The Survey Science Centre report to the XMM-Newton Users Group

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Topics

- SSC and XMM2ATHENA activities
- 4XMM-DR14(s)
- The slew catalogue
- Future catalogues
- XMM2ATHENA project update
- Summary

SSC/XMM2ATHENA Activities

- Regular teleconferences with 8 SSC & XMM2ATHENA points of contact
- Continued SAS task development + support
- Continued data products screening
- Ongoing source identification activities (machine learning, ...)
- Enhancement of catalogue servers
- FLIX sensitivity estimator now includes stacked catalogue
- Updating XMM-SSC and XMM2ATHENA webpages
- Continued input into SAS and pipeline development via monthly SAS-CCB and SASWG meetings
- Fitting of all spectra & identifying long and short term variability
- Systematic exploitation of OM data (with X-ray sources)
- Very successful catalogue workshop 26-29th February (>90 participants)
- Outreach projects
- Release of 4XMM-DR14 & 4XMM-DR14s, planned for 9th July 2024

4XMM-DR14

1035832 detections, 692109 unique sources

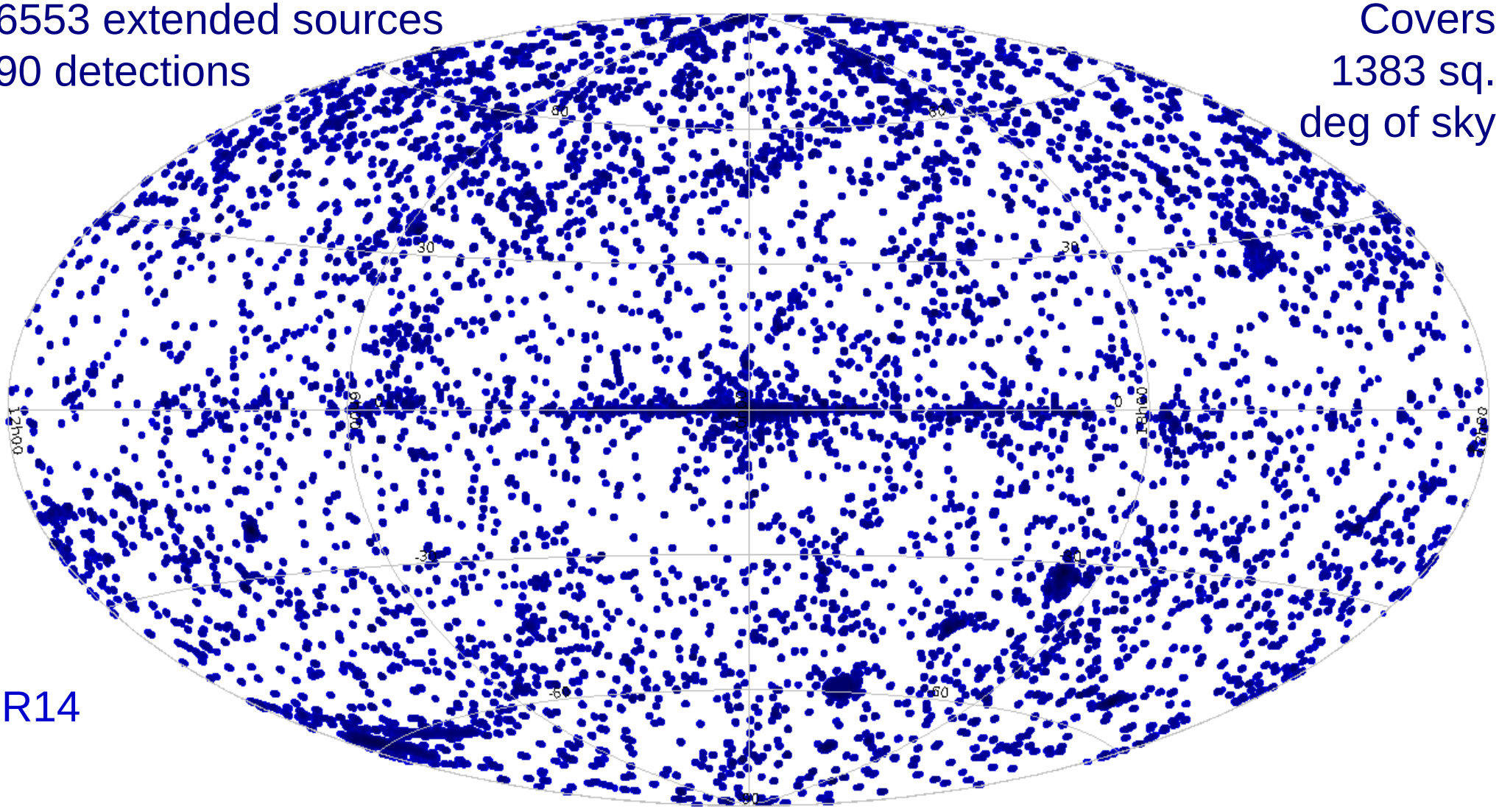
372313 (36%) sources with spectra & lightcurves

96553 extended sources

≤90 detections

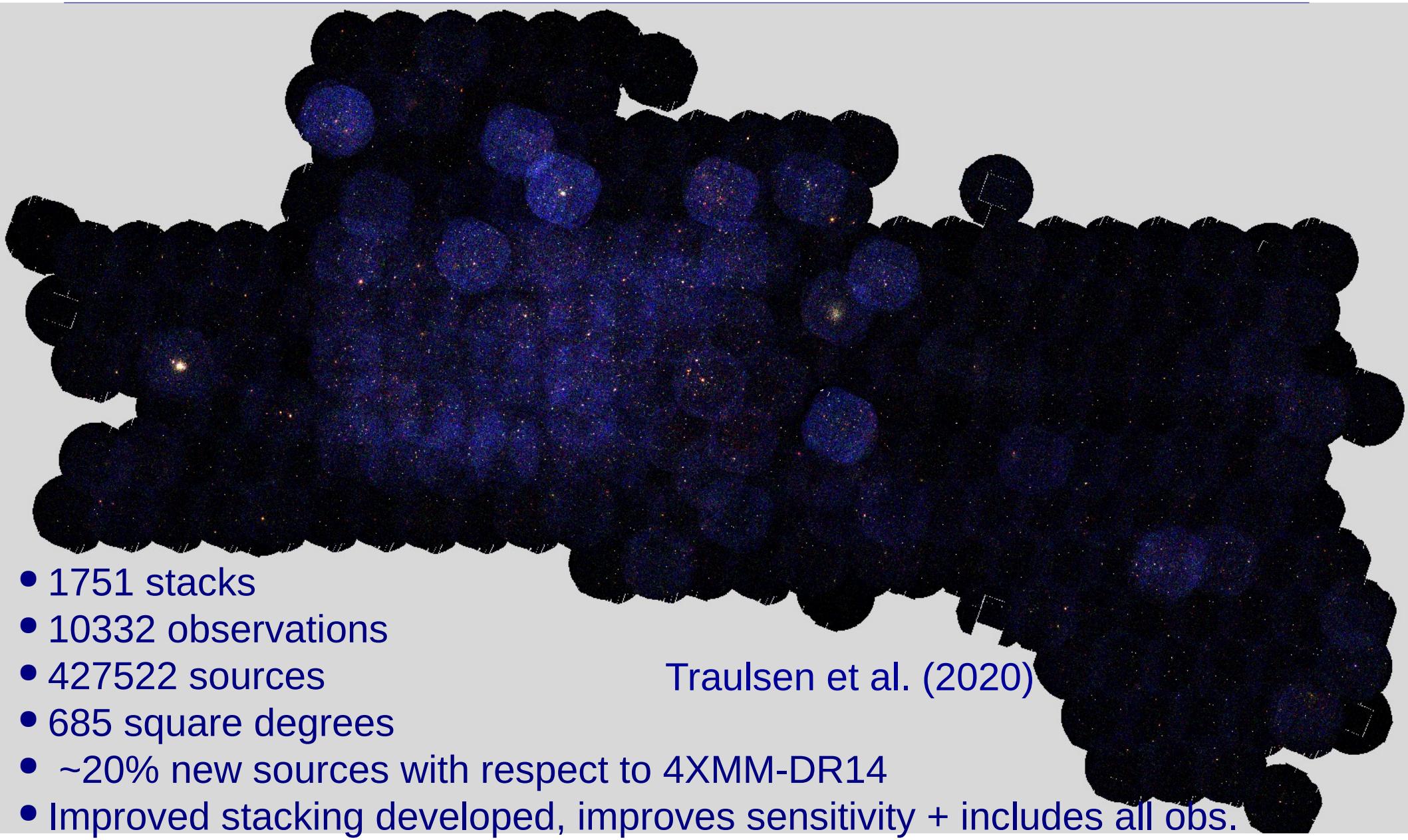
To release: 9th July 2024

Covers 1383 sq. deg of sky



DR14

4XMM-DR14s



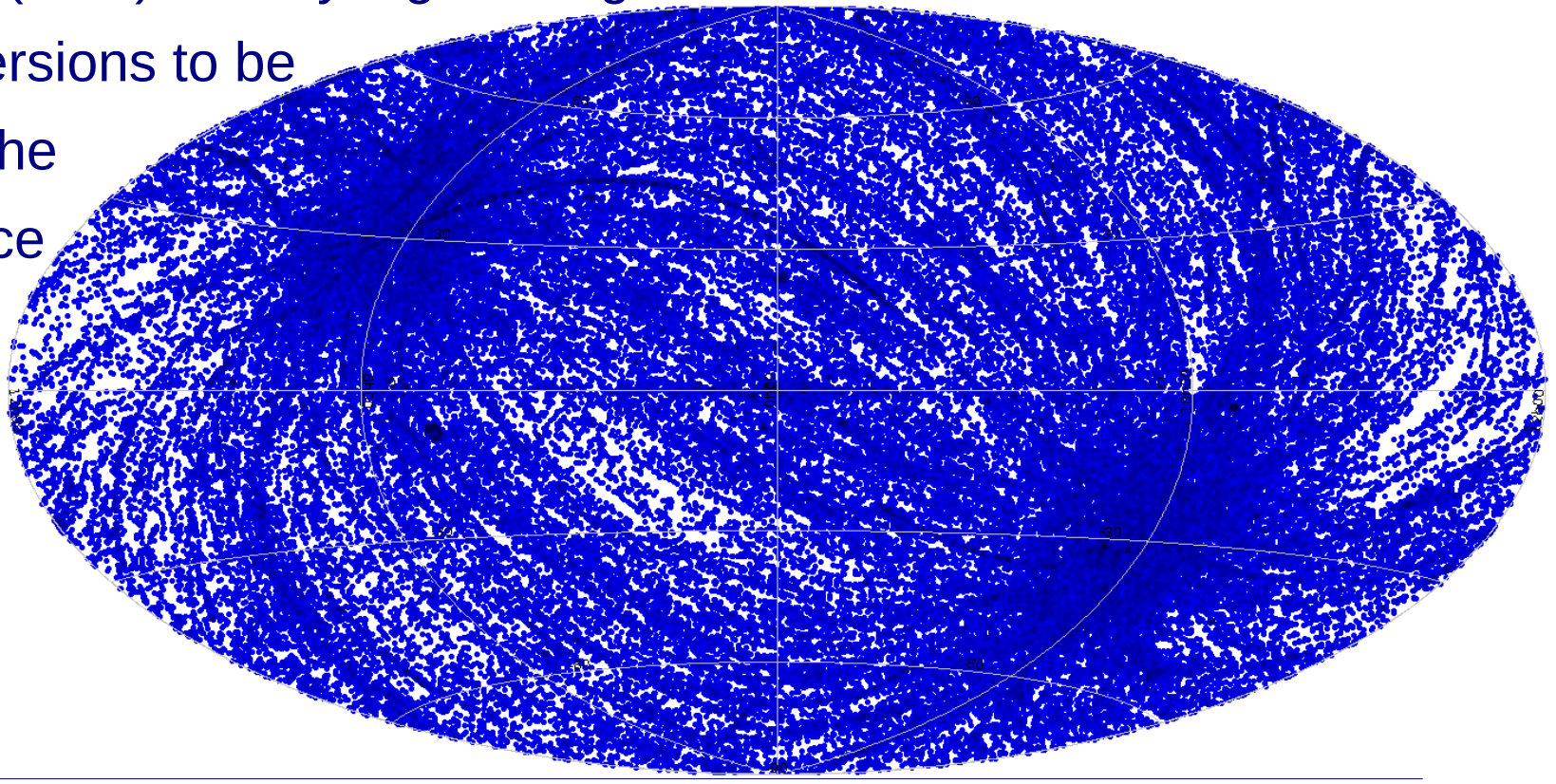
- 1751 stacks
- 10332 observations
- 427522 sources
- 685 square degrees
- ~20% new sources with respect to 4XMM-DR14
- Improved stacking developed, improves sensitivity + includes all obs.

Traulsen et al. (2020)

Slew catalogue

Endorsement 2022-05-17/14:

- Period : August 2001-August 2023 – previous version up to end of 2014
- Catalogue testing under way, release imminent
- 140735 detections (68383 new detections)
- 25695 flagged (18%), mostly high background
- Subsequent versions to be released with the detection/source catalogue(s)



5XMM

- Significant development to prepare for reprocessing
- SOC reprocessed all 17199 observations ready for production of 5XMM – some issues with position errors identified
- Catalogue simplified, one single stacked catalogue, with ~450 columns
- To include :
  - OM + multi-wavelength counterparts : Recommendation 2022-05-17/15
  - upper limits
  - long-term variability information + OM variability
  - spectral fits
  - classifications
  - photometric redshifts
- Expected for Summer 2025

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement n°101004168

SED finder tool

XMM2ATHENA

https://xcatdb.unistra.fr/sedfinder/

XMM-NEWTON SURVEY SCIENCE CENTRE

XMM SED Finder

Retrieve SEDs for either Pointed Observation Sources or Stacked Sources

Enter a SRCID or a sky position followed with an optional search radius. Ex:

- 209119902010157 in Obs mode
- 3000011010100001 in stacked mode
- 4XMM J143706.2+584002
- 4XMM J143706.2+584002 0.5arcmin
- 4XMM J143706.2+584002 48arcsec
- 219.275869 +58.6672877

Cone search radius is limited to 1 arcmin (6 arcsec by default)

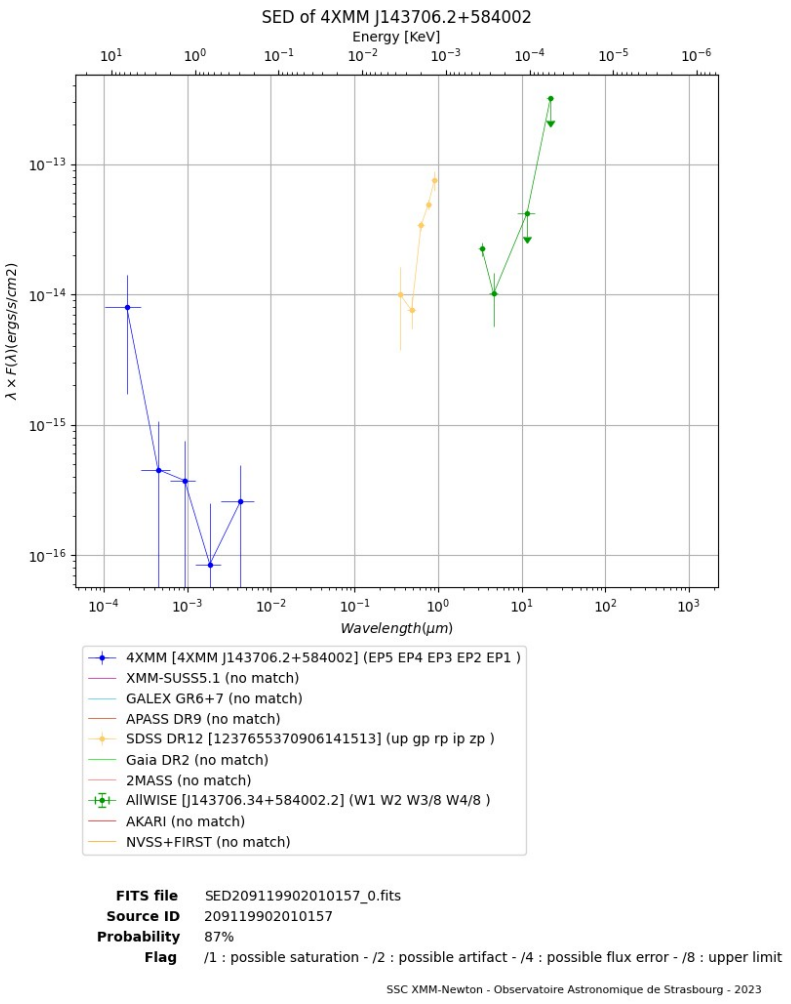
Mode: Pointed Observations Stacked

Enter a srcid | Submit

Response:

URL (curl):

HOME | DOWNLOAD | DOCS | LINKS | ABOUT



FITS file also available

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Classifying the OM sources

XMM2ATHENA

- Used CLAXBOI (Tranin et al. 2022) to classify all XMM-SUSS 5.0 sources
- 4.7 million stars, 1 million galaxies, 230k QSOs.
- Good discrimination between Galactic and extragalactic sources
- Some leakage between QSOs and galaxies.
- Get the classifications at: http://xmm-ssc.irap.omp.eu/xmm2athena/catalogues
- Classification of OM sources help associating X-ray counterparts & classif. of X-ray sources
- XMM-OM QSO sample could help aspect correction for EPIC
- OM covers highest sensitivity, best PSF parts of EPIC images.

	Real star	Real QSO	Real galaxy	Total classified	Precision %
Appears to be star	62647	67	40	62754	99.5
Appears to be QSO	795	3476	256	4537	86.2
Appears to be galaxy	251	636	5541	6428	88.4
Total	63693	4179	5837		
Recall %	98.4	83.2	94.9		

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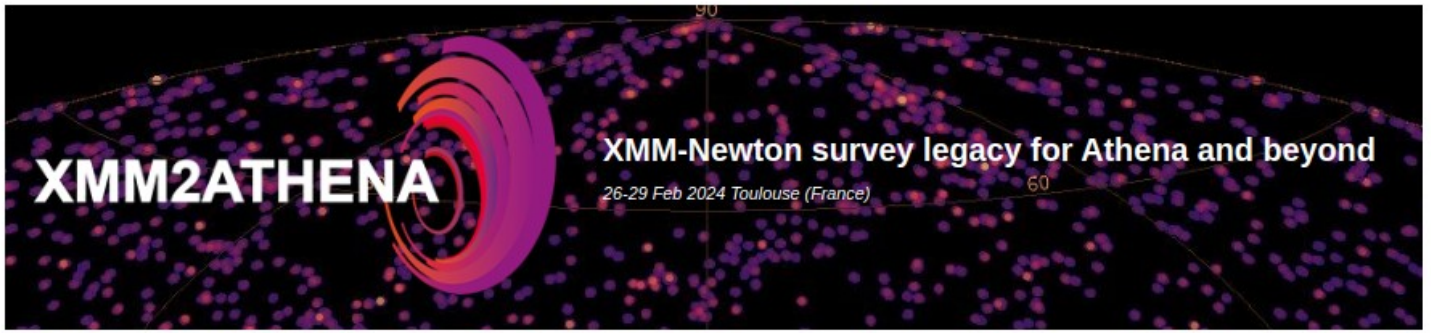
Transients

Long term transients :

- Code placed in ACDS pipeline - Recommendation 2023-05-11/11 - but not activated
- Online interface available – excellent for searching for gravitational wave alerts for example
- Alerts generated for new sources
- Paper published (Quintin et al., 2024)
- Variety of new objects discovered

Short term transients

- Code completely revised (bugs in previous version)
- Also uses ‘bad time interval’ by calculating expected value based on background
- Ran on 13864 archival observations (5, 50 & 200 s bins)
- ~30000 variable sources (3σ) – 15252 in Simbad, ~10000 sources (5σ)
- Detected stellar flares, active galactic nuclei (AGN), X-ray binaries (XRBs), X-ray bursts, magnetars, etc



WORKSHOP AIMS

This workshop will run from Monday 26th (afternoon) to the Thursday 29th (morning) and will cover a number of topics that are important to legacy missions including catalogues, source detection, source classification and machine learning techniques, time domain astronomy and other tools for exploiting large datasets. There will also be some discussion on citizen science and outreach in general. It will be the chance to learn about the new software that has been developed within the XMM2ATHENA H2020 project, as well as other similar projects, and to see some of the exciting science that has been done using the new tools. The workshop will run over three days, with invited, sollicited and contributed talks covering all of aspects of the areas highlighted above. Poster space will also be available. A complimentary buffet lunch will be provided for all participants on Tuesday, Wednesday and Thursday lunchtimes.

Please note, that whilst the workshop is closed for new talk abstracts, we still have a small amount of poster space and are still accepting posters, until all of the space is filled. Please also note that as of 10th January, it is no longer possible to sign up for the dinner as we have reached the maximum number of people that the restaurant can take. Should places become available, we will let you know.

INVITED SPEAKERS

Deborah Baines (ESAC, Spain)

Didier Barret (IRAP, France)

Raffaele D'Abrusco (CfA | Harvard & Smithsonian, USA)

Andrea De Luca (INAF, Italy)

Phil Evans (University of Leicester, UK)

Olivier Godet (IRAP, France)

Claire Greenwell (University of Durham, UK)

Peter Hurley - TBC

Emille Ishida (LPC-Clermont, France)

Georg Lamer (AIP, Germany)

Fabrizio Nicastro (INAF, Italy)

Mara Salvato (MPE, Germany)

SOLLICITED SPEAKERS

https://xmm2athena.sciencesconf.org/

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Workshop : XMM-Newton survey legacy for Athena & beyond

XMM2ATHENA

- 26-29th February 2024, IRAP, Toulouse (~70 in person & ~25 remote)

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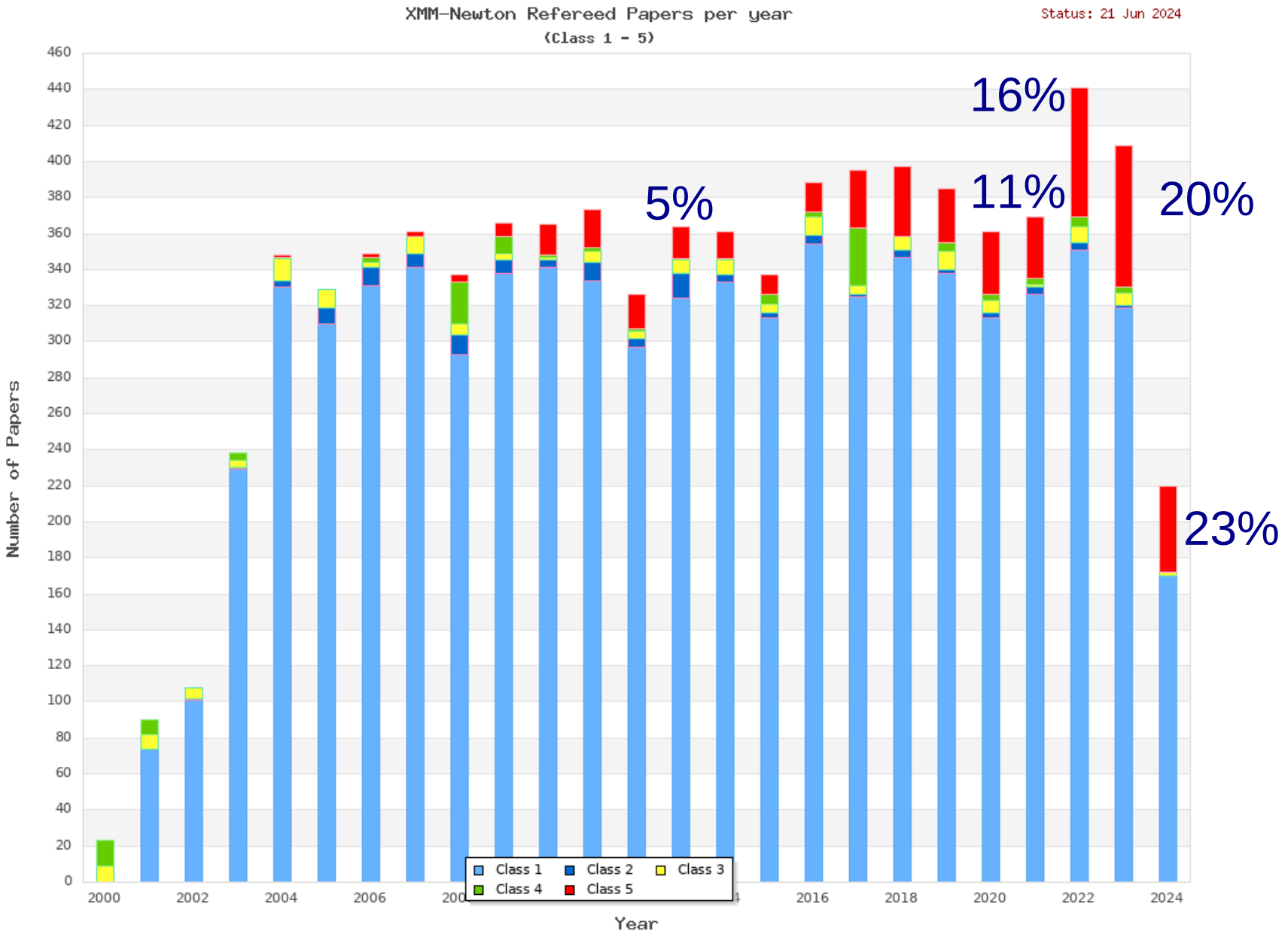
Success of catalogue promotion

XMM2ATHENA



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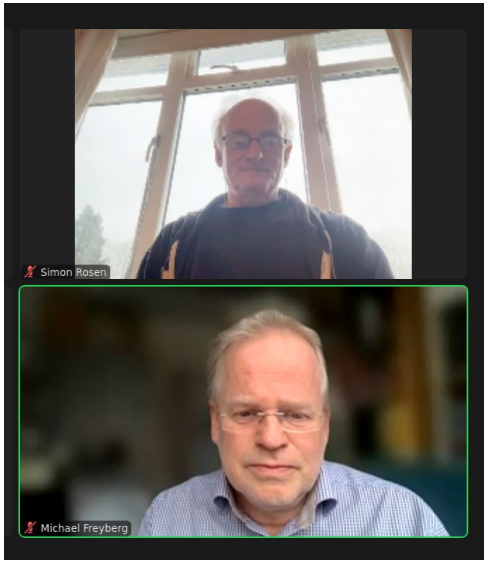
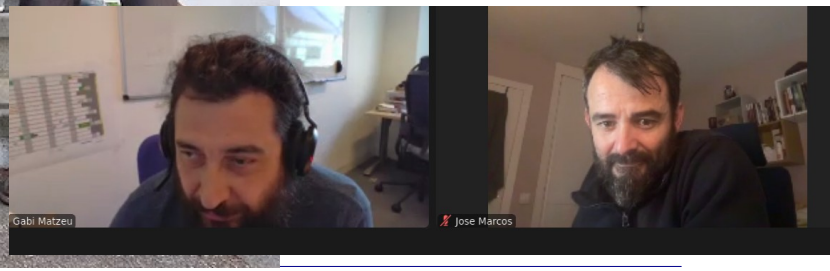
Summary

- Continued SAS task development + support
- Continued data products screening
- Ongoing source identification activities
- Enhanced catalogue servers helping to disseminate data products
- 4XMM-DR13(s) released in June 2023, DR14(s) for this Summer
- Many more new products with XMM2ATHENA
- Highly successful catalogue workshop
- Increased usage of the XMM-Newton catalogues
- End of XMM2ATHENA (30/9/24) but 5XMM planned for summer 2025
- Continue to provide XMM-Newton legacy products
- Raising the profile of XMM-Newton

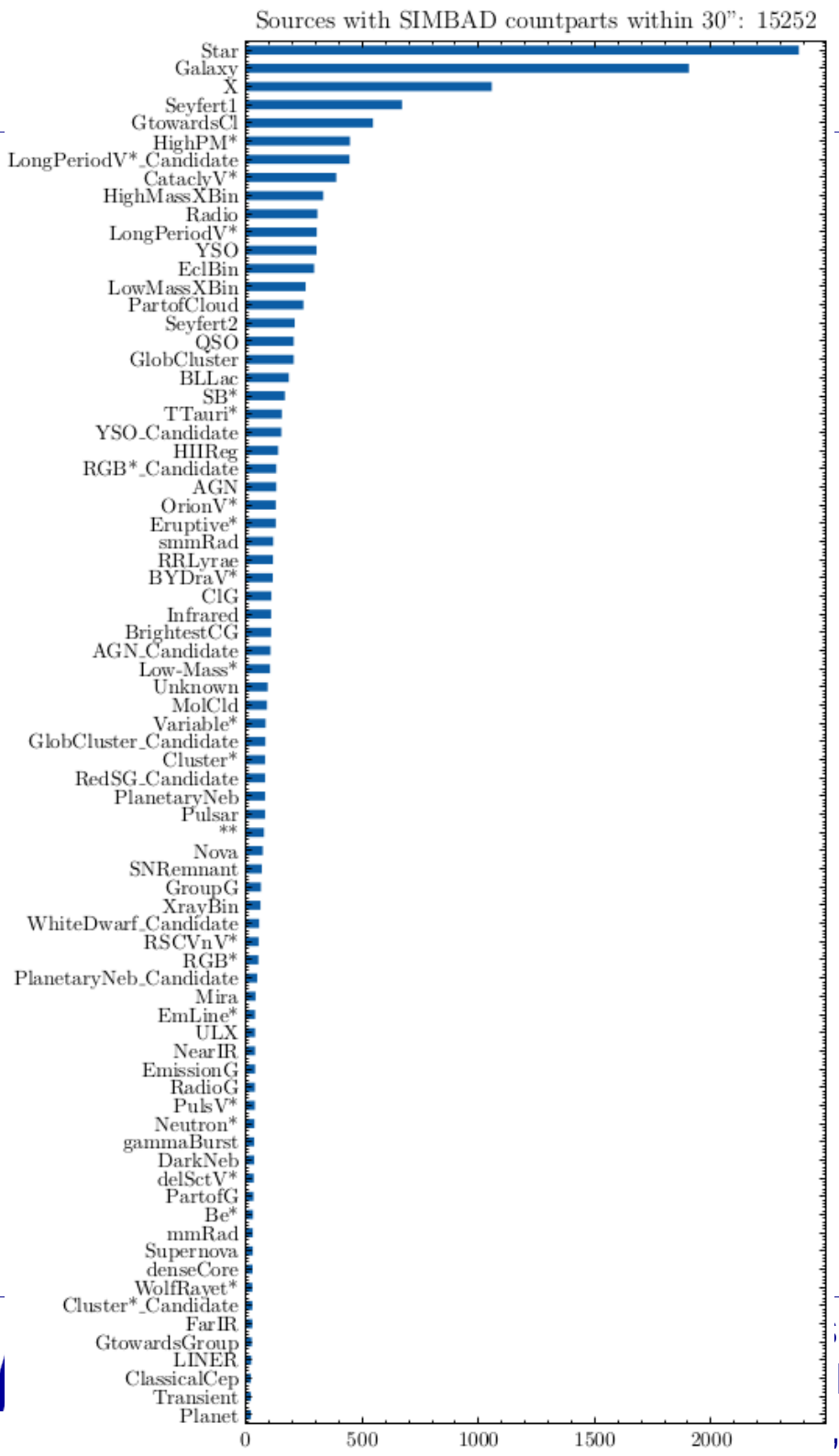
Stronger together!





Back up

Nature of the short variable sources



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Photometric redshifts

- Pipeline put into place for the photometric redshift based on MLZ-TPZ (Carrasco Kind & Brunner, 2013)
- Matching done at the CDS
- SDSS, PanSTARRS & DES photometry
- Compared to redshifts from spectroscopy