WIRCAM Large Programs

- 2 extragalactic surveys in YJHK :
  - Deep with K_{AB}=24 over 0.44 deg^2 in VVDS02hr (spectro @ I_{AB}=24) : ~ 30 nights
  - Wide with K_{AB}=23 over 2 deg^2 in COSMOS field (morph. with ACS) : ~ 20 nights
- Both fields have multi-λ data from X to Radio
- Testing galaxy formation scenarios

Testing hierarchical model

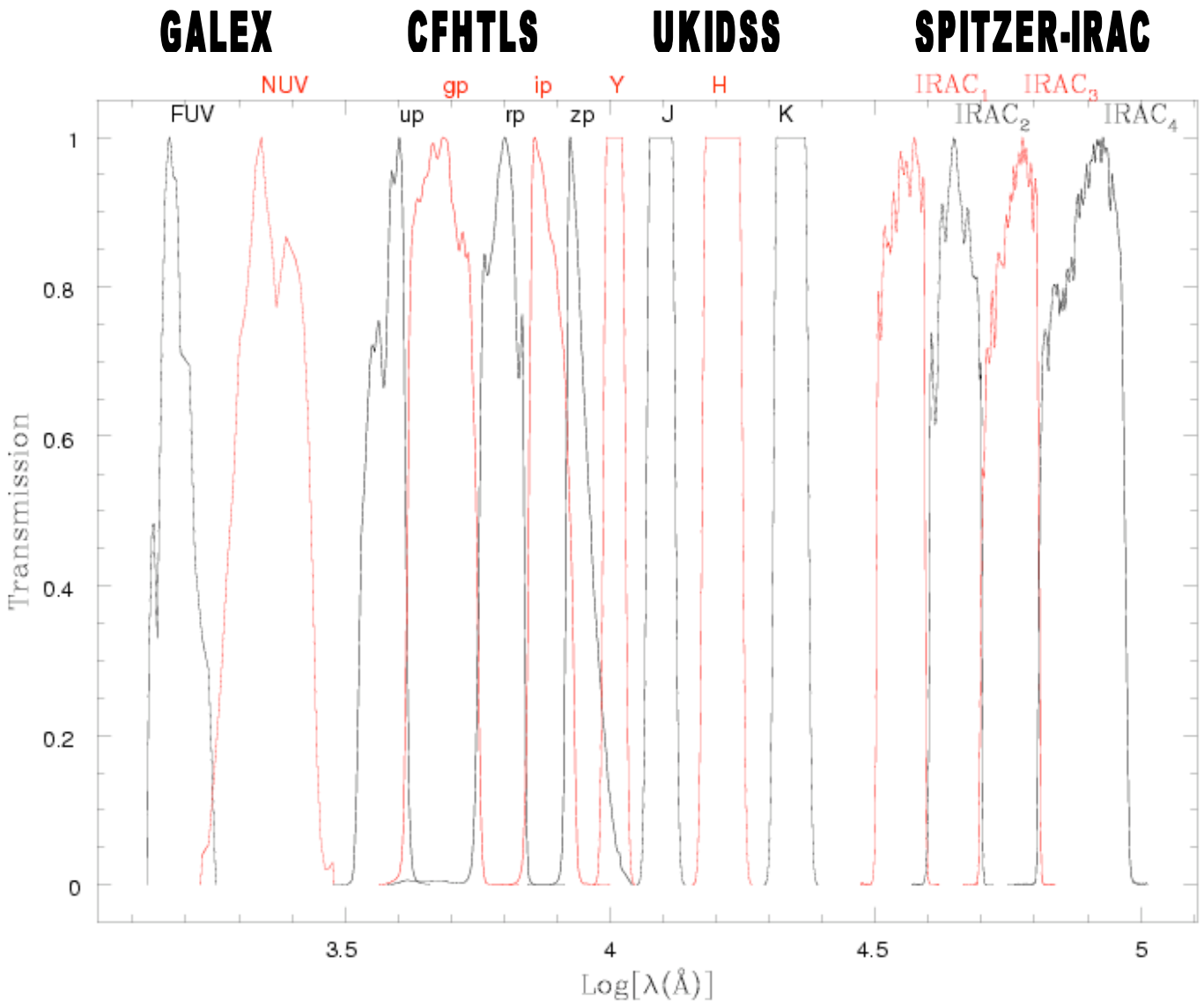
Dark matter haloes + Baryons -> galaxies ?

- What are the formation epochs of galaxies ?
  - *How fast is the mass assembly ?*
  - *How and when appear the Hubble sequence ?*
- What the Star Formation history ?
  - *Could environ^{t} affects the SF process ? Merging rate and LSS*
- How galaxy populations trace the underlying mass ?

need :

- multi-color information including NIR & Deep (high-z)
- morphology (characteristical sizes, scaling relations)
- large area (statistical approach + LSS)
- Z_{spec} or at least Z_{phot}

Multi-wavelengthes fields



1<Z<3-4

Current SF

Optical

Stellar Mass

Local Universe with :
GALEX-SDSS
+2MASS /UKIDSS

Photo-z accuracy

Simulations :

* LF(R,type,z)
* 72 SEDs divided as:

Red : Ell-Sbc

Green: Sbc-Scd

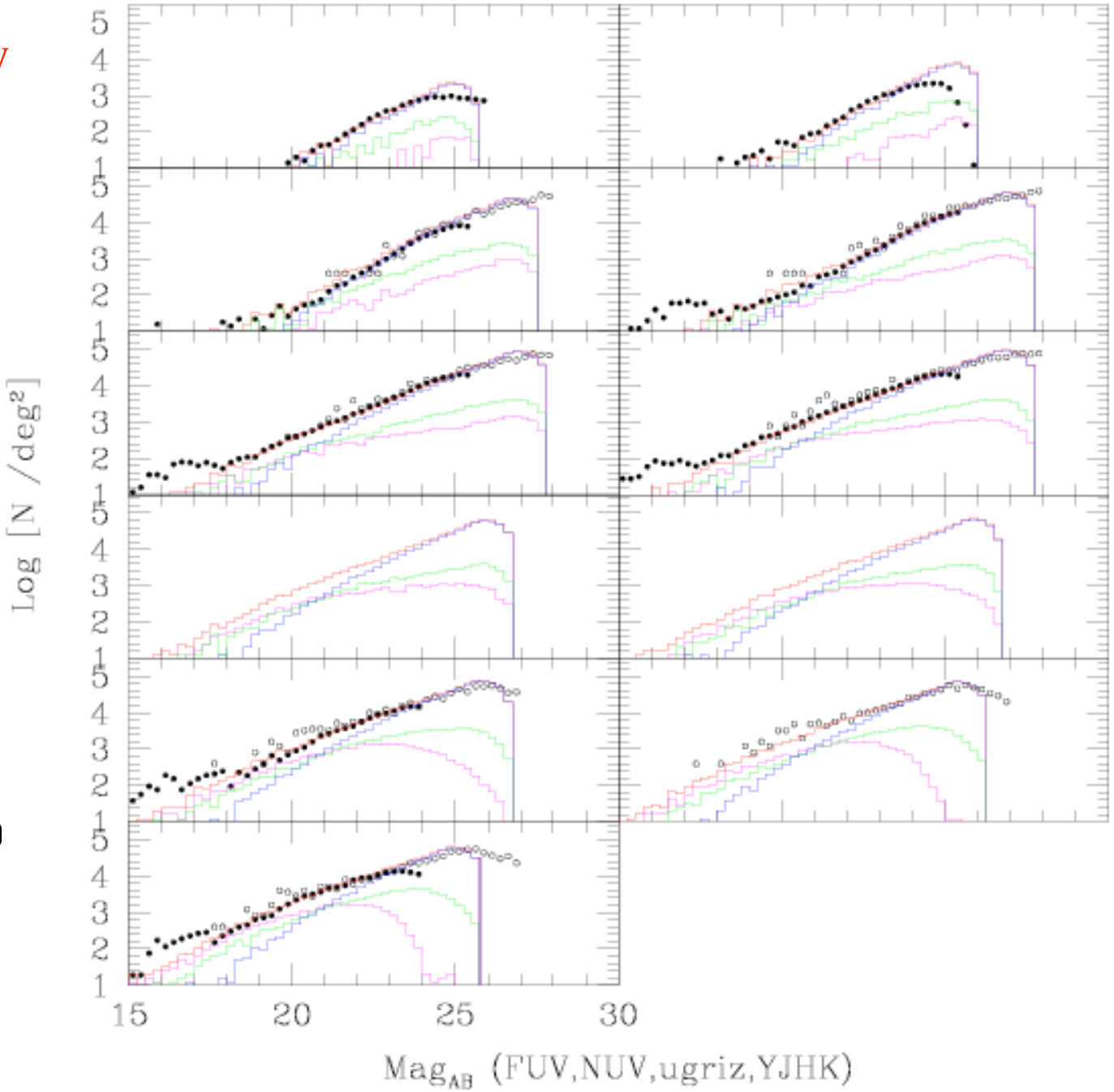
Blue : SF-Scd

+ dust ext.

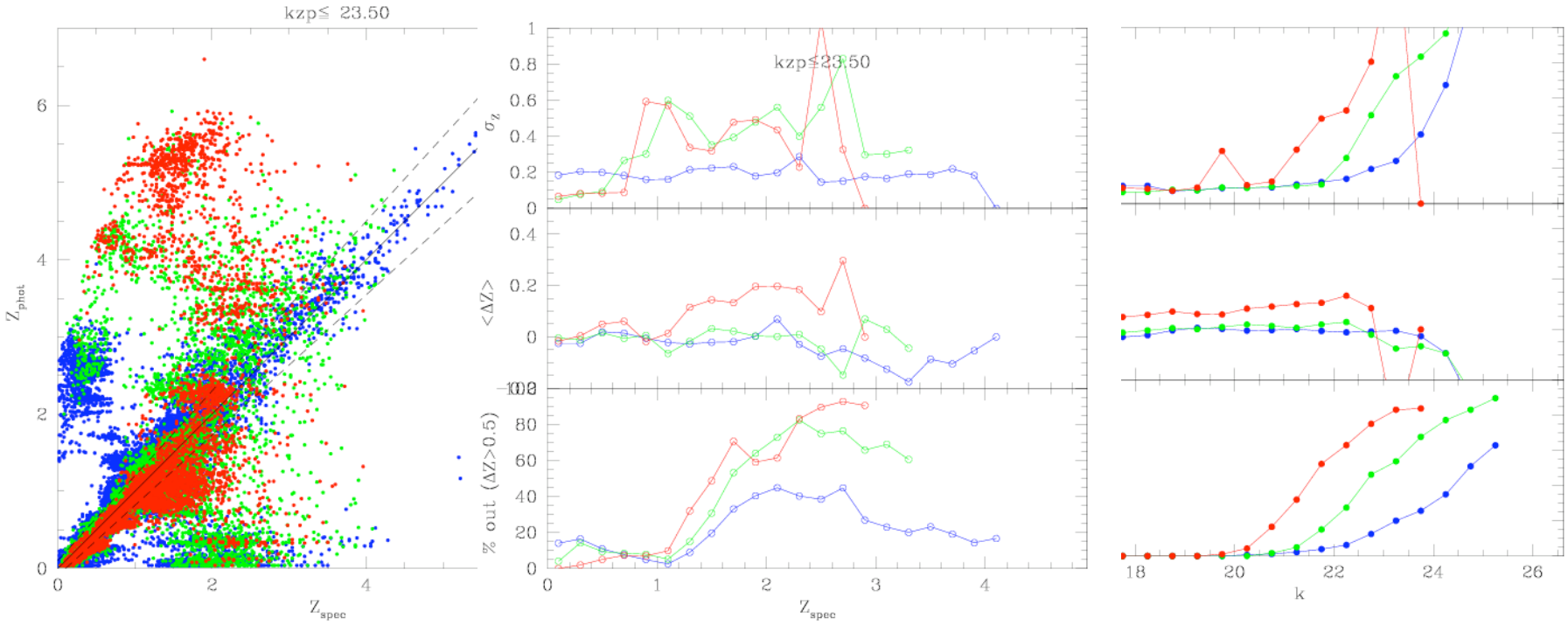
* Err vs mag

Zphot :

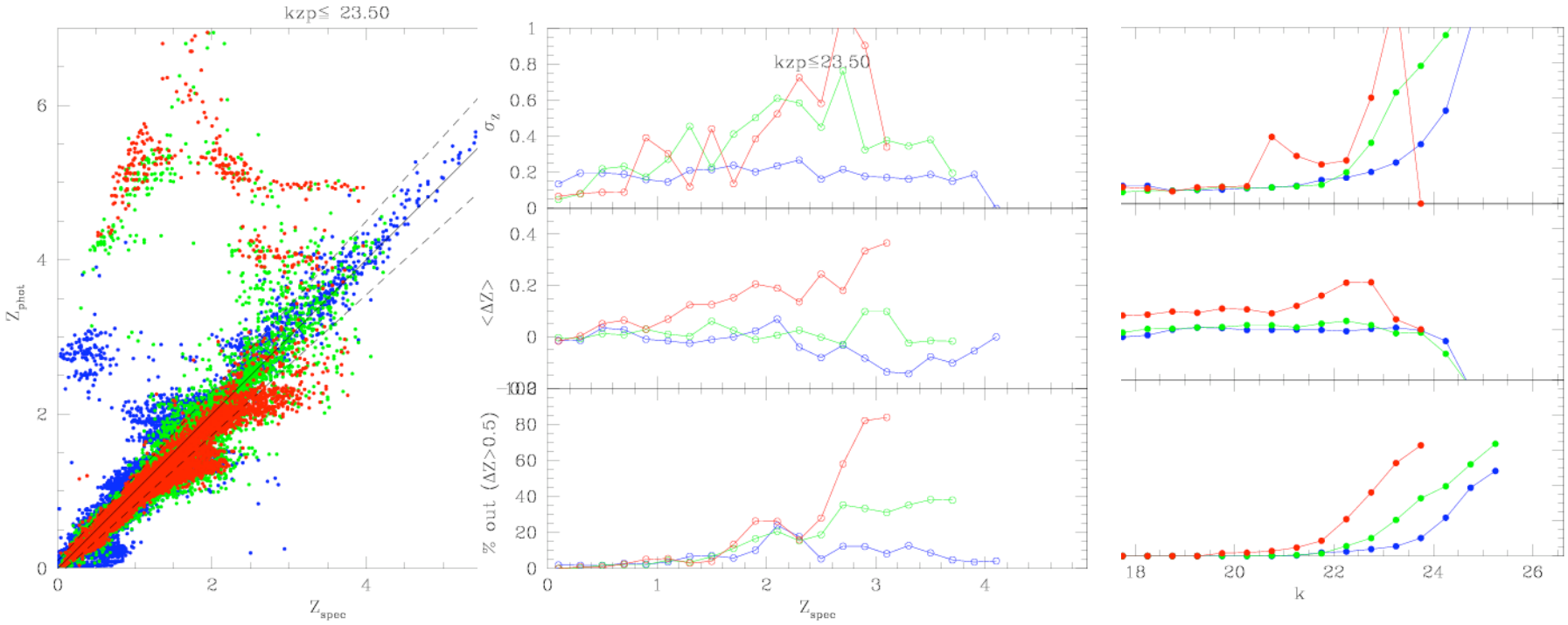
Using CWW SEDs +
SB1-2 and E(B-V)



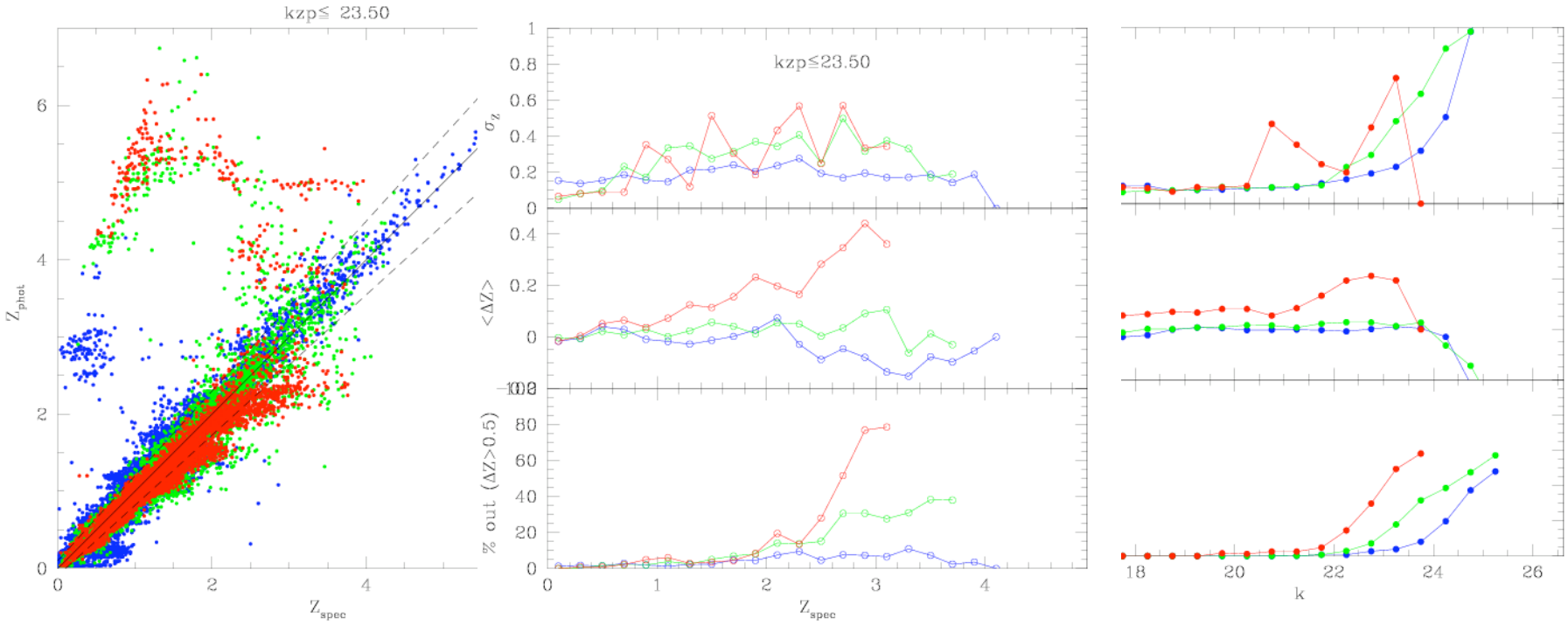
GALEX + CFHTLS



GALEX + CFHTLS+JK

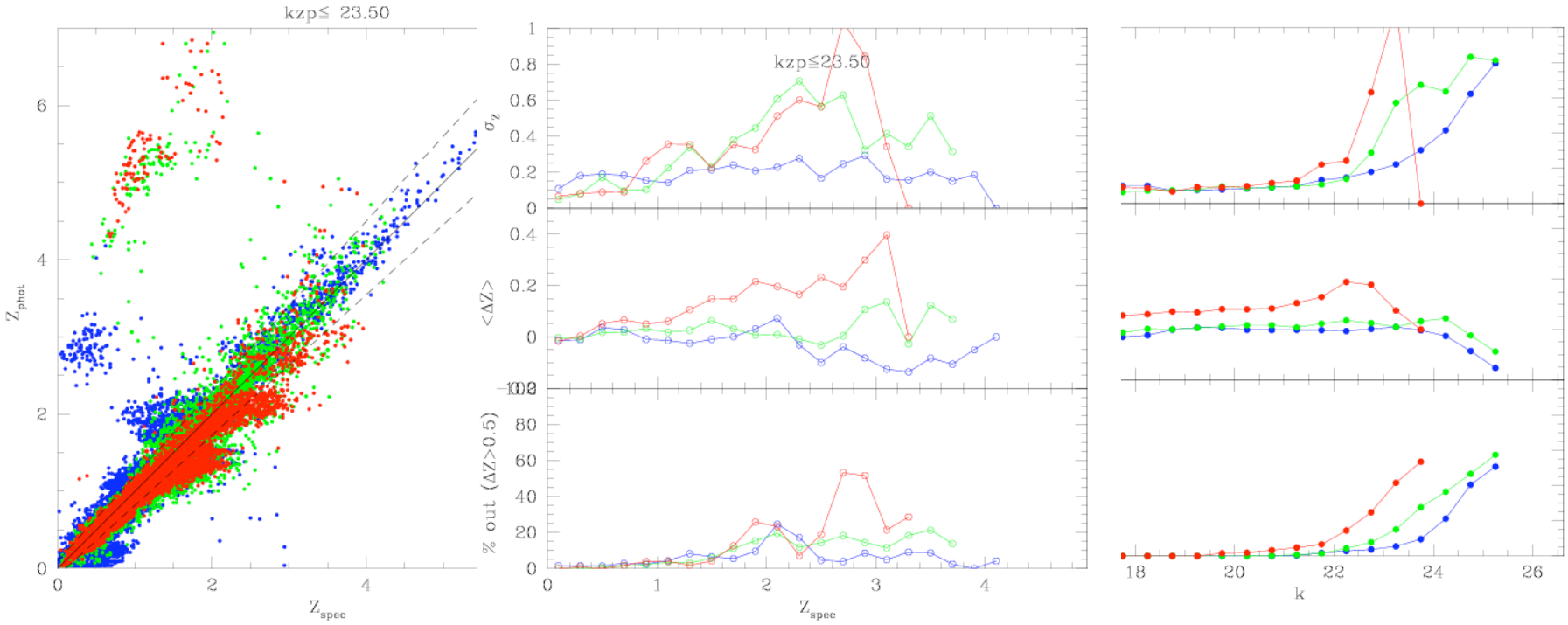


GALEX + CFHTLS+YJK



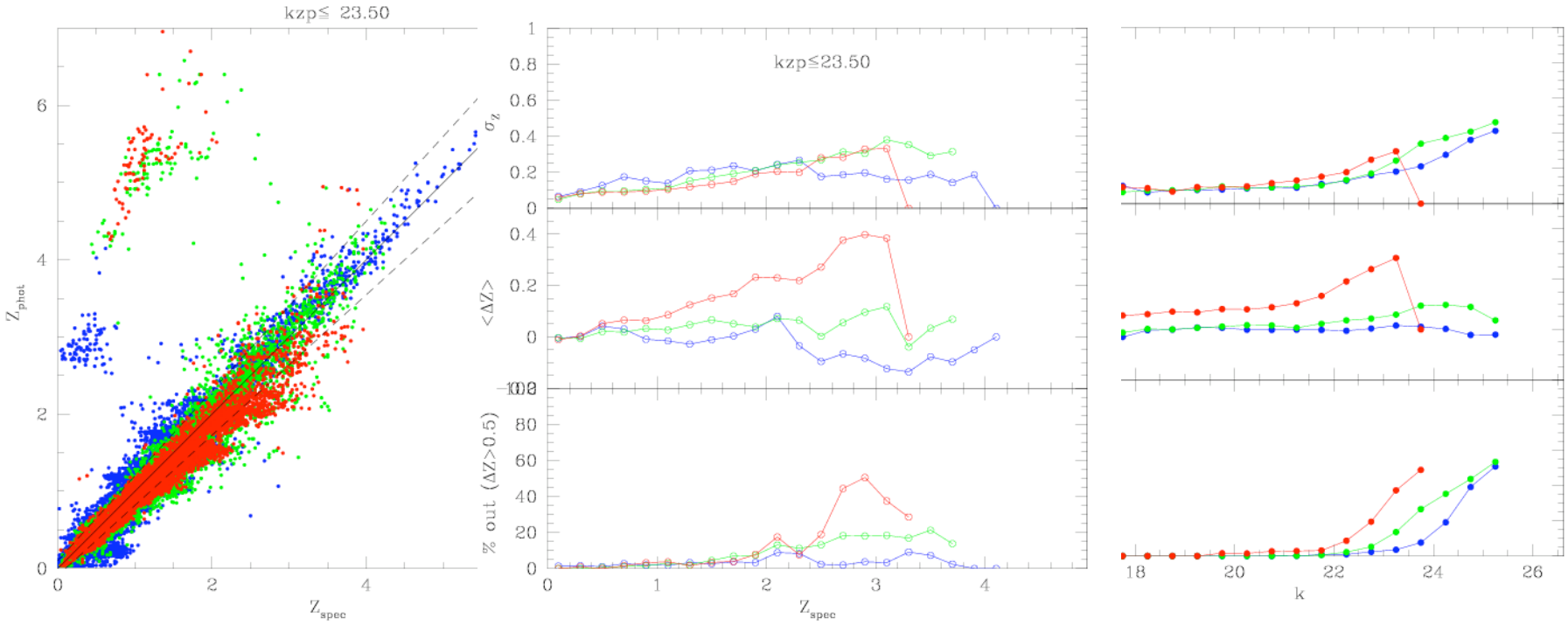
Y improves Zphot around z=1-2

GALEX + CFHTLS+JHK



H improves Zphot at z>2

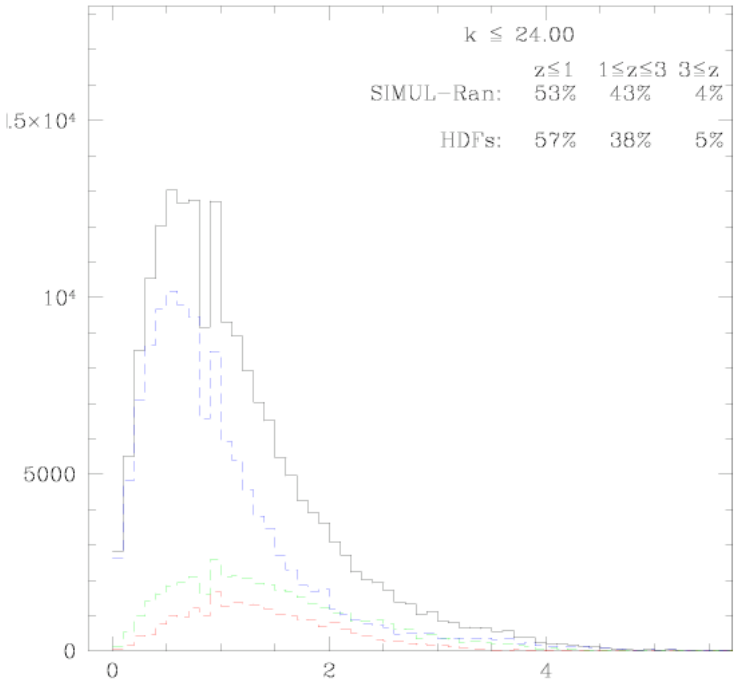
GALEX + CFHTLS+YJHK



Obviously the best. $\sigma(z) \propto 0.1 \times (1+z)$

The DEEP Field in VVDS02hr

Probing high-z populations: 1<z<4



band	# / deg^2	Z>1
NUV>25	45.000	7%
g<26	170.000	40%
i<26	310.000	40%
J<25	250.000	45%
K<24	190.000	45%

Spectro area with I<24 with SR > 35%
40x40 arcmin^2 = 0.44 deg^2

Data: GALEX, XMM, CFHTLS-D1, SWIRE

WIRCAM depth in AB:
25 (Y) 25 (J) 24.5 (H) 24 (K)

Assuming lim mag at 5σ in 1hr, in AB

23.8 23.9 23.4 22.9 in YJHK

9.1h 7.6h 7.6h 9.1h = 33.4hr

4 pointings + 1/3 overheads = 180hr

= 30 nights

The WIDE Field in 10hr

Evolution of the Stellar pop. vs morphological types and env. up to z=2

COSMOS-ACS = 2 deg^2

Data: GALEX, XMM, CFHTLS-D2 (1 deg^2)
SPITZER ? zCOSMOS ?

WIRCAM depth in AB to match morphology information (I_{AB}=23-23.5):

24 (Y) 24 (J) 23.5 (H) 23 (K)

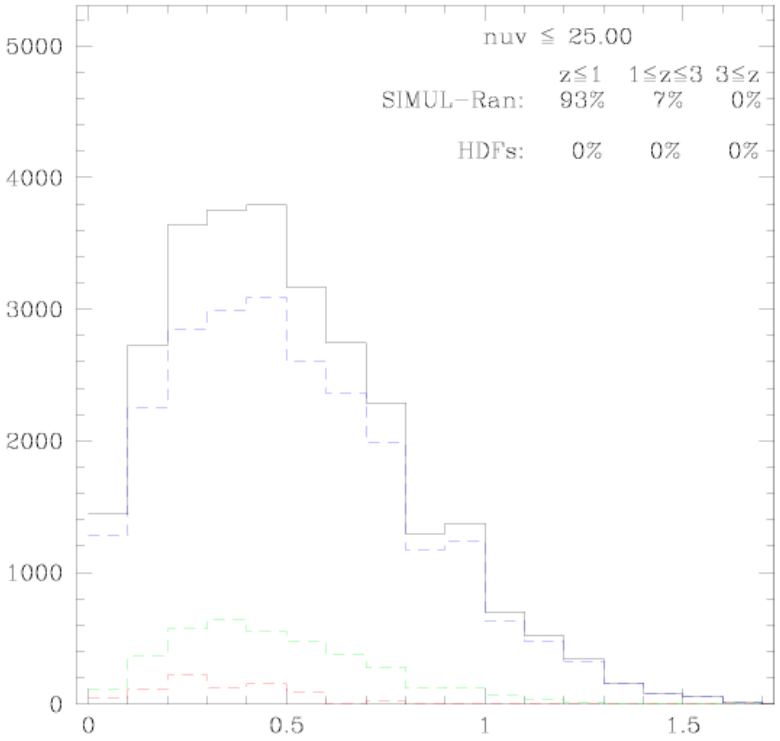
1.5h 1.2h 1.2h 1.2h = 5.1hr

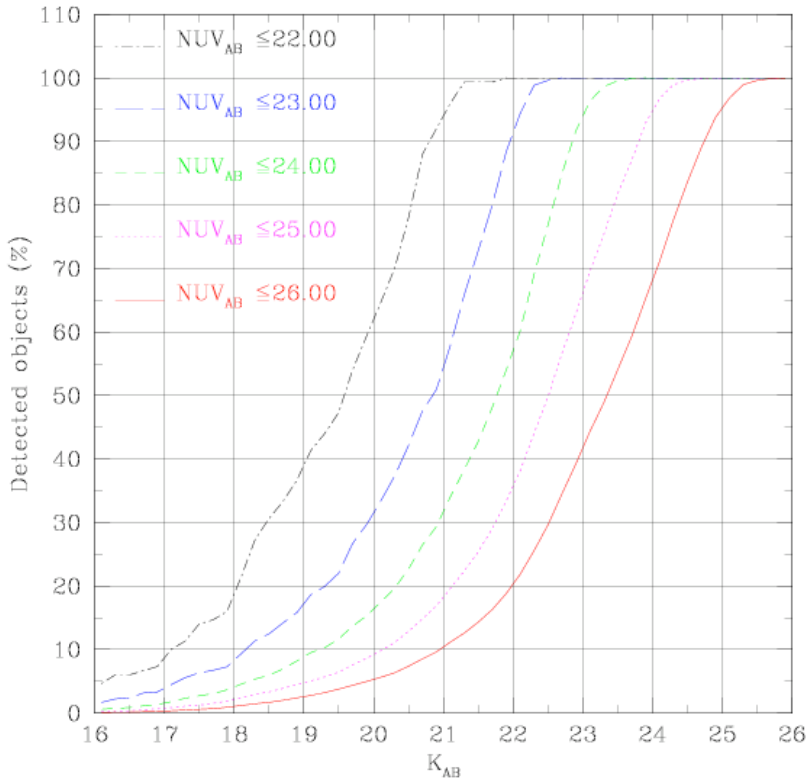
18 pointings + 1/3 overheads = 120hr

= 20 nights

Band	# /deg^2	Z>1
J<24	120.000	30-35%
K<23	90.000	30-35%

Impact for the NUV sample

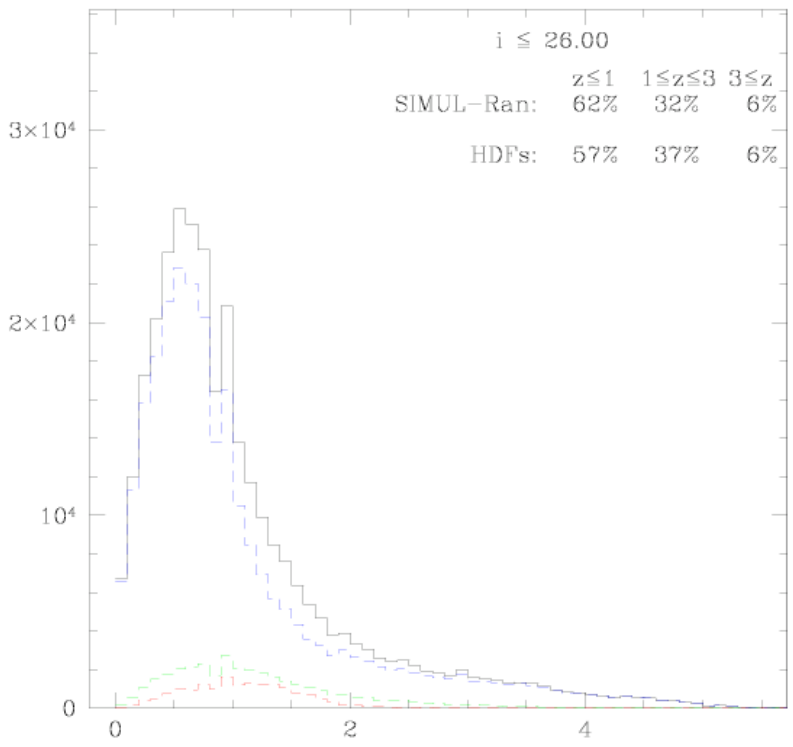


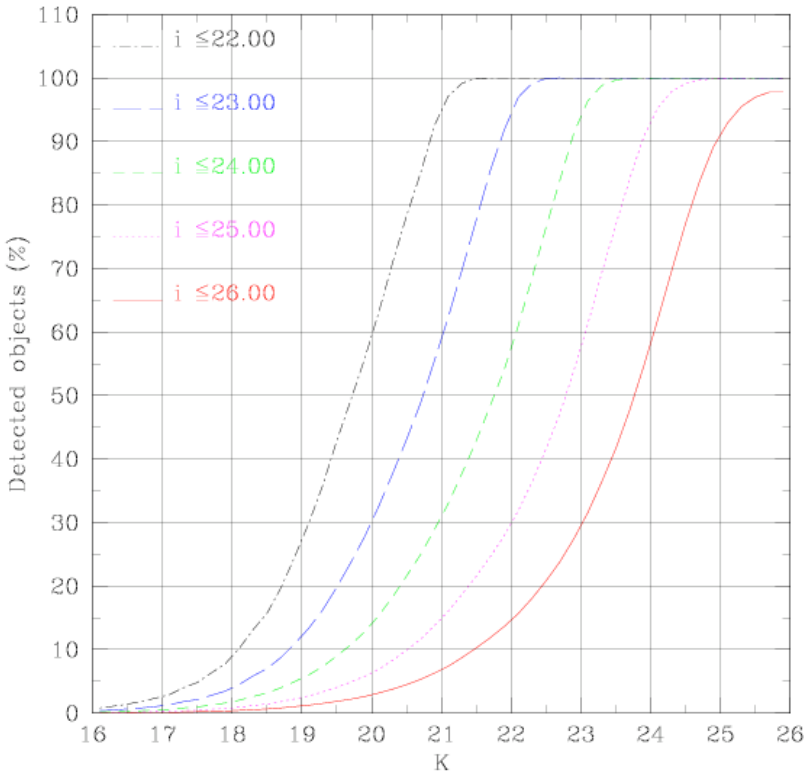


→ @ NUV=25, 60% have K<23 and 90% have K<24

→ Estimation of the current over past SF activity for most of the SF galaxies

Impact for the I sample





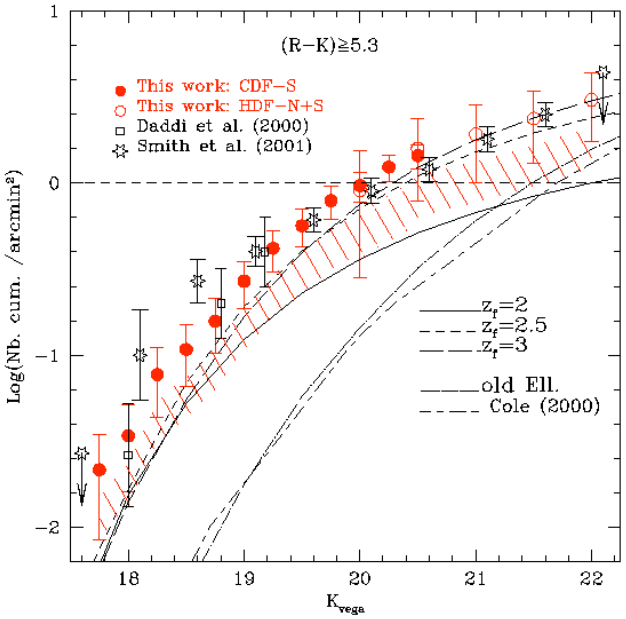
→ @ I=26, 30% have K<23 and 60% have K<24

Science cases : SEDs

Combination of GALEX-CFHTLS-WIRCAM-SPITZER

- YJHK: improves photo-z :
  - *good follow-up of the 4000 break*
  - *@ z=1.5 : Y,J,H,K = u,g,r,i*
- Averaged SED reconstruction as a function of type/mass/z/morph.
  as COMBO17
- Using rest (UV-optical) SED shapes for dust attenuation curves
  - *Evidence that Calzetti law not appropriated for SF galaxies*
  - *Ext. Correction : $A_{UV} \propto \beta$ slope + b-parameter (A_{4000};Kong 2004)*
  - *Role of dust vs SF-Actvity/ type / z*

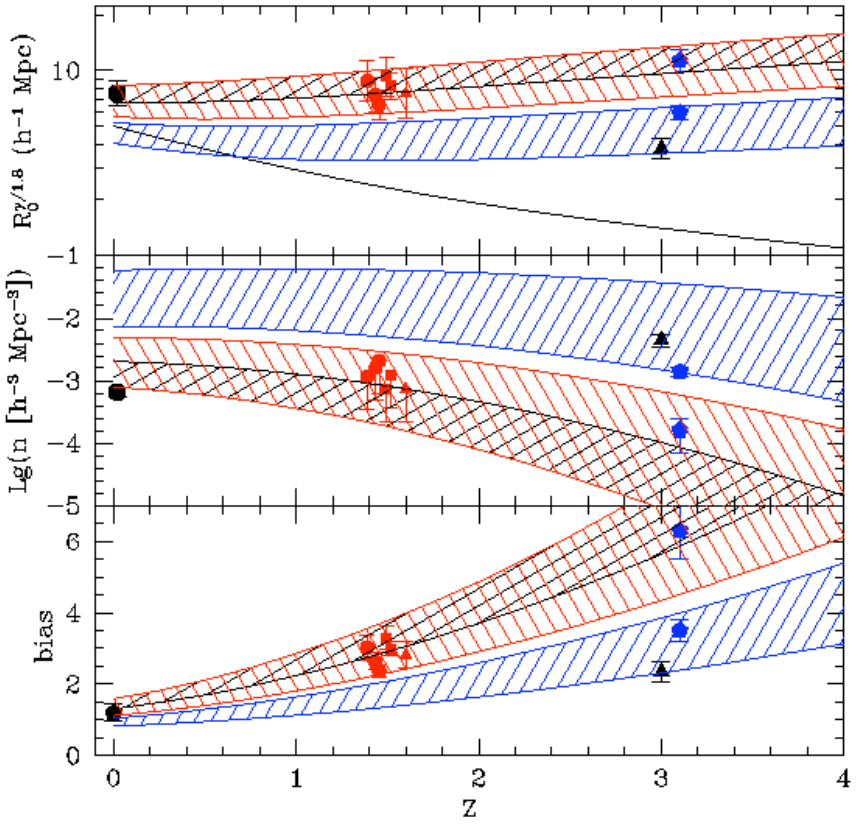
Science cases : EROs



- YJHK: easy to distinguish Elliptical to dusty SB
  - •Fraction of Ell vs SB still uncertain 30-50%
  - •help from morph. in COSMOS
- SAM prediction well below observations
  - •Problem with SF process ?
  - • high-z elliptical ?
- •Clustering of small samples :
  agree with elliptical prediction in SAM

Sample size : K=23 : 18000 in COSMOS & K=24 : 6400

Science cases : Clustering



- Behaviours of the Galaxy clustering & comparison with DM haloes behaviour
- Cross-correlation SF vs Mass