

Estimation of degradation curves for LYRA unit 2

IED 25 Apr 2013

Based on the last report

http://solwww.oma.be/users/dammasch/IED_20121218_DegradationUpdate.pdf
that uses data from campaigns up to December 2012, the degradation curves were fitted once more to cover the current year with updated estimates (i.e. up to day ~ 1500).

Estimates for channels 2-1 and 2-2 do not change much relative to the last version, which is about a year old.

Since the estimate for channel 2-3 was slightly pessimistic last time, the new (lower) estimates will hardly make a difference at the current time (day ~ 1200). After reprocessing the whole data set, the long-range curve may look a bit different, though.

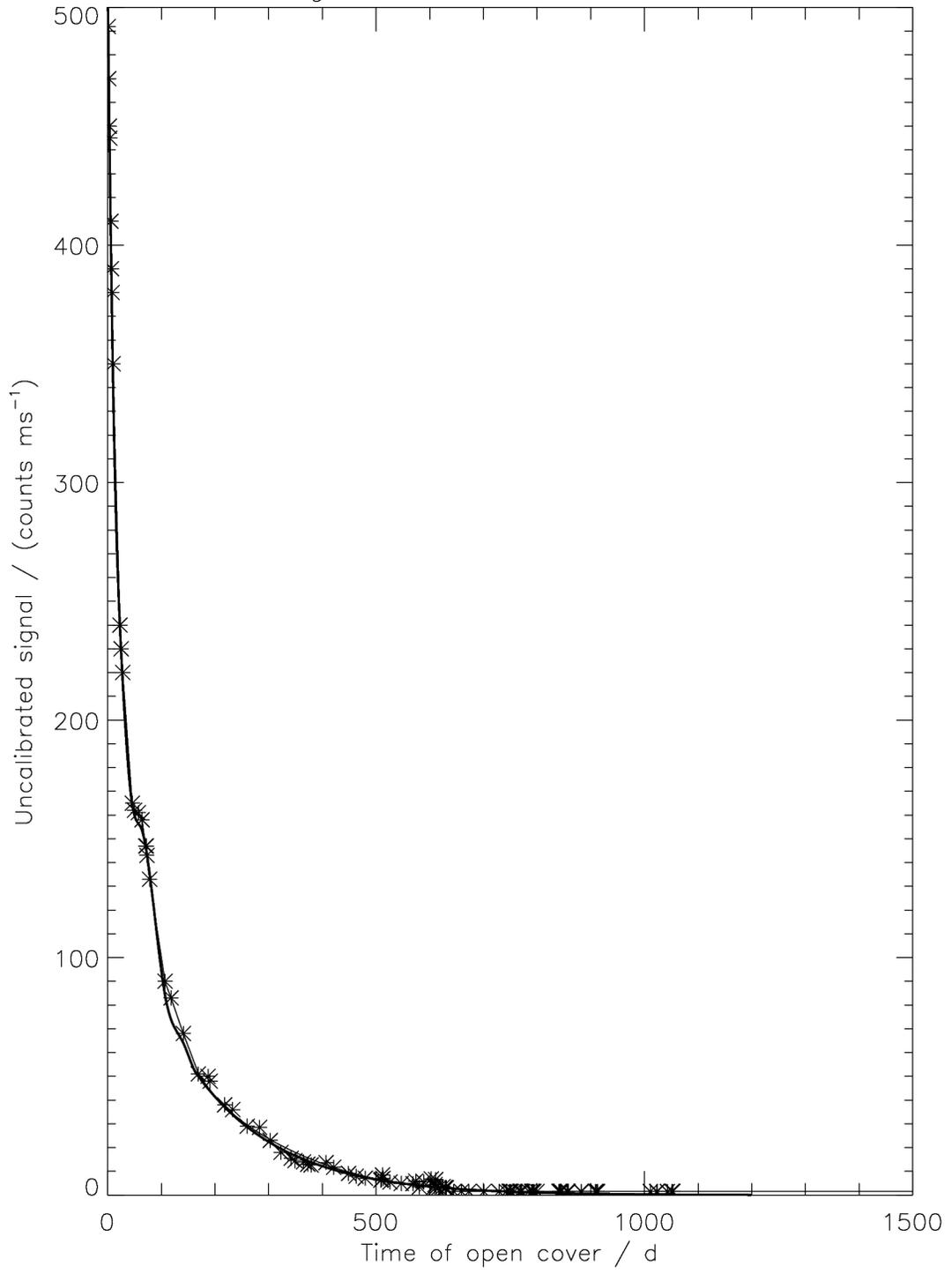
Channel 2-4 shows the biggest differences. Were the estimate still done on the basis of unit 3, the current curve would still be close to the last curve, simply somewhat more smooth: The fits were made with exponential functions of higher polynomials this time. But since it was discovered that unit 3 degrades when compared with unit 1 (approx 15% over the whole observation period; 5% immediately during the first weeks), the fit was now done on the basis of unit 1.

At the current time, a jump upwards of approx 0.06 mW/m² (~ 8%) must be expected. This is due to the fact that the degradation of unit 2 was estimated on the basis of unit 3 before. The degradation of unit 3 was assumed to be zero before, but is 15% now, based on the comparison with unit 1. Thus, the degradation of unit 3 and unit 2 was underestimated, and now a bigger term must be added. Relative to the solar variations (typically in the order of 0.5 mW/m² per rotation) the expected upward jump will still be almost negligible.

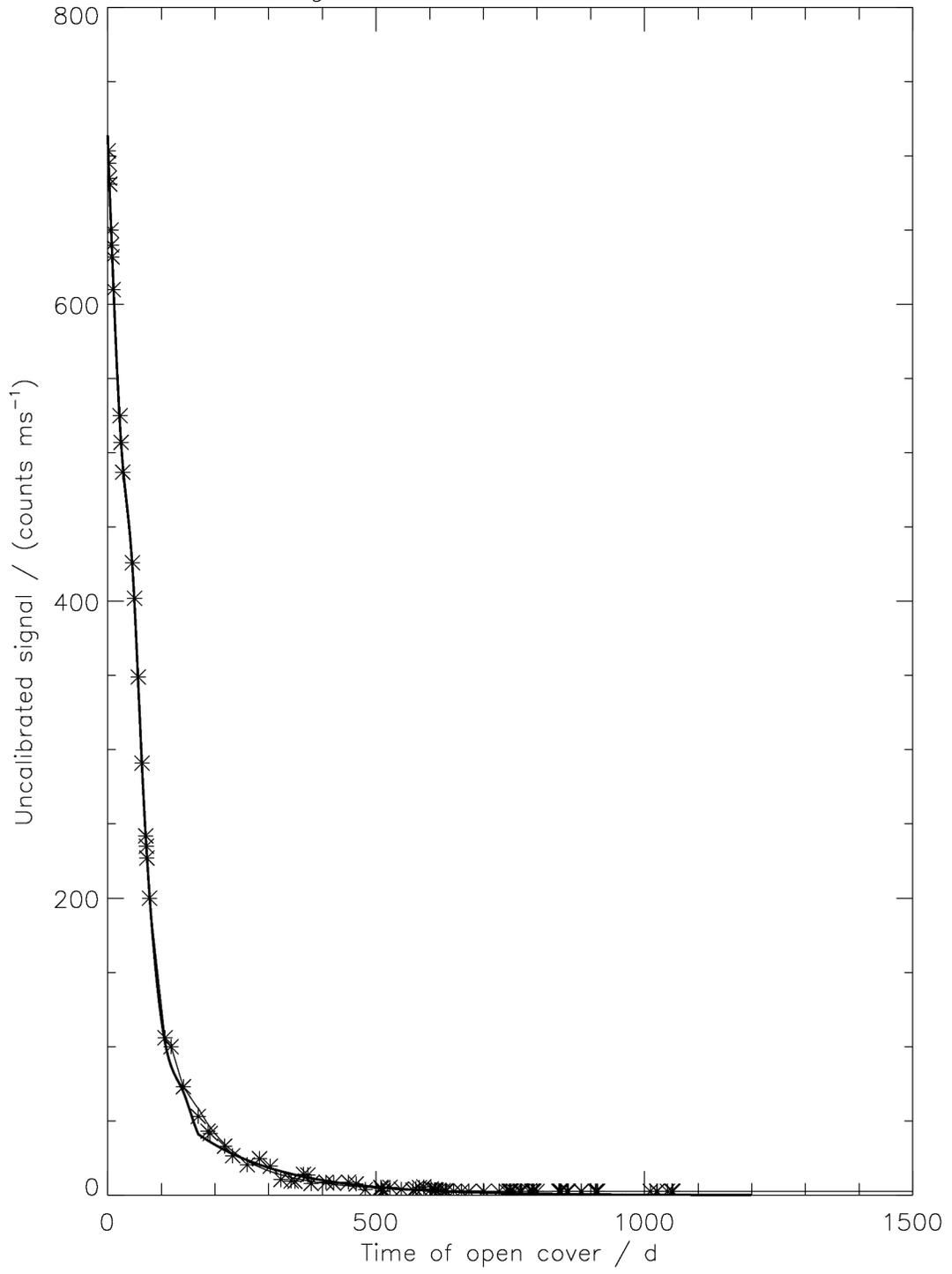
The differences of the various methods can best be seen in the fourth figure. The asterisks denote the observations, scaled with unit 3 to remove solar variations. The upper curve shows the fit. The thick curve shows the old fit, based only on observations up to day 700. - The large squares denote the observations, scaled with unit 1 to remove solar variations. The lower curve shows the fit for these. Since there are less data points from unit 1, leading to higher uncertainty, it was considered to fit the observations by taking the "good" fit with unit 3 and multiply it with the degradation of channel 3-4 relative to channel 1-4 (which scatters less and seems quite plausible). This estimate is shown with a dotted line and will be selected for the current update.

The next four pages show the development for the channels of LYRA unit 2.

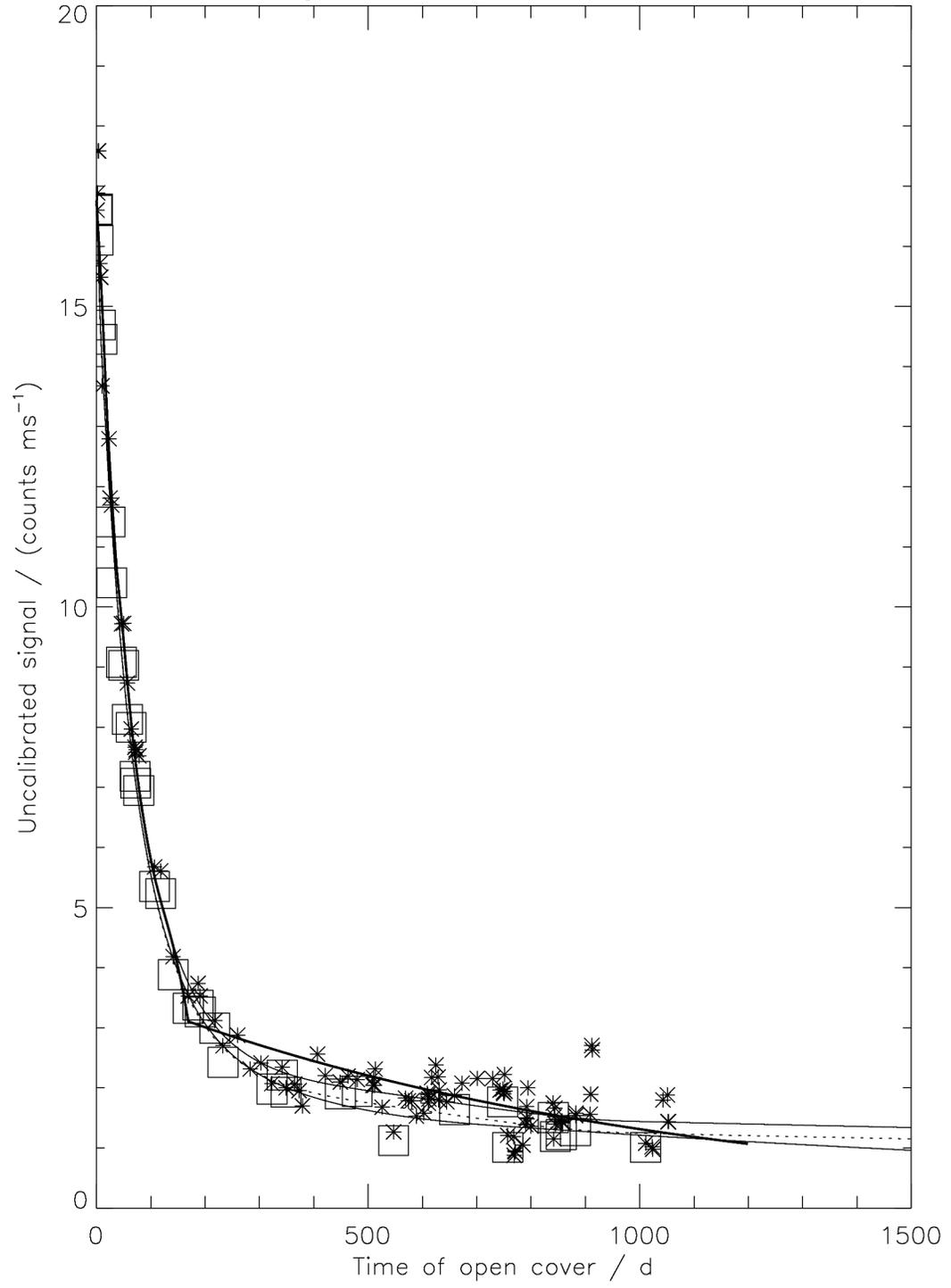
Degradation LYRA channel 2-1



Degradation LYRA channel 2-2



Degradation LYRA channel 2-3



Degradation LYRA channel 2-4

