

KIC 010538178

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})
010538178-01	OBS	No	429.695057	193.662390	289.6	4.964	11.9	5.7	1.67	6061	3.03	2.63
010538178-02	OBS	No	344.500379	395.842600	288.4	4.013	10.7	6.5	1.67	6061	3.05	3.54

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010538178-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010538178-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

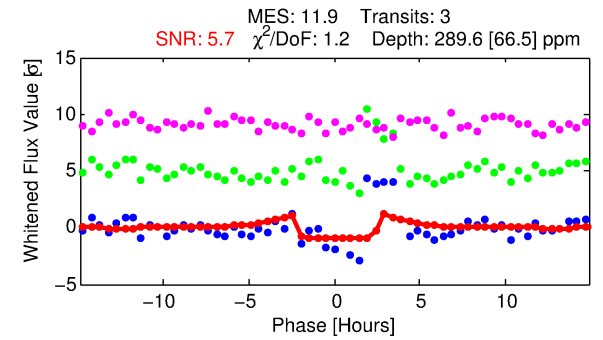
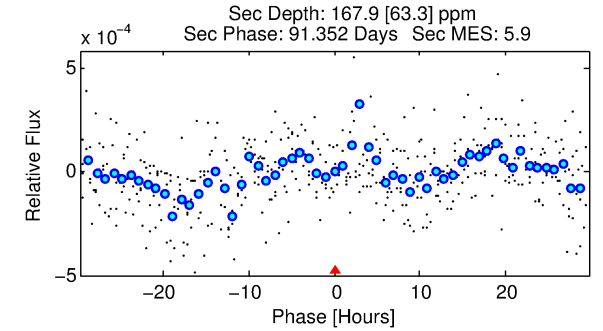
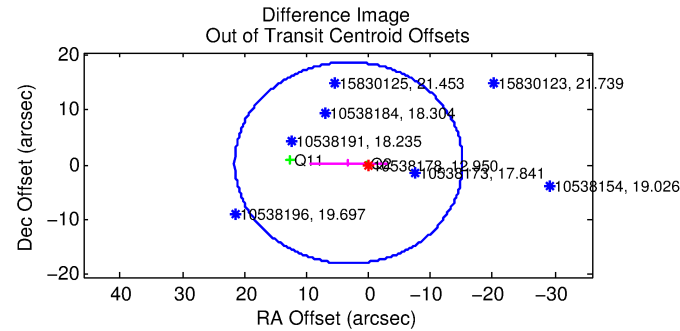
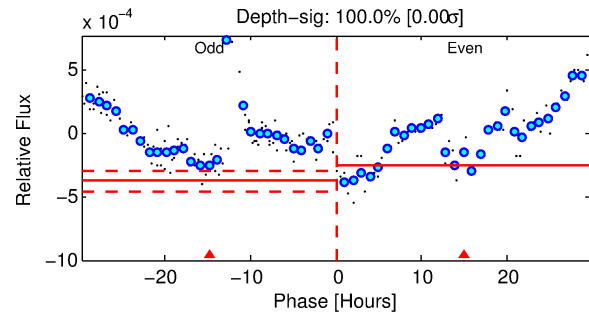
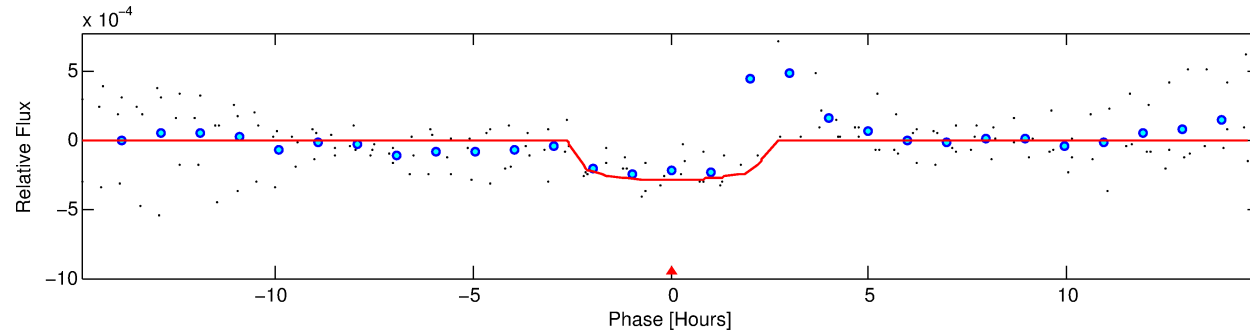
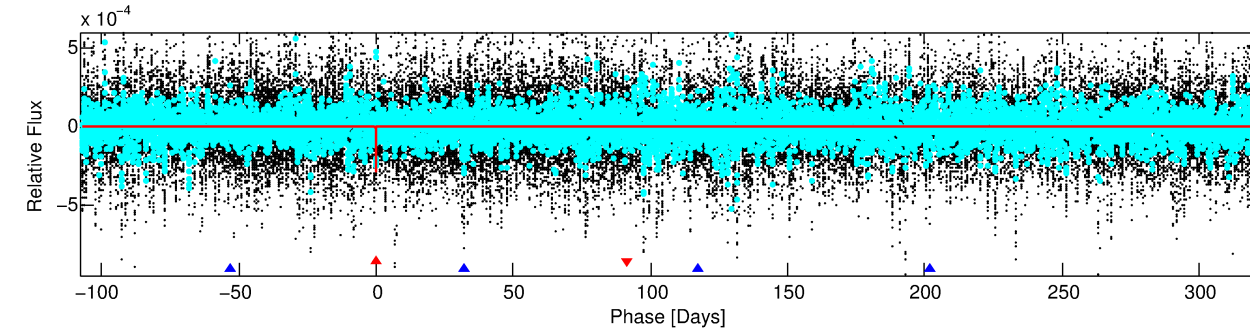
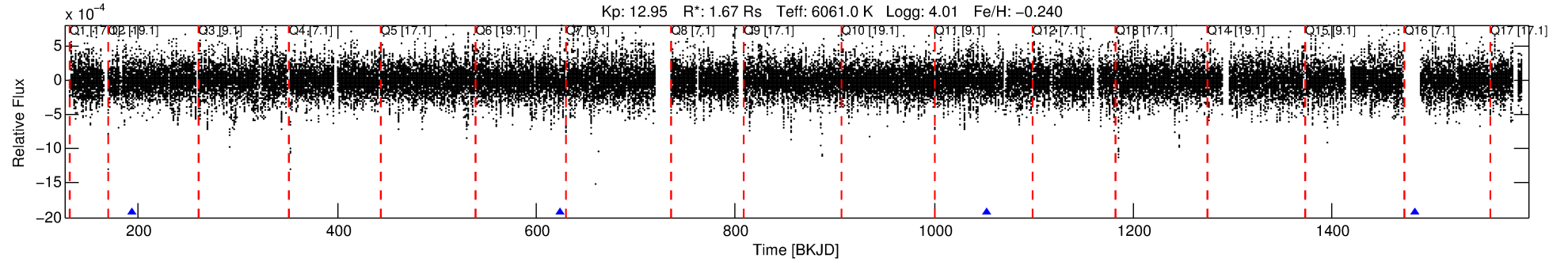
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010538178-01

No Significant Match Found

DV One-Page Summary

KIC: 10538178 Candidate: 1 of 2 Period: 429.695 d



DV Fit Results:

Period = 429.69506 [0.00661] d
Epoch = 193.6624 [0.0090] BKJD
Rp/R* = 0.0166 [0.0173]
a/R* = 497.40 [2515.55]
b = 0.68 [3.95]
Seff = 2.63 [1.71]
Teq = 325 [53] K
Rp = 3.03 [3.40] Re
a = 1.1341 [0.4538] AU
Ag = 12916.11 [28490.91] [0.45σ]
Teffp = 5355 [2834] K [1.77σ]

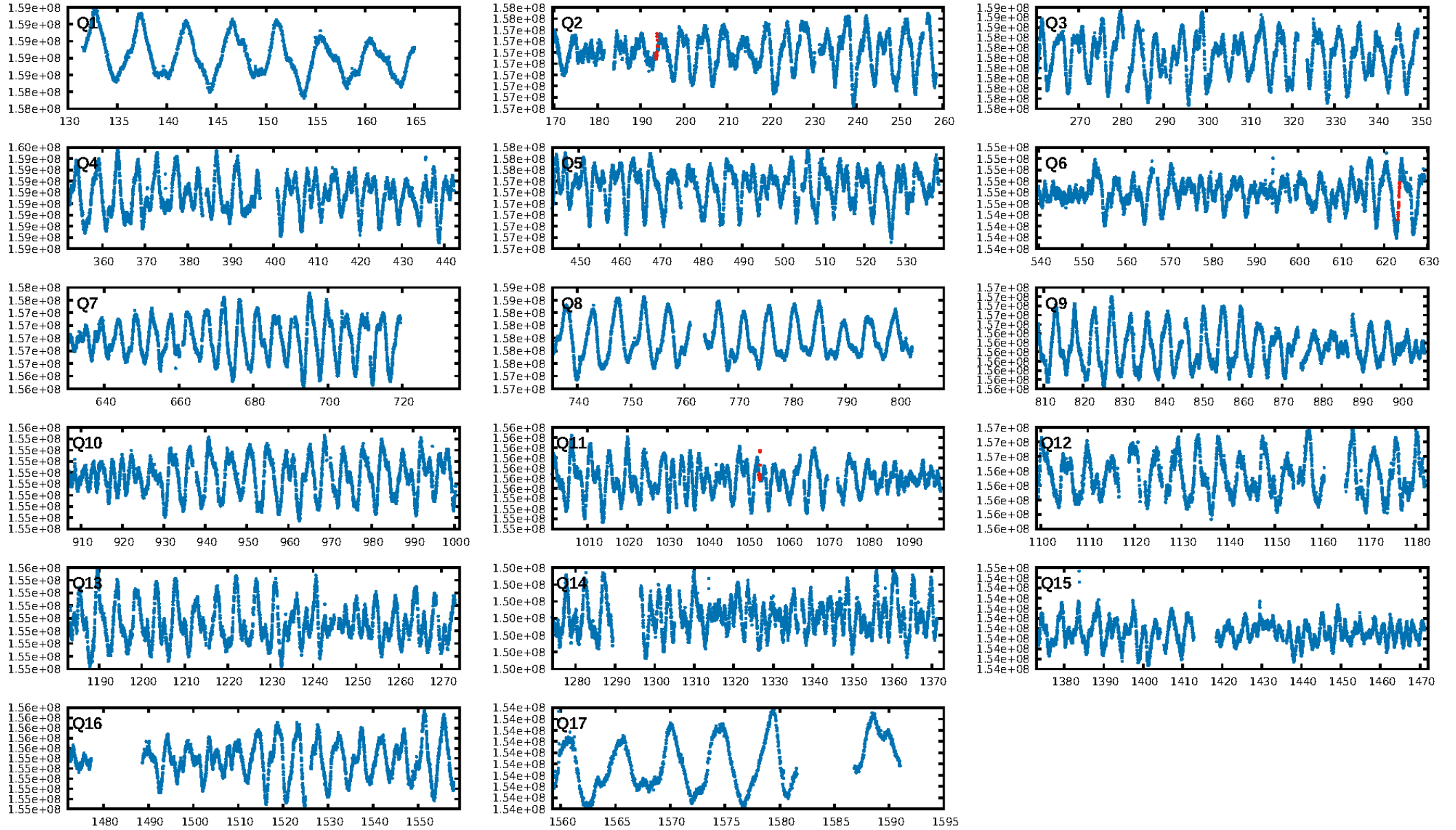
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [320.32σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 7.9%
ModelChiSquareGof-sig: 82.8%
Bootstrap-pfa: 9.68e-14
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 1.441
Centroid-sig: 12.0%
Centroid-so: 1.524 arcsec [1.55σ]
OotOffset-rm: 3.217 arcsec [0.53σ]
OotOffset-st: 1/1/0/0 [2]
KicOffset-rm: 3.221 arcsec [0.53σ]
KicOffset-st: 1/1/0/0 [2]
DiffImageQuality-fgm: 0.50 [1/2]
DiffImageOverlap-fno: 1.00 [3/3]

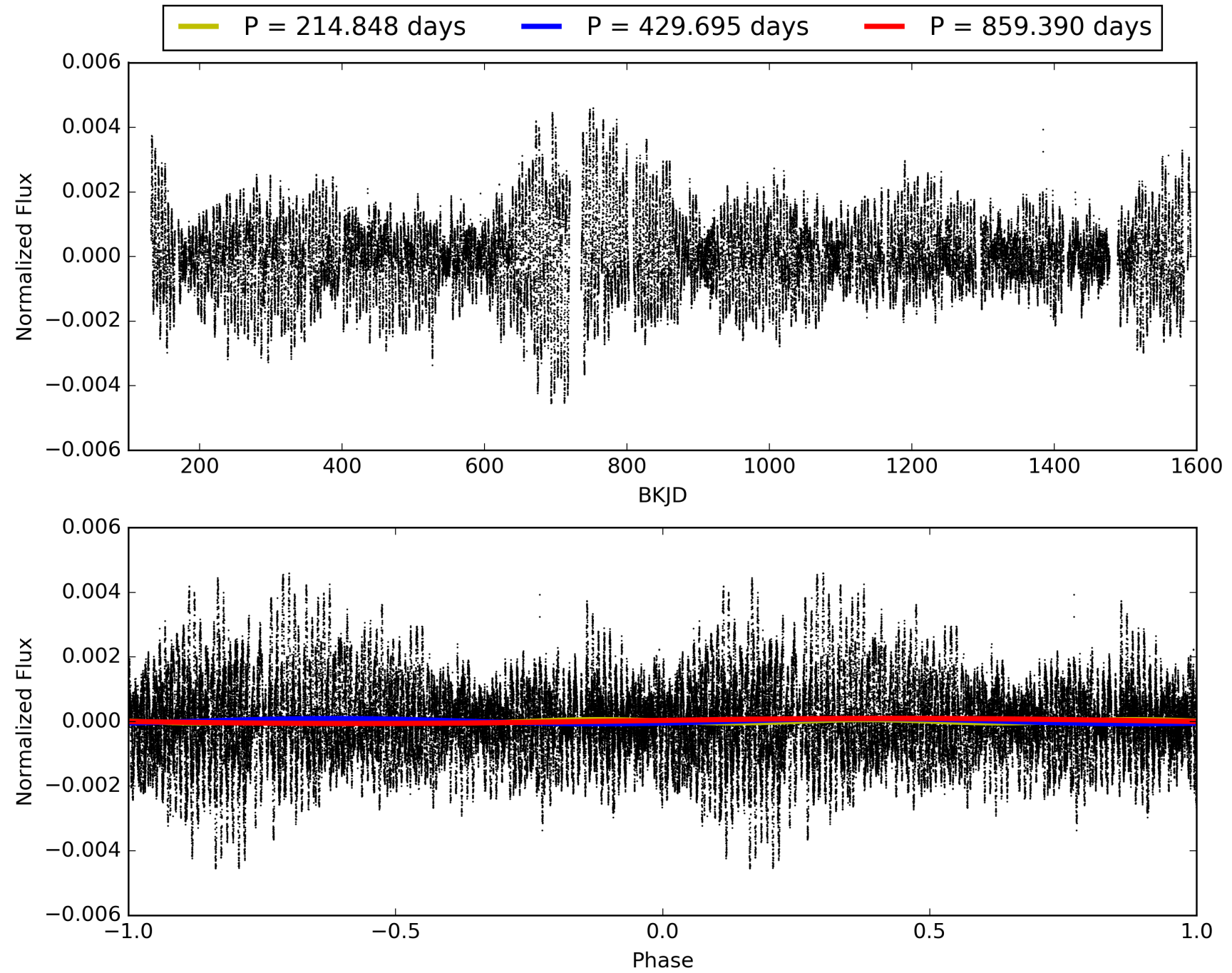
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 03:46:38 Z

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

TCE 010538178-01, PDC Light Curves

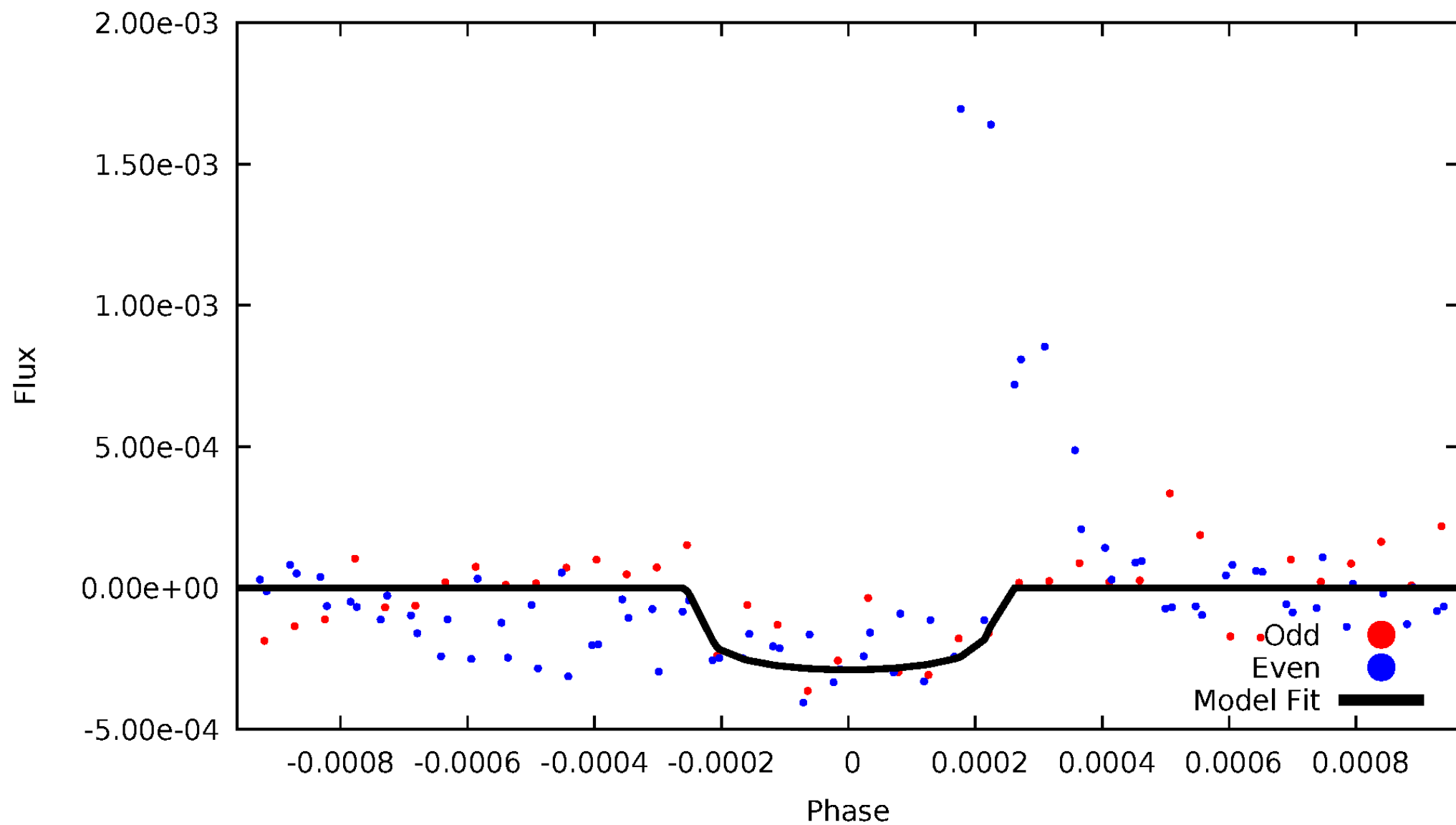


TCE 010538178-01



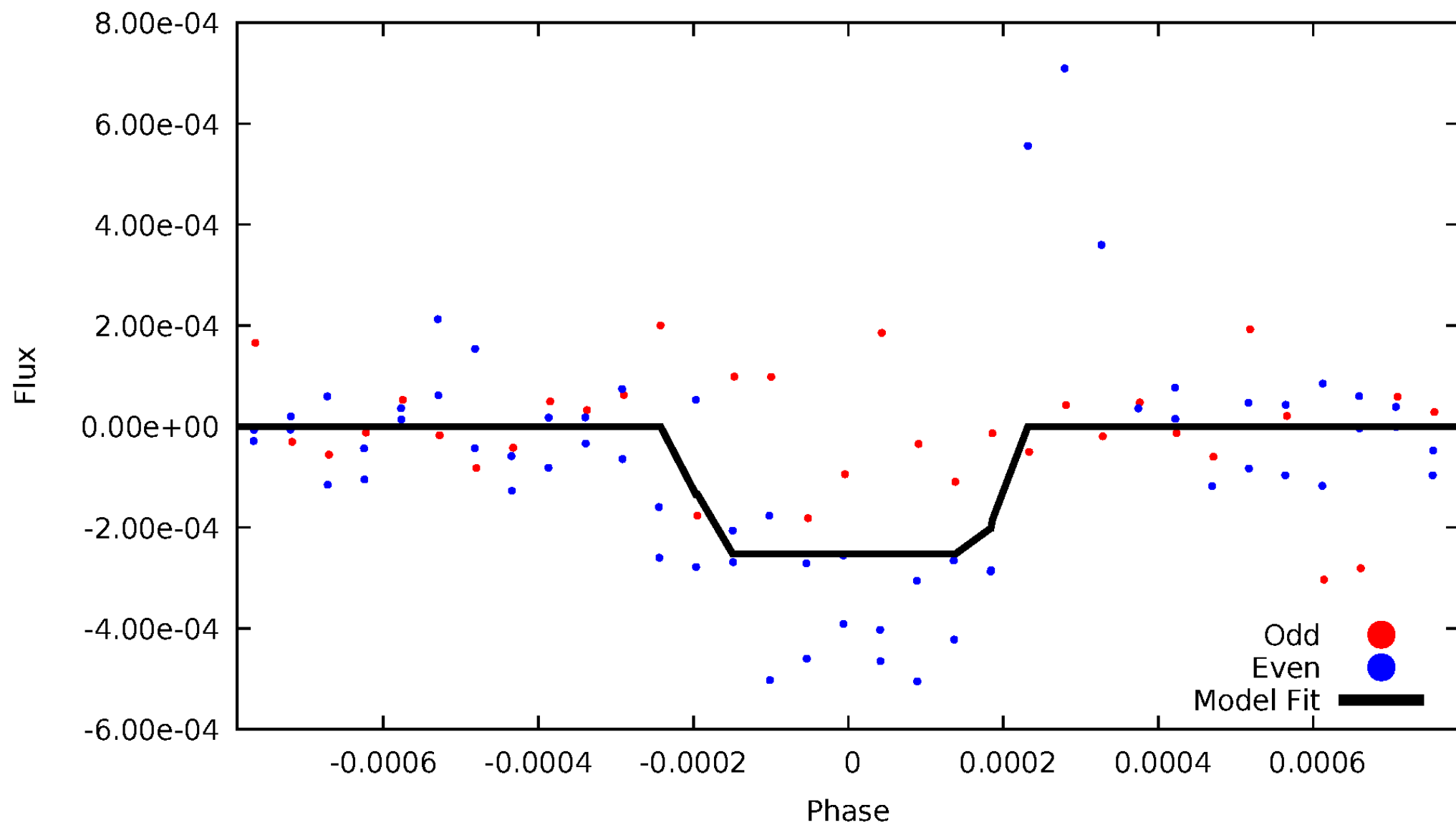
DV Odd/Even

TCE 010538178-01



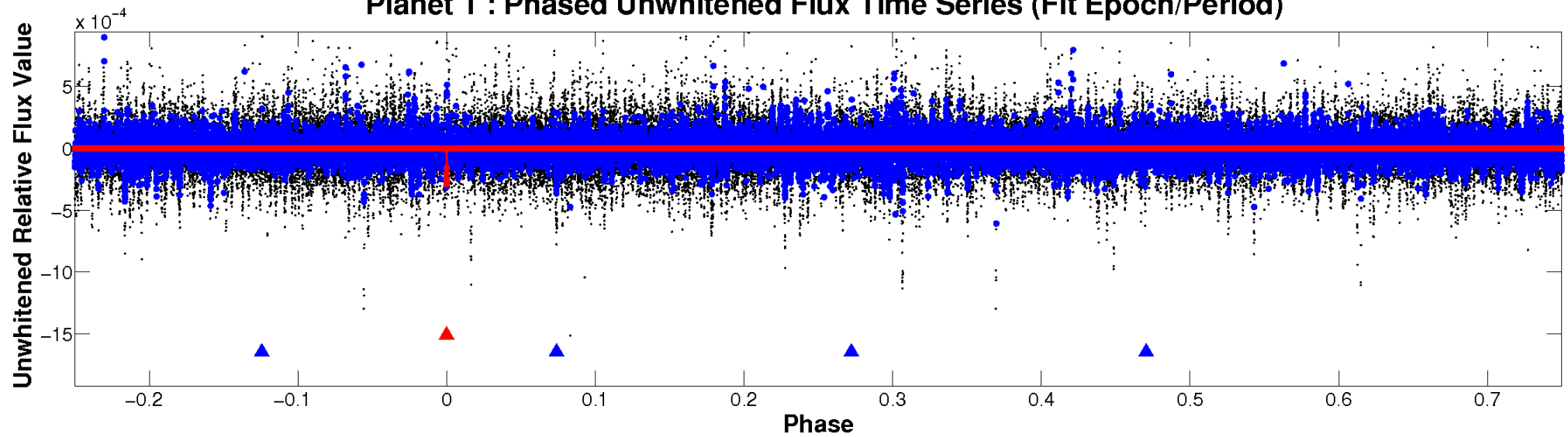
ALT Odd/Even

TCE 010538178-01

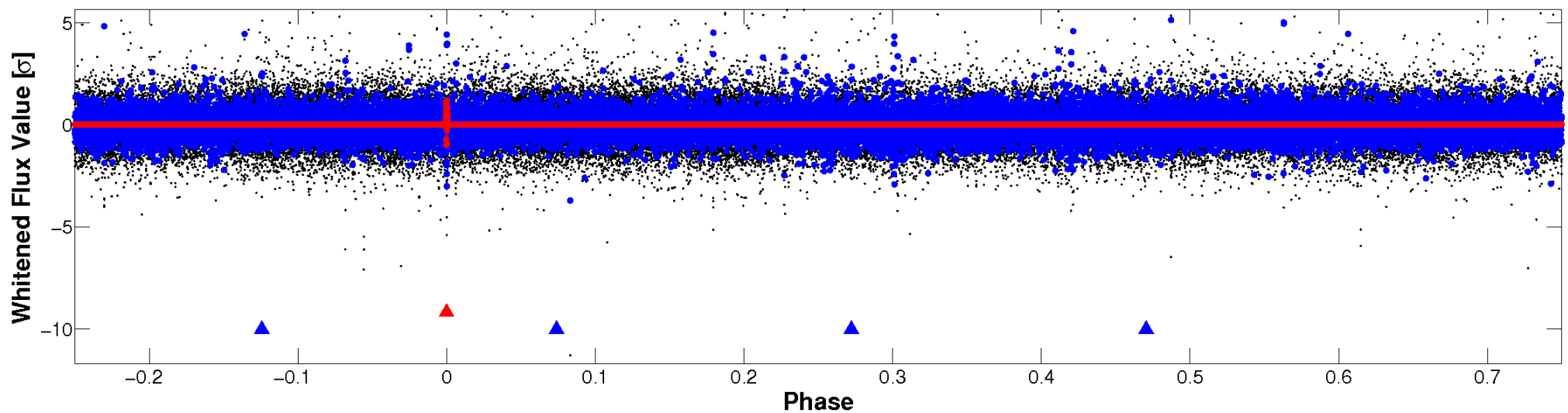


Non-Whitened Vs. Whitened Light Curve

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

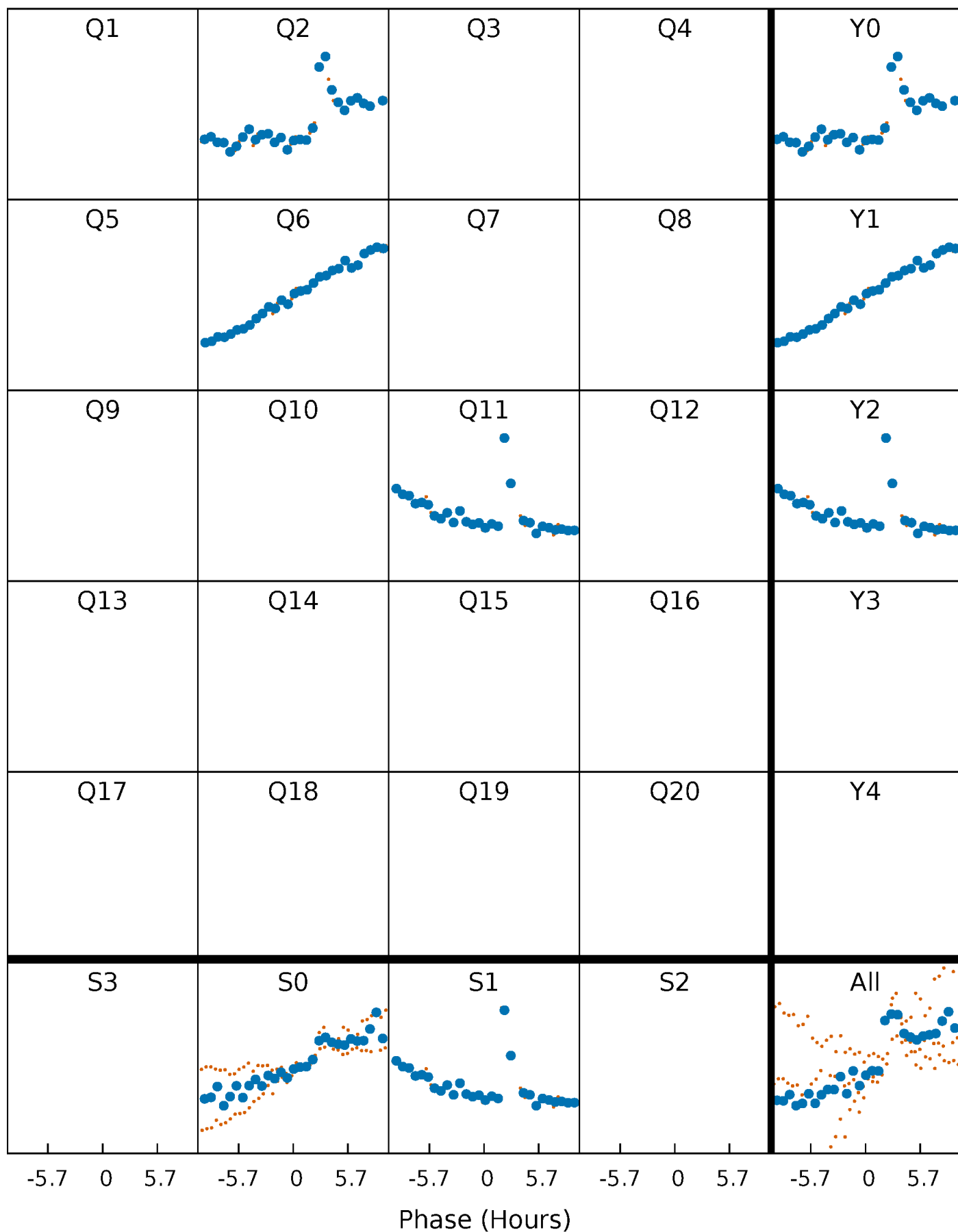


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



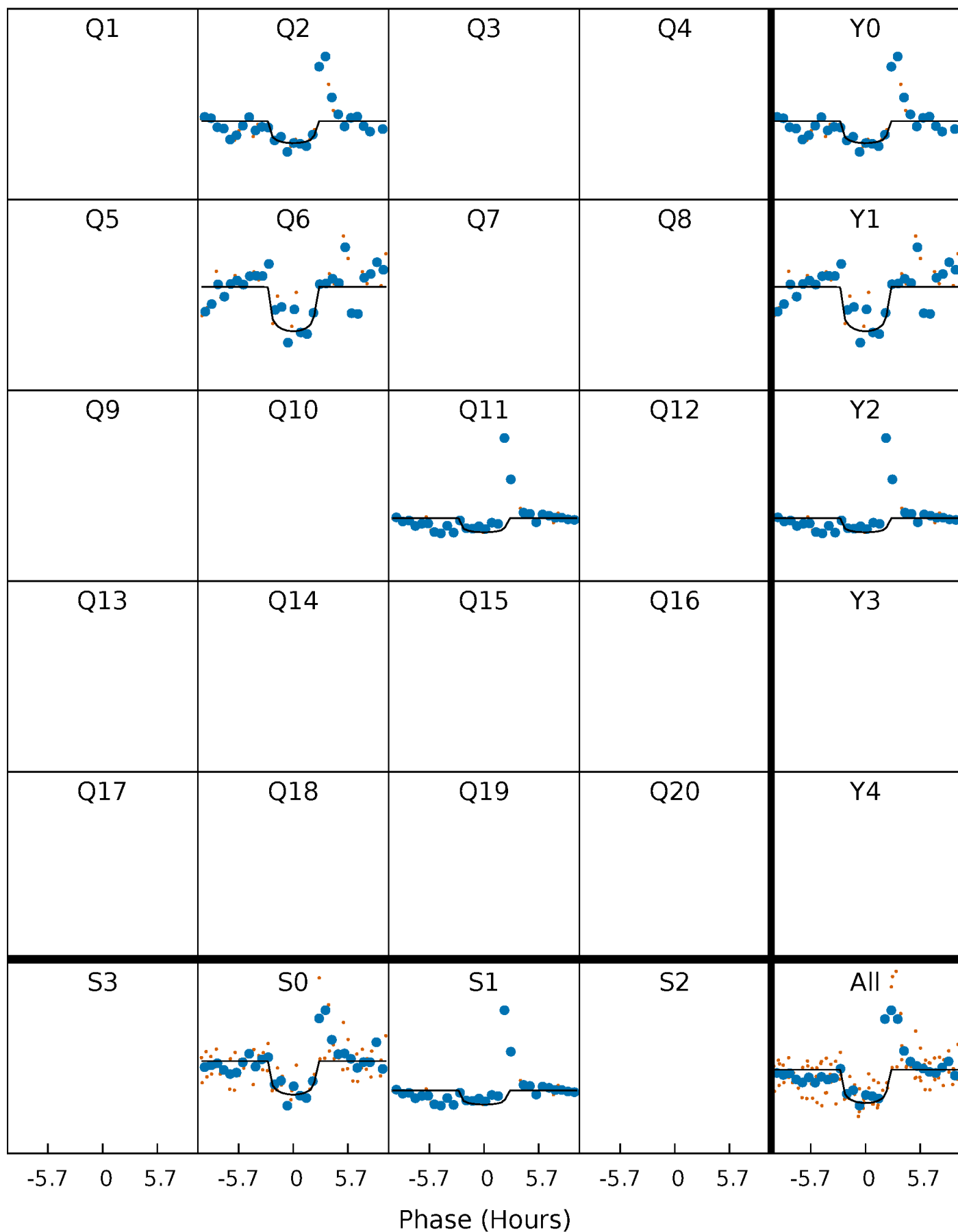
PDC Quarter-Phased Transit Curves

TCE 010538178-01 P=429.695057 Days $T_0=193.662390$ (BKJD)



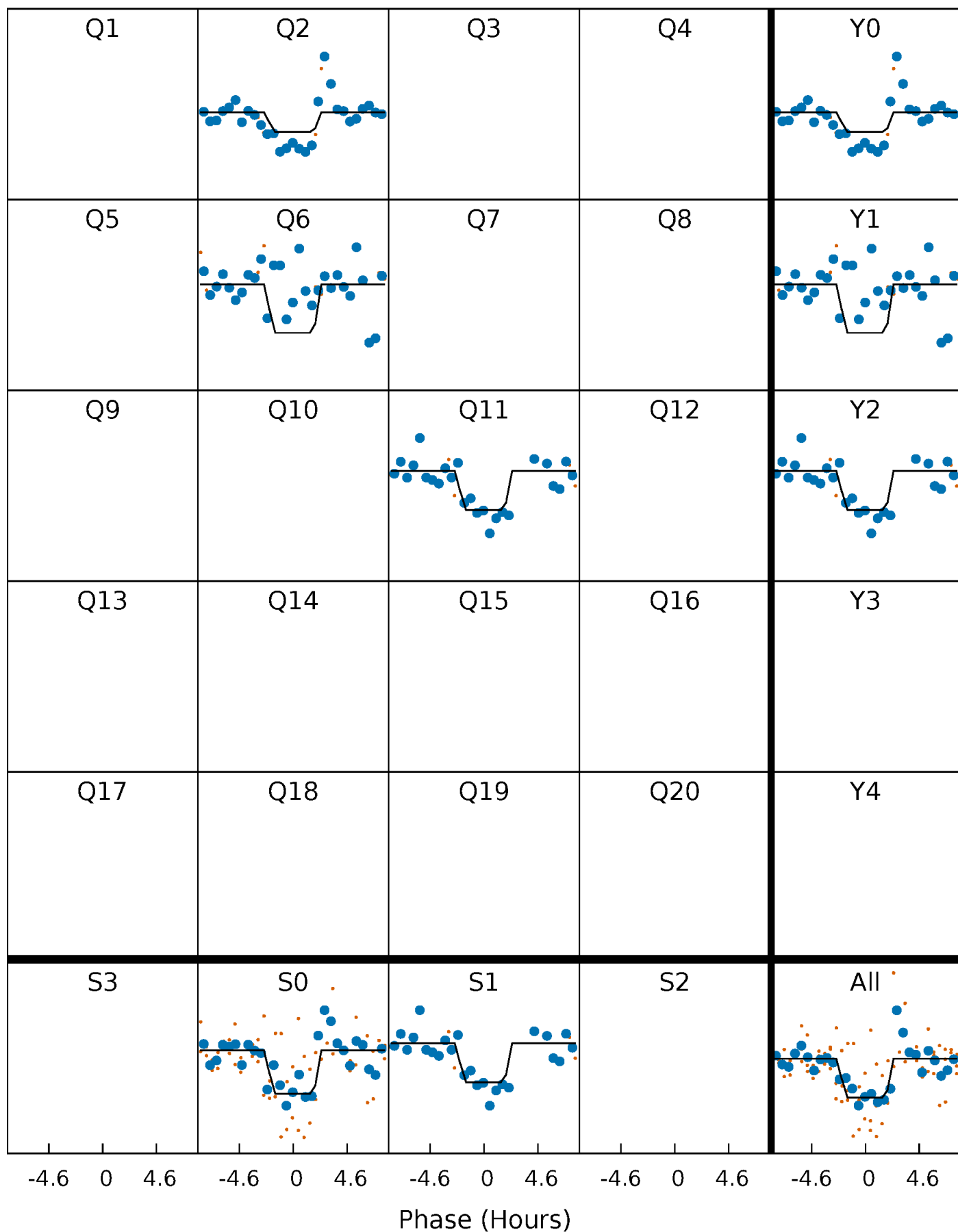
DV Quarter-Phased Transit Curves

TCE 010538178-01 P=429.695057 Days $T_0=193.662390$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

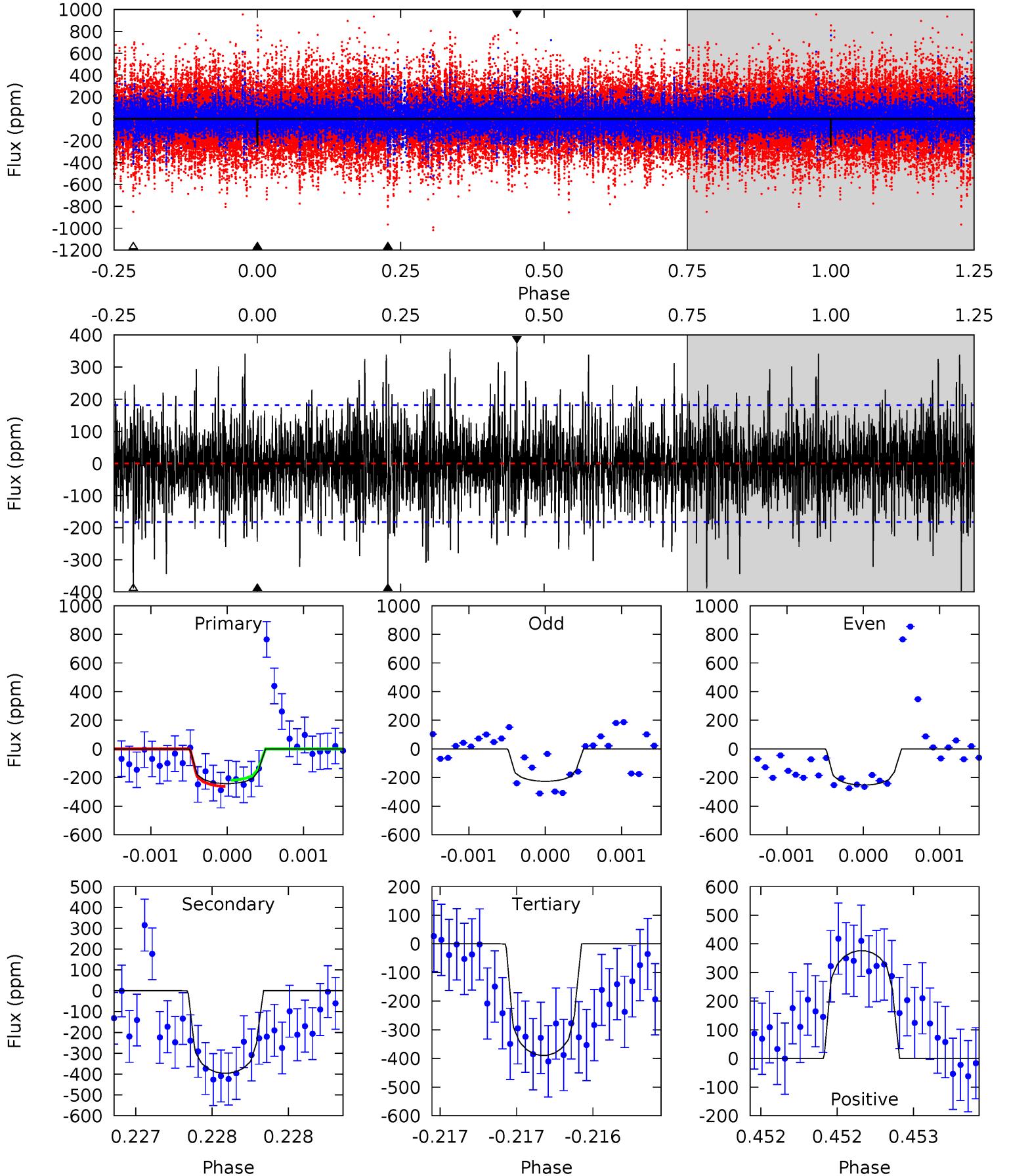
TCE 010538178-01 P=429.676900 Days $T_0=193.675400$ (BKJD)



DV Model-Shift Uniqueness Test

010538178-01, P = 429.695057 Days, E = 193.662390 Days

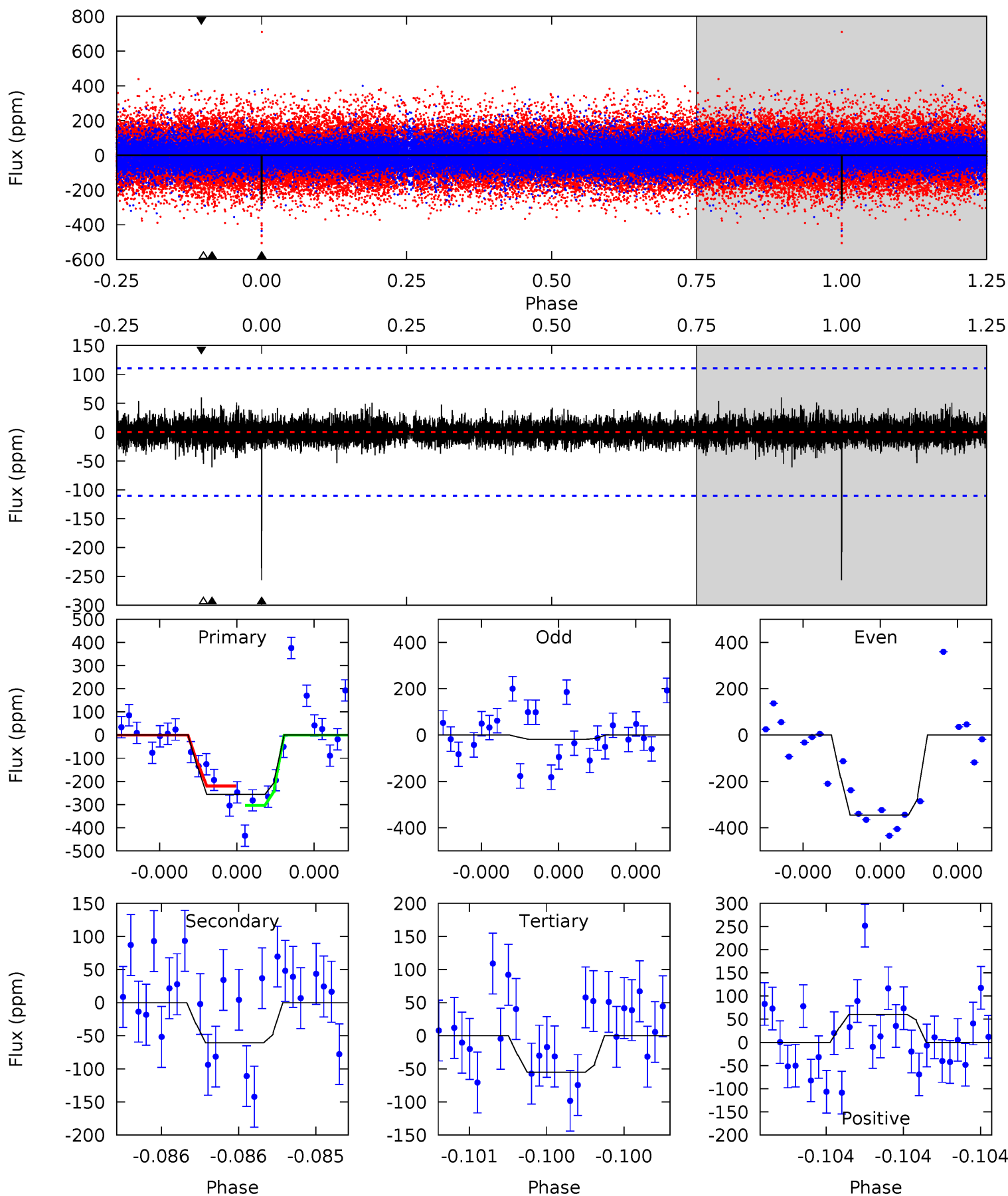
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.40	12.1	11.9	11.5	5.57	3.47	2.63	-4.49	-4.08	0.20	0.61	0.37	0.62	0.49	0.65



Alt Model-Shift Uniqueness Test

010538178-01, P = 429.676900 Days, E = 193.675400 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.1	3.08	2.80	3.07	5.62	3.55	0.59	10.3	9.99	0.28	0.02	8.03	0.90	0.19	2.12



Stellar Parameters For KIC 010538178

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6061^{+211}_{-211}	$4.013^{+0.371}_{-0.132}$	$-0.240^{+0.300}_{-0.300}$	$1.674^{+0.434}_{-0.706}$	$1.054^{+0.160}_{-0.160}$	$0.316^{+0.915}_{-0.140}$
	+3%/-3%	+9%/-3%	+125%/-125%	+26%/-42%	+15%/-15%	+289%/-44%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 010538178-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-396 ± 33	$3.45^{+2.76}_{-2.24}$	446^{+34}_{-47}	6001^{+4813}_{-1312}	$24518^{+169089}_{-17274}$
Alt.	-60 ± 20	$3.34^{+3.19}_{-2.16}$	444^{+34}_{-46}	4066^{+2029}_{-750}	3830^{+24973}_{-2843}

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

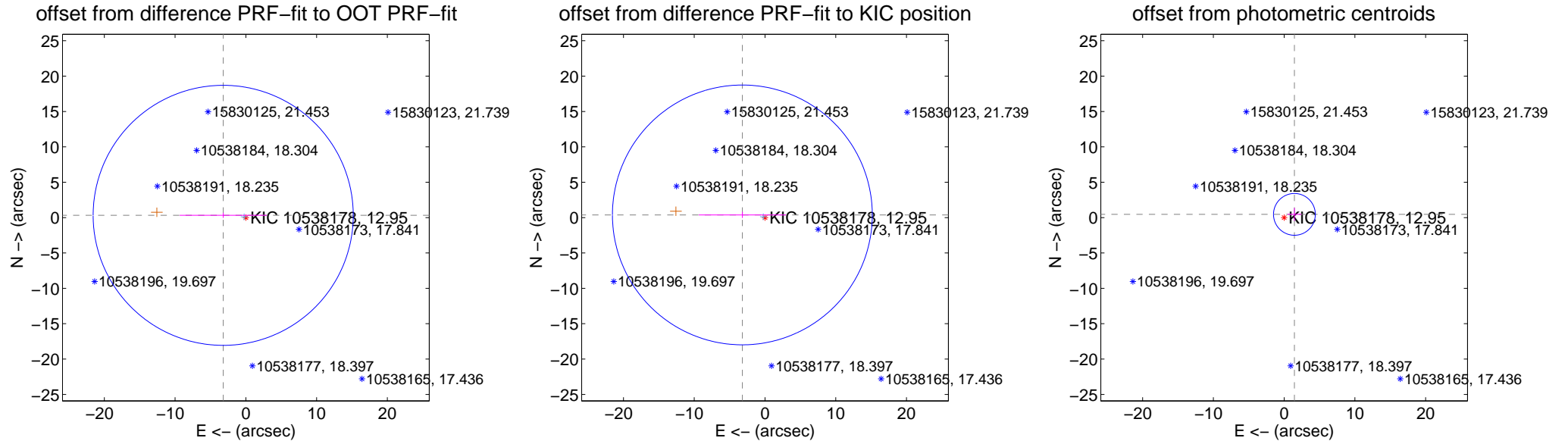
DV Centroid Data

Supplemental centroid analysis for 010538178-01. Kepler magnitude: 12.95. Transit SNR 5.66

There are 1 quarters with good PRF difference image offsets

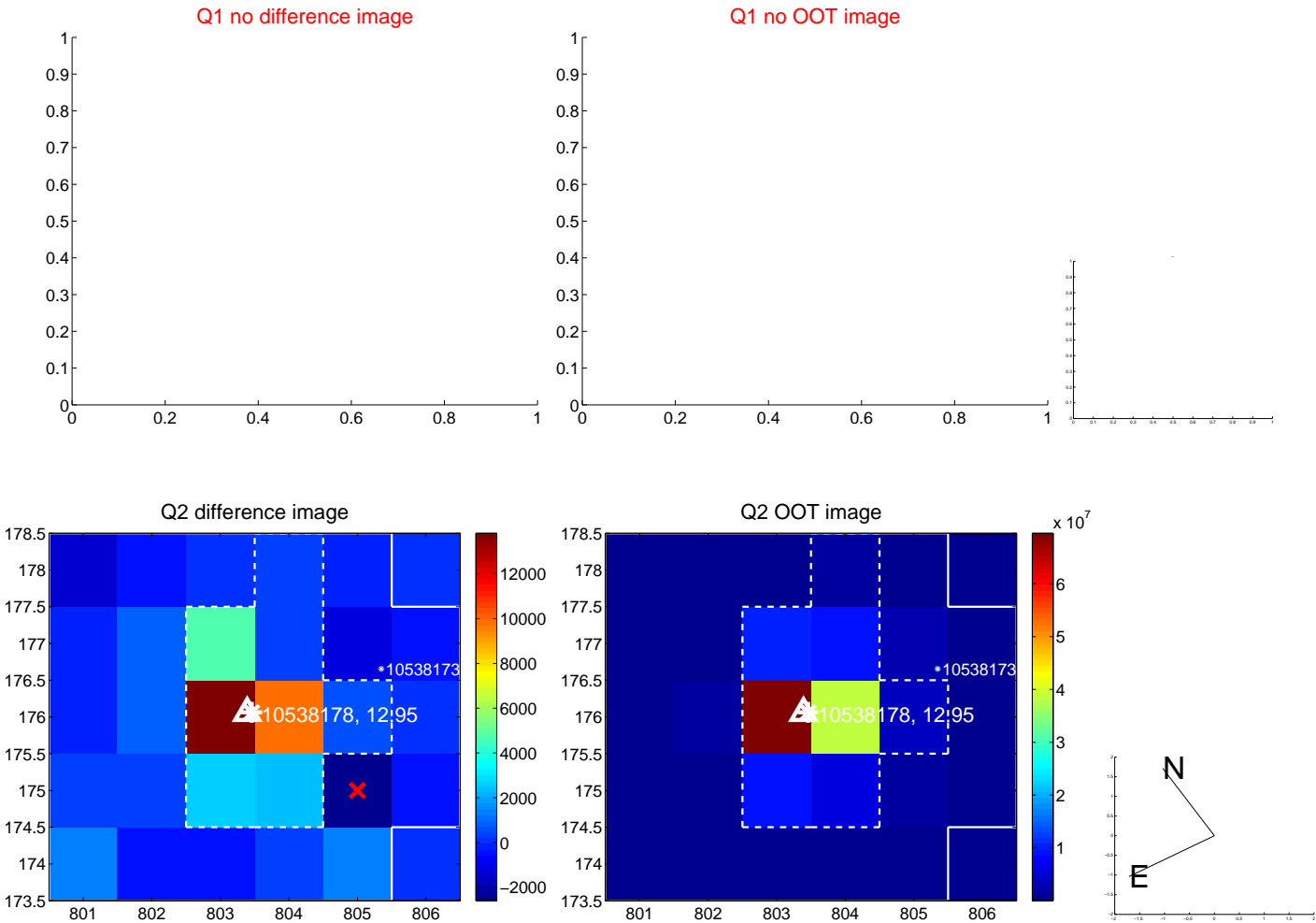
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	3.217 ± 6.127	0.53	3.201 ± 6.157	0.320 ± 0.366
PRF-fit source offset from KIC position	3.221 ± 6.121	0.53	3.199 ± 6.163	0.378 ± 0.436
photometric centroid source offset	1.52 ± 0.98	1.55	-1.45 ± 0.99	0.46 ± 0.92

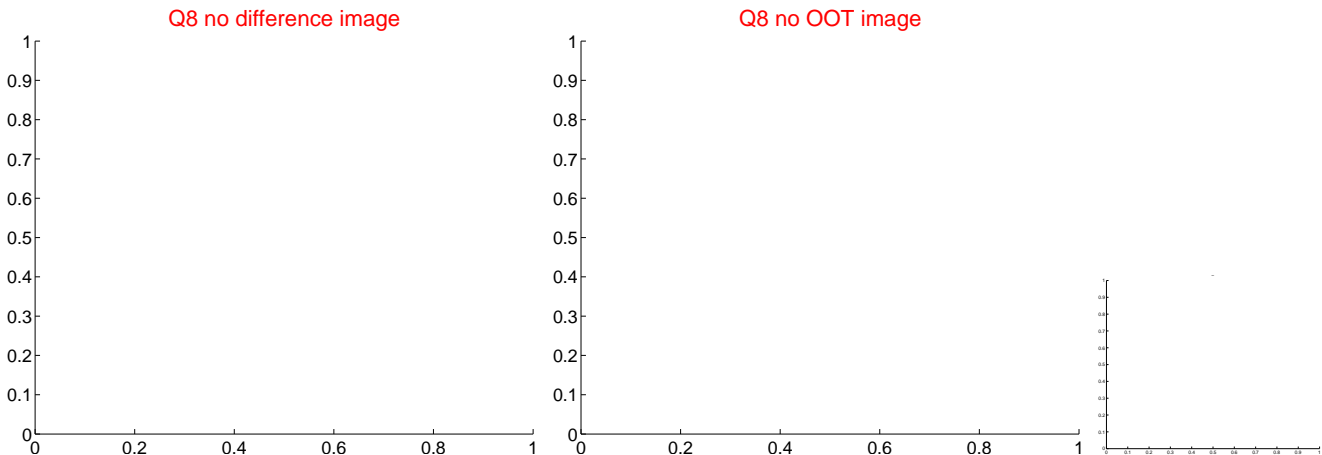
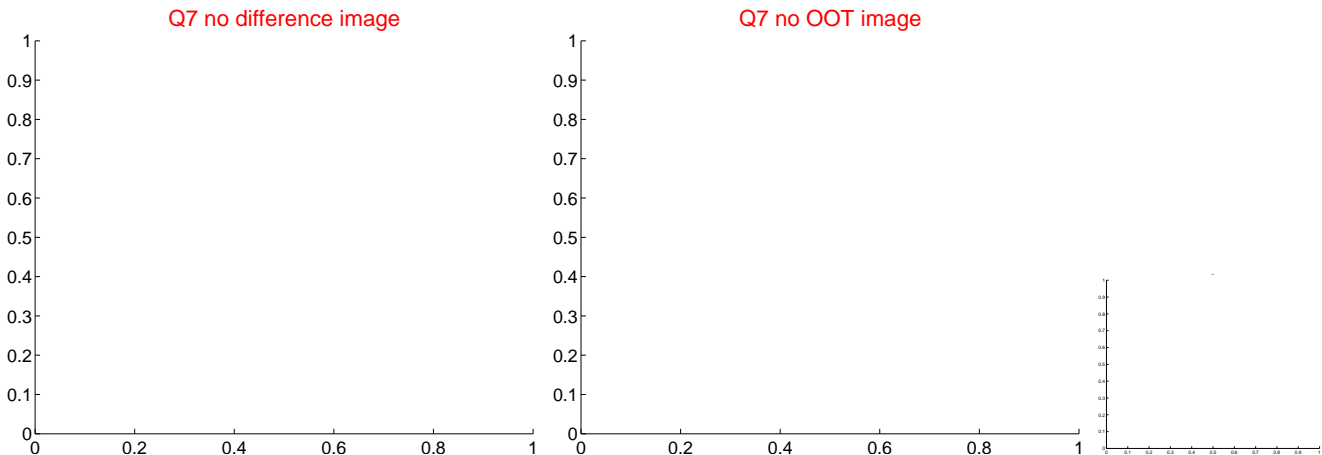
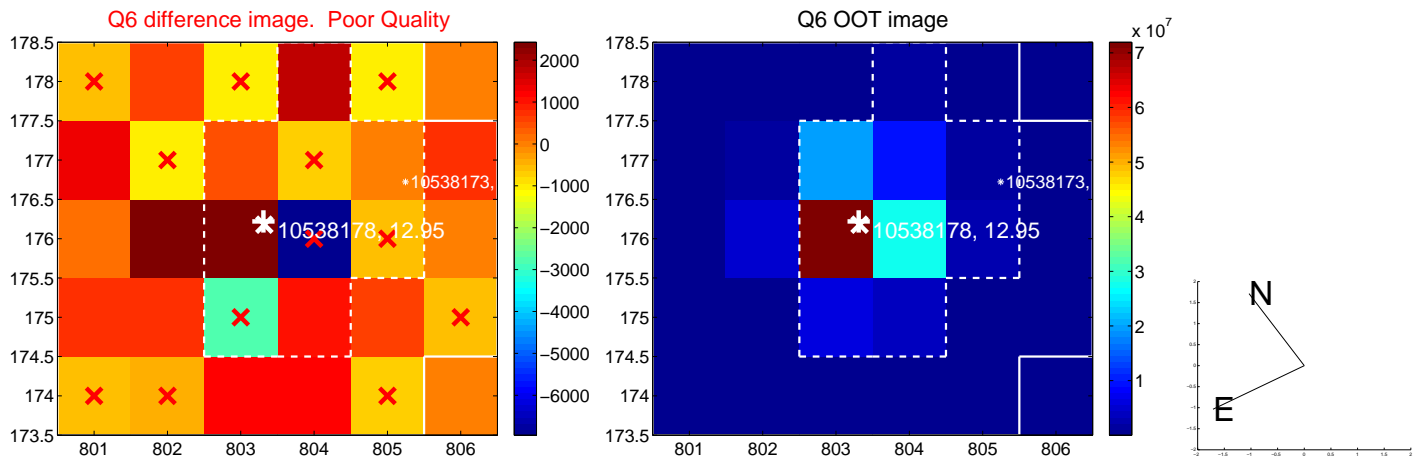
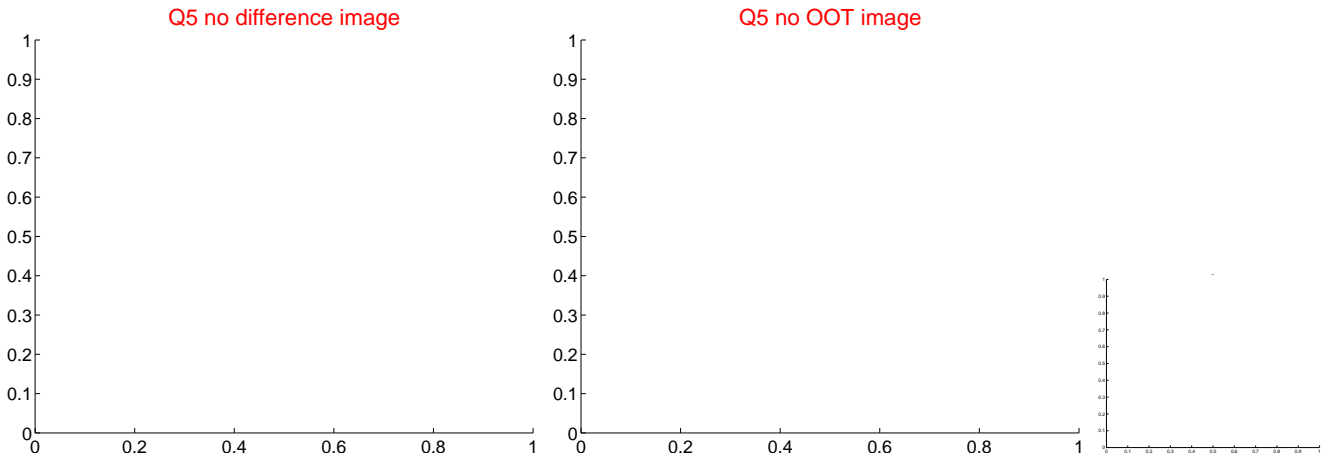


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

Q9 no difference image



Q9 no OOT image



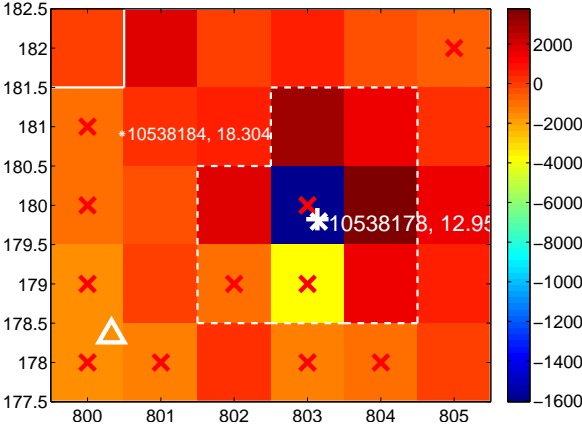
Q10 no difference image



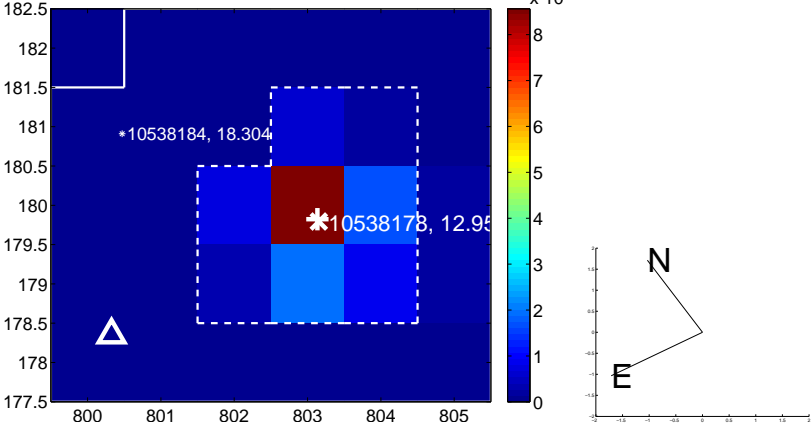
Q10 no OOT image



Q11 difference image. Poor Quality



Q11 OOT image



Q12 no difference image



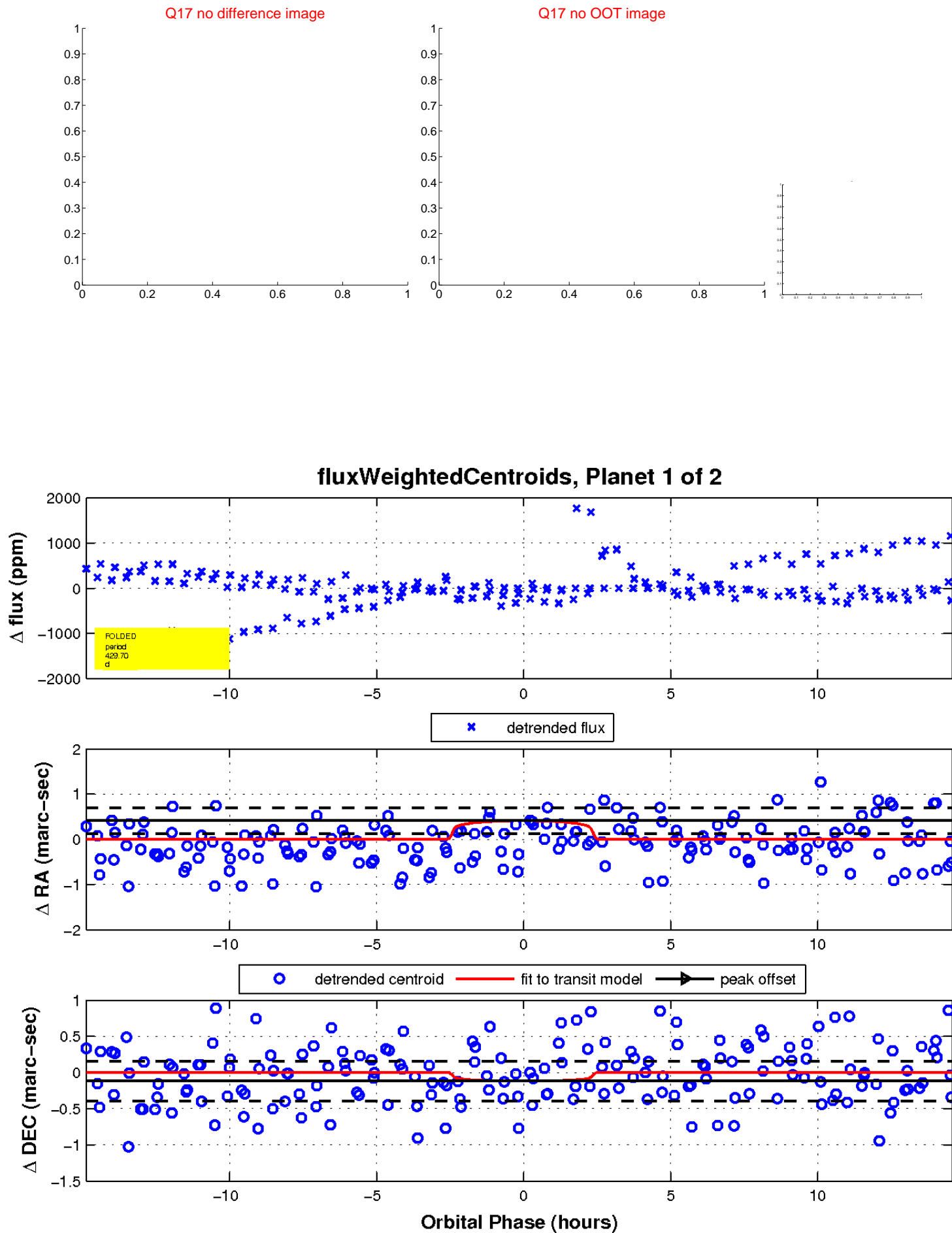
Q12 no OOT image



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

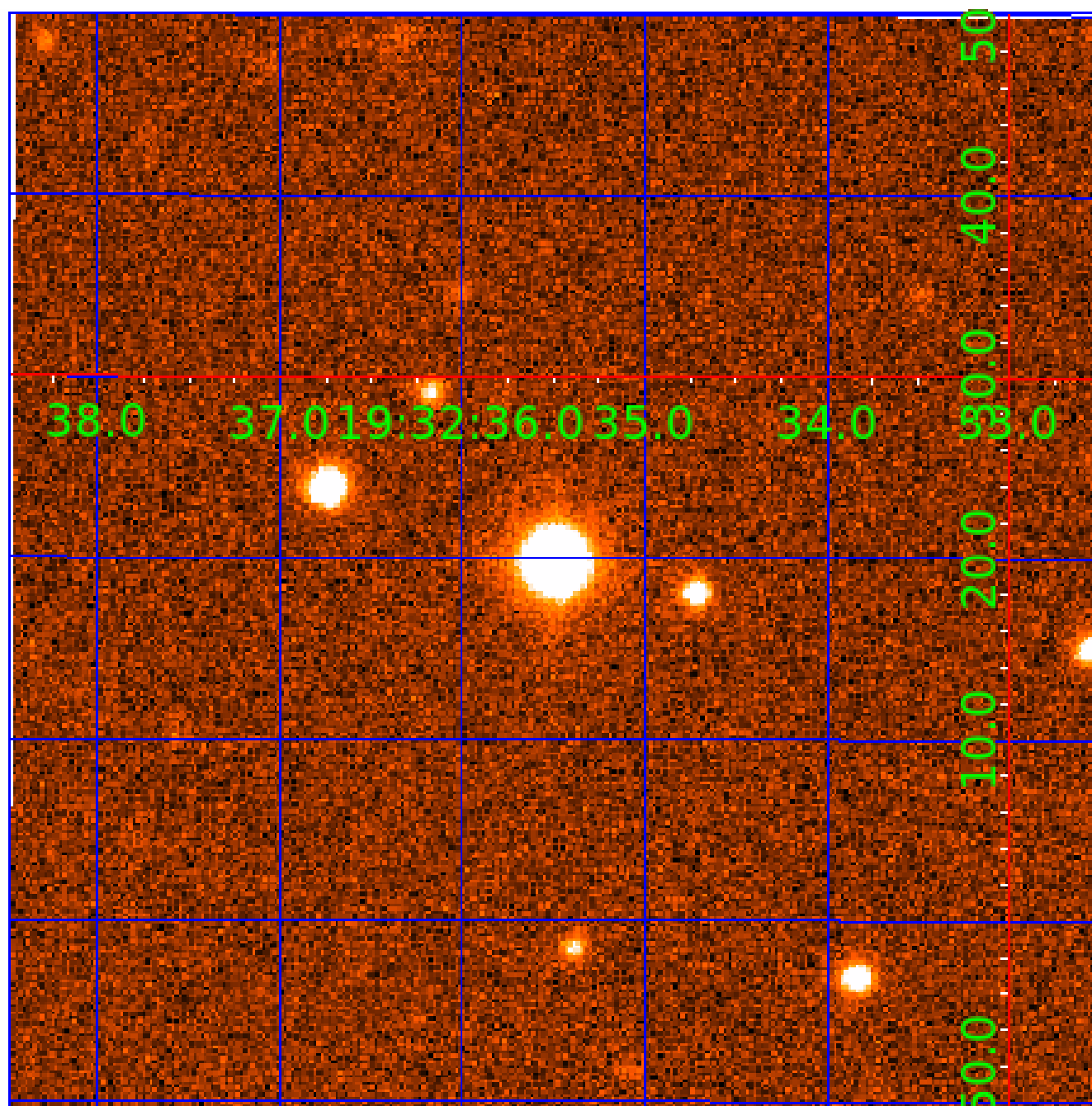


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010538178

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})
010538178-01	OBS	No	429.695057	193.662390	289.6	4.964	11.9	5.7	1.67	6061	3.03	2.63
010538178-02	OBS	No	344.500379	395.842600	288.4	4.013	10.7	6.5	1.67	6061	3.05	3.54

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010538178-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010538178-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

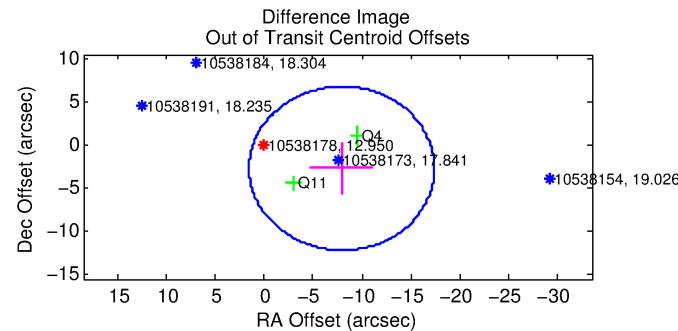
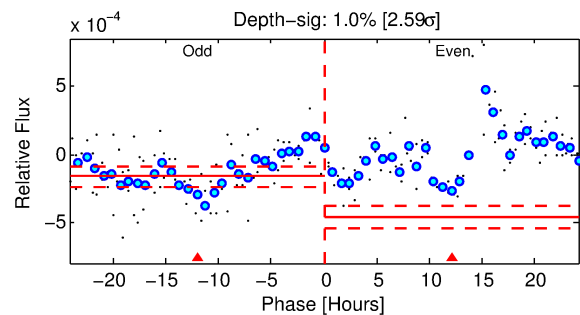
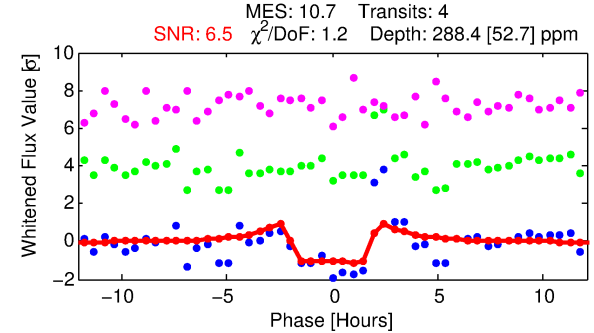
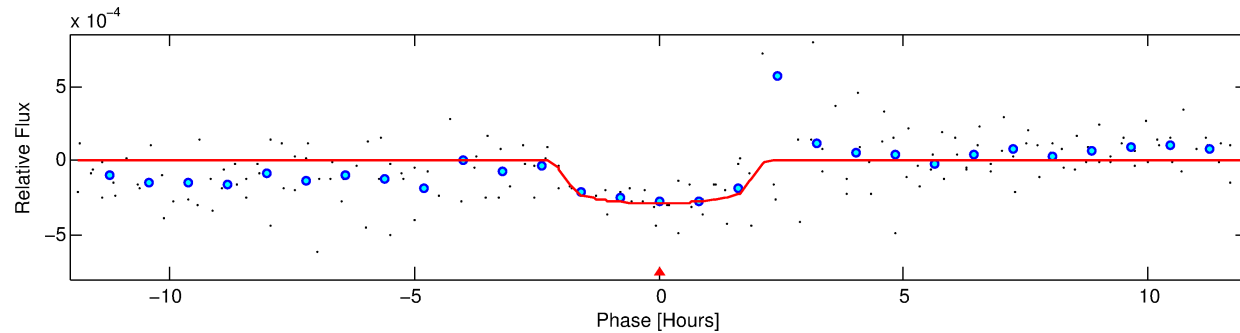
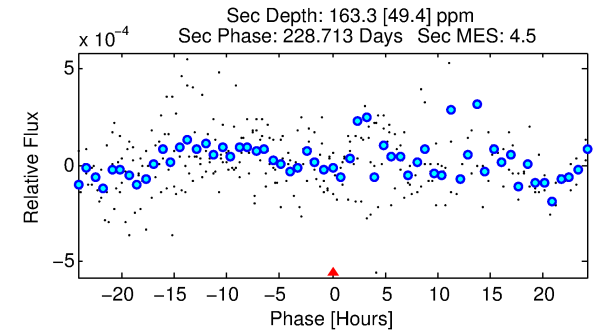
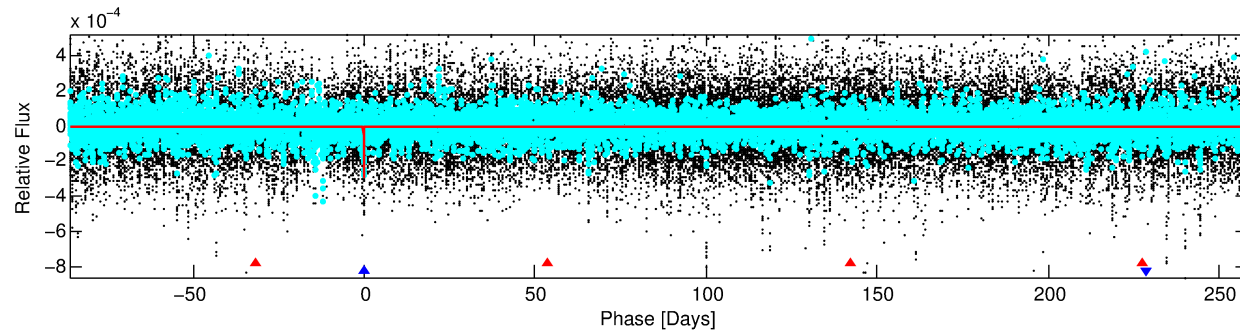
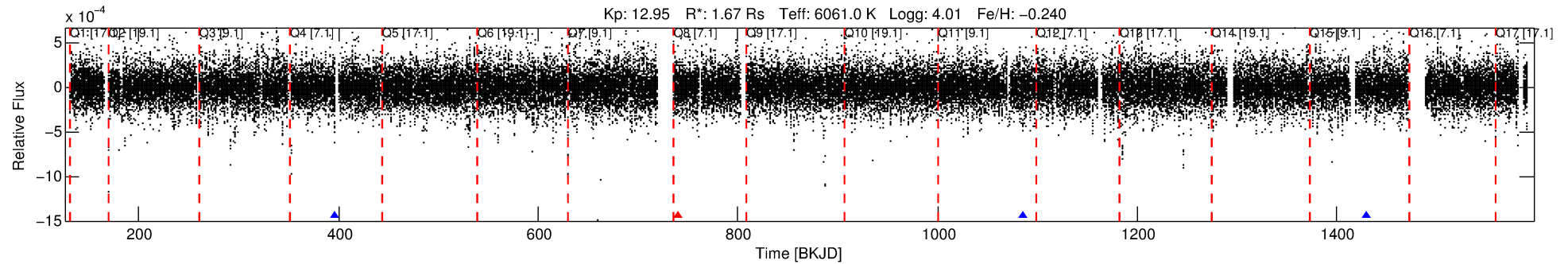
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010538178-02

No Significant Match Found

DV One-Page Summary

KIC: 10538178 Candidate: 2 of 2 Period: 344.500 d



DV Fit Results:

Period = 344.50038 [0.00493] d
Epoch = 395.8426 [0.0092] BKJD
Rp/R* = 0.0167 [0.0212]
a/R* = 474.01 [3011.90]
b = 0.72 [4.39]
Seff = 3.54 [2.30]
Teq = 350 [57] K
Rp = 3.05 [4.09] Re
a = 0.9787 [0.3917] AU
Ag = 9233.63 [24344.03] [0.38σ]
Teffp = 5300 [3395] K [1.46σ]

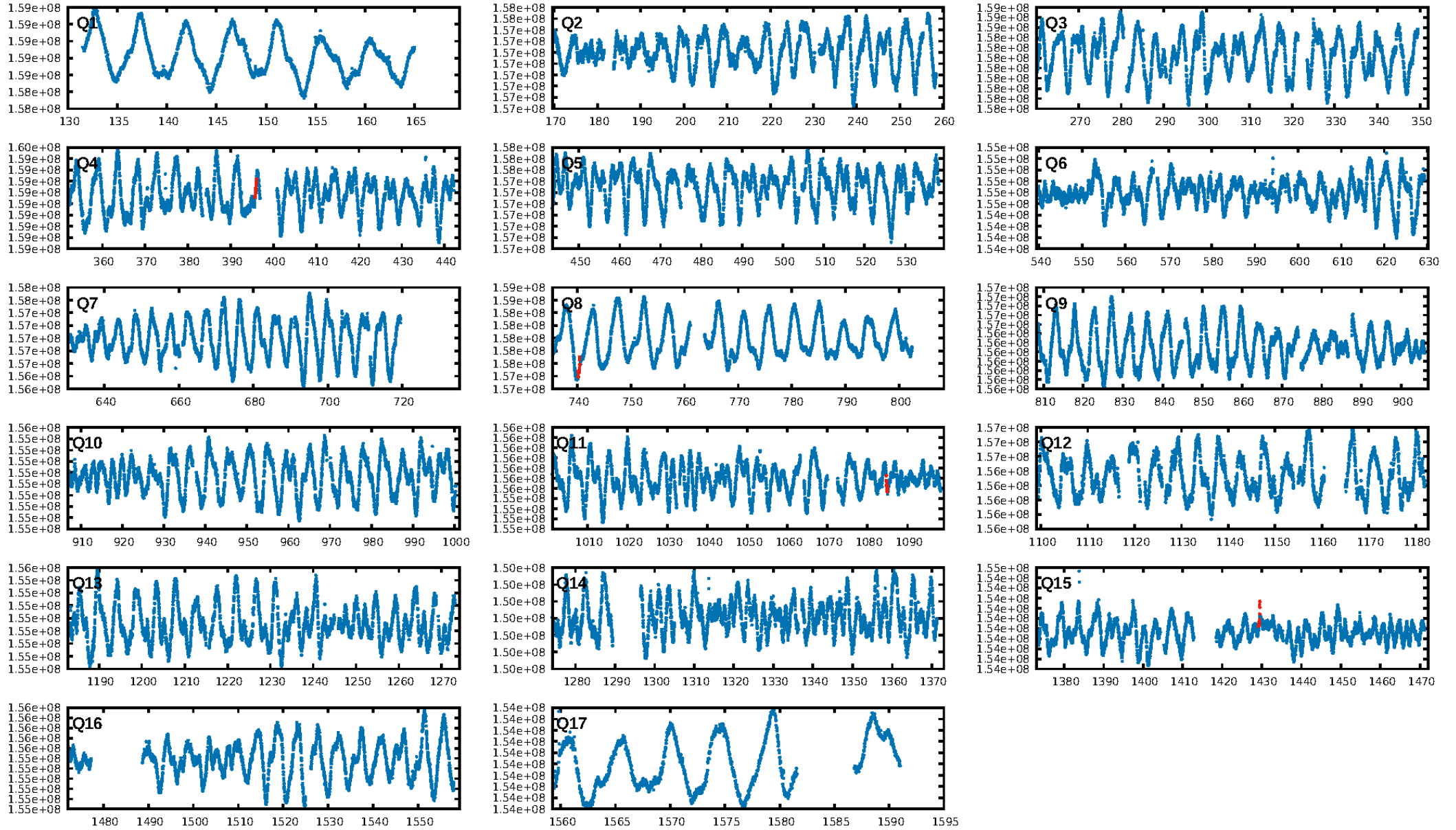
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [320.32σ]
ModelChiSquare2-sig: 13.3%
ModelChiSquareGof-sig: 99.6%
Bootstrap-pfa: 1.75e-12
RollingBand-fgt: 0.75 [3/4]
GhostDiagnostic-chr: 1.856
Centroid-sig: 1.9%
Centroid-so: 1.634 arcsec [1.76σ]
OotOffset-rm: 8.367 arcsec [2.65σ]
KicOffset-rm: 8.293 arcsec [2.64σ]
OotOffset-st: 0/1/1/0 [2]
KicOffset-st: 0/1/1/0 [2]
DiffImageQuality-fgm: 0.00 [0/2]
DiffImageOverlap-fno: 1.00 [4/4]

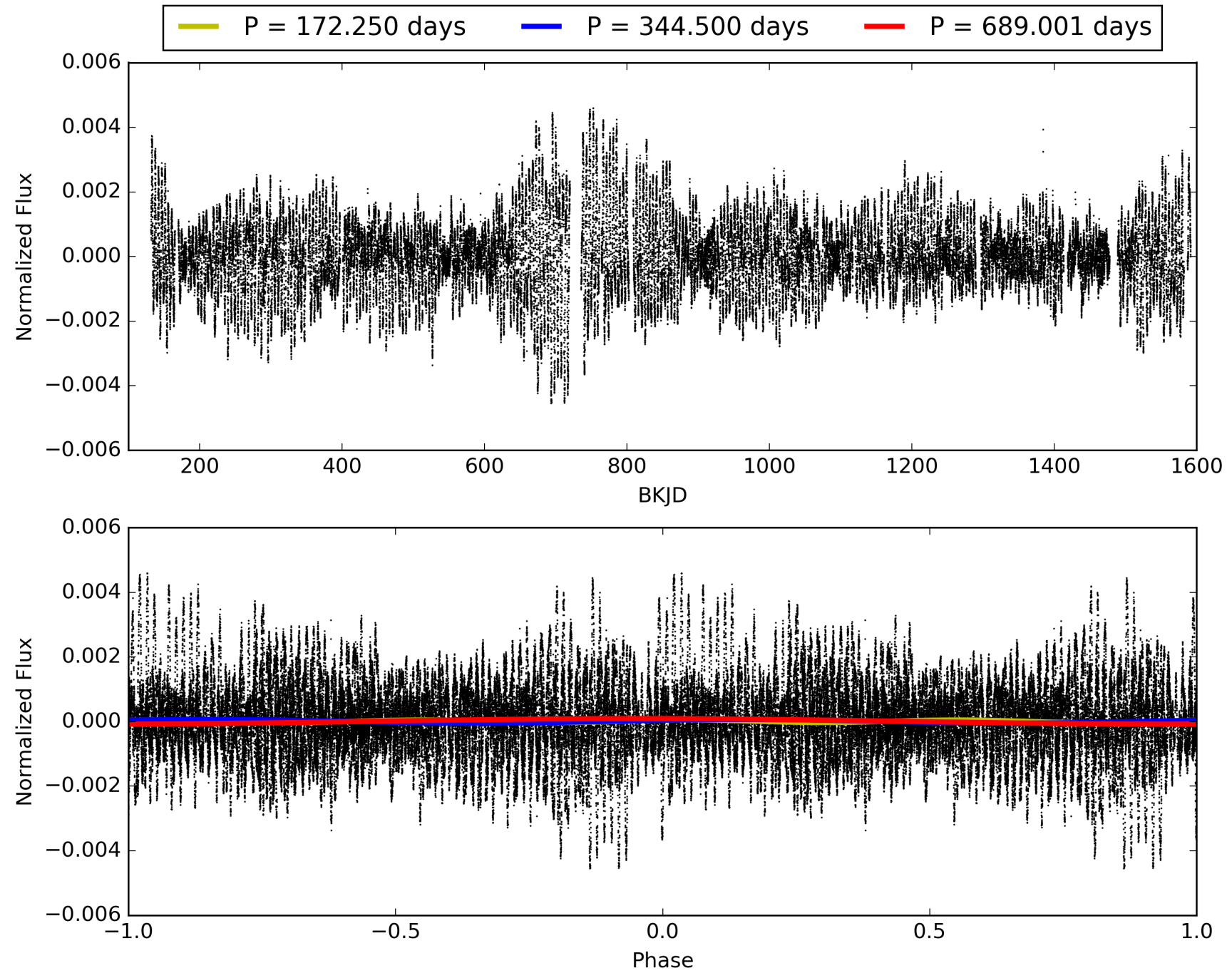
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 03:46:53 Z

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

TCE 010538178-02, PDC Light Curves

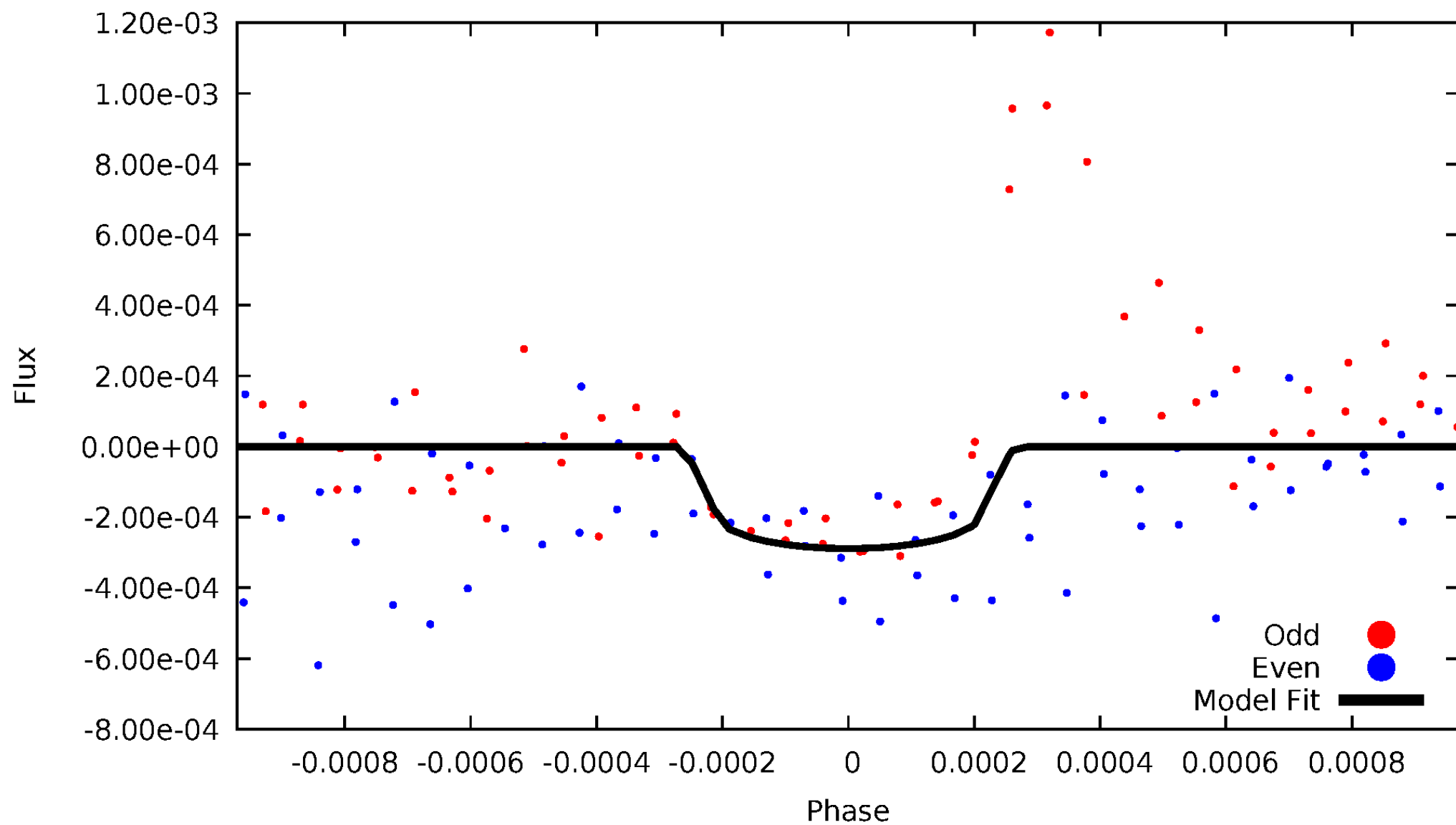


TCE 010538178-02



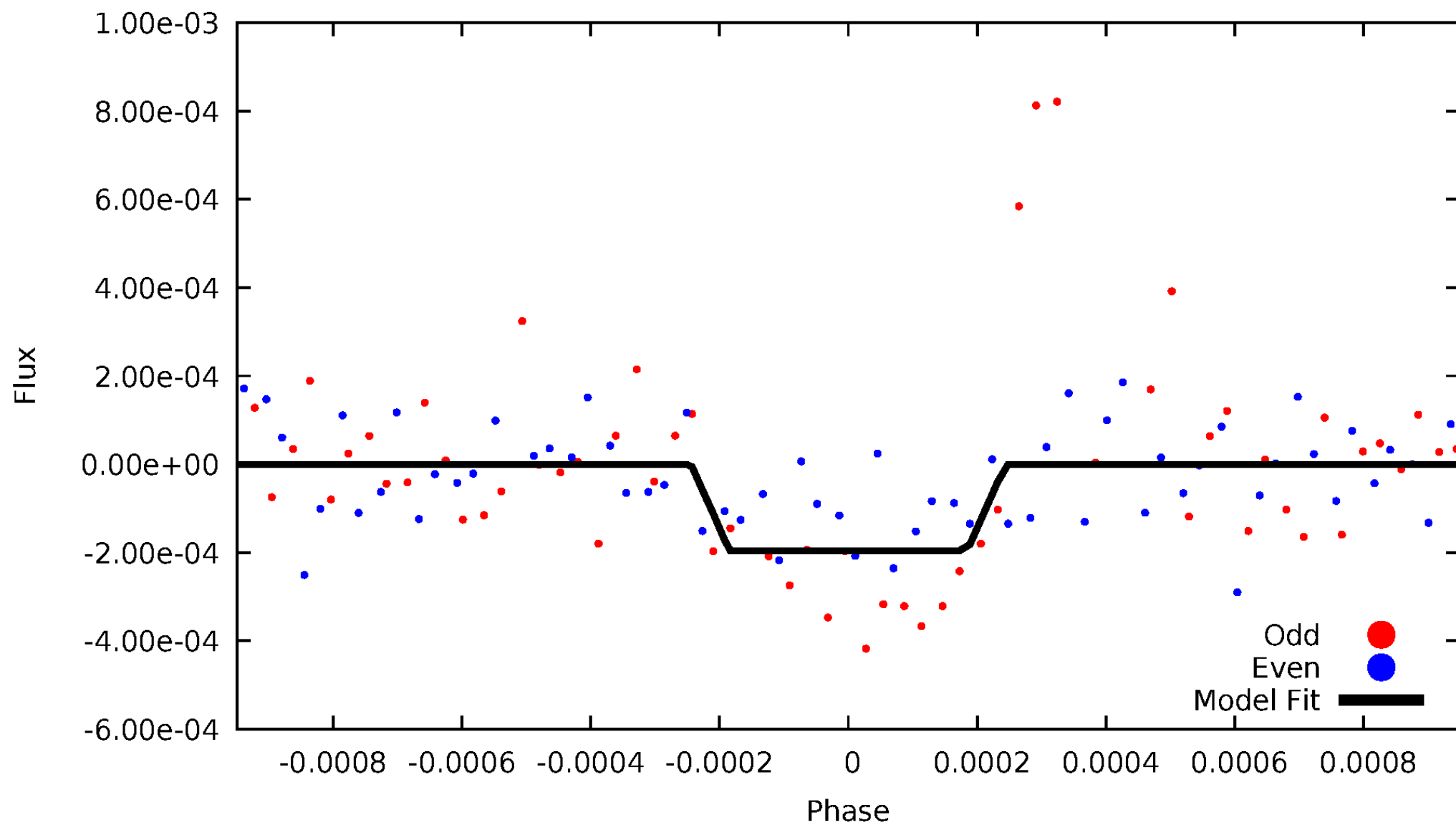
DV Odd/Even

TCE 010538178-02



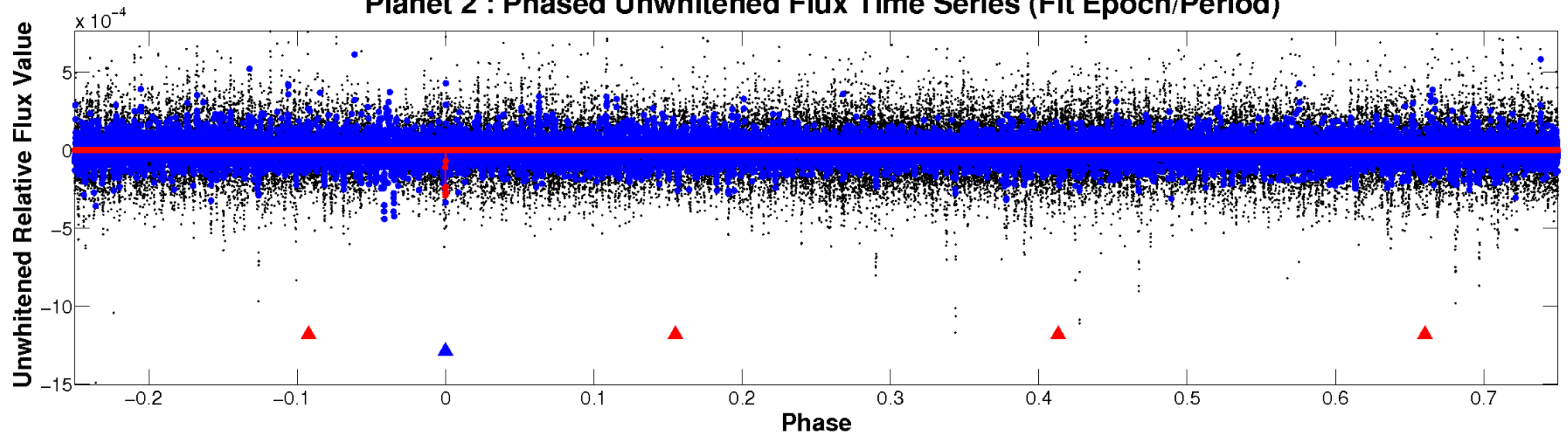
ALT Odd/Even

TCE 010538178-02

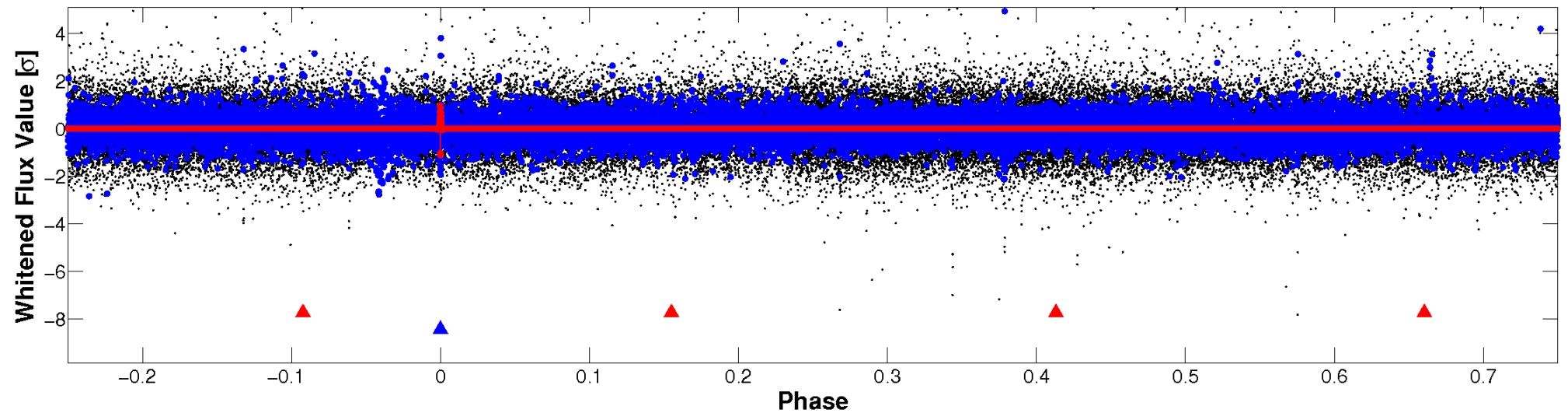


Non-Whitened Vs. Whitened Light Curve

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

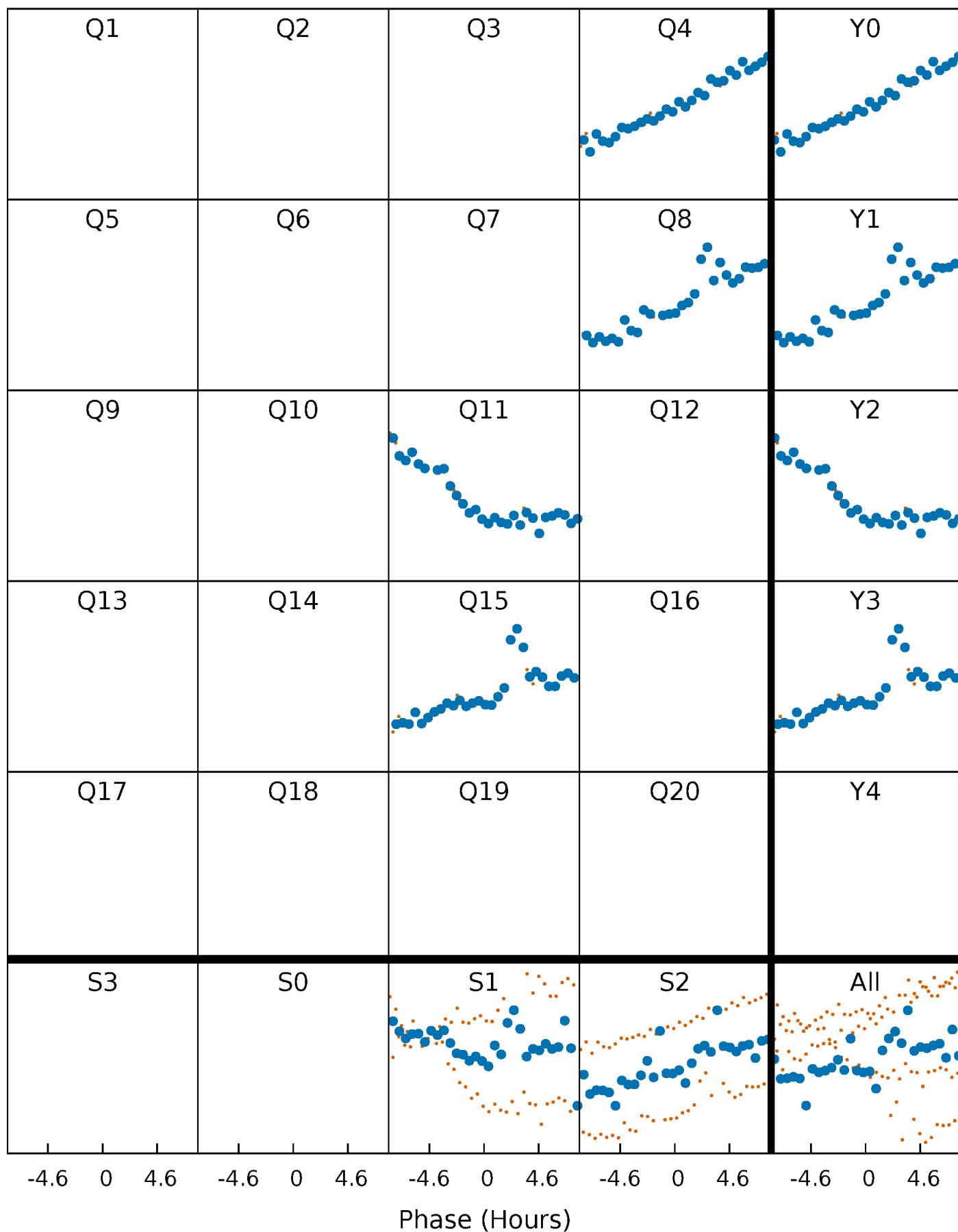


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



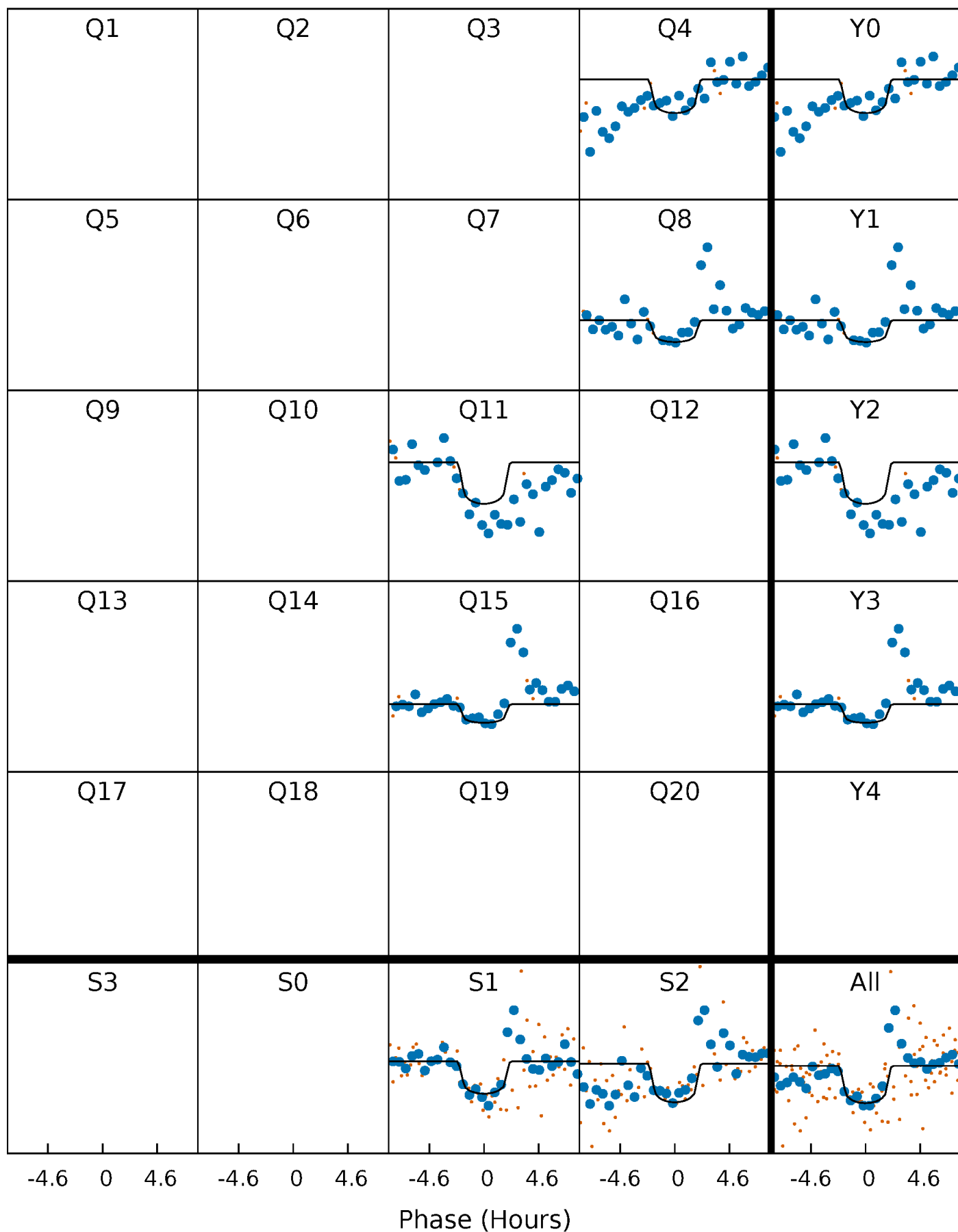
PDC Quarter-Phased Transit Curves

TCE 010538178-02 $P=344.500379$ Days $T_0=395.842600$ (BKJD)



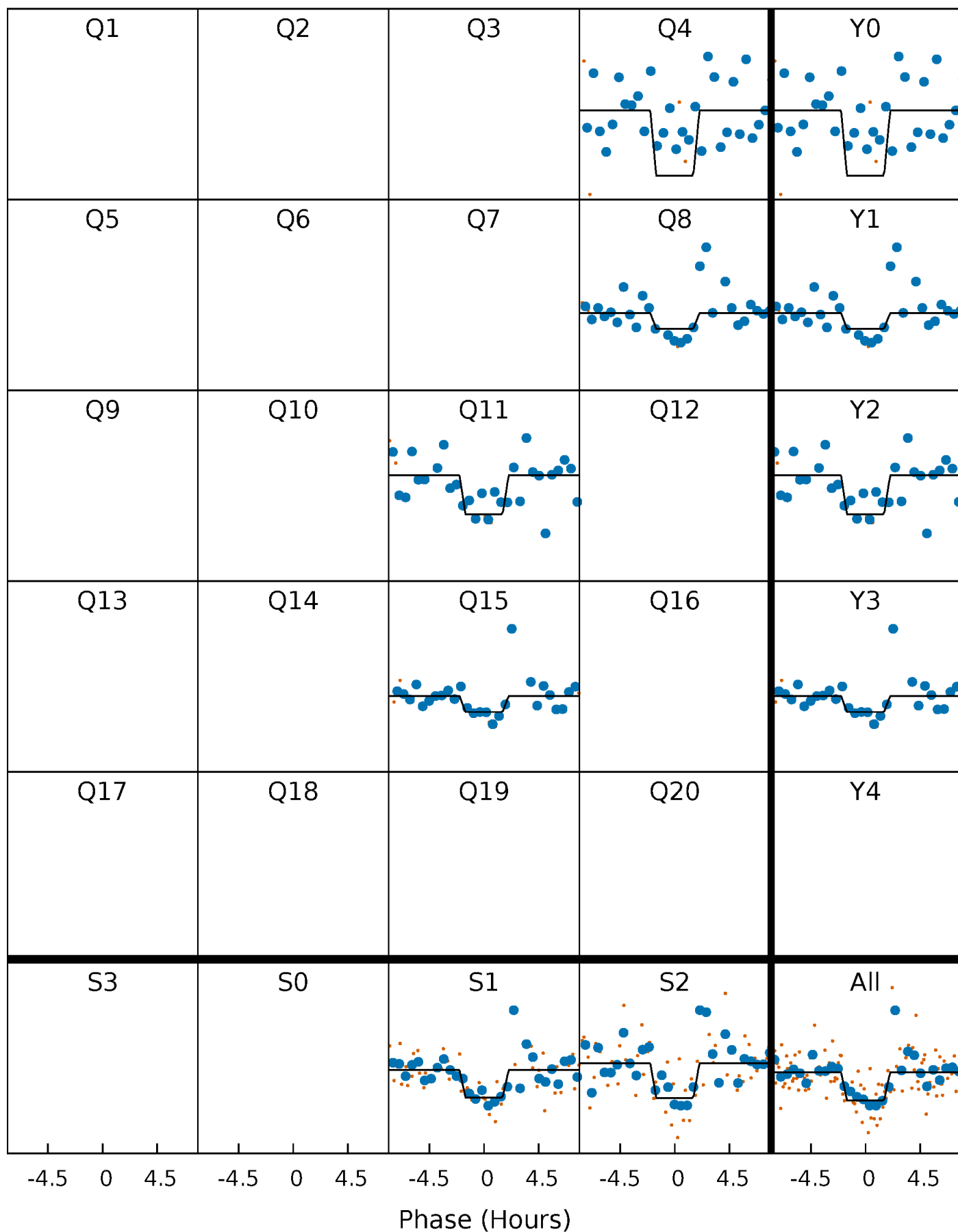
DV Quarter-Phased Transit Curves

TCE 010538178-02 $P=344.500379$ Days $T_0=395.842600$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

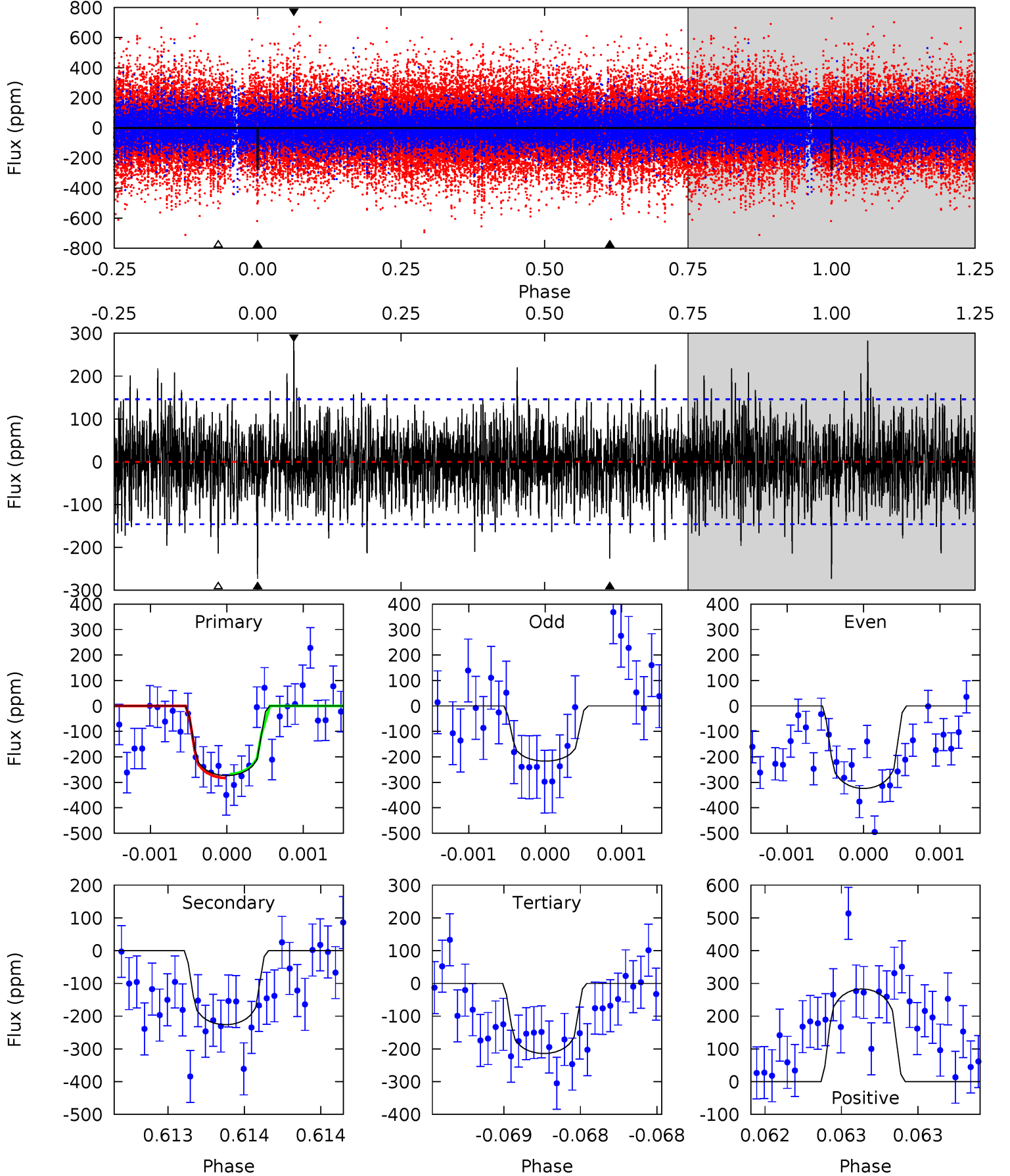
TCE 010538178-02 P=344.496575 Days $T_0=395.843378$ (BKJD)



DV Model-Shift Uniqueness Test

010538178-02, $P = 344.500379$ Days, $E = 51.342221$ Days

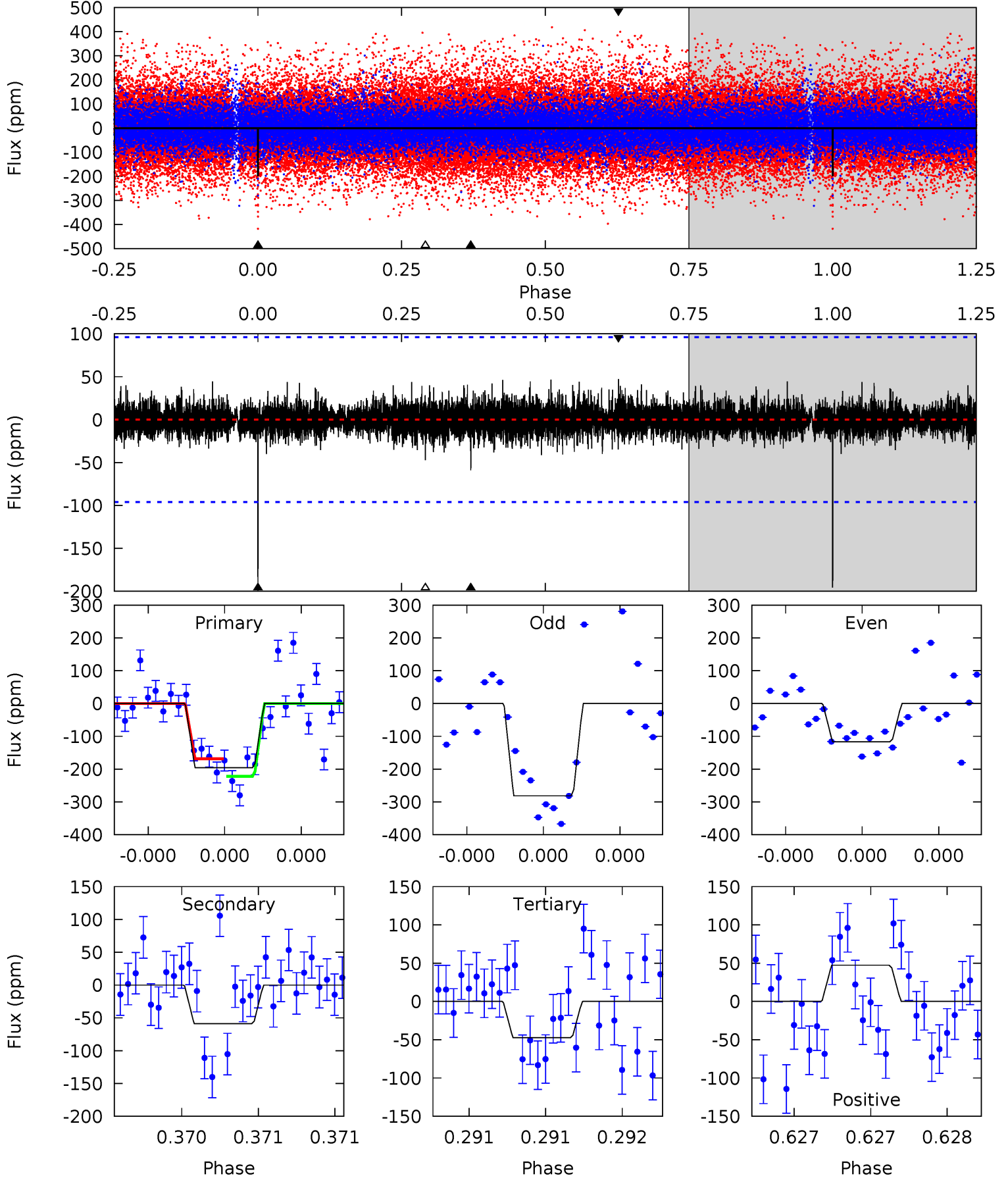
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.4	8.64	8.18	10.8	5.57	3.48	2.22	2.27	-0.36	0.46	-2.17	2.02	1.19	0.51	0.28



Alt Model-Shift Uniqueness Test

010538178-02, P = 344.496575 Days, E = 51.346803 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.4	3.43	2.74	2.75	5.58	3.49	0.64	8.62	8.61	0.69	0.68	4.81	1.00	0.20	1.55



Stellar Parameters For KIC 010538178

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6061^{+211}_{-211}	$4.013^{+0.371}_{-0.132}$	$-0.240^{+0.300}_{-0.300}$	$1.674^{+0.434}_{-0.706}$	$1.054^{+0.160}_{-0.160}$	$0.316^{+0.915}_{-0.140}$
	+3%/-3%	+9%/-3%	+125%/-125%	+26%/-42%	+15%/-15%	+289%/-44%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 010538178-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-226 ± 26	$3.60^{+3.63}_{-2.35}$	481^{+37}_{-52}	5102^{+4378}_{-1089}	8874^{+70853}_{-6547}
Alt.	-59 ± 17	$3.44^{+2.94}_{-2.21}$	478^{+41}_{-47}	4026^{+2125}_{-778}	2533^{+17767}_{-1858}

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 $A_{obs} \gg 1.0$

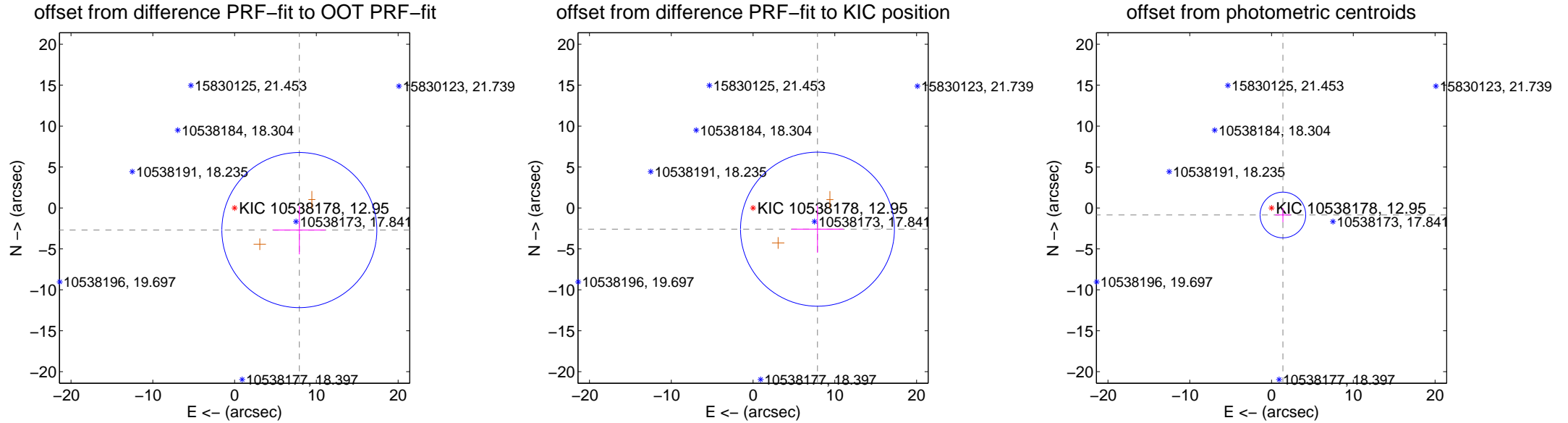
DV Centroid Data

Supplemental centroid analysis for 010538178-02. Kepler magnitude: 12.95. Transit SNR 6.51

There are 0 quarters with good PRF difference image offsets

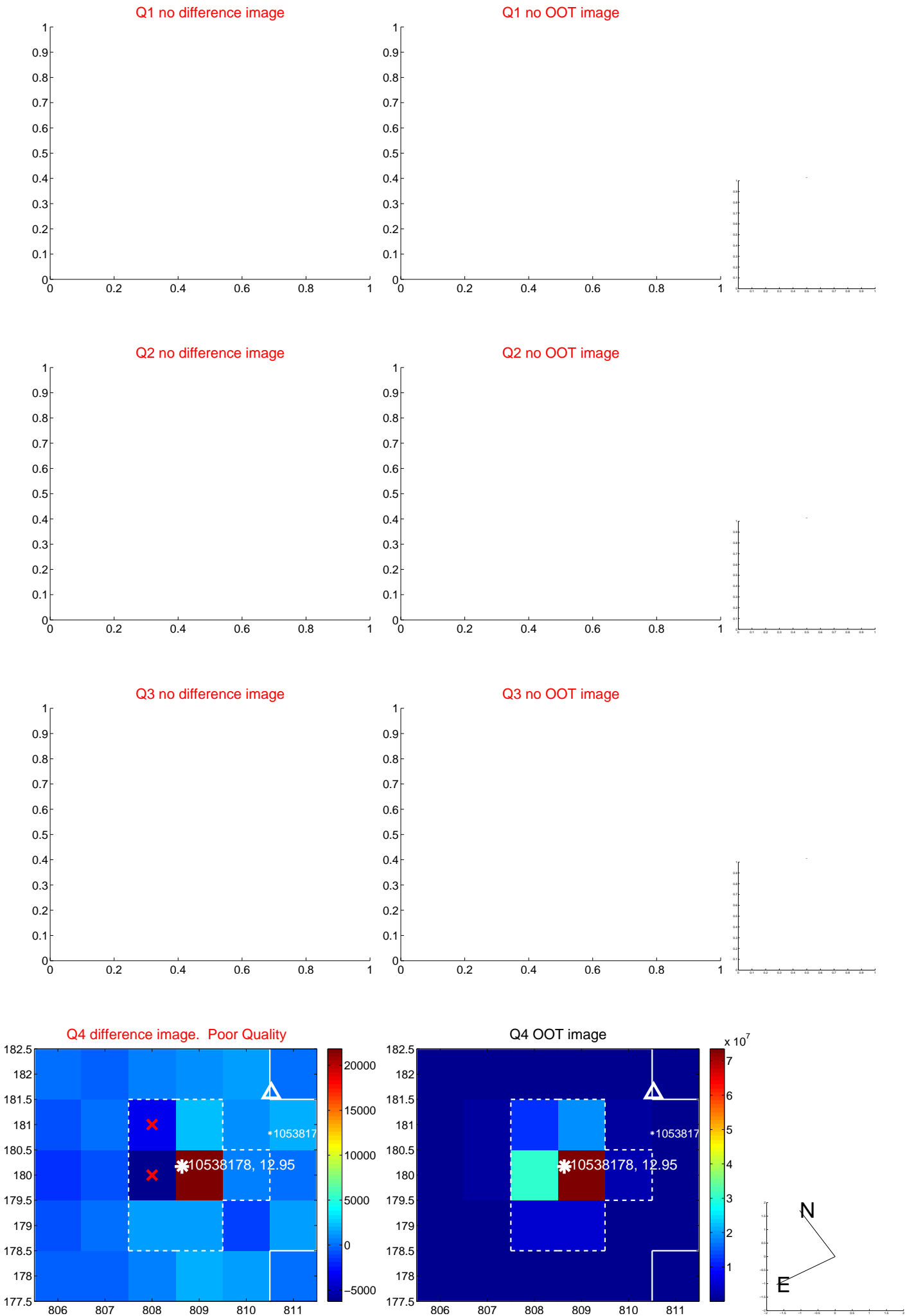
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	8.367 ± 3.159	2.65	-7.919 ± 3.180	-2.701 ± 2.970
PRF-fit source offset from KIC position	8.293 ± 3.136	2.64	-7.877 ± 3.163	-2.594 ± 2.879
photometric centroid source offset	1.63 ± 0.93	1.76	-1.39 ± 0.95	-0.86 ± 0.87

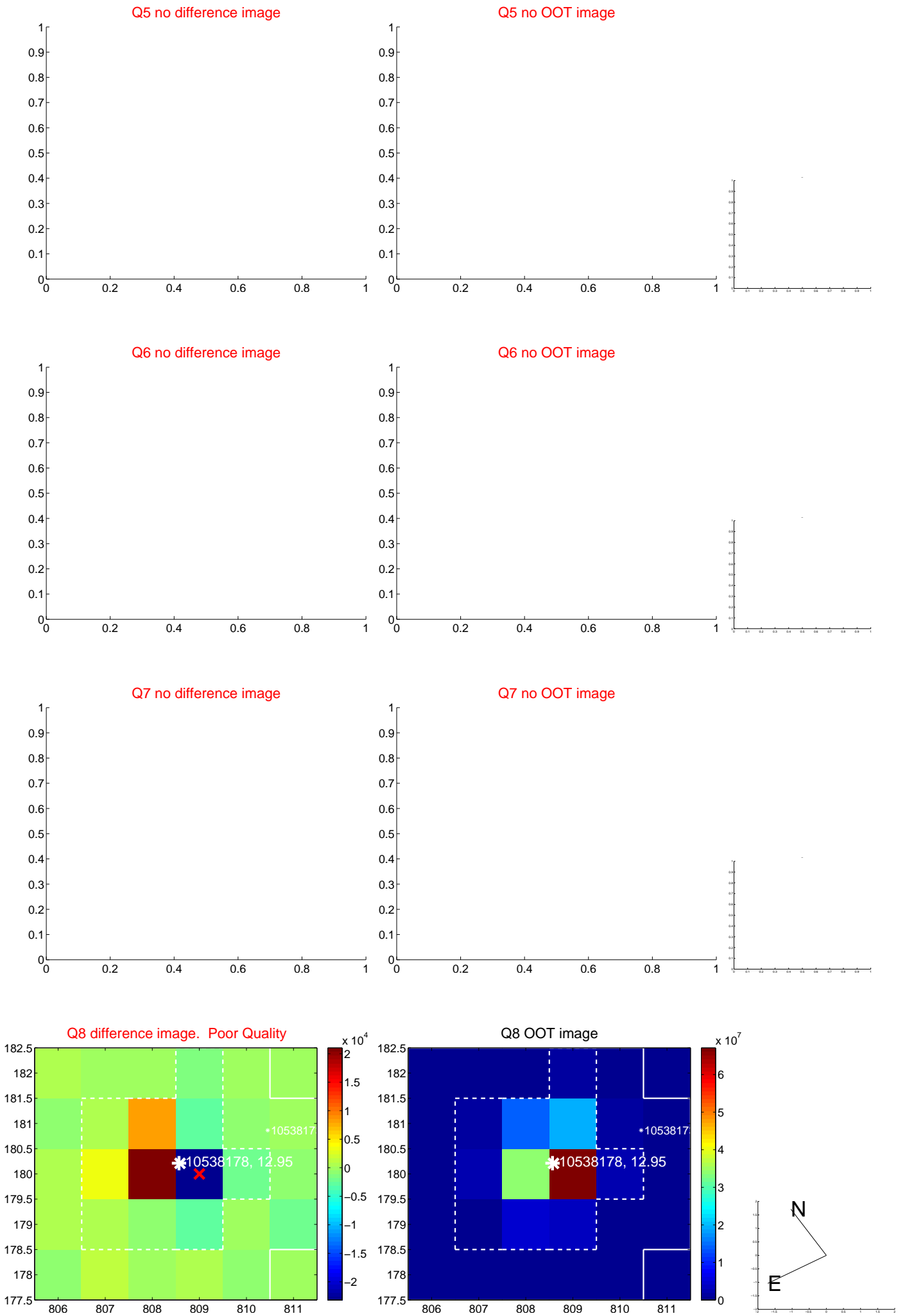


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

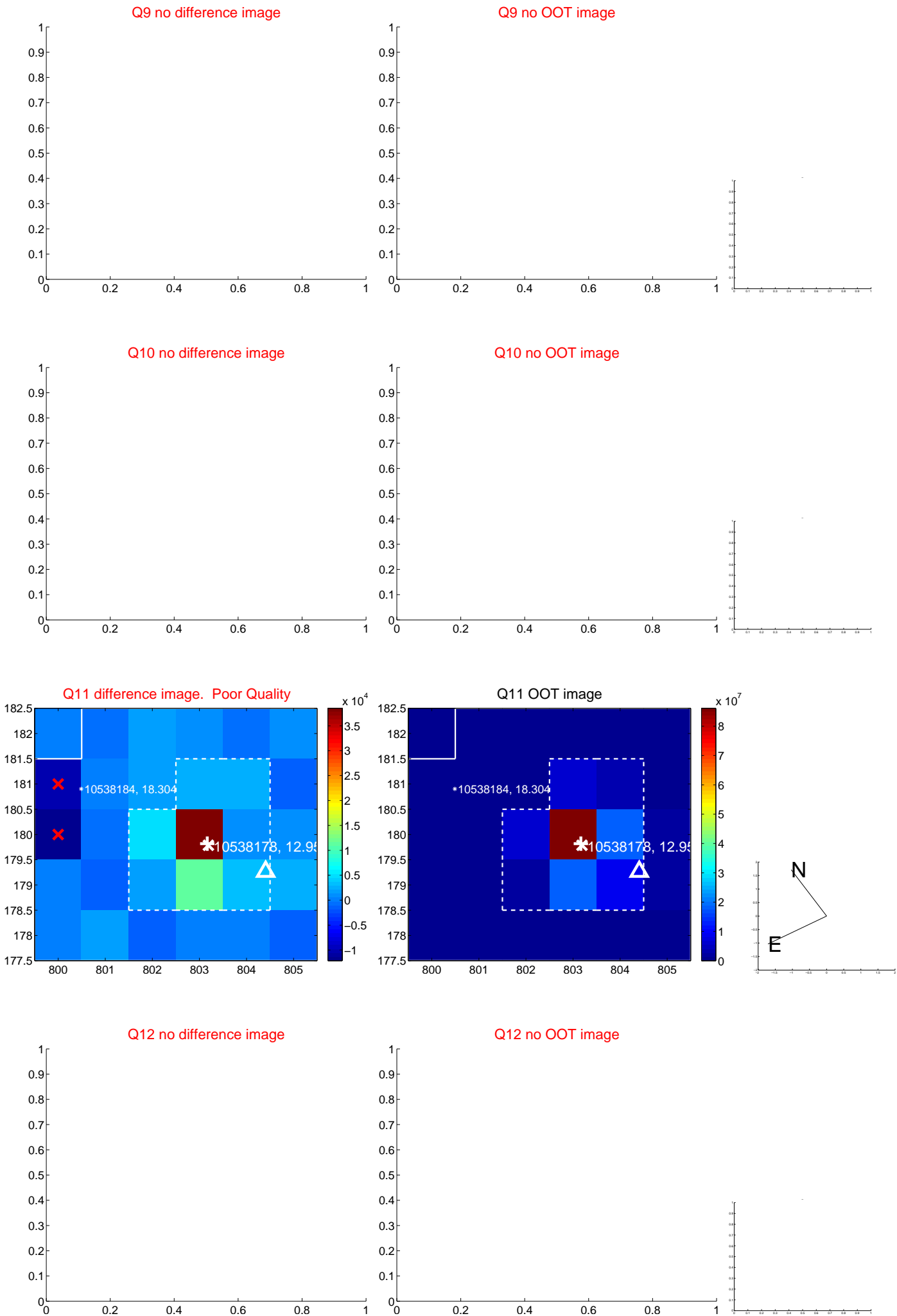
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



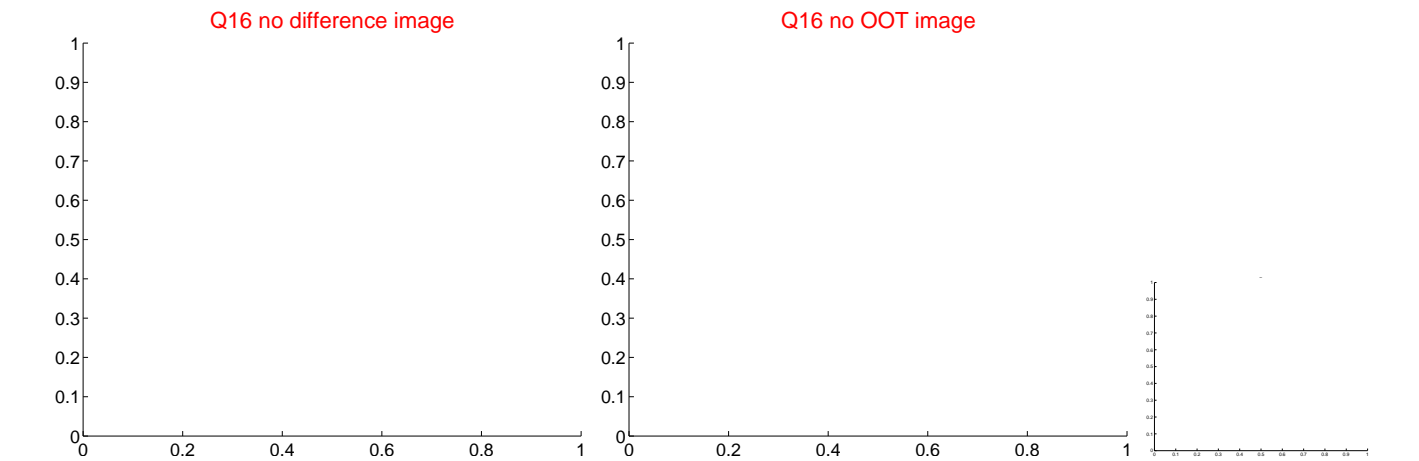
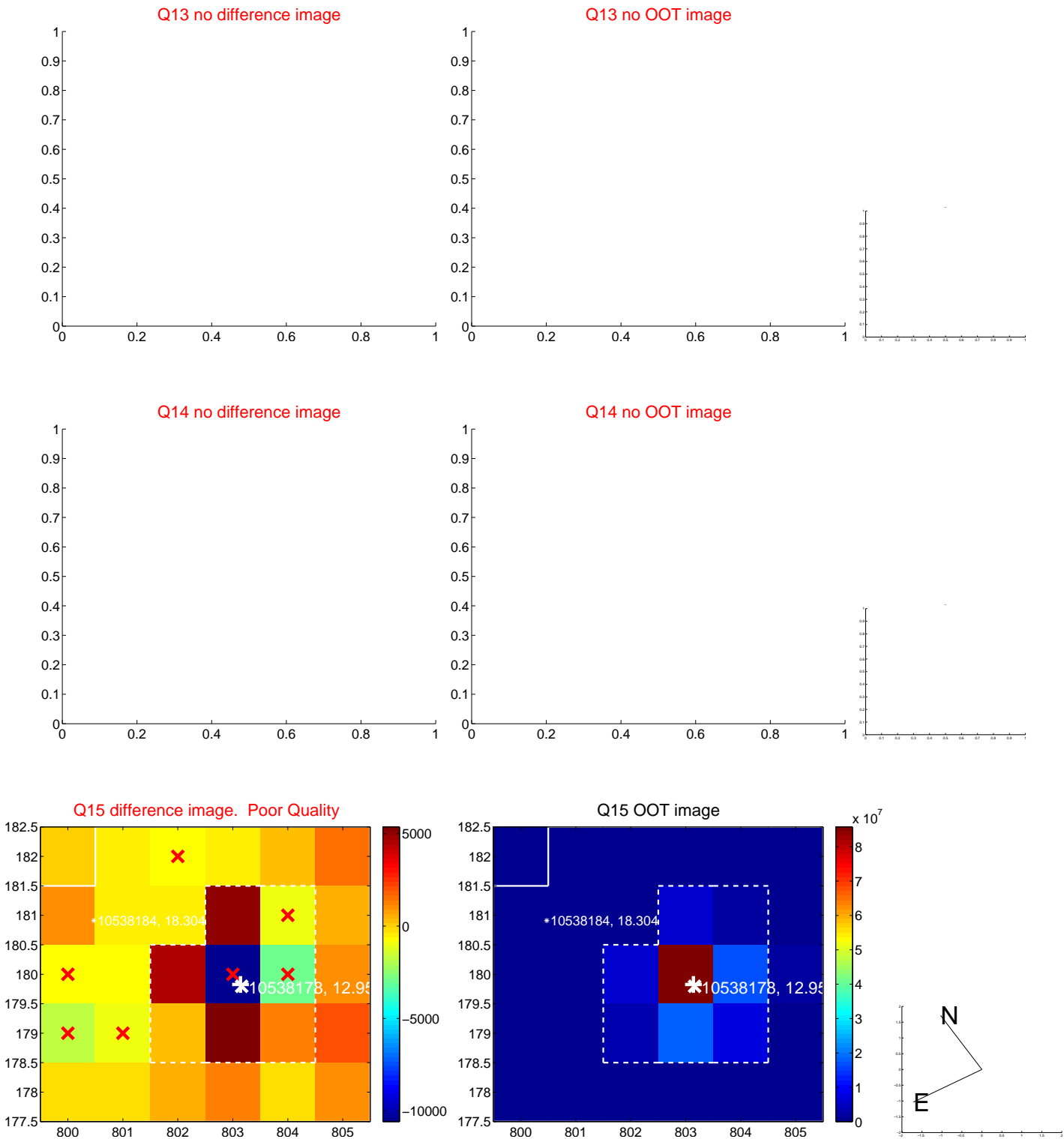
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



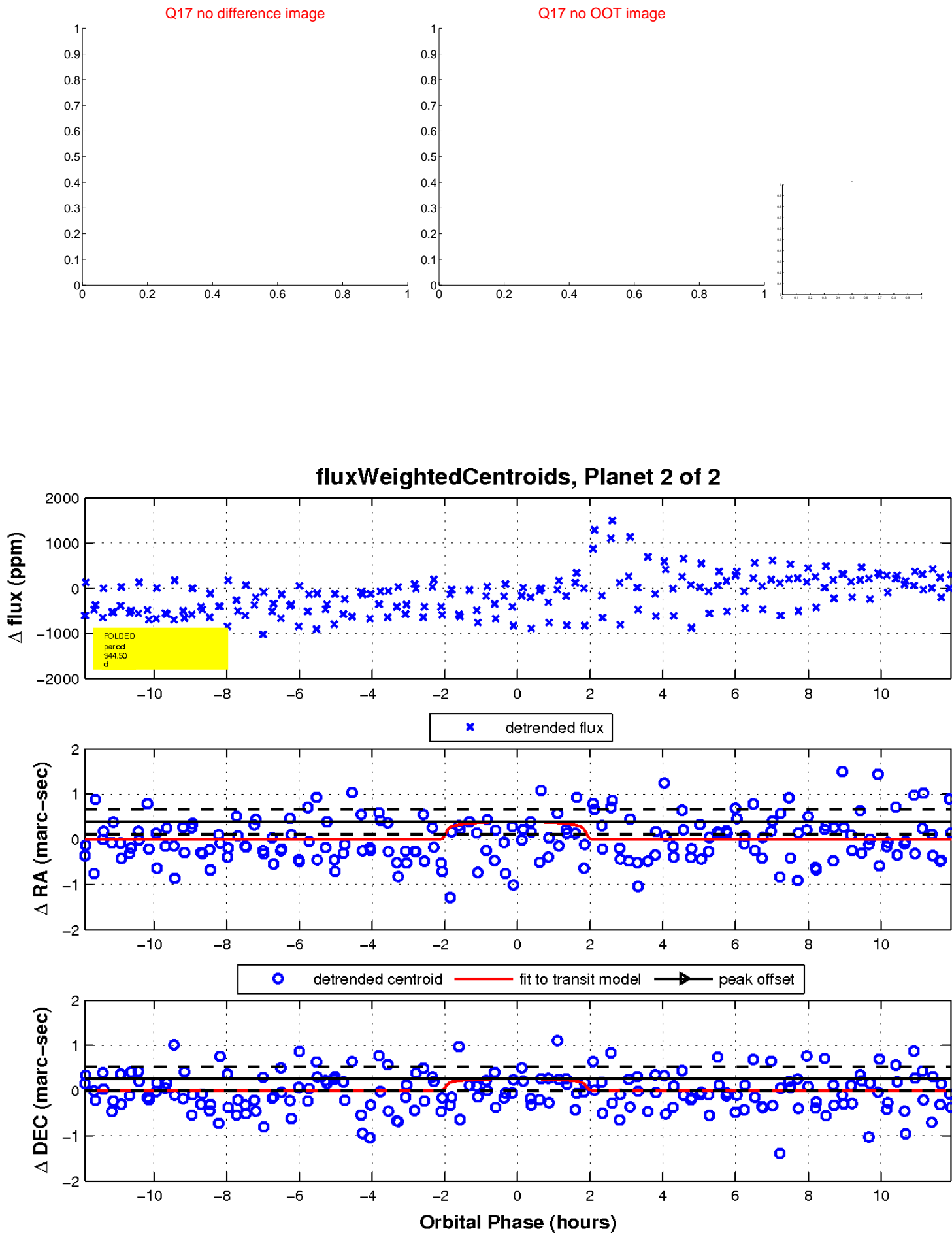
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

