

KIC 009881662

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})
009881662-01	OBS	0327.01	3.254271	133.611800	159.2	3.089	46.8	51.0	1.09	5945	1.62	677.51
009881662-02	OBS	0327.02	91.351433	189.606676	200.6	9.314	15.8	16.5	1.09	5945	1.87	7.94

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009881662-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009881662-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

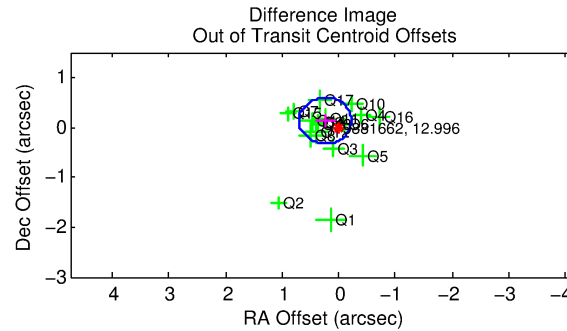
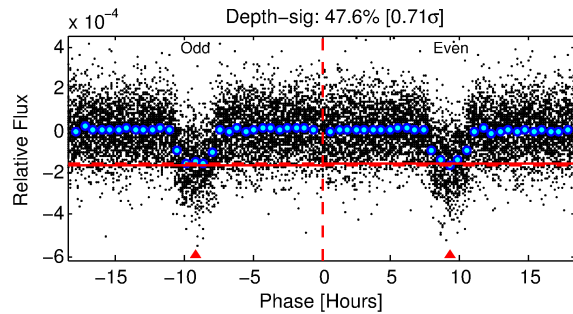
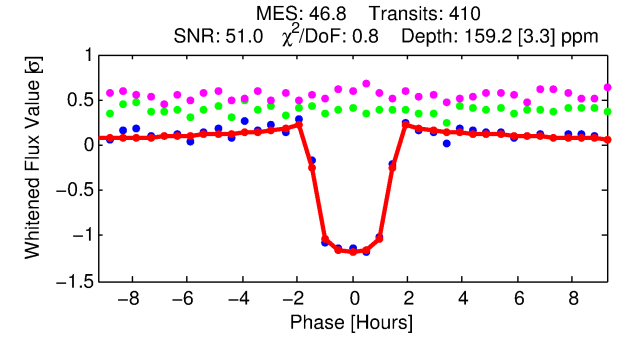
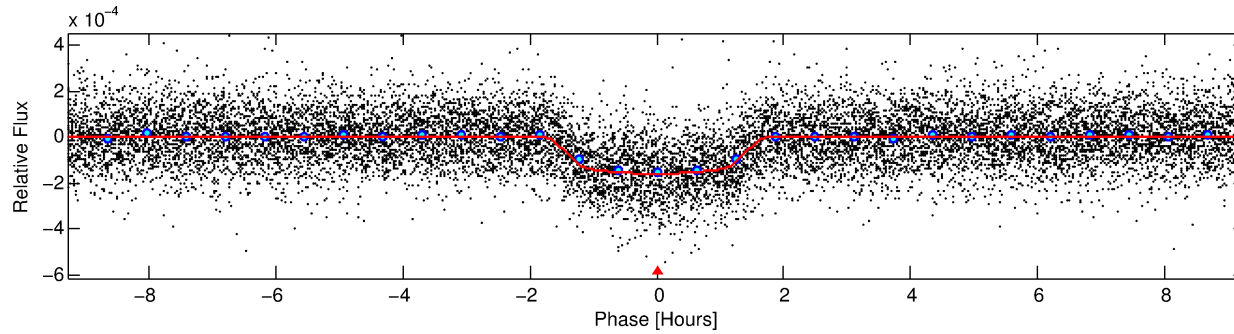
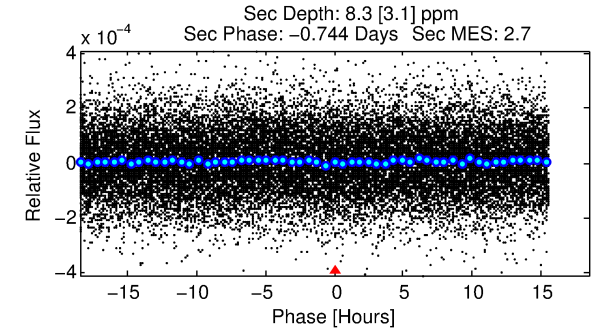
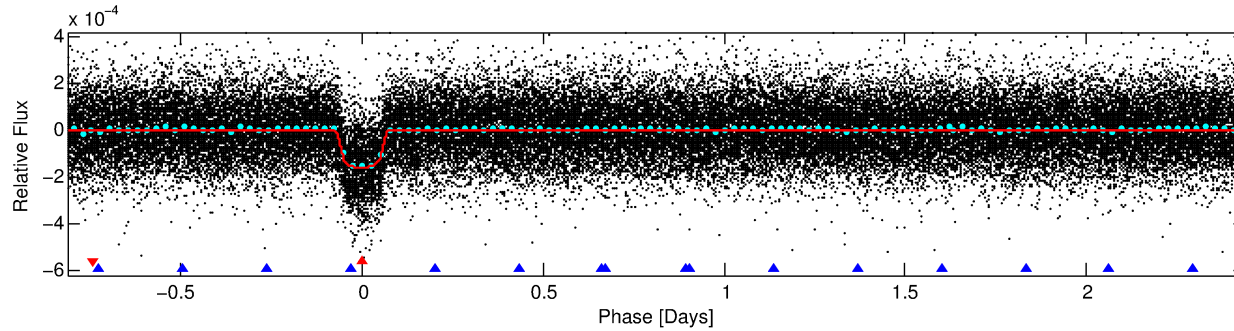
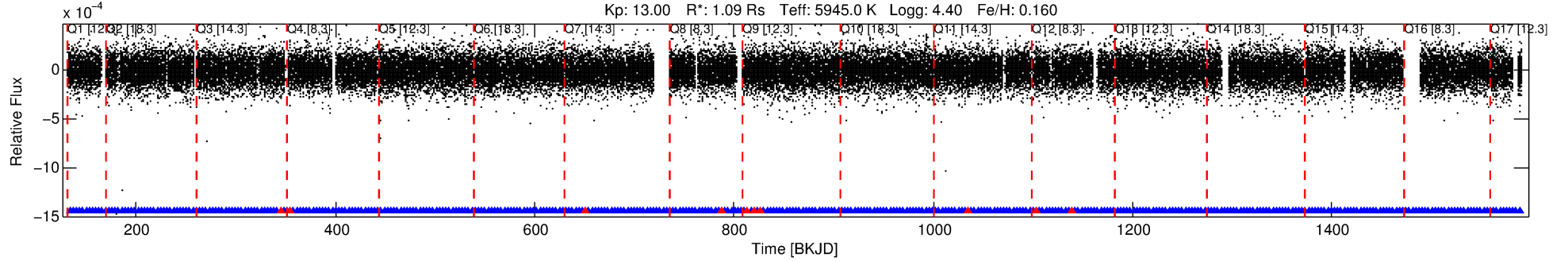
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009881662-01

No Significant Match Found

DV One-Page Summary

KIC: 9881662 Candidate: 1 of 2 Period: 3.254 d
KOI: K00327.01 Name: Kepler-140b Corr: 0.983



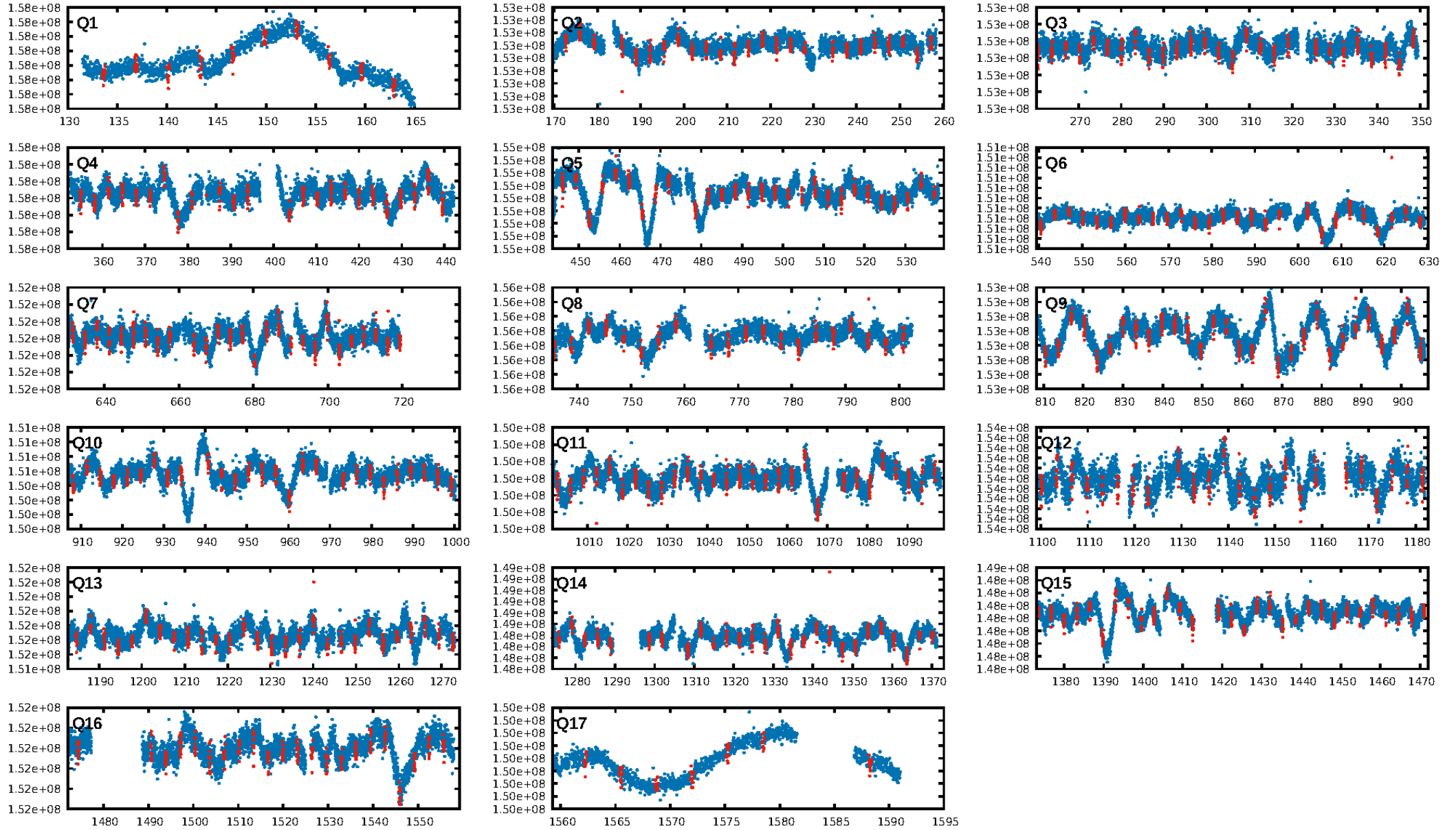
DV Fit Results:

Period = 3.25427 [0.00000] d
Epoch = 133.6118 [0.0008] BKJD
Rp/R* = 0.0136 [0.0015]
a/R* = 3.97 [1.93]
b = 0.89 [0.12]
Seff = 677.51 [153.38]
Teq = 1301 [74] K
Rp = 1.62 [0.31] Re
a = 0.0443 [0.0062] AU
Ag = 3.42 [1.62] [1.49σ]
Teffp = 2736 [297] K [4.69σ]

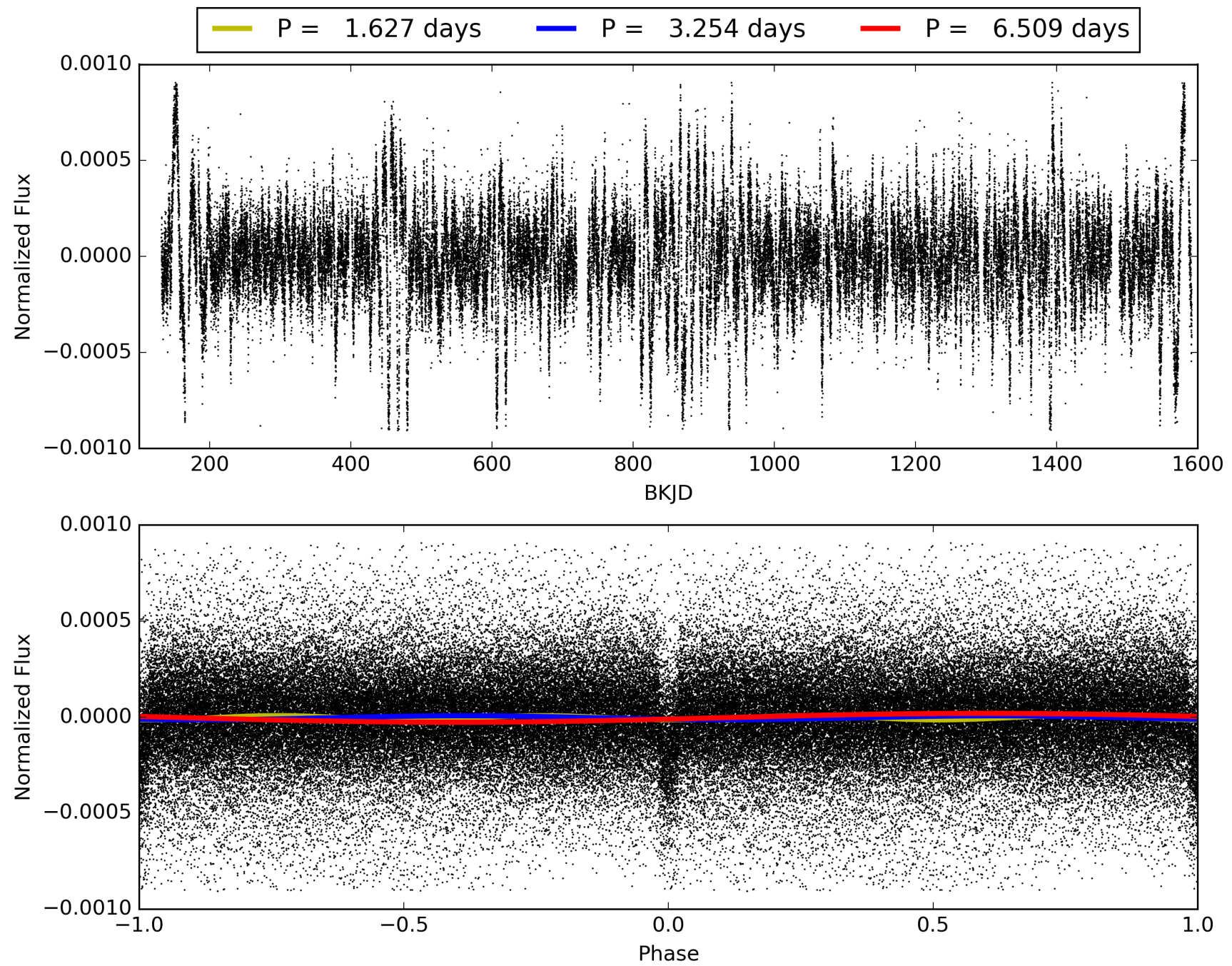
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [215.46σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 0.97 [383/393]
GhostDiagnostic-chr: 33.1
Centroid-sig: 23.0%
Centroid-so: 0.233 arcsec [1.02σ]
OotOffset-rm: 0.275 arcsec [1.78σ]
KicOffset-rm: 0.035 arcsec [0.20σ]
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 009881662-01, PDC Light Curves

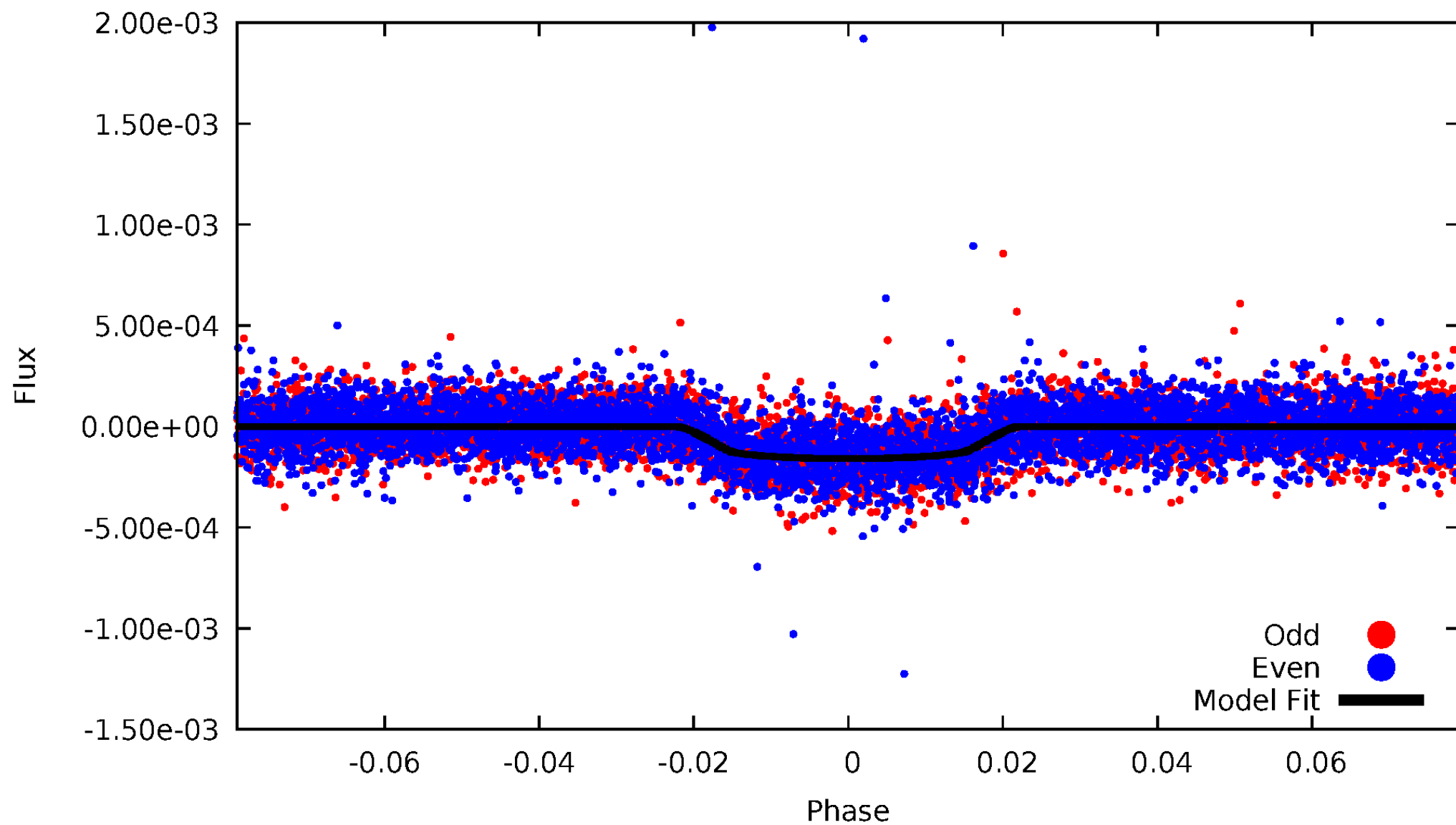


TCE 009881662-01



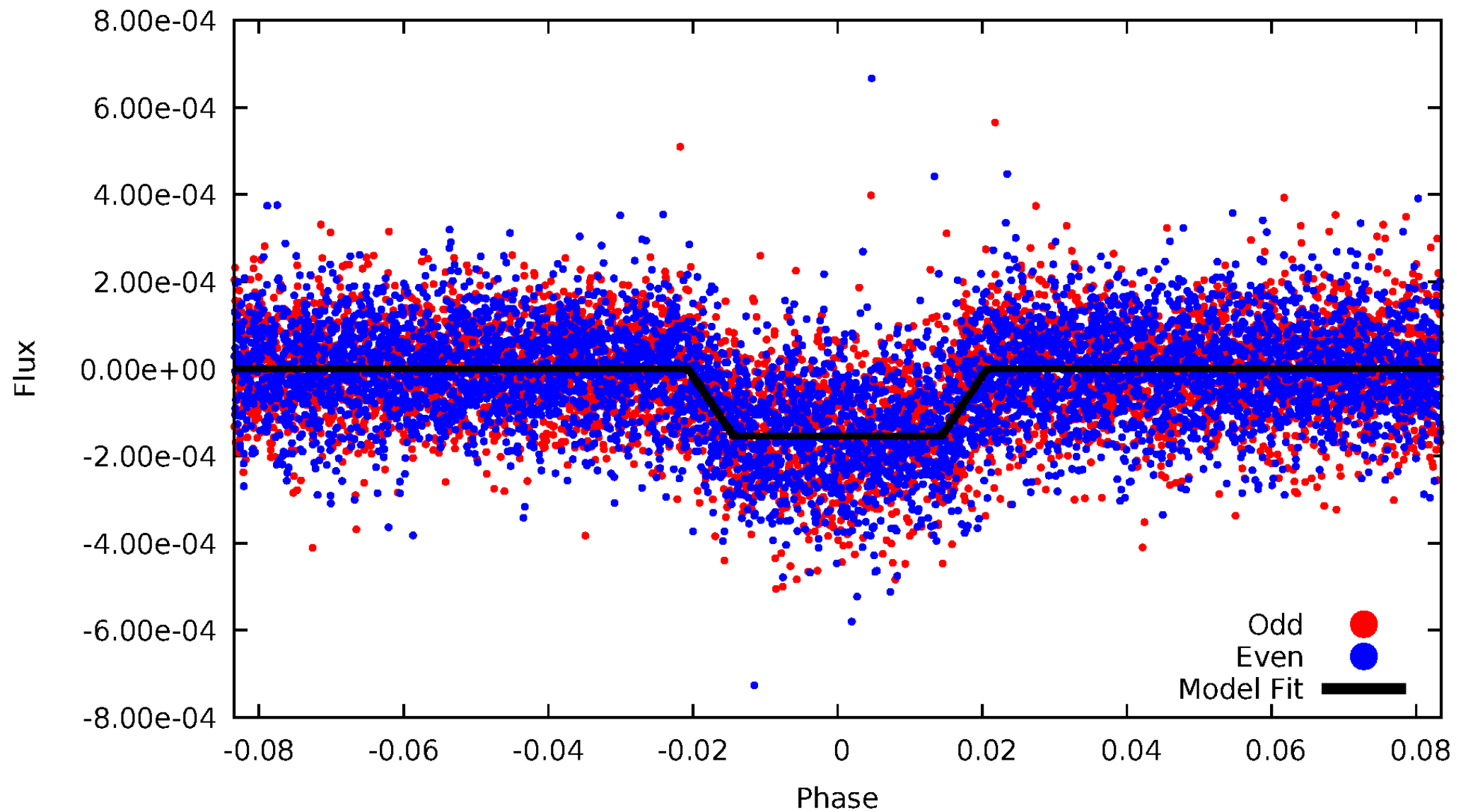
DV Odd/Even

TCE 009881662-01



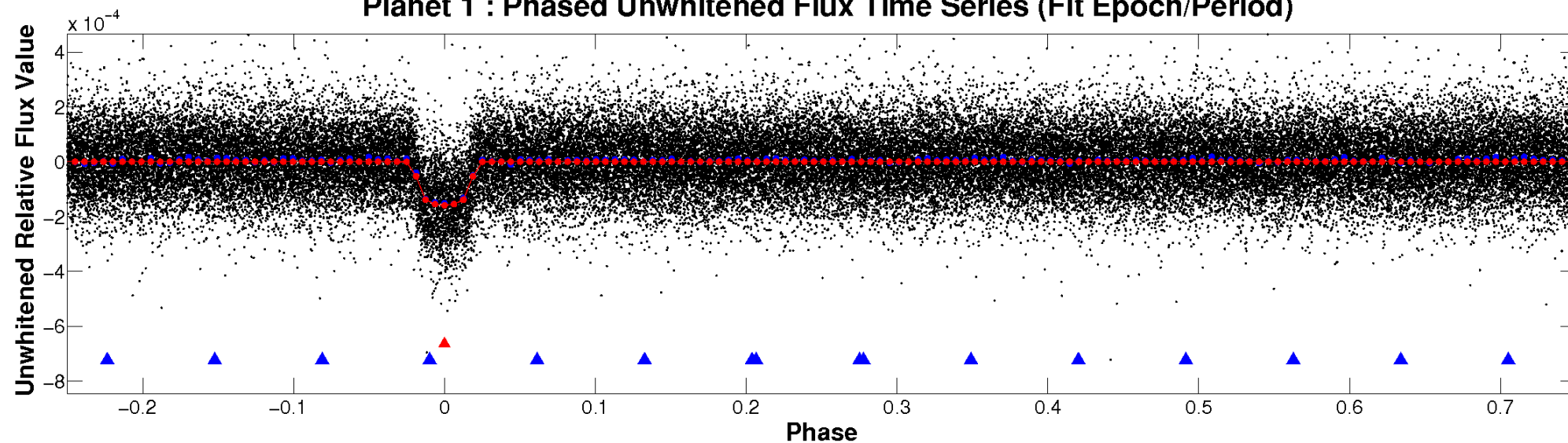
ALT Odd/Even

TCE 009881662-01

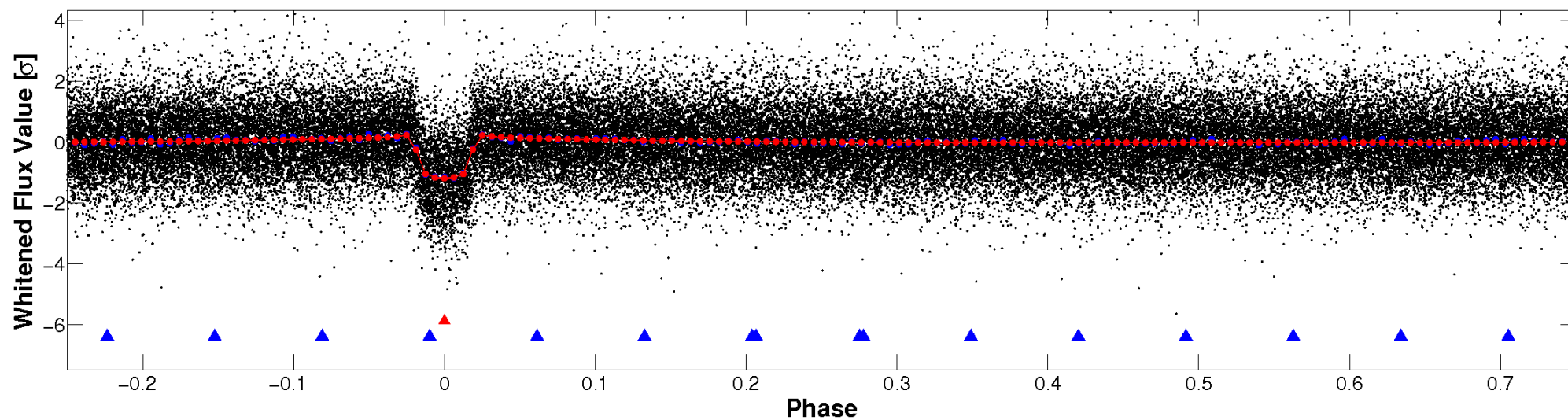


Non-Whitened Vs. Whitened Light Curve

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

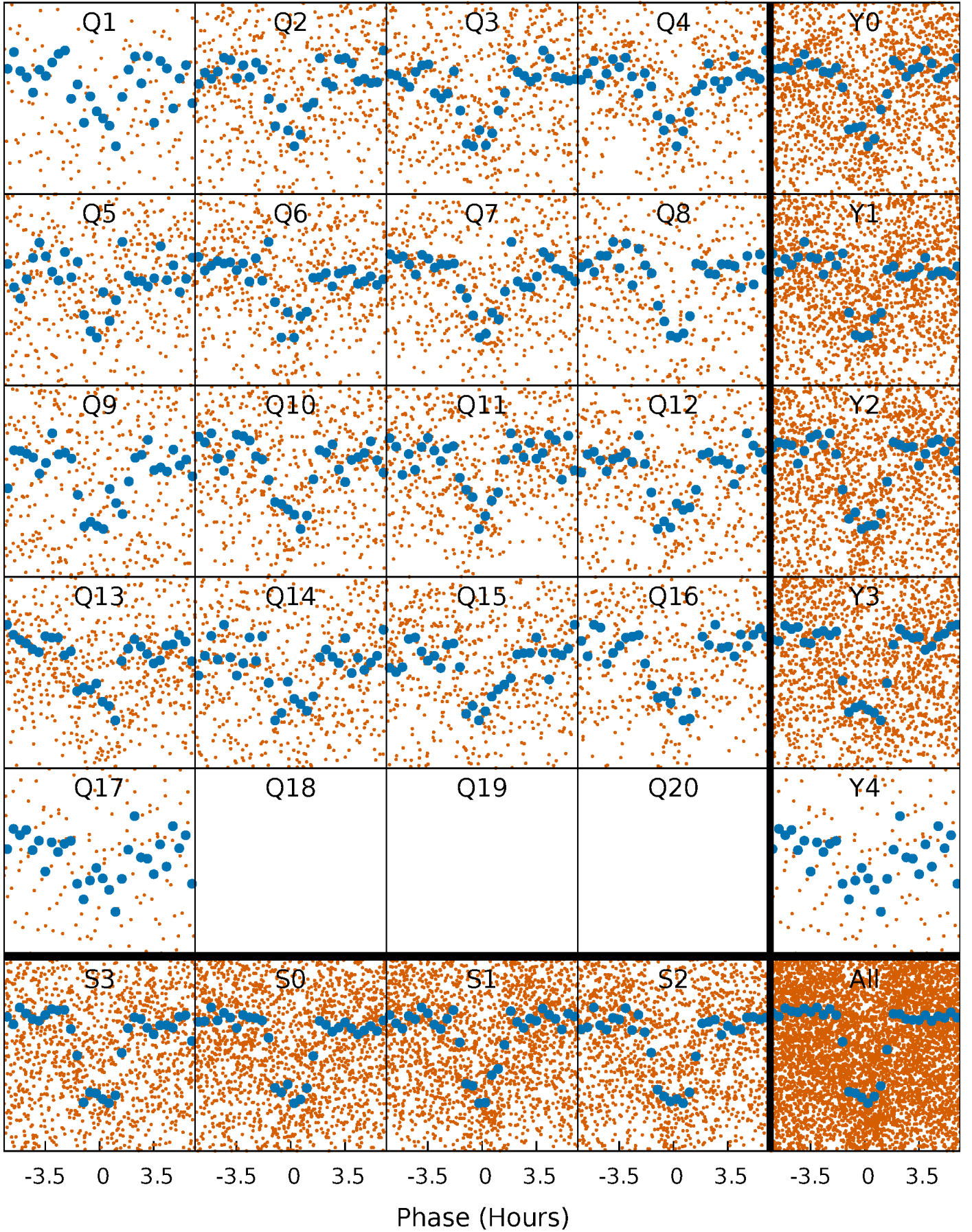


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



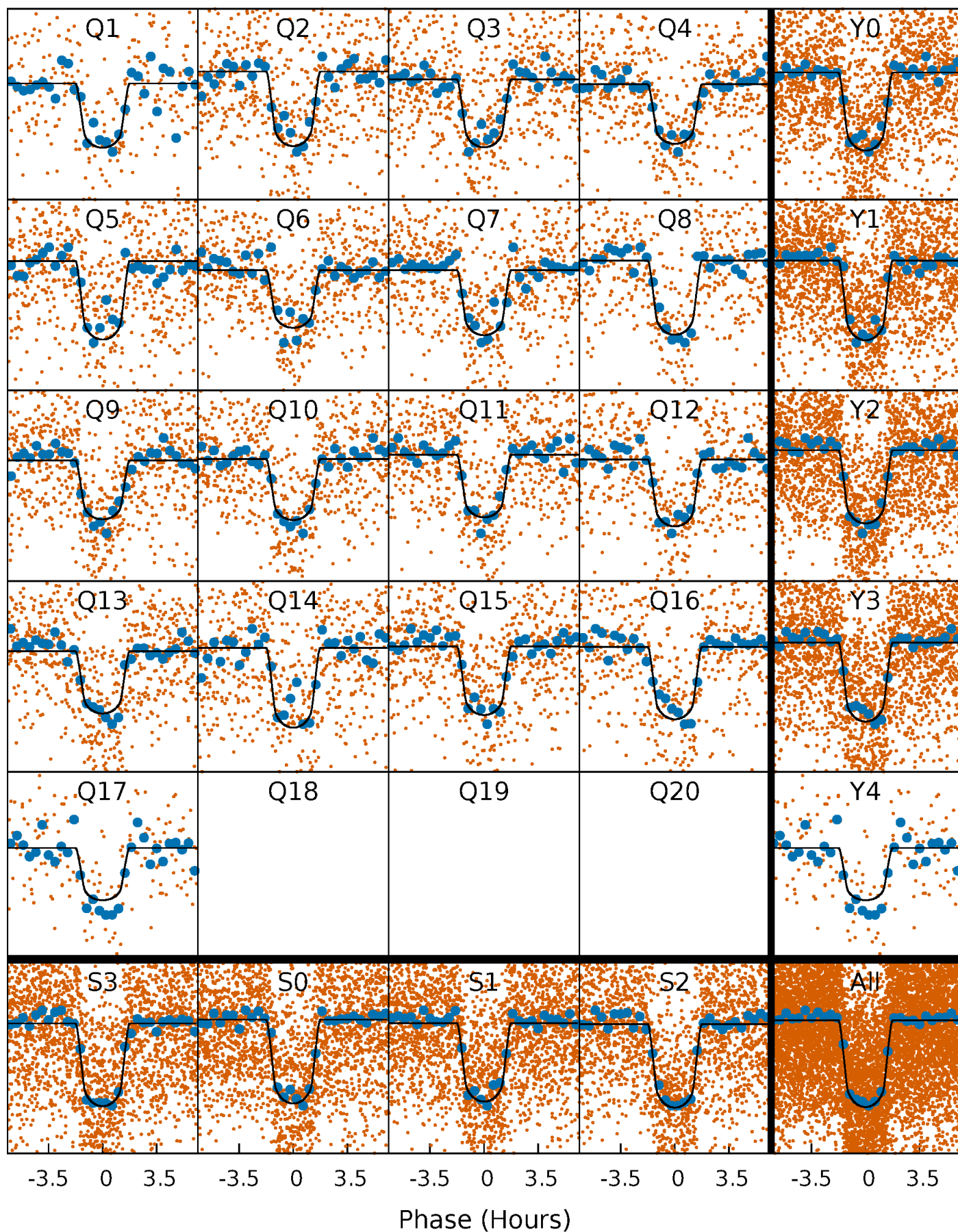
PDC Quarter-Phased Transit Curves

TCE 009881662-01 P= 3.254271 Days $T_0=133.611800$ (BKJD)



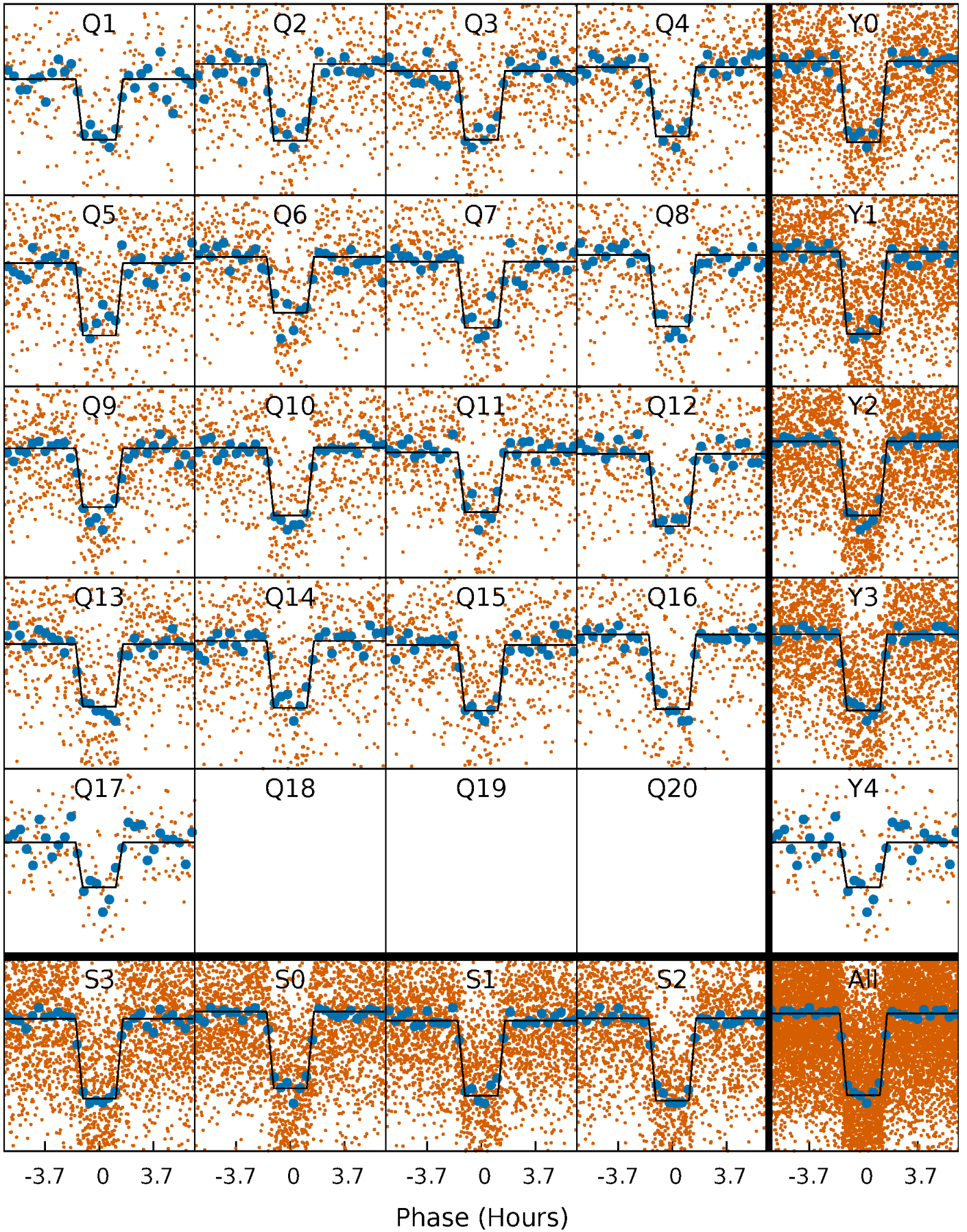
DV Quarter-Phased Transit Curves

TCE 009881662-01 P= 3.254271 Days $T_0=133.611800$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

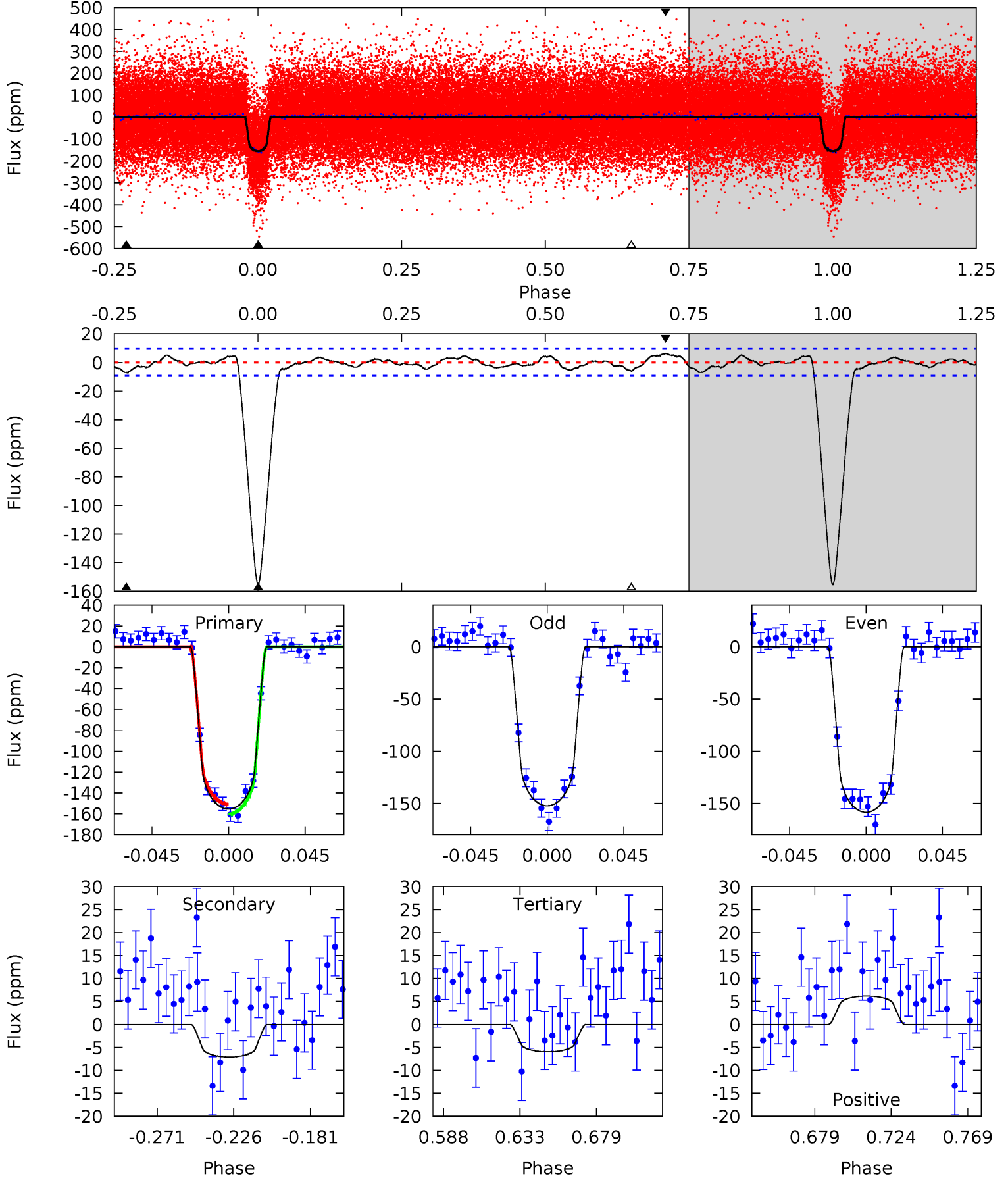
TCE 009881662-01 P= 3.254280 Days $T_0=133.610233$ (BKJD)



DV Model-Shift Uniqueness Test

009881662-01, P = 3.254271 Days, E = 130.357529 Days

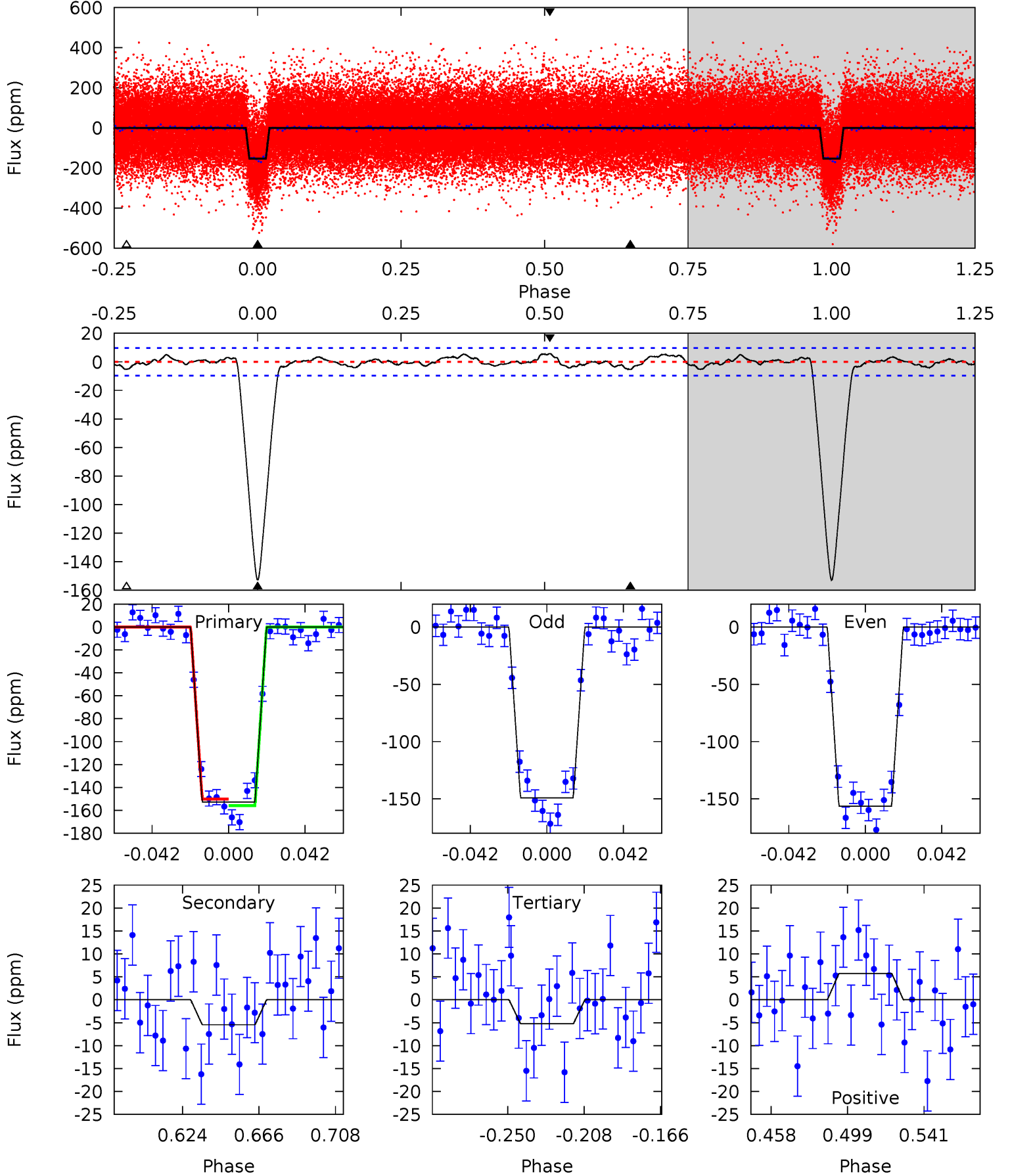
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
78.0	3.57	2.99	3.10	4.73	2.00	1.35	75.0	74.9	0.58	0.47	1.58	0.97	0.04	2.38



Alt Model-Shift Uniqueness Test

009881662-01, P = 3.254280 Days, E = 130.355953 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
75.1	2.68	2.58	2.83	4.75	2.04	1.18	72.6	72.3	0.11	-0.14	1.81	0.97	0.04	1.41



Stellar Parameters For KIC 009881662

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5945^{+106}_{-130}	$4.402^{+0.054}_{-0.117}$	$0.160^{+0.150}_{-0.150}$	$1.089^{+0.174}_{-0.094}$	$1.092^{+0.077}_{-0.077}$	$1.191^{+0.246}_{-0.423}$
	+2%/-2%	+1%/-3%	+94%/-94%	+16%/-9%	+7%/-7%	+21%/-35%
Source	SPE59	SPE59	SPE59	DSEP		

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

Secondary Eclipse Parameters for KIC 009881662-01 / KOI 0327.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-7 ± 2	$1.66^{+0.23}_{-0.20}$	1833^{+73}_{-58}	3161^{+174}_{-201}	$2.748^{+1.236}_{-0.911}$
Alt.	-5 ± 2	$1.50^{+0.22}_{-0.19}$	1832^{+74}_{-61}	3118^{+225}_{-248}	$2.539^{+1.403}_{-1.040}$

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

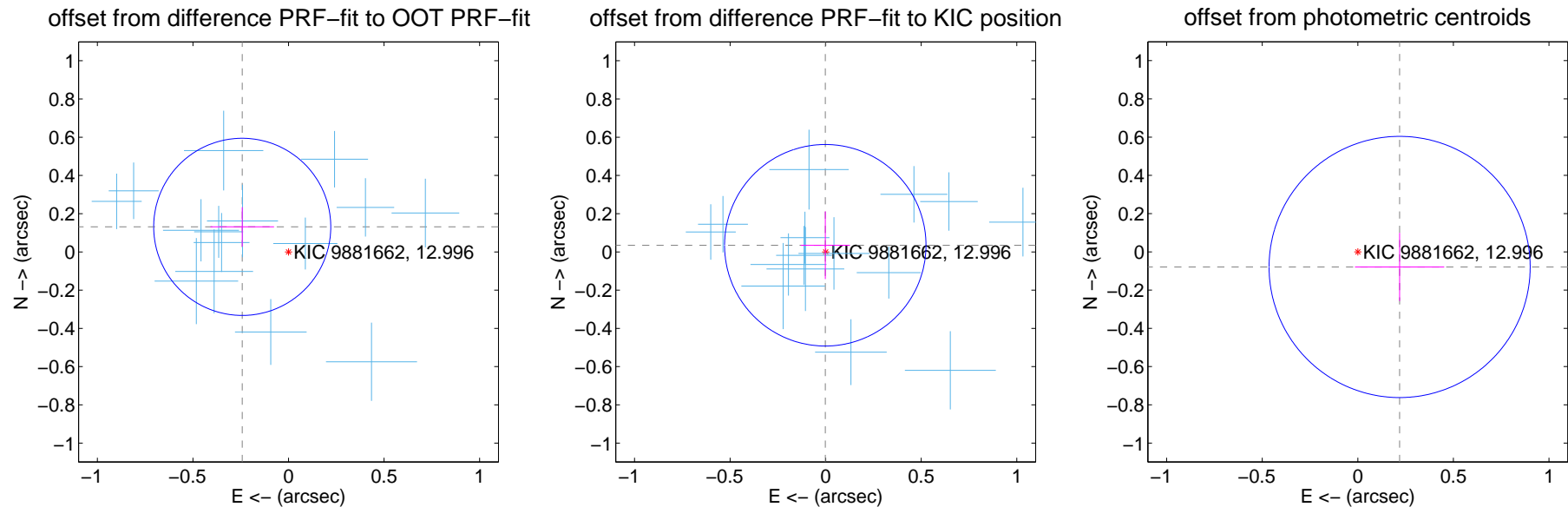
DV Centroid Data

Supplemental centroid analysis for 009881662-01. Kepler magnitude: 13.00. Transit SNR 50.98

There are 17 quarters with good PRF difference image offsets

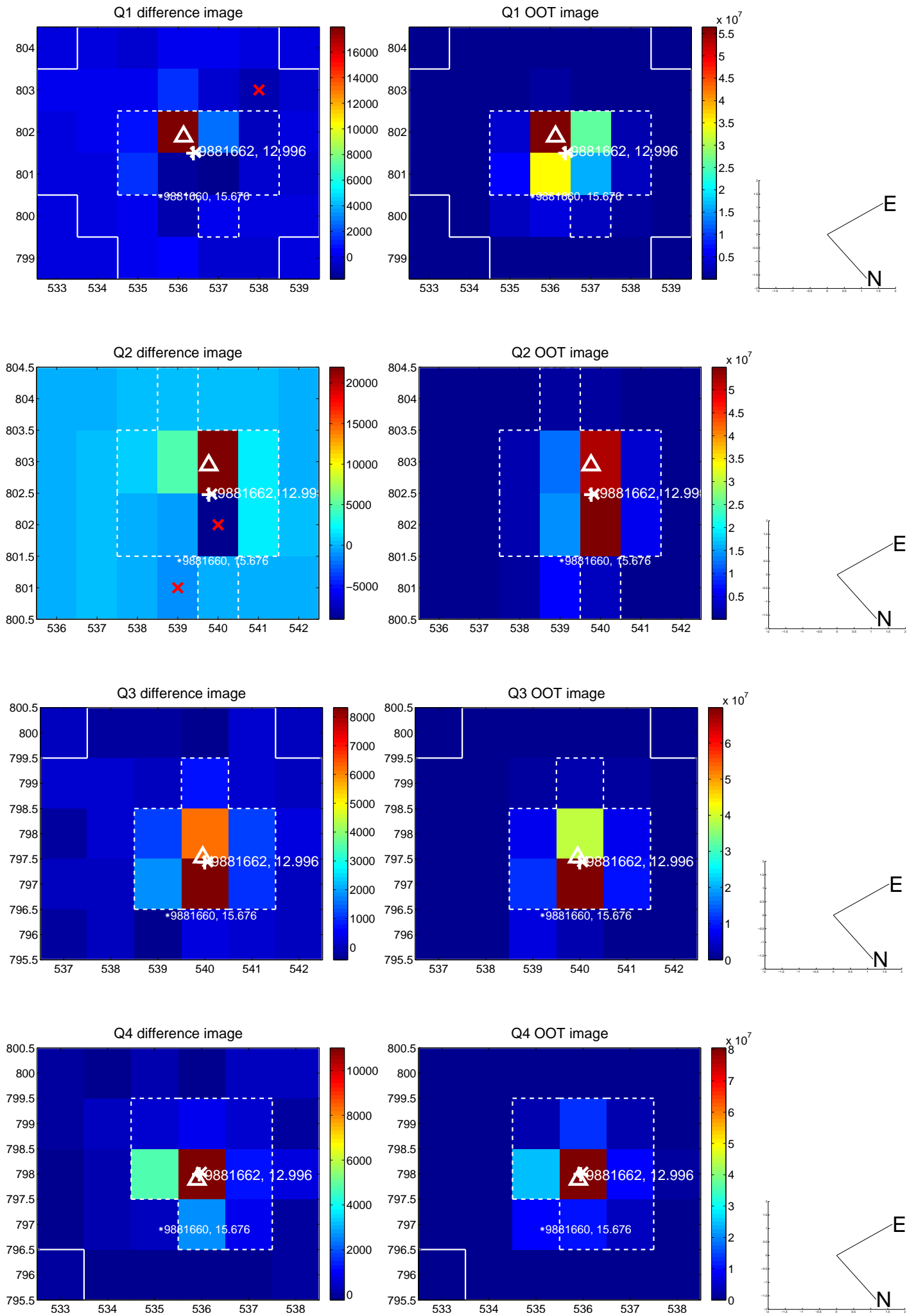
The direct PRF centroid is offset from the target star catalog position by about 0.27 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.275 ± 0.154	1.78	0.242 ± 0.167	0.131 ± 0.103
PRF-fit source offset from KIC position	0.035 ± 0.176	0.20	0.002 ± 0.128	0.035 ± 0.177
photometric centroid source offset	0.23 ± 0.23	1.02	-0.22 ± 0.23	-0.08 ± 0.18

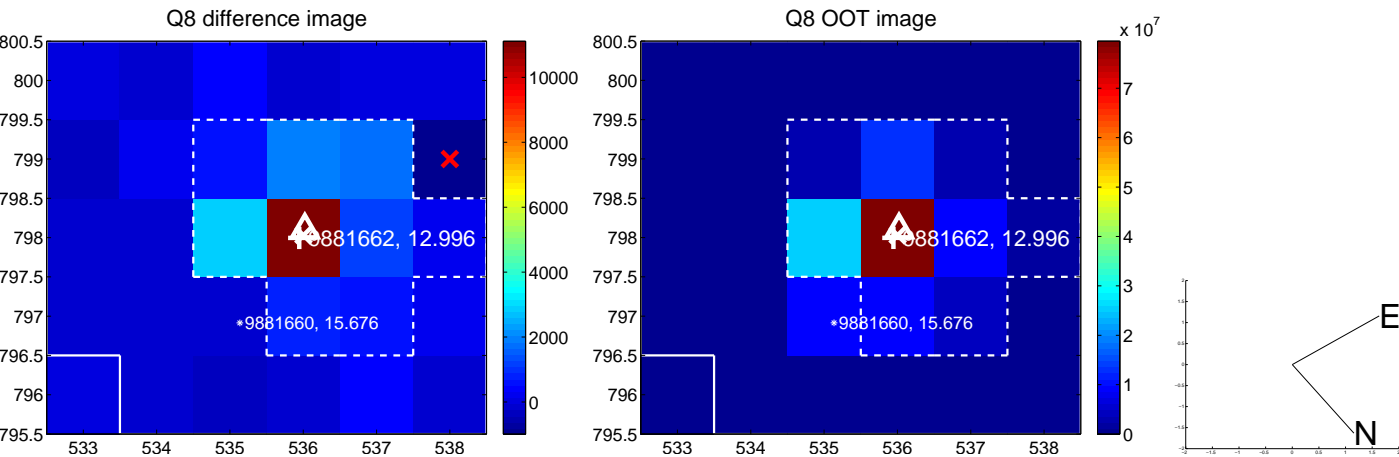
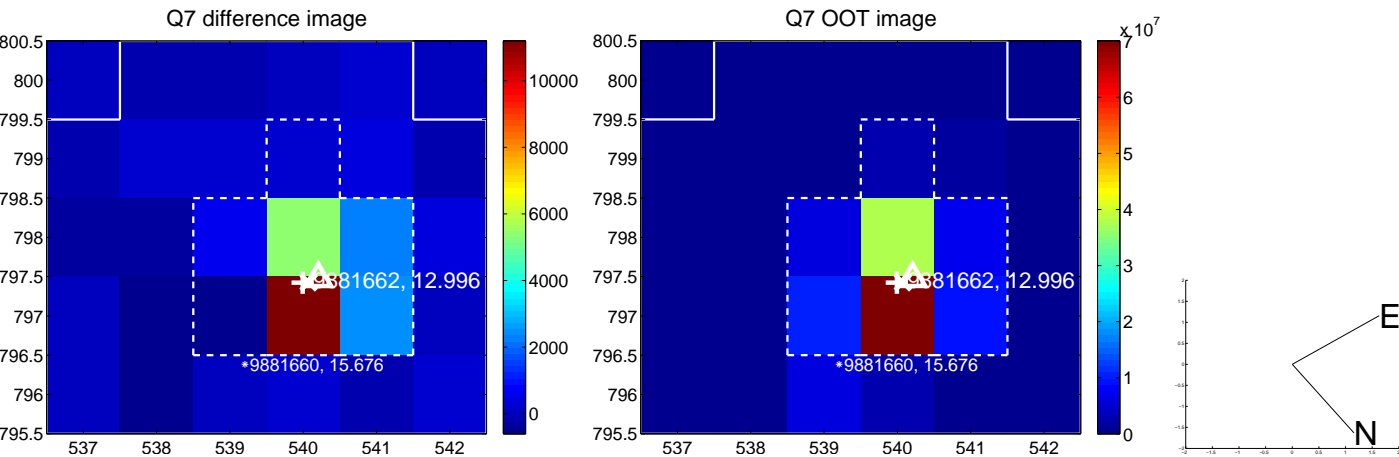
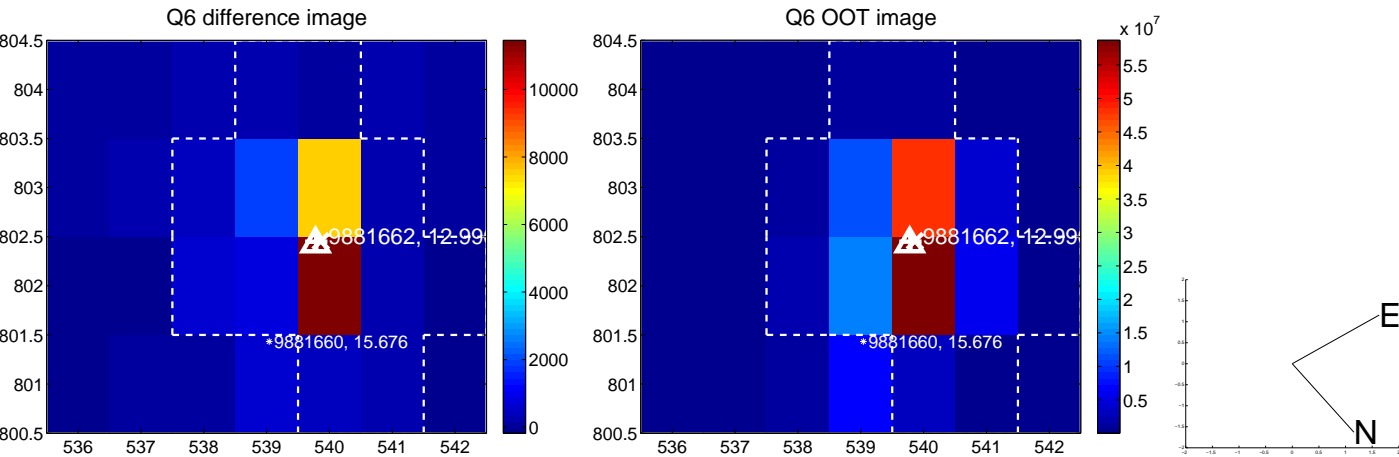
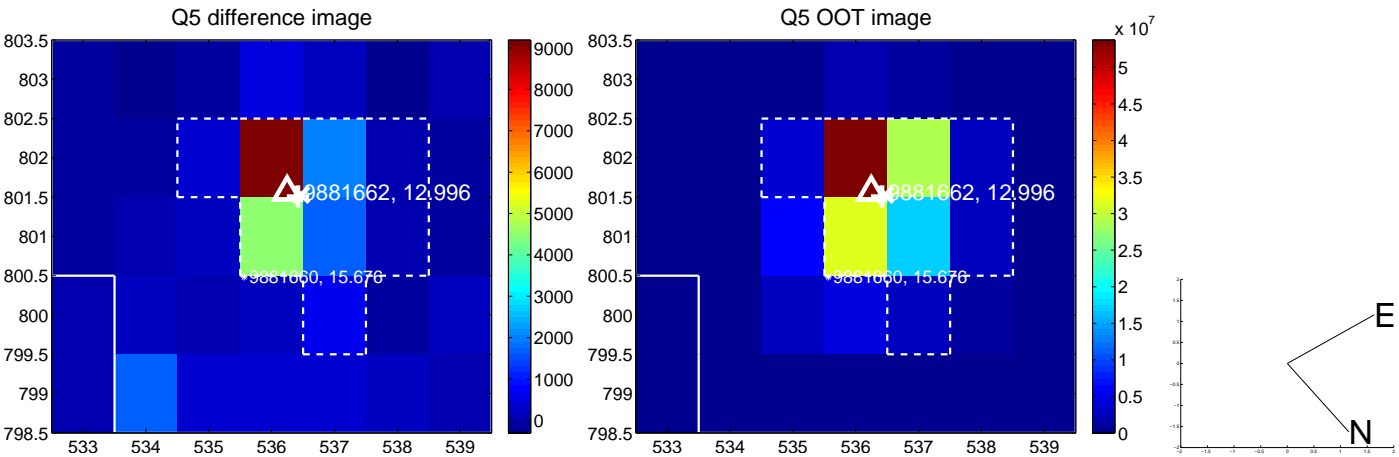


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

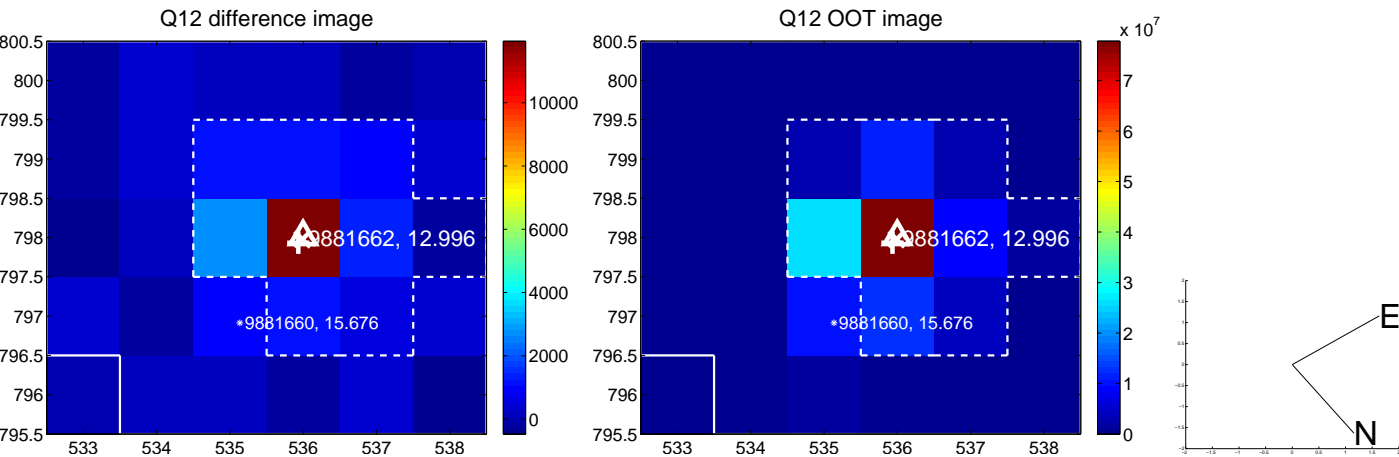
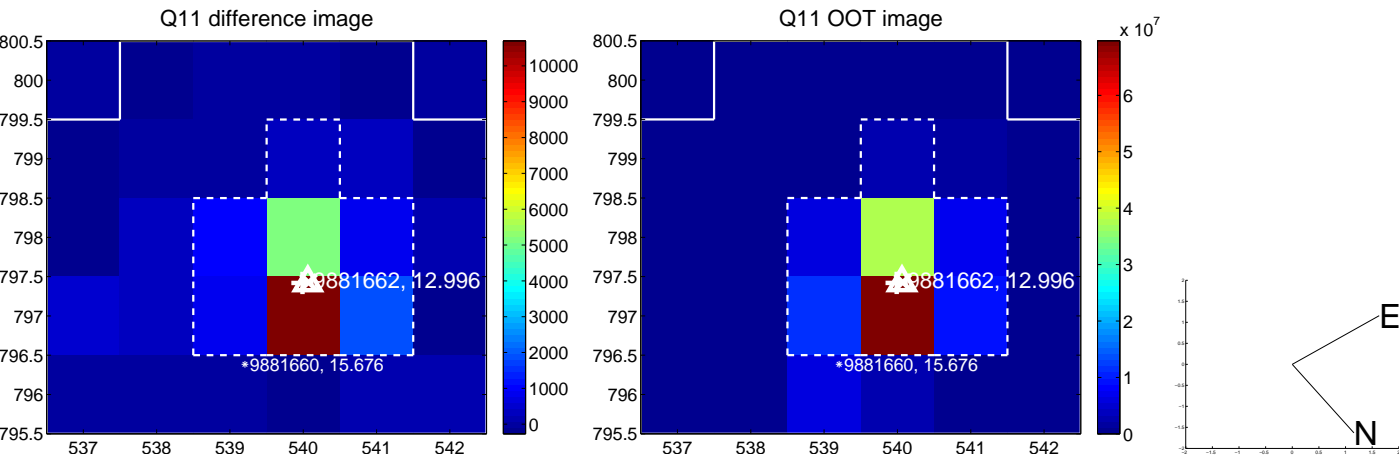
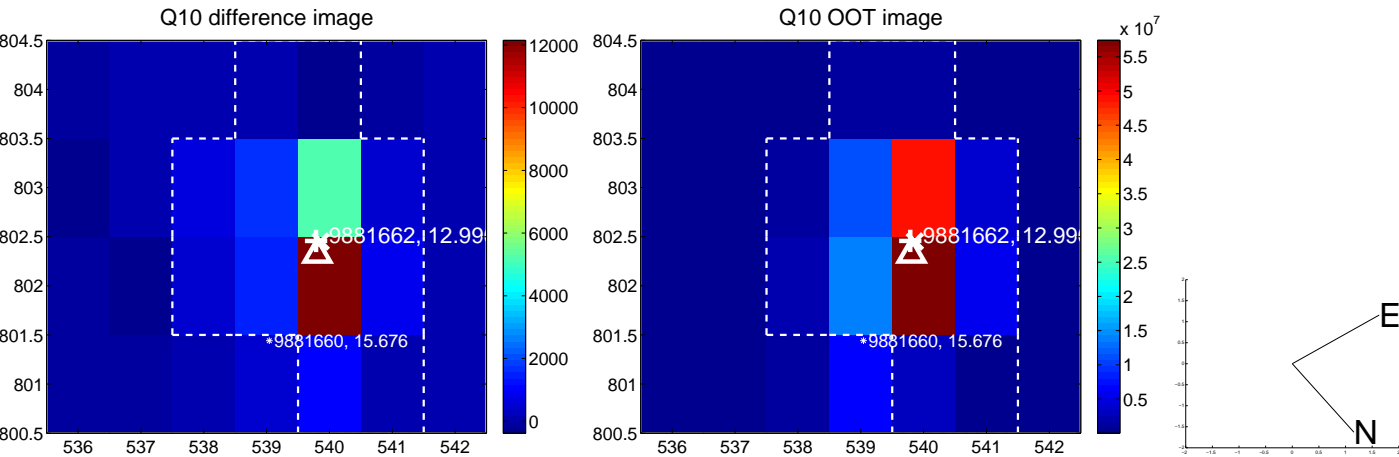
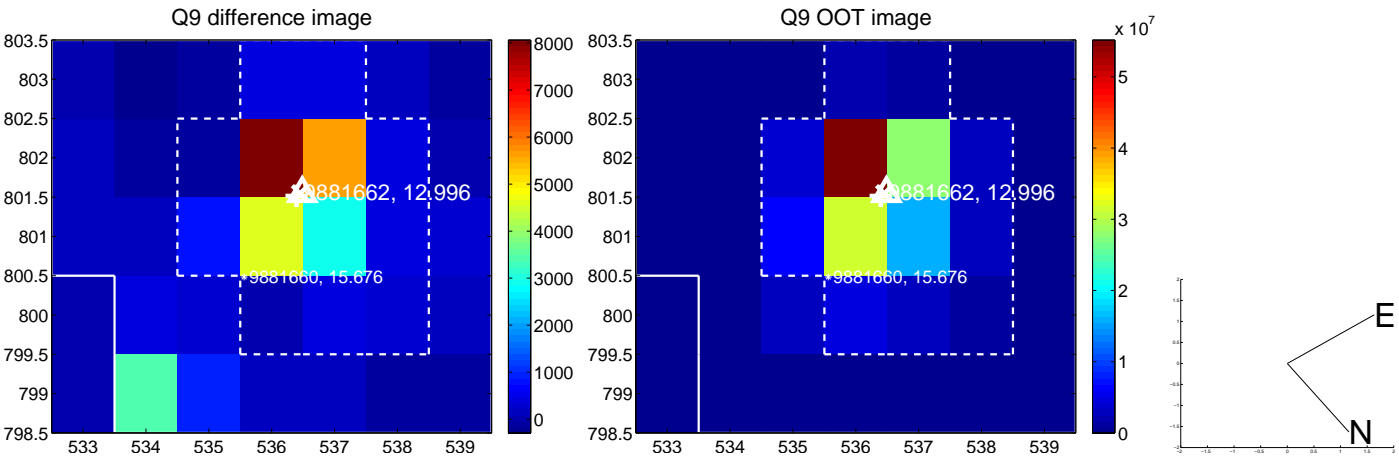
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



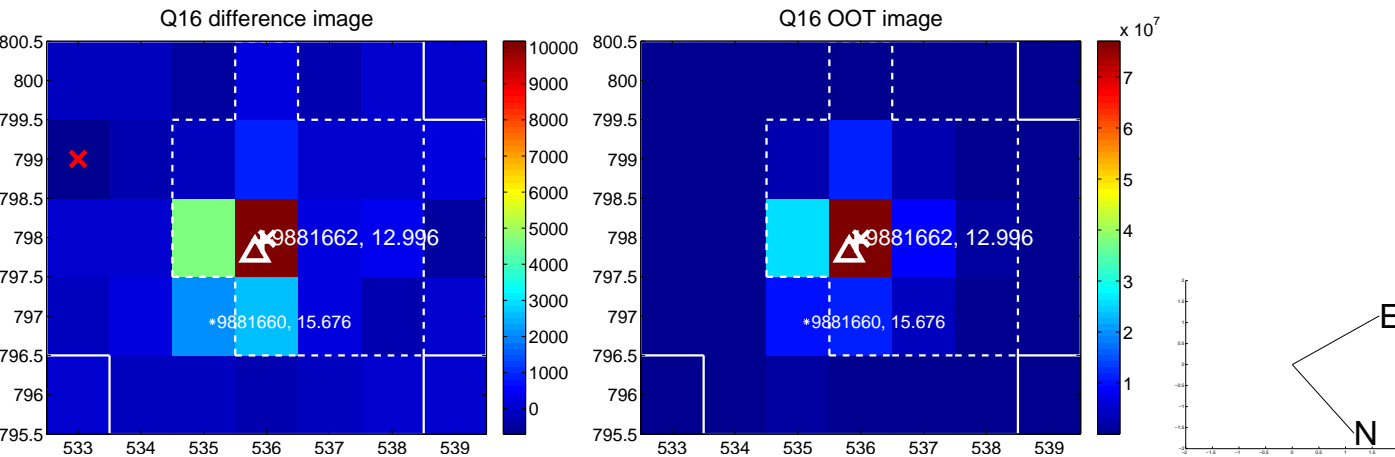
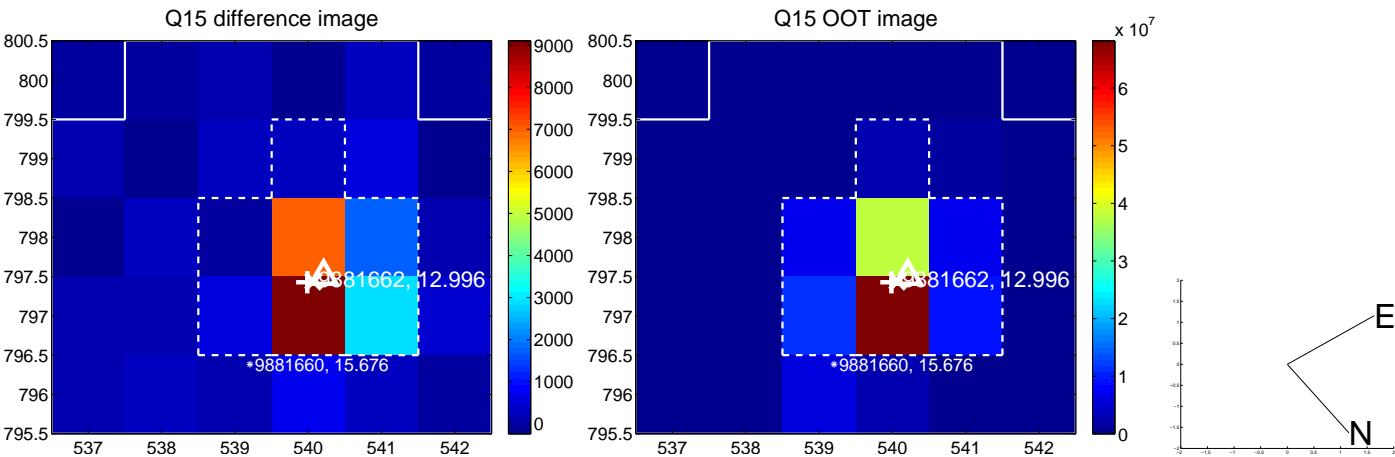
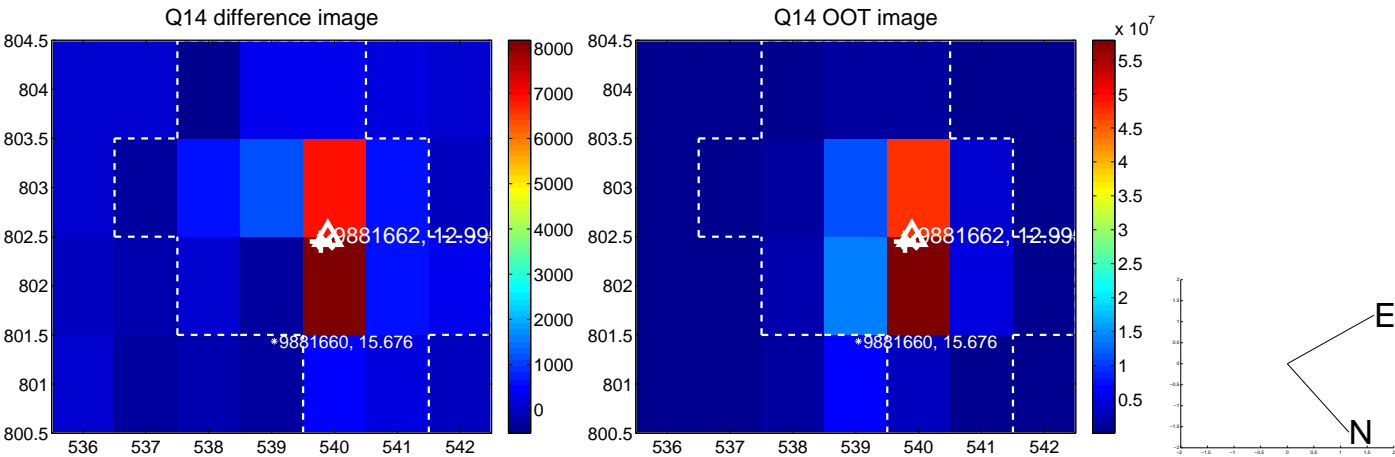
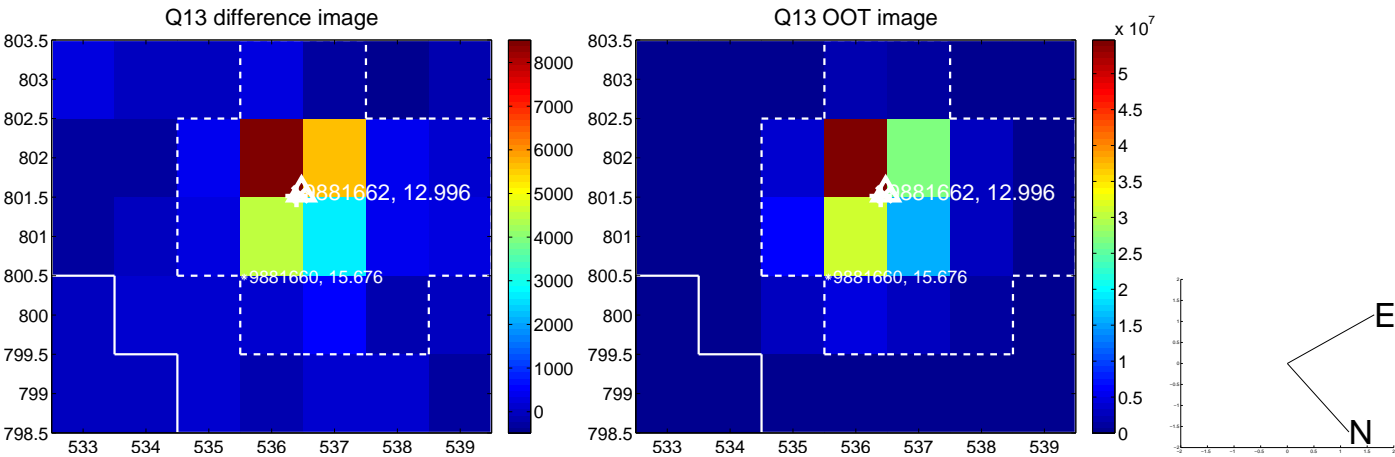
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

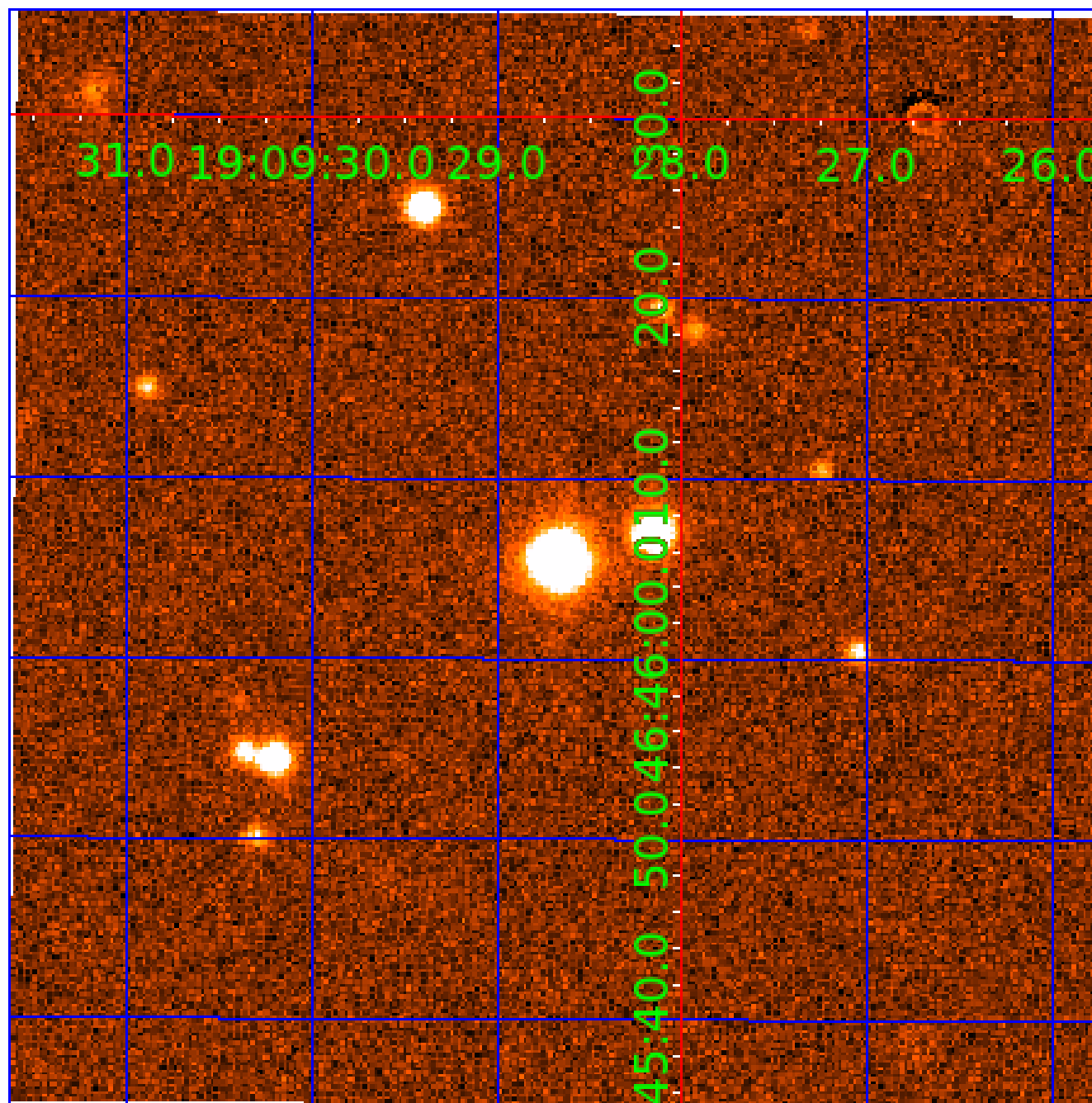


white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009881662

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})
009881662-01	OBS	0327.01	3.254271	133.611800	159.2	3.089	46.8	51.0	1.09	5945	1.62	677.51
009881662-02	OBS	0327.02	91.351433	189.606676	200.6	9.314	15.8	16.5	1.09	5945	1.87	7.94

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009881662-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
009881662-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

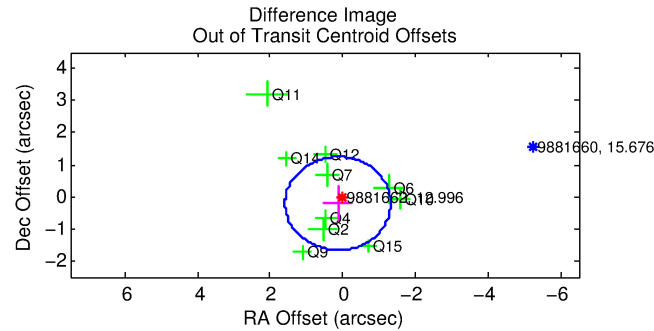
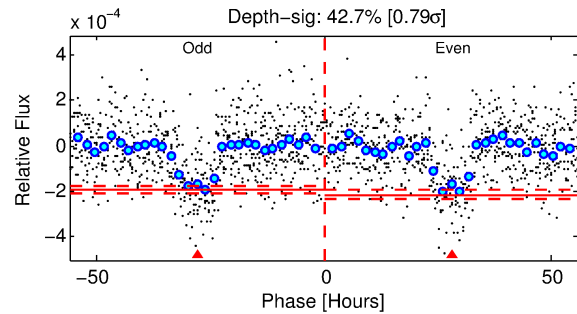
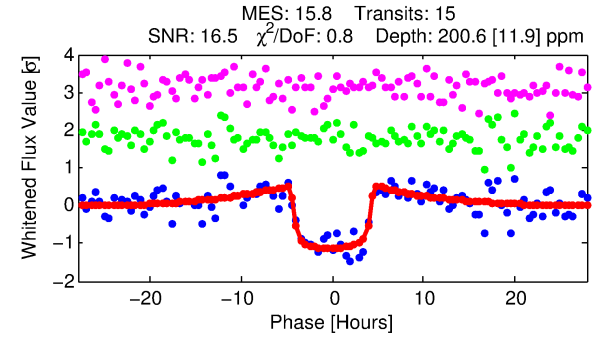
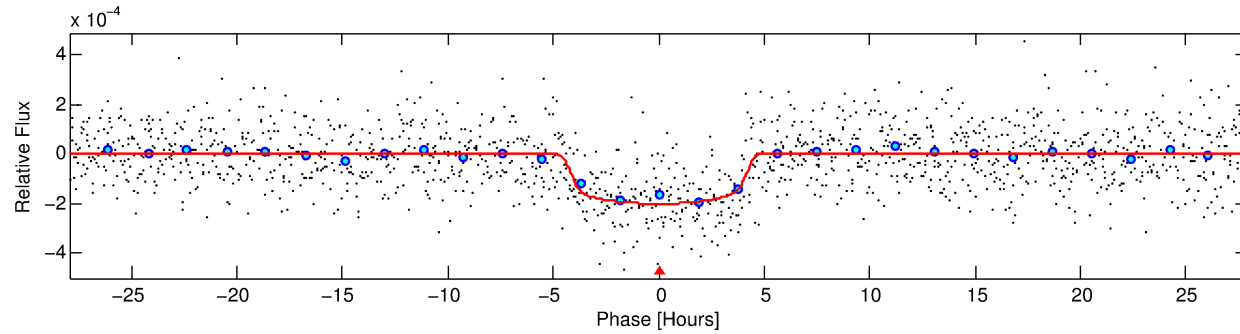
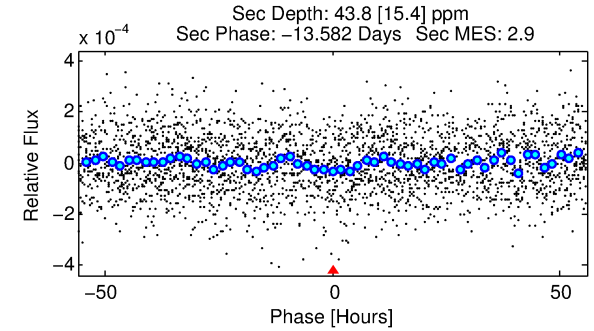
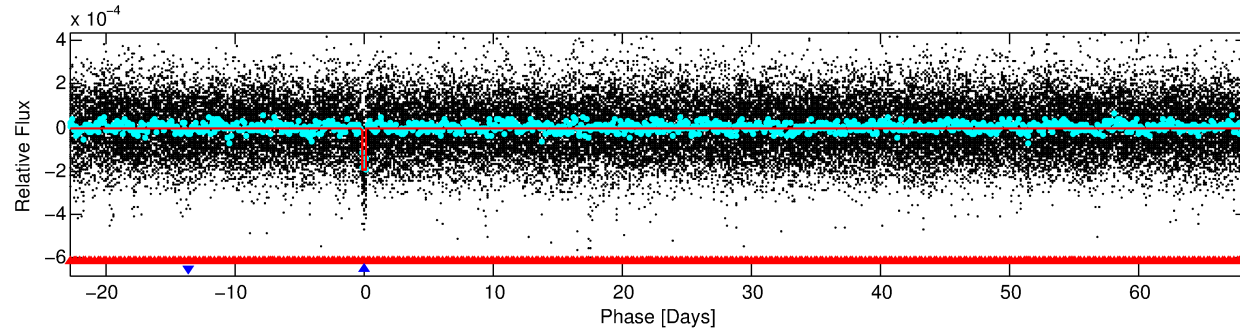
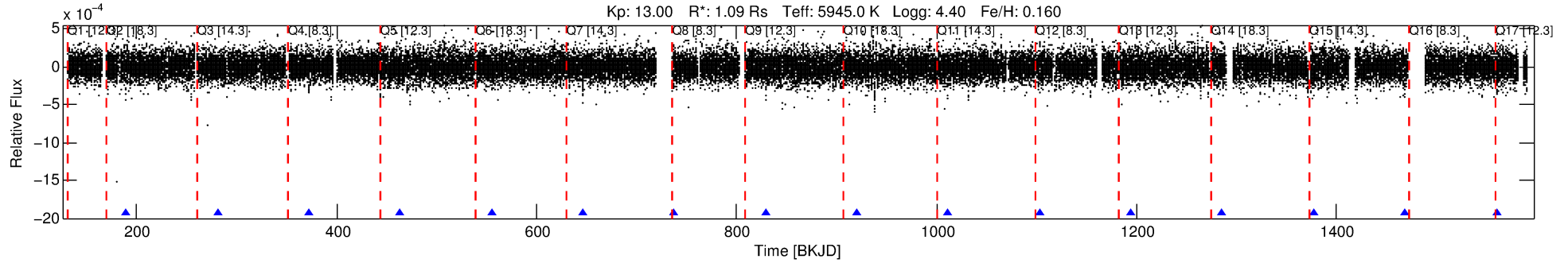
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009881662-02

No Significant Match Found

DV One-Page Summary

KIC: 9881662 Candidate: 2 of 2 Period: 91.351 d
KOI: K00327.02 Name: Kepler-140c Corr: 0.957



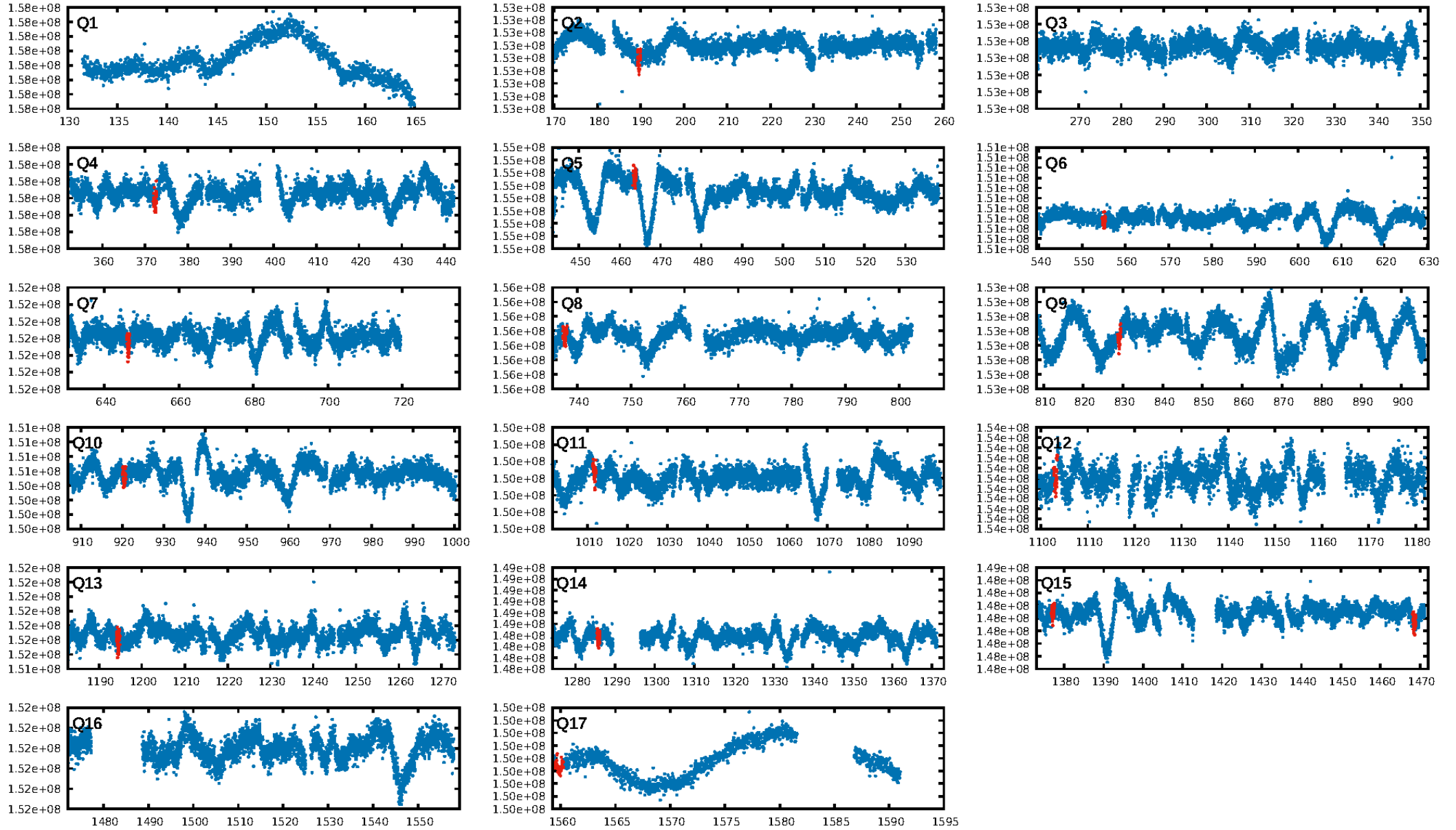
DV Fit Results:

Period = 91.35143 [0.00093] d
Epoch = 189.6067 [0.0081] BKJD
Rp/R* = 0.0158 [0.0011]
a/R* = 31.77 [9.41]
b = 0.92 [0.05]
Seff = 7.94 [1.80]
Teq = 428 [24] K
Rp = 1.87 [0.33] Re
a = 0.4088 [0.0570] AU
Ag = 1146.61 [494.83] [2.32σ]
Teffp = 3851 [373] K [9.15σ]

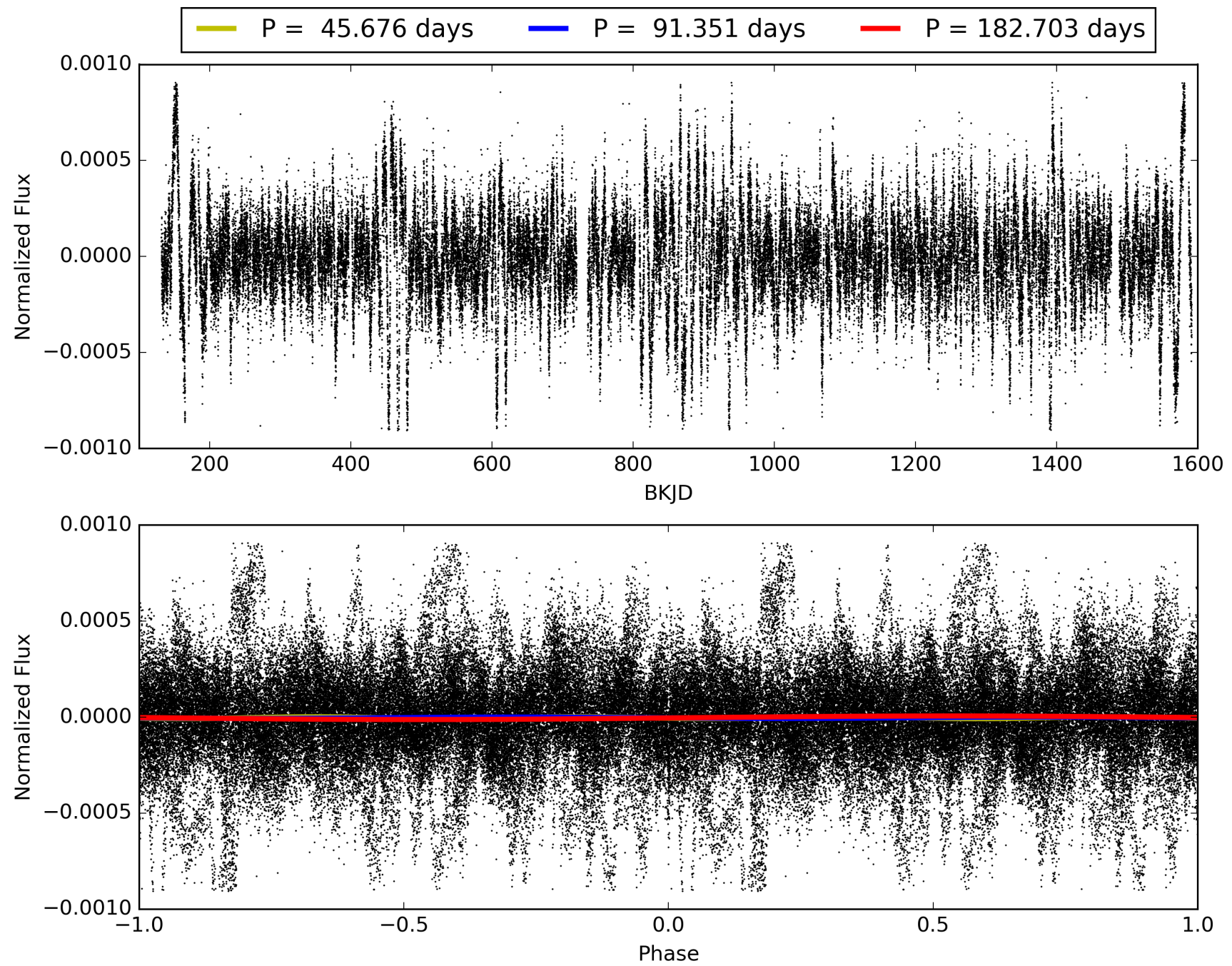
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [215.46σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 97.4%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.78e-46
RollingBand-fgt: 1.00 [14/14]
GhostDiagnostic-chr: -6.311
Centroid-sig: 9.7%
Centroid-so: 0.568 arcsec [0.95σ]
OotOffset-rm: 0.249 arcsec [0.51σ]
OotOffset-st: 4/3/2/1 [10]
KicOffset-rm: 0.334 arcsec [0.67σ]
KicOffset-st: 4/3/2/1 [10]
DiffImageQuality-fgm: 0.80 [8/10]
DiffImageOverlap-fno: 0.50 [6/12]

TCE 009881662-02, PDC Light Curves

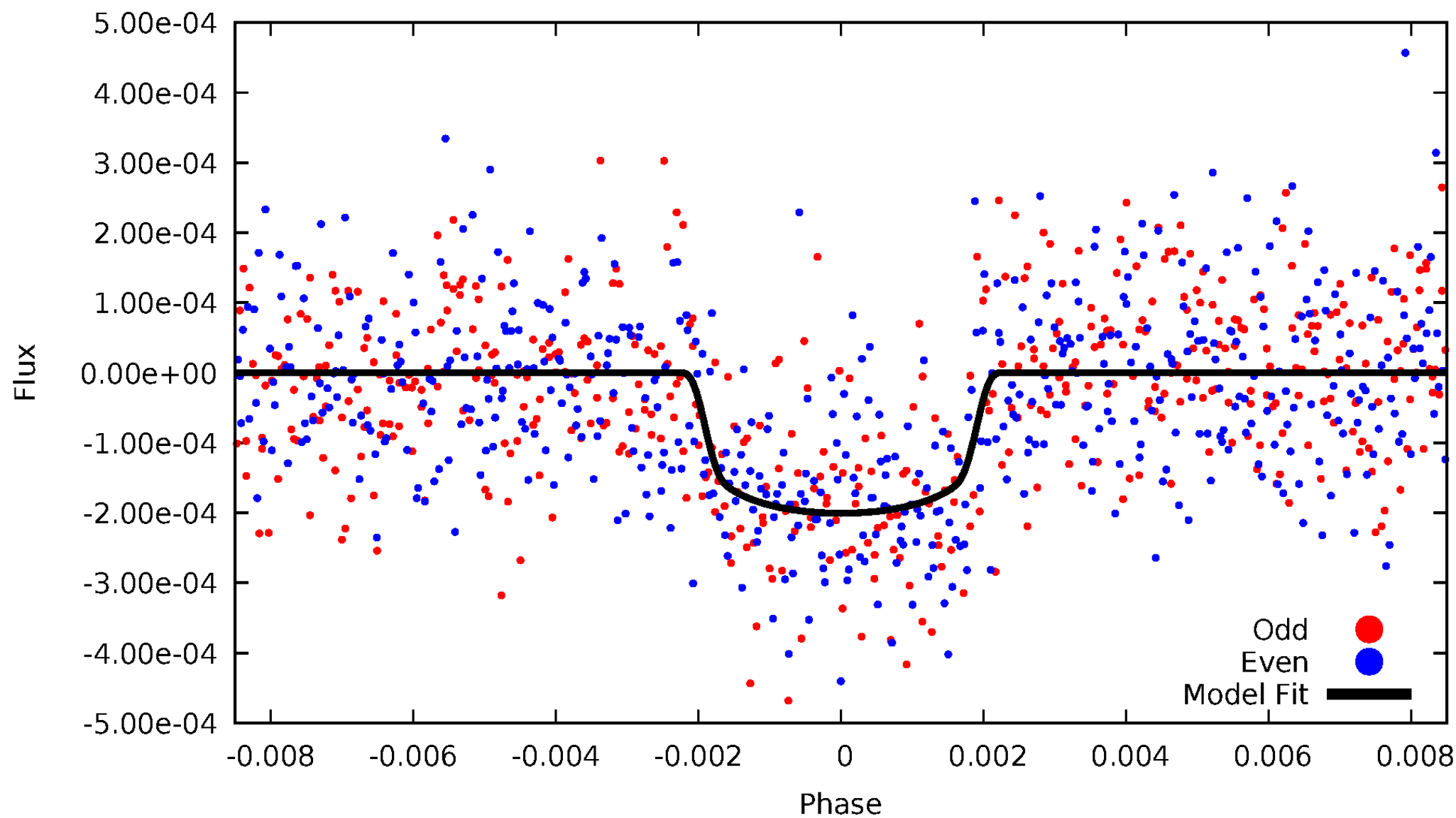


TCE 009881662-02



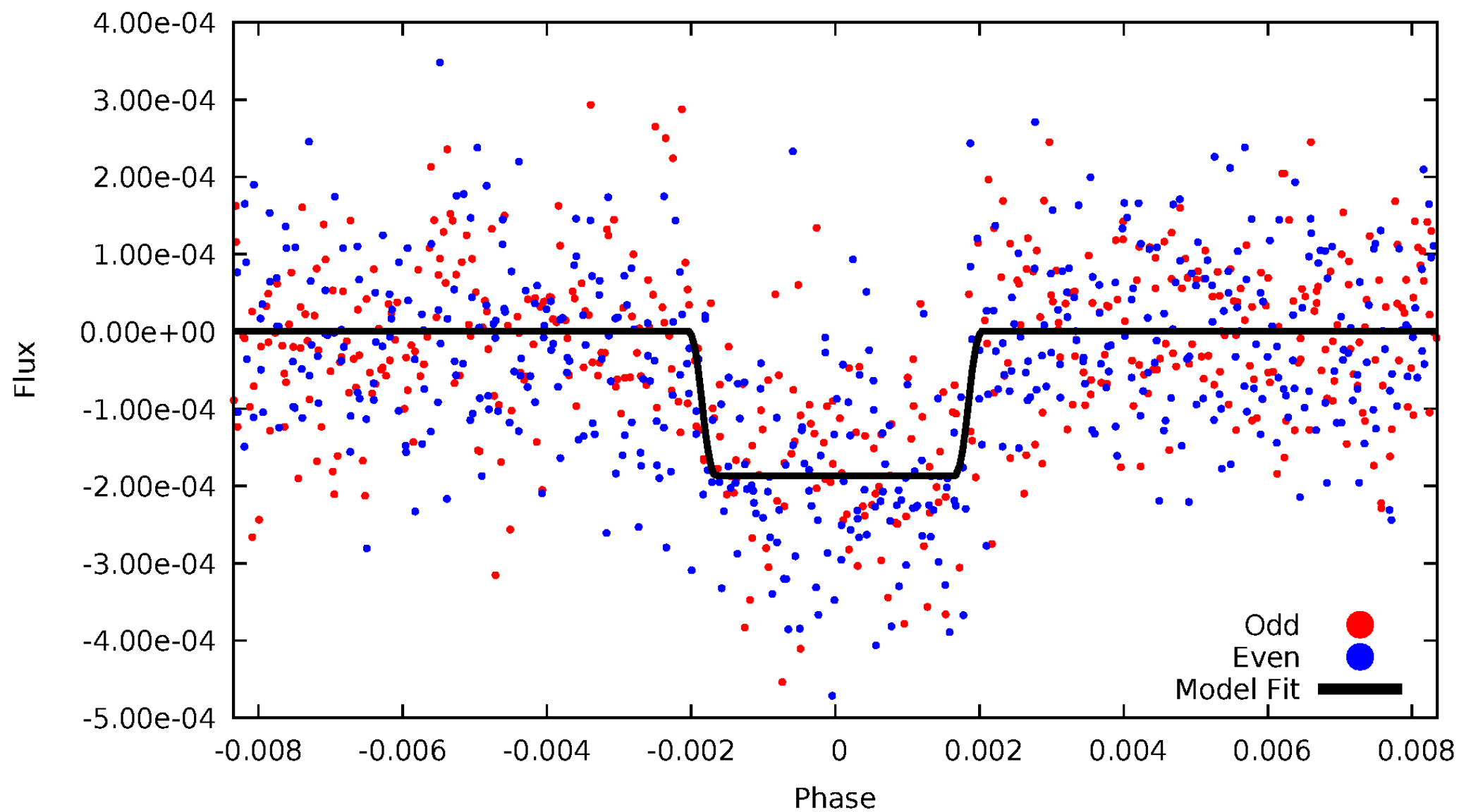
DV Odd/Even

TCE 009881662-02



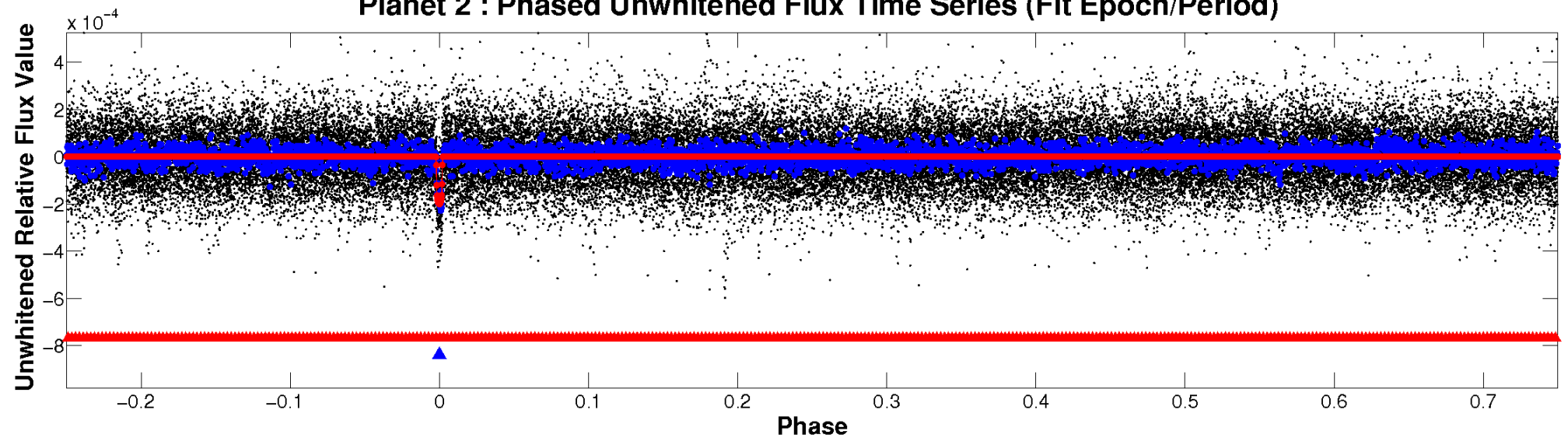
ALT Odd/Even

TCE 009881662-02

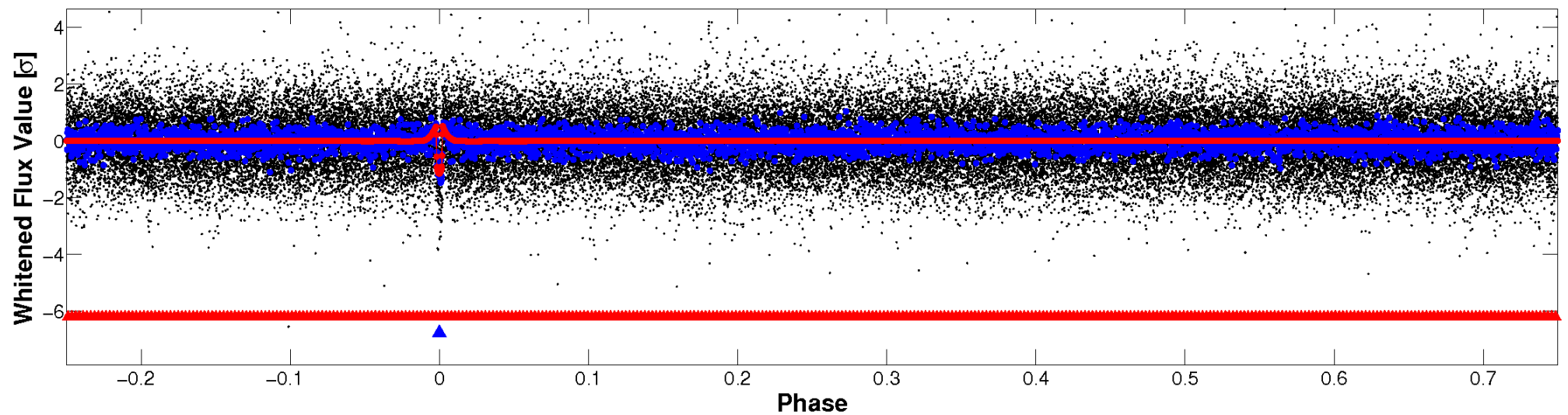


Non-Whitened Vs. Whitened Light Curve

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

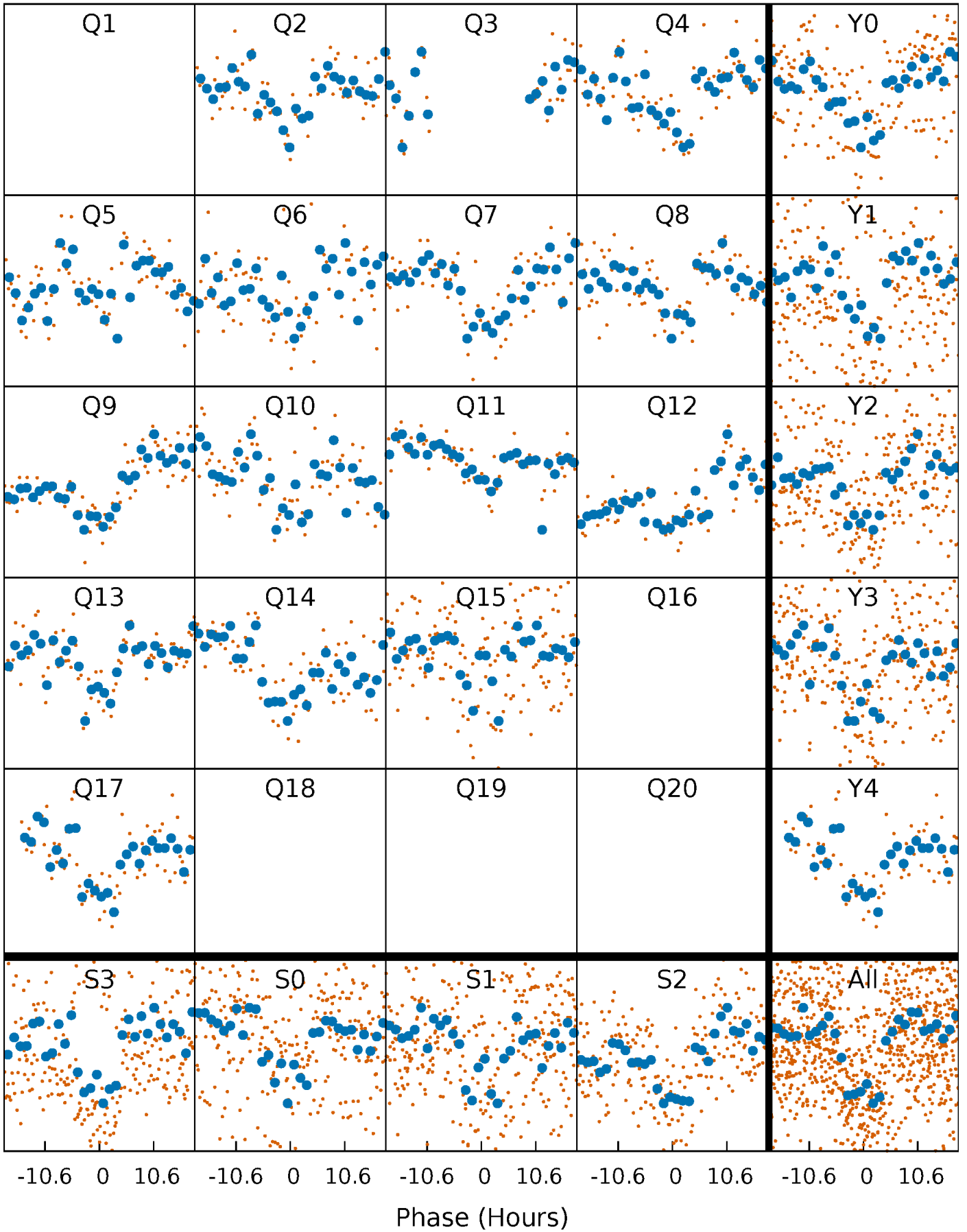


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



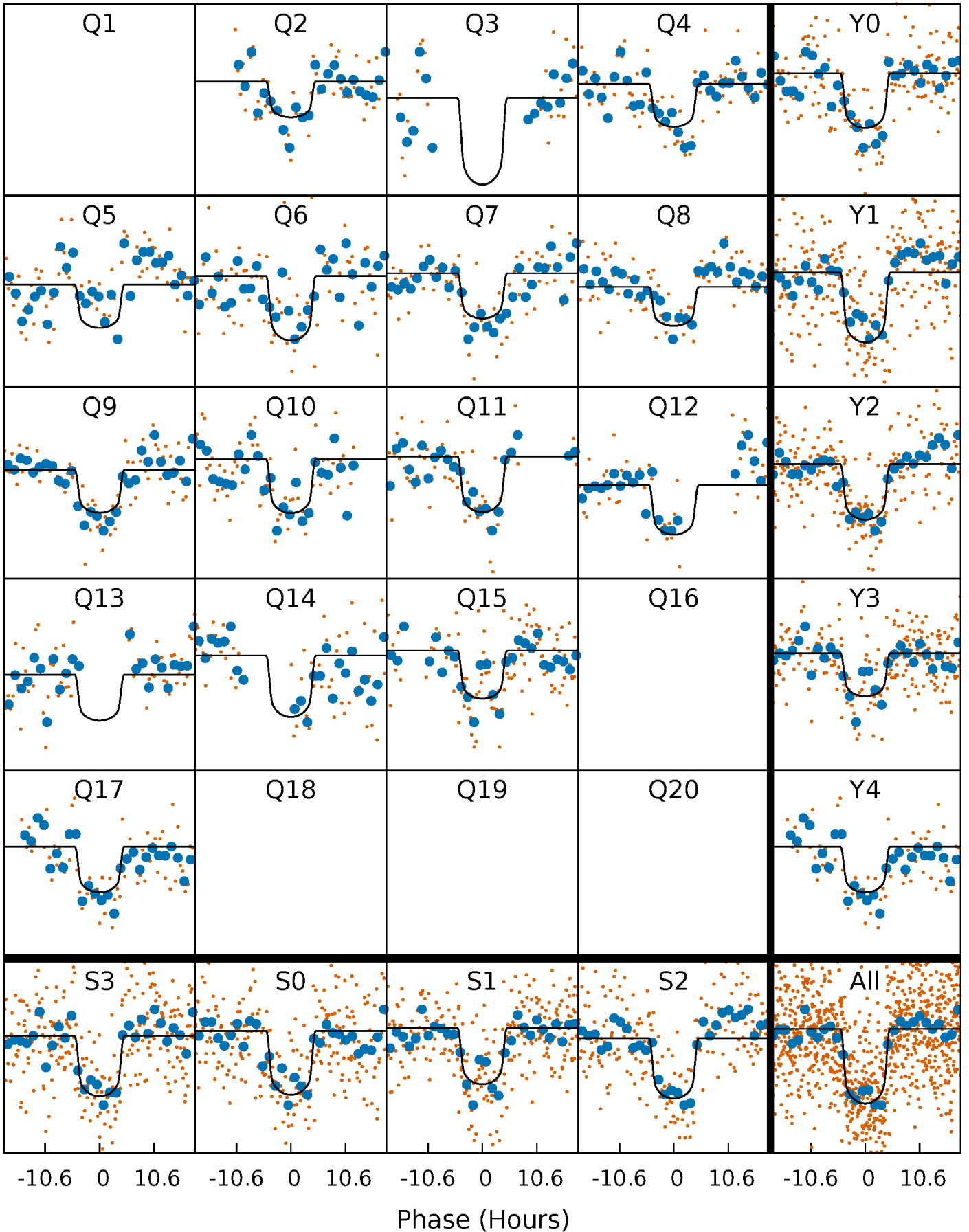
PDC Quarter-Phased Transit Curves

TCE 009881662-02 P= 91.351433 Days $T_0=189.606676$ (BKJD)



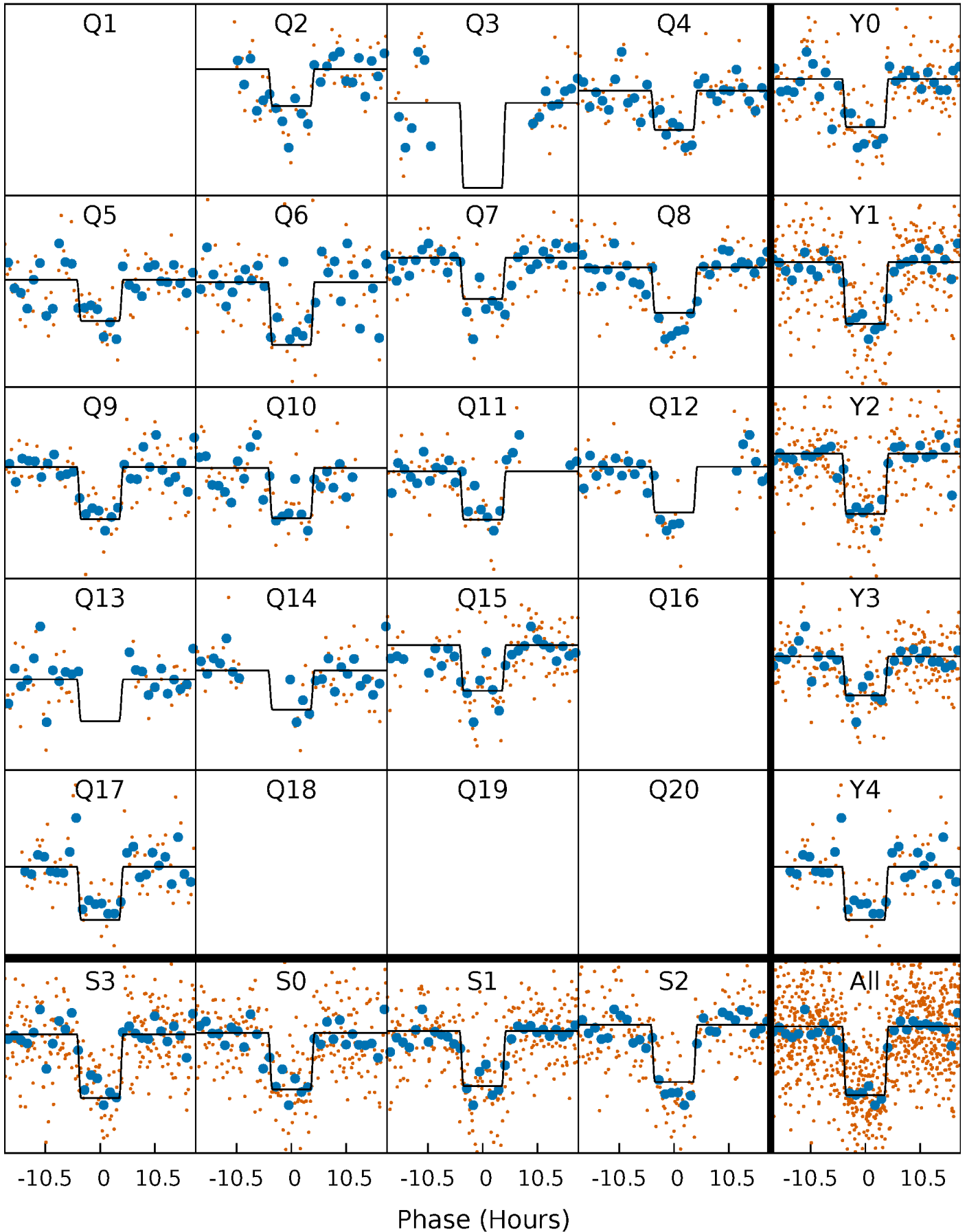
DV Quarter-Phased Transit Curves

TCE 009881662-02 P= 91.351433 Days $T_0=189.606676$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

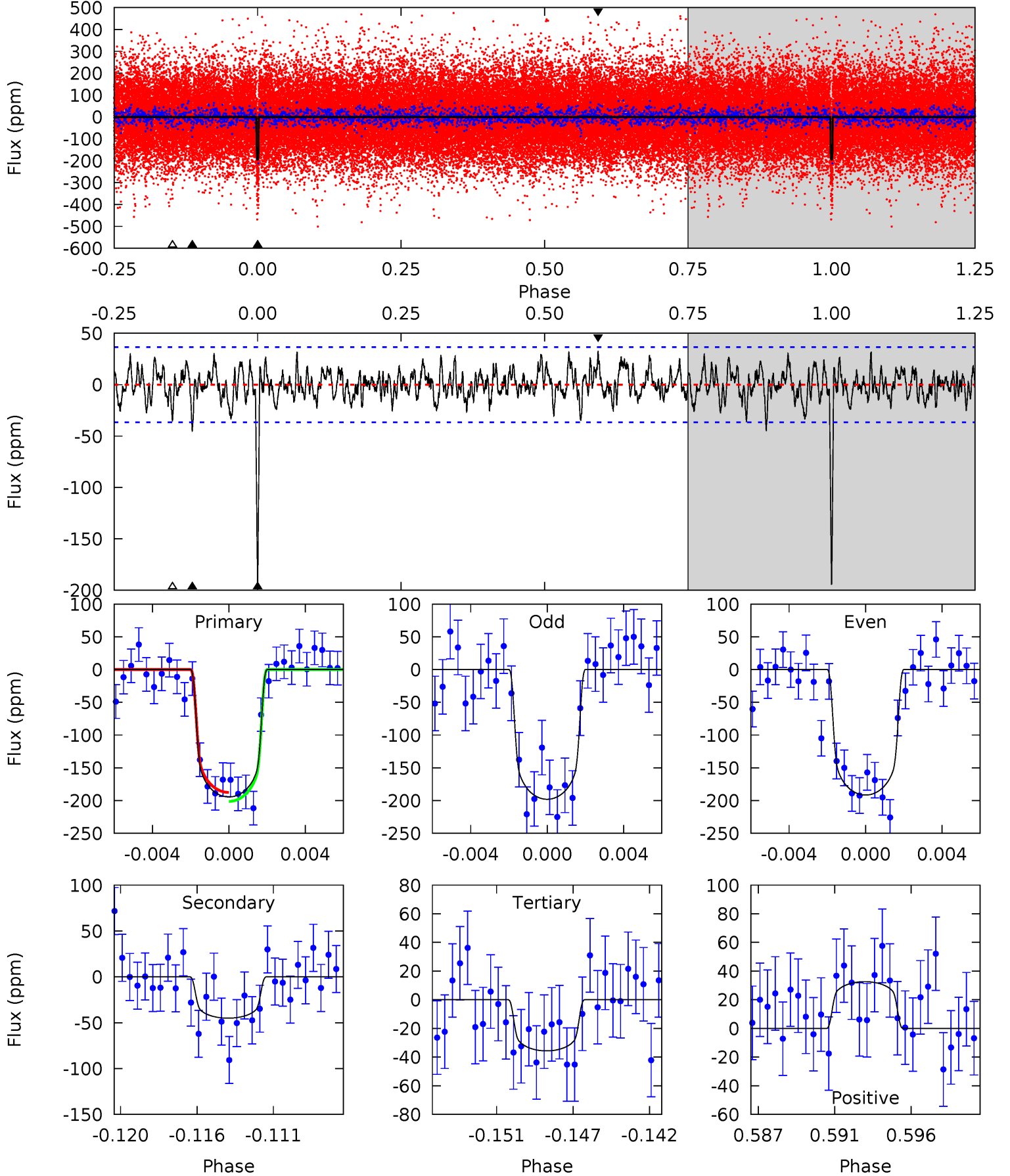
TCE 009881662-02 P= 91.350649 Days $T_0=189.610456$ (BKJD)



DV Model-Shift Uniqueness Test

009881662-02, P = 91.351433 Days, E = 98.255243 Days

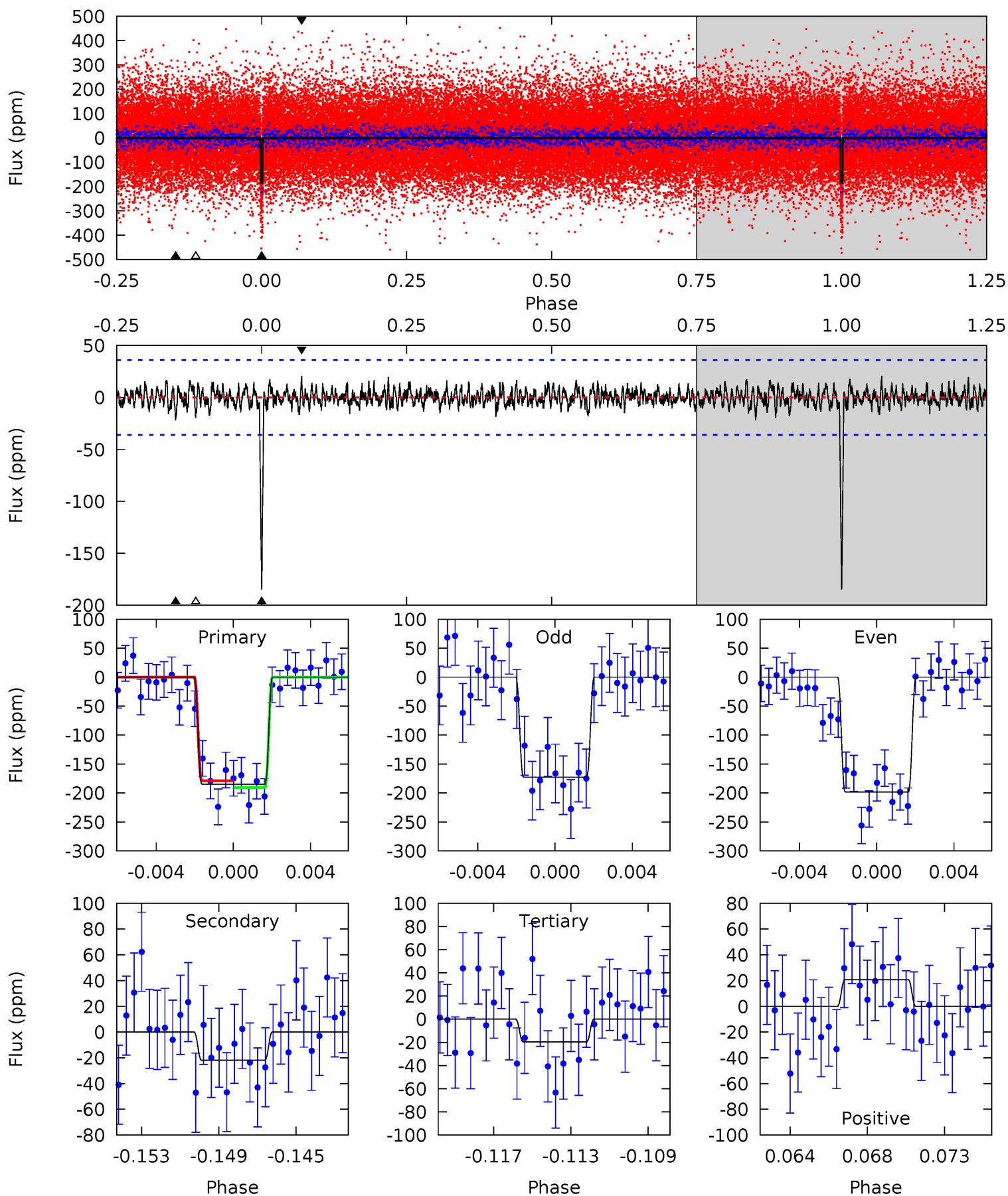
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
27.6	6.39	5.06	4.62	5.18	2.84	1.66	22.5	23.0	1.33	1.77	0.46	1.00	0.14	0.97



Alt Model-Shift Uniqueness Test

009881662-02, P = 91.350649 Days, E = 98.259807 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
26.7	3.18	2.83	2.99	5.20	2.88	0.92	23.8	23.7	0.34	0.19	1.83	1.03	0.10	0.85



Stellar Parameters For KIC 009881662

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5945^{+106}_{-130}	$4.402^{+0.054}_{-0.117}$	$0.160^{+0.150}_{-0.150}$	$1.089^{+0.174}_{-0.094}$	$1.092^{+0.077}_{-0.077}$	$1.191^{+0.246}_{-0.423}$
	+2%/-2%	+1%/-3%	+94%/-94%	+16%/-9%	+7%/-7%	+21%/-35%
Source	SPE59	SPE59	SPE59	DSEP		

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

Secondary Eclipse Parameters for KIC 009881662-02 / KOI 0327.02

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-45 ± 7	$1.90^{+0.22}_{-0.17}$	603^{+25}_{-20}	4141^{+169}_{-161}	1109^{+325}_{-254}
Alt.	-22 ± 7	$1.65^{+0.18}_{-0.15}$	602^{+24}_{-19}	3839^{+233}_{-260}	716^{+312}_{-246}

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 $A_{obs} \gg 1.0$

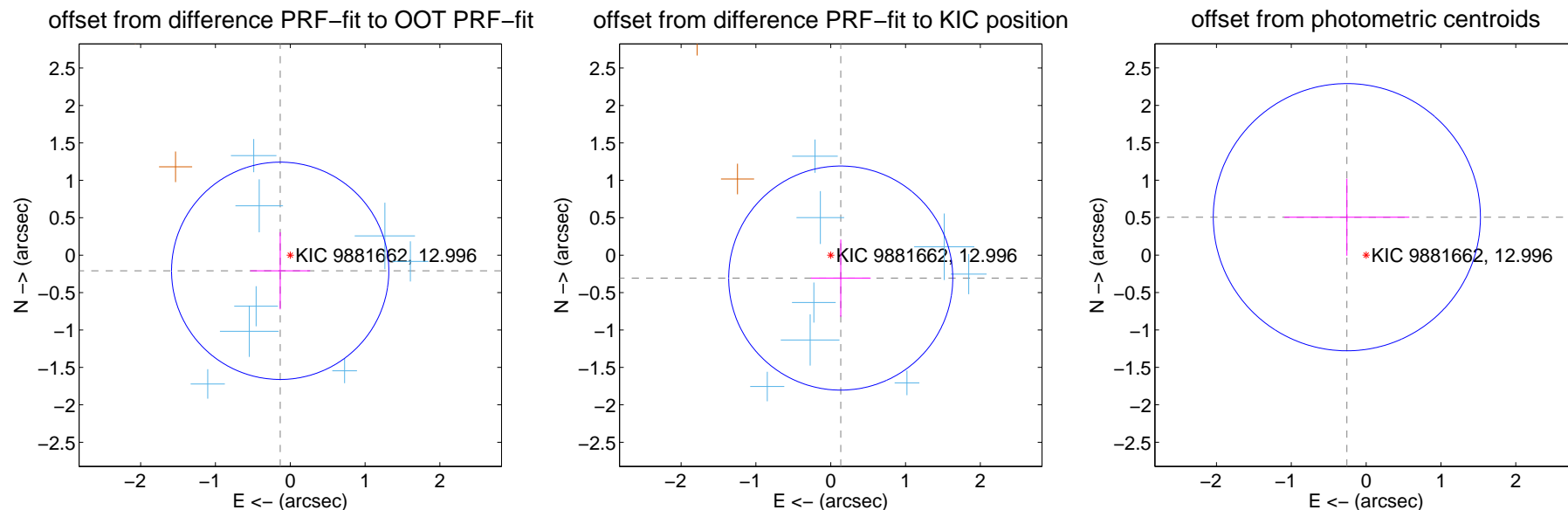
DV Centroid Data

Supplemental centroid analysis for 009881662-02. Kepler magnitude: 13.00. Transit SNR 16.51

There are 8 quarters with good PRF difference image offsets

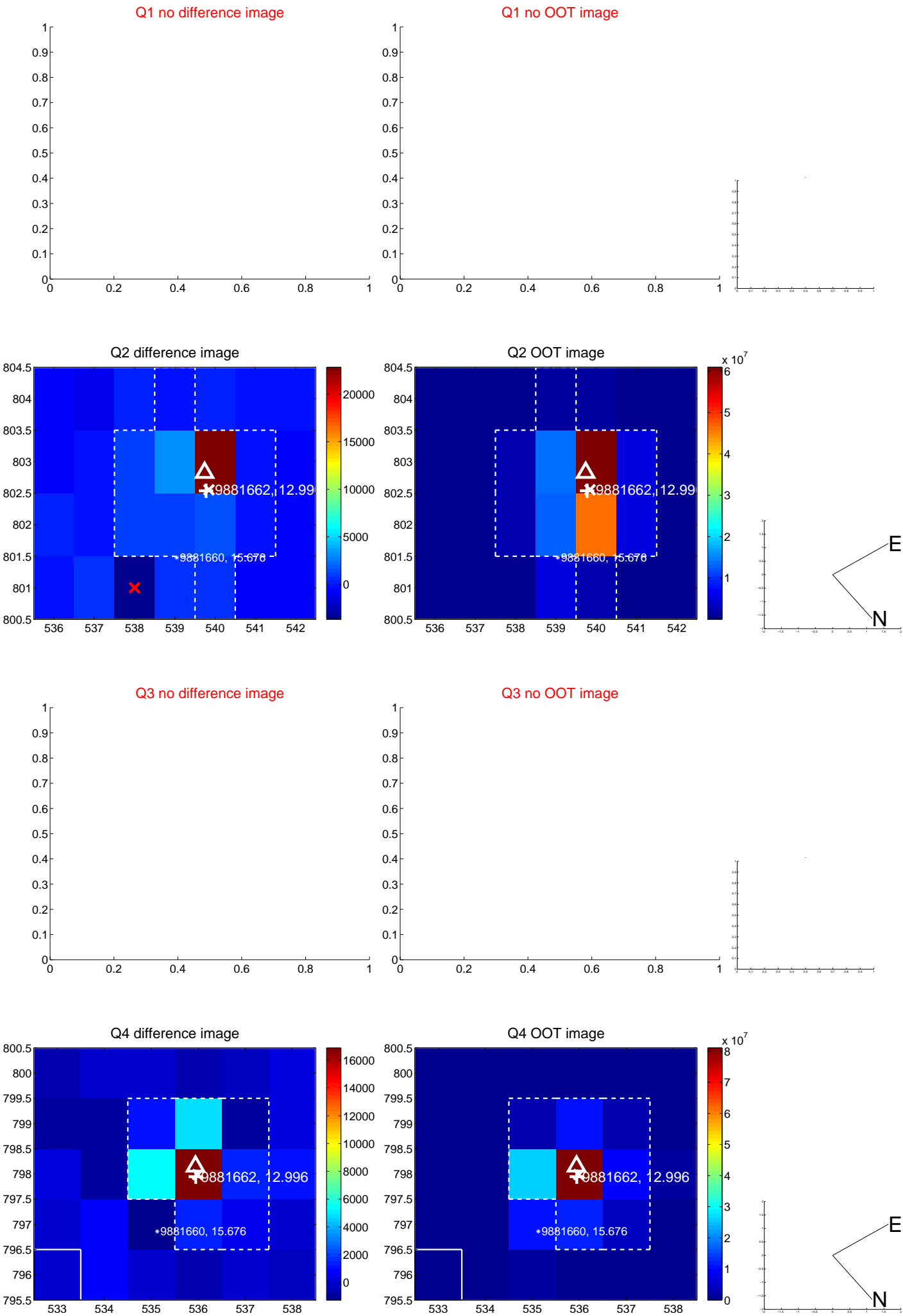
The direct PRF centroid is offset from the target star catalog position by about 0.33 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.249 ± 0.484	0.51	0.135 ± 0.400	-0.209 ± 0.515
PRF-fit source offset from KIC position	0.334 ± 0.499	0.67	-0.134 ± 0.400	-0.306 ± 0.516
photometric centroid source offset	0.57 ± 0.59	0.95	0.26 ± 0.84	0.51 ± 0.51

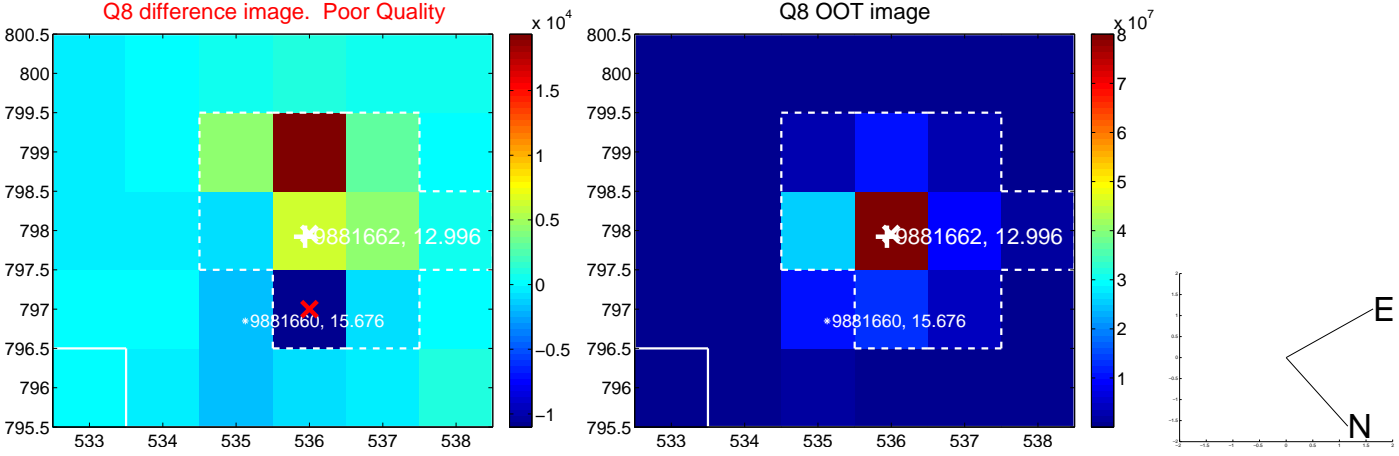
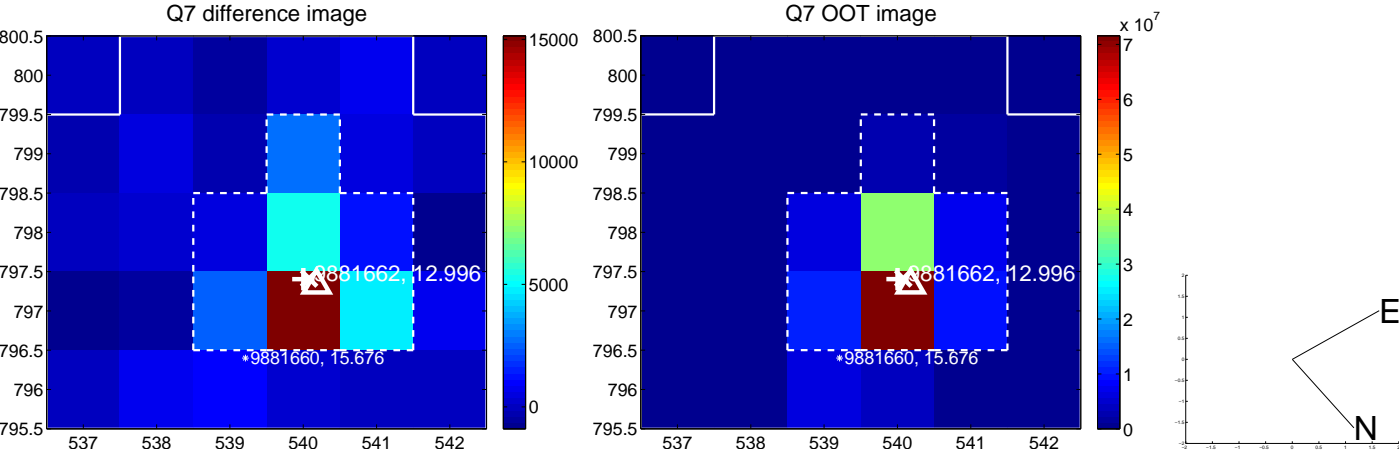
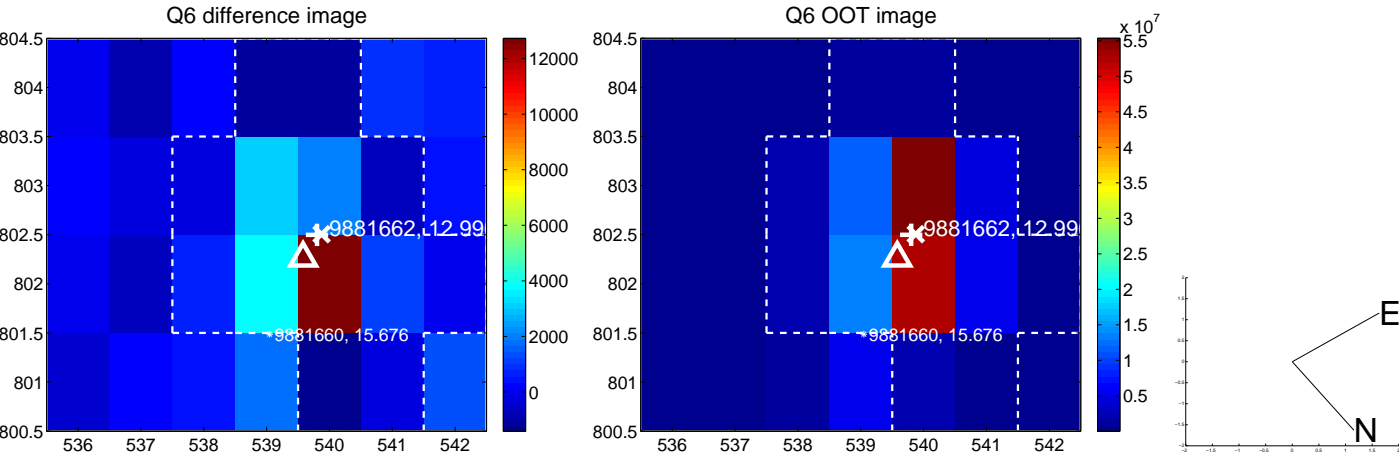
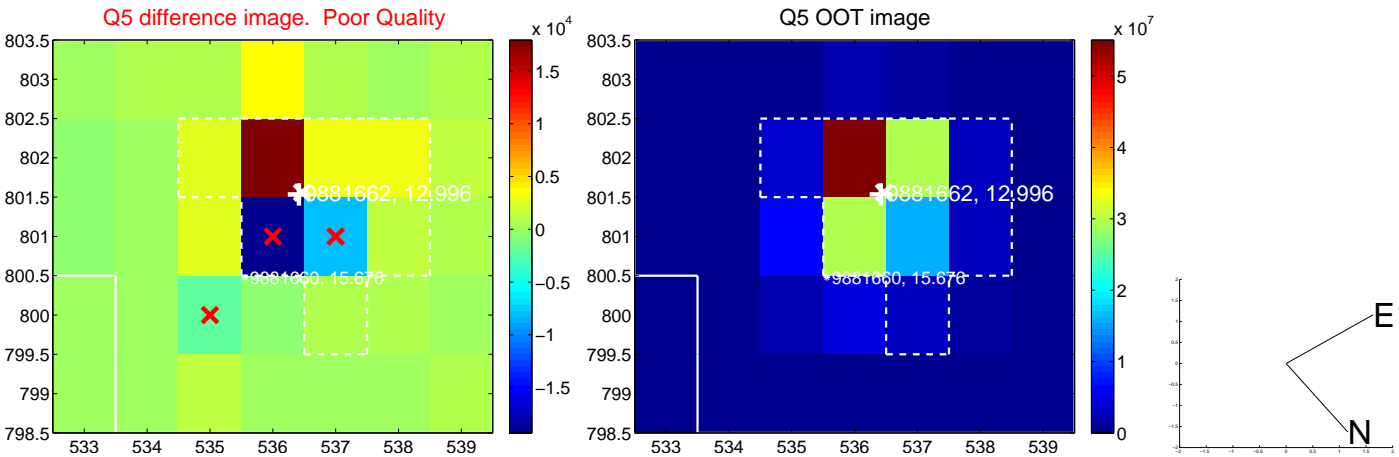


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

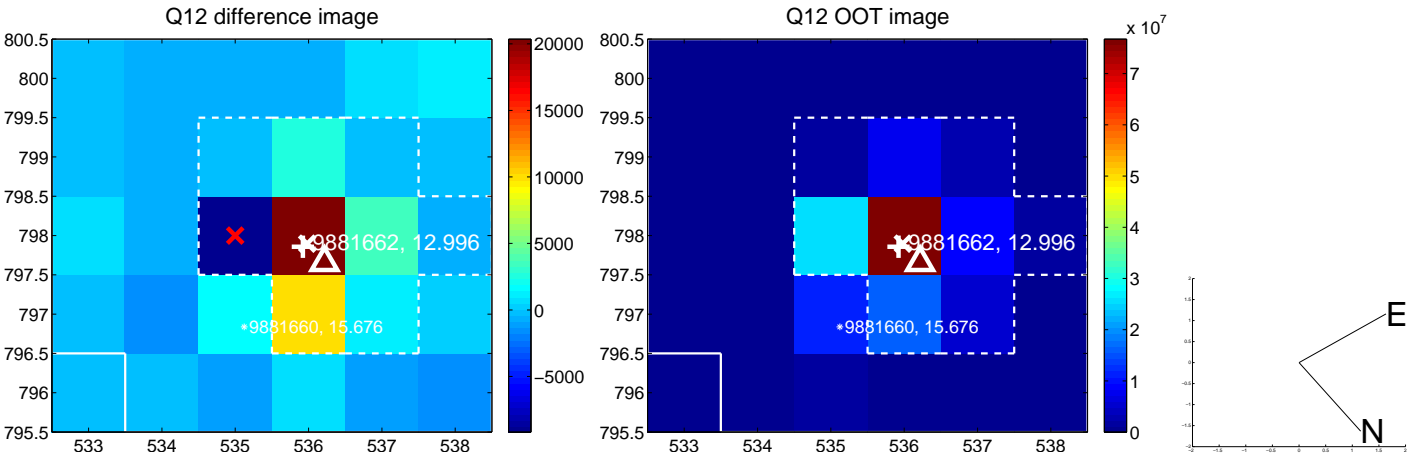
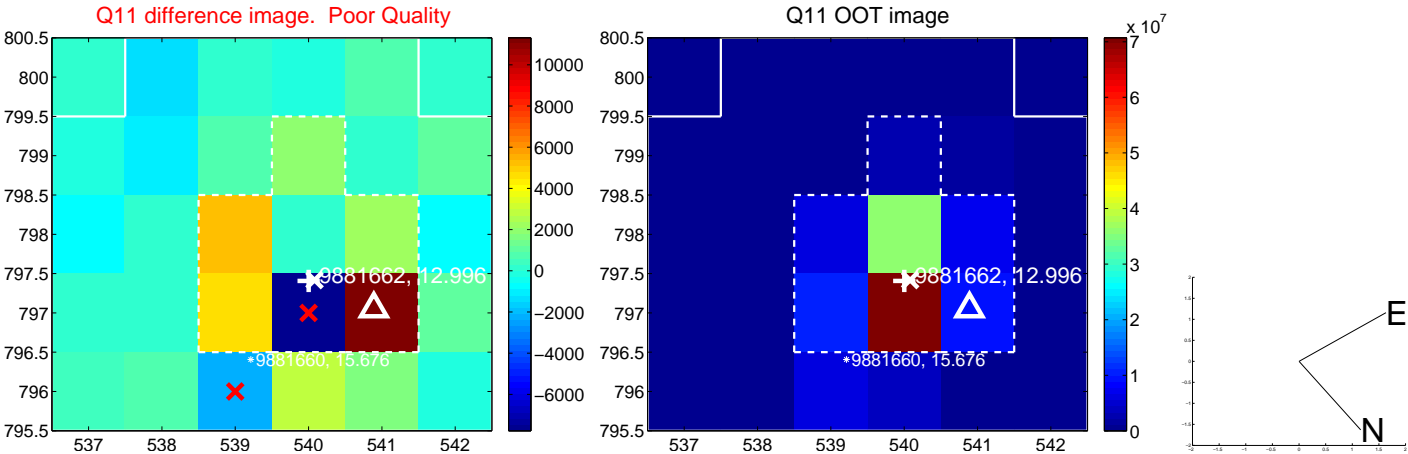
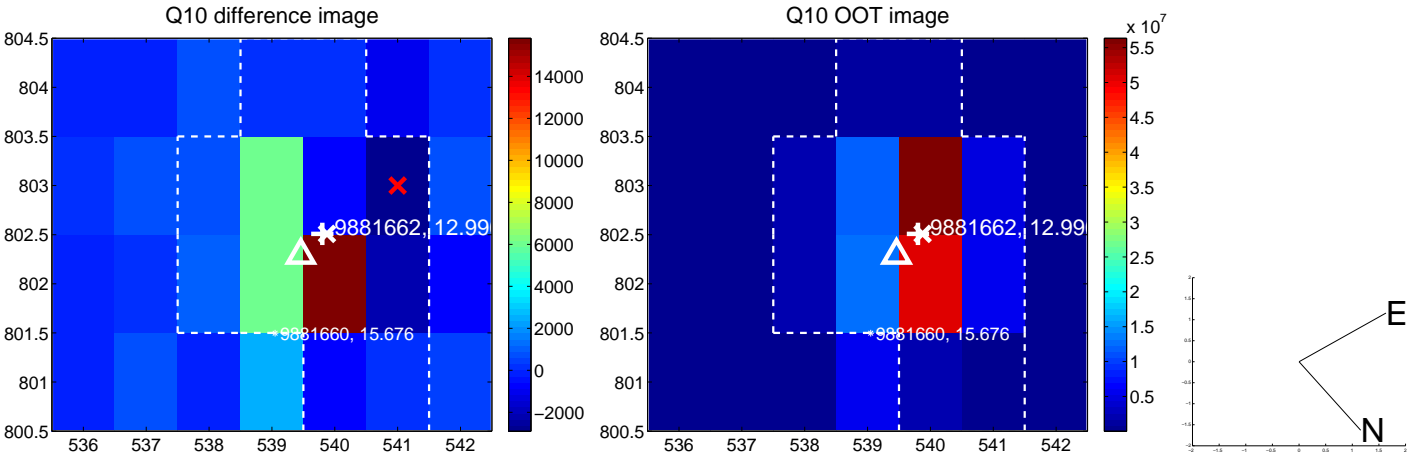
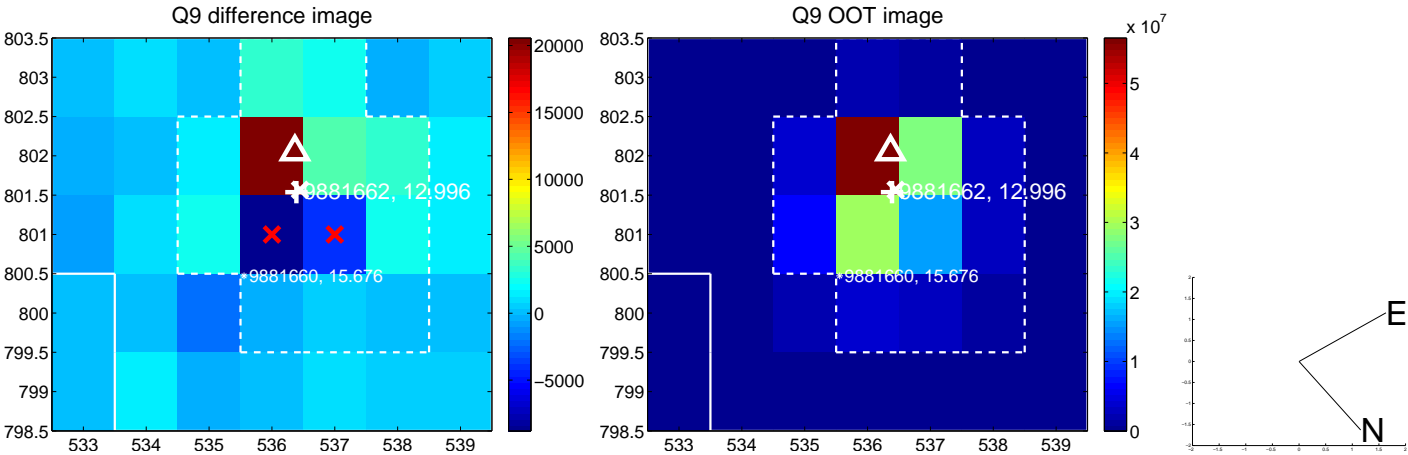
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



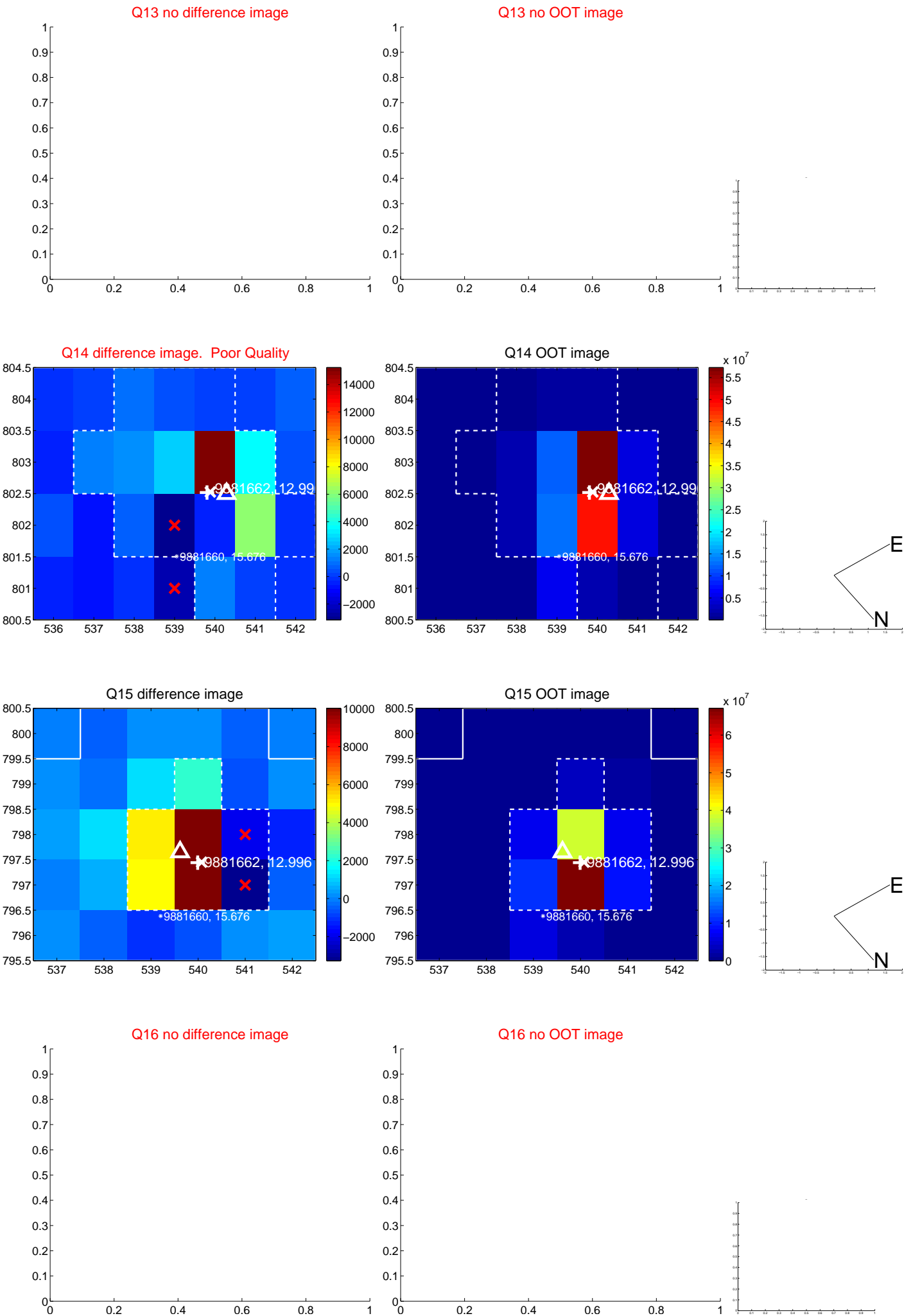
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



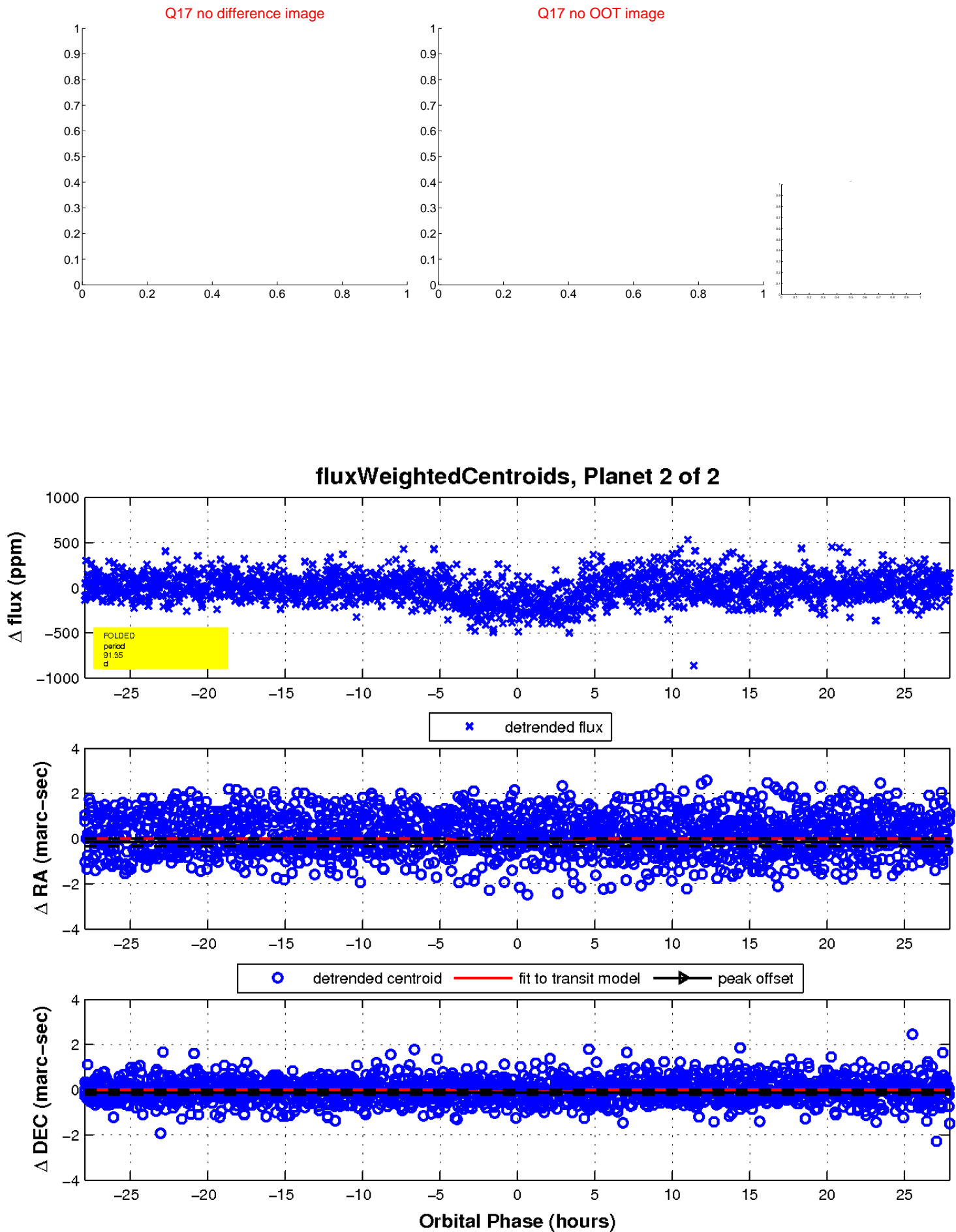
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

