

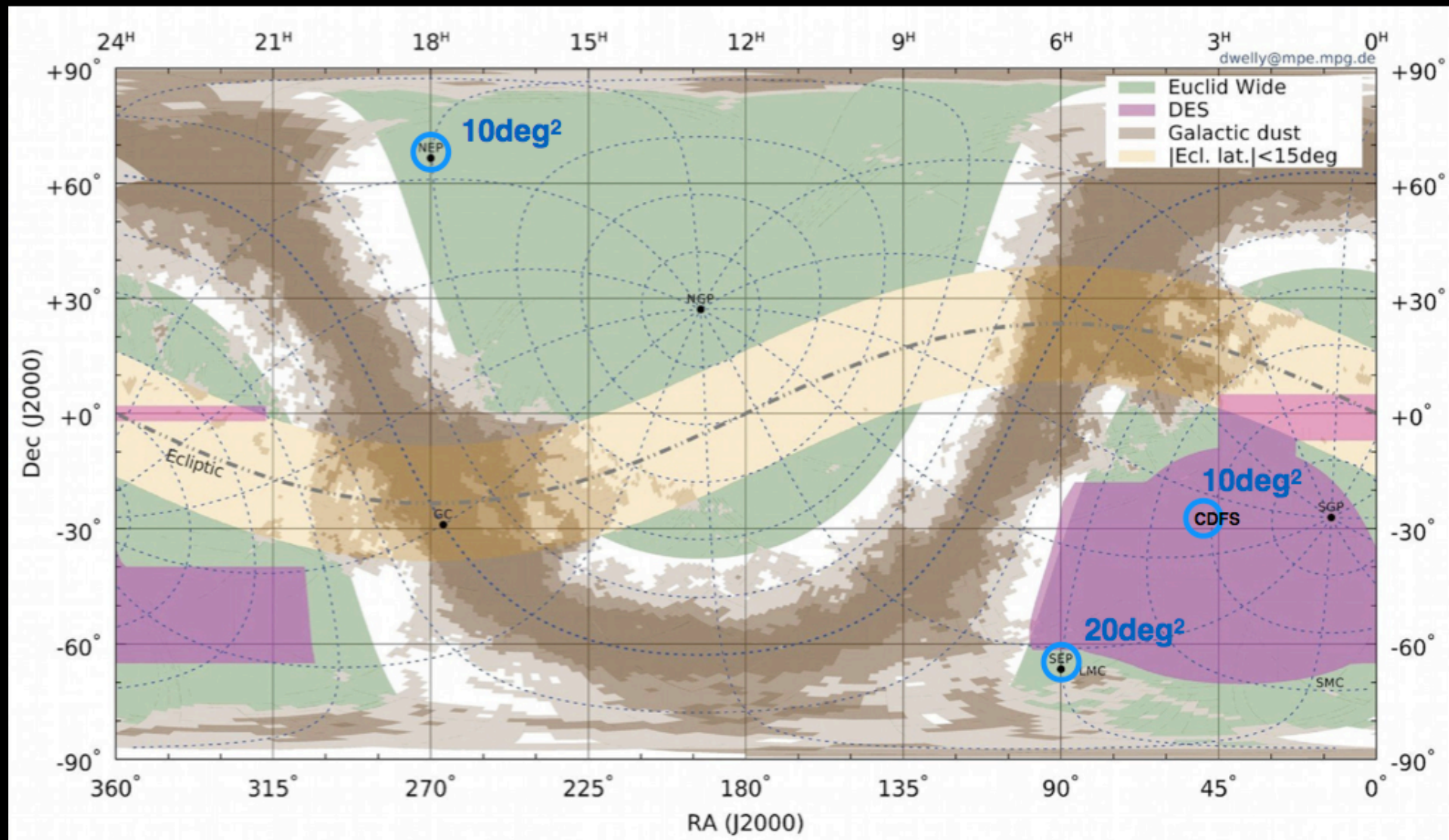
# The Euclid-LSST Deep Fields

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(on behalf of Rebecca Bowler – co-lead of the Euclid  
LBG WG)

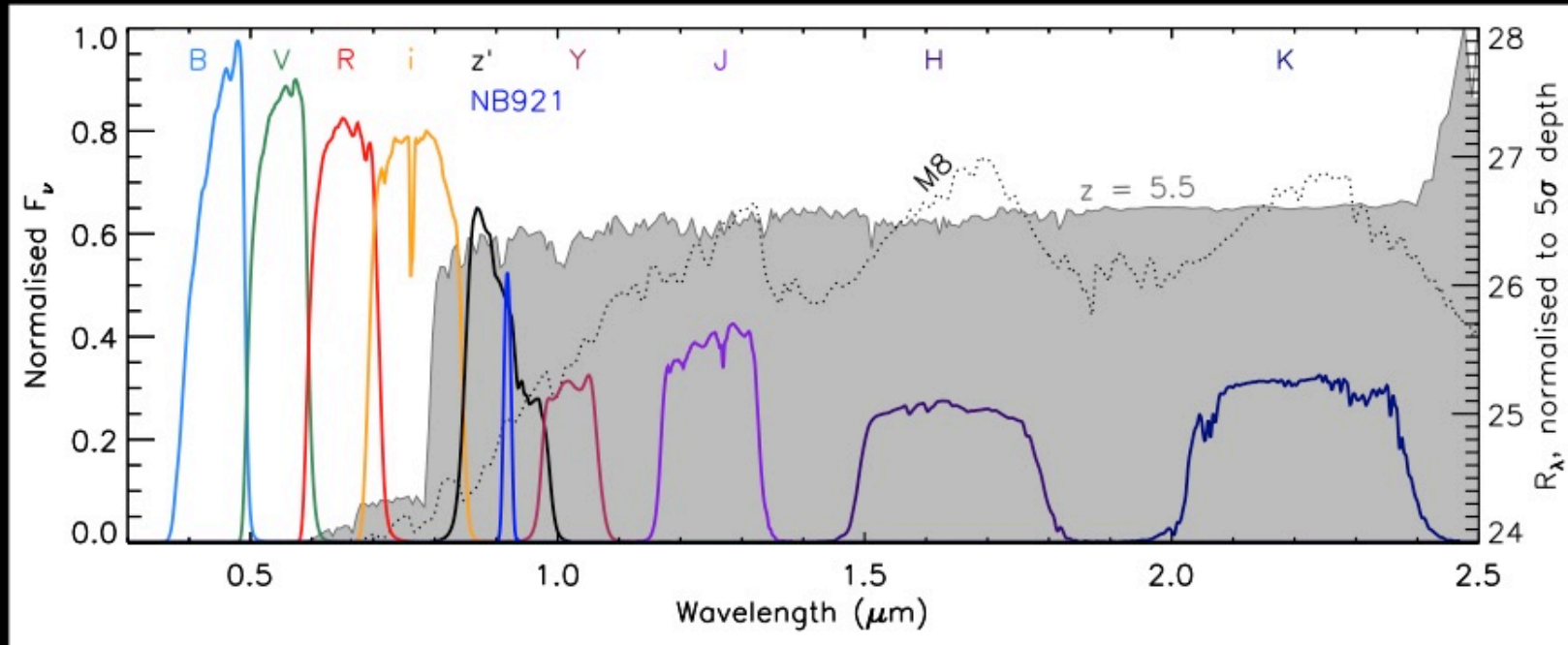


# The Euclid deep fields - NEP, SEP & CDFS



Euclid deep provides YJH to 26th mag (AB) over 40 deg²

# Bright high-redshift galaxies from LSST + Euclid



**NIR** data is required to select  $z > 7$  galaxies/AGN

Deep **optical** data is essential to  
1) measure strong Lyman-break 2) remove contaminant low- $z$   
or cool galactic brown dwarfs that will be detected in redder  
optical bands

# The Euclid deep fields - status of optical data

[depths compiled by Jean-Gabriel Cuby, Pascal Oesch for Euclid Primeval Universe Working Group]

NEP	area	u <sub>CFHT</sub>	g <sub>HSC</sub>	r <sub>HSC</sub>	i <sub>HSC</sub>	z <sub>HSC</sub>	y <sub>HSC</sub>	3.6	4.5
HSC - H2O	10	25.5	27.5	27.5	27	26.5	26		
IRAC	10							24.6	24.2

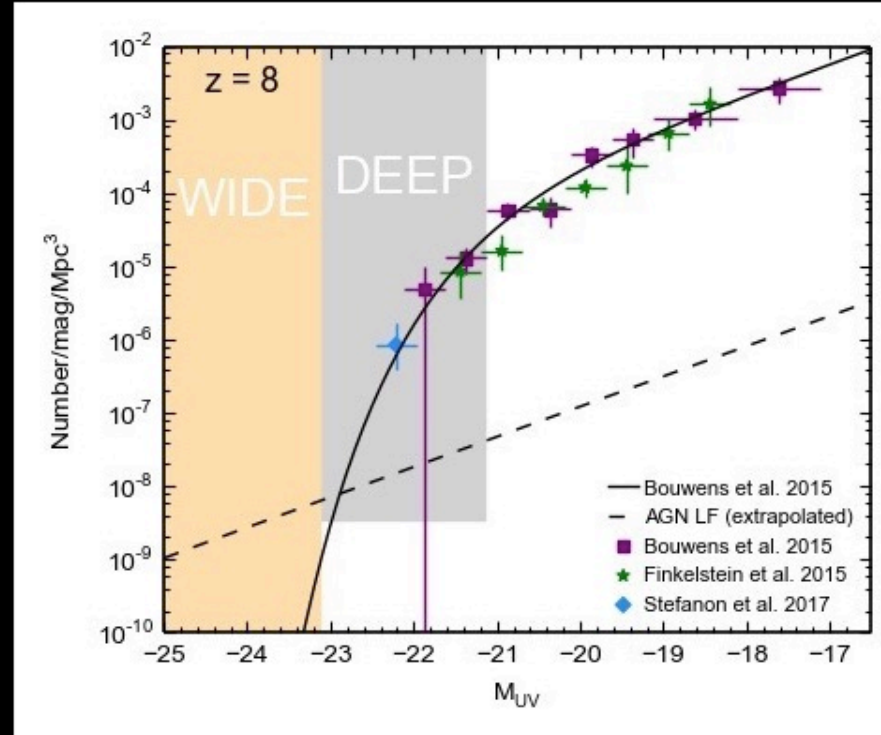
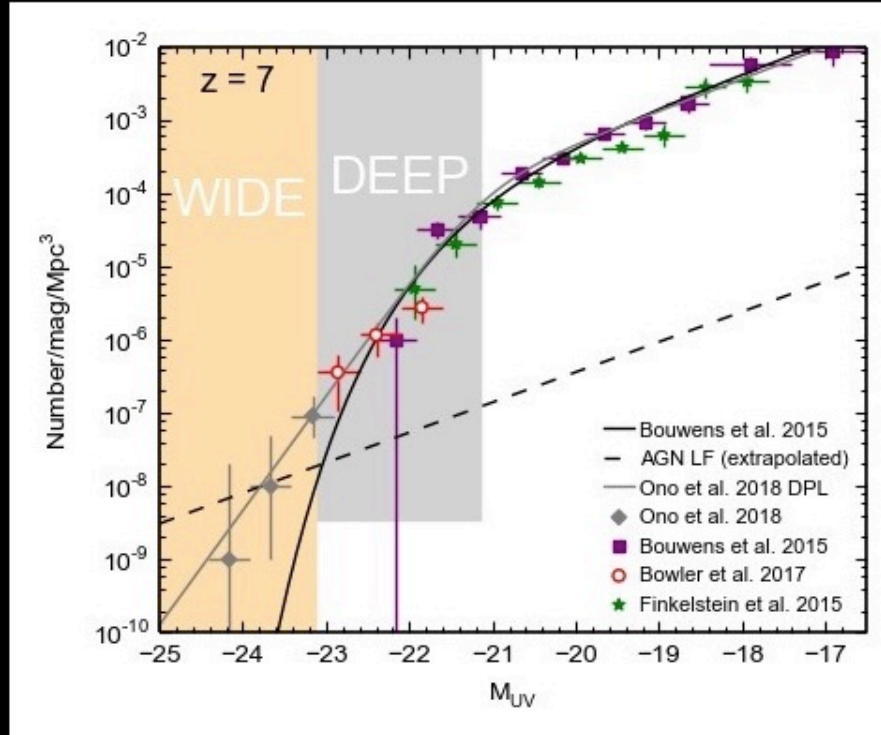
CDFS/Fornax	area	u	g	r	i	z	y	3.6	4.5
HSC - H2O	10		27.5	27.5	27	26.5	26		
LSST	10	28.5	28.7	28.9	28.4	28	27		
IRAC	10							24.6	24.2

SEP	area	u	g	r	i	z	y	3.6	4.5
?	20								
IRAC (SIMES)	7.7							21.4	21.5

- ★ Deep ground-based optical data is required for the majority of science utilising the NIR data e.g. for photo-zs, clean selection of  $z = 7+$  LBGs/AGN
- ★ However, the SEP (half the area of Euclid DEEP) has no current or planned deep optical data - **clear case for an LSST deep field**



# Bright high-redshift galaxies from LSST + Euclid



## Predicted number counts in the Euclid DEEP

	6	7	8	9	10
Lyman-break Galaxies	50,000	10,000	2,000	100s?	10s?
High-z AGN	200	50	10	3?	1?

New era of high- $z$  studies, probing the most star-forming galaxies into the EoR, and the growth of early SMBH

## The case for a LSST deep field at the SEP

- ★ An LSST deep field at the SEP will **double** the area of deep optical+NIR data for galaxy evolution studies
- ★ The availability of deep (26th mag) and high-resolution (FWHM  $\sim 0.3''$ ) will make the SEP a key extragalactic field
- ★ Particularly beneficial for studies of rare objects, such as high- $z$  galaxies and AGN (where only handful are expected)
- ★ Reduced cosmic variance and alternate sightline through the Milky Way (for studies of halo stars, brown dwarfs)