

KIC 006451936

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})
006451936-01	OBS	0511.01	8.005768	138.481823	637.9	3.208	62.0	66.9	0.94	6032	2.64	197.43
006451936-02	OBS	0511.02	4.263745	133.719416	178.1	2.458	21.1	23.4	0.94	6032	1.46	457.33

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006451936-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
006451936-02	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.

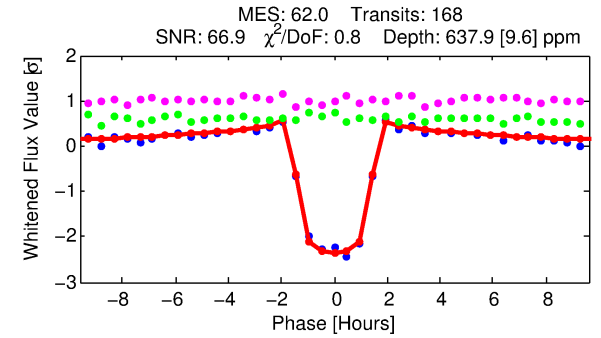
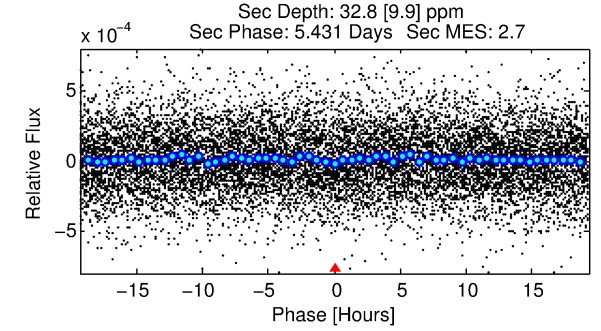
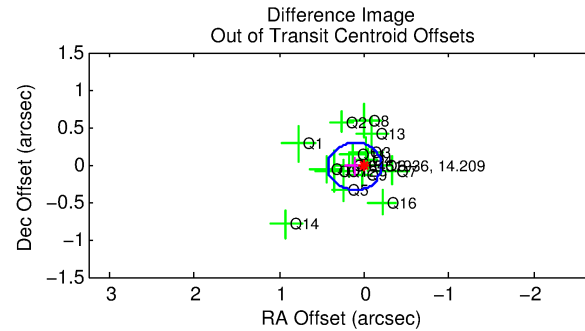
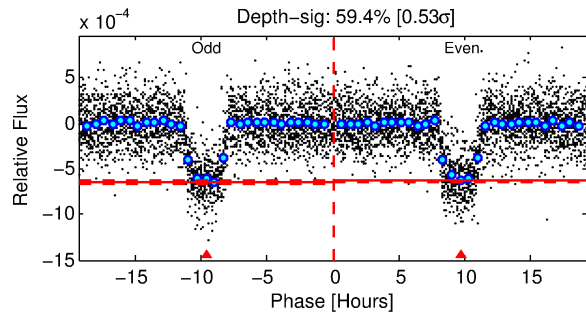
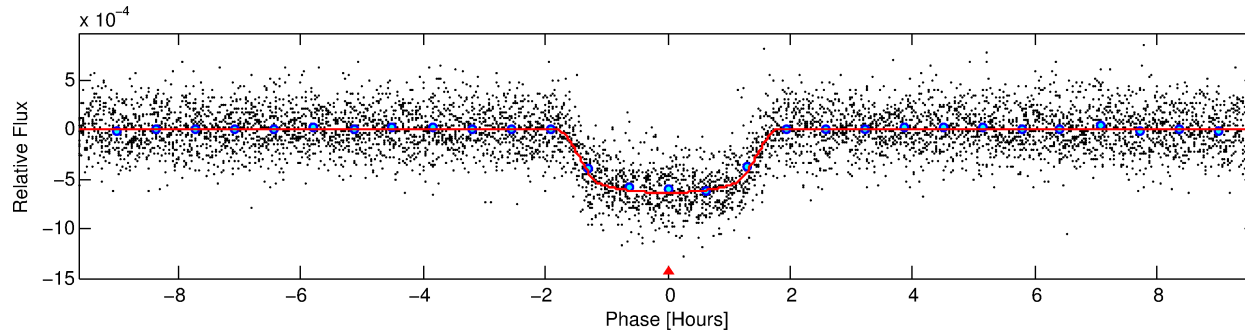
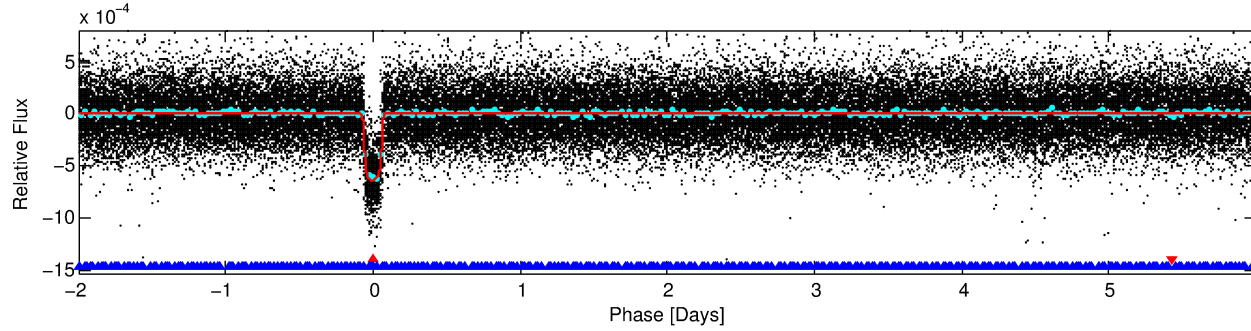
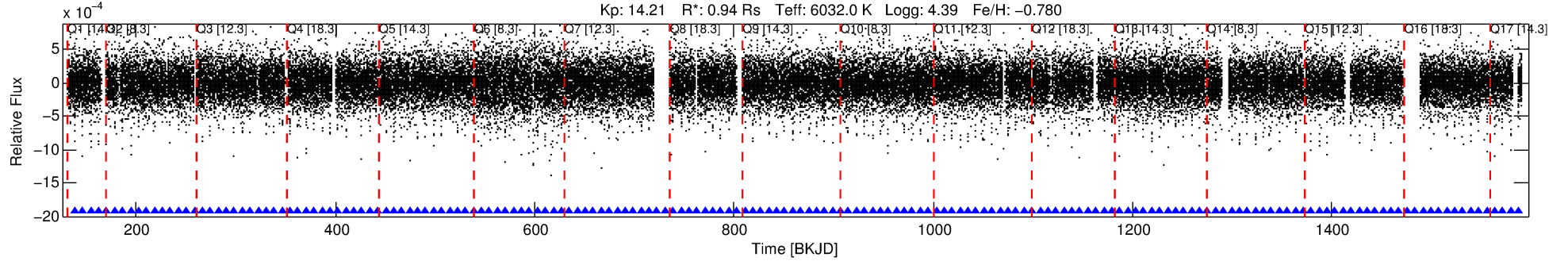
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 006451936-01

No Significant Match Found

DV One-Page Summary

KIC: 6451936 Candidate: 1 of 2 Period: 8.006 d
KOI: K00511.01 Name: Kepler-173c Corr: 0.984



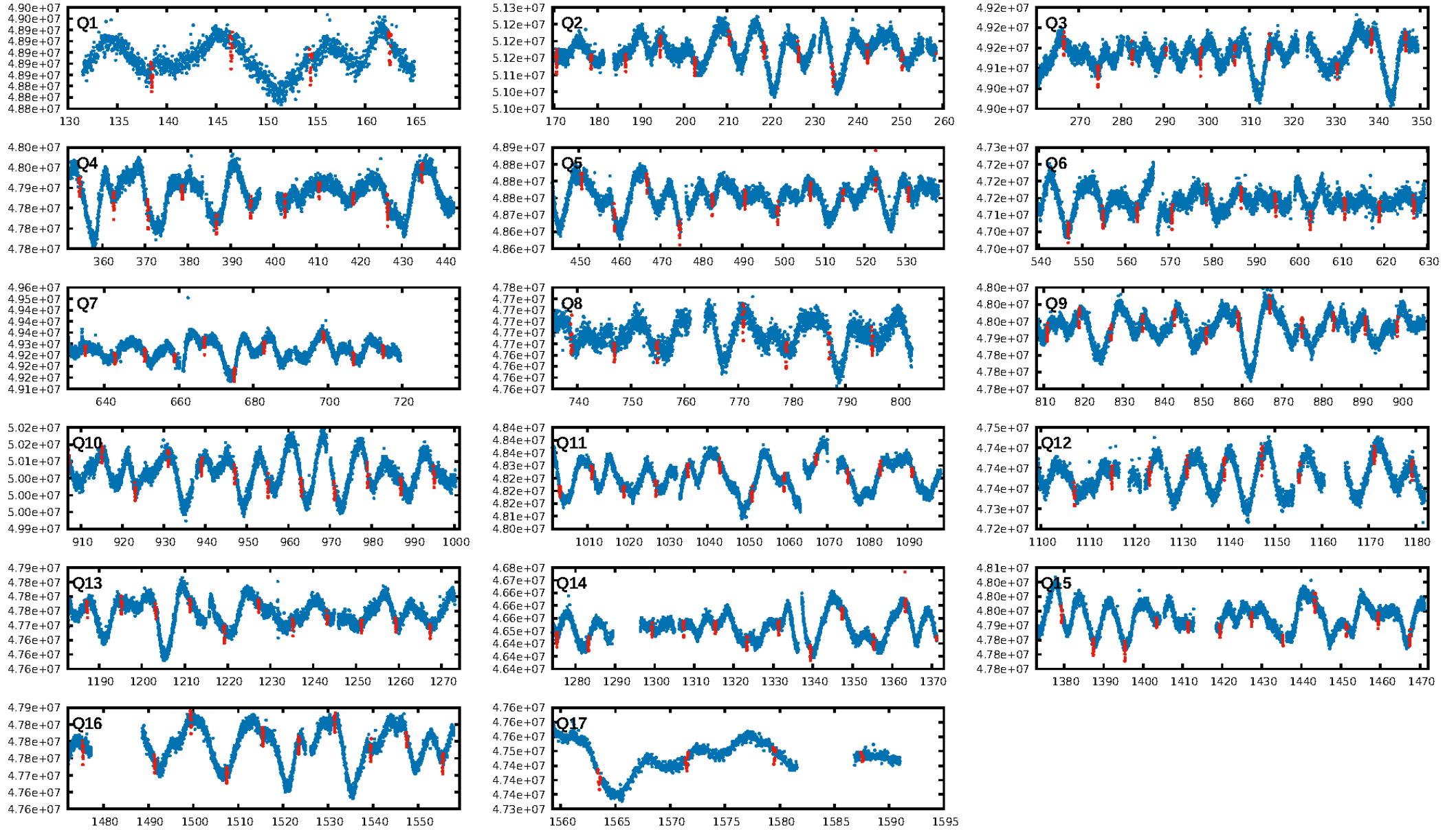
DV Fit Results:

Period = 8.00577 [0.00001] d
Epoch = 138.4818 [0.0008] BKJD
Rp/R* = 0.0258 [0.0016]
a/R* = 11.75 [3.84]
b = 0.82 [0.13]
Seff = 197.43 [67.55]
Teff = 956 [82] K
Rp = 2.64 [0.64] Re
a = 0.0725 [0.0152] AU
Ag = 13.63 [6.23] [2.03 σ]
Teffp = 2840 [247] K [7.25 σ]

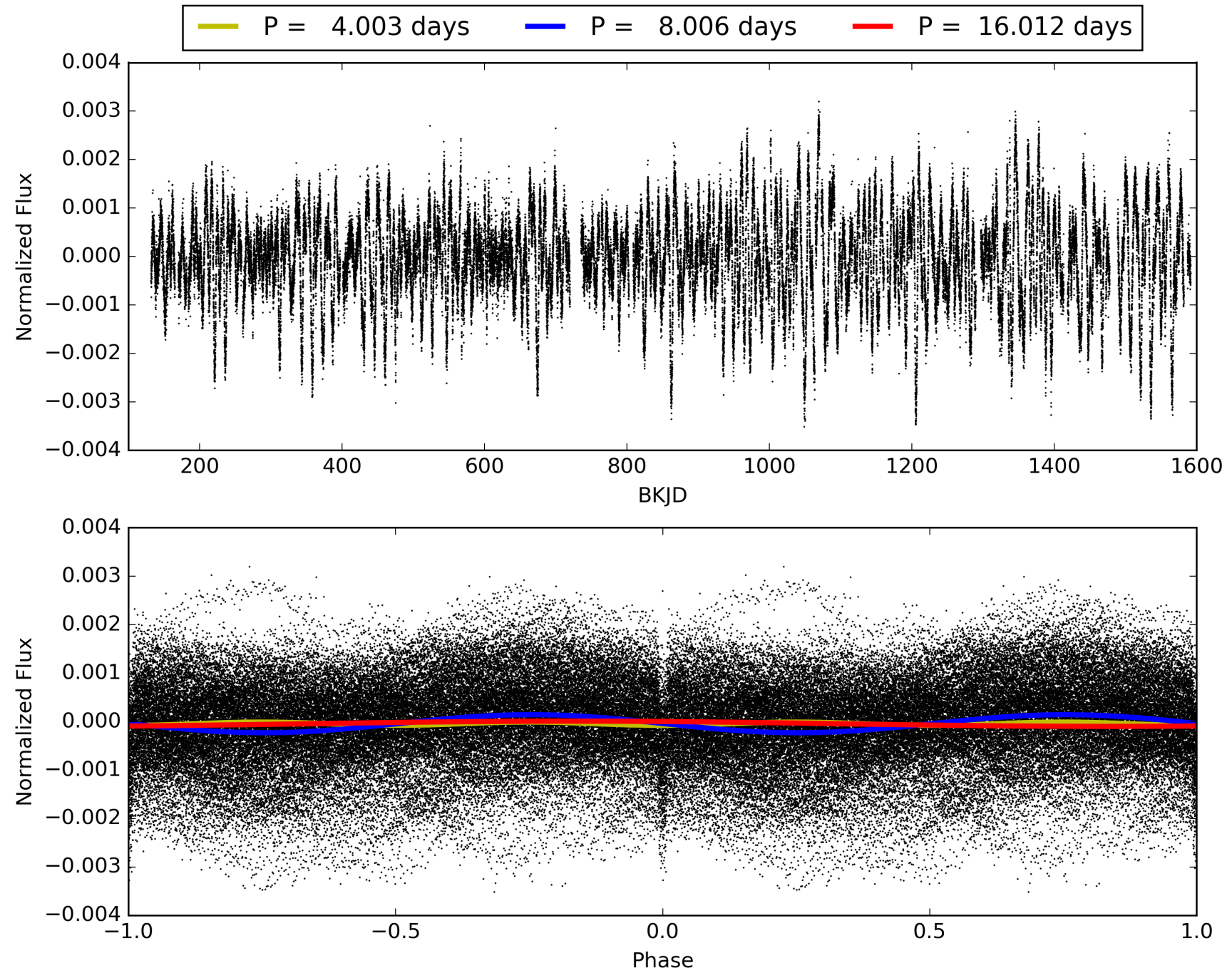
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [22.22 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 88.8%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [160/160]
GhostDiagnostic-chr: 4.867
Centroid-sig: 60.7%
Centroid-so: 0.610 arcsec [3.40 σ]
OotOffset-rm: 0.111 arcsec [1.06 σ]
KicOffset-rm: 0.096 arcsec [0.92 σ]
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]

TCE 006451936-01, PDC Light Curves

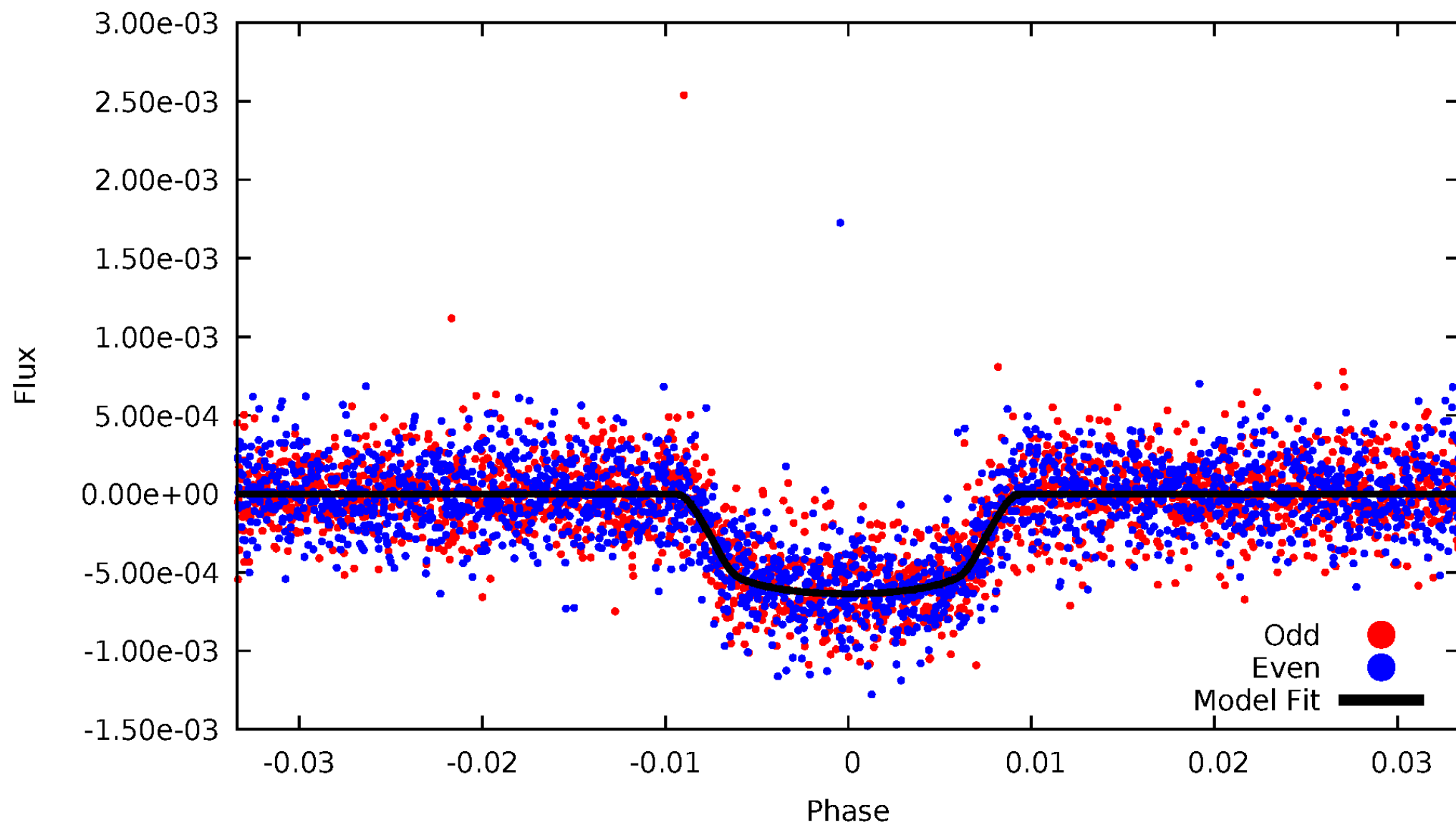


TCE 006451936-01



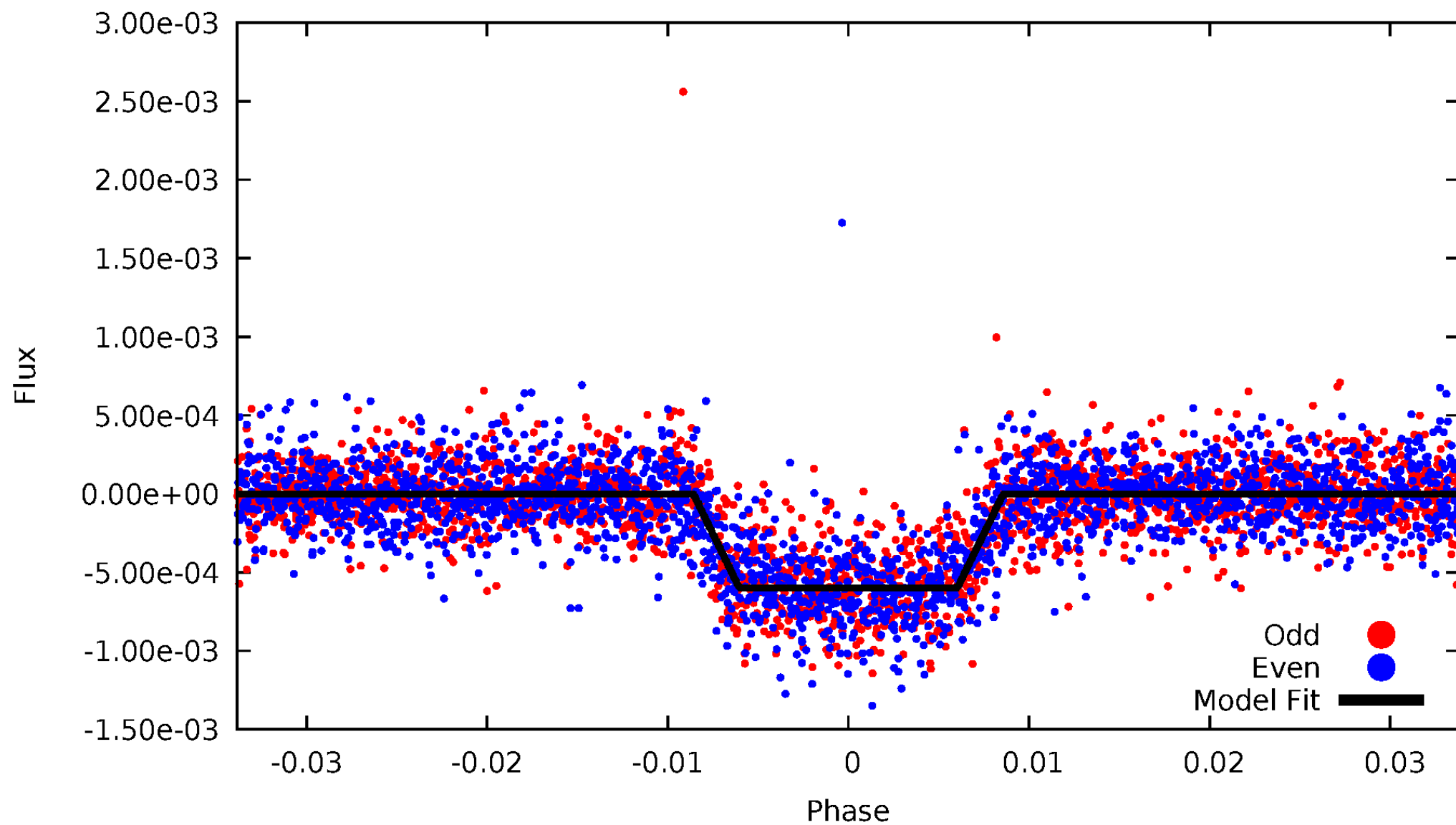
DV Odd/Even

TCE 006451936-01



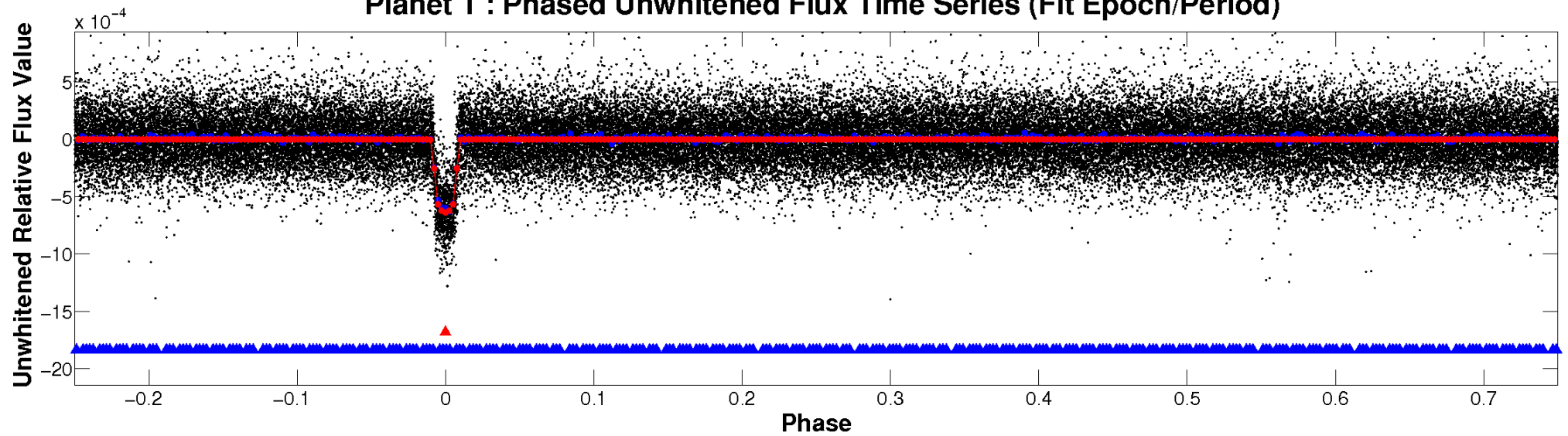
ALT Odd/Even

TCE 006451936-01

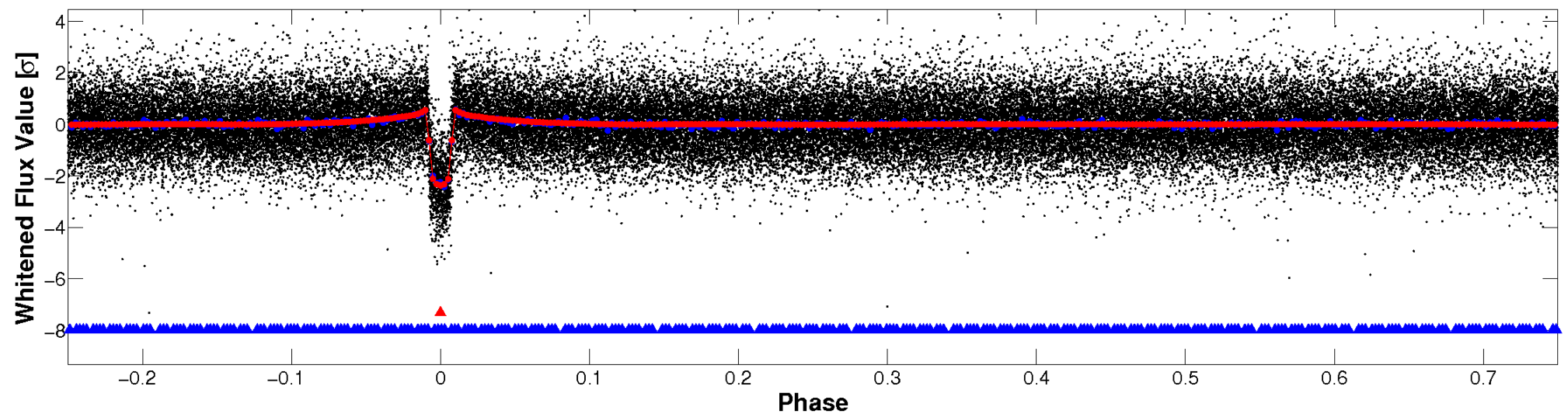


Non-Whitened Vs. Whitened Light Curve

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

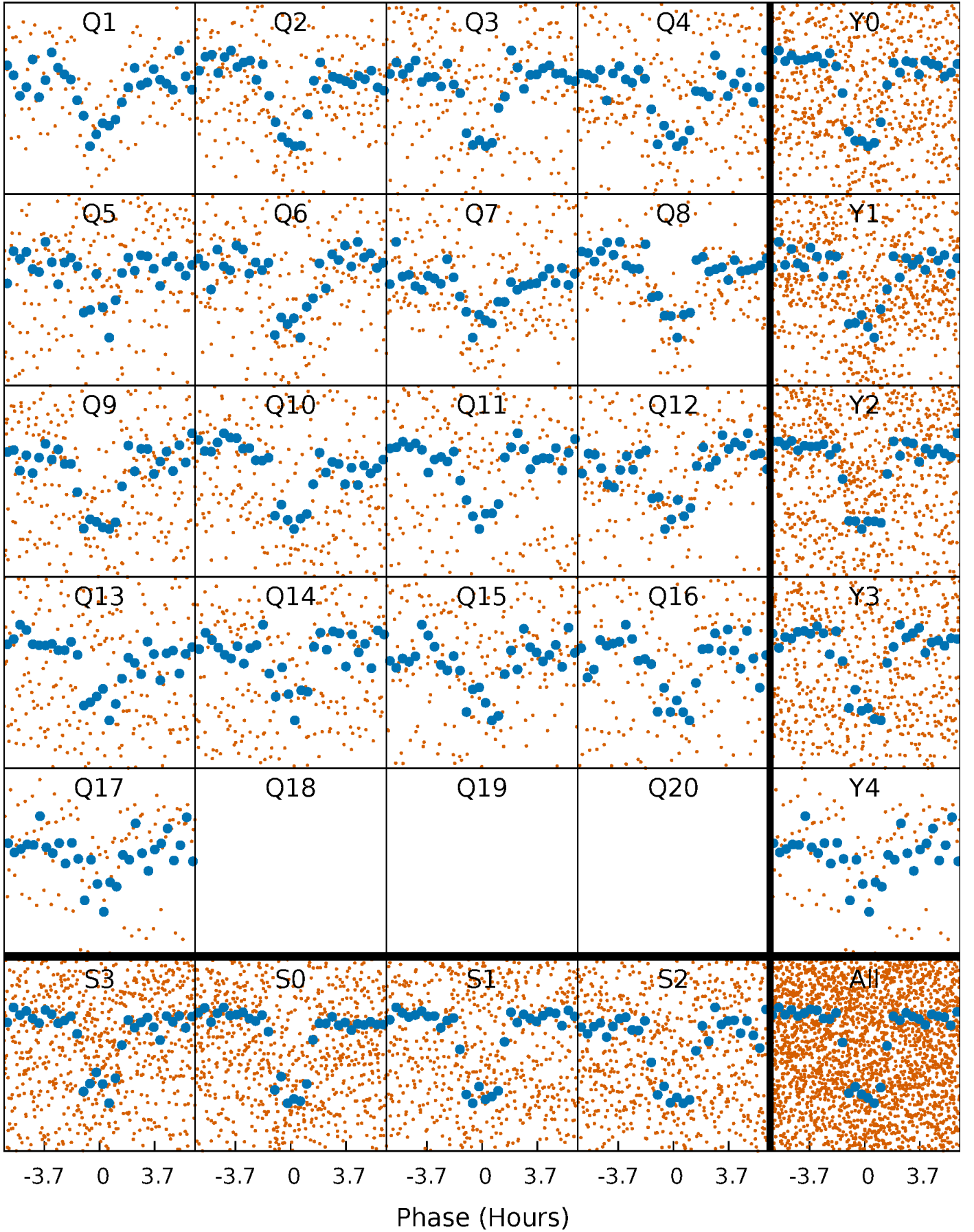


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



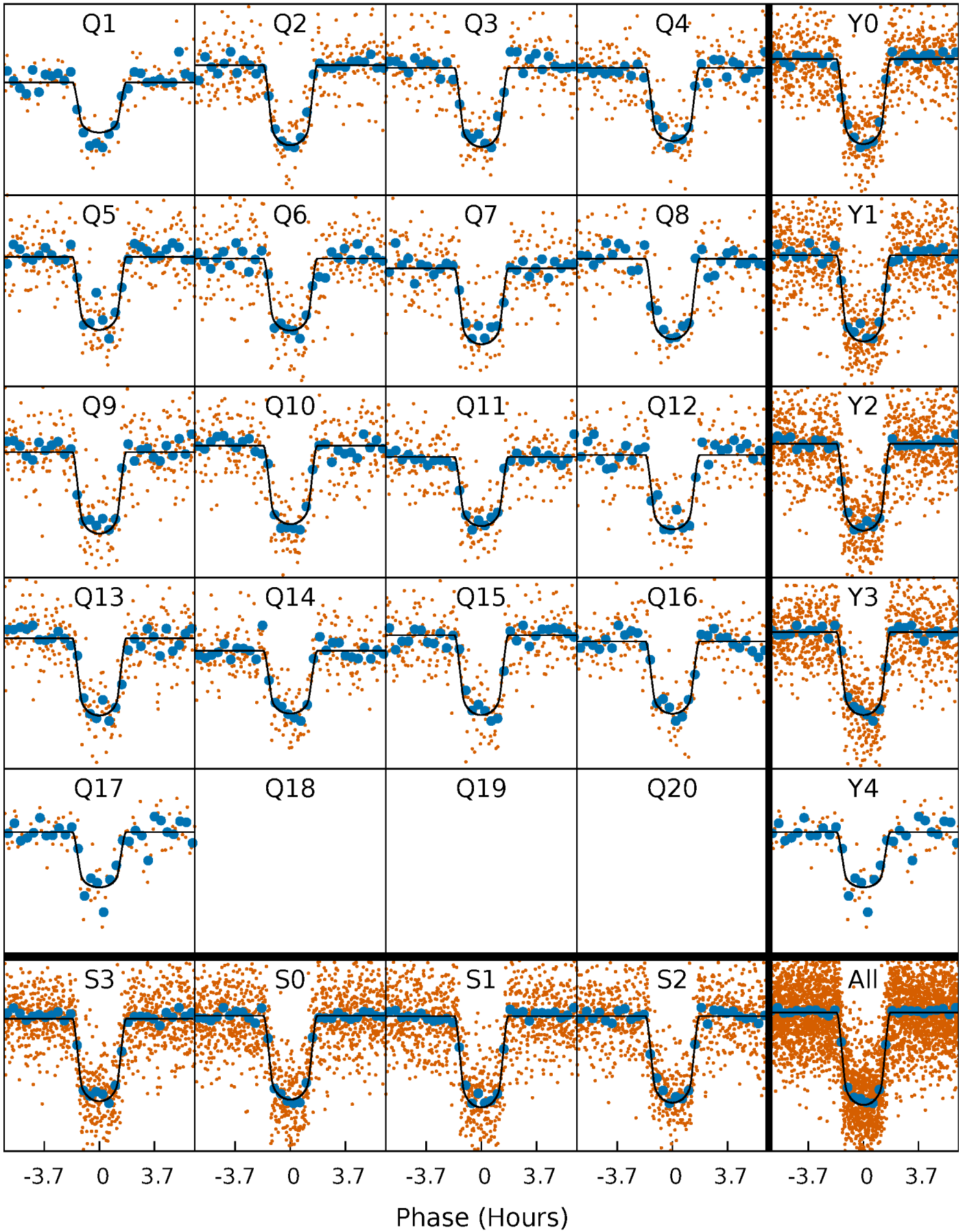
PDC Quarter-Phased Transit Curves

TCE 006451936-01 P= 8.005768 Days $T_0=138.481823$ (BKJD)



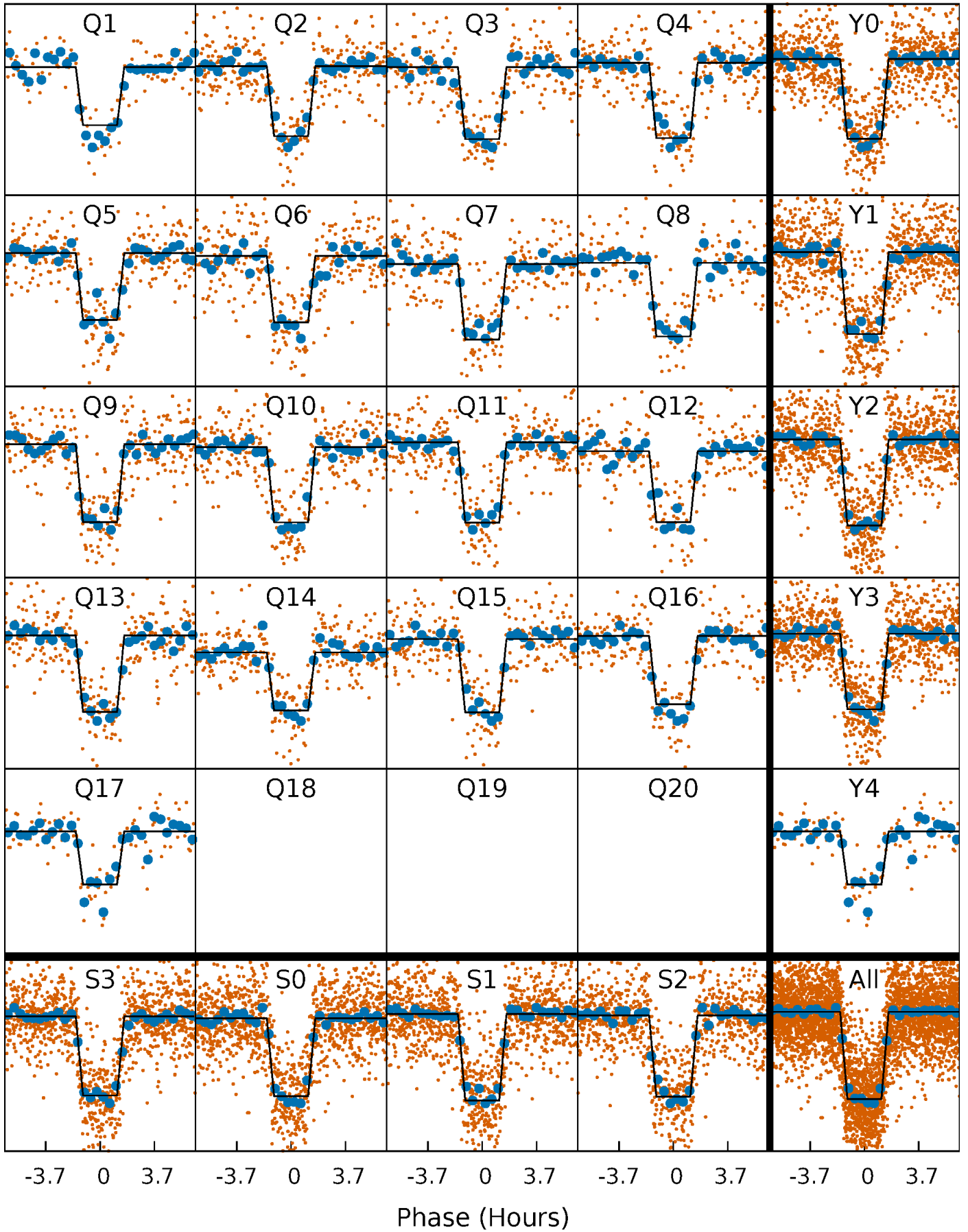
DV Quarter-Phased Transit Curves

TCE 006451936-01 P= 8.005768 Days $T_0=138.481823$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

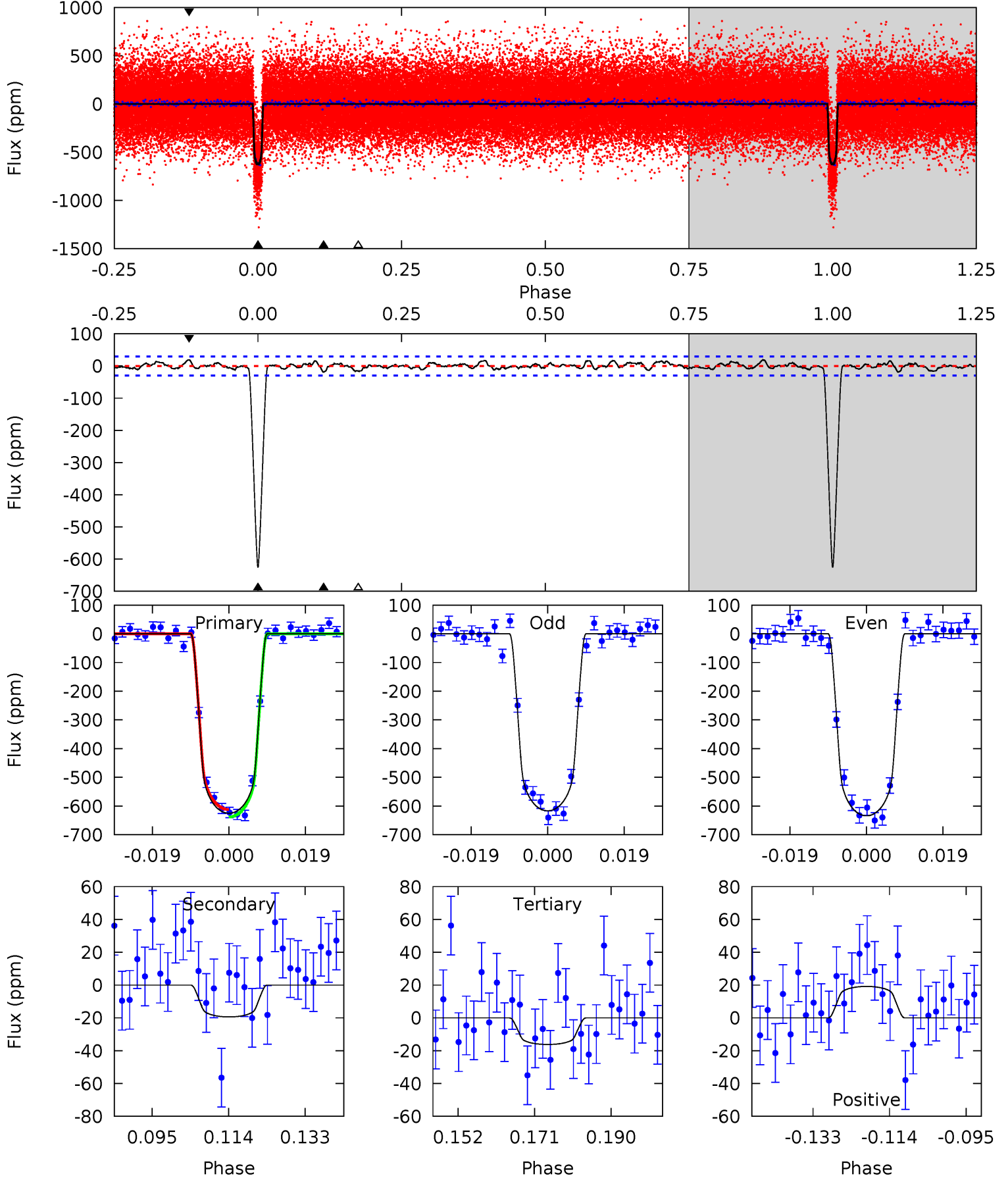
TCE 006451936-01 P= 8.005786 Days $T_0=138.480349$ (BKJD)



DV Model-Shift Uniqueness Test

006451936-01, P = 8.005768 Days, E = 130.476055 Days

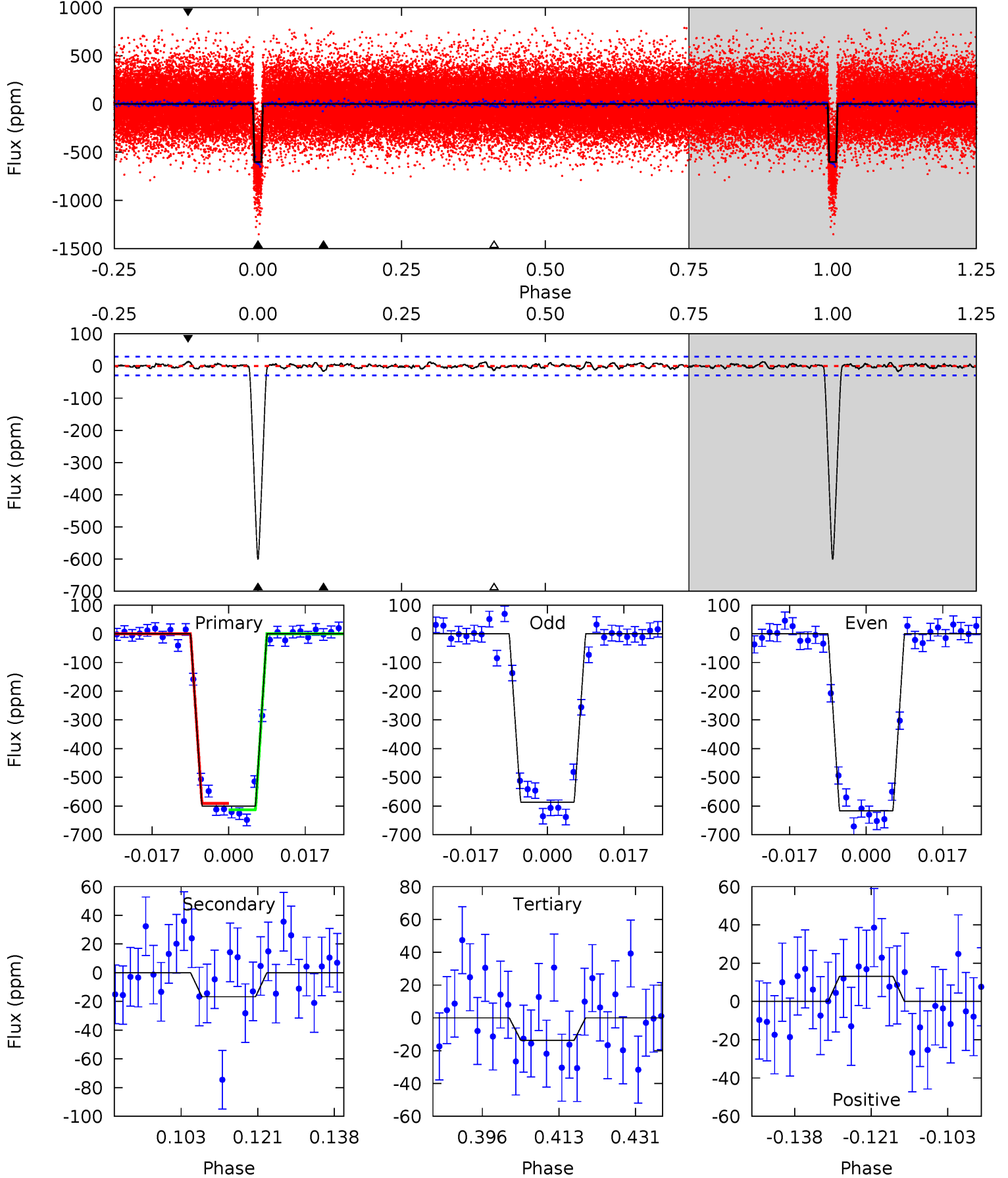
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
103.6	3.22	2.69	3.18	4.90	2.35	1.12	100.9	100.5	0.53	0.04	1.44	0.99	0.03	2.13



Alt Model-Shift Uniqueness Test

006451936-01, P = 8.005786 Days, E = 130.474563 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
102.0	2.84	2.31	2.22	4.92	2.38	0.81	99.7	99.8	0.53	0.62	2.55	1.00	0.02	1.91



Stellar Parameters For KIC 006451936

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6032^{+163}_{-181}	$4.395^{+0.165}_{-0.182}$	$-0.780^{+0.300}_{-0.300}$	$0.935^{+0.220}_{-0.165}$	$0.793^{+0.093}_{-0.050}$	$1.365^{+0.955}_{-0.609}$
	+3%/-3%	+4%/-4%	+38%/-38%	+24%/-18%	+12%/-6%	+70%/-45%
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 006451936-01 / KOI 0511.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-19 ± 6	$2.67^{+0.42}_{-0.33}$	1339^{+100}_{-87}	3093^{+148}_{-171}	$7.764^{+3.648}_{-2.752}$
Alt.	-17 ± 6	$2.54^{+0.41}_{-0.32}$	1338^{+93}_{-85}	3068^{+176}_{-191}	$7.572^{+3.499}_{-3.056}$

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 $A_{obs} \gg 1.0$

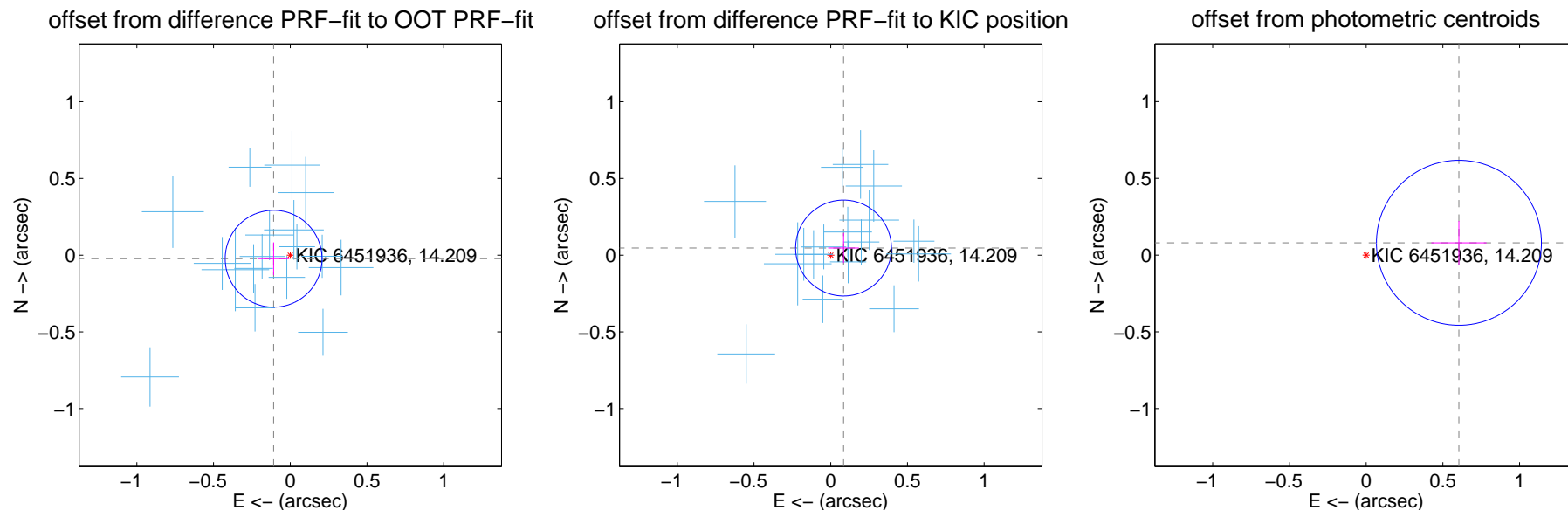
DV Centroid Data

Supplemental centroid analysis for 006451936-01. Kepler magnitude: 14.21. Transit SNR 66.94

There are 17 quarters with good PRF difference image offsets

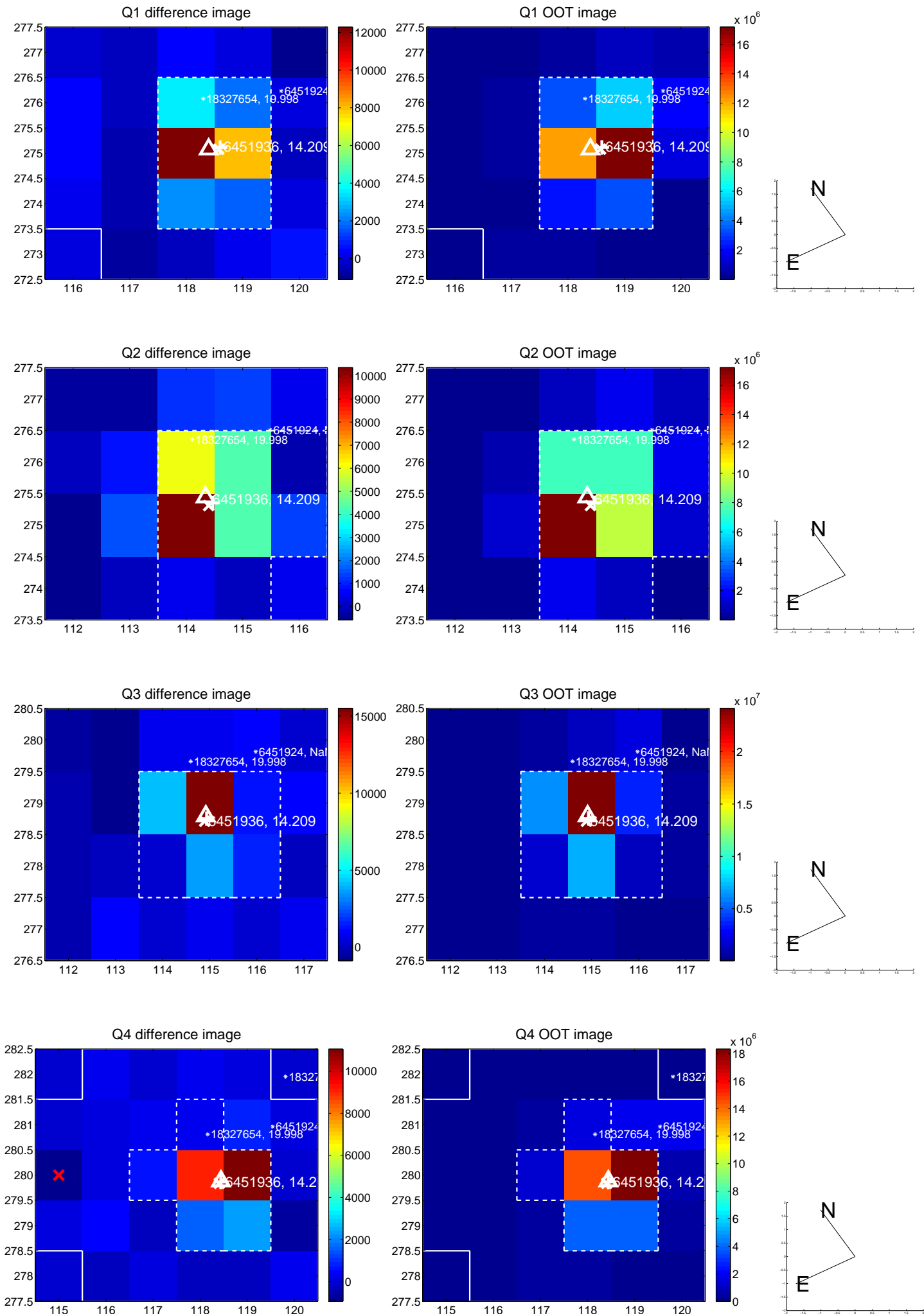
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.111 ± 0.105	1.06	0.109 ± 0.102	-0.023 ± 0.106
PRF-fit source offset from KIC position	0.096 ± 0.104	0.92	-0.084 ± 0.100	0.046 ± 0.098
photometric centroid source offset	0.61 ± 0.18	3.40	-0.60 ± 0.18	0.08 ± 0.14

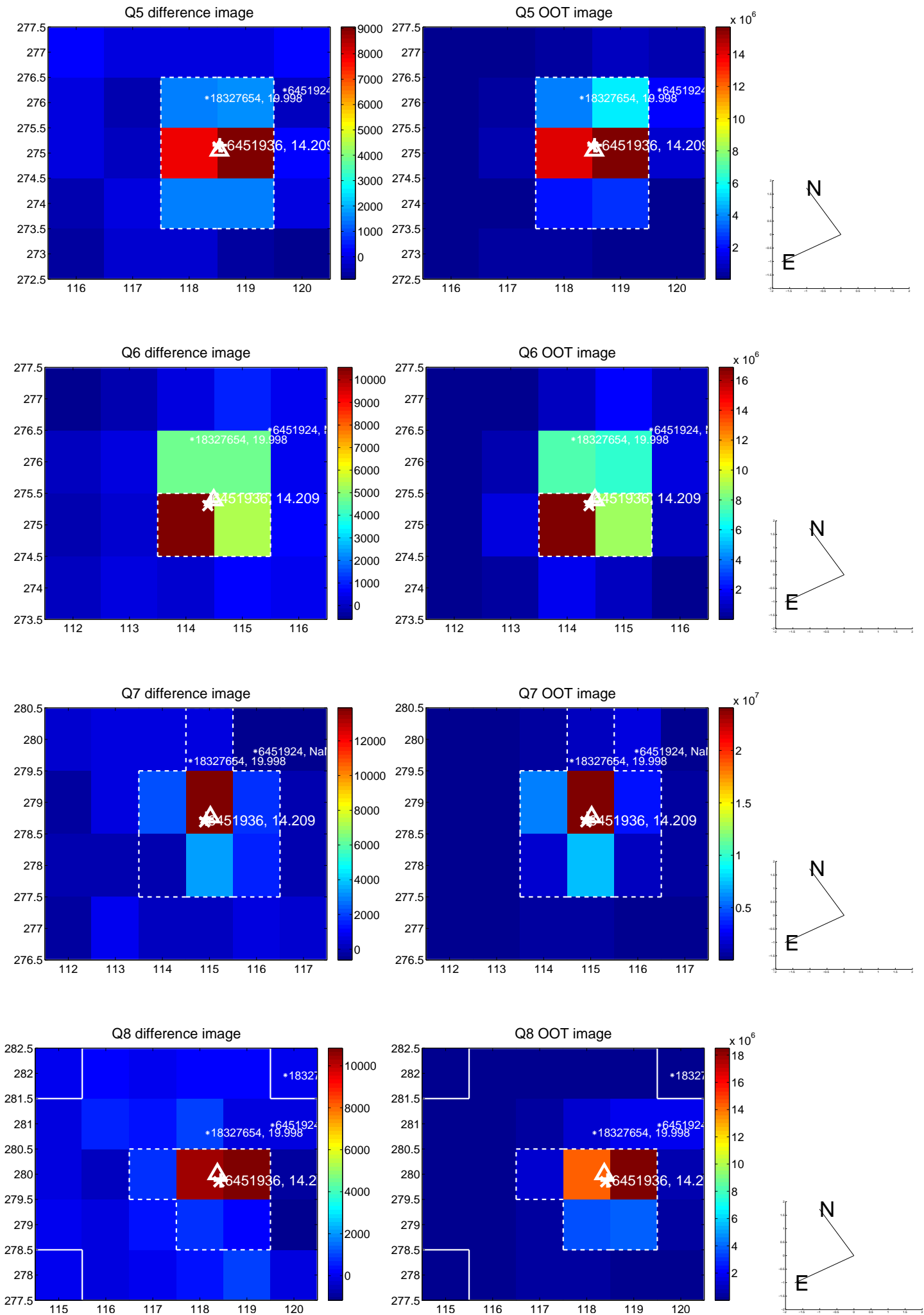


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

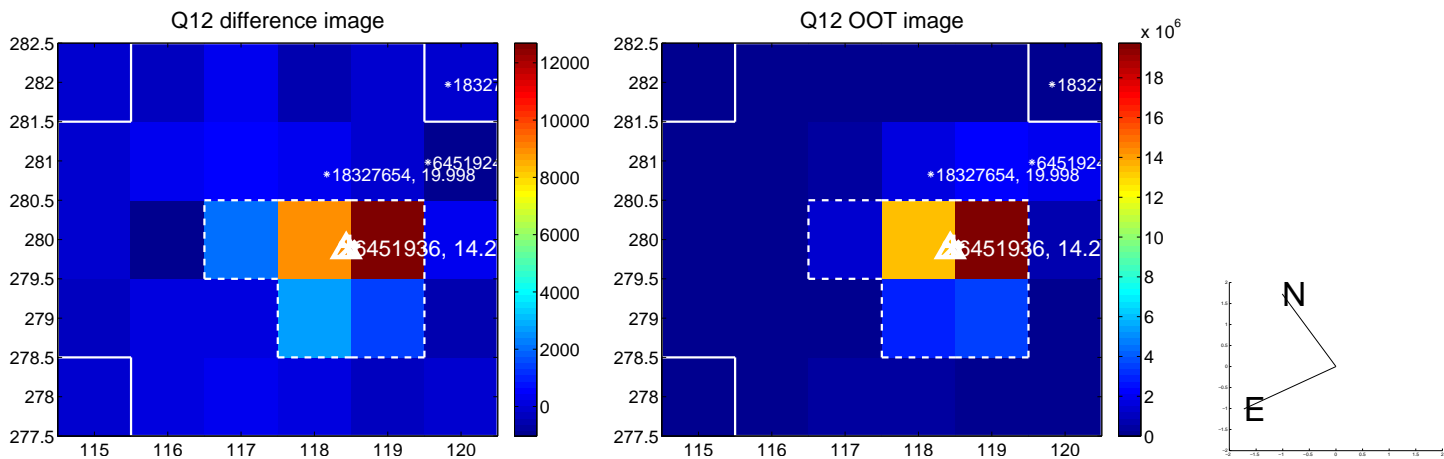
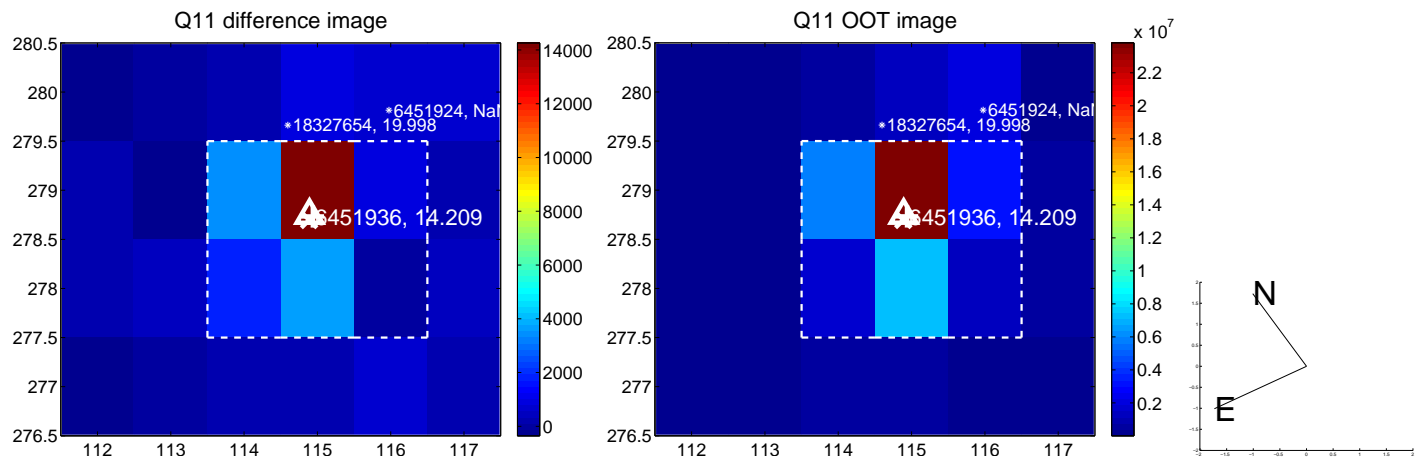
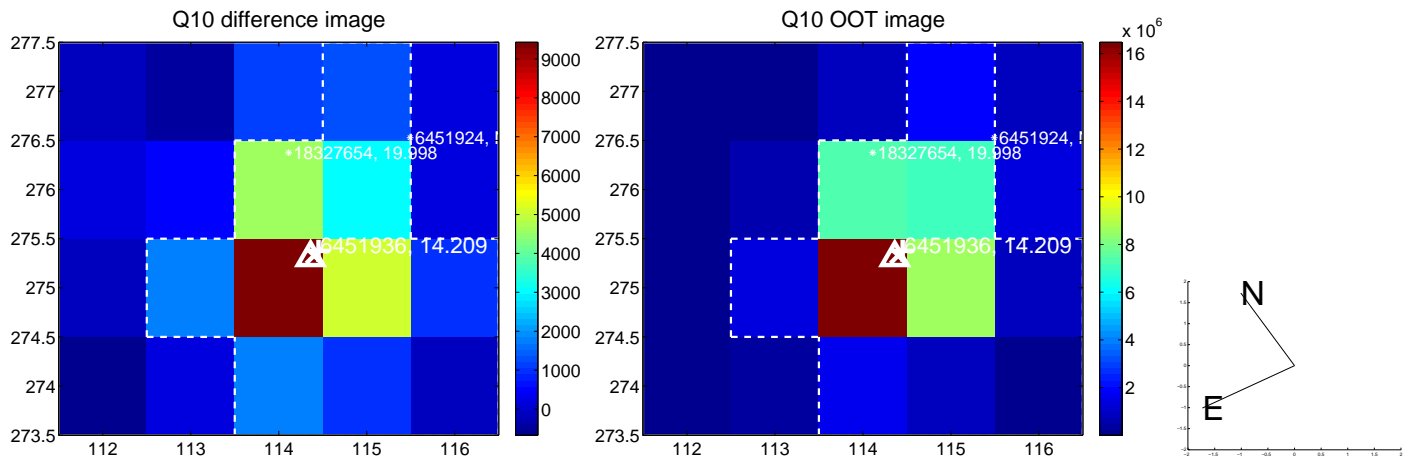
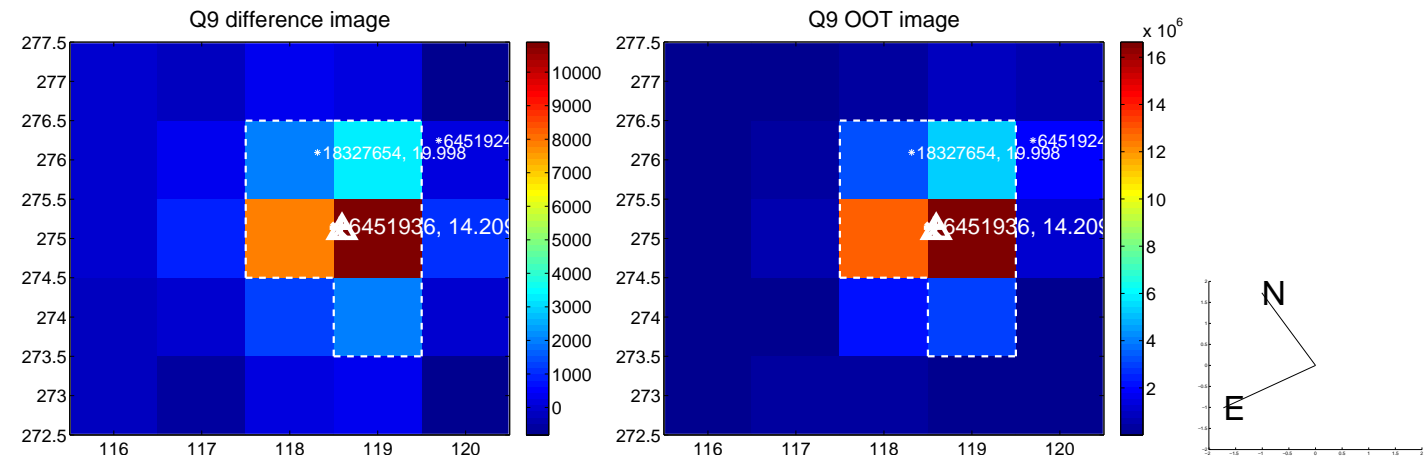
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



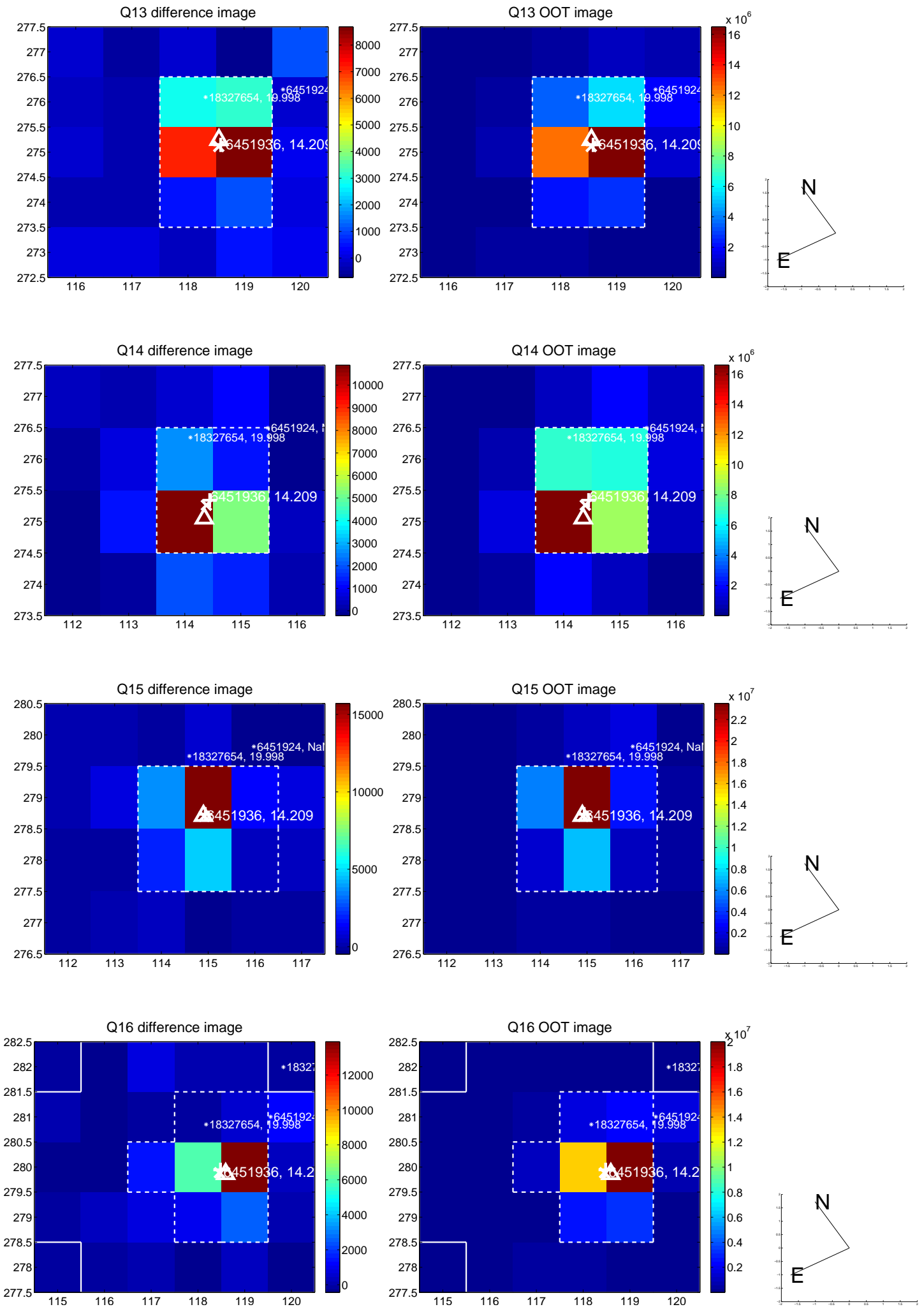
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



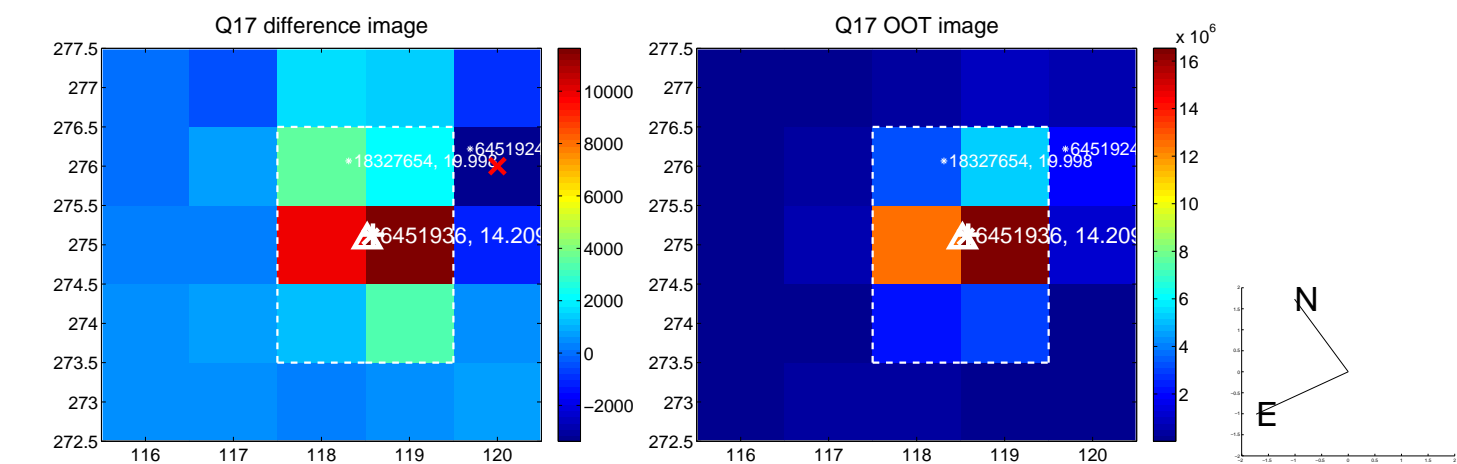
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



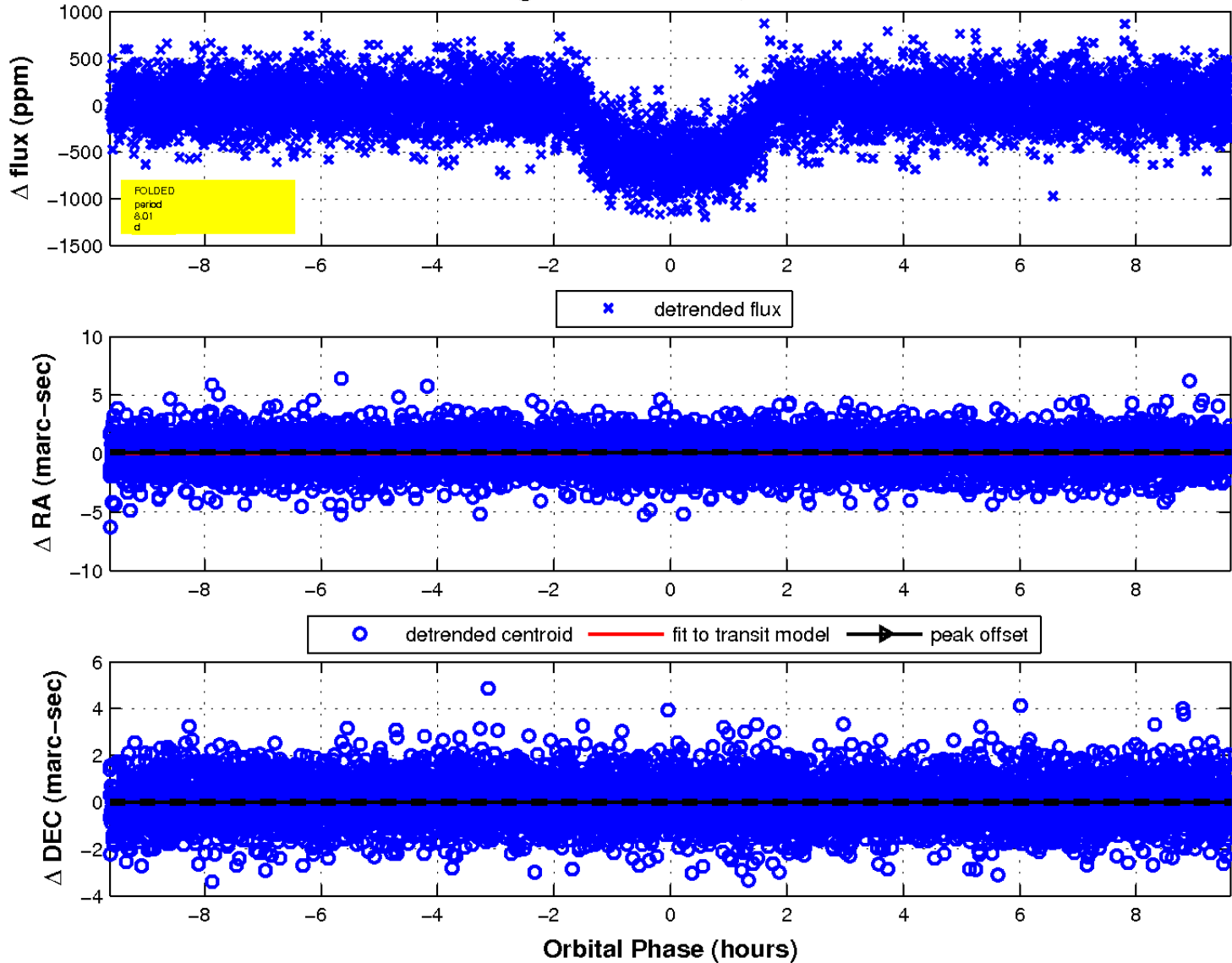
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

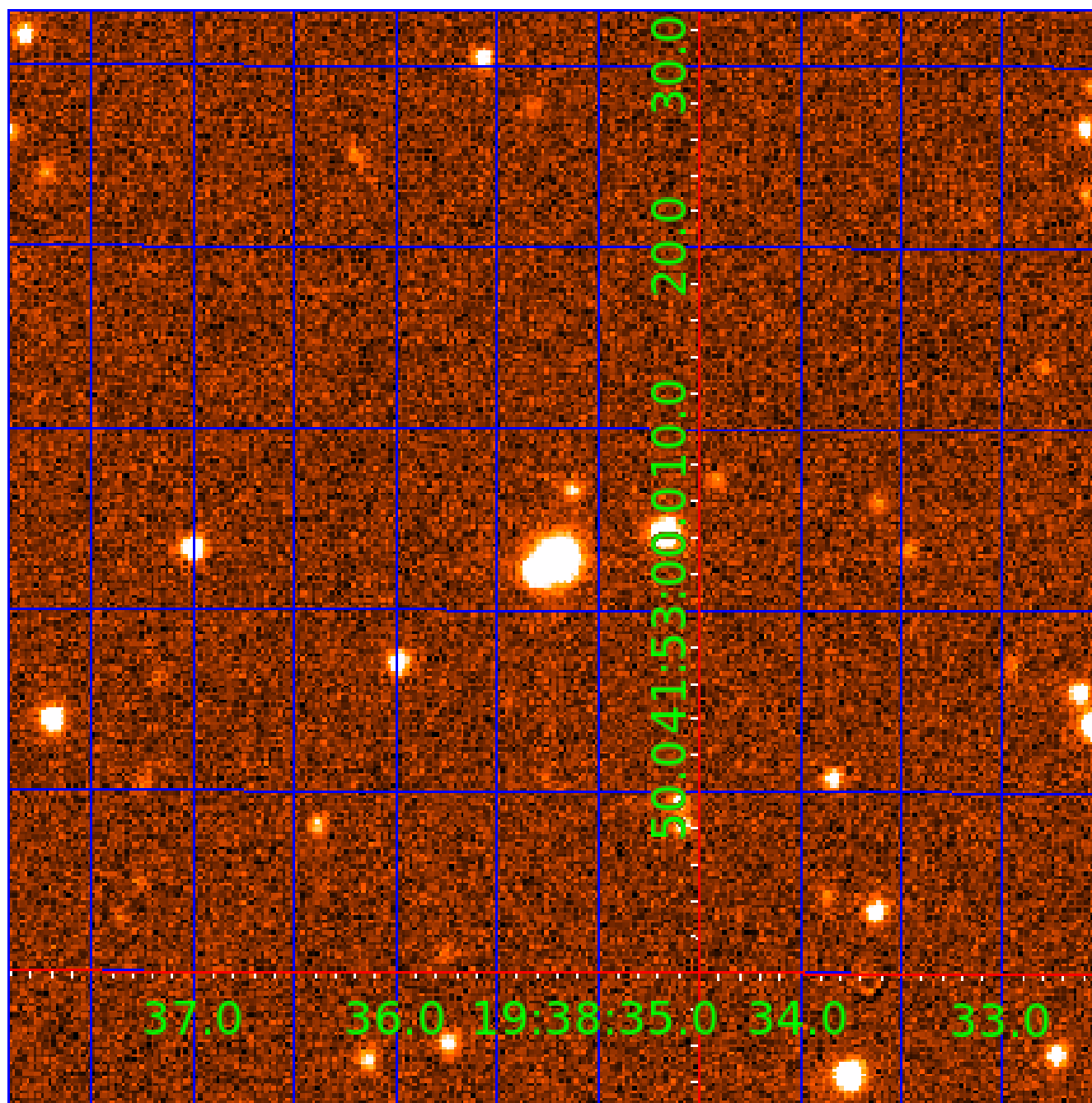


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 006451936

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})
006451936-01	OBS	0511.01	8.005768	138.481823	637.9	3.208	62.0	66.9	0.94	6032	2.64	197.43
006451936-02	OBS	0511.02	4.263745	133.719416	178.1	2.458	21.1	23.4	0.94	6032	1.46	457.33

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006451936-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
006451936-02	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.

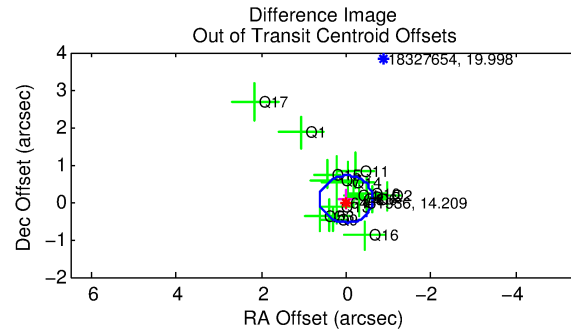
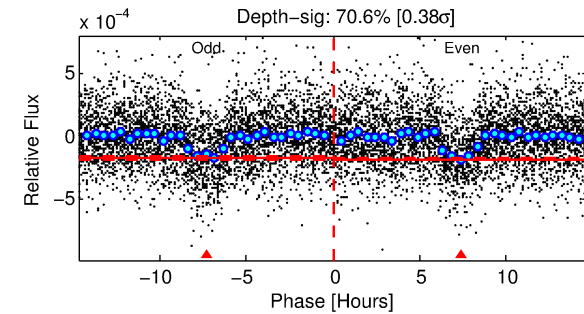
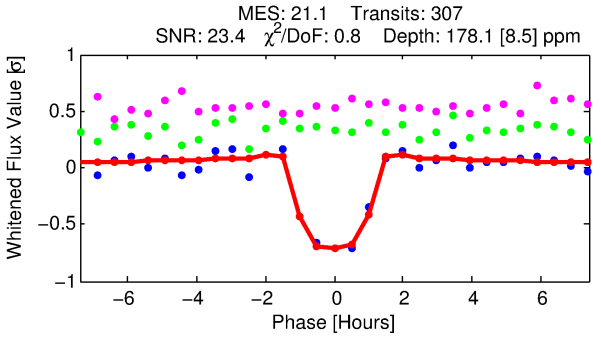
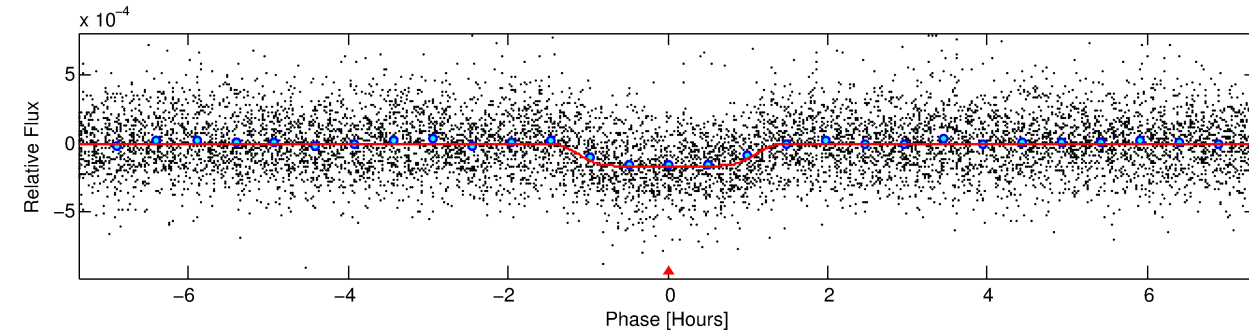
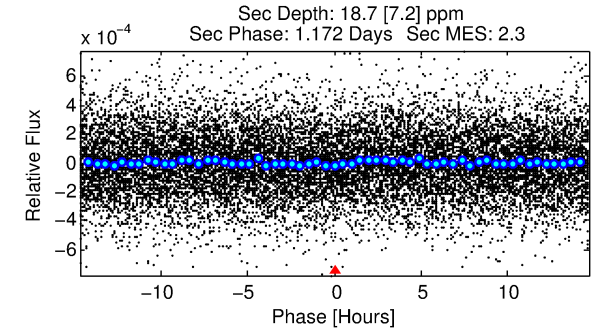
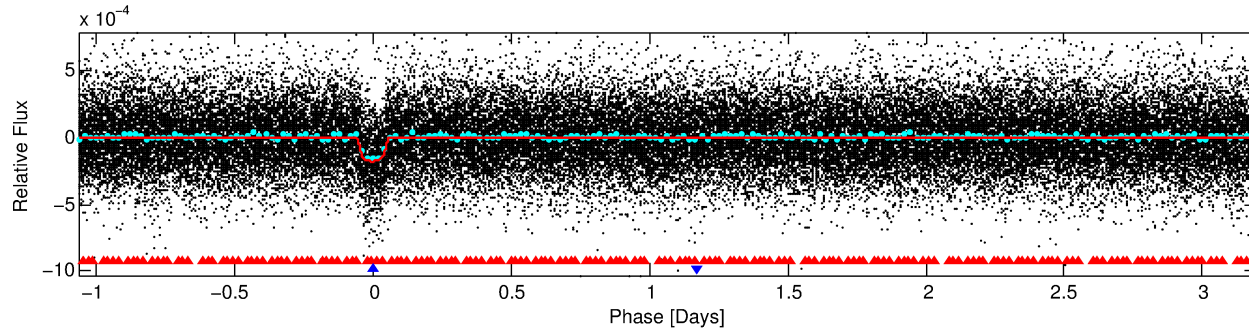
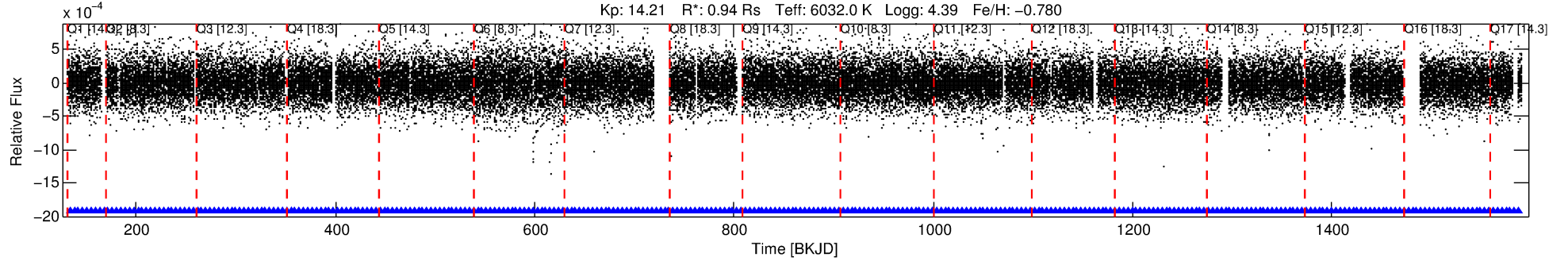
Ephemeris Match Information For 006451936-02

No Significant Match Found

DV One-Page Summary

KIC: 6451936 Candidate: 2 of 2 Period: 4.264 d
KOI: K00511.02 Name: Kepler-173b Corr: 0.965

Kp: 14.21 R*: 0.94 Rs Teff: 6032.0 K Logg: 4.39 Fe/H: -0.780



DV Fit Results:

Period = 4.26375 [0.00001] d
Epoch = 133.7194 [0.0016] BKJD
Rp/R* = 0.0143 [0.0033]
a/R* = 6.38 [8.01]
b = 0.90 [0.29]
Seff = 457.33 [156.47]
Teq = 1179 [101] K
Rp = 1.46 [0.48] Re
a = 0.0476 [0.0100] AU
Ag = 10.99 [7.53] [1.33σ]
Teffp = 3319 [512] K [4.10σ]

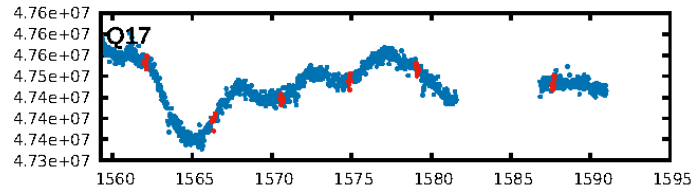
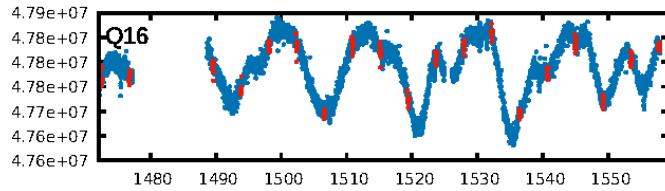
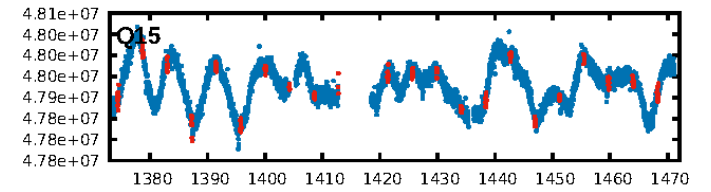
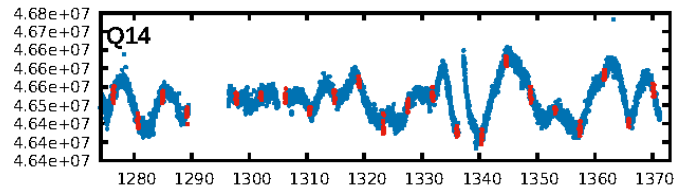
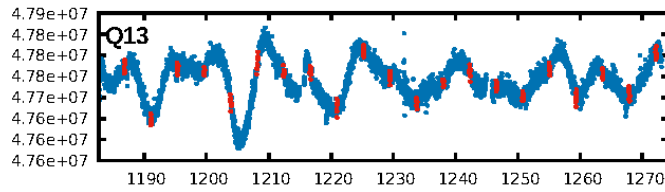
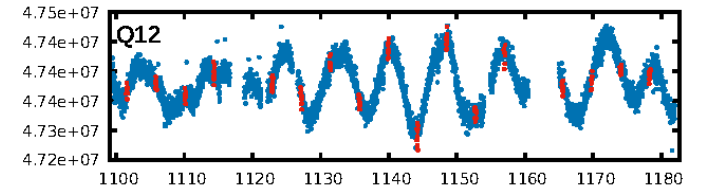
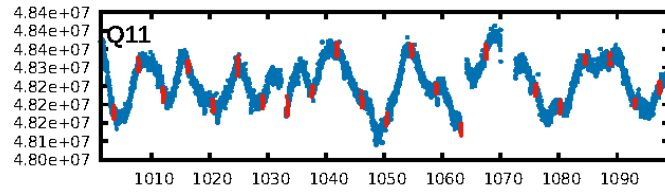
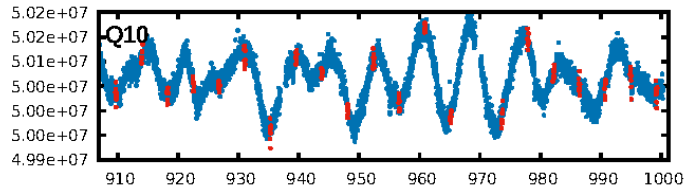
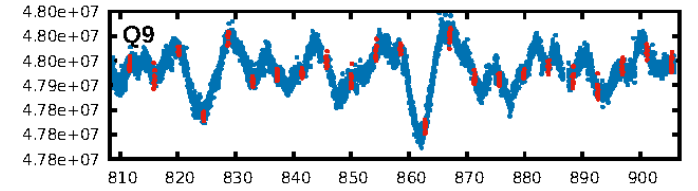
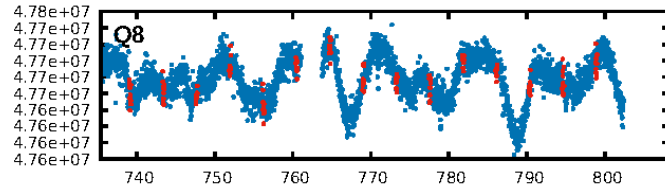
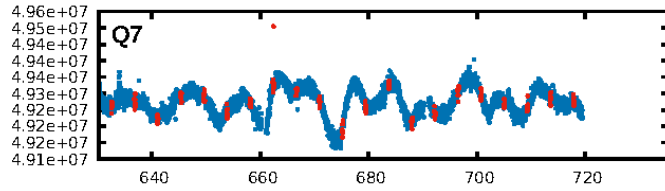
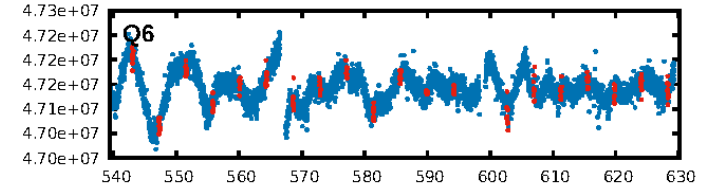
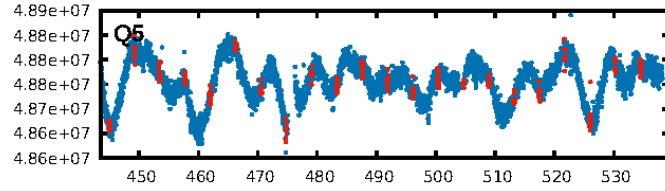
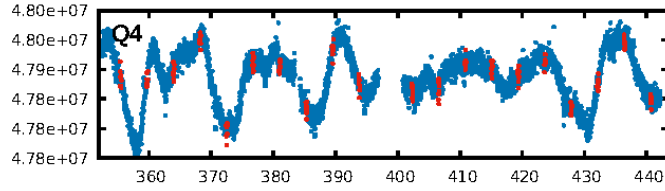
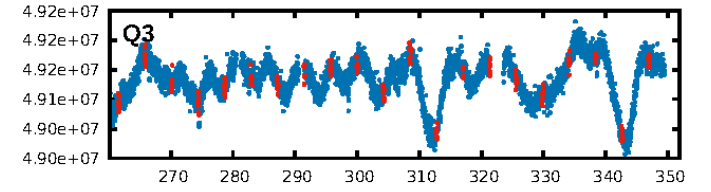
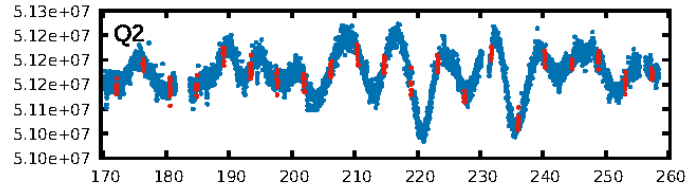
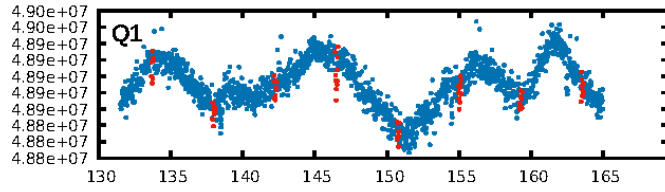
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [22.2σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 8.26e-94
RollingBand-fgt: 1.00 [295/295]
GhostDiagnostic-chr: 4.799
Centroid-sig: 20.6%
Centroid-so: 1.058 arcsec [2.09σ]
OotOffset-rm: 0.078 arcsec [0.37σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-rm: 0.256 arcsec [1.45σ]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 1.00 [17/17]

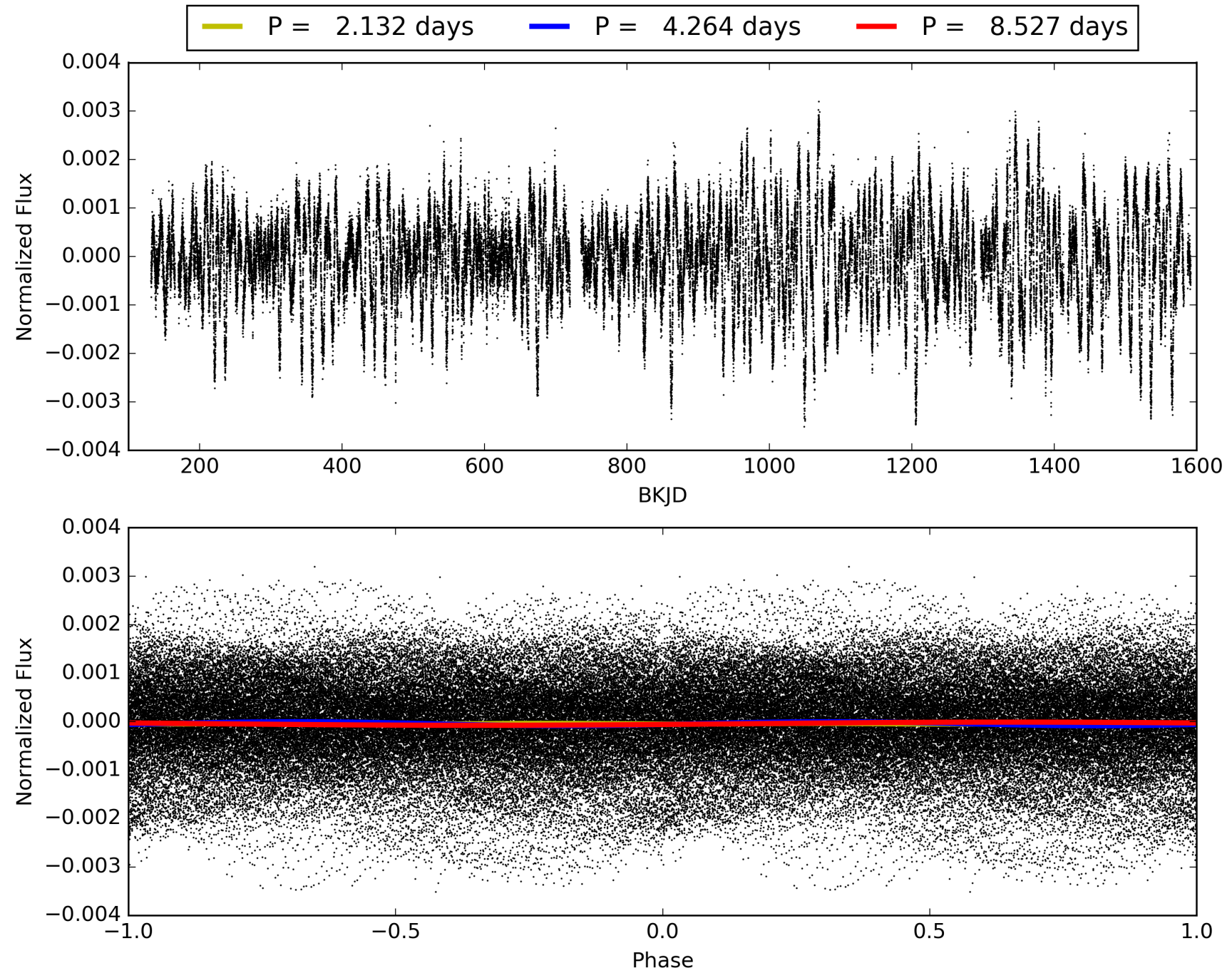
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 22:59:28 Z

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

TCE 006451936-02, PDC Light Curves

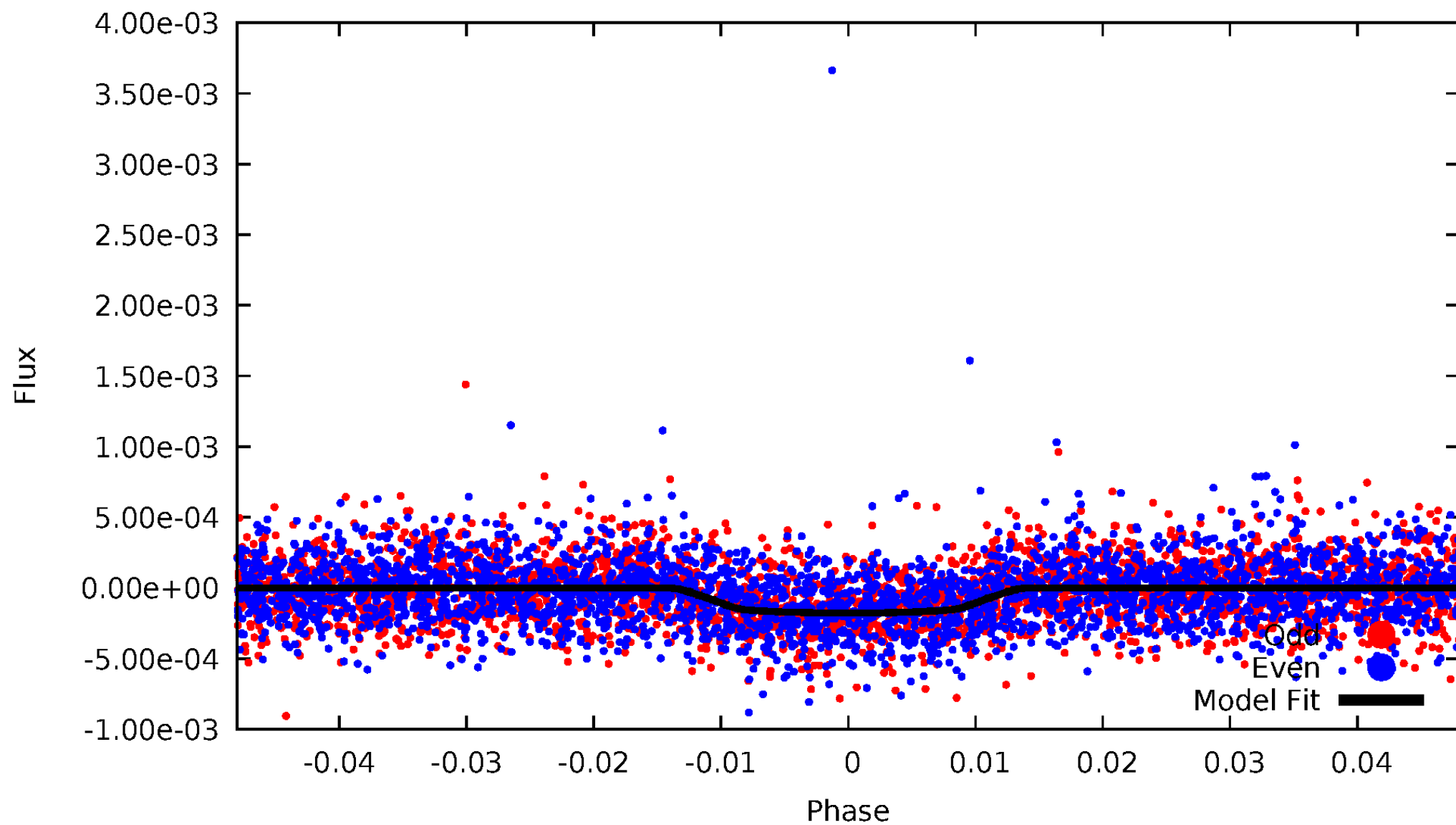


TCE 006451936-02



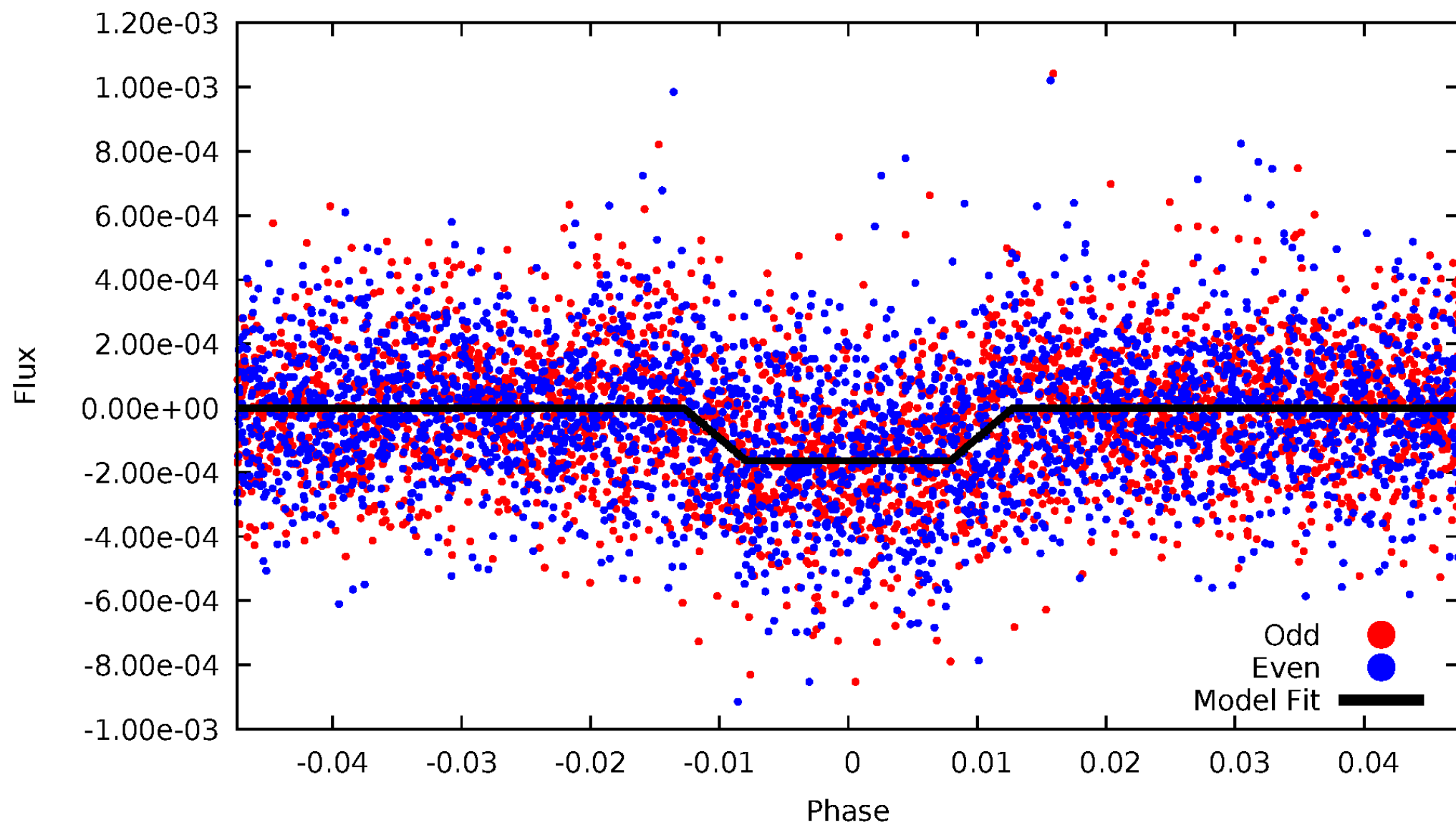
DV Odd/Even

TCE 006451936-02



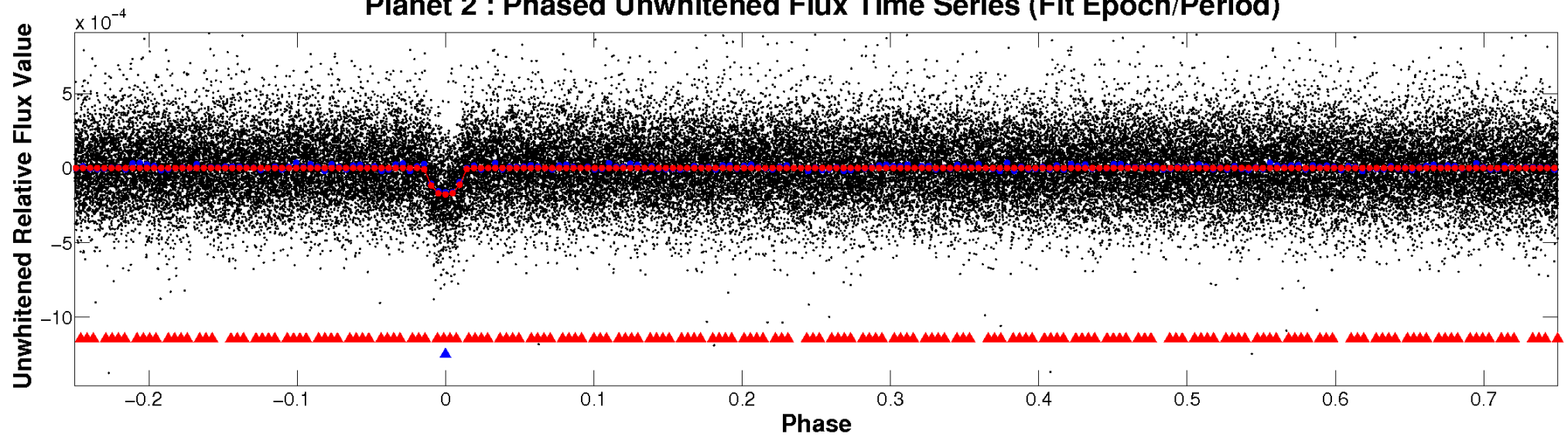
ALT Odd/Even

TCE 006451936-02

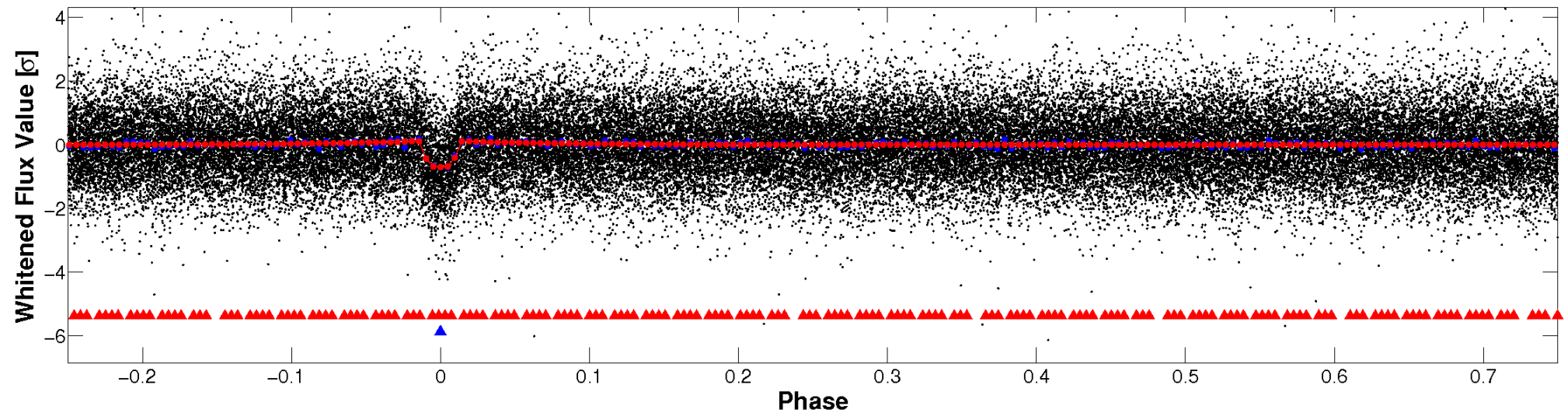


Non-Whitened Vs. Whitened Light Curve

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

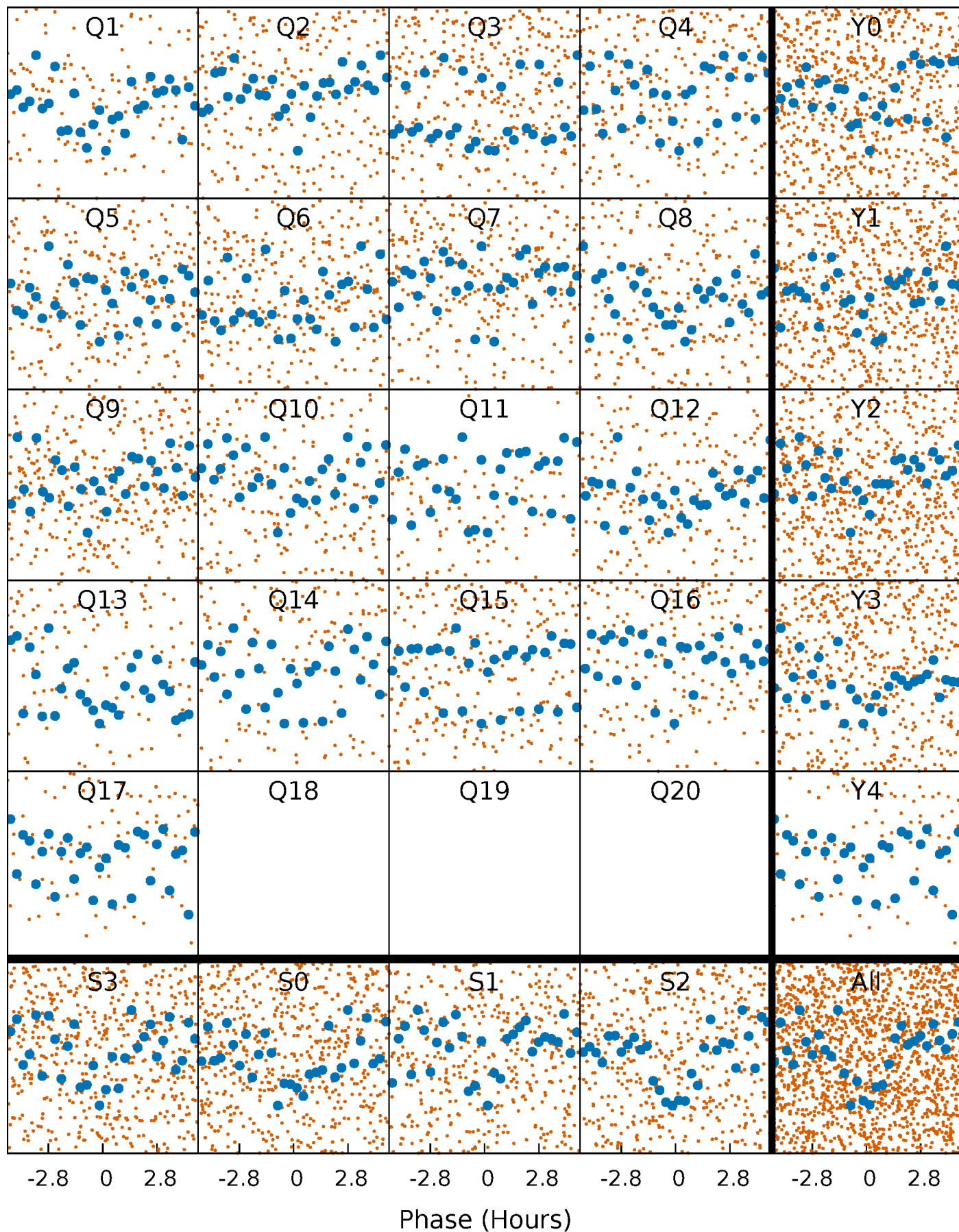


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



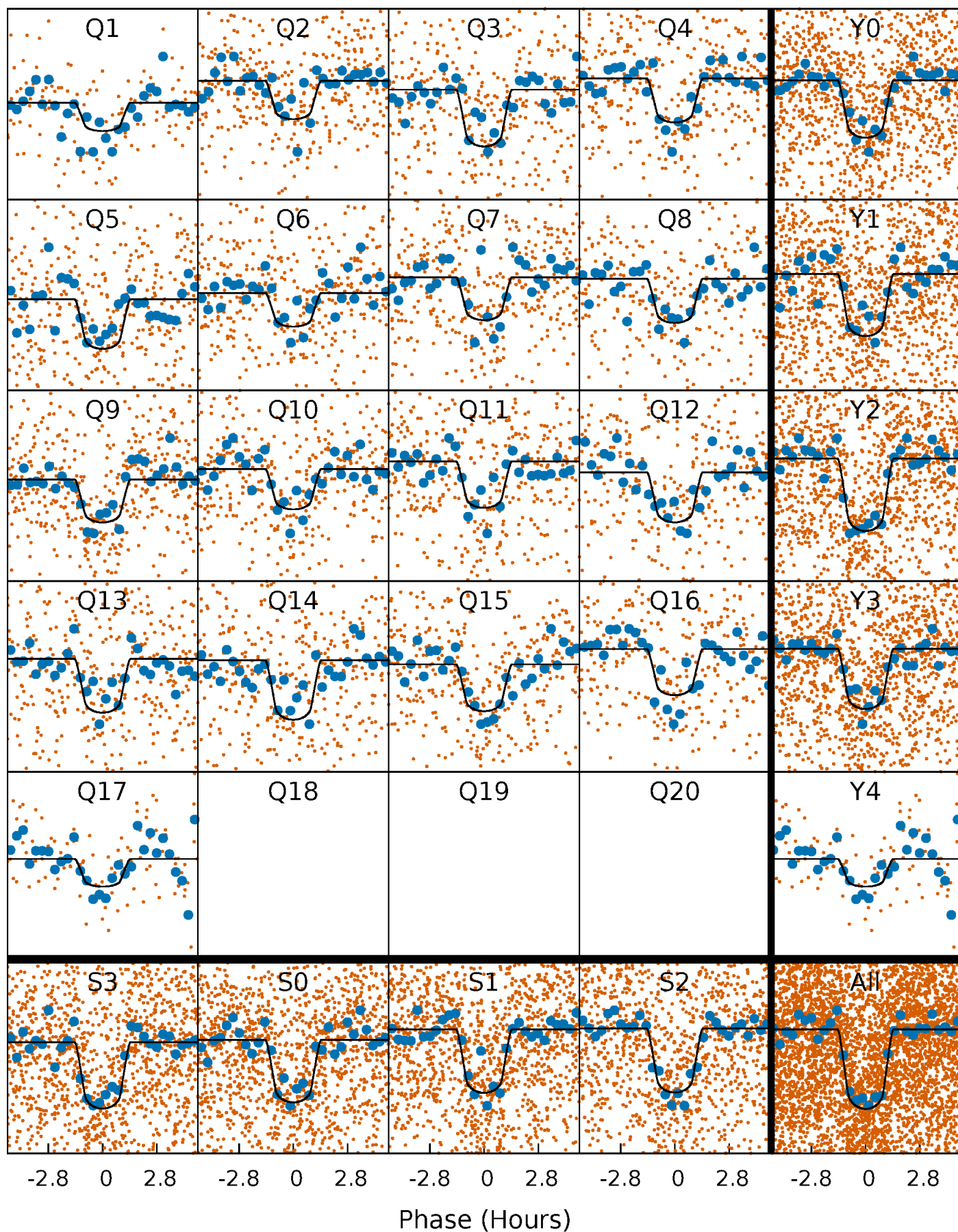
PDC Quarter-Phased Transit Curves

TCE 006451936-02 P= 4.263745 Days $T_0=133.719416$ (BKJD)



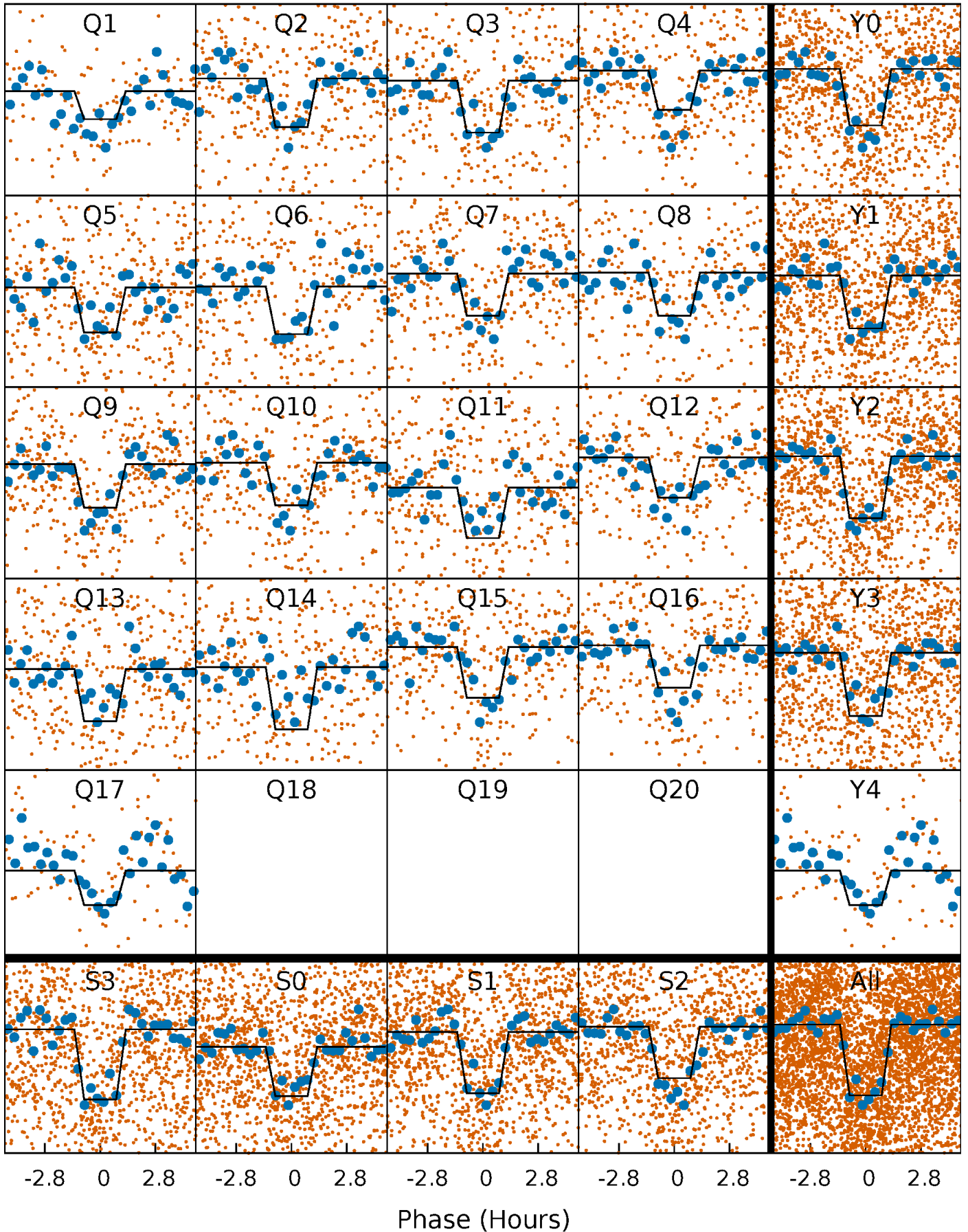
DV Quarter-Phased Transit Curves

TCE 006451936-02 P= 4.263745 Days $T_0=133.719416$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

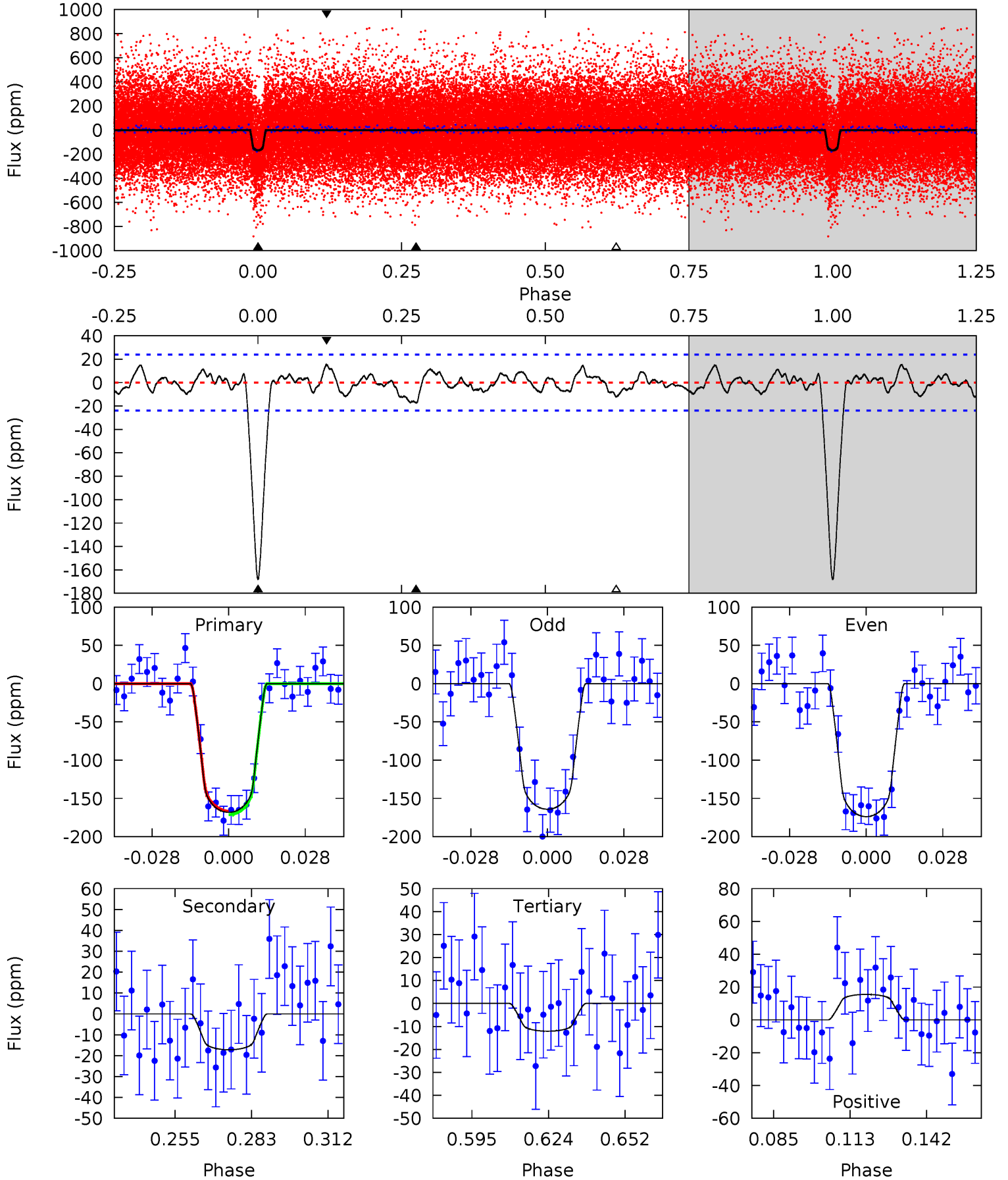
TCE 006451936-02 P= 4.263708 Days $T_0=133.726169$ (BKJD)



DV Model-Shift Uniqueness Test

006451936-02, P = 4.263745 Days, E = 129.455671 Days

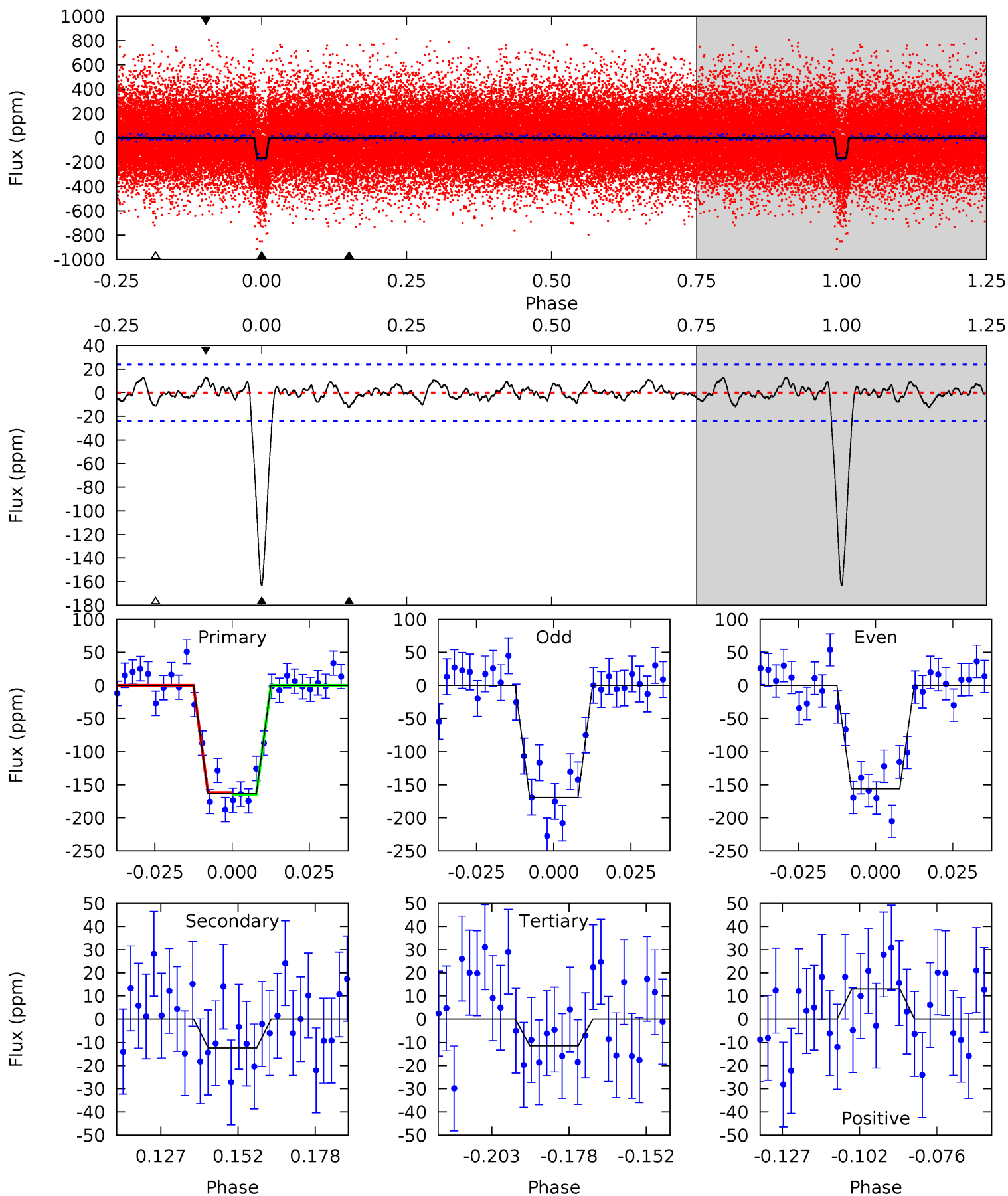
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
33.8	3.46	2.43	3.13	4.82	2.19	1.16	31.4	30.7	1.03	0.33	0.98	0.94	0.08	0.44



Alt Model-Shift Uniqueness Test

006451936-02, P = 4.263708 Days, E = 129.462461 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
33.1	2.51	2.33	2.62	4.84	2.24	0.95	30.8	30.5	0.18	-0.11	1.33	0.97	0.07	0.31



Stellar Parameters For KIC 006451936

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6032^{+163}_{-181}	$4.395^{+0.165}_{-0.182}$	$-0.780^{+0.300}_{-0.300}$	$0.935^{+0.220}_{-0.165}$	$0.793^{+0.093}_{-0.050}$	$1.365^{+0.955}_{-0.609}$
	+3%/-3%	+4%/-4%	+38%/-38%	+24%/-18%	+12%/-6%	+70%/-45%
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 006451936-02 / KOI 0511.02

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-17 ± 5	$1.50^{+0.41}_{-0.38}$	1648^{+121}_{-102}	3625^{+380}_{-329}	$9.313^{+8.740}_{-4.192}$
Alt.	-12 ± 5	$1.30^{+0.41}_{-0.35}$	1649^{+121}_{-102}	3567^{+440}_{-385}	$8.789^{+8.867}_{-4.693}$

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 $A_{obs} \gg 1.0$

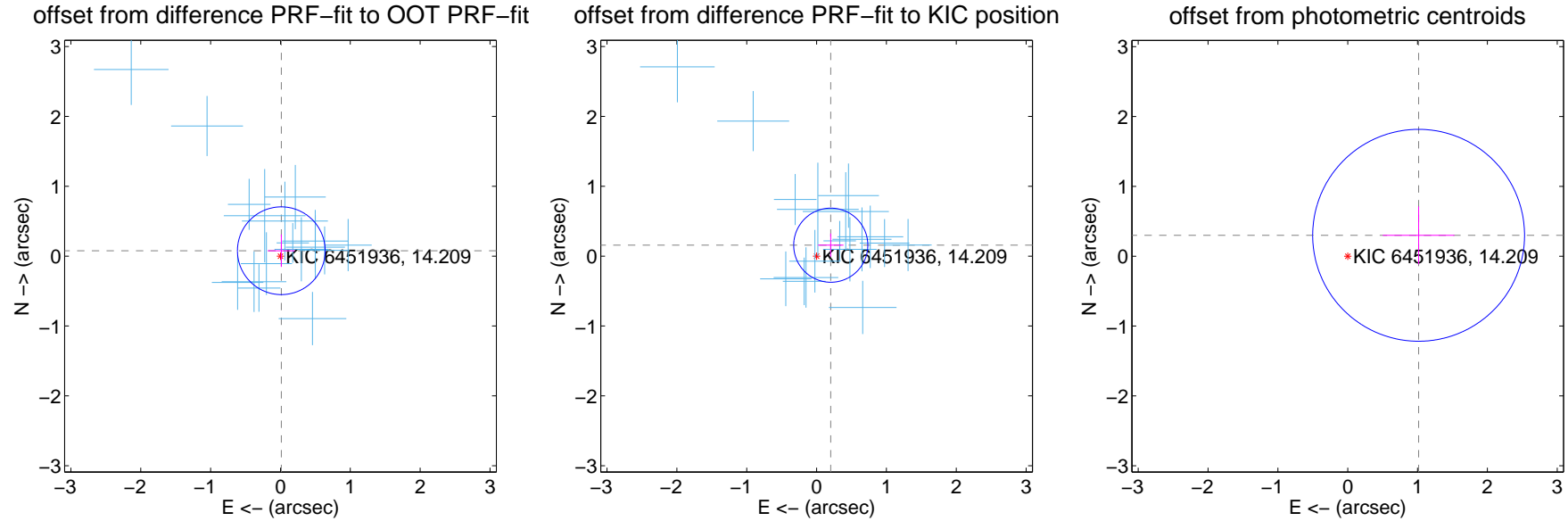
DV Centroid Data

Supplemental centroid analysis for 006451936-02. Kepler magnitude: 14.21. Transit SNR 23.39

There are 17 quarters with good PRF difference image offsets

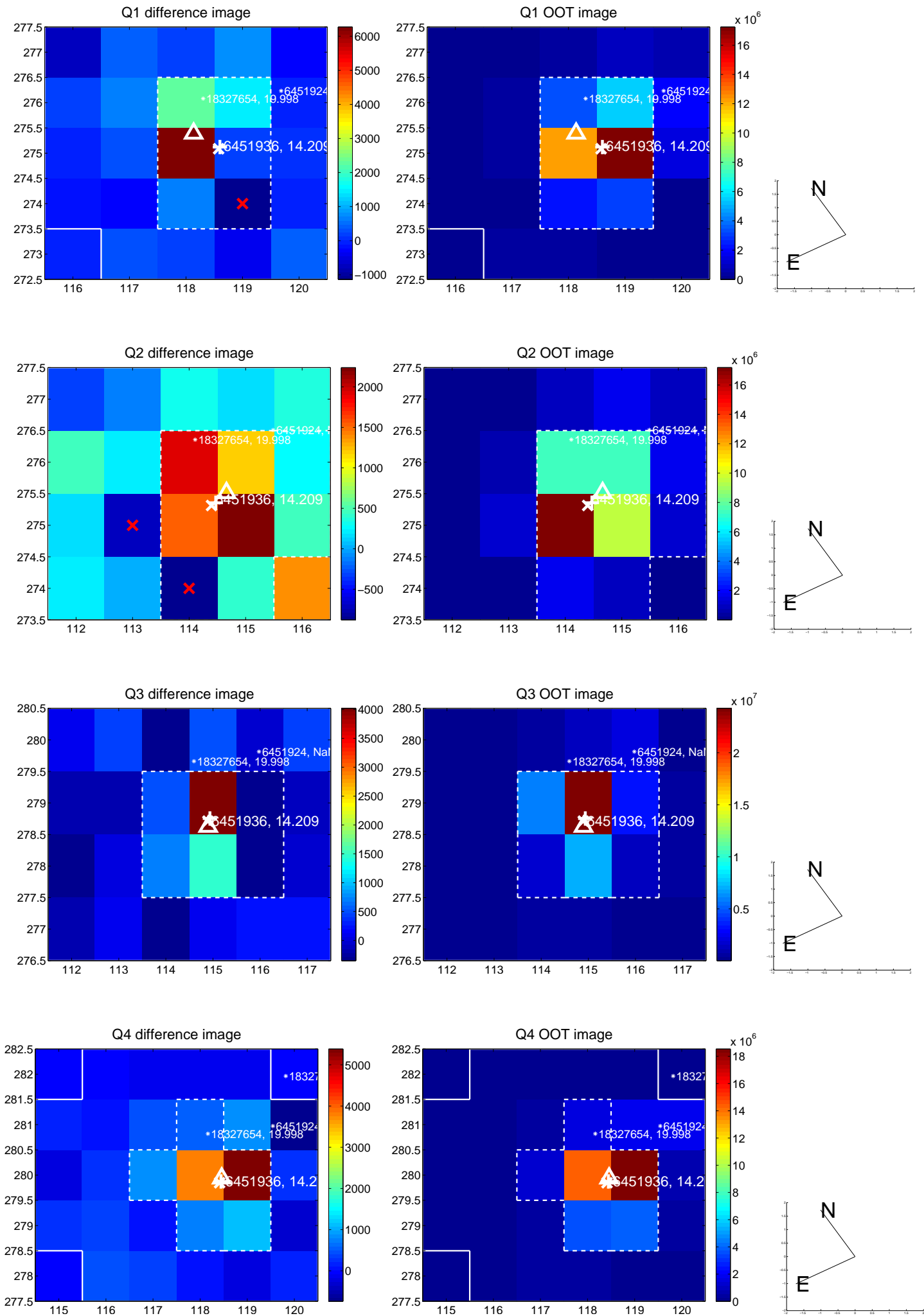
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.078 ± 0.209	0.37	-0.012 ± 0.194	0.077 ± 0.232
PRF-fit source offset from KIC position	0.256 ± 0.177	1.45	-0.203 ± 0.182	0.157 ± 0.167
photometric centroid source offset	1.06 ± 0.51	2.09	-1.01 ± 0.51	0.30 ± 0.41

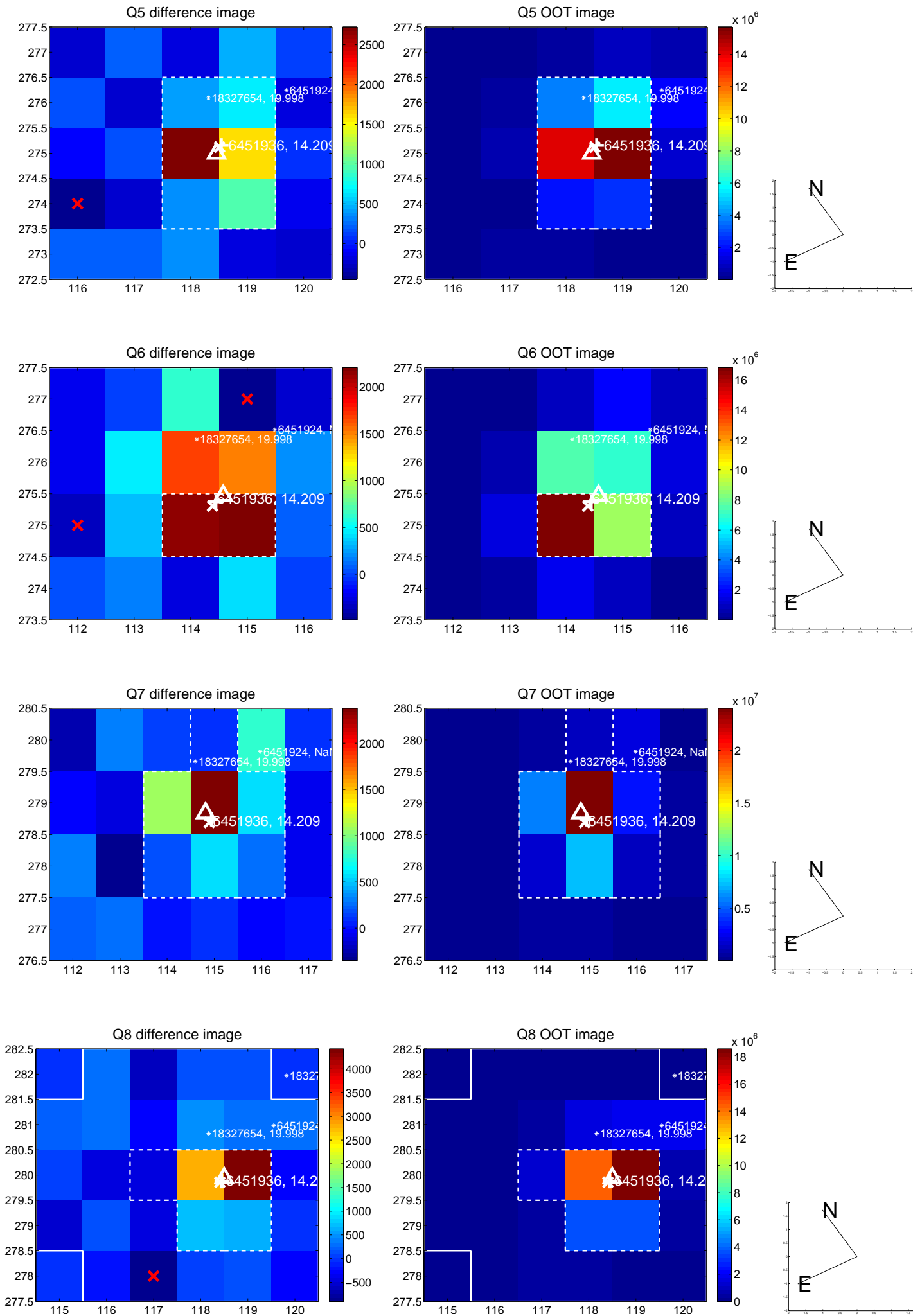


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

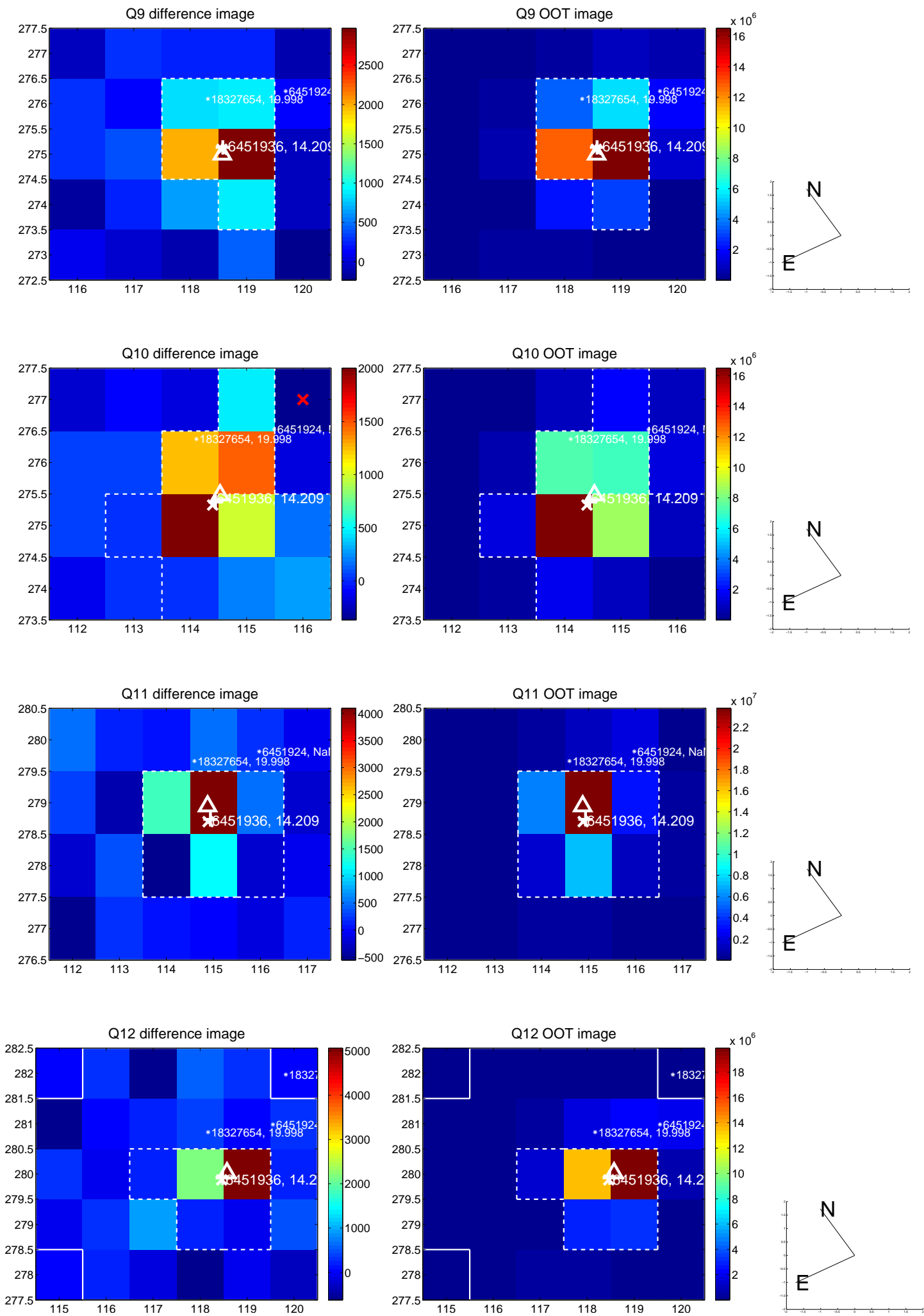
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



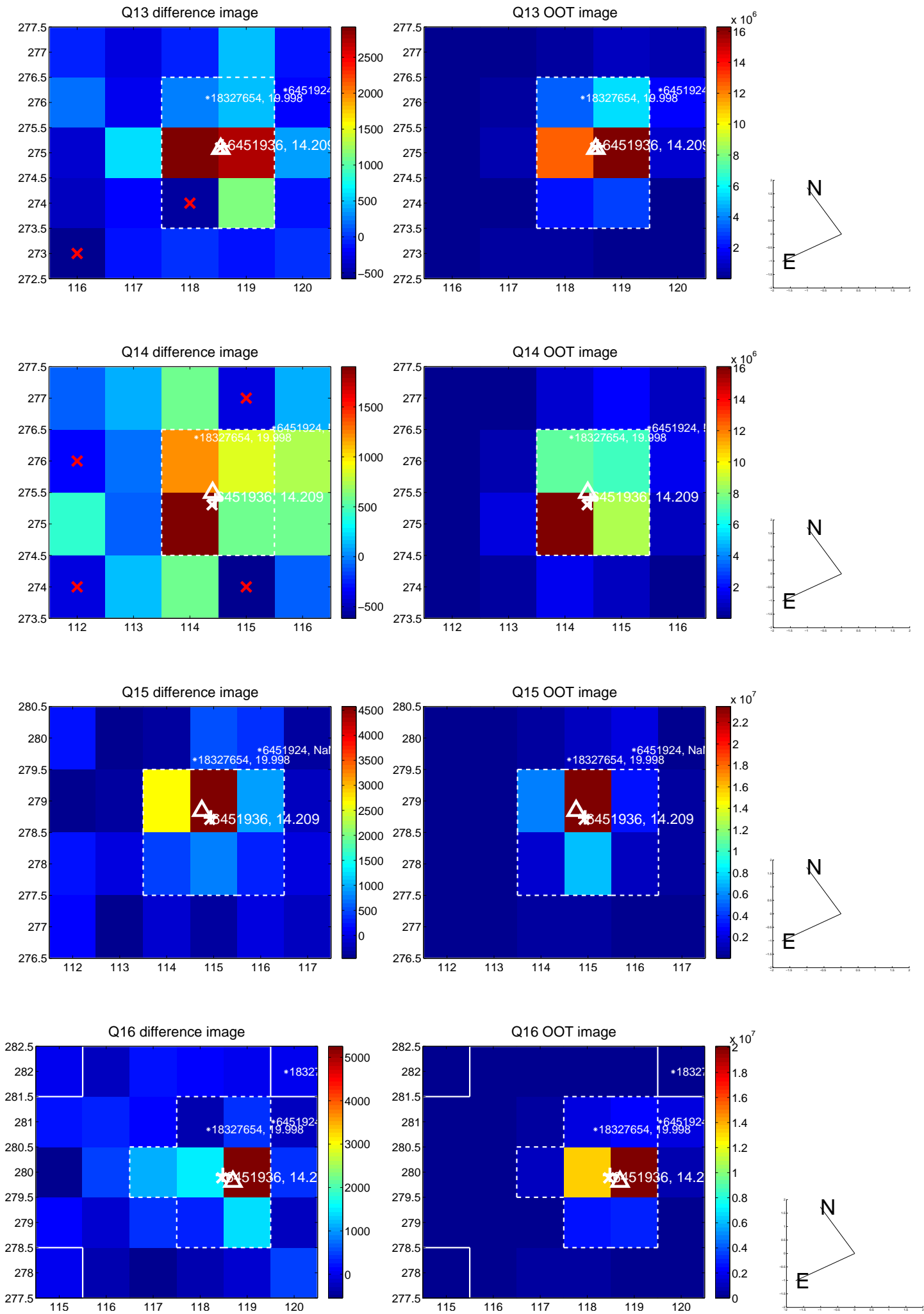
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



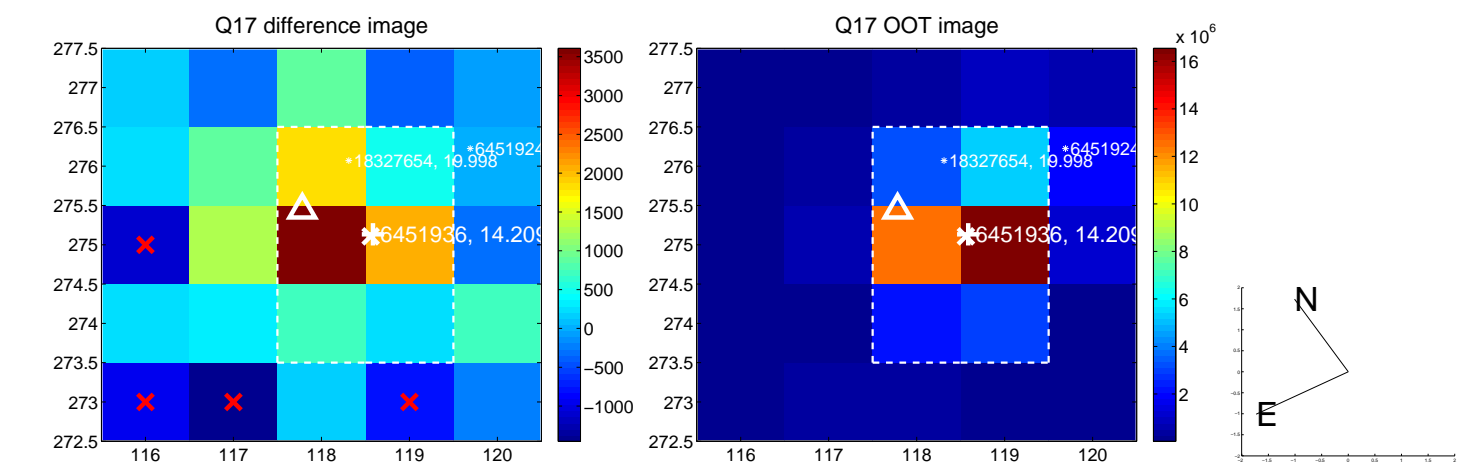
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



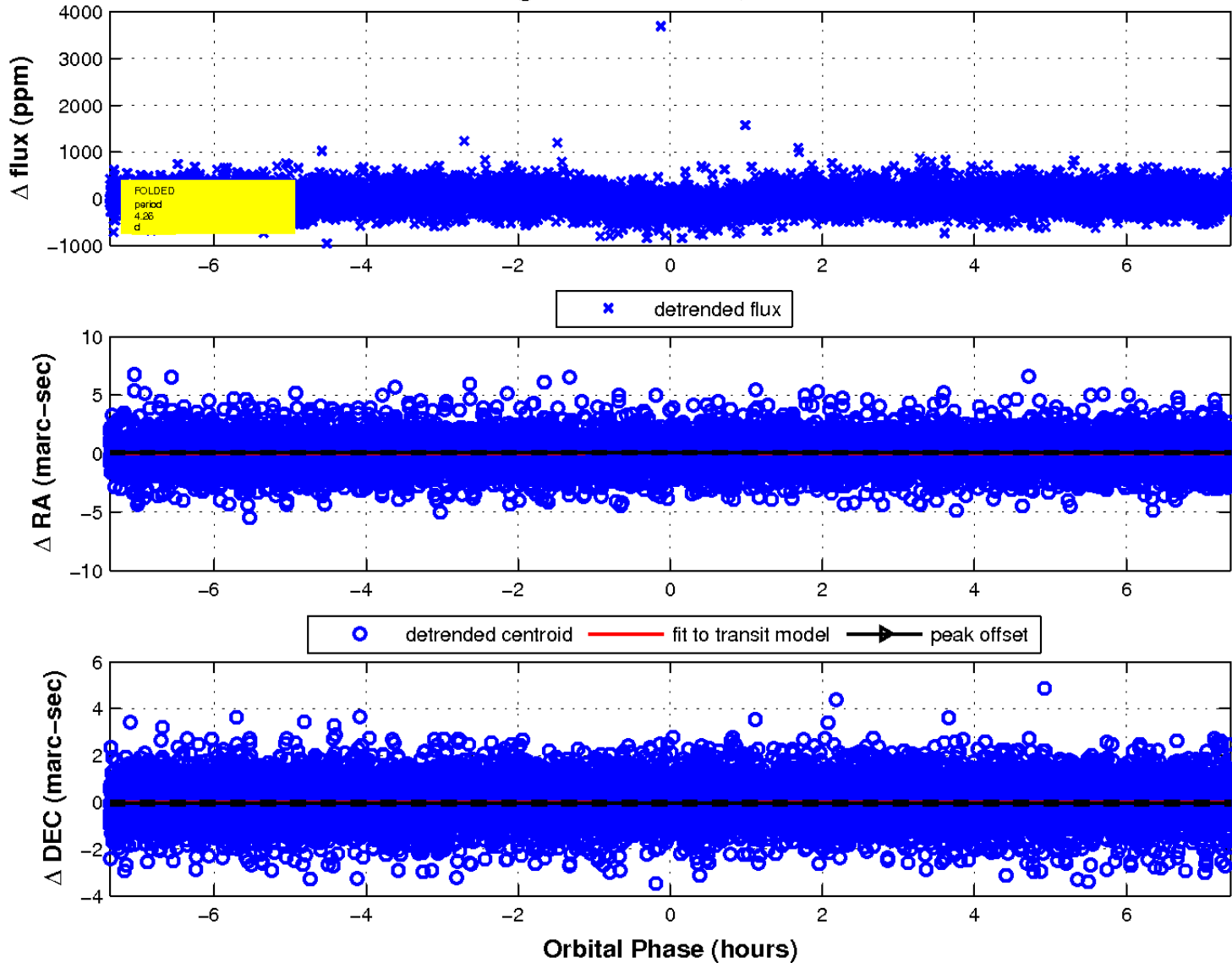
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

