

# Density fluctuations in the VVDS-02h field

- First epoch data -

# Goal & Method

- Main goal

Study the environmental effects on Luminosity Function, color indices, morphology-density relation (zCOSMOS), etc...

- Problem to solve

Is the observed  $\delta$  distribution representative?

- Method

Comparison between the density field of a VVDS mock and the density field of the parent catalog (GALICS simulations)

# Density field

Continuous 3D overdensity field obtained from dilution of the galaxy distribution

$$\delta_g(\mathbf{r}, R) = \frac{\rho_g(\mathbf{r}, R) - \bar{\rho}_g}{\bar{\rho}_g} \longrightarrow \text{Dimensionless density contrast at the comoving position } \mathbf{r}, \text{ smoothed over a typical dimension } R$$

$$\rho_g(\mathbf{r}, R, <M^c) \longrightarrow \text{Smoothed number density of galaxies above the absolute magnitude threshold } M^c$$

$$\bar{\rho}_g \longrightarrow \text{Average galaxy distribution in survey slices } \mathbf{r} \pm D, \text{ where } D=400 h^{-1} \text{ Mpc}$$

Find  $R$  and  $z$  ranges where  $\delta_{\text{VDS}}$  is representative of the parent distribution.

# The smoothing window

- Gaussian window
- Six different smoothing radii:

$$R=1.0 h^{-1} \text{ Mpc}$$

$$R=2.0 h^{-1} \text{ Mpc}$$

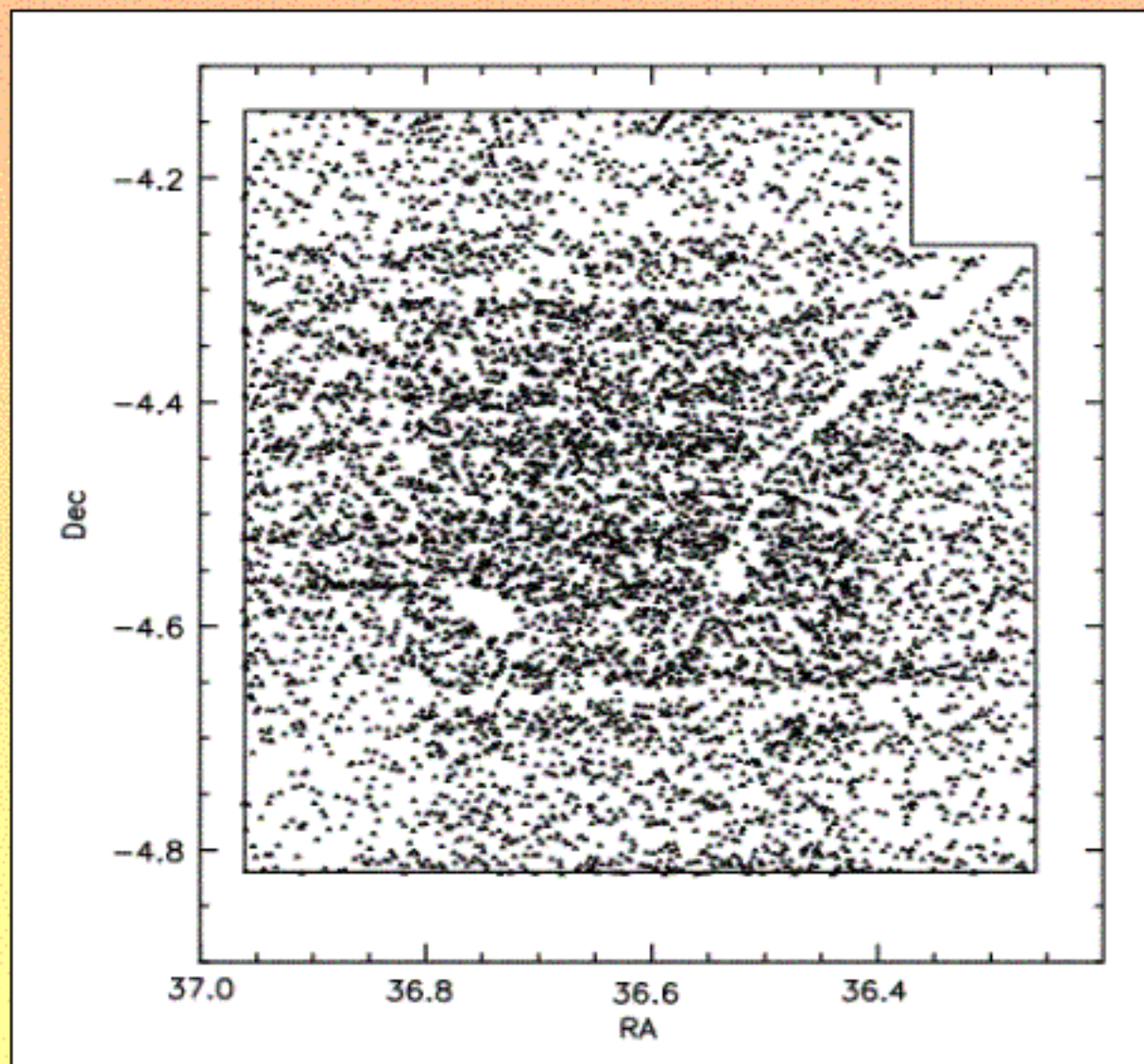
$$R=3.0 h^{-1} \text{ Mpc}$$

$$R=4.0 h^{-1} \text{ Mpc}$$

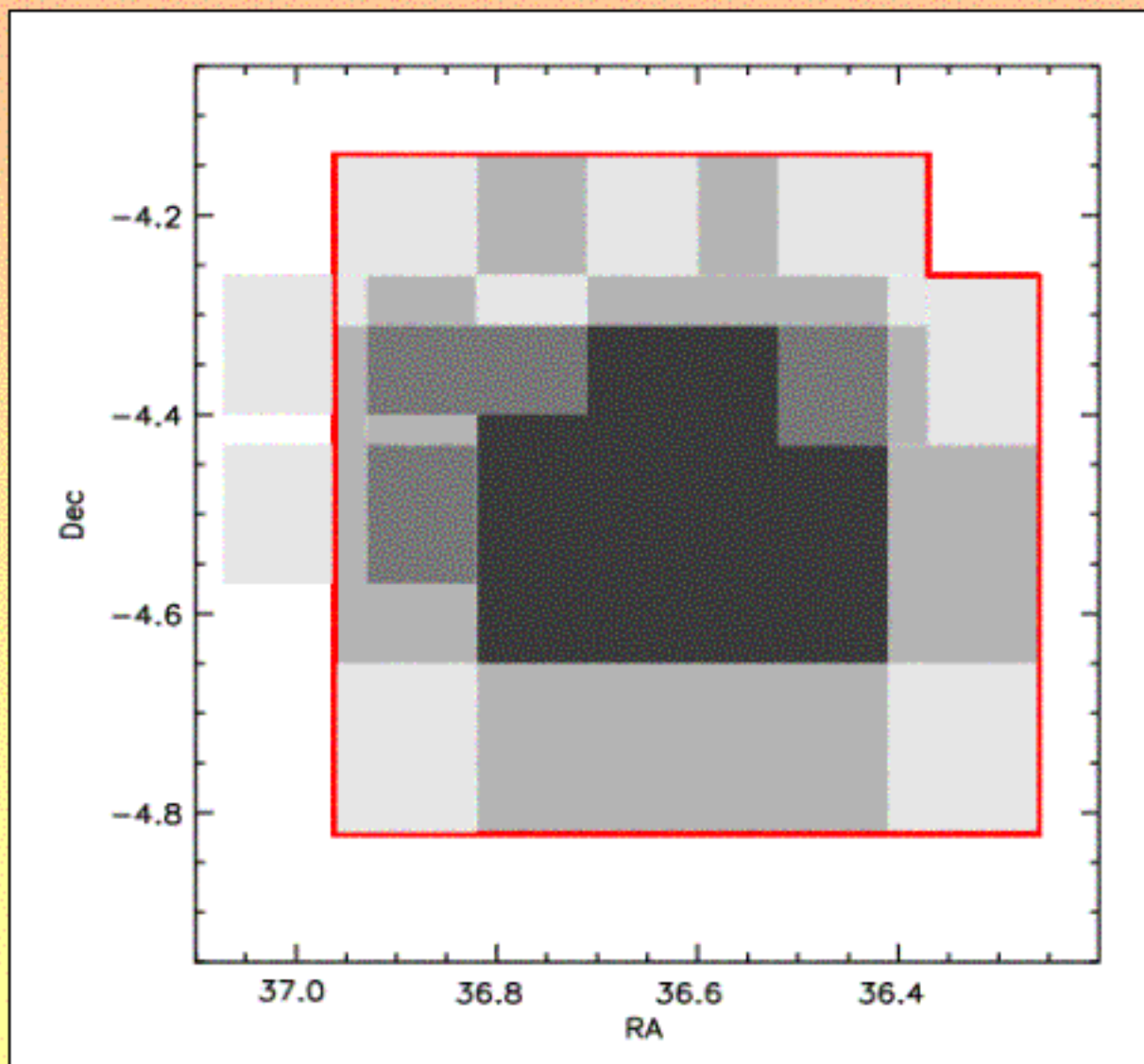
$$R=6.0 h^{-1} \text{ Mpc}$$

$$R=8.0 h^{-1} \text{ Mpc}$$

2h-field:  $z\text{-flag} > 1$



# 2h-field: SSPOC passes



4 passes:

25%

3 passes:

10%

2 passes:

38%

1 pass:

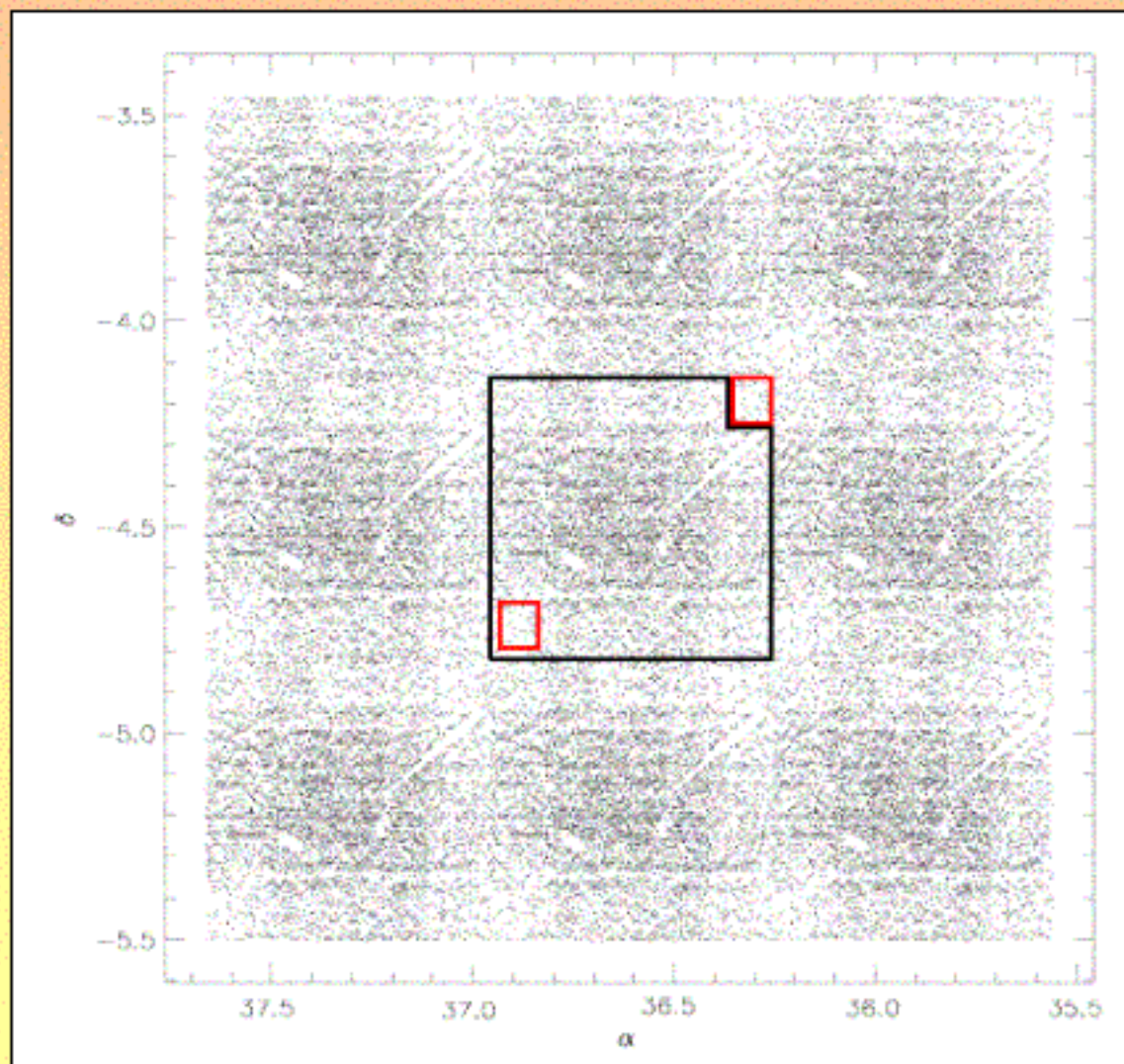
27%



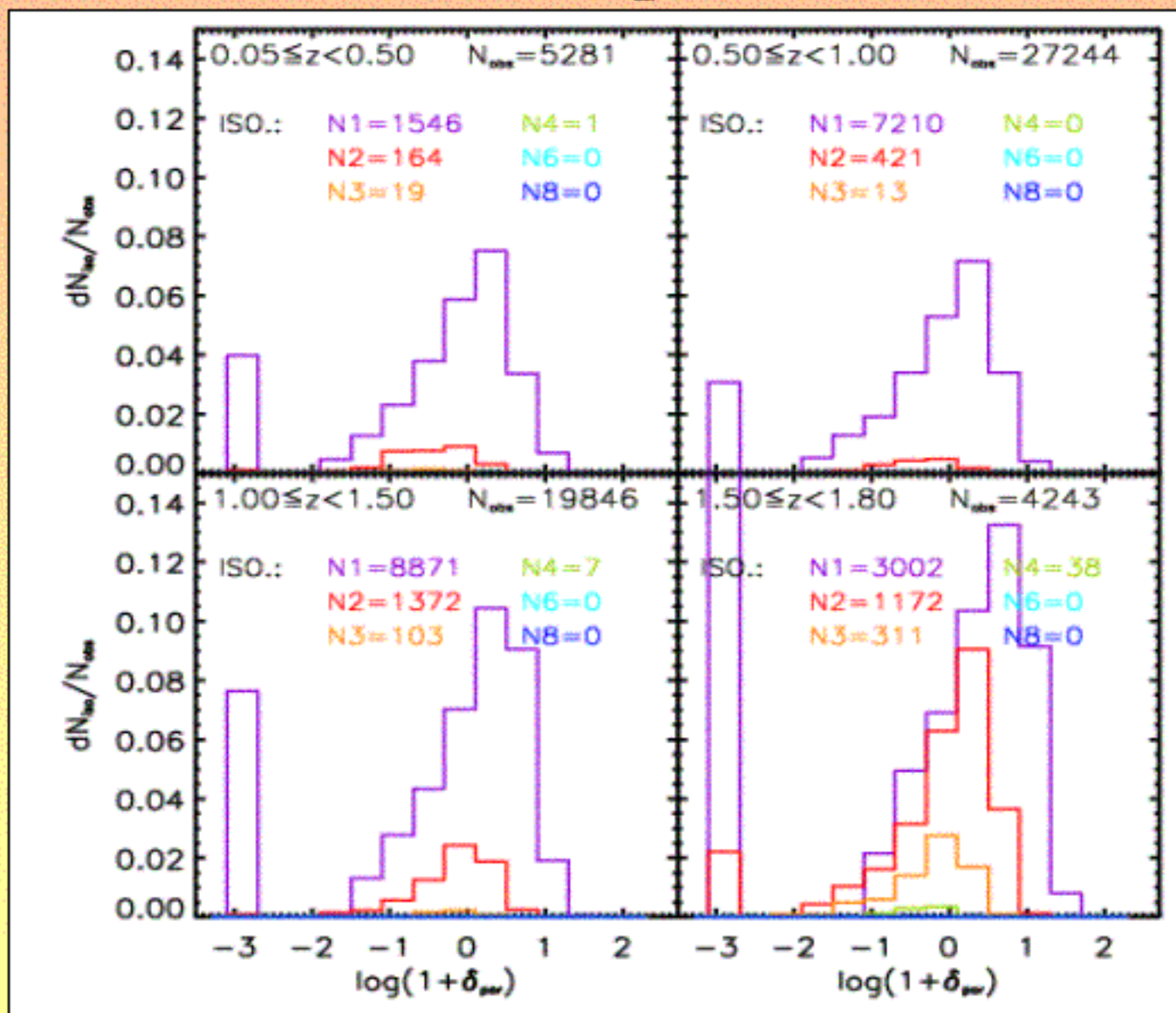
# First order corrections

Correction for  
redshift  
sampling rate

Correction for  
boundary effects



# First results: reconstructing the distribution of isolated galaxies



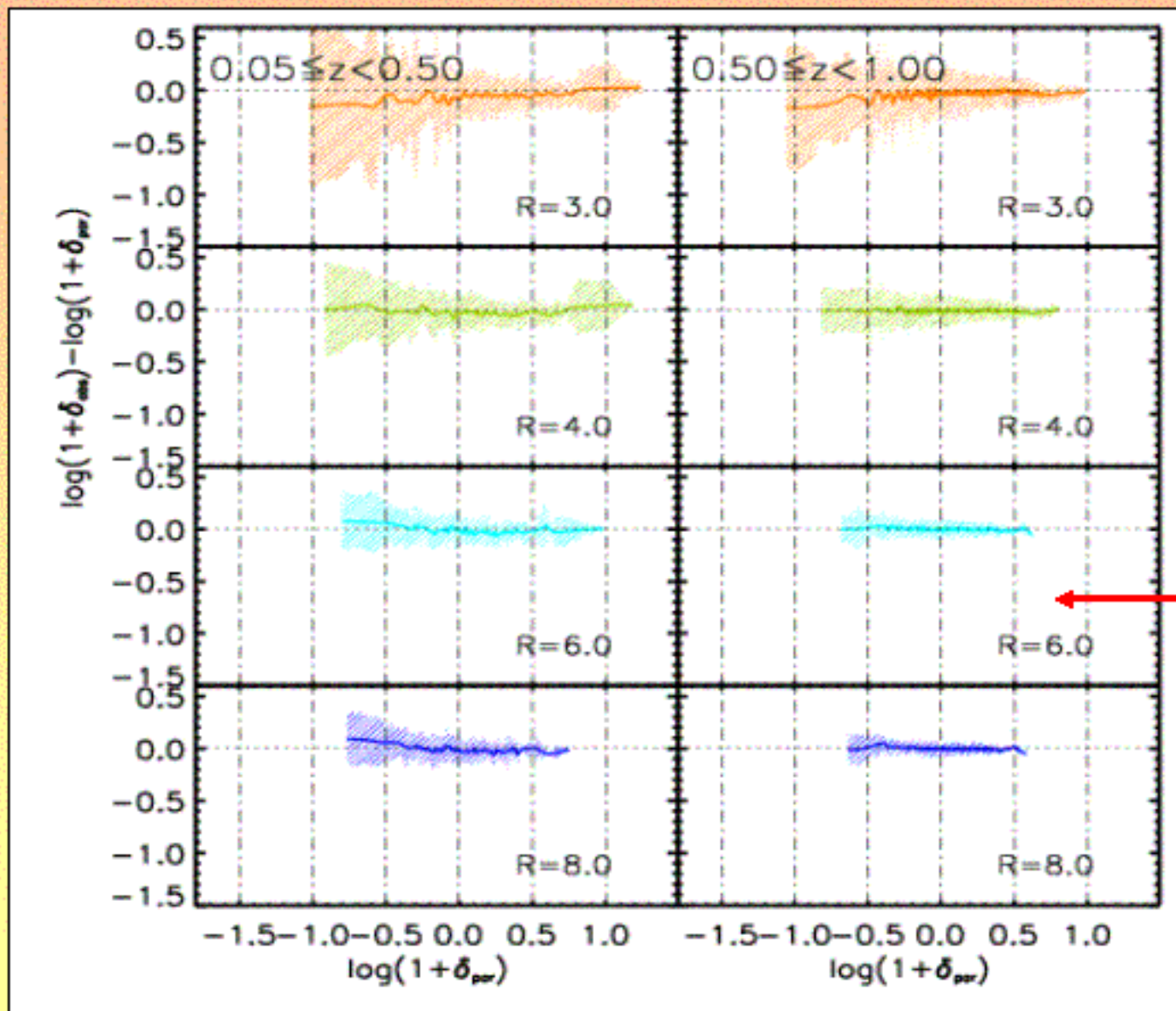


We exclude two smoothing radii:

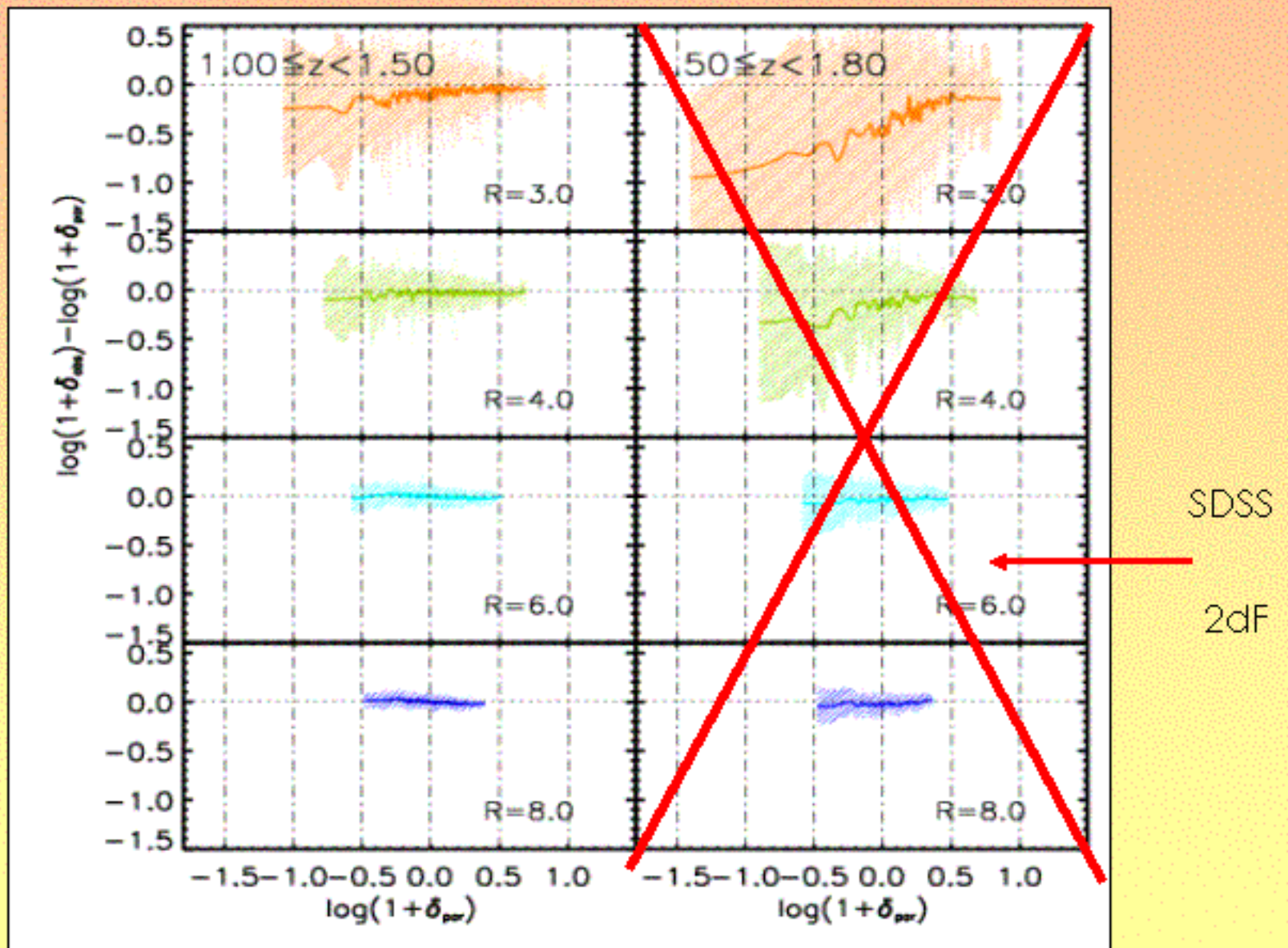
$$R=1.0 \text{ Mpc } h^{-1}$$

$$R=2.0 \text{ Mpc } h^{-1}$$

# First results: reconstructing the distribution of $\delta$ as a function of $\delta(\text{par})$ (1)

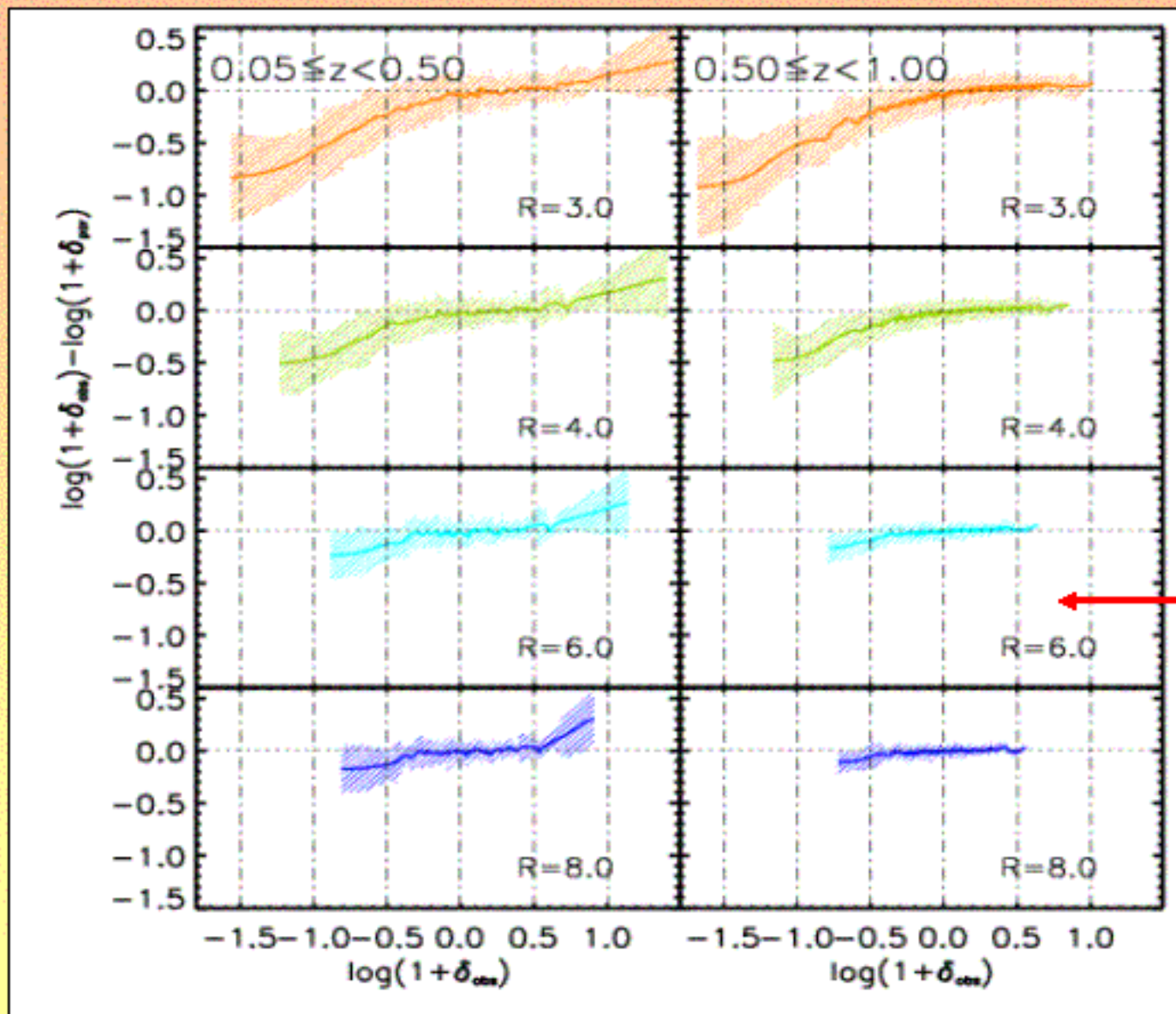


# First results: reconstructing the distribution of $\delta$ as a function of $\delta(\text{par})$ (2)



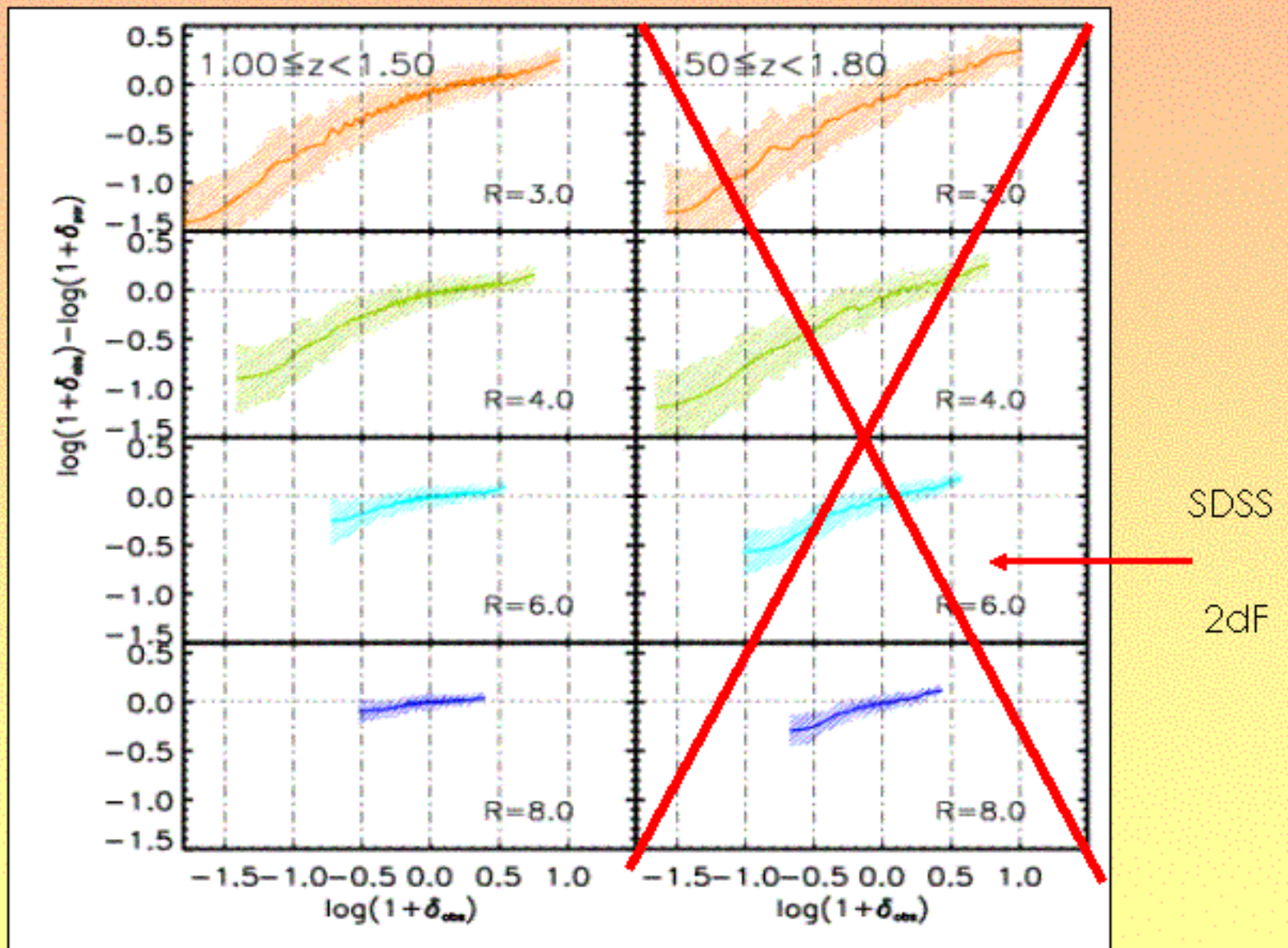
There are no systematic biases in our reconstruction of the  $\delta$  distribution

# First results: reconstructing the distribution of $\delta$ as a function of $\delta(\text{obs})$ (1)





# First results: reconstructing the distribution of $\delta$ as a function of $\delta(\text{obs})$ (2)

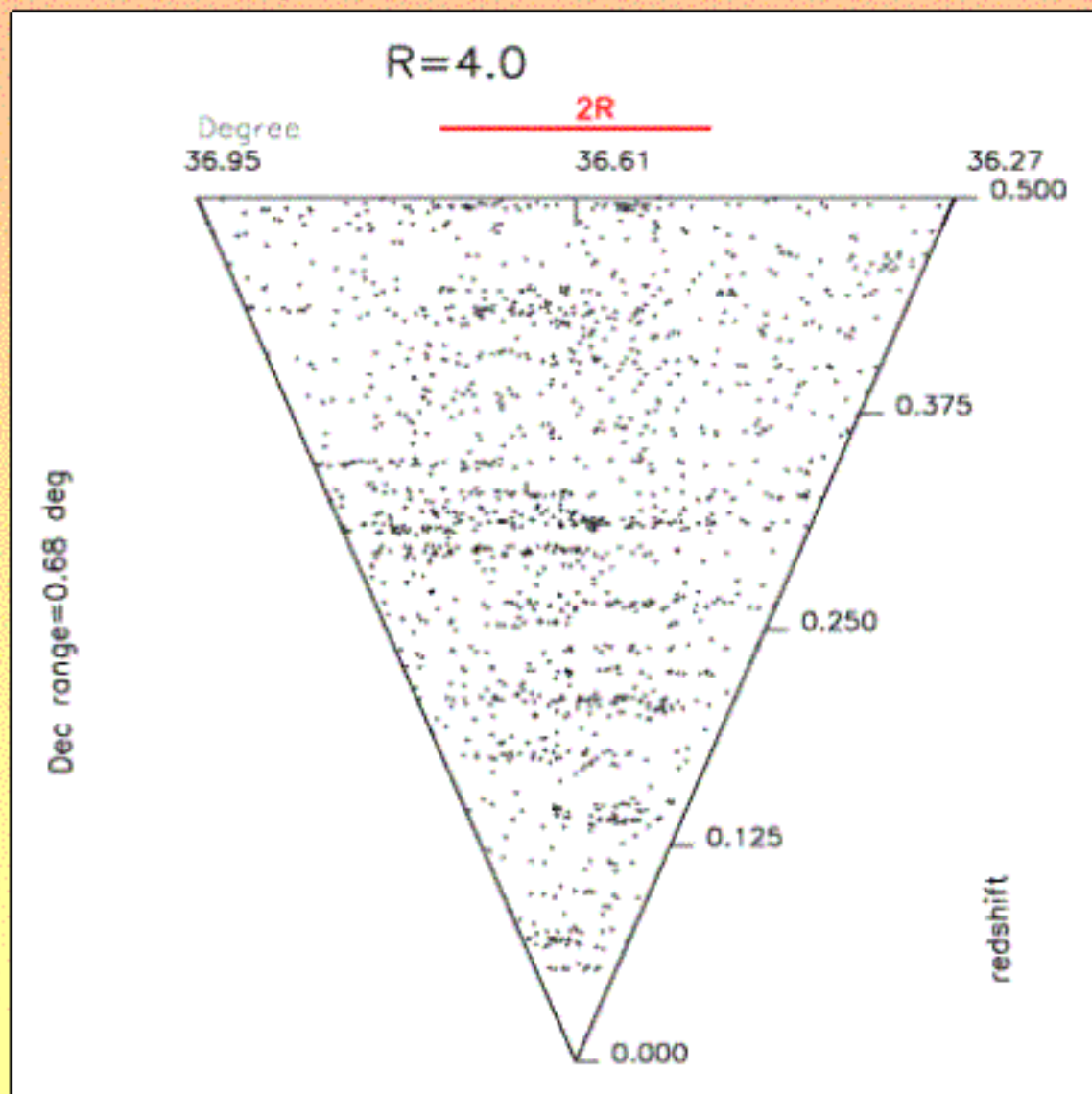


# First results for real VVDS data

- Gaussian window
- Correction for redshift sampling rate (SSPOC passes)
- Boundary correction
- Galaxies with  $z\text{-flag} > 1$

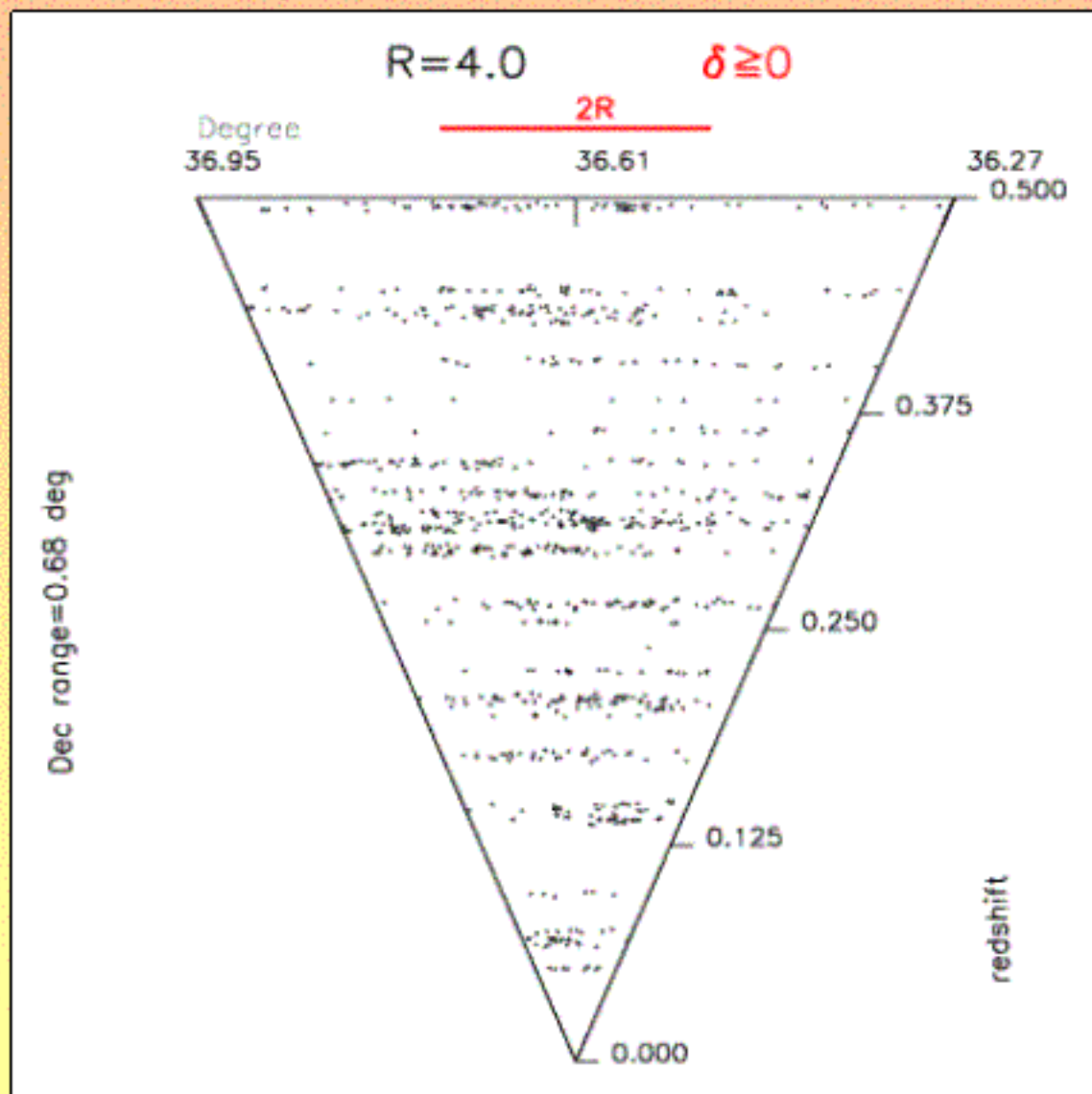
# First results for real VVDS data

Compression on the 'Dec' axis



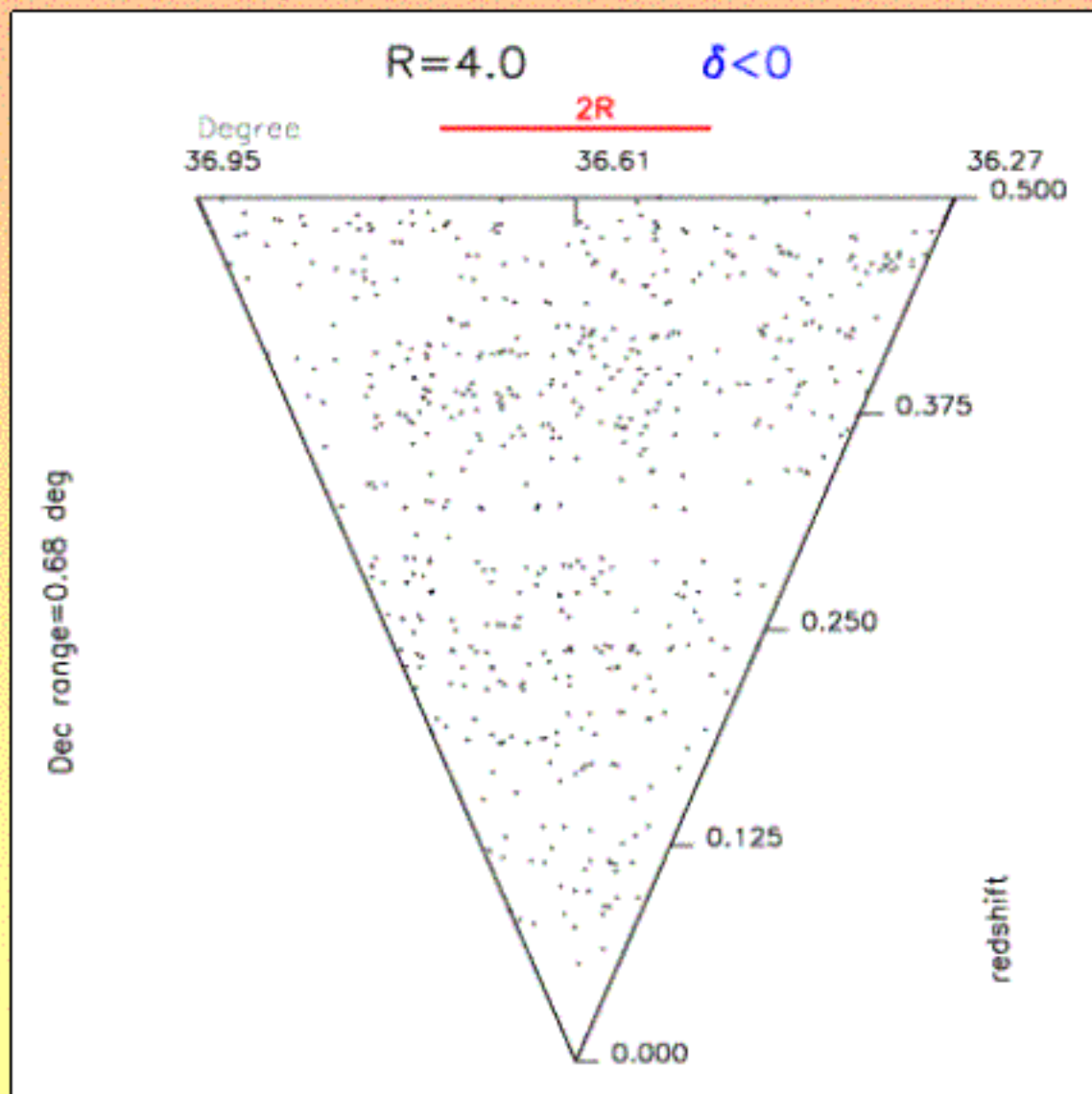
# First results for real VVDS data

Compression on the 'Dec' axis



# First results for real VVDS data

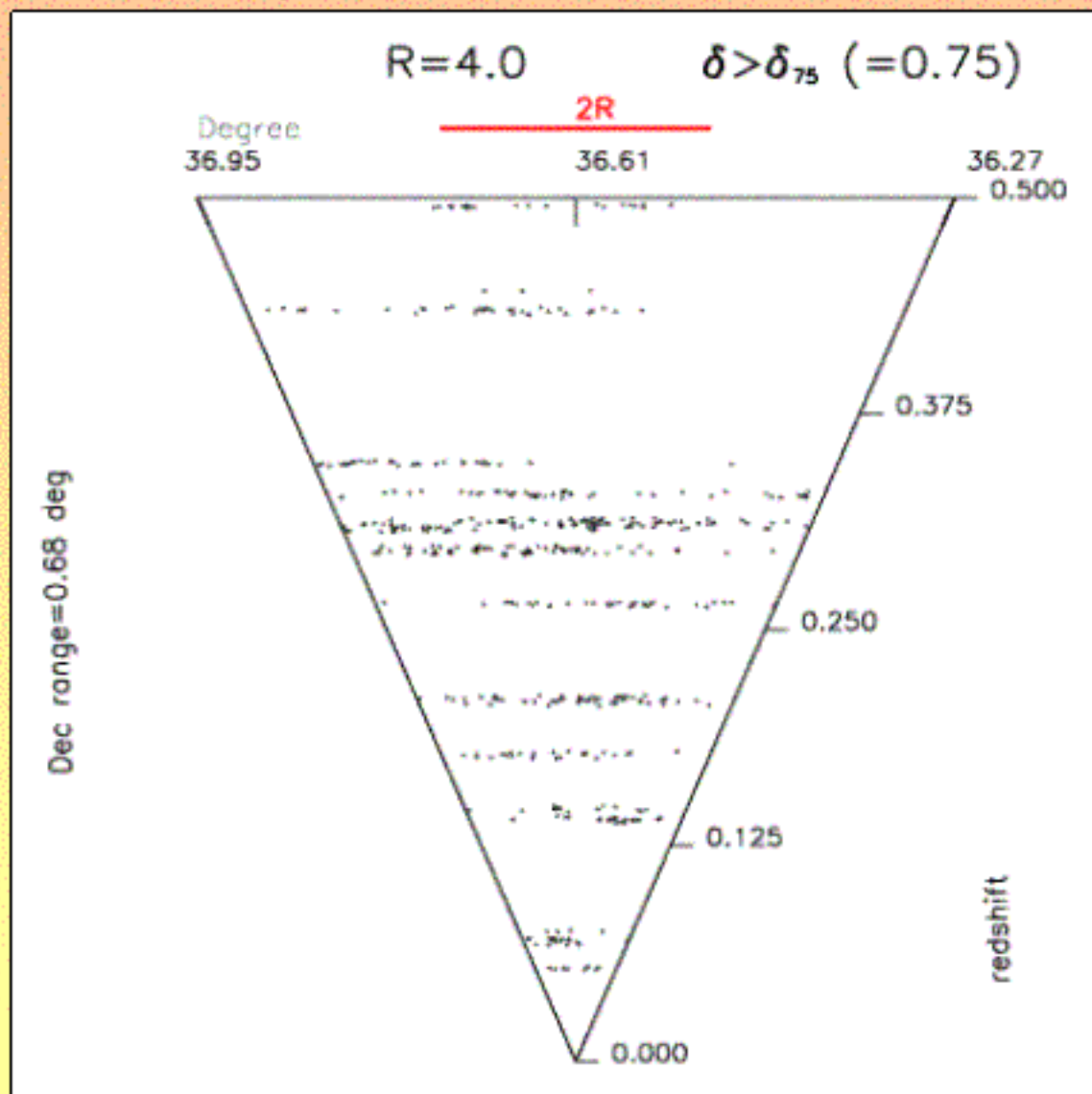
Compression on the 'Dec' axis





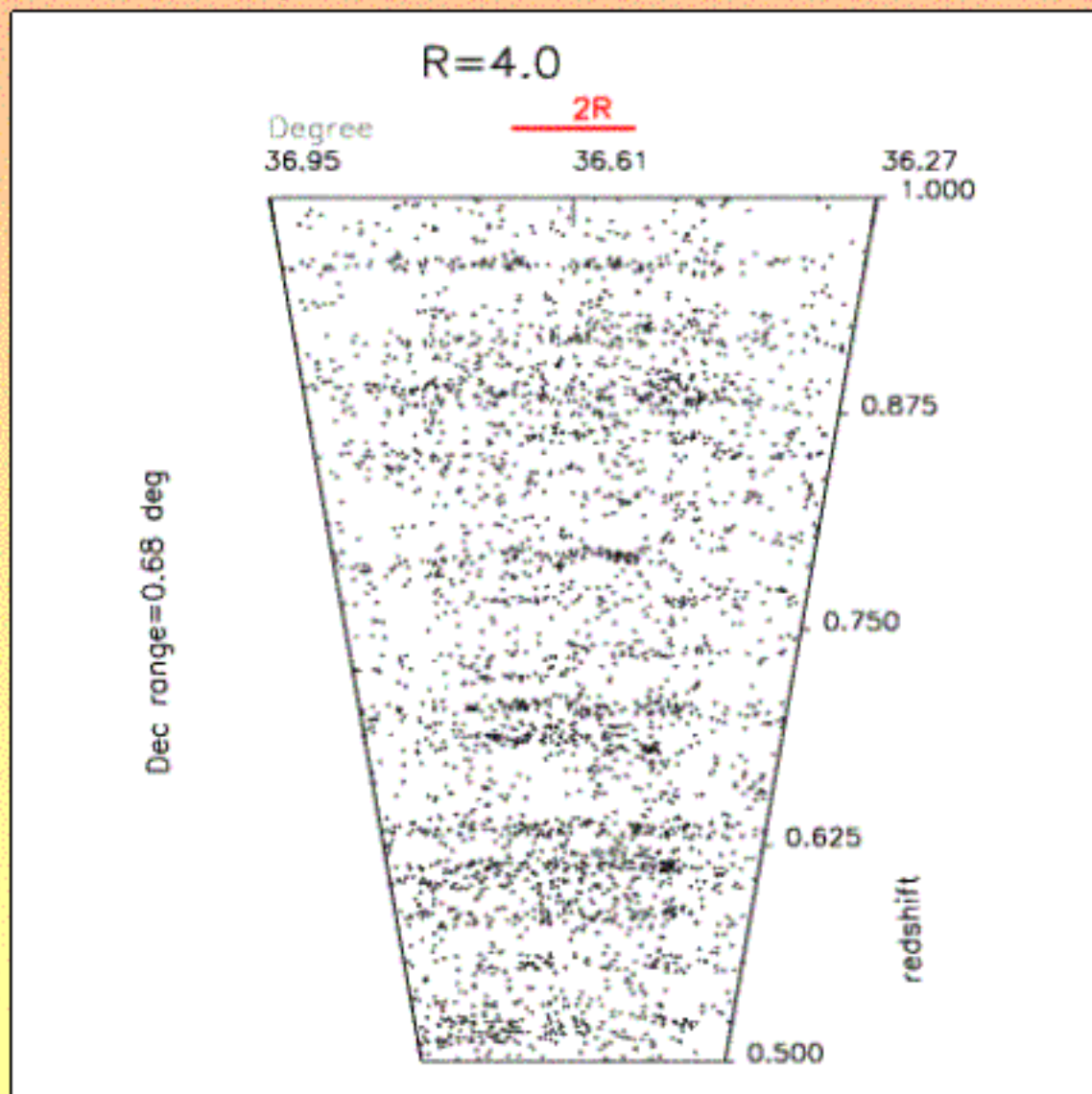
# First results for real VVDS data

Compression on the 'Dec' axis



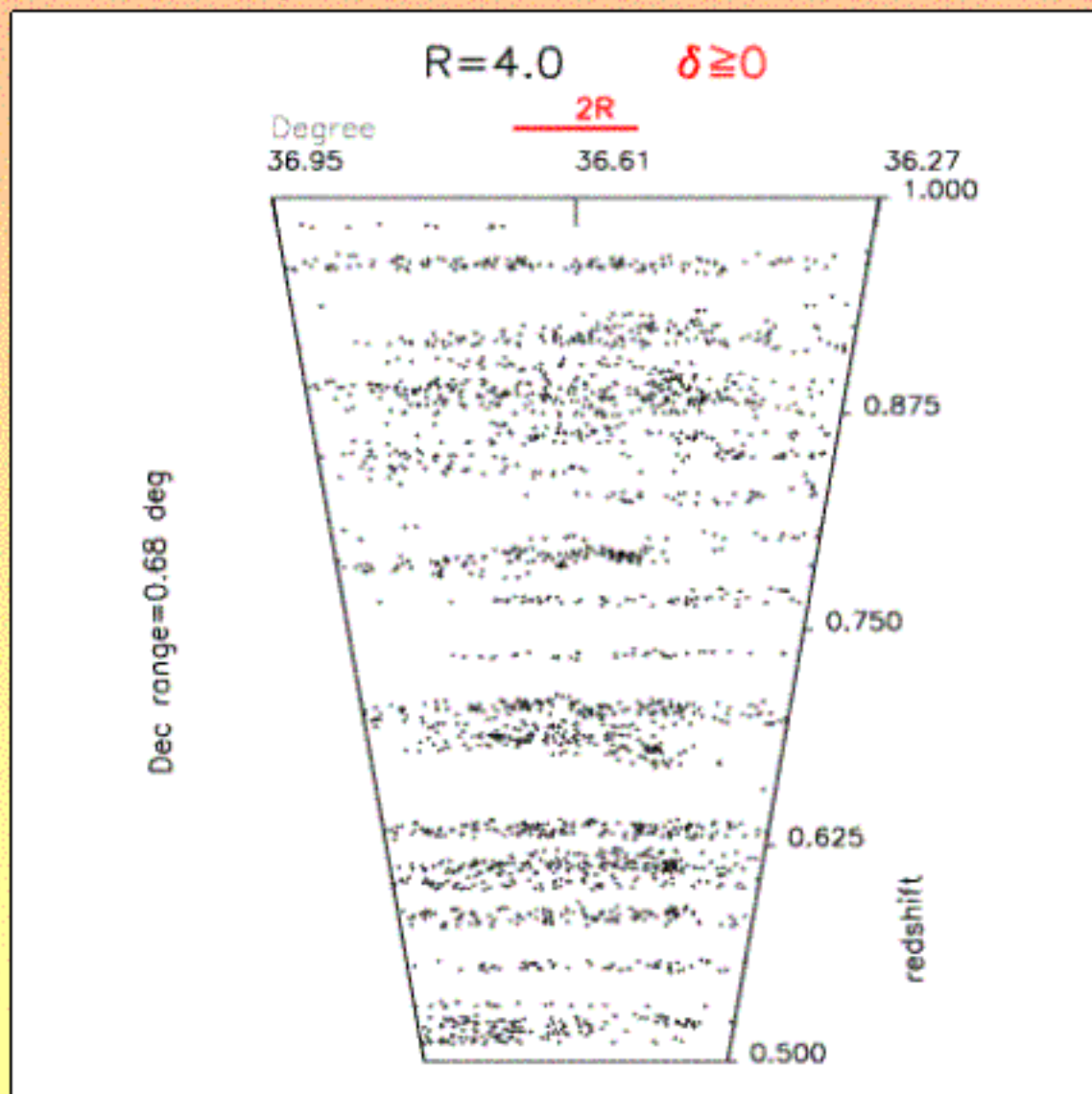
# First results for real VVDS data

Compression on the 'Dec' axis



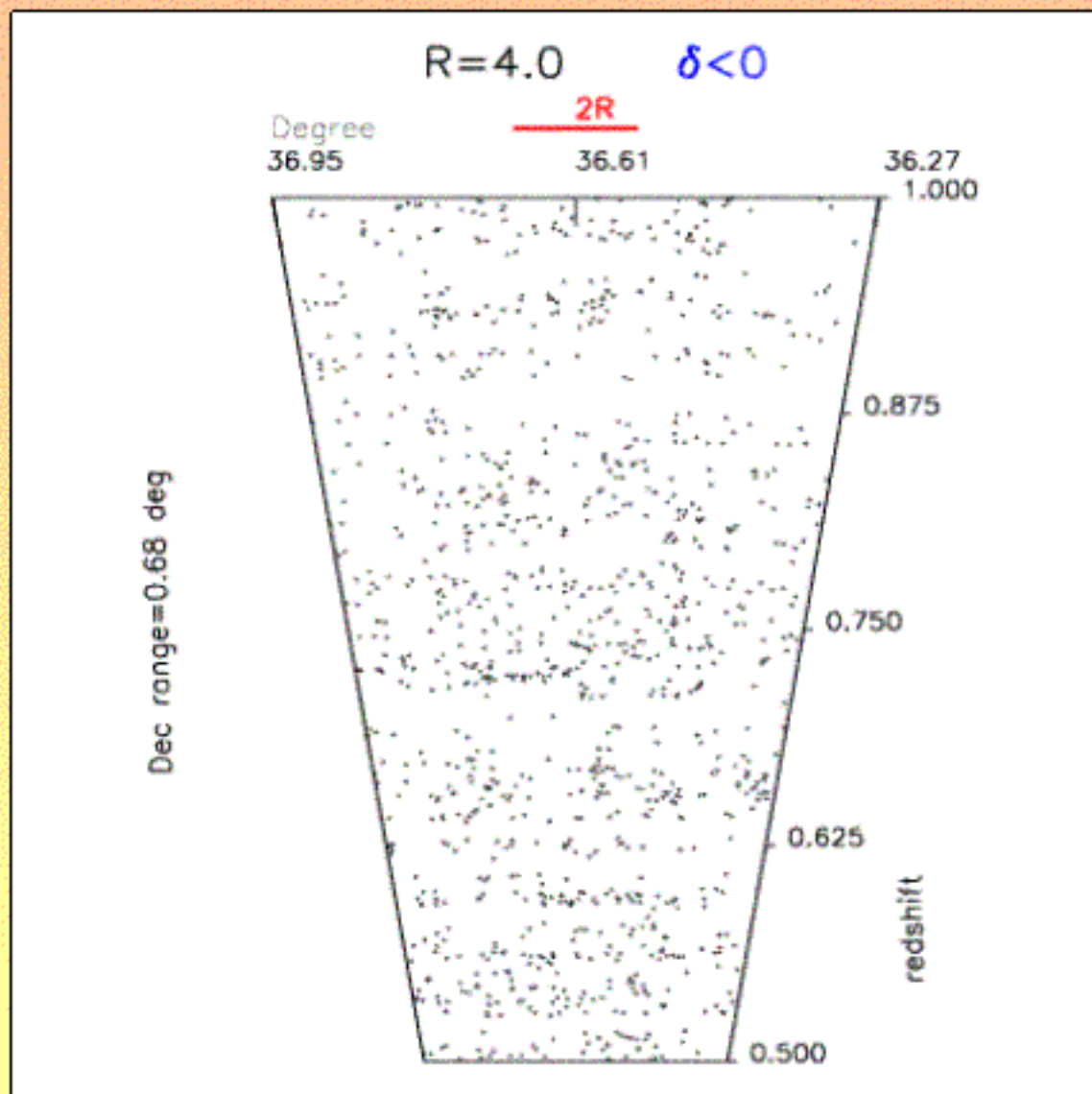
# First results for real VVDS data

Compression on the 'Dec' axis



# First results for real VVDS data

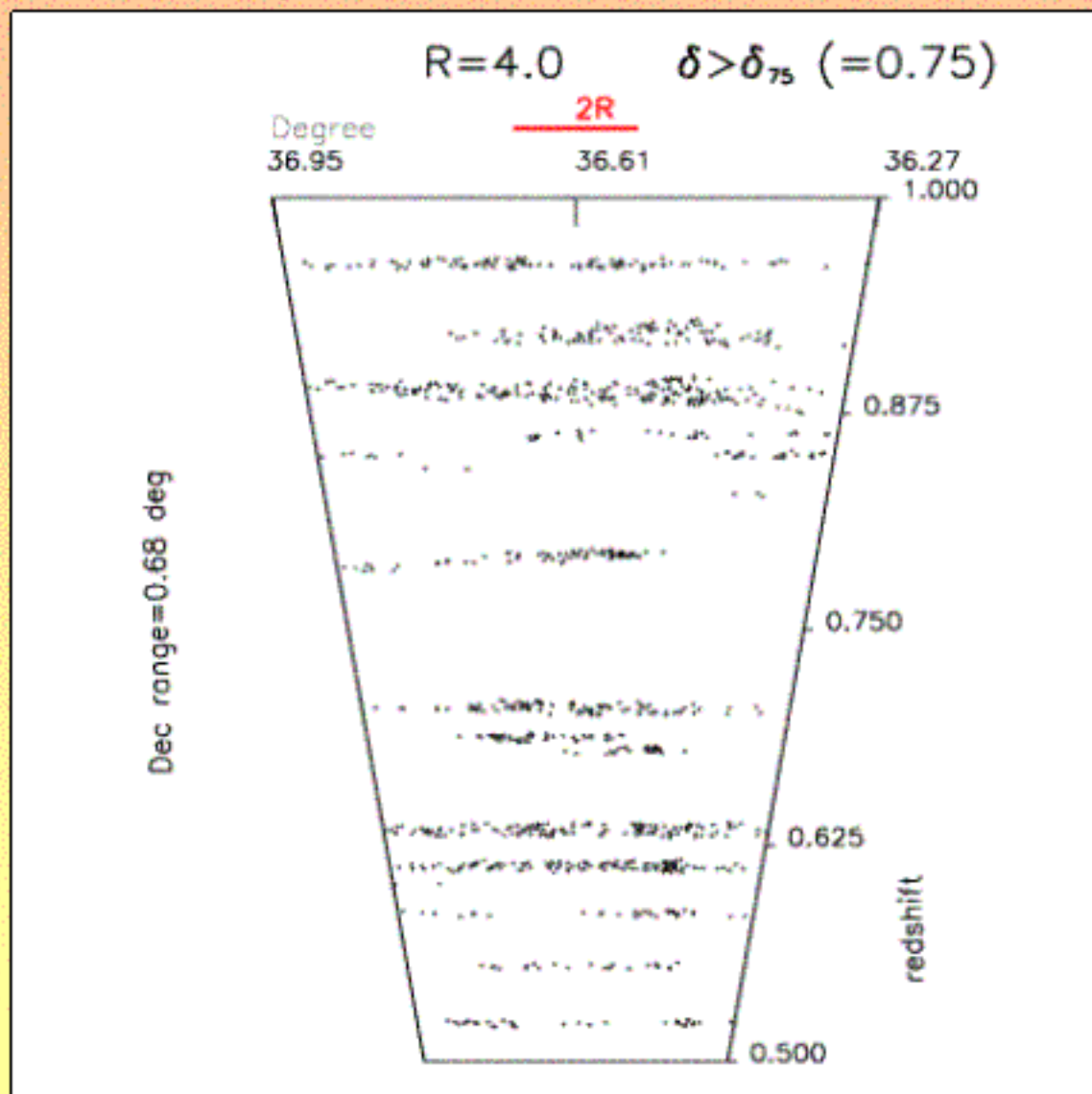
Compression on the 'Dec' axis





# First results for real VVDS data

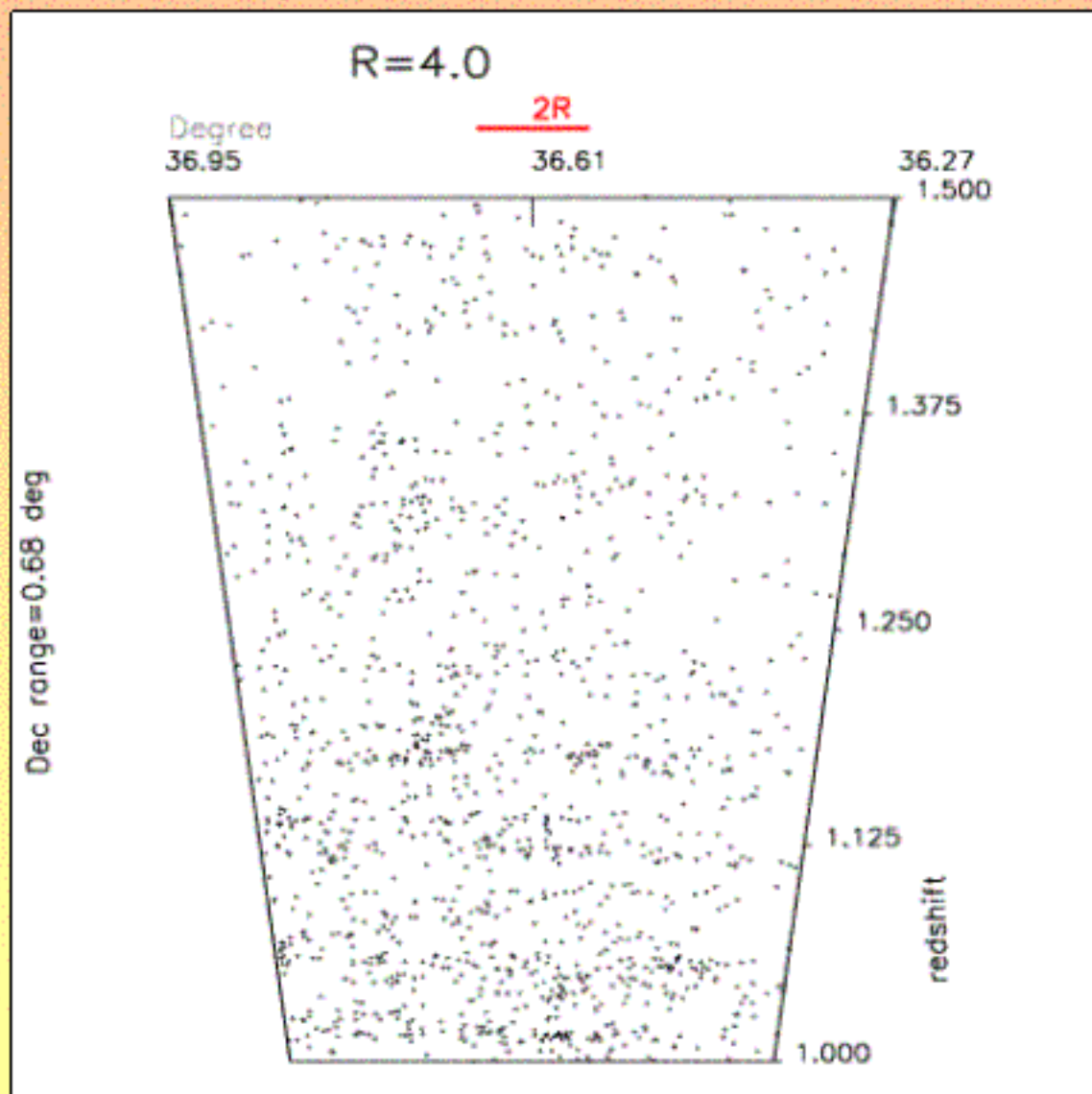
Compression on the 'Dec' axis





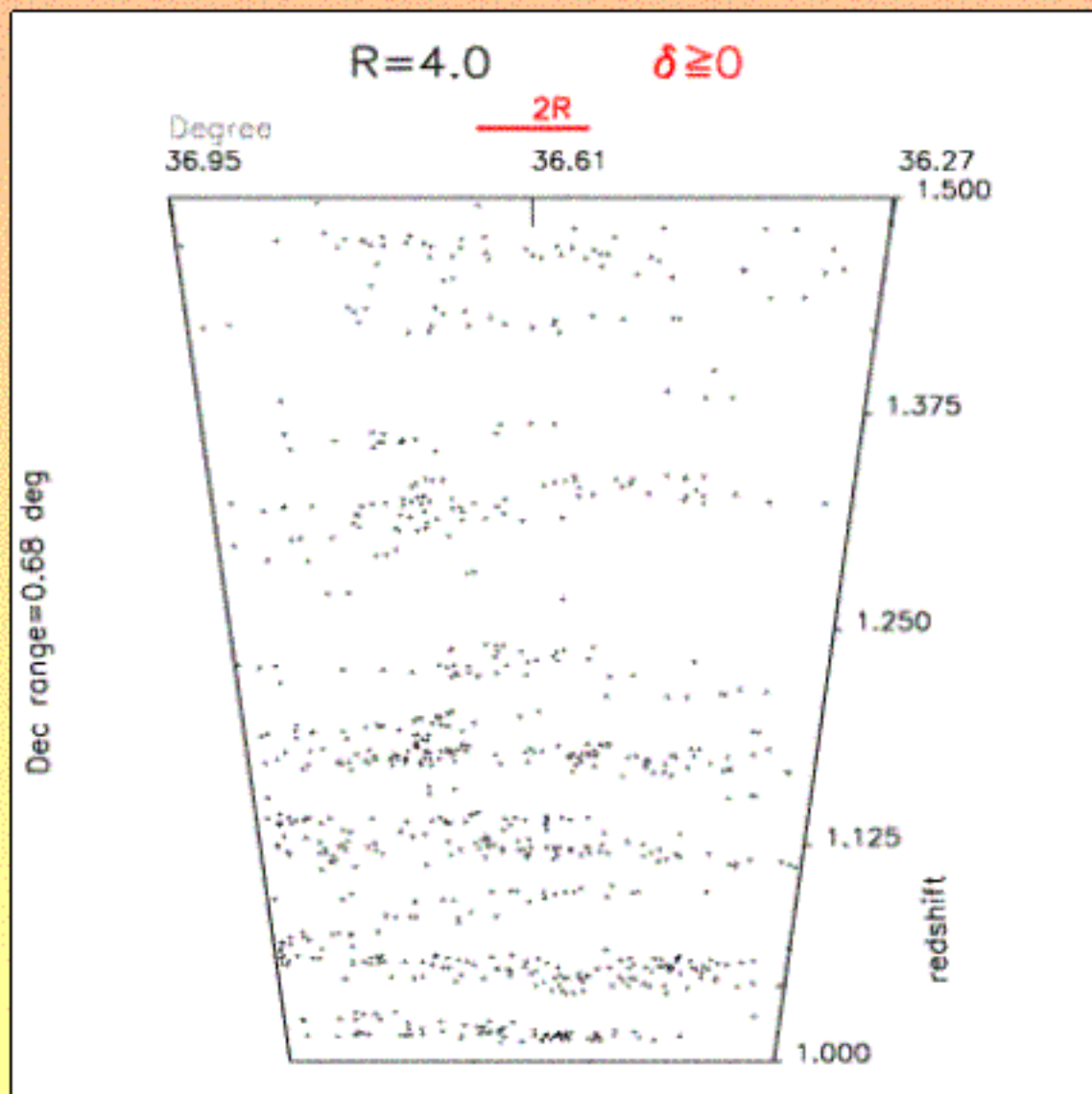
# First results for real VVDS data

Compression on the 'Dec' axis



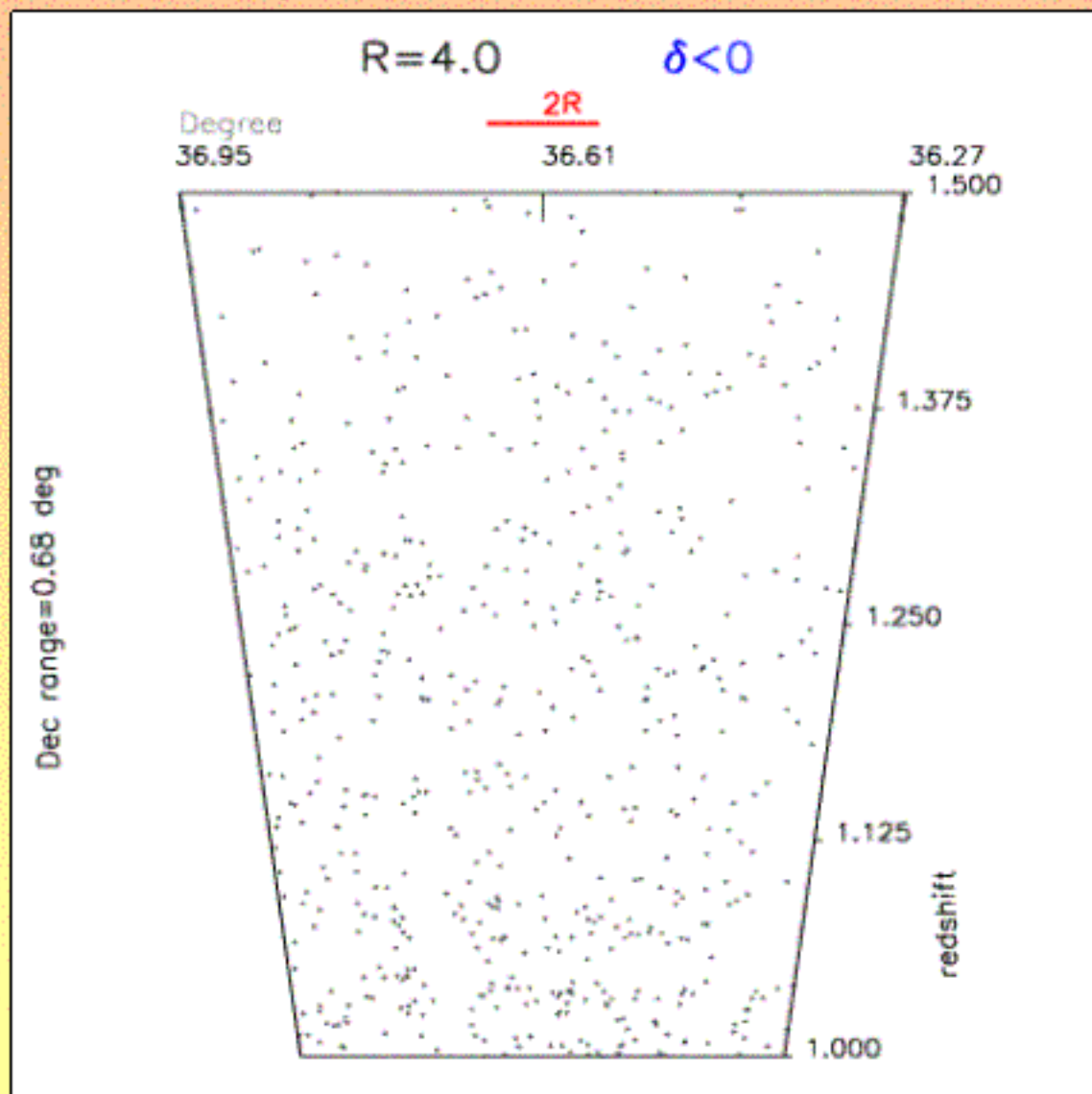
# First results for real VVDS data

Compression on the 'Dec' axis



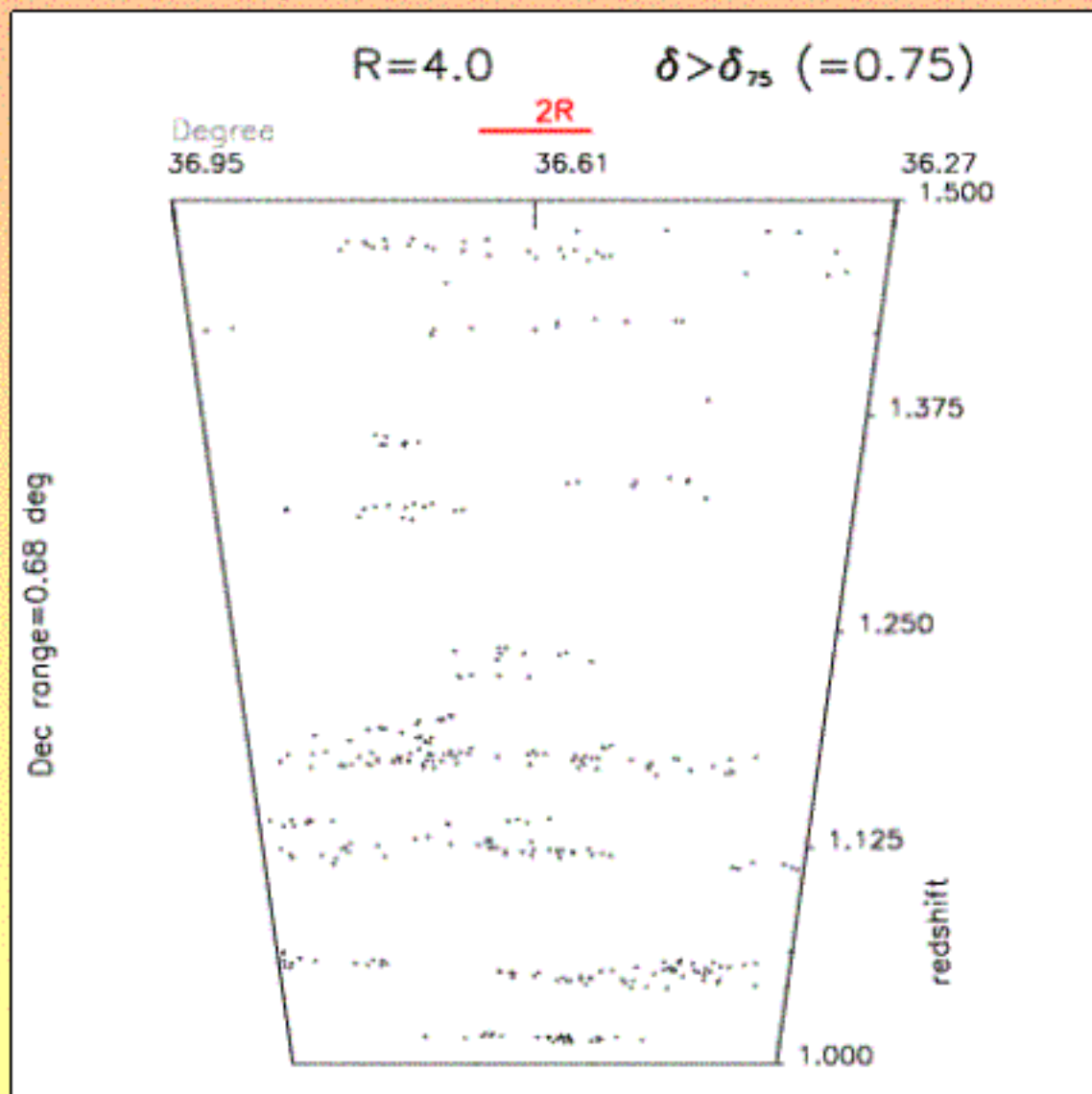
# First results for real VVDS data

Compression on the 'Dec' axis



# First results for real VVDS data

Compression on the 'Dec' axis



# Conclusions

- Unbiased reconstruction for  $R \geq 4 h^{-1}$  Mpc
- Compare to  $R = 6 h^{-1}$  Mpc of SDSS and 2dF
- Looking for other 'local' corrections (work in progress)
- Coming soon delta catalogs on web page:  
<http://www.brera.mi.astro.it/~cucciati/density.html>