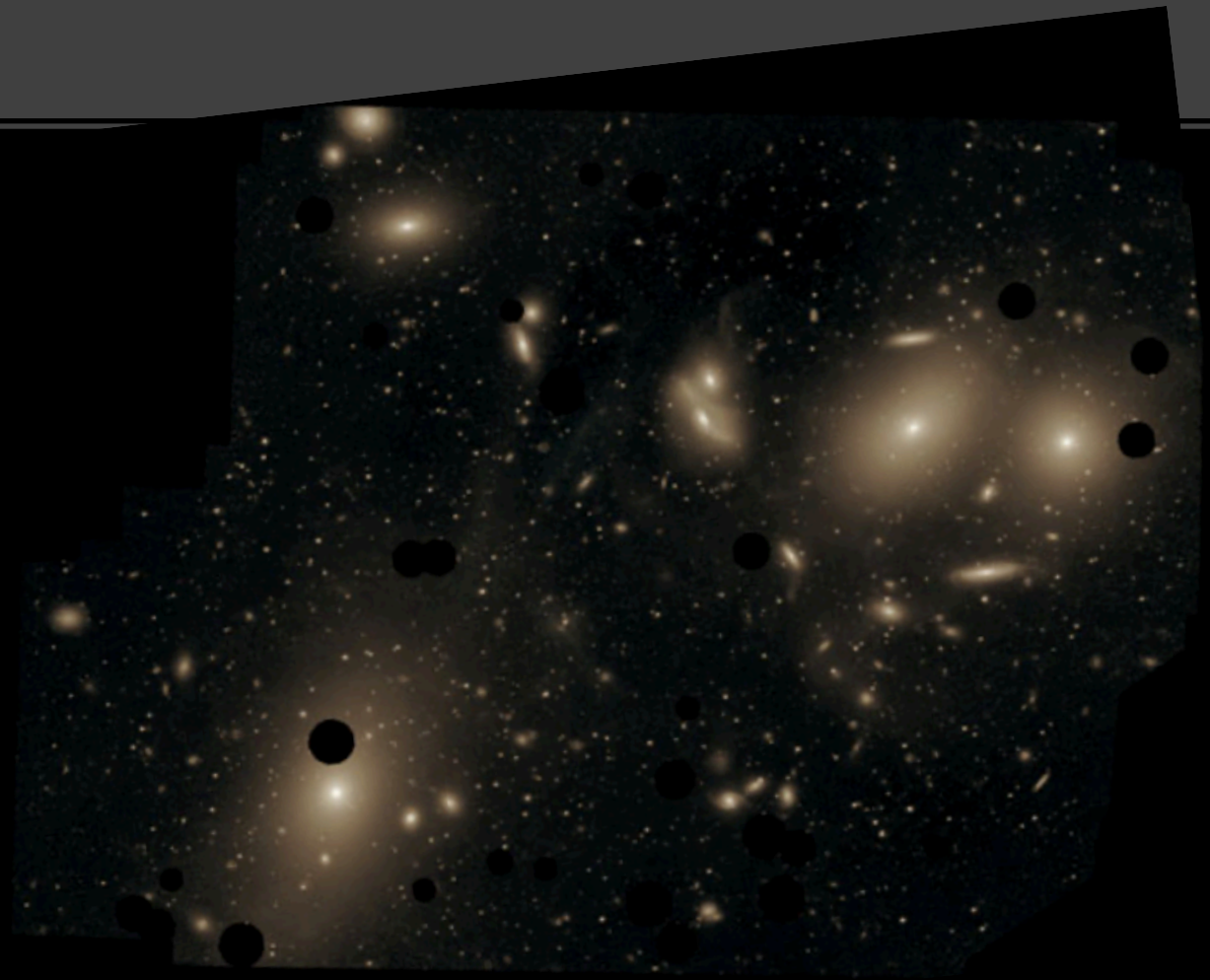
ON THE MASS DISTRIBUTION OF THE INTRA-CLUSTER LIGHT IN GALAXY GROUPS AND CLUSTERS



Intracluster light (ICL):

What is it?

- “It is a diffuse component in galaxy groups and clusters made of stars that are not bound to any galaxy.”

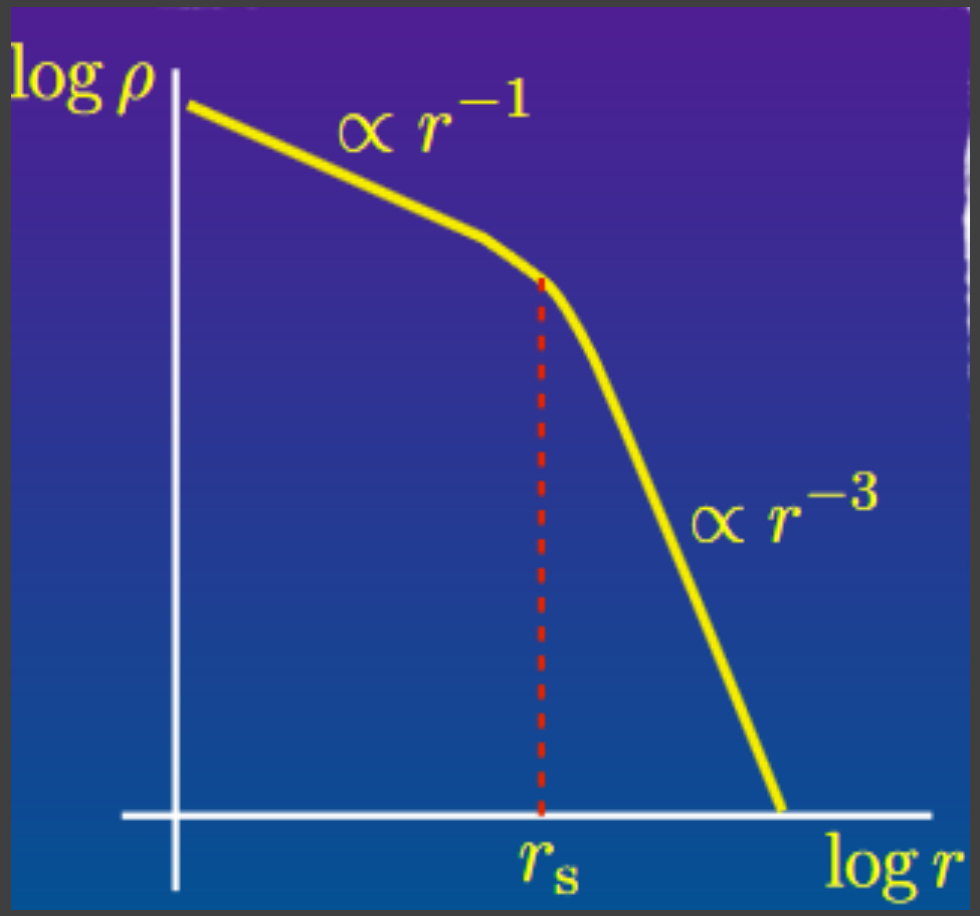
- “It is commonly associated of the most massive galaxies that reside at the centers of groups and clusters”. Most of the ICL is found around the brightest cluster galaxy (BCG) and its evolution tightly connected to the BCG’s evolution.

Intracluster light (ICL):

In this work:

- They use a semi-analytic model (Contini et al. 2014) for the formation of the BCG and the ICL. (see p. 1)
- They assume that the ICL is formed mainly through stellar striping due to tidal forces and is found to be produced in the innermost 150 kpc from the halo center.
- Since a semi-analytic model does not provide spatial information regarding the distribution of stars, they use a modified NFW profile.

Intracluster light (ICL):



$$\rho(r) = \frac{\rho_s}{(r/r_S)(1 + r/r_S)^2}$$

NFW profile:

r_s is the characteristic scale radius where the slope is -2

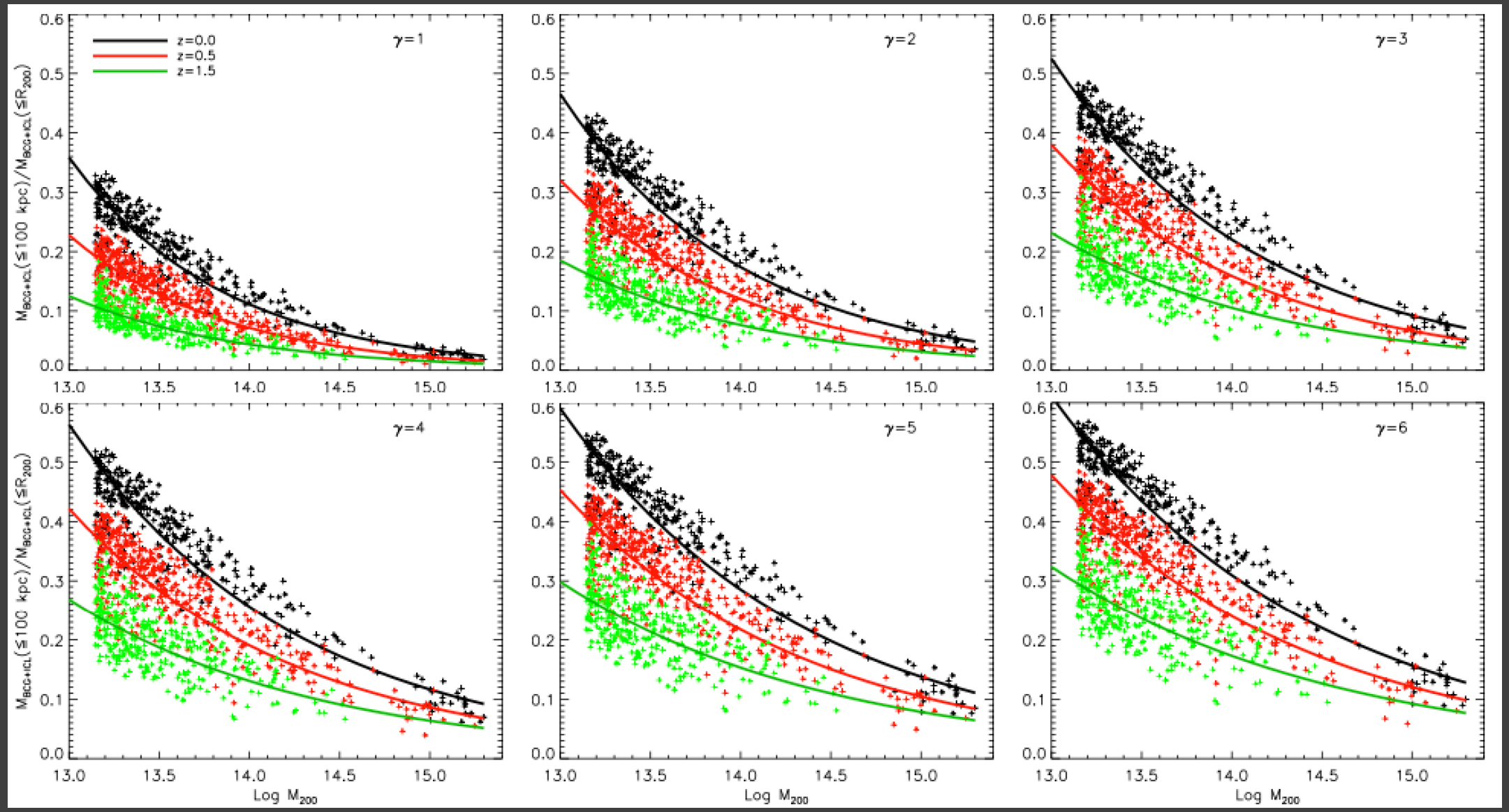
The scale radius is linked to $\mathrm{R_{vir}}(\mathrm{R_{200}}$ actually) and then the halo concentration is defined as

$$c = \frac{R_{200}}{r_s}$$

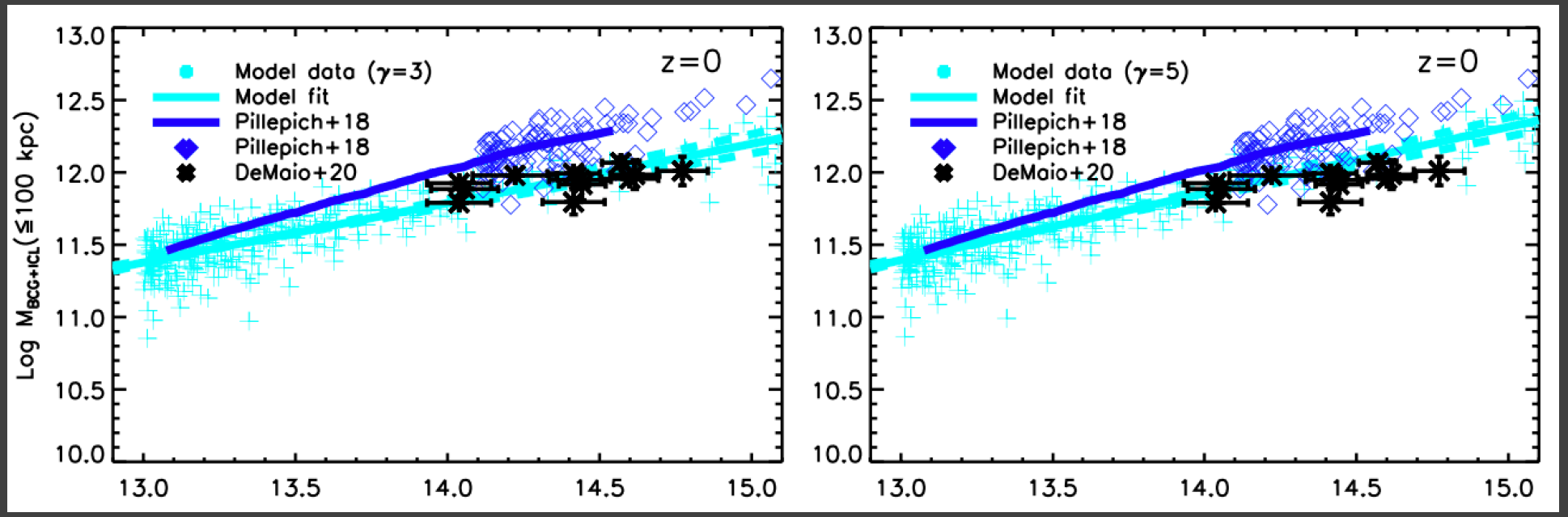
They just define

$$c_{ICL} = \gamma \frac{R_{200}}{r_s}$$

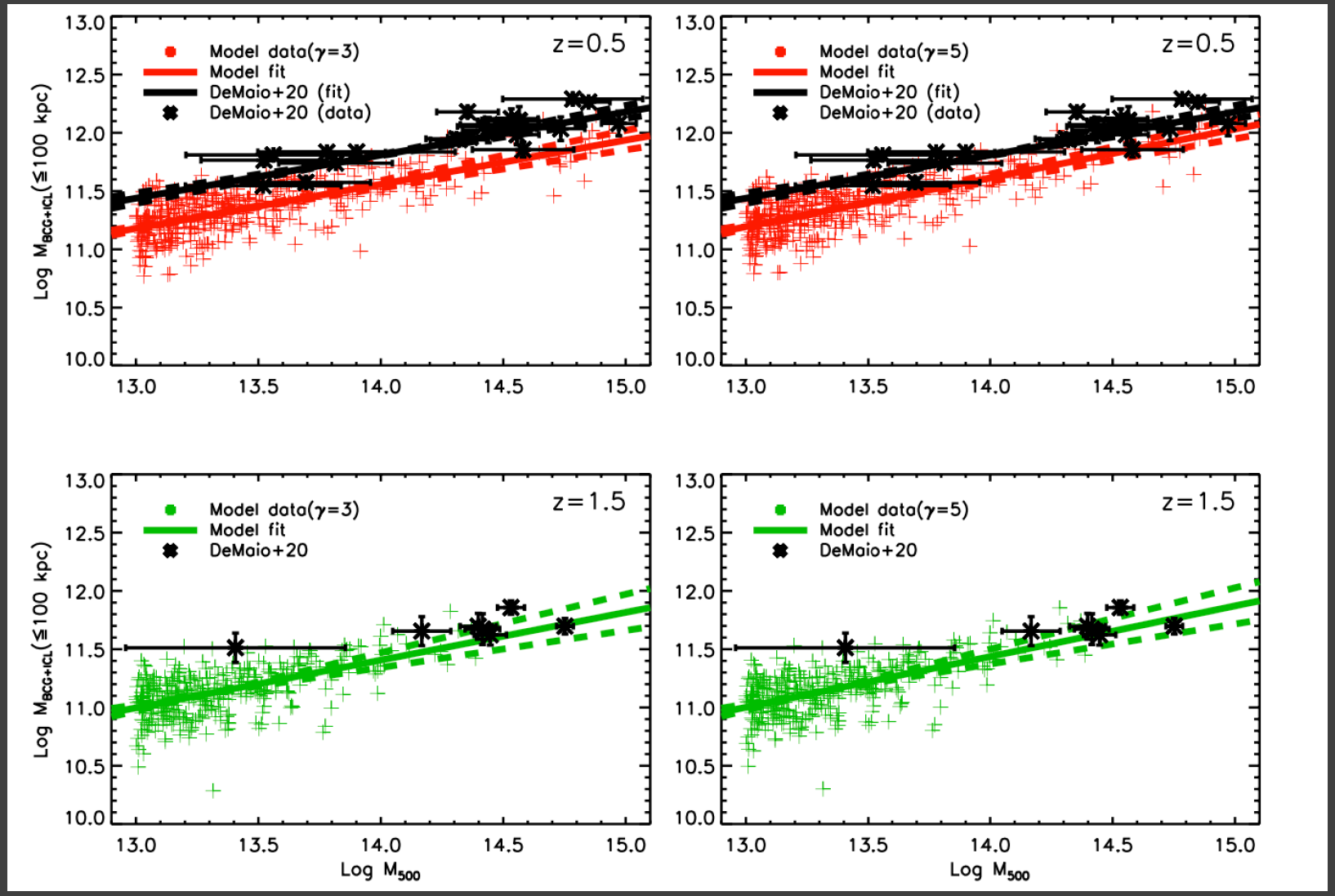
Results


z=0.0
z=0.5
z=1.5
γ=1
γ=2
γ=3
γ=4
γ=5
γ=6
$M_{BCG+ICL}(\leq 100\ kpc)/M_{BCG+ICL}(\leq R_{200})$
Log M_{200}
0.0
0.1
0.2
0.3
0.4
0.5
0.6
13.0
13.5
14.0
14.5
15.0

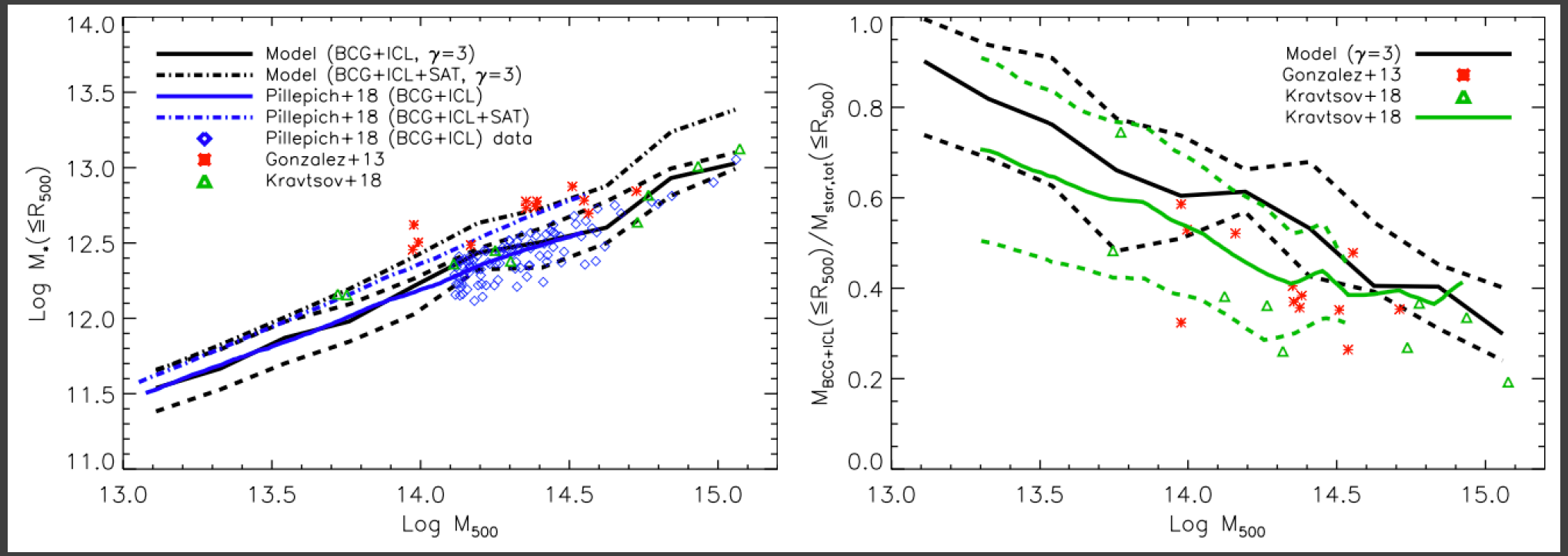
Results


Model data (γ=3)
Model fit
Pillepich+18
Pillepich+18
DeMaio+20
z=0
Log $M_{BCG+ICL}(\leq 100$ kpc)
13.0
12.5
12.0
11.5
11.0
10.5
10.0
13.0
13.5
14.0
14.5
15.0
Model data (γ=5)
Model fit
Pillepich+18
Pillepich+18
DeMaio+20
z=0

Results


Model data(γ=3)
Model fit
DeMaio+20 (fit)
DeMaio+20 (data)
z=0.5
Model data(γ=5)
Model fit
DeMaio+20 (fit)
DeMaio+20 (data)
z=0.5
Model data(γ=3)
Model fit
DeMaio+20
z=1.5
Model data(γ=5)
Model fit
DeMaio+20
z=1.5
Log M_BCG+ICL(≦100 kpc)
Log M_500
13.0
12.5
12.0
11.5
11.0
10.5
10.0
13.0
13.5
14.0
14.5
15.0

Results


Model (BCG+ICL, γ=3)
Model (BCG+ICL+SAT, γ=3)
Pillepich+18 (BCG+ICL)
Pillepich+18 (BCG+ICL+SAT)
Pillepich+18 (BCG+ICL) data
Gonzalez+13
Kravtsov+18
Log M*(≦R500)
Log M500
14.0
13.5
13.0
12.5
12.0
11.5
11.0
13.0
13.5
14.0
14.5
15.0
Model (γ=3)
Gonzalez+13
Kravtsov+18
Kravtsov+18
MBCG+ICL(≦R500)/Mstar,tot(≦R500)
Log M500
1.0
0.8
0.6
0.4
0.2
0.0
13.0
13.5
14.0
14.5
15.0