Aladin
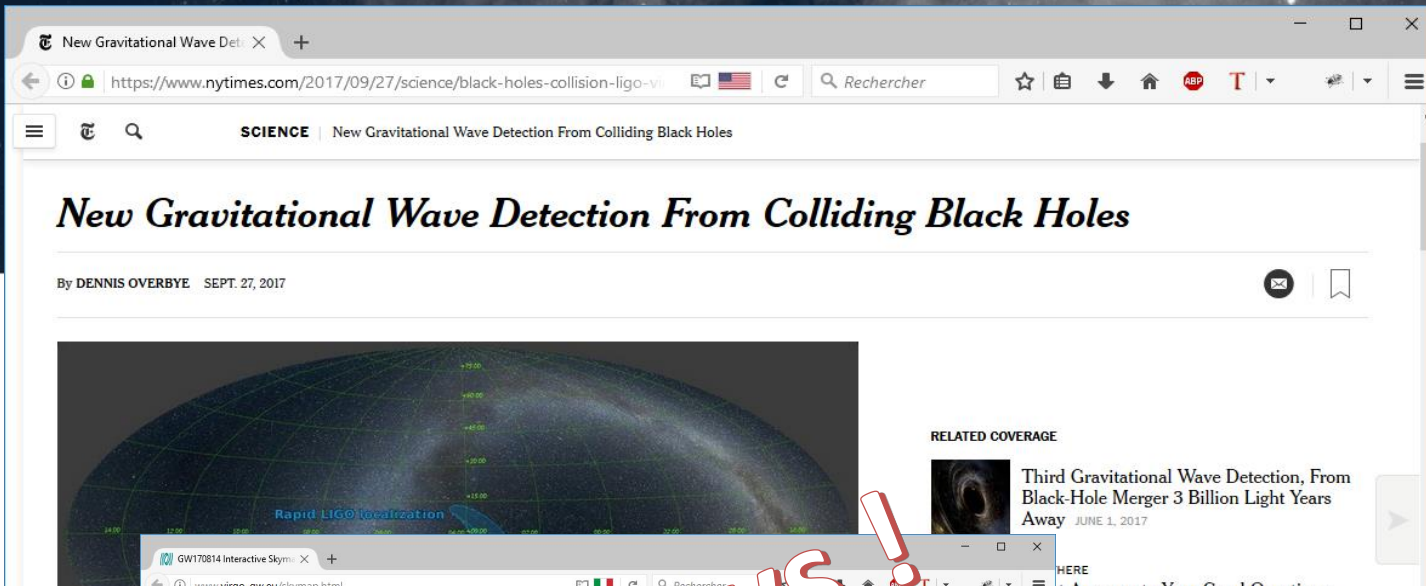
Milestones, Statistics & Challenges

CDS council – 10 & 11 October 2017

Pierre Fernique
on behalf of Thomas Boch, Caroline Bot,
François Bonnarel, Mihaëla Buga, Chaitra,
François-Xavier Pineau, Ibrahim Yapici
& Jean-Yves Hangouët, Thomas Keller

CENTRE DE DONNÉES
ASTRONOMIQUES DE STRASBOURG

- Aladin Desktop
- Aladin Lite
- HiPS
- MOC

... in the New York Times, APoD, ...

Lastest news !
28 September 2017

Aladin 2017 milestones

- ## Aladin V10 release
  - ### Ready for ADASS (October 2017)
  - ### V10 is a major release (in preparation since 2 years):
    - All VO data available => data discovery tree based on MOCServer;
    - Integration++: query by criteria (TAP), by regions (MOC), by X-match (CDS-Xmatch);
    - "modern" Look&Feel
    - Aladin applet => Goodbye, Farewell !
- ## HiPS IVOA standards 1.0 (June 2017)
  - ### HiPS => Not only at CDS anymore:
    - HEASARC skyview HiPS extension (July);
    - Python astronomy package for HiPS (Google Summer of Code 2017)

Aladin 2017 milestones – cont.

- Hipsgen (= generator of HiPS)
  - Code improvements: able to generate huge HiPS (ex: PanSTARRs 200mas/pixel, 30TB HiPS)
  - Used by all HiPS partners (ESA, JAXA, CADC, IRAP, HEASARC, ESO, …)
- Aladin Lite
  - ipyaladin => allows AL integration in Python "notebook"
  - HTTPS support
- Aladin Desktop for the next generation of preparation tools
  - NASA APT: HST -> JWST
  - ESO GuideCamTool (next version in preparation)

Aladin 2017 R&D

- Planetology (in the framework of Europlanet project)
  - Aladin Desktop adaptation (in progress),
  - 10 test HiPS (Mars, Venus, Earth)

- Generic SIAv2
  based on MocServer
  - Just beginning
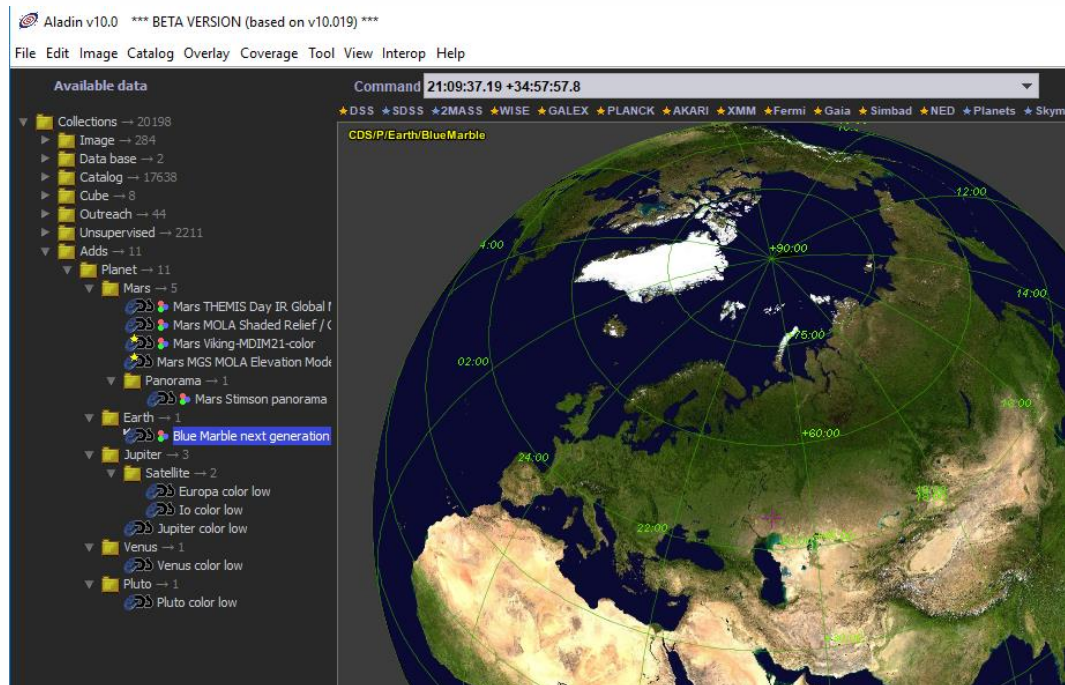
Aladin 2017 global indicators

- **Audience**: +30% 80 000 hosts/month (2016: +13% 62000)

- **Usage**: +8% : 300 000 actions/day (2016: +11% 275 000)

- **Implementation** (Aladin Lite): +50% 78 web sites (2016: 52)

- **Content**: +37% HiPS 380 / 134TB (2016: 344 HiPS / 100TB)
  CDS 180/110TB+CADC 59/15To, ESAC 33/2TB, CADE 68/20GB, JAXA 6, SSC 6, …

- **Citations** (AD+AL+HiPS reference papers): +24% 57 citations/year, total of 352
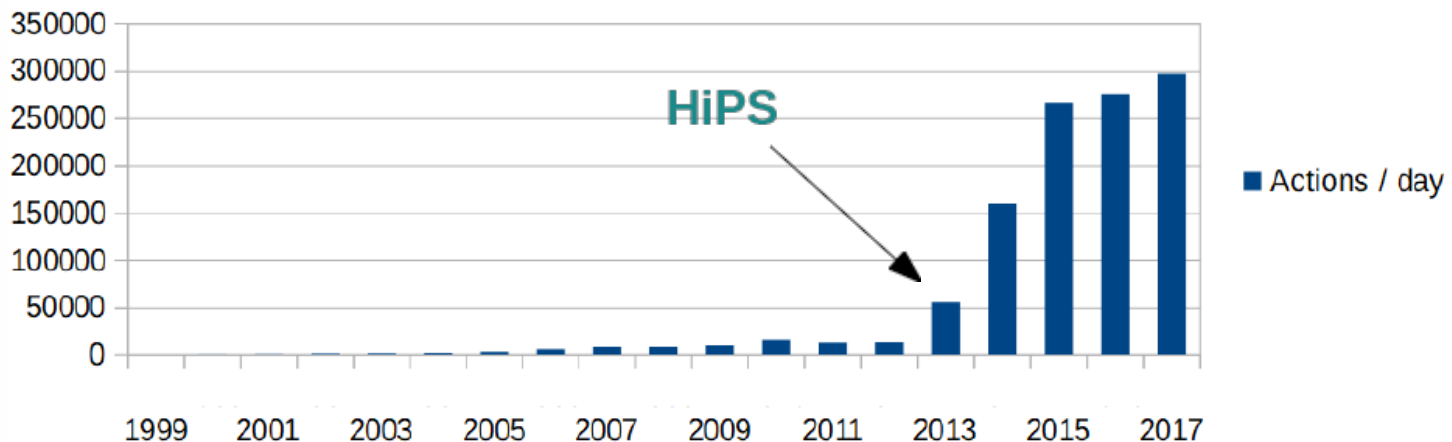
=> 2017: « Un bon cru ! »

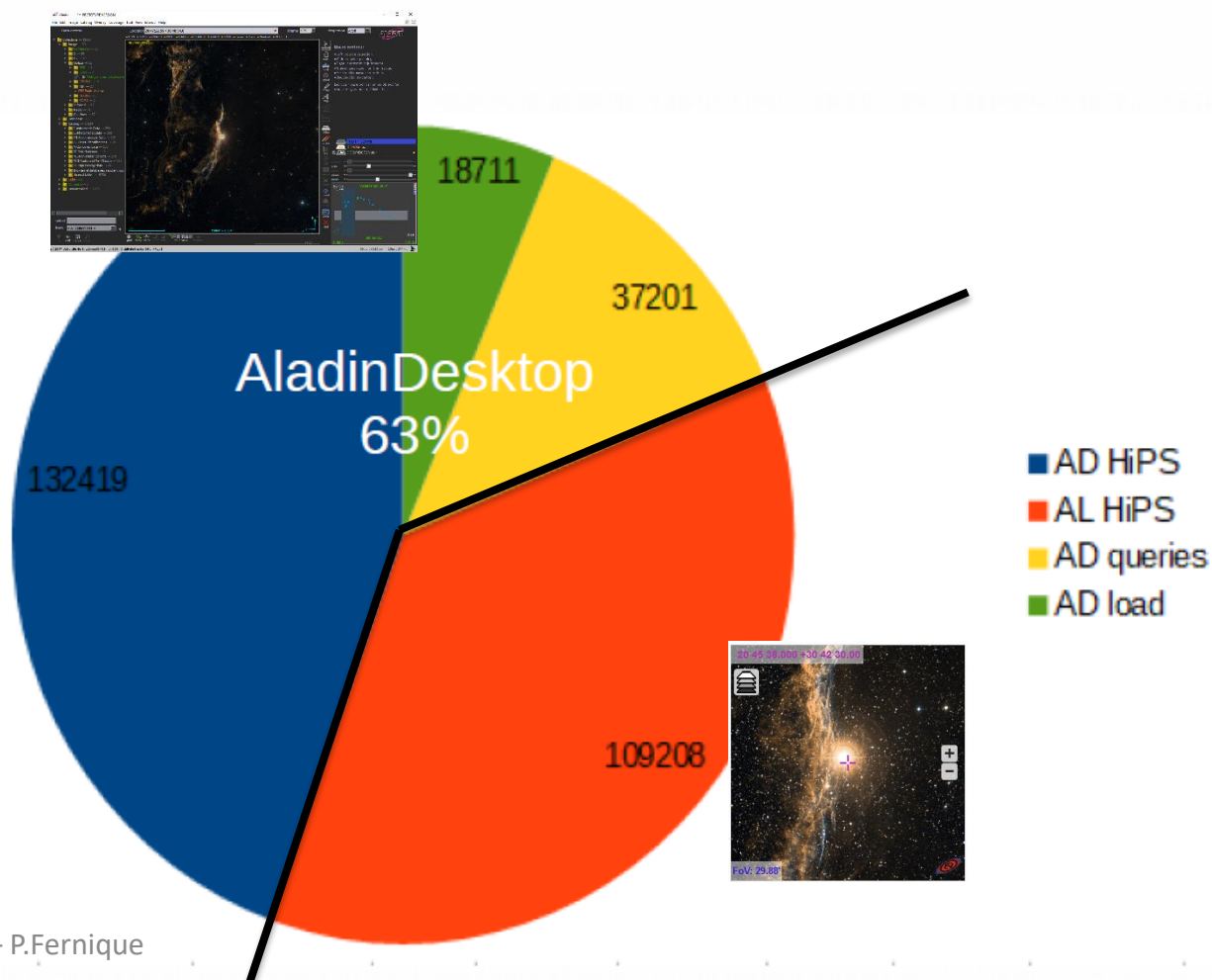# Audience & Usage evolution

Hosts evolution (monthly mean)
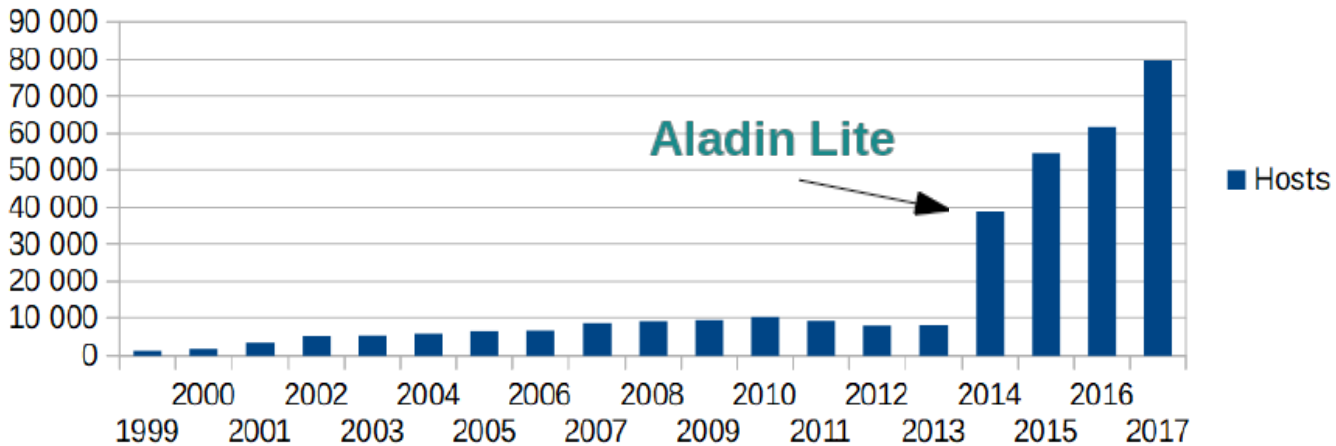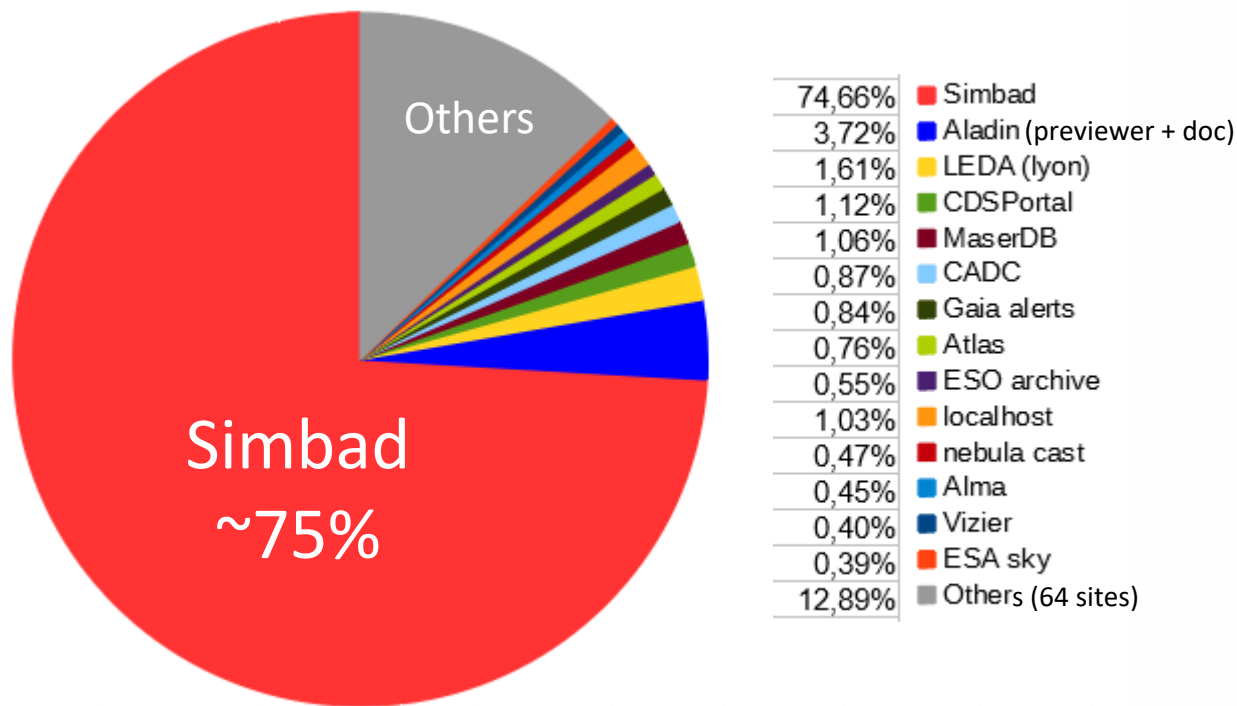

Usage evolution (dayly mean)

Usage distribution

(Daily actions,
rough estimation
for Aladin Lite)

AladinDesktop
63%

18711
37201
132419
109208

- AD HiPS
- AL HiPS
- AD queries
- AD load

Aladin Lite origin distribution

(percentage of startups)

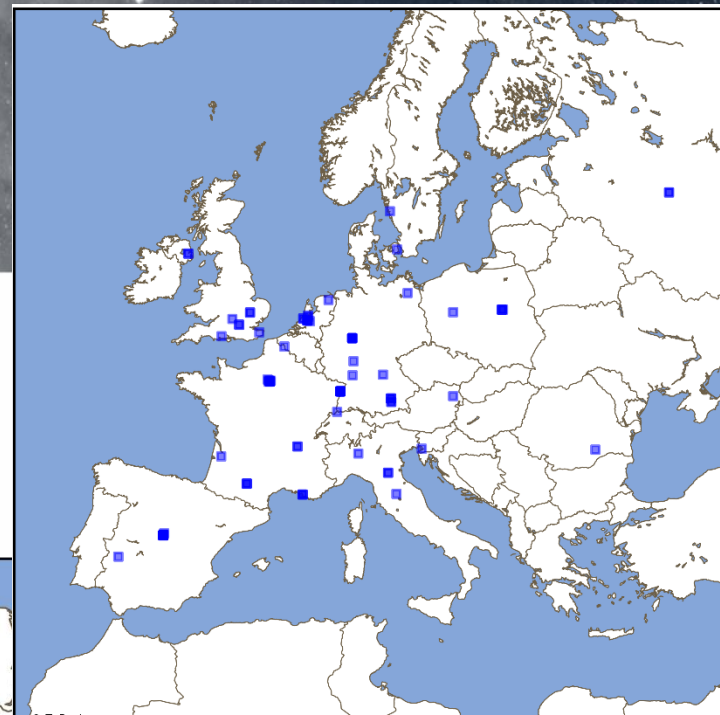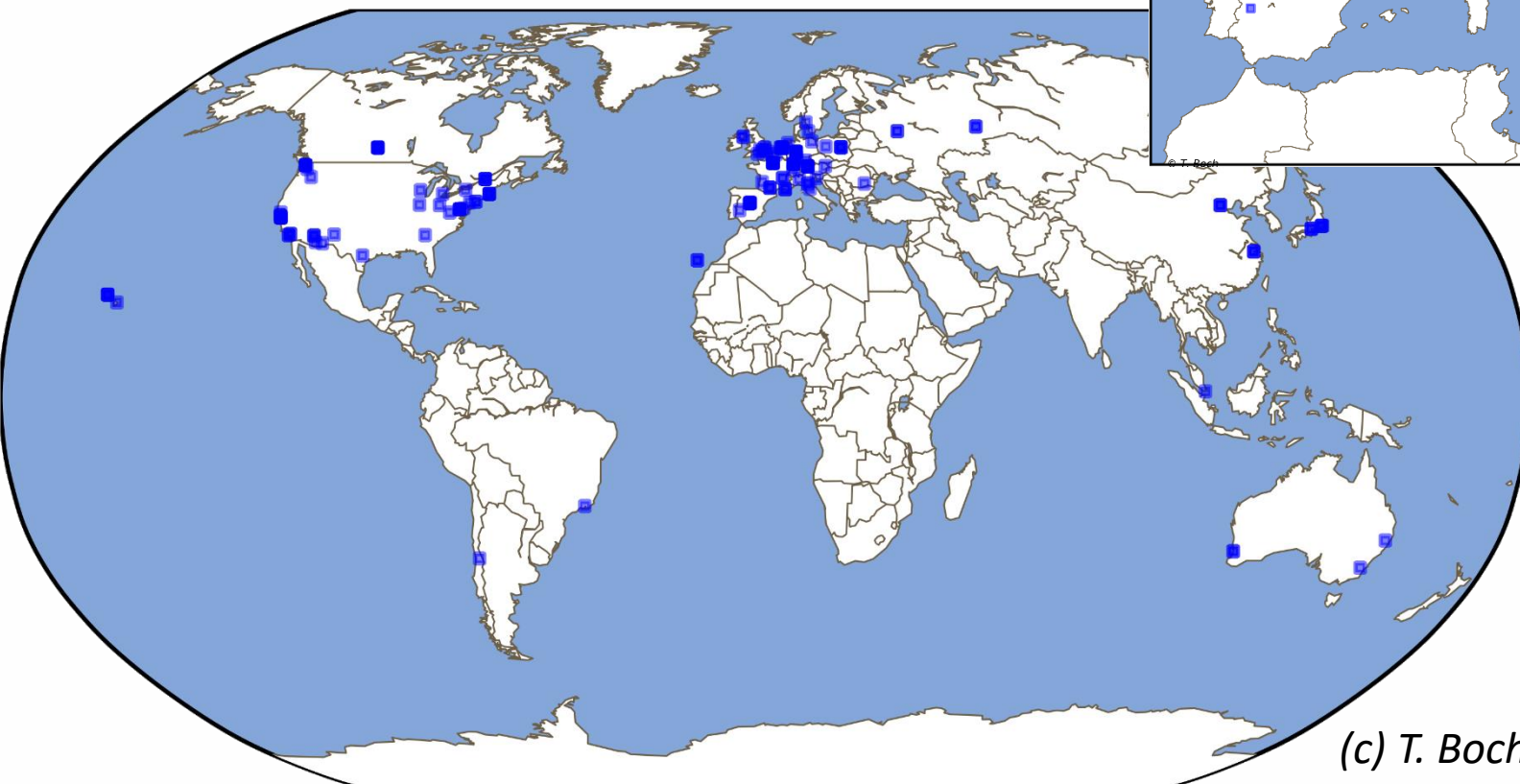|	
74,66%	■ Simbad
3,72%	■ Aladin (previewer + doc)
1,61%	■ LEDA (lyon)
1,12%	■ CDSPortal
1,06%	■ MaserDB
0,87%	■ CADC
0,84%	■ Gaia alerts
0,76%	■ Atlas
0,55%	■ ESO archive
1,03%	■ localhost
0,47%	■ nebula cast
0,45%	■ Alma
0,40%	■ Vizier
0,39%	■ ESA sky
12,89%	■ Others (64 sites)

Others

Simbad
~75%

=> *Similar to 2016 repartition*

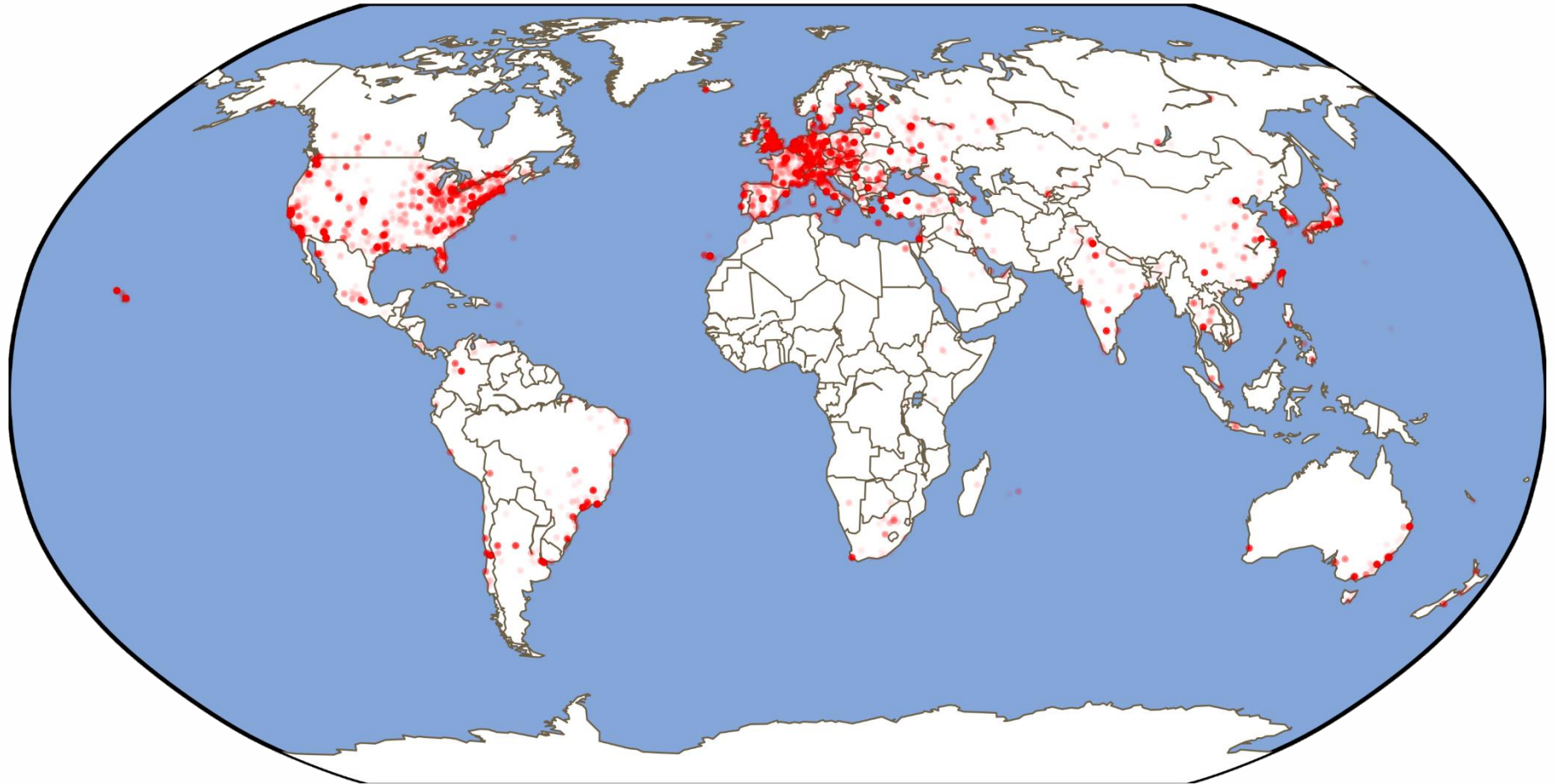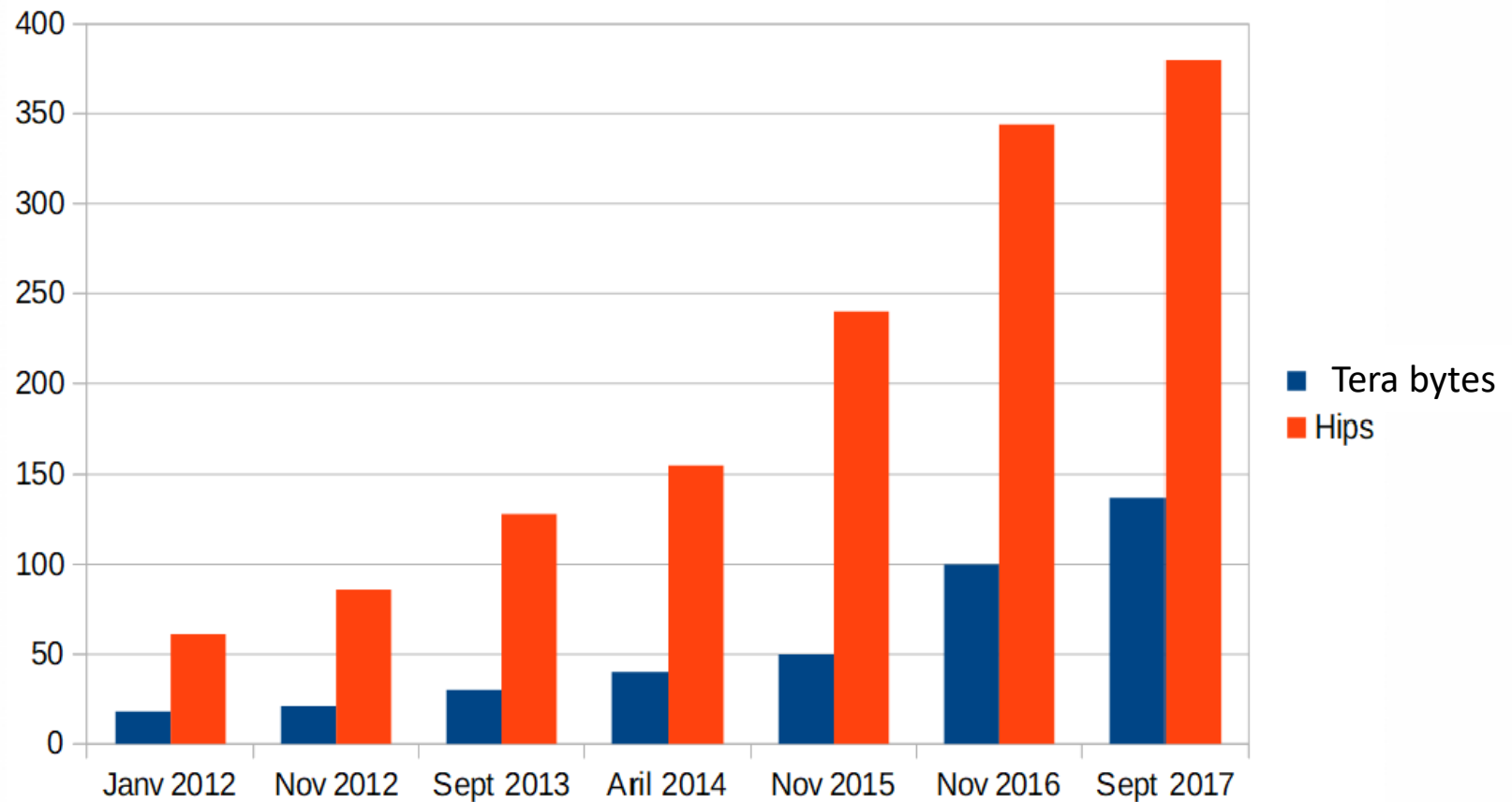# Aladin Lite Web site implementation
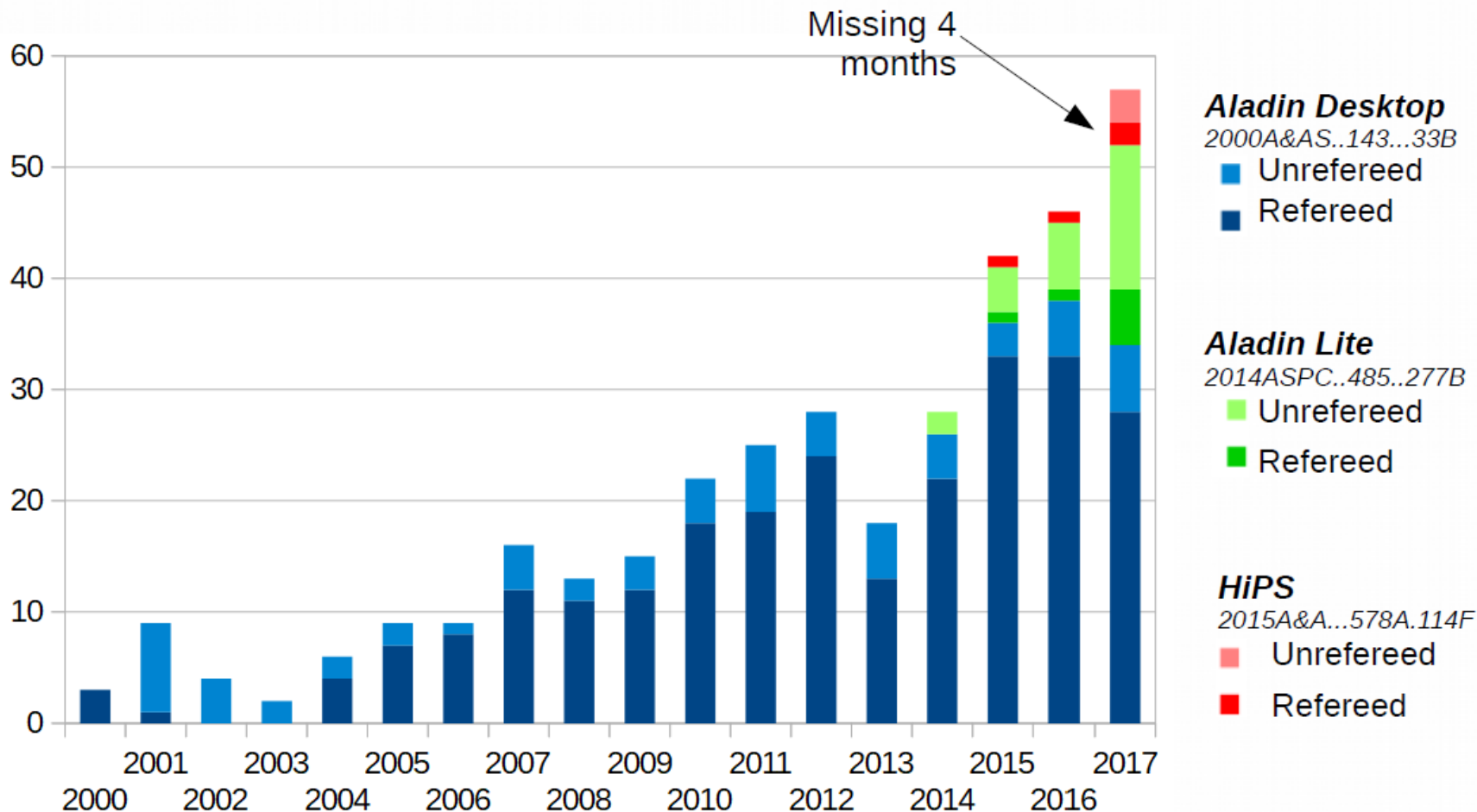
(>100 startups)

(c) T. Boch

Aladin Lite user localisation

(c) T. Boch

Content evolution

Literature citations

☐ Aladin next challenges

- Aladin client evolution
  - AD+AL technologies/developements ready to face to 2-3 next years (2 contexts covered: AD->desktop machines, AL-> Web navigators)
  - What about mobile phone/pad ?
    => Apps android + iOS, or AL adaptation ?
- Hips servers: to be ready for new surveys (such as Euclid)
  - 1PB volume for 2019 (demand in progress)
  - HTTP load: 300 000 req/day today,
    1M already supported => not a problem
  - Deeper usage of HiPS FITS tiles (server side HiPS tools, SIAv2, …)

Aladin use cases & demo

- Aladin v10 -> Caroline Bot

- Aladin Lite ipyaladin -> Thomas Boch

Aladin V10:
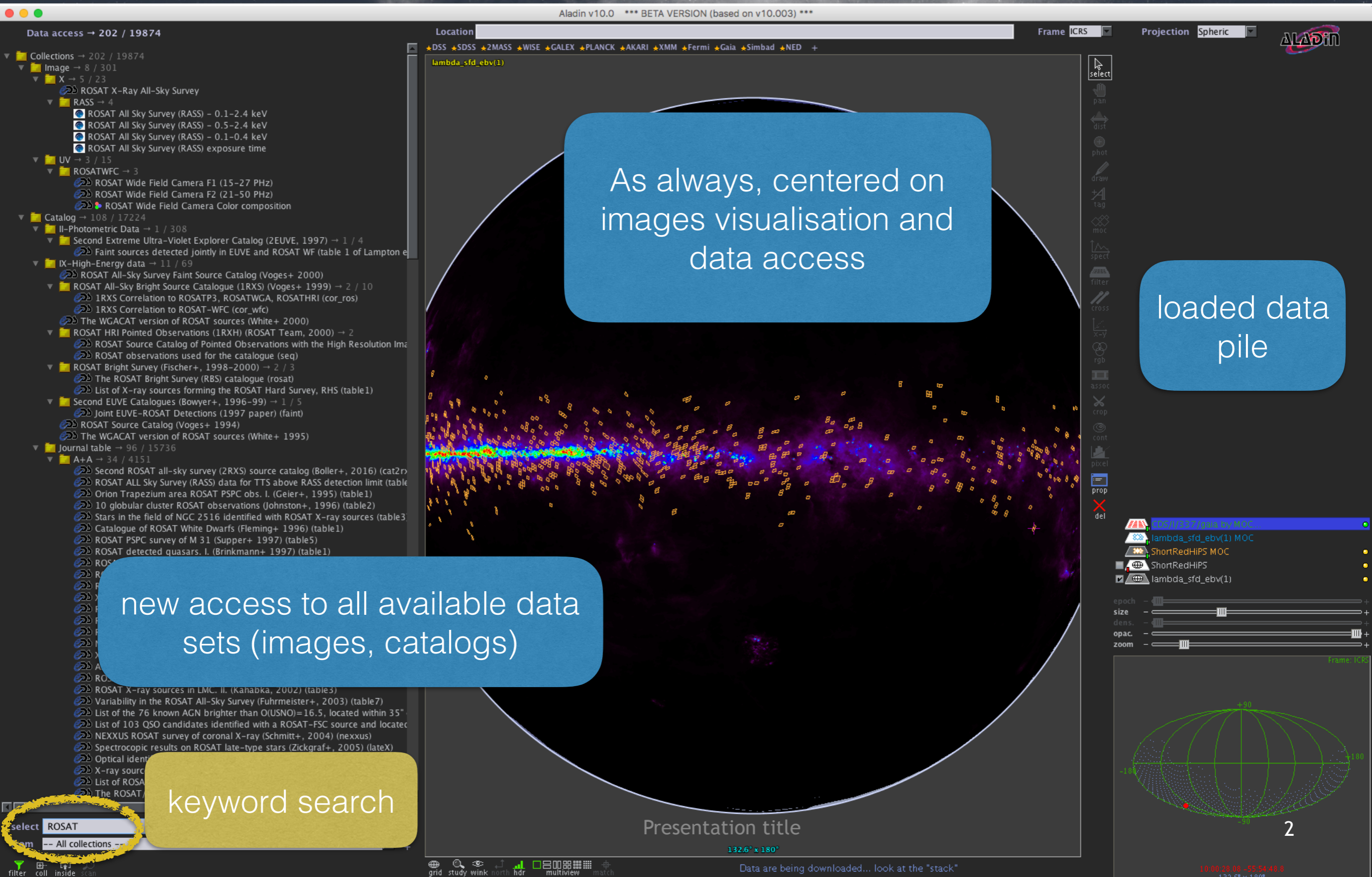# HiPS HiPS HiPS Hooray!

Caroline Bot

on behalf of Pierre Fernique, Thomas Boch, François Bonnarel, Mihaëla Buga, Chaitra, François-Xavier Pineau, Ibrahim Yapici & Jean-Yves Hangouët, Thomas Keller

CENTRE DE DONNÉES
ASTRONOMIQUES DE STRASBOURG

Aladin V10, a new interface

As always, centered on images visualisation and data access

loaded data pile

new access to all available data sets (images, catalogs)
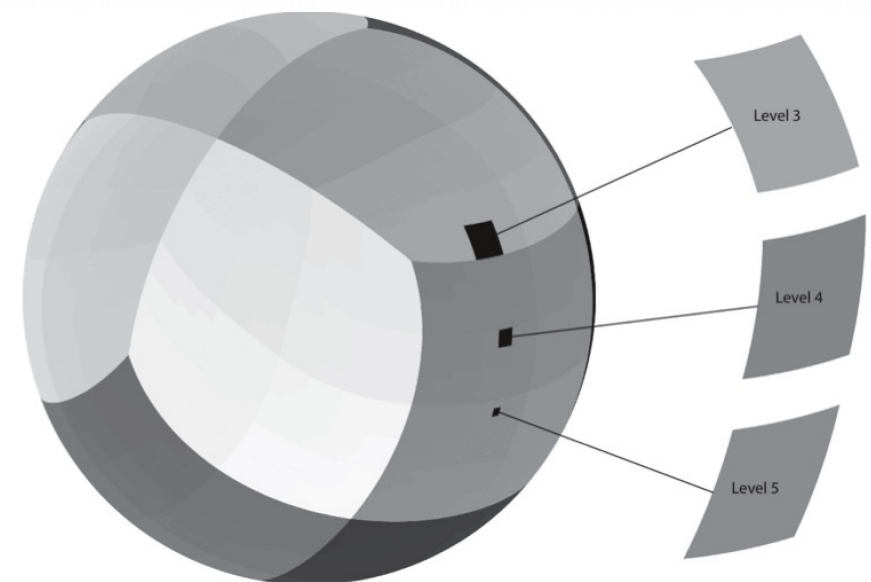
keyword search

Presentation title

2

HiPS: Hierarchical Progressive Survey

- based on HEALPix (allsky tesselation)
- Fernique et al (2015)
  2015A&A...578A.114F
- Progressive display of a survey:
  the more you zoom, the more you see
- Images survey, but also catalogs and cubes
- HiPS are build from an image collection using HiPSgen

MOC: Multi-Order Coverage

- Sky coverage of a data set

exp: MOC of the GALEX AIS survey, NUV band

exp: MOC of SDSS survey, u band
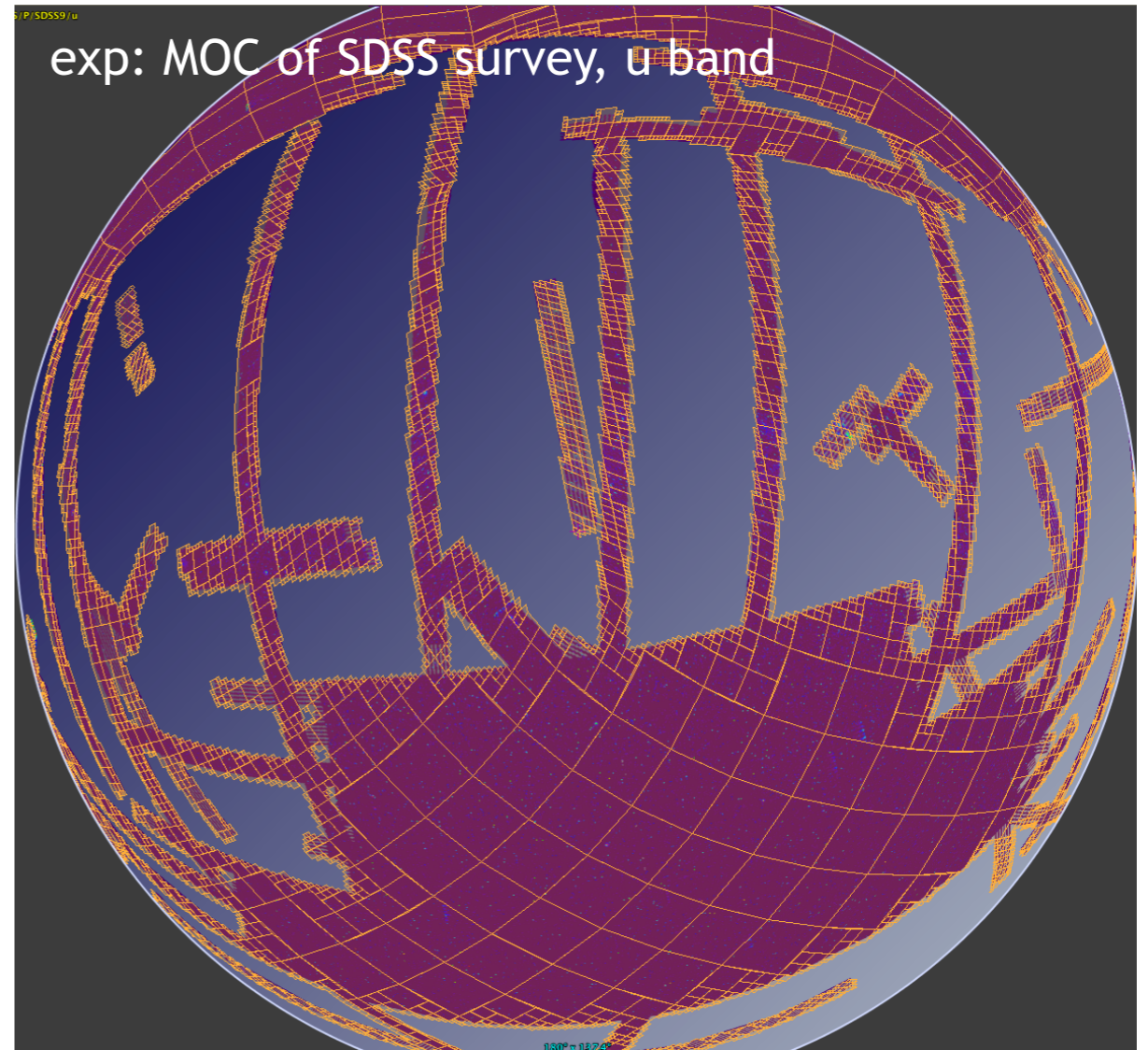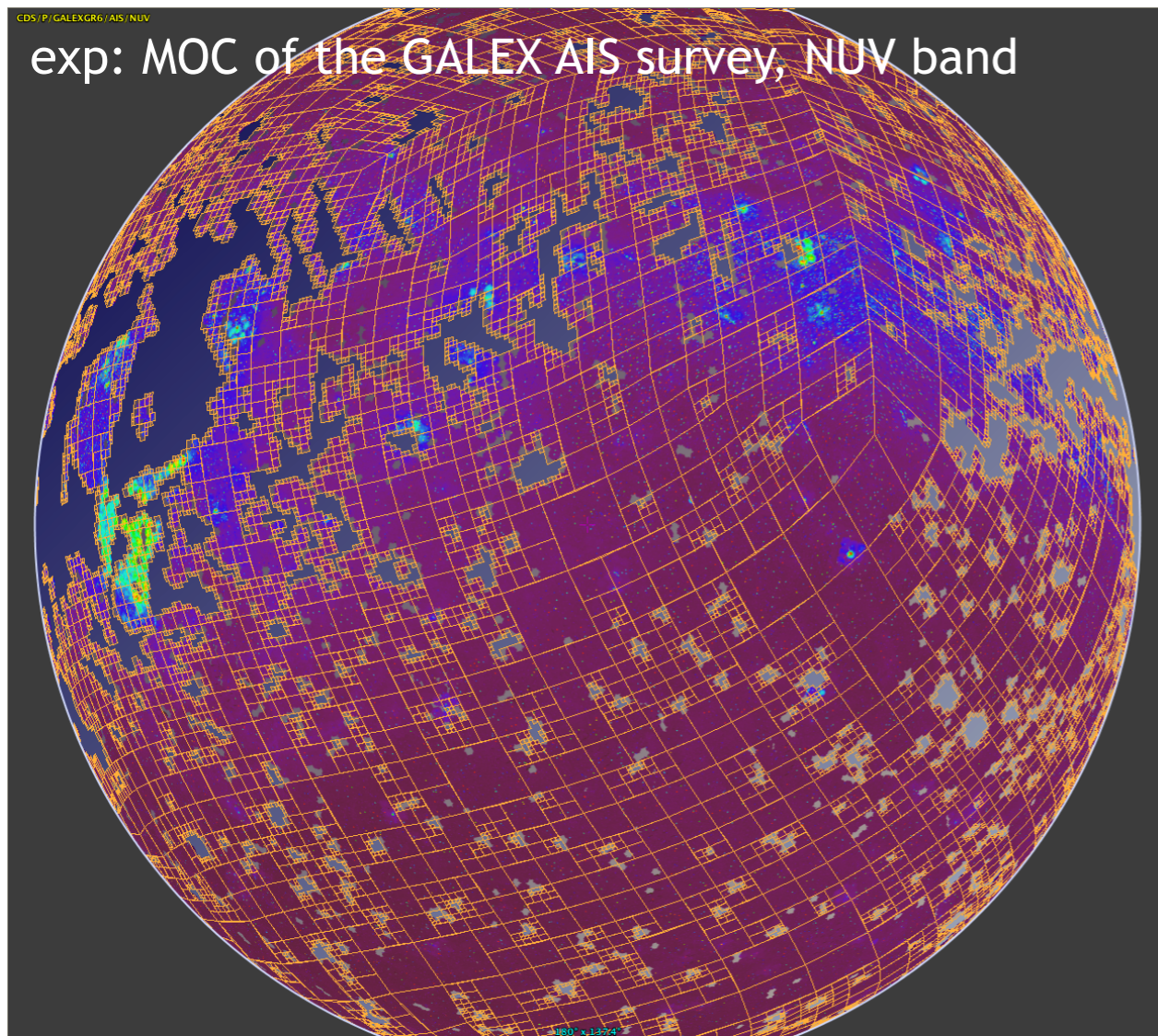
- Logical operations (intersections, unions, …)
- Query by MOC *("I would like data from catalog XXX in the YYY fields")*

Example/demo

- *"I have a set of observations or of regions of interests (MASH survey (Parker et al. 2006-2008)). I would like to identify the regions at low extinction, find sources detected both in Gaia DR1 and WISE and visualise different parameters (color-color diagram)"*
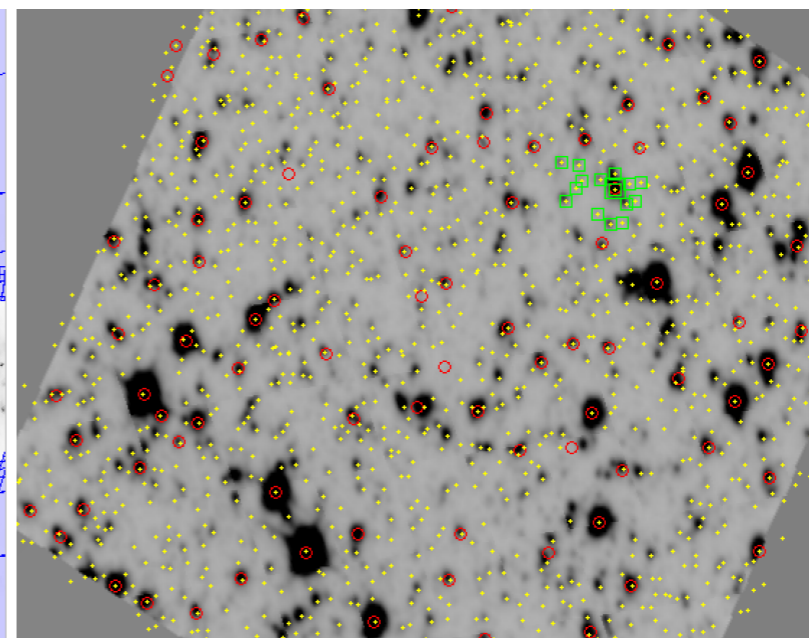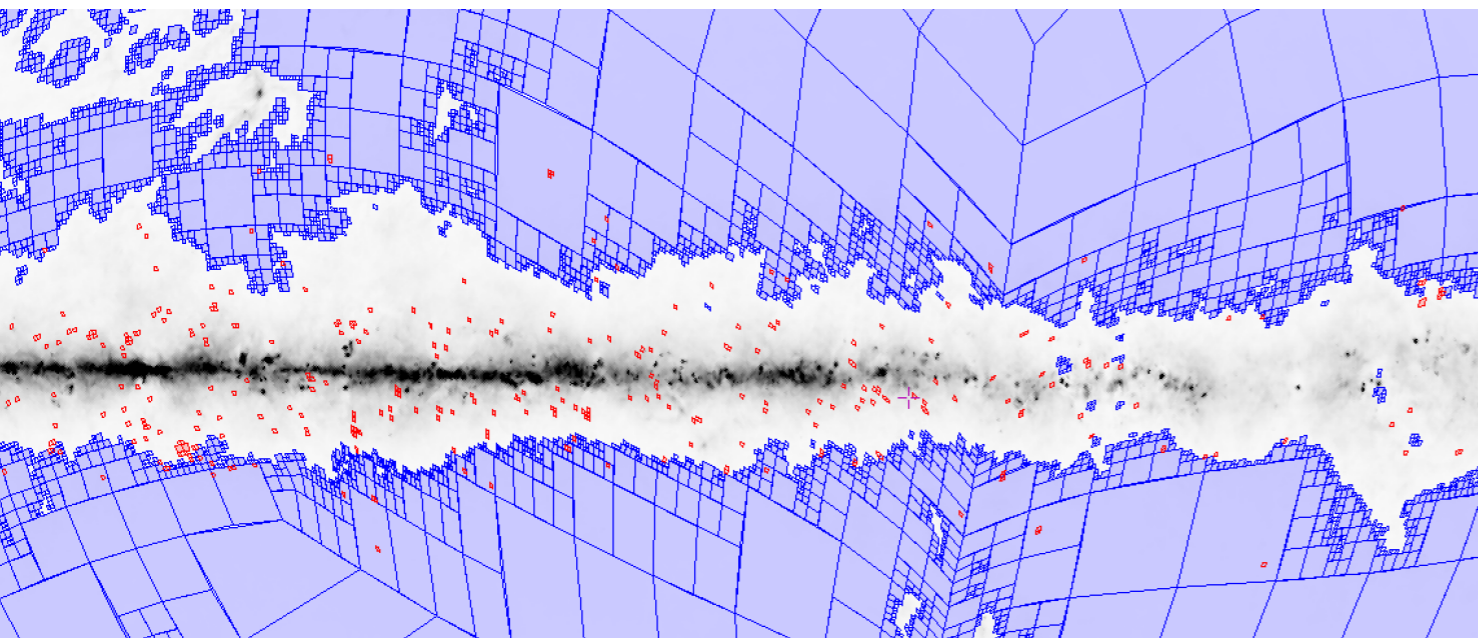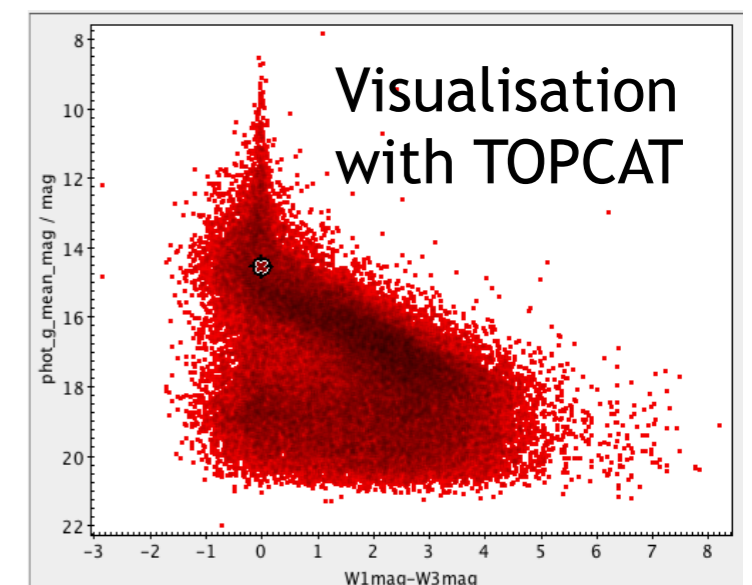

Xmatch Gaia-WISE

Find the sky coverage

load the Gaia catalog in the regions of interest

Visualisation with TOPCAT

Step-by-step tutorial available on the euro-vo webpages:
http://www.euro-vo.org/?q=science/scientific-tutorials

Creating a HiPS + MOC for a set of images

	MASH Catalogues of Planetary Nebulae (Parker+ 2006-2008)
V/127A	
☐ V/127A/mash1	(c)The MASH Catalog of Planetary Nebulae (paper I) *(903 rows)*
☐ V/127A/mash2	(c)The MASH-II Supplement (from paper II) *(335 rows)*
☐ V/127A/sp	*List of spectra available in "sp" subdirectory *(Note)* *(1657 rows)*

- A set of Halpha + Short Red images in 1338 fields

 1002_sr.fits
  1003_sr.fits
  1004_sr.fits
  1005_sr.fits
  1006_sr.fits
  1007_sr.fits
  1008_sr.fits
  1009_sr.fits
  1010_sr.fits
  1011_sr.fits
  1012_sr.fits
  1013_sr.fits
  1014_sr.fits
  1015_sr.fits
  1016_sr.fits
  1017_sr.fits
  1018_sr.fits
  1019_sr.fits
  1020_sr.fits

  - Use HiPSgen to create a HiPS for all SR images
  - Create the MOC
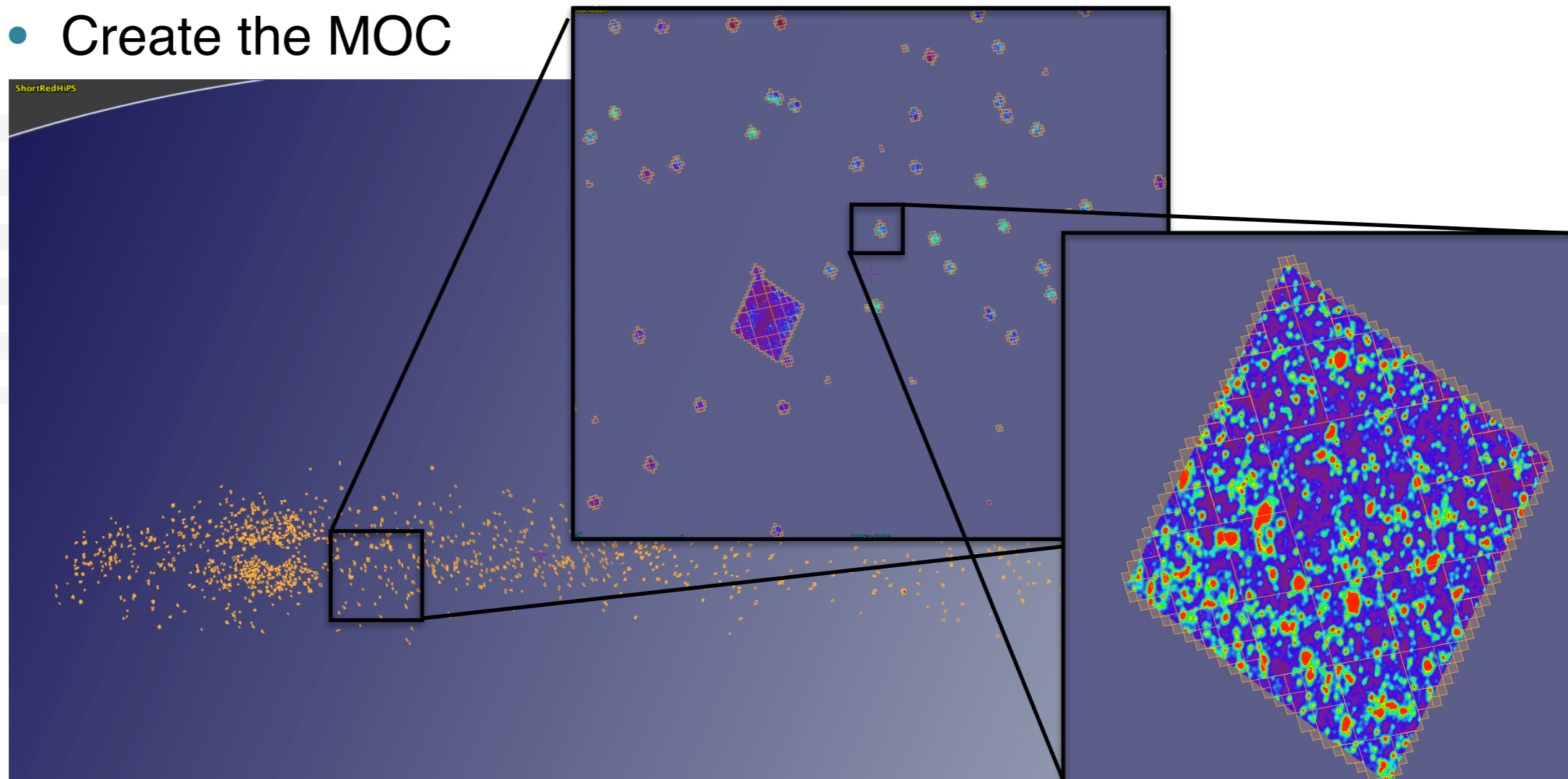
Create a MOC given a range of fluxes in an healpix image

- Load the HEALPix image E(B-V) from Schlegel Finkbeiner & Davis (1998)
- Create the MOC so that the flux in the map is <0.5 (low extinction)
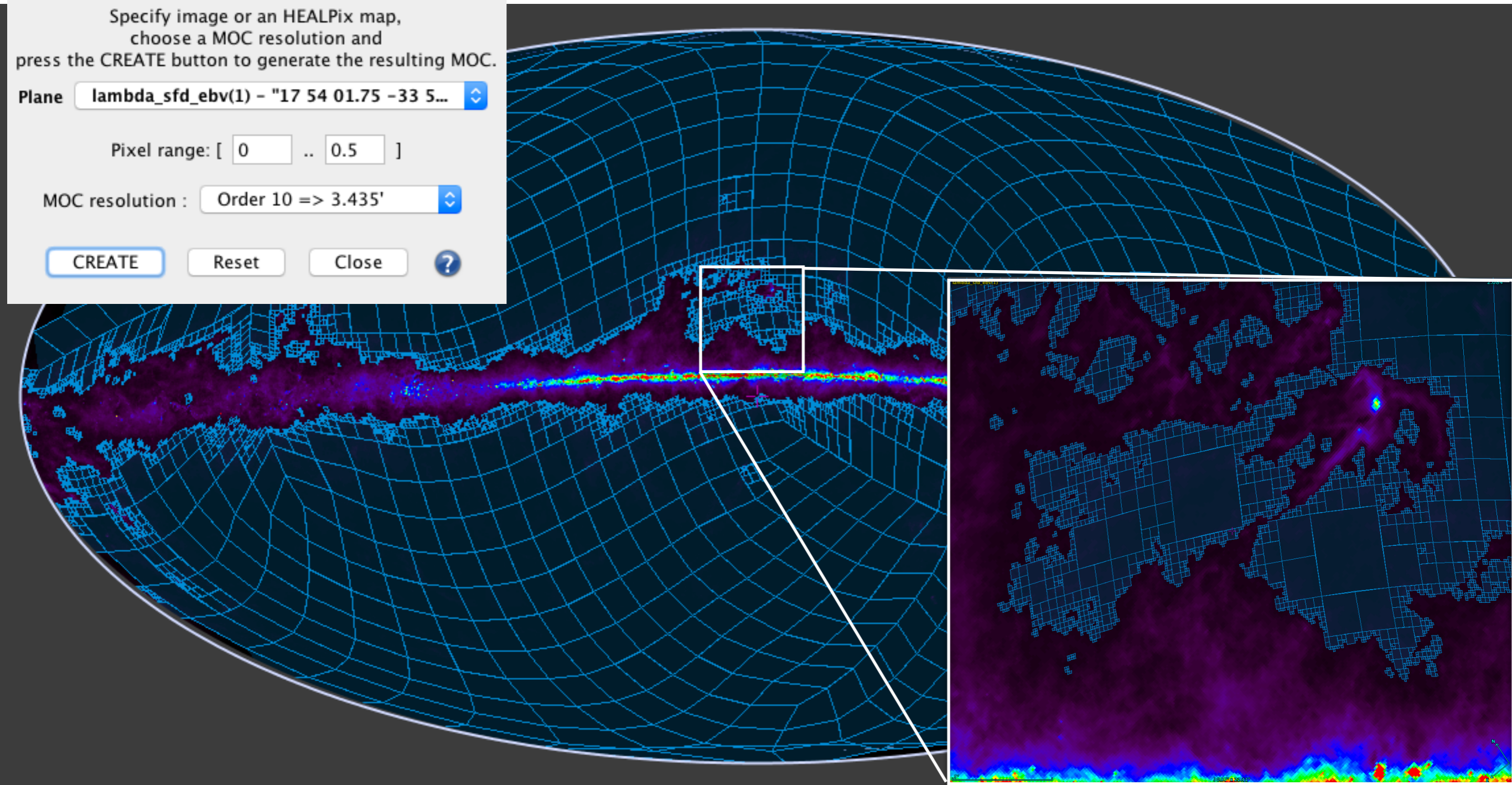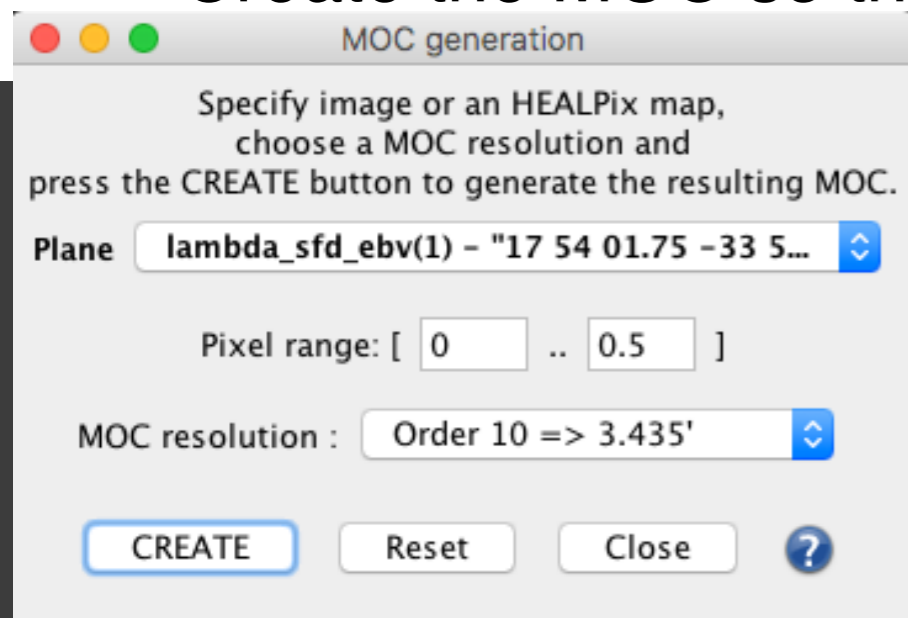
MOC generation

Specify image or an HEALPix map,
choose a MOC resolution and
press the CREATE button to generate the resulting MOC.

Plane lambda_sfd_ebv(1) – "17 54 01.75 –33 5…

Pixel range: [0 .. 0.5]

MOC resolution : Order 10 => 3.435'

CREATE   Reset   Close

intersection
of
regions
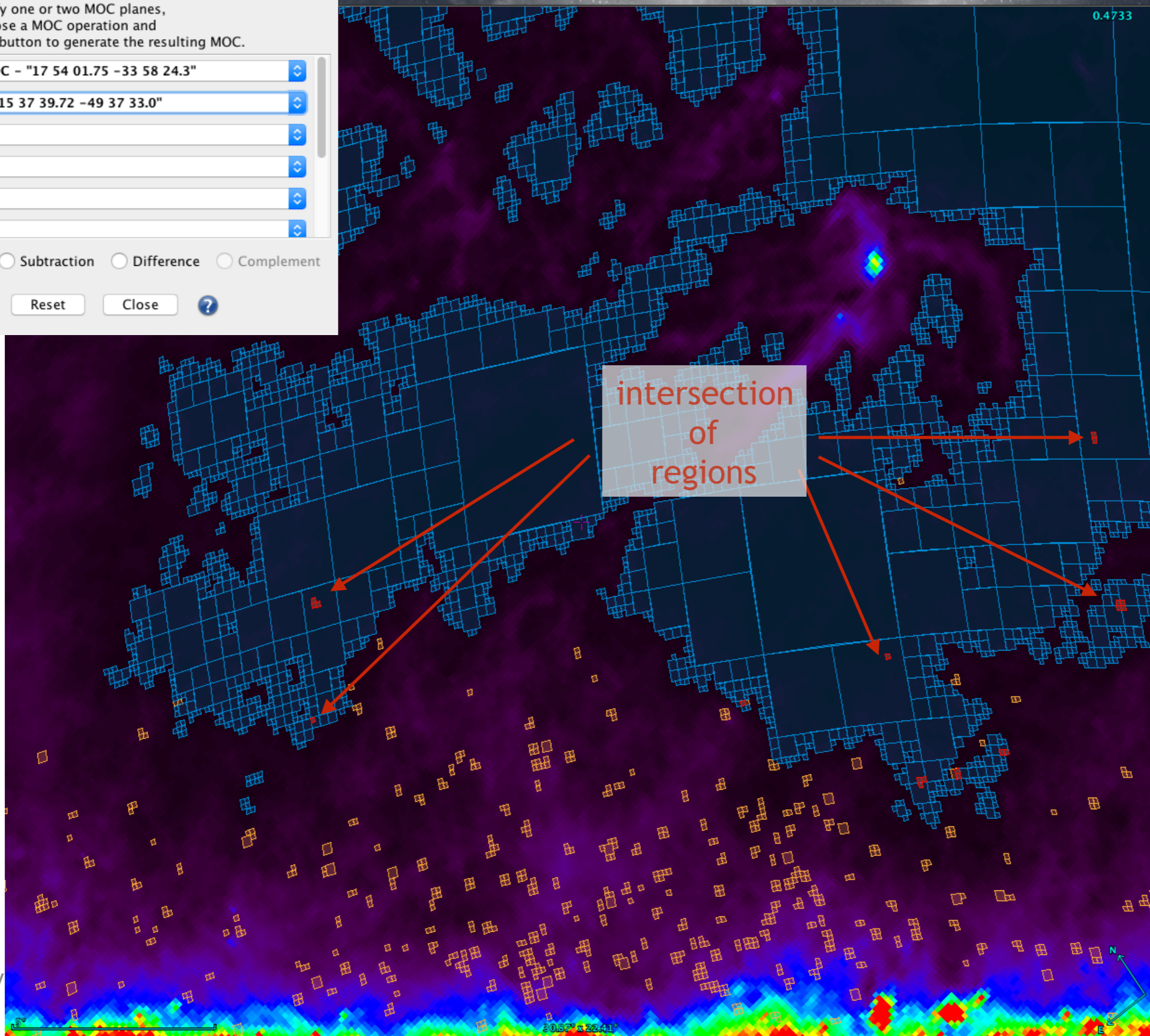
Query by MOC, Fast Xmatch

- Loading Gaia DR1 sources only in the regions of interest identified previously

- Fast Xmatch with the WISE catalog sources (Cutri et al. 2012)
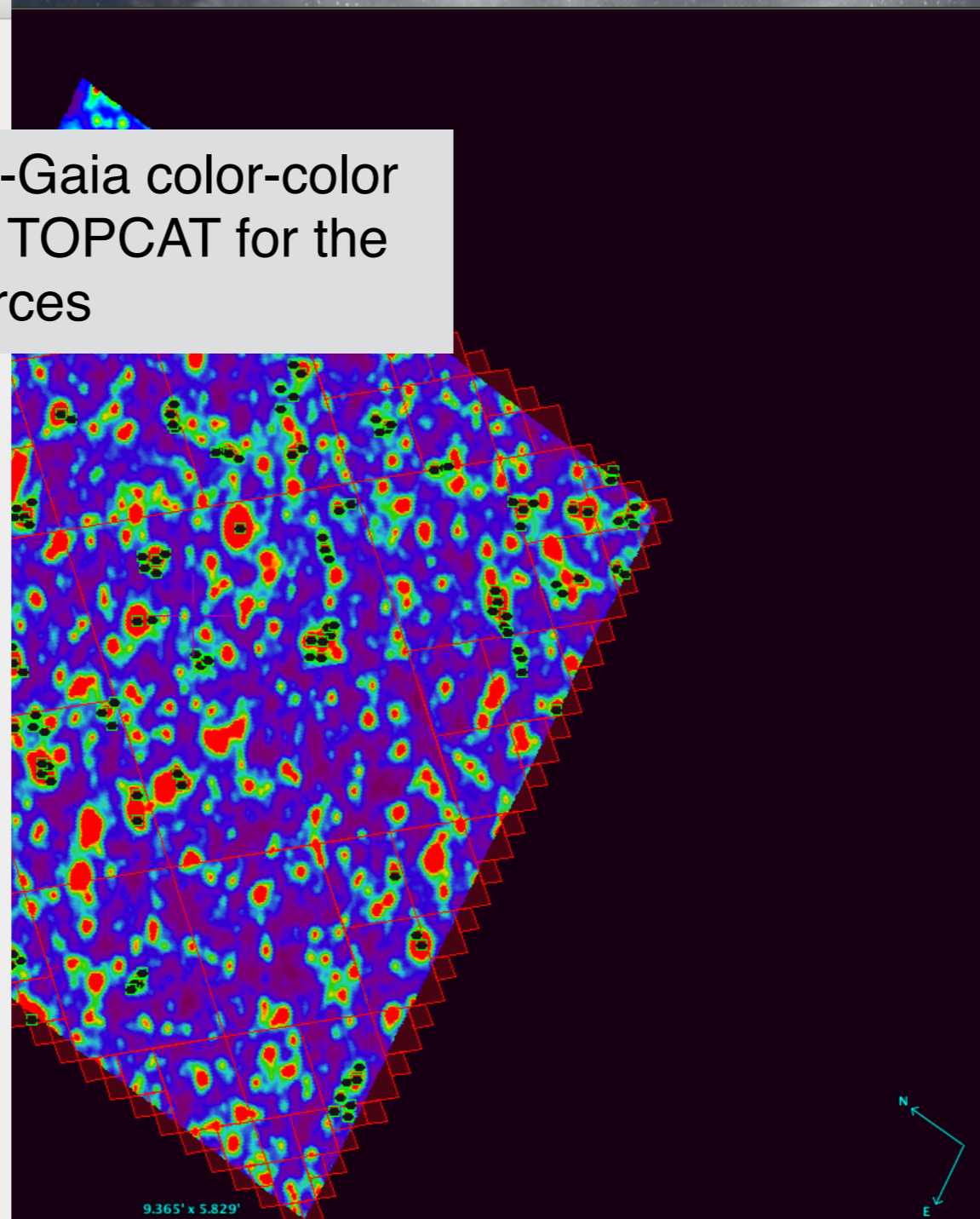
Interoperability with VO tools
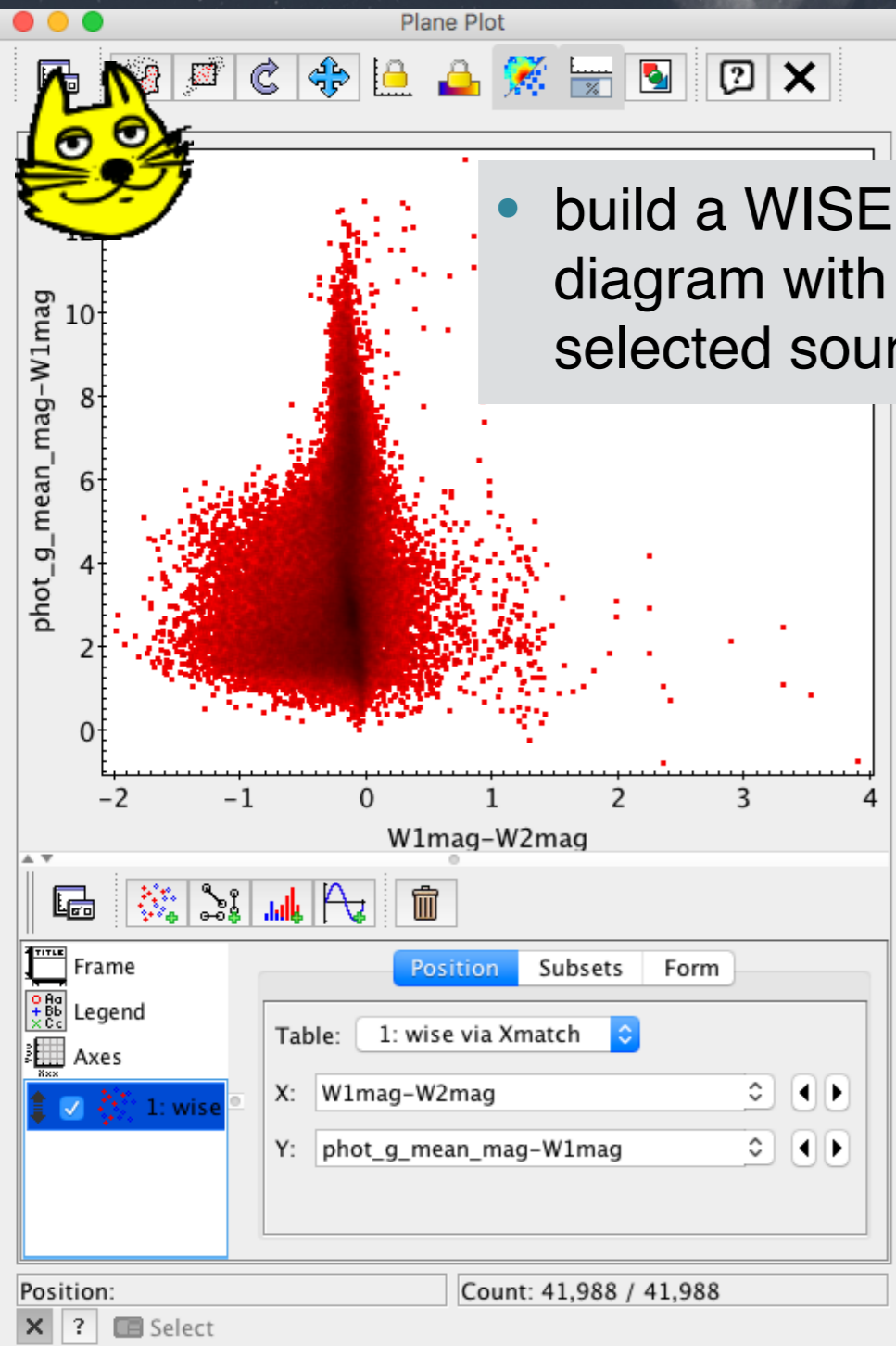
- build a WISE-Gaia color-color diagram with TOPCAT for the selected sources

Conclusions

- Aladin v10 enables an advanced scientific usage thanks to HiPS and MOC standards and their hierarchical properties on the sky

- New way to explore and interact with data sets

- Fast access to the CDS Xmatch tool

- Without losing functionalities Aladin users are used to, and while keeping the interoperability with all VO compatible services

- Strong potential for new/advanced scientific usage

- Aladin v10 is already available as the beta version of Aladin
  - Give it a try!
  - Official release: october 2017

ipyaladin,
a Jupyter/IPython widget
for Aladin Lite

Thomas Boch, Jérôme Desroziers

CENTRE DE DONNÉES
ASTRONOMIQUES DE STRASBOURG

☐ Context and motivations

- Python

  - Growing community in astronomy

  - astropy, astroquery, astroML, …

Full text mentions of programming languages in Astronomy papers

- Jupyter notebooks

  - Documents with live code, running the browser

  - "reproducible science"

- Jupyter widgets

  - Interactive HTML/JS widgets for Jupyter notebooks
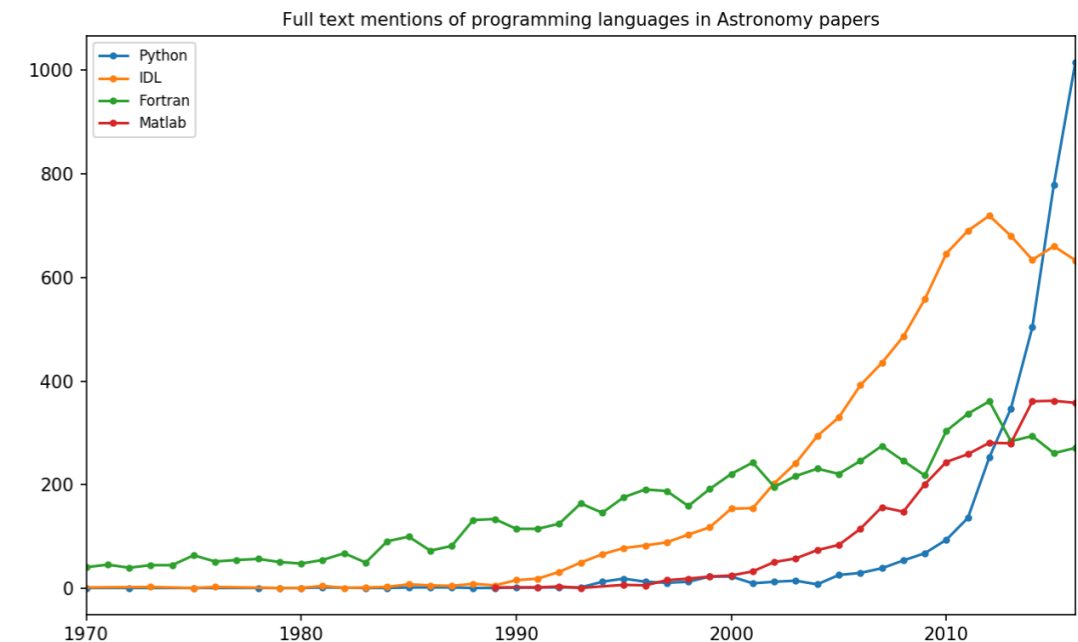
☐ Version 0.1

- v 0.1 developed in two weeks and released mid-July

- Available on GitHub: github.com/cds-astro/ipyaladin

- Installation from pip package manager:
  `pip install ipyaladin`

- Announced on Twitter

Sylvain Corlay @SylvainCorlay · 13 juil.
En réponse à @bochthomas @jradavenport
Great work! It is nice to see more people building cool viz libraries on the top of ipywidgets! Come say hi when you are in the Paris area.
🌐 À l'origine en anglais
💬 1   ♥ 2

Arna Karick @drarnakarick · 13 juil.
En réponse à @bochthomas @jradavenport
Fantastic! Will demo this in a couple of weeks. Holding a @techsavvyastro mini workshop and giving a colloquium to @unimelb astros
🌐 À l'origine en anglais
💬   ♥ 1

Maarten A. Breddels @maartenbreddels · 13 juil.
En réponse à @bochthomas @jradavenport
Excellent work, and fast! Looking forward to try this out, also in combination with vaex! Would love to see this on conda-forge.
🌐 À l'origine en anglais
💬   ♡ 1

★ amanda bauer ★ @astropixie · 13 juil.
En réponse à @bochthomas @jradavenport
this is cool, @bochthomas ! will play with it and get back to you.
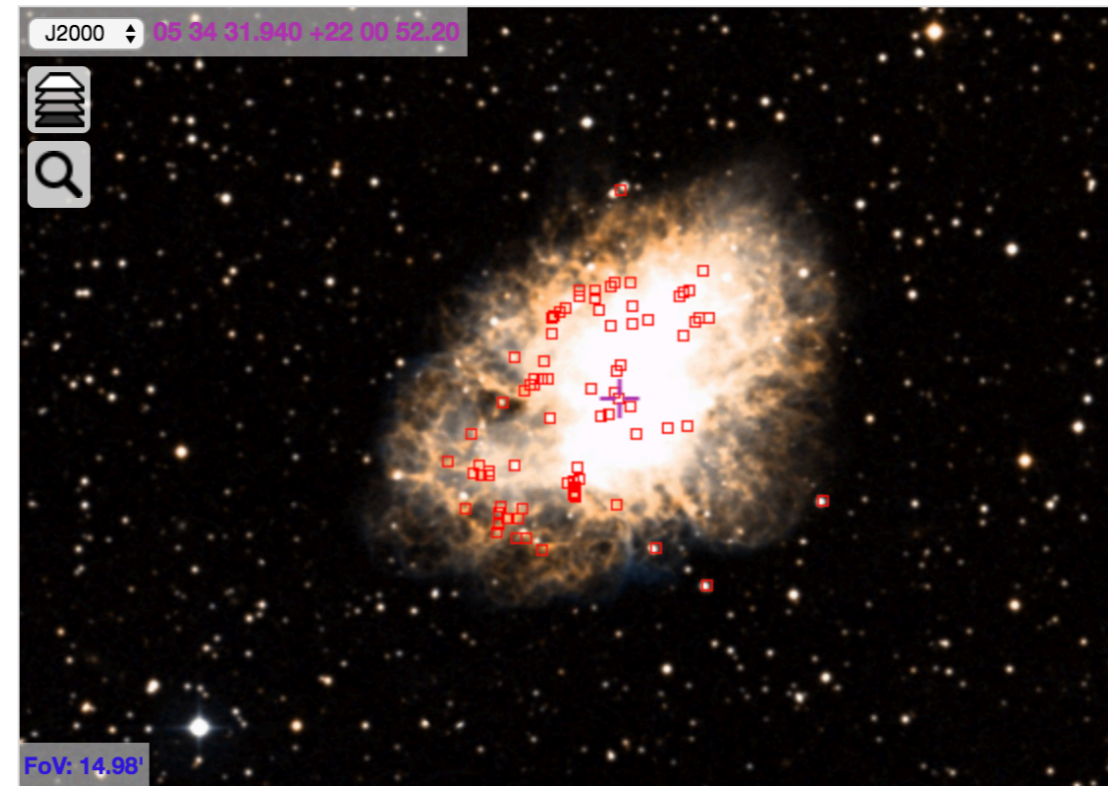🌐 À l'origine en anglais

Demo outline

- Simple integration

- Bi-directional communication

- Linked views

- Load an Astropy table
  Load a MOC

- Trigger some processing from actions in Aladin Lite