

Large Scale Galaxy Structures and Galaxy Clusters in CANDELS

(The Cosmic Assembly Near-infrared Deep
Extragalactic Legacy Survey)

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On behalf of the CANDELS team



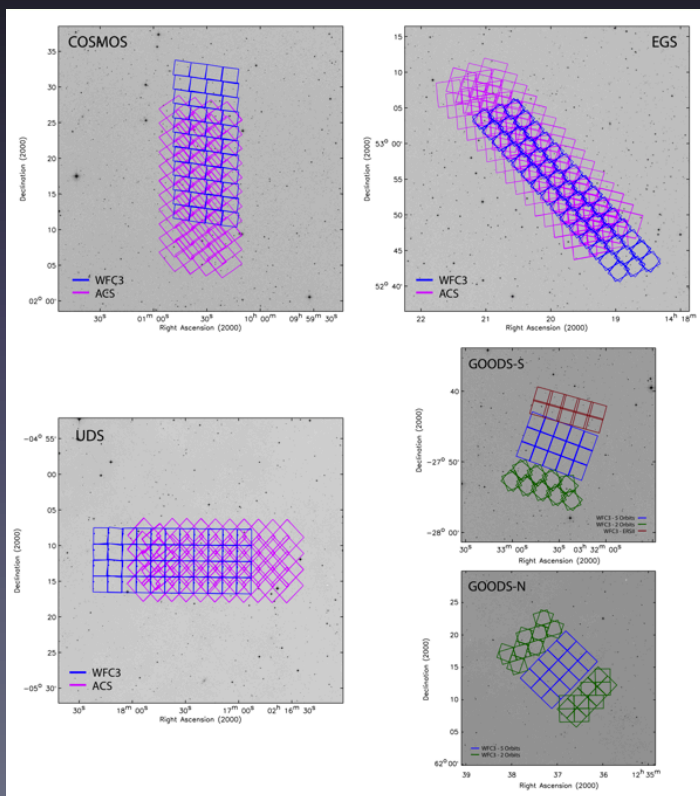
Osservatorio di Roma





CANDELS

- ✧ Largest project in the history of Hubble (902 orbits)
 - ✧ PIs: S. Faber (UC Santa Cruz), H. Ferguson (STScI, Baltimore)
 - ✧ Imaging with WFC₃ (F160W~27) and ACS of 0.22 sq. degrees
 - ✧ Grogin et al 2011; Koekemoer et al. 2011
 - ✧ 3 years to complete (mid 2010 – mid 2013)
 - ✧ More than 100 scientists from 12 country hosts.



- ✧ Five fields:
 - ✧ GOODS-S ; UDS; COSMOS (completed)
 - ✧ GOODS-N; EGS (1/2 completed)
- ✧ Imaging in:
 - ✧ WFC₃ F125W (J), F160W (H)
 - ✧ ACS F606W (V), F814W (I)
 - ✧ WFC₃ F105W (Y; GOODS)

http://candels.ucolick.org/data_access/Latest_Release.html



The HUGS survey

✧ The HAWK-I UDS and GOODS-S survey:

Fontana et al. in prep.

- ✧ PIs: A. Fontana (OAR), J. Dunlop (ROE)
- ✧ On-going Large VLT/HAWK-I program (4 semesters)
- ✧ GOODS-S (Ks) and UDS (Y and Ks); Depths tuned to CANDELS
- ✧ Photometry release within CANDELS multiwavelength catalogs

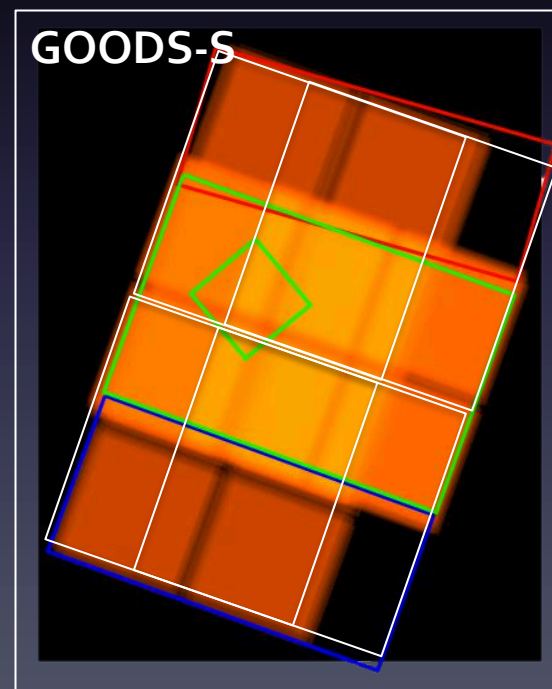
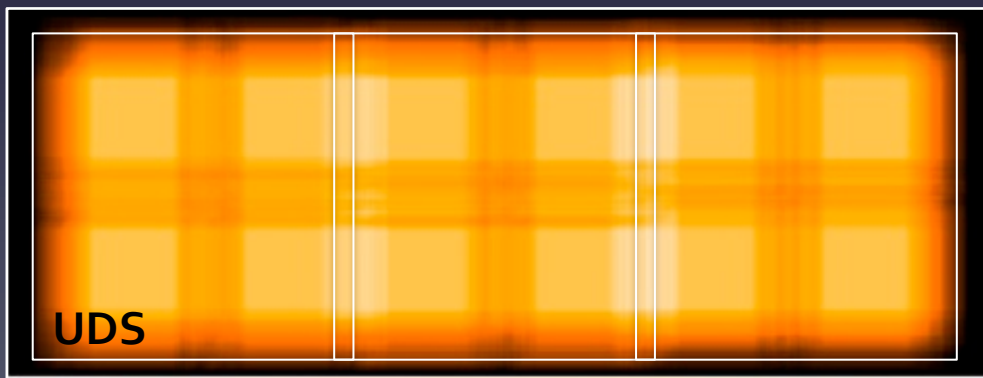
UDS : 3 pointings (95% of the CANDELS area)

Y~26.7 (8h), Ks~26 (13h) - completed

GOODS-S 6 pointings (100% CANDELS Wide+Deep)

Plan: deepest K band (86h in central area)

To date: 2/3 data – Ks~27 (62h)





CANDELS catalogues

- ✧ CANDELS multiwavelength catalogs: Galamez et al. in prep.
 - ✧ WFC₃ F160W-selected; Photometry with SExtractor and TFIT
 - ✧ Current effort in UDS (released within CANDELS) and GOODS-S (upcoming)
- ✧ Photometric redshifts and stellar masses Mobasher et al. in prep.
- ✧ GALFIT light profiles and Sersic indexes Van der Wel in prep.
- ✧ Visual morphology classification Kartaltepe et al. in prep.

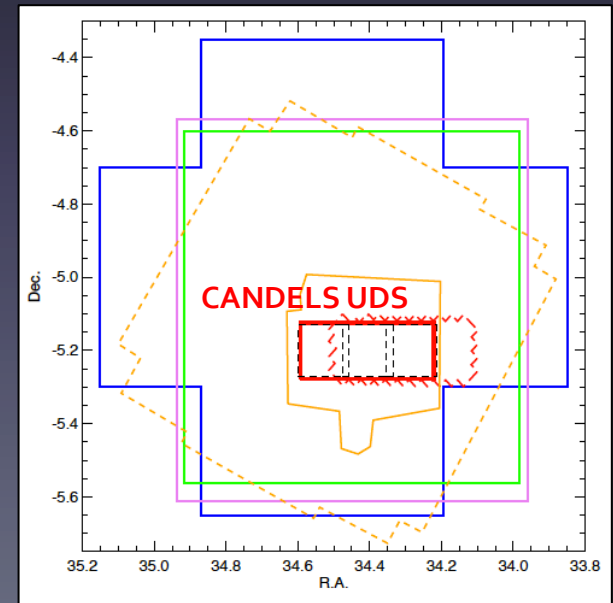
First CANDELS Multiwavelength catalogue

UDS Multiwavelength catalogue (Galamez et al. in prep.)

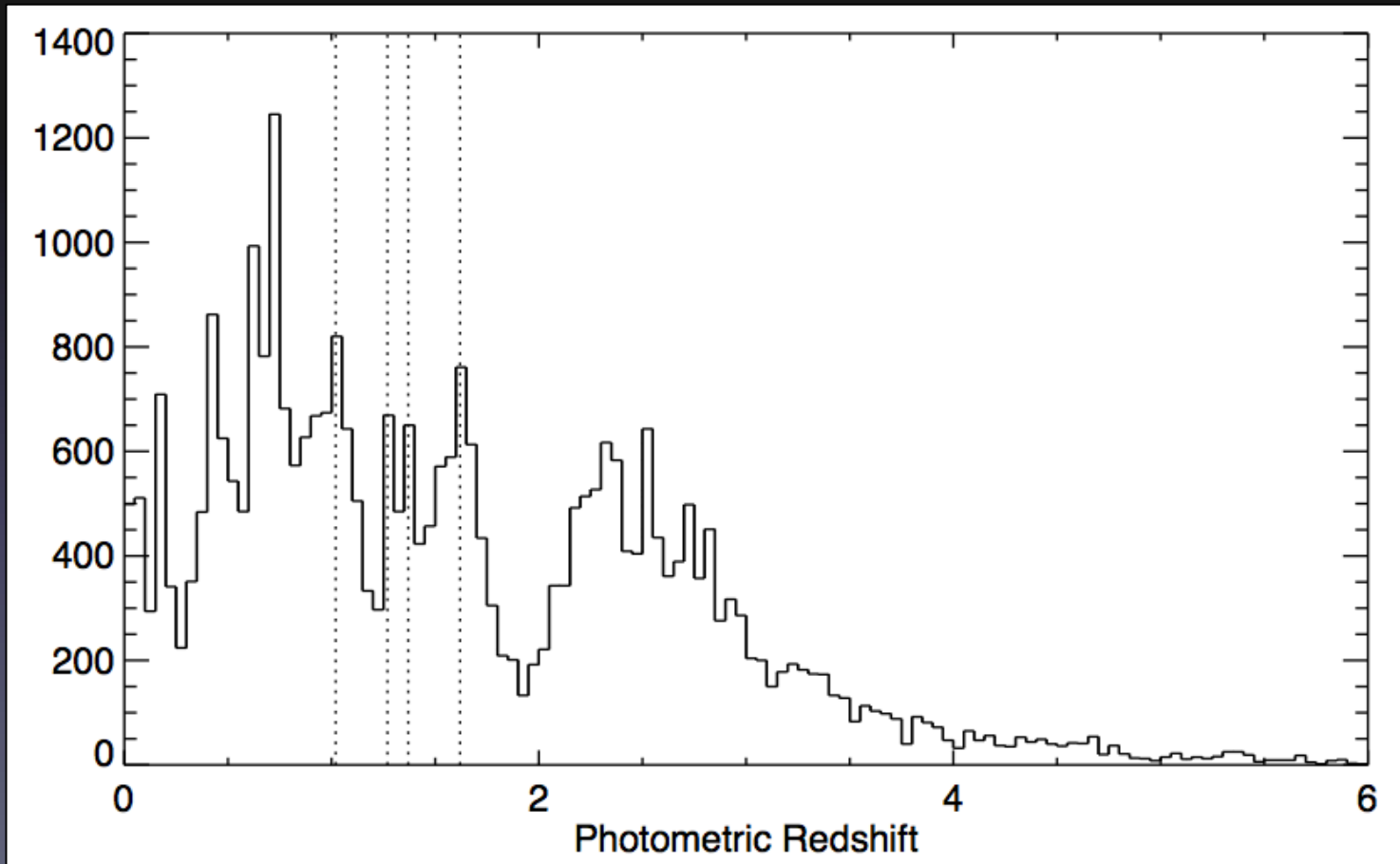
CANDELS Release: Aug 2012 – Worldwide Release: End of 2012

Instrument	Filter	FWHM	Reference
CFHT/MegaCam	U	0.86	Almaini et al. in prep
Subaru/SuprimeCam	B,V,Rc,i',z'	~0.8	Furusawa et al. 2008
HST/ACS	F606W, F814W	0.10	CANDELS
HST/WFC3	F125W, F160W	0.20	CANDELS
VLT/HAWK-I	Y, Ks	~0.4-0.5	Fontana et al. in prep
UKIRT/WFCAM	J, H, K	0.7-0.8	UKIDSS DR8
<i>Spitzer</i> /IRAC SEDS	3.6, 4.5um	~1.9	Fazio et al. in prep
<i>Spitzer</i> /IRAC SpUDS	3.6,4.5,5.8,8um	~1.9	PI: J. Dunlop

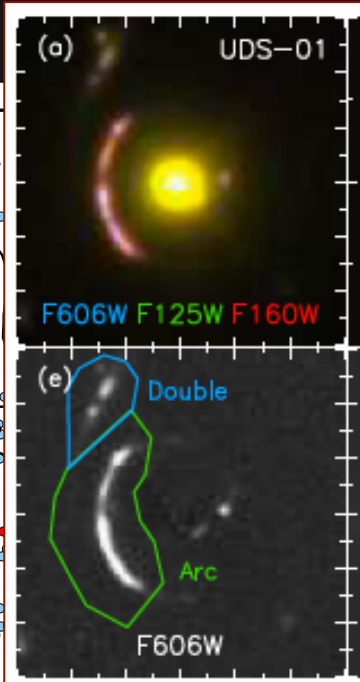
+ Spectroscopic redshifts for ~450 sources



Chasing Galaxy Clusters – Photo-z



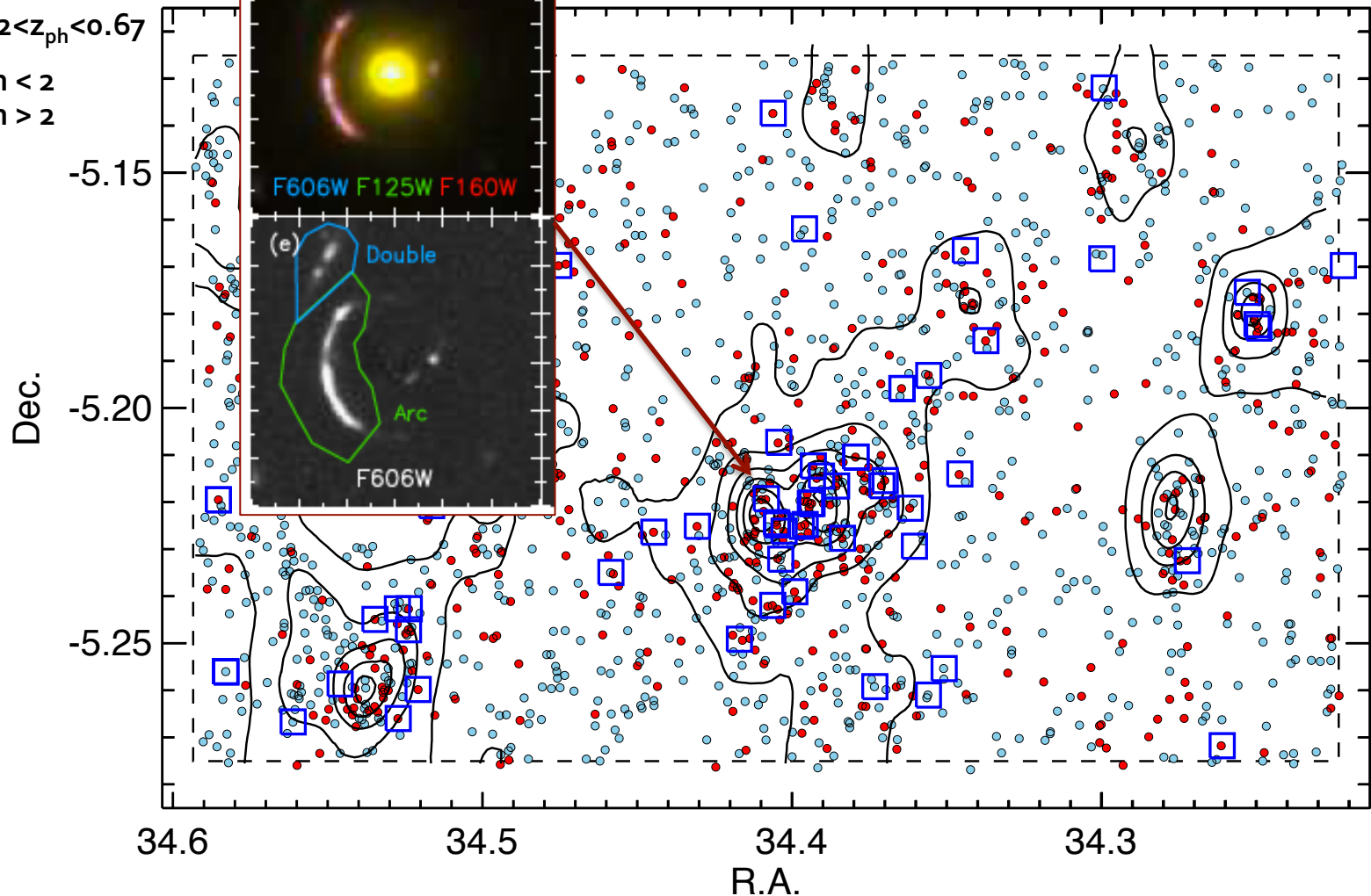
Large Scale Structure at $z=0.65$



Cooray et al. submitted - arXiv1110.3784

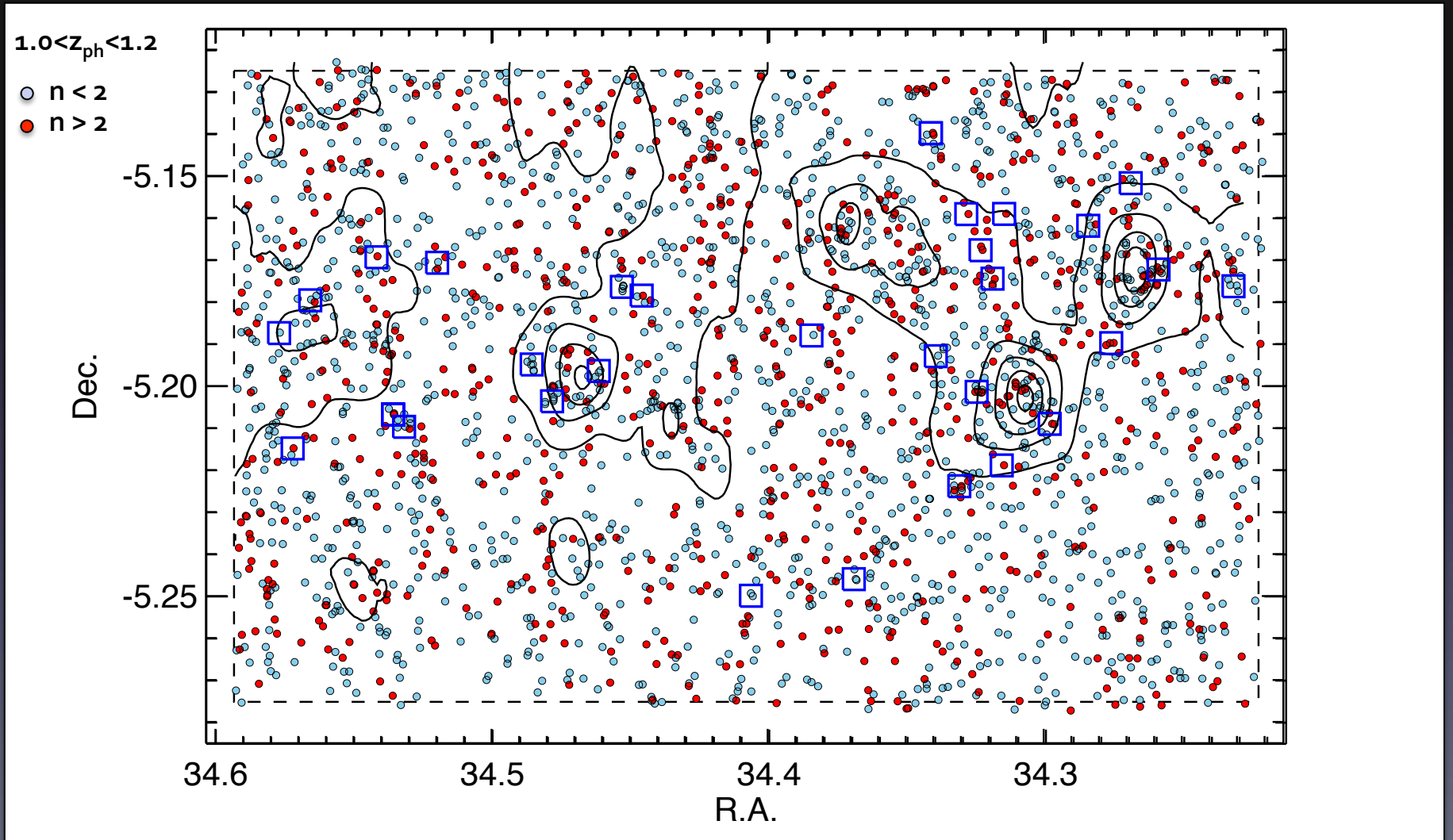
$0.62 < z_{\text{ph}} < 0.67$

- $n < 2$
- $n > 2$



See also Geach et al. 2007

Large Scale Structure at $z=1.1$



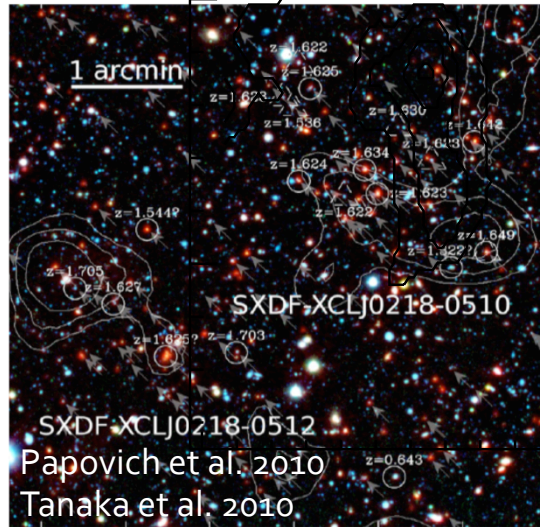
Large Scale Structure at $z=1.62$

$1.58 < z_{\text{ph}} < 1.67$

- \circ $n < 2$
- \bullet $n > 2$

-5.15

δ

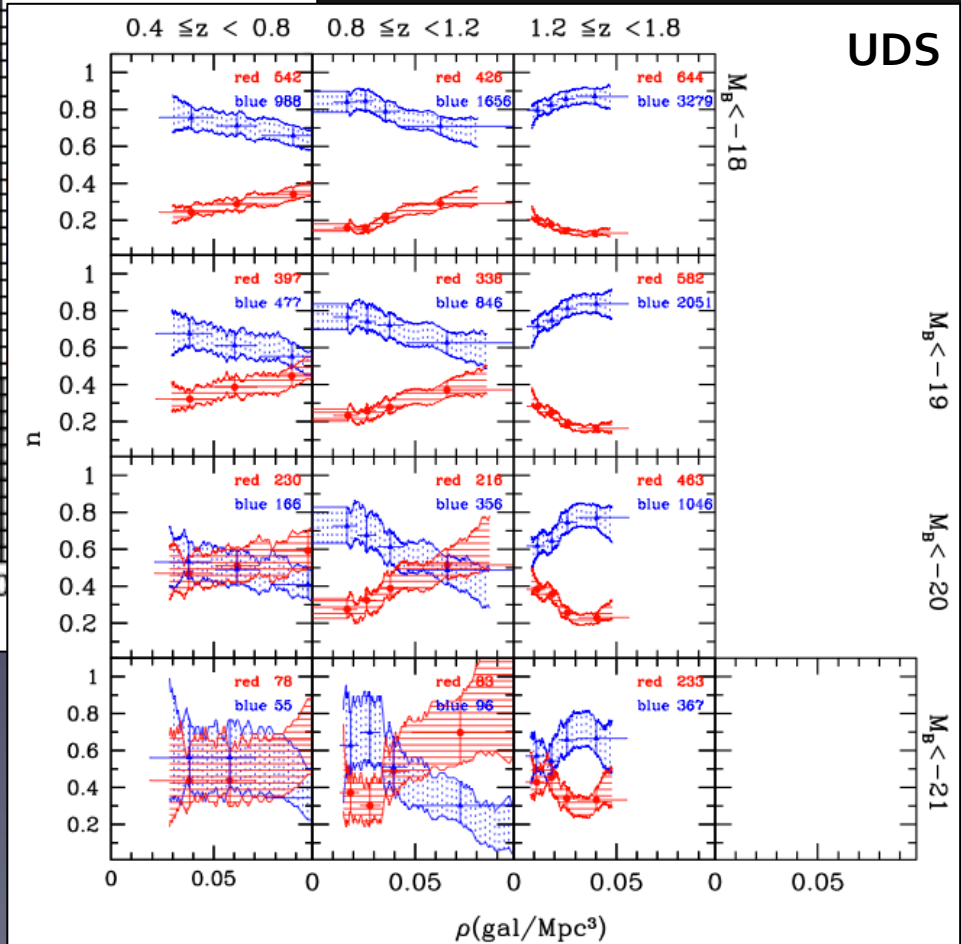
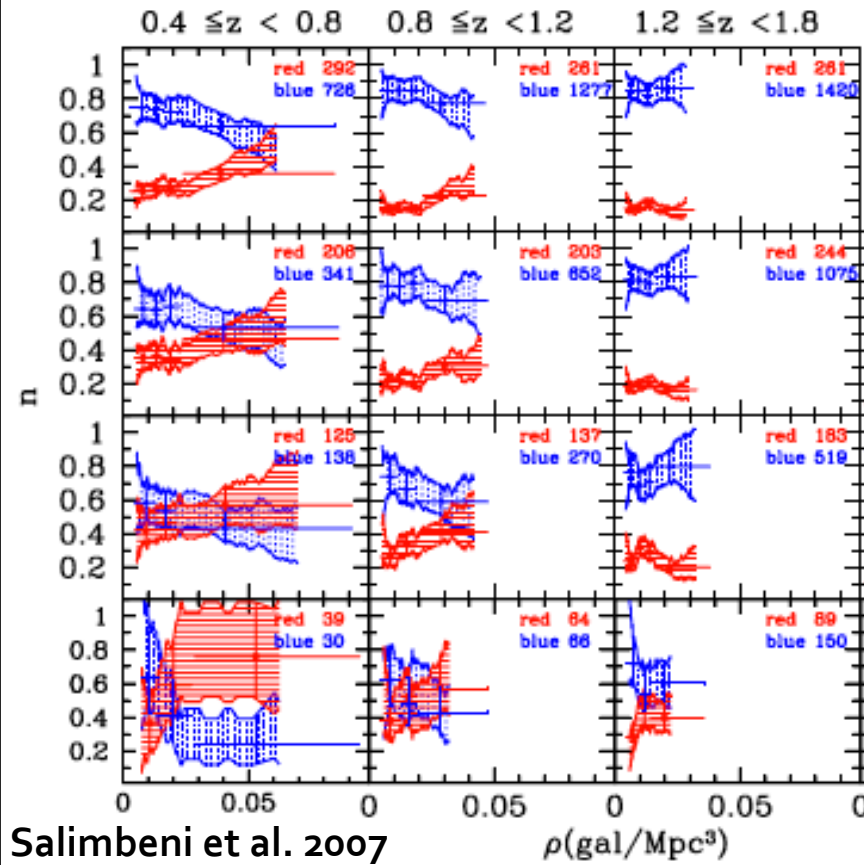


5

34.4
R.A.

34.3

Blue/red fraction versus density





Conclusions

- ✧ CANDELS is 2/3 done with 3 ½ fields already completed. Its extension with VLT/HAWK-I (HUGS) is going to provide unique dataset to complement CANDELS to an equivalent depth and provide the deepest K band ever taken ($K > 27$ in GOODS-S).
- ✧ All (optical to mid-IR) data ever taken in each CANDELS fields will be included in legacy multiwavelength catalogs – Release of UDS and Goods-S at the end of 2012.
- ✧ Despite its 'limited' field of view, CANDELS contains a number of high-redshift large scale structures (groups and cluster candidates) and will help studying the dependence of galaxy properties (stellar mass, R/B fraction, age, morphology) with environment.