

# PS1 Photometric Depth

The photometric depth depends on various factors like number of exposures used, total exposure time, seeing, cloud coverage, and crowdedness. Therefore PS1 does not have a uniform depth (see spatial depth maps below), but overall due to a real effort to apply a [PS1 Observing strategy](#) that maximizes the uniformity, the differences in depth are in general only a few tenths of magnitude. Galaxy photometry appears to have a depth about [0.3 -- 0.4 magnitudes shallower](#) than point source photometry.

### Contents

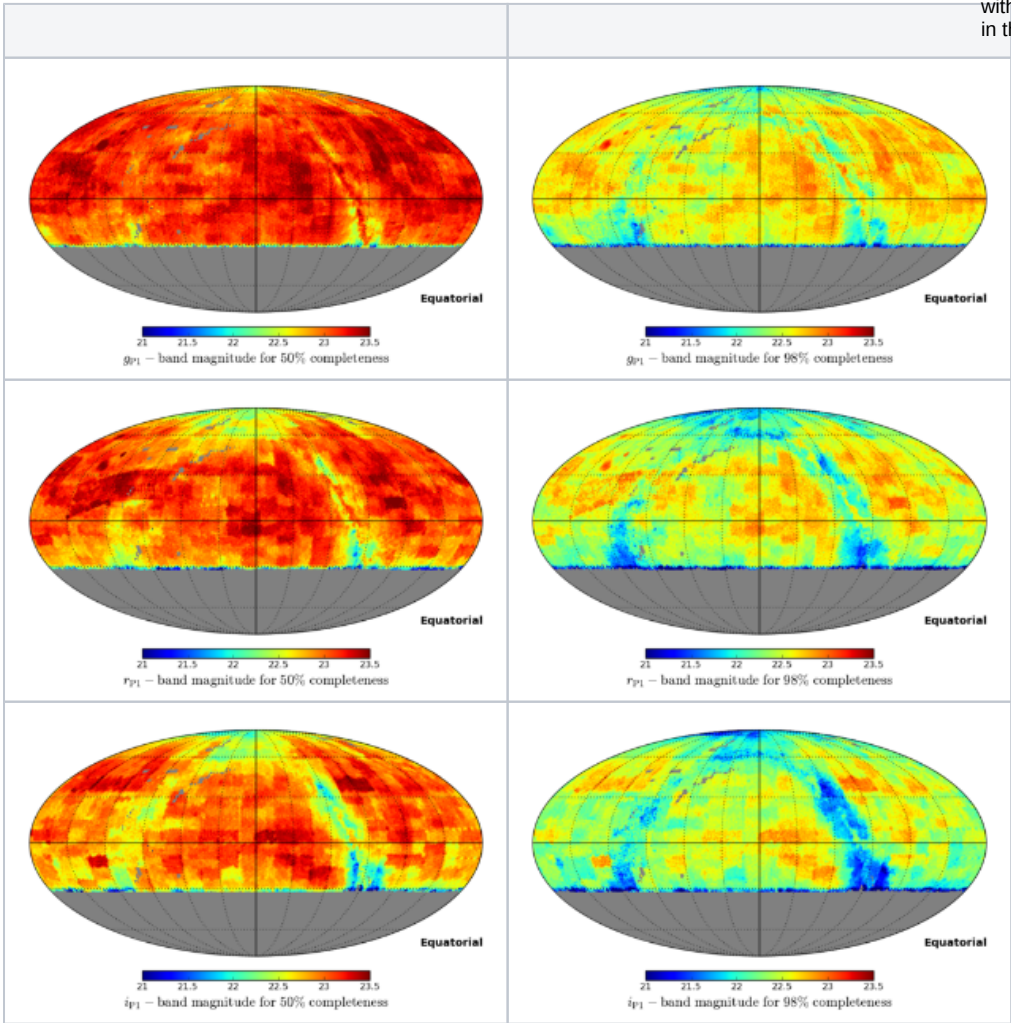
- [Spatial Depth Maps for Point Sources](#)
- [Depth of Galaxies in Comparison to Point Sources](#)

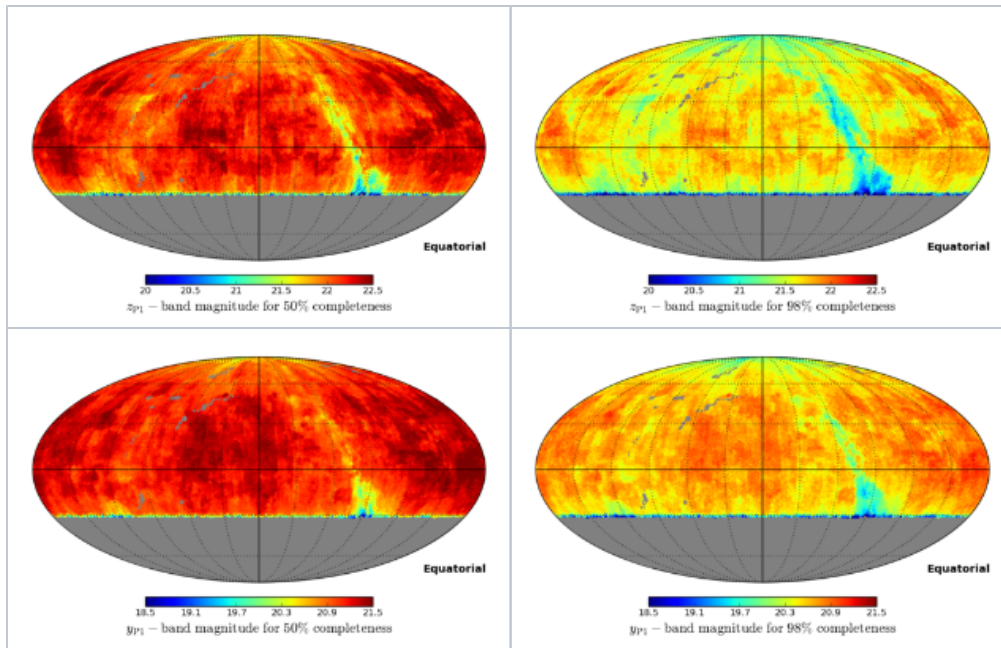
| PS1 depth |      |     |
|-----------|------|-----|
| filter    | 50%  | 98% |
| g         | 23.2 |     |
| r         | 23.2 |     |
| i         | 23.1 |     |
| z         | 22.3 |     |
| y         | 21.2 |     |

## Spatial Depth Maps for Point Sources

The table below shows the depth maps of the PS1 grizy filters for 50% and 98% completeness on the left and right side, respectively, determined with PSF photometry of stellar sources in the stacked images. if fields with  $|b| < 20$  are excluded, the median improves by  $\sim 0.1$  mag.

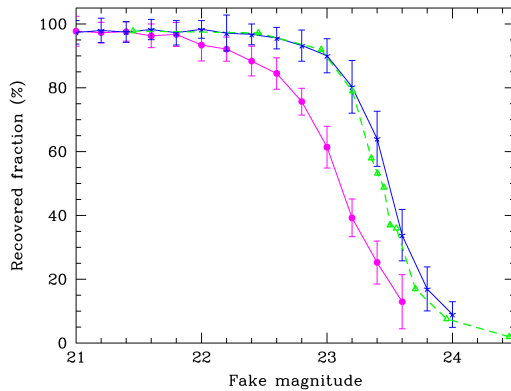
Median 50% and 98% completeness for the PS1 grizy filters, determined with PSF photometry of stellar sources in the 3pi stacked images.





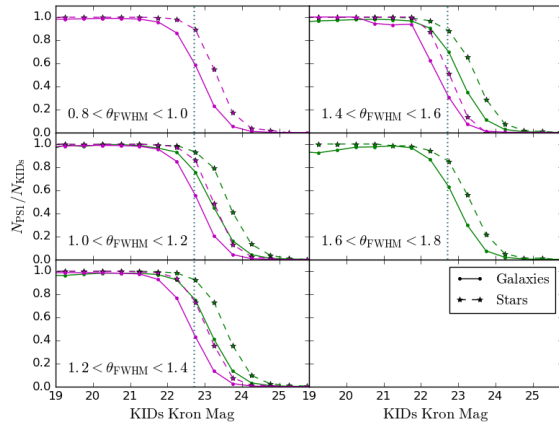
## Depth of Galaxies in Comparison to Point Sources

The depth of the PS1 galaxy catalogue is shallower than the stellar catalogue simply because galaxies, being extended sources, have lower surface brightnesses. In the figure below, copied from Fig 12 of [Metcalfe et al \(2013\)](#), we show how the depth of simulated stars (green and blue) compares to the depth of simulated galaxies (magenta) on a stack of science verification data (for more details see the paper).



A comparison of star- versus galaxy-completeness was also carried out by comparing the DR1 data to the [Kilo-Degree survey \(KiDs\)](#) DR3 data. The depth of stars and galaxies is presented below, using the KiDs star/galaxy separation down to faint magnitudes. Note that the KiDs star/galaxy separation is imperfect at faint magnitudes. The different panels represent different FWHM values in PS1, showing some image quality dependence on depth.

This figure and further tests of galaxy depth will be presented in Farrow et al (in preparation).



Both of the figures suggest the depth of the galaxy catalogue is typically 0.3-0.4 mags shallower than the stars.