

KIC 002438513

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	R_{\star} (R_{\odot})	T_{\star} (K)	R_p (R_{\oplus})	S_p (S_{\oplus})
002438513-01	OBS	1944.01	12.184231	139.054042	483.7	2.474	25.8	29.2	1.07	5771	2.55	106.63
002438513-02	OBS	1944.02	8.360724	138.813447	152.8	6.959	12.6	12.8	1.07	5771	1.57	176.18

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002438513-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
002438513-02	OBS	FP	0.00	0	0	1	1	CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

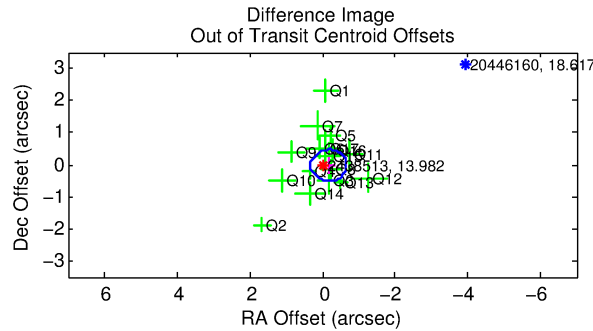
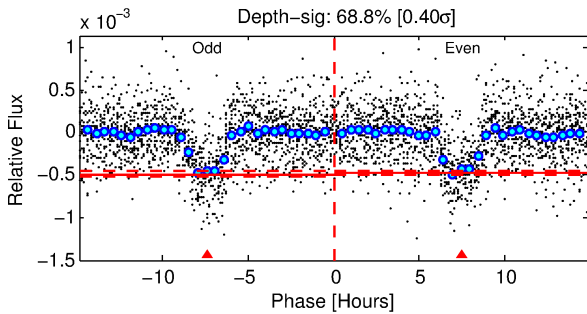
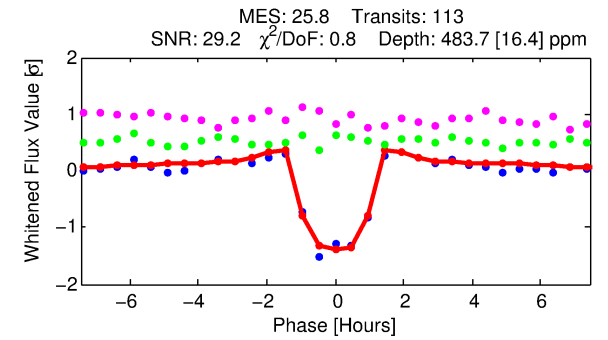
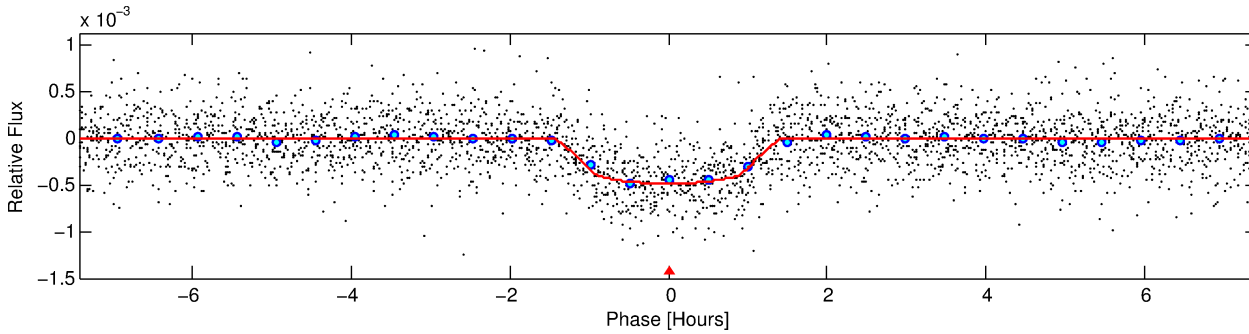
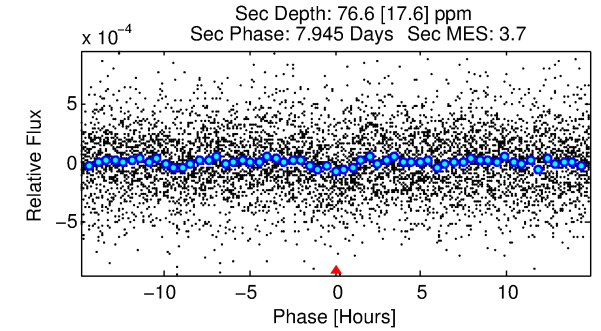
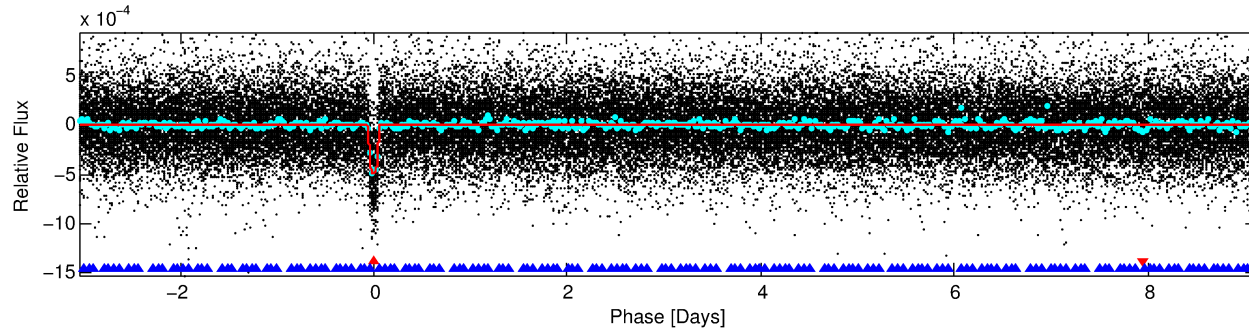
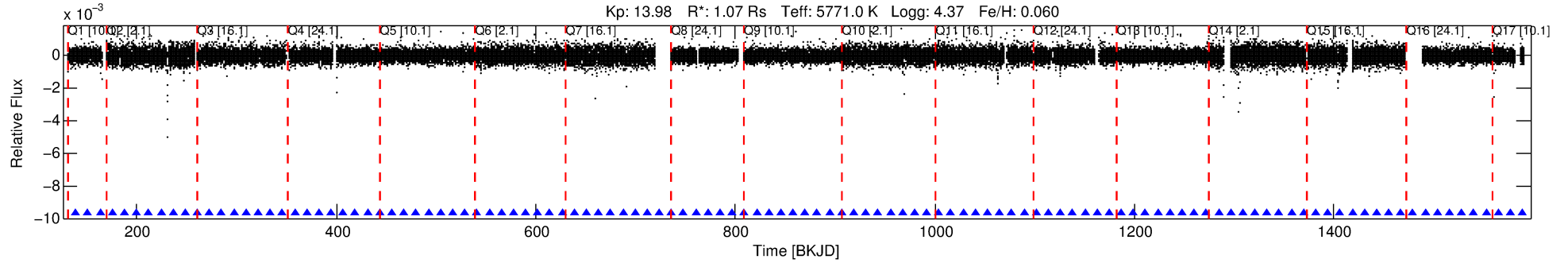
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 002438513-01

No Significant Match Found

DV One-Page Summary

KIC: 2438513 Candidate: 1 of 2 Period: 12.184 d
KOI: K01944.01 Corr: 0.979



DV Fit Results:

Period = 12.18423 [0.00002] d
Epoch = 139.0540 [0.0016] BKJD
Rp/R* = 0.0218 [0.0077]
a/R* = 26.51 [40.66]
b = 0.74 [0.95]
Seff = 106.63 [21.97]
T_{eq} = 819 [42] K
Rp = 2.55 [0.97] Re
a = 0.1031 [0.0133] AU
Ag = 69.15 [52.86] [1.29σ]
T_{eff} = 3653 [680] K [4.16σ]

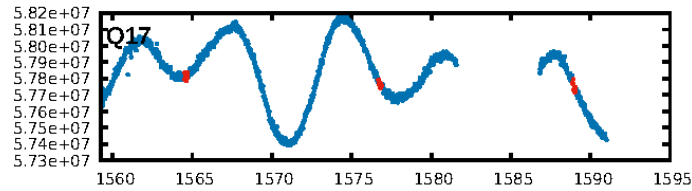
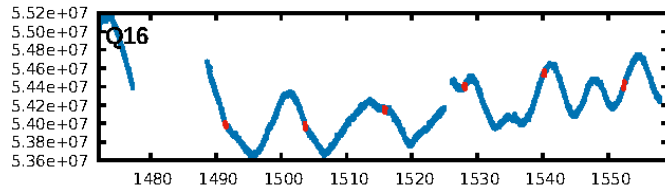
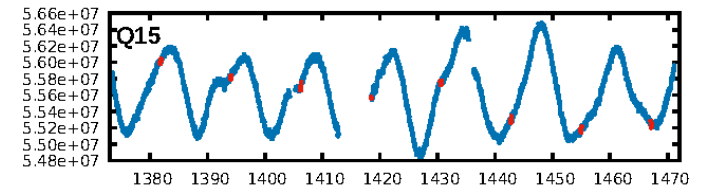
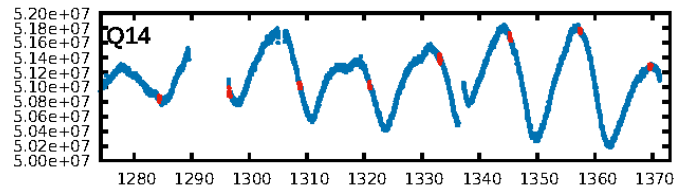
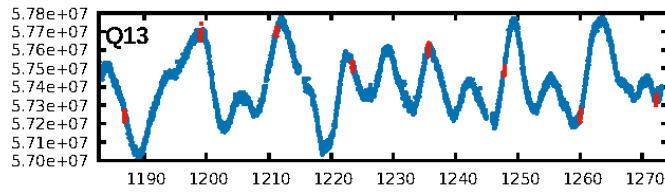
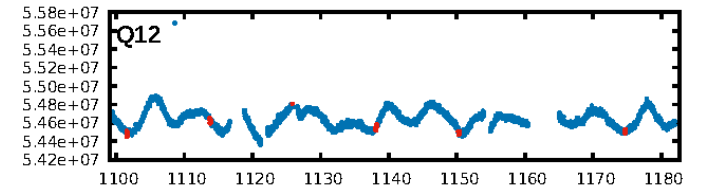
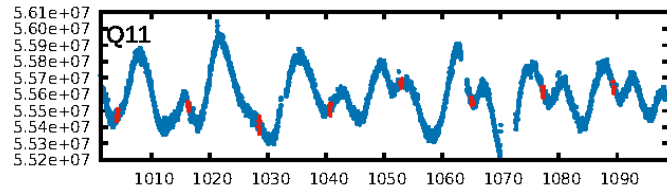
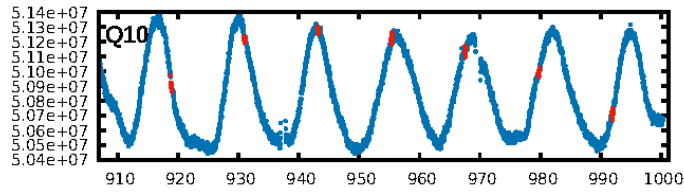
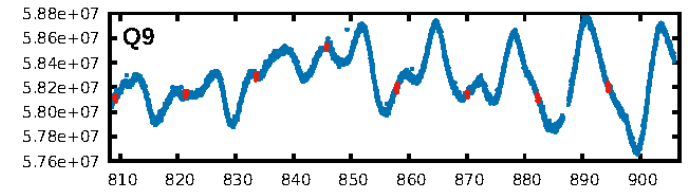
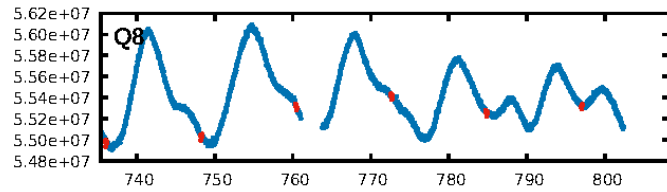
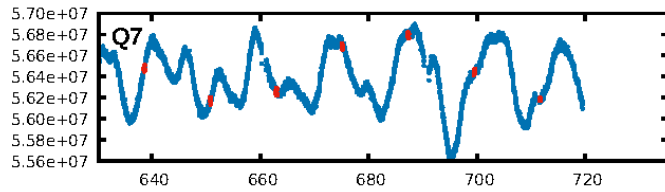
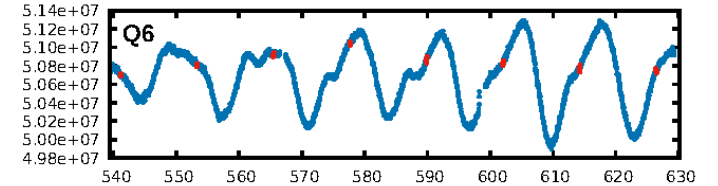
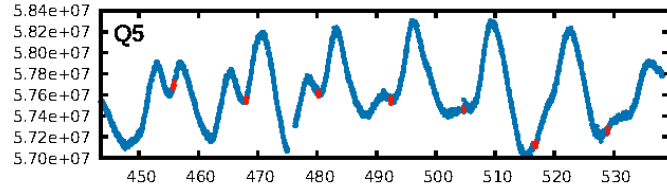
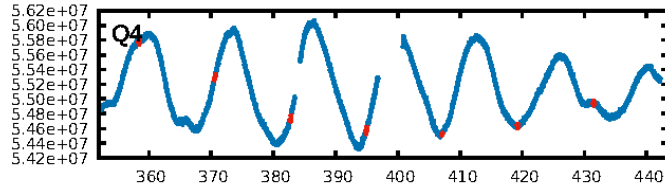
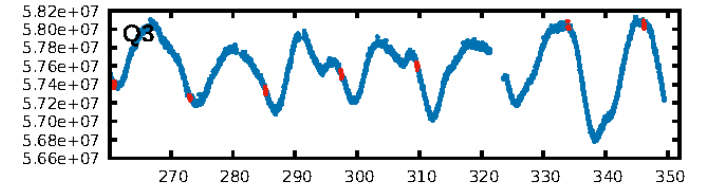
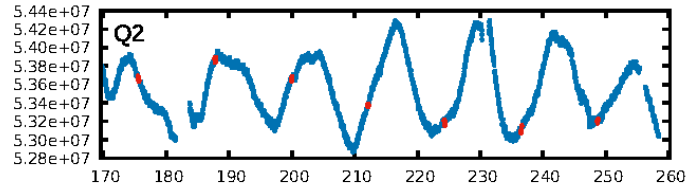
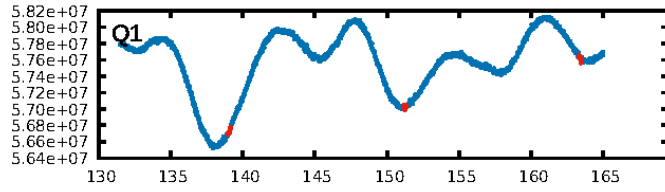
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [12.42σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 100.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.54e-127
RollingBand-fgt: 1.00 [107/107]
GhostDiagnostic-chr: 5.697
Centroid-sig: 0.3%
Centroid-so: 0.454 arcsec [1.19σ]
OotOffset-rm: 0.173 arcsec [1.06σ]
KicOffset-rm: 0.202 arcsec [1.24σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 1.00 [17/17]

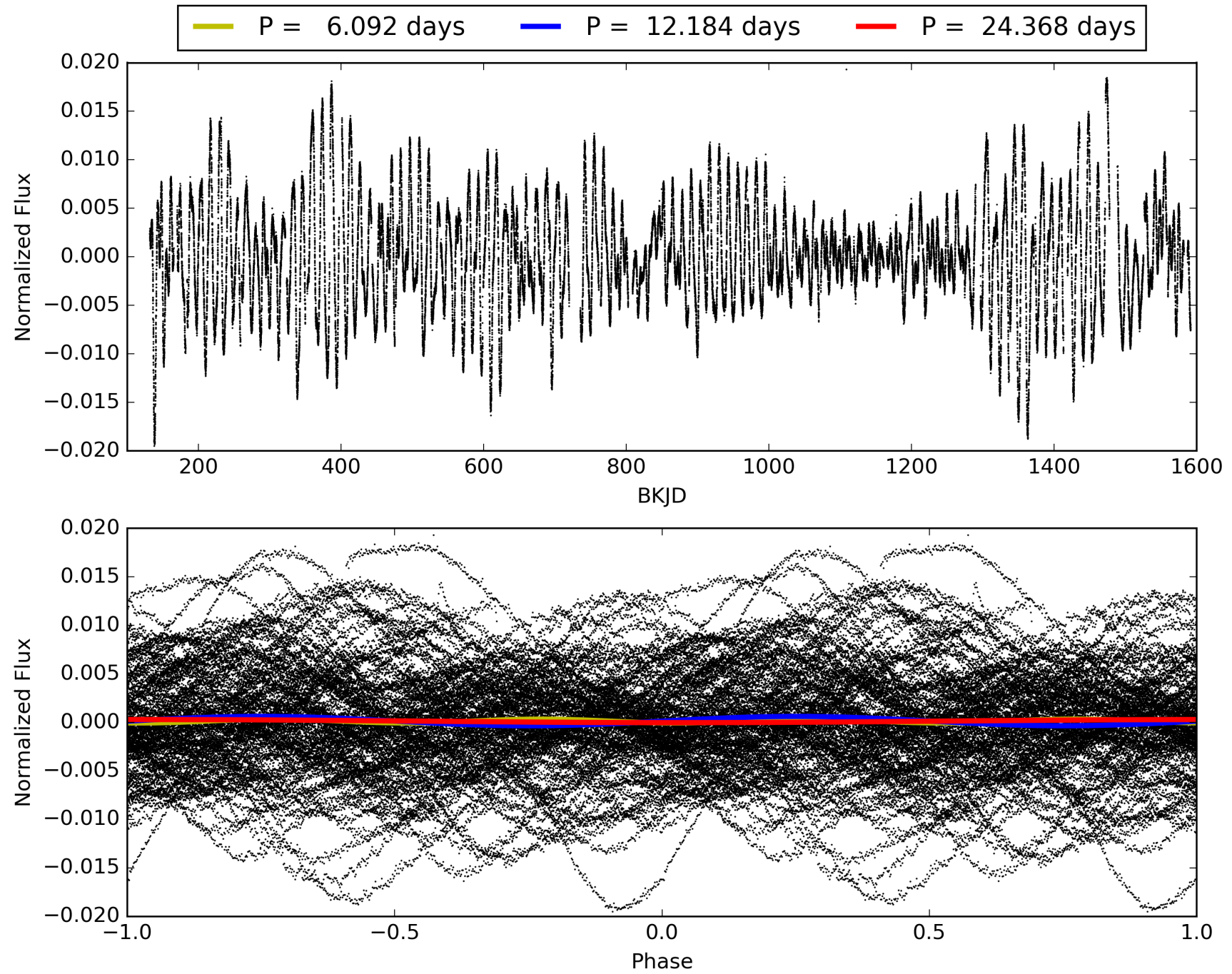
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 19:07:20 Z

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

TCE 002438513-01, PDC Light Curves

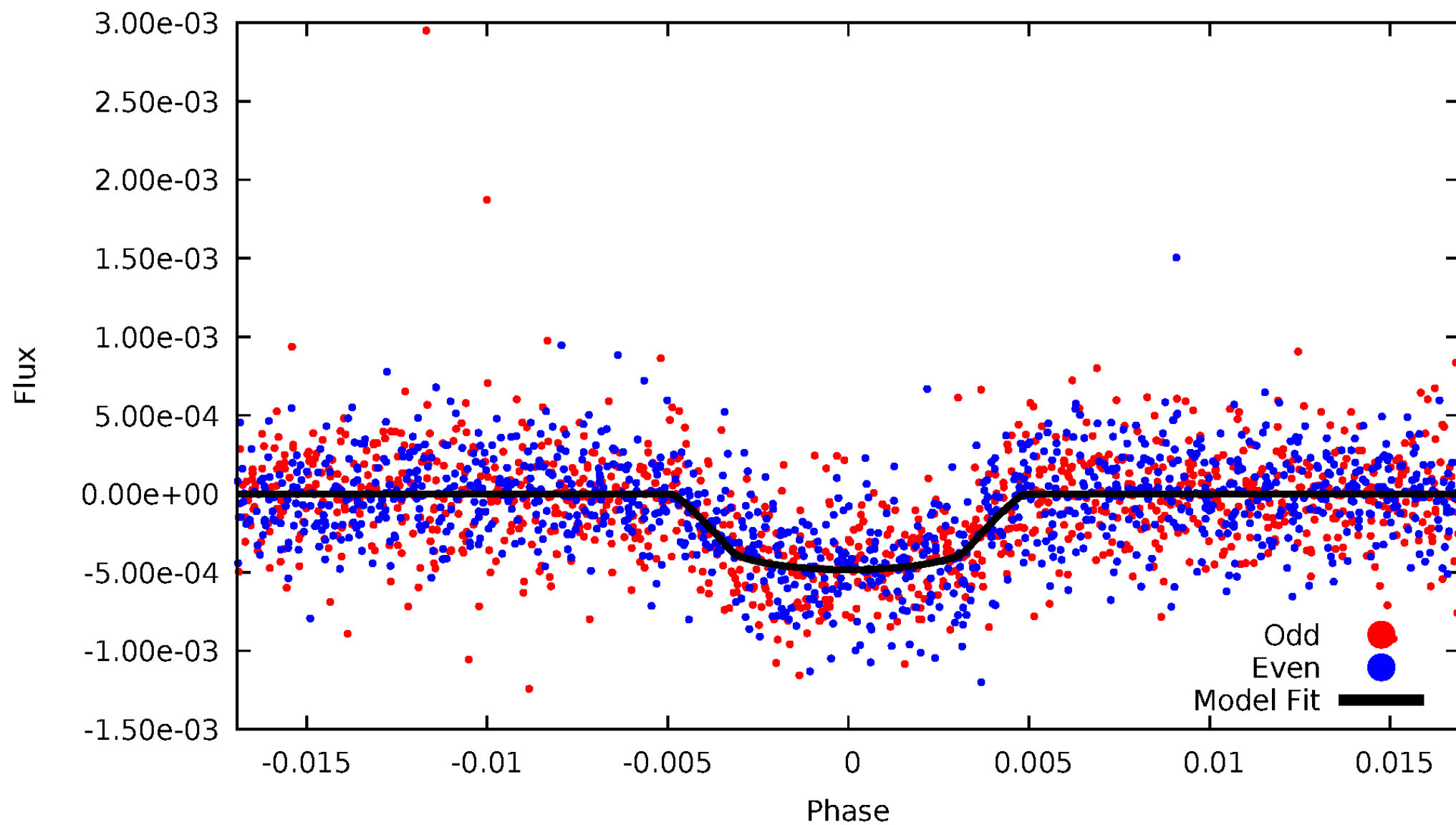


TCE 002438513-01



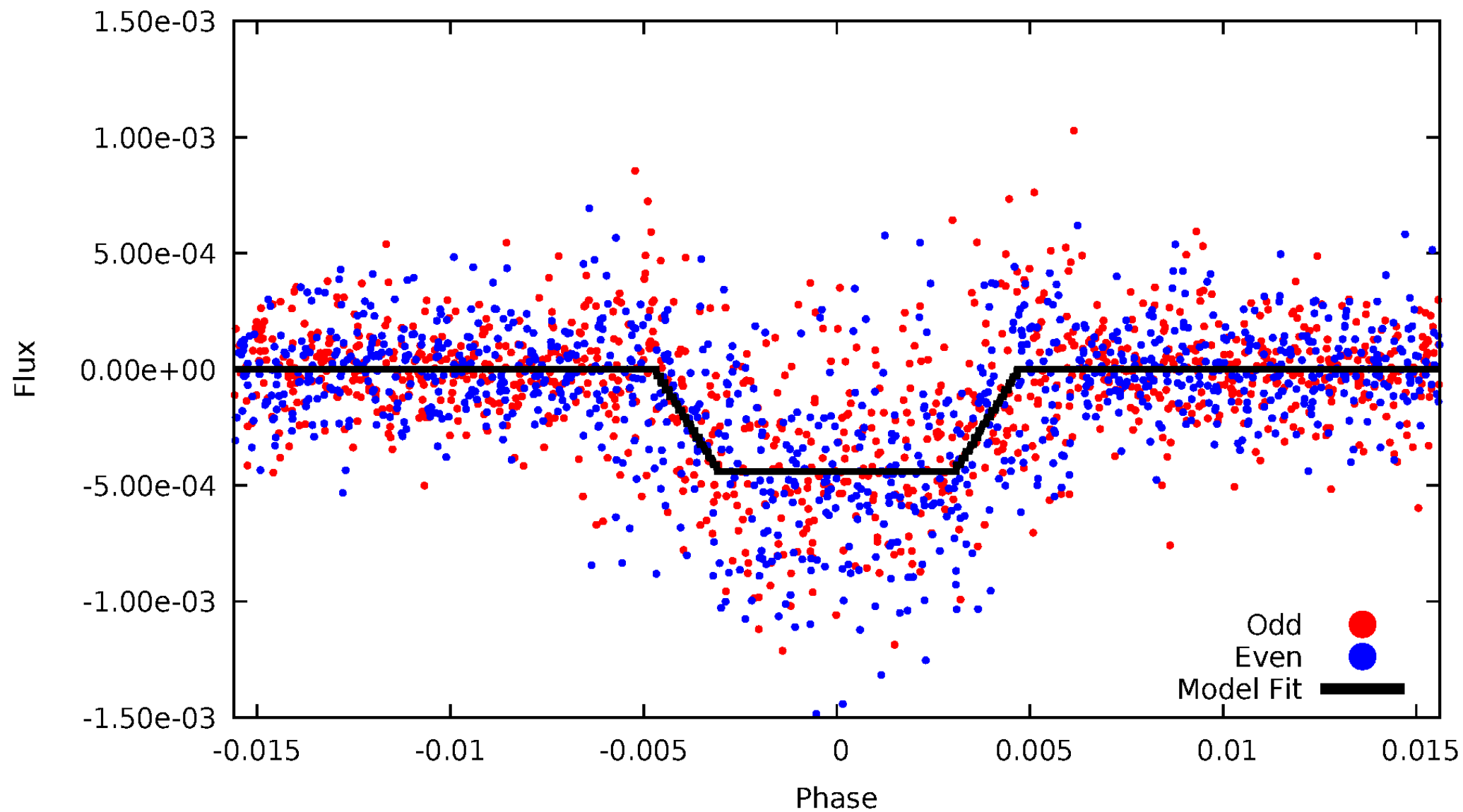
DV Odd/Even

TCE 002438513-01

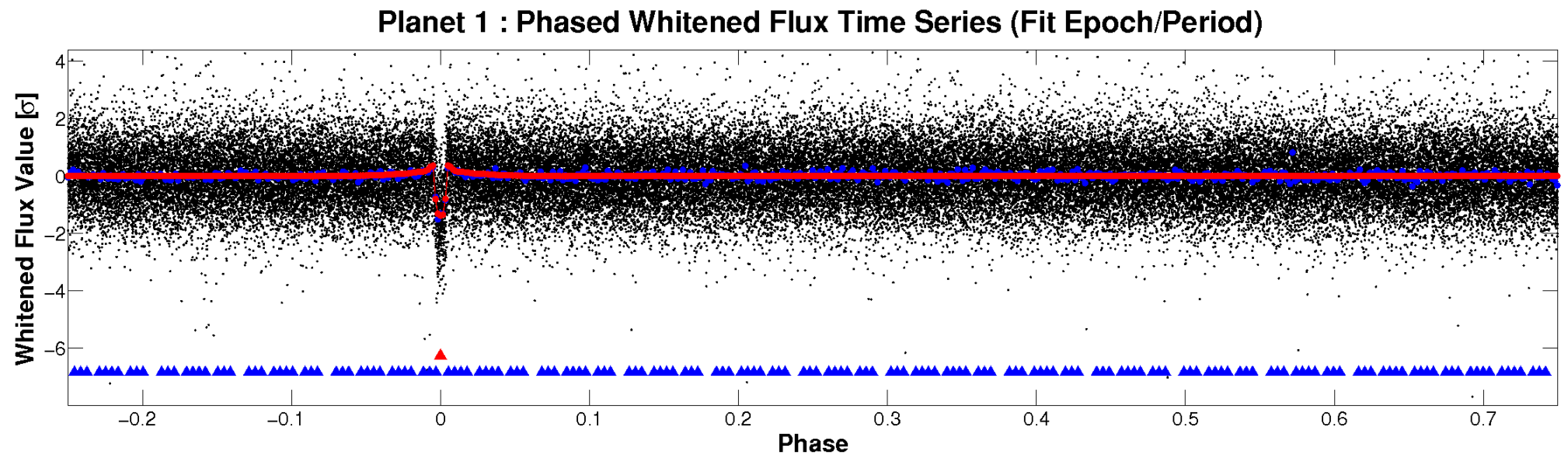
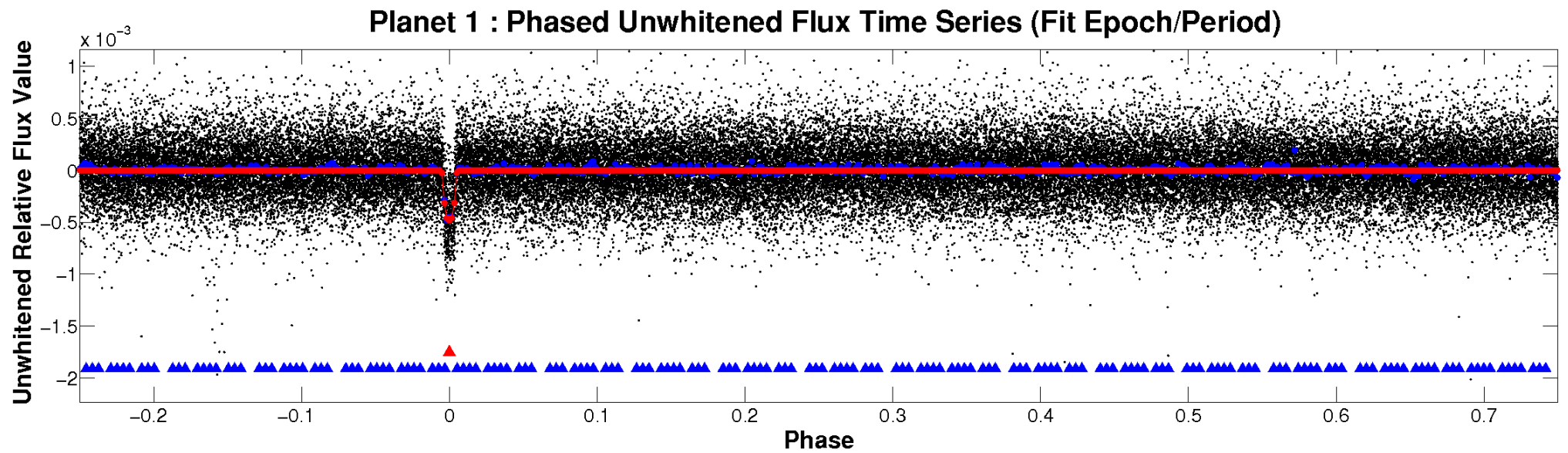


ALT Odd/Even

TCE 002438513-01

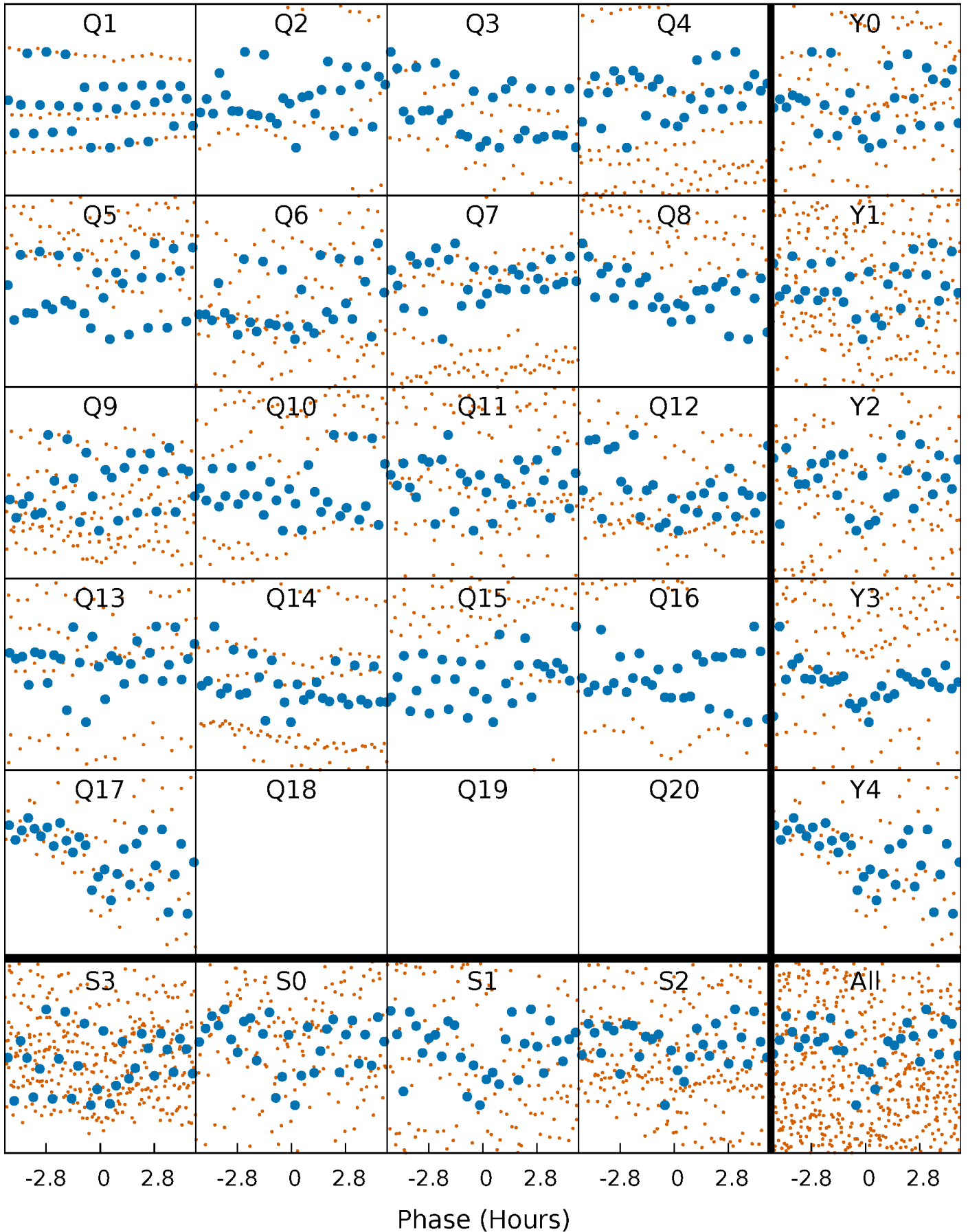


Non-Whitened Vs. Whitened Light Curve



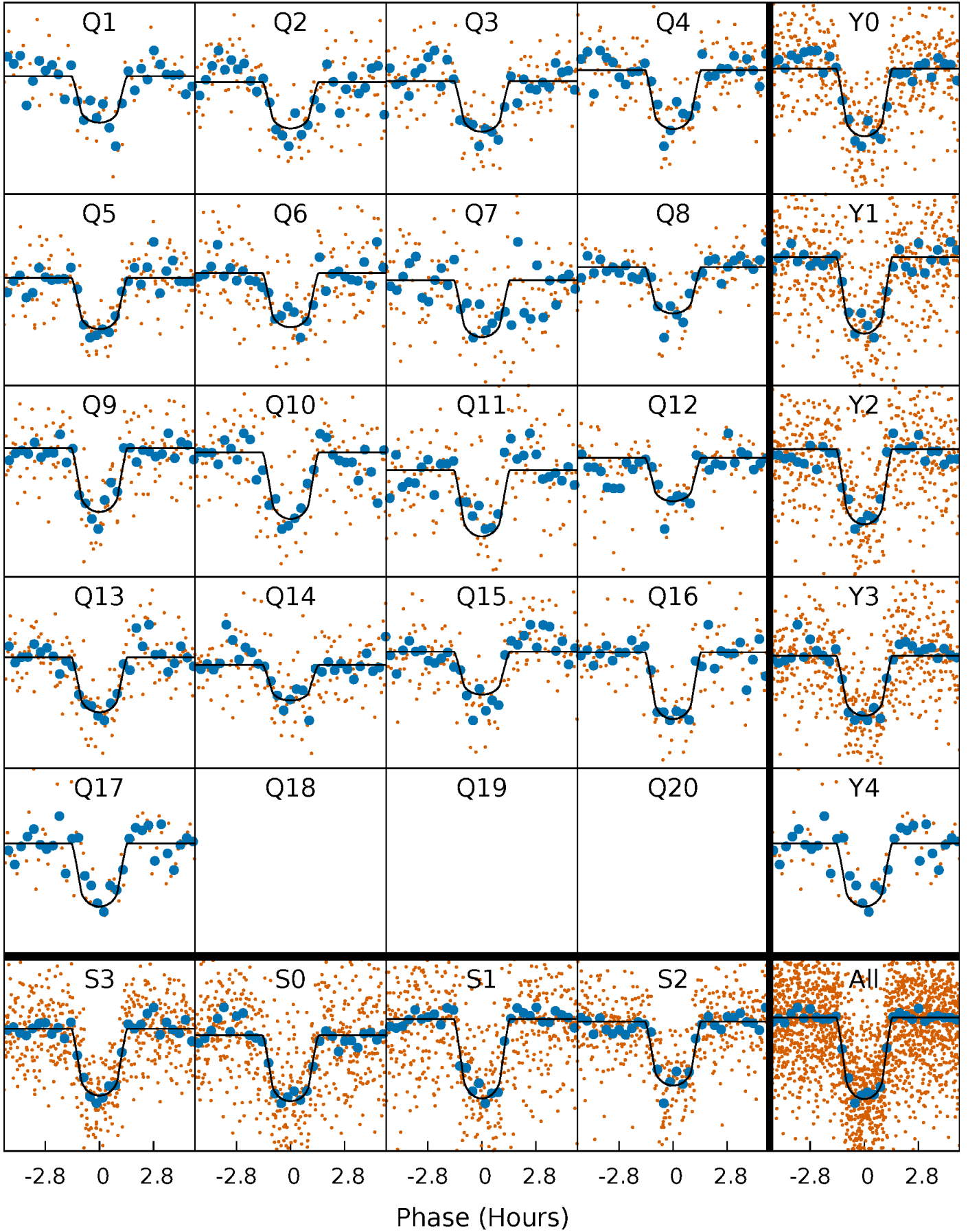
PDC Quarter-Phased Transit Curves

TCE 002438513-01 P= 12.184231 Days $T_0=139.054042$ (BKJD)



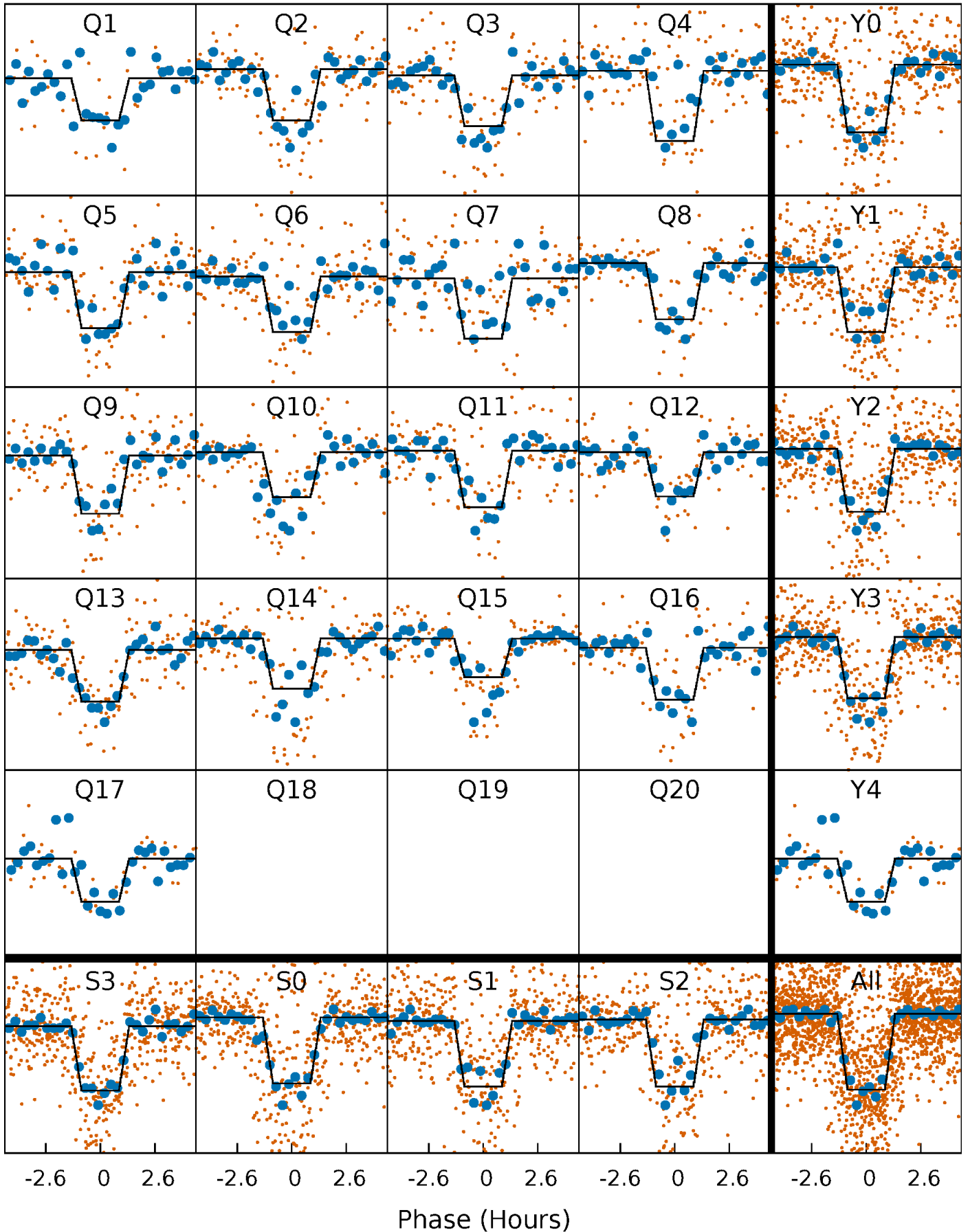
DV Quarter-Phased Transit Curves

TCE 002438513-01 P= 12.184231 Days $T_0=139.054042$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

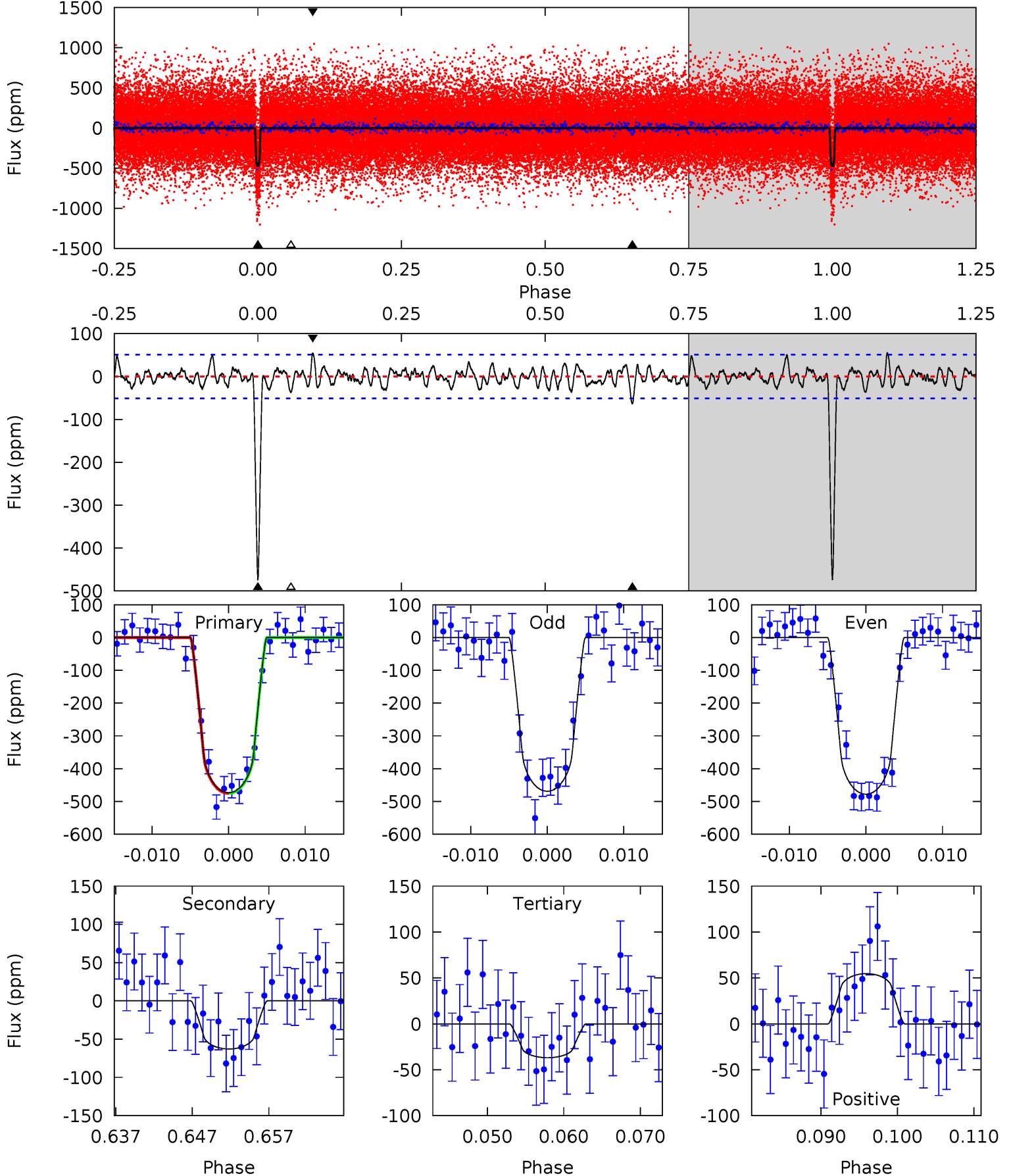
TCE 002438513-01 P= 12.184222 Days $T_0=139.055219$ (BKJD)



DV Model-Shift Uniqueness Test

002438513-01, P = 12.184231 Days, E = 126.869811 Days

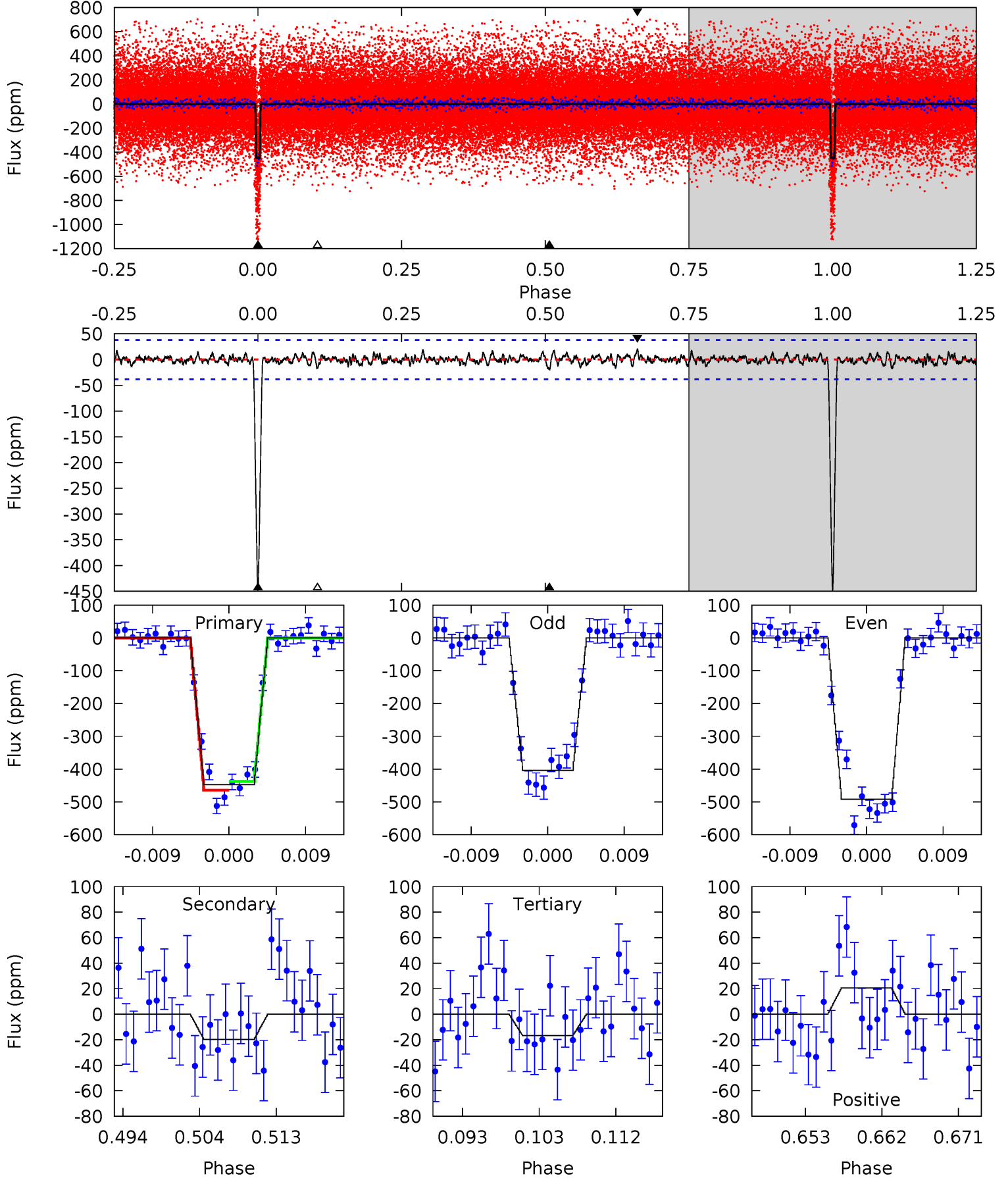
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
46.7	6.20	3.64	5.39	5.03	2.58	1.50	43.0	41.3	2.56	0.81	0.45	1.00	0.10	0.00



Alt Model-Shift Uniqueness Test

002438513-01, P = 12.184222 Days, E = 126.870997 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
59.2	2.62	2.22	2.72	5.04	2.60	0.76	57.0	56.5	0.40	-0.10	5.82	0.98	0.04	1.79



Stellar Parameters For KIC 002438513

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5771^{+104}_{-115}	$4.374^{+0.105}_{-0.105}$	$0.060^{+0.150}_{-0.150}$	$1.068^{+0.161}_{-0.120}$	$0.984^{+0.072}_{-0.065}$	$1.139^{+0.446}_{-0.378}$
	+2%/-2%	+2%/-2%	+250%/-250%	+15%/-11%	+7%/-7%	+39%/-33%
Source	SPE58	SPE58	SPE58	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 002438513-01 / KOI 1944.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-63 ± 10	$2.55^{+0.88}_{-0.98}$	1142^{+48}_{-46}	3850^{+699}_{-395}	59^{+89}_{-29}
Alt.	-20 ± 8	$2.41^{+0.87}_{-0.87}$	1140^{+51}_{-45}	3197^{+523}_{-324}	19^{+30}_{-10}

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)

A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

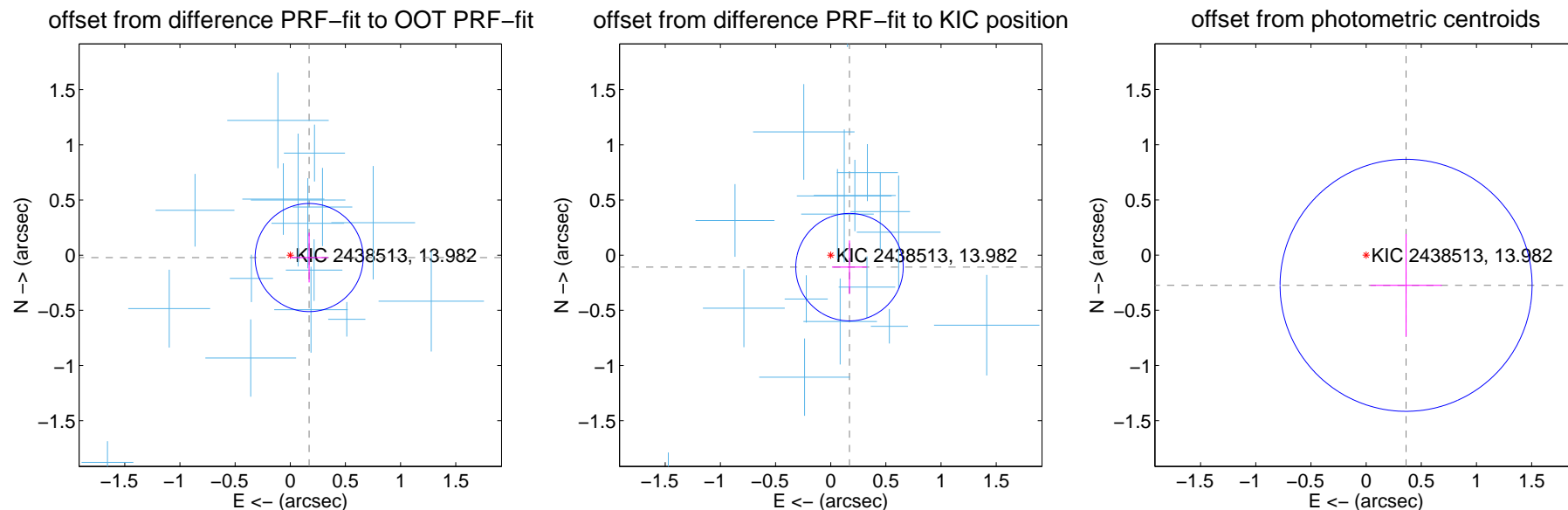
DV Centroid Data

Supplemental centroid analysis for 002438513-01. Kepler magnitude: 13.98. Transit SNR 29.24

There are 17 quarters with good PRF difference image offsets

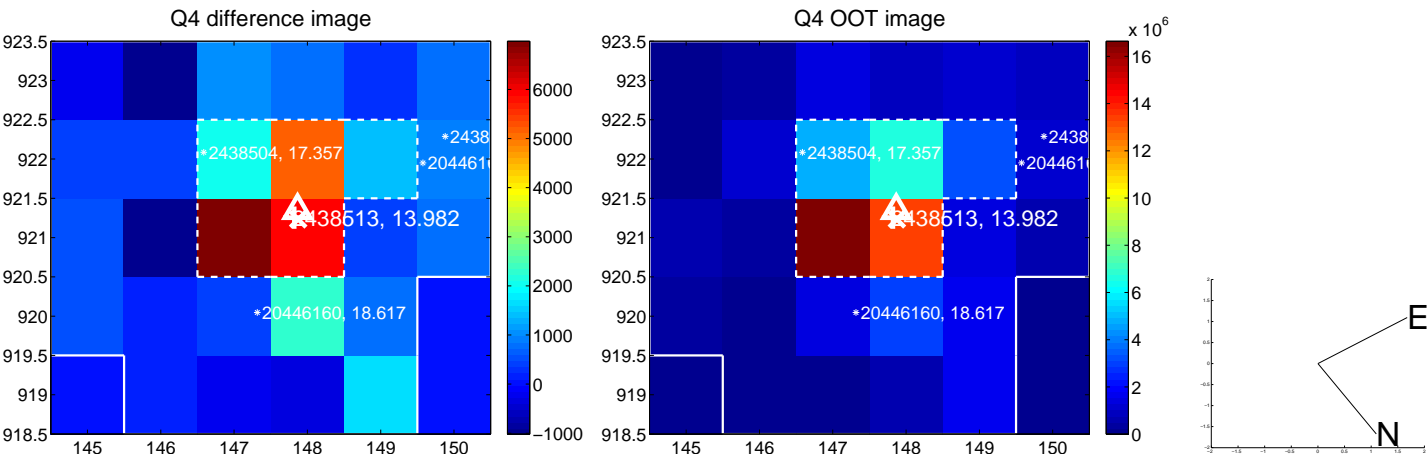
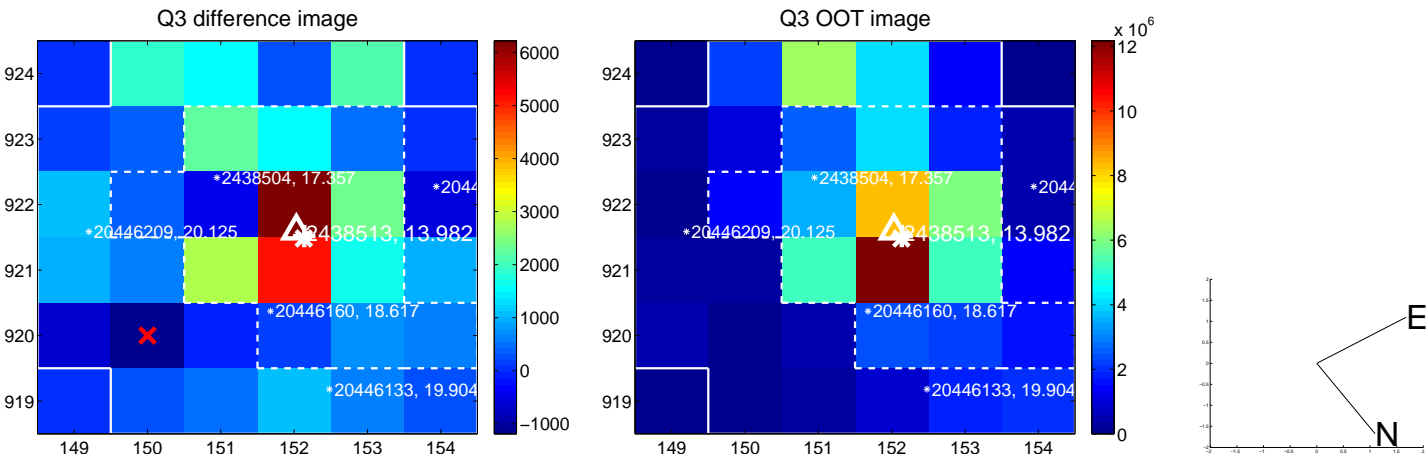
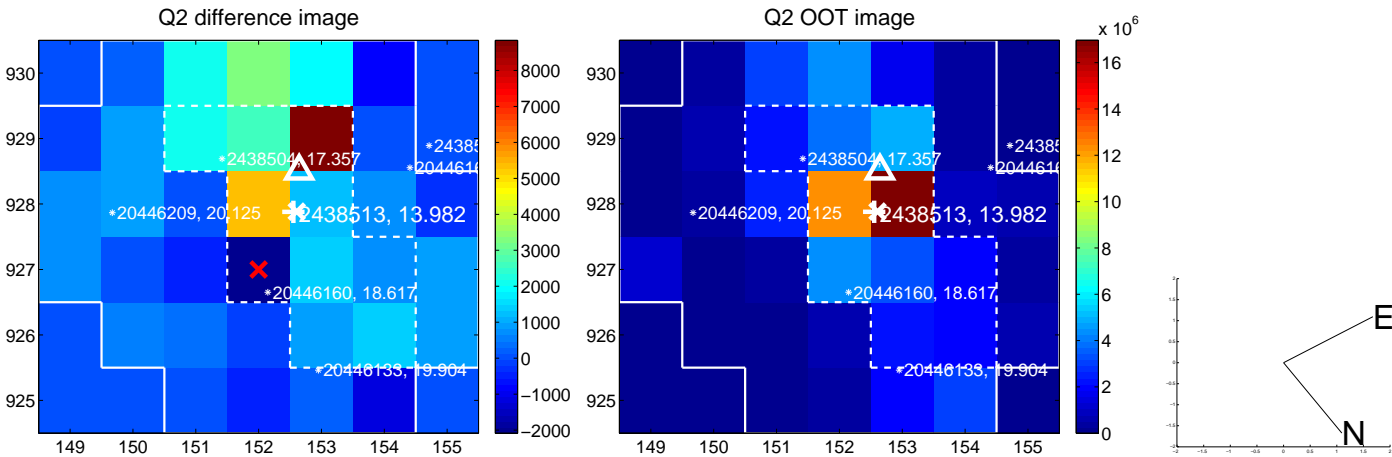
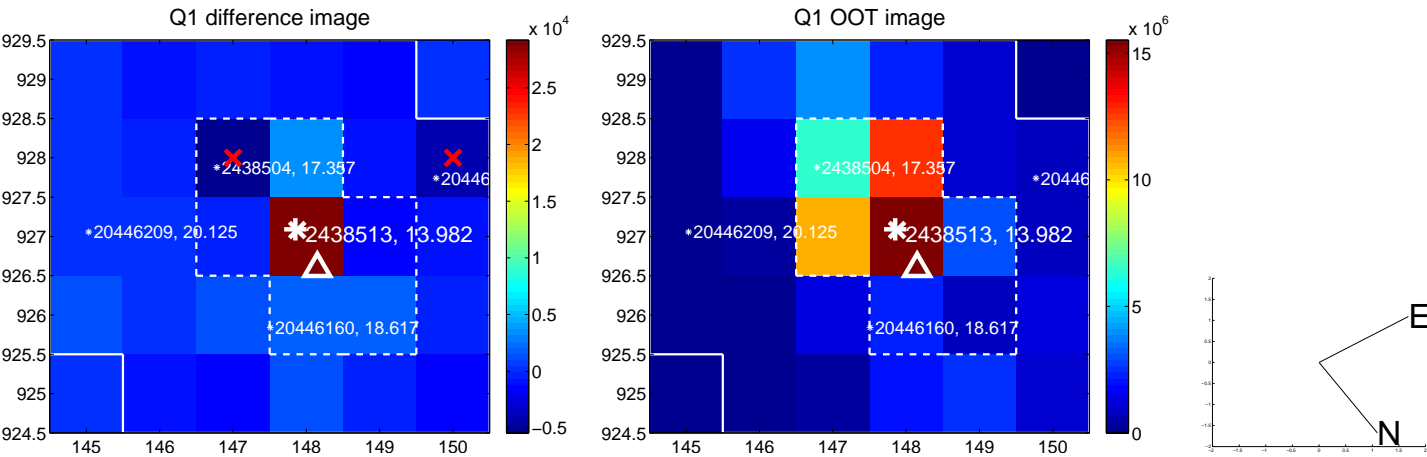
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.173 ± 0.163	1.06	-0.171 ± 0.172	-0.022 ± 0.225
PRF-fit source offset from KIC position	0.202 ± 0.162	1.24	-0.170 ± 0.158	-0.109 ± 0.243
photometric centroid source offset	0.45 ± 0.38	1.19	-0.36 ± 0.32	-0.27 ± 0.46

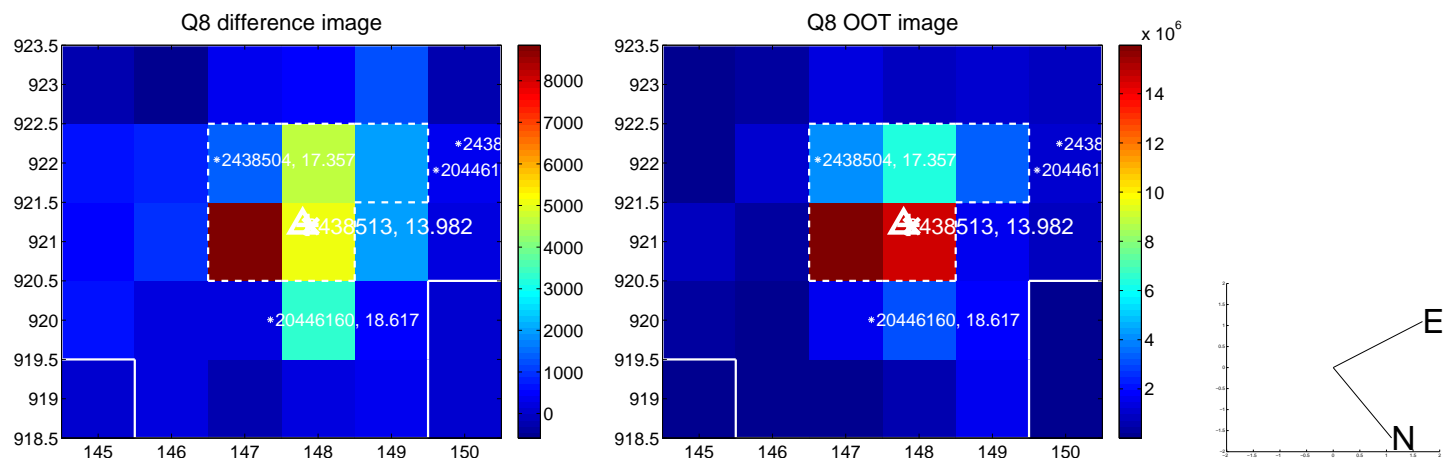
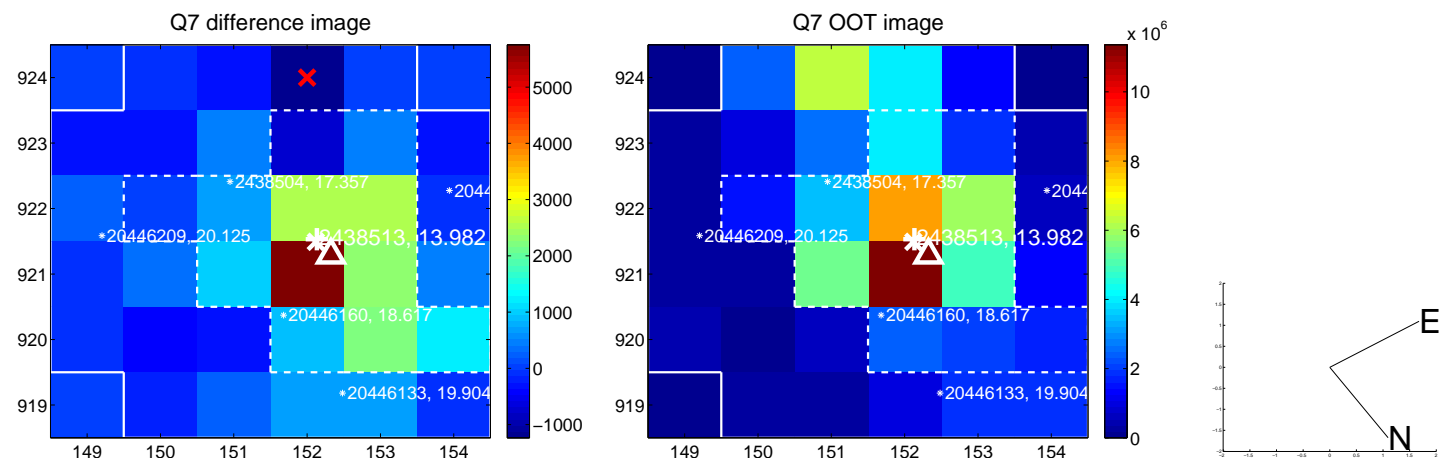
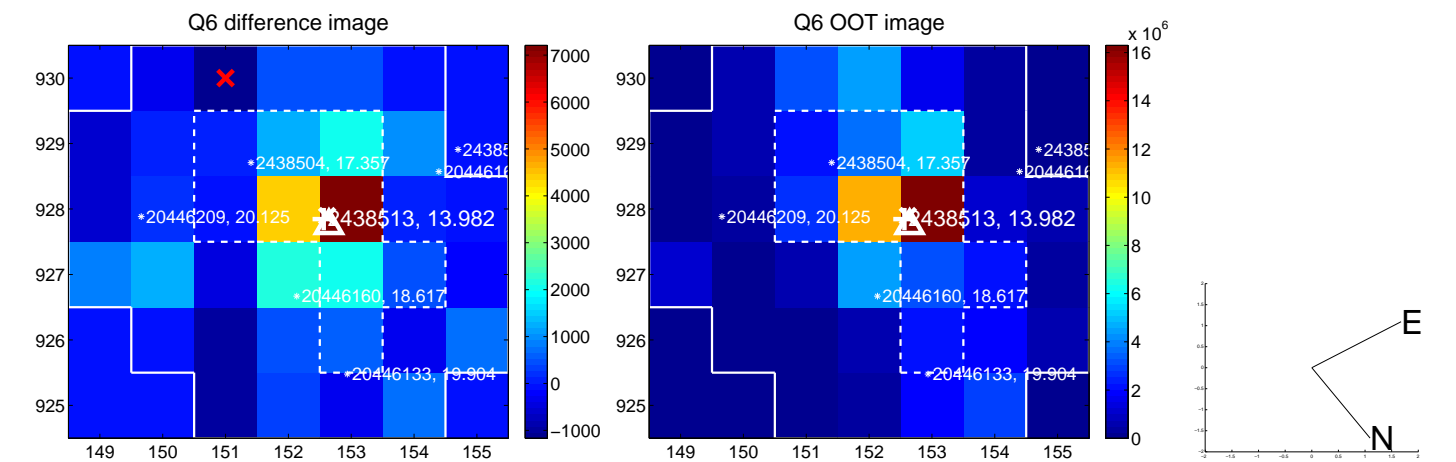
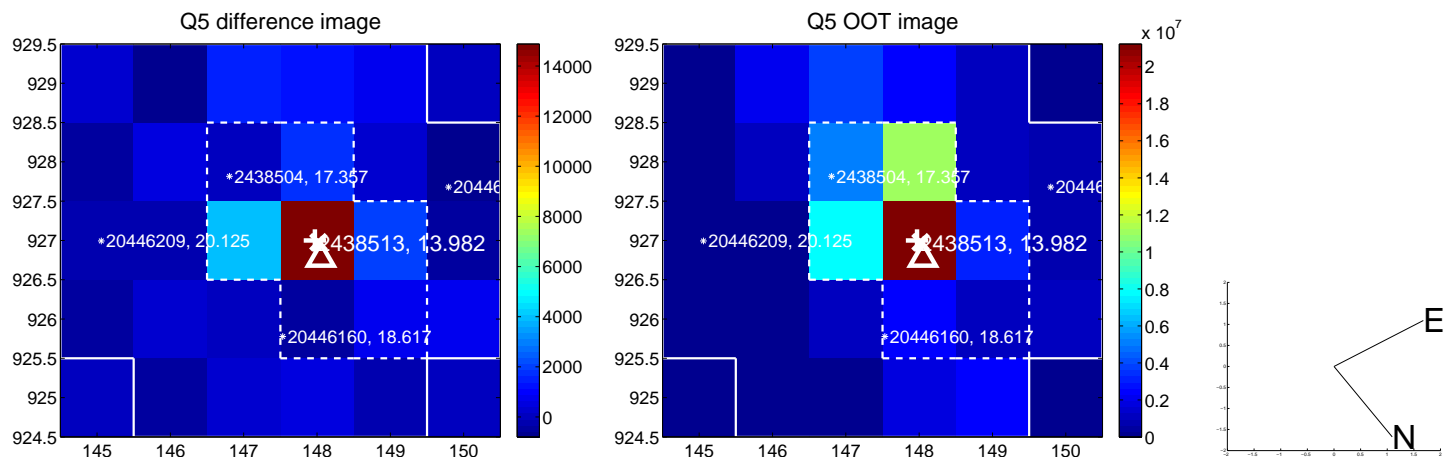


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

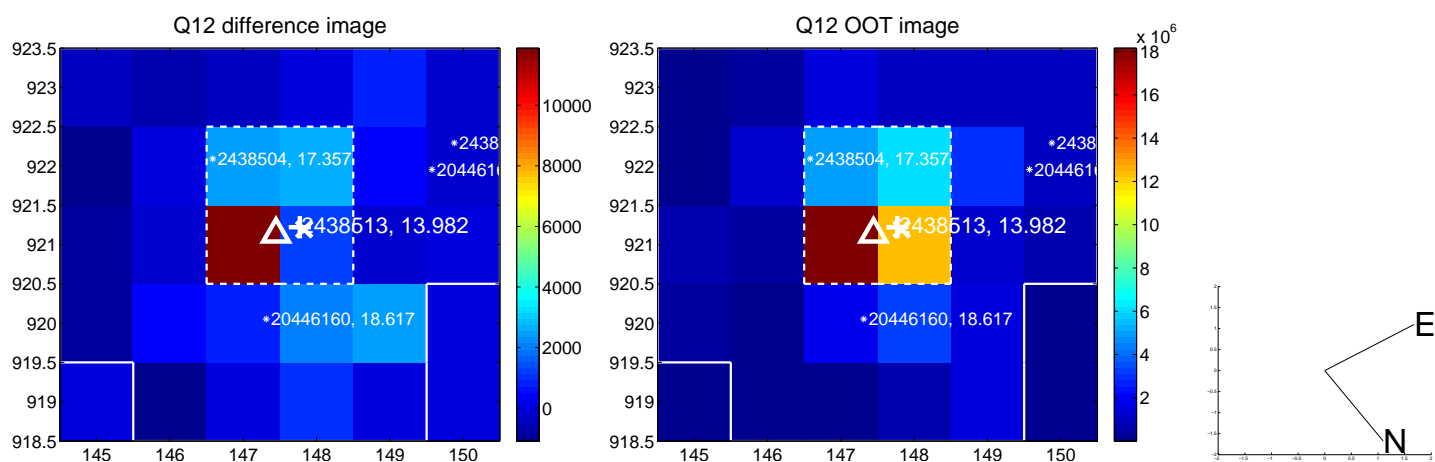
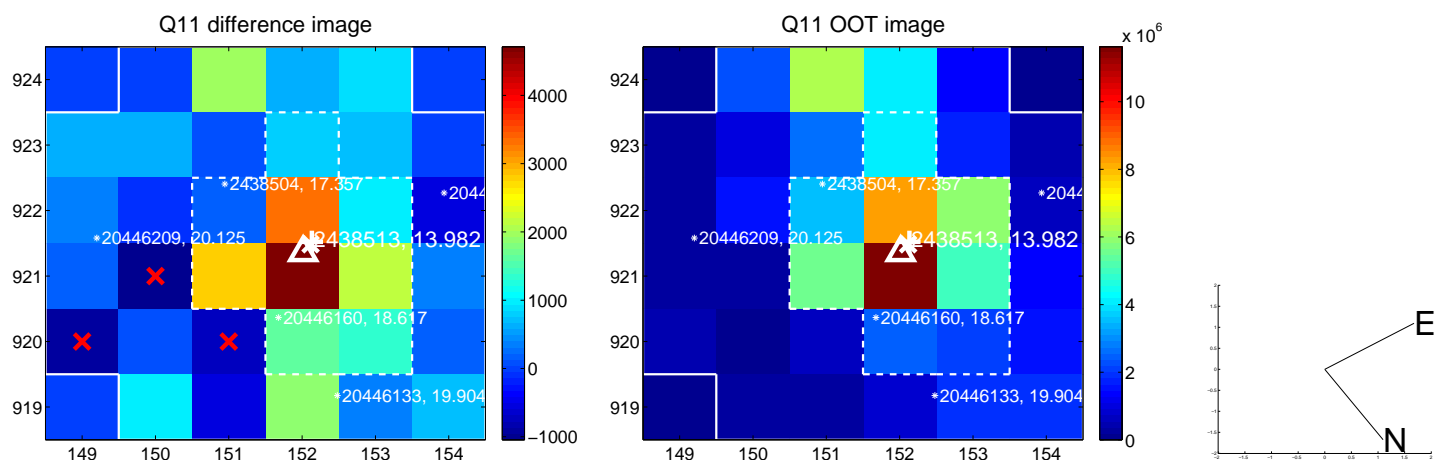
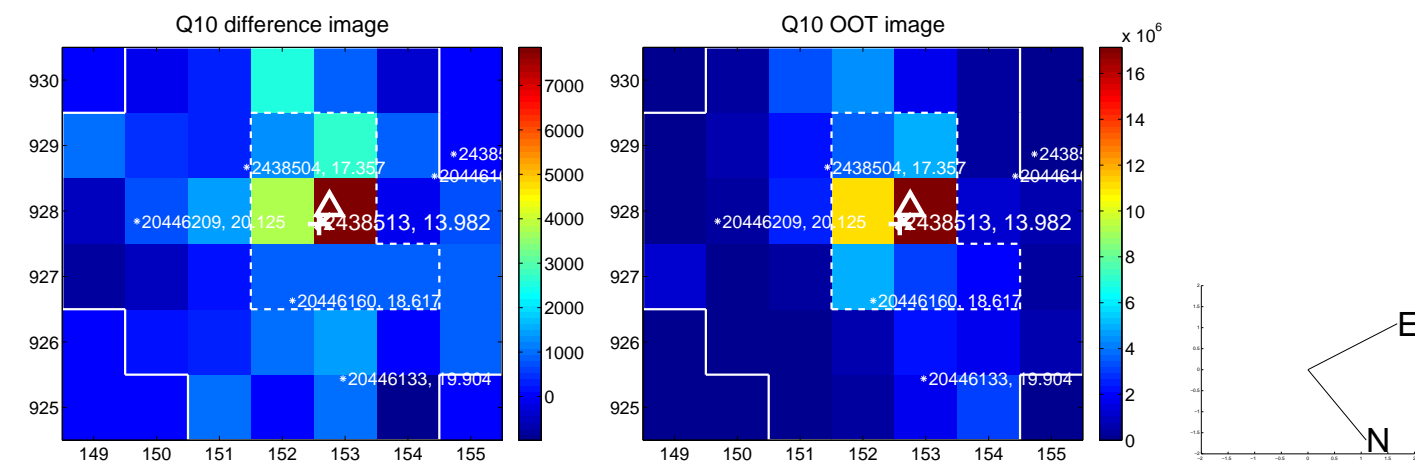
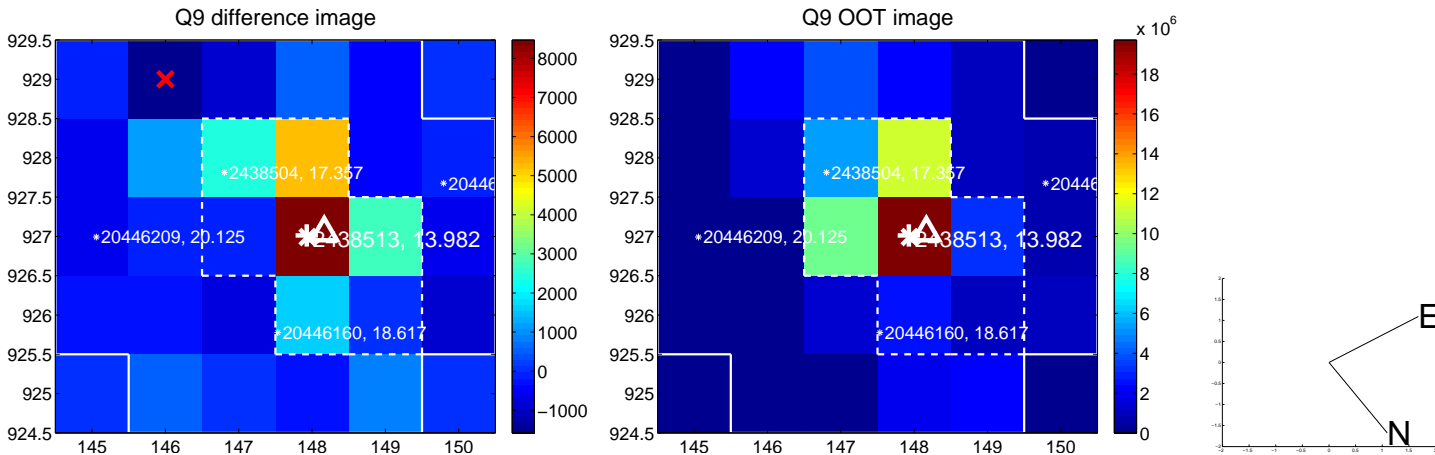
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



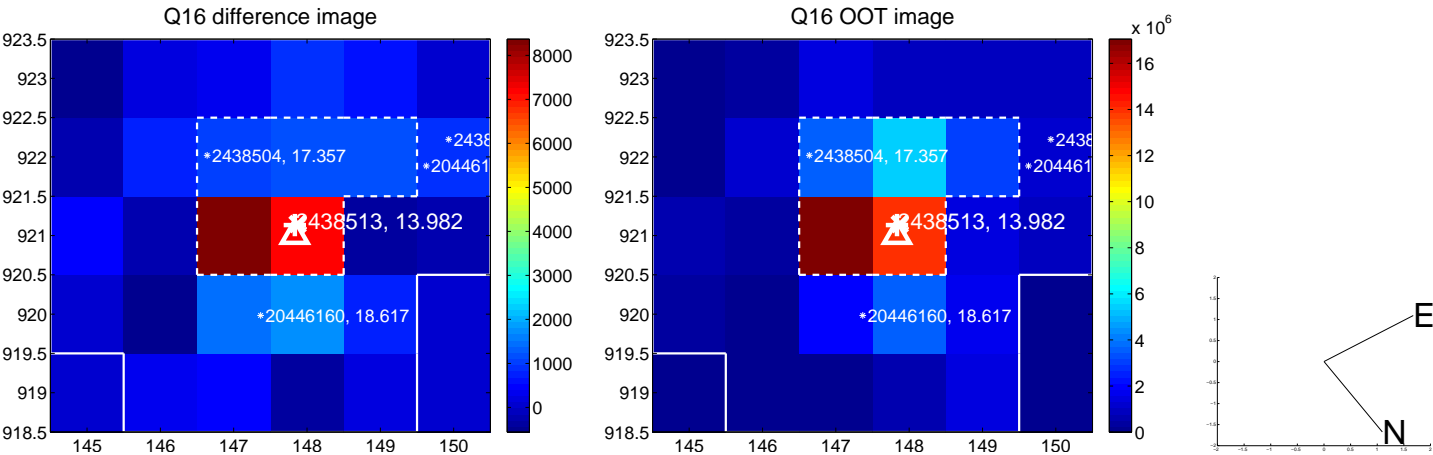
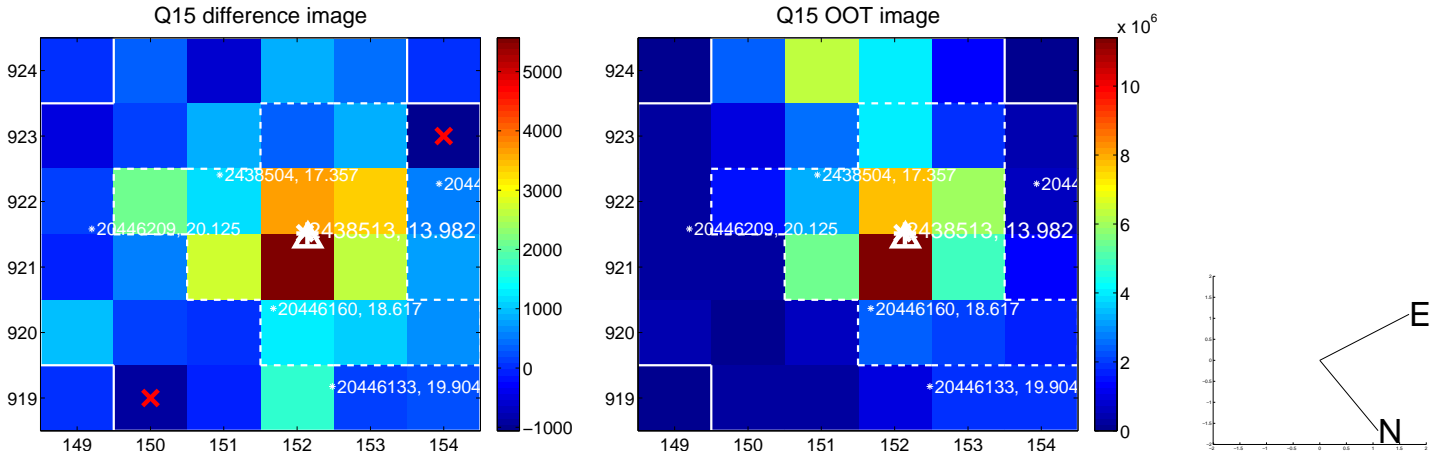
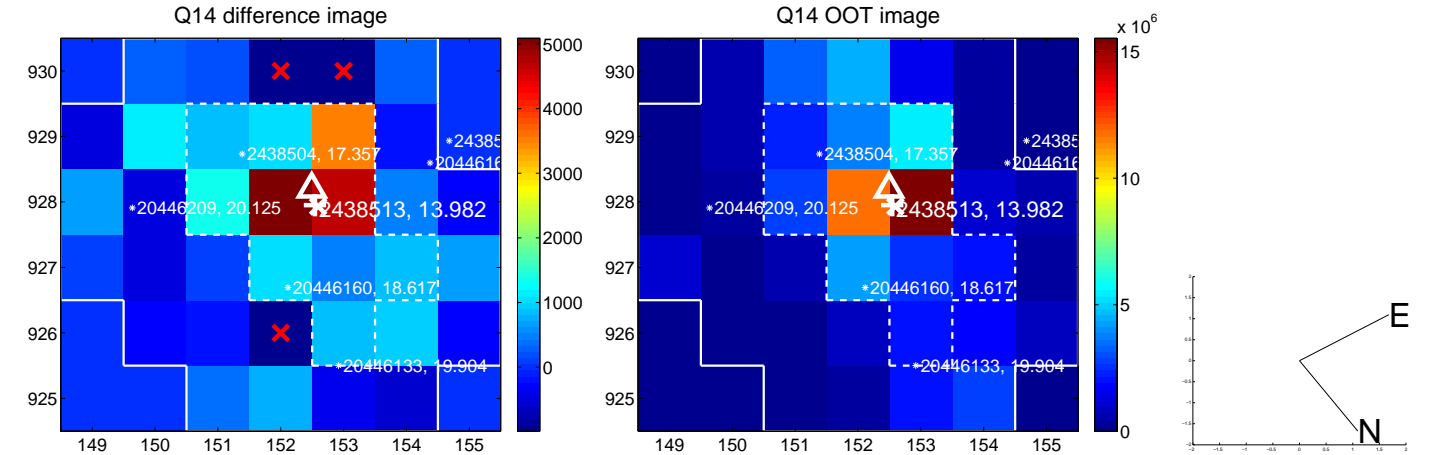
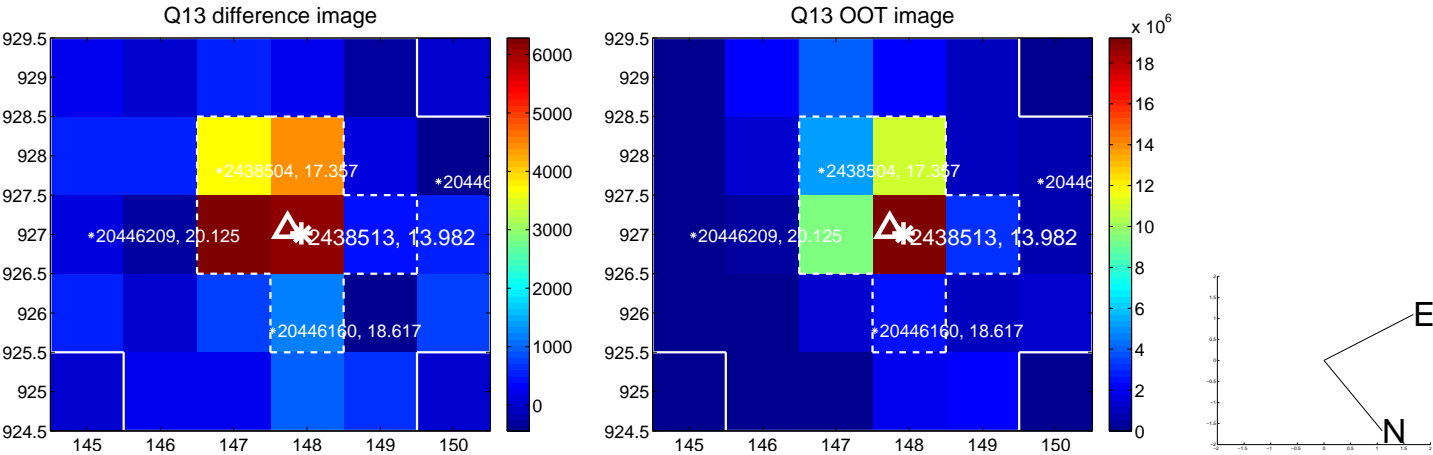
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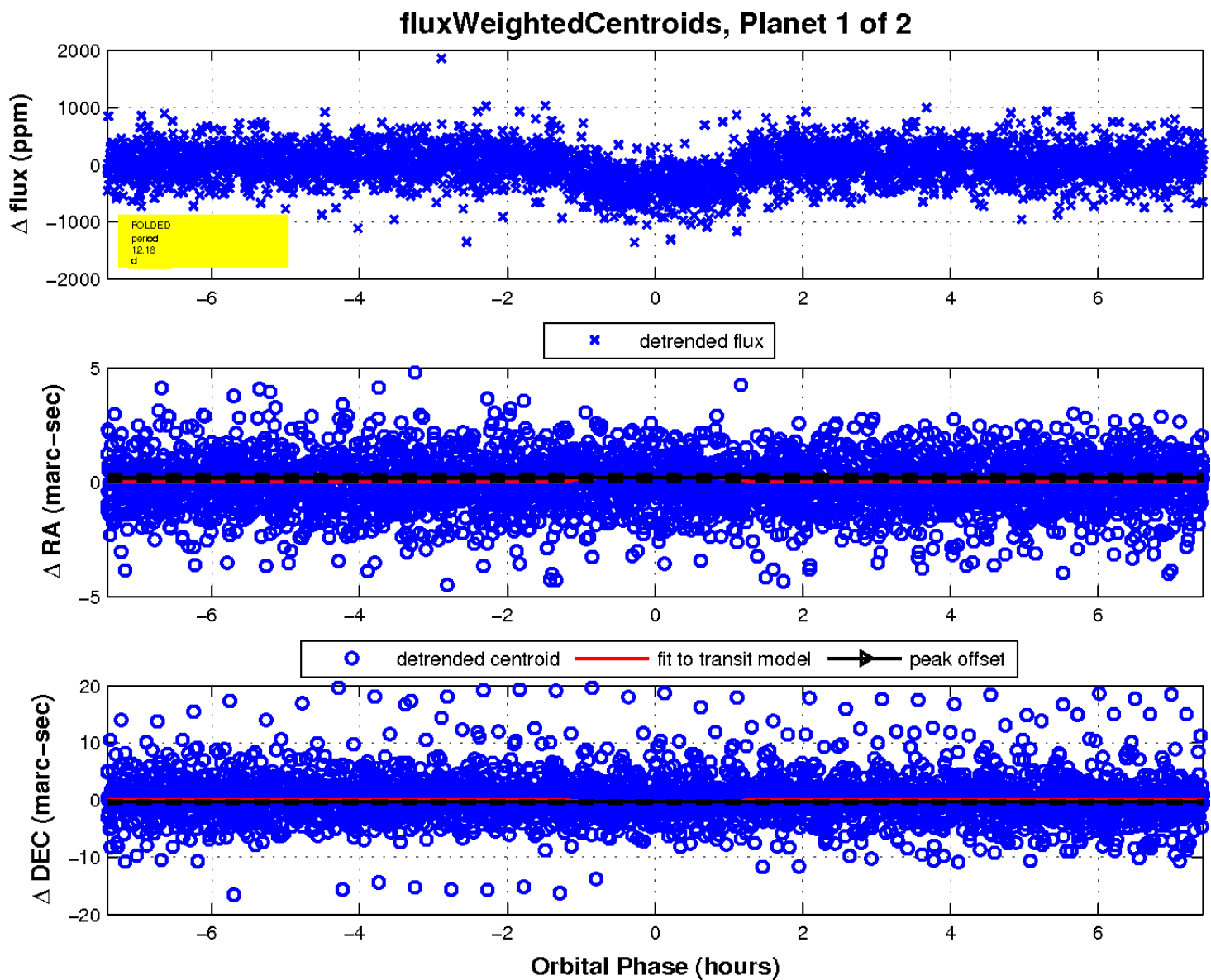
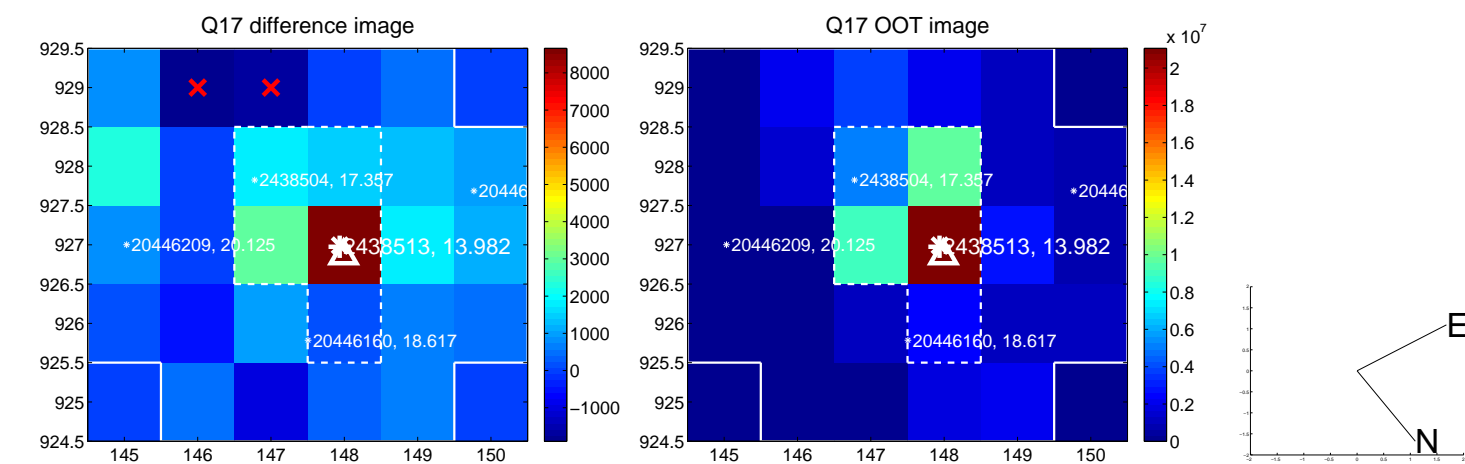
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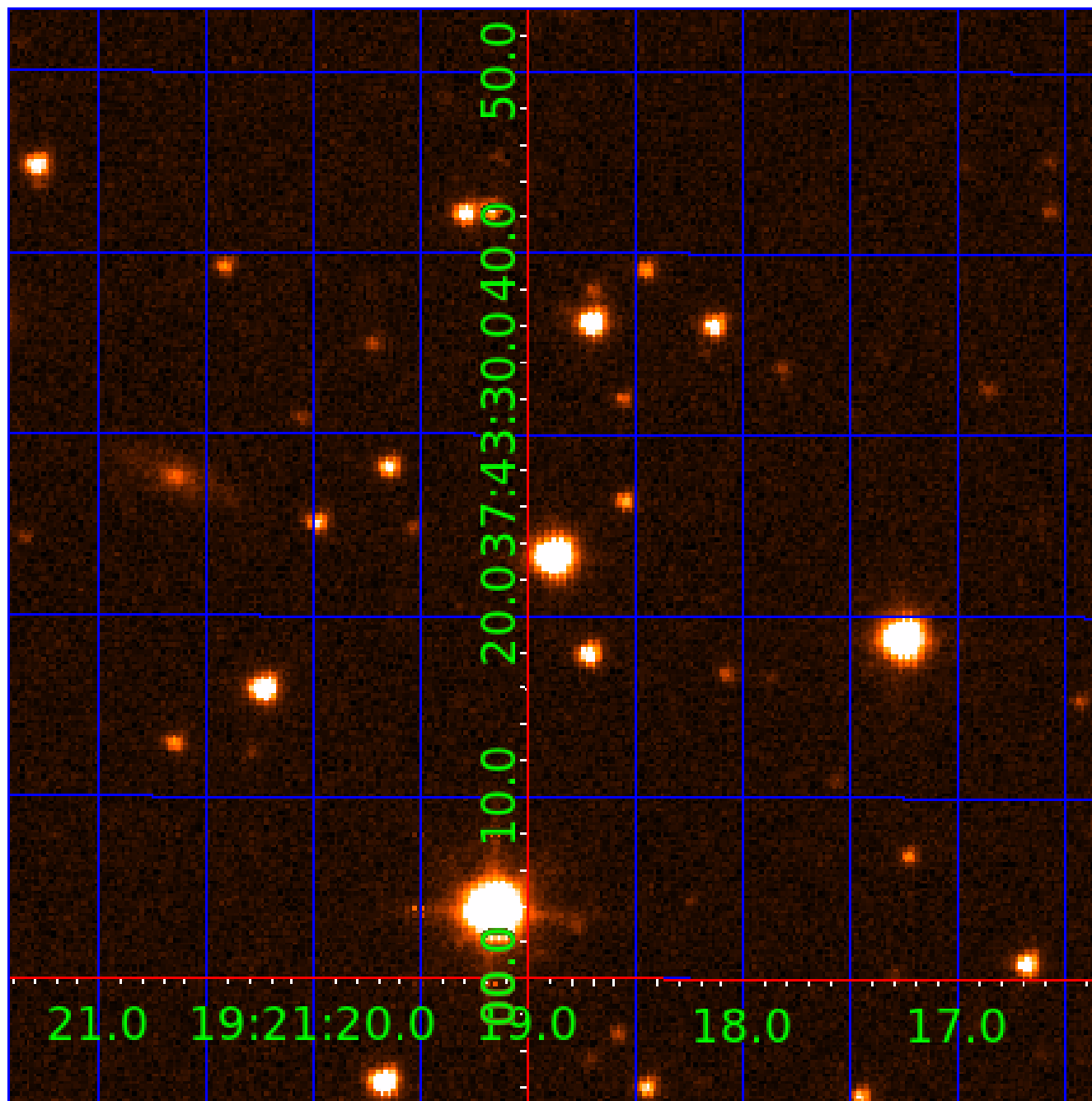


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 002438513

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	R_{\star} (R_{\odot})	T_{\star} (K)	R_p (R_{\oplus})	S_p (S_{\oplus})
002438513-01	OBS	1944.01	12.184231	139.054042	483.7	2.474	25.8	29.2	1.07	5771	2.55	106.63
002438513-02	OBS	1944.02	8.360724	138.813447	152.8	6.959	12.6	12.8	1.07	5771	1.57	176.18

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002438513-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
002438513-02	OBS	FP	0.00	0	0	1	1	CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

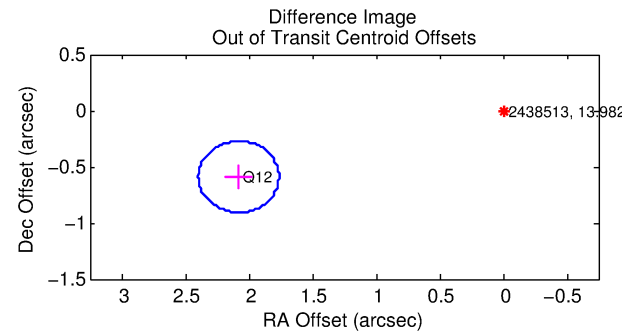
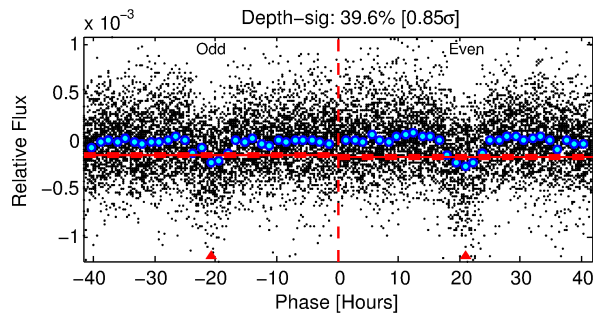
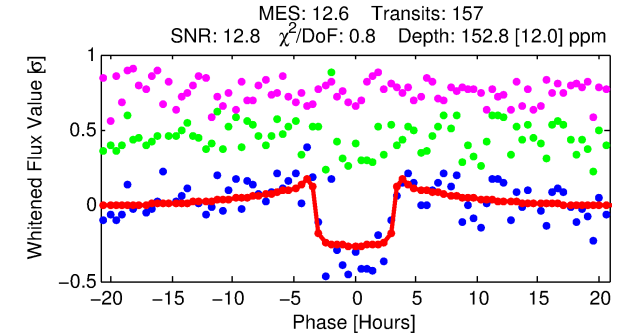
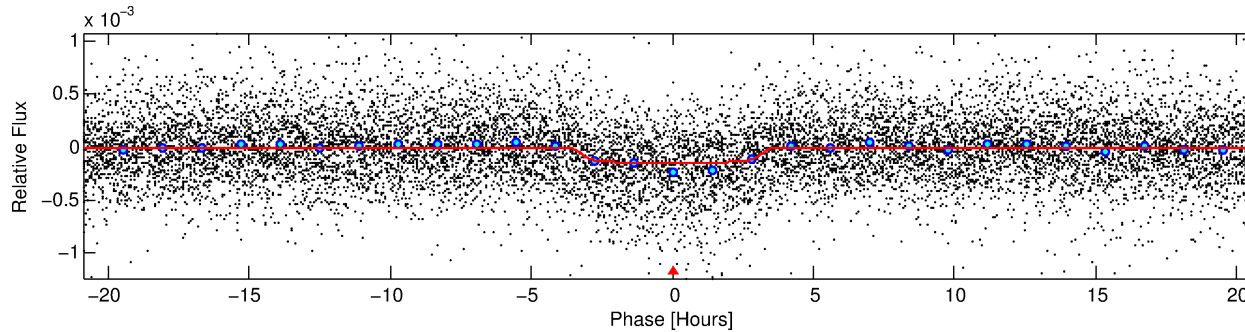
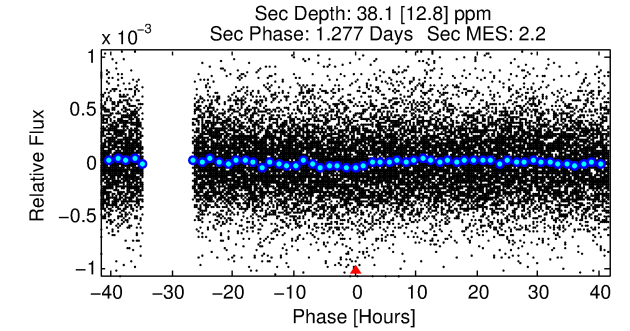
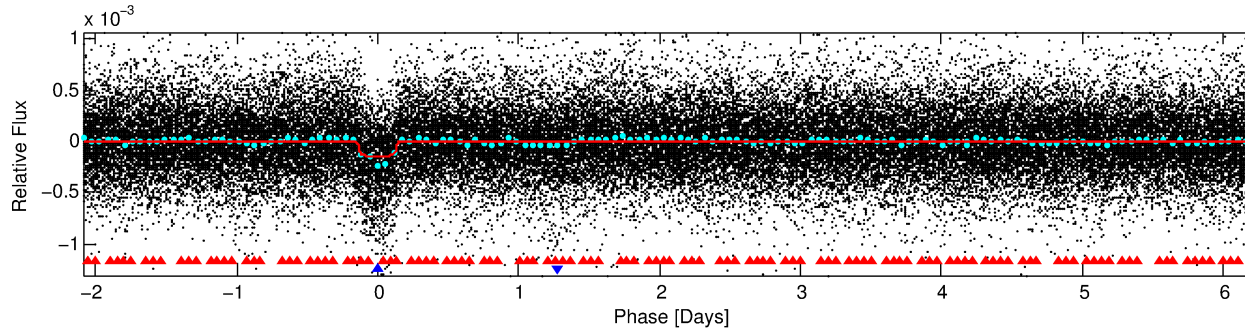
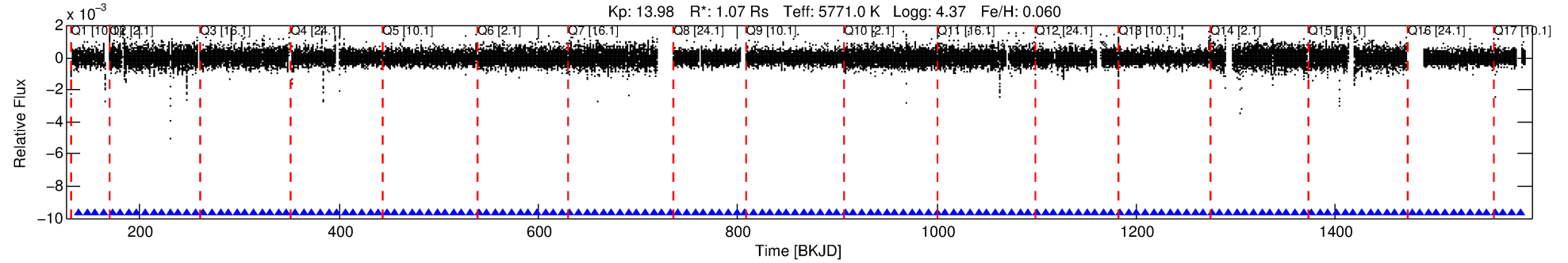
Ephemeris Match Information For 002438513-02

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
002438513-02	2438513	1003.01	2438502	1:1	13.3	3	-1	16.21	13.98	226.24	Direct-PRF	0	0.55	0.31

Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 2438513 Candidate: 2 of 2 Period: 8.361 d
KOI: K01944.02 Corr: 0.982



DV Fit Results:

Period = 8.36072 [0.00006] d
Epoch = 138.8134 [0.0058] BKJD
Rp/R* = 0.0135 [0.0018]
a/R* = 4.37 [2.43]
b = 0.90 [0.12]
Seff = 176.18 [36.29]
Teq = 929 [48] K
Rp = 1.57 [0.31] Re
a = 0.0802 [0.0103] AU
Ag = 54.76 [25.60] [2.10σ]
Teffp = 3907 [424] K [6.97σ]

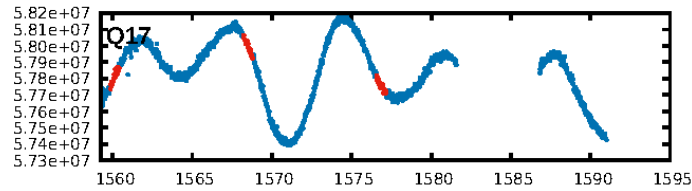
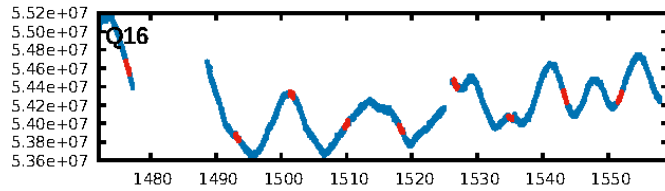
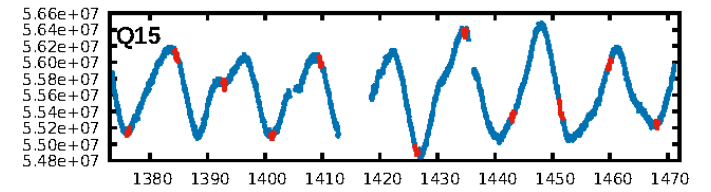
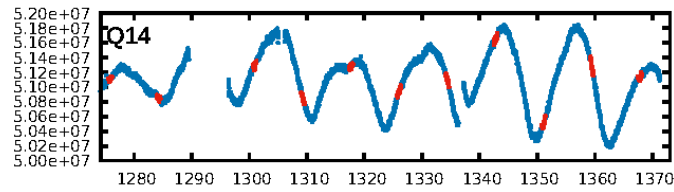
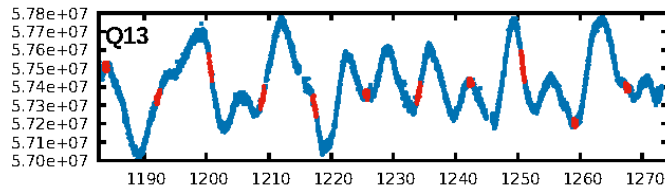
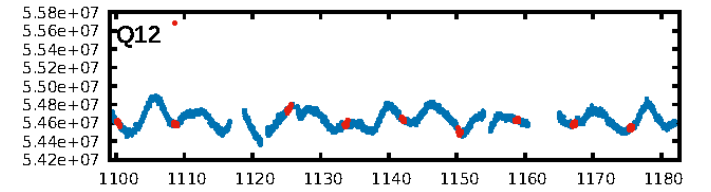
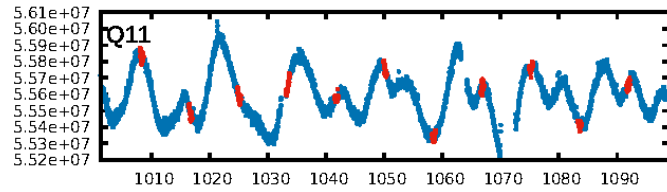
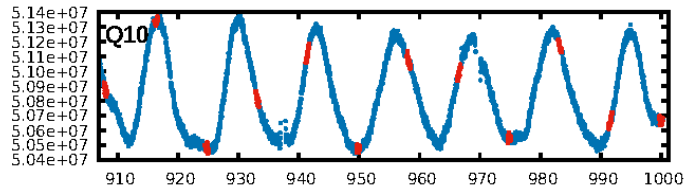
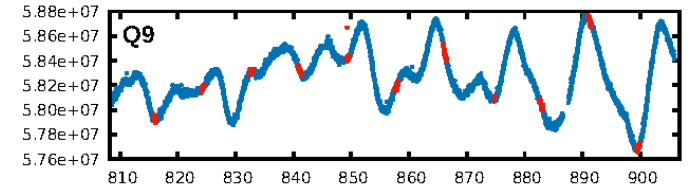
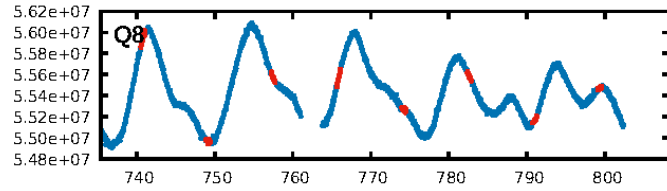
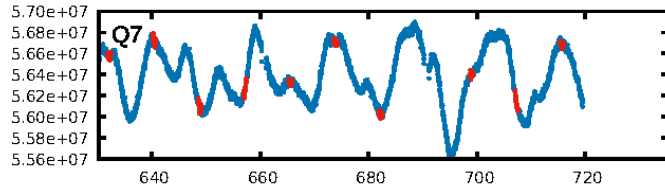
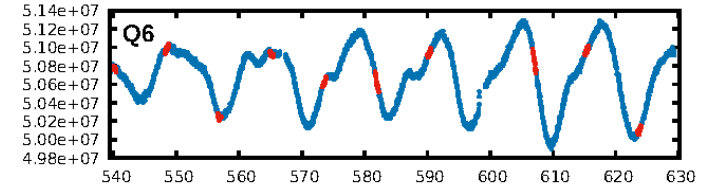
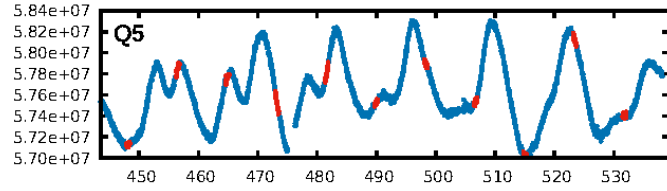
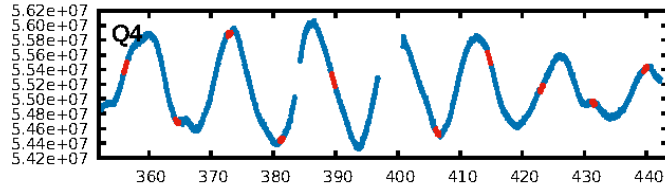
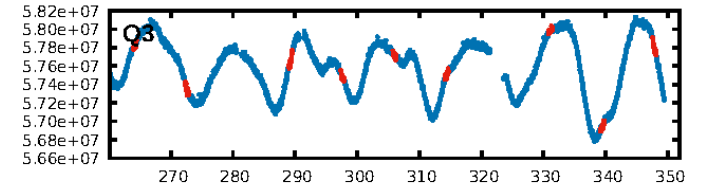
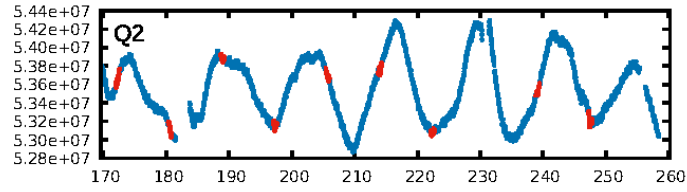
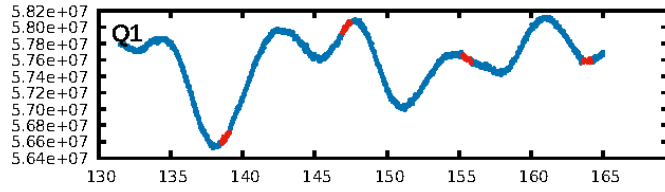
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [12.42σ]
ModelChiSquare2-sig: 2.3%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.69e-32
RollingBand-fgt: 1.00 [150/150]
GhostDiagnostic-chr: -0.2453
Centroid-sig: 0.0%
Centroid-so: 40.140 arcsec [38.46σ]
OotOffset-rm: 2.163 arcsec [20.47σ]
KicOffset-rm: 2.082 arcsec [19.80σ]
OotOffset-st: 0/0/1/0 [1]
KicOffset-st: 0/0/1/0 [1]
DiffImageQuality-fgm: 0.00 [0/1]
DiffImageOverlap-fno: 1.00 [17/17]

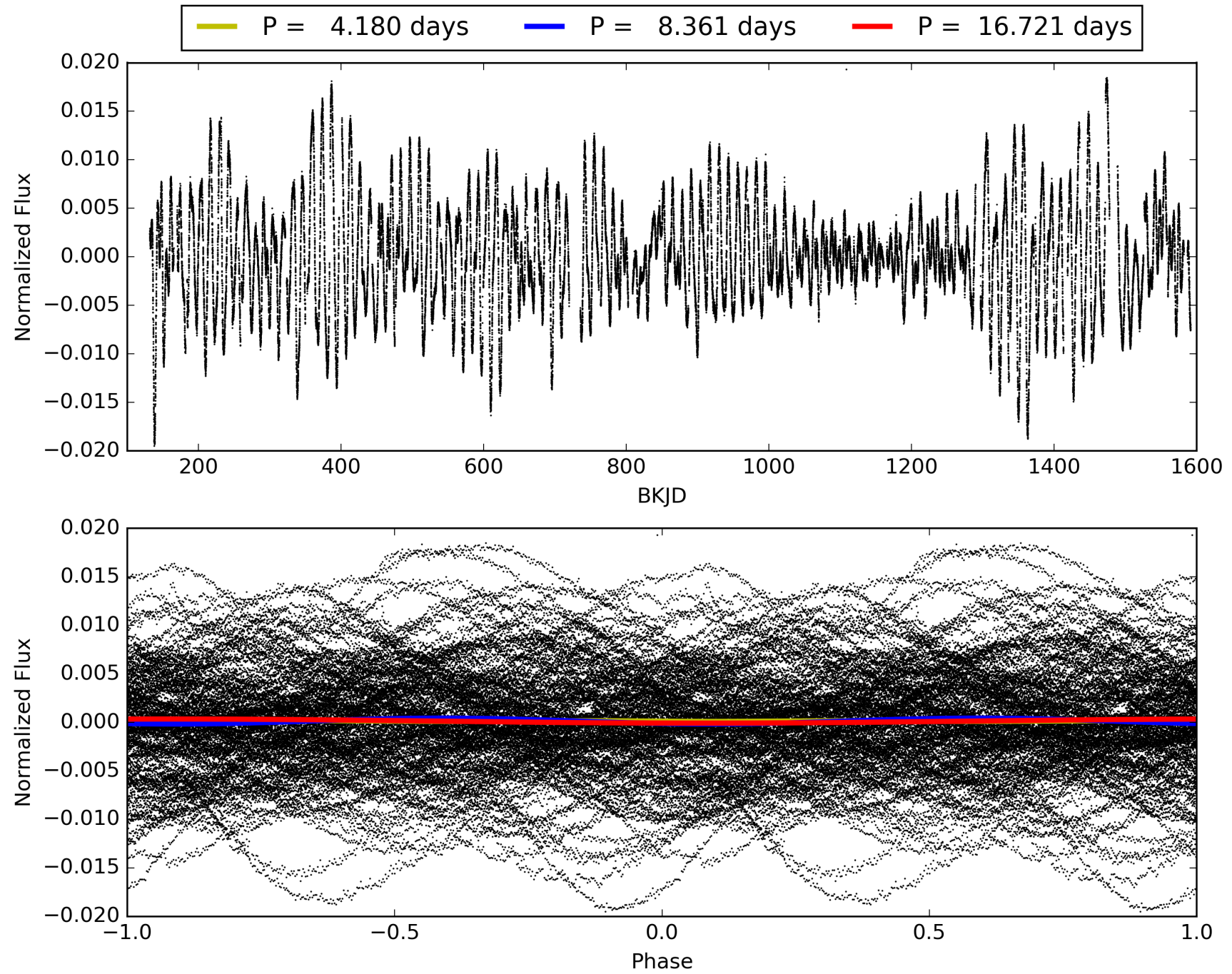
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 19:07:26 Z

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

TCE 002438513-02, PDC Light Curves

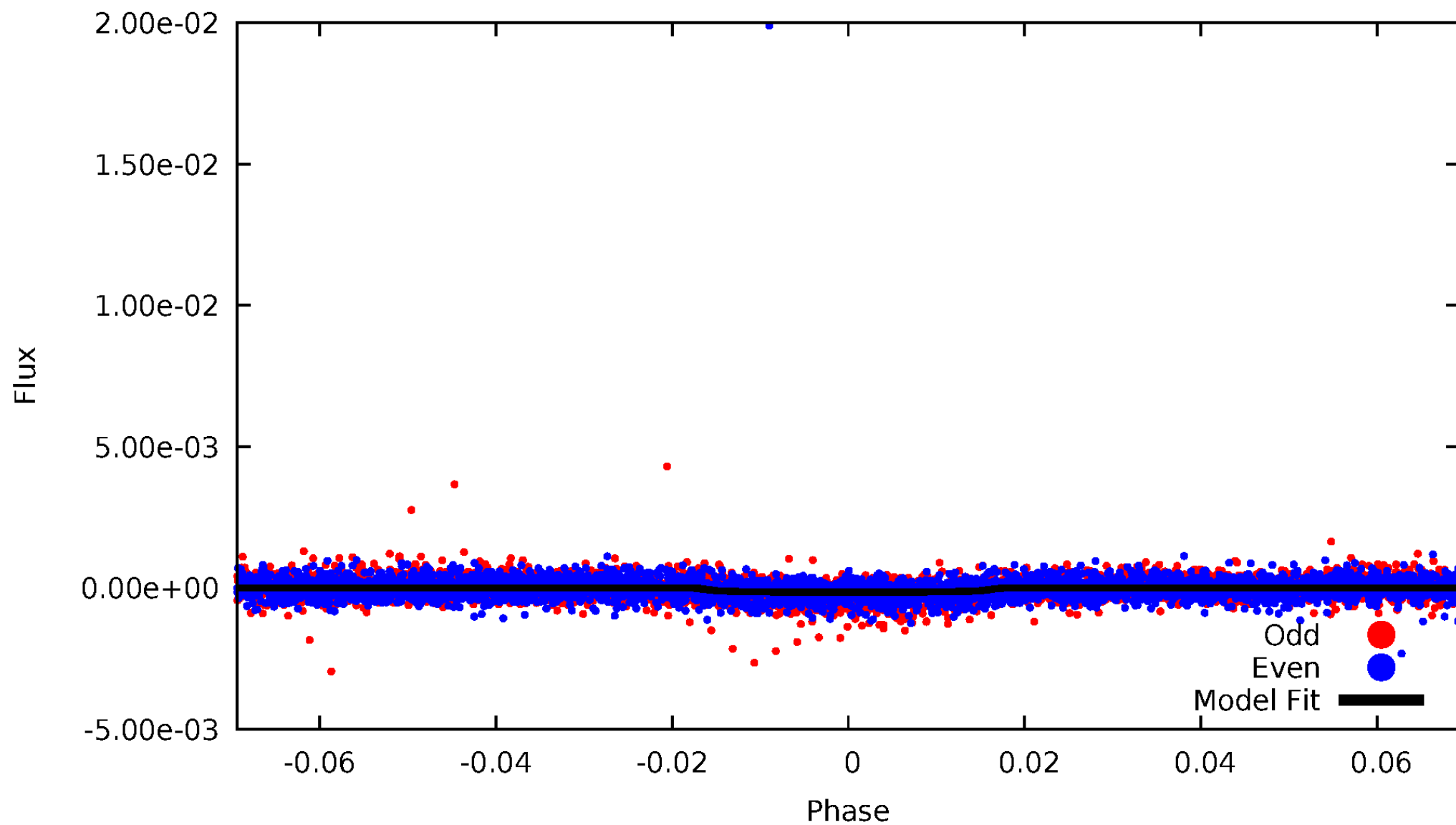


TCE 002438513-02



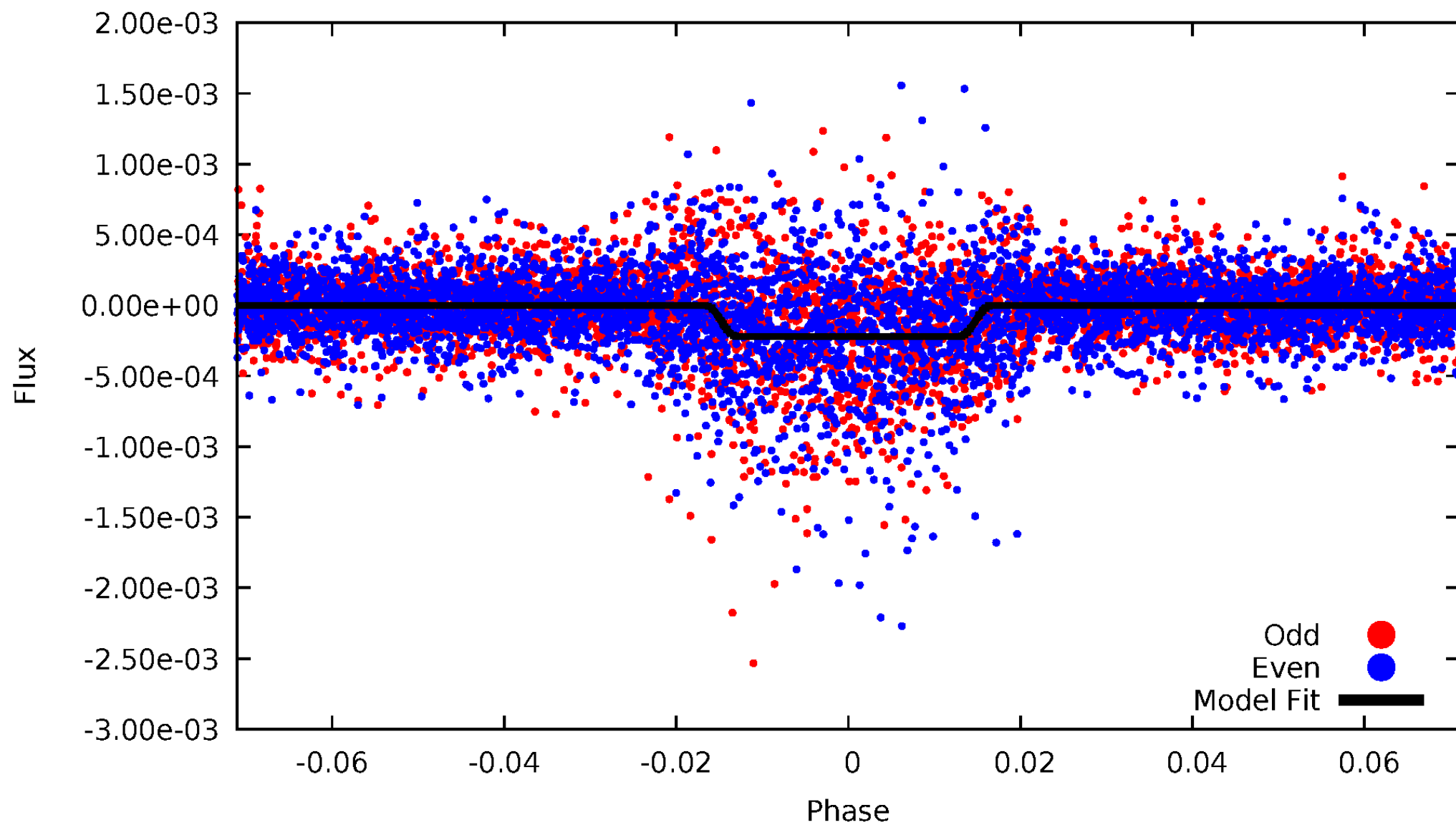
DV Odd/Even

TCE 002438513-02



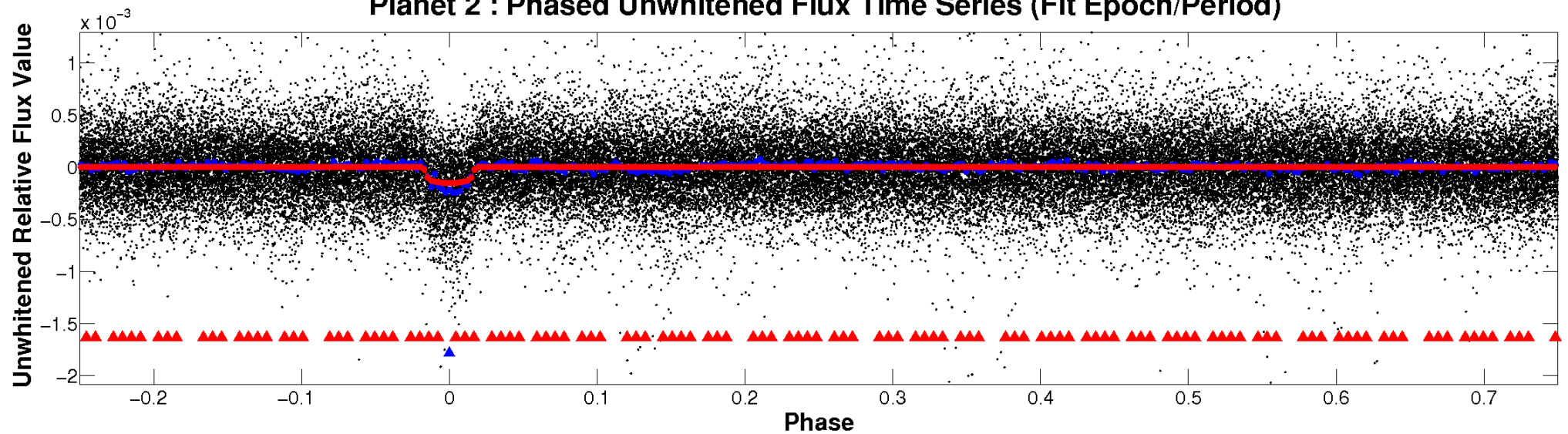
ALT Odd/Even

TCE 002438513-02

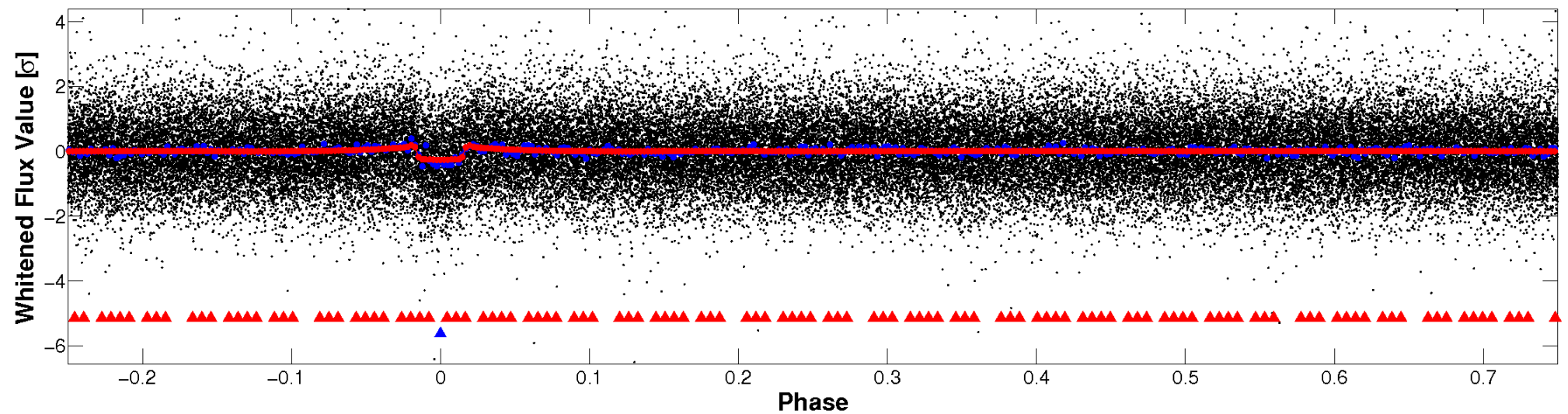


Non-Whitened Vs. Whitened Light Curve

Planet 2 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

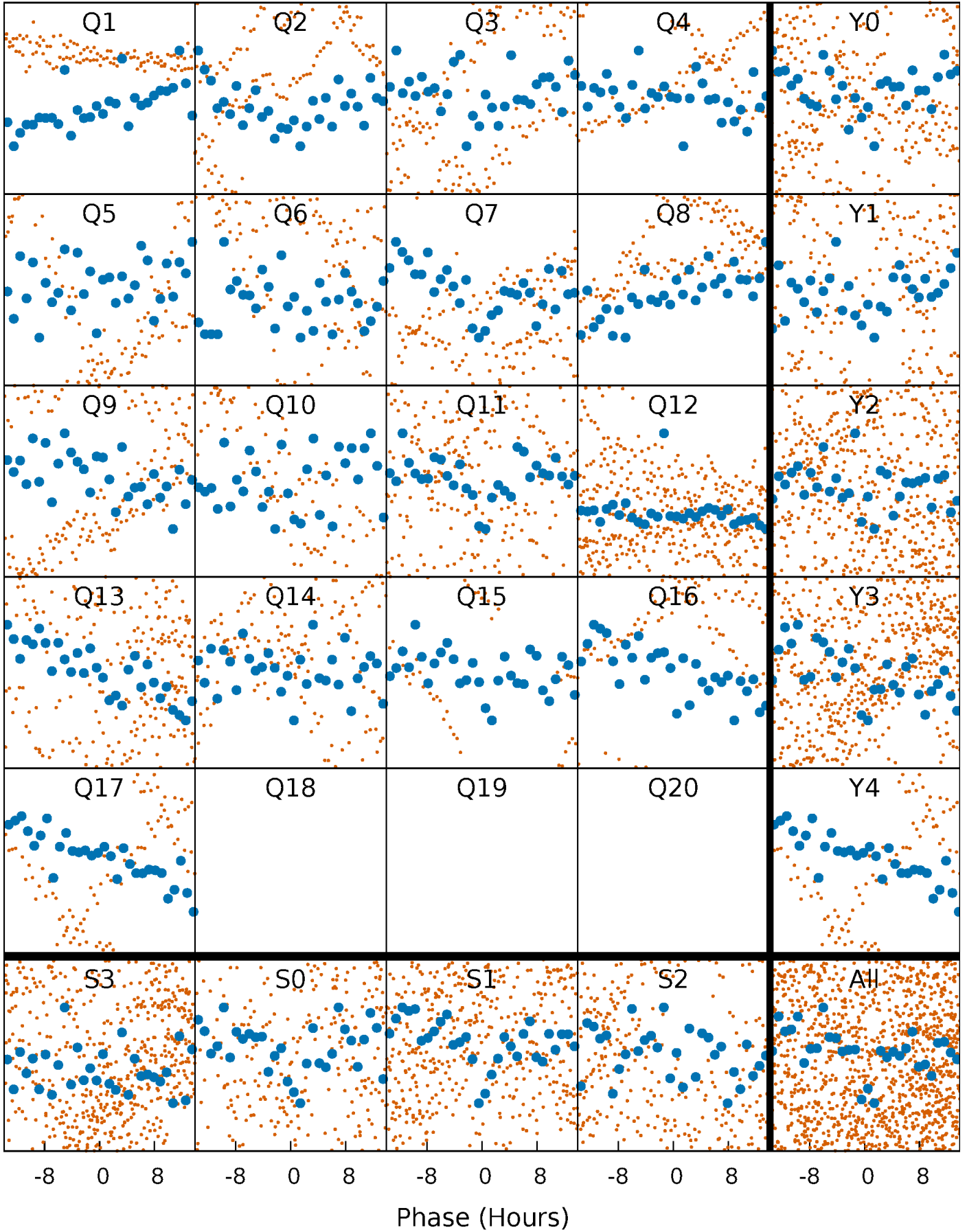


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



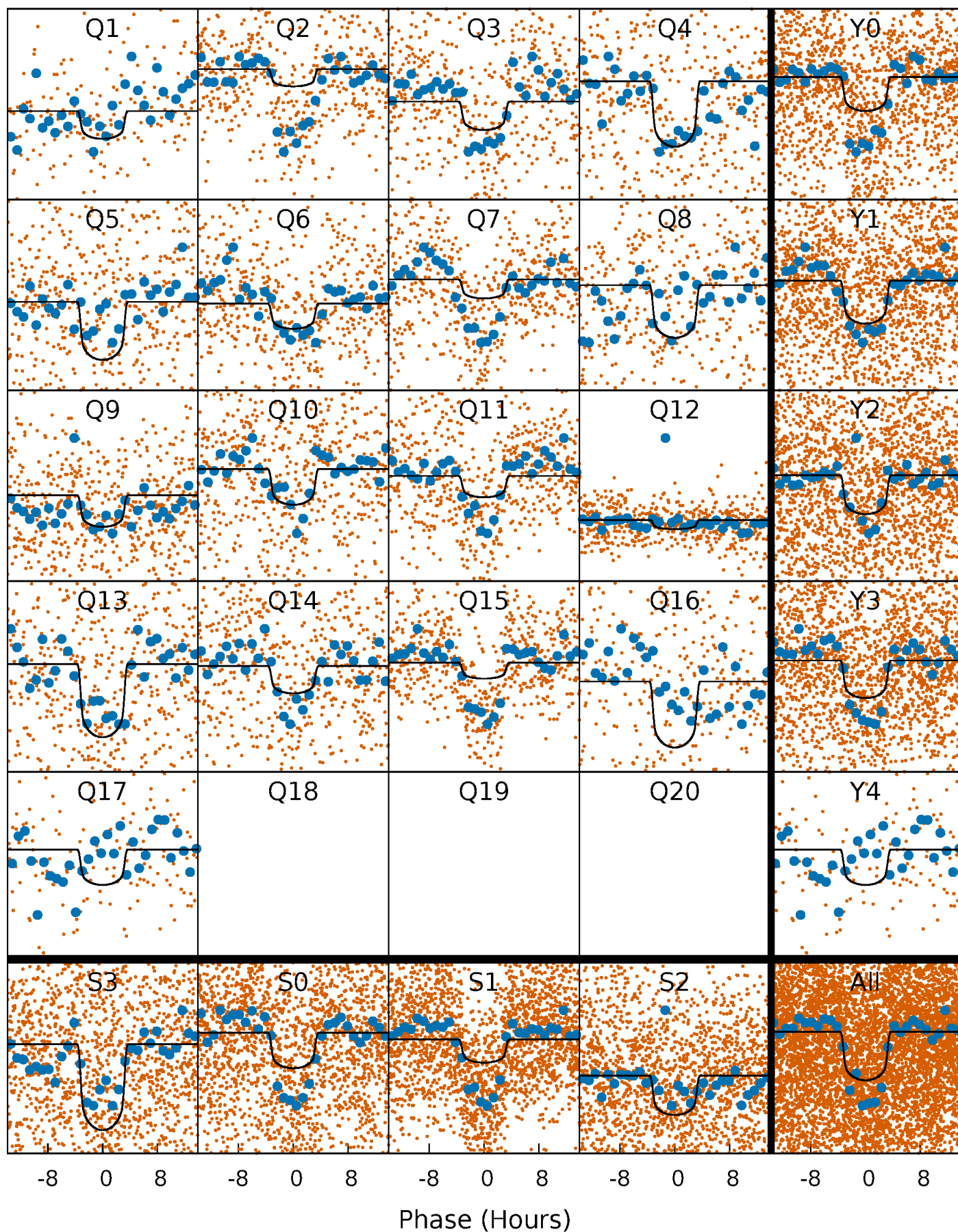
PDC Quarter-Phased Transit Curves

TCE 002438513-02 P= 8.360724 Days $T_0=138.813447$ (BKJD)



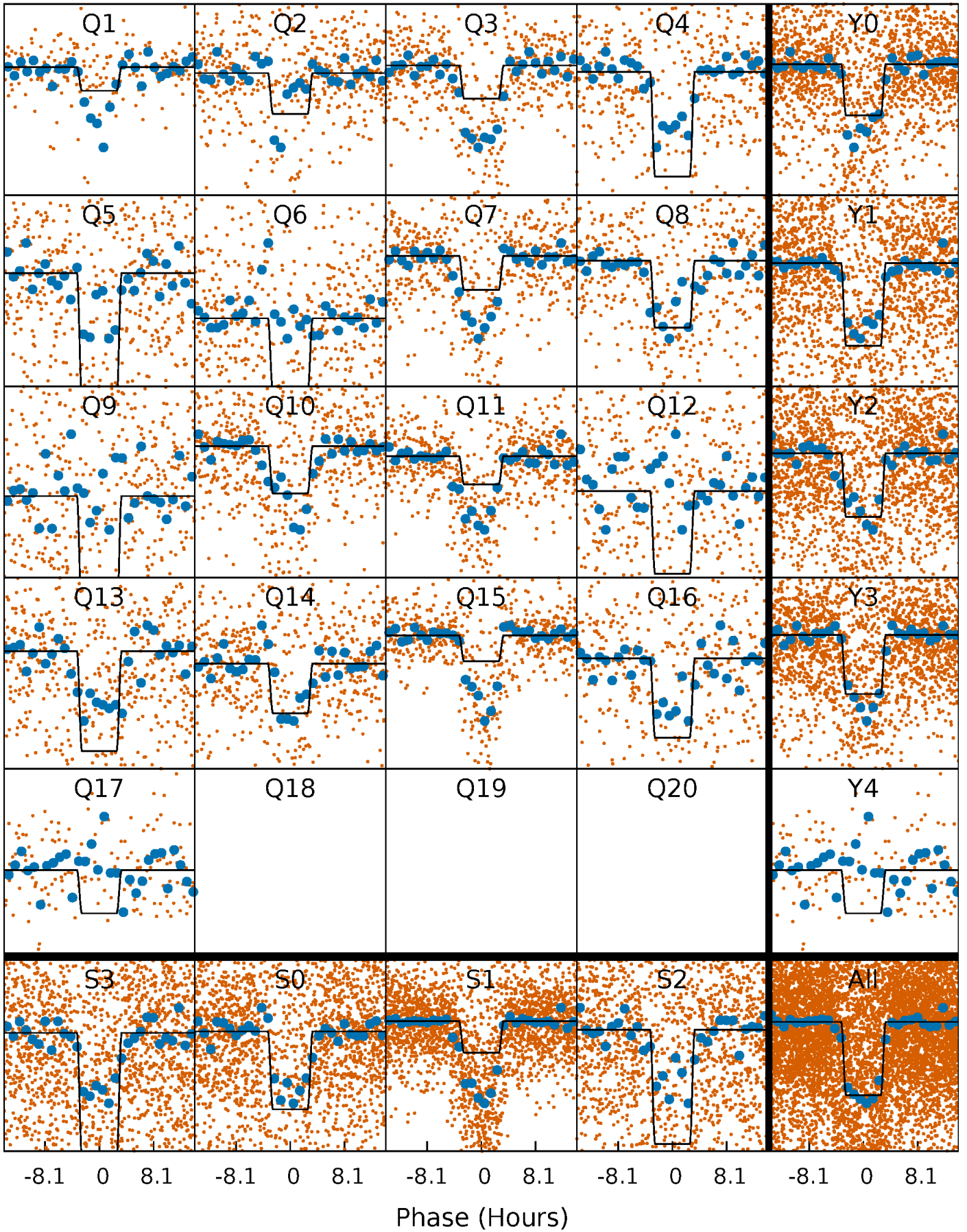
DV Quarter-Phased Transit Curves

TCE 002438513-02 P= 8.360724 Days $T_0=138.813447$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

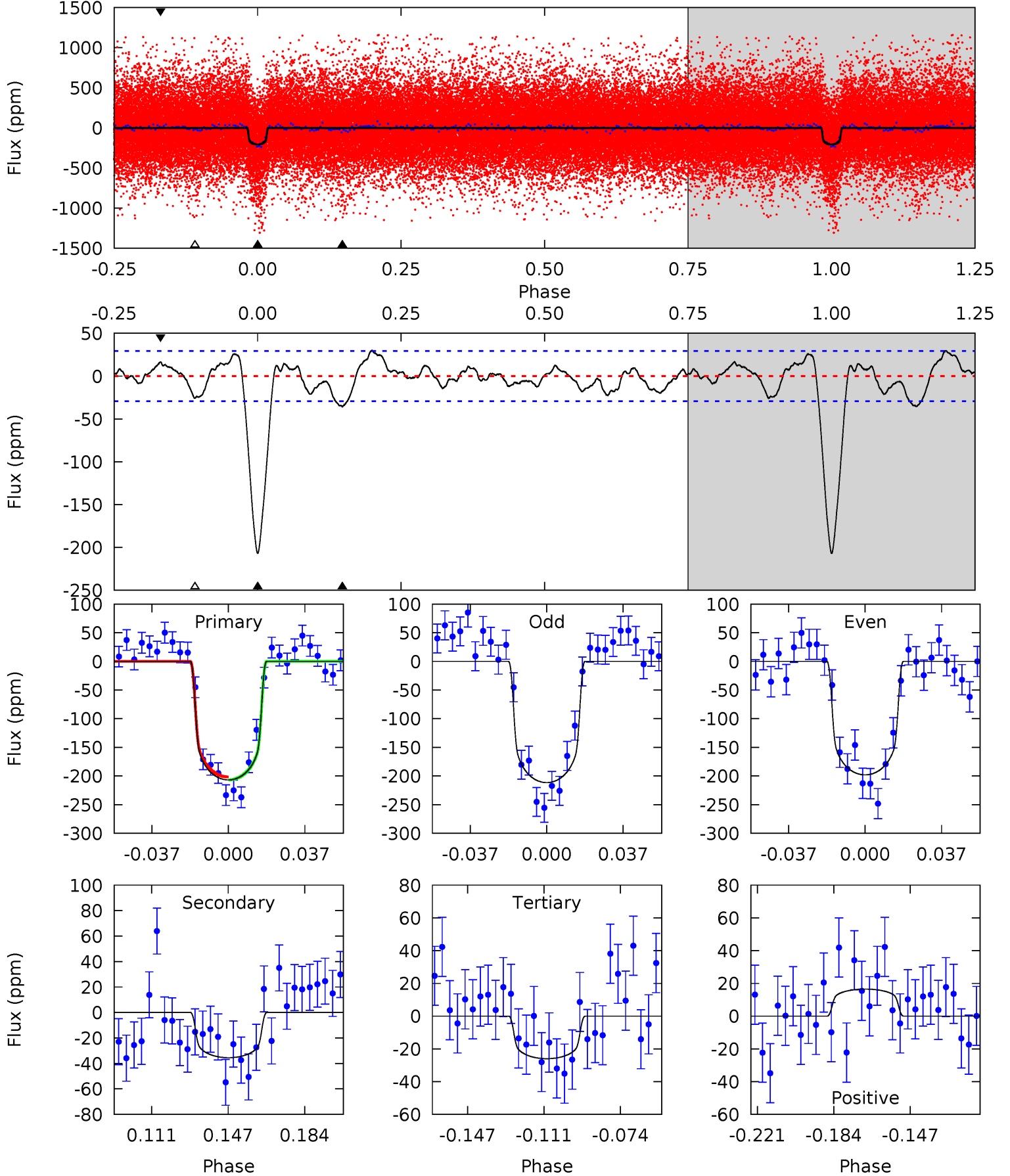
TCE 002438513-02 P= 8.360662 Days $T_0=138.817151$ (BKJD)



DV Model-Shift Uniqueness Test

002438513-02, P = 8.360724 Days, E = 130.452723 Days

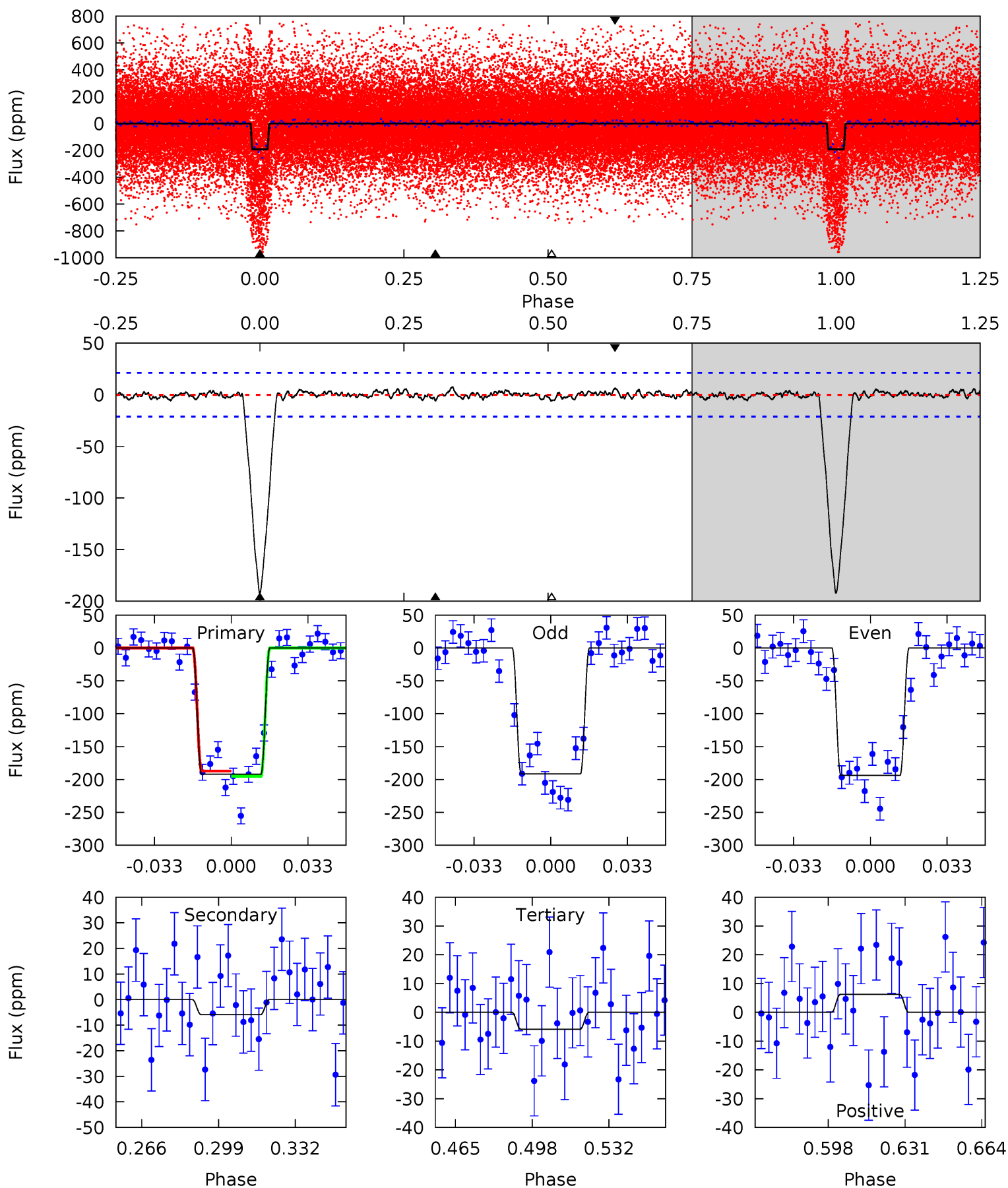
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
33.7	5.78	4.23	2.69	4.77	2.09	1.83	29.4	31.0	1.55	3.09	1.10	1.33	0.13	0.43



Alt Model-Shift Uniqueness Test

002438513-02, P = 8.360662 Days, E = 130.456489 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
43.5	1.34	1.33	1.41	4.79	2.13	0.54	42.2	42.1	0.01	-0.07	0.23	1.24	0.04	0.88



Stellar Parameters For KIC 002438513

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5771^{+104}_{-115}	$4.374^{+0.105}_{-0.105}$	$0.060^{+0.150}_{-0.150}$	$1.068^{+0.161}_{-0.120}$	$0.984^{+0.072}_{-0.065}$	$1.139^{+0.446}_{-0.378}$
	+2%/-2%	+2%/-2%	+250%/-250%	+15%/-11%	+7%/-7%	+39%/-33%
Source	SPE58	SPE58	SPE58	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 002438513-02 / KOI 1944.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-35 ± 6	$1.57^{+0.25}_{-0.23}$	1292^{+57}_{-47}	4096^{+268}_{-228}	50^{+22}_{-15}
Alt.	-6 ± 4	$1.72^{+0.25}_{-0.23}$	1296^{+57}_{-54}	2986^{+285}_{-569}	$6.881^{+6.376}_{-5.374}$

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)

A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{\text{obs}} \gg T_{\text{max}}$ AND $A_{\text{obs}} \gg 1.0$

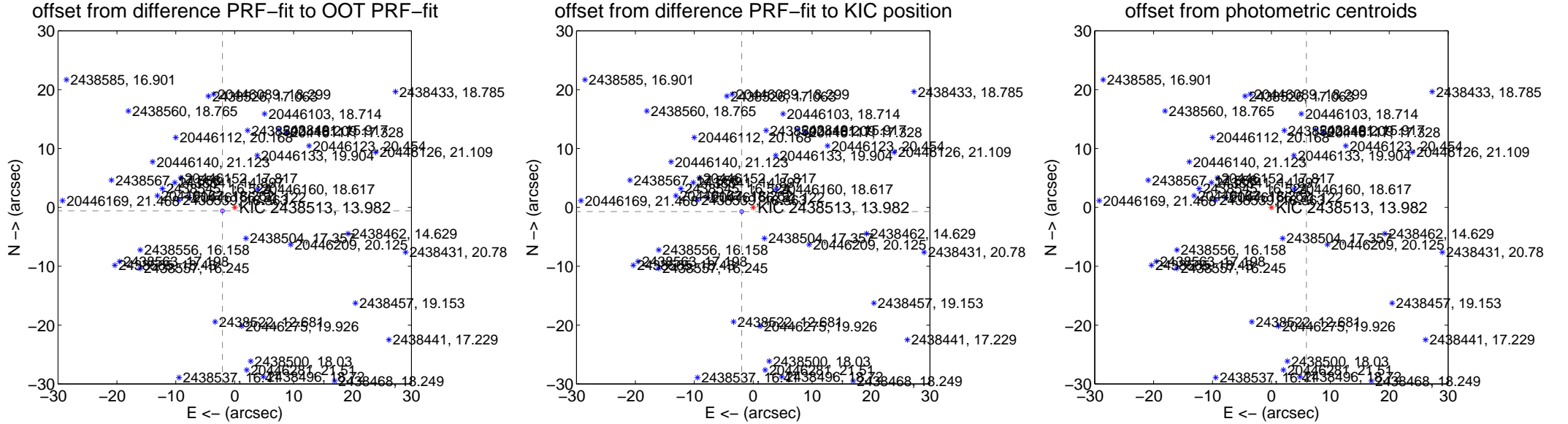
DV Centroid Data

Supplemental centroid analysis for 002438513-02. Kepler magnitude: 13.98. Transit SNR 12.80

There are 0 quarters with good PRF difference image offsets

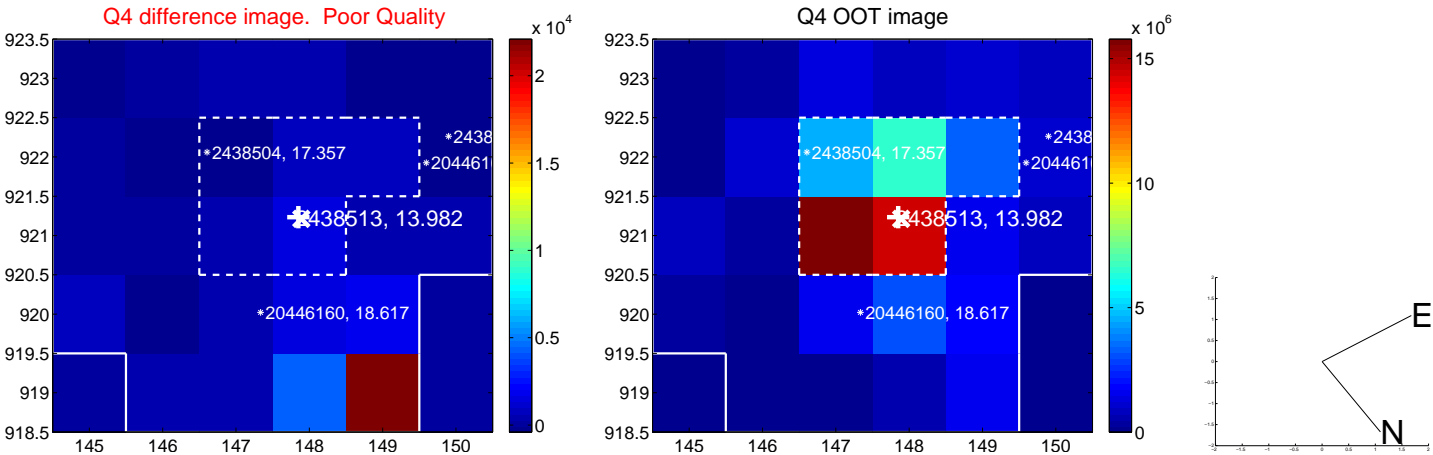
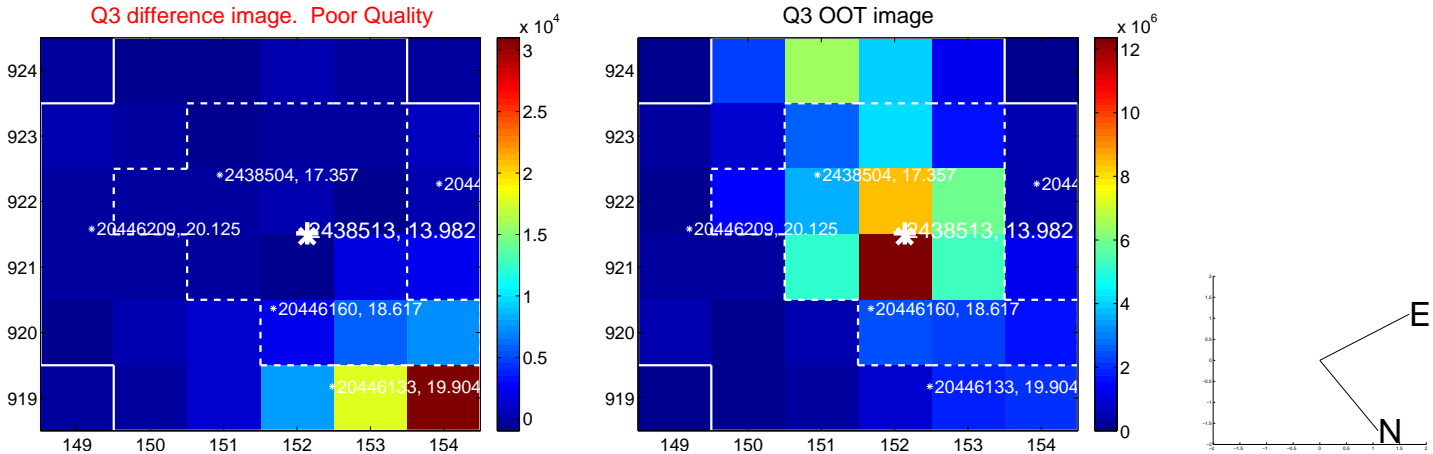
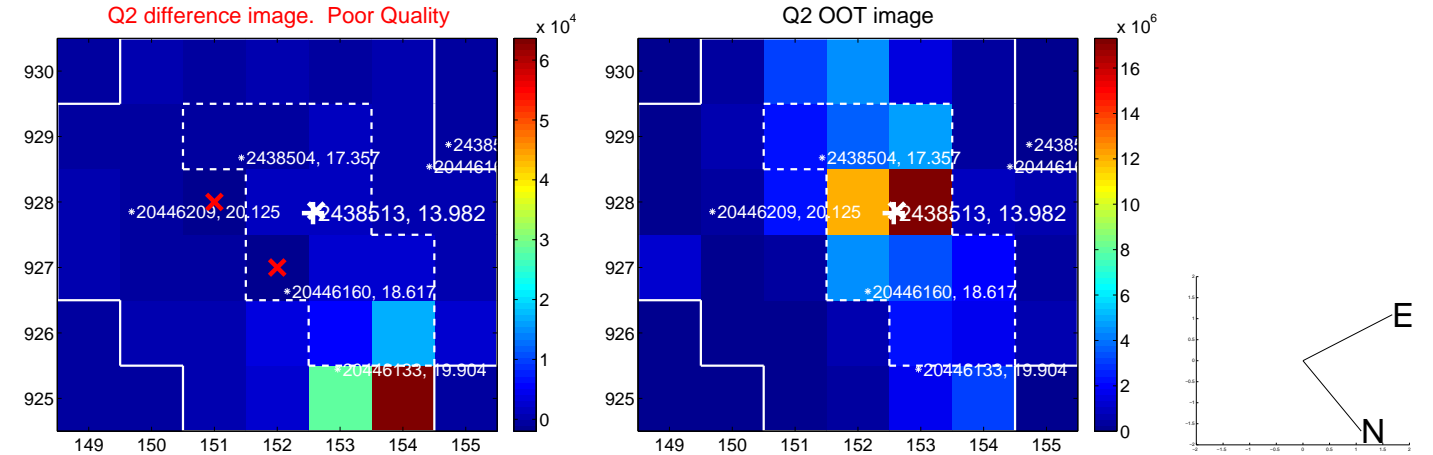
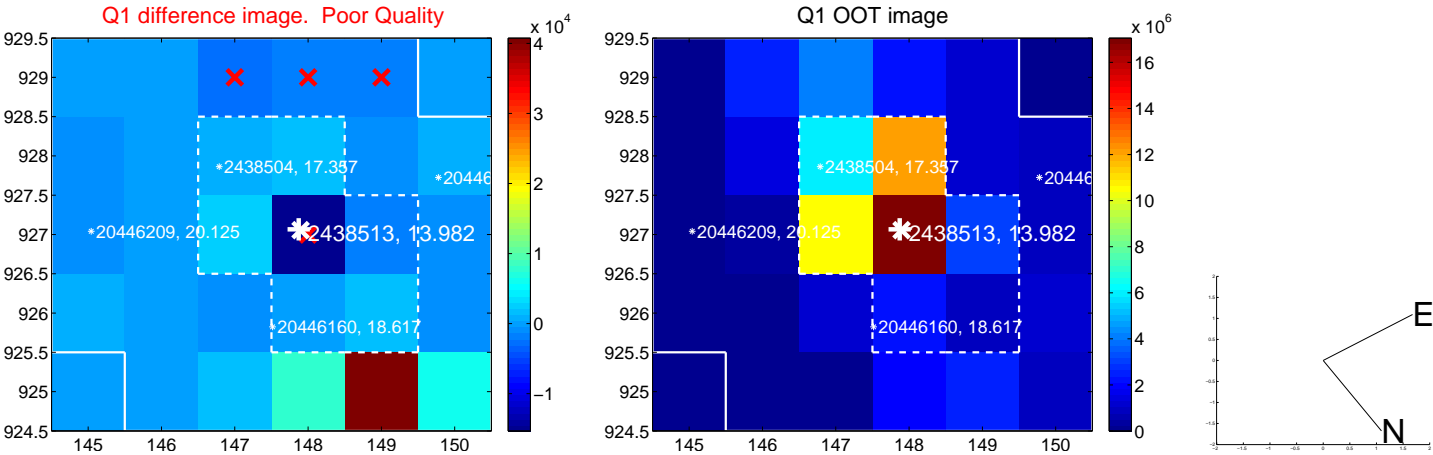
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.163 \pm 0.106	20.47	2.081 \pm 0.107	-0.590 \pm 0.093
PRF-fit source offset from KIC position	2.082 \pm 0.105	19.80	1.956 \pm 0.107	-0.713 \pm 0.093
photometric centroid source offset	40.14 \pm 1.04	38.46	-5.94 \pm 0.61	39.70 \pm 1.05

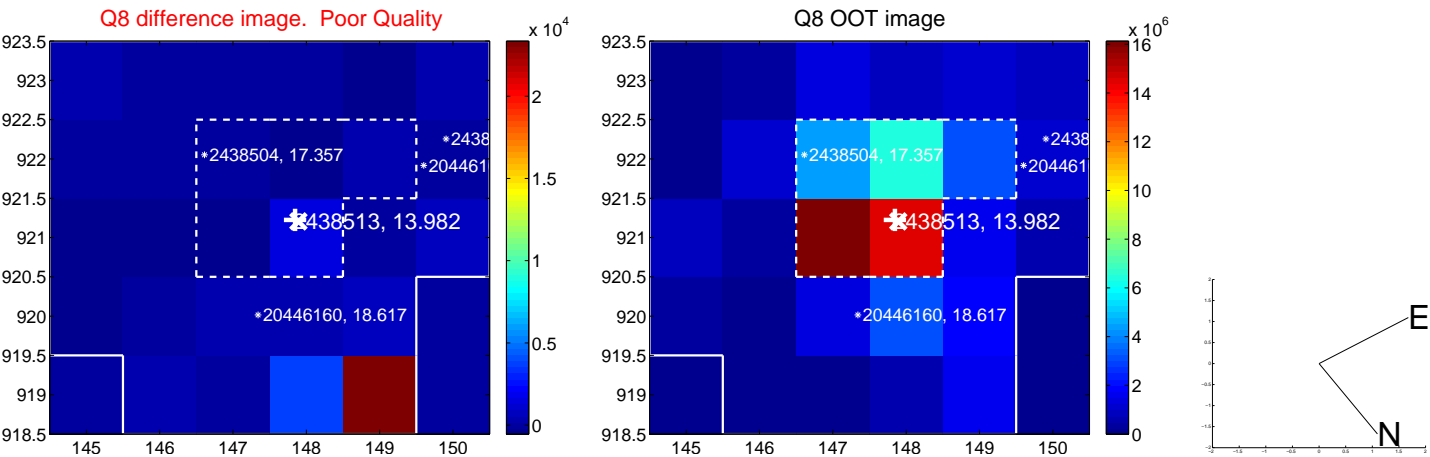
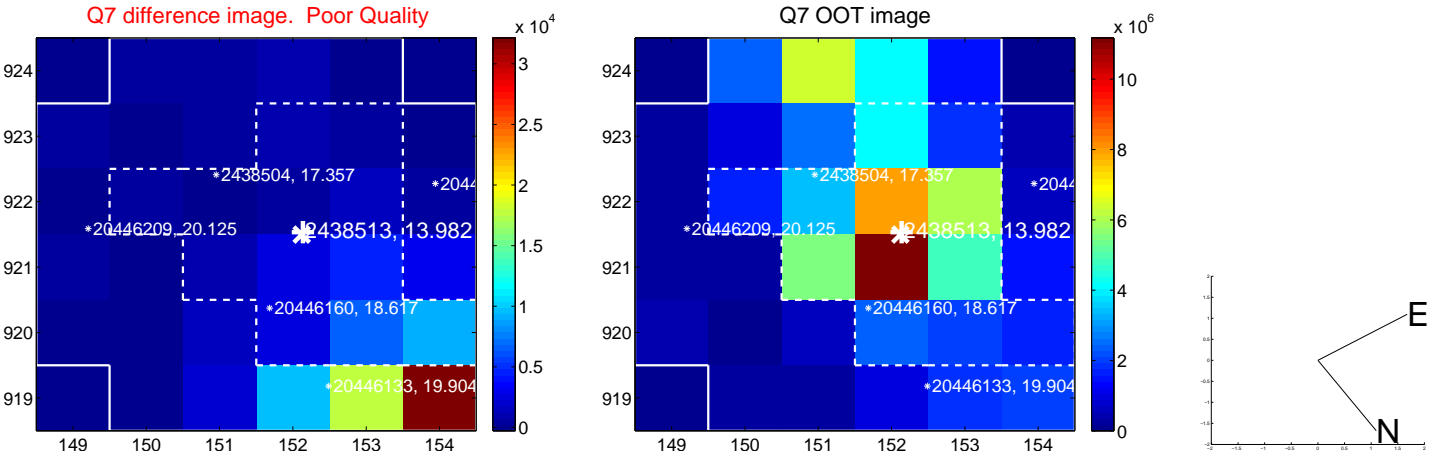
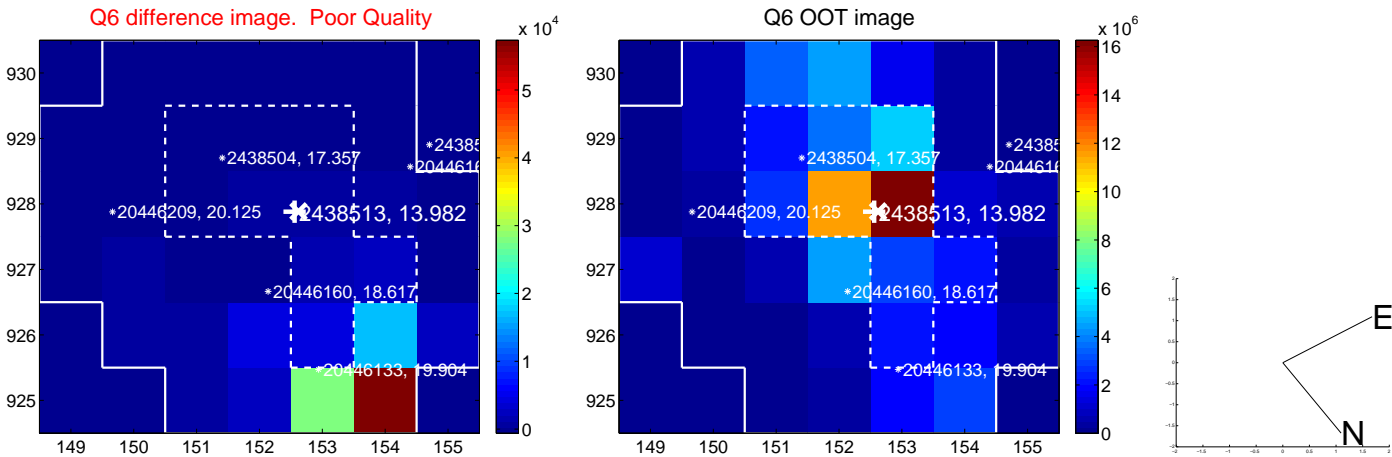
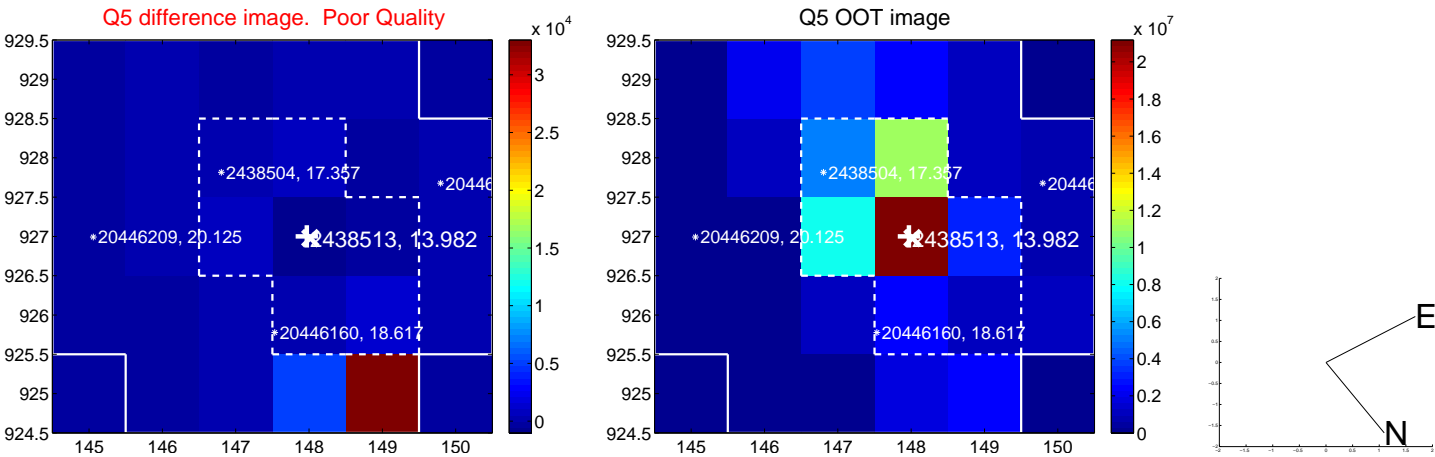


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

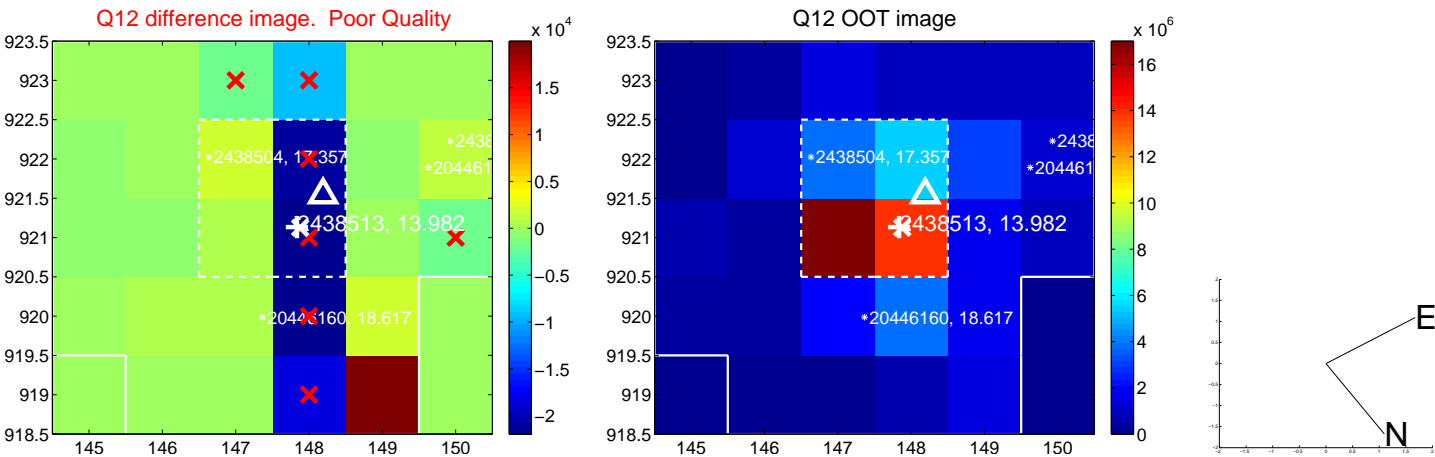
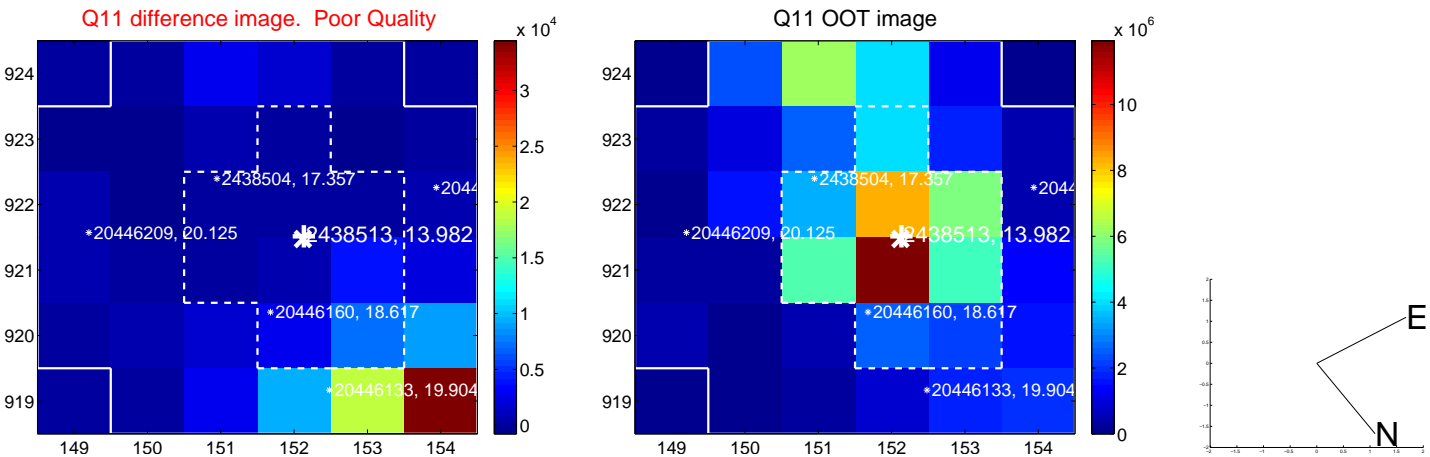
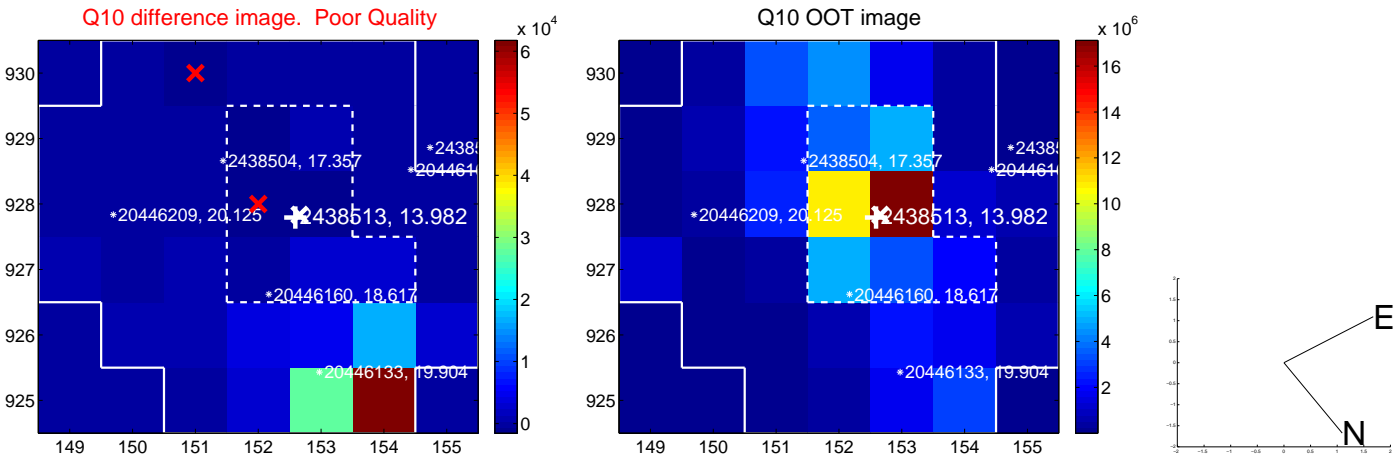
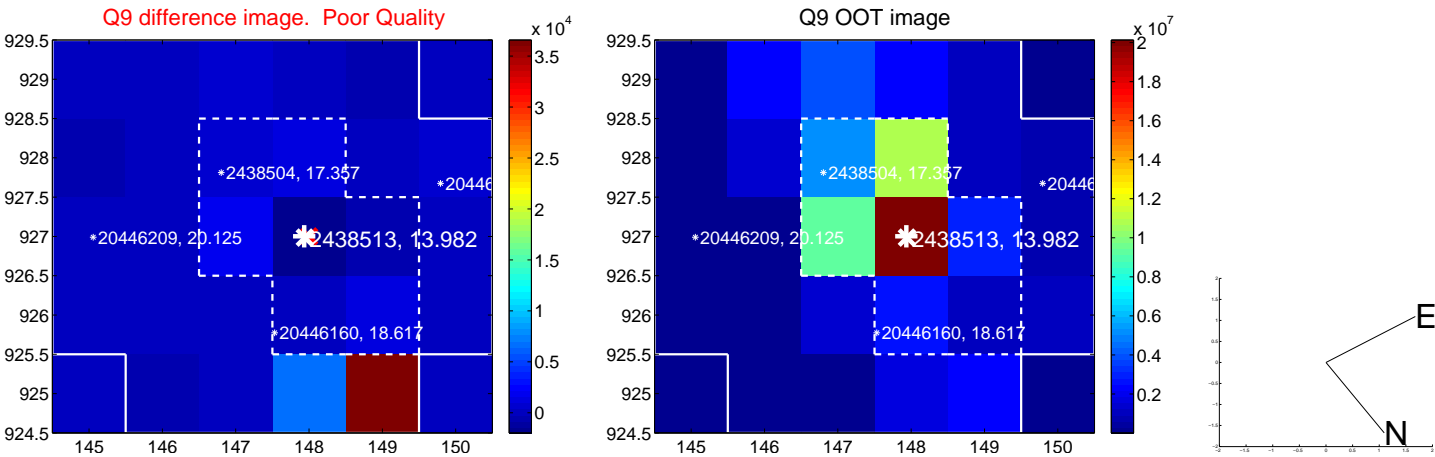
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



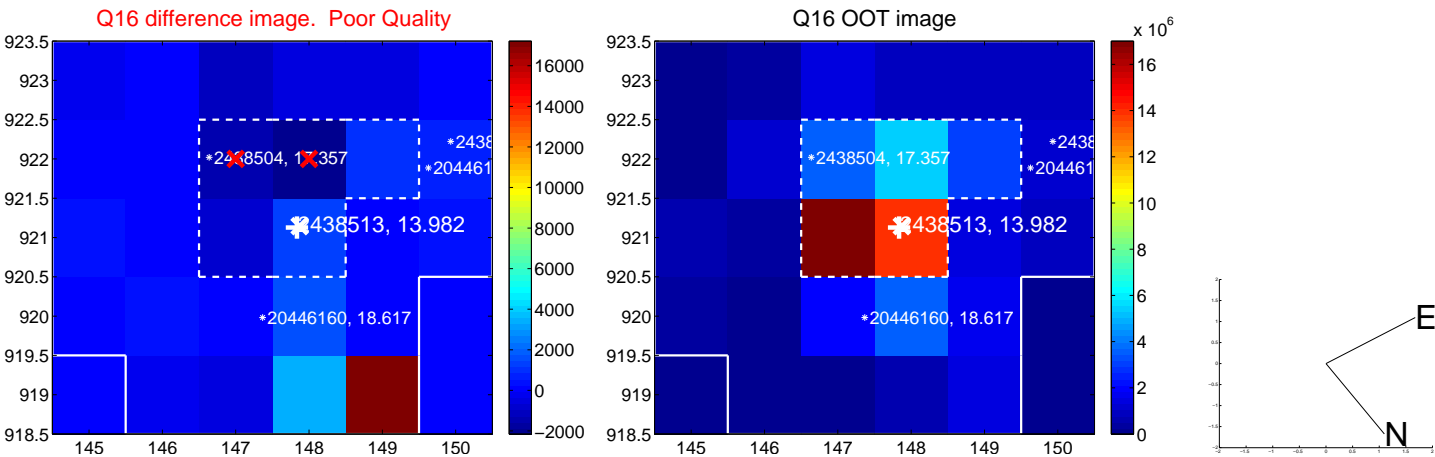
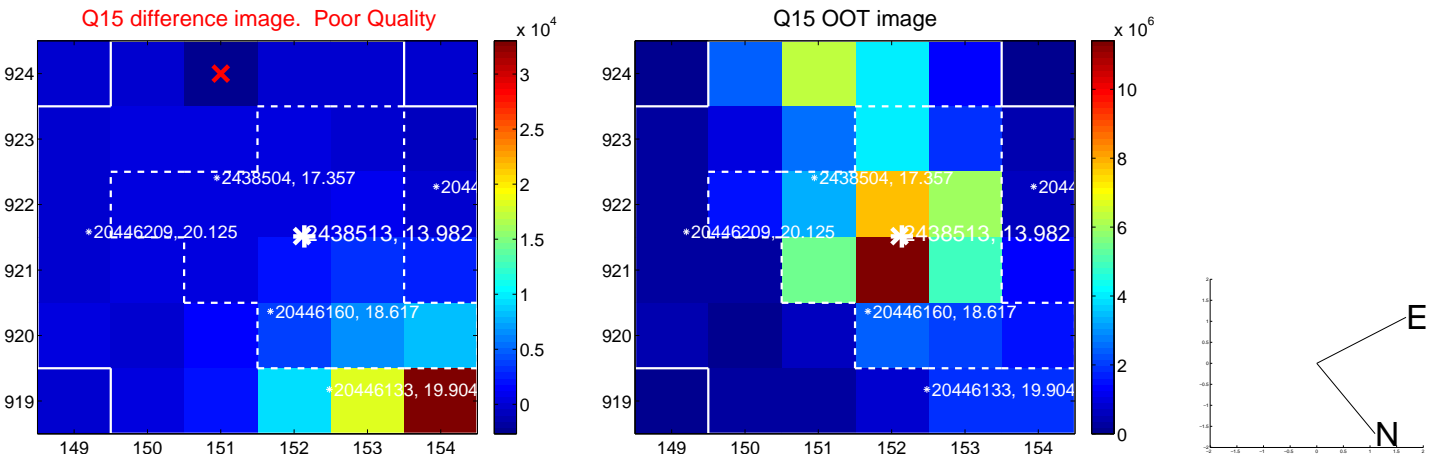
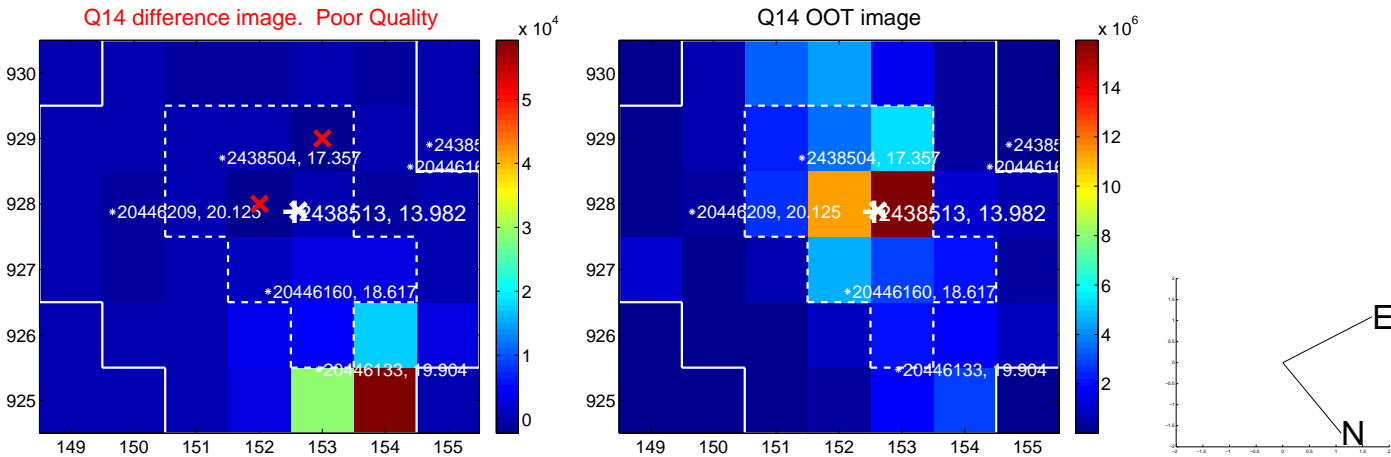
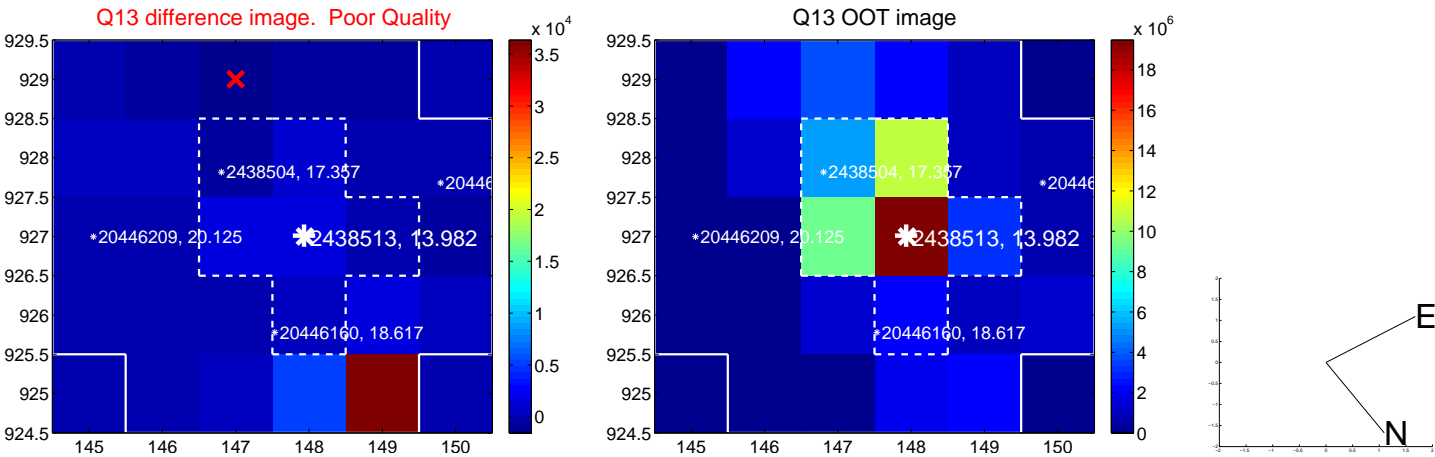
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



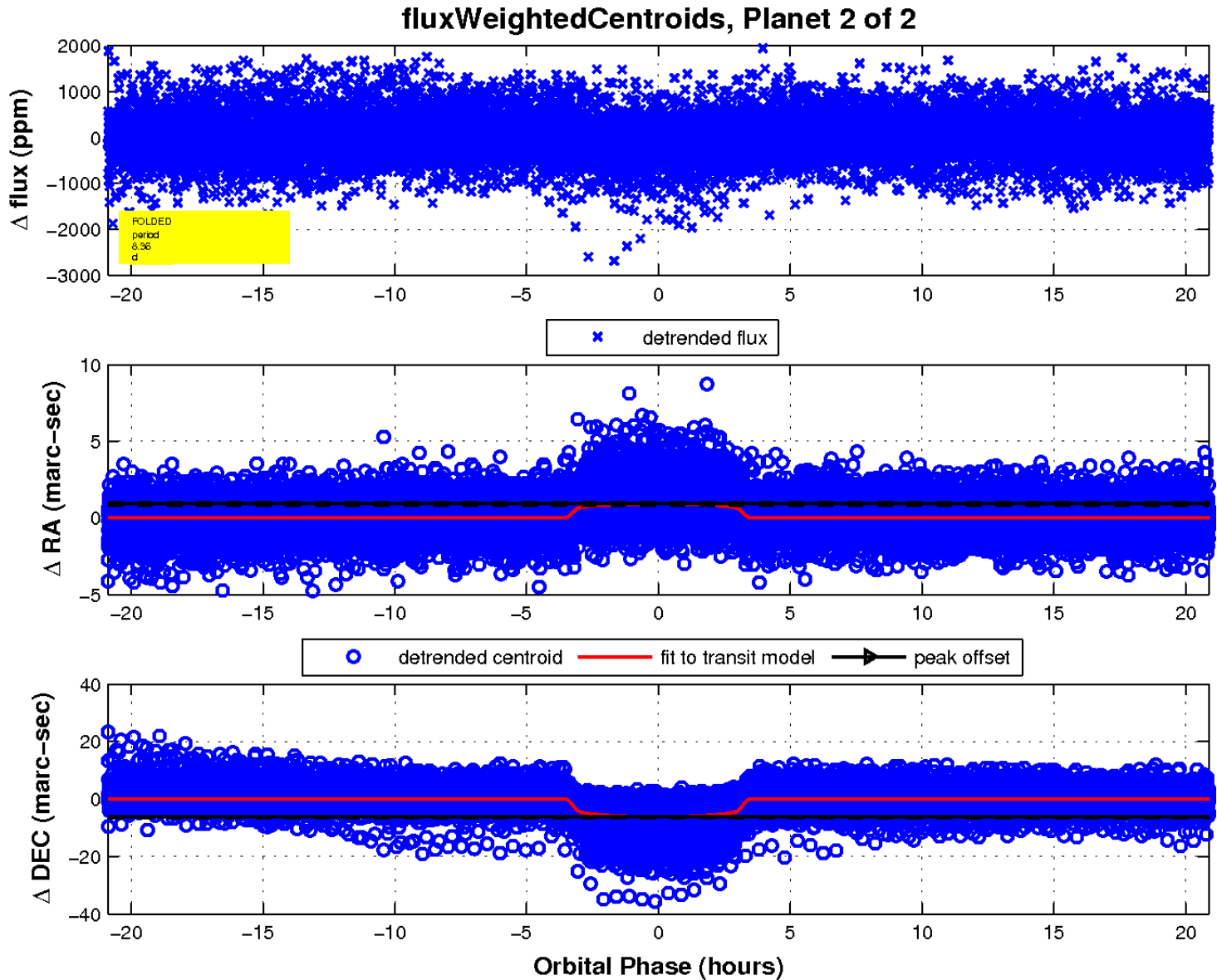
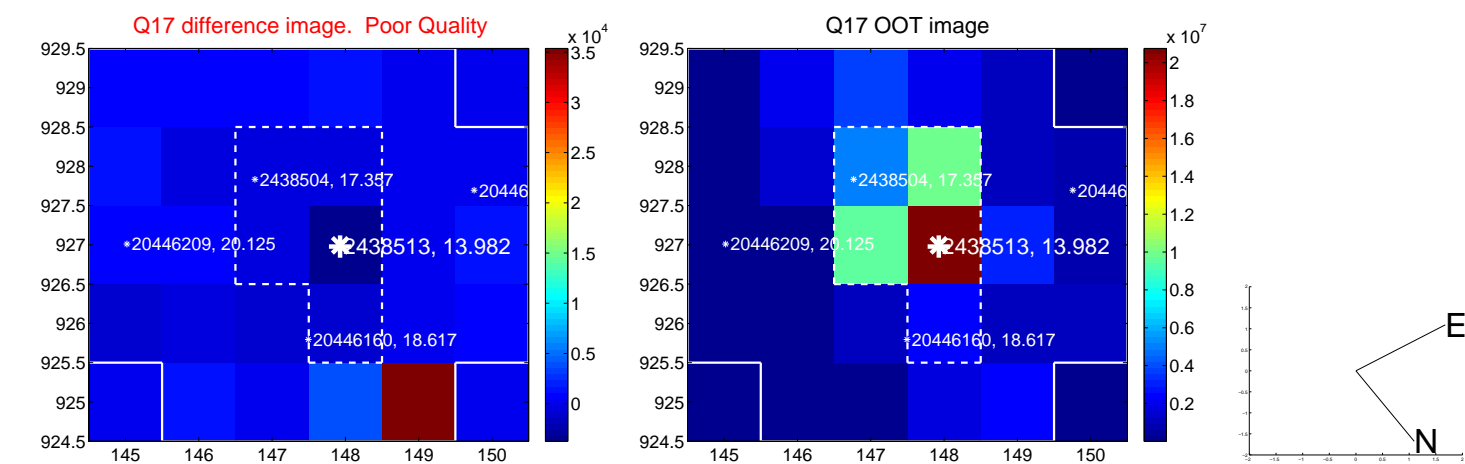
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination

