The Delivered Image Quality with the MOSAIC Cameras at the Mayall and Blanco 4m Telescopes

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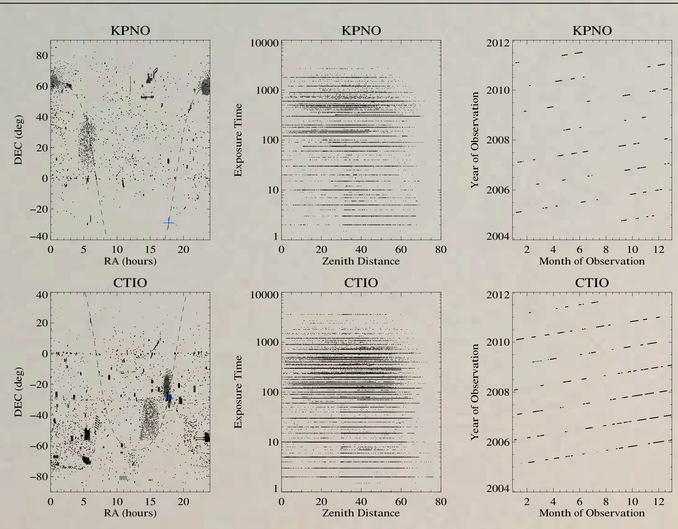
ABSTRACT

We analyze archival images from the Kitt Peak and Cerro Tololo 4m MOSAIC cameras in order to determine the distribution of delivered image quality. The DIQ is similar at both telescopes with little, if any, variation with wavelength.

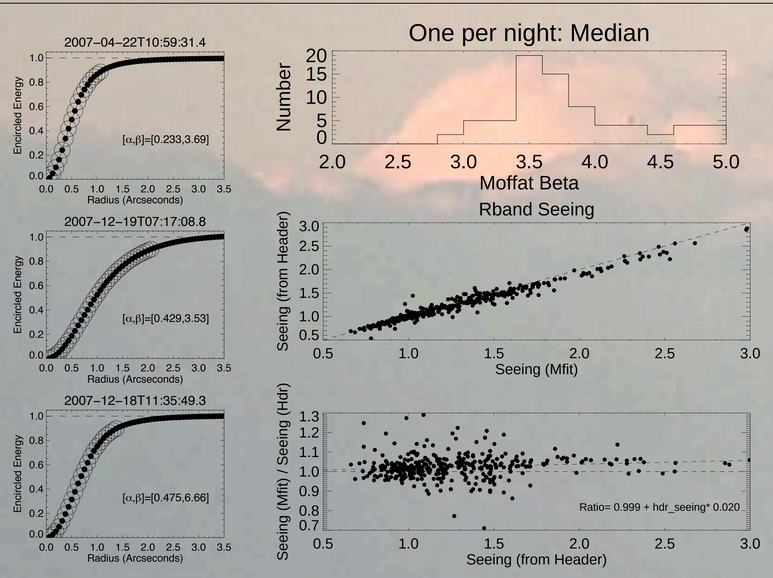
DATA

17,268 KPNO MOSAIC images and 47,266 CTIO MOSAIC2 images, spanning 2006 to the present. All images were reduced by the NOAO MOSAIC pipeline.



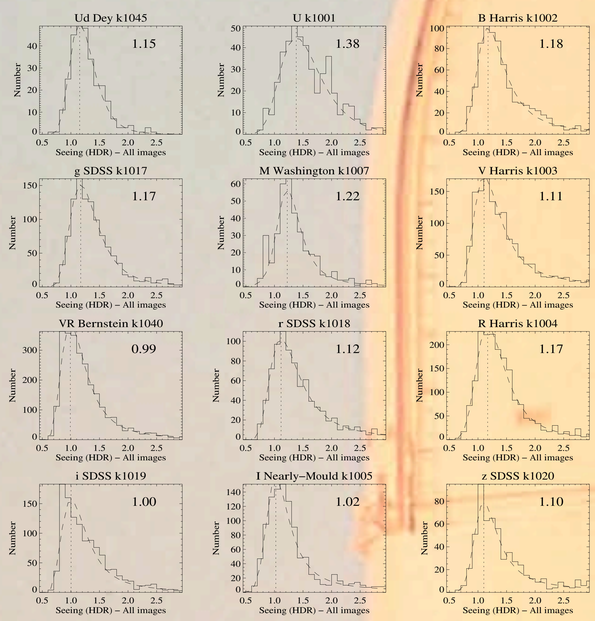
ANALYSIS

We constructed median PSFs for each of ~400 images and fit Moffat profiles to derive shape parameters. The fit FWHM agrees well with the value stored in the 'SEEING' header parameter (in arcseconds). For the remainder of the analyses, we therefore used the header 'SEEING' value. Nights with multiple observations were analyzed in two ways, using either the median value of all the data or the best value from the night.

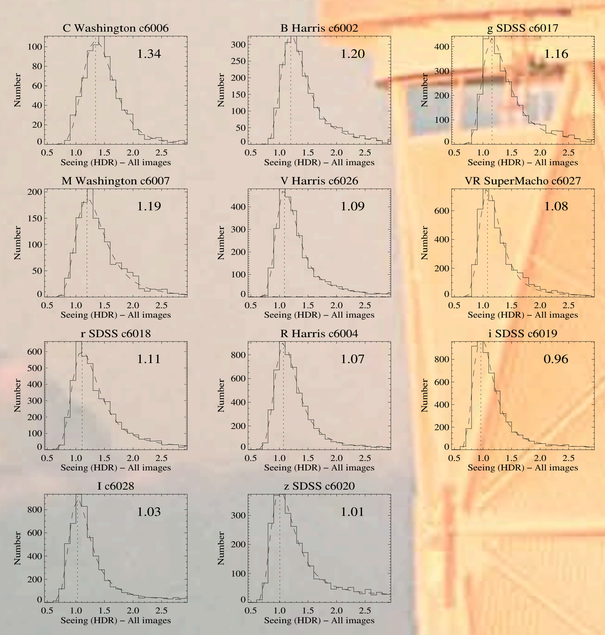


Sample DIQ Distributions in broad-band filters

Mayall:



Blanco:

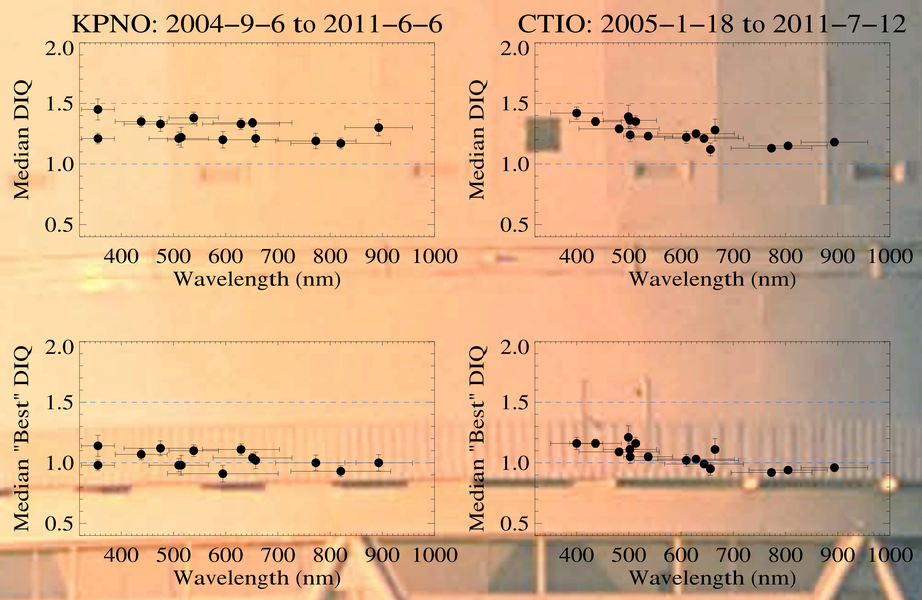


RESULTS

Moffat profile with beta=3.5 is a good fit to the delivered PSF.

FWHM value stored in the 'SEEING' header parameter is a reliable estimate of the DIQ for in-focus images.

The median image quality with both instruments is similar, showing little, if any, difference between the two sites.



FUTURE DIRECTIONS

We are currently investigating the dependence of the measured DIQ on environmental and instrumental effects (e.g., telescope and ambient temperatures, temperature differences, wind speed and direction, guiding and tracking, etc.). We aim to determine whether better monitoring and control of the mirror temperature, telescope focus, and improvements to the guiding and tracking will result in the DIQ more closely matching the site seeing.

We are also exploring ways of objectively identifying and removing out-of-focus images from the analyses.

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