

KIC 005978559

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})
005978559-01	OBS	2321.01	95.610993	138.358682	484.6	7.860	17.1	18.6	1.08	6002	2.72	7.47
005978559-02	OBS	2321.02	36.250708	142.081437	163.3	5.176	7.5	8.6	1.08	6002	1.54	27.22

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978559-01	OBS	PC	0.99	0	0	0	0	NO_COMMENT
005978559-02	OBS	PC	0.62	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.

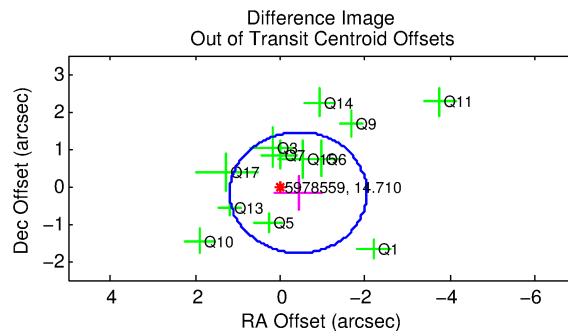
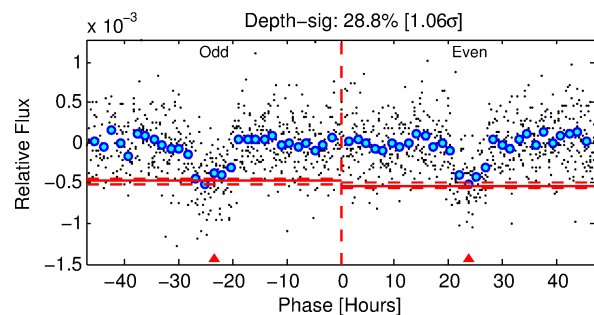
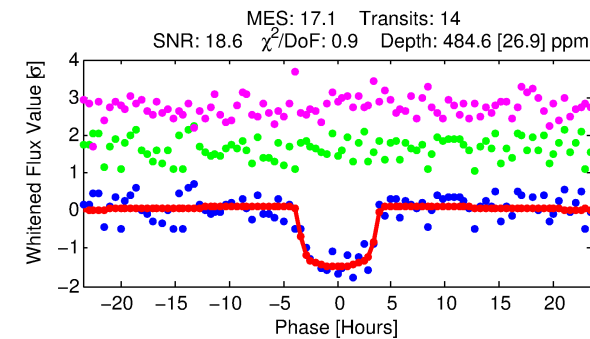
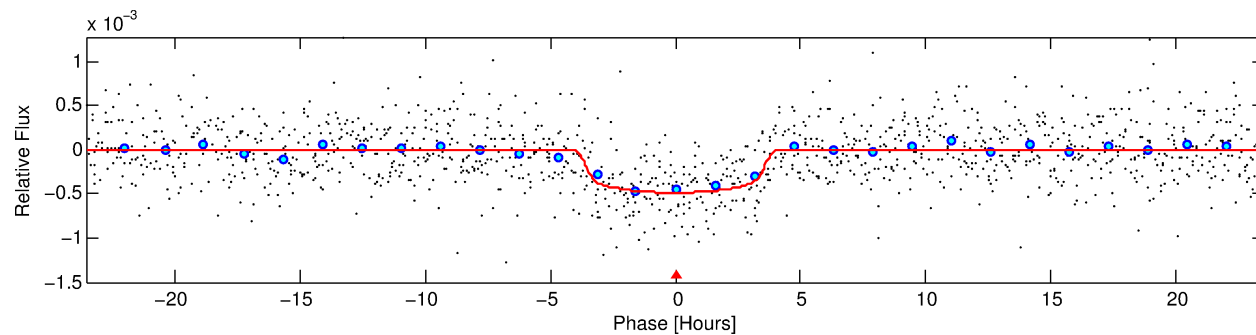
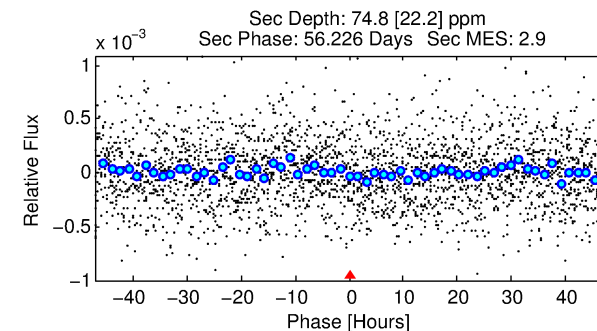
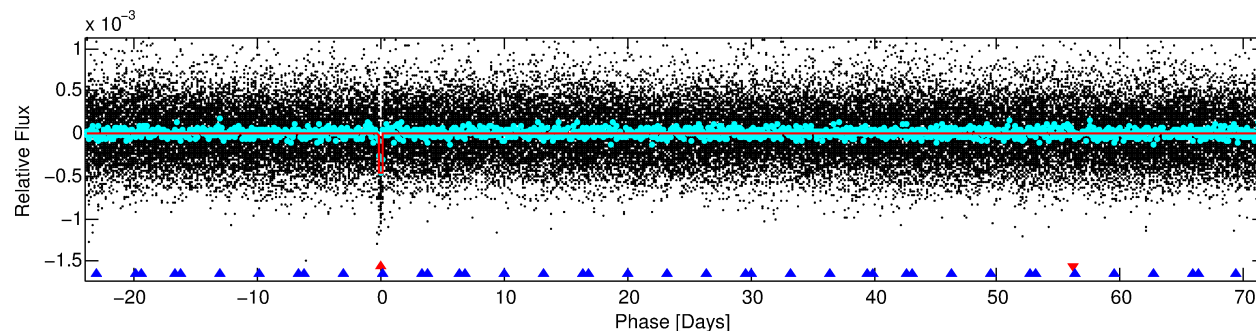
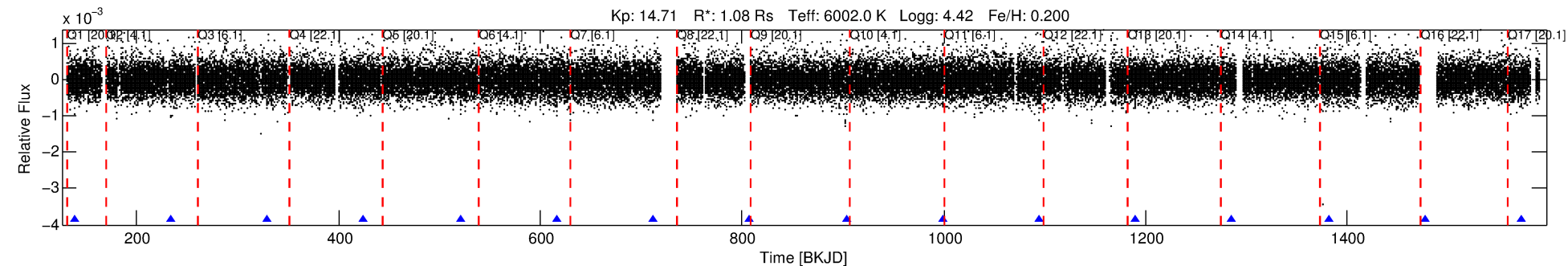
Ephemeris Match Information For 005978559-01

No Significant Match Found

DV One-Page Summary

KIC: 5978559 Candidate: 1 of 2 Period: 95.611 d

KOI: K02321.01 Corr: 0.969



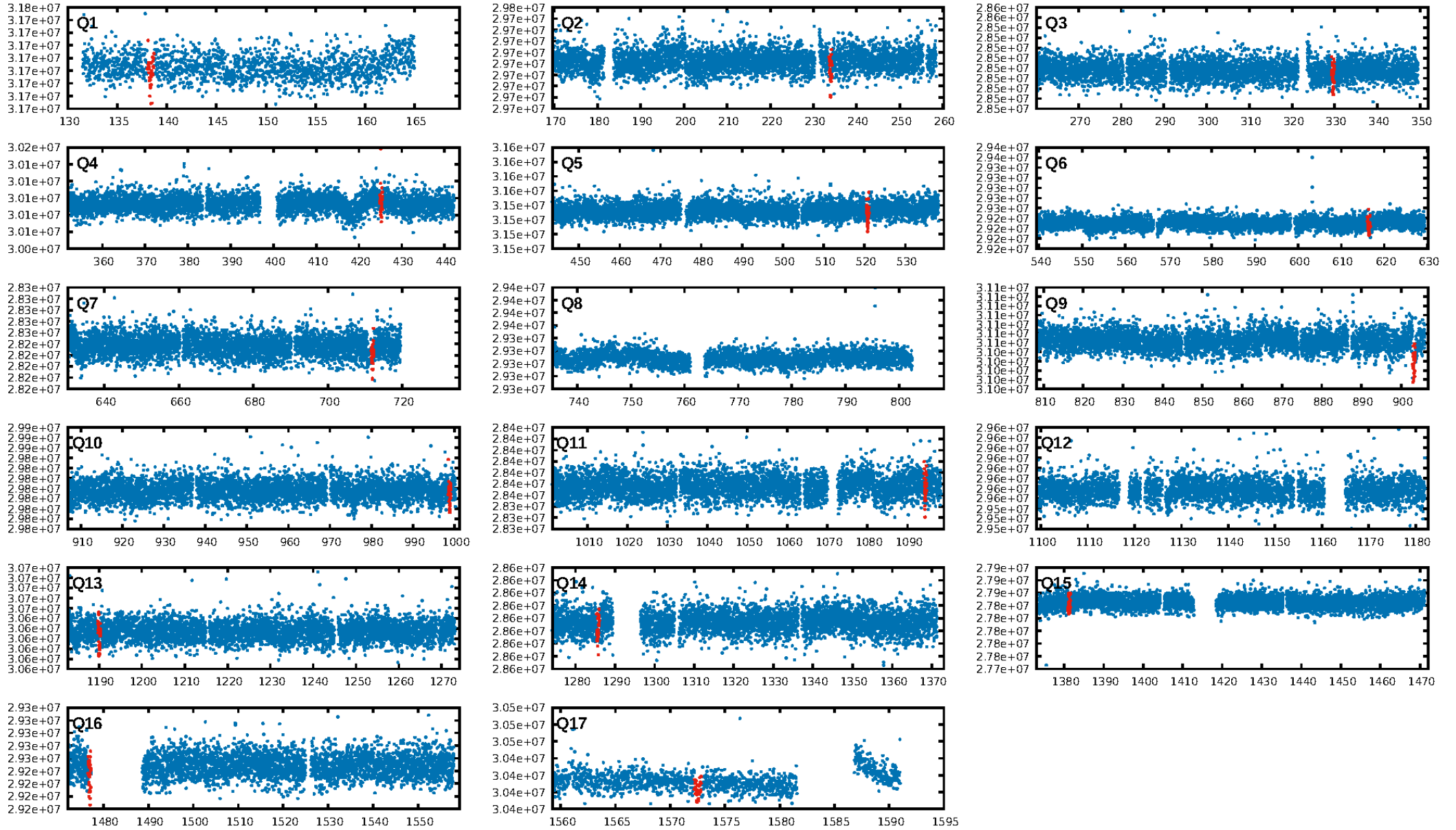
DV Fit Results:

Period = 95.61099 [0.00086] d
Epoch = 138.3587 [0.0073] BKJD
Rp/R* = 0.0231 [0.0028]
a/R* = 52.26 [29.42]
b = 0.85 [0.18]
Seff = 7.47 [1.65]
Teq = 422 [23] K
Rp = 2.72 [0.55] Re
a = 0.4265 [0.0597] AU
Ag = 1012.06 [445.96] [2.27 σ]
Teffp = 3676 [359] K [9.05 σ]

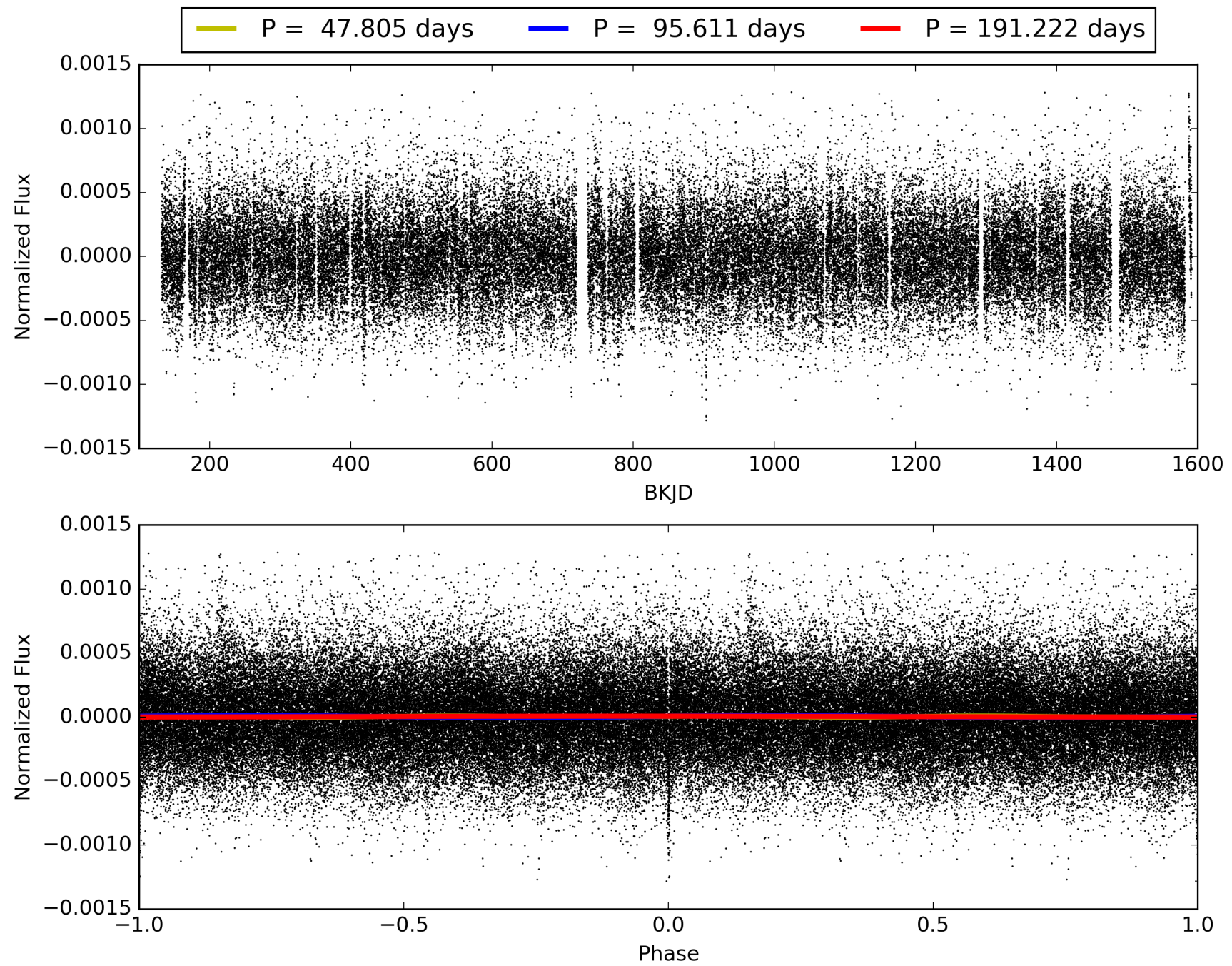
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [151.38 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 86.9%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 6.57e-60
RollingBand-fgt: 1.00 [12/12]
GhostDiagnostic-chr: 8.082
Centroid-sig: 0.9%
Centroid-so: 1.250 arcsec [1.78 σ]
OotOffset-rm: 0.462 arcsec [0.86 σ]
KicOffset-rm: 0.487 arcsec [0.92 σ]
OotOffset-st: 3/4/0/5 [12]
KicOffset-st: 3/4/0/5 [12]
DiffImageQuality-fgm: 0.75 [9/12]
DiffImageOverlap-fno: 0.93 [13/14]

TCE 005978559-01, PDC Light Curves

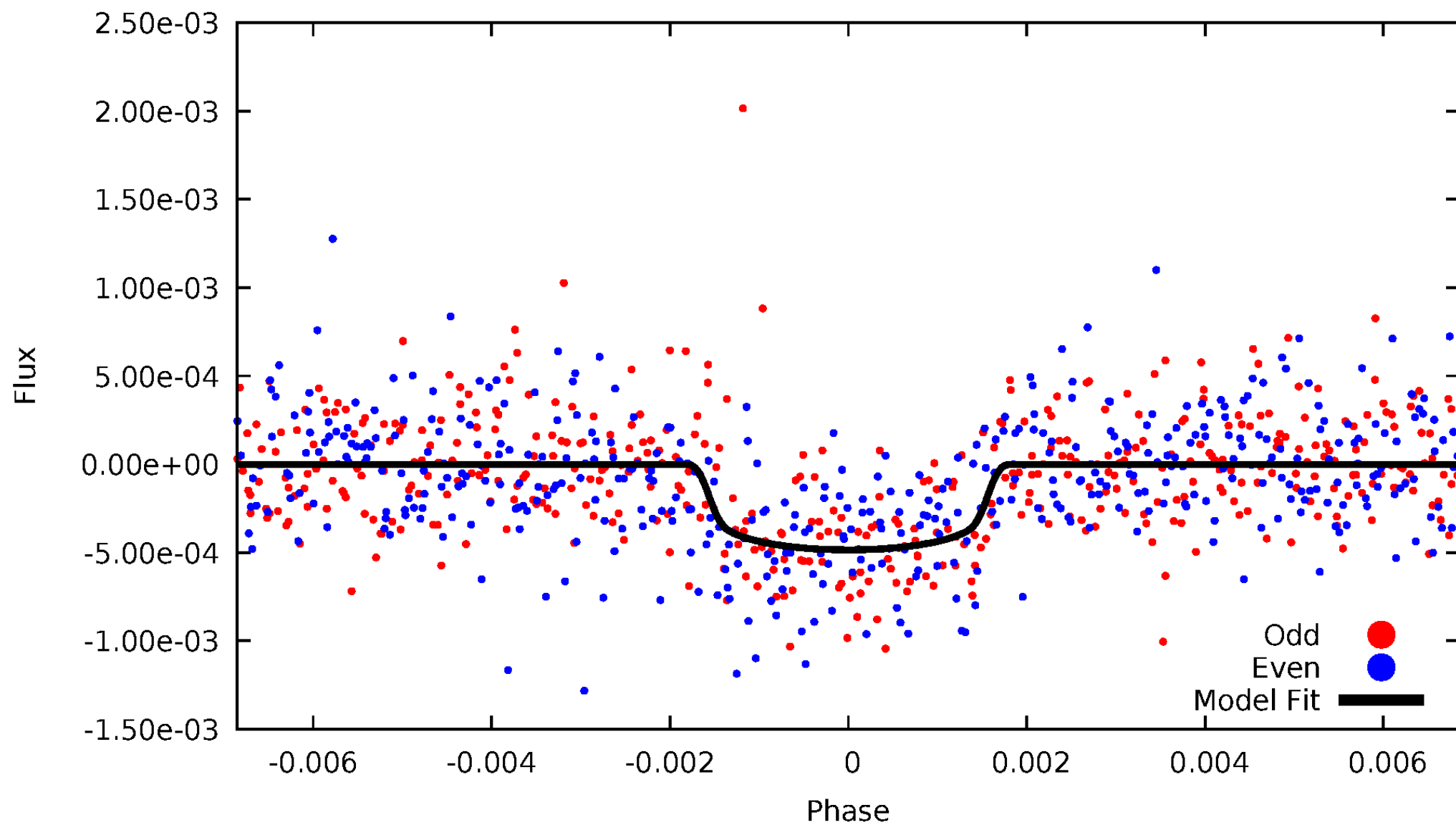


TCE 005978559-01



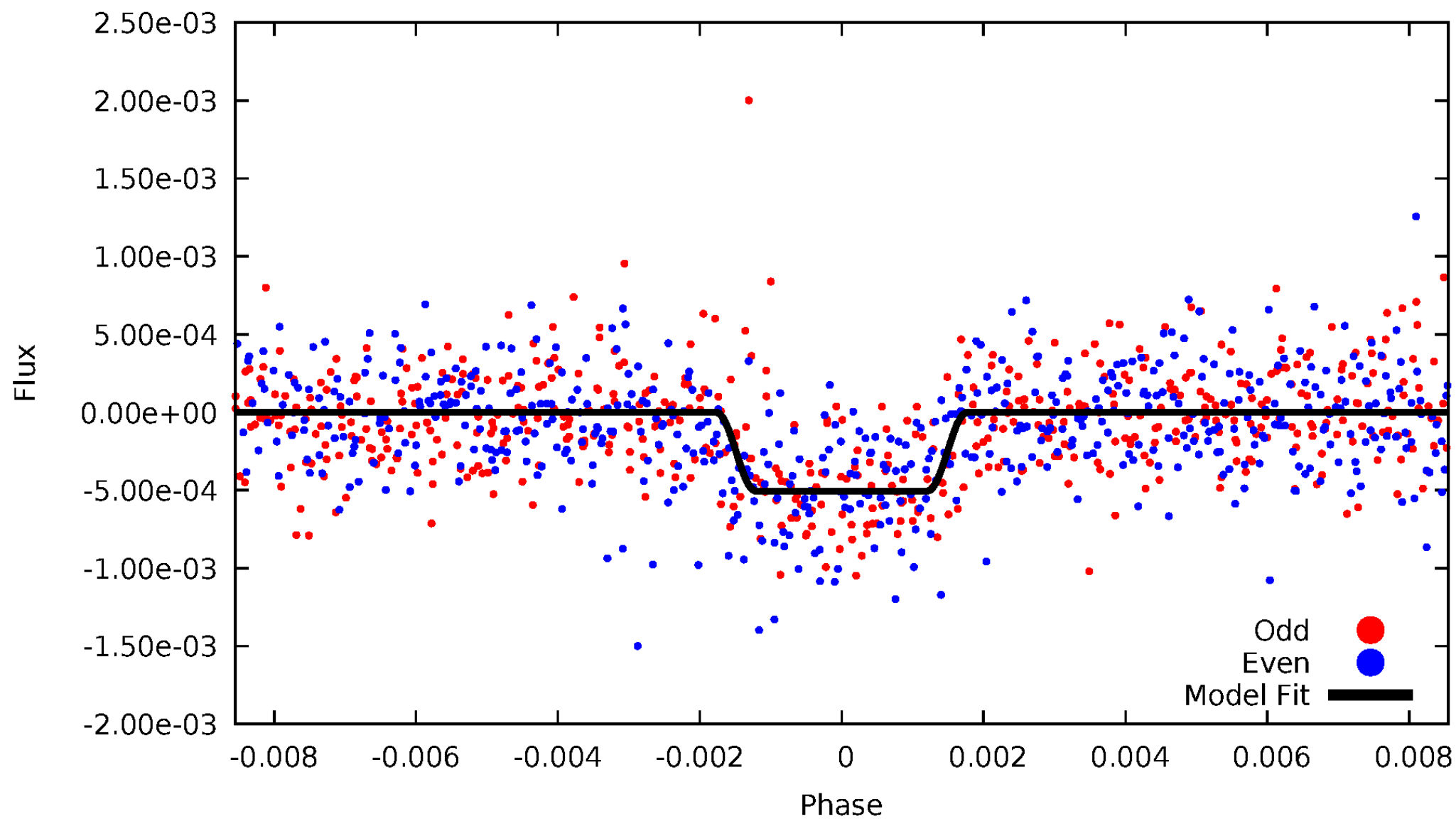
DV Odd/Even

TCE 005978559-01

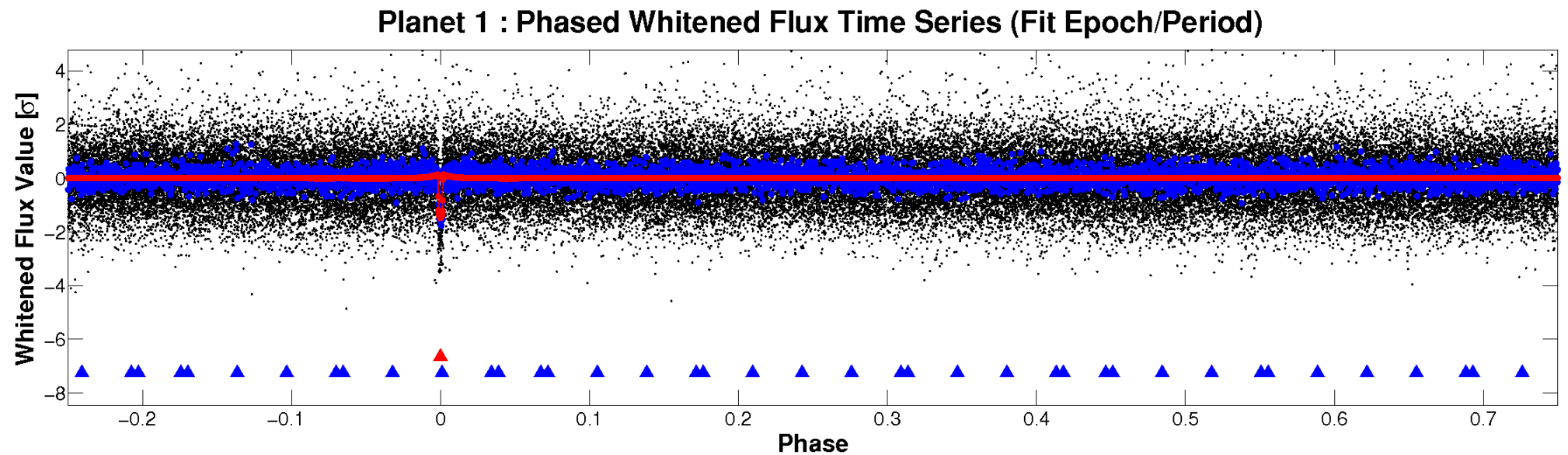
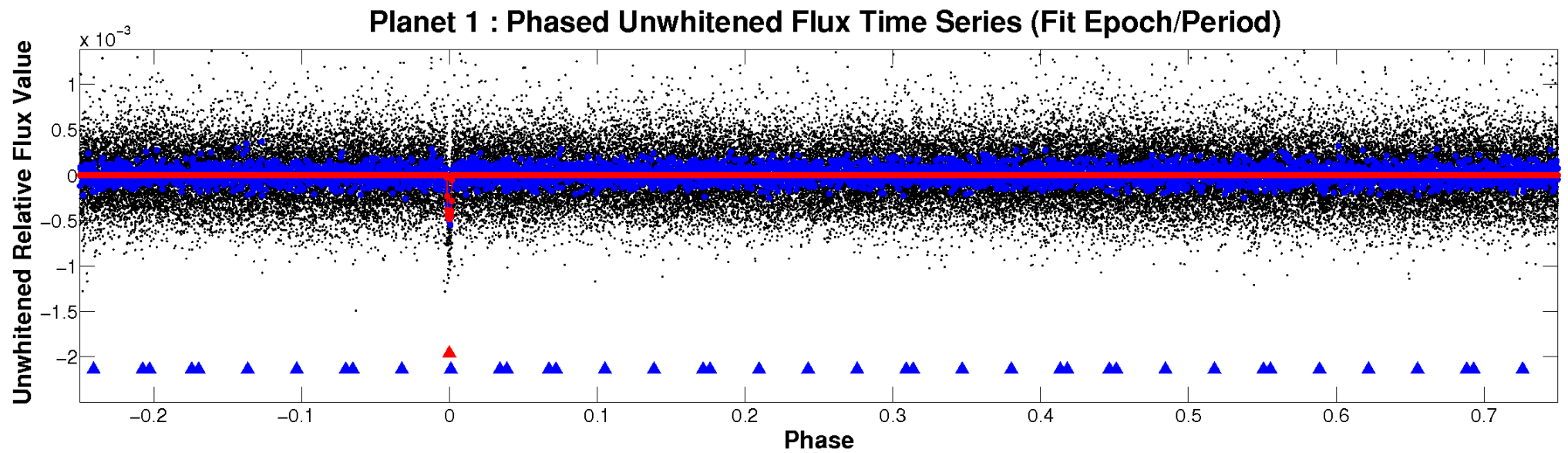


ALT Odd/Even

TCE 005978559-01

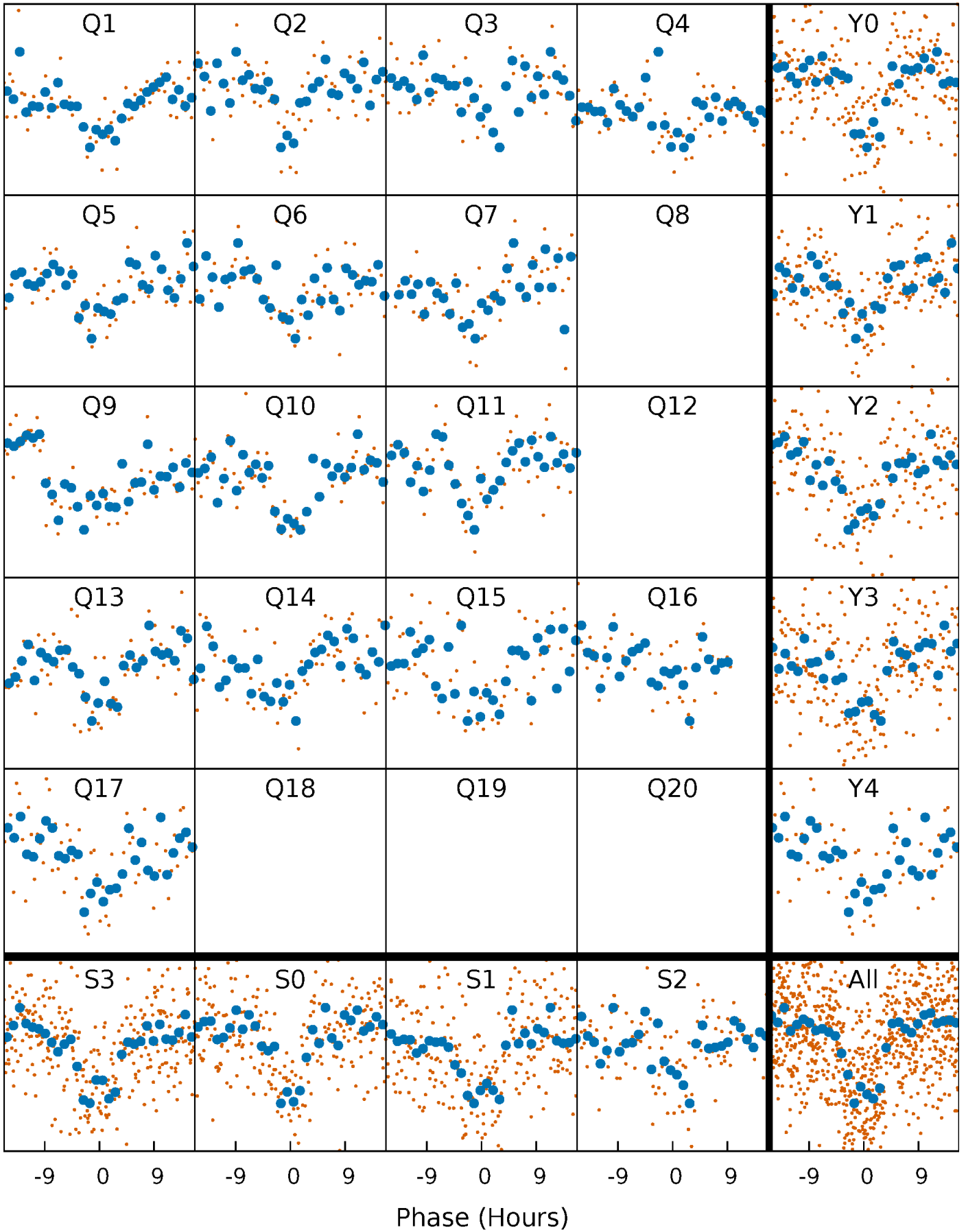


Non-Whitened Vs. Whitened Light Curve



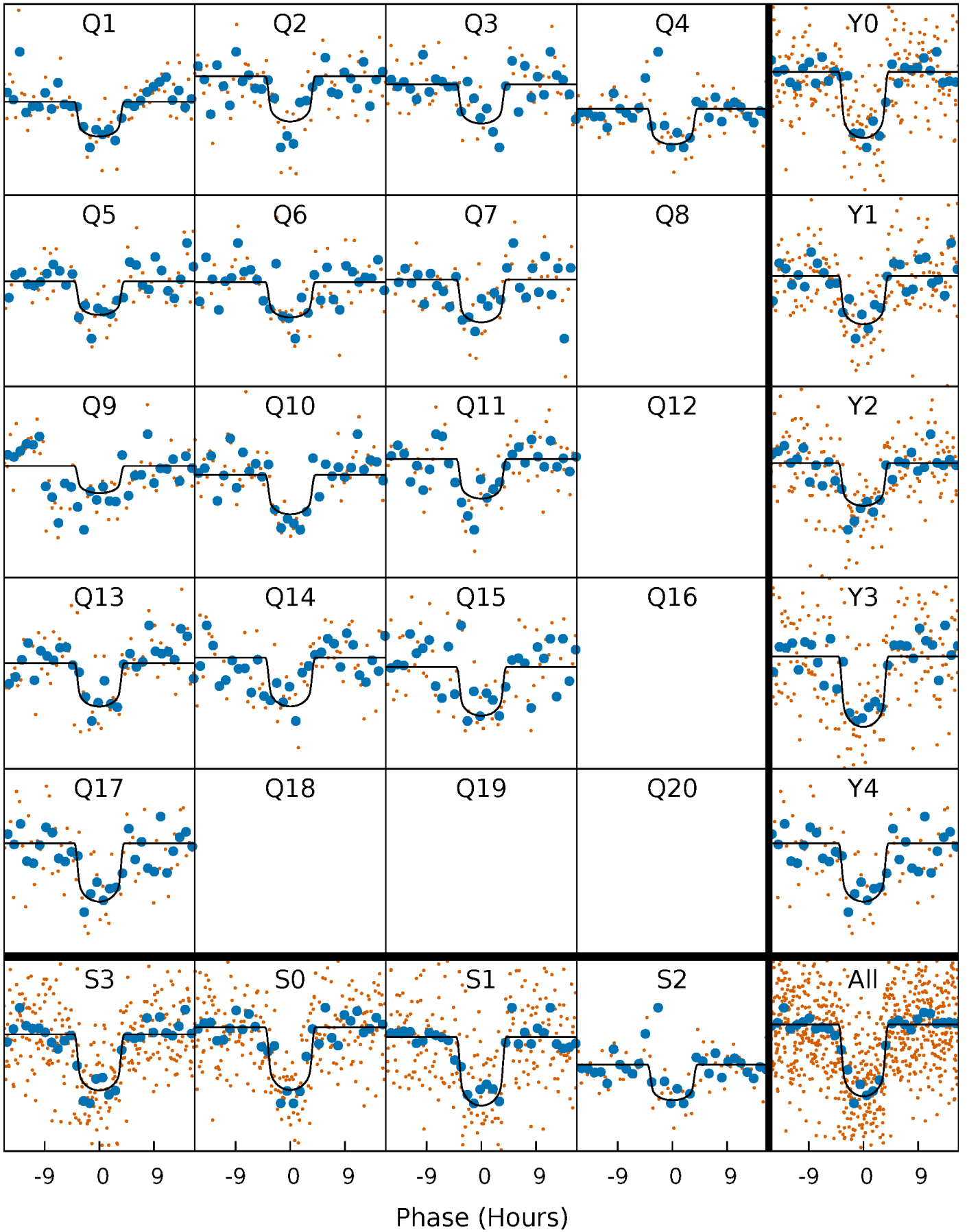
PDC Quarter-Phased Transit Curves

TCE 005978559-01 P= 95.610993 Days $T_0=138.358682$ (BKJD)



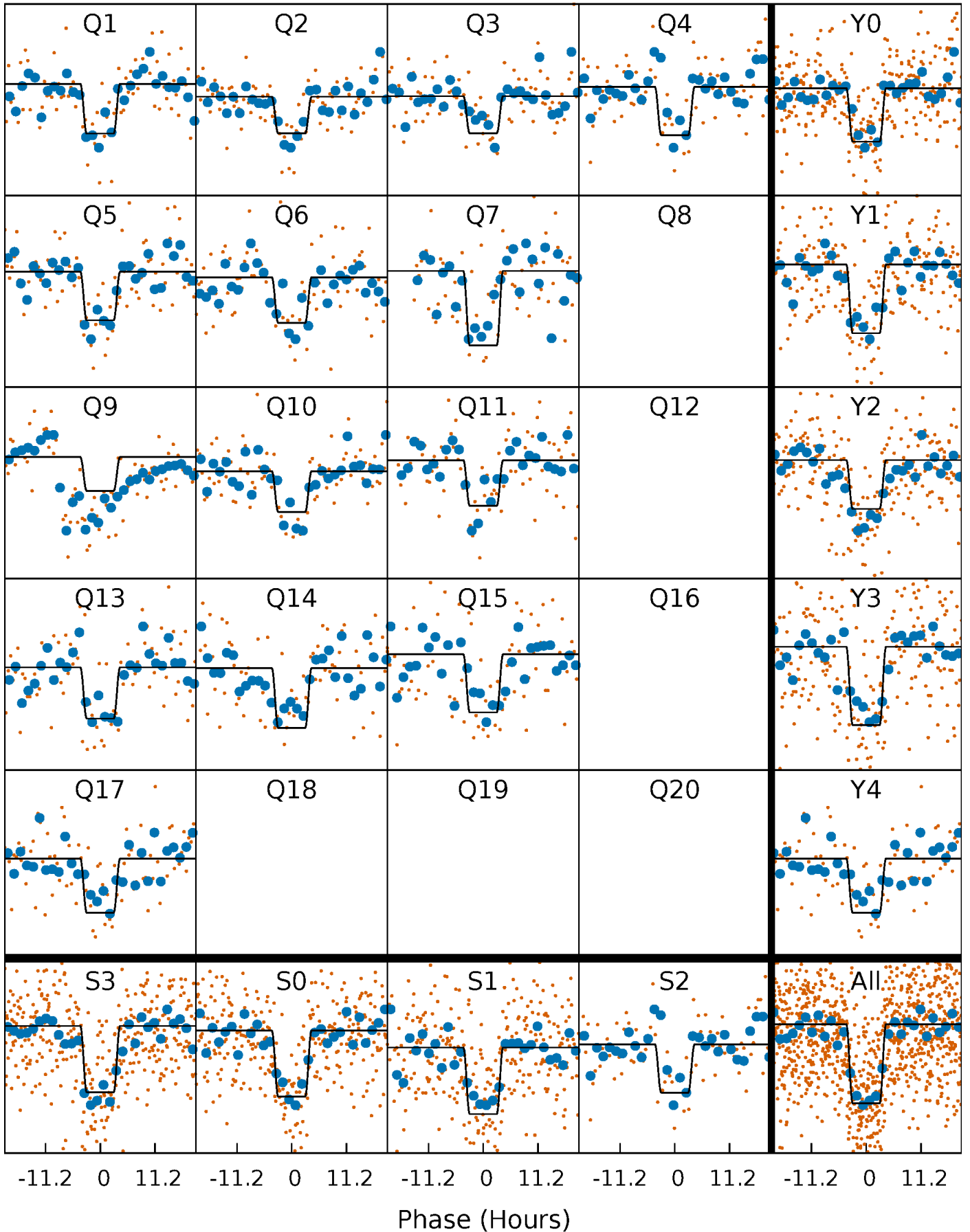
DV Quarter-Phased Transit Curves

TCE 005978559-01 P= 95.610993 Days $T_0=138.358682$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

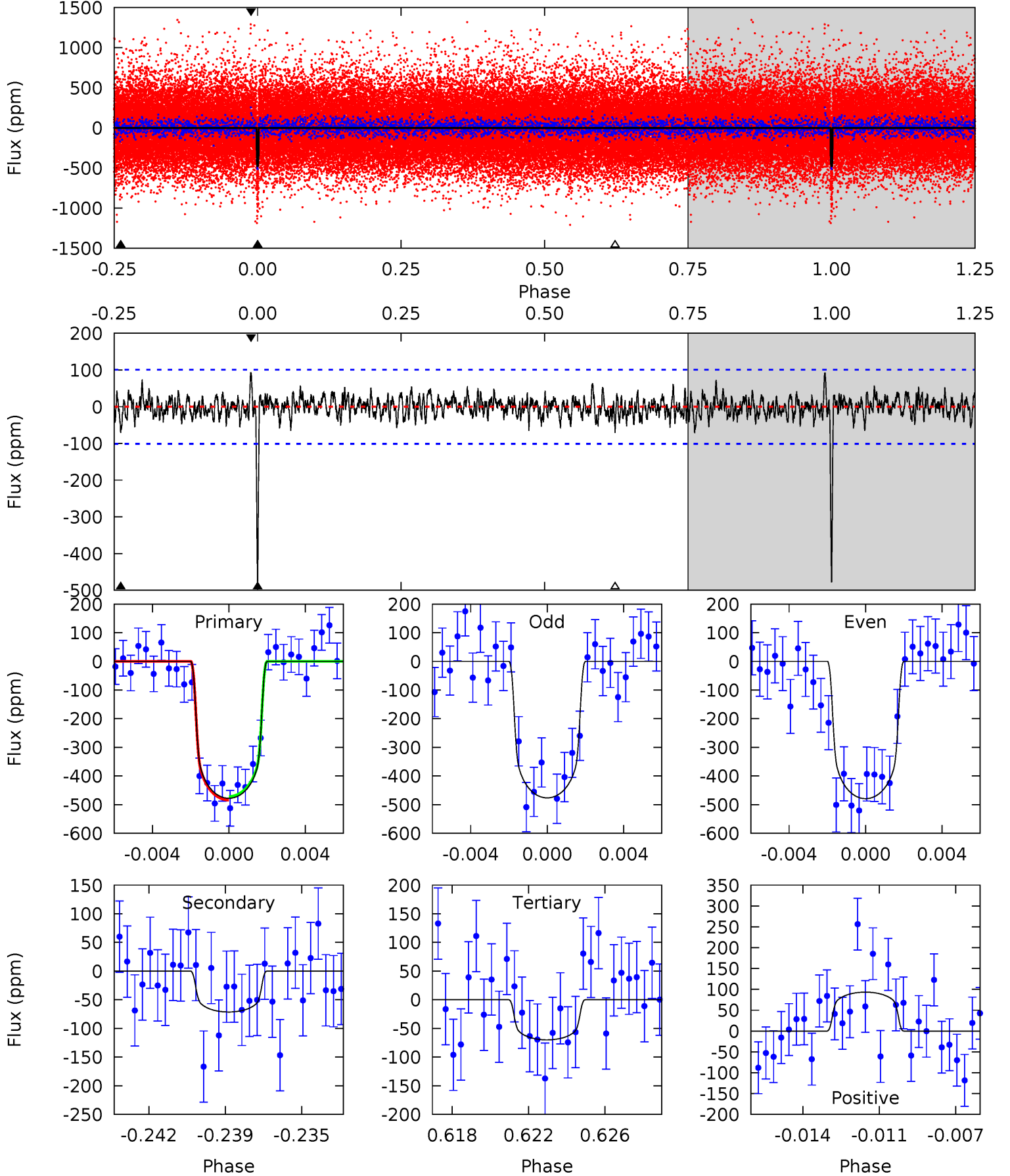
TCE 005978559-01 P= 95.606900 Days $T_0=138.383103$ (BKJD)



DV Model-Shift Uniqueness Test

005978559-01, P = 95.610993 Days, E = 42.747689 Days

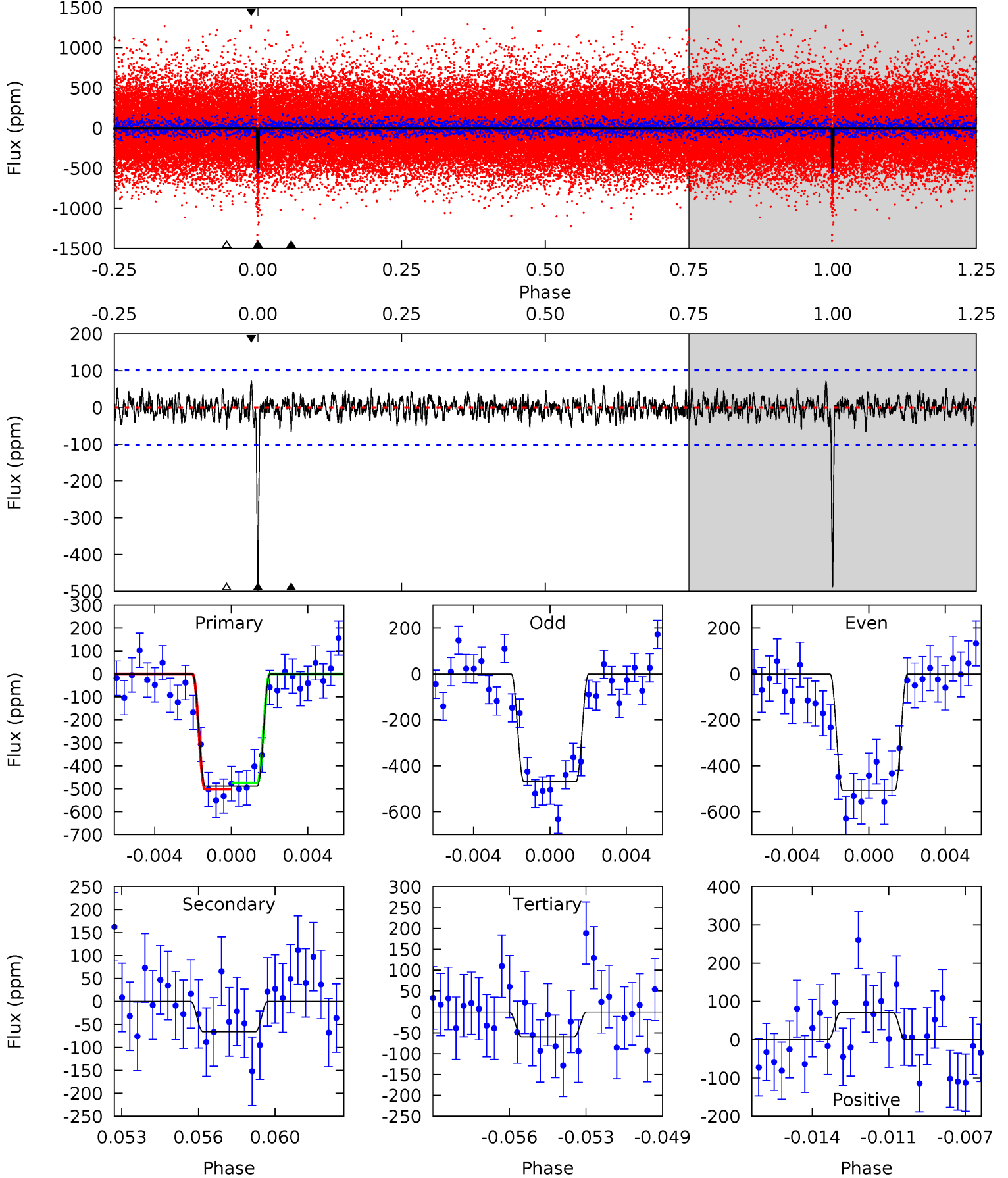
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.7	3.69	3.62	4.82	5.22	2.91	1.15	21.1	19.9	0.07	-1.13	0.07	1.02	0.16	0.32



Alt Model-Shift Uniqueness Test

005978559-01, P = 95.606900 Days, E = 42.776203 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
25.3	3.41	3.08	3.70	5.22	2.92	1.01	22.2	21.6	0.33	-0.28	0.99	1.05	0.13	0.70



Stellar Parameters For KIC 005978559

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6002^{+71}_{-89}	$4.424^{+0.032}_{-0.120}$	$0.200^{+0.150}_{-0.150}$	$1.081^{+0.171}_{-0.061}$	$1.135^{+0.062}_{-0.070}$	$1.265^{+0.188}_{-0.454}$
	+1%/-1%	+1%/-3%	+75%/-75%	+16%/-6%	+5%/-6%	+15%/-36%
Source	SPE90	SPE90	SPE90	DSEP		

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

Secondary Eclipse Parameters for KIC 005978559-01 / KOI 2321.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-71 ± 19	$2.78^{+0.42}_{-0.36}$	596^{+23}_{-16}	3967^{+273}_{-276}	900^{+426}_{-306}
Alt.	-66 ± 19	$2.73^{+0.39}_{-0.38}$	594^{+24}_{-14}	3936^{+279}_{-268}	867^{+433}_{-283}

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

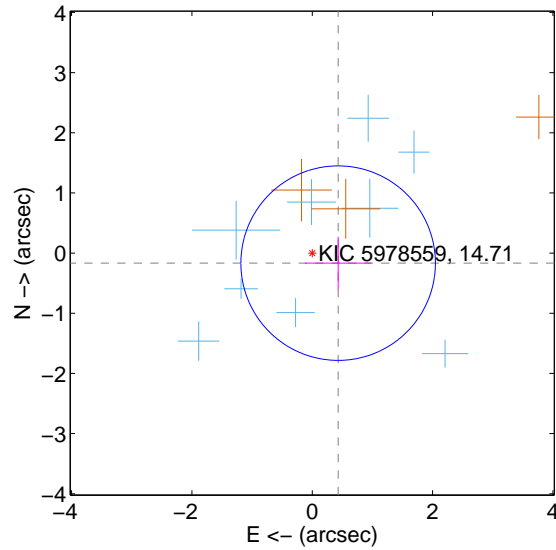
Supplemental centroid analysis for 005978559-01. Kepler magnitude: 14.71. Transit SNR 18.59

There are 9 quarters with good PRF difference image offsets

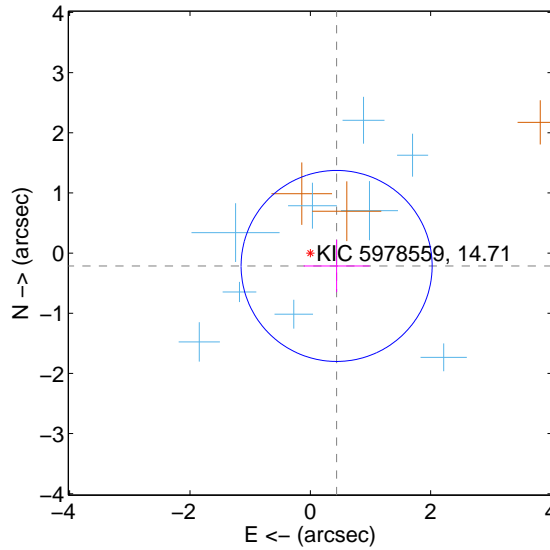
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.462 ± 0.539	0.86	-0.430 ± 0.553	-0.167 ± 0.437
PRF-fit source offset from KIC position	0.487 ± 0.529	0.92	-0.437 ± 0.549	-0.214 ± 0.435
photometric centroid source offset	1.25 ± 0.70	1.78	0.56 ± 0.71	1.12 ± 0.70

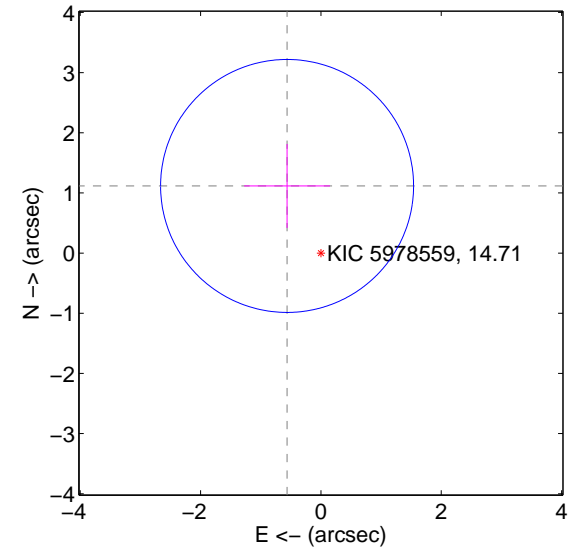
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

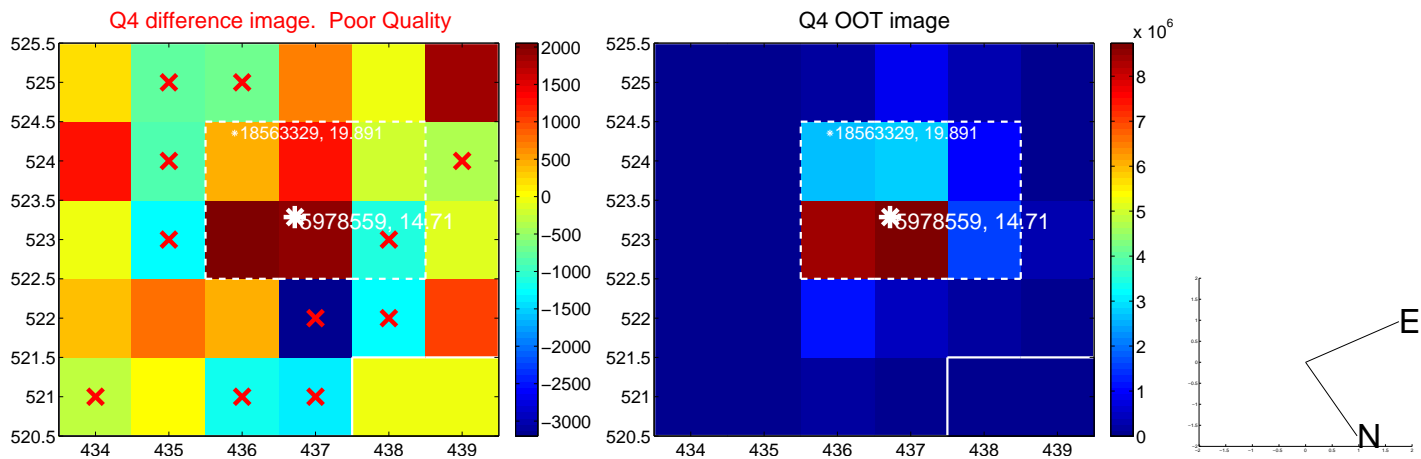
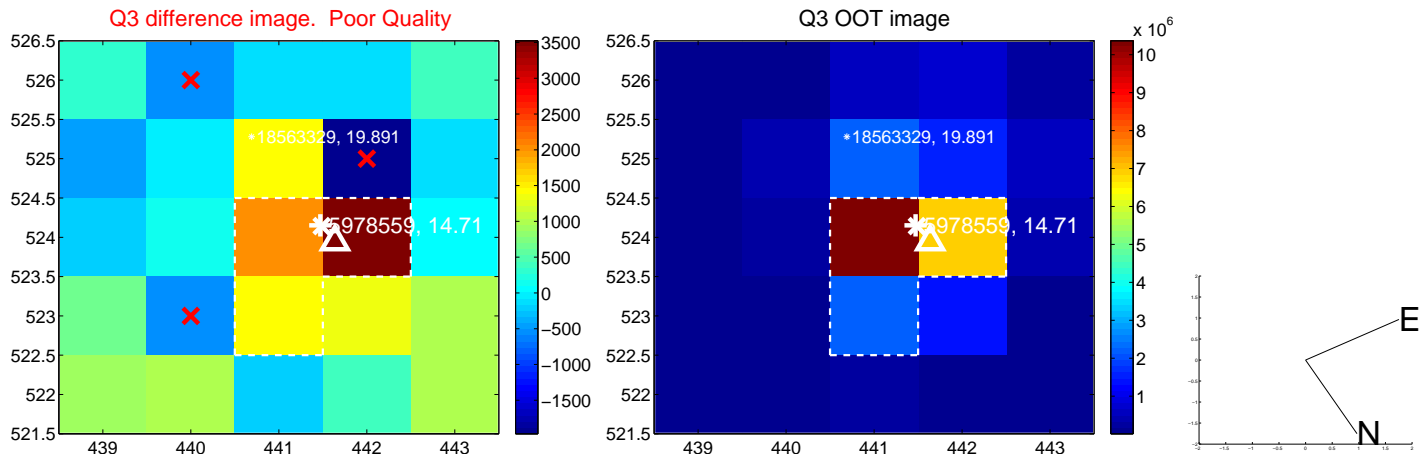
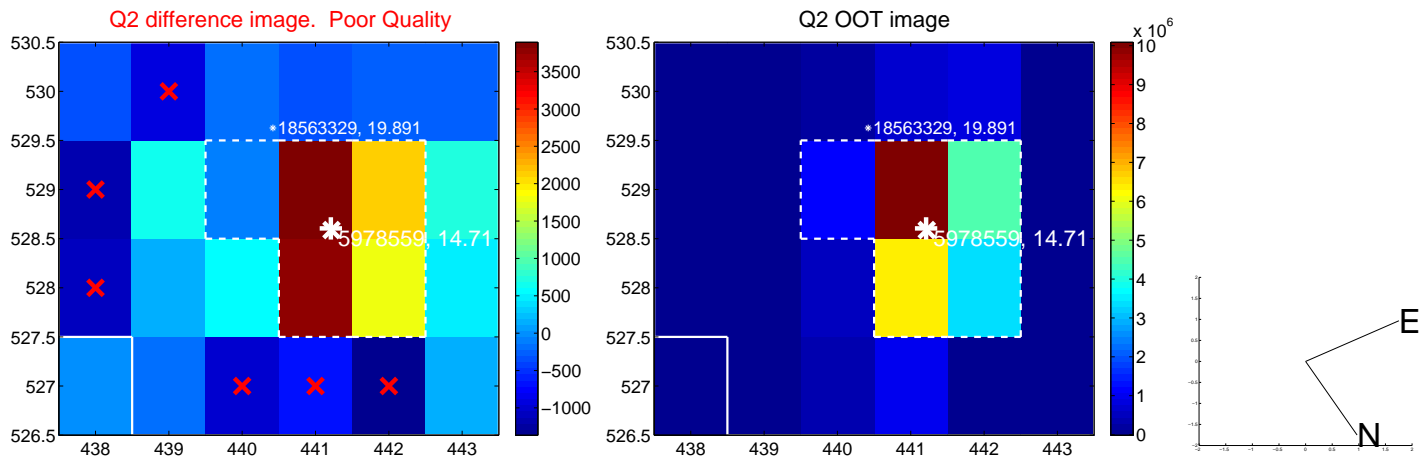
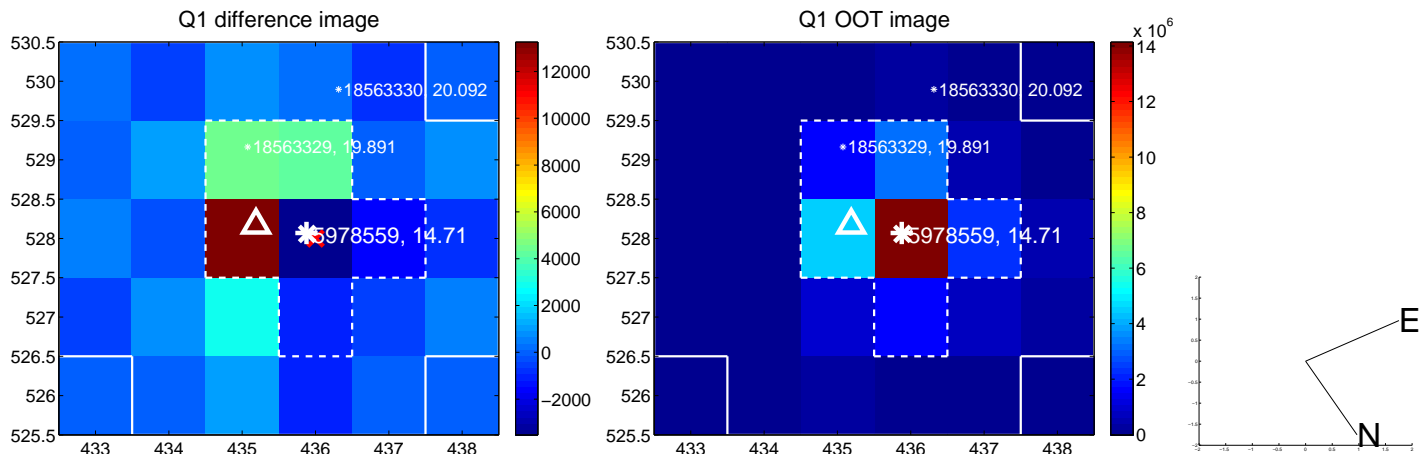


offset from photometric centroids

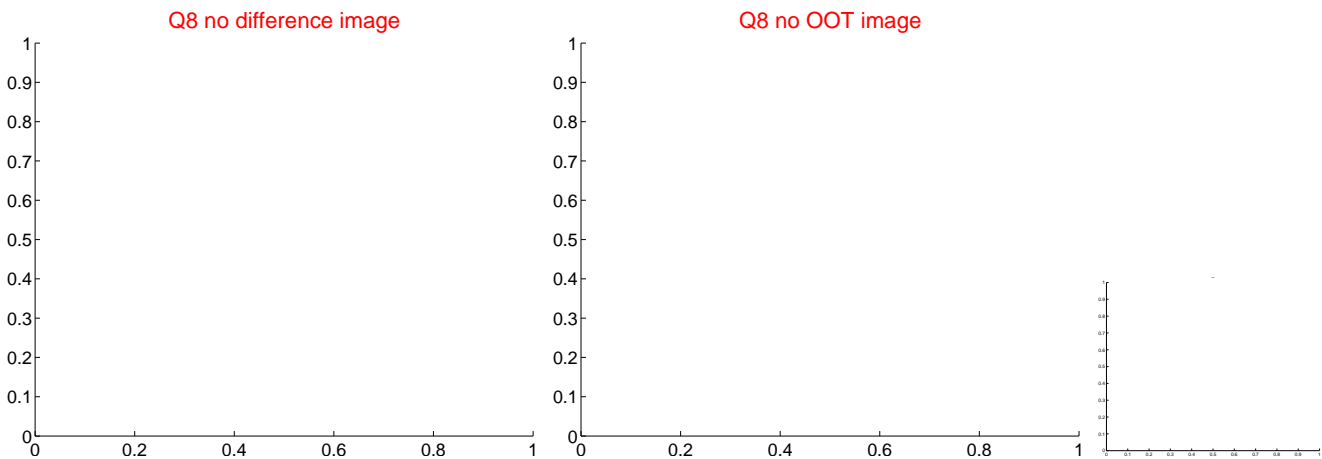
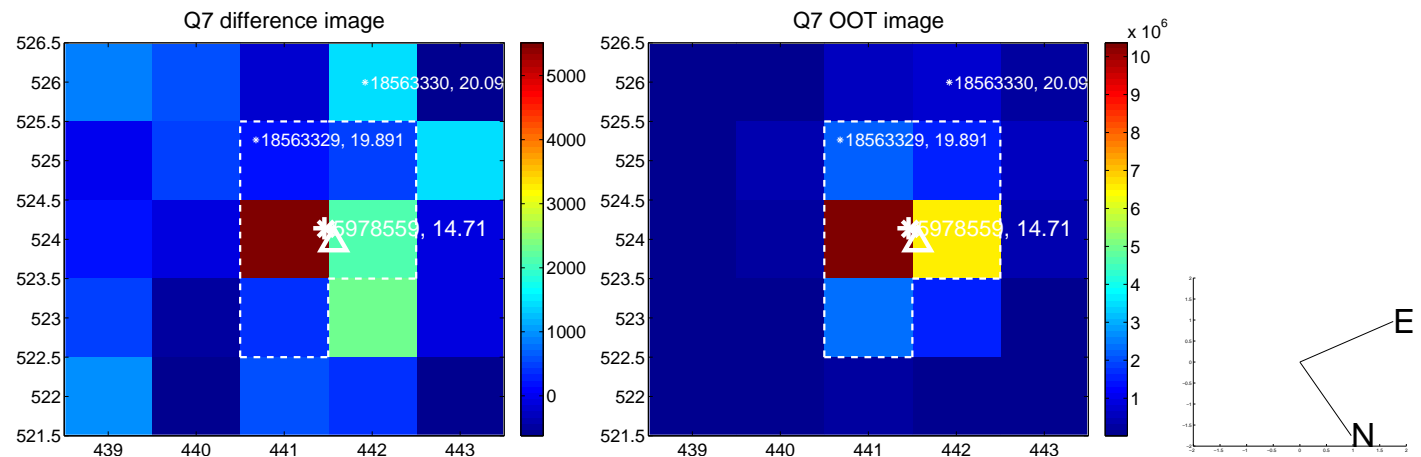
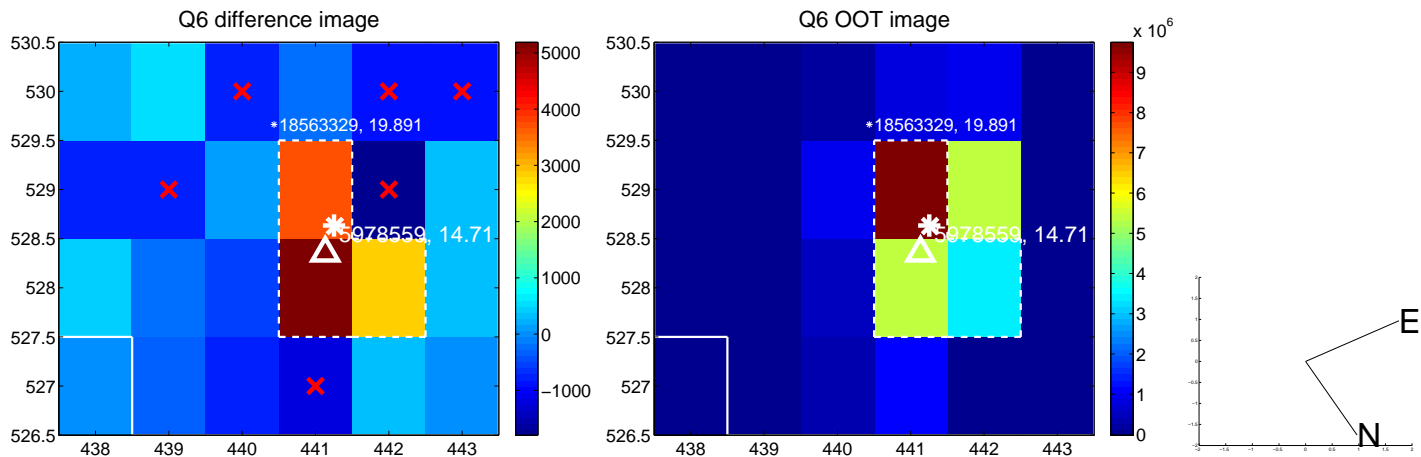
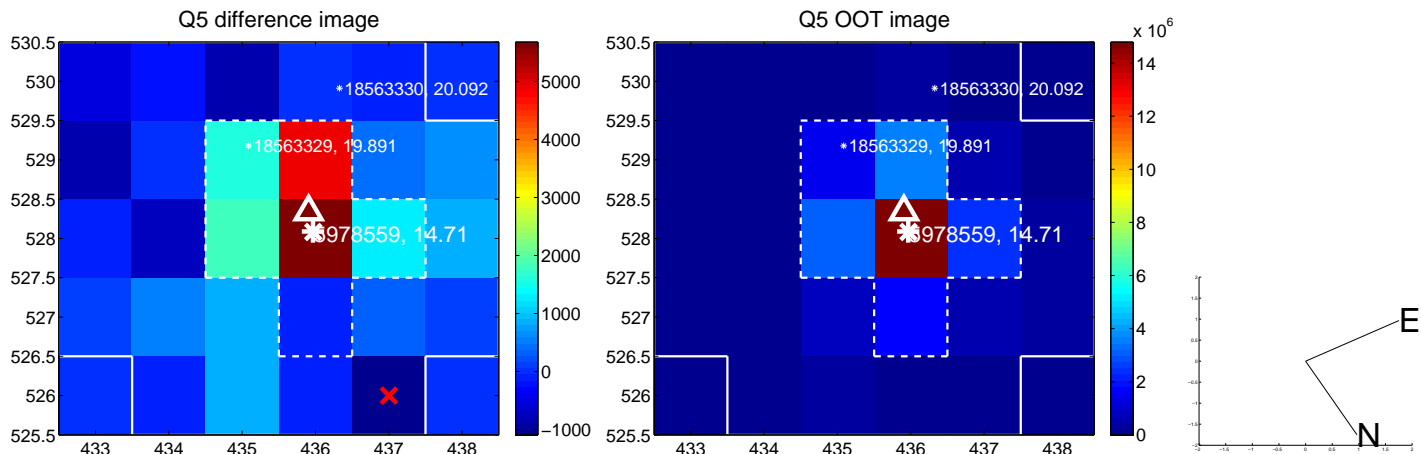


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

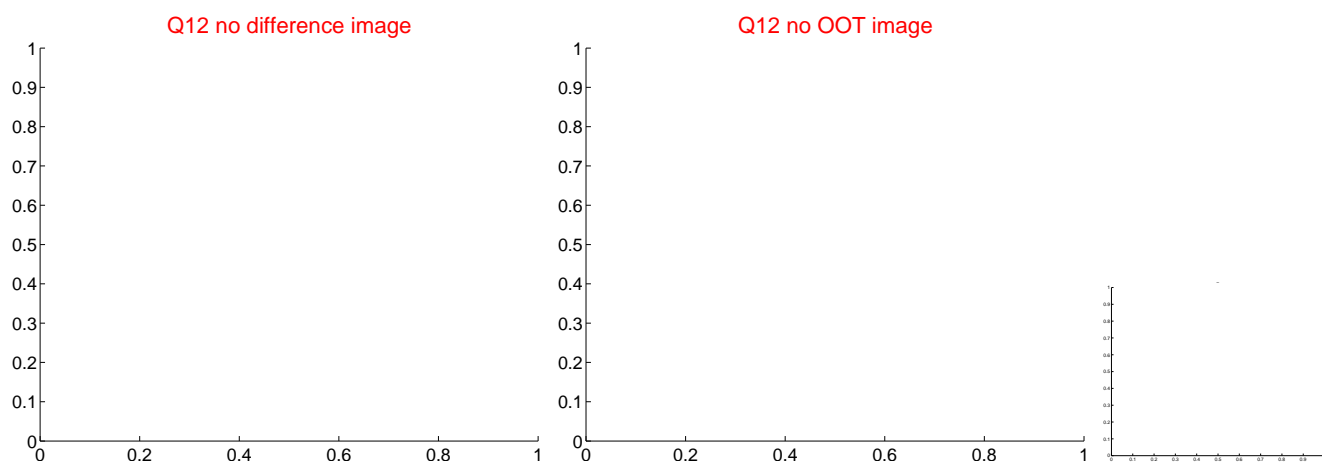
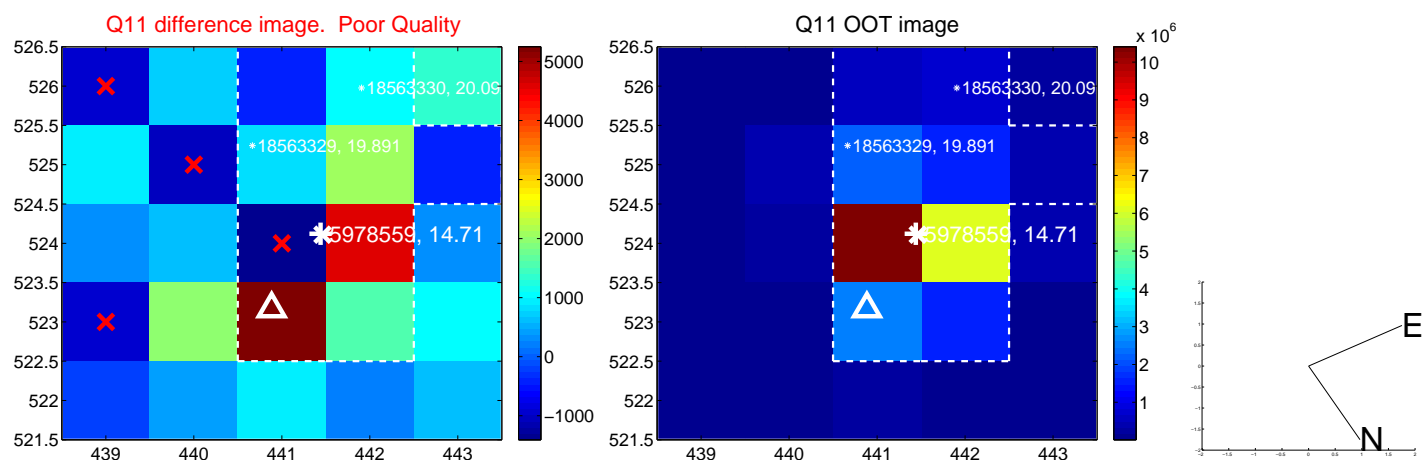
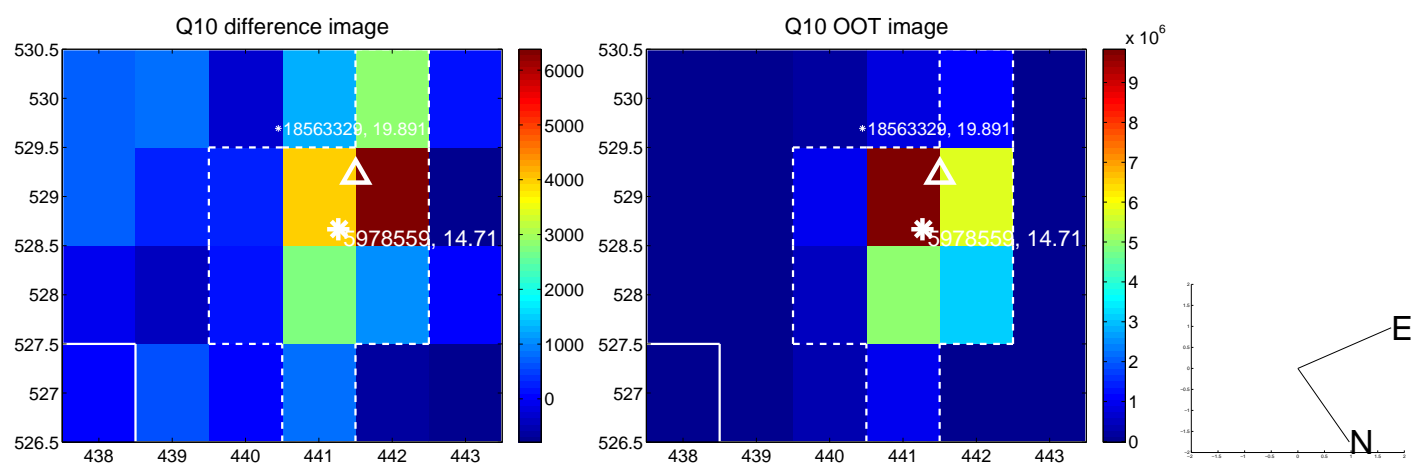
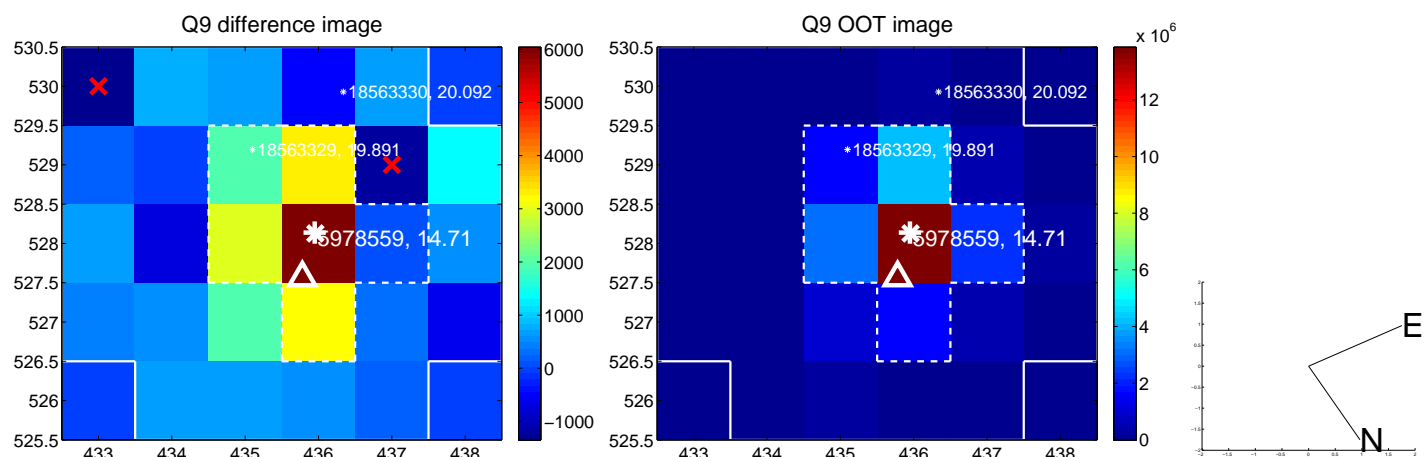
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



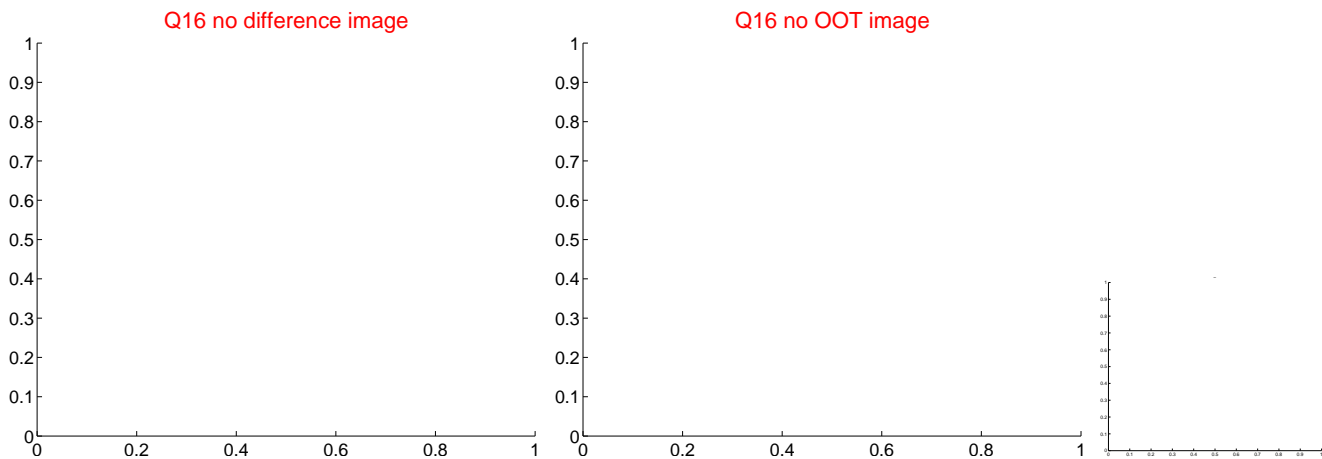
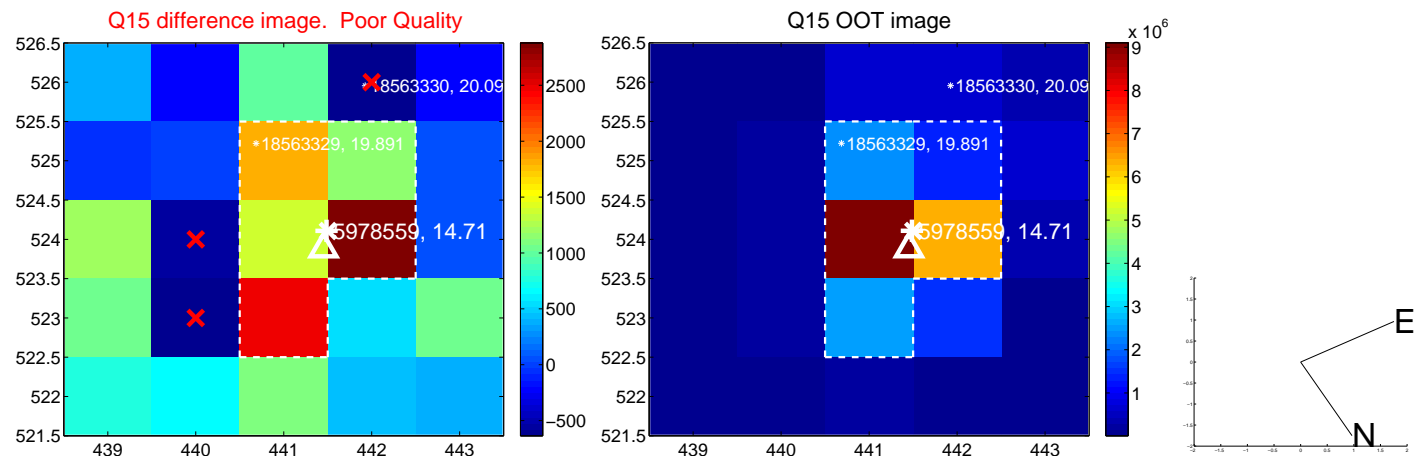
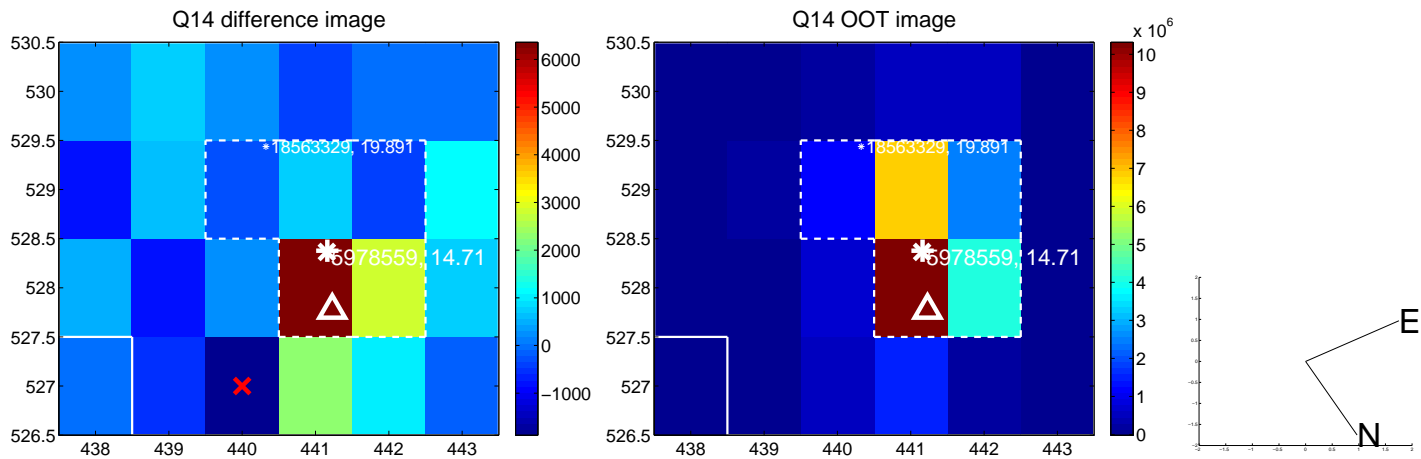
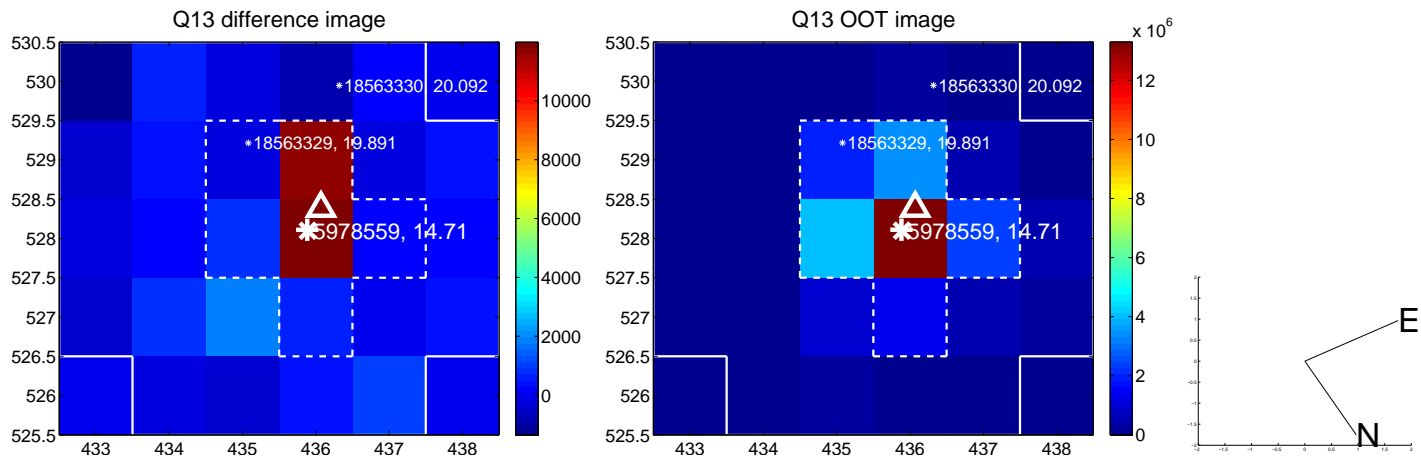
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



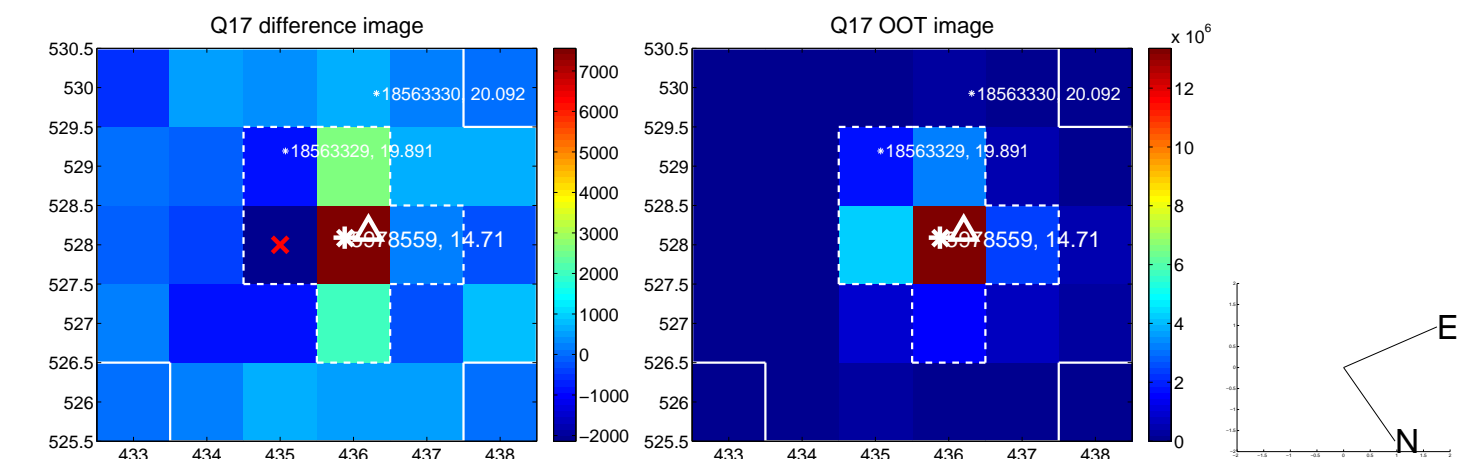
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



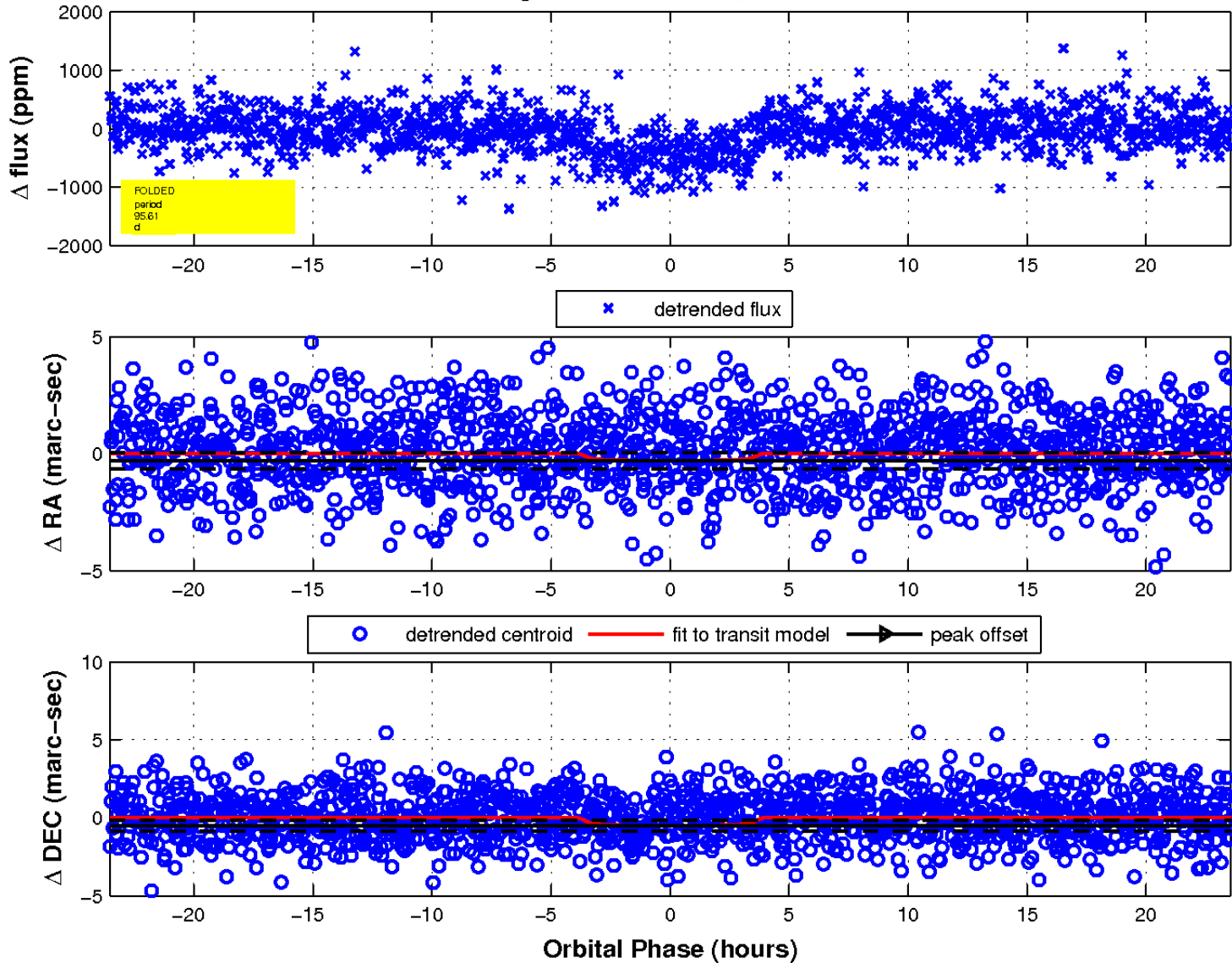
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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

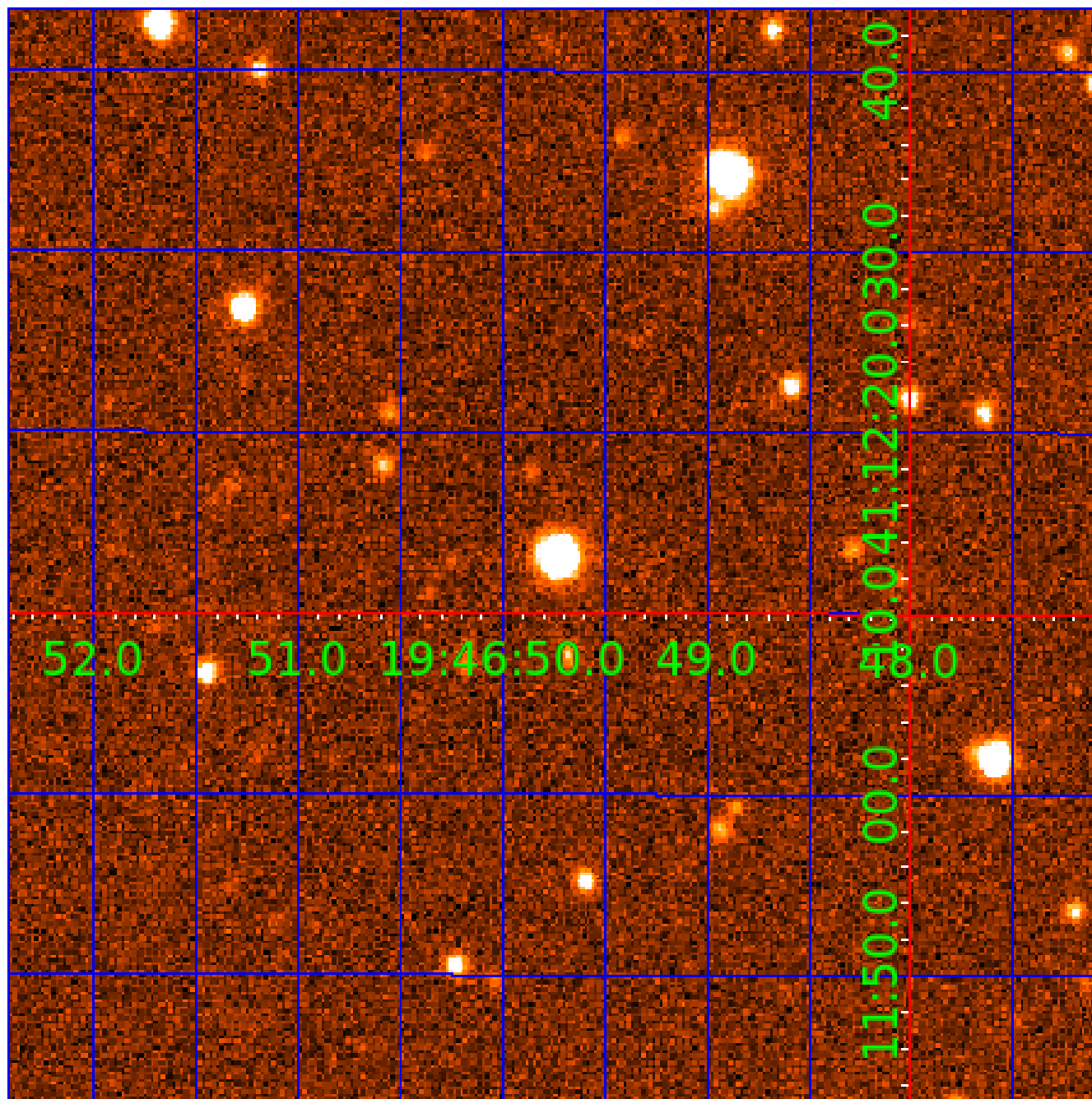


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 005978559

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})
005978559-01	OBS	2321.01	95.610993	138.358682	484.6	7.860	17.1	18.6	1.08	6002	2.72	7.47
005978559-02	OBS	2321.02	36.250708	142.081437	163.3	5.176	7.5	8.6	1.08	6002	1.54	27.22

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005978559-01	OBS	PC	0.99	0	0	0	0	NO_COMMENT
005978559-02	OBS	PC	0.62	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.

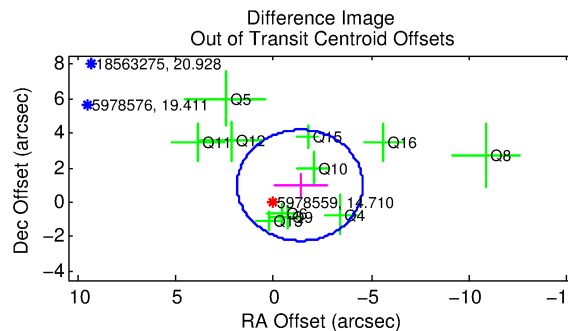
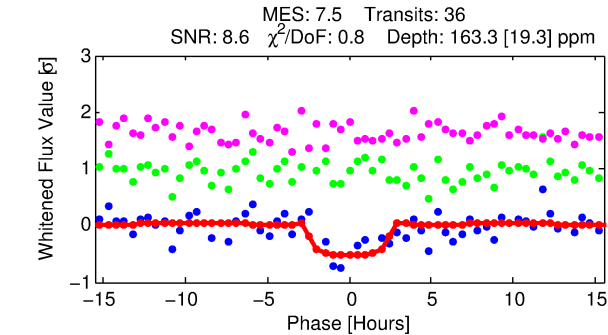
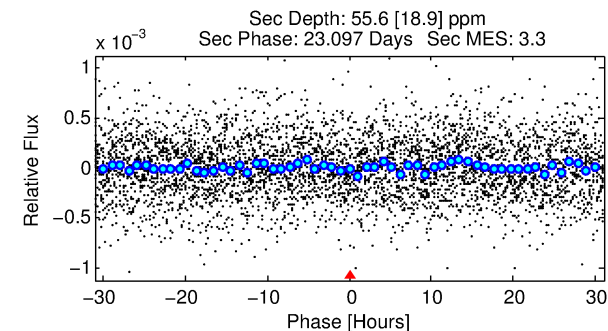
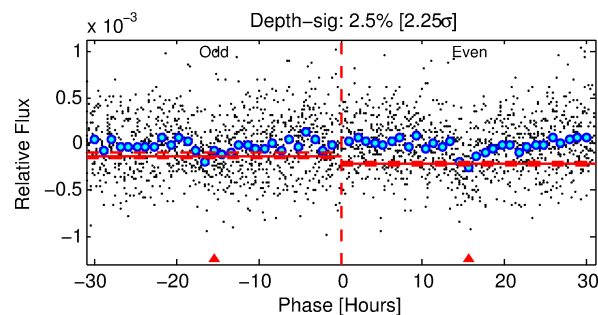
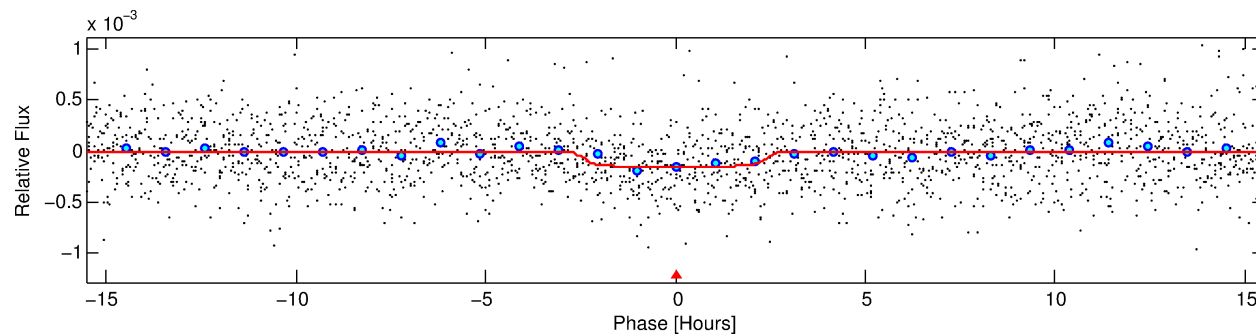
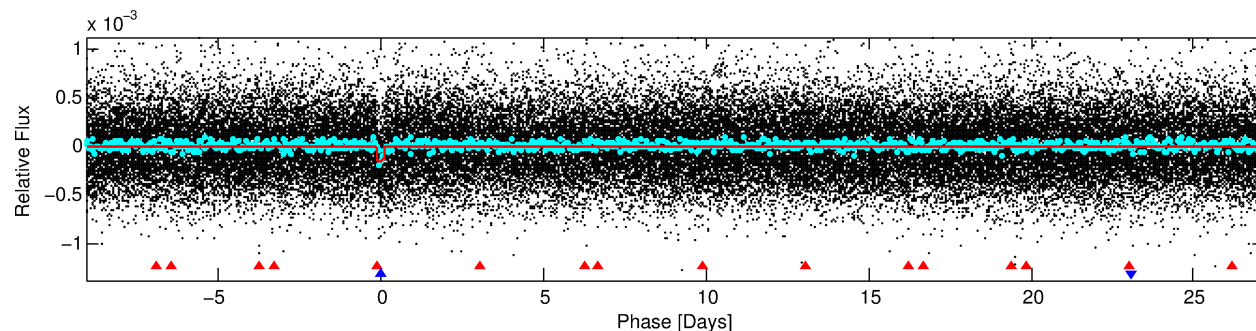
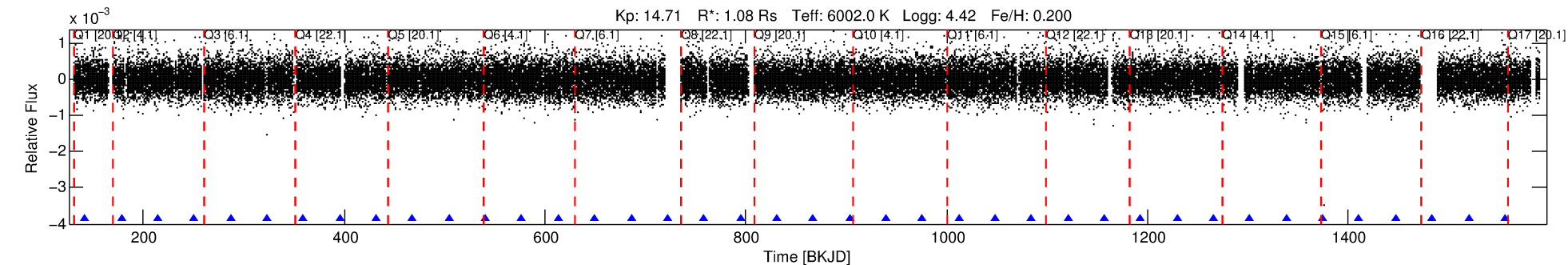
Ephemeris Match Information For 005978559-02

No Significant Match Found

DV One-Page Summary

KIC: 5978559 Candidate: 2 of 2 Period: 36.251 d

KOI: K02321.02 Corr: 0.920



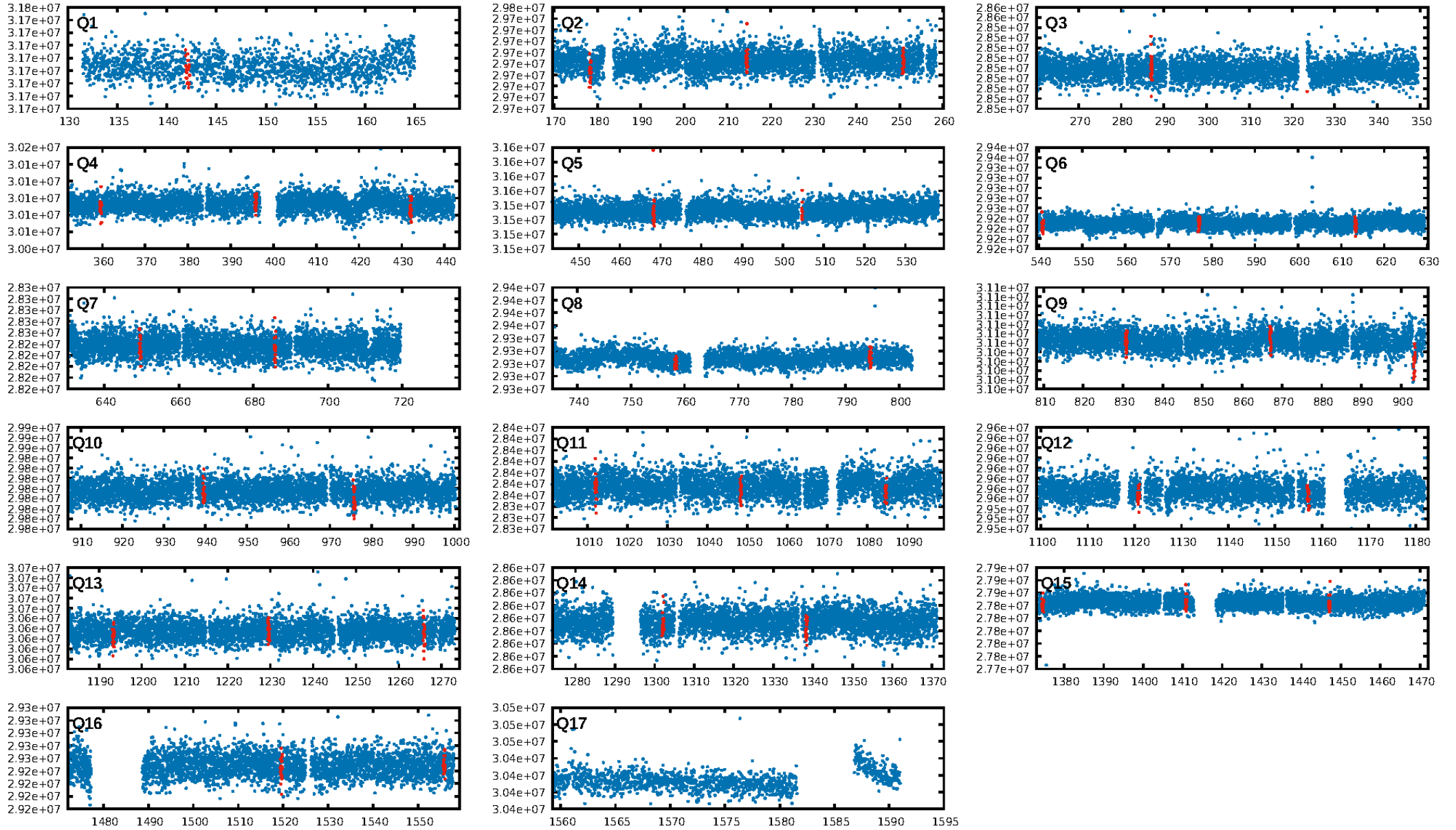
DV Fit Results:

Period = 36.25071 [0.00054] d
Epoch = 142.0814 [0.0121] BKJD
Rp/R* = 0.0130 [0.0108]
a/R* = 32.62 [127.68]
b = 0.81 [1.69]
Seff = 27.22 [6.00]
Teq = 582 [32] K
Rp = 1.54 [1.30] Re
a = 0.2234 [0.0313] AU
Ag = 644.95 [1099.60] [0.59 σ]
Teffp = 4538 [1920] K [2.06 σ]

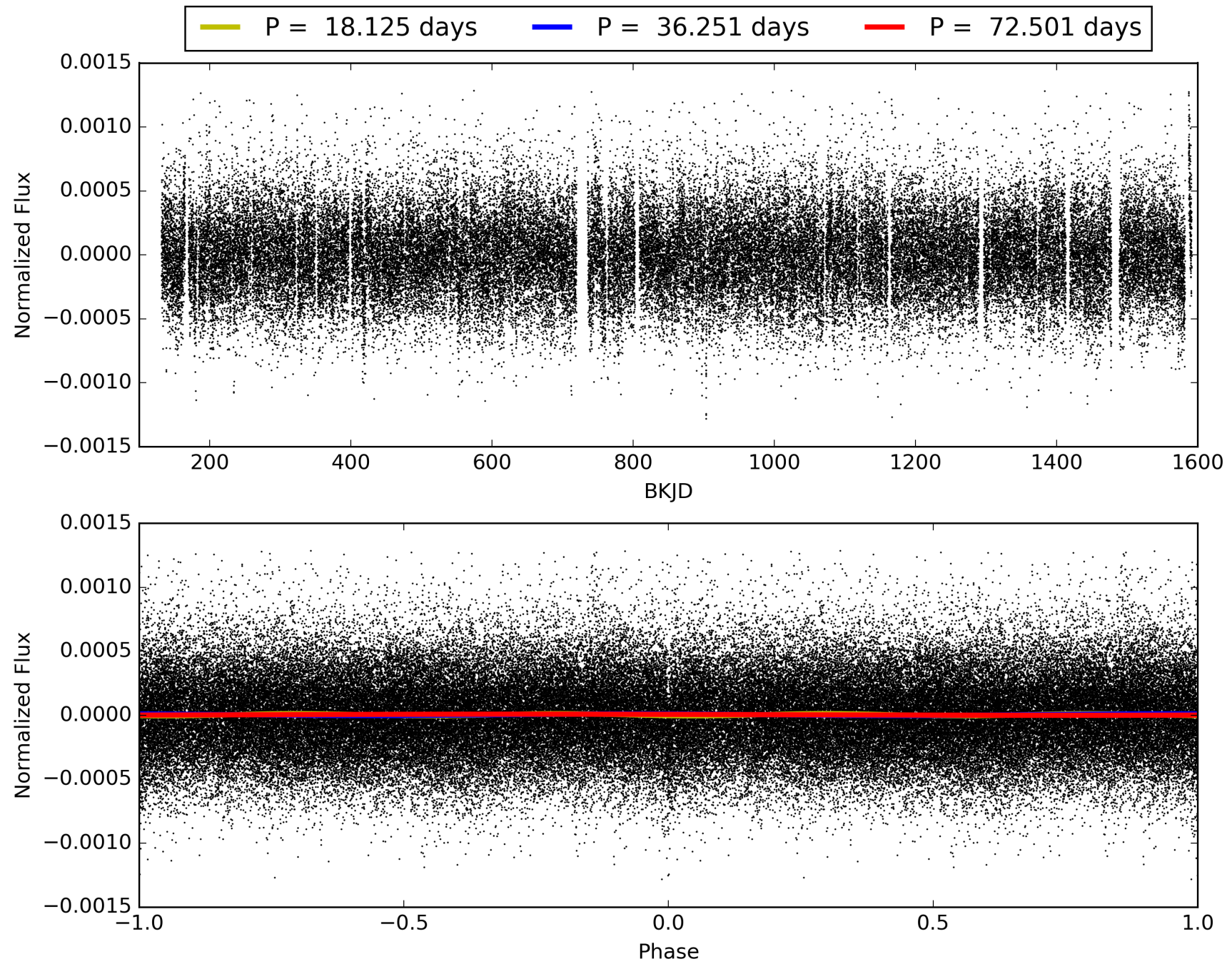
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [151.38 σ]
ModelChiSquare2-sig: 89.7%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.11e-13
RollingBand-fgt: 1.00 [35/35]
GhostDiagnostic-chr: 2.419
Centroid-sig: 28.7%
Centroid-so: 1.891 arcsec [1.19 σ]
OotOffset-rm: 1.671 arcsec [1.56 σ]
KicOffset-rm: 1.650 arcsec [1.68 σ]
OotOffset-st: 2/2/4/3 [11]
KicOffset-st: 2/2/4/3 [11]
DiffImageQuality-fgm: 0.45 [5/11]
DiffImageOverlap-fno: 1.00 [16/16]

TCE 005978559-02, PDC Light Curves

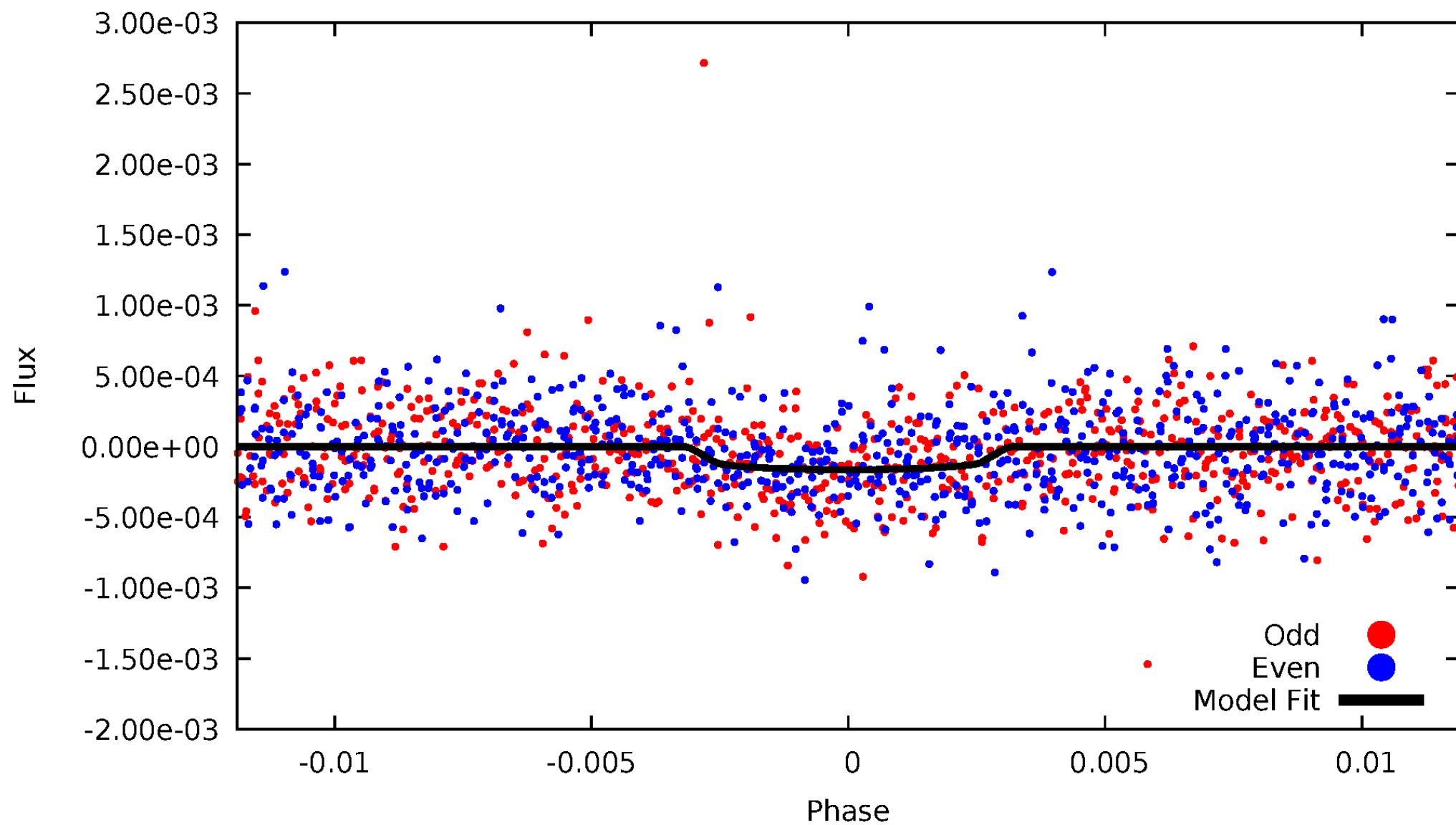


TCE 005978559-02



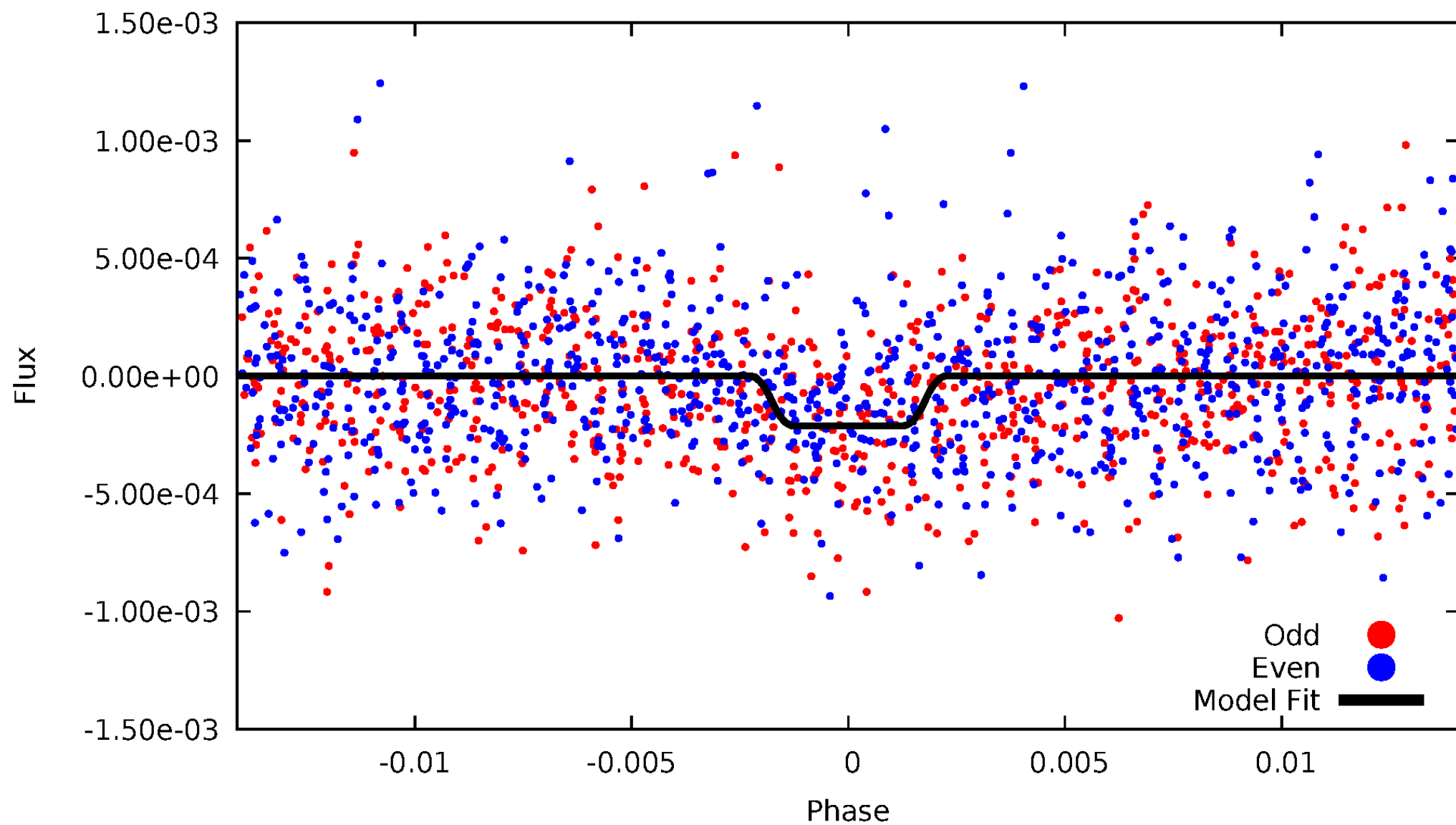
DV Odd/Even

TCE 005978559-02



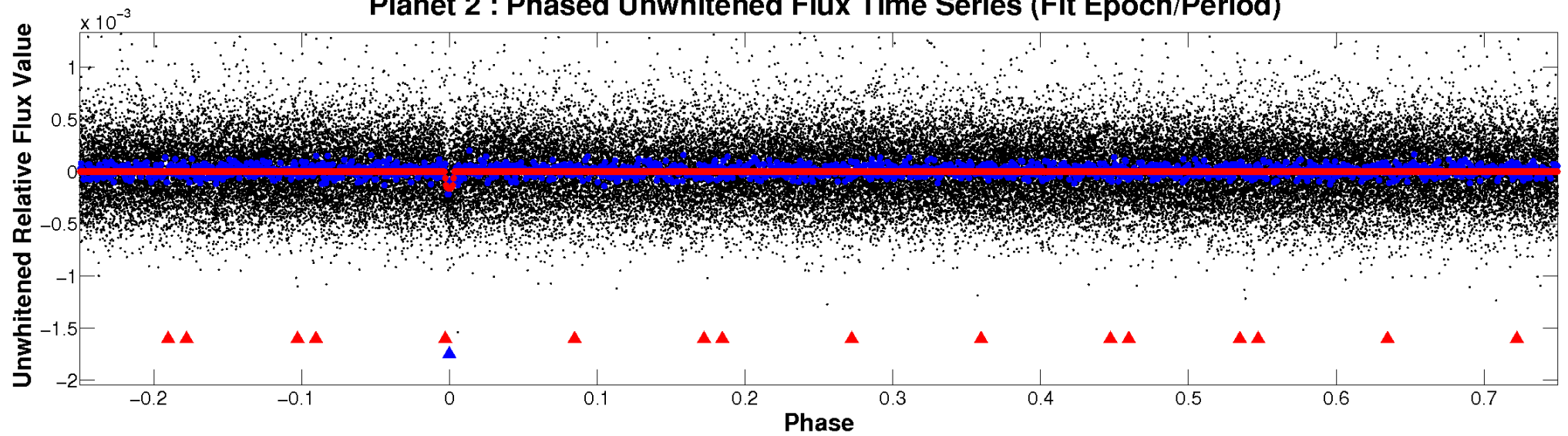
ALT Odd/Even

TCE 005978559-02

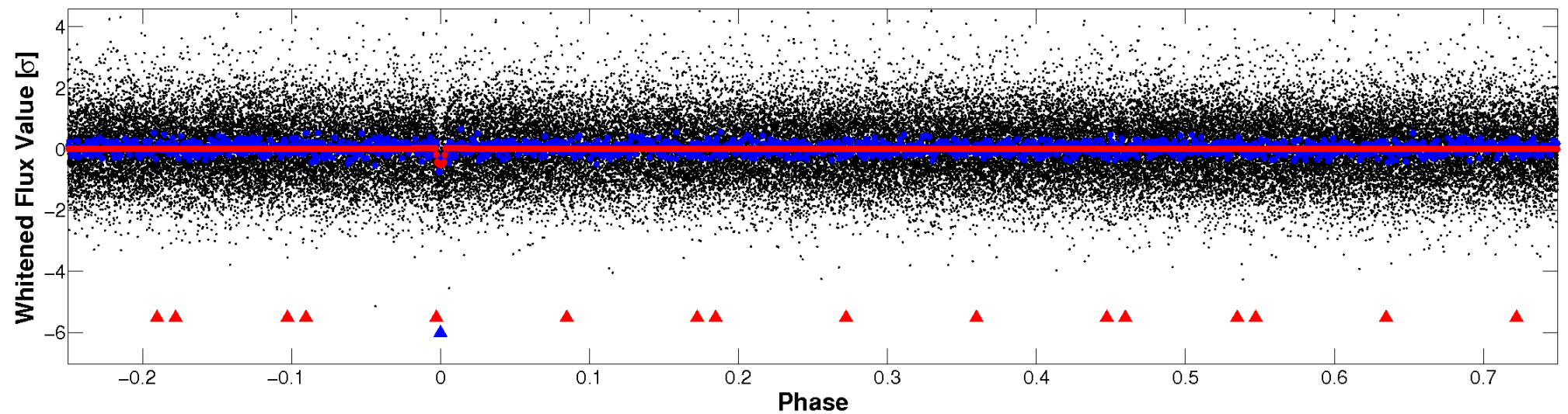


Non-Whitened Vs. Whitened Light Curve

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

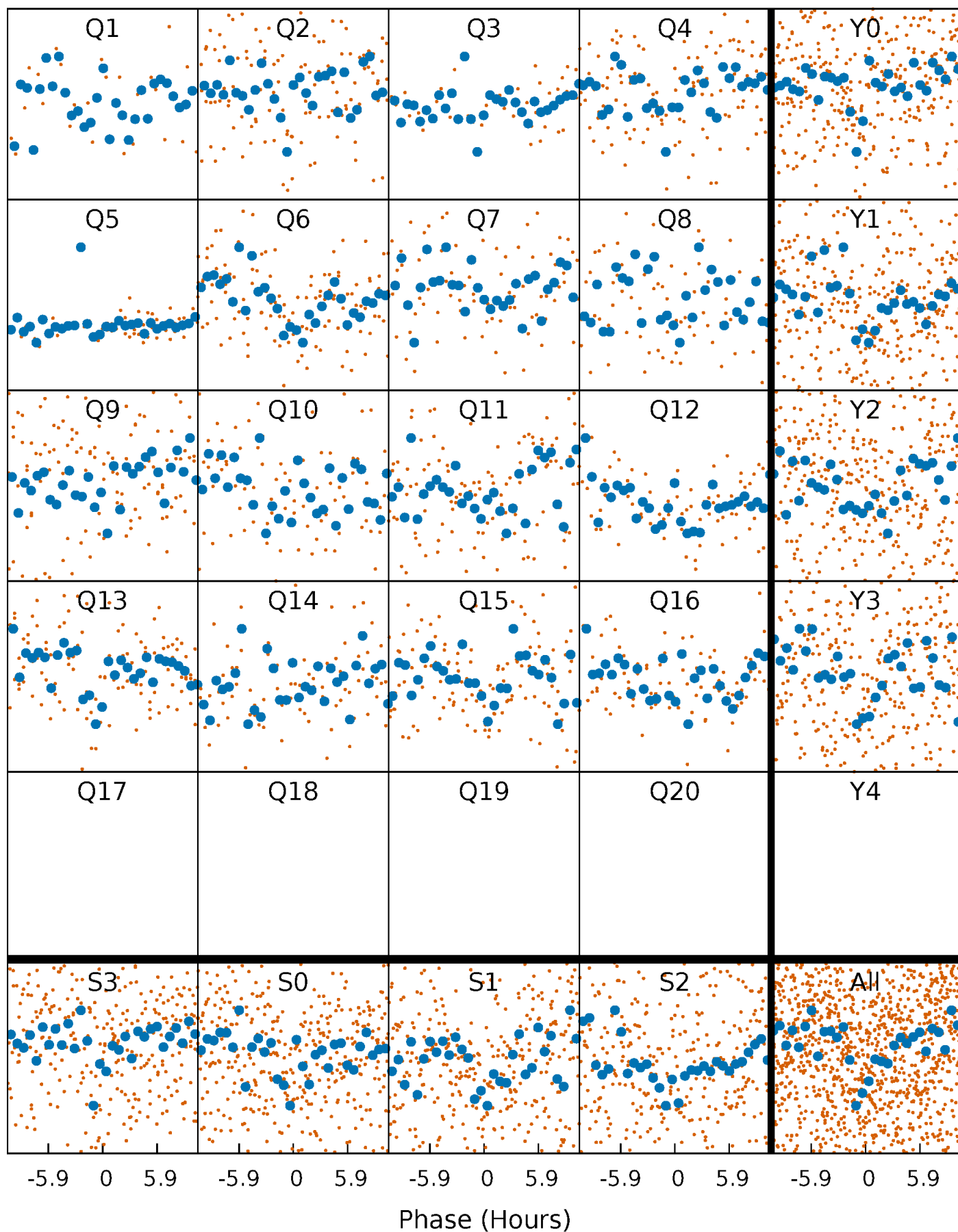


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



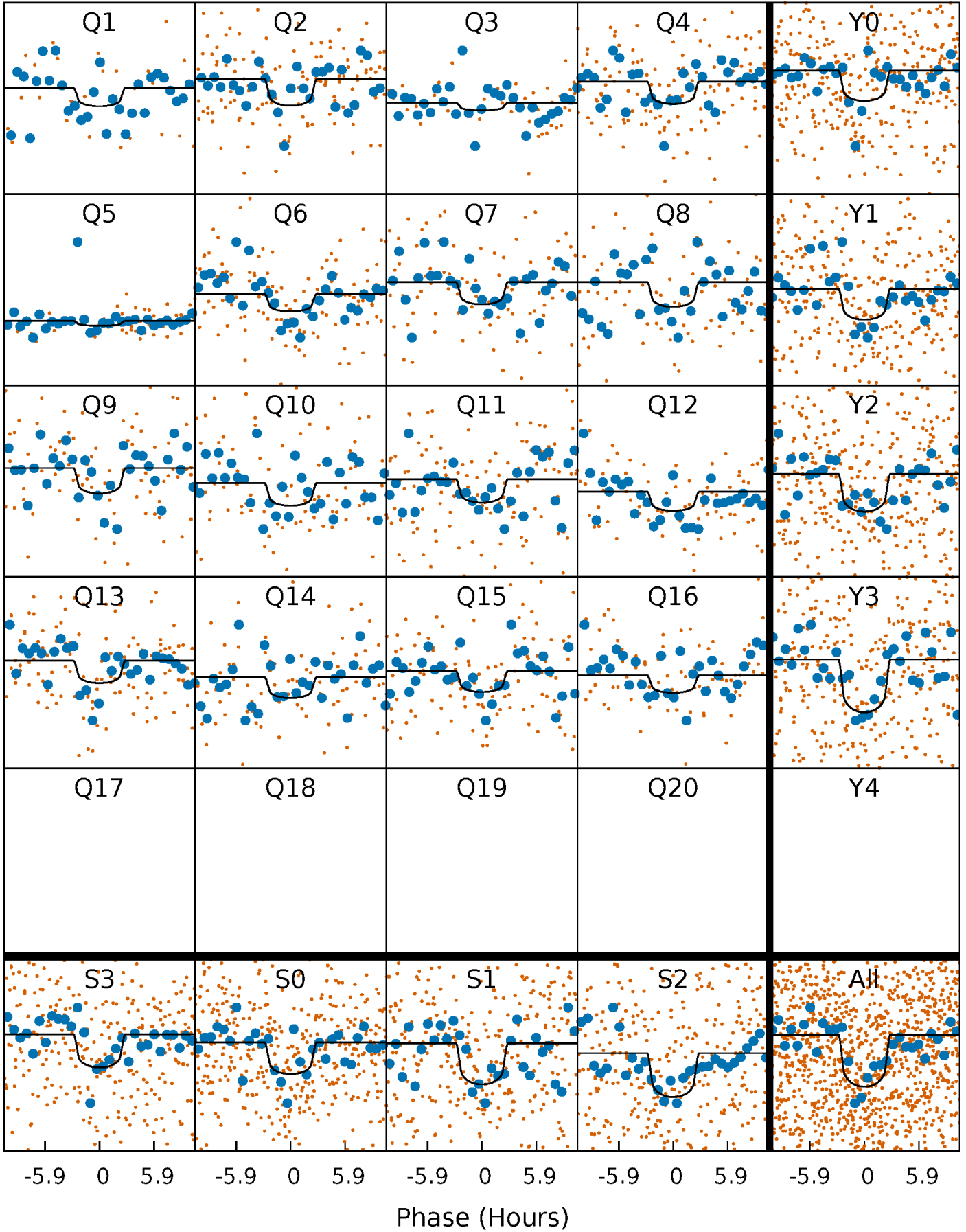
PDC Quarter-Phased Transit Curves

TCE 005978559-02 P= 36.250708 Days $T_0=142.081437$ (BKJD)



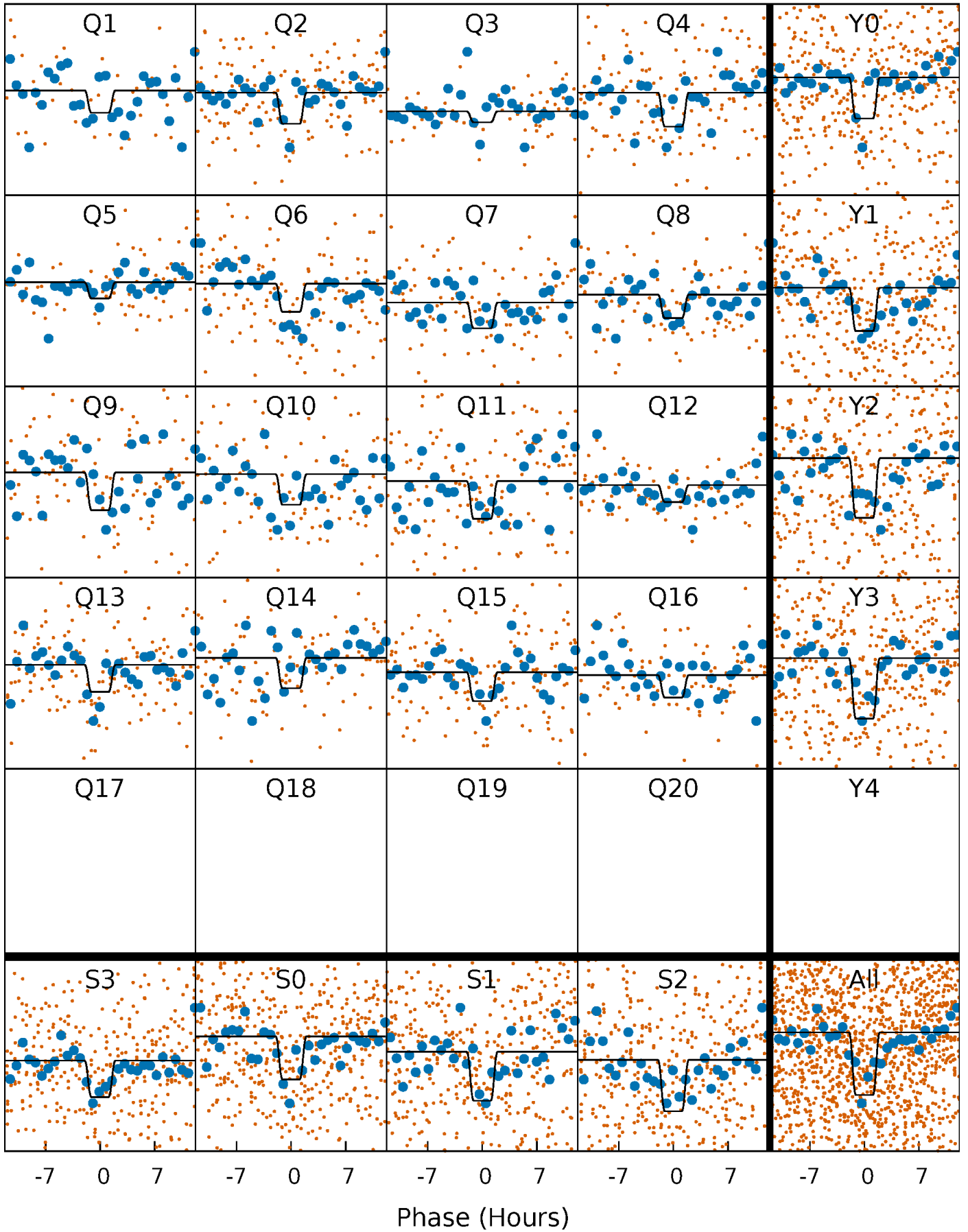
DV Quarter-Phased Transit Curves

TCE 005978559-02 P= 36.250708 Days $T_0=142.081437$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

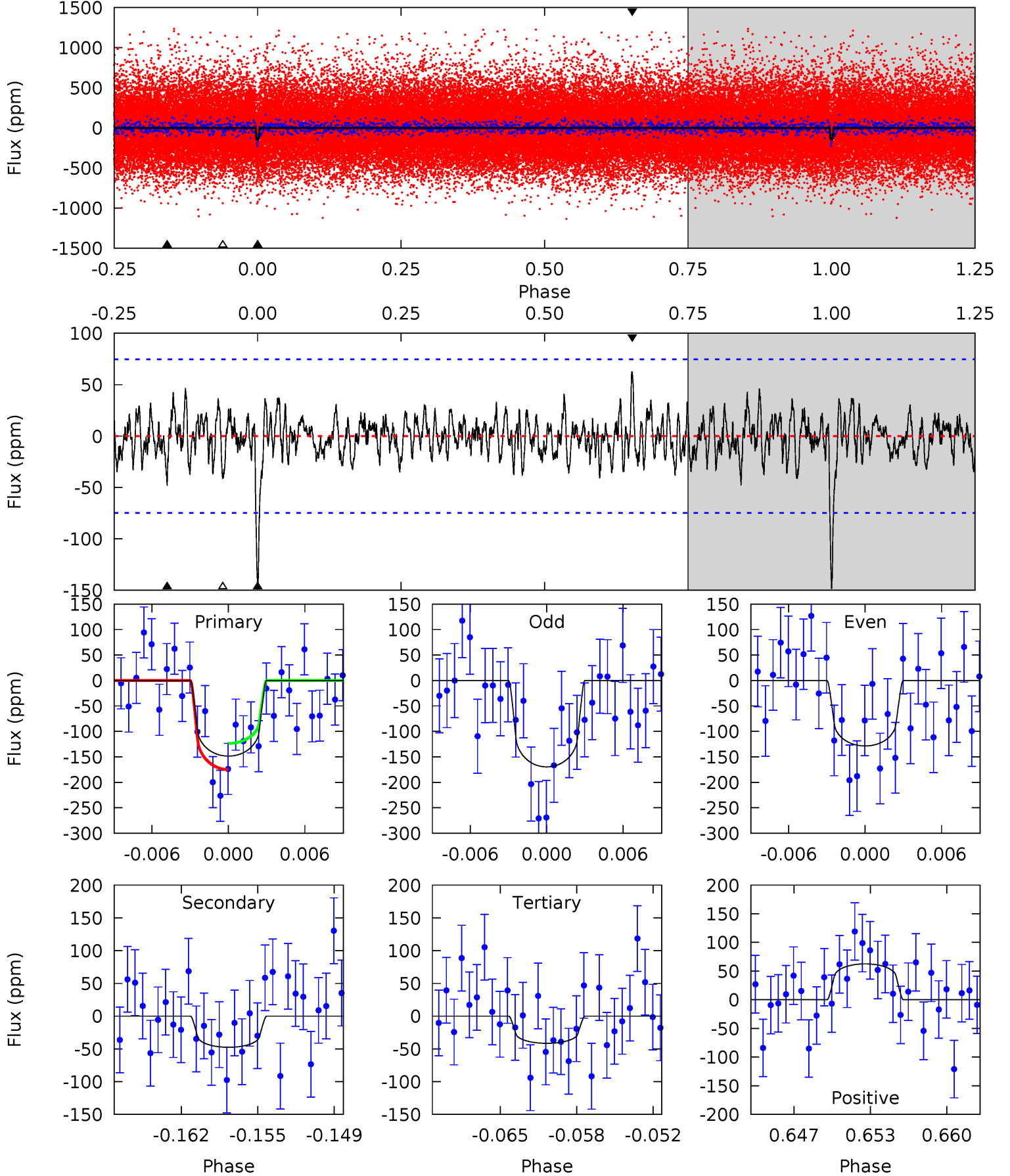
TCE 005978559-02 P= 36.251097 Days $T_0=142.064468$ (BKJD)



DV Model-Shift Uniqueness Test

005978559-02, $P = 36.250708$ Days, $E = 105.830729$ Days

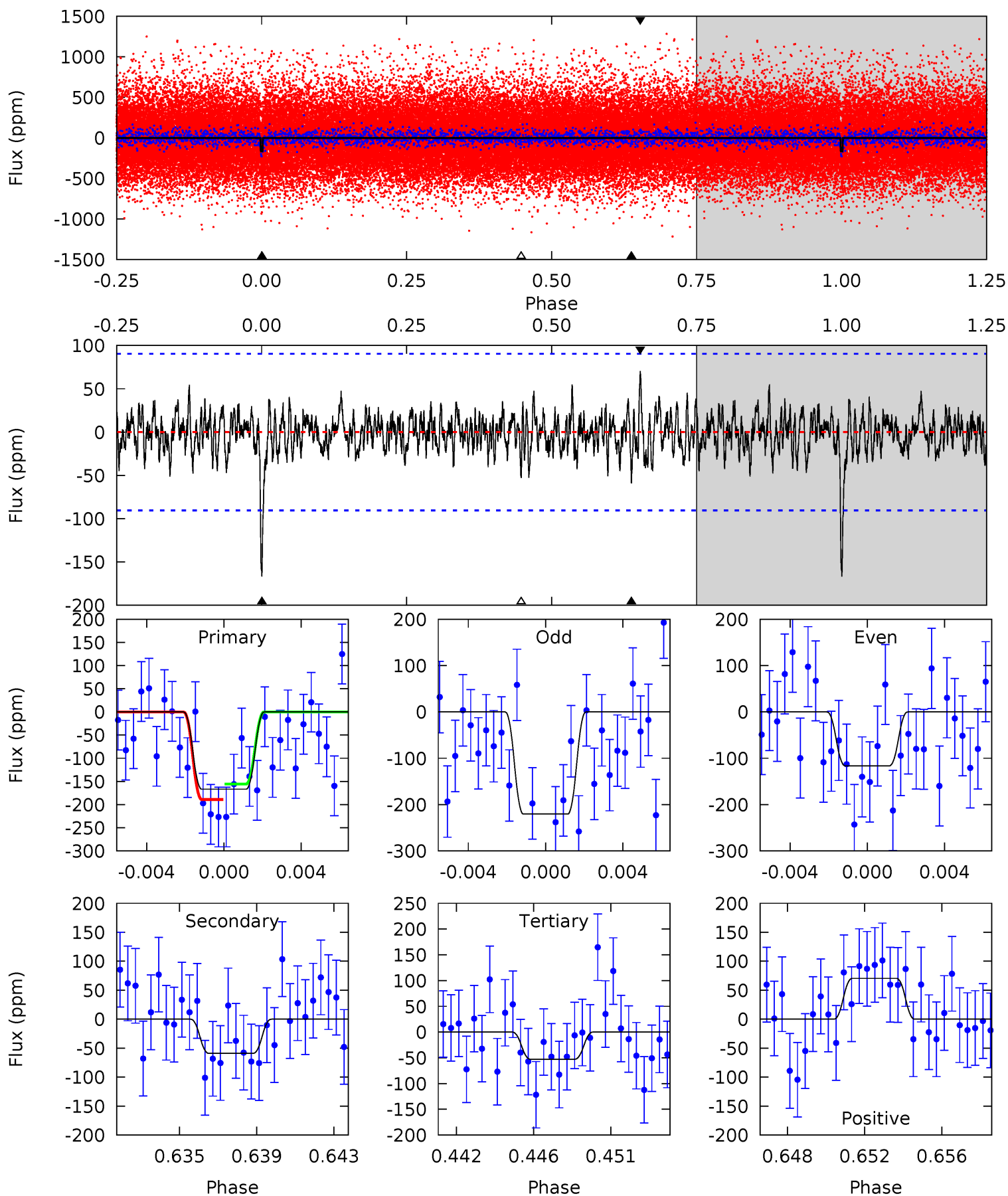
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.2	3.25	2.84	4.28	5.11	2.72	1.10	7.32	5.87	0.42	-1.03	1.41	1.00	0.30	1.75



Alt Model-Shift Uniqueness Test

005978559-02, $P = 36.251097$ Days, $E = 105.813371$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.56	3.38	3.02	4.04	5.18	2.85	1.05	6.53	5.52	0.35	-0.66	2.99	1.11	0.30	0.96



Stellar Parameters For KIC 005978559

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6002^{+71}_{-89}	$4.424^{+0.032}_{-0.120}$	$0.200^{+0.150}_{-0.150}$	$1.081^{+0.171}_{-0.061}$	$1.135^{+0.062}_{-0.070}$	$1.265^{+0.188}_{-0.454}$
	+1%/-1%	+1%/-3%	+75%/-75%	+16%/-6%	+5%/-6%	+15%/-36%
Source	SPE90	SPE90	SPE90	DSEP		

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

Secondary Eclipse Parameters for KIC 005978559-02 / KOI 2321.02

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-48 ± 15	$1.70^{+1.23}_{-0.99}$	820^{+30}_{-20}	4378^{+2063}_{-797}	428^{+2134}_{-295}
Alt.	-59 ± 17	$1.96^{+1.23}_{-1.06}$	821^{+29}_{-21}	4340^{+1889}_{-696}	430^{+1800}_{-279}

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 $A_{obs} \gg 1.0$

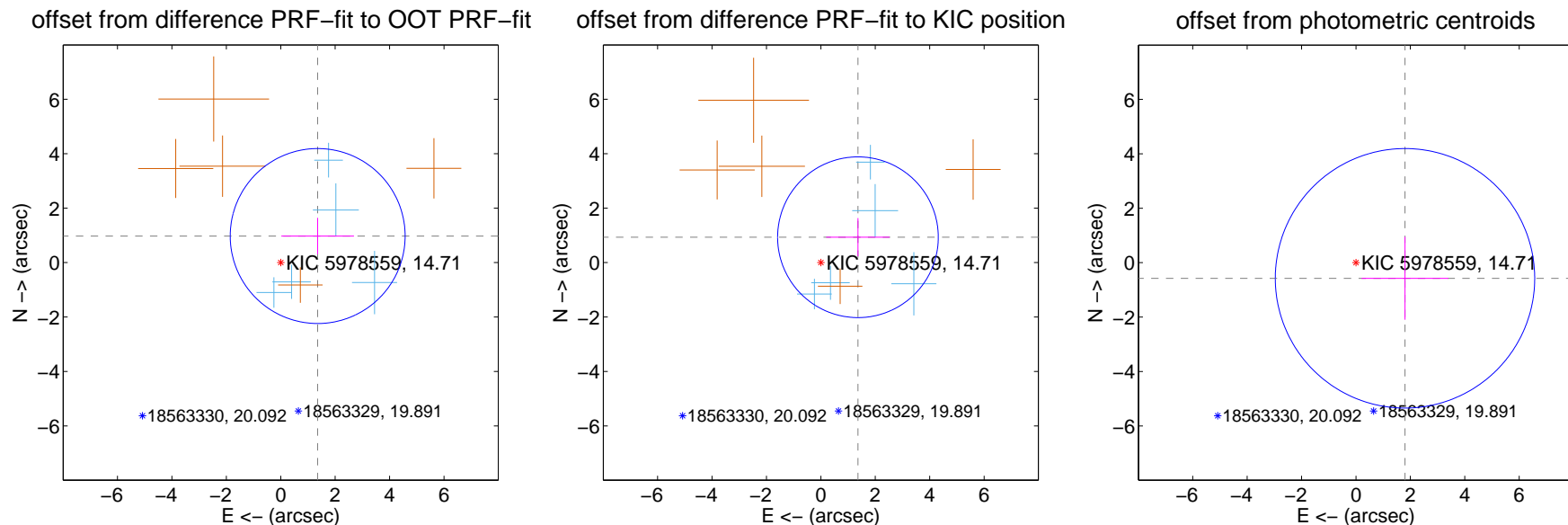
DV Centroid Data

Supplemental centroid analysis for 005978559-02. Kepler magnitude: 14.71. Transit SNR 8.61

There are 5 quarters with good PRF difference image offsets

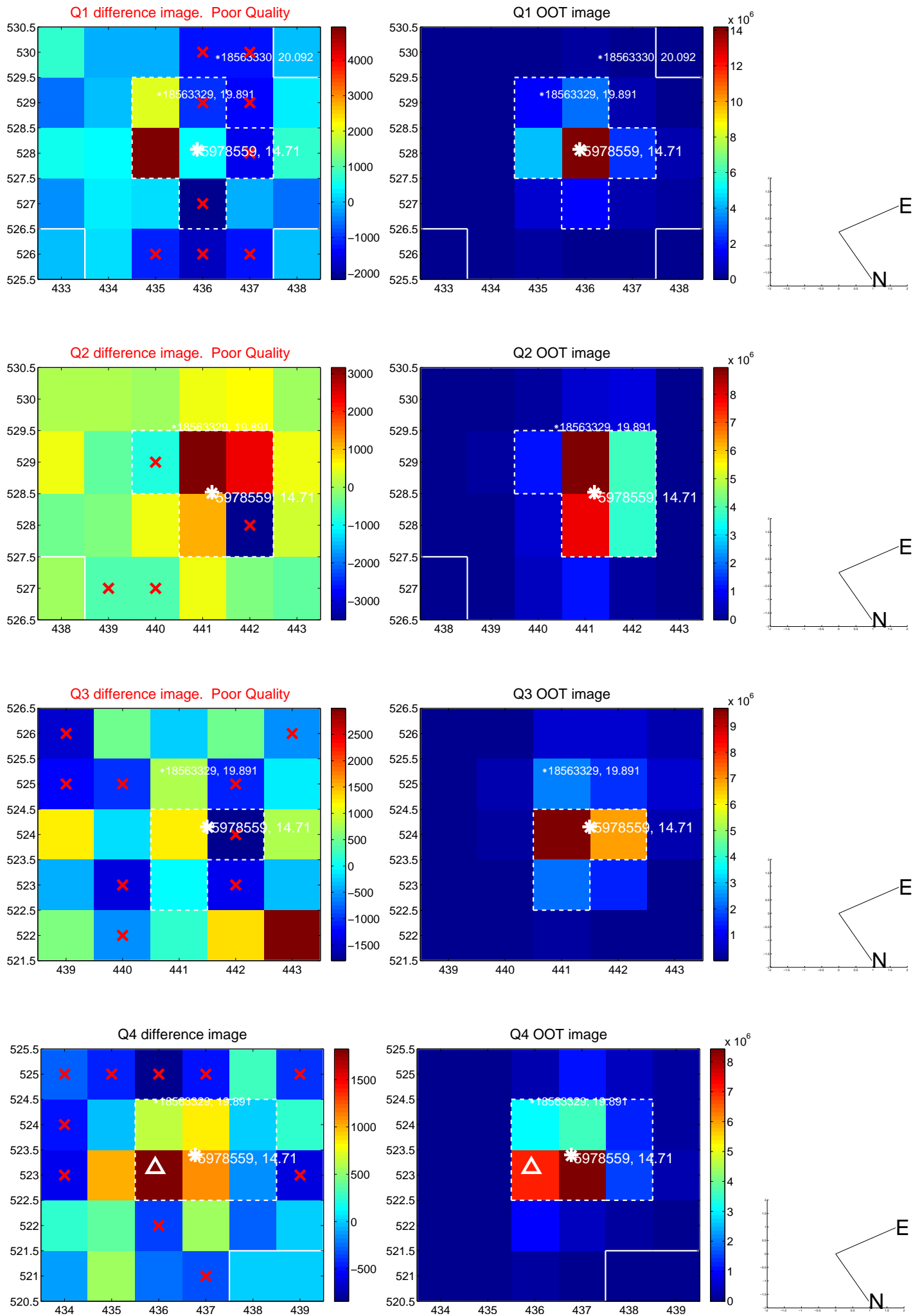
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.671 ± 1.071	1.56	-1.356 ± 1.335	0.975 ± 0.668
PRF-fit source offset from KIC position	1.650 ± 0.984	1.68	-1.362 ± 1.167	0.931 ± 0.703
photometric centroid source offset	1.89 ± 1.59	1.19	-1.80 ± 1.60	-0.57 ± 1.52

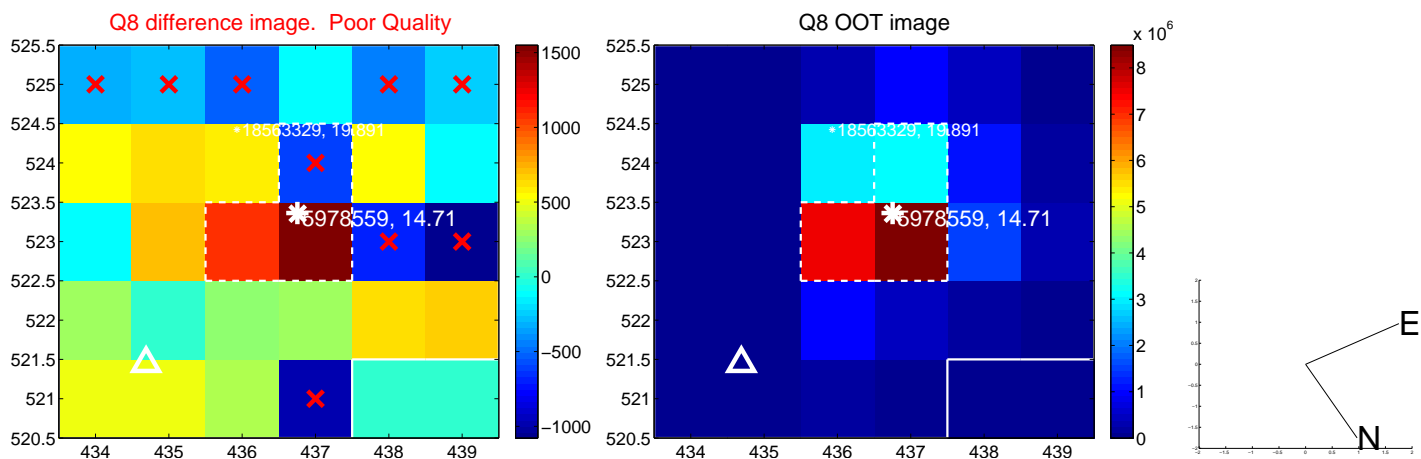
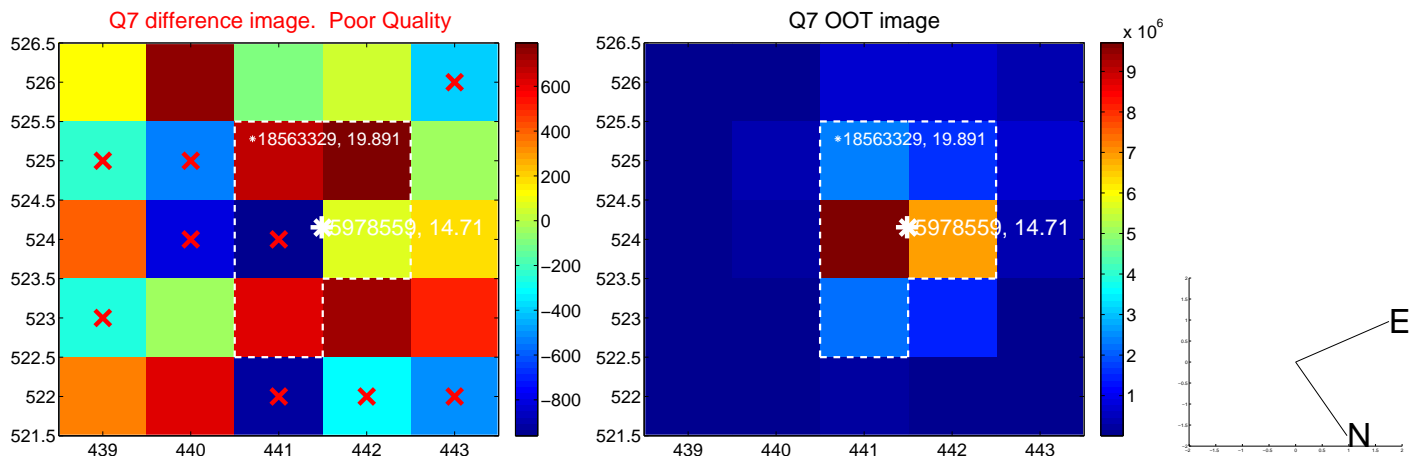
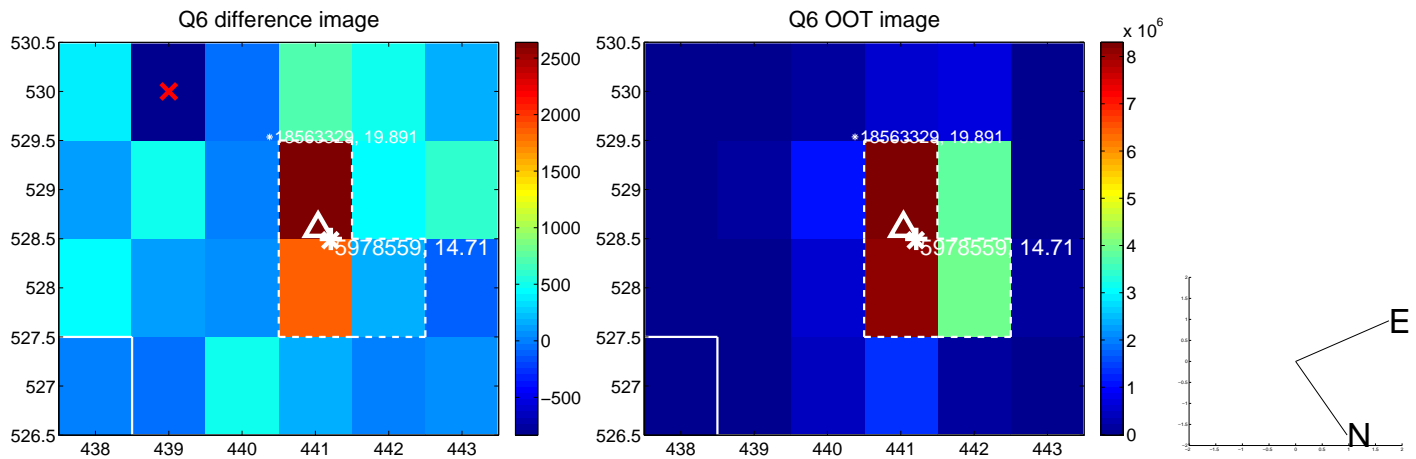
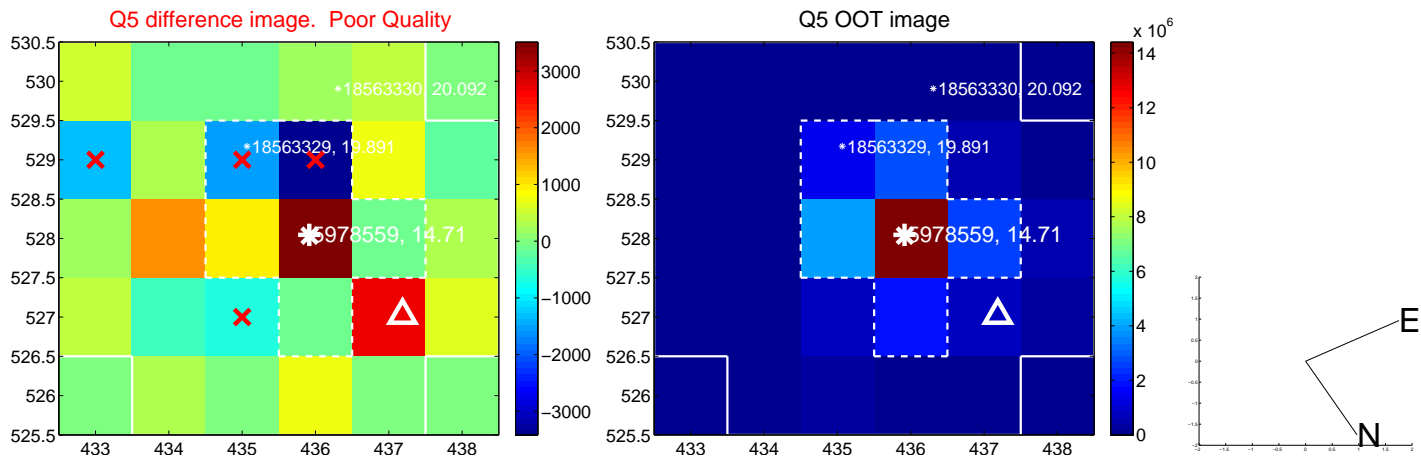


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

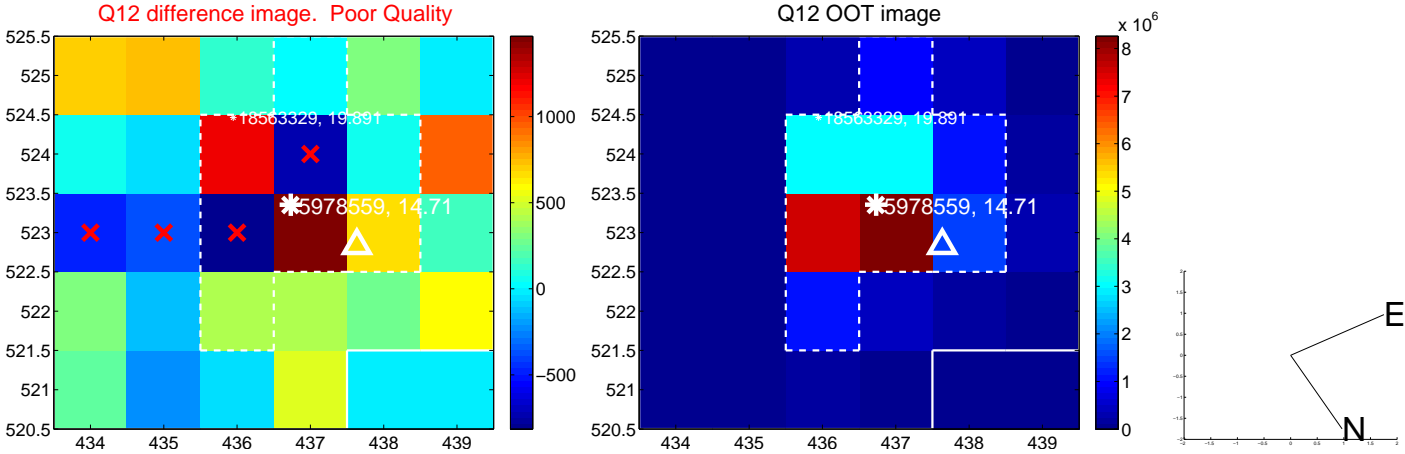
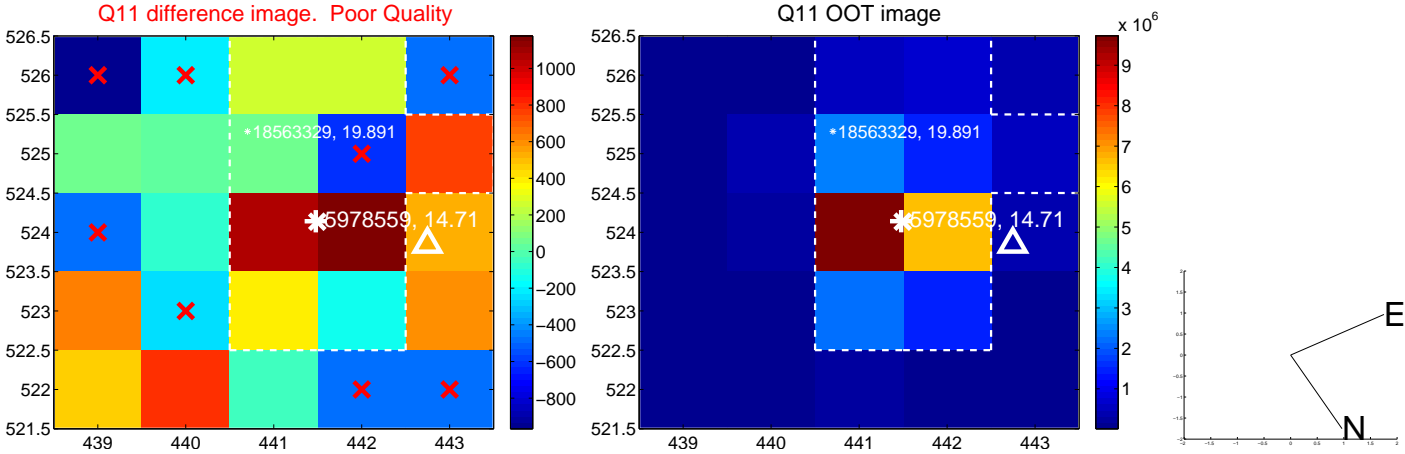
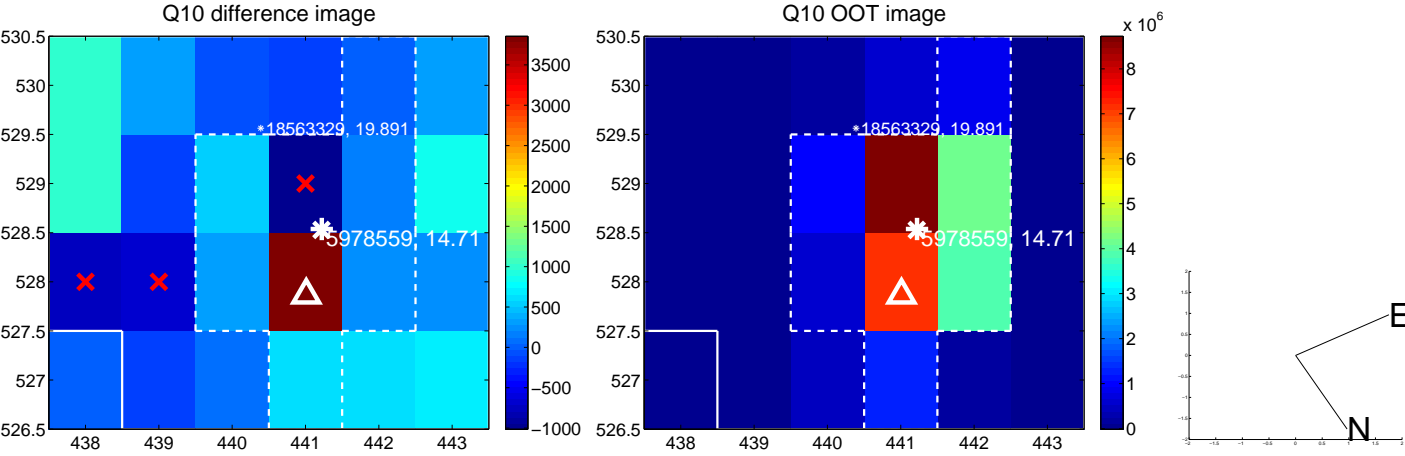
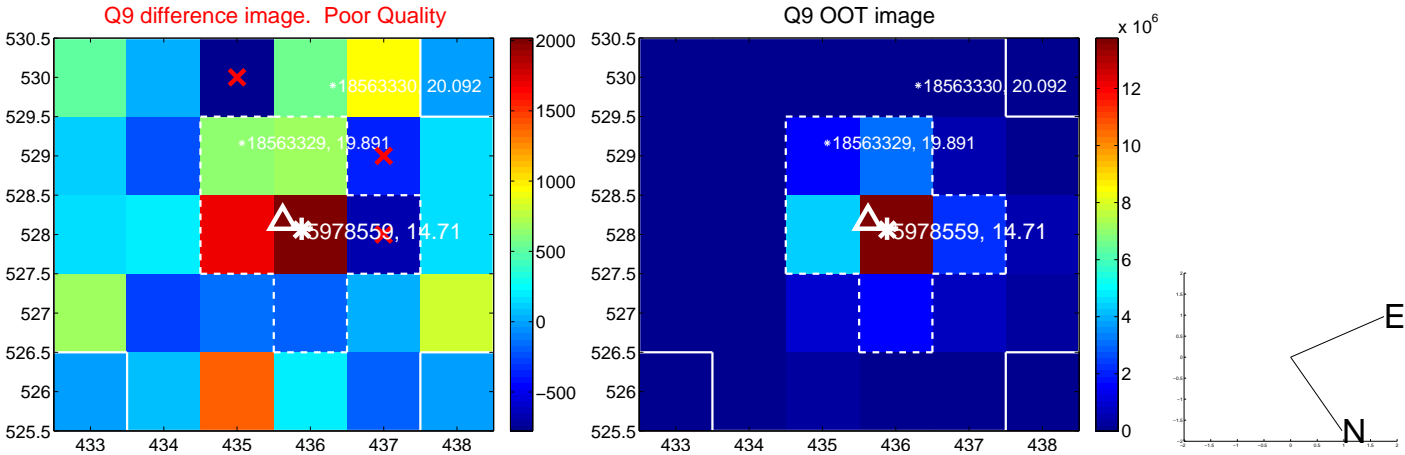
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



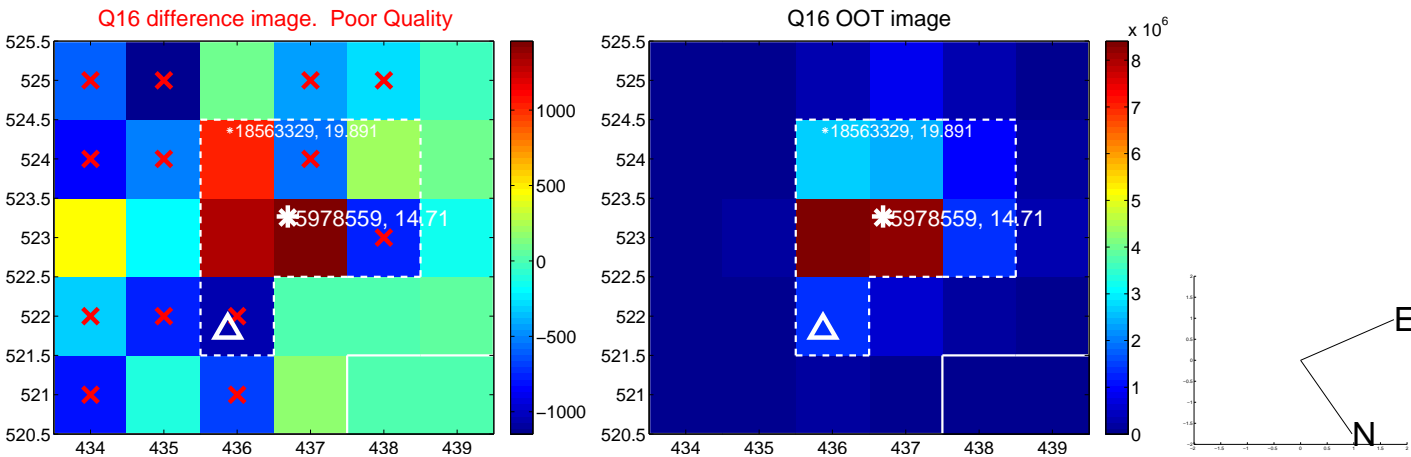
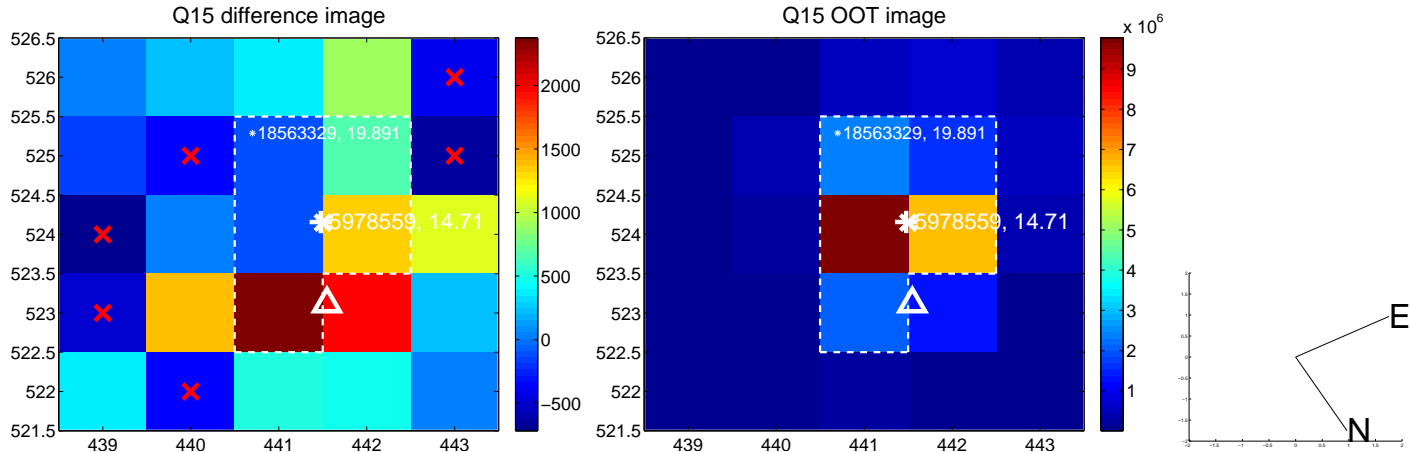
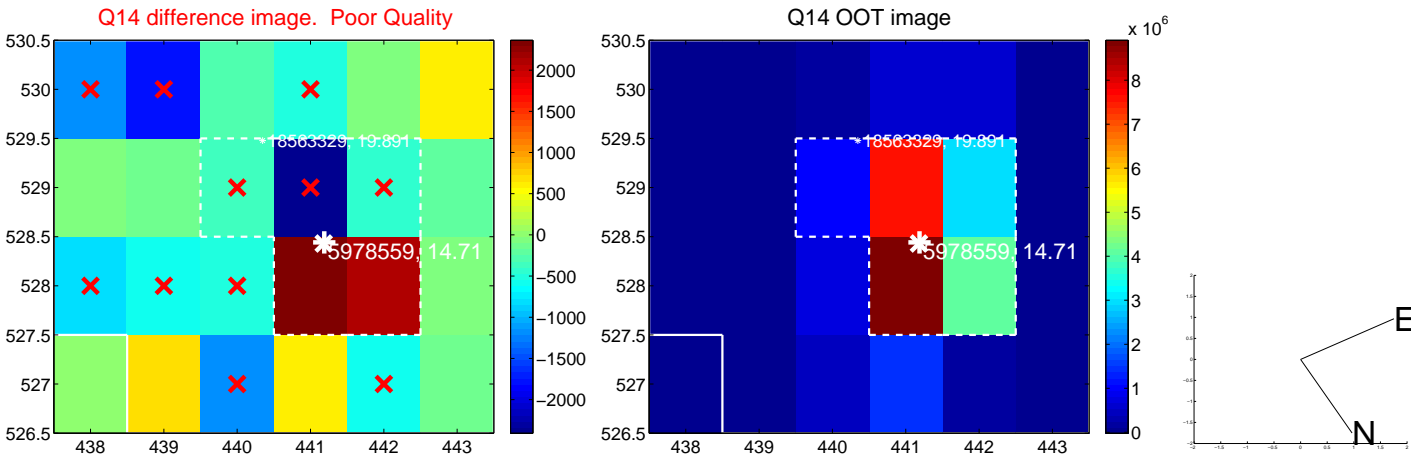
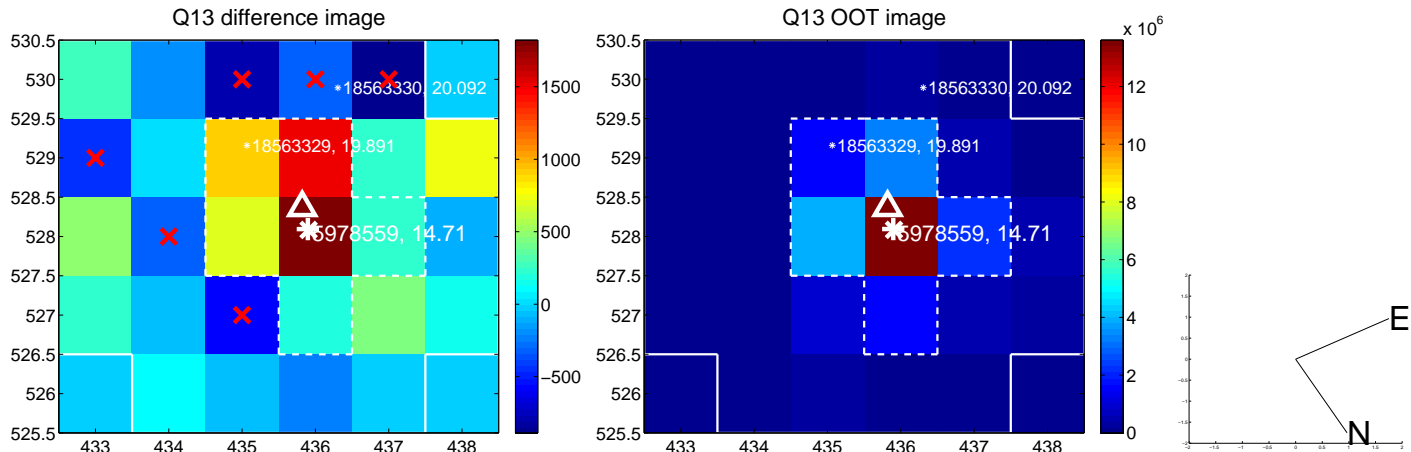
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



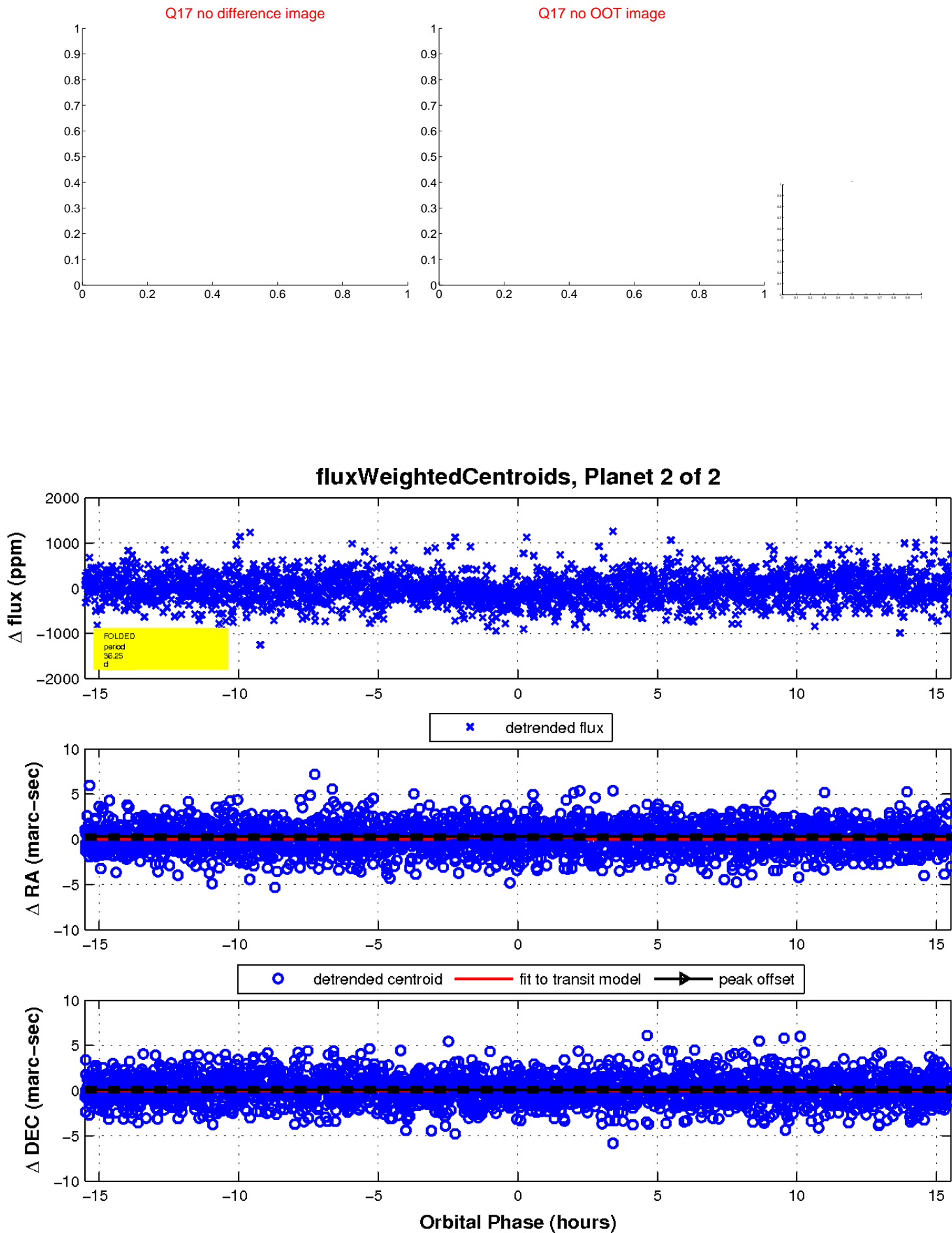
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

