

KIC 009765489

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})
009765489-01	OBS	No	5.379914	136.730251	23.4	25.359	9.0	12.3	2.03	8554	1.05	3460.24
009765489-02	OBS	No	5.378943	135.097484	5.2	32.279	7.2	2.3	2.03	8554	0.48	3461.08

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009765489-01	OBS	FP	0.00	1	0	0	0	LPP_DV
009765489-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—SAME_NTL_PERIOD

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

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

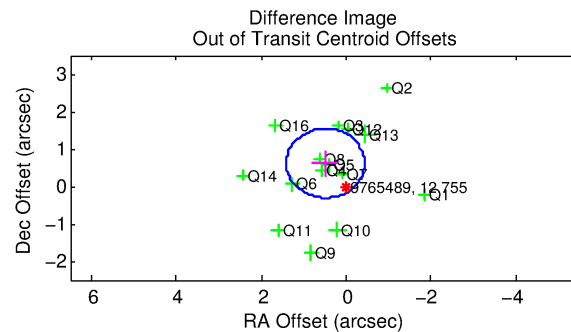
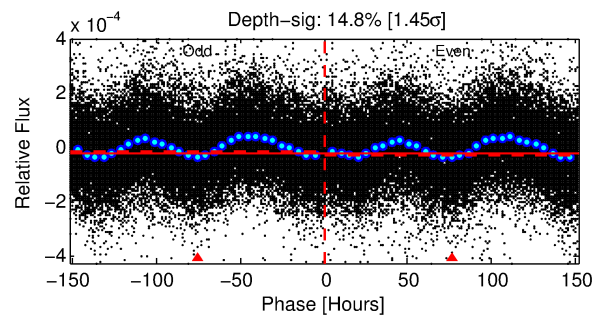
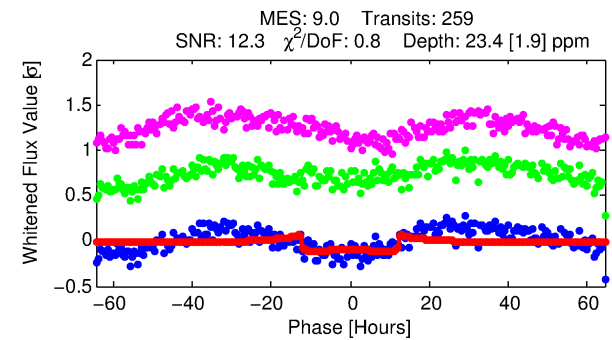
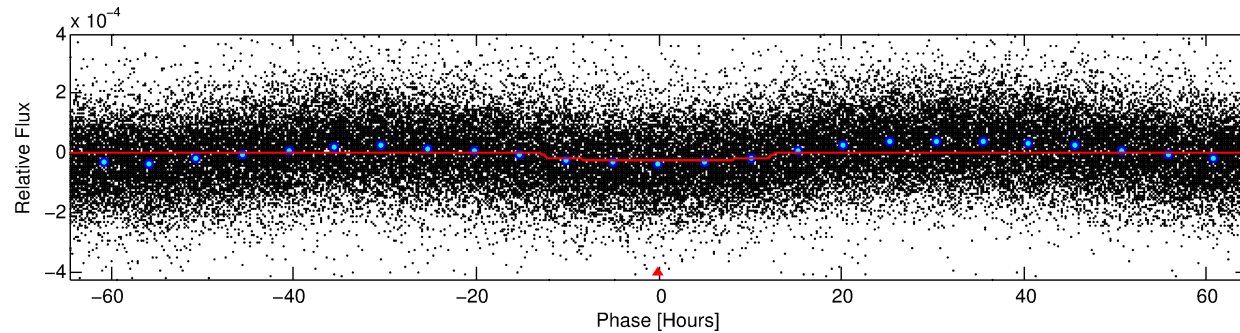
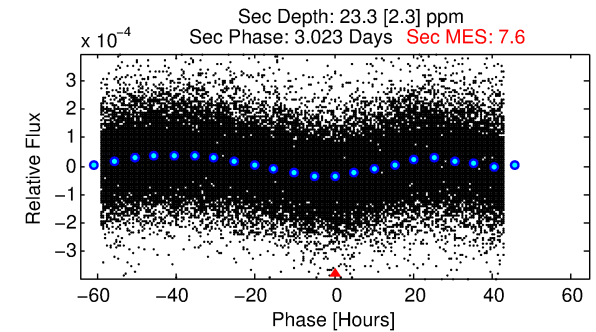
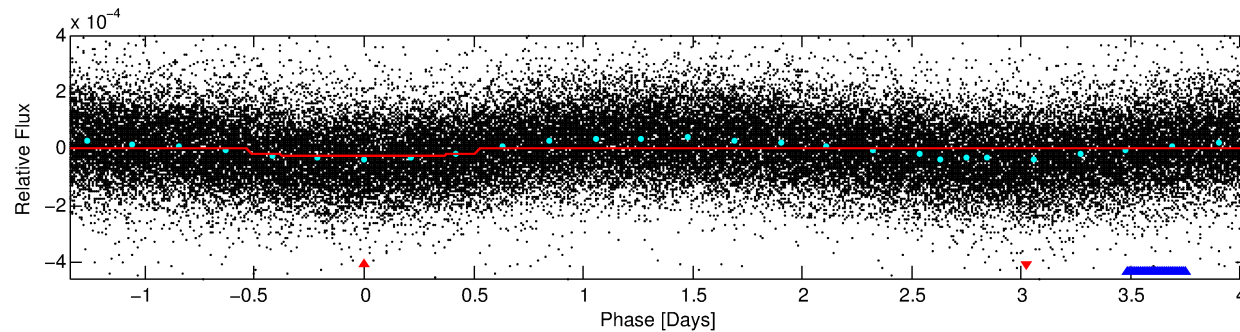
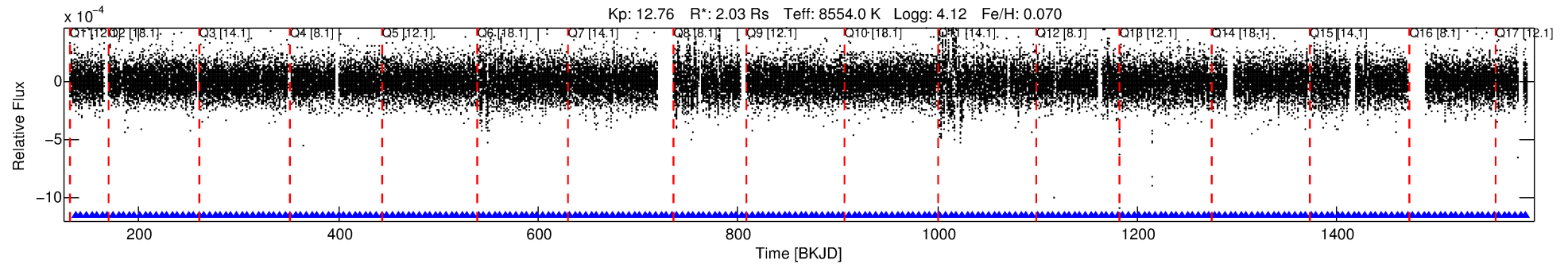
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009765489-01

No Significant Match Found

DV One-Page Summary

KIC: 9765489 Candidate: 1 of 2 Period: 5.380 d



DV Fit Results:

Period = 5.37991 [0.00007] d
Epoch = 136.7303 [0.0095] BKJD
Rp/R* = 0.0047 [0.0006]
a/R* = 1.43 [0.59]
b = 0.70 [0.60]
Seff = 3460.24 [1138.80]
Teff = 1956 [161] K
Rp = 1.05 [0.27] Re
a = 0.0755 [0.0144] AU
Ag = 66.15 [26.40] [2.47σ]
Teffp = 8623 [718] K [9.06σ]

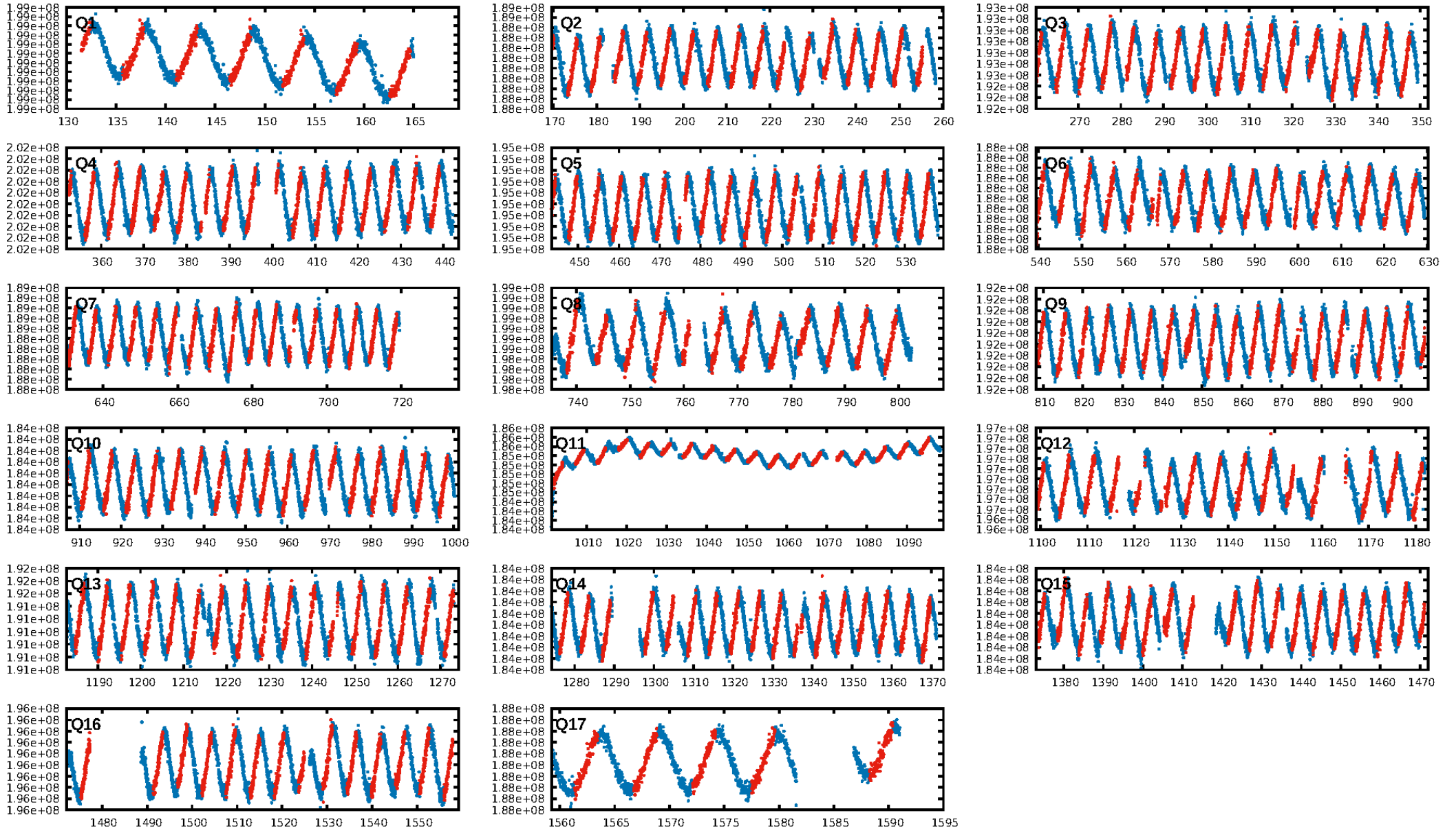
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [247/247]
GhostDiagnostic-chr: 0.5058
Centroid-sig: 0.0%
Centroid-so: 2.336 arcsec [3.31σ]
OotOffset-rm: 0.786 arcsec [2.54σ]
OotOffset-st: 4/3/4/4 [15]
KicOffset-rm: 0.767 arcsec [2.46σ]
KicOffset-st: 4/3/4/4 [15]
DiffImageQuality-fgm: 0.87 [13/15]
DiffImageOverlap-fno: 0.00 [0/17]

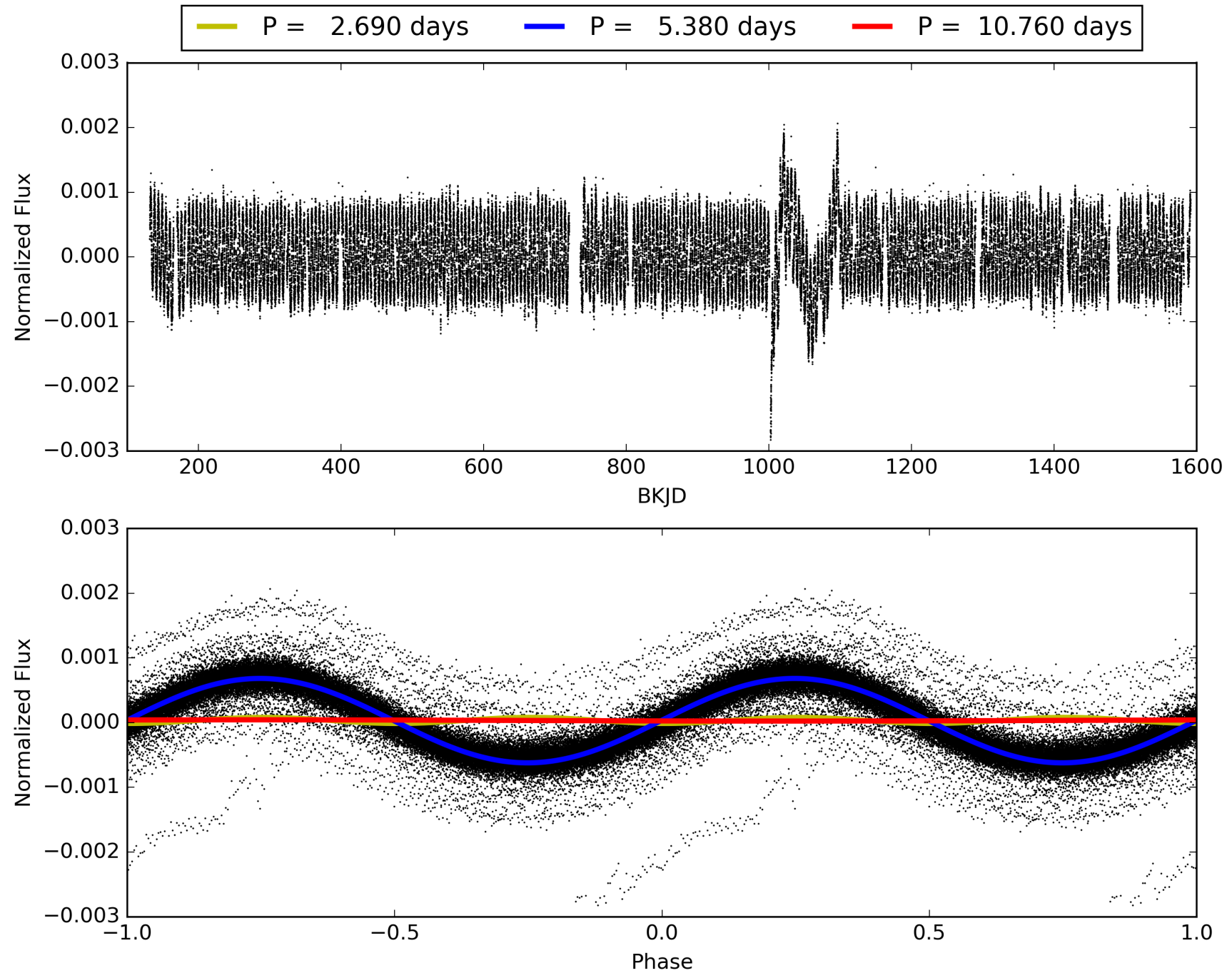
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 00:53:17 Z

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

TCE 009765489-01, PDC Light Curves

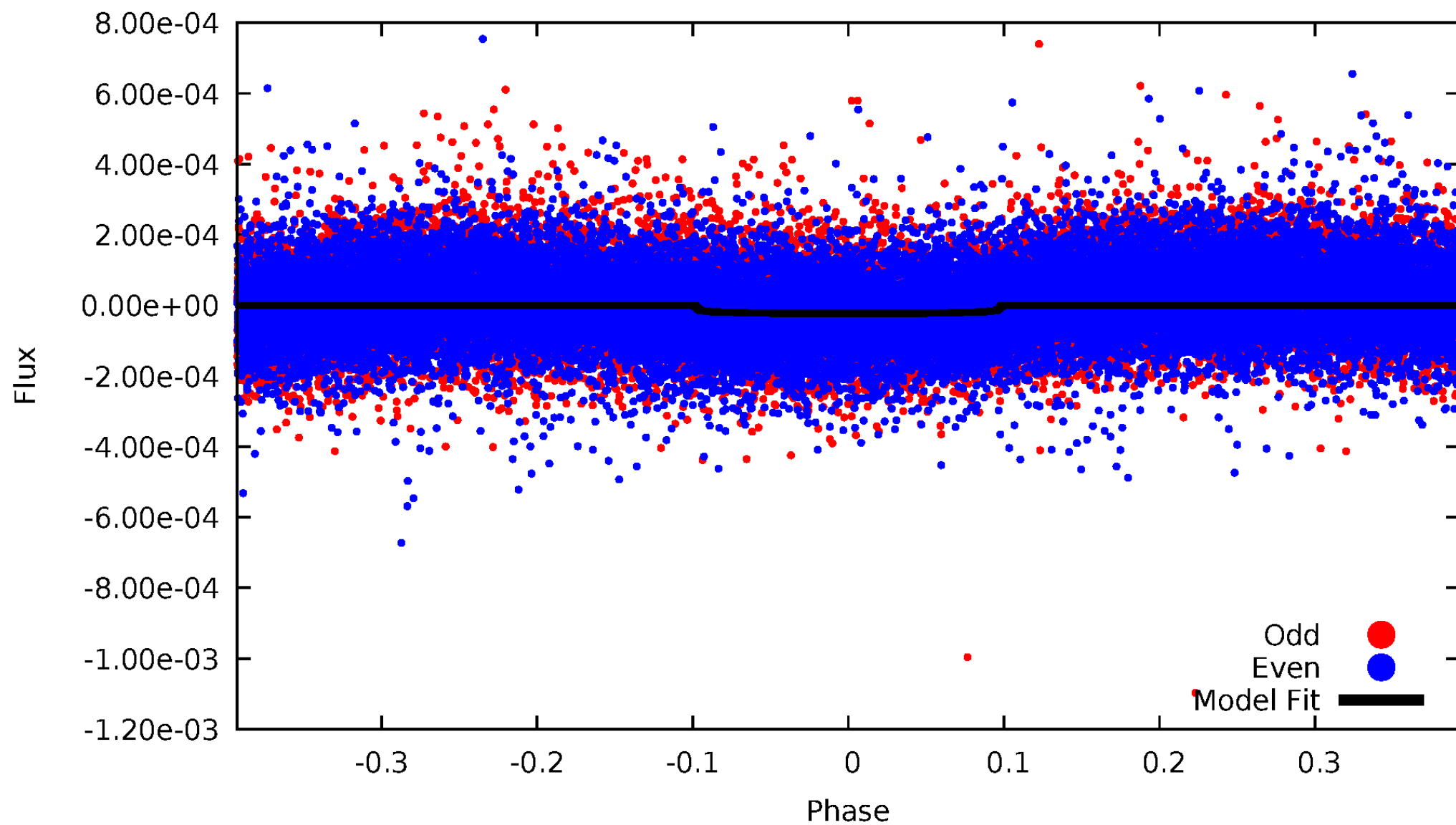


TCE 009765489-01



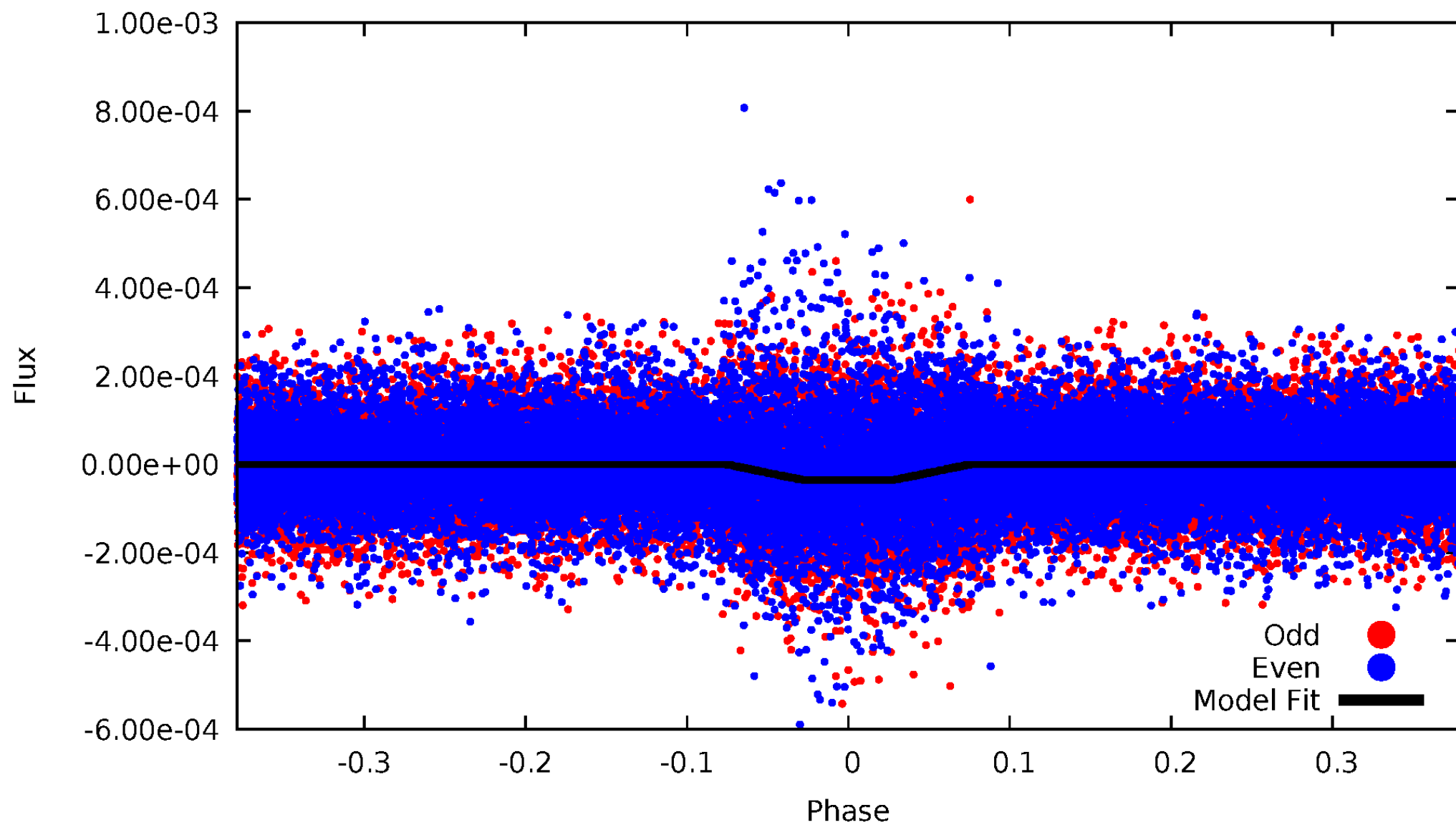
DV Odd/Even

TCE 009765489-01

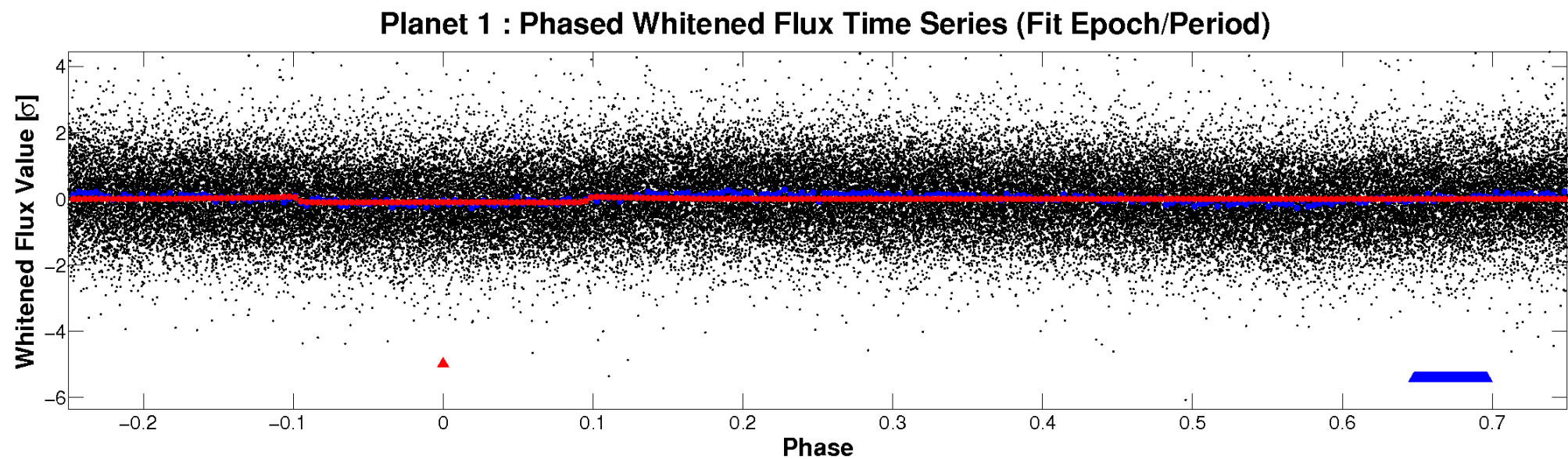
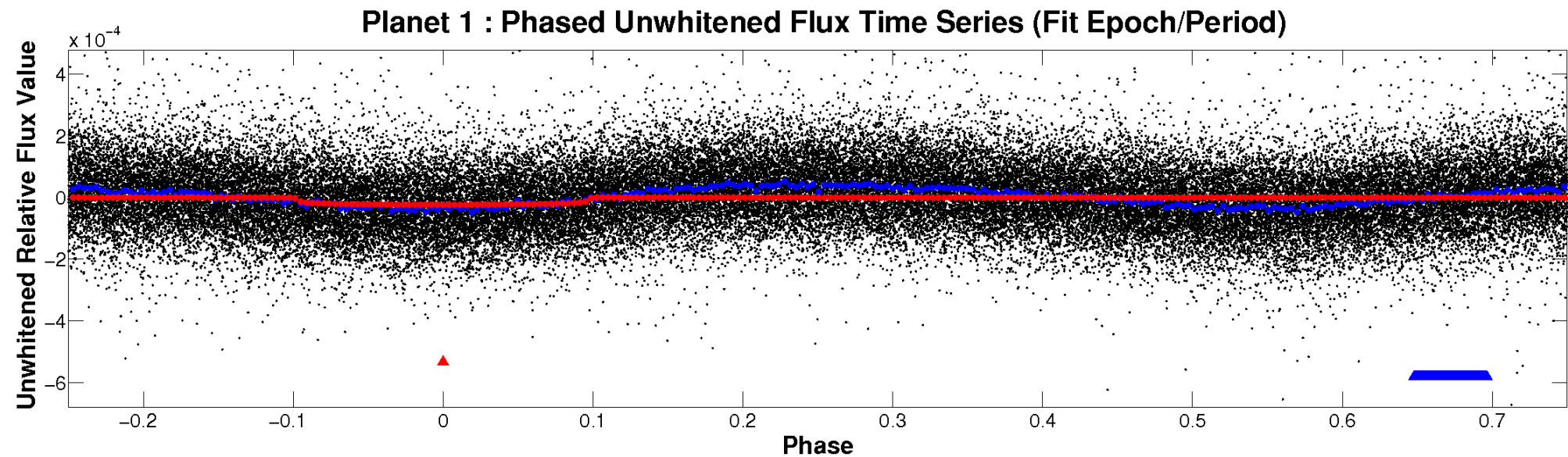


ALT Odd/Even

TCE 009765489-01

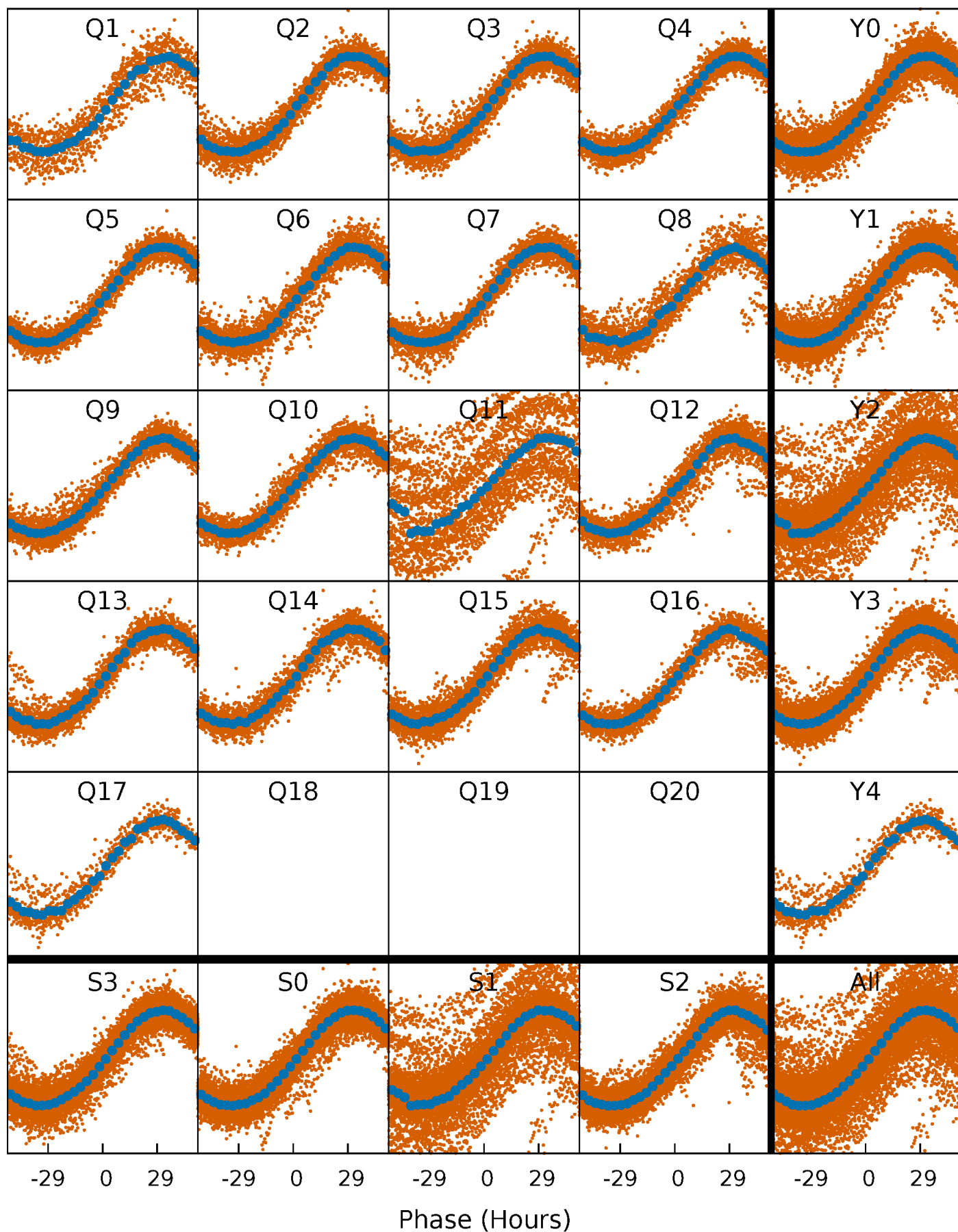


Non-Whitened Vs. Whitened Light Curve



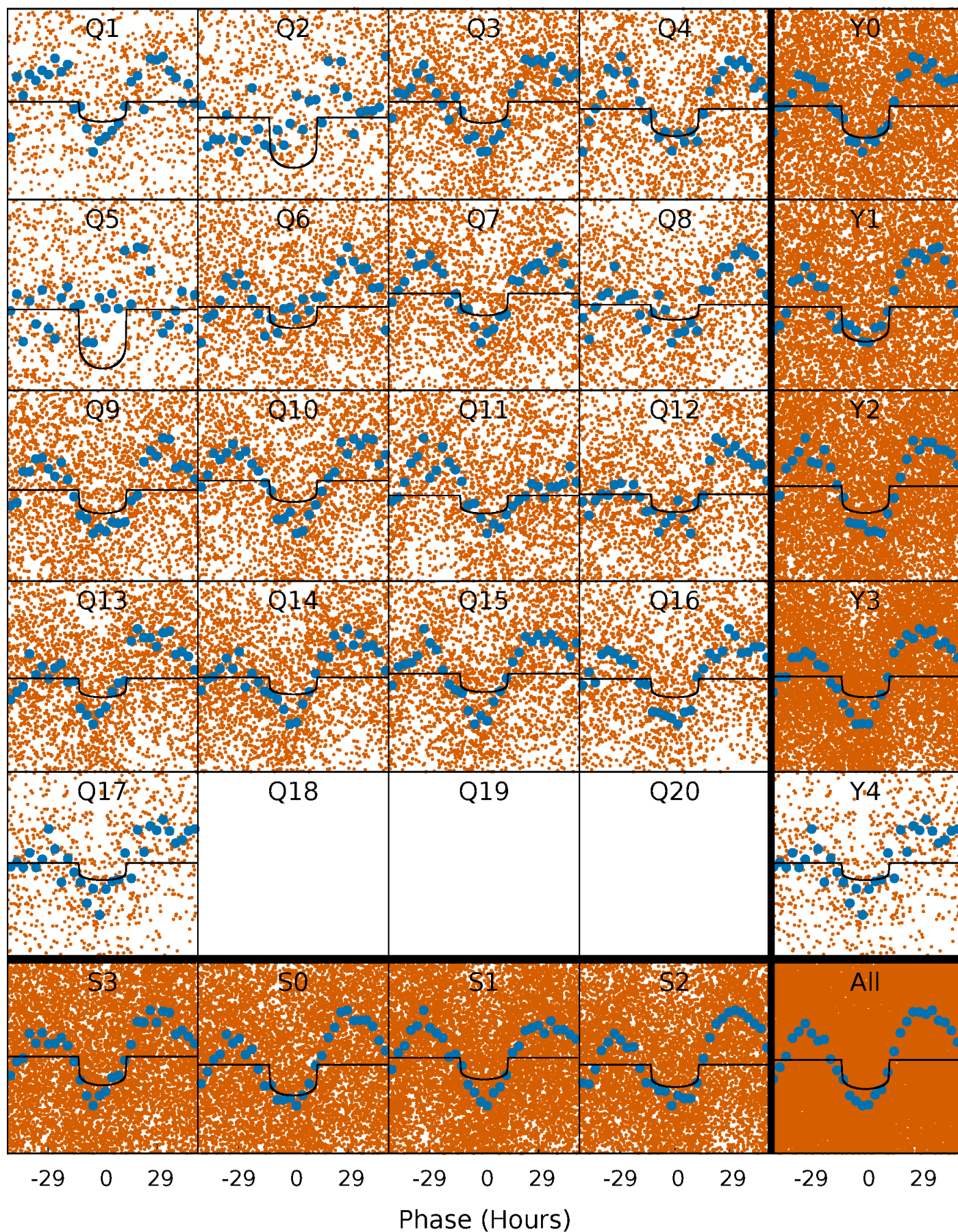
PDC Quarter-Phased Transit Curves

TCE 009765489-01 P= 5.379914 Days $T_0=136.730251$ (BKJD)



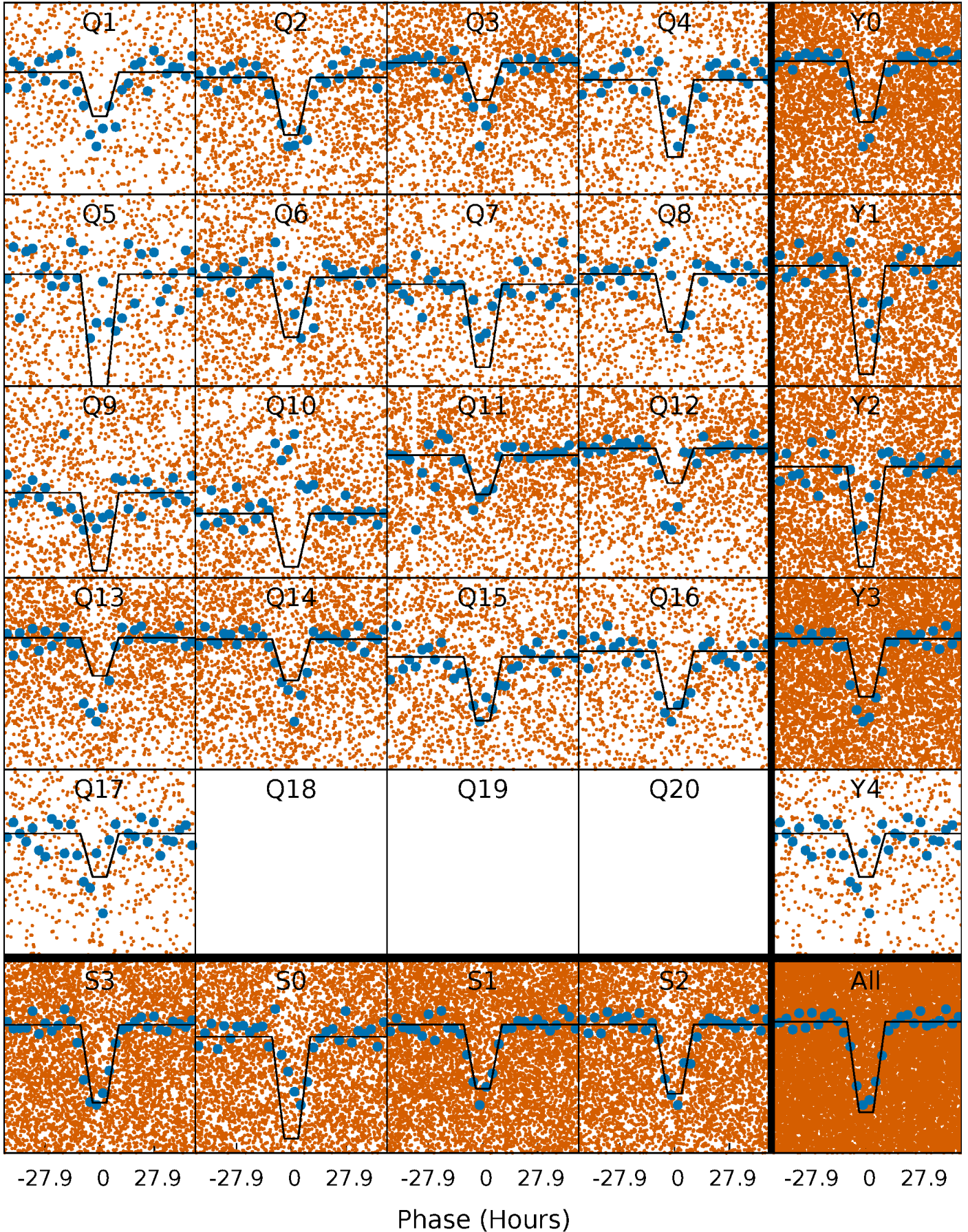
DV Quarter-Phased Transit Curves

TCE 009765489-01 P= 5.379914 Days $T_0=136.730251$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

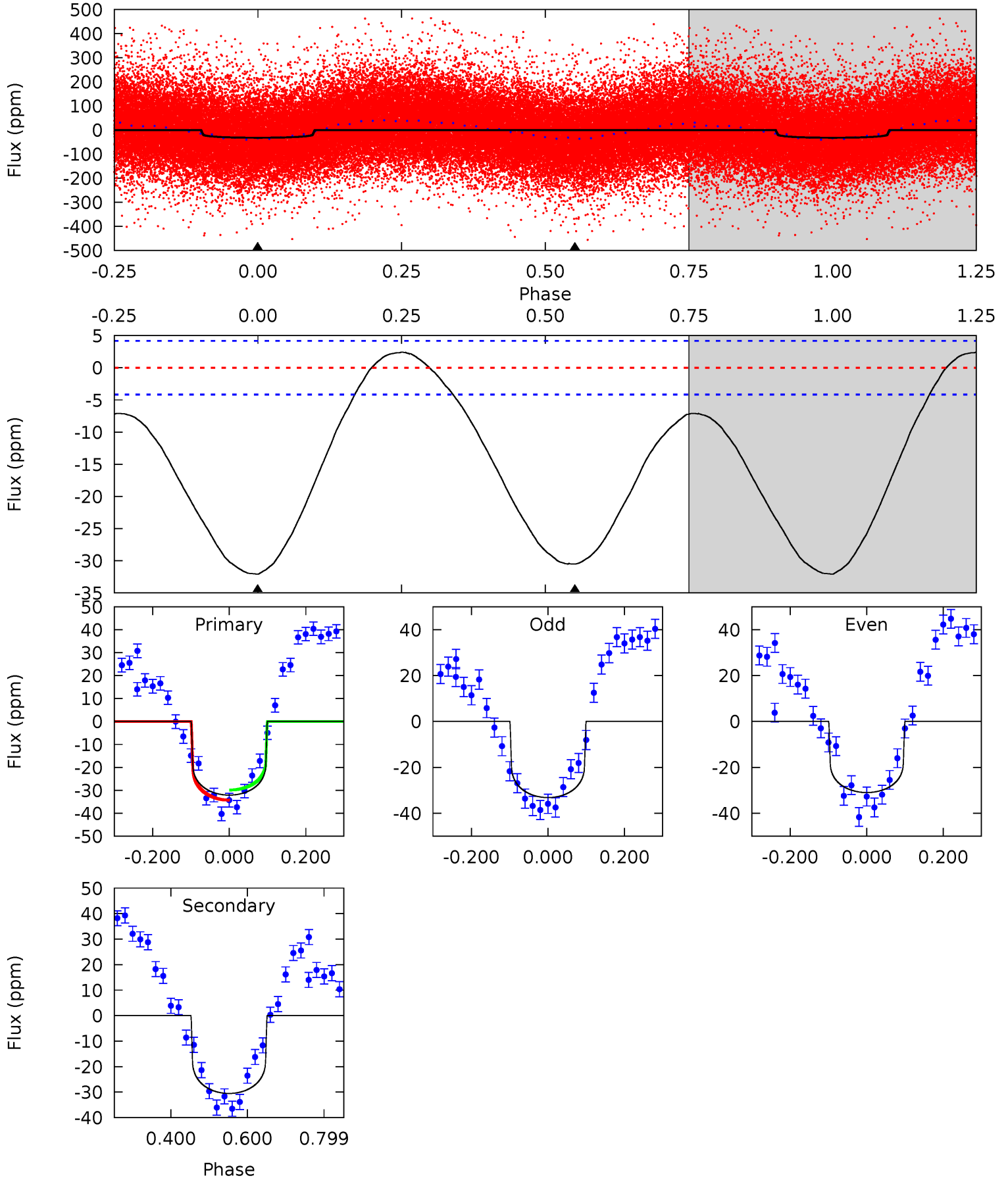
TCE 009765489-01 P= 5.379683 Days $T_0=136.627382$ (BKJD)



DV Model-Shift Uniqueness Test

009765489-01, P = 5.379914 Days, E = 131.350337 Days

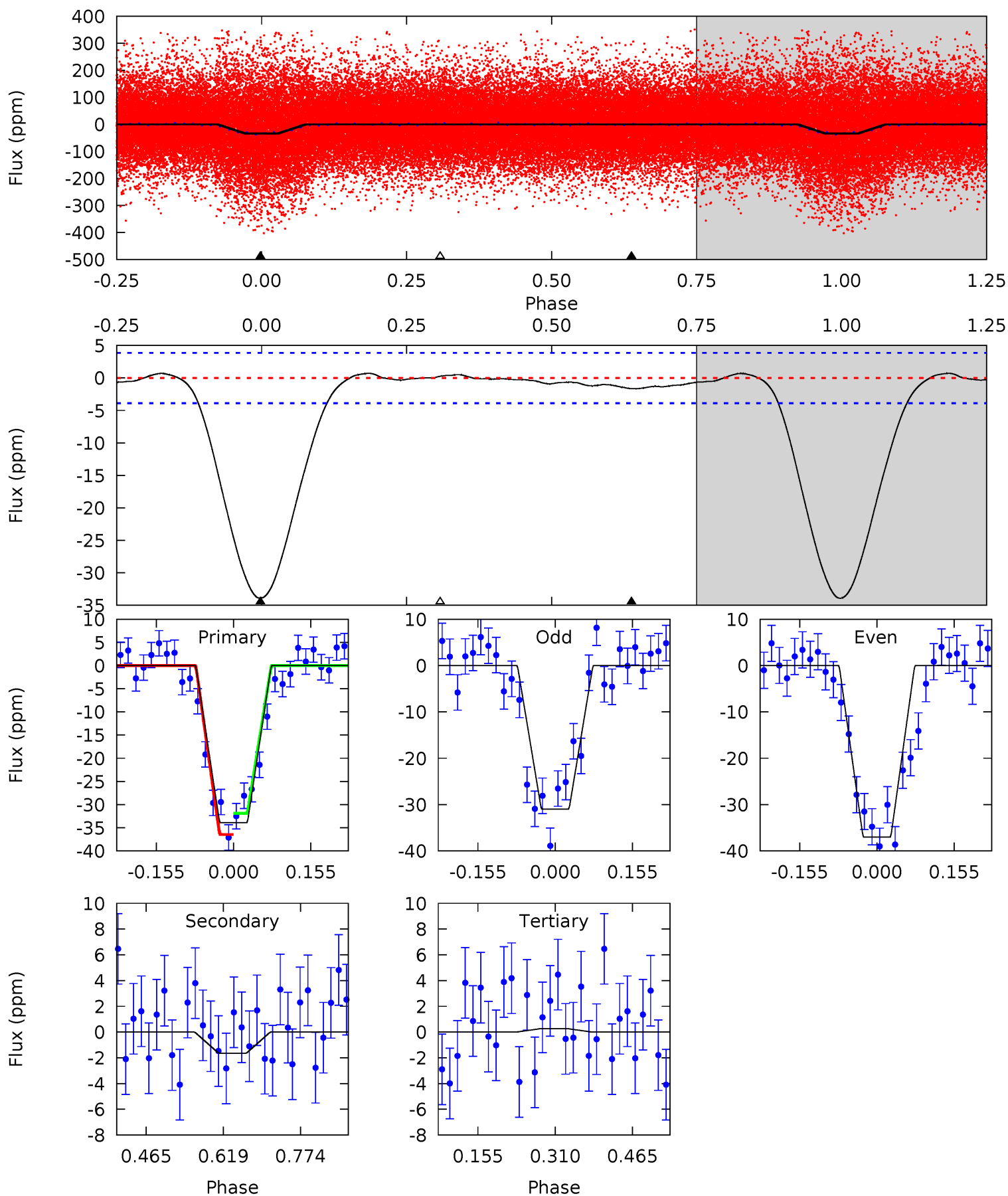
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
33.9	32.3	0	0	4.42	1.28	4.07	33.9	33.9	32.3	32.3	1.17	1.00	0.07	2.37



Alt Model-Shift Uniqueness Test

009765489-01, P = 5.379683 Days, E = 131.247699 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
39.1	1.90	-0.30	0	4.47	1.42	0.40	39.4	39.1	2.20	1.90	3.47	1.22	0.02	0



Stellar Parameters For KIC 009765489

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	8554^{+235}_{-370}	$4.121^{+0.126}_{-0.154}$	$0.070^{+0.250}_{-0.550}$	$2.027^{+0.456}_{-0.456}$	$1.979^{+0.341}_{-0.455}$	$0.335^{+0.235}_{-0.137}$
	+3%/-4%	+3%/-4%	+357%/-786%	+22%/-22%	+17%/-23%	+70%/-41%
Source	KIC0	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 009765489-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-31 ± 1	$1.06^{+0.20}_{-0.19}$	2737^{+179}_{-167}	9392^{+1189}_{-857}	85^{+36}_{-23}
Alt.	-2 ± 1	$1.34^{+0.24}_{-0.22}$	2745^{+173}_{-180}	3980^{+421}_{-569}	$2.748^{+1.905}_{-1.562}$

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 $A_{obs} \gg 1.0$

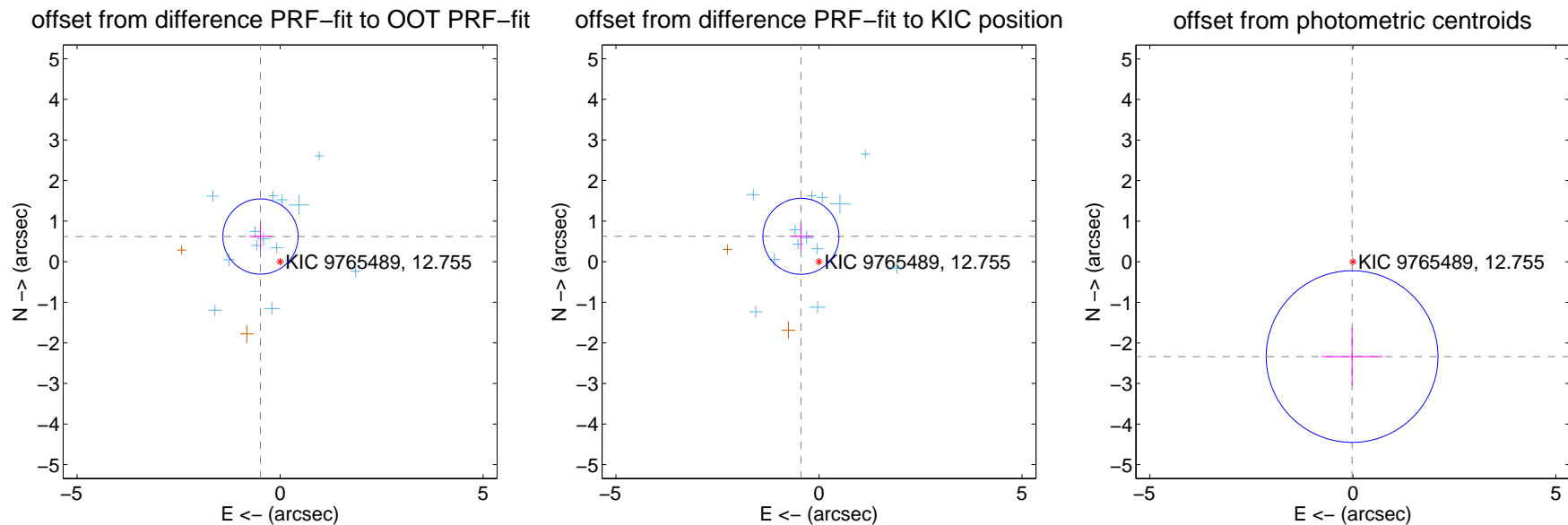
DV Centroid Data

Supplemental centroid analysis for 009765489-01. Kepler magnitude: 12.76. Transit SNR 12.31

There are 13 quarters with good PRF difference image offsets

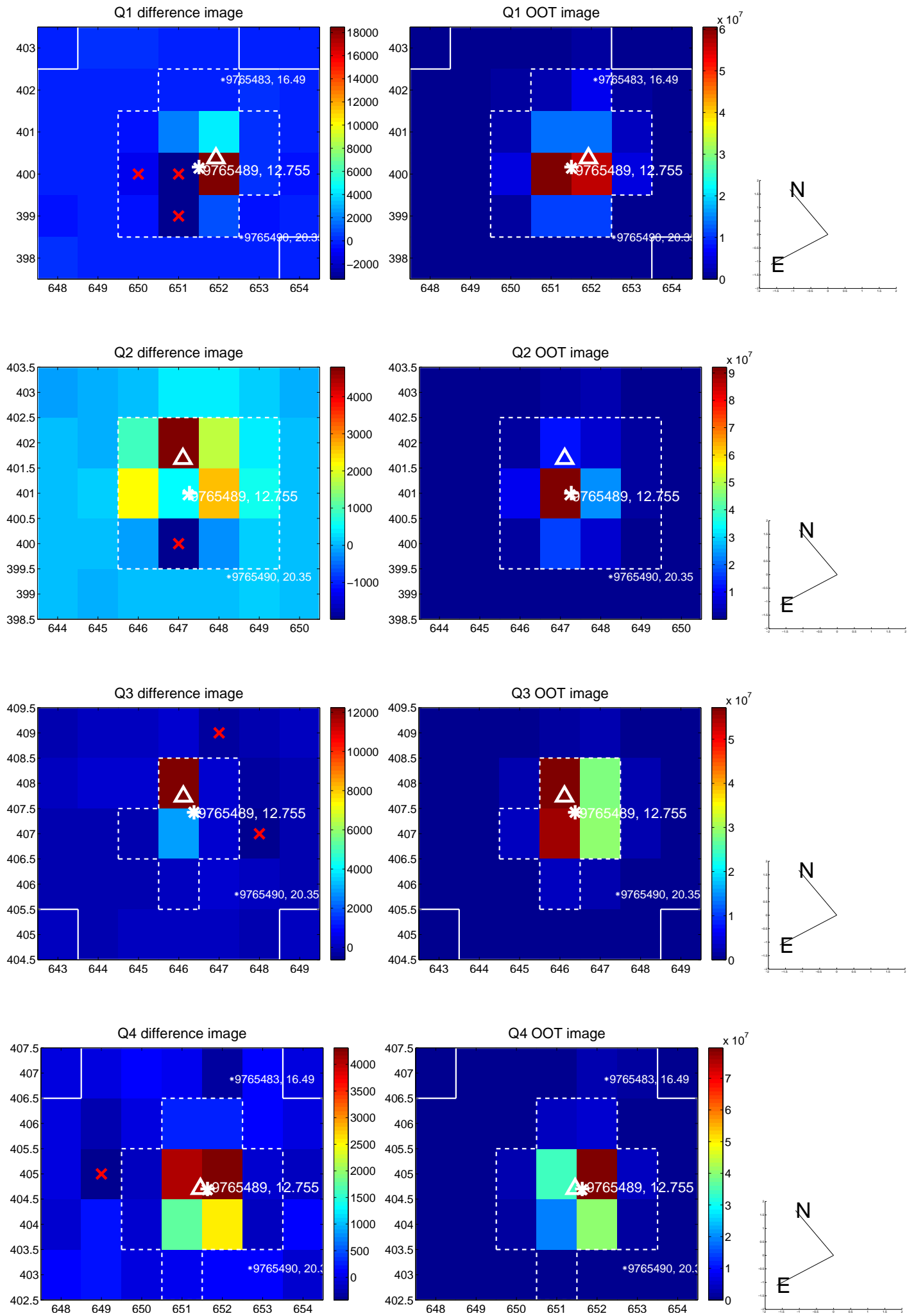
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.786 ± 0.309	2.54	0.483 ± 0.282	0.620 ± 0.324
PRF-fit source offset from KIC position	0.767 ± 0.312	2.46	0.445 ± 0.280	0.625 ± 0.327
photometric centroid source offset	2.34 ± 0.71	3.31	0.02 ± 0.76	-2.34 ± 0.71

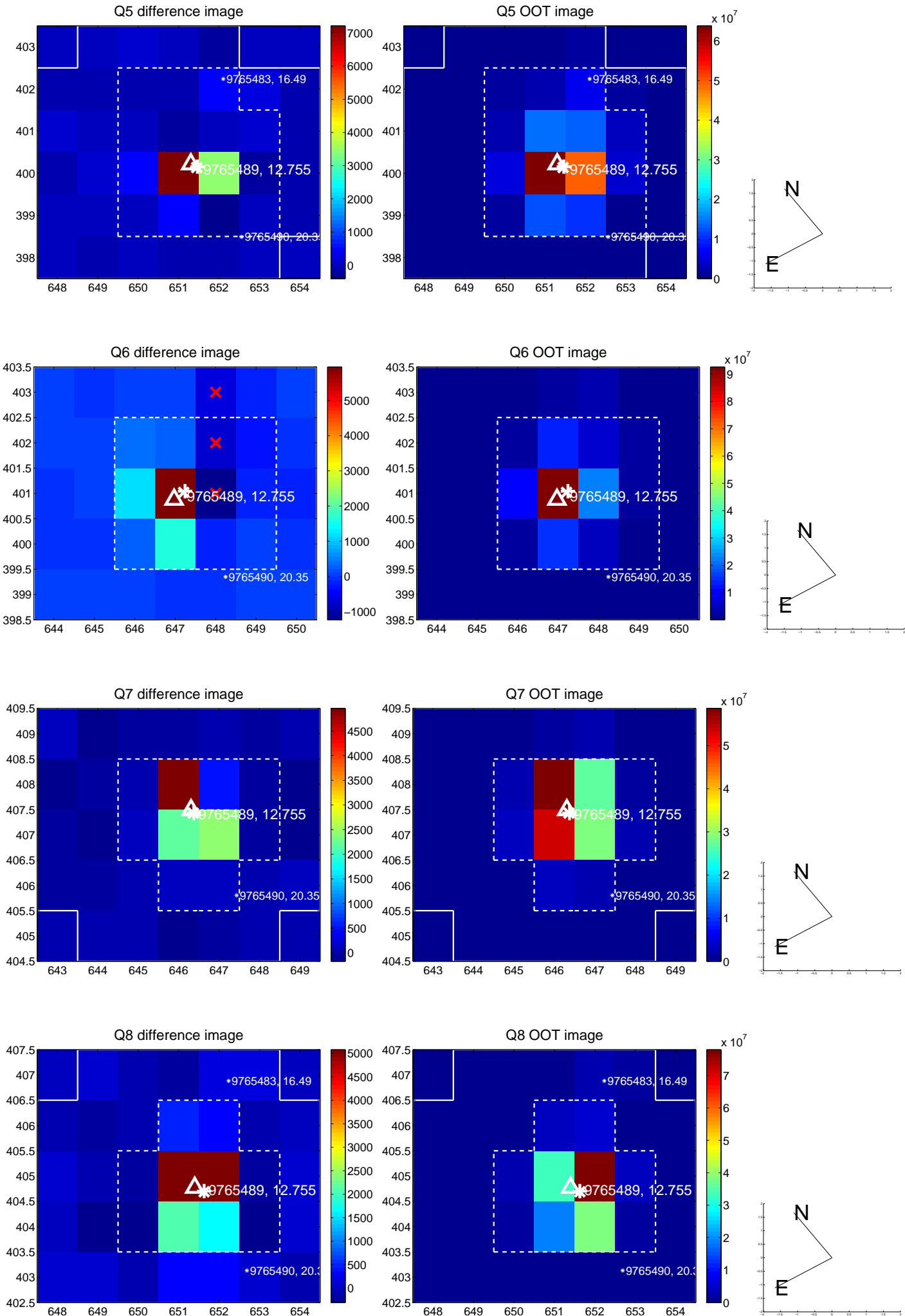


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

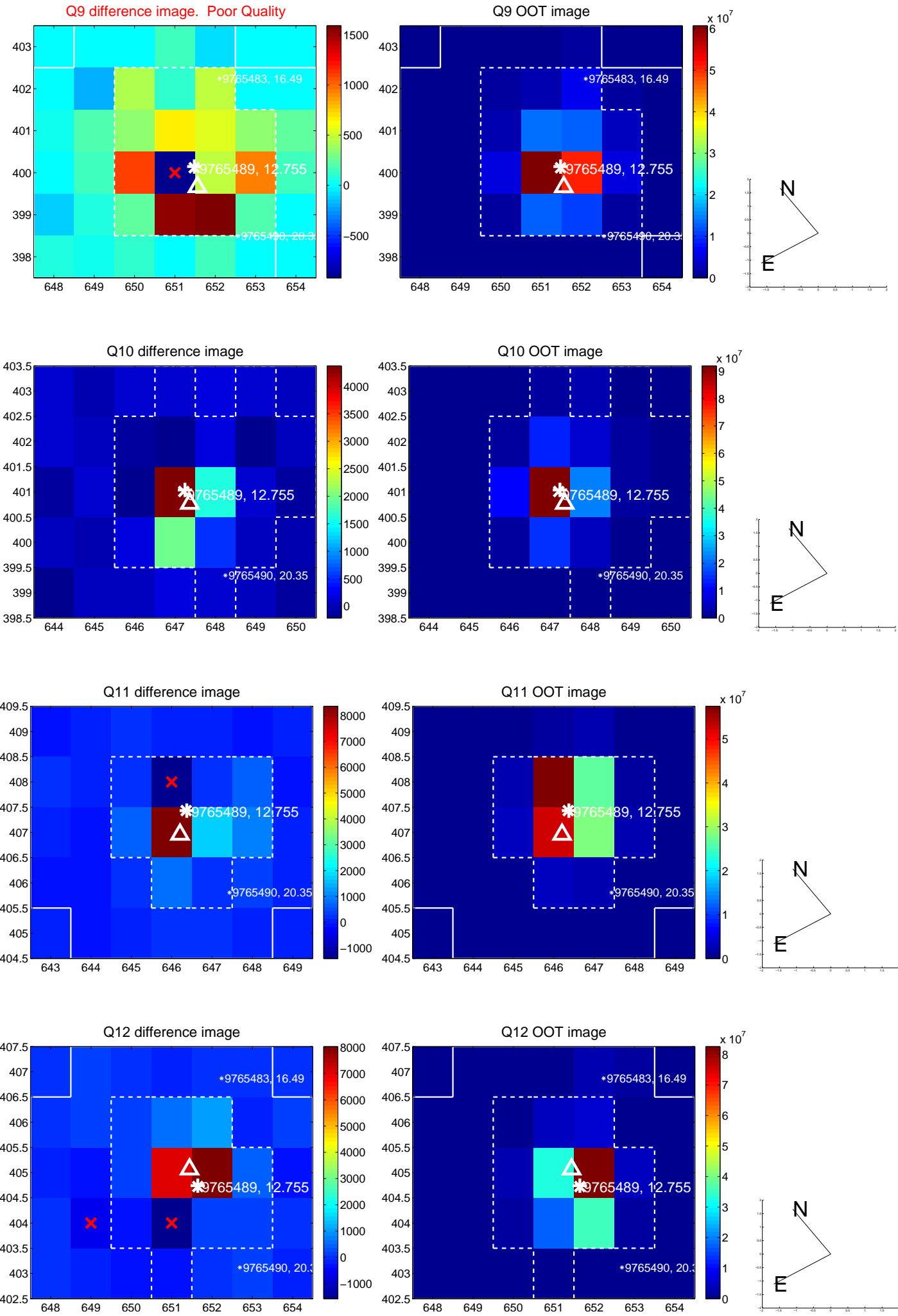
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



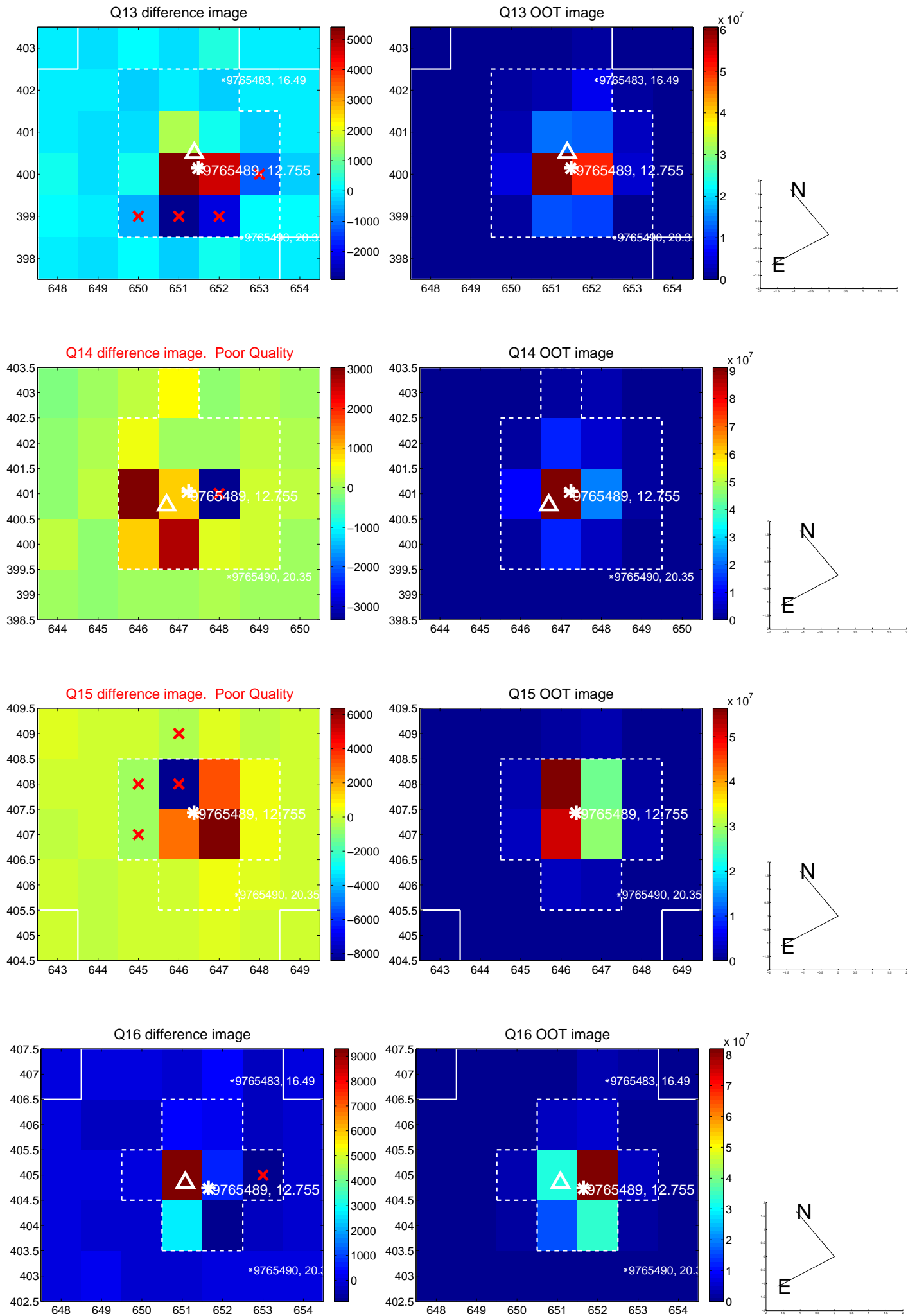
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



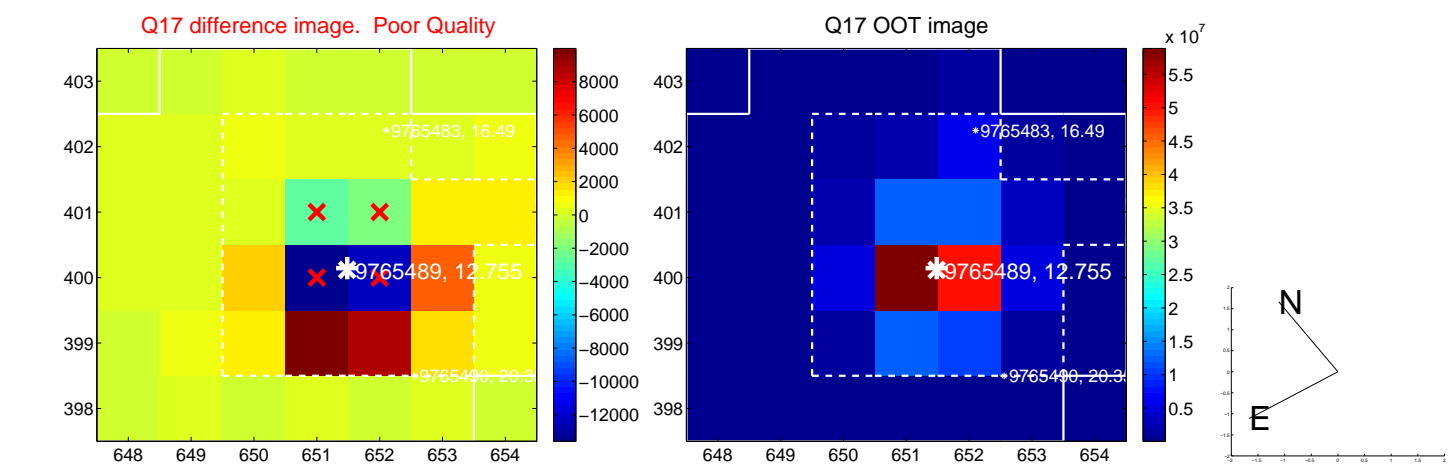
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



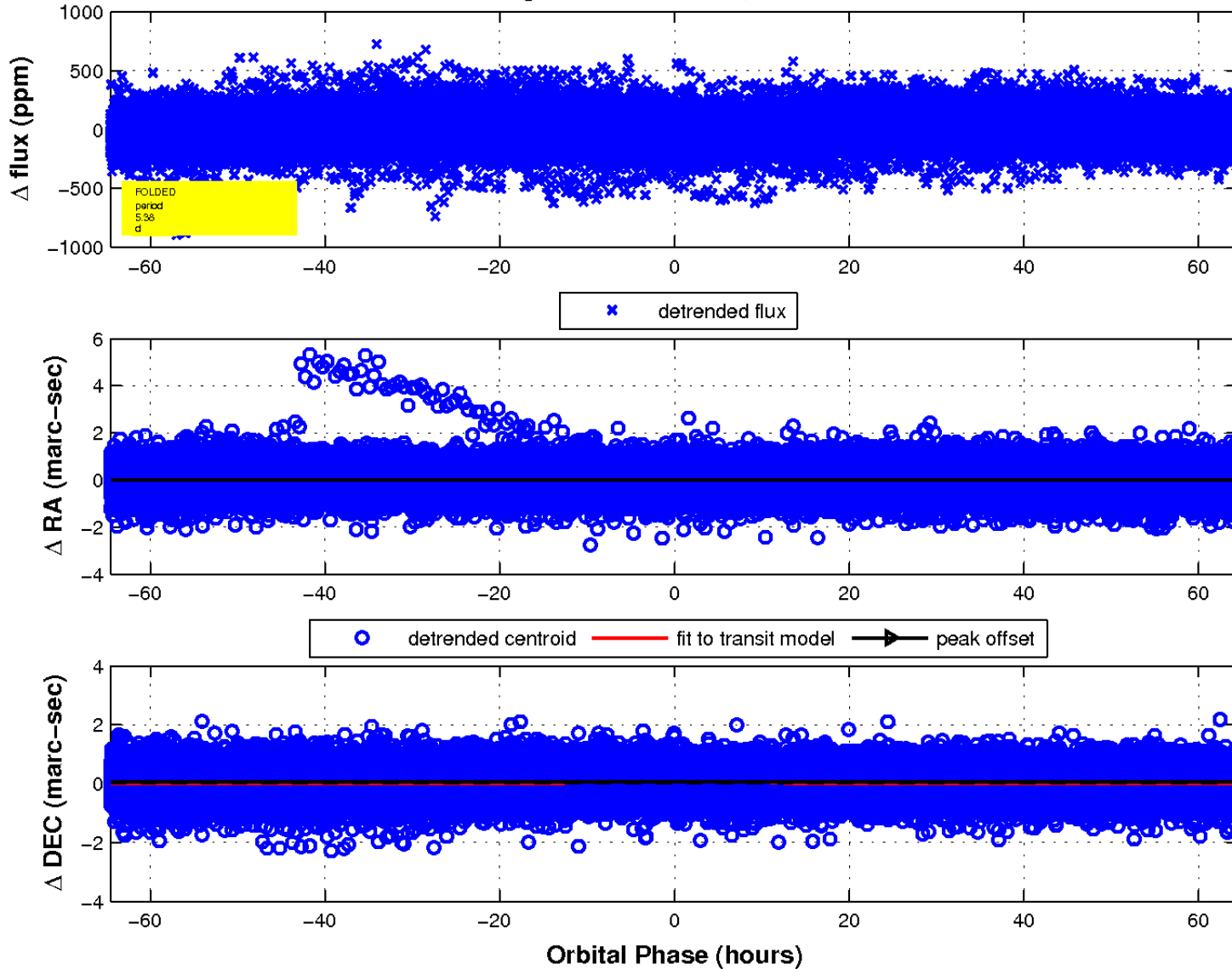
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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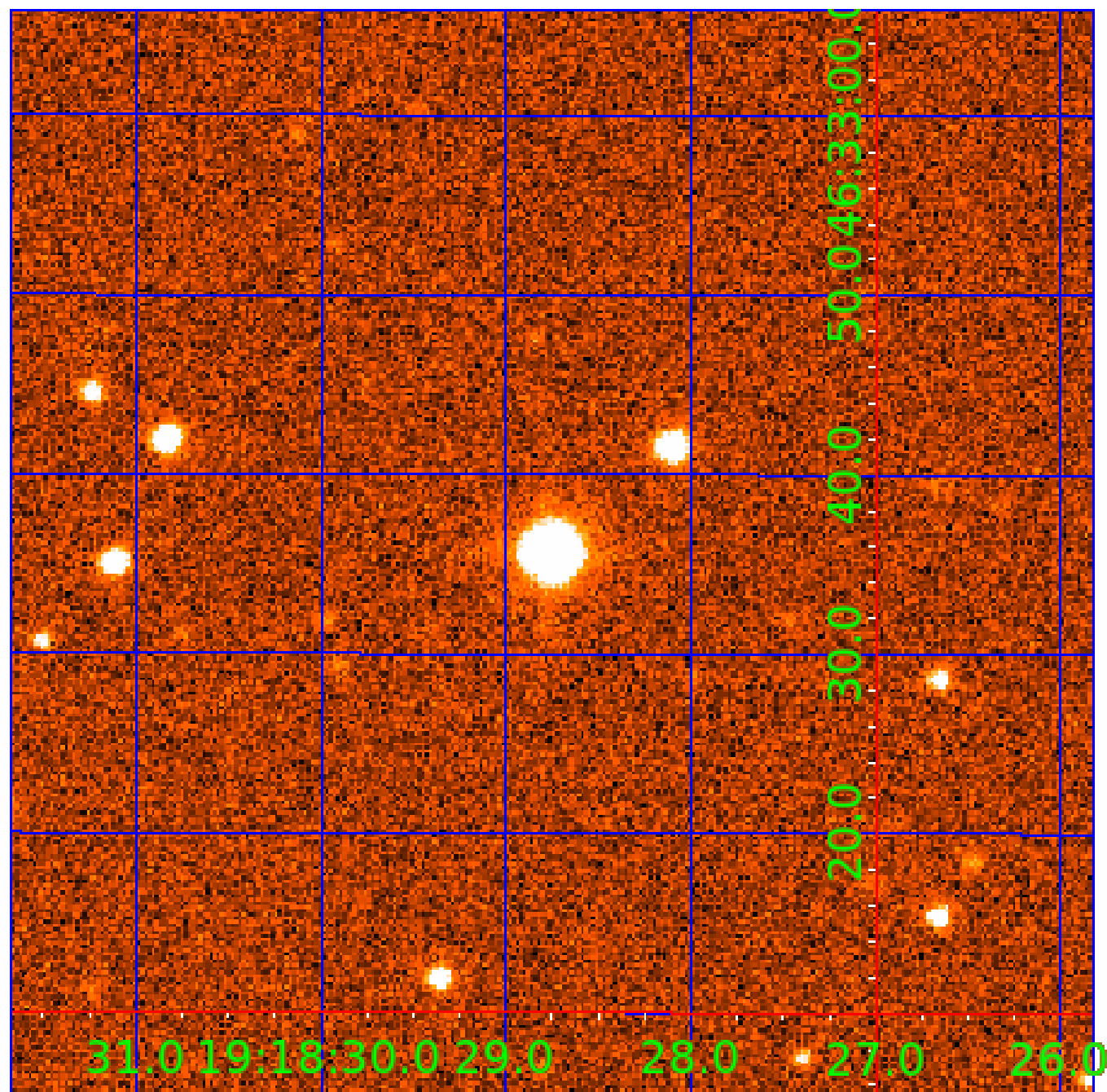


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 009765489

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})
009765489-01	OBS	No	5.379914	136.730251	23.4	25.359	9.0	12.3	2.03	8554	1.05	3460.24
009765489-02	OBS	No	5.378943	135.097484	5.2	32.279	7.2	2.3	2.03	8554	0.48	3461.08

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009765489-01	OBS	FP	0.00	1	0	0	0	LPP_DV
009765489-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—SAME_NTL_PERIOD

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

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

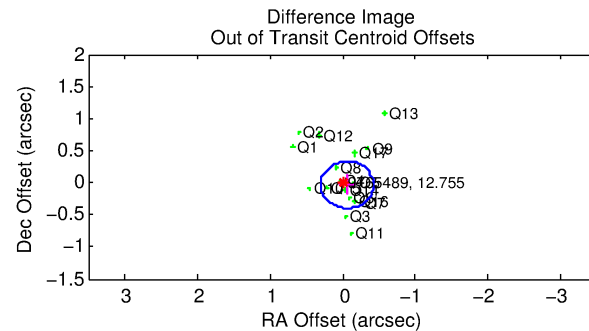
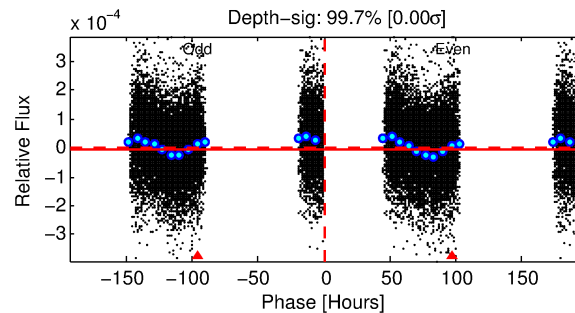
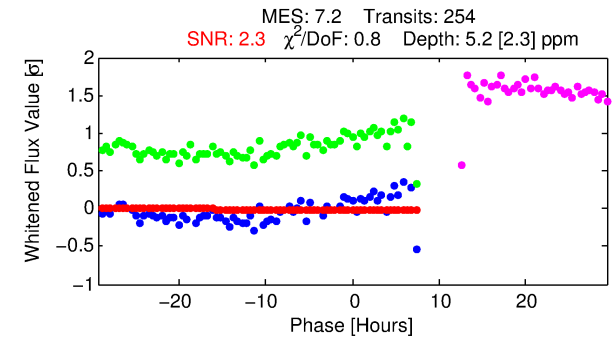
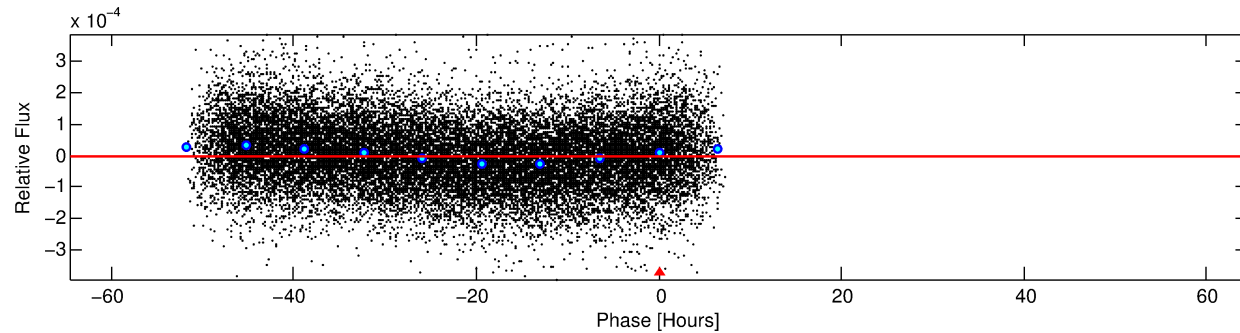
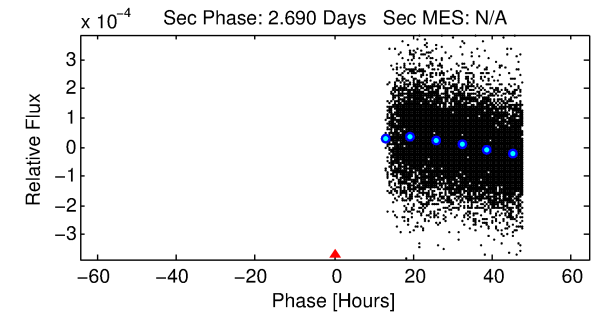
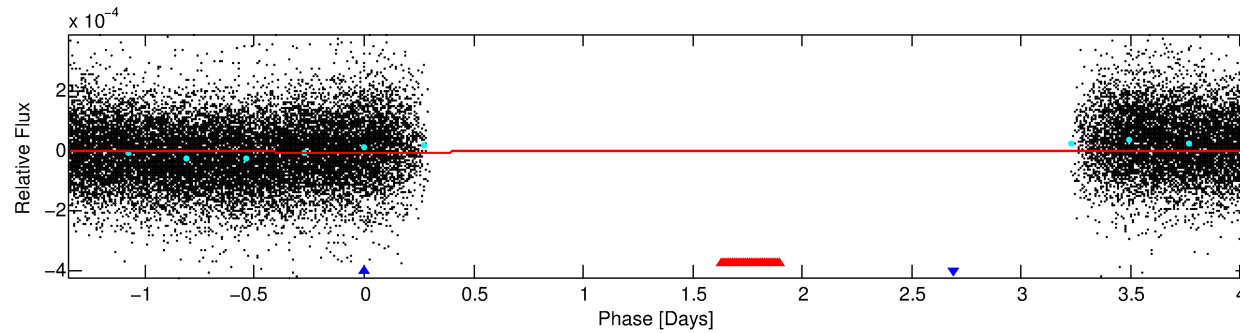
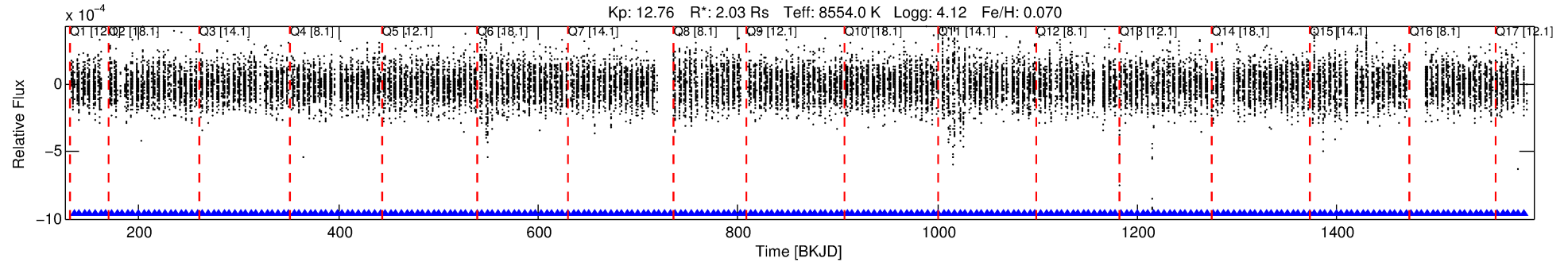
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009765489-02

No Significant Match Found

DV One-Page Summary

KIC: 9765489 Candidate: 2 of 2 Period: 5.379 d



DV Fit Results:

Period = 5.37894 [0.00048] d
 Epoch = 135.0975 [0.1912] BKJD
 Rp/R* = 0.0022 [0.0022]
 a/R* = 1.33 [3.39]
 b = 0.50 [9.13]
 Seff = 3461.08 [1139.07]
 Teq = 1956 [161] K
 Rp = 0.48 [0.49] Re
 a = 0.0755 [0.0144] AU

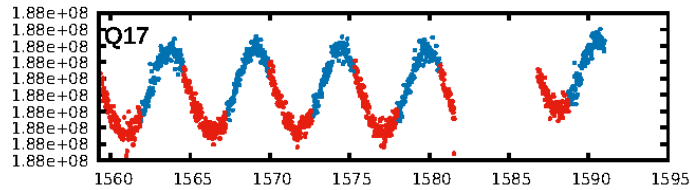
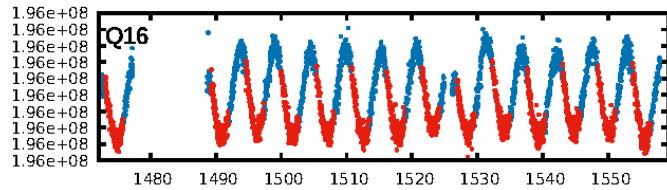
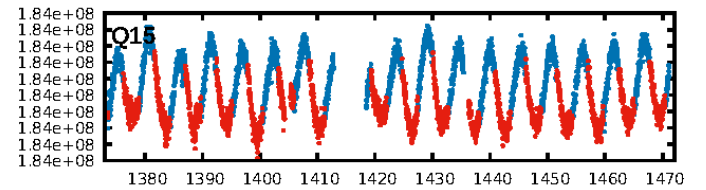
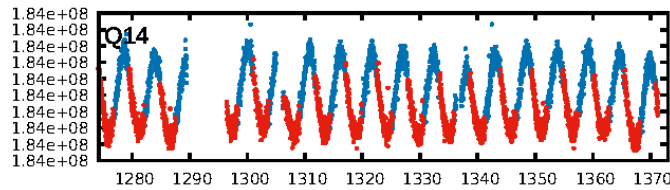
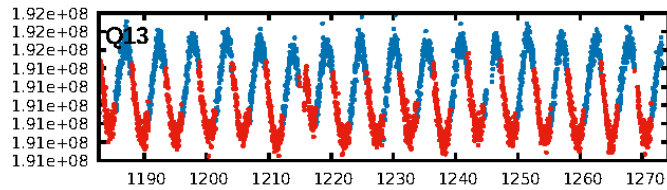
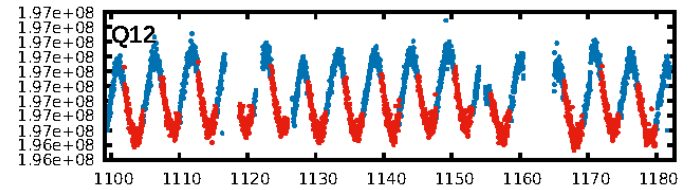
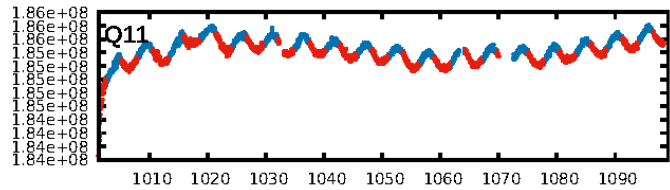
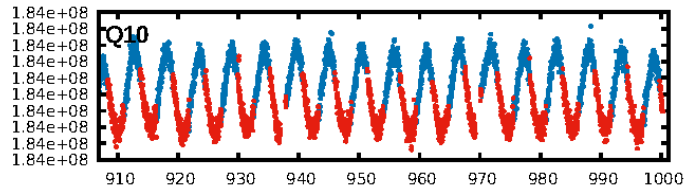
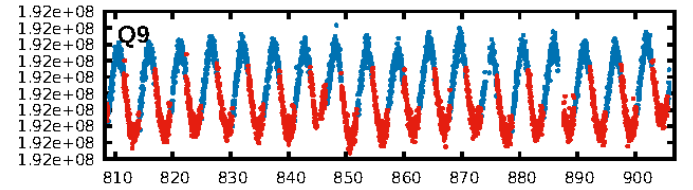
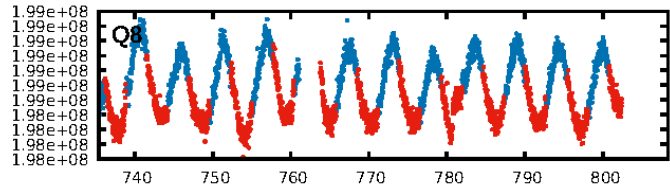
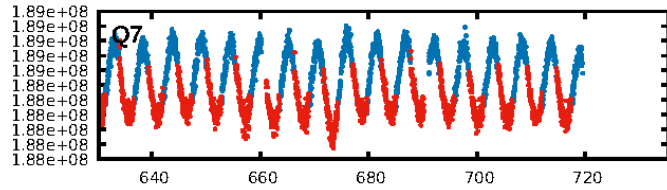
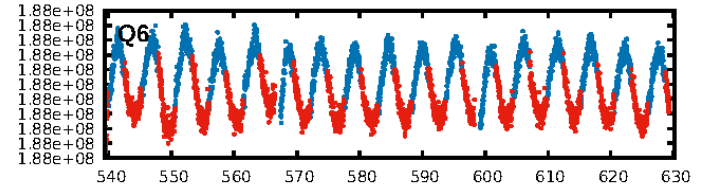
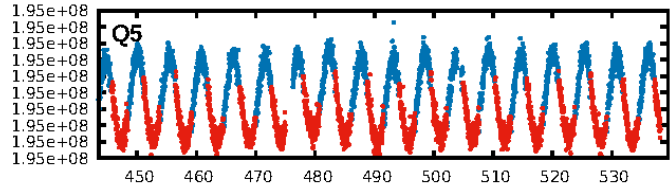
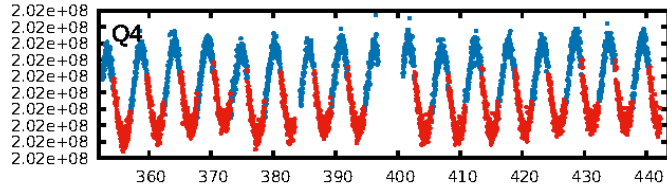
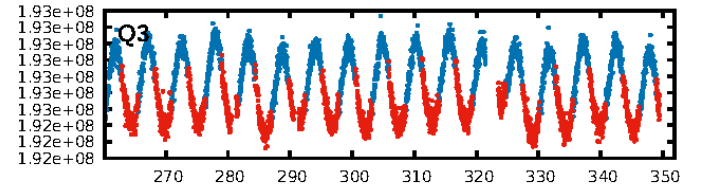
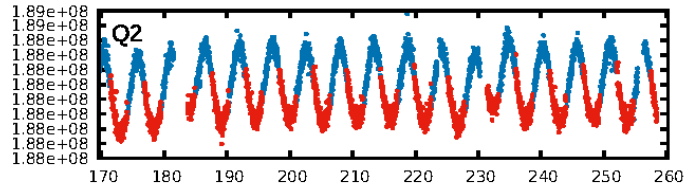
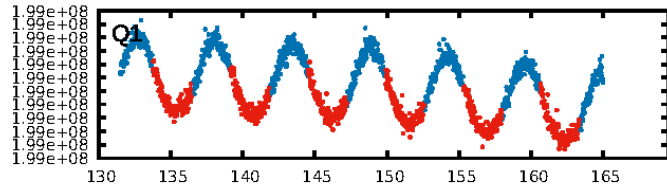
DV Diagnostic Results:

ShortPeriod-sig: N/A
 LongPeriod-sig: 0.0% [0.00σ]
 ModelChiSquare2-sig: N/A
 ModelChiSquareGof-sig: N/A
 Bootstrap-pfa: N/A
 RollingBand-fgt: 1.00 [242/242]
 GhostDiagnostic-chr: 0.434
 Centroid-sig: 0.0%
 Centroid-so: 19.022 arcsec [6.34σ]
 OotOffset-rm: 0.068 arcsec [0.56σ]
 KicOffset-rm: 0.115 arcsec [1.10σ]
 OotOffset-st: 4/4/4/5 [17]
 KicOffset-st: 4/4/4/5 [17]
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 DiffImageOverlap-fno: 0.00 [0/17]

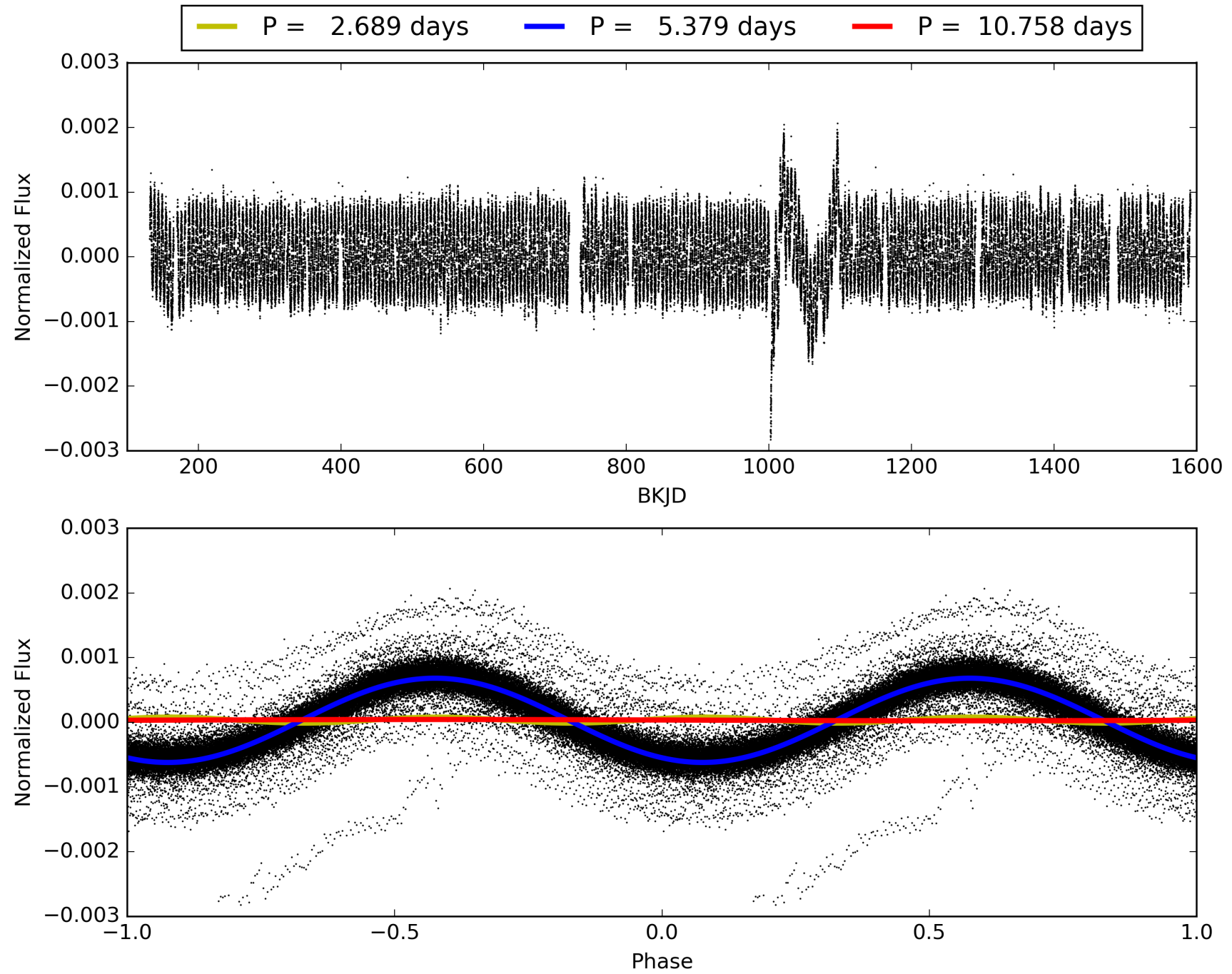
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 00:53:31 Z

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

TCE 009765489-02, PDC Light Curves

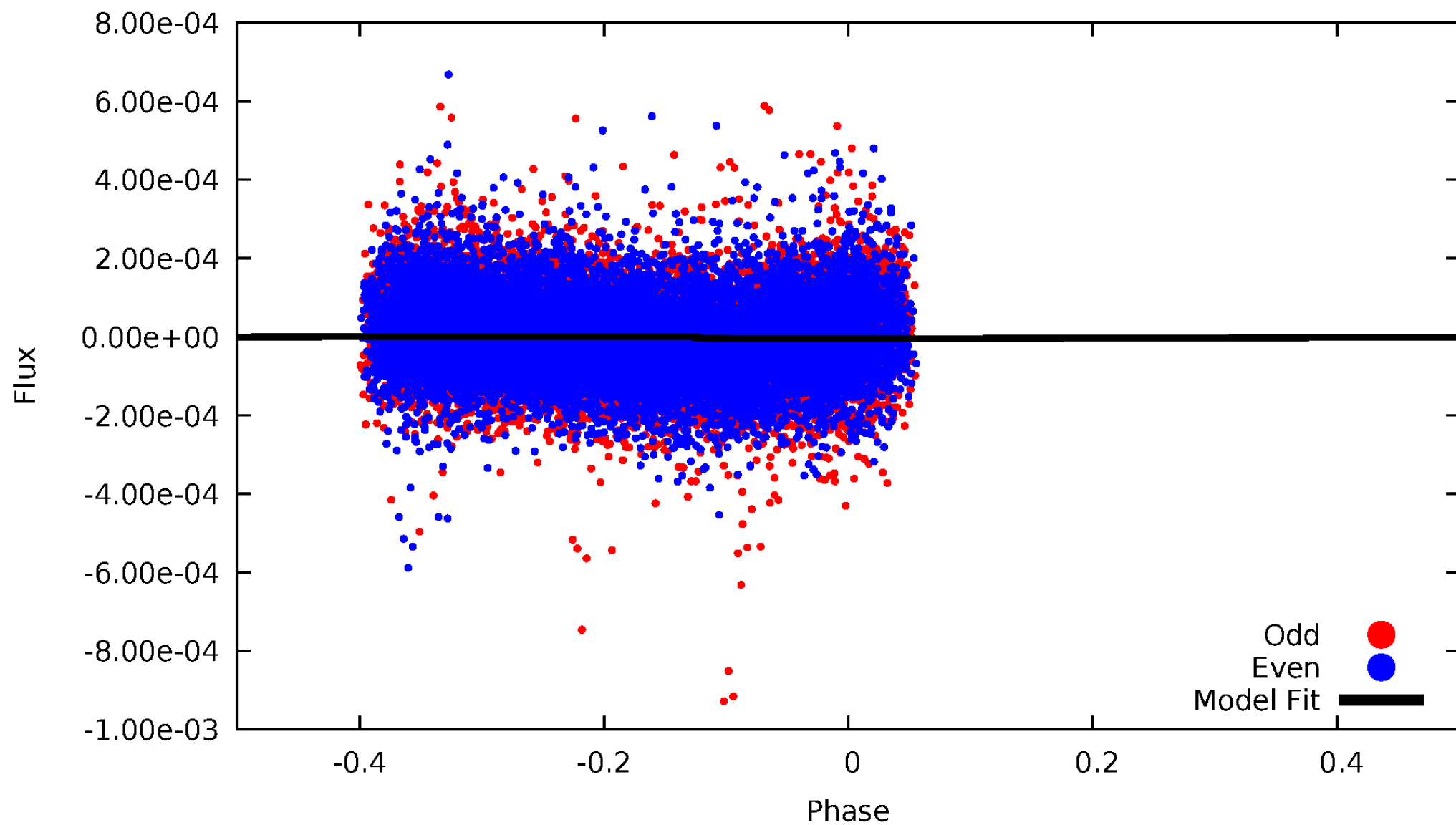


TCE 009765489-02



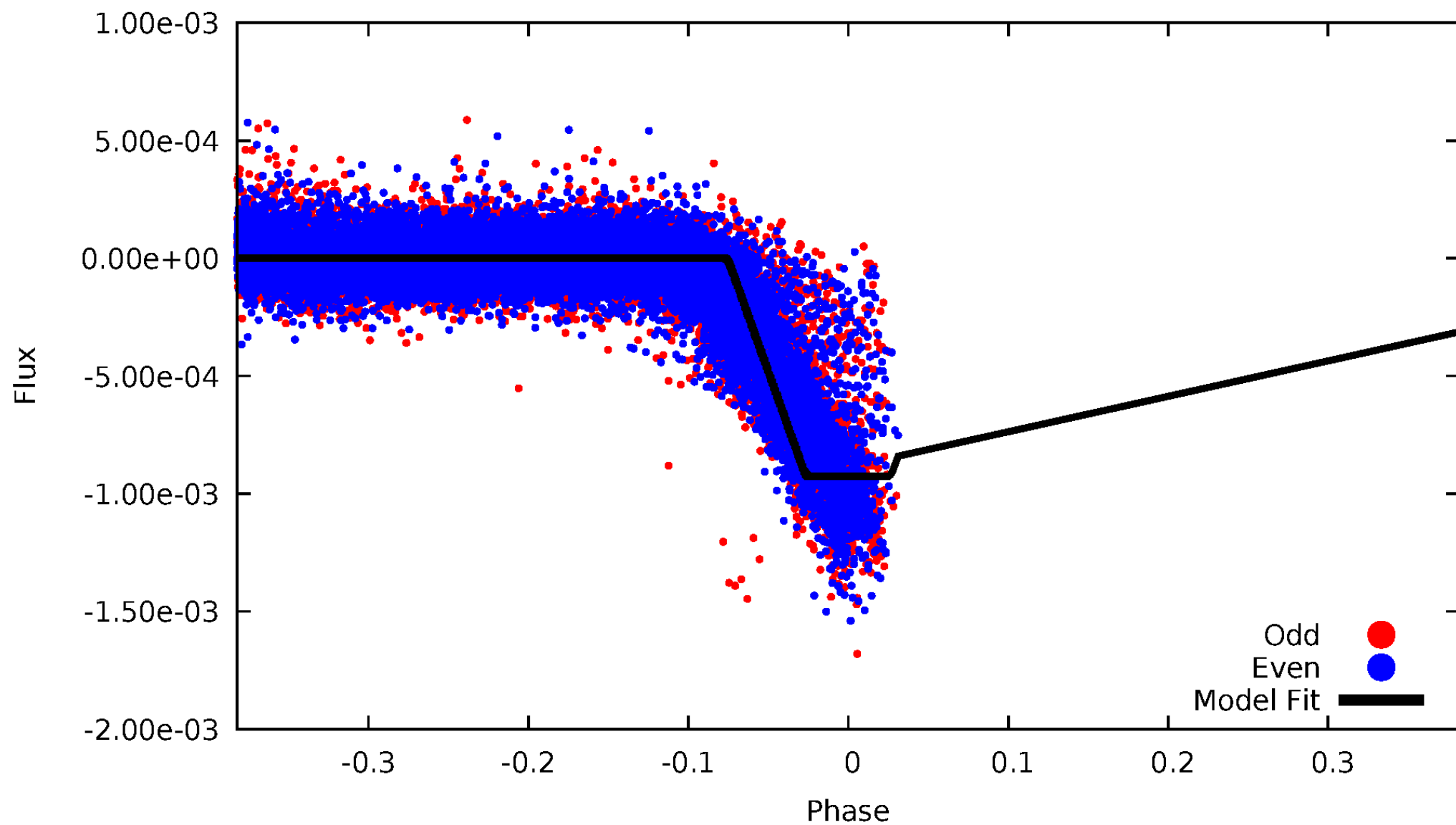
DV Odd/Even

TCE 009765489-02



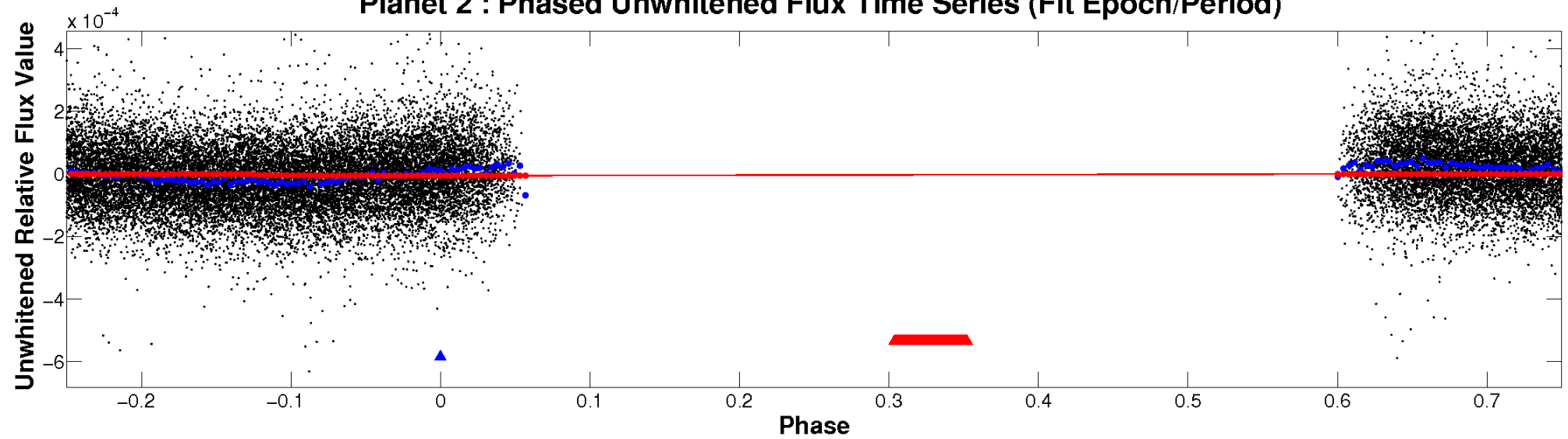
ALT Odd/Even

TCE 009765489-02

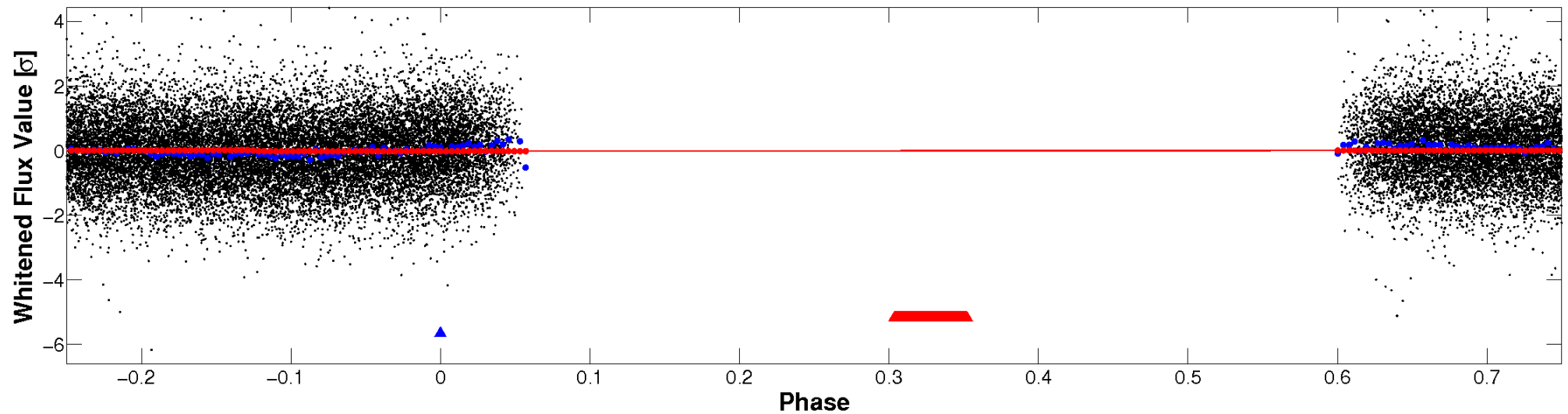


Non-Whitened Vs. Whitened Light Curve

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

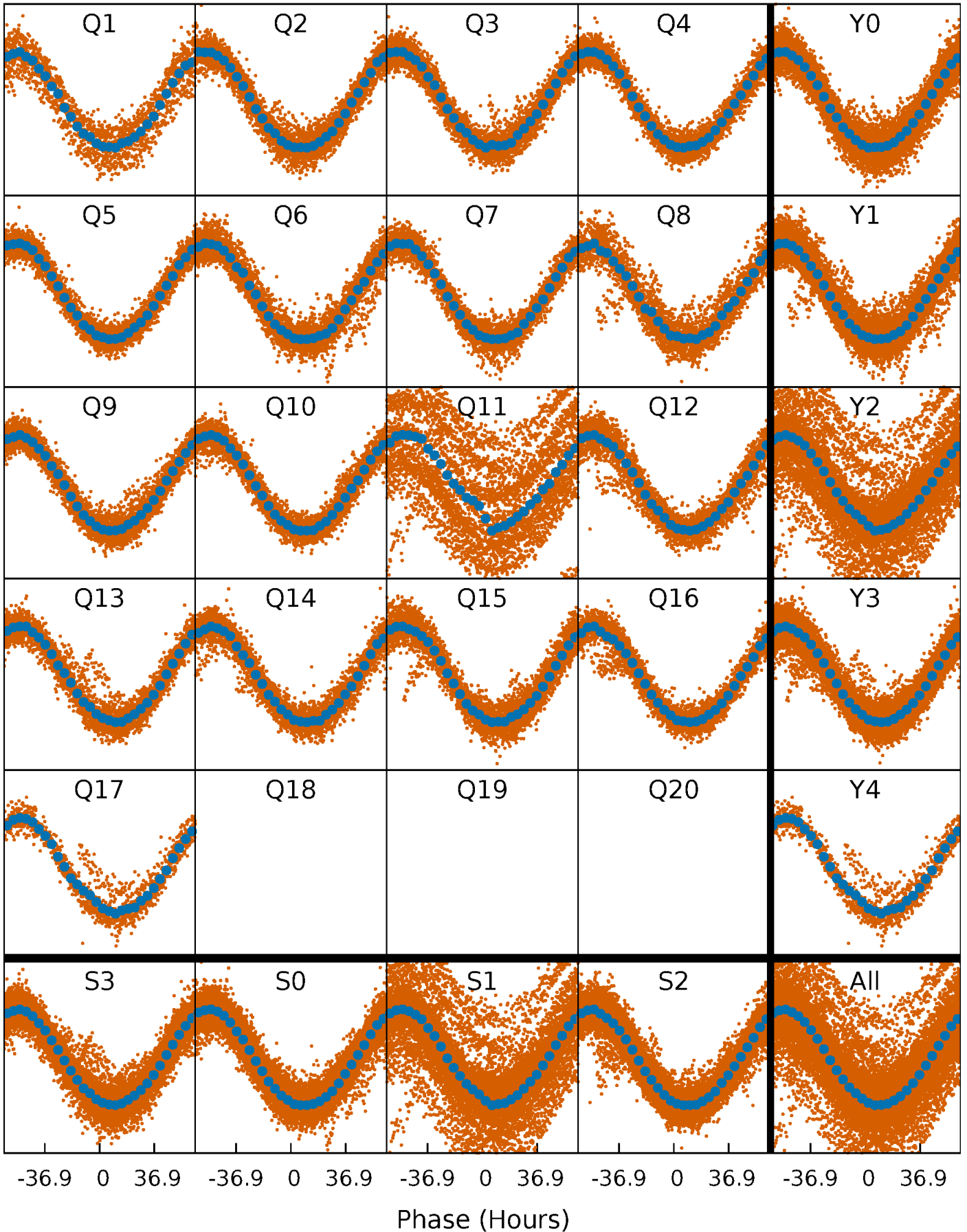


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



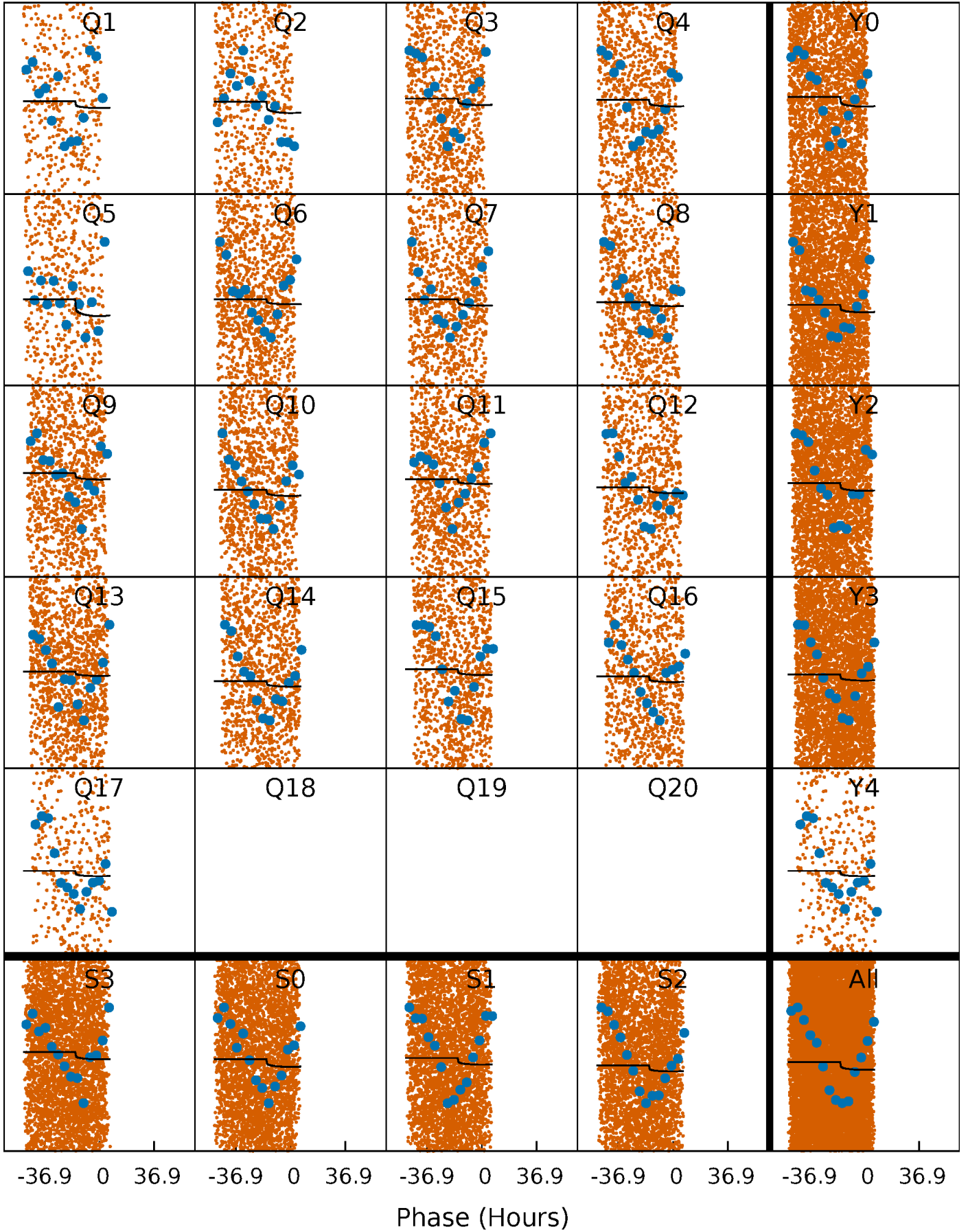
PDC Quarter-Phased Transit Curves

TCE 009765489-02 P= 5.378943 Days $T_0=135.097484$ (BKJD)



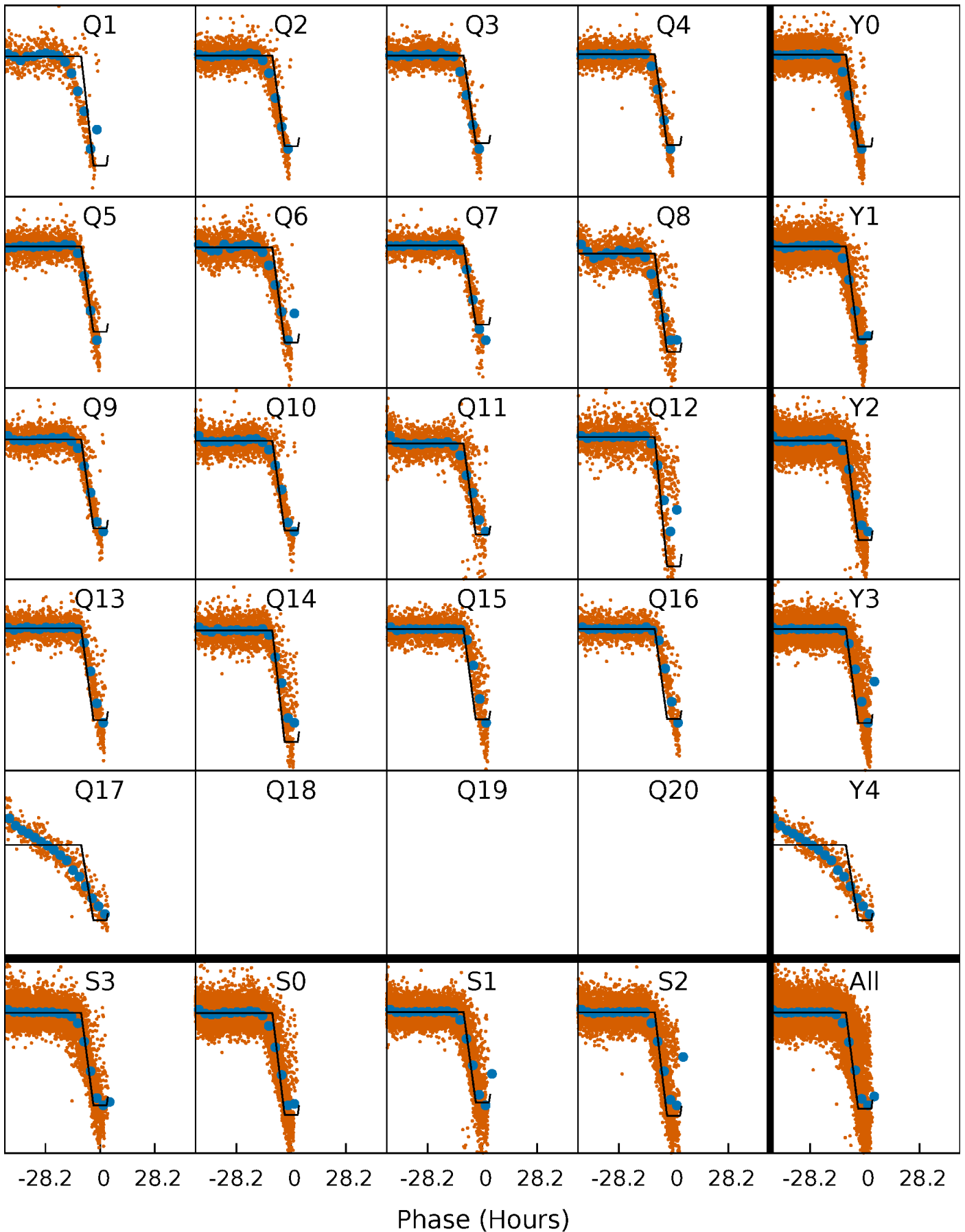
DV Quarter-Phased Transit Curves

TCE 009765489-02 $P = 5.378943$ Days $T_0 = 135.097484$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

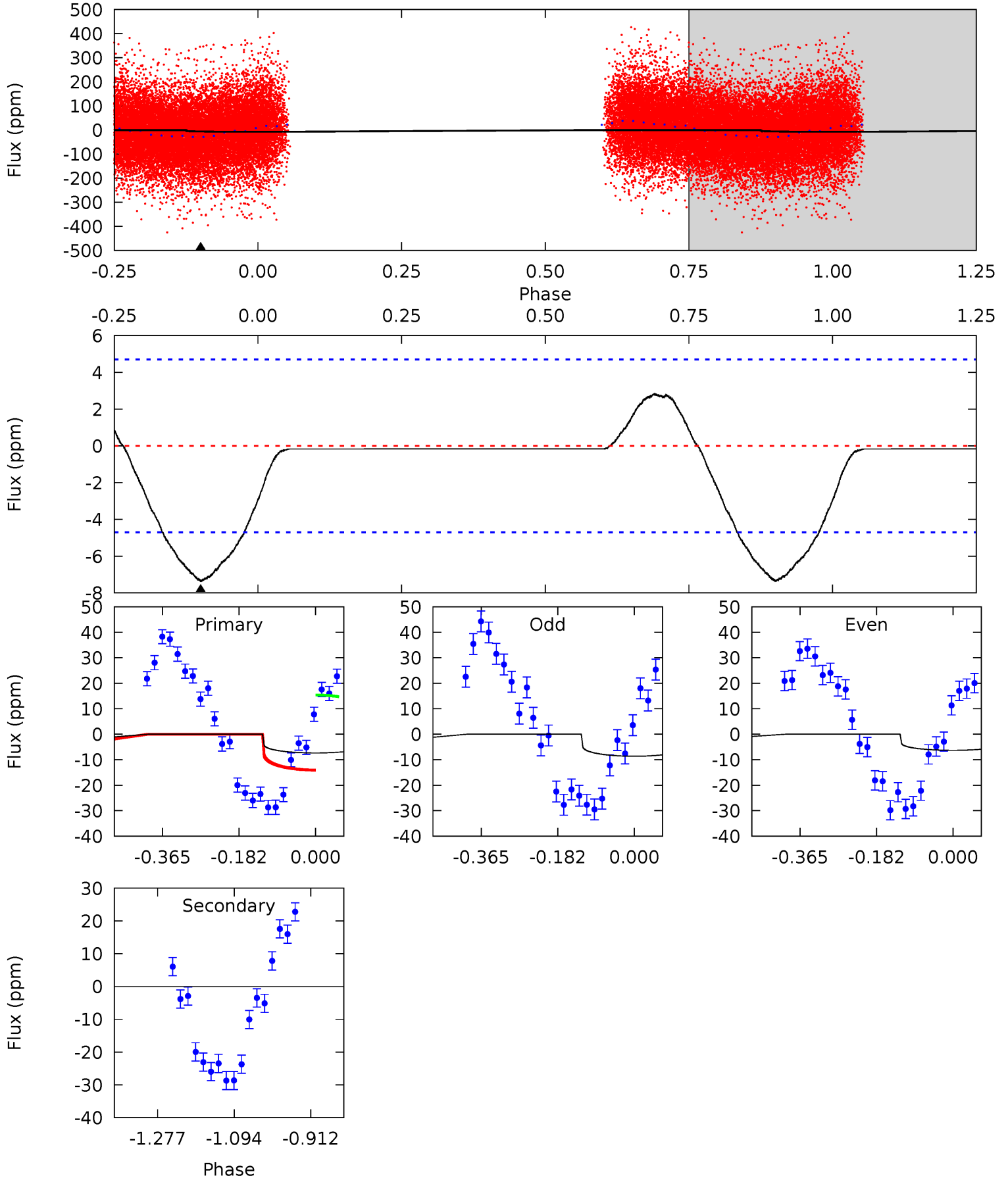
TCE 009765489-02 $P = 5.379223$ Days $T_0 = 135.153944$ (BKJD)



DV Model-Shift Uniqueness Test

009765489-02, P = 5.378943 Days, E = 129.718541 Days

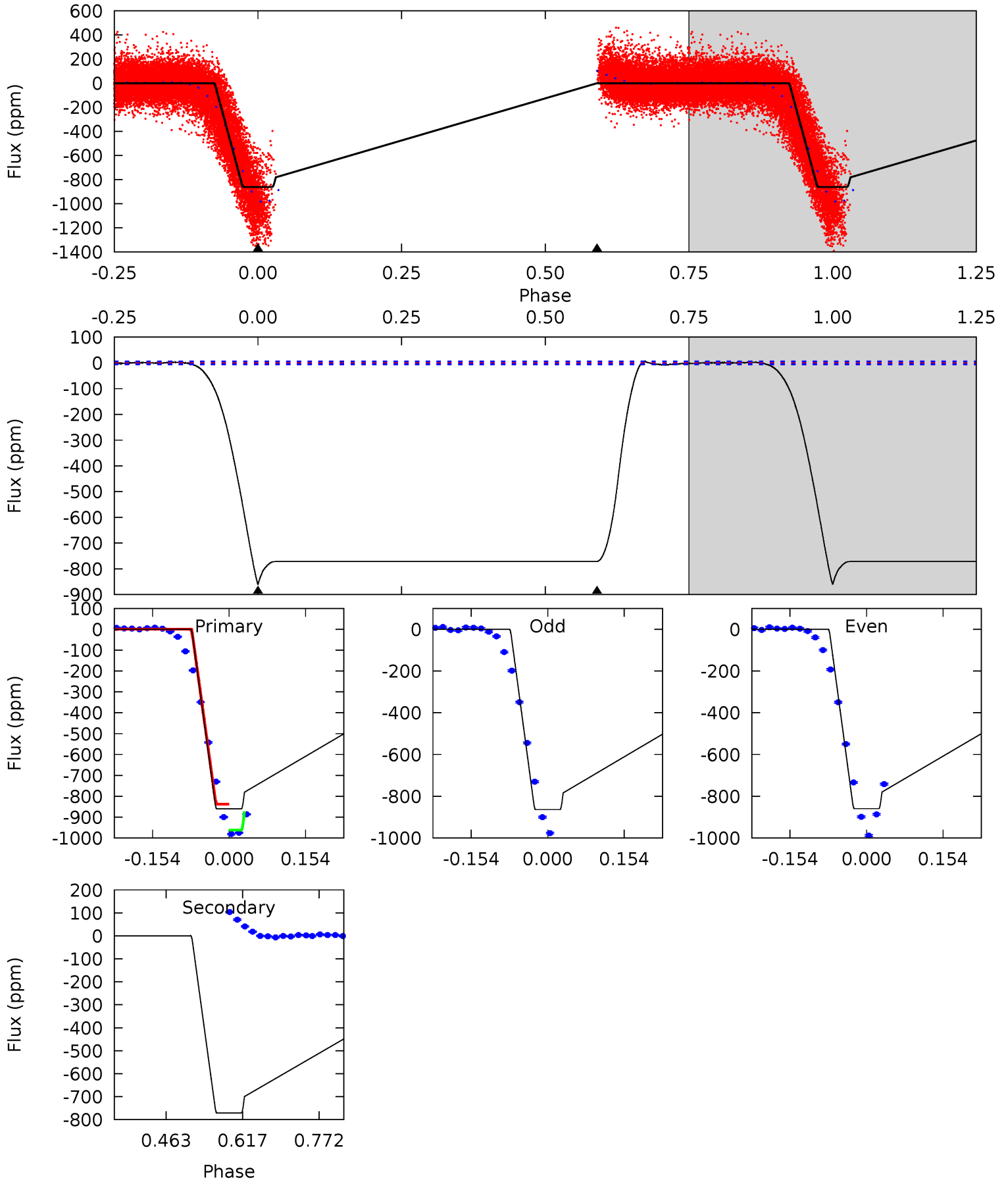
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.94	0	0	0	4.44	1.33	0.89	6.94	6.94	0	0	1.09	1.23	0.28	0.51



Alt Model-Shift Uniqueness Test

009765489-02, P = 5.379223 Days, E = 129.774721 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
674.2	604.2	0	0	4.47	1.42	0.86	674.2	674.2	604.2	604.2	1.67	0.95	0.01	9.11



Stellar Parameters For KIC 009765489

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	8554^{+235}_{-370}	$4.121^{+0.126}_{-0.154}$	$0.070^{+0.250}_{-0.550}$	$2.027^{+0.456}_{-0.456}$	$1.979^{+0.341}_{-0.455}$	$0.335^{+0.235}_{-0.137}$
	+3%/-4%	+3%/-4%	+357%/-786%	+22%/-22%	+17%/-23%	+70%/-41%
Source	KIC0	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 009765489-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	0 ± 1	$0.59^{+0.47}_{-0.35}$	2742^{+180}_{-165}	-2869^{+8470}_{-2991}	$0.060^{+13.362}_{-16.094}$
Alt.	-771 ± 1	$6.88^{+1.07}_{-0.98}$	2750^{+164}_{-185}	7997^{+472}_{-431}	51^{+16}_{-12}

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 $A_{obs} \gg 1.0$

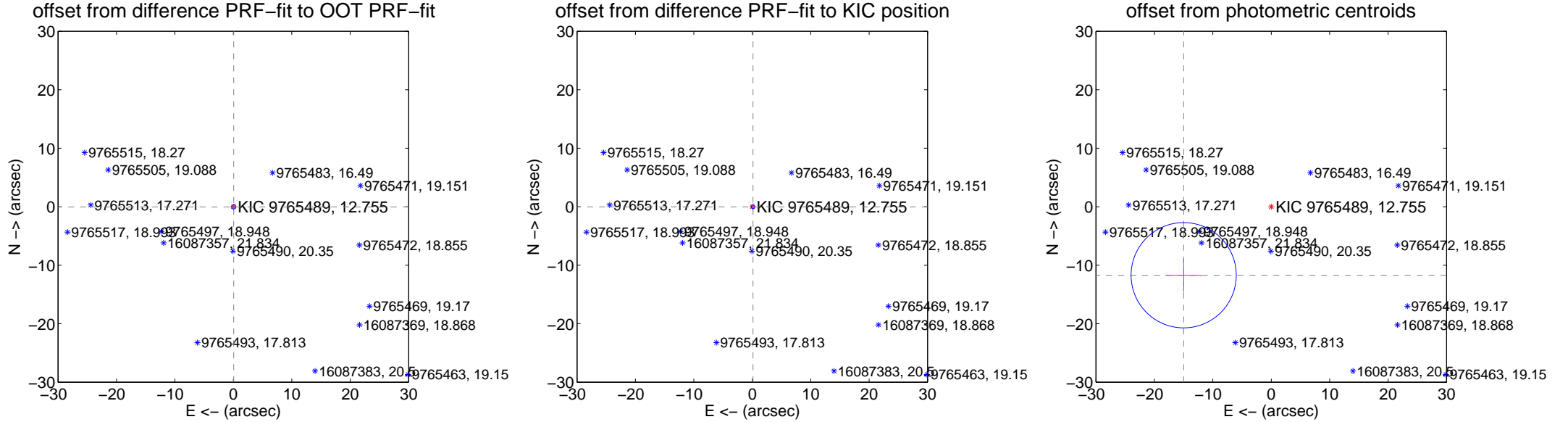
DV Centroid Data

Supplemental centroid analysis for 009765489-02. Kepler magnitude: 12.76. Transit SNR 2.27

There are 17 quarters with good PRF difference image offsets

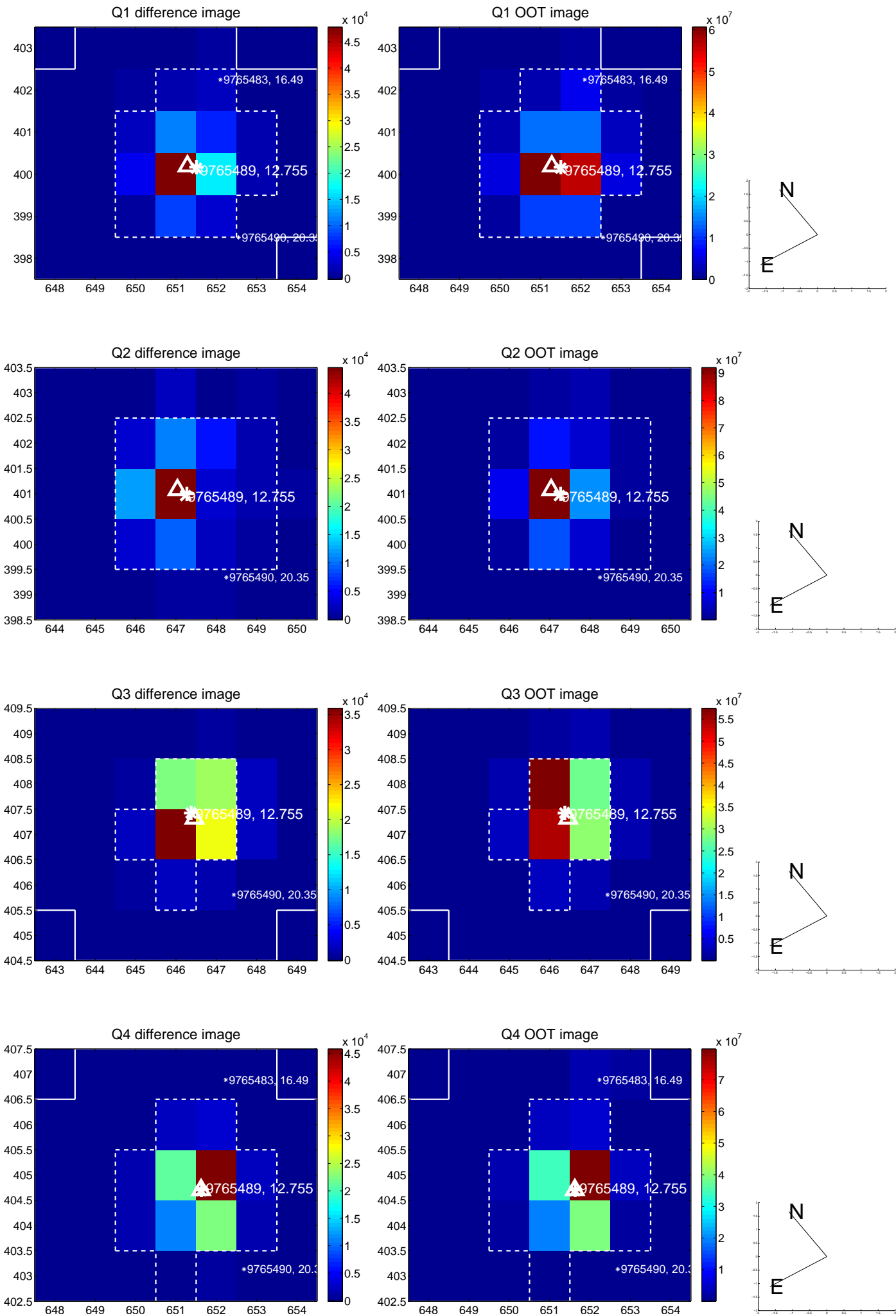
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.068 ± 0.122	0.56	-0.059 ± 0.107	-0.033 ± 0.138
PRF-fit source offset from KIC position	0.115 ± 0.105	1.10	-0.114 ± 0.101	-0.014 ± 0.145
photometric centroid source offset	19.02 ± 3.00	6.34	14.99 ± 3.09	-11.71 ± 2.85

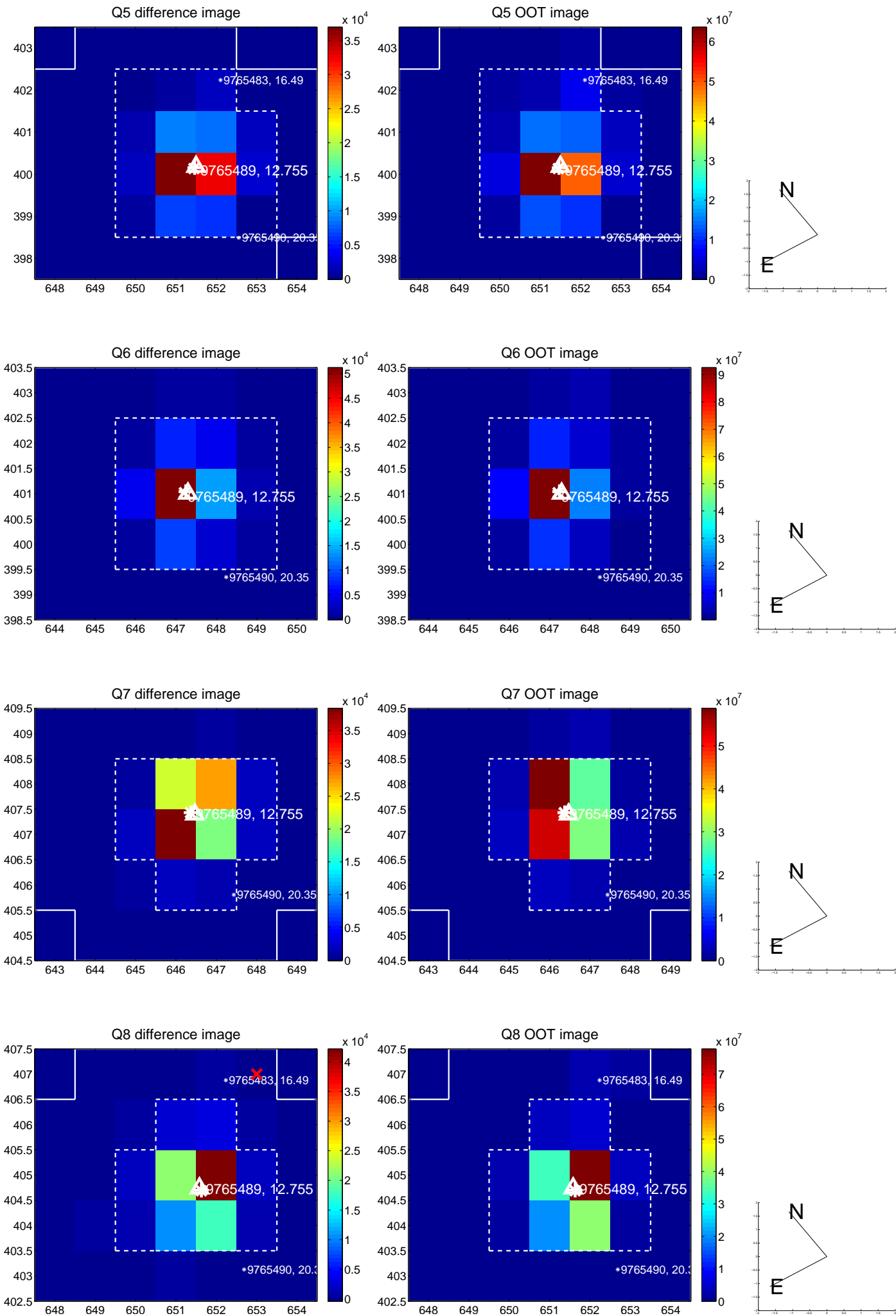


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

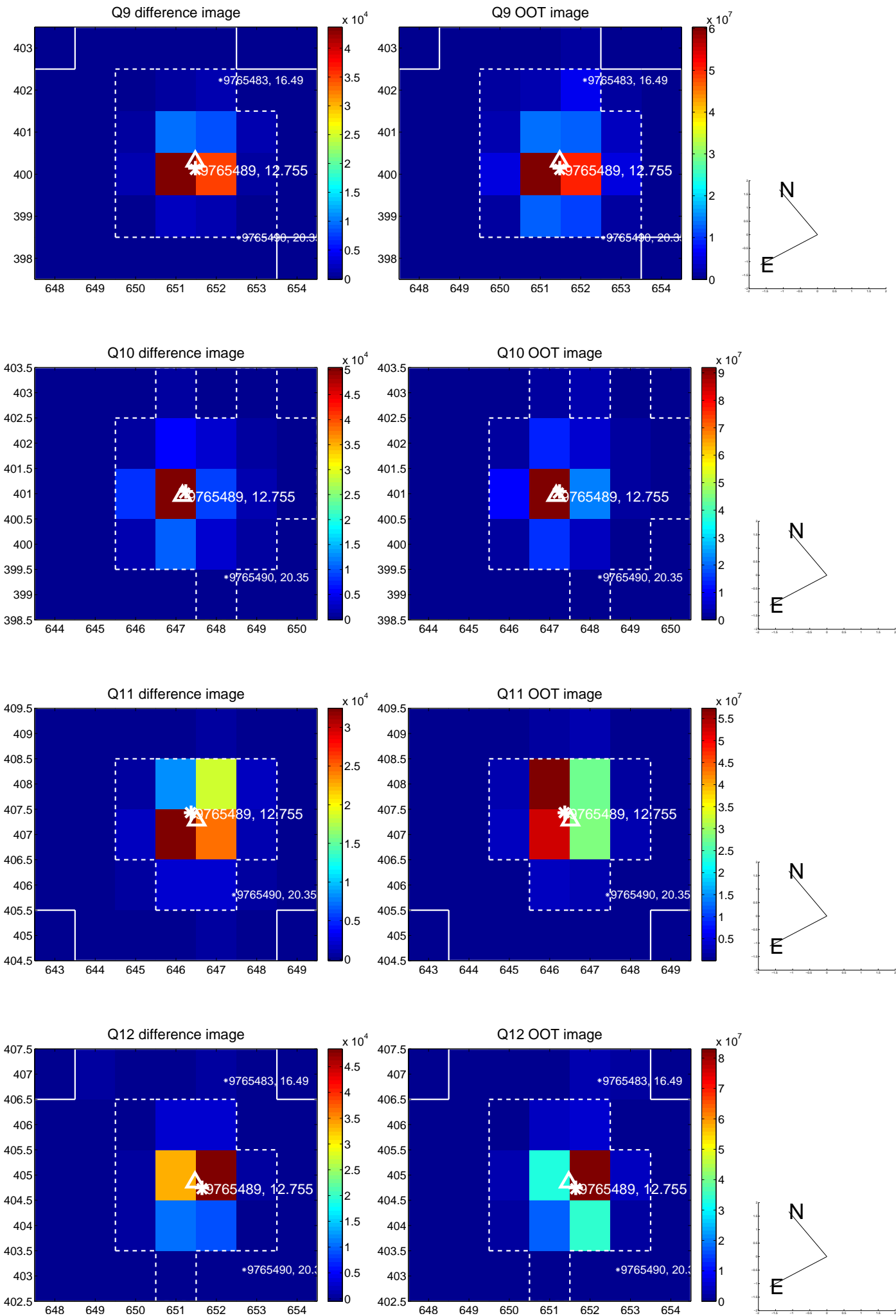
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



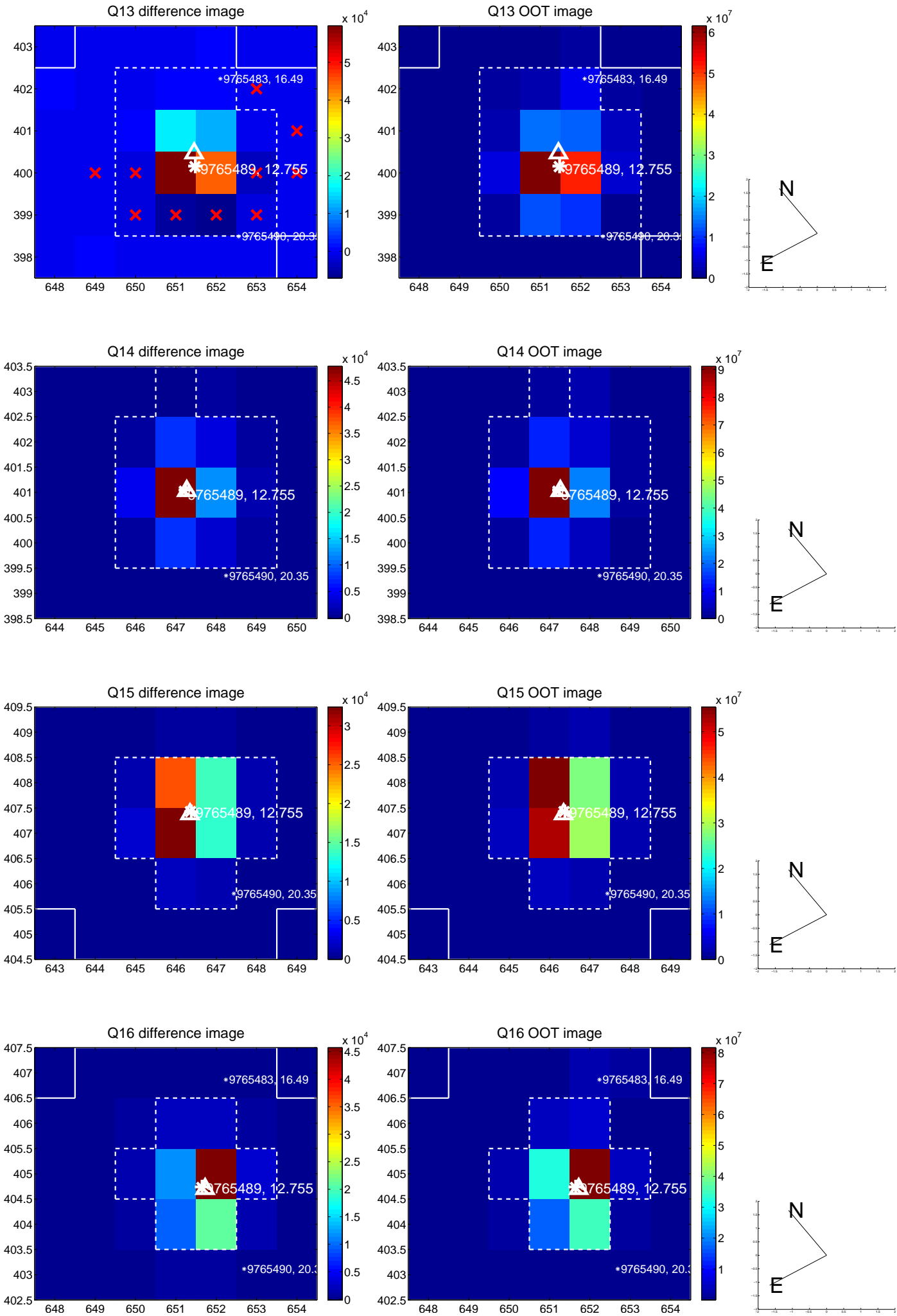
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



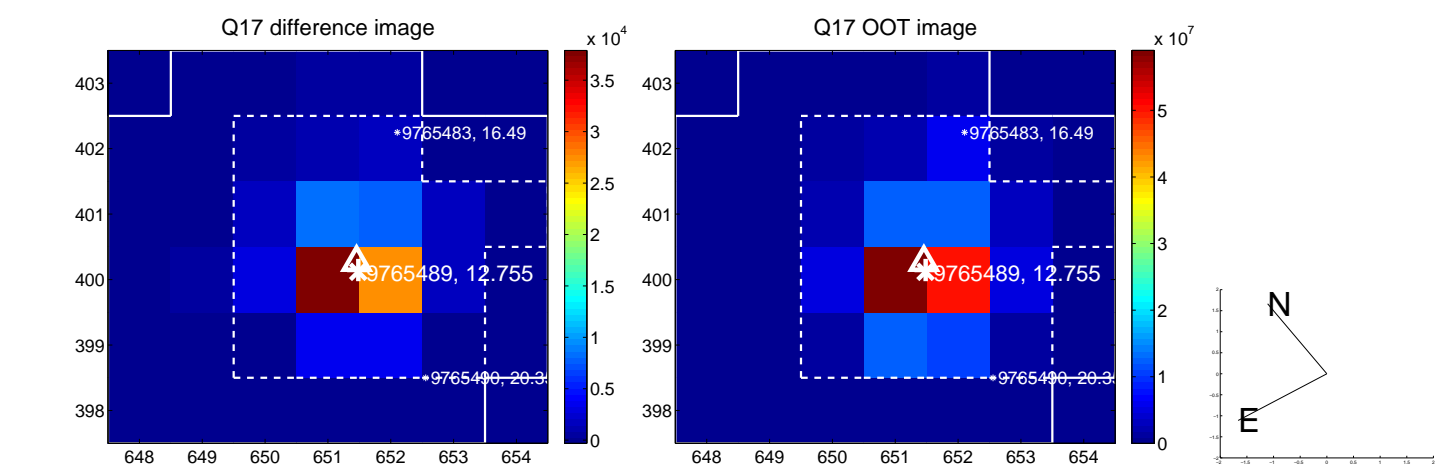
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



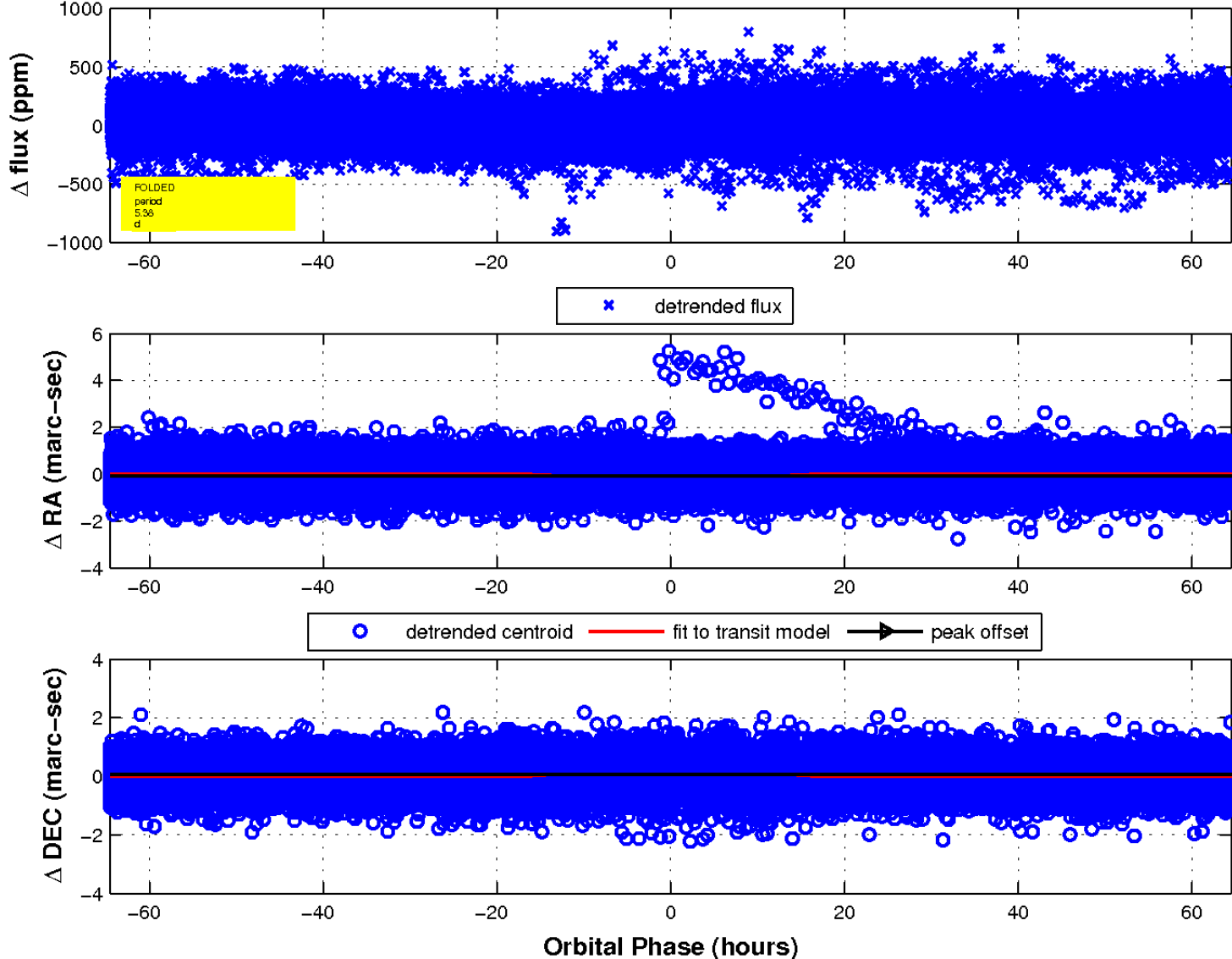
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

