

Digital Access to a Sky Century at Harvard (DASCH)

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George Champine - **Logbook digitization**

Bob Simcoe - **Hardware engineer**

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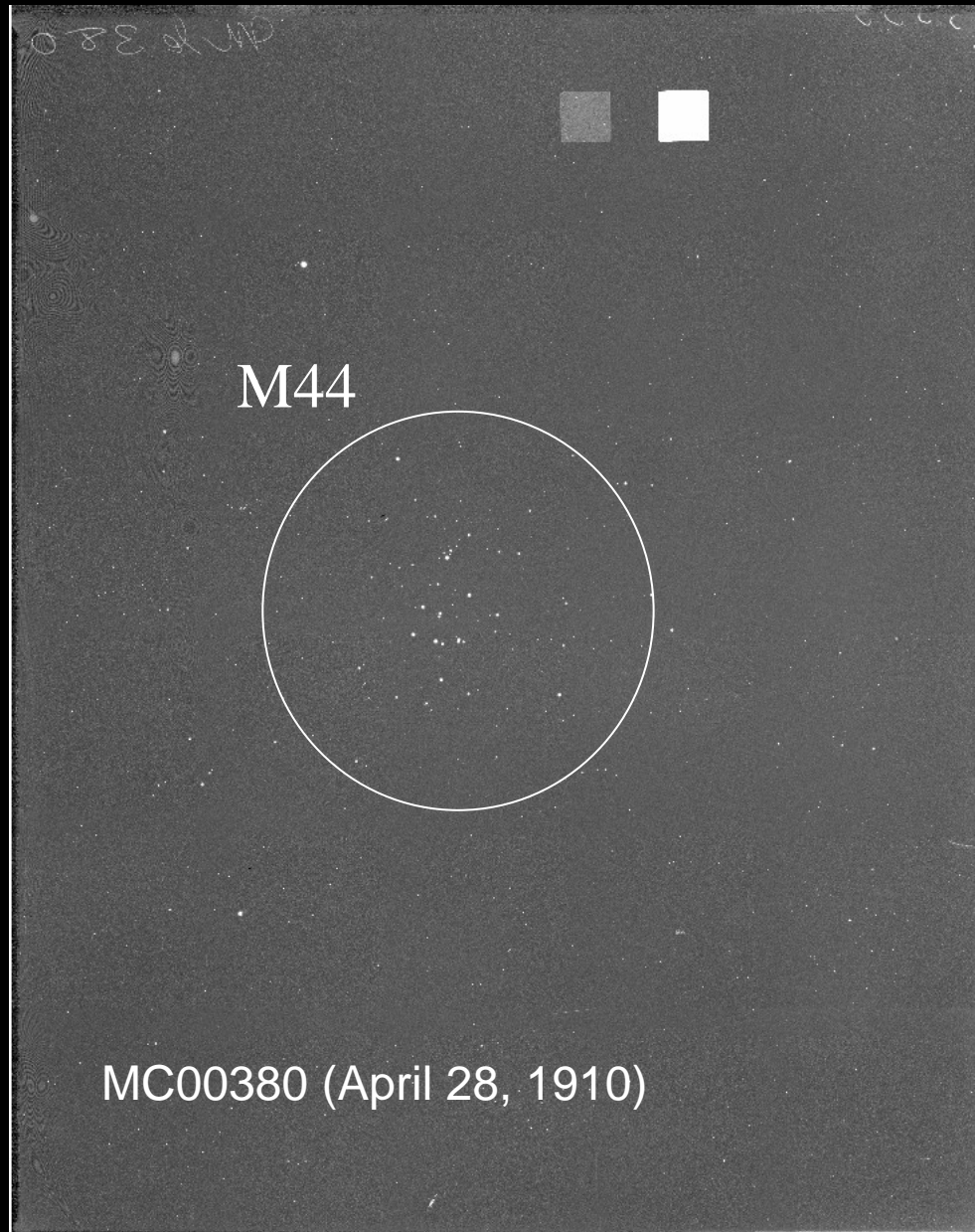
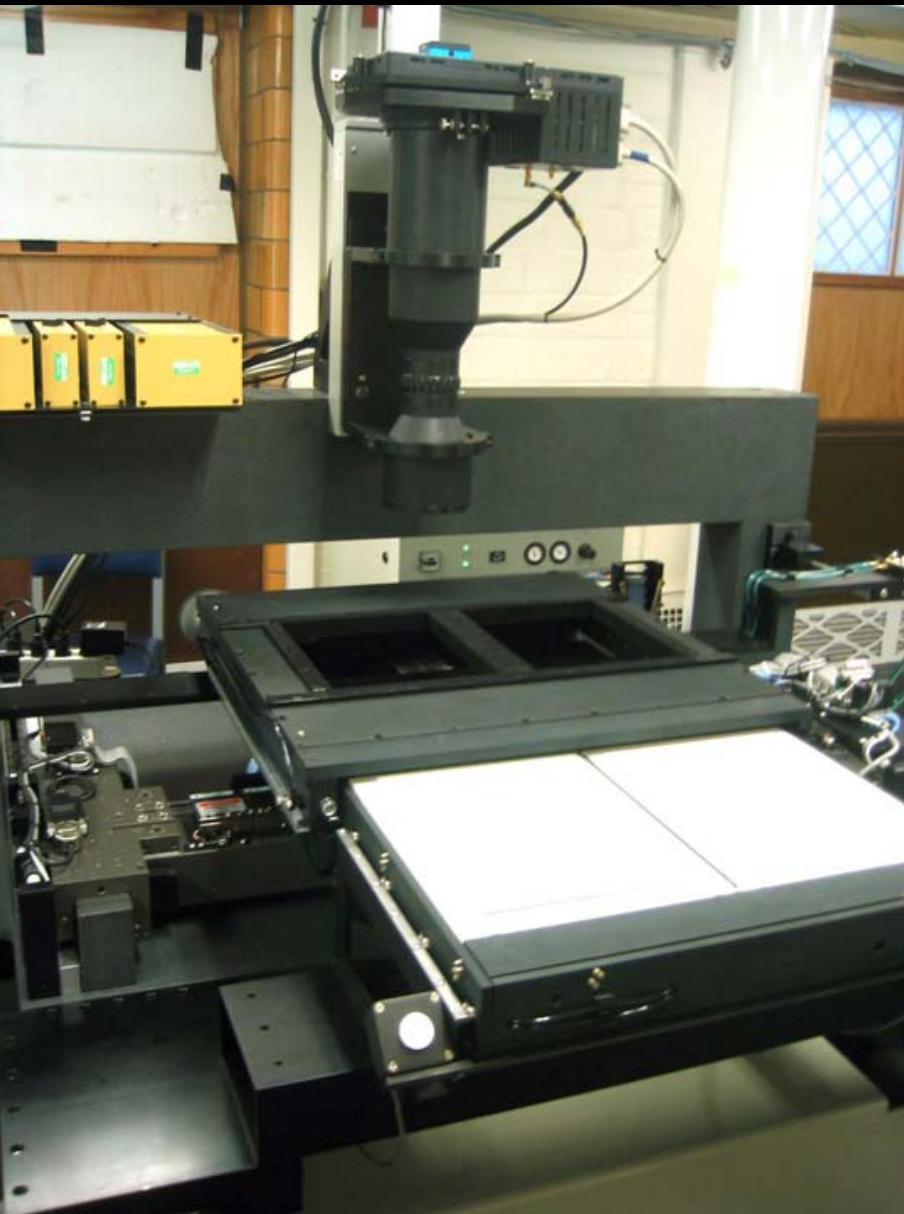
AAS 213th Meeting, Long Beach, Jan. 5, 2009

Introduction to **DASCH**

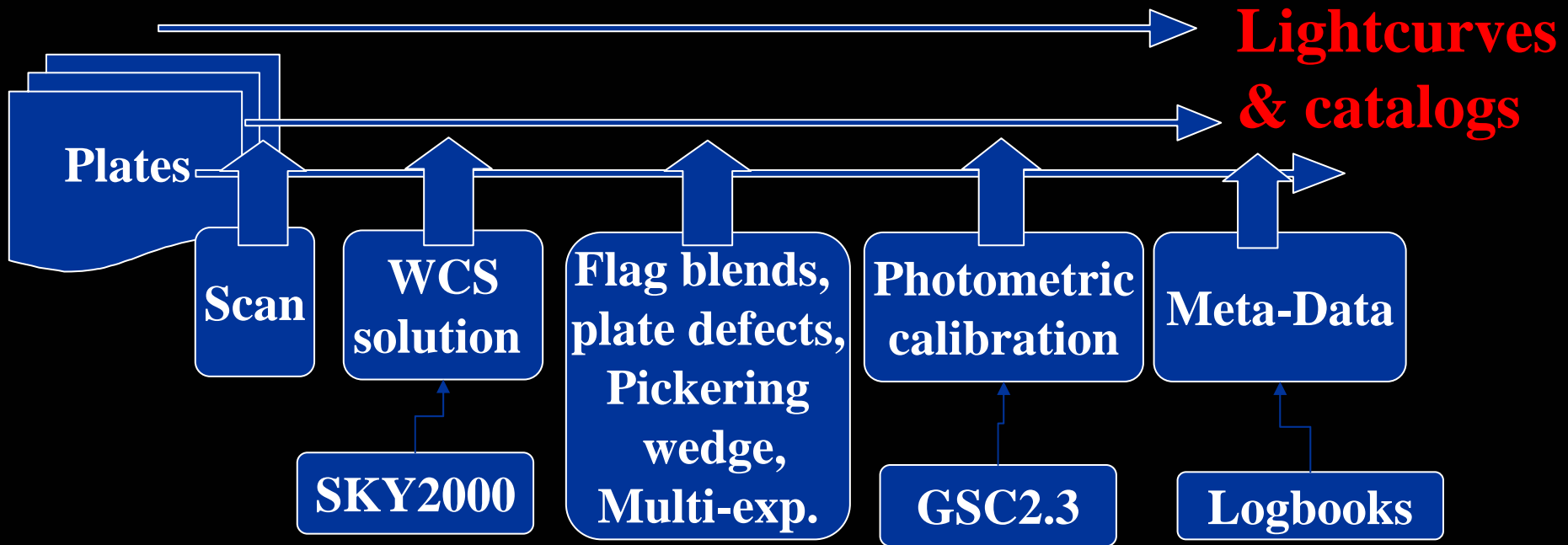
- The Harvard College Observatory (HCO) maintains a collection of more than **500,000** glass astrophotographic plates that cover both the northern and southern skies from the 1880s to the 1980s.
- Limiting magnitude: 14 to 17 blue magnitudes; some down to 18 mag
- These 8x10 & 14x17 inch Plates are wide, cover 5-25 degrees on a side.
- Every point on the sky has been observed about **500-1000** times.
- **100 year coverage**: a unique resource for studying temporal variations in the universe on 10-100y timescales.
- **The Digital Access to a Sky Century at Harvard (DASCH)** collaboration has developed an ultrahigh speed digital plate scanner (Simcoe et al. 2006) which will ultimately enable the full Harvard plate collection to be digitized.

Scanner

Start scanning in Nov, 2005



DASCH Pipeline



DASCH refs:

<http://hea-www.harvard.edu/DASCH/>

Scanner - *Simcoe et al. 2006*, Proc SPIE (astro-ph/0610351)

I. **Overview of DASCH** - *Grindlay et al. 2009*, in prep.

II. **Astrometry & Photometry** - *Laycock et al. 2009*, AJ submitted (astro-ph/0811.2005)

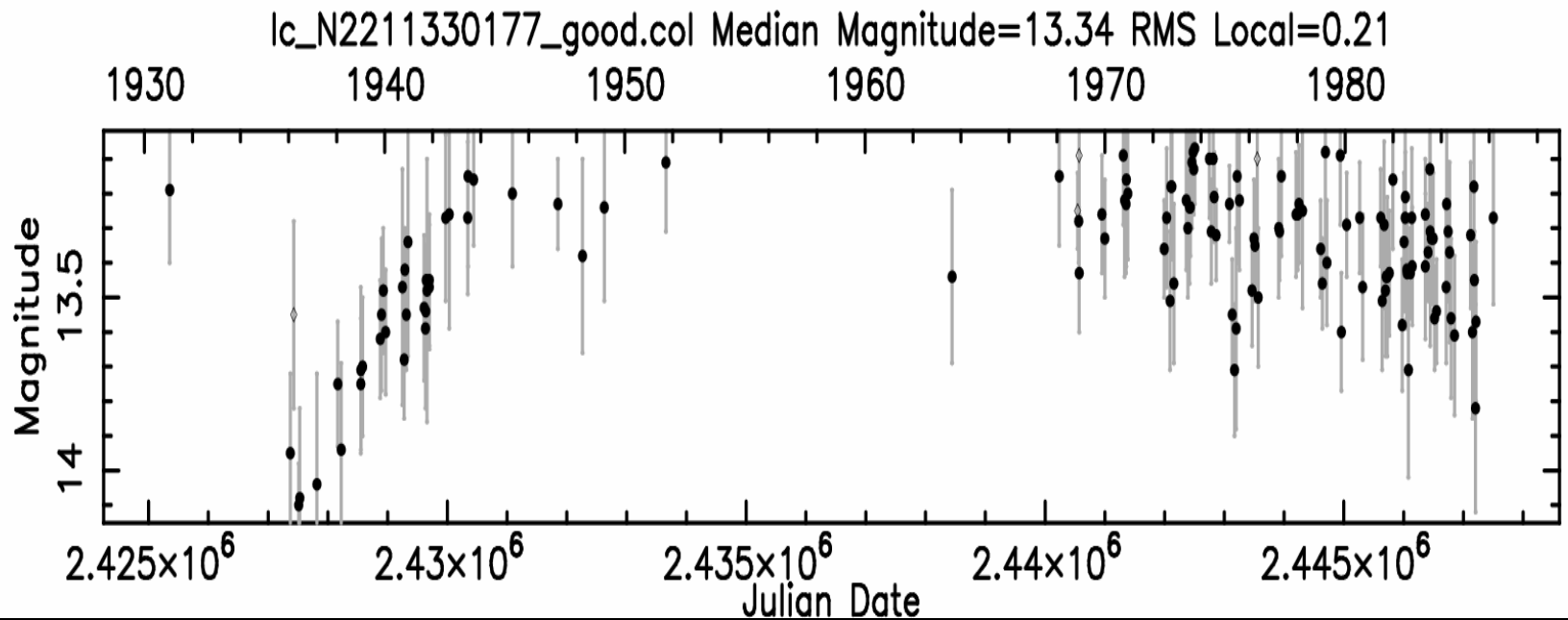
III. **Improvements in the pipeline** - *Tang et al. 2009*, in prep.

IV. **A He-rich sd (?) with 10-yr flare** - *Tang et al. 2009*, ApJL, in prep.

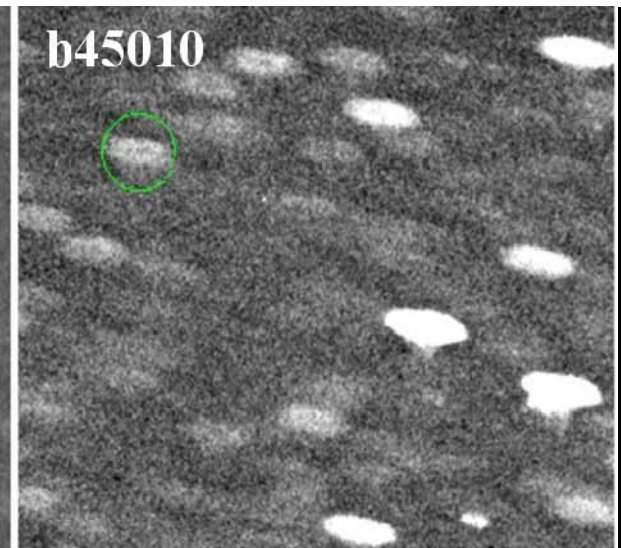
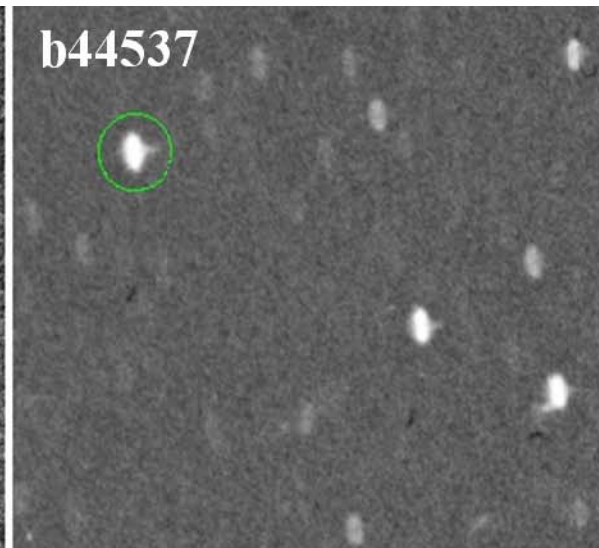
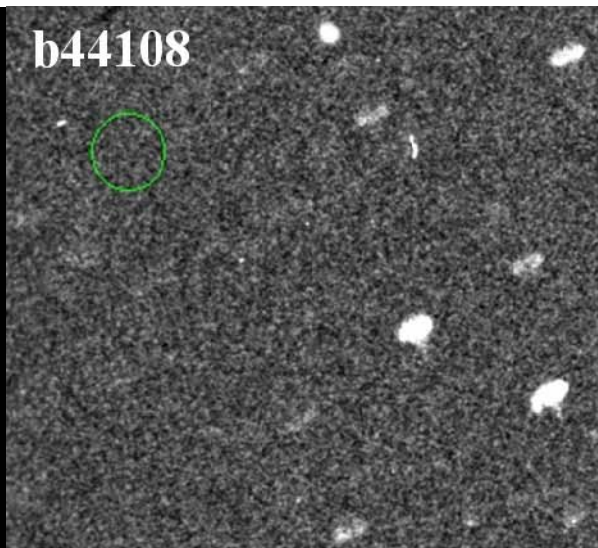
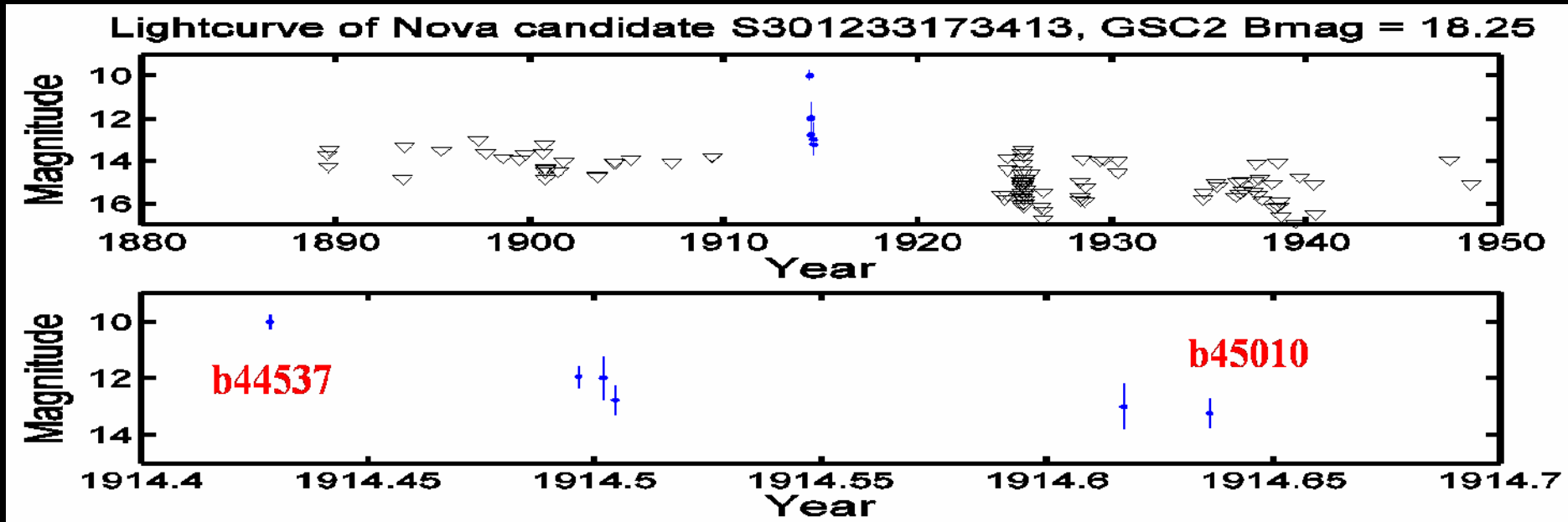
Highlights of current results

- We found ~400 new large amplitude variables in the M44 plates and some of them are very unusual (see our poster 427.07 for details)
- We found 4 new RCB candidates (~100 known so far)
- **Several** very unusual variables that do not match any of the common classes, which may contain stars captured during extremely short-lived evolutionary stages.
- ALL of the are derived from 0.1% of the available plates

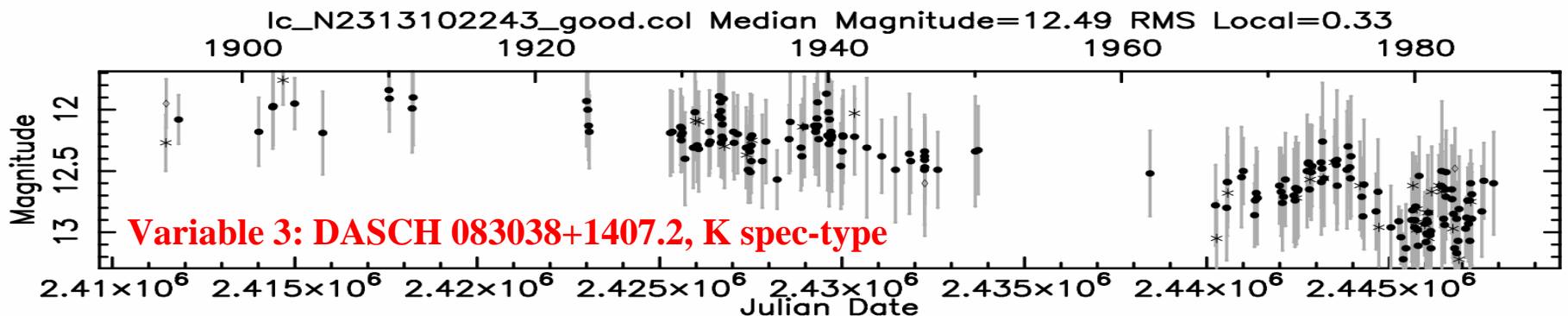
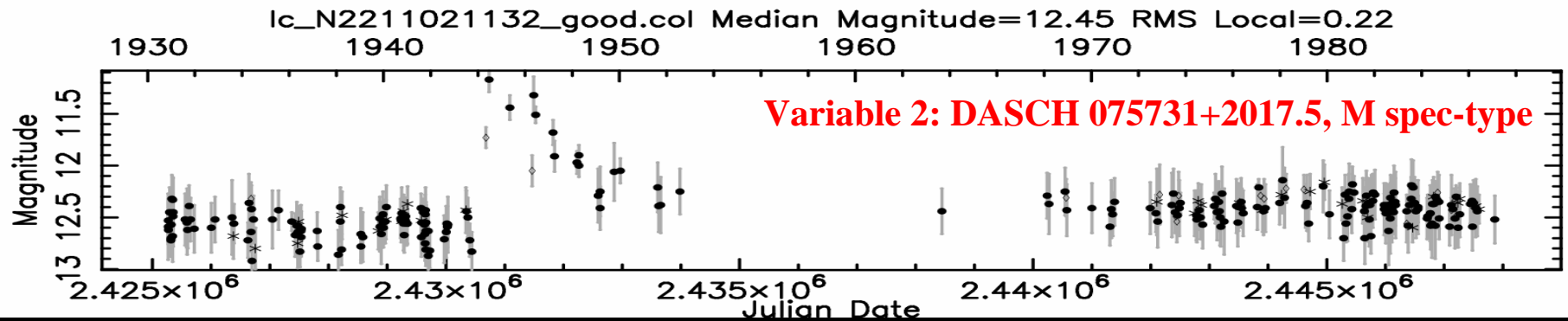
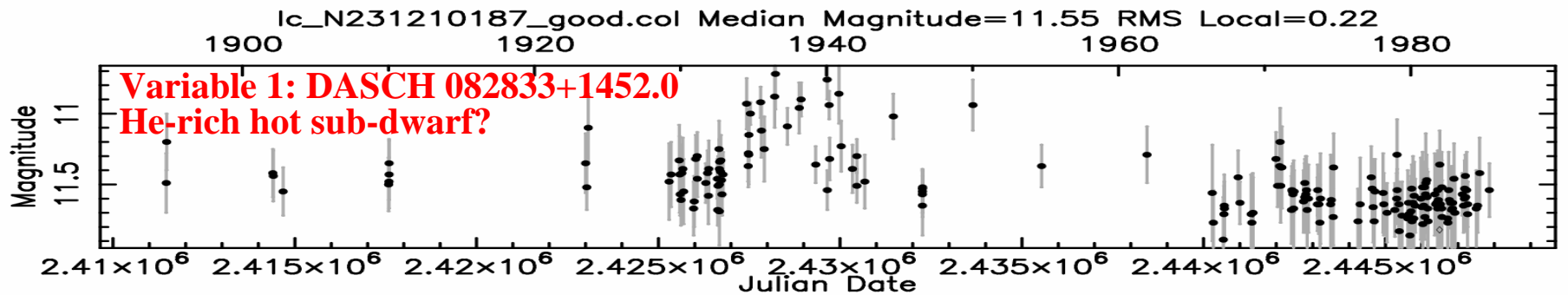
An example for new RCB candidates



An example: a nova found in Baade's window plates



Examples of unusual long-term variables



Current Status

- We have scanned ~3800 plates on 5 fields: M44, 3C 273, Baade's Window, PG 0844+349, PG 2130+099
- Photometric accuracy on best plates: 0.1 mag
- Astrometric accuracy on best plates: 1"

- We could start production scanning and building the database within 6 months of finding funds (\$3M) for personnel to operate scanner and data archive for the 3-4 yr needed to scan all ~500,000 plates.