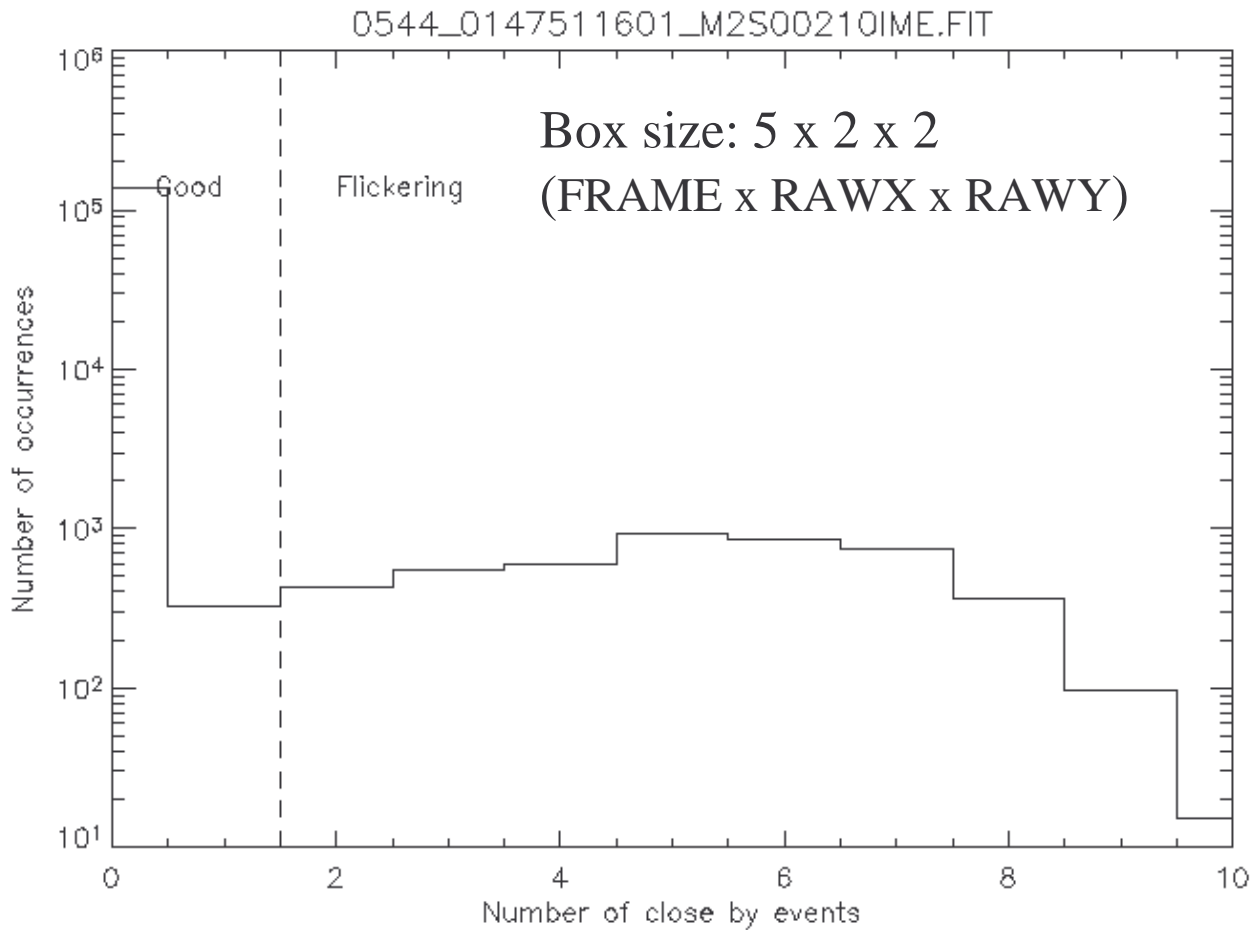


MOS flickering pixels

- ü Became pressing issue when 1XMM catalogue showed a distinct excess of weak sources in MOS 2
- ü *emevents 7.10* marks flickering pixels and event clusters in nearby frames (cosmic rays). New parameters : `rejectflickering`, `tolfxy`

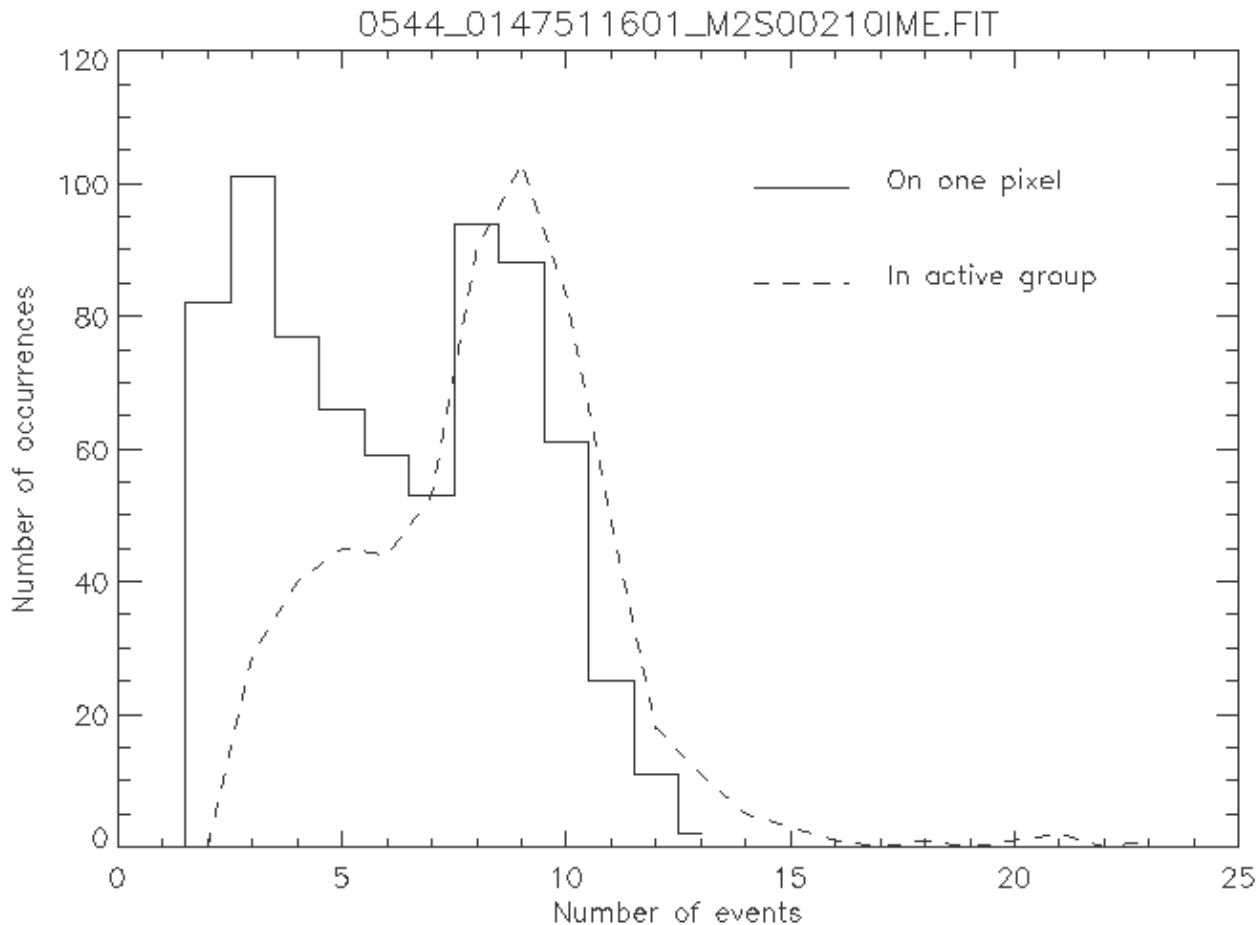
MOS flickering pixels (I)



Find peaks in
RAWX, RAWY, FRAME
using a sliding box algorithm

MOS 2, CCD 1

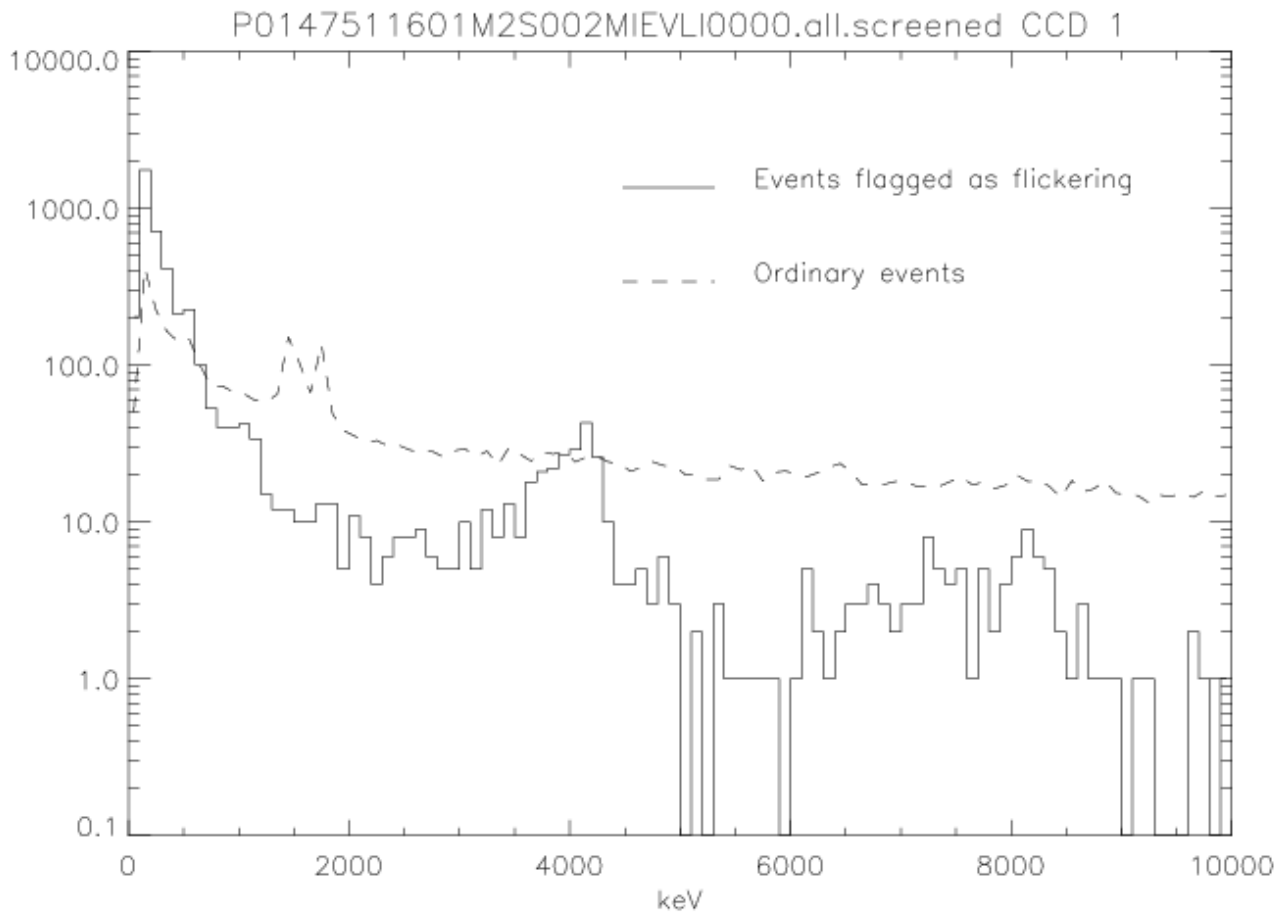
MOS flickering pixels (II)



- ü Once a peak is found, accrete neighbouring events as long as their density exceeds the average density
- ü Guard against variable sources by flagging only when the spatial distribution is incompatible with the PSF (too narrow, or too elongated)

Flickering occurrence lasts 10 frames on average, sometimes up to 20

MOS flickering pixels (III)

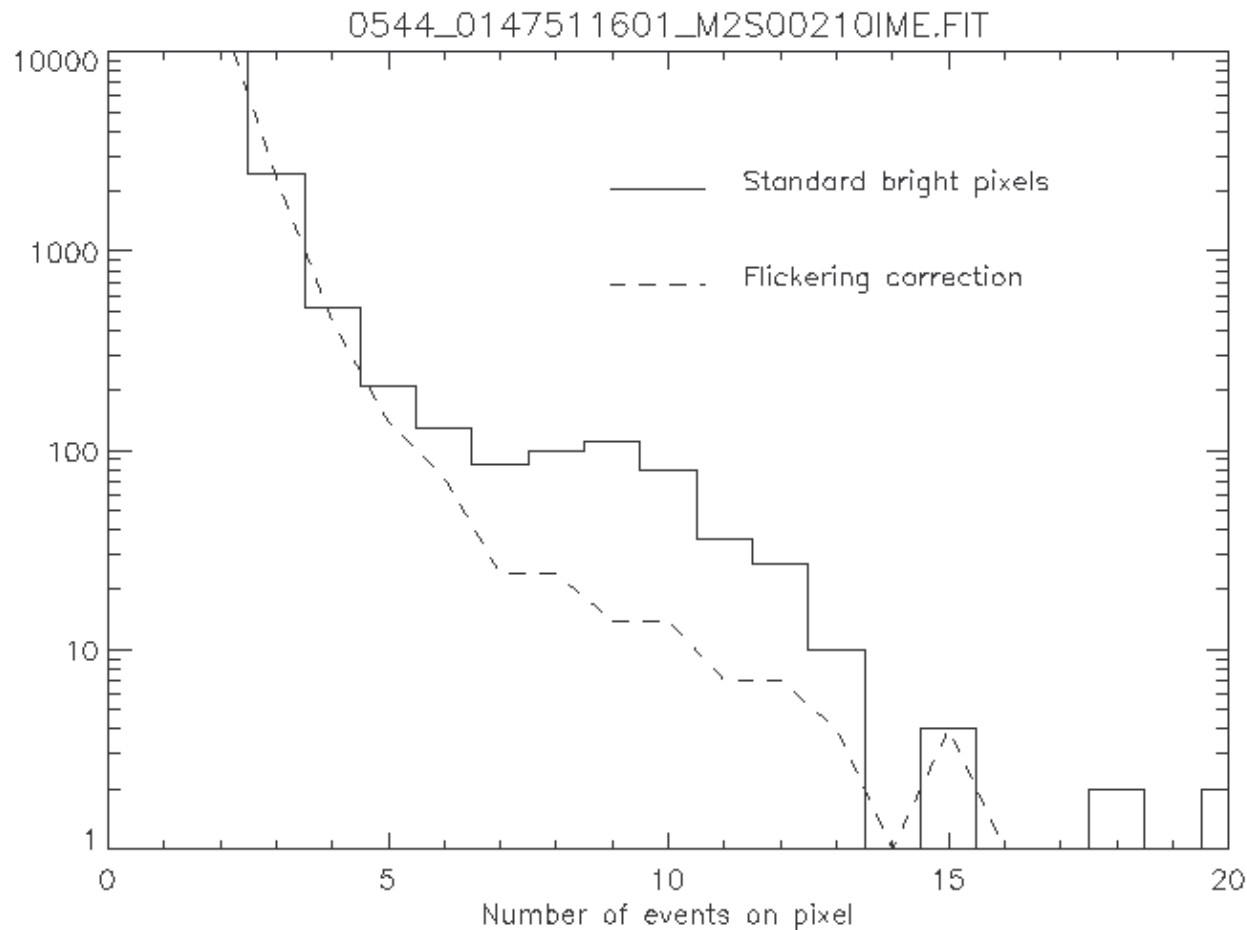


MOS 2, CCD 1

- Peak around 4 keV (same in CCDs 4 and 6)
- Most flickering events are at low energy, but rather broad peak

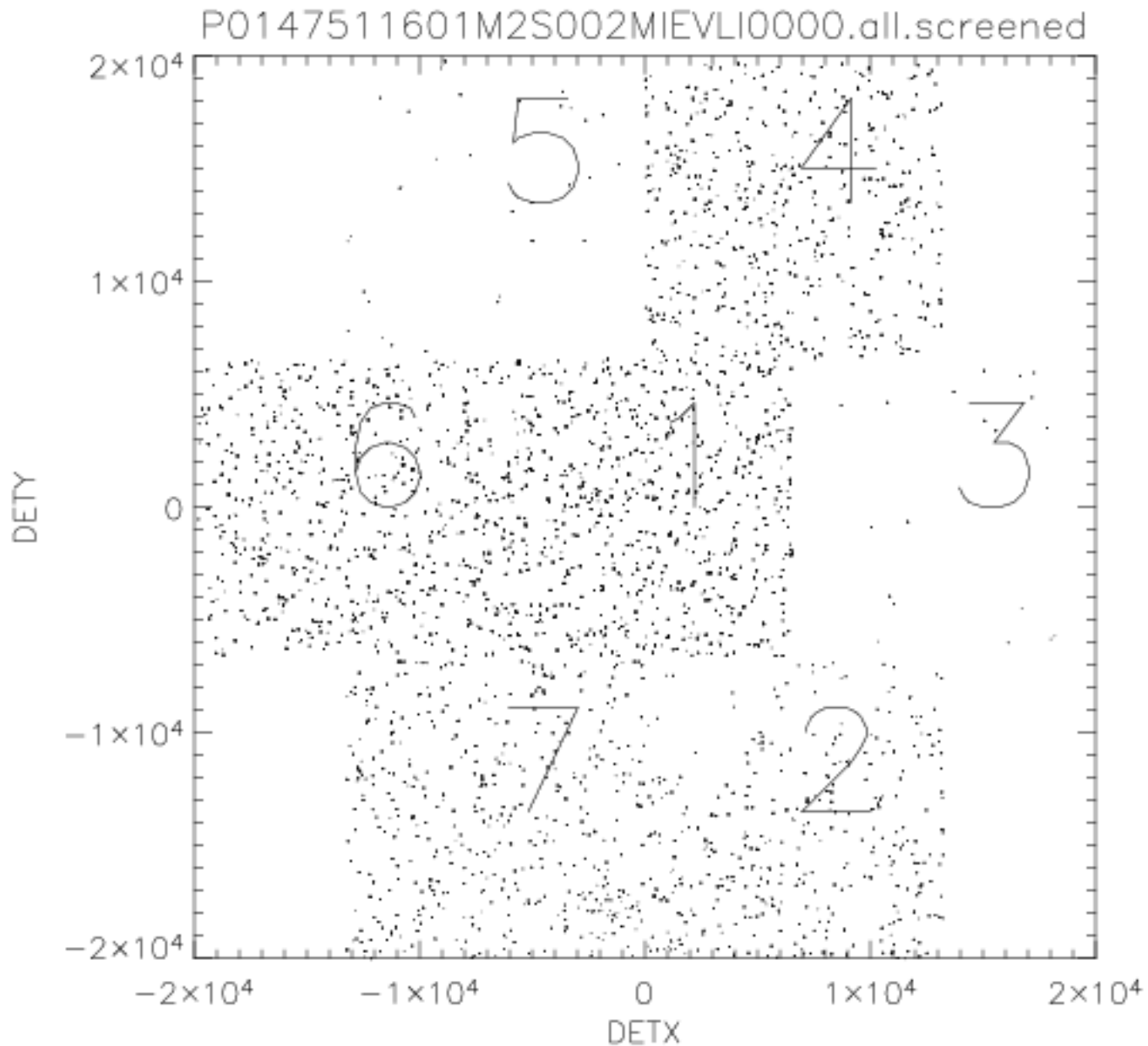
MOS flickering pixels (IV)

MOS 2, CCD 1



- ü The histogram of events per pixel had a peak near 10 events (after *embadpixfind*)
- ü That peak is significantly reduced after applying the flickering detection

MOS flickering pixels (V)



Percentage of
flickering events

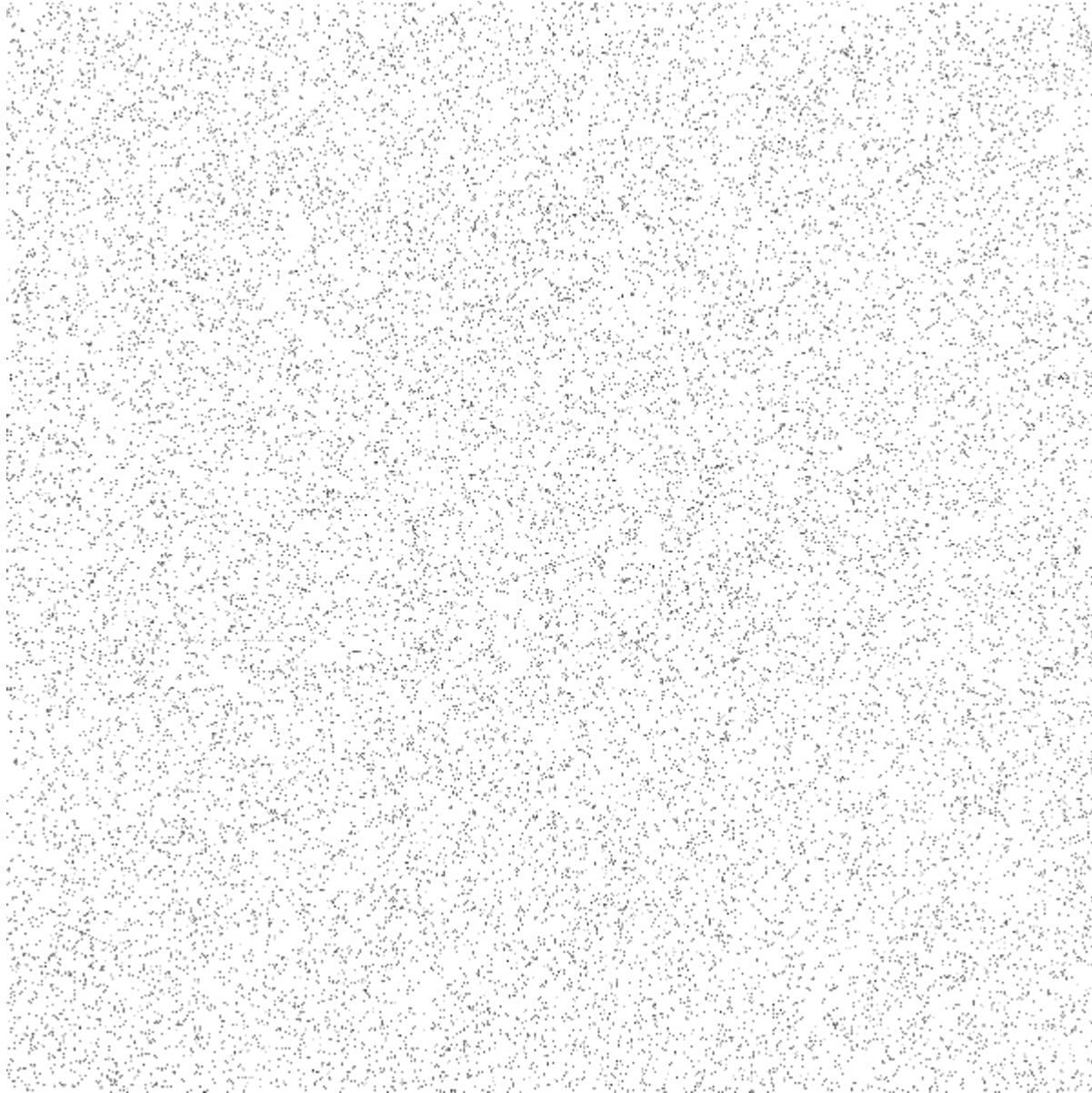
MOS 2

| CCDNR | % |
|-------|------|
| 1 | 8.06 |
| 2 | 2.77 |
| 3 | 0.16 |
| 4 | 6.75 |
| 5 | 0.20 |
| 6 | 6.05 |
| 7 | 3.68 |

MOS 1

None

MOS flickering pixels (VI)



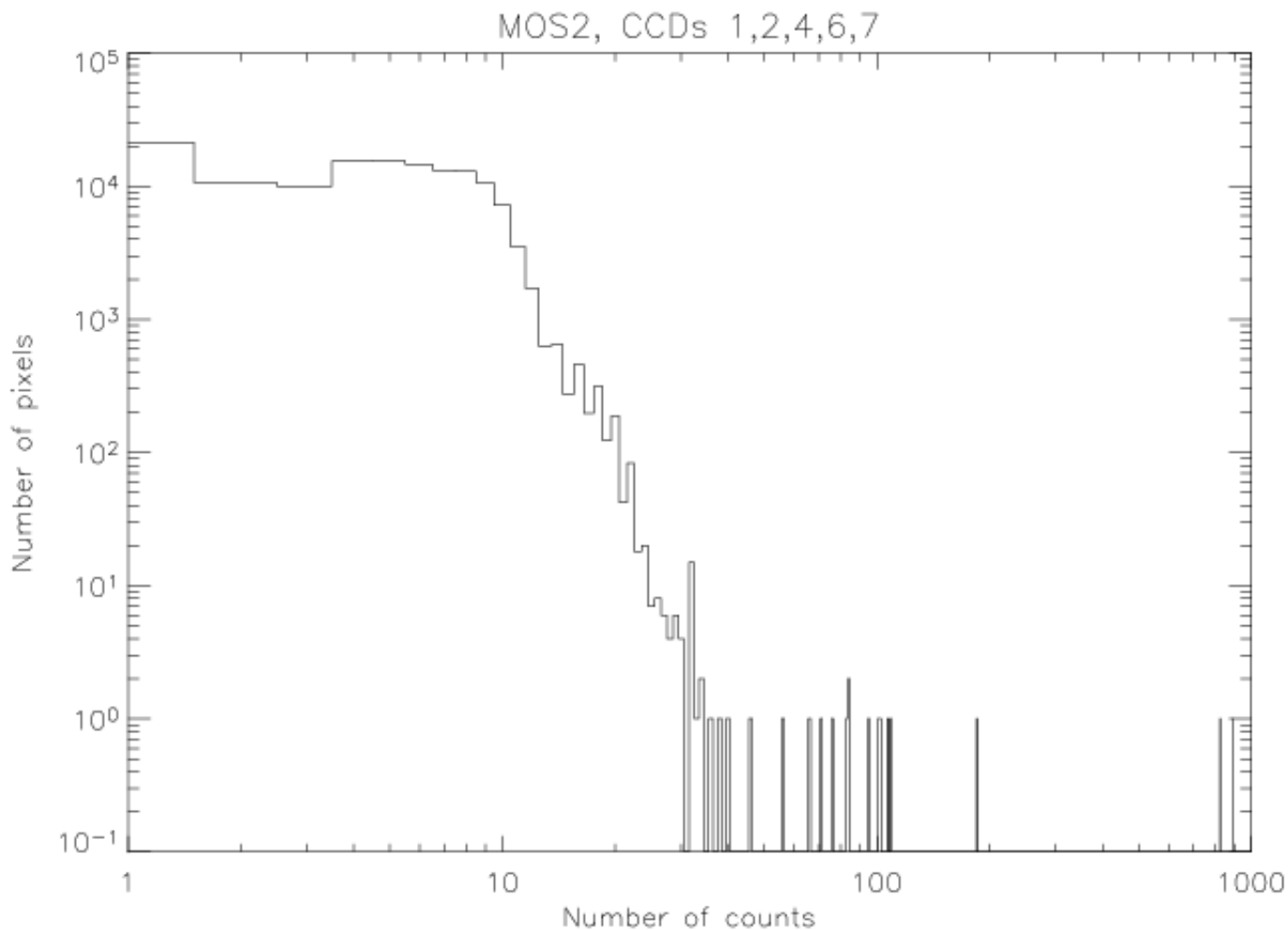
MOS 2, CCD 1

All CAL/PV data
(plus a few others)

No excess at centre
(where the sources are)

relatively uniform
distribution

MOS flickering pixels (VII)



All CAL/PV data
(plus a few others)

- The secondary peaks at 20 and 30 are due to chance coincidences (5% of pixels > 3)
- Apart from a few truly bright pixels, the flickering pixels seem to occur randomly over the CCDs