

KIC 003640905

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})
003640905-01	OBS	1221.01	30.159900	138.518412	173.0	7.808	18.6	20.4	3.05	5010	4.45	115.87
003640905-02	OBS	1221.02	51.077463	152.352113	143.0	11.391	13.9	14.8	3.05	5010	3.99	57.40

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003640905-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
003640905-02	OBS	PC	0.98	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.

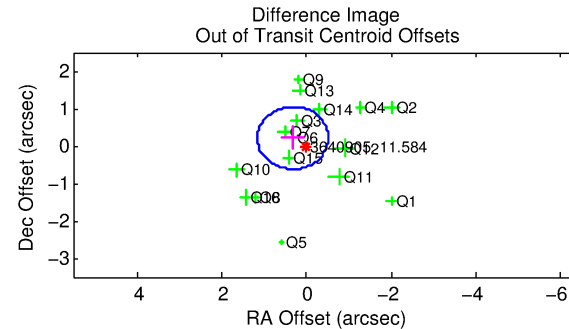
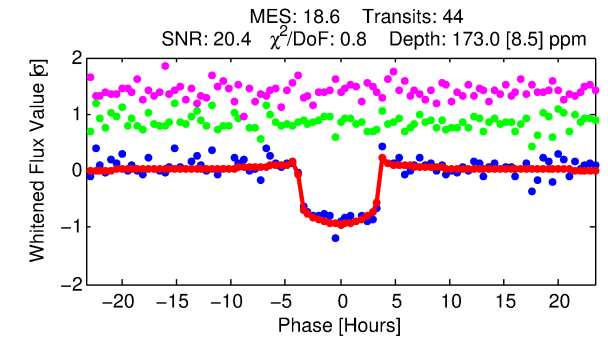
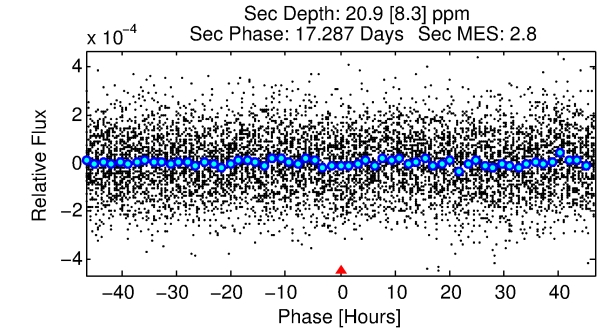
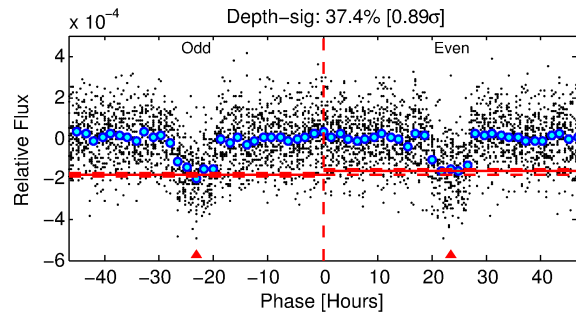
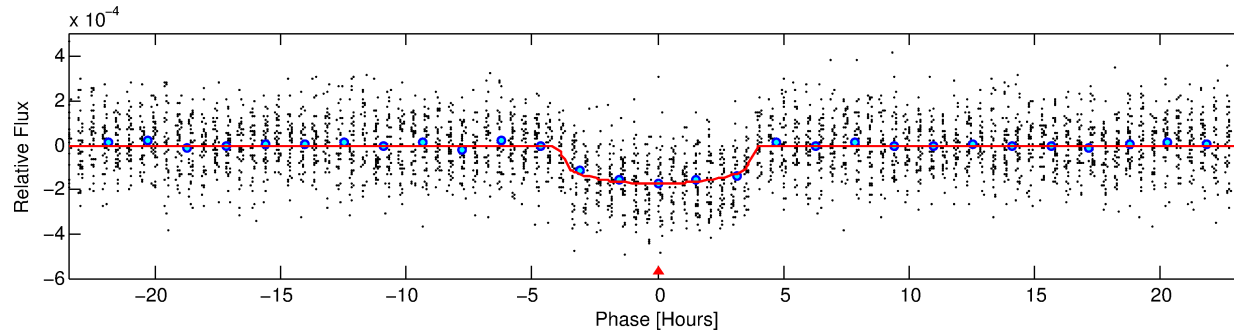
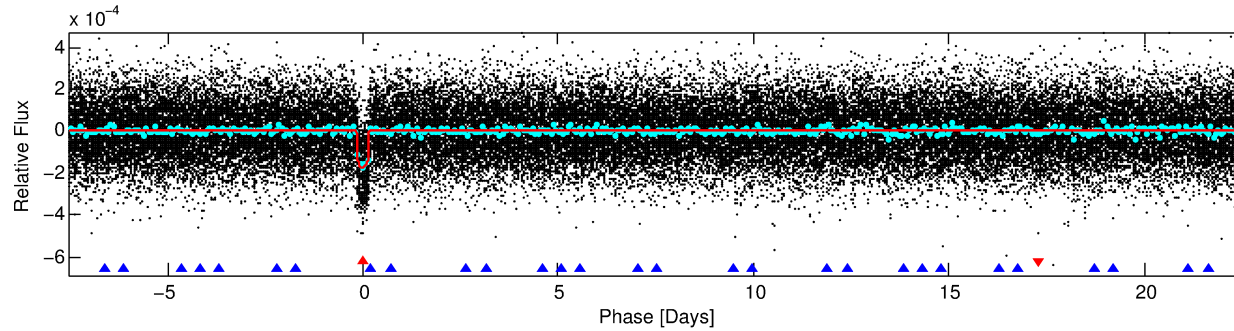
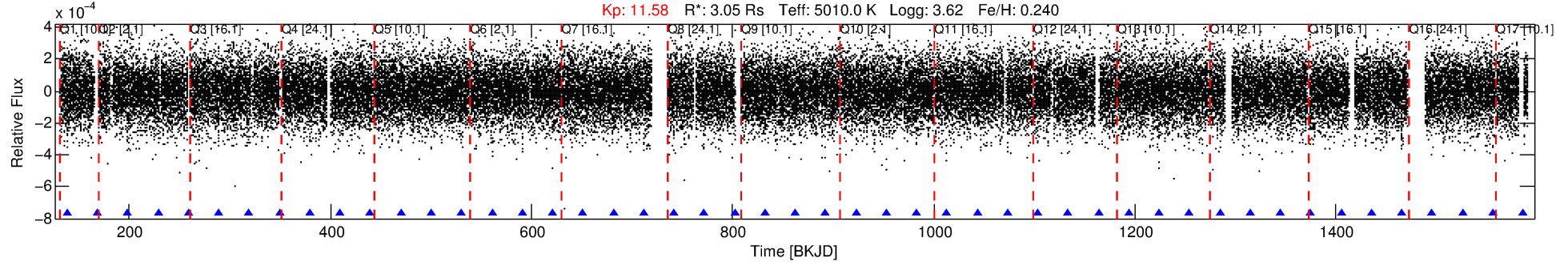
Ephemeris Match Information For 003640905-01

No Significant Match Found

DV One-Page Summary

KIC: 3640905 Candidate: 1 of 2 Period: 30.160 d
KOI: K01221.01 Name: Kepler-278b Corr: 0.998

Kp: 11.58 R*: 3.05 Rs Teff: 5010.0 K Logg: 3.62 Fe/H: 0.240



DV Fit Results:

Period = 30.15990 [0.00022] d
Epoch = 138.5184 [0.0060] BKJD
Rp/R* = 0.0134 [0.0029]
a/R* = 18.99 [14.61]
b = 0.78 [0.39]
Seff = 115.87 [17.59]
Teq = 837 [32] K
Rp = 4.45 [1.12] Re
a = 0.2130 [0.0212] AU
Ag = 26.25 [15.69] [1.61σ]
Teff = 2928 [432] K [4.83σ]

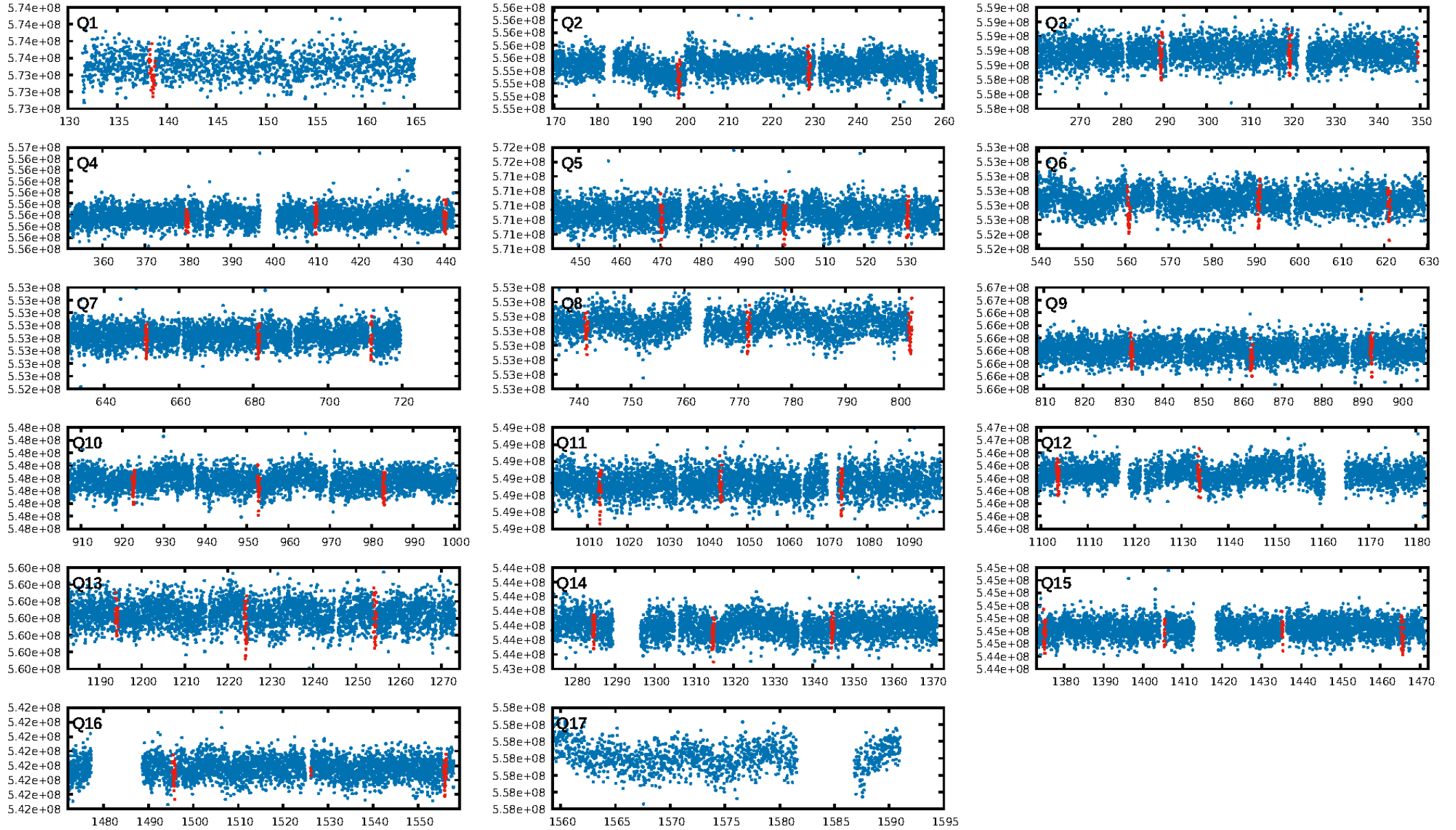
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [36.35σ]
ModelChiSquare2-sig: 98.5%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.87e-70
RollingBand-fgt: 1.00 [43/43]
GhostDiagnostic-chr: 3.539
Centroid-sig: 0.0%
Centroid-so: 0.641 arcsec [2.20σ]
OotOffset-rm: 0.385 arcsec [1.38σ]
KicOffset-rm: 0.547 arcsec [1.92σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.88 [14/16]
DiffImageOverlap-fno: 1.00 [16/16]

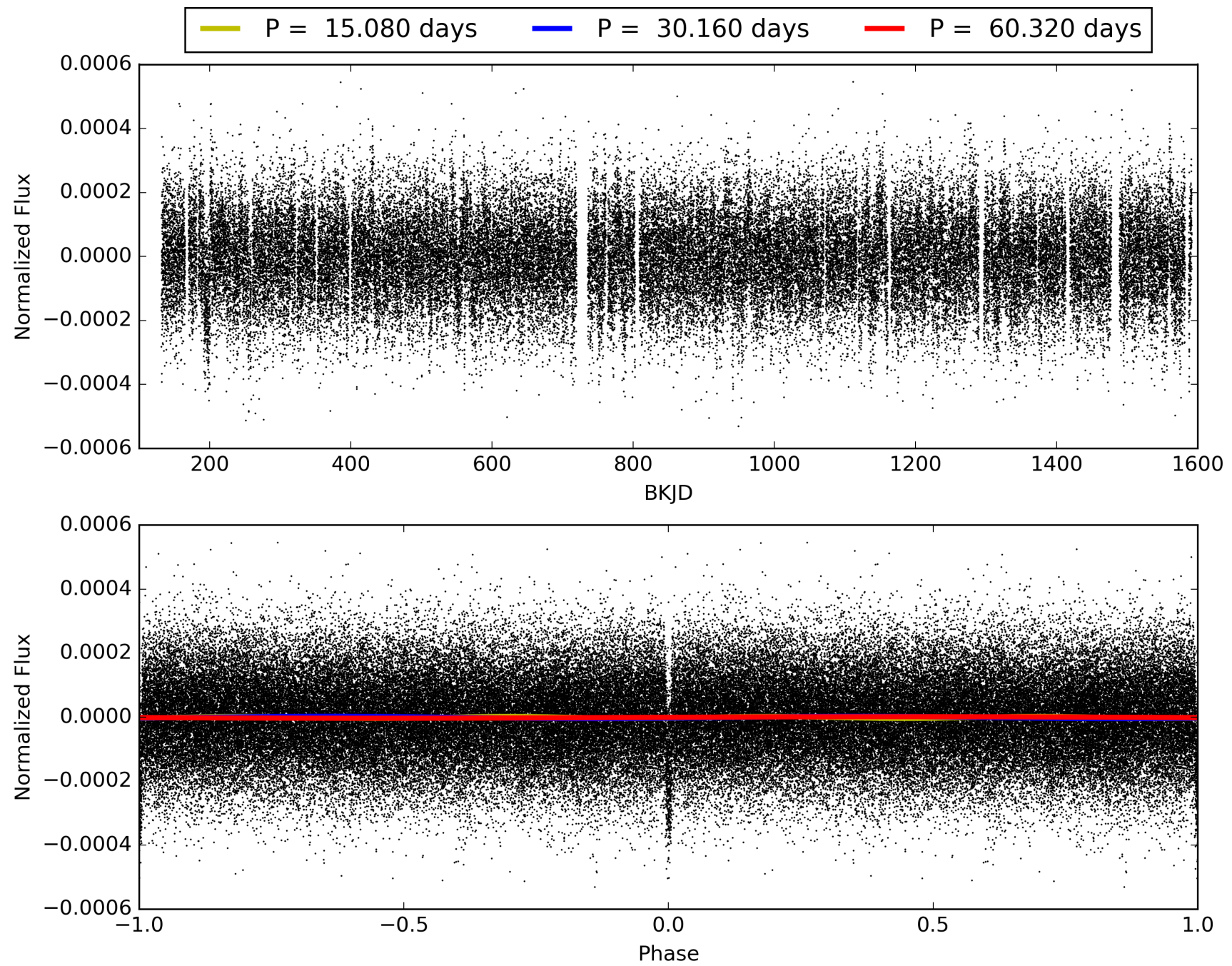
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 17:04:20 Z

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

TCE 003640905-01, PDC Light Curves

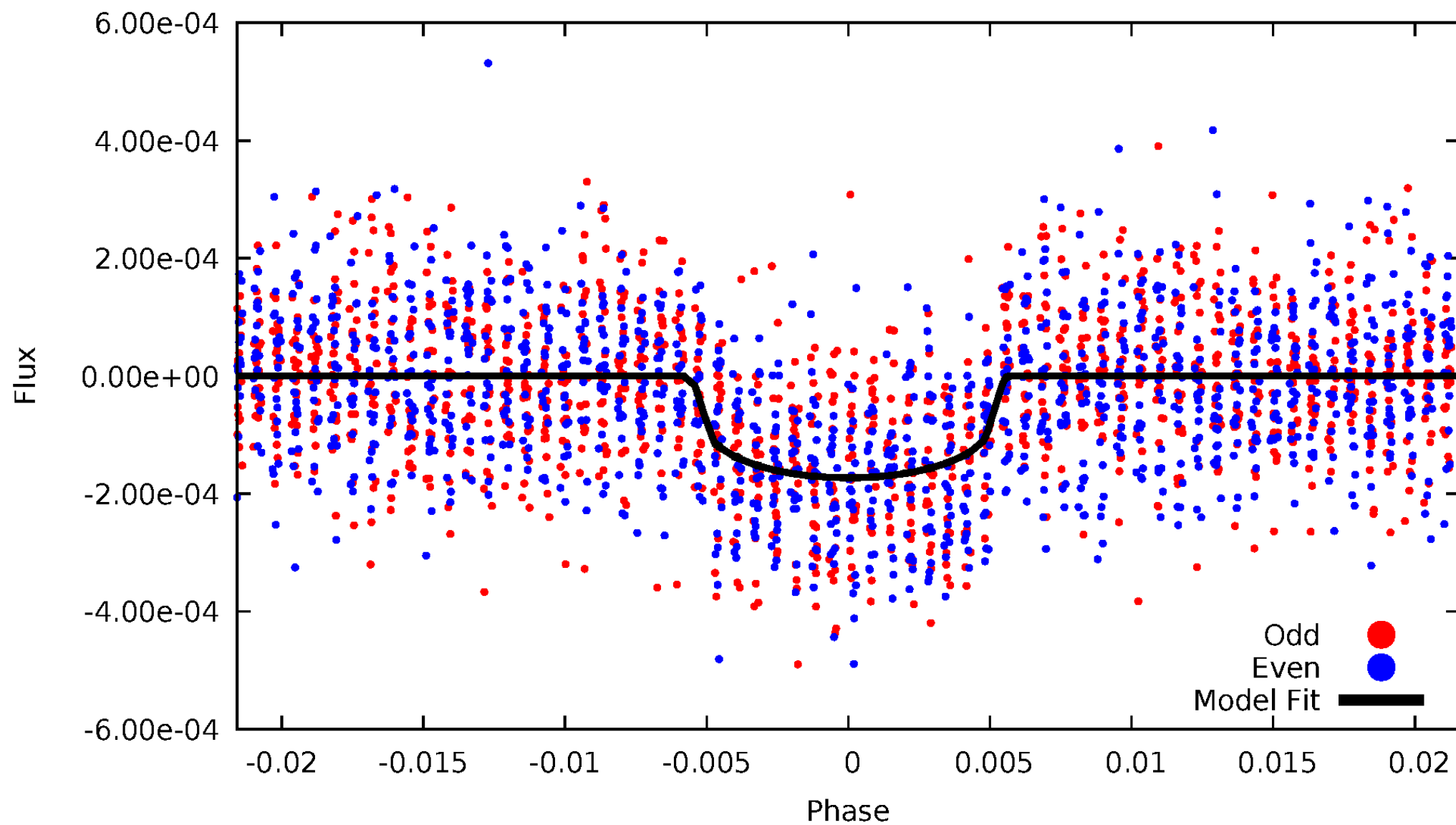


TCE 003640905-01



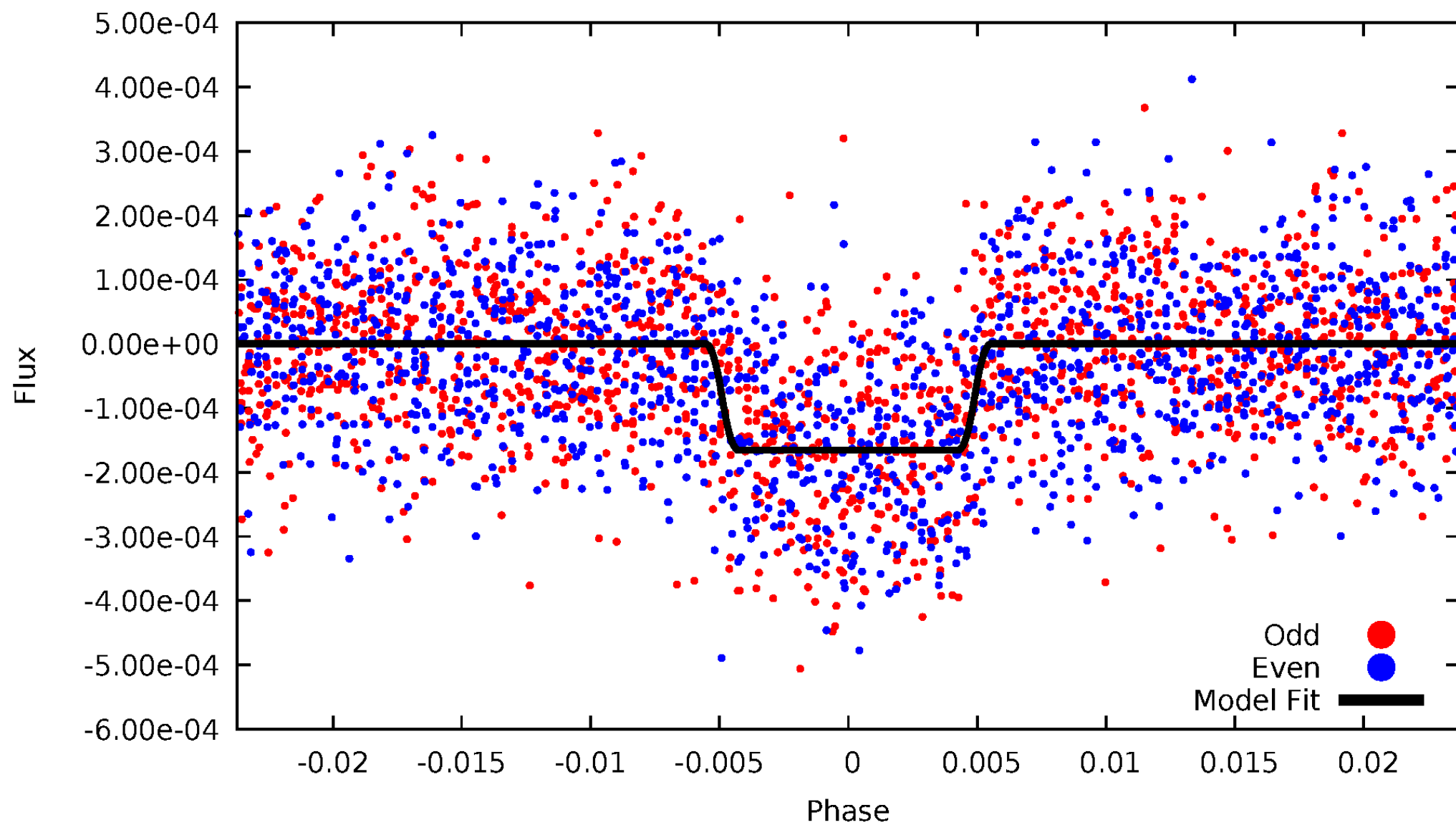
DV Odd/Even

TCE 003640905-01

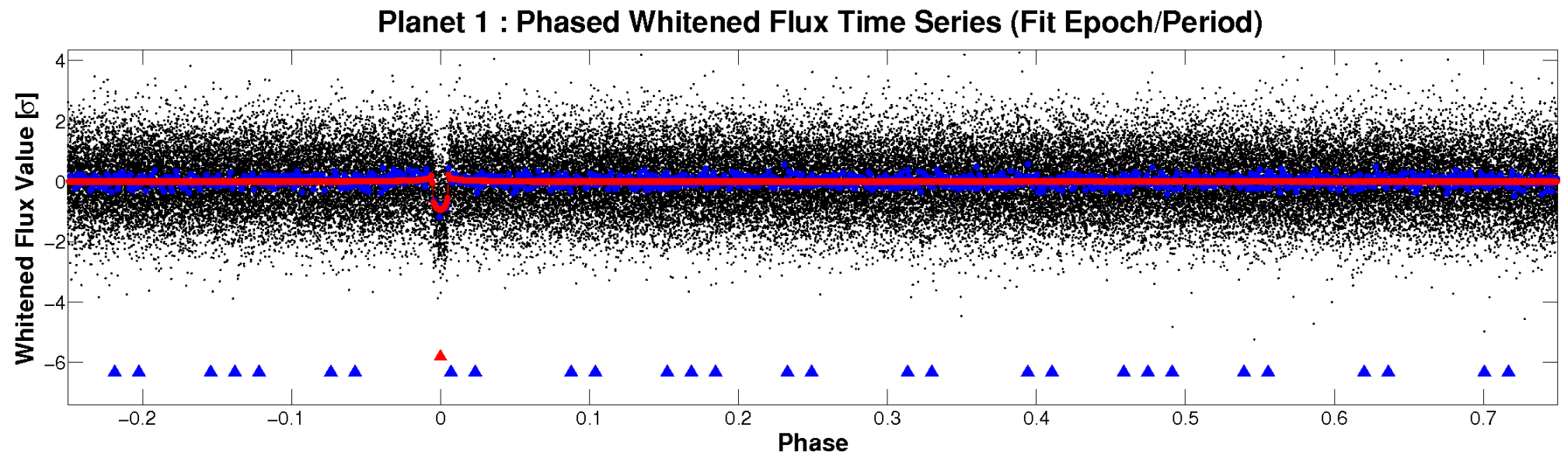
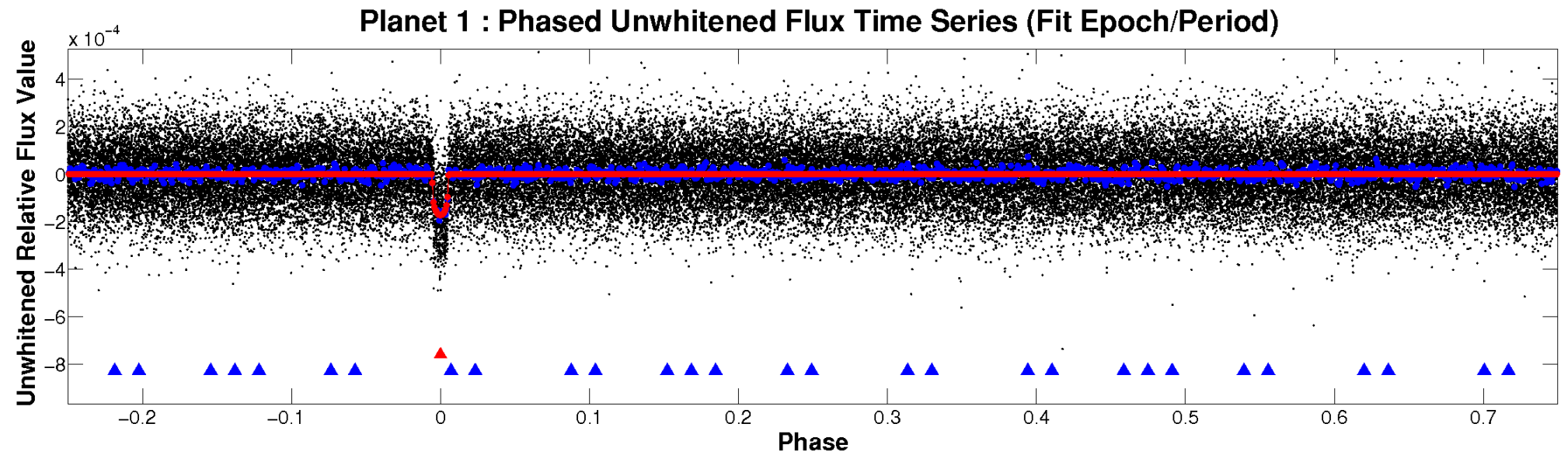


ALT Odd/Even

TCE 003640905-01

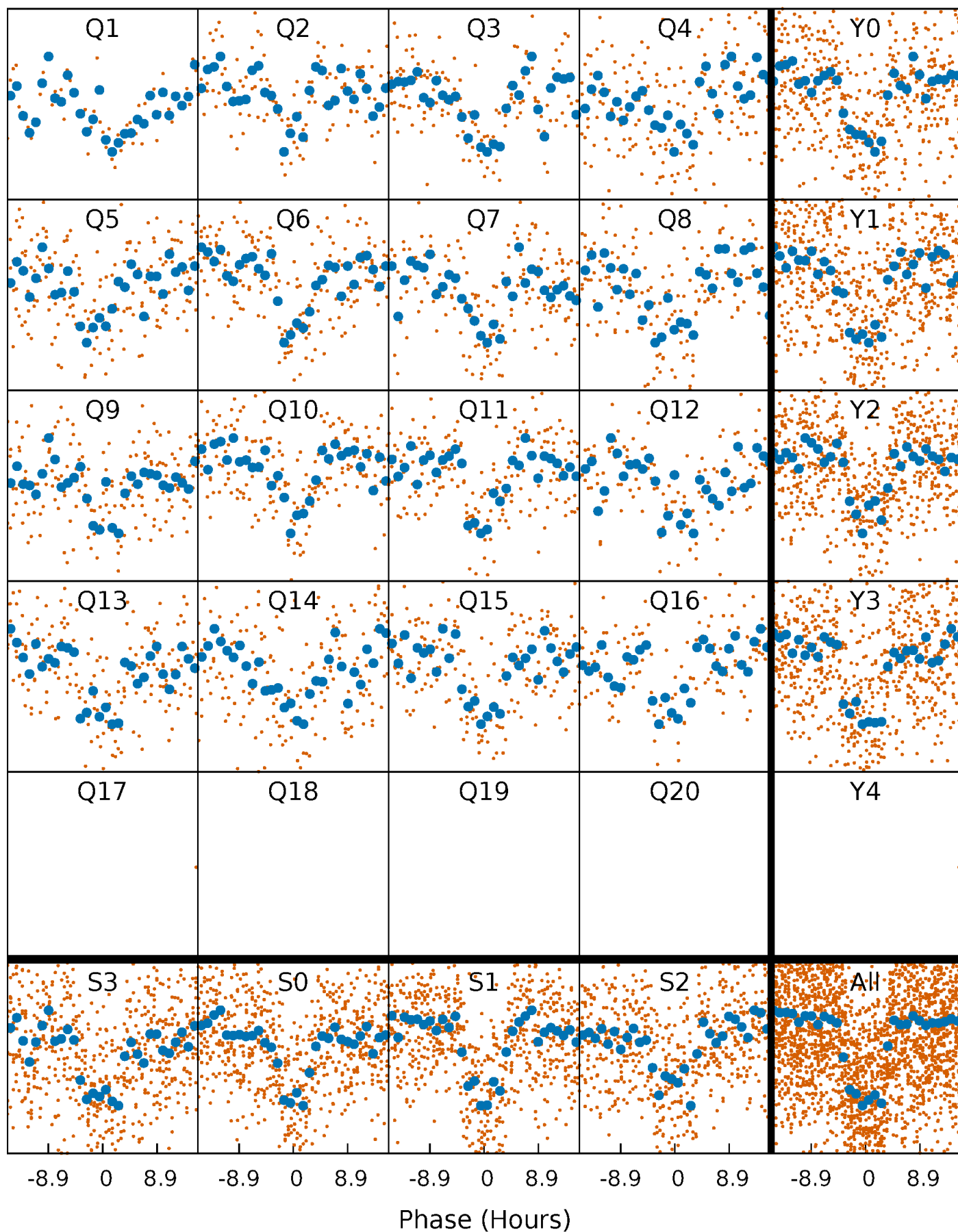


Non-Whitened Vs. Whitened Light Curve



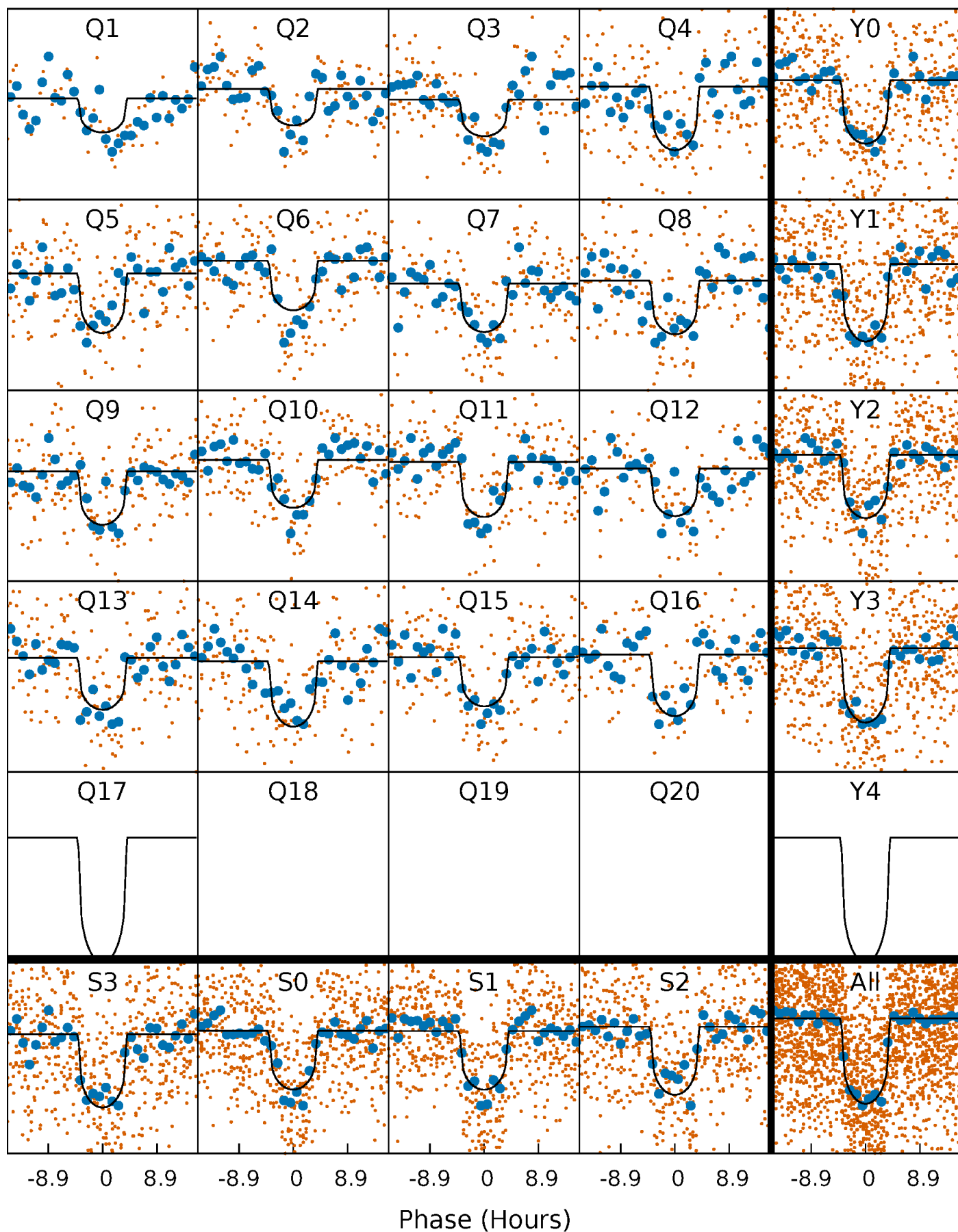
PDC Quarter-Phased Transit Curves

TCE 003640905-01 P= 30.159900 Days $T_0=138.518412$ (BKJD)



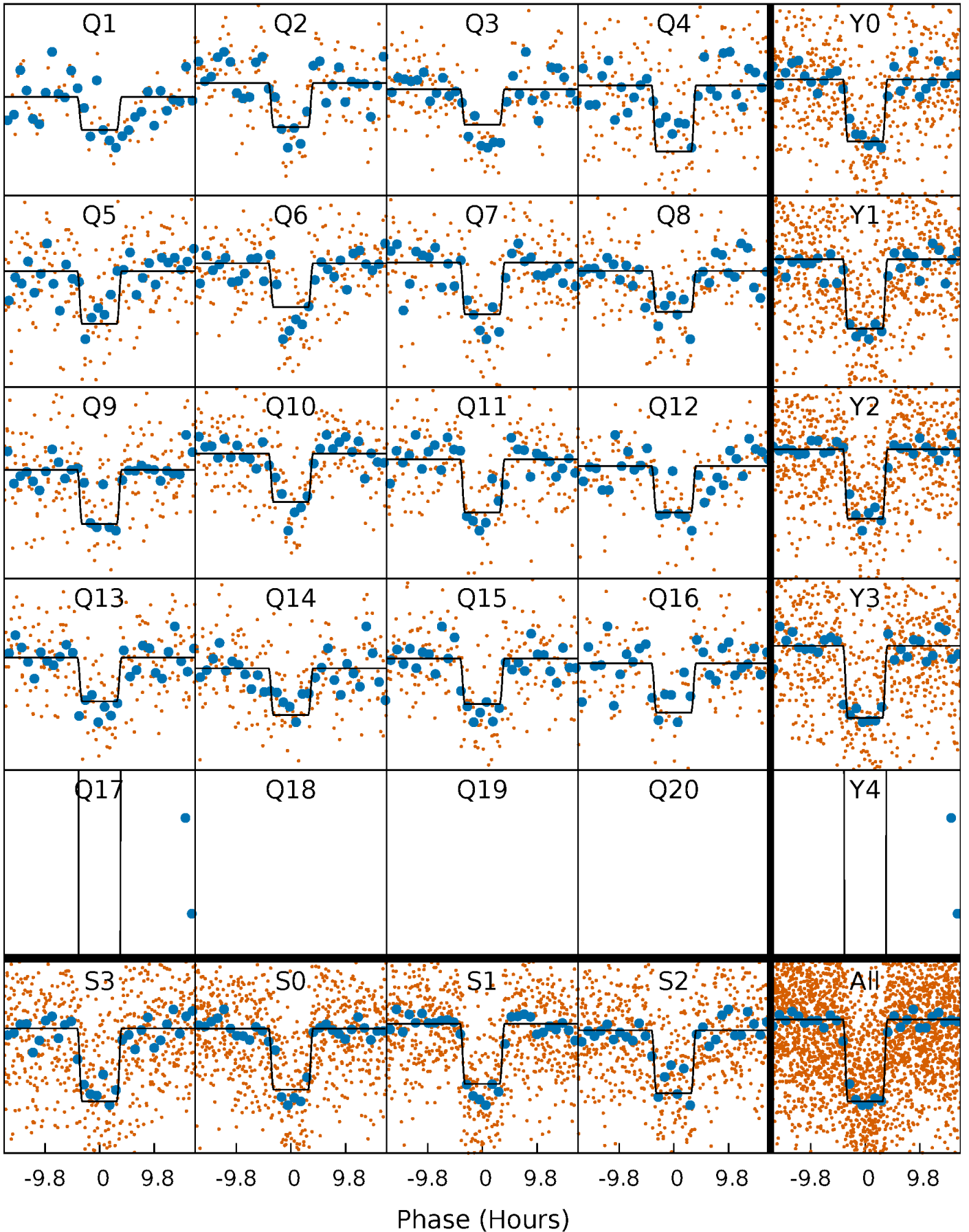
DV Quarter-Phased Transit Curves

TCE 003640905-01 P= 30.159900 Days $T_0=138.518412$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

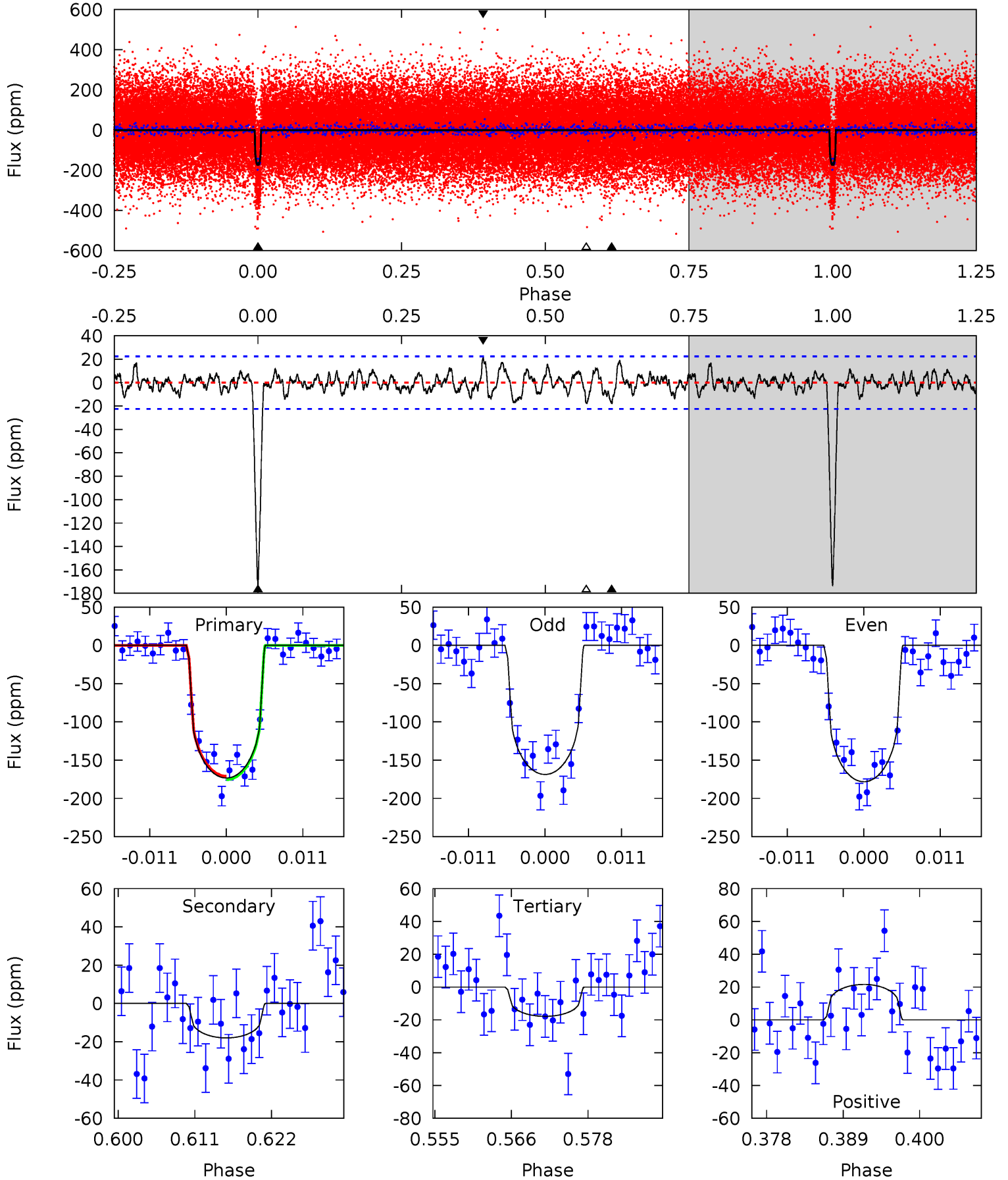
TCE 003640905-01 P= 30.160768 Days $T_0=138.497582$ (BKJD)



DV Model-Shift Uniqueness Test

003640905-01, $P = 30.159900$ Days, $E = 108.358512$ Days

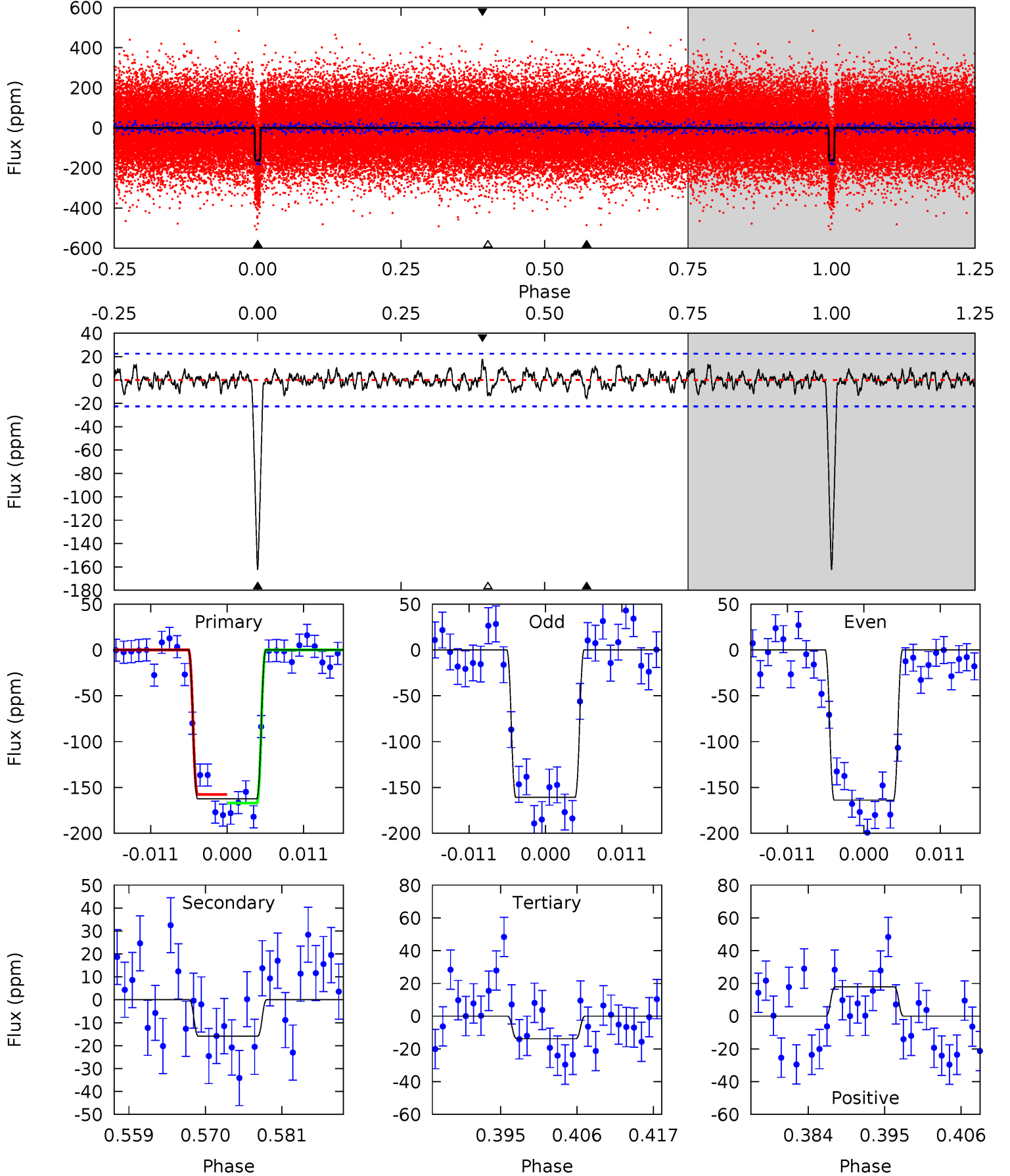
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
38.5	4.00	3.97	4.80	5.01	2.54	1.45	34.6	33.7	0.03	-0.80	1.06	1.03	0.11	0.49



Alt Model-Shift Uniqueness Test

003640905-01, P = 30.160768 Days, E = 108.336814 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
36.0	3.53	3.06	3.95	5.01	2.54	1.11	33.0	32.1	0.48	-0.42	0.34	1.03	0.10	1.03



Stellar Parameters For KIC 003640905

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5010^{+51}_{-103}	$3.620^{+0.060}_{-0.055}$	$0.240^{+0.100}_{-0.200}$	$3.051^{+0.202}_{-0.404}$	$1.414^{+0.099}_{-0.277}$	$0.070^{+0.021}_{-0.011}$
	+1%/-2%	+2%/-2%	+42%/-83%	+7%/-13%	+7%/-20%	+30%/-16%
Source	SPE72	AST8	SPE72	DSEP		

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

Secondary Eclipse Parameters for KIC 003640905-01 / KOI 1221.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-18 ± 4	$4.43^{+1.10}_{-0.98}$	1166^{+31}_{-35}	3300^{+289}_{-232}	22^{+15}_{-8}
Alt.	-16 ± 5	$4.33^{+0.97}_{-1.03}$	1165^{+30}_{-32}	3262^{+313}_{-245}	21^{+17}_{-8}

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)

A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

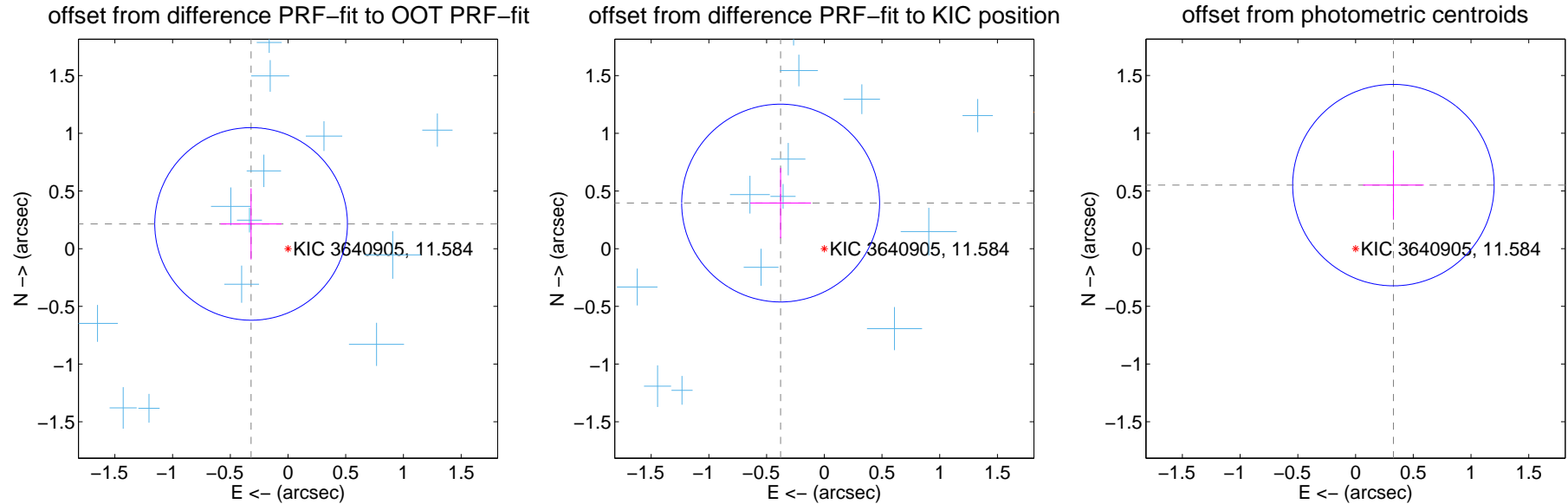
DV Centroid Data

Supplemental centroid analysis for 003640905-01. **Kepler magnitude: 11.58.** Transit SNR 20.36

There are 14 quarters with good PRF difference image offsets

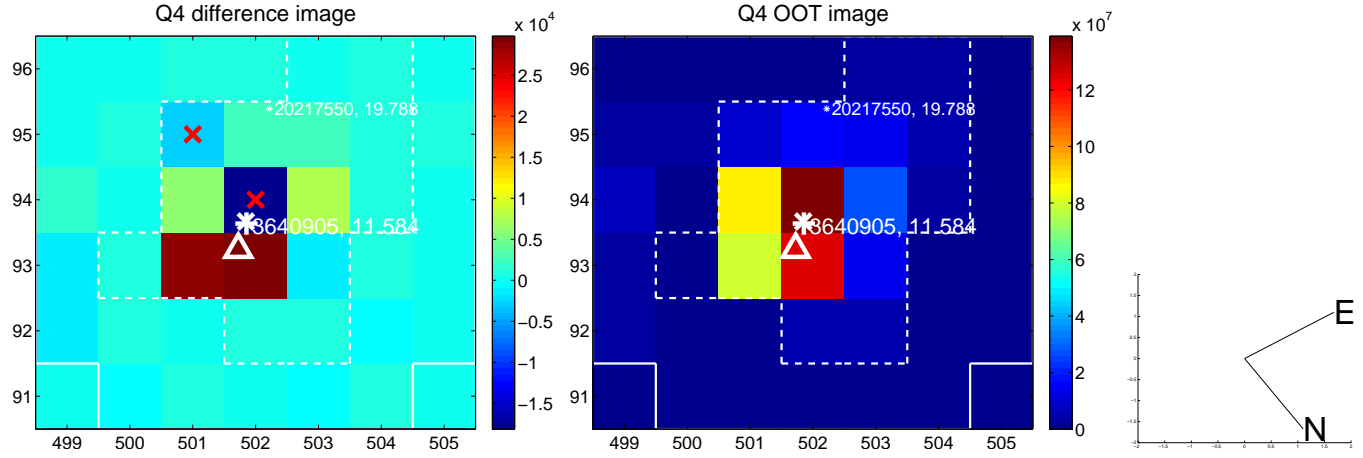
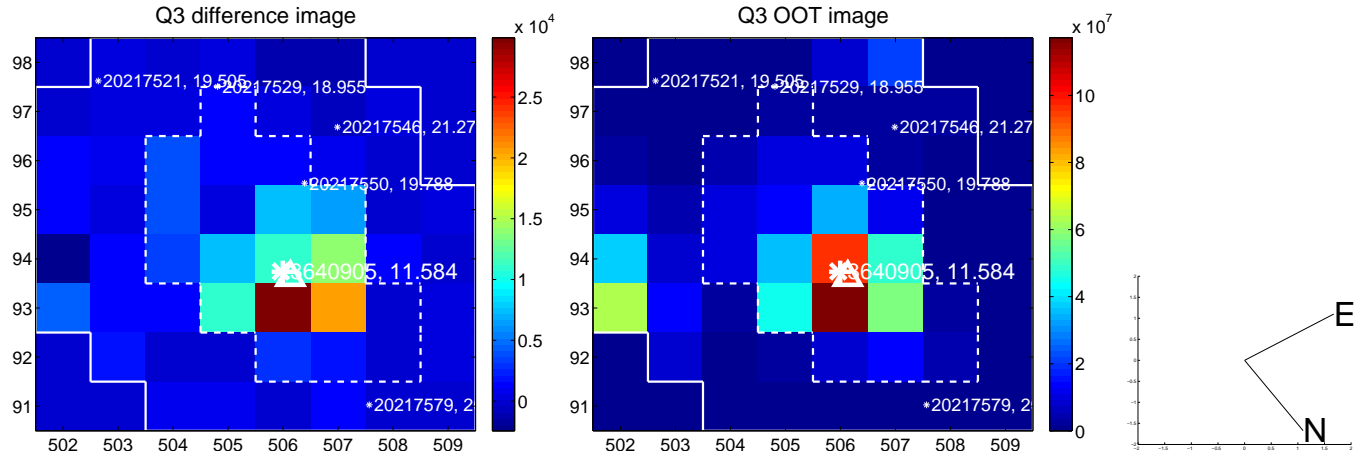
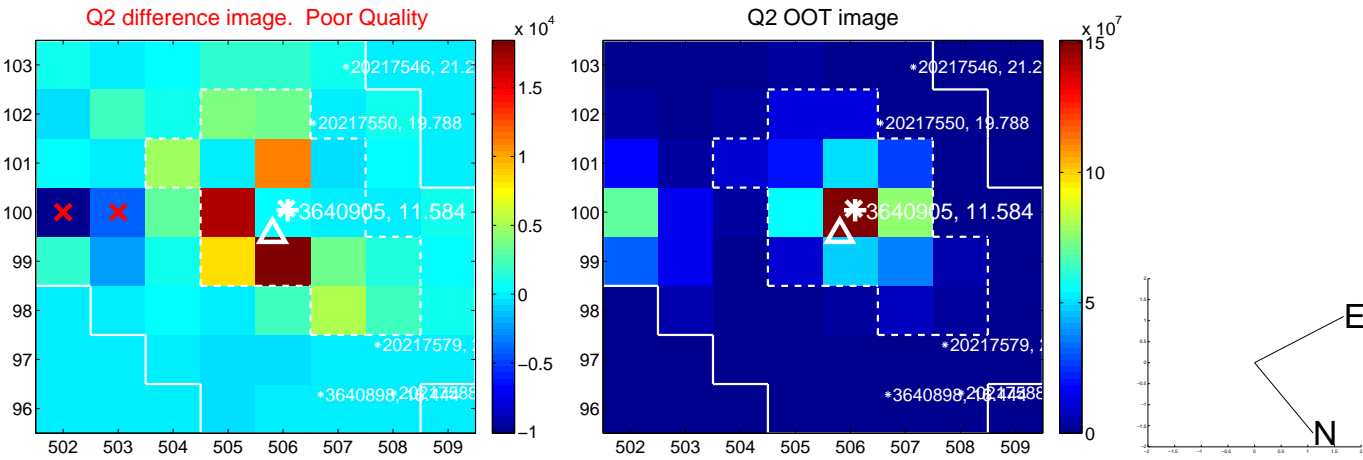
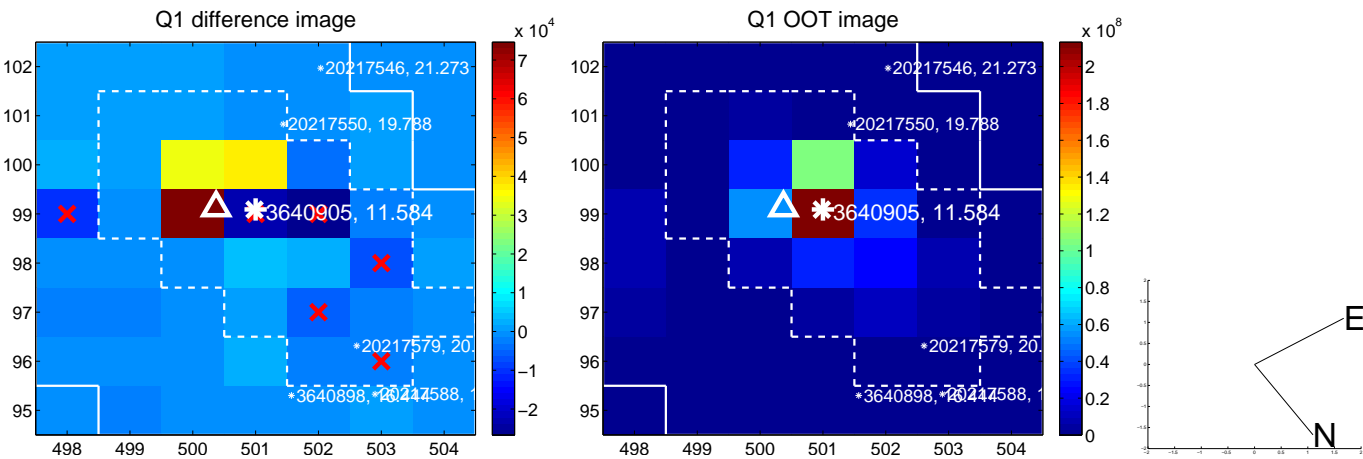
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.385 ± 0.278	1.38	0.320 ± 0.264	0.215 ± 0.308
PRF-fit source offset from KIC position	0.547 ± 0.286	1.92	0.378 ± 0.263	0.395 ± 0.305
photometric centroid source offset	0.64 ± 0.29	2.20	-0.33 ± 0.26	0.55 ± 0.30

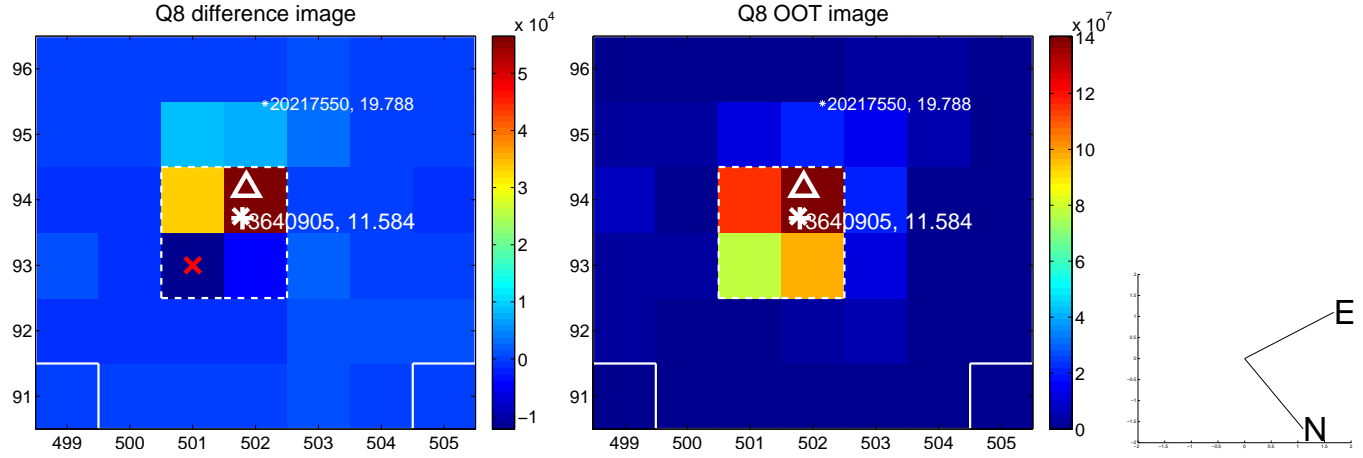
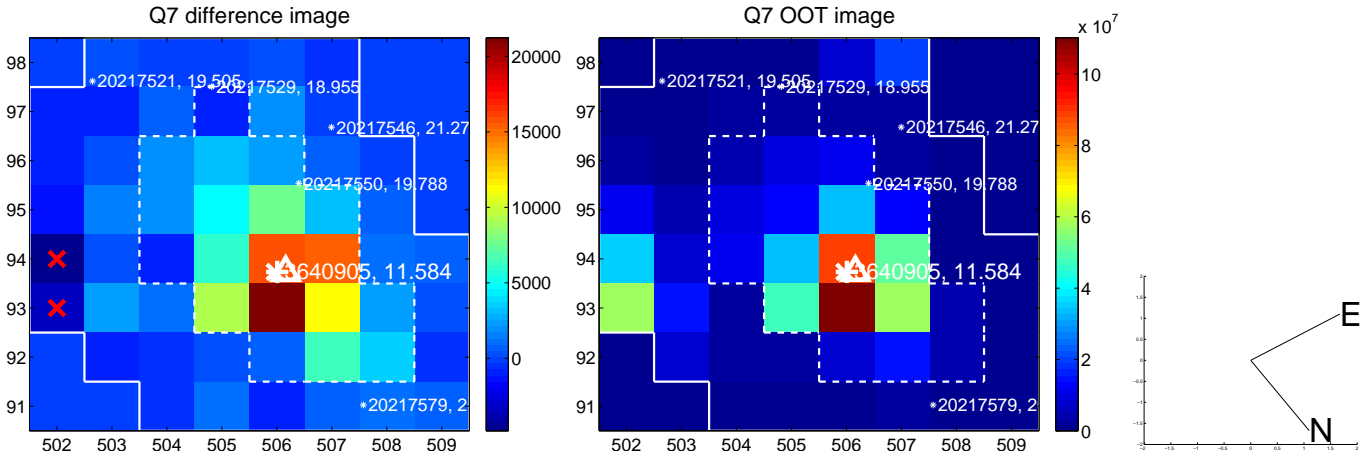
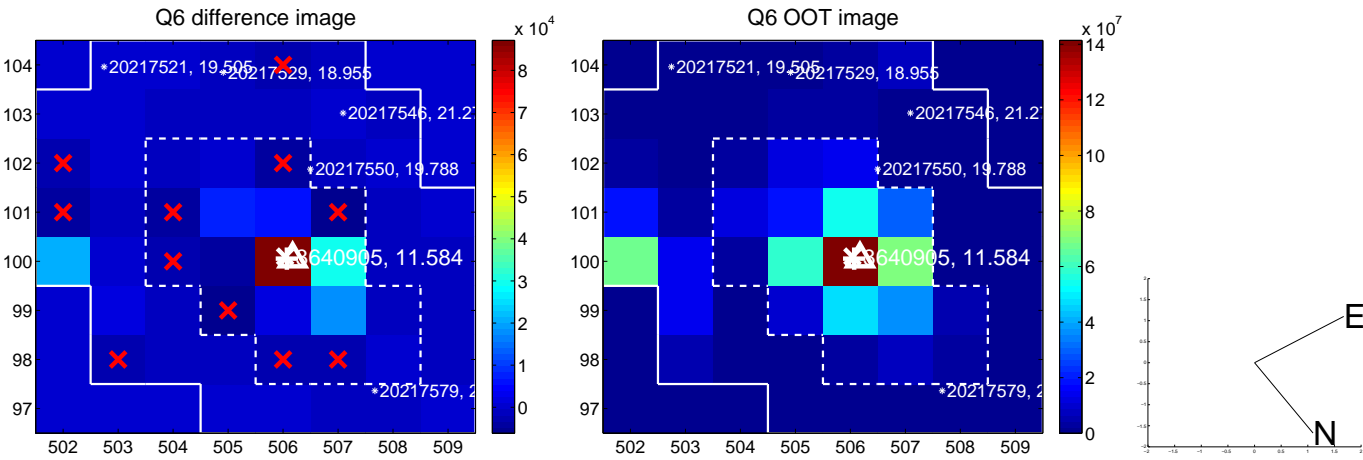
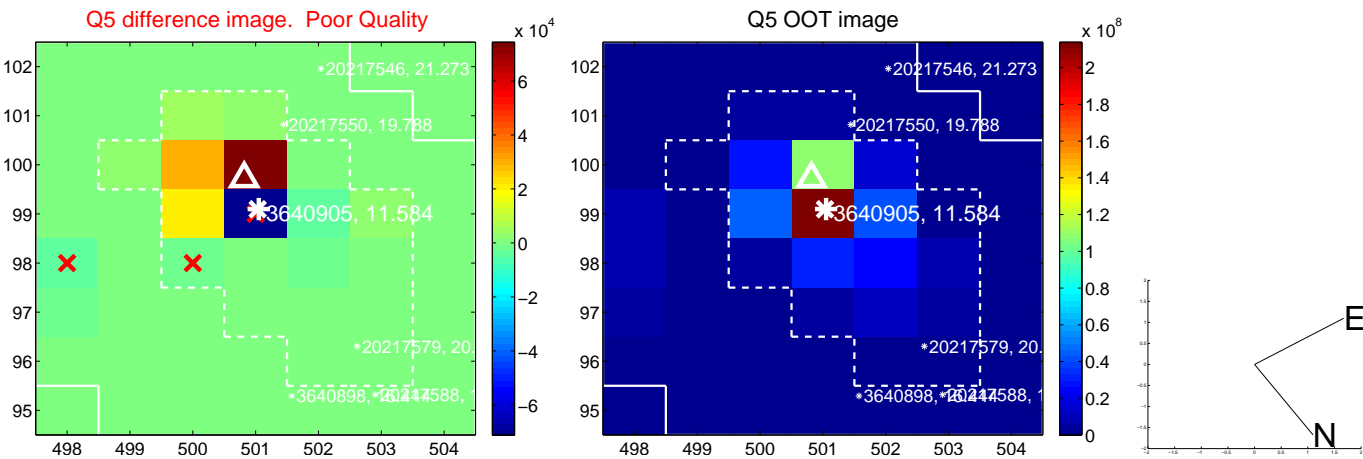


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

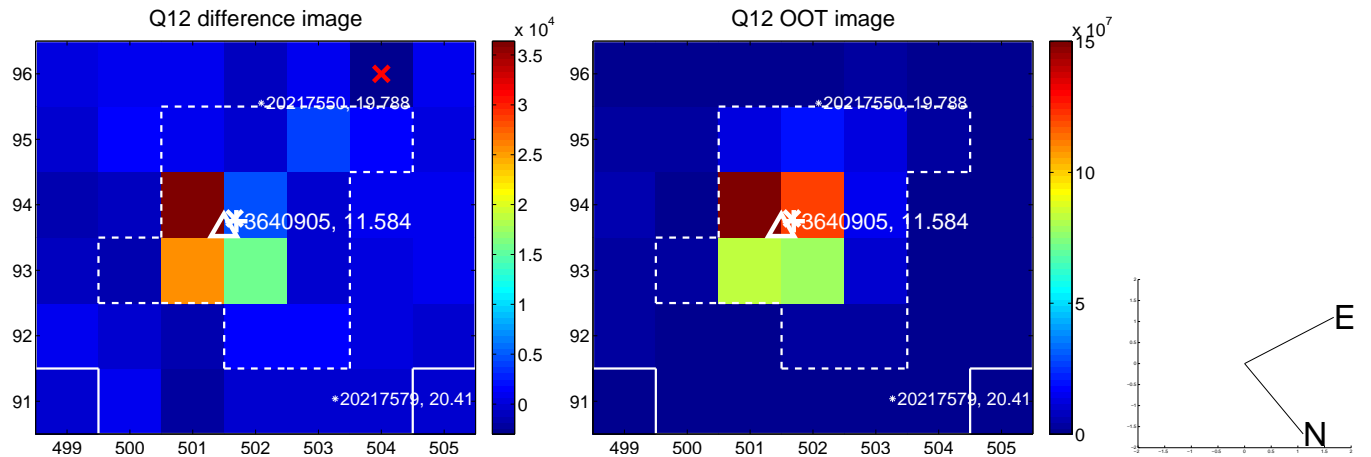
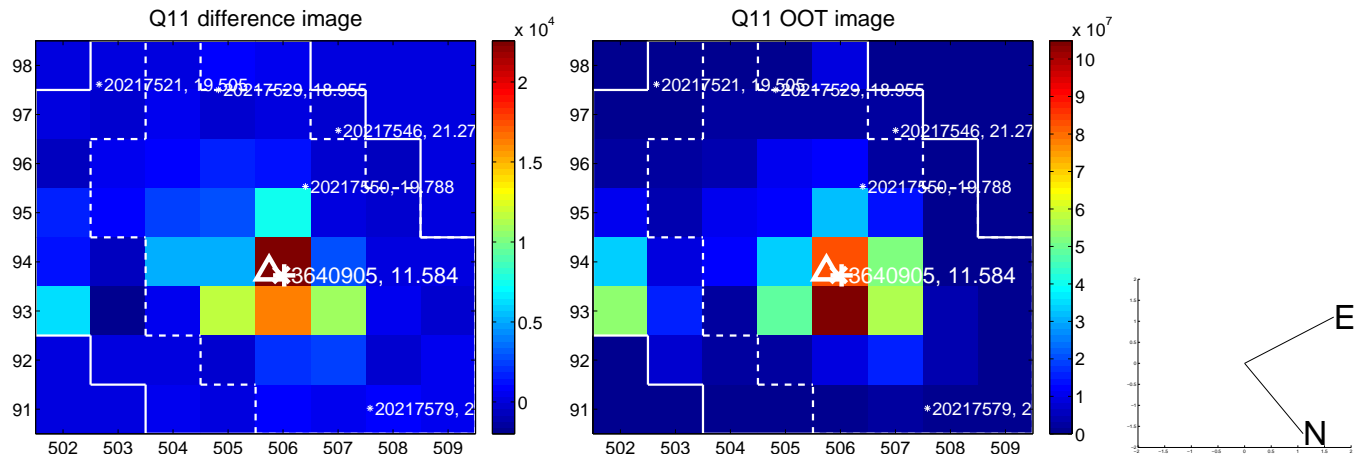
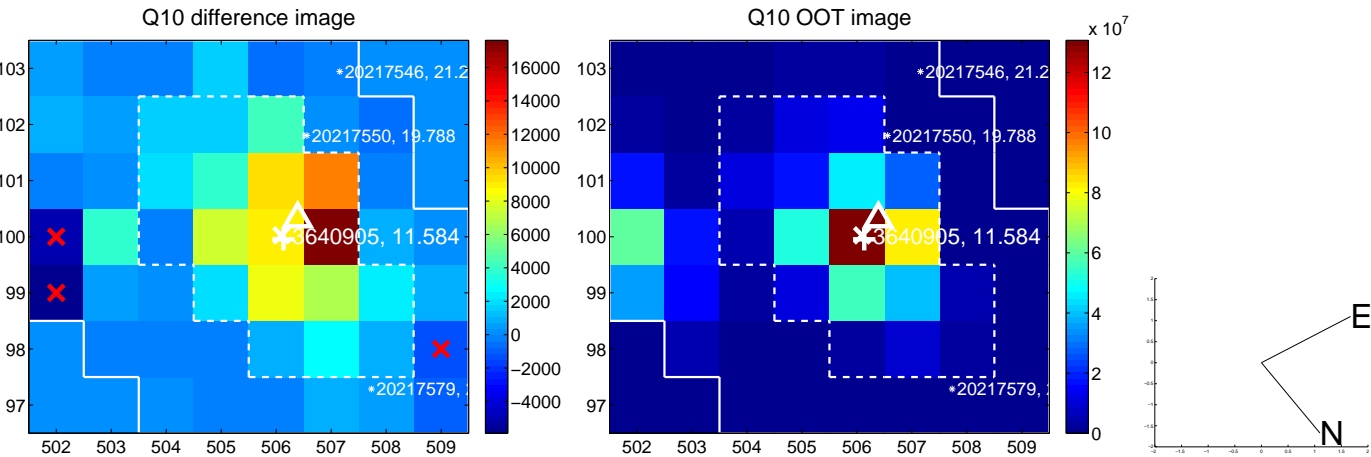
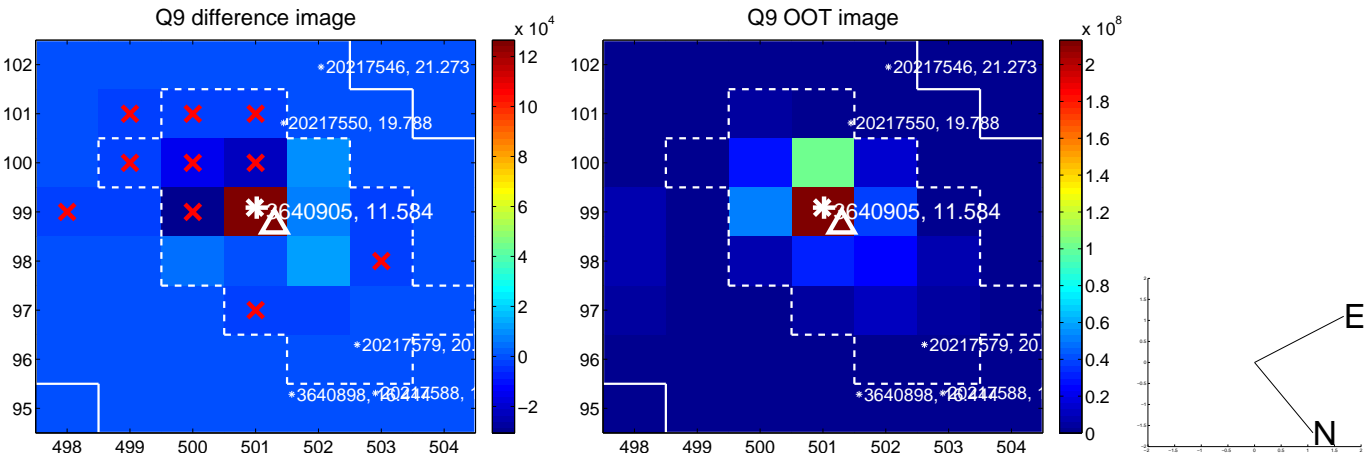
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



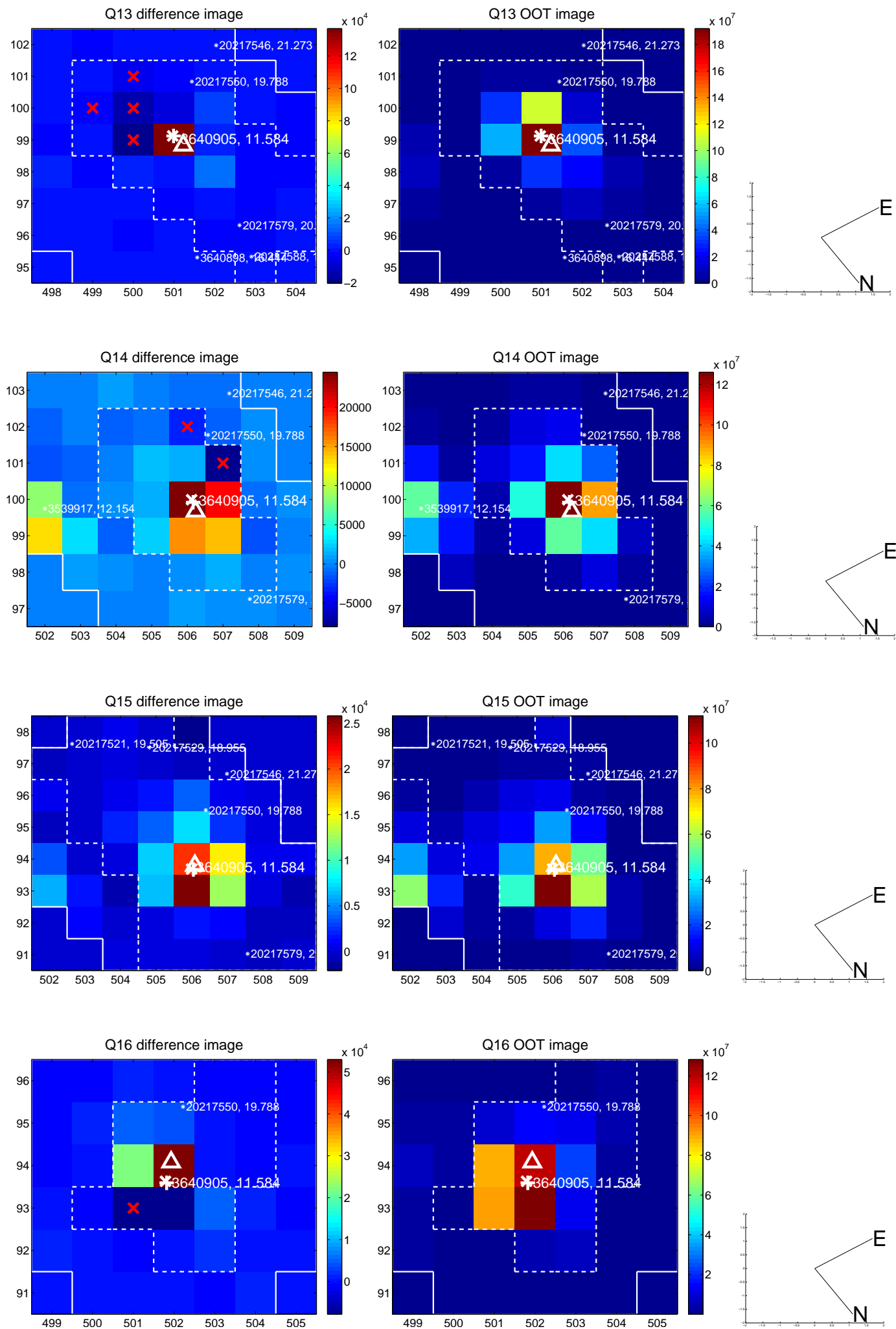
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



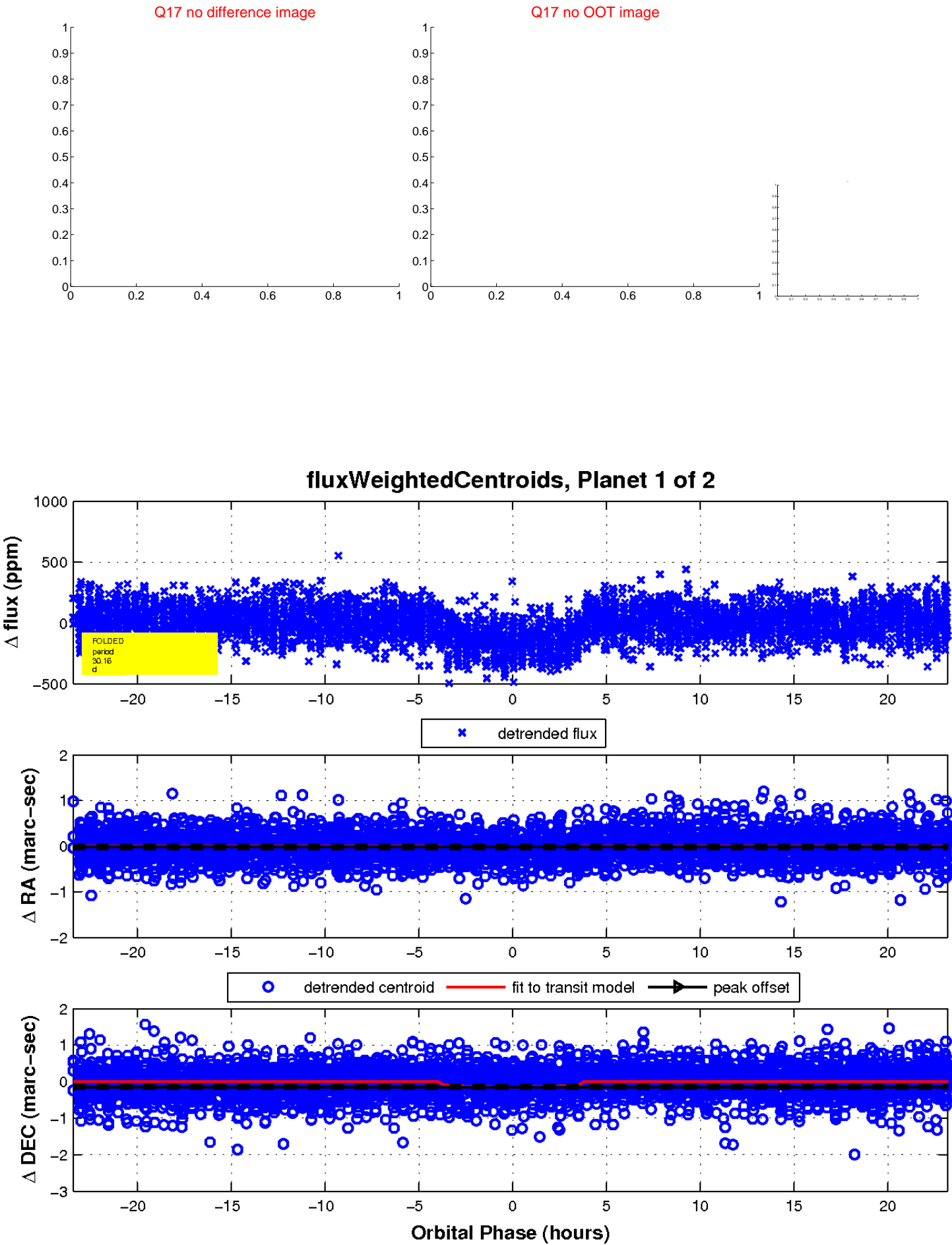
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

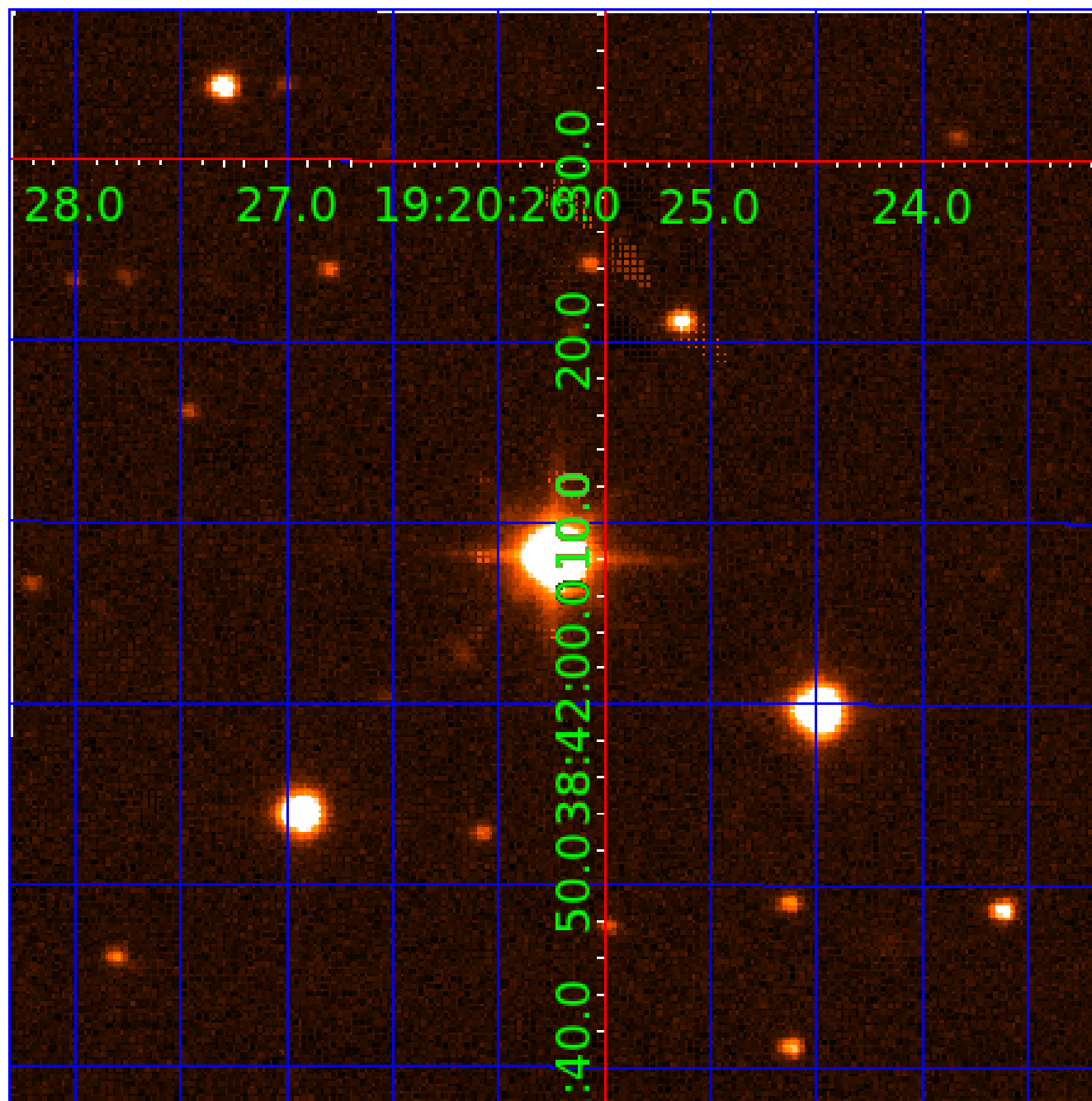


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 003640905

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})
003640905-01	OBS	1221.01	30.159900	138.518412	173.0	7.808	18.6	20.4	3.05	5010	4.45	115.87
003640905-02	OBS	1221.02	51.077463	152.352113	143.0	11.391	13.9	14.8	3.05	5010	3.99	57.40

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003640905-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
003640905-02	OBS	PC	0.98	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.

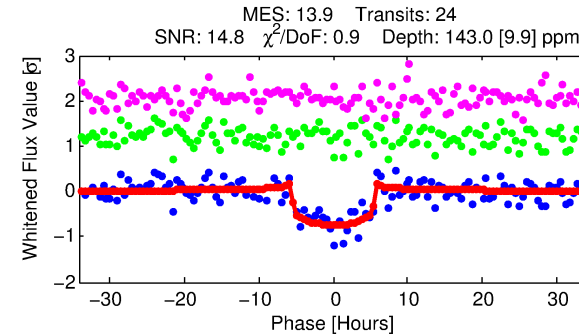
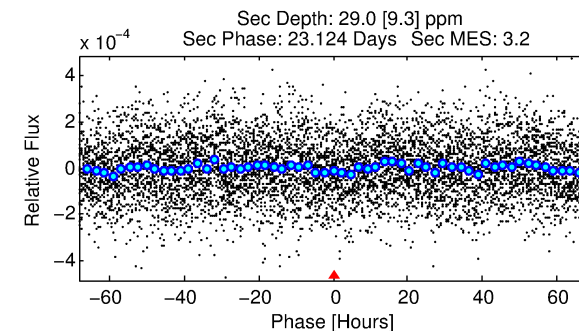
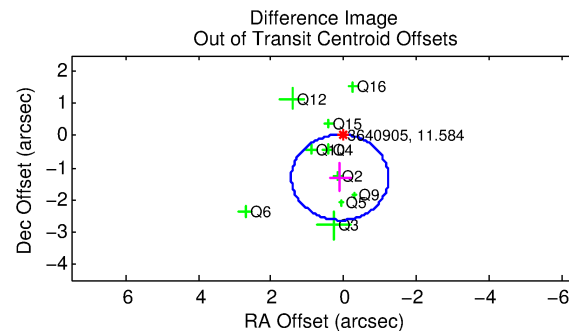
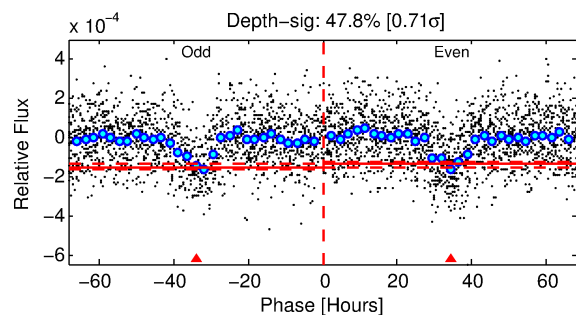
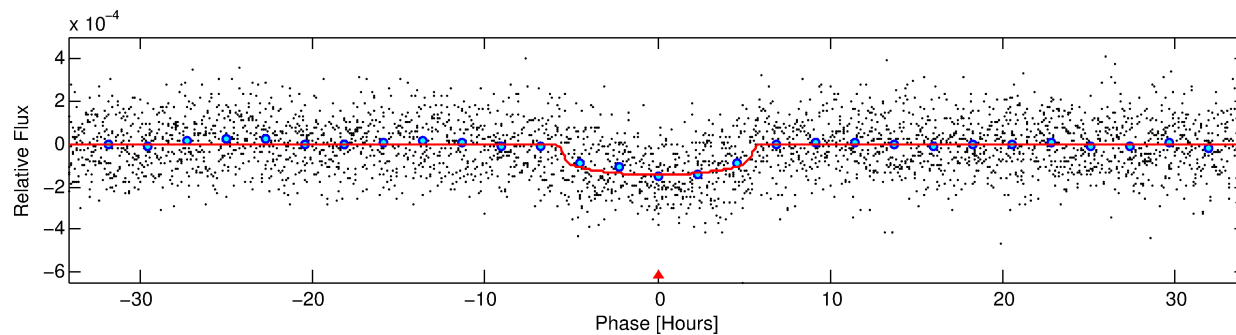
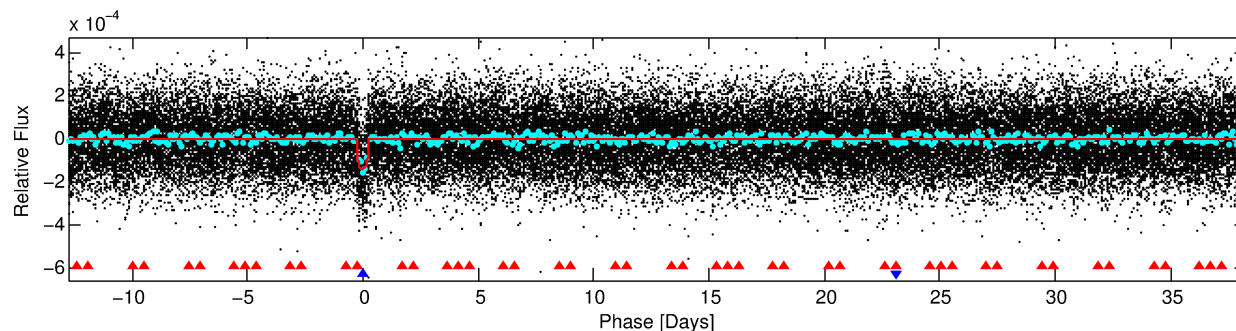
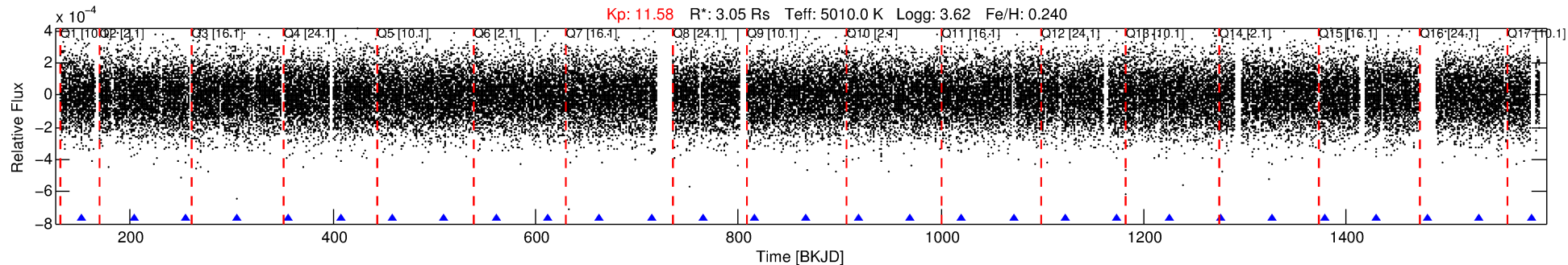
Ephemeris Match Information For 003640905-02

No Significant Match Found

DV One-Page Summary

KIC: 3640905 Candidate: 2 of 2 Period: 51.077 d
KOI: K01221.02 Name: Kepler-278c Corr: 0.965

Kp: 11.58 R*: 3.05 Rs Teff: 5010.0 K Logg: 3.62 Fe/H: 0.240



DV Fit Results:

Period = 51.07746 [0.00055] d
Epoch = 152.3521 [0.0085] BKJD
Rp/R* = 0.0120 [0.0032]
a/R* = 22.96 [22.21]
b = 0.76 [0.55]
Seff = 57.40 [8.71]
Teq = 702 [27] K
Rp = 3.99 [1.20] Re
a = 0.3026 [0.0301] AU
Ag = 91.62 [58.82] [1.54σ]
Teffp = 3357 [533] K [4.98σ]

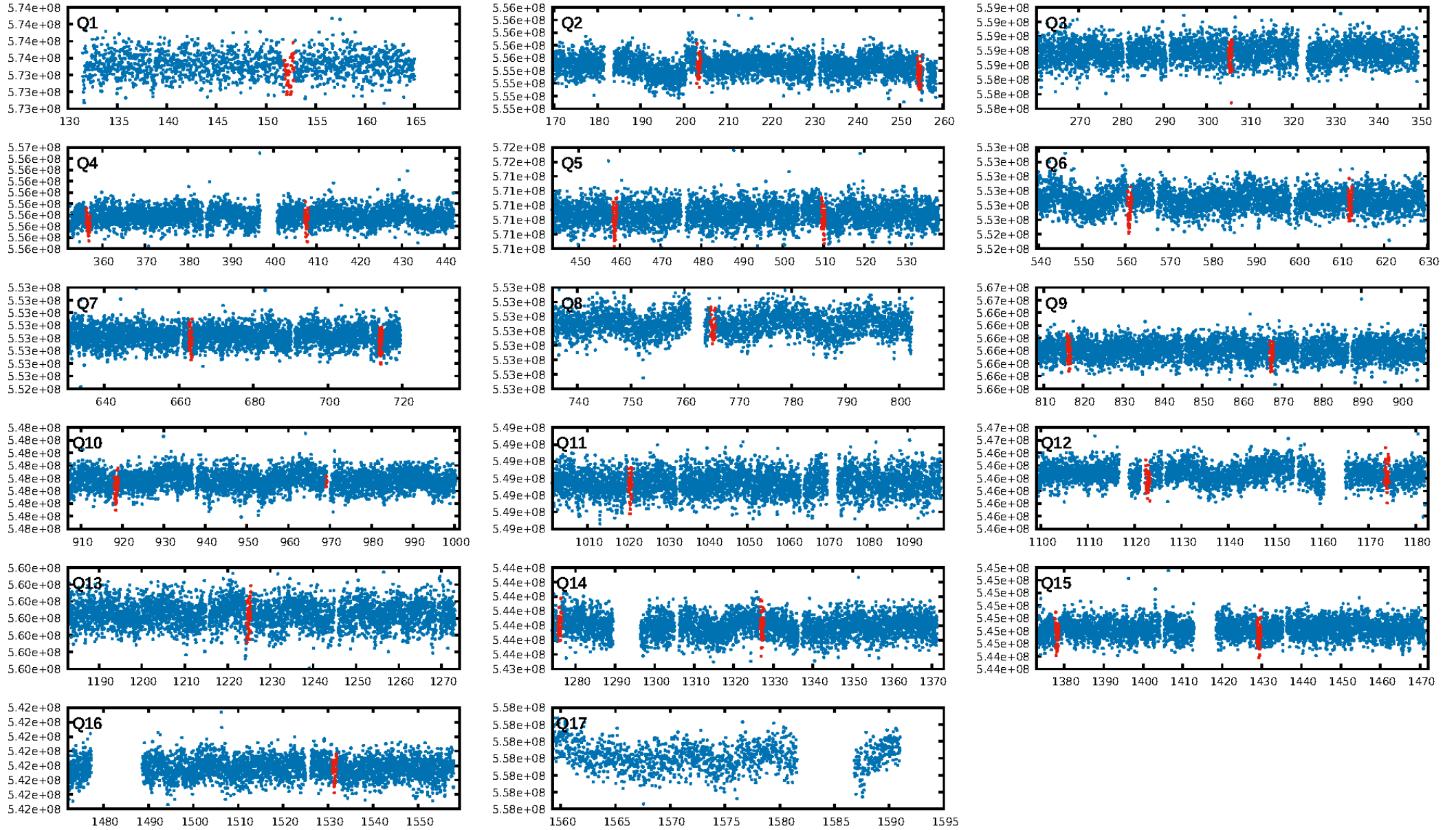
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [36.35σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 68.7%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 3.90e-41
RollingBand-fgt: 1.00 [23/23]
GhostDiagnostic-chr: -41.12
Centroid-sig: 57.3%
Centroid-so: 0.278 arcsec [0.69σ]
OotOffset-rm: 1.309 arcsec [2.94σ]
KicOffset-rm: 1.195 arcsec [2.49σ]
OotOffset-st: 3/2/3/2 [10]
KicOffset-st: 3/2/3/2 [10]
DiffImageQuality-fgm: 0.70 [7/10]
DiffImageOverlap-fno: 0.93 [13/14]

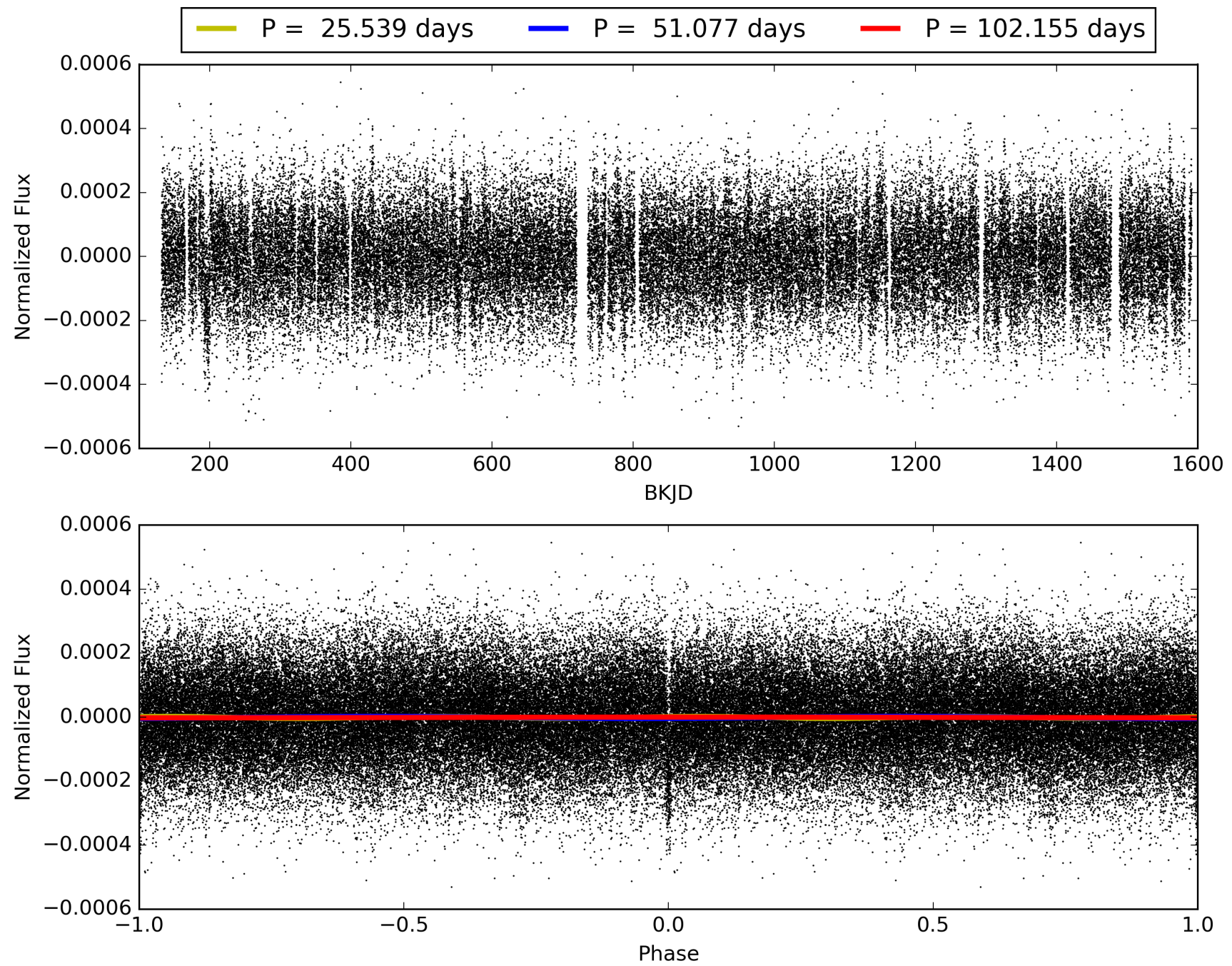
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 003640905-02, PDC Light Curves

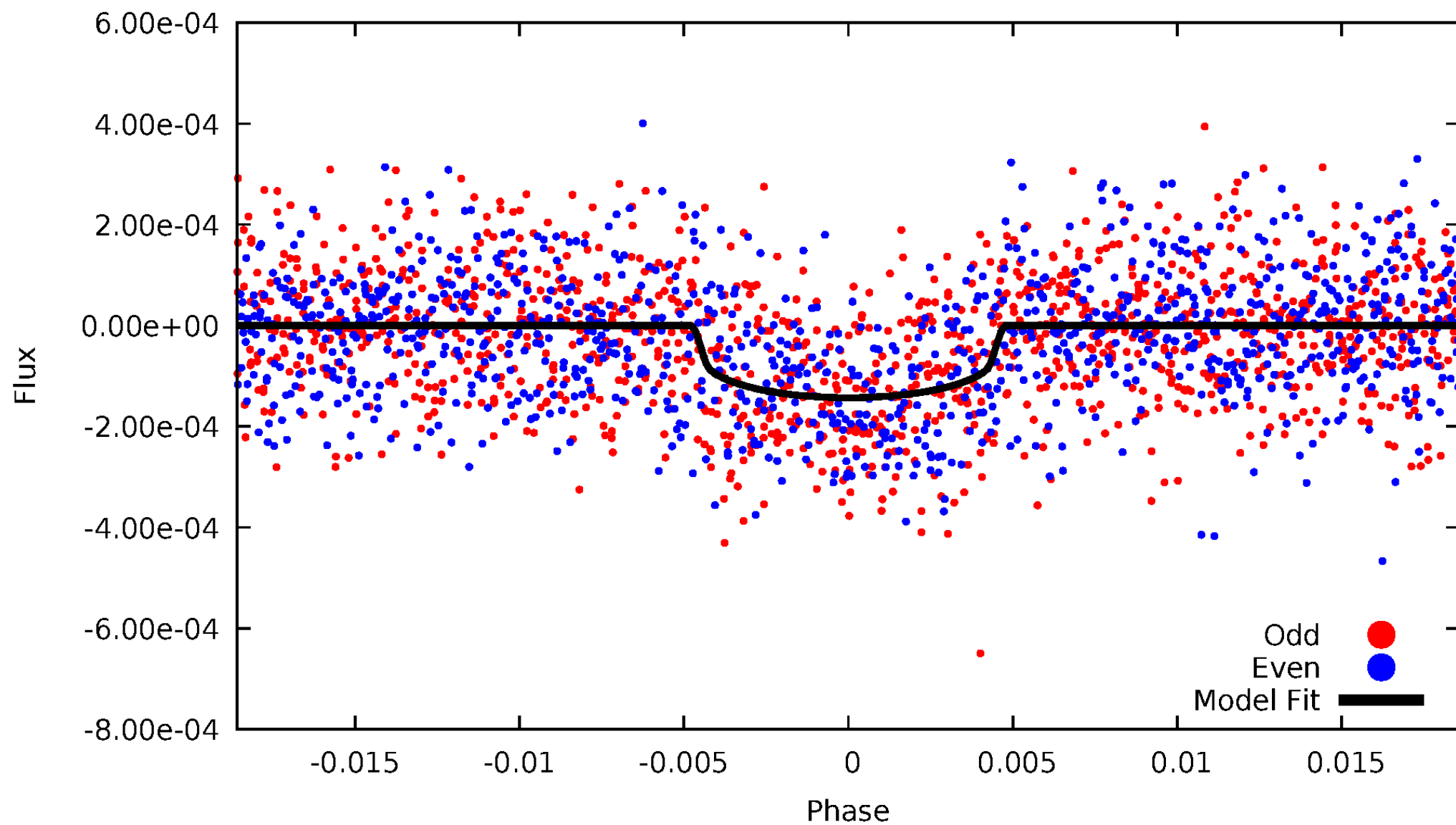


TCE 003640905-02



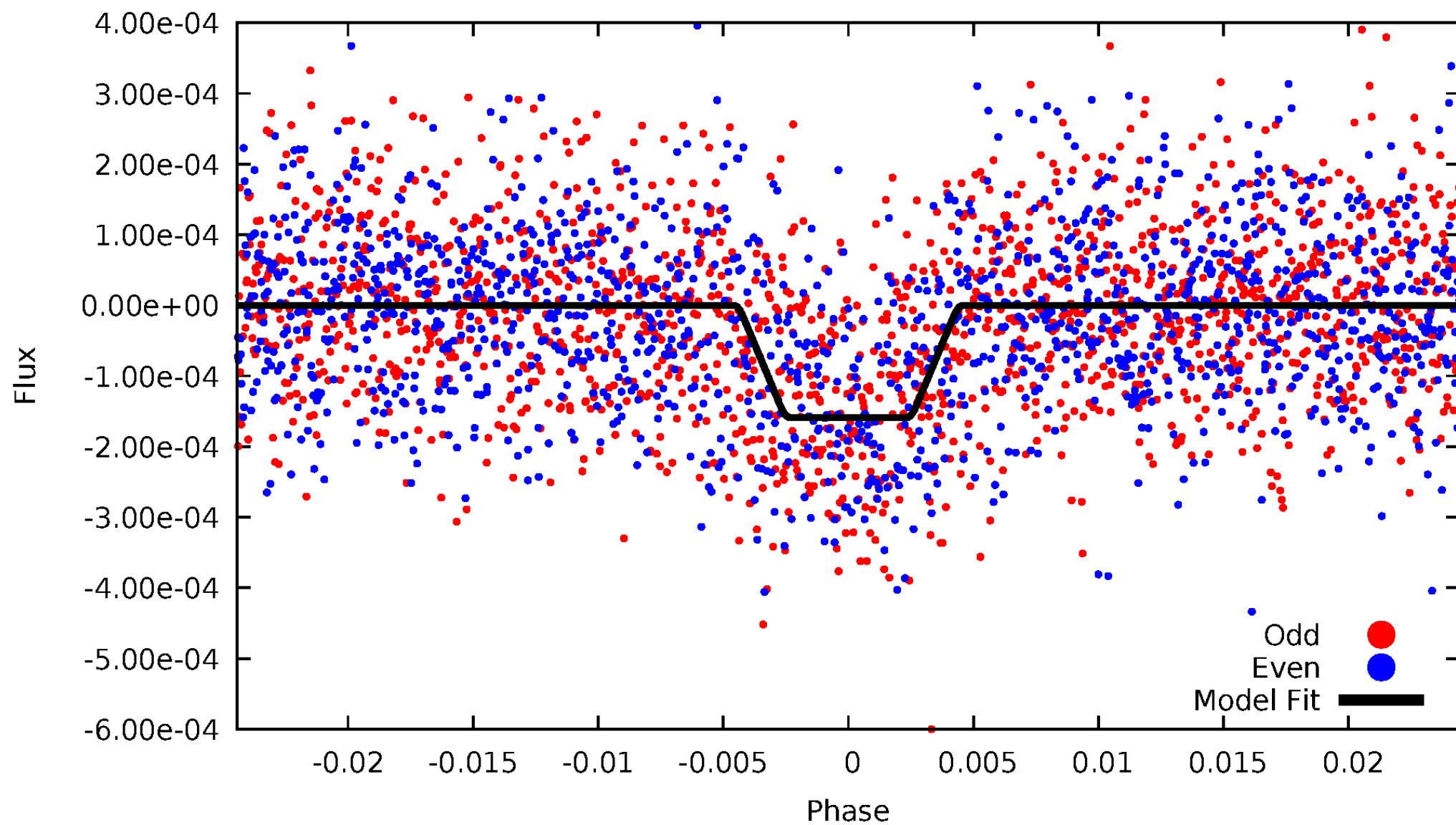
DV Odd/Even

TCE 003640905-02



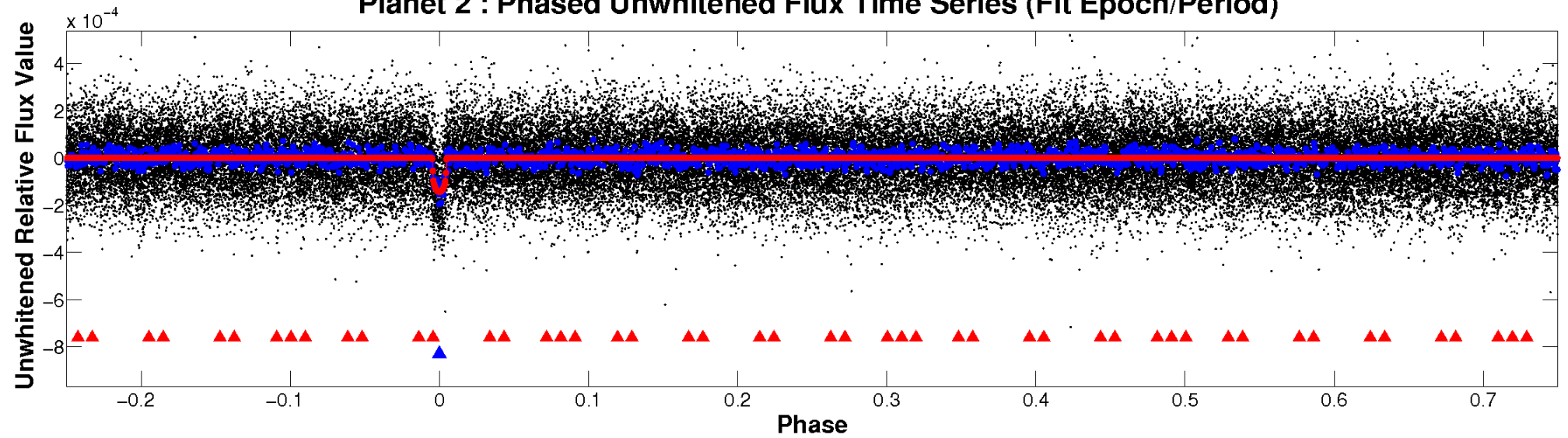
ALT Odd/Even

TCE 003640905-02

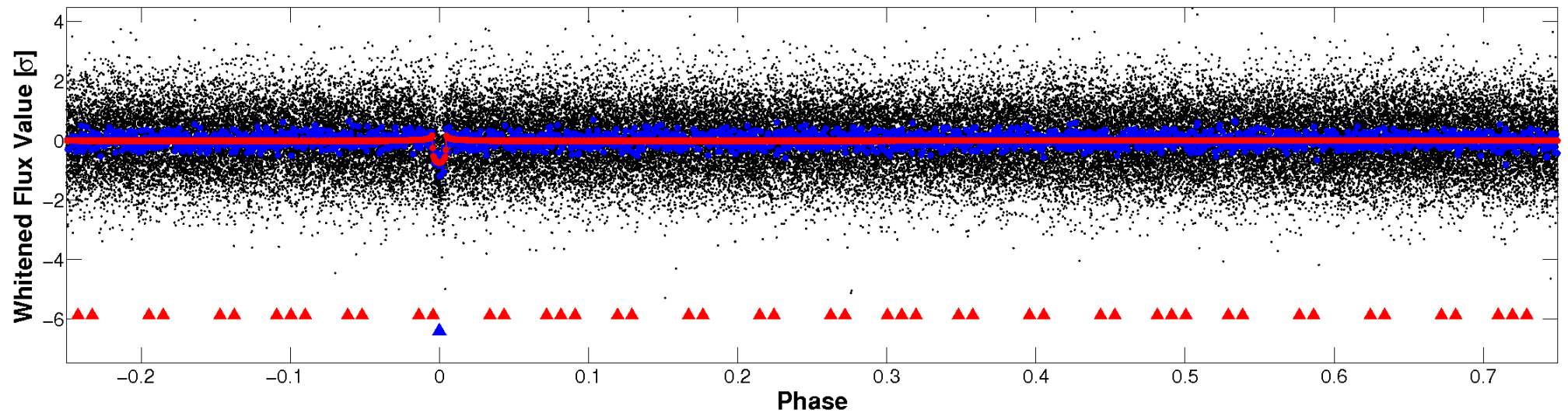


Non-Whitened Vs. Whitened Light Curve

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

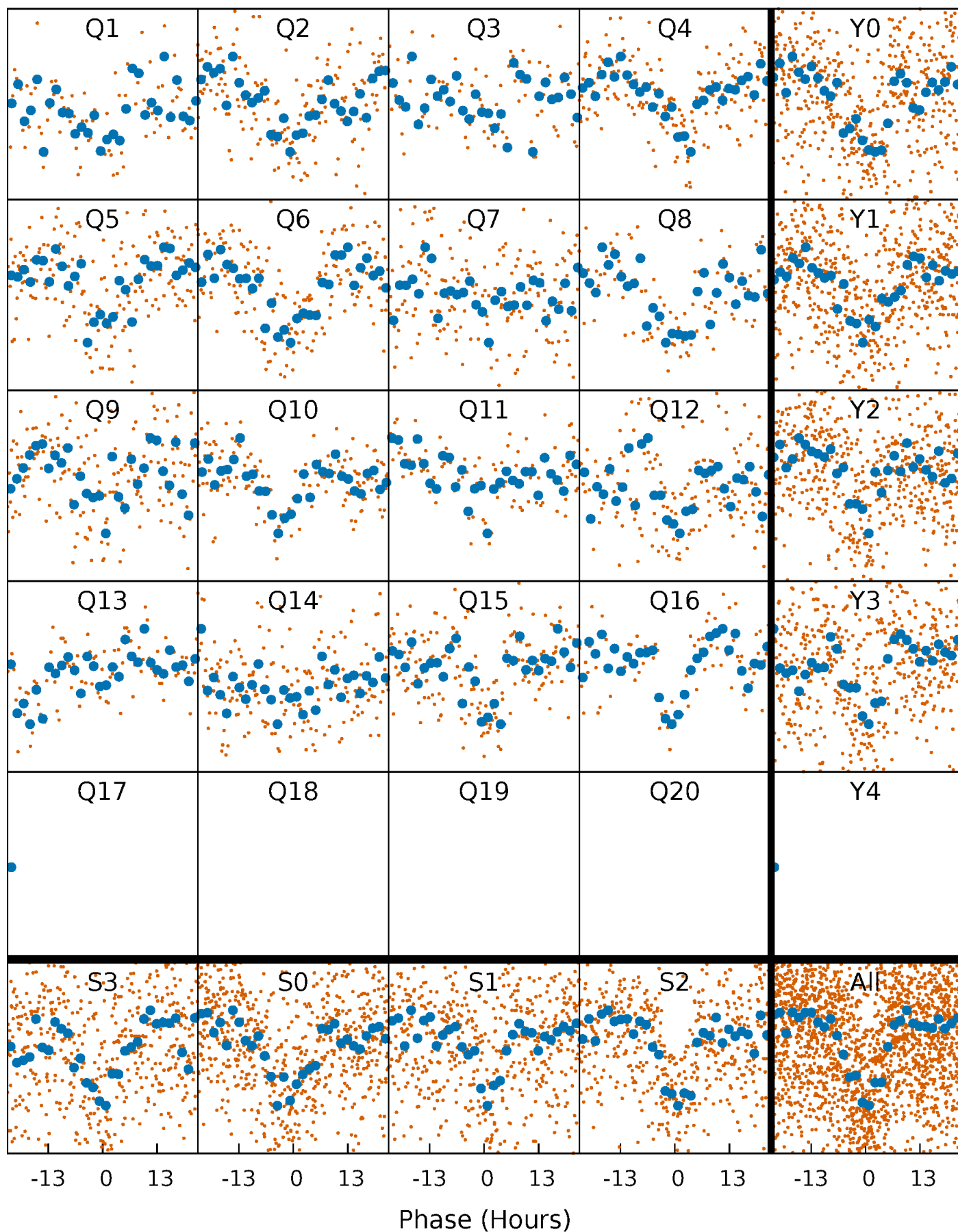


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



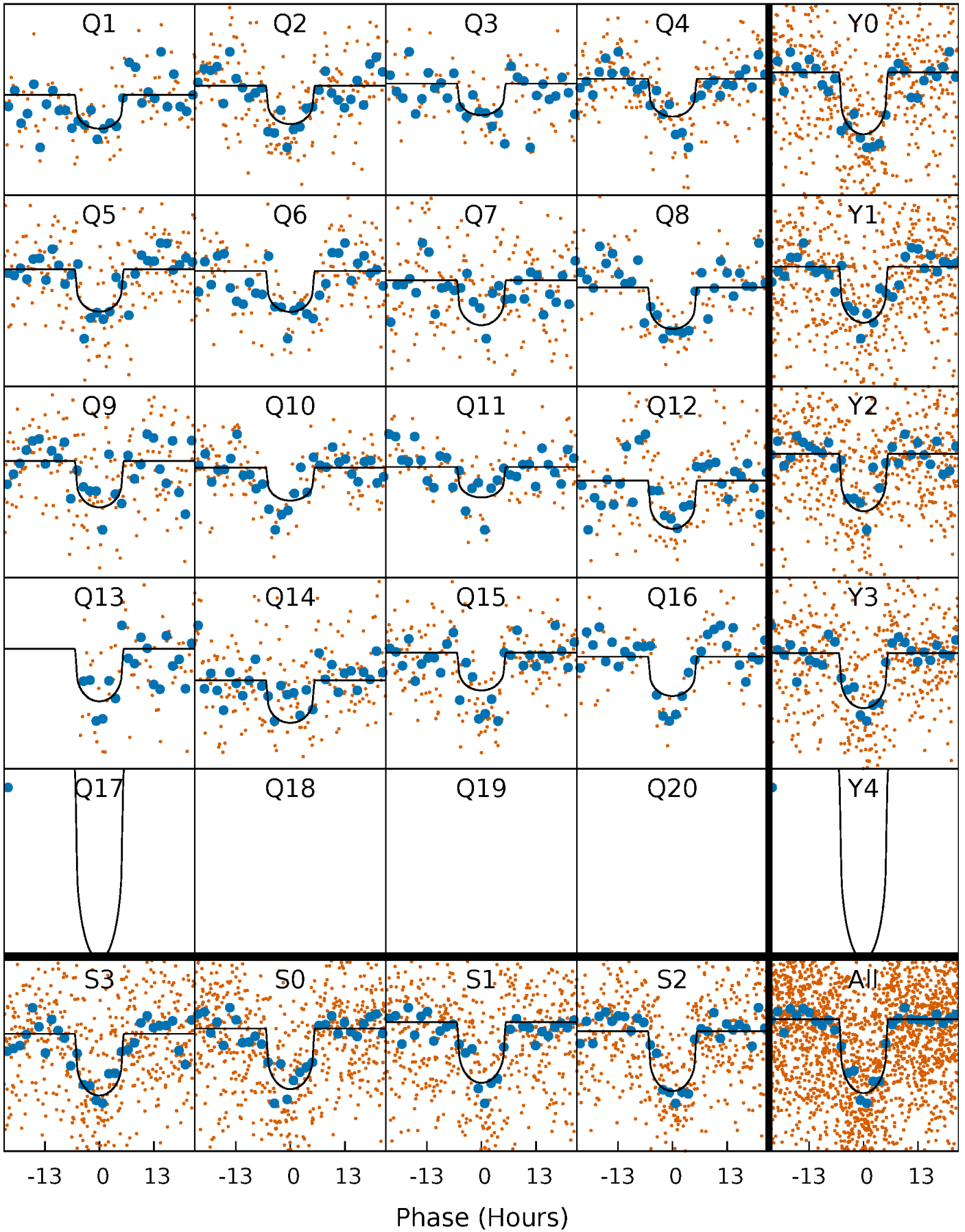
PDC Quarter-Phased Transit Curves

TCE 003640905-02 P= 51.077463 Days $T_0=152.352113$ (BKJD)



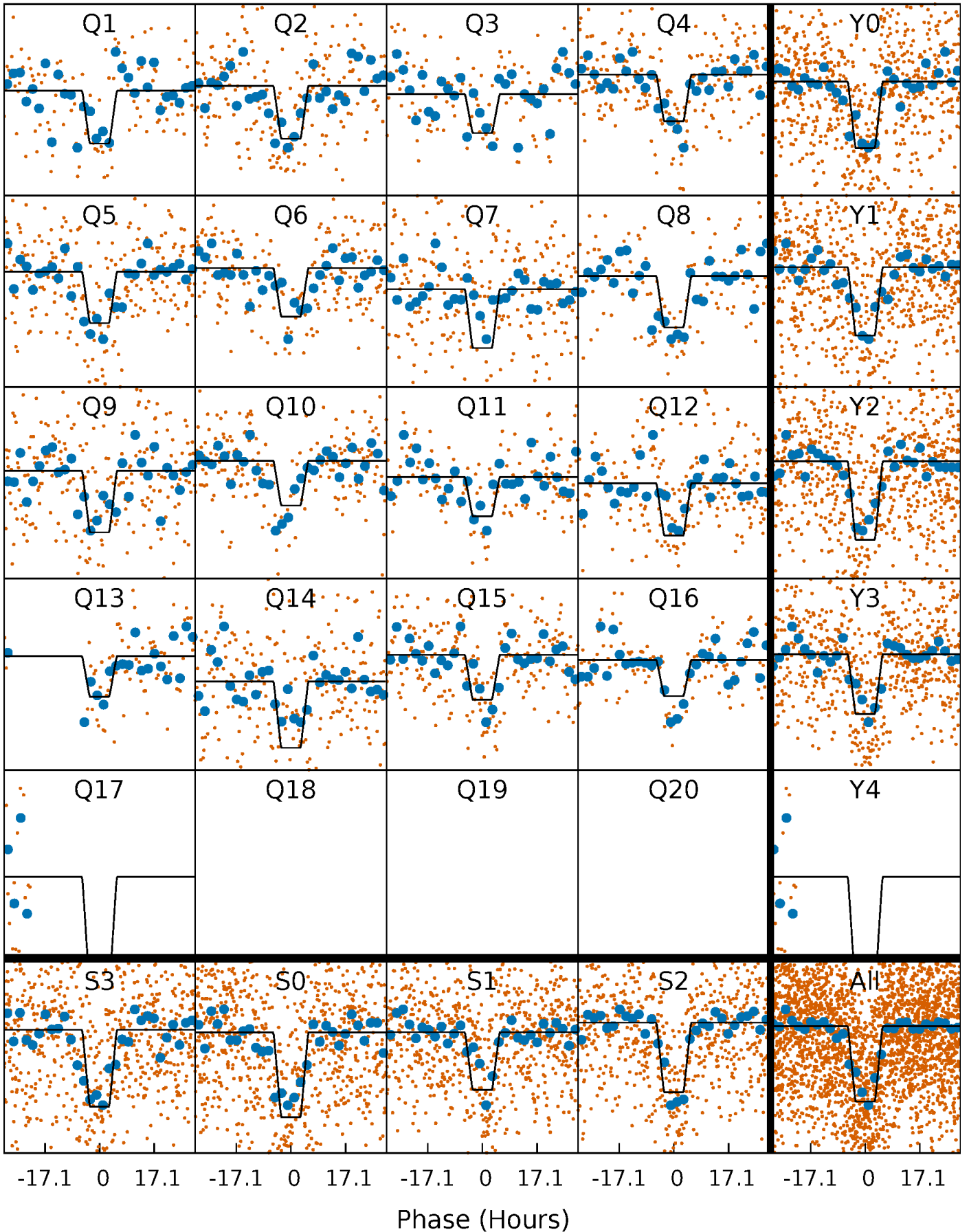
DV Quarter-Phased Transit Curves

TCE 003640905-02 P= 51.077463 Days $T_0=152.352113$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

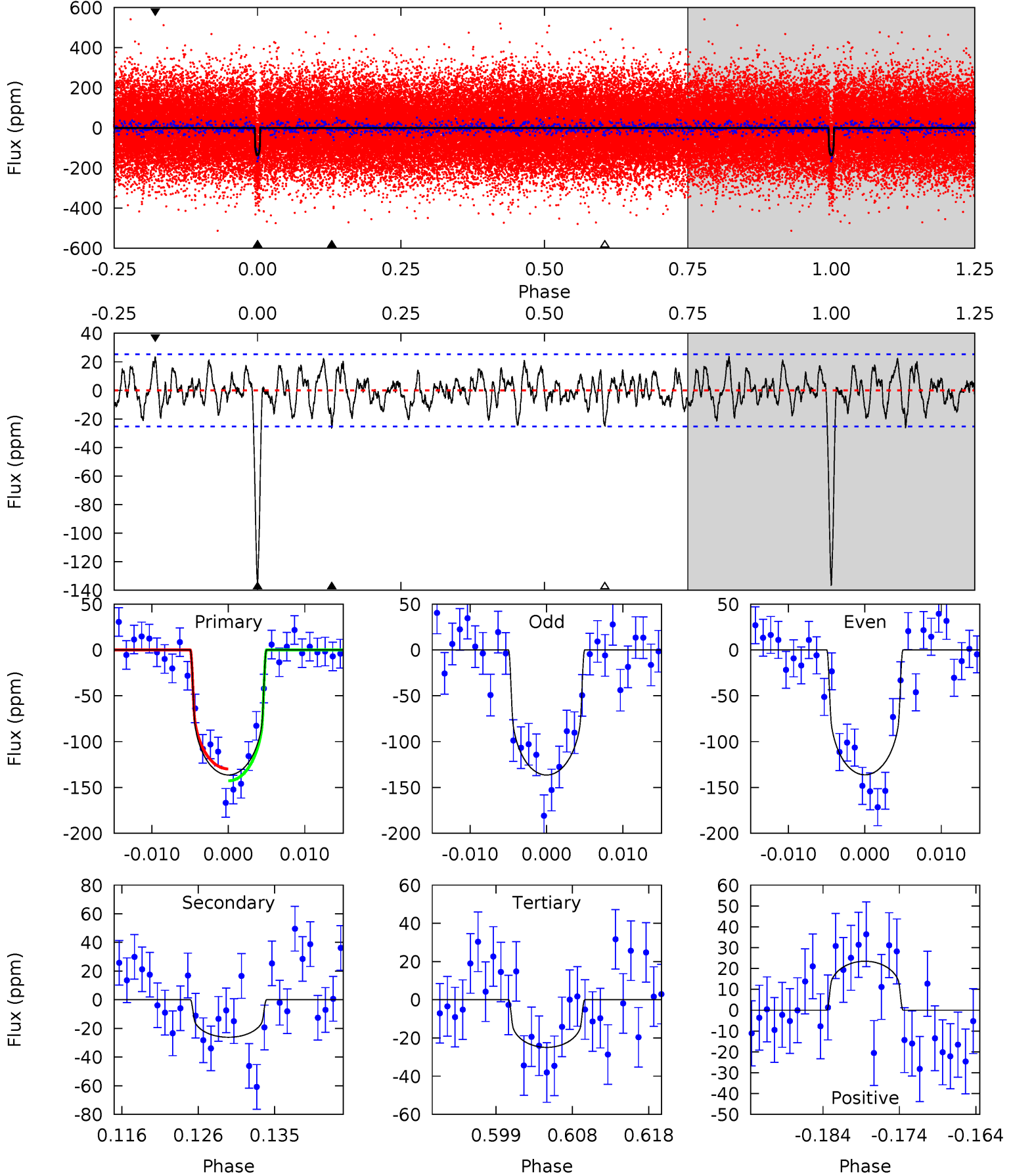
TCE 003640905-02 P= 51.074777 Days $T_0=152.395436$ (BKJD)



DV Model-Shift Uniqueness Test

003640905-02, P = 51.077463 Days, E = 101.274650 Days

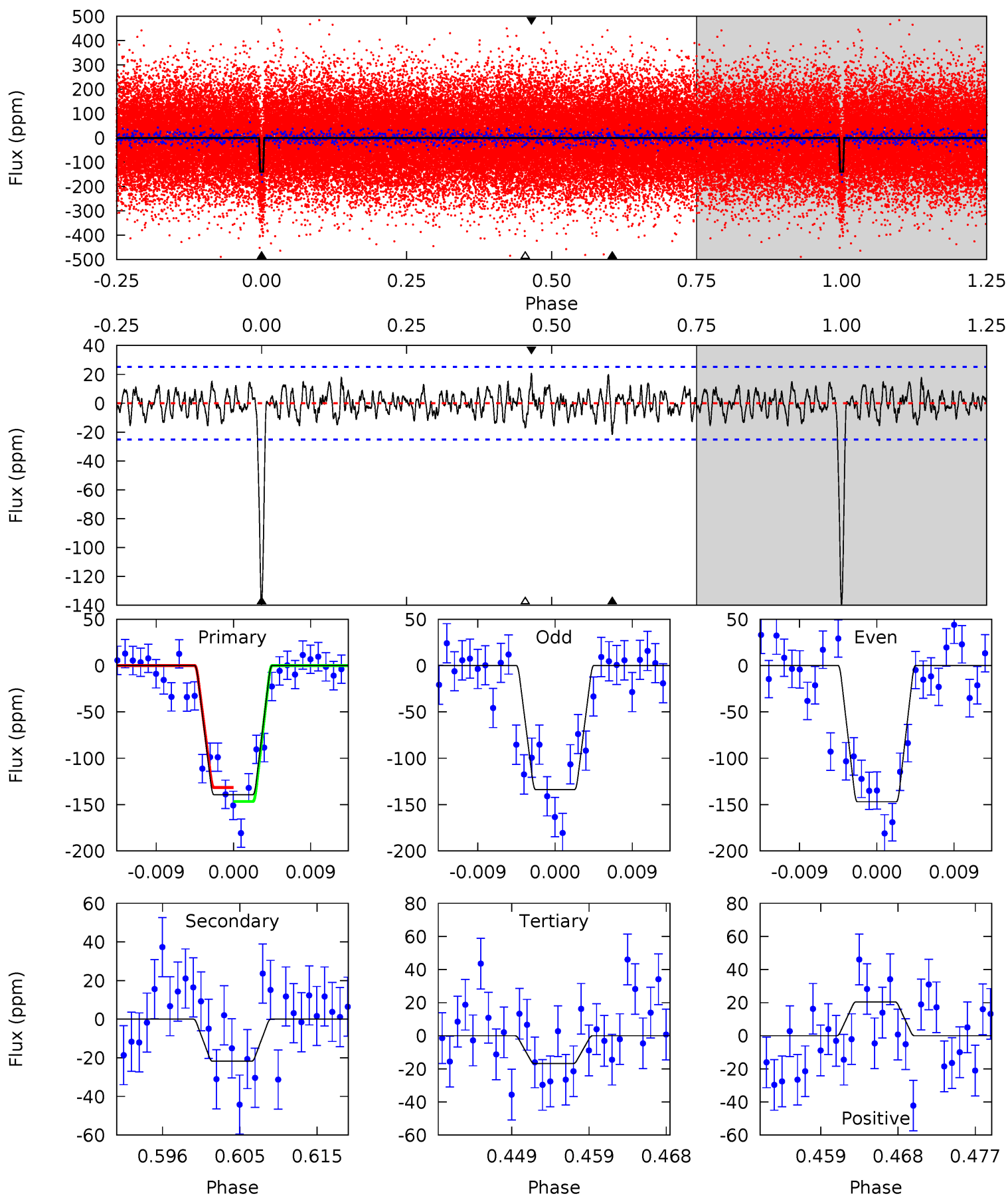
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
27.2	5.22	4.97	4.68	5.03	2.59	1.76	22.2	22.5	0.25	0.54	0.02	0.92	0.15	1.30



Alt Model-Shift Uniqueness Test

003640905-02, P = 51.074777 Days, E = 101.320659 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
27.9	4.37	3.37	4.10	5.04	2.61	1.33	24.5	23.8	0.99	0.27	1.31	0.99	0.13	1.52



Stellar Parameters For KIC 003640905

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5010^{+51}_{-103}	$3.620^{+0.060}_{-0.055}$	$0.240^{+0.100}_{-0.200}$	$3.051^{+0.202}_{-0.404}$	$1.414^{+0.099}_{-0.277}$	$0.070^{+0.021}_{-0.011}$
	+1%/-2%	+2%/-2%	+42%/-83%	+7%/-13%	+7%/-20%	+30%/-16%
Source	SPE72	AST8	SPE72	DSEP		

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

Secondary Eclipse Parameters for KIC 003640905-02 / KOI 1221.02

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-26 ± 5	$3.91^{+1.12}_{-1.12}$	976^{+27}_{-30}	3631^{+493}_{-295}	82^{+87}_{-32}
Alt.	-22 ± 5	$4.18^{+1.17}_{-1.17}$	979^{+24}_{-29}	3476^{+413}_{-289}	62^{+61}_{-26}

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

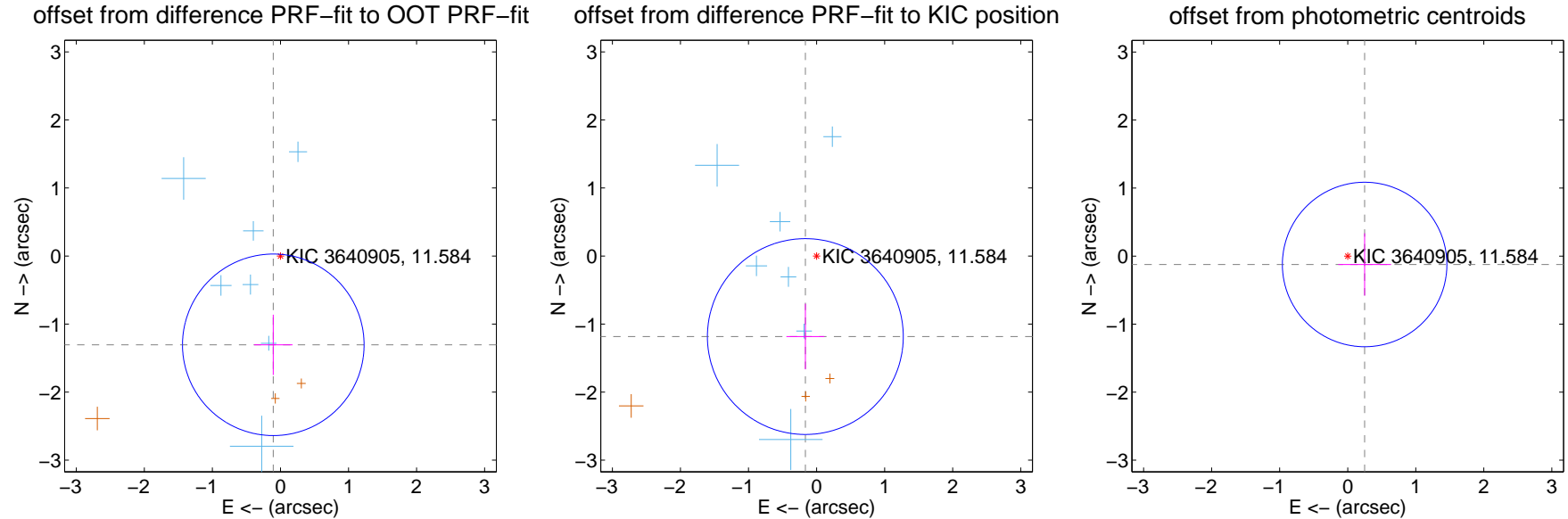
DV Centroid Data

Supplemental centroid analysis for 003640905-02. **Kepler magnitude: 11.58.** Transit SNR 14.76

There are 7 quarters with good PRF difference image offsets

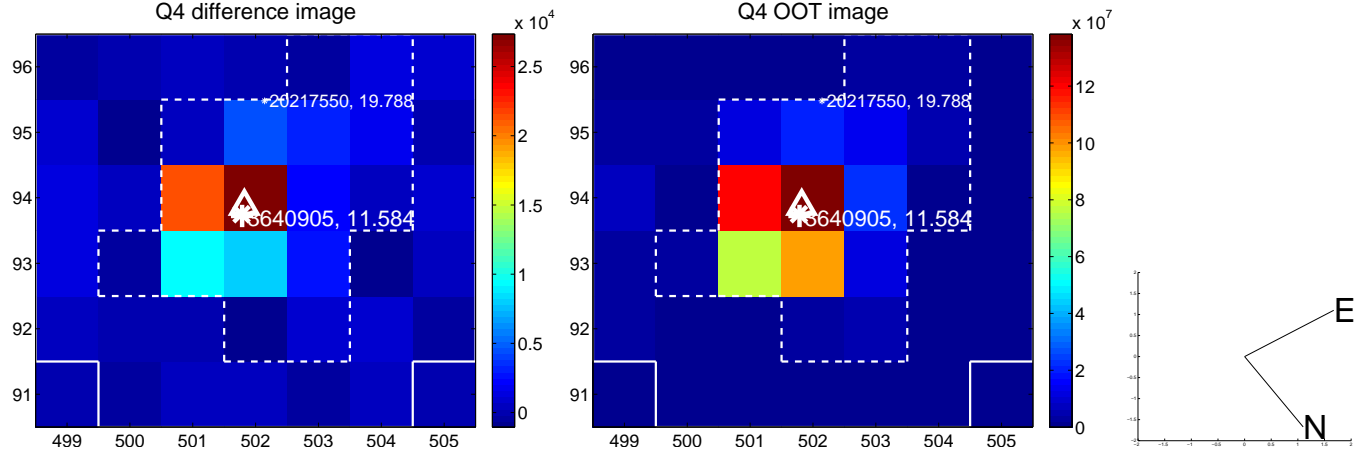
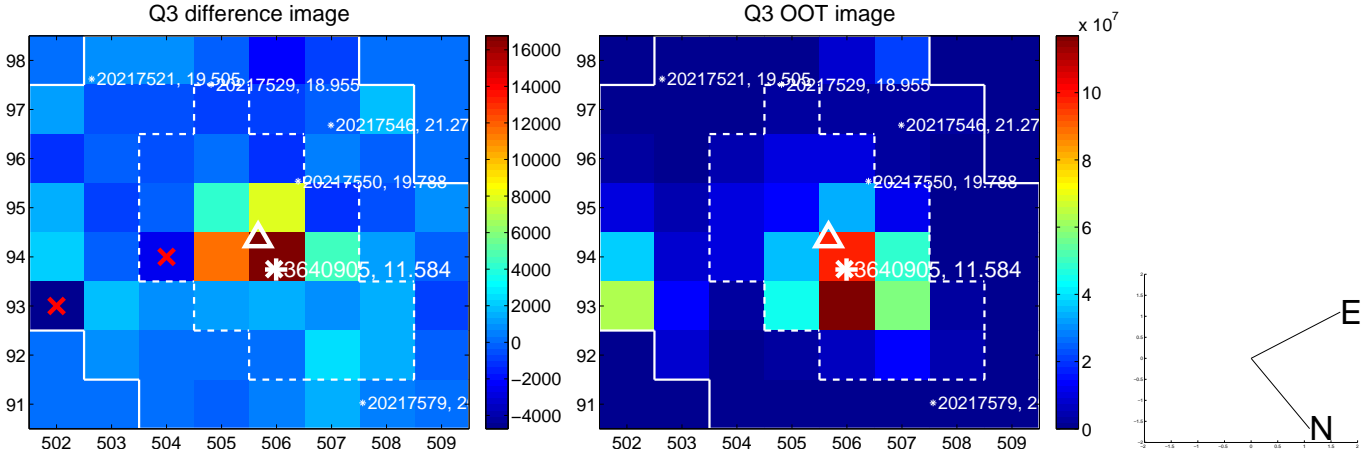
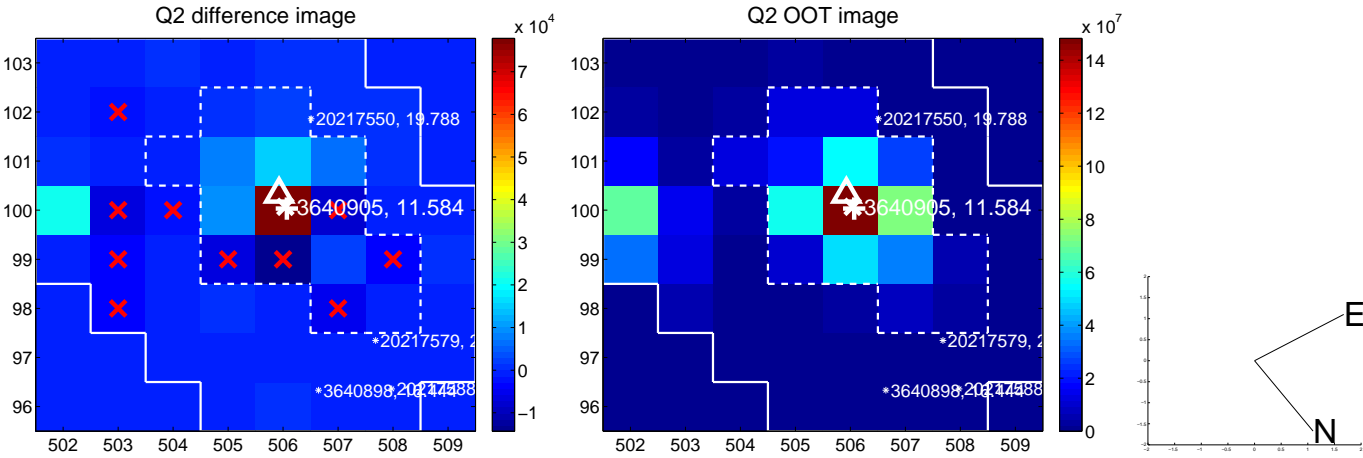
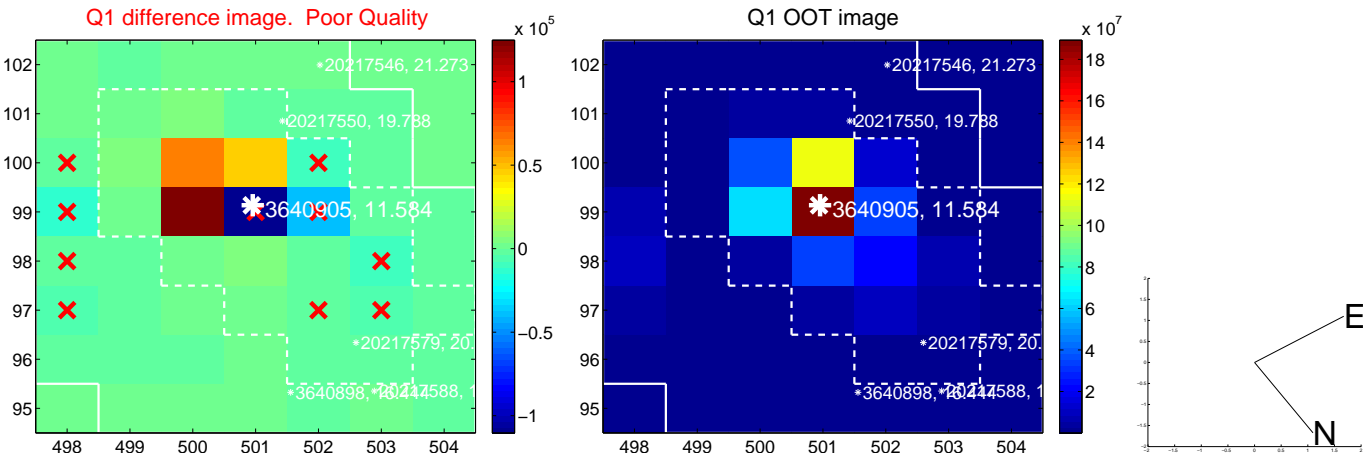
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.309 ± 0.445	2.94	0.105 ± 0.284	-1.305 ± 0.443
PRF-fit source offset from KIC position	1.195 ± 0.480	2.49	0.165 ± 0.278	-1.184 ± 0.482
photometric centroid source offset	0.28 ± 0.40	0.69	-0.25 ± 0.39	-0.12 ± 0.46

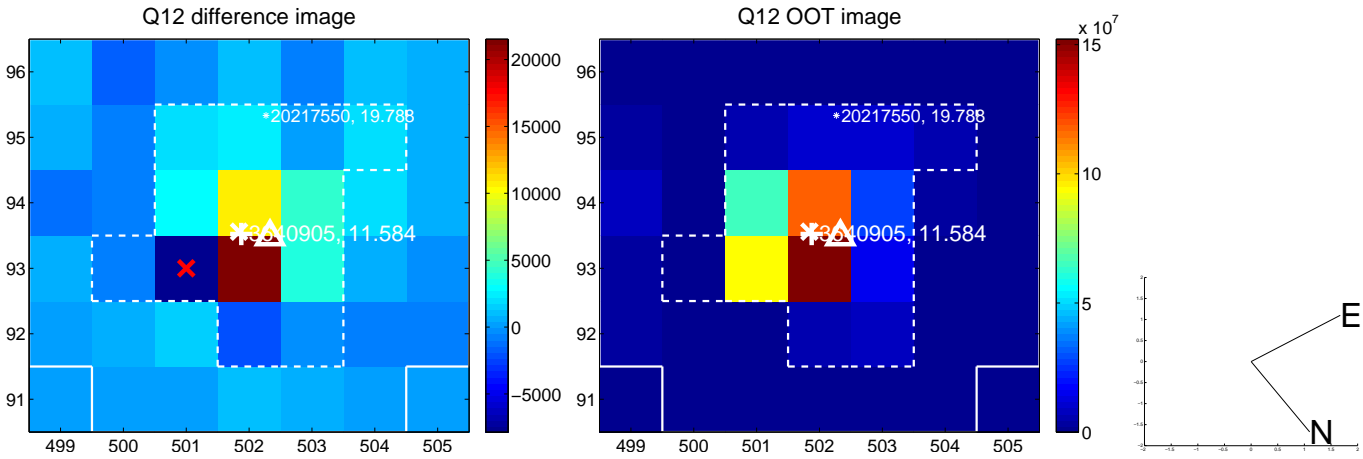
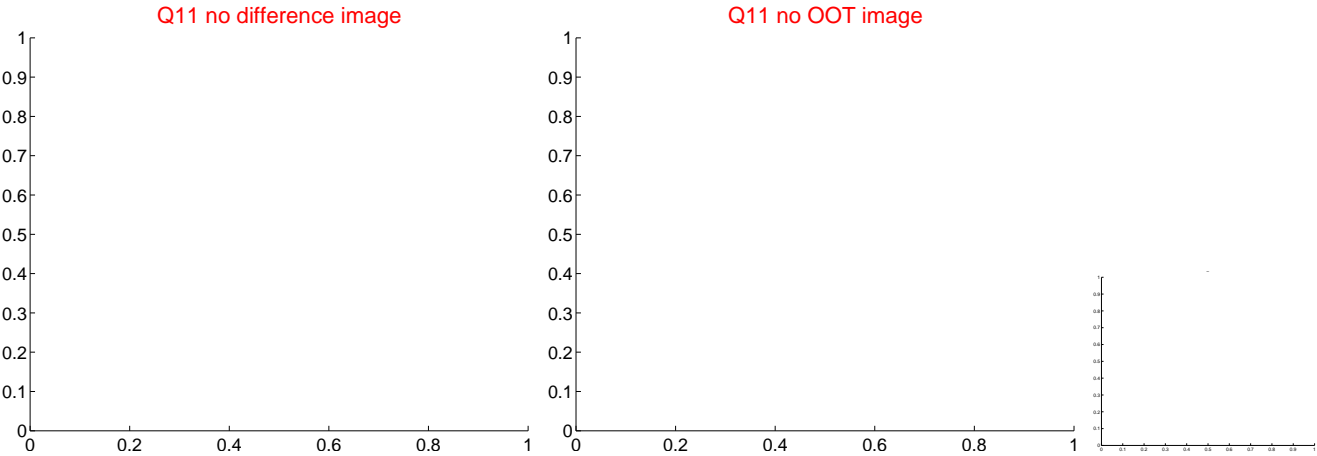
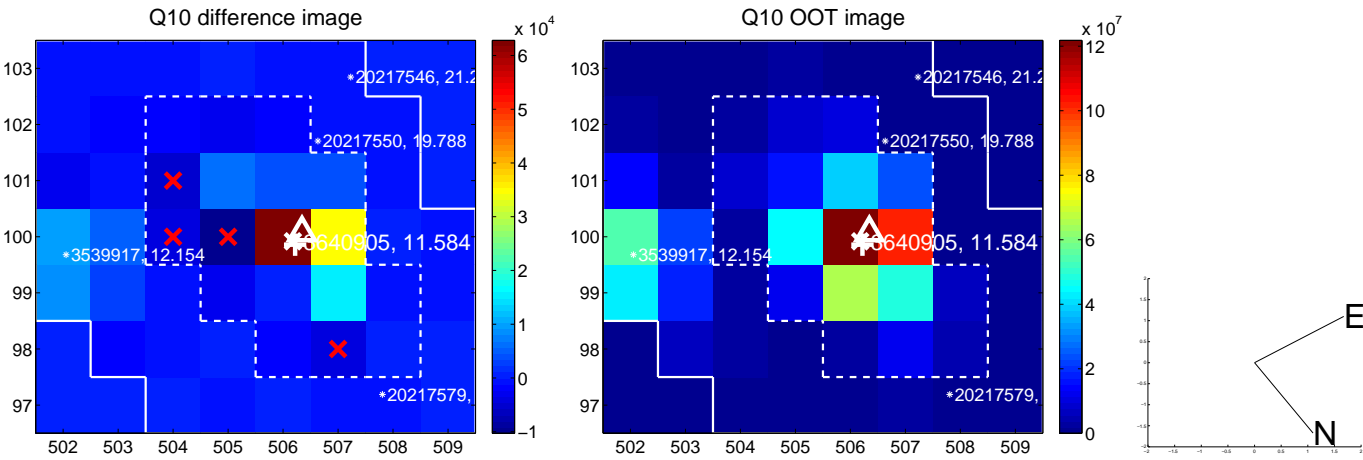
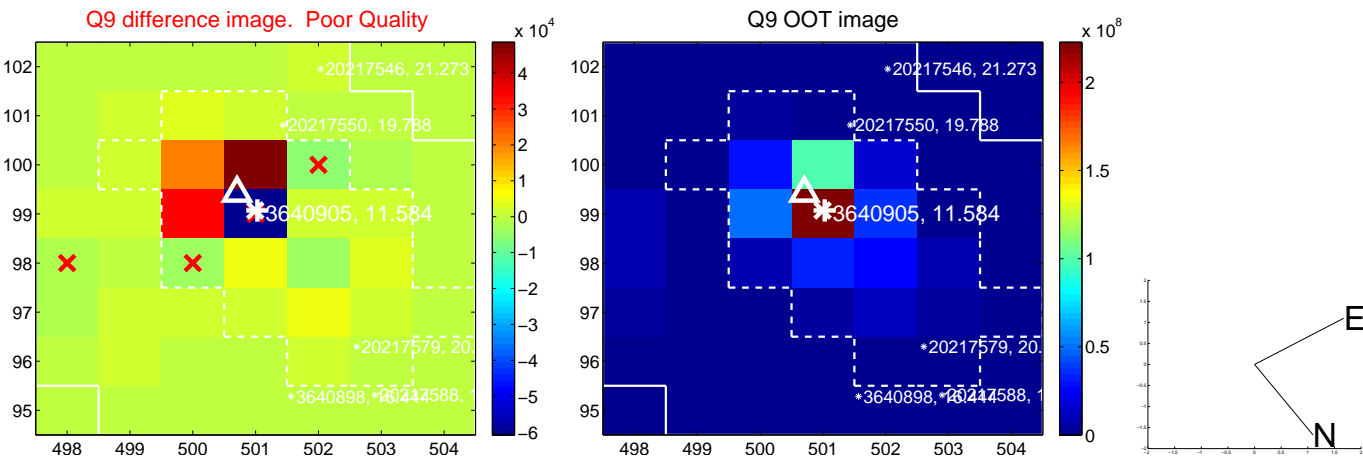


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

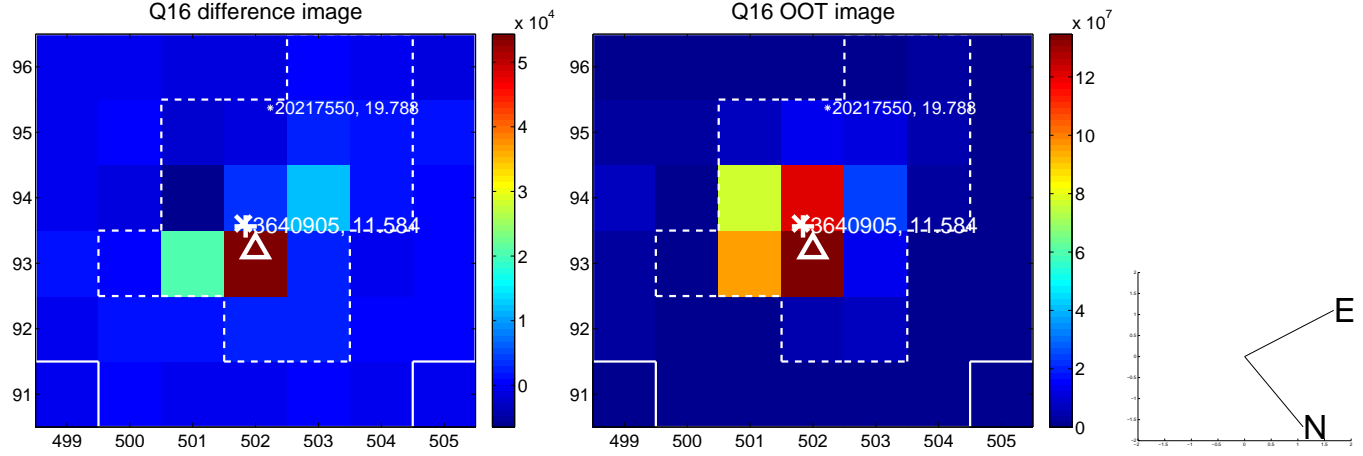
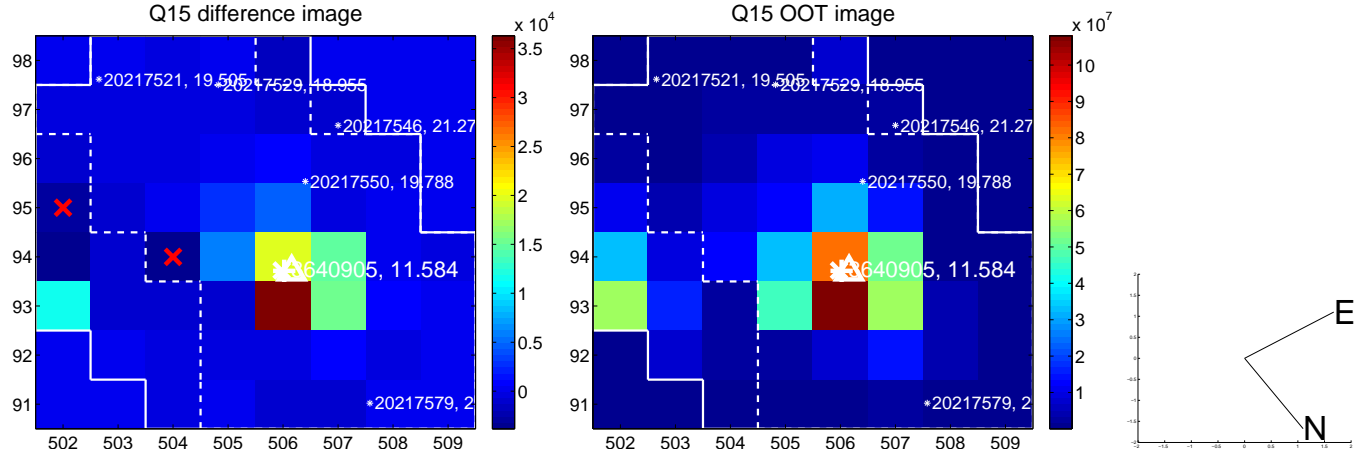
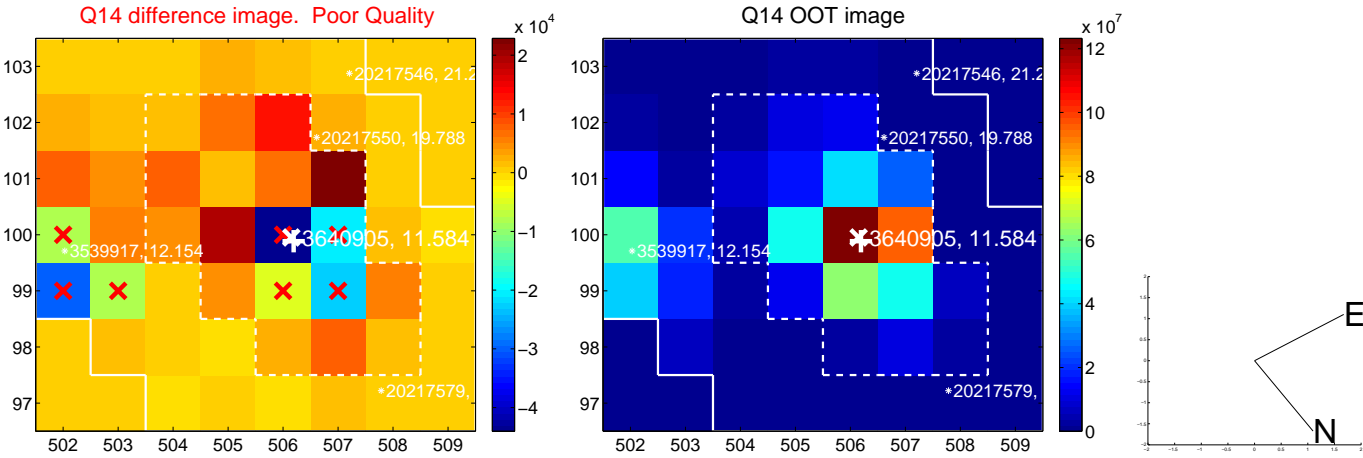
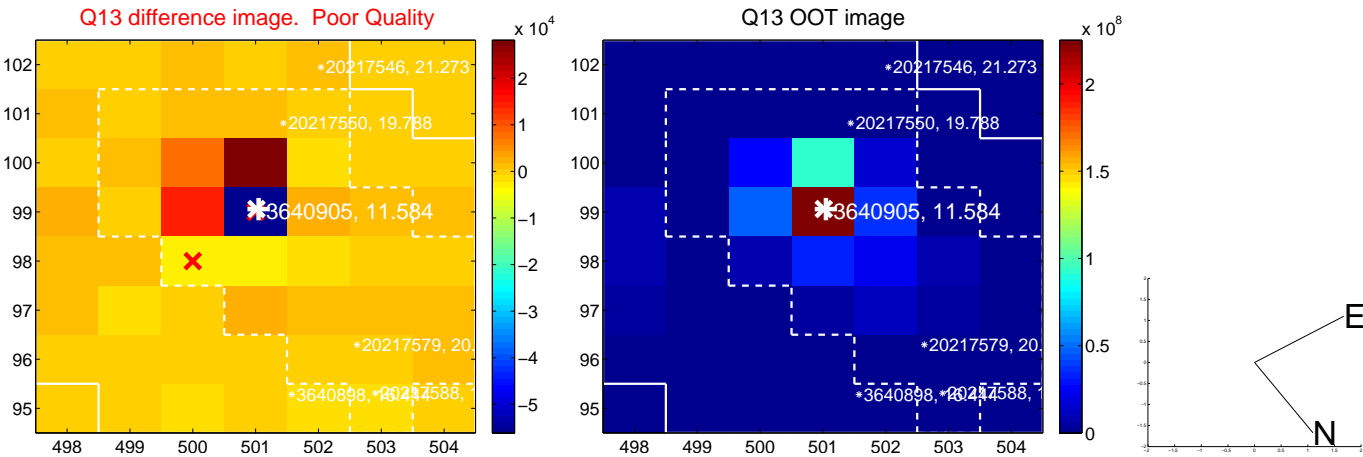
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



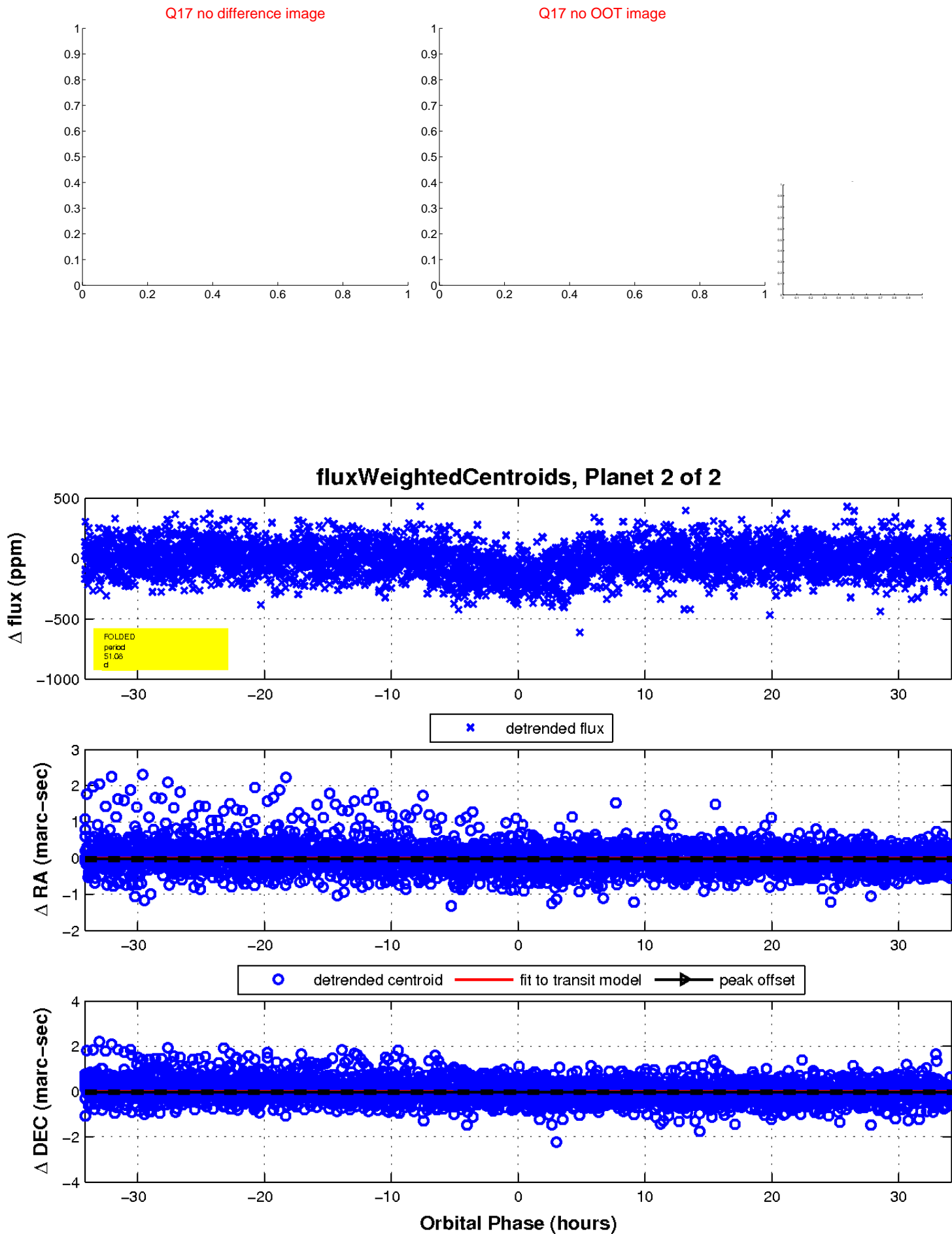
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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.



UKIRT Image

Declination

