

---

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

**Natalie Webb**

# Topics

---

- SSC activities
- 4XMM (DR9 & DR9s)
- Improved databases
- Classifying 4XMM and citizen science
- Future catalogues and products
- Summary

# SSC Activities

---

- Regular teleconferences with 8 SSC points of contact
- Continued SAS task development + support
- Continued data products screening
- Ongoing source identification activities
- Enhancement of catalogue servers
- Updating XMM-SSC webpages
- Continued input into SAS and pipeline development via monthly SAS-CCB and SASWG meetings
- New outreach projects
- Participation in XMM-Newton's 20<sup>th</sup> anniversary events
- Release of 4XMM (DR9 & DR9s, 18<sup>th</sup> December 2019)

# 4XMM-DR9

4XMM-DR9

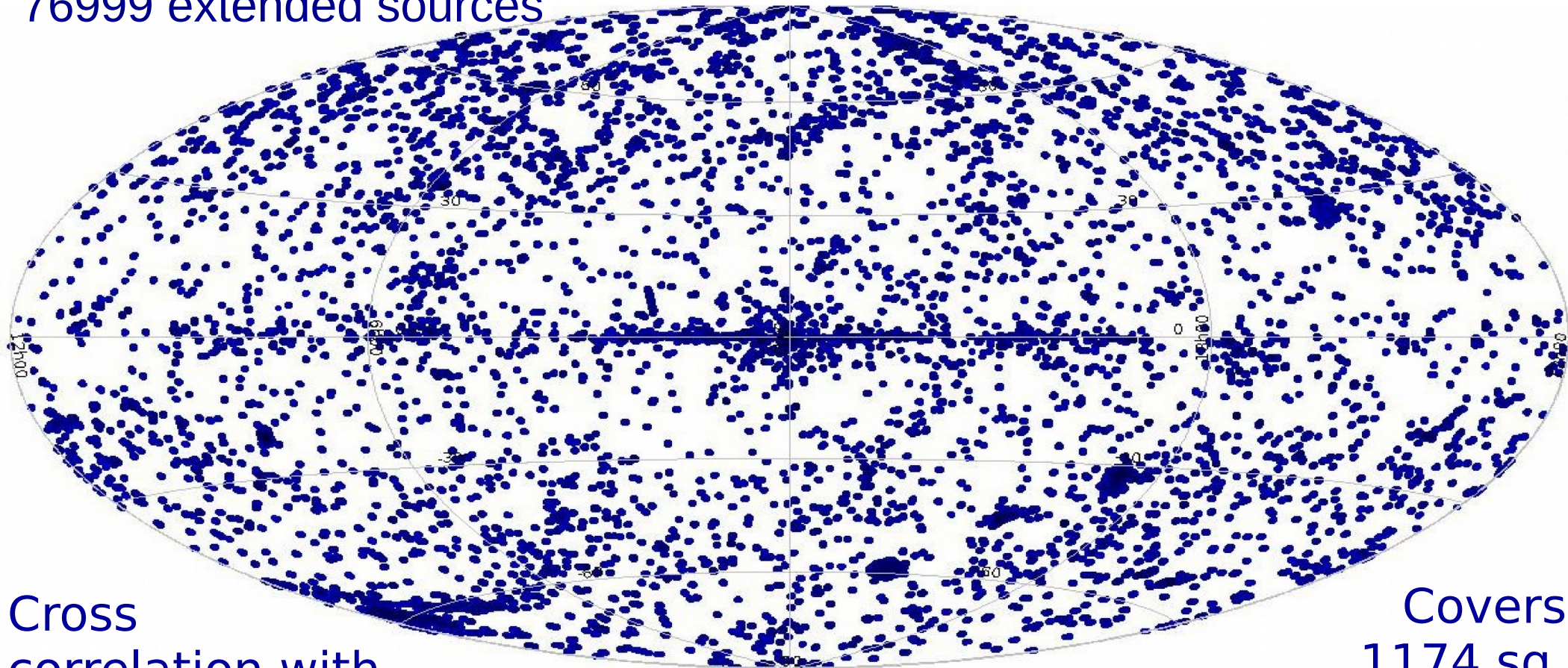
3 February 2000 – 1 March 2019

Released : 18th December 2019

810795 detections, 550124 unique sources - detected up to 69 times

288282 (36%) sources with spectra and lightcurves

76999 extended sources



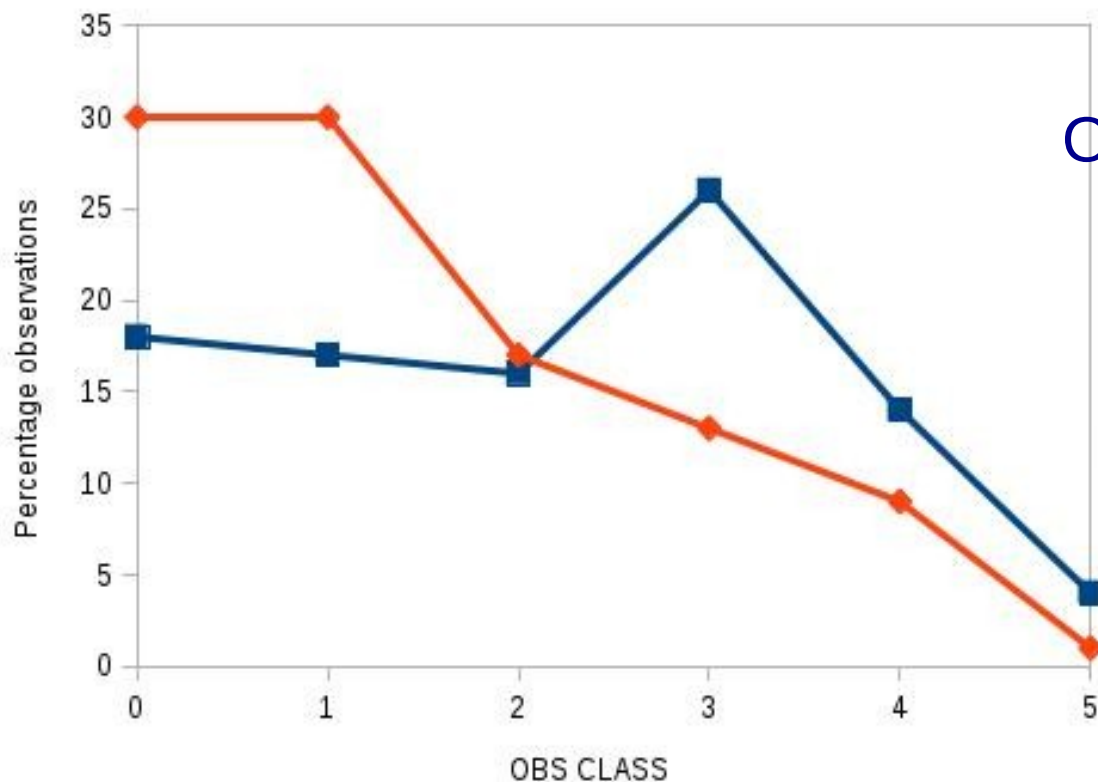
Cross  
correlation with  
222 catalogues

Covers  
1174 sq.  
deg of sky



# 4XMM-DR9

4XMM-DR9



Obsclass

Quality

0

bad area = 0%

1

$0\% < \text{bad area} < 0.1\%$

2

$0.1\% < \text{bad area} < 1\%$

3

$1\% < \text{bad area} < 10\%$

4

$10\% < \text{bad area} < 100\%$

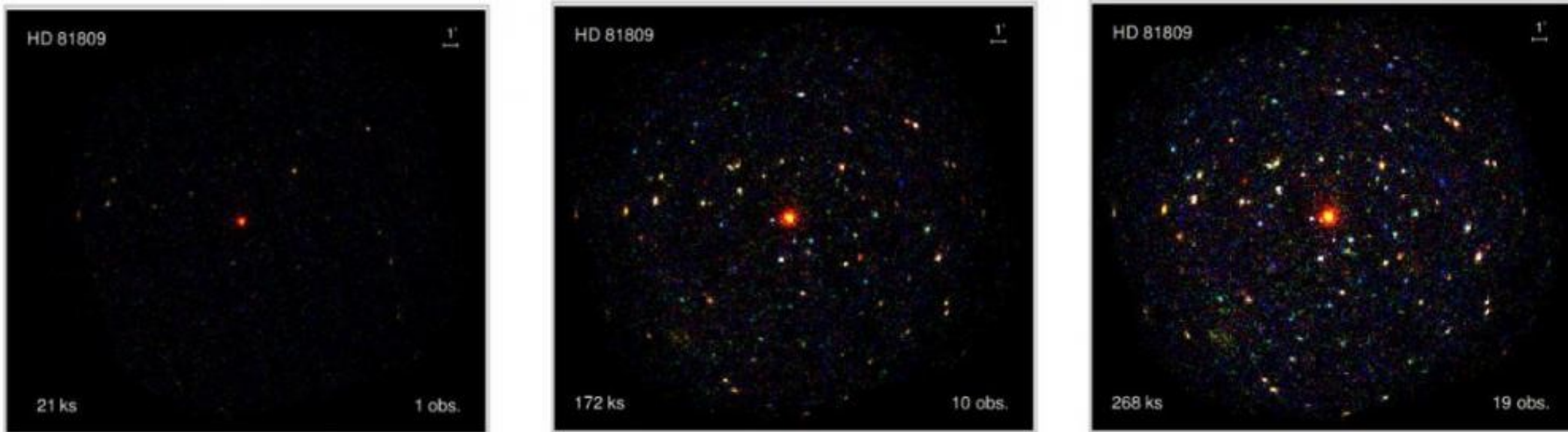
5

bad area = 100%

Other new products for 4XMM:

- Multi-Order-Coverage maps (MOCs) for individual obs. & 4XMM-DR9
- Flux and rate maps per observation
- Radio to gamma-ray Spectral Energy Distributions (SEDs)
- Pileup evaluation

(Webb et al. submitted)



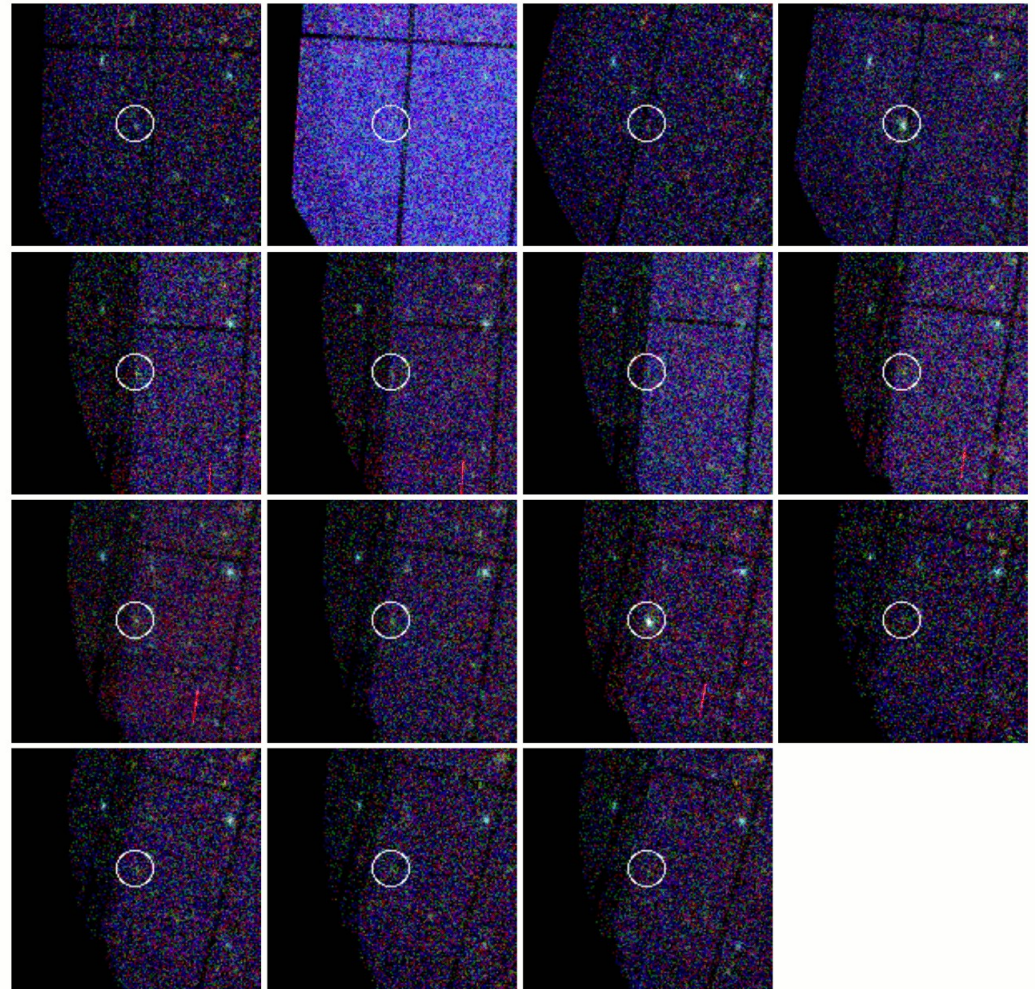
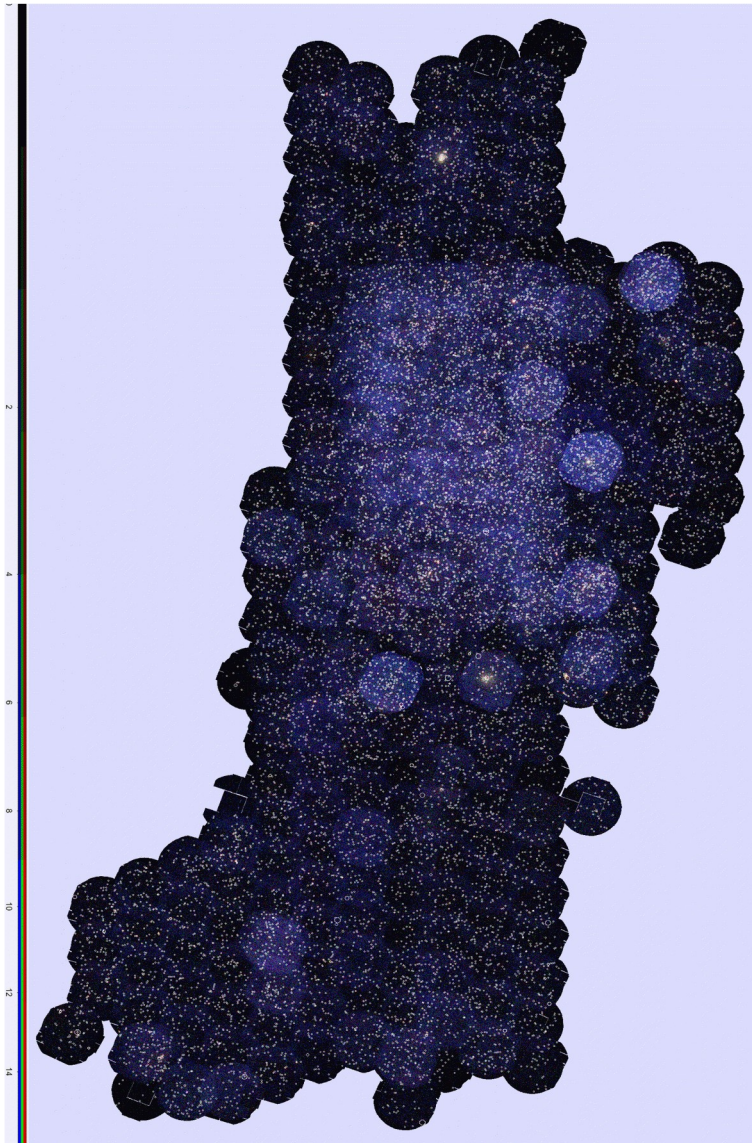
- 1329 stacks
- 6604 observations
- 288191 sources
- ~20% new sources with respect to 4XMM

Traulsen et al. submitted



# 4XMM-DR9s

4XMM-DR9





## XMM-Newton Catalogue Observatory of Strasbourg



### Select a Catalog

Click on one of the blues frames below to redirect to the requested interface.



### Select Sources of Interest

Build simple or complex queries. Have a look at the videos to get an overview on the query features



### Get Anything about X-Ray Sources

Access all source parameters, possible identifications, spectral fits and lots of others things.

4XMM-dr9 Unique Sources

4XMM-dr9 Detections

4XMM-dr9 Alix Sky Browser

3XMM-dr8 Unique Sources

3XMM-dr8 Detections

ARCHES Unique Sources

ARCHES Cross-matched Catalogue

### News

- 4XMM dr9 online (including the Alix Sky Browser)  
10/03/2020
- 3XMM dr8 online  
16/05/2018
- 3XMM dr7 online  
01/06/2017
- 3XMM dr6 online  
05/07/2016
- New Aladin Lite interface - Overlay with Vizier catalogues - full text search for both hips and catalogues  
03/2016



# Citizen science



[About us](#)
[The project](#)
[Tutorial](#)
[Contact](#)
[Log in](#)
[Sign up](#)

## Welcome to CLAXSON!

(Classification of X-ray Sources for Novices)

Help astronomers find exotic objects in the high-energy Universe: fast X-ray transients, pulsating neutron stars, intermediate-mass black holes...

Begin!

Presentation

<http://xmm-ssc.irap.omp.eu/claxson>

Logged in as: htraniin [Disconnect](#)

You have made 10 classifications to date. Success rate: 80%.

Original image credit: NASA/JPL-Caltech

### Classification of X-ray Sources for Novices (CLAXSON)

4XMM J140313.1+542055 (SRCID=202124802010017)

☒ Star
 ☐ AGN
 ☐ X-ray Binary
 ☐ Cataclysmic Variable
 ☐ None of these
 ☐ I don't know
 [Submit](#)
[Pass](#)
[Show the truth](#)
[Commentable tutorial](#)
[Simbad XMM catalog](#)

X-ray (XMM)

PN spectrum, obs 0212480201, source 20

Ultraviolet (GALEX)

Simultaneous obs 0212480201, source 20, instrument M1

Optical (DSS)

Light curve from the detections of 4XMM-DR9 (commentable!)

Infrared (WISE)

Additional information

Galactic latitude = 59.8°  
 $l_{XO}$  = unknown  
 $l_{XI}$  = -0.59

### TUTORIAL

1. Compare the center brightness of all images
2. Look at the form of the spectrum (if present)
3. Check the values shown in the lower right corner
4. Conclude. What object do you recognize?

Examples below show these elements:

X-ray image	Spectrum or Light-curve	Empirical approximative rules
UV image	Optical image	Infrared image

AGN

- $l_{XO}$  = unknown or  $> -2$  and  $< 2$
- $l_{XO} > -1$  and  $< 1$
- $b < -20^\circ$  or  $> 20^\circ$

Star

- $l_{XO} < -2$
- $l_{XI} < -1.5$
- $b > -20^\circ$  and  $b < 20^\circ$

# Upcoming products

---

4XMM-DR10 and 4XMM-DR10s for later this year

Updates to the FLIX upper limit server

Work ongoing on algorithms and tests to find variable sources in the XMM-Newton field of view and alert the community in nearly real time

Ideas for improved source detection in the stacked catalogue

# Summary

---

Continued SAS task development + support

Continued data products screening

Ongoing source identification activities

Enhanced catalogue servers helping to disseminate data products

4XMM released at the end of 2019

Yearly incremental updates of 4XMM + 4XMMs expected

New methodology developed continually to provide added variability information, improve source detection & identify sources

New outreach project

Exploit the time domain capacity of XMM-Newton

5XMM expected for ~2025

Continue to provide XMM-Newton legacy products

---



# Ready for the next decade of XMM-Newton!

