

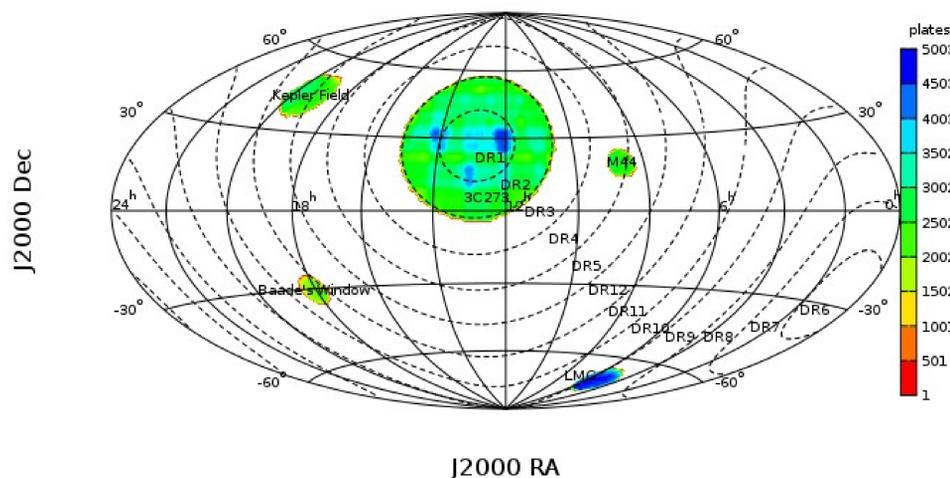
The DASCH Public Data Release



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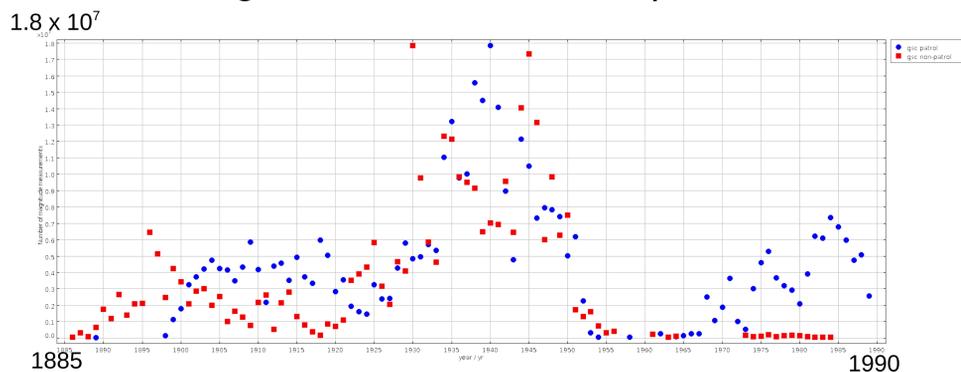
The plate stacks of the Harvard College Observatory, one of the original large scale sky surveys, contains an estimated 30-50 x 10⁹ star images spanning over 100 years. The Digital Access to a Sky Century @ Harvard (DASCH) is in the process of digitizing this archive and computing magnitudes for these images. This poster describes the characteristics of this data release.

Data Release 2 Is Now Available



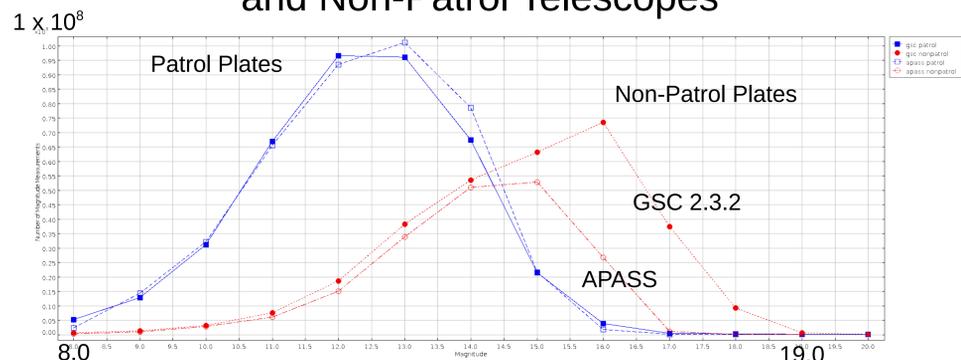
Data for data release 2 (DR2) encompasses galactic latitudes from +60 to +75 degrees. This data joins previously released (DR1) data encompassing galactic latitudes above 75 degrees and including five calibrations fields: M44, 3C273, Baade's Window, and the Large Magellanic Cloud with a 5 degree radius; and the Kepler satellite field with an 8 degree radius. Released data now includes all or part of about 34,000 digitized plates covering 3200 square degrees of the sky. As scanning proceeds, we plan to release data in 10 subsequent releases, DR3 to DR12, in the sequence shown.

Magnitude Measurements per Year



The released data contains over 708,066,000 magnitude estimates spanning the years 1886 to 1989. The data comes from 30 telescopes which may be divided into 18 wide field patrol telescopes (blue circles) with scales greater than 350 arcsec/mm and objective diameters of 1 to 3 inches; and narrow field telescopes (red squares) with objective diameters of 4 to 24 inches. The main patrol programs ran from about 1900 to the 1950's. A smaller patrol program using six Damon telescopes with 1.65" diameter objectives ran from 1970 to 1990.

Magnitude Measurements per Magnitude for Patrol and Non-Patrol Telescopes

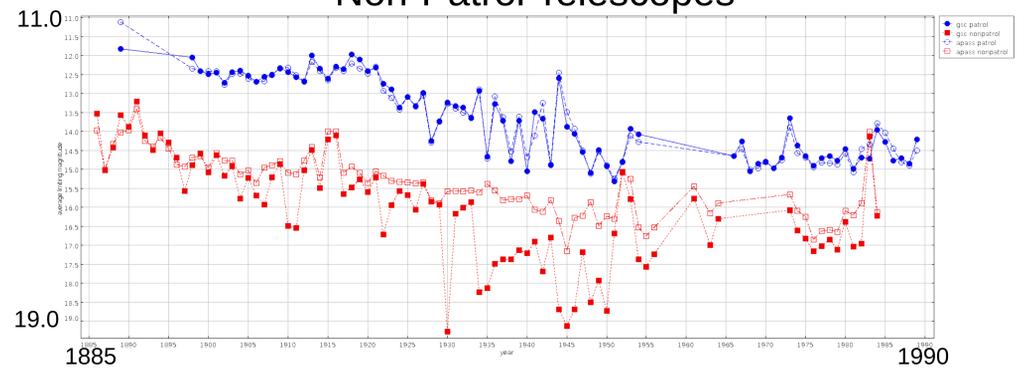


The above-mentioned magnitude measurements were obtained by fitting calibration curves using magnitudes from the GSC2.3.2 Hubble Guide Star Catalog. Of the released data, 559,000,000 images matched with GSC2.3.2 were used for this calibration. These images, in turn, calibrated an additional 149,000,000 unmatched images. The DASCH photometry pipeline performs independent magnitude estimates using the AAVSO Photometric All-Sky Survey (APASS) and the Kepler Input Catalog (KIC). While the APASS catalog is more accurate, it is limited to stars brighter than magnitude 16. As a result, the APASS dataset contains only 598,240,000 magnitude measurements divided between 482,000,000 matched catalog images and an additional 116,000,000 unmatched images.

Released Data Available For Download at <http://dasch.rc.fas.harvard.edu/>

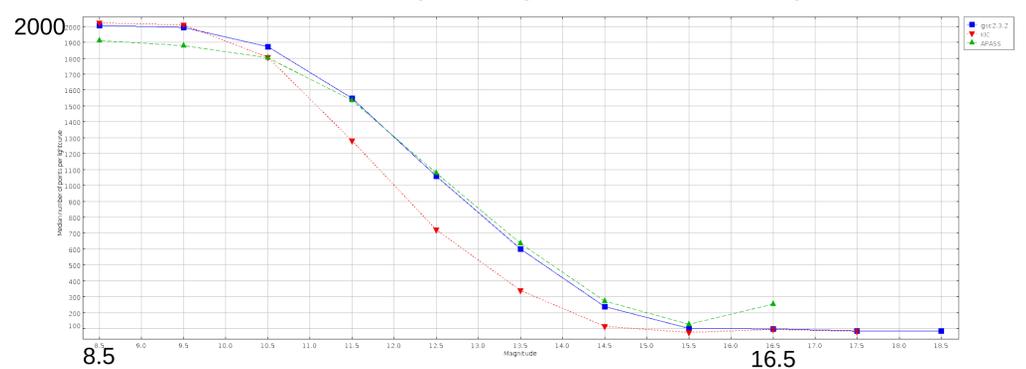
All of the above lightcurves may be accessed through the DASCH website. A cone search function is available to find variable candidates and their neighbors. For each candidate, the web site provides a lightcurve plot, thumbnail digitized images, and Virtual Observatory compatible tables.

Average Limiting Magnitude per Year for Patrol and Non-Patrol Telescopes



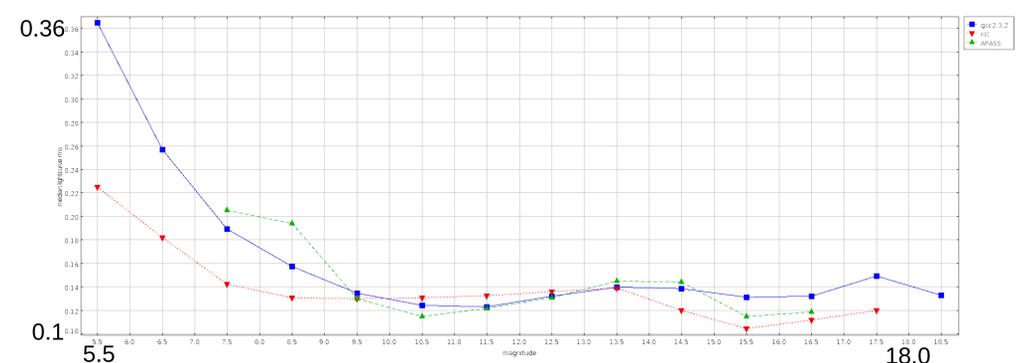
The above figure shows that a significant improvement in emulsions occurred during the 1920's and 1930's (Blue for patrol plates; Red for non-patrol; solid symbols for GSC2.3.2 calibration; open symbols for APASS calibration).

Median Points per Lightcurve vs Magnitude



The total number of lightcurves in the release is 1,029,052 lightcurves for the GSC2.3.2 calibration (Squares); 644,666 lightcurves for the APASS calibration (Triangles); and 260,915 lightcurves for the Kepler Input Catalog calibration (Inverted Triangles).

Median Lightcurve RMS vs Magnitude



This figure shows the median RMS values for the lightcurves in the previous figure. These median values are less than 0.14 magnitude for images with brightness ranging from magnitudes 9.5 to 16.5. (Squares: GSC2.3.2 calibration; Triangles: APASS calibration; Inverted Triangles: KIC calibration)

References

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- S. Laycock, S. Tang, J. Grindlay, E. Los, R. Simcoe, J. D. Mink (2010), "Digital Access to a Sky Century at Harvard. II: Initial Photometry and Astrometry" AJ, Vol 140, Issue 4, pp. 1062-1077
- Sumin Tang et al. (2013), "Improved Photometry for the DASCH pipeline", arXiv:1304.7504, PASP, 125:857-865, 2013

Acknowledgments

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The ongoing AAVSO Photometric All-Sky Survey (APASS) has improved DASCH photometric calibration and is funded by the Robert Martin Ayers Sciences Fund.