

KIC 012306284

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})
012306284-01	OBS	No	2.989965	132.378976	40.4	5.968	9.0	8.4	1.38	6462	1.03	1525.56
012306284-02	OBS	No	1.494347	131.791733	28.9	8.416	7.9	10.0	1.38	6462	0.76	3846.36

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012306284-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_KIC_POS
012306284-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—CENT_KIC_POS

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

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

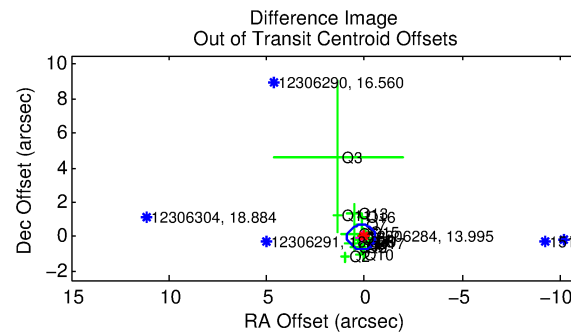
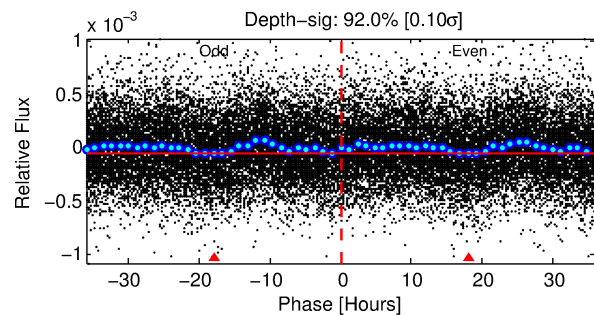
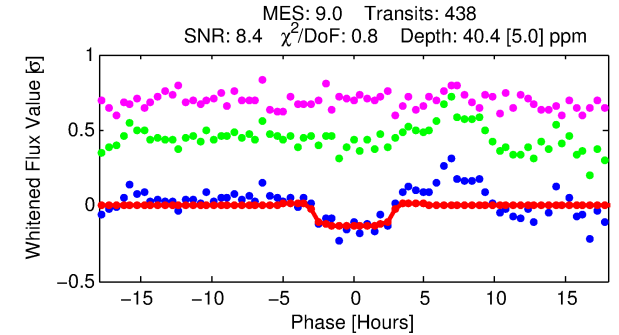
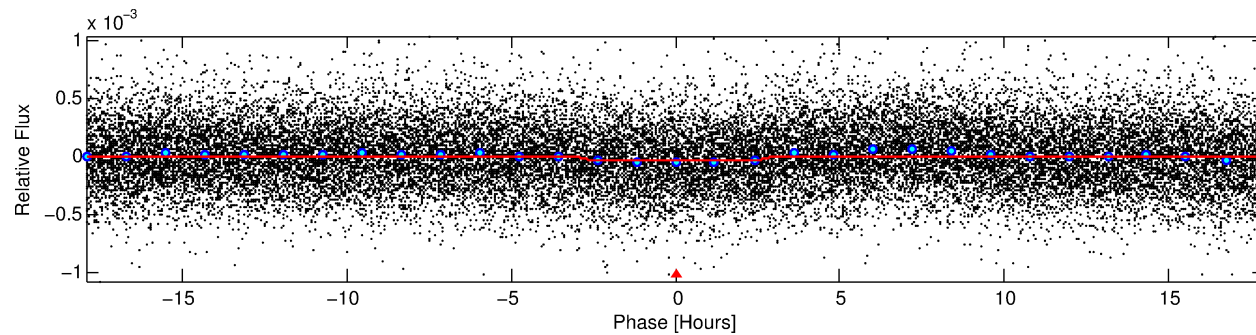
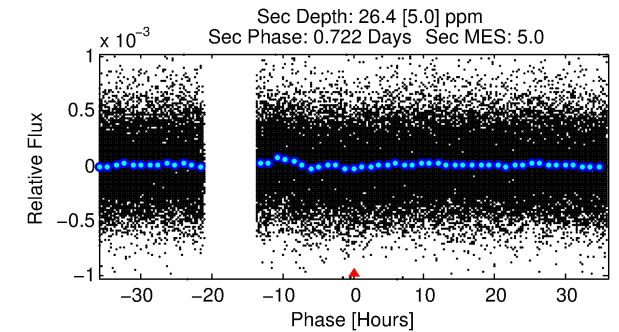
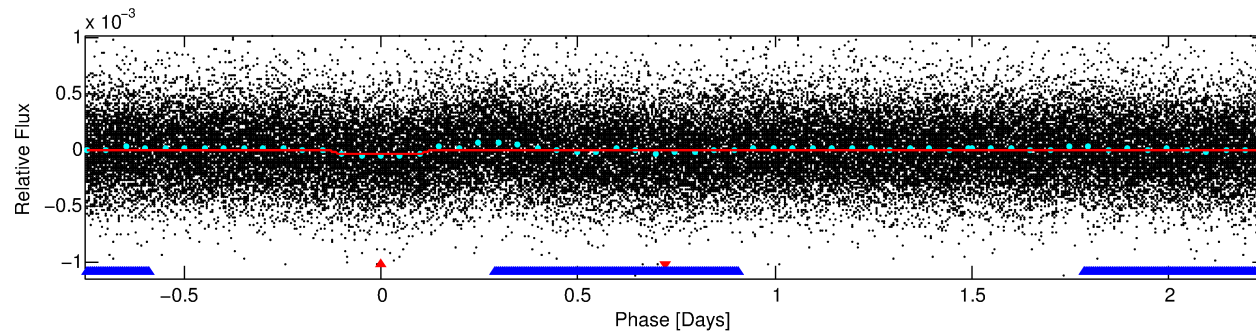
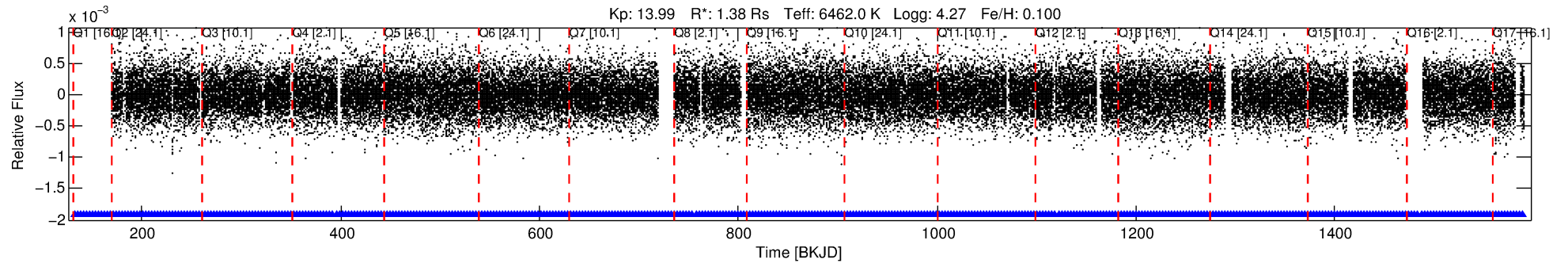
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 012306284-01

No Significant Match Found

DV One-Page Summary

KIC: 12306284 Candidate: 1 of 2 Period: 2.990 d



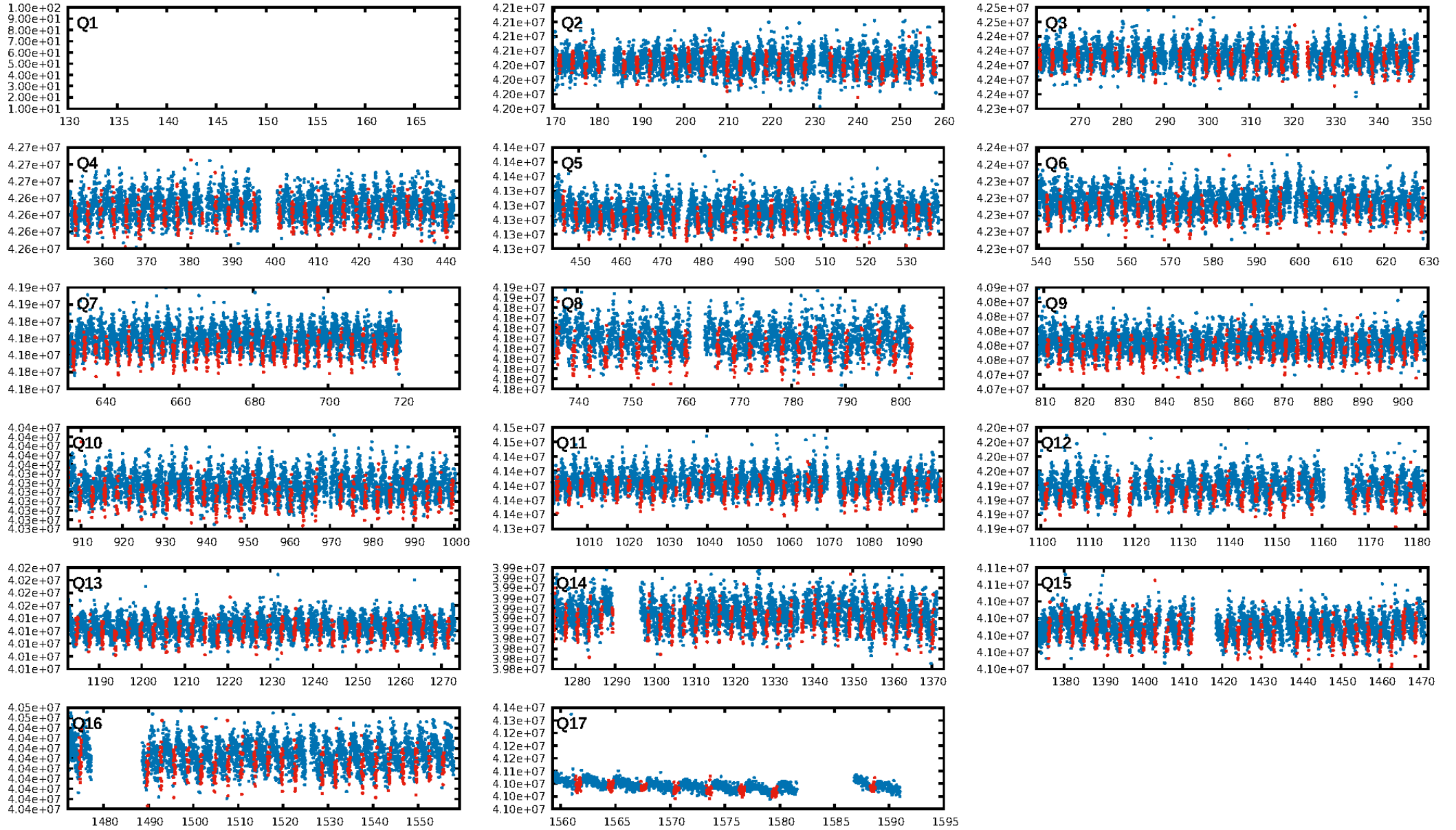
DV Fit Results:

Period = 2.98996 [0.00004] d
Epoch = 132.3790 [0.0081] BKJD
Rp/R* = 0.0069 [0.0027]
a/R* = 1.89 [3.08]
b = 0.91 [0.43]
Seff = 1525.56 [621.60]
Teff = 1594 [162] K
Rp = 1.04 [0.53] Re
a = 0.0441 [0.0117] AU
Ag = 26.29 [23.70] [1.07σ]
Teffp = 5579 [1162] K [3.40σ]

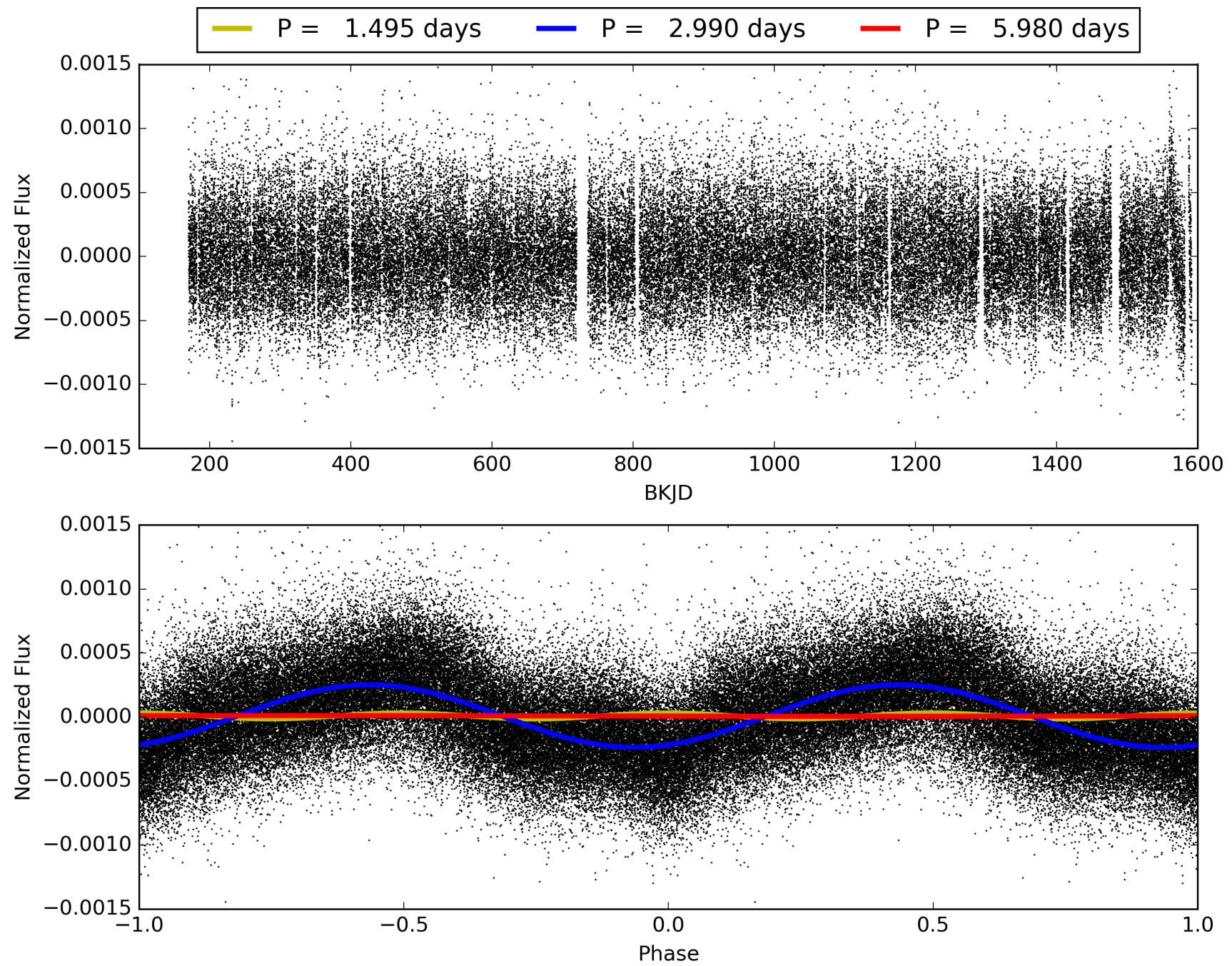
DV Diagnostic Results:

ShortPeriod-sig: 99.9% [3.48σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 4.95e-21
RollingBand-fgt: 1.00 [430/430]
GhostDiagnostic-chr: 1.064
Centroid-sig: 0.5%
Centroid-so: 3.752 arcsec [2.56σ]
OotOffset-rm: 0.174 arcsec [0.74σ]
KicOffset-rm: 0.739 arcsec [2.58σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.75 [12/16]
DiffImageOverlap-fno: 0.31 [5/16]

TCE 012306284-01, PDC Light Curves

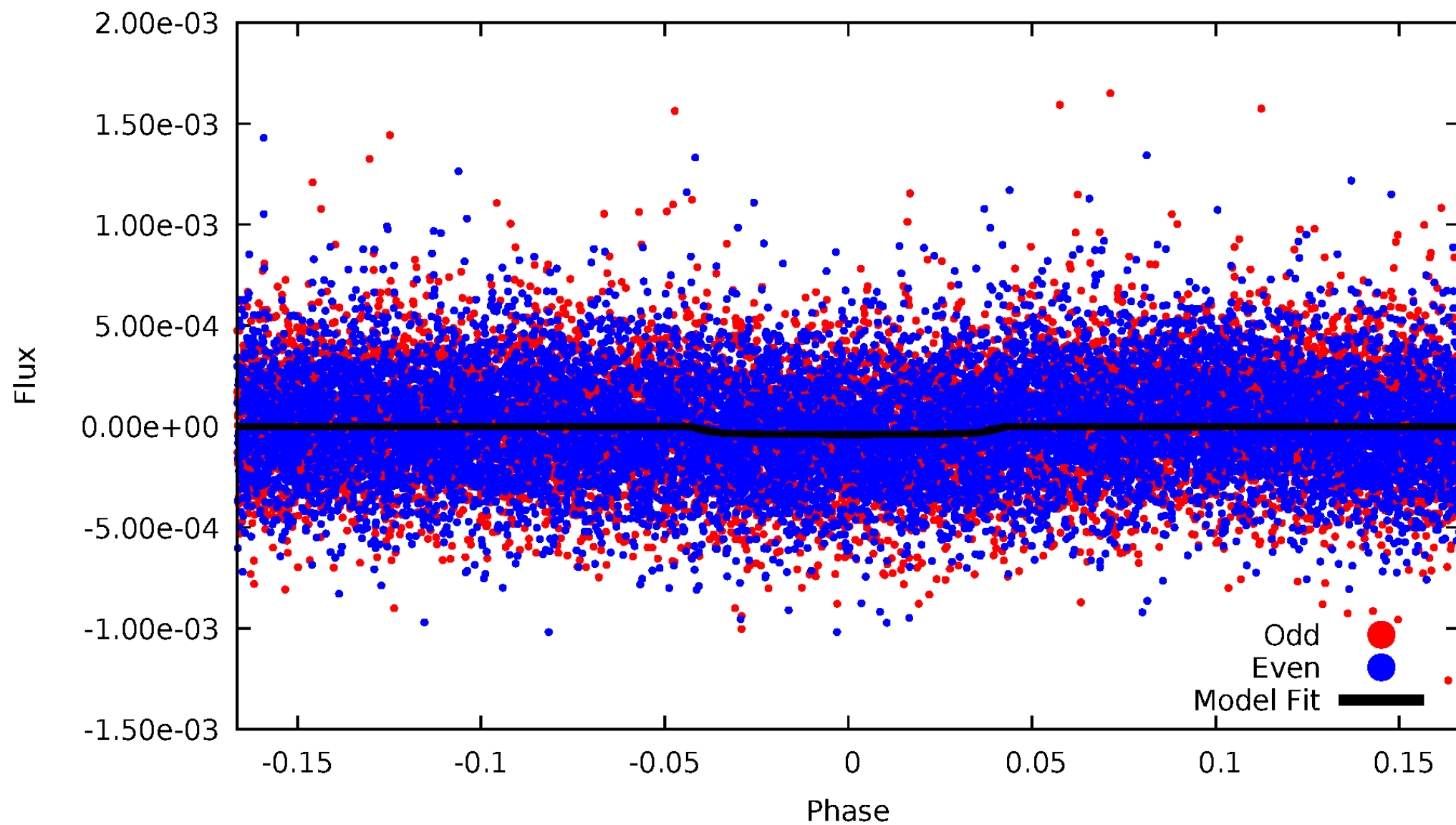


TCE 012306284-01



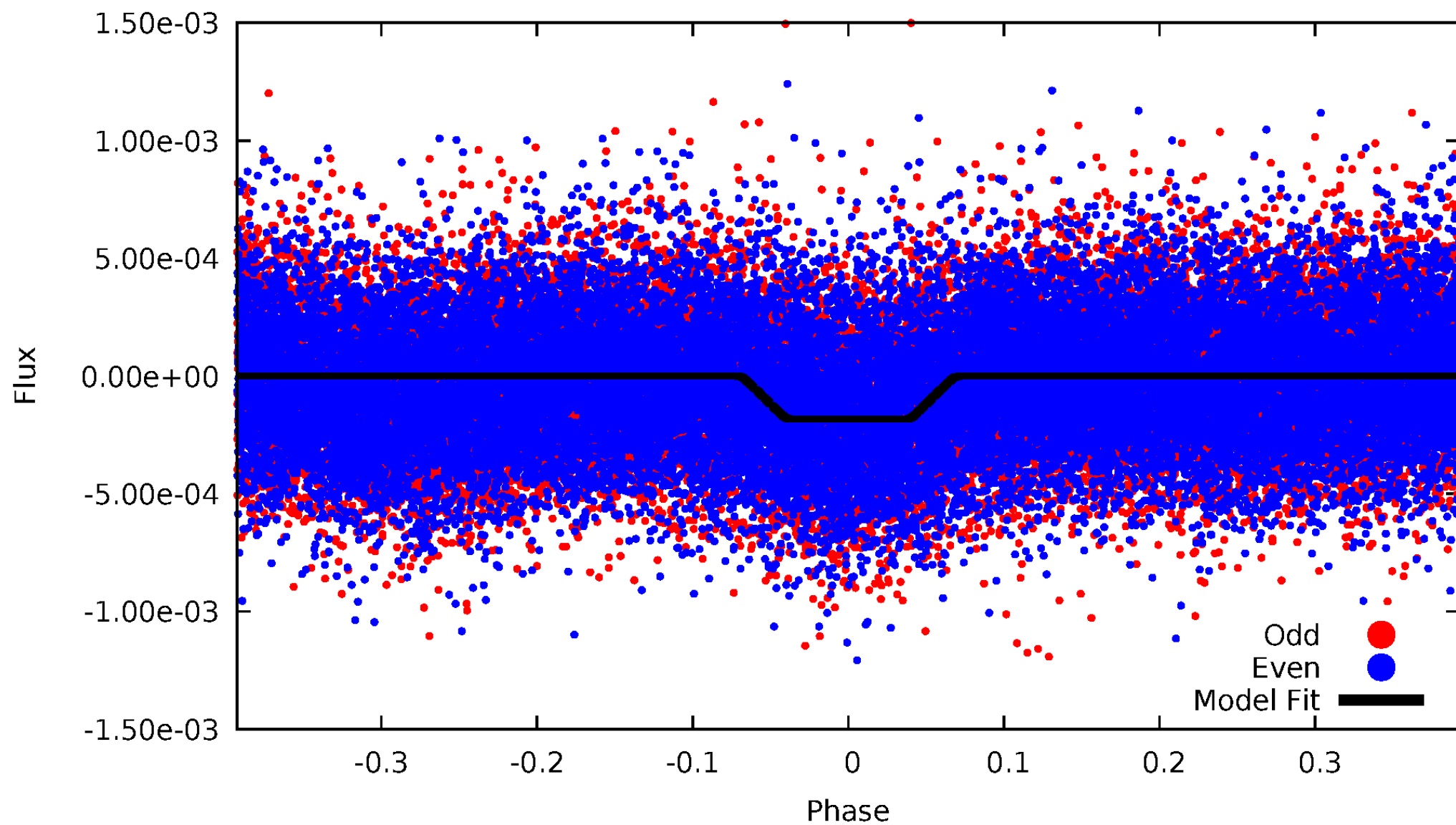
DV Odd/Even

TCE 012306284-01

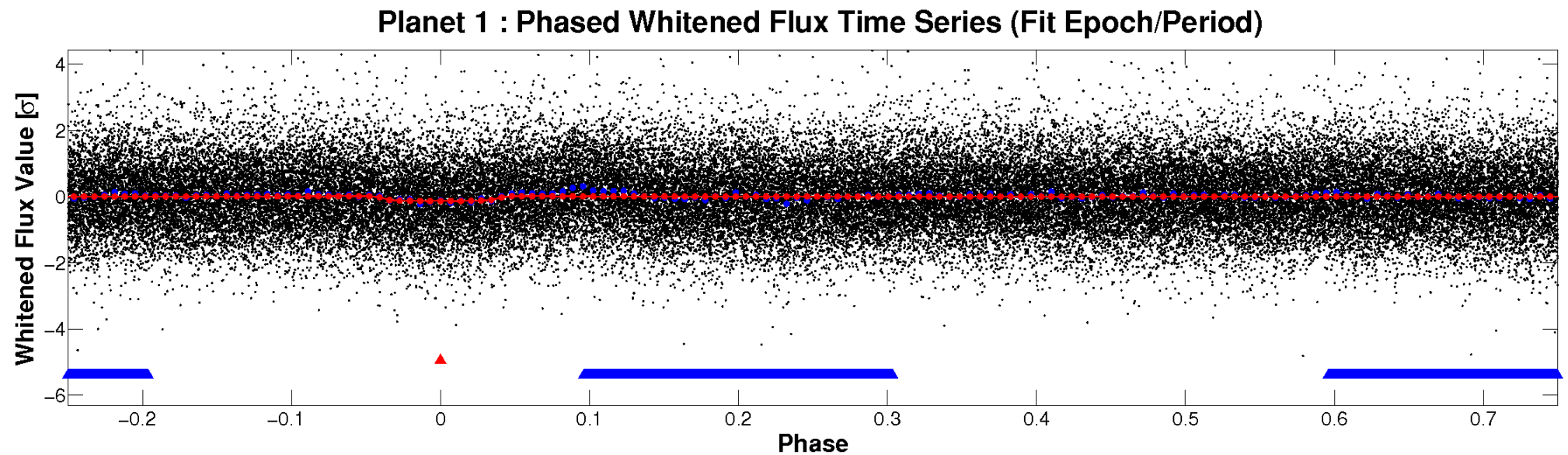
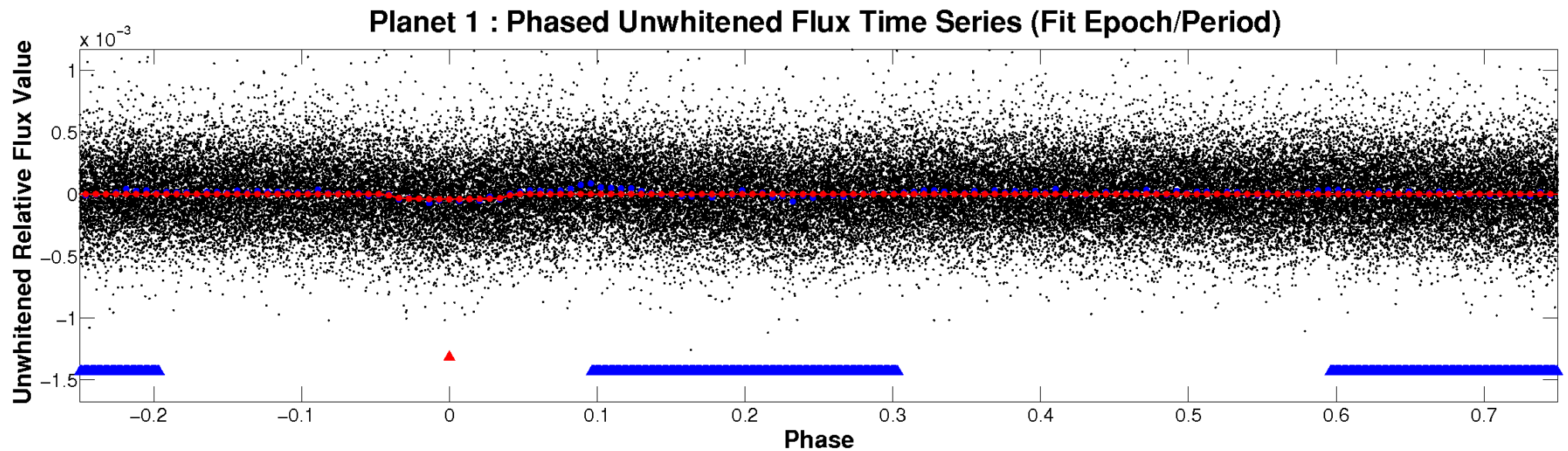


ALT Odd/Even

TCE 012306284-01

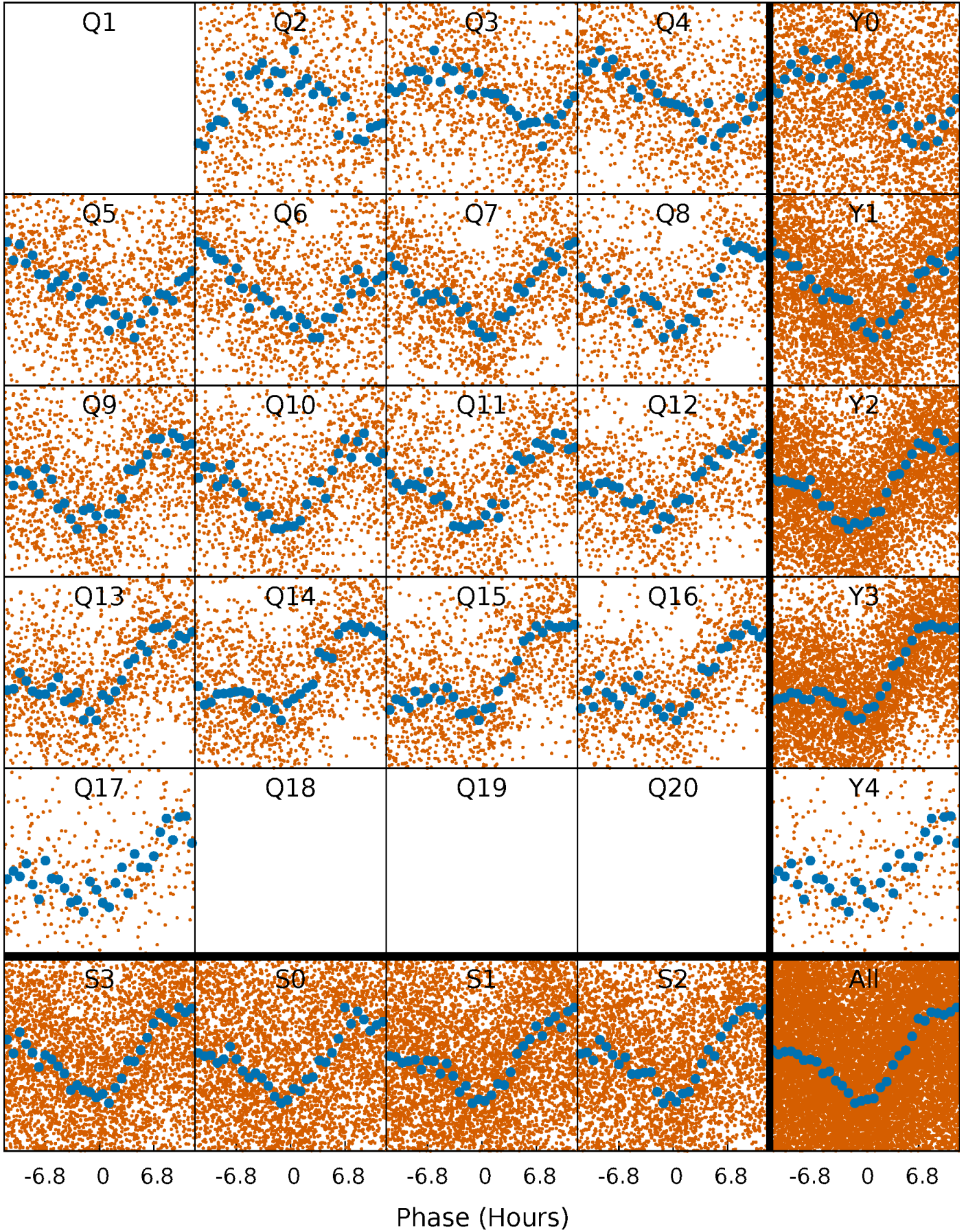


Non-Whitened Vs. Whitened Light Curve



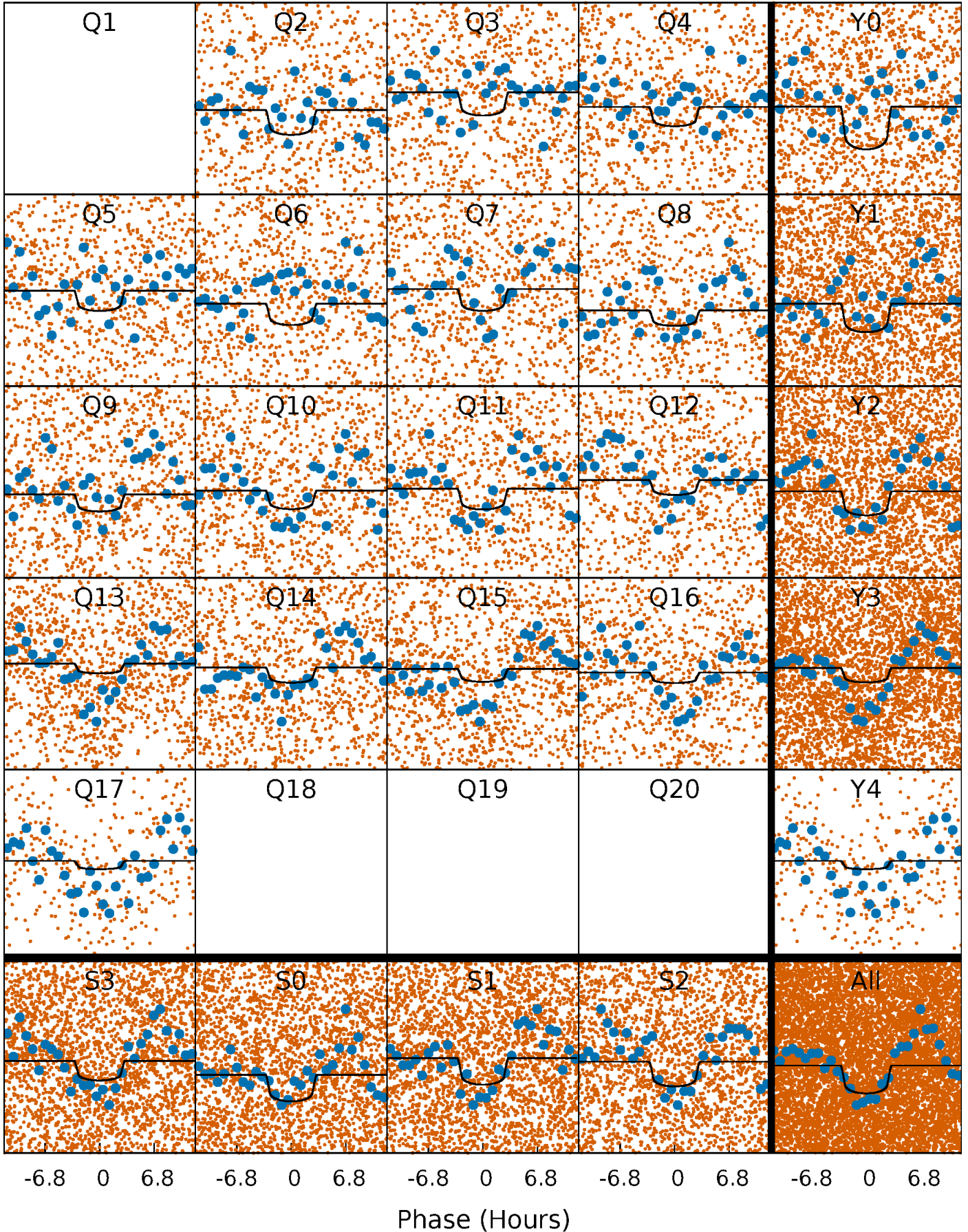
PDC Quarter-Phased Transit Curves

TCE 012306284-01 P= 2.989965 Days $T_0=132.378976$ (BKJD)



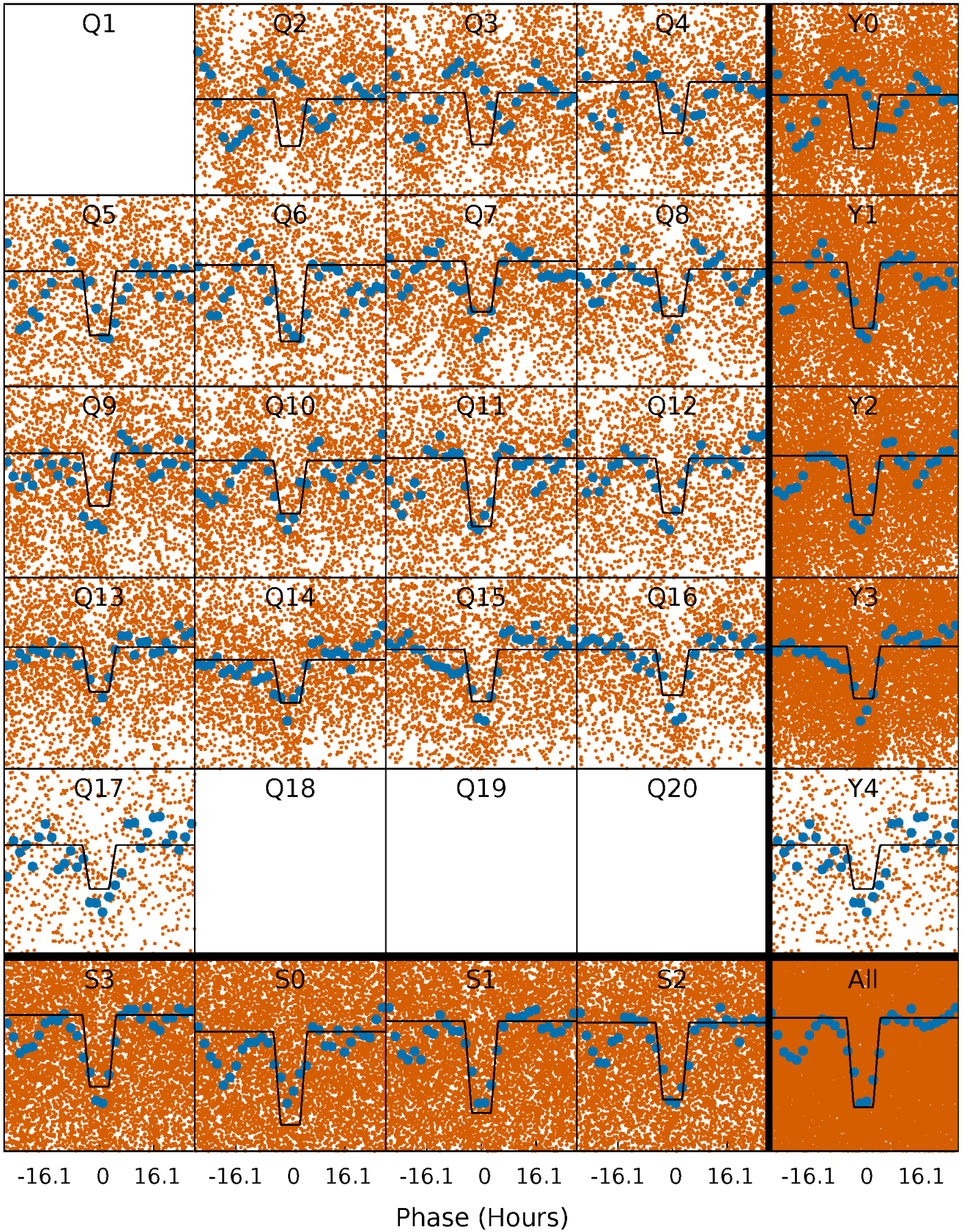
DV Quarter-Phased Transit Curves

TCE 012306284-01 P= 2.989965 Days $T_0=132.378976$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

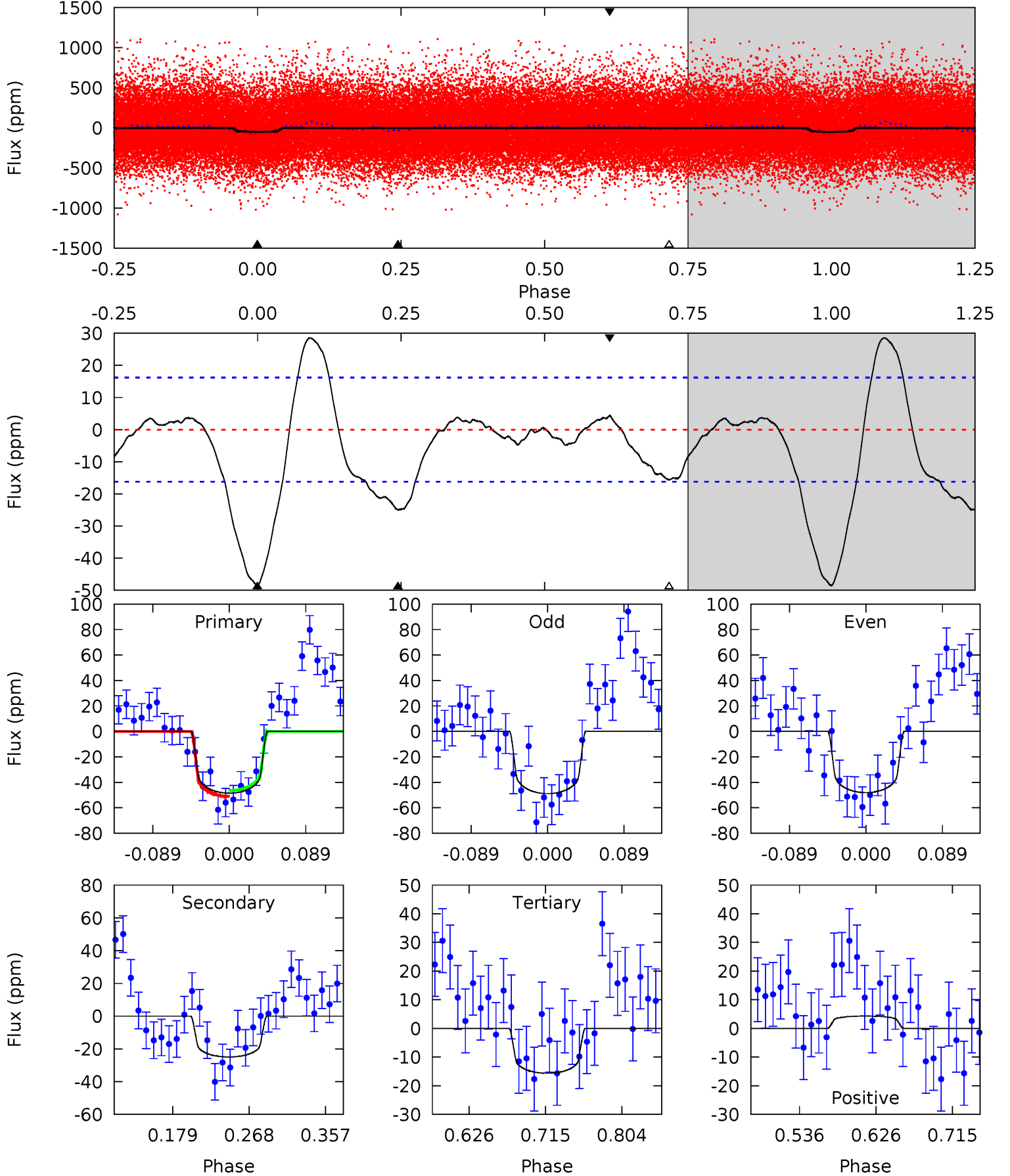
TCE 012306284-01 P= 2.989754 Days $T_0=132.448152$ (BKJD)



DV Model-Shift Uniqueness Test

012306284-01, P = 2.989965 Days, E = 132.378976 Days

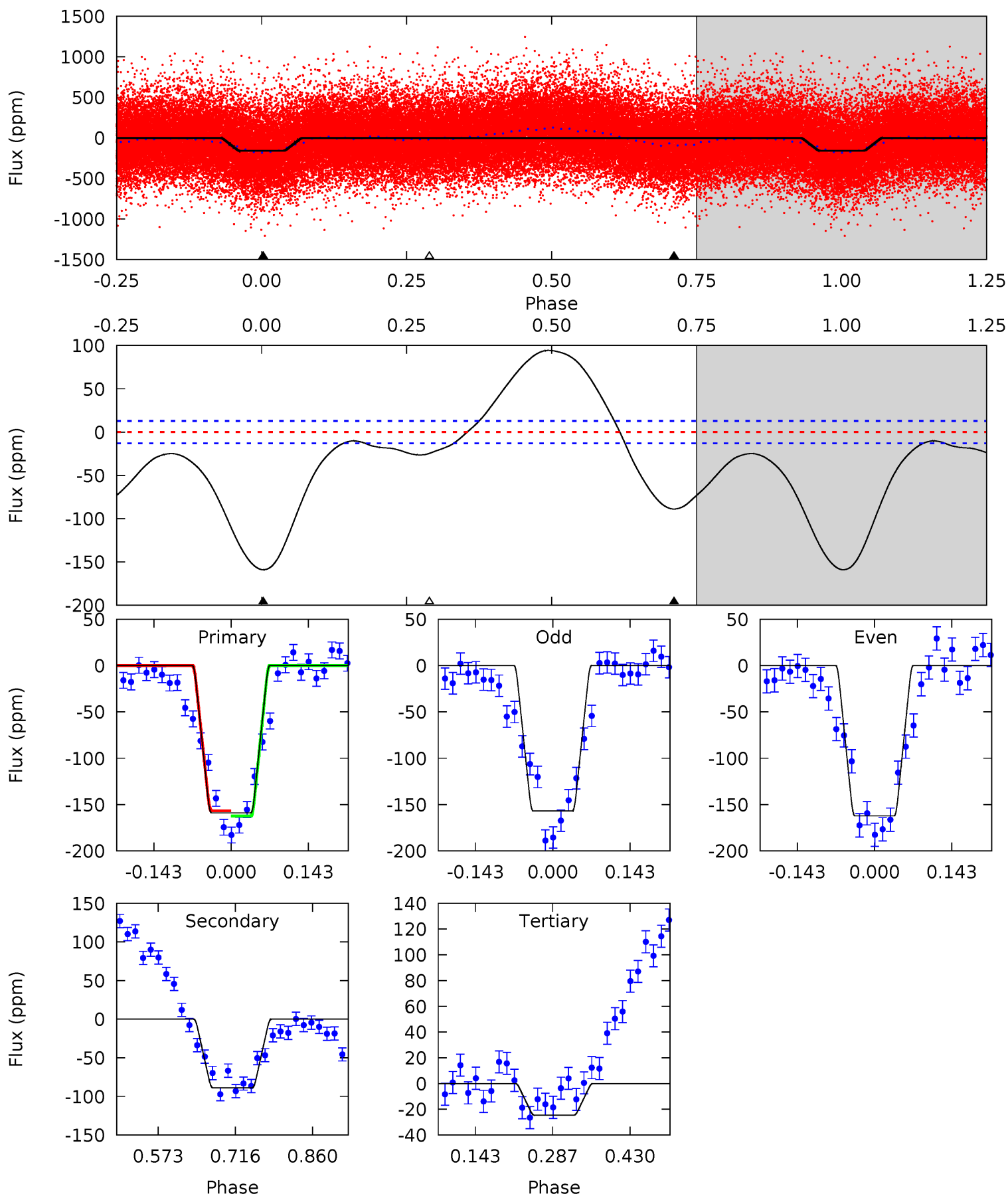
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.7	7.07	4.43	1.23	4.59	1.70	2.33	9.30	12.5	2.64	5.84	0.11	0.86	0.37	0.66



Alt Model-Shift Uniqueness Test

012306284-01, P = 2.989754 Days, E = 132.448152 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
55.1	30.8	8.52	0	4.49	1.46	15.9	46.6	55.1	22.3	30.8	0.91	0.90	0.37	1.02



Stellar Parameters For KIC 012306284

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6462^{+180}_{-248}	$4.266^{+0.108}_{-0.201}$	$0.100^{+0.250}_{-0.350}$	$1.377^{+0.449}_{-0.242}$	$1.278^{+0.197}_{-0.197}$	$0.689^{+0.358}_{-0.372}$
	+3%/-4%	+3%/-5%	+250%/-350%	+33%/-18%	+15%/-15%	+52%/-54%
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 012306284-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-25 ± 4	$1.06^{+0.48}_{-0.41}$	2240^{+186}_{-138}	5479^{+1346}_{-751}	24^{+37}_{-13}
Alt.	-89 ± 3	$2.06^{+0.56}_{-0.45}$	2256^{+167}_{-131}	5437^{+568}_{-483}	22^{+14}_{-8}

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 $A_{obs} \gg 1.0$

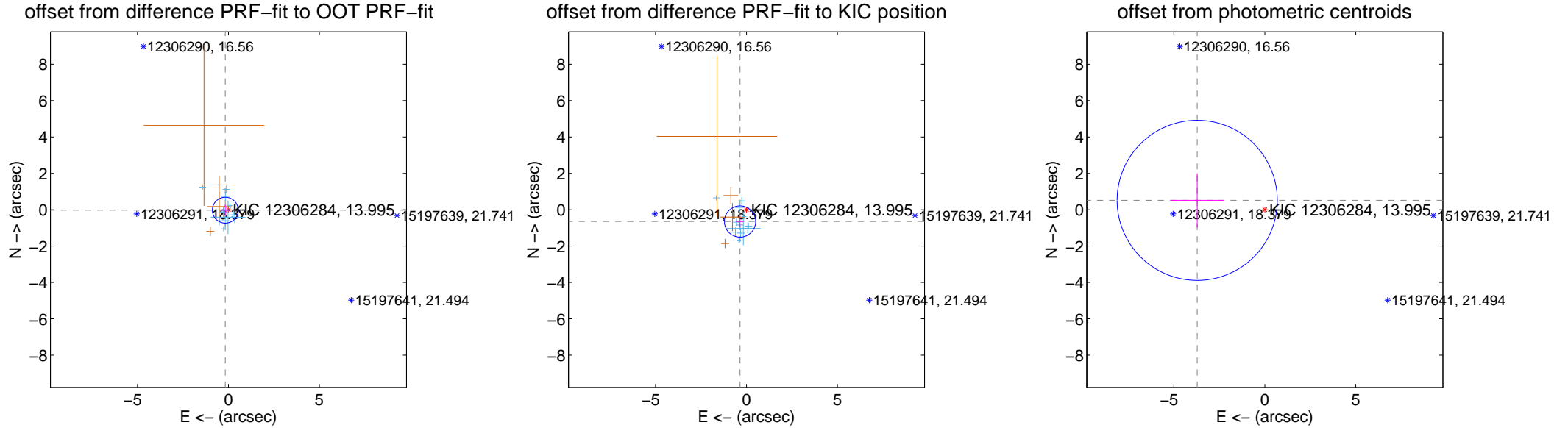
DV Centroid Data

Supplemental centroid analysis for 012306284-01. Kepler magnitude: 13.99. Transit SNR 8.42

There are 12 quarters with good PRF difference image offsets

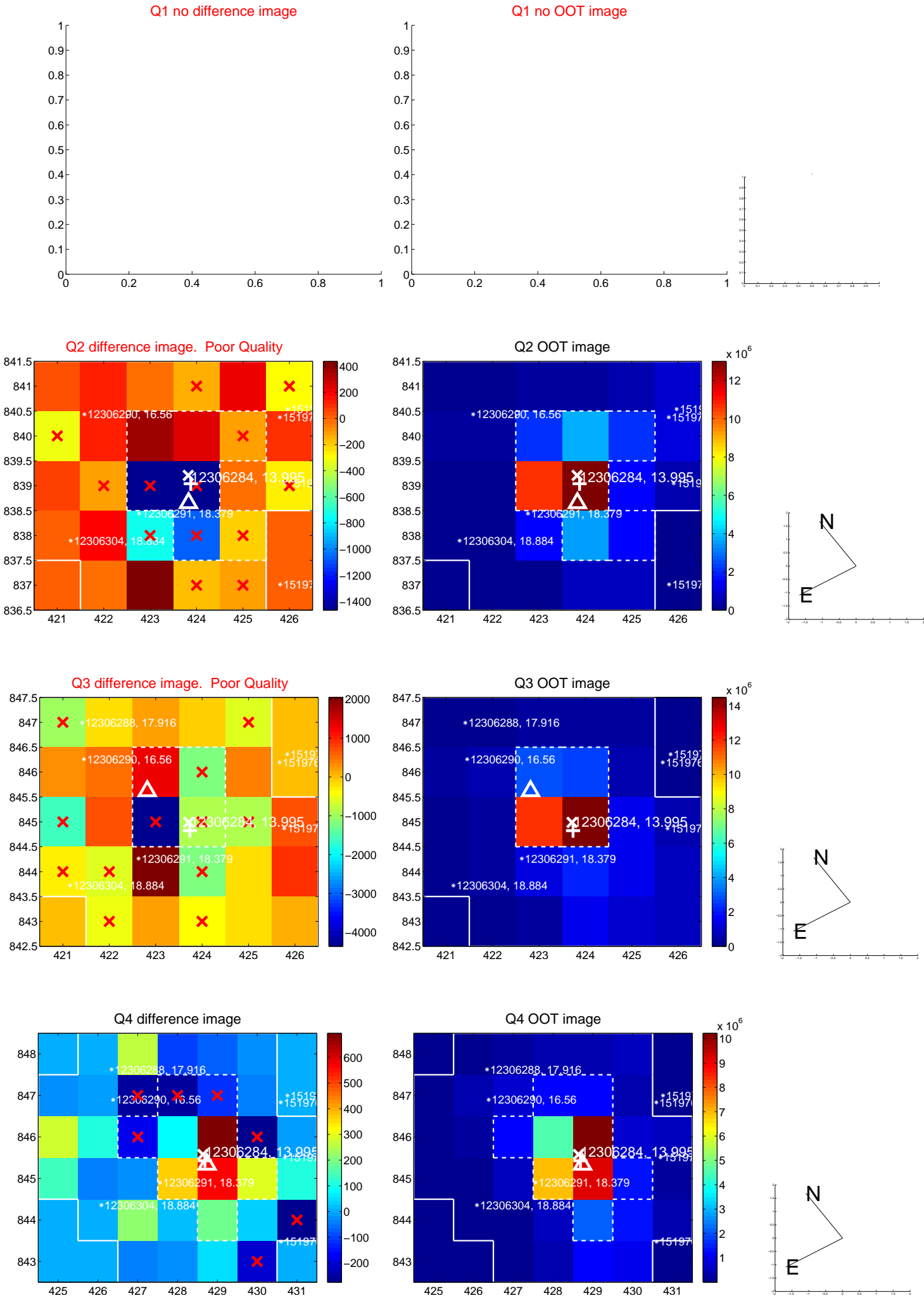
The direct PRF centroid is offset from the target star catalog position by about 0.66 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.174 ± 0.237	0.74	0.172 ± 0.236	-0.026 ± 0.300
PRF-fit source offset from KIC position	0.739 ± 0.286	2.58	0.354 ± 0.236	-0.648 ± 0.300
photometric centroid source offset	3.75 ± 1.47	2.56	3.72 ± 1.47	0.52 ± 1.49

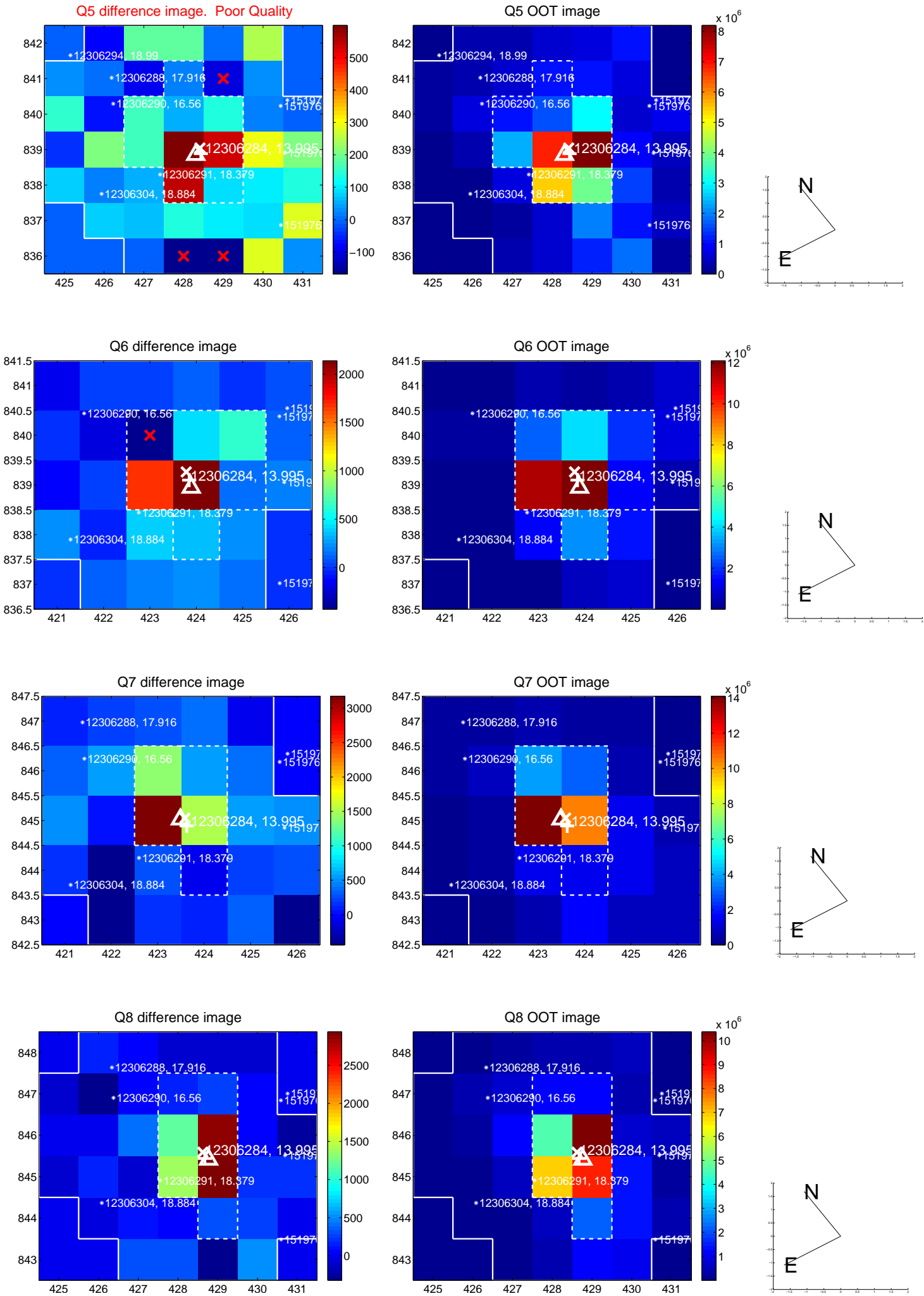


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

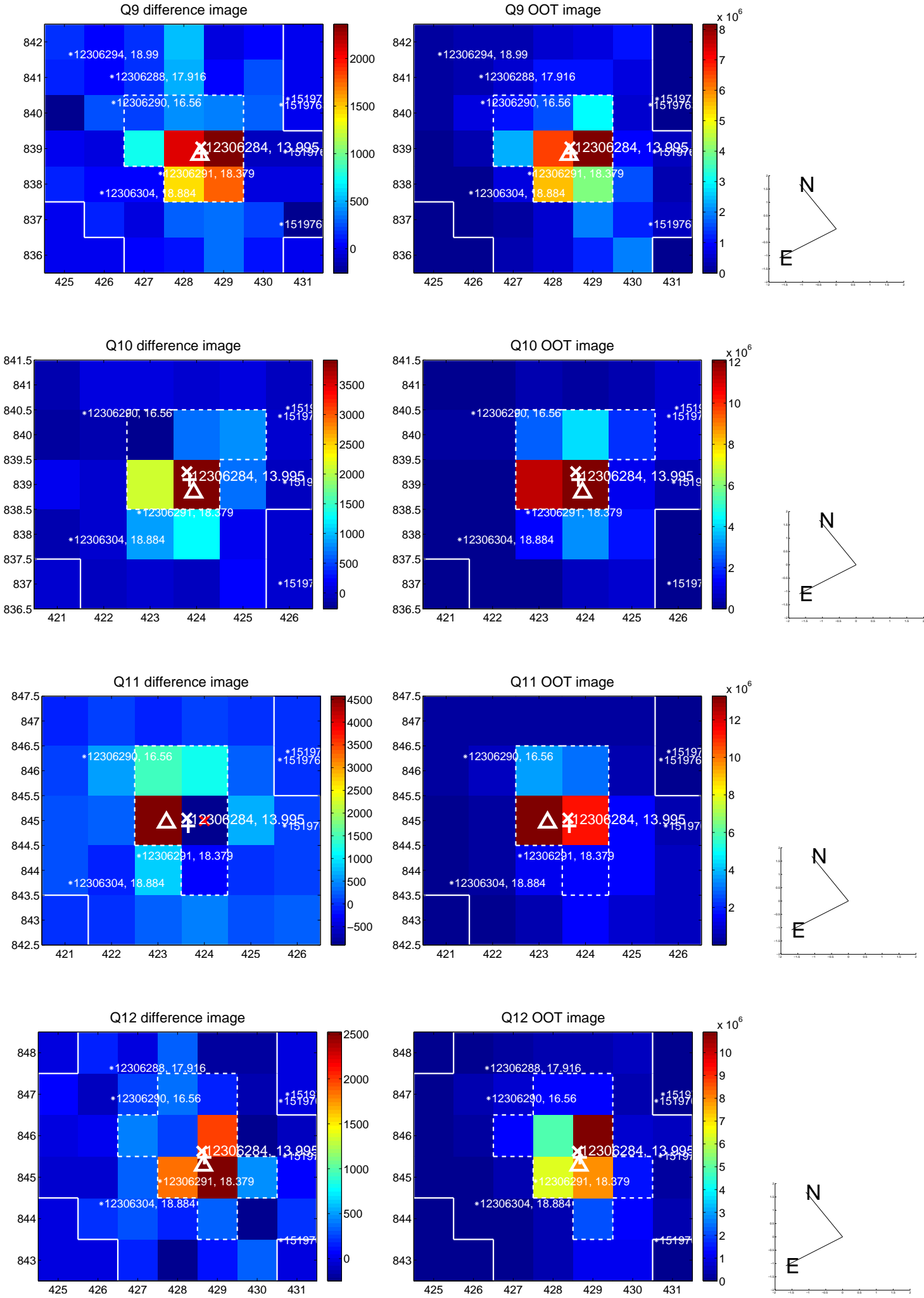
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



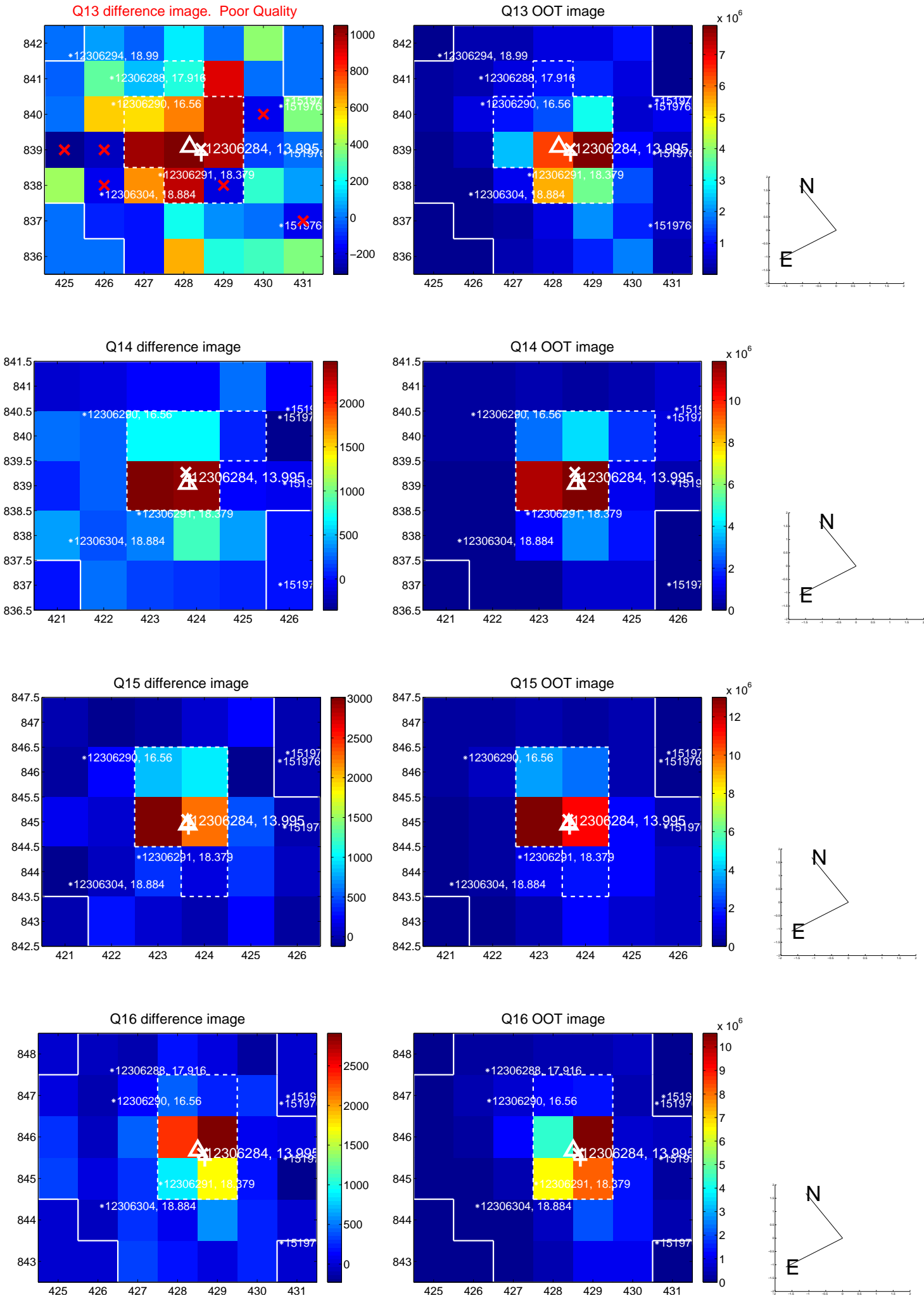
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

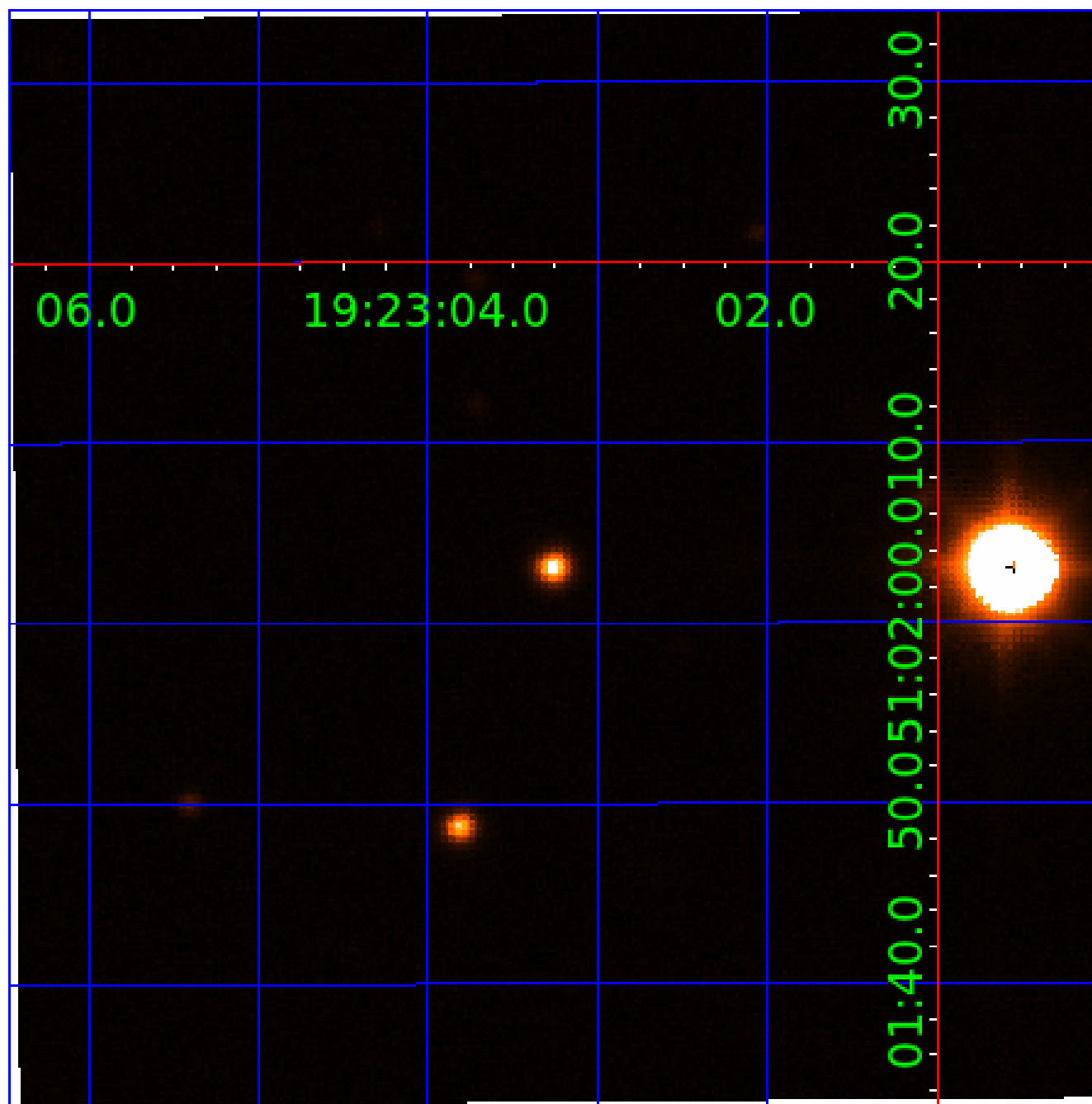


white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 012306284

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})
012306284-01	OBS	No	2.989965	132.378976	40.4	5.968	9.0	8.4	1.38	6462	1.03	1525.56
012306284-02	OBS	No	1.494347	131.791733	28.9	8.416	7.9	10.0	1.38	6462	0.76	3846.36

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012306284-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_KIC_POS
012306284-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—CENT_KIC_POS

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

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

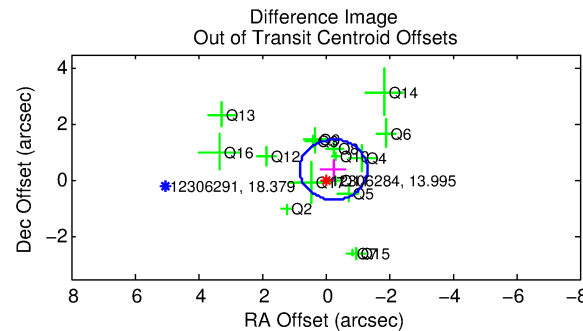
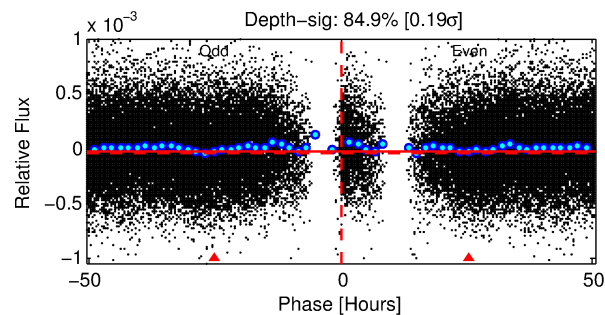
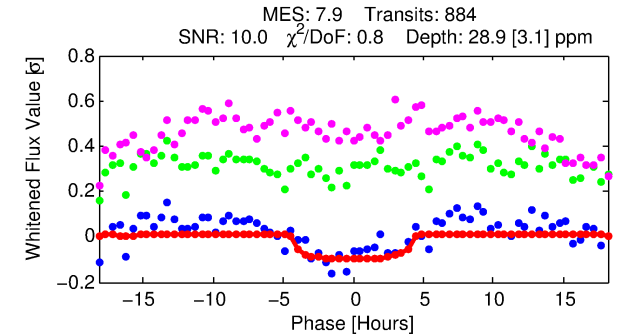
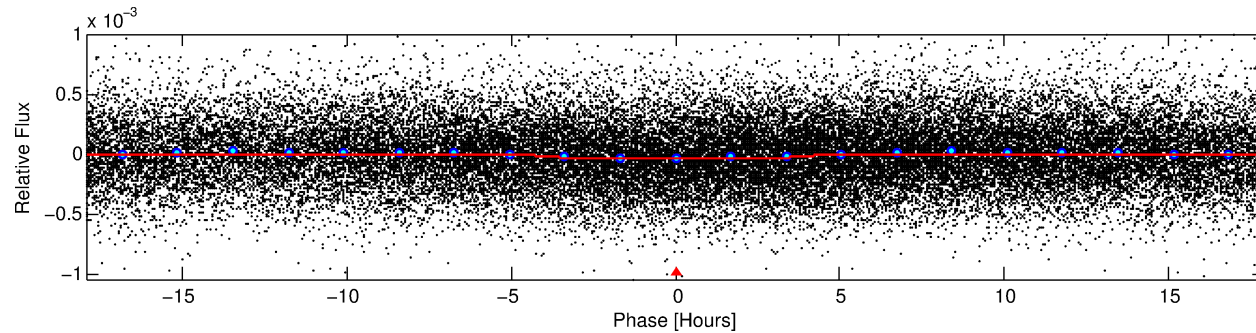
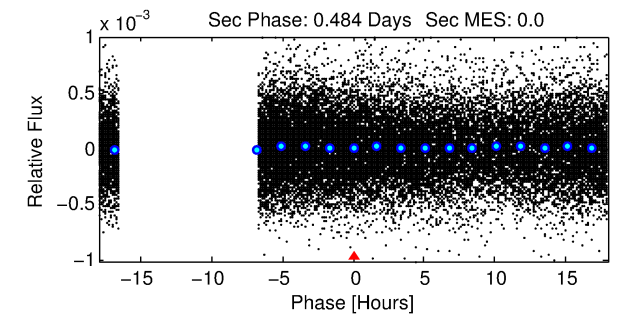
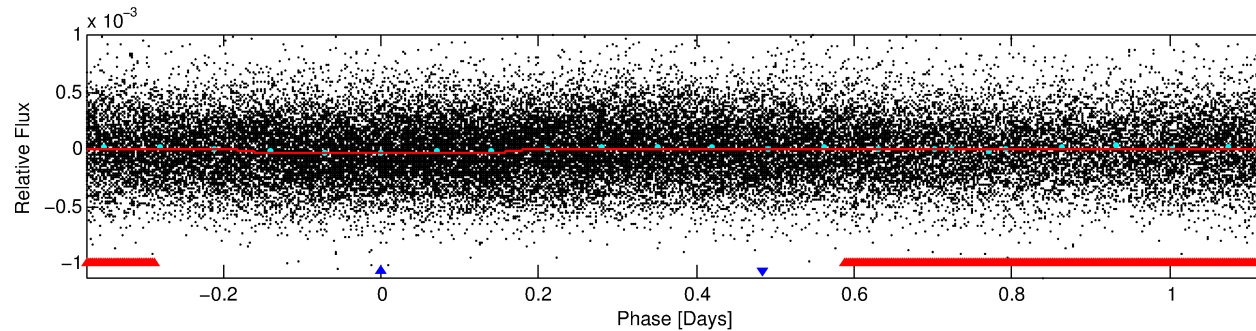
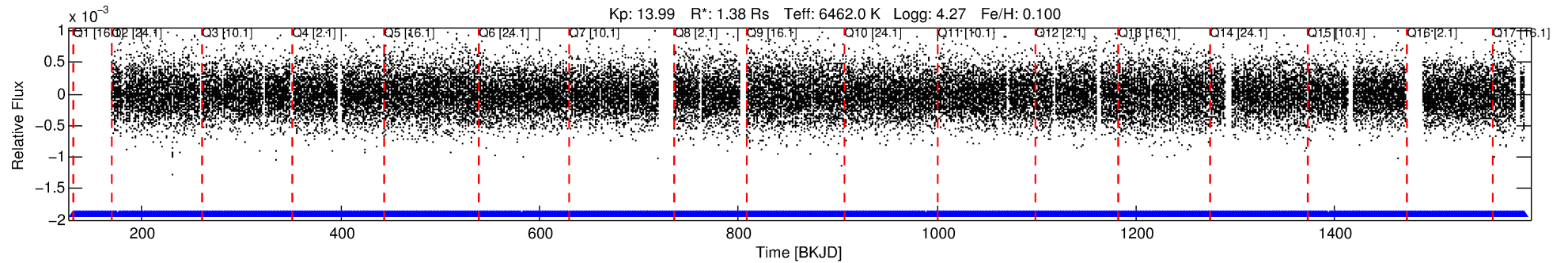
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 012306284-02

No Significant Match Found

DV One-Page Summary

KIC: 12306284 Candidate: 2 of 2 Period: 1.494 d



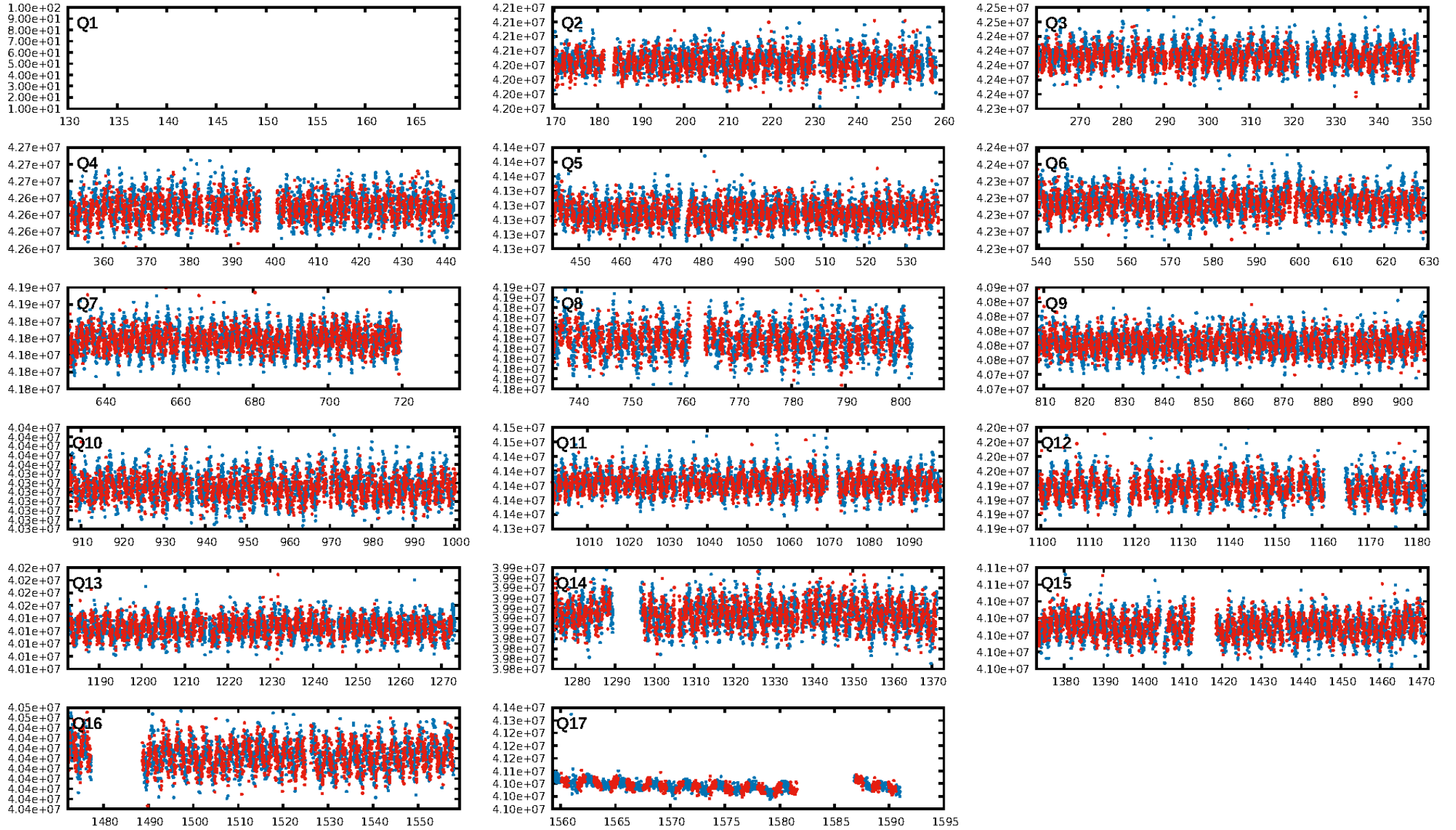
DV Fit Results:

Period = 1.49435 [0.00002] d
Epoch = 131.7917 [0.0082] BKJD
Rp/R* = 0.0051 [0.0049]
a/R* = 1.41 [3.51]
b = 0.46 [8.84]
Seff = 3846.36 [1567.23]
Teq = 2008 [205] K
Rp = 0.76 [0.77] Re
a = 0.0278 [0.0074] AU
Ag = N/A
Teffp = N/A

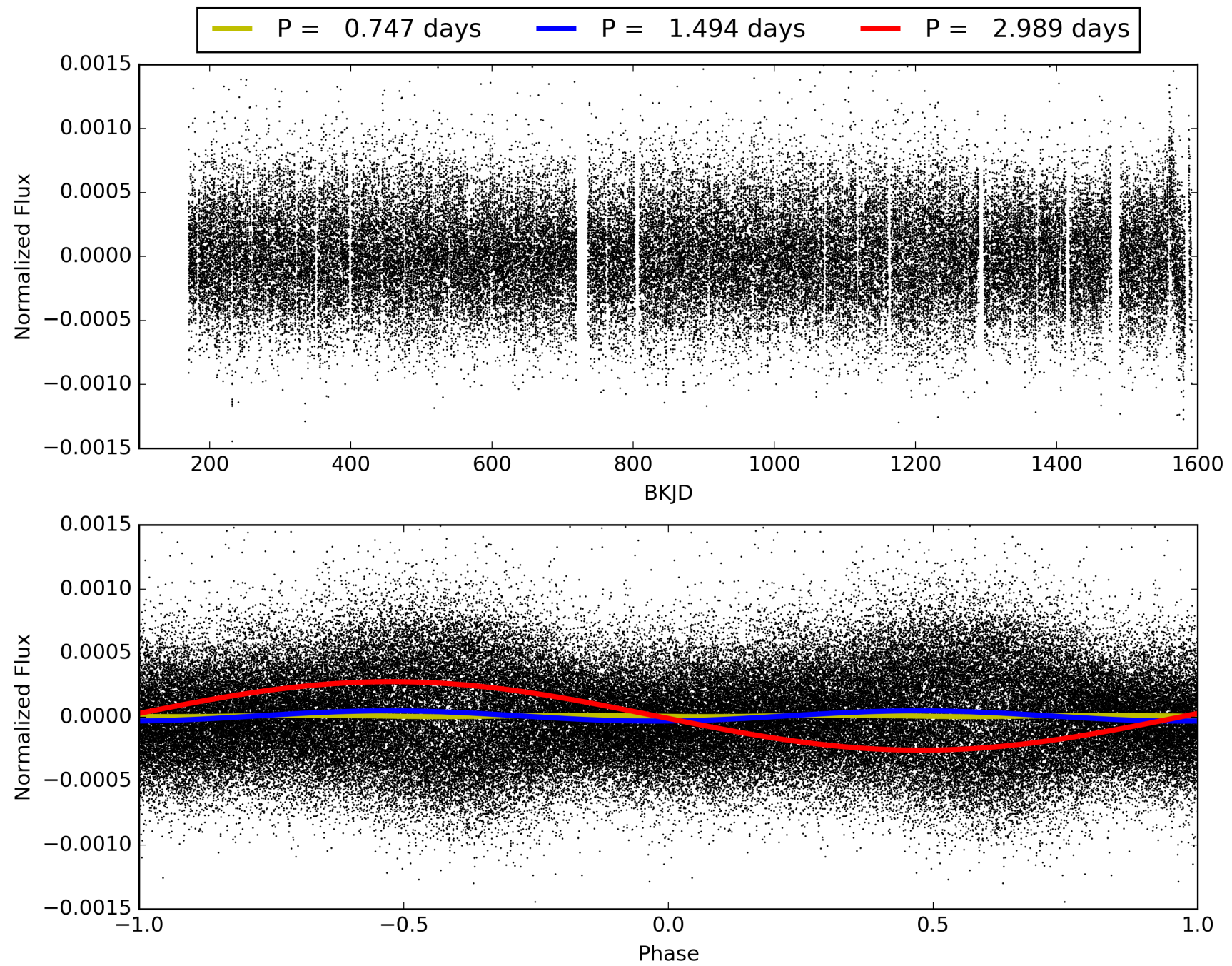
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 99.9% [3.48σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.07e-21
RollingBand-fgt: 1.00 [866/866]
GhostDiagnostic-chr: 1.843
Centroid-sig: 55.2%
Centroid-so: 0.906 arcsec [0.74σ]
OotOffset-rm: 0.463 arcsec [1.30σ]
KicOffset-rm: 0.213 arcsec [0.50σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.50 [8/16]
DiffImageOverlap-fno: 0.94 [15/16]

TCE 012306284-02, PDC Light Curves

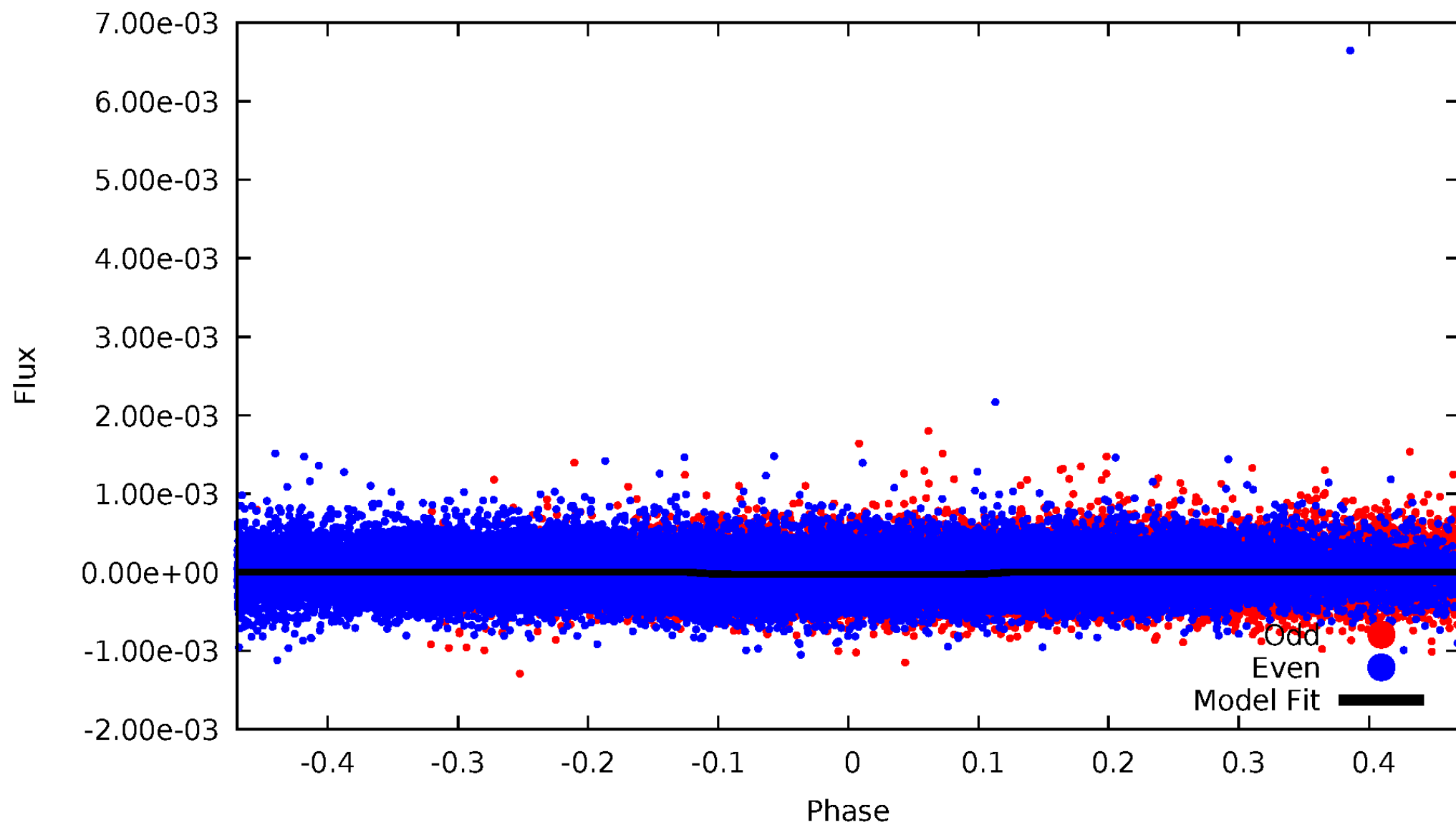


TCE 012306284-02



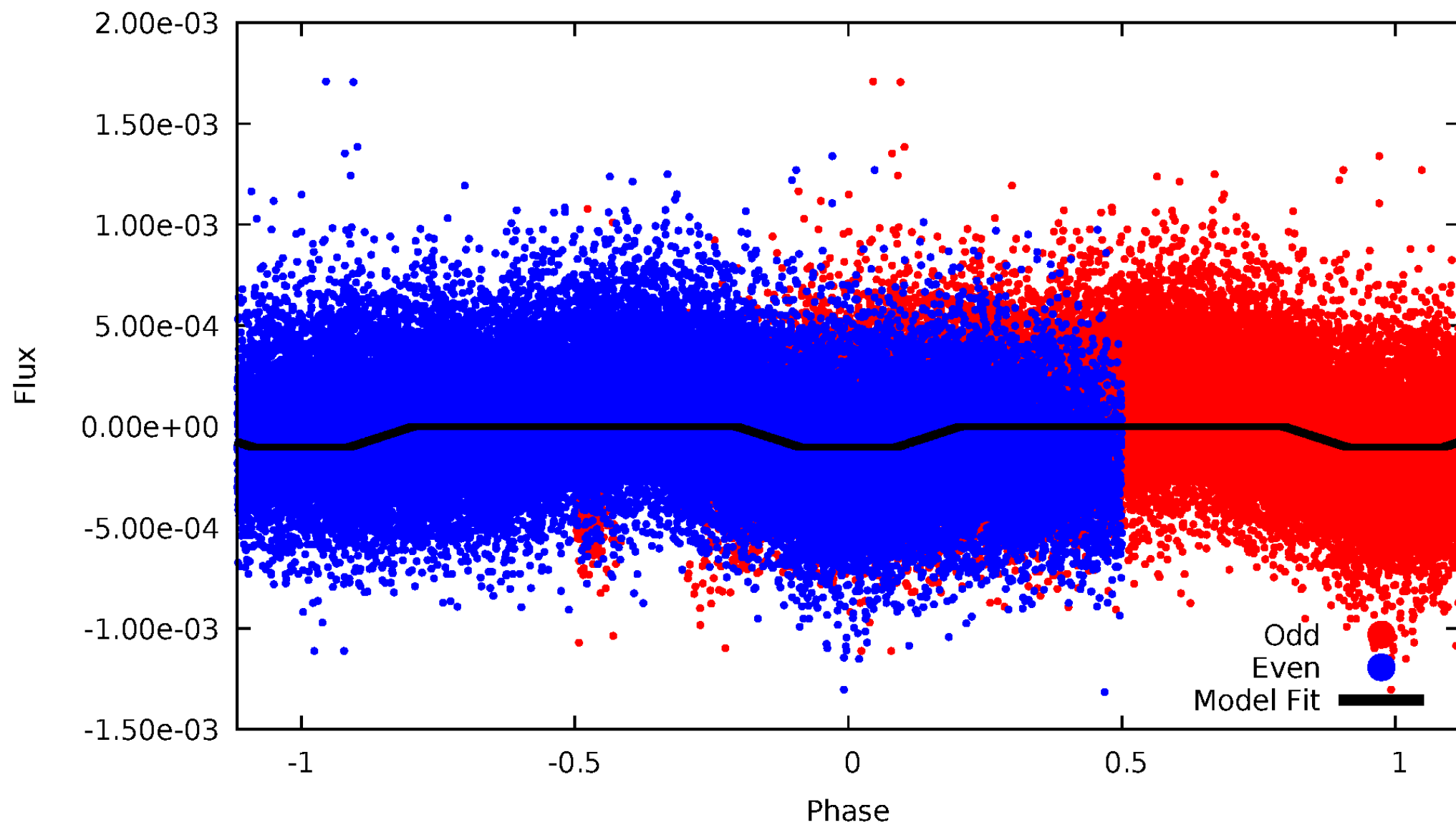
DV Odd/Even

TCE 012306284-02



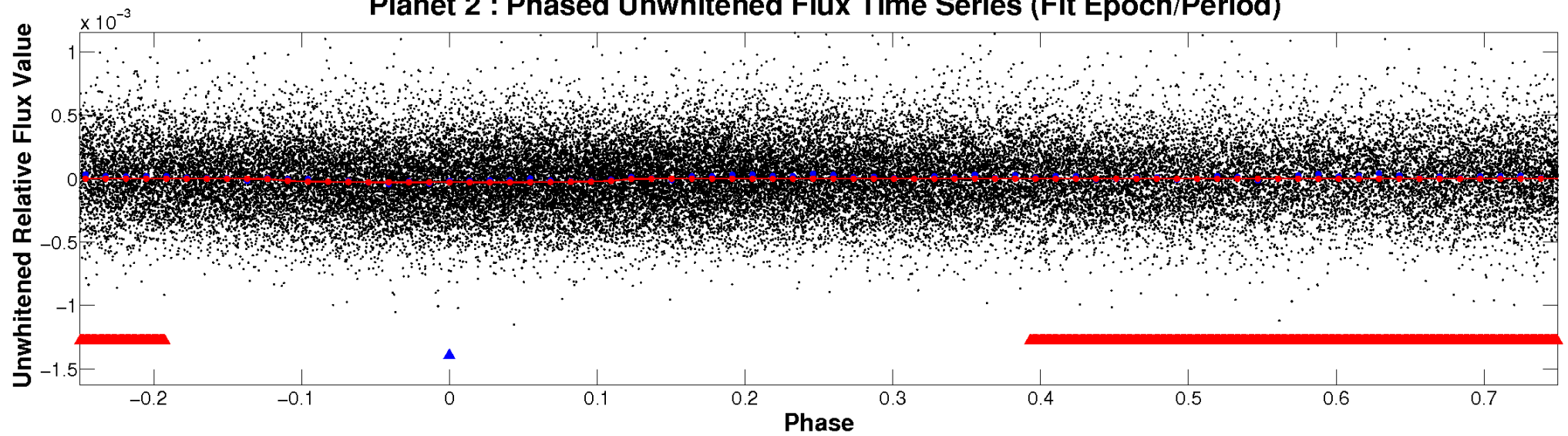
ALT Odd/Even

TCE 012306284-02

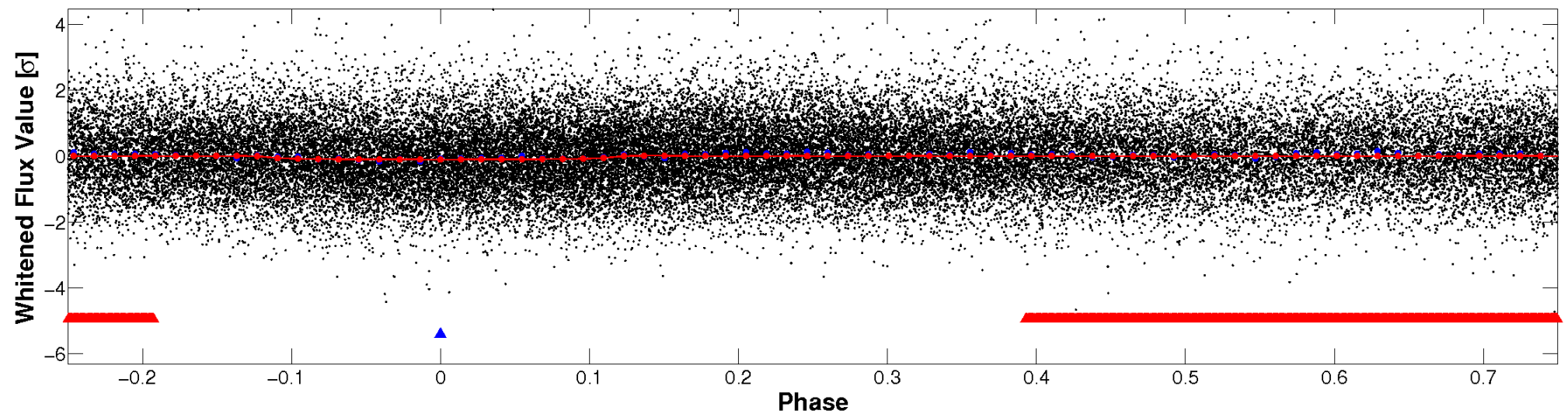


Non-Whitened Vs. Whitened Light Curve

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

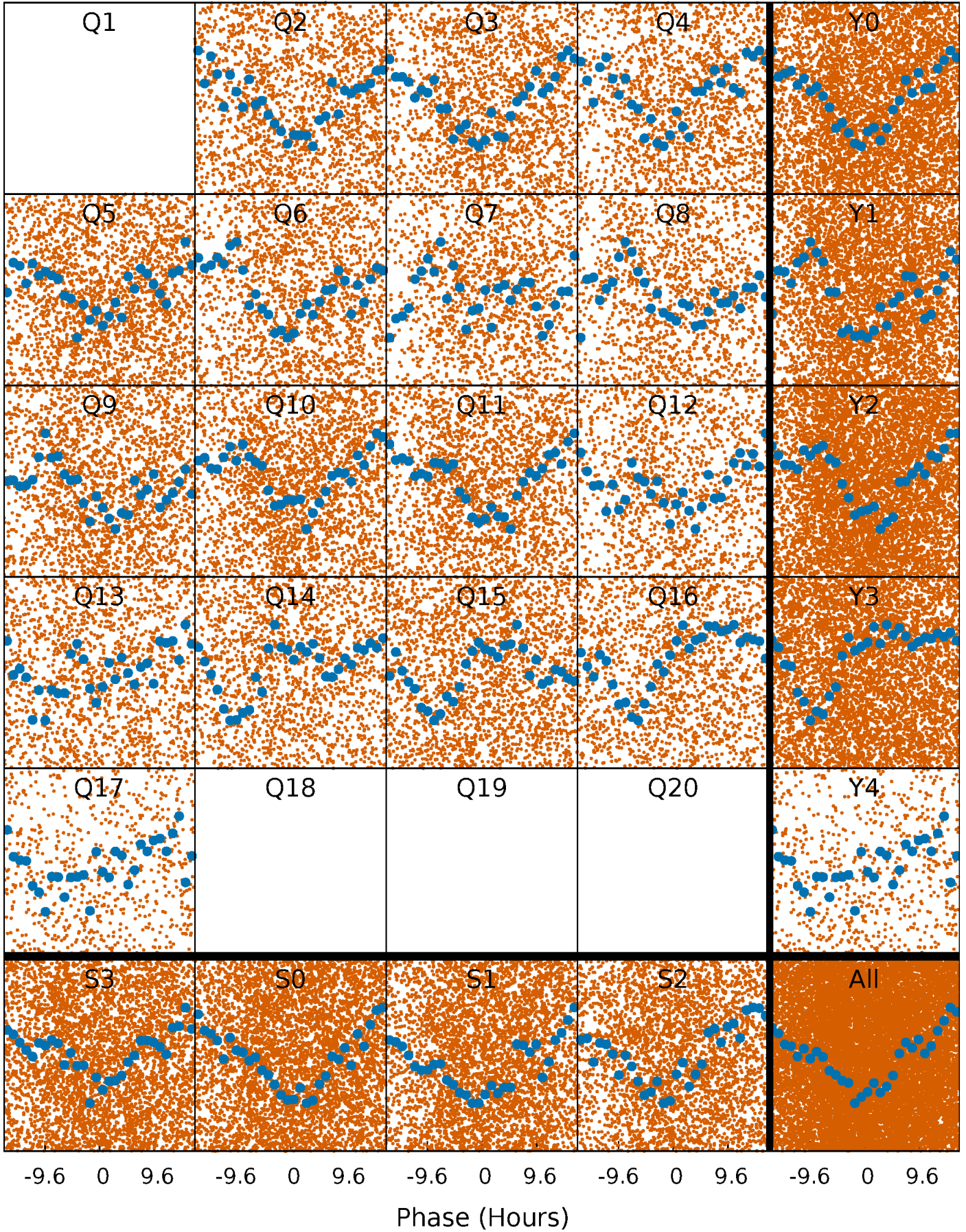


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



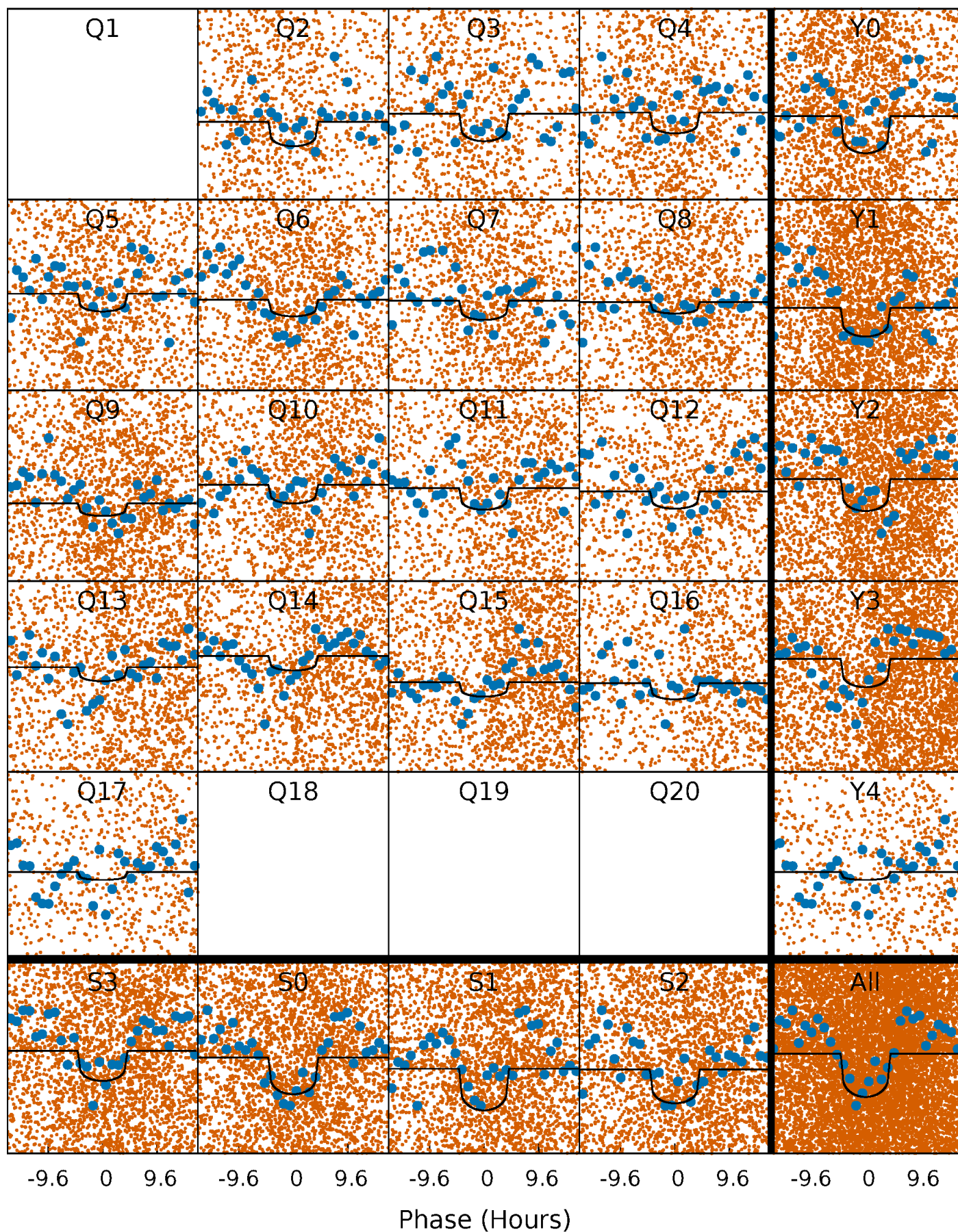
PDC Quarter-Phased Transit Curves

TCE 012306284-02 P= 1.494347 Days $T_0=131.791733$ (BKJD)



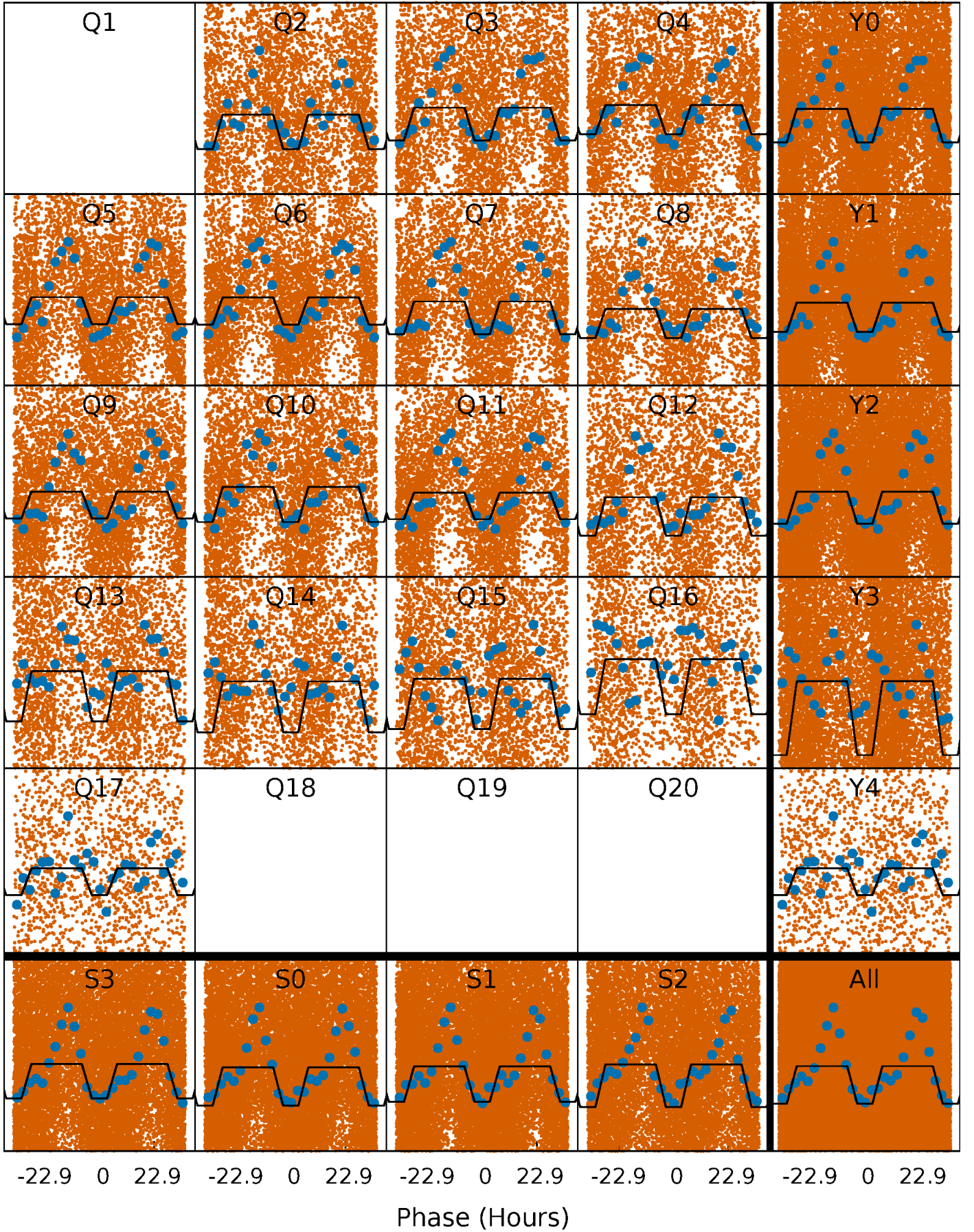
DV Quarter-Phased Transit Curves

TCE 012306284-02 P= 1.494347 Days $T_0=131.791733$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

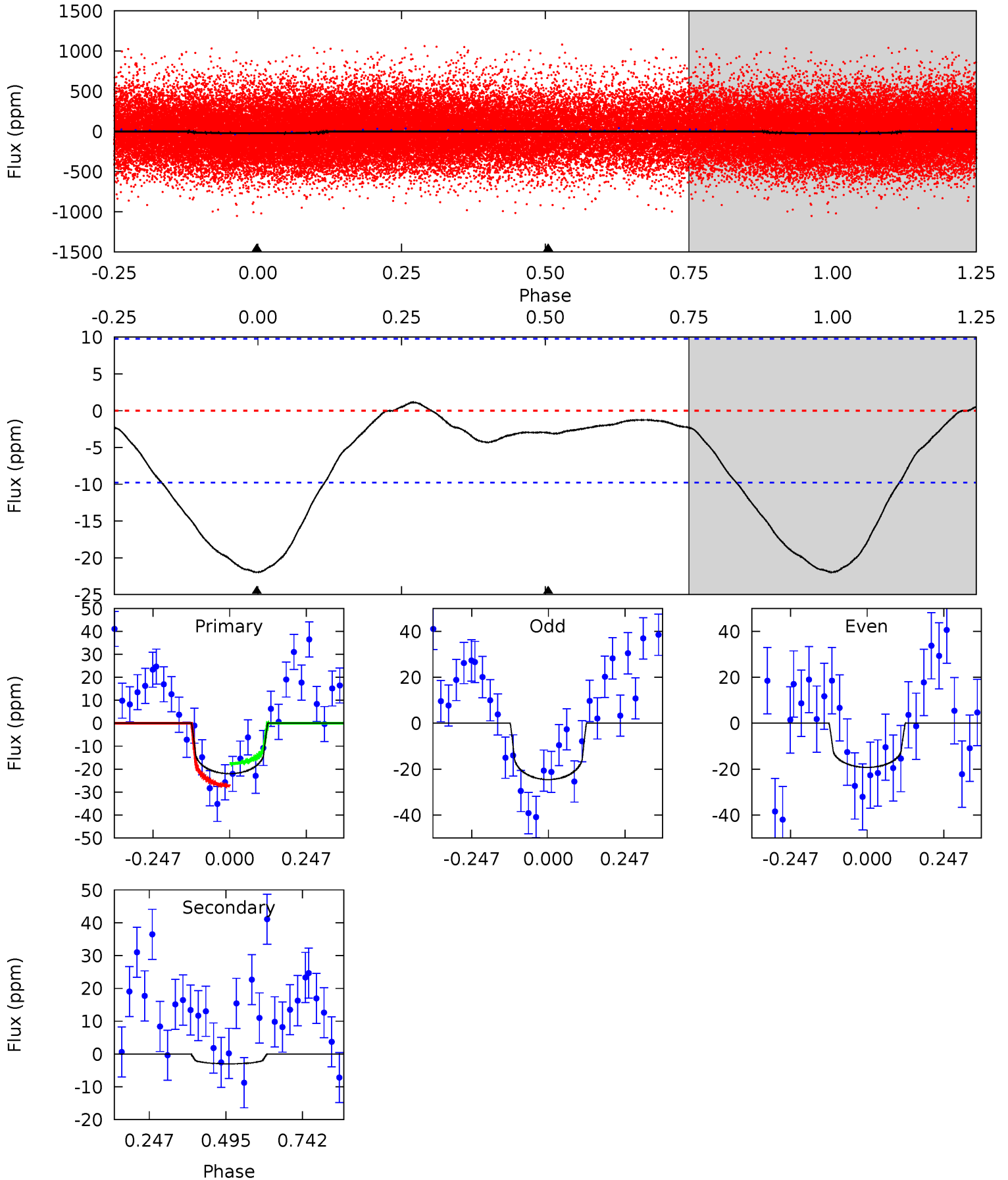
TCE 012306284-02 $P = 1.494322$ Days $T_0 = 131.752428$ (BKJD)



DV Model-Shift Uniqueness Test

012306284-02, P = 1.494347 Days, E = 131.791733 Days

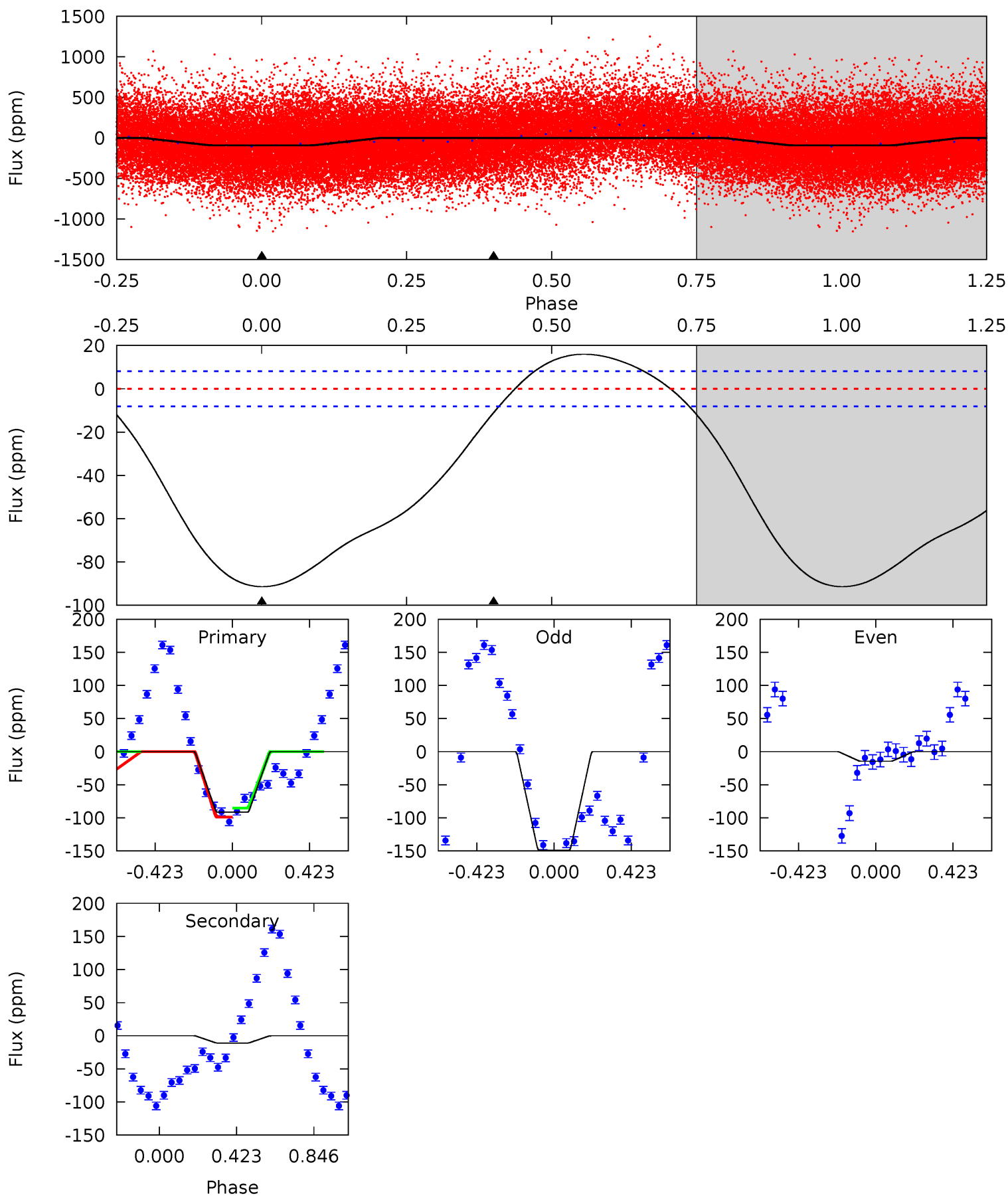
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.83	1.34	0	0	4.37	1.16	0.69	9.83	9.83	1.34	1.34	1.19	0.82	0.05	2.17



Alt Model-Shift Uniqueness Test

012306284-02, P = 1.494322 Days, E = 131.752428 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
47.7	5.74	0	0	4.25	0.80	4.76	47.7	47.7	5.74	5.74	36.3	0.89	0.15	3.58



Stellar Parameters For KIC 012306284

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6462^{+180}_{-248}	$4.266^{+0.108}_{-0.201}$	$0.100^{+0.250}_{-0.350}$	$1.377^{+0.449}_{-0.242}$	$1.278^{+0.197}_{-0.197}$	$0.689^{+0.358}_{-0.372}$
	+3%/-4%	+3%/-5%	+250%/-350%	+33%/-18%	+15%/-15%	+52%/-54%
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 012306284-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-3 ± 2	$0.93^{+0.68}_{-0.57}$	2833^{+227}_{-170}	3563^{+1916}_{-6188}	$1.226^{+7.198}_{-1.030}$
Alt.	-11 ± 2	$1.59^{+0.73}_{-0.77}$	2838^{+217}_{-177}	3842^{+1253}_{-586}	$1.853^{+4.929}_{-1.011}$

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 $A_{obs} \gg 1.0$

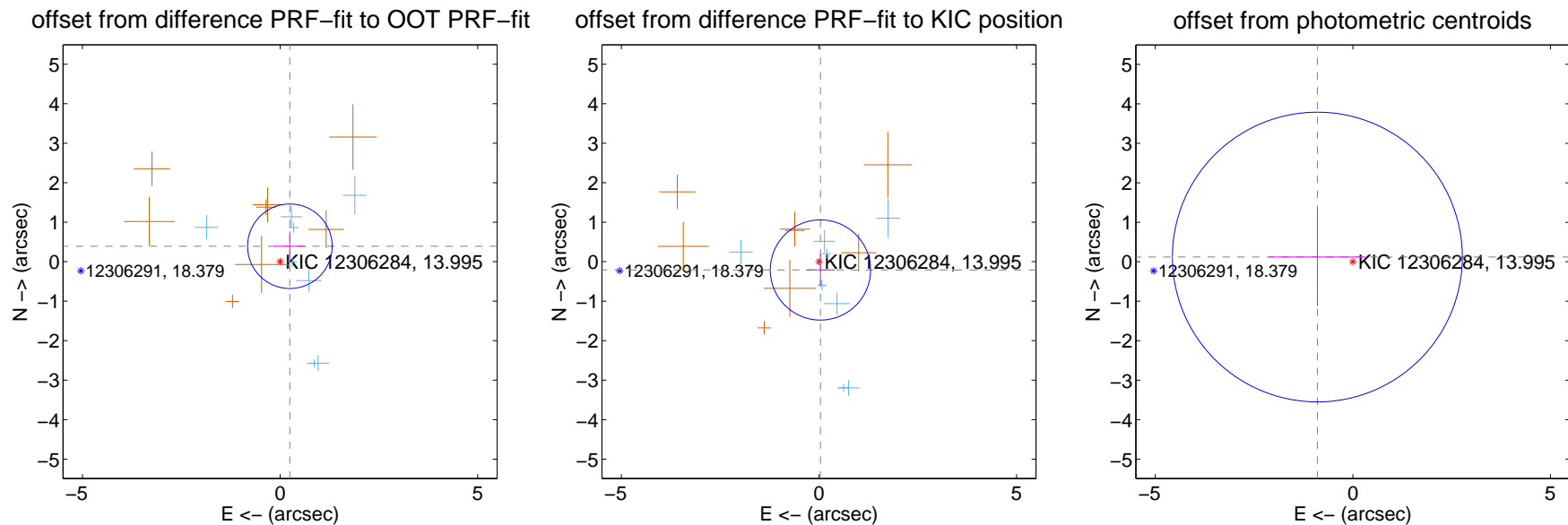
DV Centroid Data

Supplemental centroid analysis for 012306284-02. Kepler magnitude: 13.99. Transit SNR 10.00

There are 8 quarters with good PRF difference image offsets

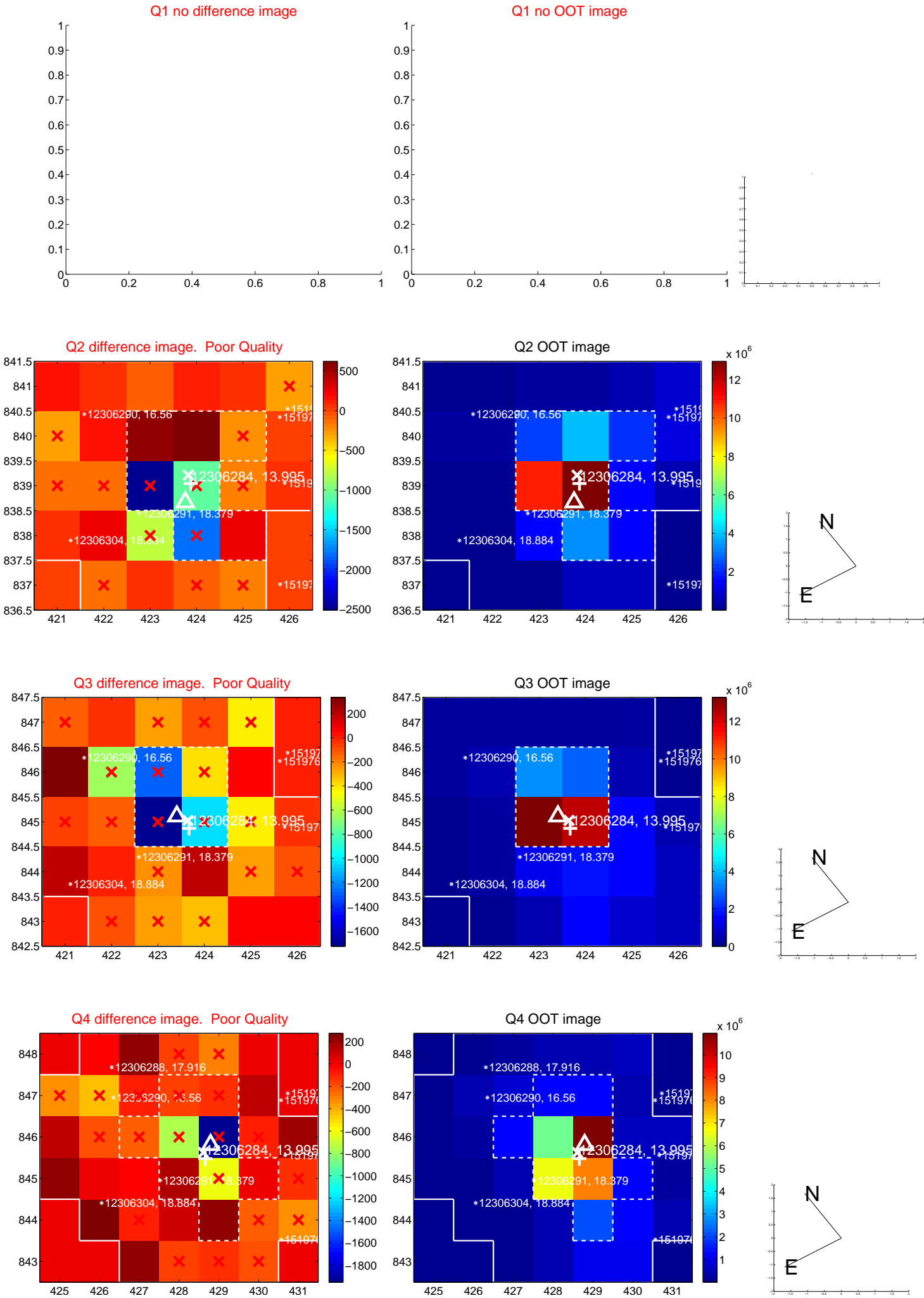
The direct PRF centroid is offset from the target star catalog position by about 0.66 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.463 ± 0.357	1.30	-0.247 ± 0.395	0.391 ± 0.375
PRF-fit source offset from KIC position	0.213 ± 0.423	0.50	-0.037 ± 0.364	-0.210 ± 0.417
photometric centroid source offset	0.91 ± 1.22	0.74	0.90 ± 1.22	0.12 ± 1.24

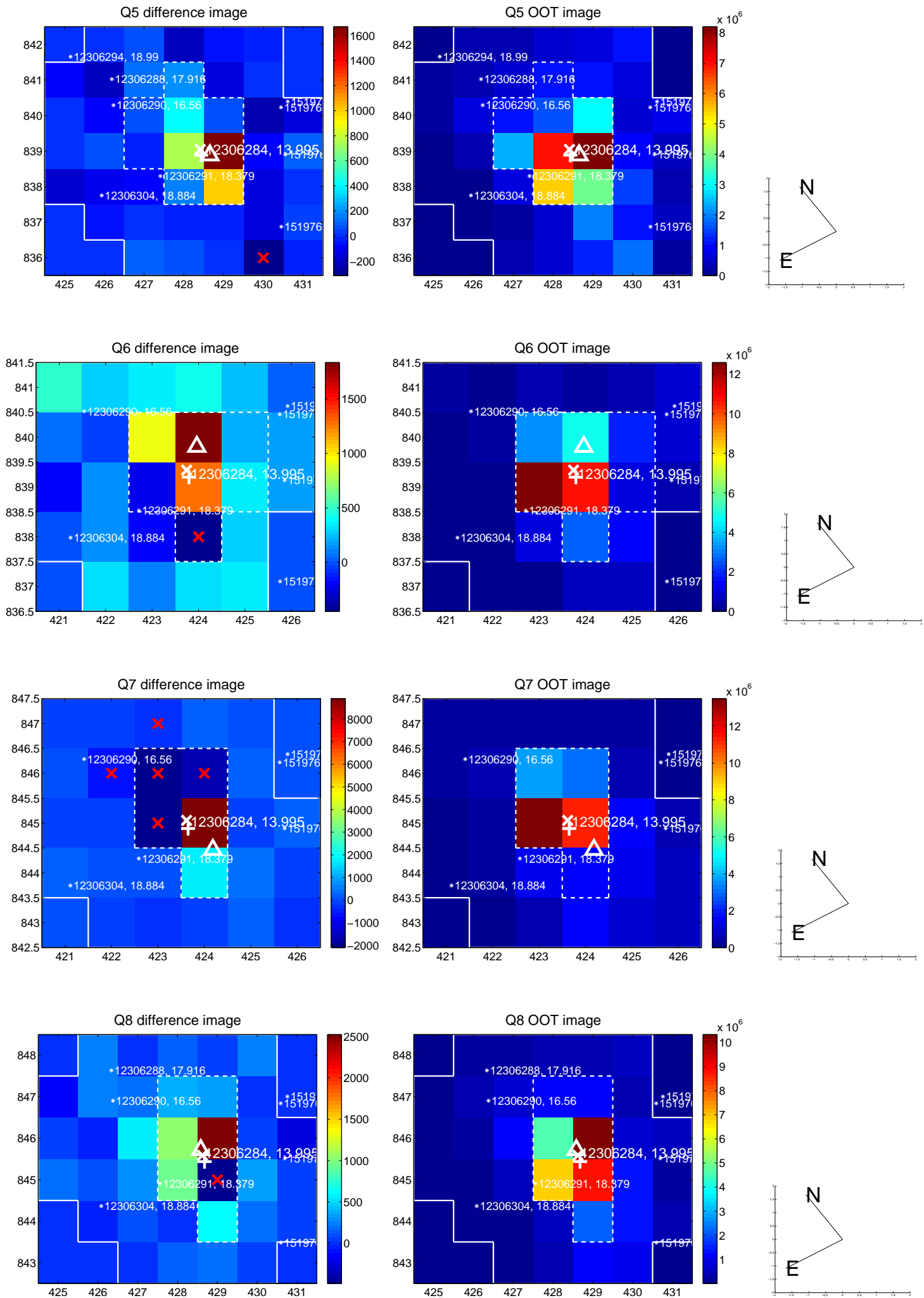


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

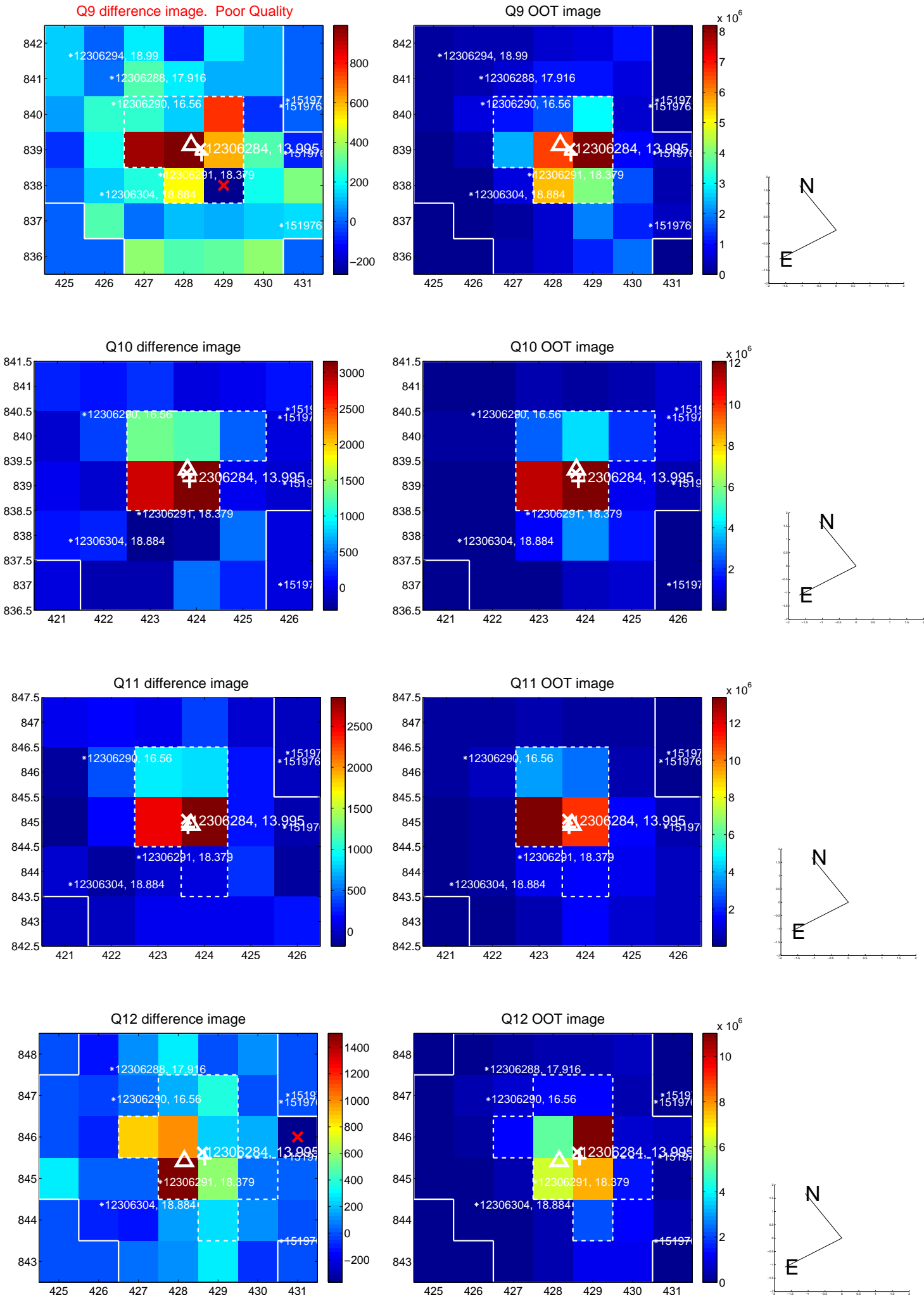
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



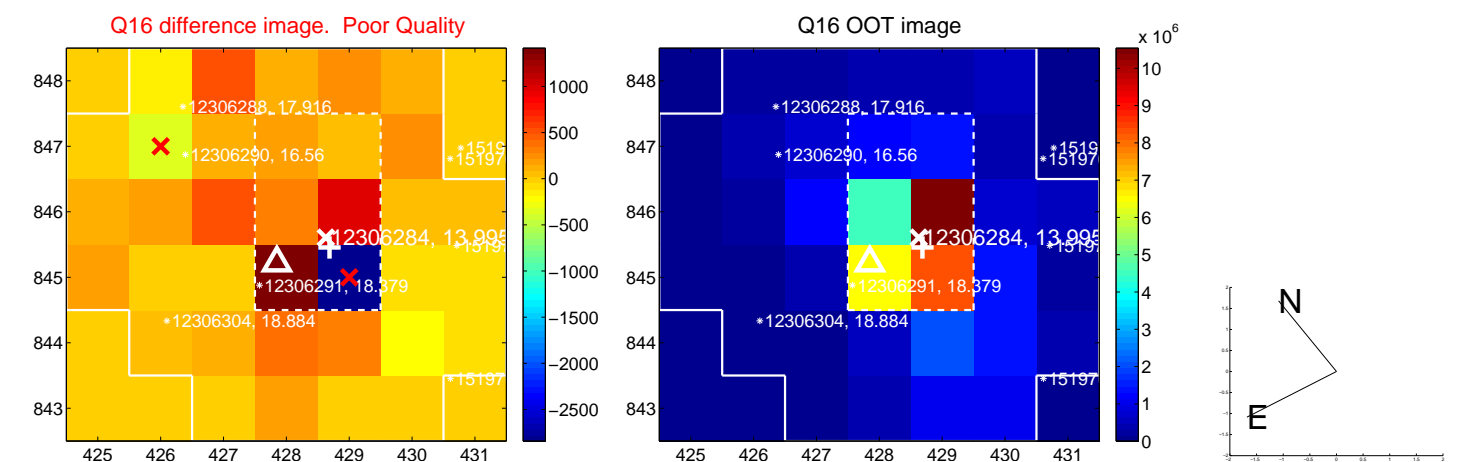
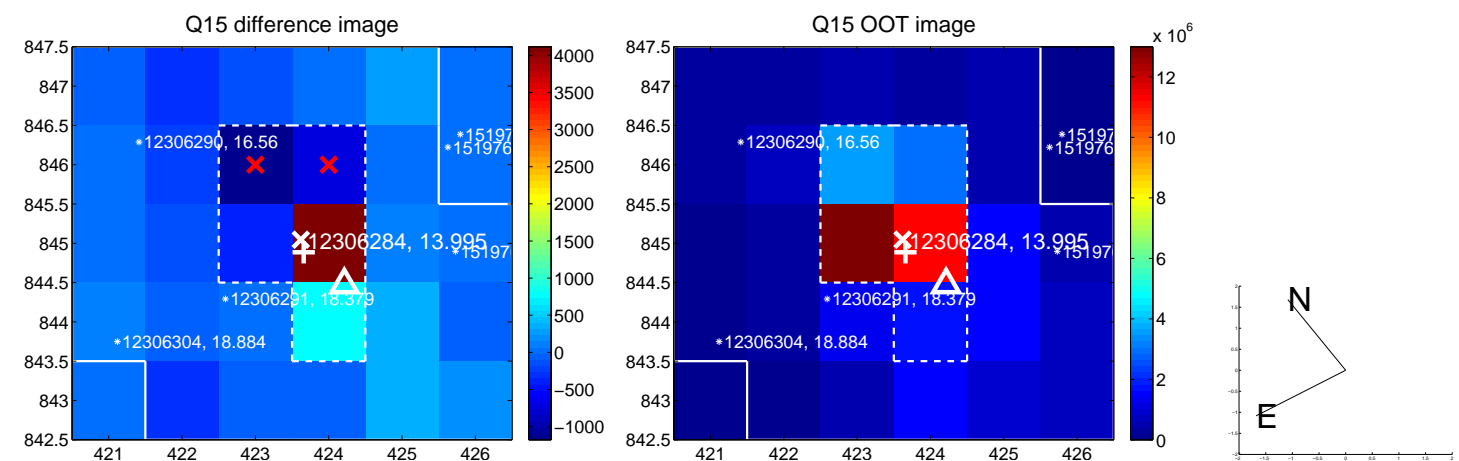
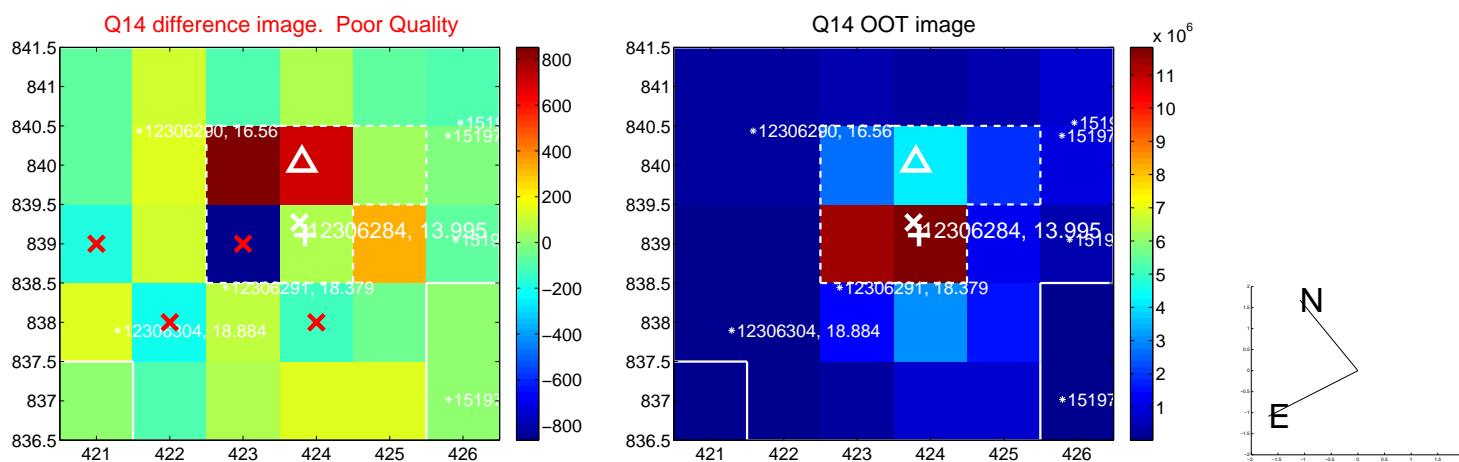
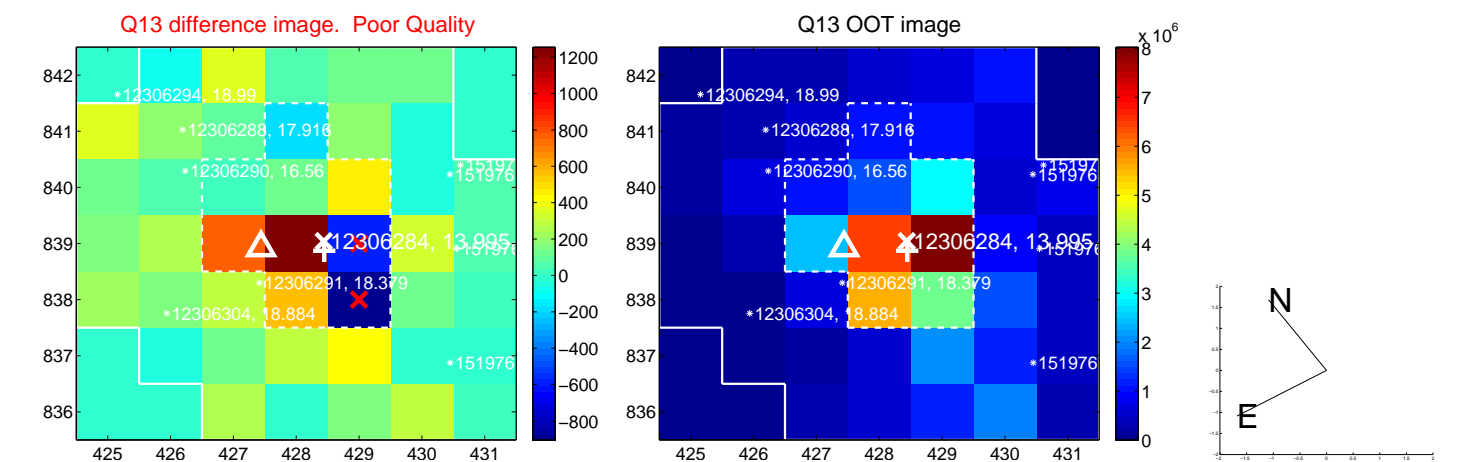
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



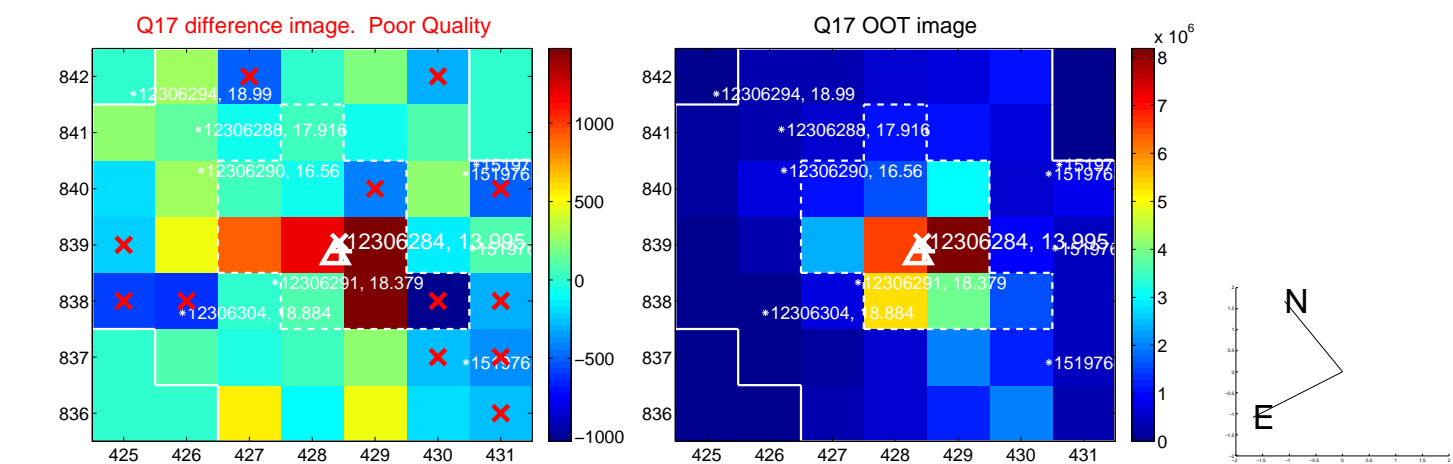
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



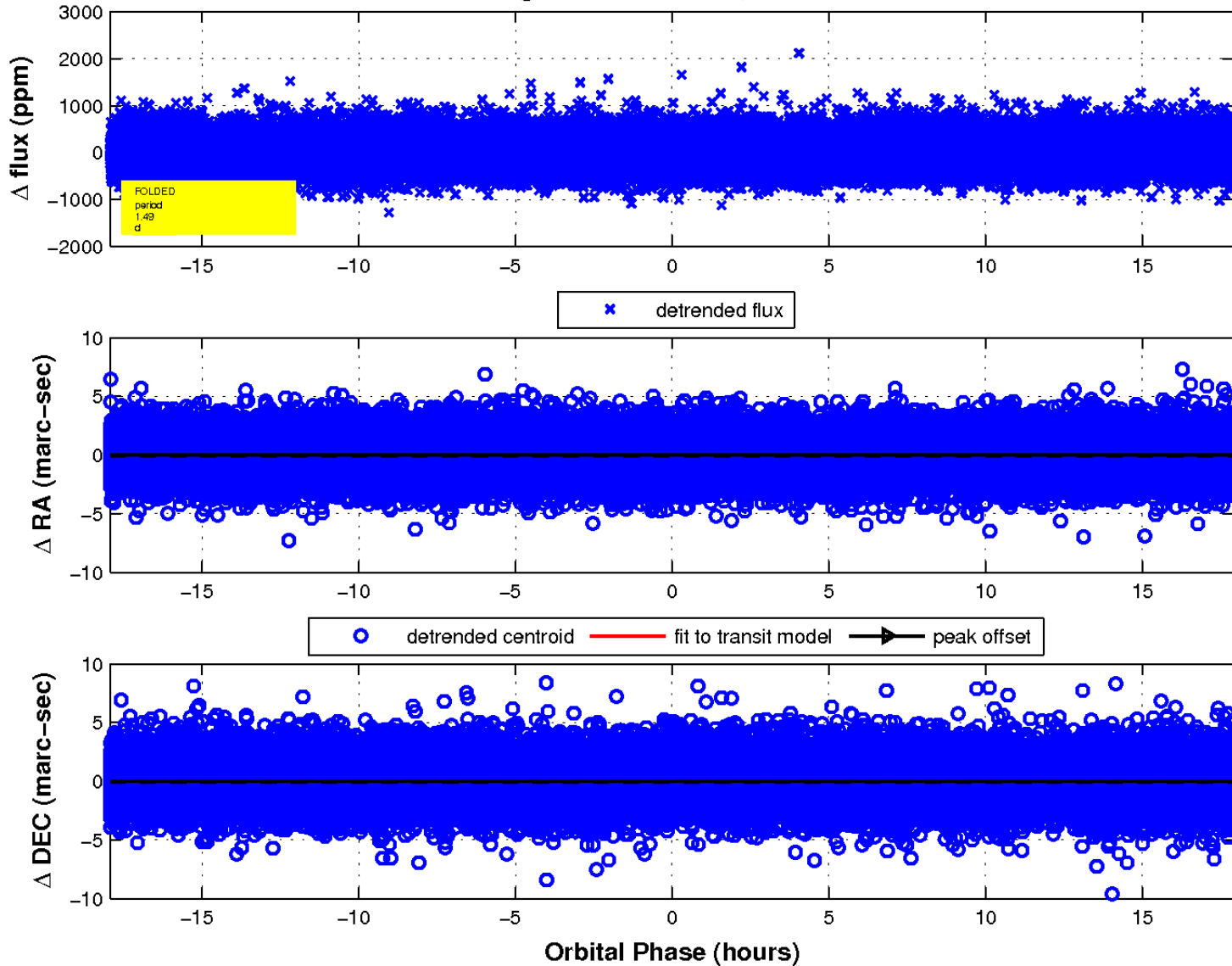
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

