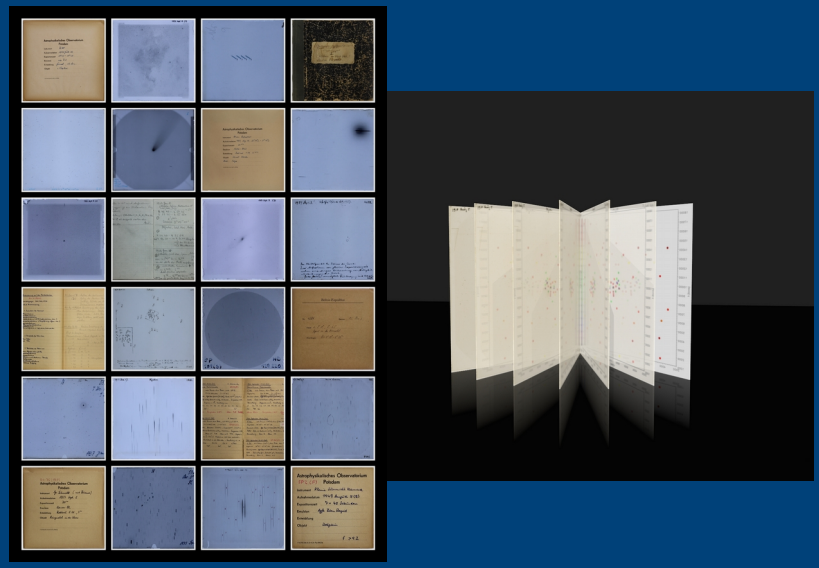
Leibniz-Institut für
Astrophysik Potsdam

Protypical implementation of the IVOA provenance model for the APPLAUSE archive



Anastasia Galkin
Ole Streicher
Harry Enke
Kristin Riebe

IVOA 2019, Paris

APPLAUSE

Archives of Photographic PLates for Astronomical USE

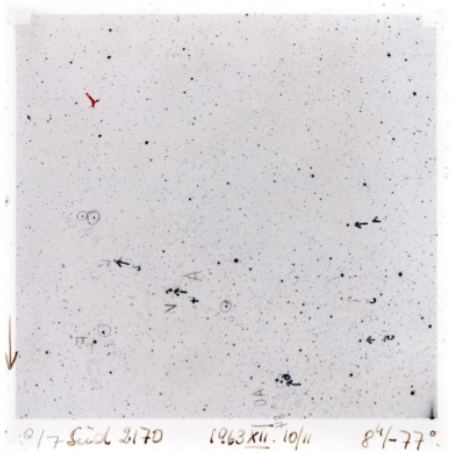
Home | Project | Documentation | Database tables | Query | Viewer | Contact | Wiki | Anastasia Galkin

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.

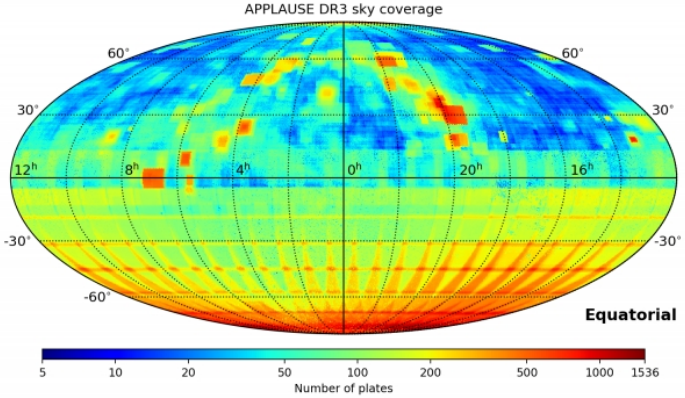
There are about 85000 plates in the archives of Hamburger Sternwarte, Dr. Karl Remeis-Sternwarte Bamberg, and Leibniz-Institut für Astrophysik Potsdam (AIP). The plates are digitized with high-resolution flatbed scanners. In addition, the corresponding plate envelopes and observation logbooks are digitized, 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.



Example of a photographic plate. More sample images can be found in the image gallery. Access to all image material is also provided by the viewer.

Data Release 3 is available

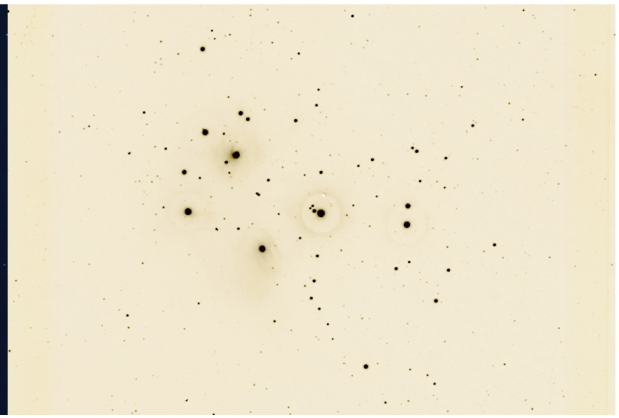


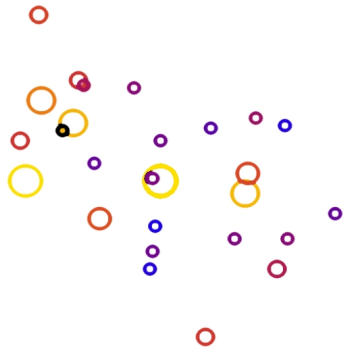
Attributions

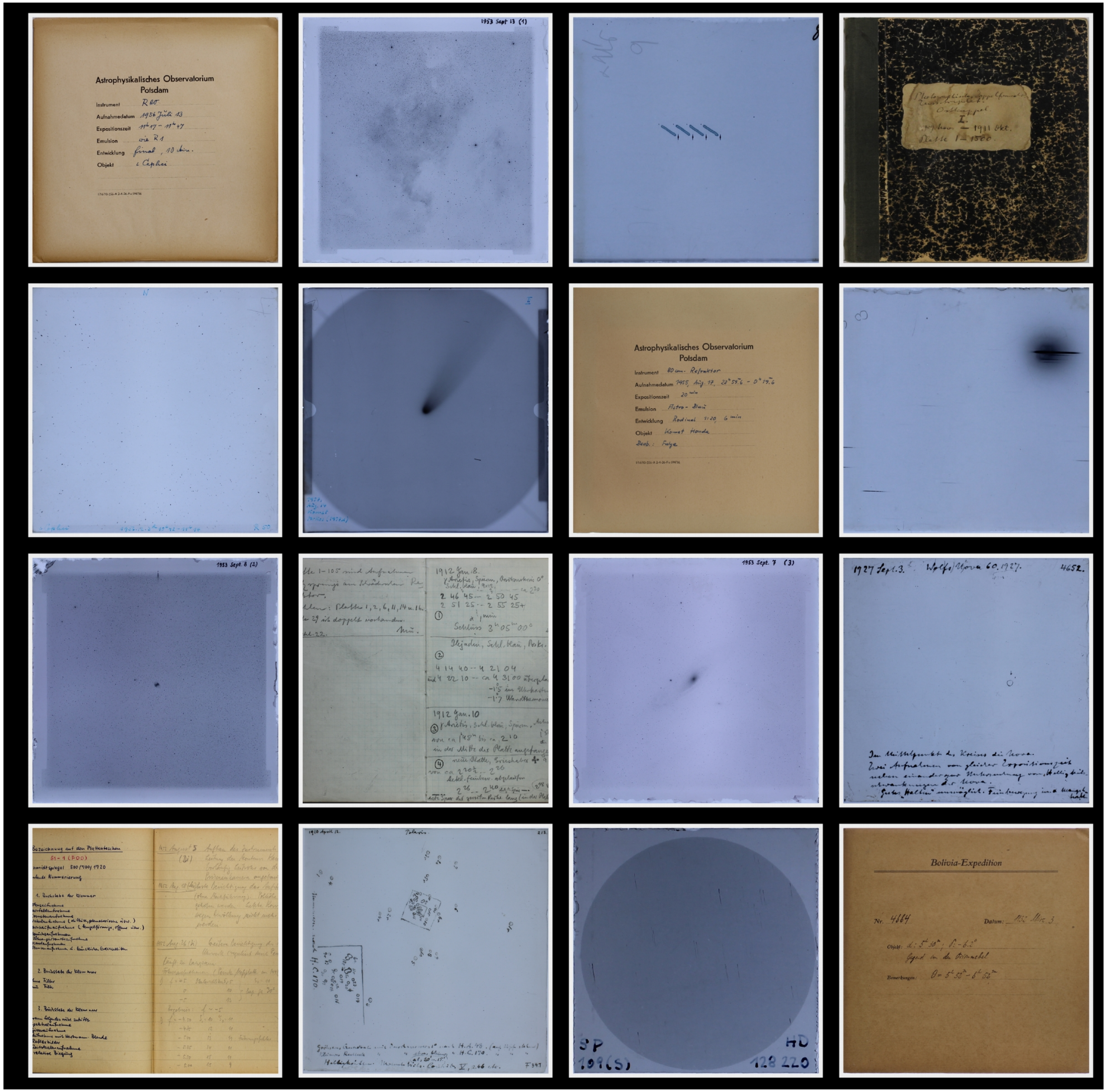
If you make use of the APPLAUSE data please cite the the appropriate acknowledgements for the various data releases:

- DR1: Acknowledgements
- DR2: Acknowledgements
- DR3: Acknowledgements

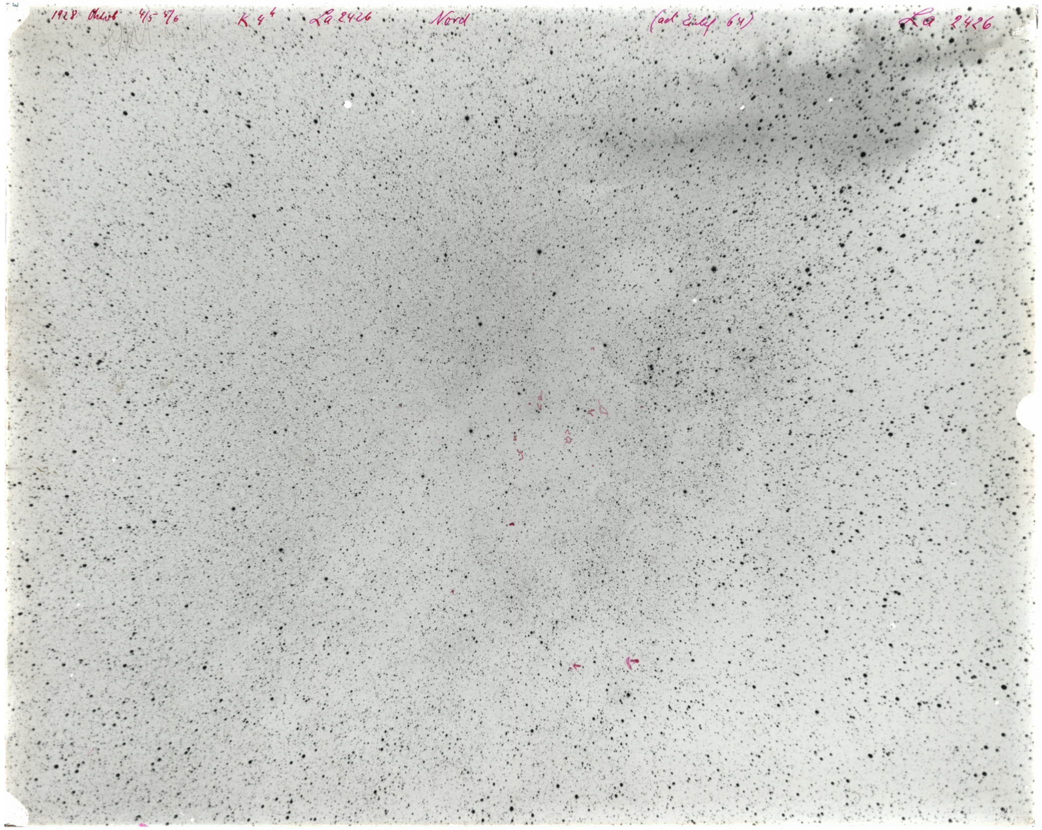
https://www.plate-archive.org







Astrophysikalisches Observatorium Potsdam
Instrument
Aufnahmedatum
Expositionszeit
Emulsion
Entwicklung
Objekt
1953 Sept 13 (1)
Astrophysikalisches Observatorium Potsdam
Instrument
Aufnahmedatum
Expositionszeit
Emulsion
Entwicklung
Objekt
1953 Sept 8 (2)
1953 Sept. 7 (3)
Bolivia-Expedition
Nr.
Datum:
Objekt:
Bemerkungen:



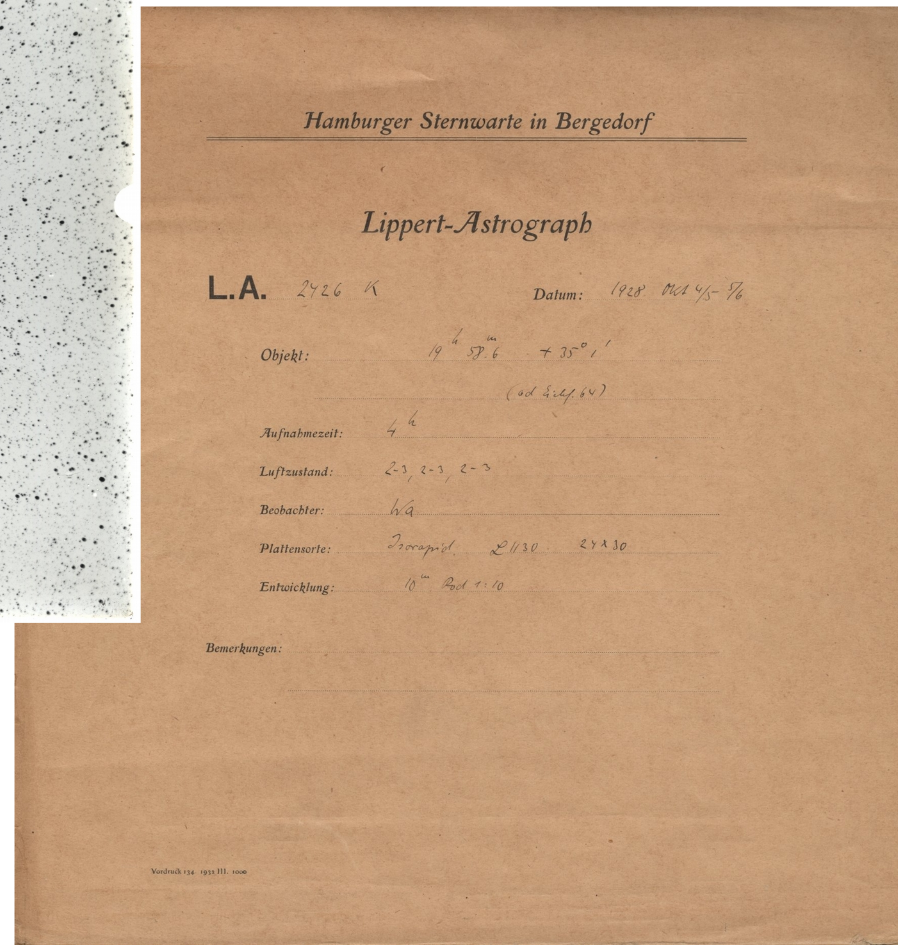
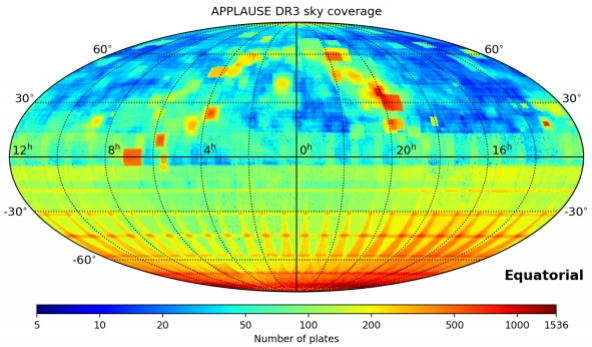
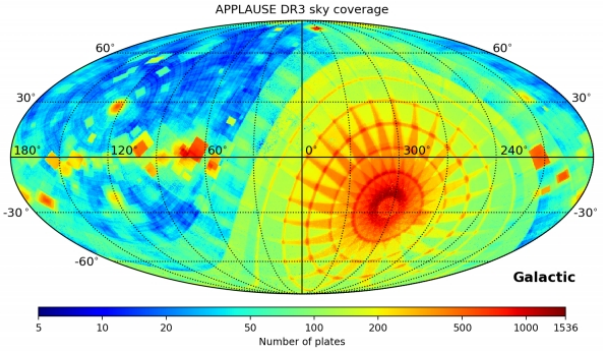


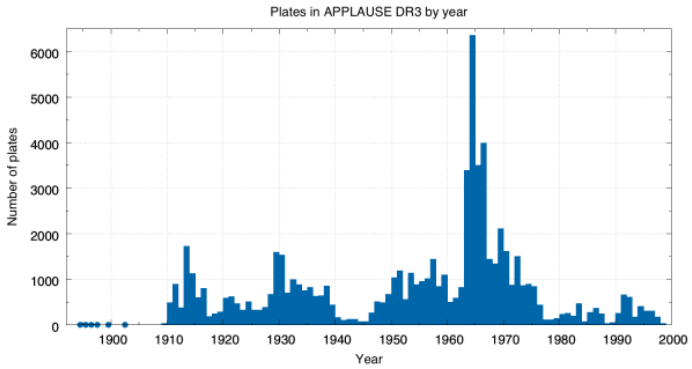
Plate LA02426 (plate_id 2180) with the its cover

APPLAUSE DR 3 released in October 2018

- images and metadata from 24 plate archives/collections in Hamburg, Bamberg, Potsdam, Tautenburg and Tartu;
- 101138 scans of 70276 photographic plates;
- metadata for 72314 plates with a total of 110877 exposures;
- 96852 images of logbook pages and plate covers;
- 215 logbooks;
- astrometric solutions for 64426 plates;
- photometric calibration for 62933 plates;
- 3.508 billion extracted sources, of which 2.065 billion with matched UCAC4 designations.







Proudly powered by Daiquiri - https://github.com/django-daiquiri/

APPLAUSE DR3 provenance – recorded from the start

Example: how to find out what sources, plates and corresponding scans (with their previews) were involved in the construction of the lightcurve with the UCAC4 id 614-089373:

```
-- postgres
SELECT lc.source_id, lc.scan_id, lc.plate_id, preview.filename
FROM APPLAUSE_DR2.lightcurve AS lc
INNER JOIN APPLAUSE_DR3.plate AS pl ON lc.plate_id = pl.plate_id
INNER JOIN APPLAUSE_DR3.preview AS preview ON preview.plate_id =
pl.plate_id
WHERE lc.ucac4_id = '614-089373'
```

APPLAUSE DR3 prov

Implemented:

- Archives of photographic plates (applause_dr3.archive)
- Photographic plates as physical objects (applause_dr3.plate)
- Exposure data (applause_dr3.exposure)
- Sub-exposures – interupted exposures (applause_dr3.exposure_sub)
- Previews of photographic plates (applause_dr3.preview)
- Scans of photographic plates (applause_dr3.scan)
- Logbooks (applause_dr3.logbook)
- Logbook pages and plate envelopes (applause_dr3.logpage)
- Relation between plates and logpages (applause_dr3.plate_logpage)
- Plate image processes (applause_dr3.process)

For provenance schema we have:

- 425421 activities
- 327 agents
- 528082 entities
- 799097 used relations
- 471888 wasGeneratedBy relations
- 138552 wasAttributedTo relations

APPLAUSE DR3 tables

Used for the prov:

- Archives of photographic plates (applause_dr3.archive)
- Photographic plates as physical objects (applause_dr3.plate)
- Exposure data (applause_dr3.exposure)
- Sub-exposures – interupted exposures (applause_dr3.exposure_sub)
- Previews of photographic plates (applause_dr3.preview)
- Scans of photographic plates (applause_dr3.scan)
- Logbooks (applause_dr3.logbook)
- Logbook pages and plate envelopes (applause_dr3.logpage)
- Relation between plates and logpages (applause_dr3.plate_logpage)
- Plate image processes (applause_dr3.process)

To be added to prov:

- Extracted sources (applause_dr3.source)
- Extracted sources with calibrated positions and magnitudes (applause_dr3.source_calib)
- Light curves (applause_dr3.lightcurve)
- Astrometric solutions of plate scans (applause_dr3.solution)
- Photometric calibration on whole scans (applause_dr3.phot_calib)
- Photometric calibration: color term estimation (applause_dr3.phot_cterm)
- Photometric calibration in sub-fields (applause_dr3.phot_subfield)
- Astrometric calibration in sub-fields (applause_dr3.astrom_subfield)

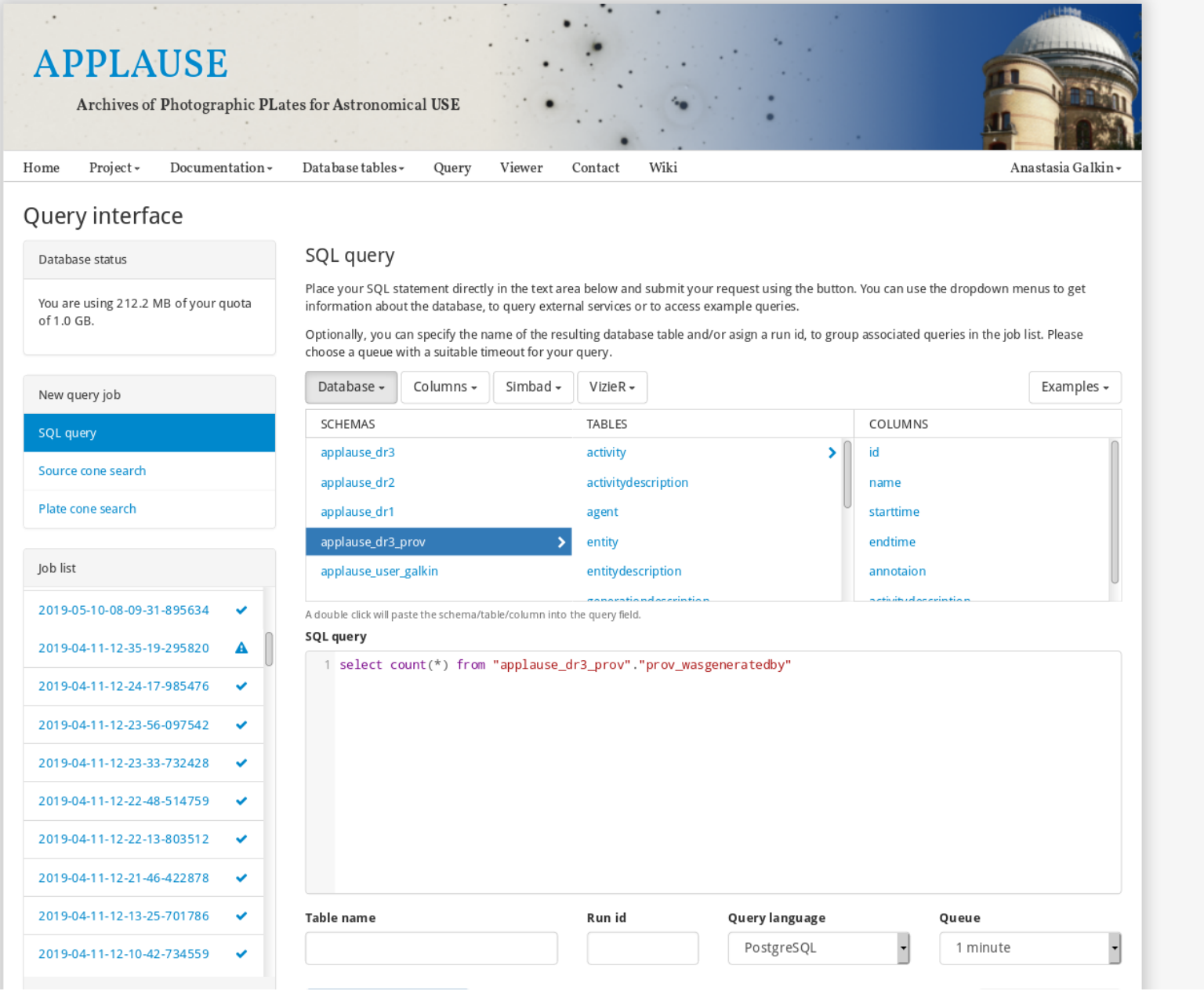
Provenance – an interative process

What we have learned:

- Implementation of provenance model for a productive database (PostgresQL) in form of views is performant enough (for now).
- The process is well documented as the SQL create statements are stored for future use.
- Close collaboration with scientists involved in the pipeline of the project is crucial.
- Conceive the provenance information as early in the project as possible along with use-cases.
- The core classes of the IVOA data model are suffient to model the provenance information for the APPLAUSE archive DR‘s.
- Level of granularity has to be decided by the project itself to address the user needs and might change in the process.
- The implementation is W3C compliant (-ish).

Open questions:

- How to deal with incomplete provenance information and uncertainties?
- How to deal with multiple activities (exposures, sub-exposures) that generate one physical entity (plate) and deliver this information in meaningful way to the user? Same example would be a construction of the instrument where some activities are during a week time but not documented further.
- Scalability – over 2 billion of sources (entities) have to be tested yet.


APPLAUSE
Archives of Photographic PLates for Astronomical USE
Home
Project
Documentation
Database tables
Query
Viewer
Contact
Wiki
Anastasia Galkin
Query interface
Database status
You are using 212.2 MB of your quota of 1.0 GB.
New query job
SQL query
Source cone search
Plate cone search
Job list
2019-05-10-08-09-31-895634
2019-04-11-12-35-19-295820
2019-04-11-12-24-17-985476
2019-04-11-12-23-56-097542
2019-04-11-12-23-33-732428
2019-04-11-12-22-48-514759
2019-04-11-12-22-13-803512
2019-04-11-12-21-46-422878
2019-04-11-12-13-25-701786
2019-04-11-12-10-42-734559
SQL query
Place your SQL statement directly in the text area below and submit your request using the button. You can use the dropdown menus to get information about the database, to query external services or to access example queries.
Optionally, you can specify the name of the resulting database table and/or asign a run id, to group associated queries in the job list. Please choose a queue with a suitable timeout for your query.
Database
Columns
Simbad
VizieR
Examples
SCHEMAS
TABLES
COLUMNS
applause_dr3
applause_dr2
applause_dr1
applause_dr3_prov
applause_user_galkin
activity
activitydescription
agent
entity
entitydescription
id
name
starttime
endtime
annotaion
A double click will paste the schema/table/column into the query field.
SQL query
1 select count(*) from "applause_dr3_prov"."prov_wasgeneratedby"
Table name
Run id
Query language
PostgreSQL
Queue
1 minute

Leibniz-Institut für
Astrophysik Potsdam

Questions?

Anastasia Galkin
agalkin@aip.de

github.com/aipescience
gihub.com/django-daiquiri
escience.aip.de