

# **OU-EXT, the quest for Euclid's 4th instrument**

*Building a comprehensive plan for the Euclid ground-based survey*

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with contributions from S. Arnouts, J. Dinis, T. Dwelly

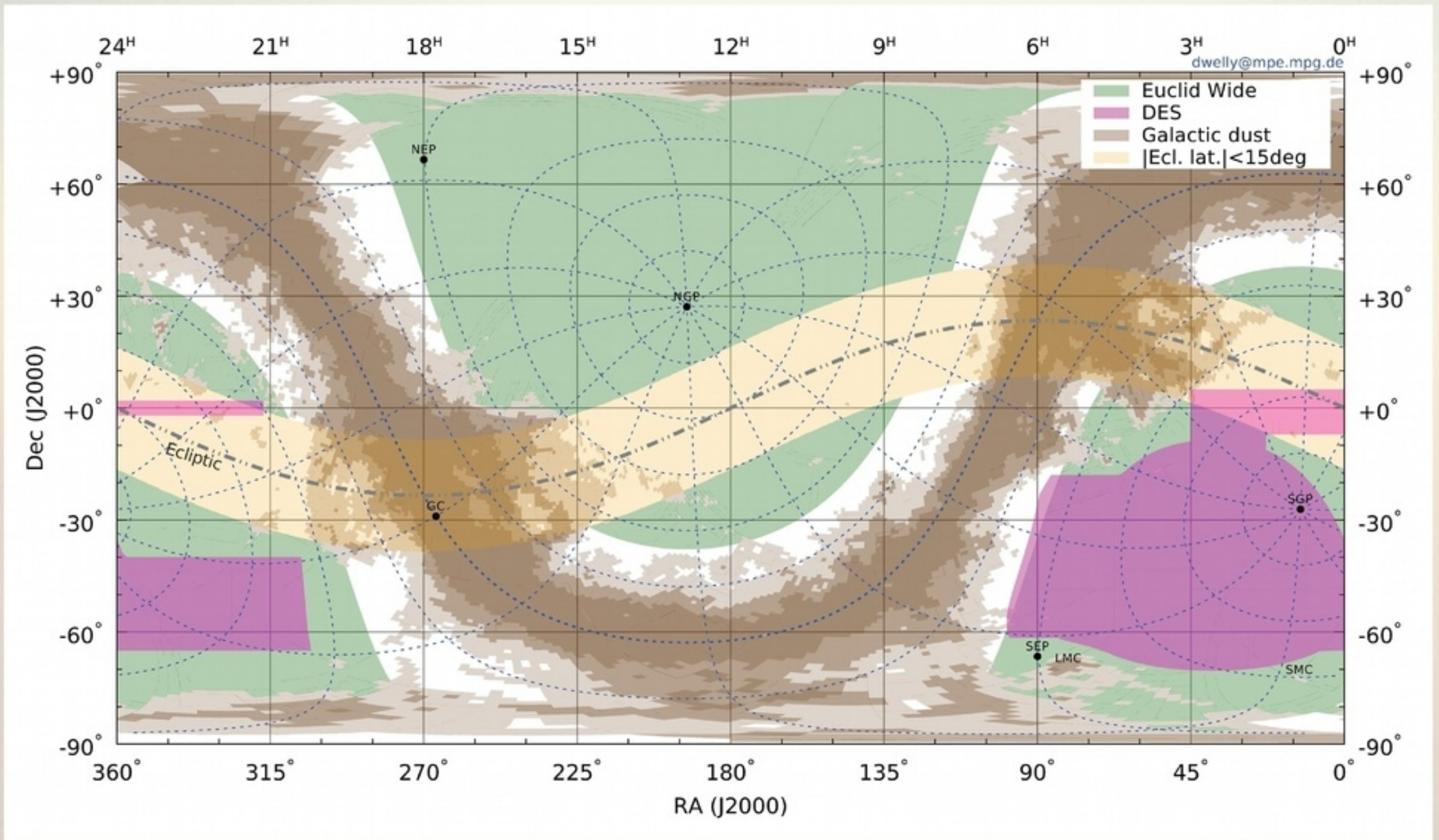


Abby Cuttriss

**Journées Euclid-France 2015, Paris, 7 & 8 janvier 2016**



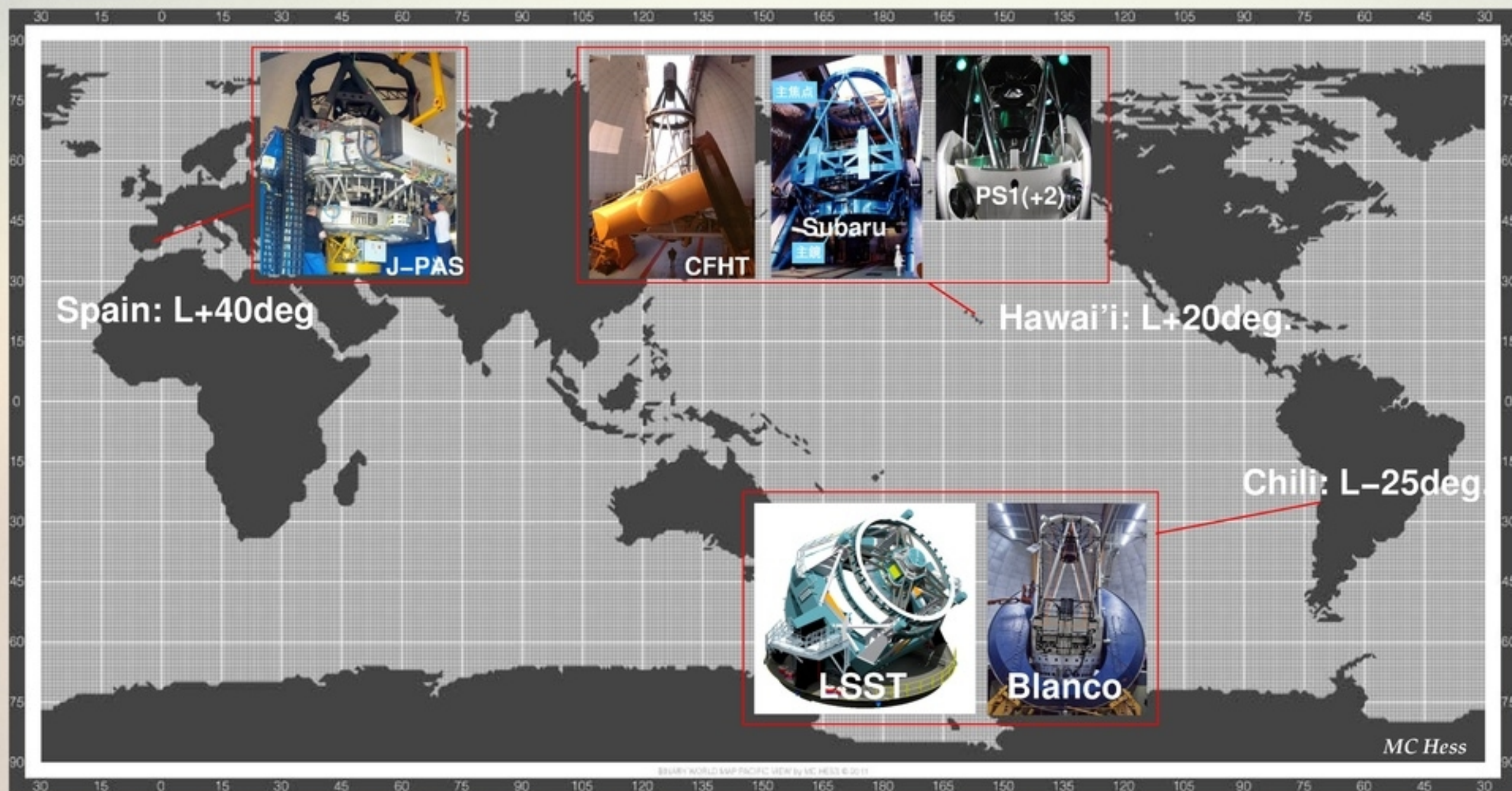
# A wide optical ground-based survey: Euclid "4th" instrument



**Euclid Wide covers ~15,000 square degrees, avoiding the galactic and ecliptic planes**  
**As of today (2016), only the DES ~4,500 square degrees in griz match Euclid's requirements**



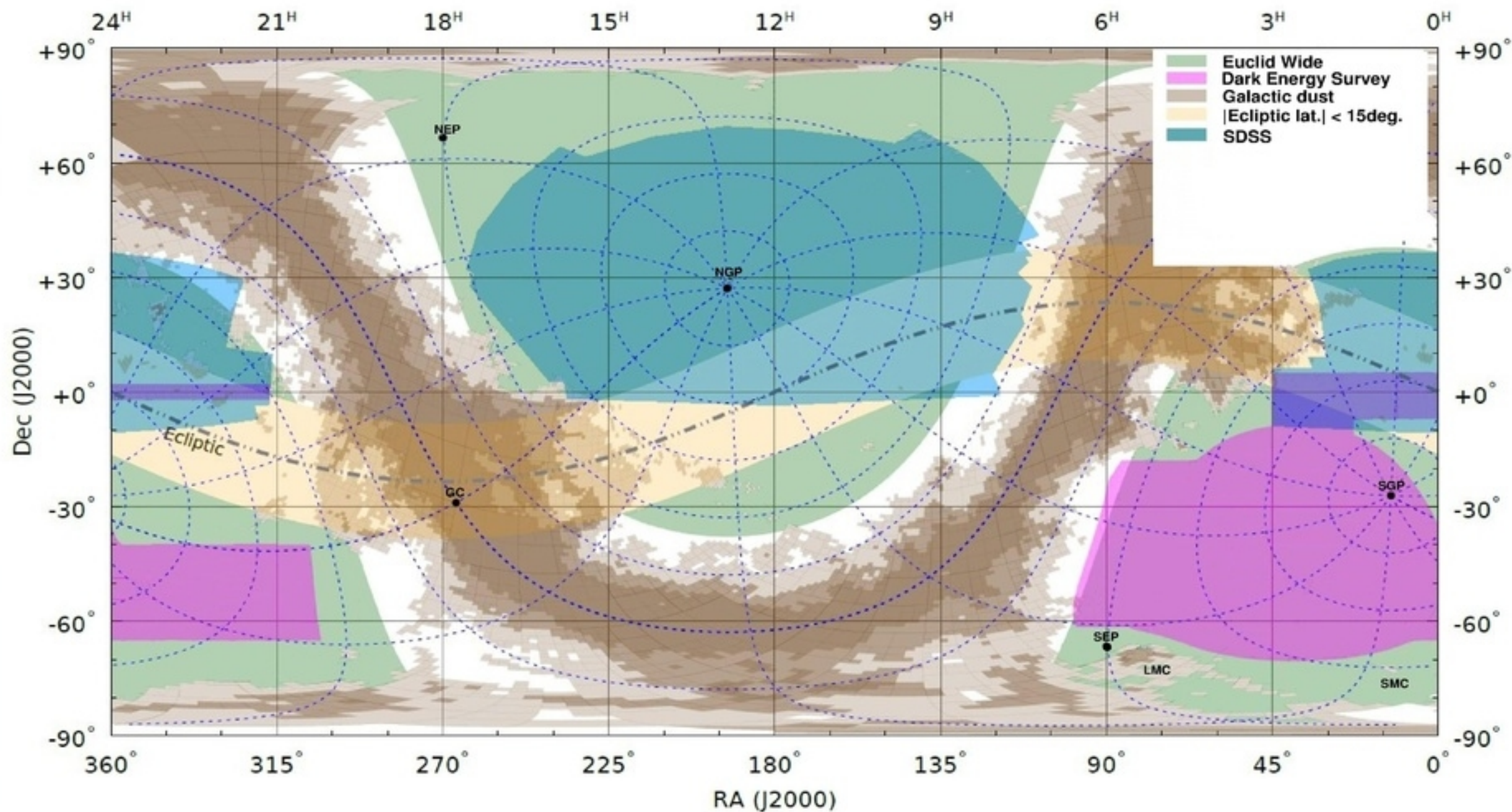
# Present and upcoming wide-field imagers relevant for Euclid



| Facility | Year | Aper. | FOV        | IQ   | CCD class      | Type        | Hemisphere |
|----------|------|-------|------------|------|----------------|-------------|------------|
| LSST     | 2021 | 6.6m  | 10 sq.deg. | 0.8" | Deep depletion | Surveyor    | South      |
| J-PAS    | 2016 | 2.5m  | 7 sq.deg.  | 0.8" | Deep depletion | Surveyor    | North      |
| Subaru   | 2014 | 8.2m  | 2 sq.deg.  | 0.6" | Fully depleted | Observatory | North      |
| Blanco   | 2013 | 4.0m  | 3 sq.deg.  | 0.9" | Fully depleted | Observatory | South      |
| CFHT     | 2003 | 3.6m  | 1 sq.deg.  | 0.6" | EPI            | Observatory | North      |
| PS1      | 2008 | 1.5m  | 7 sq.deg.  | 1.0" | Fully depleted | Surveyor    | North      |



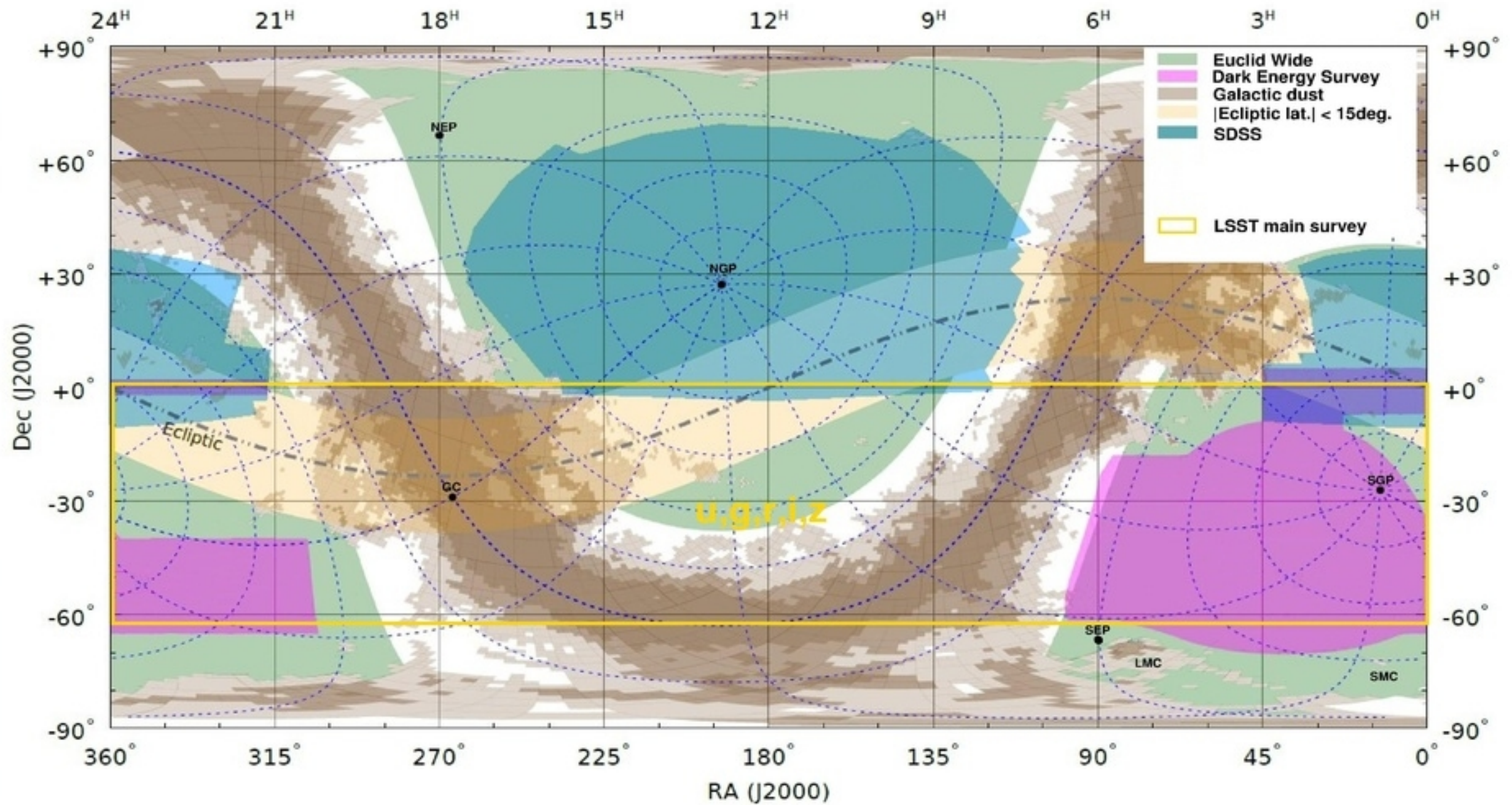
# Euclid Wide + DES + SDSS



As of today (2016), only the DES ~4,500 square degrees in griz match Euclid's requirements



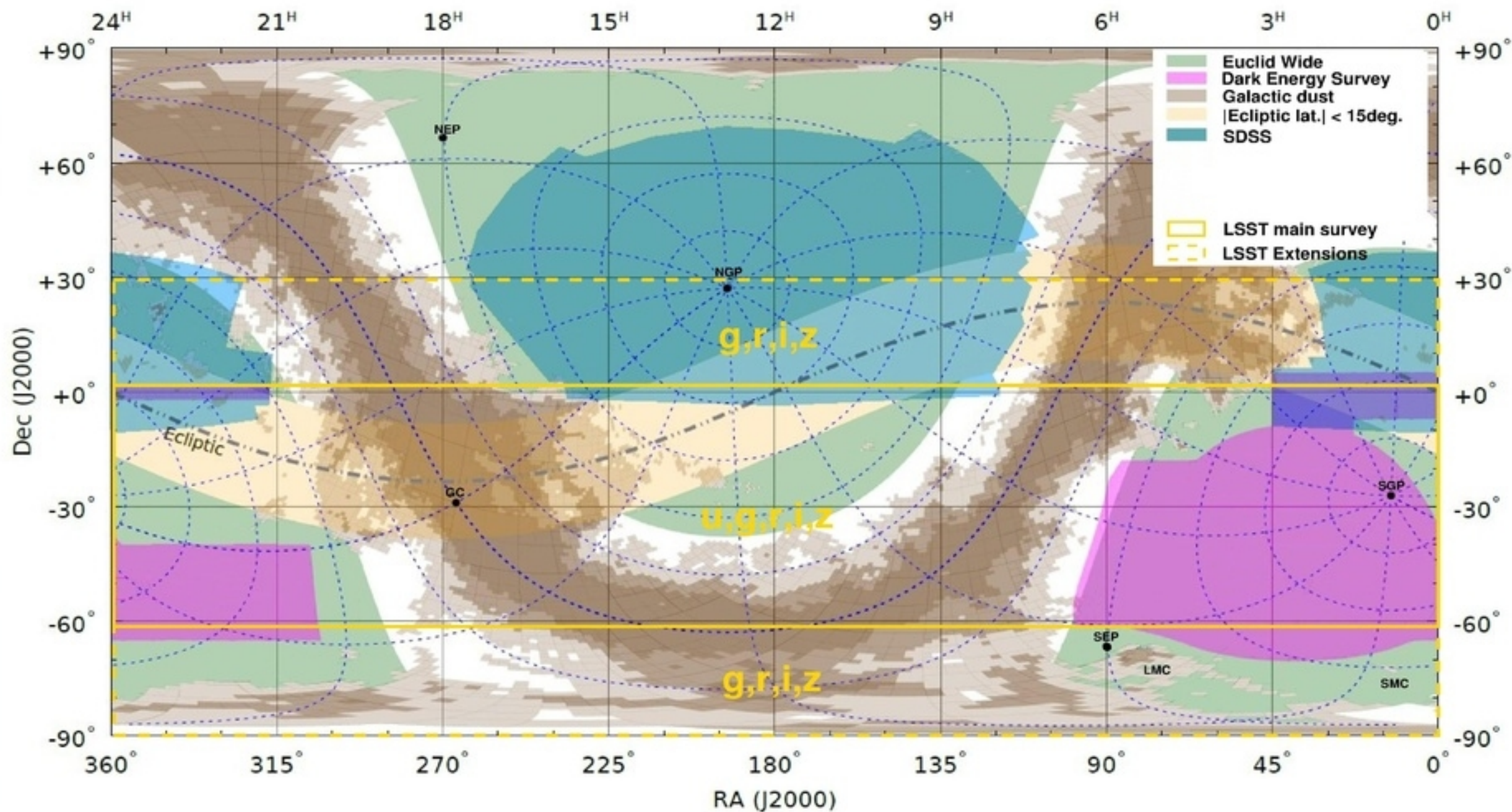
# Euclid Wide + LSST Main Survey



LSST will cover to great depths in ugriz nearly 7,000 square degrees of Euclid Wide



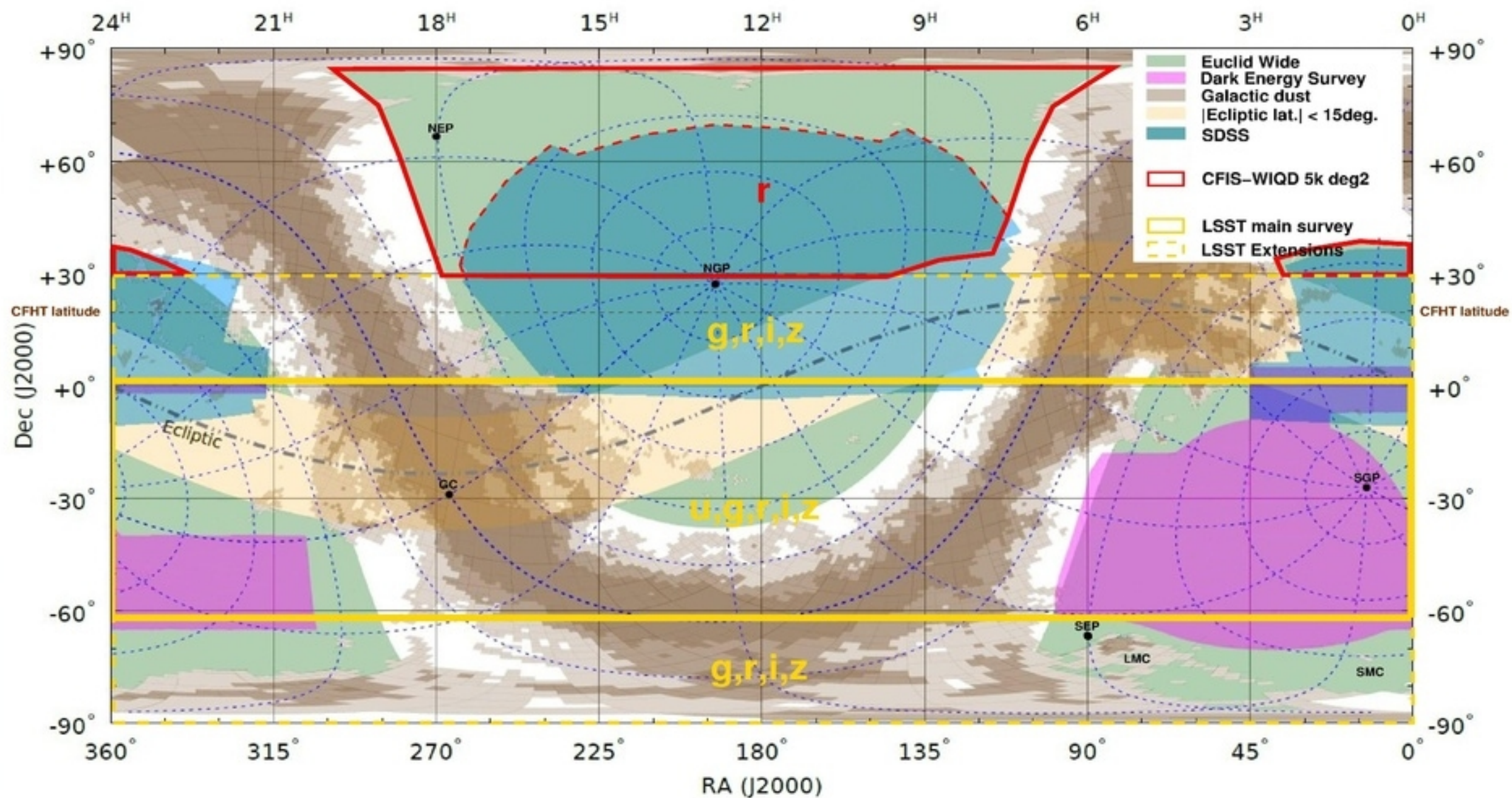
# Euclid Wide + LSST Main Survey + LSST Extensions



LSST extensions to DEC -90 & +30 could bring an extra ~4,000 square degrees to Euclid Wide  
The southern extension is already planned to depths greater than Euclid's needs  
The northern extension is discussed for the nominal Euclid depths ("shallow")



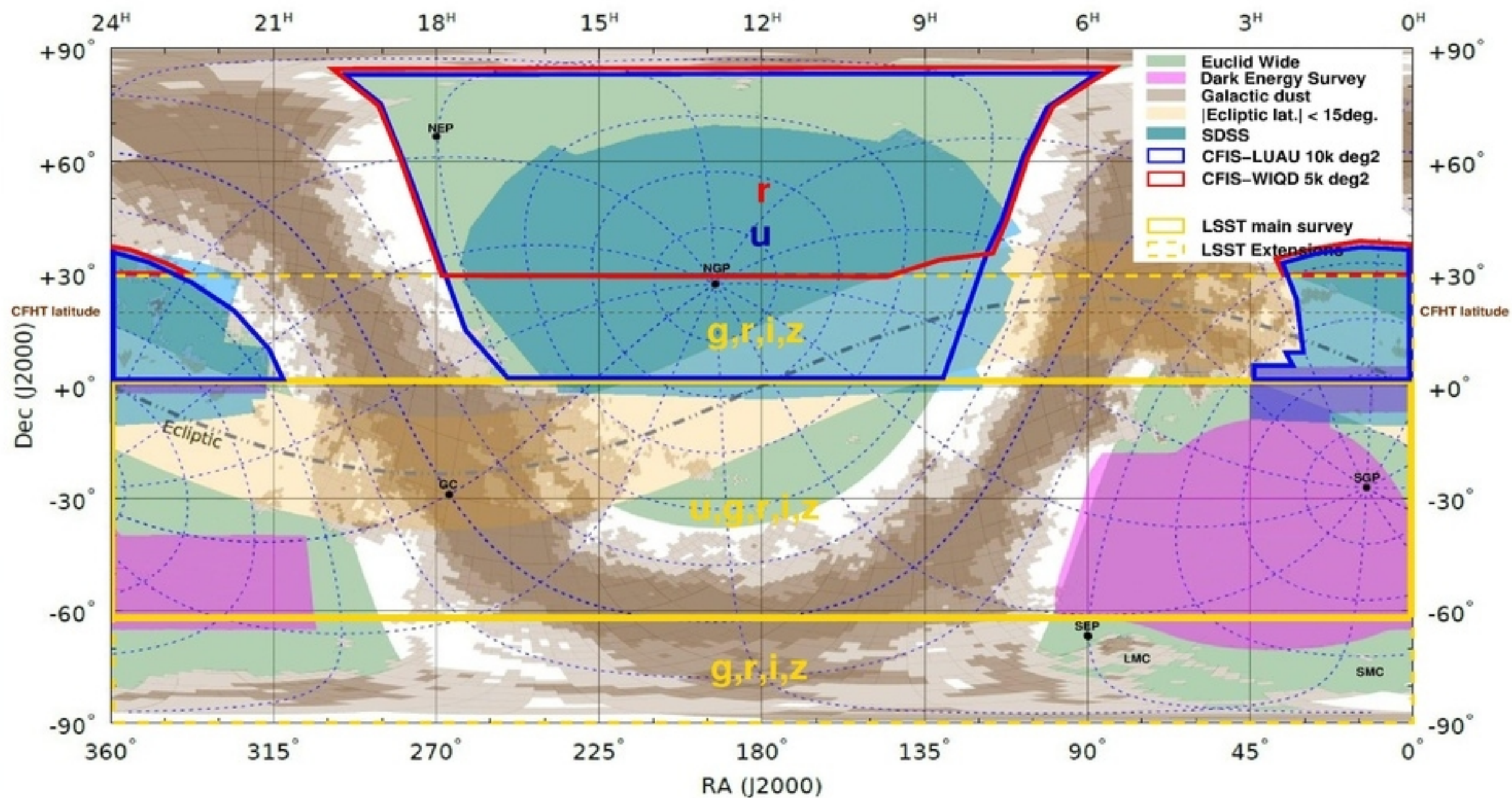
# Euclid Wide + CFHT-r (CFIS-WIQD)



The Canada-France Imaging Survey (CFIS) Wide/ImageQuality/Deep (WIQD)  
The 5,000 most northern Euclid Wide square degrees in r-band at the nominal Euclid depth



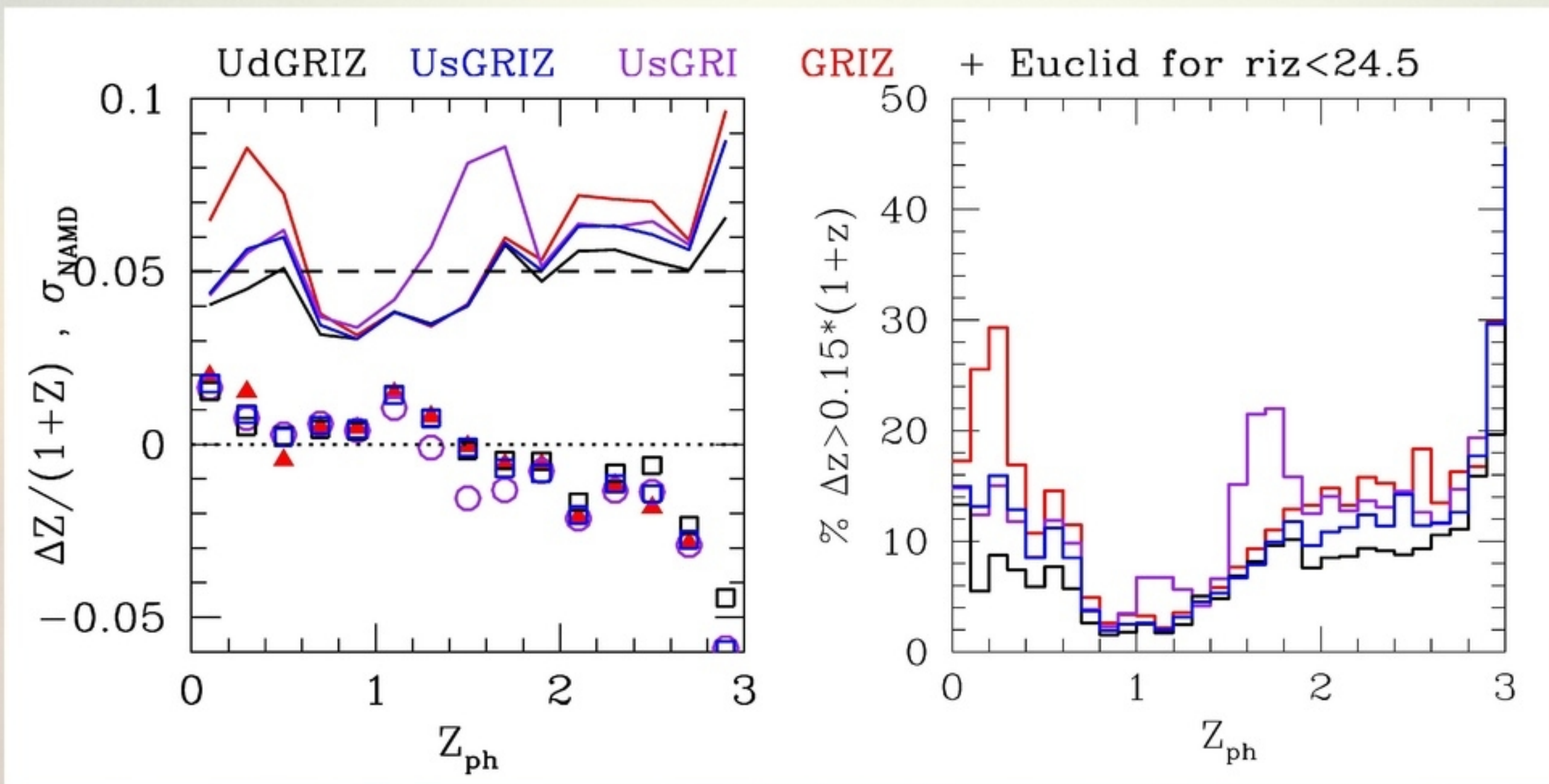
# Euclid Wide + CFHT-u (CFIS-LUAU)



The Canada-France Imaging Survey (CFIS) Legacy for the U-band All-sky Universe (LUAU)  
10,000 northern square degrees in u-band above the galactic plane, shallow (240s total)



# A u-shallow (Us) helps Euclid's nominal griz at low and high z

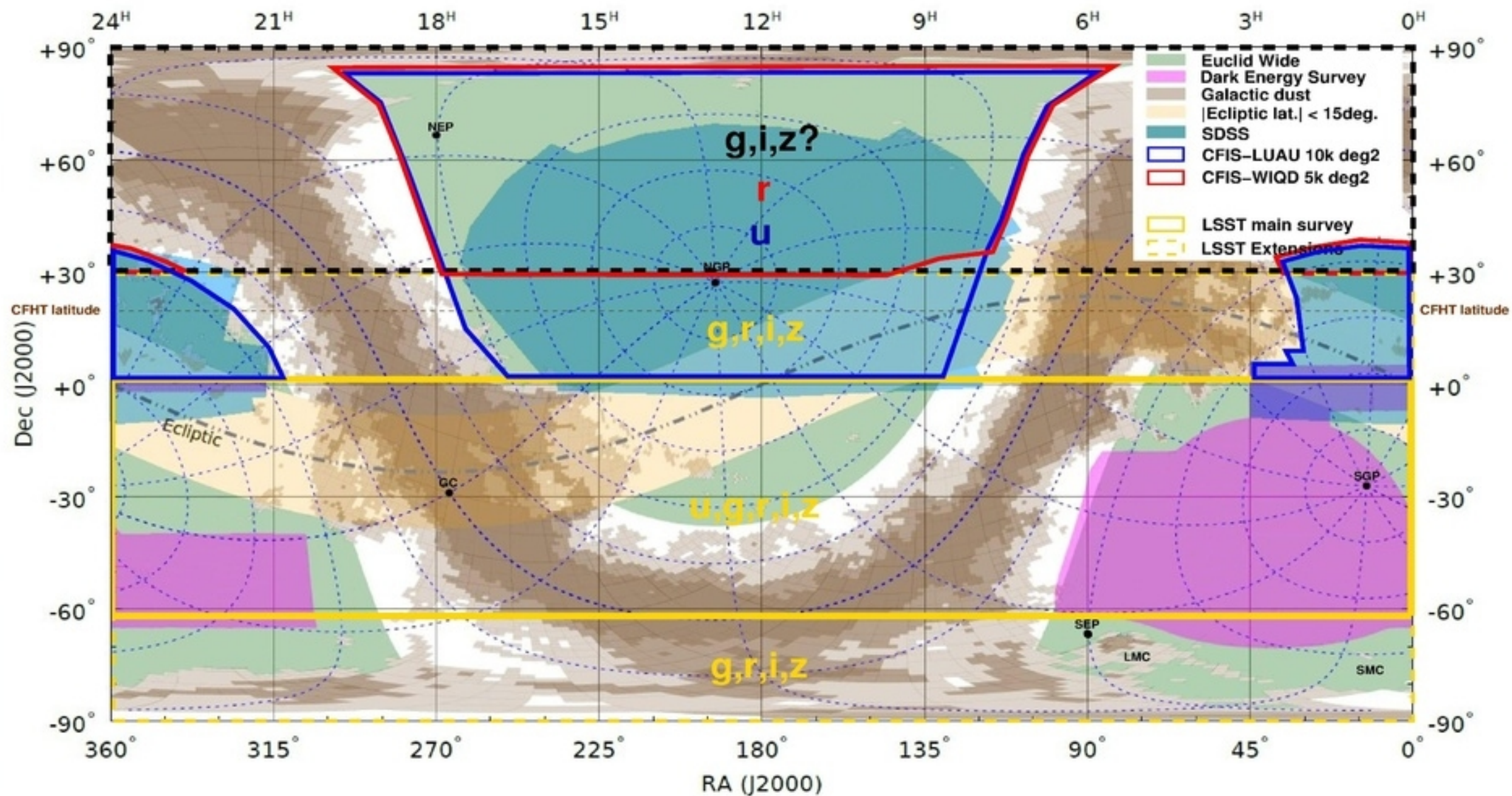


Left: photo-z accuracy vs redshift for various Sloan filter combinations (+Euclid)

Right: the catastrophic fractions



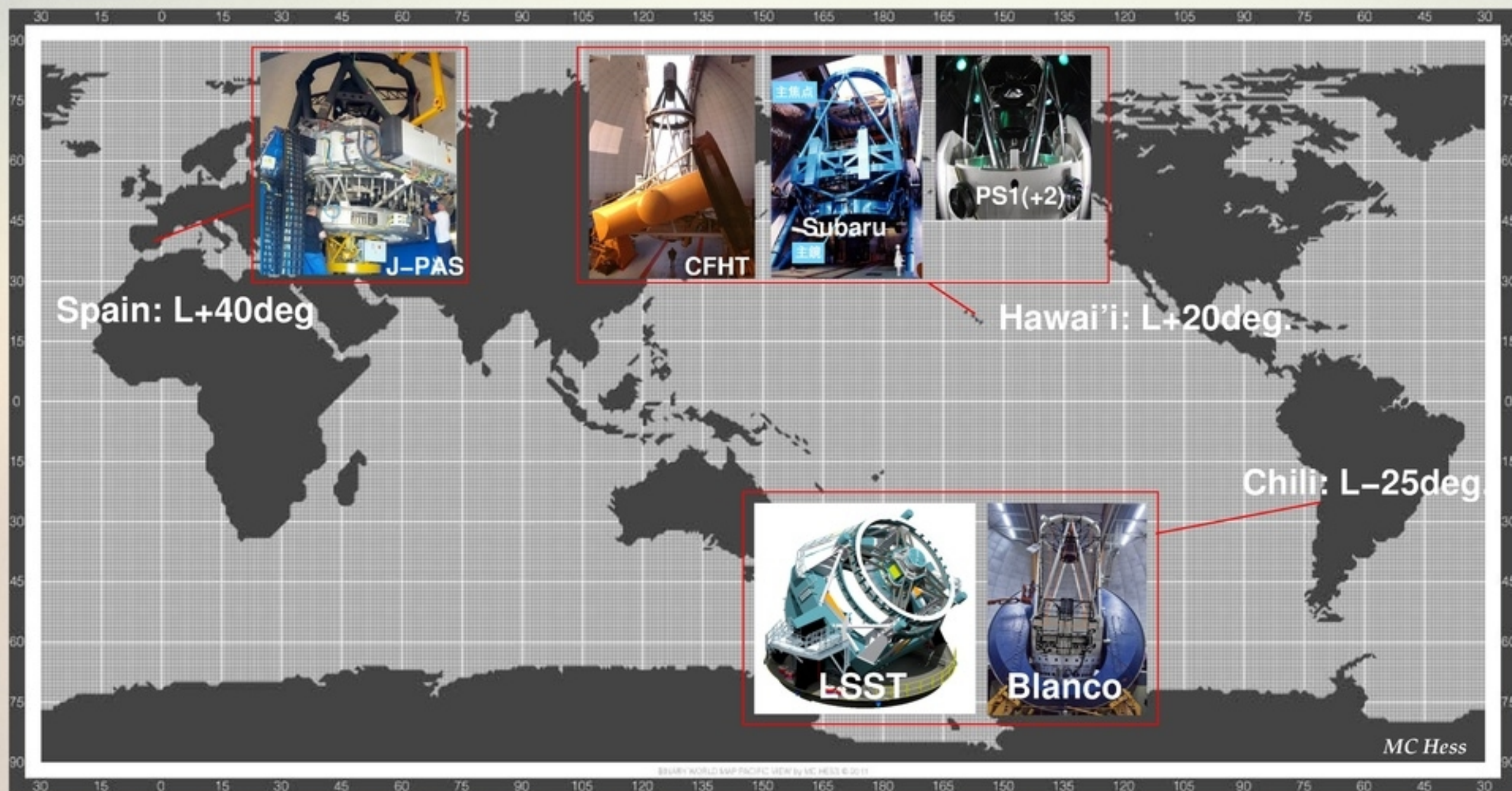
# Euclid Wide's missing part: 5,000 square degrees in g,i,z



g- and i-band are reasonably feasible, but the z-band is expensive (equivalent to g+i)



# Present and upcoming wide-field imagers relevant for Euclid



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