

KIC 010491544

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})
010491544-01	OBS	3639.01	22.771937	140.487948	36893.3	8.146	917.0	443.0	4.61	5073	154.85	585.99
010491544-02	OBS	No	22.771932	133.843076	30768.3	10.551	779.3	442.2	4.61	5073	142.06	585.99

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010491544-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_UNRESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
010491544-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_UNRESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH

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 010491544-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
010491544-01	10491544	3576.01	10491554	1:1	4.4	1	1	15.02	13.44	8.44	Direct-PRF	0	0.03	0.03

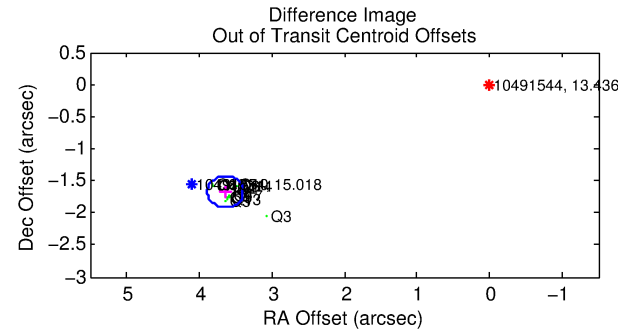
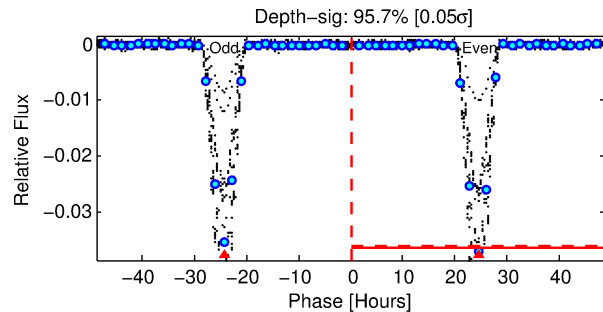
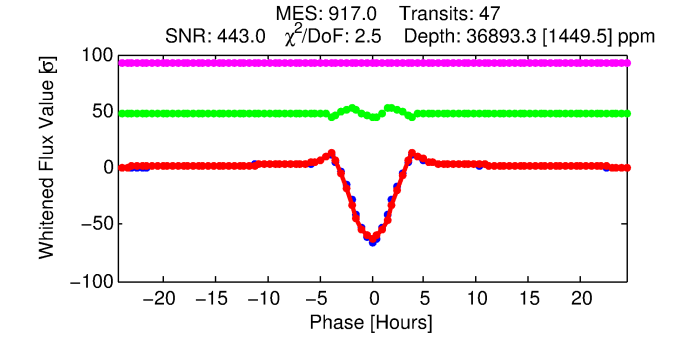
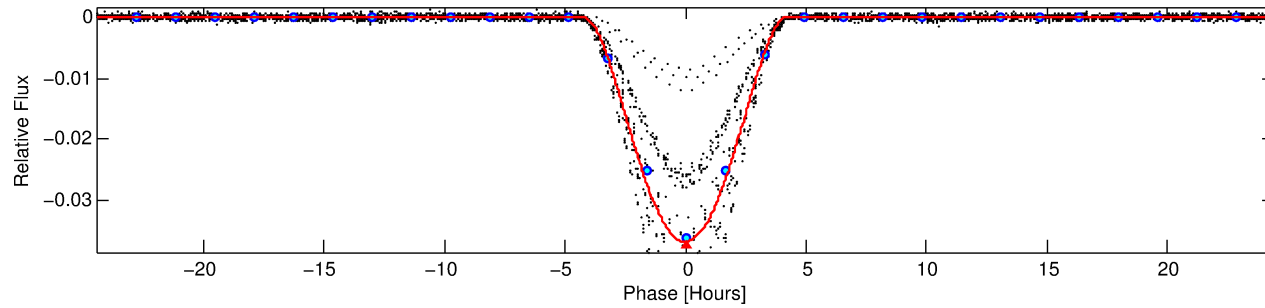
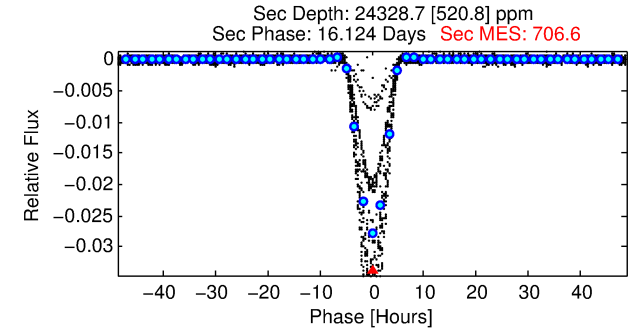
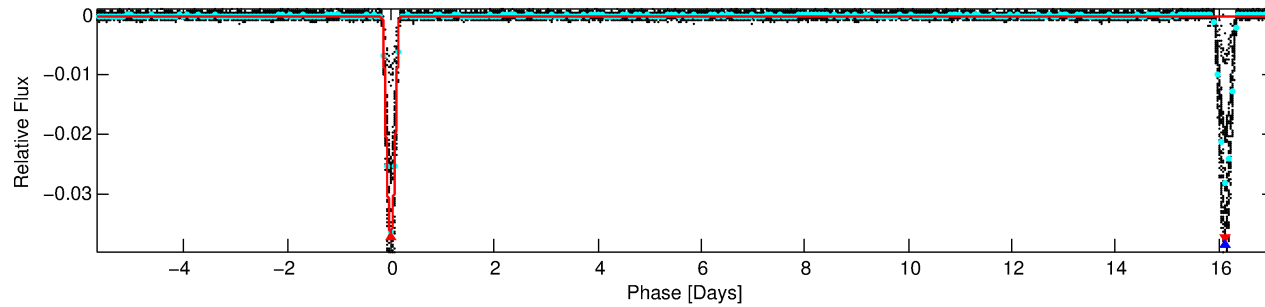
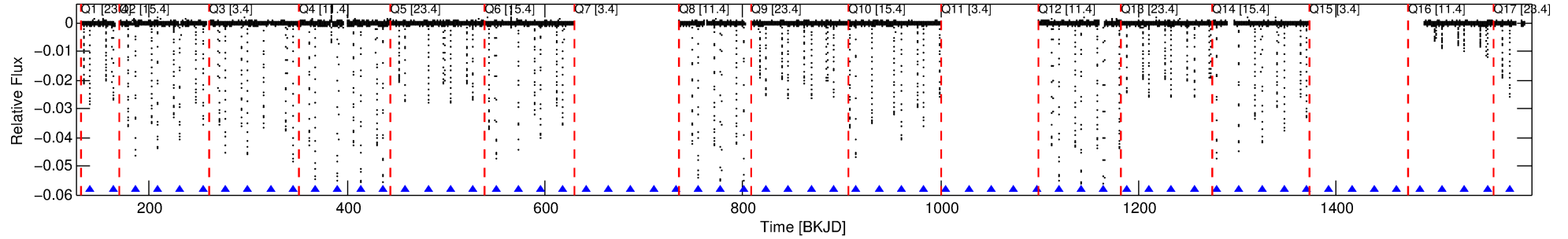
Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 10491544 Candidate: 1 of 2 Period: 22.772 d

KOI: K03639 Corr: No Ephemeris Match

Kp: 13.44 R*: 4.61 Rs Teff: 5073.0 K Logg: 3.02 Fe/H: -0.760



DV Fit Results:

Period = 22.77194 [0.00001] d
Epoch = 140.4879 [0.0003] BKJD
Rp/R* = 0.3078 [0.0288]
a/R* = 18.03 [0.06]
b = 1.00 [0.03]
Seff = 585.99 [396.73]
Teq = 1255 [212] K
Rp = 154.85 [91.61] Re
a = 0.1467 [0.0695] AU
Ag = 12.01 [8.31] [1.32σ]
Teffp = 3611 [202] K [8.04σ]

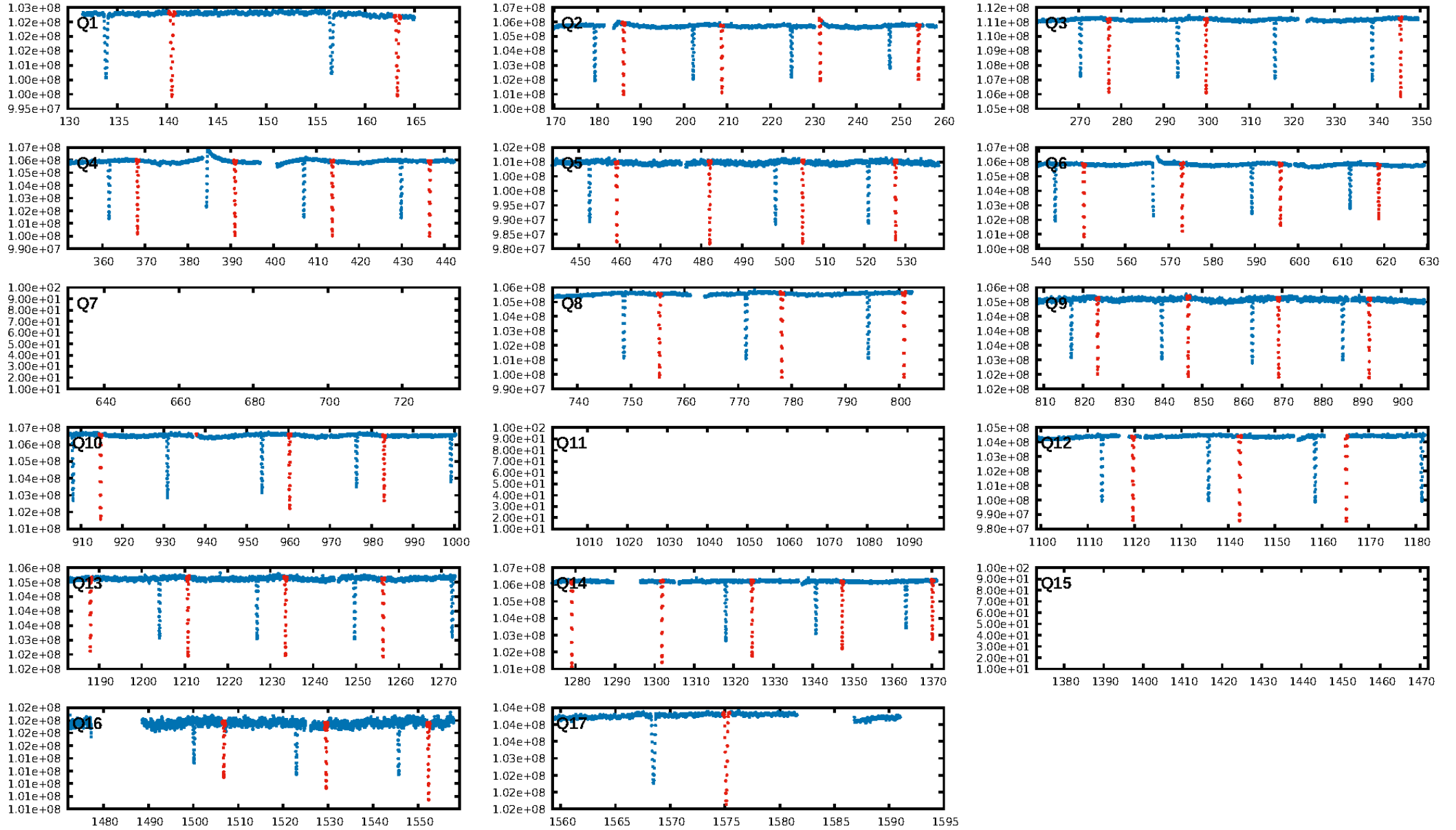
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.0%
ModelChiSquareGoF-sig: 0.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [44/44]
GhostDiagnostic-chr: 0.1914
Centroid-sig: 0.0%
Centroid-so: 4.448 arcsec [923.92σ]
OotOffset-rm: 4.006 arcsec [48.66σ]
KicOffset-rm: 4.383 arcsec [61.49σ]
OotOffset-st: 4/1/4/5 [14]
KicOffset-st: 4/1/4/5 [14]
DiffImageQuality-fgm: 1.00 [14/14]
DiffImageOverlap-fno: 1.00 [14/14]

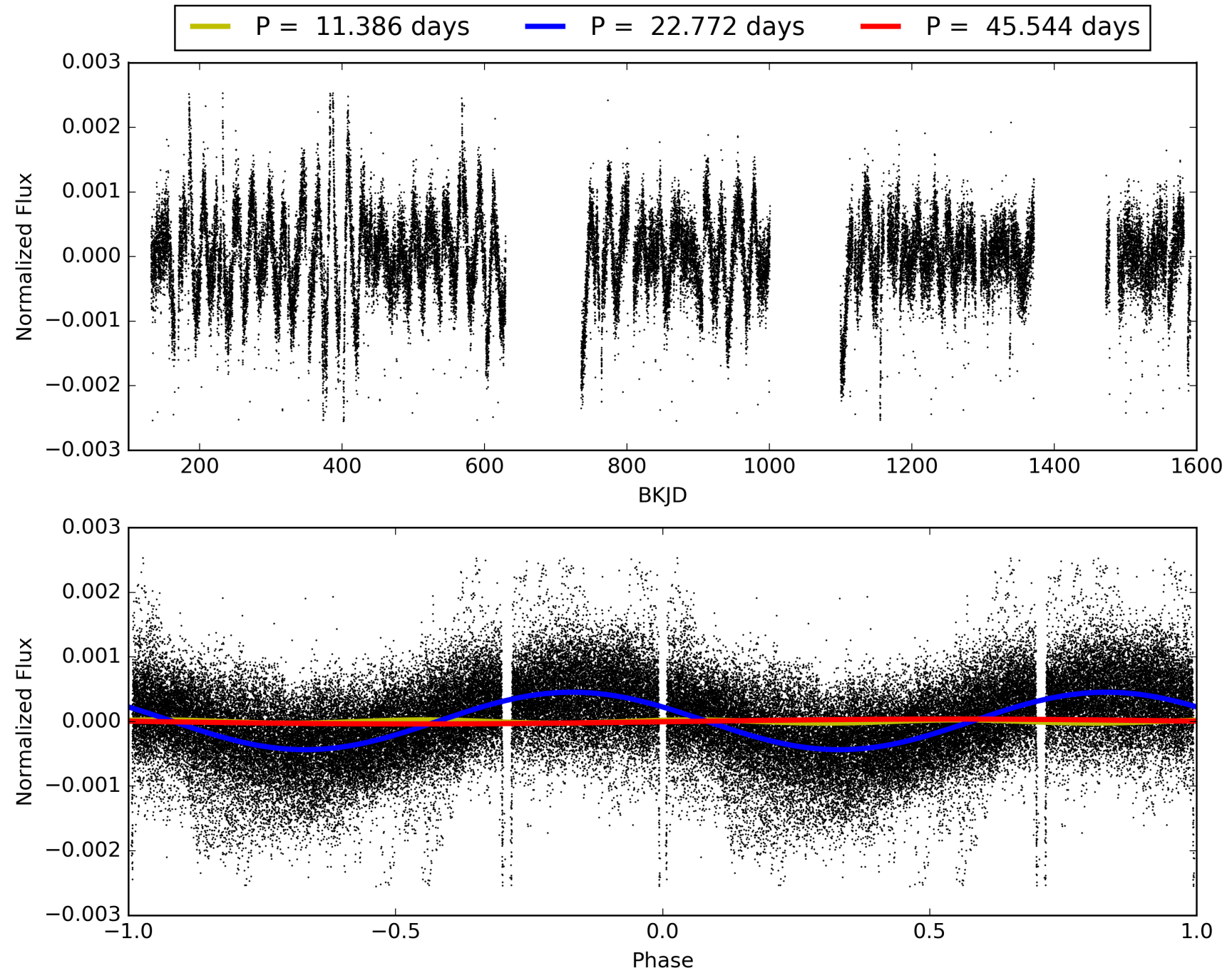
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 18:35:37 Z

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

TCE 010491544-01, PDC Light Curves

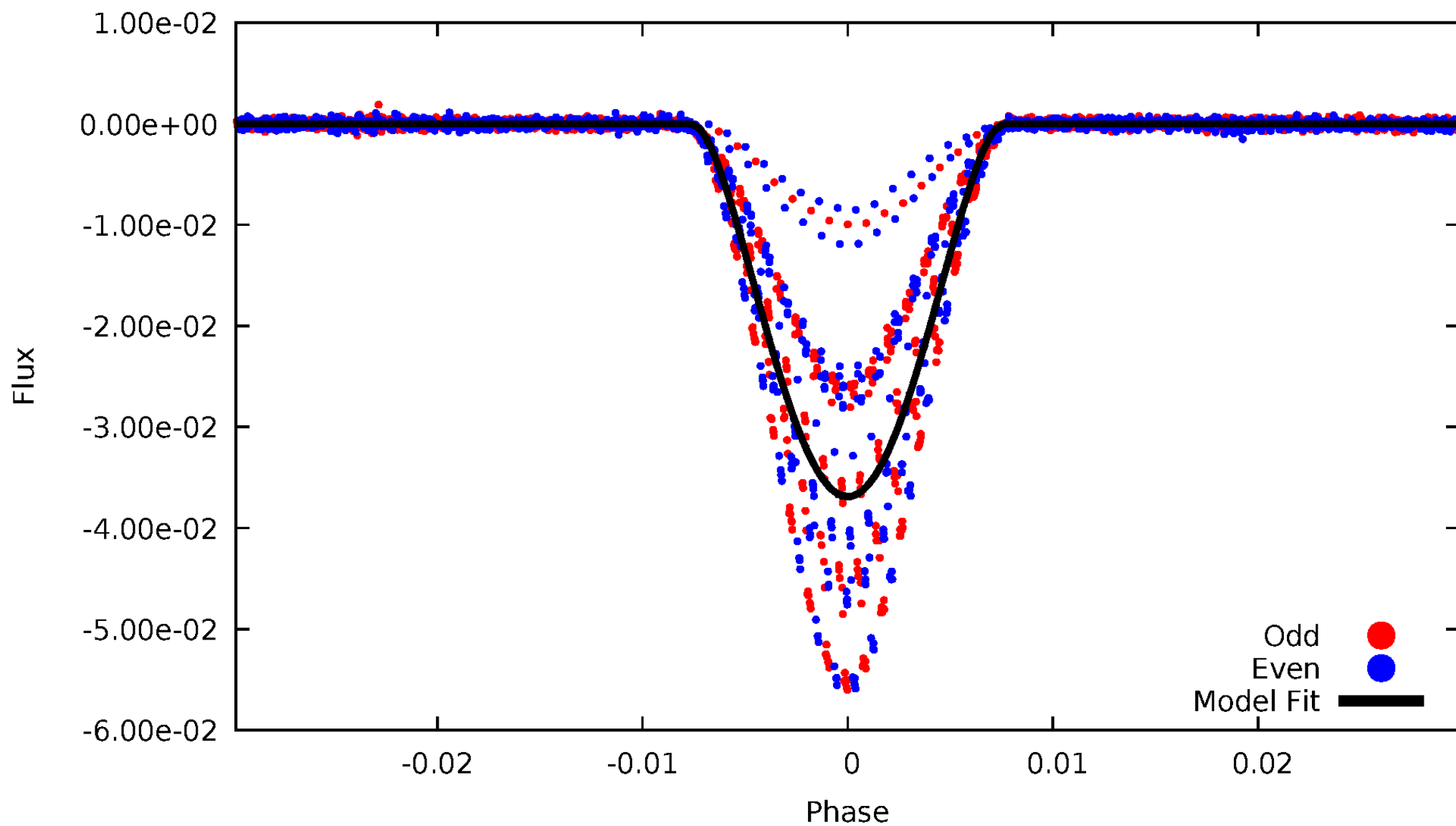


TCE 010491544-01



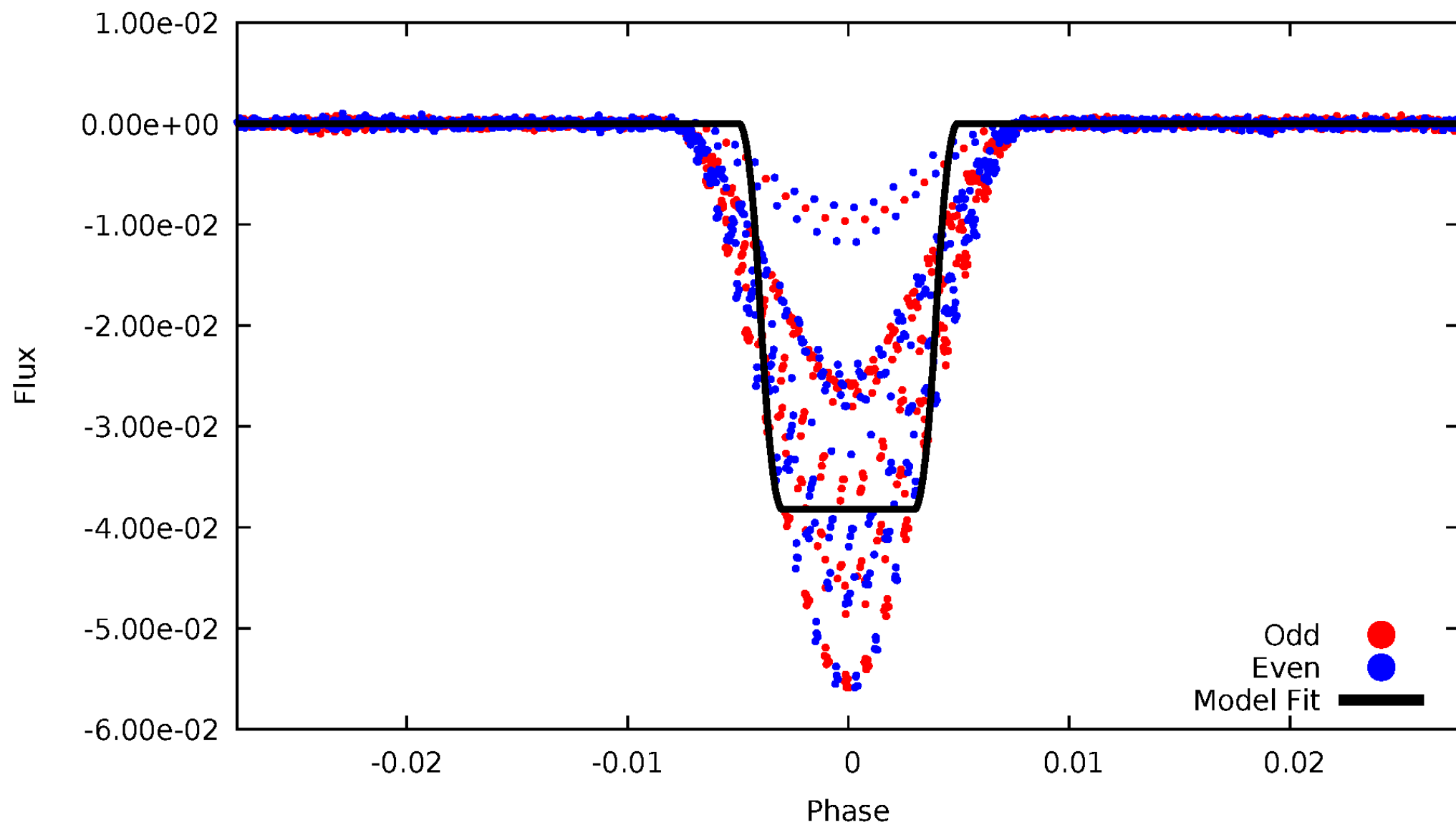
DV Odd/Even

TCE 010491544-01



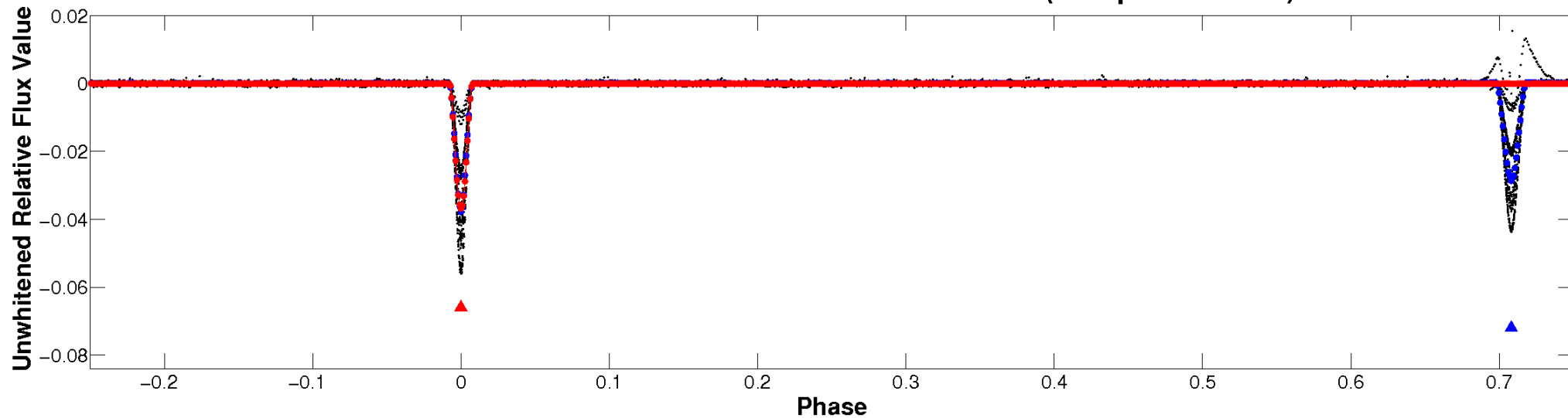
ALT Odd/Even

TCE 010491544-01

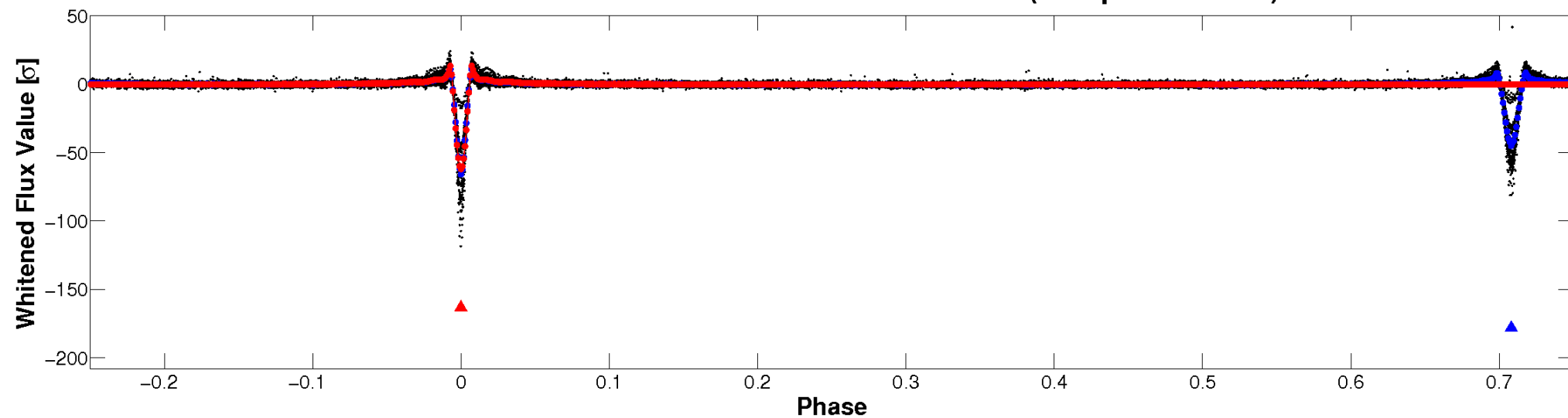


Non-Whitened Vs. Whitened Light Curve

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

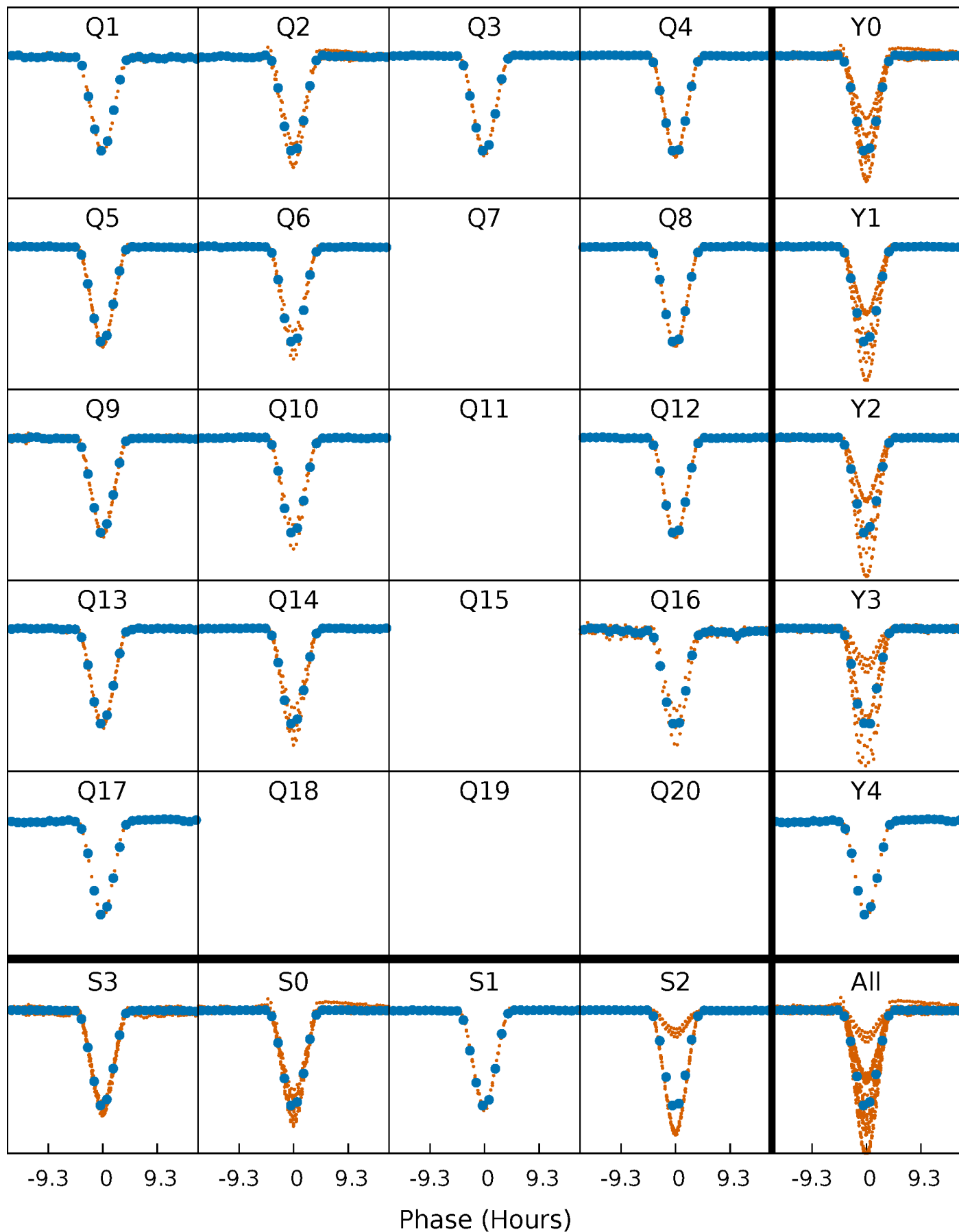


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



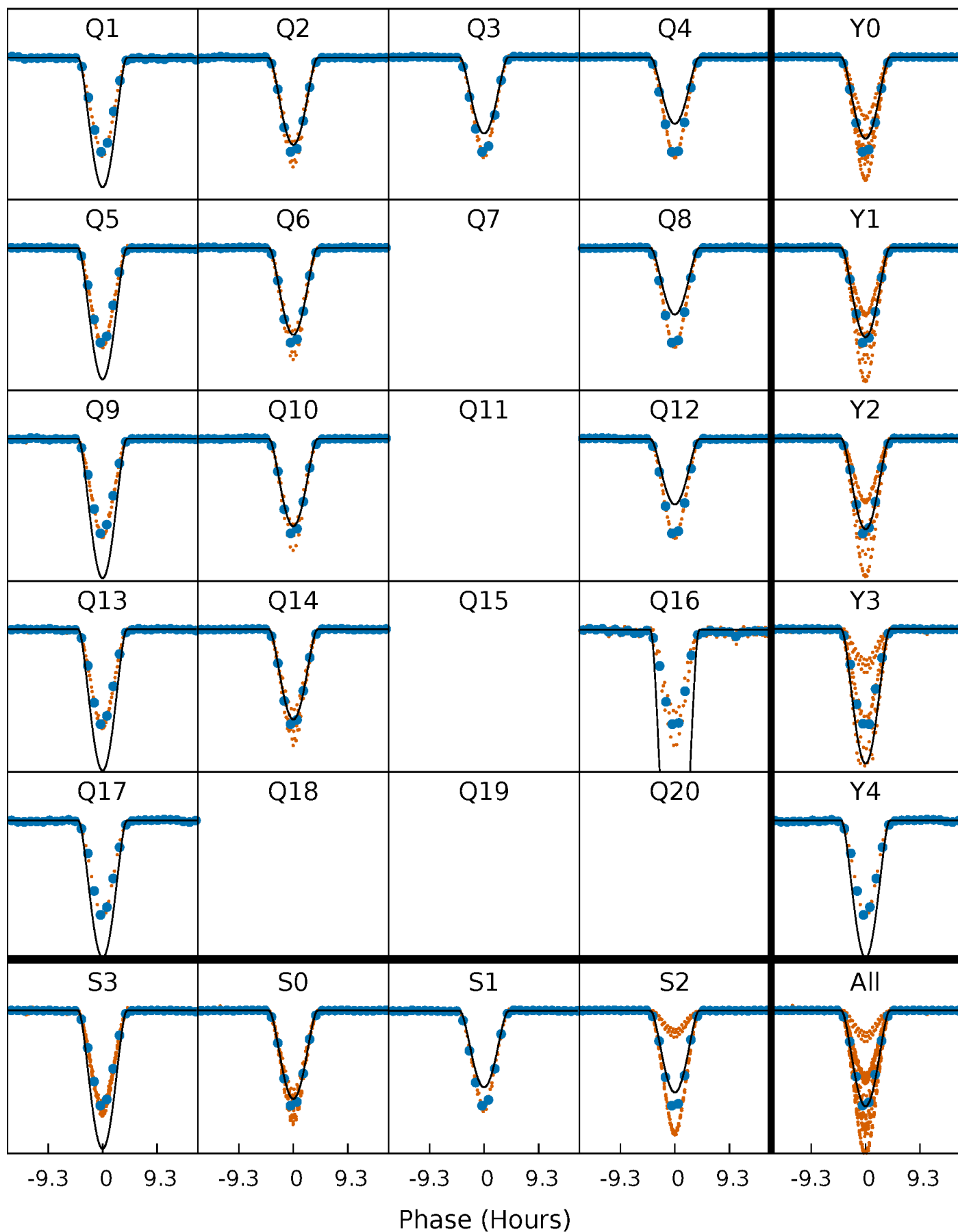
PDC Quarter-Phased Transit Curves

TCE 010491544-01 P= 22.771937 Days $T_0=140.487948$ (BKJD)



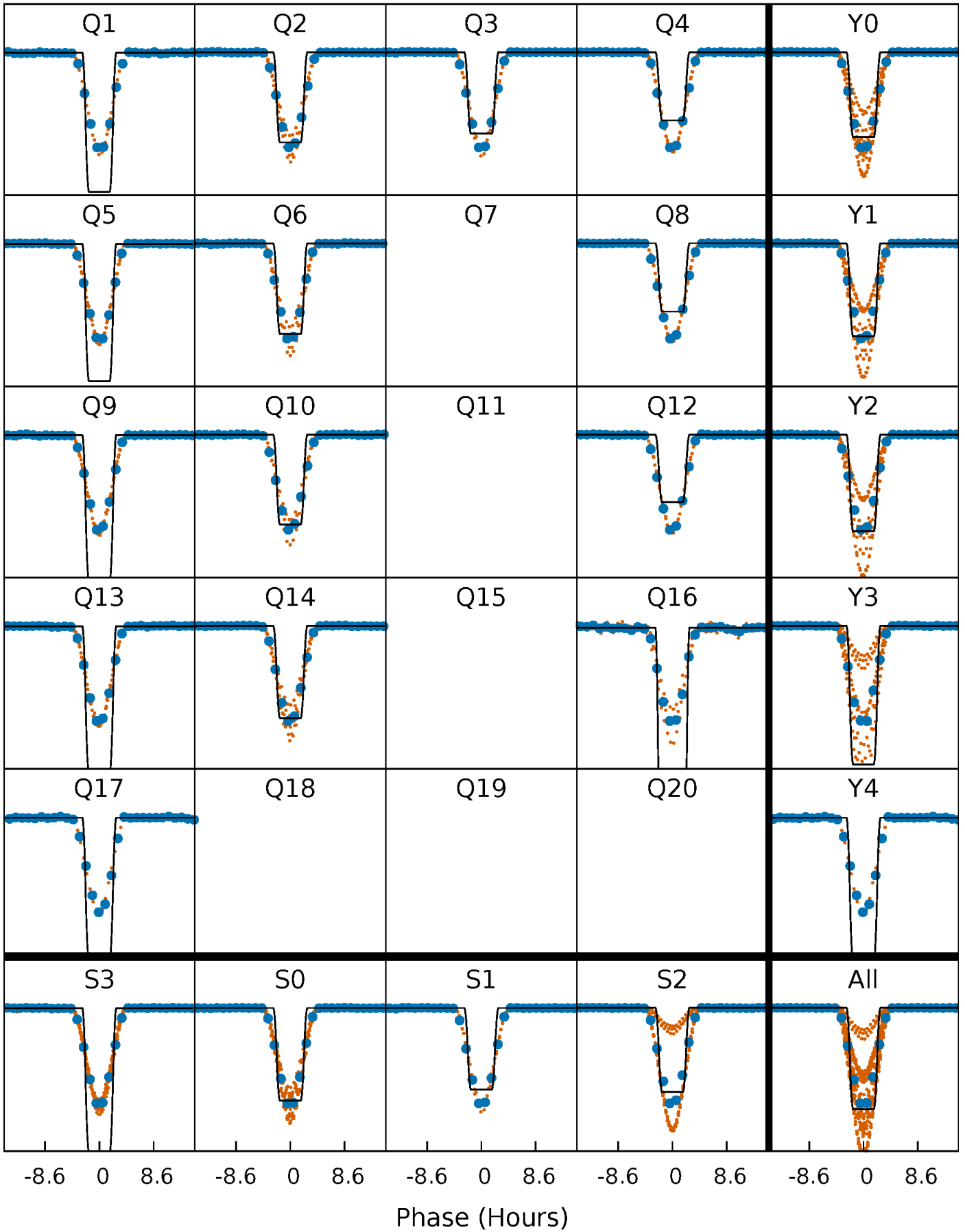
DV Quarter-Phased Transit Curves

TCE 010491544-01 P= 22.771937 Days $T_0=140.487948$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

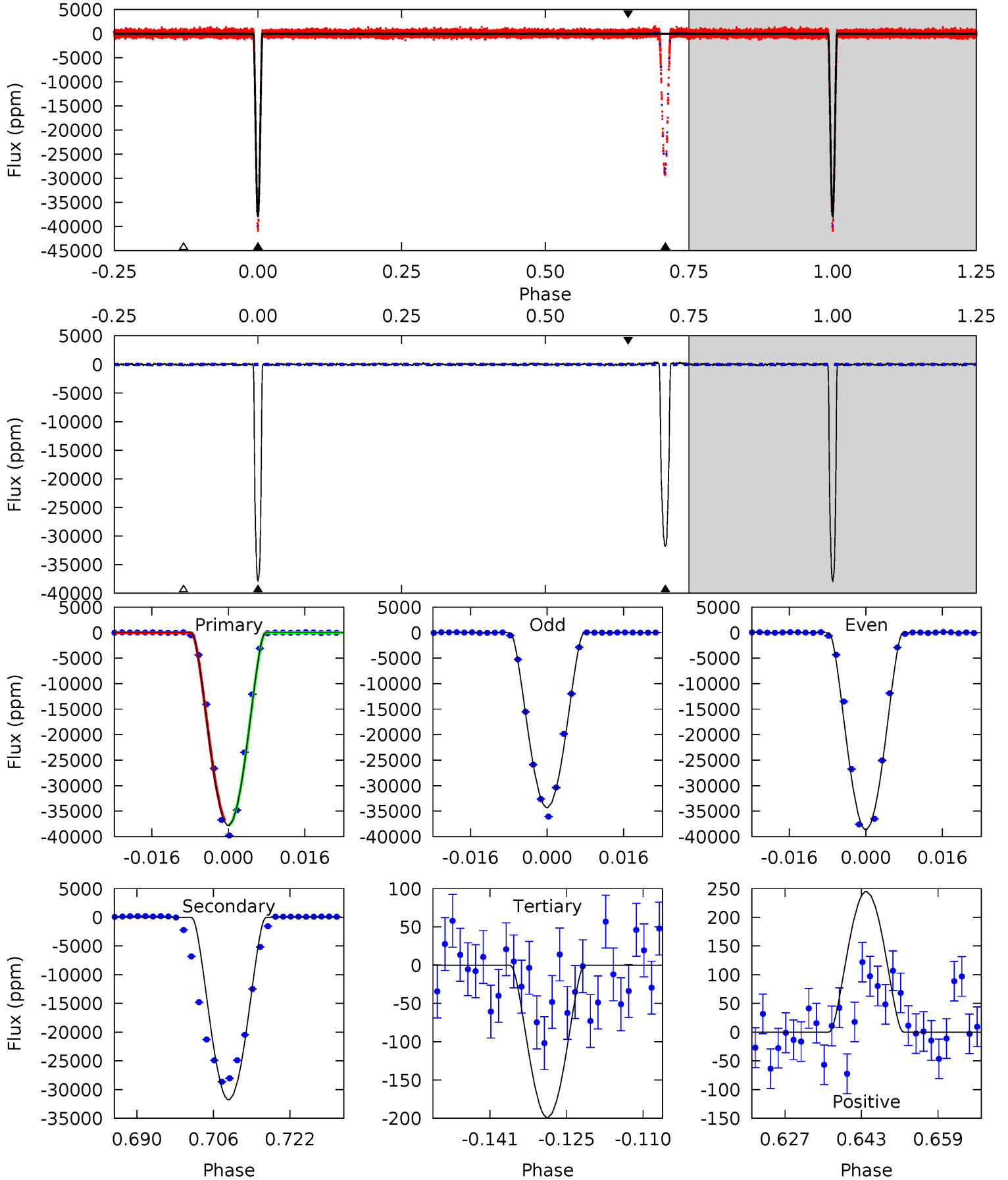
TCE 010491544-01 P= 22.772049 Days $T_0=140.484585$ (BKJD)



DV Model-Shift Uniqueness Test

010491544-01, P = 22.771937 Days, E = 117.716011 Days

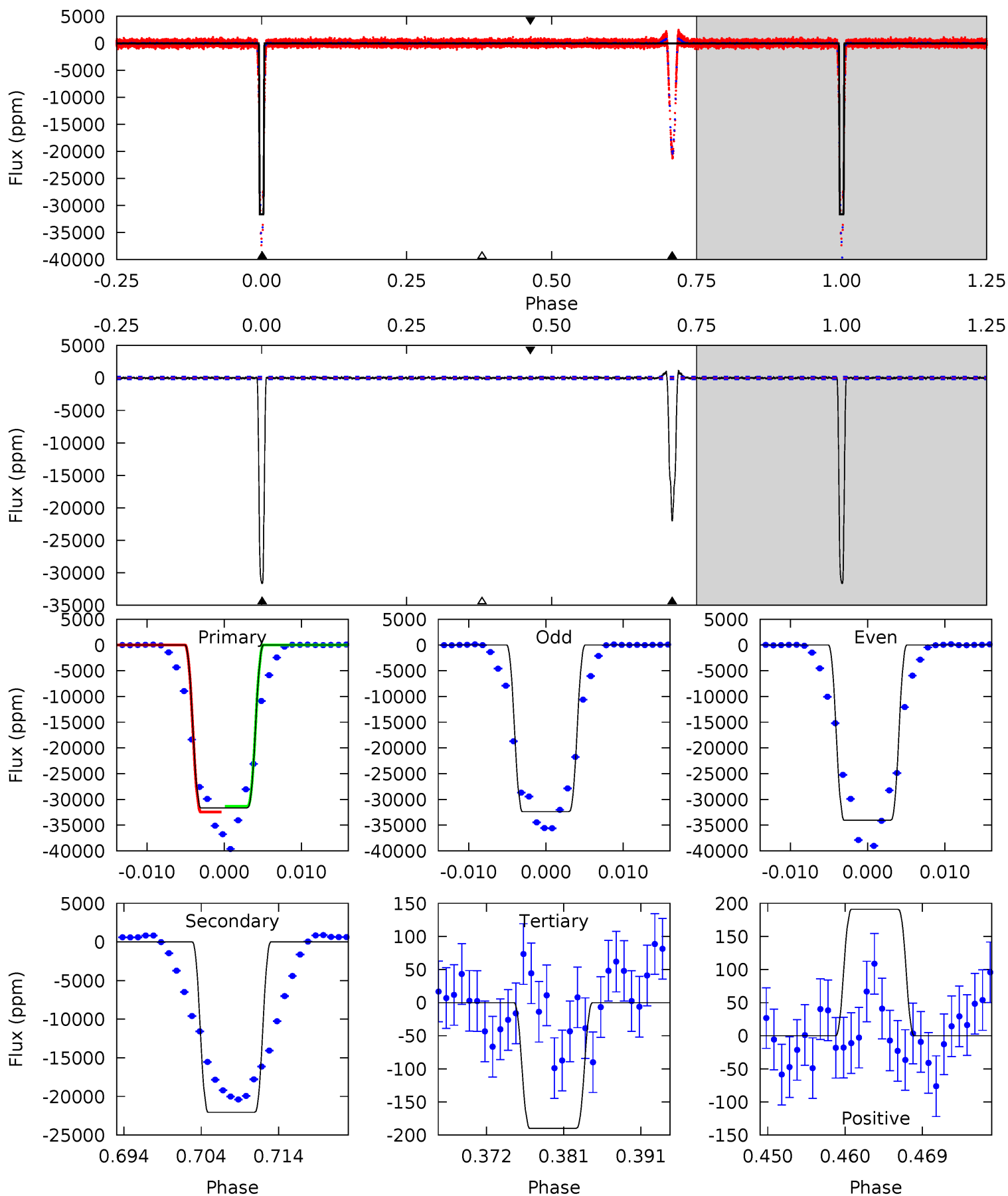
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1869	1572	9.85	12.1	4.94	2.42	3.98	1859	1857	1562	1560	114.1	0.94	0.01	0



Alt Model-Shift Uniqueness Test

010491544-01, P = 22.772049 Days, E = 117.712536 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
751.9	524.2	4.51	4.54	5.03	2.58	2.31	747.4	747.4	519.7	519.6	22.5	0.94	0.03	0



Stellar Parameters For KIC 010491544

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5073^{+154}_{-102}	$3.020^{+0.352}_{-0.288}$	$-0.760^{+0.300}_{-0.250}$	$4.610^{+2.693}_{-1.243}$	$0.812^{+0.352}_{-0.020}$	$0.012^{+0.025}_{-0.008}$
	+3%/-2%	+12%/-10%	+39%/-33%	+58%/-27%	+43%/-2%	+216%/-69%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 010491544-01 / KOI 3639.01

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-31798 ± 20	$154.74^{+49.79}_{-31.97}$	1736^{+217}_{-172}	4115^{+177}_{-141}	17^{+10}_{-7}
Alt.	-22056 ± 42	$99.94^{+31.37}_{-25.72}$	1733^{+231}_{-184}	4563^{+342}_{-275}	30^{+21}_{-13}

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 $A_{obs} \gg 1.0$

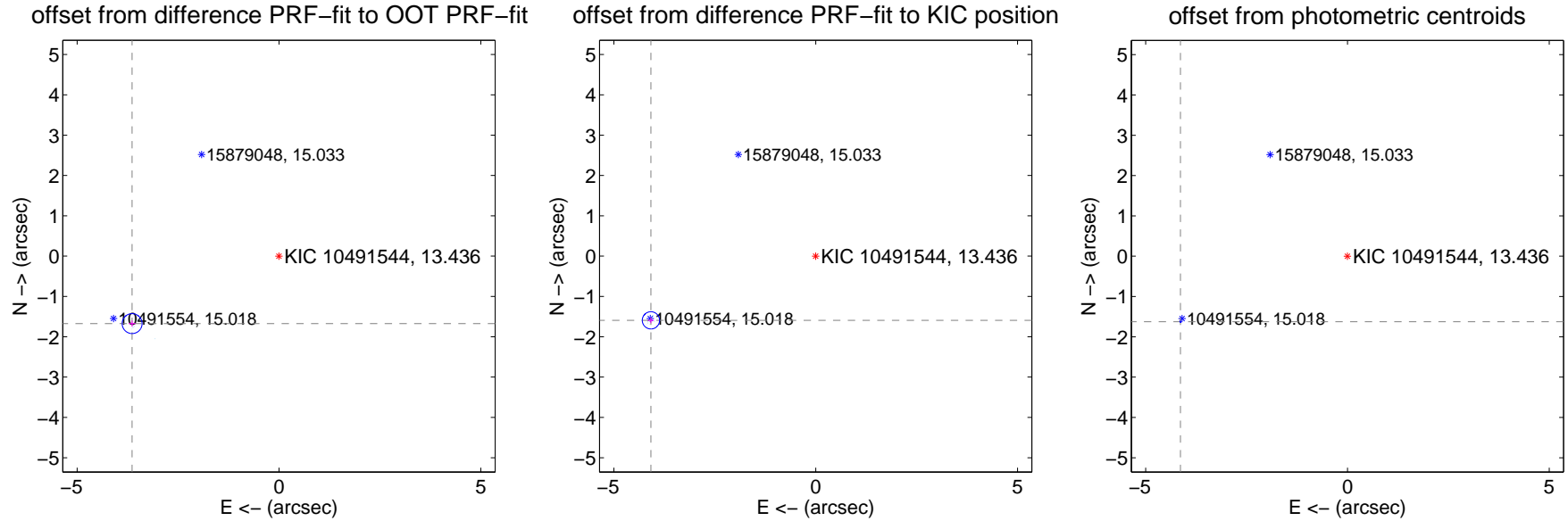
DV Centroid Data

Supplemental centroid analysis for 010491544-01. Kepler magnitude: 13.44. Transit SNR 442.96

There are 14 quarters with good PRF difference image offsets

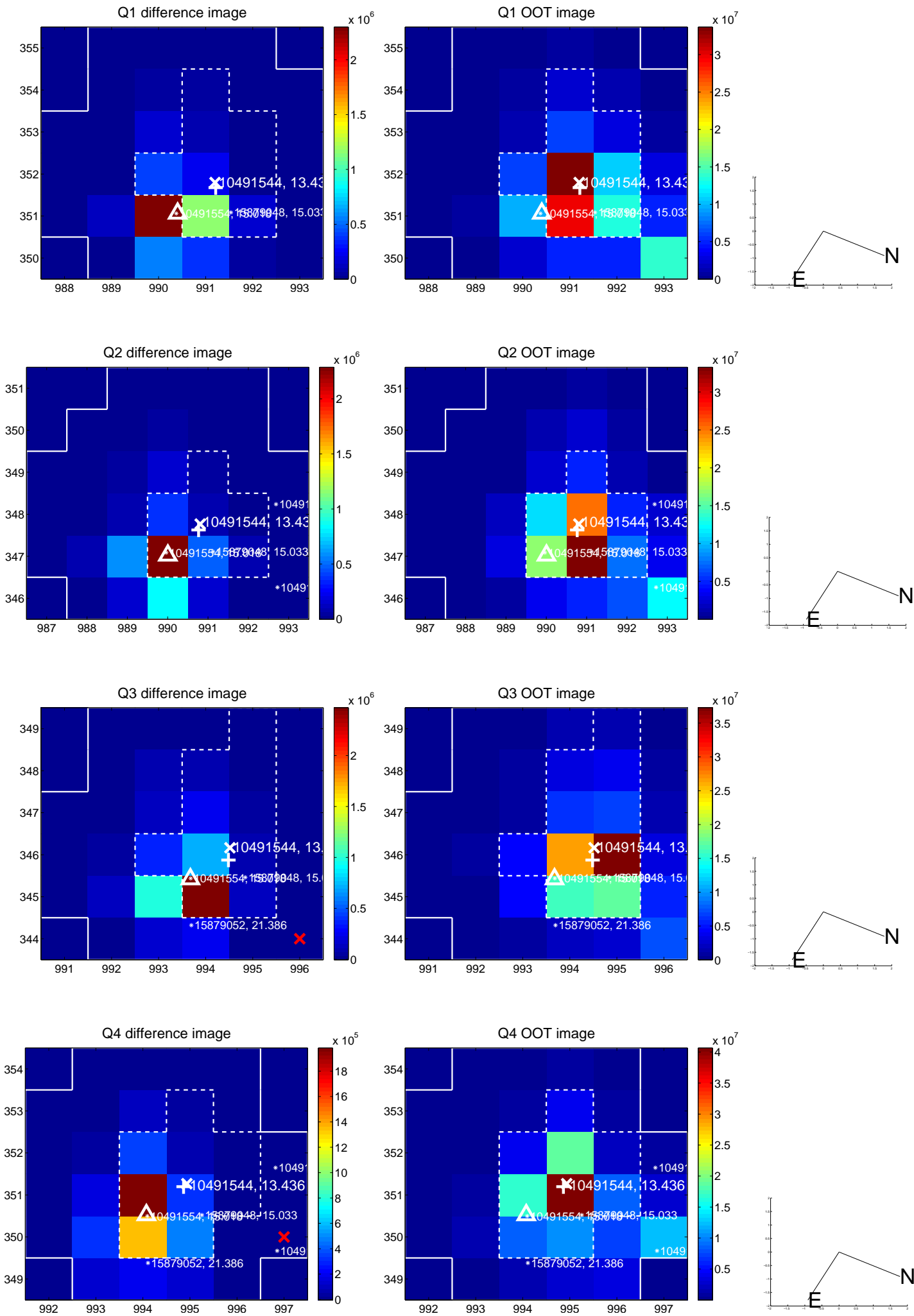
The direct PRF centroid is offset from the target star catalog position by about 0.45 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	4.006 ± 0.082	48.66	3.639 ± 0.084	-1.673 ± 0.076
PRF-fit source offset from KIC position	4.383 ± 0.071	61.49	4.083 ± 0.071	-1.593 ± 0.070
photometric centroid source offset	4.45 ± 0.00	923.92	4.14 ± 0.00	-1.63 ± 0.01

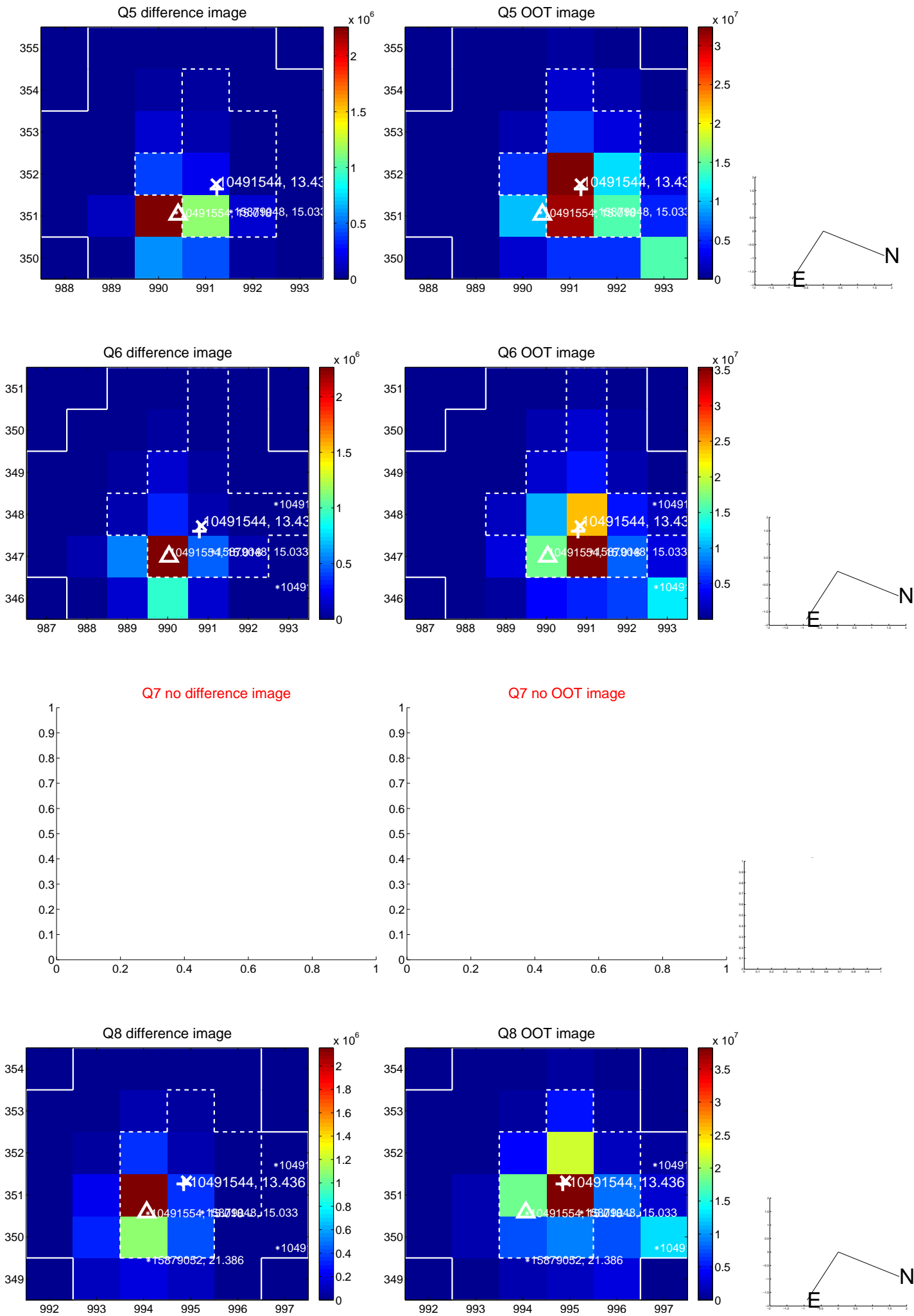


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

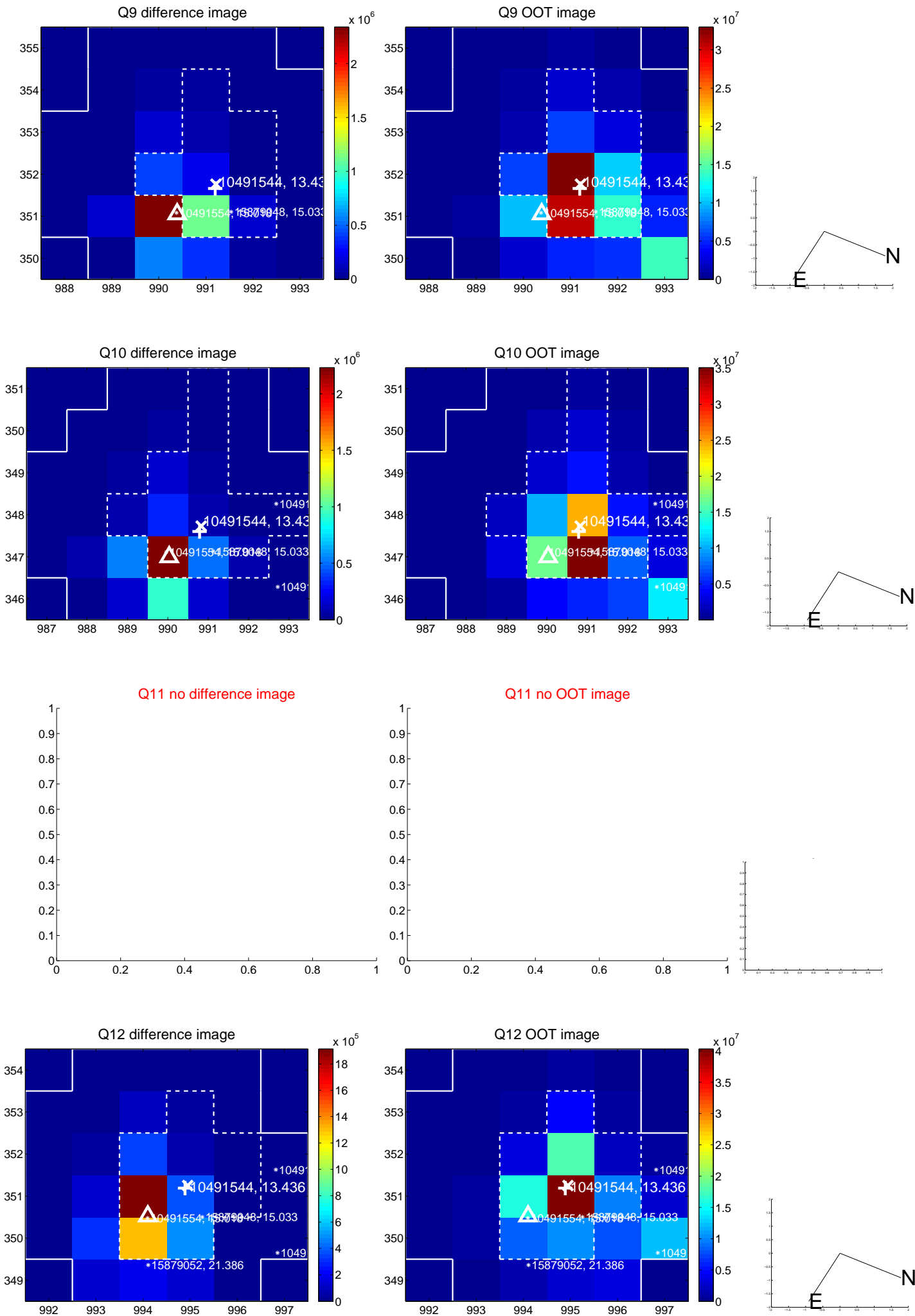
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



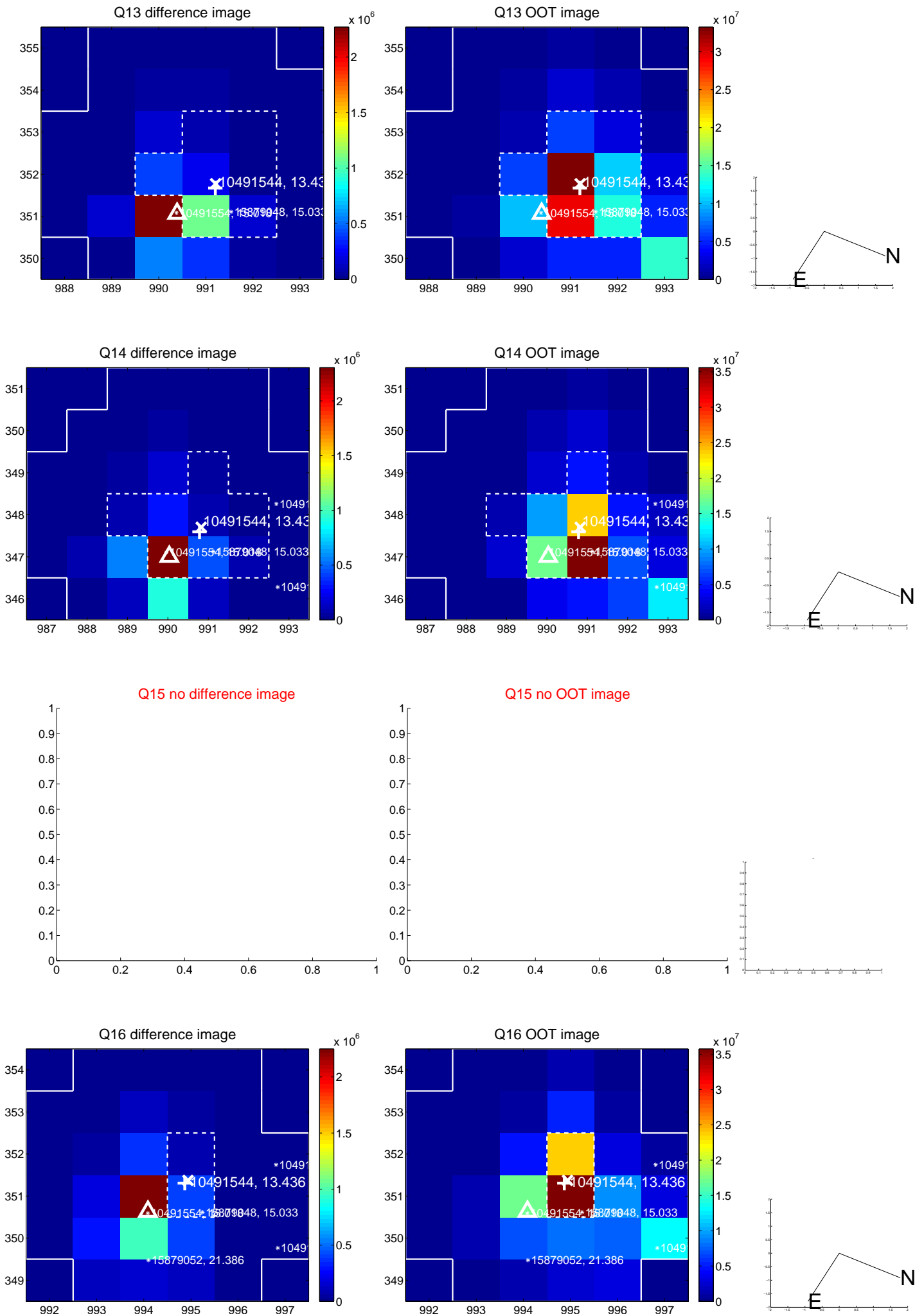
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



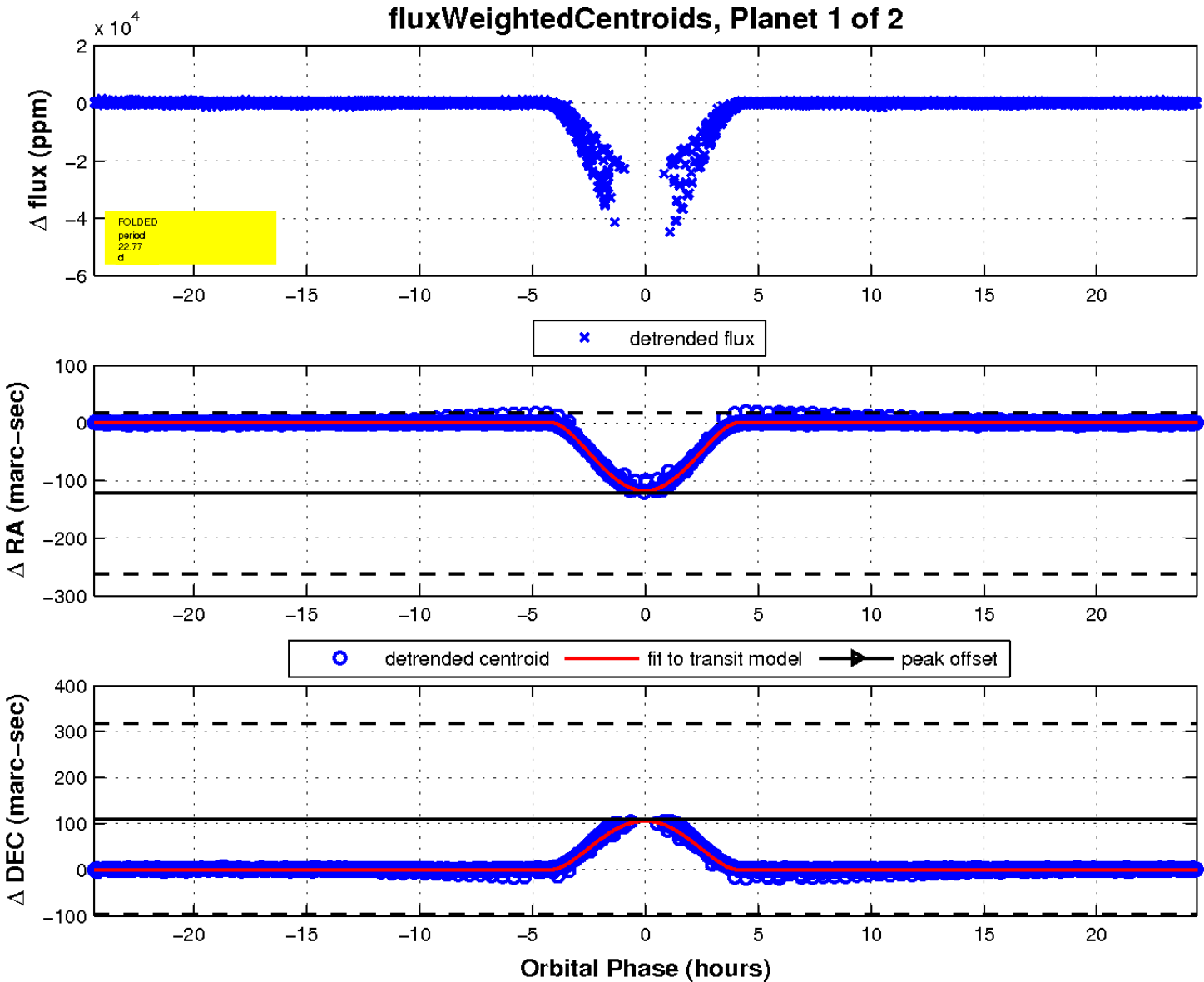
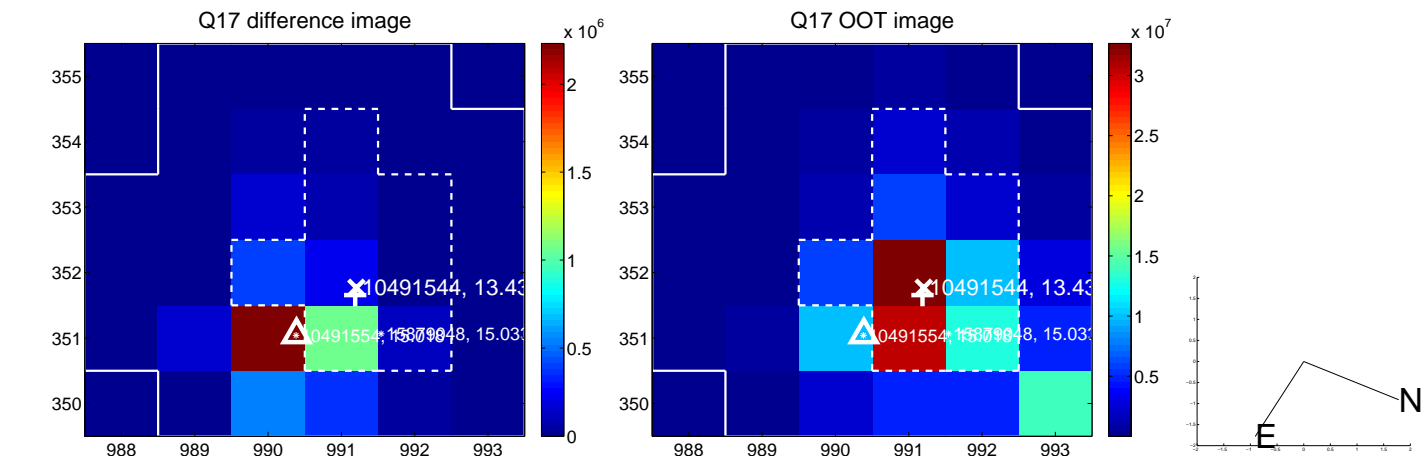
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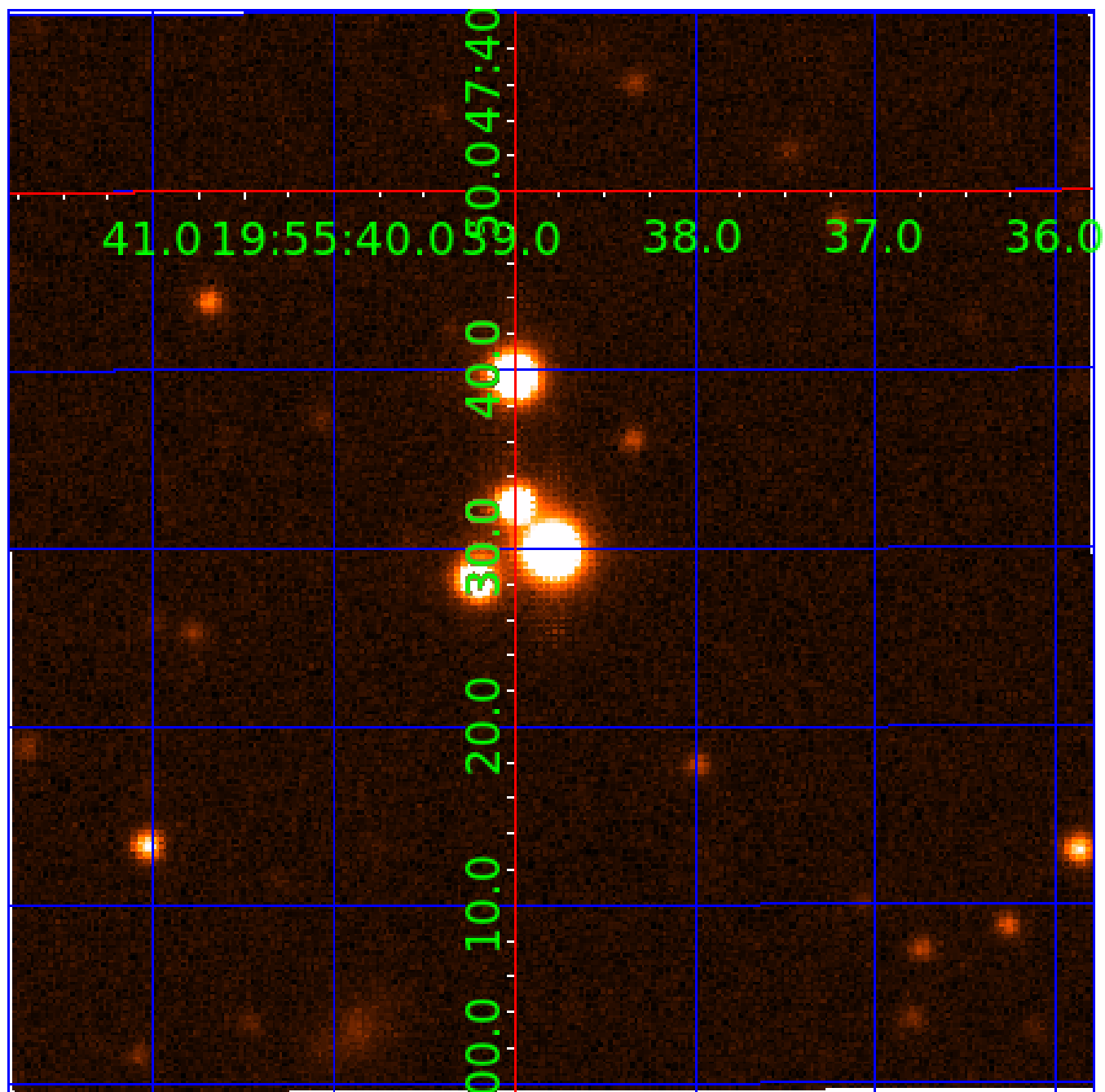


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010491544

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})
010491544-01	OBS	3639.01	22.771937	140.487948	36893.3	8.146	917.0	443.0	4.61	5073	154.85	585.99
010491544-02	OBS	No	22.771932	133.843076	30768.3	10.551	779.3	442.2	4.61	5073	142.06	585.99

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010491544-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_UNRESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
010491544-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_UNRESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH

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 010491544-02

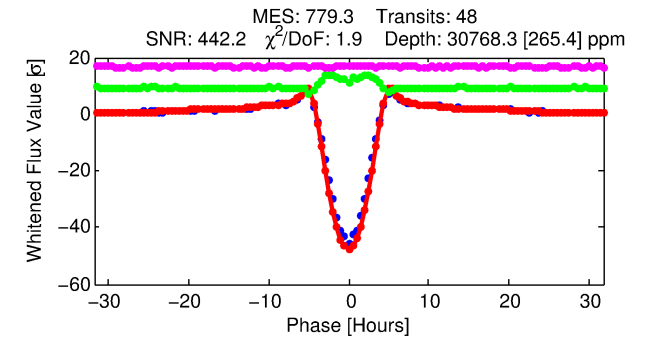
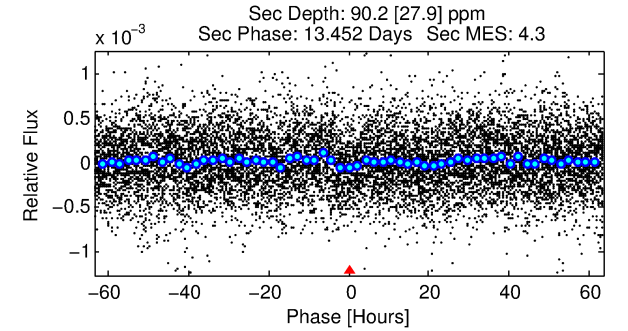
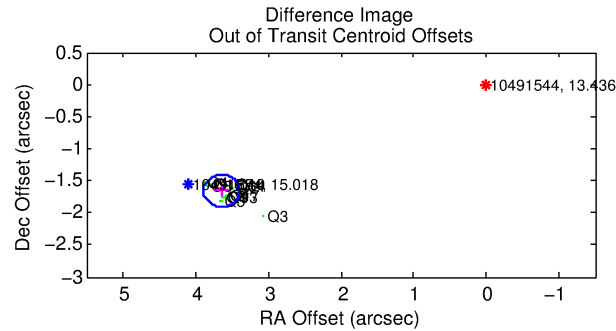
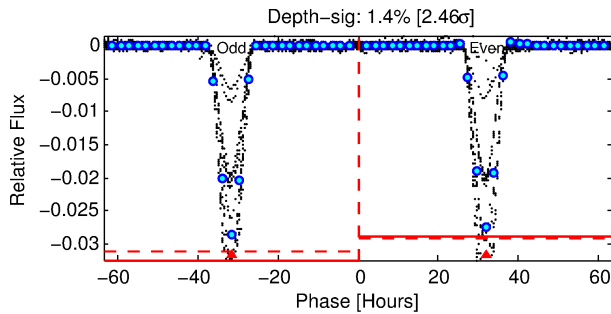
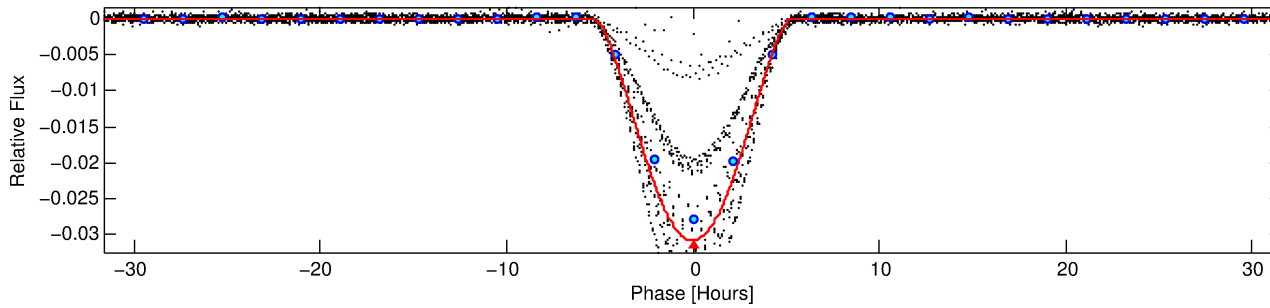
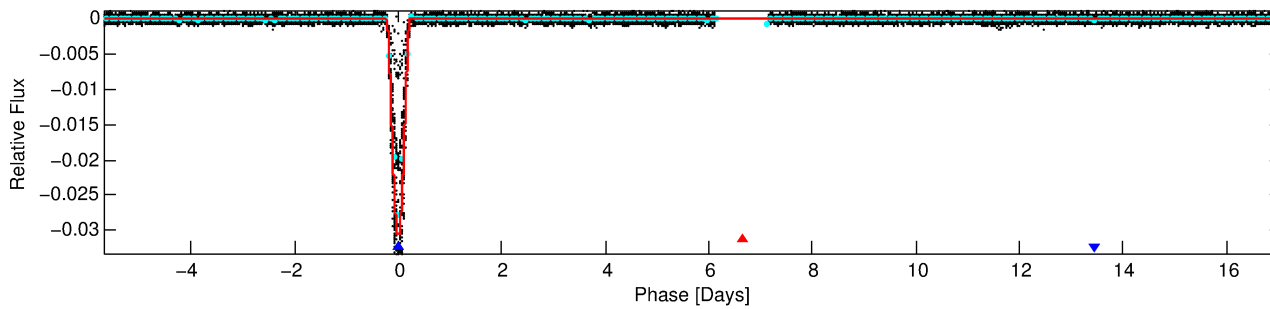
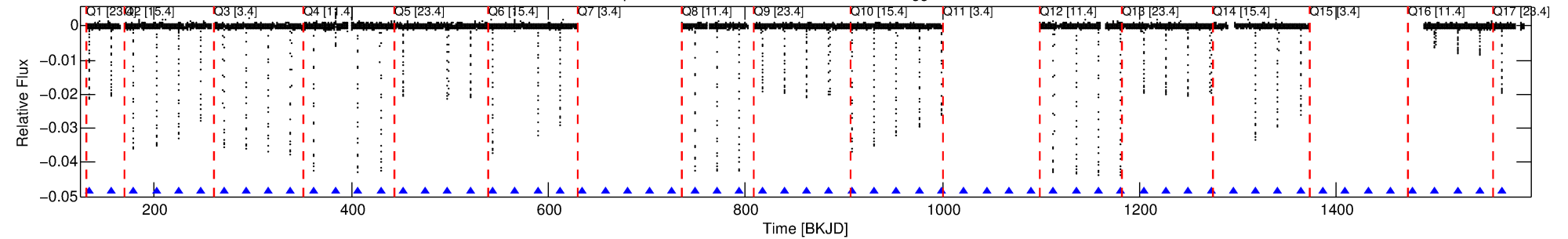
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ($''$)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
010491544-02	10491544	010491554-02	10491554	1:1	4.4	1	1	15.02	13.44	7.87	Direct-PRF	0	0.04	0.02

Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 10491544 Candidate: 2 of 2 Period: 22.772 d
KOI: K03639.01 Corr: 0.986

Kp: 13.44 R*: 4.61 Rs Teff: 5073.0 K Logg: 3.02 Fe/H: -0.760



DV Fit Results:

Period = 22.77193 [0.00001] d
Epoch = 133.8431 [0.0003] BKJD
Rp/R* = 0.2824 [0.0230]
a/R* = 13.29 [0.06]
b = 1.00 [0.03]
Seff = 585.99 [396.73]
Teff = 1255 [212] K
Rp = 142.06 [83.79] Re
a = 0.1467 [0.0695] AU
Ag = 0.05 [0.04] [-23.79σ]
Teffp = 930 [86] K [-1.41σ]

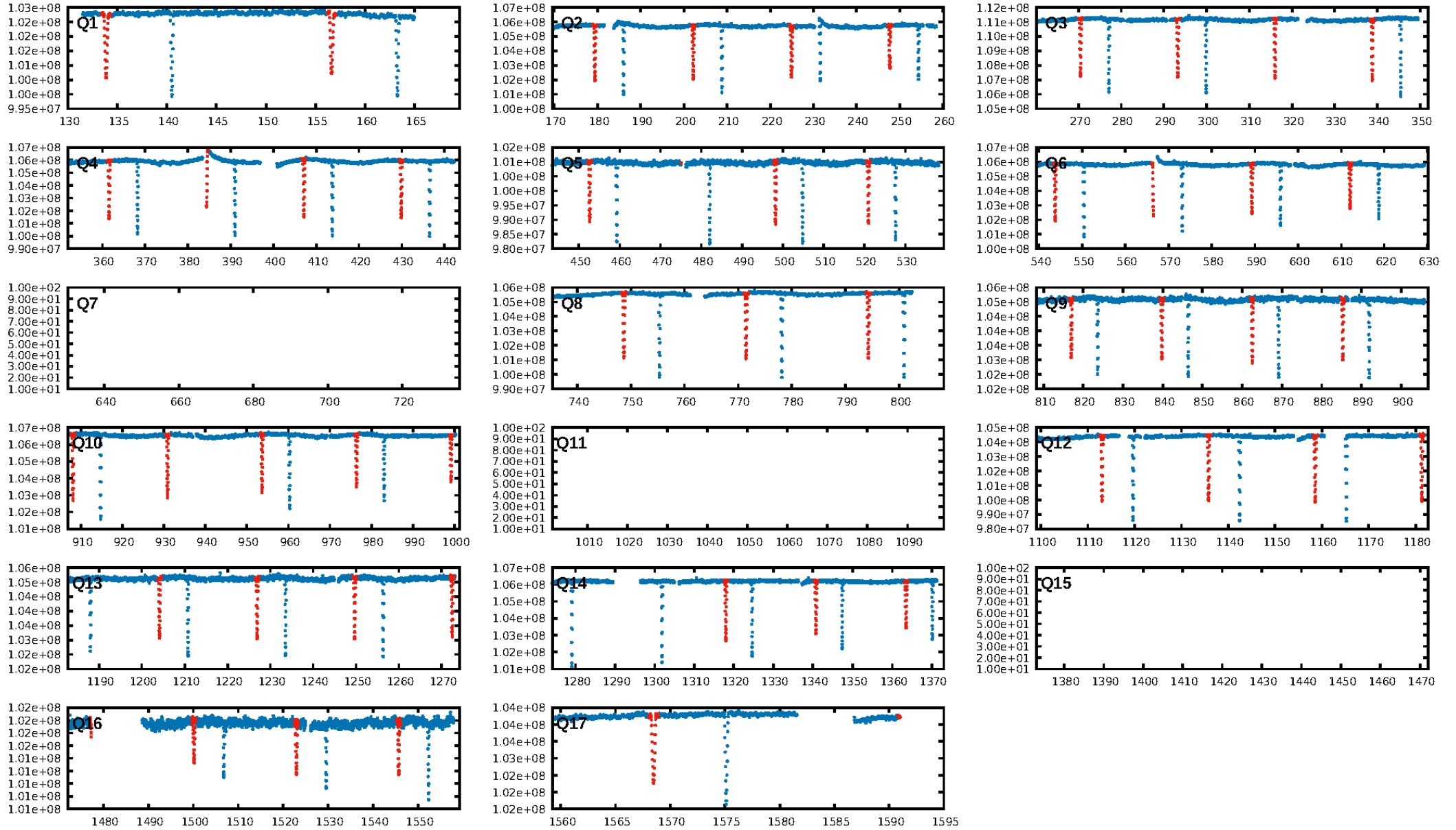
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 0.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [45/45]
GhostDiagnostic-chr: 0.241
Centroid-sig: 0.0%
Centroid-so: 4.249 arcsec [800.05σ]
OotOffset-rm: 4.002 arcsec [47.56σ]
KicOffset-rm: 4.386 arcsec [61.50σ]
OotOffset-st: 4/1/4/5 [14]
KicOffset-st: 4/1/4/5 [14]
DiffImageQuality-fgm: 1.00 [14/14]
DiffImageOverlap-fno: 1.00 [14/14]

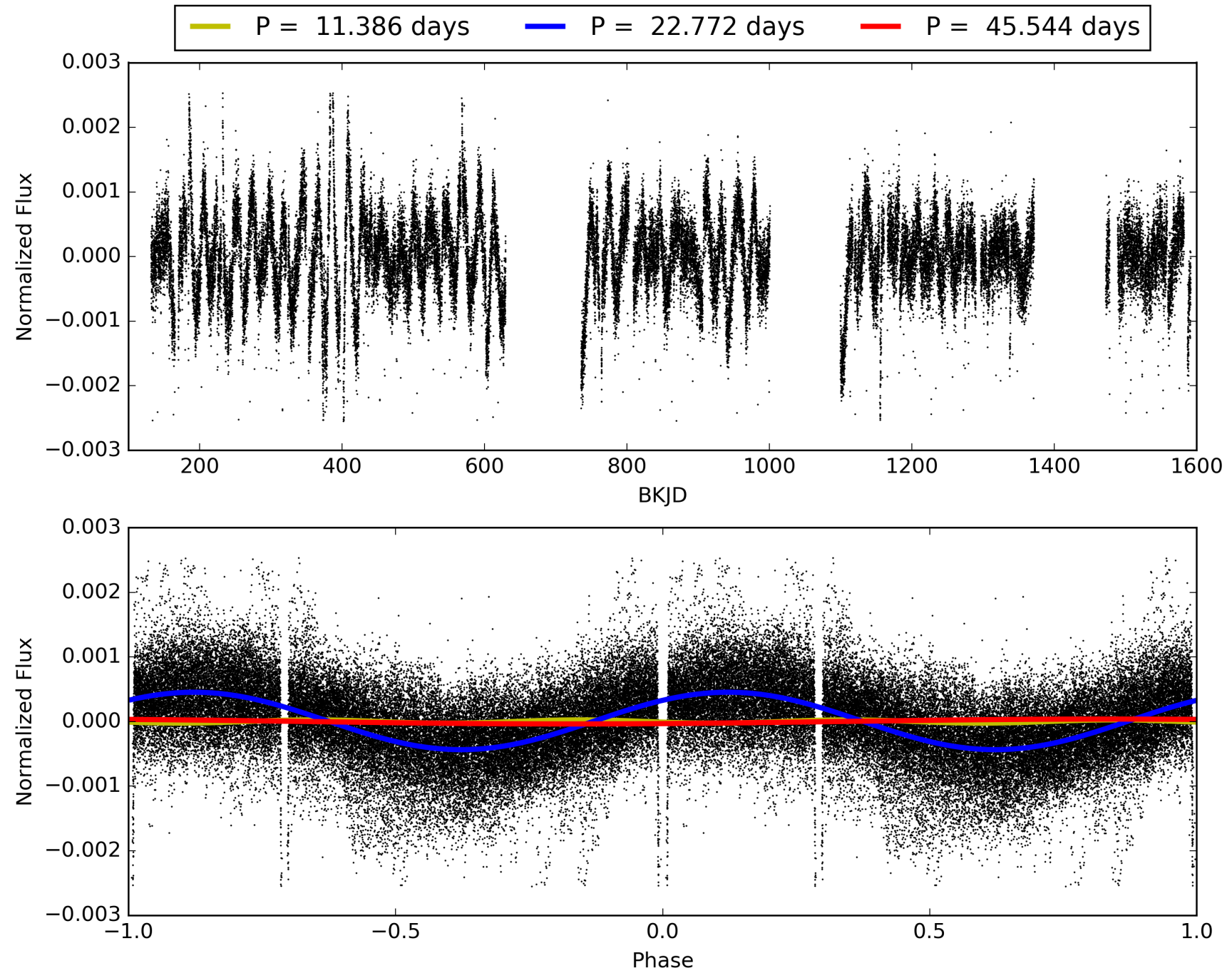
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 18:35:42 Z

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TCE 010491544-02, PDC Light Curves

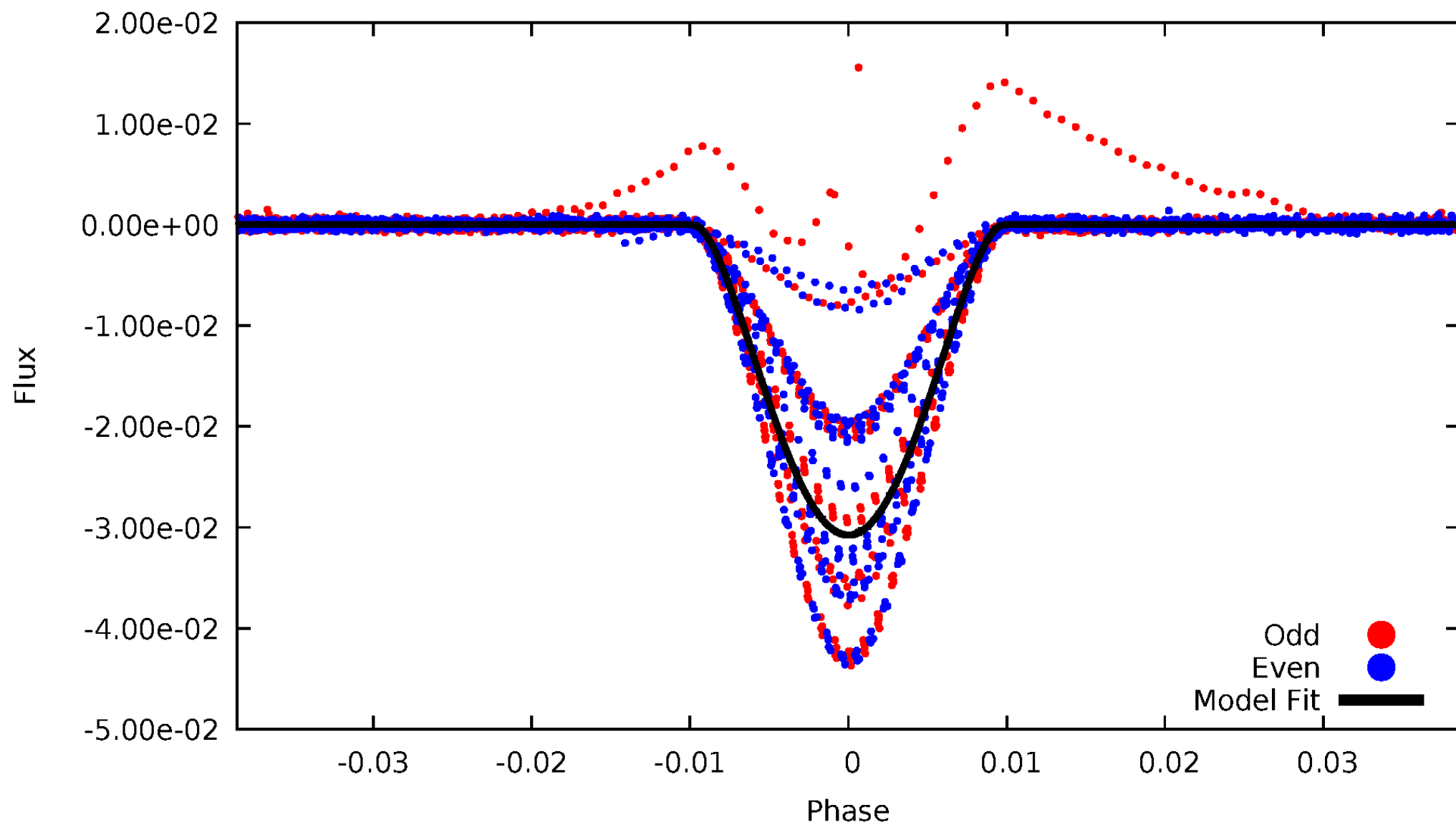


TCE 010491544-02



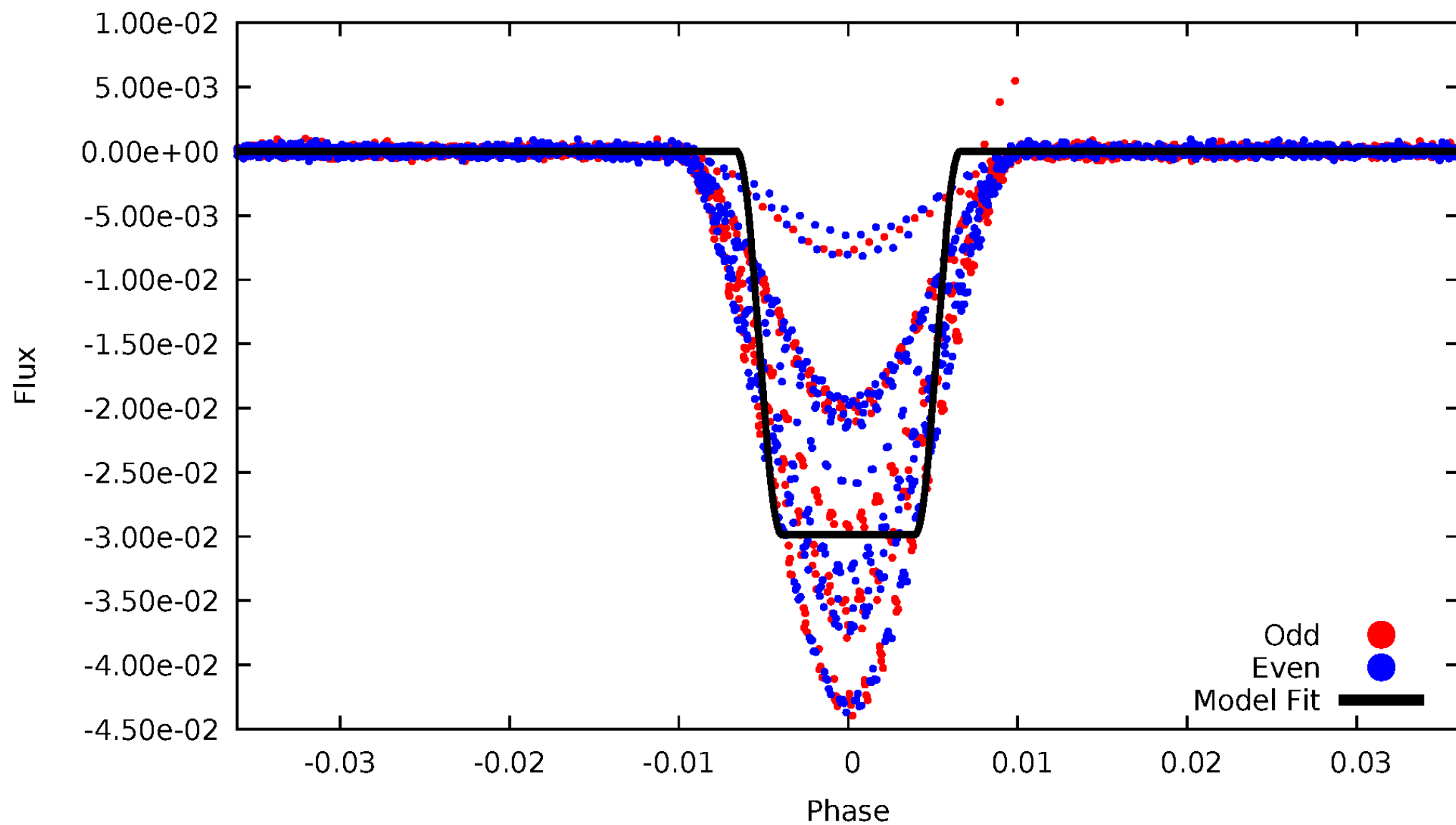
DV Odd/Even

TCE 010491544-02



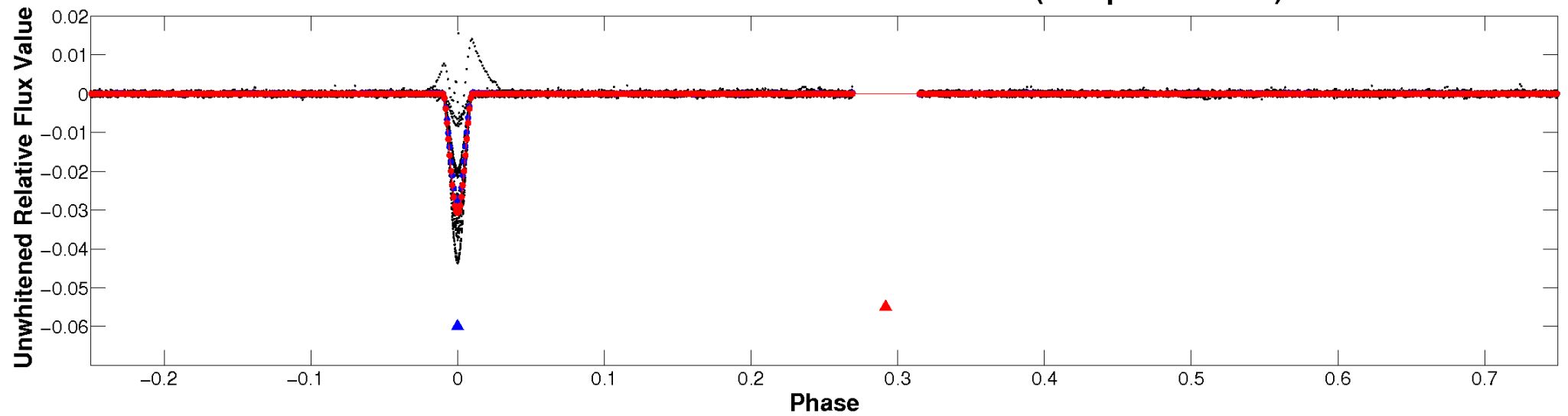
ALT Odd/Even

TCE 010491544-02

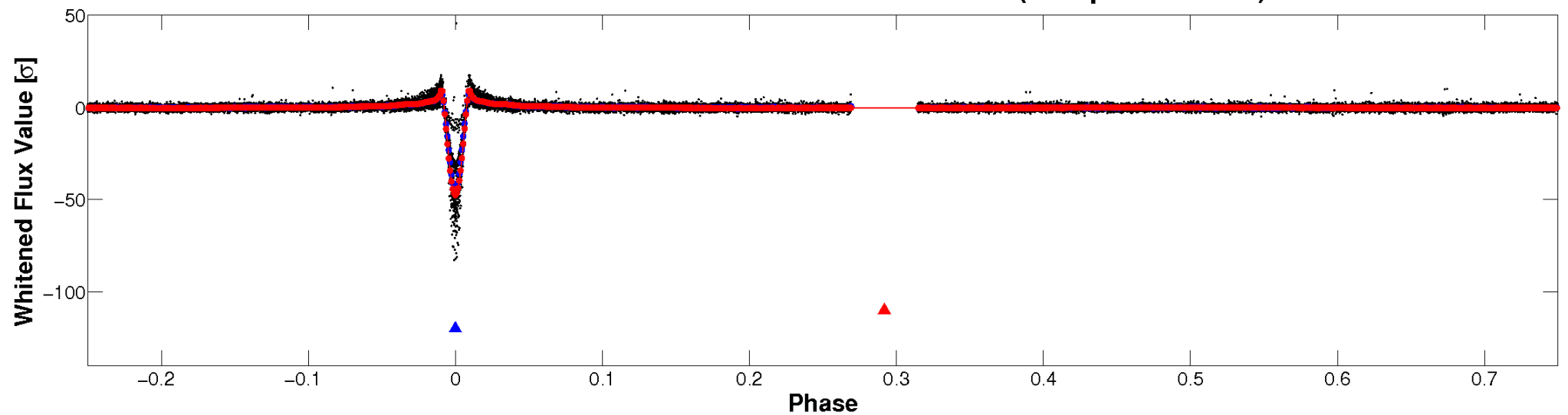


Non-Whitened Vs. Whitened Light Curve

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

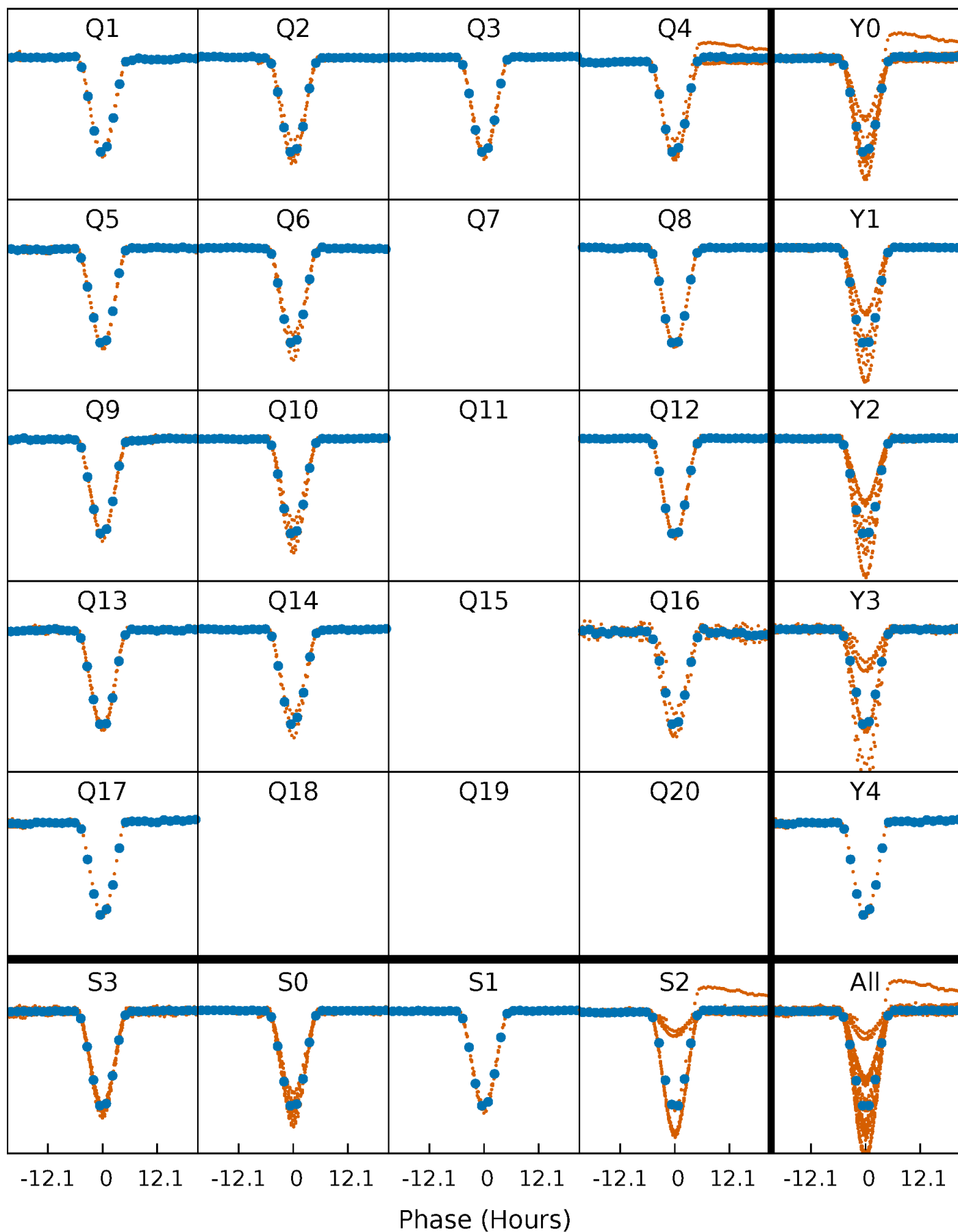


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



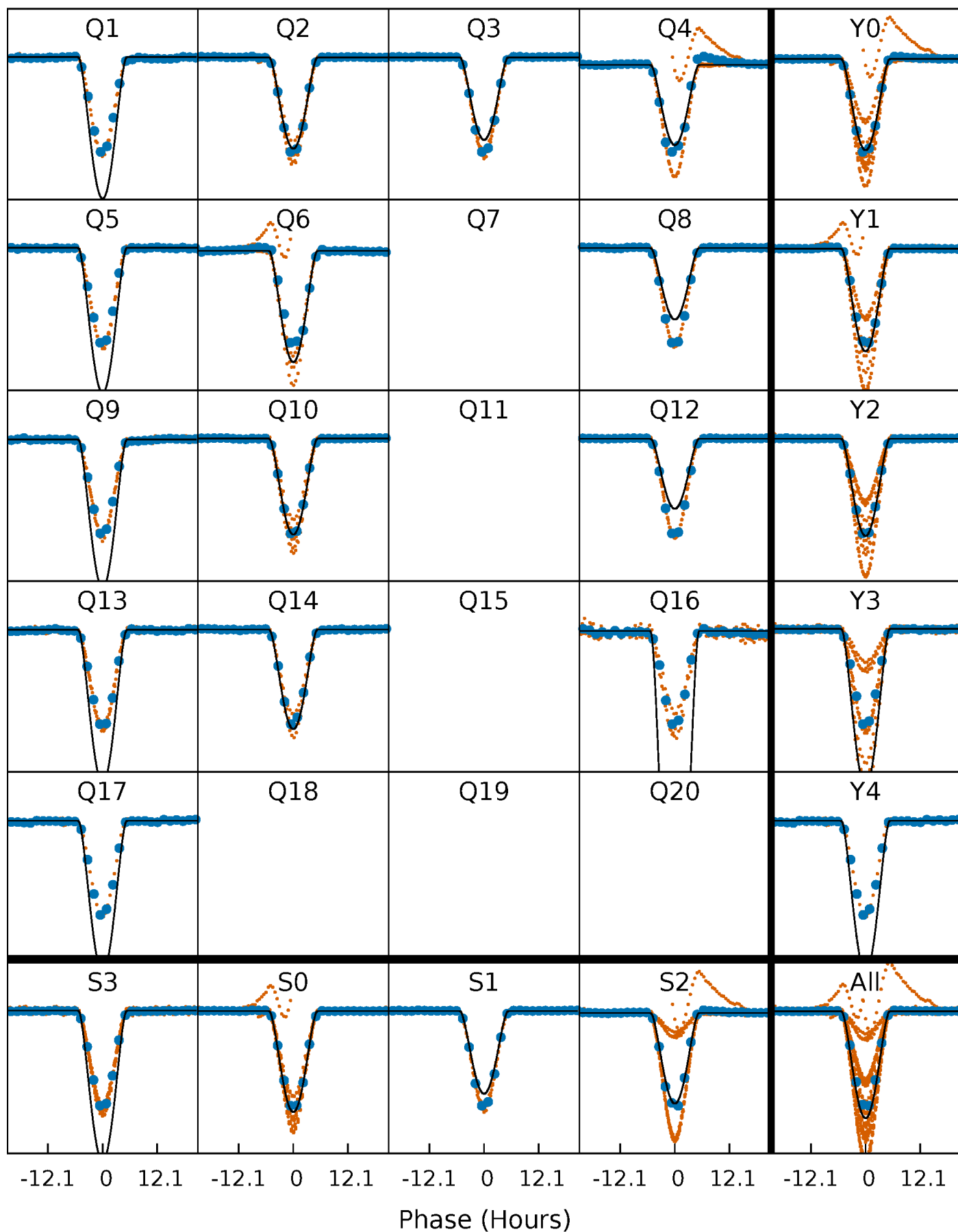
PDC Quarter-Phased Transit Curves

TCE 010491544-02 P= 22.771932 Days $T_0=133.843076$ (BKJD)



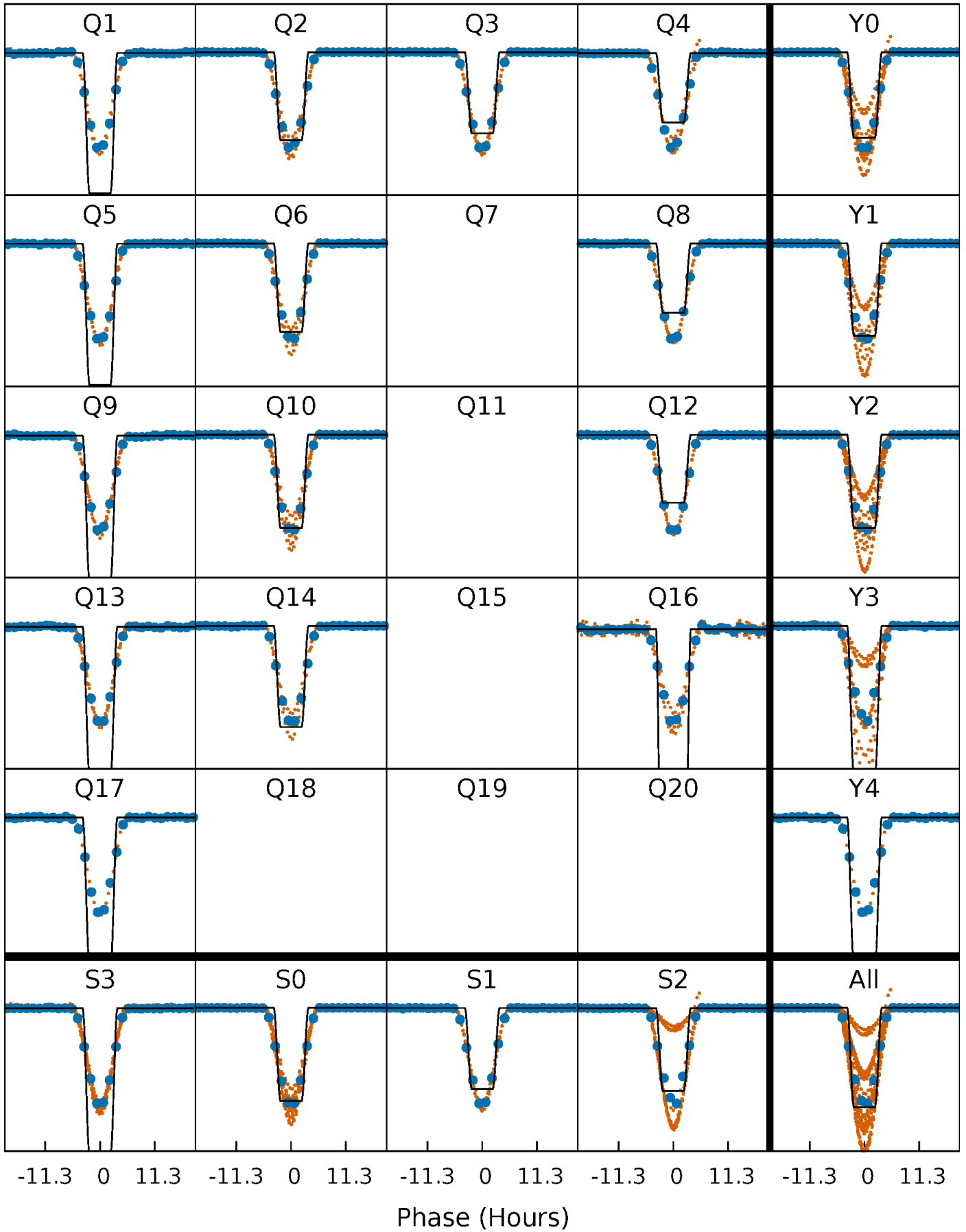
DV Quarter-Phased Transit Curves

TCE 010491544-02 P= 22.771932 Days $T_0=133.843076$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

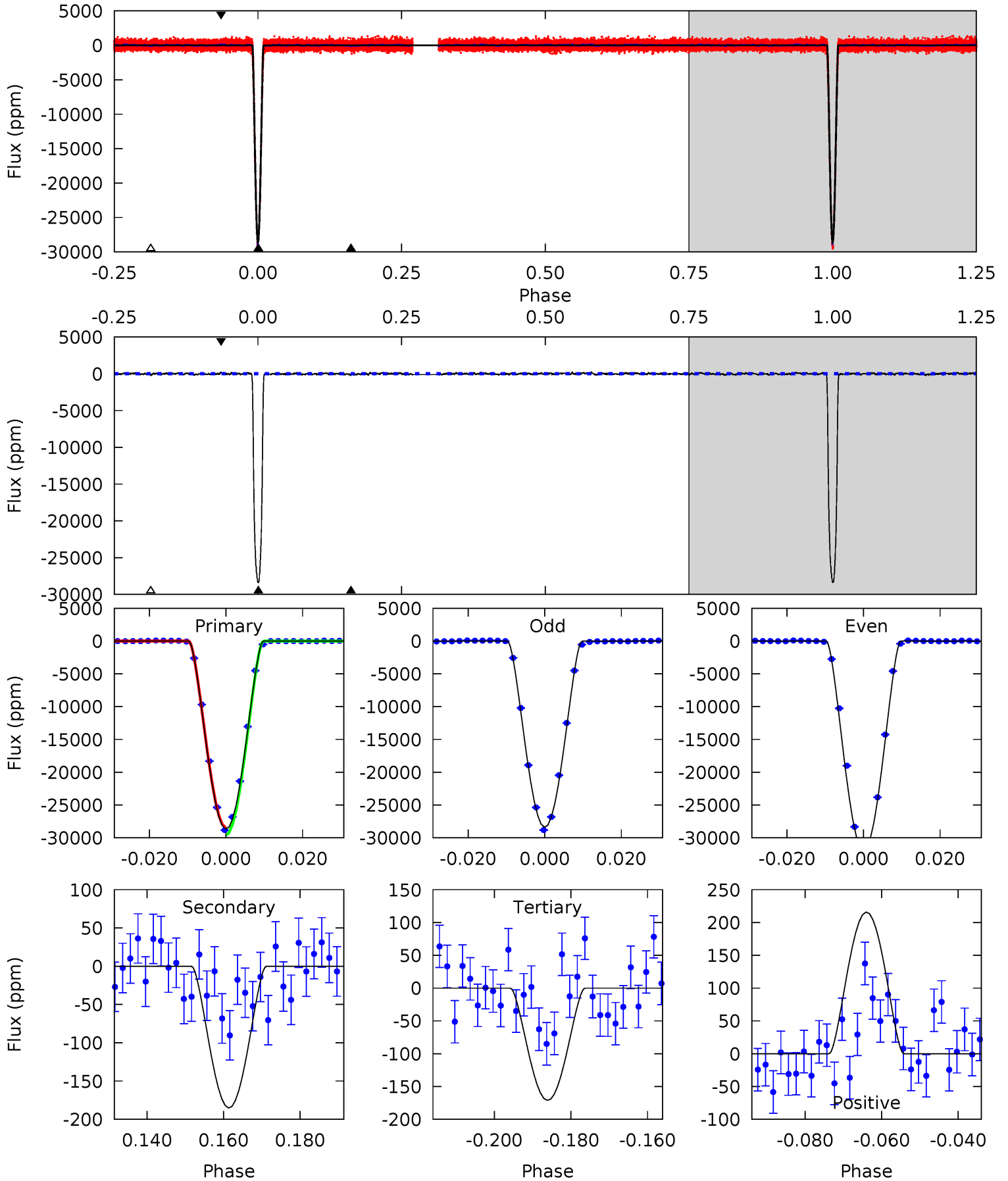
TCE 010491544-02 P= 22.771849 Days $T_0=133.844900$ (BKJD)



DV Model-Shift Uniqueness Test

010491544-02, P = 22.771932 Days, E = 111.071144 Days

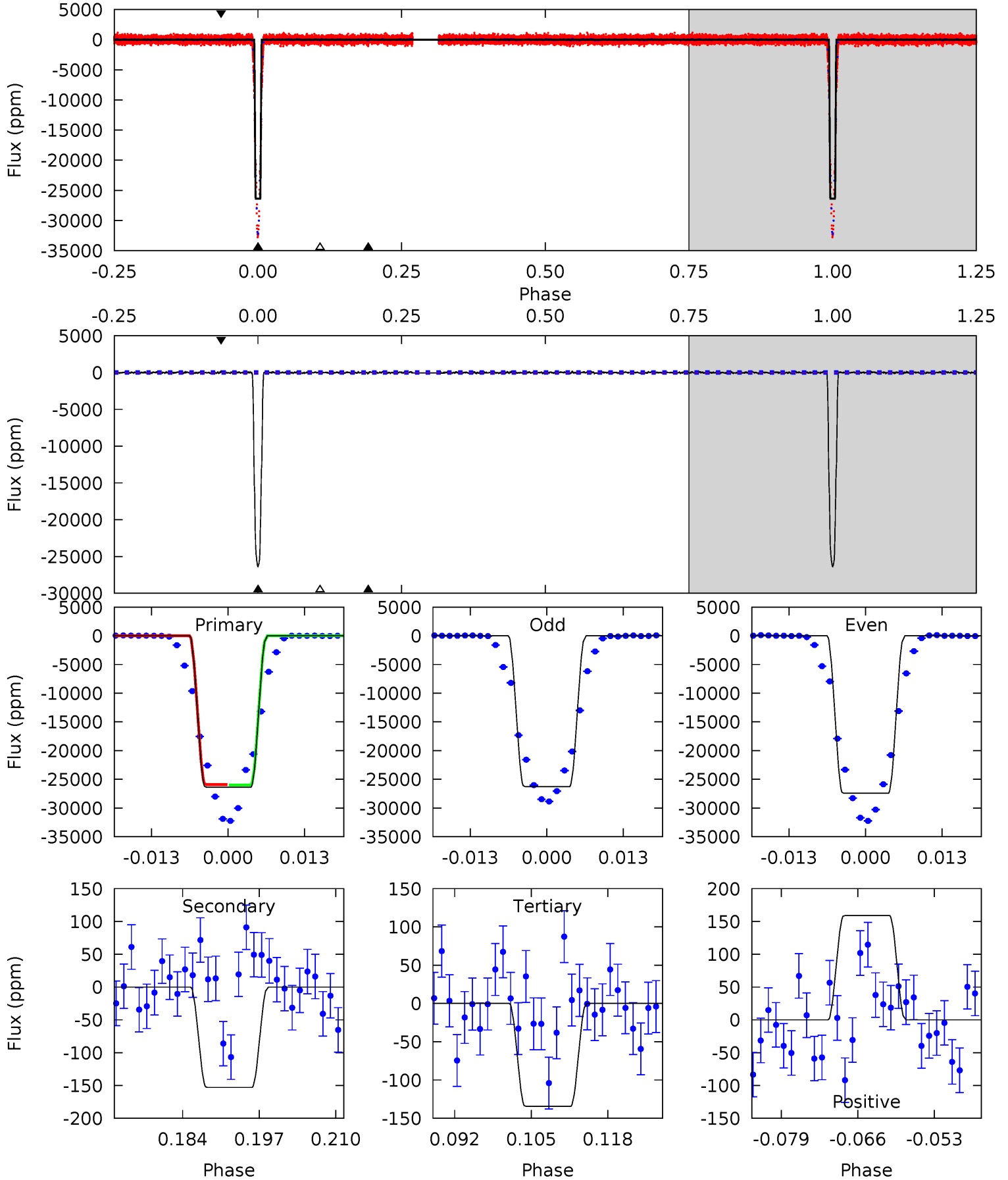
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1618	10.5	9.66	12.2	4.89	2.33	3.50	1609	1606	0.79	-1.73	105.4	0.95	0.01	0



Alt Model-Shift Uniqueness Test

010491544-02, P = 22.771849 Days, E = 111.073051 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
765.6	4.44	3.90	4.61	4.97	2.48	1.32	761.7	761.0	0.54	-0.17	19.4	0.93	0.01	0



Stellar Parameters For KIC 010491544

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5073^{+154}_{-102}	$3.020^{+0.352}_{-0.288}$	$-0.760^{+0.300}_{-0.250}$	$4.610^{+2.693}_{-1.243}$	$0.812^{+0.352}_{-0.020}$	$0.012^{+0.025}_{-0.008}$
	+3%/-2%	+12%/-10%	+39%/-33%	+58%/-27%	+43%/-2%	+216%/-69%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 010491544-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-183 ± 18	$143.02^{+46.16}_{-26.88}$	1740^{+235}_{-166}	-2197^{+170}_{-191}	$0.114^{+0.059}_{-0.048}$
Alt.	-153 ± 34	$89.08^{+28.05}_{-19.30}$	1738^{+217}_{-161}	-1922^{+3929}_{-334}	$0.245^{+0.162}_{-0.103}$

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 $A_{obs} \gg 1.0$

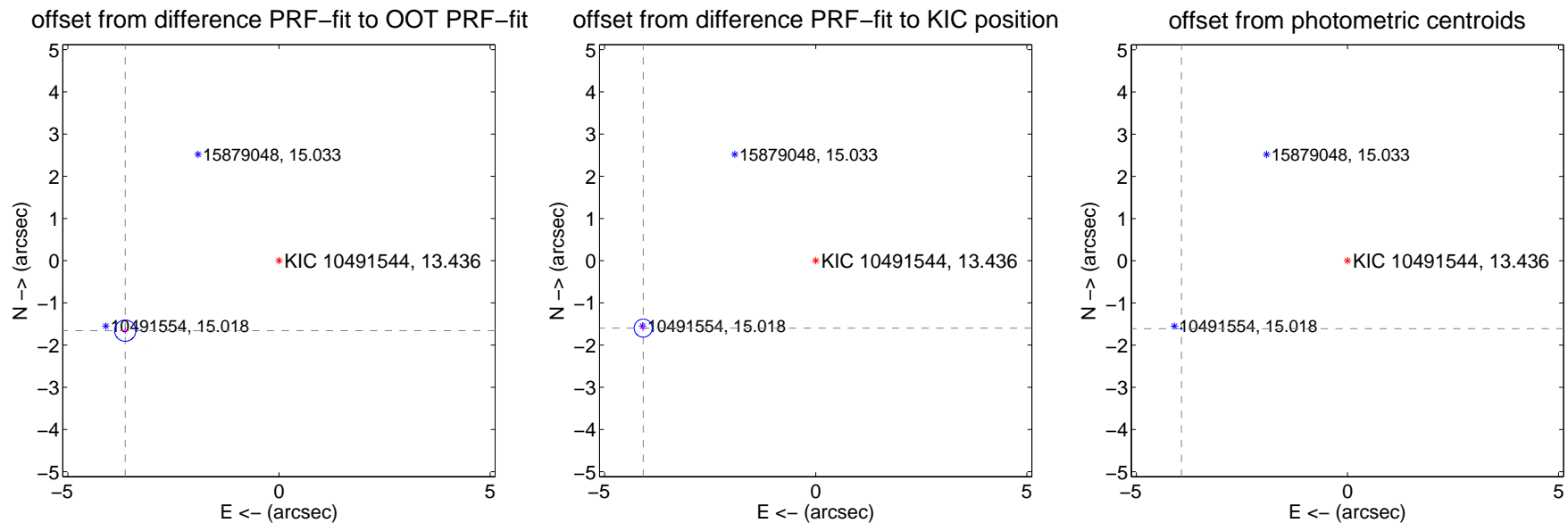
DV Centroid Data

Supplemental centroid analysis for 010491544-02. Kepler magnitude: 13.44. Transit SNR 442.22

There are 14 quarters with good PRF difference image offsets

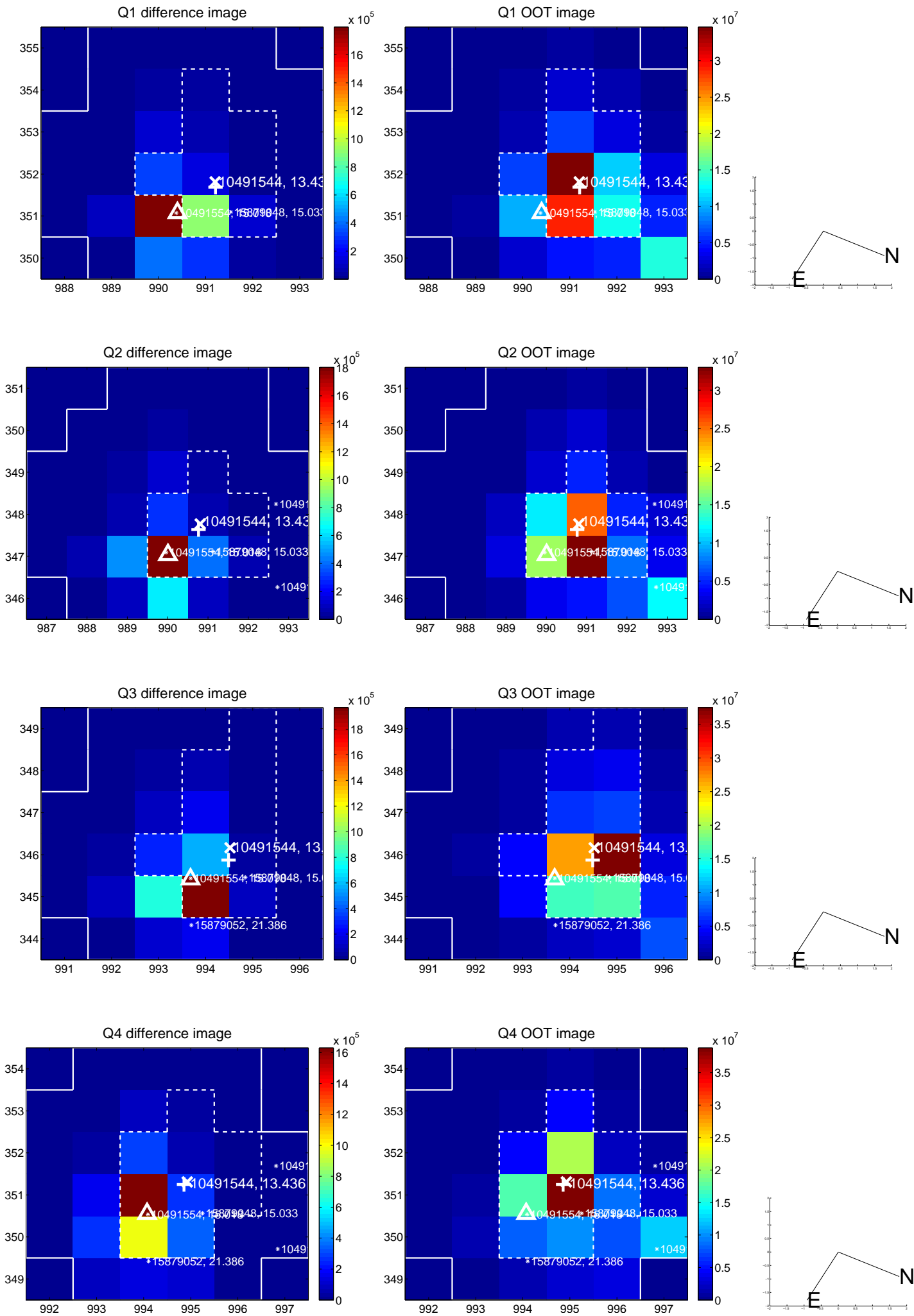
The direct PRF centroid is offset from the target star catalog position by about 0.45 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	4.002 ± 0.084	47.56	3.642 ± 0.086	-1.658 ± 0.075
PRF-fit source offset from KIC position	4.386 ± 0.071	61.50	4.085 ± 0.072	-1.597 ± 0.070
photometric centroid source offset	4.25 ± 0.01	800.05	3.93 ± 0.00	-1.61 ± 0.01

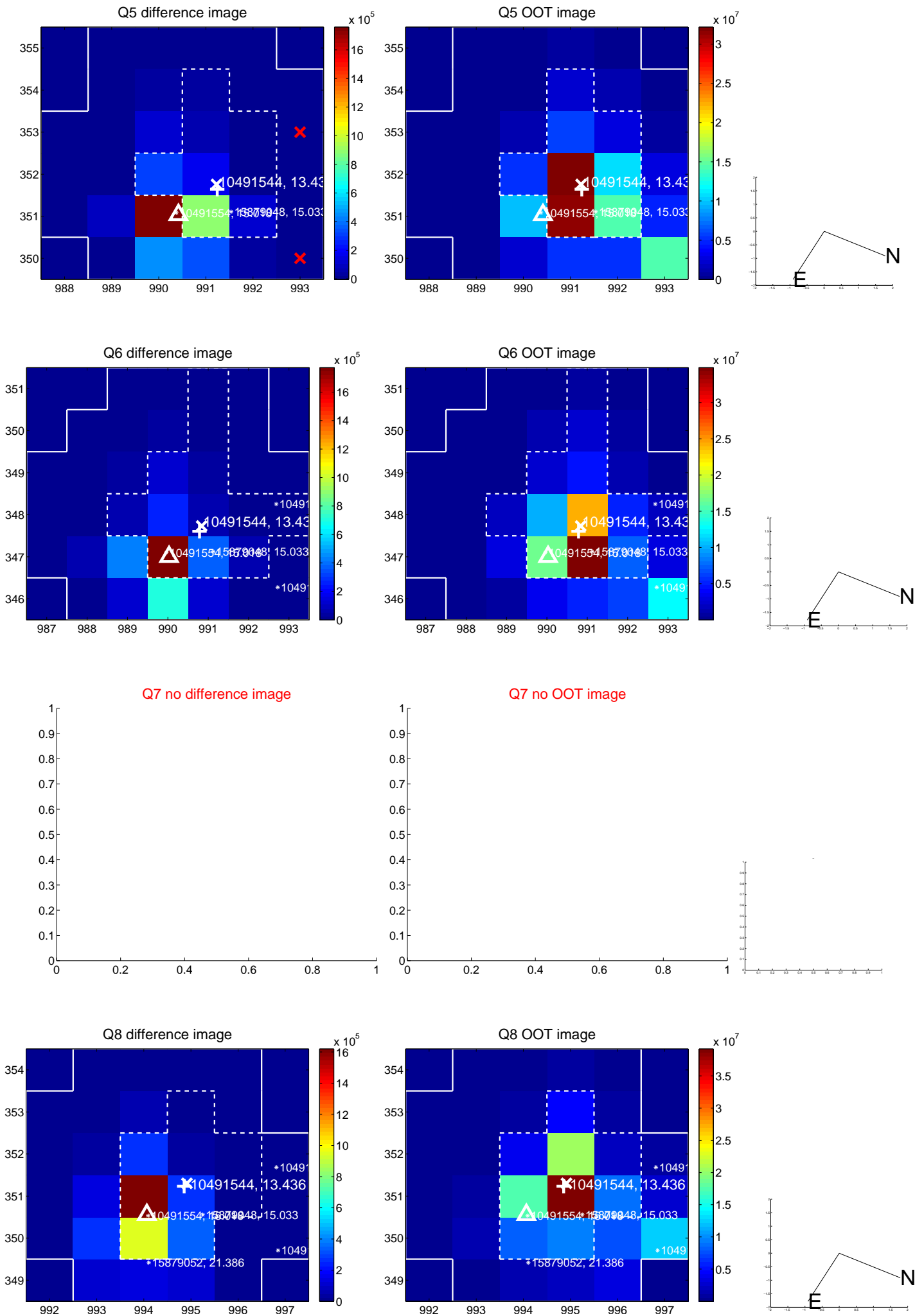


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

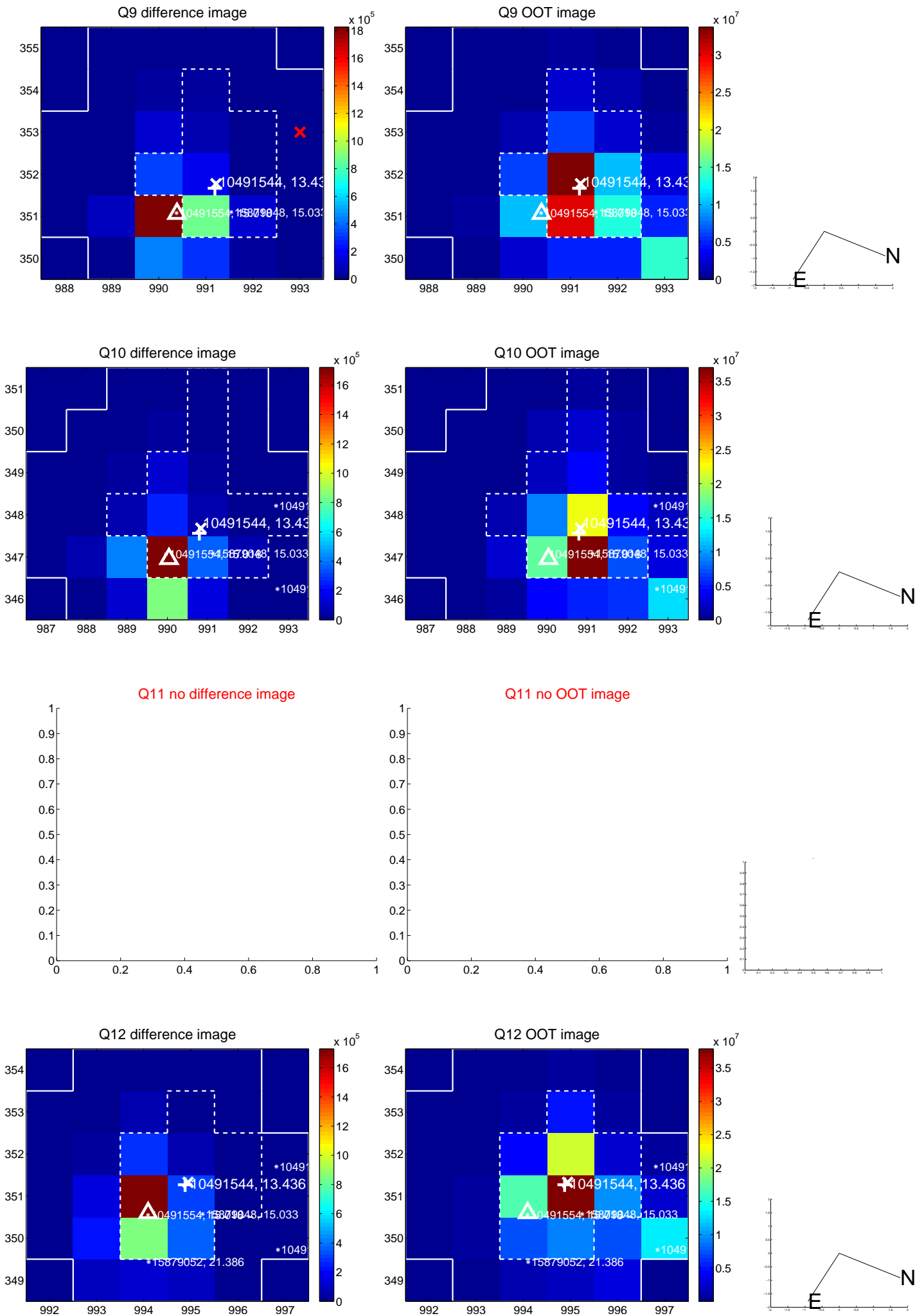
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



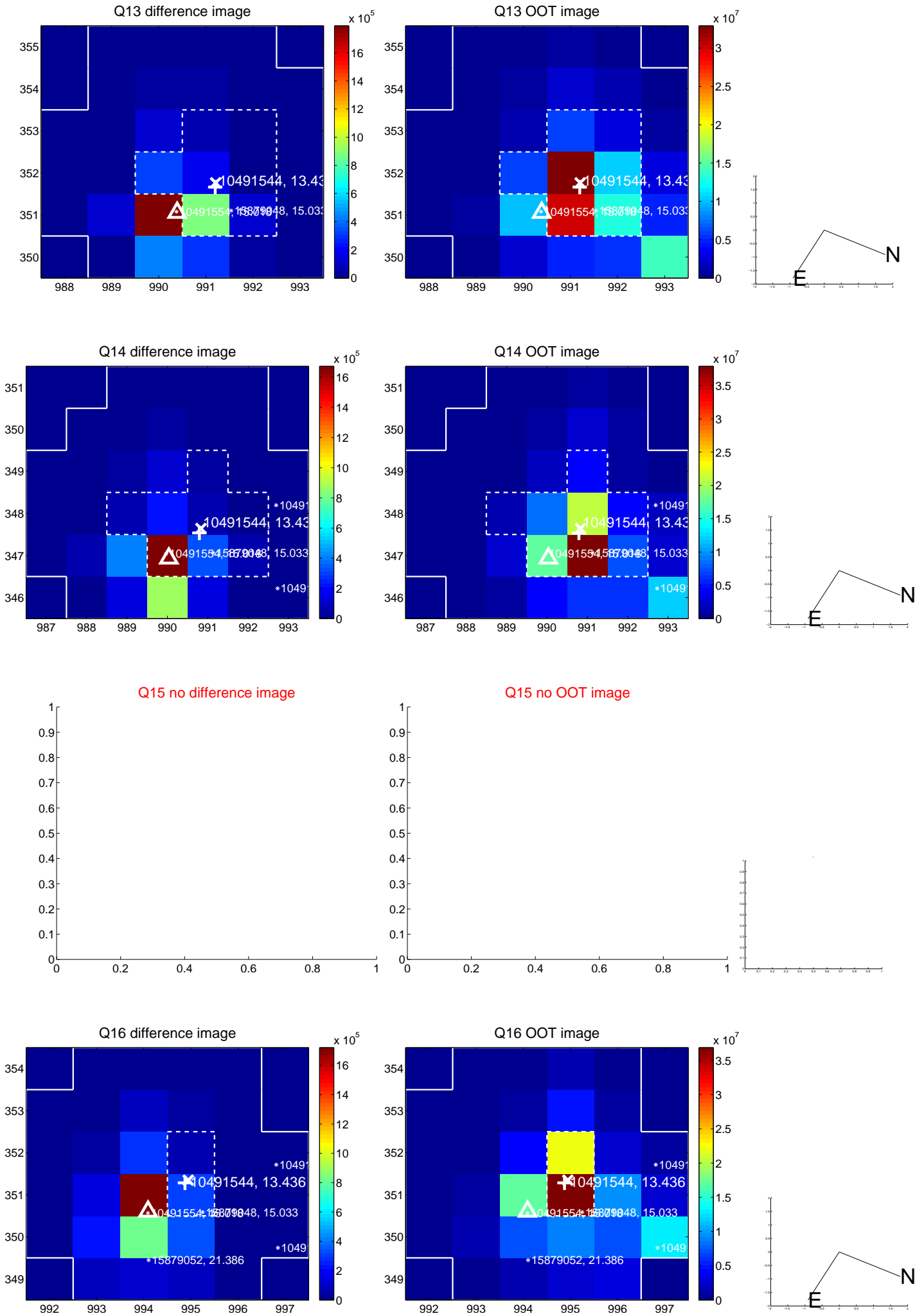
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



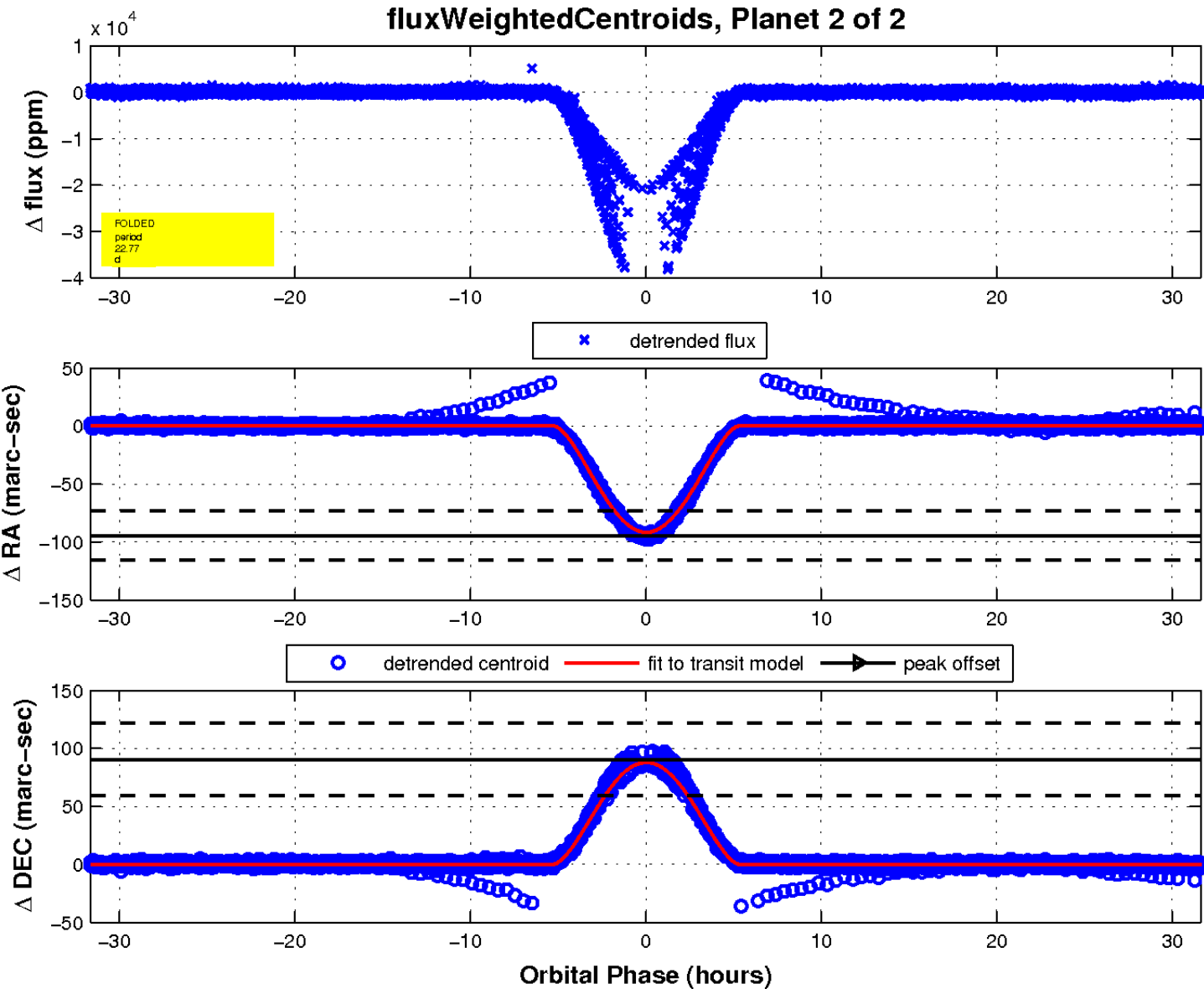
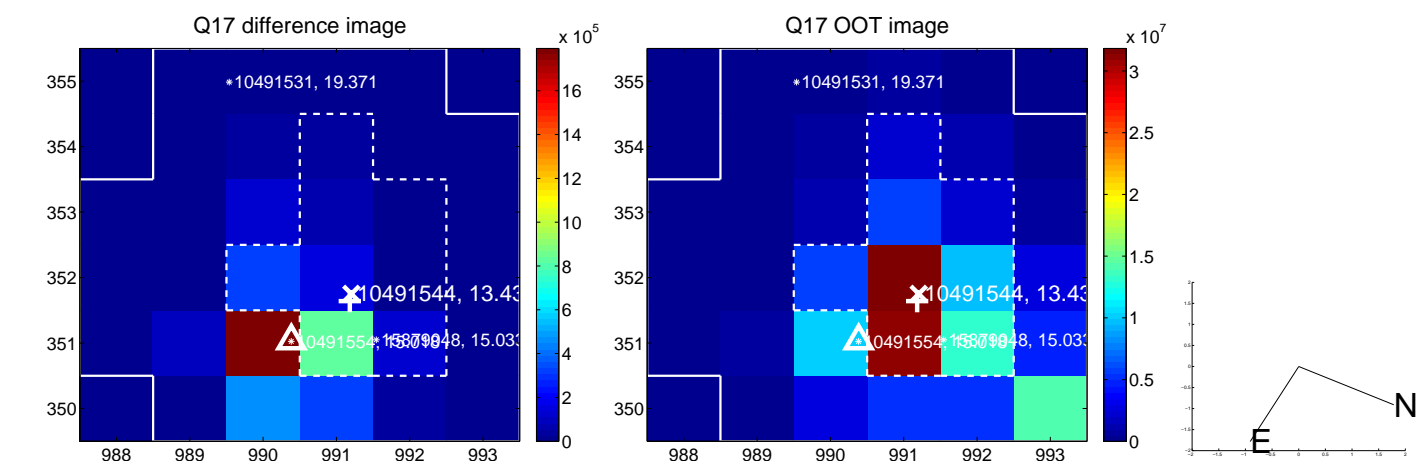
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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



UKIRT Image

Declination

