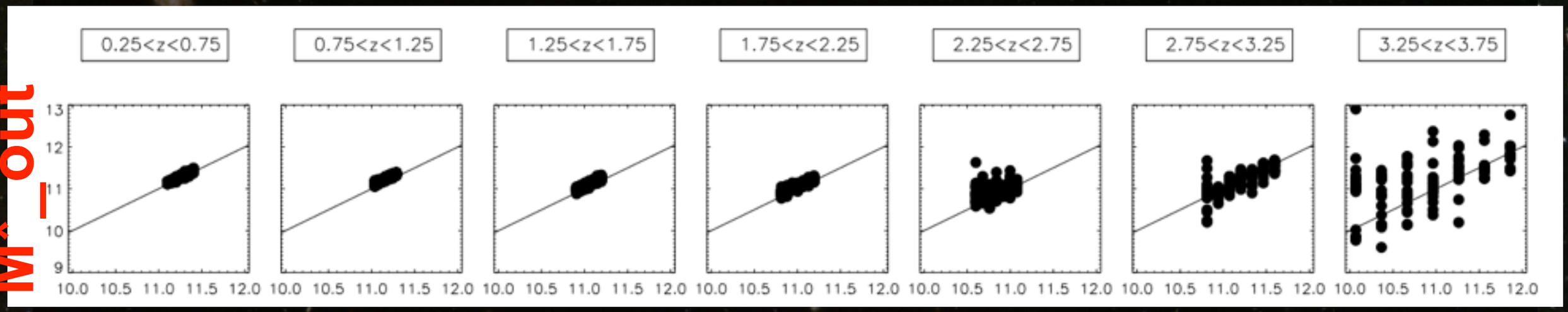
Eddington Bias: The intrinsic MF

1. Start with some evolving prescription for the MF.
2. Create fake populations of objects, inject them into images, recover them.
3. Construct the output MF from your input population
4. Match the output MF to observed MF, this gives you the underlying intrinsic MF of your observed MF

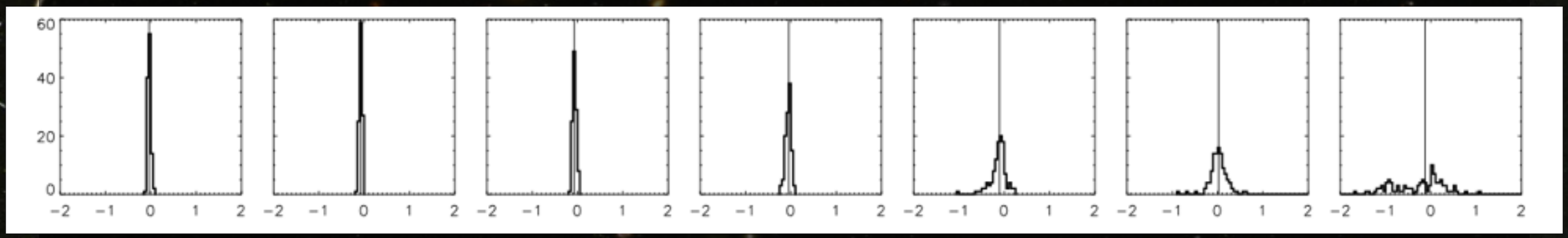




Eddington Bias: Change in M*

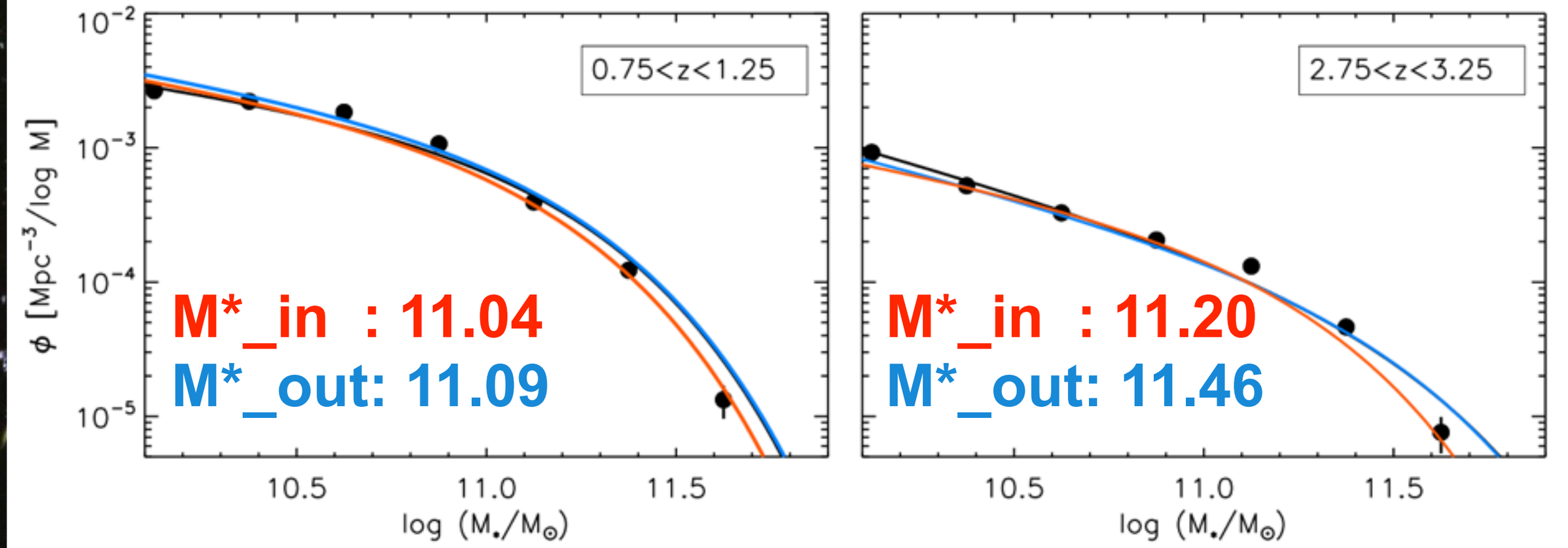


M*_in



M*_in-M*_out

Eddington Bias: Preliminary results



Eddington bias is a strong function of redshift in our data set. The impact of Eddington bias on M* is negligible at low z but ~0.26 dex at z=3

Summary

- UltraVISTA gives us the power to explore the high mass end of the MF with high accuracy.
- Our IRAC selected sample does not contribute strongly to the MF at z<3, therefore data at wavelengths bluer than IRAC affords us a complete view of the MF at high masses.
- Using simulations to explore Eddington bias we find little impact at low redshift but find that it can alter M* by ~0.26 dex at z=3