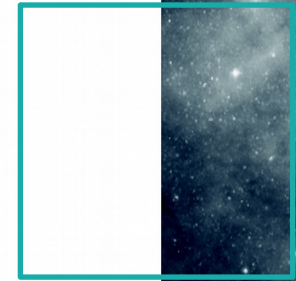


# Epoch description in VizieR catalogues



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IVOA Interoperability meeting  
Victoria, May 30

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# □ Time domain in VizieR

- See my presentations in Shanghai, Santiago
- 17,000 catalogues
  - More than 10 % with timeSerie flag
  - Gaia DR2 publication !



## Find catalogs among 15978 available

Expand search

? **Catalog**, author's name,  
word(s) from title, description, etc.  
e.g.: AGN, Veron, I/239, or bibcodes...

▶ **Search for catalogs by column descriptions (UCD)** ?

▼ **Hide catalogs containing additional data**

time serie  spectrum  images  cube  SED (Spectral Energy Distribution)  none

### Wavelength Mission Astronomy

Radio	AKARI	Abundances
IR	ANS	Ages
optical	ASCA	AGN
UV	BeppoSAX	Associations
EUV	CGRO	Atomic_Data
X-ray	Chandra	Binaries:cataclysmic
Gamma-ray	COBE	Binaries:eclipsing

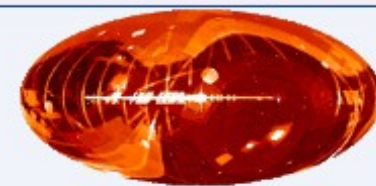
## Search by Position across 17071 tables

Target Name (resolved by [Sesame](#)) or Position:

Target dimension:

J2000

Radius  Box size



[More about VizieR](#)

~ 1754 matching catalogs

# □ Usage of time (epoch) in VizieR

- Add new search dimension in VizieR (mainly spatial queries at present, but also wavelength range) : time axis
  - Discover which data collections correspond to some time range (ObsCore description)
  - T-MOC : precise catalogue epoch footprints (see P. Fernique's talk)
    - intersection of temporal coverages
- Extract simple time series
  - From a single catalogue : convert to homogeneous format
  - Across multiple catalogues for one Target

# Various steps

## 1) Identify needed metadata elements

- ObsCore+ metadata for discovery
- New METAtime\_XXX tables for exploitation

## 2) Populate metadata values to describe catalogues

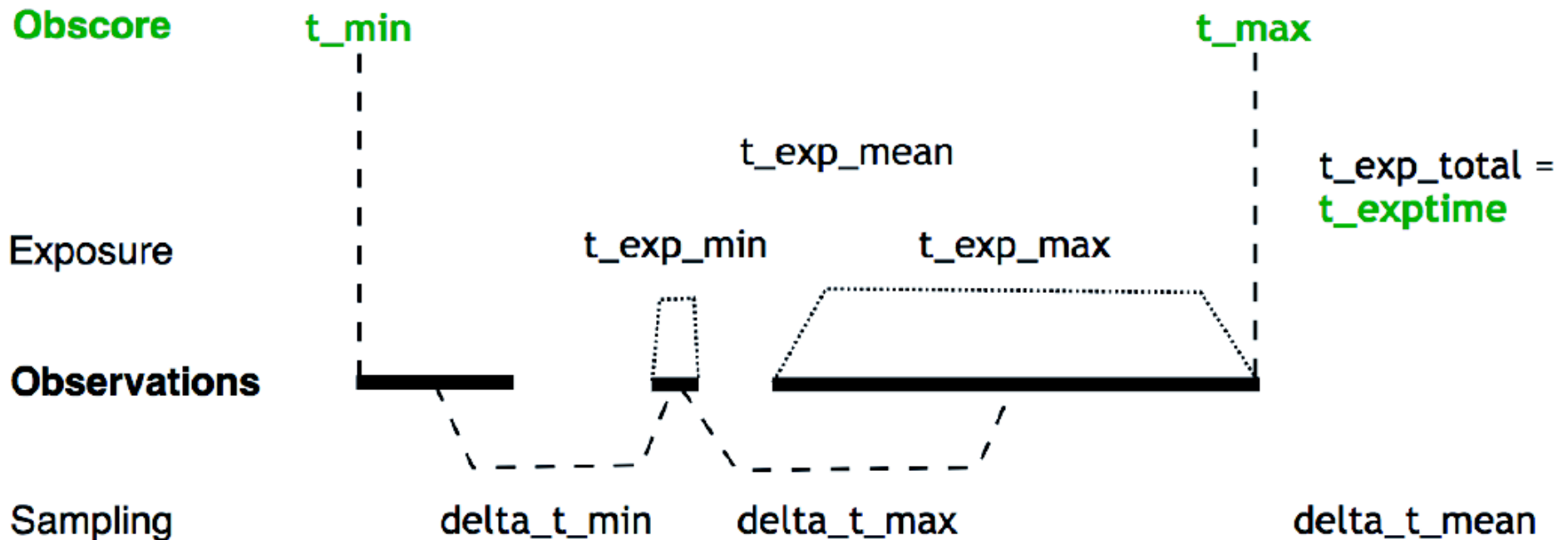
- Time Index : ObsCore+, T-MOC ?
- INSERT INTO METAtime\_XXX VALUES ...

## 3) Serialize time series in XML

- VOtable for Vizier widget
- Simple mapping with GROUPs / utypes (F. Bonnarel)
- VO-DML Lite description (Laurent Michel)

# 1a) Metadata for data discovery

- Several possible solutions :
  - T-MOC
  - Based on ObsCore data model



- Mandatory parameters used in VizierR associated data
  - e.g. Corot catalogue

# 1b) Metadata for time series

- New METAtime\_XXX tables in VizieR (beta version)
- Describe which columns of which catalogues contain time (ref. to scale, frame) + dependent axis

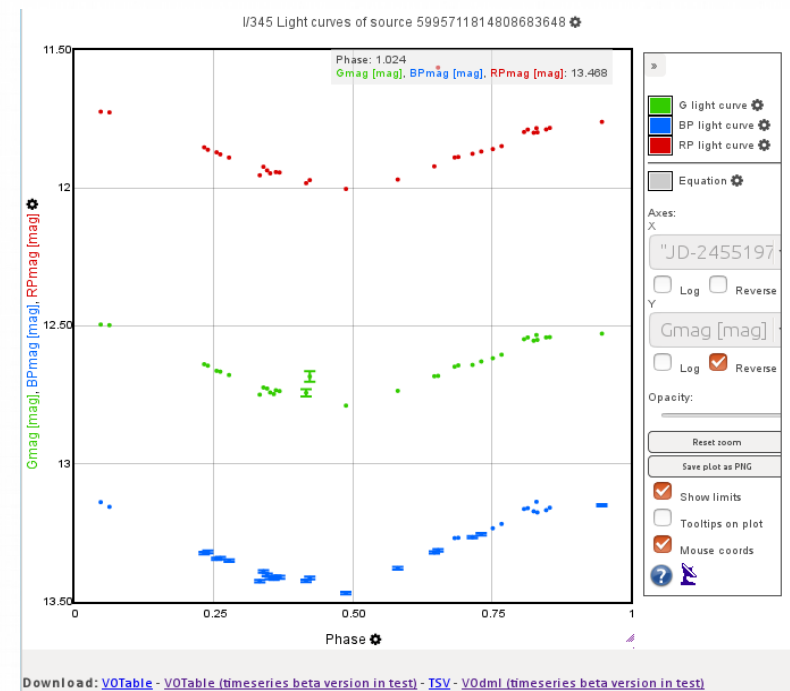
<a href="#">METAtimeSystem</a>	General Time System table; PK=time <sub>syst</sub> id
<a href="#">METAtimeScaleRef</a>	Time scale reference table; PK=time <sub>scale</sub> id
<a href="#">METAtimeFrameRef</a>	Time Frame position reference table; PK=time <sub>frame</sub> id
<a href="#">METAtimeRepstRef</a>	Time Representation reference table; PK=time <sub>rep</sub> id
<a href="#">METAtimeCol</a>	Time table applied to columns
<a href="#">METAtimeRel</a>	Related time columns
<a href="#">METAtimeSyst</a>	Time System view
<a href="#">METAtime</a>	Time catalogue view

## 2) Populating metadata

- Example on Gaia DR2 :
  - « Gaia » Time system linked to
    - Time scale : TCB
    - Time frame : BARYCENTER
  - Multiple epoch values in same table for different filters (time&duration of transit different for G, BP, RP)
    - Different epochs linked to different columns
    - Different uncertainties
- VizieR documentalists will try to assign relevant metadata (time... consuming !)
  - Well documented for large projects
  - Most likely tricky for small tables : use default values with large systematic uncertainty if unknown ?

# 3) Light curves

- Gaia DR2 Cepheid light curves
- Beta access to XML serializations
  - VOTimeSerie with utypes, GROUPs (instead of TABLEs) (F. Bonnarel)
  - VO-DML Lite (L. Michel)
  - Dedicated VOTable
- Live demo !





# Future steps

- Define strategy for global Time index  
→ T-MOC ?
- Repeat step 2 for many more catalogues
  - Characterize epoch columns + dependent values
  - Define new time systems as needed  
→ VizieR documentalists need training for these new concepts !
- Improve XML serializations, following IVOA recommendations