KIC 006470521

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 ($S_\oplus$)
006470521-01	OBS	3701.01	2.080436	131.826548	6969.4	6.689	1472.0	769.0	1.12	6377	16.73	1666.13
006470521-02	OBS	No	1.040199	131.844527	1671.6	3.000	47.5	-1.0	1.12	6377	4.59	4198.47

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006470521-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_DV—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH
006470521-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_NOFITS—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 006470521-01

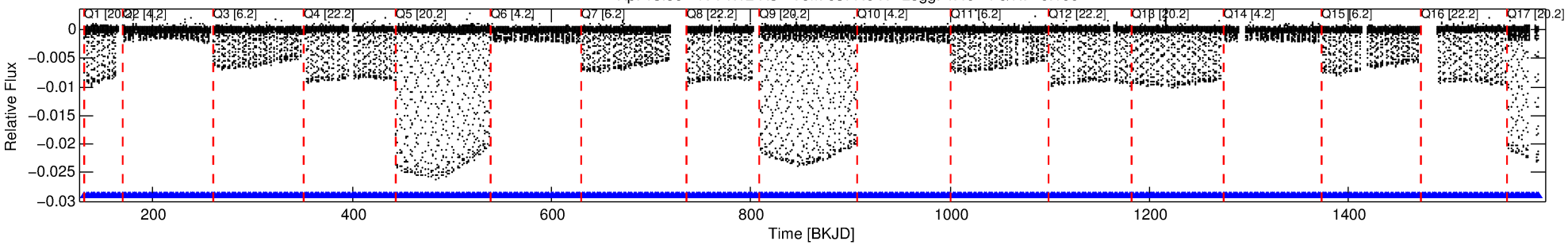
TCE (1)	KIC	Parent (2)	Parent KIC	P_1:P_2	Dist (″)	ΔRow	ΔCol	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
006470521-01	6470521	3705.01	6470516	1:1	6.6	-1	-1	16.45	13.86	137.16	Direct-PRF	0	0.17	0.11

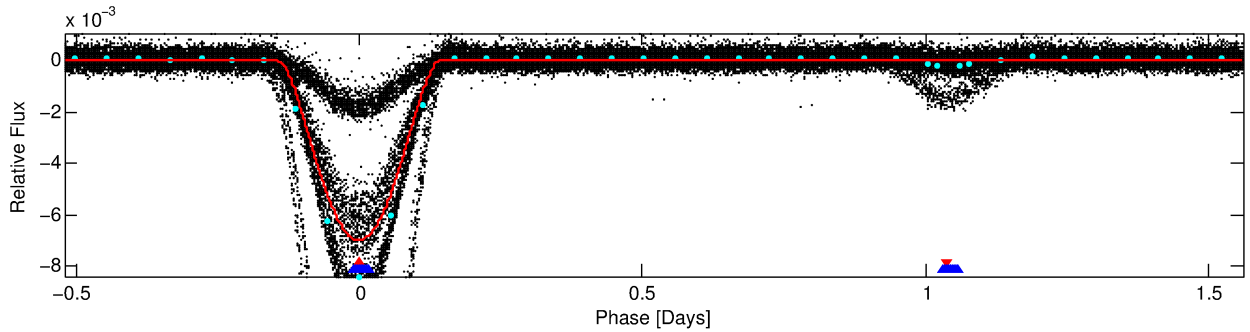
Notes: P_1:P_2 is the period ratio. Dist is the distance in arcseconds. ΔRow and ΔCol are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth dividied by the child's. σ_P and σ_T are the significance of the match 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 recieve extra scrutiny, especially if the period ratio is very large.

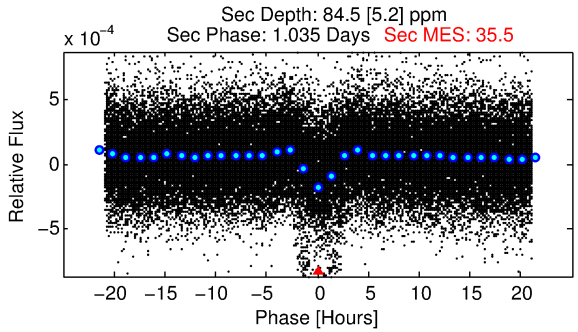
DV One-Page Summary

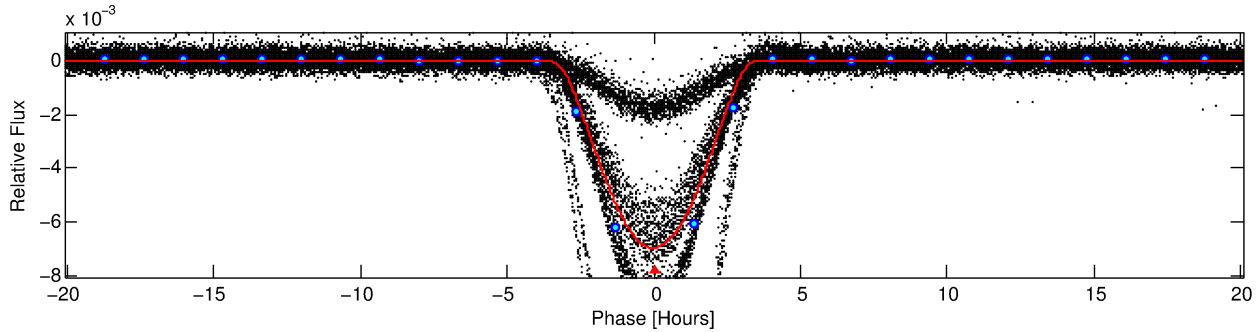
KIC: 6470521 Candidate: 1 of 2 Period: 2.080 d
KOI: K03701.01 Corr: 0.969

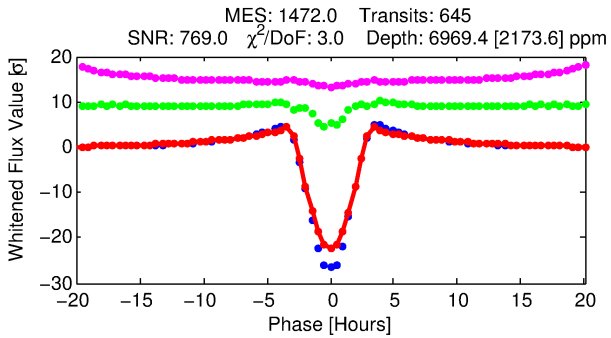
Kp: 13.86 R*: 1.12 Rs Teff: 6377.0 K Logg: 4.40 Fe/H: −0.100

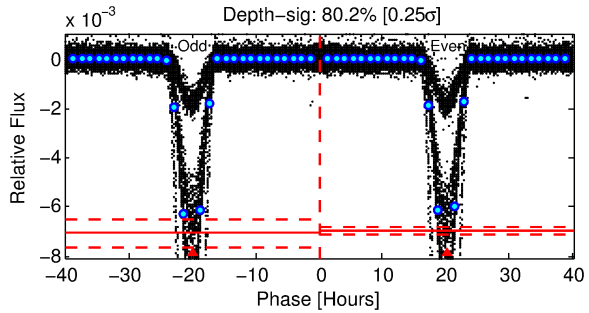


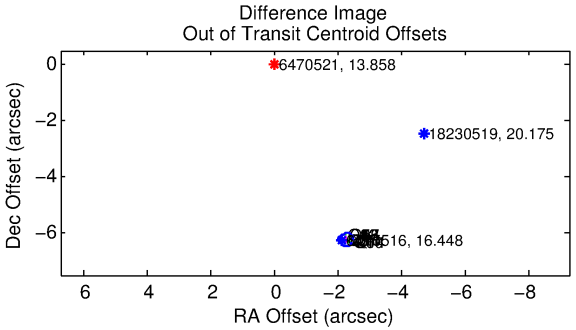












DV Fit Results:

Period = 2.08044 [0.00000] d
Epoch = 131.8265 [0.0002] BKJD
Rp/R* = 0.1370 [0.0073]
a/R* = 1.66 [0.00]
b = 1.00 [0.02]

Seff = 1666.13 [711.16]
Teq = 1629 [174] K
Rp = 16.73 [5.89] Re
a = 0.0334 [0.0095] AU

Ag = 0.18 [0.08] [−10.40σ]
Teffp = 1652 [75] K [0.12σ]

DV Diagnostic Results:

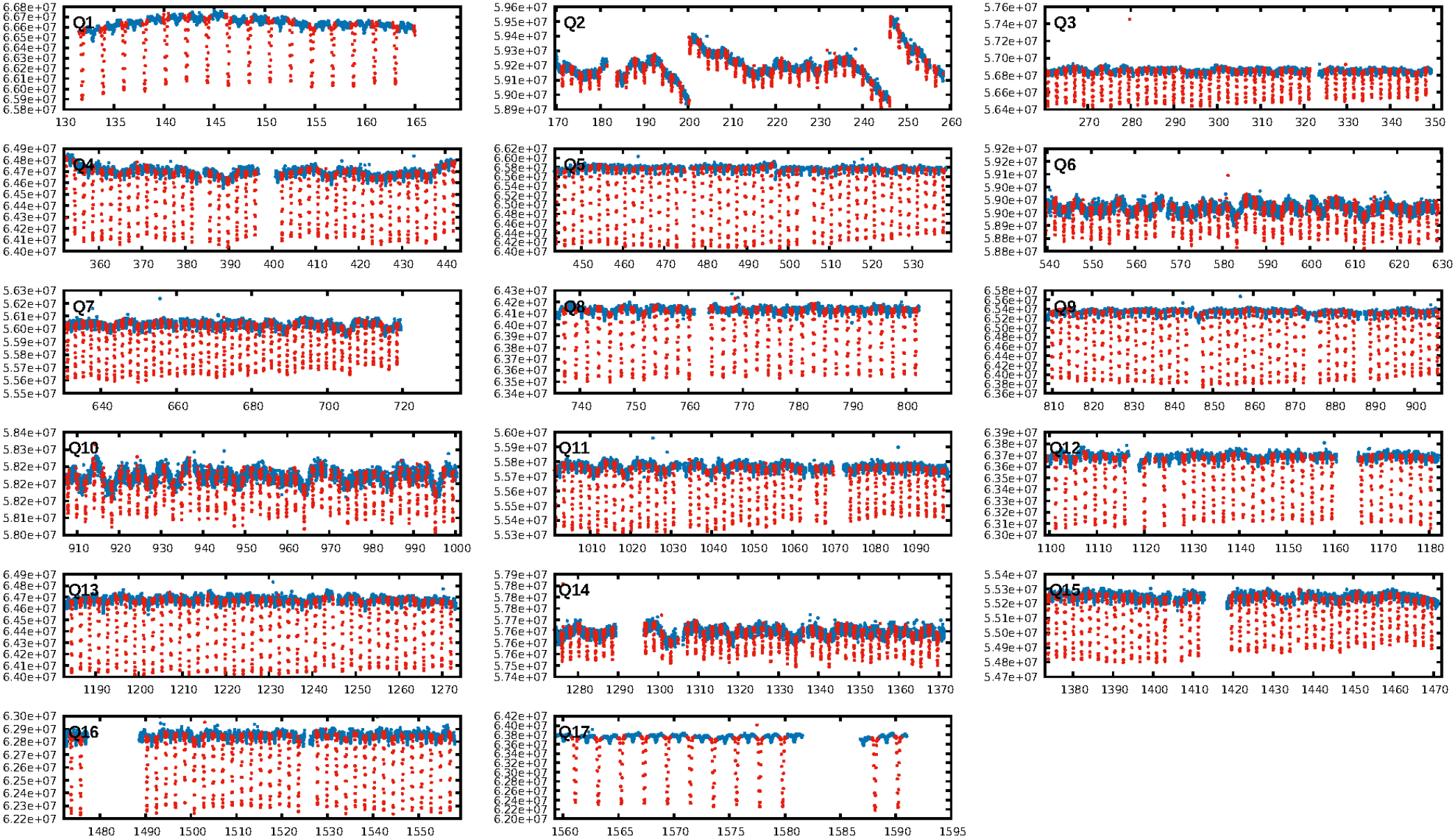
ShortPeriod−sig: 99.9% [3.41σ]
LongPeriod−sig: N/A
ModelChiSquare2−sig: N/A
ModelChiSquareGof−sig: N/A
Bootstrap−pfa: N/A
RollingBand−fgt: 1.00 [616/616]
GhostDiagnostic−chr: −0.633

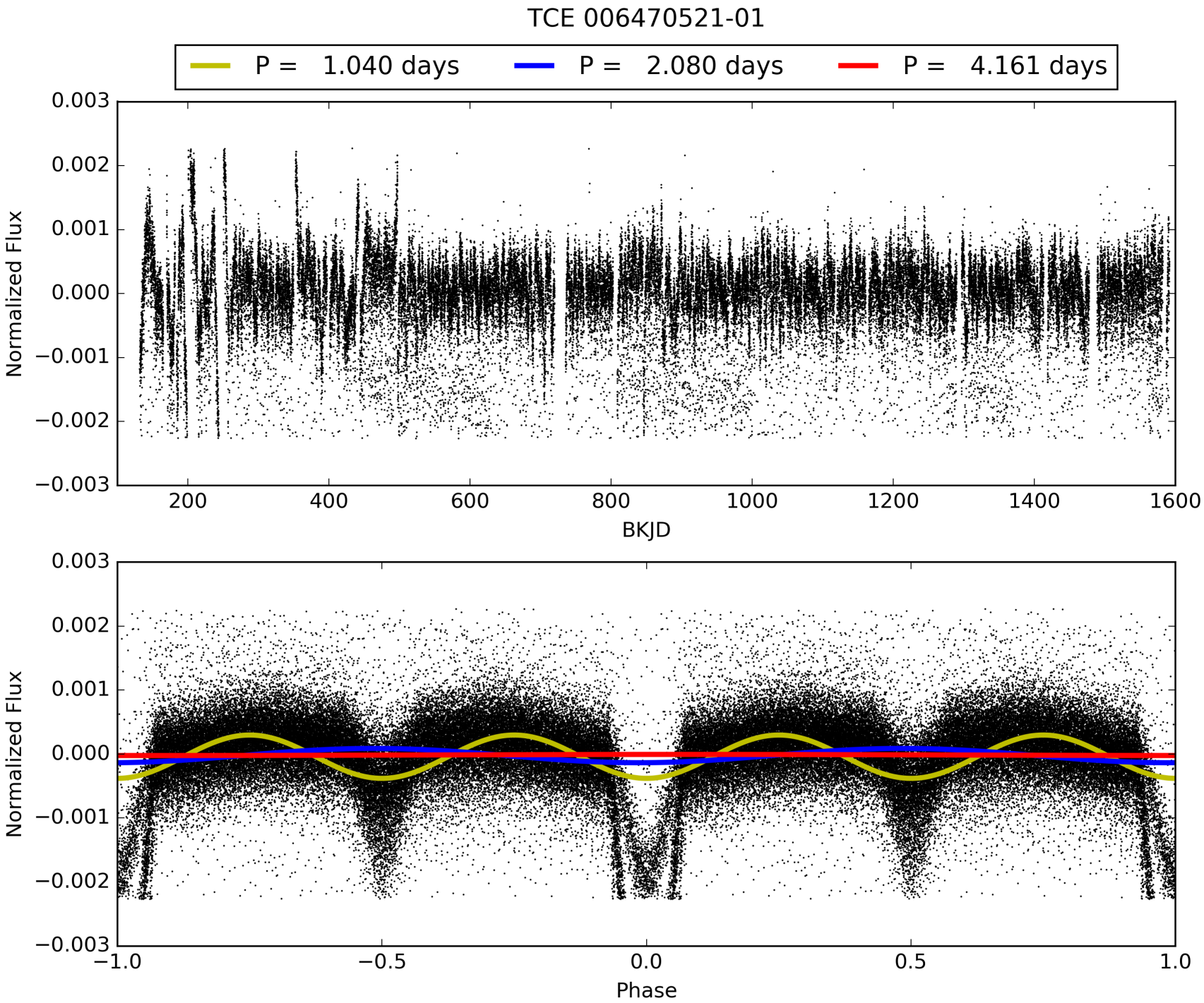
Centroid−sig: N/A
Centroid−so: 41.057 arcsec [1261.05σ]
OotOffset−rm: 6.624 arcsec [88.56σ]
KicOffset−rm: 6.669 arcsec [94.39σ]
OotOffset−st: 4/4/4/5 [17]
KicOffset−st: 4/4/4/5 [17]
DiffImageQuality−fgm: 1.00 [17/17]
DiffImageOverlap−fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 −− Date Generated: 31−Jan−2016 06:49:13 Z

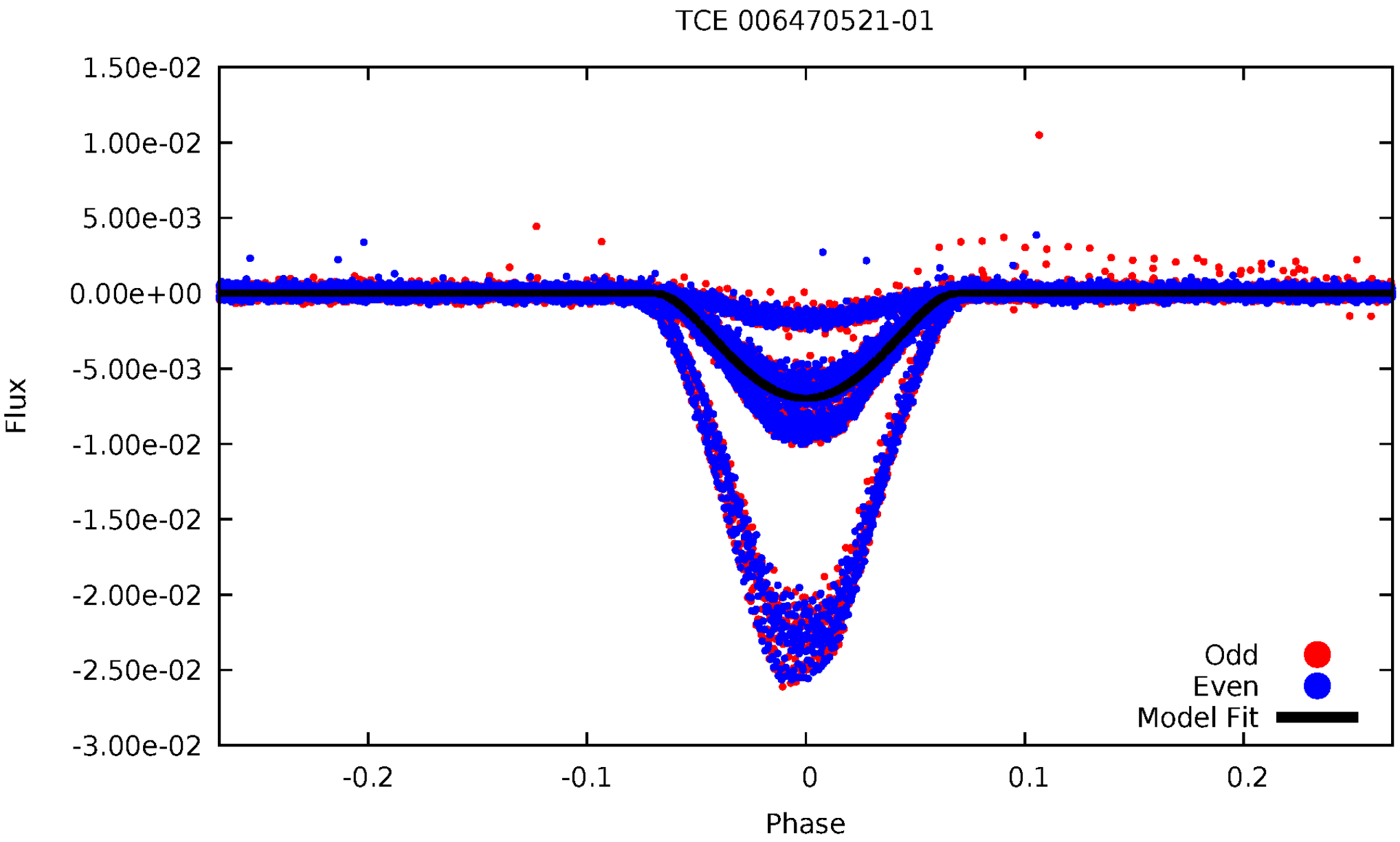
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 006470521-01, PDC Light Curves

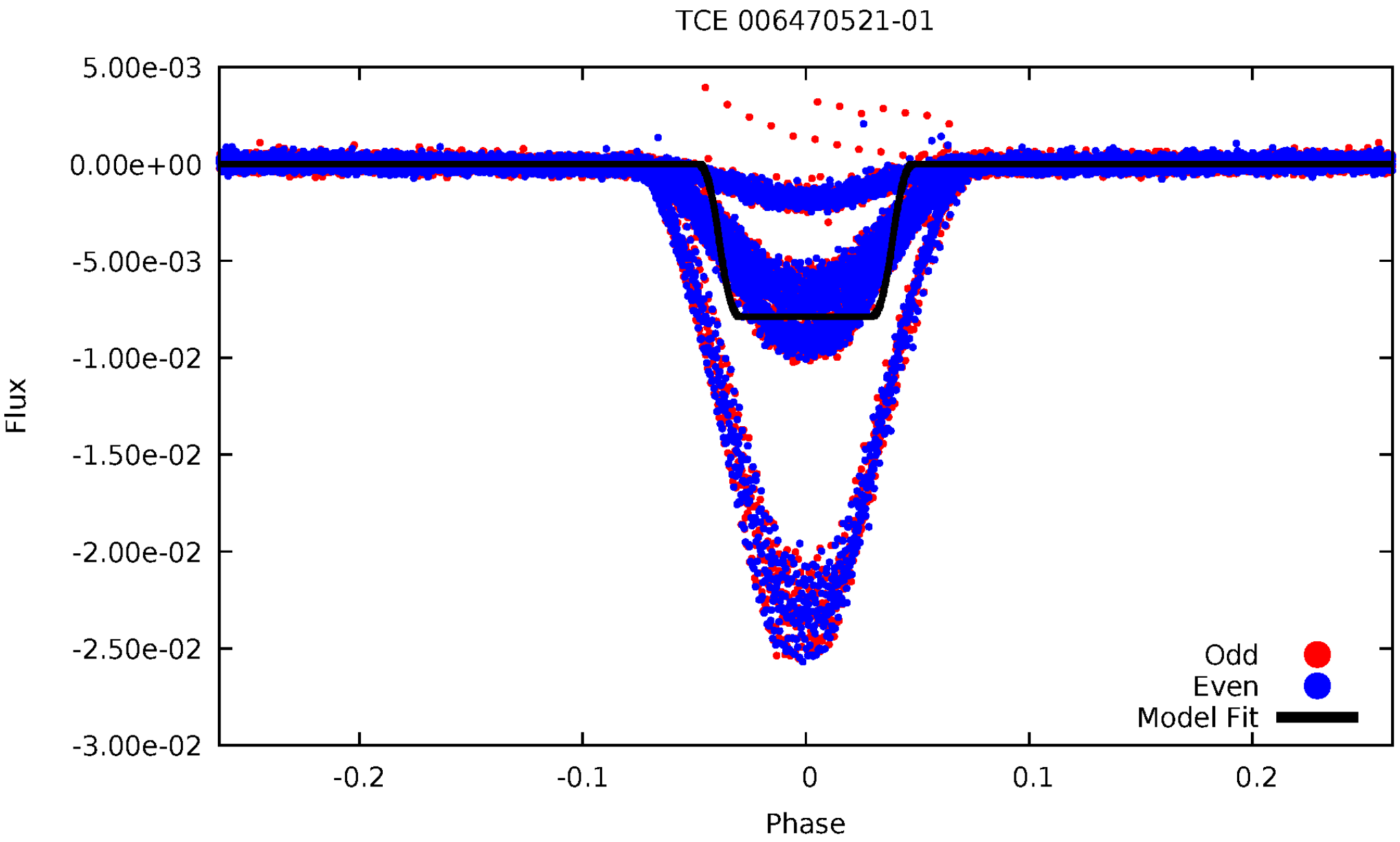



TCE 006470521-01
P = 1.040 days
P = 2.080 days
P = 4.161 days
Normalized Flux
BKJD
Phase

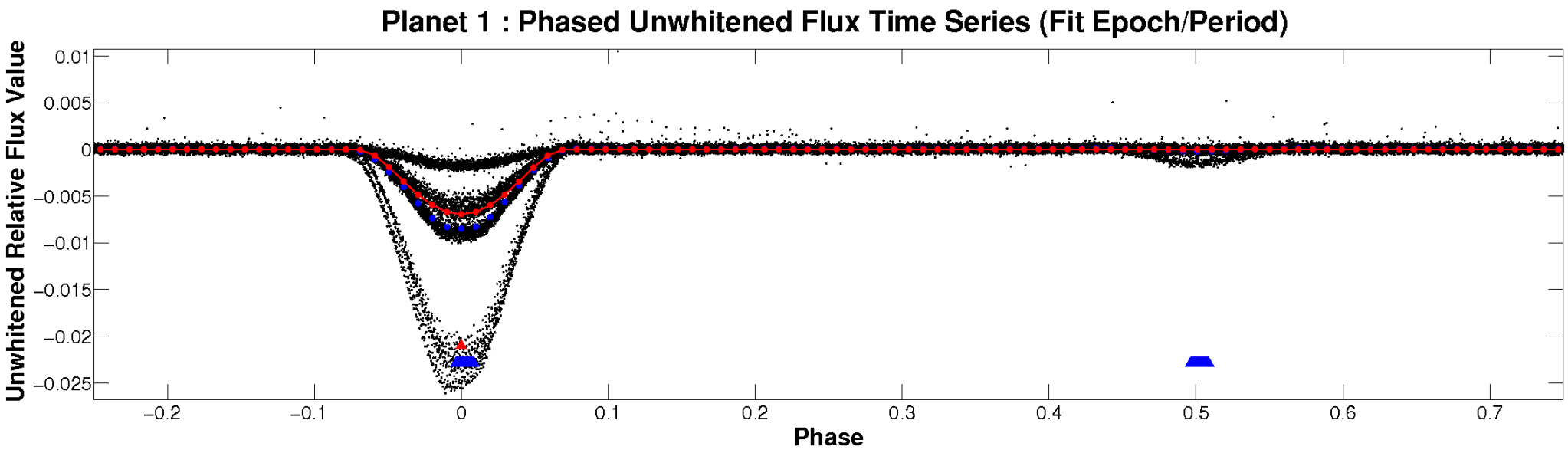
DV Odd/Even

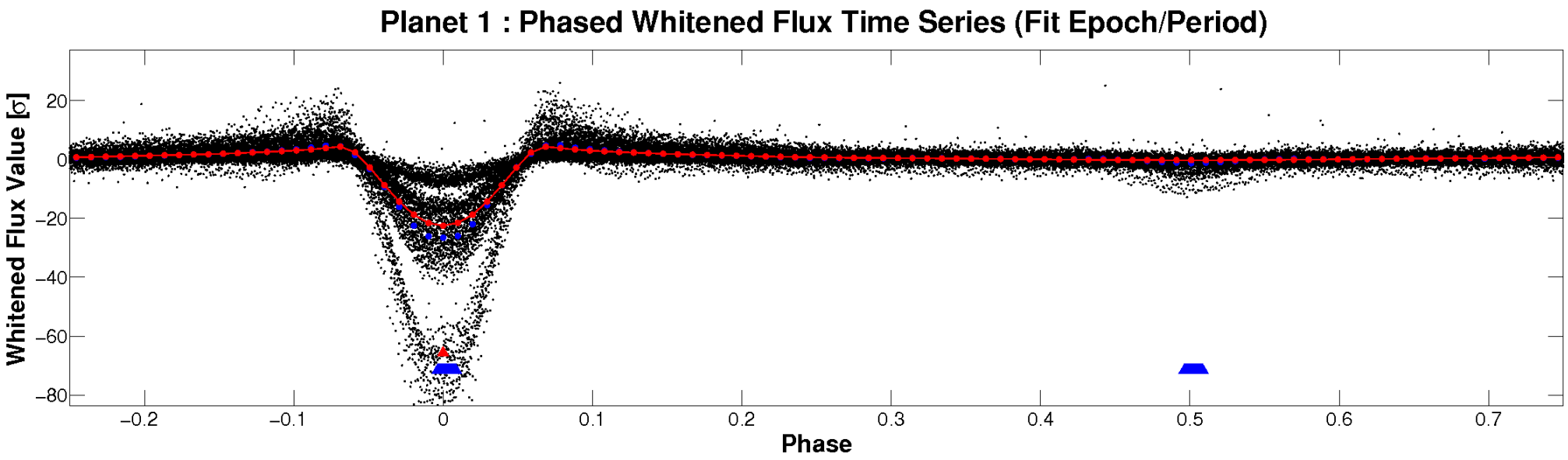

TCE 006470521-01
1.50e-02
1.00e-02
5.00e-03
0.00e+00
-5.00e-03
-1.00e-02
-1.50e-02
-2.00e-02
-2.50e-02
-3.00e-02
Flux
-0.2
-0.1
0
0.1
0.2
Phase
Odd
Even
Model Fit

ALT Odd/Even


TCE 006470521-01
5.00e-03
0.00e+00
-5.00e-03
-1.00e-02
-1.50e-02
-2.00e-02
-2.50e-02
-3.00e-02
Flux
-0.2
-0.1
0
0.1
0.2
Phase
Odd
Even
Model Fit

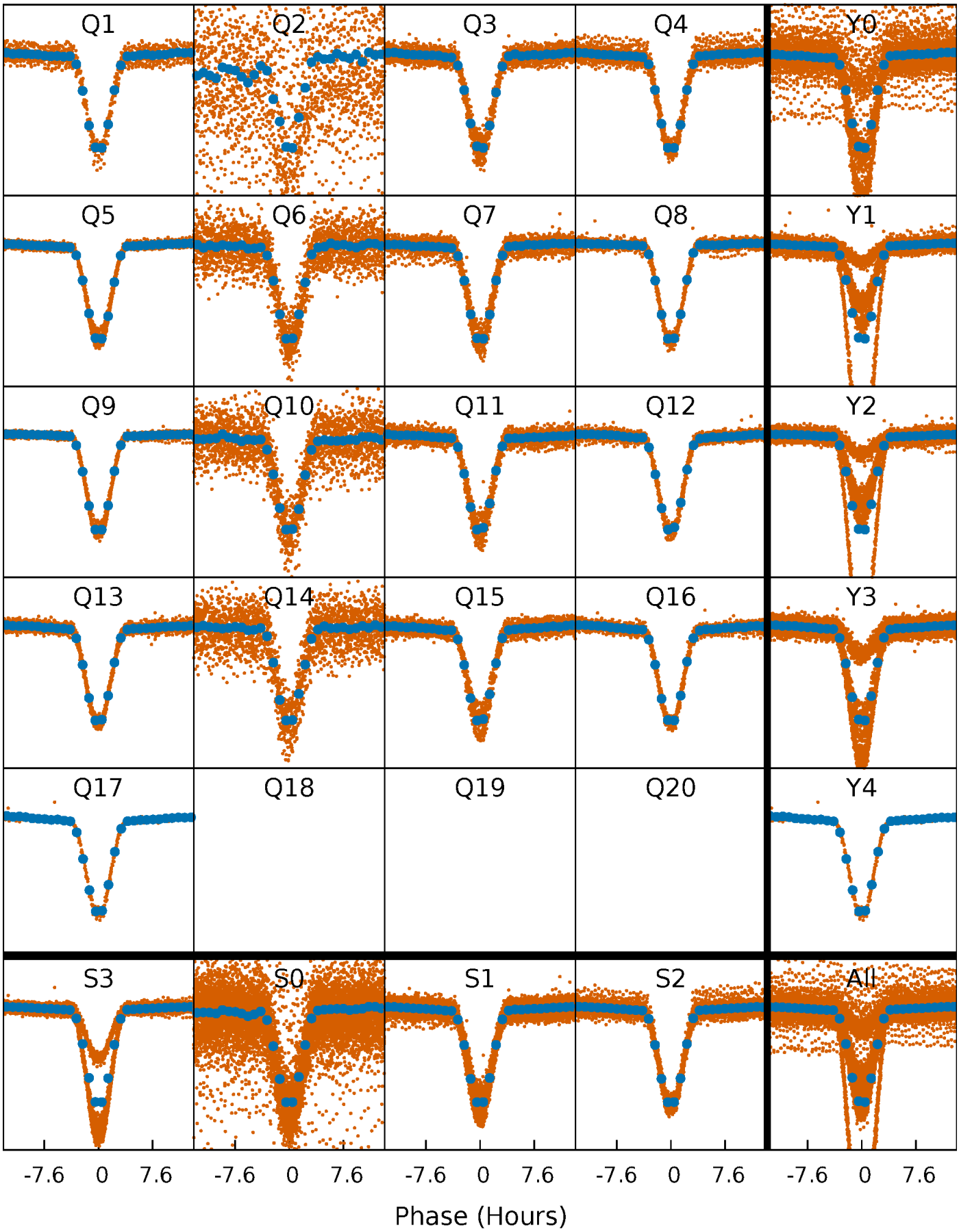
Non-Whitened Vs. Whitened Light Curve





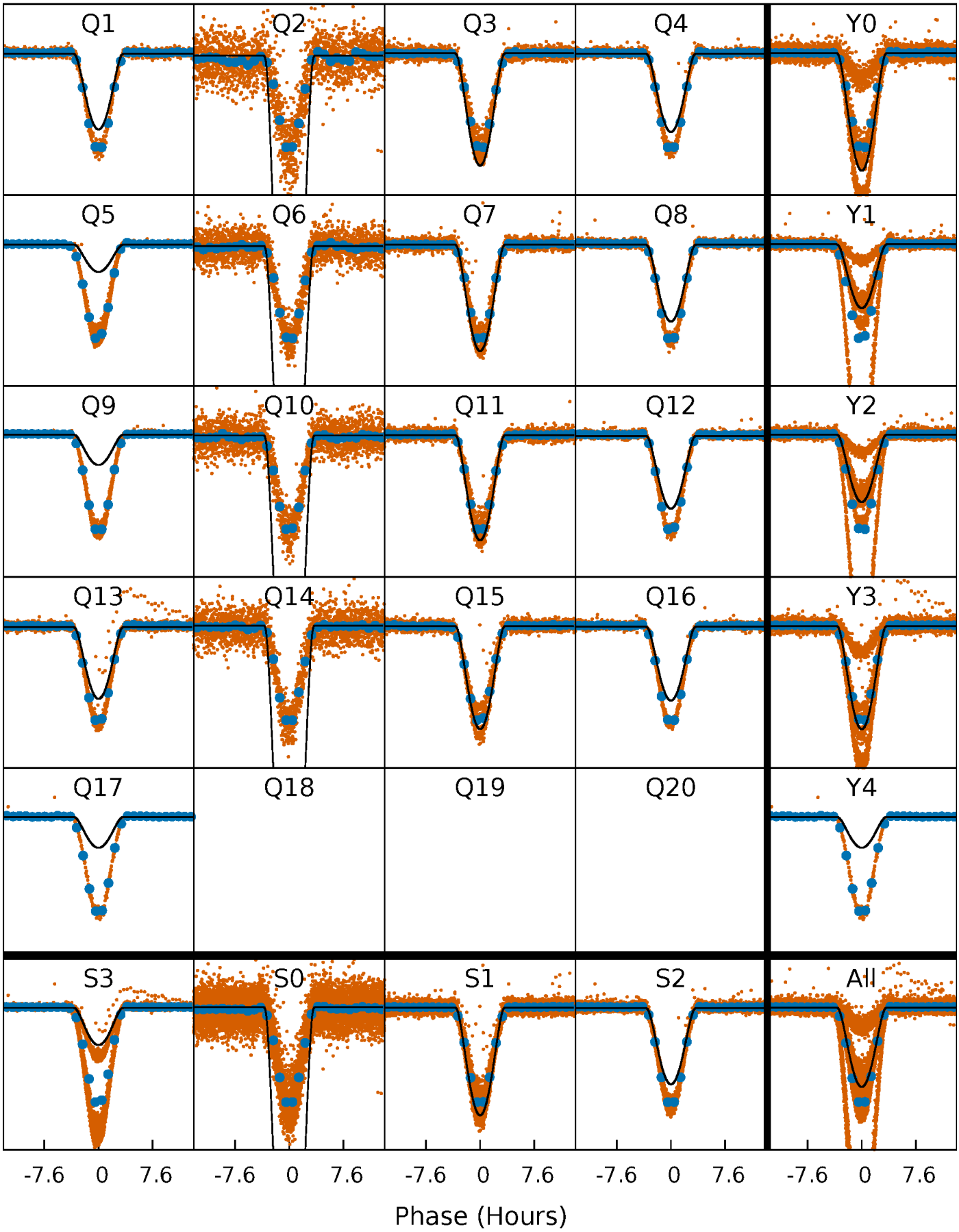
PDC Quarter-Phased Transit Curves

TCE 006470521-01 P= 2.080436 Days T_0=131.826548 (BKJD)



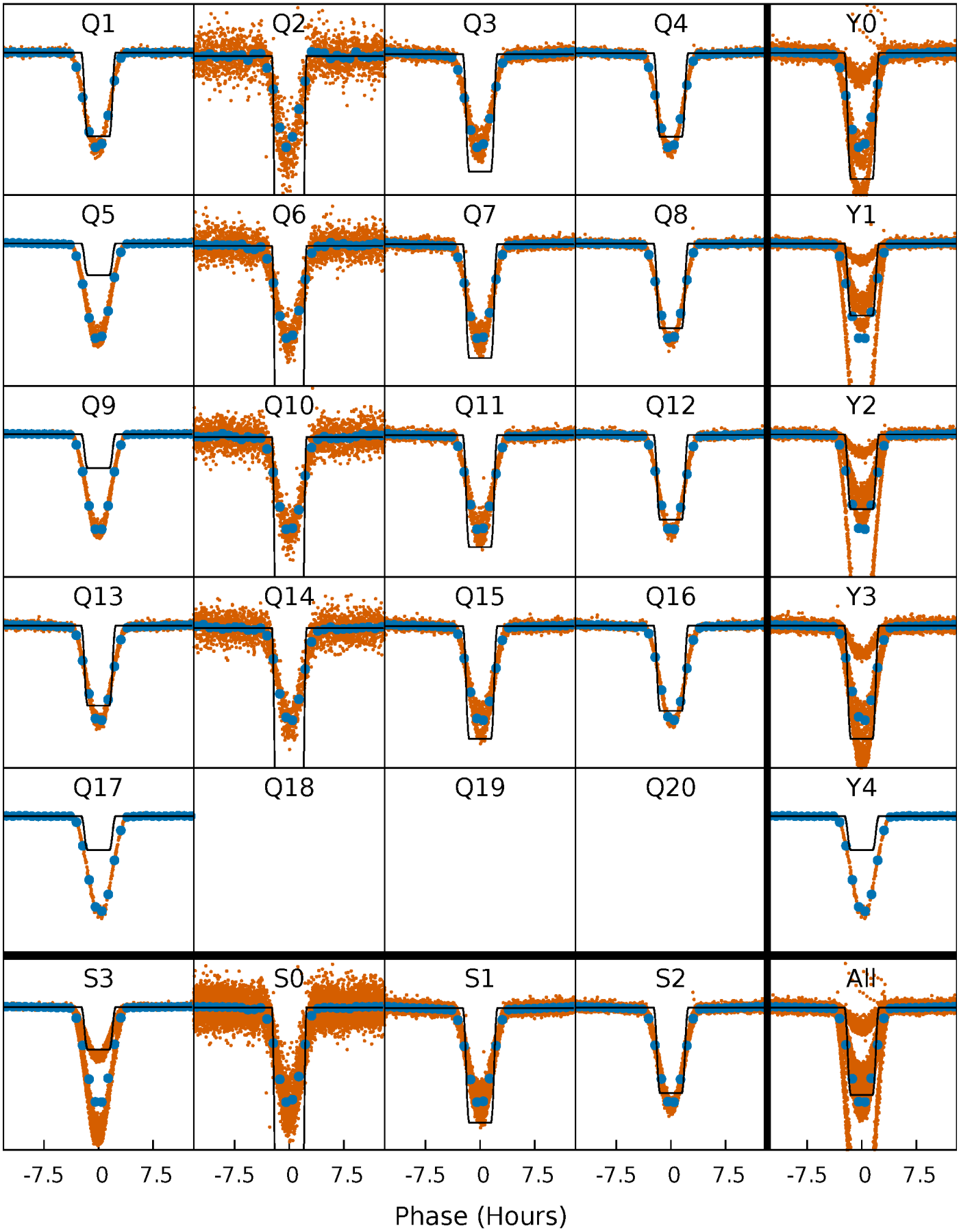
DV Quarter-Phased Transit Curves

TCE 006470521-01 P= 2.080436 Days T_0=131.826548 (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

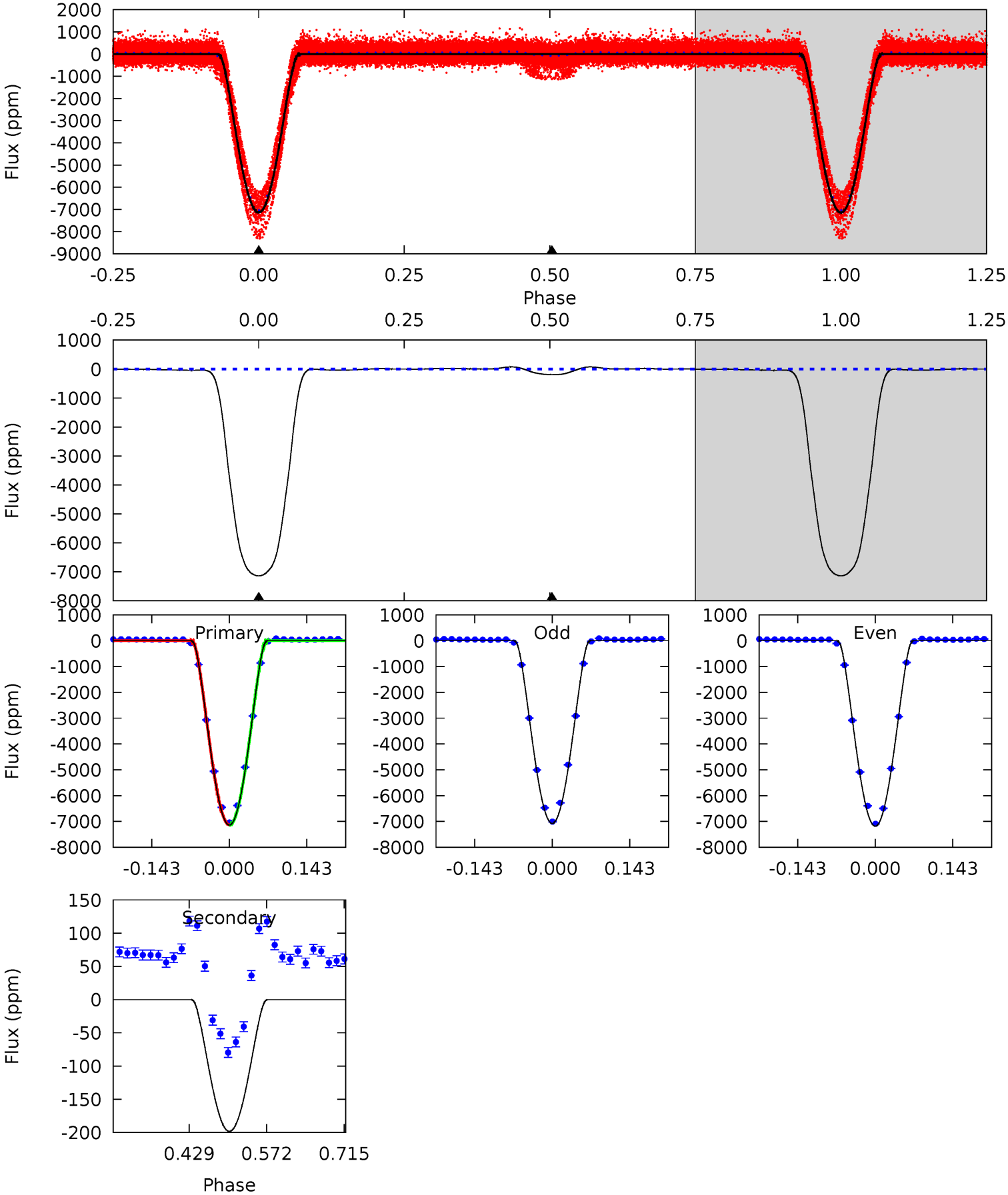
TCE 006470521-01 P= 2.080409 Days T_0=131.836160 (BKJD)



DV Model-Shift Uniqueness Test

006470521-01, P = 2.080436 Days, E = 129.746112 Days

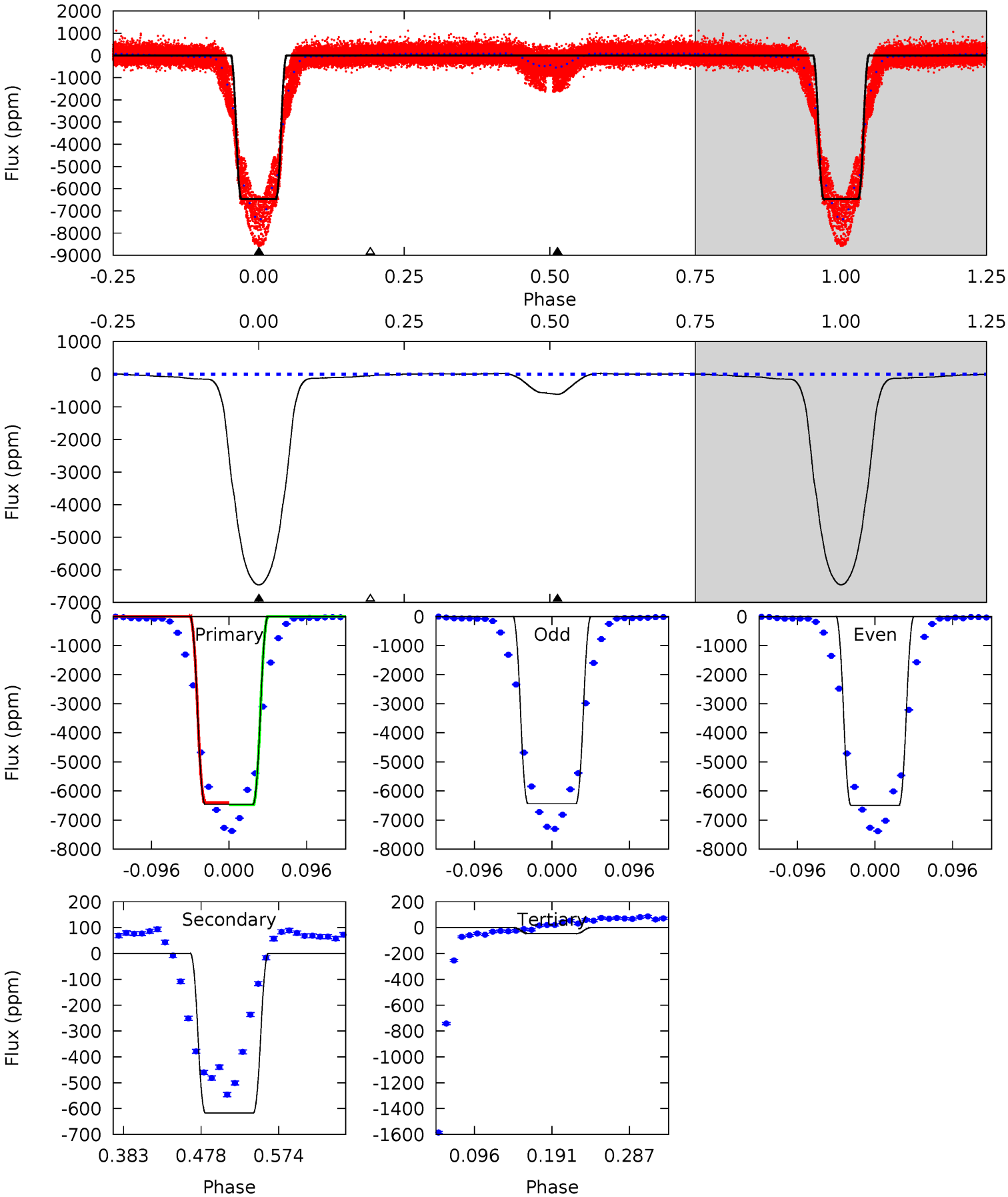
Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2096	58.2	0	0	4.49	1.46	3.97	2096	2096	58.2	58.2	15.5	1.18	0.01	0



Alt Model-Shift Uniqueness Test

006470521-01, P = 2.080409 Days, E = 129.755751 Days

Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1371	130.9	9.78	0	4.57	1.67	10.1	1362	1371	121.1	130.9	5.81	1.15	0.00	0



Stellar Parameters For KIC 006470521

	$T_{\rm eff}(K)$	$\log(g)$	[Fe/H]	R ($R_\odot$)	$M(M_\odot)$	$p_\star$ (g·cm^{-3})
	6377^{+173}_{-211}	$4.399^{+0.072}_{-0.217}$	$-0.100^{+0.250}_{-0.300}$	$1.119^{+0.389}_{-0.130}$	$1.147^{+0.172}_{-0.157}$	$1.152^{+0.341}_{-0.616}$
	+3%/-3%	+2%/-5%	+250%/-300%	+35%/-12%	+15%/-14%	+30%/-53%
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 006470521-01 / KOI 3701.01

Detrend	Depth (ppm)	R_p ($R_\oplus$)	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-198±3	$17.24^{+3.29}_{-1.96}$	2320^{+187}_{-117}	2340^{+169}_{-4217}	$0.403^{+0.097}_{-0.111}$
Alt.	-617±5	$11.14^{+2.28}_{-1.32}$	2315^{+169}_{-115}	3691^{+144}_{-132}	$2.976^{+0.803}_{-0.795}$

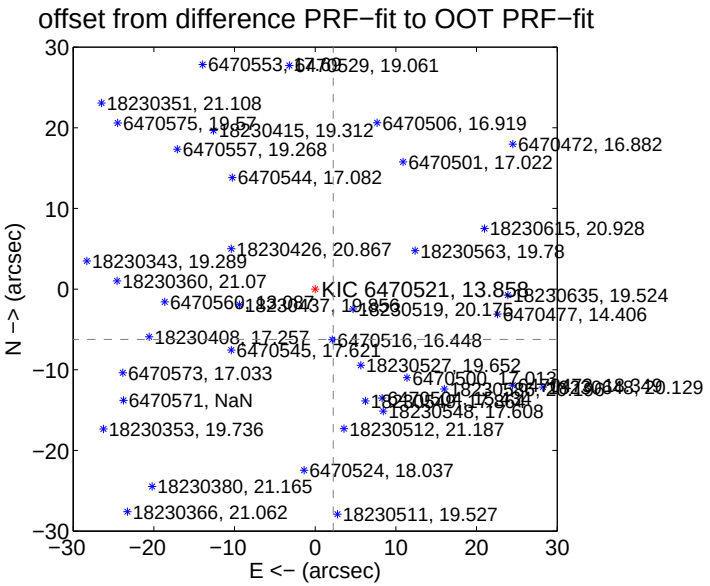
T_{max} = Theoretical Maximum Planetary Temperature
T_{obs} = Observed Planetary Temperature (Assuming A=0.3)
A_{obs} = Observed Albedo (Assuming T=0)

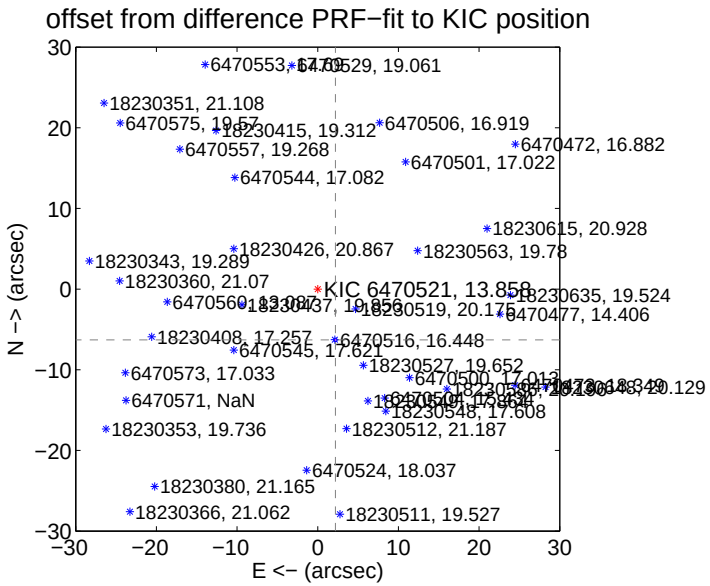
If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

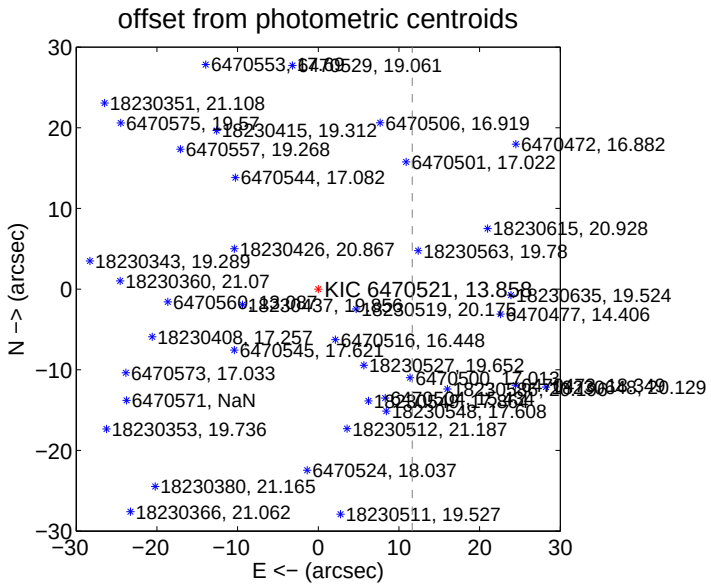
DV Centroid Data

Supplemental centroid analysis for 006470521-01. Kepler magnitude: 13.86. Transit SNR 769.05
There are 17 quarters with good PRF difference image offsets
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	6.624 ± 0.075	88.56	-2.231 ± 0.069	-6.237 ± 0.073
PRF-fit source offset from KIC position	6.669 ± 0.071	94.39	-2.197 ± 0.068	-6.296 ± 0.070
photometric centroid source offset	41.06 ± 0.03	1261.07	-11.65 ± 0.02	-39.37 ± 0.03

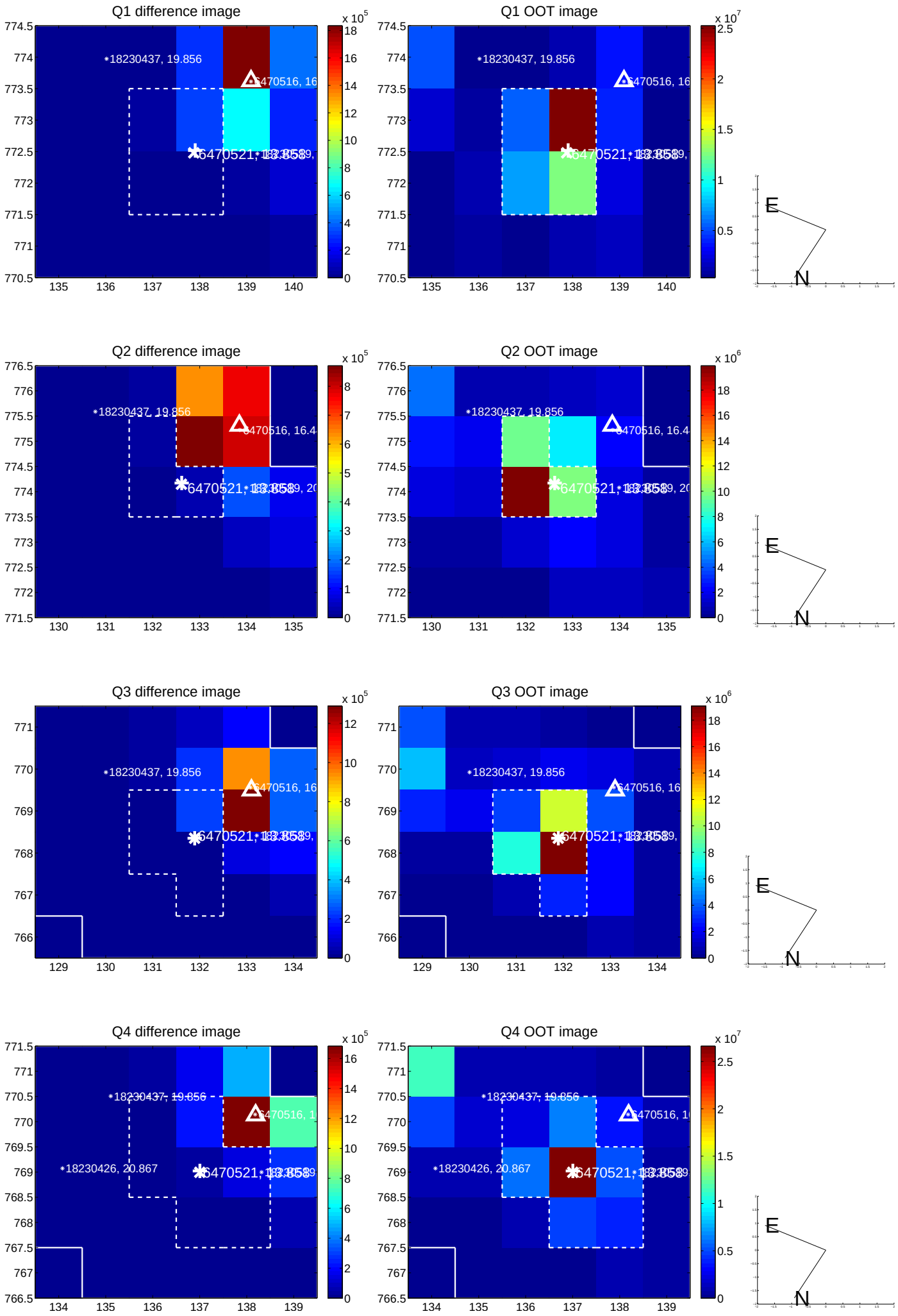




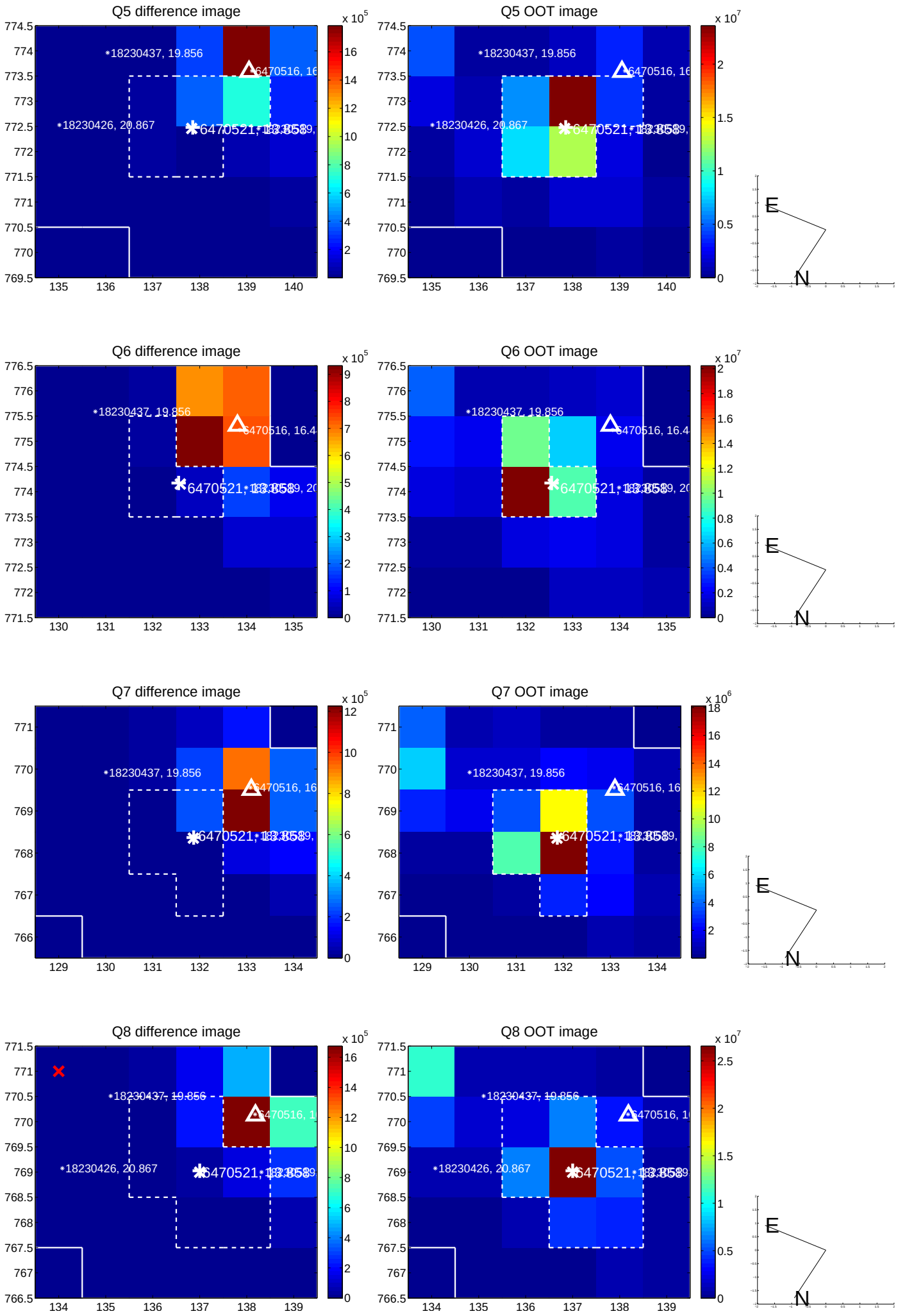


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one-σ uncertainty. Blue circle: three-σ. Red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

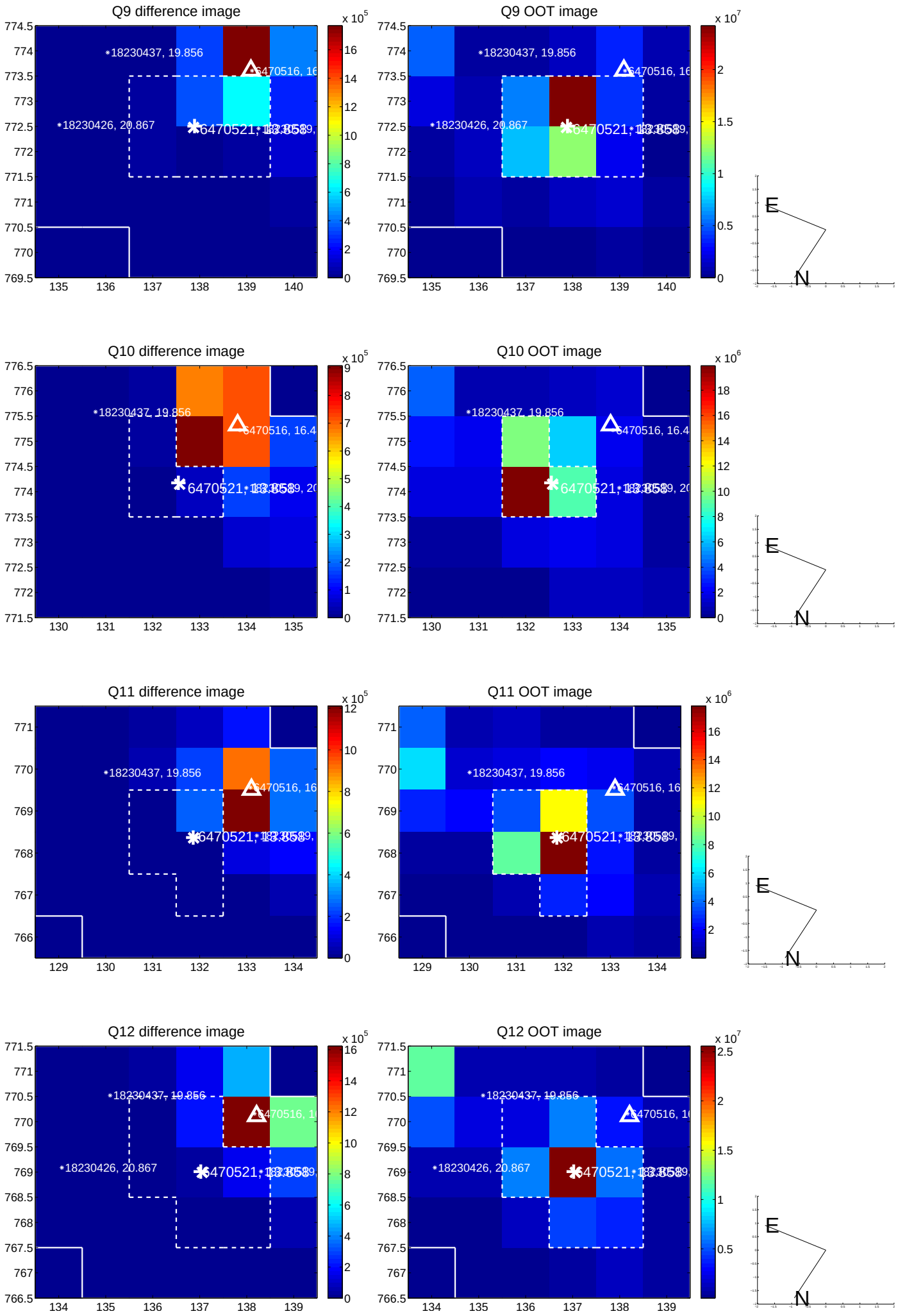
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



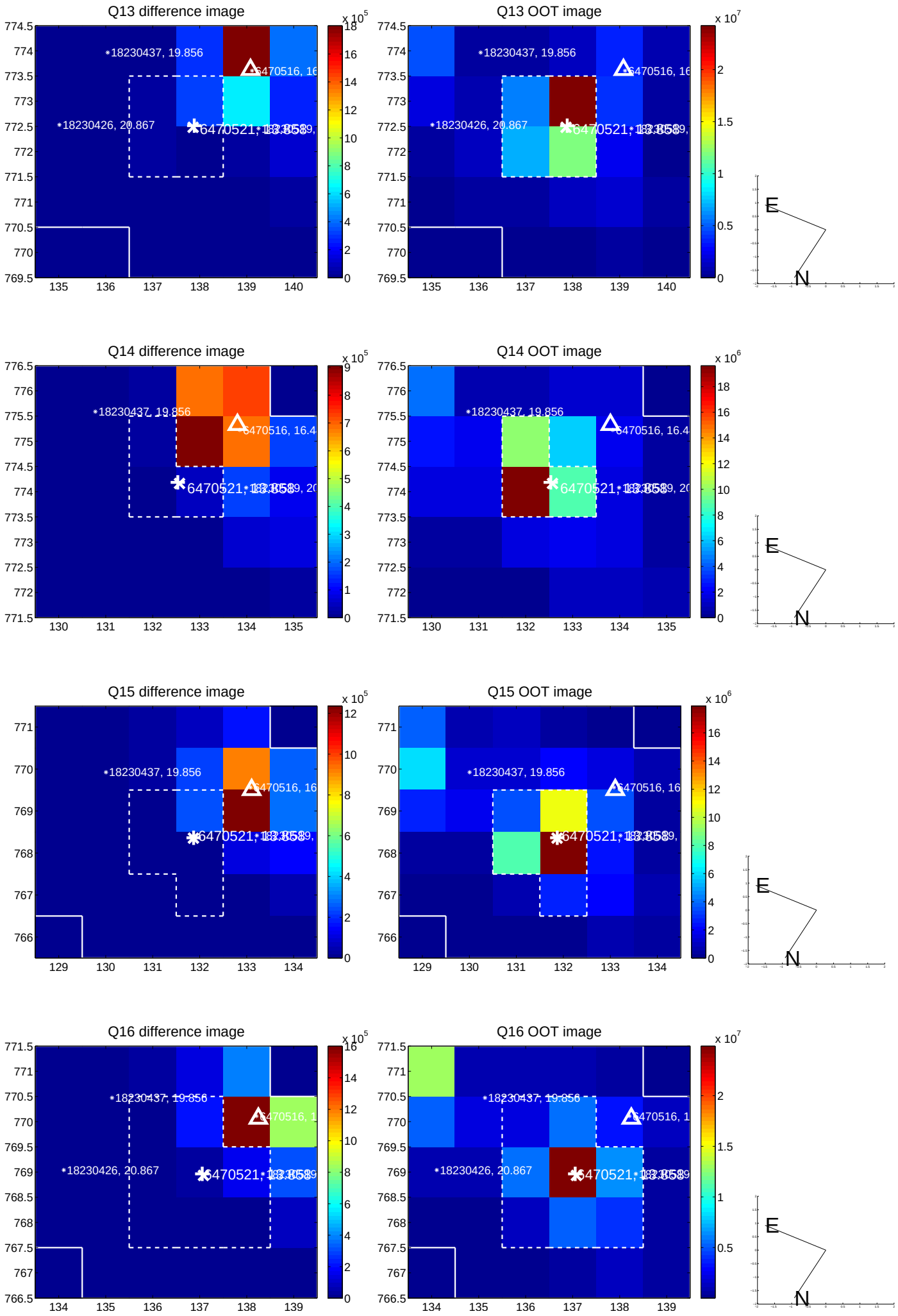
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



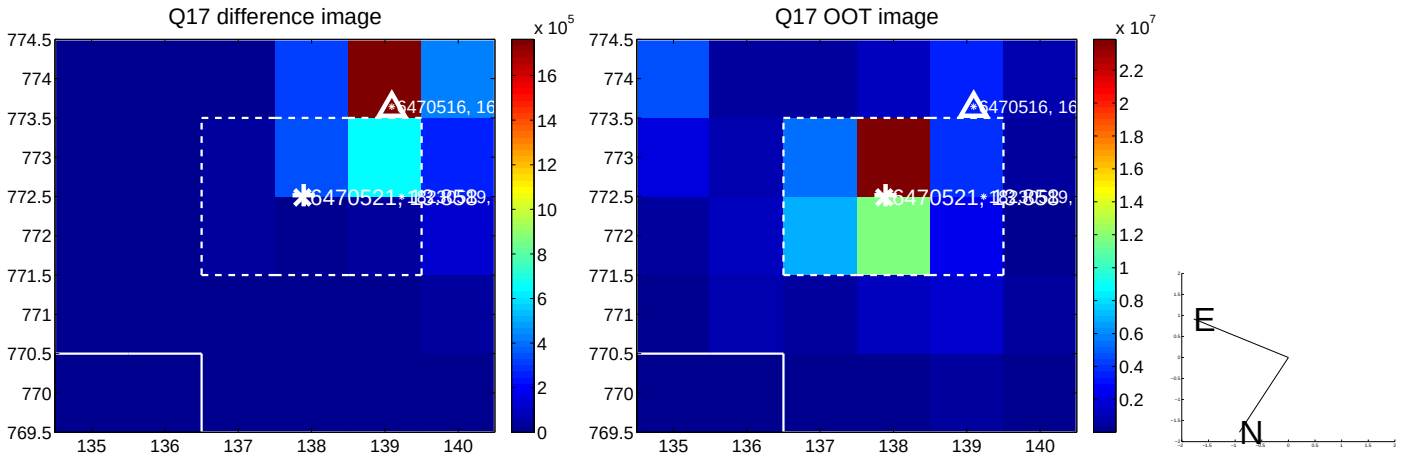
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

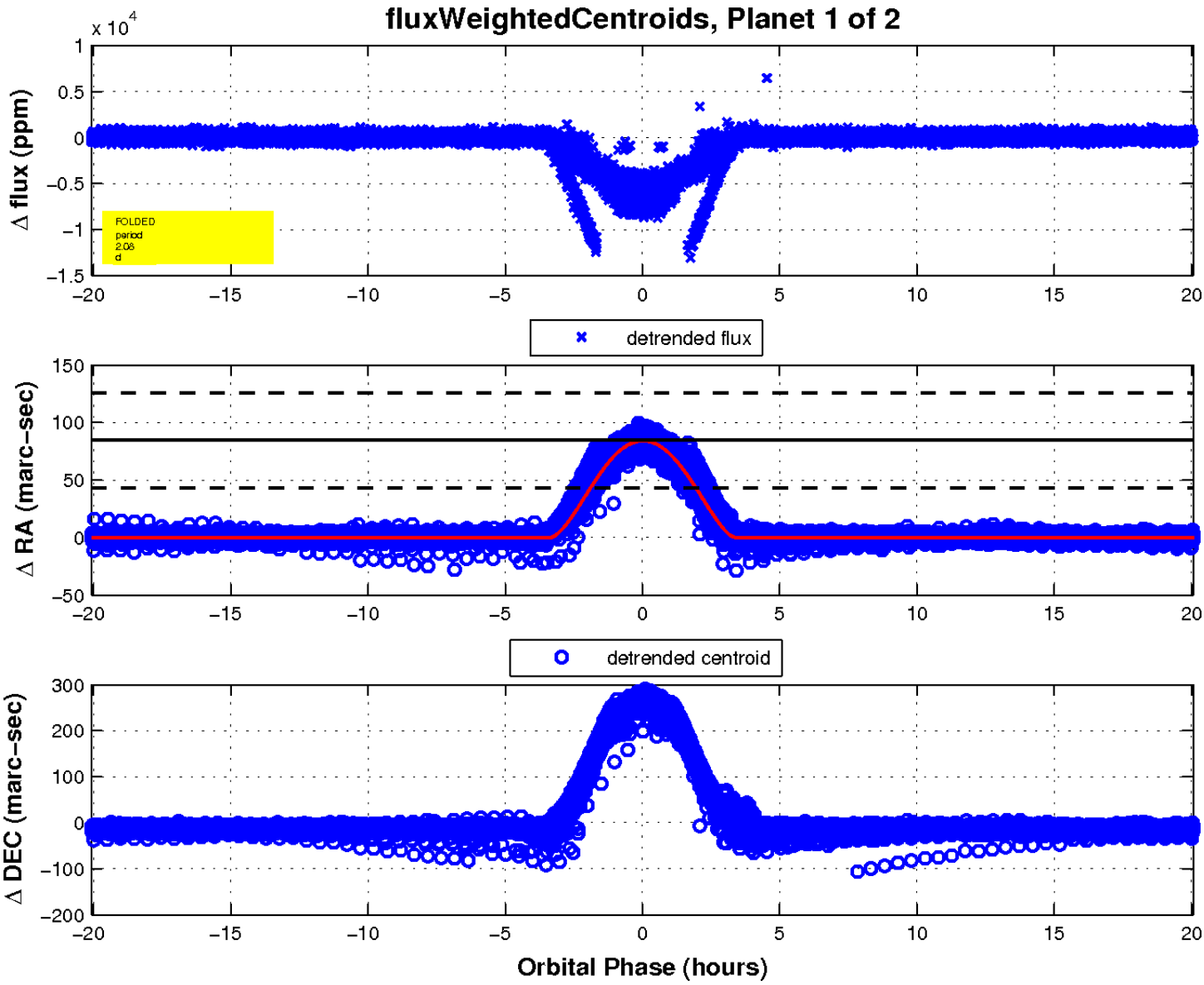


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

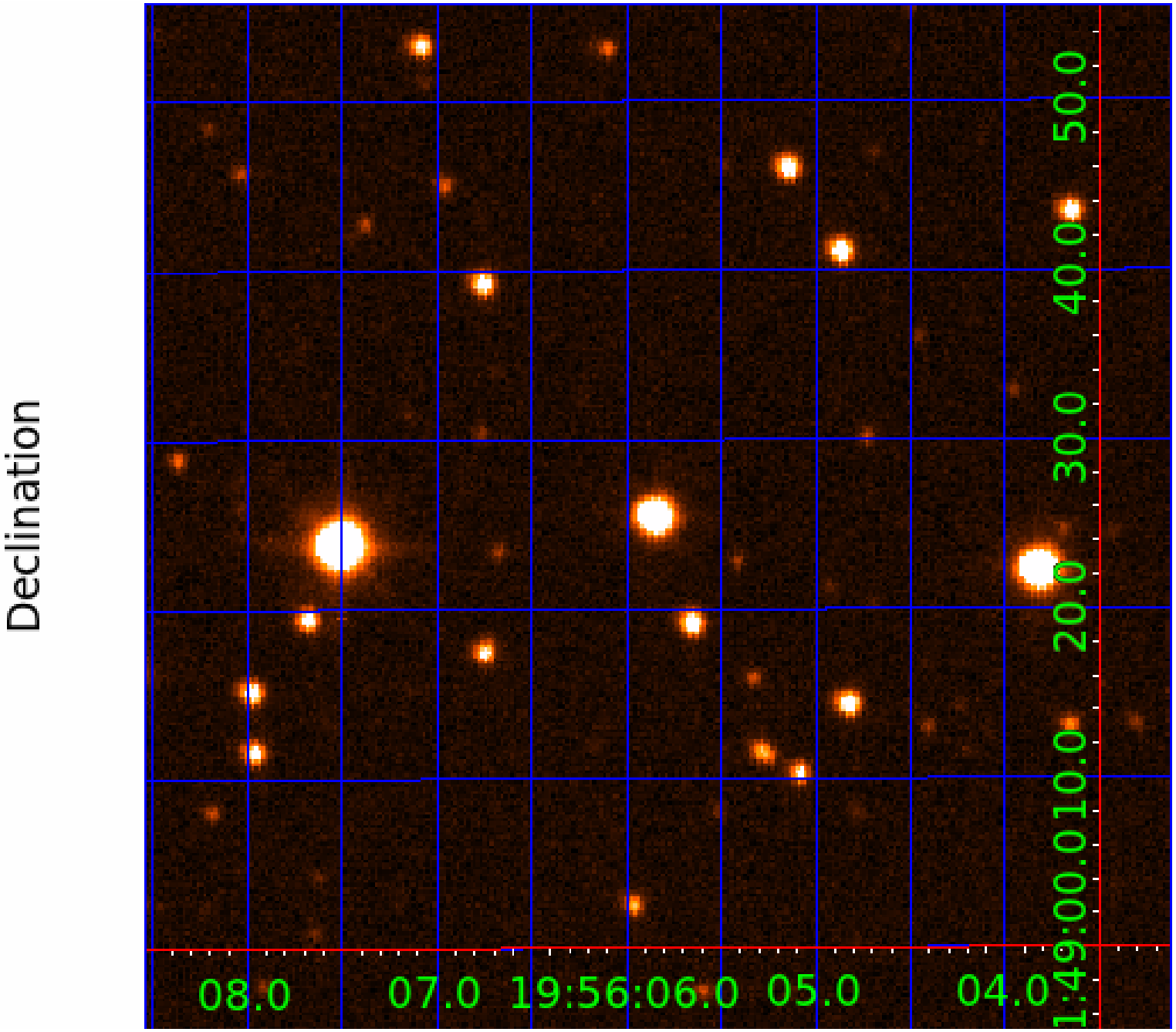


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.





UKIRT Image


Declination
08.0
07.0
19:56:06.0
05.0
04.0
1:49:00.0
10.0
20.0
30.0
40.0
50.0

KIC 006470521

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 ($S_\oplus$)
006470521-01	OBS	3701.01	2.080436	131.826548	6969.4	6.689	1472.0	769.0	1.12	6377	16.73	1666.13
006470521-02	OBS	No	1.040199	131.844527	1671.6	3.000	47.5	-1.0	1.12	6377	4.59	4198.47

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006470521-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—MOD_ODDEVEN_DV—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH
006470521-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_NOFITS—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 006470521-02

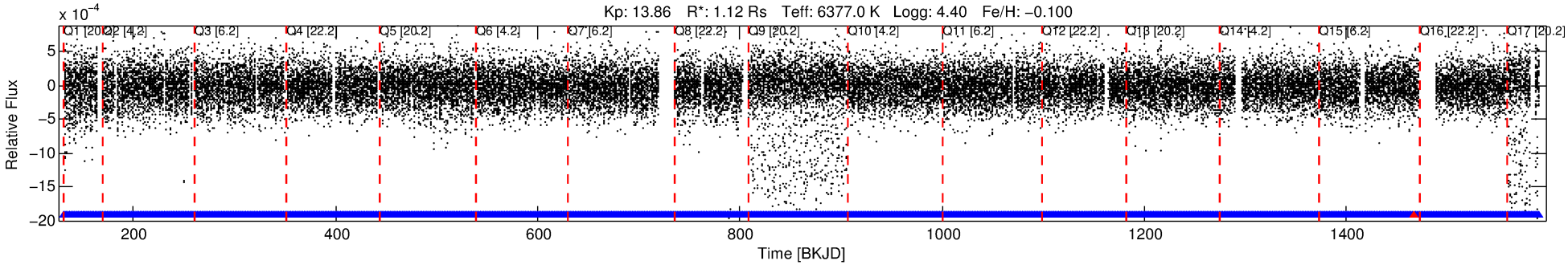
TCE (1)	KIC	Parent (2)	Parent KIC	P_1:P_2	Dist (″)	ΔRow	ΔCol	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
006470521-02	6470521	3705.01	6470516	1:2	6.6	-1	-1	16.45	13.86	571.71	Direct-PRF	0	2.76	1.15

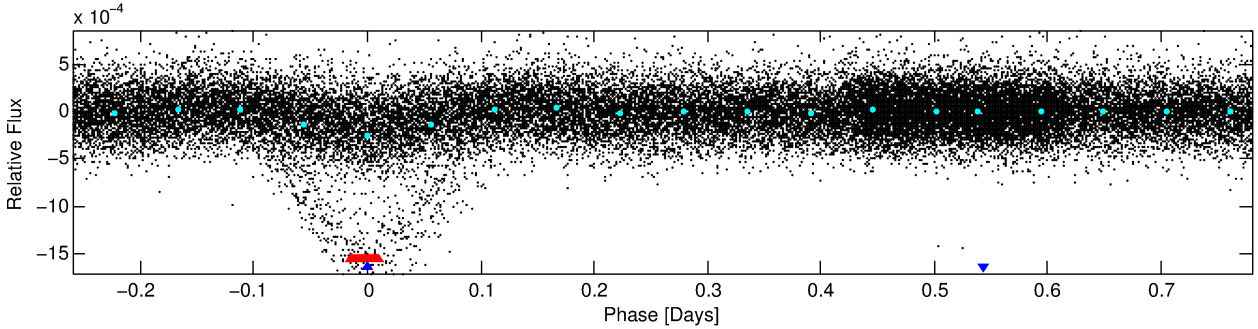
Notes: P_1:P_2 is the period ratio. Dist is the distance in arcseconds. ΔRow and ΔCol are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth dividied by the child's. σ_P and σ_T are the significance of the match 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 recieve extra scrutiny, especially if the period ratio is very large.

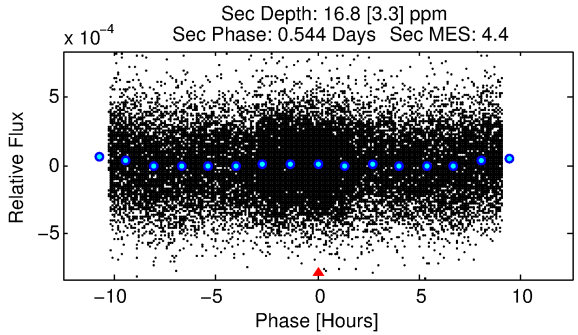
DV One-Page Summary

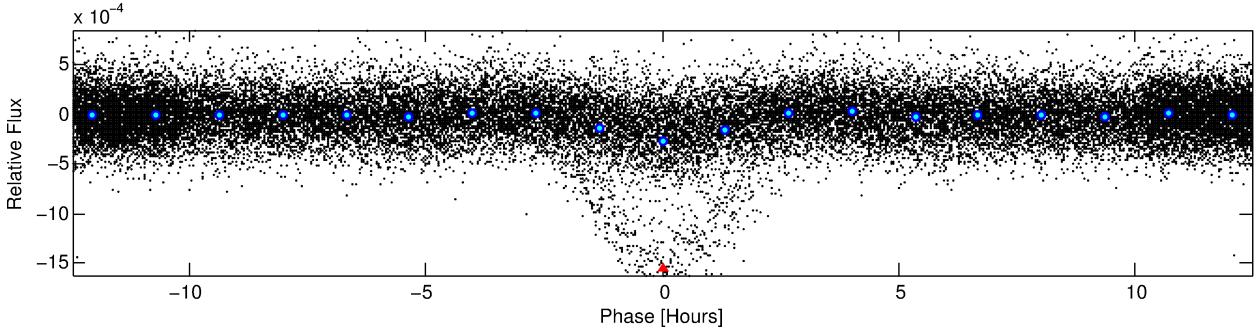
KIC: 6470521 Candidate: 2 of 2 Period: 1.040 d
KOI: K03701 Corr: No Ephemeris Match

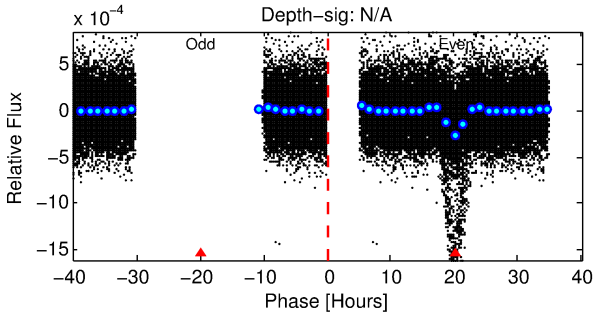
Kp: 13.86 R*: 1.12 Rs Teff: 6377.0 K Logg: 4.40 Fe/H: −0.100

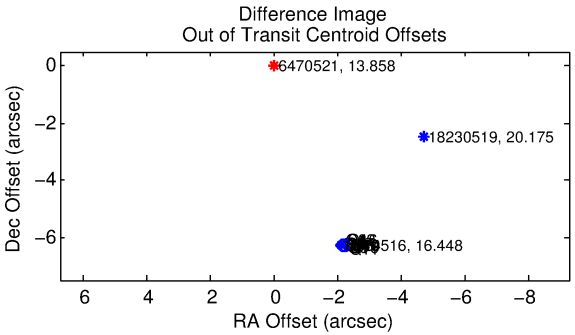












TPS TCE Results:

Period = 1.04020 d
Epoch = 131.8445 BKJD

DV fit results are unavailable

DV Diagnostic Results:

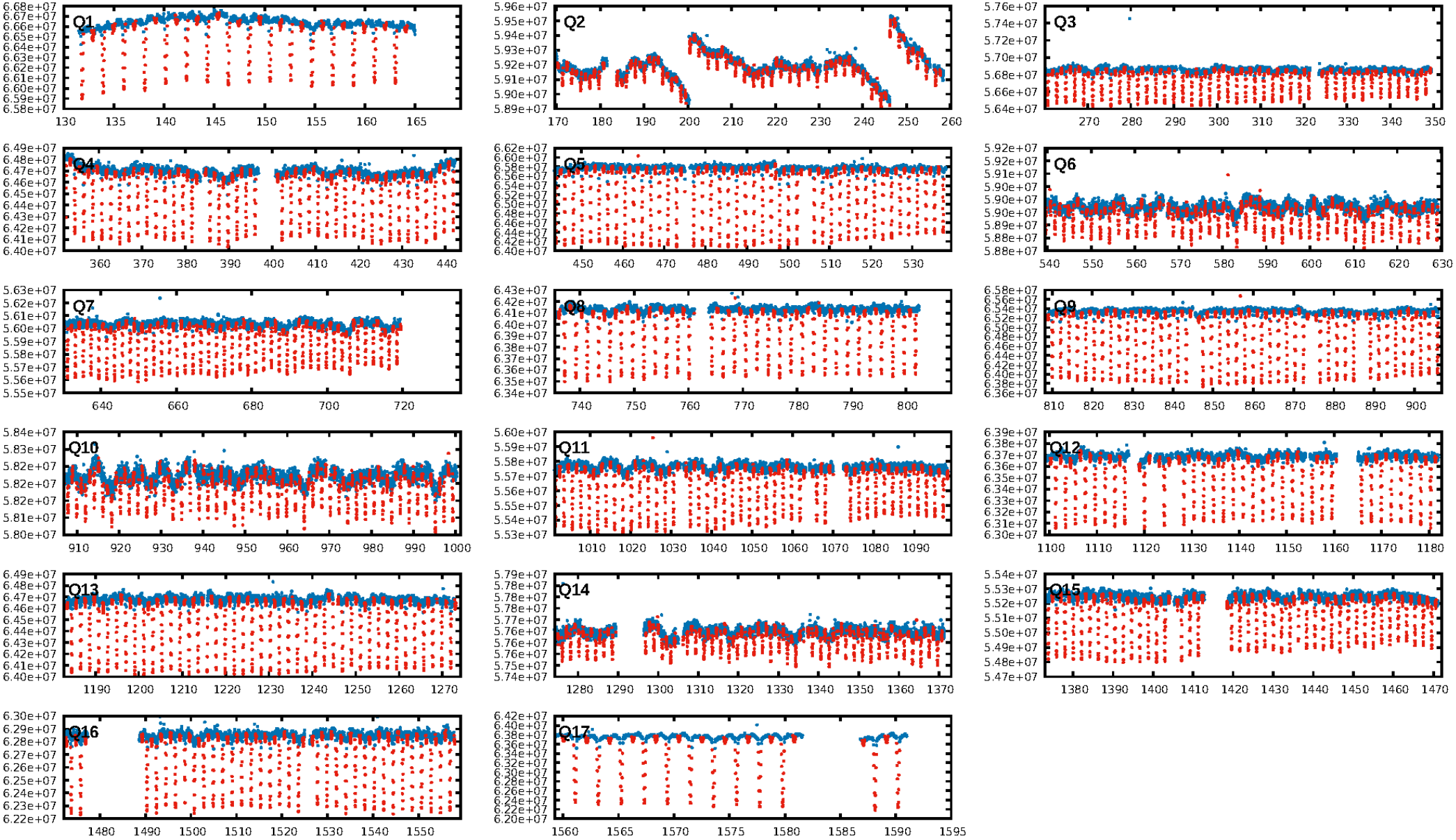
ShortPeriod−sig: N/A
LongPeriod−sig: 99.9% [3.41σ]
ModelChiSquare2−sig: N/A
ModelChiSquareGof−sig: N/A
Bootstrap−pfa: N/A
RollingBand−fgt: 1.00 [623/624]
GhostDiagnostic−chr: −0.1036

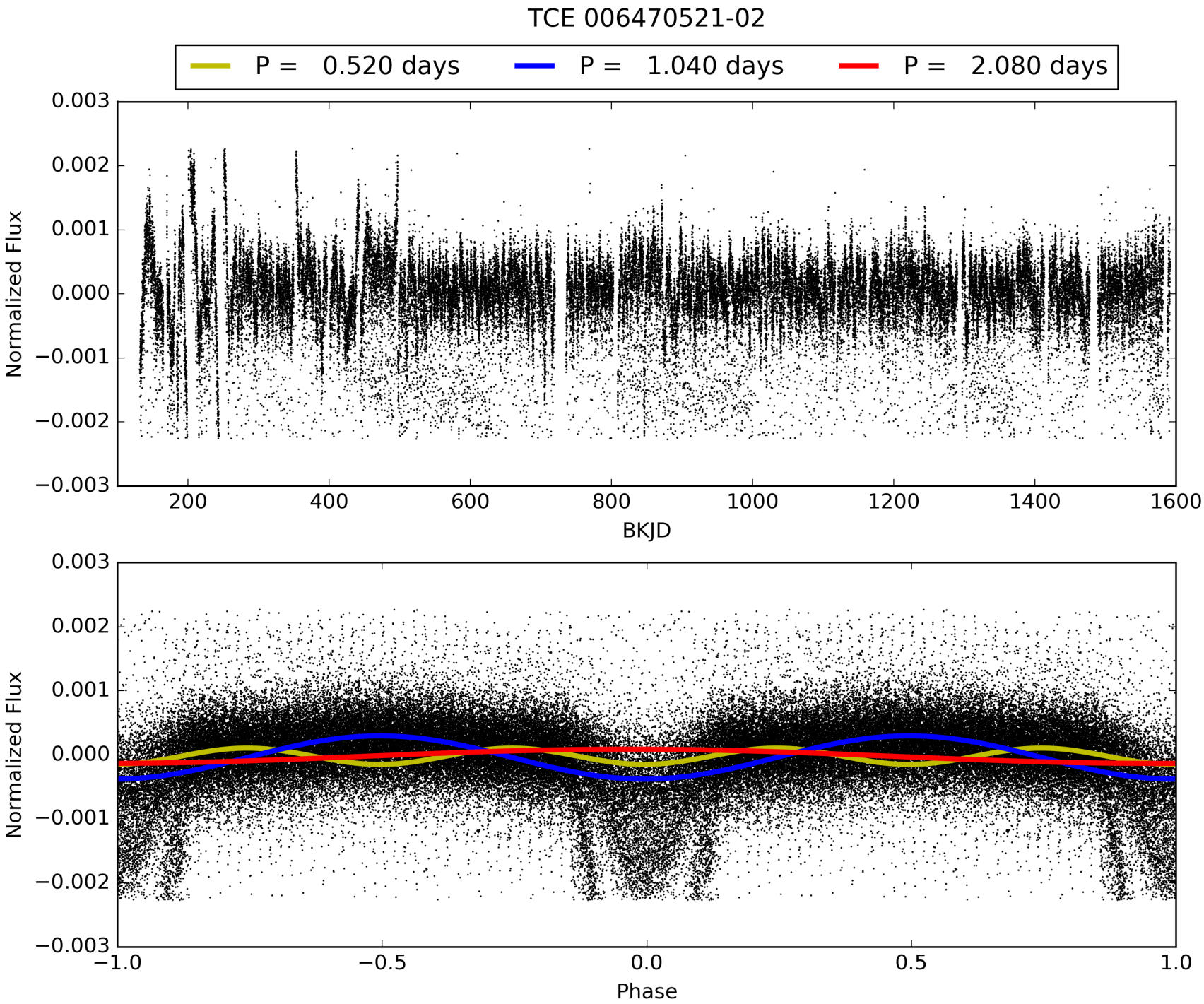
Centroid−sig: N/A
Centroid−so: 9.256 arcsec [57.55σ]
OotOffset−rm: 6.646 arcsec [92.81σ]
KicOffset−rm: 6.670 arcsec [92.40σ]
OotOffset−st: 4/4/4/5 [17]
KicOffset−st: 4/4/4/5 [17]
DiffImageQuality−fgm: 1.00 [17/17]
DiffImageOverlap−fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31−Jan−2016 06:49:24 Z

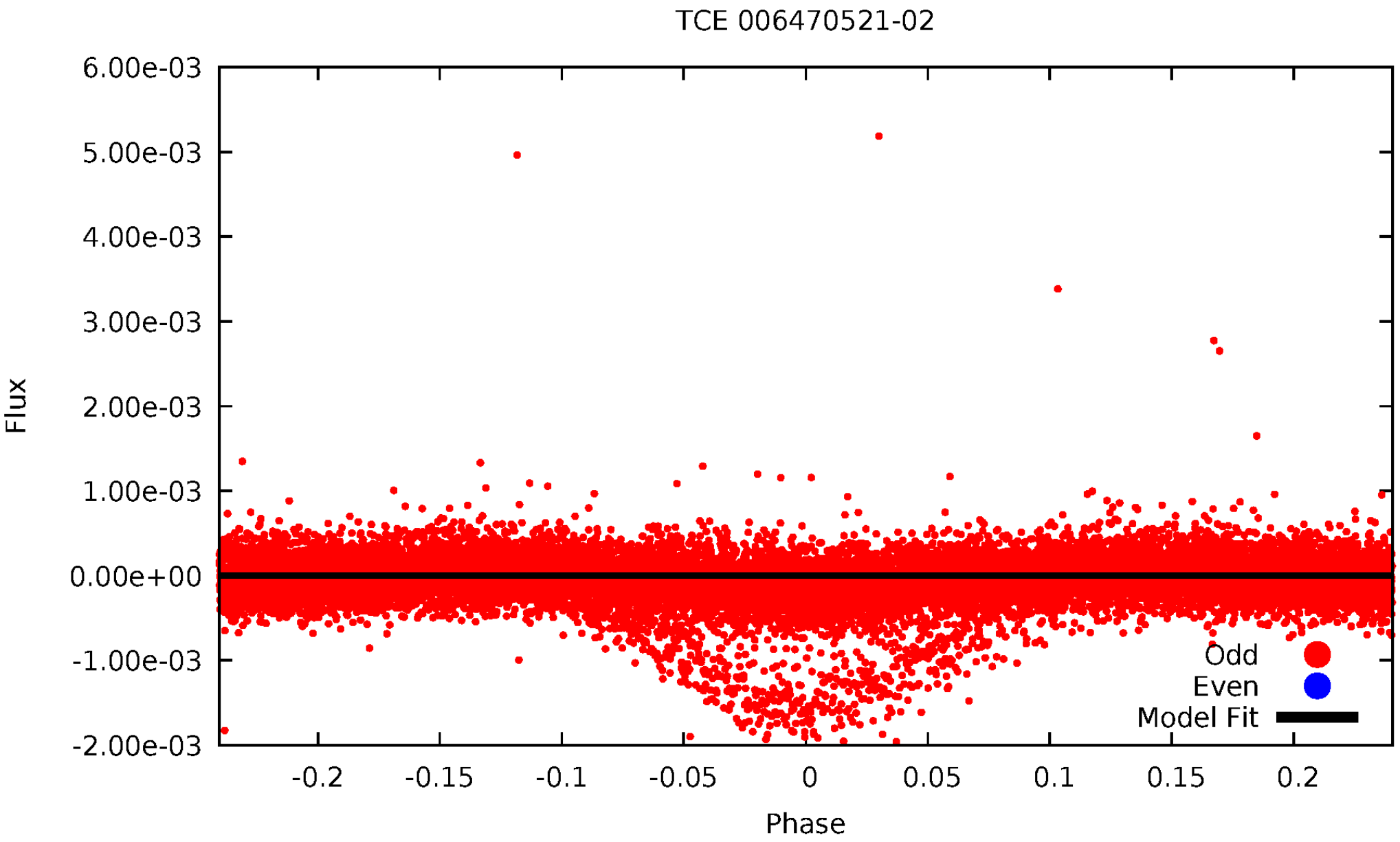
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 006470521-02, PDC Light Curves

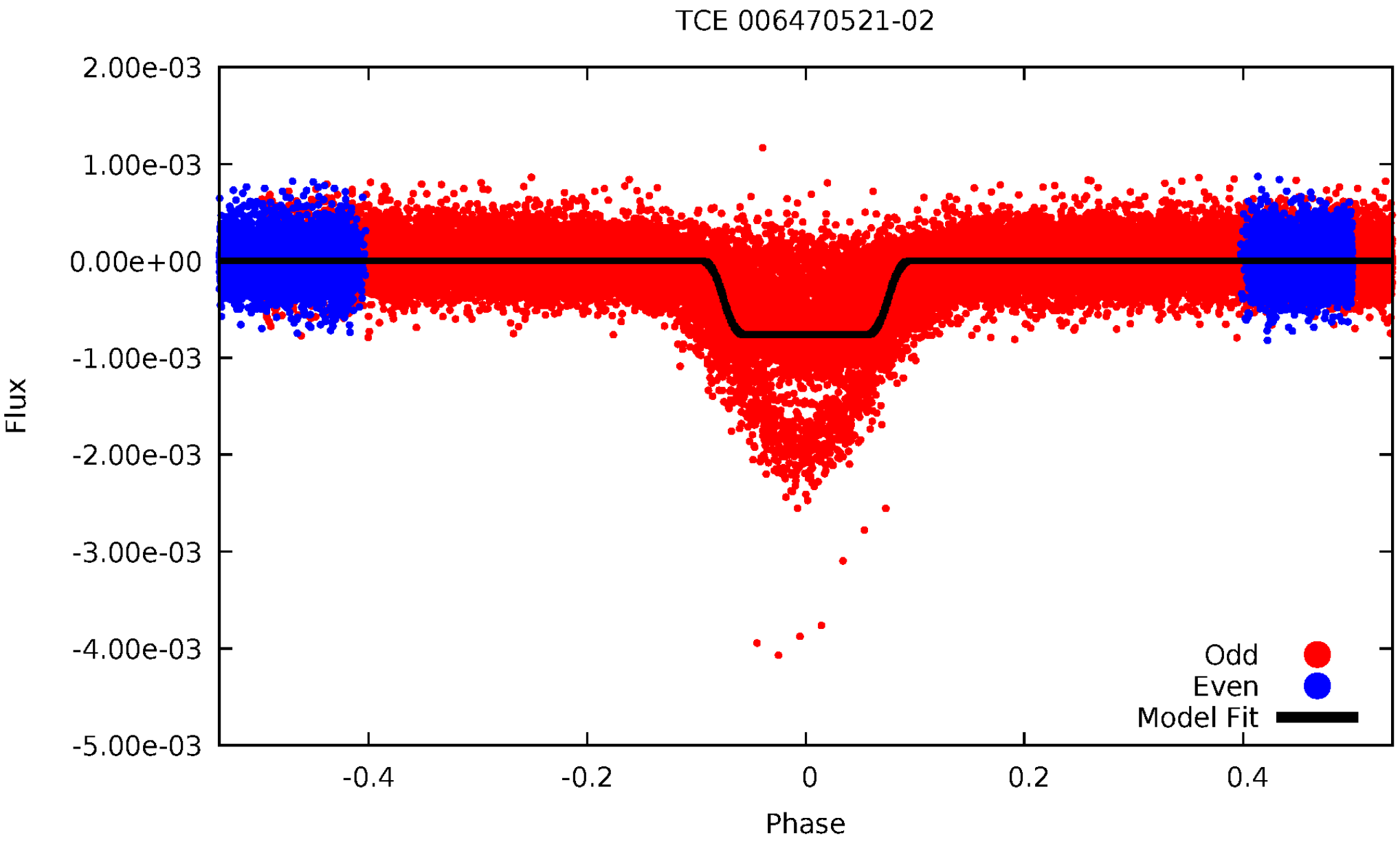



TCE 006470521-02
P = 0.520 days
P = 1.040 days
P = 2.080 days
Normalized Flux
BKJD
Phase

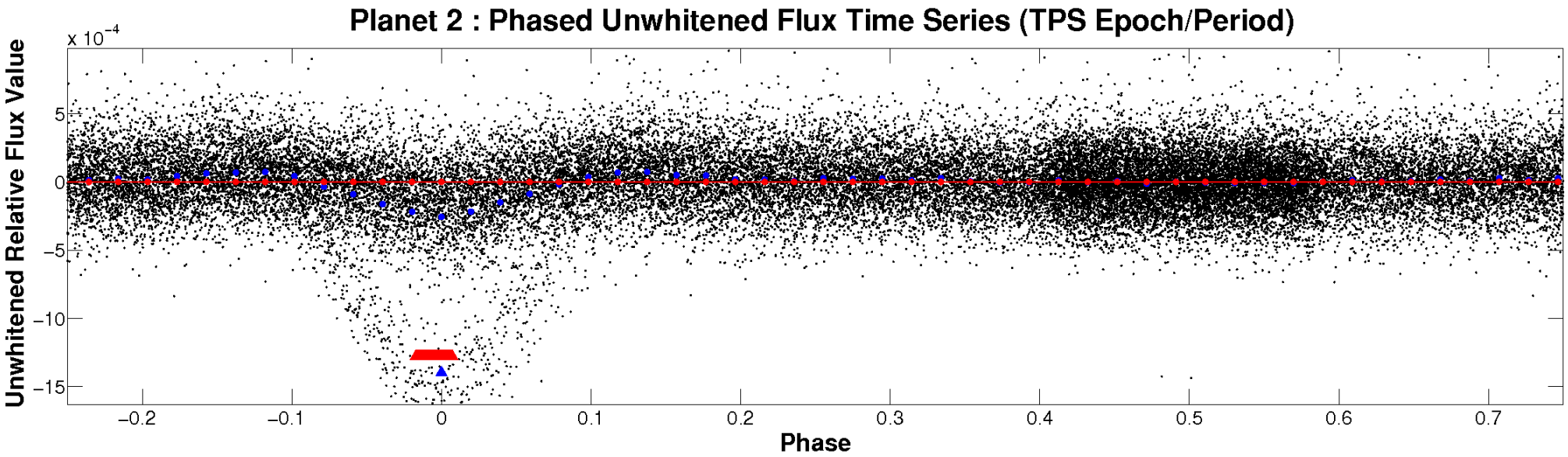
DV Odd/Even

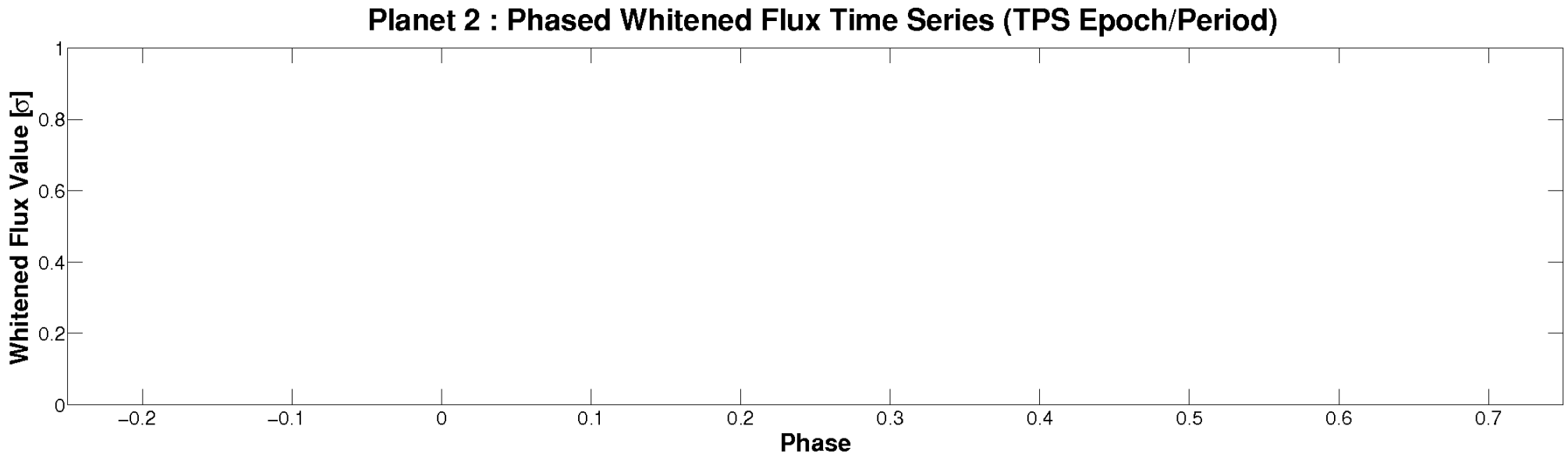

TCE 006470521-02
6.00e-03
5.00e-03
4.00e-03
3.00e-03
2.00e-03
1.00e-03
0.00e+00
-1.00e-03
-2.00e-03
Flux
-0.2
-0.15
-0.1
-0.05
0
0.05
0.1
0.15
0.2
Phase
Odd
Even
Model Fit

ALT Odd/Even


TCE 006470521-02
2.00e-03
1.00e-03
0.00e+00
-1.00e-03
-2.00e-03
-3.00e-03
-4.00e-03
-5.00e-03
Flux
-0.4
-0.2
0
0.2
0.4
Phase
Odd
Even
Model Fit

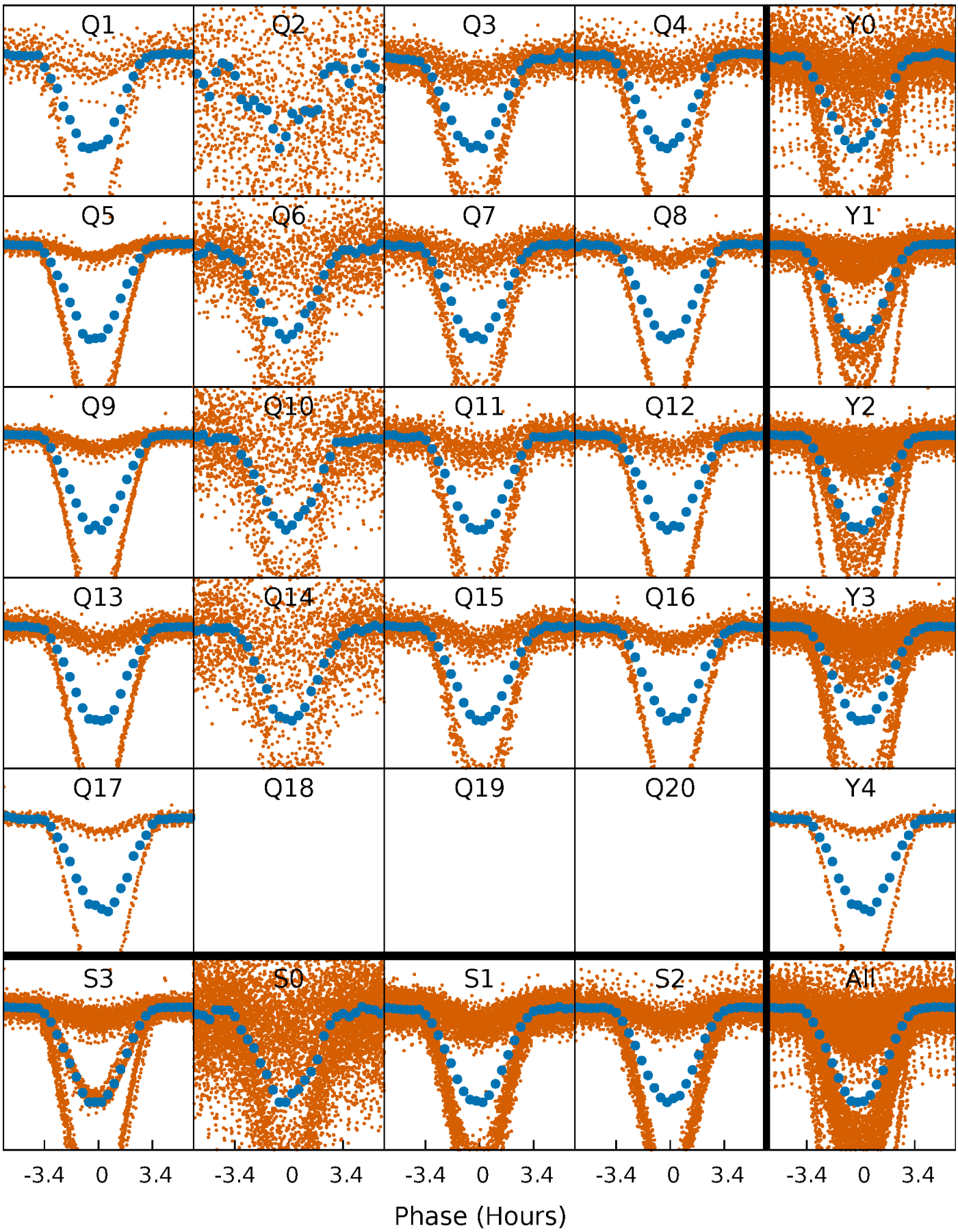
Non-Whitened Vs. Whitened Light Curve





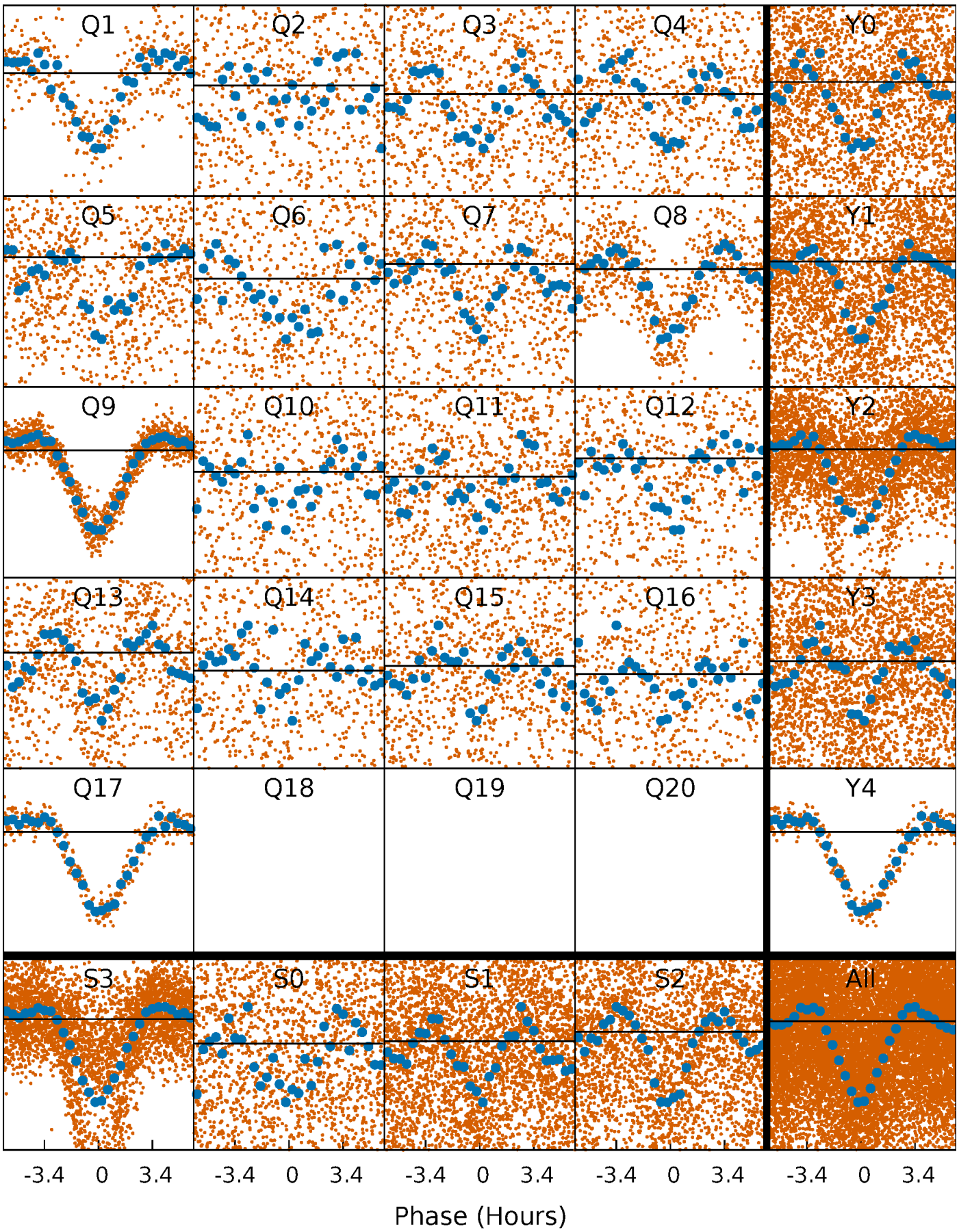
PDC Quarter-Phased Transit Curves

TCE 006470521-02 P= 1.040199 Days T_0=131.844527 (BKJD)



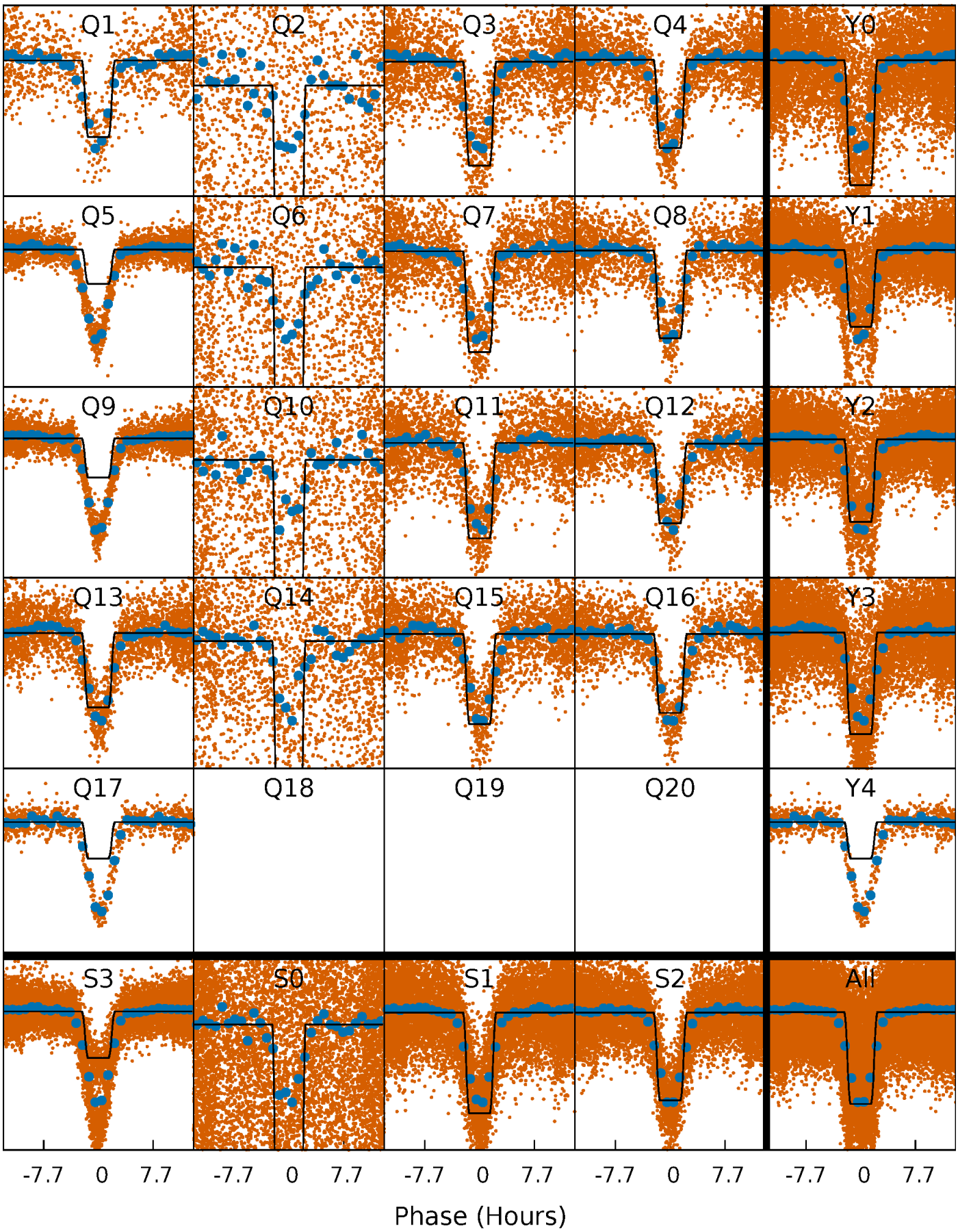
DV Quarter-Phased Transit Curves

TCE 006470521-02 P= 1.040199 Days T_0=131.844527 (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

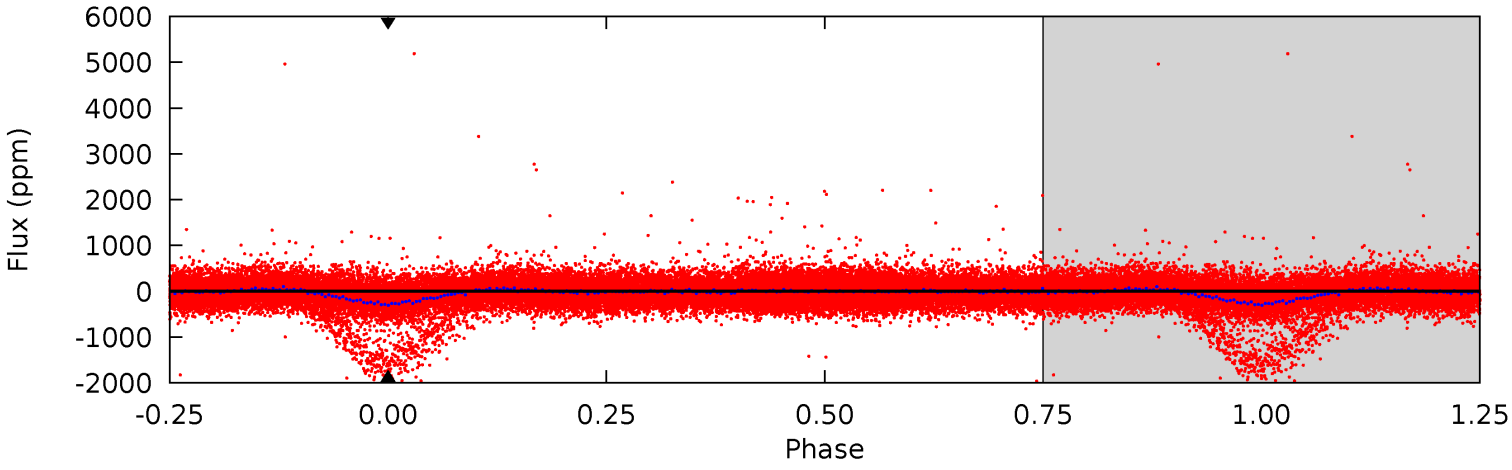
TCE 006470521-02 P= 1.040199 Days T_0=131.841751 (BKJD)

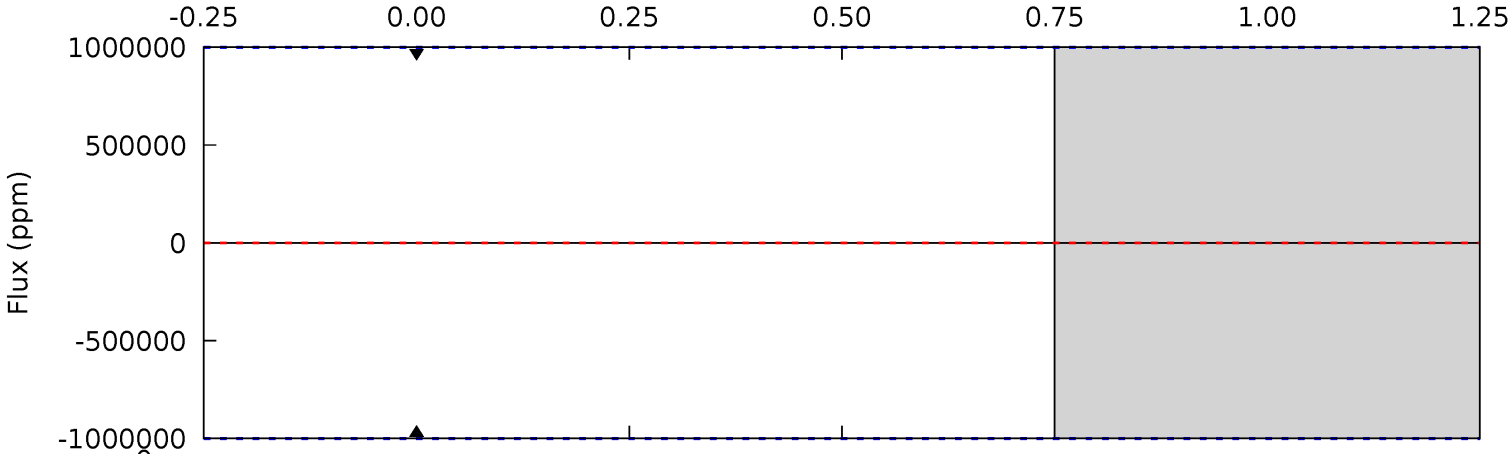


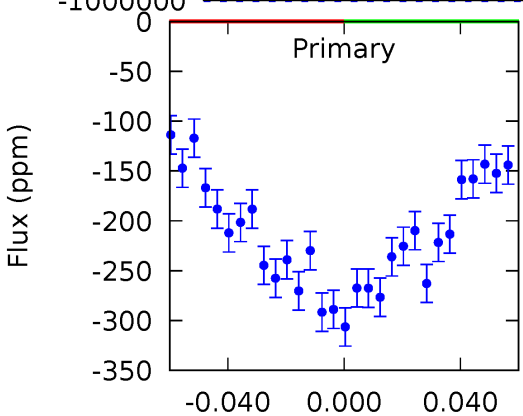
DV Model-Shift Uniqueness Test

006470521-02, P = 1.040199 Days, E = 131.844527 Days

Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



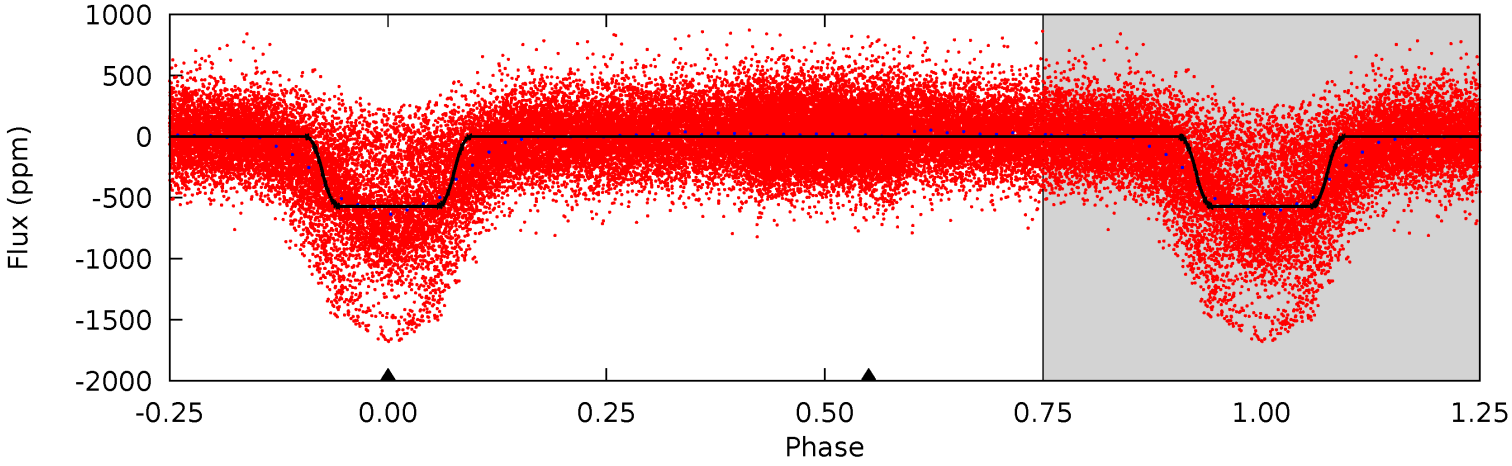


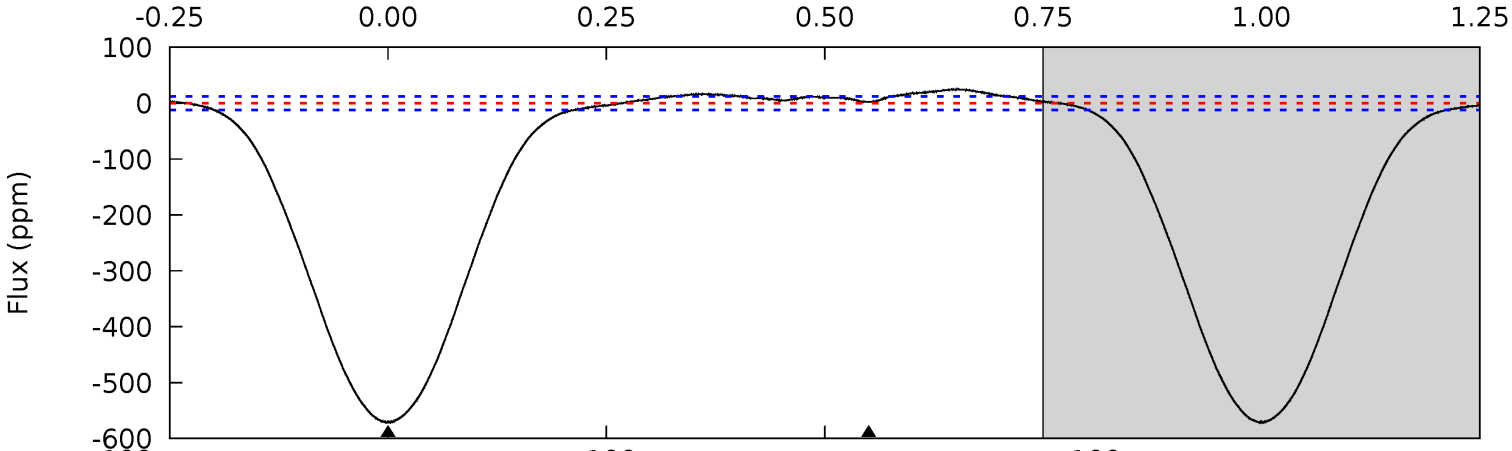


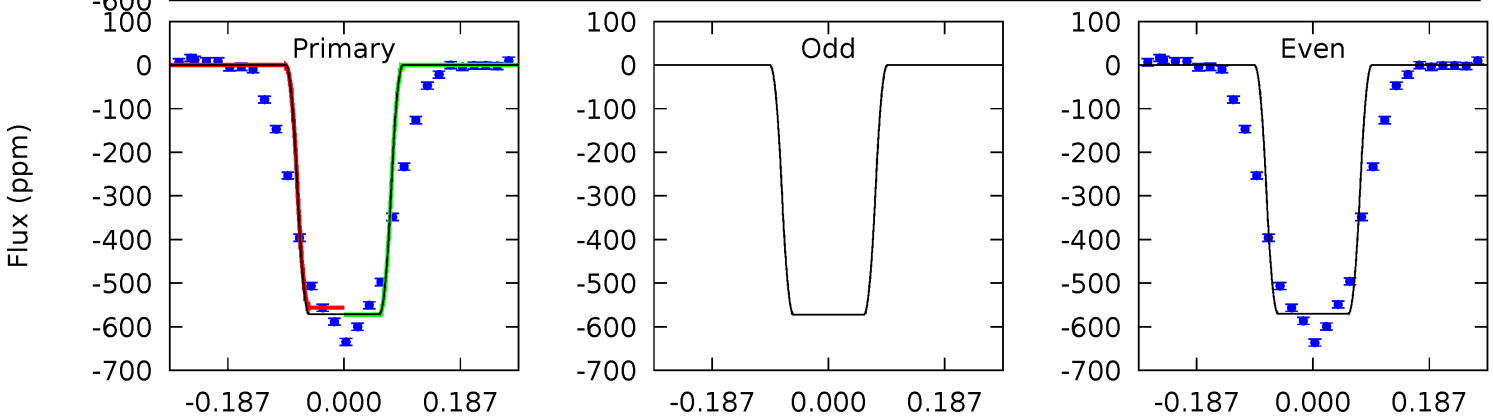
Alt Model-Shift Uniqueness Test

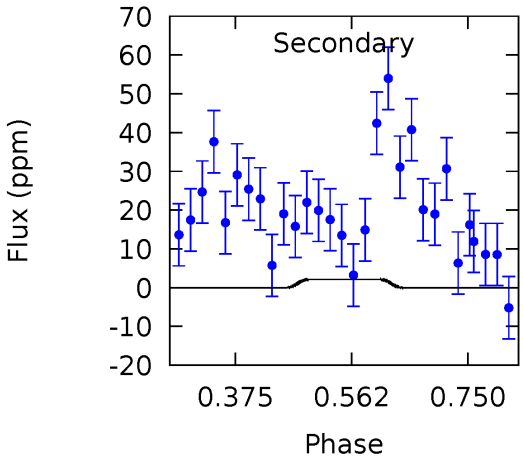
006470521-02, P = 1.040199 Days, E = 131.841751 Days

Pri	Sec	Ter	Pos	FA_1	FA_2	F_{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
209.1	-0.78	0	0	4.43	1.32	3.80	209.1	209.1	-0.78	-0.78	0.46	1.06	0.04	2.96









Stellar Parameters For KIC 006470521

	$T_{\rm eff}(K)$	$\log(g)$	[Fe/H]	R ($R_\odot$)	$M(M_\odot)$	$p_\star$ (g·cm^{-3})
	6377^{+173}_{-211}	$4.399^{+0.072}_{-0.217}$	$-0.100^{+0.250}_{-0.300}$	$1.119^{+0.389}_{-0.130}$	$1.147^{+0.172}_{-0.157}$	$1.152^{+0.341}_{-0.616}$
	+3%/-3%	+2%/-5%	+250%/-300%	+35%/-12%	+15%/-14%	+30%/-53%
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 006470521-02 / KOI

Detrend	Depth (ppm)	R_p ($R_\oplus$)	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	0±1000000	$10.70^{+9.66}_{-7.40}$	2912^{+237}_{-137}	-4280^{+26897}_{-15171}	$-1.737^{+401.483}_{-292.907}$
Alt.	2±3	$9.81^{+10.82}_{-6.84}$	2906^{+243}_{-137}	-3063^{+95}_{-200}	$-0.003^{+0.004}_{-0.037}$

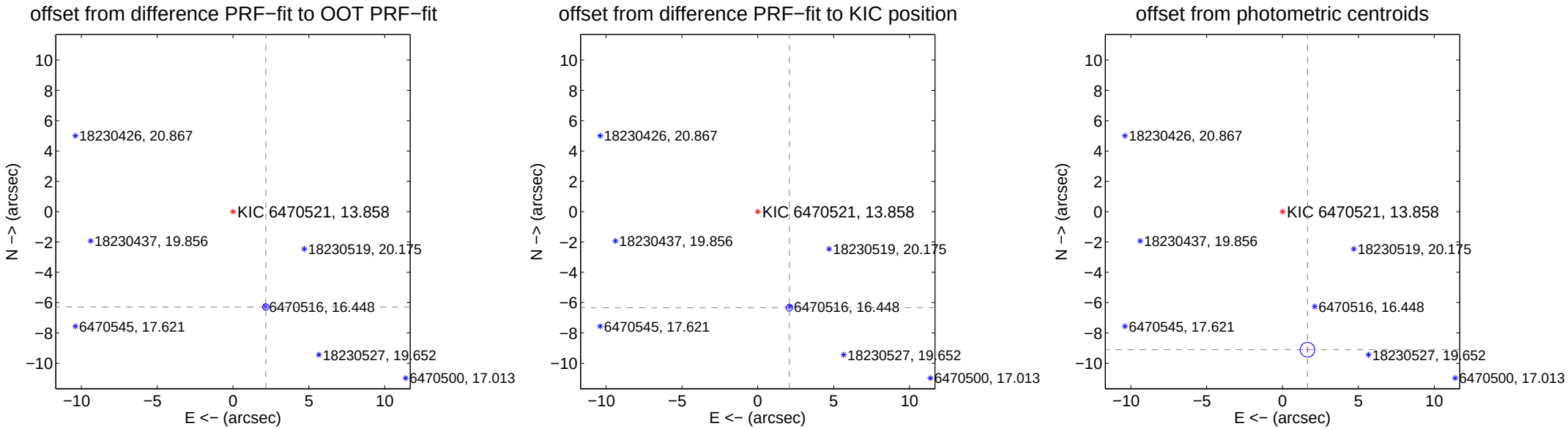
T_{max} = Theoretical Maximum Planetary Temperature
T_{obs} = Observed Planetary Temperature (Assuming A=0.3)
A_{obs} = Observed Albedo (Assuming T=0)

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

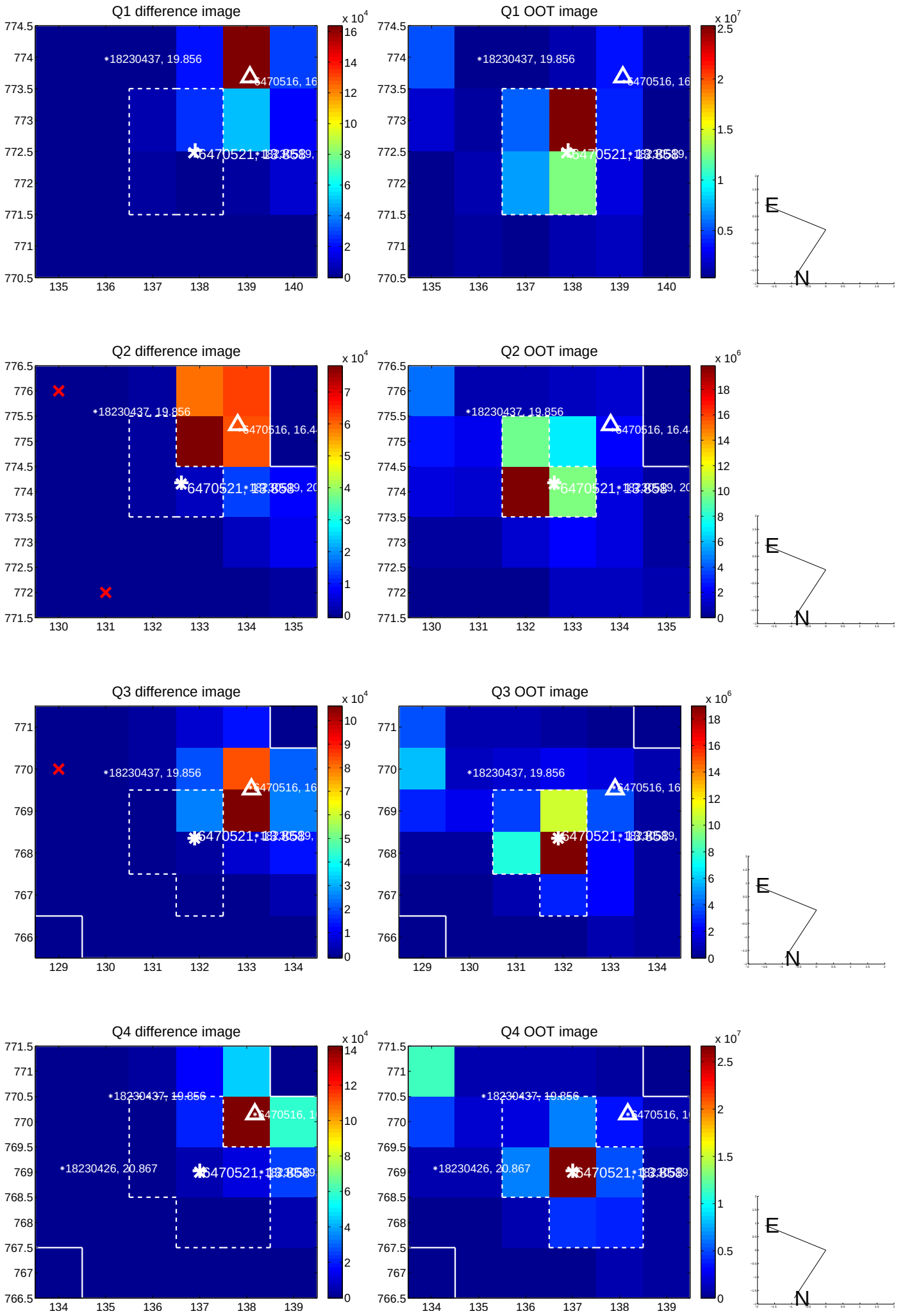
Supplemental centroid analysis for 006470521-02. Kepler magnitude: 13.86. Transit SNR -1.00
There are 17 quarters with good PRF difference image offsets
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	6.646 ± 0.072	92.81	-2.157 ± 0.070	-6.286 ± 0.071
PRF-fit source offset from KIC position	6.670 ± 0.072	92.40	-2.080 ± 0.069	-6.338 ± 0.071
photometric centroid source offset	9.26 ± 0.16	57.55	-1.64 ± 0.10	-9.11 ± 0.16

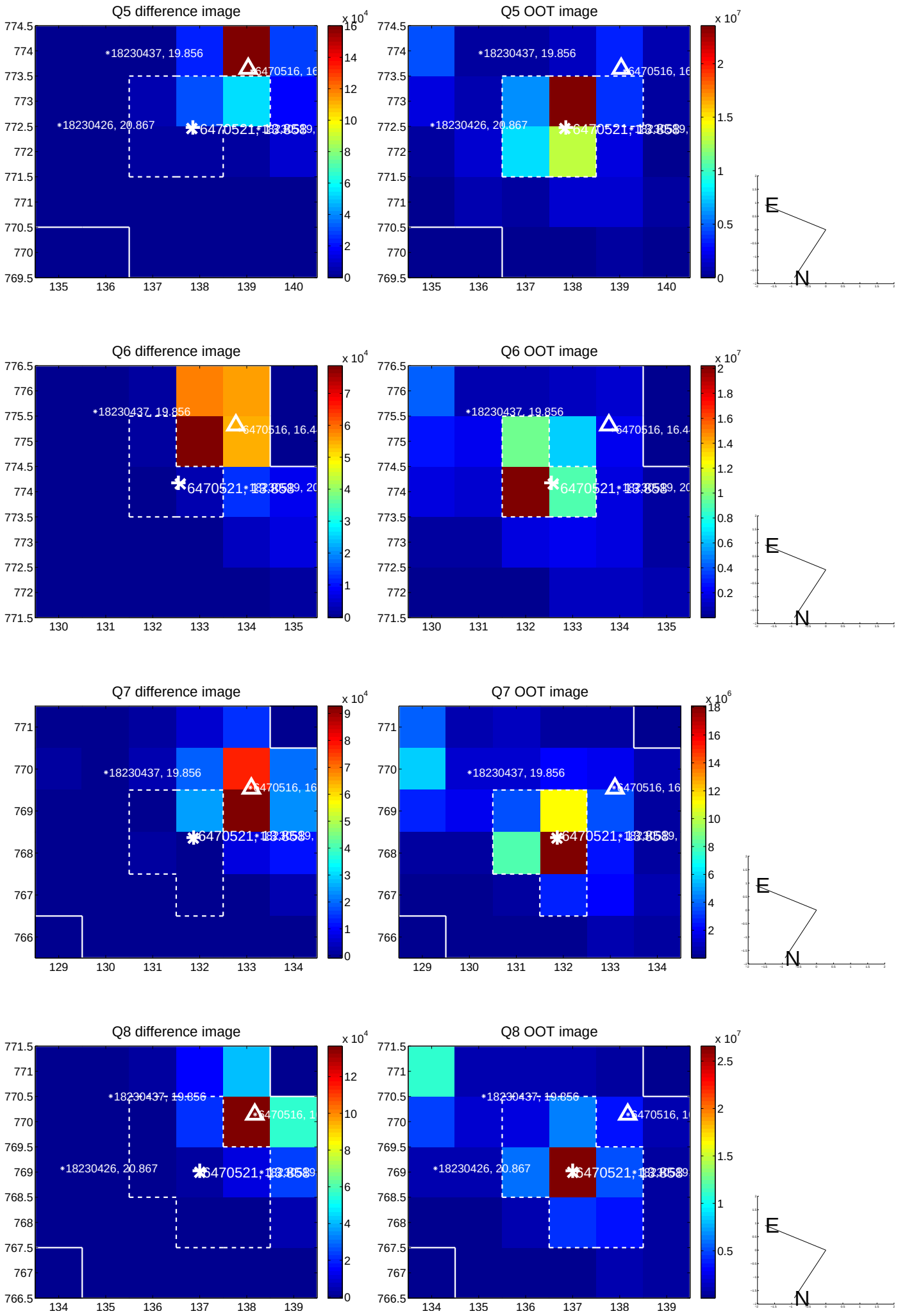


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one-σ uncertainty. Blue circle: three-σ. Red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

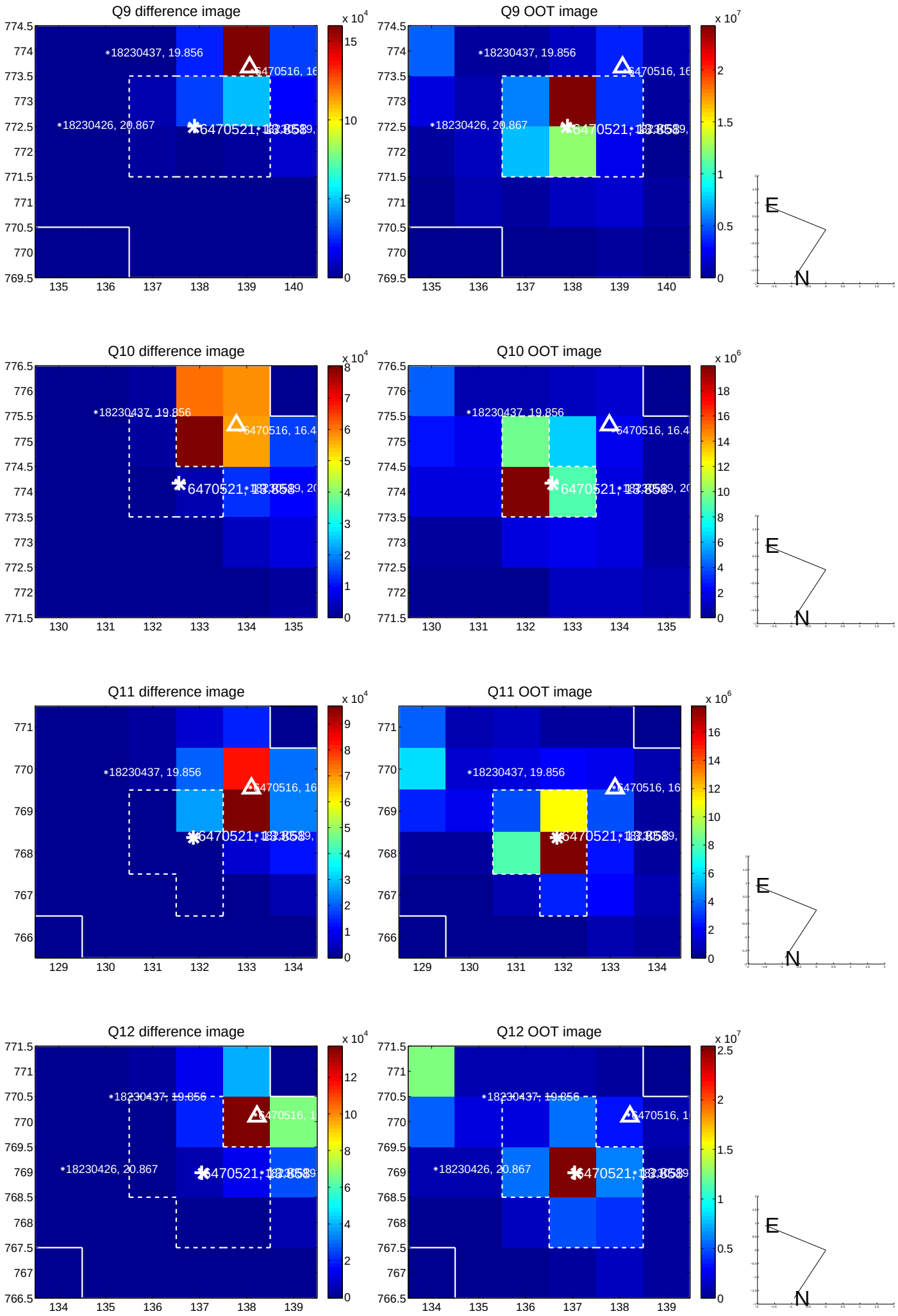
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



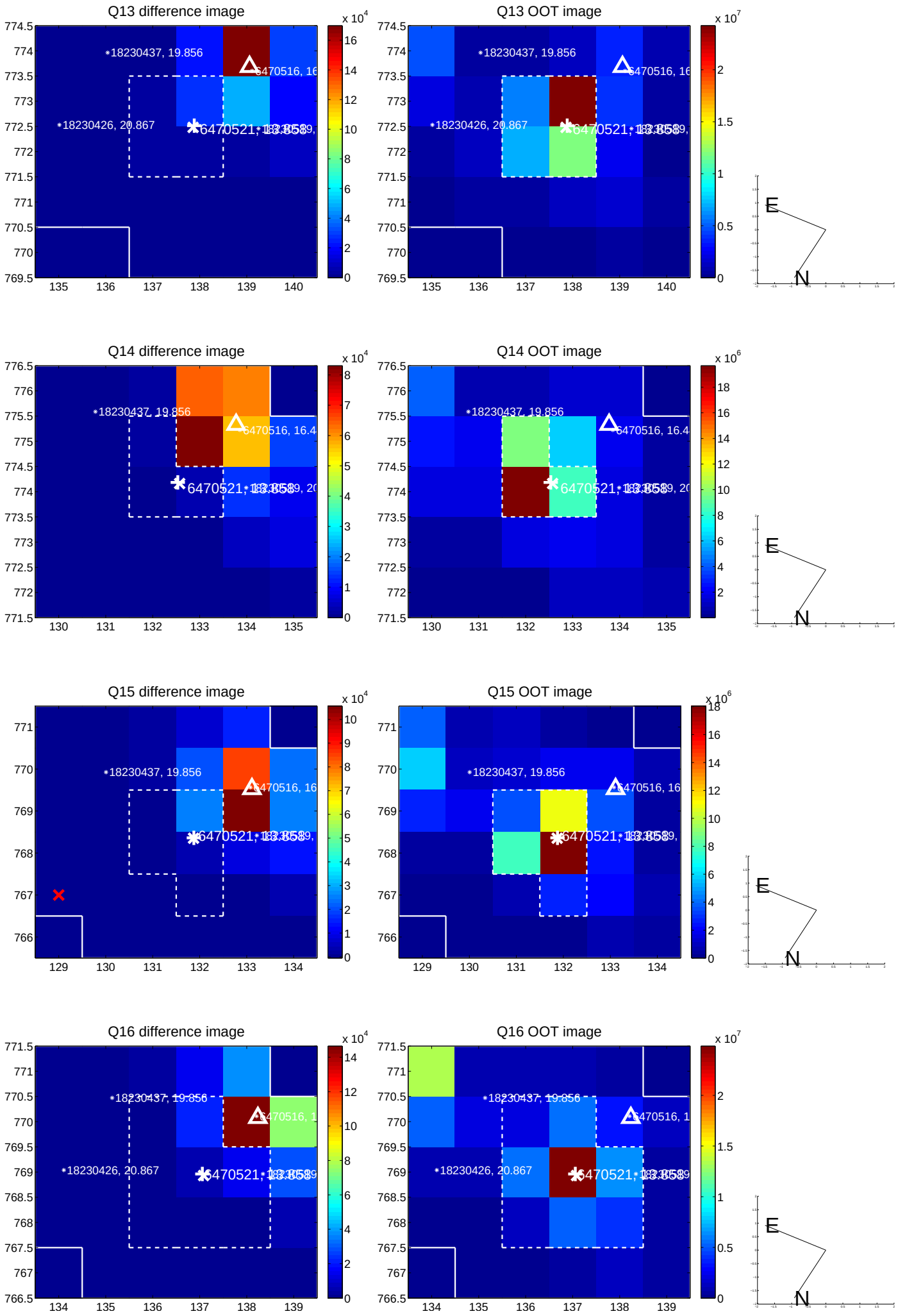
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



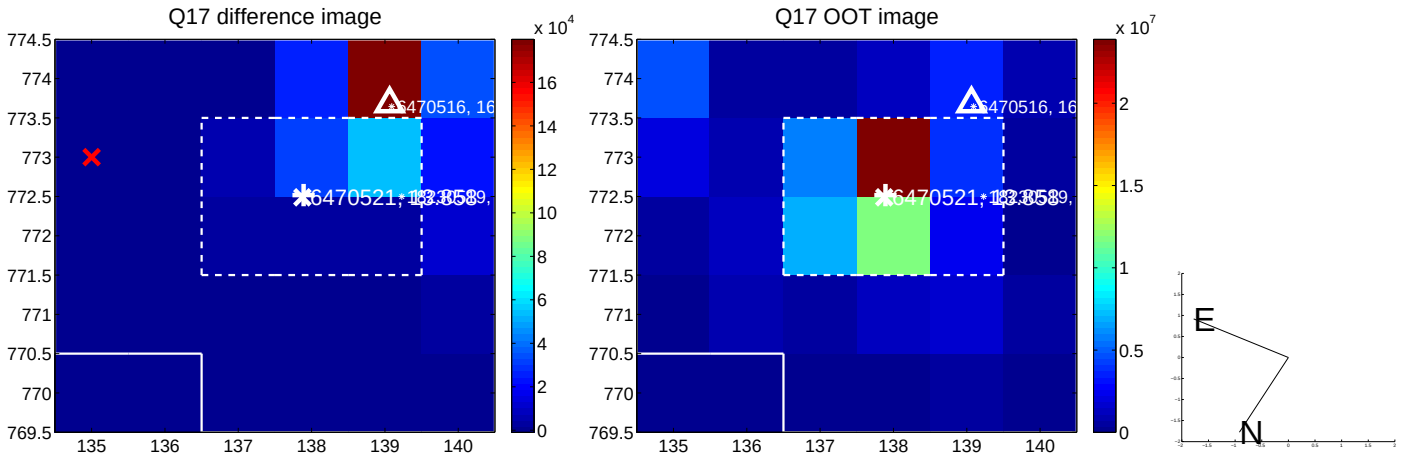
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

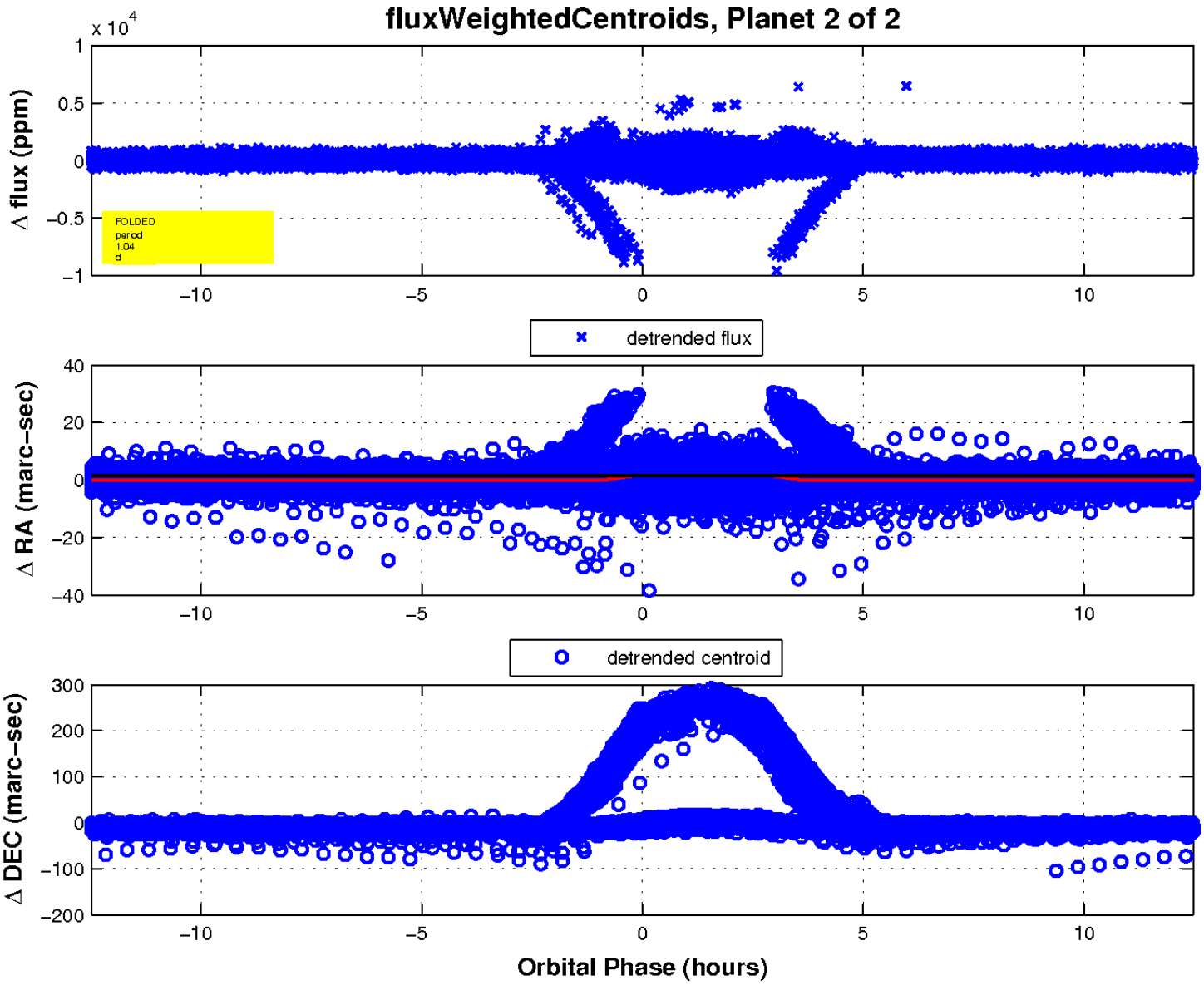


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

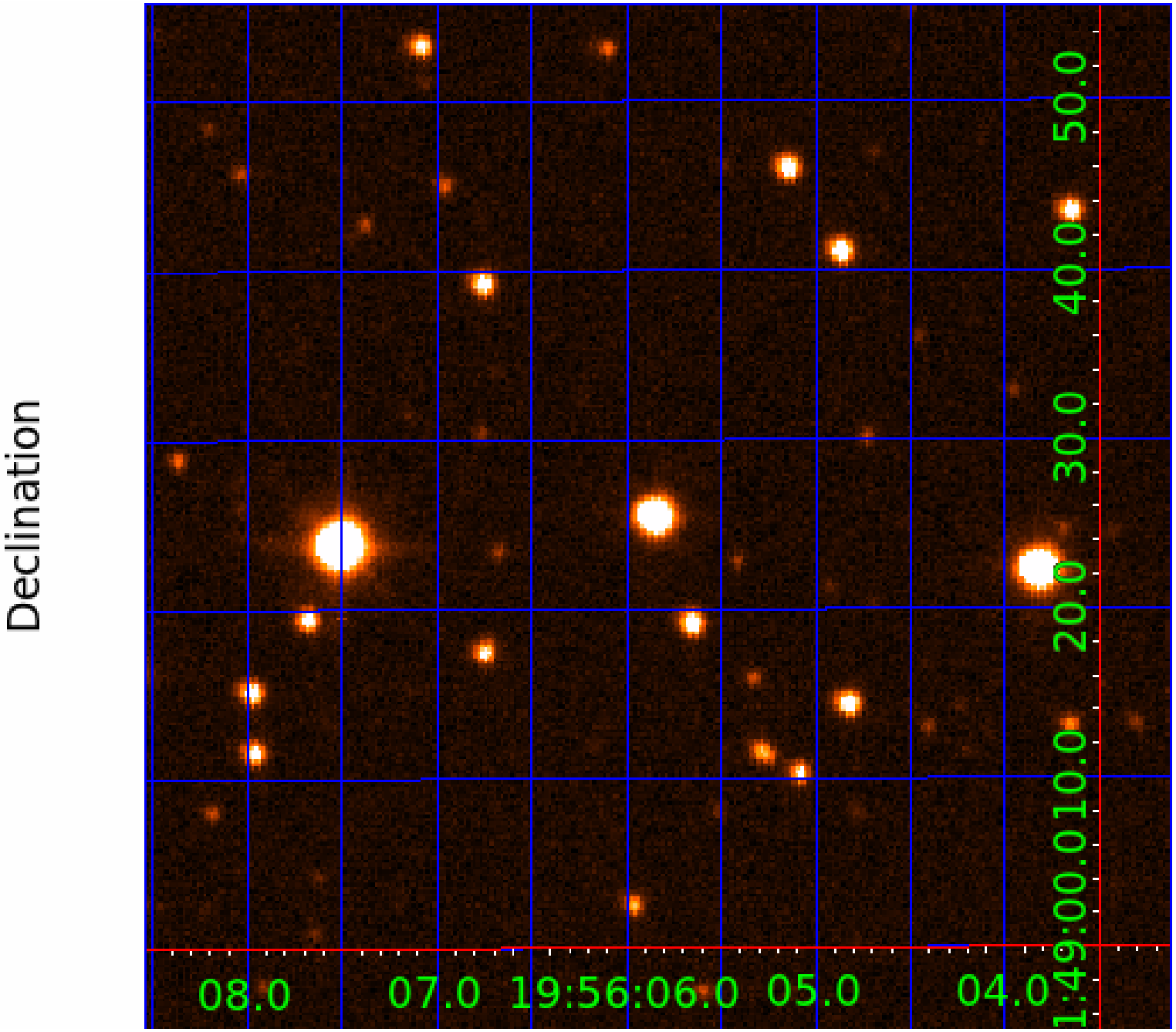


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.





UKIRT Image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