

KIC 010864531

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})
010864531-01	OBS	2080.01	83.488390	188.541885	922.2	6.371	18.7	19.0	0.94	5910	3.15	6.77
010864531-02	OBS	2080.02	34.060770	141.359706	808.1	2.514	17.7	18.8	0.94	5910	3.04	22.37

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010864531-01	OBS	PC	0.53	0	0	0	0	NO_COMMENT
010864531-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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.

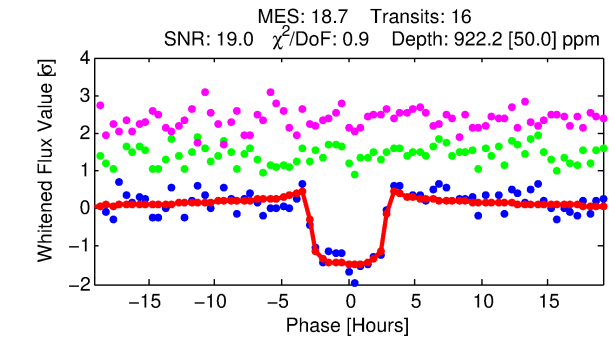
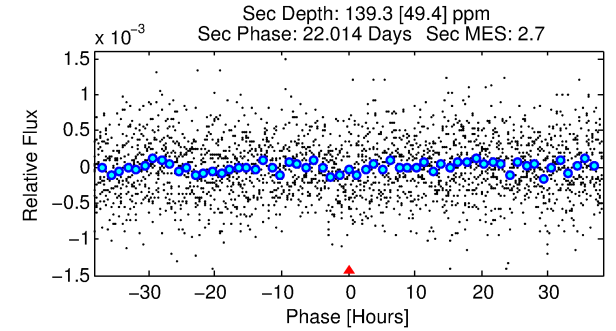
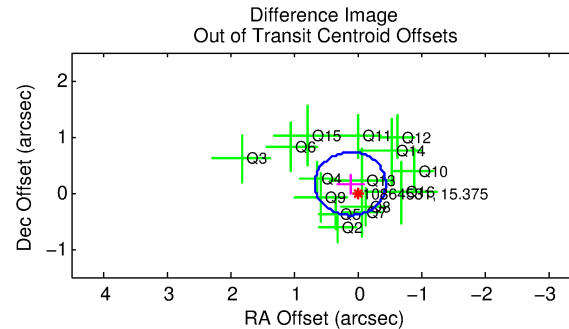
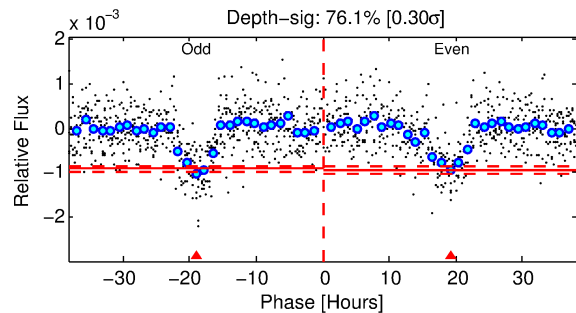
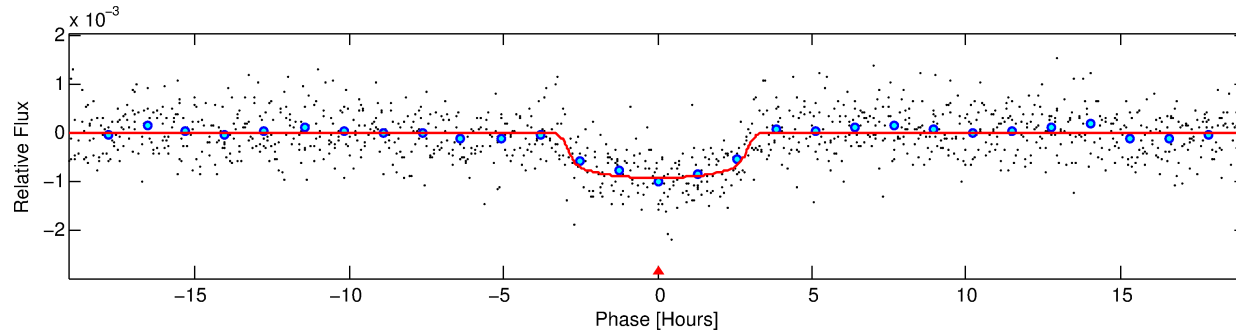
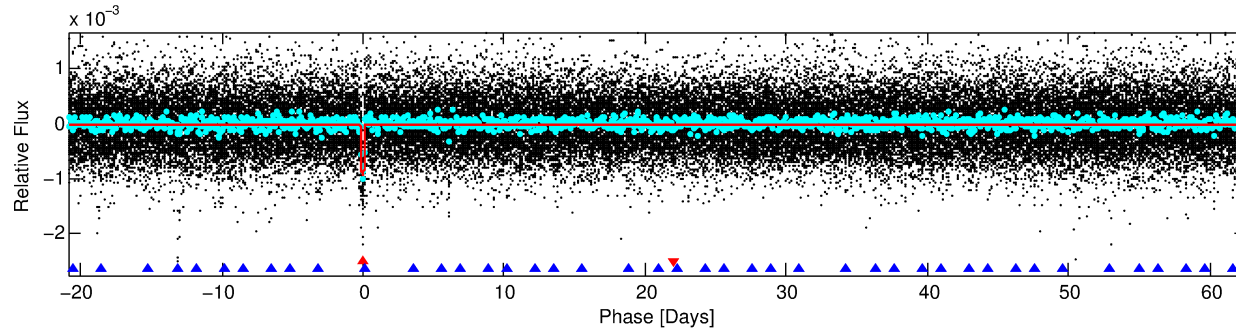
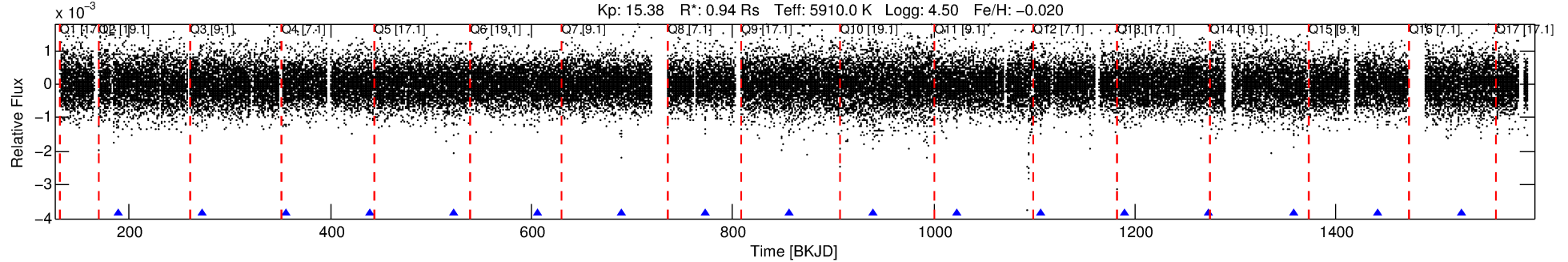
Ephemeris Match Information For 010864531-01

No Significant Match Found

DV One-Page Summary

KIC: 10864531 Candidate: 1 of 2 Period: 83.488 d
KOI: K02080.01 Name: Kepler-358c Corr: 0.992

Kp: 15.38 R*: 0.94 Rs Teff: 5910.0 K Logg: 4.50 Fe/H: -0.020



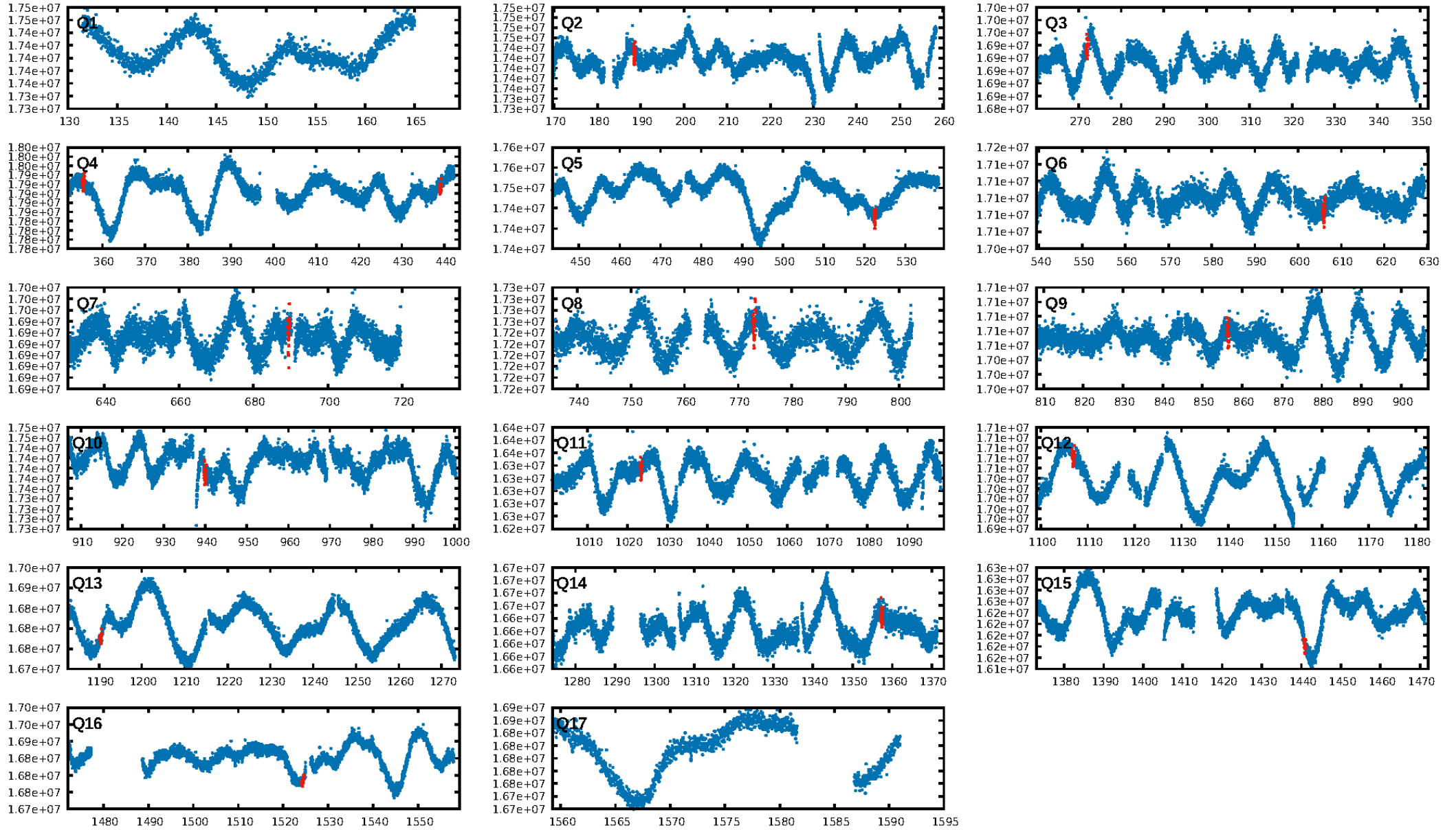
DV Fit Results:

Period = 83.48839 [0.00060] d
Epoch = 188.5419 [0.0052] BKJD
Rp/R* = 0.0308 [0.0039]
a/R* = 65.92 [37.38]
b = 0.79 [0.27]
Seff = 6.77 [2.74]
Teq = 411 [42] K
Rp = 3.16 [1.08] Re
a = 0.3777 [0.0998] AU
Ag = 1098.40 [638.34] [1.72σ]
Teffp = 3661 [418] K [7.74σ]

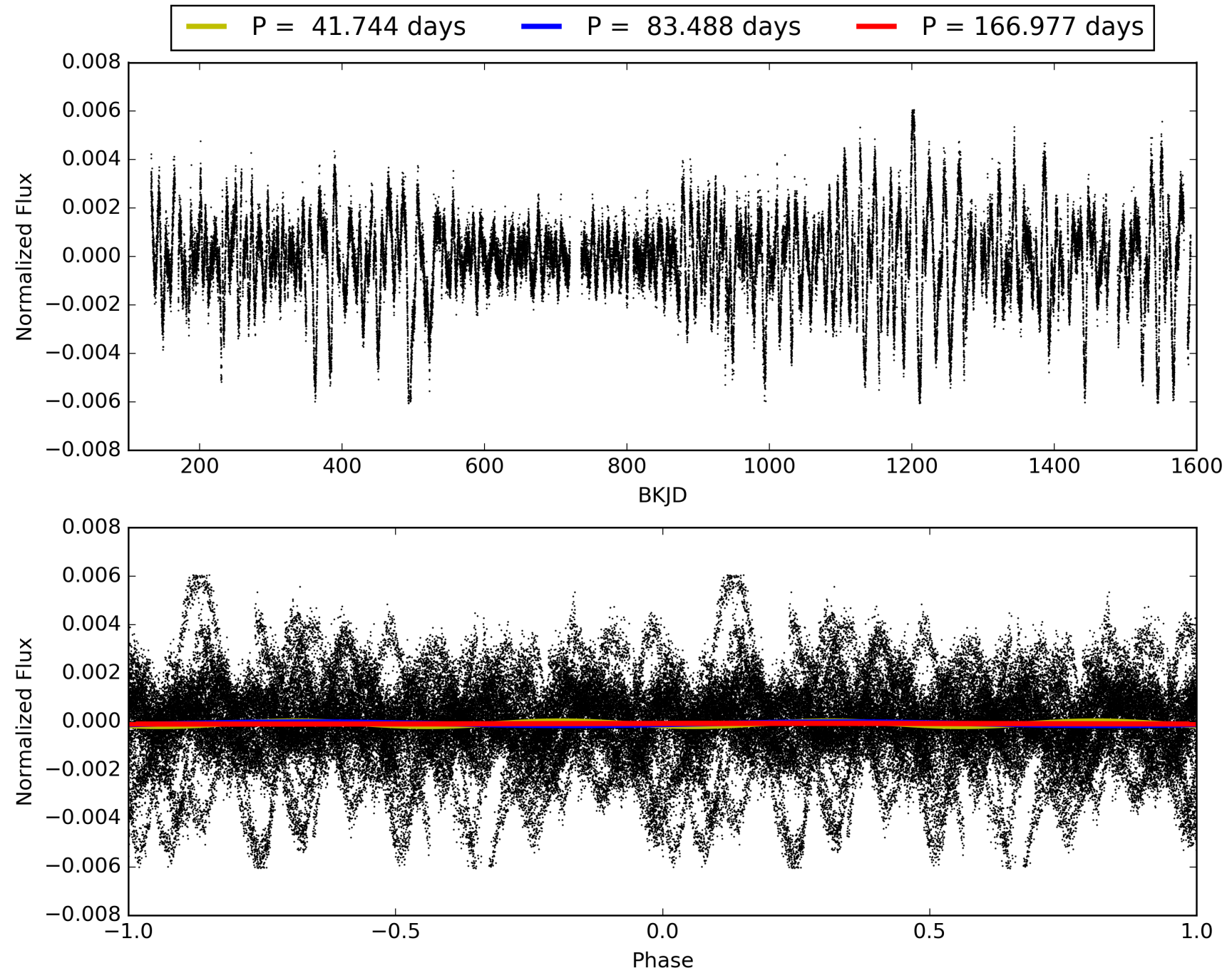
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [173.20σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 72.2%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 8.13e-67
RollingBand-fgt: 1.00 [16/16]
GhostDiagnostic-chr: 135.8
Centroid-sig: 0.2%
Centroid-so: 0.762 arcsec [1.67σ]
OotOffset-rm: 0.195 arcsec [1.04σ]
KicOffset-rm: 0.230 arcsec [1.23σ]
OotOffset-st: 4/4/4/3 [15]
KicOffset-st: 4/4/4/3 [15]
DiffImageQuality-fgm: 1.00 [15/15]
DiffImageOverlap-fno: 0.93 [14/15]

TCE 010864531-01, PDC Light Curves

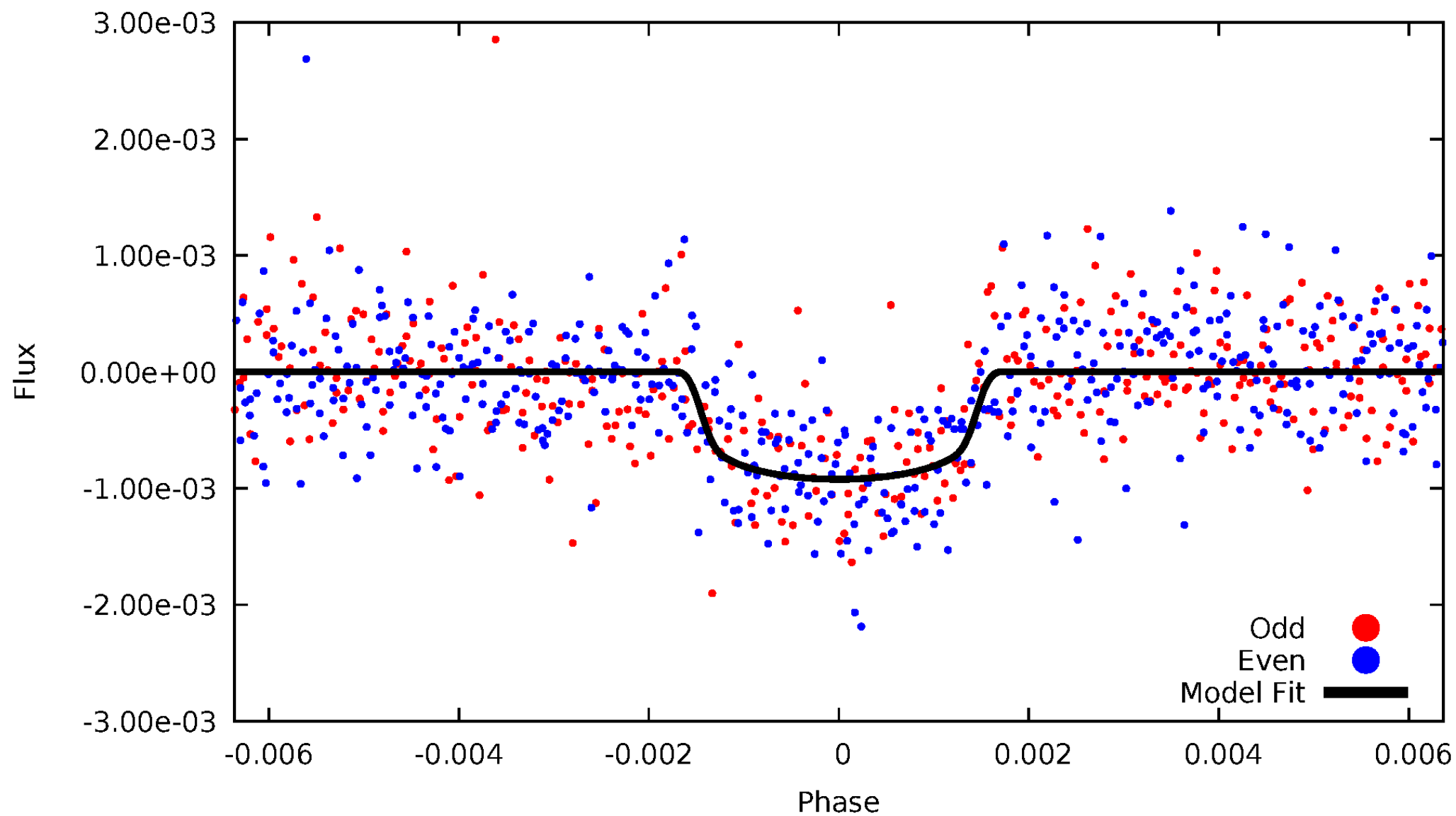


TCE 010864531-01



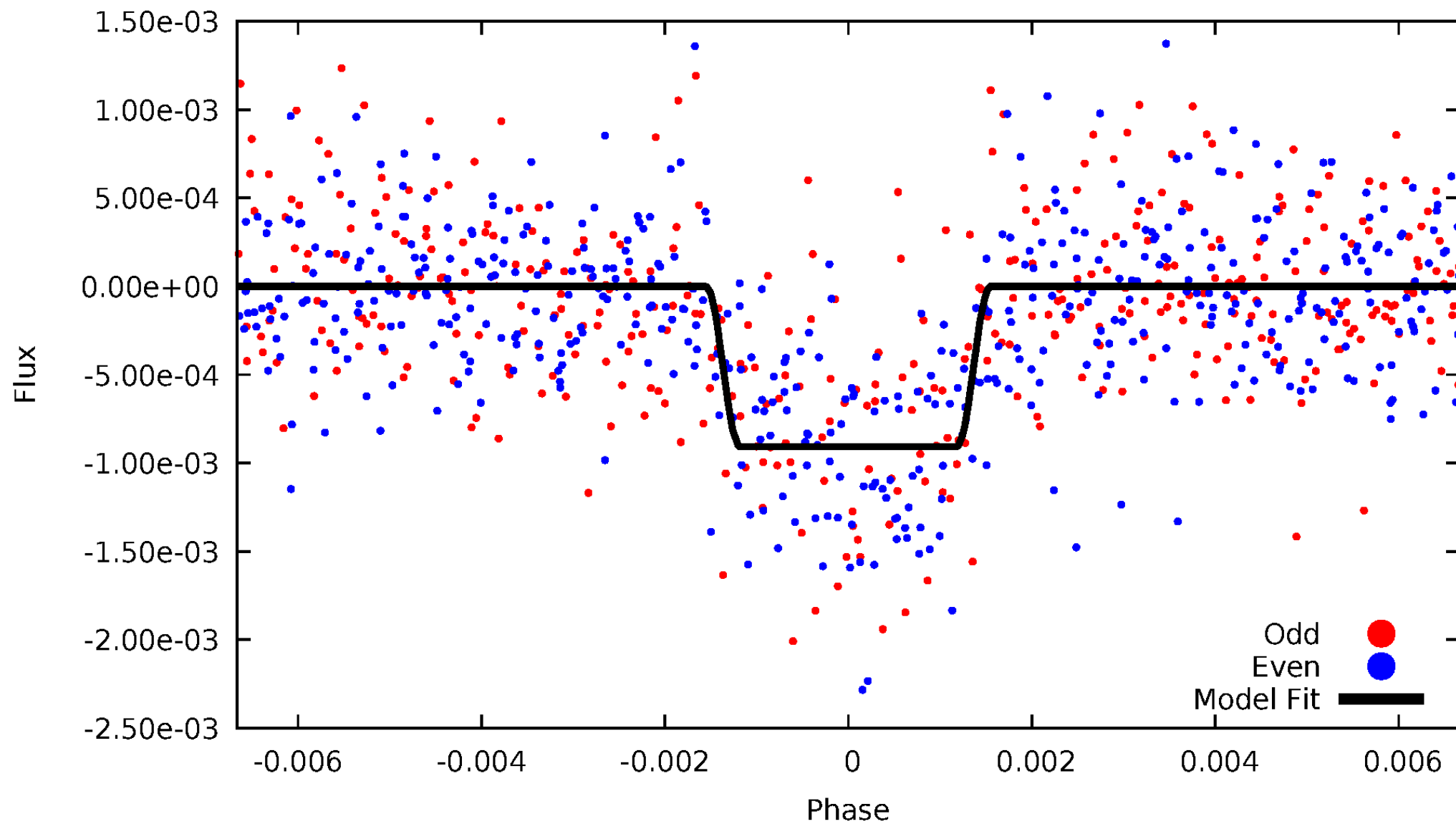
DV Odd/Even

TCE 010864531-01



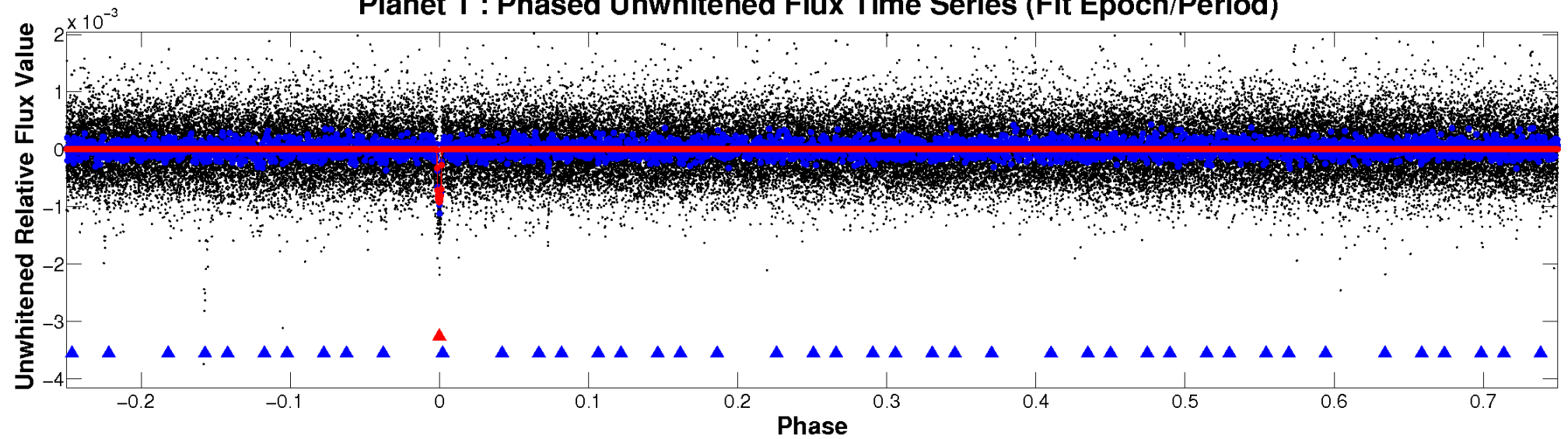
ALT Odd/Even

TCE 010864531-01

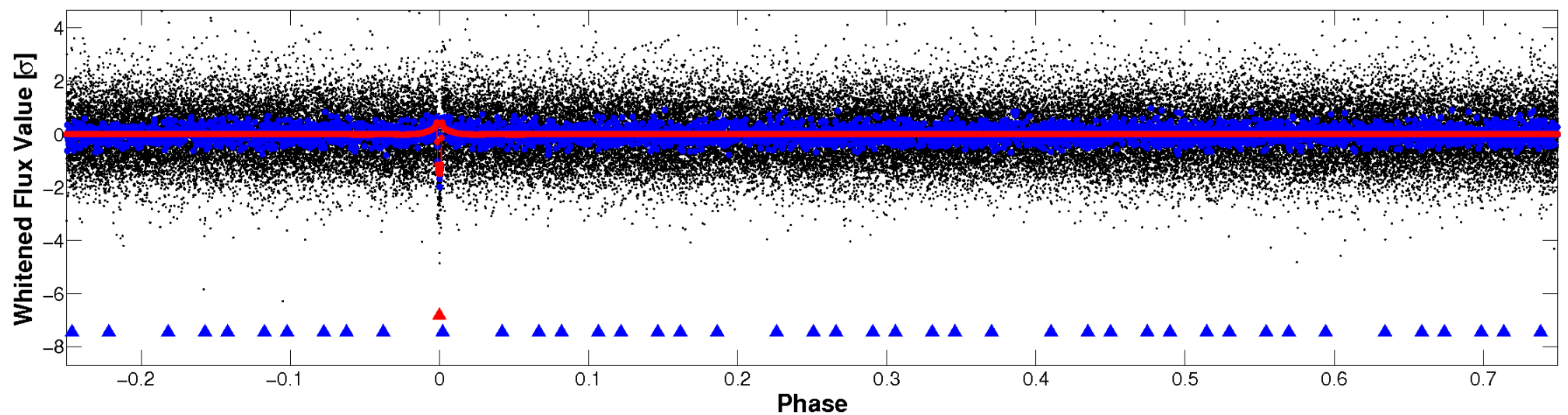


Non-Whitened Vs. Whitened Light Curve

Planet 1 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

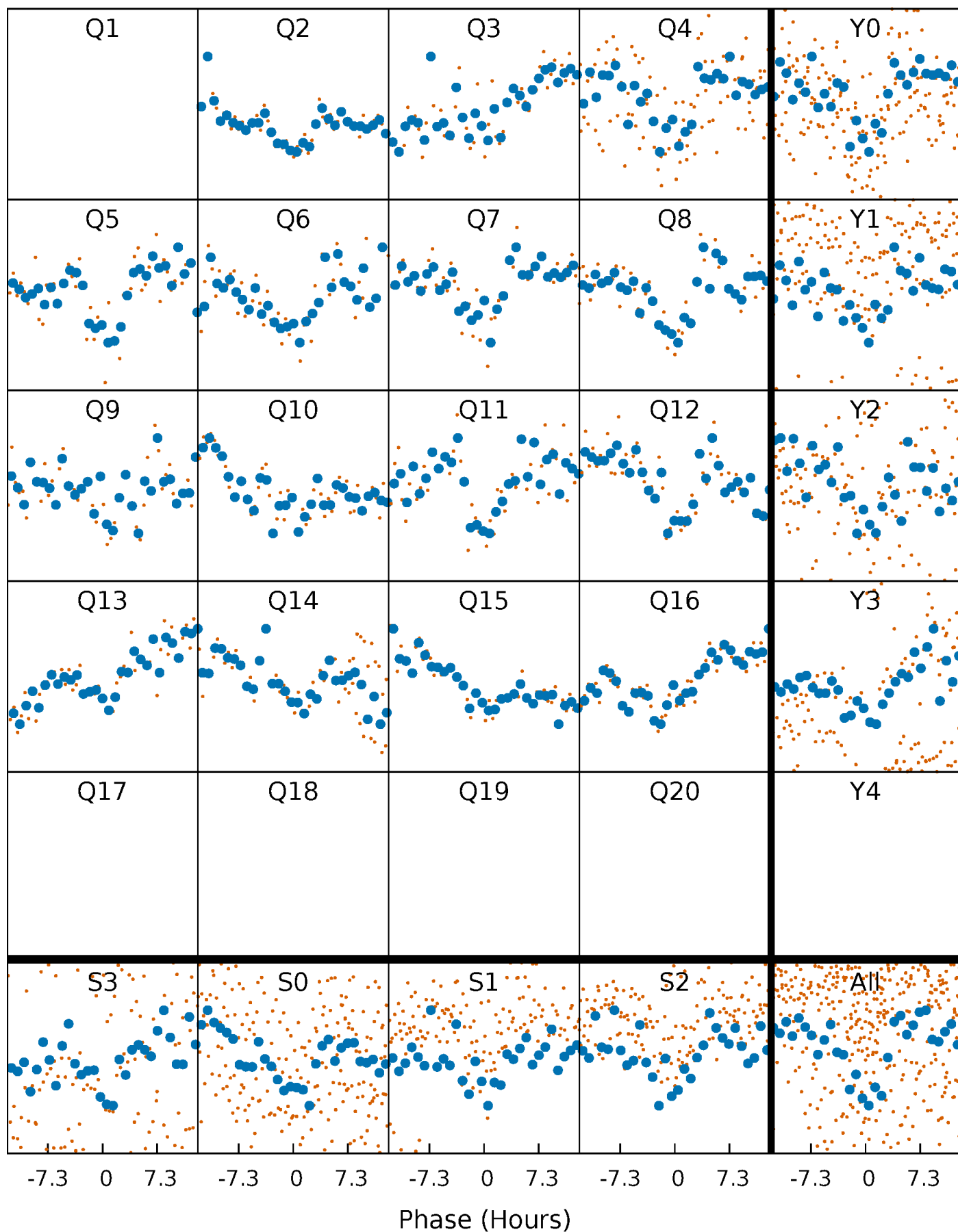


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



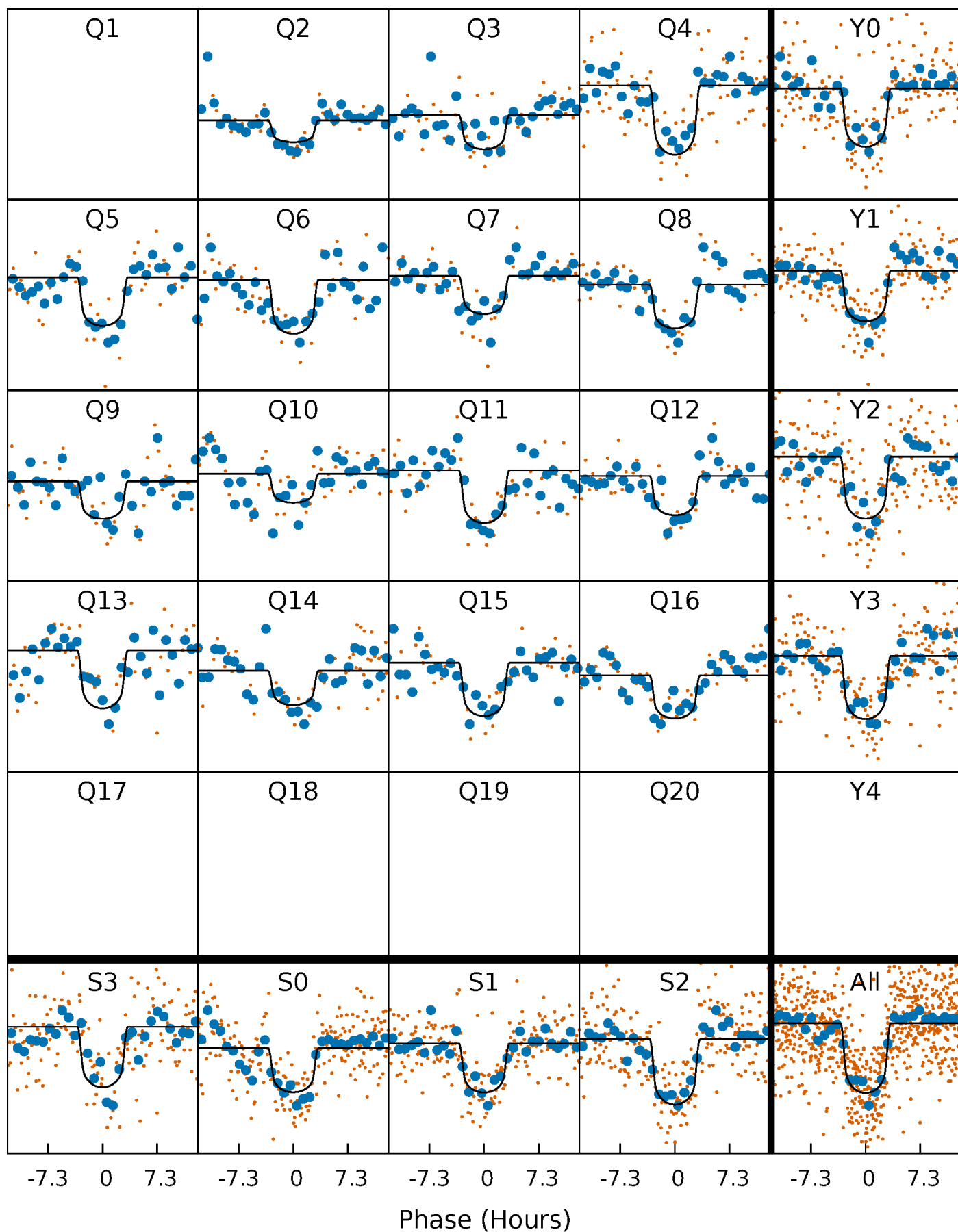
PDC Quarter-Phased Transit Curves

TCE 010864531-01 P= 83.488390 Days $T_0=188.541885$ (BKJD)



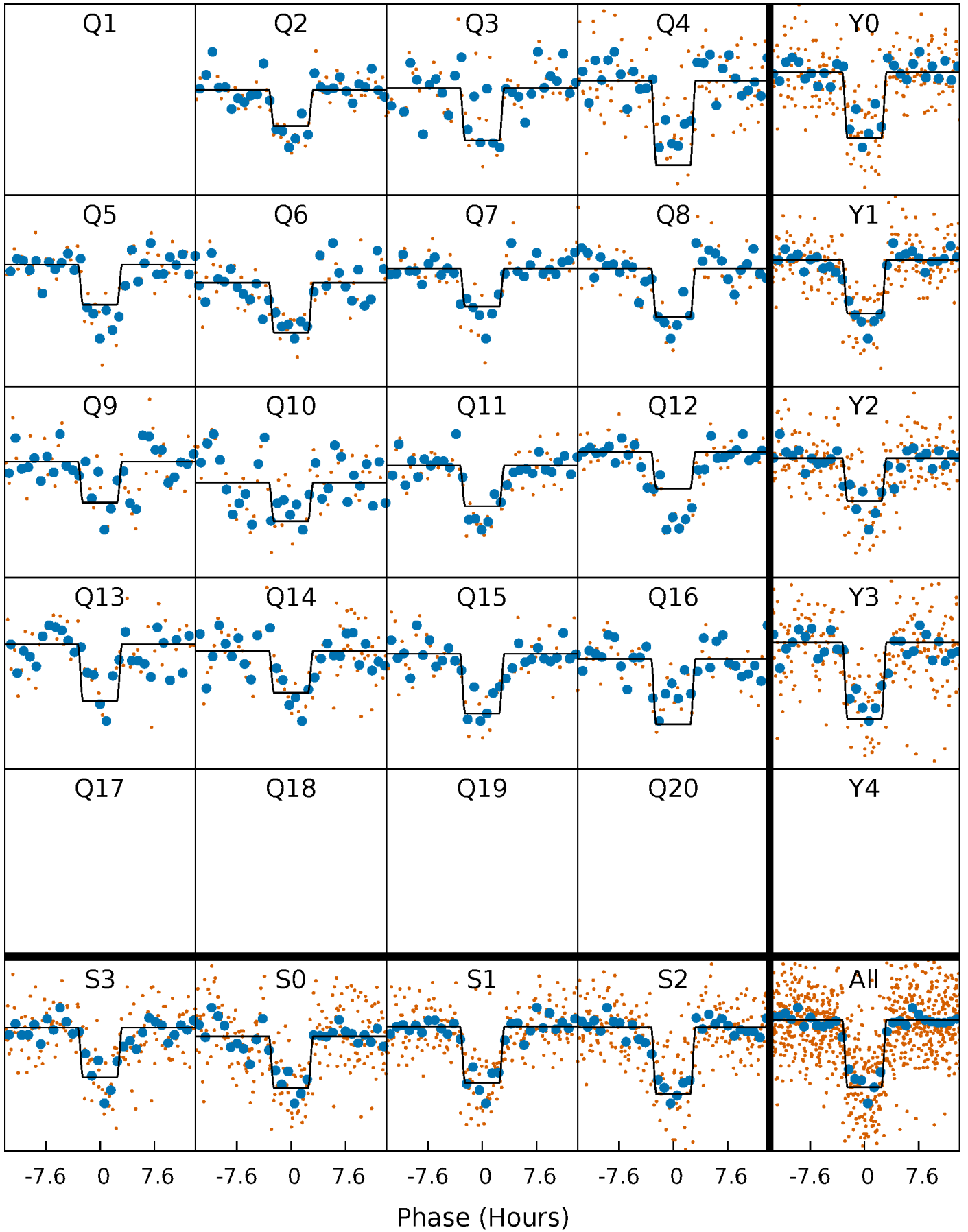
DV Quarter-Phased Transit Curves

TCE 010864531-01 P= 83.488390 Days $T_0=188.541885$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

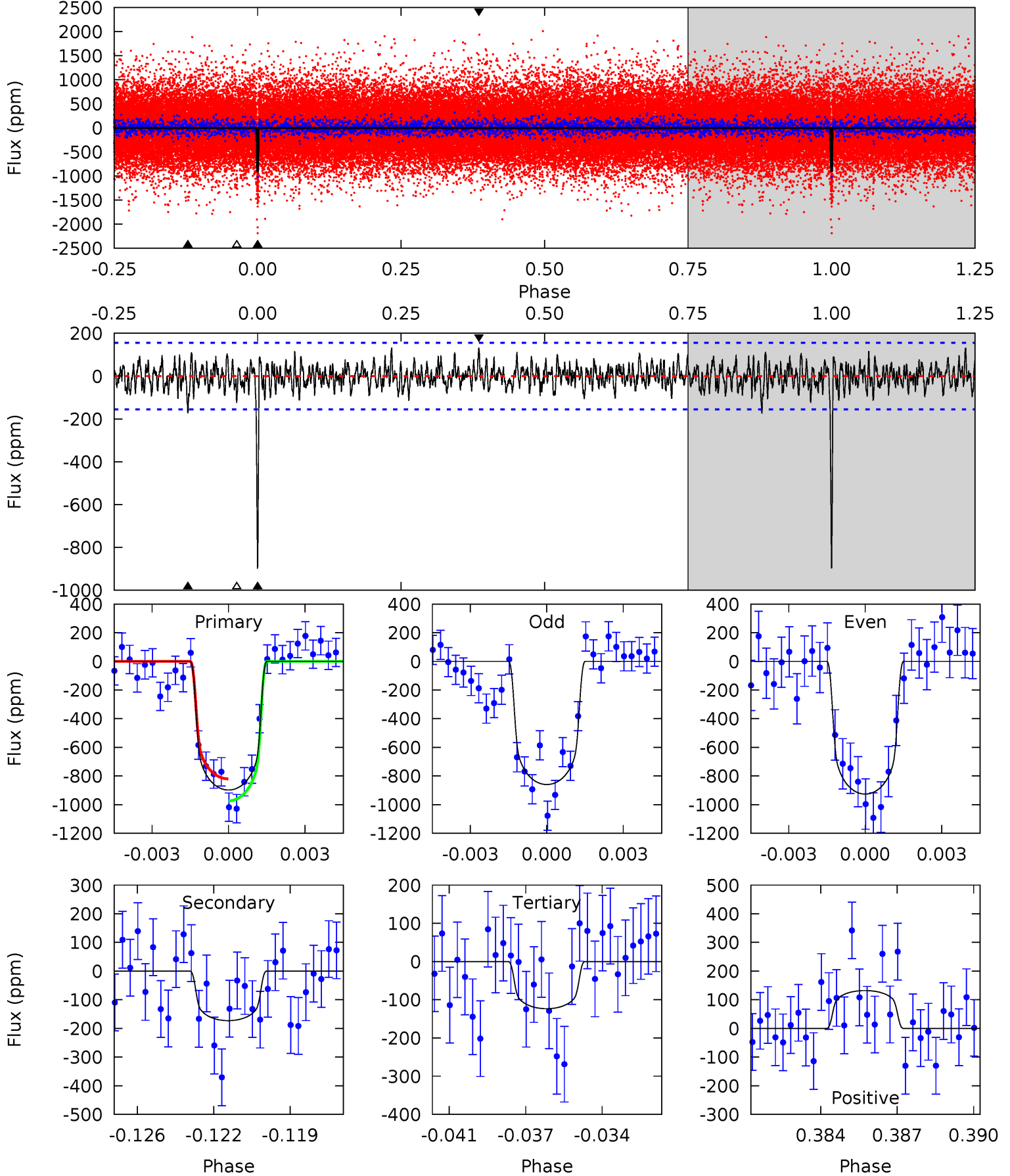
TCE 010864531-01 P= 83.488659 Days $T_0=188.542184$ (BKJD)



DV Model-Shift Uniqueness Test

010864531-01, P = 83.488390 Days, E = 105.053495 Days

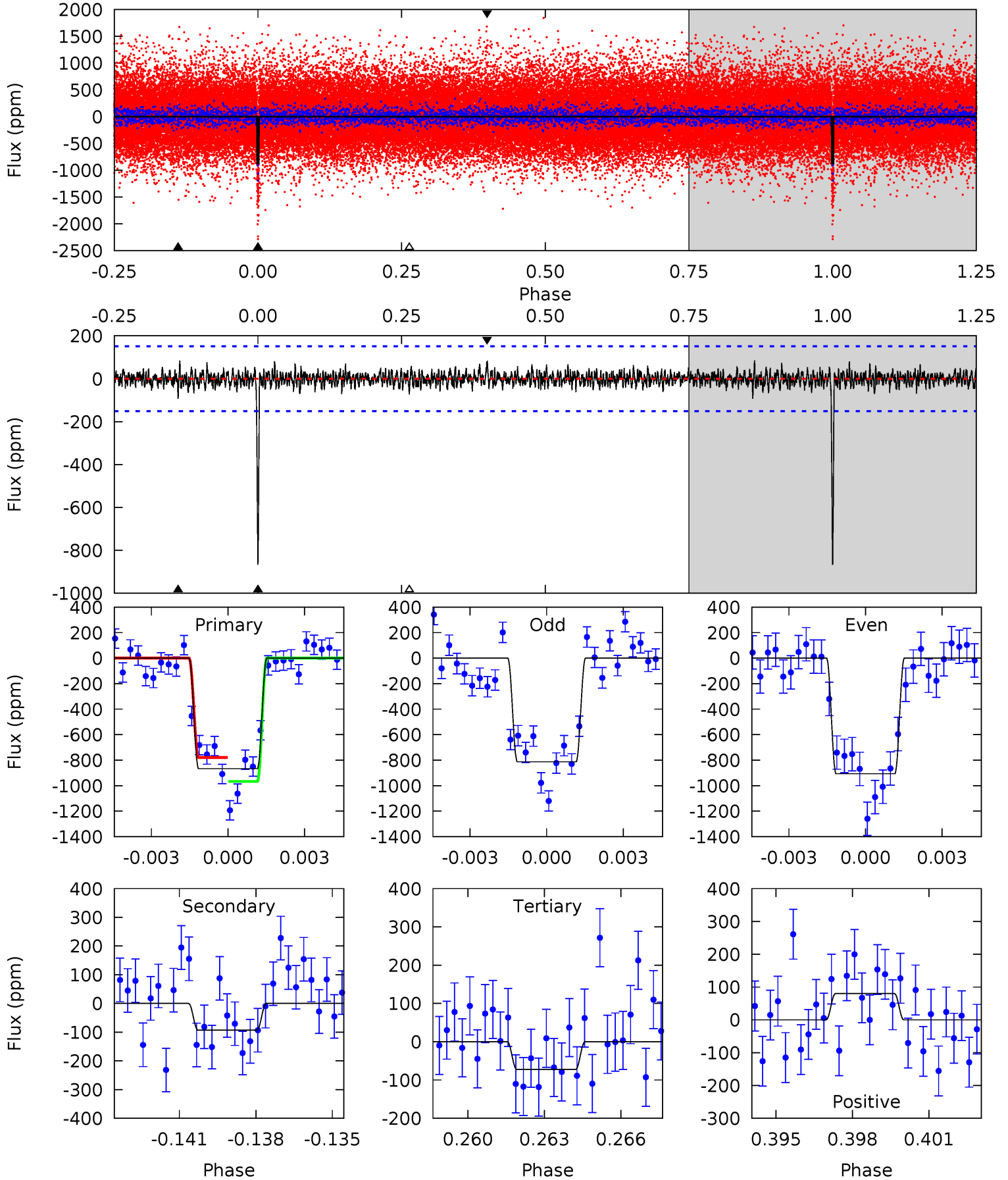
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
30.2	5.81	4.15	4.44	5.23	2.93	1.43	26.0	25.8	1.66	1.37	1.12	0.98	0.13	2.59



Alt Model-Shift Uniqueness Test

010864531-01, $P = 83.488659$ Days, $E = 105.053525$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
30.0	3.24	2.51	2.78	5.25	2.96	0.79	27.5	27.3	0.72	0.46	1.61	1.04	0.09	3.25



Stellar Parameters For KIC 010864531

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5910^{+176}_{-193}	$4.505^{+0.052}_{-0.208}$	$-0.020^{+0.250}_{-0.300}$	$0.940^{+0.297}_{-0.099}$	$1.032^{+0.124}_{-0.138}$	$1.750^{+0.470}_{-0.887}$
	+3%/-3%	+1%/-5%	+1250%/-1500%	+32%/-11%	+12%/-13%	+27%/-51%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 010864531-01 / KOI 2080.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-173 ± 30	$3.29^{+0.62}_{-0.52}$	588^{+42}_{-31}	4129^{+268}_{-231}	1207^{+527}_{-387}
Alt.	-93 ± 29	$3.23^{+0.66}_{-0.49}$	589^{+41}_{-29}	3731^{+267}_{-260}	669^{+376}_{-262}

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 $A_{obs} \gg 1.0$

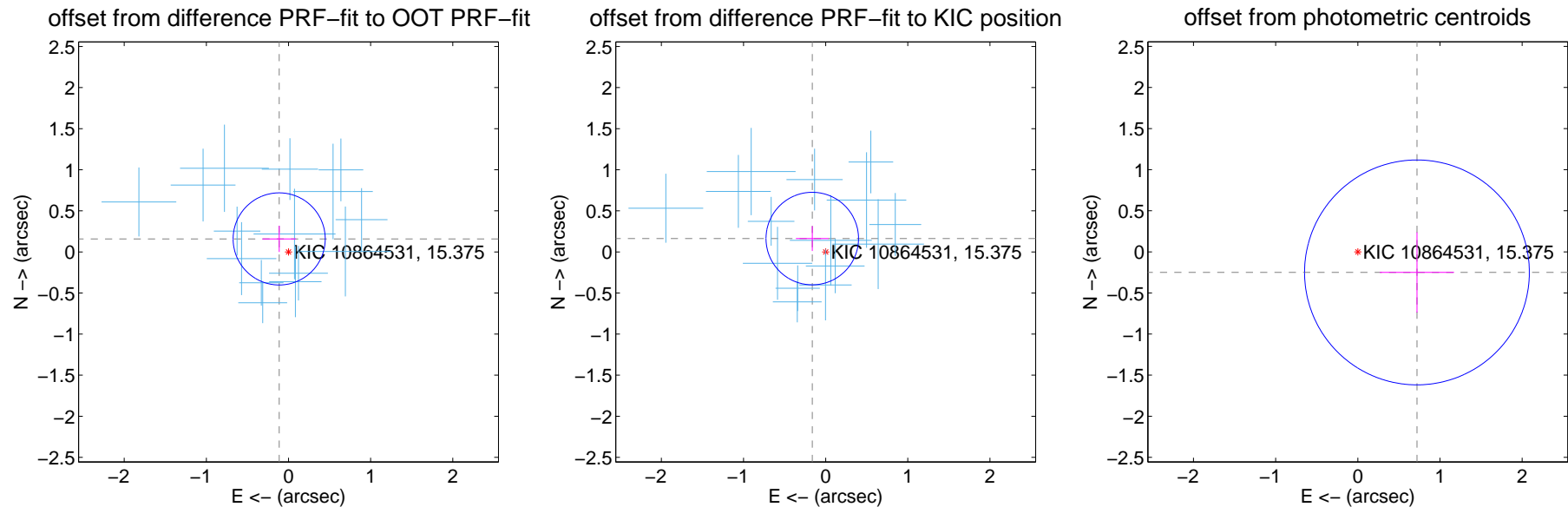
DV Centroid Data

Supplemental centroid analysis for 010864531-01. Kepler magnitude: 15.38. Transit SNR 18.98

There are 15 quarters with good PRF difference image offsets

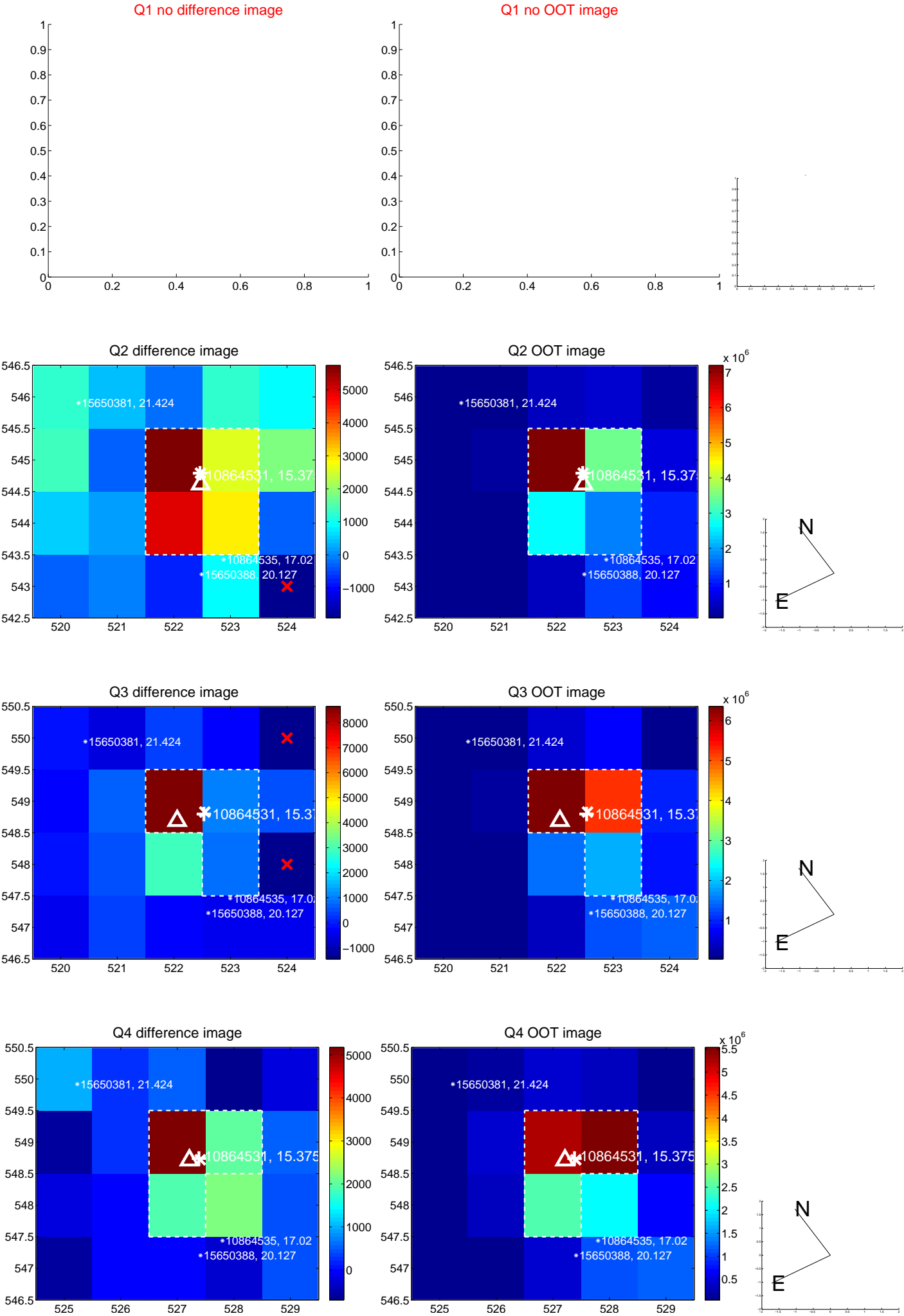
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.195 ± 0.187	1.04	0.114 ± 0.204	0.158 ± 0.159
PRF-fit source offset from KIC position	0.230 ± 0.188	1.23	0.163 ± 0.199	0.163 ± 0.152
photometric centroid source offset	0.76 ± 0.46	1.67	-0.72 ± 0.45	-0.25 ± 0.49

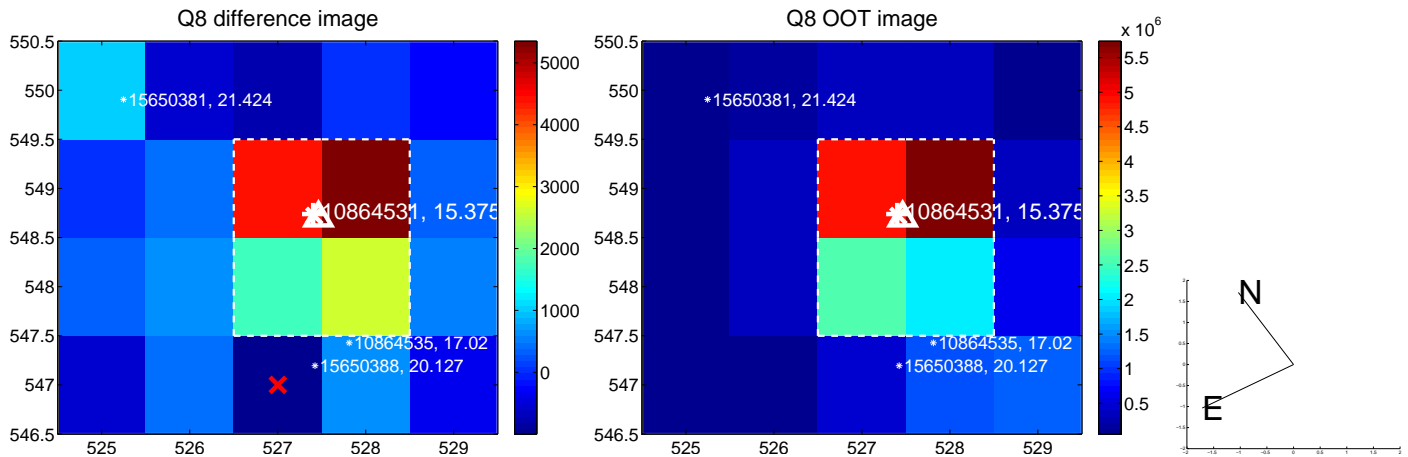
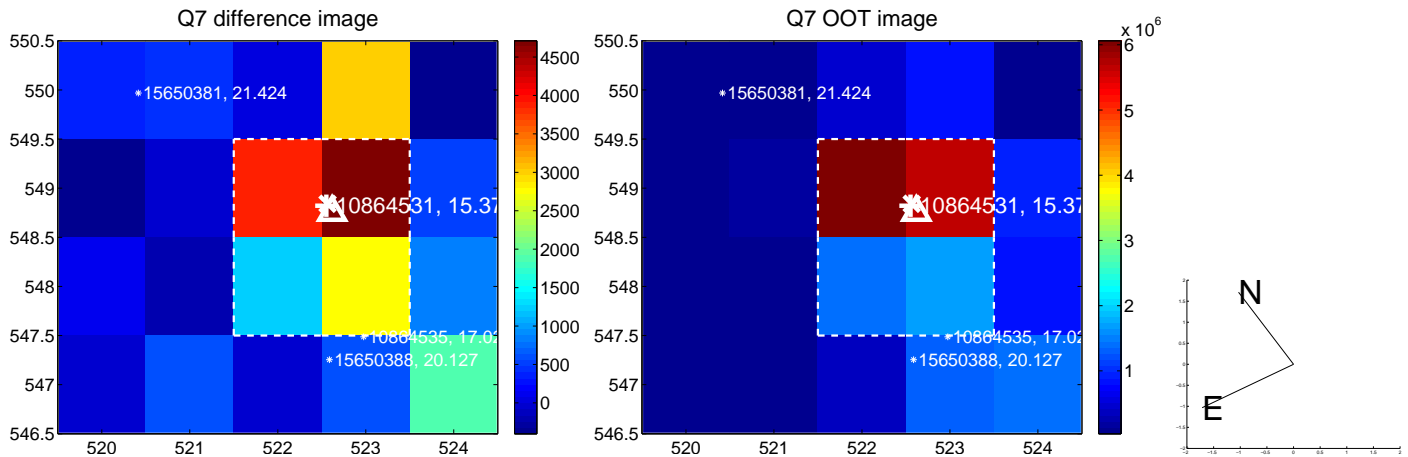
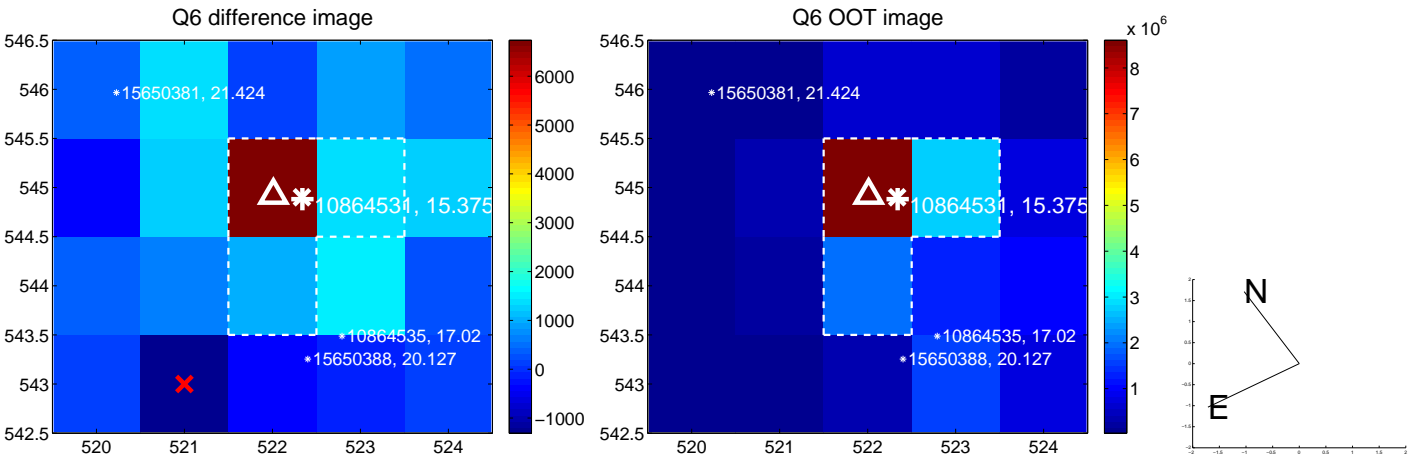
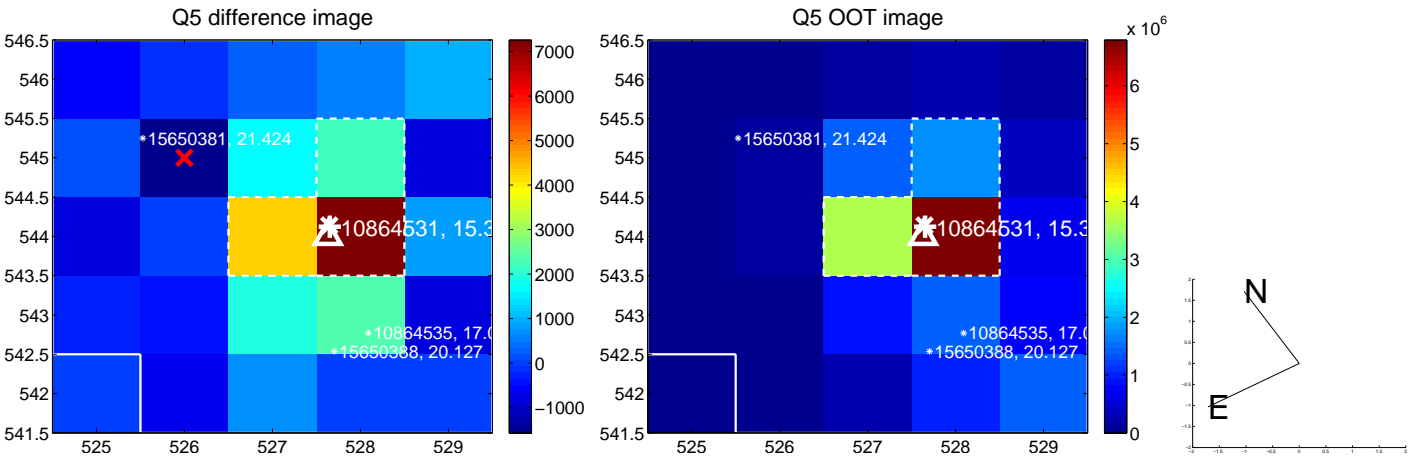


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- 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.

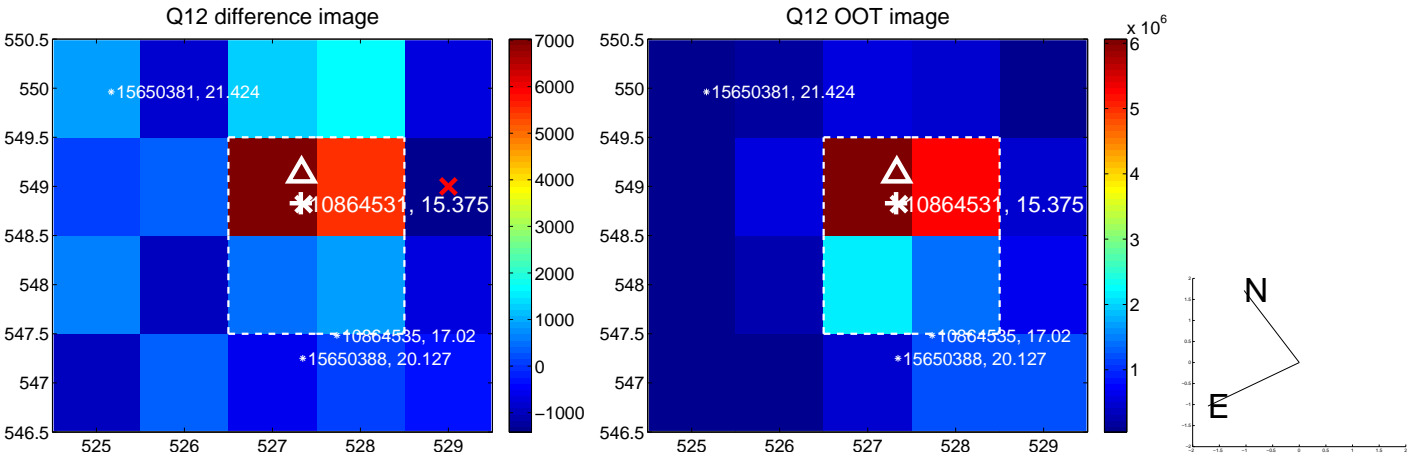
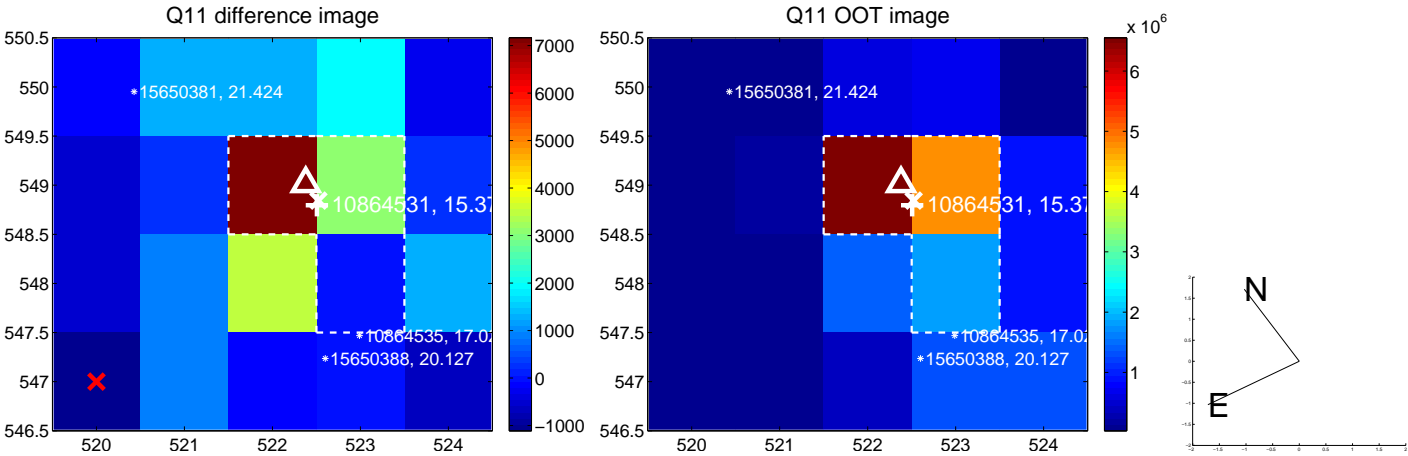
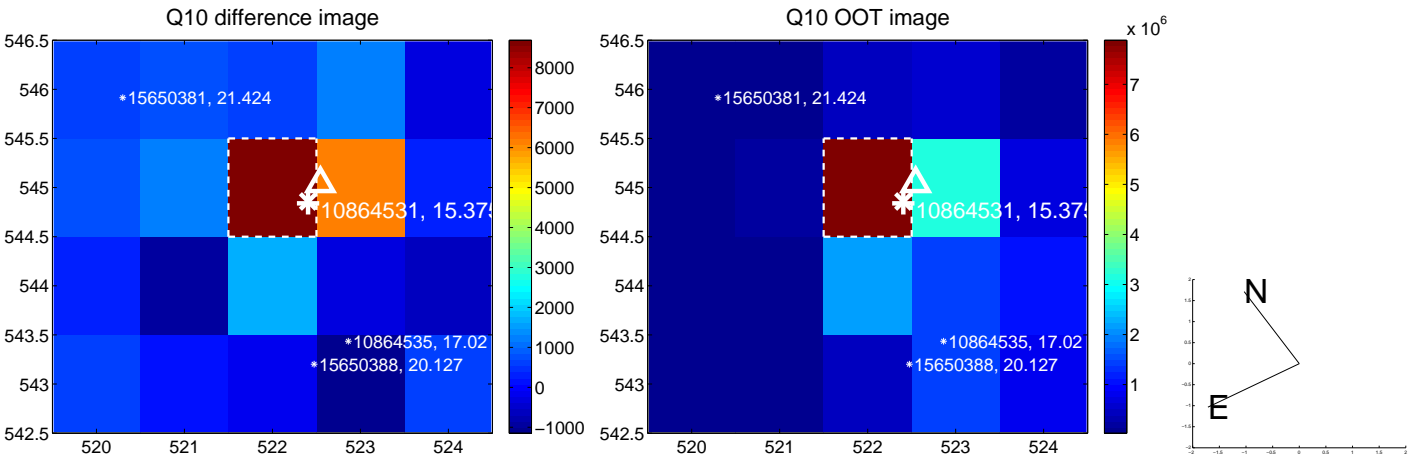
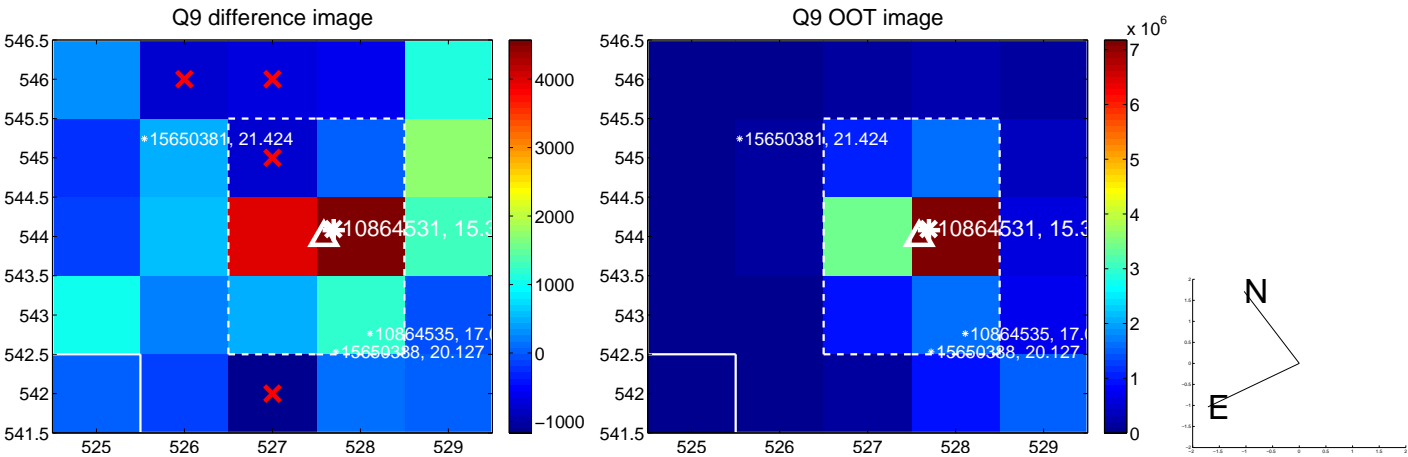
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



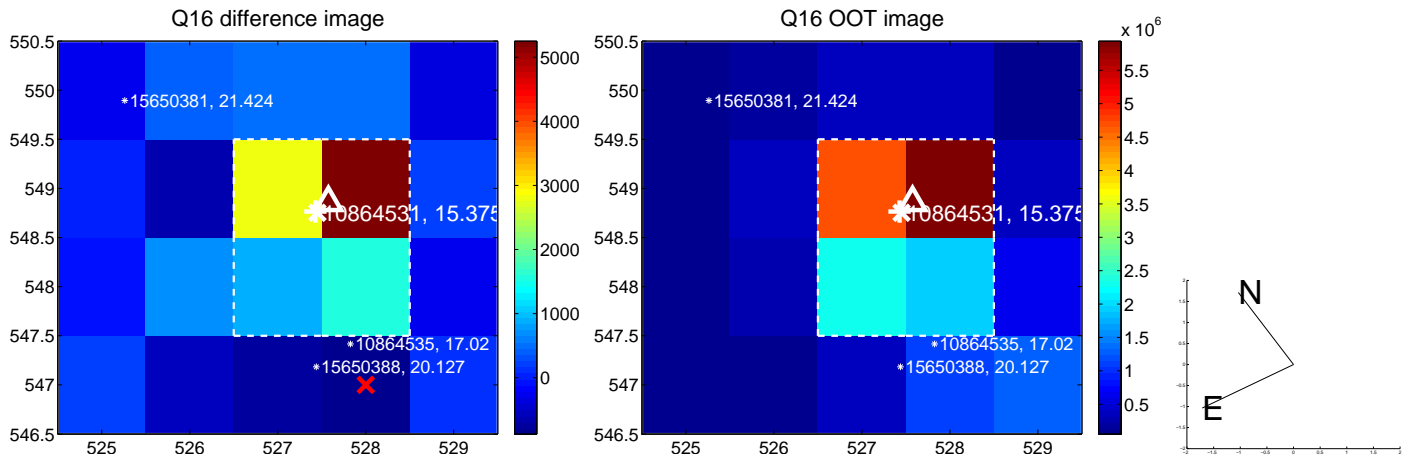
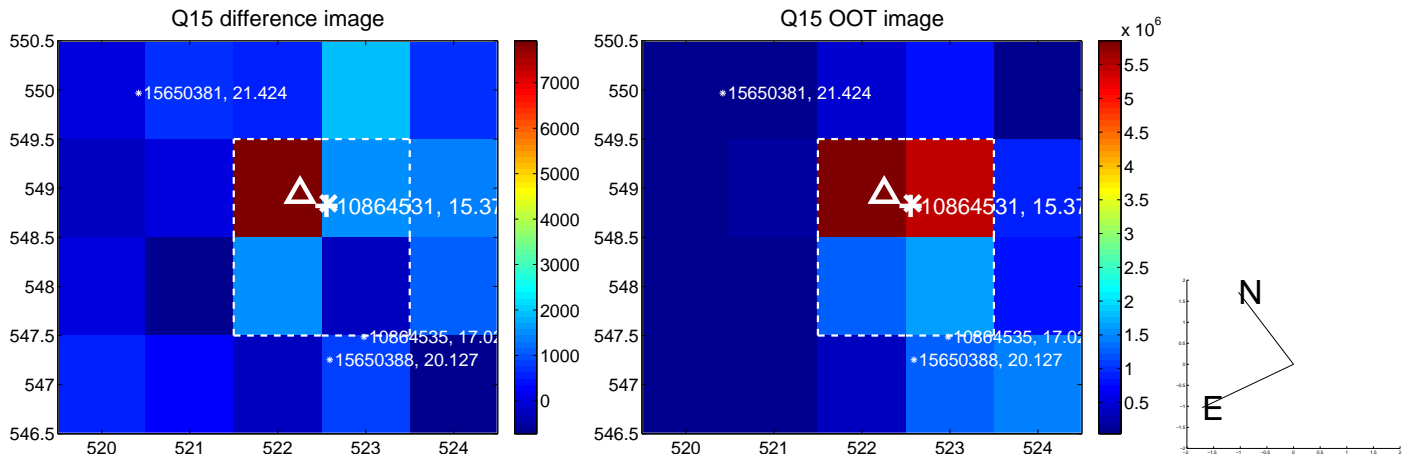
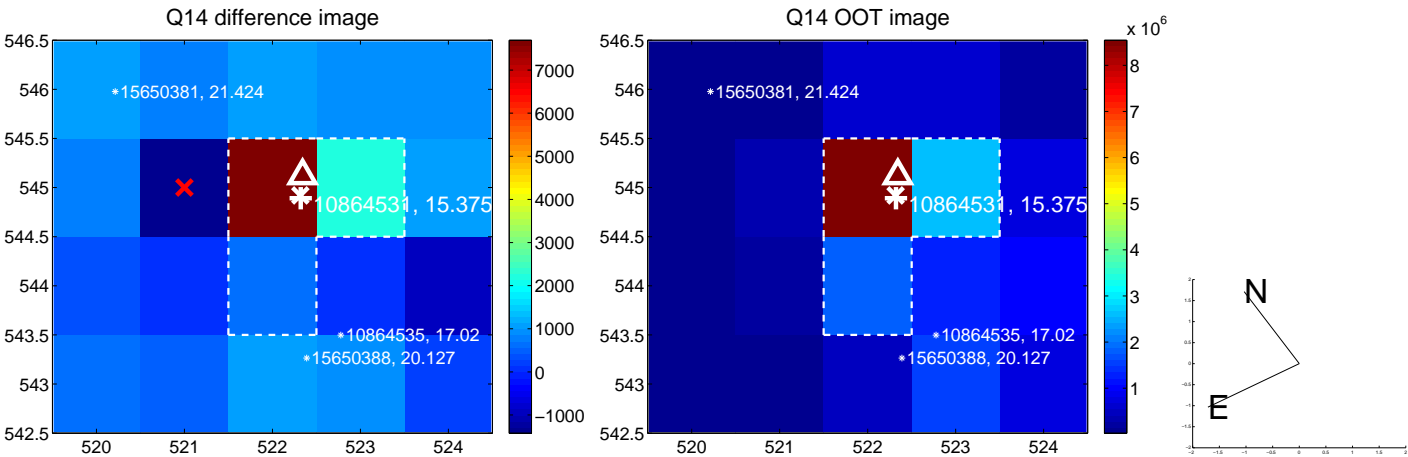
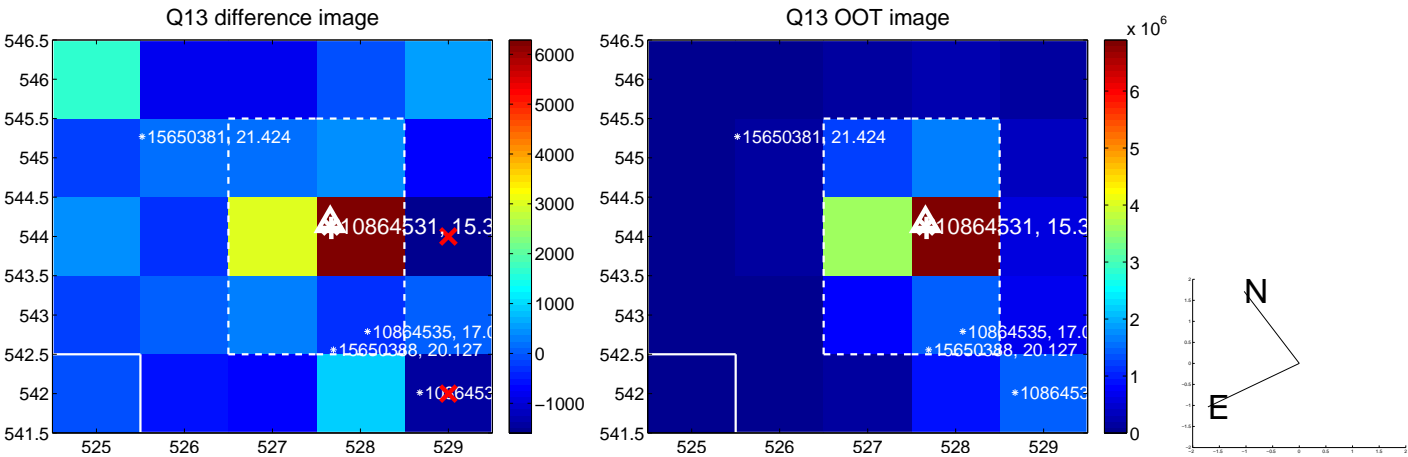
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



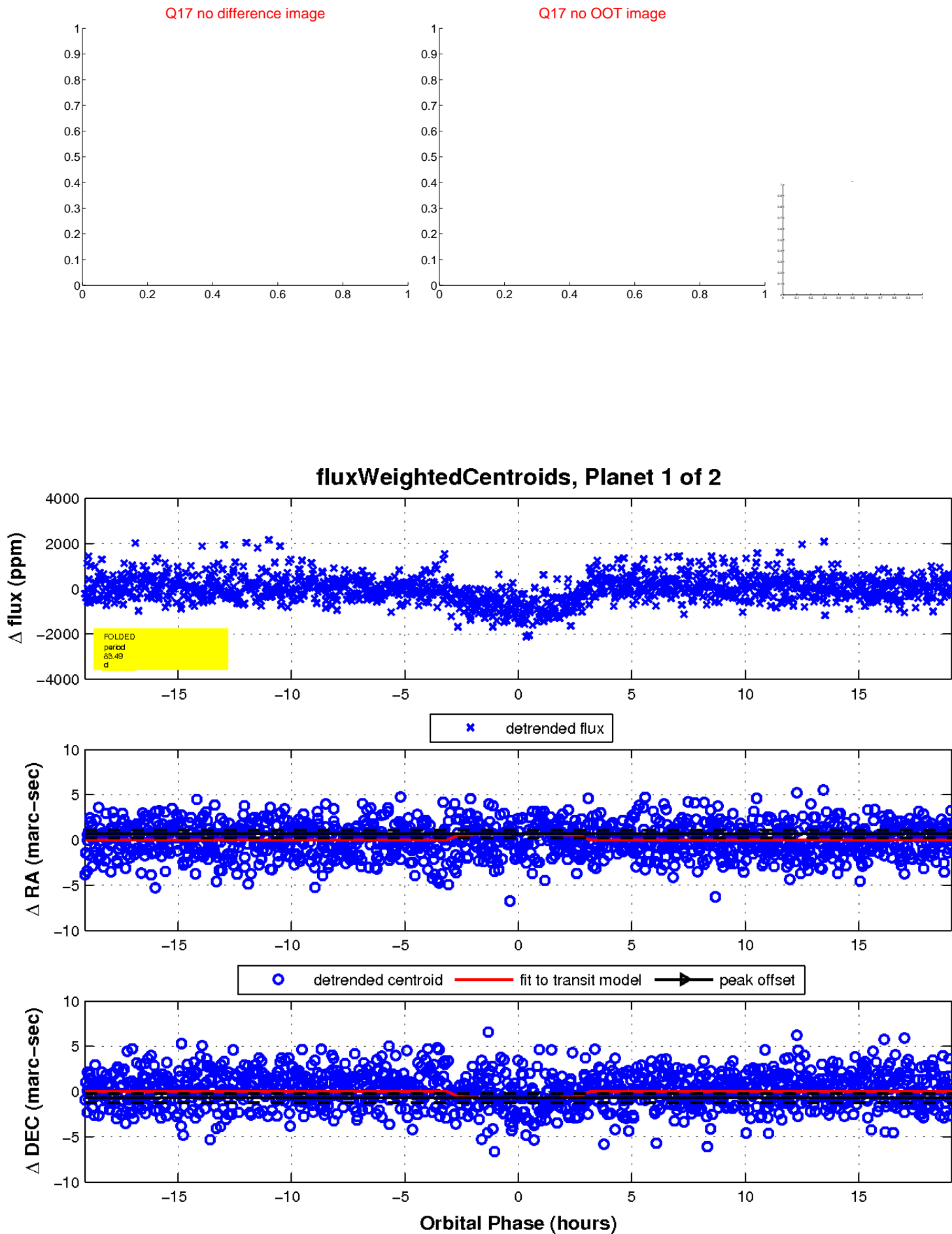
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

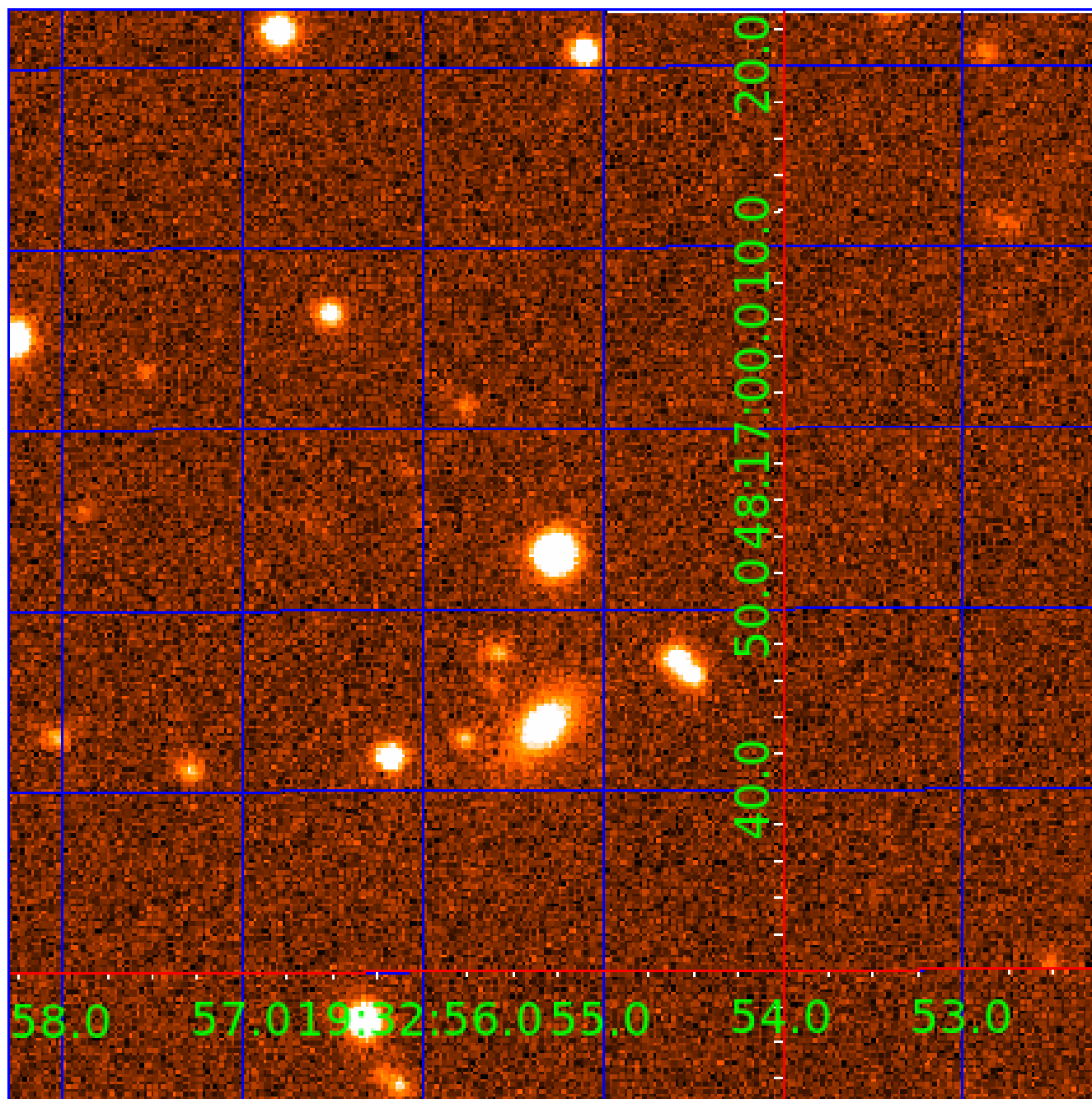


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010864531

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})
010864531-01	OBS	2080.01	83.488390	188.541885	922.2	6.371	18.7	19.0	0.94	5910	3.15	6.77
010864531-02	OBS	2080.02	34.060770	141.359706	808.1	2.514	17.7	18.8	0.94	5910	3.04	22.37

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010864531-01	OBS	PC	0.53	0	0	0	0	NO_COMMENT
010864531-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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.

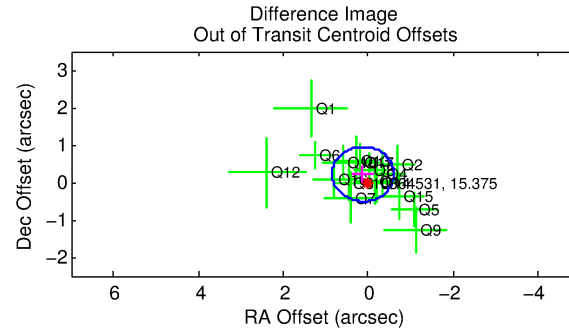
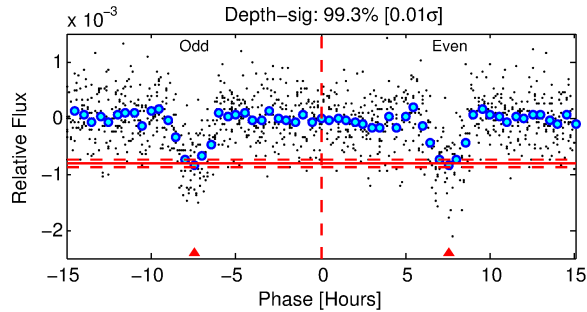
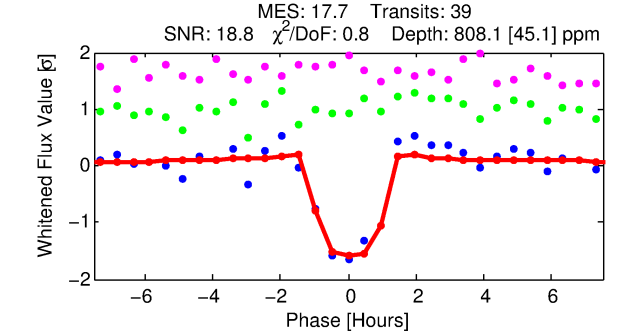
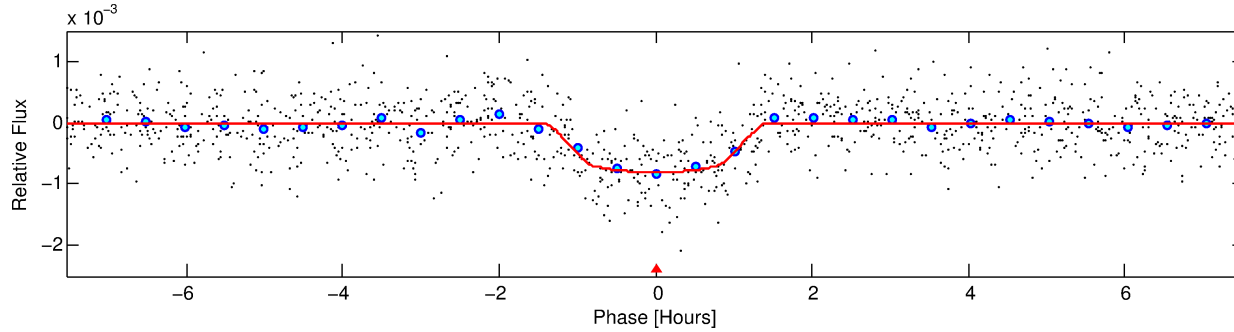
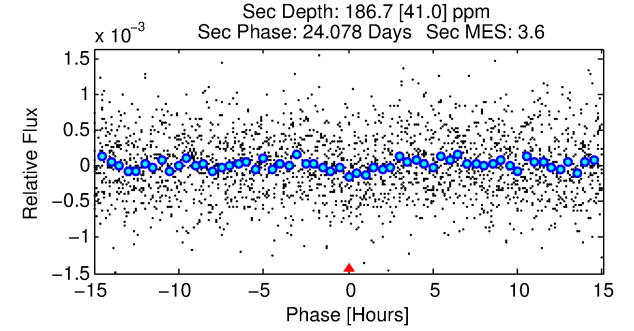
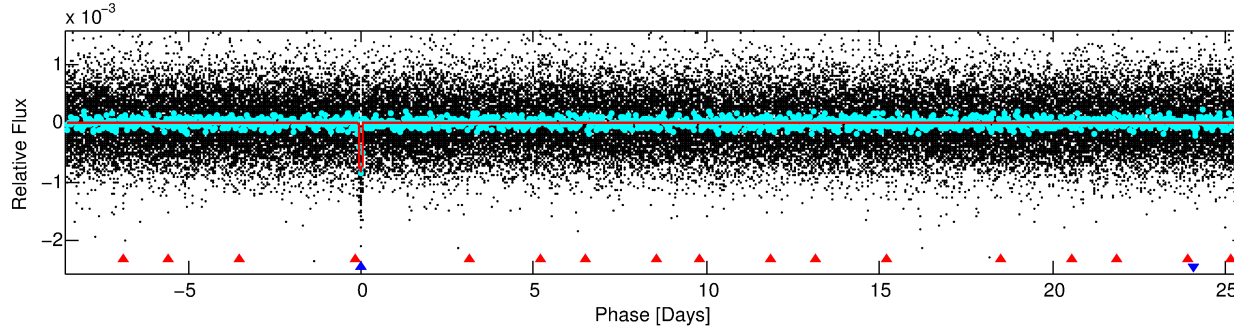
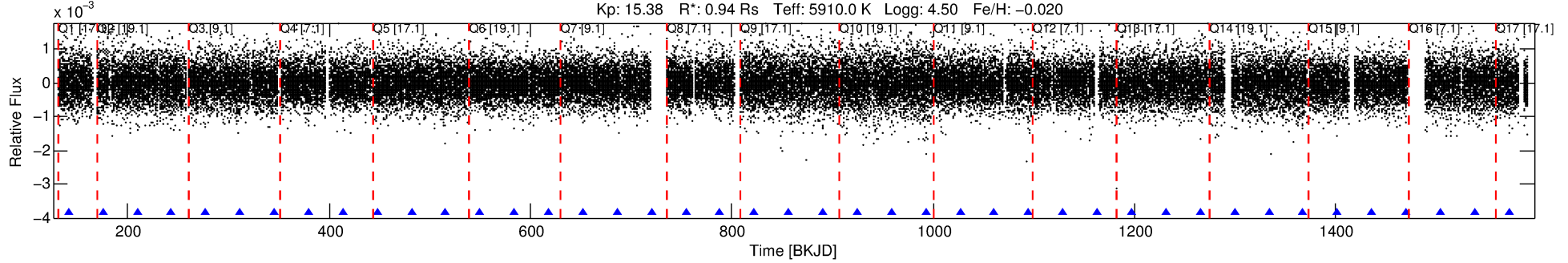
Ephemeris Match Information For 010864531-02

No Significant Match Found

DV One-Page Summary

KIC: 10864531 Candidate: 2 of 2 Period: 34.061 d
KOI: K02080.02 Name: Kepler-358b Corr: 0.986

Kp: 15.38 R*: 0.94 Rs Teff: 5910.0 K Logg: 4.50 Fe/H: -0.020



DV Fit Results:

Period = 34.06077 [0.00012] d
Epoch = 141.3597 [0.0028] BKJD
Rp/R* = 0.0296 [0.0073]
a/R* = 61.24 [69.66]
b = 0.84 [0.40]
Seff = 22.37 [9.04]
Teff = 555 [56] K
Rp = 3.04 [1.22] Re
a = 0.2078 [0.0549] AU
Ag = 481.38 [319.63] [1.50σ]
Teffp = 4016 [560] K [6.15σ]

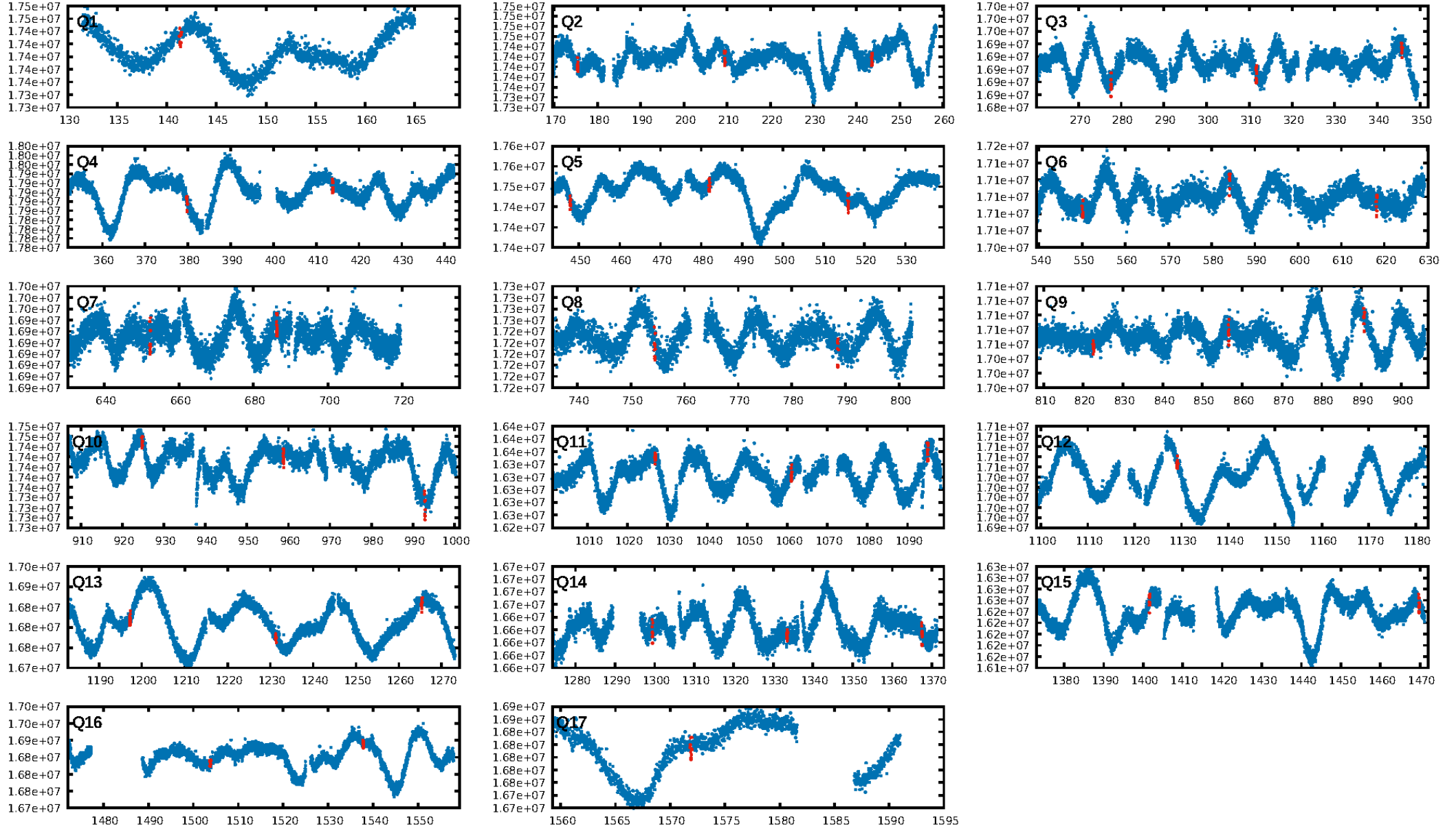
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [173.20σ]
ModelChiSquare2-sig: 50.8%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.49e-63
RollingBand-fgt: 1.00 [37/37]
GhostDiagnostic-chr: 24.64
Centroid-sig: 7.6%
Centroid-so: 0.428 arcsec [0.80σ]
OotOffset-rm: 0.252 arcsec [1.04σ]
KicOffset-rm: 0.279 arcsec [1.17σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.94 [16/17]
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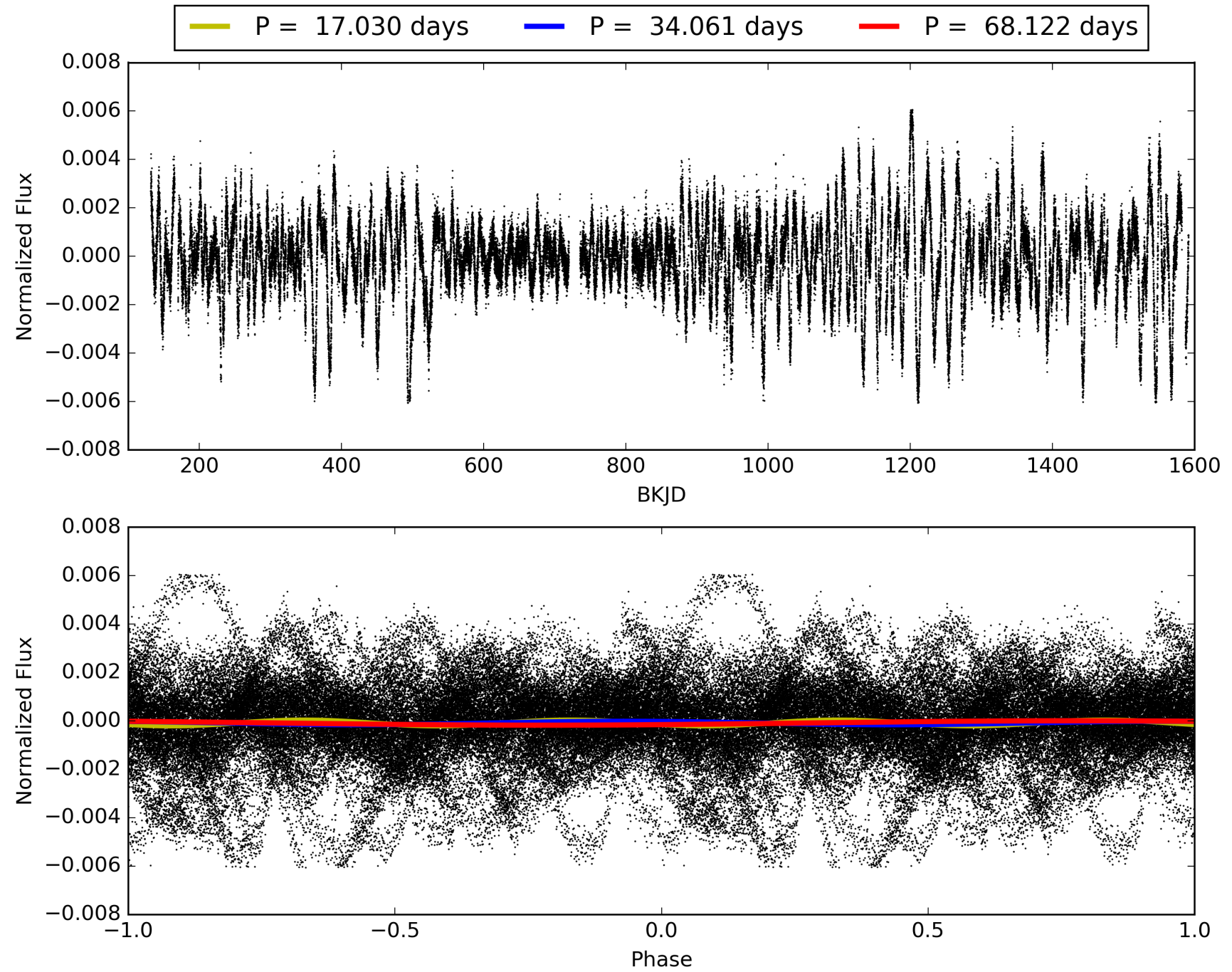
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 010864531-02, PDC Light Curves

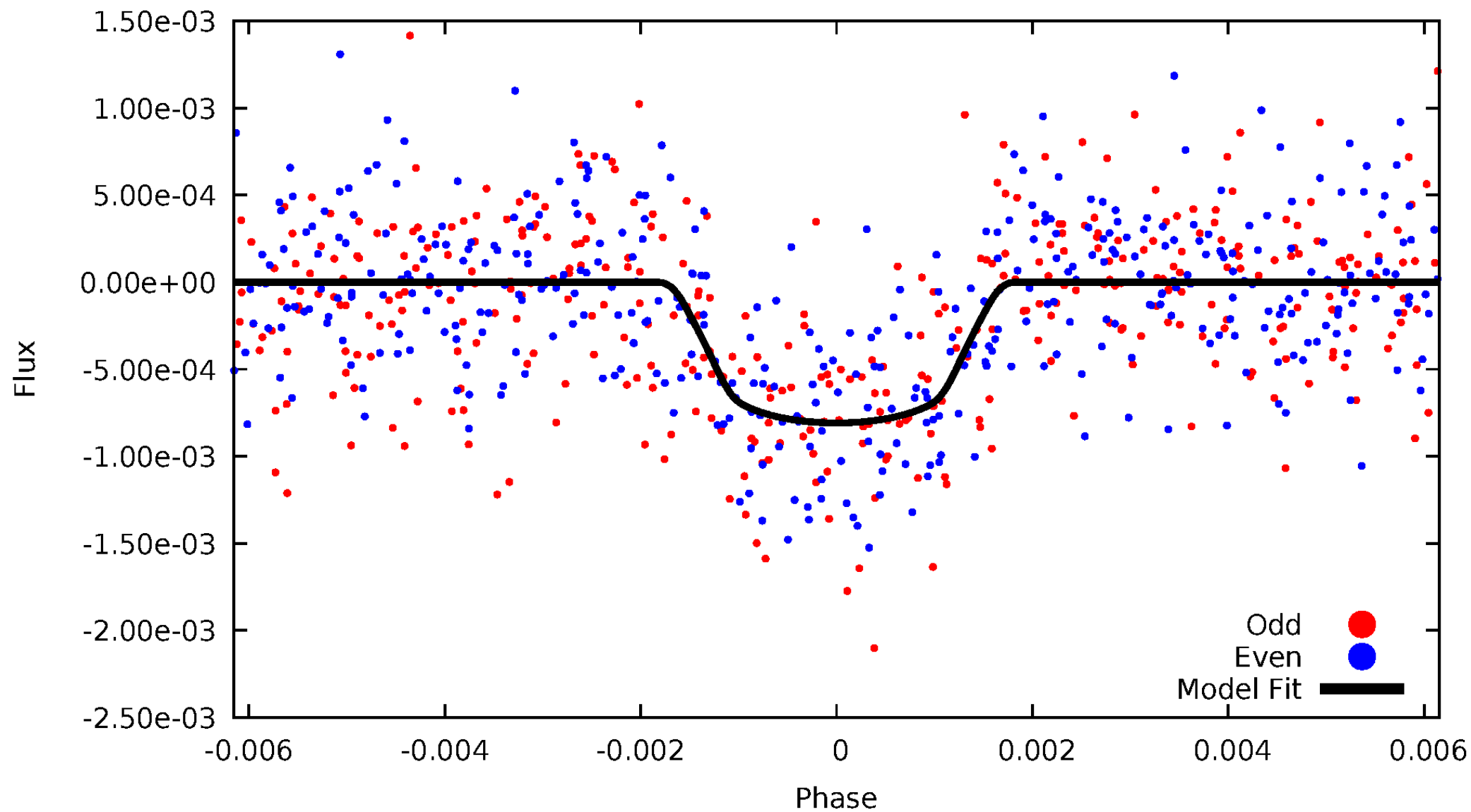


TCE 010864531-02



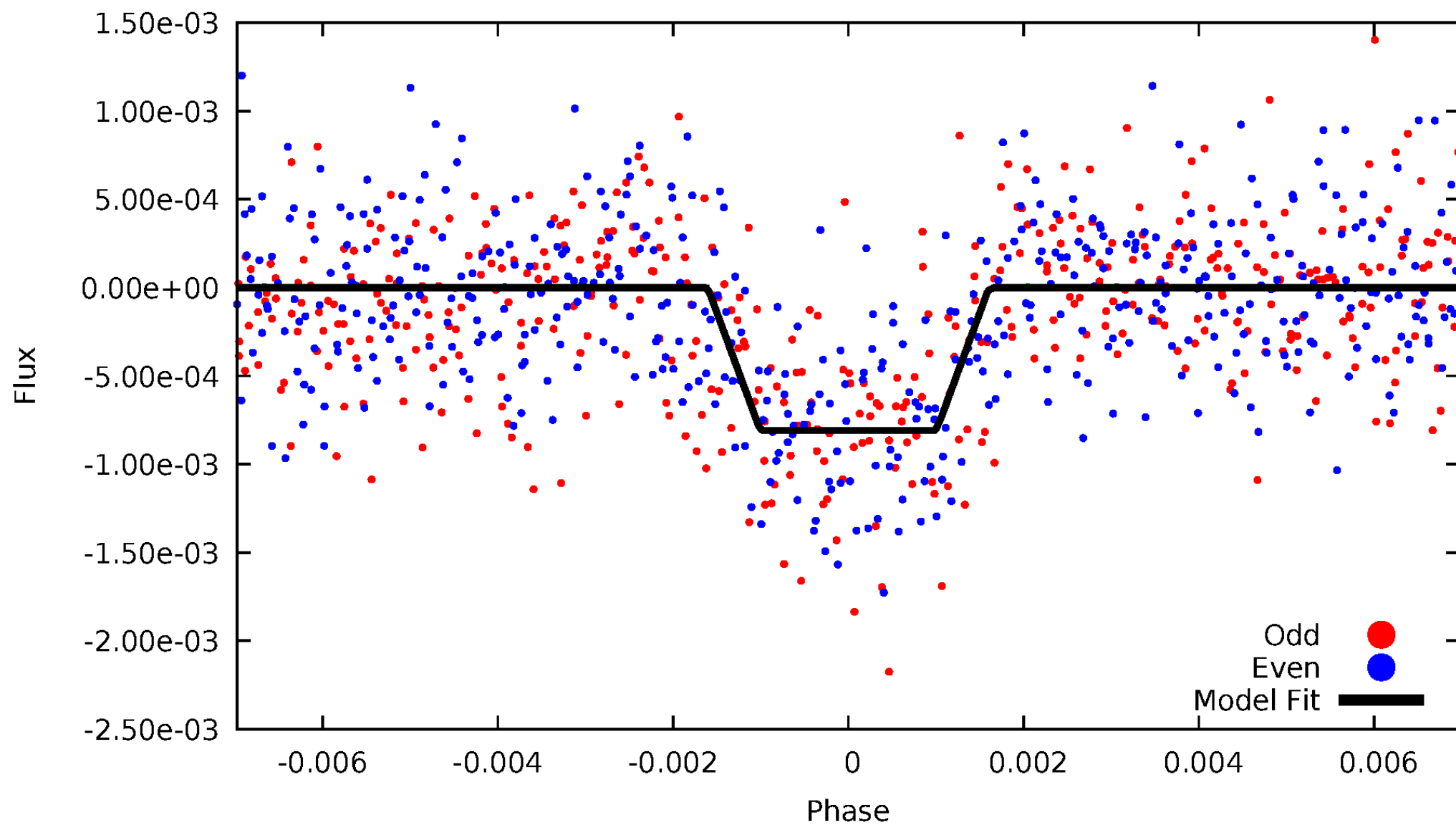
DV Odd/Even

TCE 010864531-02



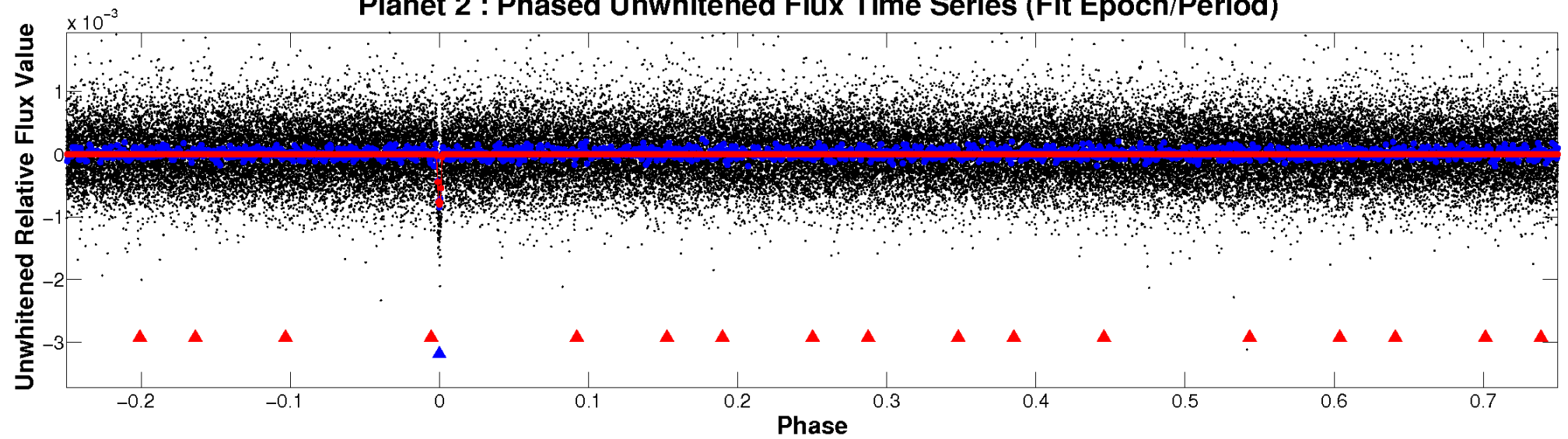
ALT Odd/Even

TCE 010864531-02

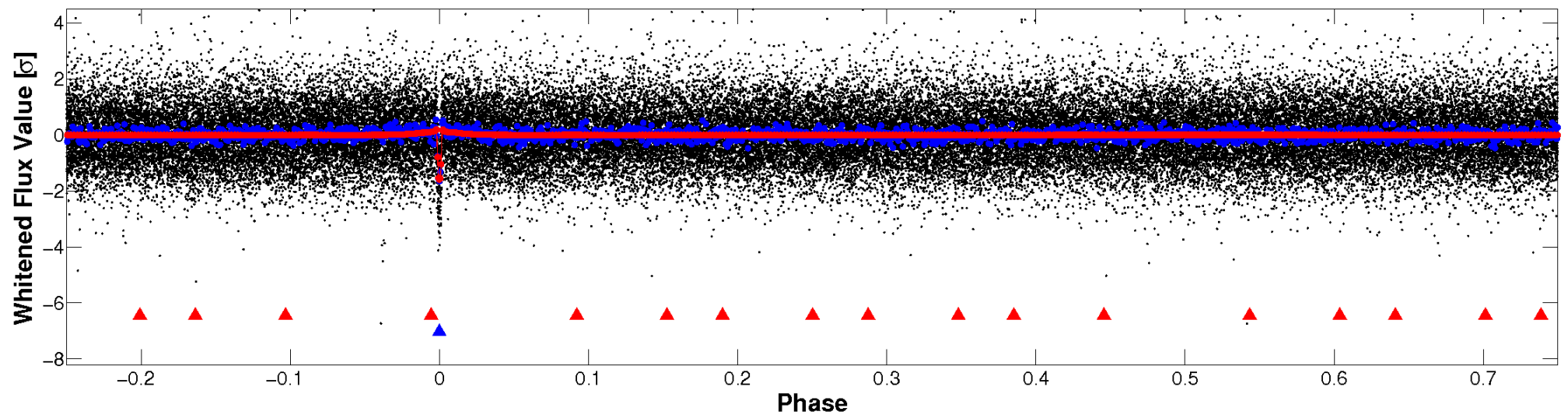


Non-Whitened Vs. Whitened Light Curve

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

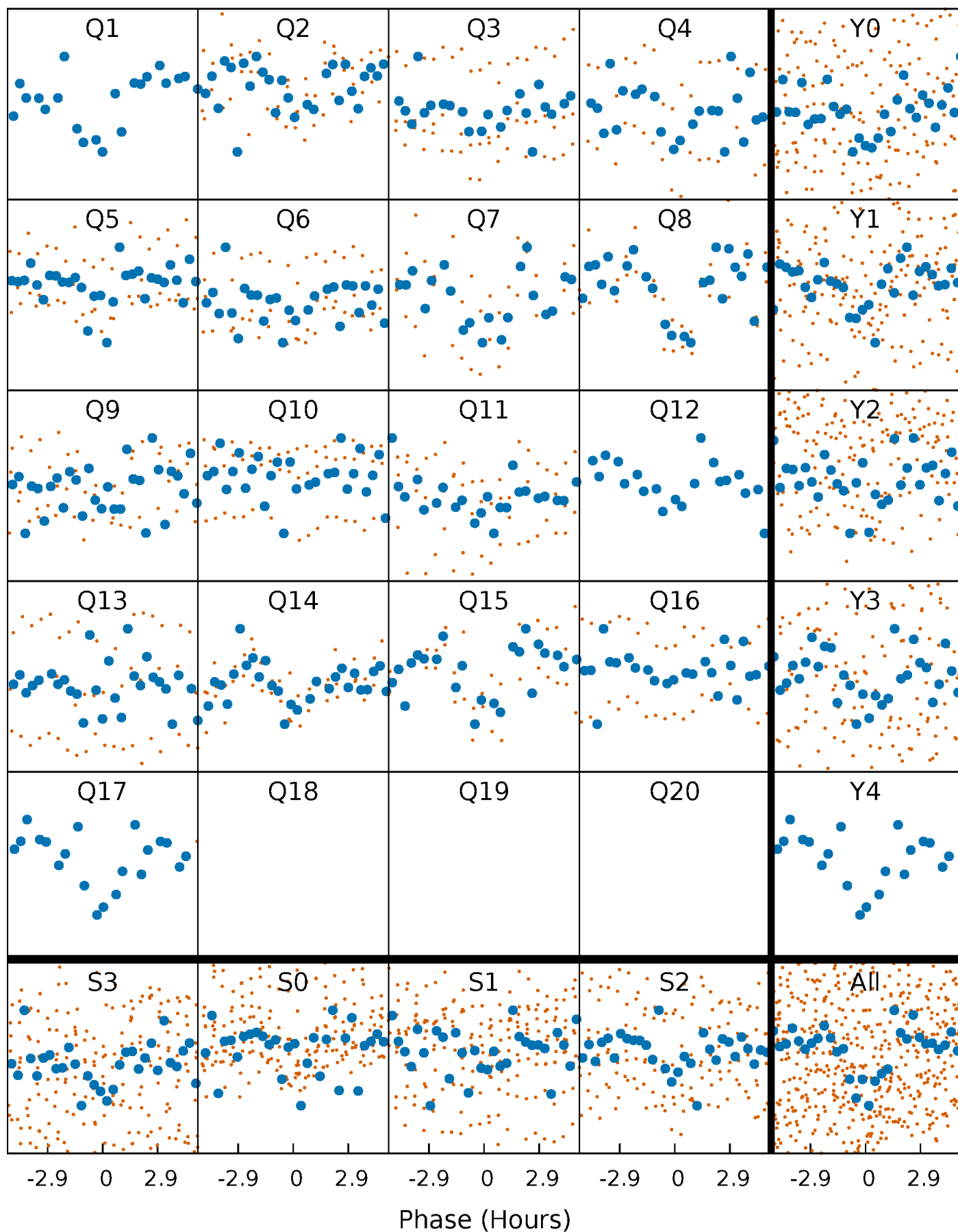


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



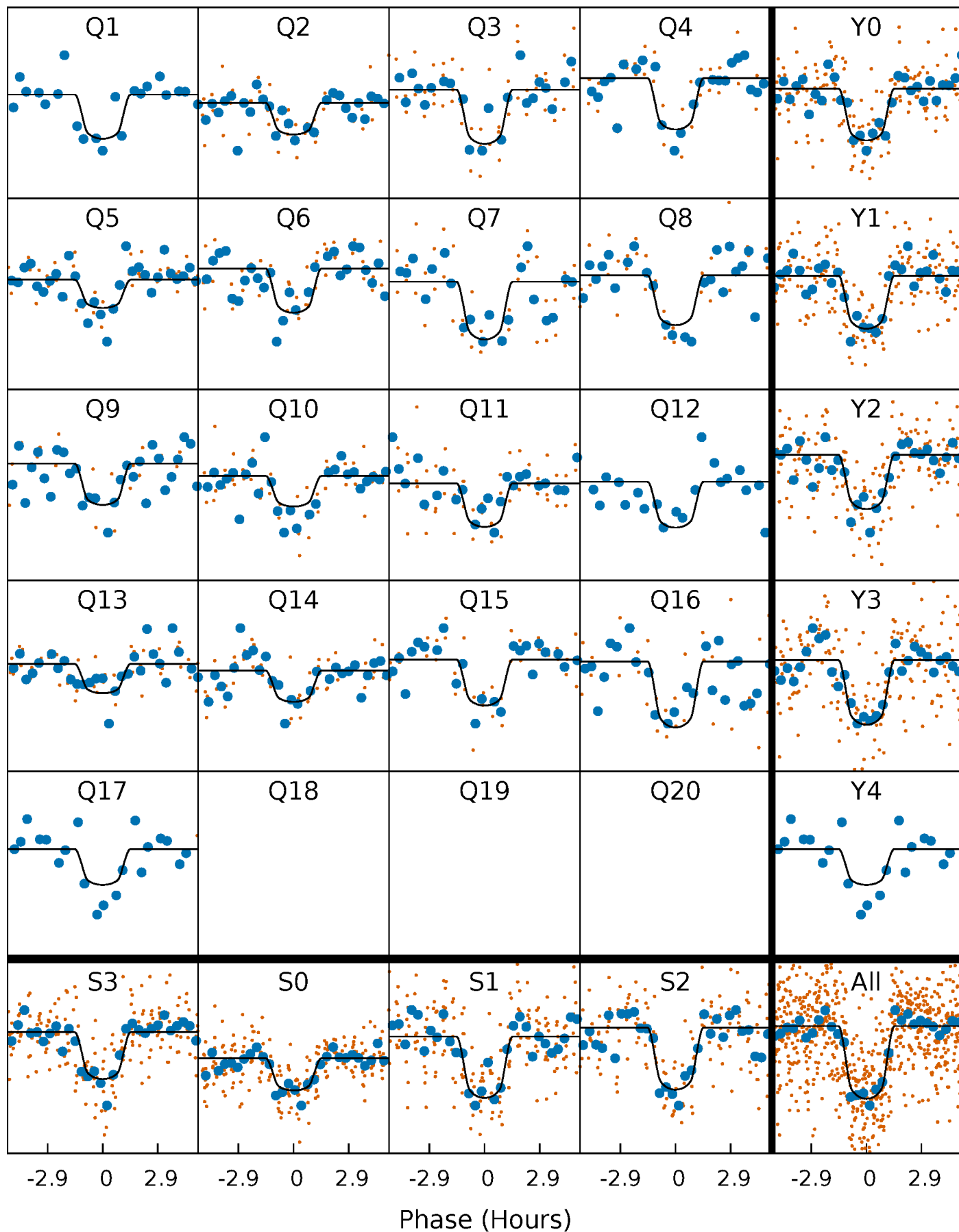
PDC Quarter-Phased Transit Curves

TCE 010864531-02 $P = 34.060770$ Days $T_0 = 141.359706$ (BKJD)



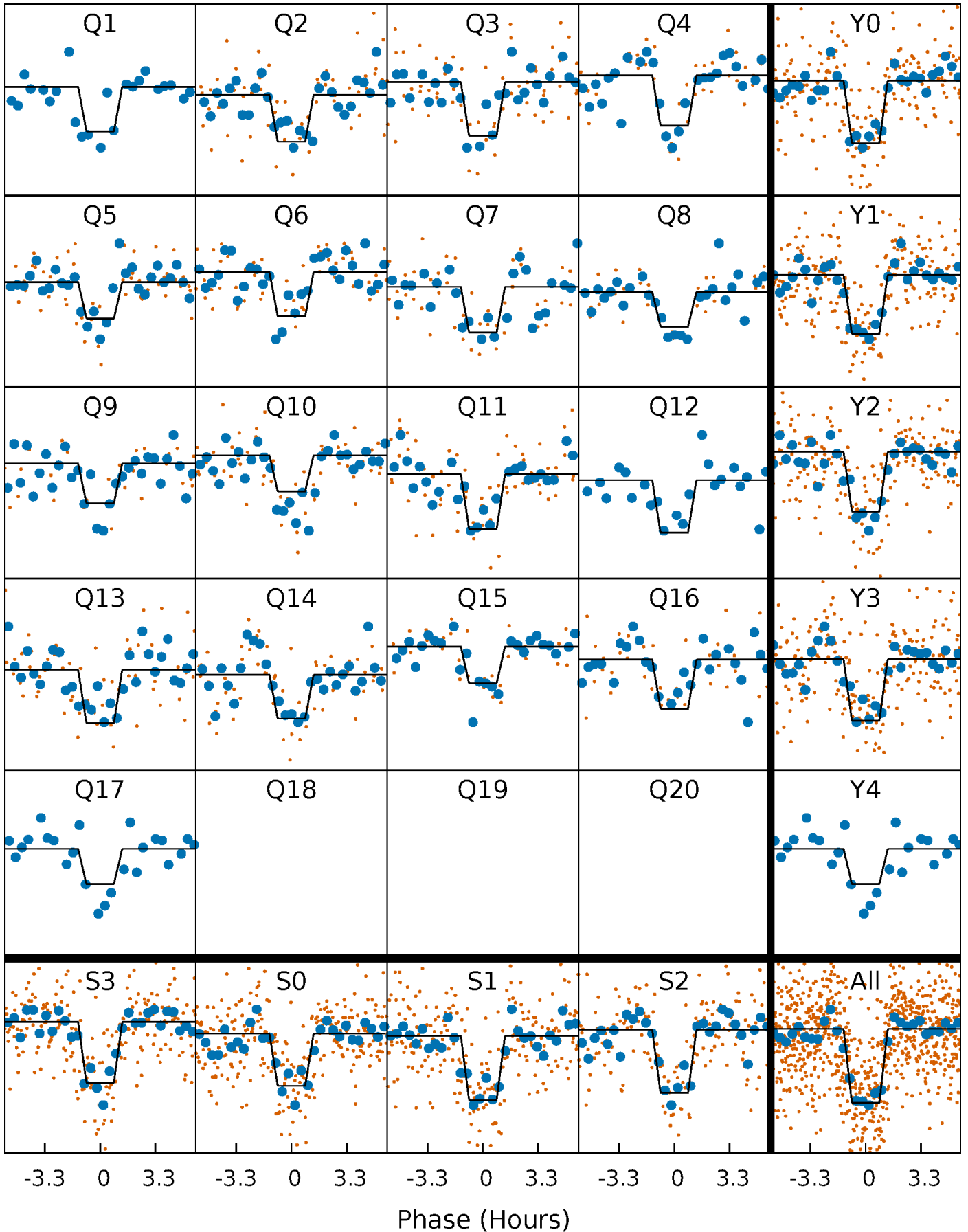
DV Quarter-Phased Transit Curves

TCE 010864531-02 $P = 34.060770$ Days $T_0 = 141.359706$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

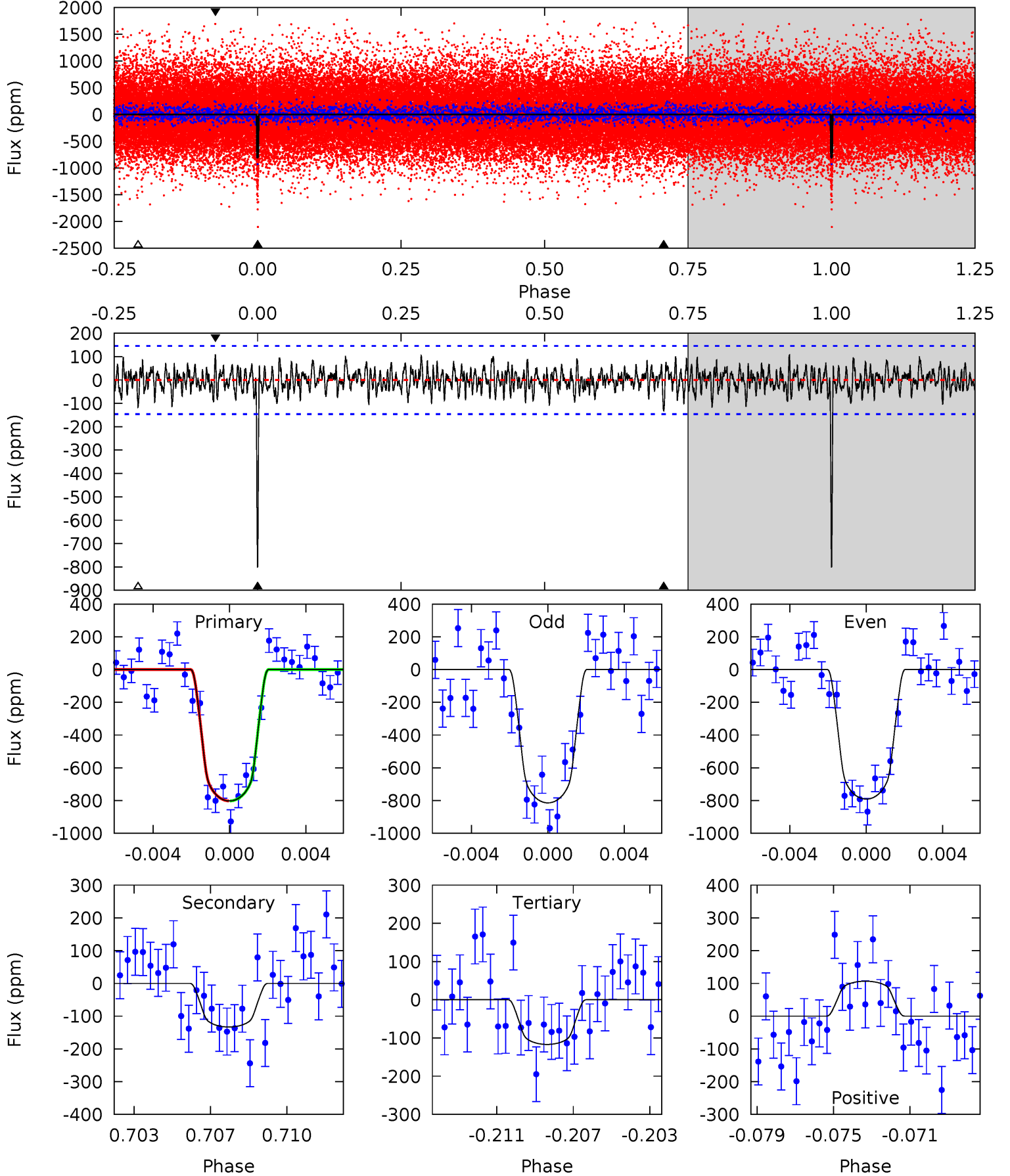
TCE 010864531-02 $P = 34.060472$ Days $T_0 = 141.364385$ (BKJD)



DV Model-Shift Uniqueness Test

010864531-02, P = 34.060770 Days, E = 107.298936 Days

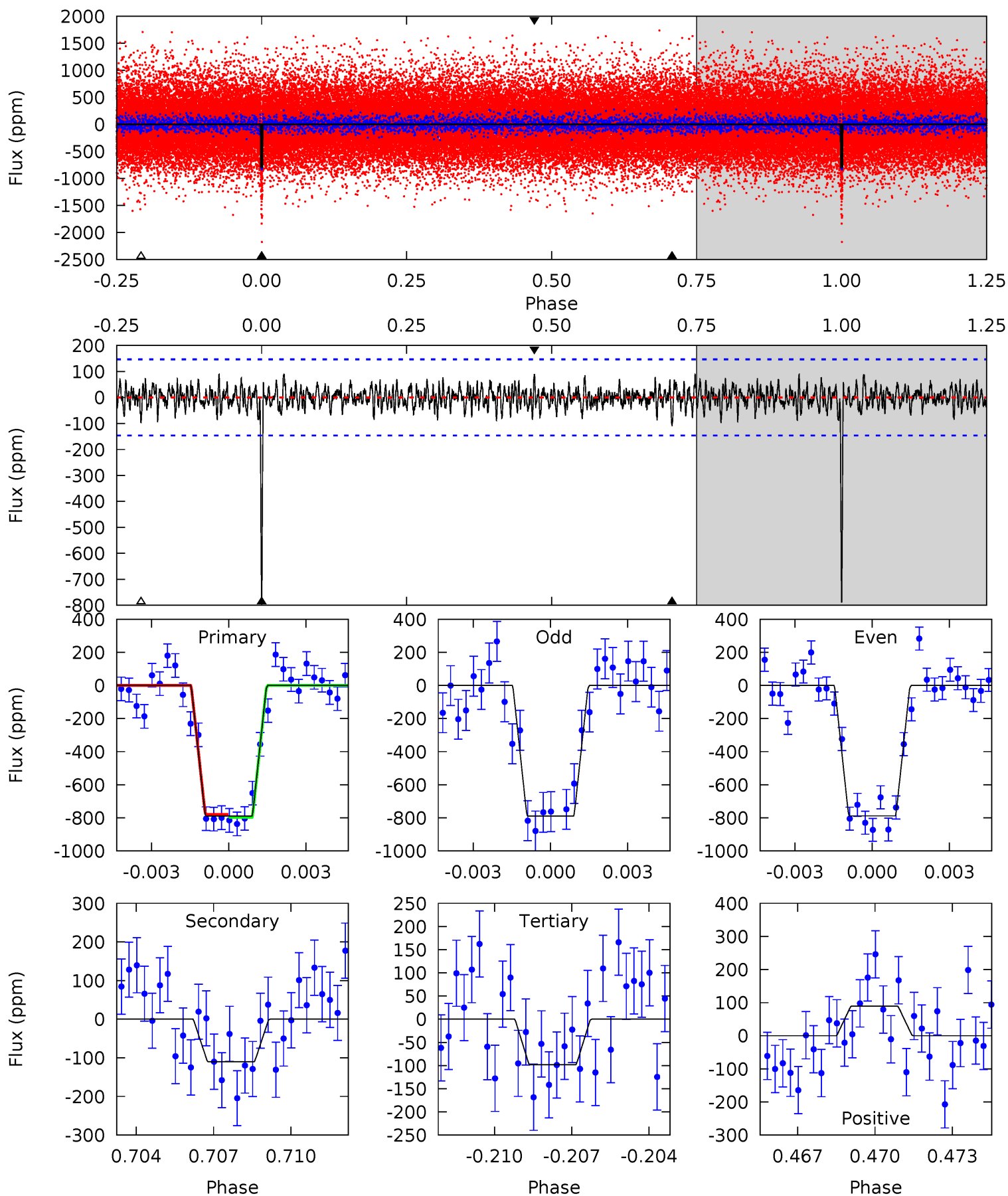
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.8	4.77	4.19	3.82	5.22	2.91	1.37	24.6	24.9	0.58	0.95	0.42	1.04	0.12	0.00



Alt Model-Shift Uniqueness Test

010864531-02, $P = 34.060472$ Days, $E = 107.303913$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.2	3.94	3.52	3.20	5.24	2.94	1.13	24.7	25.0	0.42	0.74	0.02	0.99	0.10	0.33



Stellar Parameters For KIC 010864531

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5910^{+176}_{-193}	$4.505^{+0.052}_{-0.208}$	$-0.020^{+0.250}_{-0.300}$	$0.940^{+0.297}_{-0.099}$	$1.032^{+0.124}_{-0.138}$	$1.750^{+0.470}_{-0.887}$
	+3%/-3%	+1%/-5%	+1250%/-1500%	+32%/-11%	+12%/-13%	+27%/-51%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 010864531-02 / KOI 2080.02

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-133 ± 28	$3.16^{+0.93}_{-0.80}$	792^{+54}_{-41}	3999^{+470}_{-349}	306^{+240}_{-133}
Alt.	-110 ± 28	$3.10^{+0.91}_{-0.85}$	792^{+60}_{-39}	3912^{+490}_{-358}	267^{+244}_{-118}

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 $A_{\text{obs}} \gg 1.0$

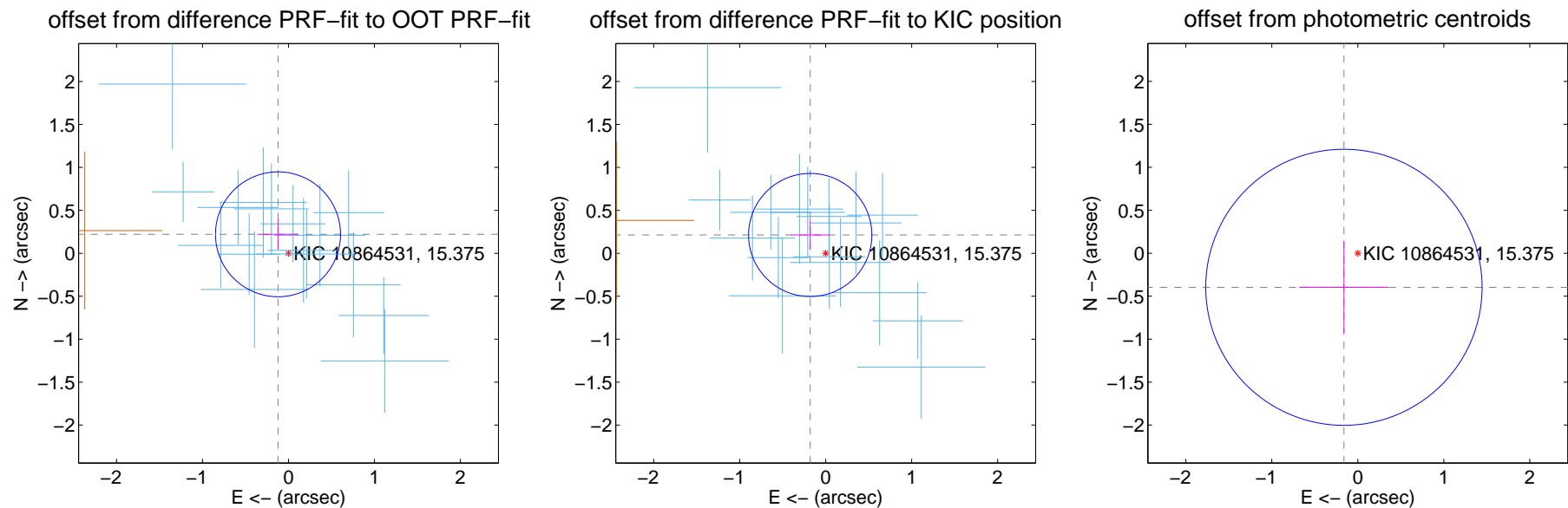
DV Centroid Data

Supplemental centroid analysis for 010864531-02. Kepler magnitude: 15.38. Transit SNR 18.80

There are 16 quarters with good PRF difference image offsets

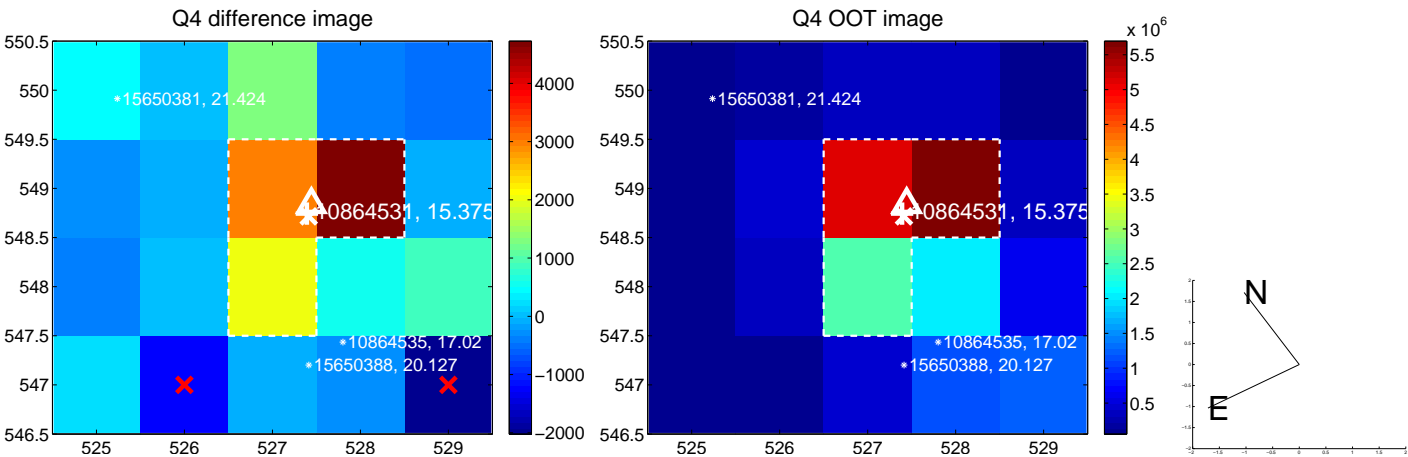
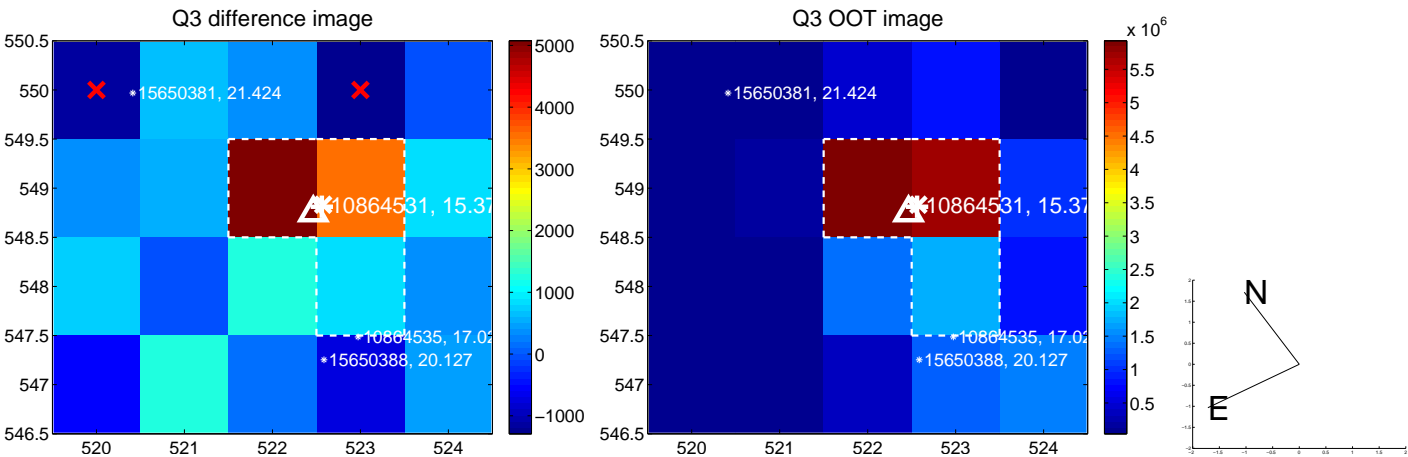
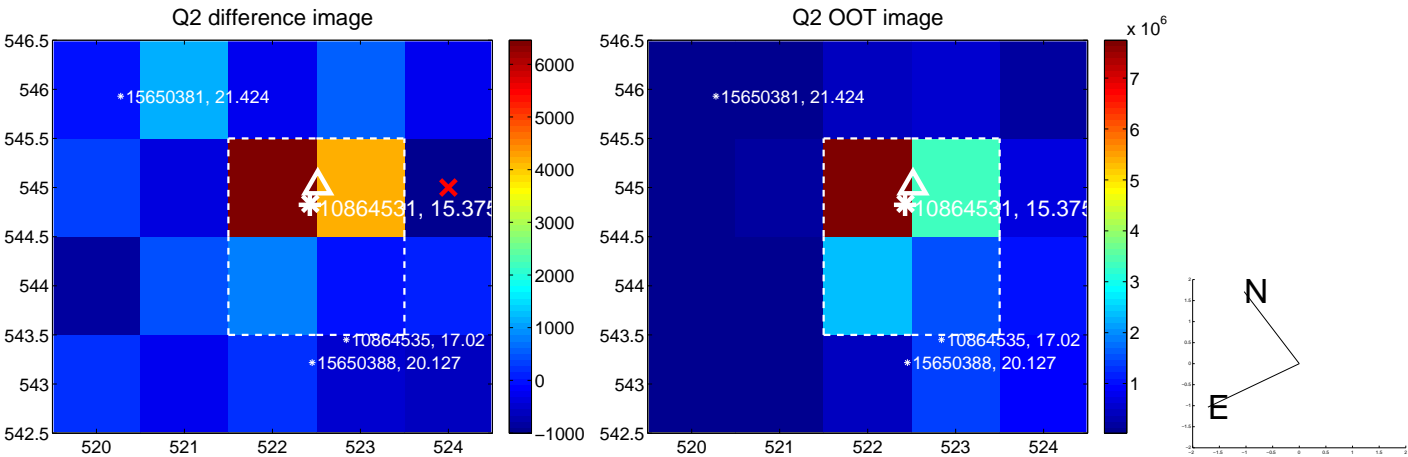
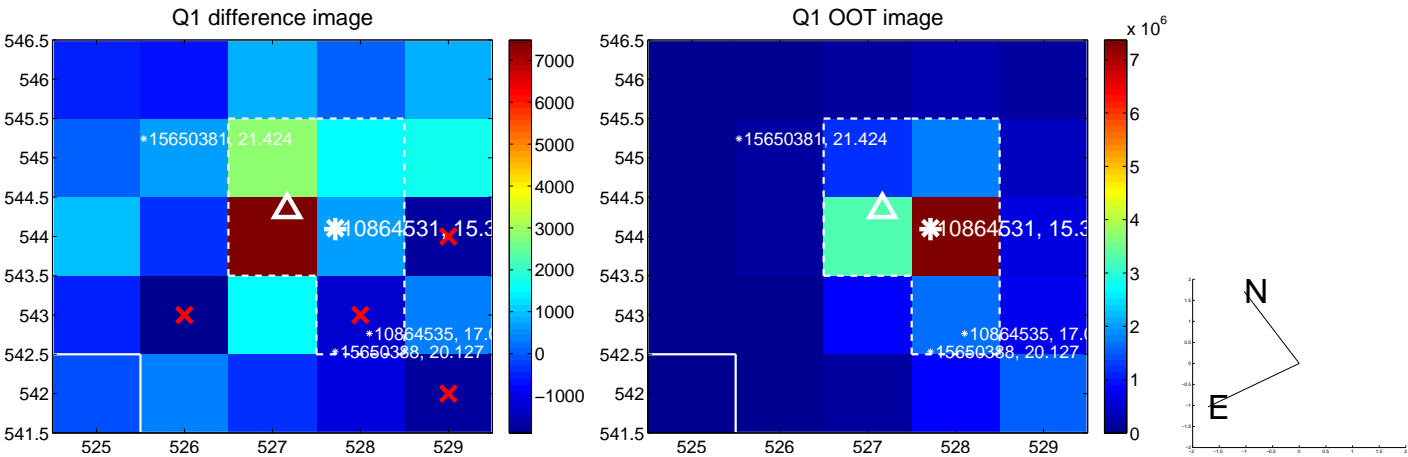
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.252 ± 0.242	1.04	0.122 ± 0.240	0.221 ± 0.181
PRF-fit source offset from KIC position	0.279 ± 0.239	1.17	0.180 ± 0.222	0.213 ± 0.174
photometric centroid source offset	0.43 ± 0.54	0.80	0.16 ± 0.52	-0.40 ± 0.54

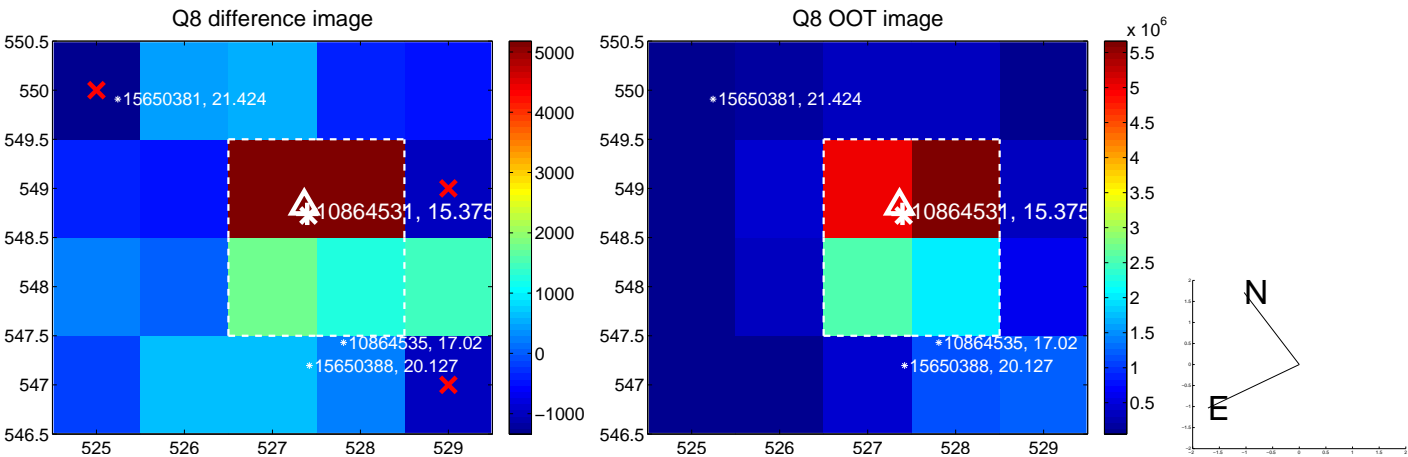
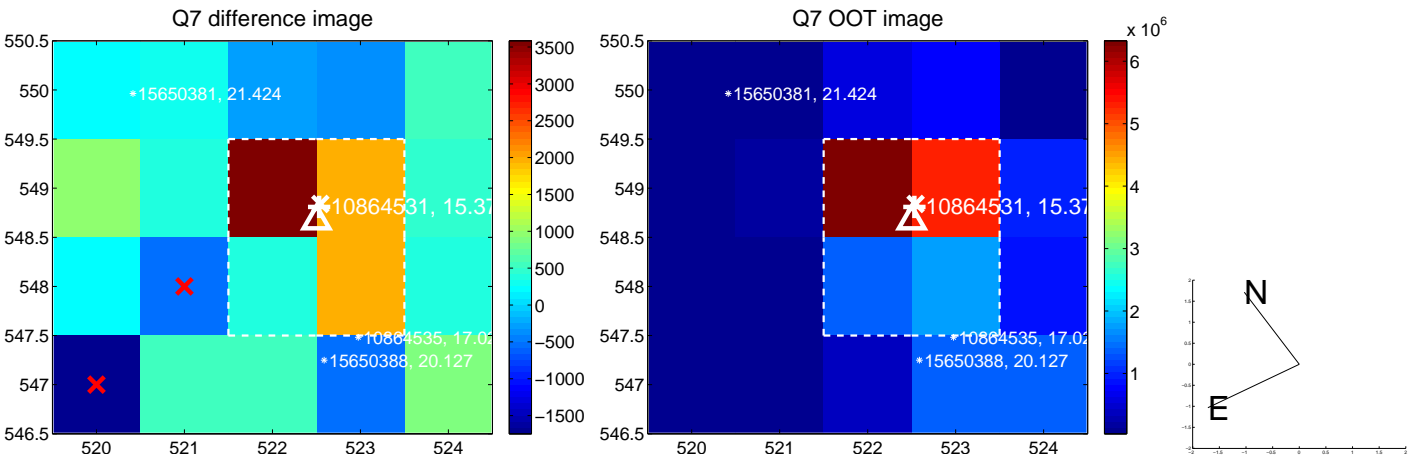
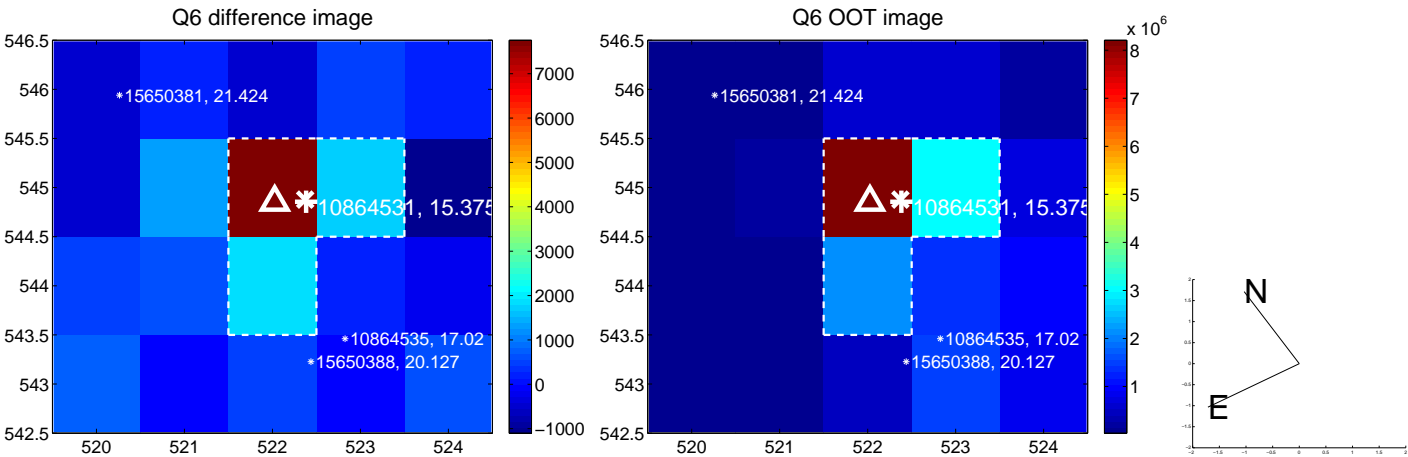
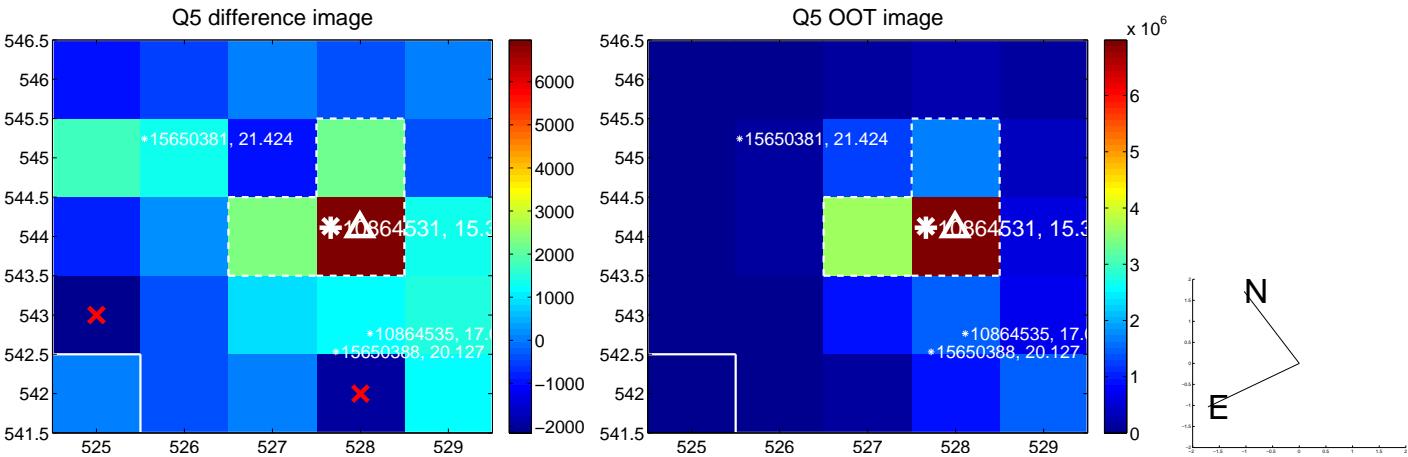


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- 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.

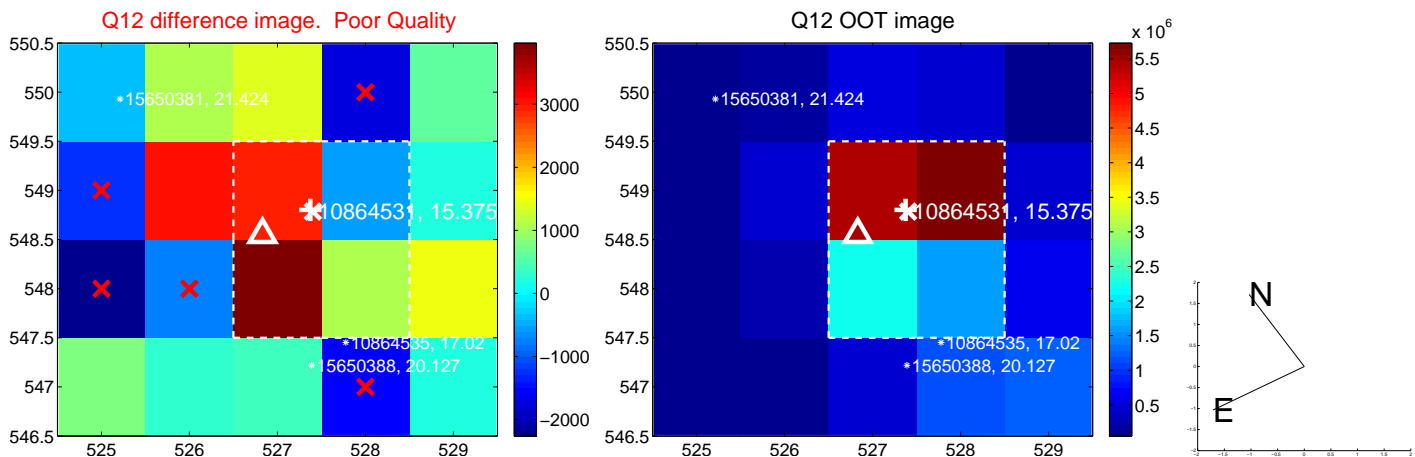
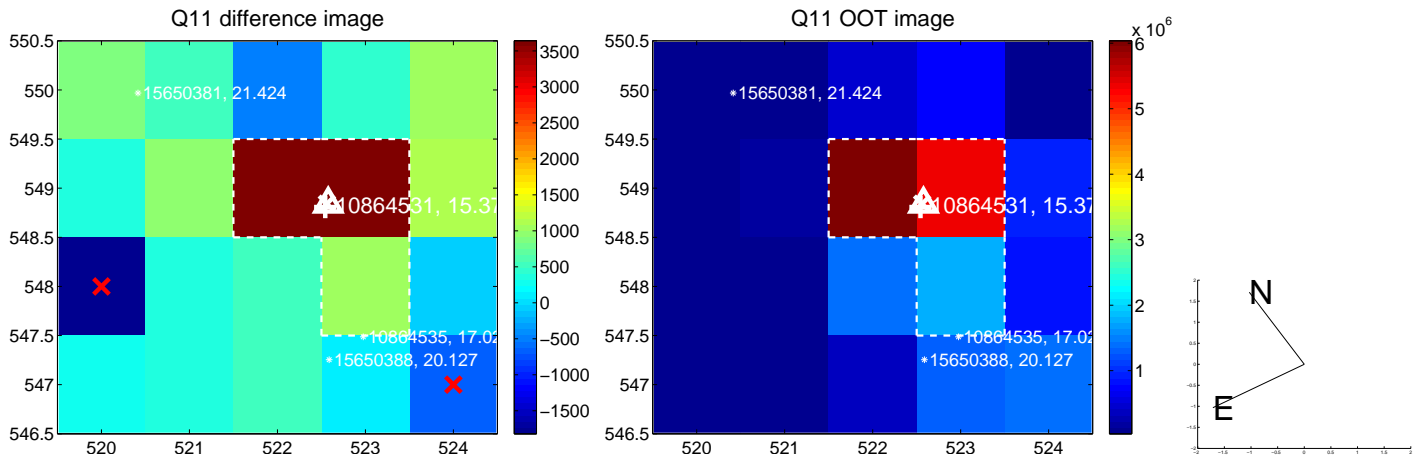
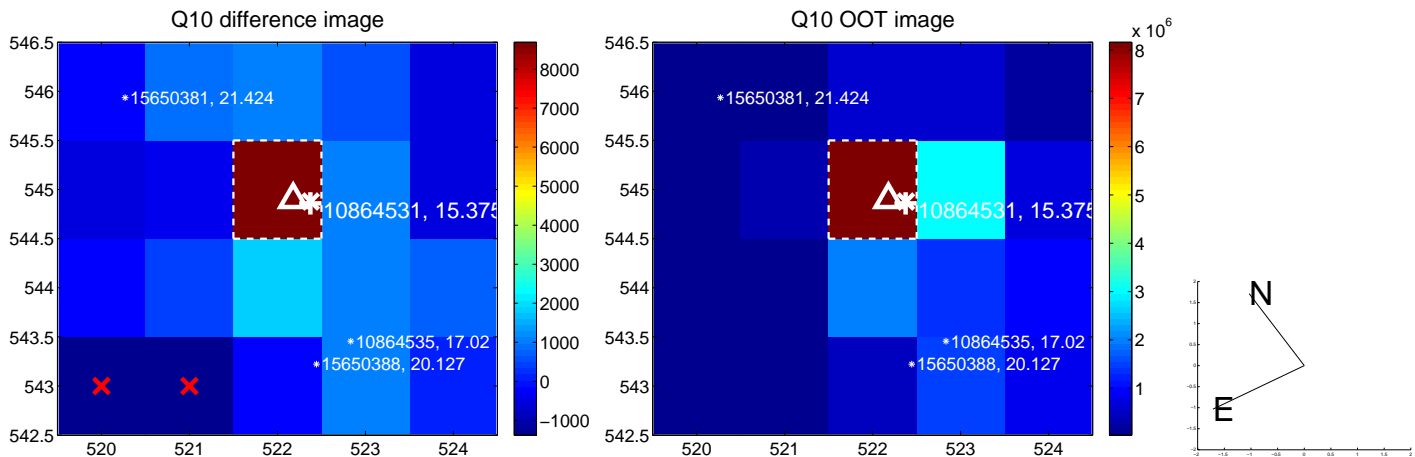
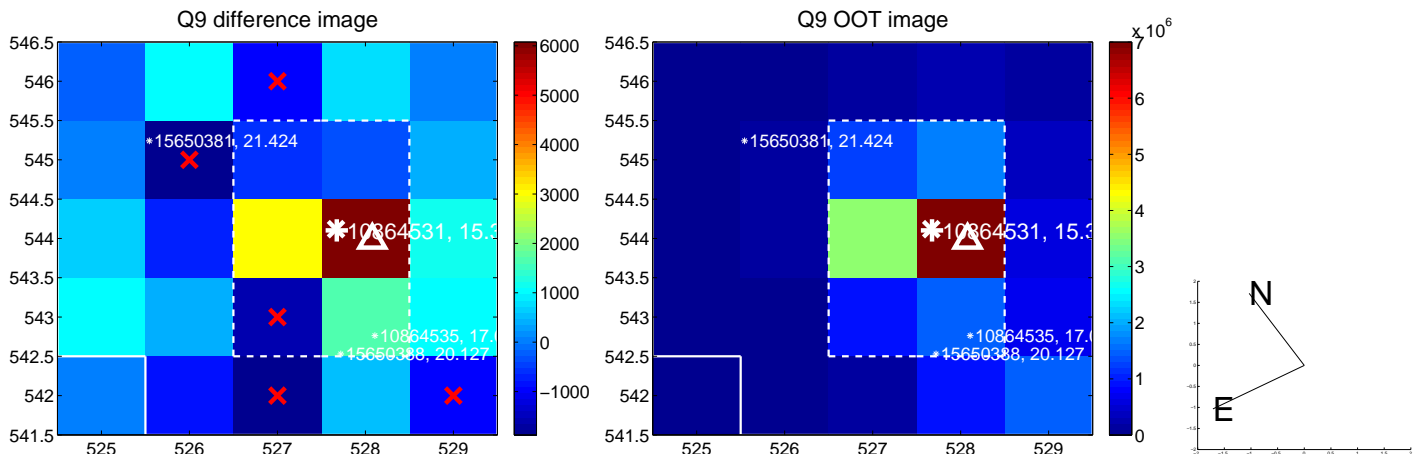
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



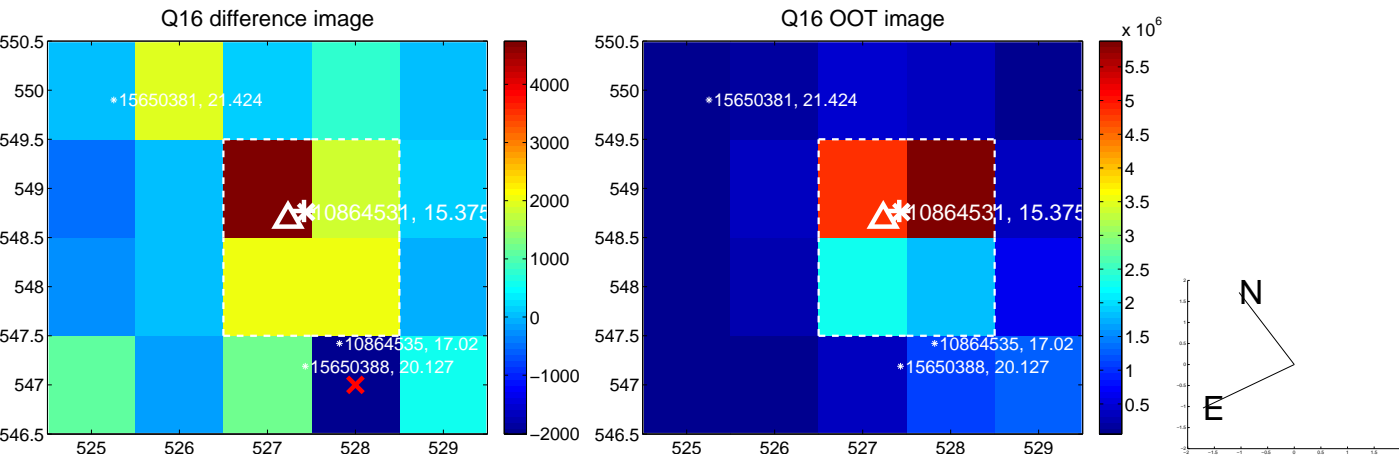
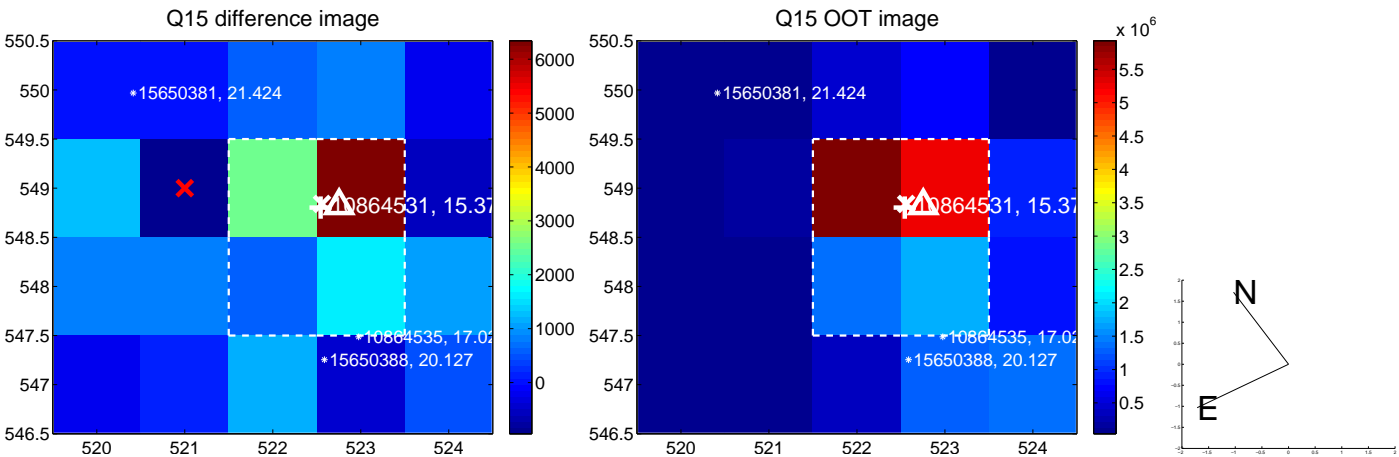
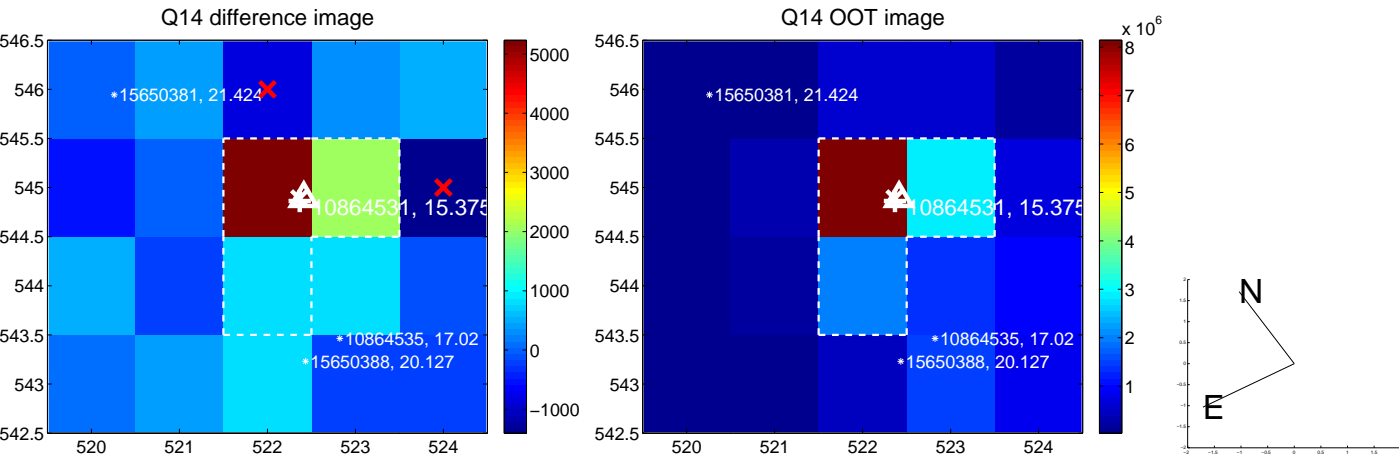
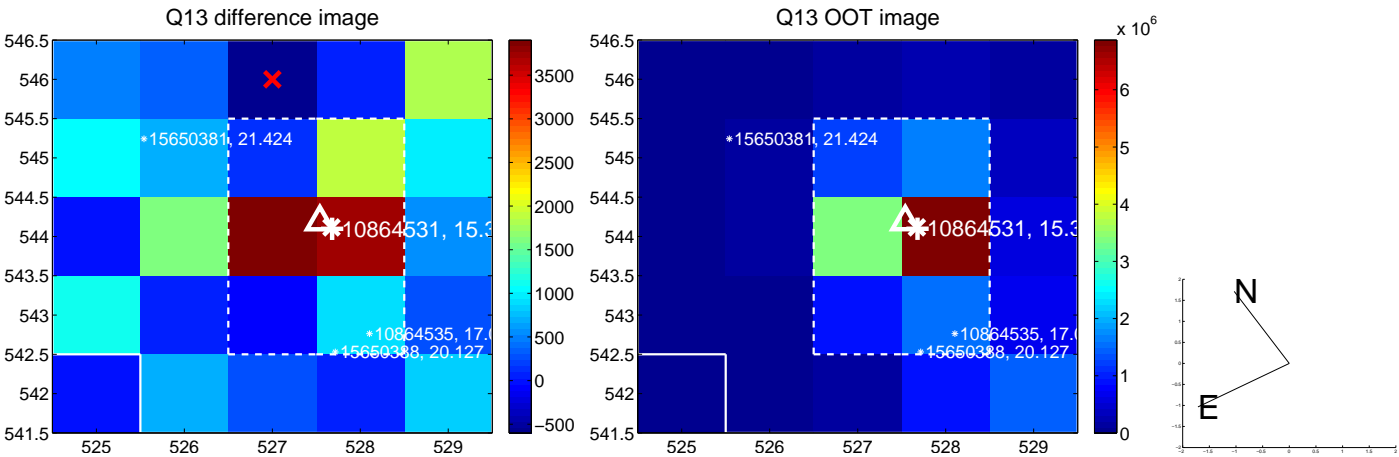
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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.



UKIRT Image

Declination

