

OM Calibration

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XMM-Newton Users
Group meeting
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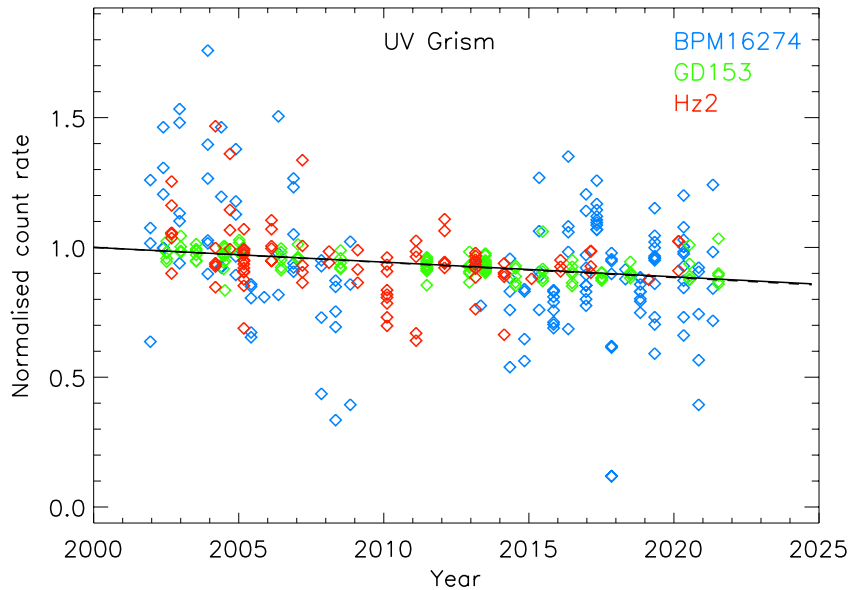
Outline

- UG recommendations 2021
- Recent OM calibration/monitoring activity
- Catalogue plans & forward look

UG recommendations (2021)

- **Recommendation 2021-06-10/13:** For consistency, the UG recommends that future OM catalogues are based on results obtained using the general pipeline instead on internal software

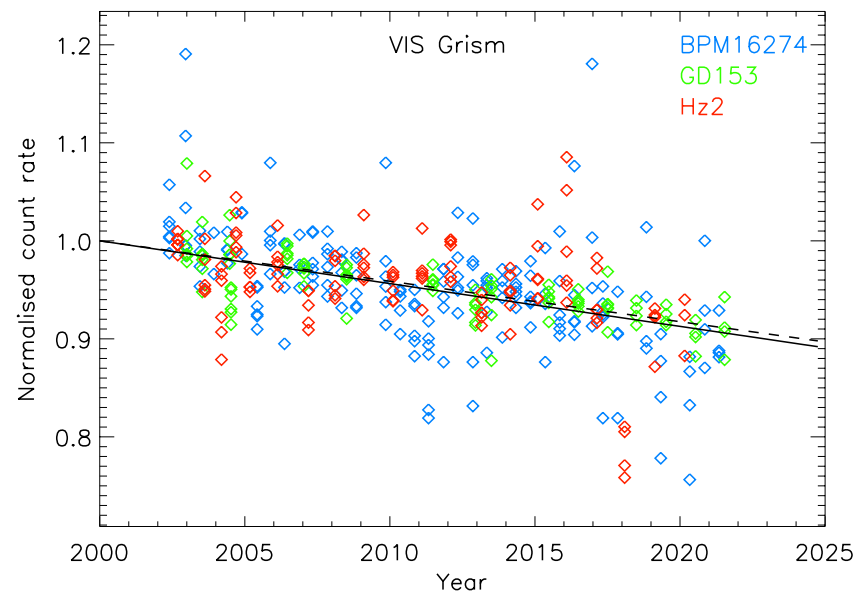
OM Grism time-dependent degradation



Measurements of spectra of 3 standard stars in 6 wavelength bands in each grism.

OM grism throughput at 2024.0

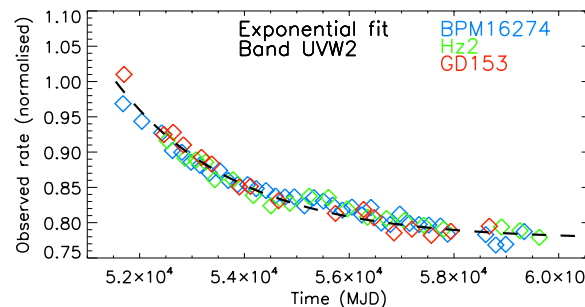
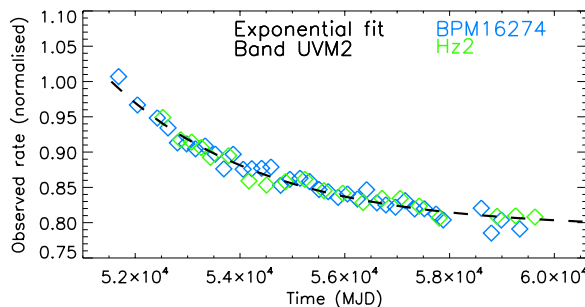
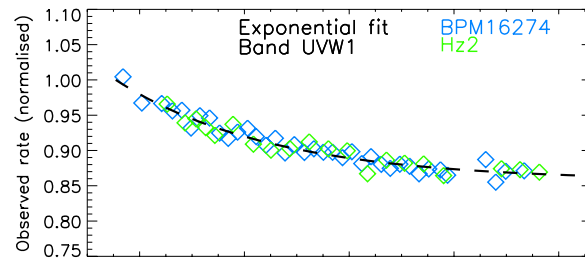
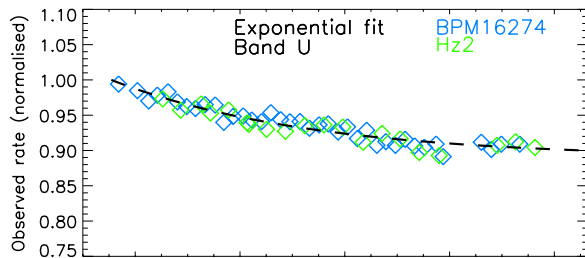
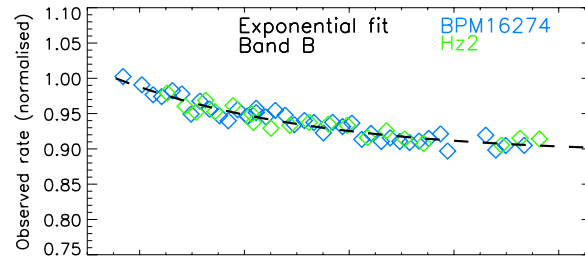
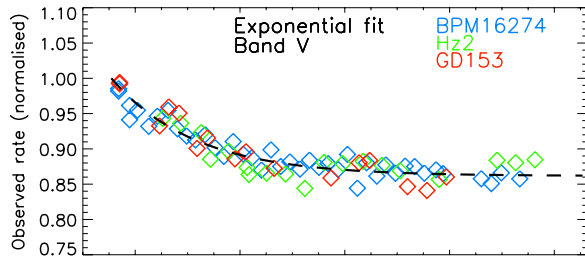
Grism	Throughput
UV	0.86
VIS	0.90



Updated to 2024 in (XMM-CCF-REL-386 released 03/12/21)

Decline corrected in SAS

Monitoring OM time-dependent degradation (filters)



OM throughput at 2030

Filter	Throughput
V	0.86
B	0.89
U	0.89
UVW1	0.86
UVM2	0.81
UVW2	0.78

Declines continue to slow in all filters.

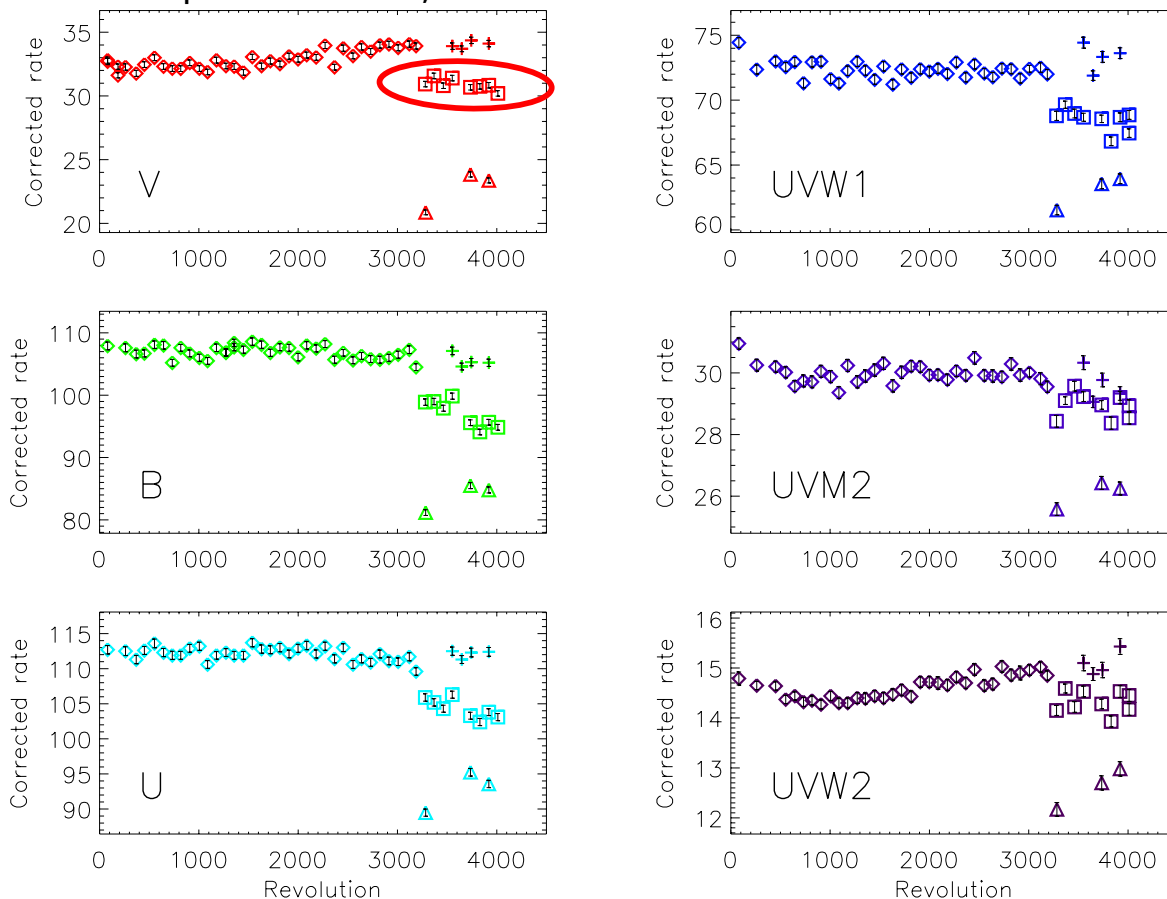
Decline corrected in SAS

To be updated prior to catalogue creation

OM boresight (Jupiter patch) monitoring

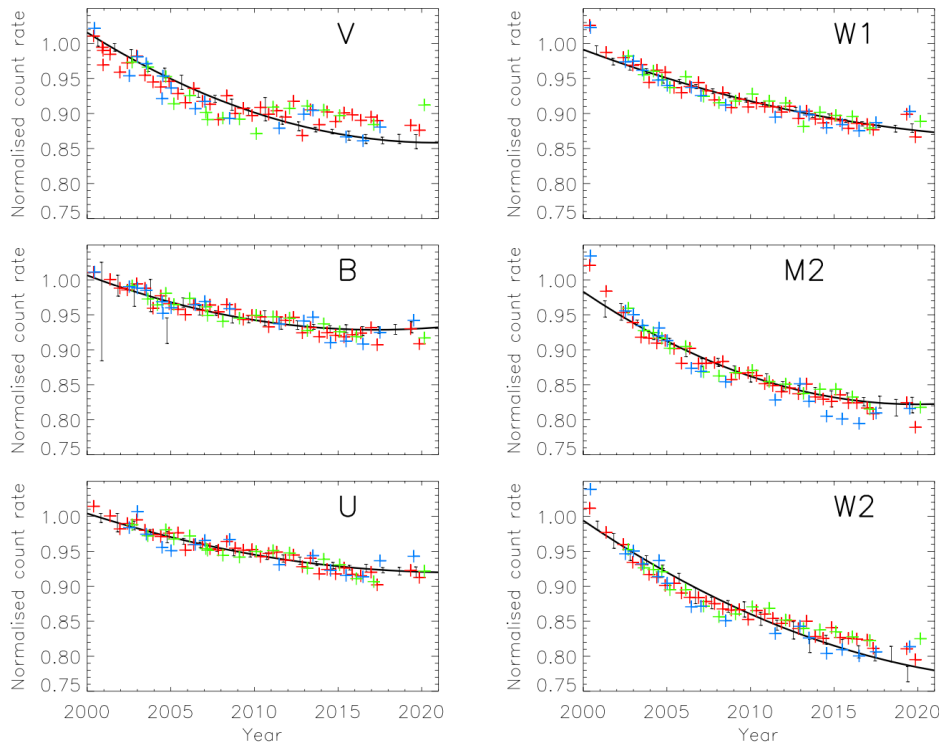
BPM16274 data (up to rev 4011)
 - corrected for general TDS degradation

□ boresight after JE, ◇ boresight pre JE,
 + off patch after JE, △ JP core after JE

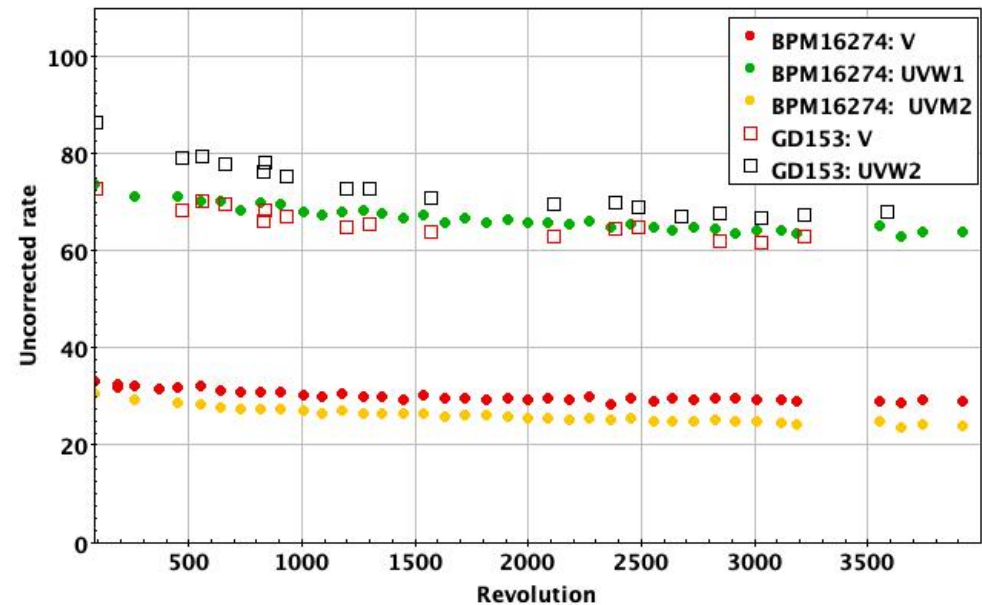


- Boresight lies in wings of Jupiter patch
- Slight further decrease of sensitivity at boresight (no more than 6% (~12% in total) - in B filter)
- To be documented in OM calibration status document

OM time-dependent degradation – differences between standards and bulk catalogue data



Rate effect?

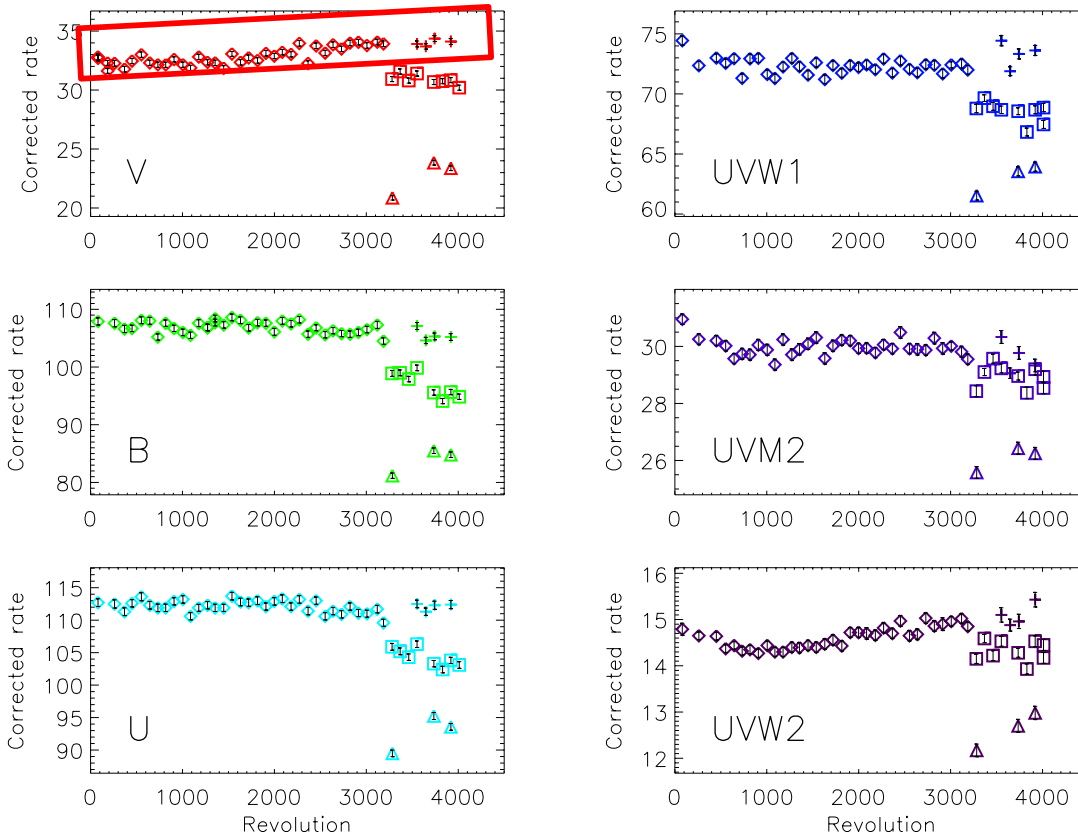


No. Similar rates, different behaviour

Declines of standards in V and UVW2 bands differ from 'constant' sources from catalogue (black curves).

OM time-dependent degradation – differences in standards and bulk catalogue data

◇ boresight pre JE, + off patch after JE, △ JP core after JE,
 □ boresight after JE,



Spatial/localised effect?

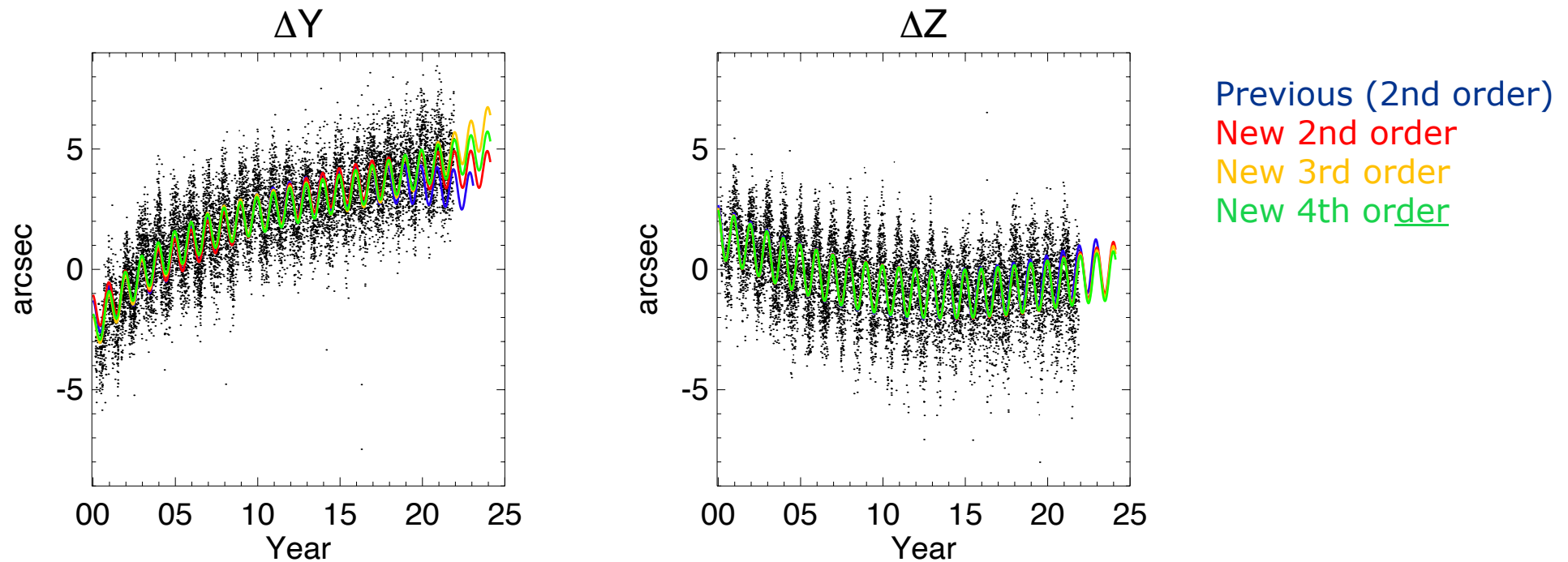
Standards recently observed off-boresight conform to previous V & W2 trends from boresight measurements.

⇒ difference between standards and bulk catalogue data unlikely due to localised boresight effects

Colour effects also explored – do not explain the difference

Cause of difference remains unclear

OM time-dependent boresight update



- OM (+EPIC) time-dependent boresight updated (Feb 22): version 0032 (XMM-CCF-REL-387).
- Error in previous 2 releases for OM (incorrect PA used). Effect is $\sim 1''$ (mainly in Y axis).
 - Rectification against astrometric catalogue generally removes error.
 - Does not affect fast mode window positioning.

OM SUSS6 catalogue

- Work to create next OM Serendipitous UV Survey, SUSS6, will begin soon (~July)
- Expected to comprise around 12300 observations with public OM data to ~June 2022 (incl. TOO/Cal/MYH public data)
- And approaching 10 million detections from 6.5 million sources
- Aim to provide next release in late 2022 or early 2023
- Prior to catalogue generation, aiming to
 1. Improve some elements of flagging software
 2. Update time-dependent degradation calibration (based on proto-catalogue data – iteration).
 3. *Evaluate (preferable) use of pipeline processed products cf bespoke processing*

Forward look and potential improvements



- XMM-OM SUSS6 catalogue
 - *Future: aim to standardize use of pipeline products*
 - *Future: better streamlining of catalogue production from products*
- Time-dependent degradation update for photometry
- *Future: As time permits, effort to create flat fields for the Jupiter patch and implementation of correction in SAS*
- *Future: Improve astrometry via revised distortion map*
- *Future: Identifying/resolving step patterns in fast mode photometry obtained in default mode*