

KIC 010460984

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})
010460984-01	OBS	0474.01	10.945752	132.936873	531.2	3.260	44.6	47.5	1.10	5888	2.99	142.53
010460984-02	OBS	0474.02	28.986830	134.782609	454.7	3.612	24.7	26.8	1.10	5888	2.63	38.90
010460984-03	OBS	0474.03	94.886484	214.827111	698.2	6.248	19.5	21.3	1.10	5888	4.00	8.00
010460984-04	OBS	0474.04	5.035004	132.663851	155.4	1.736	14.3	16.5	1.10	5888	1.62	401.39

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010460984-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010460984-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010460984-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010460984-04	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.

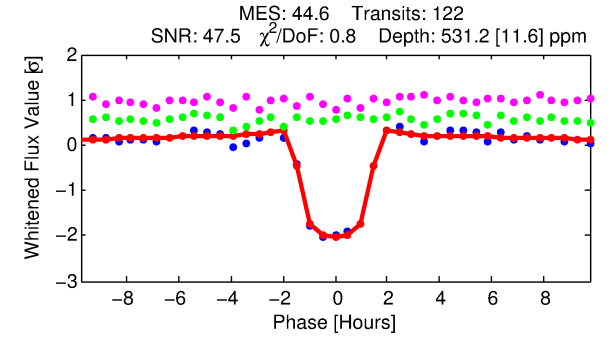
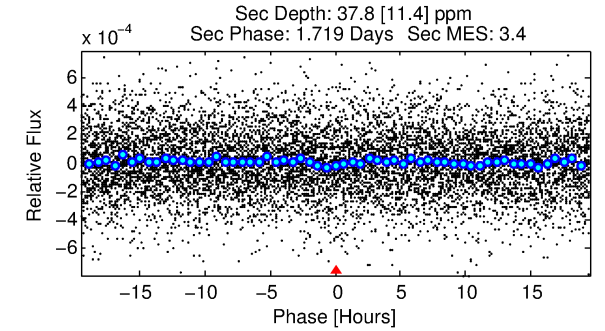
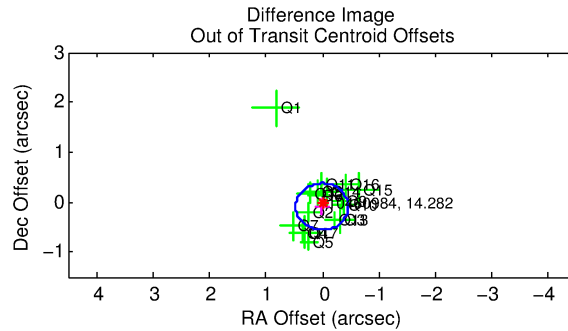
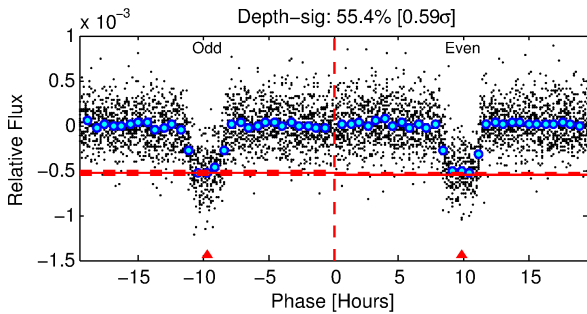
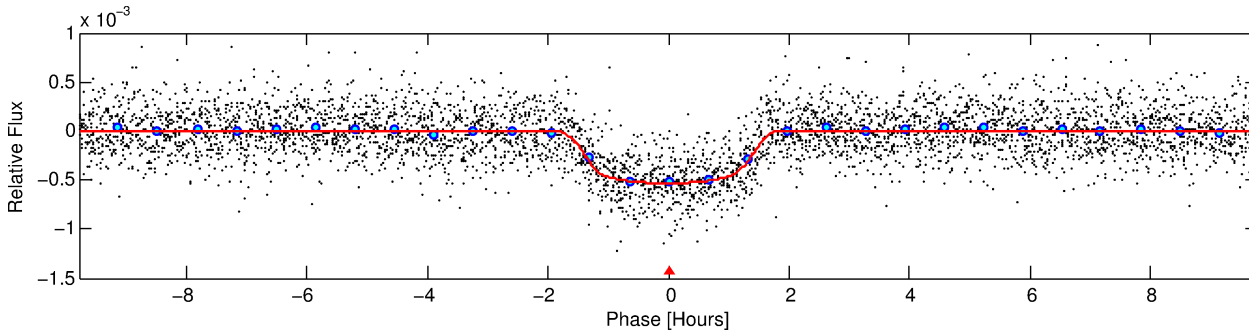
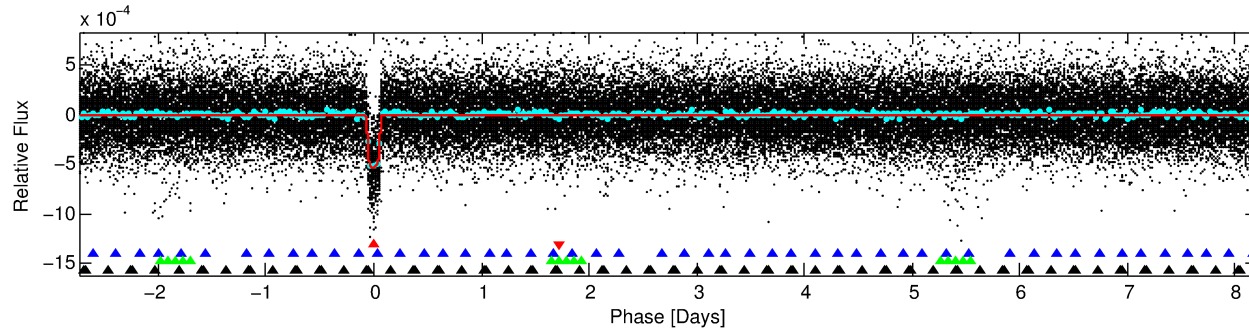
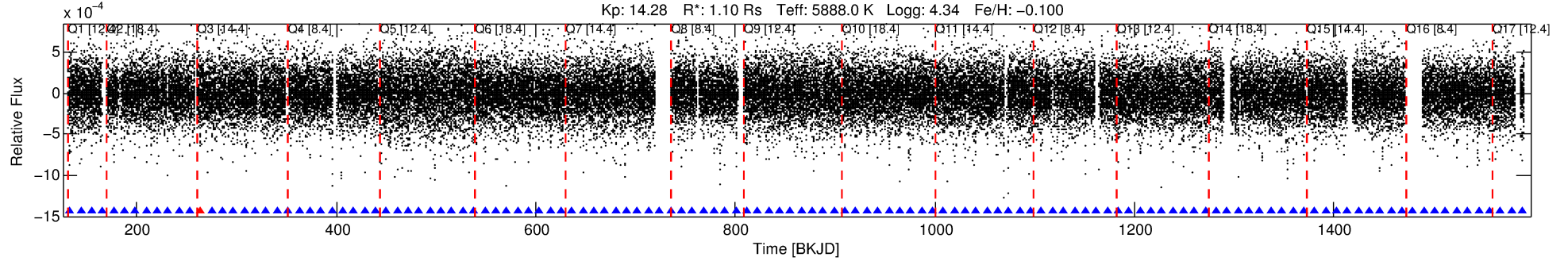
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010460984-01

No Significant Match Found

DV One-Page Summary

KIC: 10460984 Candidate: 1 of 4 Period: 10.946 d
KOI: K00474.01 Name: Kepler-164c Corr: 0.953



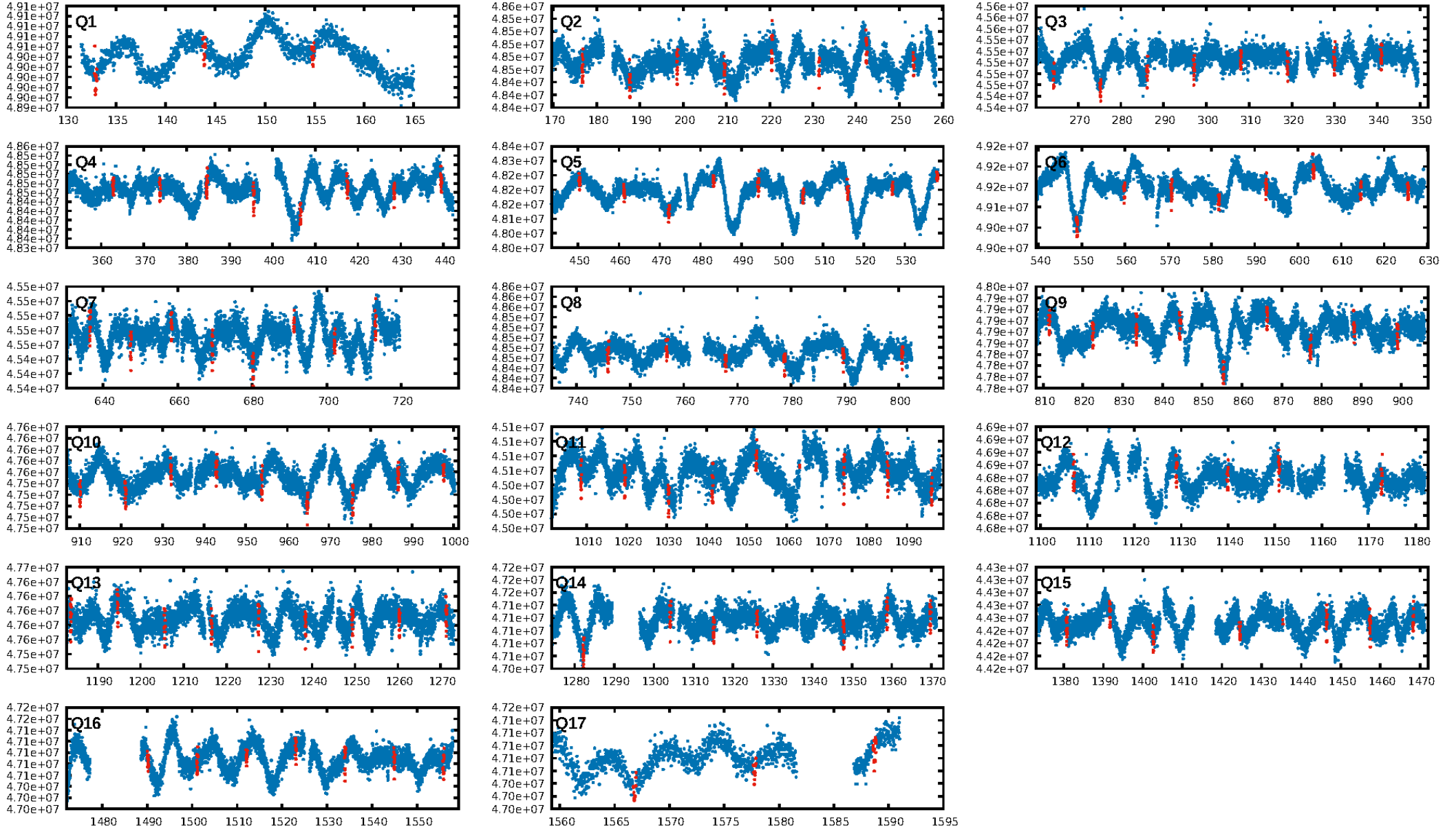
DV Fit Results:

Period = 10.94575 [0.00002] d
Epoch = 132.9369 [0.0013] BKJD
Rp/R* = 0.0250 [0.0013]
a/R* = 12.62 [3.07]
b = 0.90 [0.05]
Seff = 142.53 [31.65]
Teff = 881 [49] K
Rp = 2.99 [0.51] Re
a = 0.0954 [0.0134] AU
Ag = 21.10 [8.03] [2.50 σ]
Teffp = 2919 [240] K [8.31 σ]

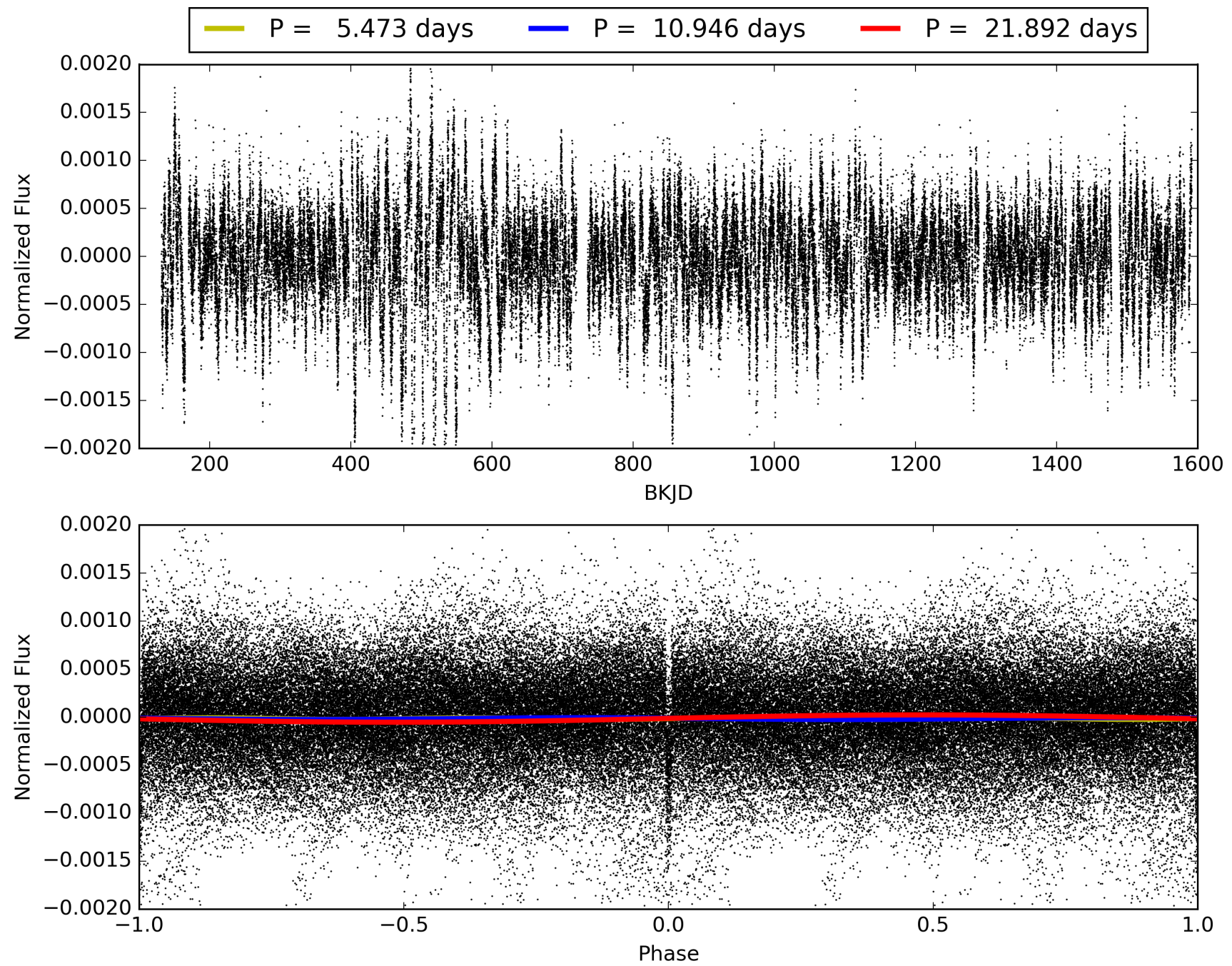
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [38.41 σ]
LongPeriod-sig: 100.0% [88.98 σ]
ModelChiSquare2-sig: 100.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 0.99 [115/116]
GhostDiagnostic-chr: 3.878
Centroid-sig: 0.8%
Centroid-so: 0.719 arcsec [2.88 σ]
OotOffset-rm: 0.091 arcsec [0.58 σ]
KicOffset-rm: 0.281 arcsec [1.71 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 010460984-01, PDC Light Curves

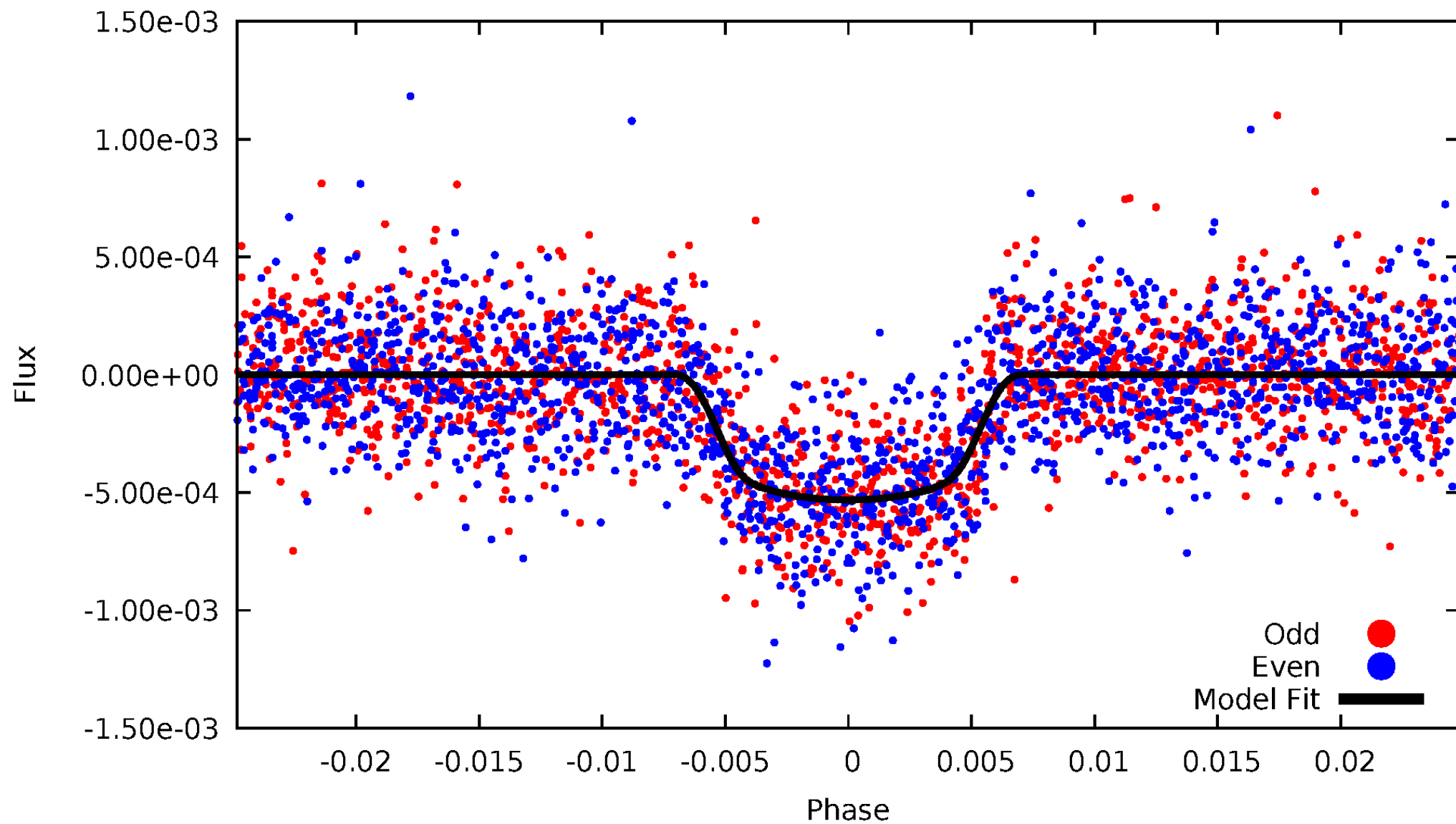


TCE 010460984-01



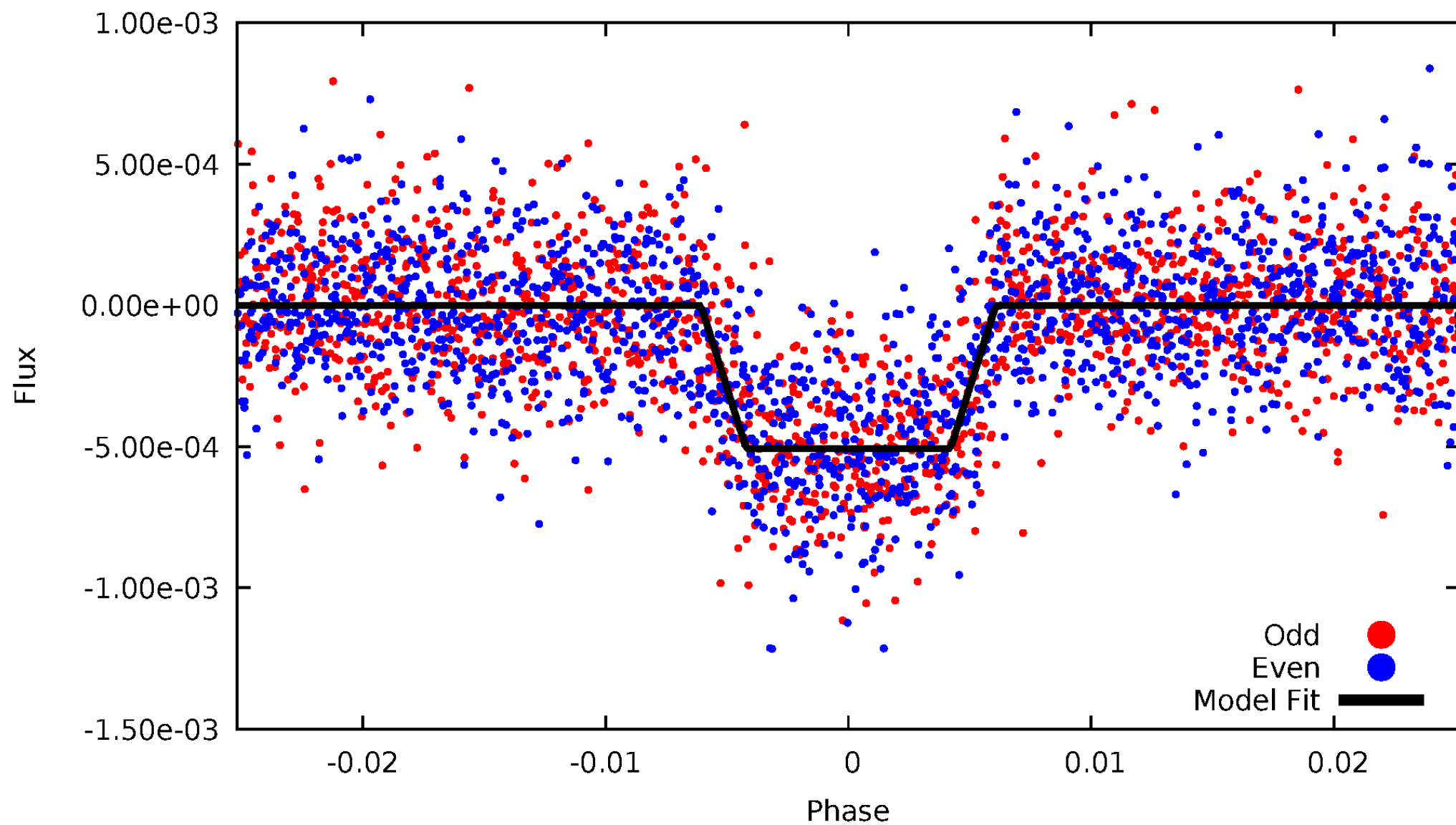
DV Odd/Even

TCE 010460984-01



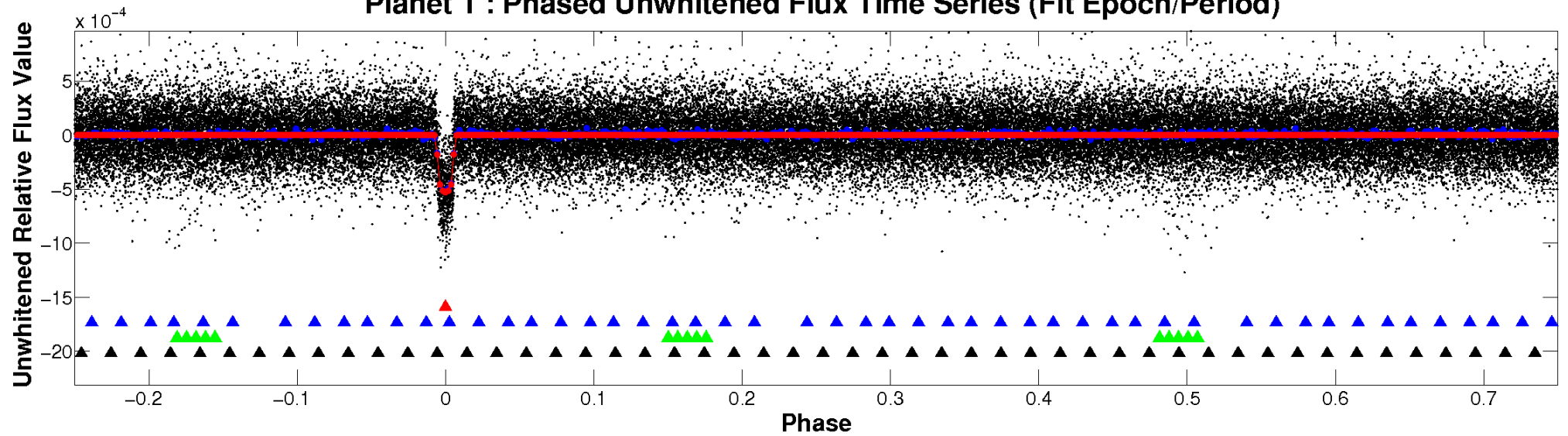
ALT Odd/Even

TCE 010460984-01

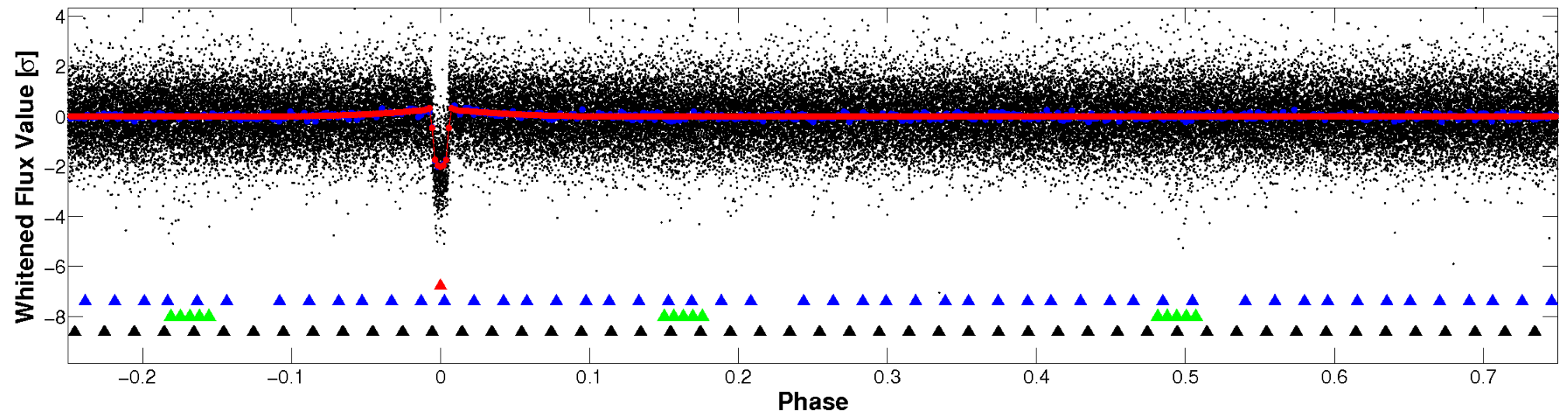


Non-Whitened Vs. Whitened Light Curve

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

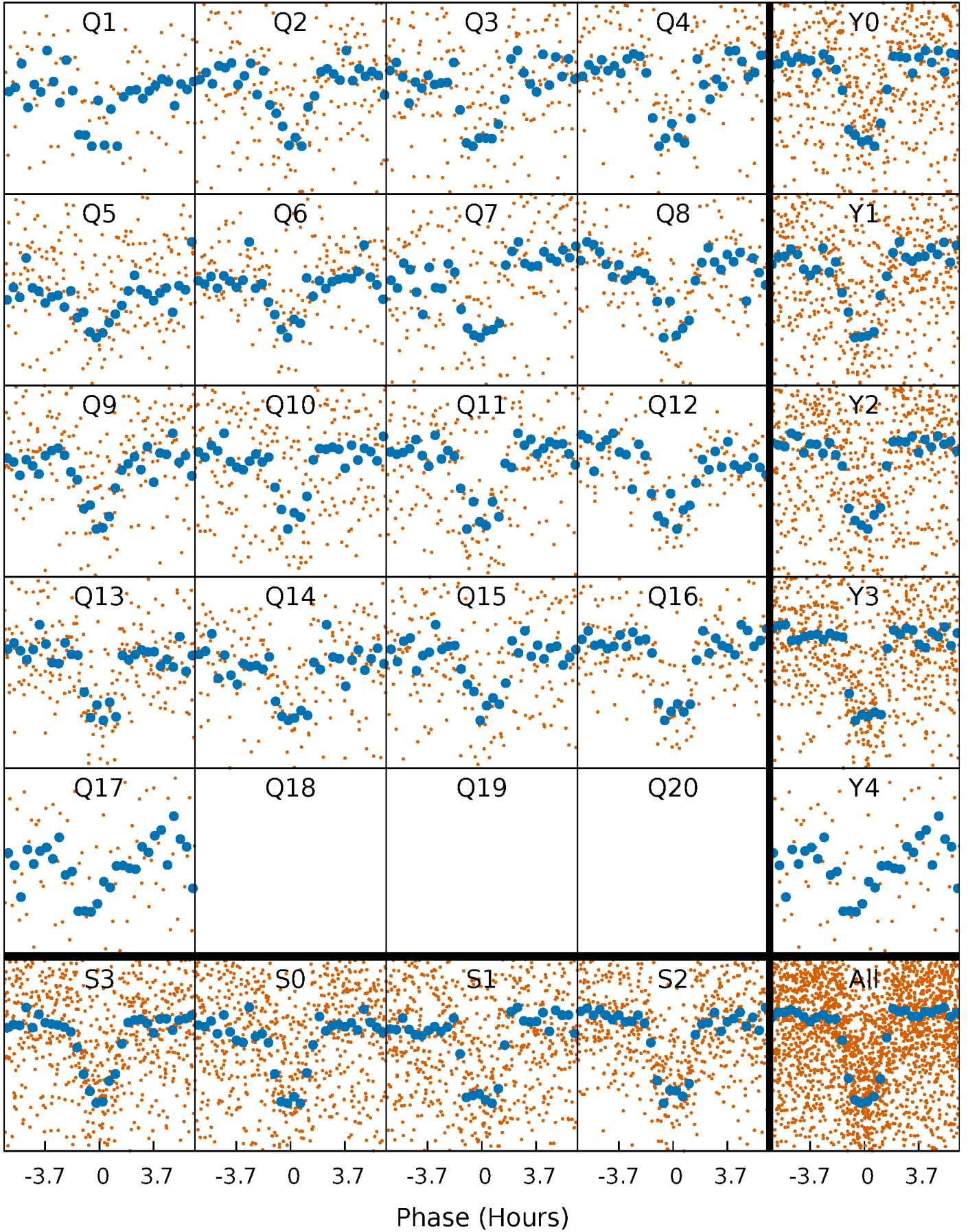


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



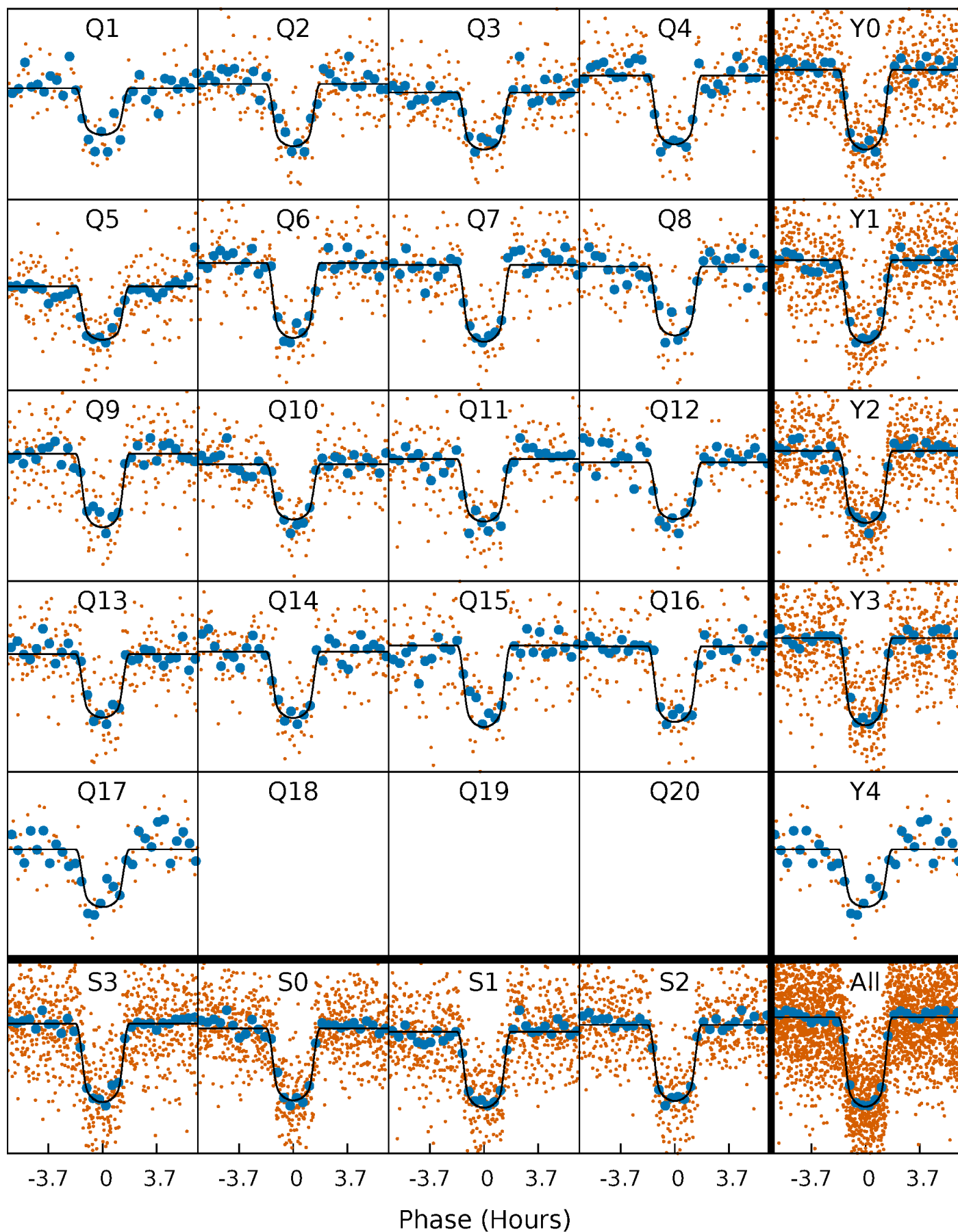
PDC Quarter-Phased Transit Curves

TCE 010460984-01 P= 10.945752 Days $T_0=132.936873$ (BKJD)



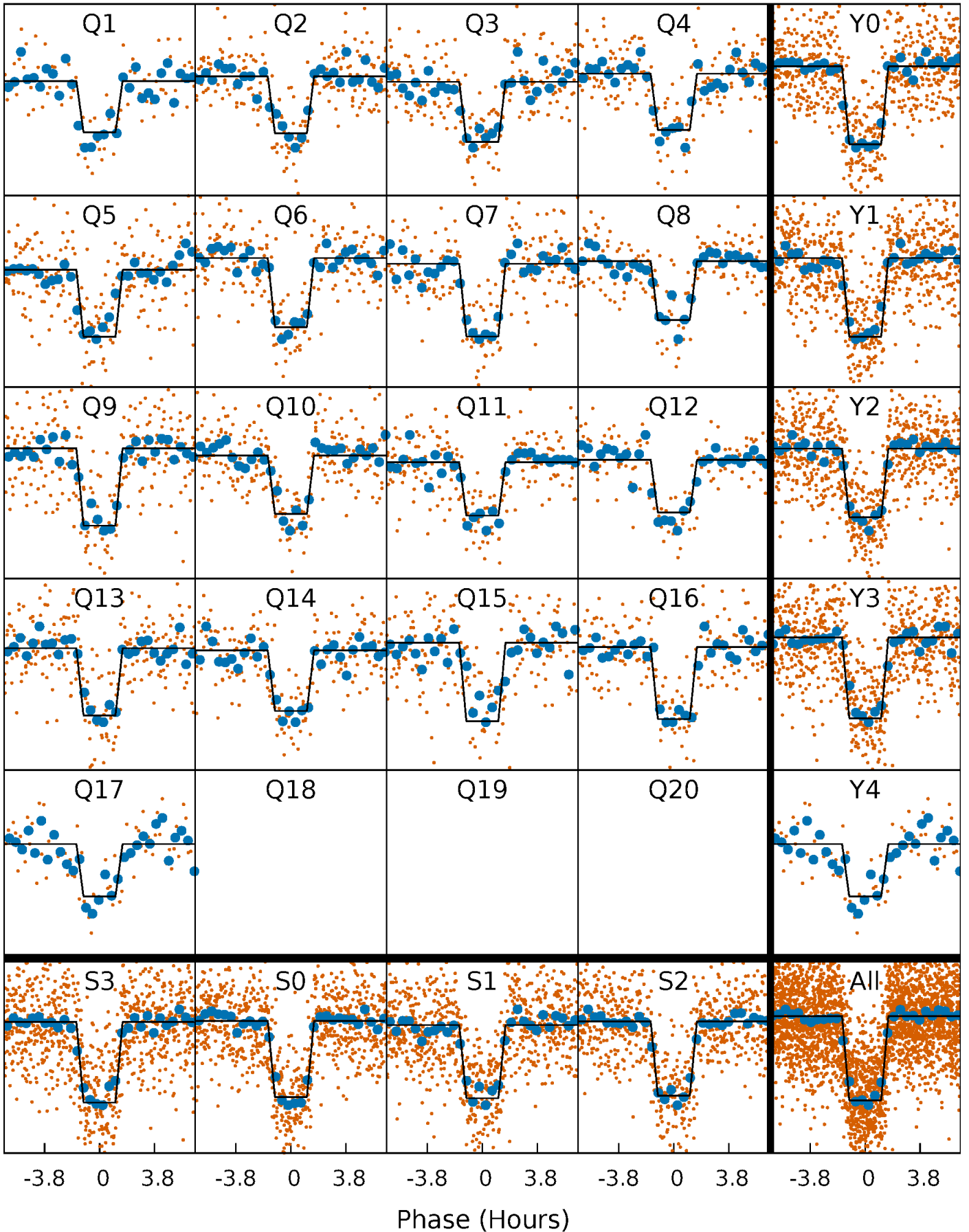
DV Quarter-Phased Transit Curves

TCE 010460984-01 P= 10.945752 Days $T_0=132.936873$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

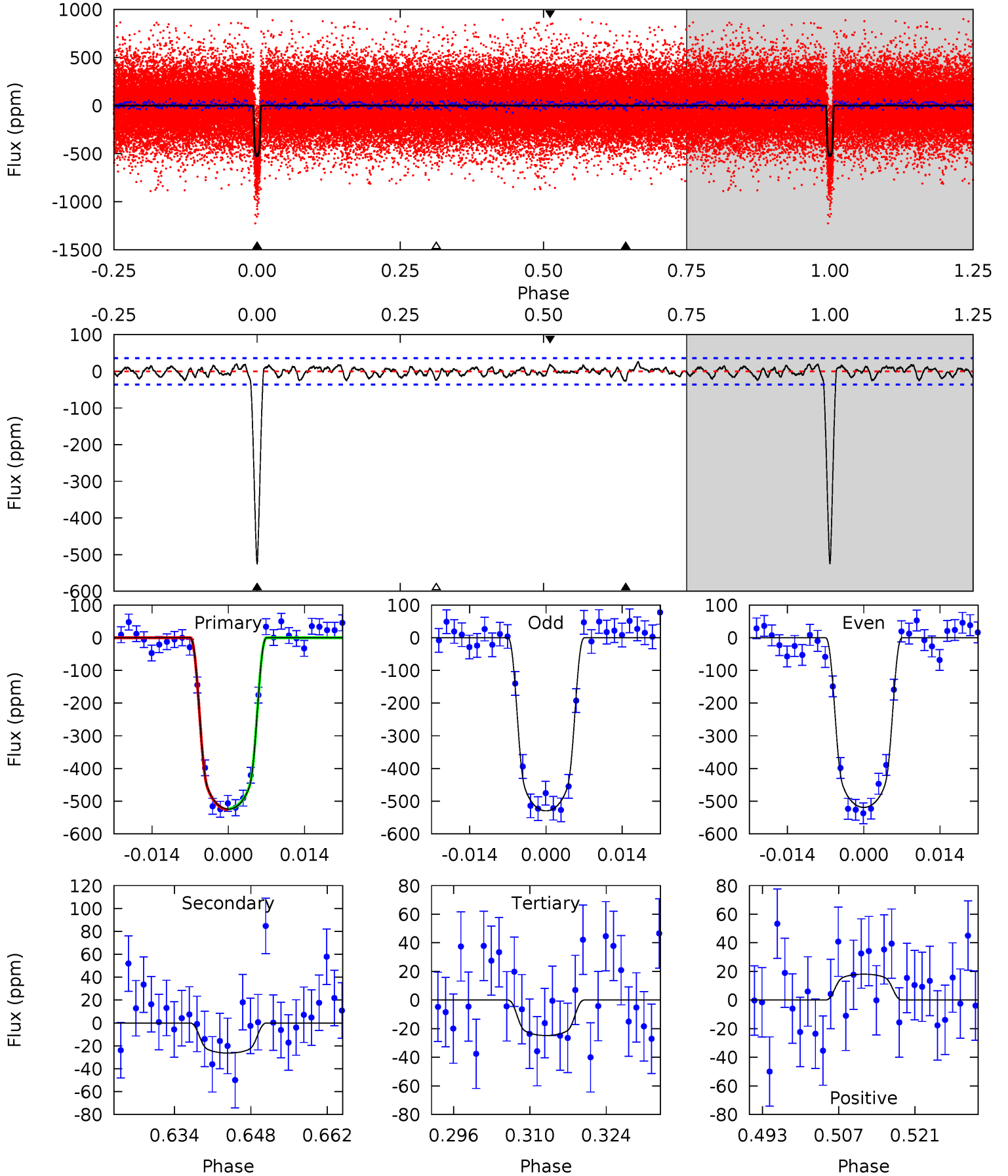
TCE 010460984-01 P= 10.945661 Days $T_0=132.942842$ (BKJD)



DV Model-Shift Uniqueness Test

010460984-01, $P = 10.945752$ Days, $E = 121.991121$ Days

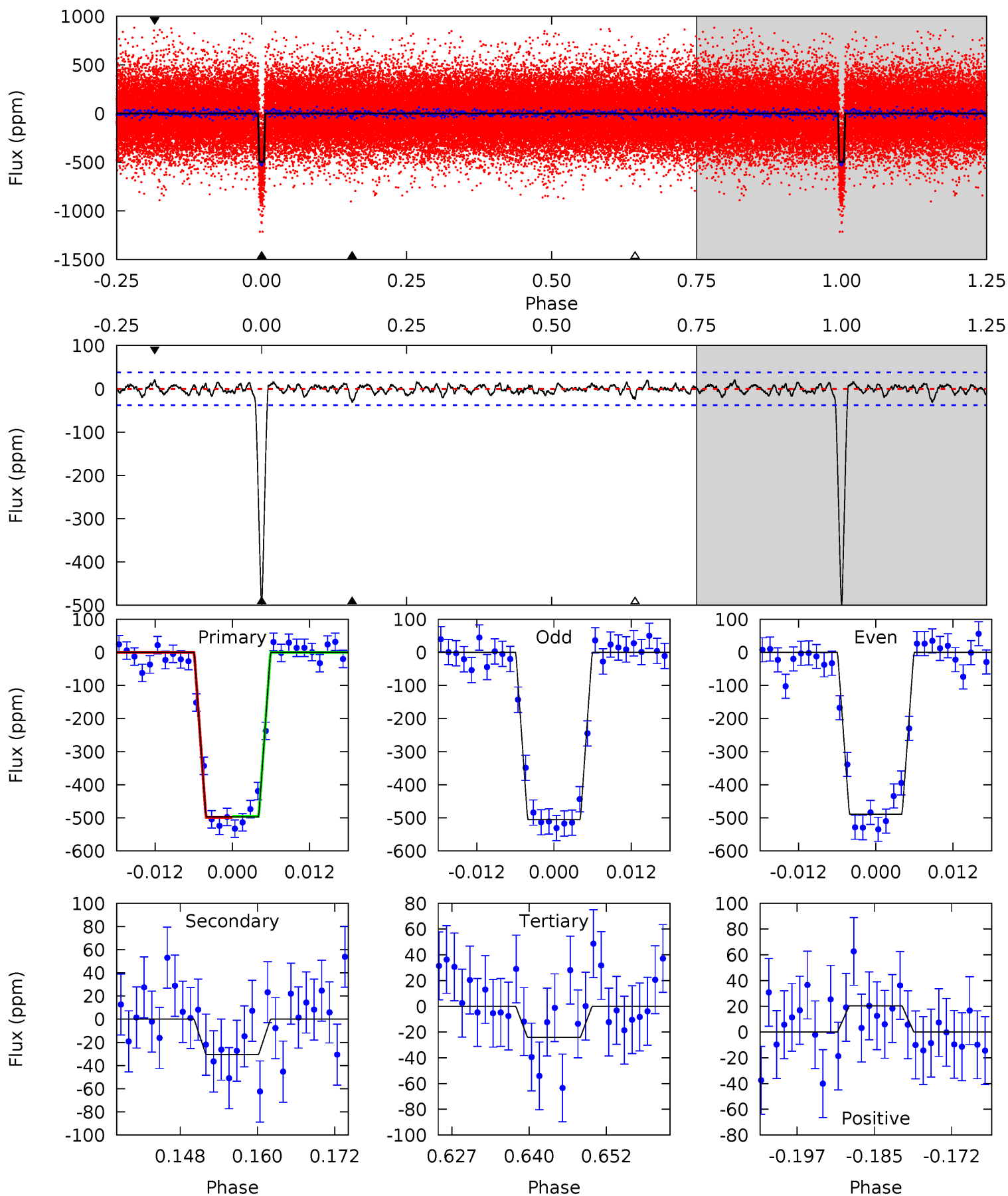
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
72.5	3.64	3.43	2.50	4.96	2.46	1.27	69.1	70.0	0.21	1.14	0.73	1.01	0.05	0.19



Alt Model-Shift Uniqueness Test

010460984-01, $P = 10.945661$ Days, $E = 121.997181$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
65.5	4.01	3.19	2.69	4.99	2.50	0.99	62.4	62.9	0.82	1.32	1.07	0.98	0.04	0.23



Stellar Parameters For KIC 010460984

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5888^{+106}_{-117}	$4.342^{+0.115}_{-0.115}$	$-0.100^{+0.150}_{-0.150}$	$1.097^{+0.179}_{-0.146}$	$0.966^{+0.075}_{-0.068}$	$1.031^{+0.522}_{-0.345}$
	+2%/-2%	+3%/-3%	+150%/-150%	+16%/-13%	+8%/-7%	+51%/-33%
Source	SPE58	SPE58	SPE58	DSEP		

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

Secondary Eclipse Parameters for KIC 010460984-01 / KOI 0474.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-26 ± 7	$2.99^{+0.30}_{-0.28}$	1228^{+56}_{-52}	3233^{+146}_{-177}	15^{+6}_{-5}
Alt.	-30 ± 8	$2.70^{+0.30}_{-0.26}$	1232^{+58}_{-52}	3406^{+158}_{-153}	20^{+8}_{-6}

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

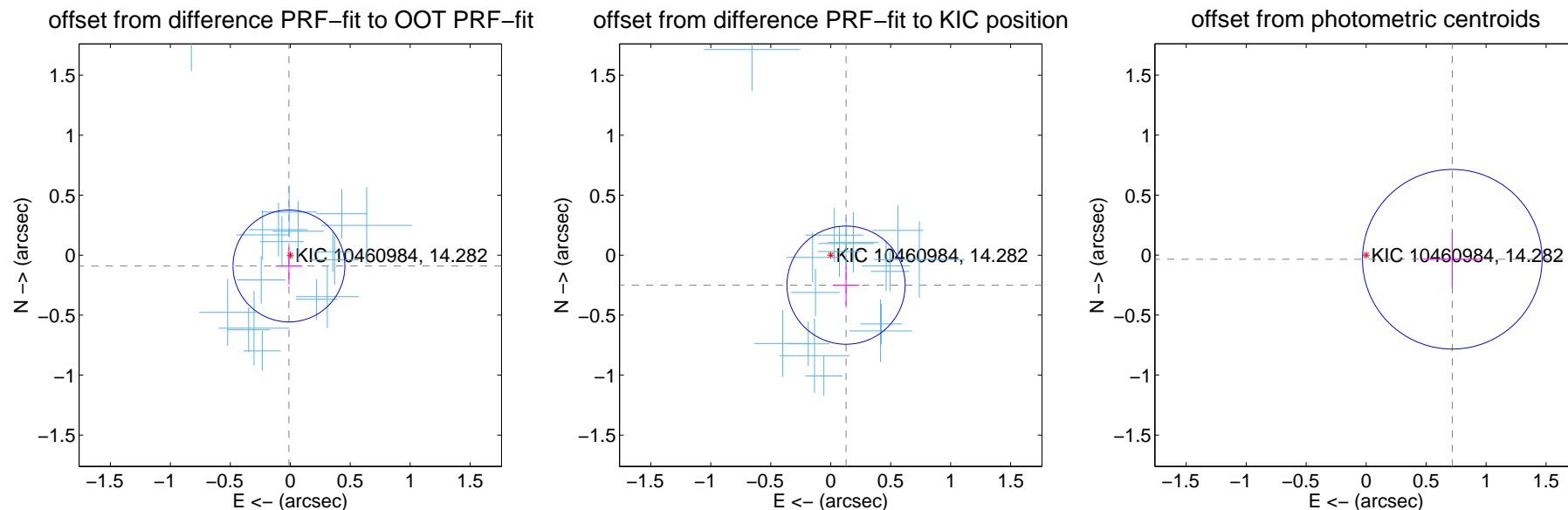
DV Centroid Data

Supplemental centroid analysis for 010460984-01. Kepler magnitude: 14.28. Transit SNR 47.48

There are 17 quarters with good PRF difference image offsets

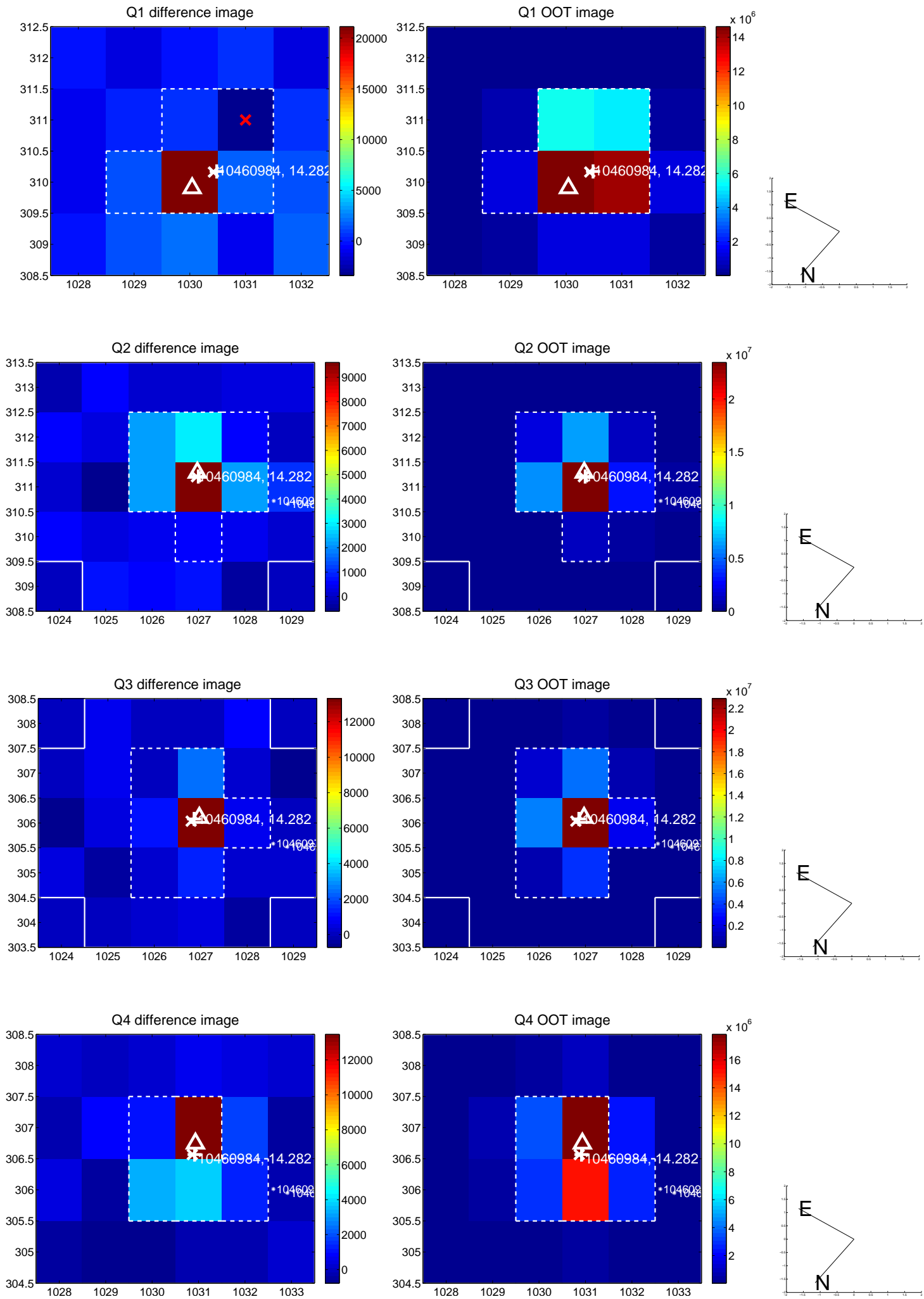
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.091 ± 0.155	0.58	0.011 ± 0.111	-0.090 ± 0.157
PRF-fit source offset from KIC position	0.281 ± 0.164	1.71	-0.128 ± 0.110	-0.250 ± 0.167
photometric centroid source offset	0.72 ± 0.25	2.88	-0.72 ± 0.25	-0.03 ± 0.24

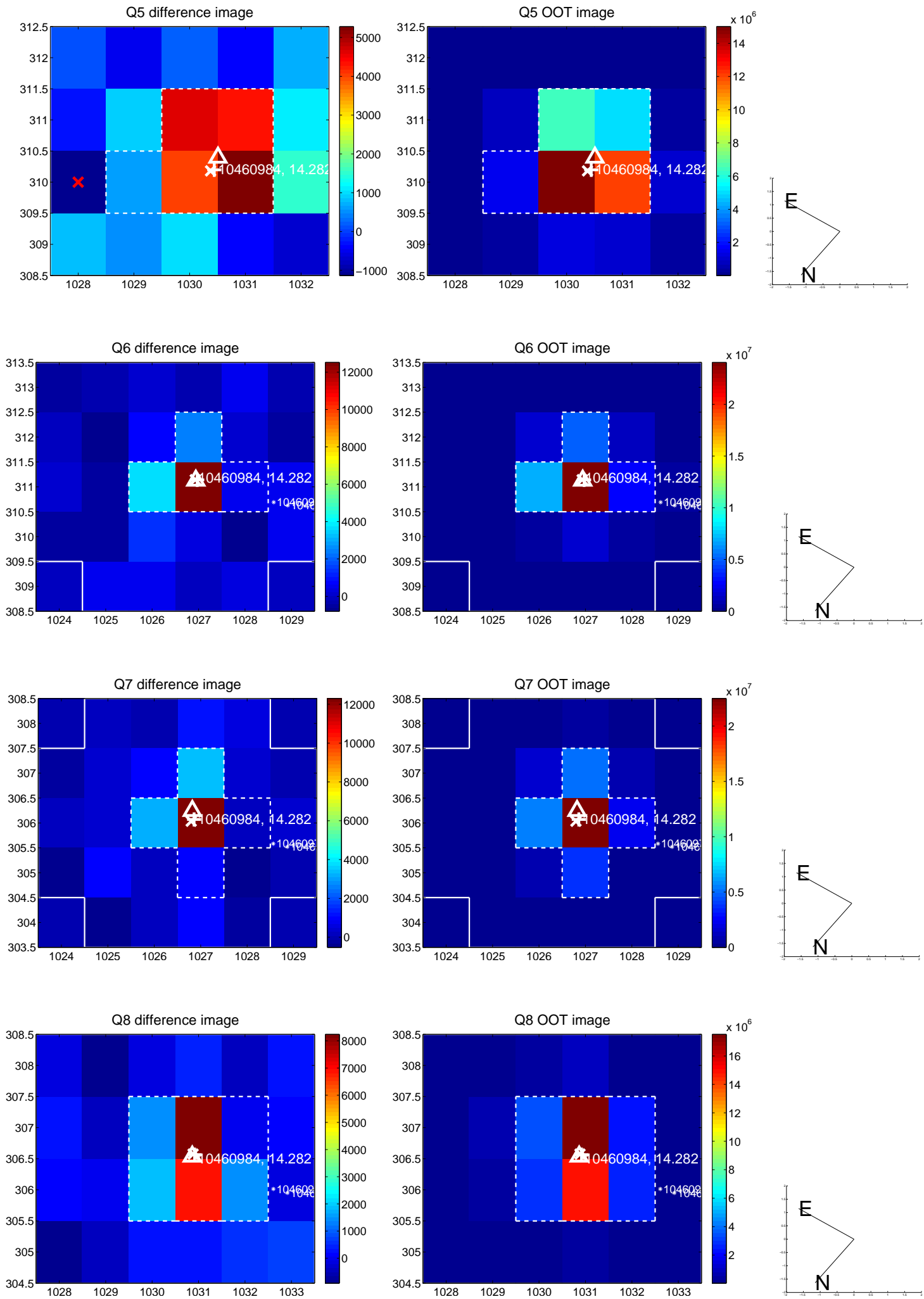


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

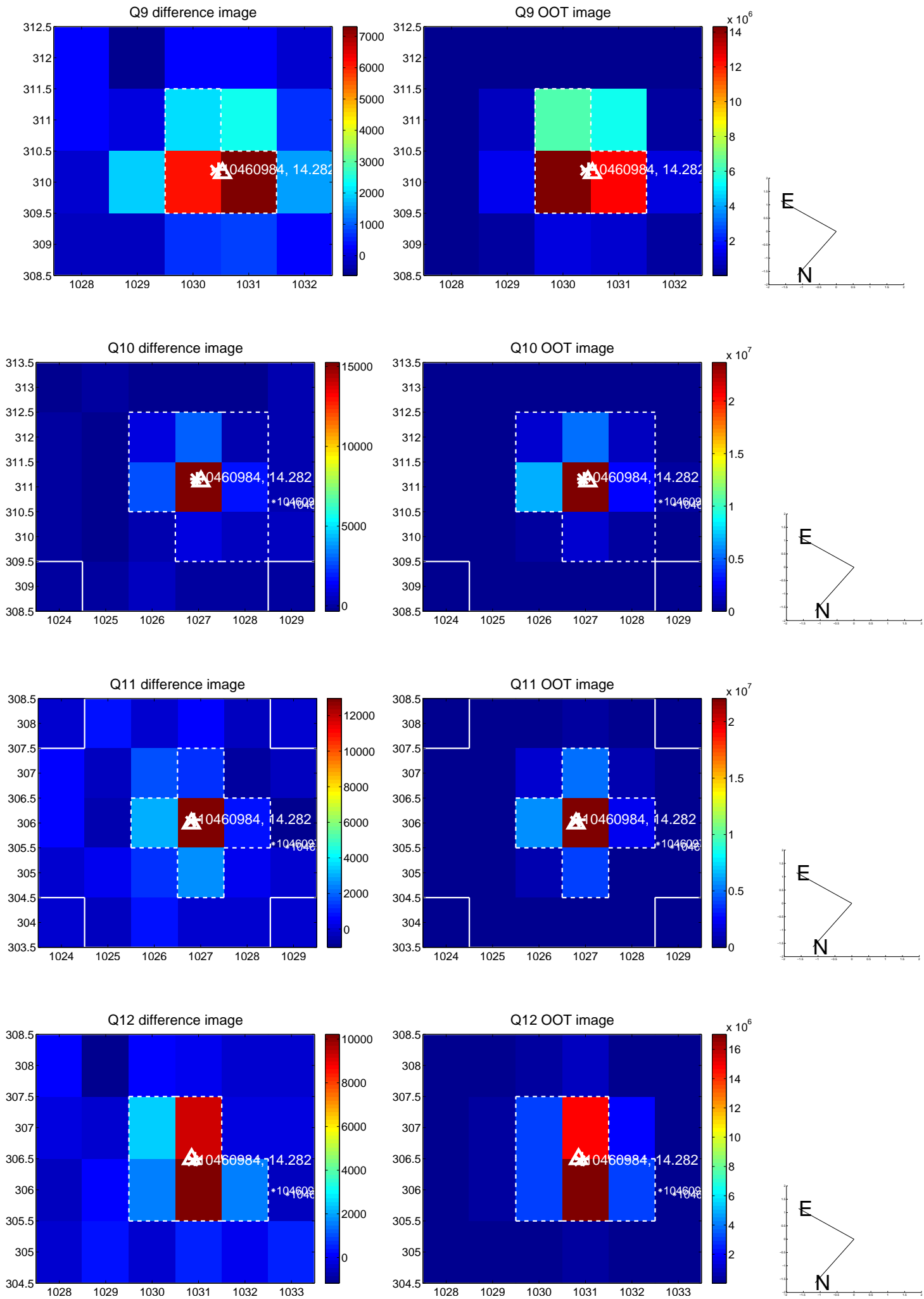
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



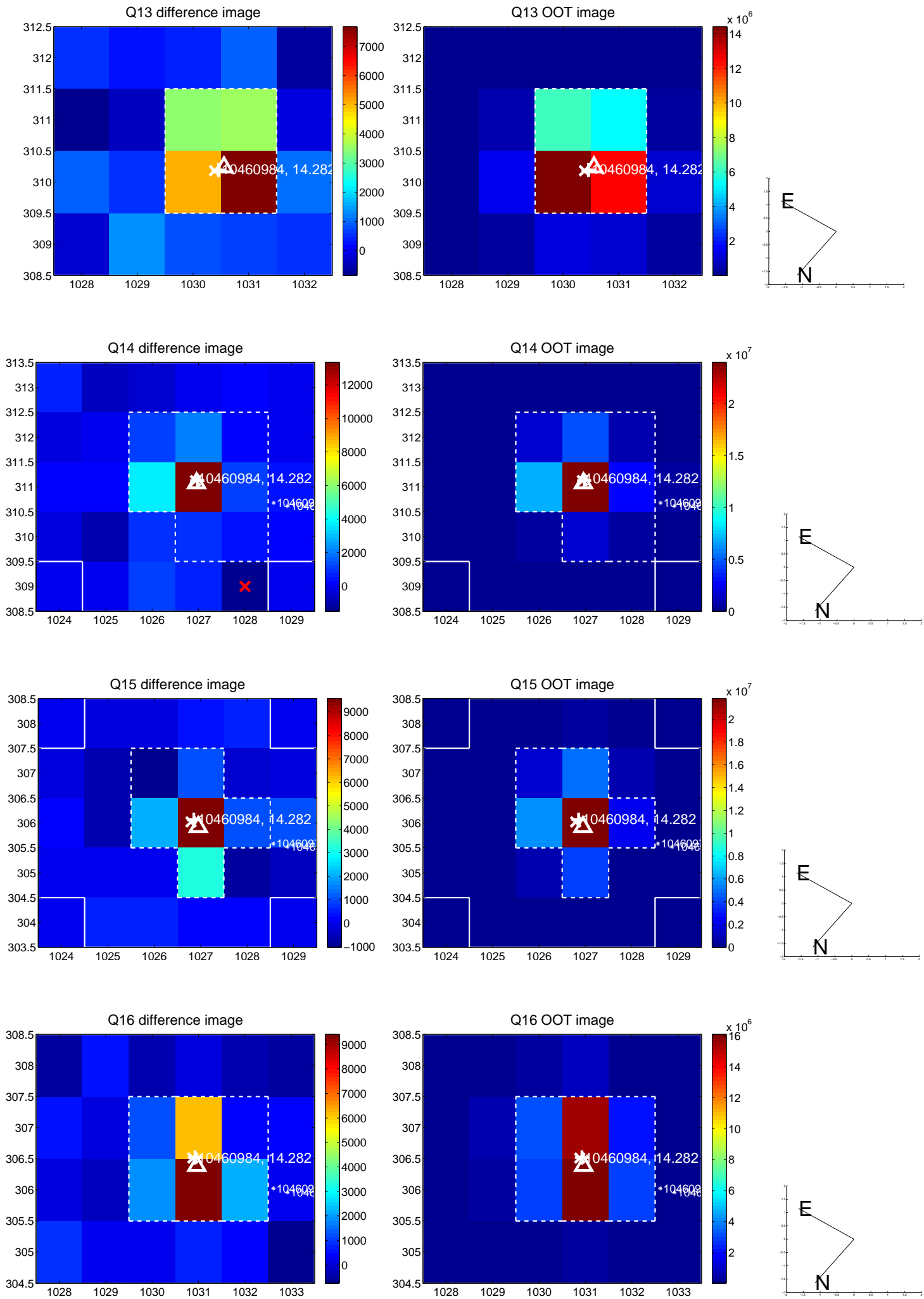
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



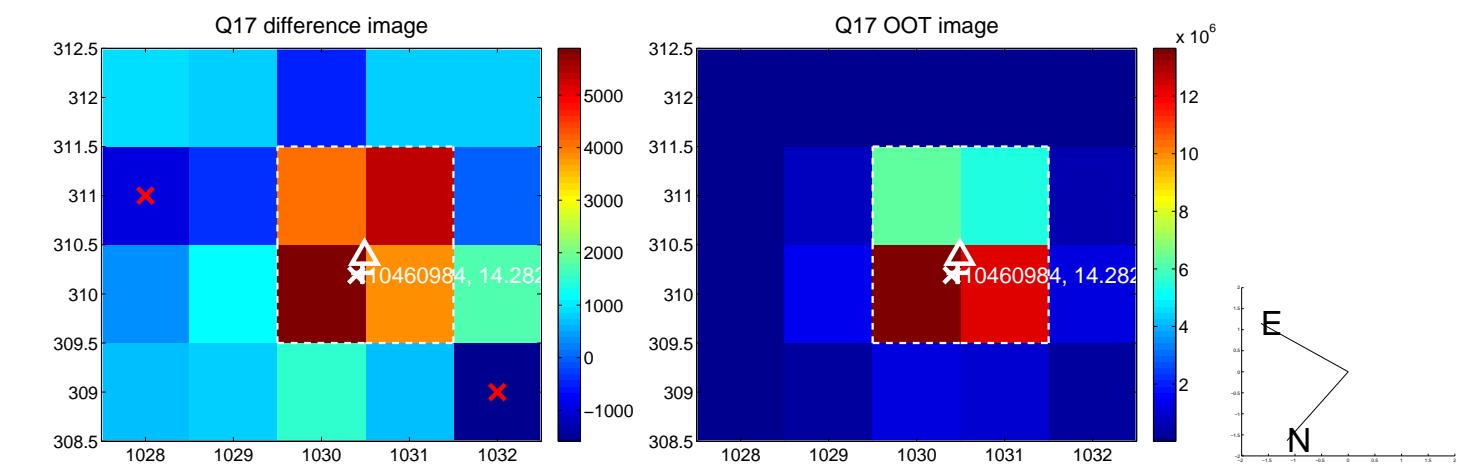
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



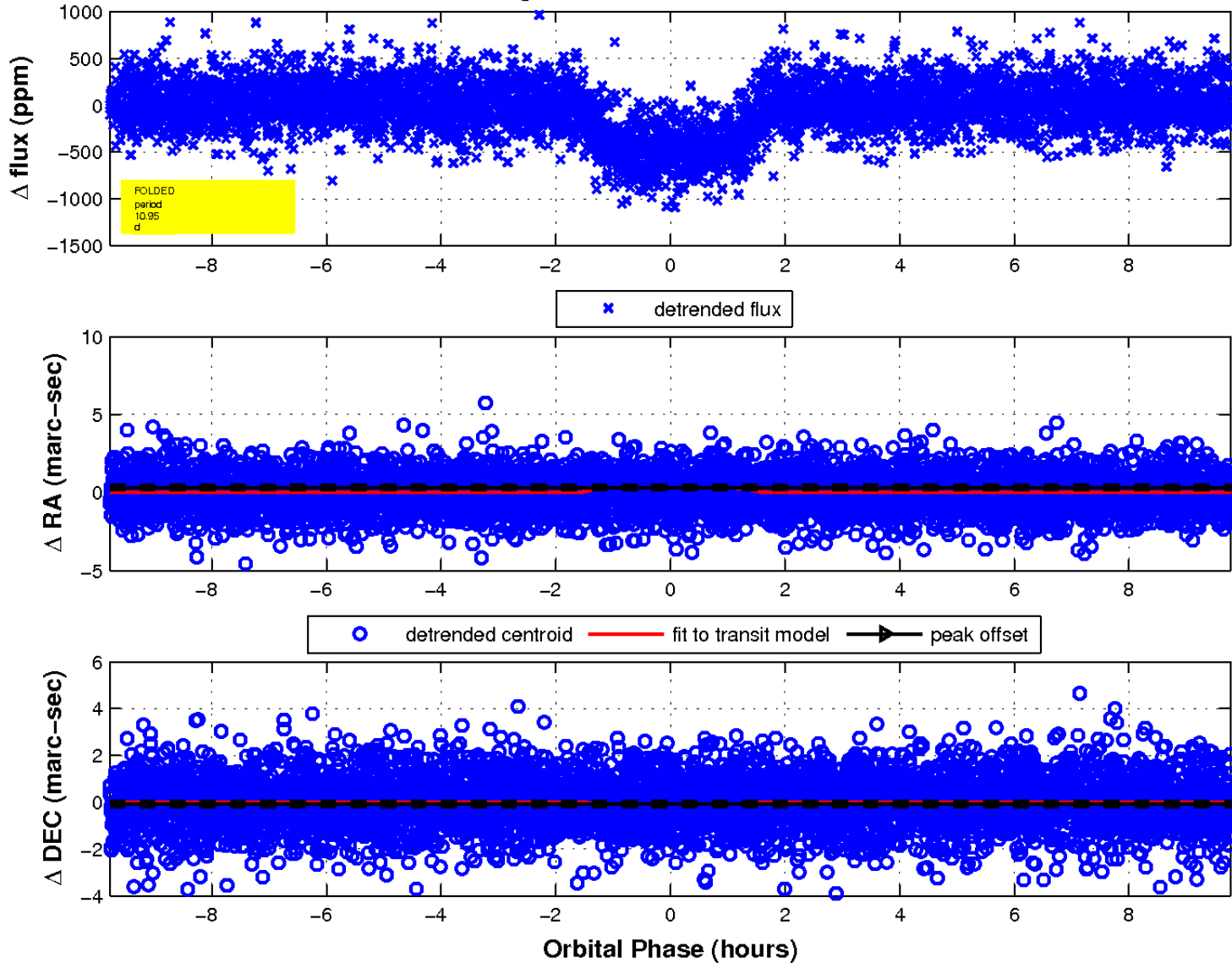
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

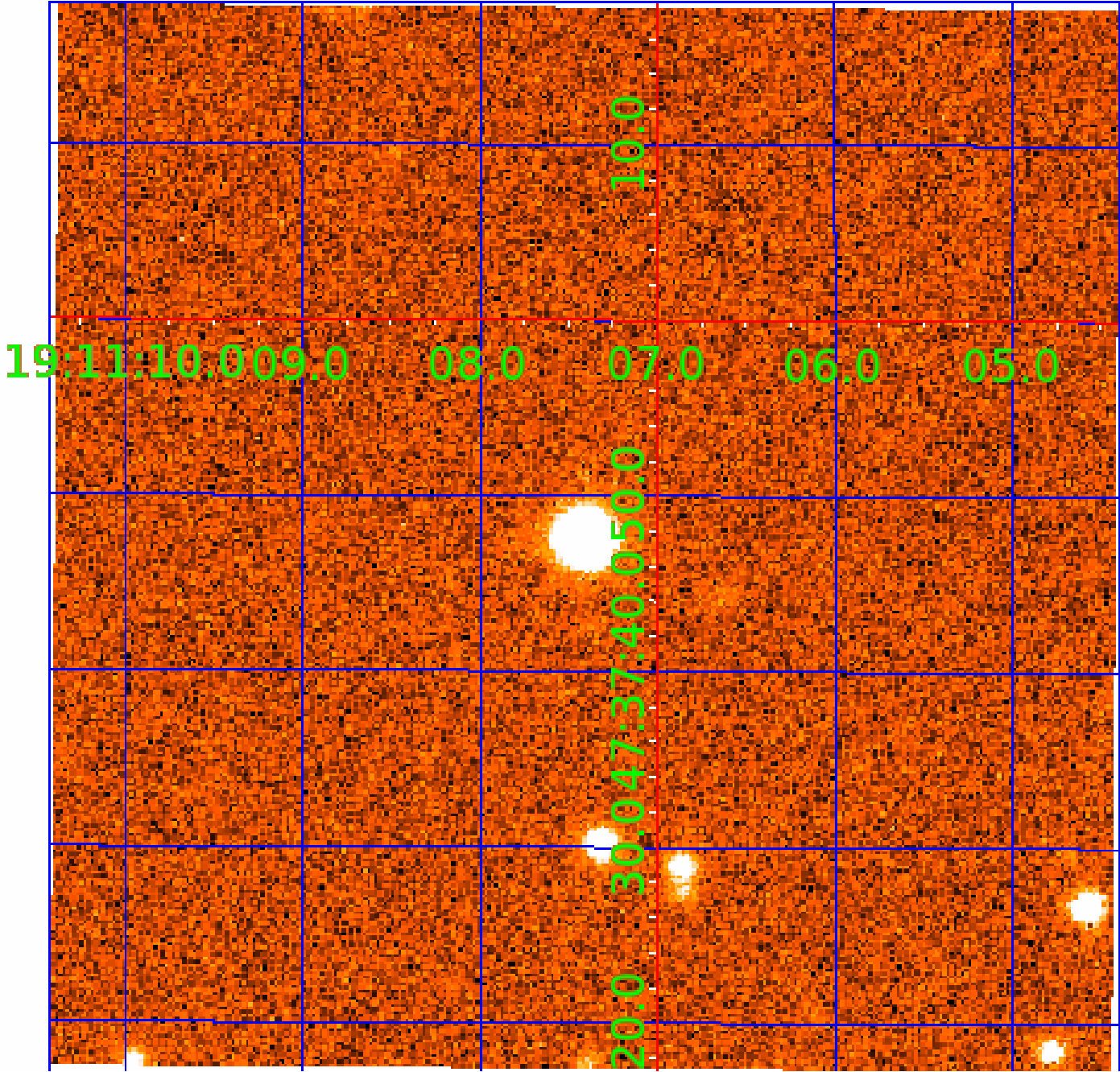


fluxWeightedCentroids, Planet 1 of 4



UKIRT Image

Declination



KIC 010460984

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})
010460984-01	OBS	0474.01	10.945752	132.936873	531.2	3.260	44.6	47.5	1.10	5888	2.99	142.53
010460984-02	OBS	0474.02	28.986830	134.782609	454.7	3.612	24.7	26.8	1.10	5888	2.63	38.90
010460984-03	OBS	0474.03	94.886484	214.827111	698.2	6.248	19.5	21.3	1.10	5888	4.00	8.00
010460984-04	OBS	0474.04	5.035004	132.663851	155.4	1.736	14.3	16.5	1.10	5888	1.62	401.39

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010460984-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010460984-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010460984-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010460984-04	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.

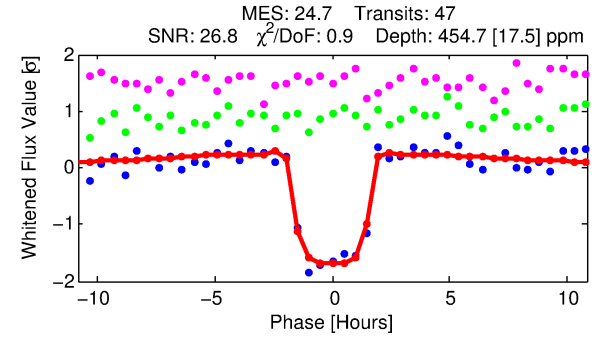
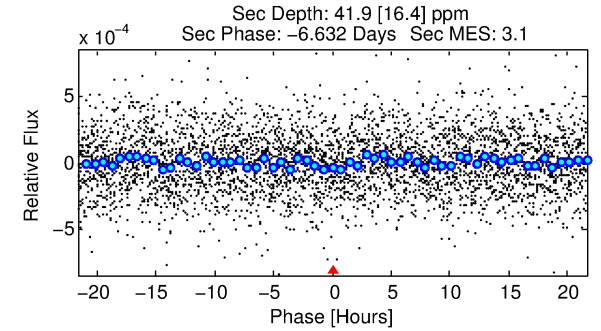
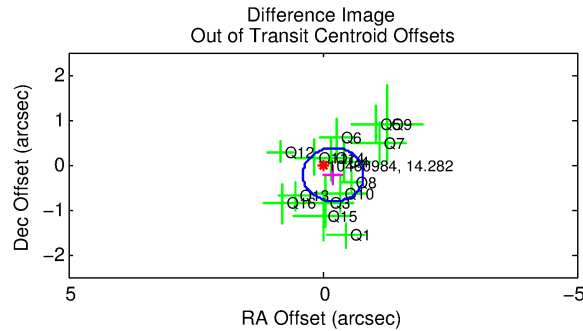
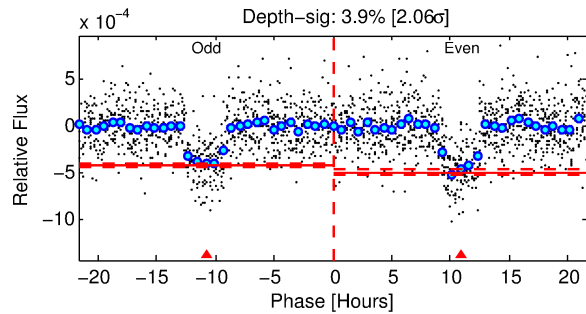
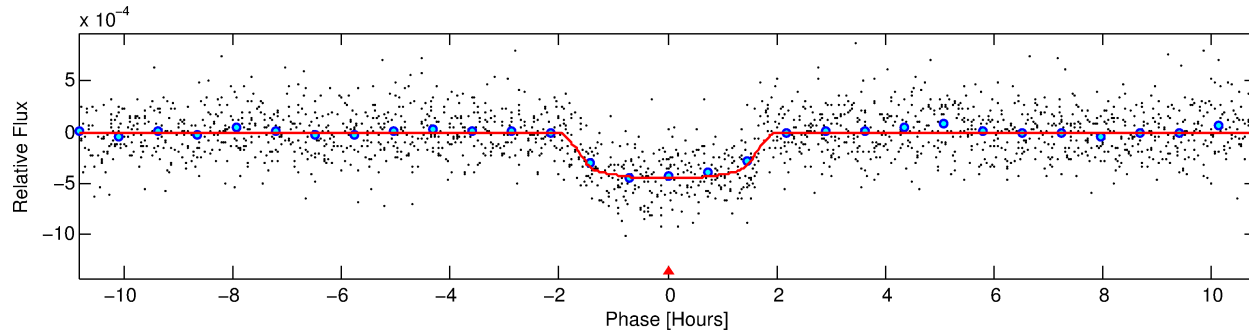
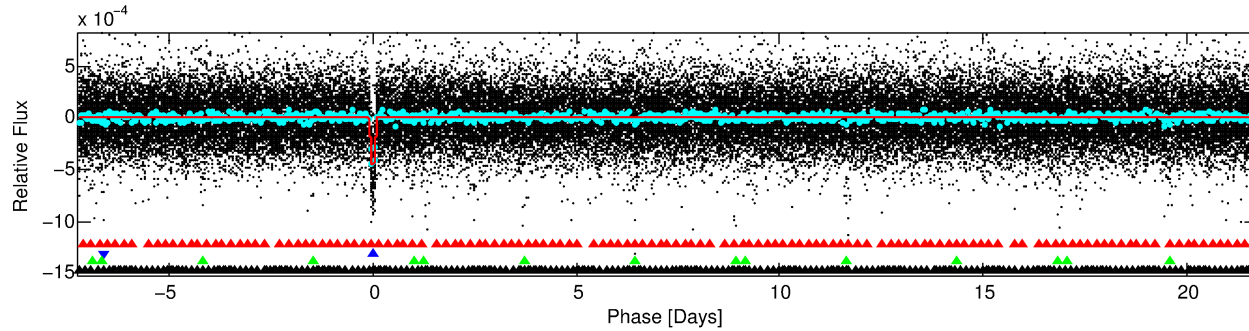
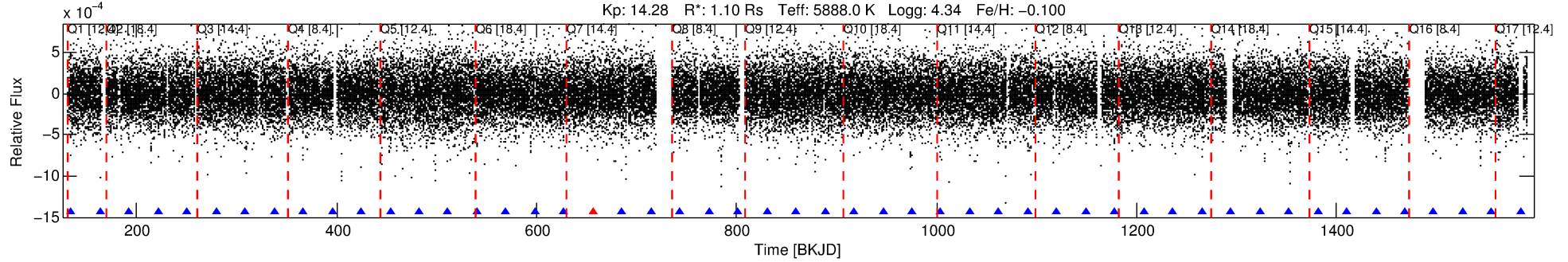
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010460984-02

No Significant Match Found

DV One-Page Summary

KIC: 10460984 Candidate: 2 of 4 Period: 28.987 d
KOI: K00474.02 Name: Kepler-164d Corr: 0.976



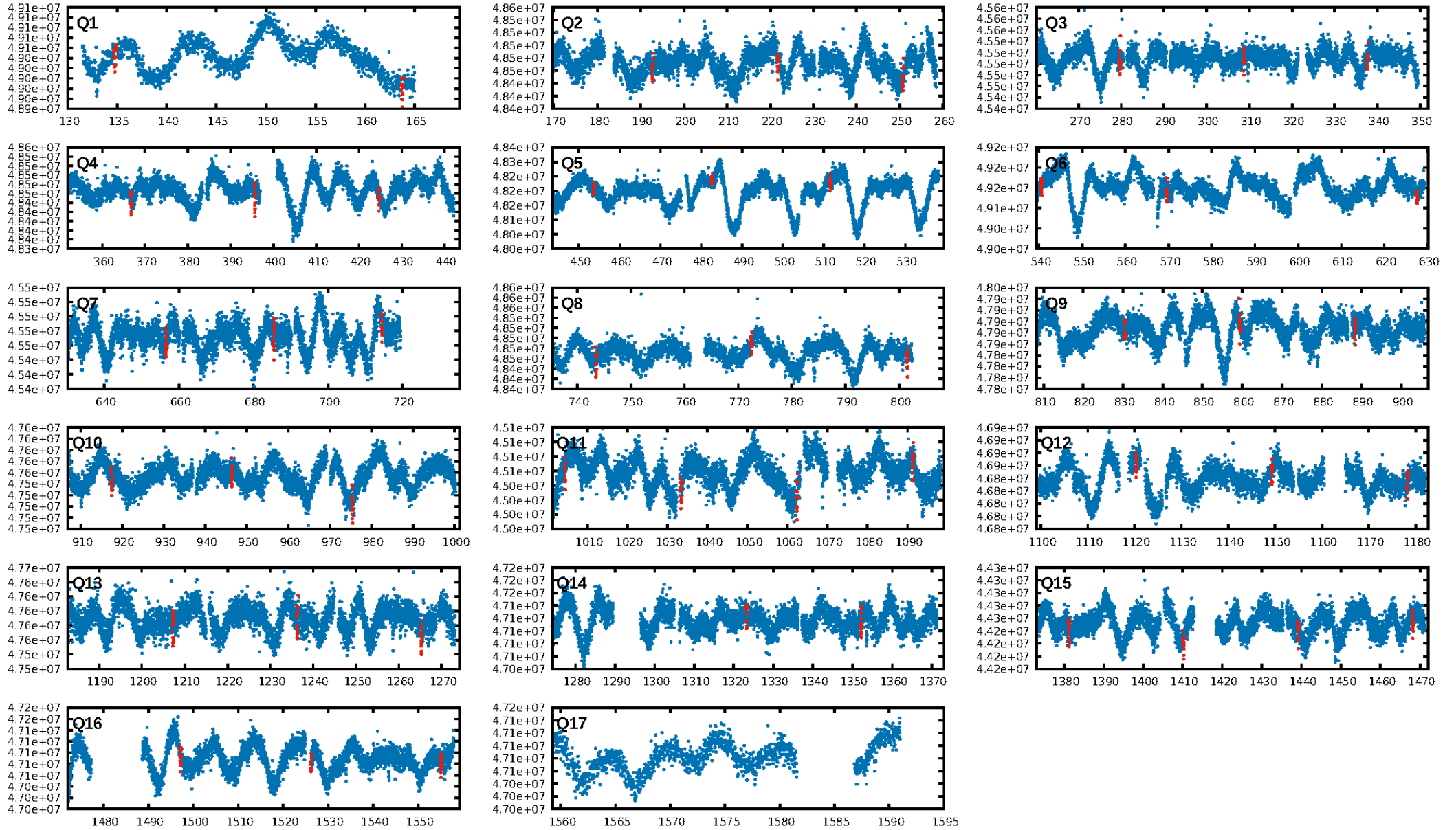
DV Fit Results:

Period = 28.98683 [0.00010] d
Epoch = 134.7826 [0.0028] BKJD
Rp/R* = 0.0219 [0.0047]
a/R* = 36.97 [37.37]
b = 0.83 [0.40]
Seff = 38.90 [8.64]
Teq = 637 [35] K
Rp = 2.63 [0.71] Re
a = 0.1825 [0.0256] AU
Ag = 111.38 [68.61] [1.61 σ]
Teffp = 3199 [468] K [5.46 σ]

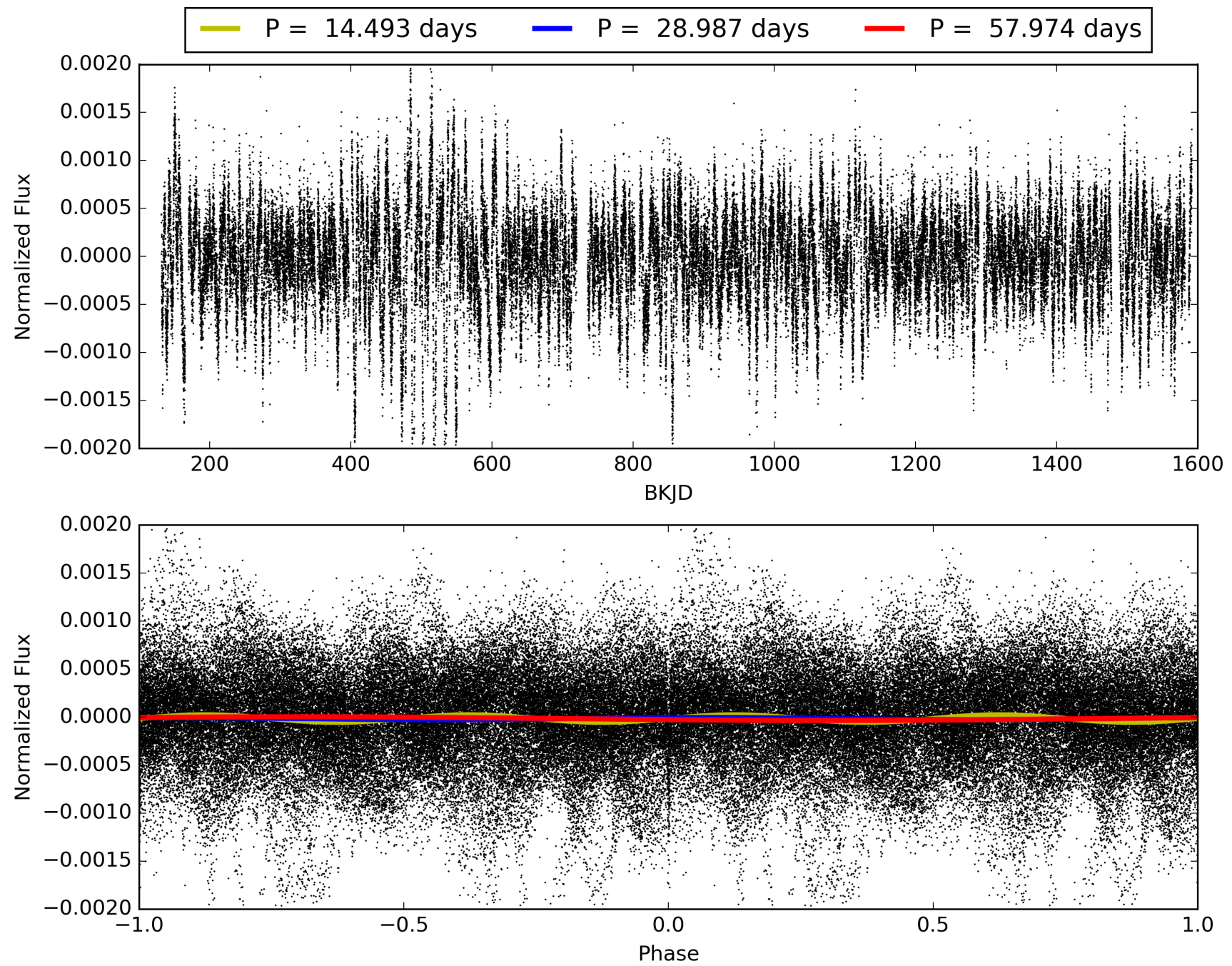
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [88.98 σ]
LongPeriod-sig: 100.0% [219.14 σ]
ModelChiSquare2-sig: 97.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 8.56e-126
RollingBand-fgt: 0.98 [44/45]
GhostDiagnostic-chr: 7.346
Centroid-sig: 0.2%
Centroid-so: 0.775 arcsec [1.82 σ]
OotOffset-rm: 0.306 arcsec [1.54 σ]
KicOffset-rm: 0.502 arcsec [2.55 σ]
OotOffset-st: 3/4/4/4 [15]
KicOffset-st: 3/4/4/4 [15]
DiffImageQuality-fgm: 1.00 [15/15]
DiffImageOverlap-fno: 1.00 [16/16]

TCE 010460984-02, PDC Light Curves

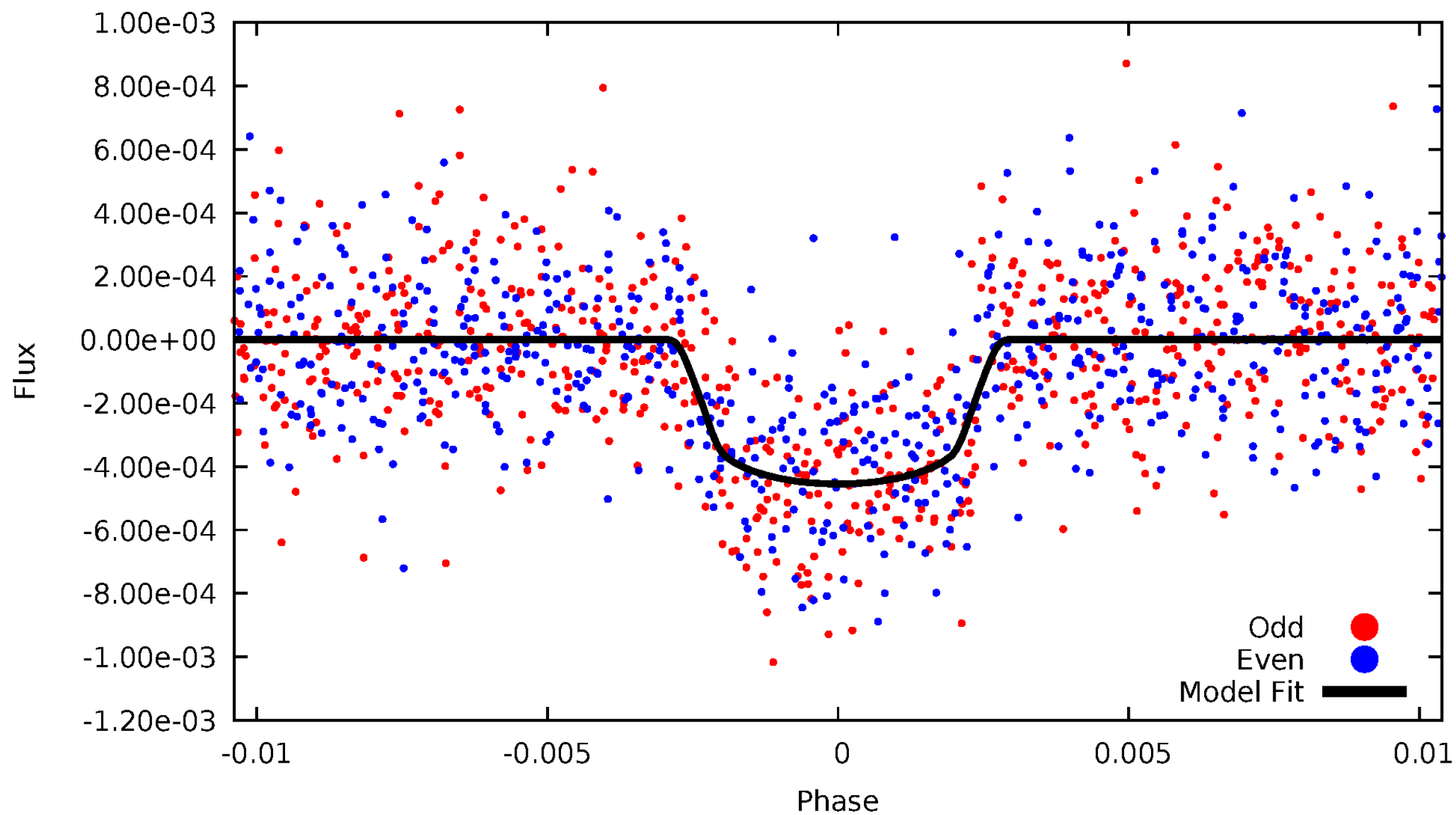


TCE 010460984-02



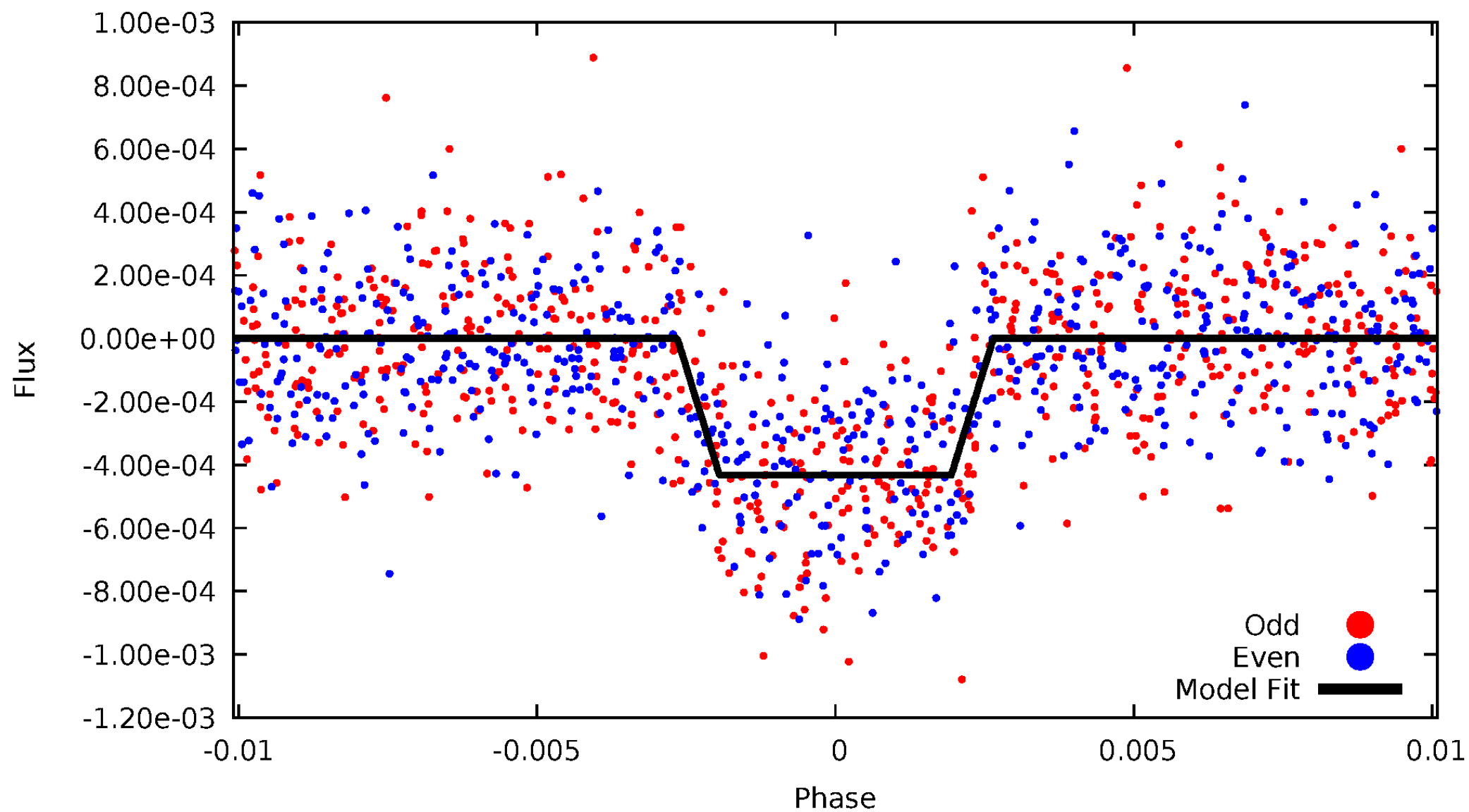
DV Odd/Even

TCE 010460984-02



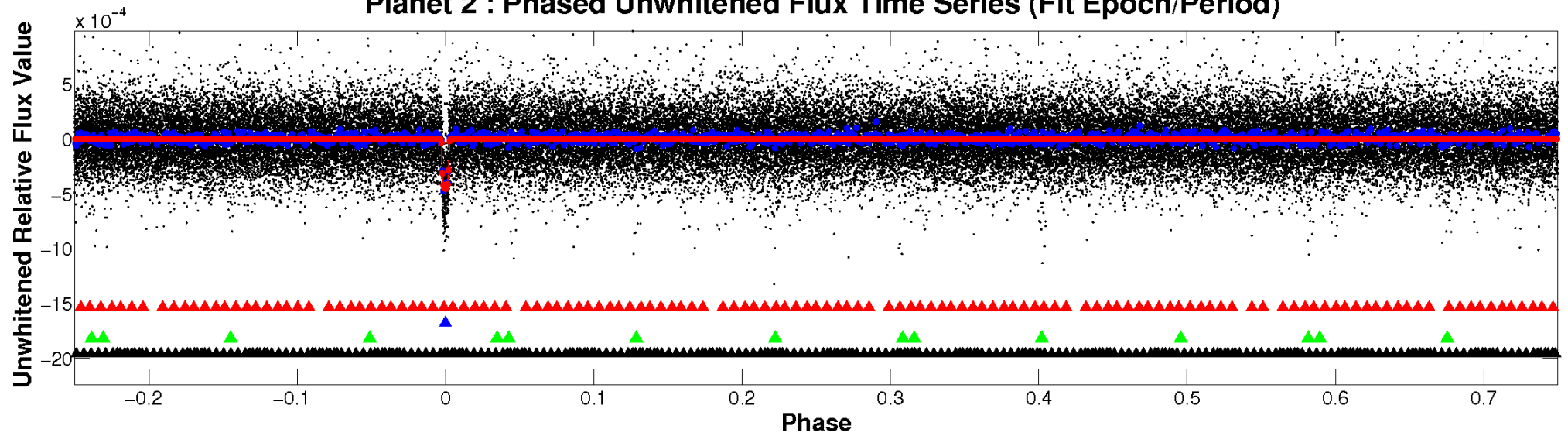
ALT Odd/Even

TCE 010460984-02

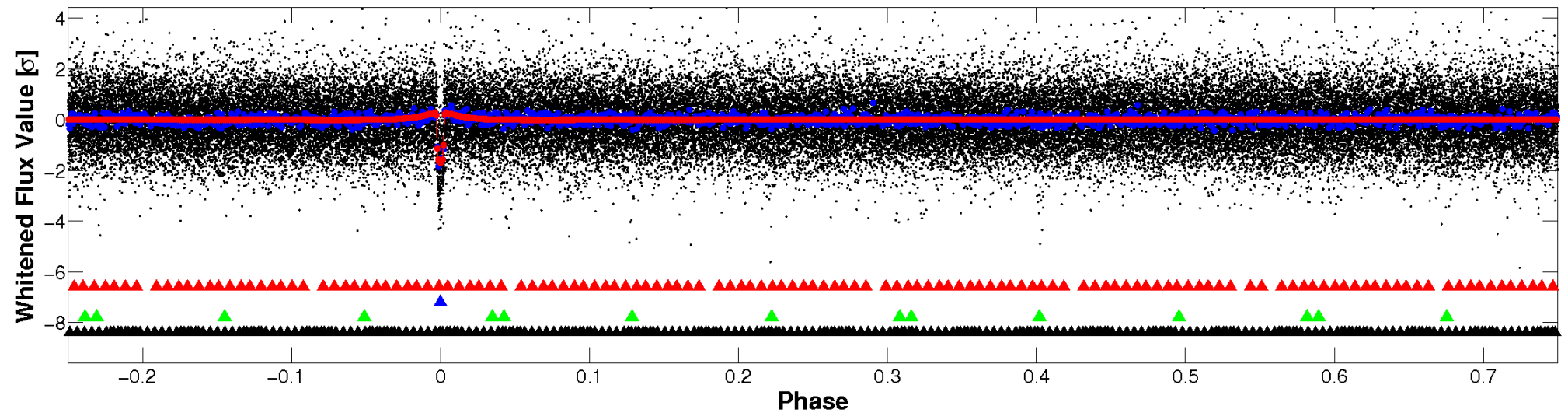


Non-Whitened Vs. Whitened Light Curve

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

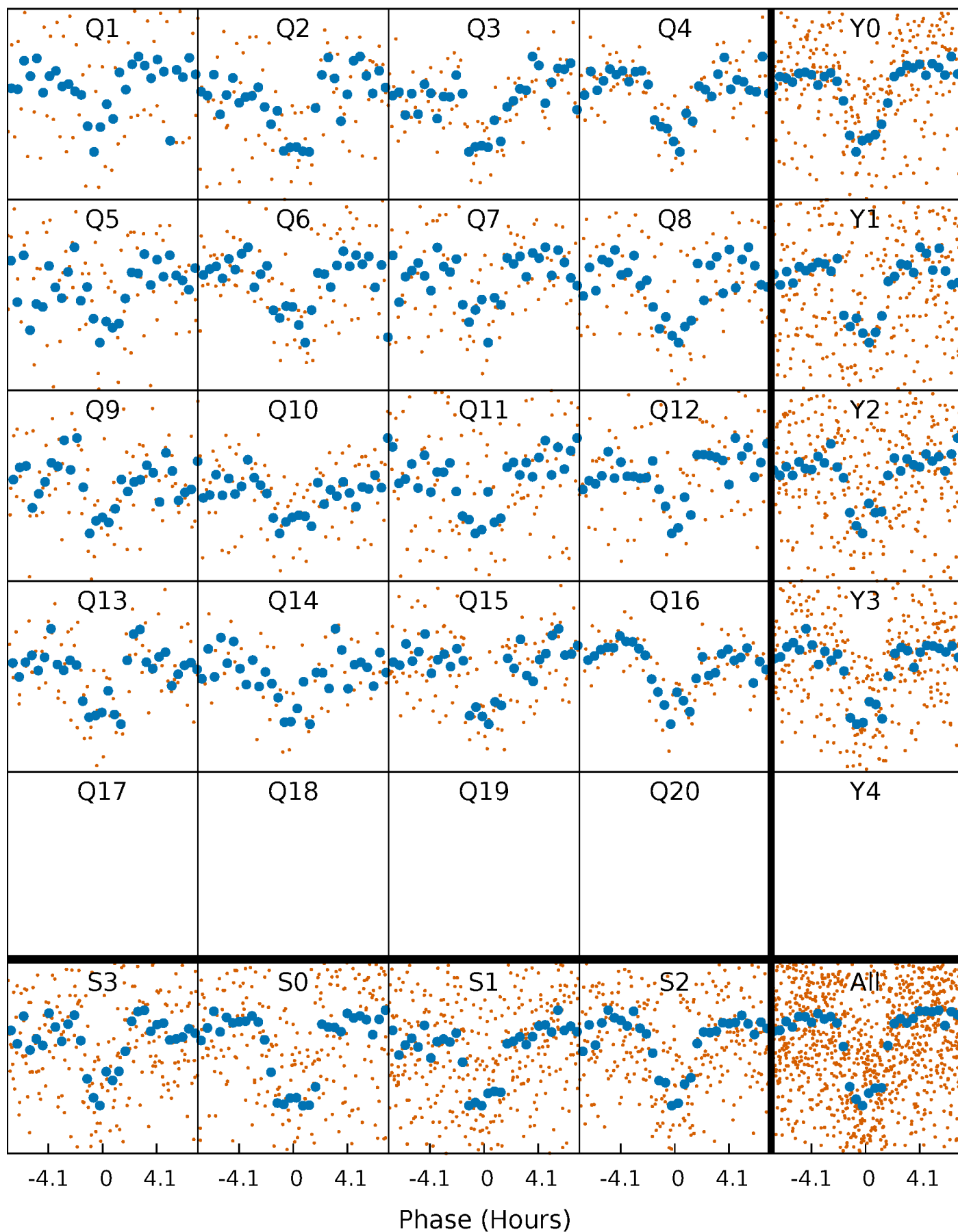


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



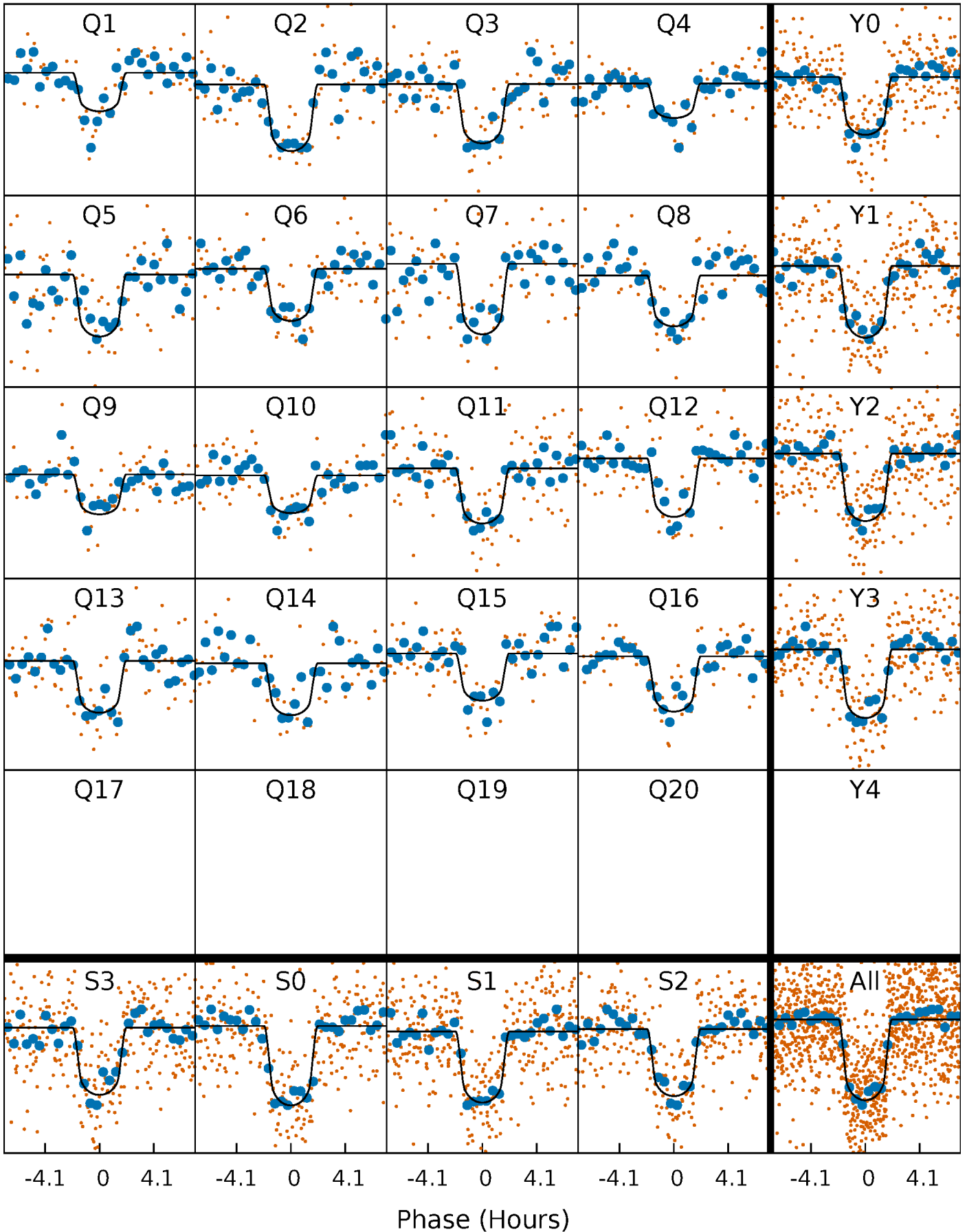
PDC Quarter-Phased Transit Curves

TCE 010460984-02 P= 28.986830 Days $T_0=134.782609$ (BKJD)



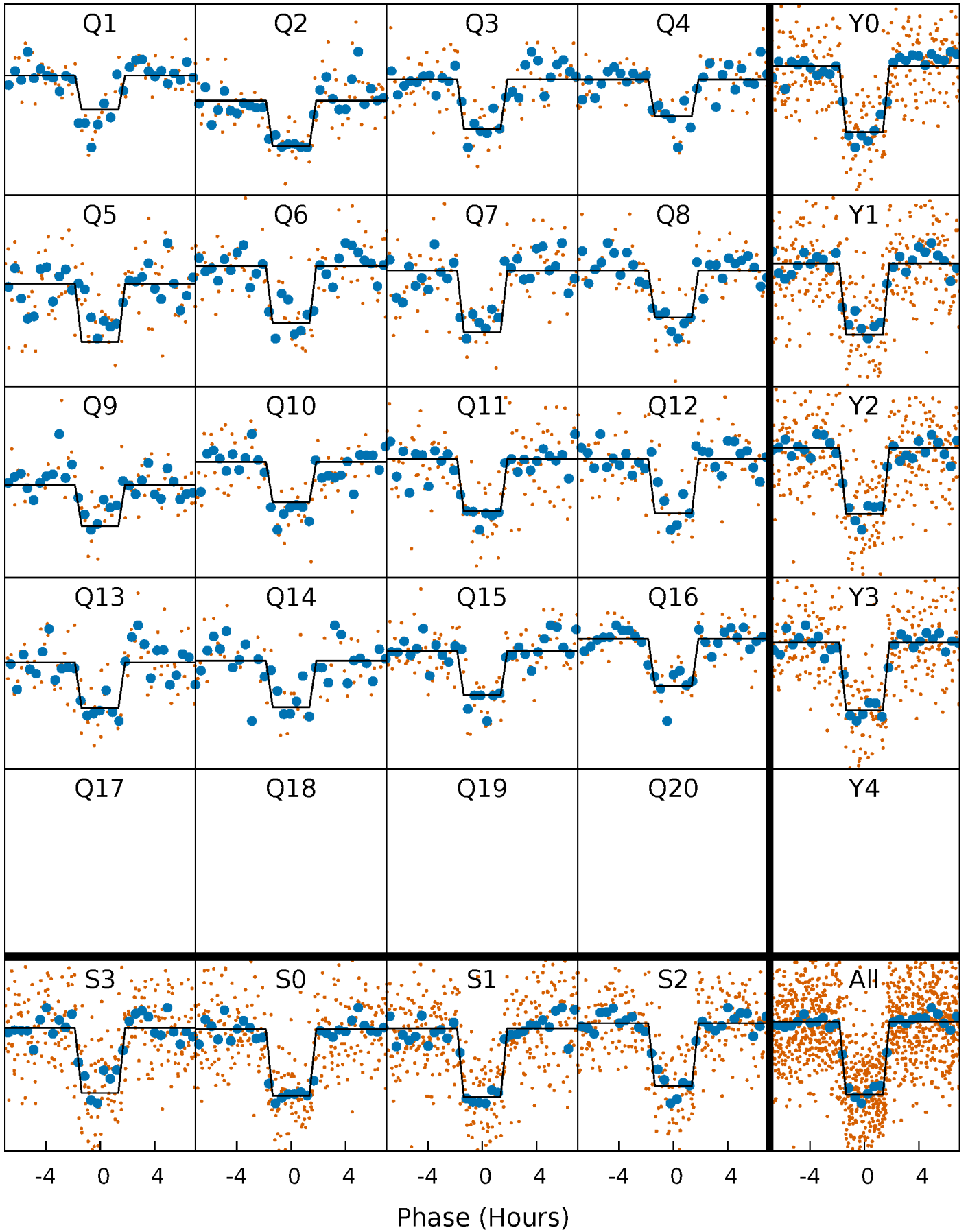
DV Quarter-Phased Transit Curves

TCE 010460984-02 P= 28.986830 Days $T_0=134.782609$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

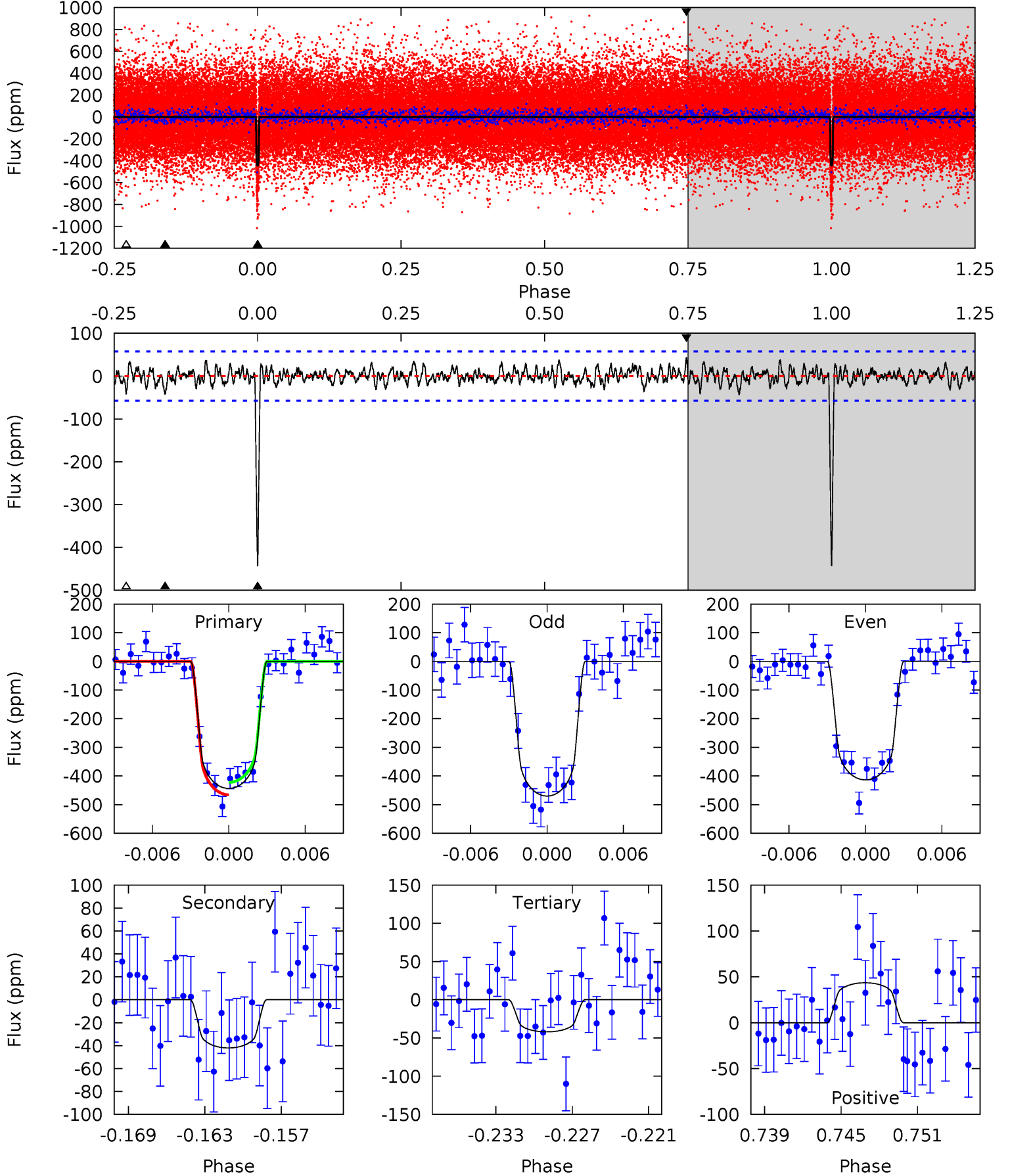
TCE 010460984-02 P= 28.986744 Days $T_0=134.785195$ (BKJD)



DV Model-Shift Uniqueness Test

010460984-02, P = 28.986830 Days, E = 105.795779 Days

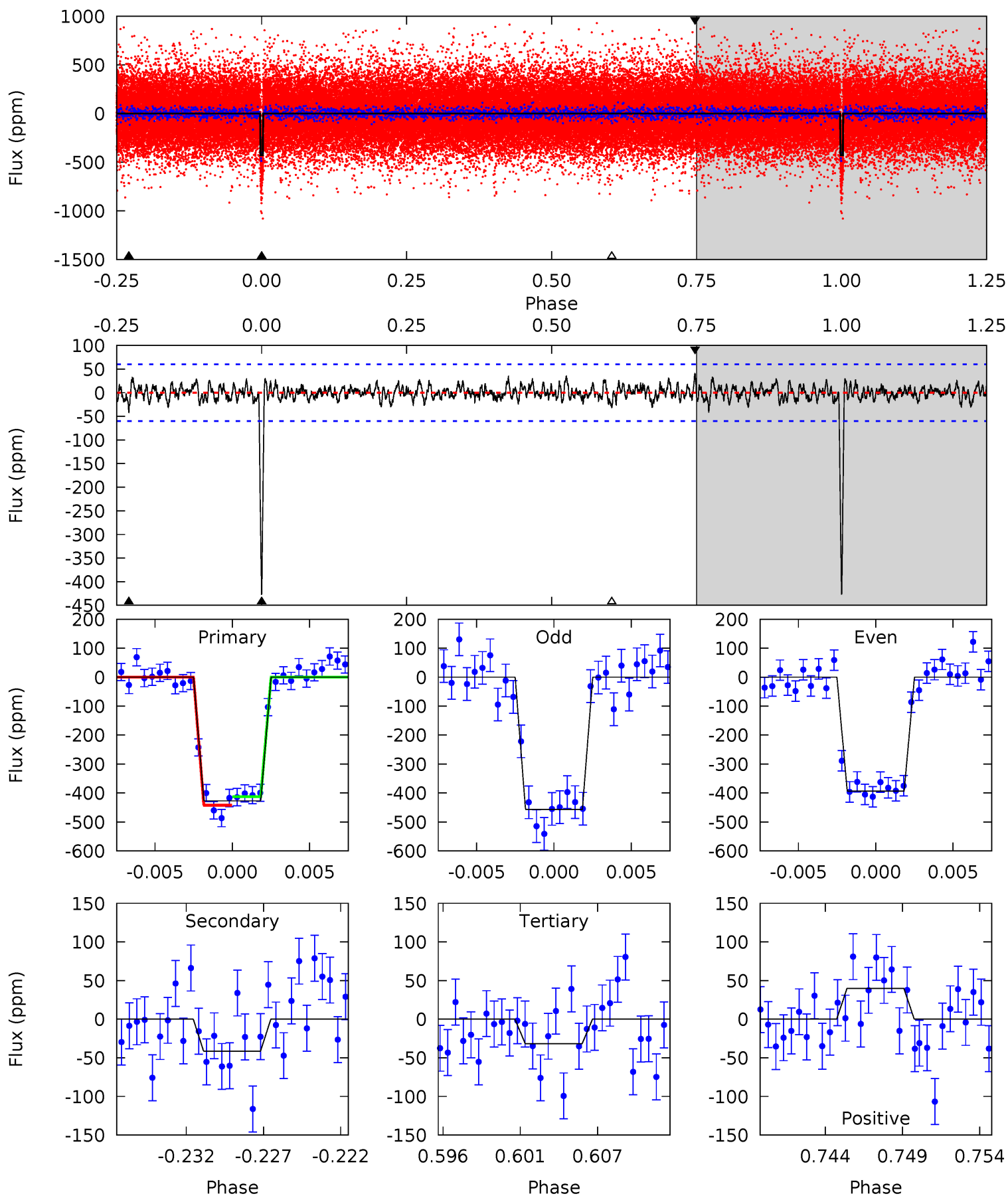
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
39.4	3.74	3.73	3.87	5.13	2.76	1.17	35.7	35.6	0.01	-0.13	2.52	0.98	0.09	1.93



Alt Model-Shift Uniqueness Test

010460984-02, P = 28.986744 Days, E = 105.798451 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
36.6	3.55	2.73	3.42	5.15	2.79	1.01	33.9	33.2	0.83	0.13	2.70	0.99	0.09	1.25



Stellar Parameters For KIC 010460984

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5888^{+106}_{-117}	$4.342^{+0.115}_{-0.115}$	$-0.100^{+0.150}_{-0.150}$	$1.097^{+0.179}_{-0.146}$	$0.966^{+0.075}_{-0.068}$	$1.031^{+0.522}_{-0.345}$
	+2%/-2%	+3%/-3%	+150%/-150%	+16%/-13%	+8%/-7%	+51%/-33%
Source	SPE58	SPE58	SPE58	DSEP		

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

Secondary Eclipse Parameters for KIC 010460984-02 / KOI 0474.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-42 ± 11	$2.62^{+0.64}_{-0.56}$	887^{+41}_{-36}	3622^{+323}_{-276}	109^{+73}_{-46}
Alt.	-41 ± 12	$2.46^{+0.61}_{-0.57}$	887^{+43}_{-37}	3695^{+396}_{-321}	123^{+100}_{-52}

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 $A_{obs} \gg 1.0$

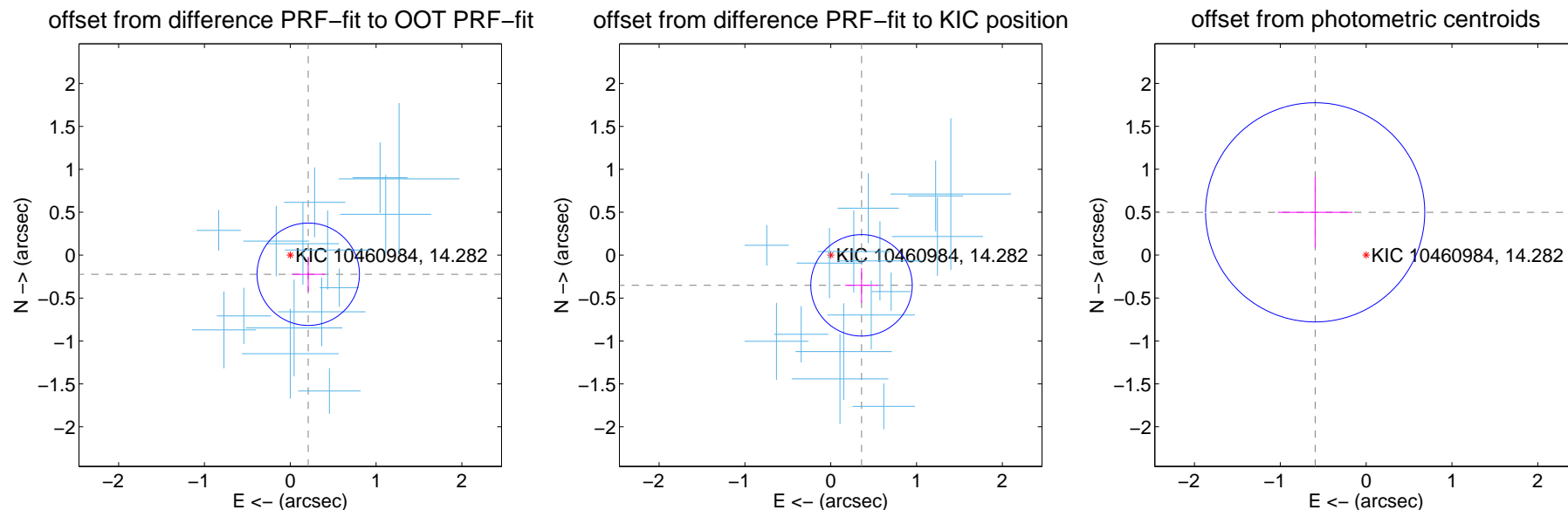
DV Centroid Data

Supplemental centroid analysis for 010460984-02. Kepler magnitude: 14.28. Transit SNR 26.81

There are 15 quarters with good PRF difference image offsets

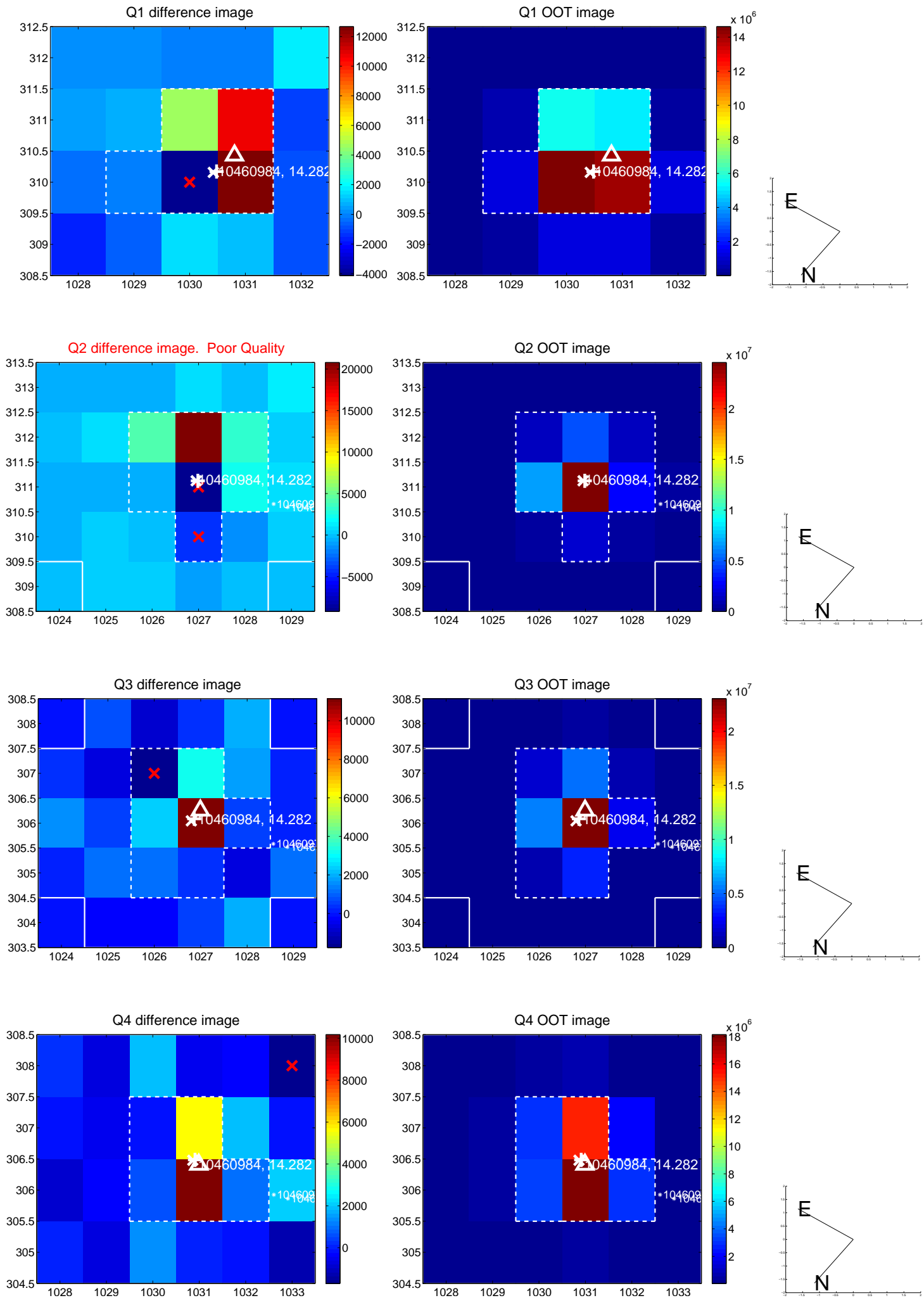
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.306 ± 0.199	1.54	-0.210 ± 0.194	-0.223 ± 0.203
PRF-fit source offset from KIC position	0.502 ± 0.197	2.55	-0.359 ± 0.192	-0.352 ± 0.202
photometric centroid source offset	0.77 ± 0.43	1.82	0.59 ± 0.44	0.50 ± 0.41

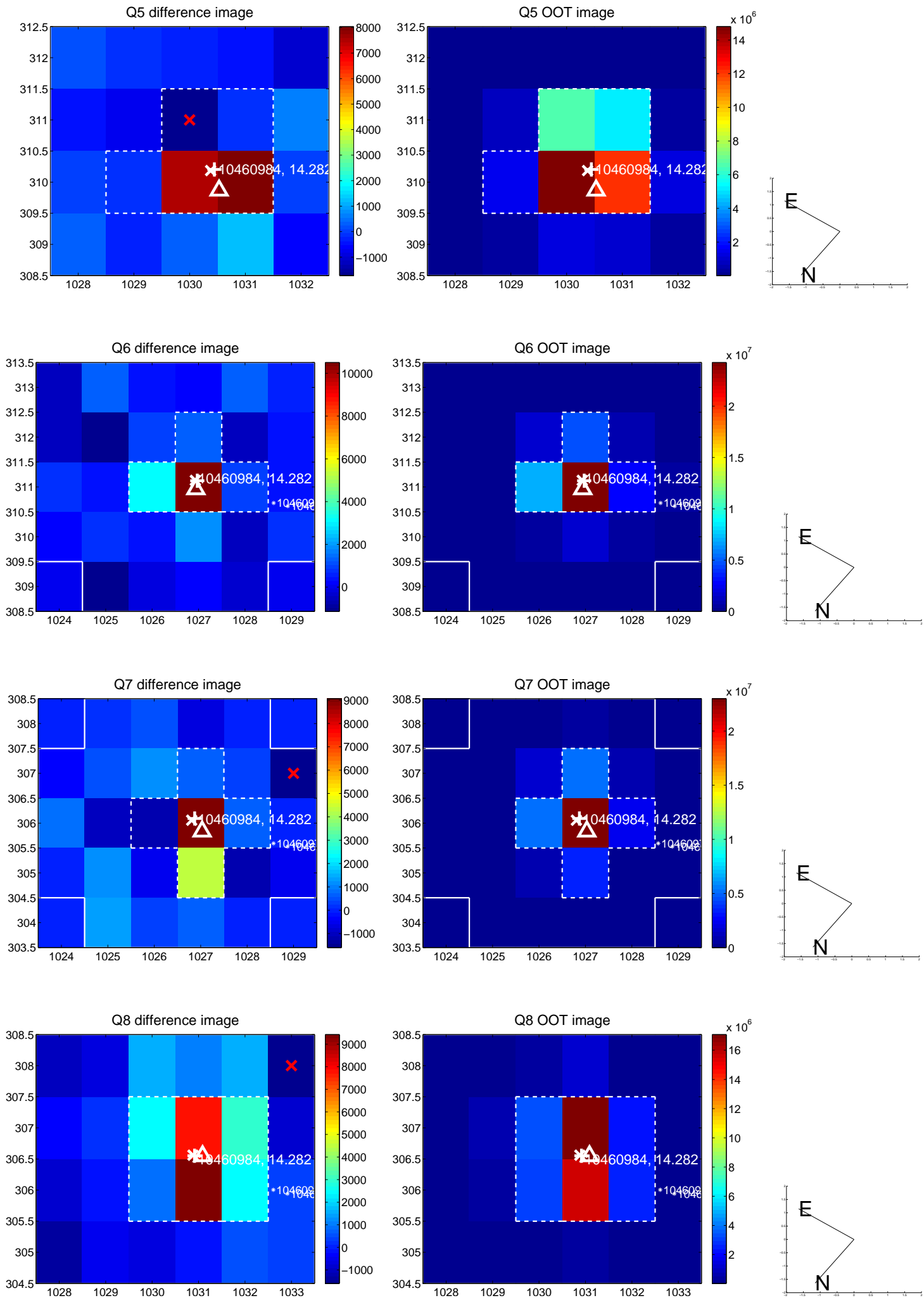


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

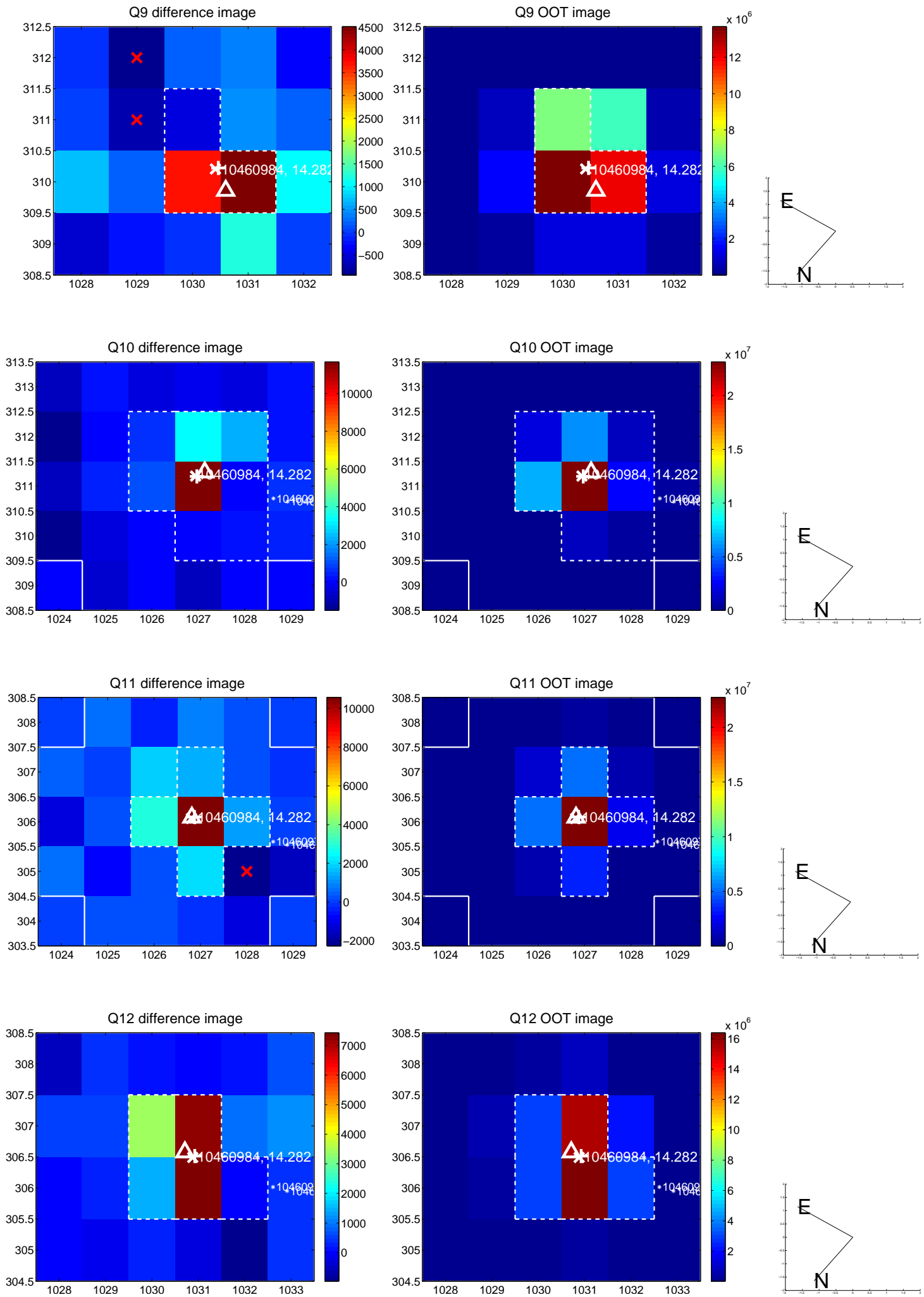
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



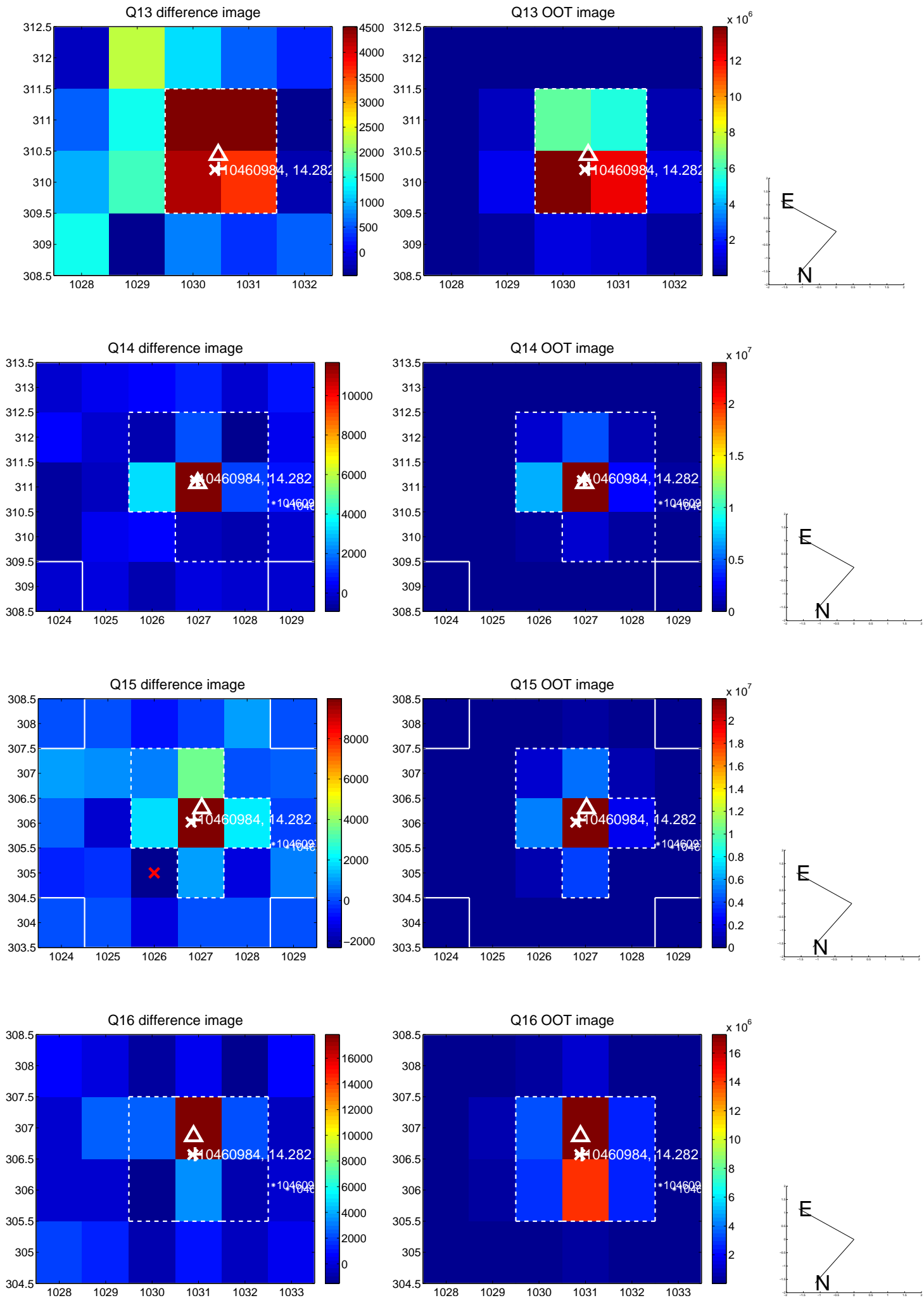
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



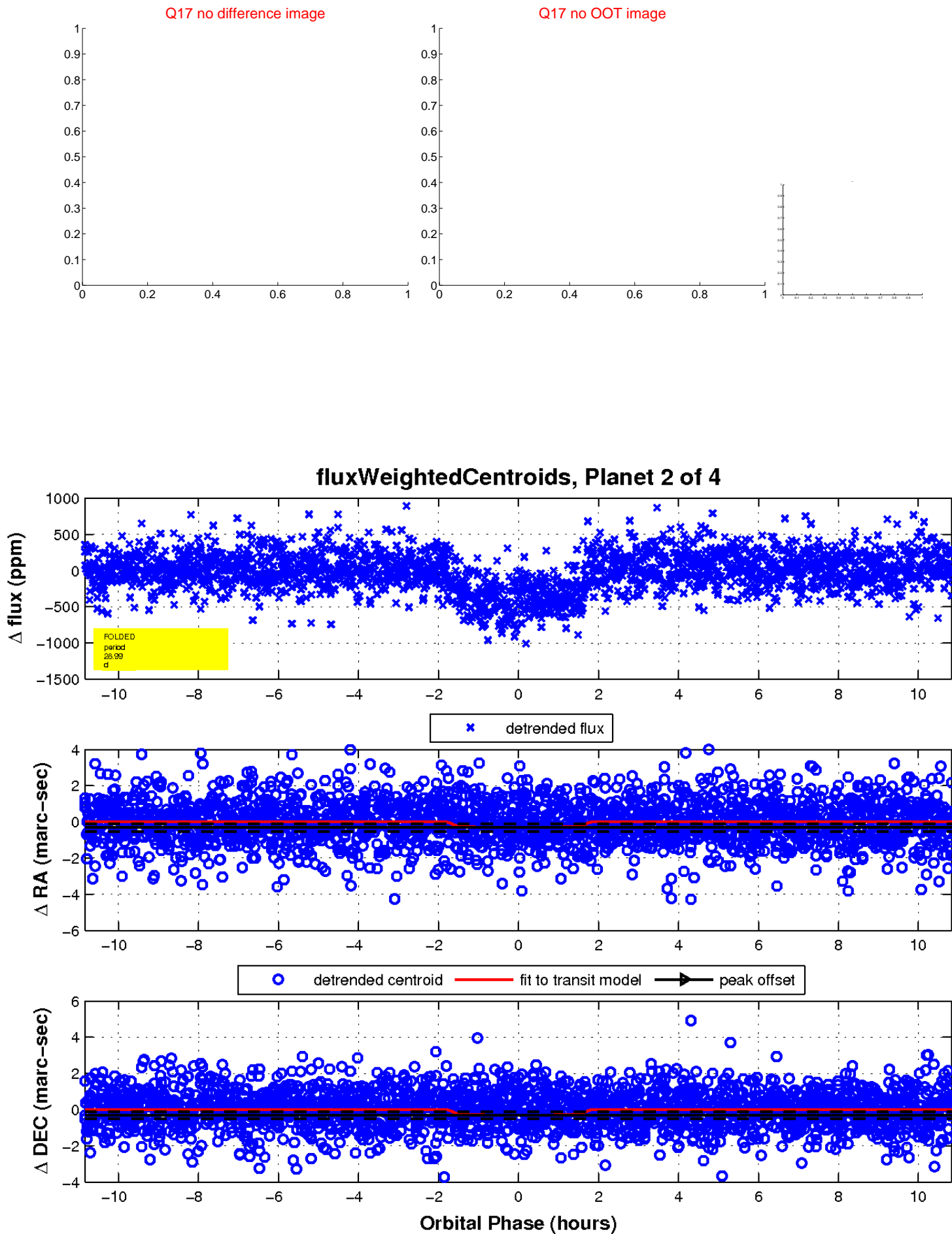
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

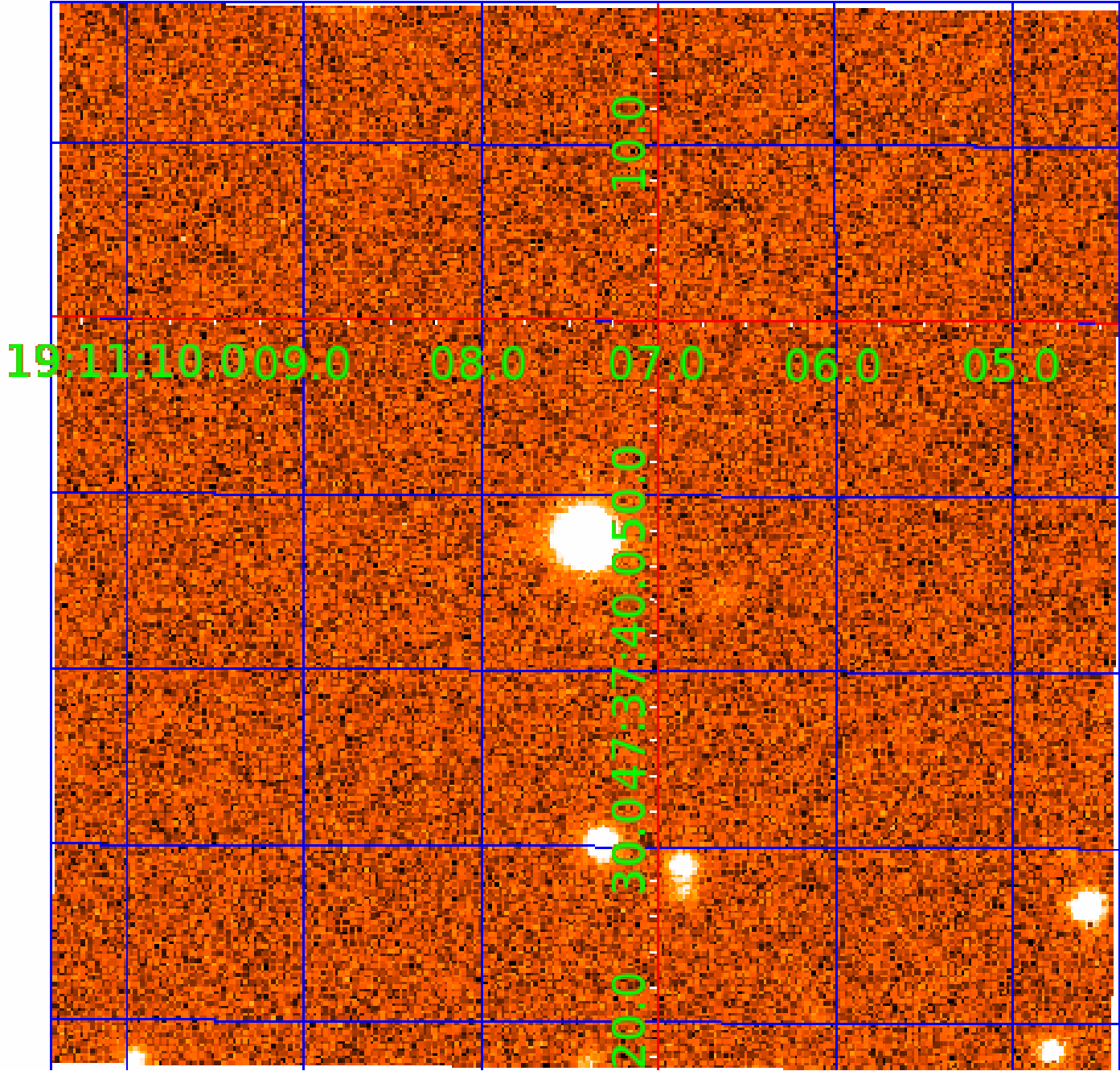


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010460984

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})
010460984-01	OBS	0474.01	10.945752	132.936873	531.2	3.260	44.6	47.5	1.10	5888	2.99	142.53
010460984-02	OBS	0474.02	28.986830	134.782609	454.7	3.612	24.7	26.8	1.10	5888	2.63	38.90
010460984-03	OBS	0474.03	94.886484	214.827111	698.2	6.248	19.5	21.3	1.10	5888	4.00	8.00
010460984-04	OBS	0474.04	5.035004	132.663851	155.4	1.736	14.3	16.5	1.10	5888	1.62	401.39

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010460984-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010460984-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010460984-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010460984-04	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.

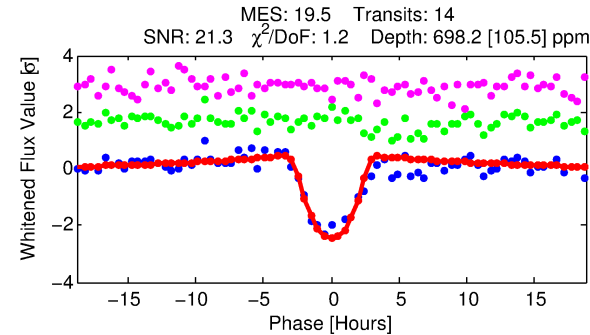
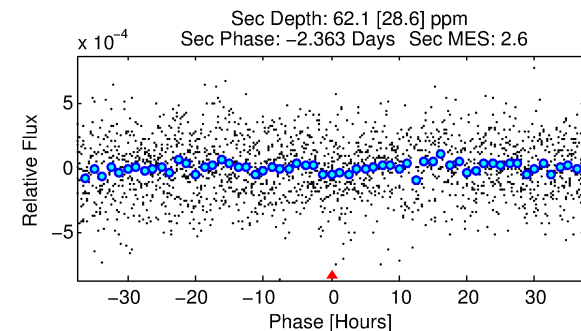
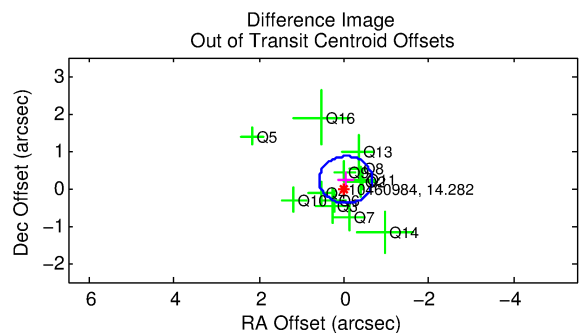
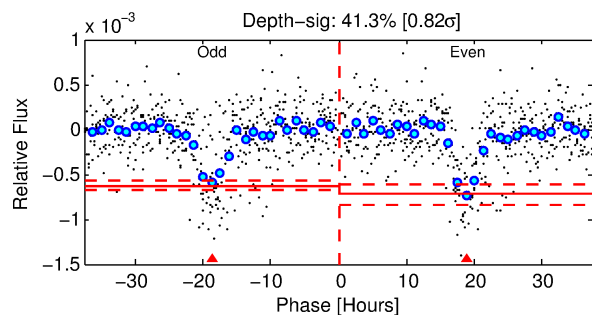
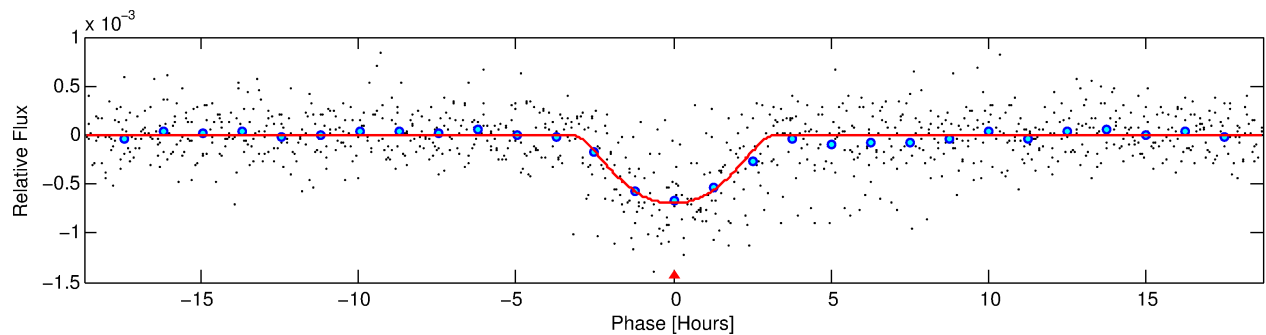
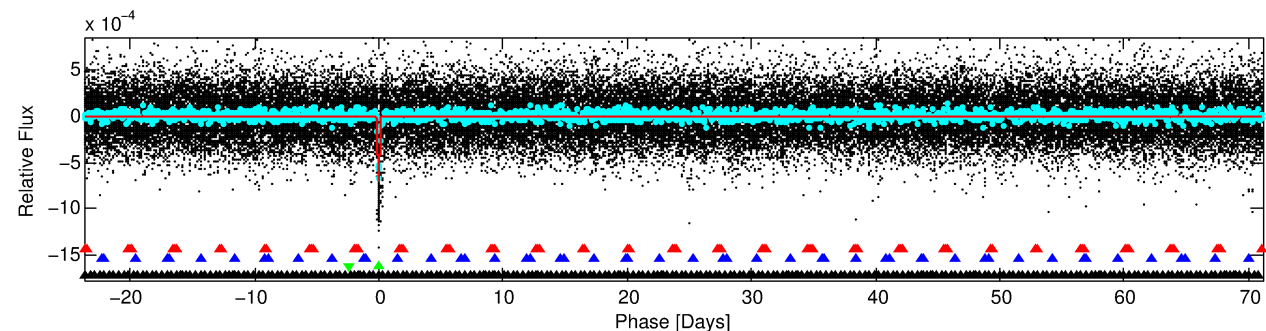
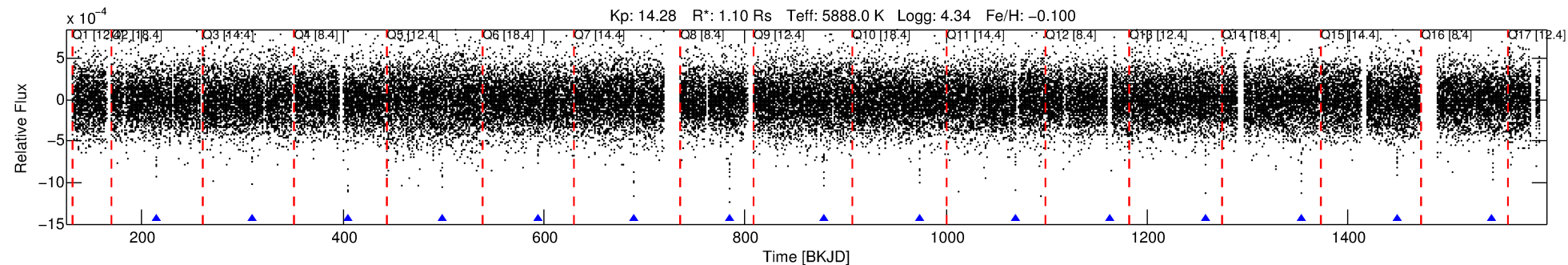
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010460984-03

No Significant Match Found

DV One-Page Summary

KIC: 10460984 Candidate: 3 of 4 Period: 94.886 d
KOI: K00474.03 Corr: 0.988



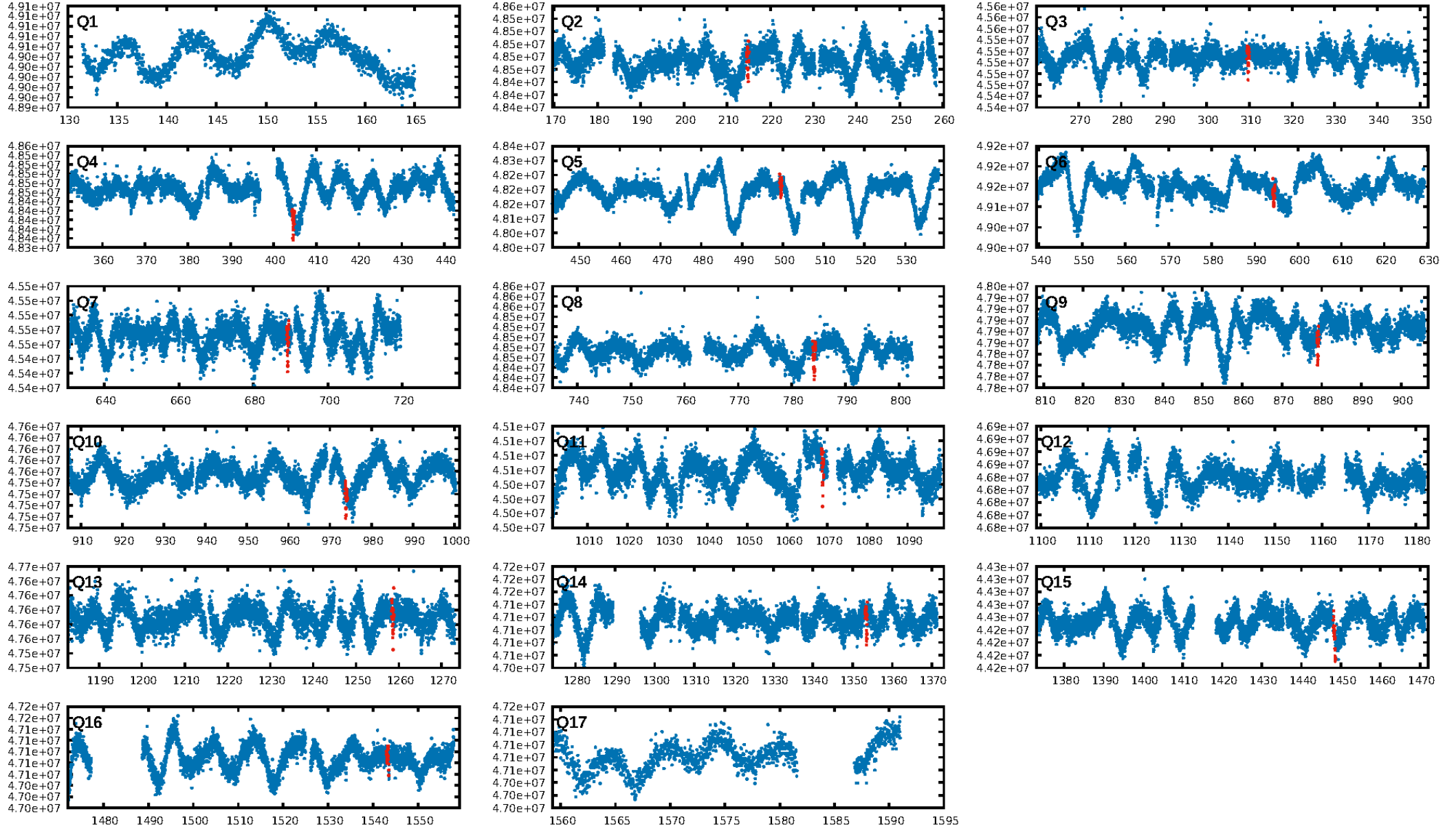
DV Fit Results:

Period = 94.88648 [0.00081] d
Epoch = 214.8271 [0.0066] BKJD
Rp/R* = 0.0334 [0.0077]
a/R* = 40.17 [6.25]
b = 0.97 [0.02]
Seff = 8.00 [1.78]
Teff = 429 [24] K
Rp = 4.00 [1.13] Re
a = 0.4024 [0.0564] AU
Ag = 345.19 [235.53] [1.46σ]
Teffp = 2858 [468] K [5.18σ]

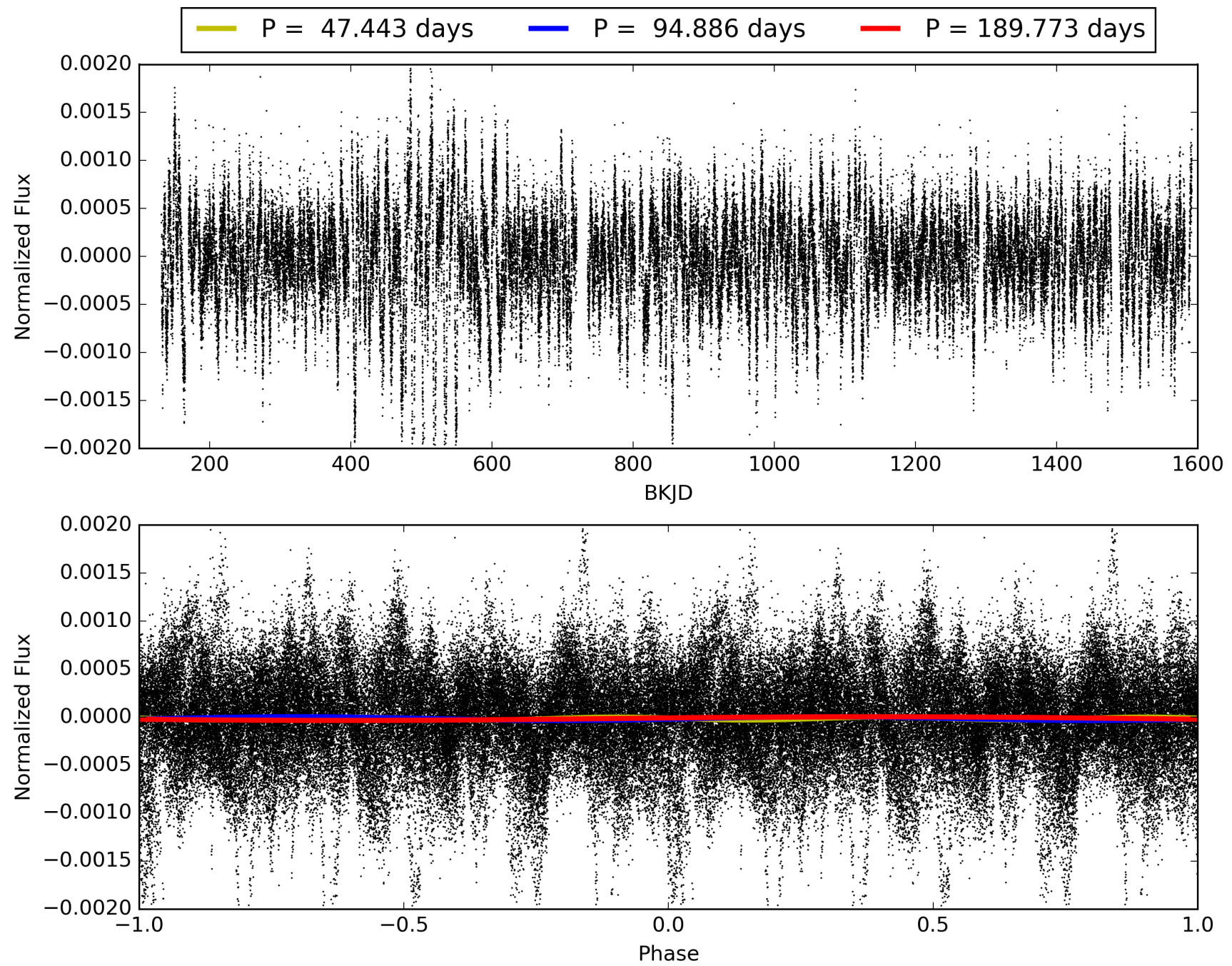
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [219.14σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 90.5%
Bootstrap-pfa: 4.43e-69
RollingBand-fgt: 1.00 [14/14]
GhostDiagnostic-chr: 42.21
Centroid-sig: 83.2%
Centroid-so: 0.110 arcsec [0.22σ]
OotOffset-rm: 0.234 arcsec [1.12σ]
KicOffset-rm: 0.218 arcsec [1.19σ]
OotOffset-st: 4/3/3/3 [13]
KicOffset-st: 4/3/3/3 [13]
DiffImageQuality-fgm: 0.92 [12/13]
DiffImageOverlap-fno: 0.79 [11/14]

TCE 010460984-03, PDC Light Curves

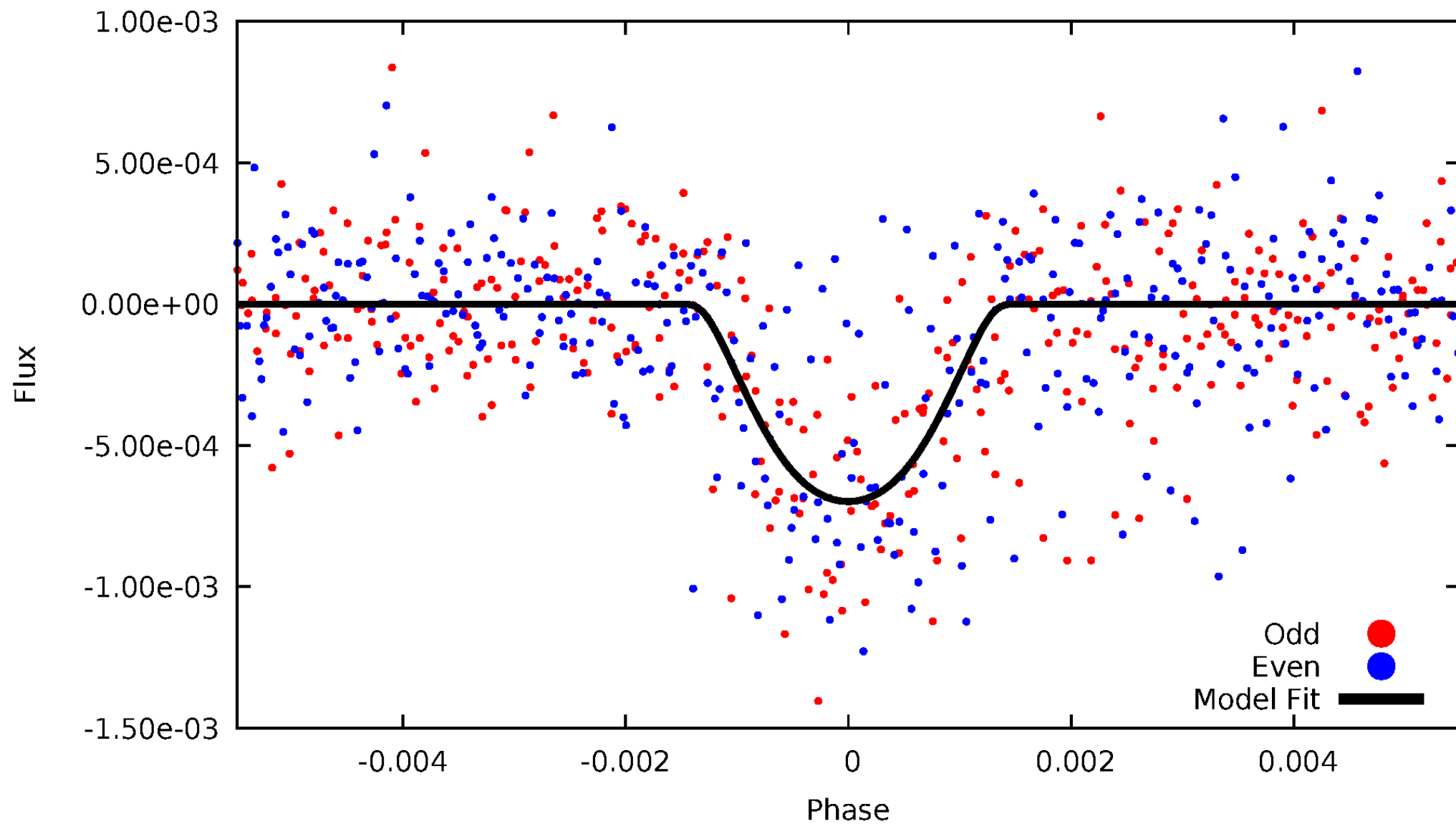


TCE 010460984-03



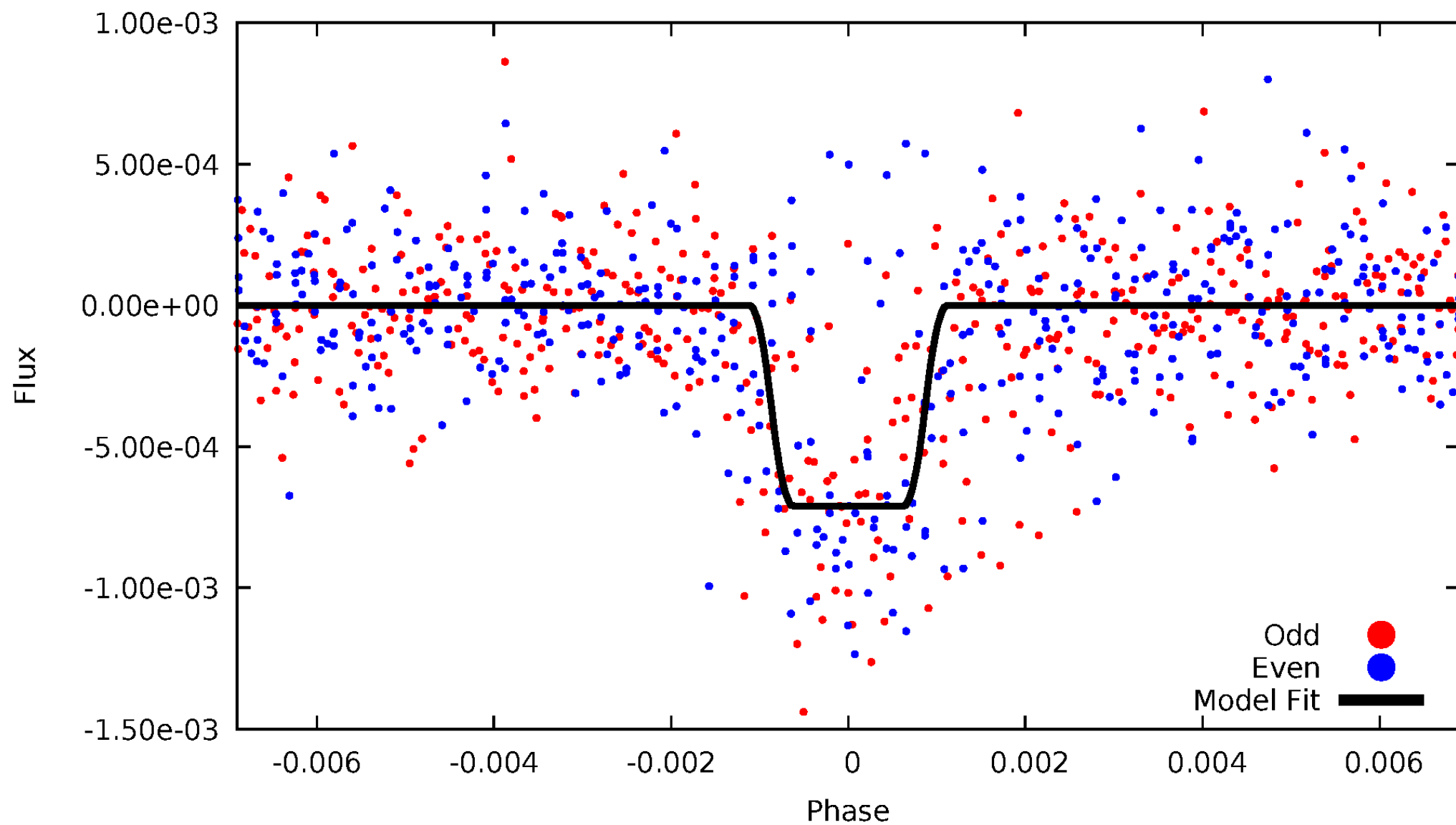
DV Odd/Even

TCE 010460984-03

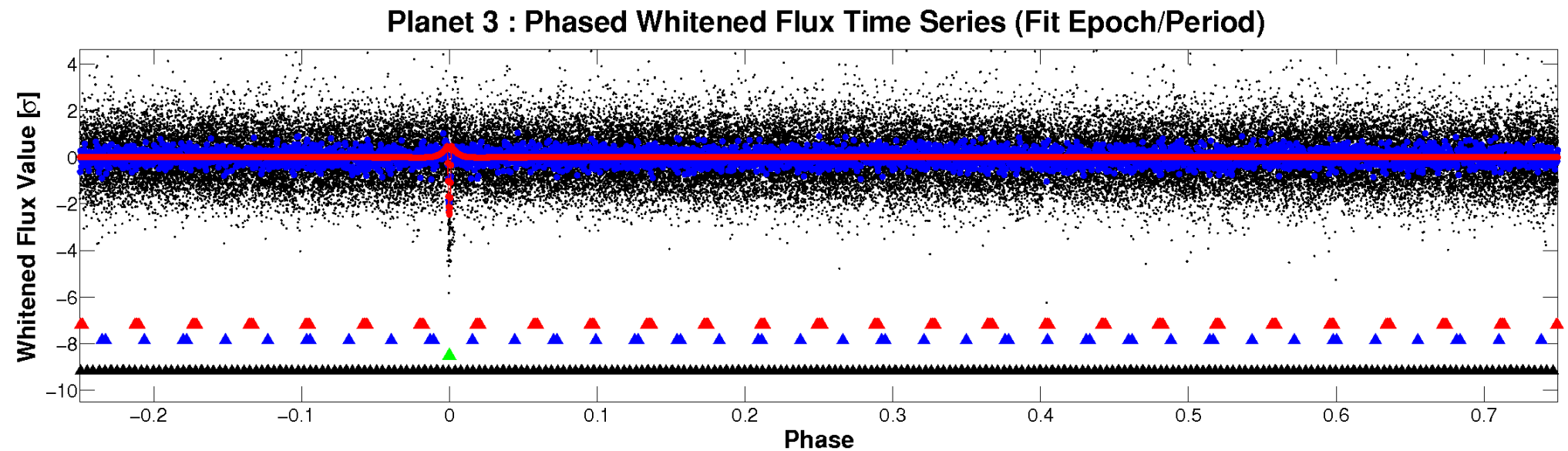
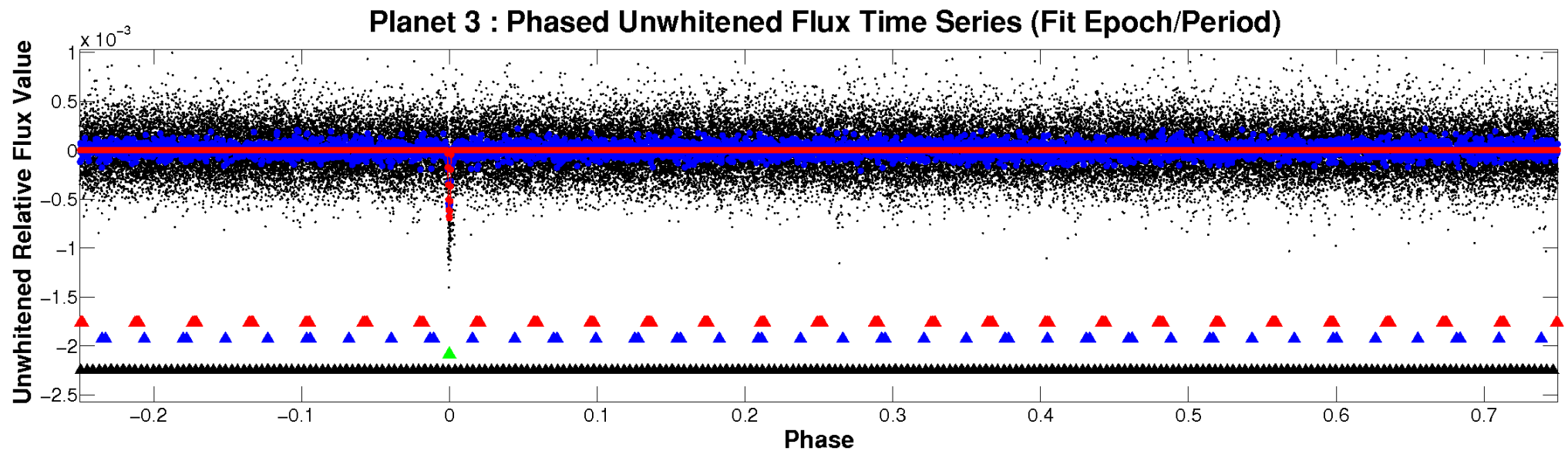


ALT Odd/Even

TCE 010460984-03

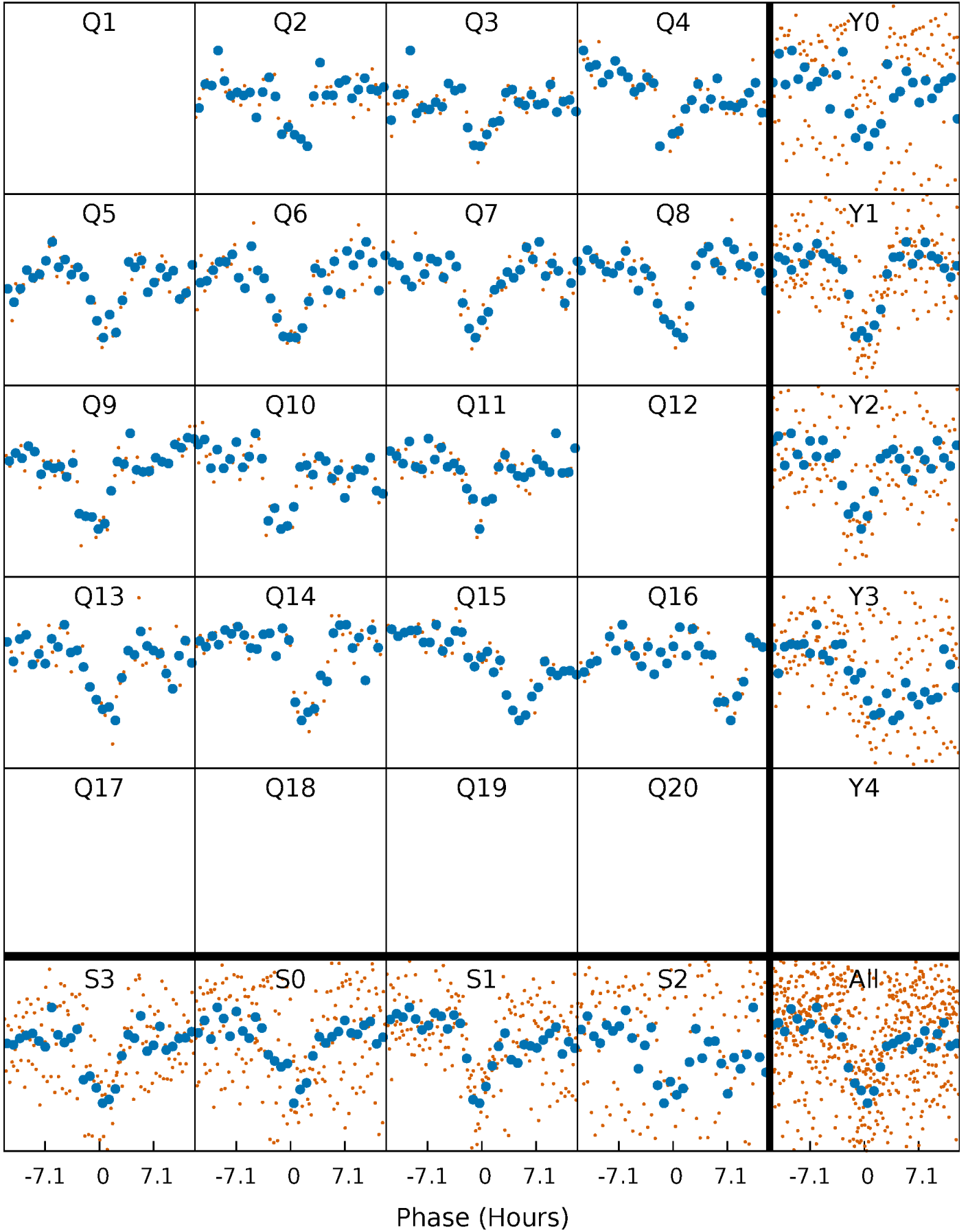


Non-Whitened Vs. Whitened Light Curve



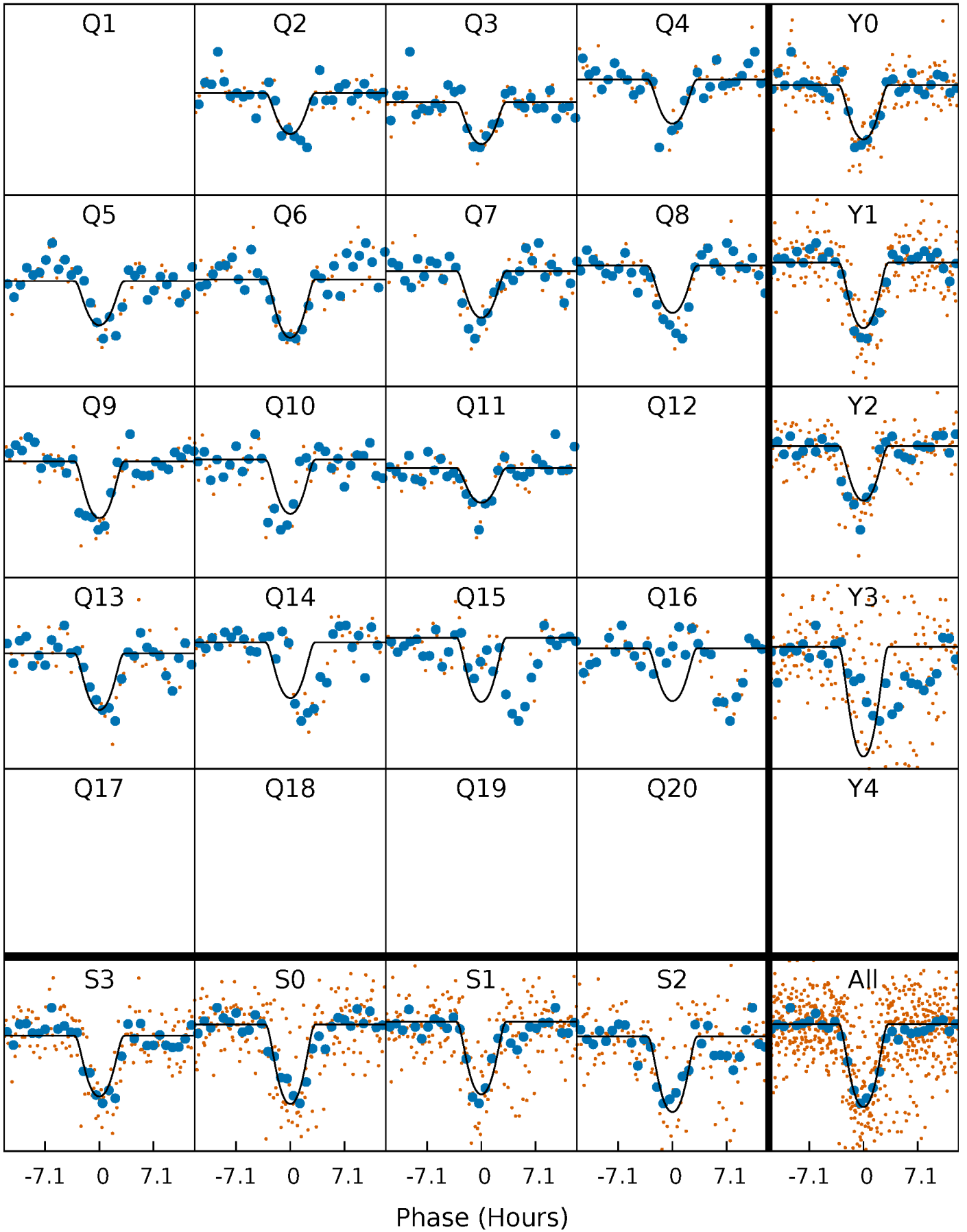
PDC Quarter-Phased Transit Curves

TCE 010460984-03 $P = 94.886484$ Days $T_0 = 214.827111$ (BKJD)



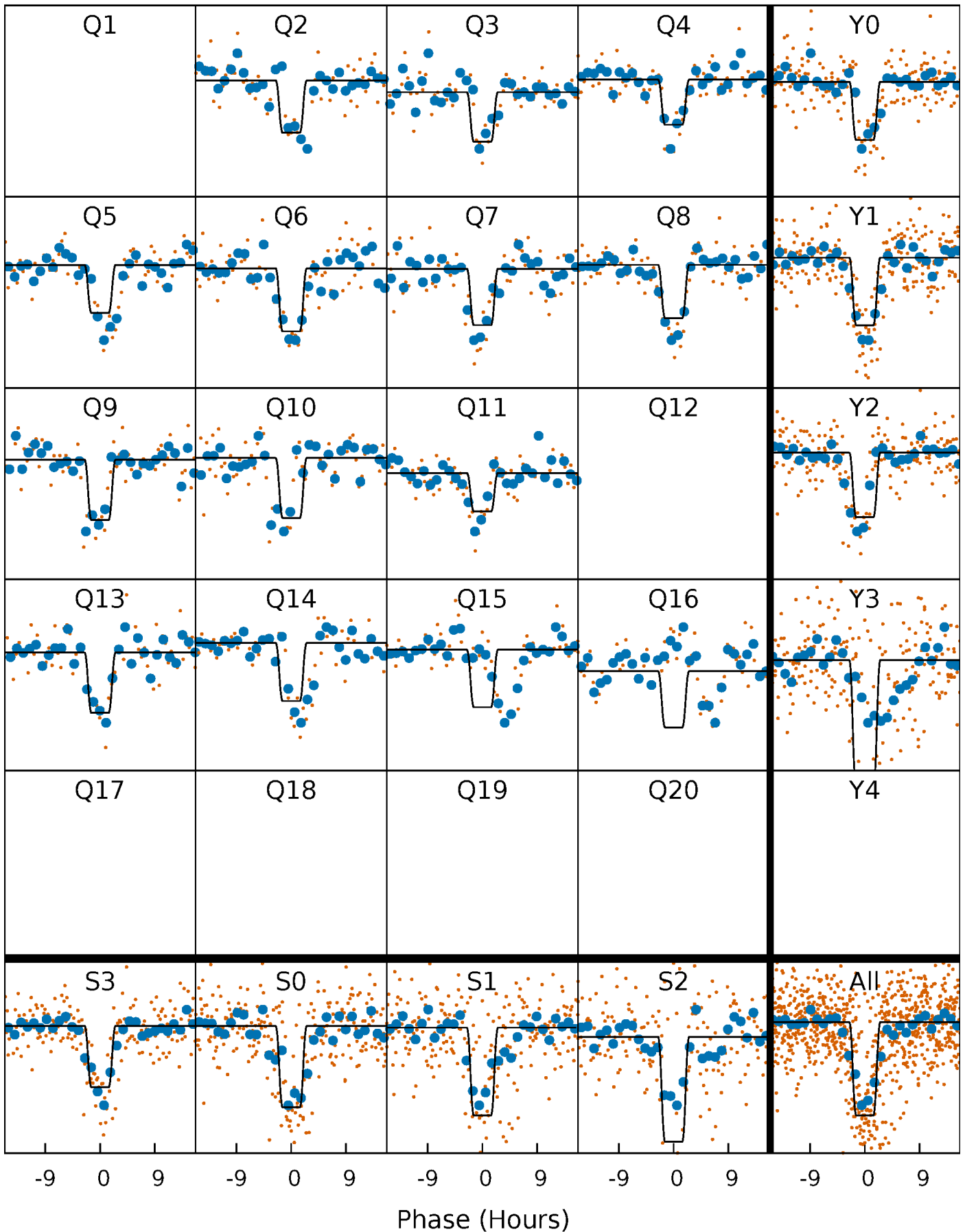
DV Quarter-Phased Transit Curves

TCE 010460984-03 $P = 94.886484$ Days $T_0 = 214.827111$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

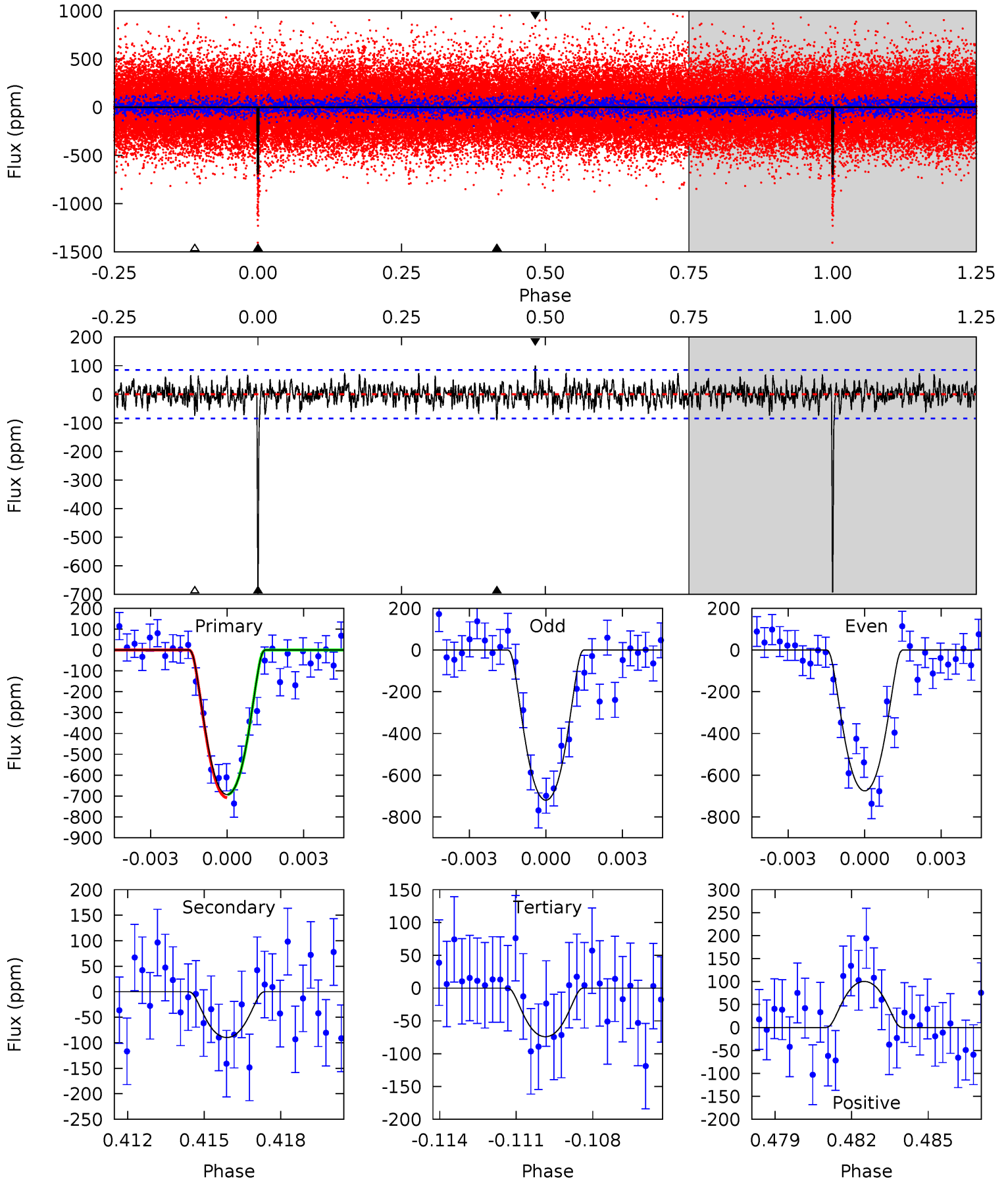
TCE 010460984-03 P= 94.891909 Days $T_0=214.800638$ (BKJD)



DV Model-Shift Uniqueness Test

010460984-03, P = 94.886484 Days, E = 119.940627 Days

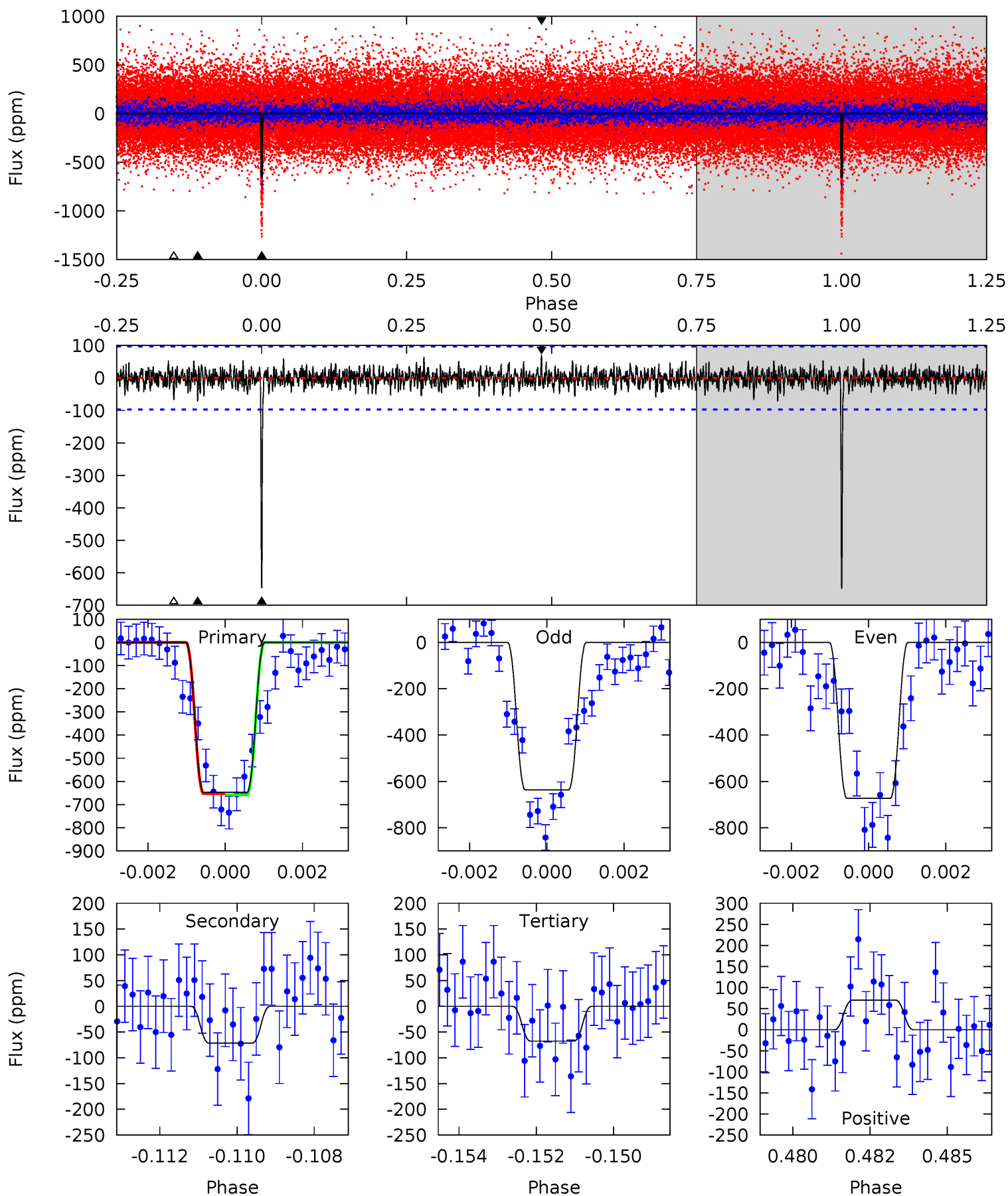
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
42.8	5.54	4.58	6.19	5.26	2.98	1.56	38.2	36.6	0.96	-0.65	1.37	0.92	0.13	0.46



Alt Model-Shift Uniqueness Test

010460984-03, P = 94.891909 Days, E = 119.908729 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
35.4	3.91	3.69	3.84	5.31	3.06	1.05	31.7	31.5	0.22	0.07	0.99	0.86	0.10	0.16



Stellar Parameters For KIC 010460984

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5888^{+106}_{-117}	$4.342^{+0.115}_{-0.115}$	$-0.100^{+0.150}_{-0.150}$	$1.097^{+0.179}_{-0.146}$	$0.966^{+0.075}_{-0.068}$	$1.031^{+0.522}_{-0.345}$
	+2%/-2%	+3%/-3%	+150%/-150%	+16%/-13%	+8%/-7%	+51%/-33%
Source	SPE58	SPE58	SPE58	DSEP		

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

Secondary Eclipse Parameters for KIC 010460984-03 / KOI 0474.03

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-90 ± 16	$3.98^{+0.97}_{-1.00}$	599^{+27}_{-26}	3598^{+347}_{-264}	497^{+422}_{-190}
Alt.	-72 ± 18	$3.18^{+0.99}_{-0.87}$	599^{+30}_{-26}	3701^{+468}_{-339}	606^{+644}_{-278}

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 $A_{obs} \gg 1.0$

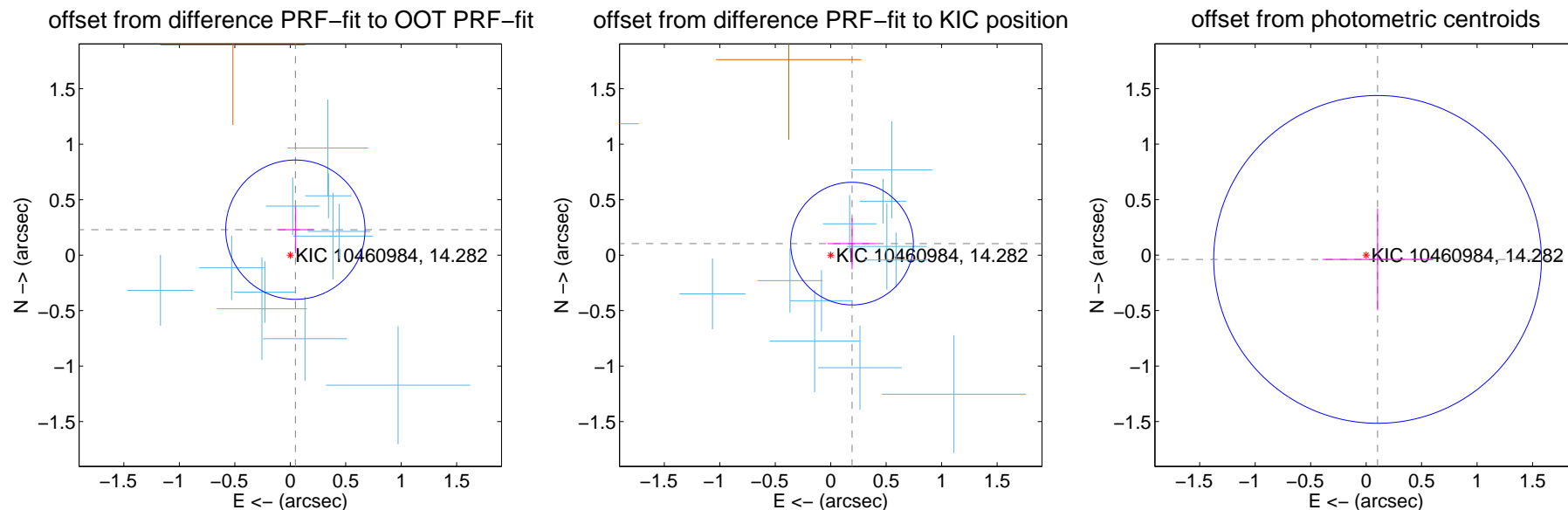
DV Centroid Data

Supplemental centroid analysis for 010460984-03. Kepler magnitude: 14.28. Transit SNR 21.31

There are 12 quarters with good PRF difference image offsets

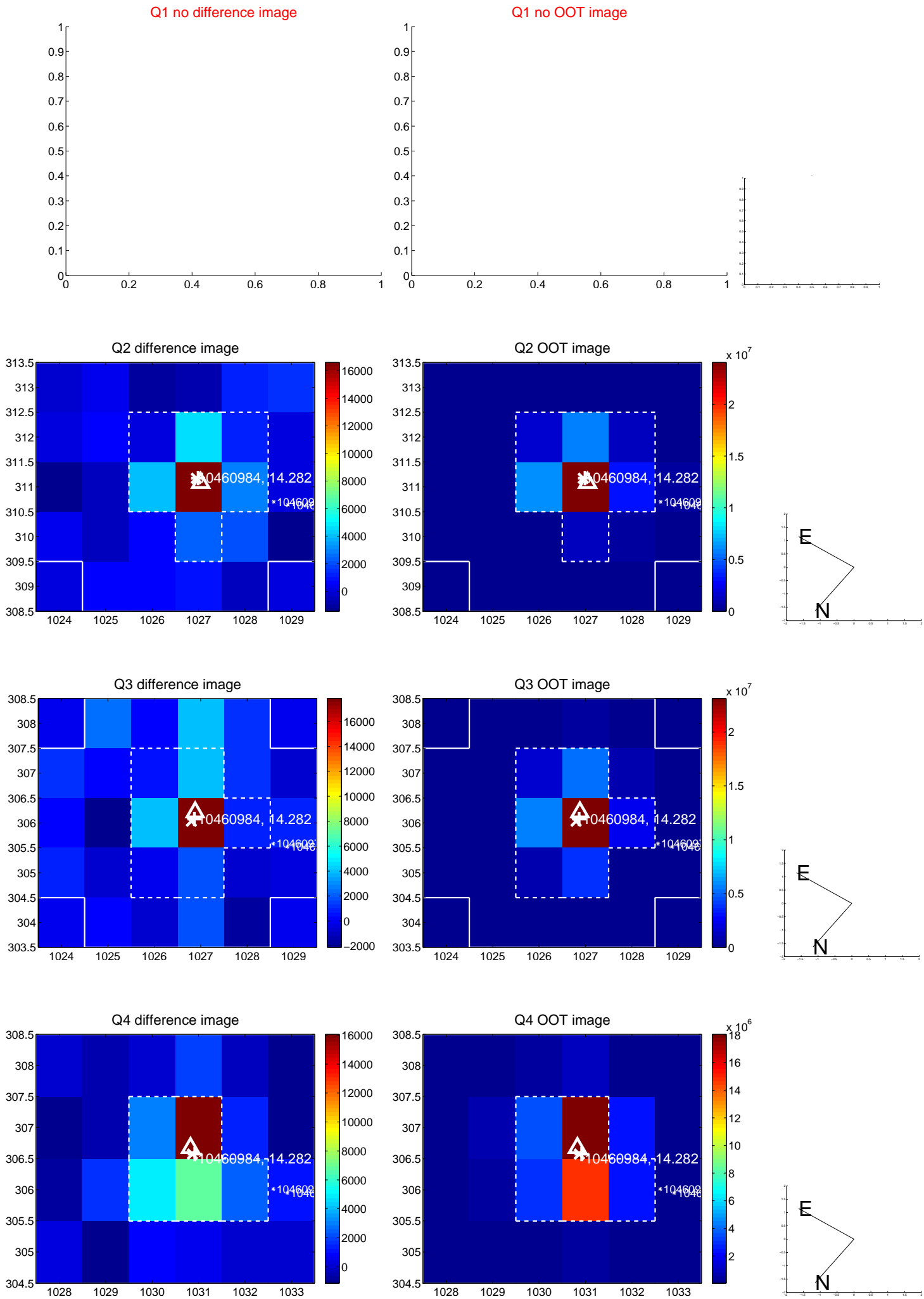
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.234 ± 0.209	1.12	-0.046 ± 0.165	0.230 ± 0.211
PRF-fit source offset from KIC position	0.218 ± 0.184	1.19	-0.192 ± 0.220	0.104 ± 0.232
photometric centroid source offset	0.11 ± 0.49	0.22	-0.10 ± 0.50	-0.04 ± 0.46

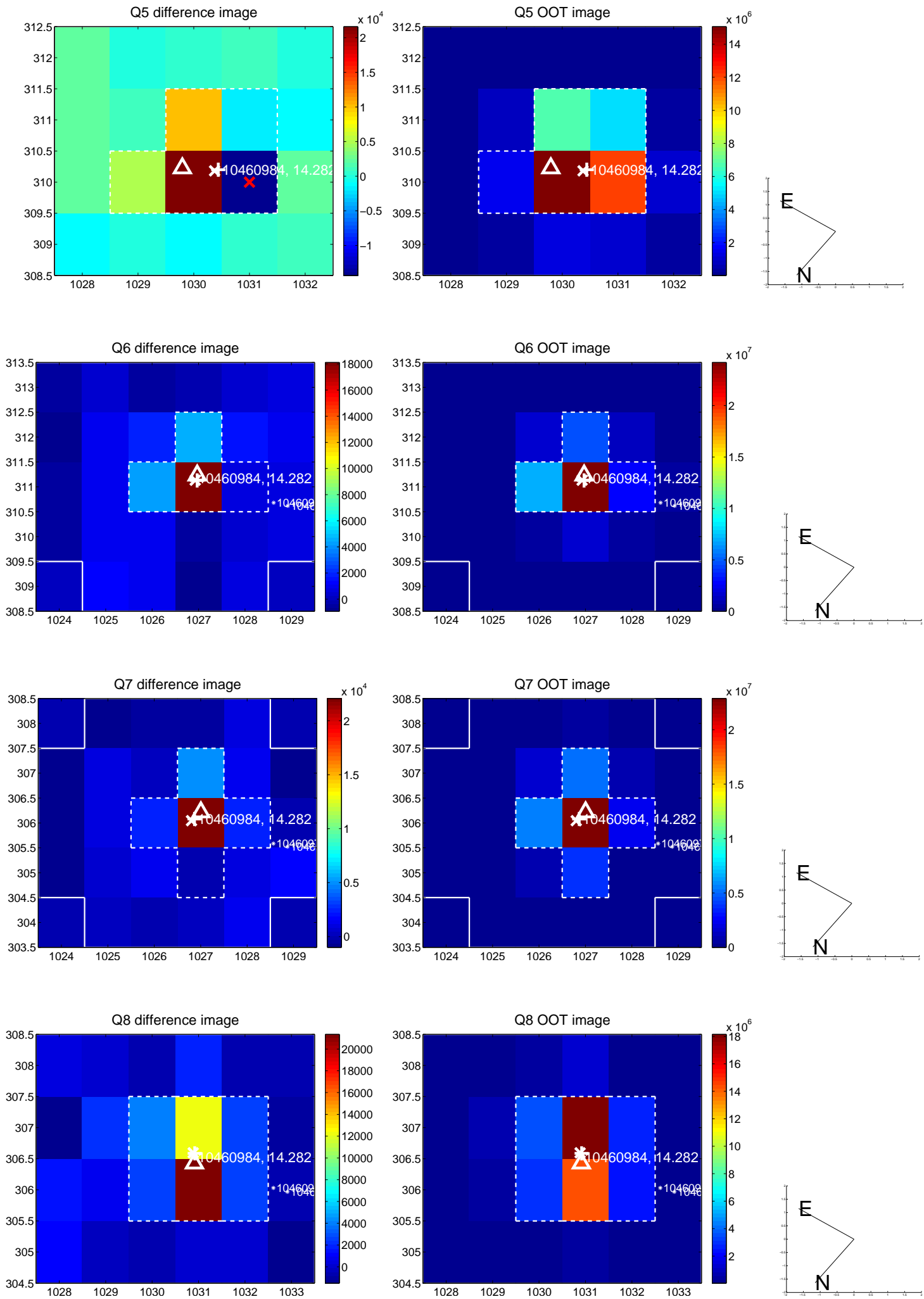


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

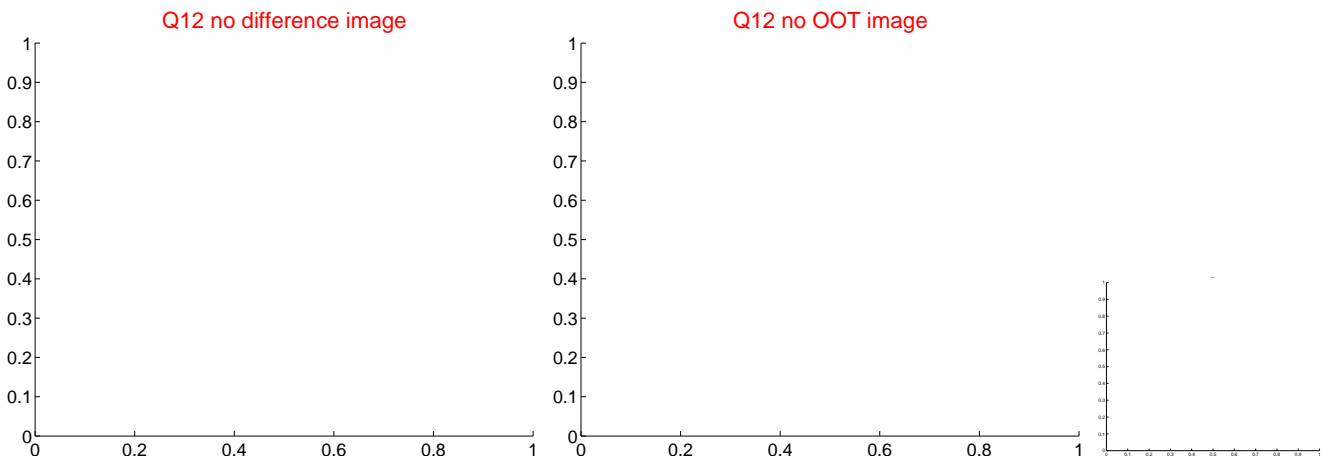
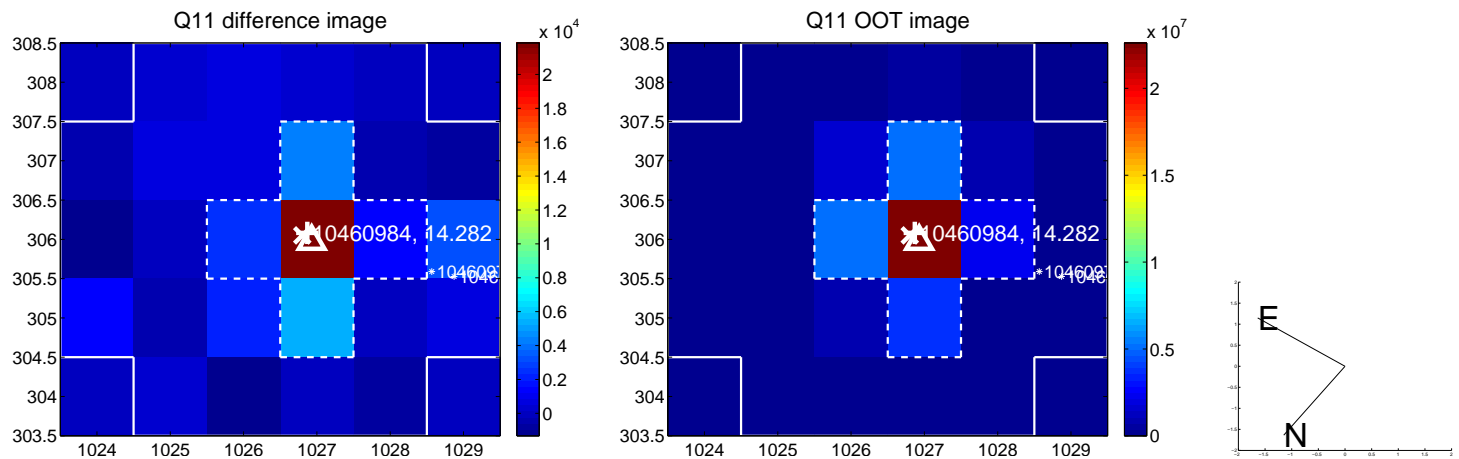
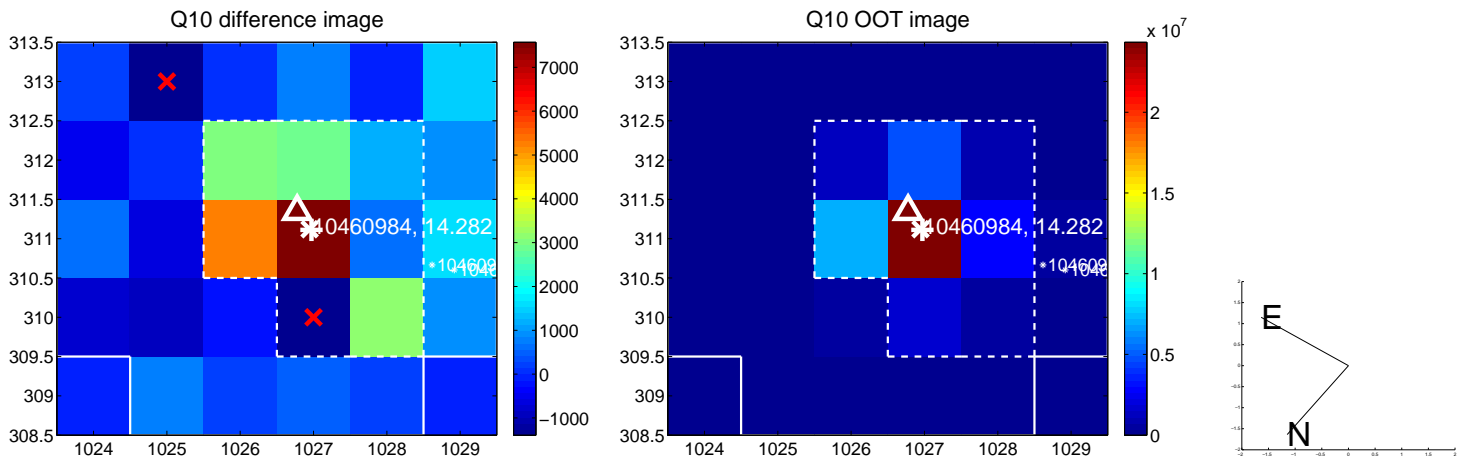
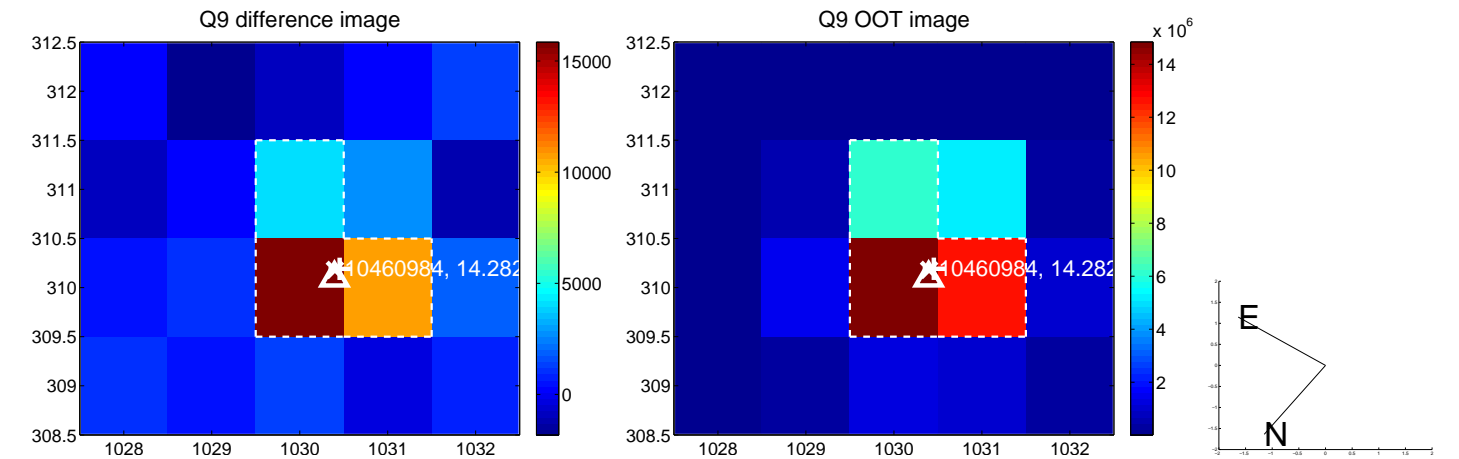
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



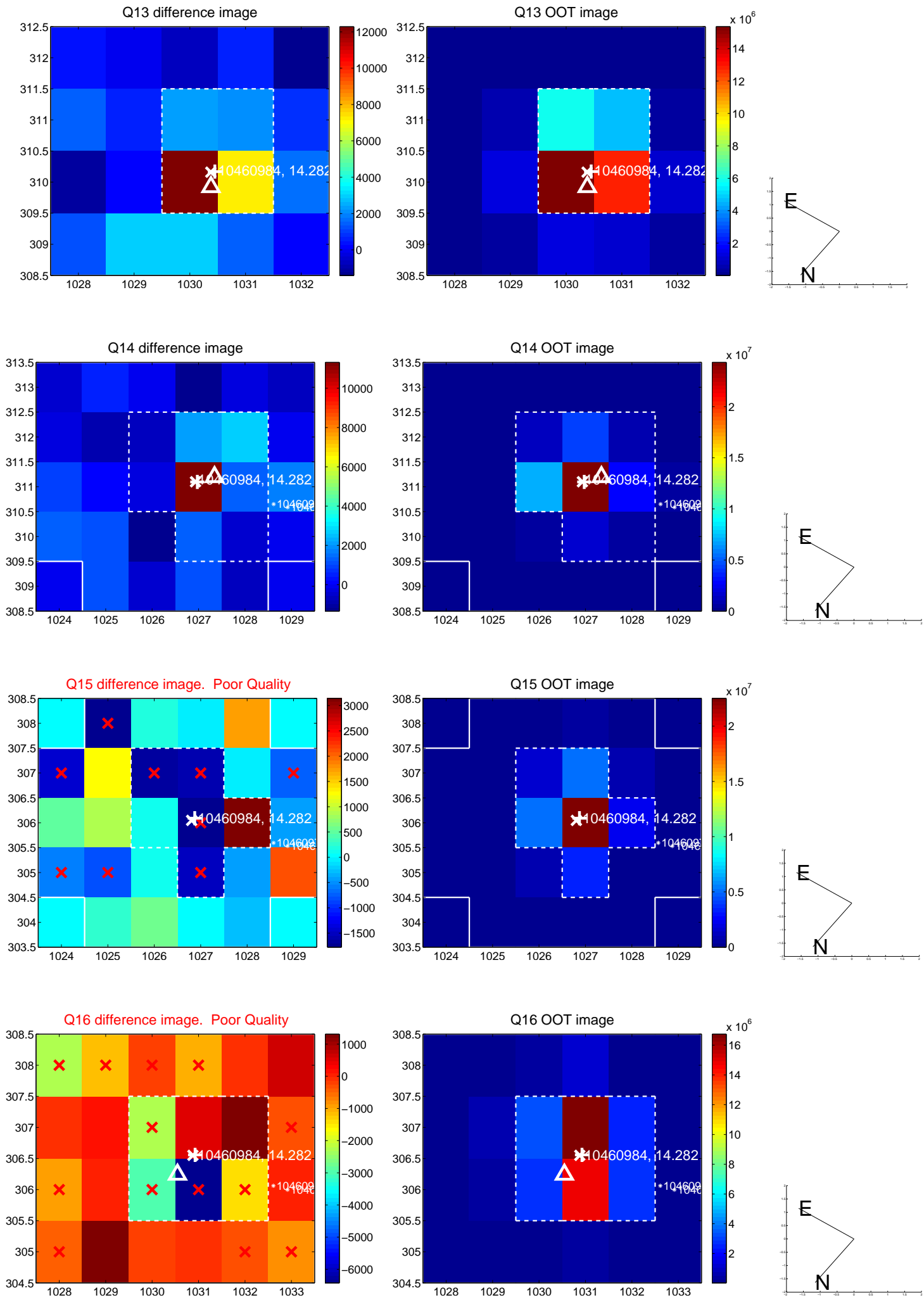
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



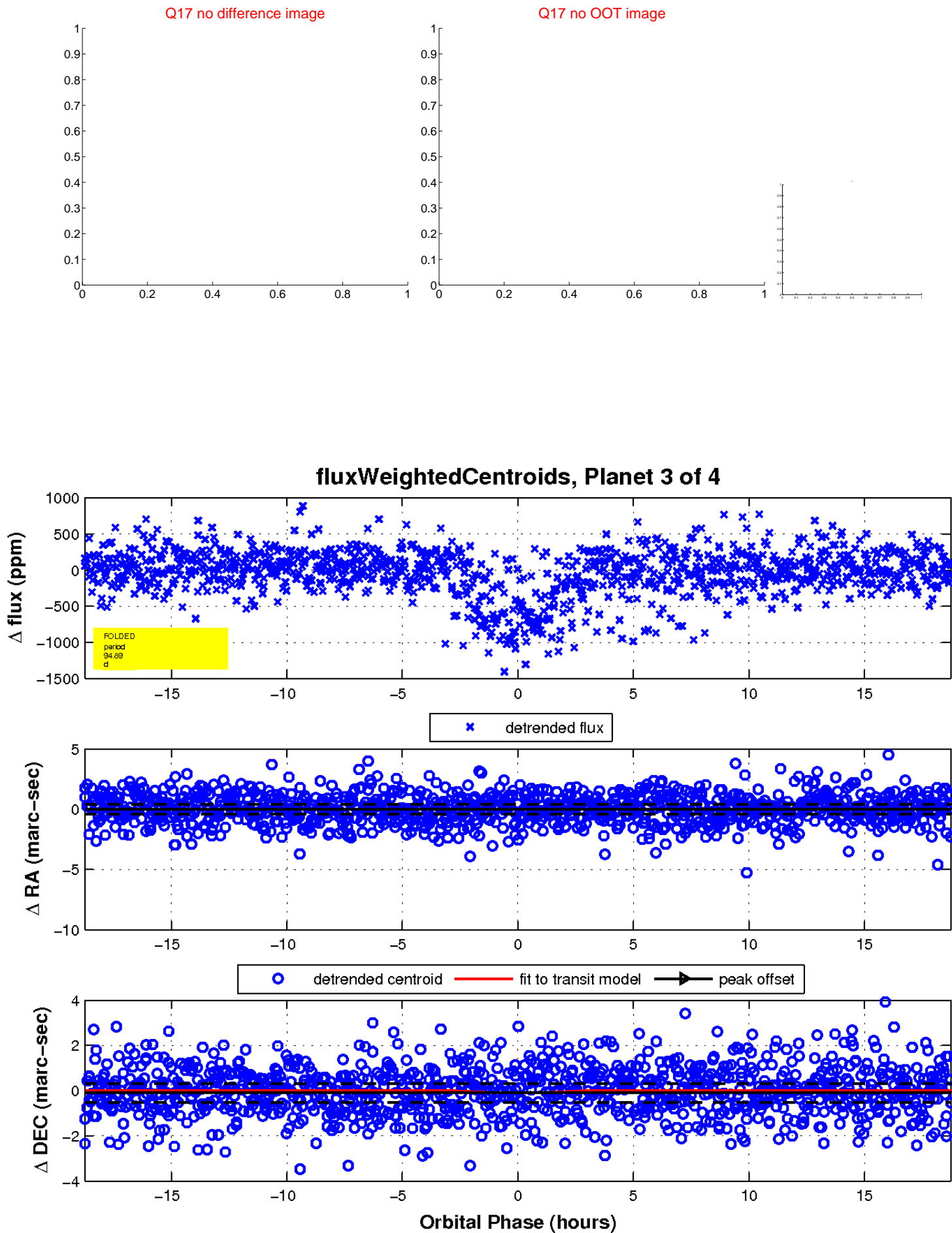
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

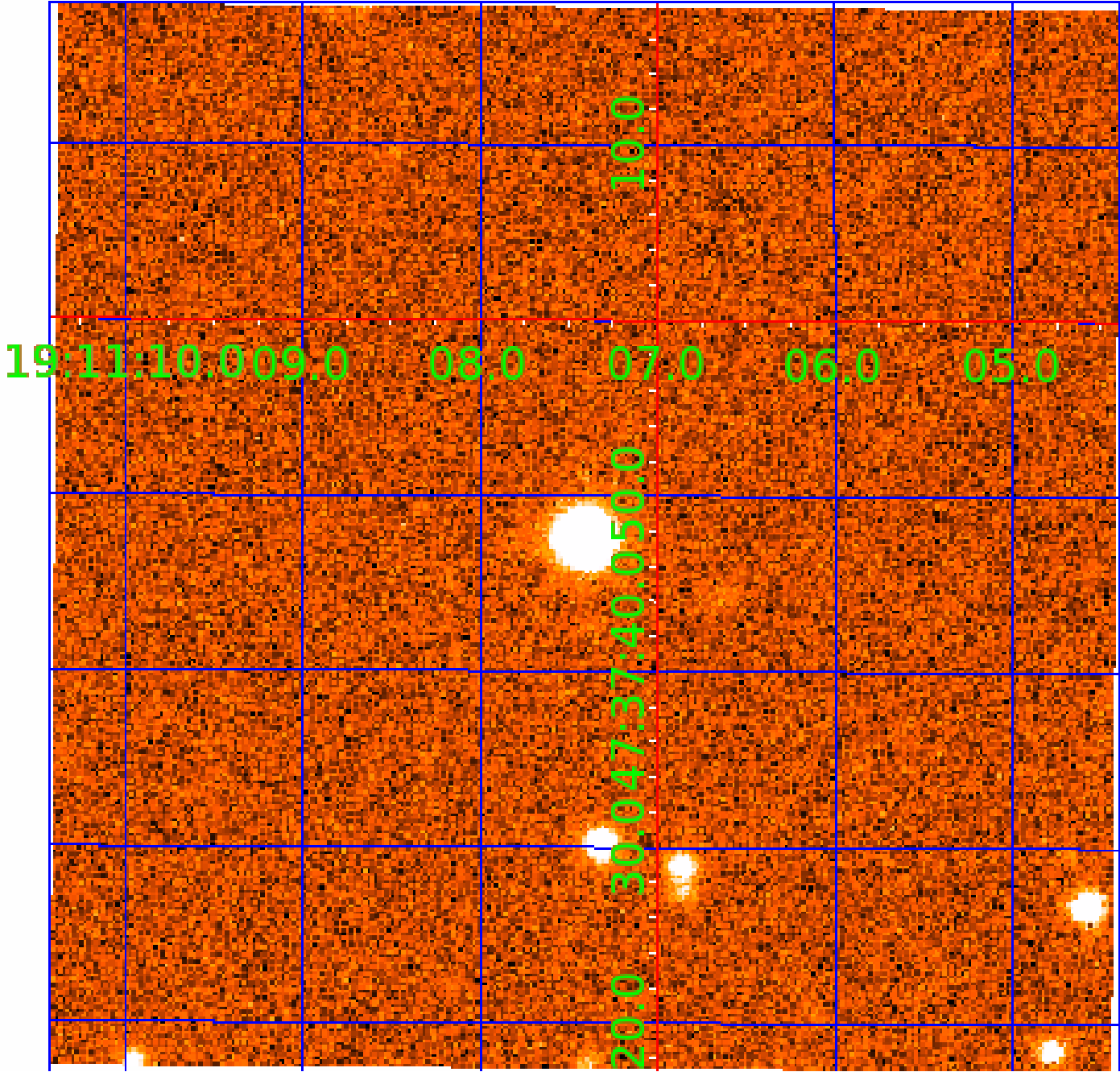


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010460984

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})
010460984-01	OBS	0474.01	10.945752	132.936873	531.2	3.260	44.6	47.5	1.10	5888	2.99	142.53
010460984-02	OBS	0474.02	28.986830	134.782609	454.7	3.612	24.7	26.8	1.10	5888	2.63	38.90
010460984-03	OBS	0474.03	94.886484	214.827111	698.2	6.248	19.5	21.3	1.10	5888	4.00	8.00
010460984-04	OBS	0474.04	5.035004	132.663851	155.4	1.736	14.3	16.5	1.10	5888	1.62	401.39

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010460984-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010460984-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010460984-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010460984-04	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.

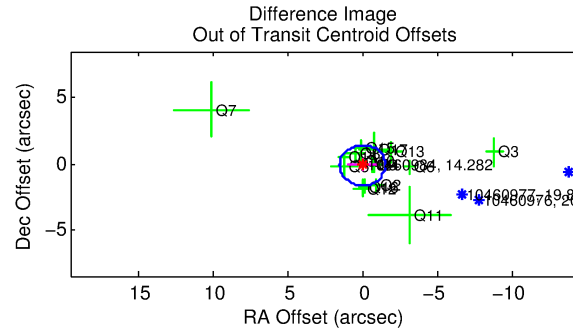
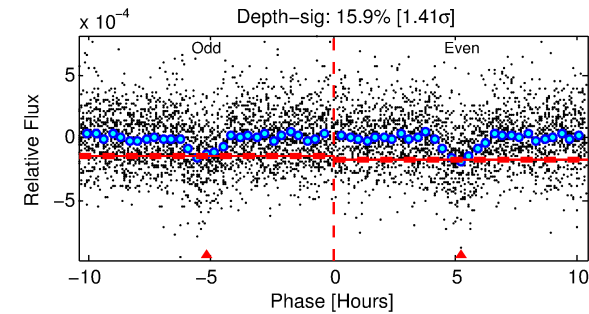
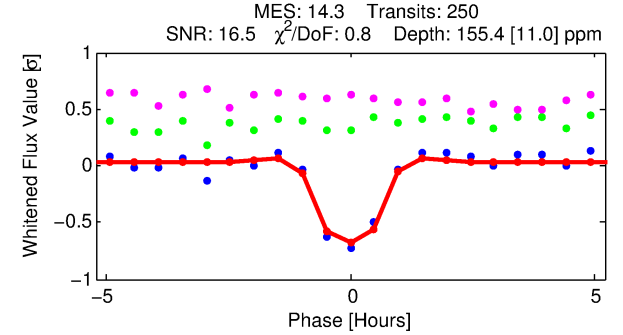
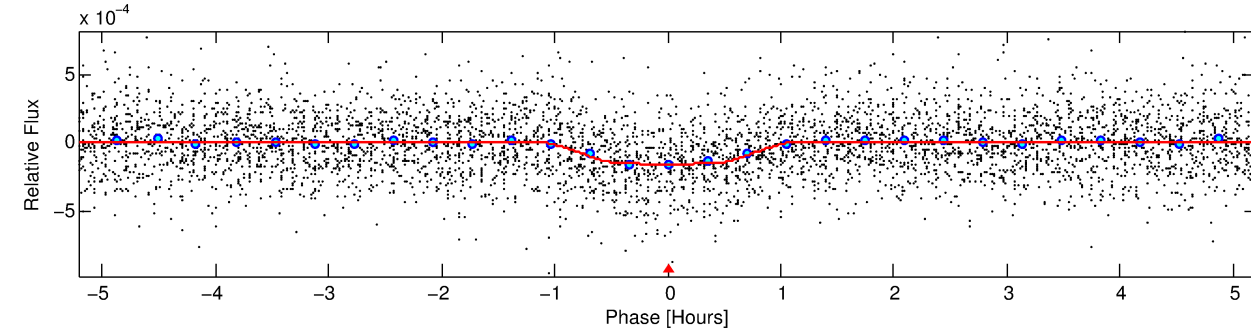
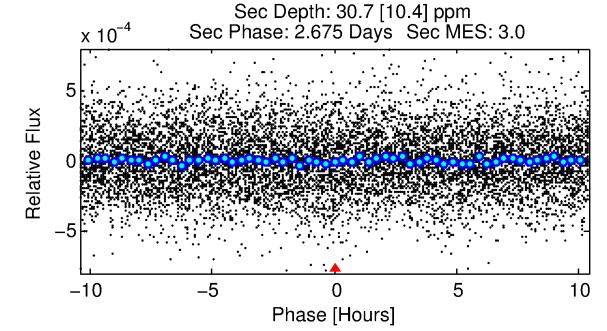
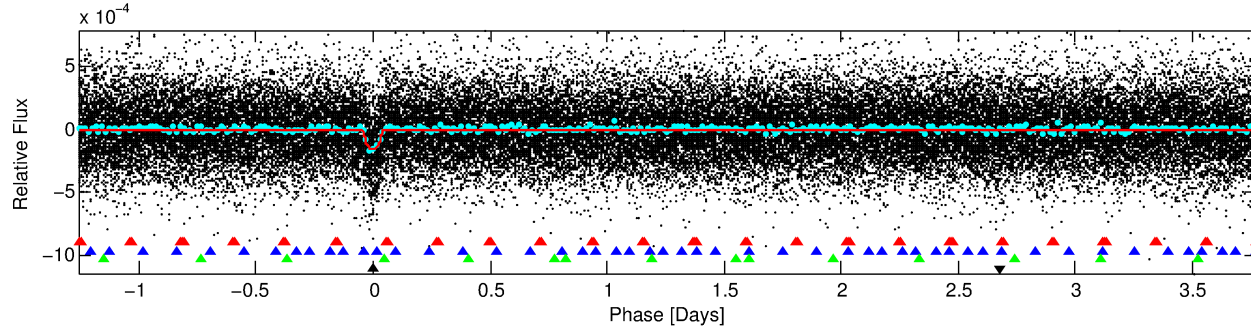
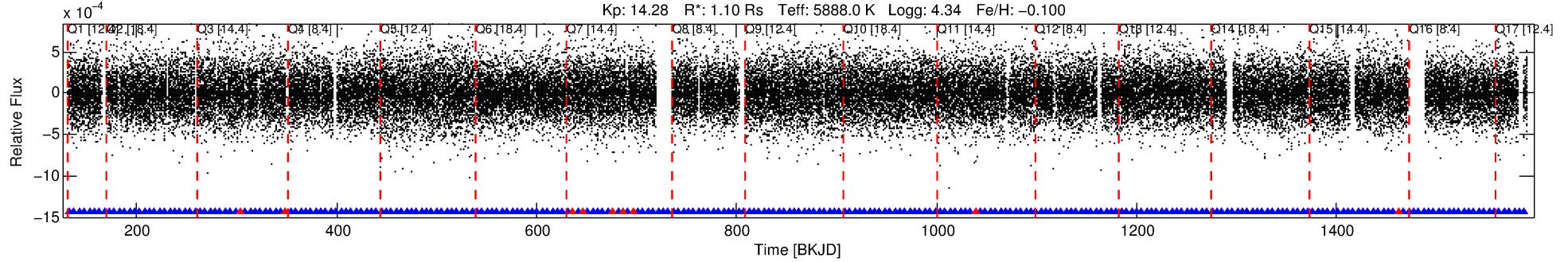
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010460984-04

No Significant Match Found

DV One-Page Summary

KIC: 10460984 Candidate: 4 of 4 Period: 5.035 d
KOI: K00474.04 Name: Kepler-164b Corr: 0.938



DV Fit Results:

Period = 5.03500 [0.00002] d
Epoch = 132.6639 [0.0021] BKJD
Rp/R* = 0.0135 [0.0070]
a/R* = 10.49 [27.05]
b = 0.90 [0.58]
Seff = 401.39 [89.14]
Teq = 1141 [63] K
Rp = 1.62 [0.88] Re
a = 0.0568 [0.0080] AU
Ag = 20.82 [23.22] [0.85σ]
Teffp = 3770 [1035] K [2.53σ]

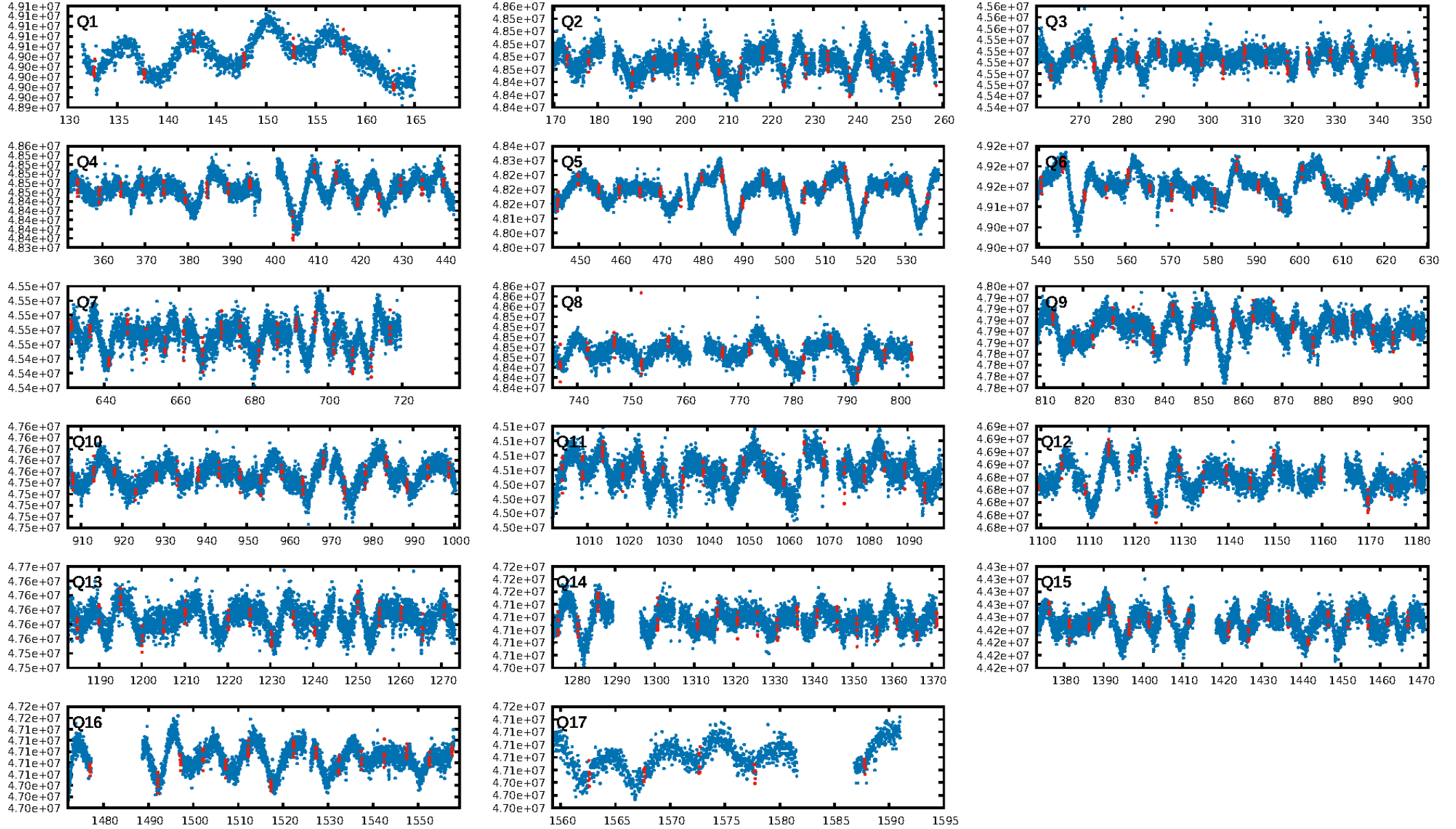
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [38.41σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 7.24e-45
RollingBand-fgt: 0.96 [230/239]
GhostDiagnostic-chr: -17.87
Centroid-sig: 43.8%
Centroid-so: 0.662 arcsec [0.84σ]
OotOffset-rm: 0.127 arcsec [0.25σ]
KicOffset-rm: 0.296 arcsec [0.41σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.75 [12/16]
DiffImageOverlap-fno: 1.00 [17/17]

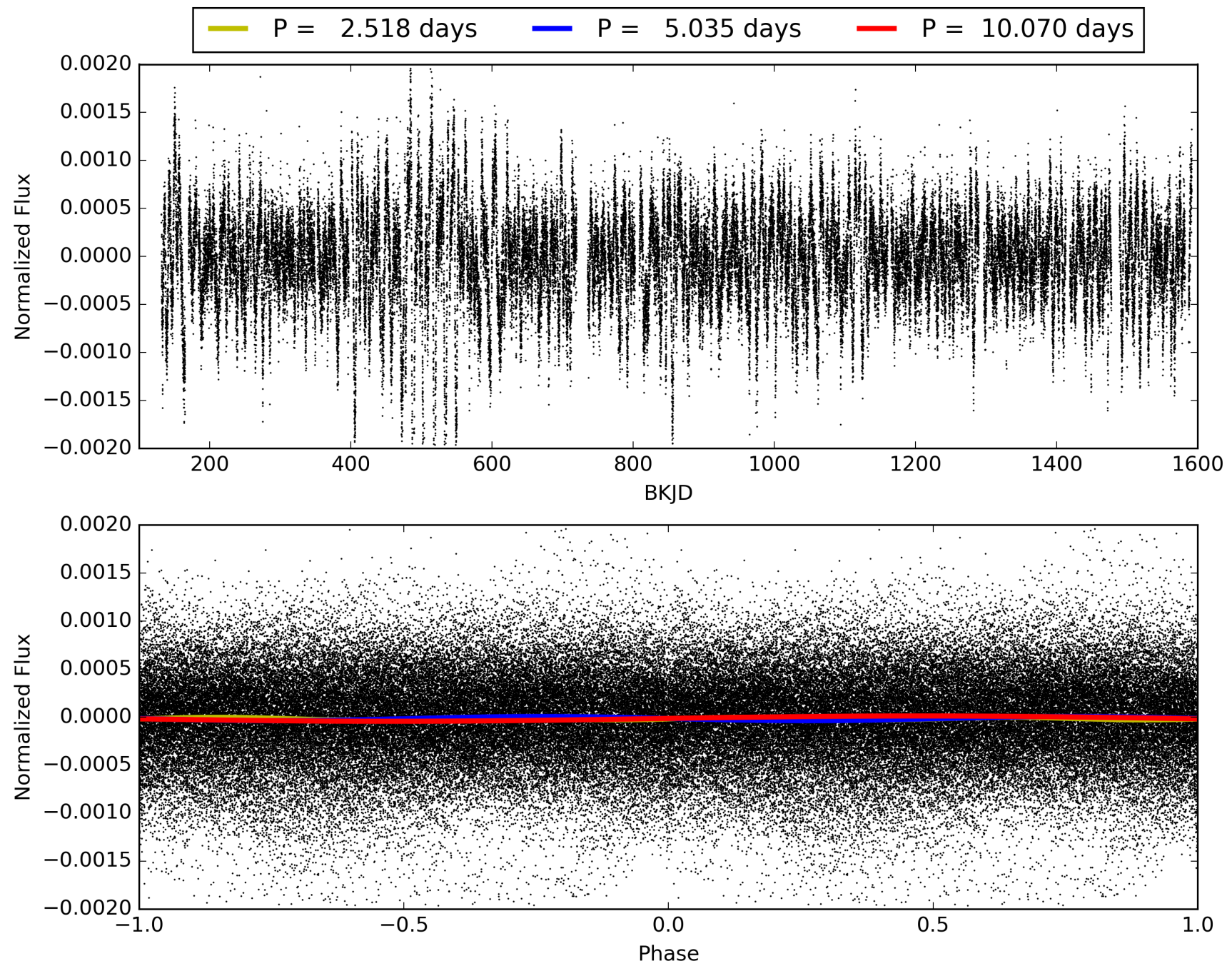
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 11:13:02 Z

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

TCE 010460984-04, PDC Light Curves

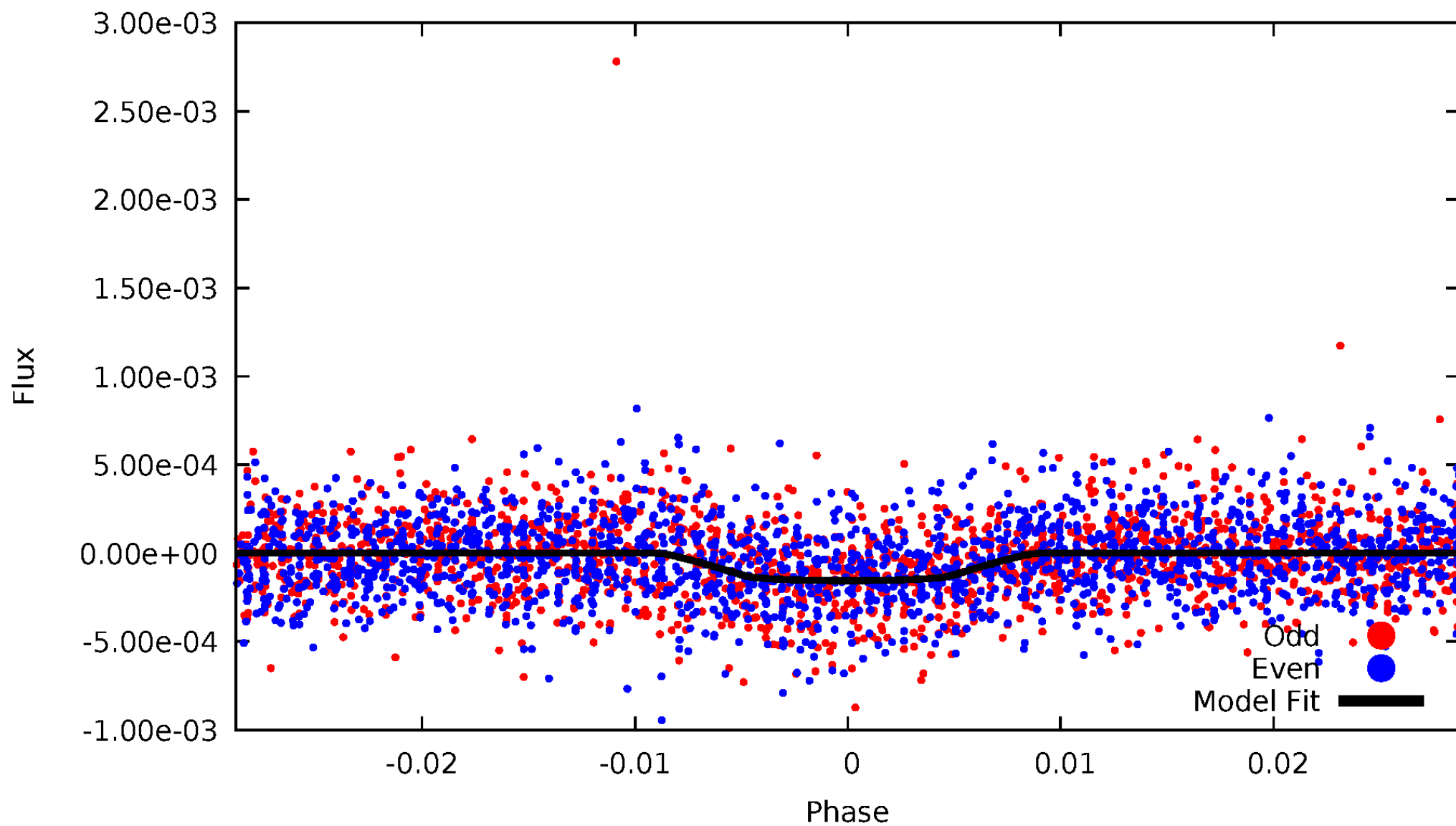


TCE 010460984-04



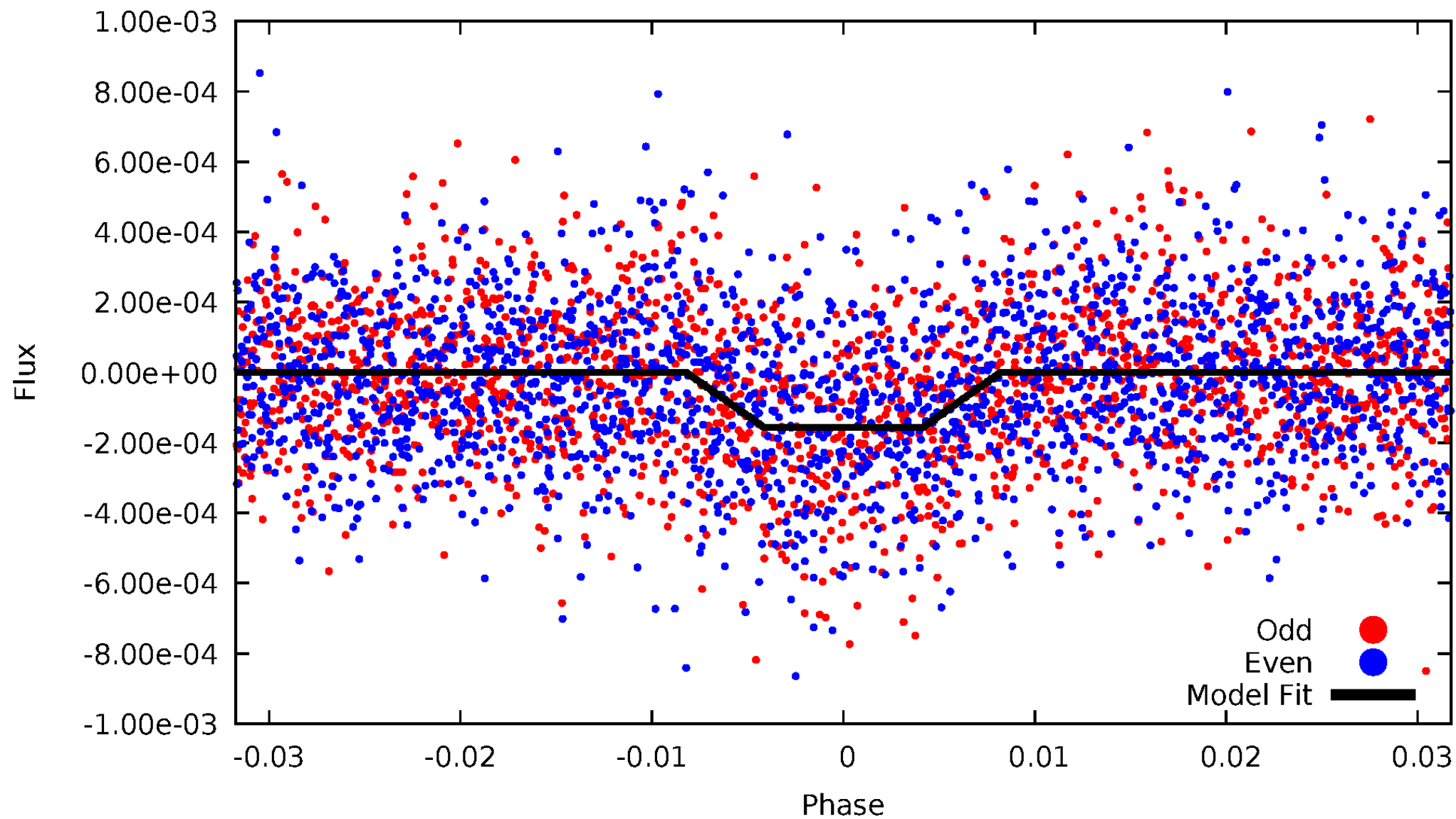
DV Odd/Even

TCE 010460984-04



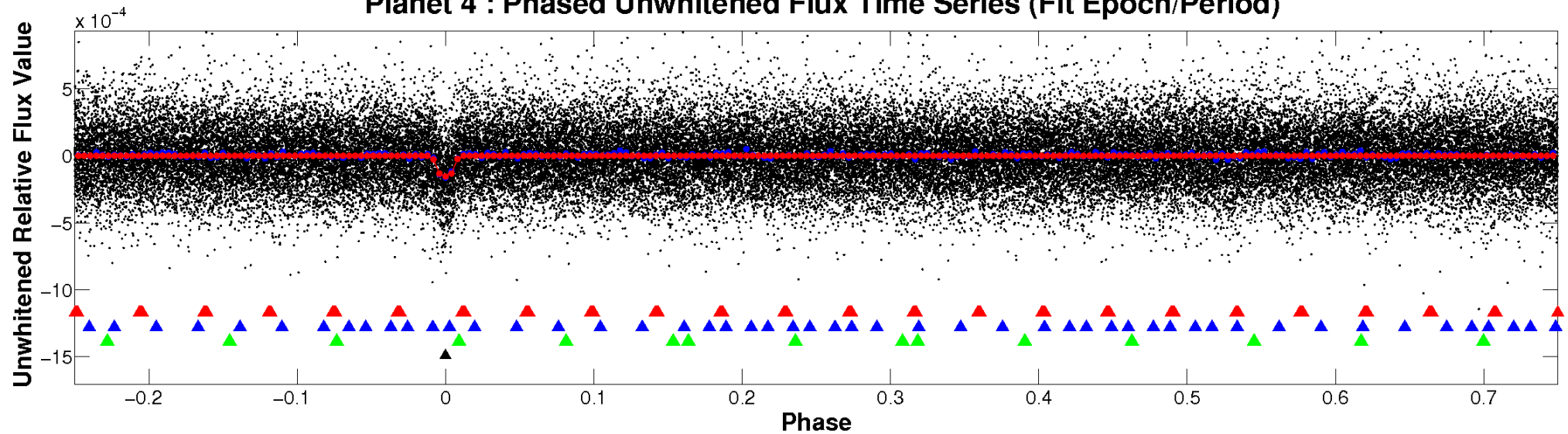
ALT Odd/Even

TCE 010460984-04

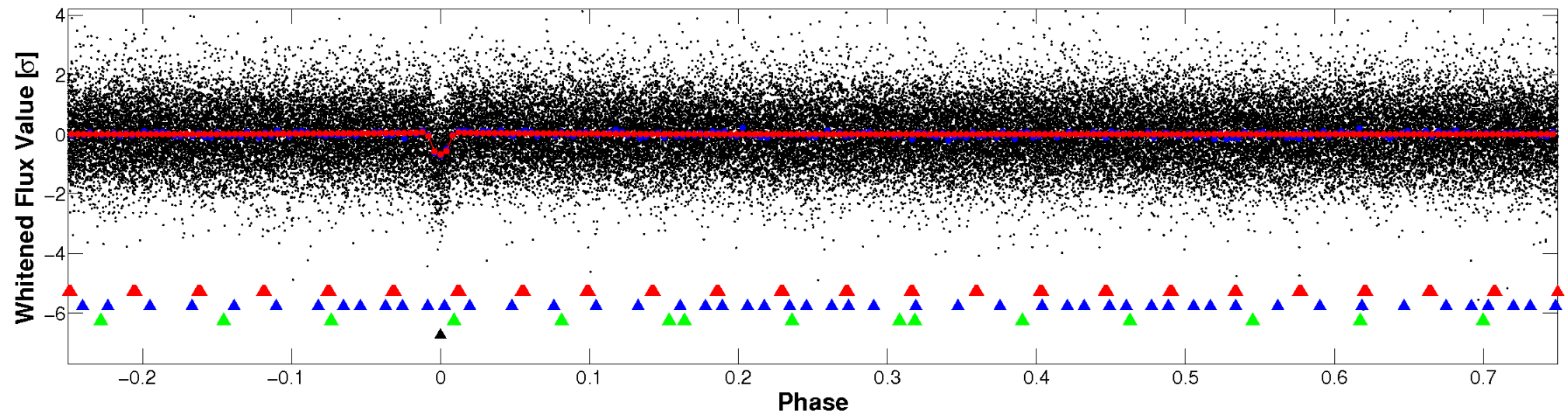


Non-Whitened Vs. Whitened Light Curve

Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

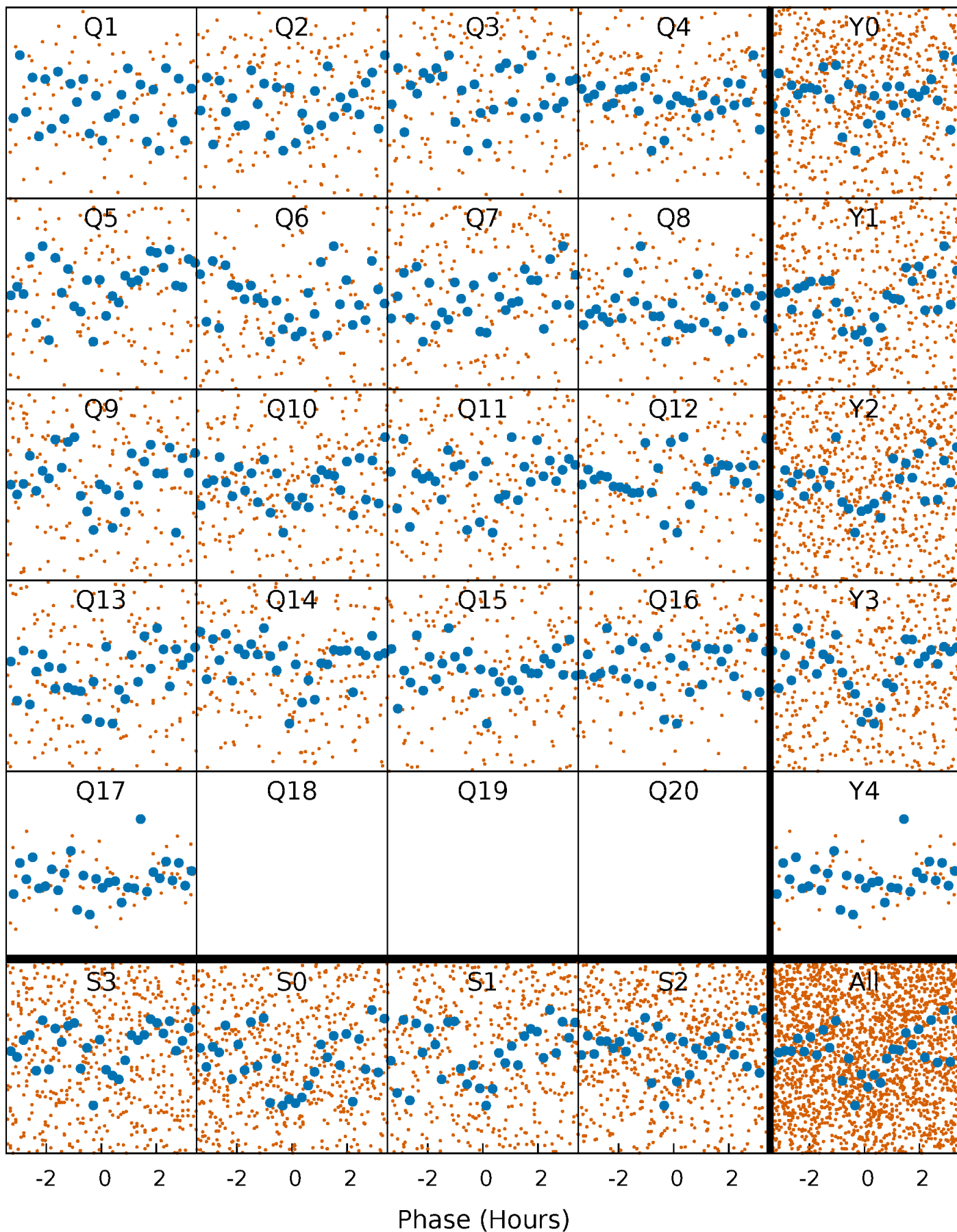


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



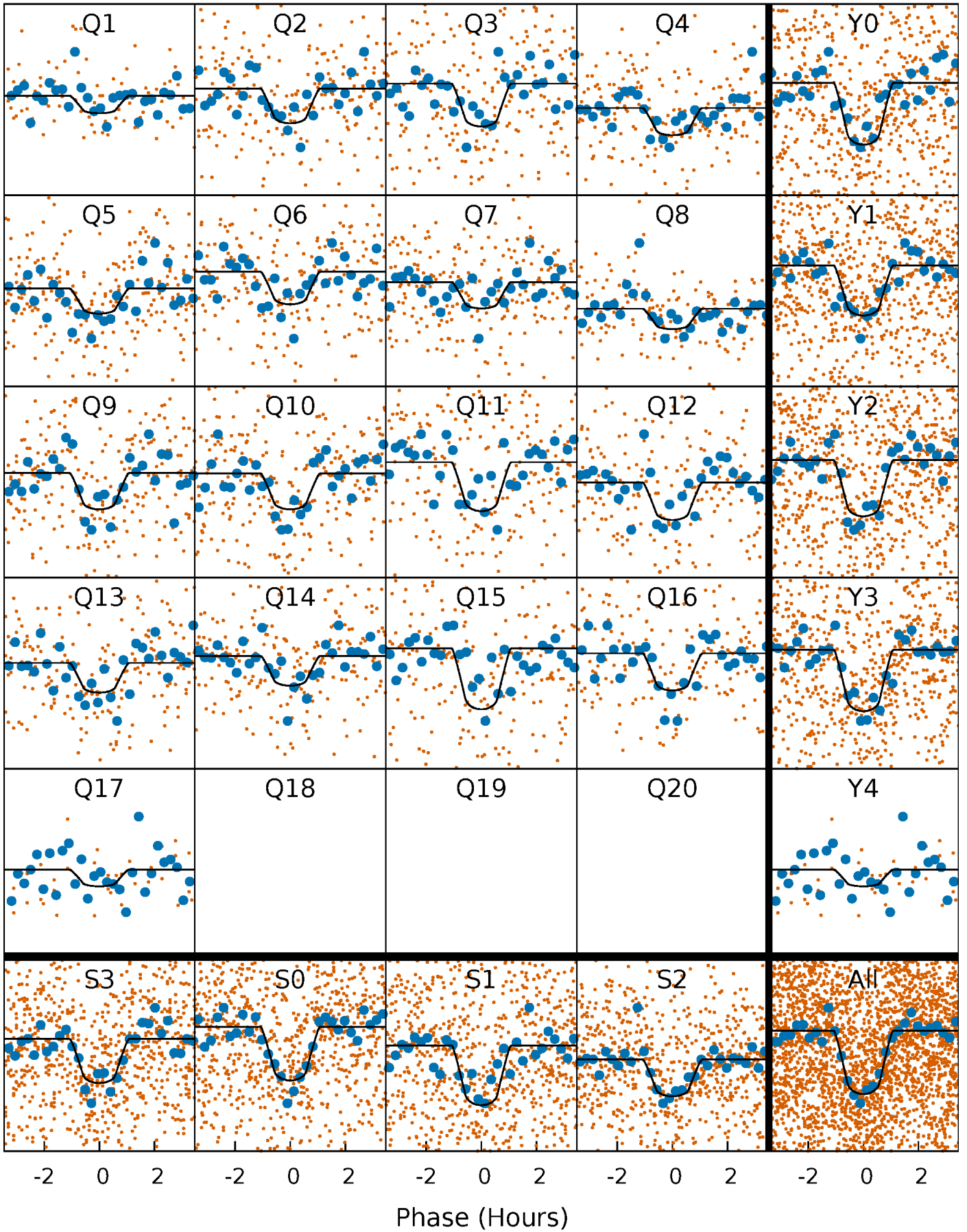
PDC Quarter-Phased Transit Curves

TCE 010460984-04 P= 5.035004 Days $T_0=132.663851$ (BKJD)



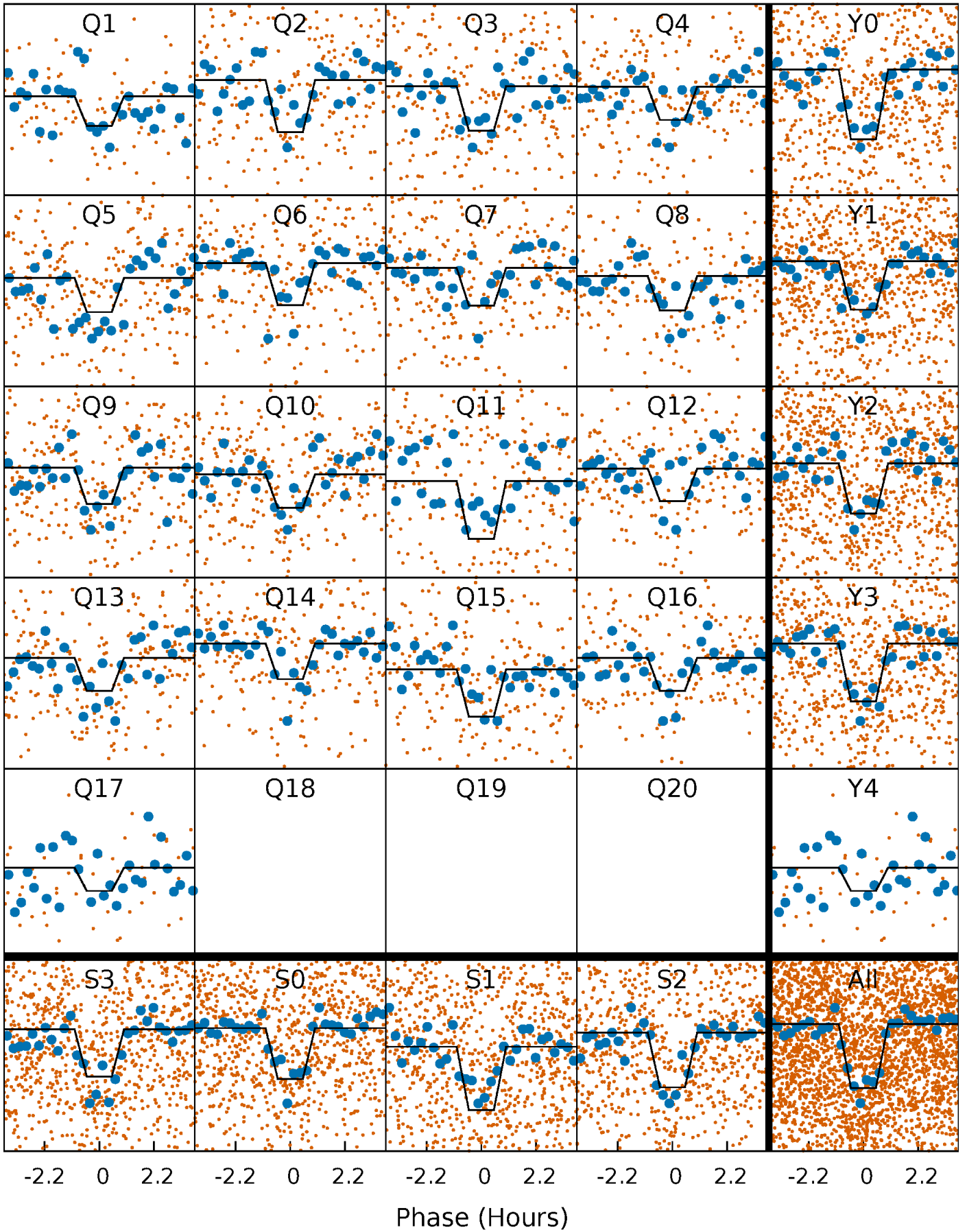
DV Quarter-Phased Transit Curves

TCE 010460984-04 P= 5.035004 Days $T_0=132.663851$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

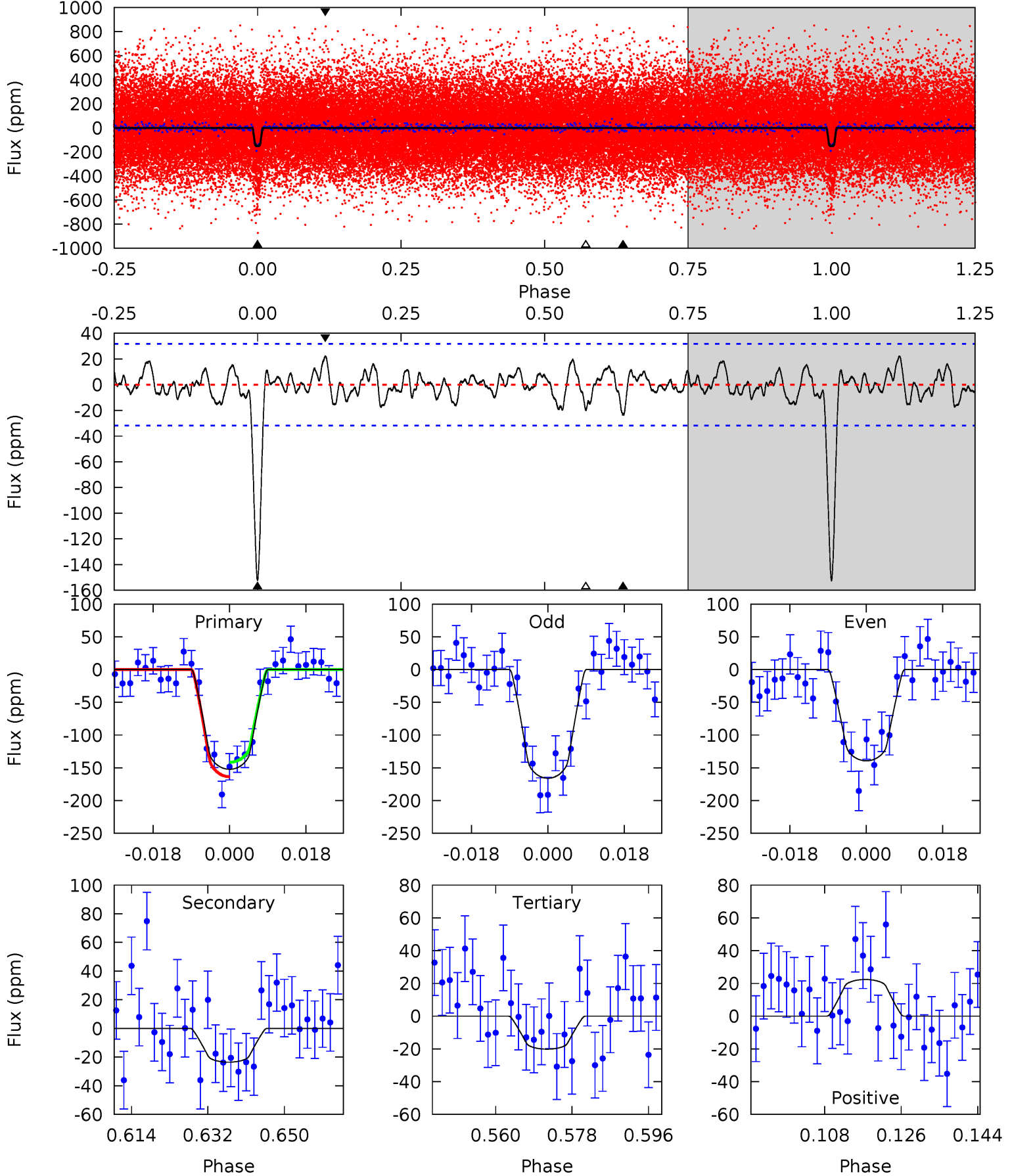
TCE 010460984-04 $P = 5.035030$ Days $T_0 = 132.659456$ (BKJD)



DV Model-Shift Uniqueness Test

010460984-04, P = 5.035004 Days, E = 127.628847 Days

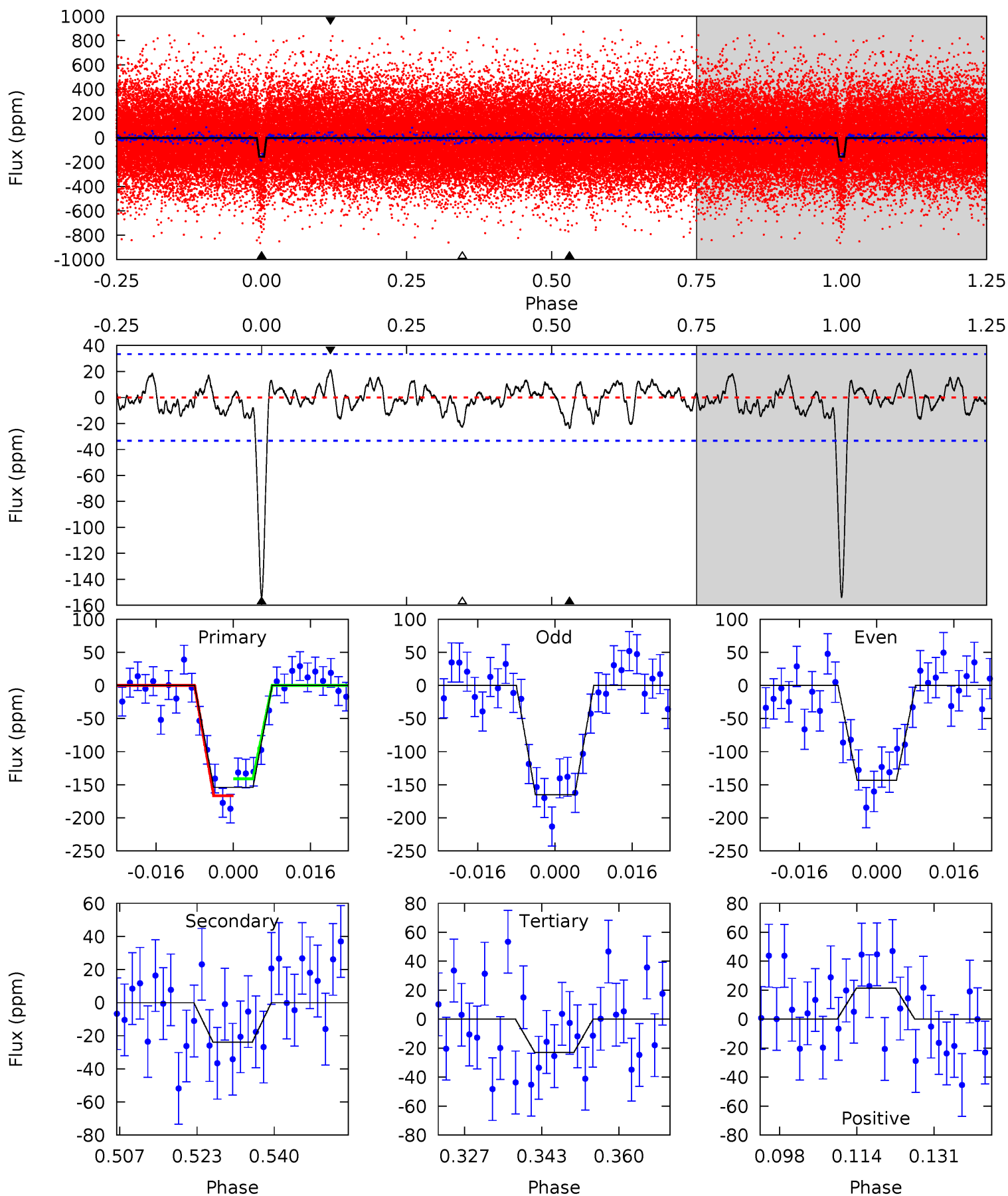
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.5	3.64	3.12	3.46	4.91	2.36	1.24	20.4	20.1	0.52	0.18	2.07	1.04	0.13	1.71



Alt Model-Shift Uniqueness Test

010460984-04, P = 5.035030 Days, E = 127.624426 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.8	3.53	3.38	3.17	4.93	2.40	1.21	19.4	19.6	0.15	0.36	1.62	0.99	0.12	1.89



Stellar Parameters For KIC 010460984

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5888^{+106}_{-117}	$4.342^{+0.115}_{-0.115}$	$-0.100^{+0.150}_{-0.150}$	$1.097^{+0.179}_{-0.146}$	$0.966^{+0.075}_{-0.068}$	$1.031^{+0.522}_{-0.345}$
	+2%/-2%	+3%/-3%	+150%/-150%	+16%/-13%	+8%/-7%	+51%/-33%
Source	SPE58	SPE58	SPE58	DSEP		

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

Secondary Eclipse Parameters for KIC 010460984-04 / KOI 0474.04

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-24 ± 6	$1.63^{+0.92}_{-0.83}$	1594^{+67}_{-65}	3825^{+1213}_{-521}	15^{+45}_{-9}
Alt.	-24 ± 7	$1.51^{+0.86}_{-0.77}$	1593^{+73}_{-76}	3909^{+1385}_{-539}	18^{+62}_{-11}

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 $A_{obs} \gg 1.0$

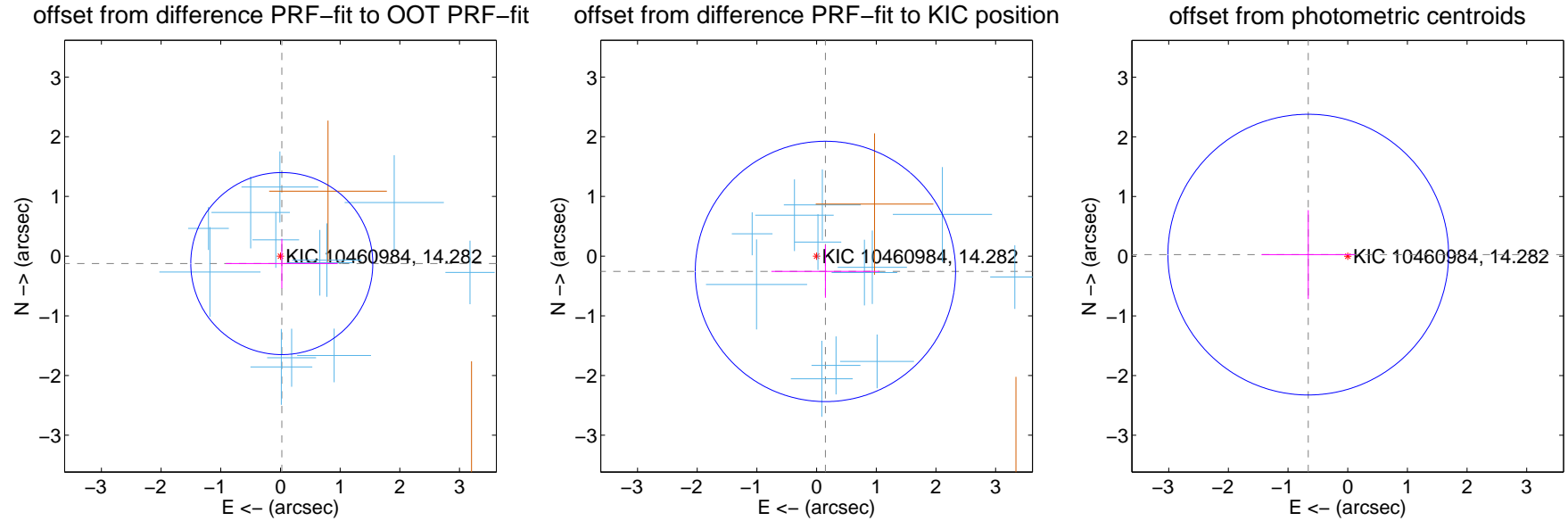
DV Centroid Data

Supplemental centroid analysis for 010460984-04. Kepler magnitude: 14.28. Transit SNR 16.49

There are 12 quarters with good PRF difference image offsets

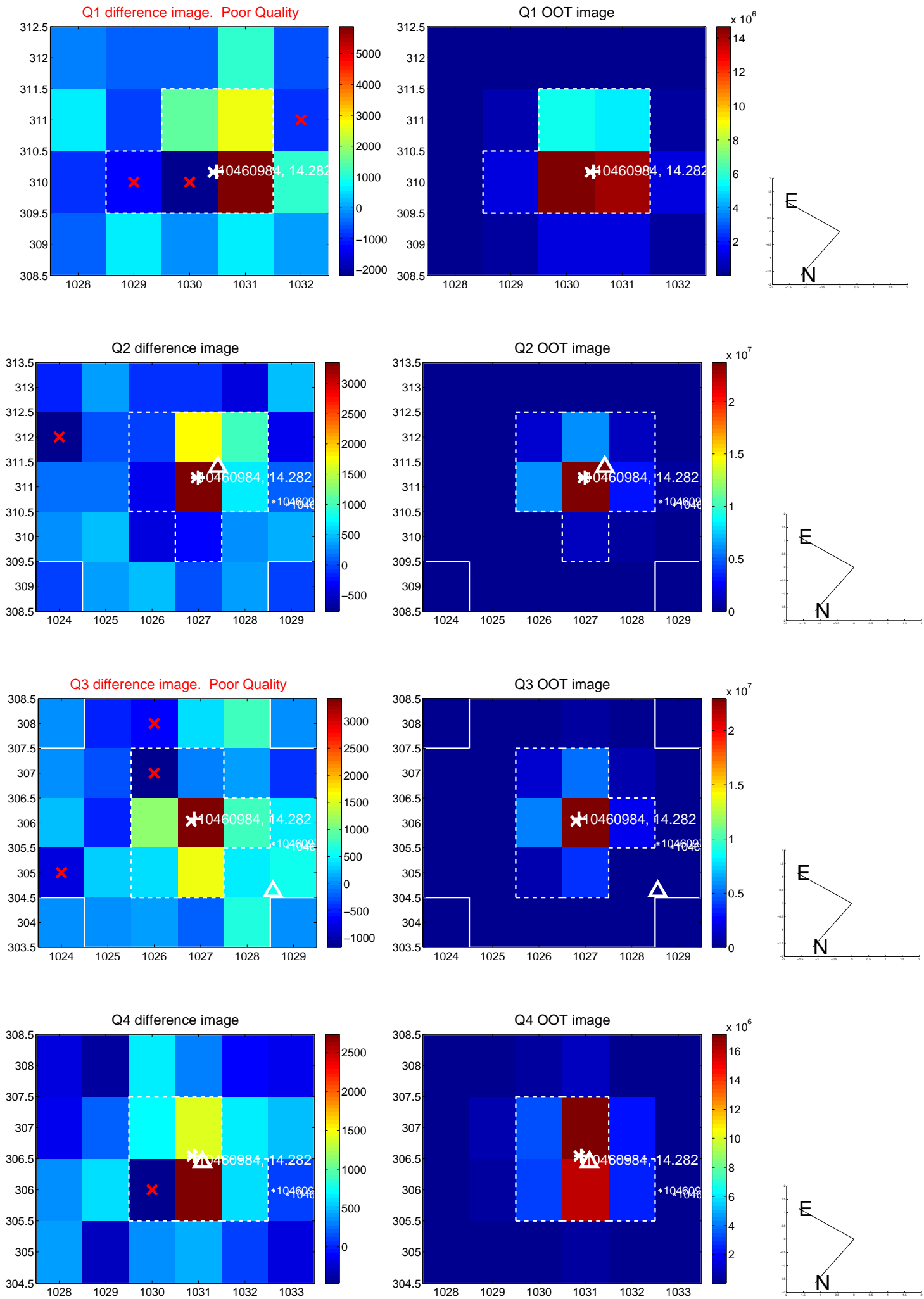
The direct PRF centroid is offset from the target star catalog position by about 0.28 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.127 ± 0.508	0.25	-0.022 ± 0.937	-0.125 ± 0.415
PRF-fit source offset from KIC position	0.296 ± 0.727	0.41	-0.148 ± 0.906	-0.256 ± 0.442
photometric centroid source offset	0.66 ± 0.78	0.84	0.66 ± 0.78	0.03 ± 0.74

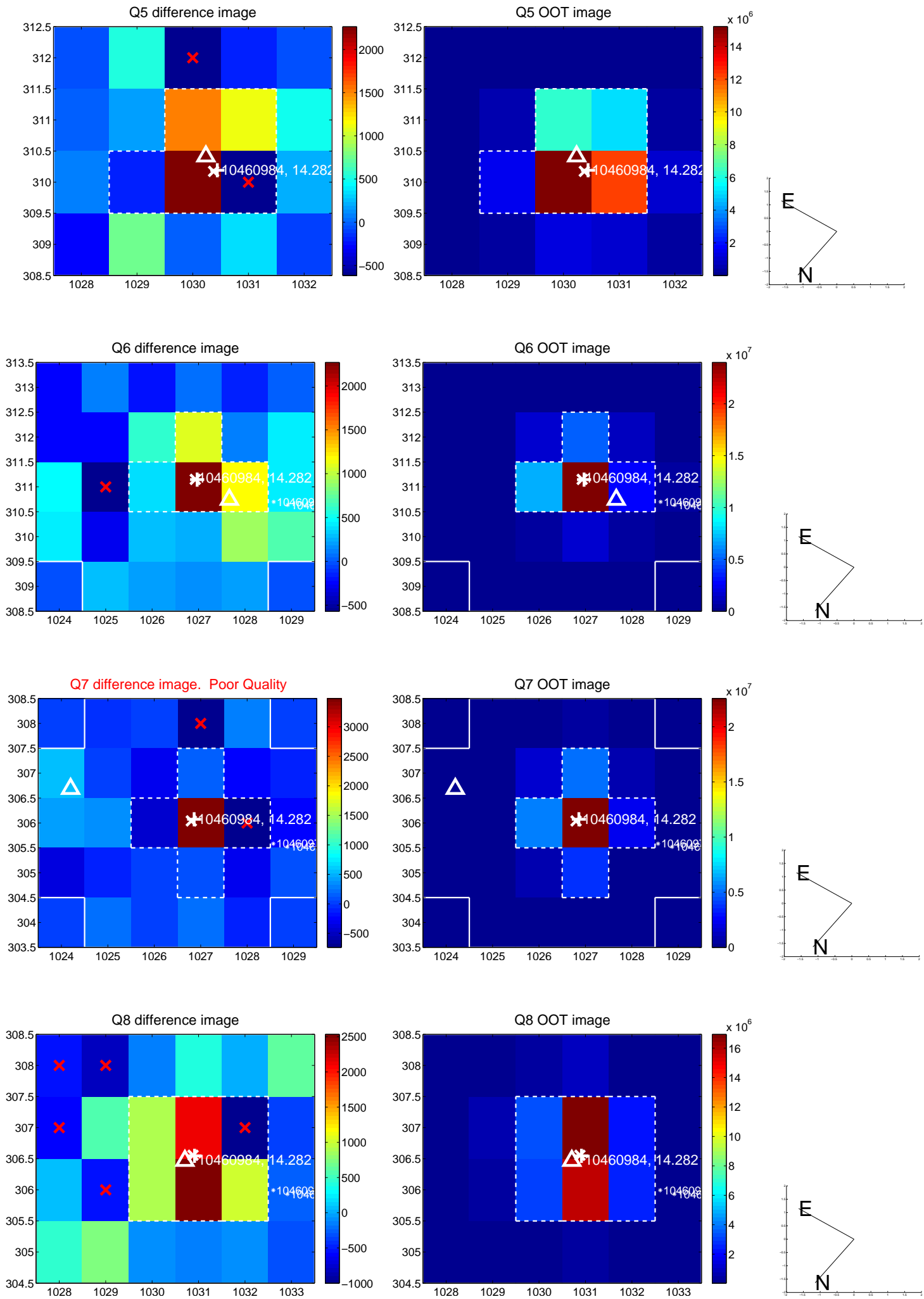


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

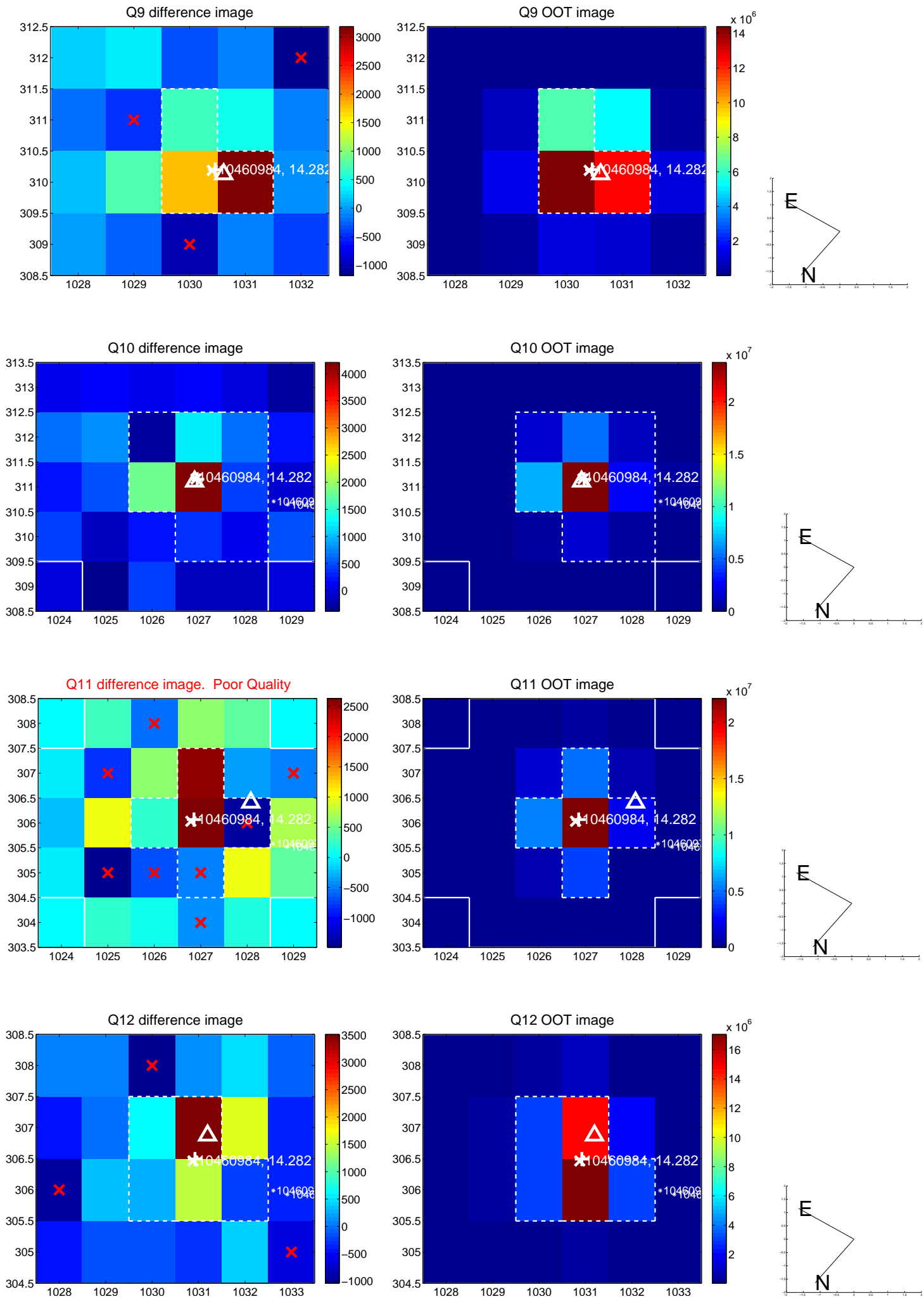
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



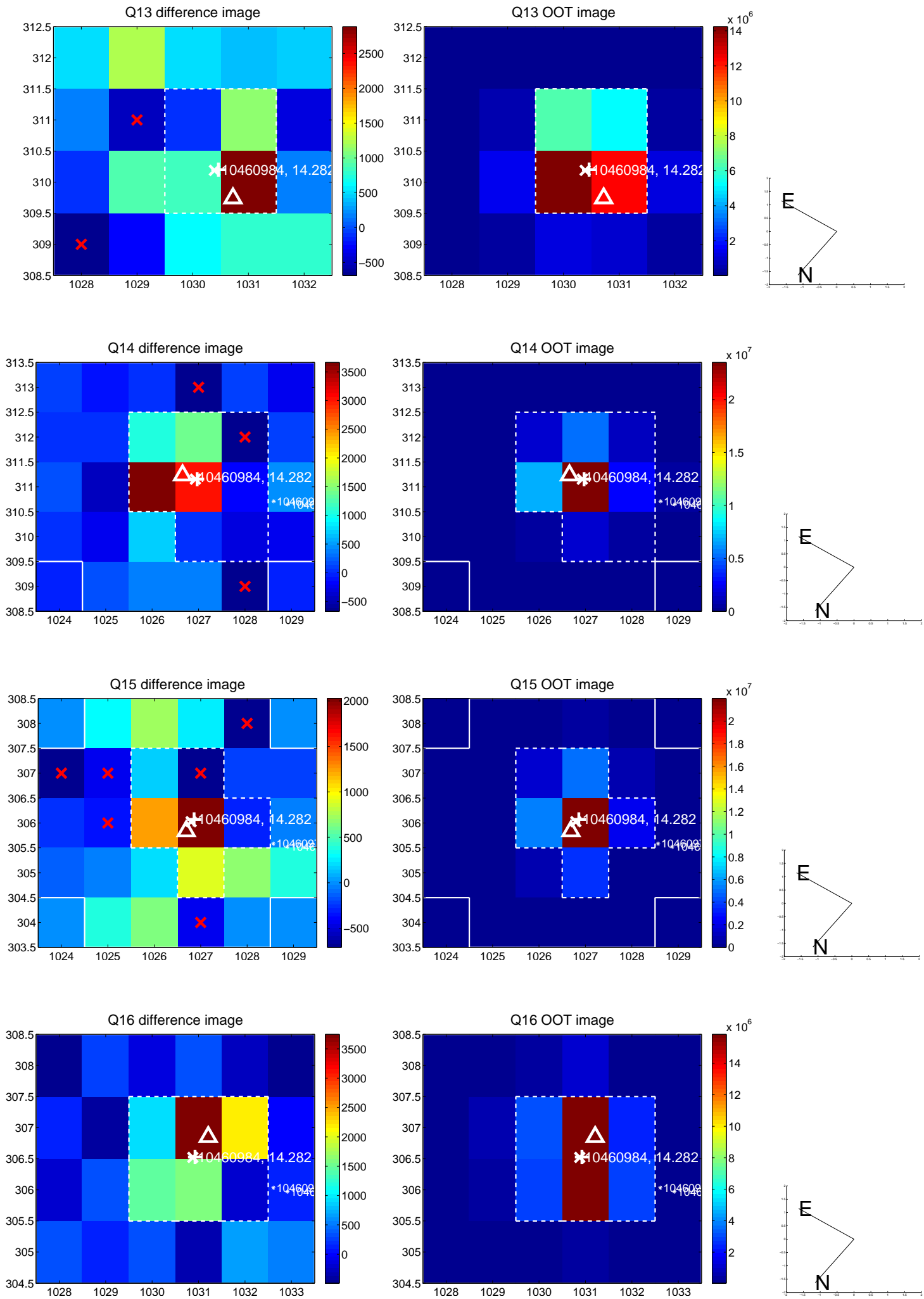
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



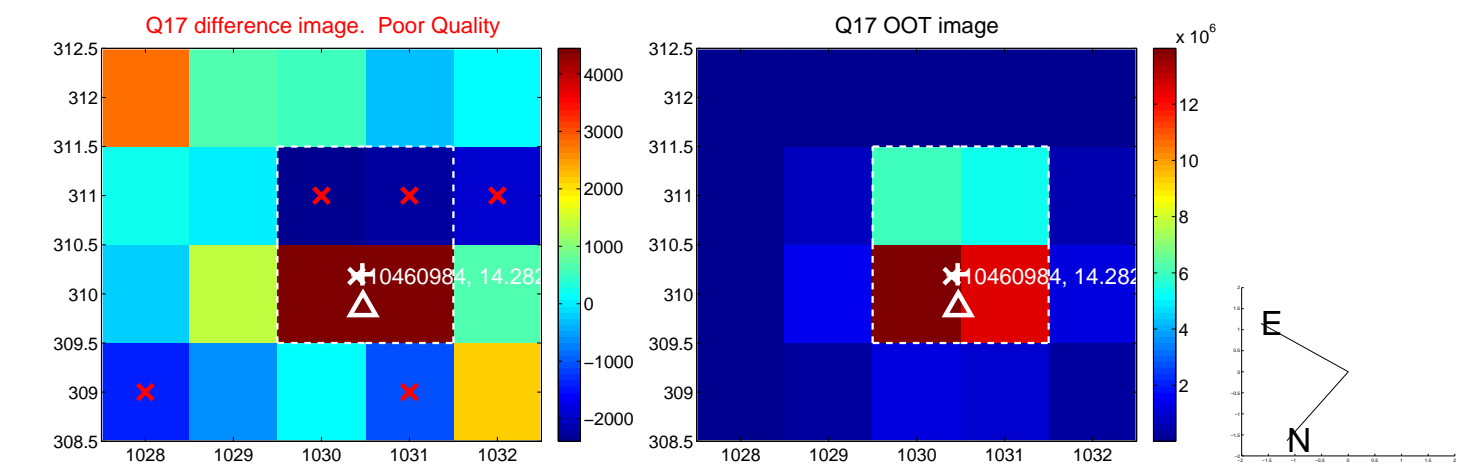
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



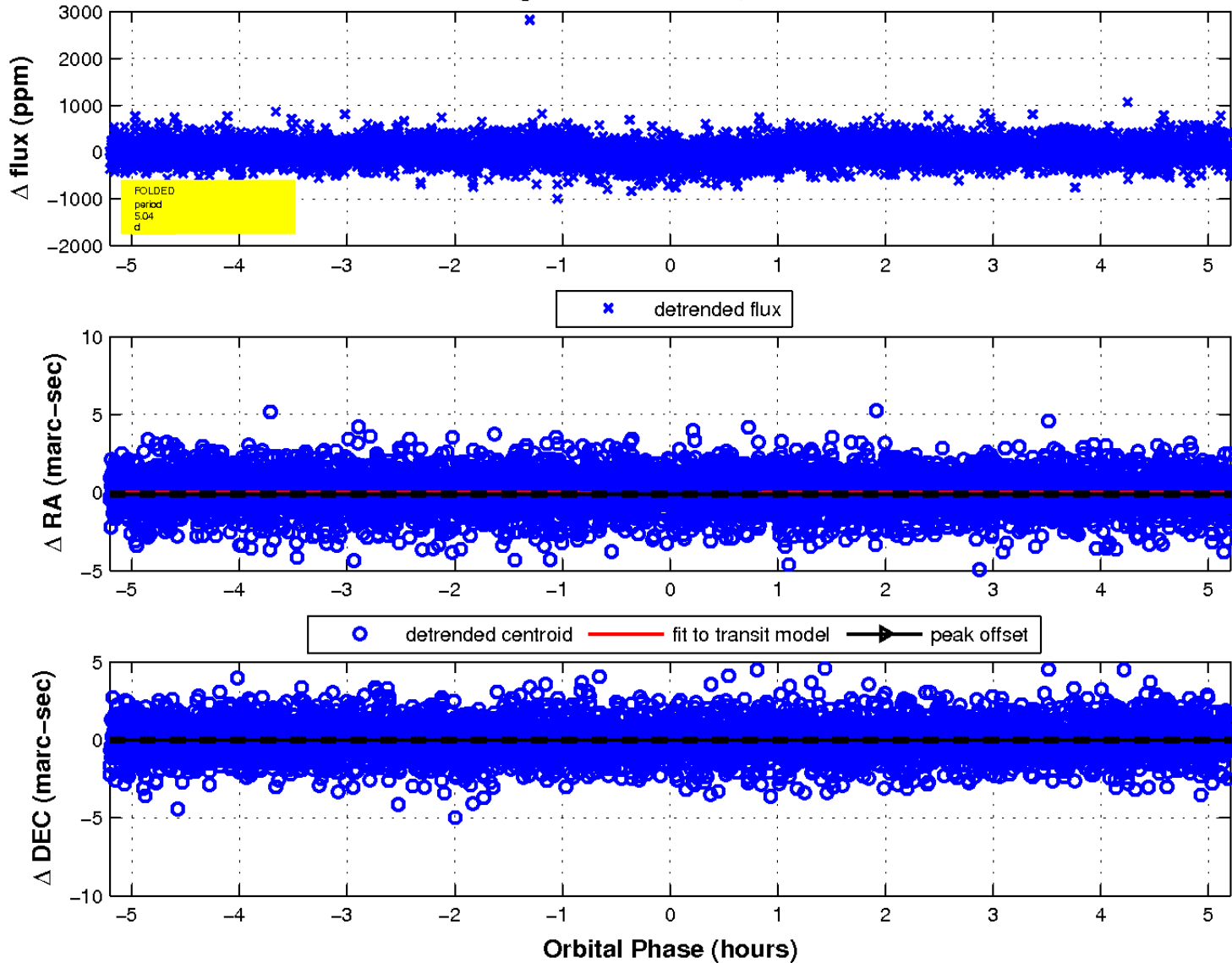
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 4



UKIRT Image

Declination

