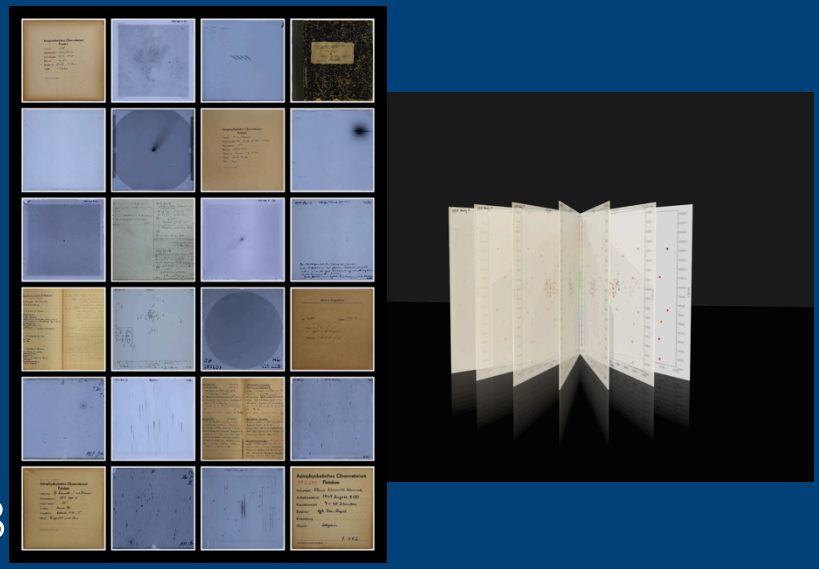
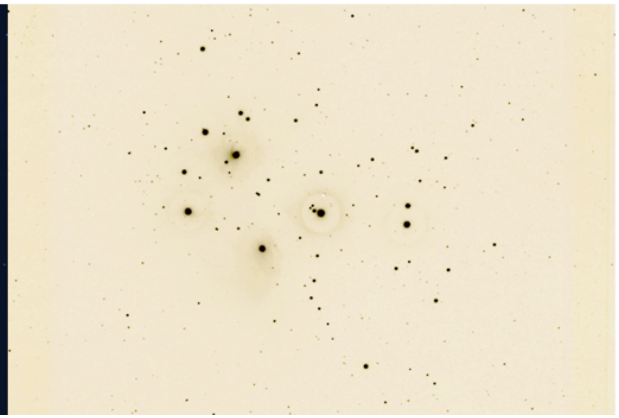
Leibniz-Institut für
Astrophysik Potsdam

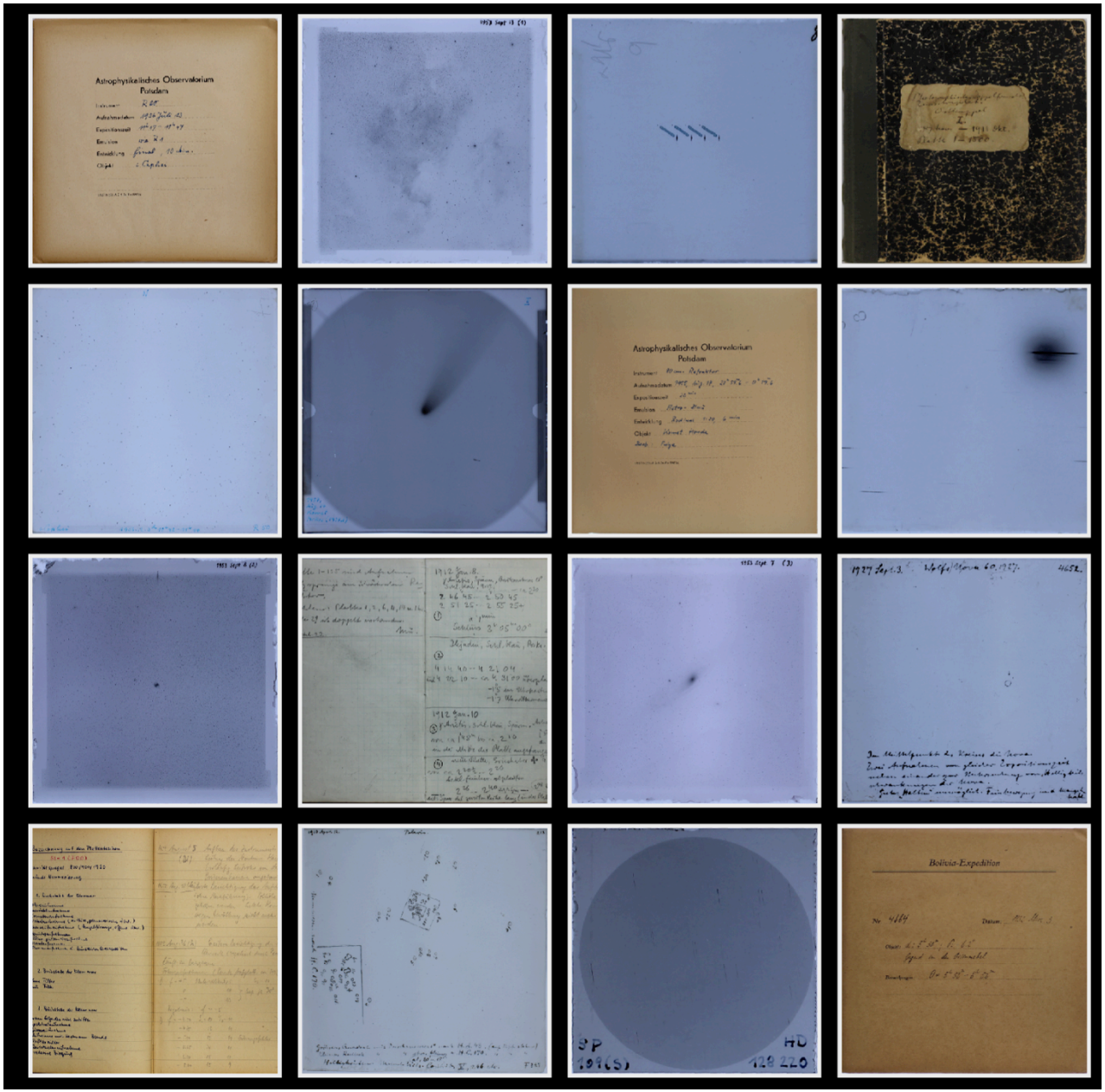
Provenance from the data provider view – constructing provenance information for the APPLAUSE archive



Anastasia Galkin
Ole Streicher
Kristin Riebe
Harry Enke

EDP Forum Heidelberg 2018




Astrophysikalisches Observatorium
Potsdam
Astrophysikalisches Observatorium
Potsdam
Bolivia-Expedition
SP
HD

APPLAUSE

Archives of **P**hotographic **PL**ates for **A**stronomical **USE**

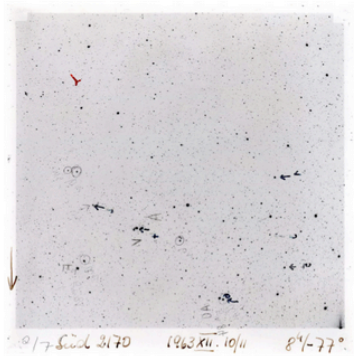
Welcome to the APPLAUSE archives

German astronomical observatories own considerable collection of photographic plates. While these observations lead to significant discoveries in the past, they are also of interest for scientists today and in the future. In particular, for the study of long-term variability of many types of stars, these measurements are of immense scientific value.

There are about 85000 plates in the archives of Hamburger Sternwarte, Dr. Karl Remeis-Sternwarte Bamberg, and Leibniz-Institut für Astrophysik Potsdam (AIP). The plates are digitized with high-resolution flatbed scanners. In addition, the corresponding plate envelopes and observation logbooks are digitized, and further metadata are entered into the database. The work is carried out within the project "Digitalisierung astronomischer Fotoplatten und ihre Integration in das internationale Virtual Observatory", which is funded by the DFG.

On this site, you can get access to the plate data that are processed so far. Please use the registration form to get a user account. Then you can submit SQL queries or fill search forms using the query interface. Without signing in, the query interface can be used as a guest user.

Also, as a result of the AstroPlate Meeting 2014 in Prague, the Astroplate Wiki has been started to share the relevant knowledge. Everyone is welcome to take part in it.



Example of a photographic plate. More sample images can be found in the image gallery.

Recent News

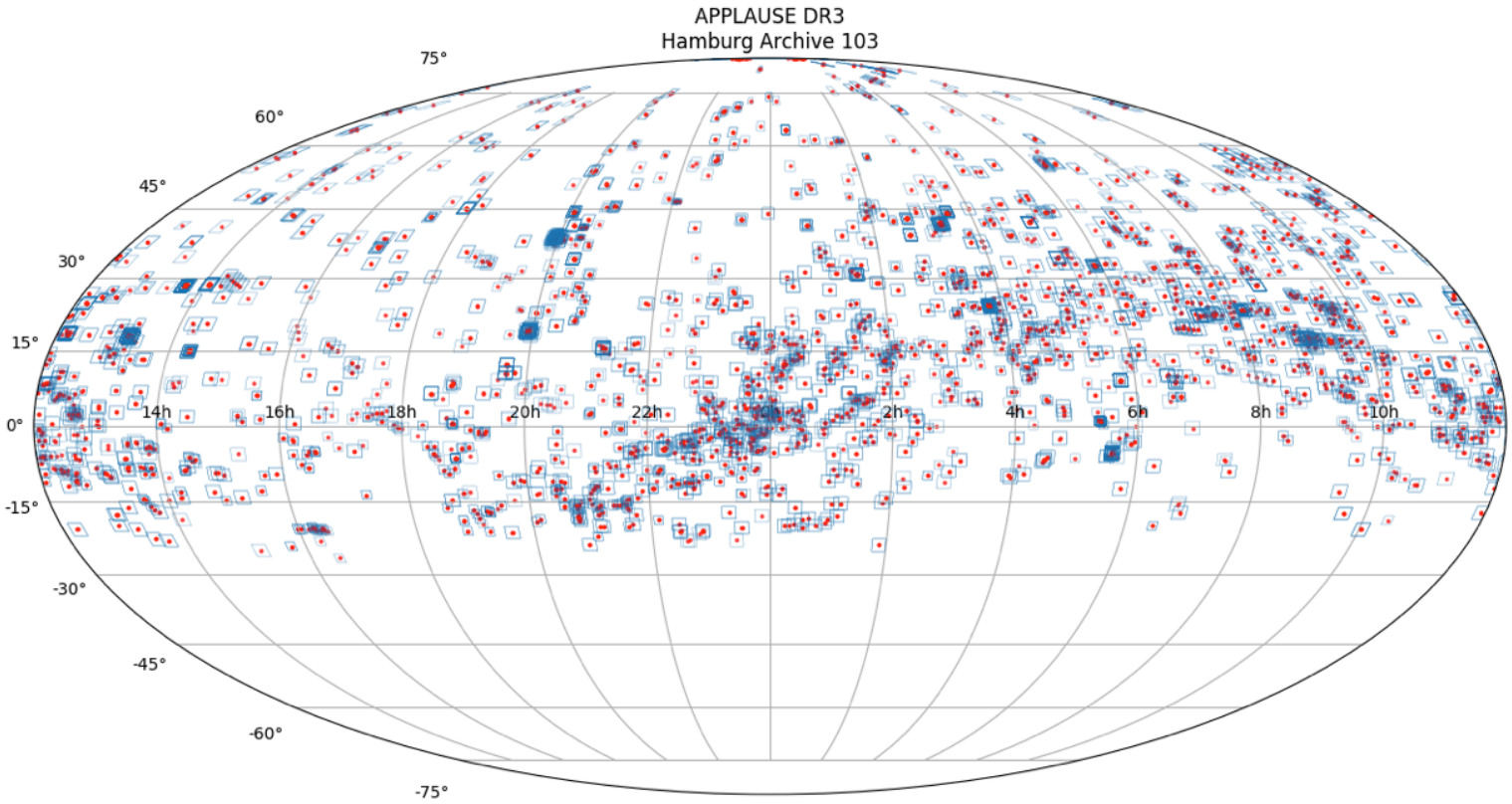
February 29th, 2016 — APPLAUSE Data Release 2 published

Data Release 2 (DR2) was published on February 29, 2016. It contains data from the Bamberg, Hamburg, Potsdam, and Tartu plate collections. DR2 contains 51517 scans of 42789 plates. All material of the former data release is included in the 58115 digital images of plate covers and logbook pages, 149 logbooks. With 2.59 billion extracted sources this data release extends the former catalogs by nearly a billion sources. The lightcurve table of DR2 is calibrated and provides additional photometric information for astronomical work with the data. The total size of the published files is 30 TB.

April 24th, 2015 — APPLAUSE Data Release 1 published

The APPLAUSE Data Release 1 (DR1) contains digitized phtographic plates from the Bamberg, Hamburg and Potsdam observatories. Over 25 thousand plate scans and a catalogue of over 1.6 billion extracted sources are available to the astronomy community and to the public. The oldest published plates date back to 1909 and the newest are from 1976. The majority of plate scans include astrometric solutions, making it possible to match the historic observations with contemporary object catalogues.

September 18th, 2014 — APPLAUSE database updated


APPLAUSE DR3
Hamburg Archive 103
75°
60°
45°
30°
15°
0°
-15°
-30°
-45°
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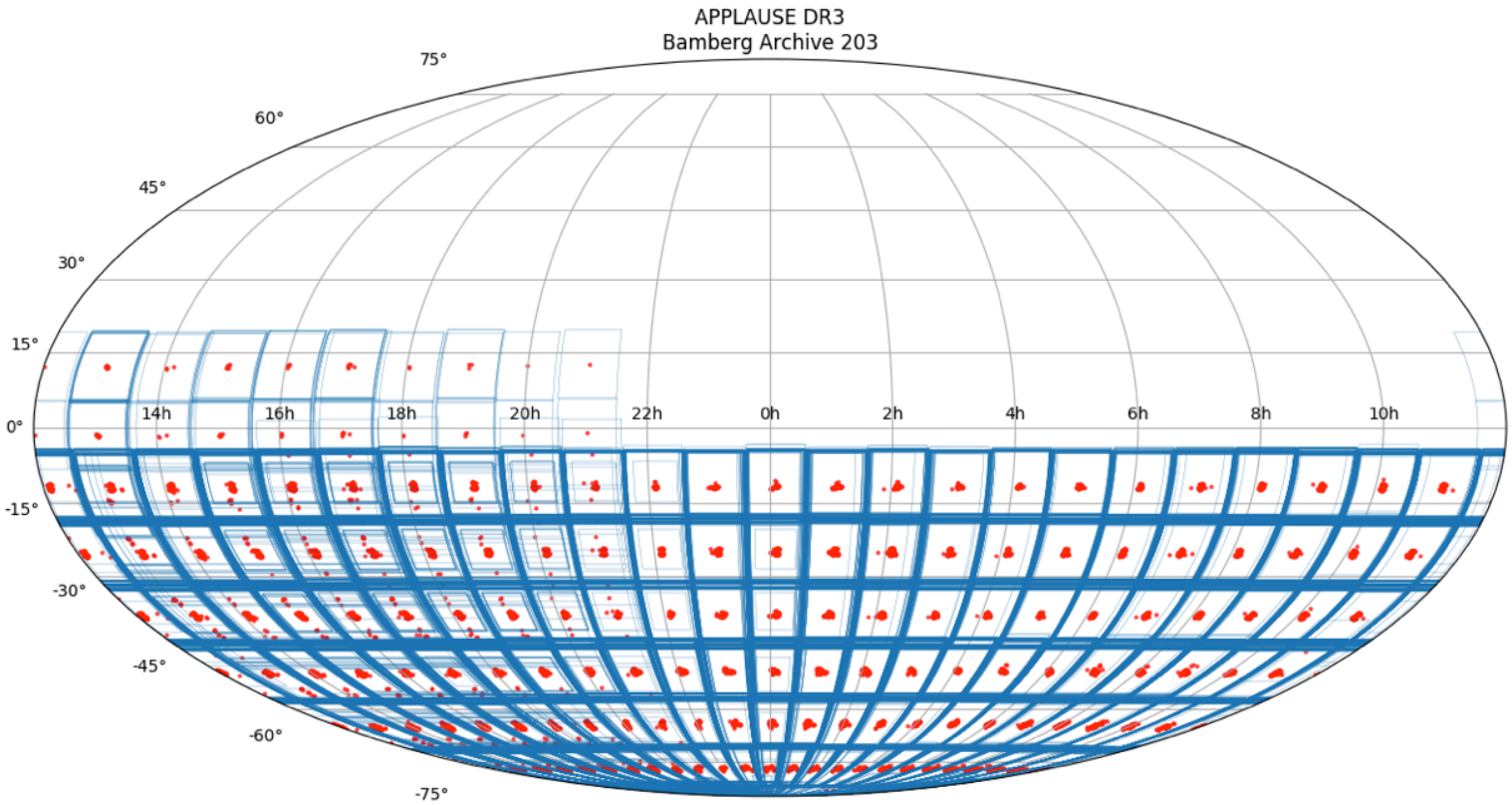
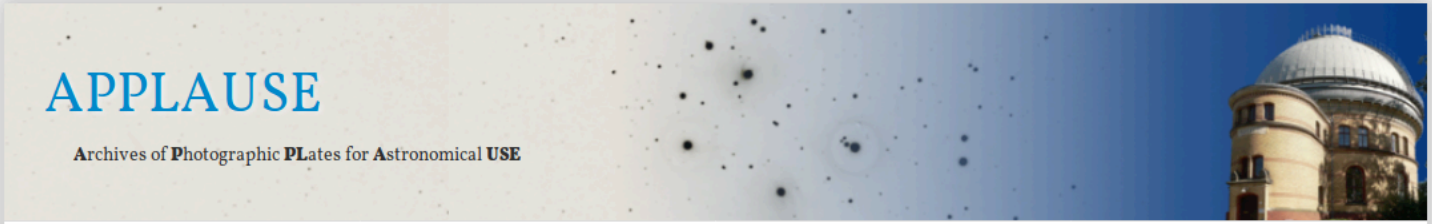
2h
4h
6h
8h
10h


APPLAUSE DR3
Bamberg Archive 203
75°
60°
45°
30°
15°
0°
-15°
-30°
-45°
-60°
-75°
14h
16h
18h
20h
22h
0h
2h
4h
6h
8h
10h

Constructing the provenance

Used for the prototype

- Information in the tables of DR2
  - Clear relations between scans, processes, sources and plates via usage of ID‘s (proc_id, plate_id, source_id, ucac4_id, etc.)
  - More investigation is necessary to complete the APPLAUSE provenance model, some activities (such as scan process) has to be defined additionally
- prov Python package for W3C provenance model
- Python script prov_applause.py as prototype for the future ProvSAP interface implementation
  - SQL queries via UWS
  - APPLAUSE DR3 will be launched based on django-daiquiri and will have the TAP interface



Tables in APPLAUSE_DR2

The following pages describe the database tables, providing column names, data types, Unified Content Descriptors (UCD), units, and column descriptions.

- APPLAUSE_DR2.archive
- APPLAUSE_DR2.exposure
- APPLAUSE_DR2.exposure_sub
- APPLAUSE_DR2.healpix
- APPLAUSE_DR2.lightcurve
- APPLAUSE_DR2.logbook
- APPLAUSE_DR2.logpage
- APPLAUSE_DR2.phot_calib
- APPLAUSE_DR2.phot_color
- APPLAUSE_DR2.phot_cterm
- APPLAUSE_DR2.phot_rmse
- APPLAUSE_DR2.plate
- APPLAUSE_DR2.plate_logpage
- APPLAUSE_DR2.process
- APPLAUSE_DR2.scan
- APPLAUSE_DR2.solution
- APPLAUSE_DR2.source
- APPLAUSE_DR2.source_calib

Please see our Disclaimer for Licenses and Acknowledgement.

UCD (Unified Content Descriptor): see UCD1+ Controlled Vocabulary (Virtual Observatory Recommendation)

Units: physical units, see e.g. Units in the VO (Virtual Observatory Recommendation)

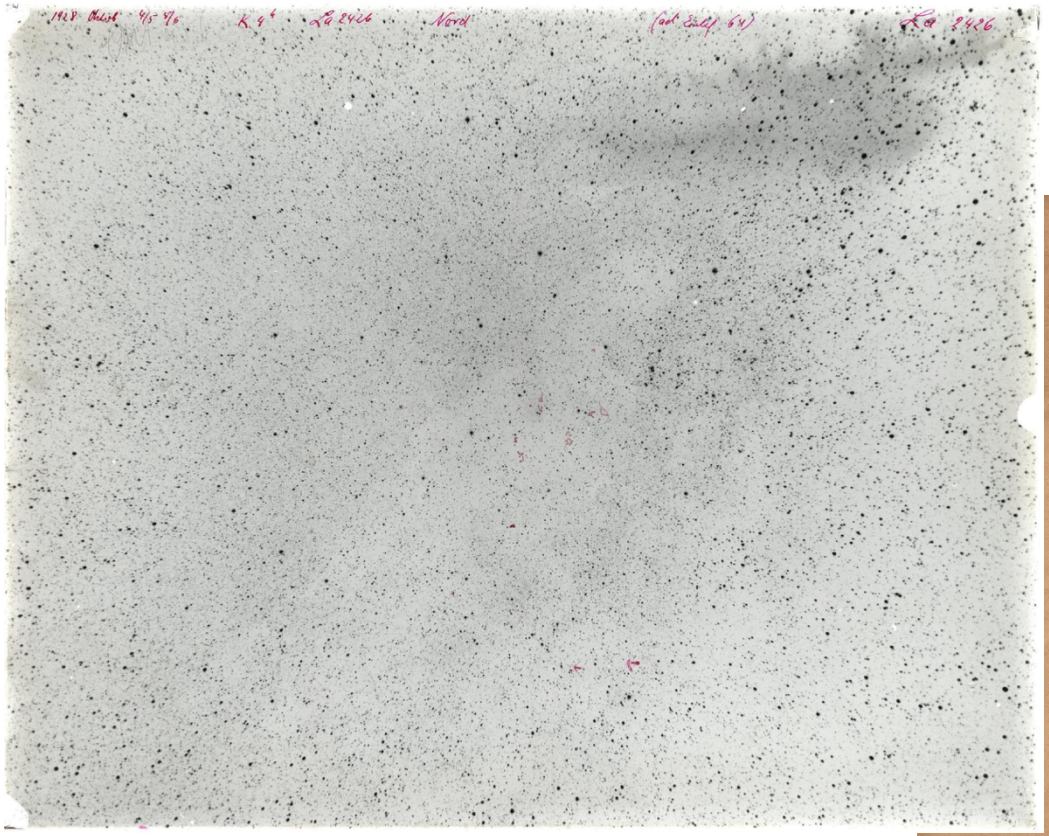
Search

Documentation

Overview of database structure
Sample use cases
Calibrated light curve and phase diagram
Plates by observer name
Air temperature vs time
Scripted Access
Data Release 2
Contents of APPLAUSE DR2
Tables in APPLAUSE_DR2
Data Release 1
Contents of APPLAUSE DR1
Tables in APPLAUSE_DR1

Archives

Archives of astronomical photographic plates
Hamburger Sternwarte
Telescopes and Plate Archives
Dr. Remeis Sternwarte Bamberg – The Sky patrols
Leibniz Institut für Astrophysik Potsdam
Potsdam Telescopes



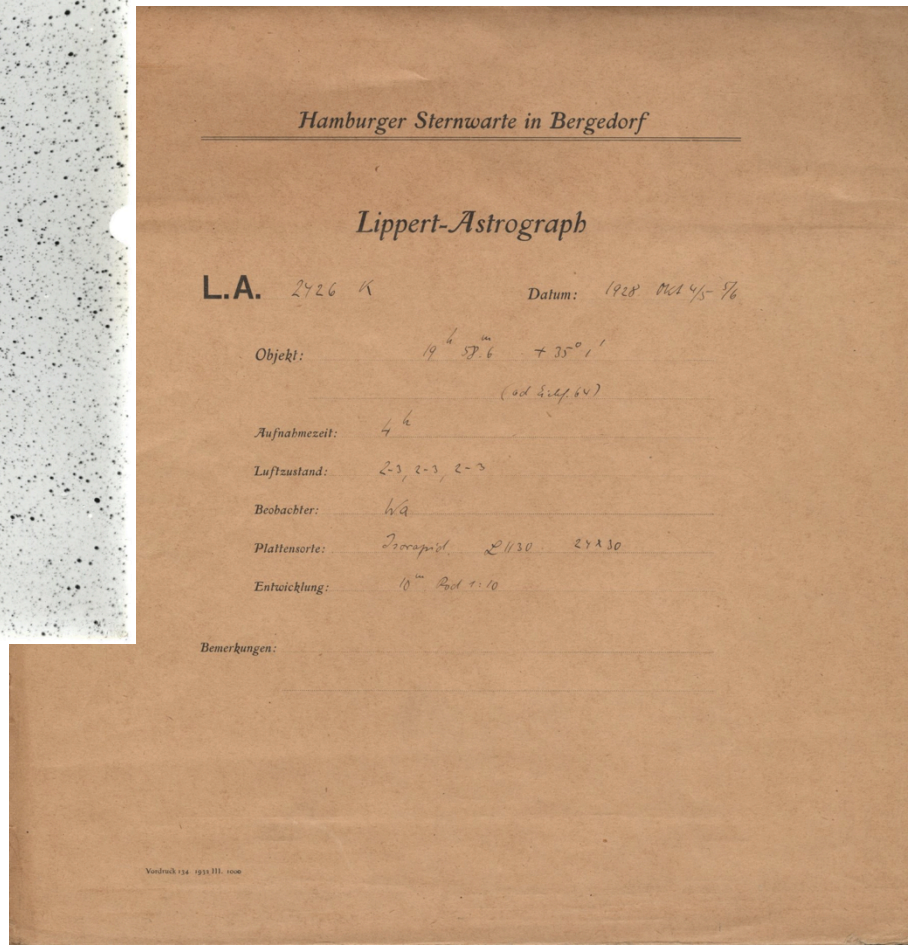
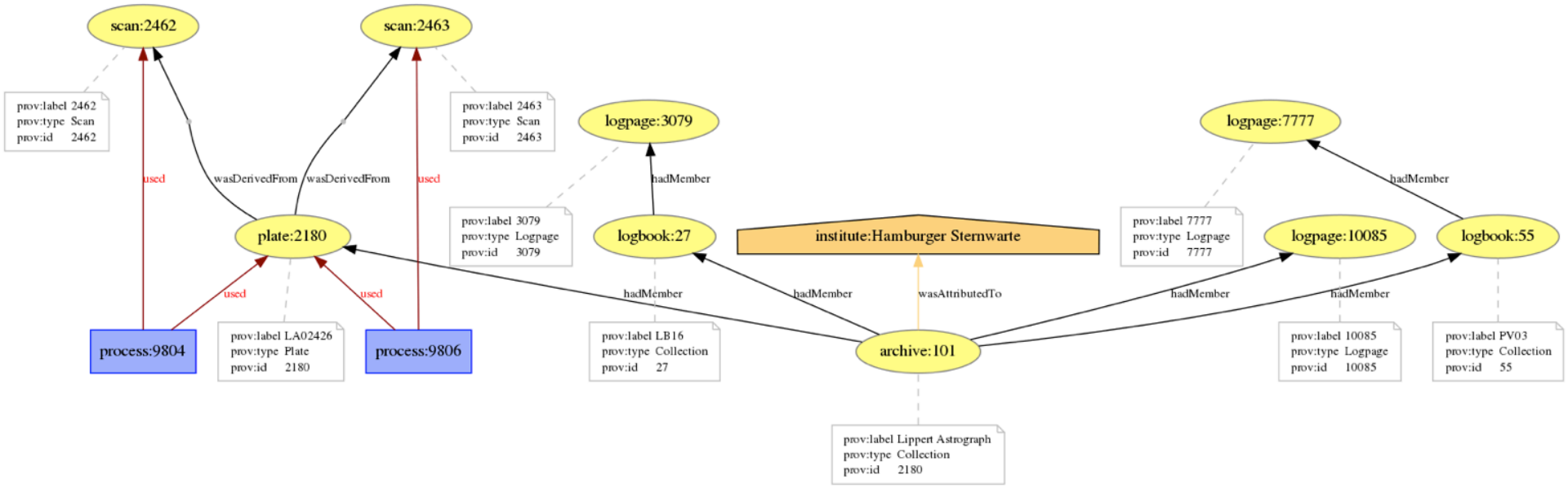
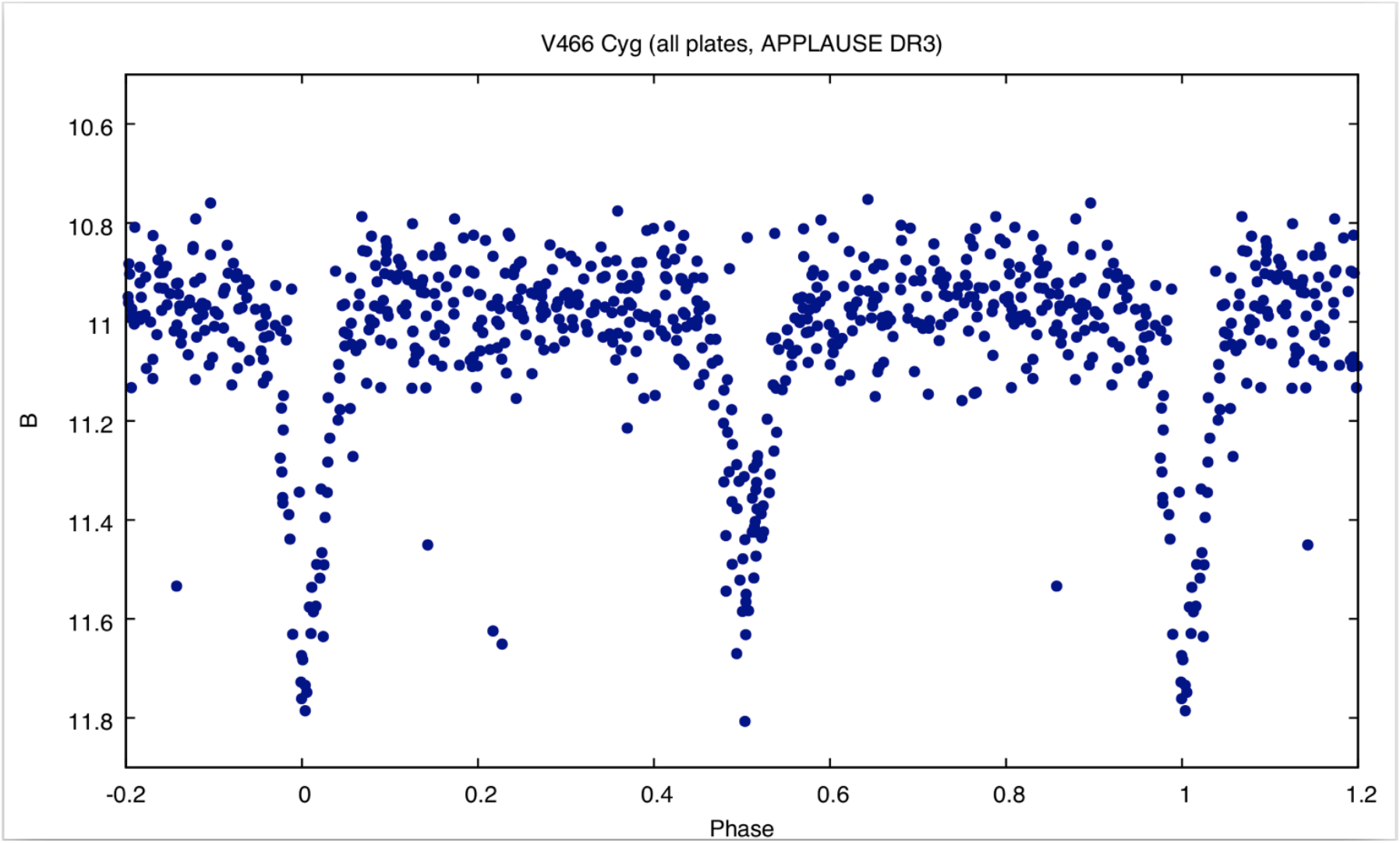


Plate LA02426 (plate_id 2180) with its cover

Provenance of the plate LA02426



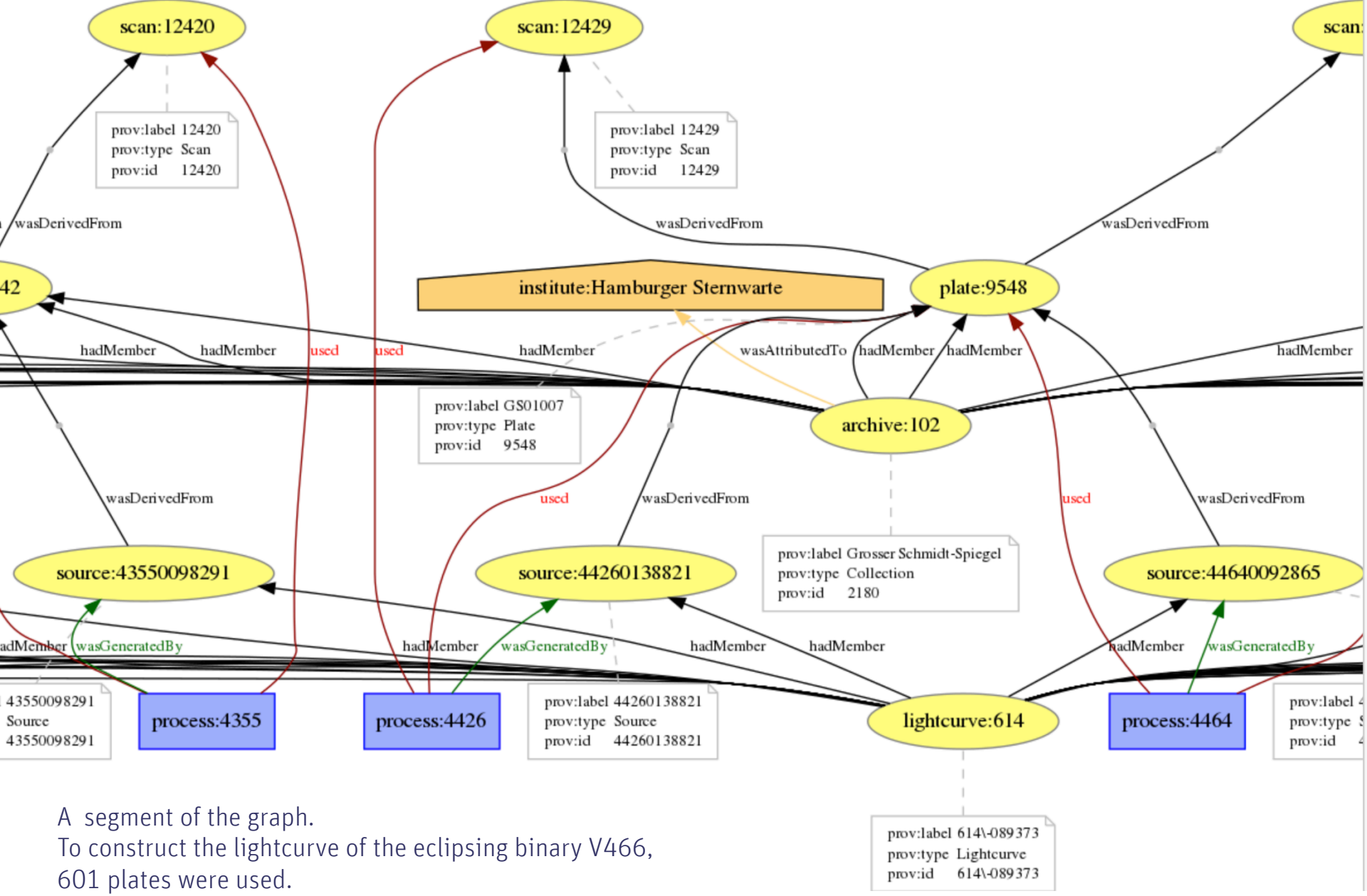
The corresponding logbook pages are included as well as the processes that “used” the plate and the scans to extract sources.



The lightcurve was folded with the known orbital period.
(T. Tuvikene, Tartu Observatory)

(Part of the) provenance of the lightcurve for V468Cyg (ucac4 _id 614-089373)

https://provenance.ecs.soton.ac.uk/store/documents/118270/



A segment of the graph.
To construct the lightcurve of the eclipsing binary V466, 601 plates were used.

Provenance for APPLAUSE DR3

Already clear how to retrieve:

- Plate – scans relations
- Used relation for processes
- Lightcurve
  - Source relations
  - Processes involved
  - Scans and plates
  - Institute and Archive

Planned:

- Files
- Previews
- Envelopes, logbooks
- Scanning process
- Processes in detail

Provenance – an interative process

What we learned:

- Close collaboration with scientists involved in the pipeline development of the project is crucial.
- Conceptualise the provenance information as early in the project as possible along with use-cases.
- W3C provenance model (since 2013)
  - is applicable to the APPLAUSE archives provenance,
  - covers the use-cases and
  - comes with tools, visualizations and a ProvStore