

DASCH : to Measure (and preserve) the Harvard Plates: Opening the 100-year Time Domain Astronomy Window

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Digital Access to a Sky Century @ Harvard (DASCH)

- The Harvard College Observatory (HCO) maintains a collection of >500,000 photographic plates that cover the whole sky from the 1880s to the 1980s.
- The DASCH collaboration has developed an ultra-high speed digital plate scanner (*Simcoe et al. 2006*) which will ultimately enable the full Harvard plate collection to be digitized. Initial processing is described by *Laycock et al 2009* and *Tang et al (2009)*.
- As demonstration projects for the science case, we have scanned more than 5000 plates covering several different fields, including the open cluster M44, Baade's window in the Galactic Bulge, several Quasars and a fraction of the plates covering the Kepler field.
- Production scanning and serving on line the entire ~1 Pb database (both images and derived lightcurves) on spinning disk could be completed within ~3-5 y after funding (for scanner operations and database construction) is obtained.

Unusual long-term variables found in DASCH

The 100 year coverage of DASCH is unique. The most exciting new science from DASCH will be long-term variables. We have found hundreds of new unusual long-term variables from partial analysis of ~5000 scans. Some of them do not match any of the common classes, and may instead suggest extremely short-lived evolutionary stages. Here we present 3 examples. According to their spectra, they are all ~K2 giants, but not R Coronae Borealis stars. Their nature remain unknown. Details are presented in *Tang et al. 2009*.

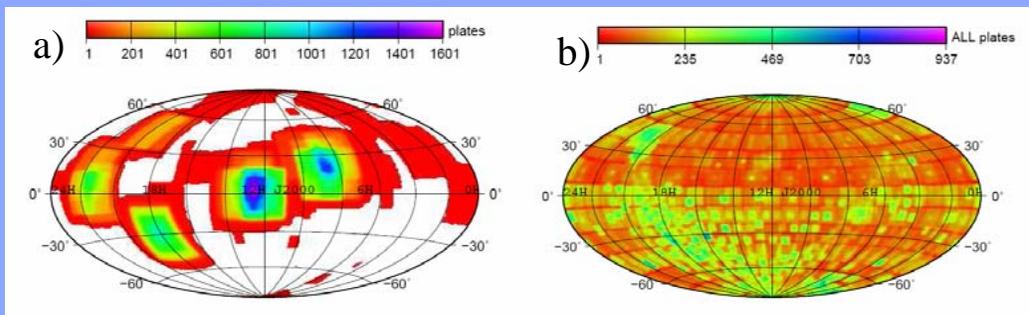
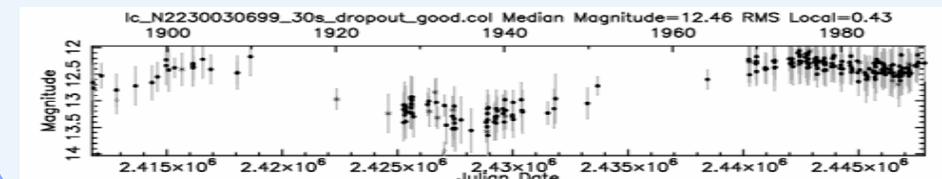
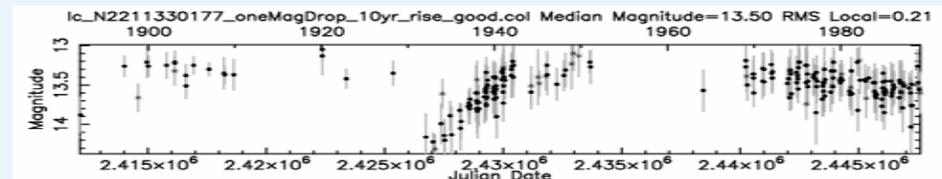
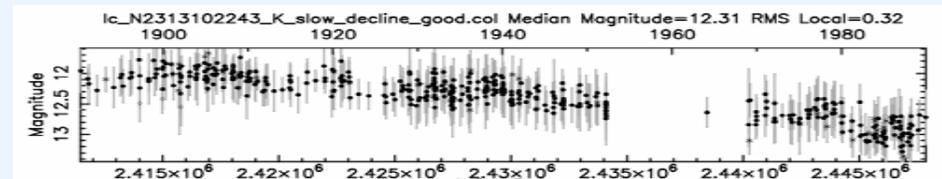
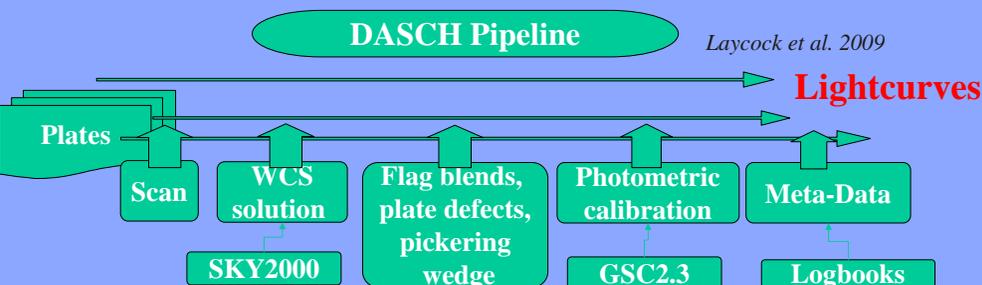
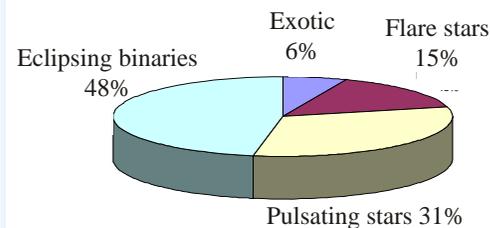


Figure 1. a) RA/Dec cords for ~5100 plates scanned for DASCH; b) Approximate number of plates reaching limiting mag $B \sim 16$ vs. RA/Dec for plate centers as derived from exposure times vs. limiting mag using the ~1/3 of the plate collection with on-line Metadata. Details are presented in *Grindlay et al. 2009*.



Demographics of DASCH Variables



References

- <http://hea-www.harvard.edu/DASCH/>
 Grindlay, J., et al. 2009, in preparation
 Laycock, S., et al. 2009, AJ, in press (astro-ph/0811.2005)
 Simcoe, B., et al. 2006, Proc. SPIE (astro-ph/0610351)
 Tang, S., et al. 2009, in preparation