



Data Validation (DV) Report

for Kepler ID 5110407

Quarters 1 - 17

This Data Validation Report was produced in the
Kepler Science Operations Center Pipeline
at NASA Ames Research Center

29-Jan-2016 21:06:50 Z

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1 Summary

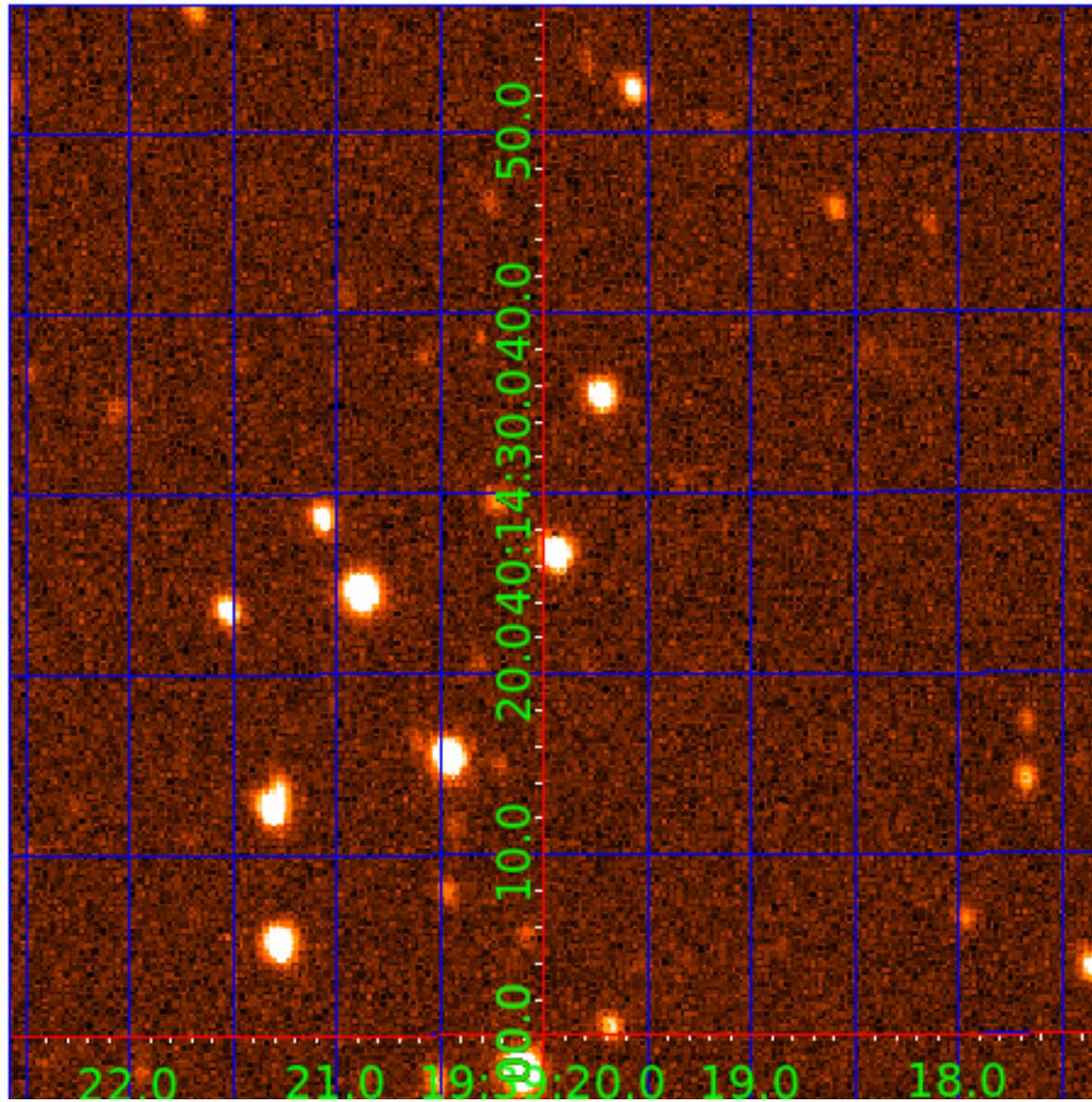
Target Properties	Value	Uncertainty	Units	Provenance
Kepler ID	5110407			
KOI ID	-			
Kepler Name	-			
Sky Group	78			
RA	19.65553800	0	hours	KIC
Dec	40.24074000	0	degrees	KIC
Magnitude	16.786	0		KIC
Radius	2.07	1.19	Solar radii	DSEP
Effective Temperature	5450	230	Kelvin	PHO1
log(g)	3.83	0.675	cm/sec ²	KIC0
[Fe/H]	-0.18	0.35	Solar metallicity	KIC0
Number of Planet Candidates	1			
Categories	GO_LC, MERGED			
KOI Model	cumulative_20150925110000.csv			
Kepler Names Model	keplernames_20150925110000.csv			
External TCE Model	-			
Software Revision	svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958			
Date Report Generated	29-Jan-2016 21:06:50 Z			

Quarter	Target Table	Module/Output	Crowding Metric	Flux Fraction	Limb Darkening Coefficients			
					1	2	3	4
2	21	3/2	0.9498	0.7214	0.4916	0.0320	0.5408	-0.3047
3	26	11/2	0.9433	0.6943	0.4916	0.0320	0.5408	-0.3047
4	29	23/2	0.9690	0.8166	0.4916	0.0320	0.5408	-0.3047
5	32	15/2	0.9975	0.5068	0.4916	0.0320	0.5408	-0.3047
7	38	11/2	0.9359	0.7830	0.4916	0.0320	0.5408	-0.3047
8	41	23/2	0.9689	0.8170	0.4916	0.0320	0.5408	-0.3047
9	44	15/2	0.9974	0.5104	0.4916	0.0320	0.5408	-0.3047
11	50	11/2	0.9377	0.7830	0.4916	0.0320	0.5408	-0.3047
12	53	23/2	0.9695	0.8208	0.4916	0.0320	0.5408	-0.3047
13	56	15/2	0.9983	0.5106	0.4916	0.0320	0.5408	-0.3047
15	62	11/2	0.9374	0.7827	0.4916	0.0320	0.5408	-0.3047
16	65	23/2	0.9697	0.8255	0.4916	0.0320	0.5408	-0.3047
17	68	15/2	0.9976	0.5114	0.4916	0.0320	0.5408	-0.3047

Planet Candidate	KOI ID	Kepler Name	KOI Correlation	Period (days)	Period Ratio	Epoch (BKJD)	Semi-major Axis (AU)	Radius (Re)	Teq (K)	False Alarm	Suspected EB
1	-	-	-	285.3	1.0	399.7	0.9	11.4	372	4.27e-12	false

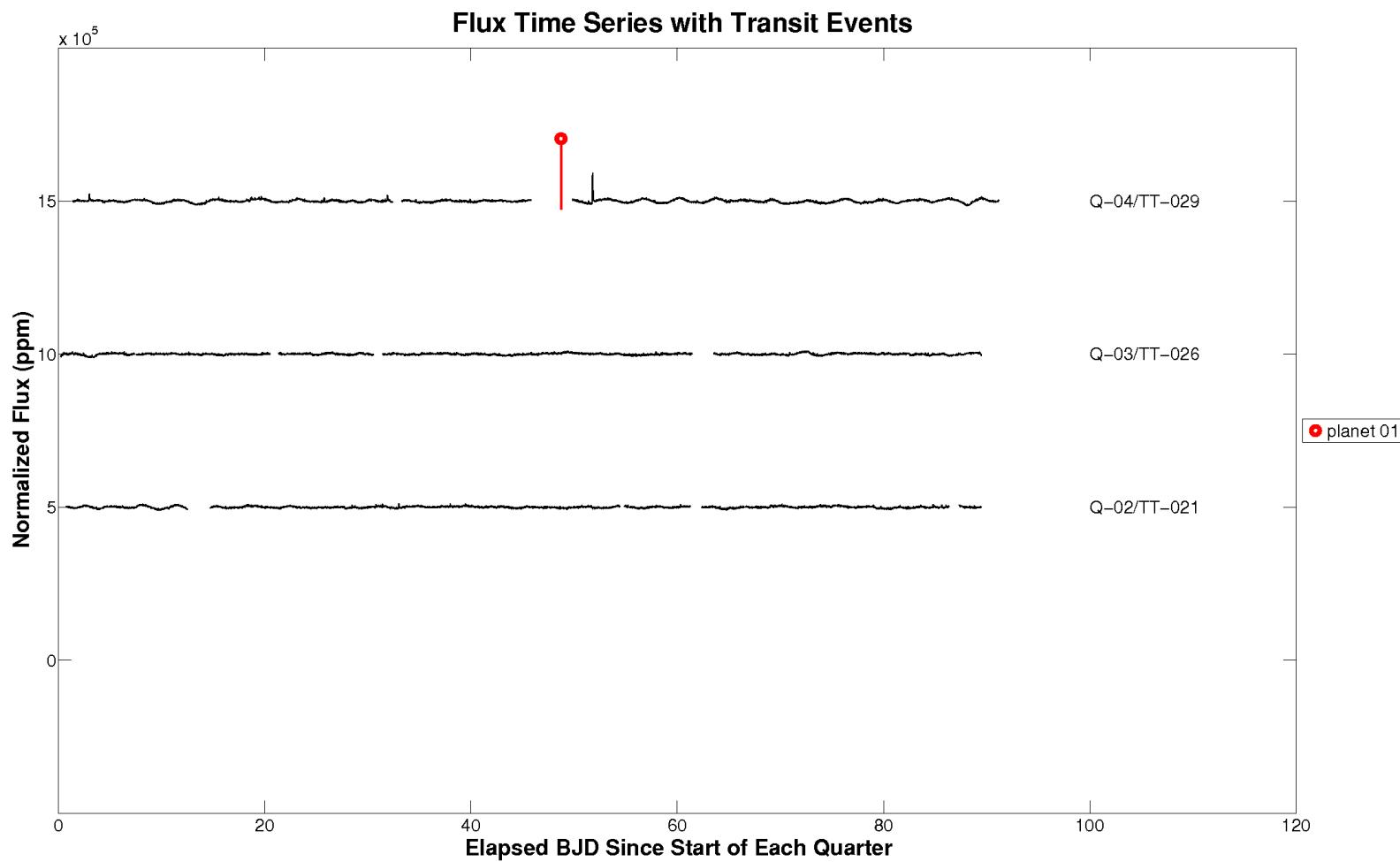
2 UKIRT Image

Declination



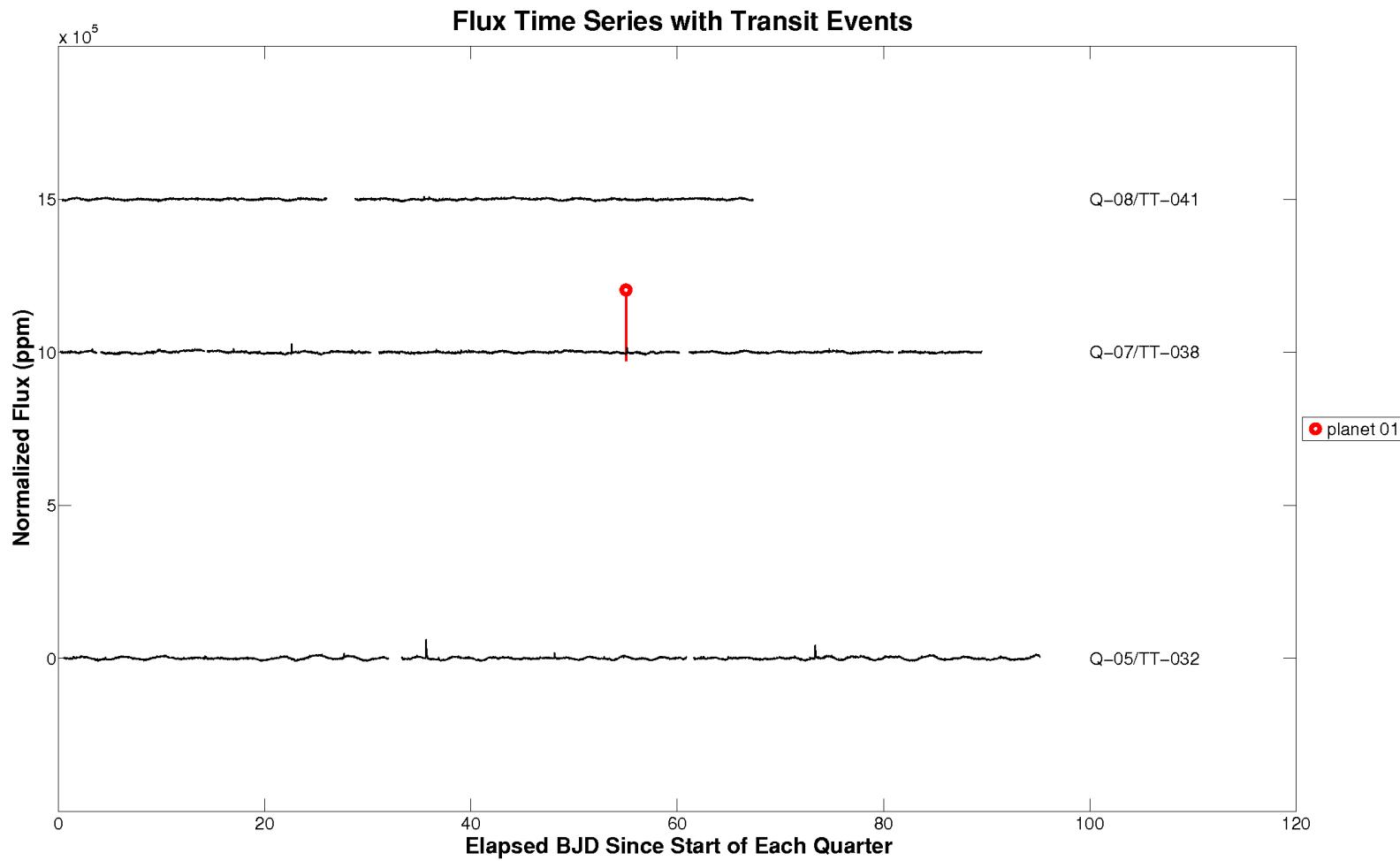
UKIRT Wide Field Camera (WFCAM) infra-red J-band image. The 1' x 1' image is centered on the target (5110407).

3 Flux Time Series



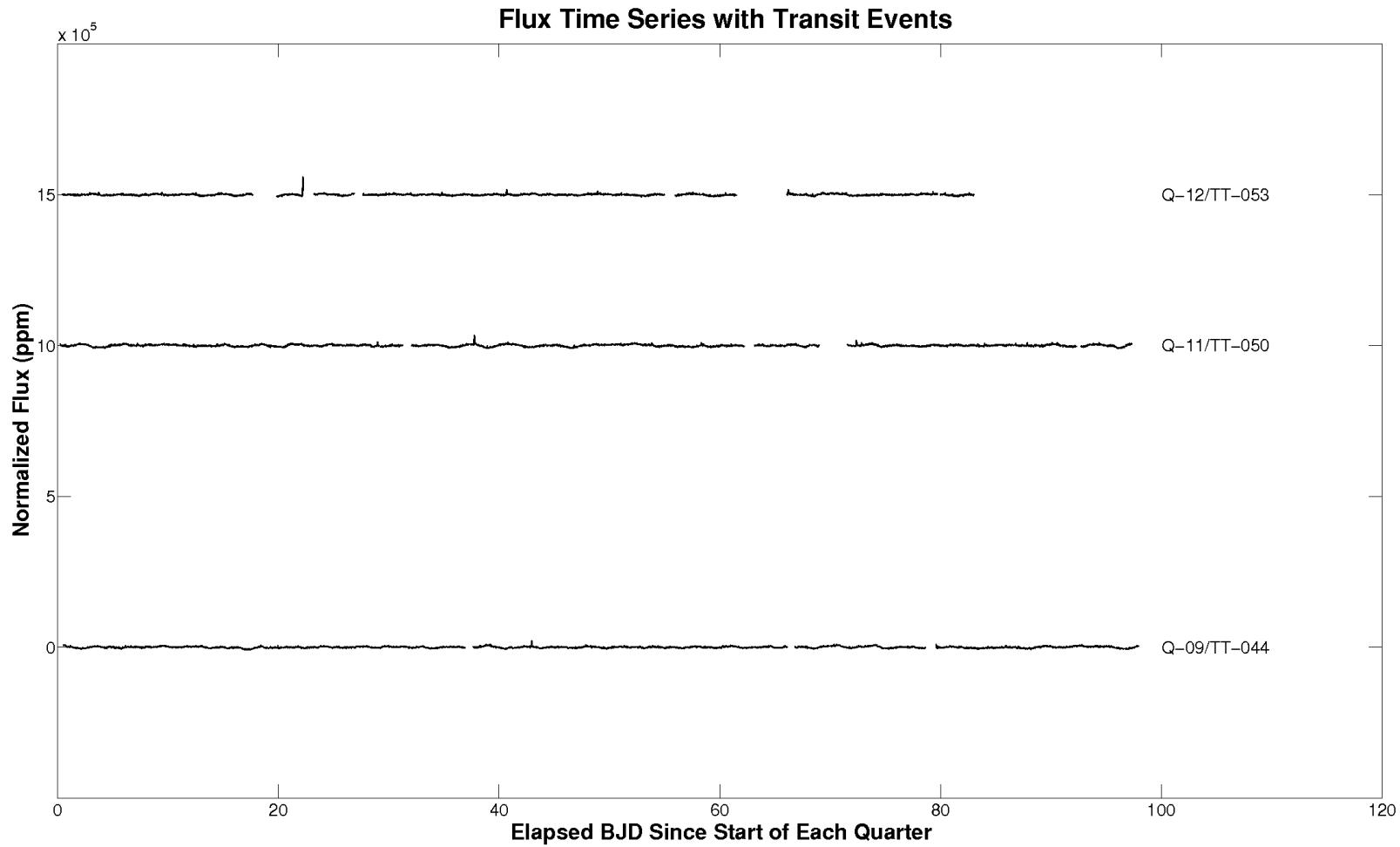
Summary plot of quarter-stitched PDC flux time series and transits for target 5110407, marked with DV fitted epoch/period (or TPS epoch/period if fit was not successful). Transits of identified planets are labeled with epoch BKJD and orbital period. For the data of quarter 1, target table 20, start BJD is 2454964 and the vertical offset is 0 ppm. For the data of quarter 2, target table 21, start BJD is 2455002 and the vertical offset is 500000 ppm. For the data of quarter 3, target table 26, start BJD is 2455093 and the vertical offset is 1000000 ppm. For the data of quarter 4, target table 29, start BJD is 2455184 and the vertical offset is 1500000 ppm.

Open [./summary-plots/005110407-00-flux-dv-fit-01-020.fig](#)



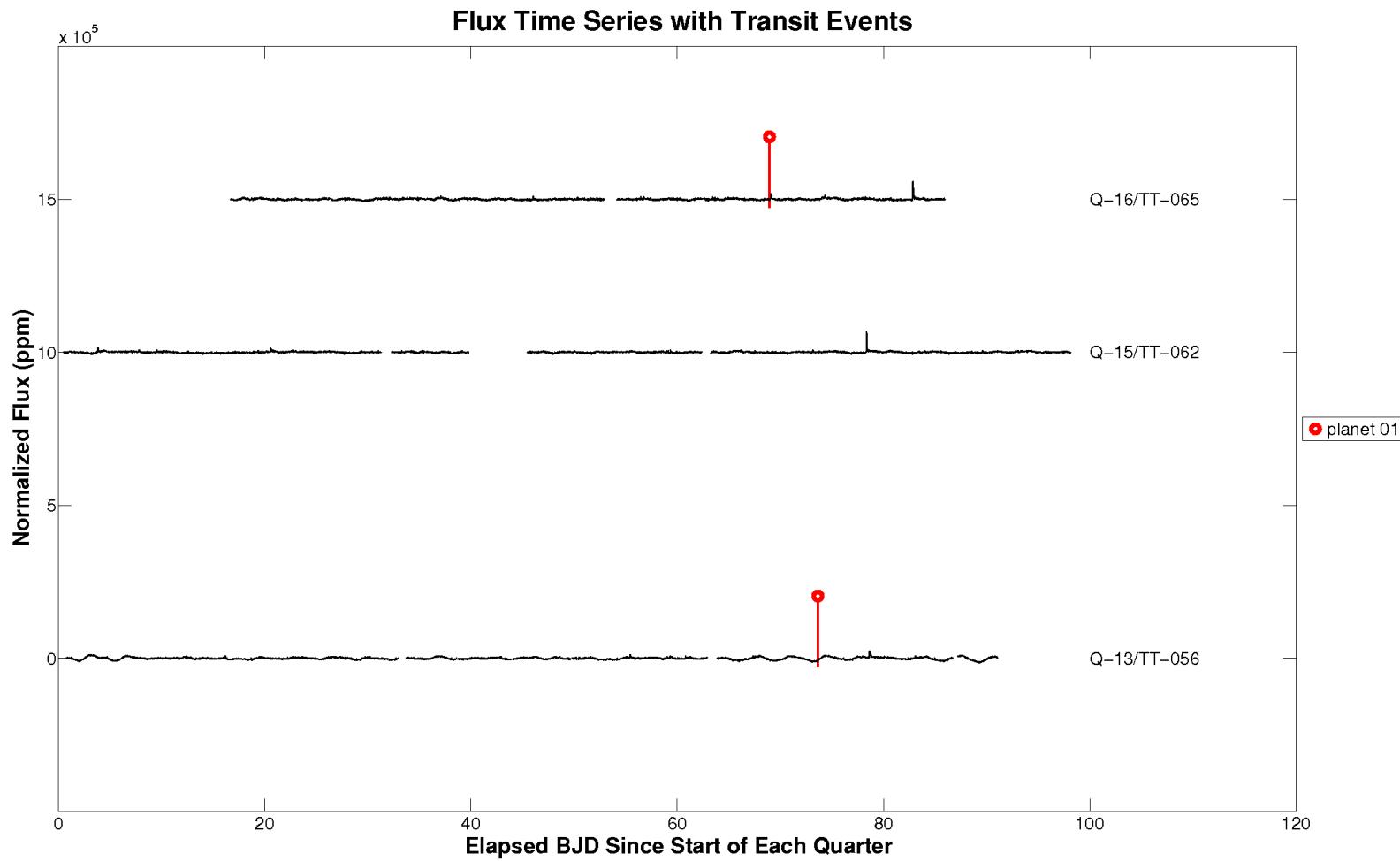
Summary plot of quarter-stitched PDC flux time series and transits for target 5110407, marked with DV fitted epoch/period (or TPS epoch/period if fit was not successful). Transits of identified planets are labeled with epoch BKJD and orbital period. For the data of quarter 5, target table 32, start BJD is 2455276 and the vertical offset is 0 ppm. For the data of quarter 6, target table 35, start BJD is 2455372 and the vertical offset is 500000 ppm. For the data of quarter 7, target table 38, start BJD is 2455463 and the vertical offset is 1000000 ppm. For the data of quarter 8, target table 41, start BJD is 2455568 and the vertical offset is 1500000 ppm.

Open [./summary-plots/005110407-00-flux-dv-fit-05-032.fig](#)



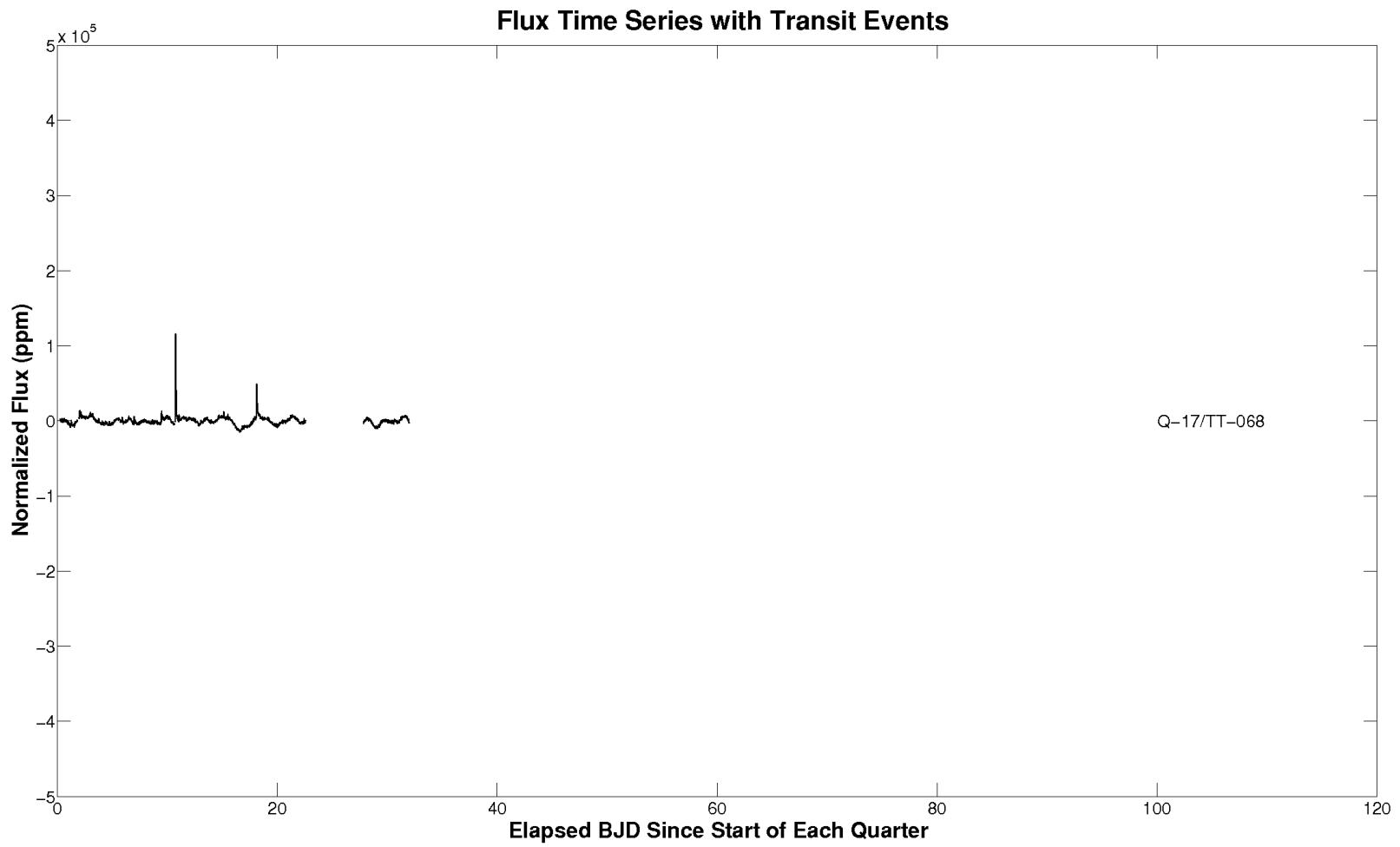
Summary plot of quarter-stitched PDC flux time series and transits for target 5110407, marked with DV fitted epoch/period (or TPS epoch/period if fit was not successful). Transits of identified planets are labeled with epoch BKJD and orbital period. For the data of quarter 9, target table 44, start BJD is 2455641 and the vertical offset is 0 ppm. For the data of quarter 10, target table 47, start BJD is 2455739 and the vertical offset is 500000 ppm. For the data of quarter 11, target table 50, start BJD is 2455834 and the vertical offset is 1000000 ppm. For the data of quarter 12, target table 53, start BJD is 2455932 and the vertical offset is 1500000 ppm.

Open [./summary-plots/005110407-00-flux-dv-fit-09-044.fig](#)



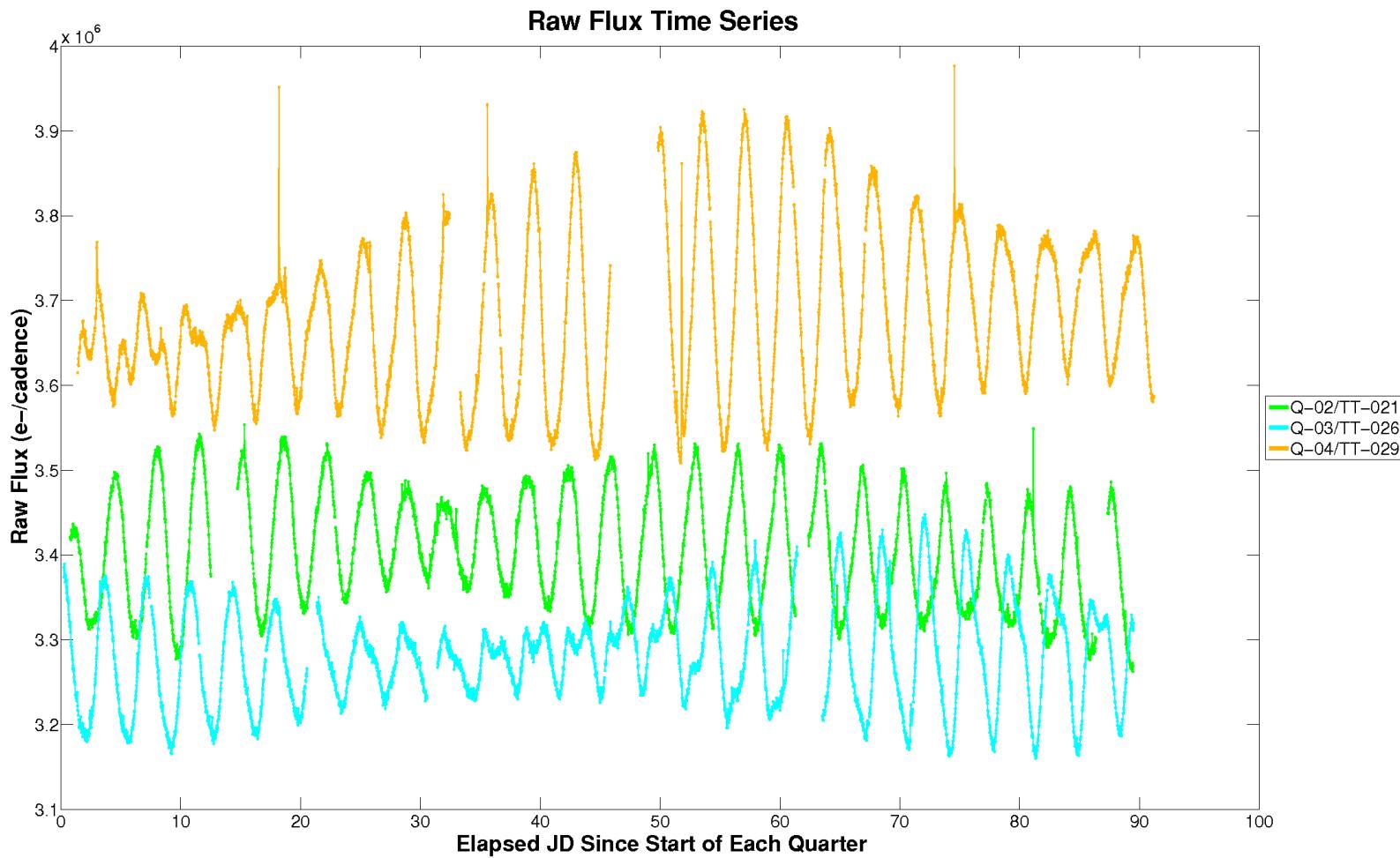
Summary plot of quarter-stitched PDC flux time series and transits for target 5110407, marked with DV fitted epoch/period (or TPS epoch/period if fit was not successful). Transits of identified planets are labeled with epoch BKJD and orbital period. For the data of quarter 13, target table 56, start BJD is 2456015 and the vertical offset is 0 ppm. For the data of quarter 14, target table 59, start BJD is 2456107 and the vertical offset is 500000 ppm. For the data of quarter 15, target table 62, start BJD is 2456206 and the vertical offset is 1000000 ppm. For the data of quarter 16, target table 65, start BJD is 2456305 and the vertical offset is 1500000 ppm.

Open [./summary-plots/005110407-00-flux-dv-fit-13-056.fig](#)



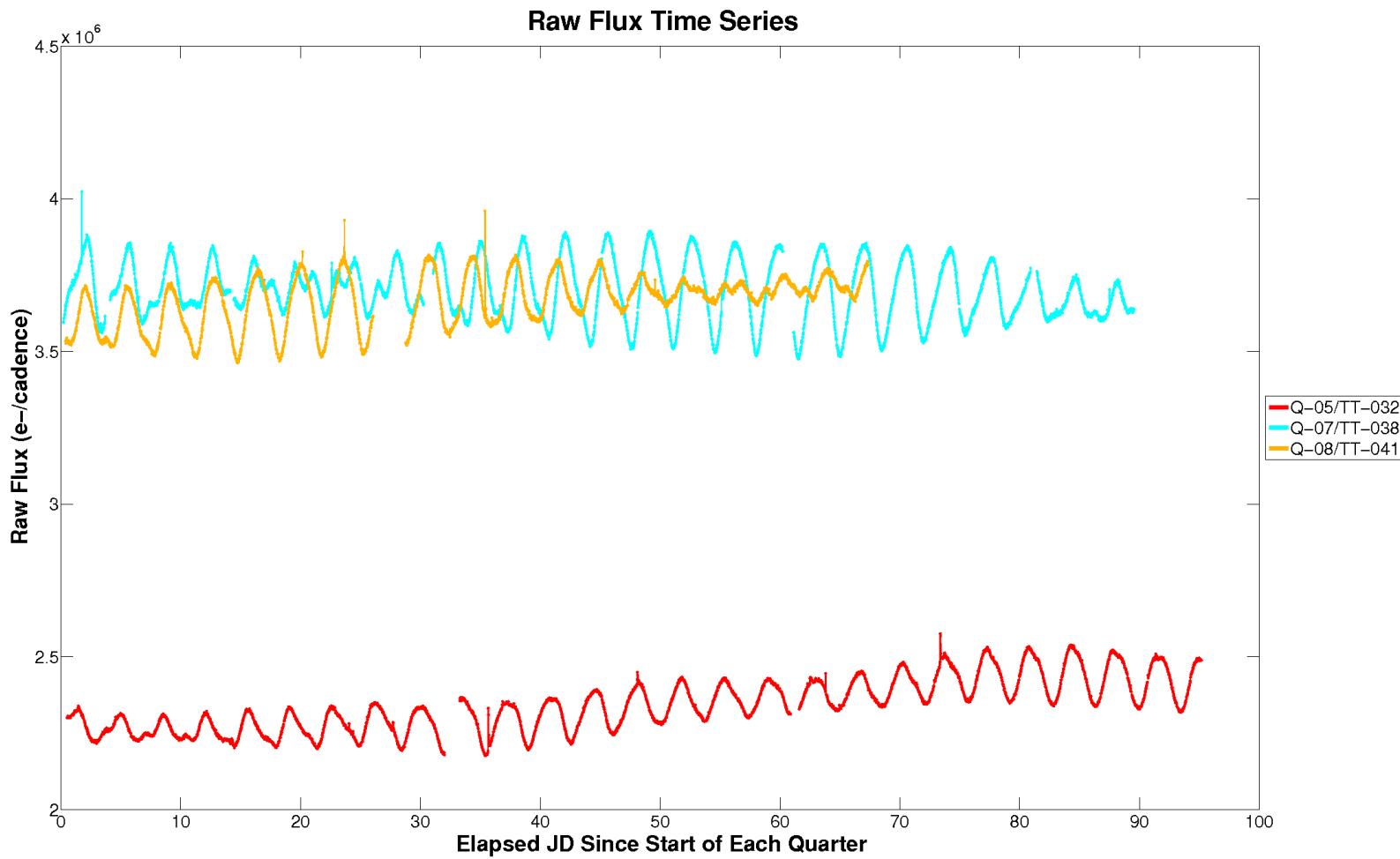
Summary plot of quarter-stitched PDC flux time series and transits for target 5110407, marked with DV fitted epoch/period (or TPS epoch/period if fit was not successful). Transits of identified planets are labeled with epoch BKJD and orbital period. For the data of quarter 17, target table 68, start BJD is 2456392.

Open [./summary-plots/005110407-00-flux-dv-fit-17-068.fig](#)



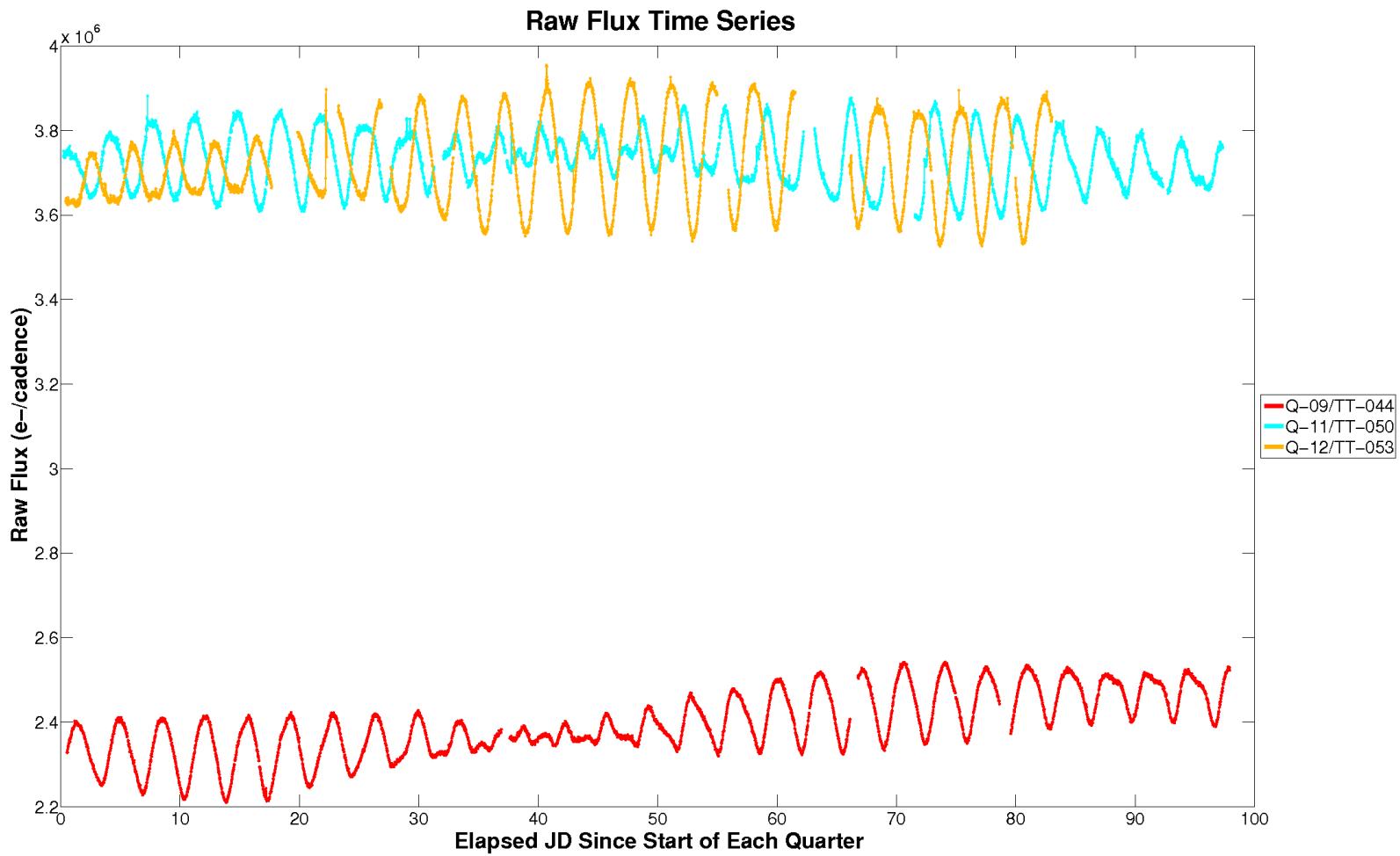
Summary plot of raw flux time series. For the data of quarter 1, target table 20, start JD is 2454964 and the vertical offset is 0 electrons/cadence. For the data of quarter 2, target table 21, start JD is 2455002 and the vertical offset is 0 electrons/cadence. For the data of quarter 3, target table 26, start JD is 2455093 and the vertical offset is 0 electrons/cadence. For the data of quarter 4, target table 29, start JD is 2455184 and the vertical offset is 0 electrons/cadence.

Open [./summary-plots/005110407-00-raw-flux-01-020.fig](#)



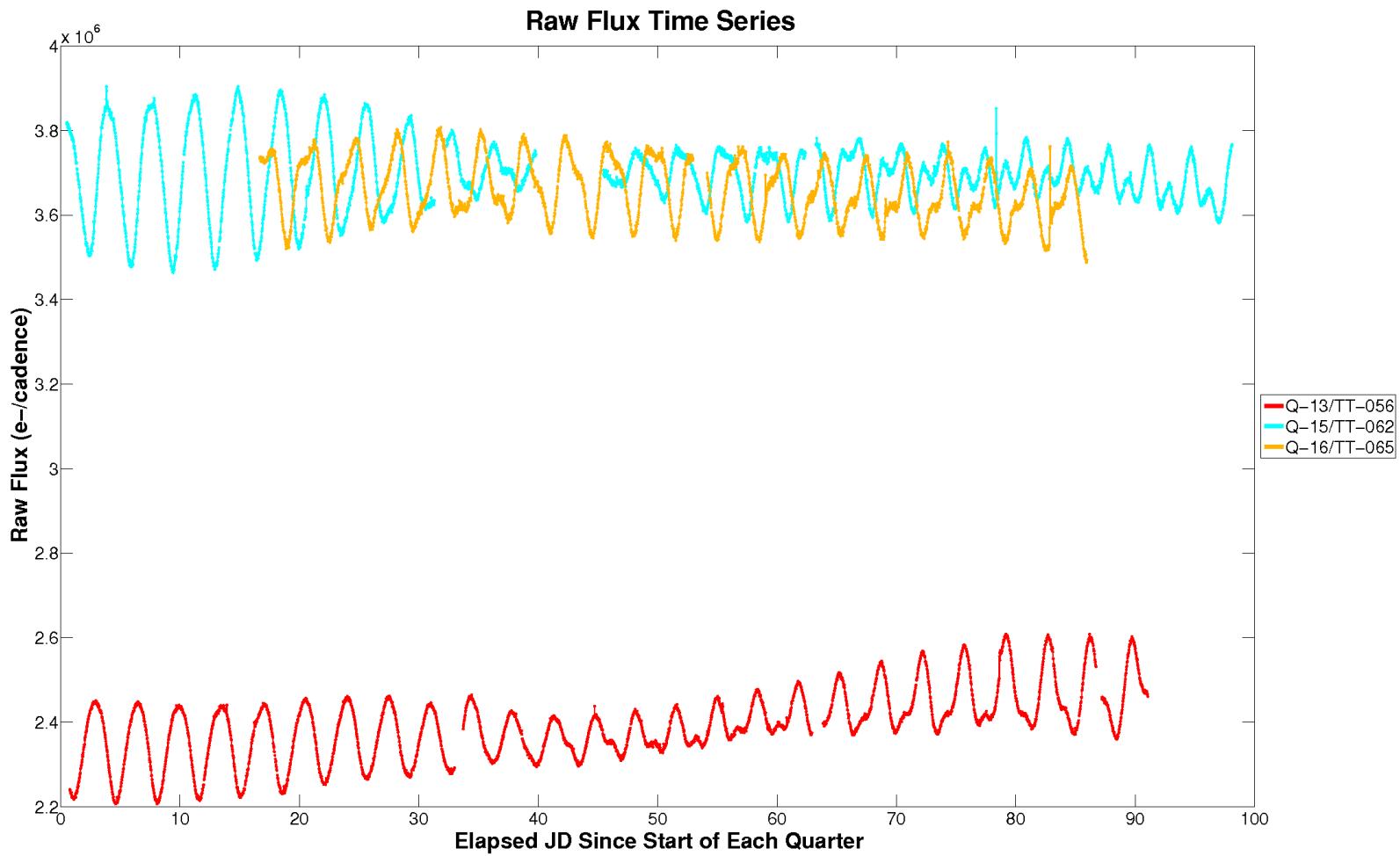
Summary plot of raw flux time series. For the data of quarter 5, target table 32, start JD is 2455276 and the vertical offset is 0 electrons/cadence. For the data of quarter 6, target table 35, start JD is 2455372 and the vertical offset is 0 electrons/cadence. For the data of quarter 7, target table 38, start JD is 2455463 and the vertical offset is 0 electrons/cadence. For the data of quarter 8, target table 41, start JD is 2455568 and the vertical offset is 0 electrons/cadence.

Open [./summary-plots/005110407-00-raw-flux-05-032.fig](#)



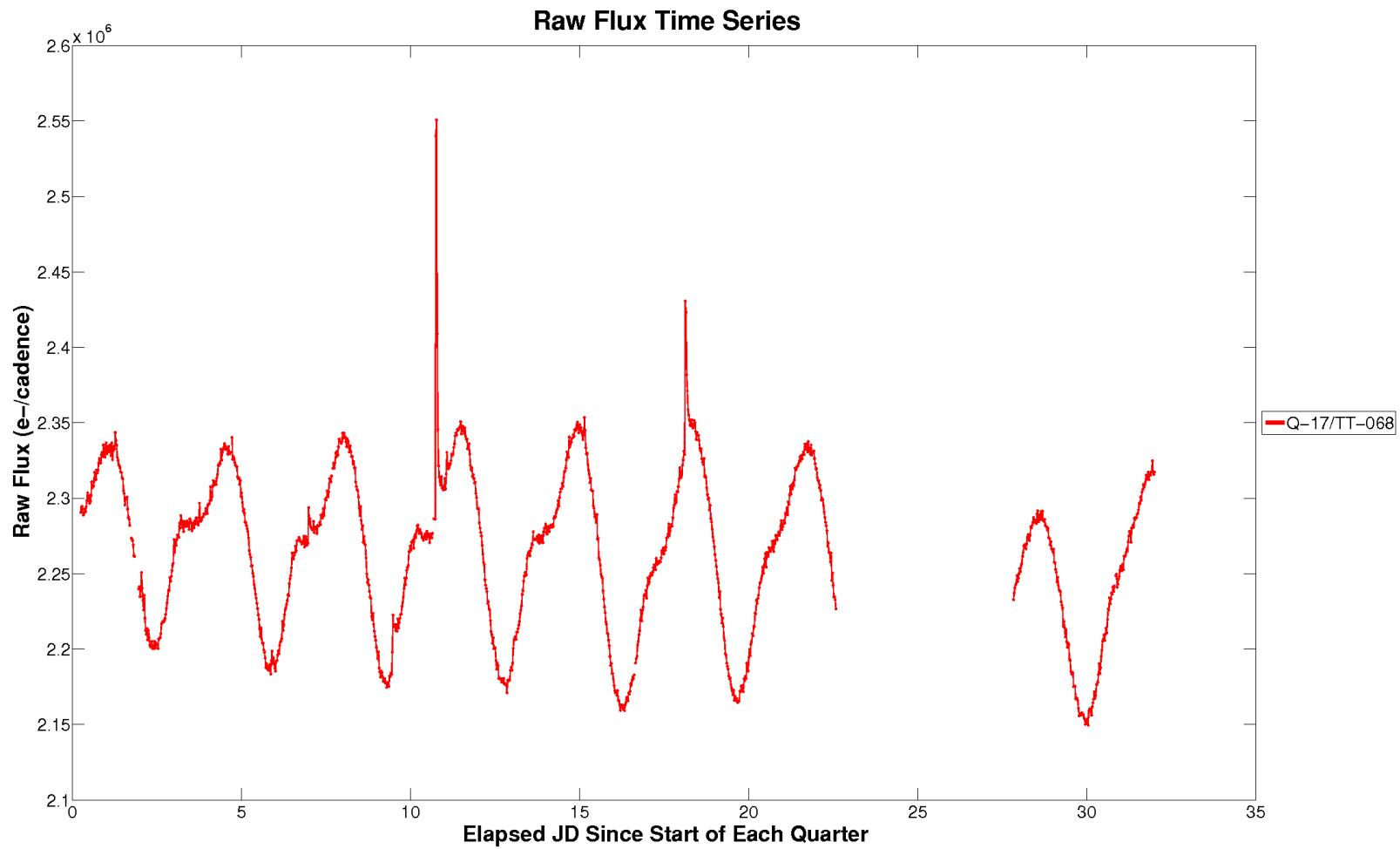
Summary plot of raw flux time series. For the data of quarter 9, target table 44, start JD is 2455641 and the vertical offset is 0 electrons/cadence. For the data of quarter 10, target table 47, start JD is 2455739 and the vertical offset is 0 electrons/cadence. For the data of quarter 11, target table 50, start JD is 2455834 and the vertical offset is 0 electrons/cadence. For the data of quarter 12, target table 53, start JD is 2455932 and the vertical offset is 0 electrons/cadence.

Open [./summary-plots/005110407-00-raw-flux-09-044.fig](#)



Summary plot of raw flux time series. For the data of quarter 13, target table 56, start JD is 2456015 and the vertical offset is 0 electrons/cadence. For the data of quarter 14, target table 59, start JD is 2456107 and the vertical offset is 0 electrons/cadence. For the data of quarter 15, target table 62, start JD is 2456206 and the vertical offset is 0 electrons/cadence. For the data of quarter 16, target table 65, start JD is 2456305 and the vertical offset is 0 electrons/cadence.

Open [./summary-plots/005110407-00-raw-flux-13-056.fig](#)



Summary plot of raw flux time series. For the data of quarter 17, target table 68, start JD is 2456392.
Open [./summary-plots/005110407-00-raw-flux-17-068.fig](#)

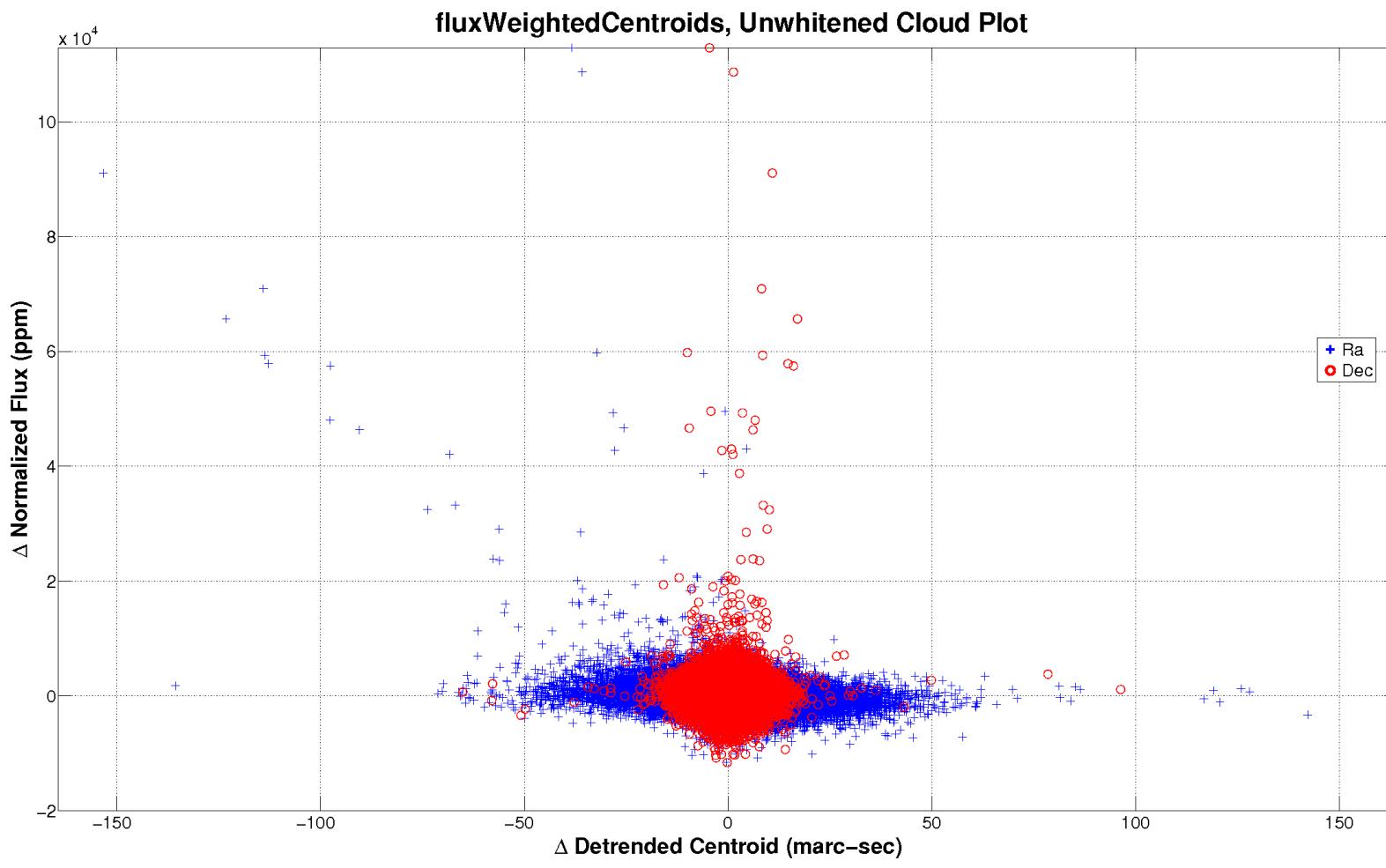
4 Dashboards

Planet Candidate 1

Model Fitter				Centroid Test
Stellar Radius 2.1 ± 1.2 Solar units		Flux Weighted Motion Detection Statistic Value = 9.82e+00 Significance = 0.74% Peak RA Offset $1.15\text{e-}02 \pm 6.38\text{e-}03$ arcsec (1.8σ) Peak Dec Offset = $1.78\text{e-}03 \pm 6.72\text{e-}03$ arcsec (0.26σ) Peak Offset Distance = $1.16\text{e-}02 \pm 6.38\text{e-}03$ arcsec (1.8σ) Source RA Offset = $-1.63\text{e+}00 \pm 1.42\text{e+}00$ arcsec (-1.1σ) Source Dec Offset = $-6.43\text{e-}01 \pm 8.95\text{e-}01$ arcsec (-0.72σ) Source Offset Distance = $1.75\text{e+}00 \pm 1.36\text{e+}00$ arcsec (1.3σ)		
Odd-Even Depth Comparison Statistic Value = 1.38e+00 Significance = 24.08%		Odd-Even Epoch Comparison Statistic Value = 8.38e-03 Significance = 92.70%		Offsets Relative to Out of Transit Centroid Source RA Offset = $-1.13\text{e+}00 \pm 4.27\text{e-}01$ arcsec (-2.64σ) Source Dec Offset = $-4.55\text{e-}01 \pm 4.43\text{e-}01$ arcsec (-1.03σ) Source Offset Distance = $1.22\text{e+}00 \pm 4.29\text{e-}01$ arcsec (2.84σ)
Shorter Period Comparison Statistic Value = N/A Significance = N/A		Longer Period Comparison Statistic Value = N/A Significance = N/A		Offsets Relative to KIC Position Source RA Offset = $-8.21\text{e-}02 \pm 2.98\text{e-}01$ arcsec (-0.28σ) Source Dec Offset = $-3.46\text{e-}02 \pm 2.91\text{e-}01$ arcsec (-0.12σ) Source Offset Distance = $8.91\text{e-}02 \pm 3.82\text{e-}01$ arcsec (0.23σ)

Summary of model fitter results and validation test results for target 5110407, planet candidate 1. In general, green denotes that the candidate is likely a planet, while red denotes that the candidate is unlikely to be a planet. Cyan denotes that no data is available. The color of the Model Fitter block is: green, when the SNR of the fit is greater than or equal to 10; yellow, if the SNR is greater than or equal to 7.1 but less than 10; red, if the SNR is less than 7.1 or if the fitter failed. The color of the Centroid Test and Eclipsing Binary Discrimination Test blocks are: green, when the significance is within 2-sigma; yellow, when the significance is between 2- and 3-sigma; red when the significance is greater than 3-sigma. The color of the Difference Image Centroid Offsets block is: green, when the max offset distance sigma is less than or equal to 2; yellow, when the max sigma is between 2 and 3; red when the max sigma is greater than 3. The color of the Bootstrap Test block is green whenever the false alarm probability is less than 10^{-12} , low enough to limit the total number of false alarms from a four year mission to less than one. If the false alarm probability is greater than 10^{-12} , the color of the Bootstrap Test block is: green, when the false alarm probability is less than or equal to the CCDF of a Gaussian distribution at the observed maximum multiple event statistic; yellow when the false alarm probability is between 1 and 2 times that of a Gaussian distribution at the max multiple event statistic; and red when the false alarm probability is more than 2 times that of a Gaussian distribution at the max multiple event statistic.

5 Centroid Cloud Plot



Out of Transit Centroid
 ra(hours): mean 19.85559008, SD 1.79e-07
 dec(degrees): mean 40.240724, SD 9.11e-07

KeplerId 5110407, KeplerMag 16.786 - This figure shows median detrended flux as a function of median detrended centroids for both ra and dec on the sky. Transit features above the noise jitter are seen as scatter outside the central cloud. Features in the flux time series are seen in the vertical direction while features in the centroid time series are seen in the horizontal direction. Any tilt to the out-of-cloud scatter indicates correlation between transit features in the flux and centroid time series. The out of transit mean and standard deviation (SD) indicated in the lower left-hand corner are robust values.

Open [./summary-plots/005110407-00-fluxWeighted-centroids-cloud.fig](#)

6 Image Artifacts

6.1 Planet Candidate 1

Rolling Band Contamination

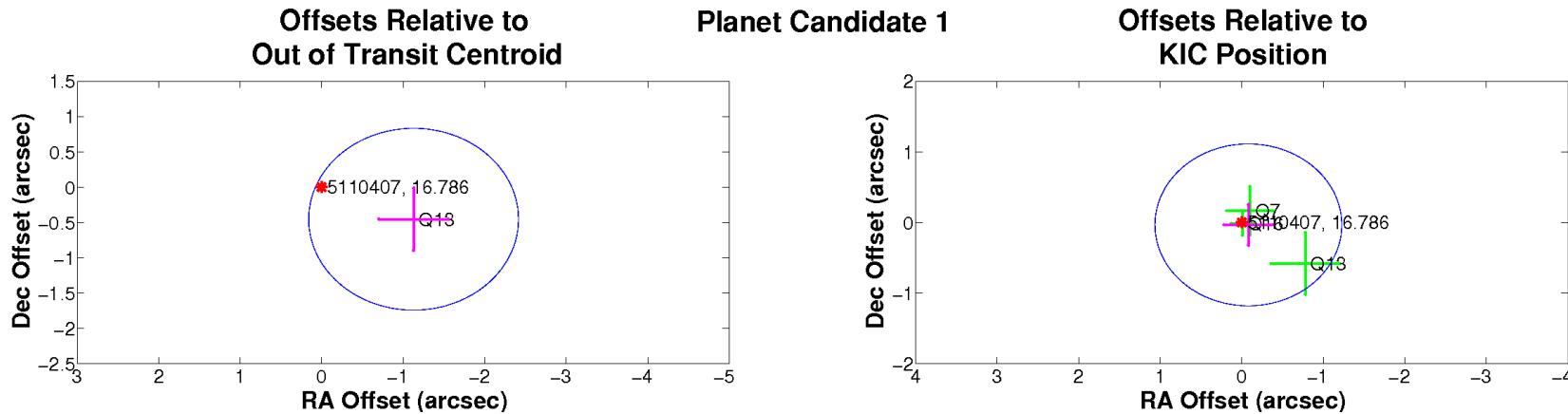
Severity Level	Transit Count	Transit Fraction
0	3	1.00
1	0	0.00
2	0	0.00
3	0	0.00
4	0	0.00
	3	1.00

7 Pixel Level Diagnostics

7.1 Planet Candidate 1

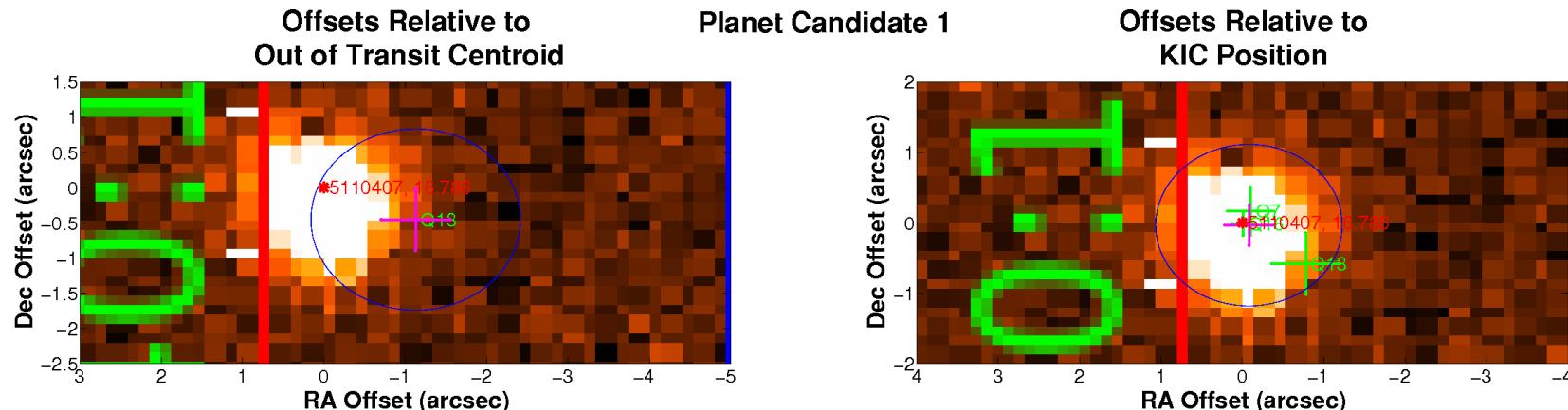
Difference Image Summary Metrics

Number of Difference Images	Number of Metrics	Number of Good Metrics	Fraction of Good Metrics	Quality Threshold
3	3	3	1.0000	0.70



Difference image centroid offsets for target 5110407, planet candidate 1. Left: difference image PRF centroid offsets in RA and Dec with respect to the quarterly out-of-transit centroids for the given target. Right: difference image PRF centroid offsets in RA and Dec with respect to the KIC coordinates of the given target. Symbol key: green cross: quarterly centroid offsets with 1-sigma error bars in RA and Dec; magenta cross: robust weighted mean offset over all quarters with 1-sigma error bars in RA and Dec; blue circle: 3-sigma radius of confusion for weighted mean offset; red cross (where applicable): multi-quarter PRF centroid offset with 1-sigma error bars in RA and Dec; cyan circle (where applicable): 3-sigma radius of confusion for multi-quarter PRF offset; red asterisk: location of target star; blue asterisk: location of other KIC objects in the neighborhood. KIC ID and magnitude are noted in the text associated with each marked object (objects in the UKIRT extension to the KIC have IDs between 15,000,000 and 30,000,000). A constant error term of 0.0667 arcseconds has been added in quadrature to the computed uncertainty in the RA and Dec components of the robust mean offset and the multi-quarter PRF offset.

Open `./planet-01/difference-image/005110407-01-difference-image-centroid-offsets.fig`



Difference image centroid offsets for target 5110407, planet candidate 1, displayed on UKIRT image for given target. Left: difference image PRF centroid offsets in RA and Dec with respect to the quarterly out-of-transit centroids for the given target. Right: difference image PRF centroid offsets in RA and Dec with respect to the KIC coordinates of the given target. Symbol key: green cross: quarterly centroid offsets with 1-sigma error bars in RA and Dec; magenta cross: robust weighted mean offset over all quarters with 1-sigma error bars in RA and Dec; blue circle: 3-sigma radius of confusion for weighted mean offset; red asterisk: location of target star; blue asterisk: location of other KIC objects in the neighborhood. KIC ID and magnitude are noted in the text associated with each marked object (objects in the UKIRT extension to the KIC have IDs between 15,000,000 and 30,000,000). A constant error term of 0.0667 arcseconds has been added in quadrature to the computed uncertainty in the RA and Dec components of the robust mean offset and the multi-quarter PRF offset.

Open `./planet-01/difference-image/005110407-01-difference-image-centroid-offsets-ukirt.fig`

Multi-Quarter Average PRF Fit of the Difference Images

Mean offset from the PRF fit to the out of transit image

	RA	Dec	Units
Offset	$-1.1279 \pm 4.27e - 01$	$-0.4551 \pm 4.43e - 01$	arcseconds
Offset/ σ	-2.64	-1.03	
Offset Distance	$1.2163 \pm 4.29e - 01$		arcseconds
Offset Distance/ σ	2.84		
3σ Radius	1.2868		arcseconds

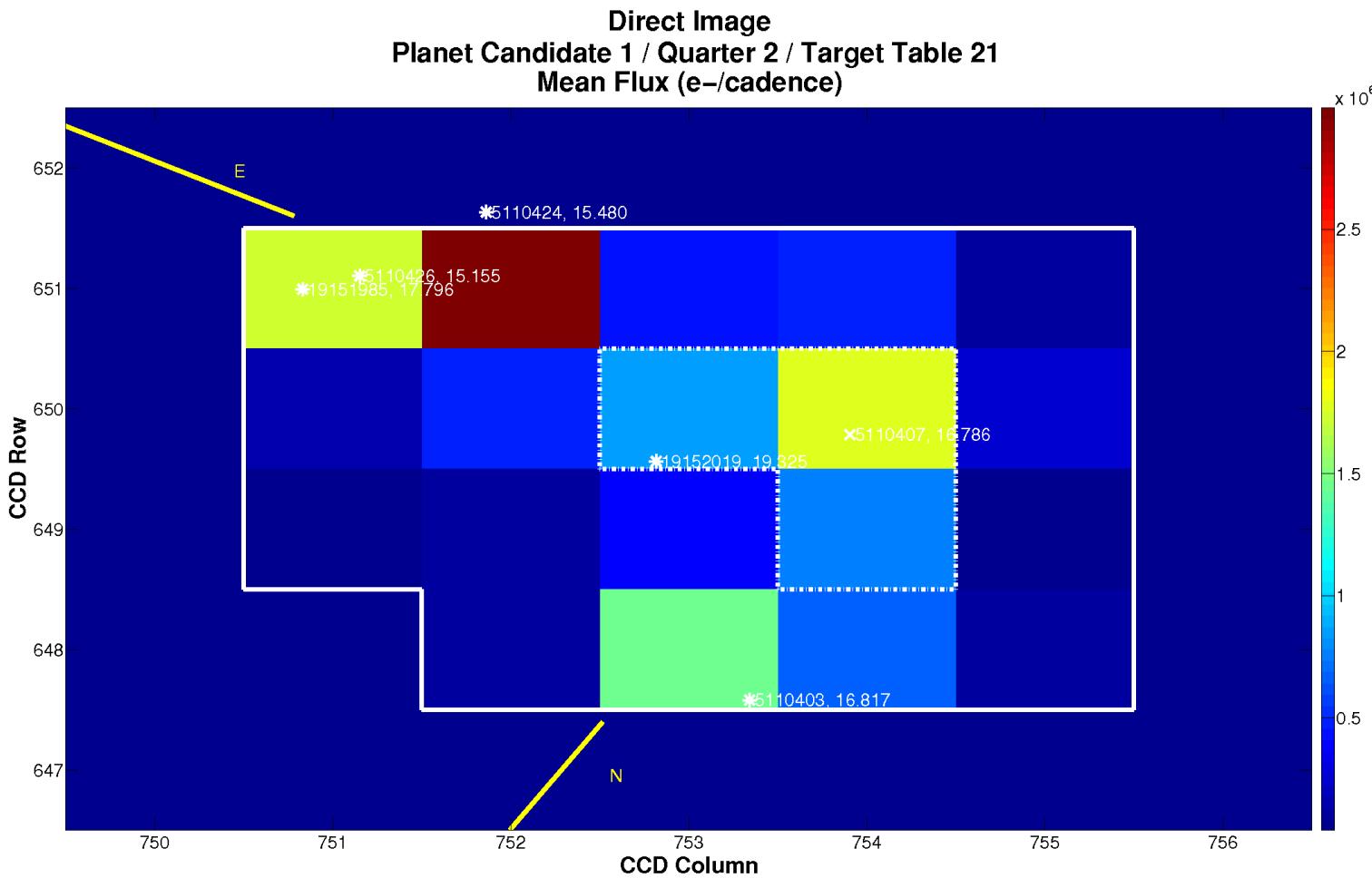
Mean offset from the KIC RA and Dec

	RA	Dec	Units
Offset	$-0.0821 \pm 2.98e - 01$	$-0.0346 \pm 2.91e - 01$	arcseconds
Offset/ σ	-0.28	-0.12	
Offset Distance	$0.0891 \pm 3.82e - 01$		arcseconds
Offset Distance/ σ	0.23		
3σ Radius	1.1460		arcseconds

Bootstrap Multi-Quarter PRF Fit of the Difference Images

Bootstrap multi-quarter PRF fit results for the difference images associated with this planet candidate are not available.

Pixel correlation centroid offsets figure for this planet candidate is not available.



Direct image for target 5110407, planet candidate 1, quarter 2, target table 21. A difference image cannot be generated because there were no transits for this planet candidate and target table. The mean flux over all cadences is shown in the figure. The optimal aperture is outlined with a white dash-dotted line and the target mask is outlined with a solid white line. Symbol key: x: target position from KIC RA and Dec converted to CCD coordinates via motion polynomials; *: position of nearby KIC objects converted to CCD coordinates via motion polynomials (objects in the UKIRT extension to the KIC have IDs between 15,000,000 and 30,000,000). CCD row and column coordinates are 0-based.

Open [./planet-01/difference-image/005110407-01-difference-image-02-021.fig](#)

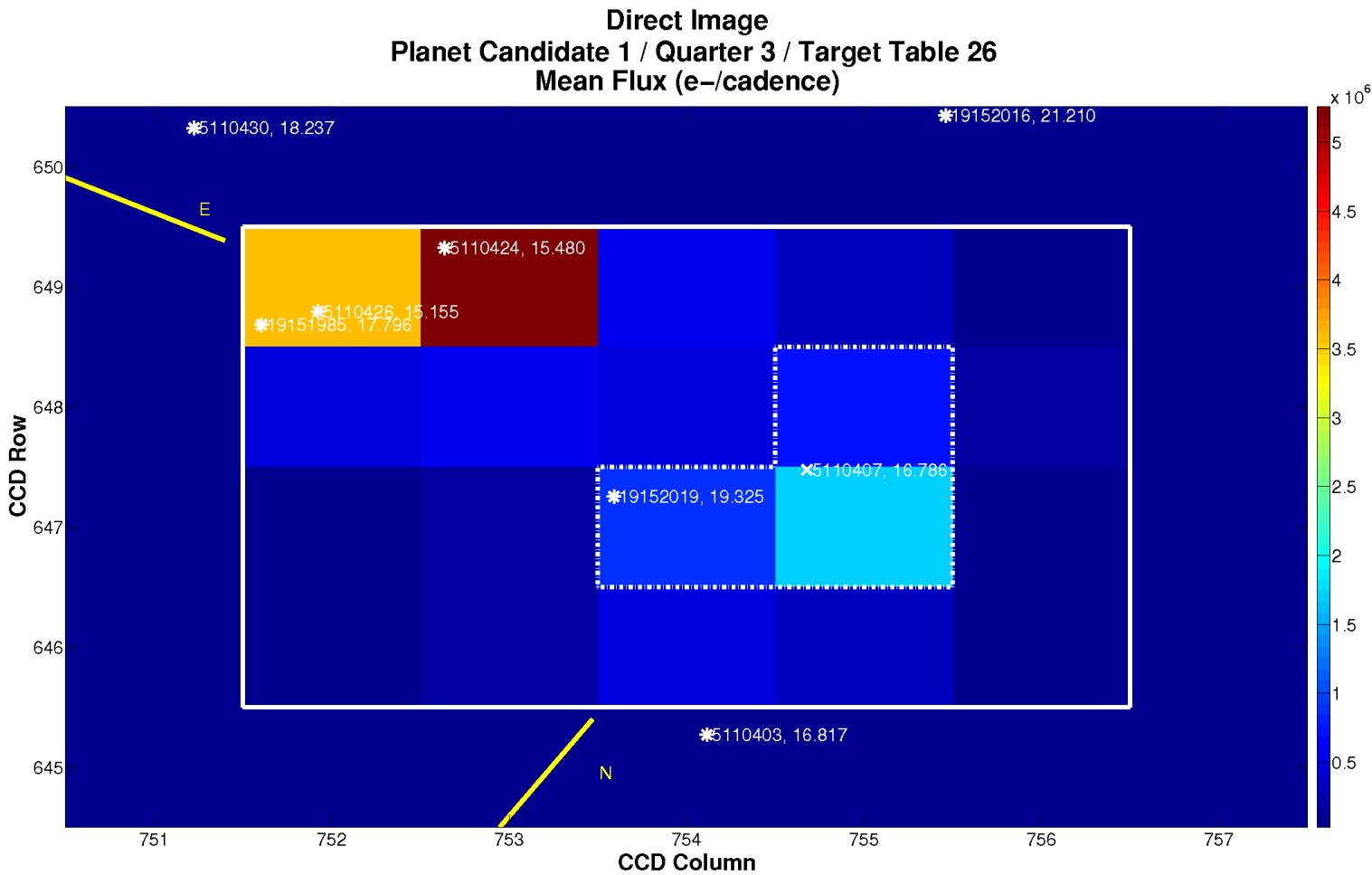
The pixel correlation statistic plot is not available for target 5110407, planet candidate 1, in target table 21.

PRF Fit of the Difference Image

The out of transit image centroid and difference image centroid could not be calculated for target 5110407, planet candidate 1, in target table 21.

PRF Fit of the Pixel Correlation Image

The pixel correlation image centroid could not be calculated for target 5110407, planet candidate 1, in target table 21.



Direct image for target 5110407, planet candidate 1, quarter 3, target table 26. A difference image cannot be generated because there were no transits for this planet candidate and target table. The mean flux over all cadences is shown in the figure. The optimal aperture is outlined with a white dash-dotted line and the target mask is outlined with a solid white line. Symbol key: x: target position from KIC RA and Dec converted to CCD coordinates via motion polynomials; *: position of nearby KIC objects converted to CCD coordinates via motion polynomials (objects in the UKIRT extension to the KIC have IDs between 15,000,000 and 30,000,000). CCD row and column coordinates are 0-based.

Open [./planet-01/difference-image/005110407-01-difference-image-03-026.fig](#)

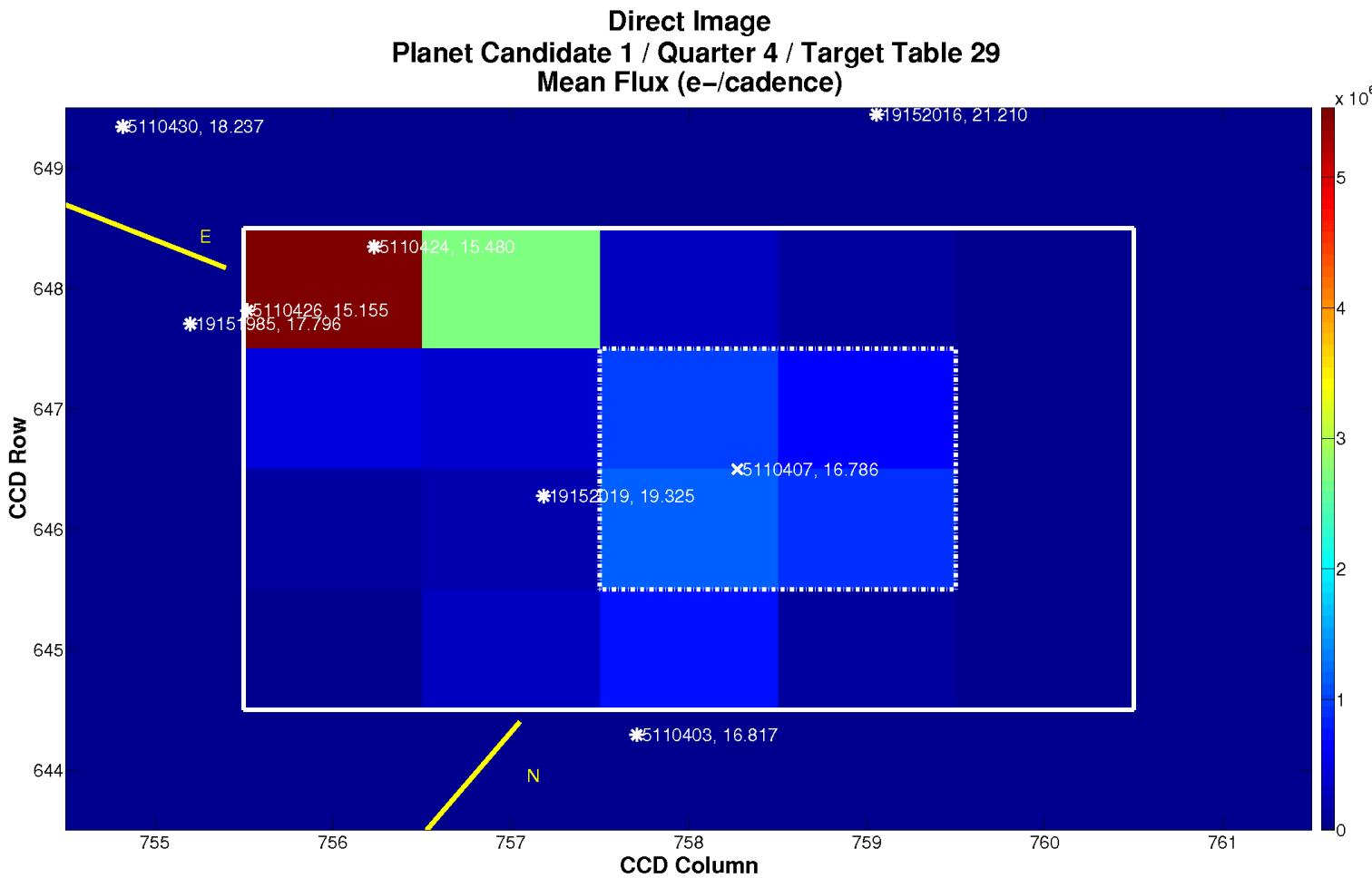
The pixel correlation statistic plot is not available for target 5110407, planet candidate 1, in target table 26.

PRF Fit of the Difference Image

The out of transit image centroid and difference image centroid could not be calculated for target 5110407, planet candidate 1, in target table 26.

PRF Fit of the Pixel Correlation Image

The pixel correlation image centroid could not be calculated for target 5110407, planet candidate 1, in target table 26.



Direct image for target 5110407, planet candidate 1, quarter 4, target table 29. A difference image cannot be generated because there were no clean transits for this planet candidate and target table. The mean flux over all cadences is shown in the figure. The optimal aperture is outlined with a white dash-dotted line and the target mask is outlined with a solid white line. Symbol key: x: target position from KIC RA and Dec converted to CCD coordinates via motion polynomials; *: position of nearby KIC objects converted to CCD coordinates via motion polynomials (objects in the UKIRT extension to the KIC have IDs between 15,000,000 and 30,000,000). CCD row and column coordinates are 0-based.

Open [./planet-01/difference-image/005110407-01-difference-image-04-029.fig](#)

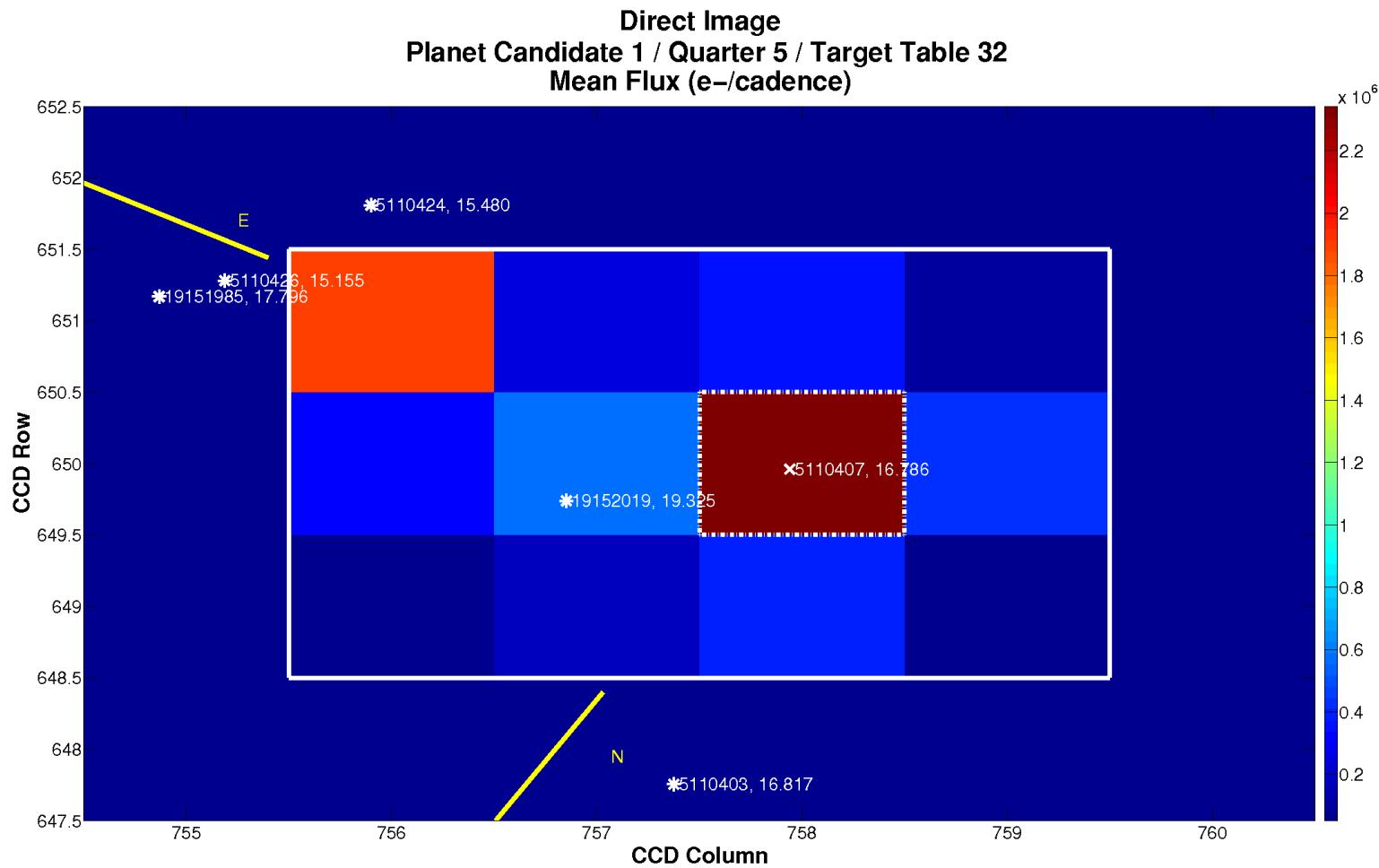
The pixel correlation statistic plot is not available for target 5110407, planet candidate 1, in target table 29.

PRF Fit of the Difference Image

The out of transit image centroid and difference image centroid could not be calculated for target 5110407, planet candidate 1, in target table 29.

PRF Fit of the Pixel Correlation Image

The pixel correlation image centroid could not be calculated for target 5110407, planet candidate 1, in target table 29.



Direct image for target 5110407, planet candidate 1, quarter 5, target table 32. A difference image cannot be generated because there were no transits for this planet candidate and target table. The mean flux over all cadences is shown in the figure. The optimal aperture is outlined with a white dash-dotted line and the target mask is outlined with a solid white line. Symbol key: x: target position from KIC RA and Dec converted to CCD coordinates via motion polynomials; *: position of nearby KIC objects converted to CCD coordinates via motion polynomials (objects in the UKIRT extension to the KIC have IDs between 15,000,000 and 30,000,000). CCD row and column coordinates are 0-based.

Open [./planet-01/difference-image/005110407-01-difference-image-05-032.fig](#)

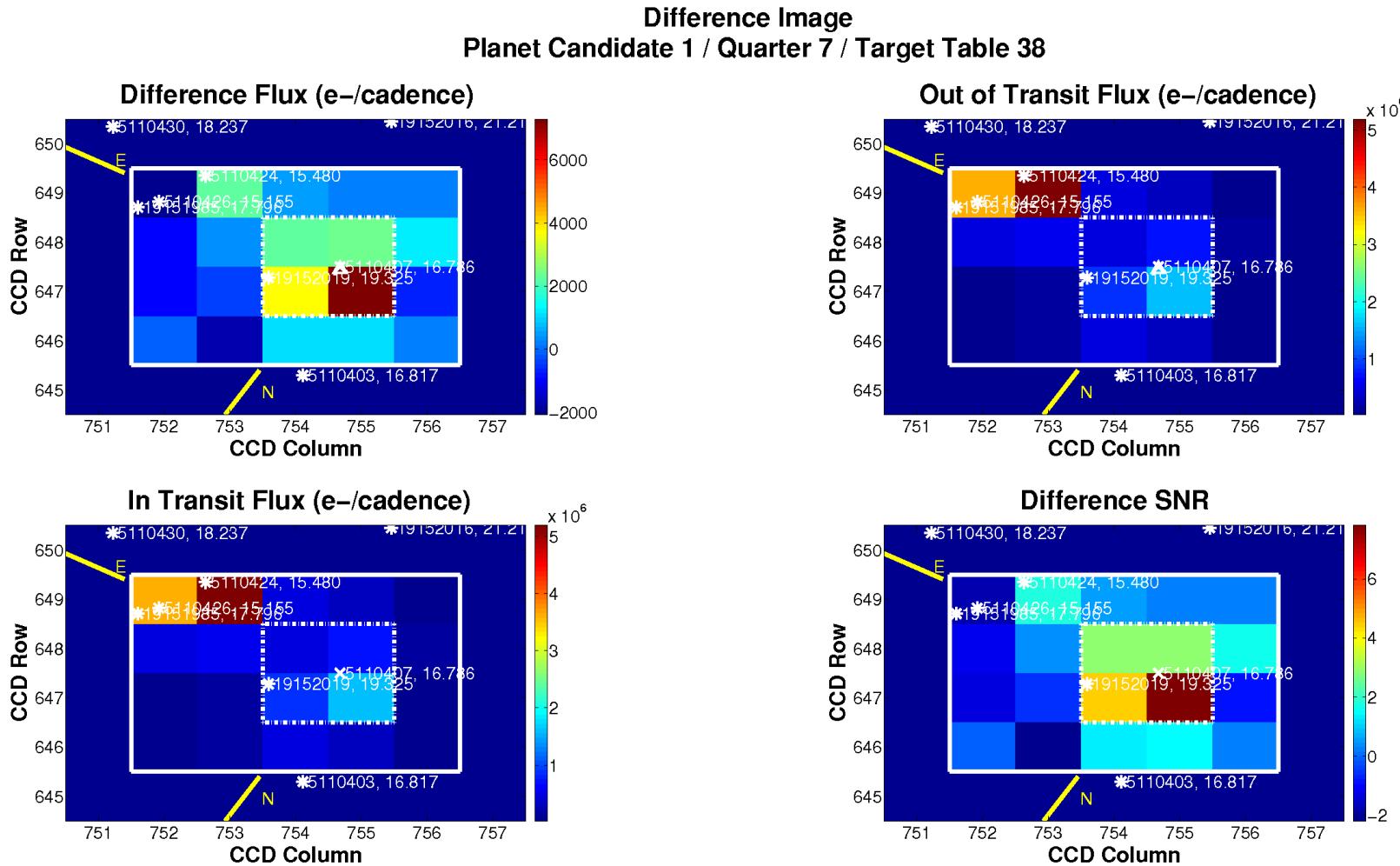
The pixel correlation statistic plot is not available for target 5110407, planet candidate 1, in target table 32.

PRF Fit of the Difference Image

The out of transit image centroid and difference image centroid could not be calculated for target 5110407, planet candidate 1, in target table 32.

PRF Fit of the Pixel Correlation Image

The pixel correlation image centroid could not be calculated for target 5110407, planet candidate 1, in target table 32.



Difference image for target 5110407, planet candidate 1, quarter 7, target table 38. Upper left: difference between mean flux out-of-transit and in-transit; upper right: mean out-of-transit flux; lower left: mean in-transit flux; lower right: difference between mean flux out-of-transit and in-transit after normalizing by the uncertainty in the difference for each pixel. The optimal aperture is outlined with a white dash-dotted line in each panel and the target mask is outlined with a solid white line. Symbol key: x: target position from KIC RA and Dec converted to CCD coordinates via motion polynomials; *: position of nearby KIC objects converted to CCD coordinates via motion polynomials (objects in the UKIRT extension to the KIC have IDs between 15,000,000 and 30,000,000); +: PRF-fit location of target from out-of-transit image; triangle: PRF-fit location of transit source from the difference image. CCD row and column coordinates are 0-based. Number of transits = 1; number of valid in-transit cadences = 8; number of in-transit cadence gaps = 0; number of valid out-of-transit cadences = 20; number of out-of-transit cadence gaps = 0. Difference image quality metric = 0.90 (good).

Open `./planet-01/difference-image/005110407-01-difference-image-07-038.fig`

The pixel correlation statistic plot is not available for target 5110407, planet candidate 1, in target table 38.

PRF Fit of the Difference Image

Offset from the PRF fit to the out of transit image

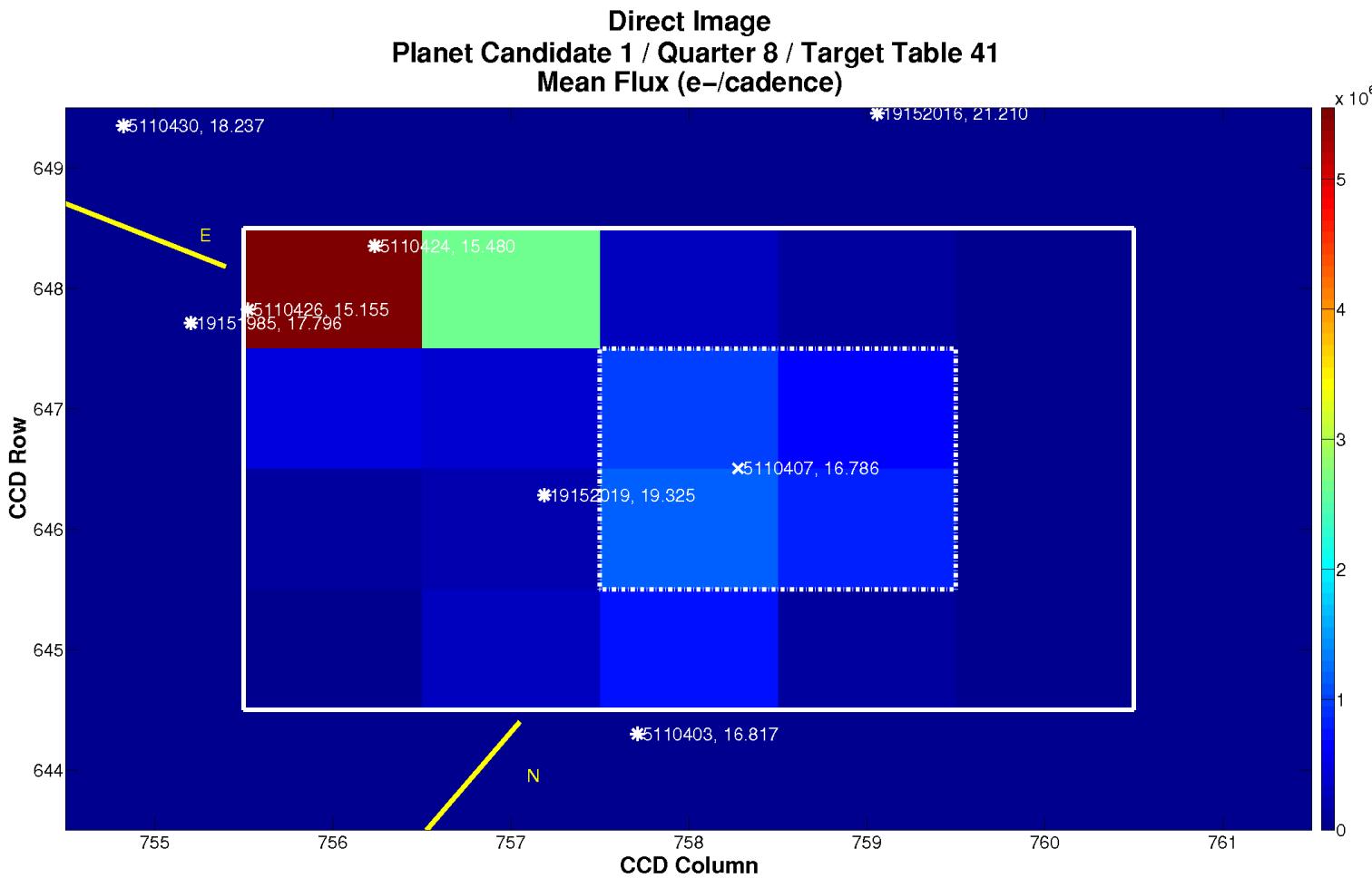
	Row	Column	Units	RA	Dec	Units
Out of Transit Image Centroid		N/A	N/A	pixels	N/A	N/A hours/degrees
Difference Image Centroid	$647.45 \pm 9.65e - 02$	$754.68 \pm 5.63e - 02$	pixels	$19.65553556 \pm 6.89e - 06$	$40.24078603 \pm 9.51e - 05$	hours/degrees
Offset		N/A	N/A	pixels	N/A	N/A arcseconds
Offset/ σ		N/A	N/A		N/A	N/A
Offset Distance		N/A	pixels		N/A	arcseconds
Offset Distance/ σ		N/A			N/A	

Offset from the KIC RA and Dec converted to pixels via motion polynomials

	Row	Column	Units	RA	Dec	Units
KIC Reference Centroid	$647.50 \pm 1.11e - 05$	$754.68 \pm 1.11e - 05$	pixels	$19.65553800 \pm 0.00e + 00$	$40.24074000 \pm 0.00e + 00$	hours/degrees
Difference Image Centroid	$647.45 \pm 9.65e - 02$	$754.68 \pm 5.63e - 02$	pixels	$19.65553556 \pm 6.89e - 06$	$40.24078603 \pm 9.51e - 05$	hours/degrees
Offset	$-0.0487 \pm 9.65e - 02$	$0.0009 \pm 5.63e - 02$	pixels	$-0.1004 \pm 2.84e - 01$	$0.1657 \pm 3.42e - 01$	arcseconds
Offset/ σ	-0.50	0.02		-0.35	0.48	
Offset Distance	$0.0487 \pm 9.66e - 02$	pixels		$0.1937 \pm 3.84e - 01$		arcseconds
Offset Distance/ σ	0.50			0.50		

PRF Fit of the Pixel Correlation Image

The pixel correlation image centroid could not be calculated for target 5110407, planet candidate 1, in target table 38.



Direct image for target 5110407, planet candidate 1, quarter 8, target table 41. A difference image cannot be generated because there were no transits for this planet candidate and target table. The mean flux over all cadences is shown in the figure. The optimal aperture is outlined with a white dash-dotted line and the target mask is outlined with a solid white line. Symbol key: x: target position from KIC RA and Dec converted to CCD coordinates via motion polynomials; *: position of nearby KIC objects converted to CCD coordinates via motion polynomials (objects in the UKIRT extension to the KIC have IDs between 15,000,000 and 30,000,000). CCD row and column coordinates are 0-based.

Open [./planet-01/difference-image/005110407-01-difference-image-08-041.fig](#)

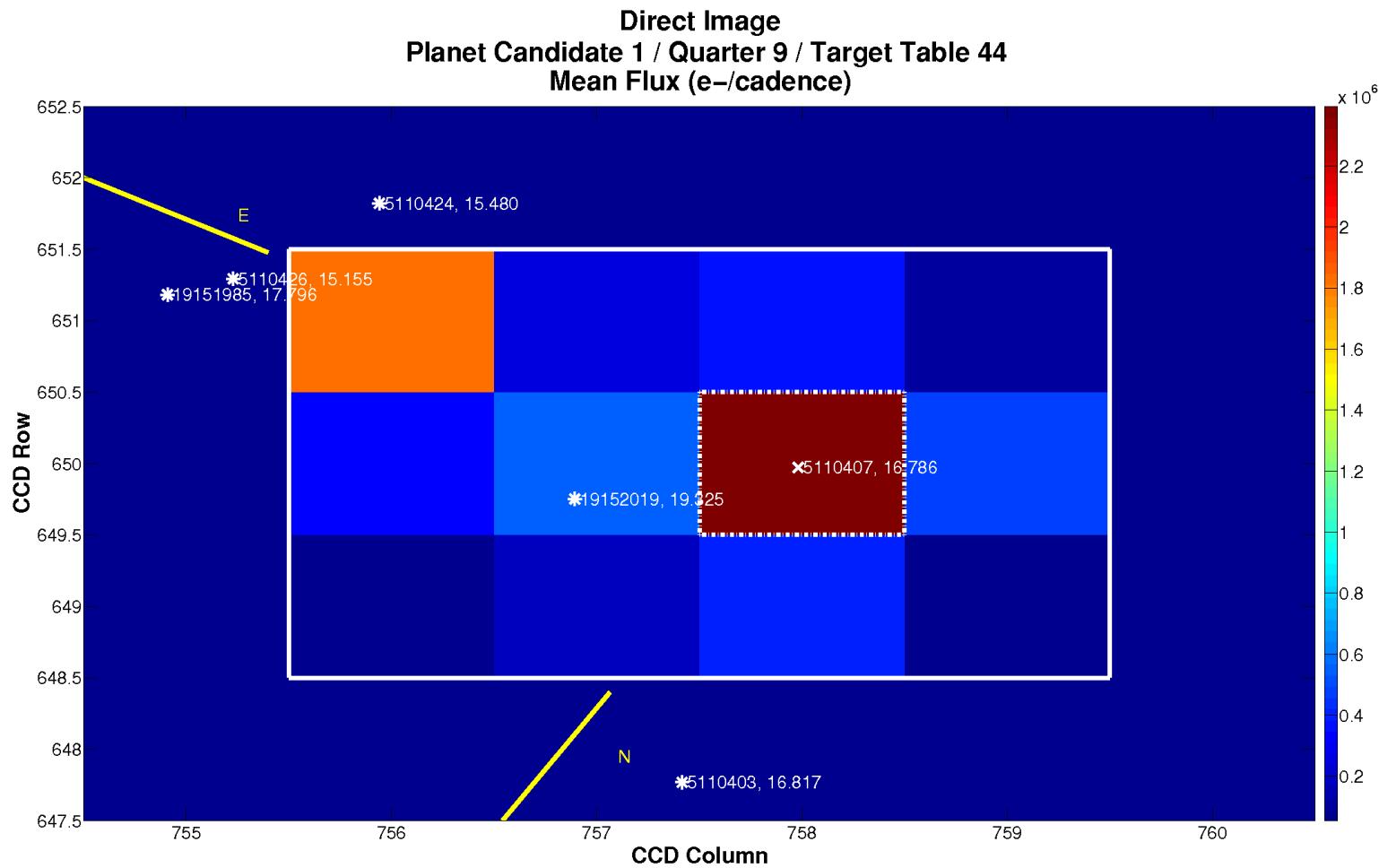
The pixel correlation statistic plot is not available for target 5110407, planet candidate 1, in target table 41.

PRF Fit of the Difference Image

The out of transit image centroid and difference image centroid could not be calculated for target 5110407, planet candidate 1, in target table 41.

PRF Fit of the Pixel Correlation Image

The pixel correlation image centroid could not be calculated for target 5110407, planet candidate 1, in target table 41.



Direct image for target 5110407, planet candidate 1, quarter 9, target table 44. A difference image cannot be generated because there were no transits for this planet candidate and target table. The mean flux over all cadences is shown in the figure. The optimal aperture is outlined with a white dash-dotted line and the target mask is outlined with a solid white line. Symbol key: x: target position from KIC RA and Dec converted to CCD coordinates via motion polynomials; *: position of nearby KIC objects converted to CCD coordinates via motion polynomials (objects in the UKIRT extension to the KIC have IDs between 15,000,000 and 30,000,000). CCD row and column coordinates are 0-based.

Open [./planet-01/difference-image/005110407-01-difference-image-09-044.fig](#)

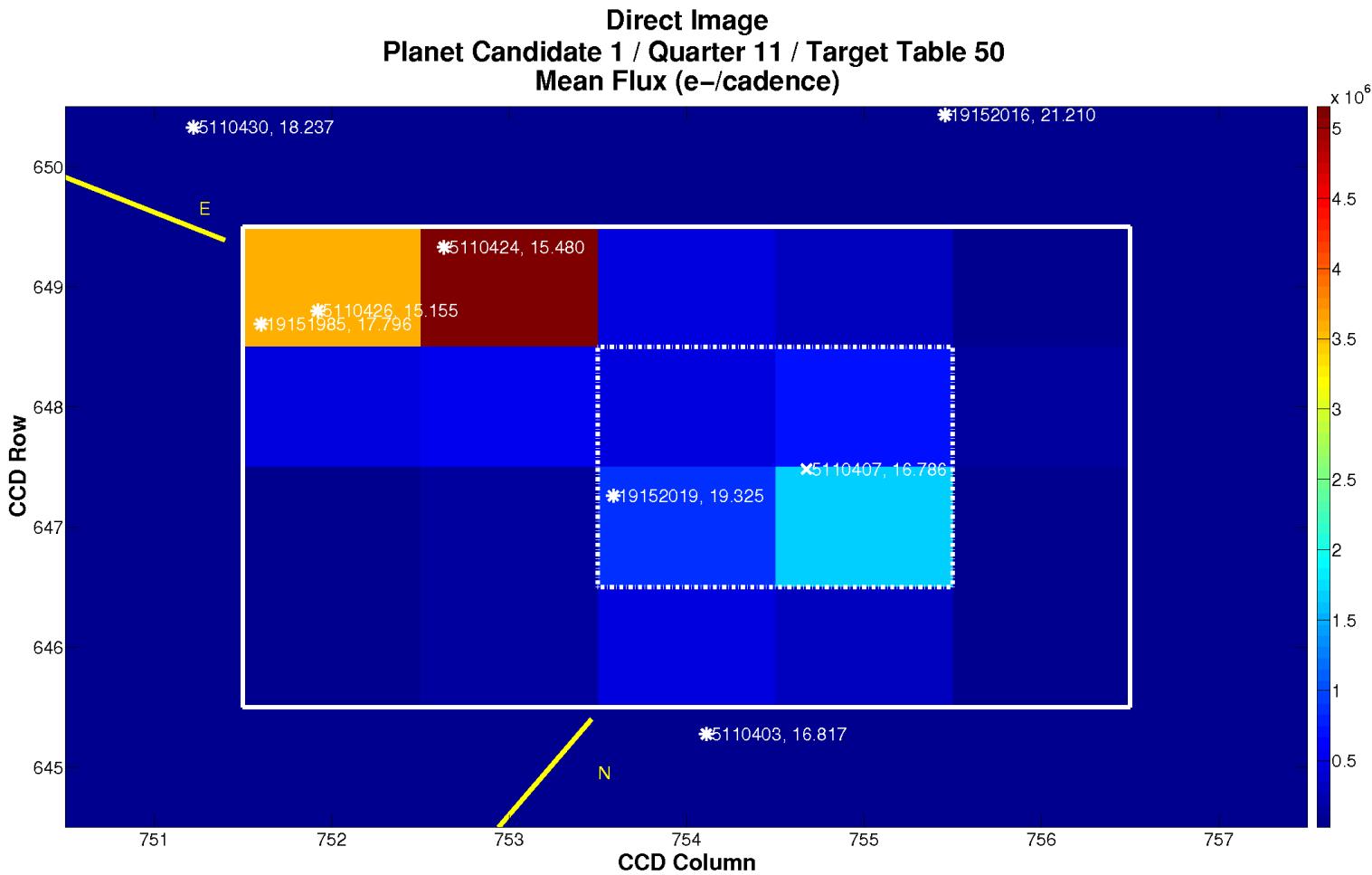
The pixel correlation statistic plot is not available for target 5110407, planet candidate 1, in target table 44.

PRF Fit of the Difference Image

The out of transit image centroid and difference image centroid could not be calculated for target 5110407, planet candidate 1, in target table 44.

PRF Fit of the Pixel Correlation Image

The pixel correlation image centroid could not be calculated for target 5110407, planet candidate 1, in target table 44.



Direct image for target 5110407, planet candidate 1, quarter 11, target table 50. A difference image cannot be generated because there were no transits for this planet candidate and target table. The mean flux over all cadences is shown in the figure. The optimal aperture is outlined with a white dash-dotted line and the target mask is outlined with a solid white line. Symbol key: x: target position from KIC RA and Dec converted to CCD coordinates via motion polynomials; *: position of nearby KIC objects converted to CCD coordinates via motion polynomials (objects in the UKIRT extension to the KIC have IDs between 15,000,000 and 30,000,000). CCD row and column coordinates are 0-based.

Open [./planet-01/difference-image/005110407-01-difference-image-11-050.fig](#)

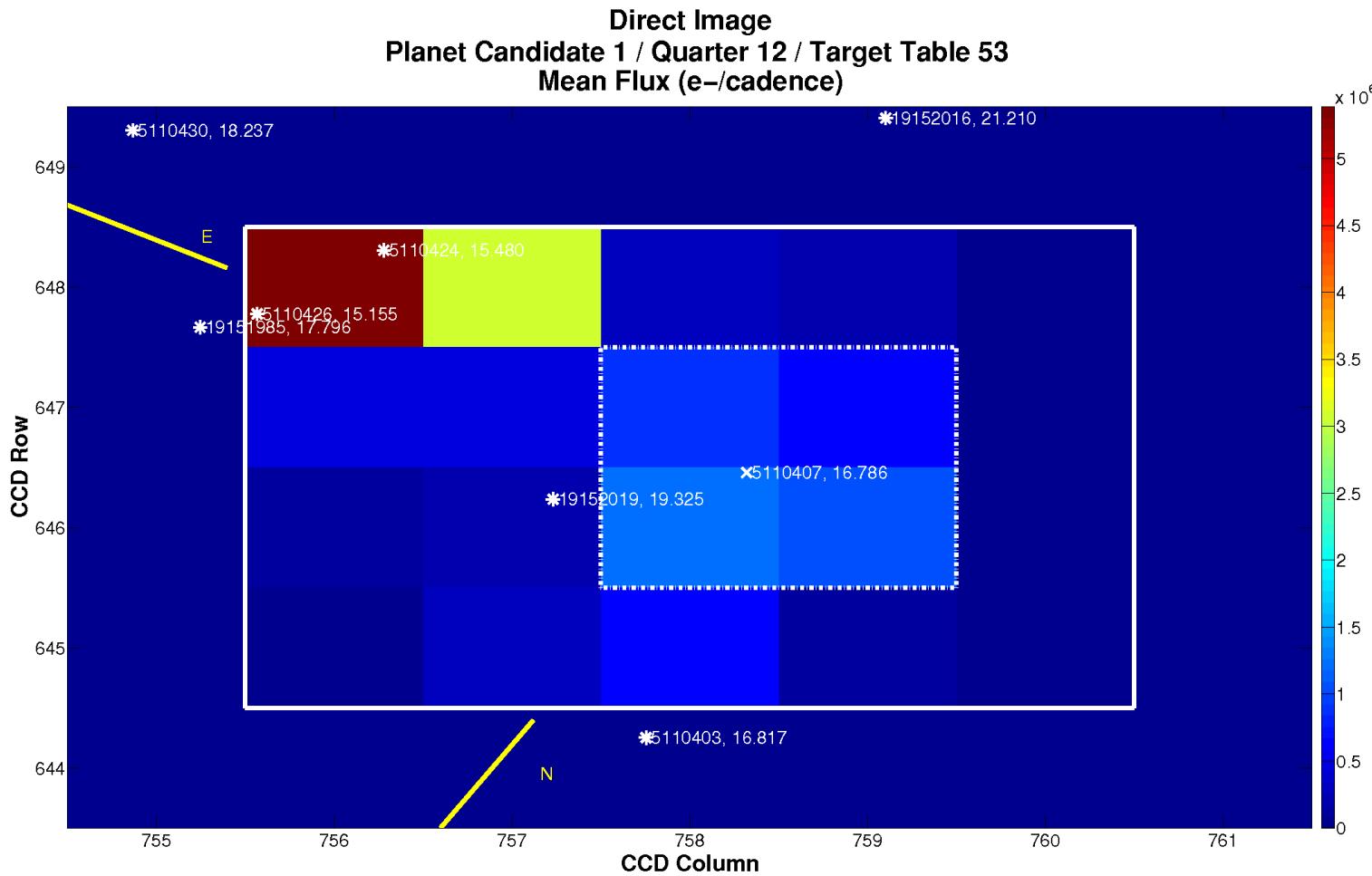
The pixel correlation statistic plot is not available for target 5110407, planet candidate 1, in target table 50.

PRF Fit of the Difference Image

The out of transit image centroid and difference image centroid could not be calculated for target 5110407, planet candidate 1, in target table 50.

PRF Fit of the Pixel Correlation Image

The pixel correlation image centroid could not be calculated for target 5110407, planet candidate 1, in target table 50.



Direct image for target 5110407, planet candidate 1, quarter 12, target table 53. A difference image cannot be generated because there were no transits for this planet candidate and target table. The mean flux over all cadences is shown in the figure. The optimal aperture is outlined with a white dash-dotted line and the target mask is outlined with a solid white line. Symbol key: x: target position from KIC RA and Dec converted to CCD coordinates via motion polynomials; *: position of nearby KIC objects converted to CCD coordinates via motion polynomials (objects in the UKIRT extension to the KIC have IDs between 15,000,000 and 30,000,000). CCD row and column coordinates are 0-based.

Open [./planet-01/difference-image/005110407-01-difference-image-12-053.fig](#)

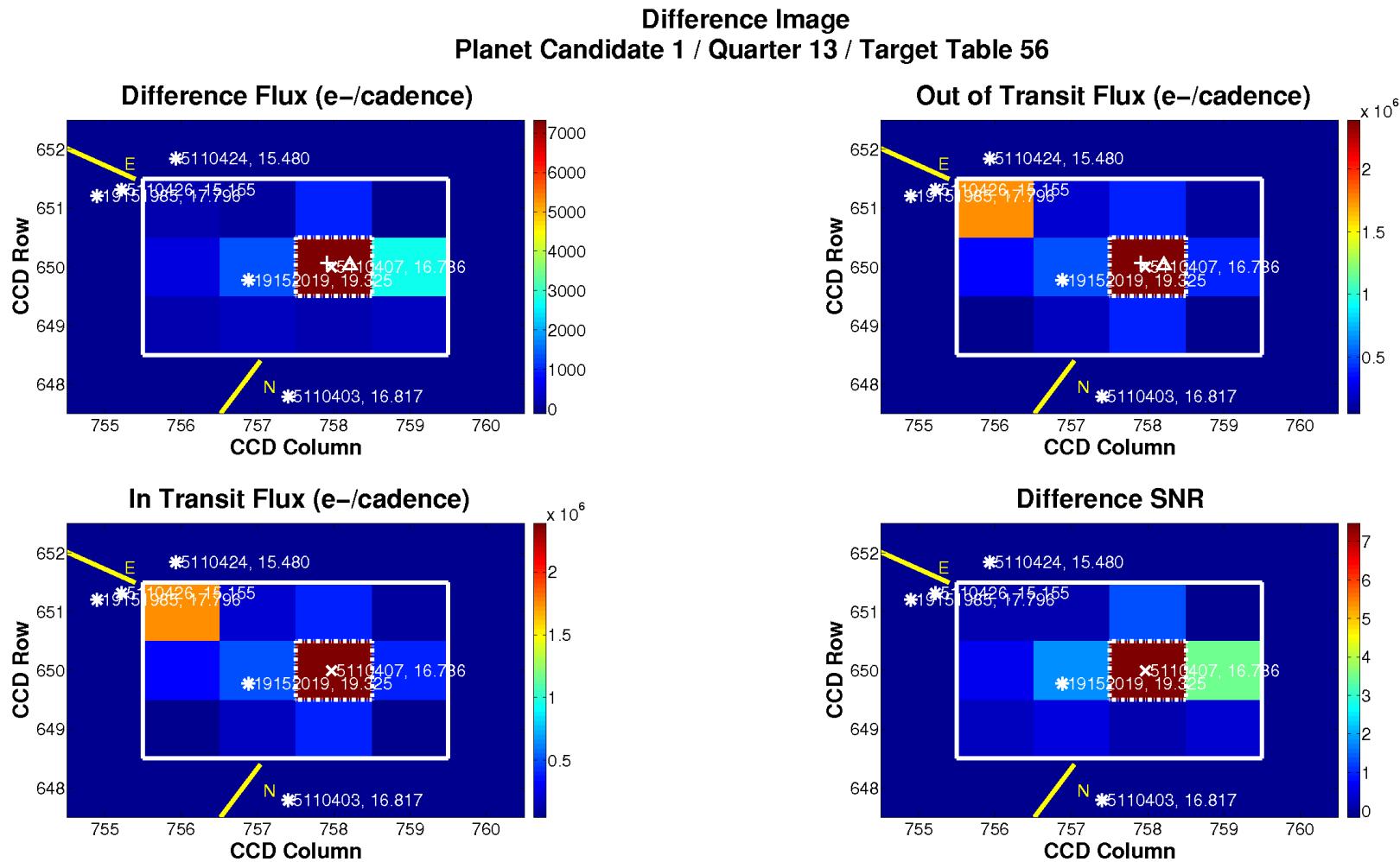
The pixel correlation statistic plot is not available for target 5110407, planet candidate 1, in target table 53.

PRF Fit of the Difference Image

The out of transit image centroid and difference image centroid could not be calculated for target 5110407, planet candidate 1, in target table 53.

PRF Fit of the Pixel Correlation Image

The pixel correlation image centroid could not be calculated for target 5110407, planet candidate 1, in target table 53.



Difference image for target 5110407, planet candidate 1, quarter 13, target table 56. Upper left: difference between mean flux out-of-transit and in-transit; upper right: mean out-of-transit flux; lower left: mean in-transit flux; lower right: difference between mean flux out-of-transit and in-transit after normalizing by the uncertainty in the difference for each pixel. The optimal aperture is outlined with a white dash-dotted line in each panel and the target mask is outlined with a solid white line. Symbol key: x: target position from KIC RA and Dec converted to CCD coordinates via motion polynomials; *: position of nearby KIC objects converted to CCD coordinates via motion polynomials (objects in the UKIRT extension to the KIC have IDs between 15,000,000 and 30,000,000); +: PRF-fit location of target from out-of-transit image; triangle: PRF-fit location of transit source from the difference image. CCD row and column coordinates are 0-based. Number of transits = 1; number of valid in-transit cadences = 8; number of in-transit cadence gaps = 0; number of valid out-of-transit cadences = 21; number of out-of-transit cadence gaps = 0. Difference image quality metric = 0.99 (good).

Open `./planet-01/difference-image/005110407-01-difference-image-13-056.fig`

The pixel correlation statistic plot is not available for target 5110407, planet candidate 1, in target table 56.

PRF Fit of the Difference Image

Offset from the PRF fit to the out of transit image

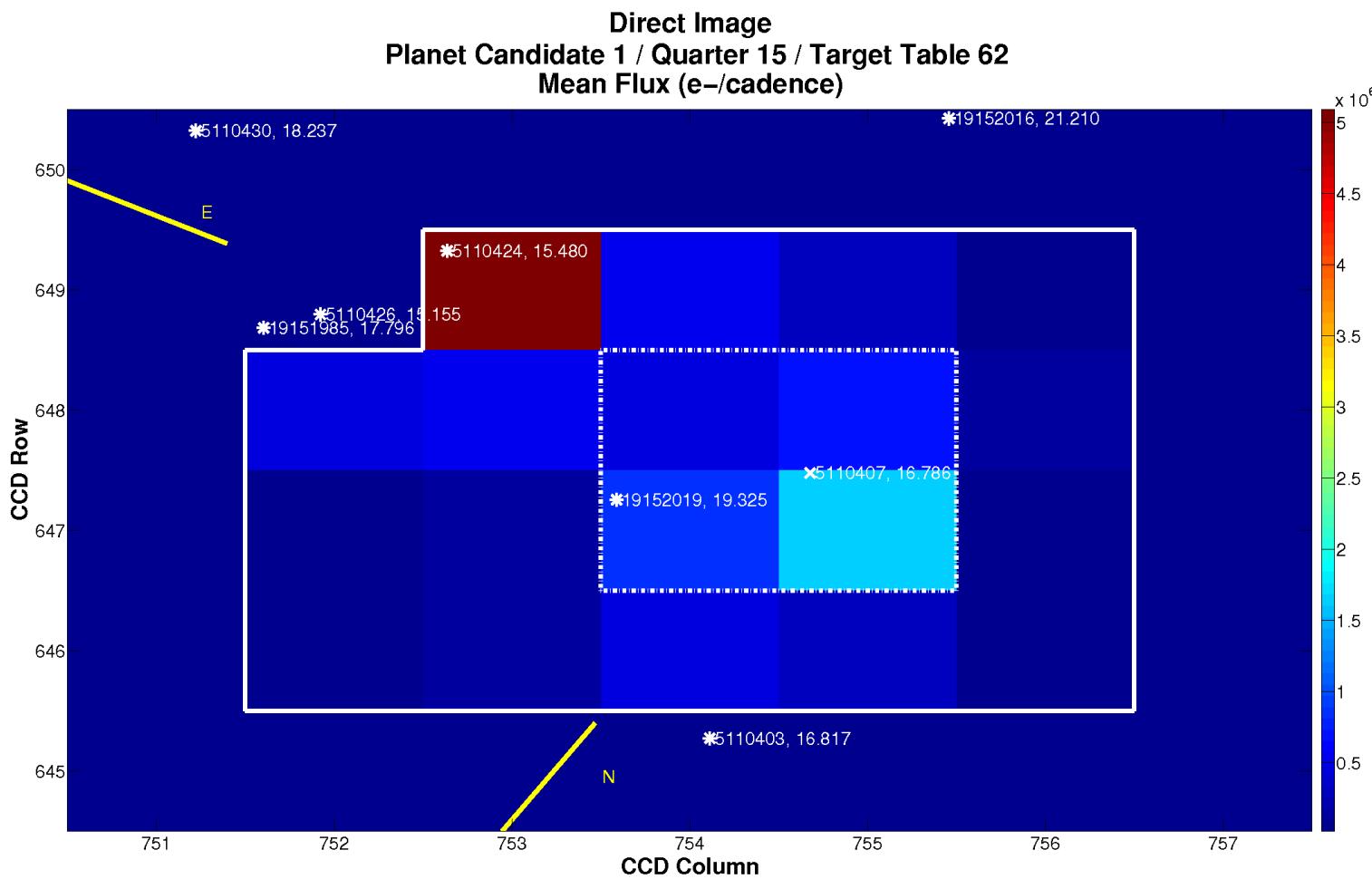
	Row	Column	Units	RA	Dec	Units
Out of Transit Image Centroid	$650.07 \pm 1.69e - 04$	$757.91 \pm 2.49e - 04$	pixels	$19.65554644 \pm 2.27e - 08$	$40.24070492 \pm 2.08e - 07$	hours/degrees
Difference Image Centroid	$650.02 \pm 1.20e - 01$	$758.21 \pm 9.41e - 02$	pixels	$19.65551908 \pm 1.02e - 05$	$40.24057851 \pm 1.22e - 04$	hours/degrees
Offset	$-0.0438 \pm 1.20e - 01$	$0.3025 \pm 9.41e - 02$	pixels	$-1.1279 \pm 4.21e - 01$	$-0.4551 \pm 4.38e - 01$	arcseconds
Offset/ σ	-0.37	3.21		-2.68		-1.04
Offset Distance	$0.3057 \pm 9.63e - 02$		pixels	$1.2163 \pm 3.84e - 01$		arcseconds
Offset Distance/ σ	3.18			3.17		

Offset from the KIC RA and Dec converted to pixels via motion polynomials

	Row	Column	Units	RA	Dec	Units
KIC Reference Centroid	$650.00 \pm 9.10e - 06$	$757.97 \pm 1.00e - 05$	pixels	$19.65553800 \pm 0.00e + 00$	$40.24074000 \pm 0.00e + 00$	hours/degrees
Difference Image Centroid	$650.02 \pm 1.20e - 01$	$758.21 \pm 9.41e - 02$	pixels	$19.65551908 \pm 1.02e - 05$	$40.24057851 \pm 1.22e - 04$	hours/degrees
Offset	$0.0276 \pm 1.20e - 01$	$0.2430 \pm 9.41e - 02$	pixels	$-0.7800 \pm 4.21e - 01$	$-0.5814 \pm 4.38e - 01$	arcseconds
Offset/ σ	0.23	2.58		-1.85		-1.33
Offset Distance	$0.2445 \pm 9.33e - 02$		pixels	$0.9728 \pm 3.72e - 01$		arcseconds
Offset Distance/ σ	2.62			2.62		

PRF Fit of the Pixel Correlation Image

The pixel correlation image centroid could not be calculated for target 5110407, planet candidate 1, in target table 56.



Direct image for target 5110407, planet candidate 1, quarter 15, target table 62. A difference image cannot be generated because there were no transits for this planet candidate and target table. The mean flux over all cadences is shown in the figure. The optimal aperture is outlined with a white dash-dotted line and the target mask is outlined with a solid white line. Symbol key: x: target position from KIC RA and Dec converted to CCD coordinates via motion polynomials; *: position of nearby KIC objects converted to CCD coordinates via motion polynomials (objects in the UKIRT extension to the KIC have IDs between 15,000,000 and 30,000,000). CCD row and column coordinates are 0-based.

Open [./planet-01/difference-image/005110407-01-difference-image-15-062.fig](#)

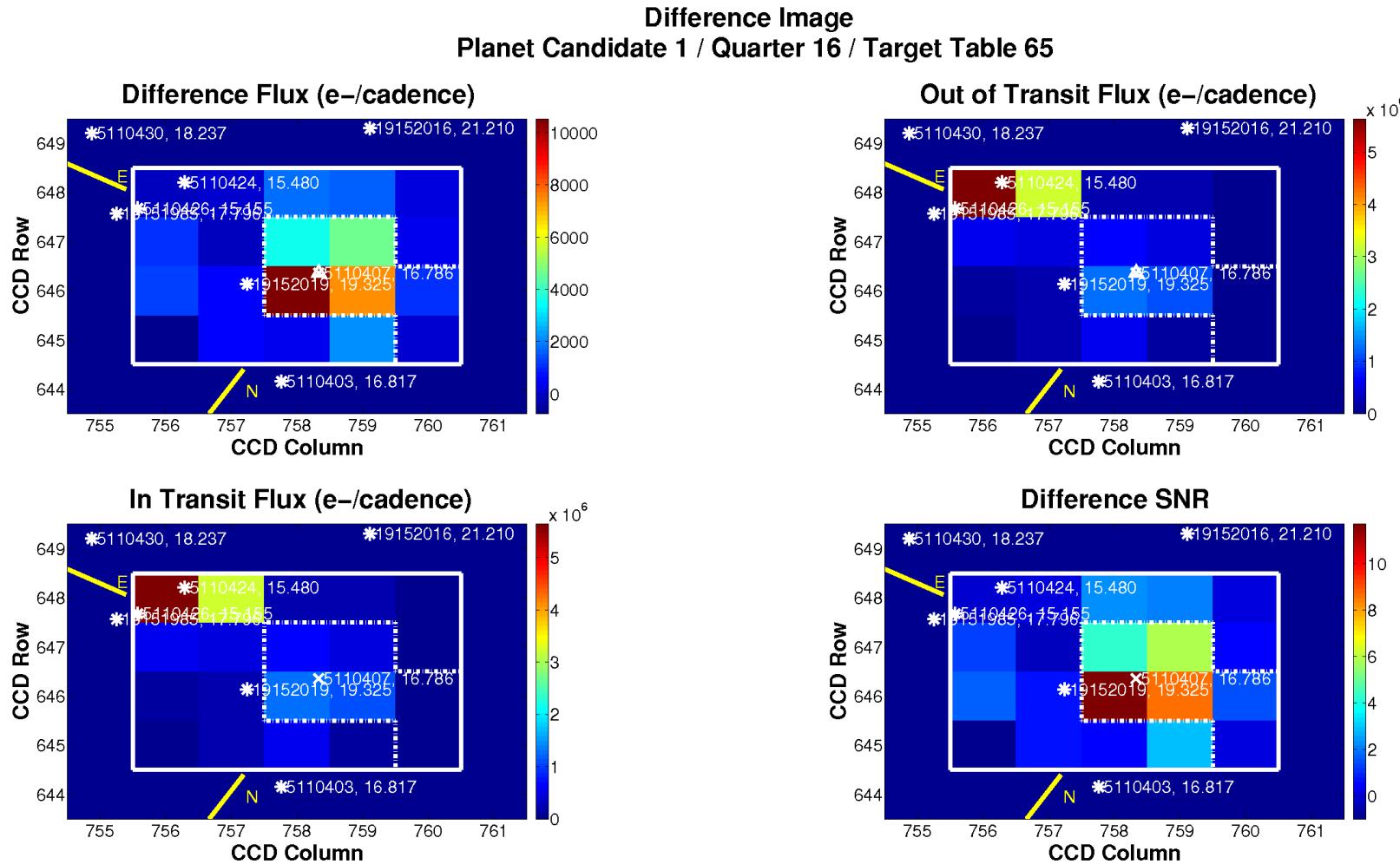
The pixel correlation statistic plot is not available for target 5110407, planet candidate 1, in target table 62.

PRF Fit of the Difference Image

The out of transit image centroid and difference image centroid could not be calculated for target 5110407, planet candidate 1, in target table 62.

PRF Fit of the Pixel Correlation Image

The pixel correlation image centroid could not be calculated for target 5110407, planet candidate 1, in target table 62.



Difference image for target 5110407, planet candidate 1, quarter 16, target table 65. Upper left: difference between mean flux out-of-transit and in-transit; upper right: mean out-of-transit flux; lower left: mean in-transit flux; lower right: difference between mean flux out-of-transit and in-transit after normalizing by the uncertainty in the difference for each pixel. The optimal aperture is outlined with a white dash-dotted line in each panel and the target mask is outlined with a solid white line. Symbol key: x: target position from KIC RA and Dec converted to CCD coordinates via motion polynomials; *: position of nearby KIC objects converted to CCD coordinates via motion polynomials (objects in the UKIRT extension to the KIC have IDs between 15,000,000 and 30,000,000); +: PRF-fit location of target from out-of-transit image; triangle: PRF-fit location of transit source from the difference image. CCD row and column coordinates are 0-based. Number of transits = 1; number of valid in-transit cadences = 8; number of in-transit cadence gaps = 0; number of valid out-of-transit cadences = 20; number of out-of-transit cadence gaps = 0. Difference image quality metric = 0.96 (good).

Open `./planet-01/difference-image/005110407-01-difference-image-16-065.fig`

The pixel correlation statistic plot is not available for target 5110407, planet candidate 1, in target table 65.

PRF Fit of the Difference Image

Offset from the PRF fit to the out of transit image

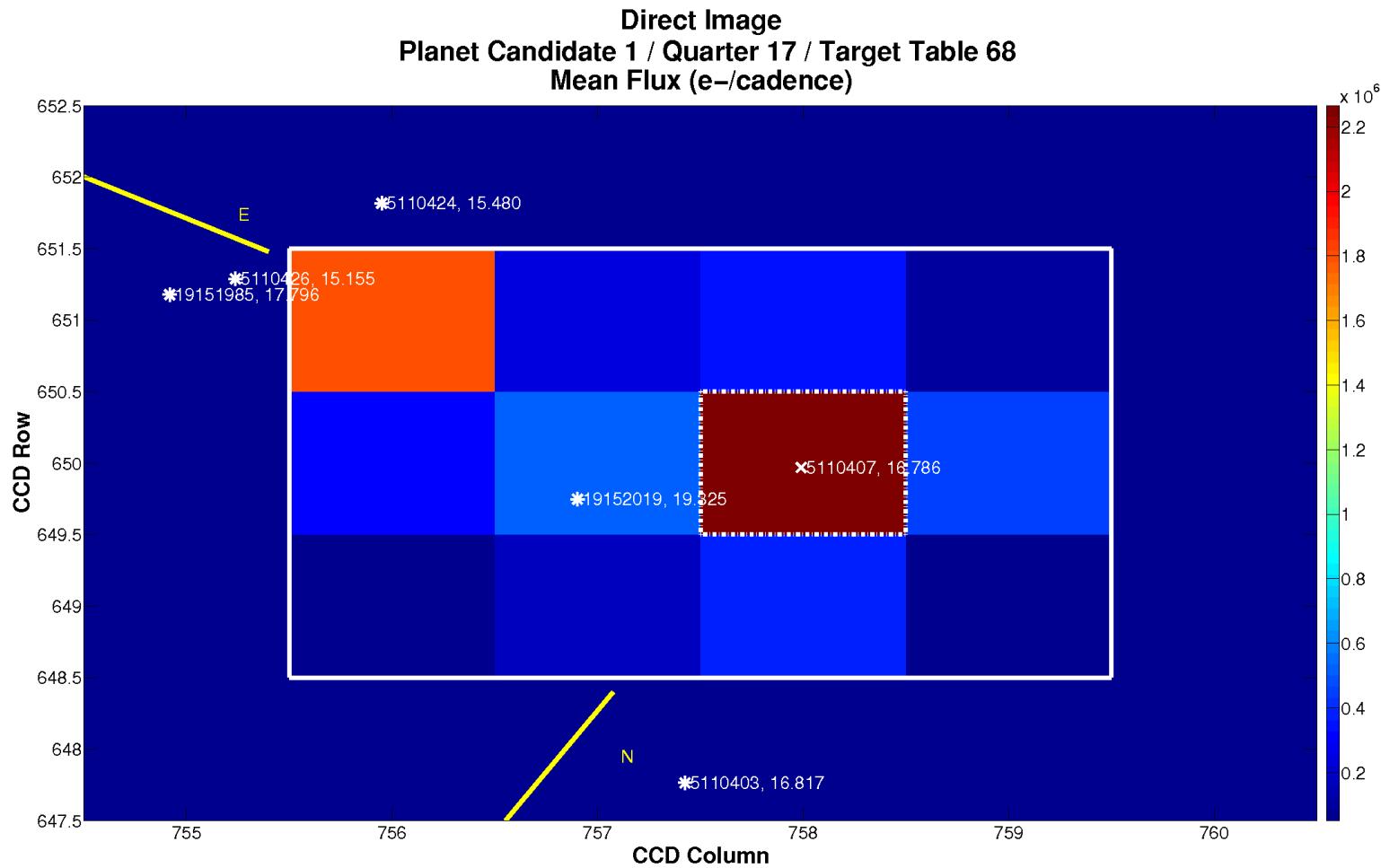
	Row	Column	Units	RA	Dec	Units
Out of Transit Image Centroid	<i>N/A</i>	<i>N/A</i>	pixels	<i>N/A</i>	<i>N/A</i>	hours/degrees
Difference Image Centroid	$646.36 \pm 4.51e - 02$	$758.33 \pm 3.04e - 02$	pixels	$19.65553778 \pm 3.32e - 06$	$40.24073619 \pm 4.66e - 05$	hours/degrees
Offset	<i>N/A</i>	<i>N/A</i>	pixels	<i>N/A</i>	<i>N/A</i>	arcseconds
Offset/ σ	<i>N/A</i>	<i>N/A</i>		<i>N/A</i>	<i>N/A</i>	
Offset Distance	<i>N/A</i>		pixels	<i>N/A</i>		arcseconds
Offset Distance/ σ	<i>N/A</i>			<i>N/A</i>		

Offset from the KIC RA and Dec converted to pixels via motion polynomials

	Row	Column	Units	RA	Dec	Units
KIC Reference Centroid	$646.36 \pm 1.17e - 05$	$758.33 \pm 8.25e - 06$	pixels	$19.65553800 \pm 0.00e + 00$	$40.24074000 \pm 0.00e + 00$	hours/degrees
Difference Image Centroid	$646.36 \pm 4.51e - 02$	$758.33 \pm 3.04e - 02$	pixels	$19.65553778 \pm 3.32e - 06$	$40.24073619 \pm 4.66e - 05$	hours/degrees
Offset	$0.0019 \pm 4.51e - 02$	$0.0037 \pm 3.04e - 02$	pixels	$-0.0089 \pm 1.37e - 01$	$-0.0137 \pm 1.68e - 01$	arcseconds
Offset/ σ	0.04	0.12		-0.06	-0.08	
Offset Distance	$0.0041 \pm 3.42e - 02$		pixels	$0.0163 \pm 1.36e - 01$		arcseconds
Offset Distance/ σ	0.12			0.12		

PRF Fit of the Pixel Correlation Image

The pixel correlation image centroid could not be calculated for target 5110407, planet candidate 1, in target table 65.



Direct image for target 5110407, planet candidate 1, quarter 17, target table 68. A difference image cannot be generated because there were no transits for this planet candidate and target table. The mean flux over all cadences is shown in the figure. The optimal aperture is outlined with a white dash-dotted line and the target mask is outlined with a solid white line. Symbol key: x: target position from KIC RA and Dec converted to CCD coordinates via motion polynomials; *: position of nearby KIC objects converted to CCD coordinates via motion polynomials (objects in the UKIRT extension to the KIC have IDs between 15,000,000 and 30,000,000). CCD row and column coordinates are 0-based.

Open [./planet-01/difference-image/005110407-01-difference-image-17-068.fig](#)

The pixel correlation statistic plot is not available for target 5110407, planet candidate 1, in target table 68.

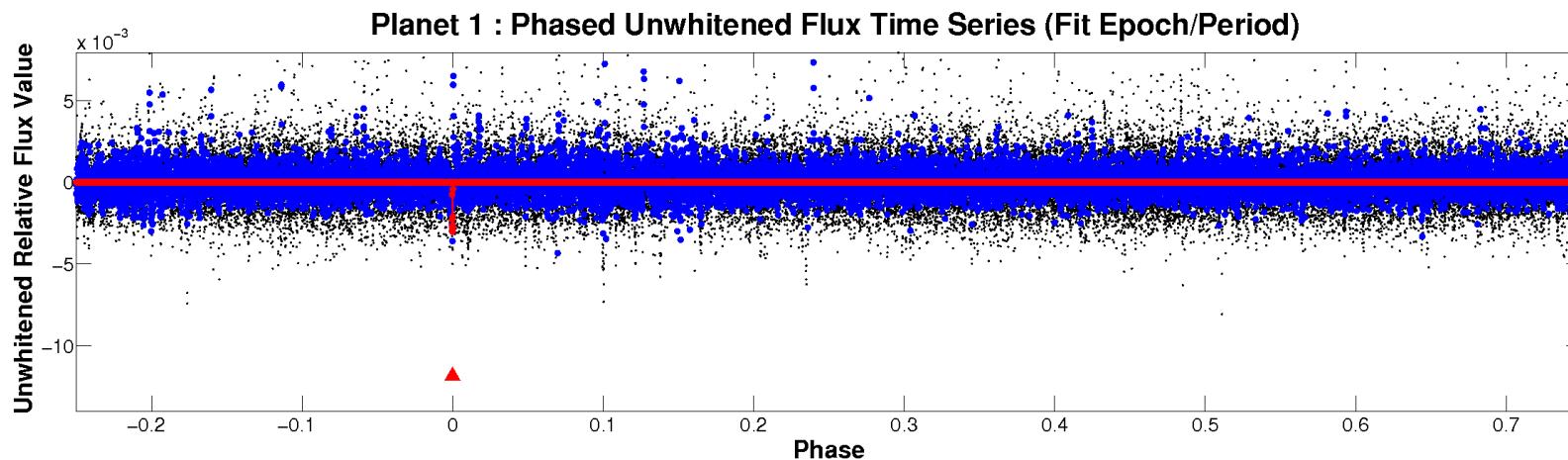
PRF Fit of the Difference Image

The out of transit image centroid and difference image centroid could not be calculated for target 5110407, planet candidate 1, in target table 68.

PRF Fit of the Pixel Correlation Image

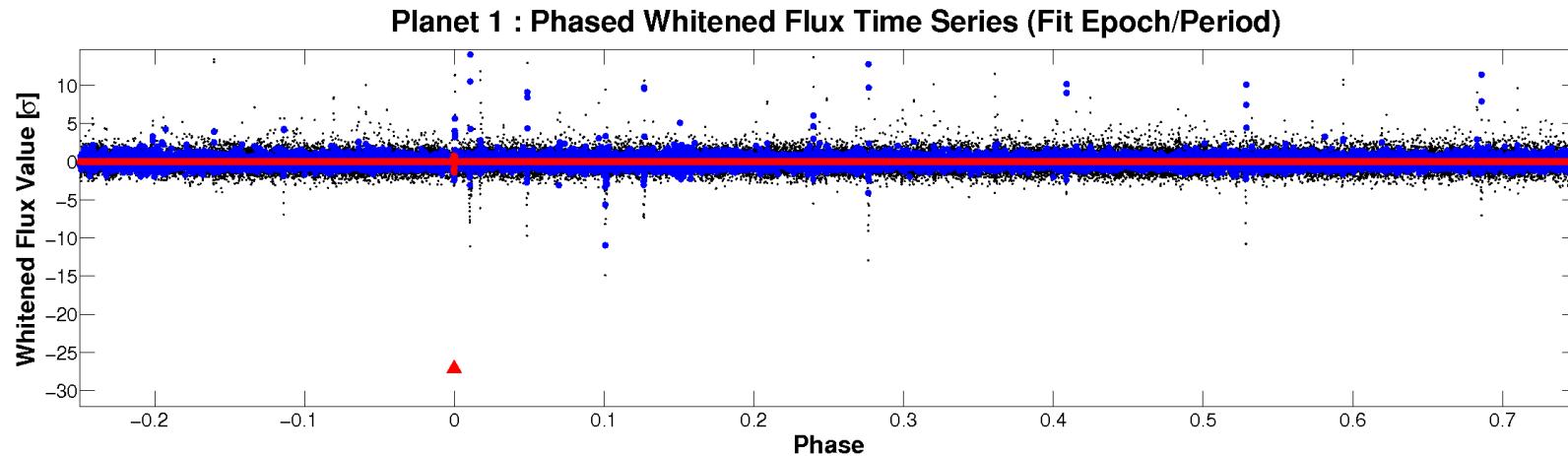
The pixel correlation image centroid could not be calculated for target 5110407, planet candidate 1, in target table 68.

8 Phased Light Curves



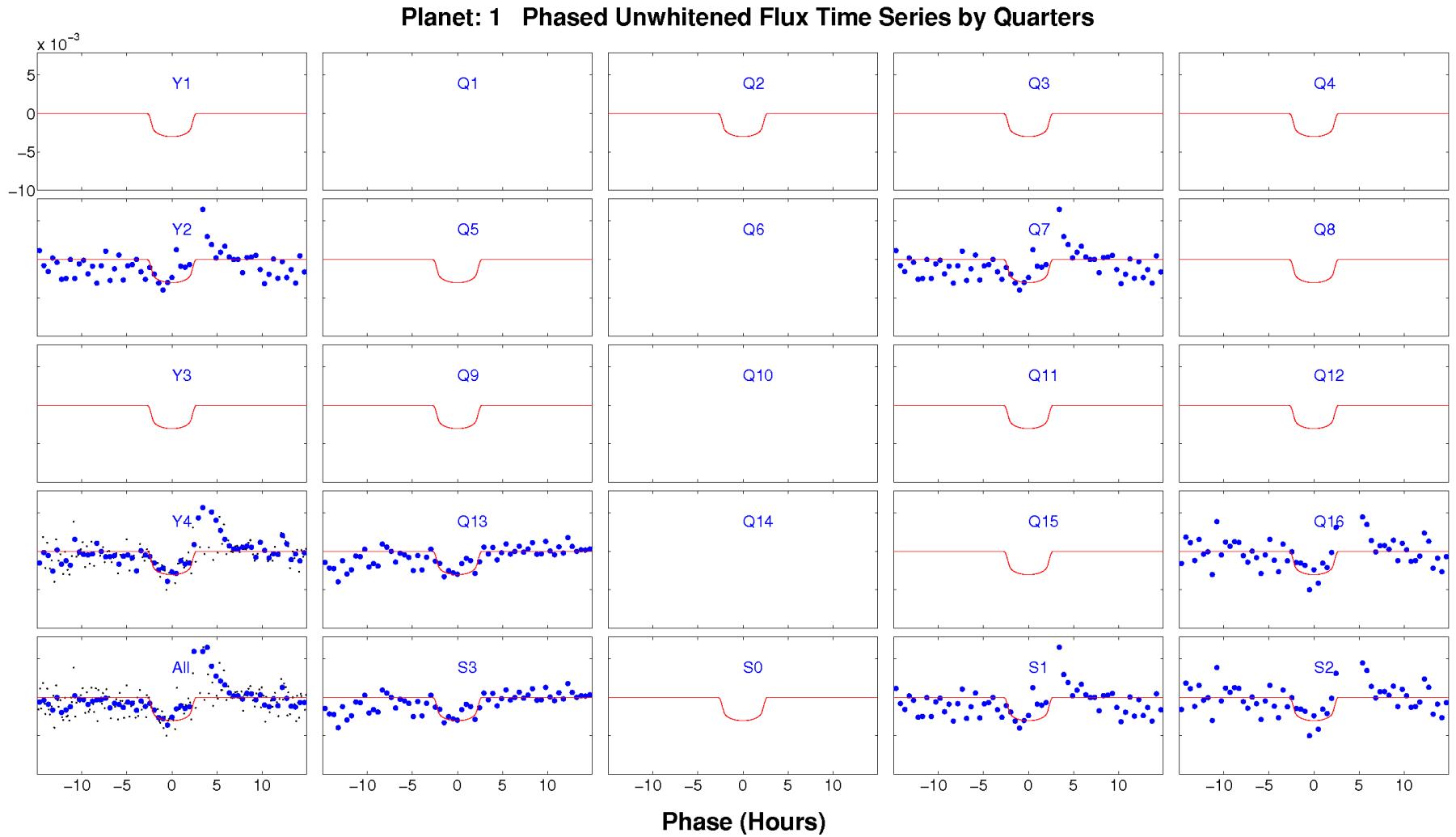
Phased unwhitened flux time series is plotted in black dots. When all transits fit completed with full or secondary convergence, the phase is determined with the fitted epoch and period; otherwise, the phase is determined with the TPS epoch and period. The values of the phased unwhitened flux time series averaged in one cadence wide bins are plotted in bigger blue dots. When all transits fit completes with full or secondary convergence, the averaged values of the phased unwhitened fitted model light curve are plotted in red dots. Transit event markers in different colors indicate the locations of the transits of all planet candidates. The transits of the same planet candidate are labeled with the markers of the same color, for example, blue markers for transits of planet candidate #1, red markers for transits of planet candidate #2, etc.

Open [./summary-plots/005110407-01-phased-unwhitened-flux-time-series.fig](#)



Phased whitened flux time series is plotted in black dots. When all transits fit completed with full or secondary convergence, the phase is determined with the fitted epoch and period; otherwise, the phase is determined with the TPS epoch and period. The values of the phased whitened flux time series averaged in one cadence wide bins are plotted in bigger blue dots. When all transits fit completes with full or secondary convergence, the averaged values of the phased whitened fitted model light curve are plotted in red dots. Transit event markers in different colors indicate the locations of the transits of all planet candidates. The transits of the same planet candidate are labeled with the markers of the same color, for example, blue markers for transits of planet candidate #1, red markers for transits of planet candidate #2, etc.

Open [./summary-plots/005110407-01-phased-whitened-flux-time-series.fig](#)



Phased unwhitened flux time series by quarter for target 5110407, planet candidate 1. Period = 285.3025 days; transit epoch = 399.7316 BKJD.
Open [./summary-plots/005110407-01-phased-unwhitened-flux-time-series-by-quarter.fig](#)

9 Planet Candidate 1

9.1 Model Fitter: All Transits

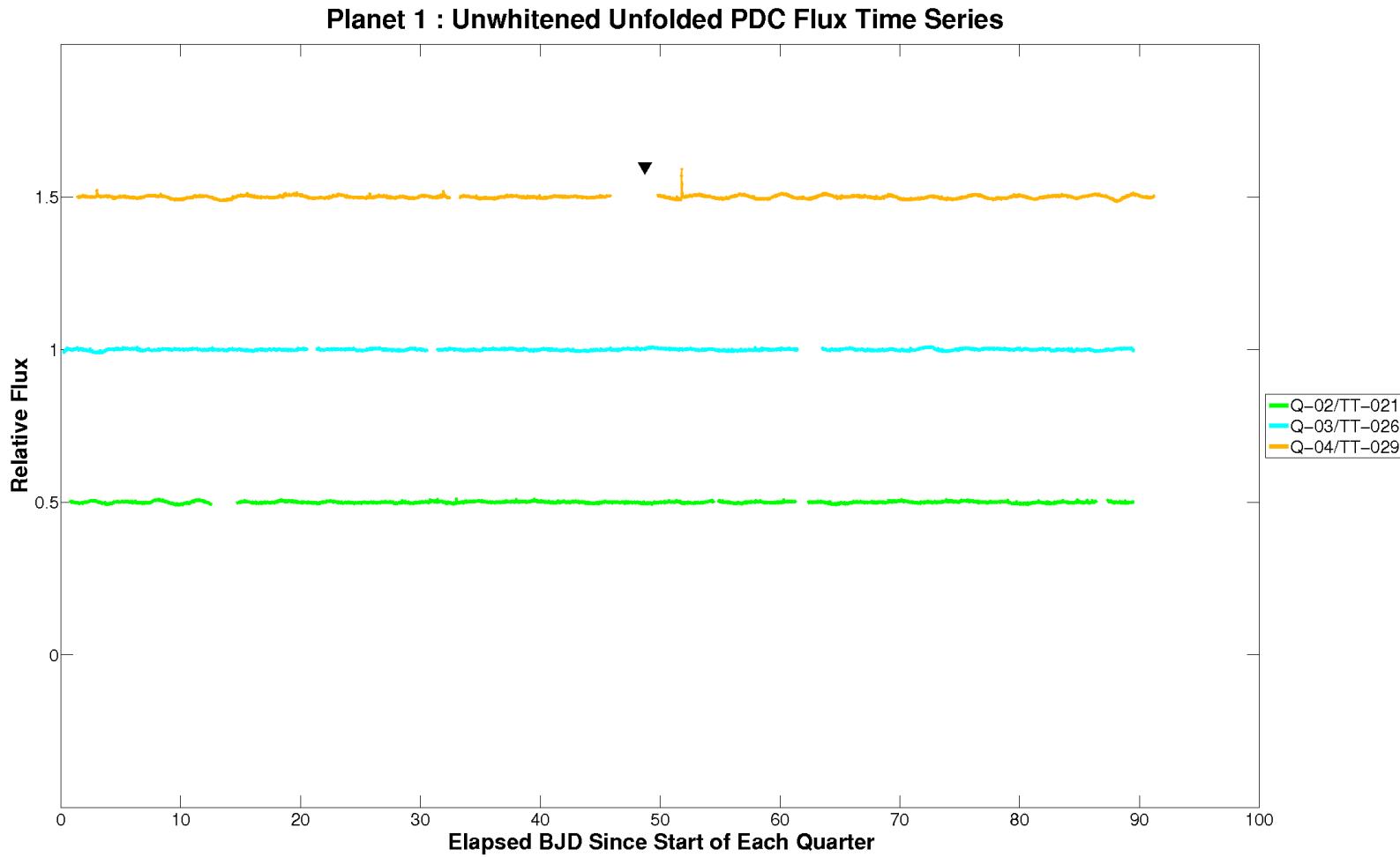
Model Characteristic	Name
Transit Model	mandel-agol_geometric_transit_model
Limb Darkening Model	claret_nonlinear_limb_darkening_model_2011

TCE Parameter	Value	Units
Trial Transit Pulse Duration	5.0	hours
Transit Epoch	55232.2116856	MJD
Orbital Period	285.3069871	days
Maximum SES	9.0	
Maximum MES	10.4	
Robust Statistic	7.4	
Chi Square Goodness of Fit Statistic (DoF)	37.4 (31)	
Chi Square2 Statistic (DoF)	4.6 (7.1)	
Threshold for Desired PFA		

DoF: Degrees of Freedom

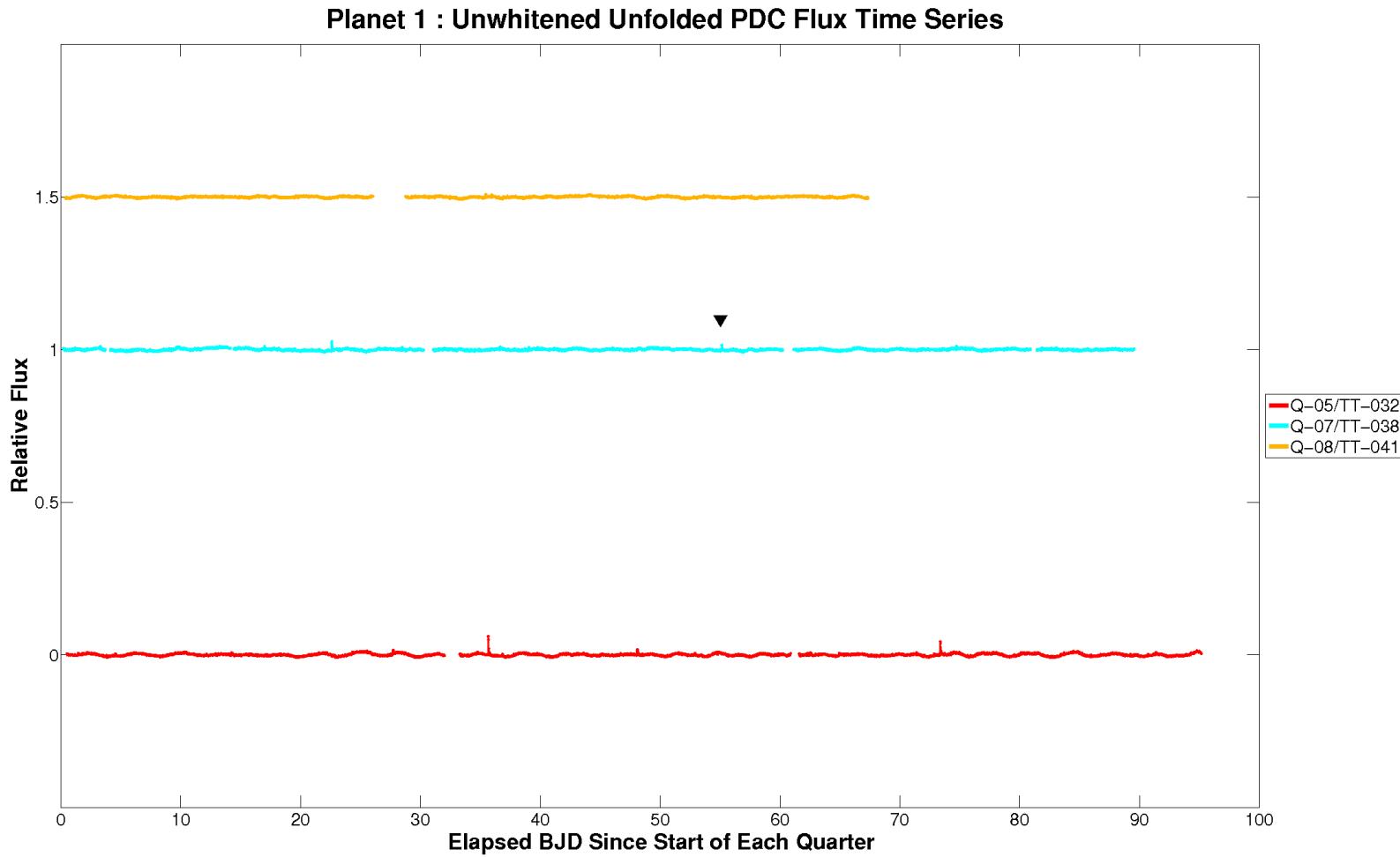
Parameter	Value	Uncertainty	Units
SNR	6.8		
Orbital Period	285.3025280	6.3103e-03	days
Transit Epoch	399.7316034	1.8349e-02	BKJD
Impact Parameter	0.3857	9.5823e+00	
Planet Radius to Star Radius Ratio	0.0505598	5.4604e-02	
Semi-major Axis to Star Radius Ratio	426.6673	1.8330e+03	
Planet Radius	11.4372	1.3989e+01	Earth radii
Semi-major Axis	0.8669	5.5837e-01	AU
Effective Stellar Flux	4.5200	5.0507e+00	Goldilocks
Equilibrium Temperature	372	1.0386e+02	Kelvin
Transit Depth	3025	5.6120e+02	ppm
Transit Duration	4.9918	2.4488e+00	hours
Transit Ingress Time	0.2800	2.7252e+00	hours
Eccentricity	0.0000	0.0000e+00	
Peri Longitude	0.0000	0.0000e+00	degrees
Model Chi Square Statistic (DoF)	157.9 (145.0)		
Model Chi Square Goodness of Fit Statistic (DoF)	22.3 (32)		
Model Chi Square2 Statistic (DoF)	5.9 (2)		

DoF: Degrees of Freedom



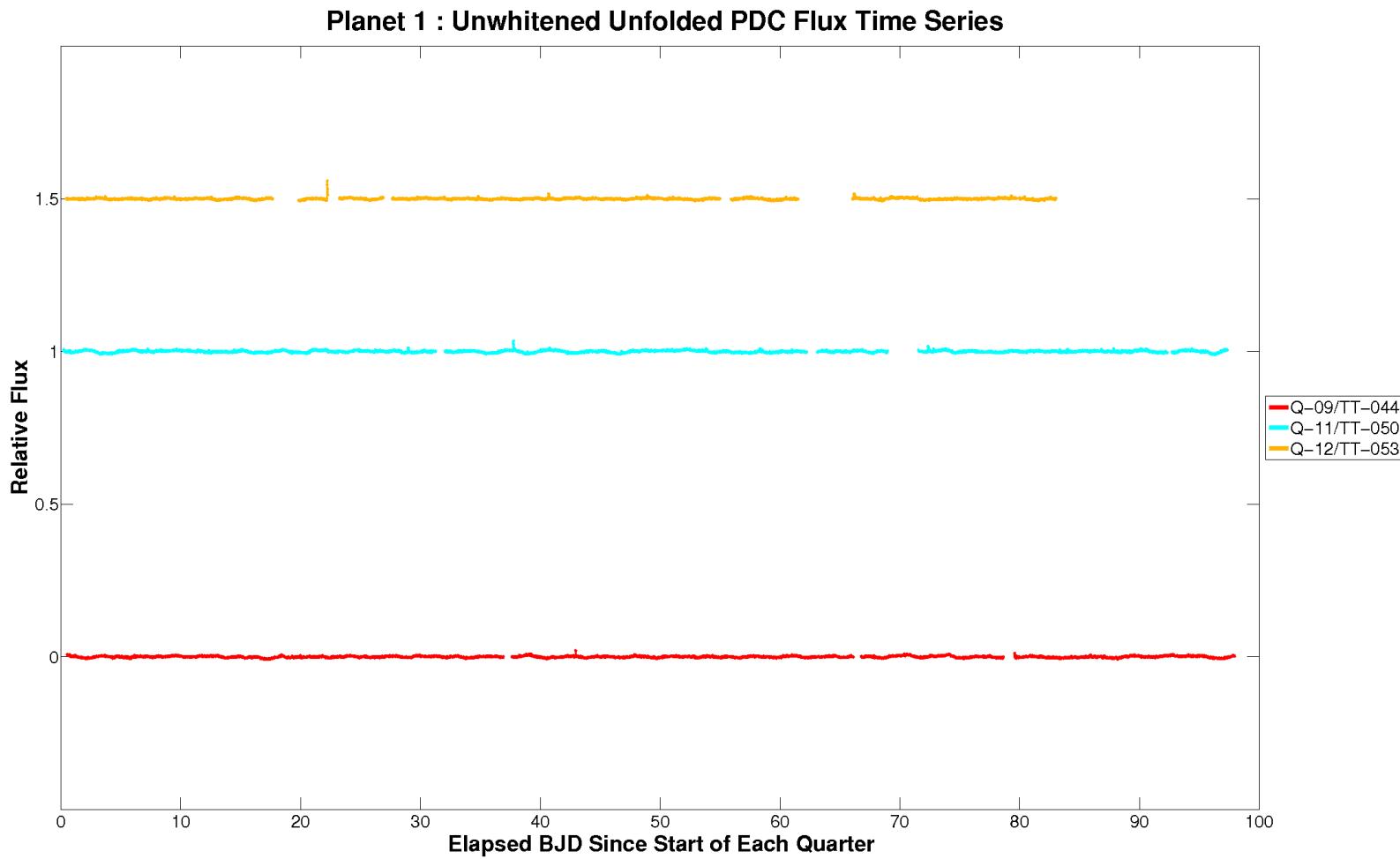
PDC Flux time series for KeplerId 5110407, Planet candidate 1 in the unwhitened domain. For the data of Quarter-01/TargetTableId-020, start BJD is 2454964 and the vertical offset is 0. For the data of Quarter-02/TargetTableId-021, start BJD is 2455002 and the vertical offset is 0.5. For the data of Quarter-03/TargetTableId-026, start BJD is 2455093 and the vertical offset is 1. For the data of Quarter-04/TargetTableId-029, start BJD is 2455184 and the vertical offset is 1.5. Transit event markers indicate the location of transits of the given planet candidate. All transits fit completed with full convergence.

Open [./planet-01/planet-search-and-model-fitting-results/all-transits-fit/005110407-01-all-unwhitened-01-020.fig](#)



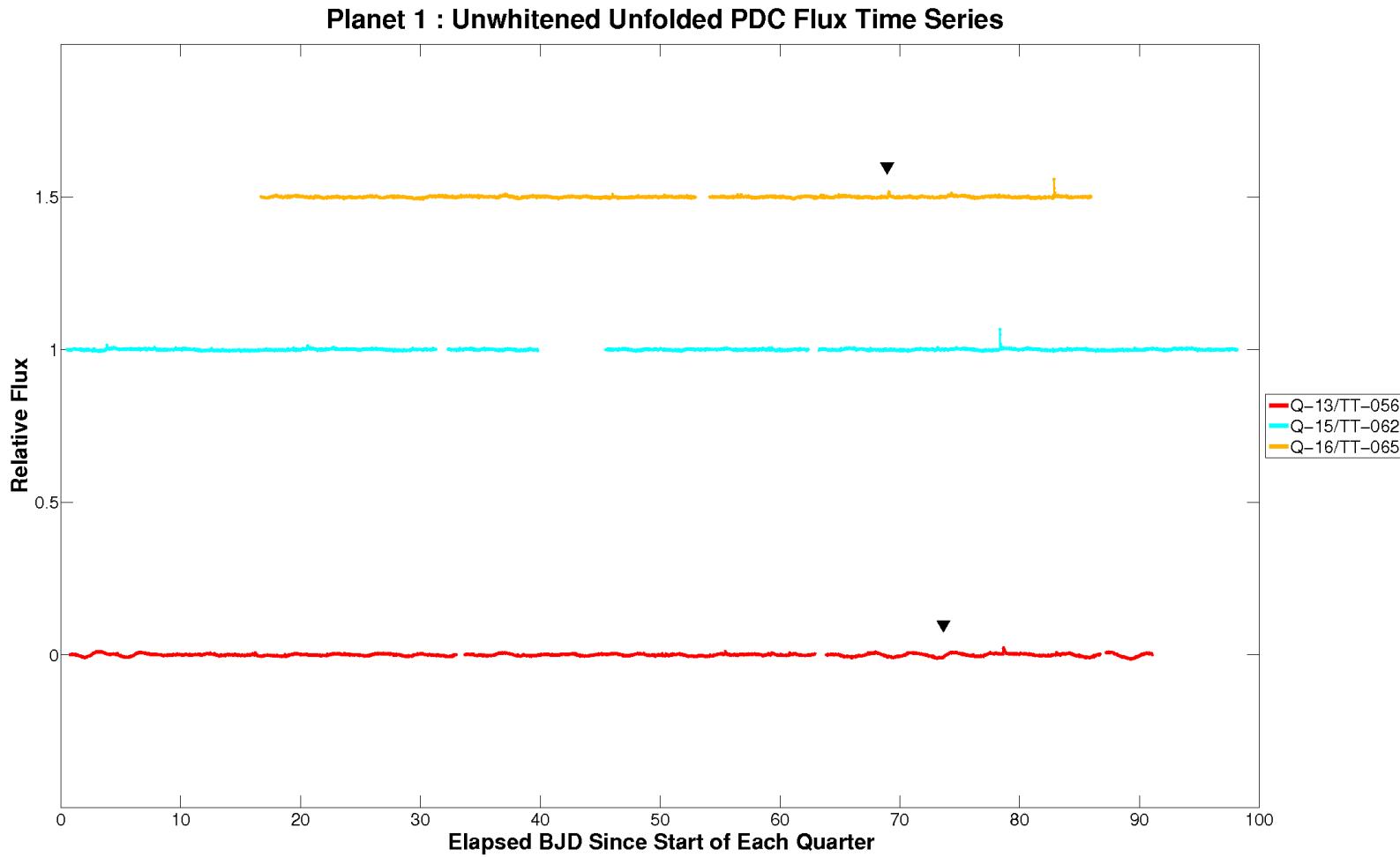
PDC Flux time series for KeplerId 5110407, Planet candidate 1 in the unwhitened domain. For the data of Quarter-05/TargetTableId-032, start BJD is 2455276 and the vertical offset is 0. For the data of Quarter-06/TargetTableId-035, start BJD is 2455372 and the vertical offset is 0.5. For the data of Quarter-07/TargetTableId-038, start BJD is 2455463 and the vertical offset is 1. For the data of Quarter-08/TargetTableId-041, start BJD is 2455568 and the vertical offset is 1.5. Transit event markers indicate the location of transits of the given planet candidate. All transits fit completed with full convergence.

Open [./planet-01/planet-search-and-model-fitting-results/all-transits-fit/005110407-01-all-unwhitened-05-032.fig](#)



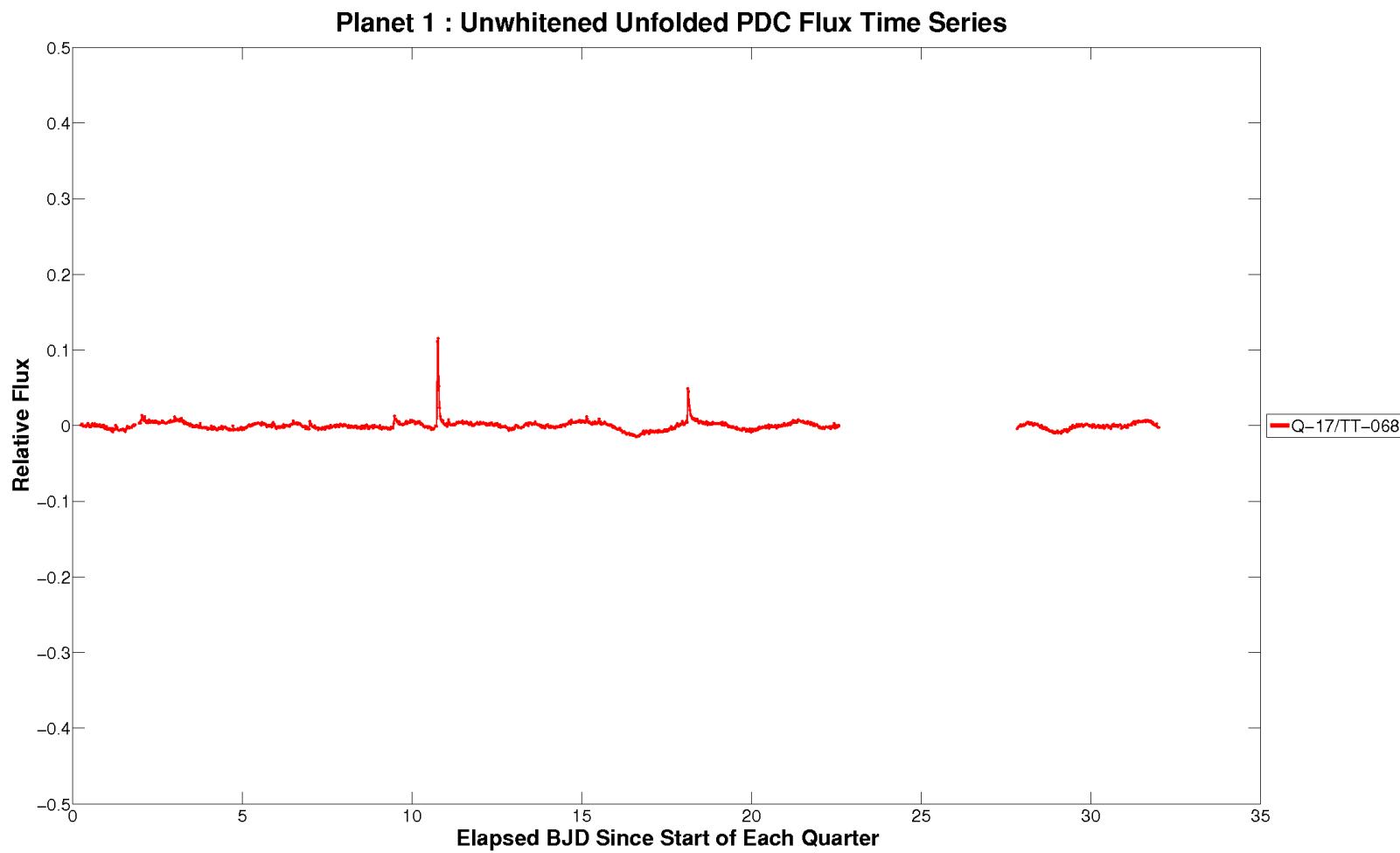
PDC Flux time series for KeplerId 5110407, Planet candidate 1 in the unwhitened domain. For the data of Quarter-09/TargetTableId-044, start BJD is 2455641 and the vertical offset is 0. For the data of Quarter-10/TargetTableId-047, start BJD is 2455739 and the vertical offset is 0.5. For the data of Quarter-11/TargetTableId-050, start BJD is 2455834 and the vertical offset is 1. For the data of Quarter-12/TargetTableId-053, start BJD is 2455932 and the vertical offset is 1.5. Transit event markers indicate the location of transits of the given planet candidate. All transits fit completed with full convergence.

Open [./planet-01/planet-search-and-model-fitting-results/all-transits-fit/005110407-01-all-unwhitened-09-044.fig](#)



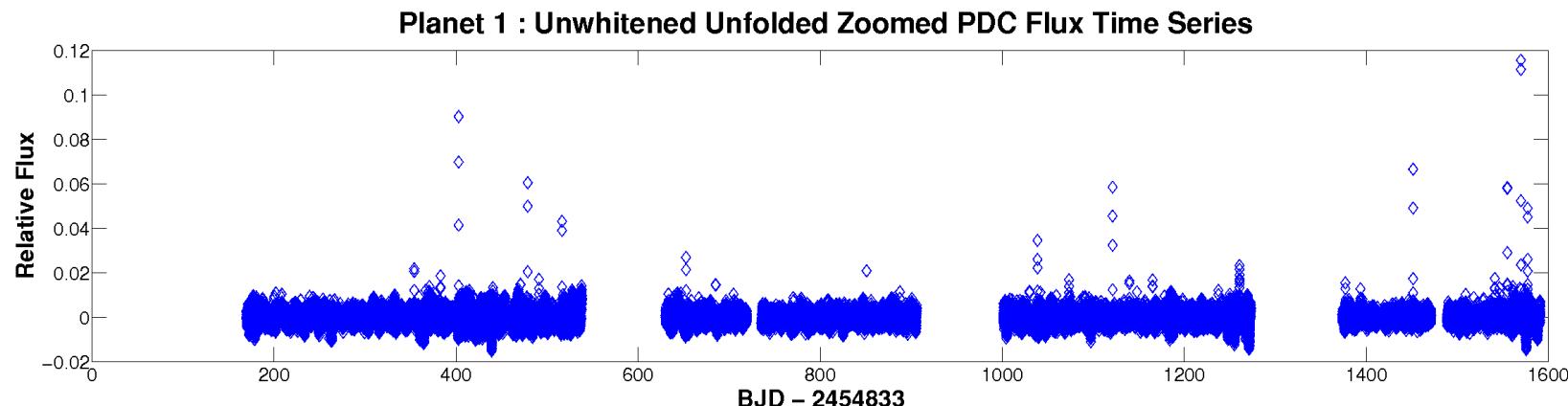
PDC Flux time series for KeplerId 5110407, Planet candidate 1 in the unwhitened domain. For the data of Quarter-13/TargetTableId-056, start BJD is 2456015 and the vertical offset is 0. For the data of Quarter-14/TargetTableId-059, start BJD is 2456107 and the vertical offset is 0.5. For the data of Quarter-15/TargetTableId-062, start BJD is 2456206 and the vertical offset is 1. For the data of Quarter-16/TargetTableId-065, start BJD is 2456305 and the vertical offset is 1.5. Transit event markers indicate the location of transits of the given planet candidate. All transits fit completed with full convergence.

Open [./planet-01/planet-search-and-model-fitting-results/all-transits-fit/005110407-01-all-unwhitened-13-056.fig](#)



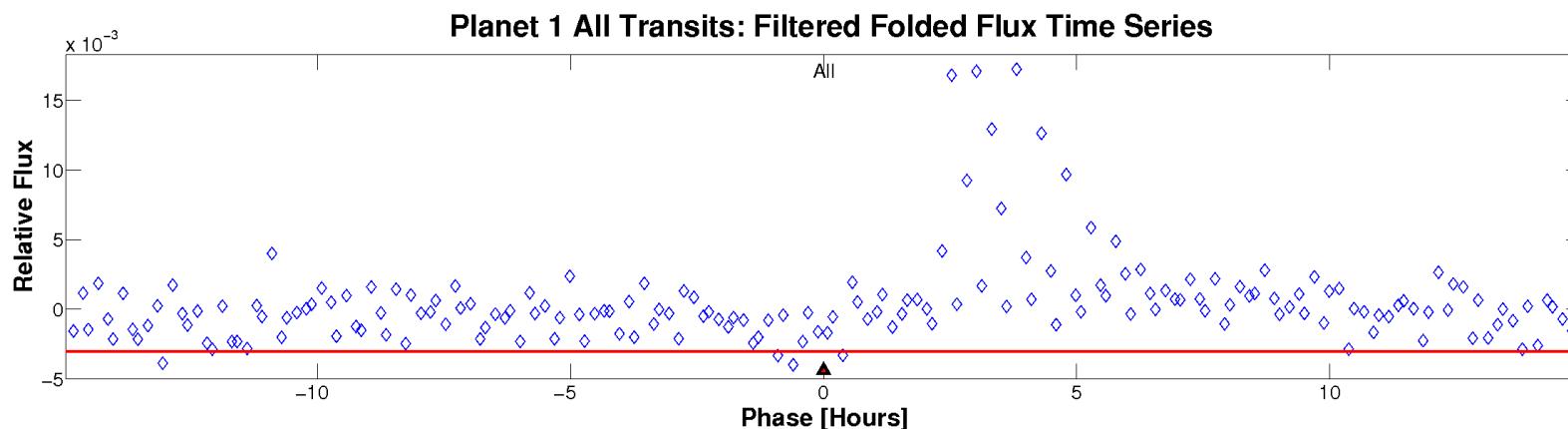
PDC Flux time series for KeplerId 5110407, Planet candidate 1 in the unwhitened domain. For the data of Quarter-17/TargetTableId-068, start BJD is 2456392. Transit event markers indicate the location of transits of the given planet candidate. All transits fit completed with full convergence.

Open [./planet-01/planet-search-and-model-fitting-results/all-transits-fit/005110407-01-all-unwhitened-17-068.fig](#)



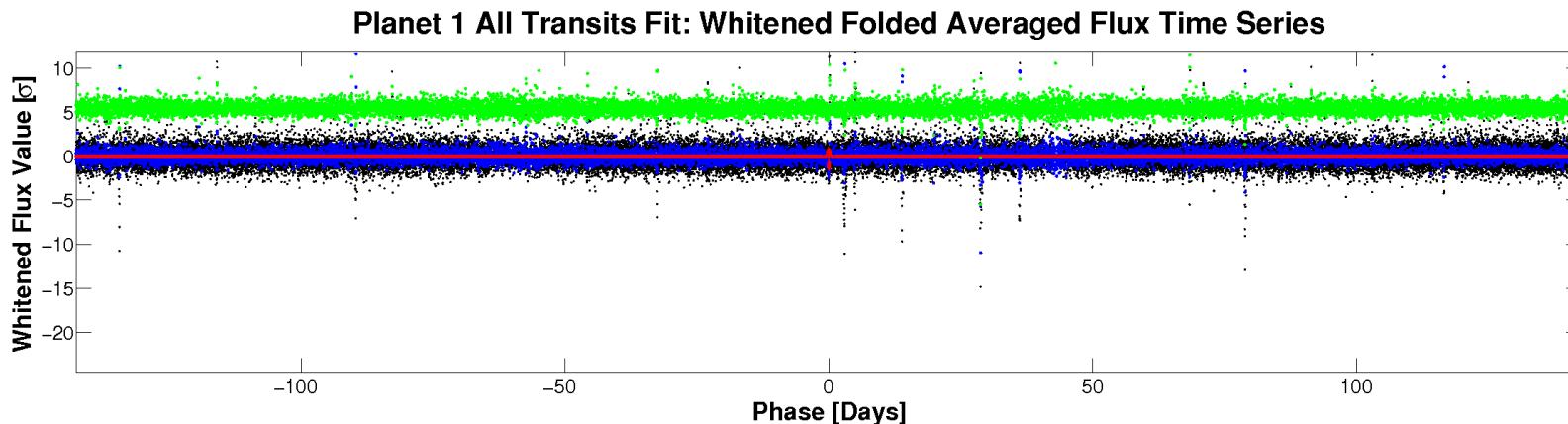
PDC Flux time series for KeplerId 5110407, Planet candidate 1 in the unwhitened domain, zoomed on last 5 transits in the unit of work. If # of transits is smaller than 5, all transits are shown.

Open [./planet-01/planet-search-and-model-fitting-results/all-transits-fit/005110407-01-all-unwhitened-zoomed.fig](#)



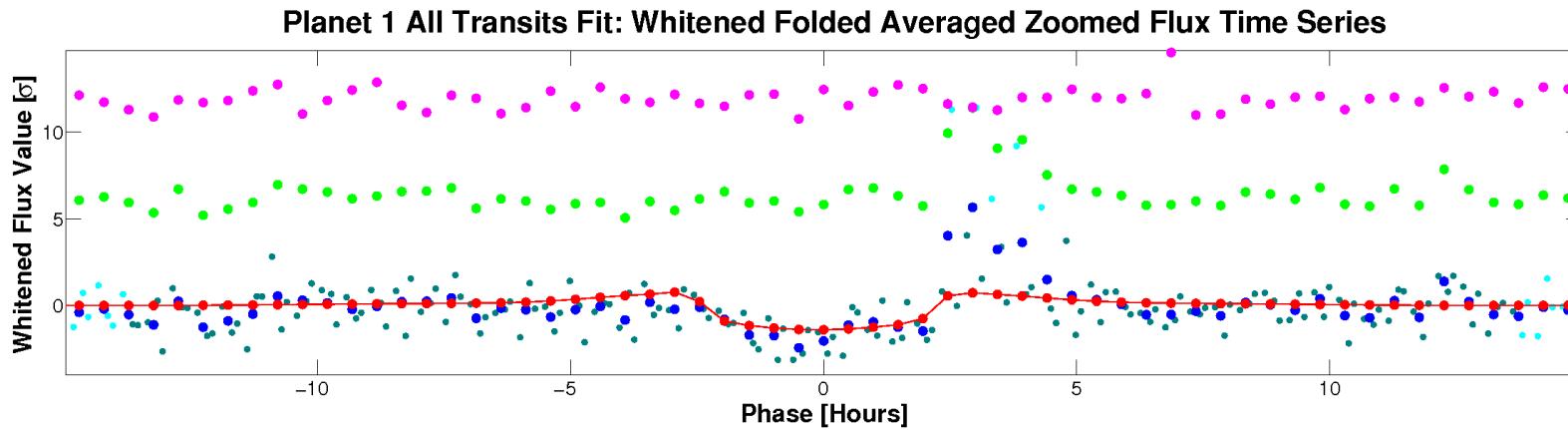
PDC Flux time series of all transits for KeplerId 5110407, Planet candidate 1 in the unwhitened domain. Data has been high-pass filtered via a median filter operating at a specified multiple of the transit duration, folded per the fitted period and epoch, and zoomed to the location of the model transit.

Open [./planet-01/planet-search-and-model-fitting-results/all-transits-fit/005110407-01-all-unwhitened-filtered-zoomed.fig](#)



Folded flux time series for KeplerId 5110407, Planet candidate 1 in the whitened domain is plotted in black dots. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the folded model light curve of the all transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. All transits fit completed with full convergence.

Open [./planet-01/planet-search-and-model-fitting-results/all-transits-fit/005110407-01-all-whitened.fig](#)



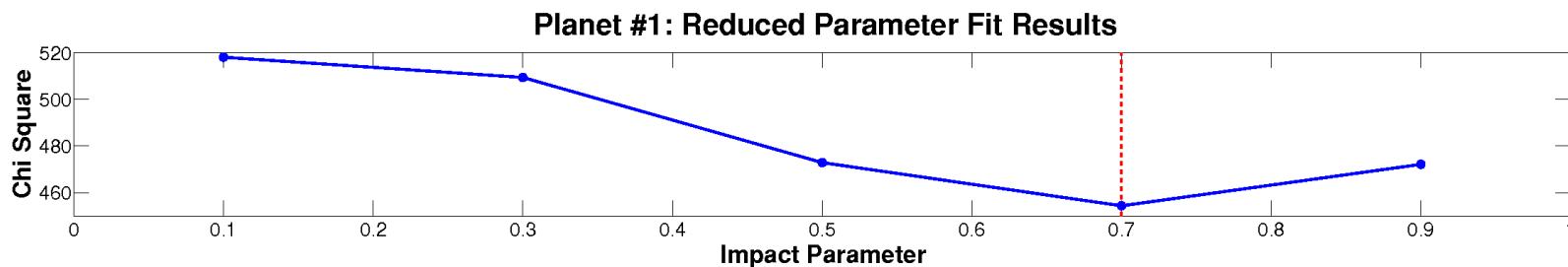
Folded flux time series for KeplerId 5110407, Planet candidate 1 in the whitened domain, zoomed on the transit. The flux data whose robust weights are larger/smaller than 0.1 are plotted in dark green/cyan dots, respectively. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the fitted model light curve of the all transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. Magenta dots are the averaged values of the folded flux time series, with a phase shift of 0.5 relative to the blue dots, vertically offset for clarity. All transits fit completed with full convergence.

Open [./planet-01/planet-search-and-model-fitting-results/all-transits-fit/005110407-01-all-whitened-zoomed.fig](#)

9.2 Model Fitter: Reduced Parameter Fit Results

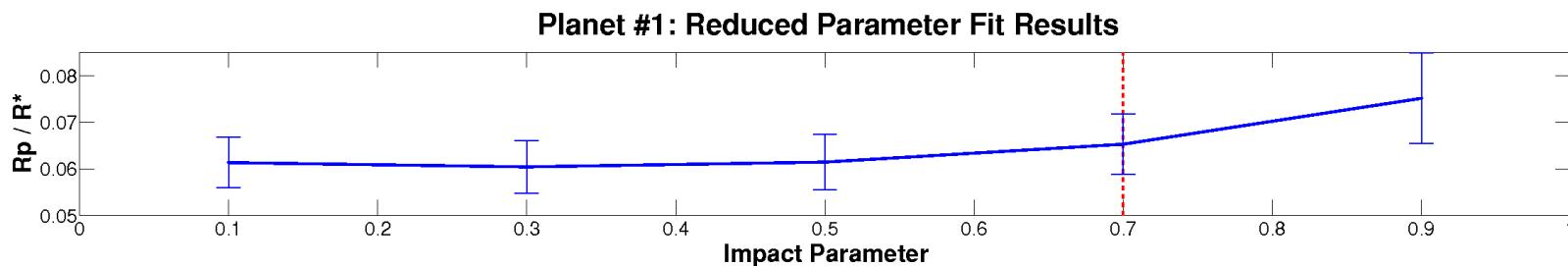
Impact Parameter	SNR	Model Chi Square	Planet Radius to Star Radius	Uncert	Semi-major Axis to Star Radius	Uncert	Transit Depth (ppm)	Uncert	Transit Duration (hours)	Uncert
0.10	10.6	518.1	0.0613202	5.4631e-03	458.5849	3.4511e+01	4615	8.1801e+02	5.0218	3.7945e-01
0.30	10.1	509.4	0.0603993	5.6984e-03	449.6558	3.6285e+01	4387	8.2363e+02	4.9300	3.9998e-01
0.50	9.9	472.9	0.0614248	5.9706e-03	419.4992	3.8771e+01	4329	8.3787e+02	4.8646	4.5186e-01
0.70	10.2	454.4	0.0652847	6.4526e-03	328.3666	2.9931e+01	4449	8.7574e+02	5.3302	4.9173e-01
0.90	10.1	472.2	0.0751493	9.7365e-03	213.0463	3.2484e+01	4639	1.1901e+03	6.0174	9.4788e-01

Highlighted row is the best reduced-parameter model fit.



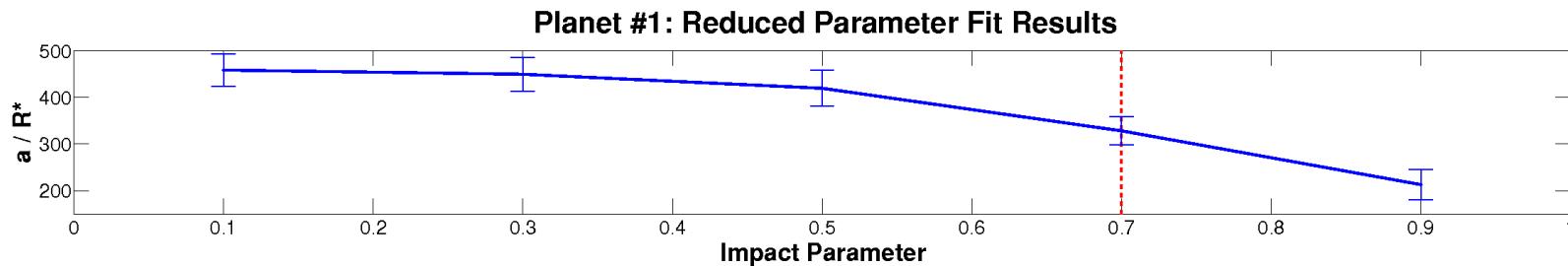
Model chi squares of reduced parameter fits vs. impact parameter for KeplerId 5110407, Planet candidate 1. The fit result with the minimum chi square is marked with a dashed line in the plot.

Open [./planet-01/planet-search-and-model-fitting-results/reduced-parameter-fits/005110407-01-reduced-fits-chi-square.fig](#)



Ratios of planet radius to star radius of reduced parameter fits vs. impact parameter for KeplerId 5110407, Planet candidate 1. The fit result with the minimum chi square is marked with a dashed line in the plot.

Open [./planet-01/planet-search-and-model-fitting-results/reduced-parameter-fits/005110407-01-reduced-fits-rp-over-rstar.fig](#)



Ratios of semimajor axis to star radius of reduced parameter fits vs. impact parameter for KeplerId 5110407, Planet candidate 1. The fit result with the minimum chi square is marked with a dashed line in the plot.

Open [./planet-01/planet-search-and-model-fitting-results/reduced-parameter-fits/005110407-01-reduced-fits-a-over-rstar.fig](#)

9.3 Model Fitter: Trapezoidal Fit Results

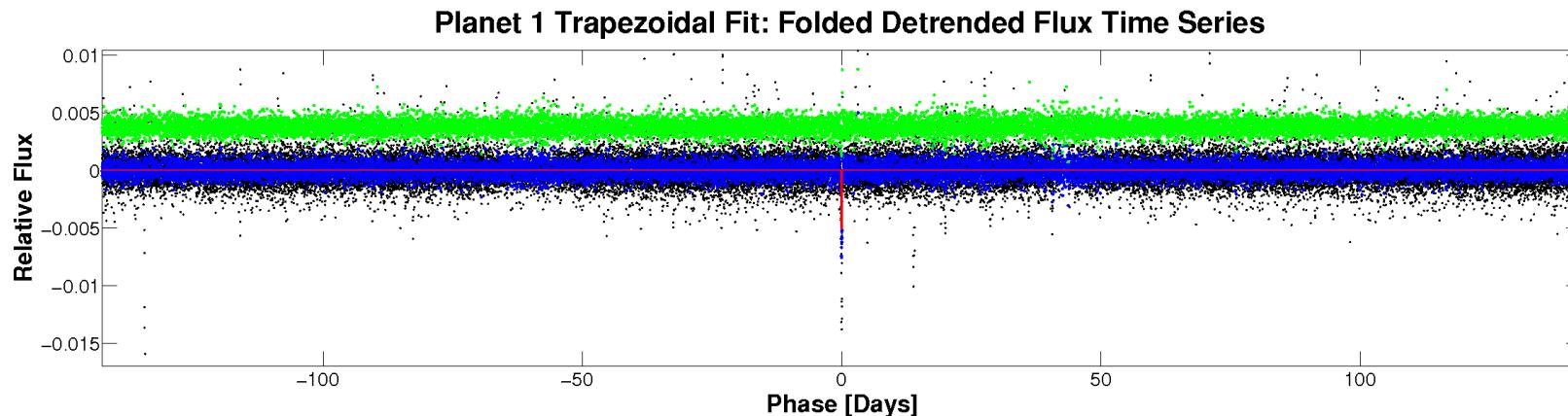
Model Characteristic	Name
Transit Model	trapezoidal_model
Limb Darkening Model	

TCE Parameter	Value	Units
Trial Transit Pulse Duration	5.0	hours
Transit Epoch	55232.2116856	MJD
Orbital Period	285.3069871	days
Maximum SES	9.0	
Maximum MES	10.4	
Robust Statistic	7.4	
Chi Square Goodness of Fit Statistic (DoF)	37.4 (31)	
Chi Square2 Statistic (DoF)	4.6 (7.1)	
Threshold for Desired PFA		

DoF: Degrees of Freedom

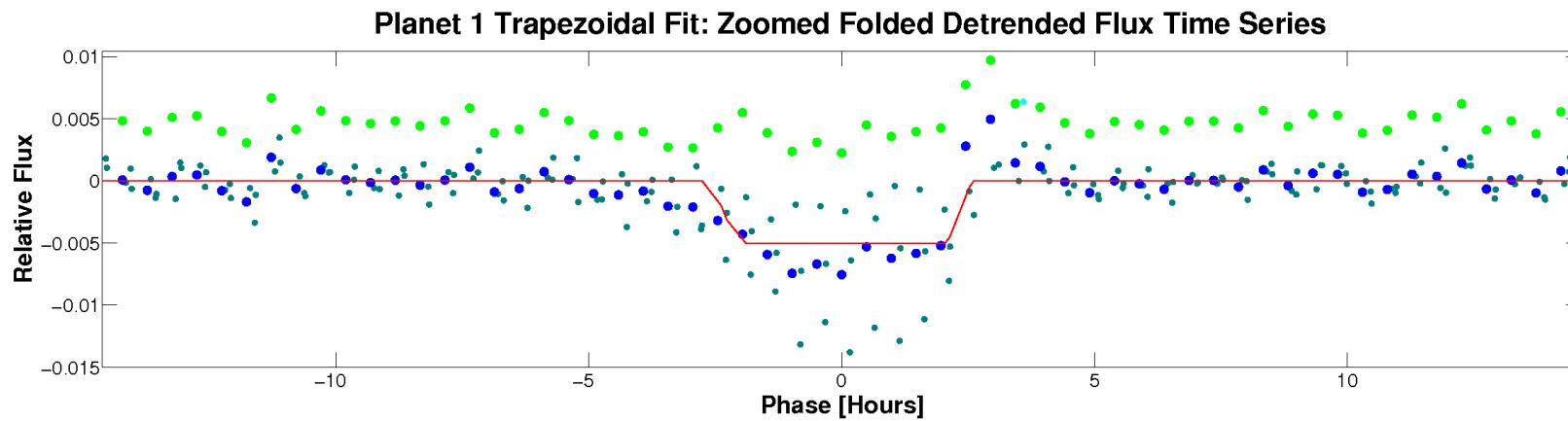
Parameter	Value	Uncertainty	Units
SNR	31.6		
Orbital Period	285.3069871		days
Transit Epoch	399.7227917		BKJD
Transit Depth	5038		ppm
Transit Duration	4.8746		hours
Transit Ingress Time	0.2128		hours
Model Chi Square Statistic (DoF)	62208.1 (241)		

DoF: Degrees of Freedom



Folded detrended flux time series for KeplerId 5110407, Planet candidate 1 and folded trapezoidal model light curve.

Open ./planet-01/planet-search-and-model-fitting-results/trapezoidal-model-fit/005110407-01-all-trapezoidal.fig



Zoomed folded detrended flux time series for KeplerId 5110407, Planet candidate 1 and folded trapezoidal model light curve.

Open ./planet-01/planet-search-and-model-fitting-results/trapezoidal-model-fit/005110407-01-all-trapezoidal-zoomed.fig

9.4 Validation Tests

The Centroid Test and Eclipsing Binary Discrimination Test are chi-squared hypothesis tests. For these tests, a significance of 100% favors a planet, while 0% indicates an unlikely planet.

9.4.1 Weak Secondary Test

Result	Value	Uncertainty	Units	Statistic in Sigmas	Significance (%)
Orbital Period	285.307		days		
Transit Duration	5		hours		
Maximum MES	10.4				
Secondary Phase	103.3598		days		
Secondary MES	4.4				
Minimum Phase	-22.9333		days		
Minimum MES	-6.1				
Median MES	0.0				
MAD MES	0.68161				
Robust Statistic	2.5				
Secondary Depth	1241.4	5.0994e+02	ppm		
Geometric Albedo	3923.5	9.6539e+03		0.4063	34.23
Planet Effective Temperature	4550	2.5081e+03	Kelvin	1.6643	4.80

9.4.2 Flux-Weighted Centroid Test

Result	Value	Uncertainty	Units	Value in Sigmas	Significance (%)
Stellar Magnitude	16.7860	0.0000e+00			
Motion Detection Statistic	9.8156e+00				0.74
Peak RA Offset	1.1450e-02	6.3758e-03	arcseconds	1.7959	
Peak Dec Offset	1.7798e-03	6.7229e-03	arcseconds	0.2647	
Peak Offset Distance	1.1588e-02	6.3842e-03	arcseconds	1.8151	
Source RA Offset	-1.6274e+00	1.4218e+00	arcseconds	-1.1445	
Source Dec Offset	-6.4252e-01	8.9543e-01	arcseconds	-0.7176	
Source Offset Distance	1.7496e+00	1.3628e+00	arcseconds	1.2839	
Source RA	19.65549852	3.4494e-05	hours		
Source Dec	40.24056152	2.4873e-04	degrees		

Peak offsets are relative to the out-of-transit centroid. Source offsets are relative to the KIC target location.

9.4.3 Eclipsing Binary Discrimination Test

Result	Value	Value in Sigmas	Significance (%)
Odd Even Transit Depth Comparison Statistic	1.3761e+00	1.1731	24.08
Odd Even Transit Epoch Comparison Statistic	8.3827e-03	0.0916	92.70

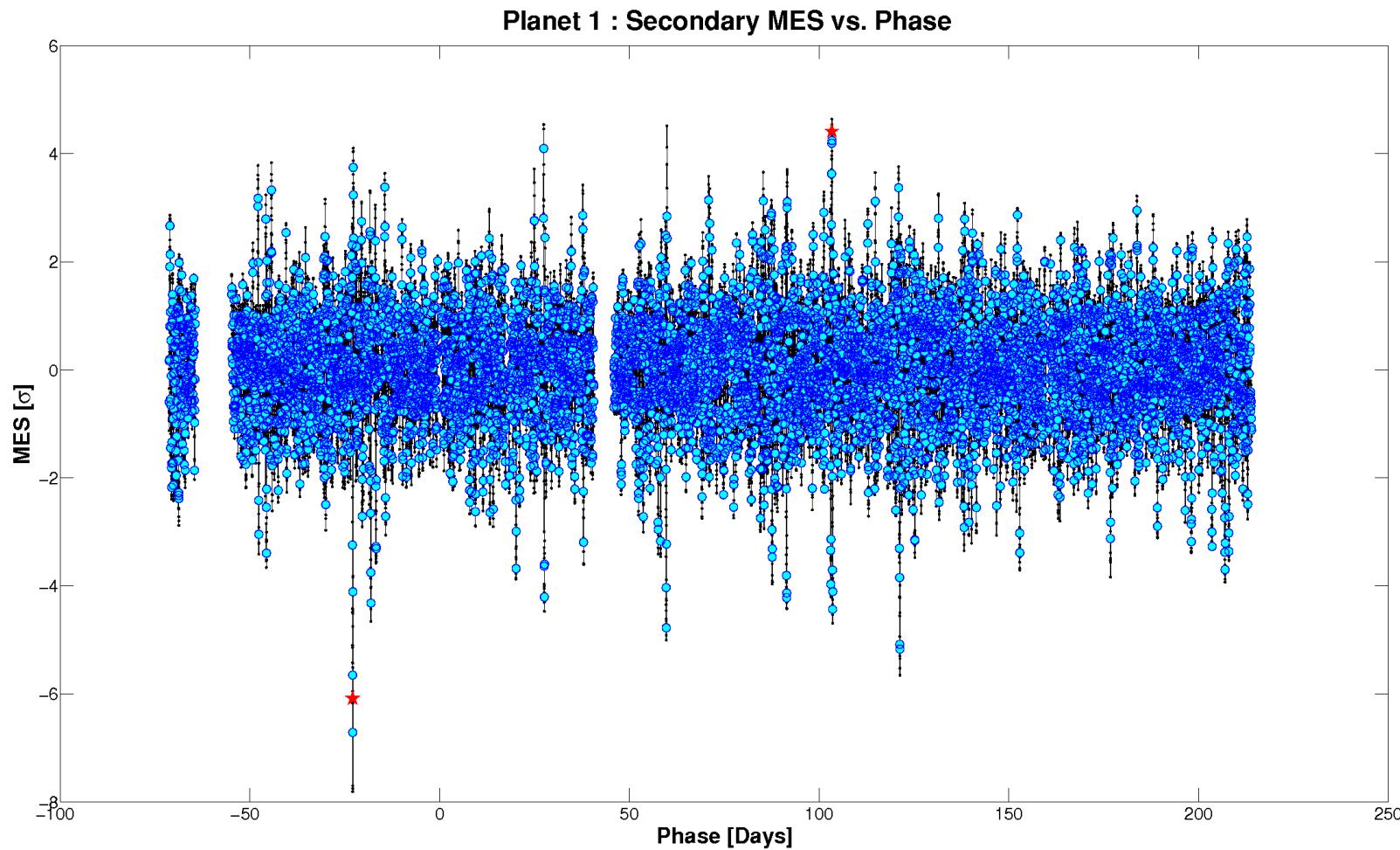
9.4.4 Bootstrap Test

Result	Value
False Alarm Probability	4.2712e-12
Bootstrap Threshold for Desired PFA	11.0
MES Mean	-2.90
MES Standard Deviation	1.95
Observed Number of Transits	3

9.4.5 Ghost Diagnostic Test

Result	Value	Significance (%)
Maximum MES	10.4	
SNR	6.8	
Core Aperture Statistic	3.0566e-01	62.01
Halo Aperture Statistic	2.2169e+00	98.67
Ratio of Core/Halo Aperture Statistics	1.3788e-01	

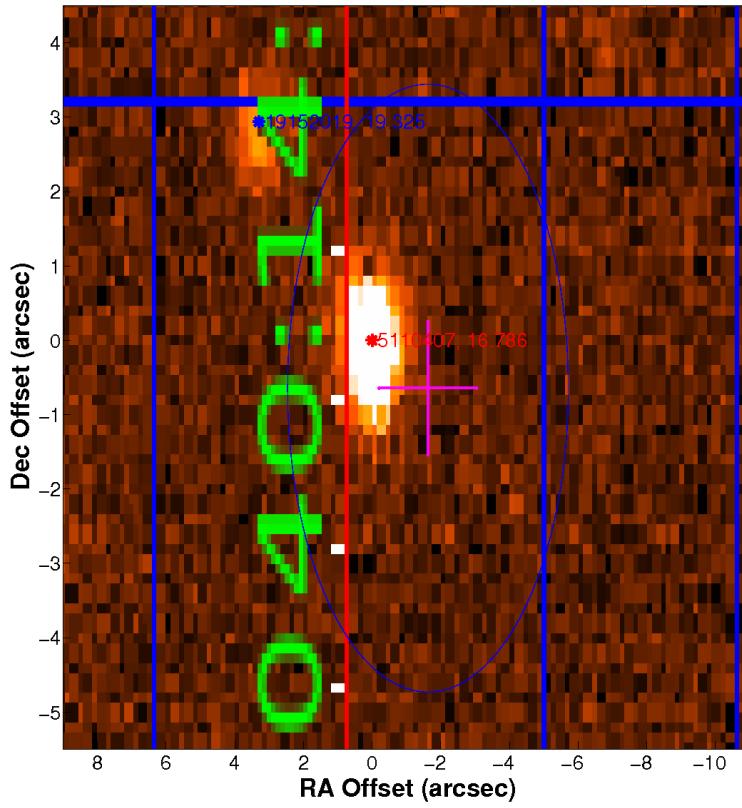
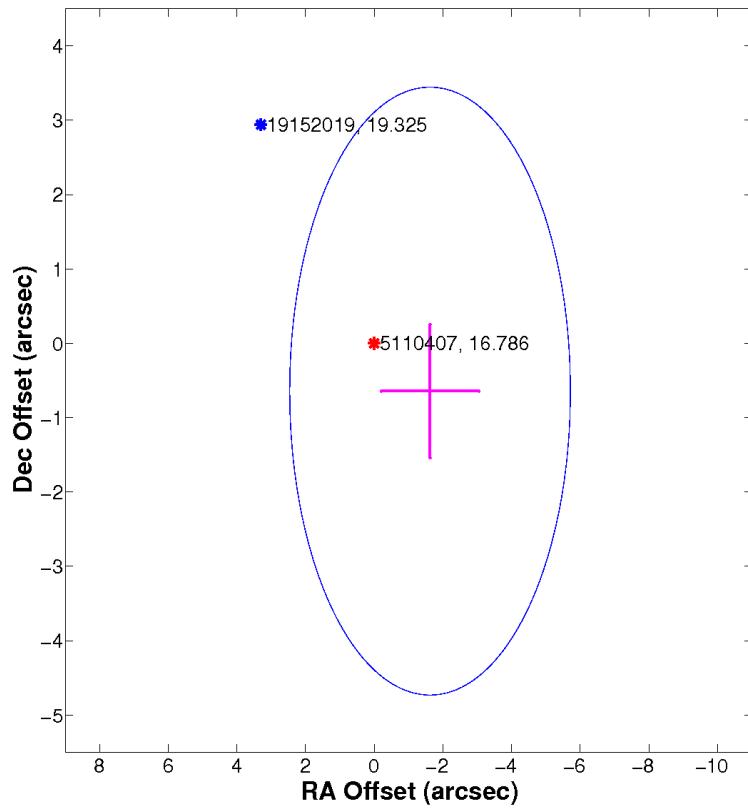
9.4.6 Validation Test Figures



The primary event has been set to zero and both the max and min of the resulting MES vs. Phase are marked with a red star. The best matched pulse duration in hours is 5. The maximum secondary MES and corresponding phase are 4.4158 and 103.3598 days respectively. The minimum secondary MES and corresponding phase are -6.0831 and -22.9333 days respectively.

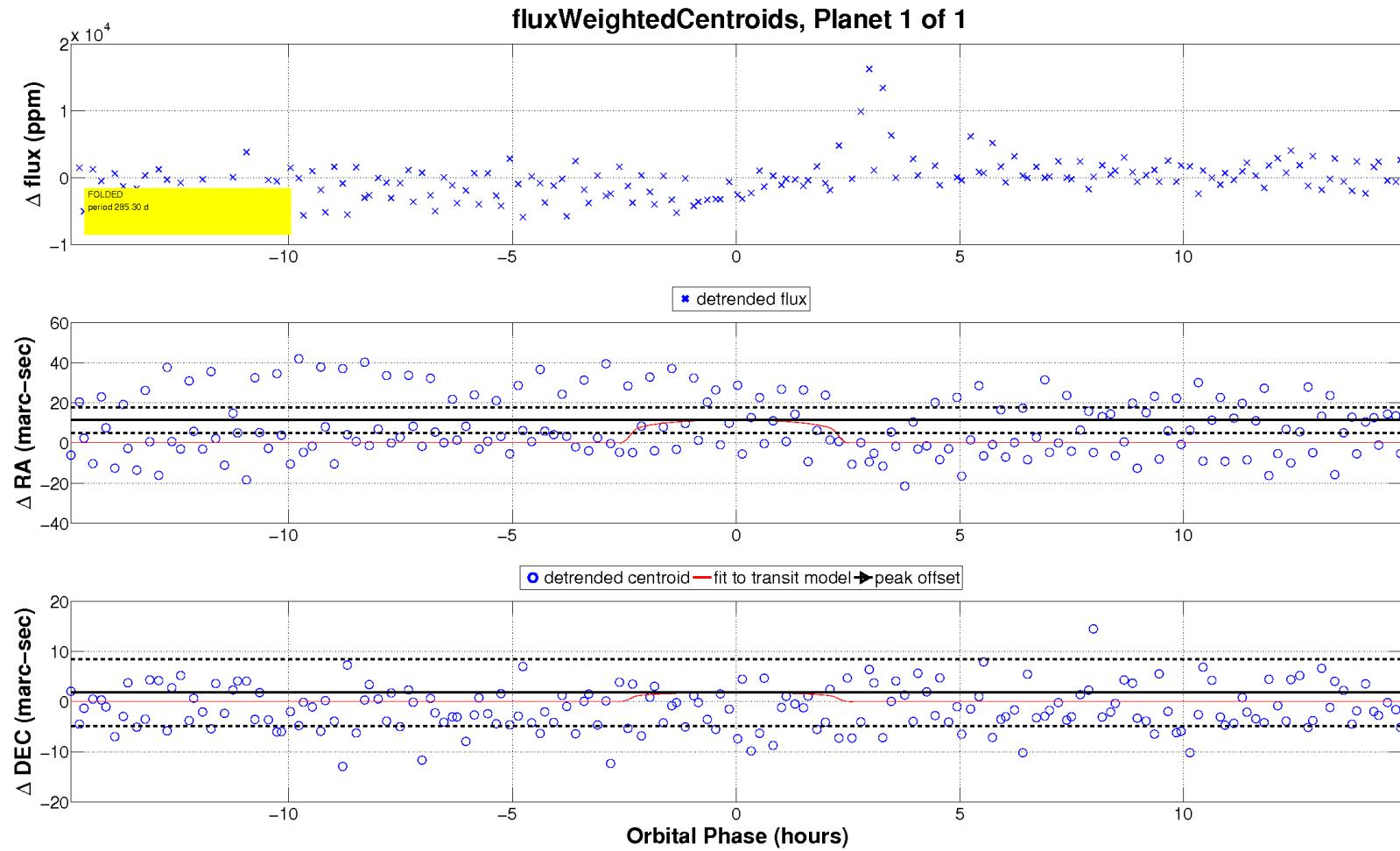
Open [./planet-01/report-summary/005110407-01-weak-secondary-diagnostic.fig](#)

Centroid Test Source Offsets Planet Candidate 1



Flux weighted centroid test source offsets for target 5110407, planet candidate 1. Symbol key: magenta cross: flux weighted centroid test source offsets with 1-sigma error bars in RA and Dec; blue circle: 3-sigma radius of confusion for source offset; red asterisk: location of target star; blue asterisk: location of other KIC objects in the neighborhood. KIC ID and magnitude are noted in the text associated with each marked object (objects in the UKIRT extension to the KIC have IDs between 15,000,000 and 30,000,000). Figure on right is displayed on UKIRT image for given target.

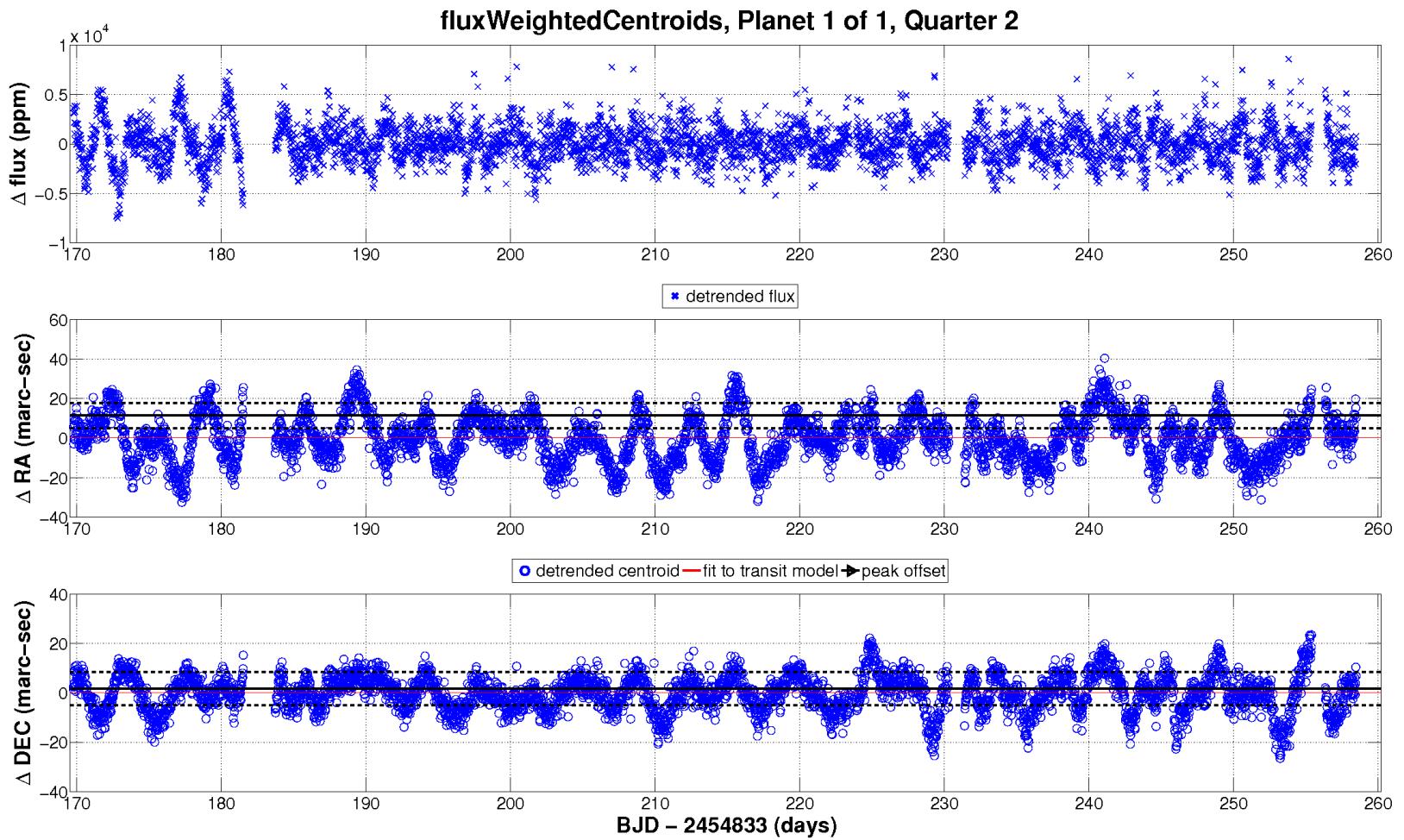
Open [./planet-01/centroid-test-results/005110407-01-centroid-test-source-offsets.fig](#)



Out of Transit Centroid
 ra(hours): mean 19.65559006, SD 1.79e-07
 dec(degrees): mean 40.24072444, SD 9.11e-07

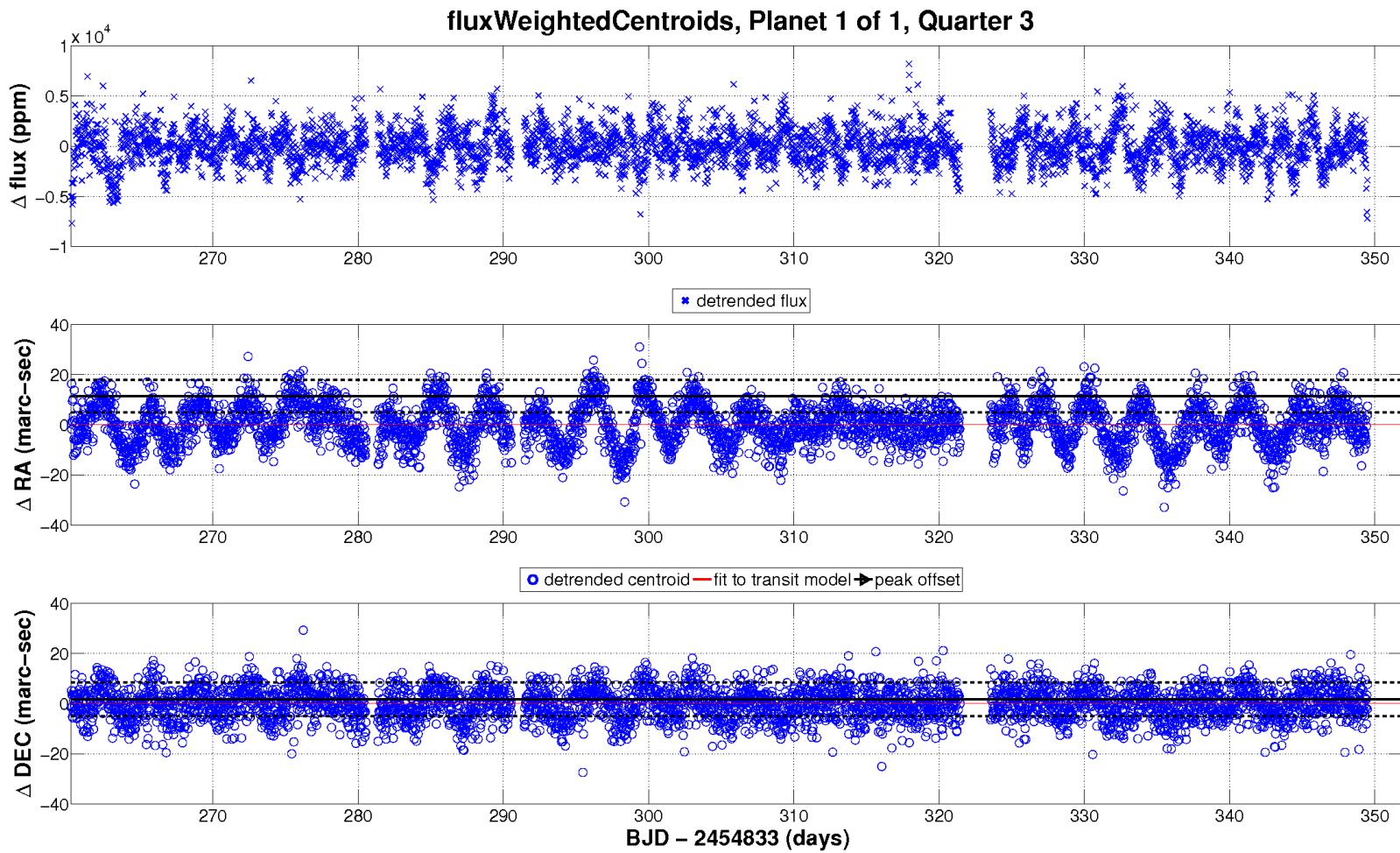
KeplerId 5110407, KeplerMag 16.79 - FOLDED FLUX AND CENTROIDS - This figure shows detrended flux and centroid data folded at the fitted orbital period and centered on the fitted transit over a few fitted transit durations. The top panel shows the change in corrected flux for this target, normalized to the median out of transit value, median detrended with the median out of transit value removed. The bottom two panels show the corresponding change in the centroid in right ascension (RA) and declination (DEC) angles on the sky. The centroids are detrended against ancillary data and have the mean out-of-transit value removed. The scaled transit model fit to the target flux is shown on the centroid plots in red. The peak fitted offset from the out-of-transit centroid is indicated by the solid black horizontal line. One sigma error bars are indicated with dashed black horizontal lines. In-transit data points for any other planets identified for this target have been gapped. The out-of-transit mean and standard deviation (SD) indicated in the lower left-hand corner are robust estimates.

Open [./planet-01/centroid-test-results/005110407-01-folded-transit-fit-fluxWeighted-centroids.fig](#)



KeplerId 5110407, KeplerMag 16.79 - UNFOLDED FLUX AND CENTROIDS - This figure shows detrended flux and centroid data over the full time range of the data set. The top panel shows the change in corrected flux for this target, normalized to the median out of transit value, median detrended with the median out of transit value removed. The bottom two panels show the corresponding change in the centroid in right ascension (RA) and declination (DEC) angles on the sky. The centroids are detrended against ancillary data and have the mean out-of-transit value removed. The scaled transit model fit to the target flux is shown on the centroid plots in red. The peak fitted offset from the out of transit centroid is indicated by the solid black horizontal line. One sigma error bars are indicated with dashed black horizontal lines. Red circles and vertical lines mark the fitted transit centers. In-transit data points for any other planets identified for this target have been gapped. The out-of-transit mean and standard deviation (SD) indicated in the lower left-hand corner are robust estimates.

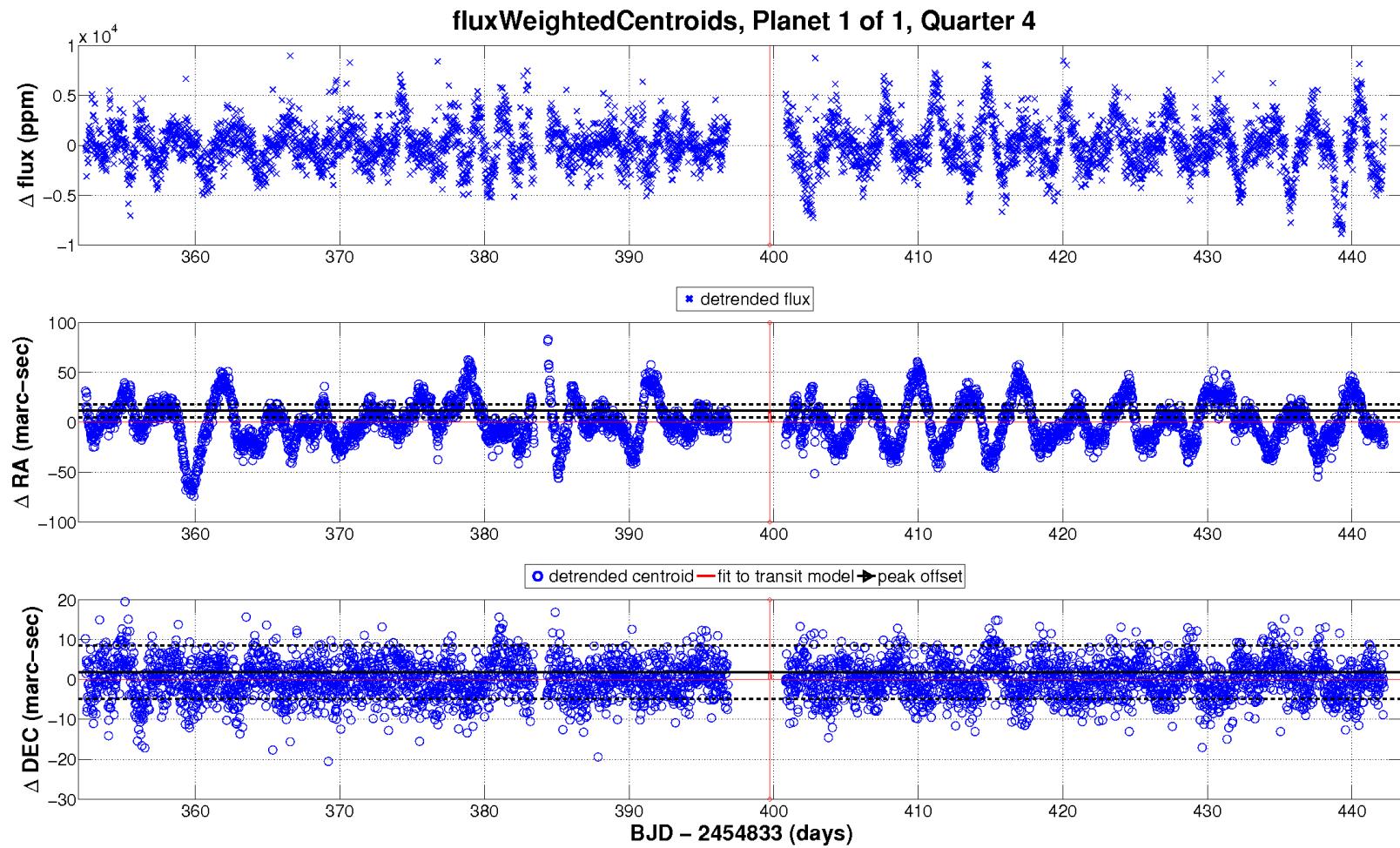
Open [./planet-01/centroid-test-results/005110407-01-transit-fit-fluxWeighted-centroids-02.fig](#)



Out of Transit Centroid
 ra(hours): mean 19.65559006, SD 1.79e-07
 dec(degrees): mean 40.24072444, SD 9.11e-07

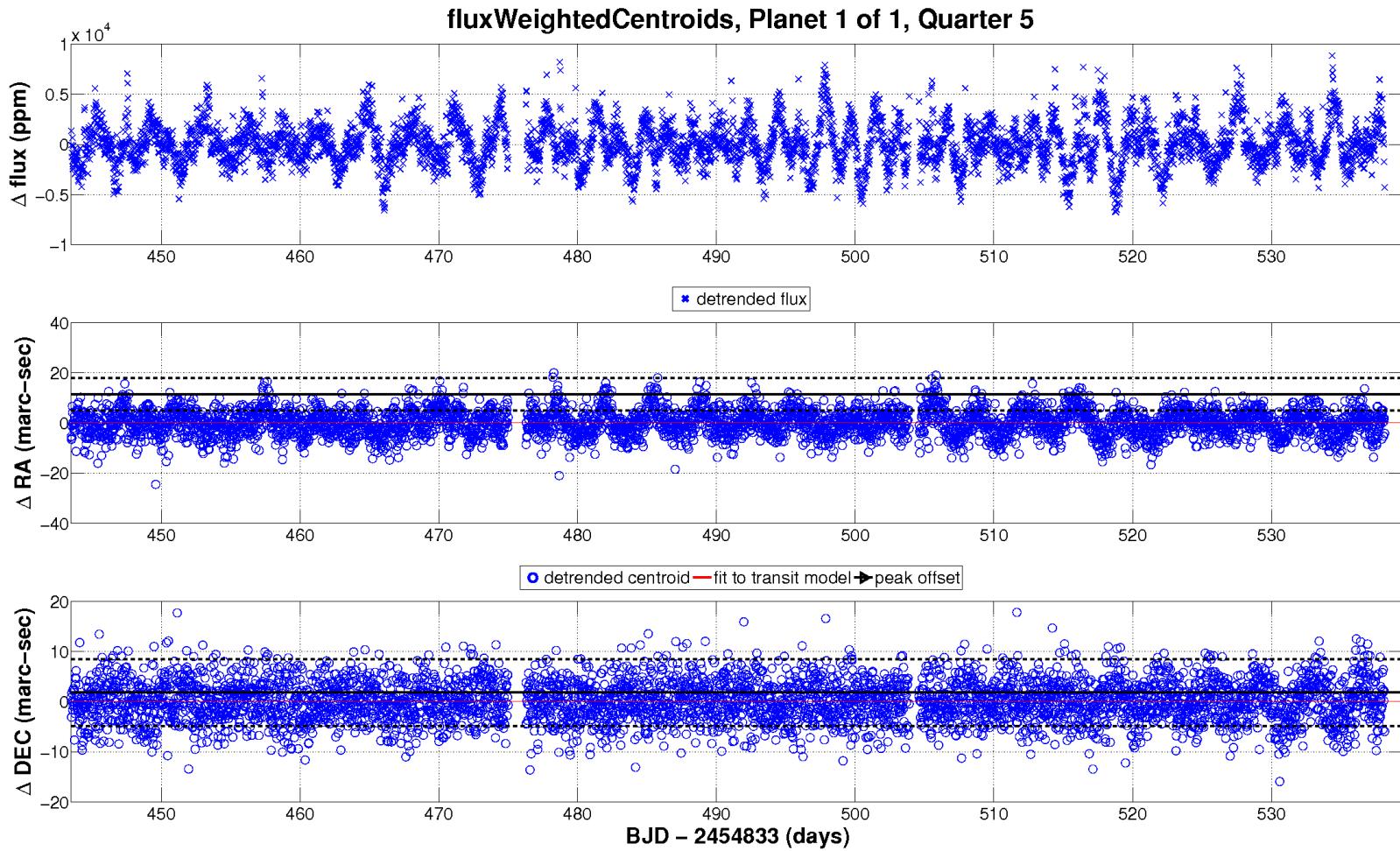
KeplerId 5110407, KeplerMag 16.79 - UNFOLDED FLUX AND CENTROIDS - This figure shows detrended flux and centroid data over the full time range of the data set. The top panel shows the change in corrected flux for this target, normalized to the median out of transit value, median detrended with the median out of transit value removed. The bottom two panels show the corresponding change in the centroid in right ascension (RA) and declination (DEC) angles on the sky. The centroids are detrended against ancillary data and have the mean out-of-transit value removed. The scaled transit model fit to the target flux is shown on the centroid plots in red. The peak fitted offset from the out of transit centroid is indicated by the solid black horizontal line. One sigma error bars are indicated with dashed black horizontal lines. Red circles and vertical lines mark the fitted transit centers. In-transit data points for any other planets identified for this target have been gapped. The out-of-transit mean and standard deviation (SD) indicated in the lower left-hand corner are robust estimates.

Open [./planet-01/centroid-test-results/005110407-01-transit-fit-fluxWeighted-centroids-03.fig](#)



KeplerId 5110407, KeplerMag 16.79 - UNFOLDED FLUX AND CENTROIDS - This figure shows detrended flux and centroid data over the full time range of the data set. The top panel shows the change in corrected flux for this target, normalized to the median out of transit value, median detrended with the median out of transit value removed. The bottom two panels show the corresponding change in the centroid in right ascension (RA) and declination (DEC) angles on the sky. The centroids are detrended against ancillary data and have the mean out-of-transit value removed. The scaled transit model fit to the target flux is shown on the centroid plots in red. The peak fitted offset from the out of transit centroid is indicated by the solid black horizontal line. One sigma error bars are indicated with dashed black horizontal lines. Red circles and vertical lines mark the fitted transit centers. In-transit data points for any other planets identified for this target have been gapped. The out-of-transit mean and standard deviation (SD) indicated in the lower left-hand corner are robust estimates.

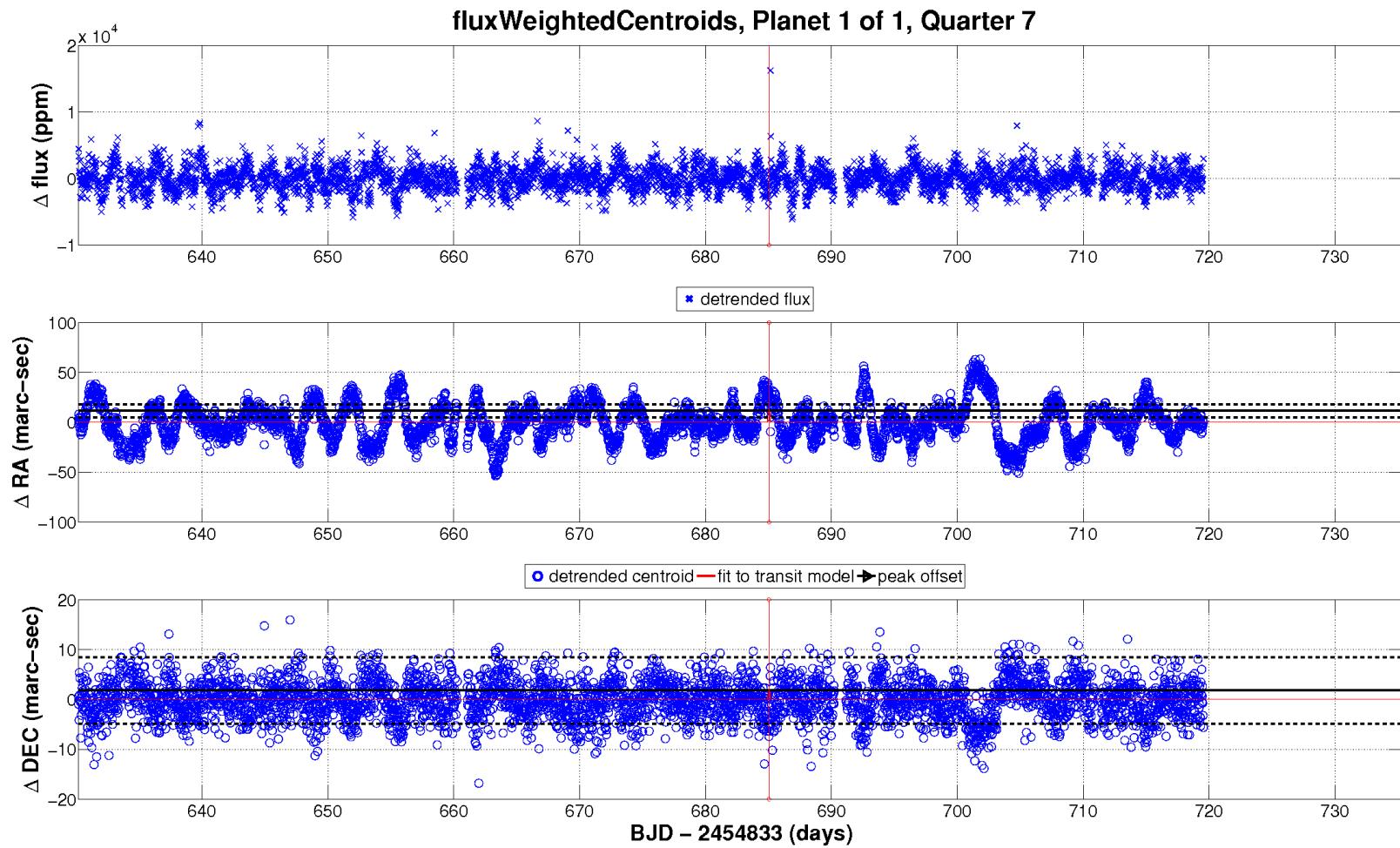
Open [./planet-01/centroid-test-results/005110407-01-transit-fit-fluxWeighted-centroids-04.fig](#)



Out of Transit Centroid
 ra(hours): mean 19.65559006, SD 1.79e-07
 dec(degrees): mean 40.24072444, SD 9.11e-07

KeplerId 5110407, KeplerMag 16.79 - UNFOLDED FLUX AND CENTROIDS - This figure shows detrended flux and centroid data over the full time range of the data set. The top panel shows the change in corrected flux for this target, normalized to the median out of transit value, median detrended with the median out of transit value removed. The bottom two panels show the corresponding change in the centroid in right ascension (RA) and declination (DEC) angles on the sky. The centroids are detrended against ancillary data and have the mean out-of-transit value removed. The scaled transit model fit to the target flux is shown on the centroid plots in red. The peak fitted offset from the out of transit centroid is indicated by the solid black horizontal line. One sigma error bars are indicated with dashed black horizontal lines. Red circles and vertical lines mark the fitted transit centers. In-transit data points for any other planets identified for this target have been gapped. The out-of-transit mean and standard deviation (SD) indicated in the lower left-hand corner are robust estimates.

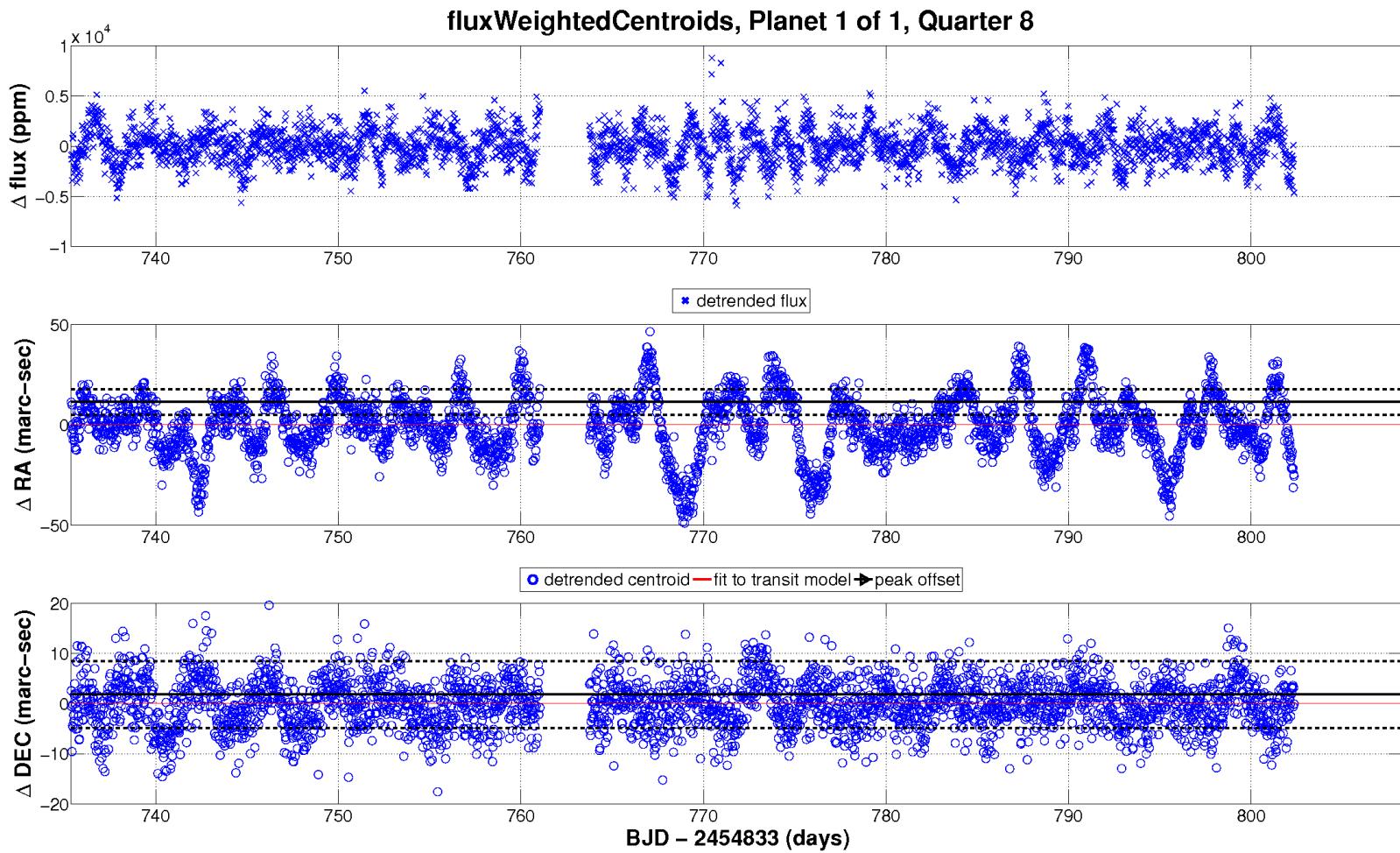
Open [./planet-01/centroid-test-results/005110407-01-transit-fit-fluxWeighted-centroids-05.fig](#)



Out of Transit Centroid
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 dec(degrees): mean 40.24072444, SD 9.11e-07

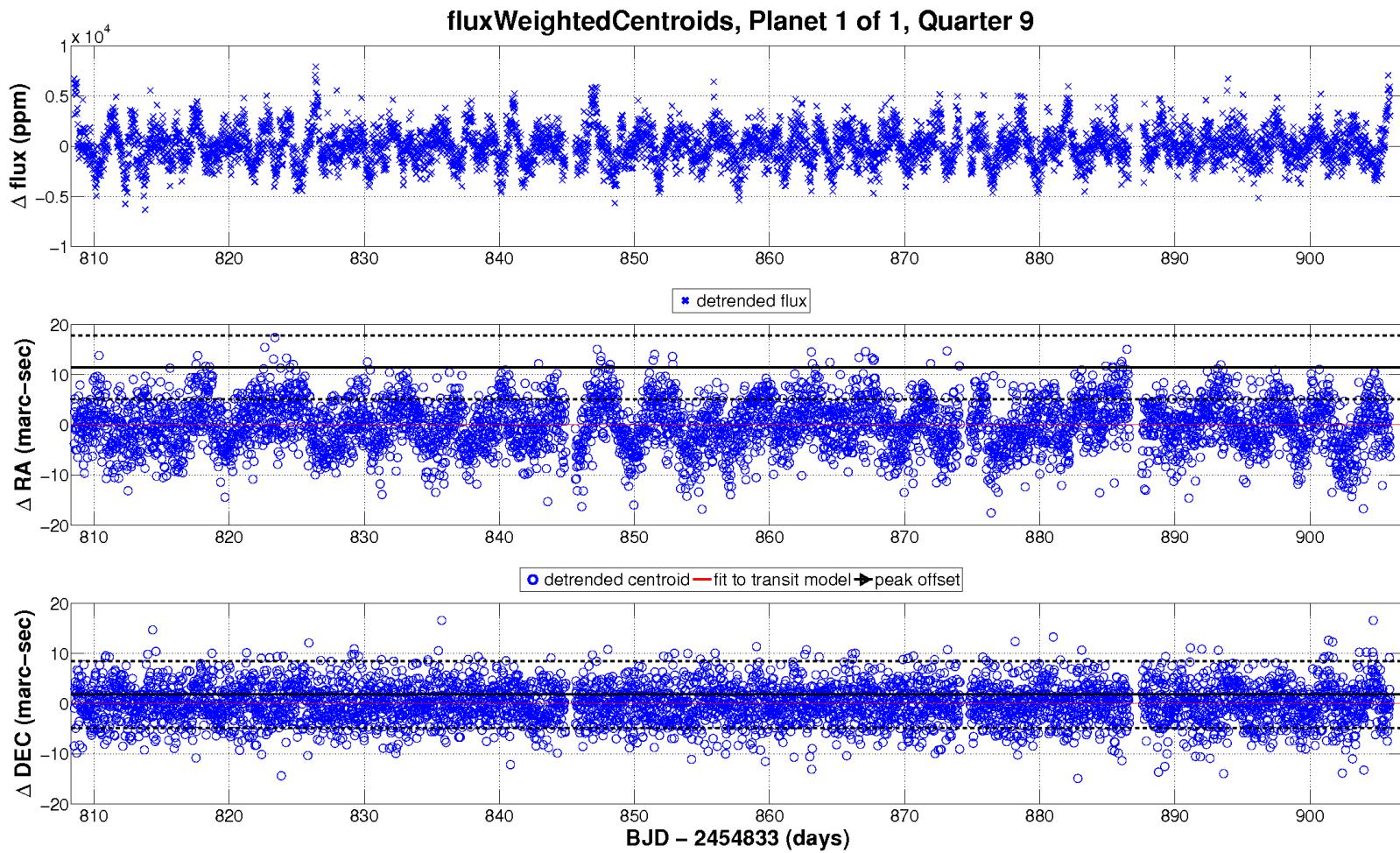
KeplerId 5110407, KeplerMag 16.79 - UNFOLDED FLUX AND CENTROIDS - This figure shows detrended flux and centroid data over the full time range of the data set. The top panel shows the change in corrected flux for this target, normalized to the median out of transit value, median detrended with the median out of transit value removed. The bottom two panels show the corresponding change in the centroid in right ascension (RA) and declination (DEC) angles on the sky. The centroids are detrended against ancillary data and have the mean out-of-transit value removed. The scaled transit model fit to the target flux is shown on the centroid plots in red. The peak fitted offset from the out of transit centroid is indicated by the solid black horizontal line. One sigma error bars are indicated with dashed black horizontal lines. Red circles and vertical lines mark the fitted transit centers. In-transit data points for any other planets identified for this target have been gapped. The out-of-transit mean and standard deviation (SD) indicated in the lower left-hand corner are robust estimates.

Open [./planet-01/centroid-test-results/005110407-01-transit-fit-fluxWeighted-centroids-07.fig](#)



KeplerId 5110407, KeplerMag 16.79 - UNFOLDED FLUX AND CENTROIDS - This figure shows detrended flux and centroid data over the full time range of the data set. The top panel shows the change in corrected flux for this target, normalized to the median out of transit value, median detrended with the median out of transit value removed. The bottom two panels show the corresponding change in the centroid in right ascension (RA) and declination (DEC) angles on the sky. The centroids are detrended against ancillary data and have the mean out-of-transit value removed. The scaled transit model fit to the target flux is shown on the centroid plots in red. The peak fitted offset from the out of transit centroid is indicated by the solid black horizontal line. One sigma error bars are indicated with dashed black horizontal lines. Red circles and vertical lines mark the fitted transit centers. In-transit data points for any other planets identified for this target have been gapped. The out-of-transit mean and standard deviation (SD) indicated in the lower left-hand corner are robust estimates.

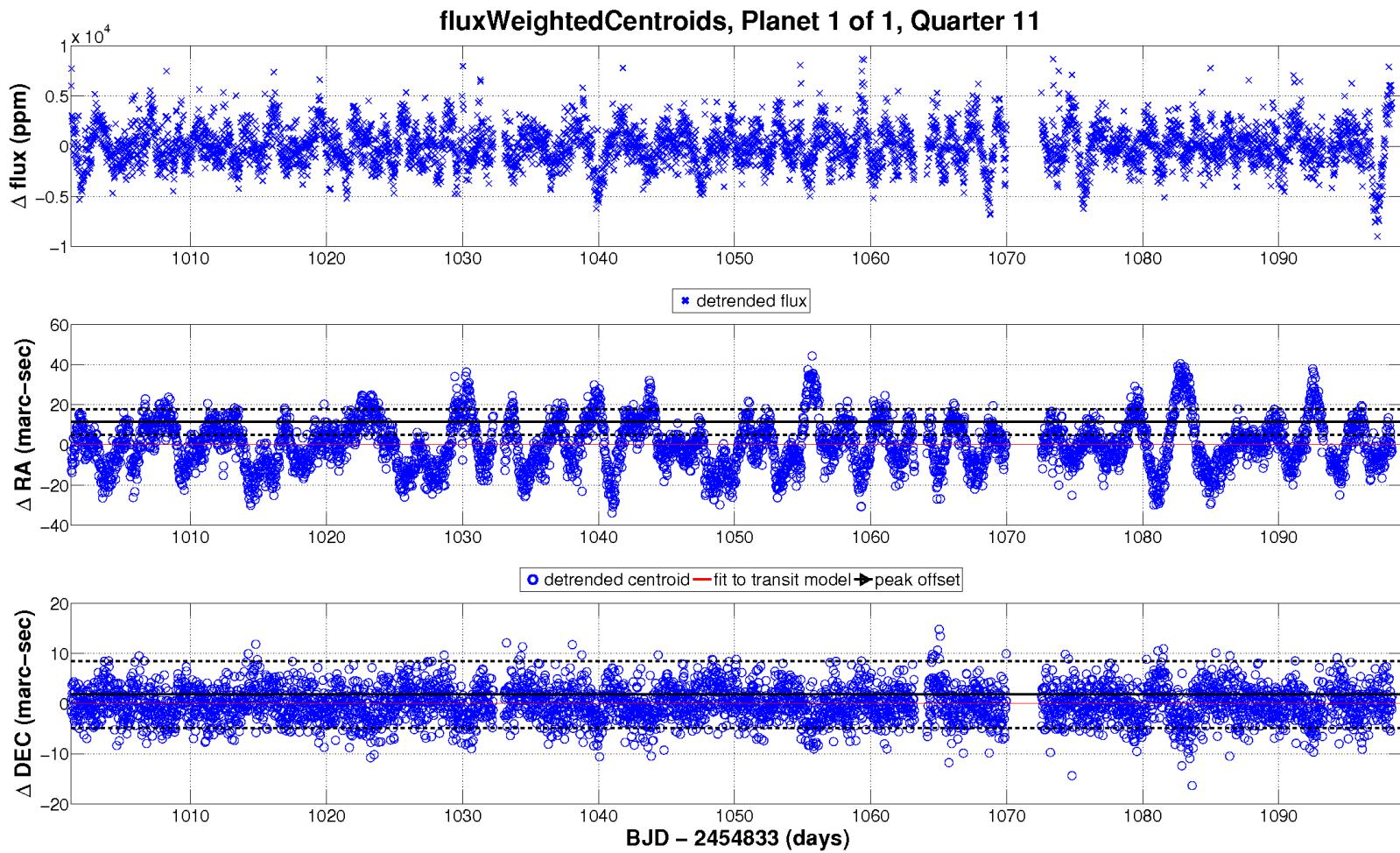
Open [./planet-01/centroid-test-results/005110407-01-transit-fit-fluxWeighted-centroids-08.fig](#)



Out of Transit Centroid
 ra(hours): mean 19.65559006, SD 1.79e-07
 dec(degrees): mean 40.24072444, SD 9.11e-07

KeplerId 5110407, KeplerMag 16.79 - UNFOLDED FLUX AND CENTROIDS - This figure shows detrended flux and centroid data over the full time range of the data set. The top panel shows the change in corrected flux for this target, normalized to the median out of transit value, median detrended with the median out of transit value removed. The bottom two panels show the corresponding change in the centroid in right ascension (RA) and declination (DEC) angles on the sky. The centroids are detrended against ancillary data and have the mean out-of-transit value removed. The scaled transit model fit to the target flux is shown on the centroid plots in red. The peak fitted offset from the out of transit centroid is indicated by the solid black horizontal line. One sigma error bars are indicated with dashed black horizontal lines. Red circles and vertical lines mark the fitted transit centers. In-transit data points for any other planets identified for this target have been gapped. The out-of-transit mean and standard deviation (SD) indicated in the lower left-hand corner are robust estimates.

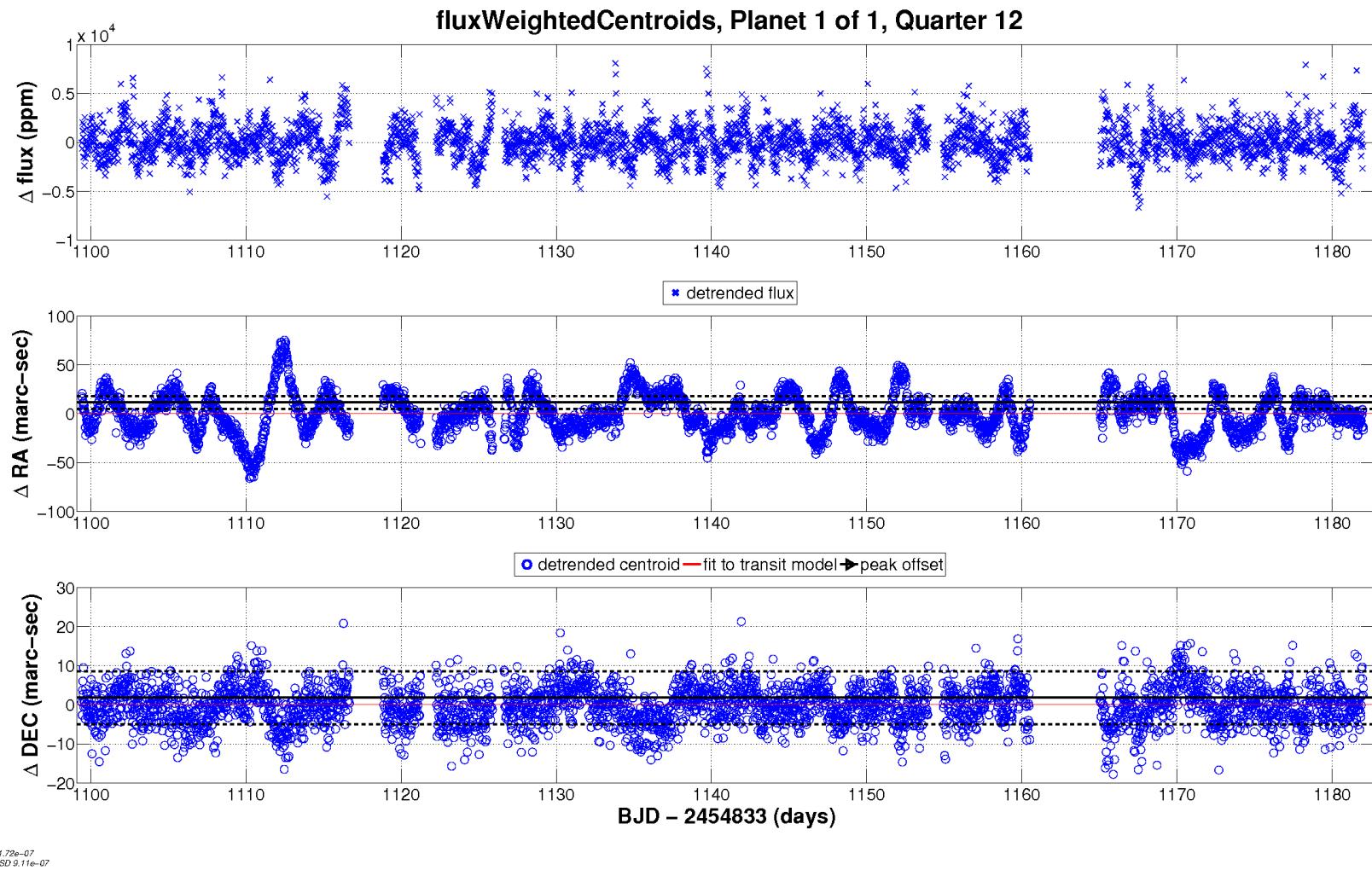
Open [./planet-01/centroid-test-results/005110407-01-transit-fit-fluxWeighted-centroids-09.fig](#)



Out of Transit Centroid
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dec(degrees): mean 40.24072444, SD 9.11e-07

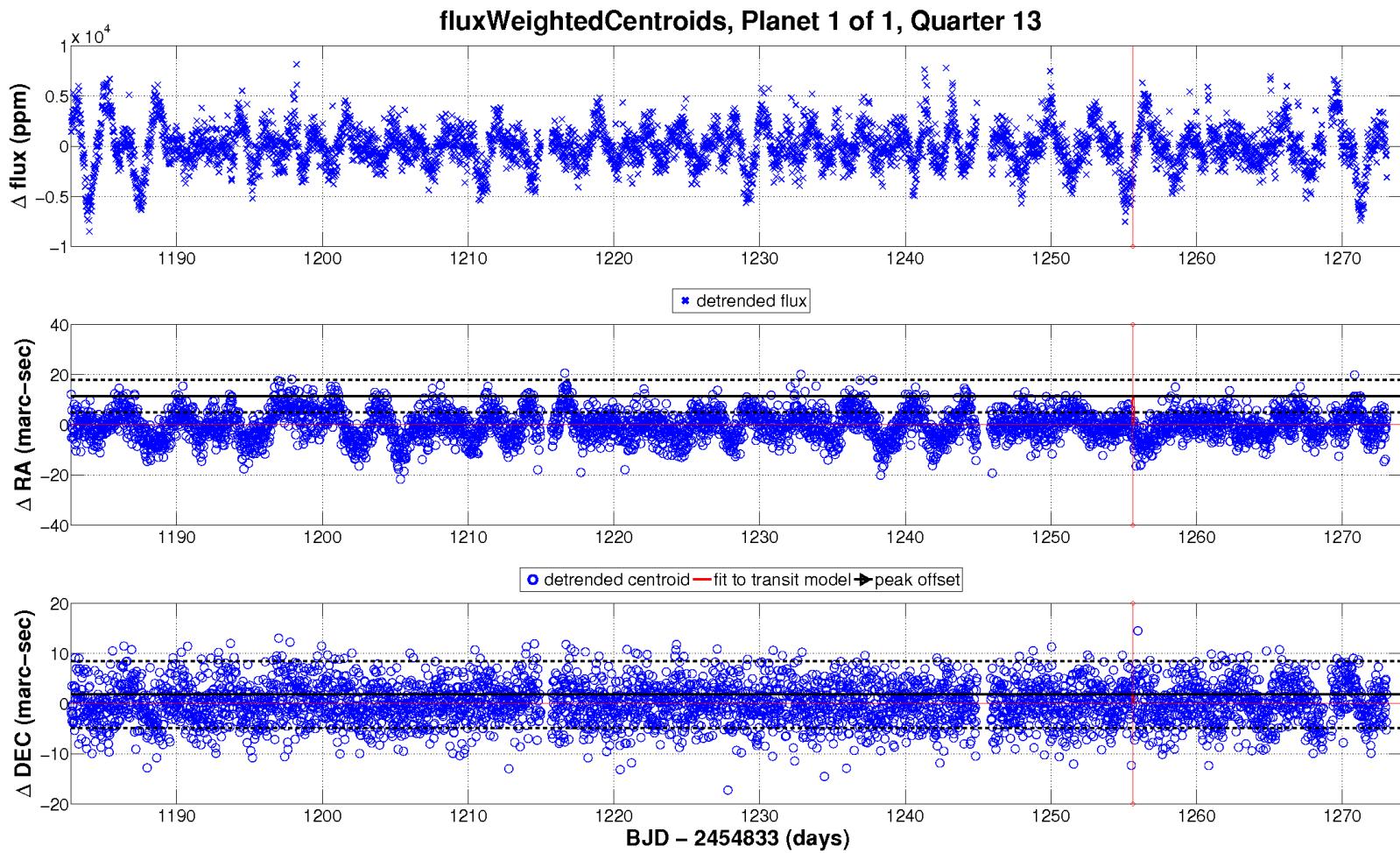
KeplerId 5110407, KeplerMag 16.79 - UNFOLDED FLUX AND CENTROIDS - This figure shows detrended flux and centroid data over the full time range of the data set. The top panel shows the change in corrected flux for this target, normalized to the median out of transit value, median detrended with the median out of transit value removed. The bottom two panels show the corresponding change in the centroid in right ascension (RA) and declination (DEC) angles on the sky. The centroids are detrended against ancillary data and have the mean out-of-transit value removed. The scaled transit model fit to the target flux is shown on the centroid plots in red. The peak fitted offset from the out of transit centroid is indicated by the solid black horizontal line. One sigma error bars are indicated with dashed black horizontal lines. Red circles and vertical lines mark the fitted transit centers. In-transit data points for any other planets identified for this target have been gapped. The out-of-transit mean and standard deviation (SD) indicated in the lower left-hand corner are robust estimates.

Open [./planet-01/centroid-test-results/005110407-01-transit-fit-fluxWeighted-centroids-11.fig](#)



KeplerId 5110407, KeplerMag 16.79 - UNFOLDED FLUX AND CENTROIDS - This figure shows detrended flux and centroid data over the full time range of the data set. The top panel shows the change in corrected flux for this target, normalized to the median out of transit value, median detrended with the median out of transit value removed. The bottom two panels show the corresponding change in the centroid in right ascension (RA) and declination (DEC) angles on the sky. The centroids are detrended against ancillary data and have the mean out-of-transit value removed. The scaled transit model fit to the target flux is shown on the centroid plots in red. The peak fitted offset from the out of transit centroid is indicated by the solid black horizontal line. One sigma error bars are indicated with dashed black horizontal lines. Red circles and vertical lines mark the fitted transit centers. In-transit data points for any other planets identified for this target have been gapped. The out-of-transit mean and standard deviation (SD) indicated in the lower left-hand corner are robust estimates.

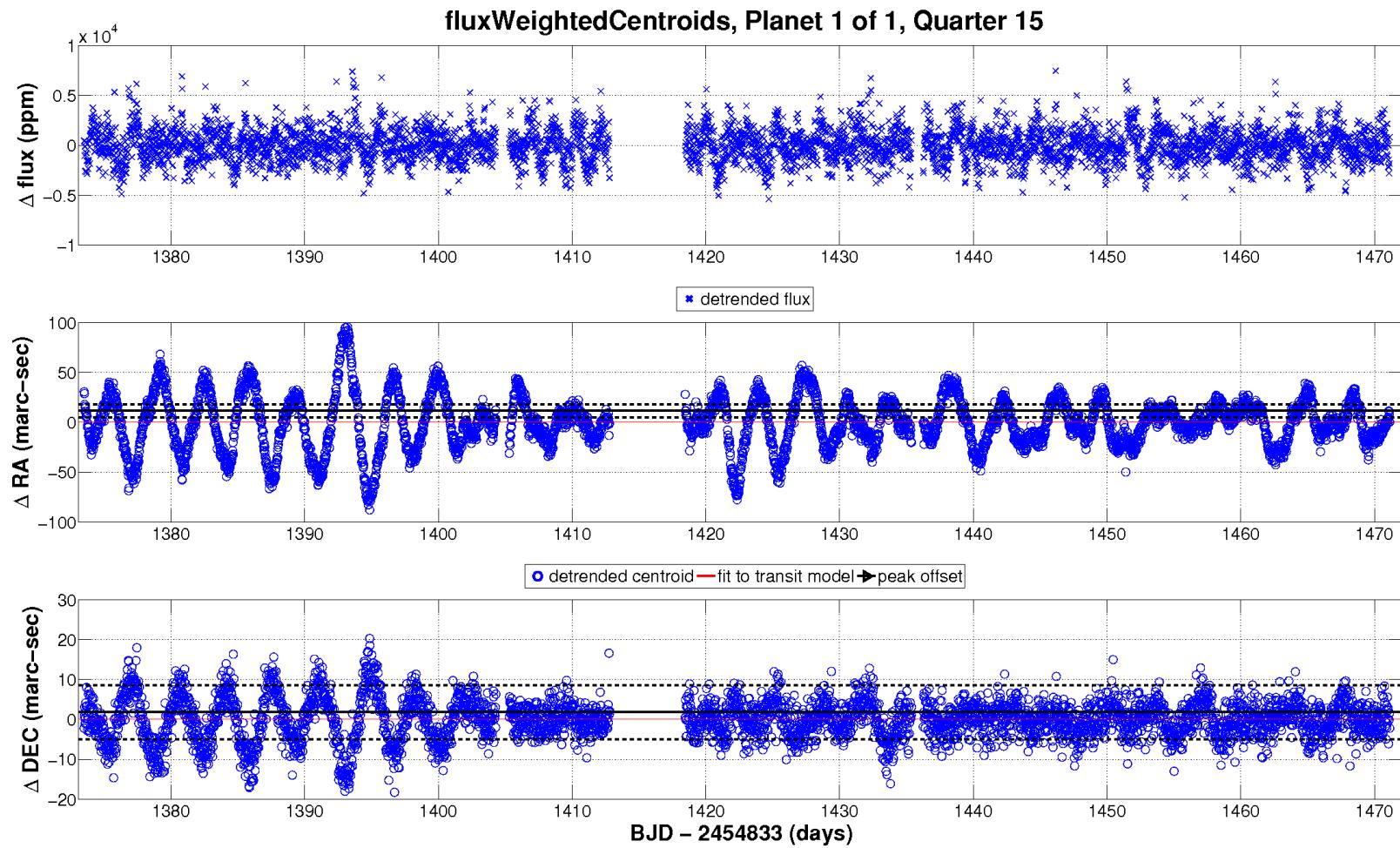
Open [./planet-01/centroid-test-results/005110407-01-transit-fit-fluxWeighted-centroids-12.fig](#)



Out of Transit Centroid
 ra(hours): mean 19.65559006, SD 1.79e-07
 dec(degrees): mean 40.24072444, SD 9.11e-07

KeplerId 5110407, KeplerMag 16.79 - UNFOLDED FLUX AND CENTROIDS - This figure shows detrended flux and centroid data over the full time range of the data set. The top panel shows the change in corrected flux for this target, normalized to the median out of transit value, median detrended with the median out of transit value removed. The bottom two panels show the corresponding change in the centroid in right ascension (RA) and declination (DEC) angles on the sky. The centroids are detrended against ancillary data and have the mean out-of-transit value removed. The scaled transit model fit to the target flux is shown on the centroid plots in red. The peak fitted offset from the out of transit centroid is indicated by the solid black horizontal line. One sigma error bars are indicated with dashed black horizontal lines. Red circles and vertical lines mark the fitted transit centers. In-transit data points for any other planets identified for this target have been gapped. The out-of-transit mean and standard deviation (SD) indicated in the lower left-hand corner are robust estimates.

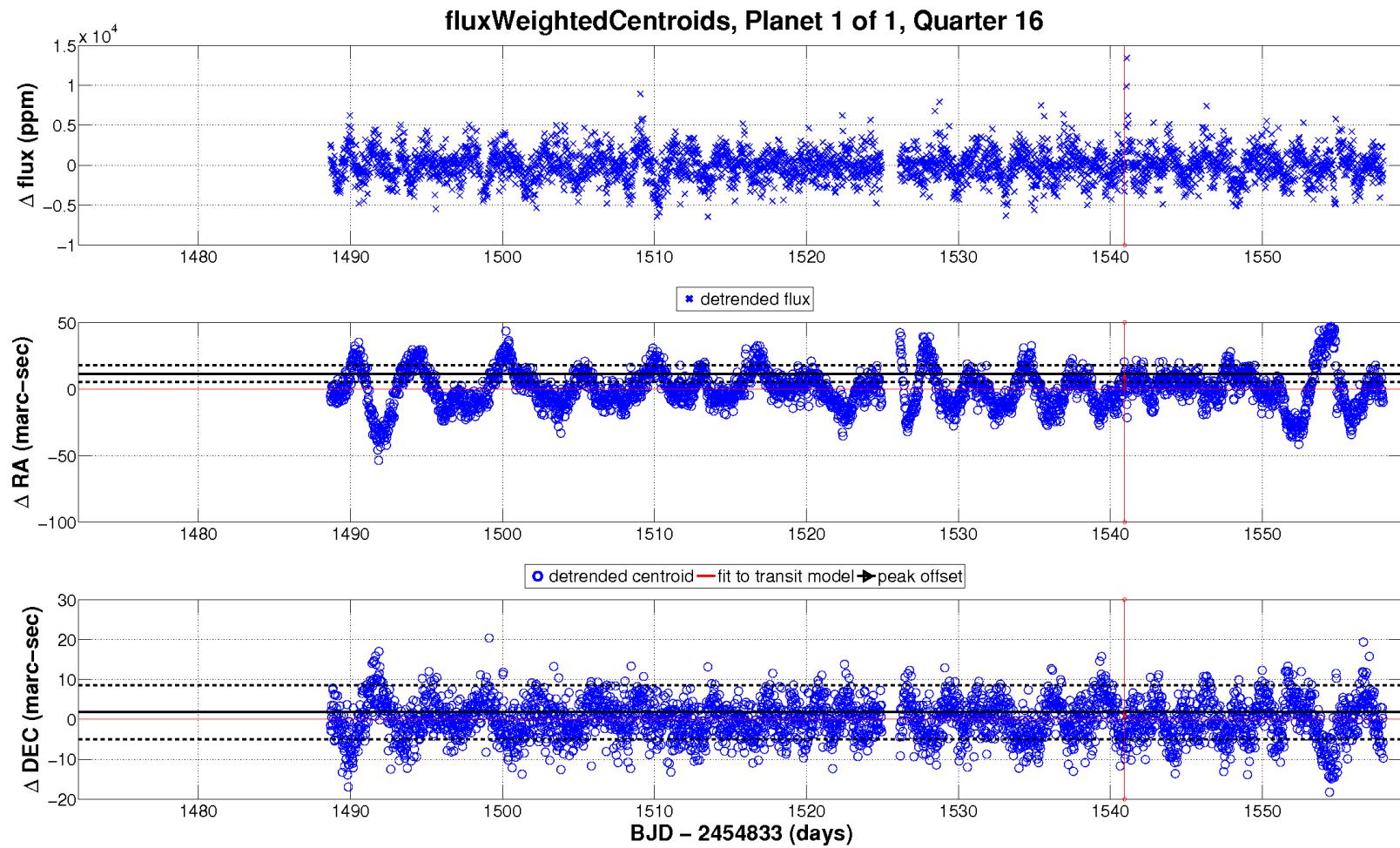
Open [./planet-01/centroid-test-results/005110407-01-transit-fit-fluxWeighted-centroids-13.fig](#)



Out of Transit Centroid
 ra(hours): mean 19.65559006, SD 1.79e-07
 dec(degrees): mean 40.24072444, SD 9.11e-07

KeplerId 5110407, KeplerMag 16.79 - UNFOLDED FLUX AND CENTROIDS - This figure shows detrended flux and centroid data over the full time range of the data set. The top panel shows the change in corrected flux for this target, normalized to the median out of transit value, median detrended with the median out of transit value removed. The bottom two panels show the corresponding change in the centroid in right ascension (RA) and declination (DEC) angles on the sky. The centroids are detrended against ancillary data and have the mean out-of-transit value removed. The scaled transit model fit to the target flux is shown on the centroid plots in red. The peak fitted offset from the out of transit centroid is indicated by the solid black horizontal line. One sigma error bars are indicated with dashed black horizontal lines. Red circles and vertical lines mark the fitted transit centers. In-transit data points for any other planets identified for this target have been gapped. The out-of-transit mean and standard deviation (SD) indicated in the lower left-hand corner are robust estimates.

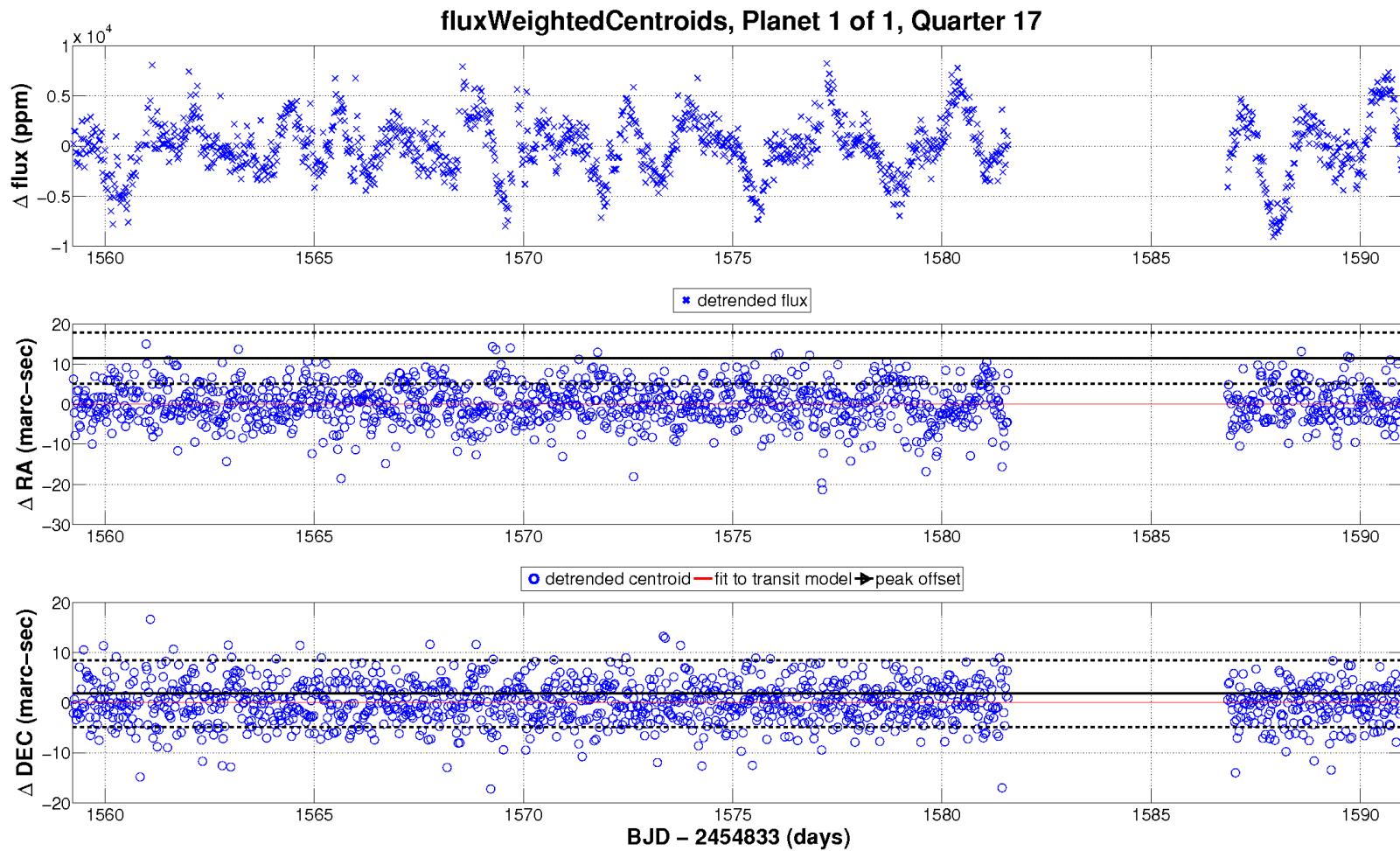
Open [./planet-01/centroid-test-results/005110407-01-transit-fit-fluxWeighted-centroids-15.fig](#)



Out of Transit Centroid
 ra(hours): mean 19.65559006, SD 1.79e-07
 dec(degrees): mean 40.24072444, SD 9.11e-07

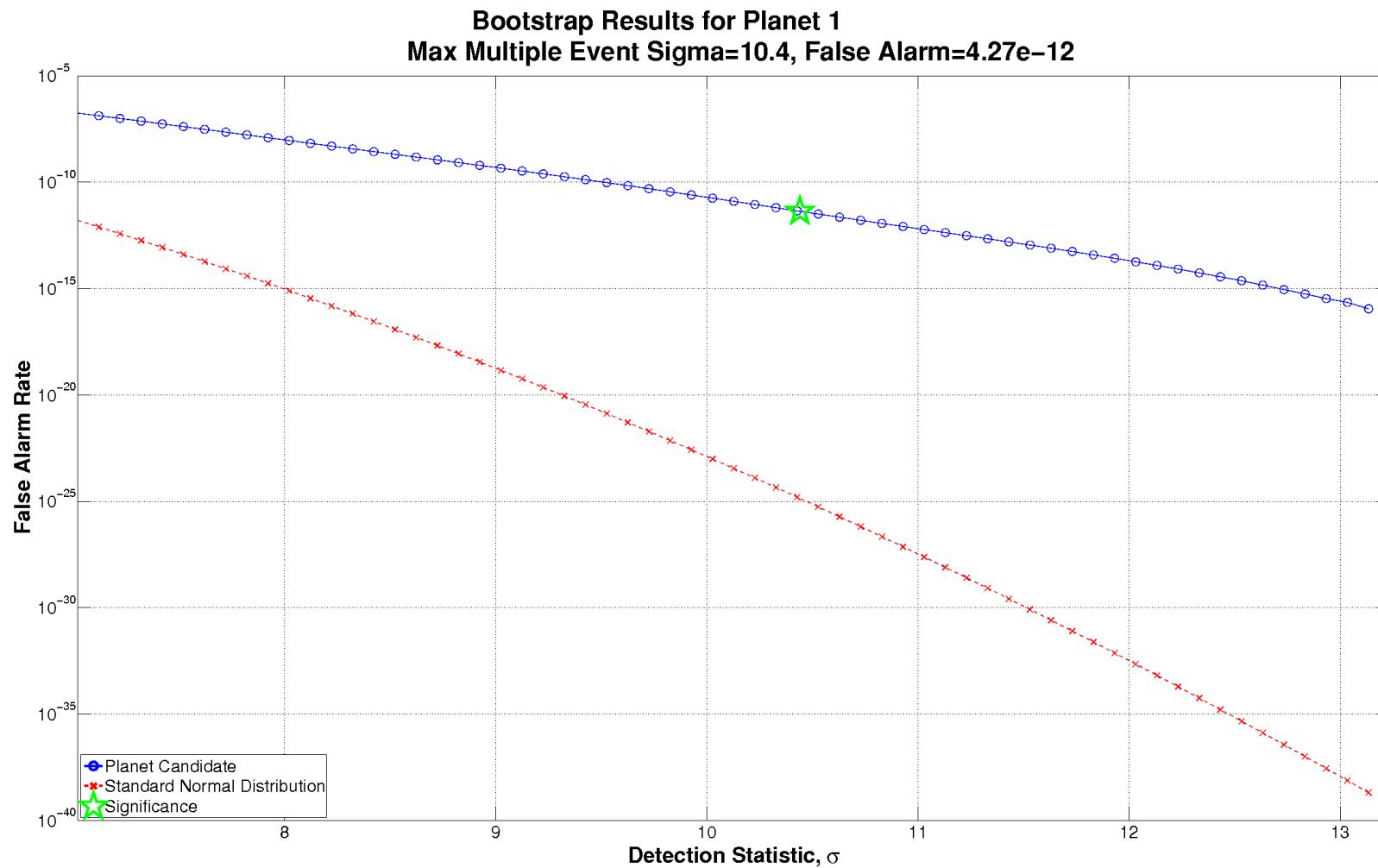
KeplerId 5110407, KeplerMag 16.79 - UNFOLDED FLUX AND CENTROIDS - This figure shows detrended flux and centroid data over the full time range of the data set. The top panel shows the change in corrected flux for this target, normalized to the median out of transit value, median detrended with the median out of transit value removed. The bottom two panels show the corresponding change in the centroid in right ascension (RA) and declination (DEC) angles on the sky. The centroids are detrended against ancillary data and have the mean out-of-transit value removed. The scaled transit model fit to the target flux is shown on the centroid plots in red. The peak fitted offset from the out of transit centroid is indicated by the solid black horizontal line. One sigma error bars are indicated with dashed black horizontal lines. Red circles and vertical lines mark the fitted transit centers. In-transit data points for any other planets identified for this target have been gapped. The out-of-transit mean and standard deviation (SD) indicated in the lower left-hand corner are robust estimates.

Open [./planet-01/centroid-test-results/005110407-01-transit-fit-fluxWeighted-centroids-16.fig](#)



KeplerId 5110407, KeplerMag 16.79 - UNFOLDED FLUX AND CENTROIDS - This figure shows detrended flux and centroid data over the full time range of the data set. The top panel shows the change in corrected flux for this target, normalized to the median out of transit value, median detrended with the median out of transit value removed. The bottom two panels show the corresponding change in the centroid in right ascension (RA) and declination (DEC) angles on the sky. The centroids are detrended against ancillary data and have the mean out-of-transit value removed. The scaled transit model fit to the target flux is shown on the centroid plots in red. The peak fitted offset from the out of transit centroid is indicated by the solid black horizontal line. One sigma error bars are indicated with dashed black horizontal lines. Red circles and vertical lines mark the fitted transit centers. In-transit data points for any other planets identified for this target have been gapped. The out-of-transit mean and standard deviation (SD) indicated in the lower left-hand corner are robust estimates.

Open [./planet-01/centroid-test-results/005110407-01-transit-fit-fluxWeighted-centroids-17.fig](#)

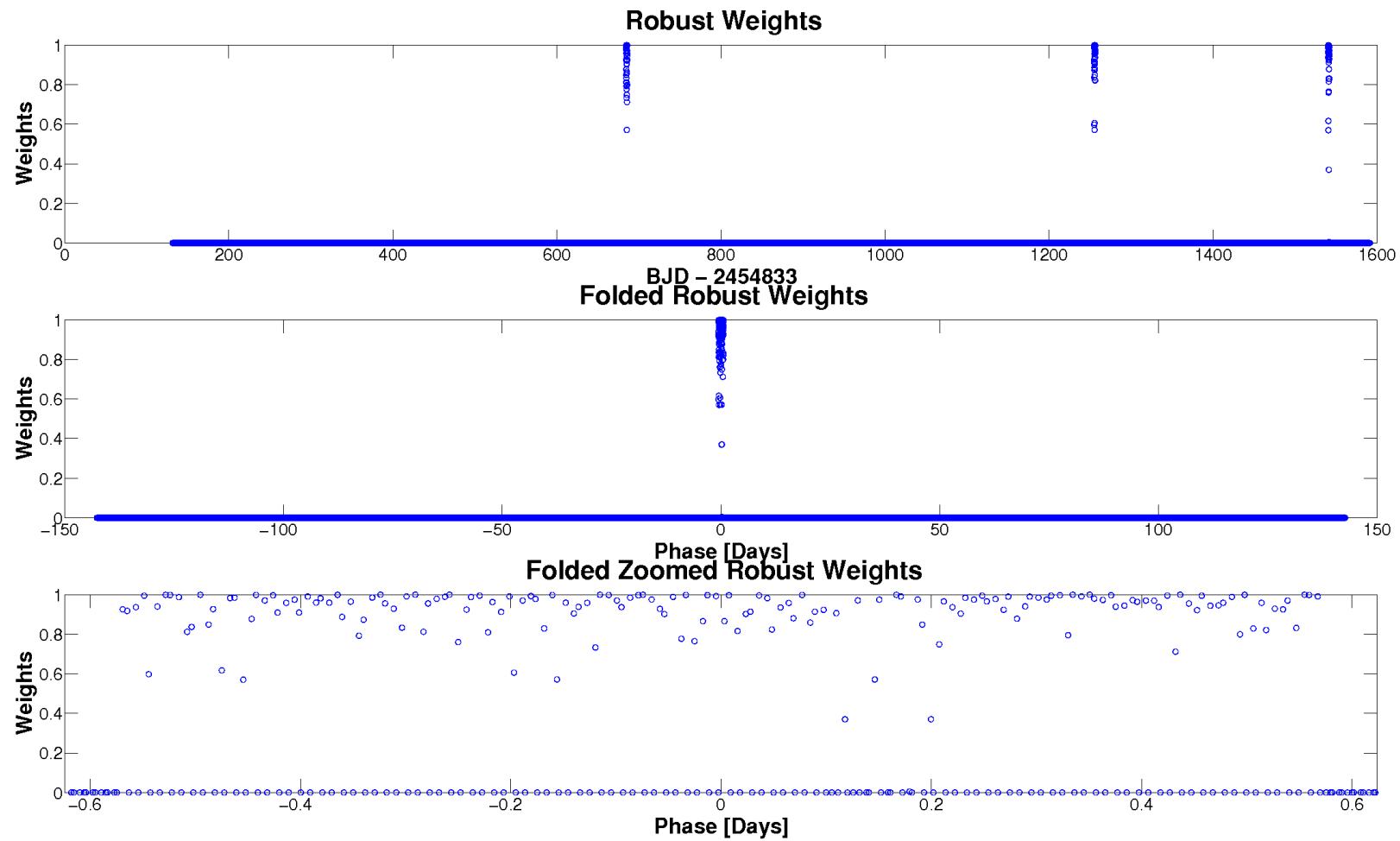


Bootstrap results for target 5110407, planet 1. Cumulative sum of the probabilities (derived from the histogram of counts) from upper tail to the search transit threshold; false alarm probability is indicated by the star. The Gaussian equivalent threshold for this false alarm probability is 6.8291. The threshold on this distribution that achieves the same false alarm rate as a 7.1 sigma threshold on a Gaussian distribution is 11.0149.

Open [./planet-01/bootstrap-results/005110407-01-bootstrap-false-alarm.fig](#)

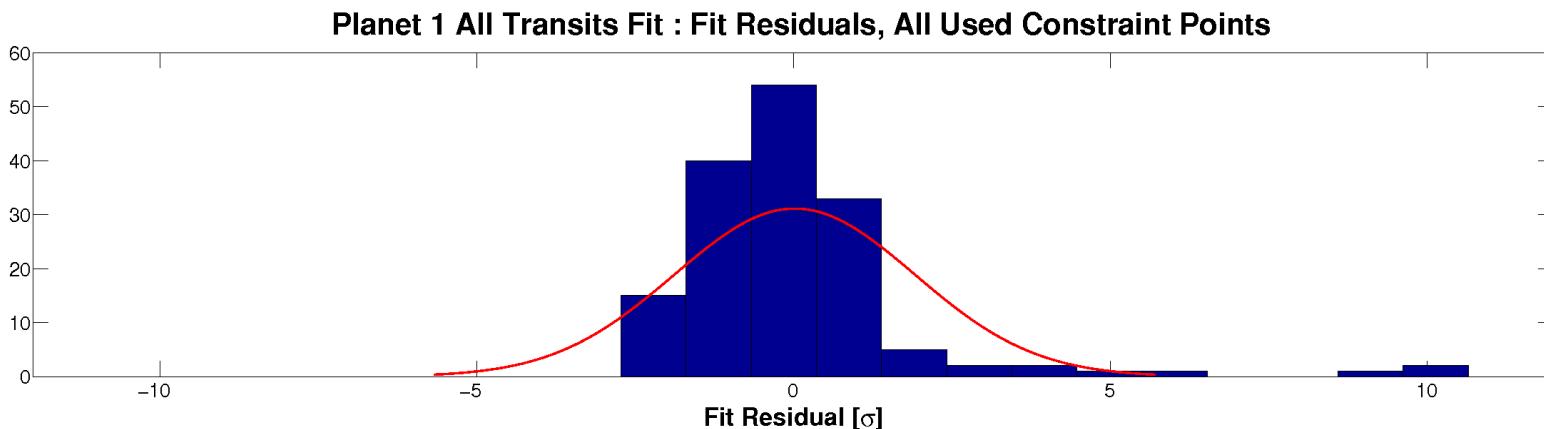
Appendix A Planet Candidate 1

A.1 Model Fitter: All Transits



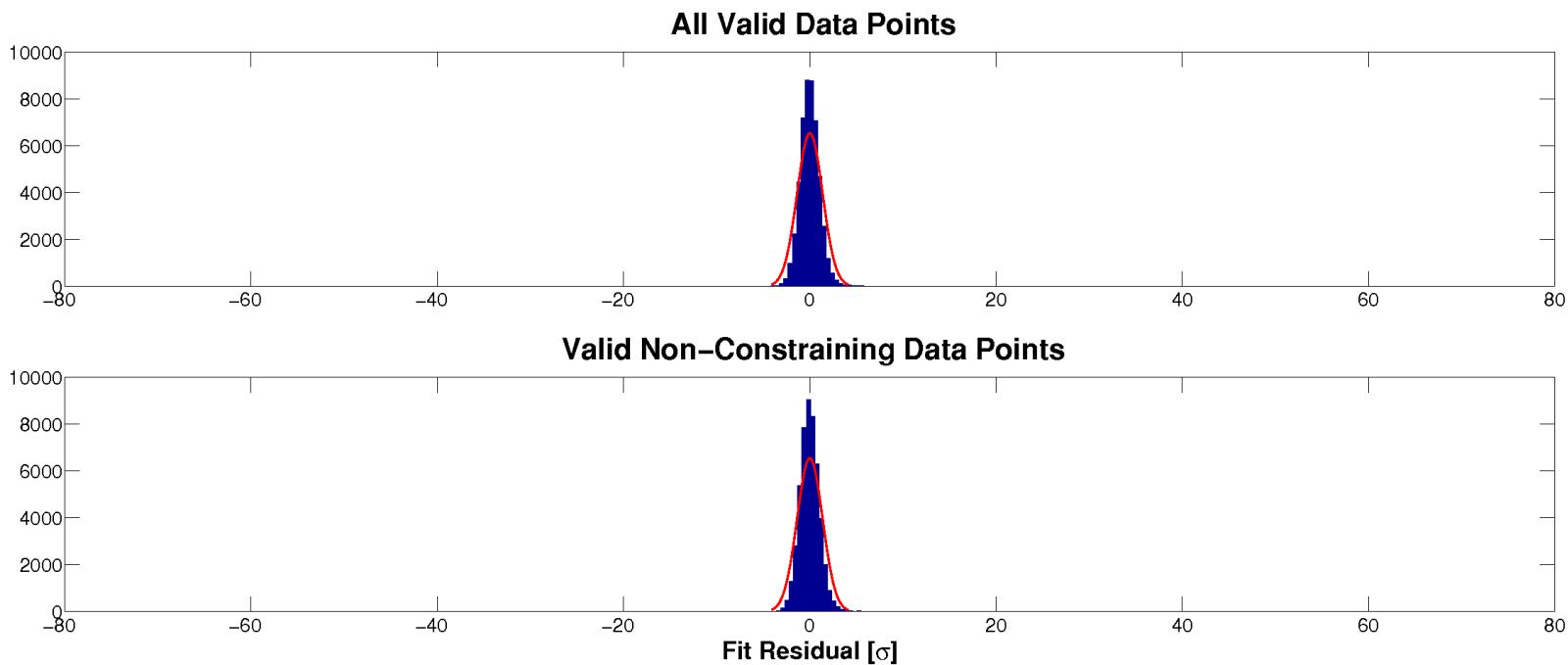
Robust weights distribution for KeplerId 5110407, Planet candidate 1. Top plot: all data points. Middle plot: all data points, folded per the fitted period and epoch. Bottom plot: all data points, folded and zoomed.

Open [./planet-01/planet-search-and-model-fitting-results/all-transits-fit/005110407-01-all-robust-weights.fig](#)



Fit residuals distribution for KeplerId 5110407, Planet candidate 1. Only the valid data points used to constrain the fit are shown here. A Gaussian fit to the histogram is shown in red.

Open [./planet-01/planet-search-and-model-fitting-results/all-transits-fit/005110407-01-all-histo-used.fig](#)



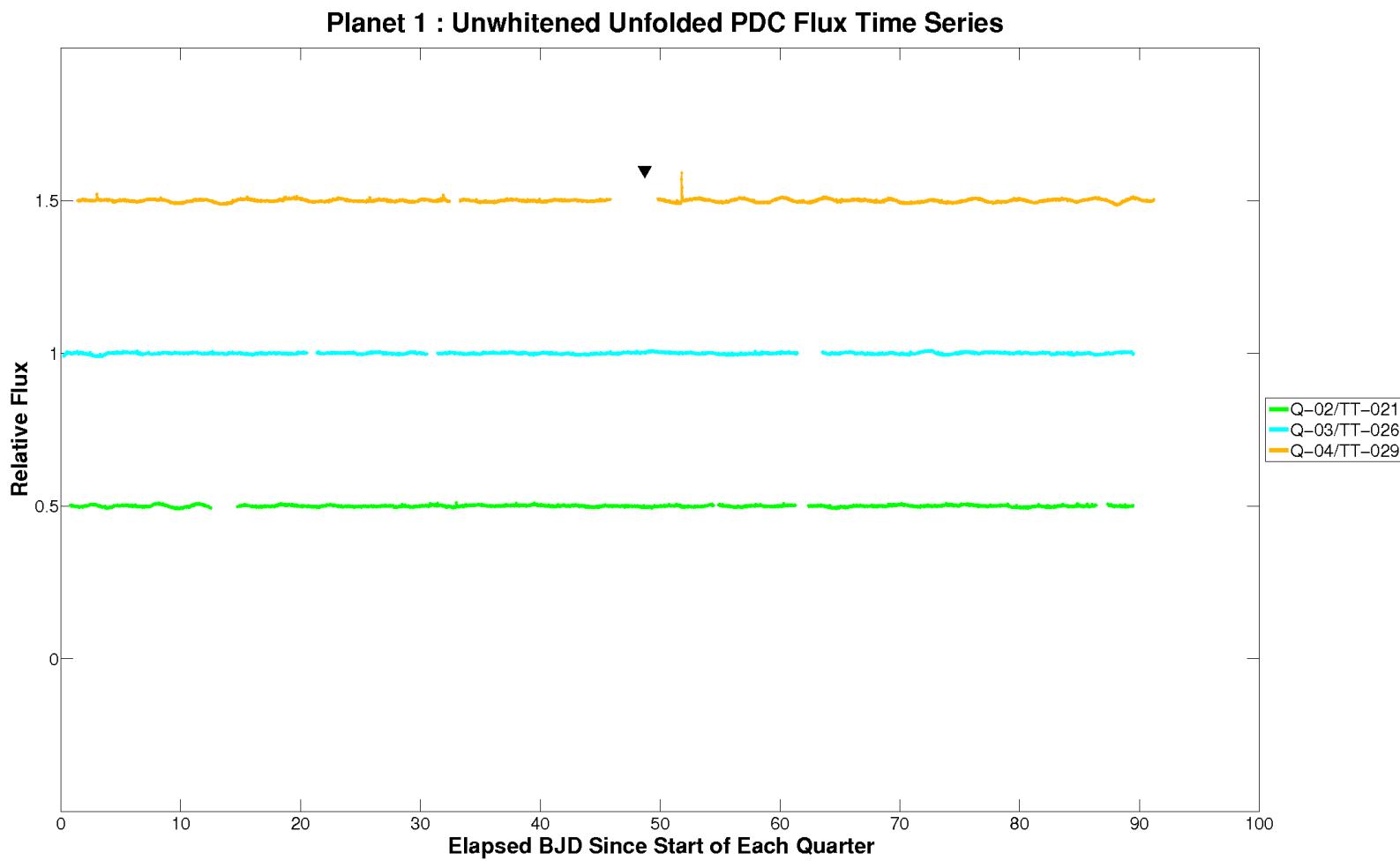
Fit residuals distribution for KeplerId 5110407, Planet candidate 1. Top plot: all valid data. Bottom plot: valid data not used to constrain fit (due to distance from a transit). Gaussian fits to the histograms are shown in red.

Open [./planet-01/planet-search-and-model-fitting-results/all-transits-fit/005110407-01-all-histo-all-and-unused.fig](#)

A.2 Model Fitter: Odd & Even Transits

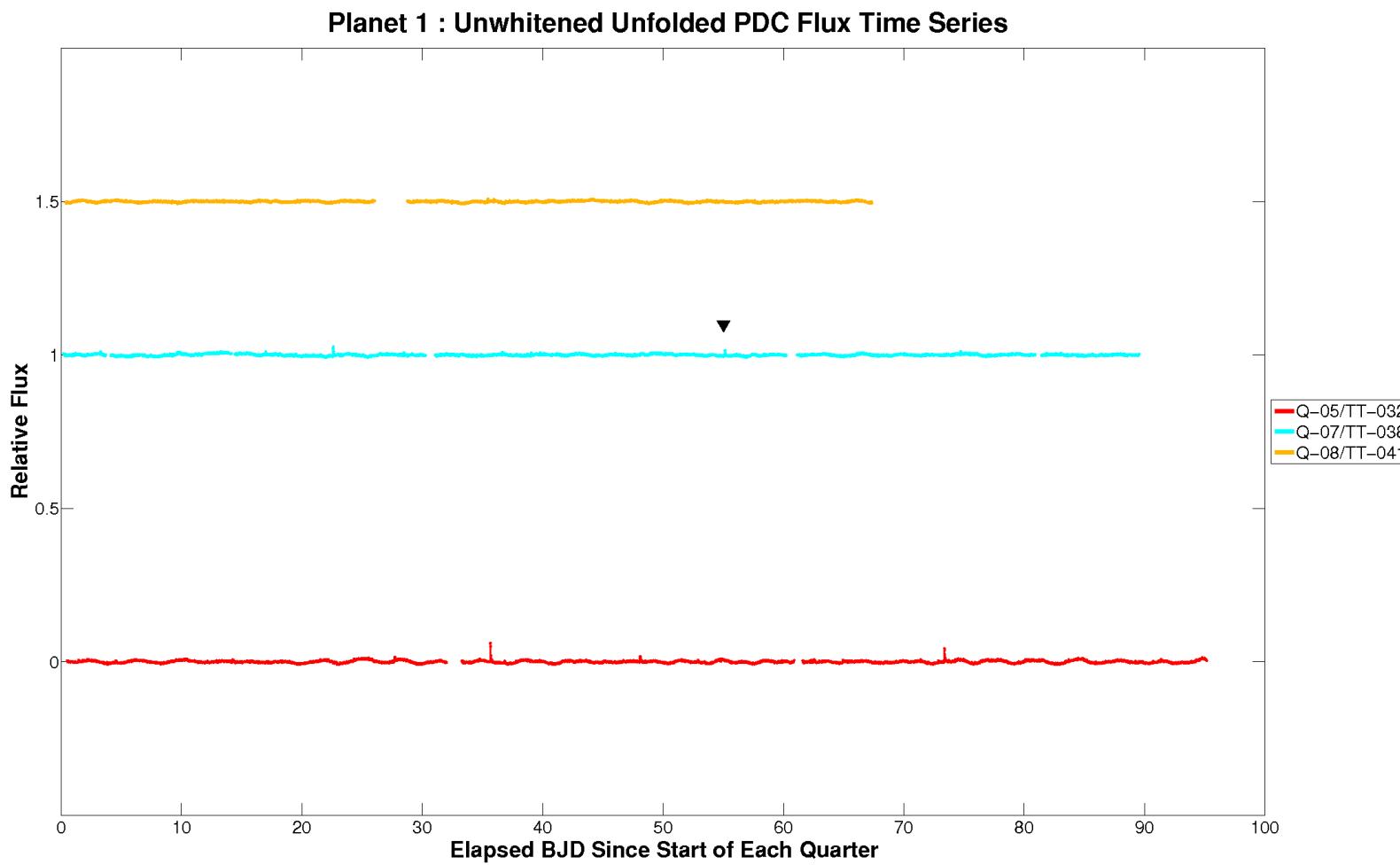
Parameter	Odd Transits Value	Odd Transits Uncertainty	Even Transits Value	Even Transits Uncertainty	Units	Difference Uncertainty
SNR	4.9		5.5			
Orbital Period	285.3073588	0.0000e+00	285.3140559	9.1989e-03	days	7.2802e-01
Transit Epoch	399.7208070	1.3649e-02	685.0157267	1.5390e-02	BKJD	3.6987e-01
Impact Parameter	0.9006	1.3640e-01	0.0021	2.8884e+03		3.1107e-04
Planet Radius to Star Radius Ratio	0.0769044	2.1434e-02	0.0474526	7.2320e-02		3.9045e-01
Semi-major Axis to Star Radius Ratio	256.7444	1.4875e+02	413.4945	2.5274e+03		6.1913e-02
Planet Radius	17.3967	1.1101e+01	10.7343	1.7482e+01	Earth radii	3.2172e-01
Semi-major Axis	0.8669	5.5838e-01	0.8669	5.5838e-01	AU	1.7179e-05
Effective Stellar Flux	4.5199	5.0506e+00	4.5198	5.0504e+00	Goldilocks	1.9805e-05
Equilibrium Temperature	372	1.0386e+02	372	1.0386e+02	Kelvin	1.9805e-05
Transit Depth	4847	1.6094e+03	2772	7.3397e+02	ppm	1.1731e+00
Transit Duration	5.0121	1.6034e+00	5.5214	3.2493e+00	hours	1.4055e-01
Transit Ingress Time	1.6471	3.1028e+00	0.2501	3.4490e+00	hours	3.0111e-01
Eccentricity	0.0000	0.0000e+00	0.0000	0.0000e+00		
Peri Longitude	0.0000	0.0000e+00	0.0000	0.0000e+00	degrees	
Model Chi Square Statistic (DoF)	149.9 (141.4)		149.9 (141.4)			

DoF: Degrees of Freedom



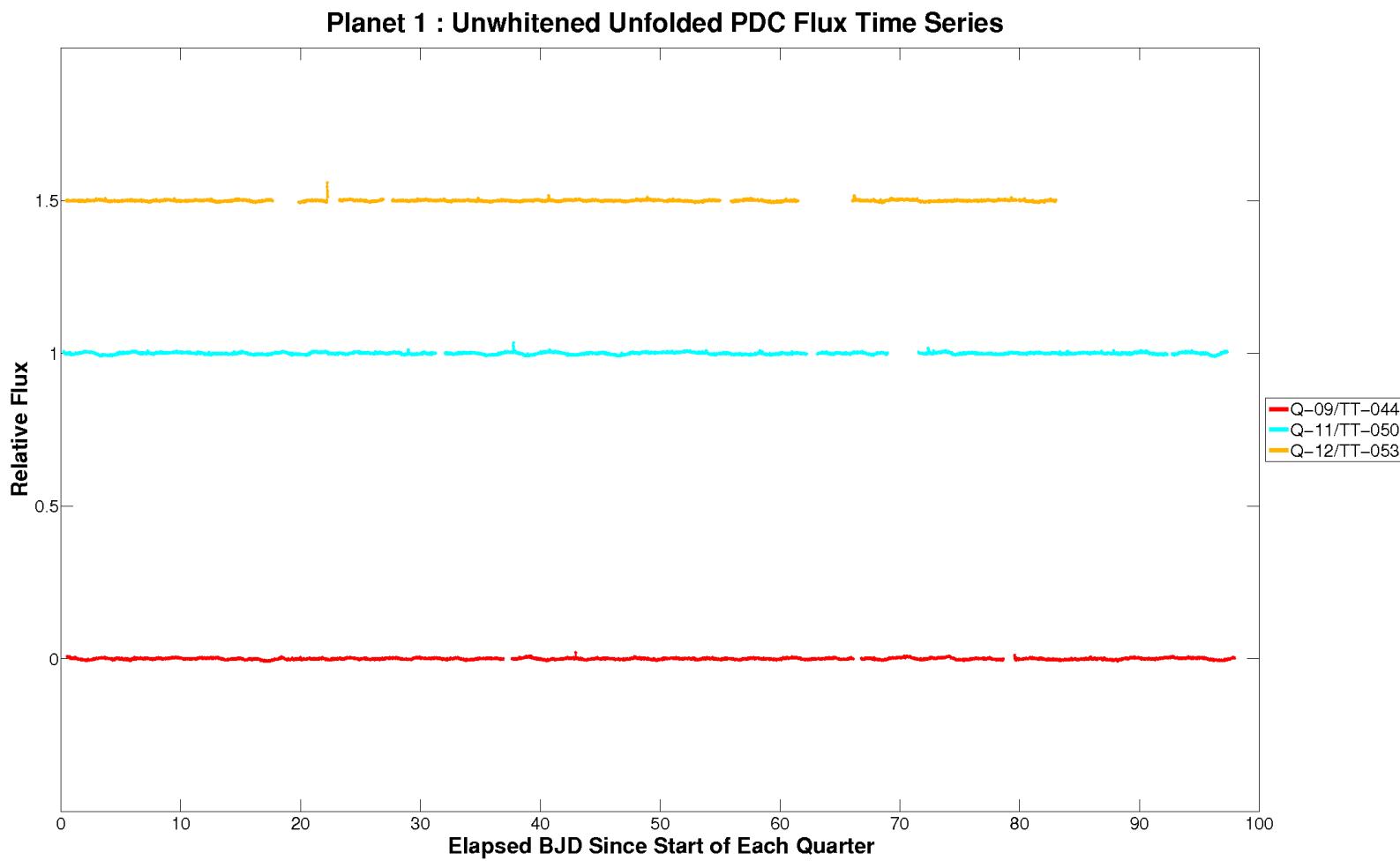
PDC Flux time series for KeplerId 5110407, Planet candidate 1 in the unwhitened domain. For the data of Quarter-01/TargetTableId-020, start BJD is 2454964 and the vertical offset is 0. For the data of Quarter-02/TargetTableId-021, start BJD is 2455002 and the vertical offset is 0.5. For the data of Quarter-03/TargetTableId-026, start BJD is 2455093 and the vertical offset is 1. For the data of Quarter-04/TargetTableId-029, start BJD is 2455184 and the vertical offset is 1.5. Transit event markers indicate the location of transits of the given planet candidate. Odd-even transits fit completed with full convergence.

Open [./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/005110407-01-odd-even-unwhitened-01-020.fig](#)



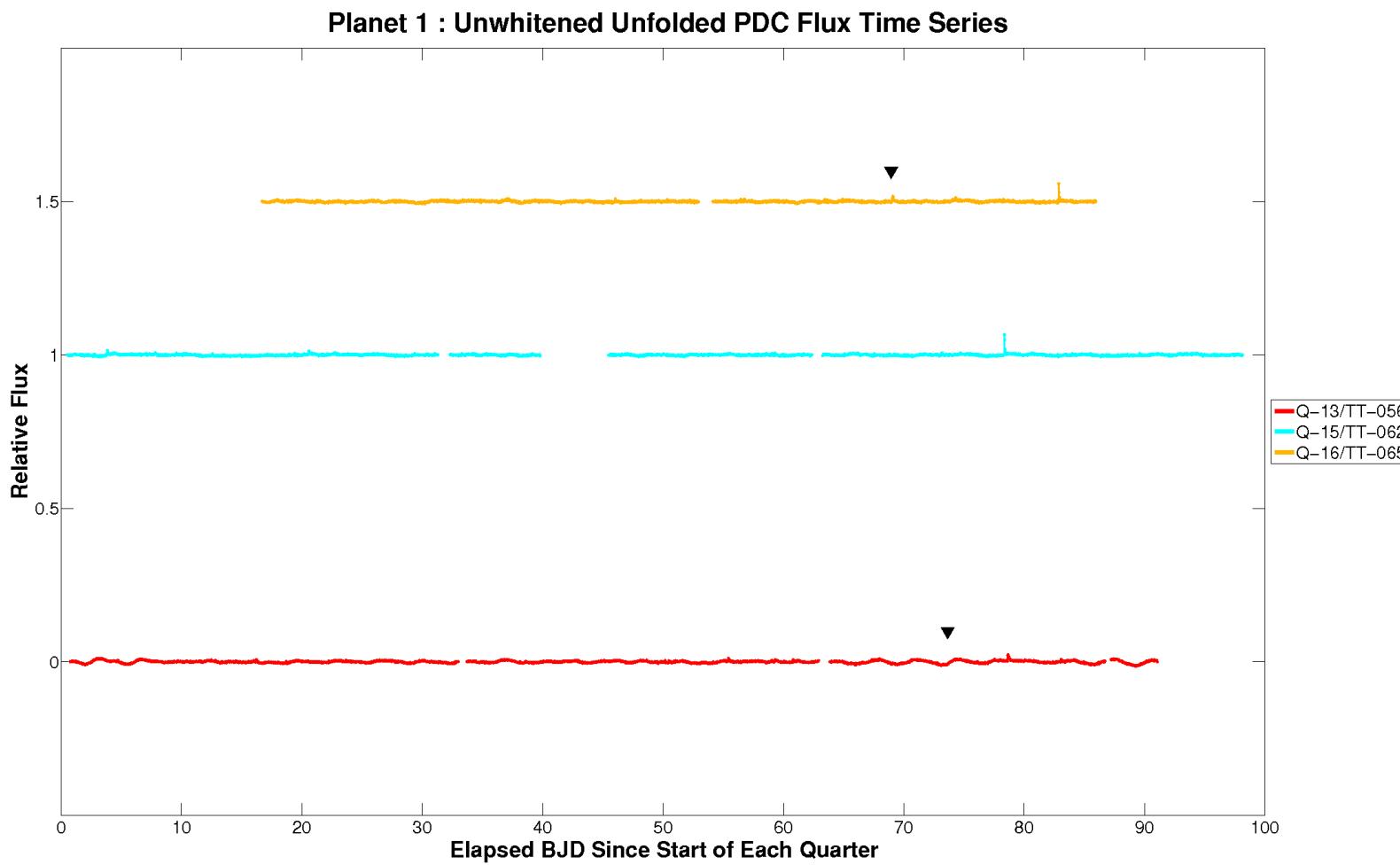
PDC Flux time series for KeplerId 5110407, Planet candidate 1 in the unwhitened domain. For the data of Quarter-05/TargetTableId-032, start BJD is 2455276 and the vertical offset is 0. For the data of Quarter-06/TargetTableId-035, start BJD is 2455372 and the vertical offset is 0.5. For the data of Quarter-07/TargetTableId-038, start BJD is 2455463 and the vertical offset is 1. For the data of Quarter-08/TargetTableId-041, start BJD is 2455568 and the vertical offset is 1.5. Transit event markers indicate the location of transits of the given planet candidate. Odd-even transits fit completed with full convergence.

Open [./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/005110407-01-odd-even-unwhitened-05-032.fig](#)



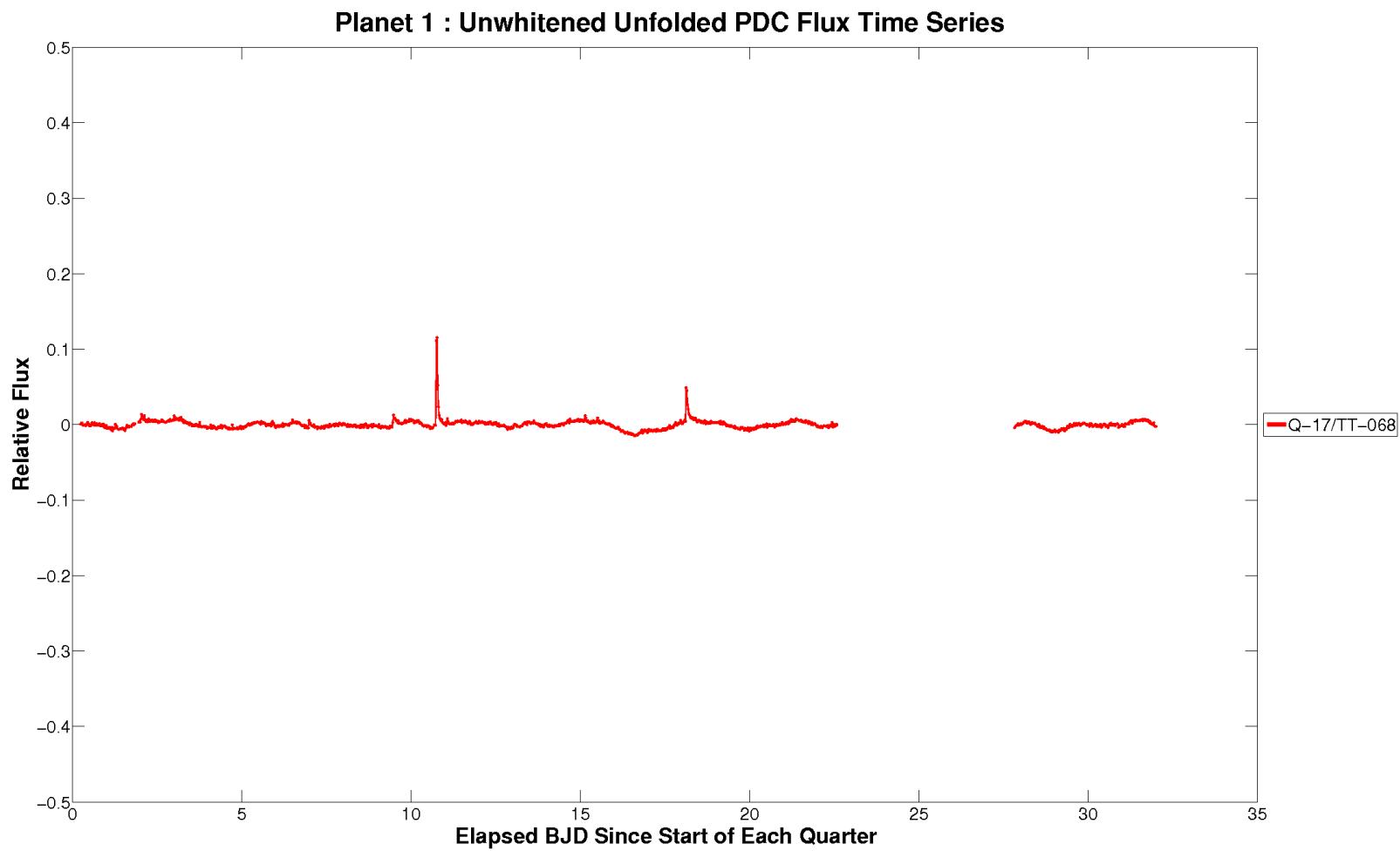
PDC Flux time series for KeplerId 5110407, Planet candidate 1 in the unwhitened domain. For the data of Quarter-09/TargetTableId-044, start BJD is 2455641 and the vertical offset is 0. For the data of Quarter-10/TargetTableId-047, start BJD is 2455739 and the vertical offset is 0.5. For the data of Quarter-11/TargetTableId-050, start BJD is 2455834 and the vertical offset is 1. For the data of Quarter-12/TargetTableId-053, start BJD is 2455932 and the vertical offset is 1.5. Transit event markers indicate the location of transits of the given planet candidate. Odd-even transits fit completed with full convergence.

Open [./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/005110407-01-odd-even-unwhitened-09-044.fig](#)



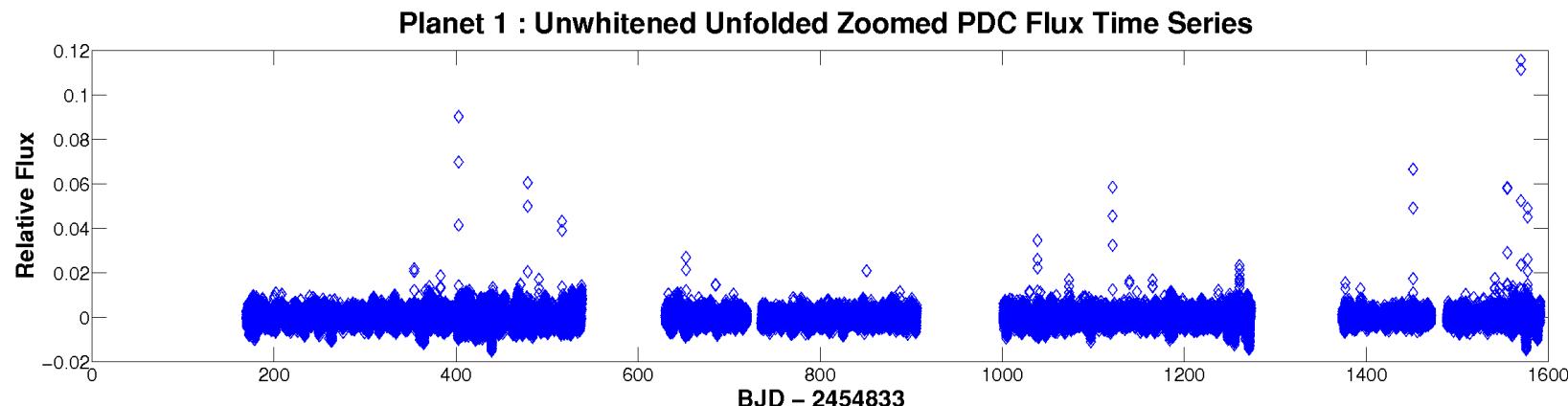
PDC Flux time series for KeplerId 5110407, Planet candidate 1 in the unwhitened domain. For the data of Quarter-13/TargetTableId-056, start BJD is 2456015 and the vertical offset is 0. For the data of Quarter-14/TargetTableId-059, start BJD is 2456107 and the vertical offset is 0.5. For the data of Quarter-15/TargetTableId-062, start BJD is 2456206 and the vertical offset is 1. For the data of Quarter-16/TargetTableId-065, start BJD is 2456305 and the vertical offset is 1.5. Transit event markers indicate the location of transits of the given planet candidate. Odd-even transits fit completed with full convergence.

Open [./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/005110407-01-odd-even-unwhitened-13-056.fig](#)



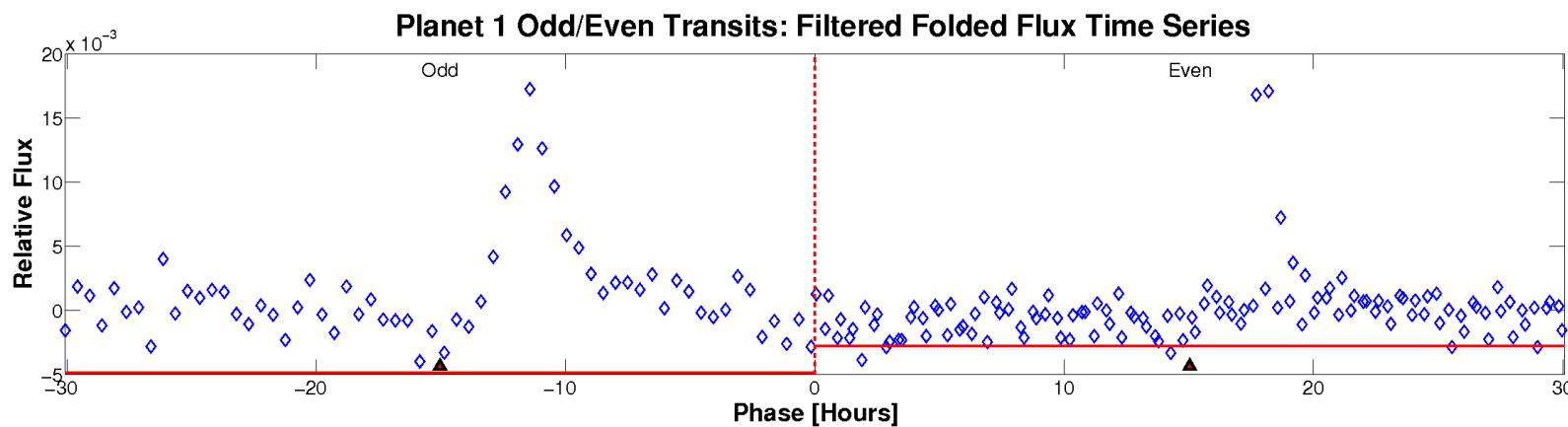
PDC Flux time series for KeplerId 5110407, Planet candidate 1 in the unwhitened domain. For the data of Quarter-17/TargetTableId-068, start BJD is 2456392. Transit event markers indicate the location of transits of the given planet candidate. Odd-even transits fit completed with full convergence.

Open [./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/005110407-01-odd-even-unwhitened-17-068.fig](#)



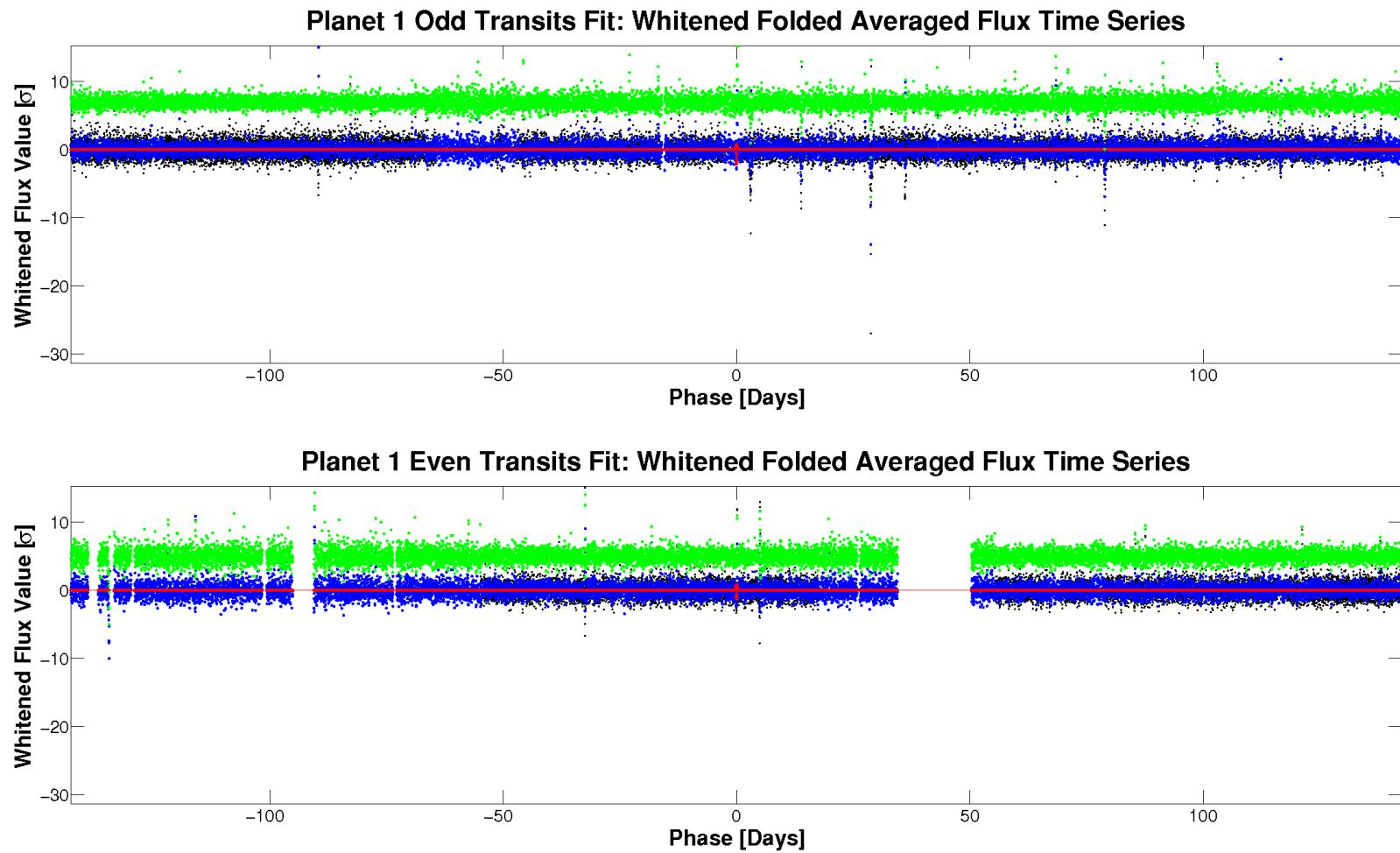
PDC Flux time series for KeplerId 5110407, Planet candidate 1 in the unwhitened domain, zoomed on last 5 transits in the unit of work. If # of transits is smaller than 5, all transits are shown.

Open [./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/005110407-01-odd-even-unwhitened-zoomed.fig](#)



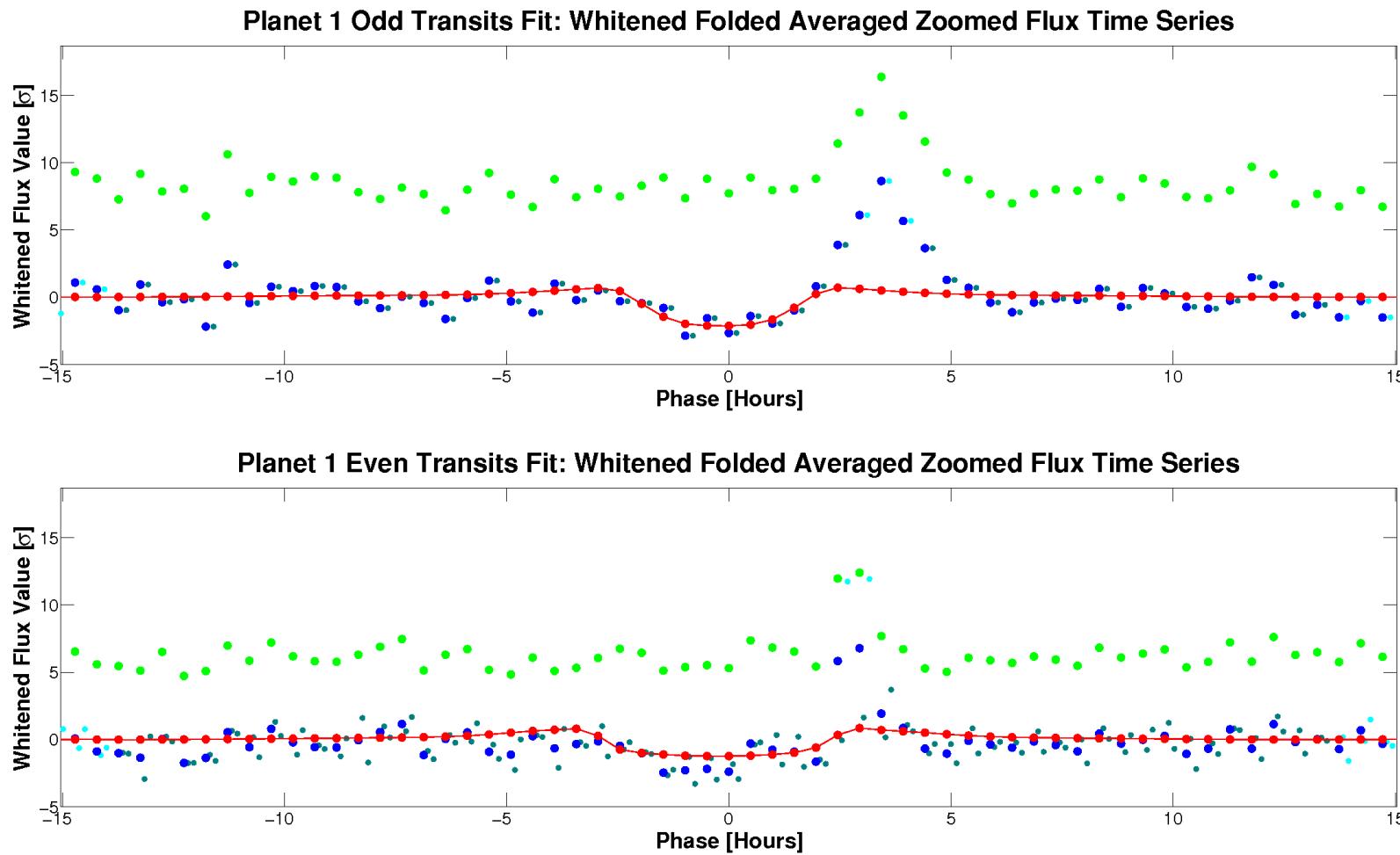
PDC Flux time series of odd/even transits for KeplerId 5110407, Planet candidate 1 in the unwhitened domain. Data has been high-pass filtered via a median filter operating at a specified multiple of the transit duration, folded per the fitted period and epoch, and zoomed to the location of the model transit.

Open [./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/005110407-01-odd-even-unwhitened-filtered-zoomed.fig](#)



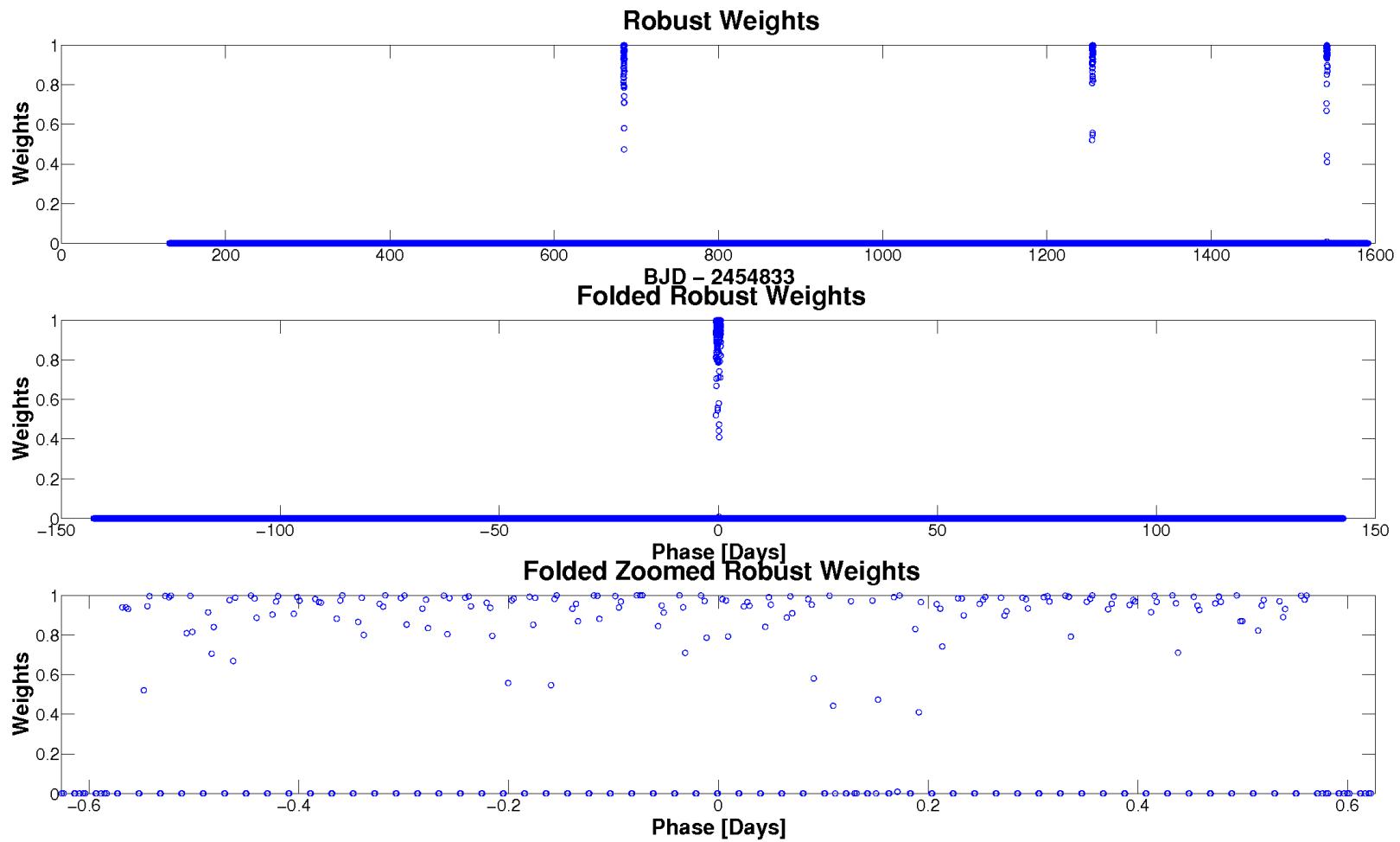
Folded flux time series for KeplerId 5110407, Planet candidate 1 in the whitened domain is plotted in black dots. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the folded model light curve of the odd/even transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. Odd-even transits fit completed with full convergence.

Open [./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/005110407-01-odd-even-whitened.fig](#)



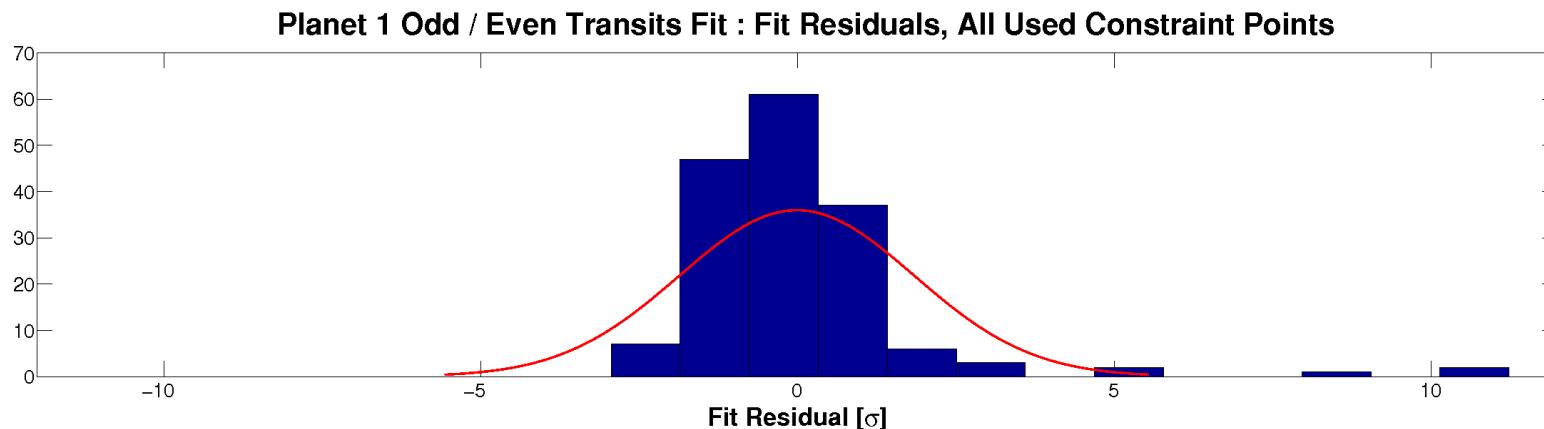
Folded flux time series for KeplerId 5110407, Planet candidate 1 in the whitened domain, zoomed on the transit. The flux data whose robust weights are larger/smaller than 0.1 are plotted in dark green/cyan dots, respectively. Values are averaged into 1 cadence wide bins. The blue dots represent the averaged values of the folded flux time series; the red dots represent the averaged values of the fitted model light curve of the odd/even transits fit; the green dots are the averaged folded fit residuals, vertically offset for clarity. Magenta dots are the averaged values of the folded flux time series, with a phase shift of 0.5 relative to the blue dots, vertically offset for clarity. Odd-even transits fit completed with full convergence.

Open [./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/005110407-01-odd-even-whitened-zoomed.fig](#)



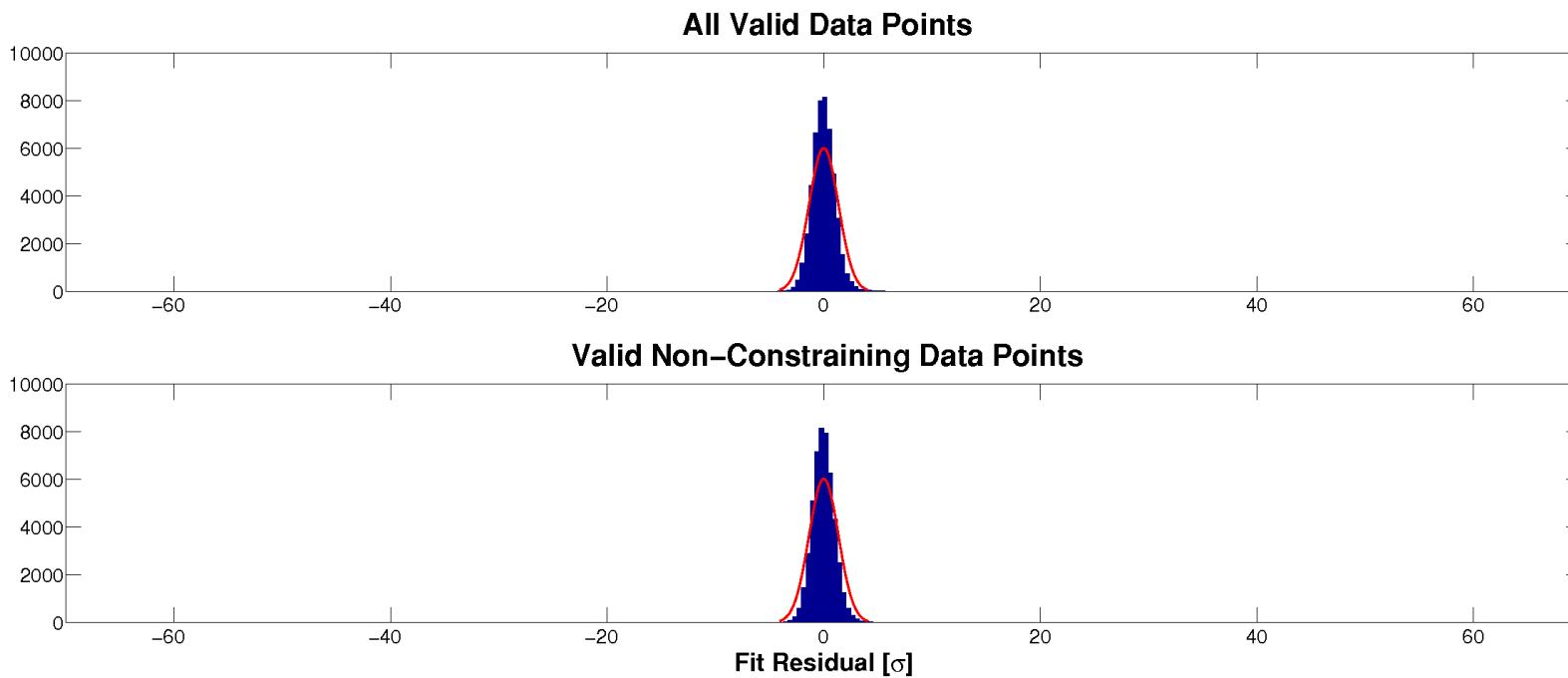
Robust weights distribution for KeplerId 5110407, Planet candidate 1. Top plot: all data points. Middle plot: all data points, folded per the fitted period and epoch. Bottom plot: all data points, folded and zoomed.

Open [./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/005110407-01-odd-even-robust-weights.fig](#)



Fit residuals distribution for KeplerId 5110407, Planet candidate 1. Only the valid data points used to constrain the fit are shown here. A Gaussian fit to the histogram is shown in red.

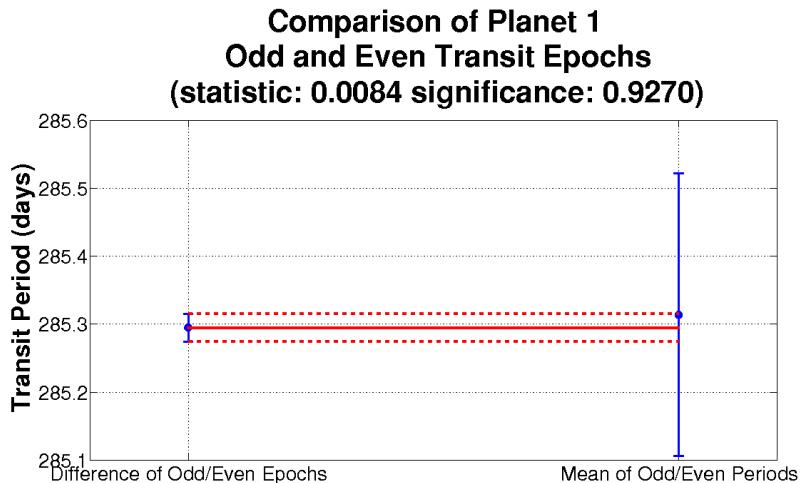
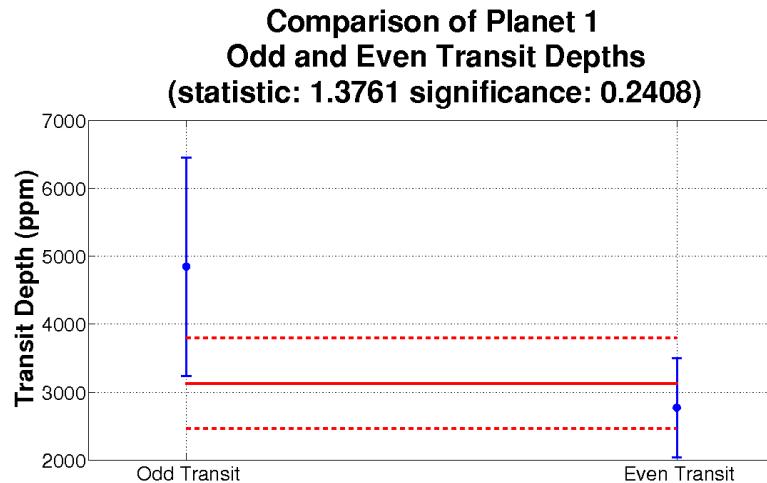
Open [./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/005110407-01-odd-even-histo-used.fig](#)



Fit residuals distribution for KeplerId 5110407, Planet candidate 1. Top plot: all valid data. Bottom plot: valid data not used to constrain fit (due to distance from a transit). Gaussian fits to the histograms are shown in red.

Open [./planet-01/planet-search-and-model-fitting-results/odd-even-transits-fit/005110407-01-odd-even-histo-all-and-unused.fig](#)

A.3 Eclipsing Binary Discrimination Test



Top-left: Diagnostic plot of Odd/Even Transit Depth Test for keplerId 5110407, planet 1. A significance level close to 1/0 favors a transiting planet/an eclipsing binary.
 Top-right: Diagnostic plot of Odd/Even Transit Epoch Test for keplerId 5110407, planet 1. A significance level close to 1/0 favors a transiting planet/an eclipsing binary.
 Open `./planet-01/binary-discrimination-test-results/005110407-01-eclipsing-binary-discrimination-tests.fig`

Appendix B Single Event Statistics from Residual Flux

No figures named 005110407-00-residual-ses-*.fig are available.

Appendix C Alerts

Time	Severity	Message
57416.8644	warning	Difference image cannot be generated because there were no transits for this planet candidate and target table (target=1, keplerId=5110407, planet=1, targetTable=21, component=generateDvDifferenceImages)
57416.8646	warning	Difference image cannot be generated because there were no transits for this planet candidate and target table (target=1, keplerId=5110407, planet=1, targetTable=26, component=generateDvDifferenceImages)
57416.8648	warning	Difference image cannot be generated because there were no clean transits for this planet candidate and target table (target=1, keplerId=5110407, planet=1, targetTable=29, component=generateDvDifferenceImages)
57416.8650	warning	Difference image cannot be generated because there were no transits for this planet candidate and target table (target=1, keplerId=5110407, planet=1, targetTable=32, component=generateDvDifferenceImages)
57416.8652	warning	Difference image cannot be generated because there were no transits for this planet candidate and target table (target=1, keplerId=5110407, planet=1, targetTable=41, component=generateDvDifferenceImages)
57416.8654	warning	Difference image cannot be generated because there were no transits for this planet candidate and target table (target=1, keplerId=5110407, planet=1, targetTable=44, component=generateDvDifferenceImages)
57416.8656	warning	Difference image cannot be generated because there were no transits for this planet candidate and target table (target=1, keplerId=5110407, planet=1, targetTable=50, component=generateDvDifferenceImages)
57416.8657	warning	Difference image cannot be generated because there were no transits for this planet candidate and target table (target=1, keplerId=5110407, planet=1, targetTable=53, component=generateDvDifferenceImages)
57416.8659	warning	Difference image cannot be generated because there were no transits for this planet candidate and target table (target=1, keplerId=5110407, planet=1, targetTable=62, component=generateDvDifferenceImages)
57416.8661	warning	Difference image cannot be generated because there were no transits for this planet candidate and target table (target=1, keplerId=5110407, planet=1, targetTable=68, component=generateDvDifferenceImages)
57416.8661	warning	Multi-quarter PRF fitting and offset analysis will not be performed because model fit SNR is above specified threshold (target=1, keplerId=5110407, planet=1, component=generateDvDifferenceImages)
57416.8677	warning	No centroid data available. Centroid test results set to default values for all planets. (target=1, keplerId=5110407, component=Centroid test prf)
57416.8797	warning	Pixel correlation test is disabled (target=1, keplerId=5110407, component=Pixel correlation test)