The Bamberg photographic plate archive

The digitizing project


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Bamberg Southern Photographic Patrol Survey *(Strohmeier 1963)*

- Boyden, South Africa, 1963-1976
  - aim: search for variable stars
  - → 22,000 plates
- direct images, $B \leq 14.5\text{mag}$, $16\text{cm} \times 16\text{cm} = 14^\circ \times 14^\circ$
- very homogenous sample
  - (22 identical wide field cameras)
- all southern data from this time is primarily based on this survey
Need for Preservation

• **historian’s point of view:**
  ◦ oldest plates at Bamberg from 1910s
  ◦ photographic emulsions already begin to decompose and dissolve from their glas plates

• **scientist’s point of view:**
  ◦ former results using blink comparator
    → **1.736** Bamberg variables (e.g. Strohmeier & Knigge 1961, Friedrich & Schöffel 1971, Knigge & Sosna 1977)
  ◦ only a fraction of observed plates have been looked on
    (each field has several dozen images)
Need for Preservation

1963 July 16

1963 July 23
Need for Preservation

1963 July 23

1964 May 13
Need for Preservation

- **25,000 - 200,000** stars on one plate
- **1,736** Bamberg variables → just ‘**tip of the iceberg**’

- equipment became affordable
  → large amount of storage space
- give access to the community (Virtual Observatory)

⇒ **digitizing project** (DFG funded)
  in collaboration with the Leibniz Institute for Astrophysics at Potsdam (AIP) and the Hamburg Observatory
Metadata

• 12 years ago:
  start of project to incorporate all metadata into Wide-Field Plate Database
  (Tsvetkov et al. 2005, Tsvetkova et al. 2006)
  → www.skyarchive.org
Scan

- flatbed scanner: EPSON Expression 10000XL
  - each scan (per plate):
    - resolution:
      - 2,400 dpi = 10 μm
        = 3''6/pix
    - duration: 5 minutes
    - size: 400 MByte

⇒ so far: >10,700 scans
Data Preparation

• implementation in **APPLAUSE** database
  (**A**rchive of **P**hotographic **PL**ates for **A**stronomical **USE**)  
  ◦ all scanned data (inclusive logbooks)  
  + metadata  
  ◦ FITS-header (Wide-Field Plate Database)  
  ◦ storage, web based interface

→ Leibniz Institute for Astrophysics at Potsdam (AIP)

→ **next talk (T. Tuvikene)**
Scientific Investigations

- **Astrometry**
  - PyPlate (SExtractor, astrometry.net, SCAMP)
    \[ x, y \rightarrow RA, DEC \]
    -> next talk (T. Tuvikene)
  - \[ \langle RA, DEC \rangle = \pm 2'' \] (note: scan resolution = 3''6 / pix)
    -> better than expected
    -> search for e.g. asteroids, comets

- **Photometry**
  - SExtractor \(\rightarrow\) relative magnitudes (using Zero point value)
  - calibration: catalog (Tycho2/UCAC4) \(\rightarrow\) magnitudes
    \[(Høg et al. 2000, Zacharias et. al. 2013)\]
Platte vs. Tycho2 ($B \leq 10.0\text{mag}$) / UCAC4 ($B > 10.0\text{mag}$)
UCAC4 252-118418
= V* V1184 Sco - Semi-regular pulsating Star
UCAC4 241-127154 = CPD-41 8037 - Star
UCAC4 241-127154 = CPD-41 8037 - Star

= BV 1737 (new)
UCAC4 226-131332 = HD 153234 - Star
= BV 1738 (new)
UCAC4 231-128493 - Star

![Graph showing data points with error bars and a plot range from JD-2438220 to 14.5 magnitude.](image-url)


