

PHT Data Validation Report TIC 94986319

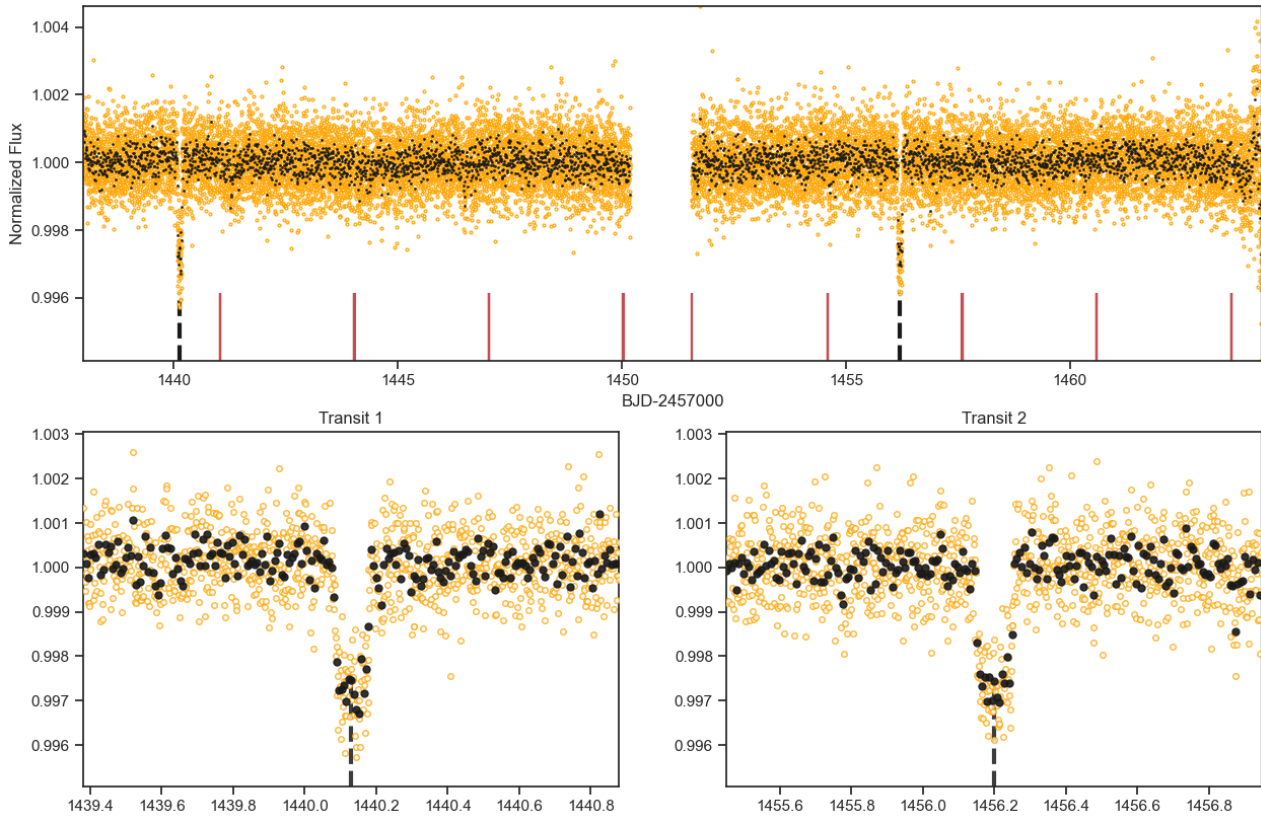


Fig 1. Full lightcurve for target TIC 94986319. The solid red lines at the bottom of the figure indicated the times of the momentum dumps and the dashed black line(s) show the time(s) of the marked transit event(s).

Target Properties

Parameter	Value	Unit
TIC ID	94986319	
RA	81.8533	degrees
Dec	-14.2767	degrees
Radius	1.1097	Solar Radii
Tess Mag	9.2160	Mag
Teff	5718	Kelvin
Sectors	5, 6 *	
TCE	Yes **	
TOI	421.01	

Table 1. Stellar properties of [TIC 94986319](#). * List of the sectors in which the target will be has been observed. ** Click [here](#) for the TCE report.

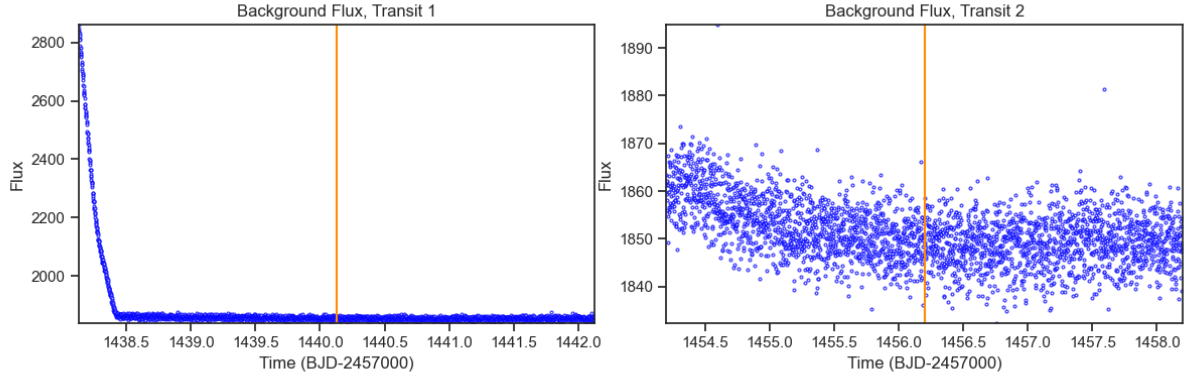


Fig 2. Background flux vs. time around the time of each transit-like event. The vertical orange line indicates the time of the transit-like event.

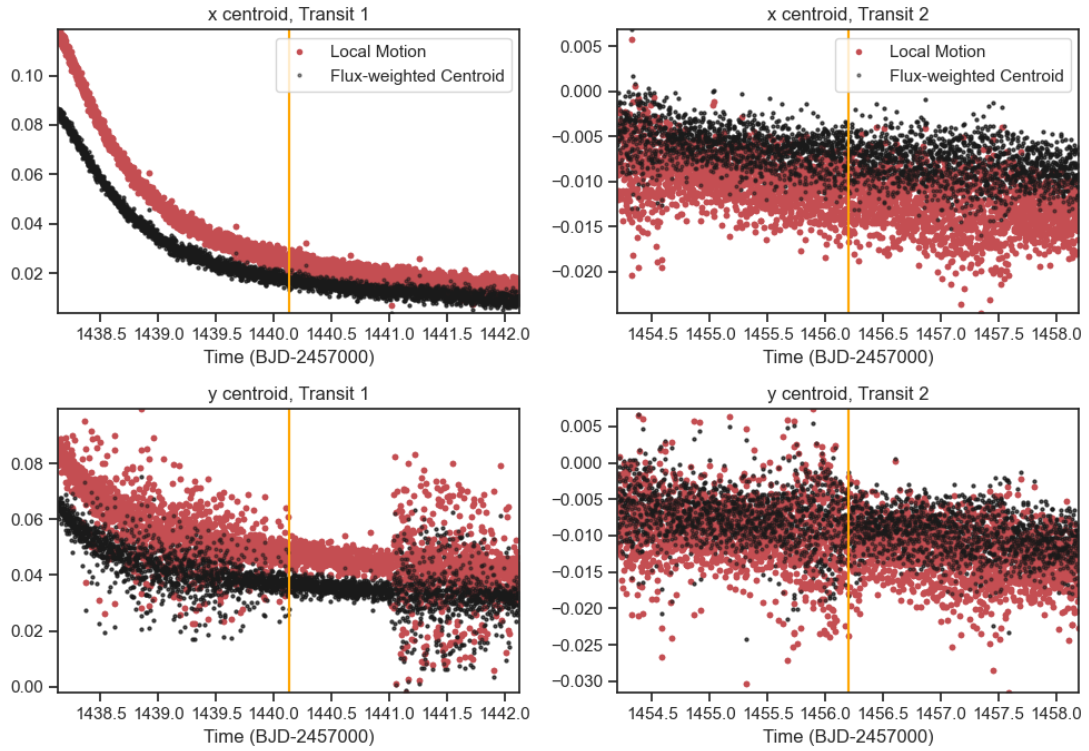


Fig 3. The x and y centroid positions around the time of each transit-like event. The black points shows the CCD column and row position of the target's flux-weighted centroid. The red shows the CCD column and row local motion differential velocity (DVA), pointing drift, and thermal effects. The vertical orange line indicates the time of the transit-like event

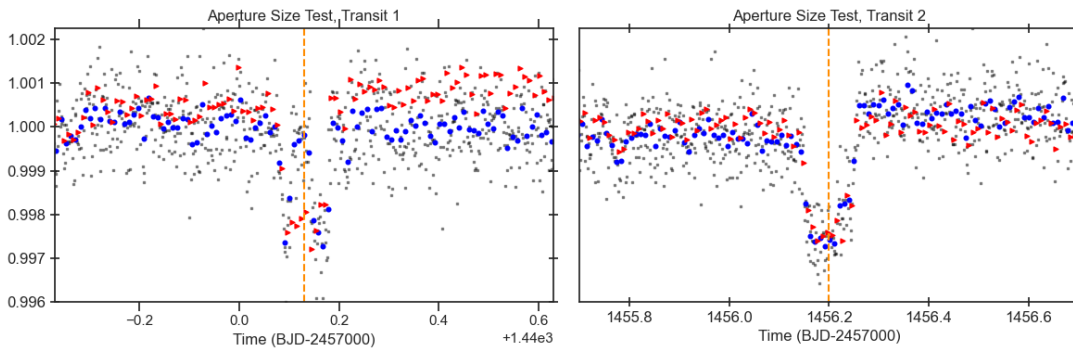


Fig 4. The lightcurve around the time of each transit-like event extracted with the SPOC pipeline defined aperture (binned:blue, unbinned:grey) and the with an aperture that is 40 per cent smaller (red). The flux is extracted from the target pixel files (TPFs) and has not been detrended or corrected for systematics. The vertical orange line indicates the time of the transit-like event.

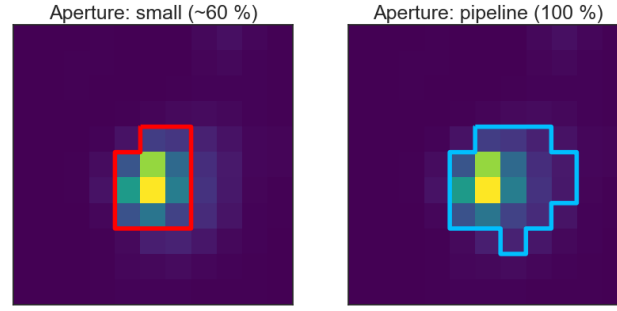


Fig 5. The apertures used to extract the lightcurves. The blue aperture on the right shows the optimum aperture determined by the SPOC pipeline, which is used for the extraction of 2-minute cadence light curves shown in Figure 1. The red outline on the left shows an aperture that is around 40 per cent smaller than the SPOC pipeline aperture which was used to extract the red lightcurve shown in Figure 4.

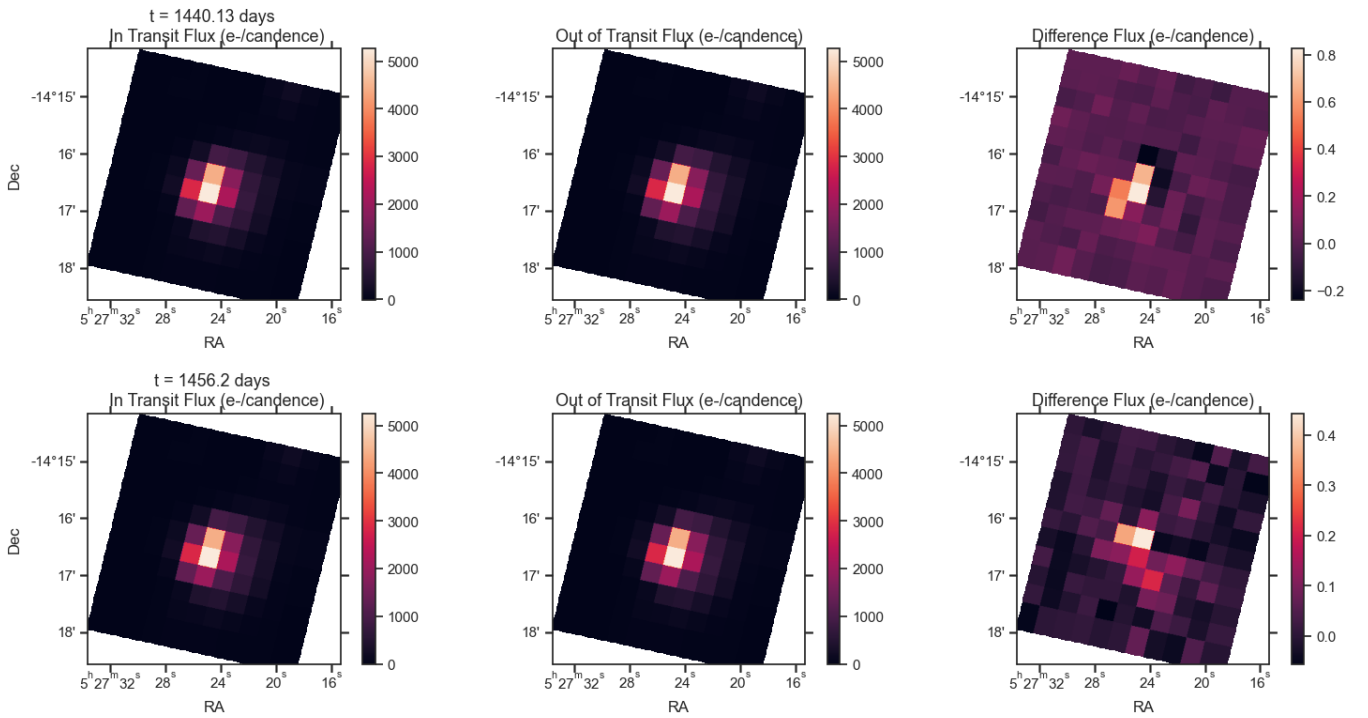


Fig 6. Difference images for target TIC 94986319 for each transit like event. Left: mean in-transit flux(left). Middle: mean out-of-transit flux. Right: difference between the mean out-of-transit and mean in-transit flux. Ensure that the change in brightness occurs on target.

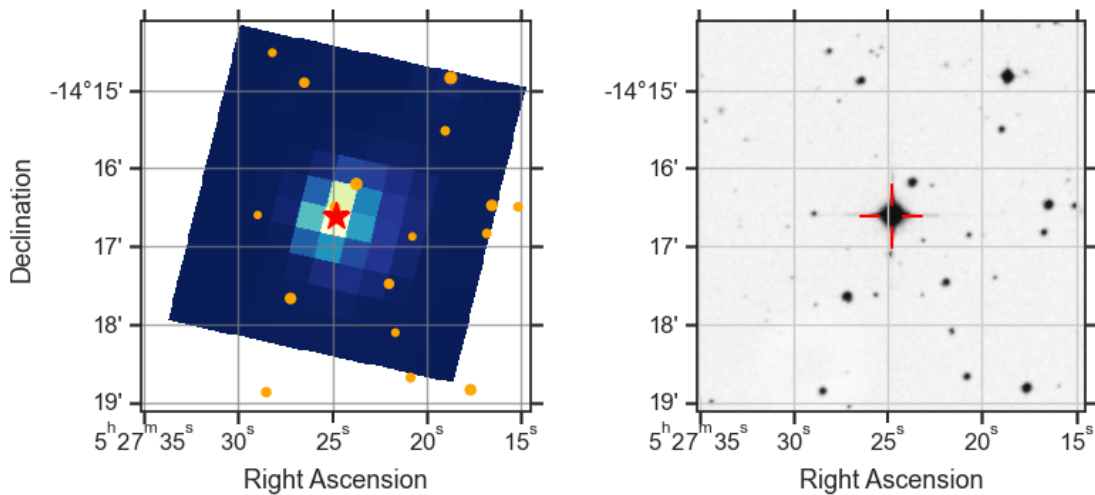


Fig 7. Left: The locations of nearby GAIA DR2 stars with mag < 15 (orange circle) within the TESS Cut Out around TIC 94986319 (red star). Only shown for one sector. Right: SDSS image of the surrounding field.

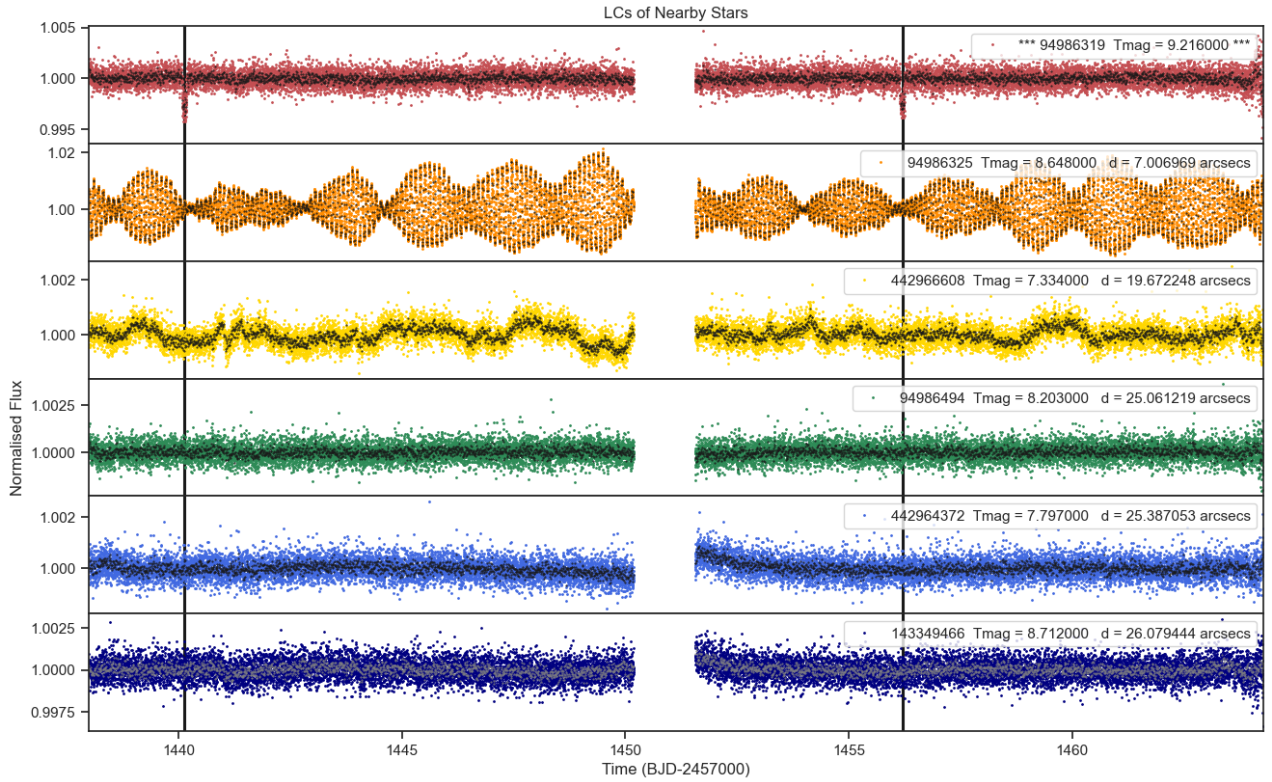


Fig 8. Lightcurves of the five closest stars to target 94986319 (top panel). The distances to the target star and the TESS magnitudes are shown for each star. Only ever shown for one sector.

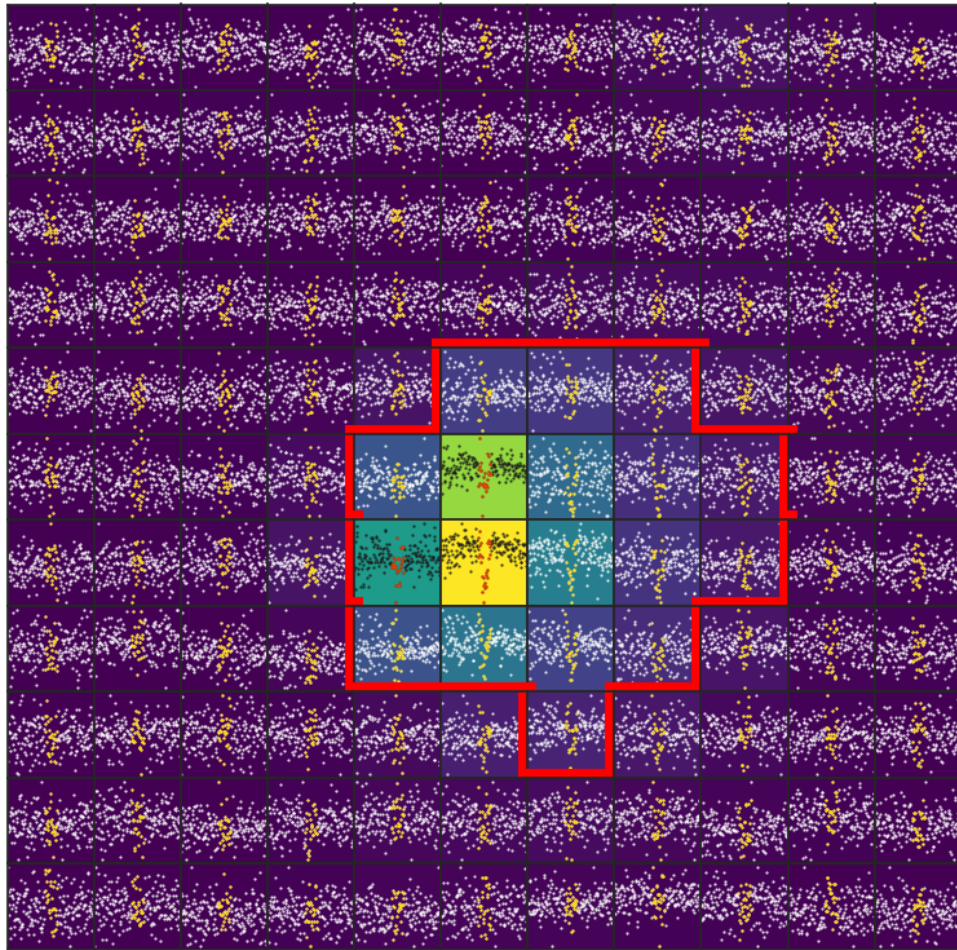


Fig 9. Normalised flux extracted for each pixel, using the SPOC pipeline mask, around the time of the transit-like event. The orange/red data points show the in-transit data. The solid red lines show the SPOC pipeline mask. Only shown for one sector.

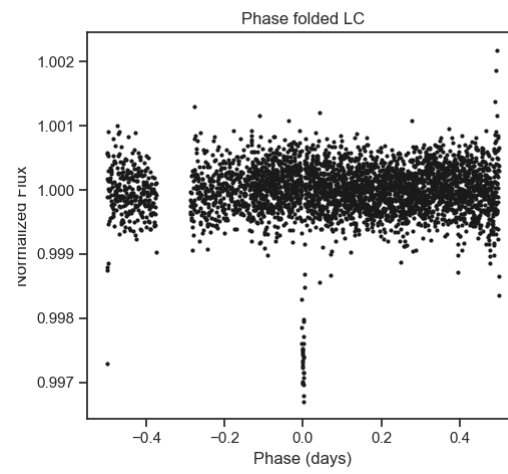


Fig 10. Phase folded lightcurve where the odd and the even transits are shown in different colours. Ensure that the odd and even transits have comparable shapes and depths.

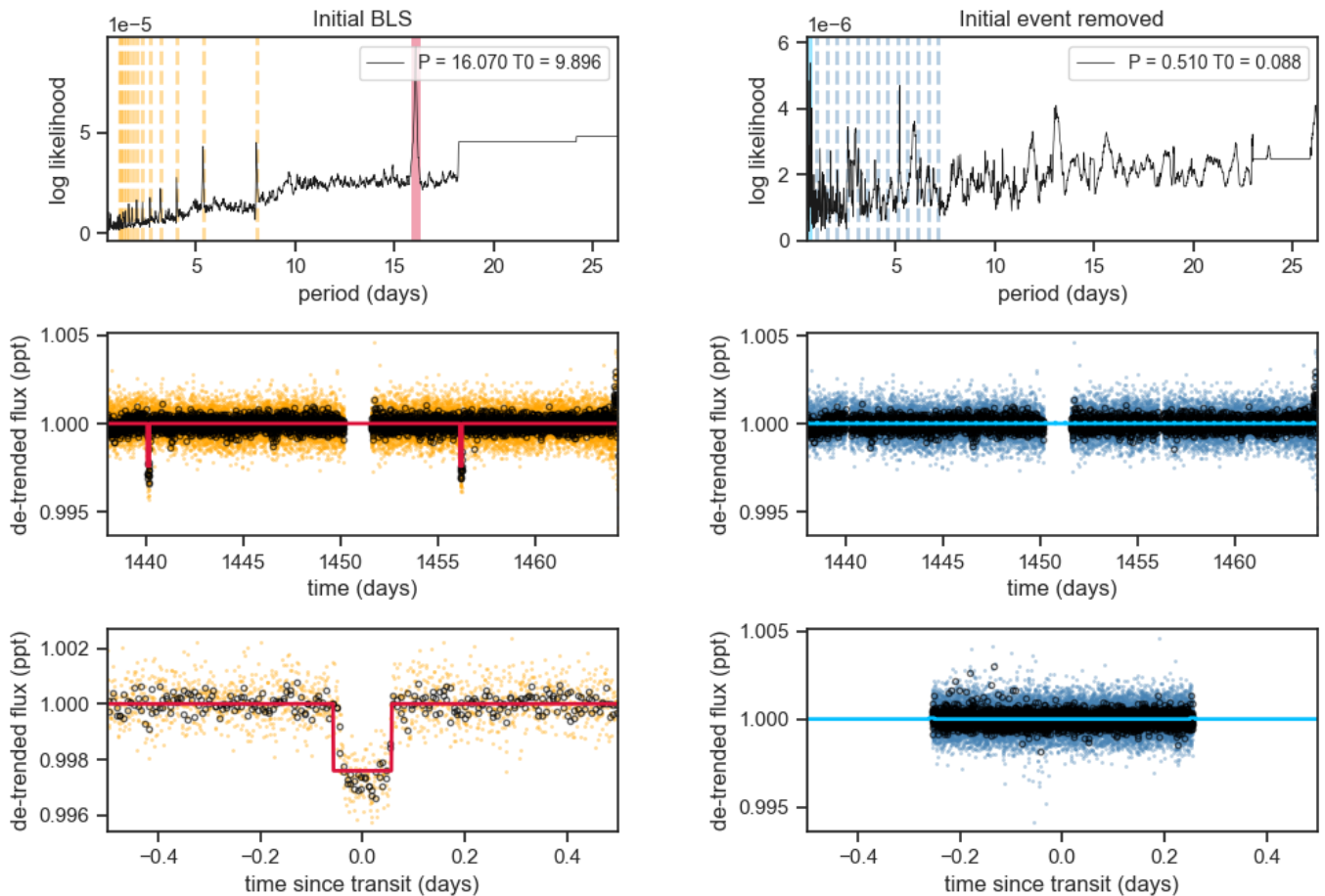


Fig 11. Box Least Square fitting (BLS) for whole lightcurve binned to 10 minutes. Top left panel: log likelihood periodogram. The solid red line indicates the peak period and the dashed orange lines show the integer harmonics of this period. Middle left panel: Full light curve, unbinned (orange) and binned to 10 minutes (black). The peak period is highlighted by the solid red lines. Bottom left Panel: Phase folded light curve where the found transit-event is fit with a simple box (red line). The pannels on the right show the same diagnostics, however the diagnostic was run with the highest detected signal-to-noise transits, from the initial BLS search, removed.

BLS parameters

Parameter	bls1	bls2
period	16.070	0.510
t0	9.90	0.09
depth	0.00241 ± 0.17758	0.00001 ± 0.12336
depth phased	-0.00024 ± 0.18335	$0.00000 \pm \text{inf}$
depth half	0.00113 ± 0.12812	$0.00000 \pm \text{inf}$
depth odd	0.00242 ± 0.25057	0.00001 ± 0.12447
depth even	0.00240 ± 0.25057	0.00001 ± 0.12460

Table 2. Summary of the two BLS fits. Fit one is run with the whole lightcurve and fit two is run with the highest detected signal-to-noise transits removed.