

KIC 001576144

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})
001576144-01	OBS	No	548.743238	406.815173	453.5	6.246	21.3	12.0	2.51	9181	5.80	13.31
001576144-02	OBS	No	2.686670	132.159784	39.6	1.993	14.9	16.1	2.51	9181	1.82	16005.58
001576144-03	OBS	No	2.686662	132.297140	14.3	6.511	12.3	5.5	2.51	9181	1.09	16005.64
001576144-04	OBS	No	498.430874	253.555320	171.7	7.935	10.6	3.5	2.51	9181	3.52	15.13
001576144-05	OBS	No	459.770198	286.410016	548.0	5.054	11.4	9.6	2.51	9181	10.80	16.85
001576144-06	OBS	No	376.172555	248.855737	416.9	4.591	9.3	10.0	2.51	9181	8.82	22.01
001576144-07	OBS	No	543.091418	407.375363	248.7	10.645	8.9	8.6	2.51	9181	4.26	13.49
001576144-08	OBS	No	197.220930	210.992354	206.7	9.324	9.0	8.6	2.51	9181	4.28	52.07

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001576144-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQU_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
001576144-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—CENT_SATURATED
001576144-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—SWEET_NTL—LPP_DV—MOD_NONUNIQU_DV—MOD_TER_DV—SAME_NTL_PERIOD—CENT_SATURATED
001576144-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQU_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—MOD_POS_DV—MOD_NONUNIQU_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED—HALO_GHOST
001576144-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_TER_DV—MOD_NONUNIQU_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-08	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQU_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED—HALO_GHOST

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

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

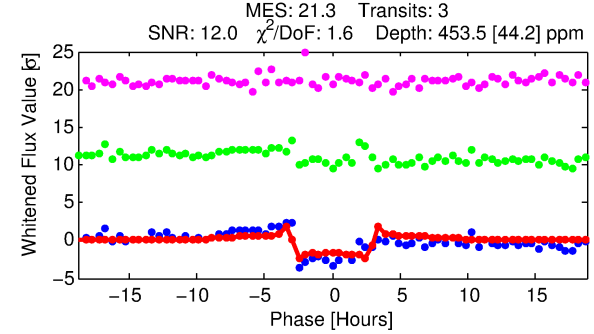
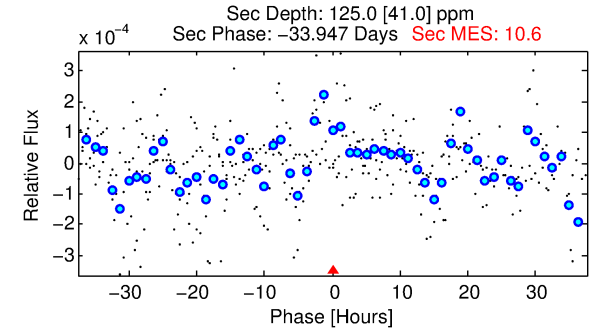
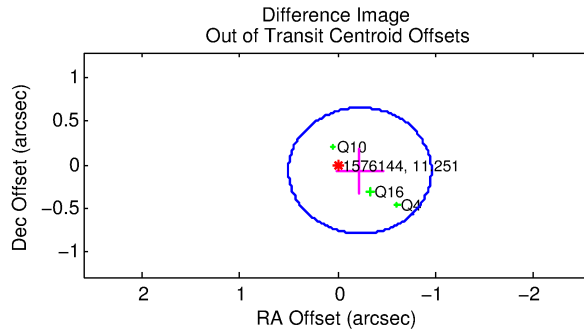
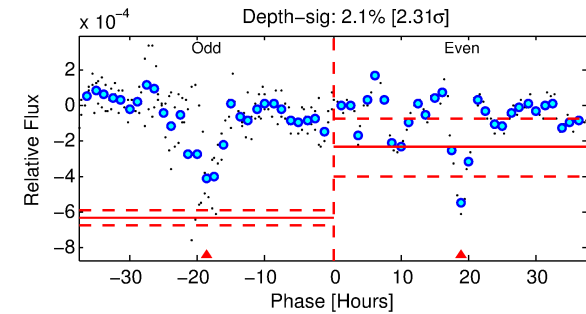
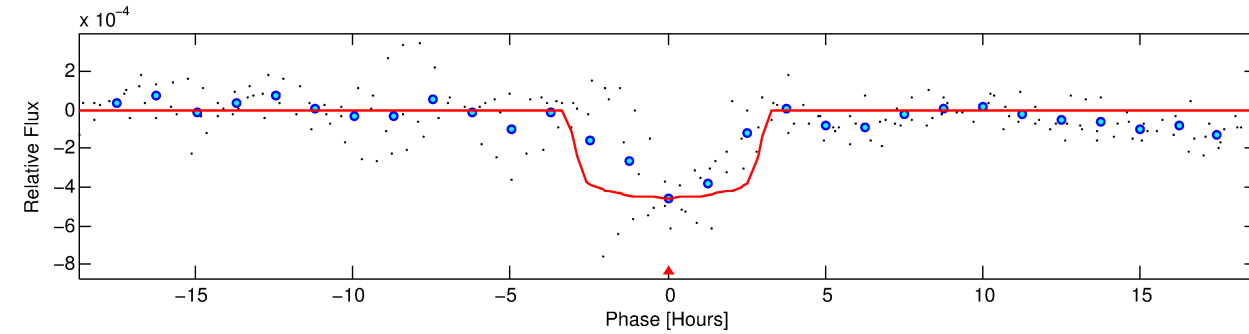
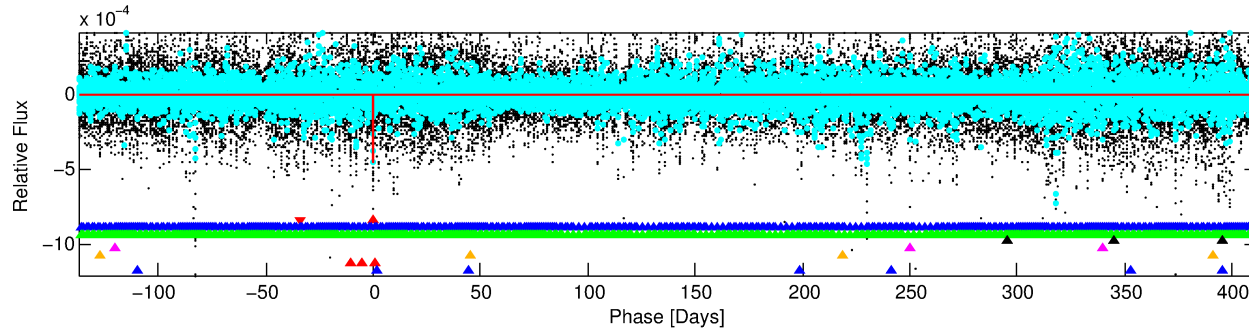
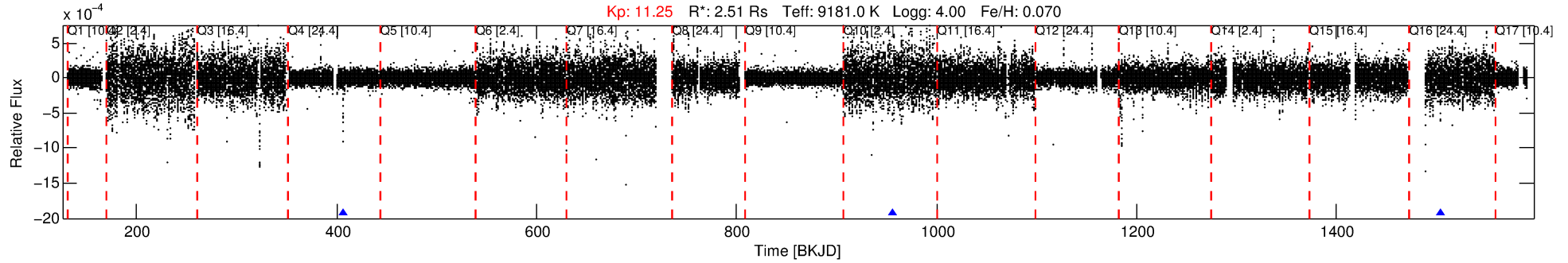
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 001576144-01

No Significant Match Found

DV One-Page Summary

KIC: 1576144 Candidate: 1 of 8 Period: 548.743 d



DV Fit Results:

Period = 548.74324 [0.00296] d
Epoch = 406.8152 [0.0039] BKJD
Rp/R* = 0.0212 [0.0082]
a/R* = 462.28 [1238.16]
b = 0.75 [1.53]
Seff = 13.31 [6.28]
Teq = 487 [57] K
Rp = 5.80 [3.09] Re
a = 1.7340 [0.5222] AU
Ag = 6139.25 [5821.77] [1.05σ]
Teffp = 6665 [1440] K [4.29σ]

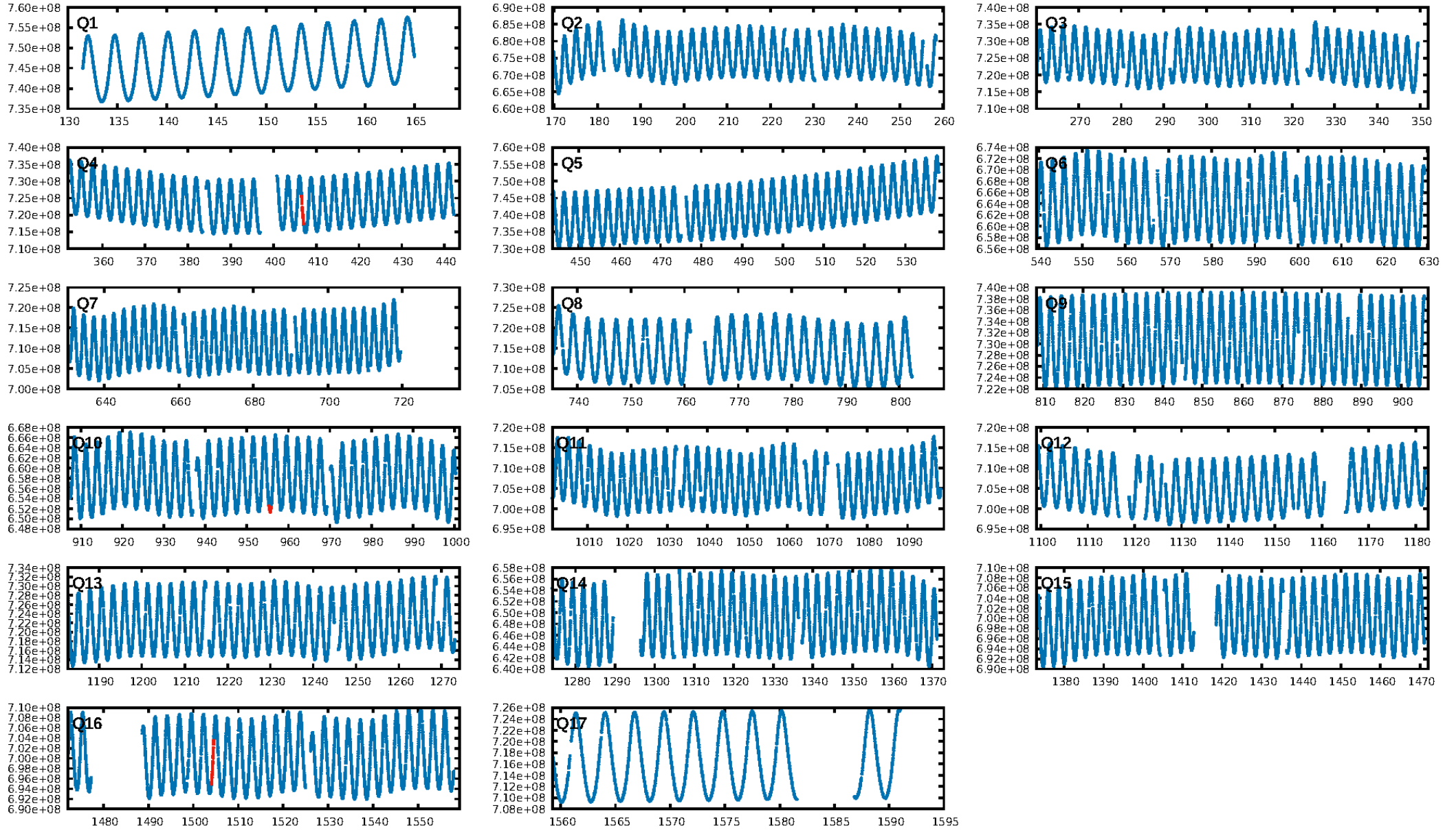
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [10.99σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 0.2%
ModelChiSquareGof-sig: 12.0%
Bootstrap-pfa: 4.22e-34
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 10.98
Centroid-sig: N/A
Centroid-so: 1.175 arcsec [2.31σ]
OotOffset-rm: 0.239 arcsec [0.98σ]
OotOffset-st: 1/0/2/0 [3]
KicOffset-rm: 0.338 arcsec [1.43σ]
KicOffset-st: 1/0/2/0 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 0.67 [2/3]

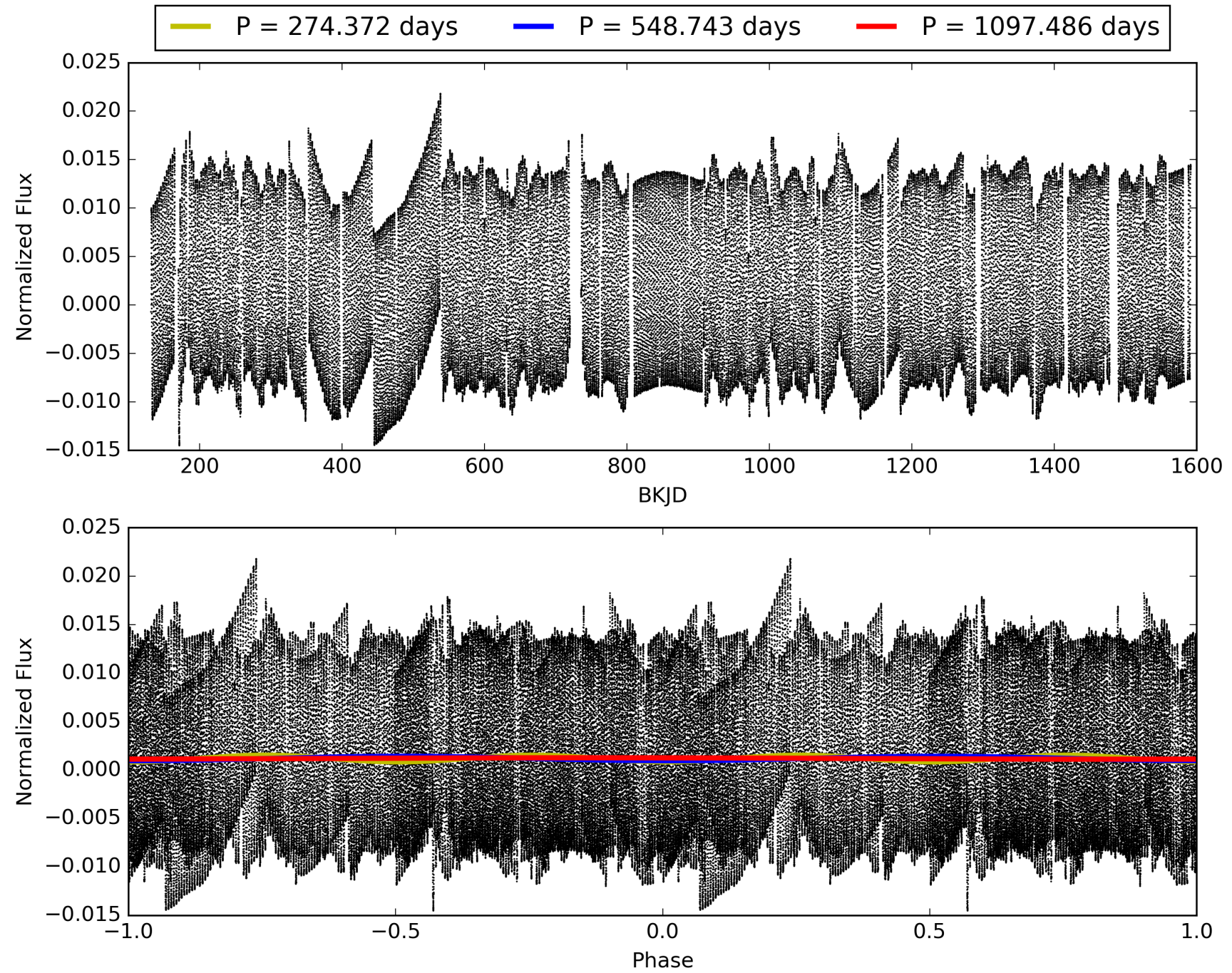
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:50:44 Z

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

TCE 001576144-01, PDC Light Curves

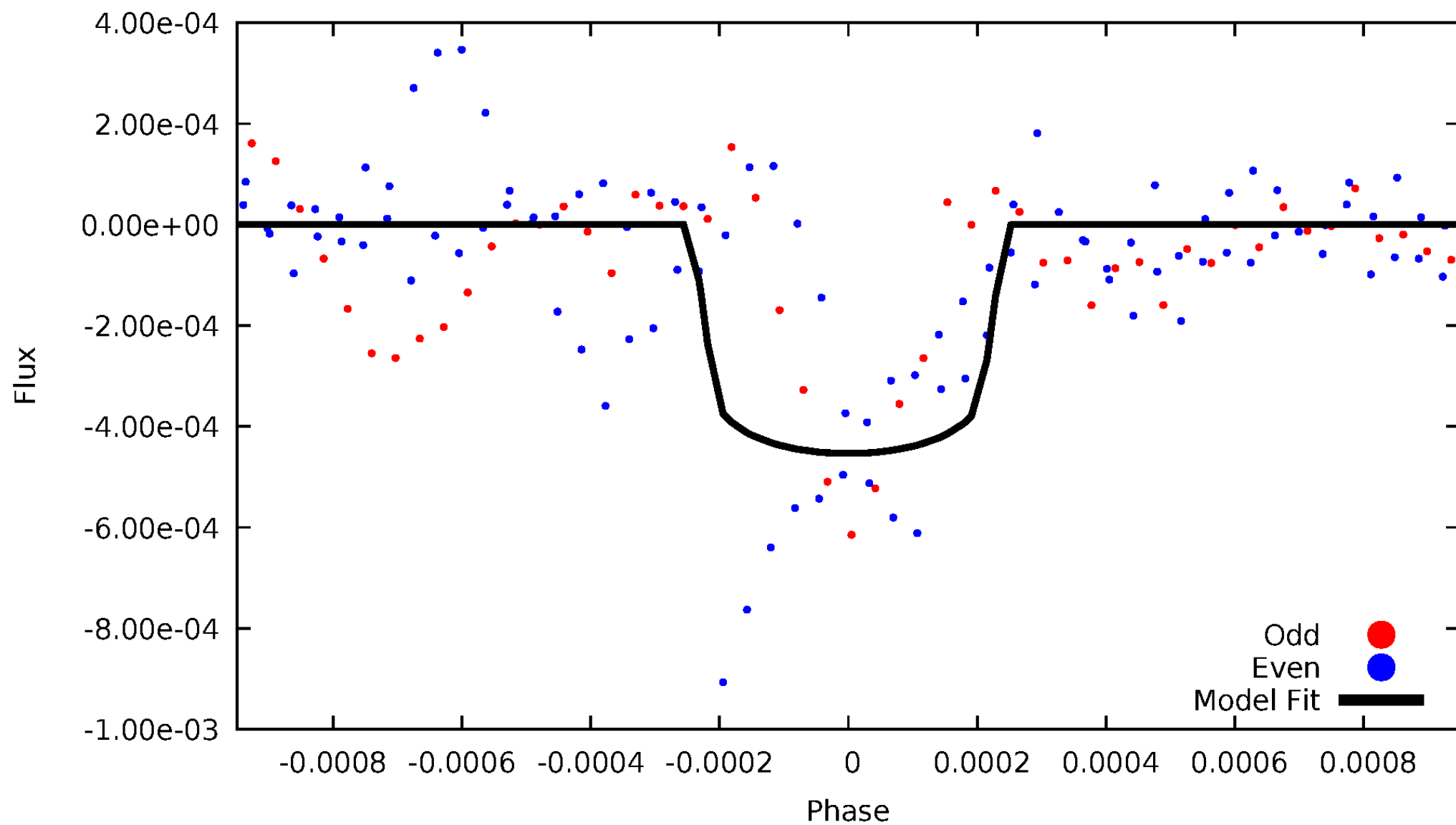


TCE 001576144-01



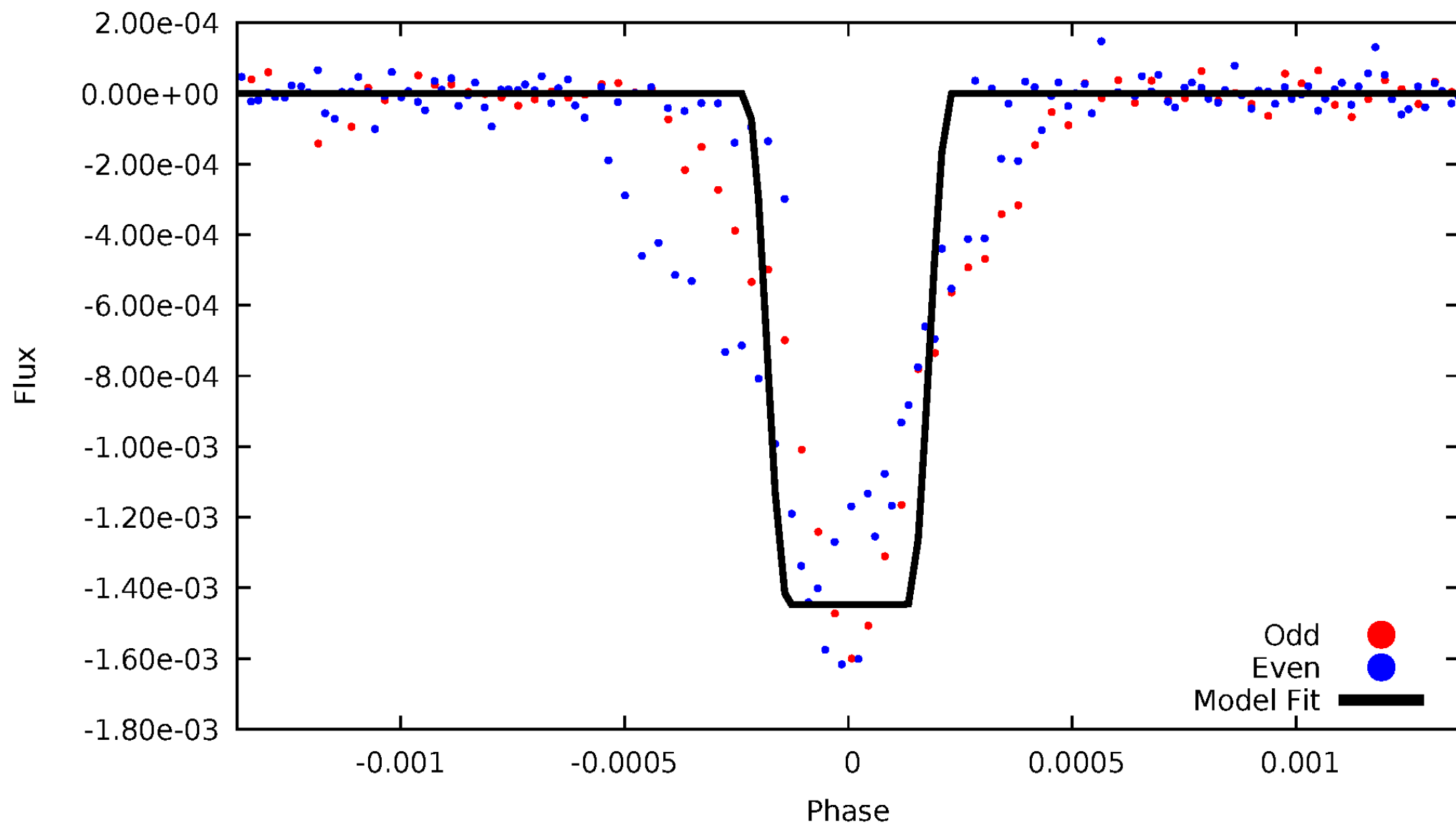
DV Odd/Even

TCE 001576144-01



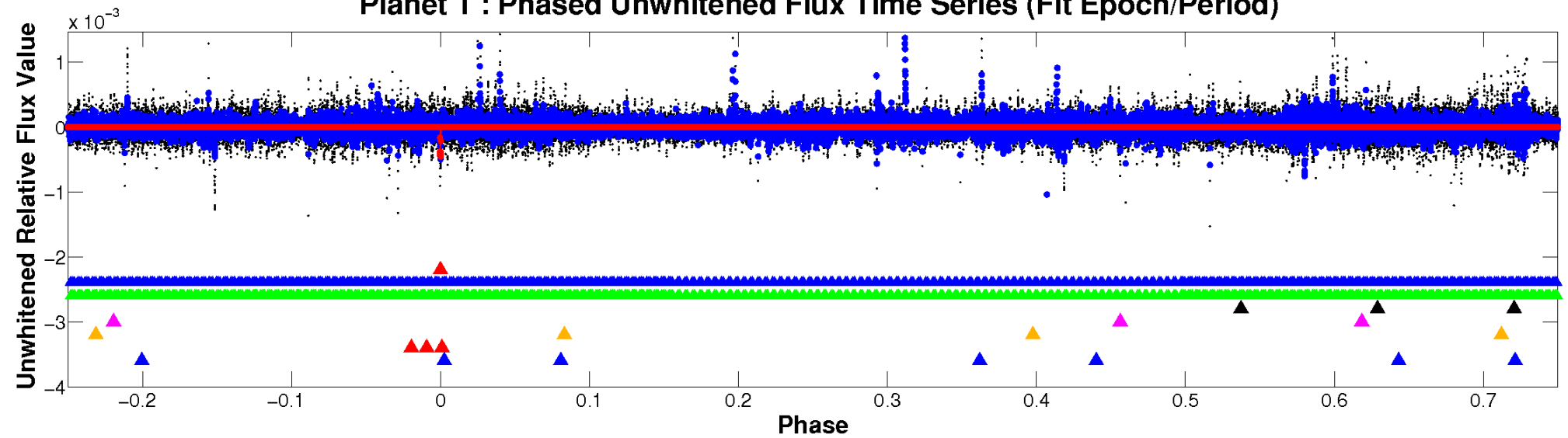
ALT Odd/Even

TCE 001576144-01

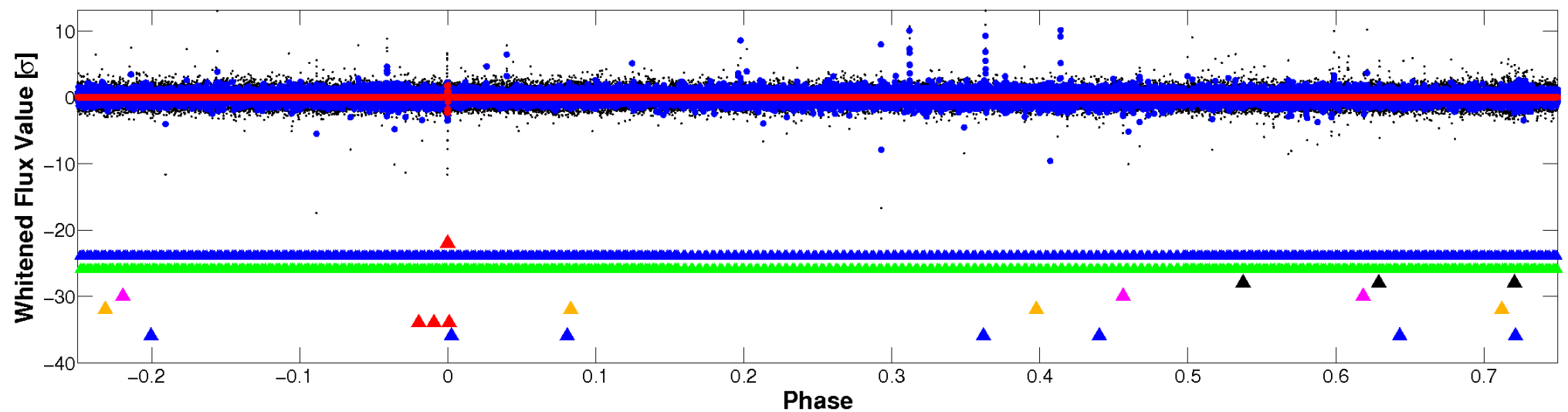


Non-Whitened Vs. Whitened Light Curve

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

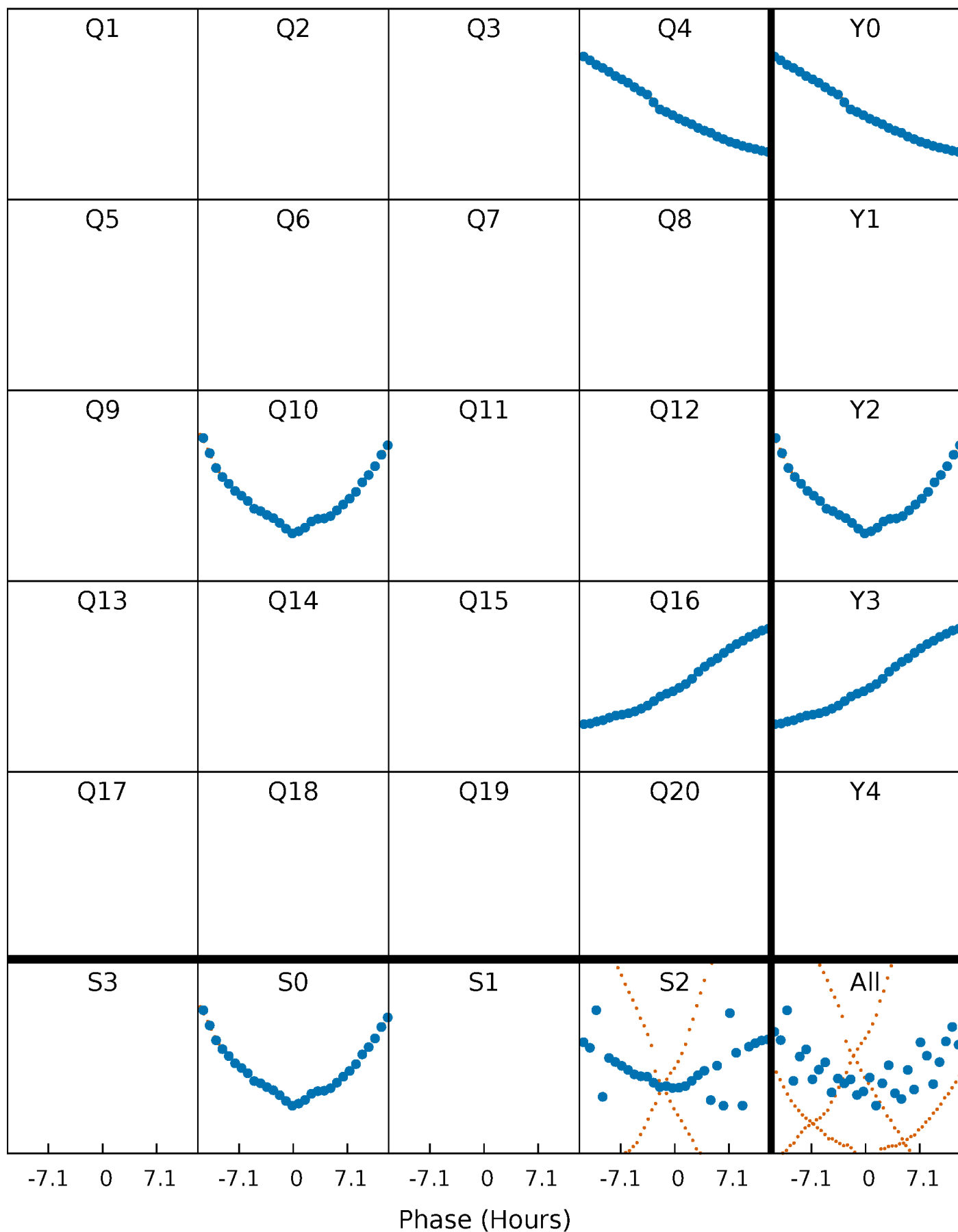


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



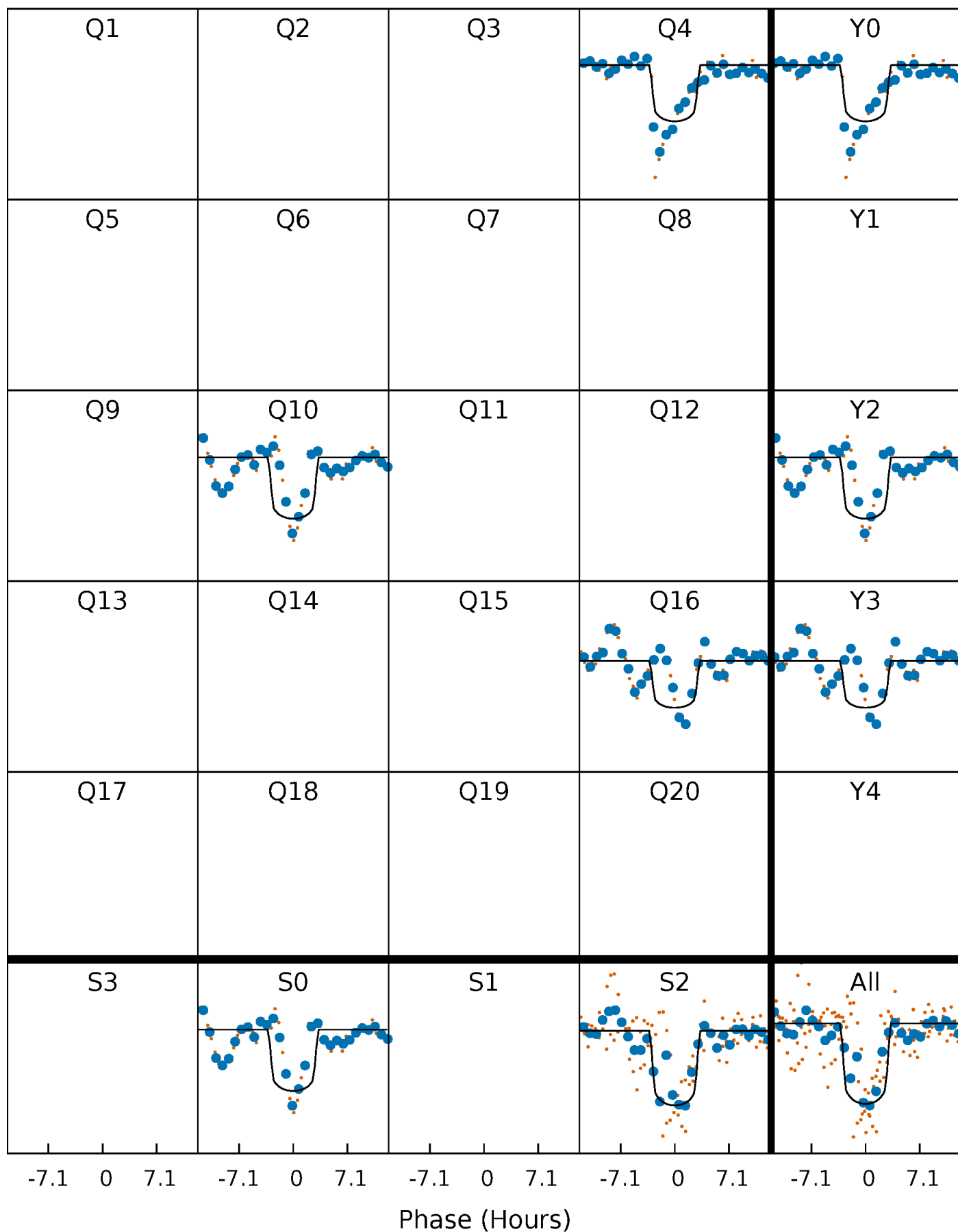
PDC Quarter-Phased Transit Curves

TCE 001576144-01 P=548.743238 Days $T_0=406.815173$ (BKJD)



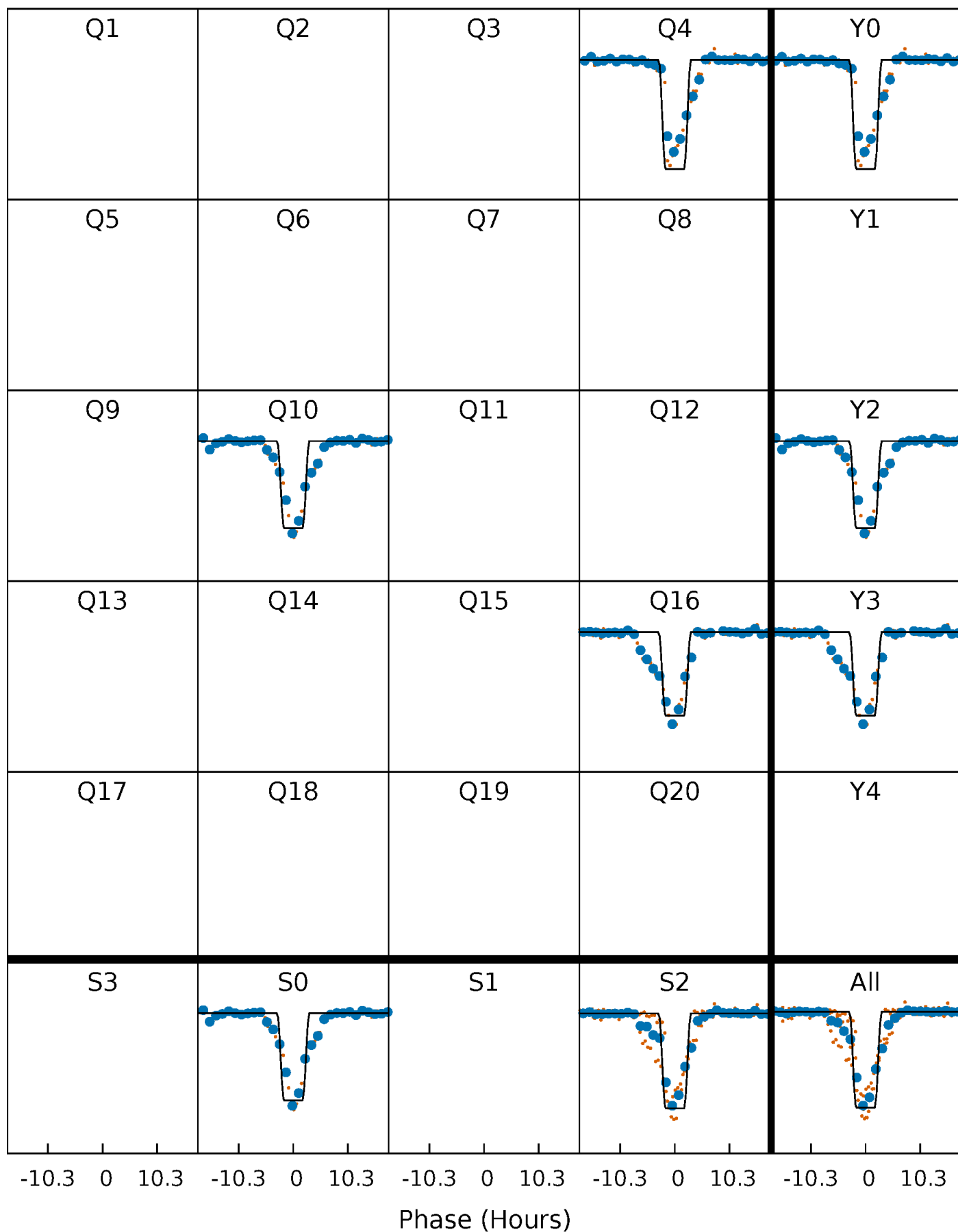
DV Quarter-Phased Transit Curves

TCE 001576144-01 P=548.743238 Days $T_0=406.815173$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

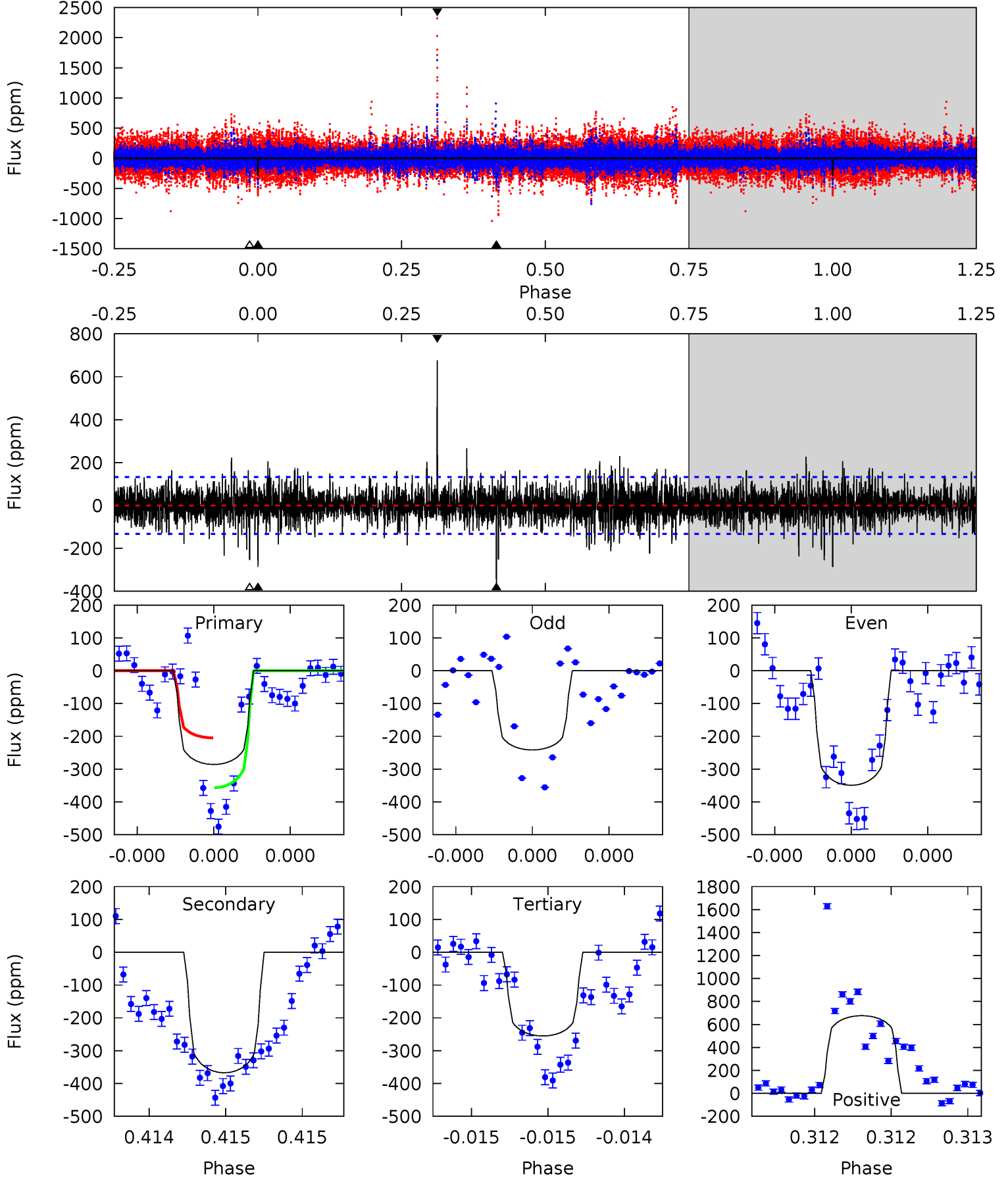
TCE 001576144-01 P=548.790932 Days $T_0=406.766155$ (BKJD)



DV Model-Shift Uniqueness Test

001576144-01, P = 548.743238 Days, E = 406.815173 Days

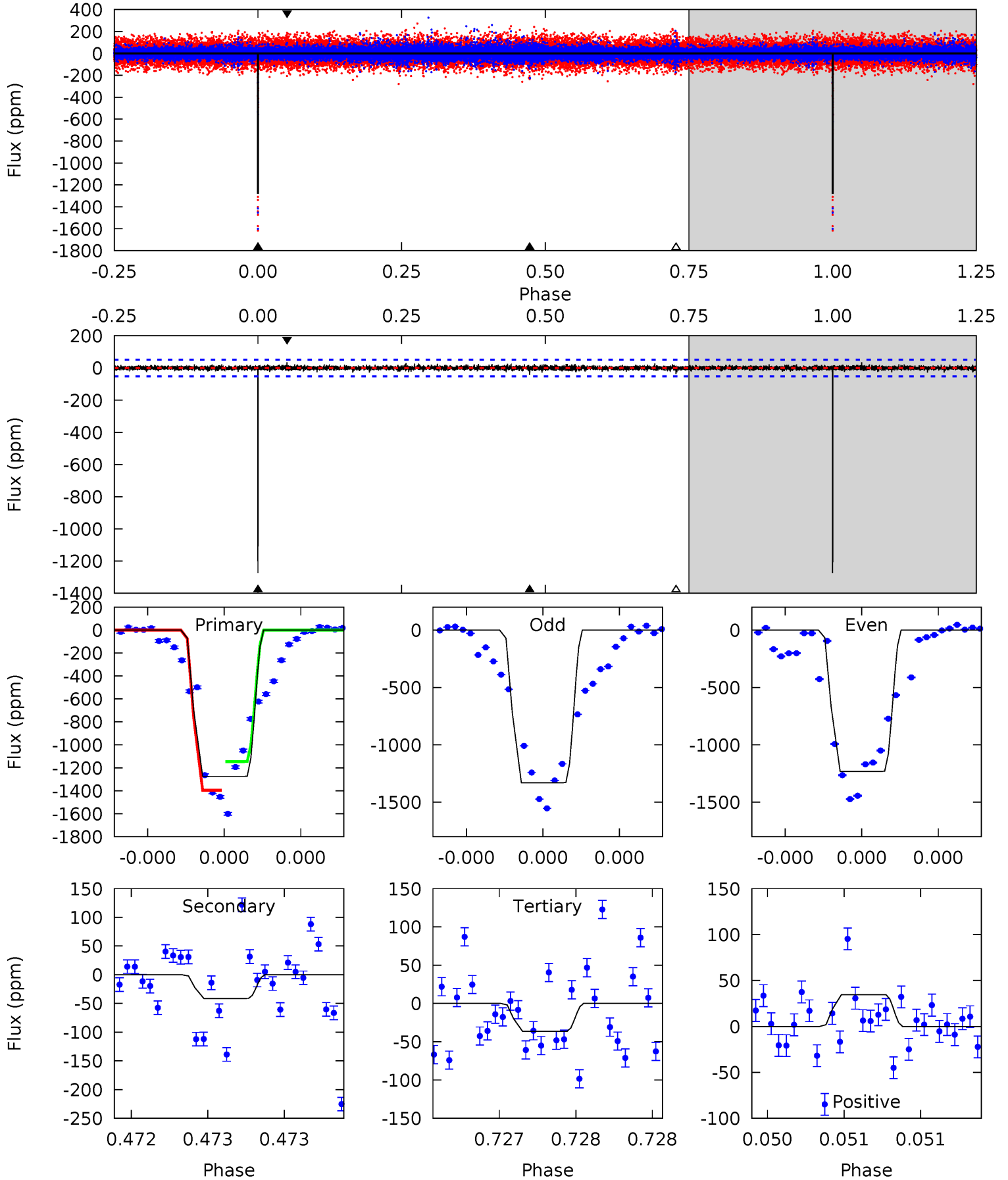
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.0	15.5	10.7	28.5	5.58	3.49	2.33	1.30	-16.4	4.72	-13.0	2.07	1.31	0.65	3.20



Alt Model-Shift Uniqueness Test

001576144-01, P = 548.790932 Days, E = 406.766155 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
138.0	4.47	3.95	3.74	5.59	3.51	0.65	134.0	134.2	0.52	0.73	5.23	0.98	0.03	12.8



Stellar Parameters For KIC 001576144

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	9181^{+251}_{-430}	$4.003^{+0.234}_{-0.156}$	$0.070^{+0.150}_{-0.700}$	$2.507^{+0.743}_{-0.909}$	$2.308^{+0.361}_{-0.721}$	$0.206^{+0.334}_{-0.097}$
	+3%/-5%	+6%/-4%	+214%/-1000%	+30%/-36%	+16%/-31%	+162%/-47%
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 001576144-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-367 ± 24	$5.45^{+2.72}_{-2.12}$	667^{+55}_{-60}	8459^{+3525}_{-1531}	19437^{+32237}_{-10496}
Alt.	-41 ± 9	$10.23^{+2.96}_{-2.70}$	673^{+55}_{-59}	3898^{+367}_{-307}	657^{+534}_{-289}

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

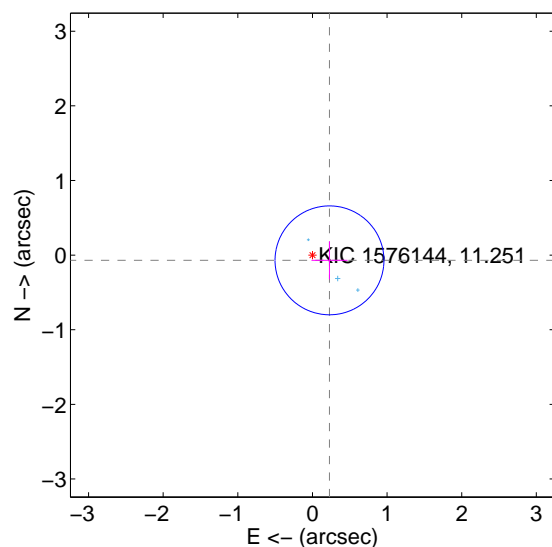
Supplemental centroid analysis for 001576144-01. **Kepler magnitude: 11.25.** Transit SNR 12.00

There are 3 quarters with good PRF difference image offsets

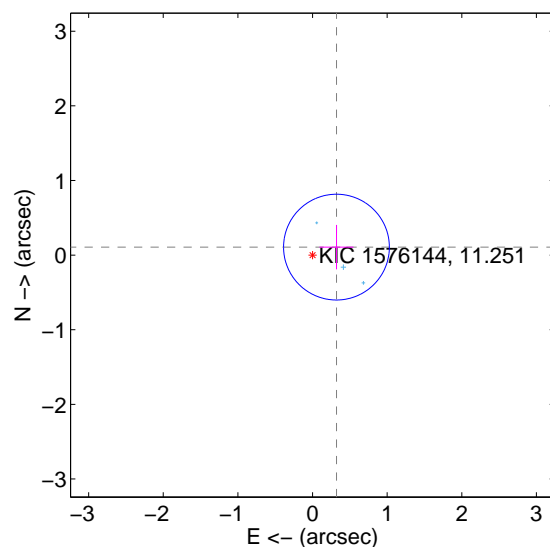
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.239 ± 0.243	0.98	-0.228 ± 0.242	-0.070 ± 0.255
PRF-fit source offset from KIC position	0.338 ± 0.236	1.43	-0.321 ± 0.228	0.107 ± 0.298
photometric centroid source offset	1.18 ± 0.51	2.31	-1.00 ± 0.45	-0.62 ± 0.63

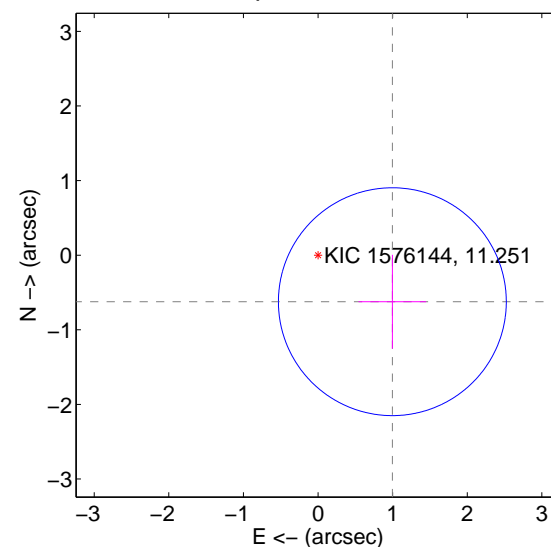
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

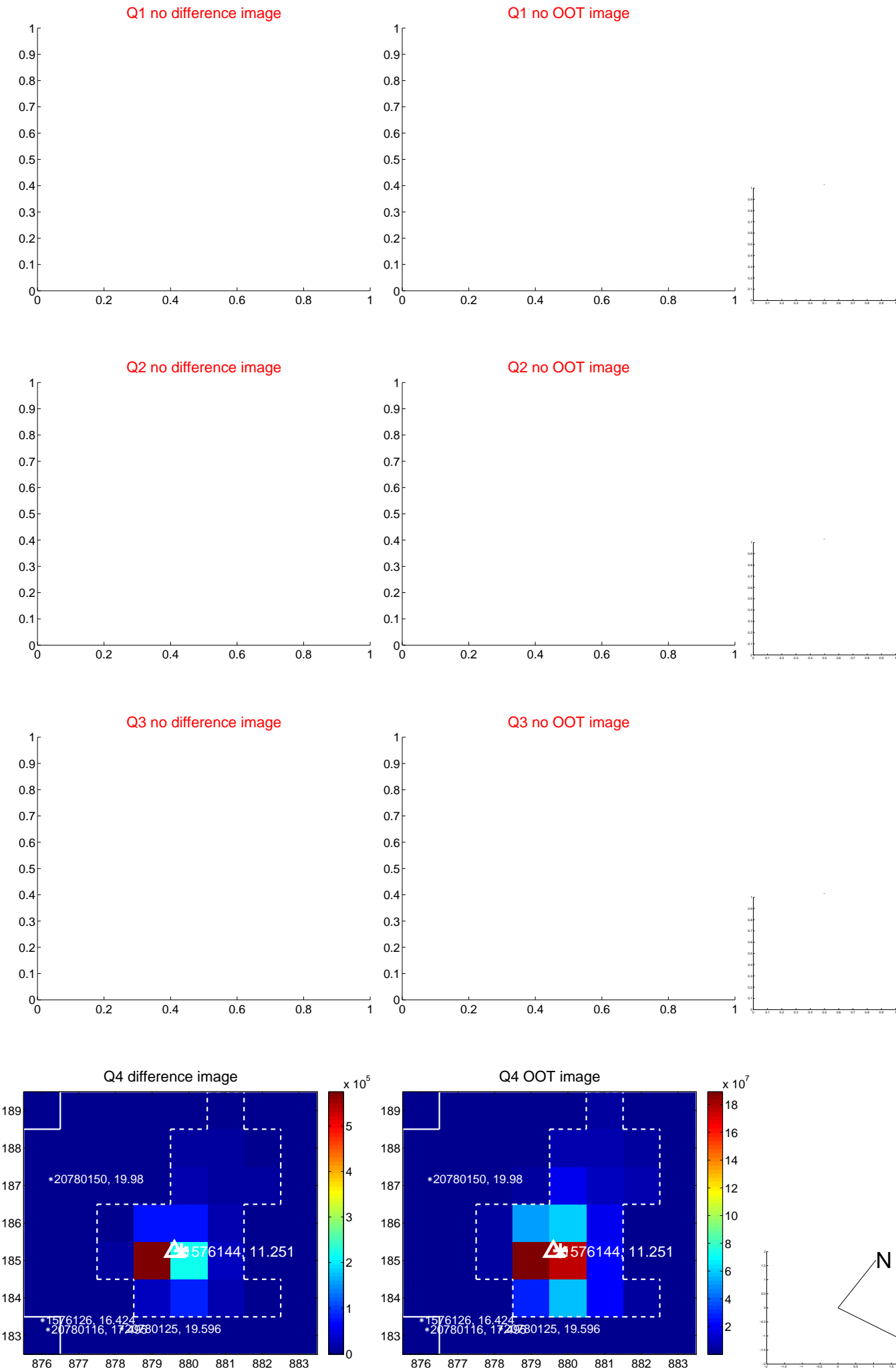


offset from photometric centroids



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.

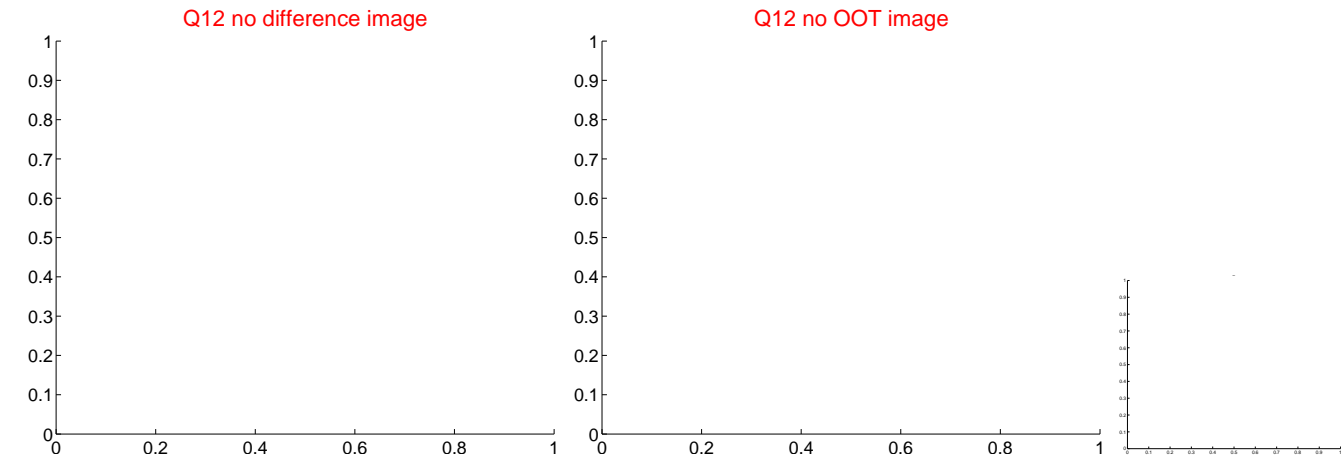
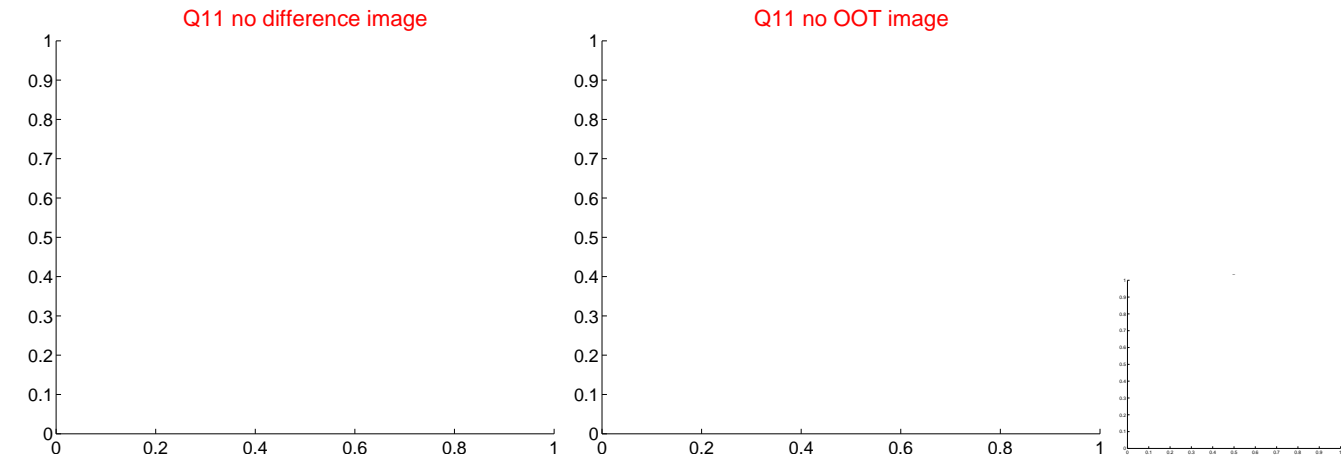
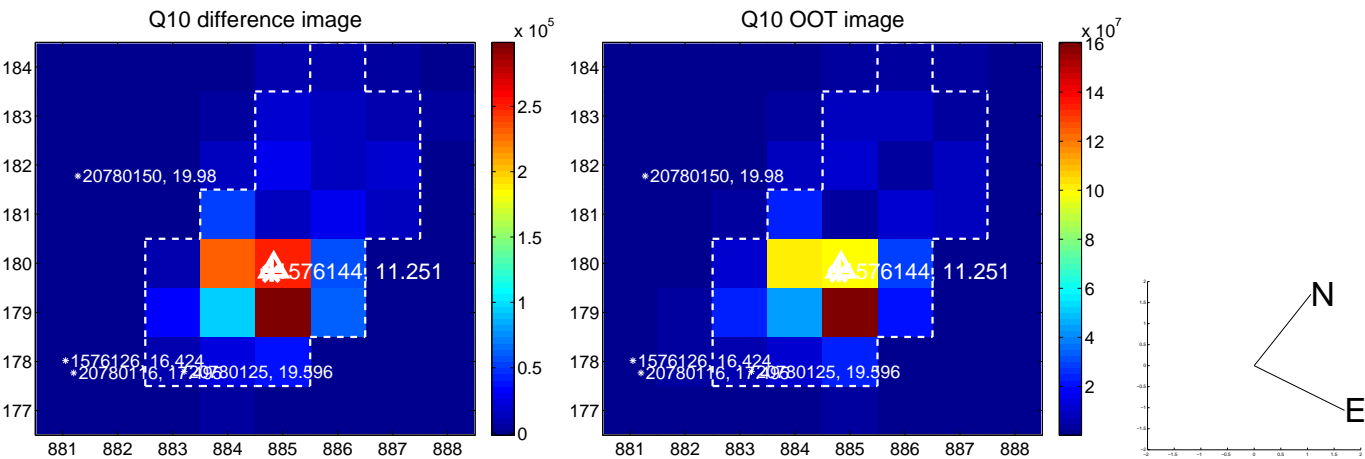
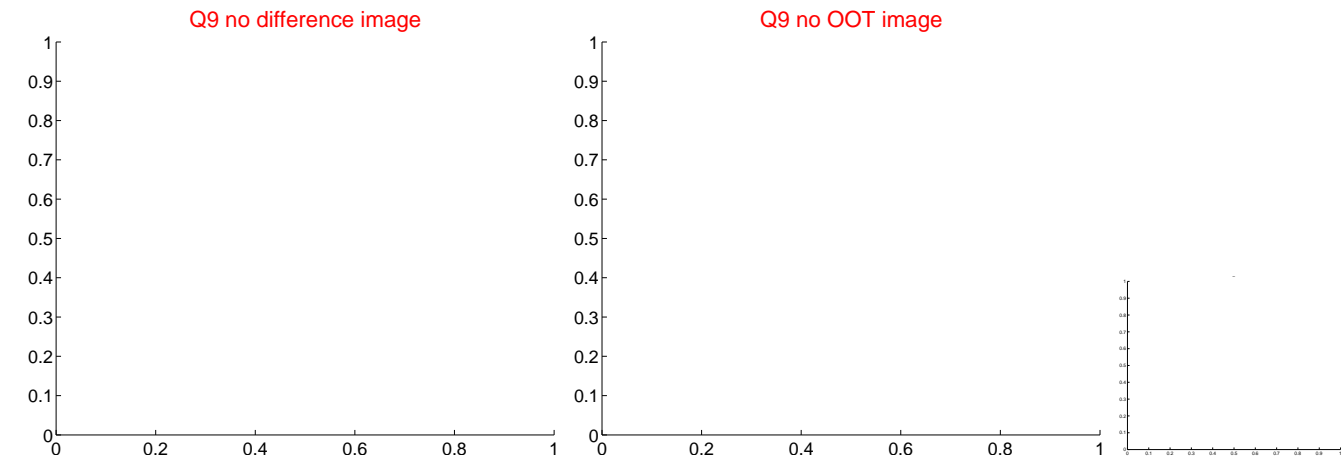
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



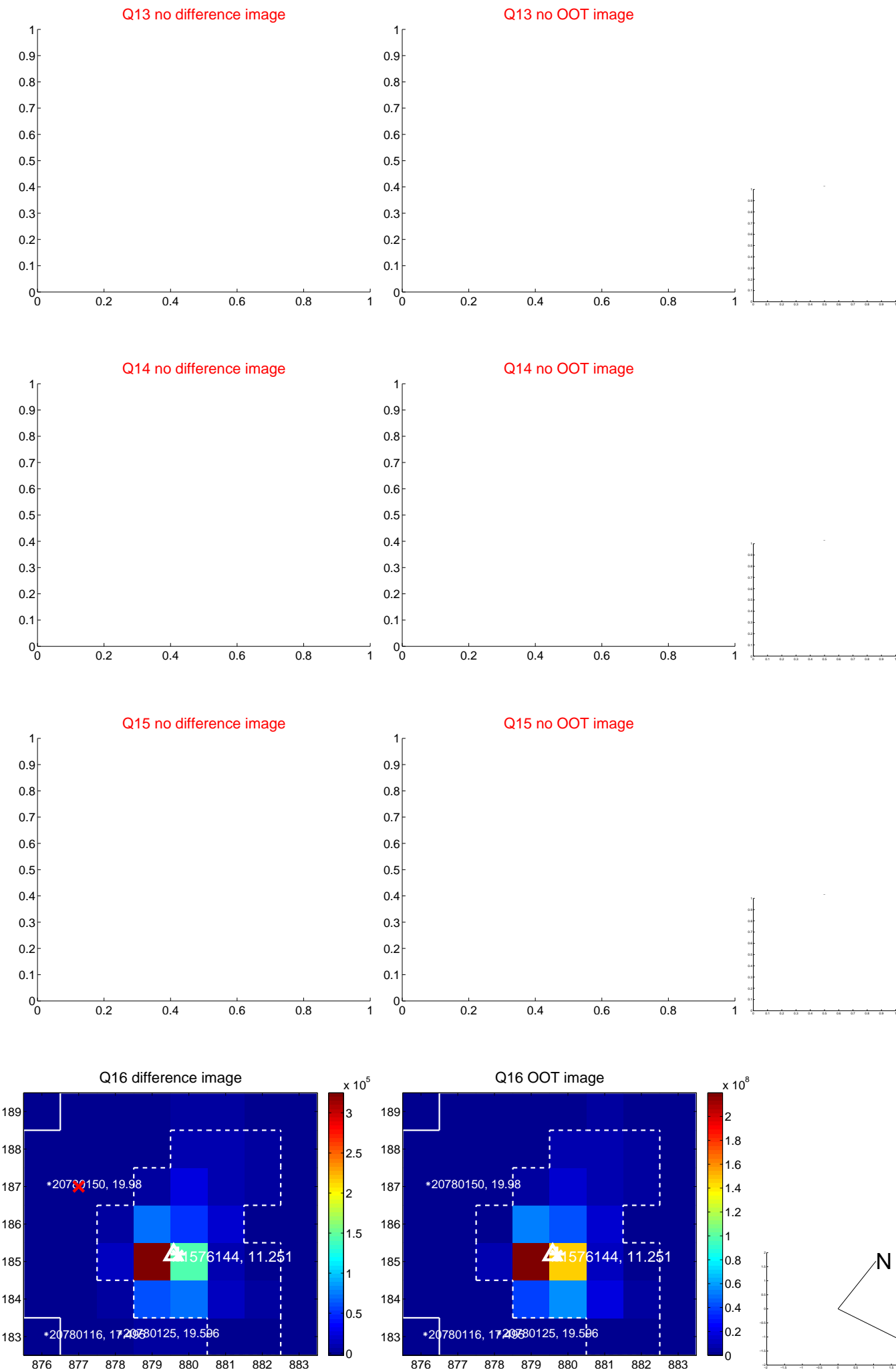
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



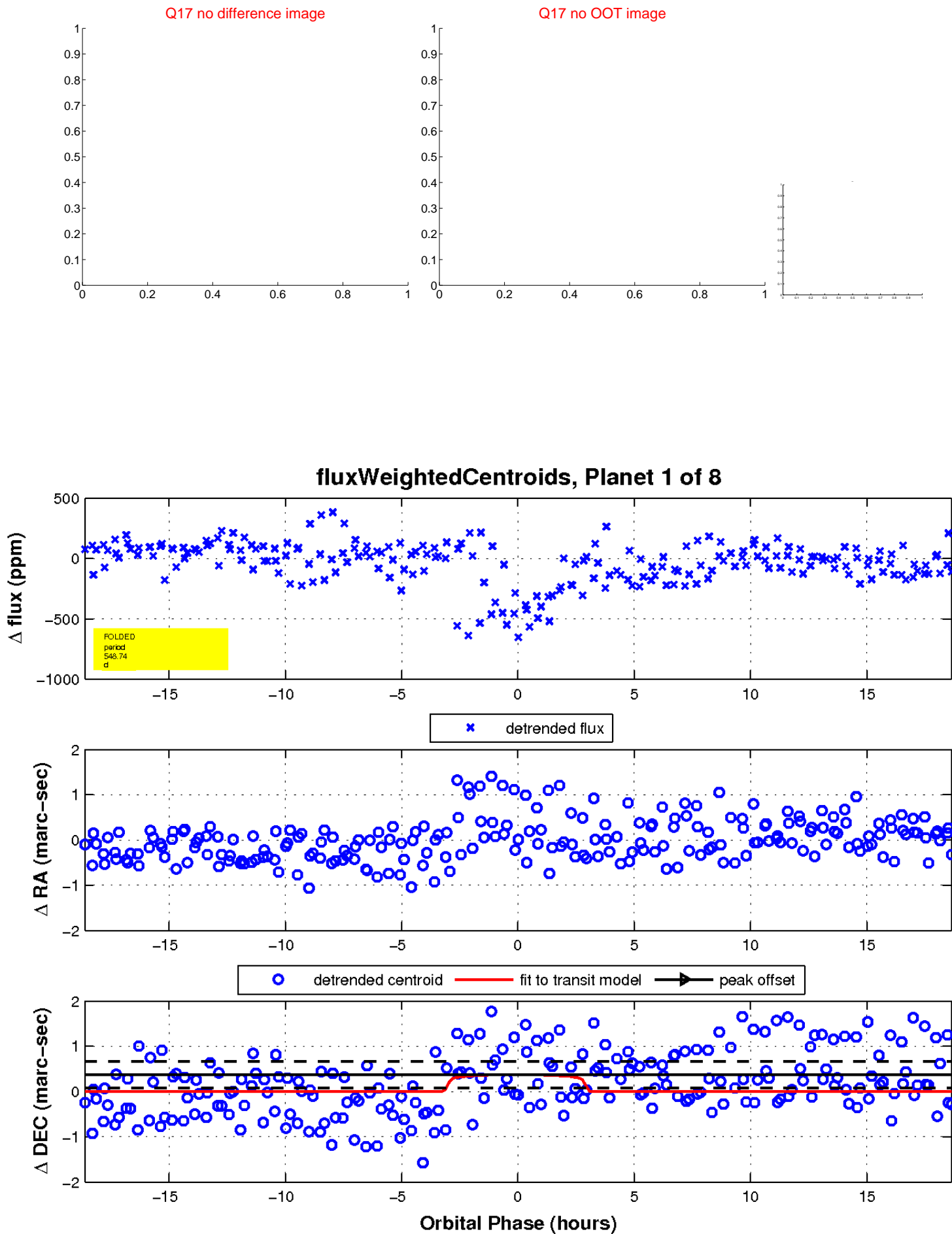
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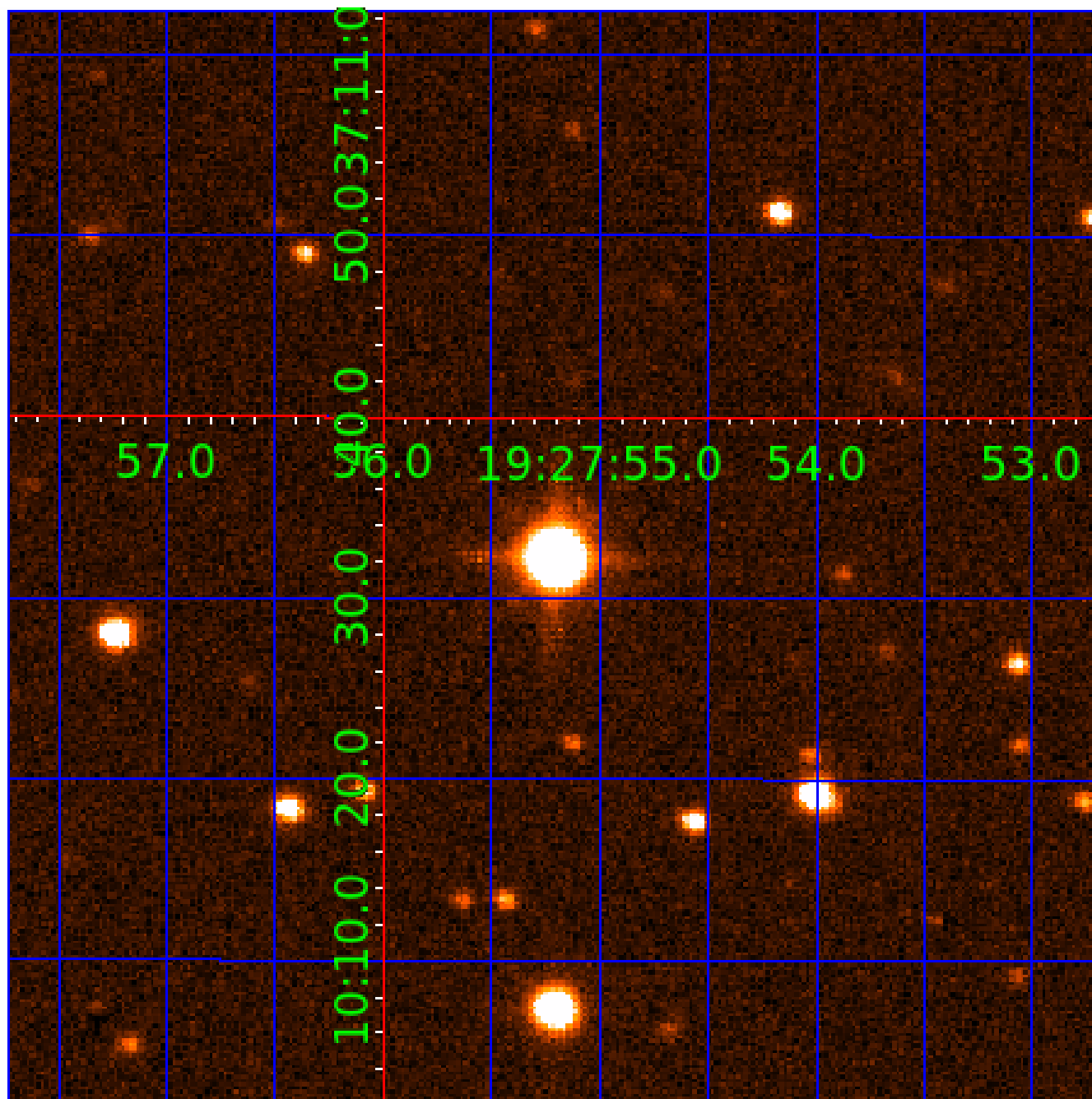


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 001576144

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})
001576144-01	OBS	No	548.743238	406.815173	453.5	6.246	21.3	12.0	2.51	9181	5.80	13.31
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Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001576144-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
001576144-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—CENT_SATURATED
001576144-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—SAME_NTL_PERIOD—CENT_SATURATED
001576144-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED—HALO_GHOST
001576144-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-08	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED—HALO_GHOST

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

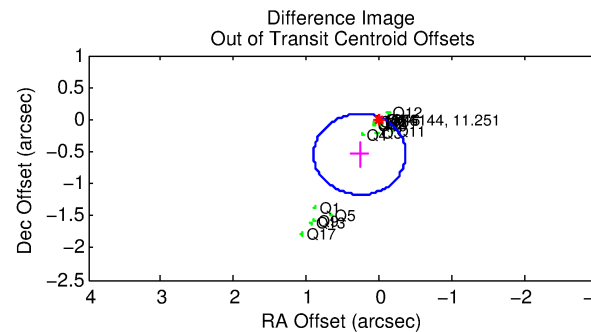
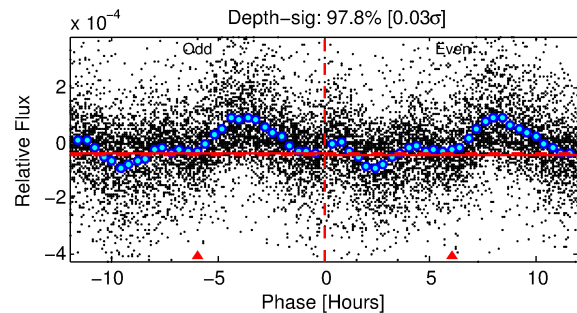
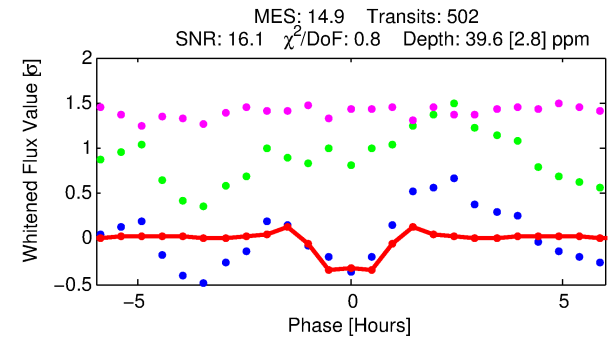
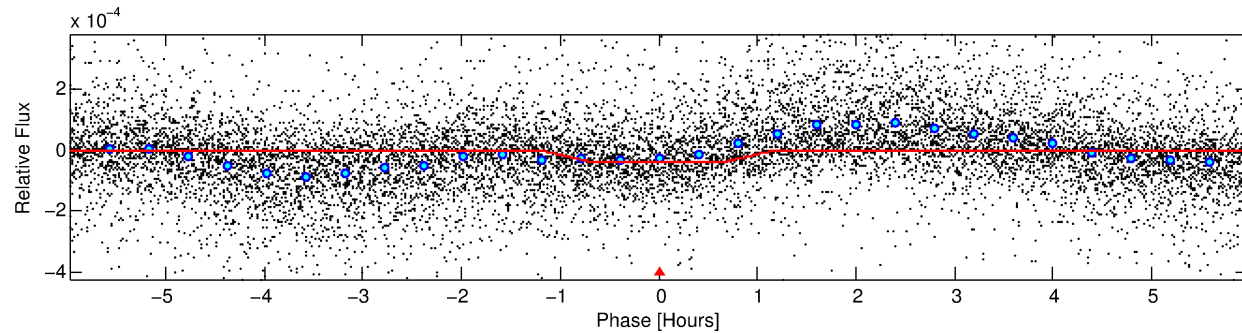
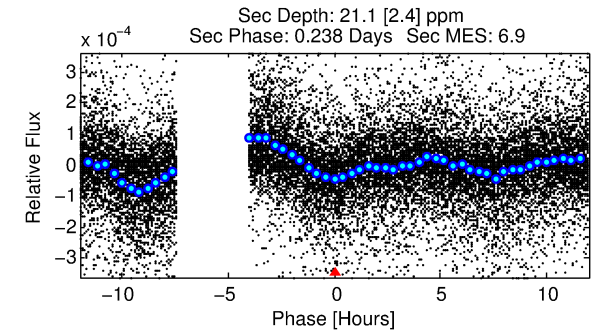
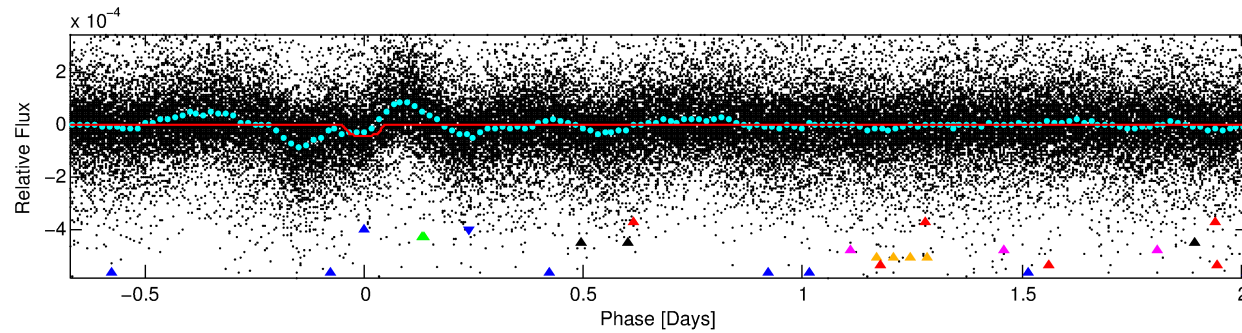
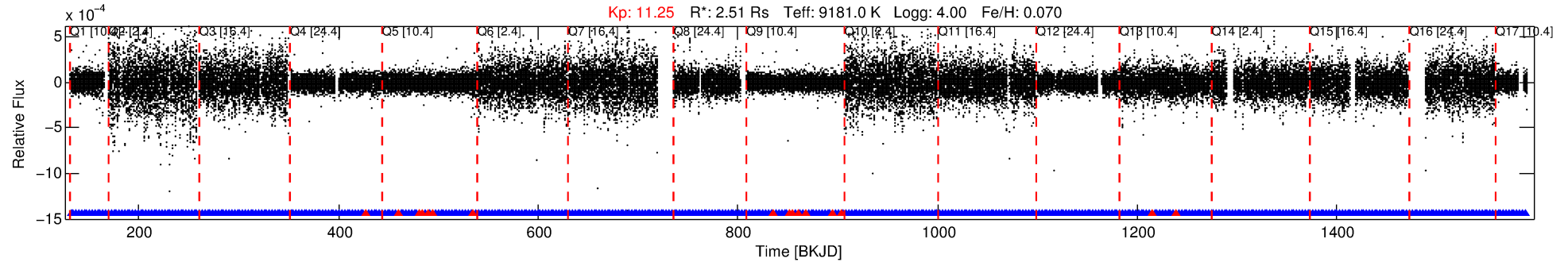
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 001576144-02

No Significant Match Found

DV One-Page Summary

KIC: 1576144 Candidate: 2 of 8 Period: 2.687 d



DV Fit Results:

Period = 2.68667 [0.00001] d
Epoch = 132.1598 [0.0014] BKJD
Rp/R* = 0.0067 [0.0009]
a/R* = 4.72 [4.50]
b = 0.90 [0.21]
Seff = 16005.58 [7550.75]
Teq = 2868 [338] K
Rp = 1.82 [0.71] Re
a = 0.0500 [0.0151] AU
Ag = 8.76 [4.62] [1.68σ]
Teffp = 7629 [676] K [6.30σ]

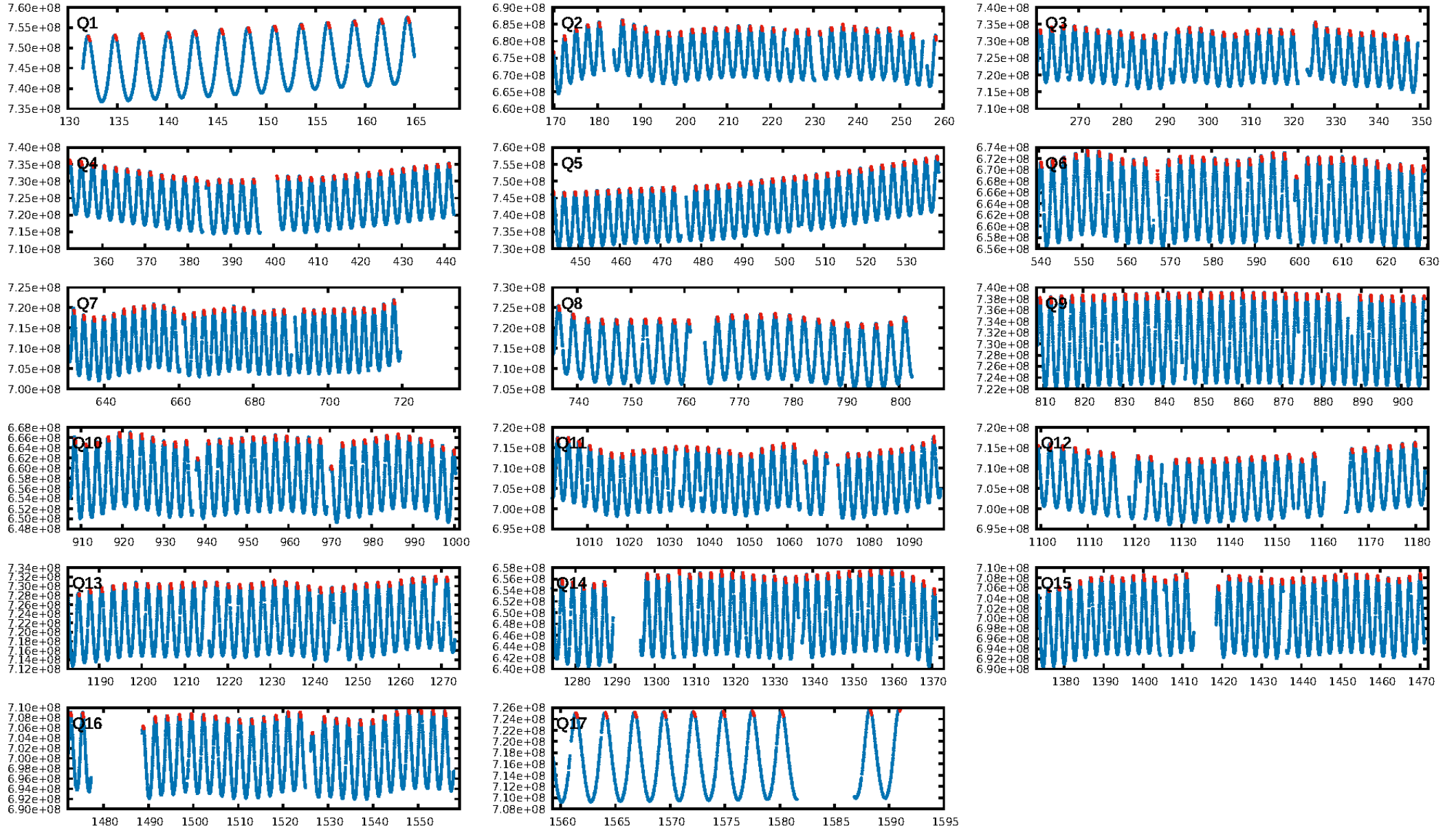
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: 100.0% [489.65σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.13e-41
RollingBand-fgt: 0.97 [463/479]
GhostDiagnostic-chr: -0.7677
Centroid-sig: N/A
Centroid-so: 0.957 arcsec [1.07σ]
OotOffset-rm: 0.601 arcsec [2.85σ]
KicOffset-rm: 0.545 arcsec [2.25σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.00 [0/17]
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:50:51 Z

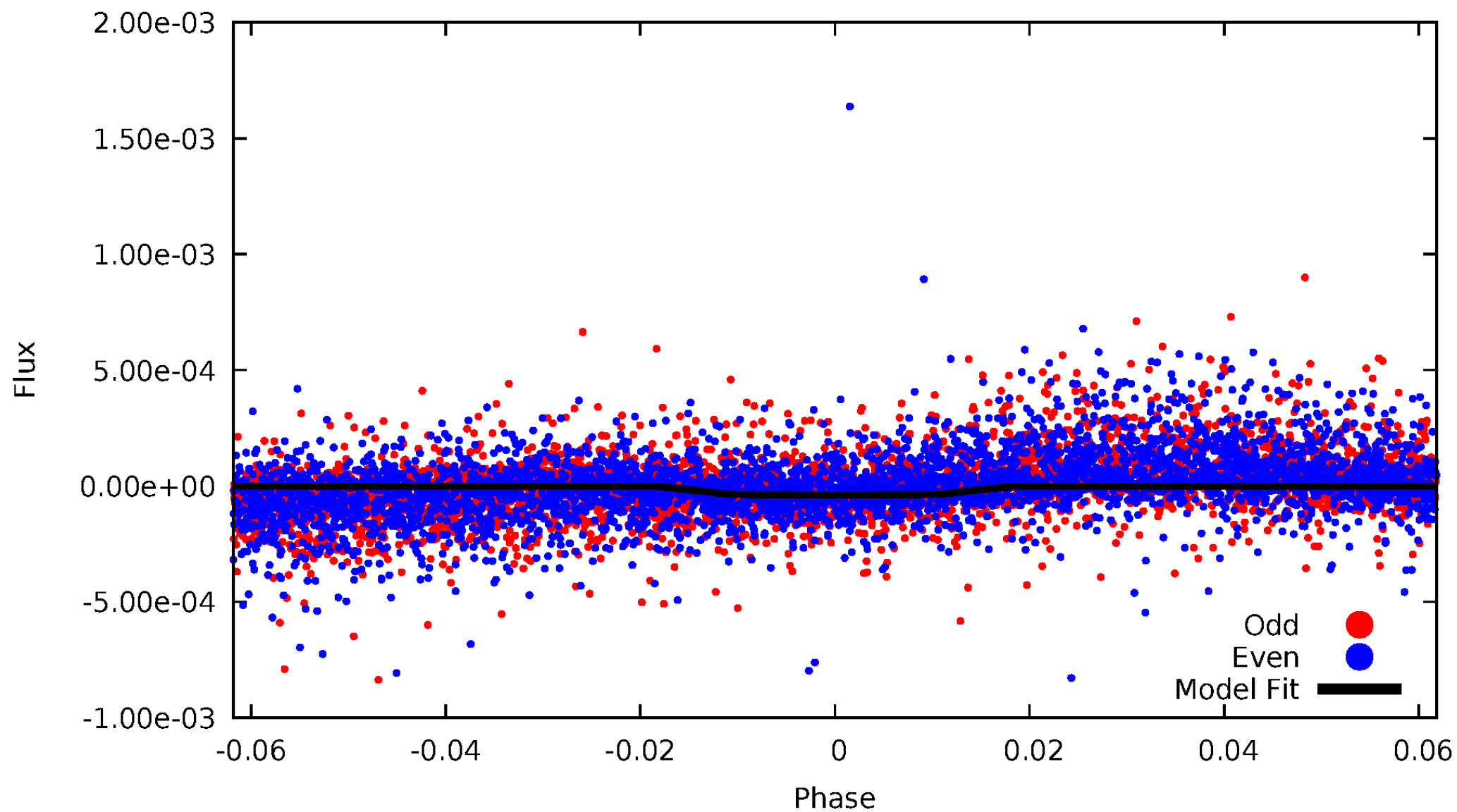
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 001576144-02, PDC Light Curves



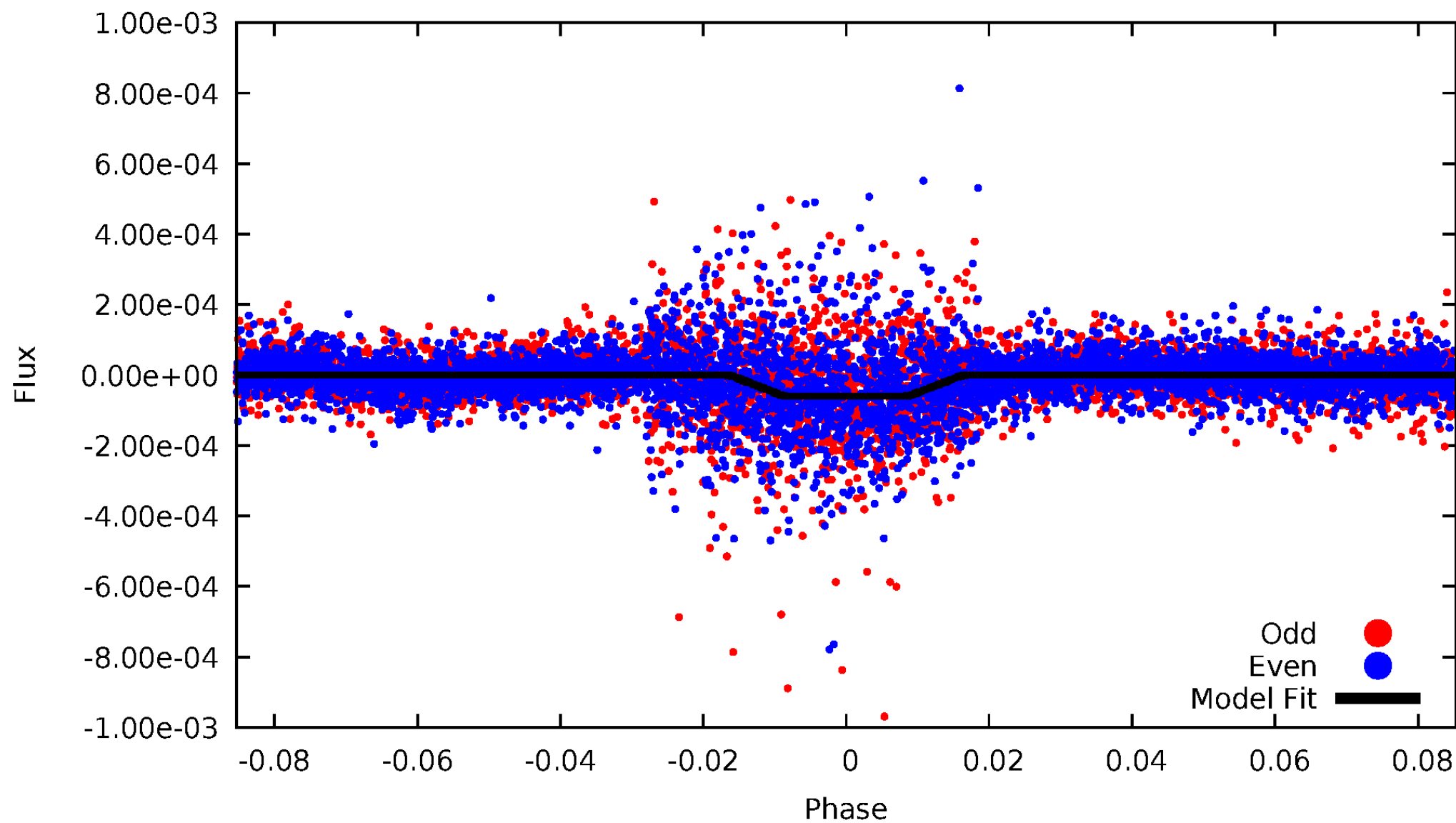
DV Odd/Even

TCE 001576144-02



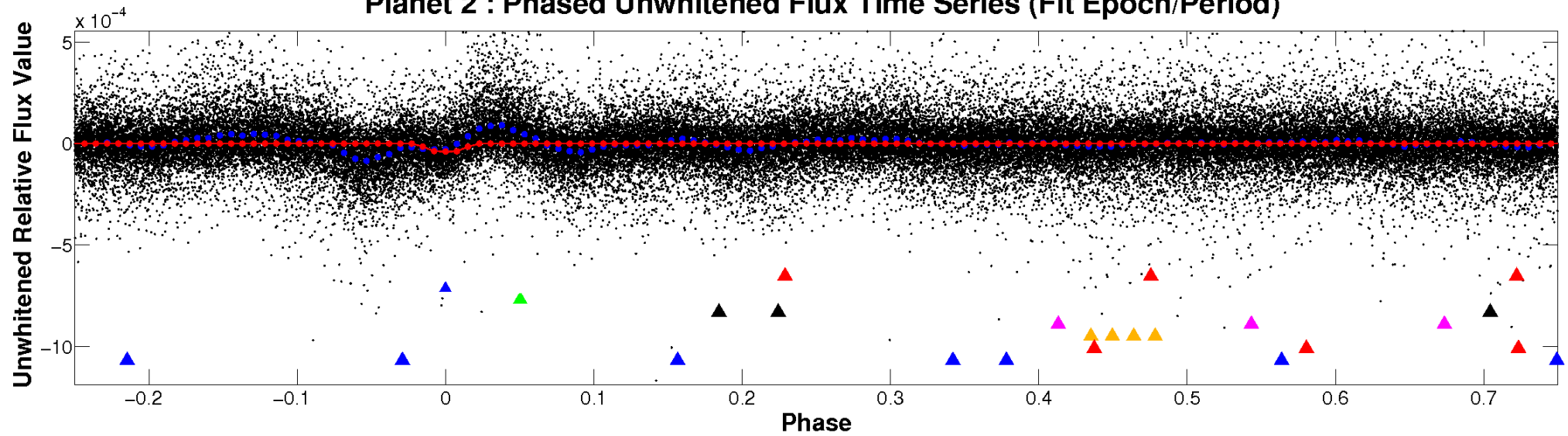
ALT Odd/Even

TCE 001576144-02

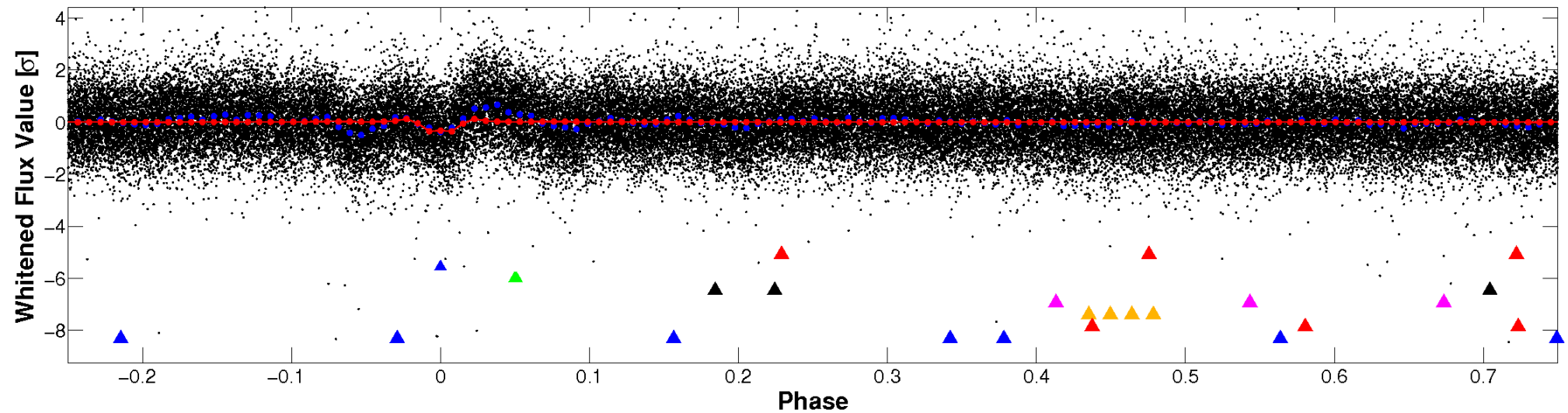


Non-Whitened Vs. Whitened Light Curve

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

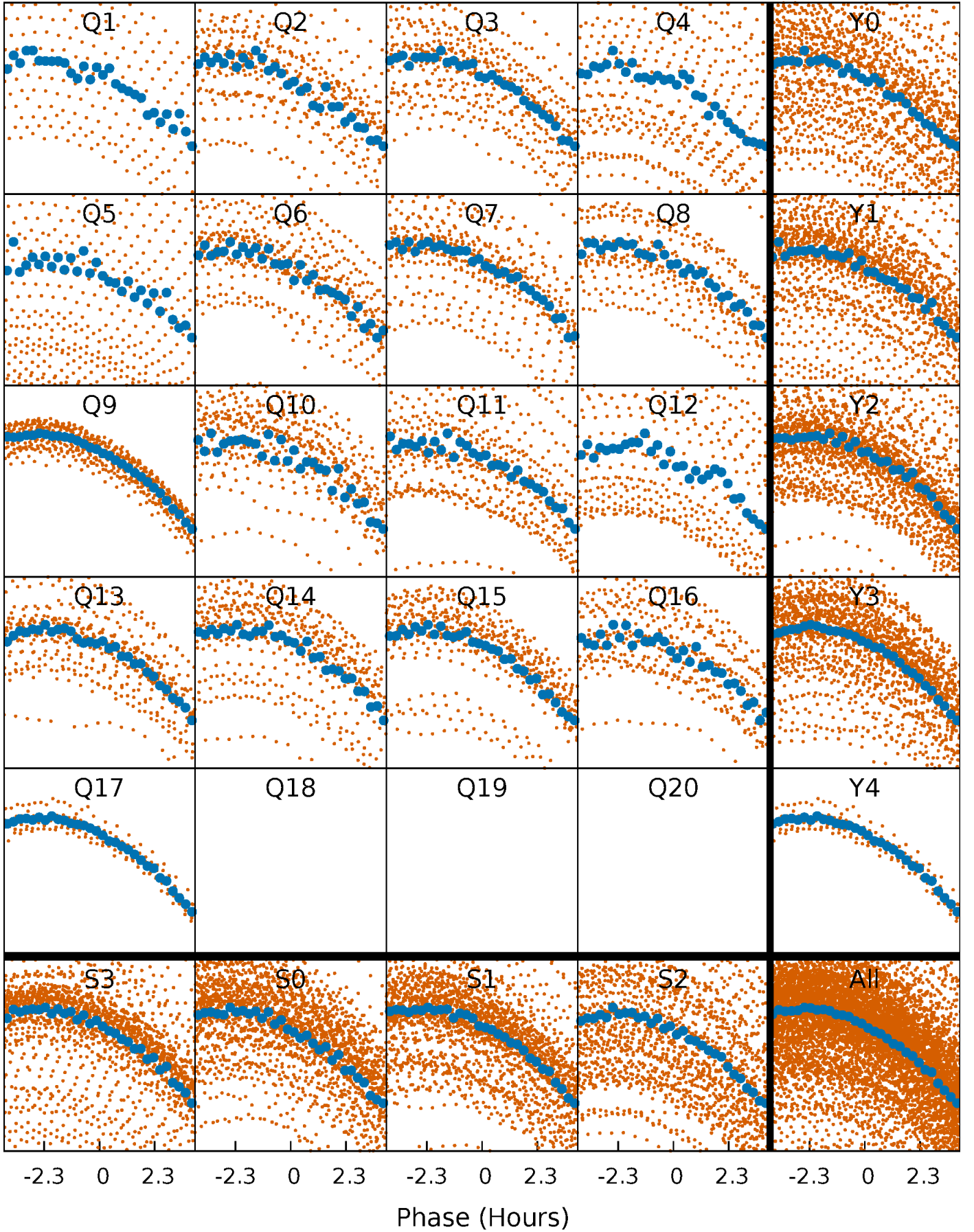


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



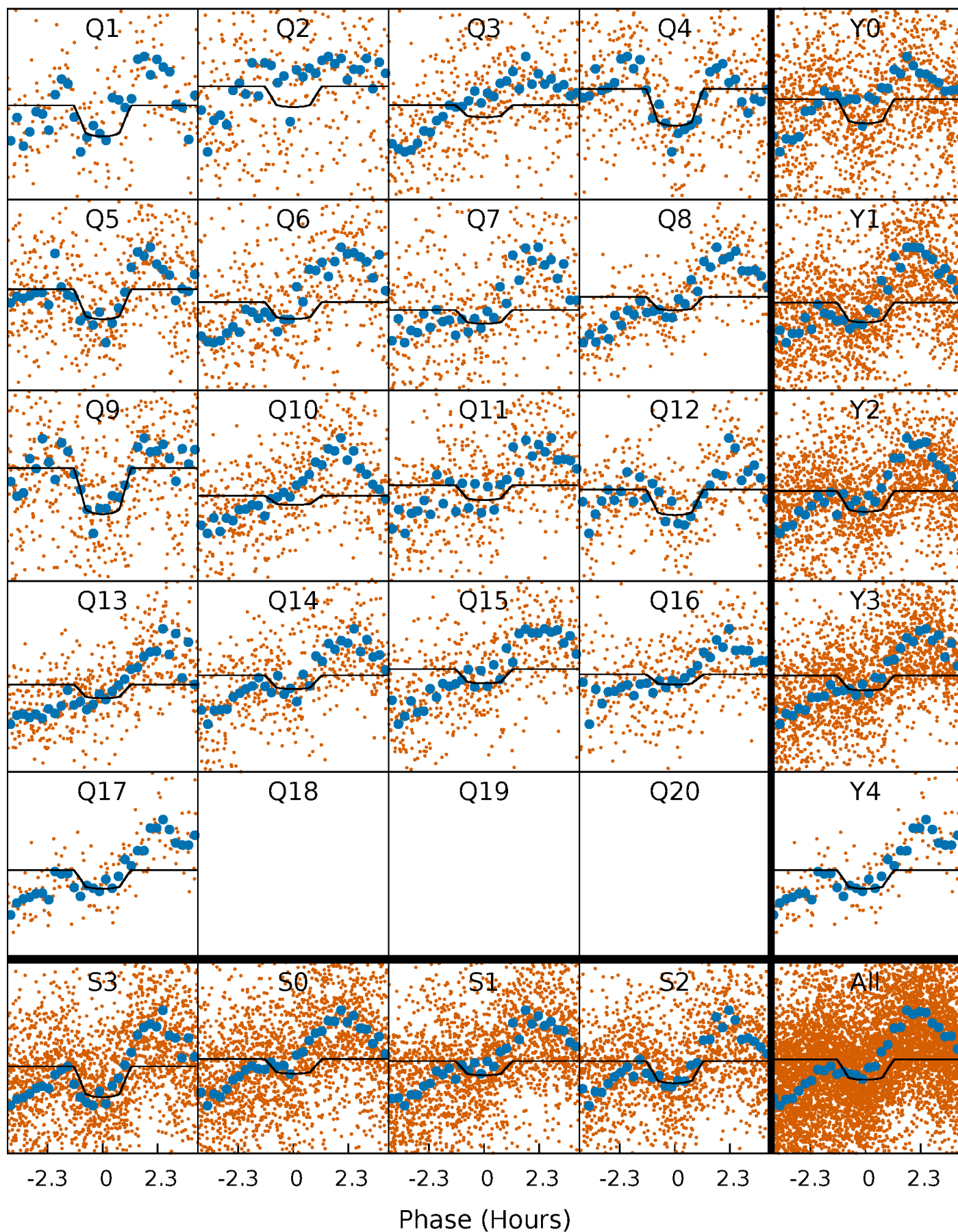
PDC Quarter-Phased Transit Curves

TCE 001576144-02 P= 2.686670 Days $T_0=132.159784$ (BKJD)



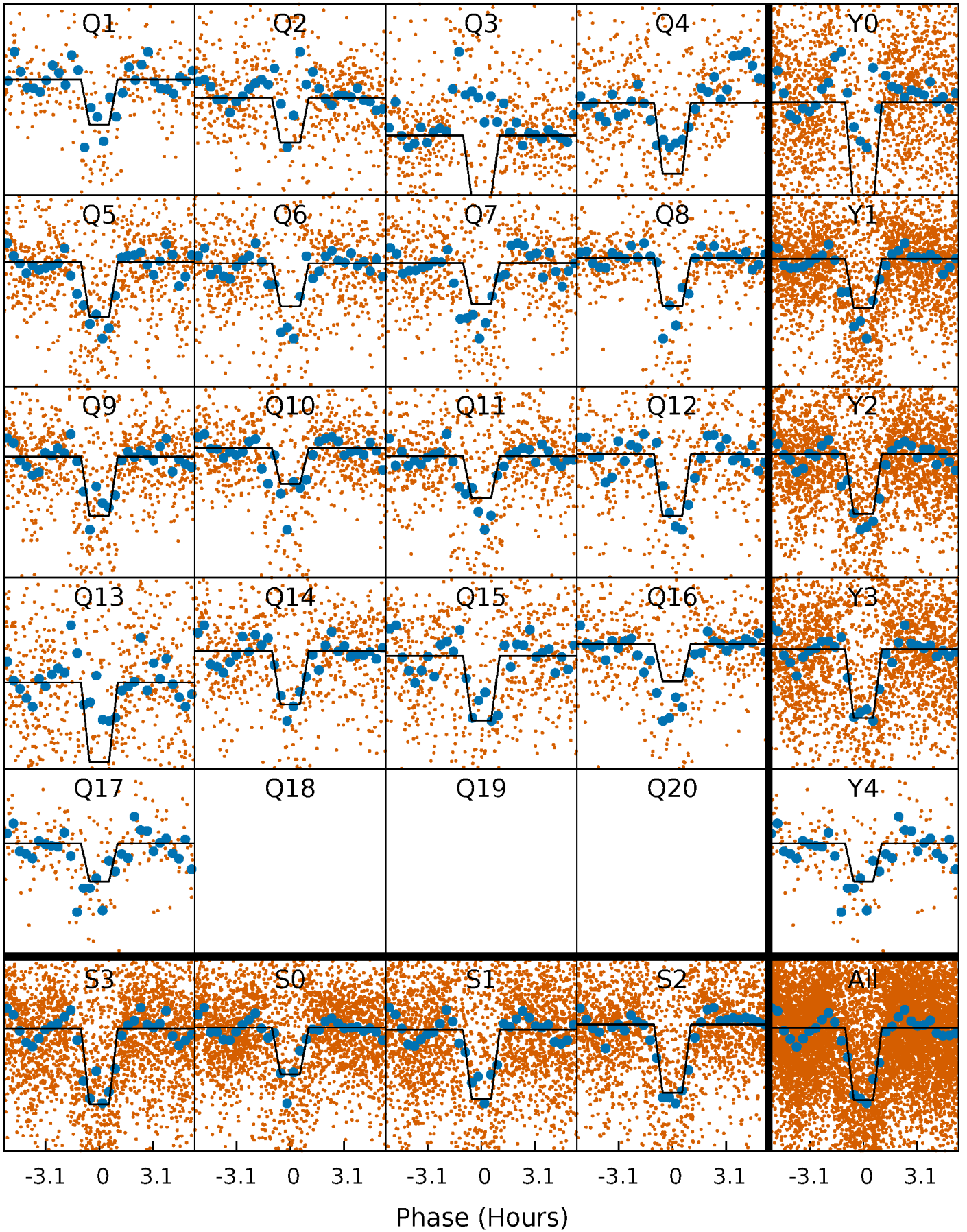
DV Quarter-Phased Transit Curves

TCE 001576144-02 P= 2.686670 Days $T_0=132.159784$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

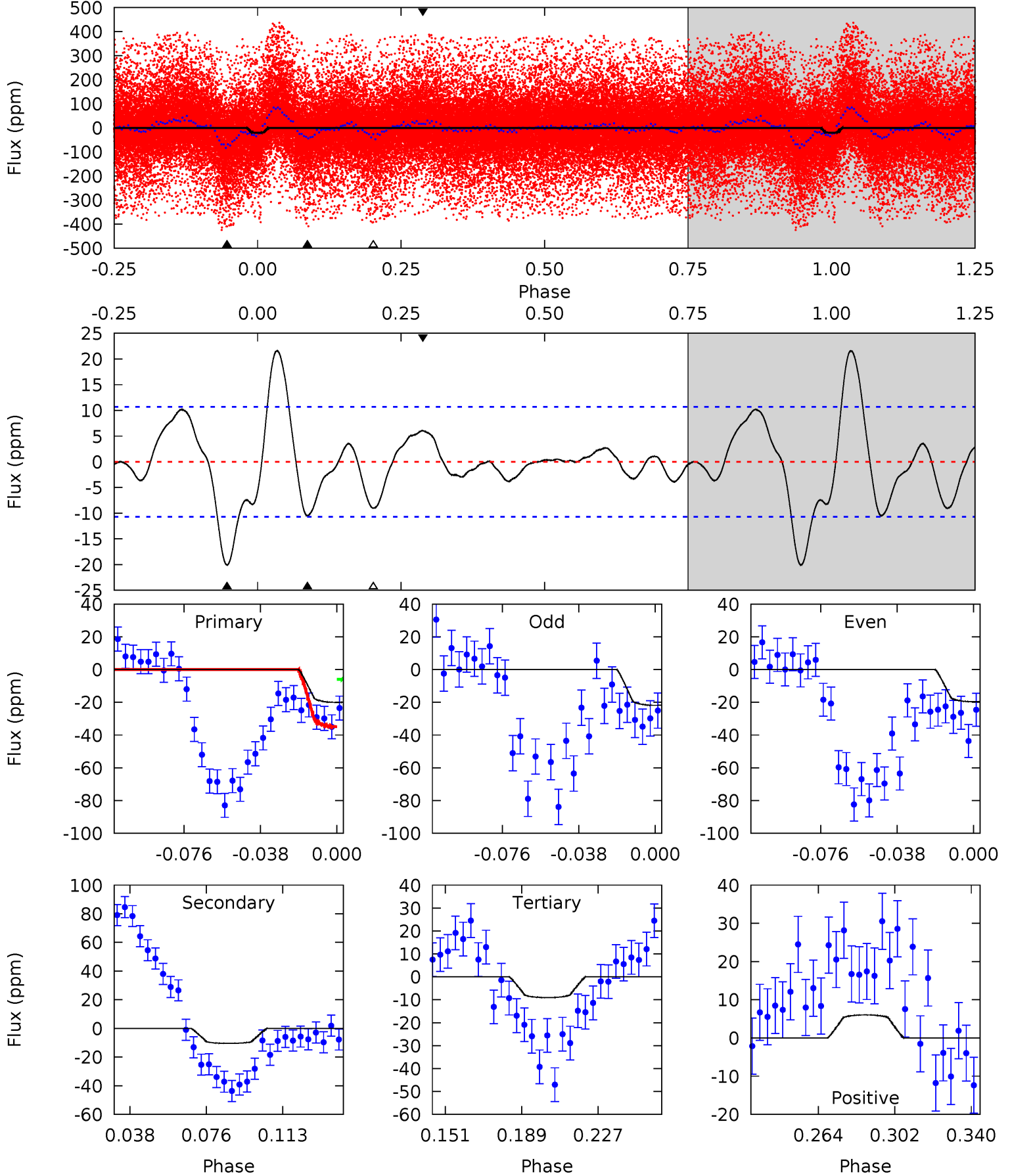
TCE 001576144-02 P= 2.686692 Days $T_0=132.158585$ (BKJD)



DV Model-Shift Uniqueness Test

001576144-02, P = 2.686670 Days, E = 129.473114 Days

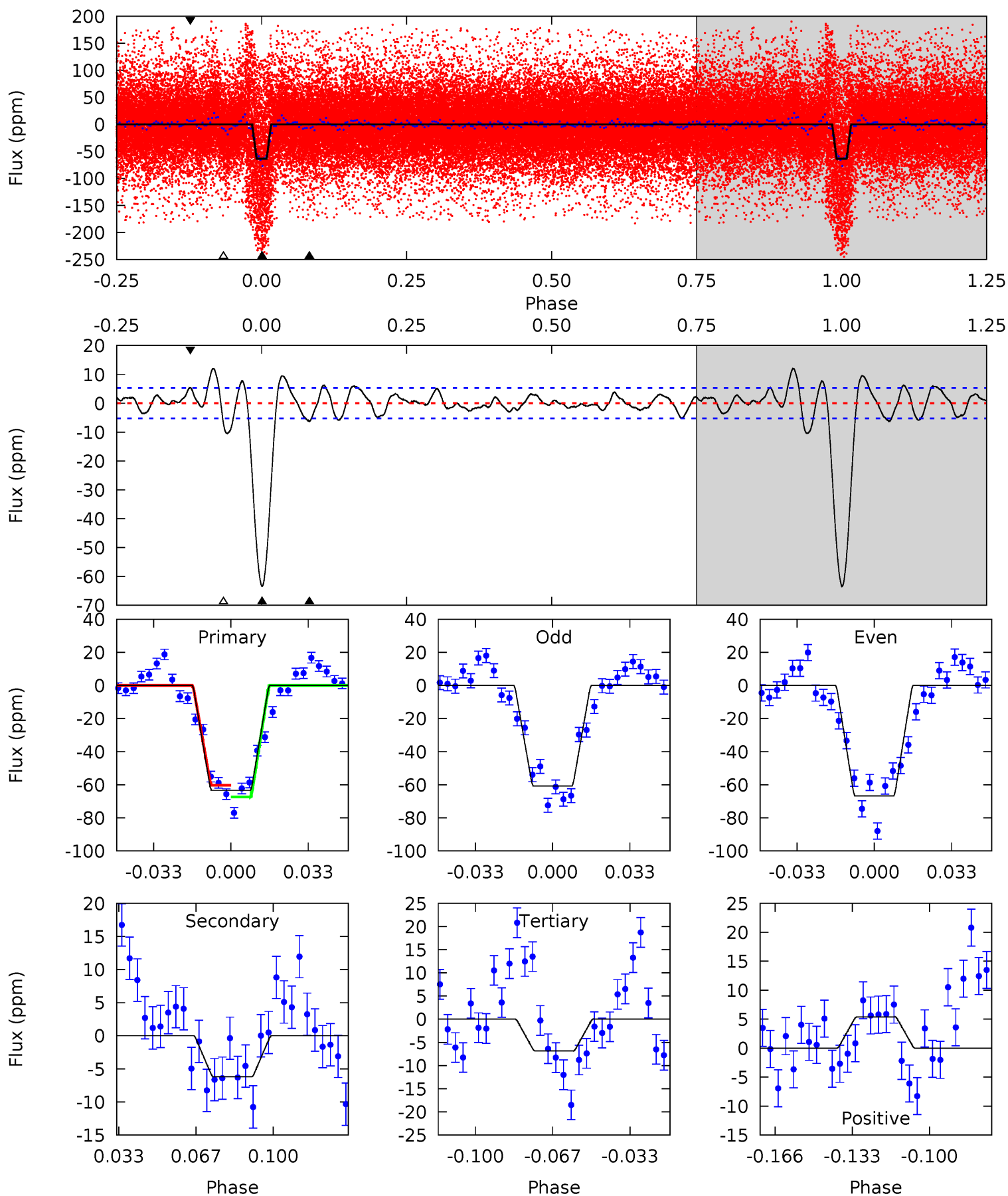
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.95	4.68	4.04	2.69	4.76	2.08	2.30	4.91	6.26	0.64	1.98	0.50	0.56	0.52	6.54



Alt Model-Shift Uniqueness Test

001576144-02, P = 2.686692 Days, E = 129.471893 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
57.7	5.65	6.24	4.91	4.79	2.13	2.91	51.4	52.8	-0.59	0.73	2.72	0.90	0.16	3.24



Stellar Parameters For KIC 001576144

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot cm^{-3})$
	9181^{+251}_{-430}	$4.003^{+0.234}_{-0.156}$	$0.070^{+0.150}_{-0.700}$	$2.507^{+0.743}_{-0.909}$	$2.308^{+0.361}_{-0.721}$	$0.206^{+0.334}_{-0.097}$
	+3%/-5%	+6%/-4%	+214%/-1000%	+30%/-36%	+16%/-31%	+162%/-47%
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 001576144-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-10 ± 2	$1.77^{+0.43}_{-0.39}$	3956^{+335}_{-351}	5942^{+553}_{-588}	$4.456^{+2.828}_{-1.650}$
Alt.	-6 ± 1	$2.09^{+0.44}_{-0.42}$	3972^{+273}_{-320}	4796^{+401}_{-364}	$1.923^{+1.076}_{-0.624}$

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

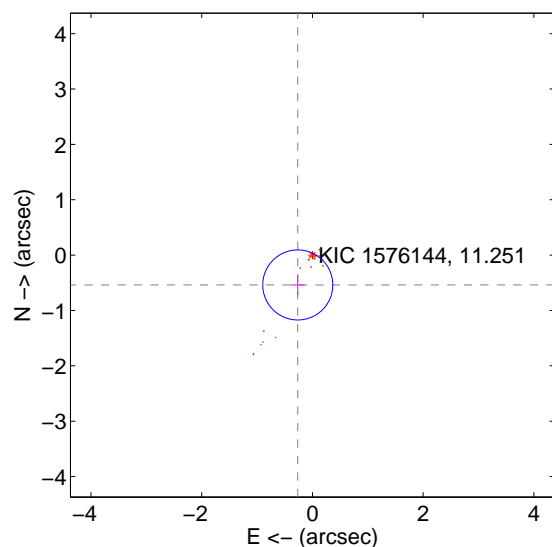
Supplemental centroid analysis for 001576144-02. **Kepler magnitude: 11.25.** Transit SNR 16.13

There are 0 quarters with good PRF difference image offsets

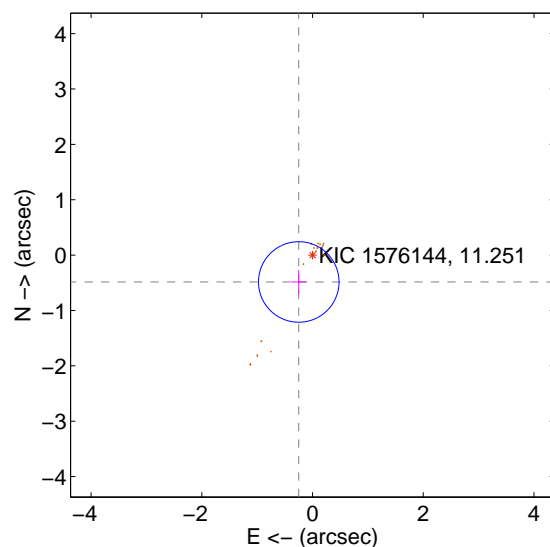
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.601 ± 0.211	2.85	0.265 ± 0.124	-0.539 ± 0.185
PRF-fit source offset from KIC position	0.545 ± 0.242	2.25	0.249 ± 0.132	-0.485 ± 0.215
photometric centroid source offset	0.96 ± 0.90	1.07	-0.28 ± 0.63	-0.91 ± 0.92

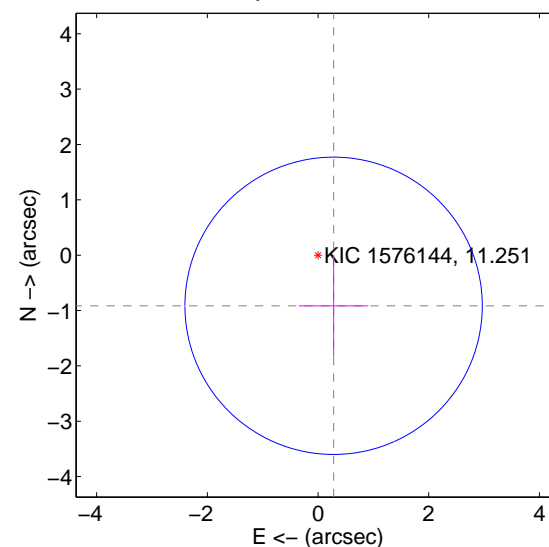
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

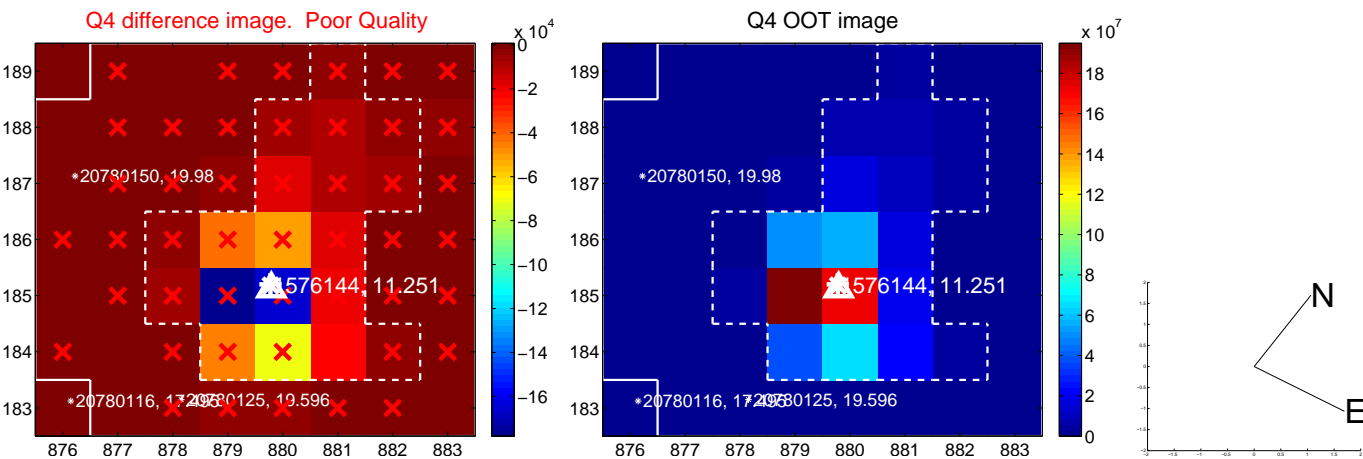
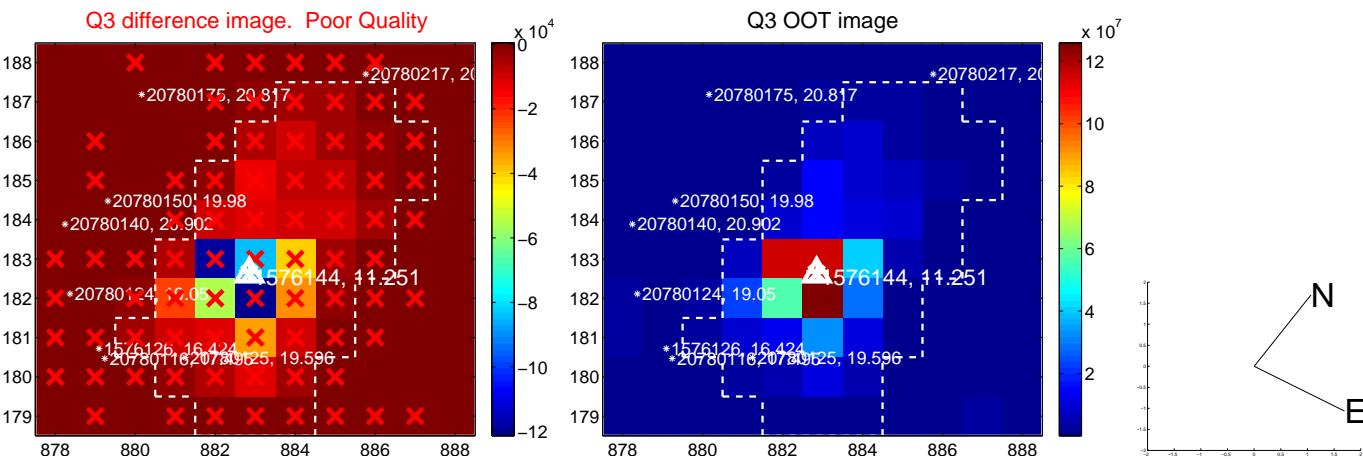
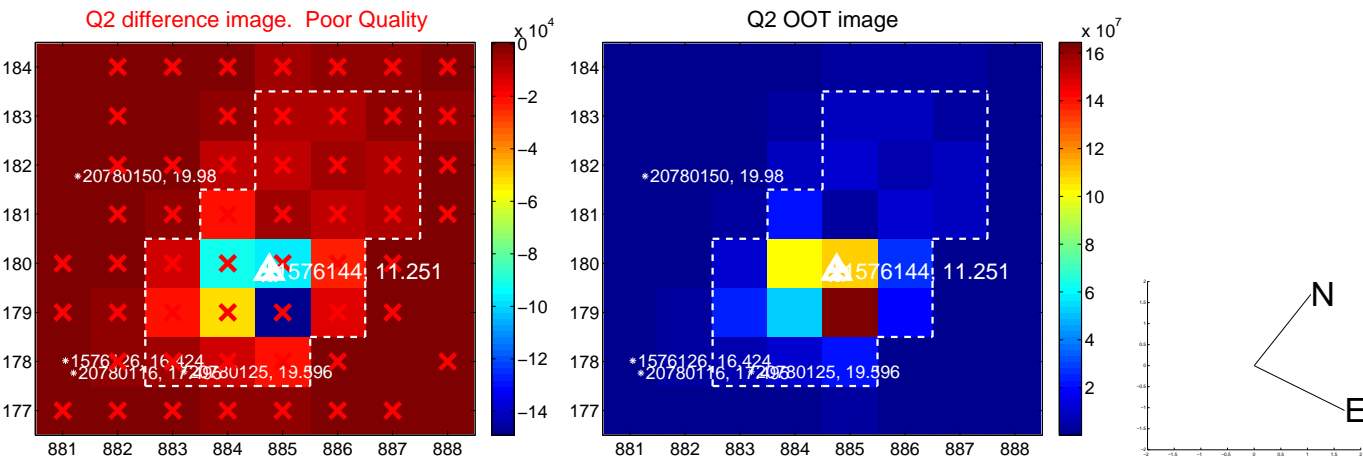
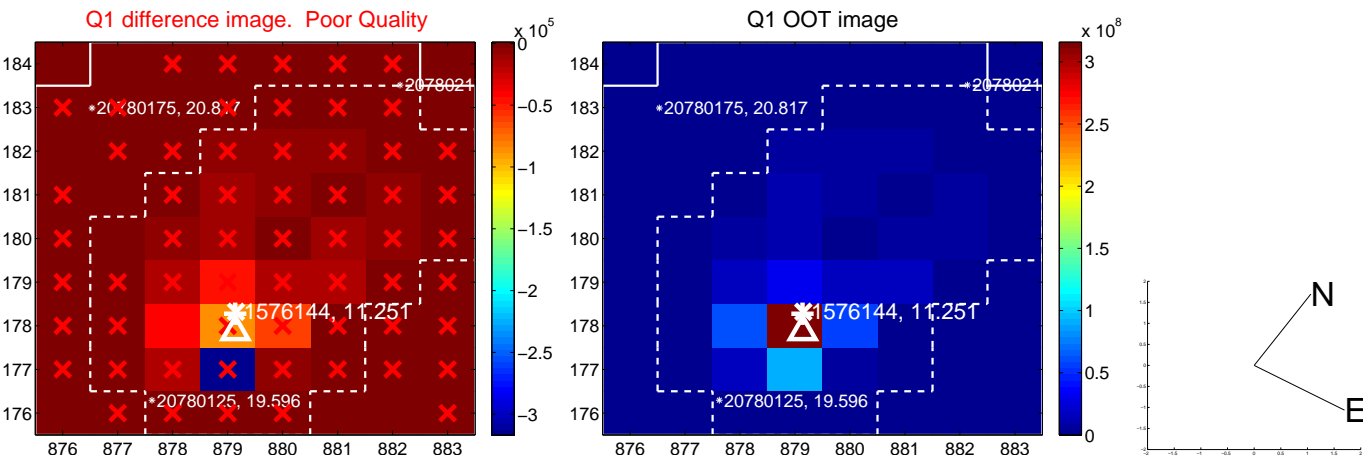


offset from photometric centroids

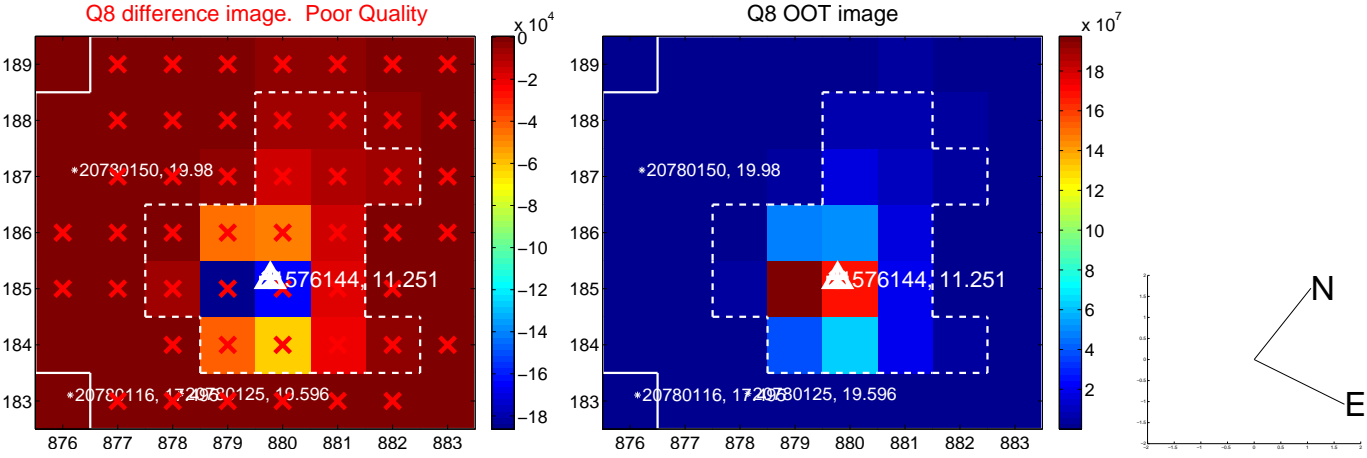
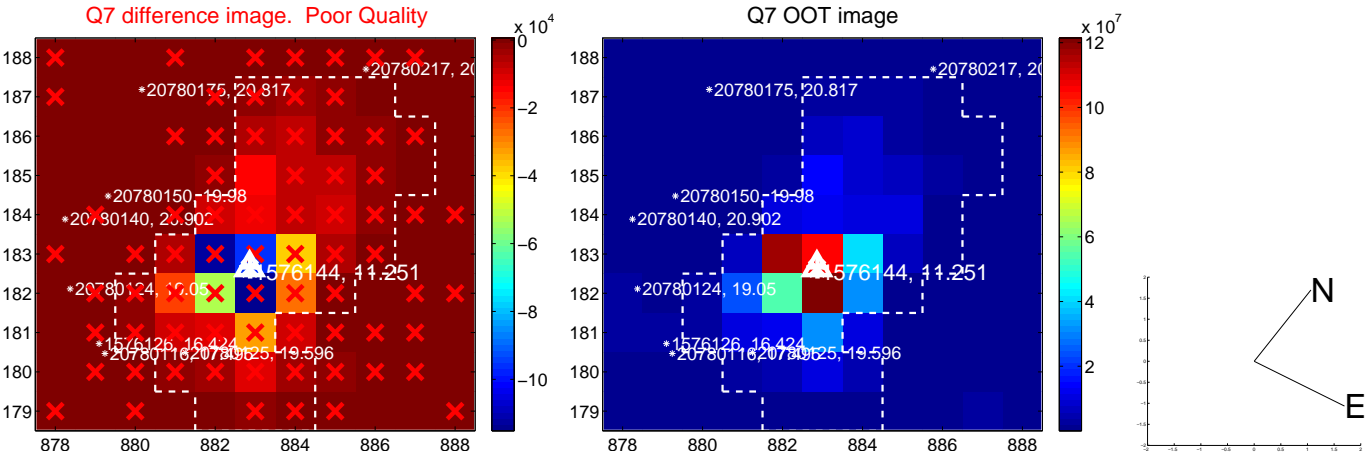
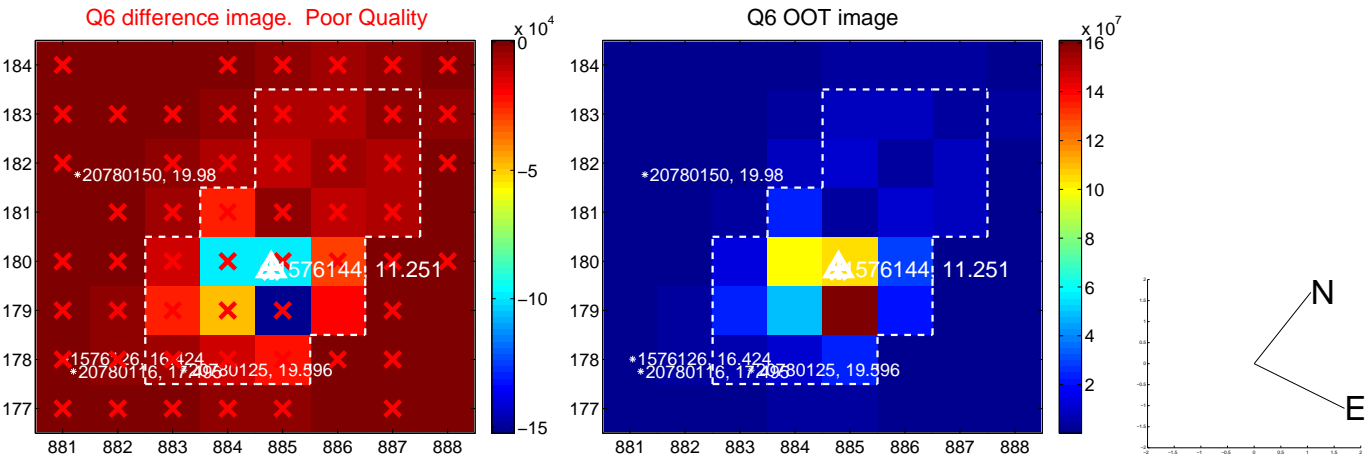
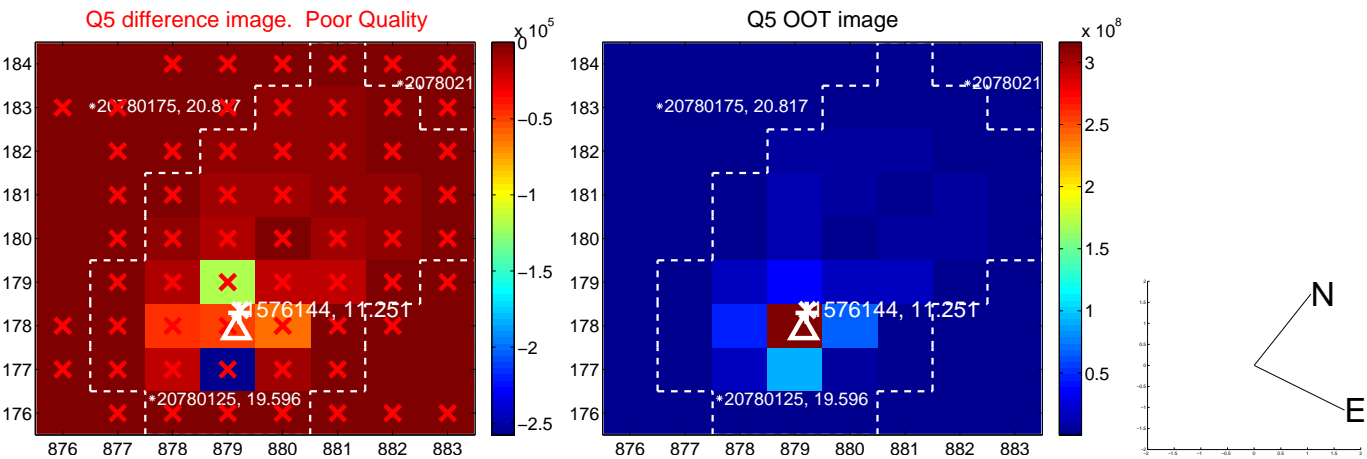


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

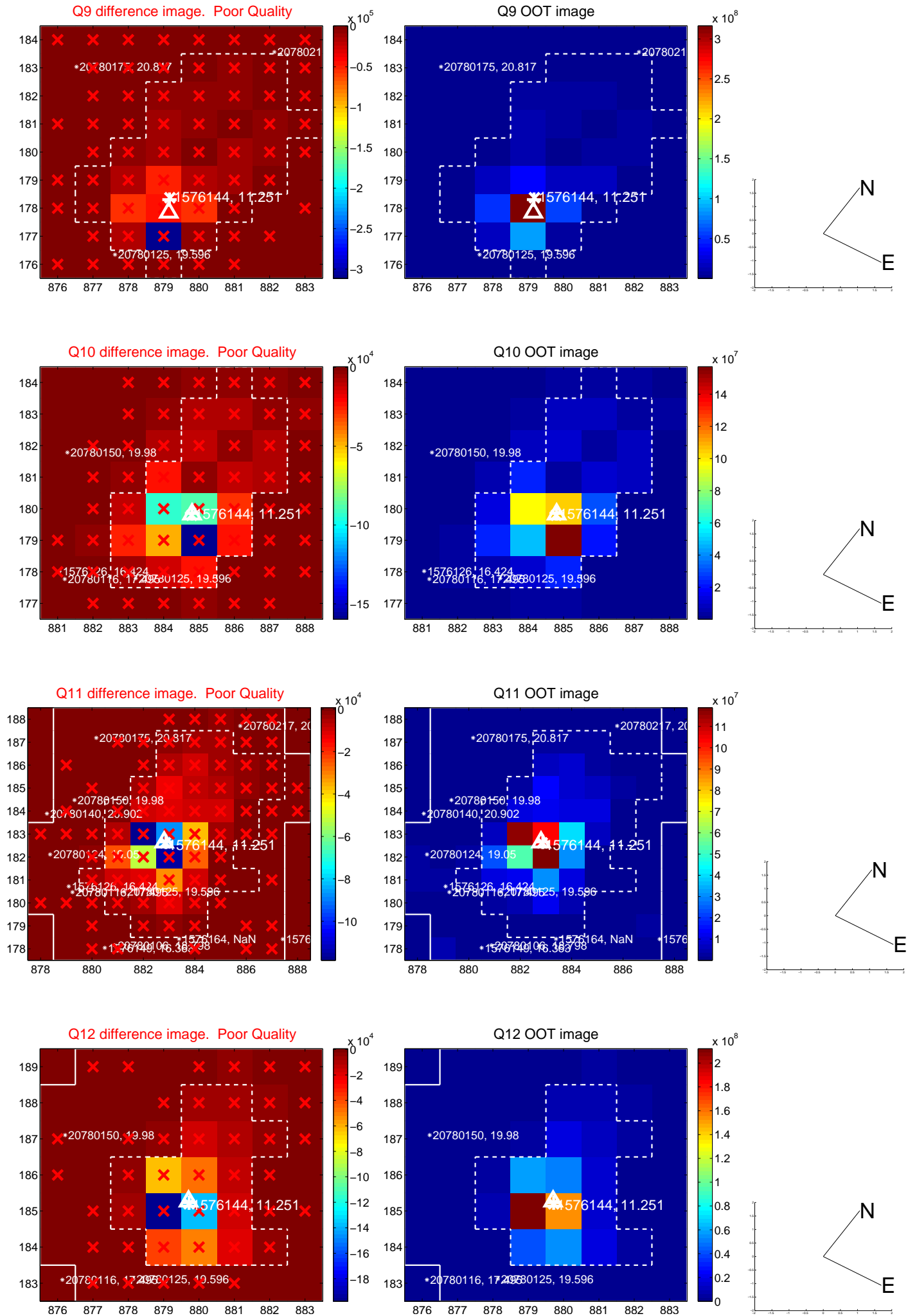
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



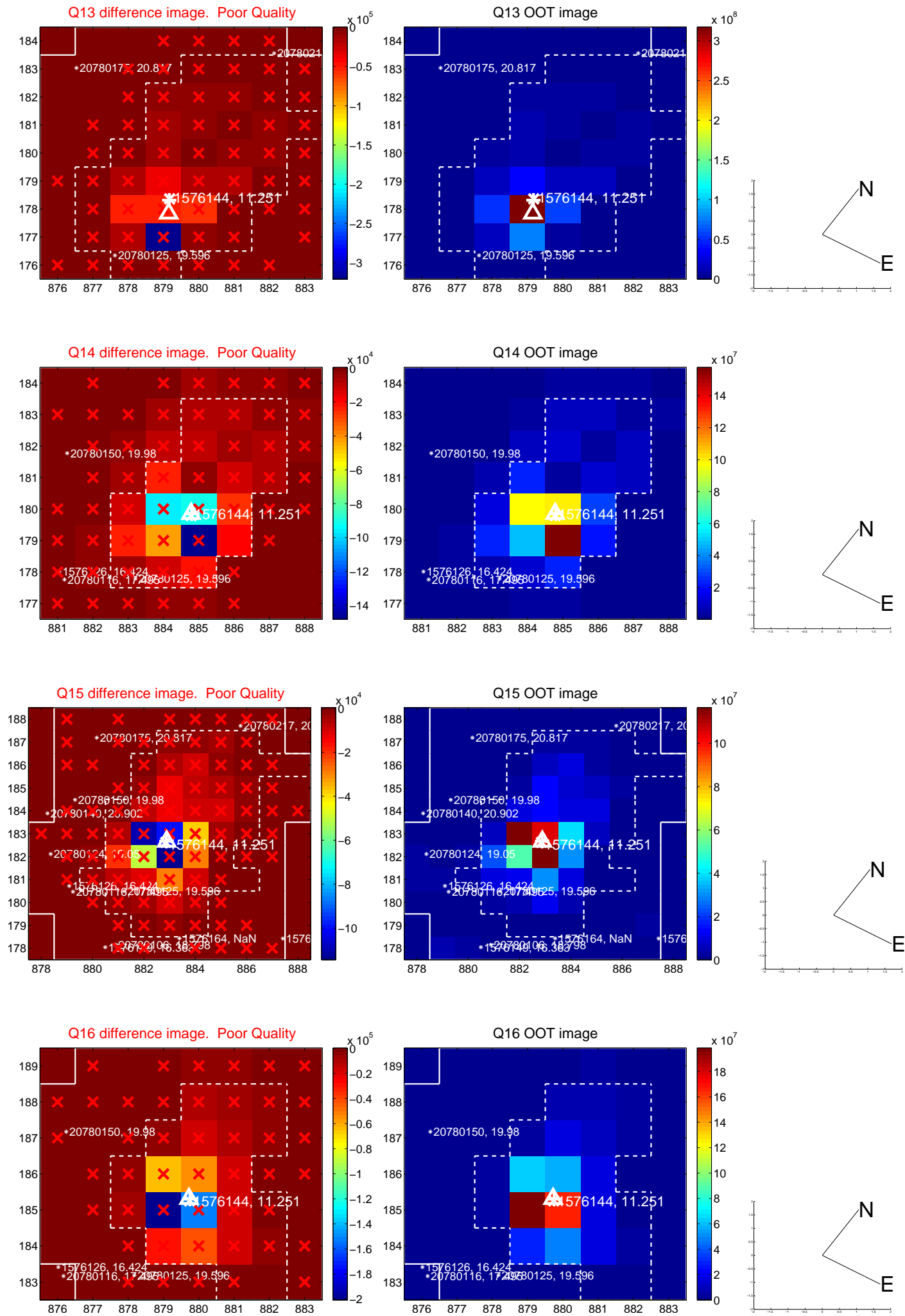
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



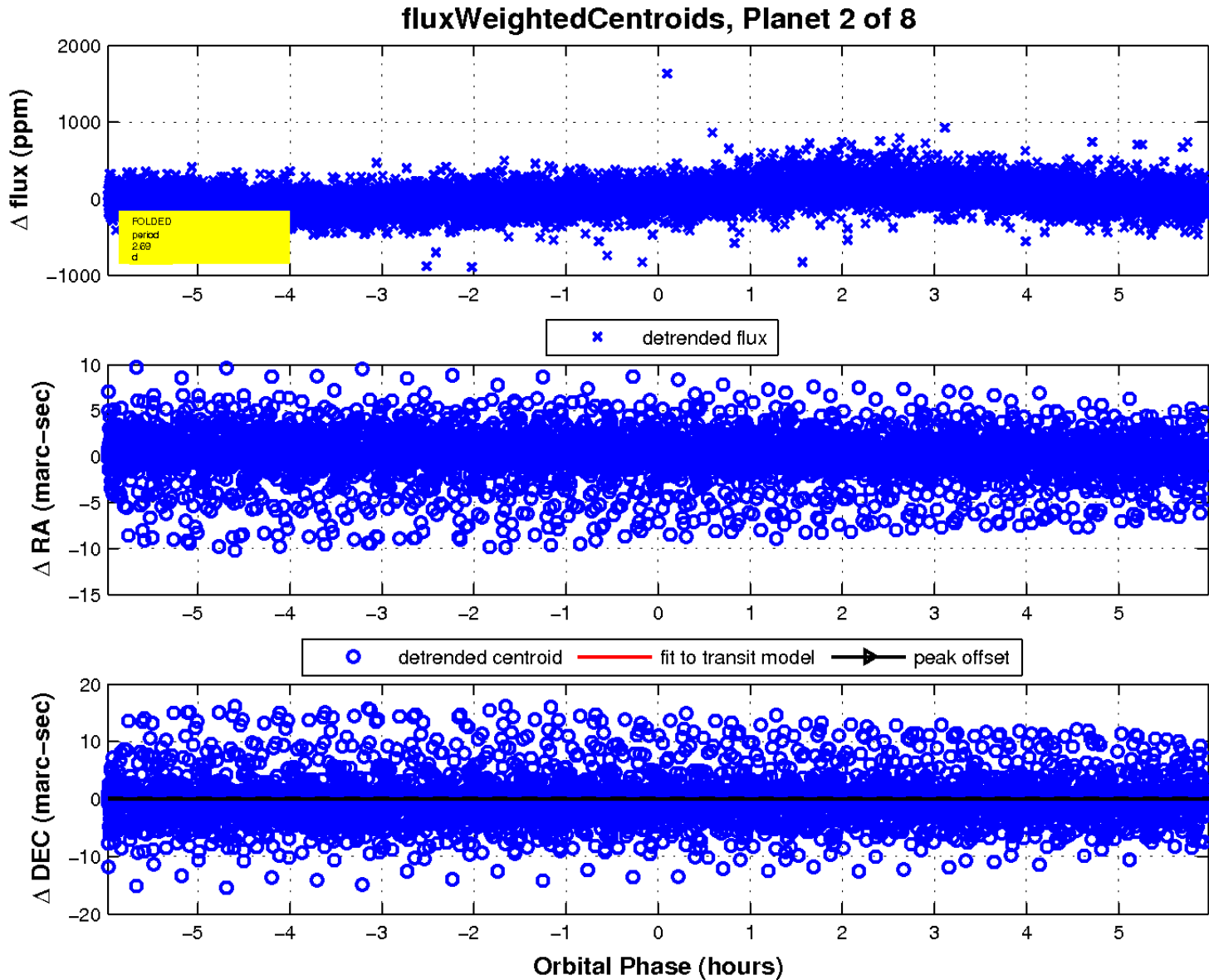
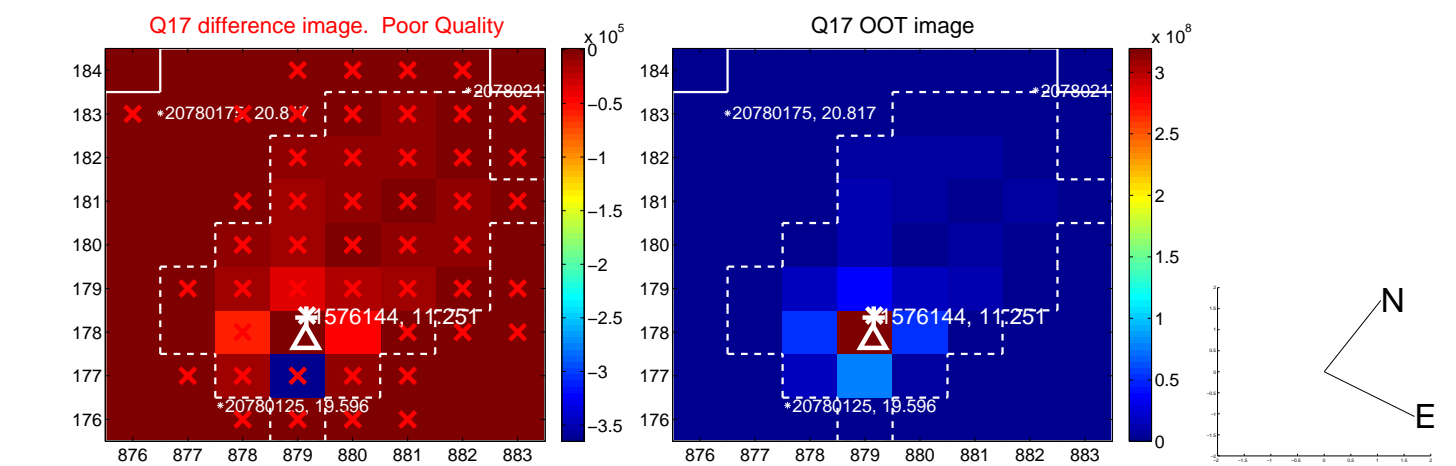
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

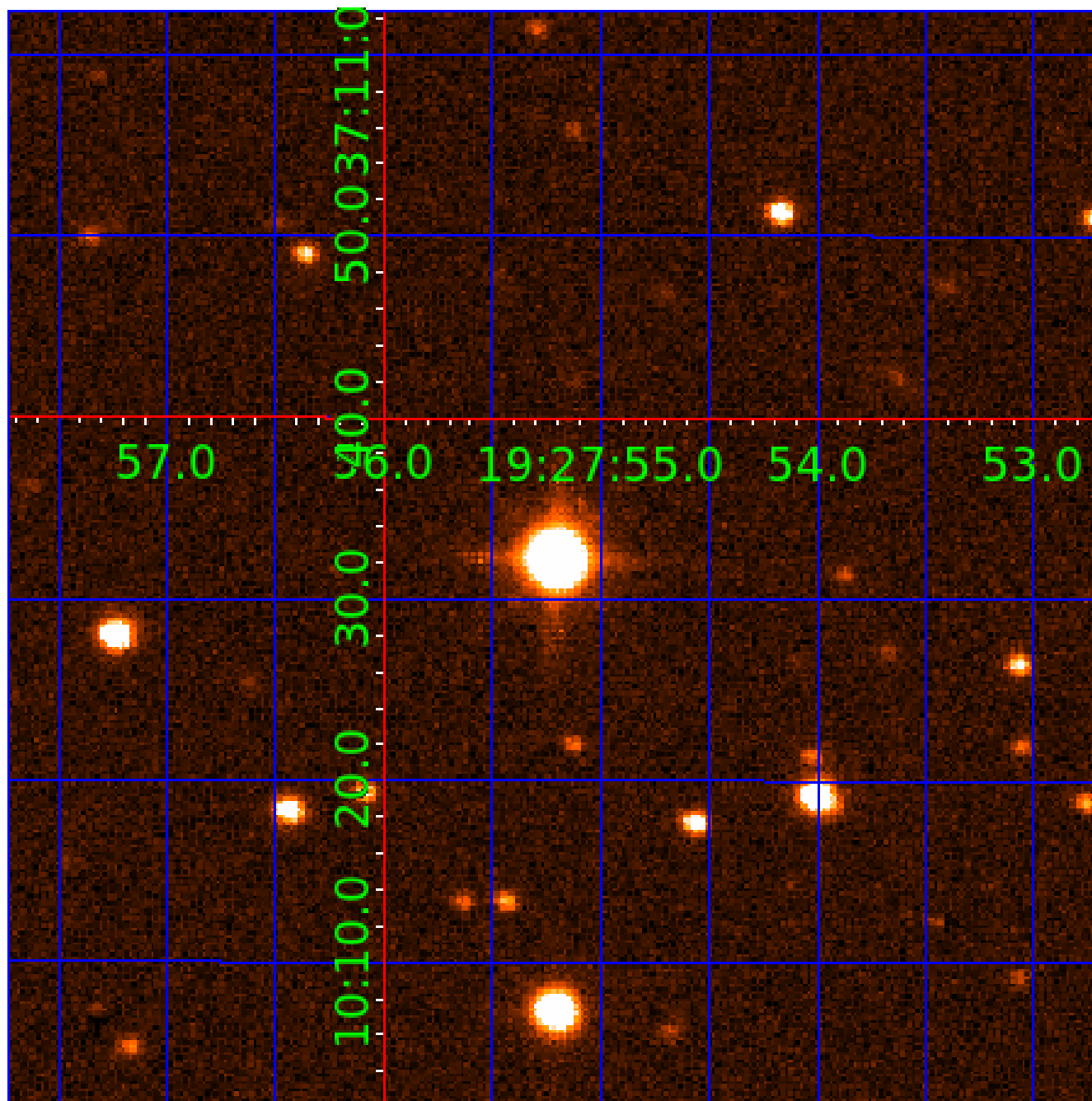


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 001576144

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})
001576144-01	OBS	No	548.743238	406.815173	453.5	6.246	21.3	12.0	2.51	9181	5.80	13.31
001576144-02	OBS	No	2.686670	132.159784	39.6	1.993	14.9	16.1	2.51	9181	1.82	16005.58
001576144-03	OBS	No	2.686662	132.297140	14.3	6.511	12.3	5.5	2.51	9181	1.09	16005.64
001576144-04	OBS	No	498.430874	253.555320	171.7	7.935	10.6	3.5	2.51	9181	3.52	15.13
001576144-05	OBS	No	459.770198	286.410016	548.0	5.054	11.4	9.6	2.51	9181	10.80	16.85
001576144-06	OBS	No	376.172555	248.855737	416.9	4.591	9.3	10.0	2.51	9181	8.82	22.01
001576144-07	OBS	No	543.091418	407.375363	248.7	10.645	8.9	8.6	2.51	9181	4.26	13.49
001576144-08	OBS	No	197.220930	210.992354	206.7	9.324	9.0	8.6	2.51	9181	4.28	52.07

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001576144-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
001576144-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—CENT_SATURATED
001576144-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—SAME_NTL_PERIOD—CENT_SATURATED
001576144-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED—HALO_GHOST
001576144-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-08	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED—HALO_GHOST

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

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

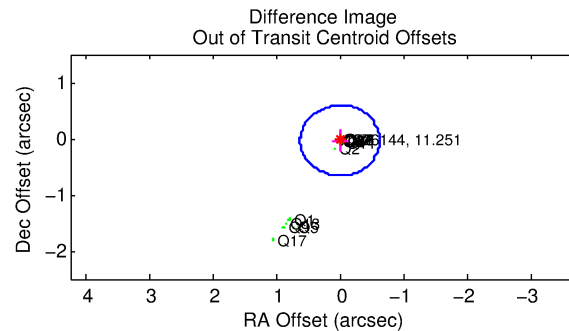
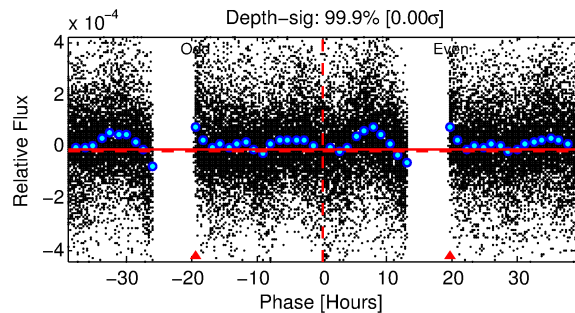
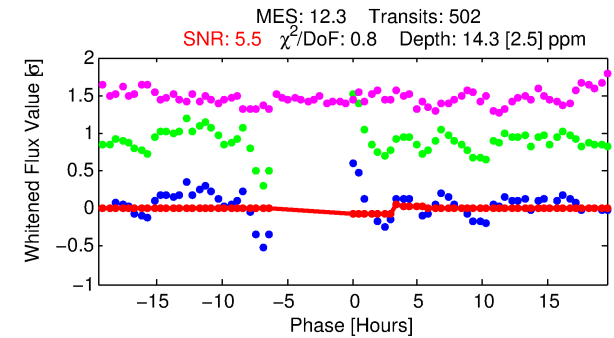
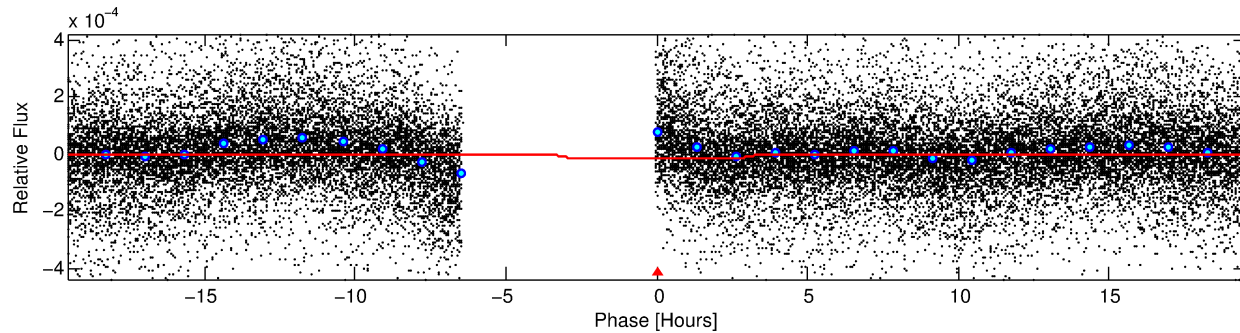
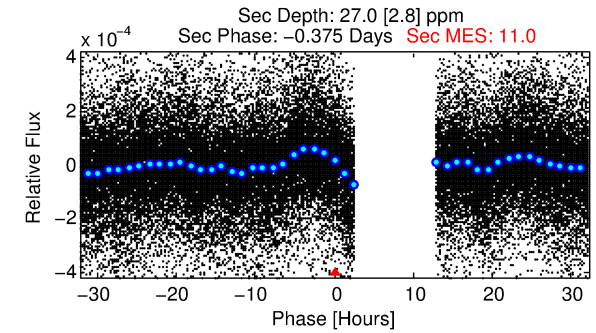
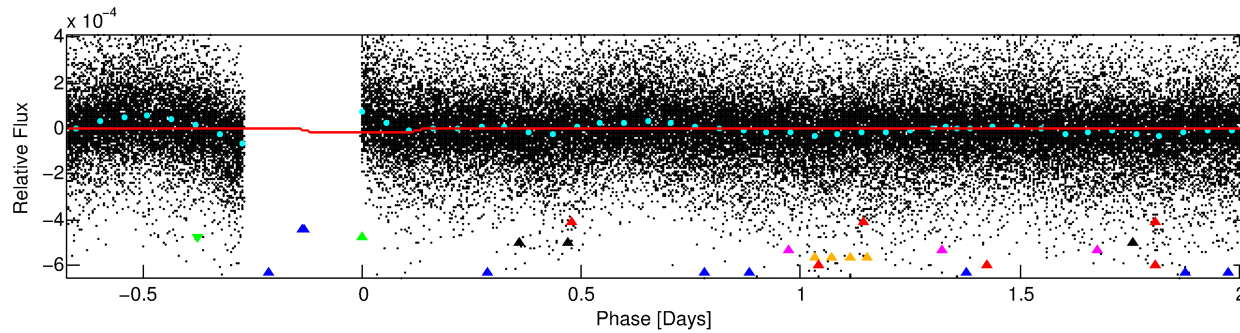
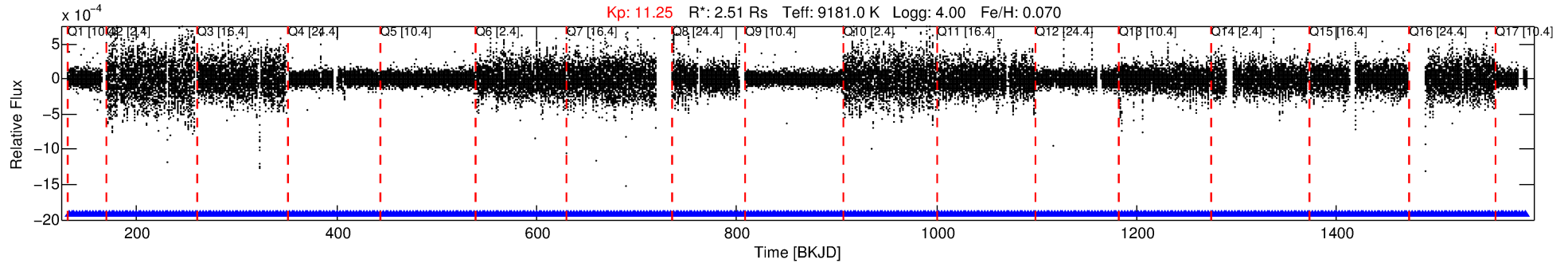
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 001576144-03

No Significant Match Found

DV One-Page Summary

KIC: 1576144 Candidate: 3 of 8 Period: 2.687 d



DV Fit Results:

Period = 2.68666 [0.00004] d
Epoch = 132.2971 [0.0234] BKJD
Rp/R* = 0.0040 [0.0010]
a/R* = 1.68 [1.96]
b = 0.90 [0.36]
Seff = 16005.64 [7550.77]
Teq = 2868 [338] K
Rp = 1.09 [0.48] Re
a = 0.0500 [0.0151] AU
Ag = 31.16 [20.80] [1.45σ]
Teffp = 10477 [1419] K [5.2σ]

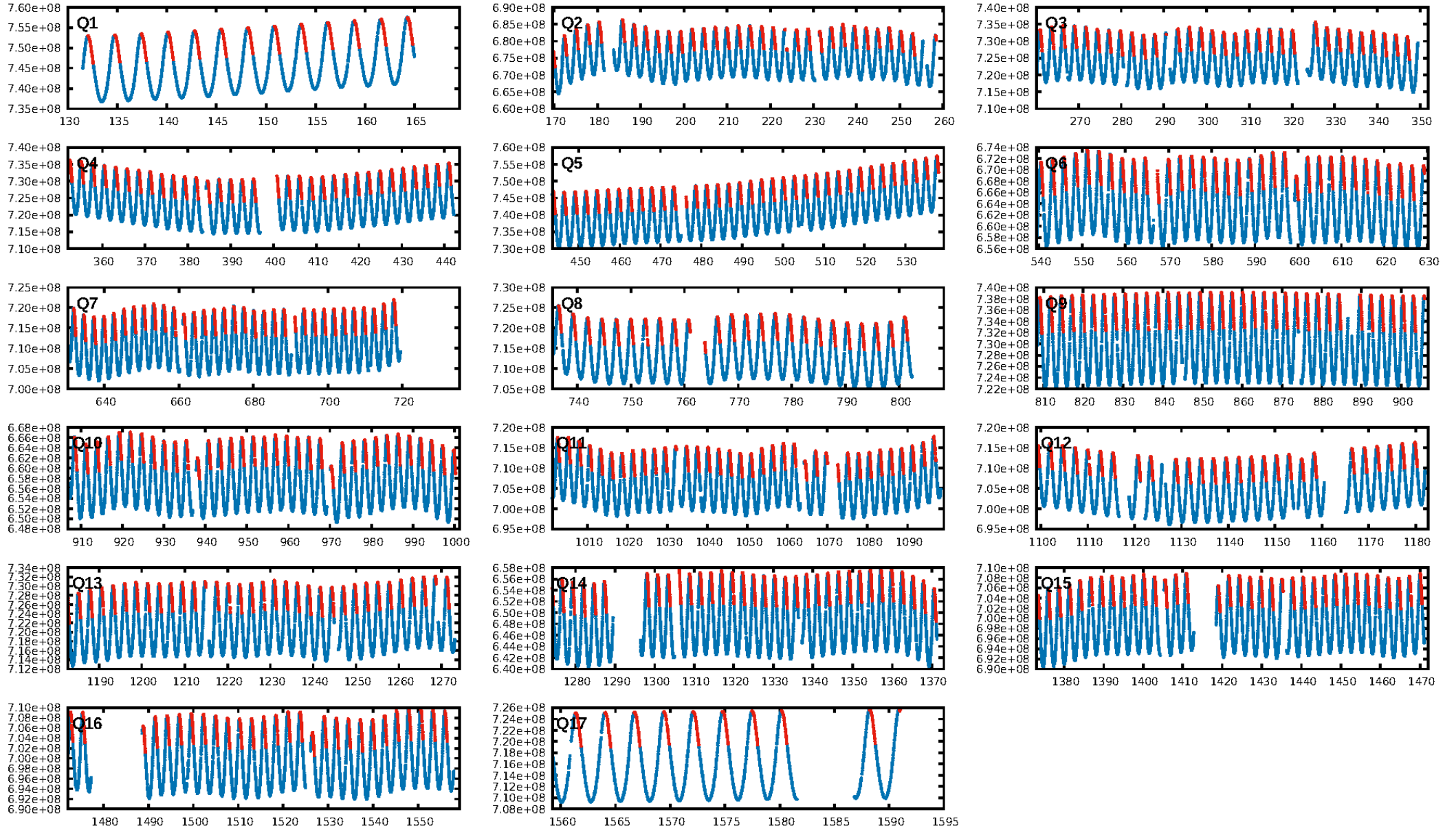
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 9.67e-29
RollingBand-fgt: 1.00 [480/480]
GhostDiagnostic-chr: 14.18
Centroid-sig: N/A
Centroid-so: 1.844 arcsec [1.10σ]
OotOffset-rm: 0.036 arcsec [0.17σ]
KicOffset-rm: 0.411 arcsec [1.58σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.00 [0/17]
DiffImageOverlap-fno: 0.00 [0/17]

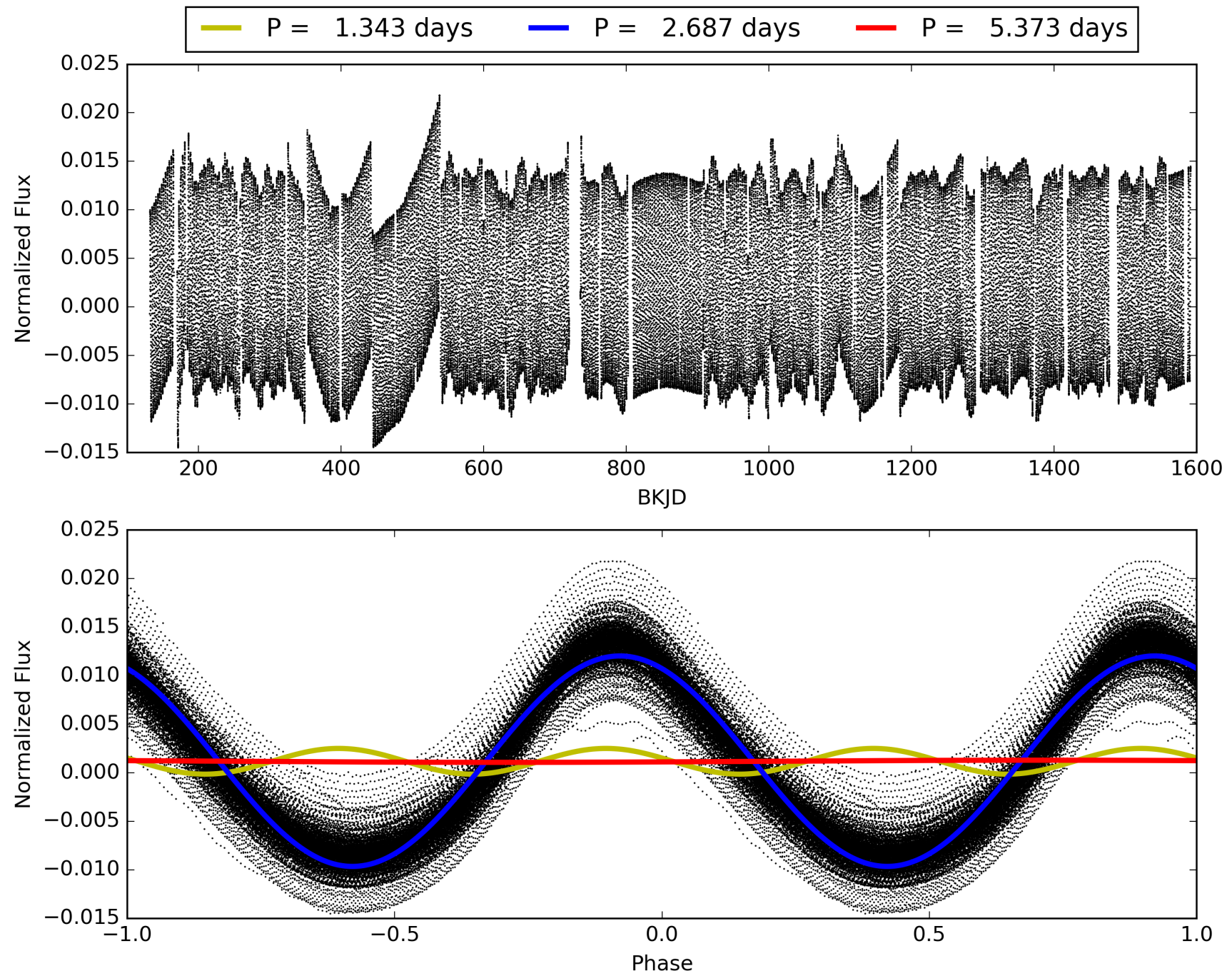
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:50:59 Z

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

TCE 001576144-03, PDC Light Curves

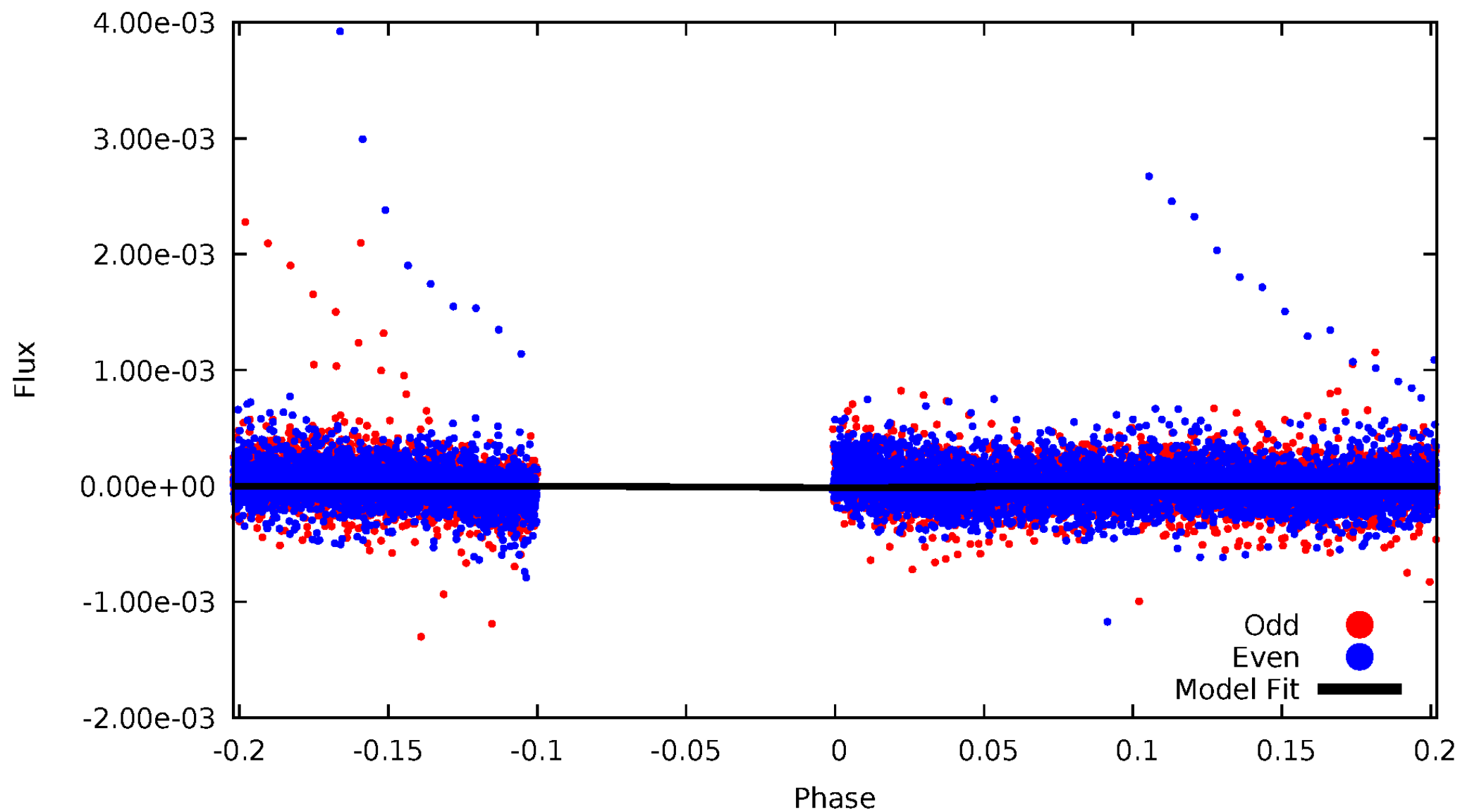


TCE 001576144-03



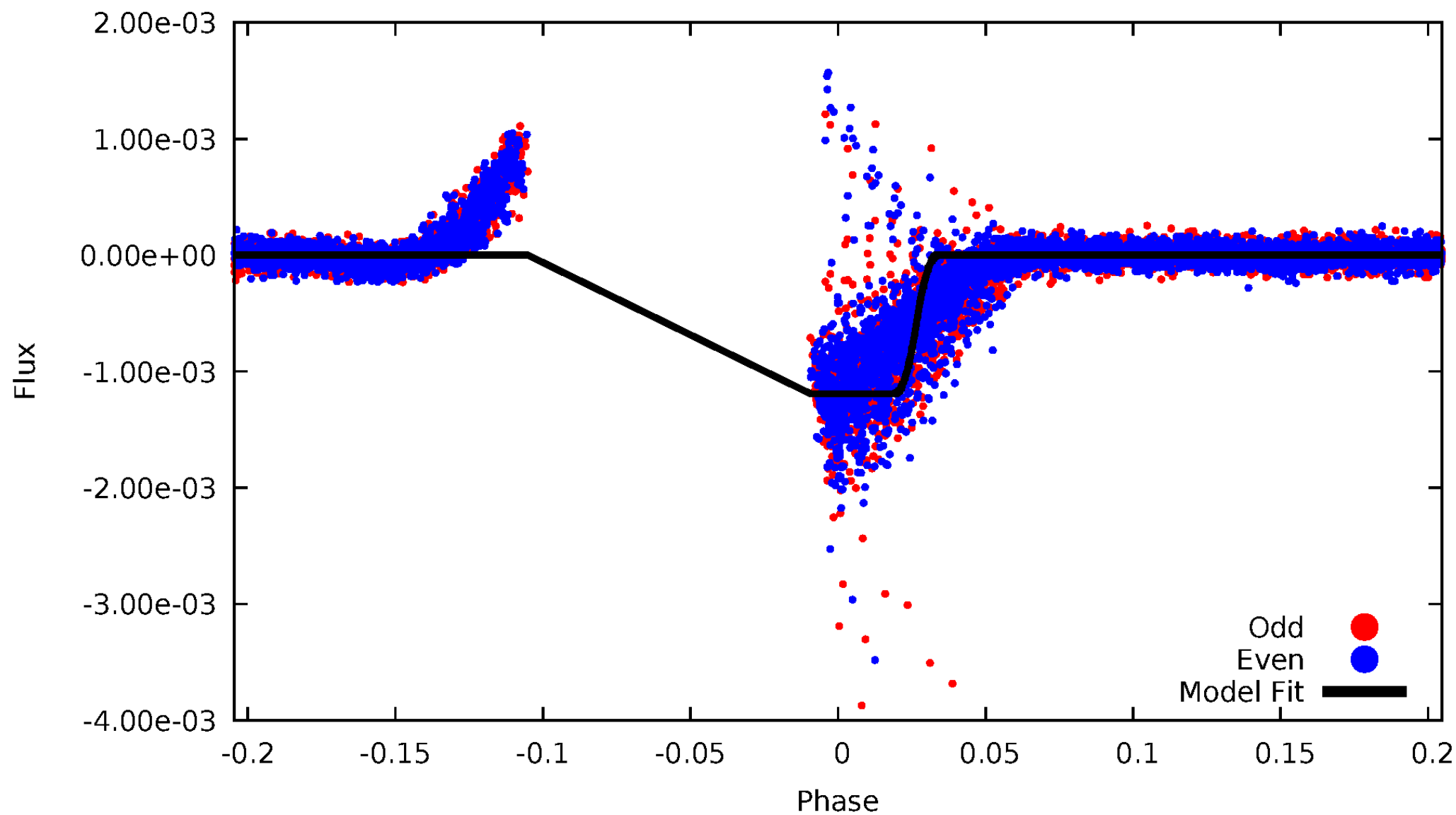
DV Odd/Even

TCE 001576144-03



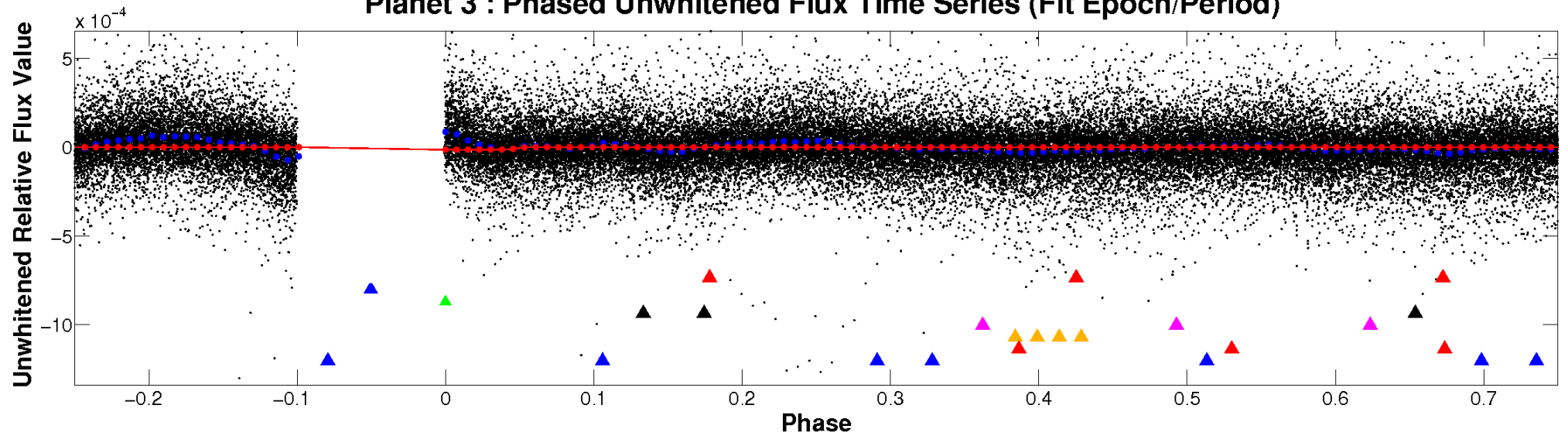
ALT Odd/Even

TCE 001576144-03

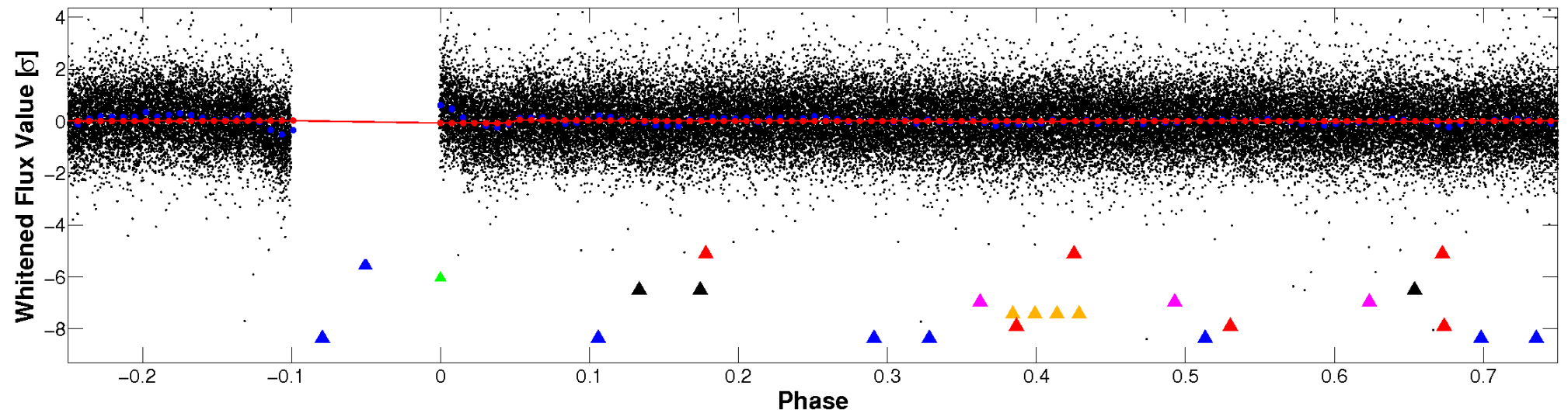


Non-Whitened Vs. Whitened Light Curve

Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

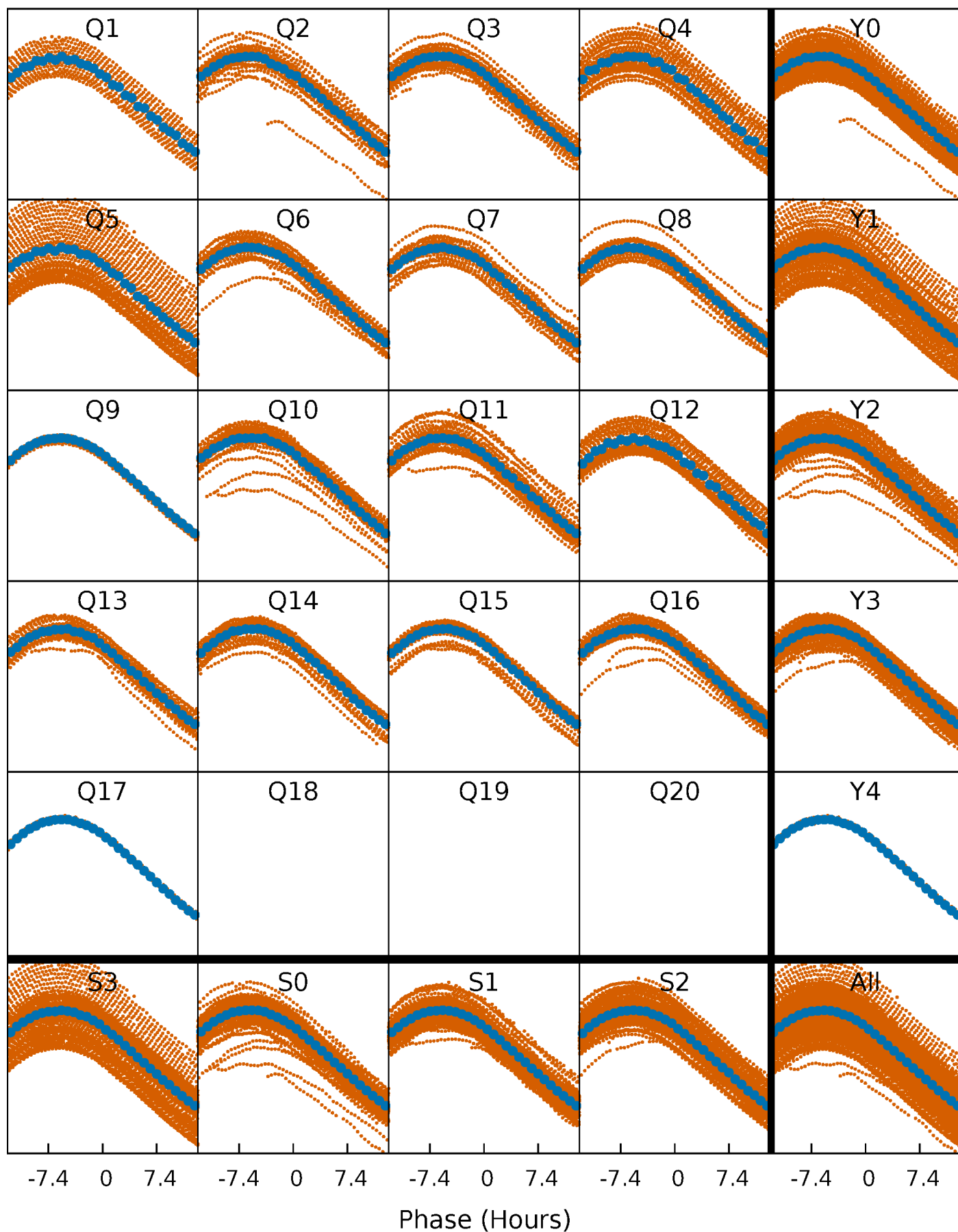


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



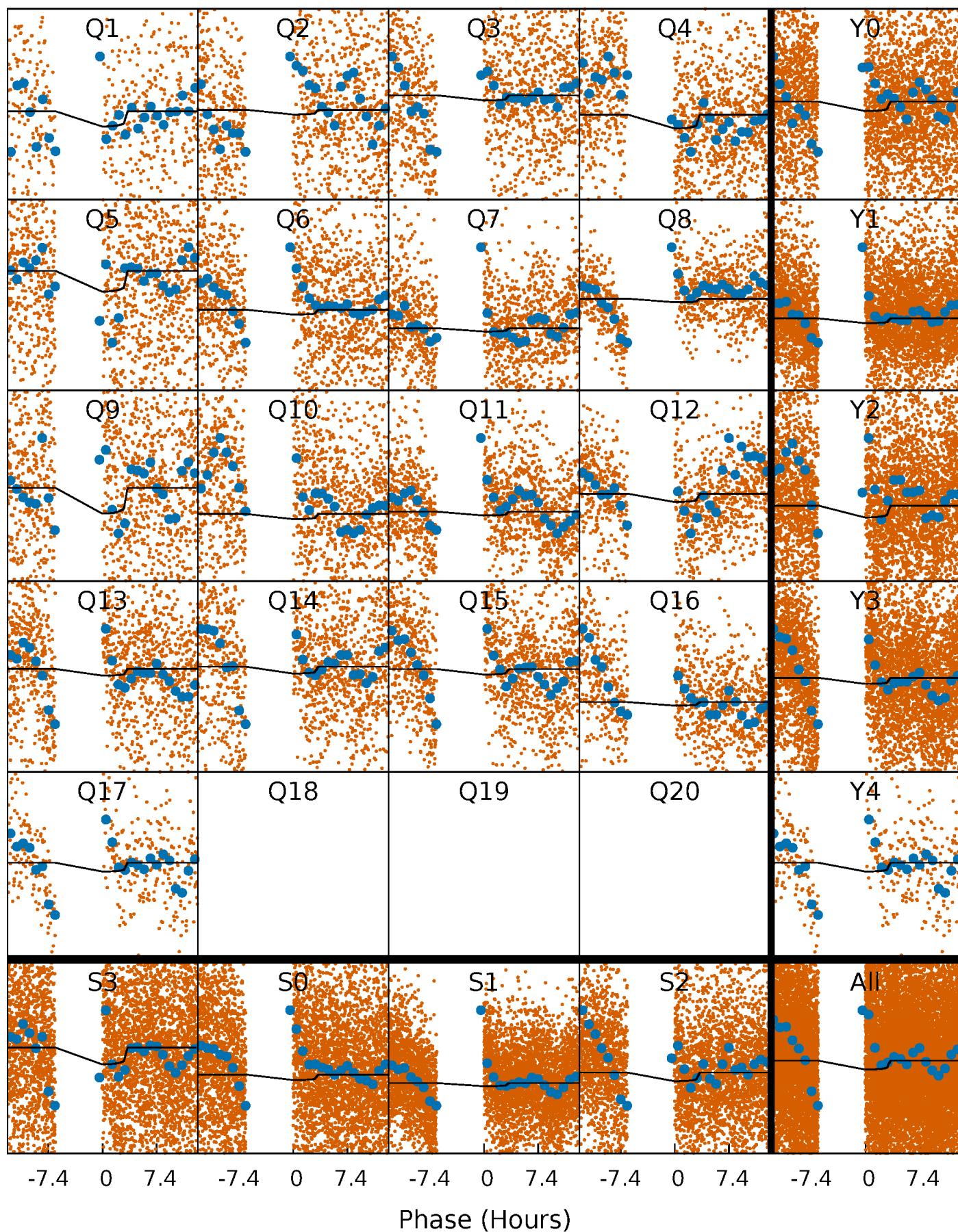
PDC Quarter-Phased Transit Curves

TCE 001576144-03 P= 2.686662 Days $T_0=132.297140$ (BKJD)



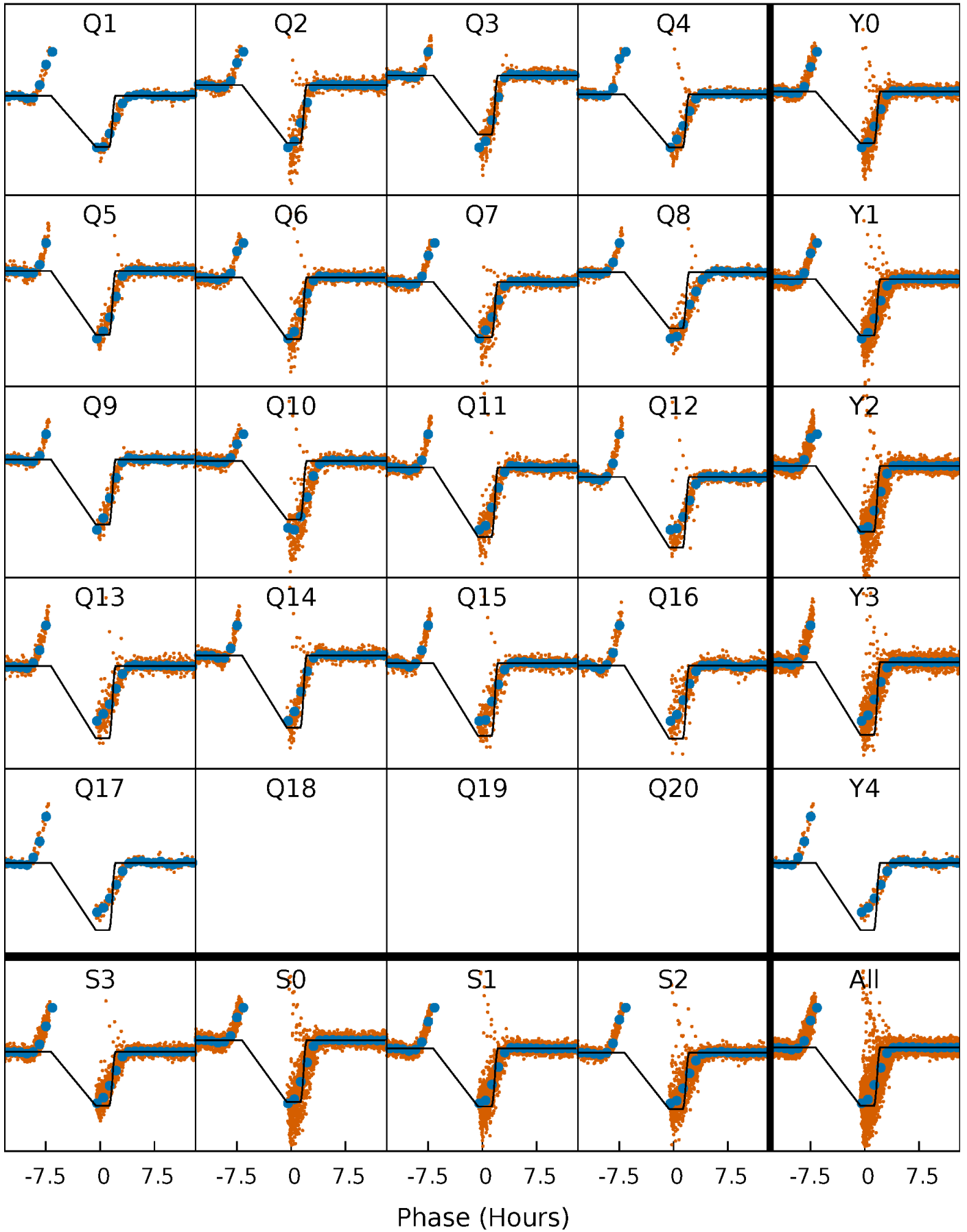
DV Quarter-Phased Transit Curves

TCE 001576144-03 P= 2.686662 Days $T_0=132.297140$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

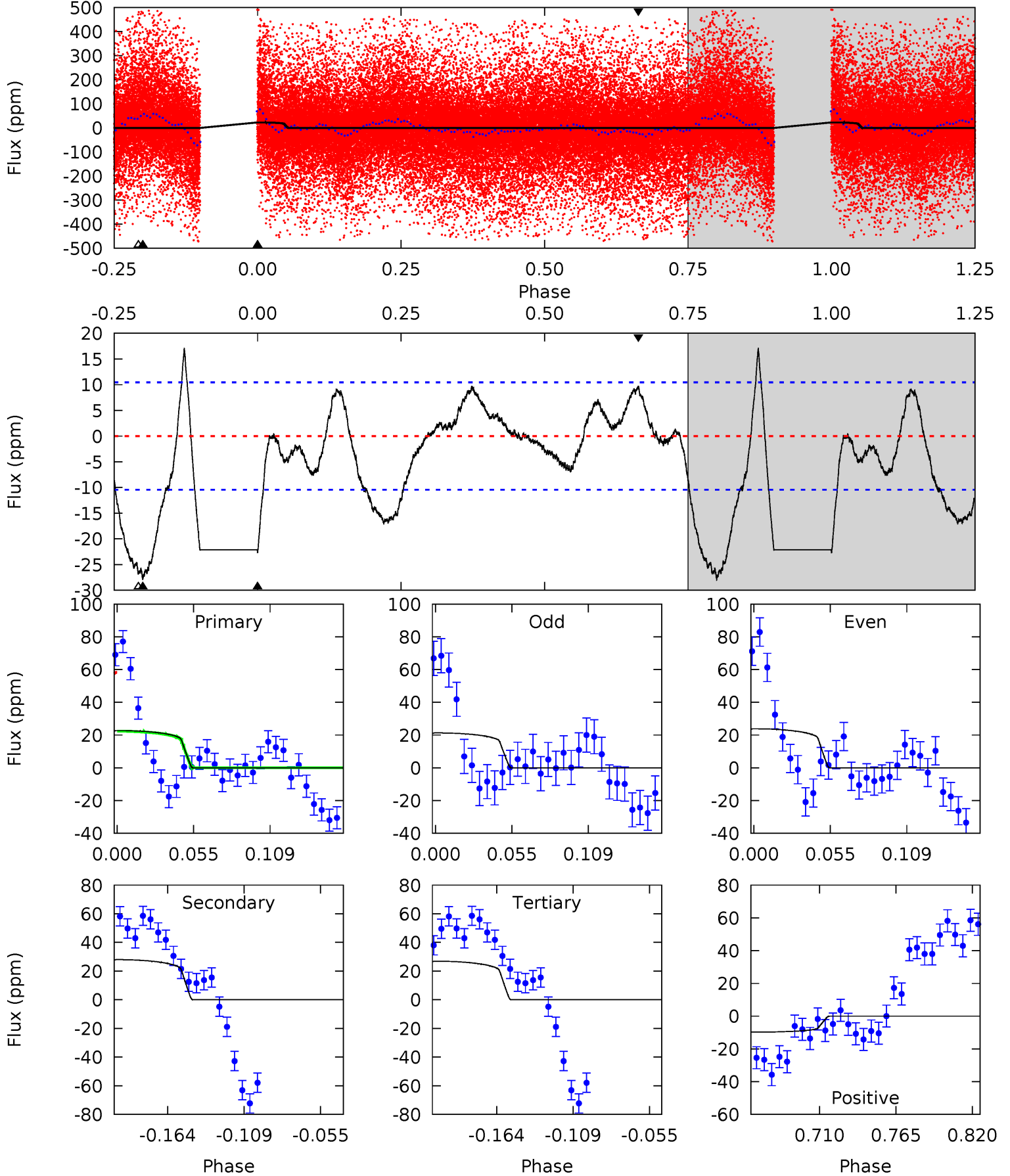
TCE 001576144-03 P= 2.686695 Days $T_0=132.306694$ (BKJD)



DV Model-Shift Uniqueness Test

001576144-03, P = 2.686662 Days, E = 129.610478 Days

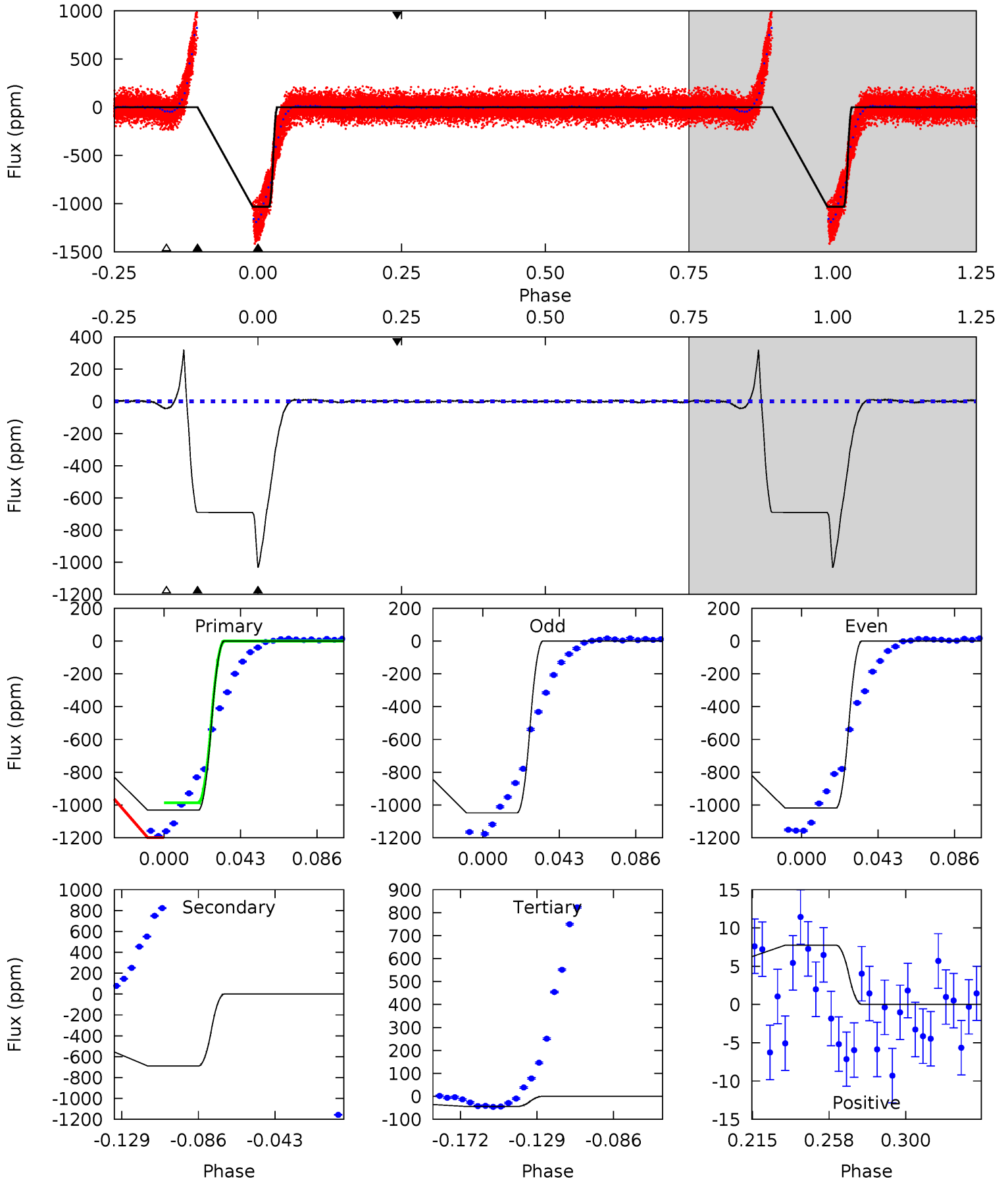
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.2	12.6	12.1	4.38	4.69	1.92	3.69	-1.87	5.83	0.49	8.19	0.57	4.91	0.38	1.09



Alt Model-Shift Uniqueness Test

001576144-03, P = 2.686695 Days, E = 129.619999 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
736.0	491.9	31.5	5.53	4.74	2.02	18.0	704.5	730.5	460.4	486.4	10.4	1.00	0.24	0



Stellar Parameters For KIC 001576144

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	9181^{+251}_{-430}	$4.003^{+0.234}_{-0.156}$	$0.070^{+0.150}_{-0.700}$	$2.507^{+0.743}_{-0.909}$	$2.308^{+0.361}_{-0.721}$	$0.206^{+0.334}_{-0.097}$
	+3%/-5%	+6%/-4%	+214%/-1000%	+30%/-36%	+16%/-31%	+162%/-47%
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 001576144-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-28 ± 2	$1.07^{+0.35}_{-0.30}$	3987^{+304}_{-354}	11247^{+2746}_{-1933}	33^{+29}_{-14}
Alt.	-690 ± 1	$9.27^{+1.44}_{-1.74}$	3934^{+314}_{-356}	7600^{+276}_{-310}	11^{+5}_{-2}

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

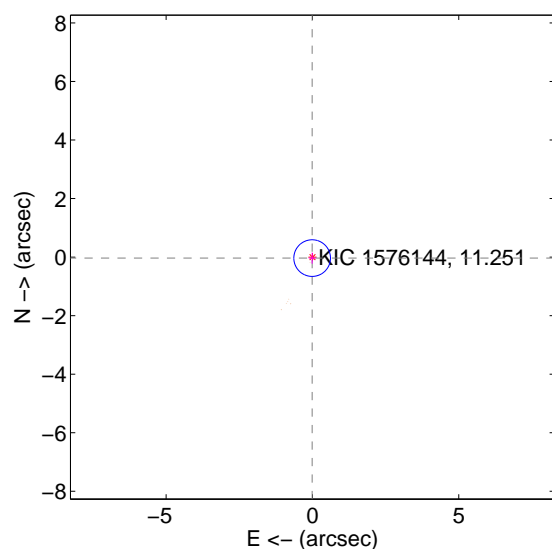
Supplemental centroid analysis for 001576144-03. **Kepler magnitude: 11.25.** Transit SNR 5.54

There are 0 quarters with good PRF difference image offsets

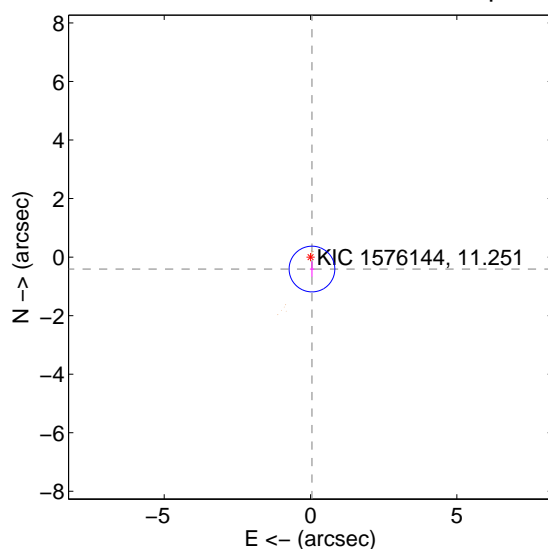
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.036 ± 0.209	0.17	0.010 ± 0.119	-0.034 ± 0.190
PRF-fit source offset from KIC position	0.411 ± 0.260	1.58	-0.049 ± 0.072	-0.408 ± 0.262
photometric centroid source offset	1.84 ± 1.68	1.10	-0.90 ± 1.20	-1.61 ± 1.81

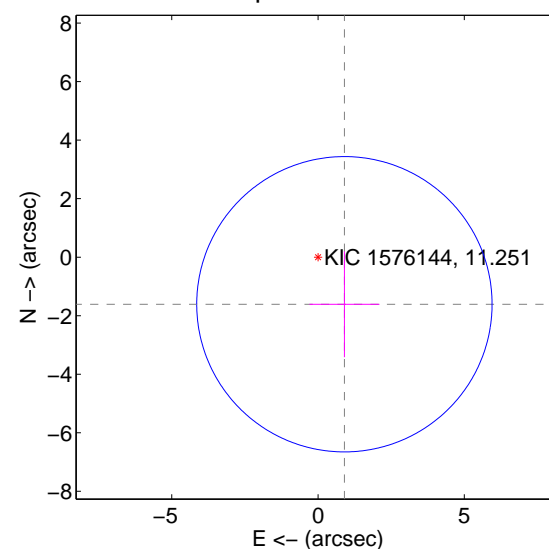
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

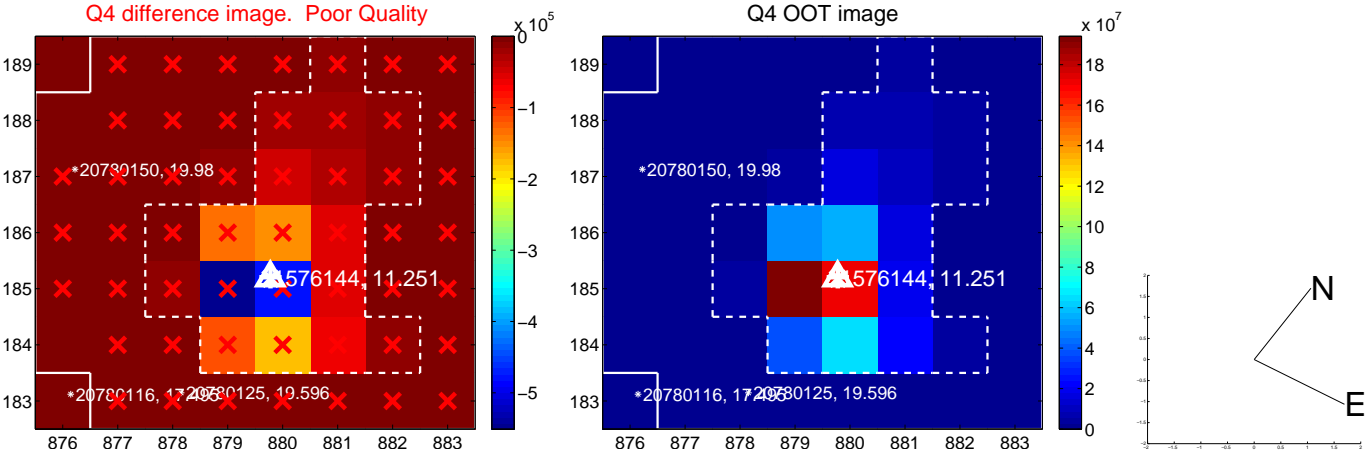
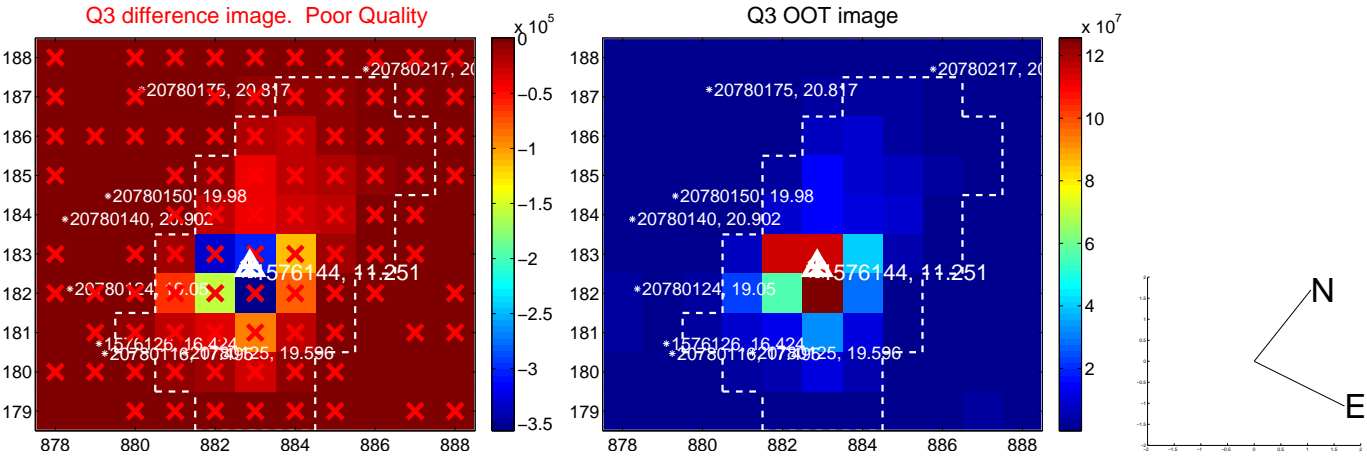
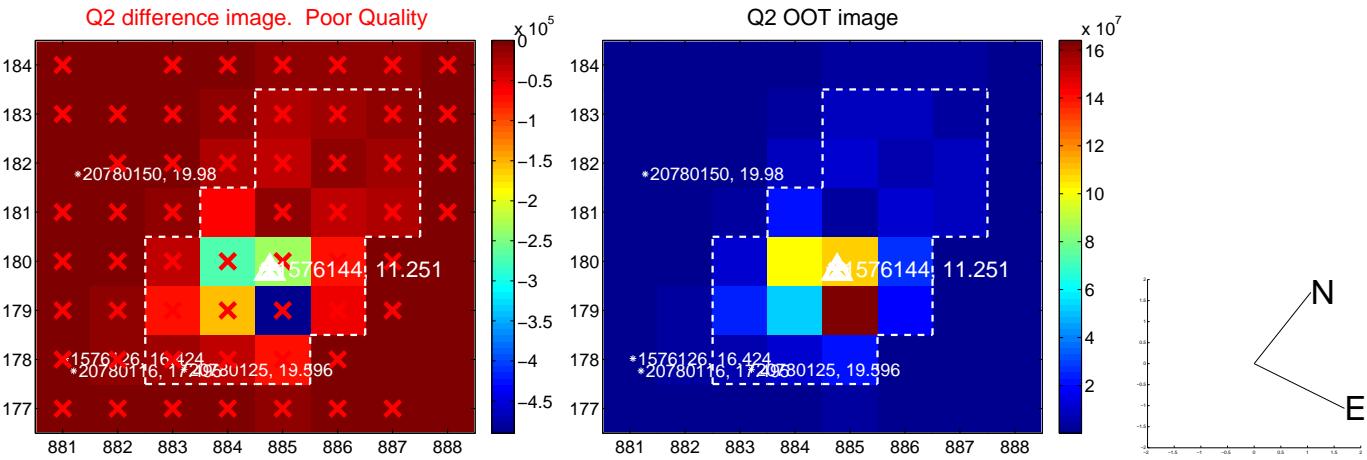
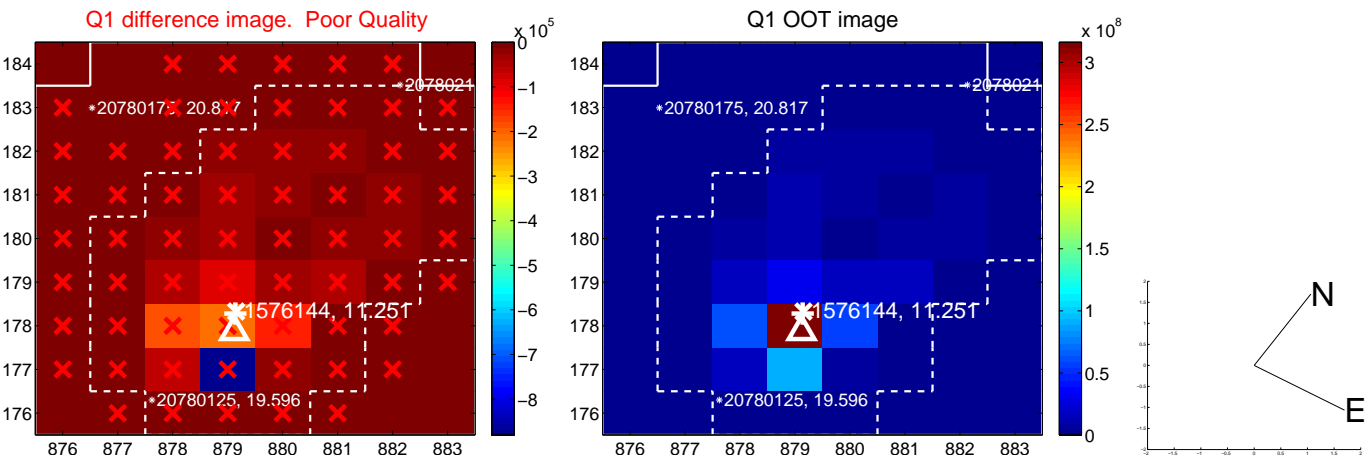


offset from photometric centroids

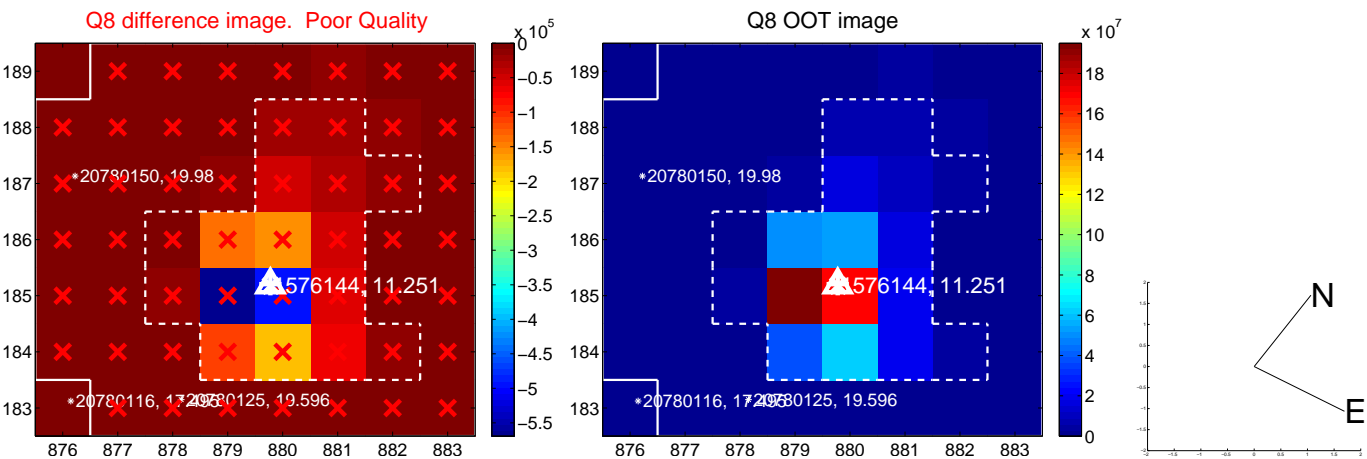
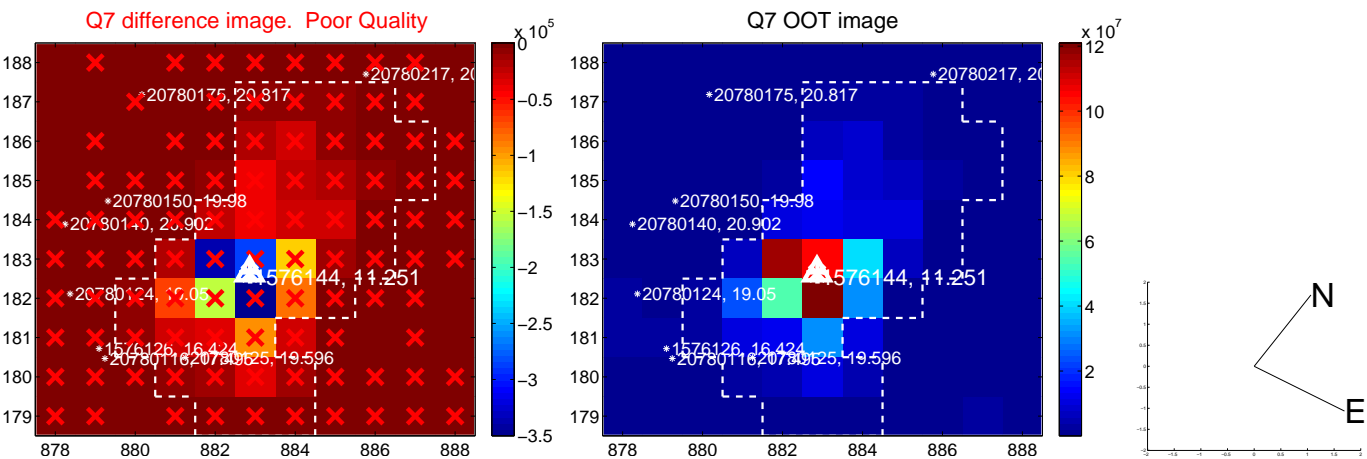
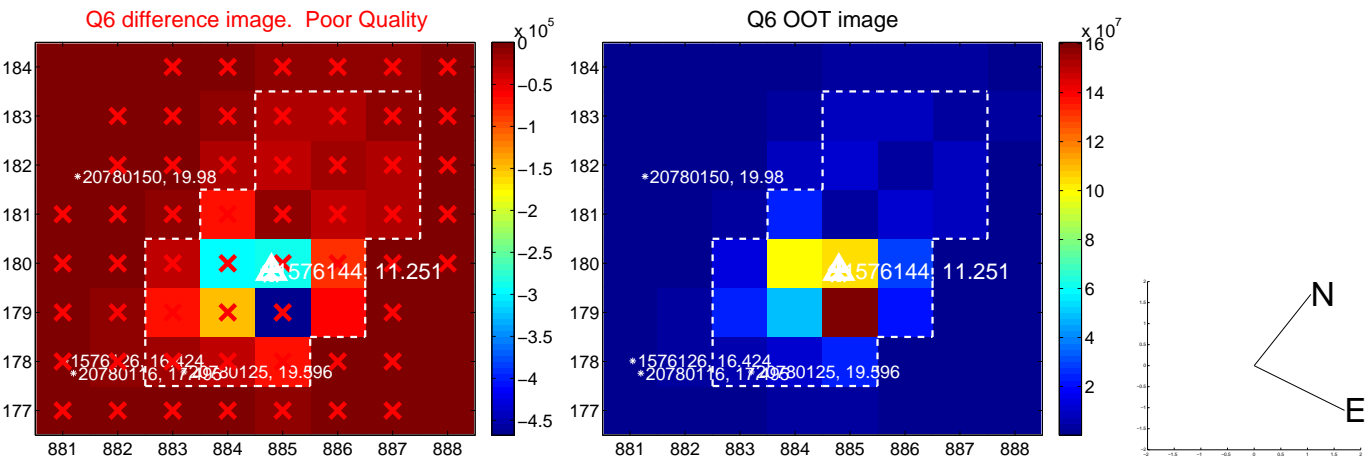
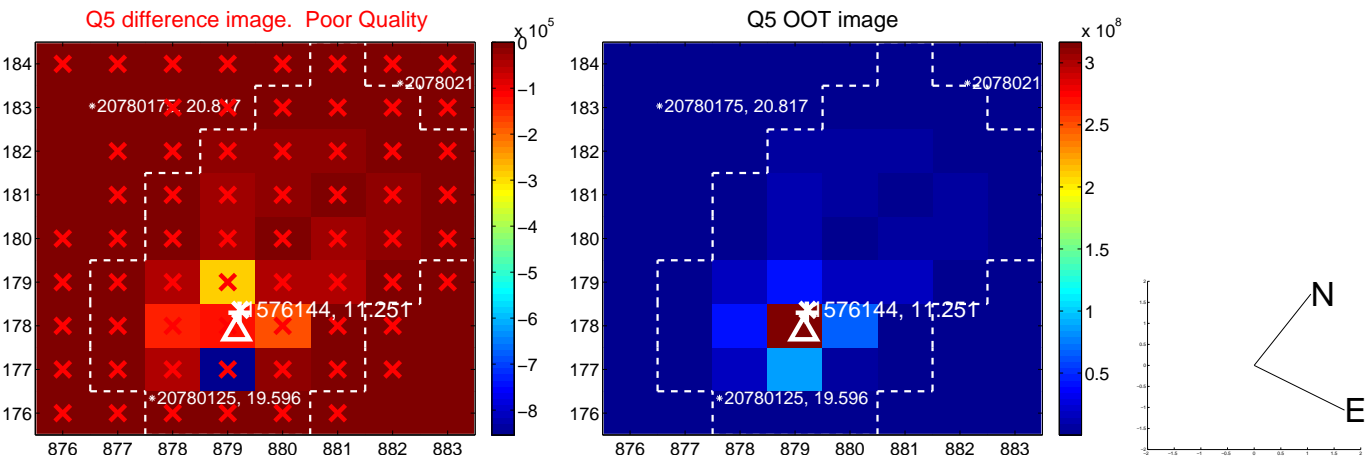


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

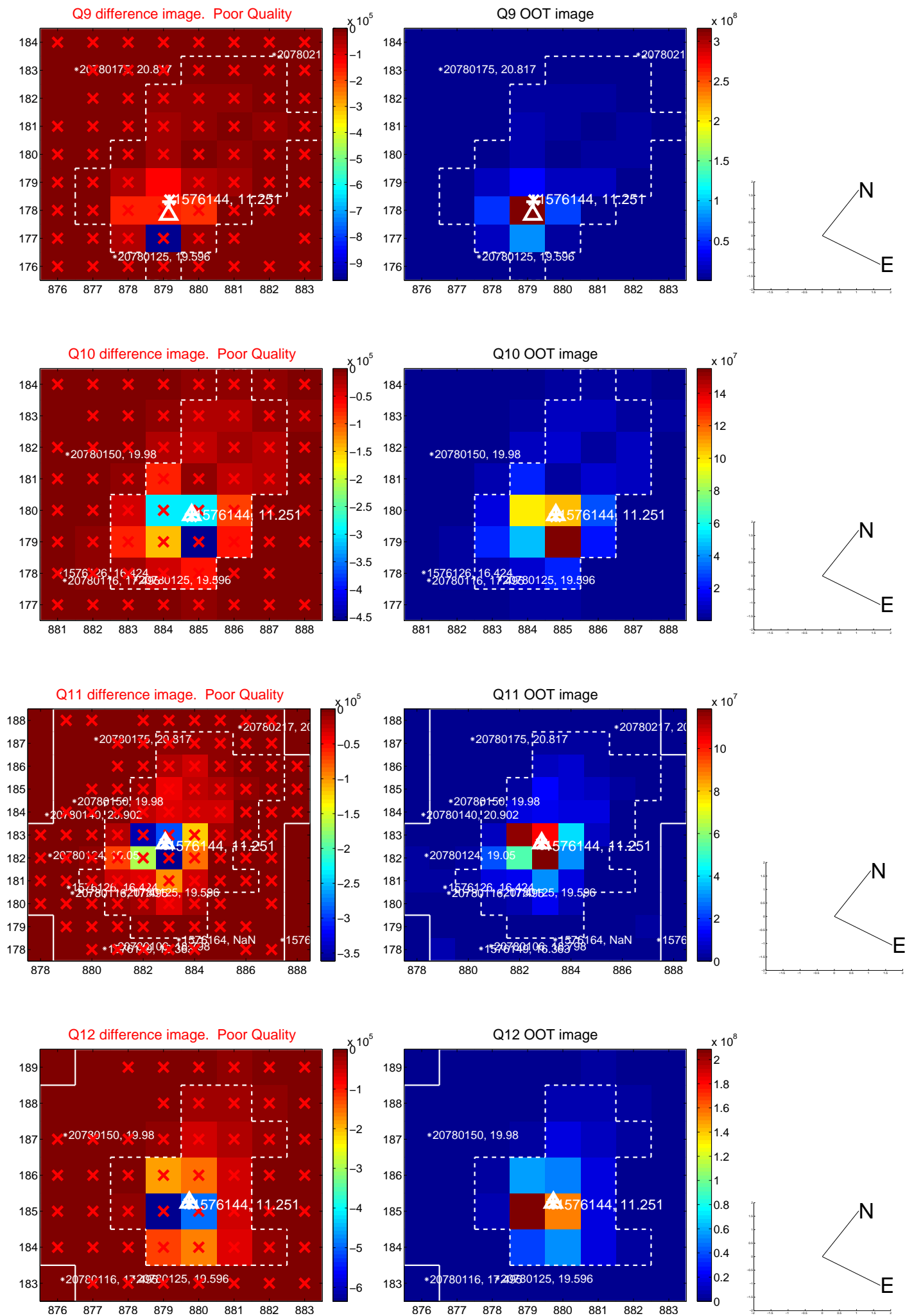
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



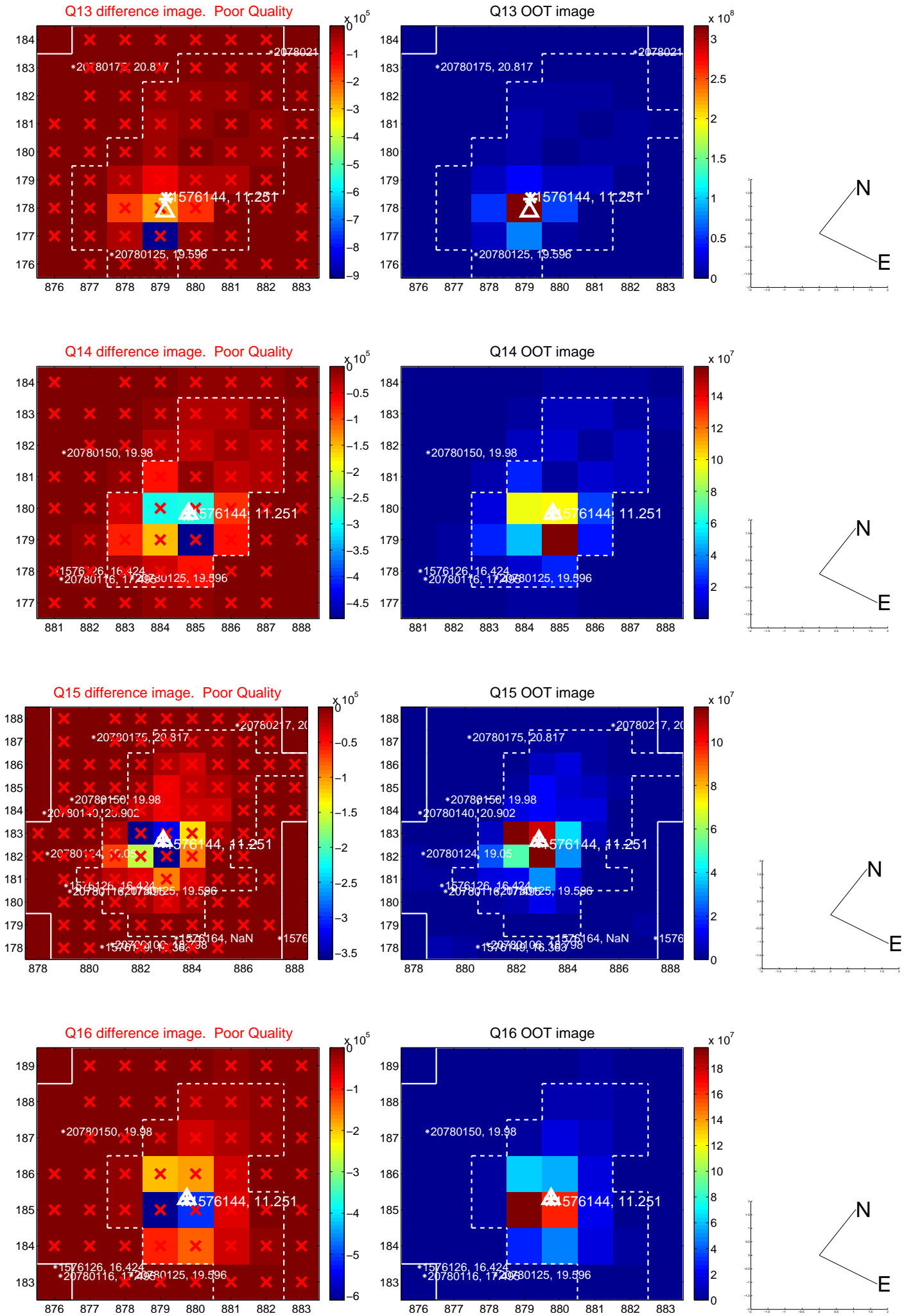
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



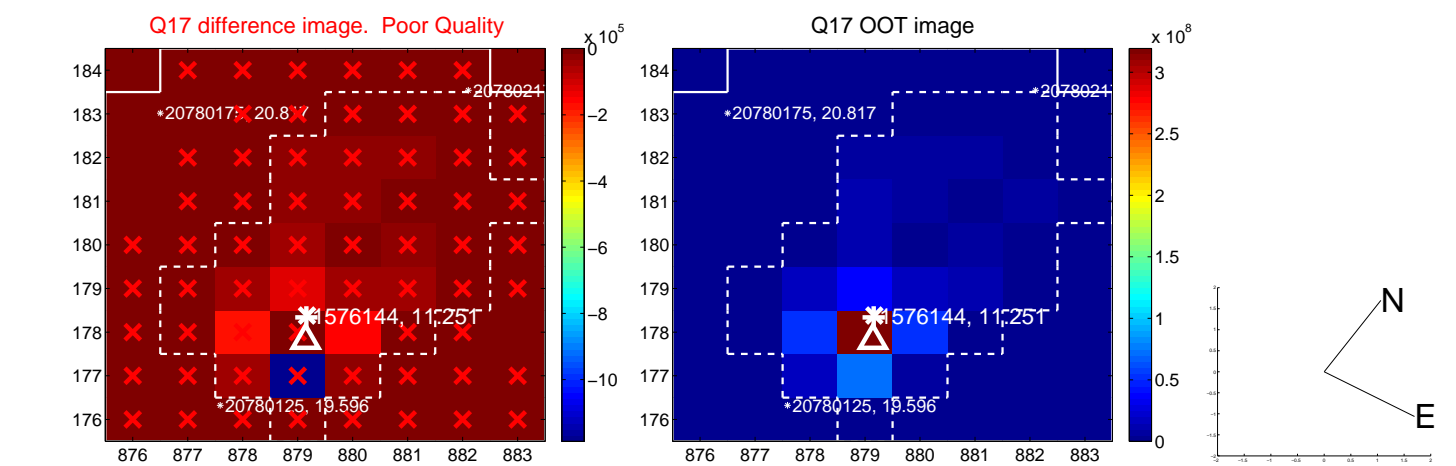
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



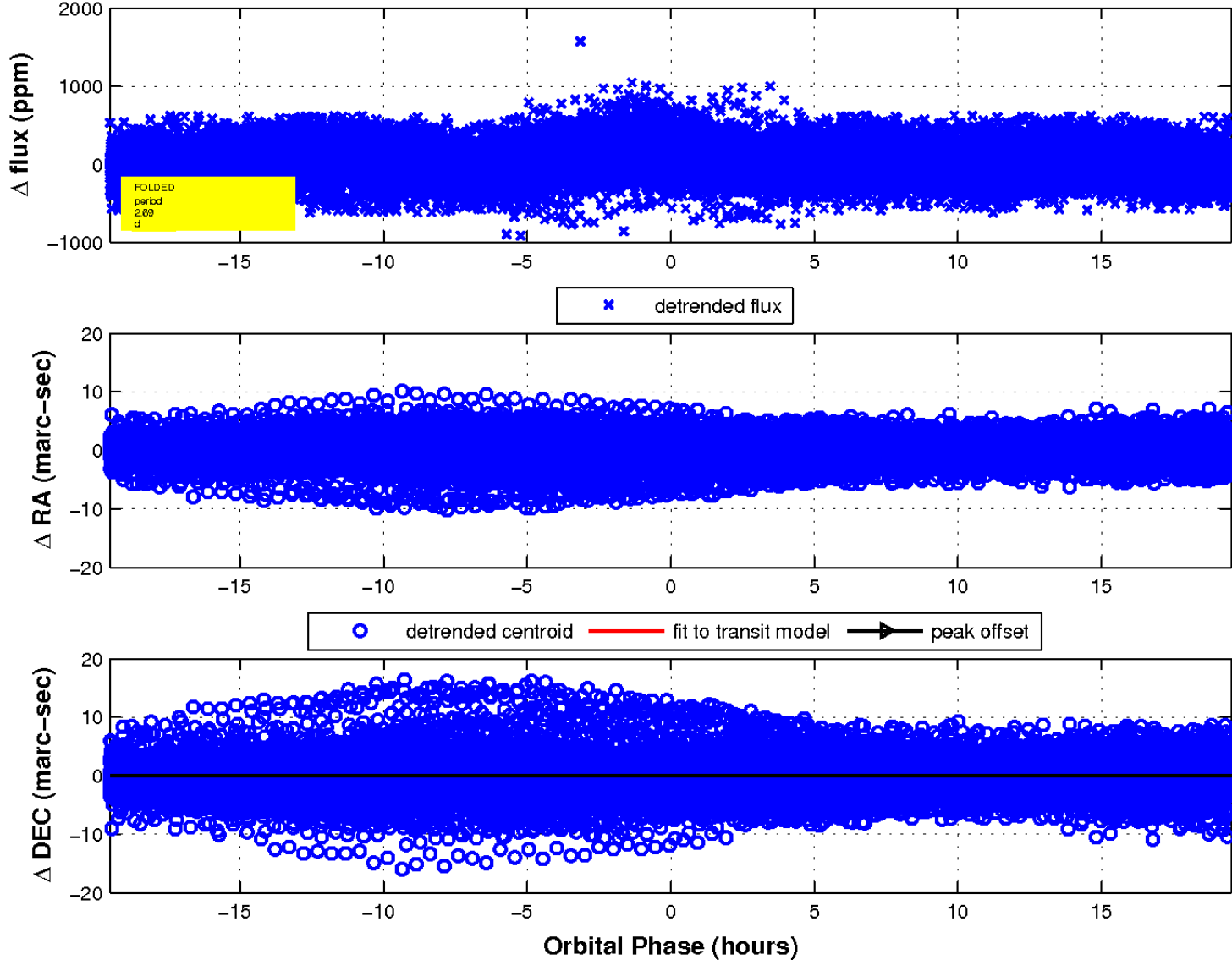
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

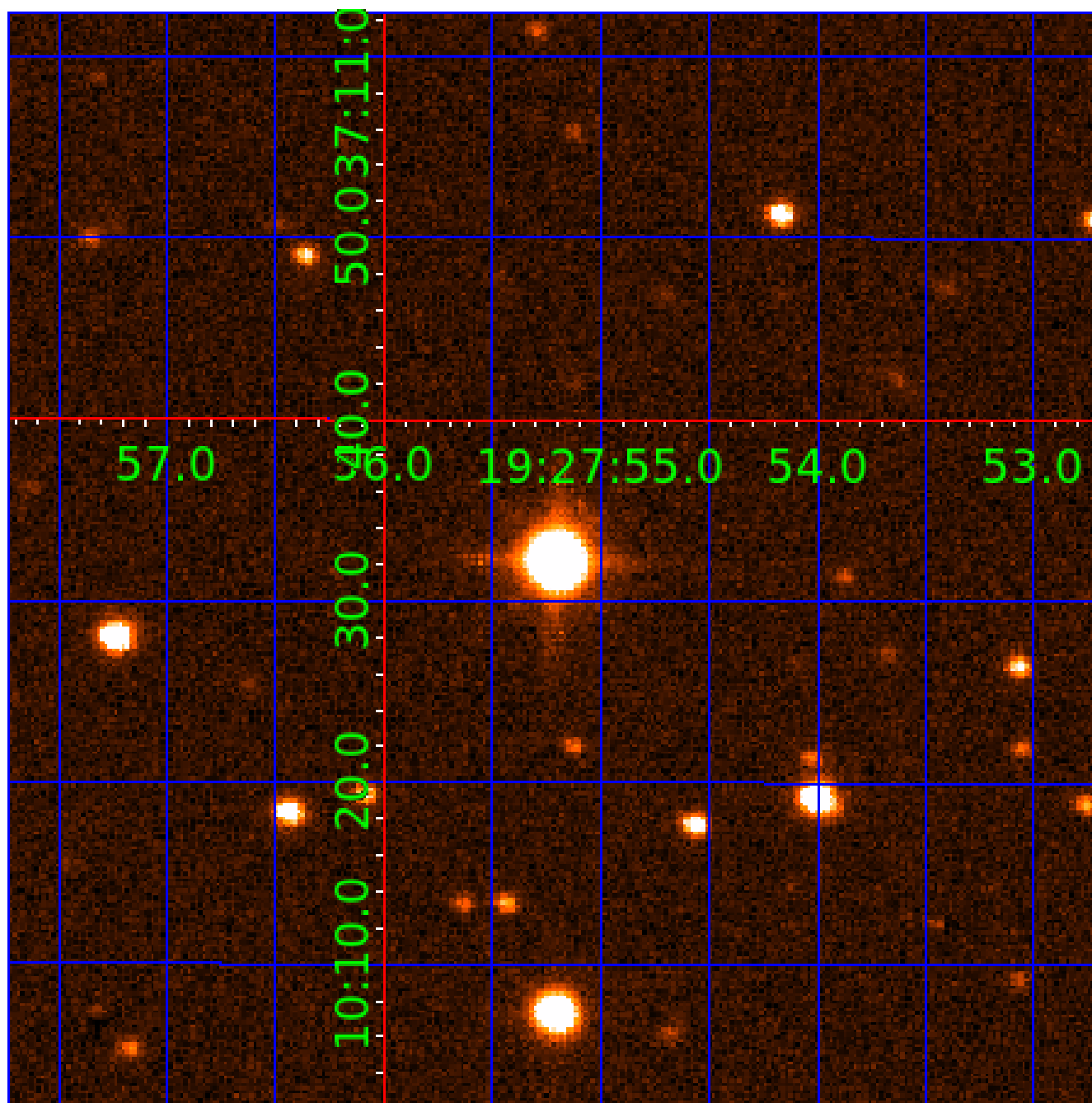


fluxWeightedCentroids, Planet 3 of 8



UKIRT Image

Declination



KIC 001576144

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})
001576144-01	OBS	No	548.743238	406.815173	453.5	6.246	21.3	12.0	2.51	9181	5.80	13.31
001576144-02	OBS	No	2.686670	132.159784	39.6	1.993	14.9	16.1	2.51	9181	1.82	16005.58
001576144-03	OBS	No	2.686662	132.297140	14.3	6.511	12.3	5.5	2.51	9181	1.09	16005.64
001576144-04	OBS	No	498.430874	253.555320	171.7	7.935	10.6	3.5	2.51	9181	3.52	15.13
001576144-05	OBS	No	459.770198	286.410016	548.0	5.054	11.4	9.6	2.51	9181	10.80	16.85
001576144-06	OBS	No	376.172555	248.855737	416.9	4.591	9.3	10.0	2.51	9181	8.82	22.01
001576144-07	OBS	No	543.091418	407.375363	248.7	10.645	8.9	8.6	2.51	9181	4.26	13.49
001576144-08	OBS	No	197.220930	210.992354	206.7	9.324	9.0	8.6	2.51	9181	4.28	52.07

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001576144-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
001576144-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—CENT_SATURATED
001576144-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—SAME_NTL_PERIOD—CENT_SATURATED
001576144-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED—HALO_GHOST
001576144-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-08	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED—HALO_GHOST

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

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

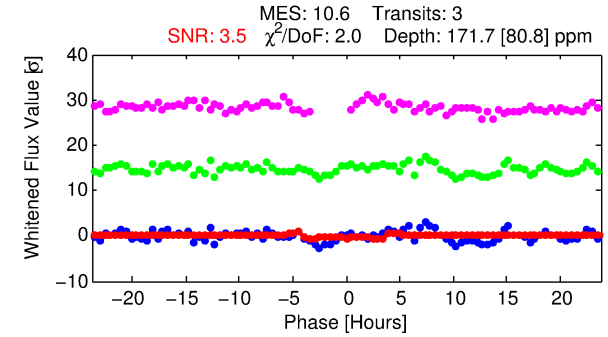
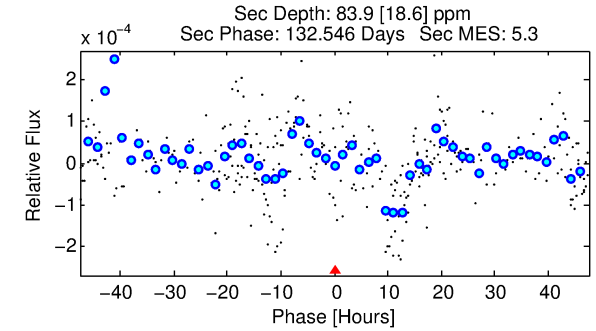
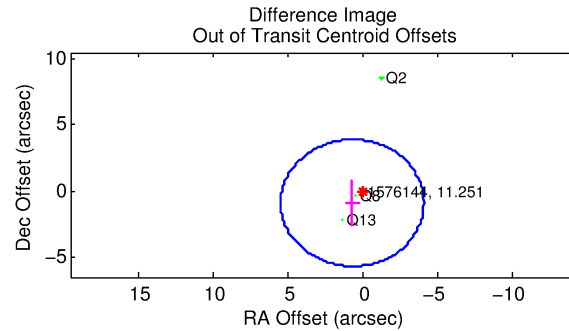
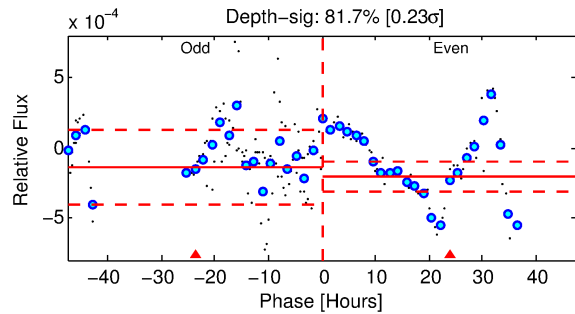
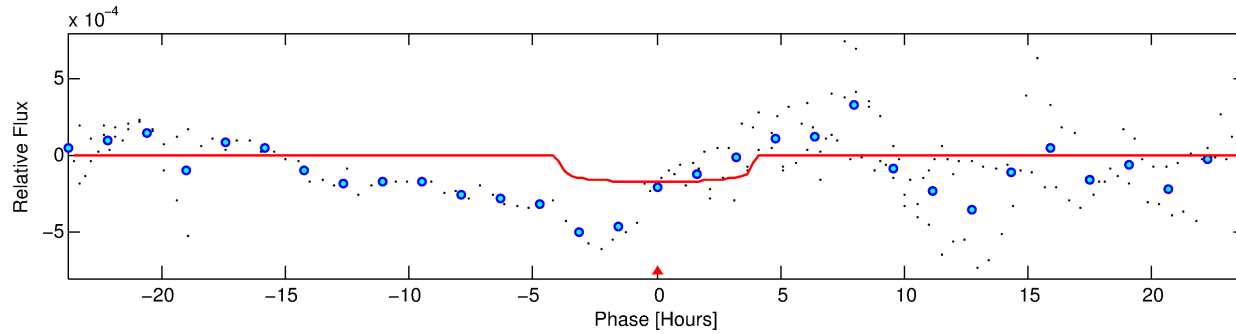
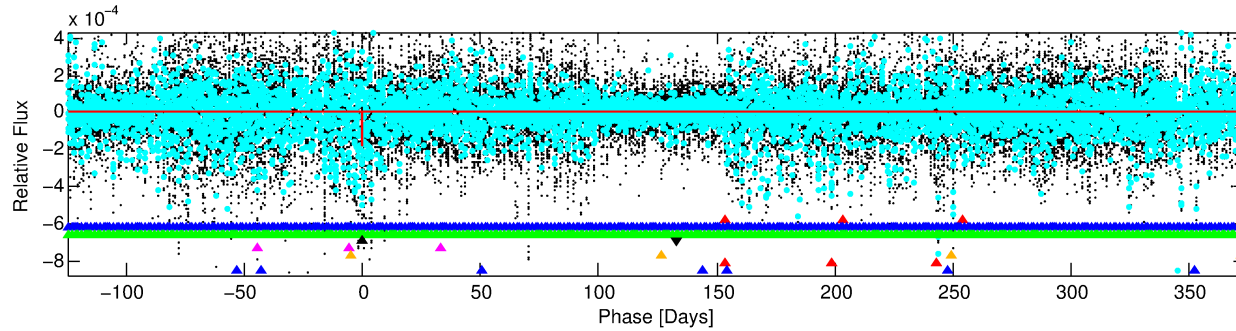
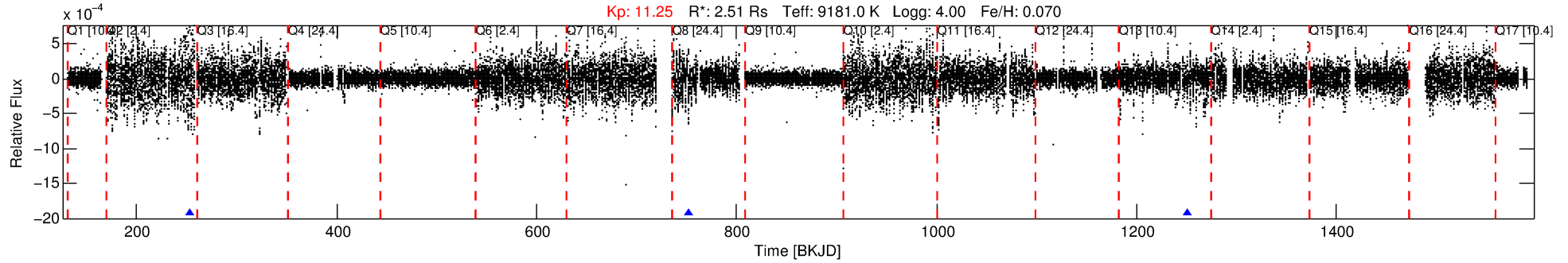
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 001576144-04

No Significant Match Found

DV One-Page Summary

KIC: 1576144 Candidate: 4 of 8 Period: 498.431 d



DV Fit Results:

Period = 498.43087 [0.02512] d
Epoch = 253.5553 [0.0358] BKJD
Rp/R* = 0.0129 [0.0074]
a/R* = 356.87 [1163.89]
b = 0.69 [2.52]
Seff = 15.13 [7.14]
Teff = 503 [59] K
Rp = 3.52 [2.40] Re
a = 1.6263 [0.4898] AU
Ag = 9854.54 [12345.93] [0.80 σ]
Teffp = 7747 [2306] K [3.14 σ]

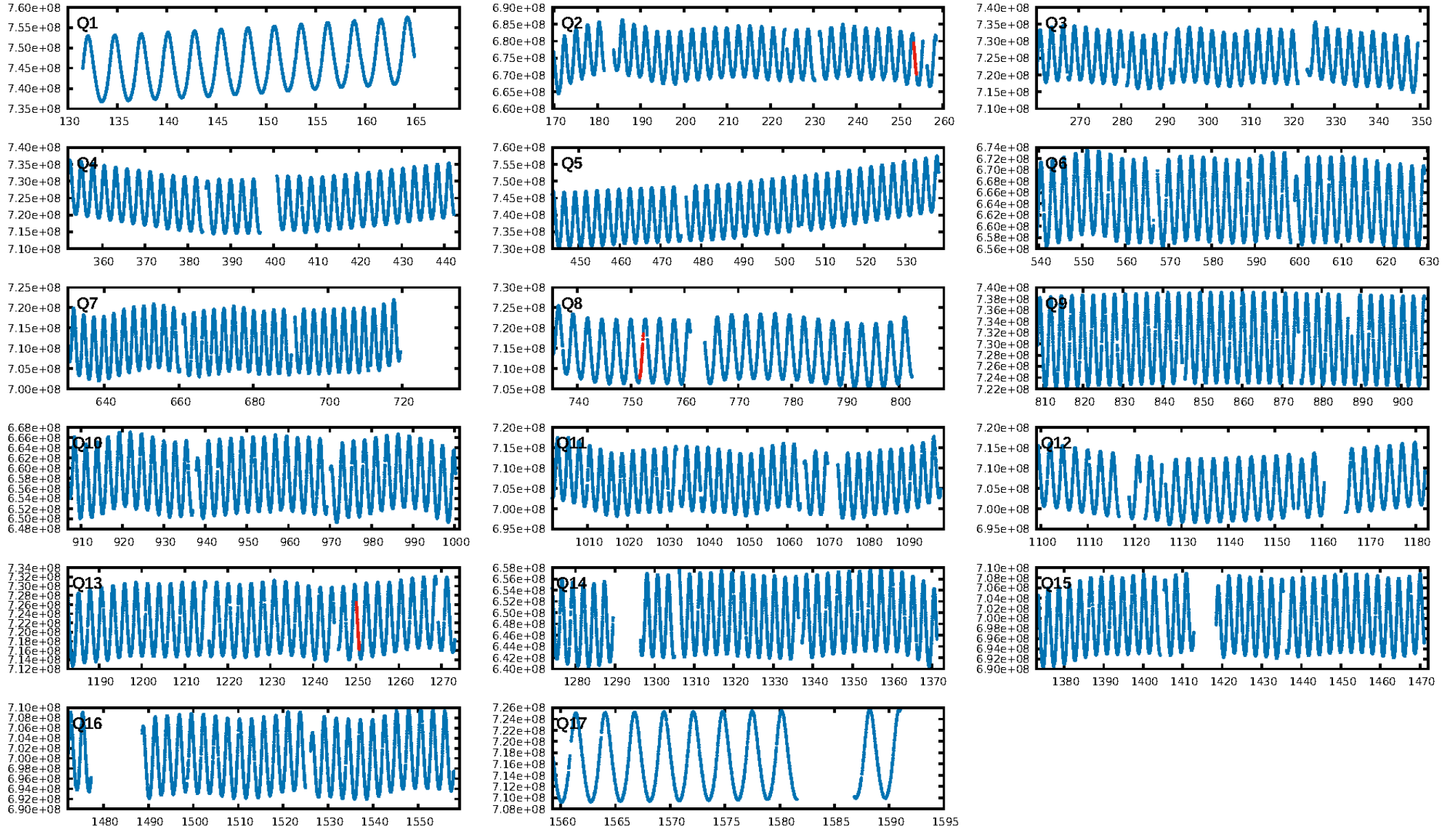
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [98.63 σ]
LongPeriod-sig: 100.0% [80.73 σ]
ModelChiSquare2-sig: 2.7%
ModelChiSquareGof-sig: 96.0%
Bootstrap-pfa: 2.10e-12
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 7.898
Centroid-sig: N/A
Centroid-so: 1.079 arcsec [0.59 σ]
OotOffset-rm: 1.113 arcsec [0.70 σ]
KicOffset-rm: 1.096 arcsec [0.48 σ]
OotOffset-st: 1/0/1/1 [3]
KicOffset-st: 1/0/1/1 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 0.33 [1/3]

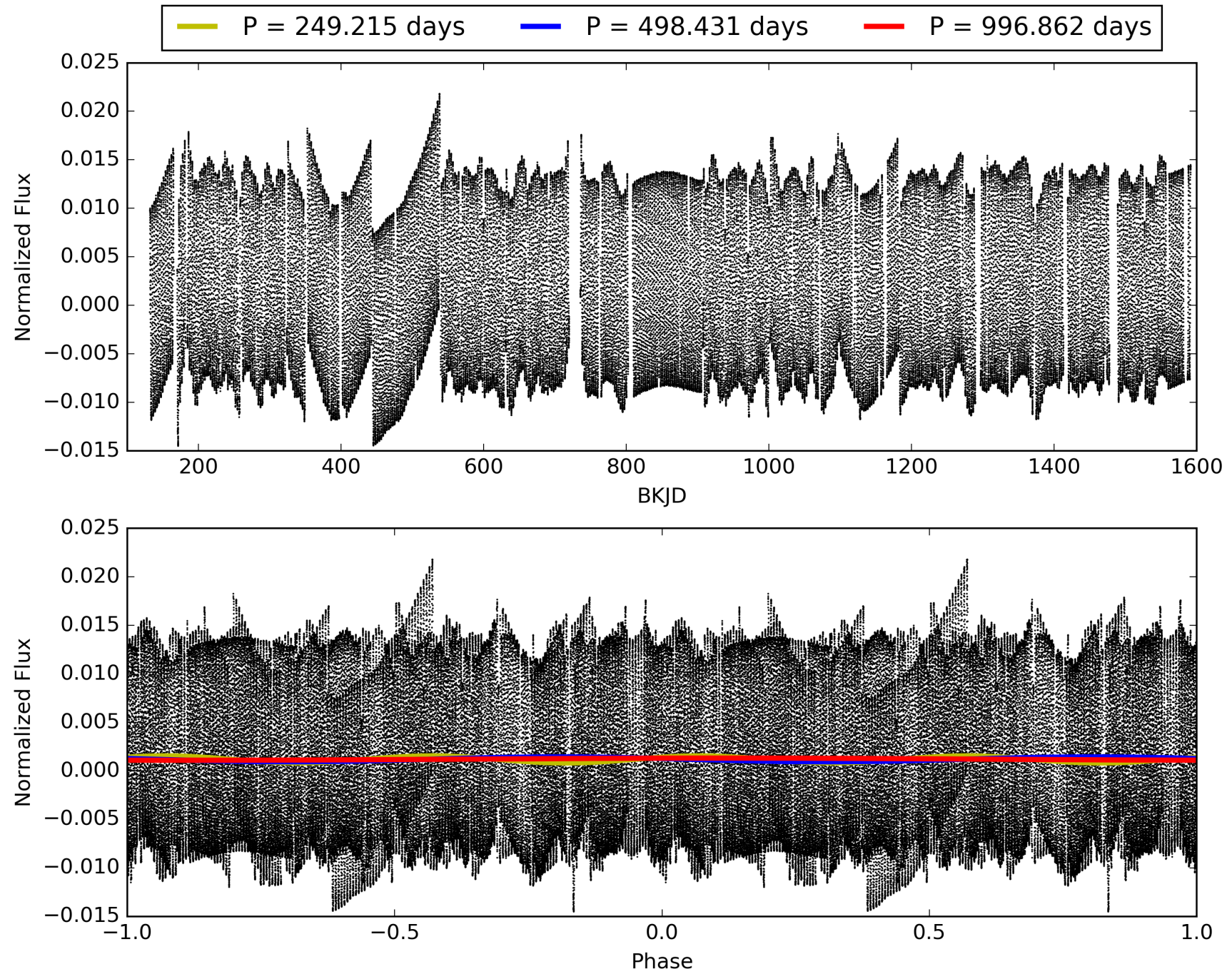
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:51:12 Z

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

TCE 001576144-04, PDC Light Curves

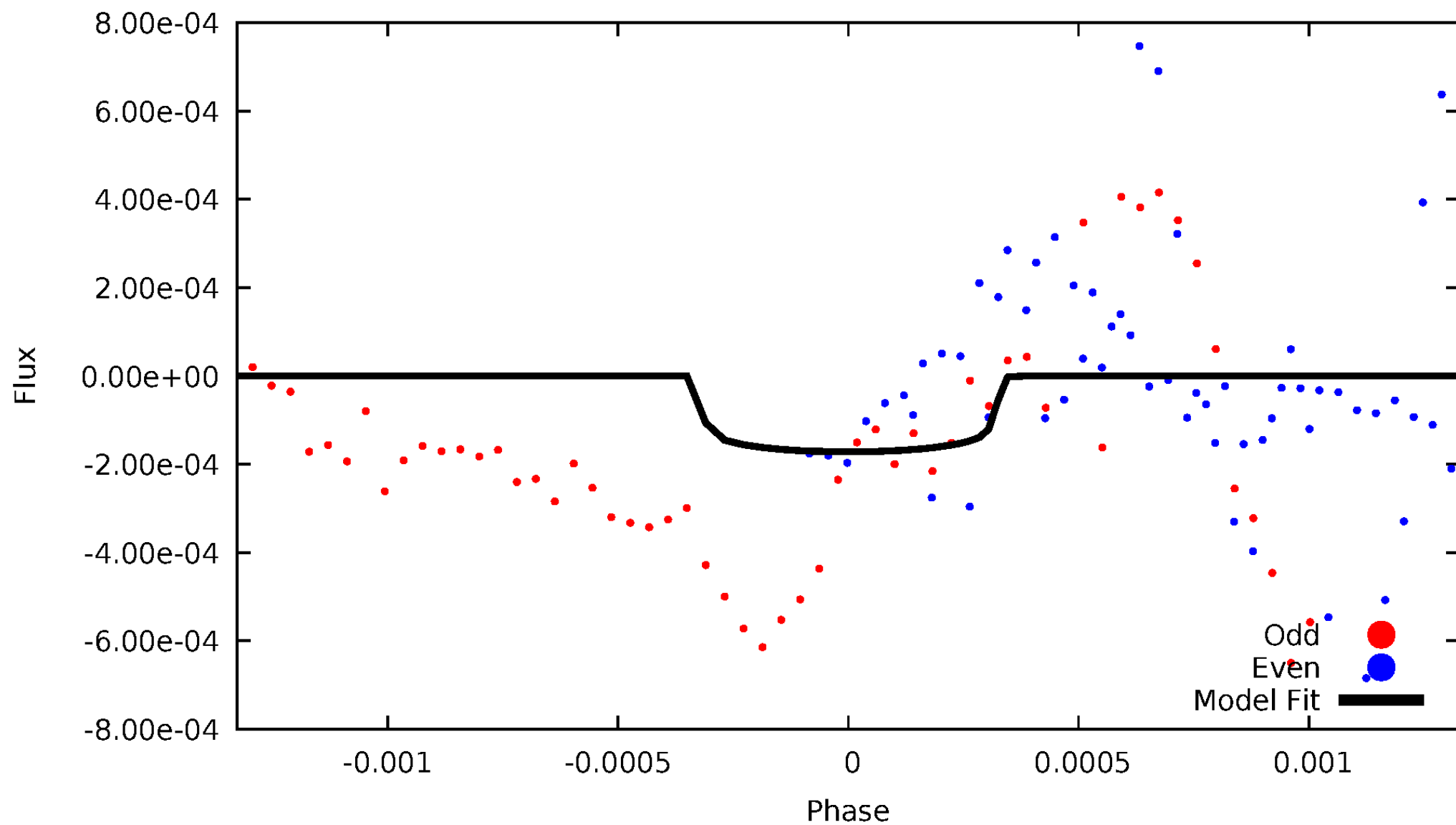


TCE 001576144-04



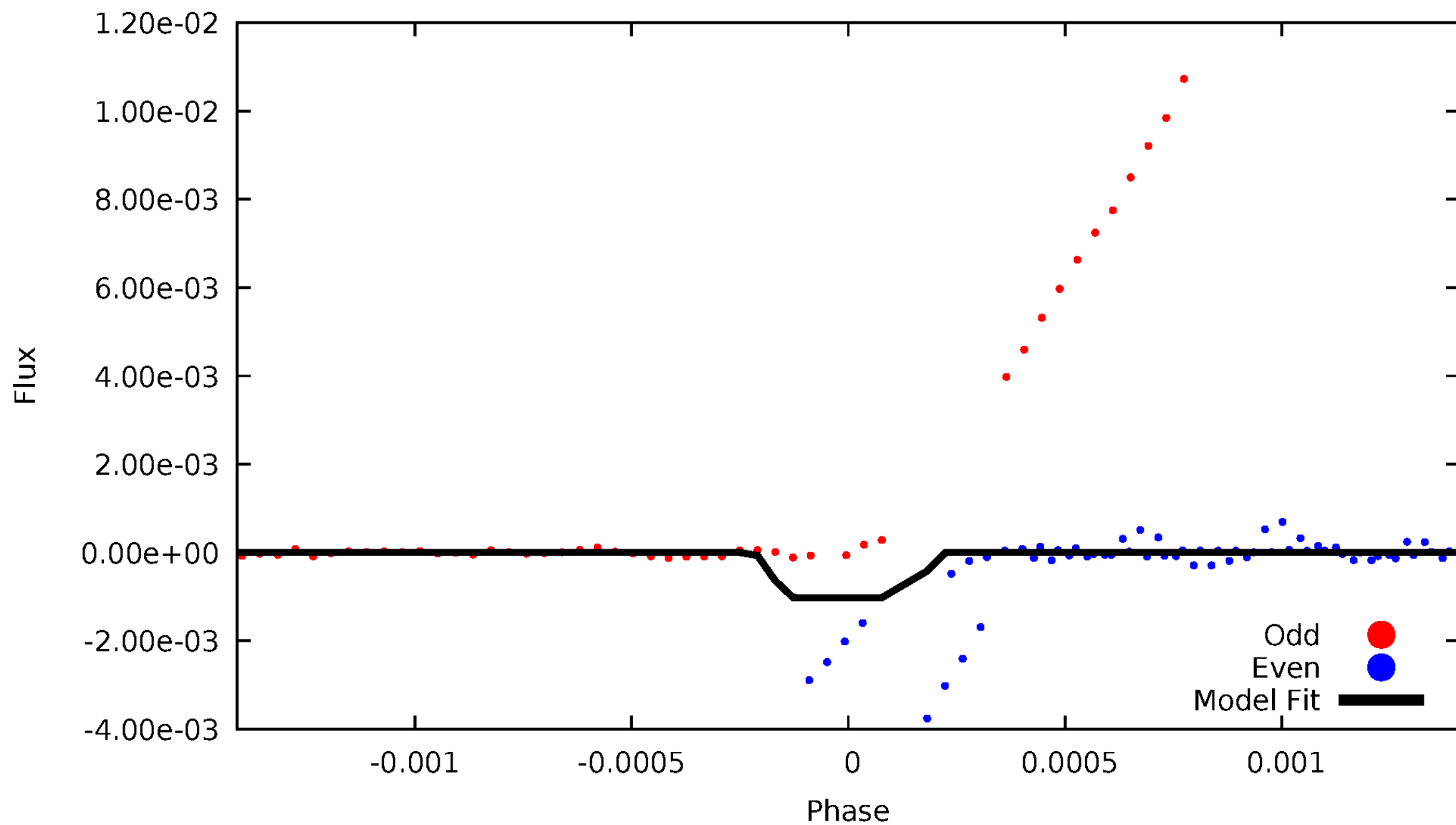
DV Odd/Even

TCE 001576144-04



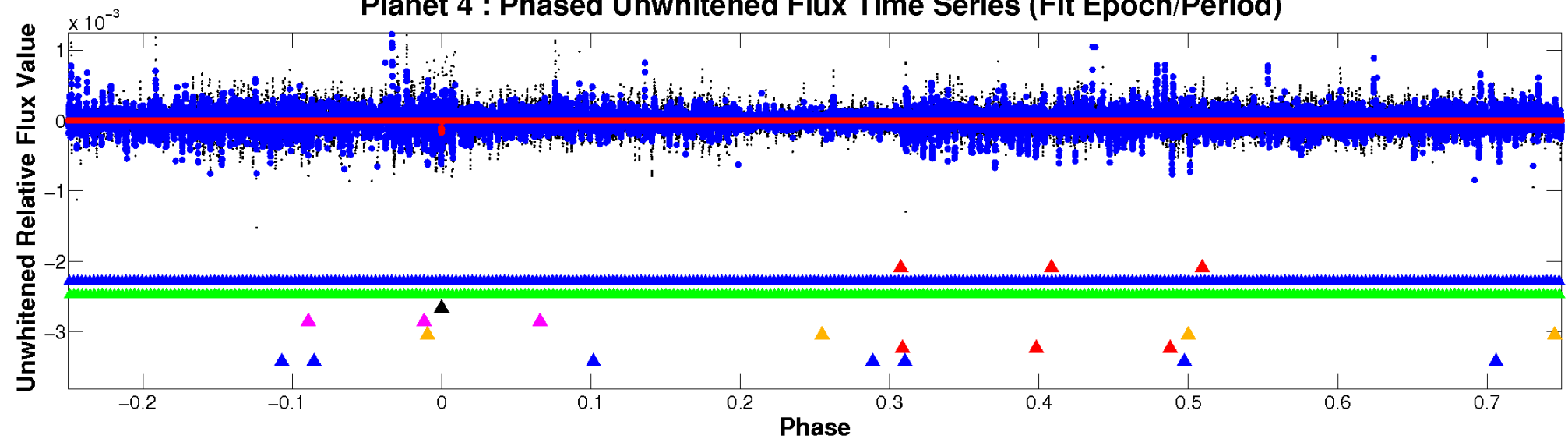
ALT Odd/Even

TCE 001576144-04

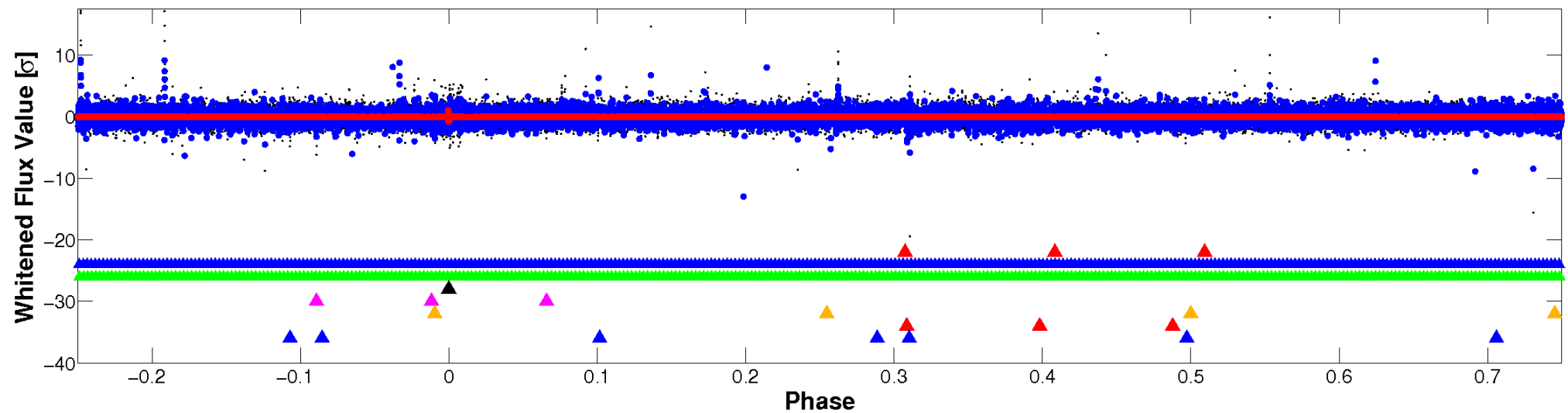


Non-Whitened Vs. Whitened Light Curve

Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

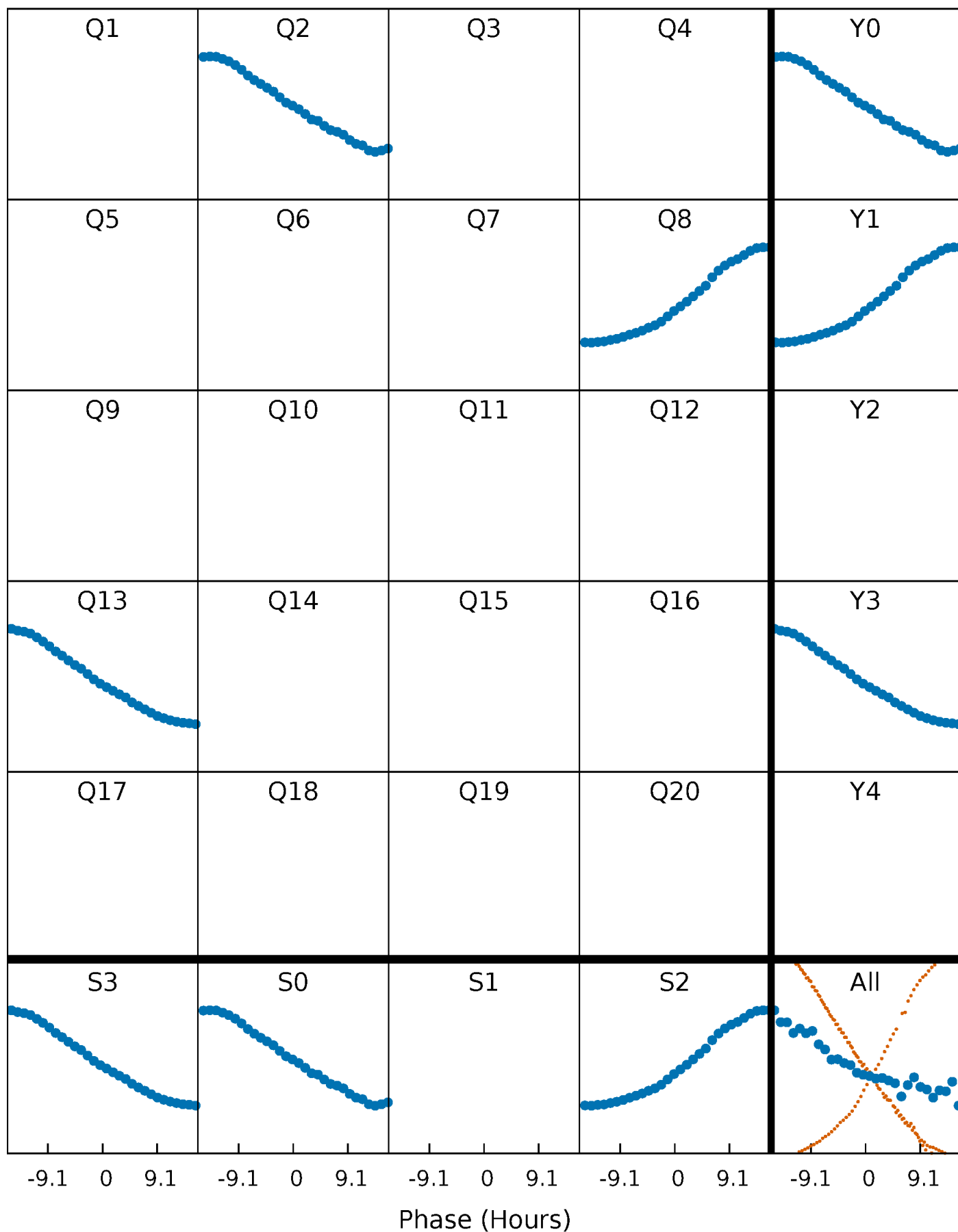


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



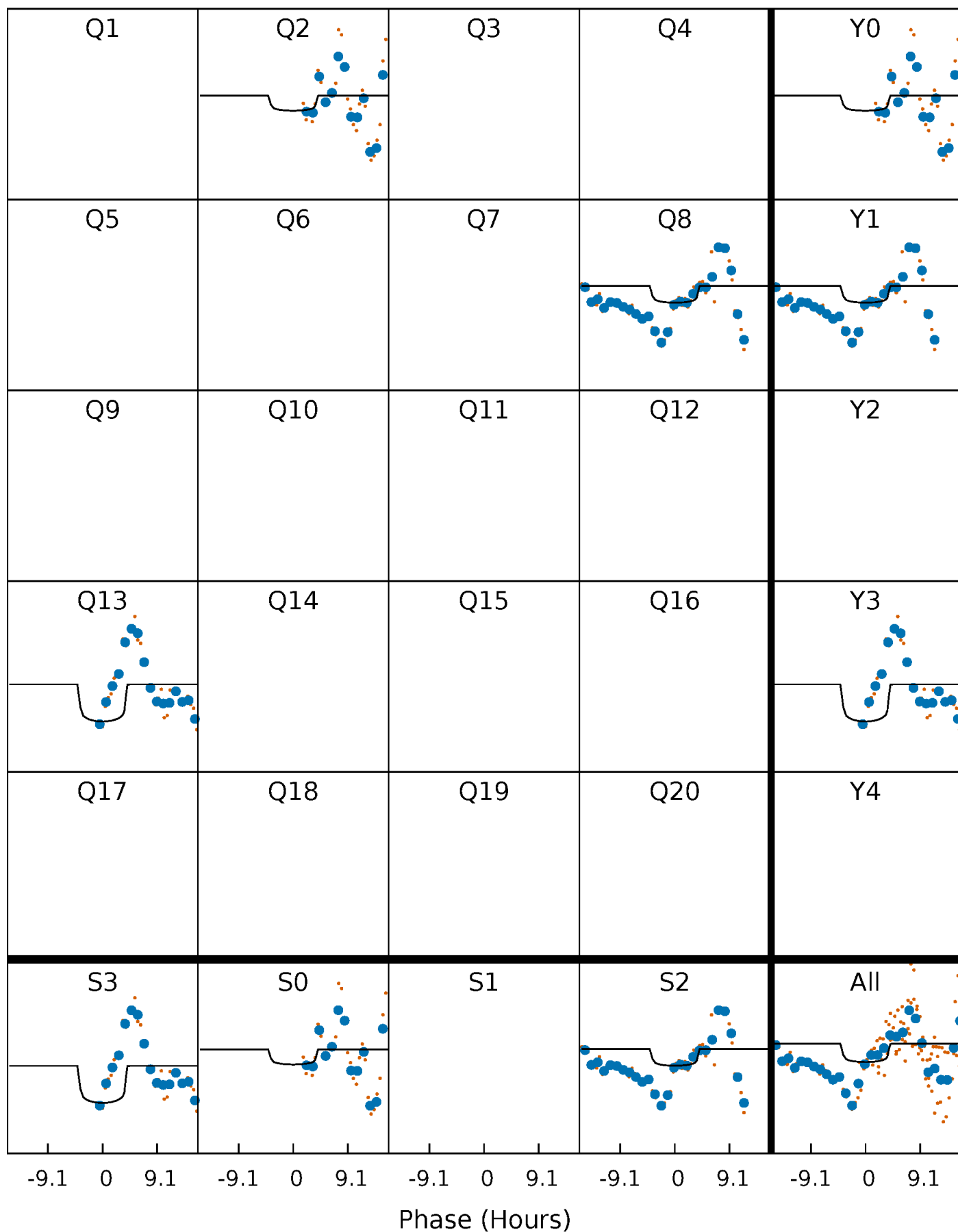
PDC Quarter-Phased Transit Curves

TCE 001576144-04 $P=498.430874$ Days $T_0=253.555320$ (BKJD)



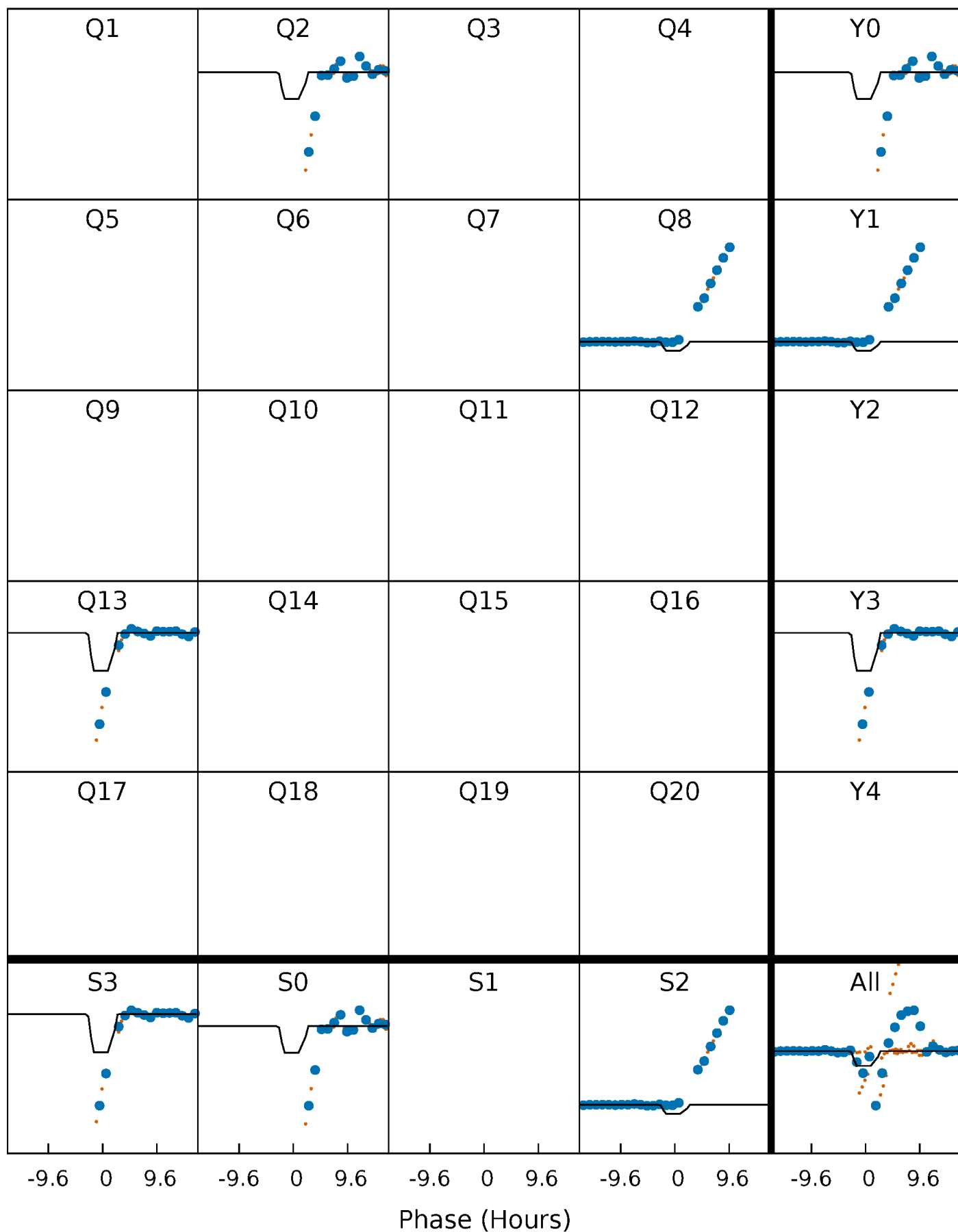
DV Quarter-Phased Transit Curves

TCE 001576144-04 $P=498.430874$ Days $T_0=253.555320$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

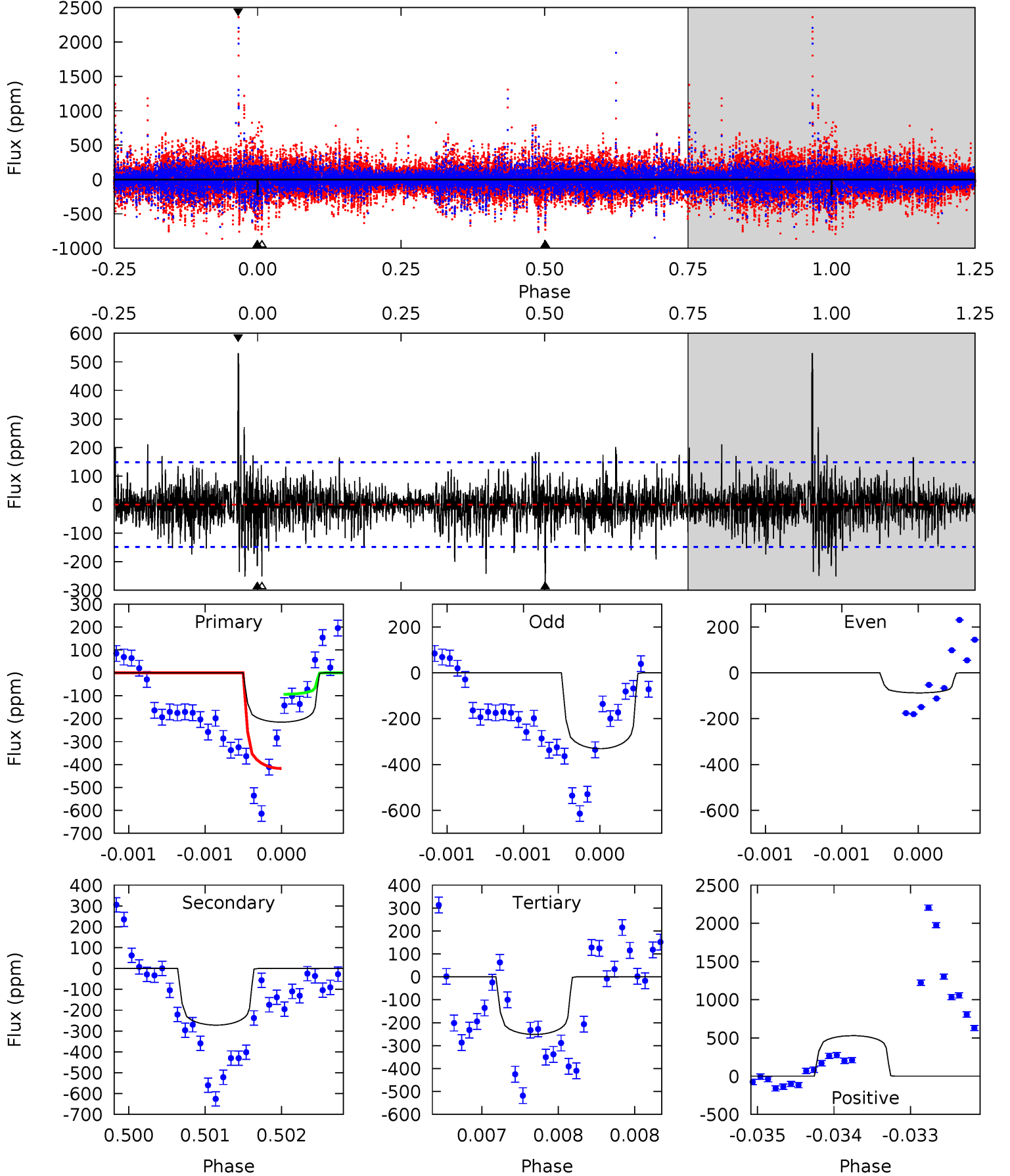
TCE 001576144-04 P=498.401773 Days $T_0=253.698123$ (BKJD)



DV Model-Shift Uniqueness Test

001576144-04, P = 498.430874 Days, E = 253.555320 Days

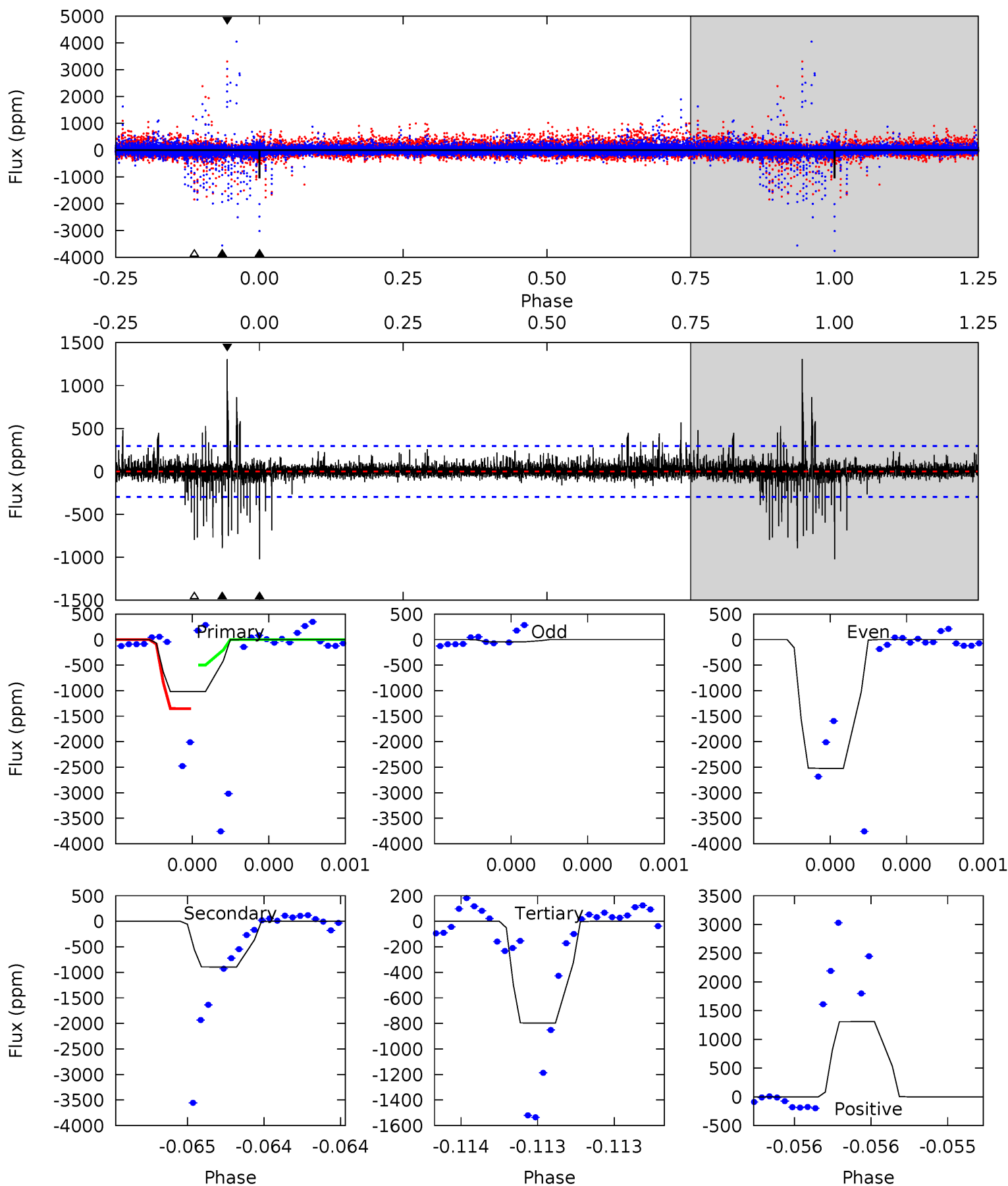
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.02	10.1	9.37	19.8	5.52	3.39	1.80	-1.35	-11.7	0.76	-9.64	4.38	0.91	0.66	5.43



Alt Model-Shift Uniqueness Test

001576144-04, P = 498.401773 Days, E = 253.698123 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.3	16.9	15.0	24.7	5.59	3.51	1.07	4.22	-5.44	1.85	-7.81	17.3	1.71	0.56	0



Stellar Parameters For KIC 001576144

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	9181^{+251}_{-430}	$4.003^{+0.234}_{-0.156}$	$0.070^{+0.150}_{-0.700}$	$2.507^{+0.743}_{-0.909}$	$2.308^{+0.361}_{-0.721}$	$0.206^{+0.334}_{-0.097}$
	+3%/-5%	+6%/-4%	+214%/-1000%	+30%/-36%	+16%/-31%	+162%/-47%
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 001576144-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-272 ± 27	$3.52^{+2.17}_{-1.75}$	695^{+56}_{-57}	10518^{+9573}_{-2749}	31212^{+87588}_{-19126}
Alt.	-895 ± 53	$8.49^{+2.66}_{-2.43}$	691^{+58}_{-62}	8672^{+1698}_{-1102}	17831^{+16281}_{-7555}

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

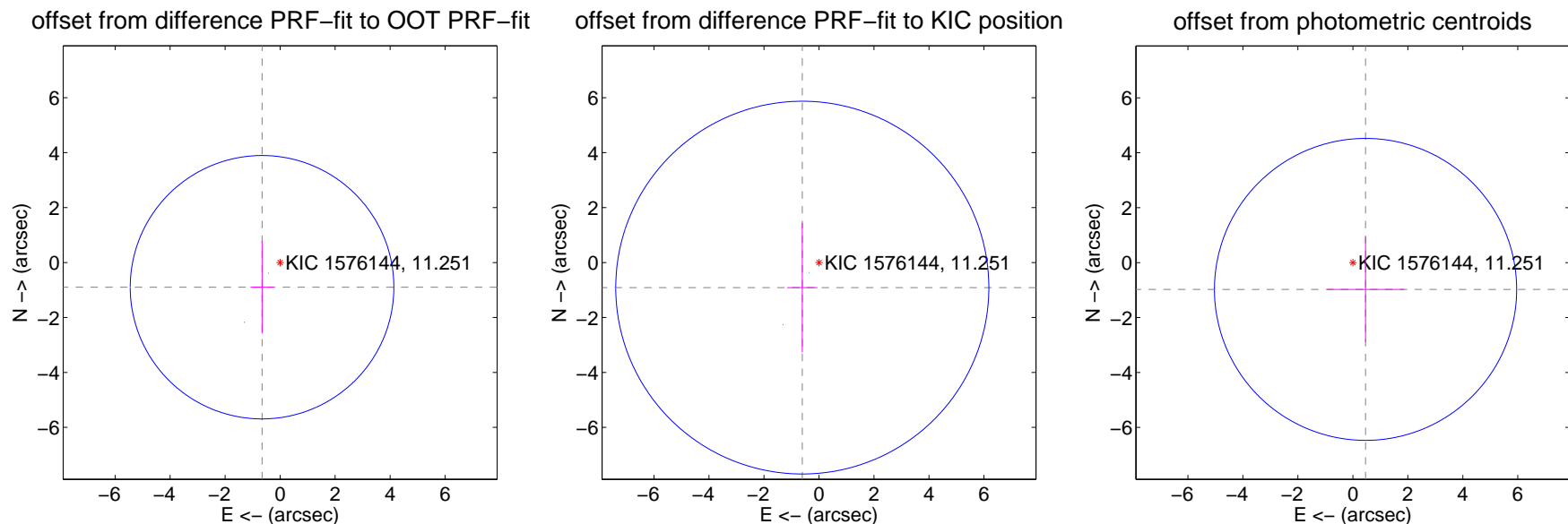
DV Centroid Data

Supplemental centroid analysis for 001576144-04. **Kepler magnitude: 11.25.** Transit SNR 3.49

There are 2 quarters with good PRF difference image offsets

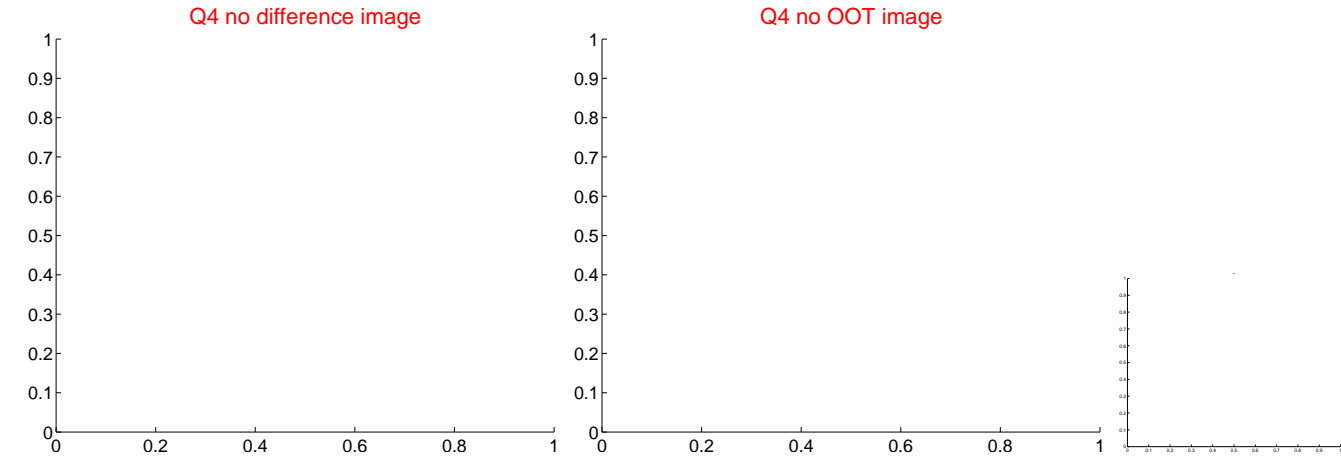
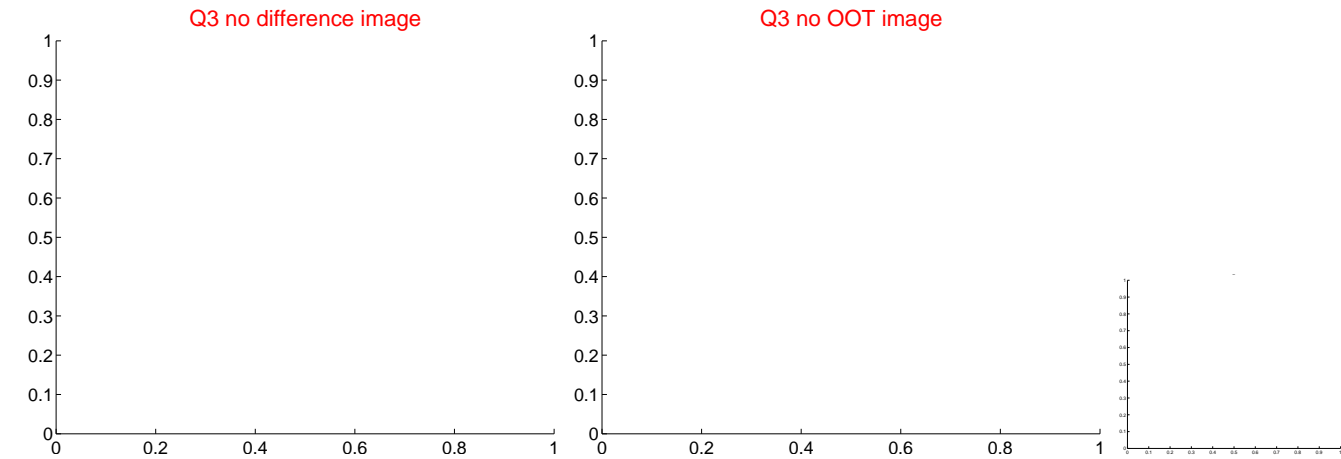
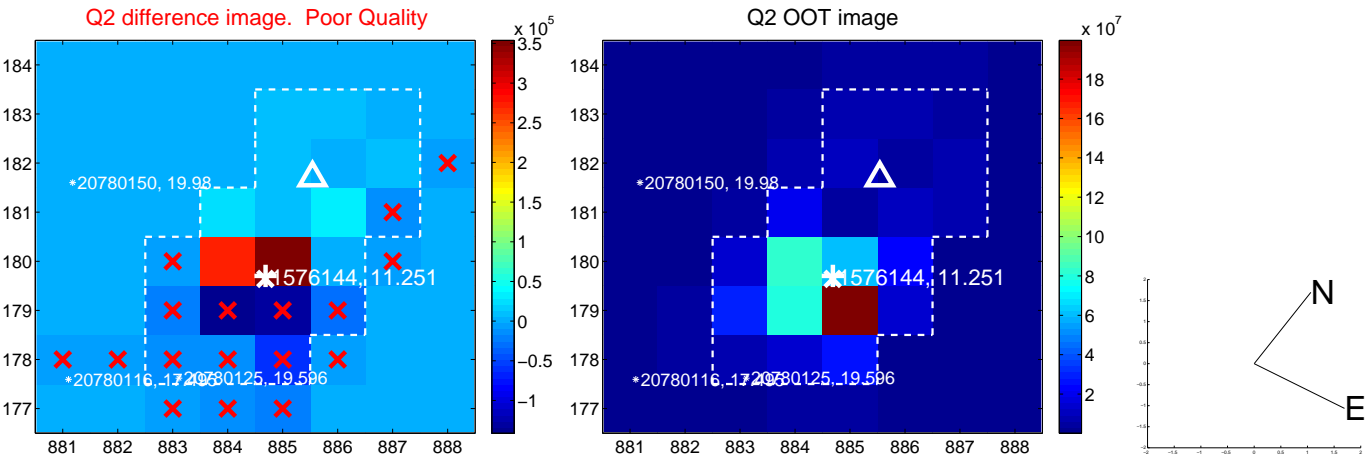
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.113 ± 1.598	0.70	0.656 ± 0.421	-0.898 ± 1.683
PRF-fit source offset from KIC position	1.096 ± 2.261	0.48	0.607 ± 0.550	-0.913 ± 2.357
photometric centroid source offset	1.08 ± 1.83	0.59	-0.46 ± 1.40	-0.98 ± 1.92

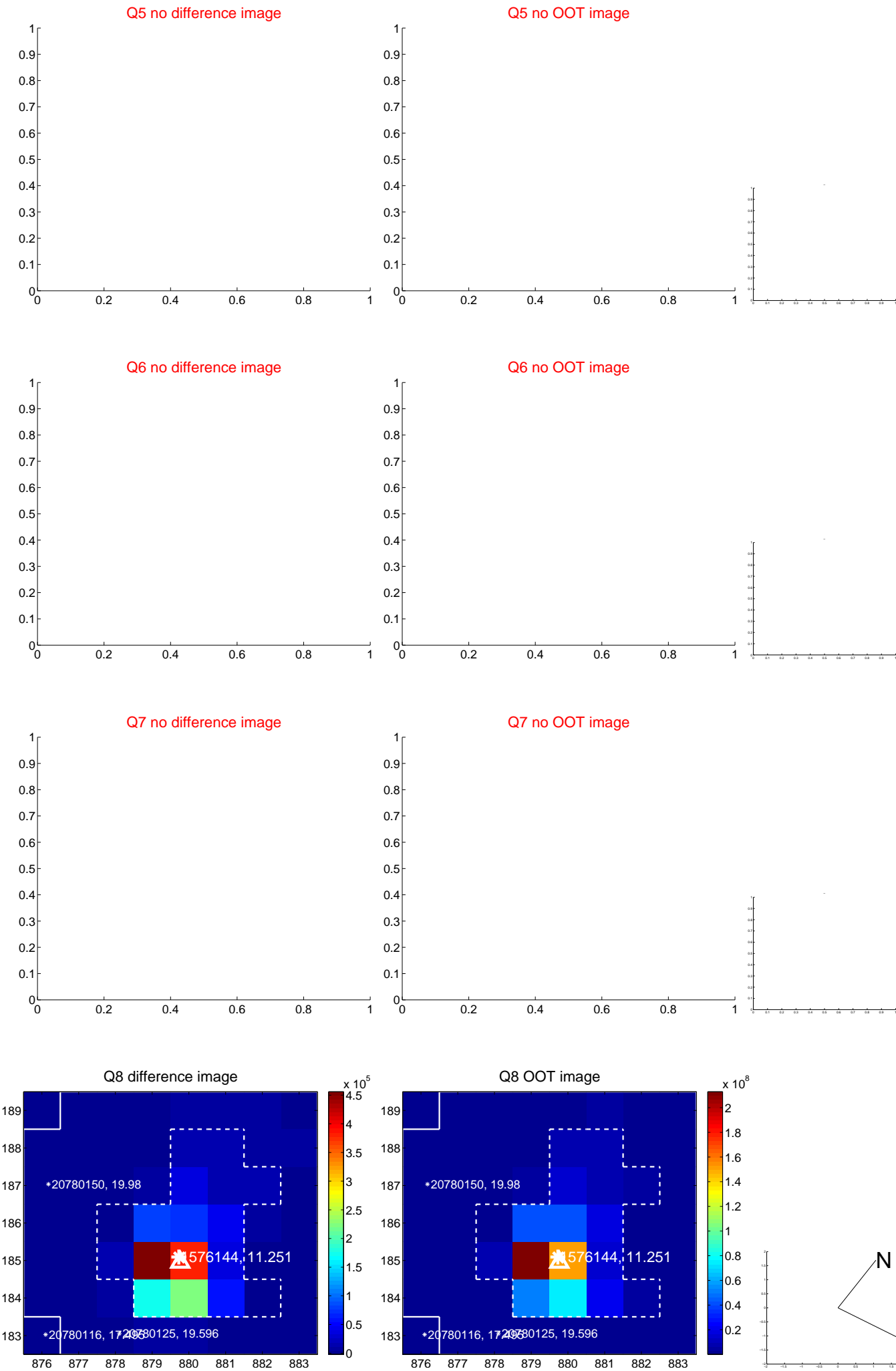


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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



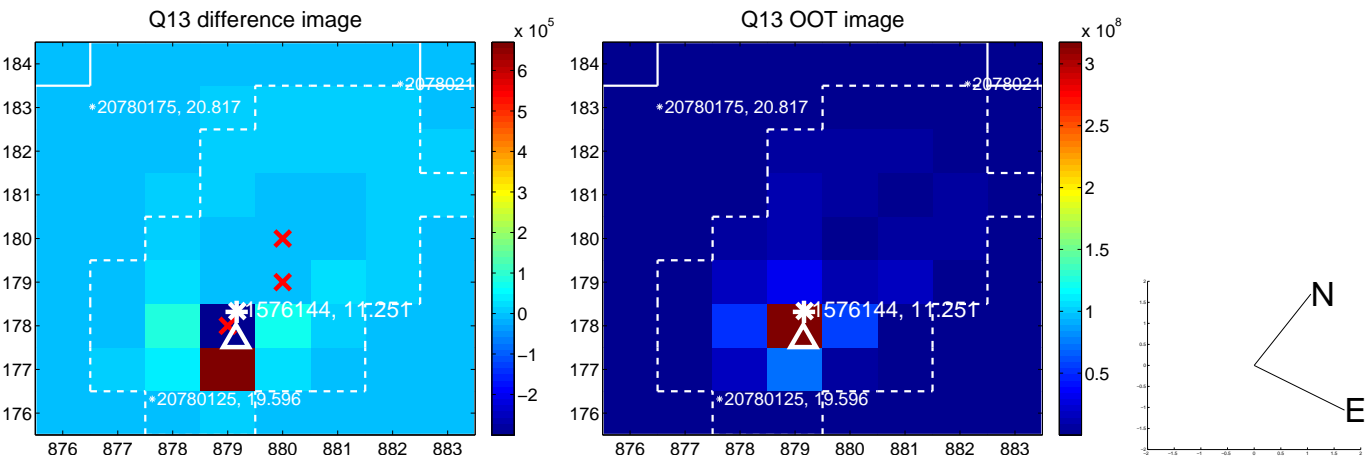
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



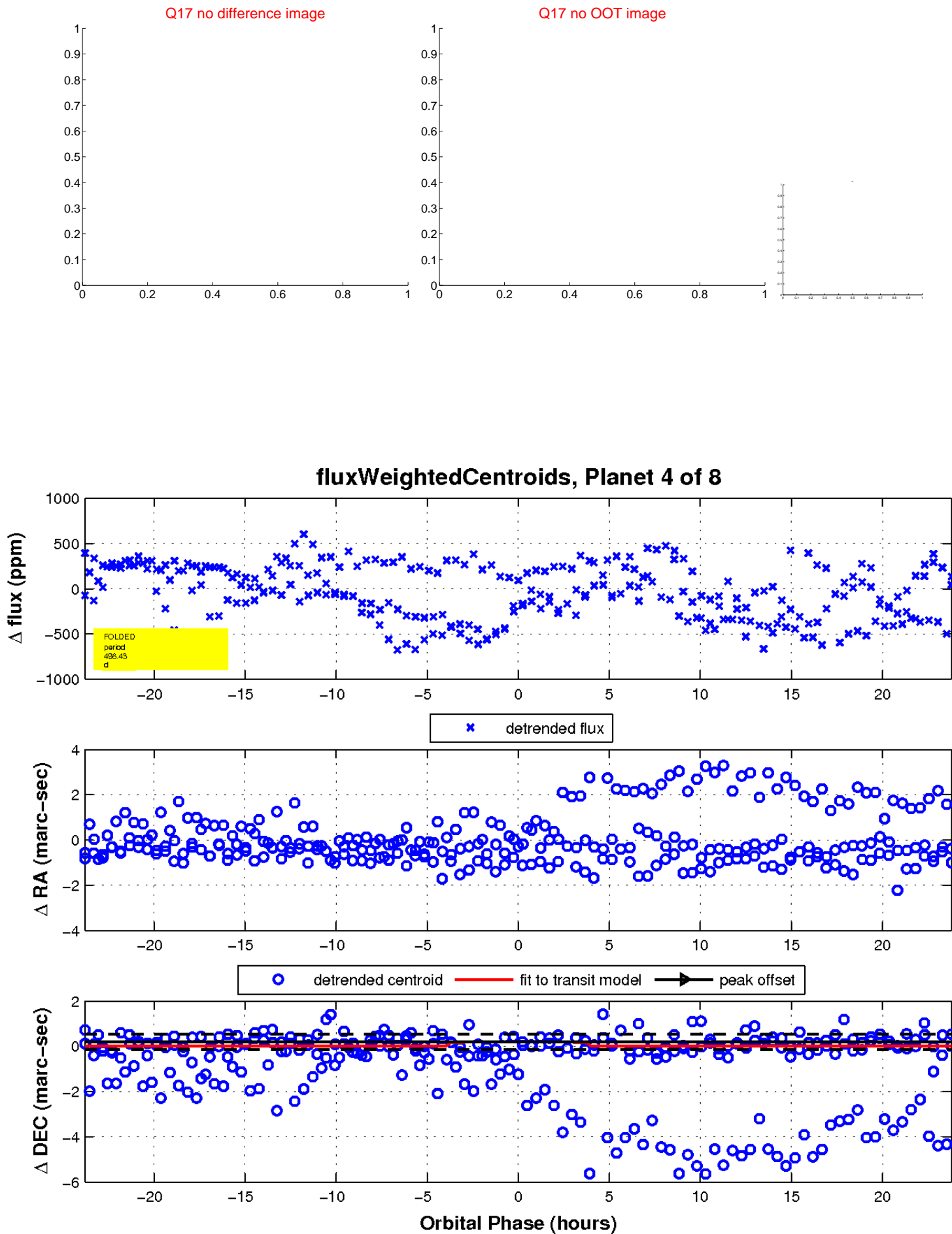
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

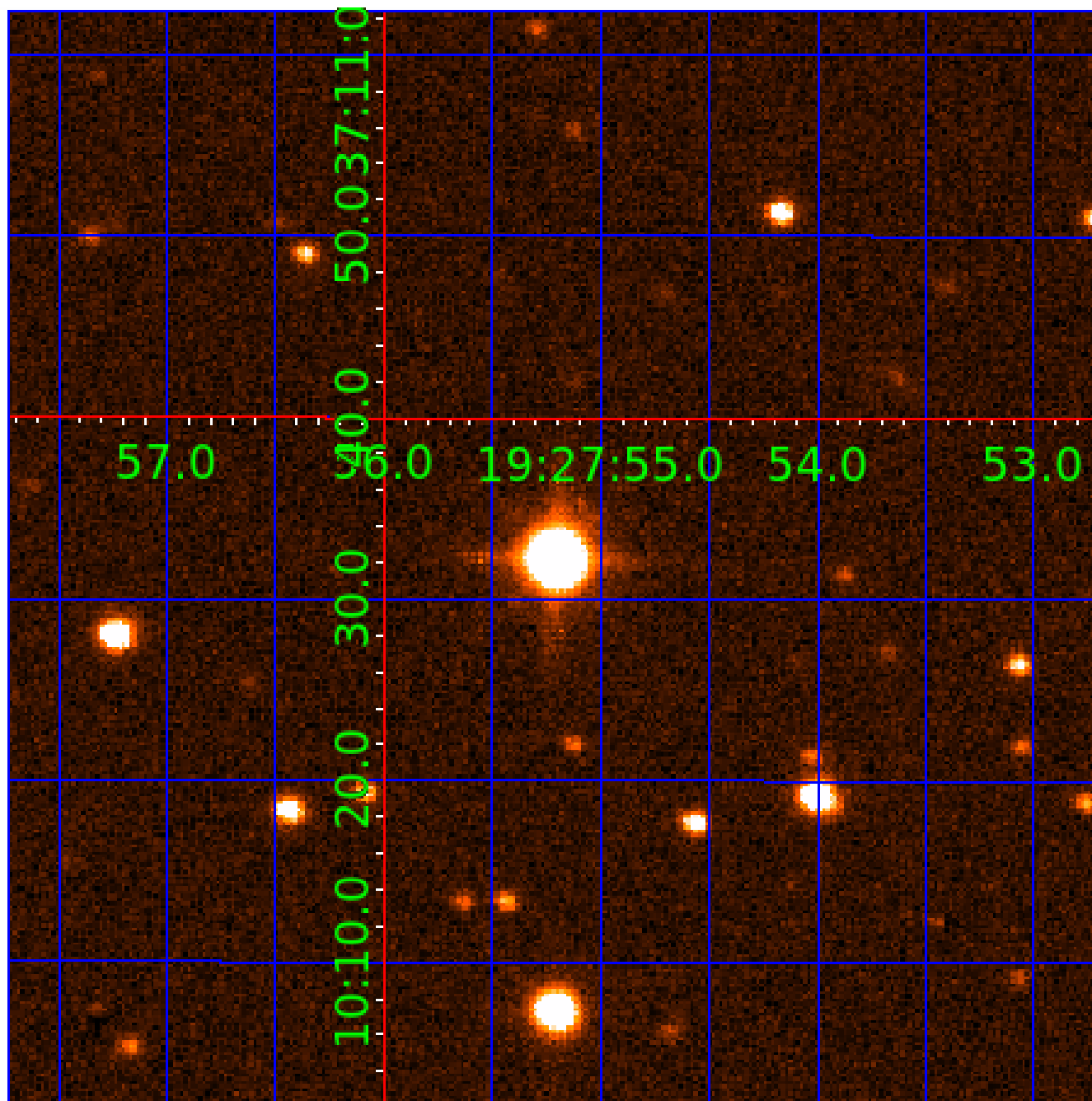


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 001576144

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})
001576144-01	OBS	No	548.743238	406.815173	453.5	6.246	21.3	12.0	2.51	9181	5.80	13.31
001576144-02	OBS	No	2.686670	132.159784	39.6	1.993	14.9	16.1	2.51	9181	1.82	16005.58
001576144-03	OBS	No	2.686662	132.297140	14.3	6.511	12.3	5.5	2.51	9181	1.09	16005.64
001576144-04	OBS	No	498.430874	253.555320	171.7	7.935	10.6	3.5	2.51	9181	3.52	15.13
001576144-05	OBS	No	459.770198	286.410016	548.0	5.054	11.4	9.6	2.51	9181	10.80	16.85
001576144-06	OBS	No	376.172555	248.855737	416.9	4.591	9.3	10.0	2.51	9181	8.82	22.01
001576144-07	OBS	No	543.091418	407.375363	248.7	10.645	8.9	8.6	2.51	9181	4.26	13.49
001576144-08	OBS	No	197.220930	210.992354	206.7	9.324	9.0	8.6	2.51	9181	4.28	52.07

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001576144-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
001576144-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—CENT_SATURATED
001576144-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—SAME_NTL_PERIOD—CENT_SATURATED
001576144-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED—HALO_GHOST
001576144-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-08	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED—HALO_GHOST

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

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

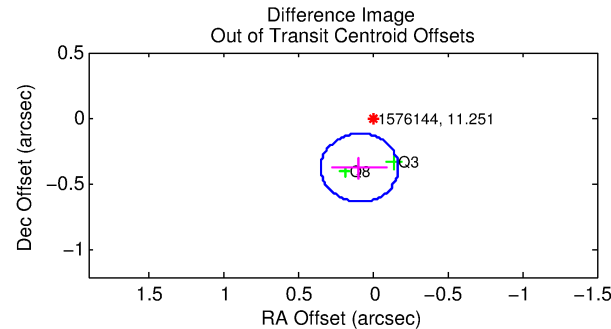
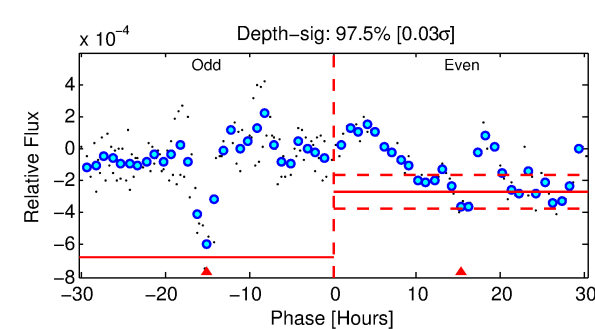
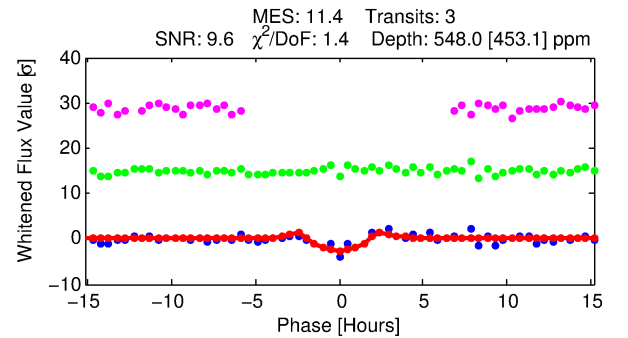
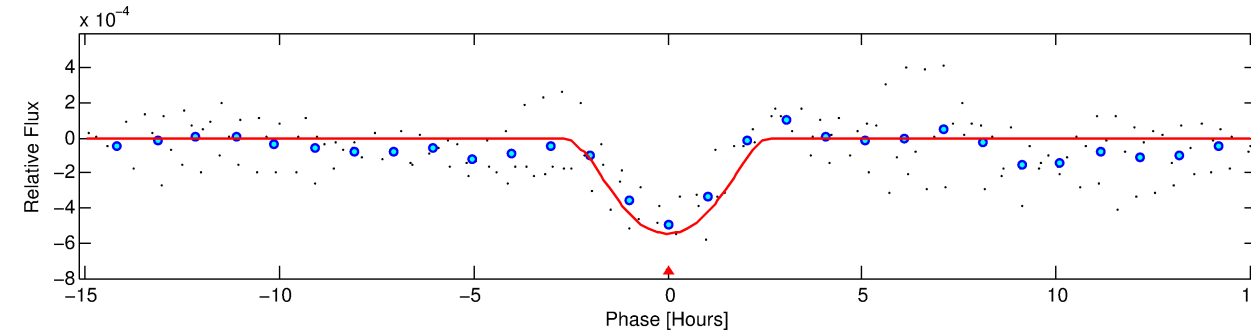
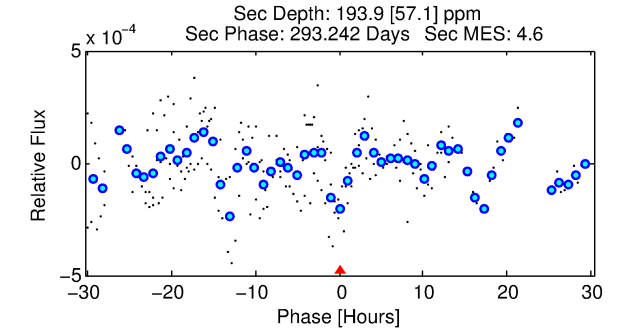
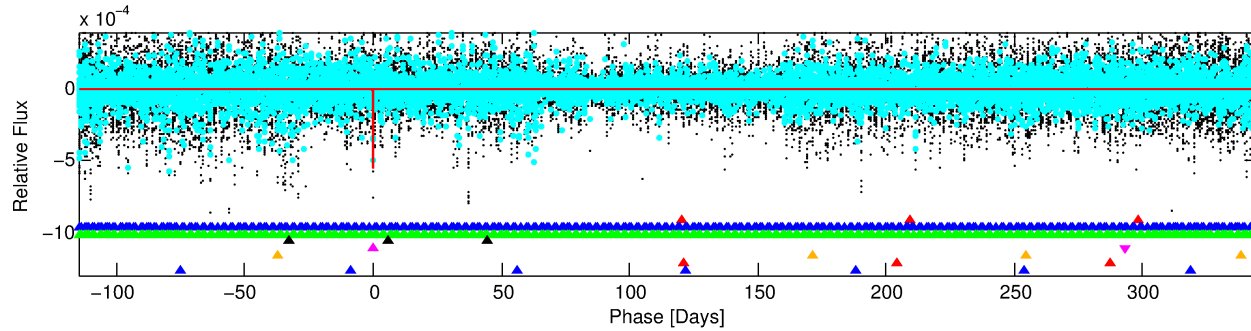
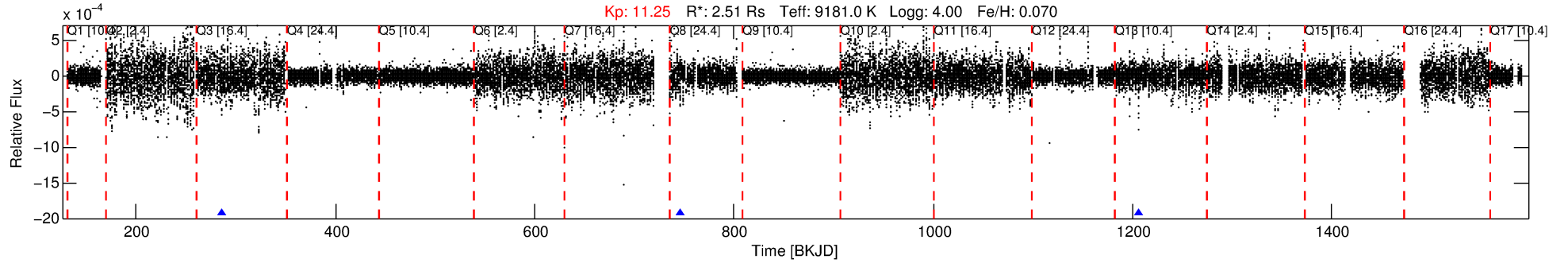
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 001576144-05

No Significant Match Found

DV One-Page Summary

KIC: 1576144 Candidate: 5 of 8 Period: 459.770 d



DV Fit Results:

Period = 459.77020 [0.00617] d
Epoch = 286.4100 [0.0096] BKJD
Rp/R* = 0.0395 [0.0692]
a/R* = 197.17 [89.75]
b = 1.00 [0.08]
Seff = 16.85 [7.95]
Teq = 517 [61] K
Rp = 10.80 [19.33] Re
a = 1.5411 [0.4641] AU
Ag = 2173.70 [7707.28] [0.28 σ]
Teffp = 5454 [4805] K [1.03 σ]

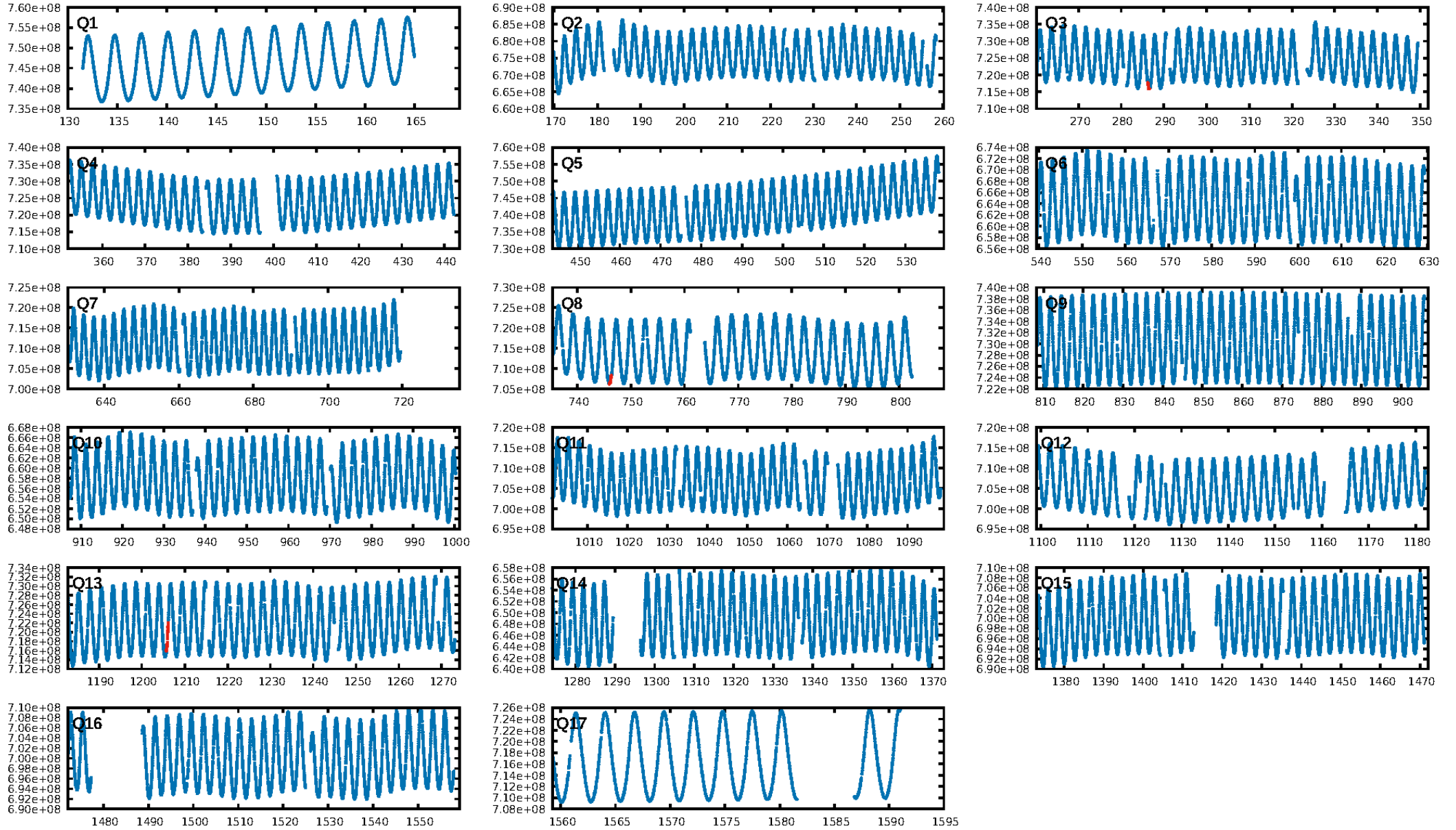
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [293.84 σ]
LongPeriod-sig: 100.0% [98.63 σ]
ModelChiSquare2-sig: 4.6%
ModelChiSquareGof-sig: 63.9%
Bootstrap-pfa: 2.12e-12
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.1832
Centroid-sig: N/A
Centroid-so: 1.114 arcsec [1.27 σ]
OotOffset-rm: 0.384 arcsec [4.44 σ]
OotOffset-st: 0/1/1/0 [2]
KicOffset-rm: 0.277 arcsec [1.78 σ]
KicOffset-st: 0/1/1/0 [2]
DiffImageQuality-fgm: 1.00 [2/2]
DiffImageOverlap-fno: 1.00 [2/2]

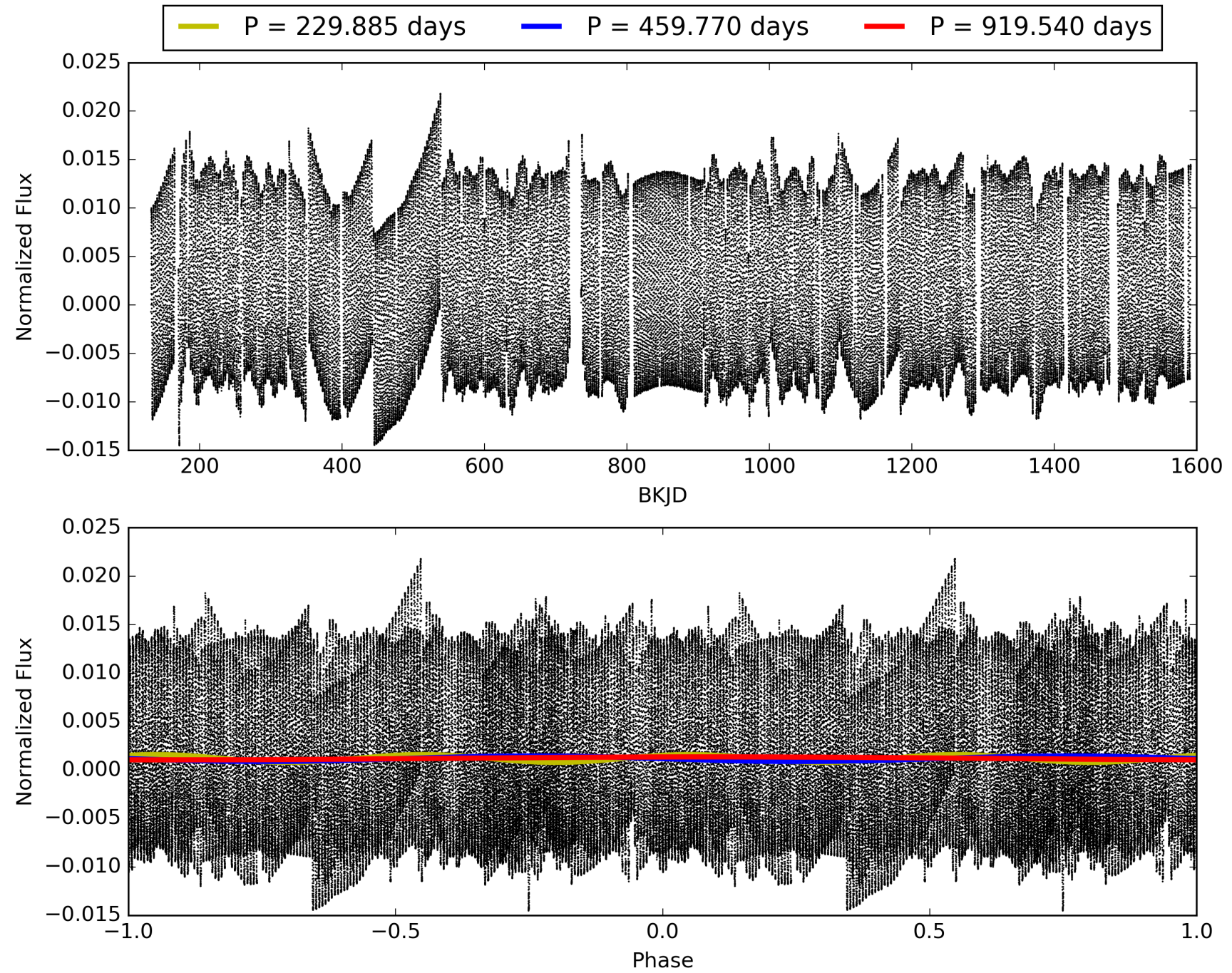
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:51:24 Z

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

TCE 001576144-05, PDC Light Curves

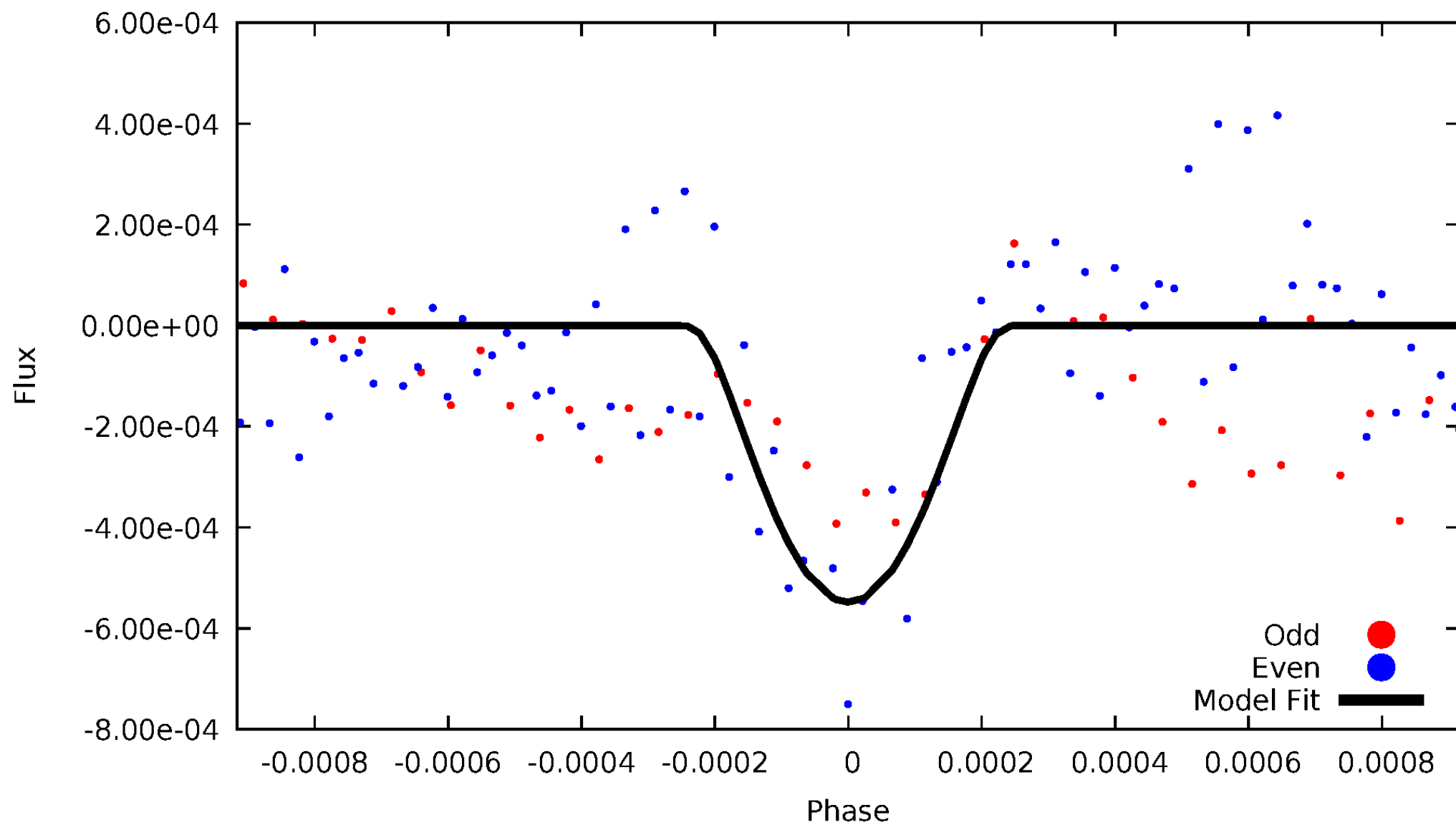


TCE 001576144-05



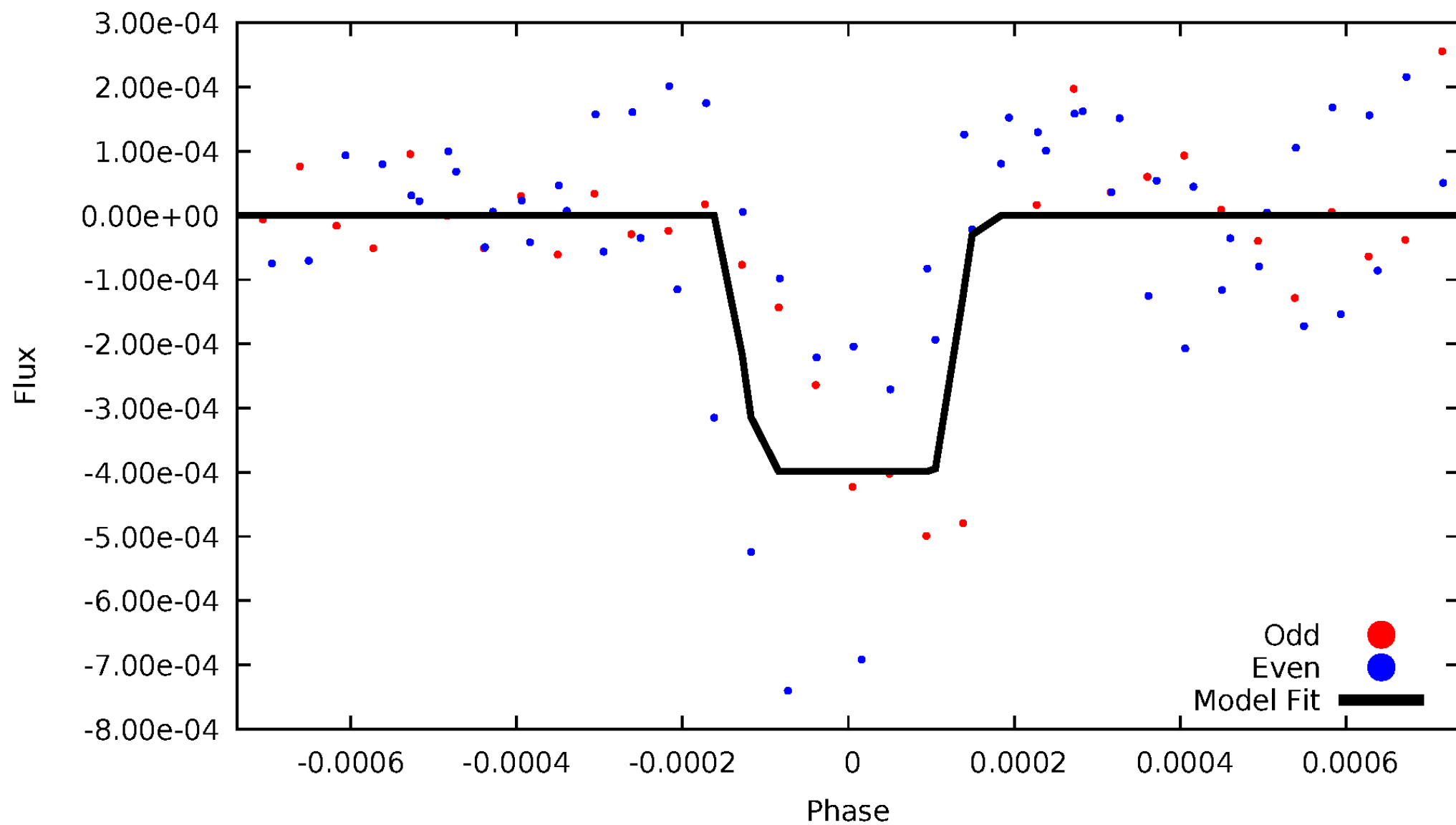
DV Odd/Even

TCE 001576144-05



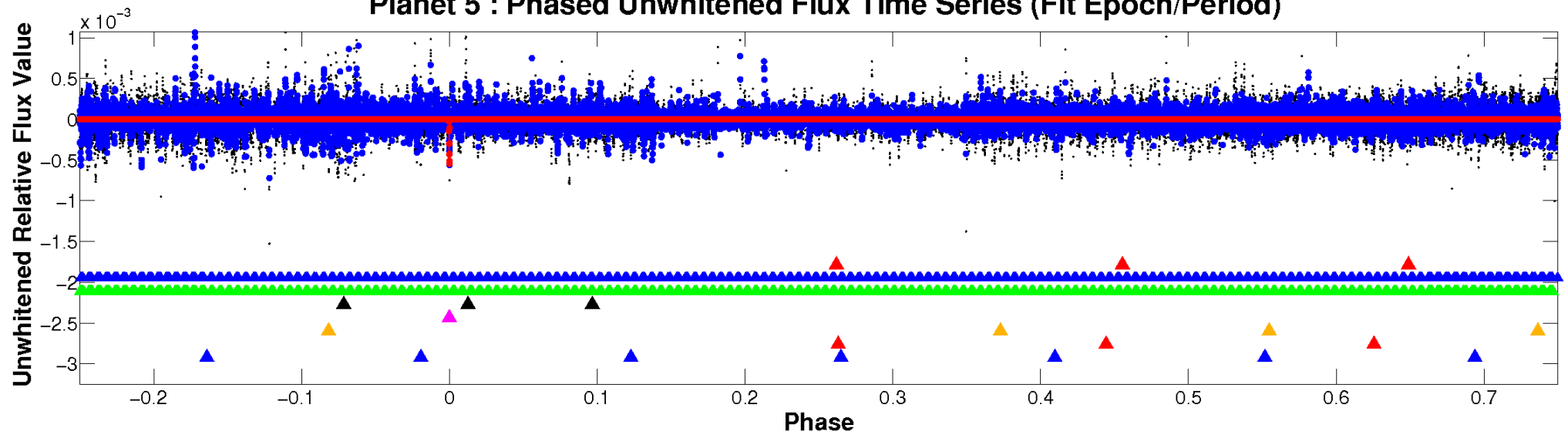
ALT Odd/Even

TCE 001576144-05

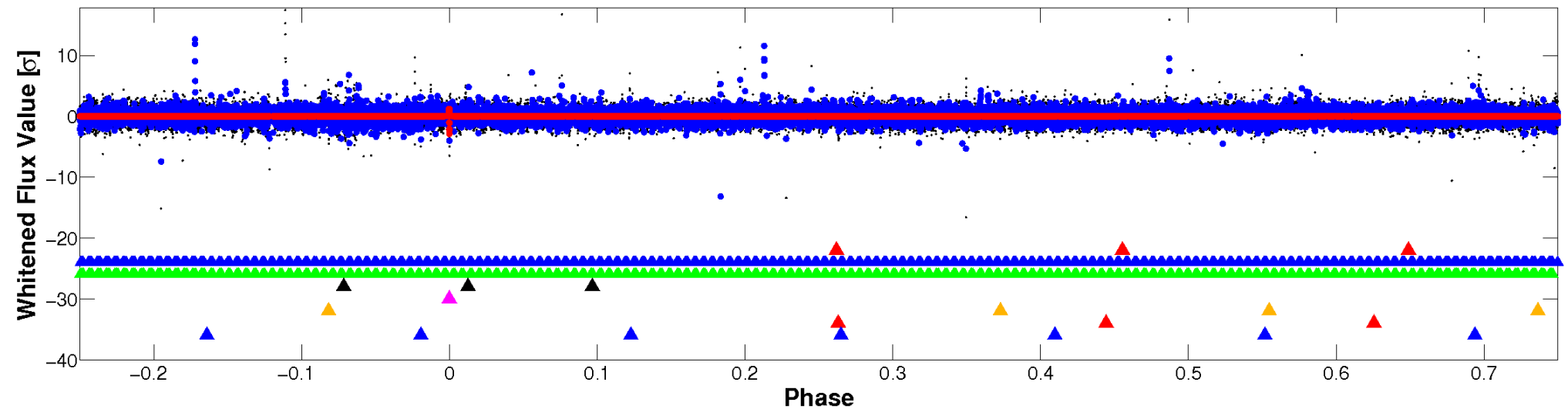


Non-Whitened Vs. Whitened Light Curve

Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

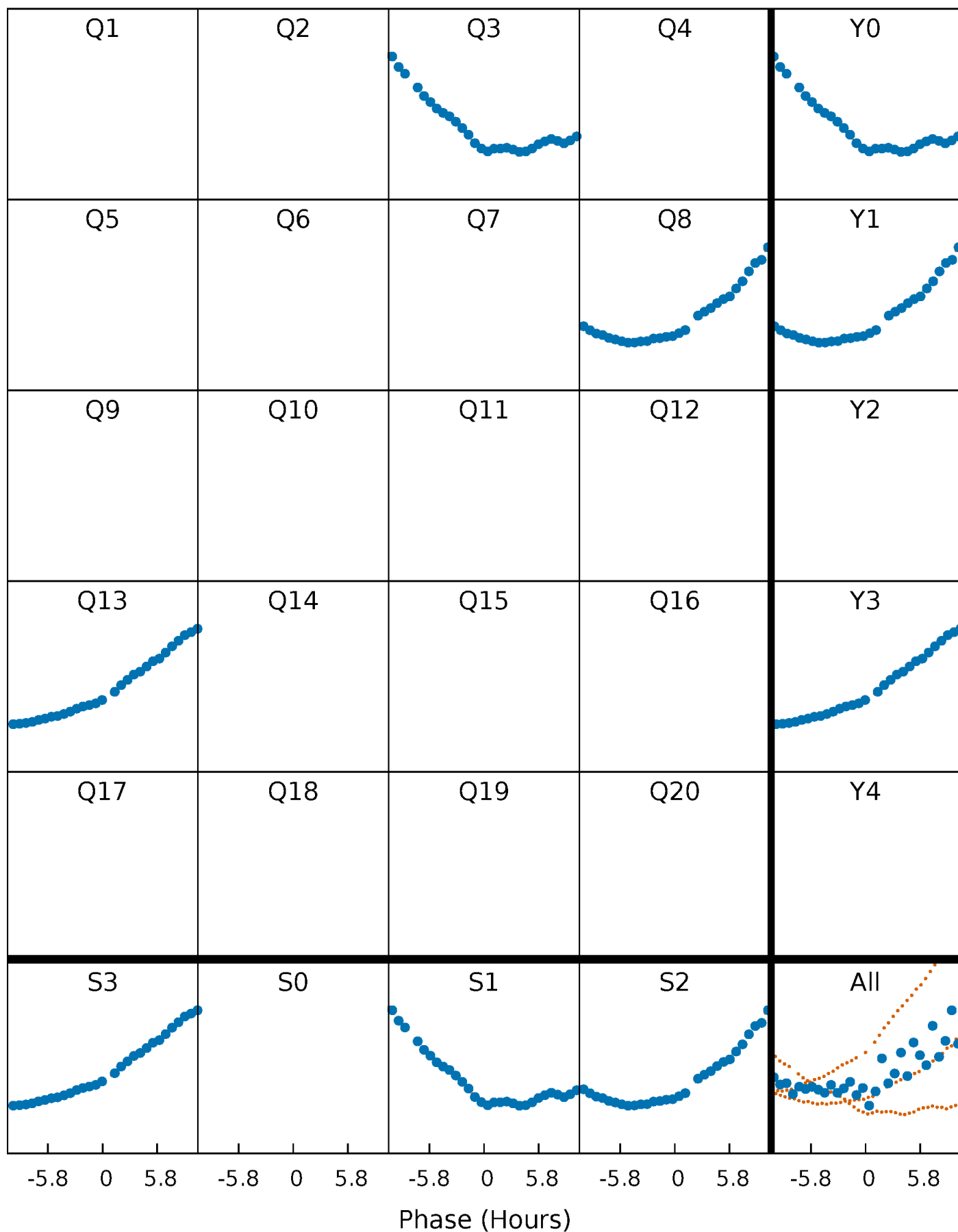


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



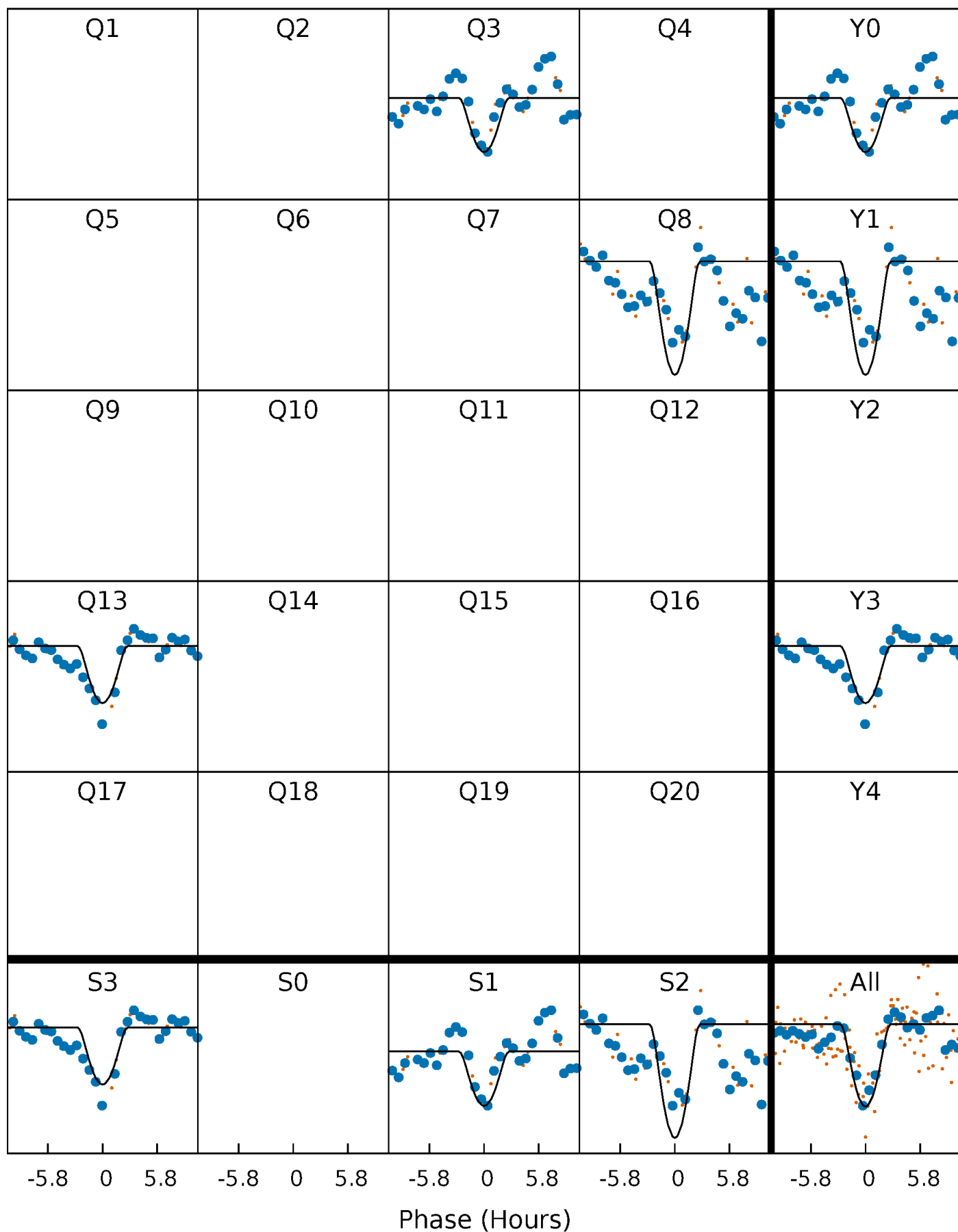
PDC Quarter-Phased Transit Curves

TCE 001576144-05 $P=459.770198$ Days $T_0=286.410016$ (BKJD)



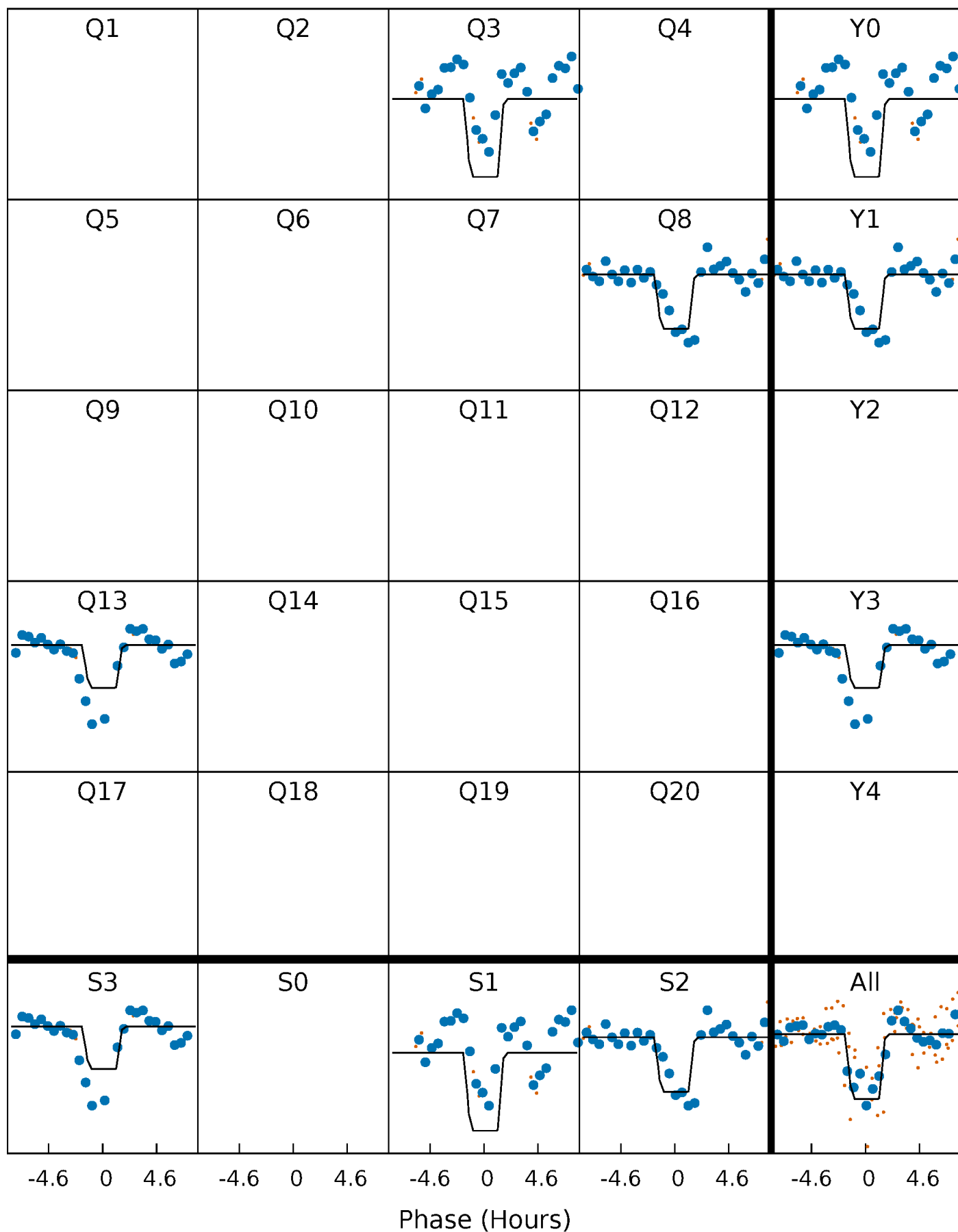
DV Quarter-Phased Transit Curves

TCE 001576144-05 $P=459.770198$ Days $T_0=286.410016$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

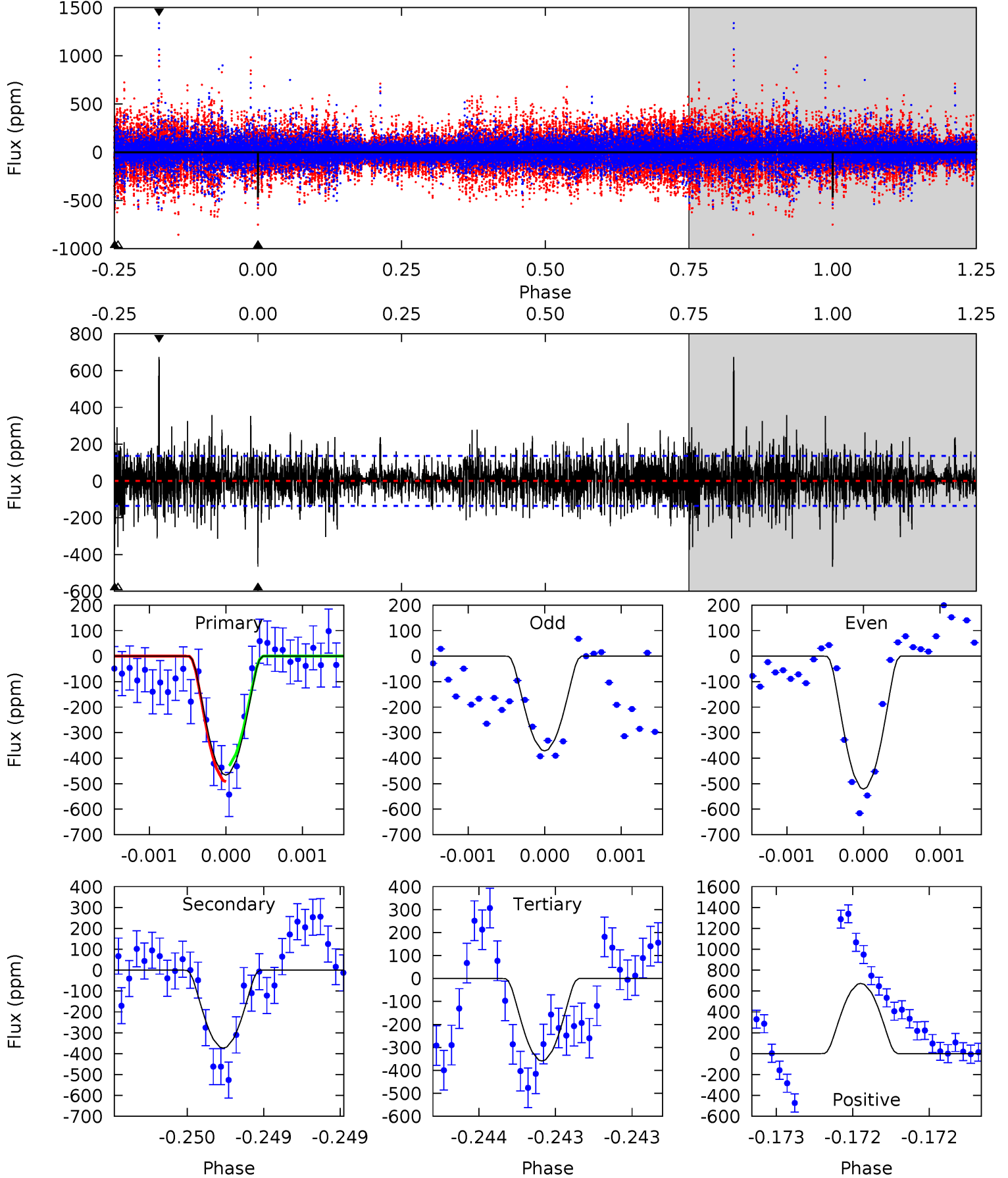
TCE 001576144-05 $P=459.773096$ Days $T_0=286.396509$ (BKJD)



DV Model-Shift Uniqueness Test

001576144-05, $P = 459.770198$ Days, $E = 286.410016$ Days

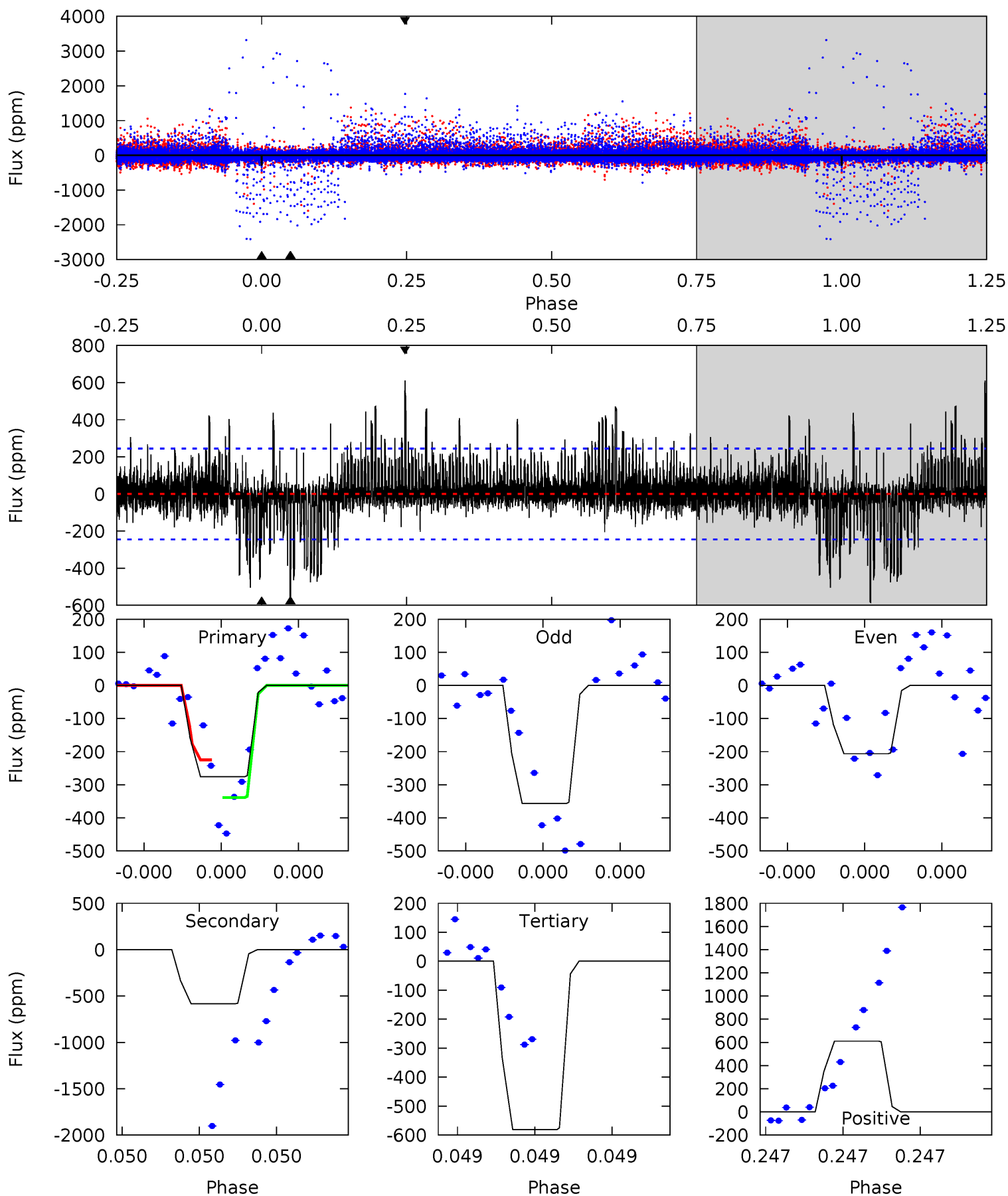
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.1	15.3	14.7	27.5	5.57	3.48	3.05	4.38	-8.45	0.58	-12.2	2.69	1.22	0.59	1.29



Alt Model-Shift Uniqueness Test

001576144-05, P = 459.773096 Days, E = 286.396509 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.37	13.5	13.4	14.1	5.65	3.60	1.62	-7.05	-7.74	0.06	-0.63	1.33	1.01	0.51	1.33



Stellar Parameters For KIC 001576144

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	9181^{+251}_{-430}	$4.003^{+0.234}_{-0.156}$	$0.070^{+0.150}_{-0.700}$	$2.507^{+0.743}_{-0.909}$	$2.308^{+0.361}_{-0.721}$	$0.206^{+0.334}_{-0.097}$
	+3%/-5%	+6%/-4%	+214%/-1000%	+30%/-36%	+16%/-31%	+162%/-47%
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 001576144-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-373 ± 24	$16.74^{+16.88}_{-11.20}$	712^{+57}_{-64}	4882^{+3800}_{-1092}	1634^{+13107}_{-1200}
Alt.	-584 ± 43	$14.02^{+14.68}_{-9.94}$	718^{+55}_{-66}	5728^{+6822}_{-1415}	3797^{+41946}_{-2900}

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

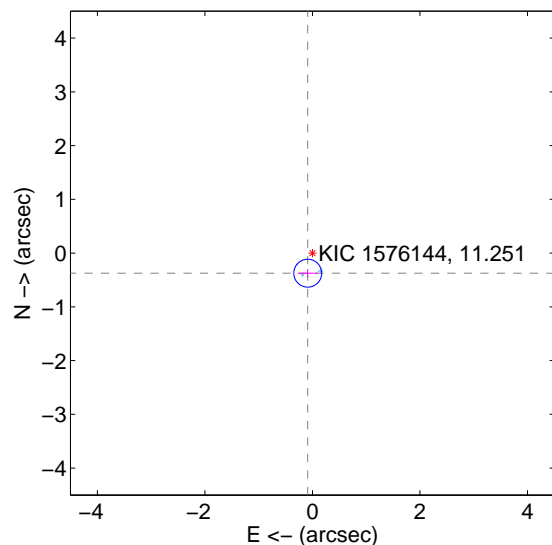
Supplemental centroid analysis for 001576144-05. **Kepler magnitude: 11.25.** Transit SNR 9.61

There are 2 quarters with good PRF difference image offsets

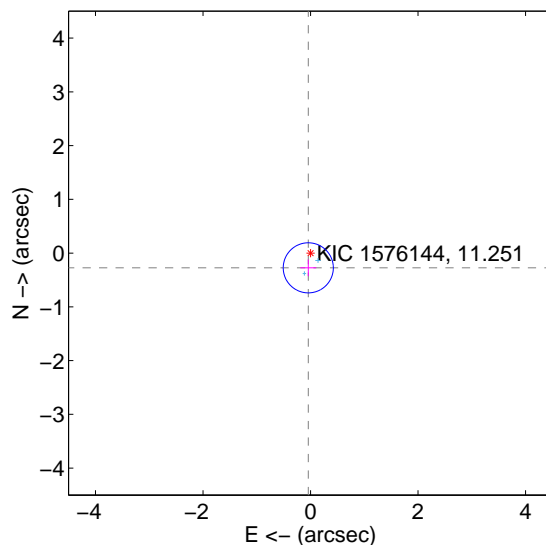
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.384 ± 0.086	4.44	0.088 ± 0.187	-0.374 ± 0.077
PRF-fit source offset from KIC position	0.277 ± 0.155	1.78	0.042 ± 0.150	-0.274 ± 0.155
photometric centroid source offset	1.11 ± 0.88	1.27	-0.22 ± 0.57	1.09 ± 0.89

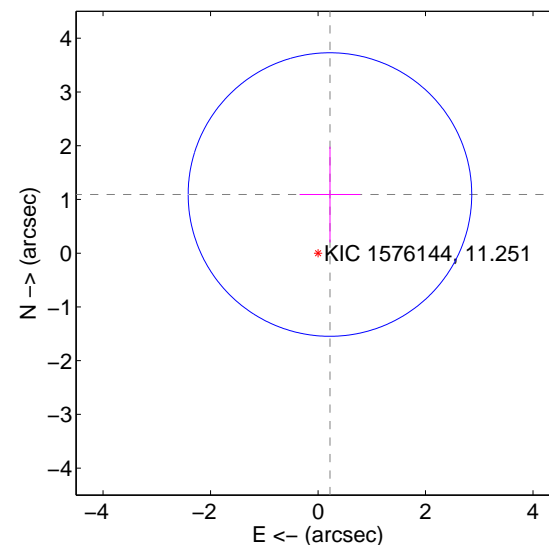
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

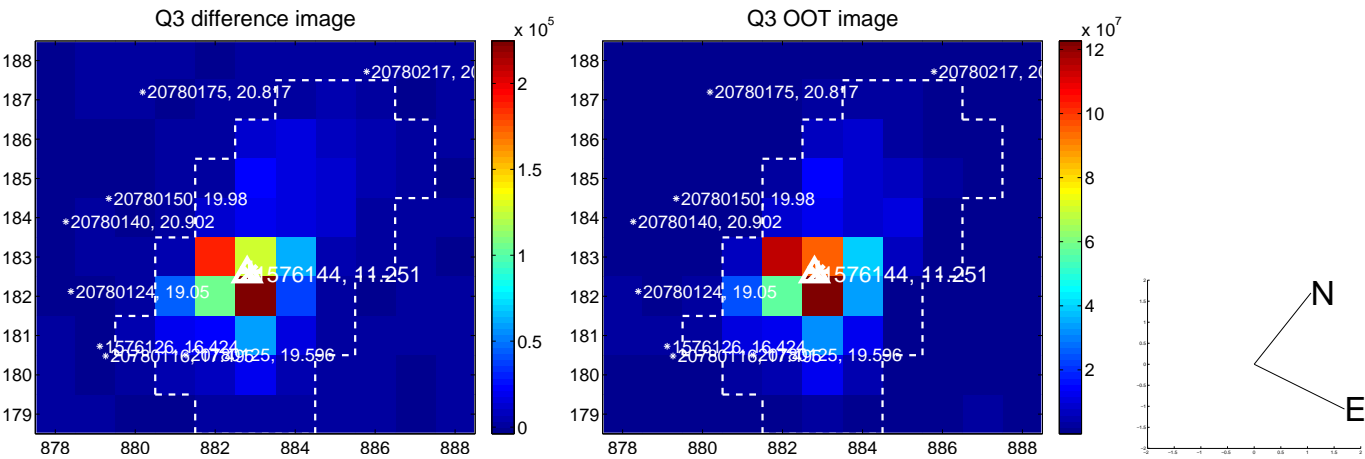


offset from photometric centroids

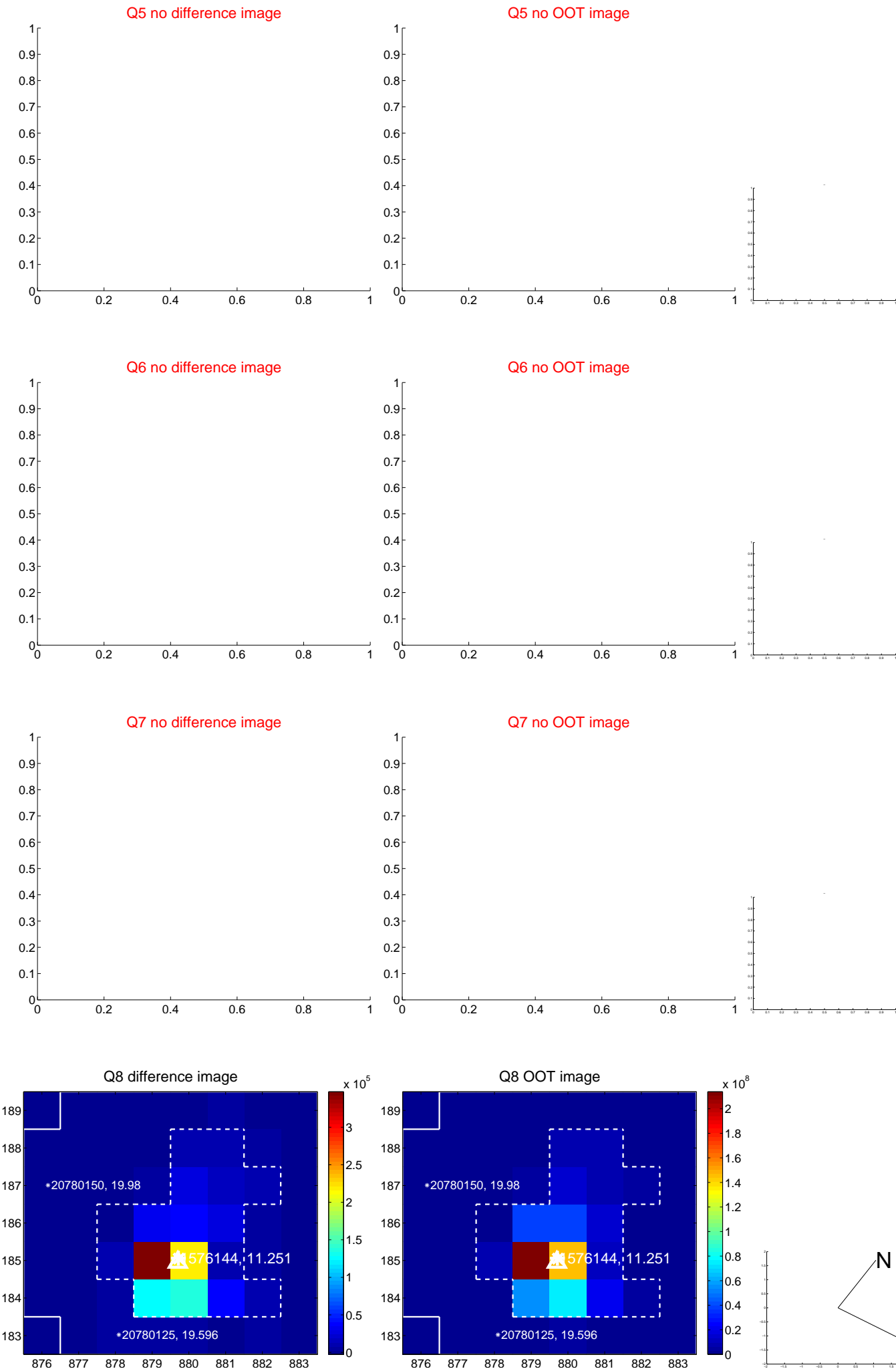


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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



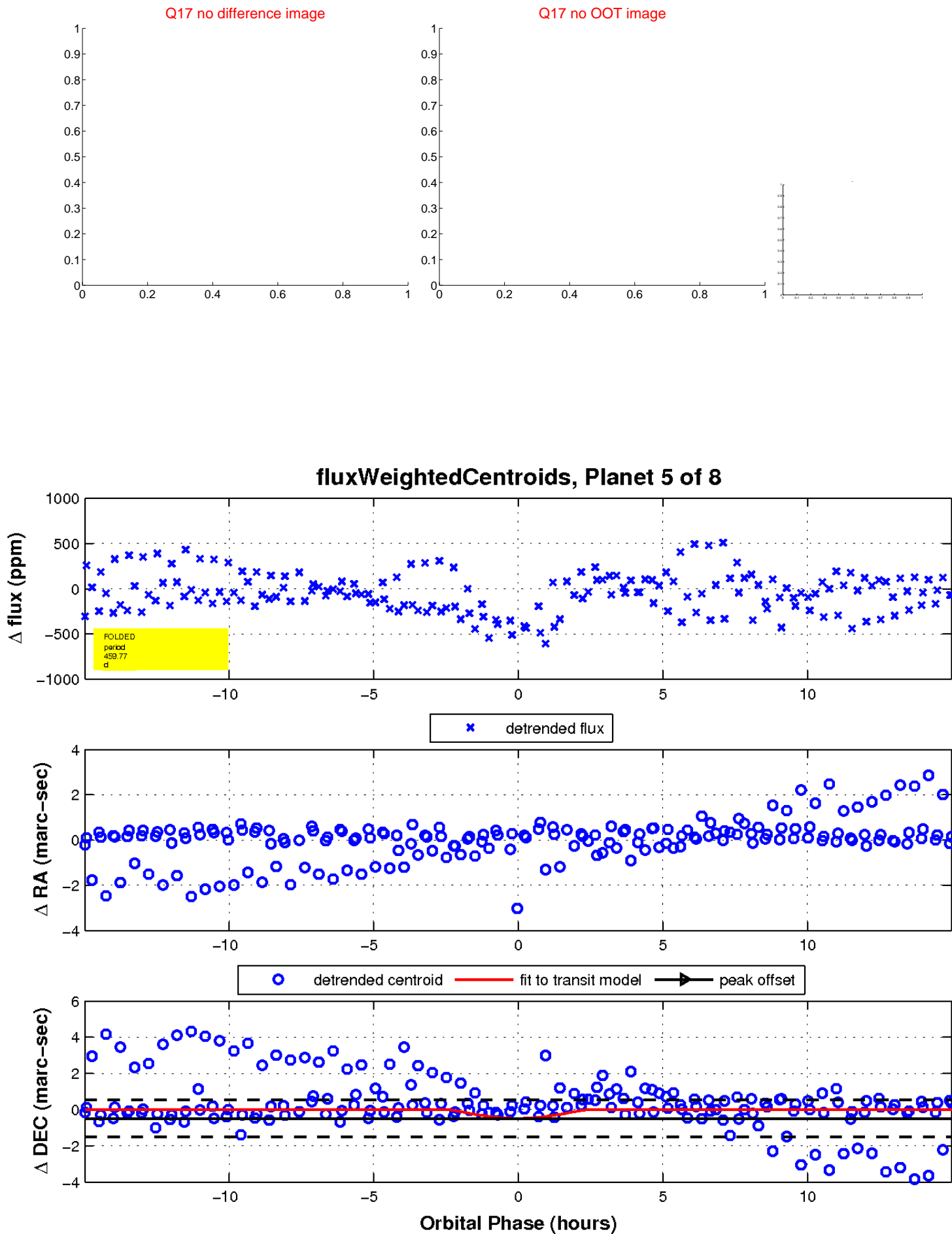
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



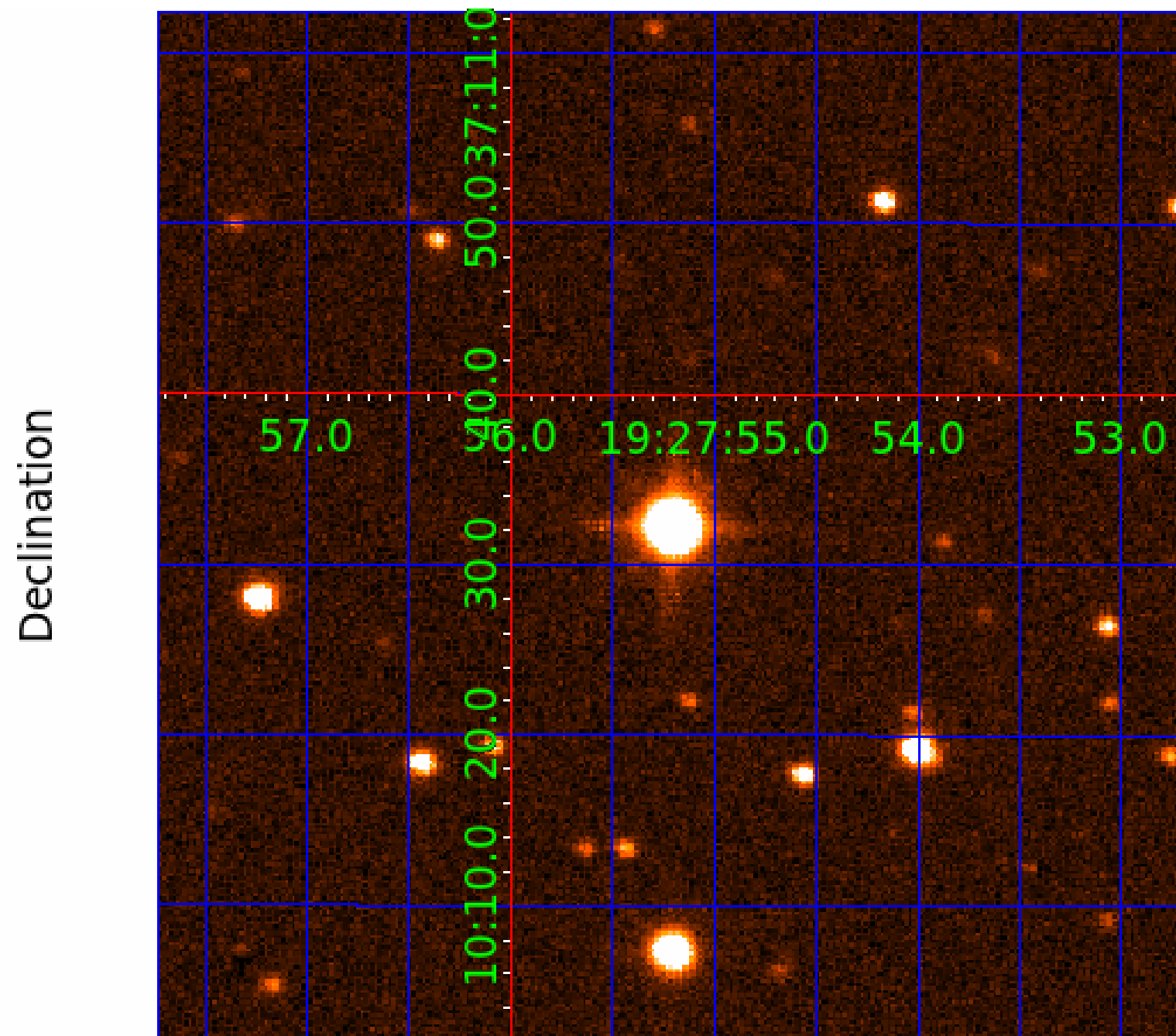
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 001576144

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})
001576144-01	OBS	No	548.743238	406.815173	453.5	6.246	21.3	12.0	2.51	9181	5.80	13.31
001576144-02	OBS	No	2.686670	132.159784	39.6	1.993	14.9	16.1	2.51	9181	1.82	16005.58
001576144-03	OBS	No	2.686662	132.297140	14.3	6.511	12.3	5.5	2.51	9181	1.09	16005.64
001576144-04	OBS	No	498.430874	253.555320	171.7	7.935	10.6	3.5	2.51	9181	3.52	15.13
001576144-05	OBS	No	459.770198	286.410016	548.0	5.054	11.4	9.6	2.51	9181	10.80	16.85
001576144-06	OBS	No	376.172555	248.855737	416.9	4.591	9.3	10.0	2.51	9181	8.82	22.01
001576144-07	OBS	No	543.091418	407.375363	248.7	10.645	8.9	8.6	2.51	9181	4.26	13.49
001576144-08	OBS	No	197.220930	210.992354	206.7	9.324	9.0	8.6	2.51	9181	4.28	52.07

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001576144-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
001576144-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—CENT_SATURATED
001576144-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—SAME_NTL_PERIOD—CENT_SATURATED
001576144-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED—HALO_GHOST
001576144-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-08	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED—HALO_GHOST

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

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

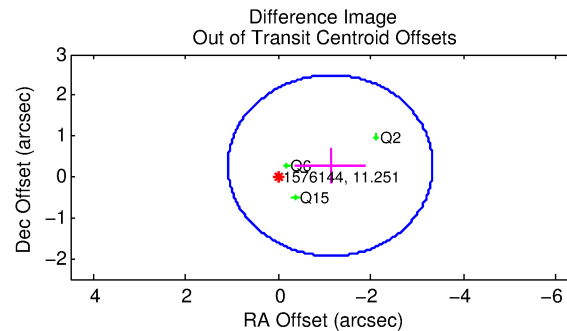
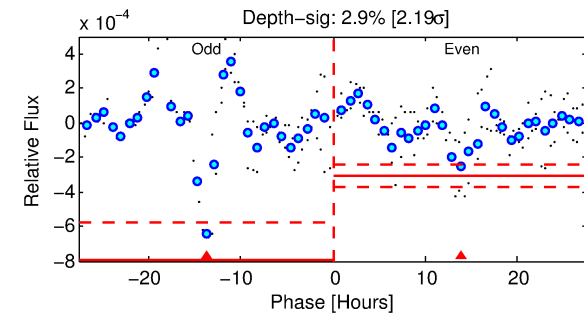
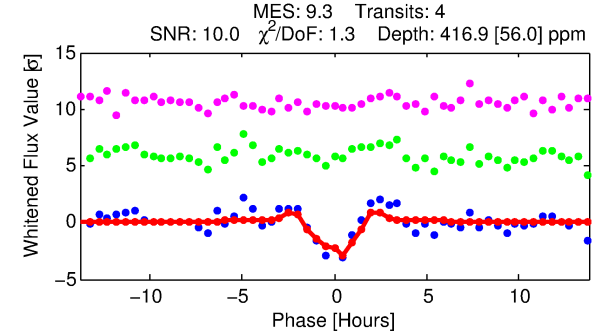
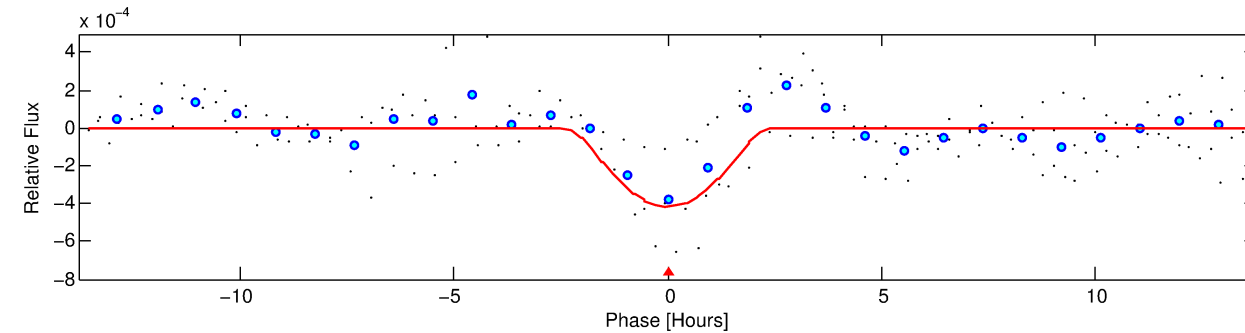
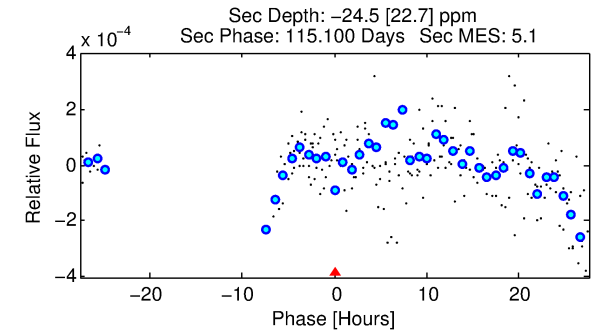
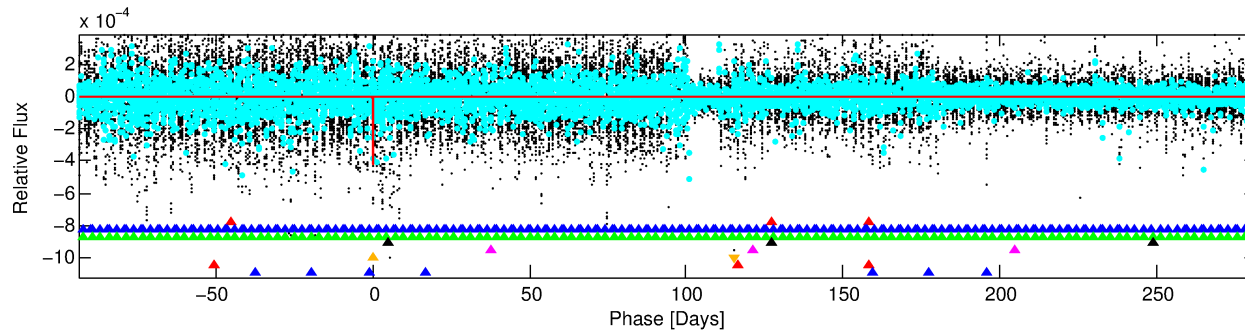
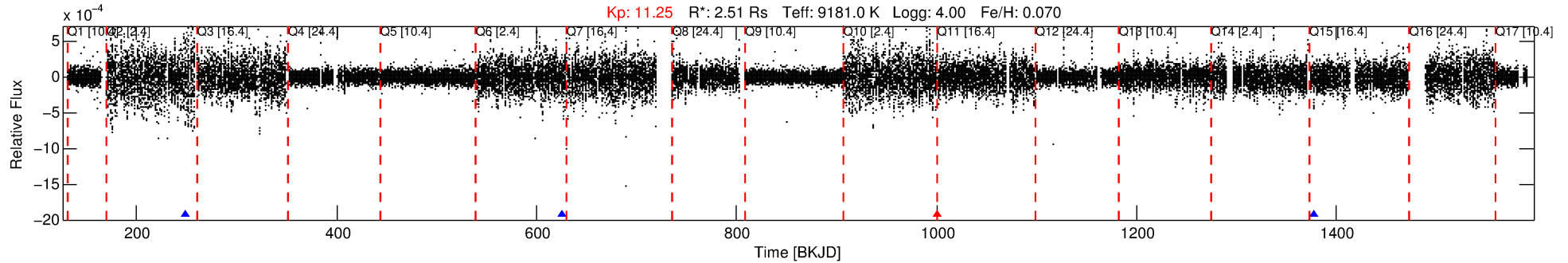
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 001576144-06

No Significant Match Found

DV One-Page Summary

KIC: 1576144 Candidate: 6 of 8 Period: 376.173 d



DV Fit Results:

Period = 376.17255 [0.00483] d
Epoch = 248.8557 [0.0103] BKJD
Rp/R* = 0.0322 [0.0490]
a/R* = 169.10 [74.57]
b = 1.00 [0.08]
Seff = 22.01 [10.39]
Teff = 552 [65] K
Rp = 8.82 [13.78] Re
a = 1.3481 [0.4060] AU
Ag = N/A
Teffp = N/A

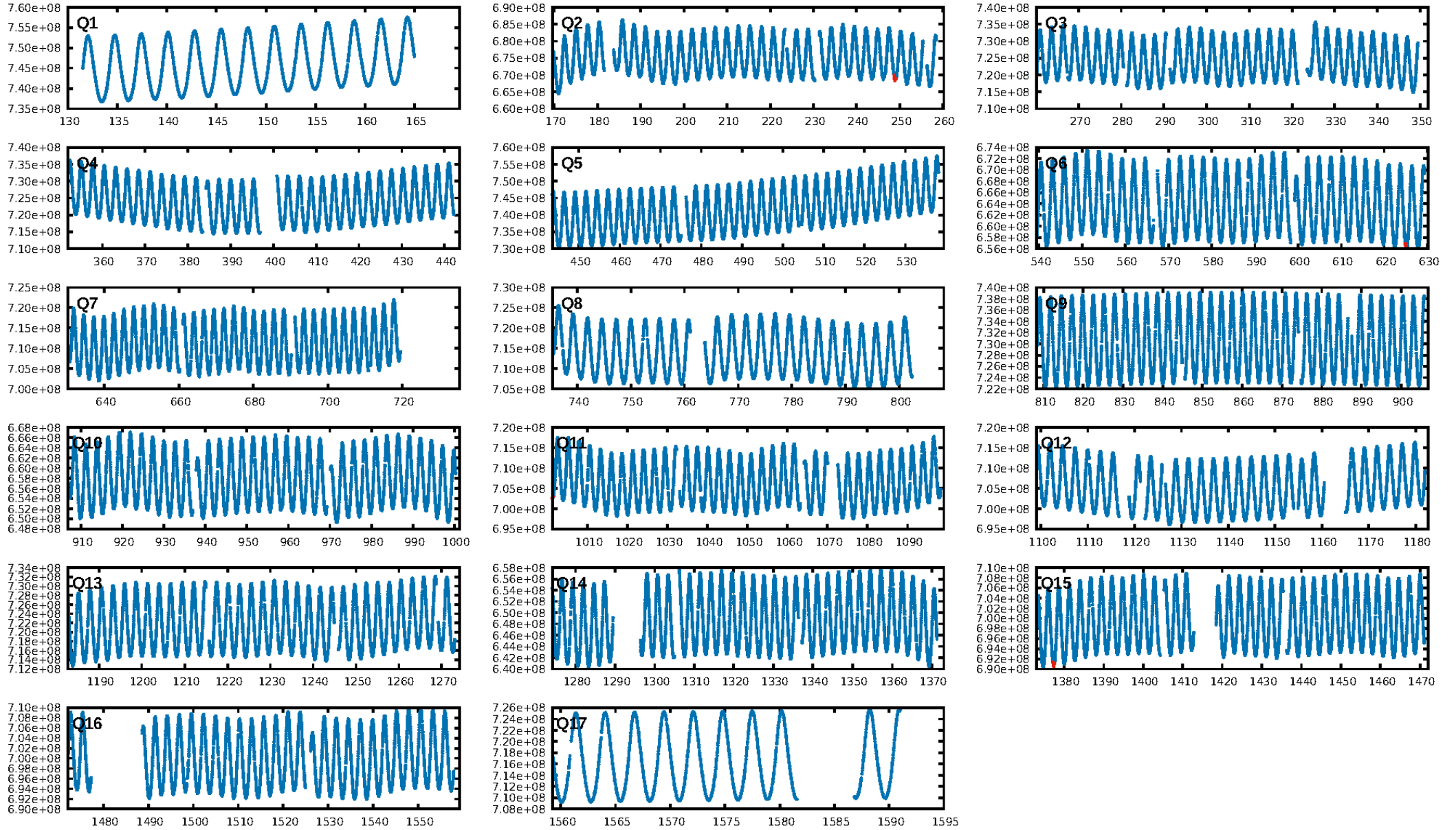
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [413.23σ]
LongPeriod-sig: 100.0% [293.84σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 44.7%
Bootstrap-pfa: 1.92e-10
RollingBand-fgt: 0.75 [3/4]
GhostDiagnostic-chr: 1.315
Centroid-sig: N/A
Centroid-so: 0.624 arcsec [0.61σ]
OotOffset-rm: 1.159 arcsec [1.57σ]
KicOffset-rm: 1.299 arcsec [1.74σ]
OotOffset-st: 2/1/0/0 [3]
KicOffset-st: 2/1/0/0 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 1.00 [3/3]

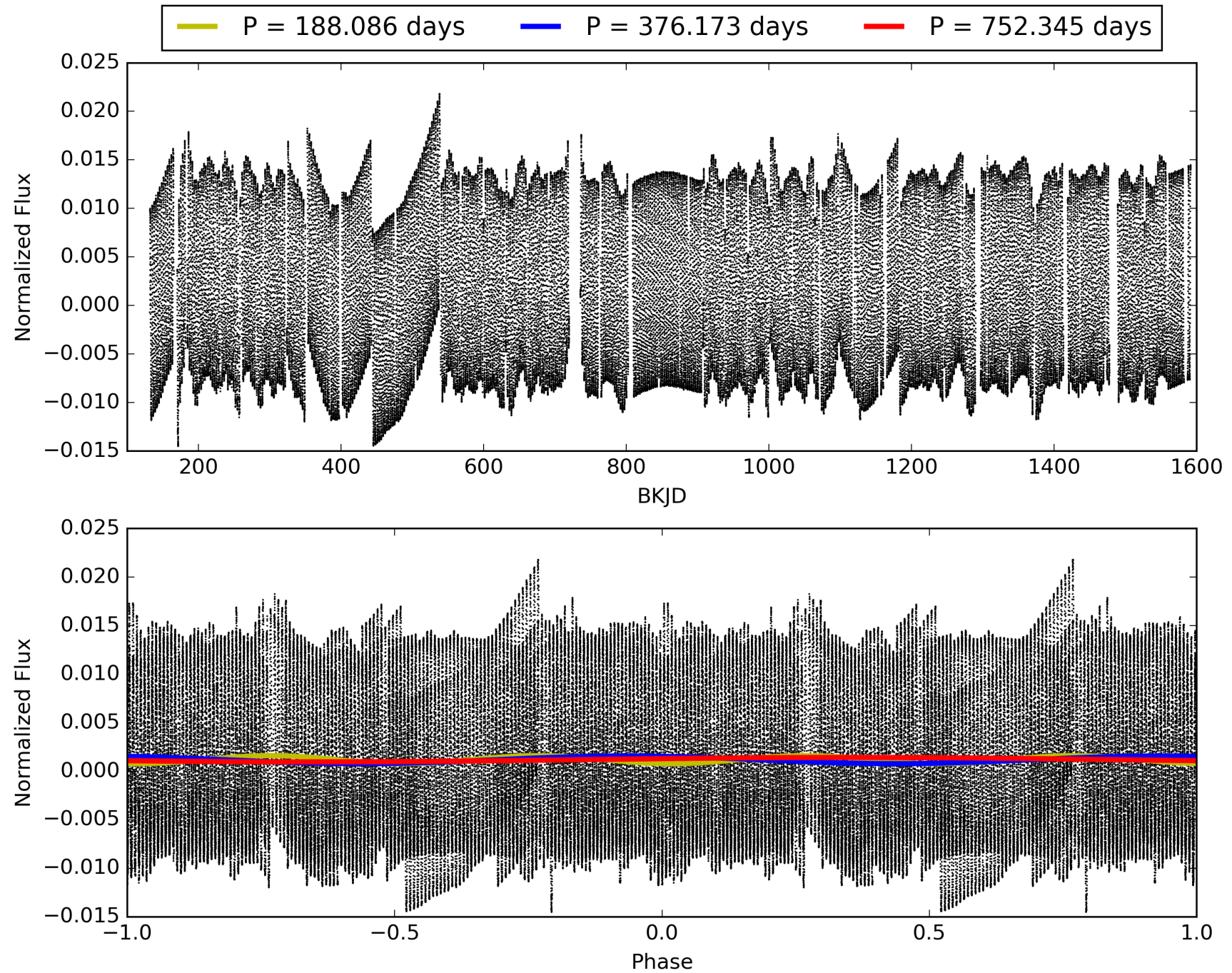
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:51:35 Z

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

TCE 001576144-06, PDC Light Curves

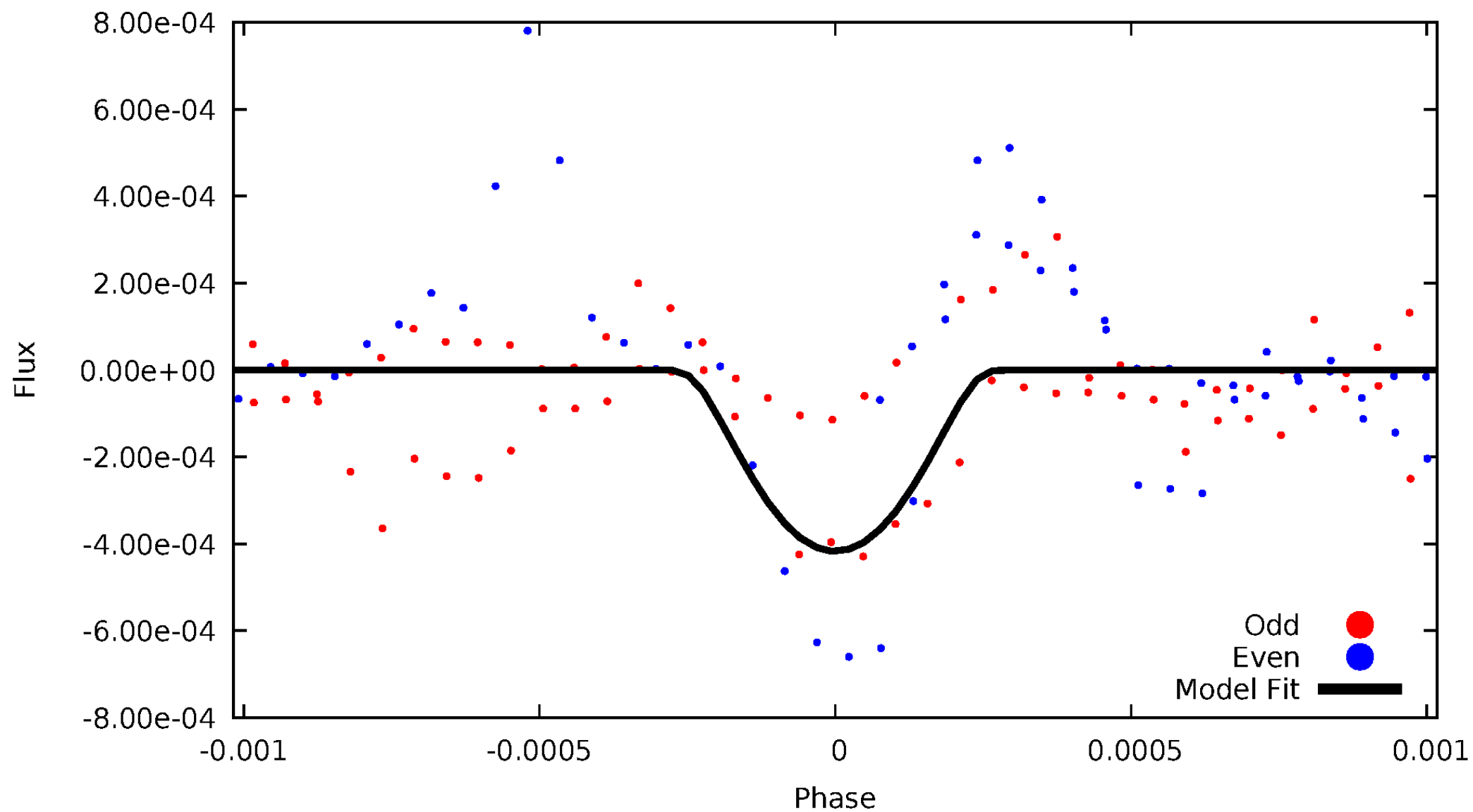


TCE 001576144-06



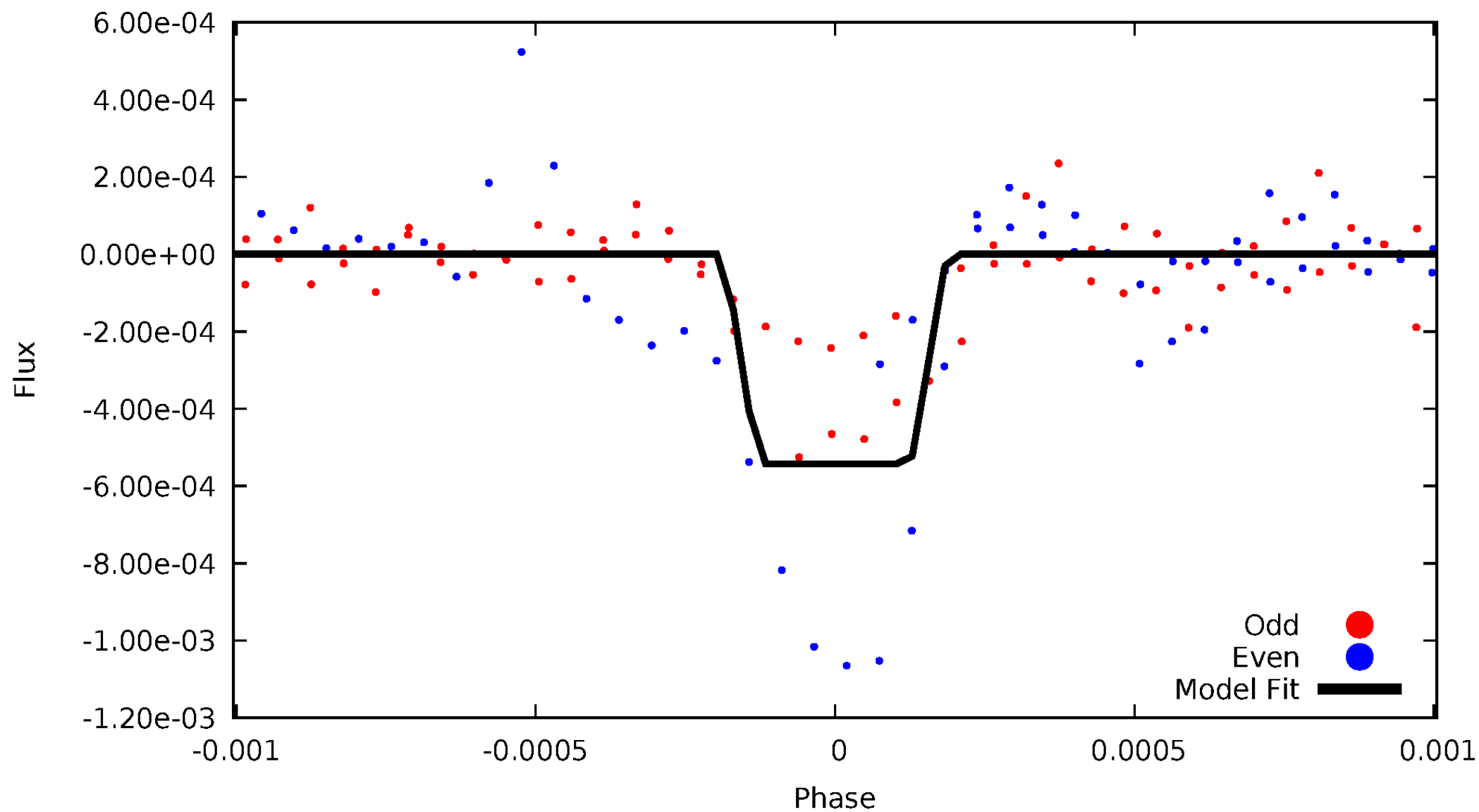
DV Odd/Even

TCE 001576144-06



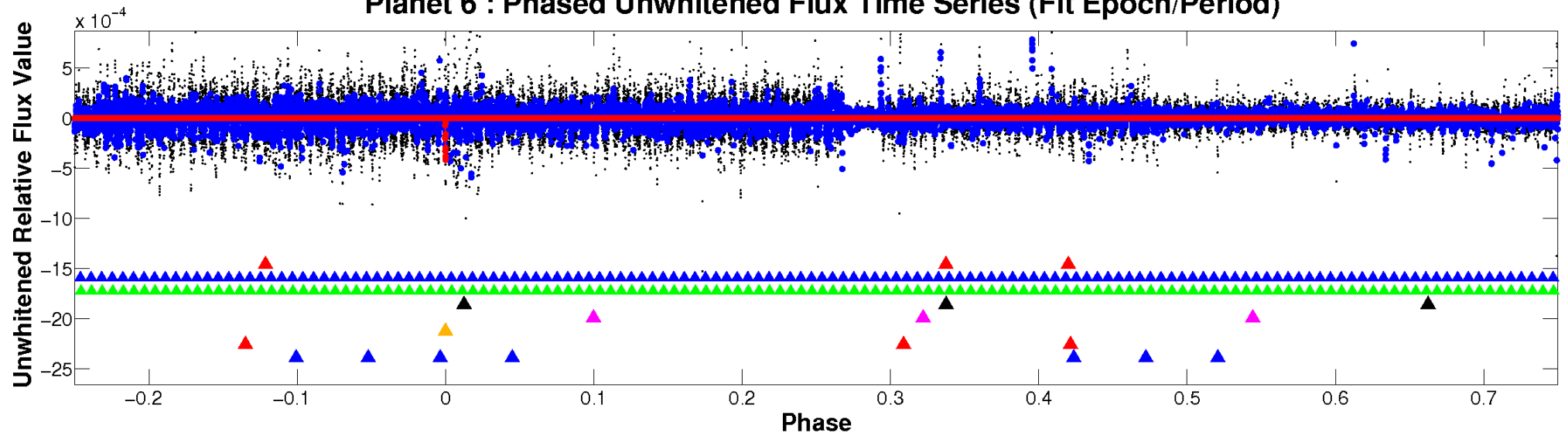
ALT Odd/Even

TCE 001576144-06

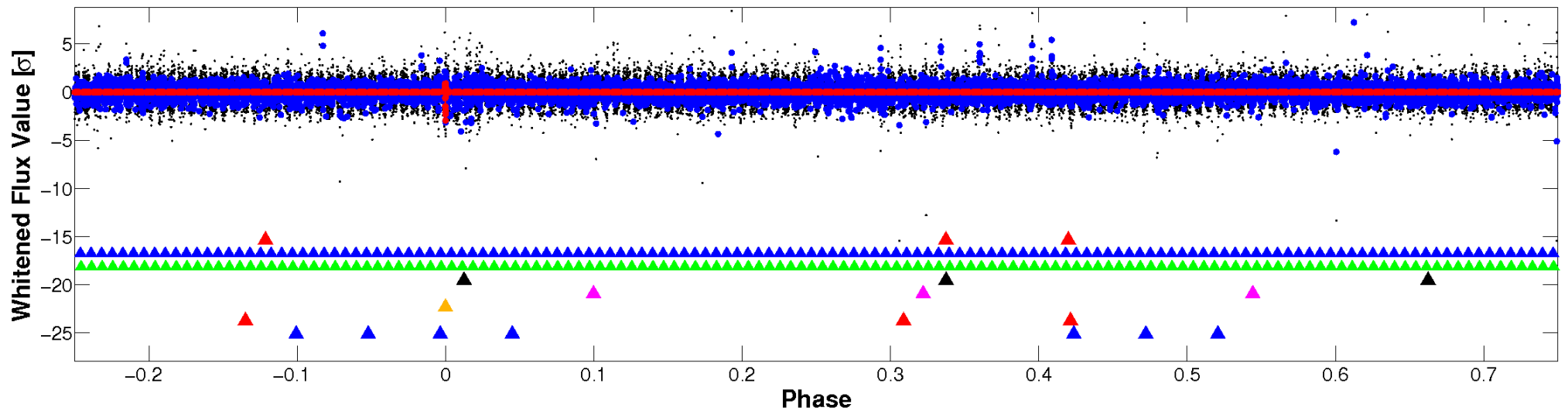


Non-Whitened Vs. Whitened Light Curve

Planet 6 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

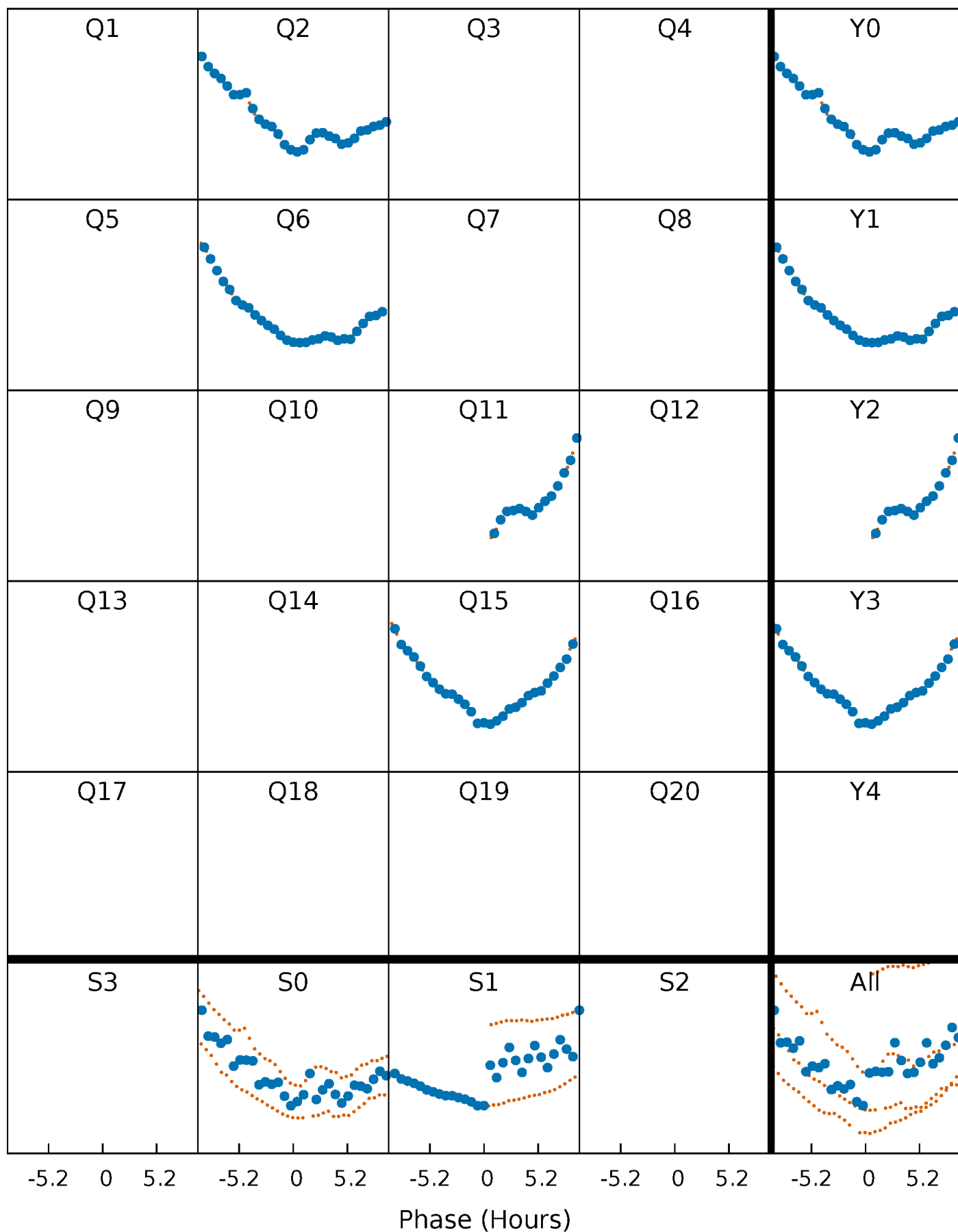


Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



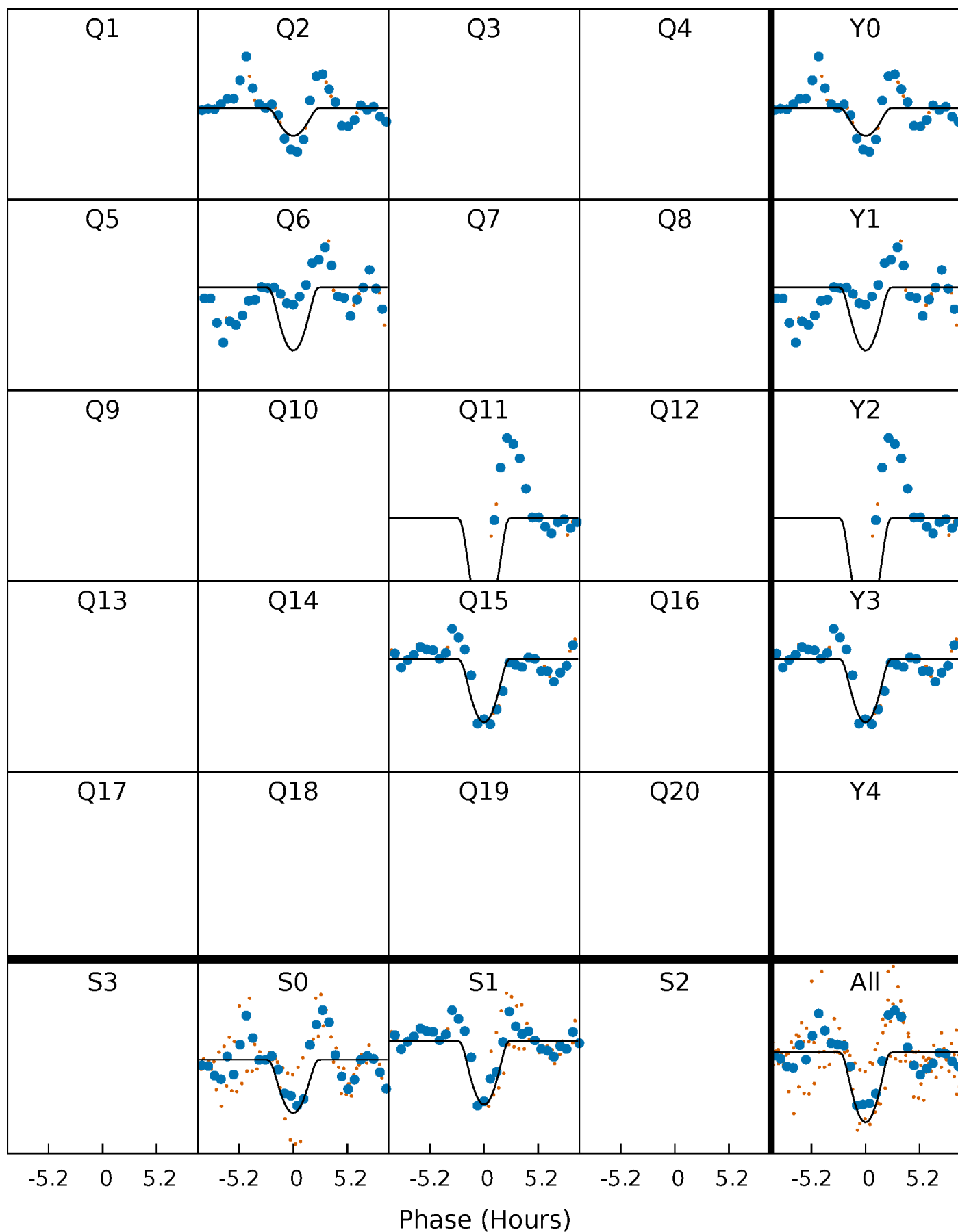
PDC Quarter-Phased Transit Curves

TCE 001576144-06 P=376.172555 Days $T_0=248.855737$ (BKJD)



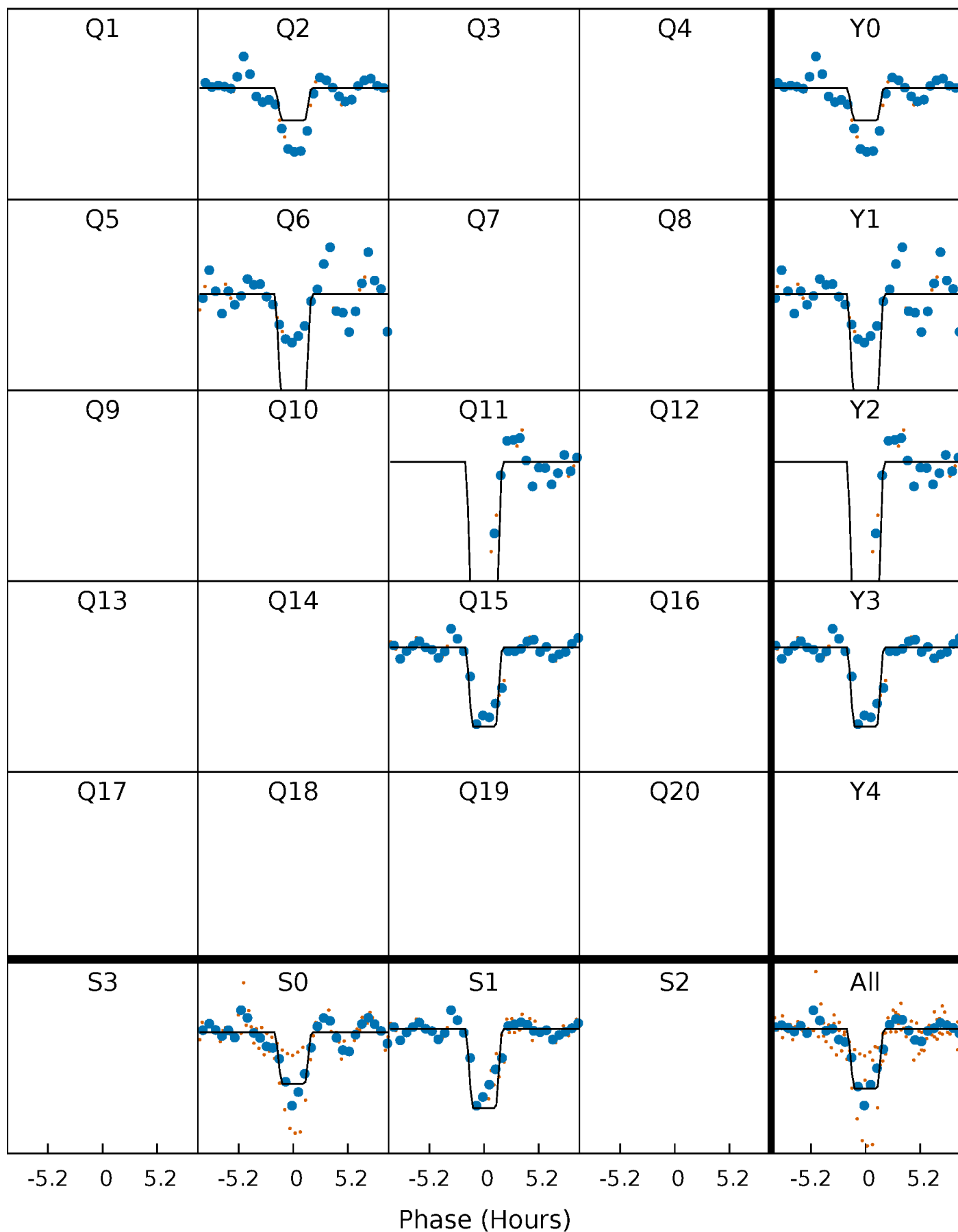
DV Quarter-Phased Transit Curves

TCE 001576144-06 P=376.172555 Days $T_0=248.855737$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

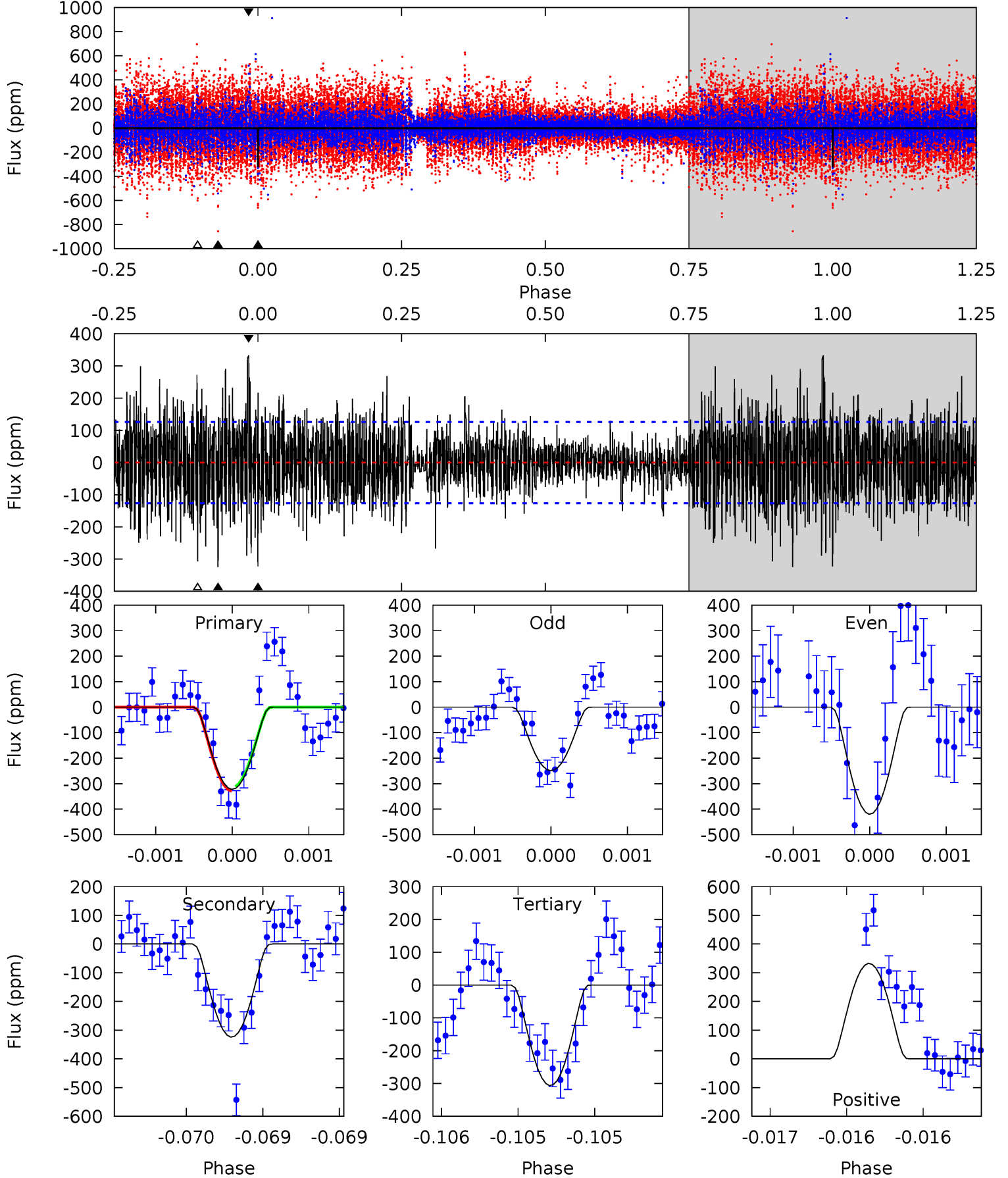
TCE 001576144-06 P=376.171940 Days $T_0=248.857110$ (BKJD)



DV Model-Shift Uniqueness Test

001576144-06, P = 376.172555 Days, E = 248.855737 Days

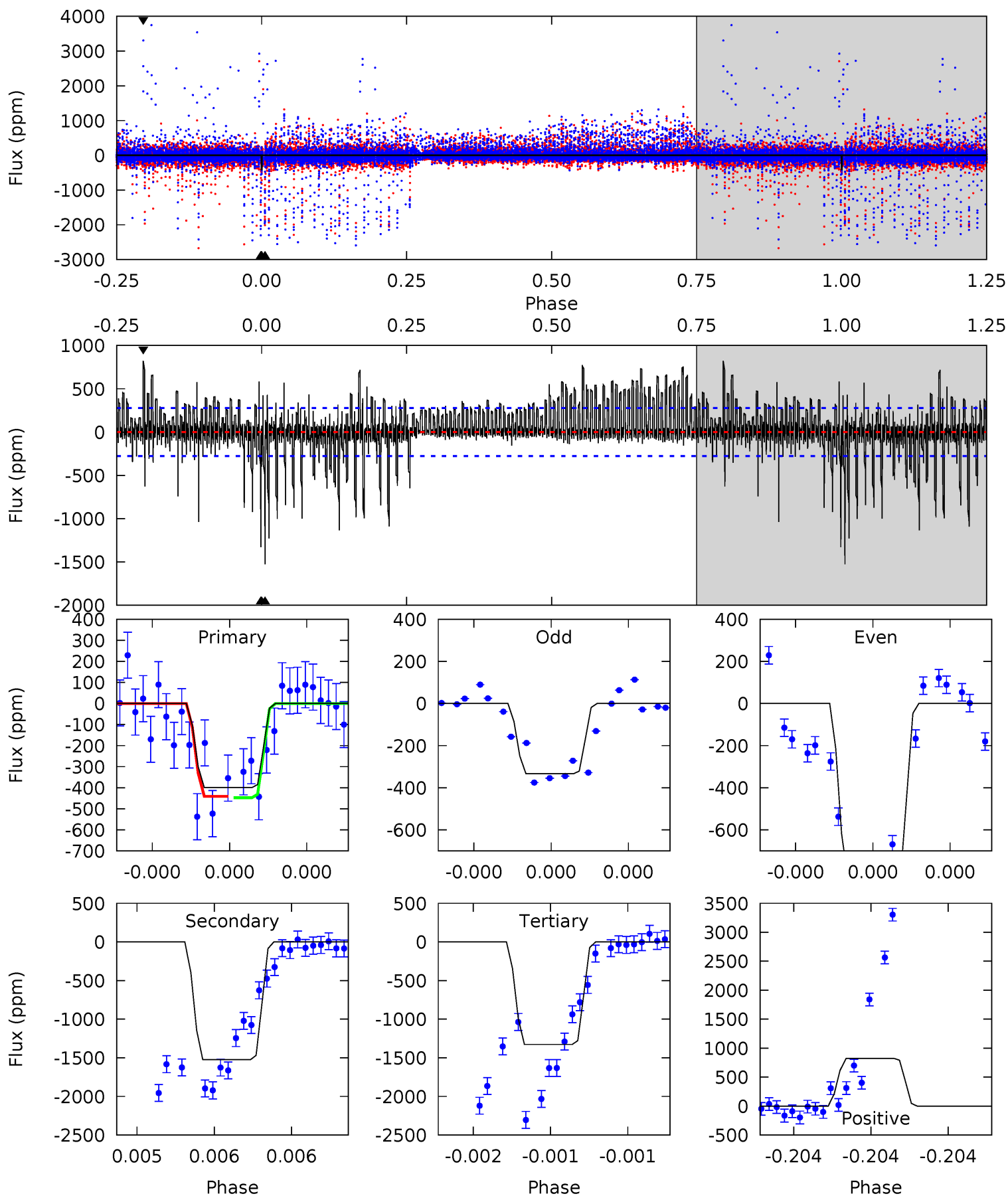
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.2	14.3	13.5	14.7	5.56	3.46	3.05	0.69	-0.47	0.78	-0.37	3.45	1.01	0.51	0.40



Alt Model-Shift Uniqueness Test

001576144-06, P = 376.171940 Days, E = 248.857110 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.11	31.0	27.0	16.7	5.63	3.57	2.32	-18.9	-8.61	4.01	14.3	4.31	1.29	0.35	0.07



Stellar Parameters For KIC 001576144

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	9181^{+251}_{-430}	$4.003^{+0.234}_{-0.156}$	$0.070^{+0.150}_{-0.700}$	$2.507^{+0.743}_{-0.909}$	$2.308^{+0.361}_{-0.721}$	$0.206^{+0.334}_{-0.097}$
	+3%/-5%	+6%/-4%	+214%/-1000%	+30%/-36%	+16%/-31%	+162%/-47%
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 001576144-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-324 ± 23	$12.11^{+10.82}_{-7.51}$	761^{+56}_{-72}	5424^{+3649}_{-1250}	2138^{+12580}_{-1554}
Alt.	-1524 ± 49	$11.62^{+11.92}_{-7.33}$	760^{+64}_{-62}	8337^{+11004}_{-2519}	10979^{+70016}_{-8188}

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

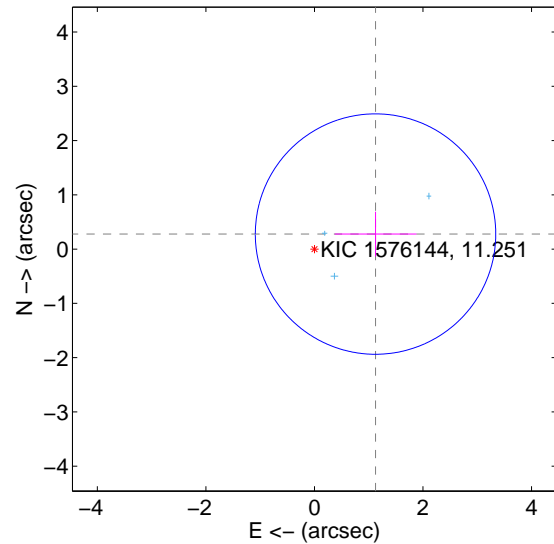
Supplemental centroid analysis for 001576144-06. **Kepler magnitude: 11.25.** Transit SNR 9.95

There are 3 quarters with good PRF difference image offsets

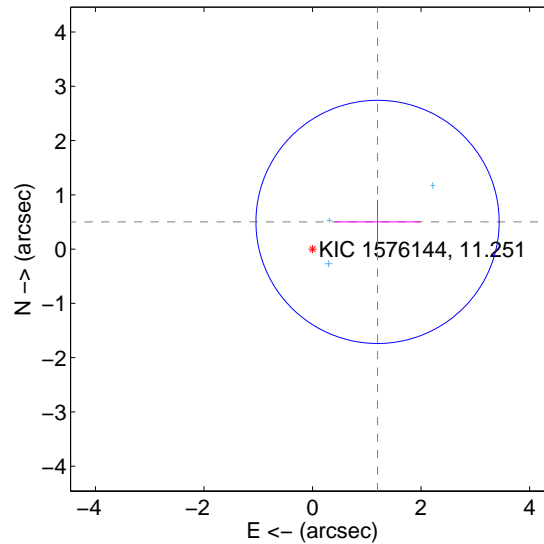
The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.159 ± 0.738	1.57	-1.126 ± 0.753	0.277 ± 0.413
PRF-fit source offset from KIC position	1.299 ± 0.747	1.74	-1.198 ± 0.791	0.501 ± 0.406
photometric centroid source offset	0.62 ± 1.03	0.61	0.23 ± 0.68	0.58 ± 1.08

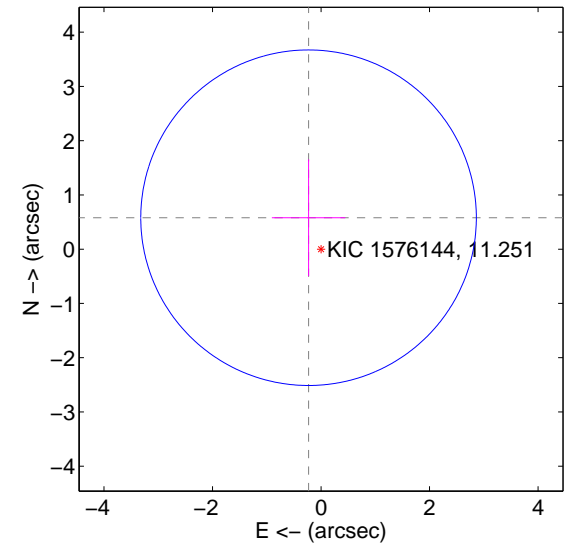
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

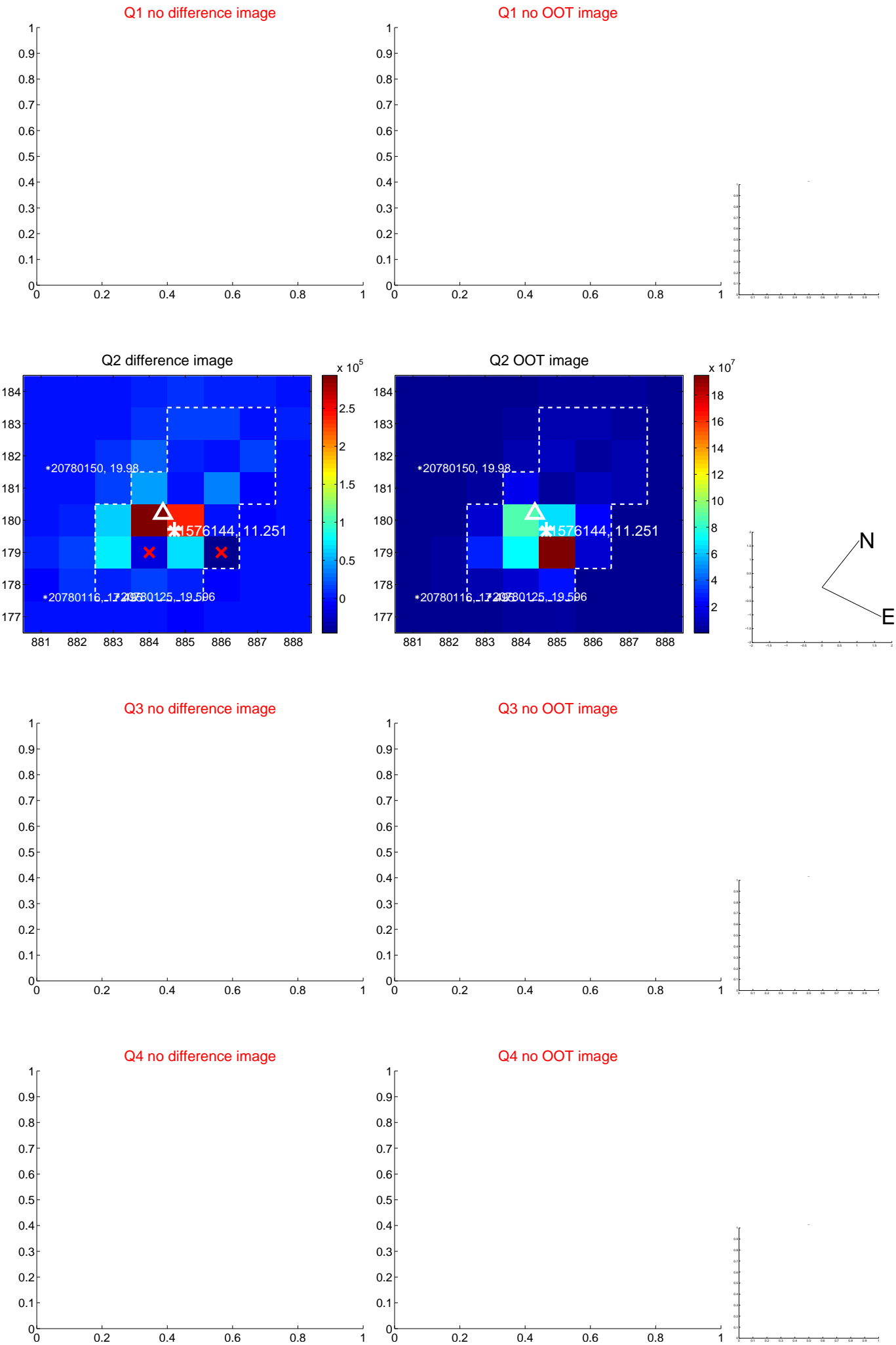


offset from photometric centroids



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.

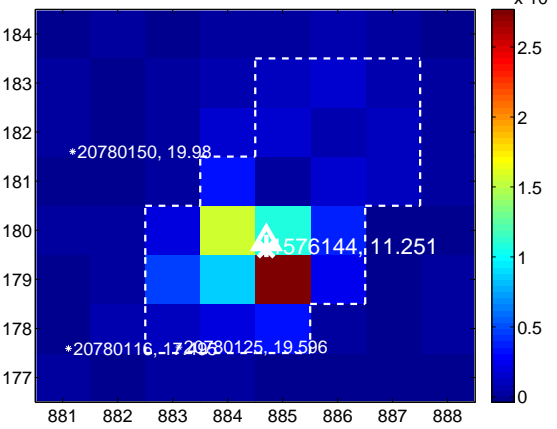
Q5 no difference image



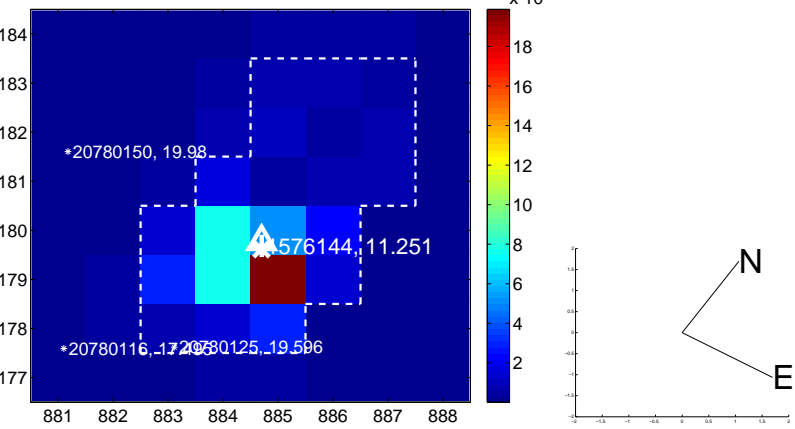
Q5 no OOT image



Q6 difference image



Q6 OOT image



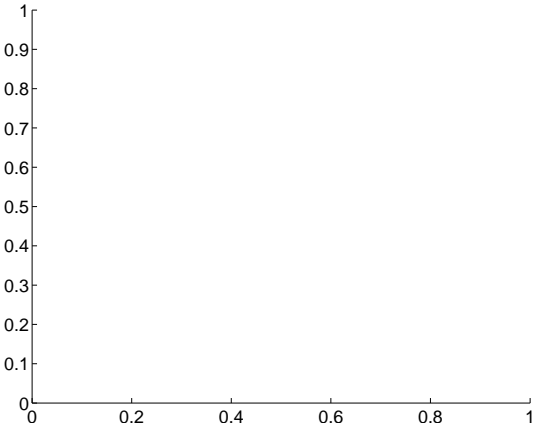
Q7 no difference image



Q7 no OOT image



Q8 no difference image



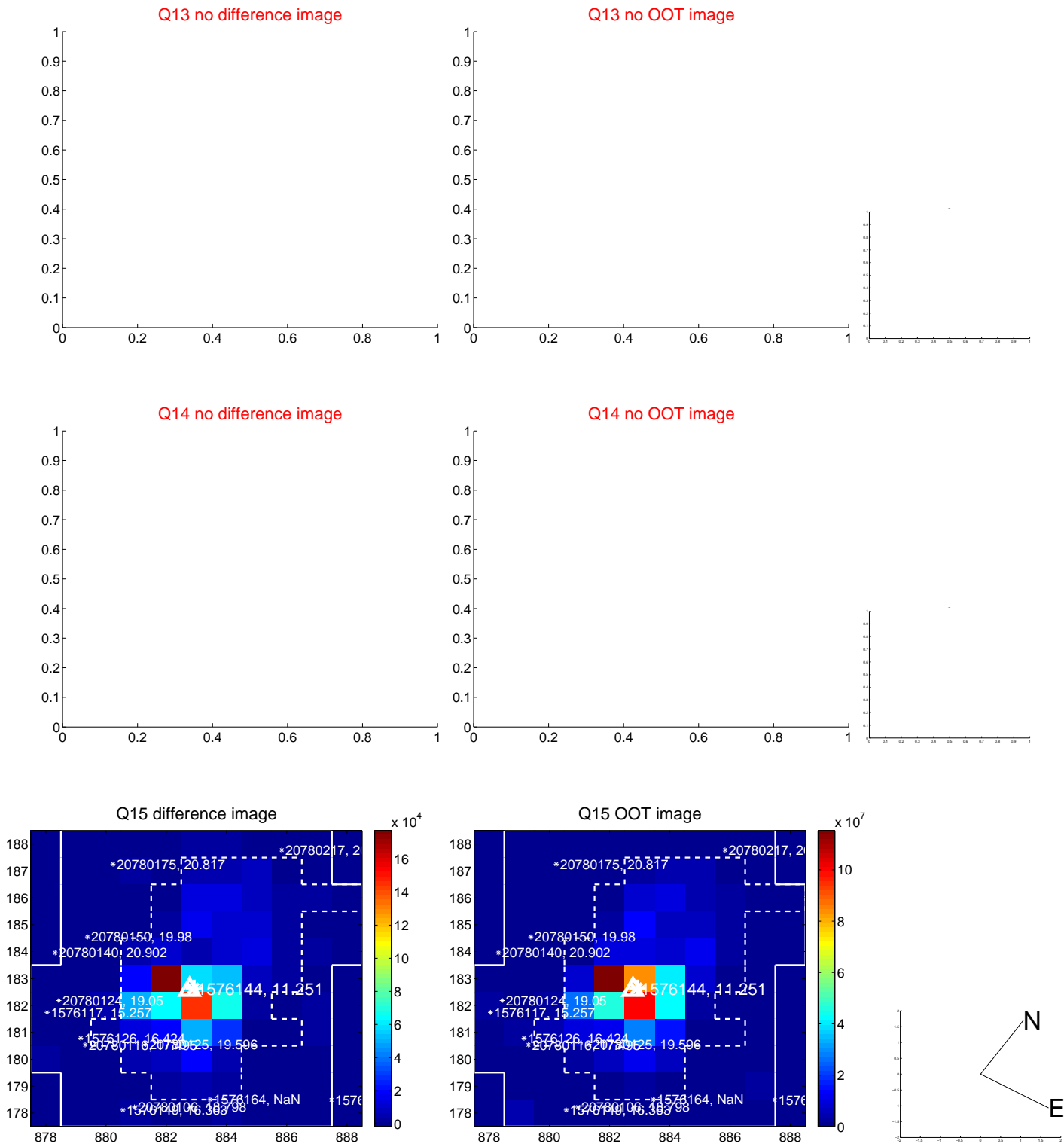
Q8 no OOT image



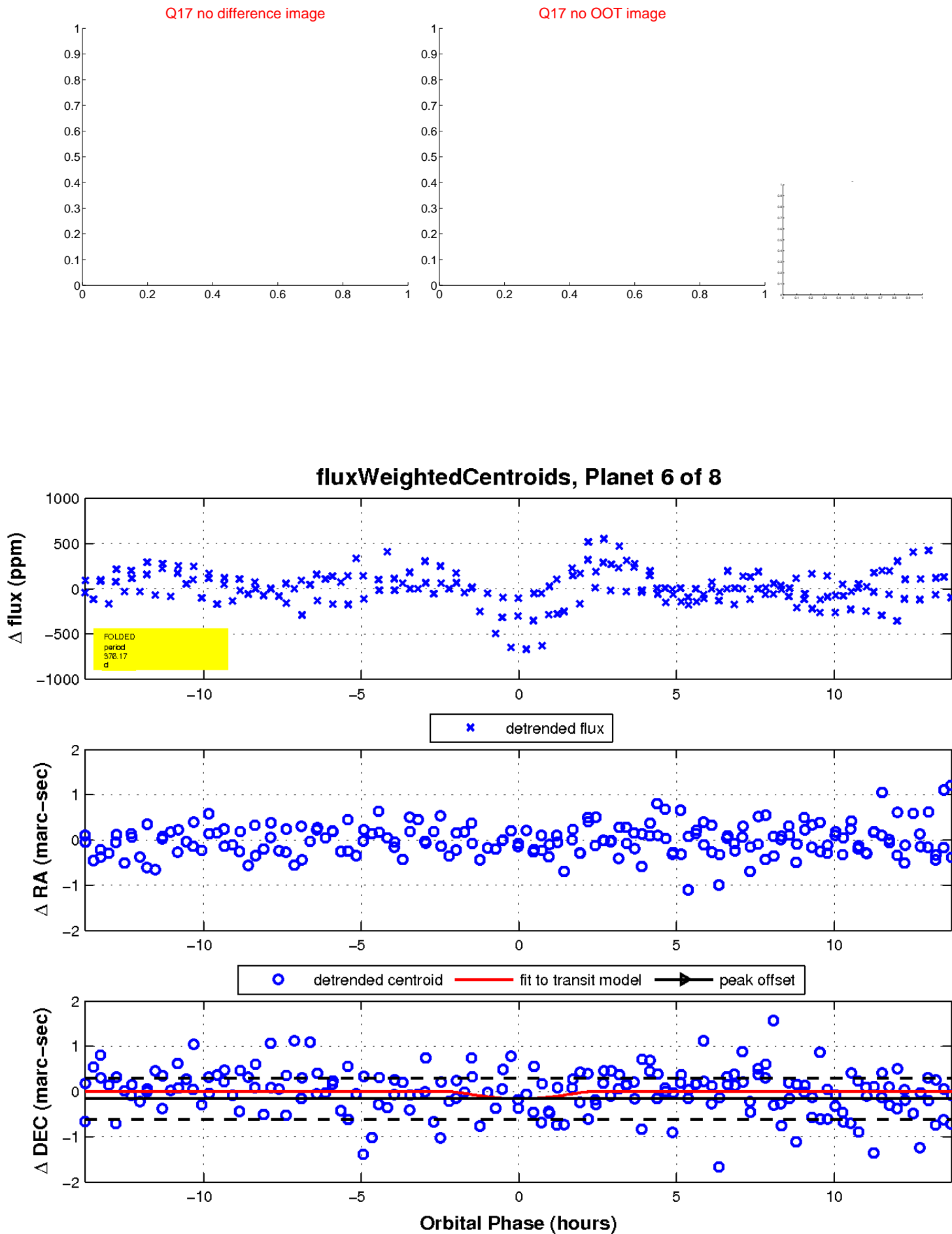
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

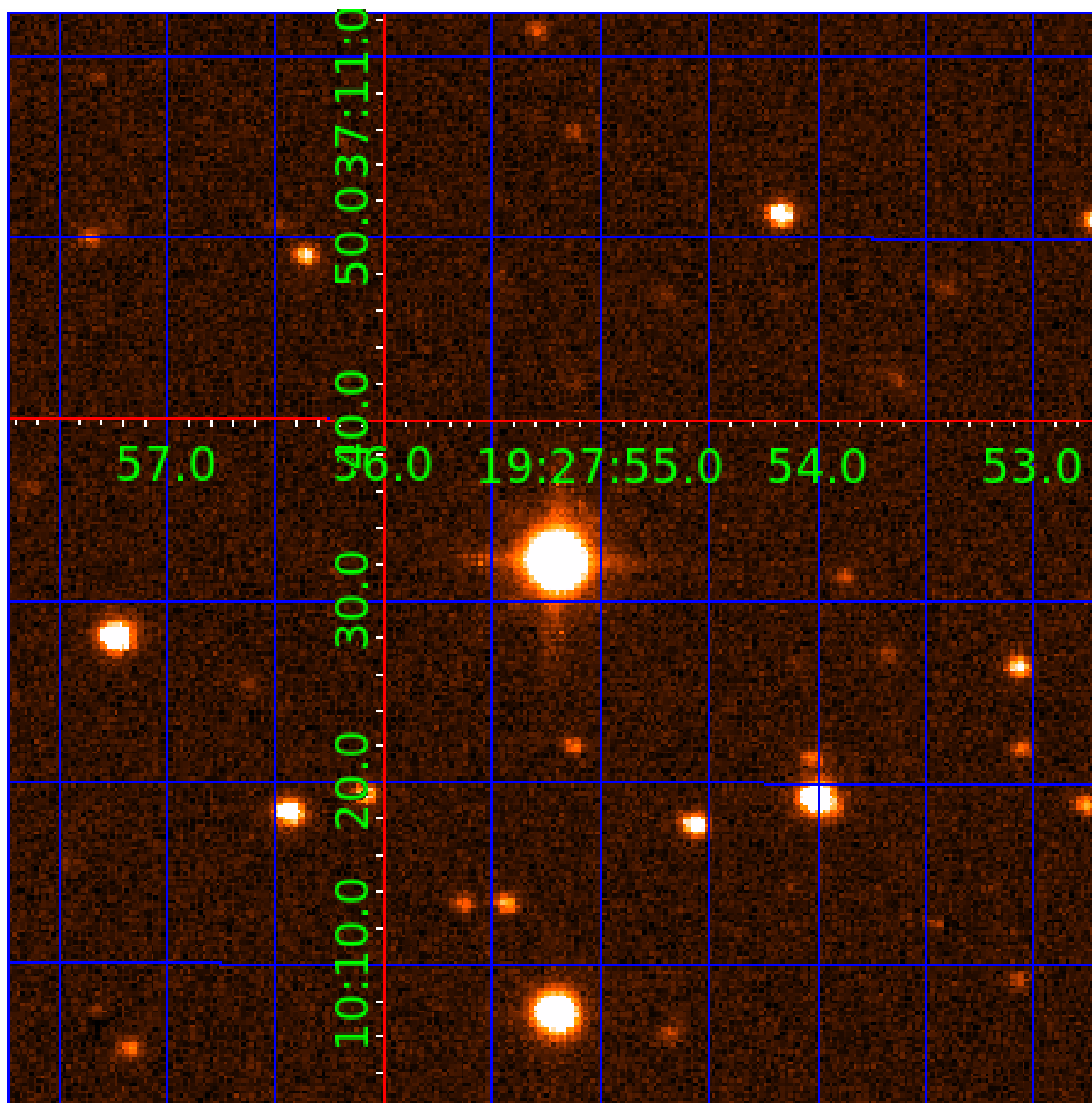


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 001576144

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})
001576144-01	OBS	No	548.743238	406.815173	453.5	6.246	21.3	12.0	2.51	9181	5.80	13.31
001576144-02	OBS	No	2.686670	132.159784	39.6	1.993	14.9	16.1	2.51	9181	1.82	16005.58
001576144-03	OBS	No	2.686662	132.297140	14.3	6.511	12.3	5.5	2.51	9181	1.09	16005.64
001576144-04	OBS	No	498.430874	253.555320	171.7	7.935	10.6	3.5	2.51	9181	3.52	15.13
001576144-05	OBS	No	459.770198	286.410016	548.0	5.054	11.4	9.6	2.51	9181	10.80	16.85
001576144-06	OBS	No	376.172555	248.855737	416.9	4.591	9.3	10.0	2.51	9181	8.82	22.01
001576144-07	OBS	No	543.091418	407.375363	248.7	10.645	8.9	8.6	2.51	9181	4.26	13.49
001576144-08	OBS	No	197.220930	210.992354	206.7	9.324	9.0	8.6	2.51	9181	4.28	52.07

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001576144-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
001576144-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—CENT_SATURATED
001576144-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—SAME_NTL_PERIOD—CENT_SATURATED
001576144-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED—HALO_GHOST
001576144-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-08	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED—HALO_GHOST

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

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

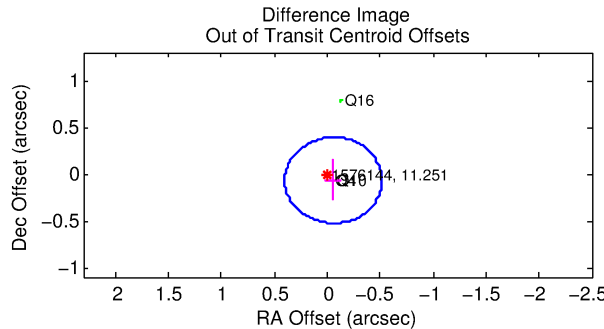
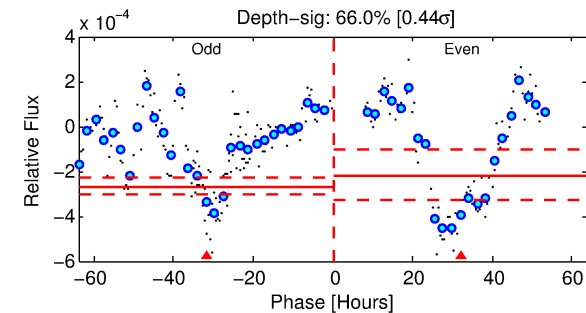
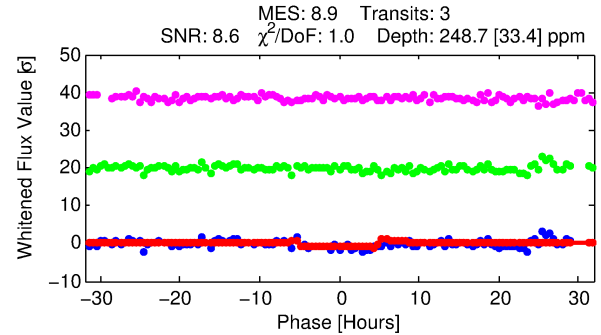
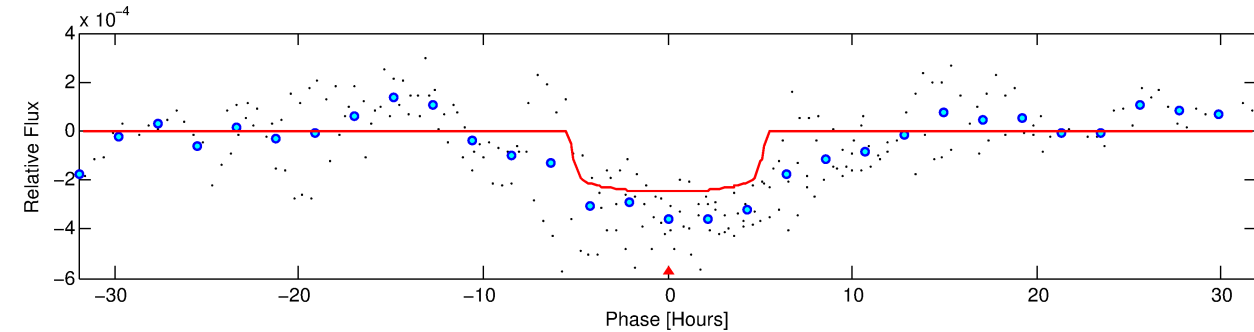
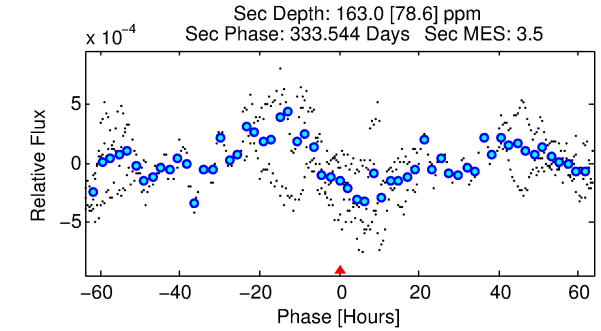
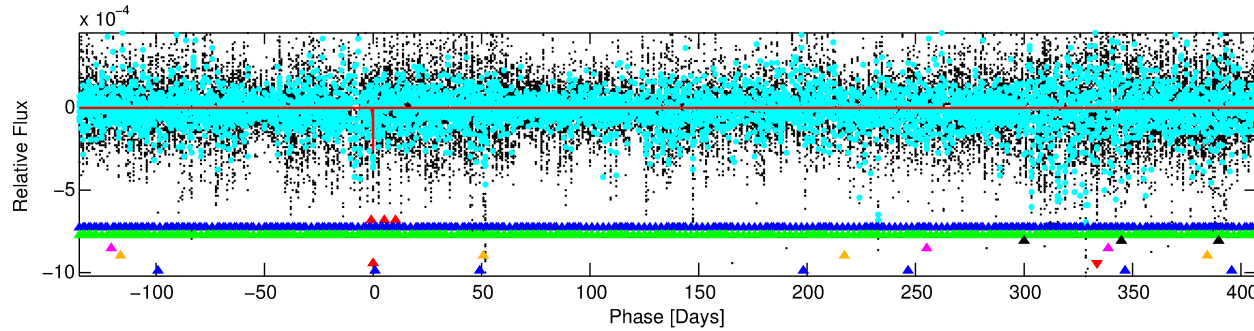
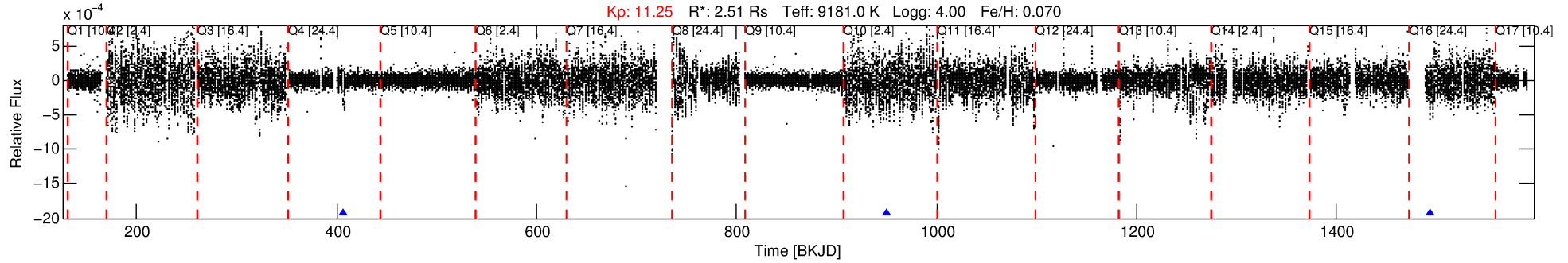
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 001576144-07

No Significant Match Found

DV One-Page Summary

KIC: 1576144 Candidate: 7 of 8 Period: 543.091 d



DV Fit Results:

Period = 543.09142 [0.00616] d
Epoch = 407.3754 [0.0095] BKJD
Rp/R* = 0.0156 [0.0125]
a/R* = 279.80 [1574.64]
b = 0.72 [3.81]
Seff = 13.49 [6.36]
Teq = 489 [58] K
Rp = 4.26 [3.76] Re
a = 1.7221 [0.5186] AU
Ag = 14636.36 [25400.51] [0.58 sigma]
Teffp = 8311 [3513] K [2.23 sigma]

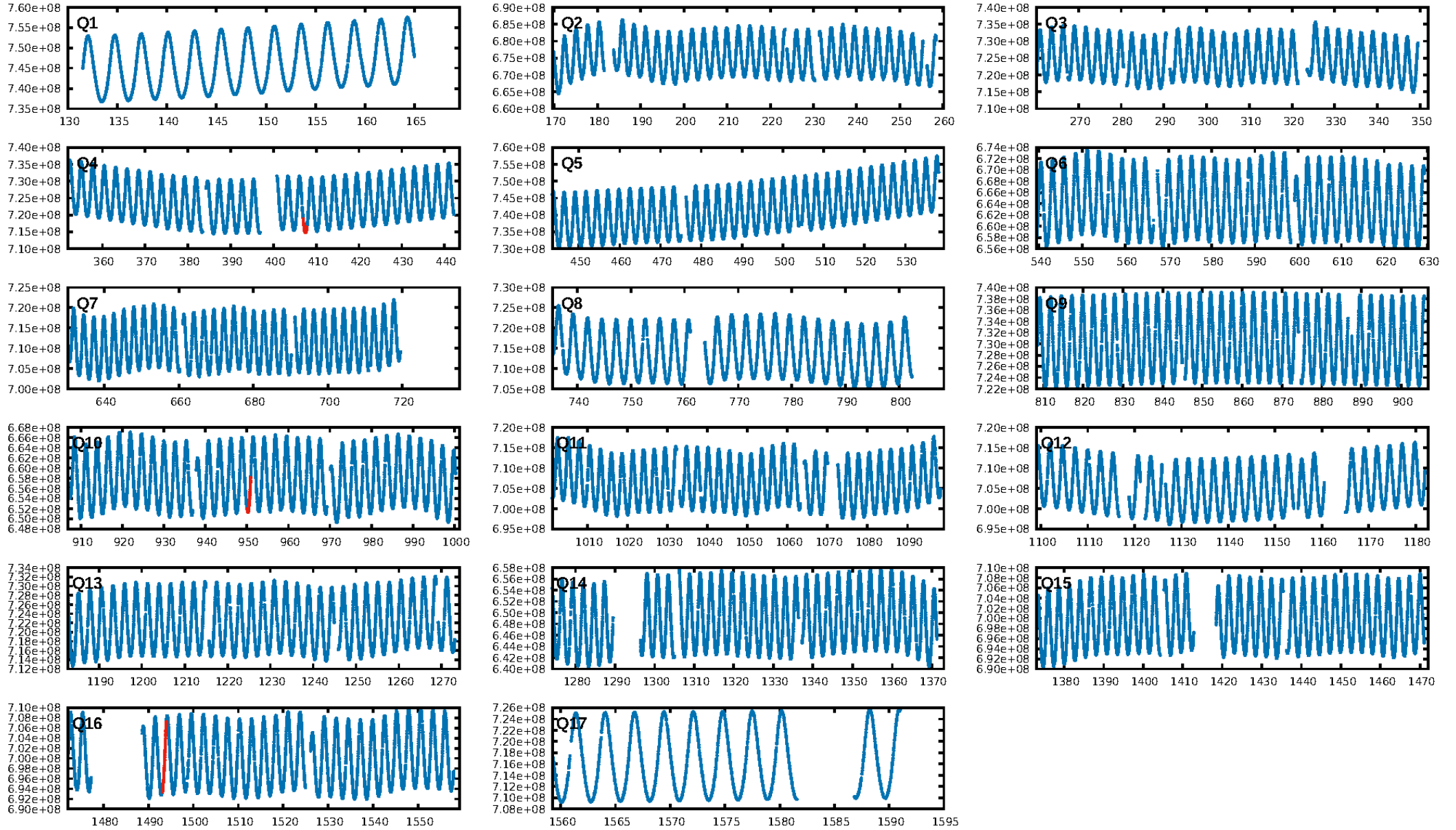
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [80.73 sigma]
LongPeriod-sig: 100.0% [10.99 sigma]
ModelChiSquare2-sig: 98.3%
ModelChiSquareGof-sig: 99.7%
Bootstrap-pfa: 1.10e-09
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -0.6566
Centroid-sig: N/A
Centroid-so: 2.232 arcsec [2.27 sigma]
OotOffset-rm: 0.090 arcsec [0.59 sigma]
OotOffset-st: 1/0/2/0 [3]
KicOffset-rm: 0.218 arcsec [1.23 sigma]
KicOffset-st: 1/0/2/0 [3]
DiffImageQuality-fgm: 1.00 [3/3]
DiffImageOverlap-fno: 0.33 [1/3]

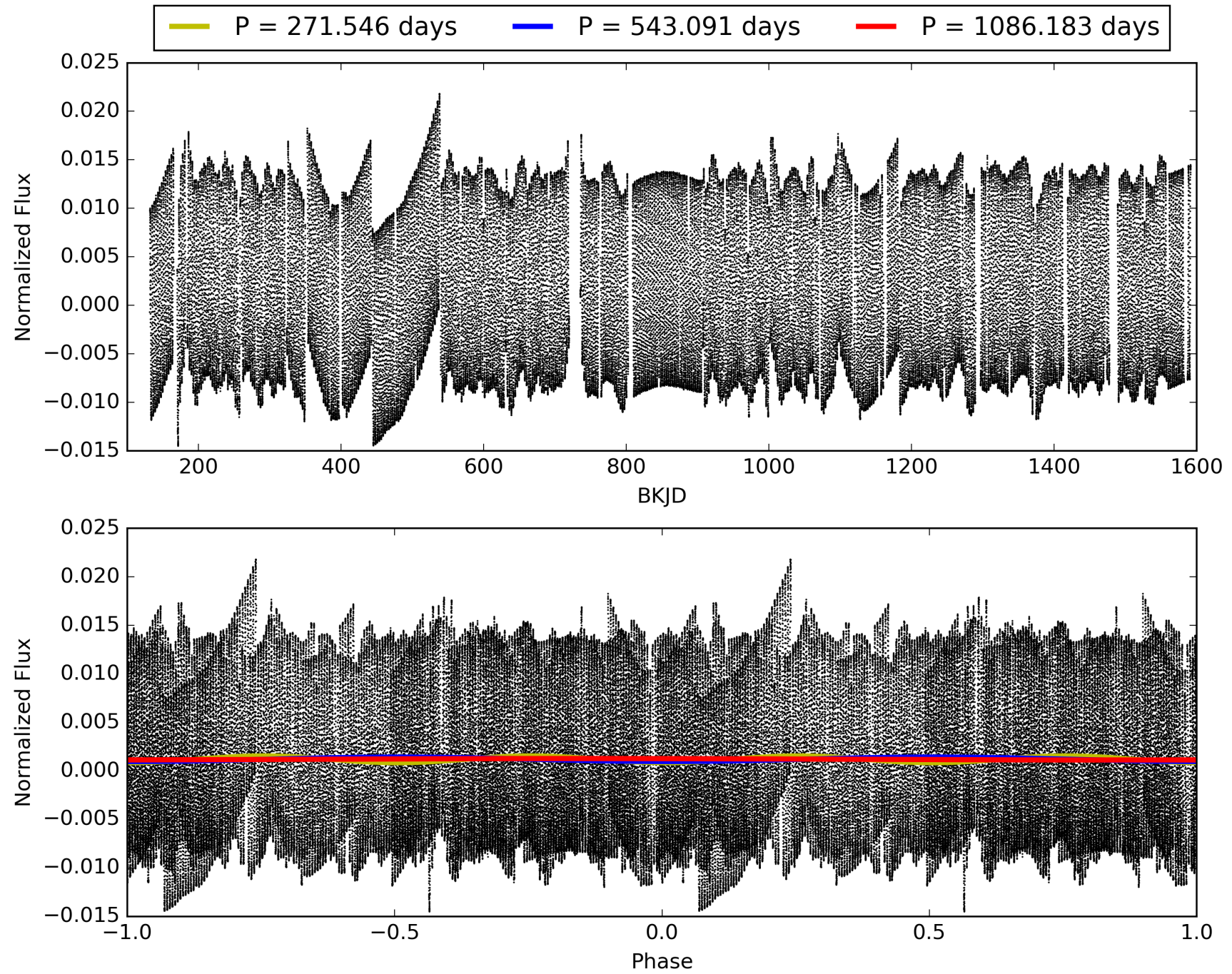
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:51:44 Z

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

TCE 001576144-07, PDC Light Curves

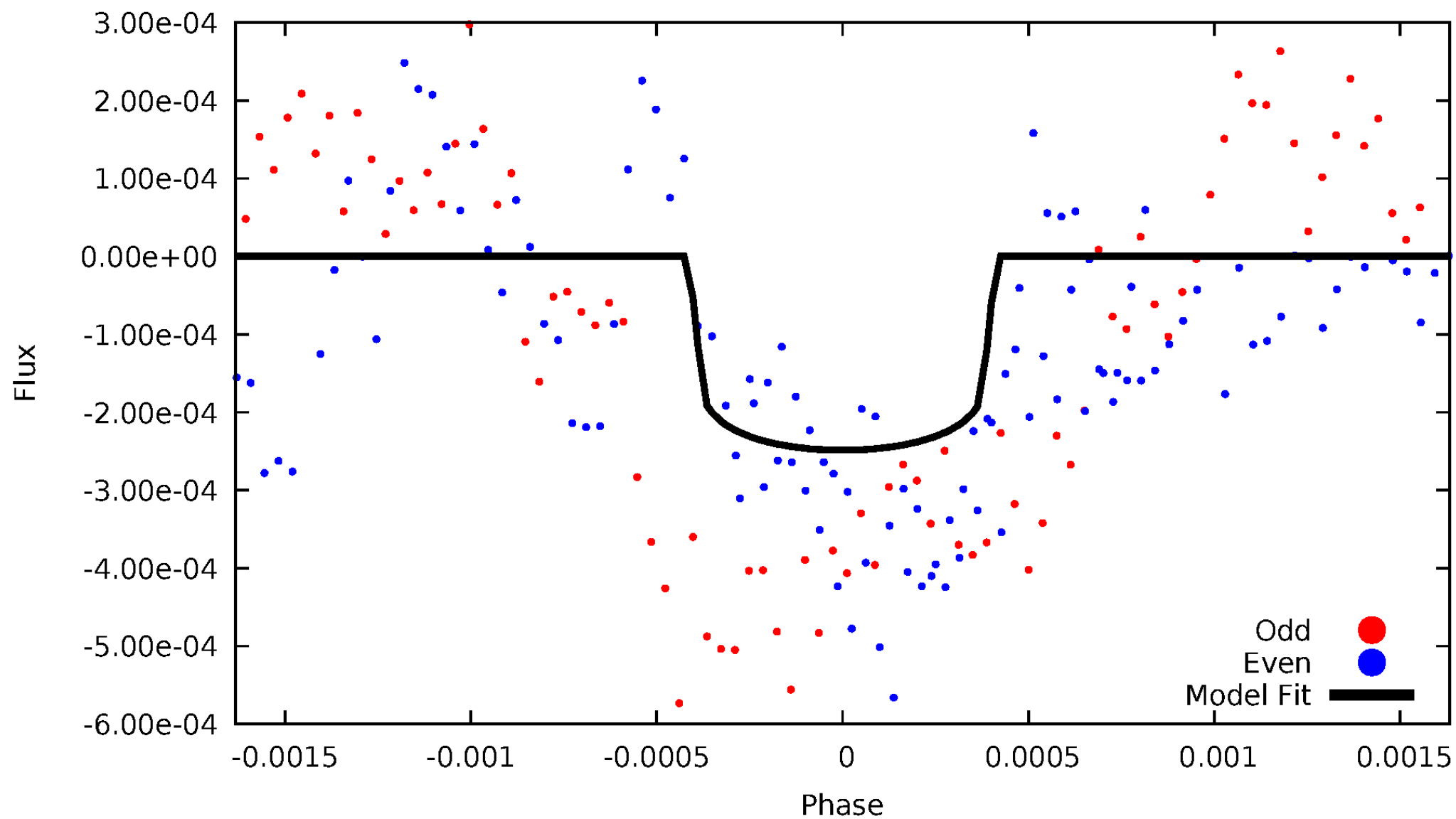


TCE 001576144-07



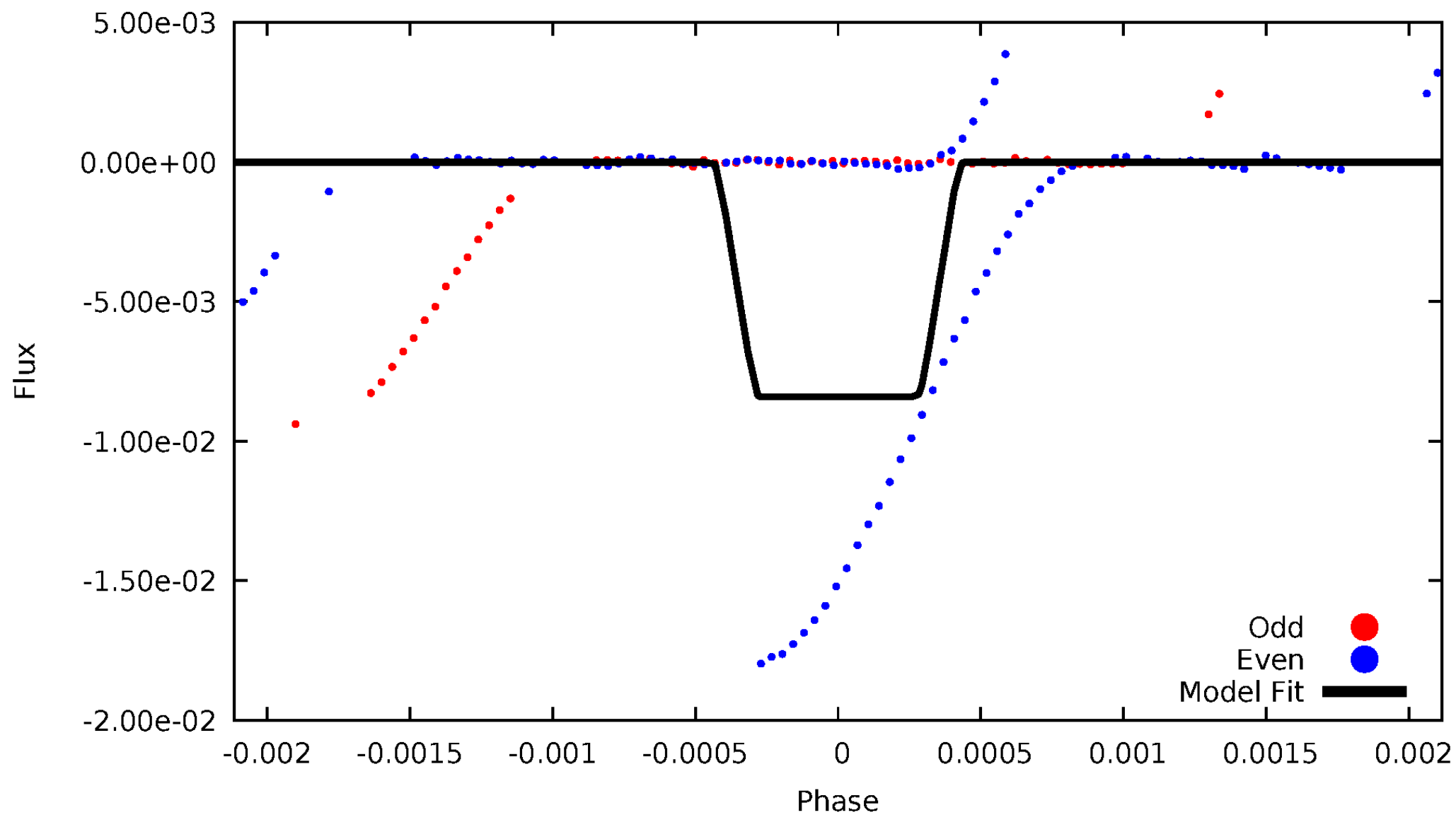
DV Odd/Even

TCE 001576144-07



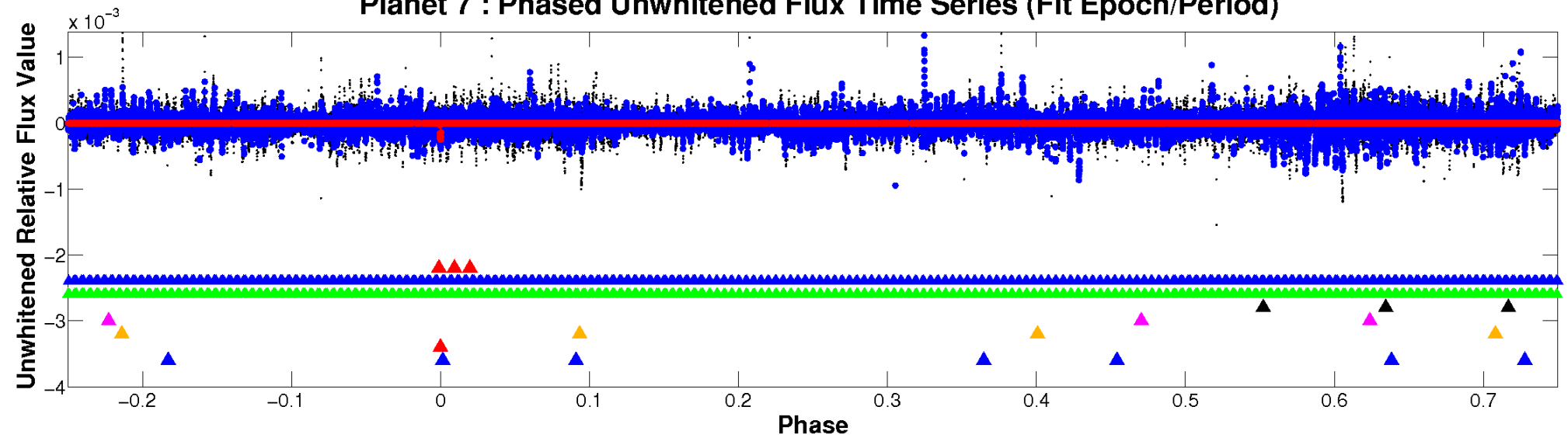
ALT Odd/Even

TCE 001576144-07

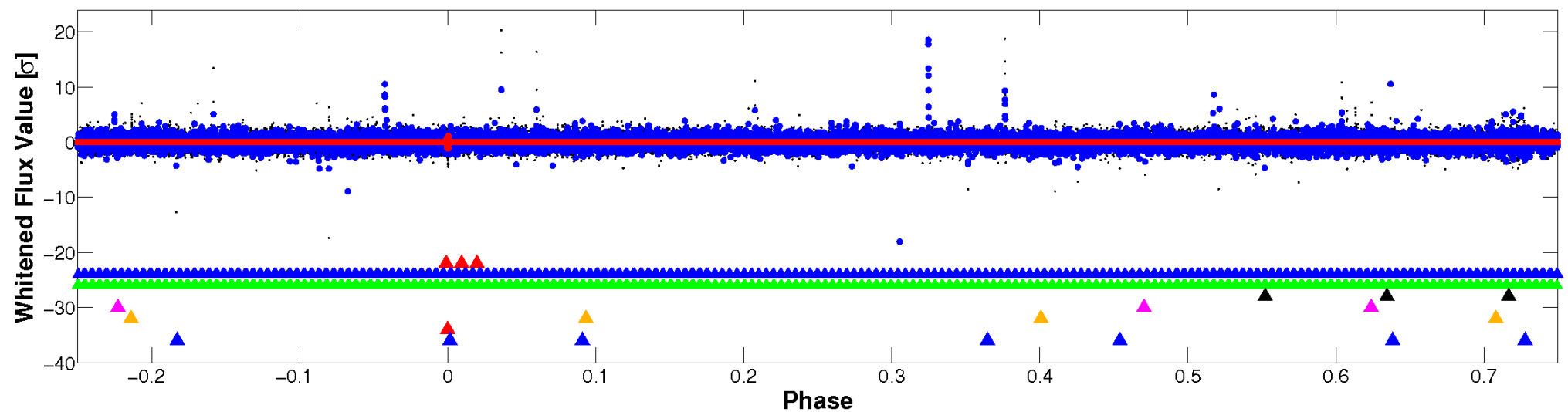


Non-Whitened Vs. Whitened Light Curve

Planet 7 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

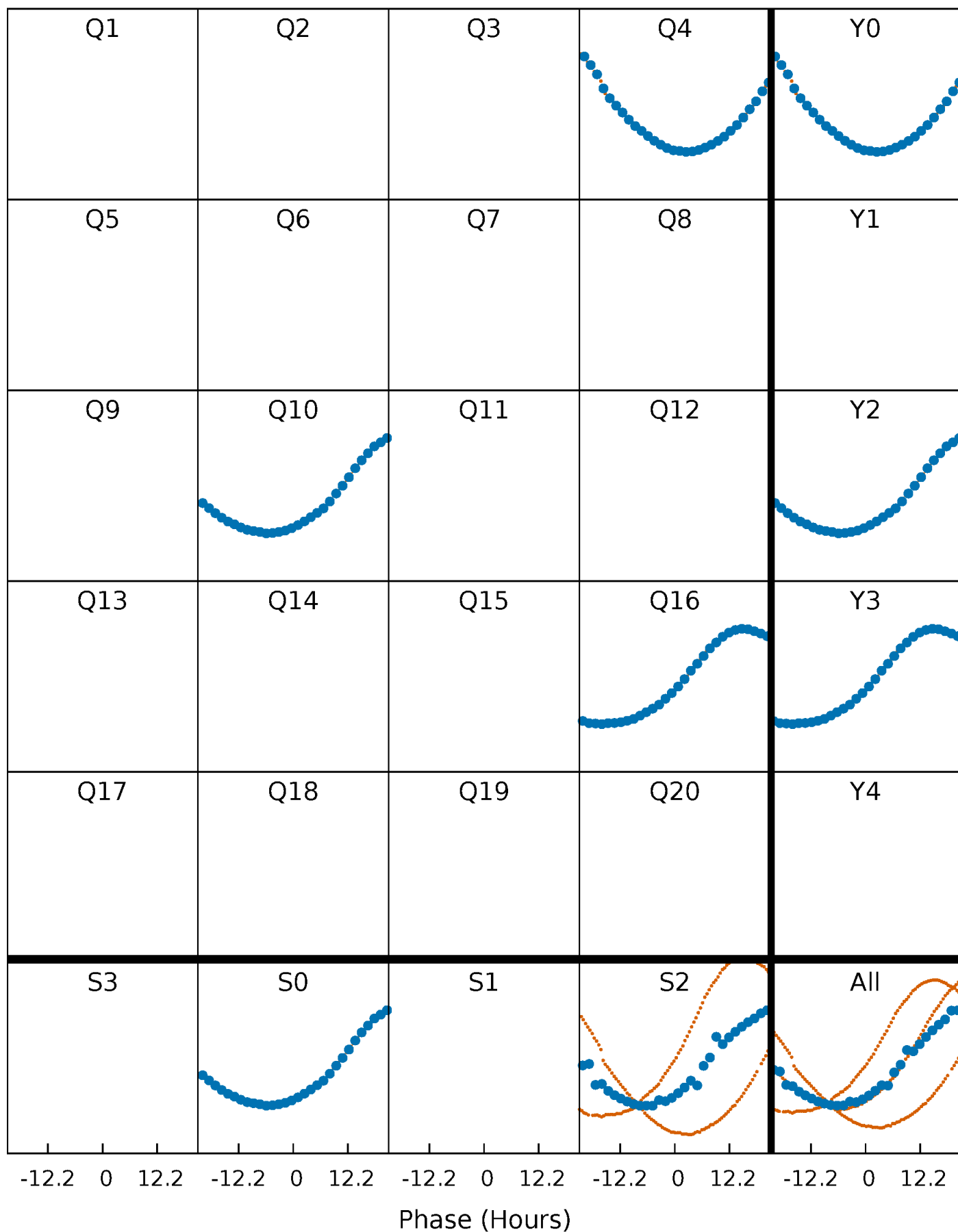


Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)



PDC Quarter-Phased Transit Curves

TCE 001576144-07 P=543.091418 Days $T_0=407.375363$ (BKJD)



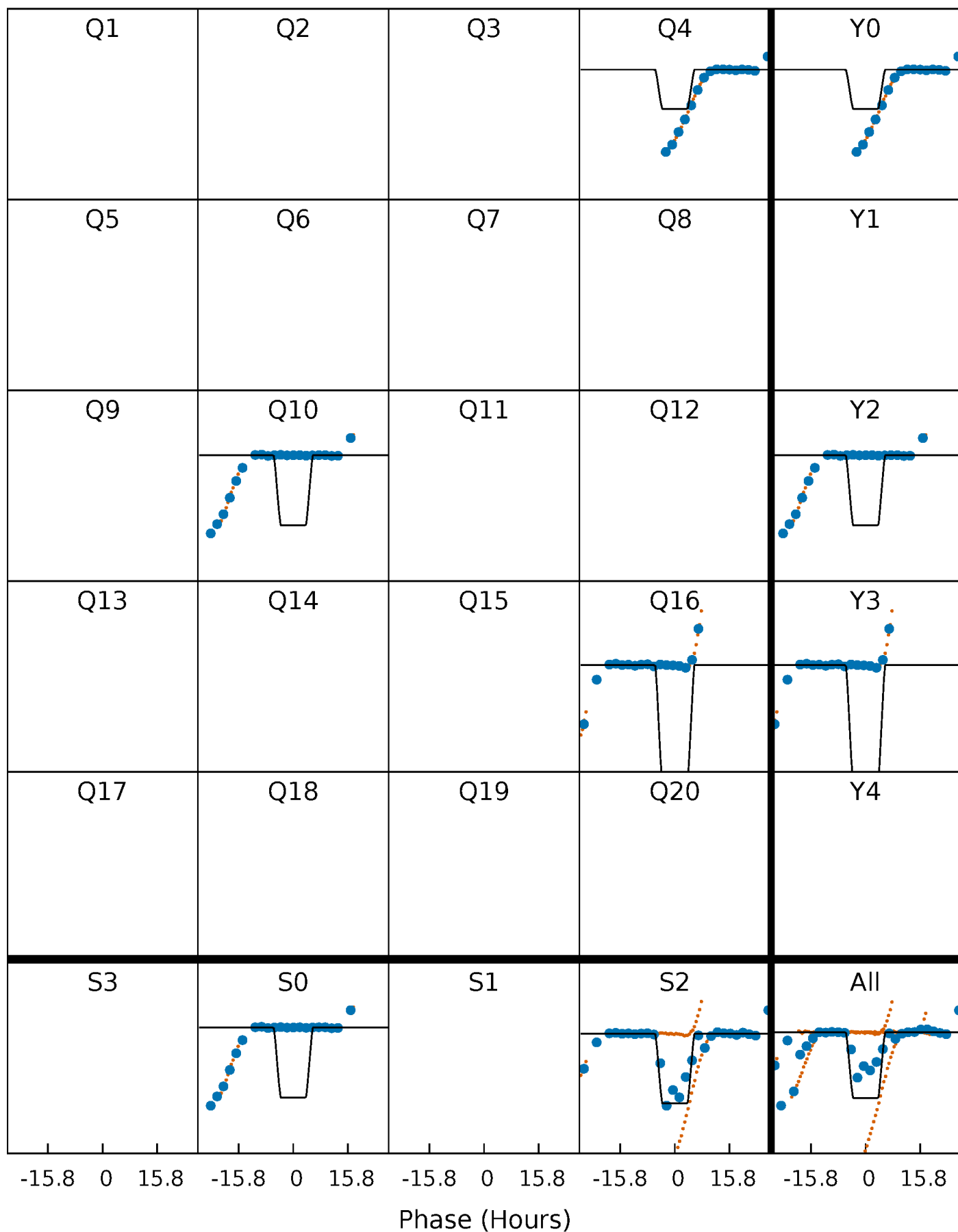
DV Quarter-Phased Transit Curves

TCE 001576144-07 P=543.091418 Days $T_0=407.375363$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

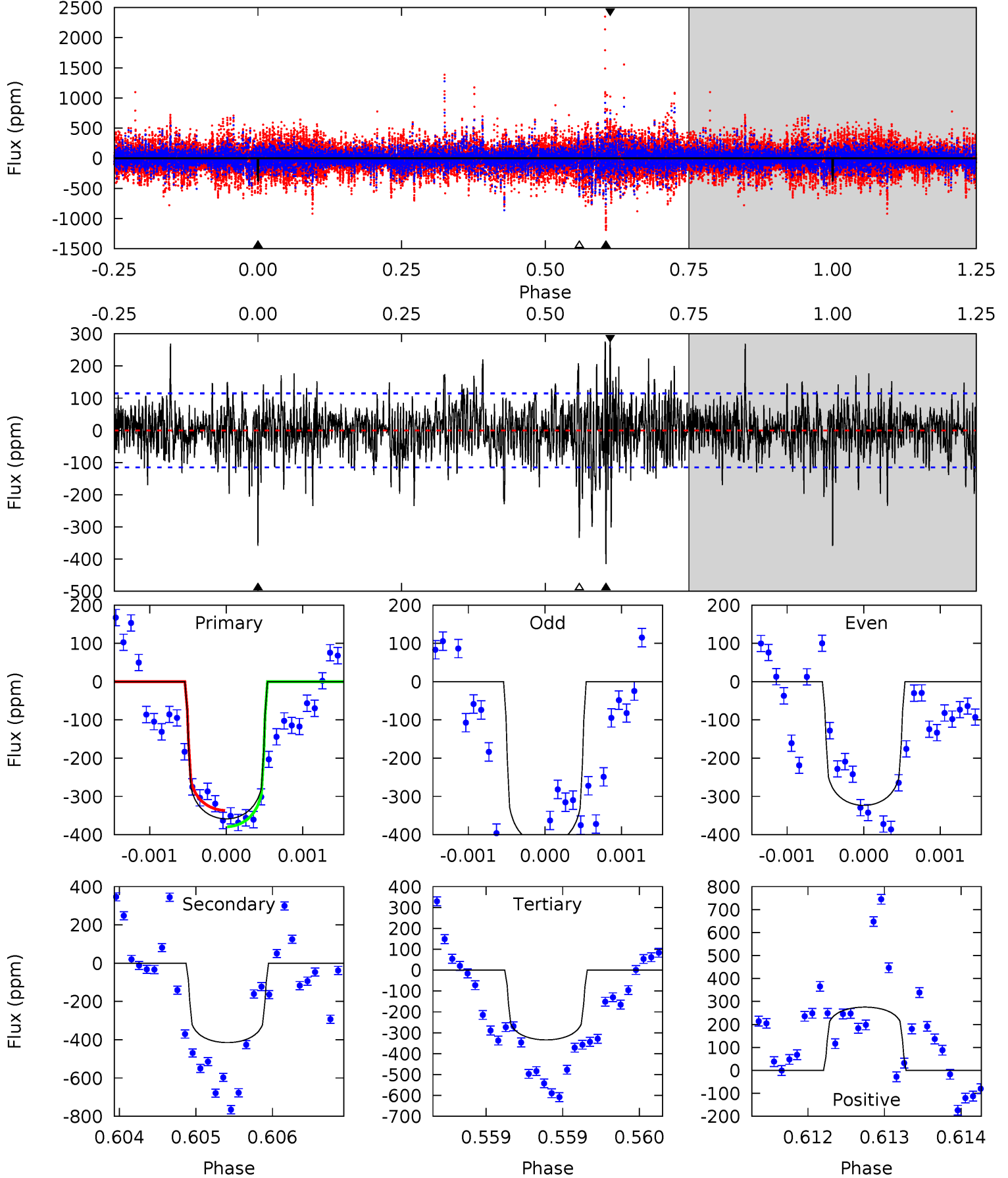
TCE 001576144-07 P=543.137647 Days $T_0=407.366047$ (BKJD)



DV Model-Shift Uniqueness Test

001576144-07, P = 543.091418 Days, E = 407.375363 Days

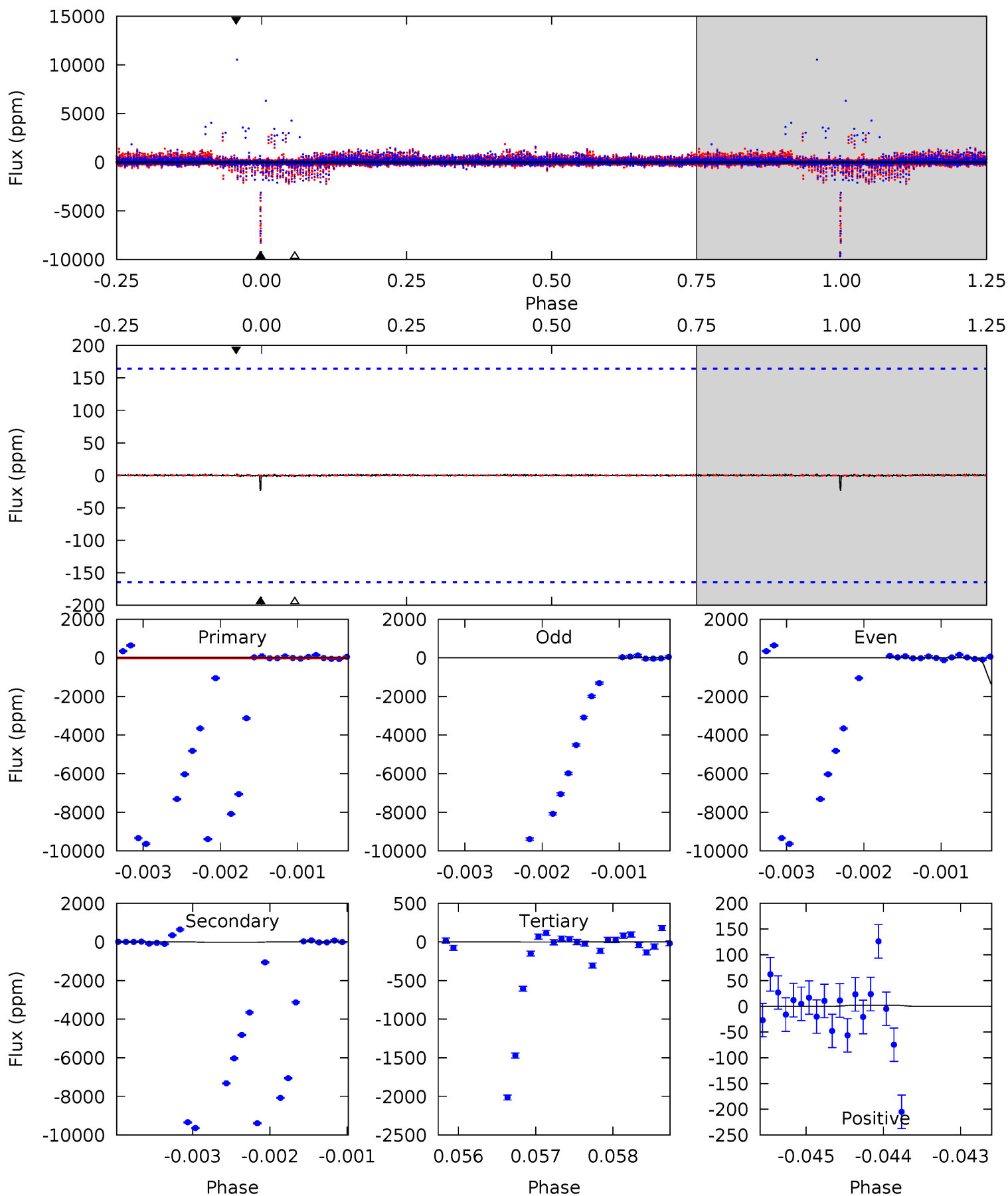
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.1	19.8	16.0	13.2	5.49	3.36	3.07	1.17	3.98	3.86	6.67	2.19	1.06	0.40	1.02



Alt Model-Shift Uniqueness Test

001576144-07, P = 543.137647 Days, E = 407.366047 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.75	0.75	0.05	0.06	5.47	3.33	0.01	0.71	0.69	0.71	0.69	18.3	110.3	0.08	0



Stellar Parameters For KIC 001576144

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	9181^{+251}_{-430}	$4.003^{+0.234}_{-0.156}$	$0.070^{+0.150}_{-0.700}$	$2.507^{+0.743}_{-0.909}$	$2.308^{+0.361}_{-0.721}$	$0.206^{+0.334}_{-0.097}$
	+3%/-5%	+6%/-4%	+214%/-1000%	+30%/-36%	+16%/-31%	+162%/-47%
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 001576144-07 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-415 ± 21	$4.34^{+3.35}_{-2.69}$	678^{+53}_{-68}	10582^{+16459}_{-3190}	$35722^{+202940}_{-24221}$
Alt.	-23 ± 30	$24.18^{+5.52}_{-4.76}$	671^{+58}_{-60}	2695^{+387}_{-5088}	54^{+101}_{-75}

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

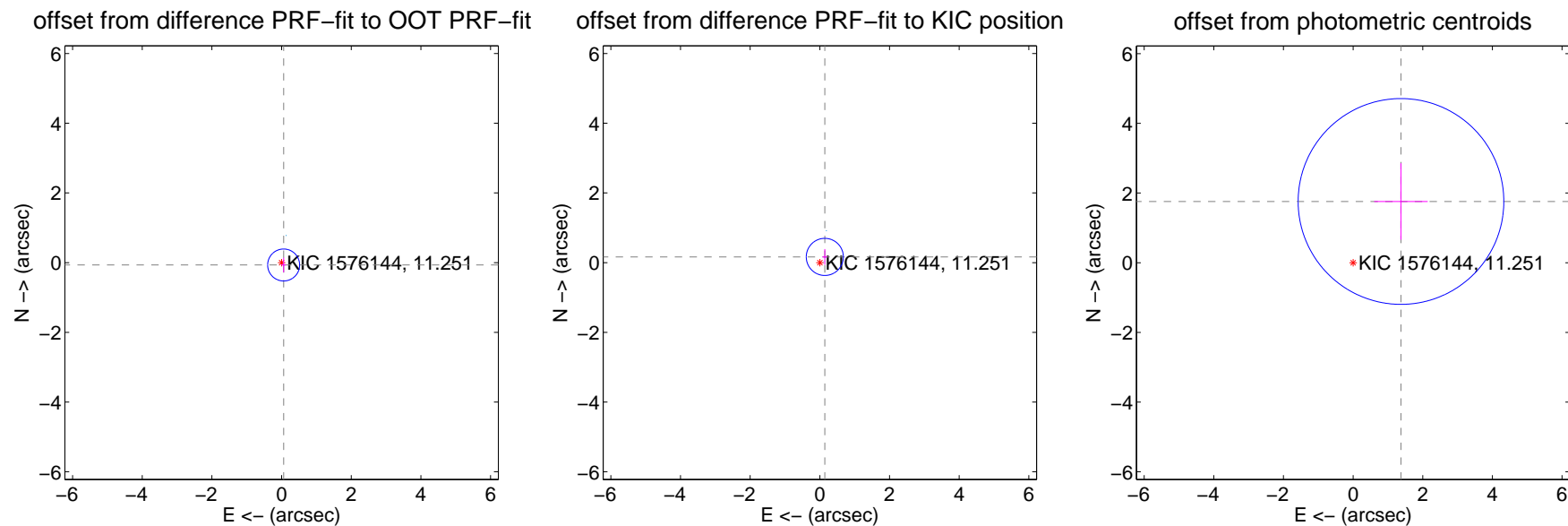
DV Centroid Data

Supplemental centroid analysis for 001576144-07. **Kepler magnitude: 11.25.** Transit SNR 8.57

There are 3 quarters with good PRF difference image offsets

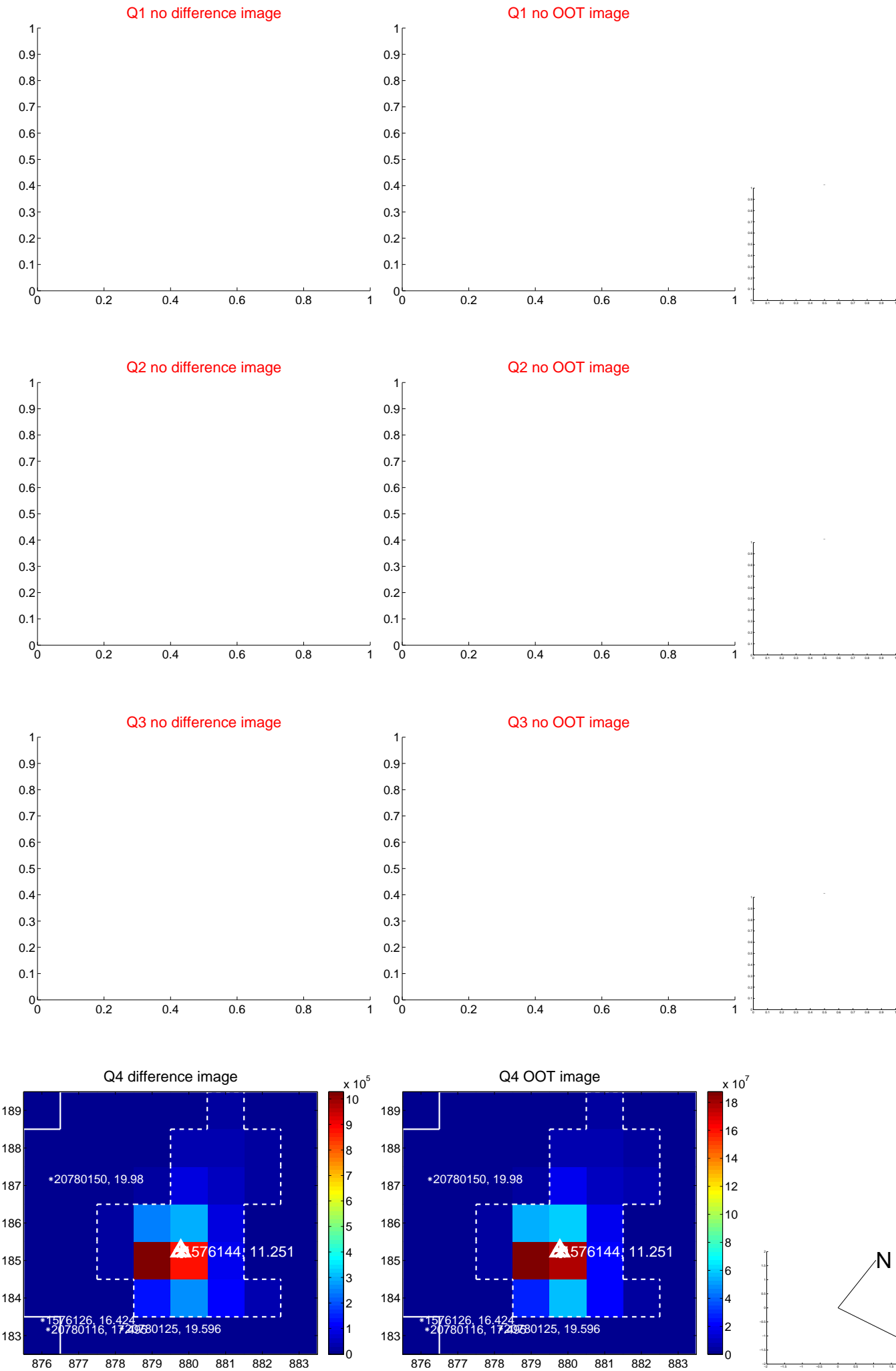
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.090 ± 0.153	0.59	-0.059 ± 0.070	-0.067 ± 0.211
PRF-fit source offset from KIC position	0.218 ± 0.177	1.23	-0.143 ± 0.071	0.165 ± 0.227
photometric centroid source offset	2.23 ± 0.98	2.27	-1.37 ± 0.77	1.76 ± 1.10

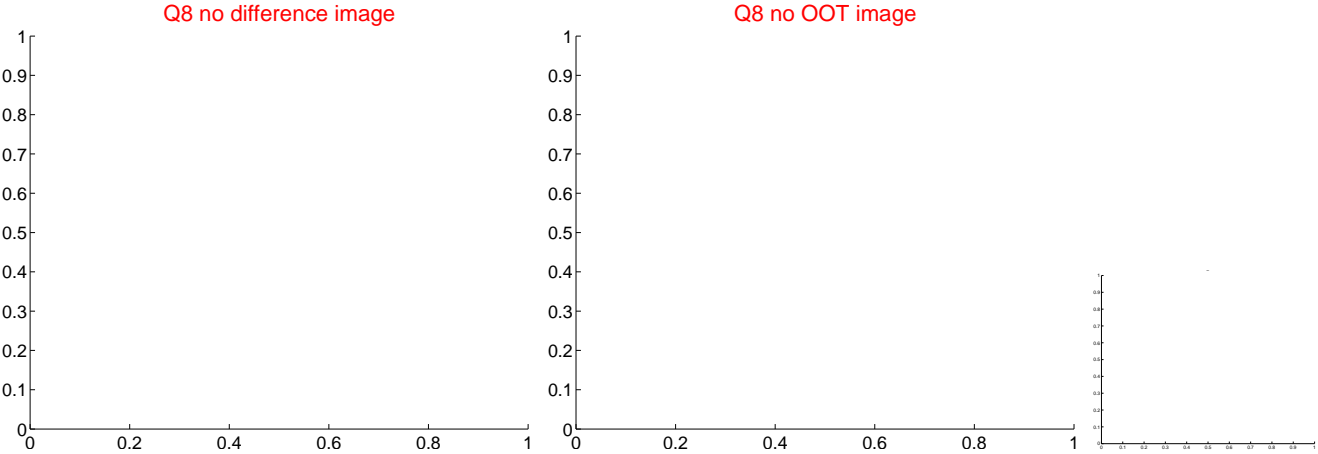
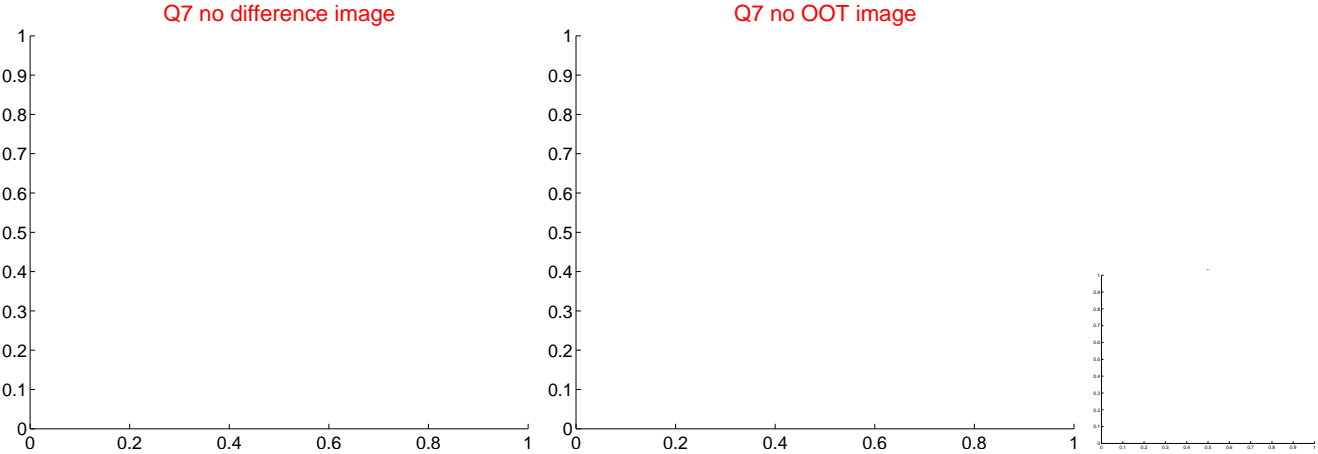
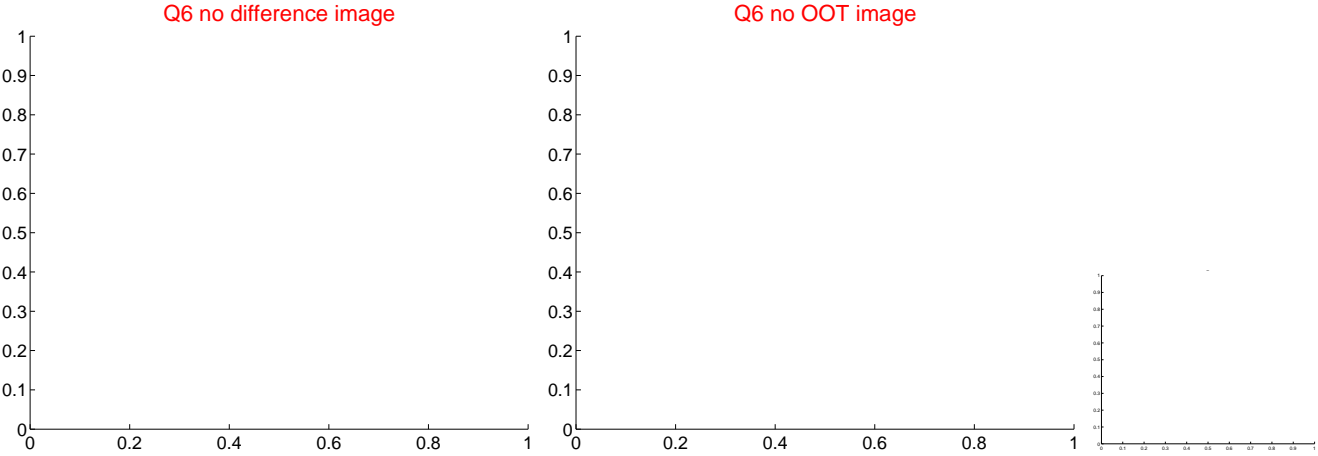
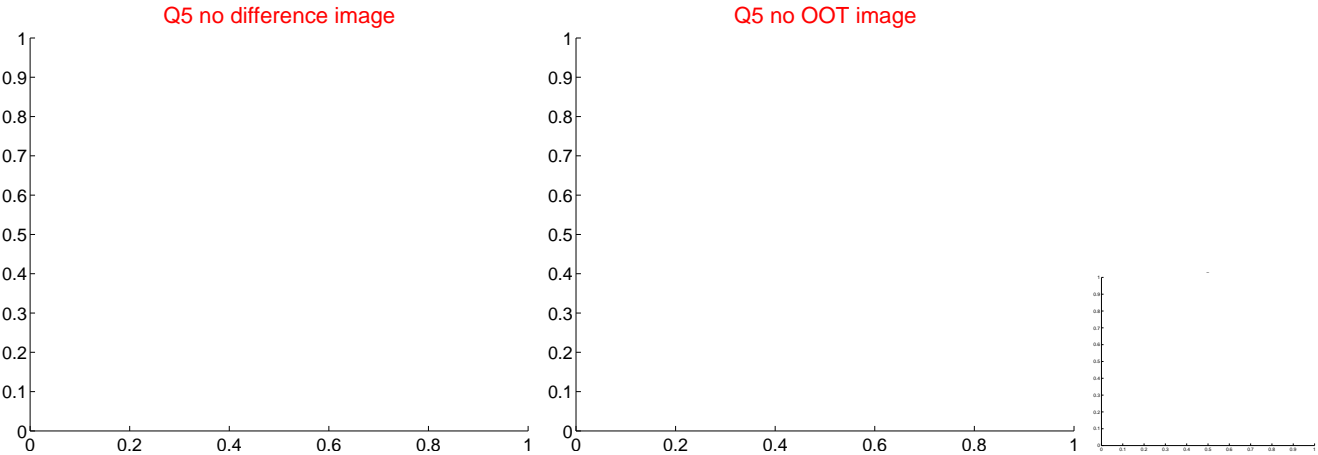


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

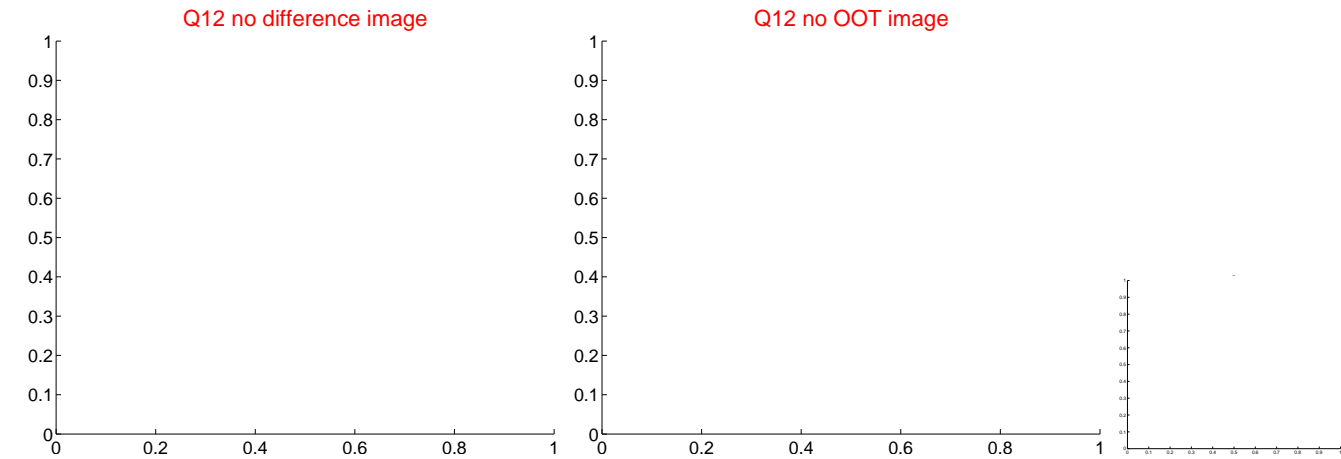
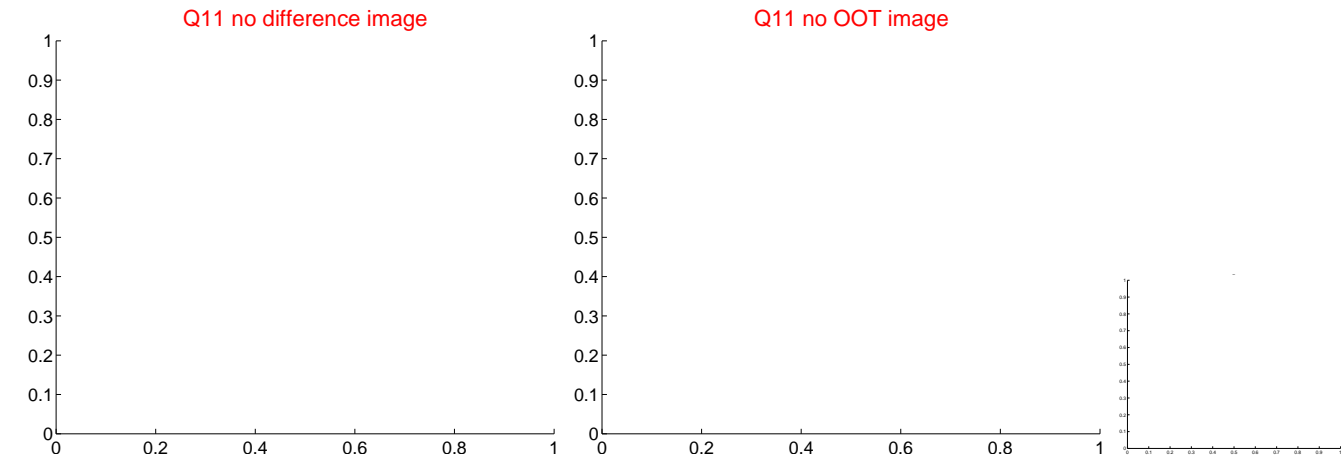
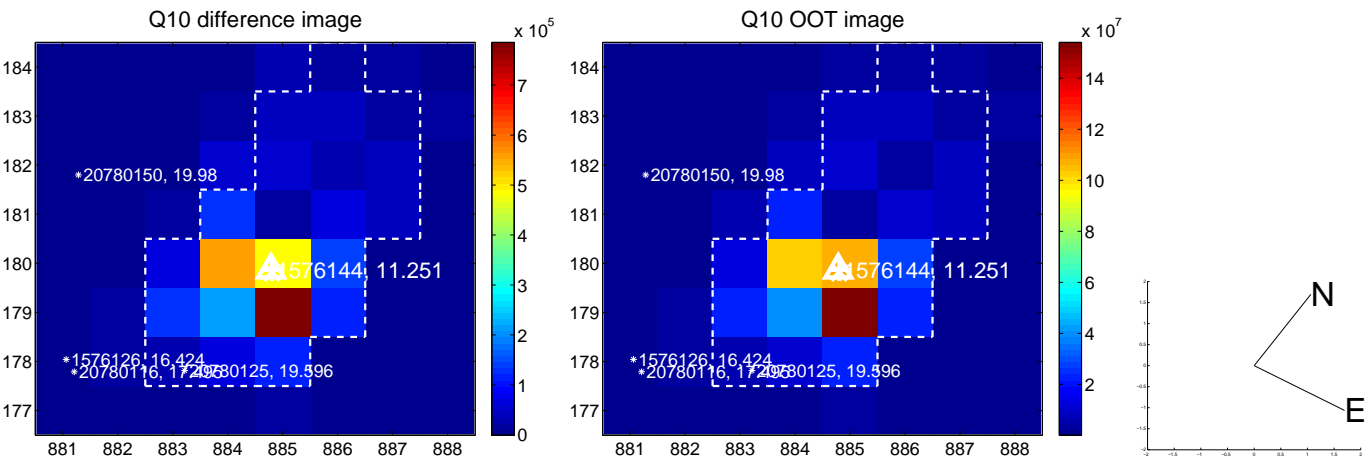
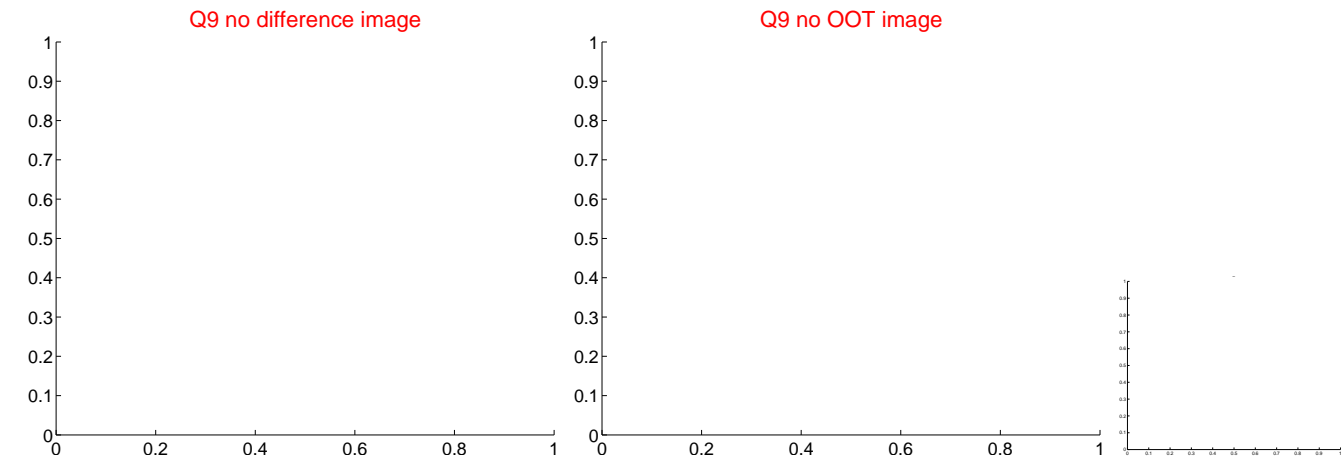
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



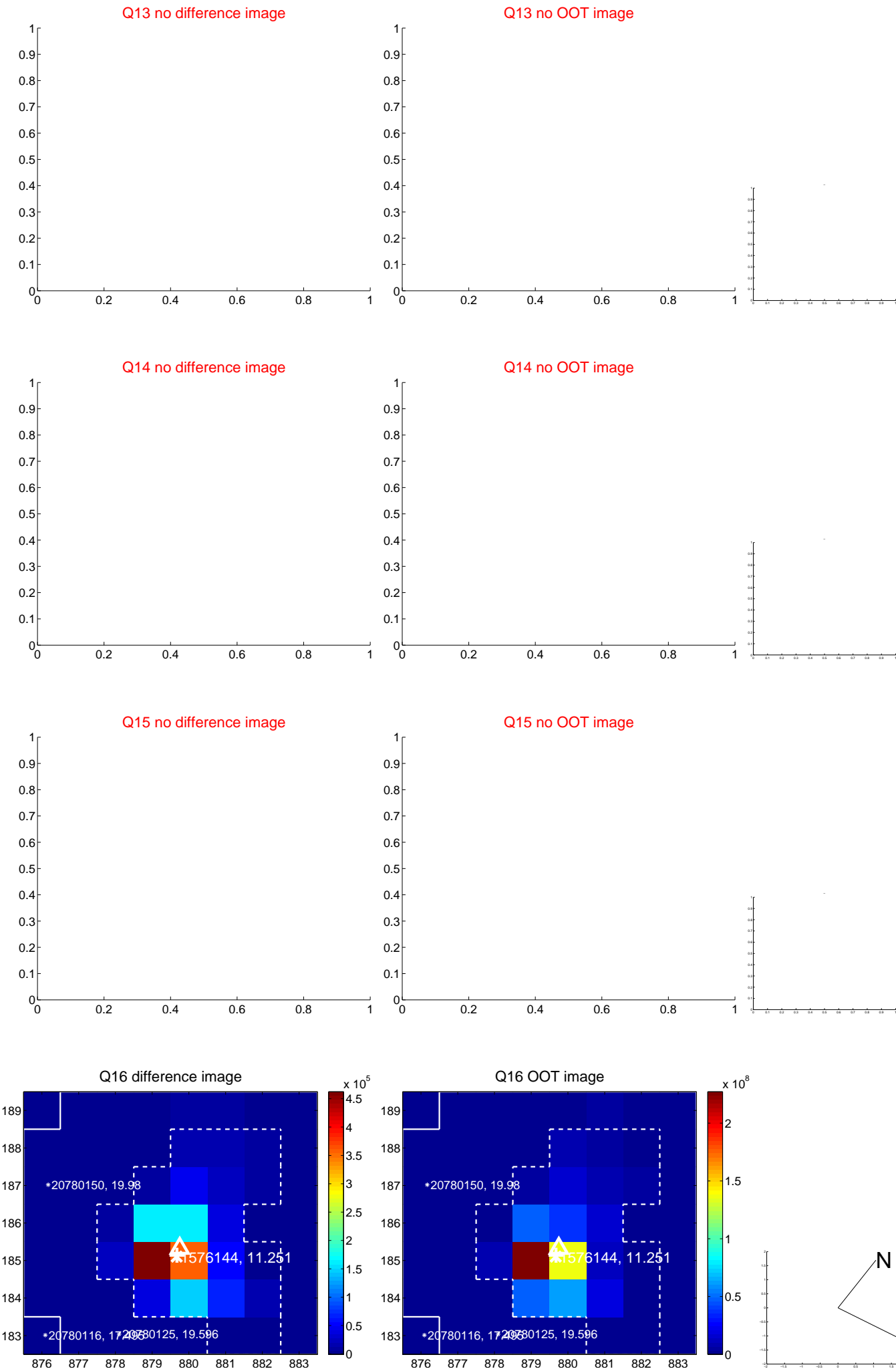
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



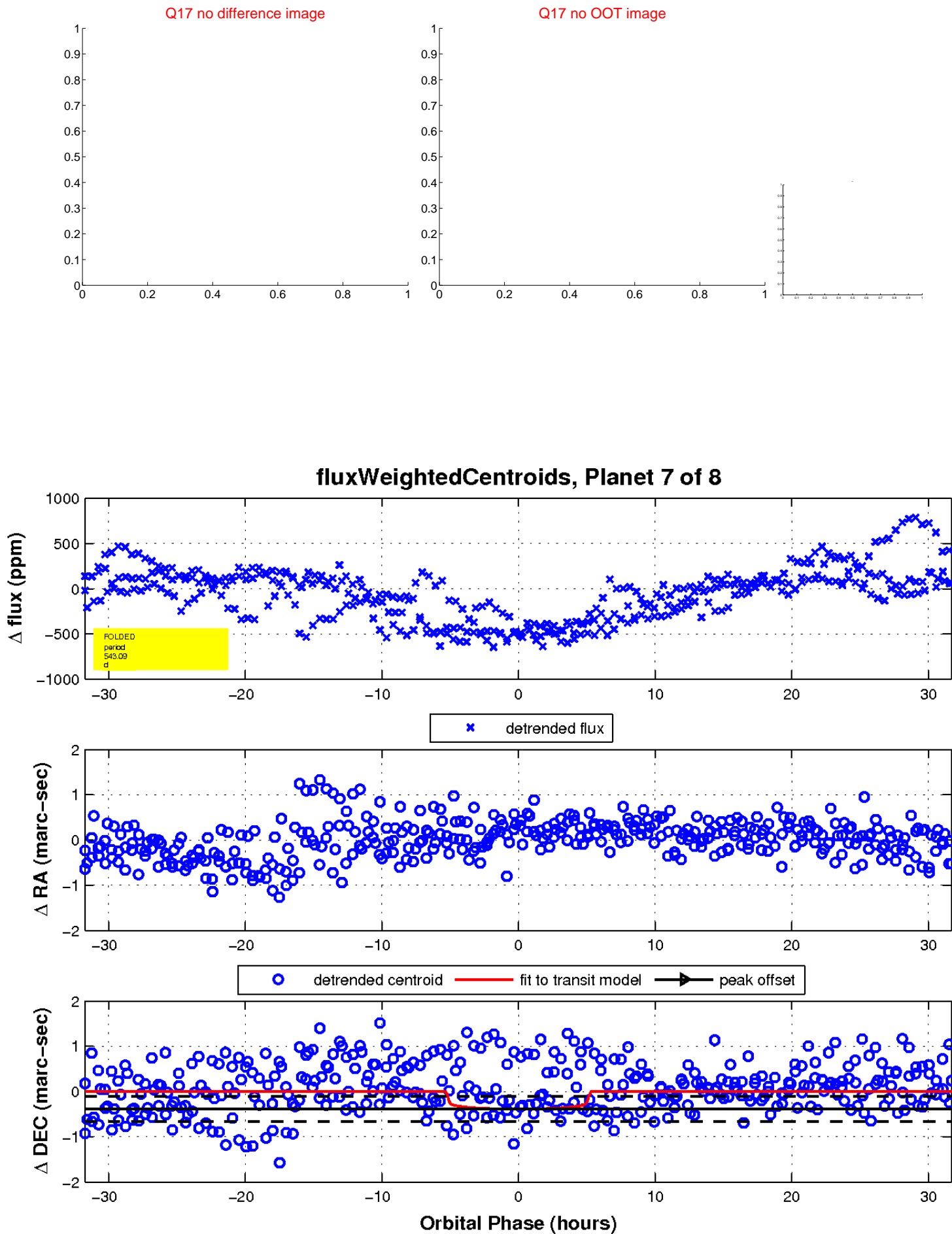
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

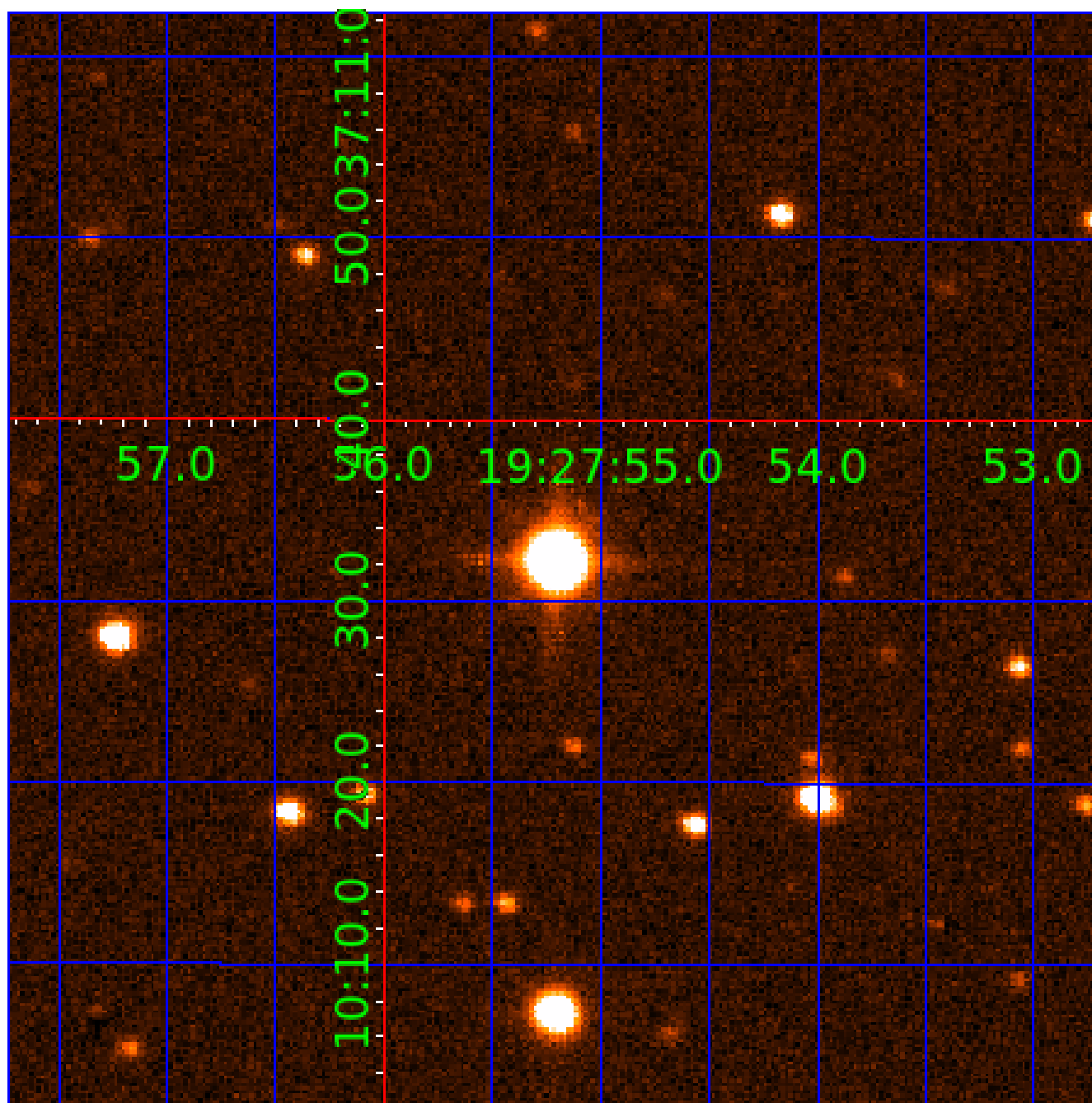


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 001576144

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})
001576144-01	OBS	No	548.743238	406.815173	453.5	6.246	21.3	12.0	2.51	9181	5.80	13.31
001576144-02	OBS	No	2.686670	132.159784	39.6	1.993	14.9	16.1	2.51	9181	1.82	16005.58
001576144-03	OBS	No	2.686662	132.297140	14.3	6.511	12.3	5.5	2.51	9181	1.09	16005.64
001576144-04	OBS	No	498.430874	253.555320	171.7	7.935	10.6	3.5	2.51	9181	3.52	15.13
001576144-05	OBS	No	459.770198	286.410016	548.0	5.054	11.4	9.6	2.51	9181	10.80	16.85
001576144-06	OBS	No	376.172555	248.855737	416.9	4.591	9.3	10.0	2.51	9181	8.82	22.01
001576144-07	OBS	No	543.091418	407.375363	248.7	10.645	8.9	8.6	2.51	9181	4.26	13.49
001576144-08	OBS	No	197.220930	210.992354	206.7	9.324	9.0	8.6	2.51	9181	4.28	52.07

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001576144-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
001576144-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—CENT_SATURATED
001576144-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—SAME_NTL_PERIOD—CENT_SATURATED
001576144-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED—HALO_GHOST
001576144-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
001576144-08	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_SATURATED—HALO_GHOST

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

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

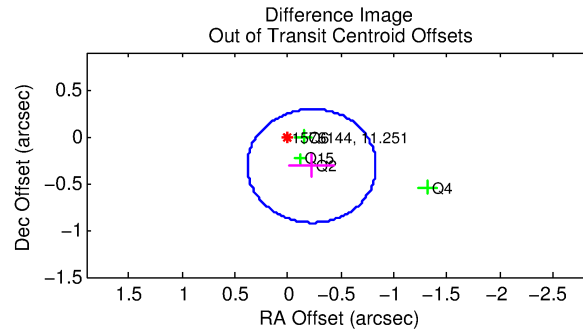
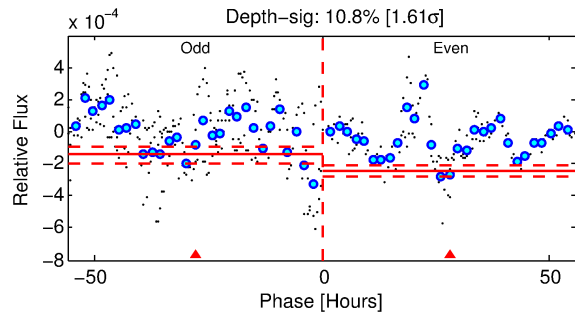
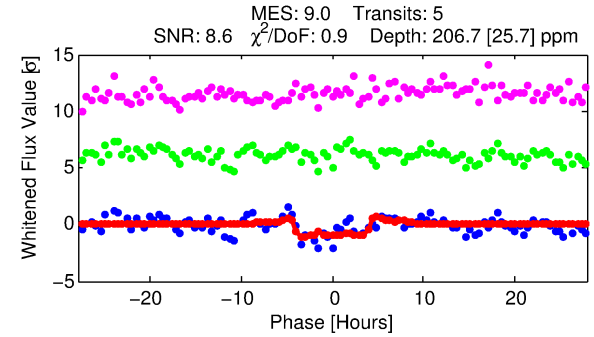
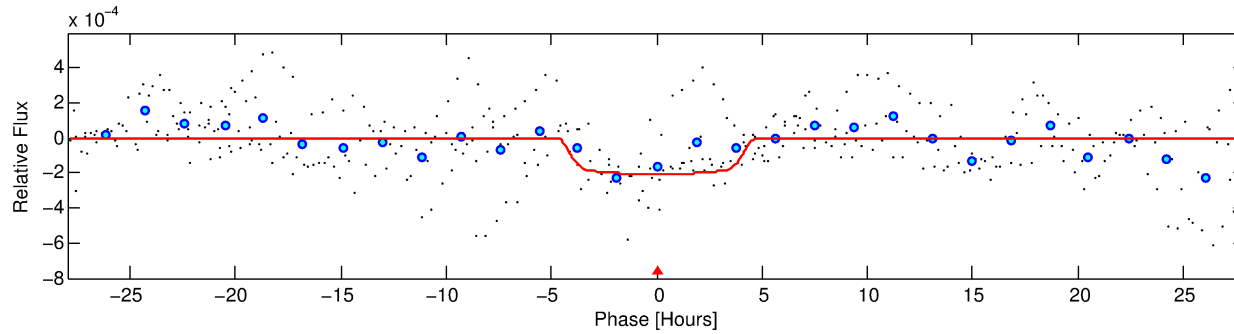
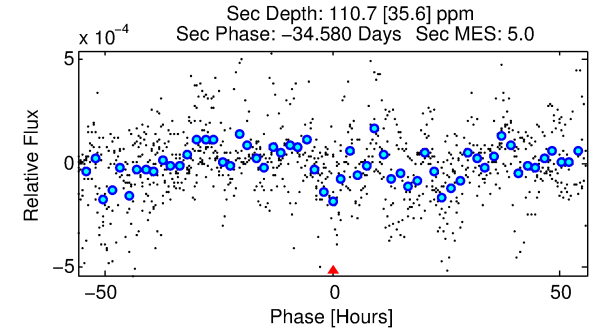
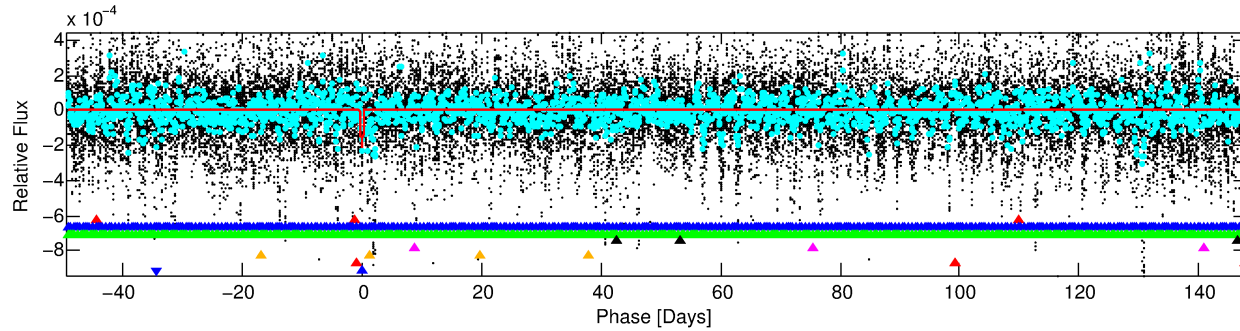
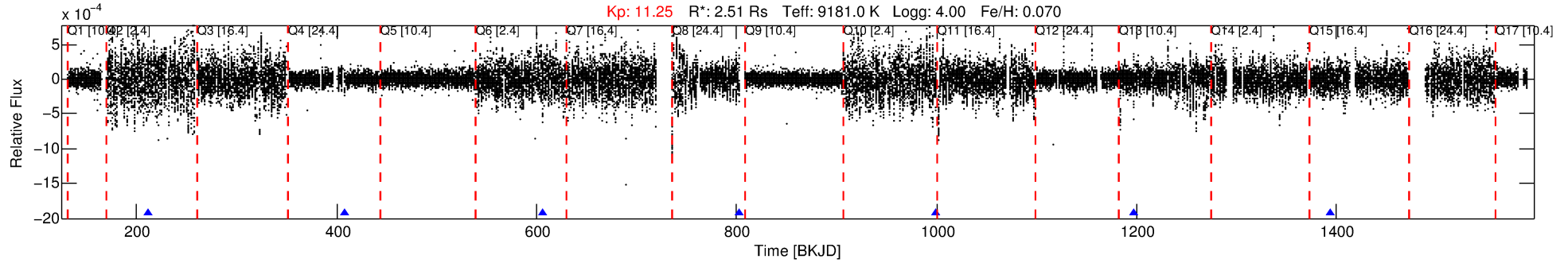
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 001576144-08

No Significant Match Found

DV One-Page Summary

KIC: 1576144 Candidate: 8 of 8 Period: 197.221 d



DV Fit Results:

Period = 197.22093 [0.00239] d
Epoch = 210.9924 [0.0096] BKJD
Rp/R* = 0.0156 [0.0012]
a/R* = 62.93 [15.84]
b = 0.94 [0.03]
Seff = 52.07 [24.57]
Teq = 685 [81] K
Rp = 4.28 [1.58] Re
a = 0.8765 [0.2640] AU
Ag = 2557.56 [1432.36] [1.78σ]
Teffp = 7531 [756] K [9.00σ]

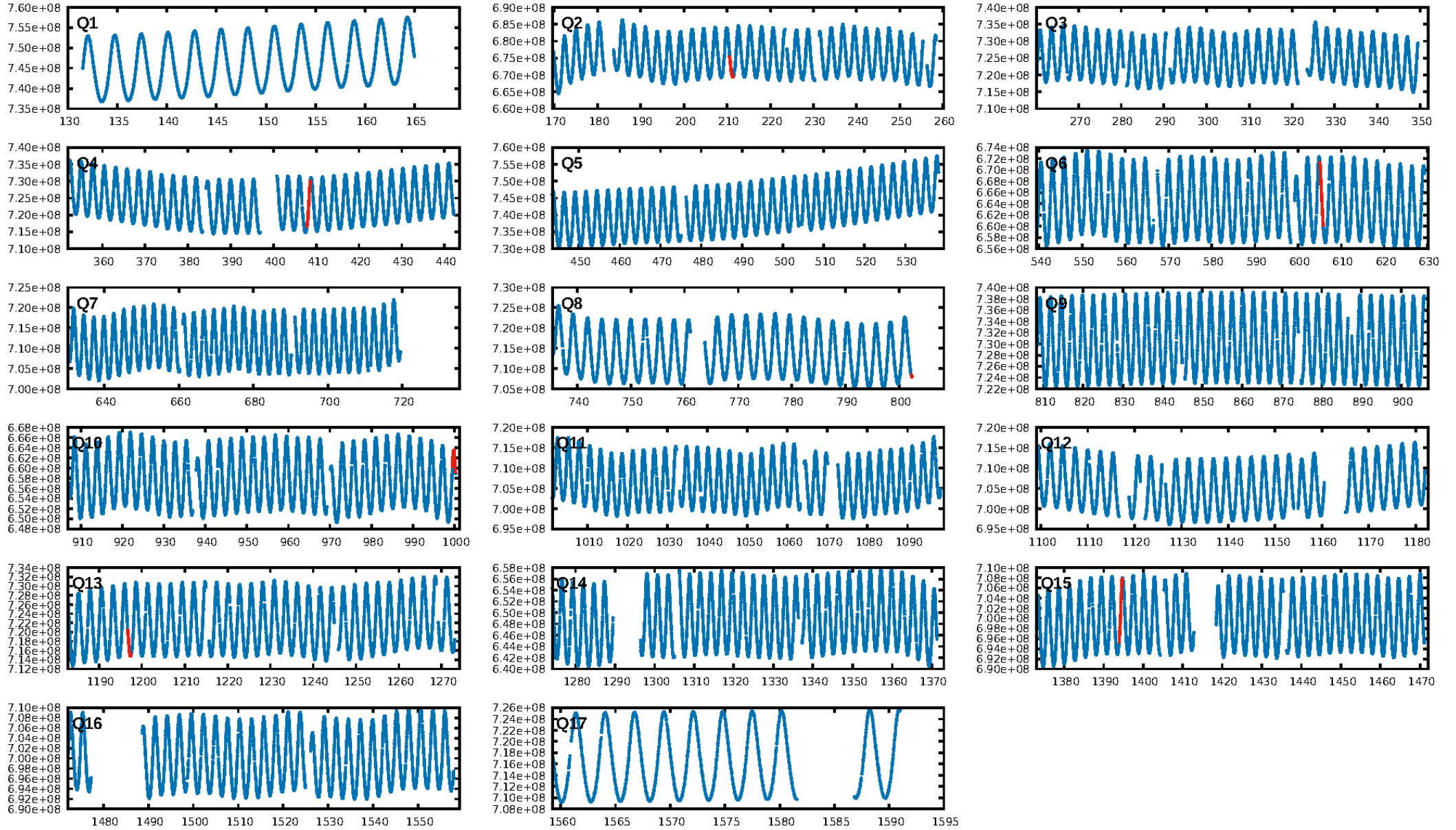
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [489.65σ]
LongPeriod-sig: 100.0% [413.23σ]
ModelChiSquare2-sig: 22.3%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.79e-11
RollingBand-fgt: 1.00 [5/5]
GhostDiagnostic-chr: 0.218
Centroid-sig: N/A
Centroid-so: 0.332 arcsec [0.39σ]
OotOffset-rm: 0.387 arcsec [1.91σ]
OotOffset-st: 2/1/1/0 [4]
KicOffset-rm: 0.324 arcsec [1.20σ]
KicOffset-st: 2/1/1/0 [4]
DiffImageQuality-fgm: 0.50 [2/4]
DiffImageOverlap-fno: 0.00 [0/4]

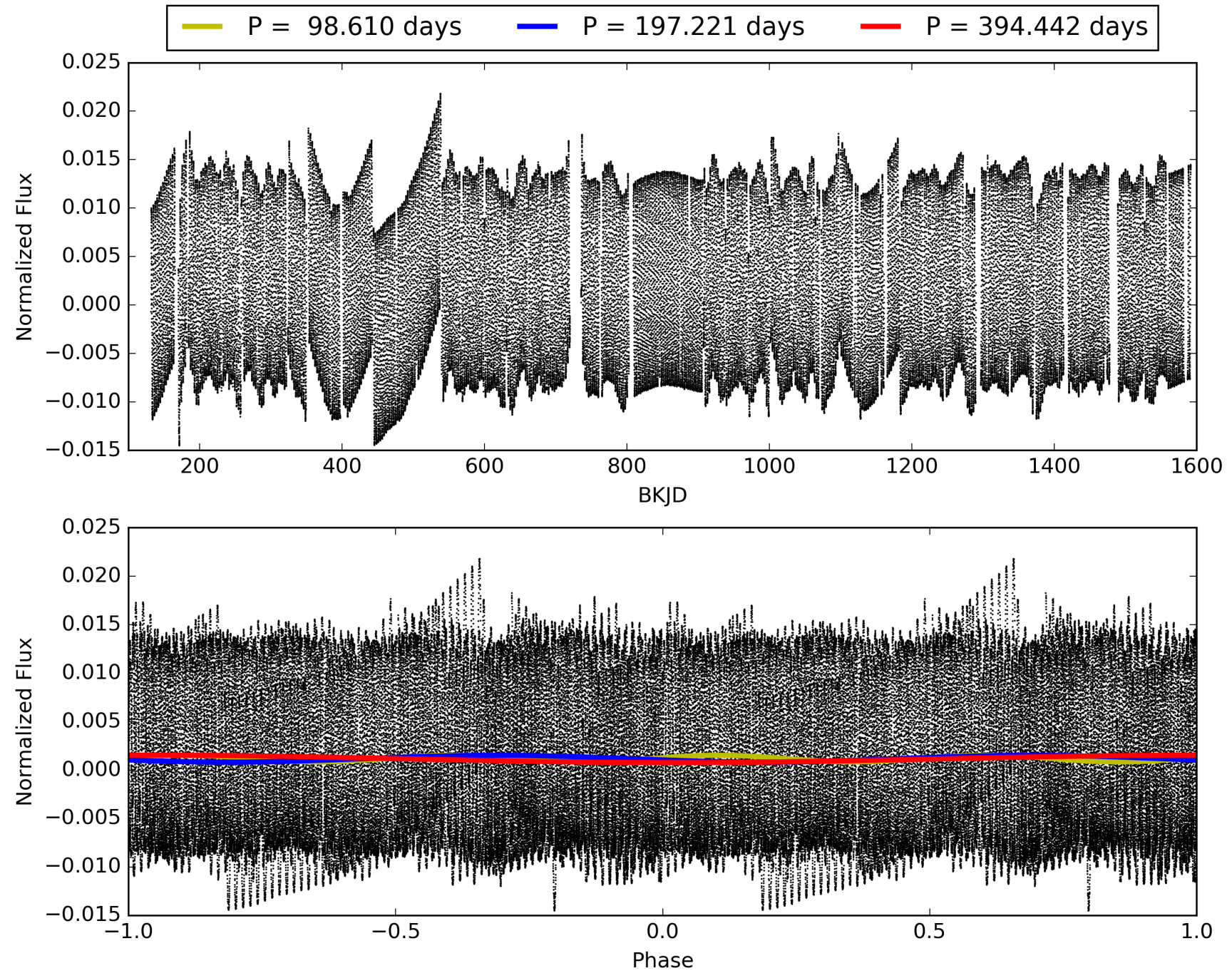
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:51:50 Z

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

TCE 001576144-08, PDC Light Curves

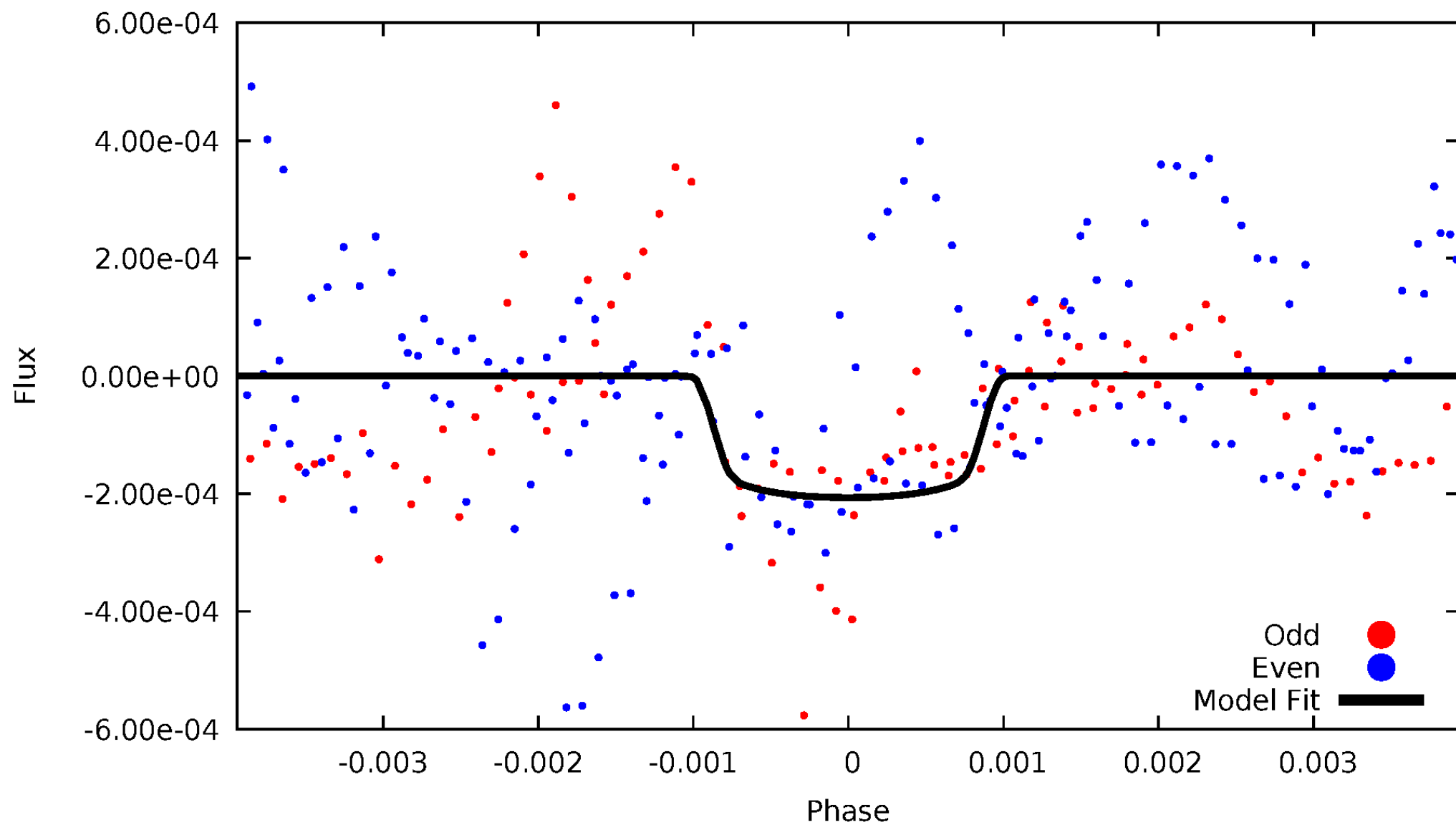


TCE 001576144-08



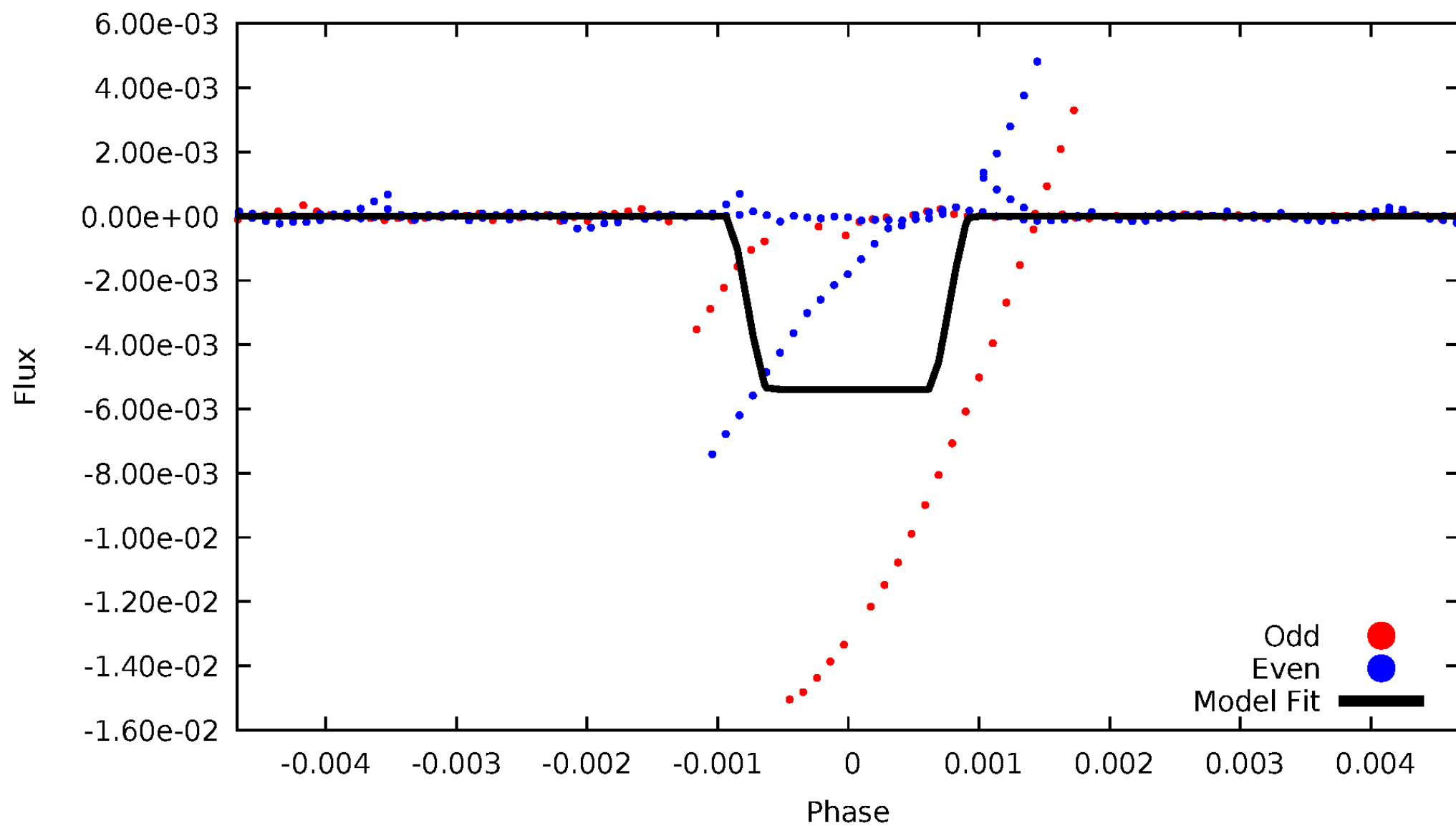
DV Odd/Even

TCE 001576144-08



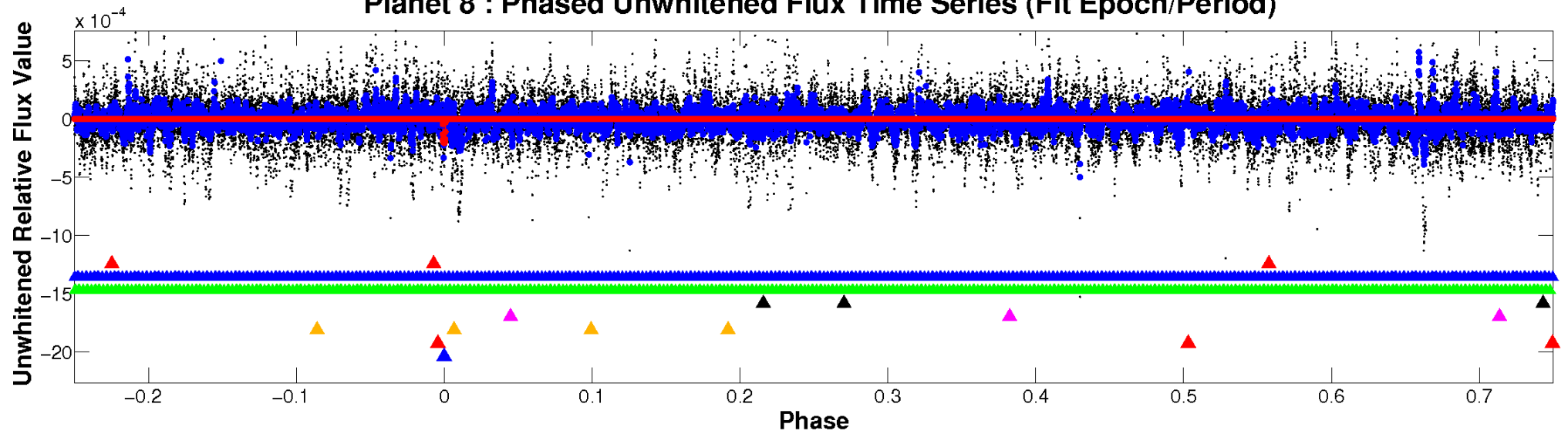
ALT Odd/Even

TCE 001576144-08

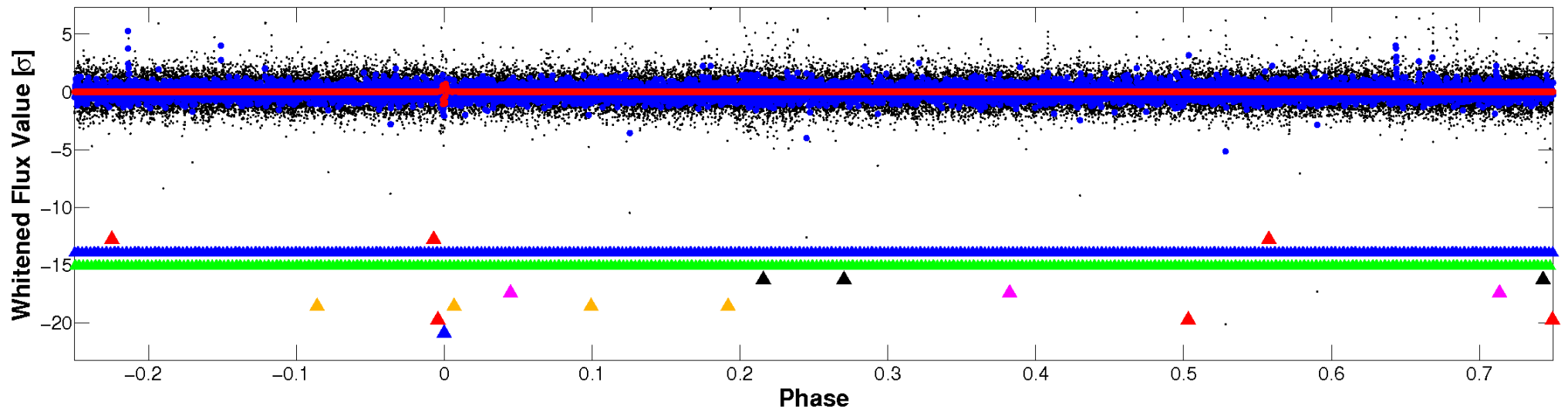


Non-Whitened Vs. Whitened Light Curve

Planet 8 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

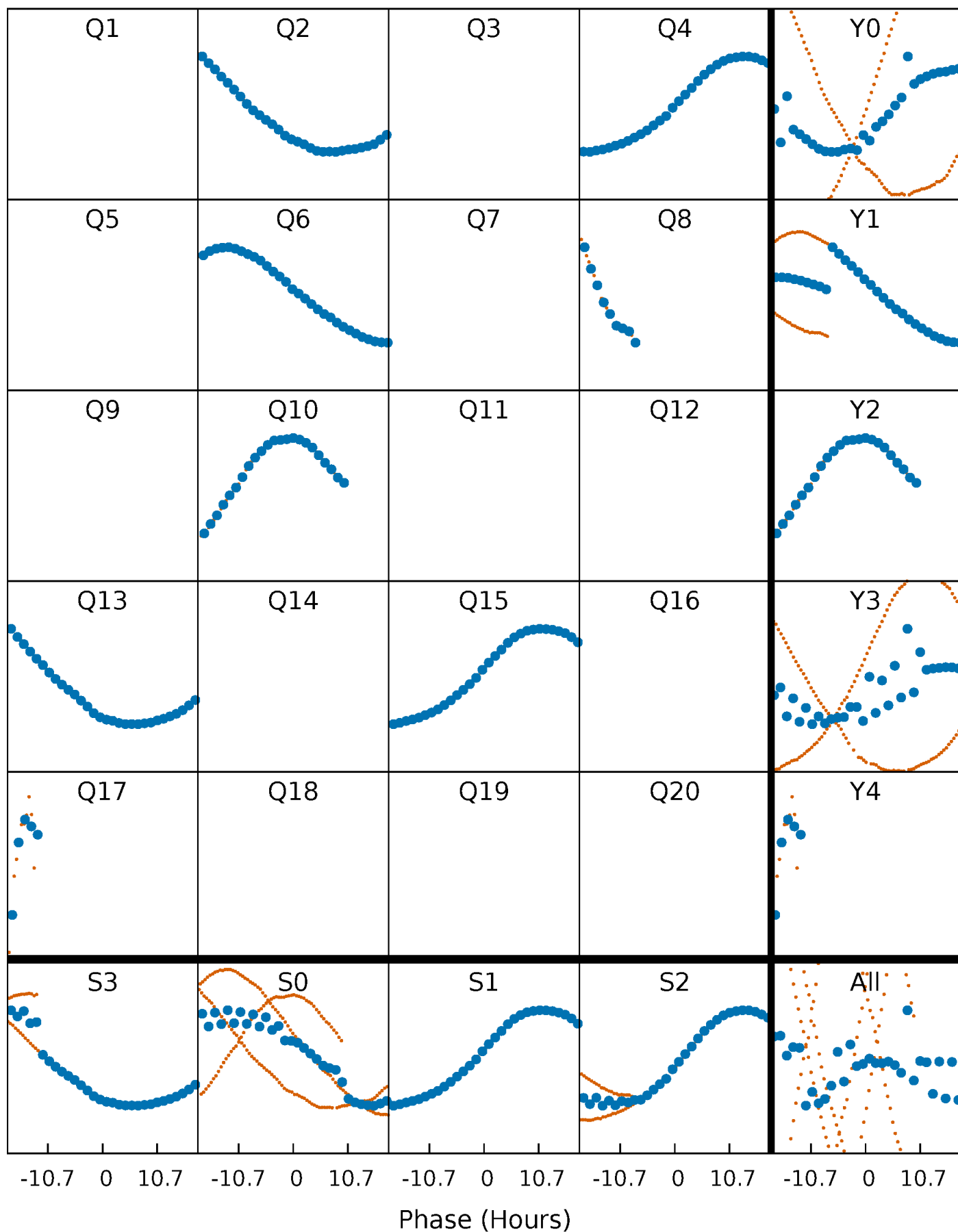


Planet 8 : Phased Whitened Flux Time Series (Fit Epoch/Period)



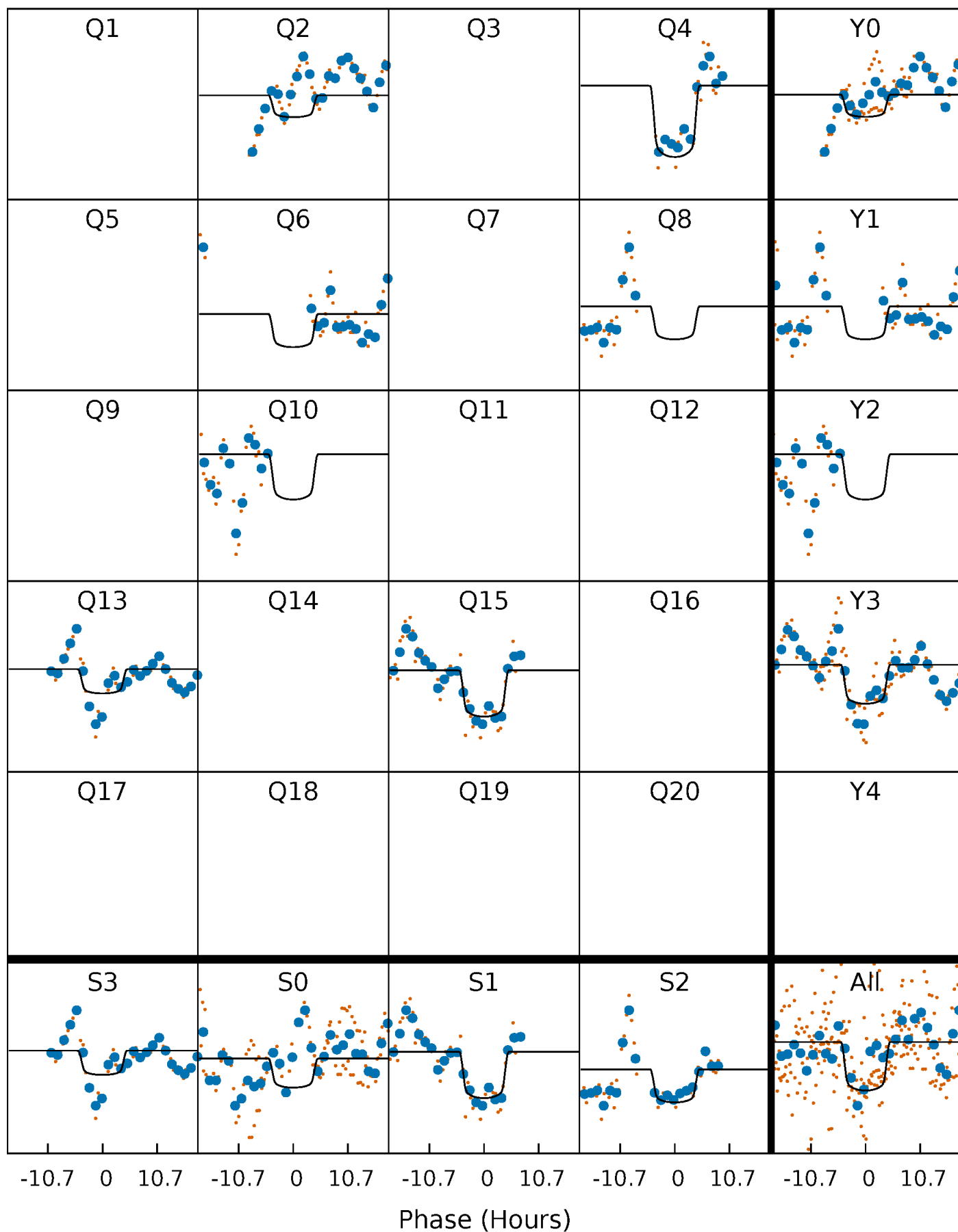
PDC Quarter-Phased Transit Curves

TCE 001576144-08 P=197.220930 Days $T_0=210.992354$ (BKJD)



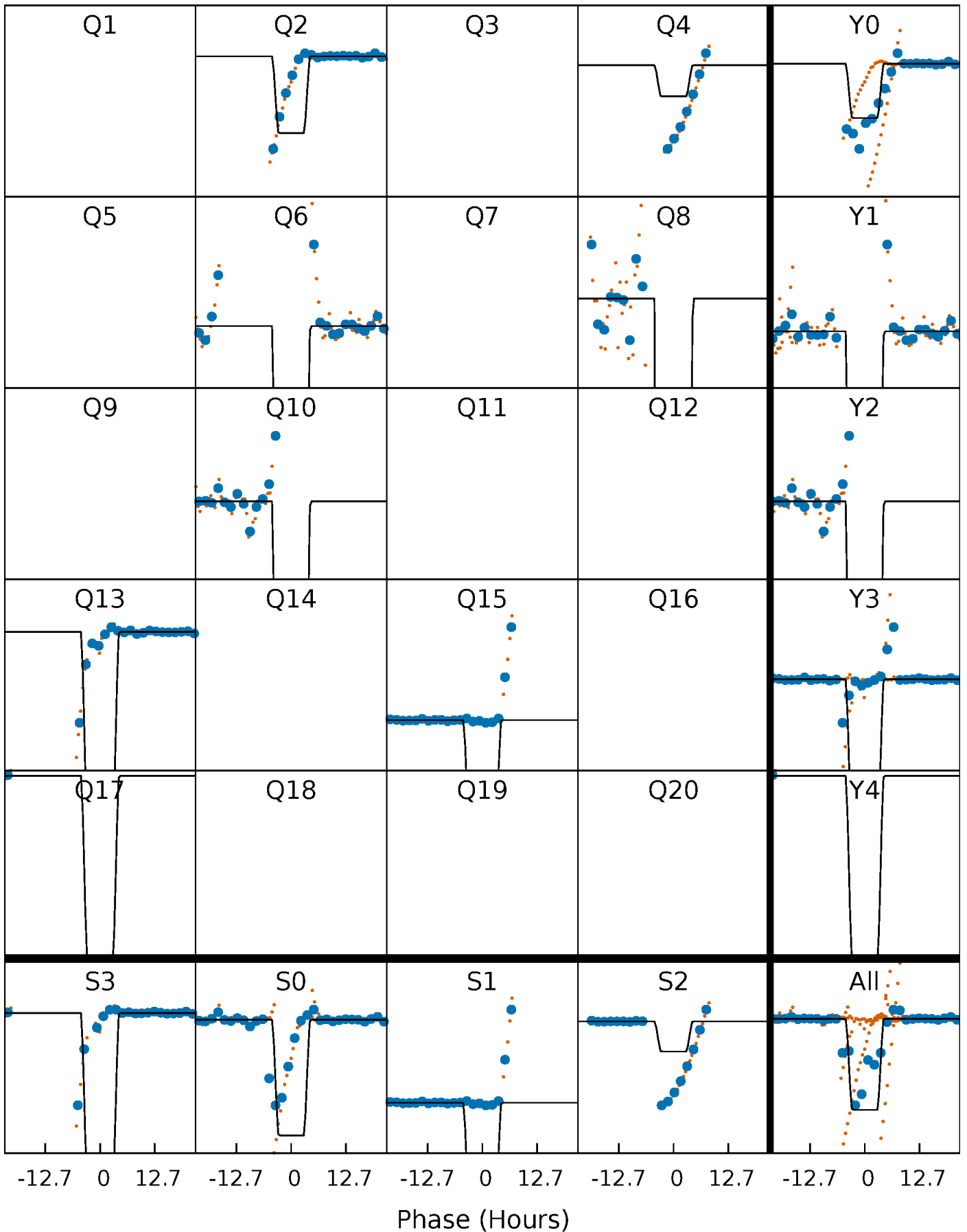
DV Quarter-Phased Transit Curves

TCE 001576144-08 P=197.220930 Days $T_0=210.992354$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

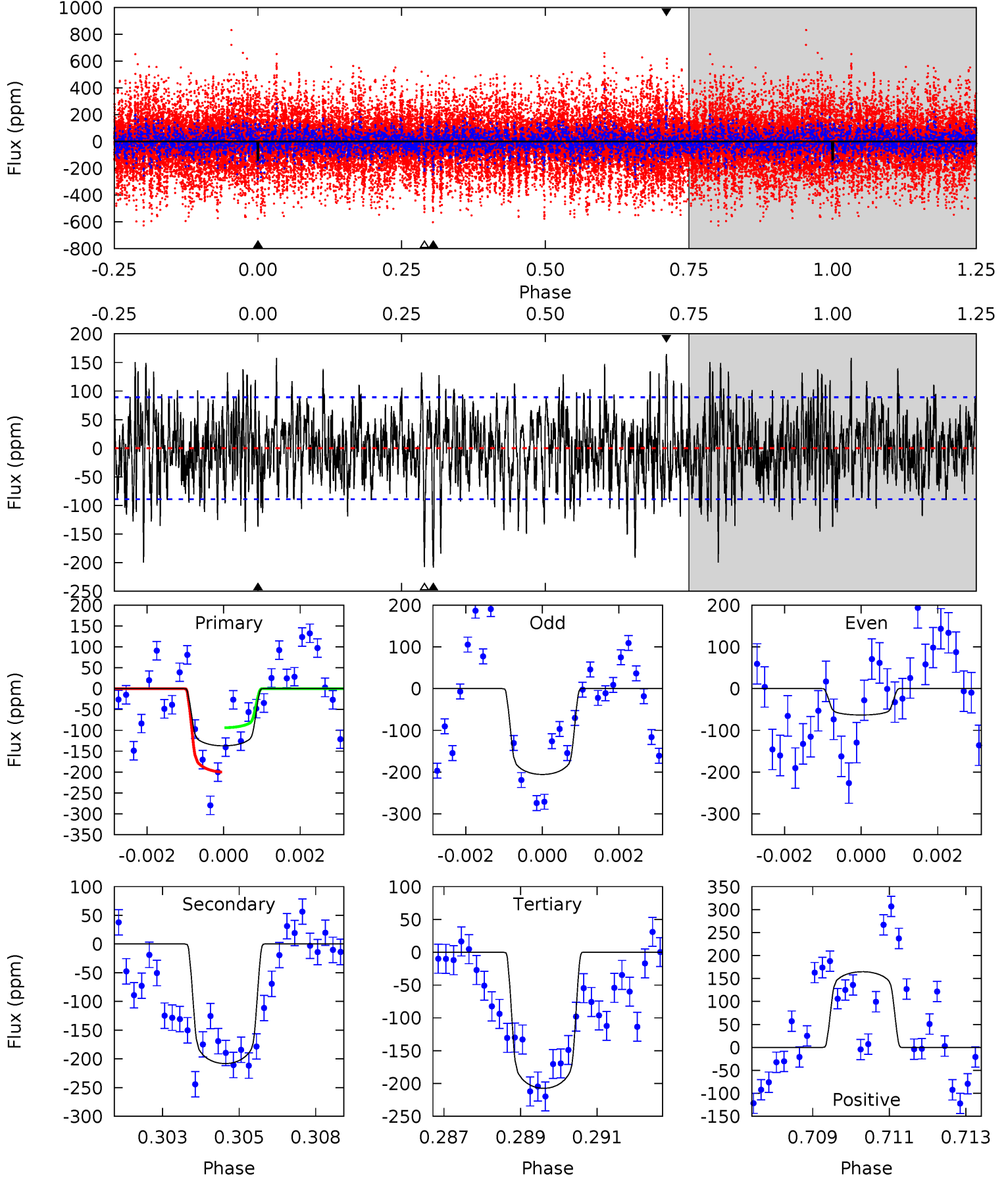
TCE 001576144-08 P=197.224721 Days $T_0=210.920935$ (BKJD)



DV Model-Shift Uniqueness Test

001576144-08, P = 197.220930 Days, E = 13.771424 Days

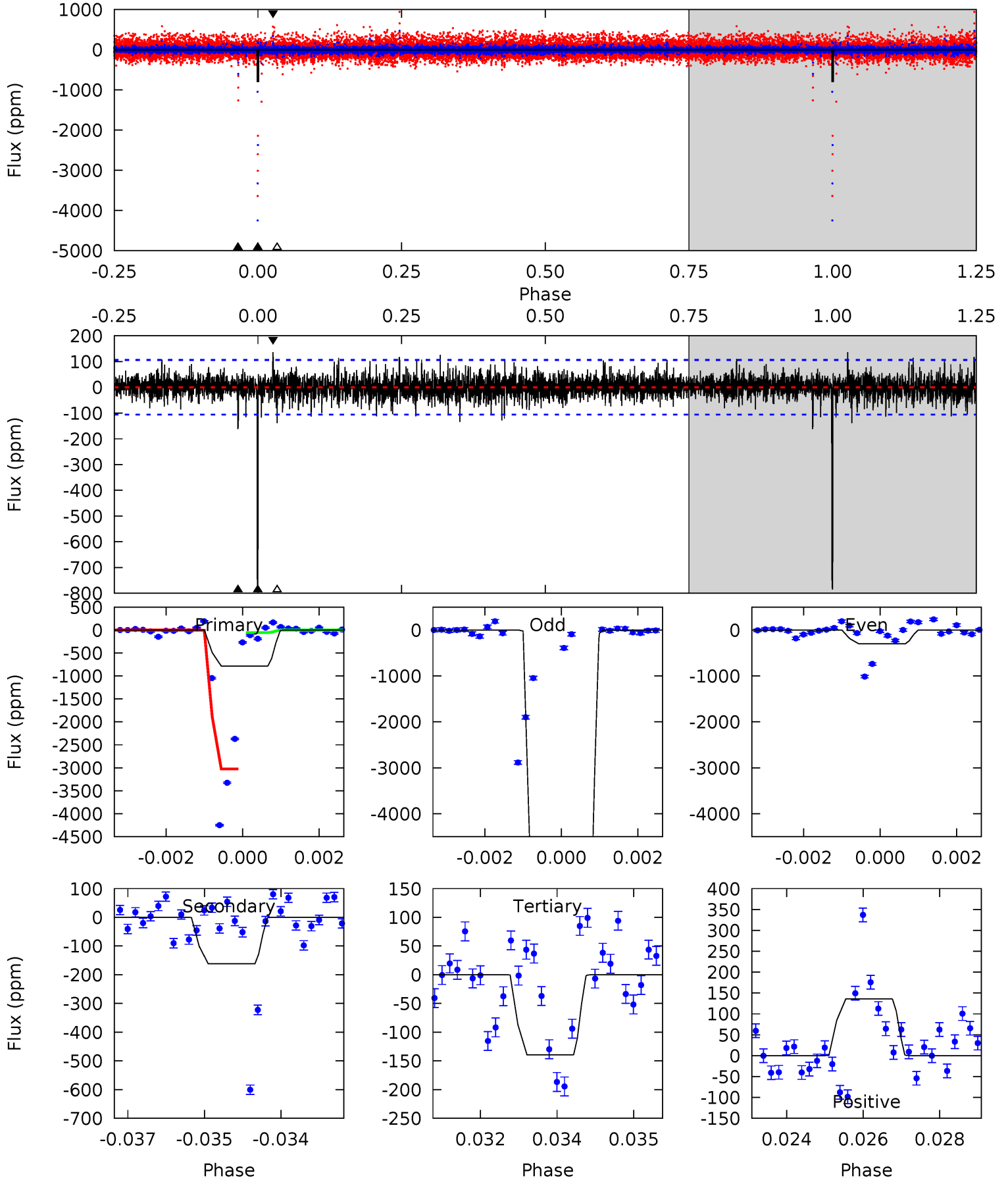
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.18	12.4	12.4	9.83	5.32	3.08	3.11	-4.19	-1.64	0.05	2.59	4.21	0.58	0.44	3.14



Alt Model-Shift Uniqueness Test

001576144-08, P = 197.224721 Days, E = 13.696214 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
39.5	8.16	7.03	6.84	5.34	3.11	1.51	32.5	32.7	1.13	1.31	105.2	8.74	0.15	0



Stellar Parameters For KIC 001576144

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	9181^{+251}_{-430}	$4.003^{+0.234}_{-0.156}$	$0.070^{+0.150}_{-0.700}$	$2.507^{+0.743}_{-0.909}$	$2.308^{+0.361}_{-0.721}$	$0.206^{+0.334}_{-0.097}$
	+3%/-5%	+6%/-4%	+214%/-1000%	+30%/-36%	+16%/-31%	+162%/-47%
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 001576144-08 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-208 ± 17	$4.21^{+0.80}_{-0.85}$	937^{+81}_{-76}	8616^{+605}_{-573}	4904^{+2365}_{-1299}
Alt.	-162 ± 20	$19.87^{+2.95}_{-3.85}$	944^{+71}_{-83}	3927^{+102}_{-123}	174^{+71}_{-47}

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 $A_{obs} \gg 1.0$

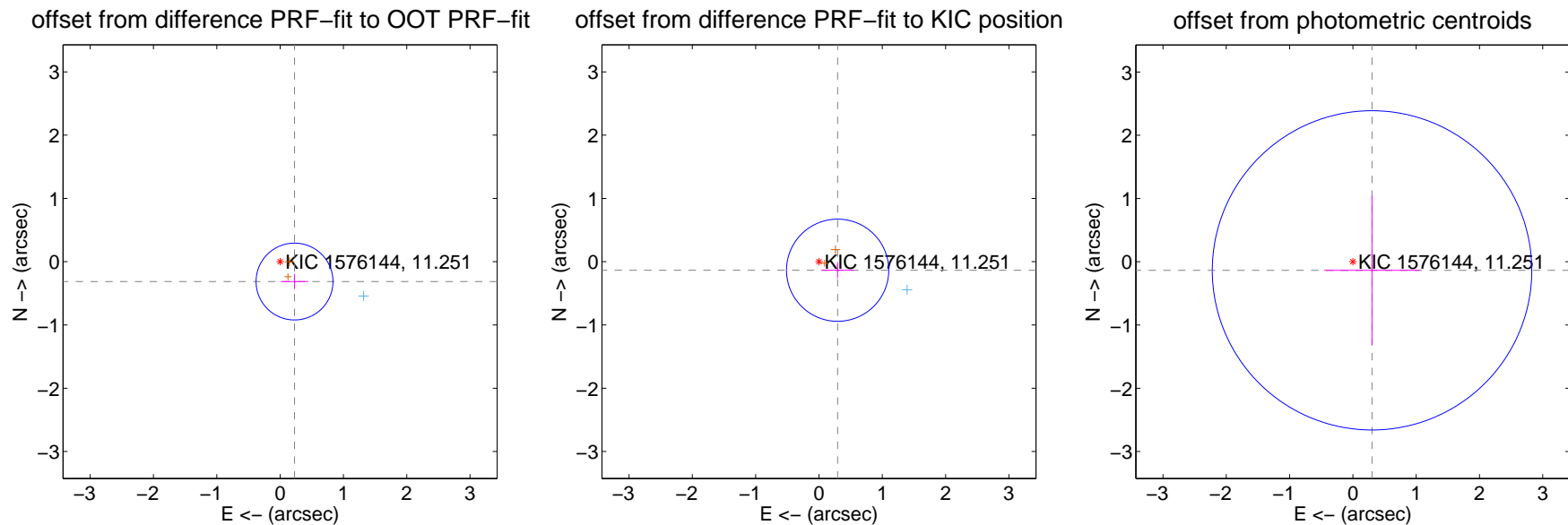
DV Centroid Data

Supplemental centroid analysis for 001576144-08. **Kepler magnitude: 11.25.** Transit SNR 8.58

There are 2 quarters with good PRF difference image offsets

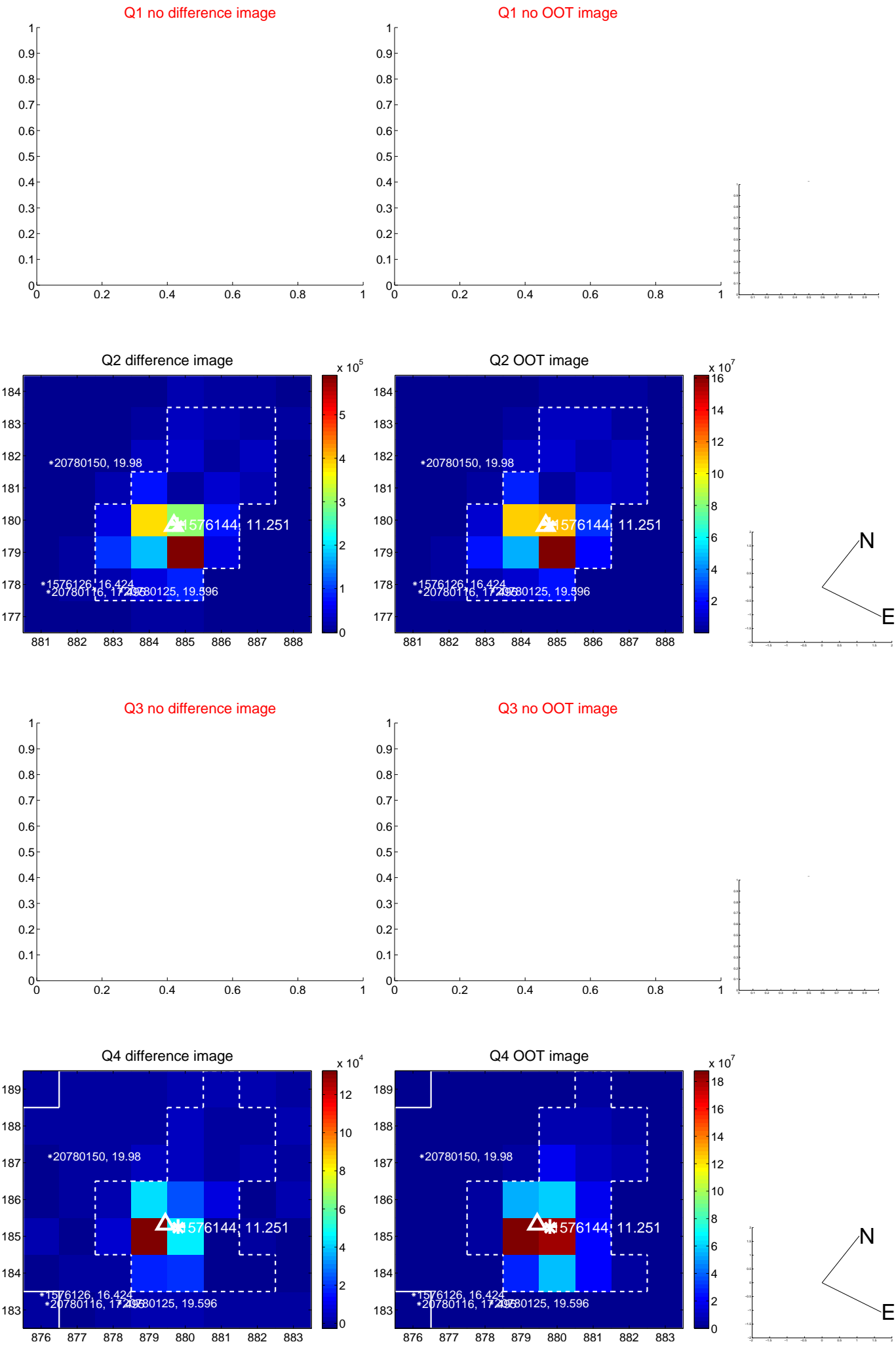
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.387 ± 0.202	1.91	-0.228 ± 0.216	-0.314 ± 0.120
PRF-fit source offset from KIC position	0.324 ± 0.269	1.20	-0.294 ± 0.257	-0.135 ± 0.126
photometric centroid source offset	0.33 ± 0.84	0.39	-0.30 ± 0.76	-0.14 ± 1.18

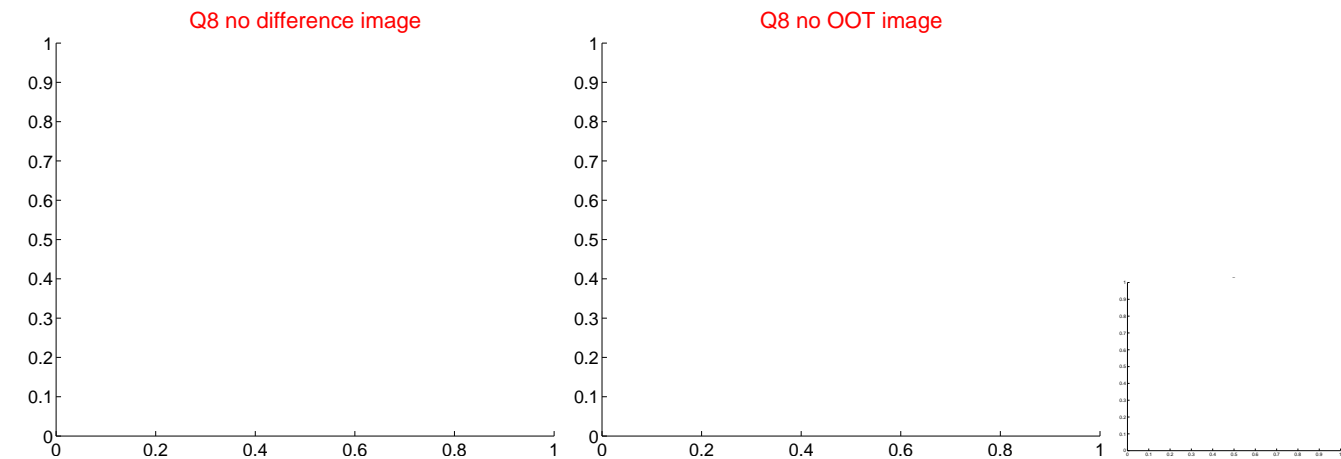
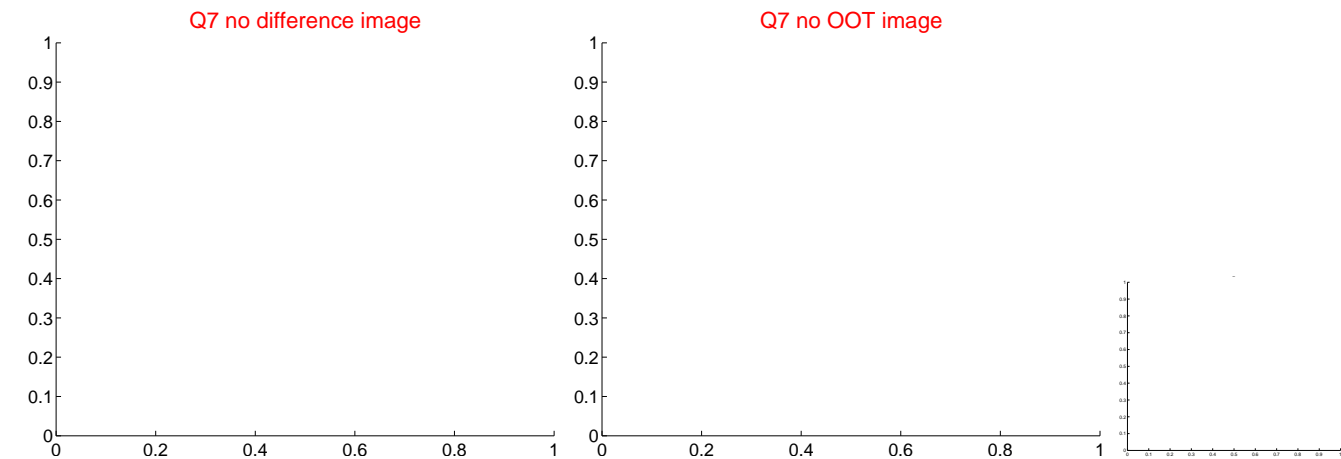
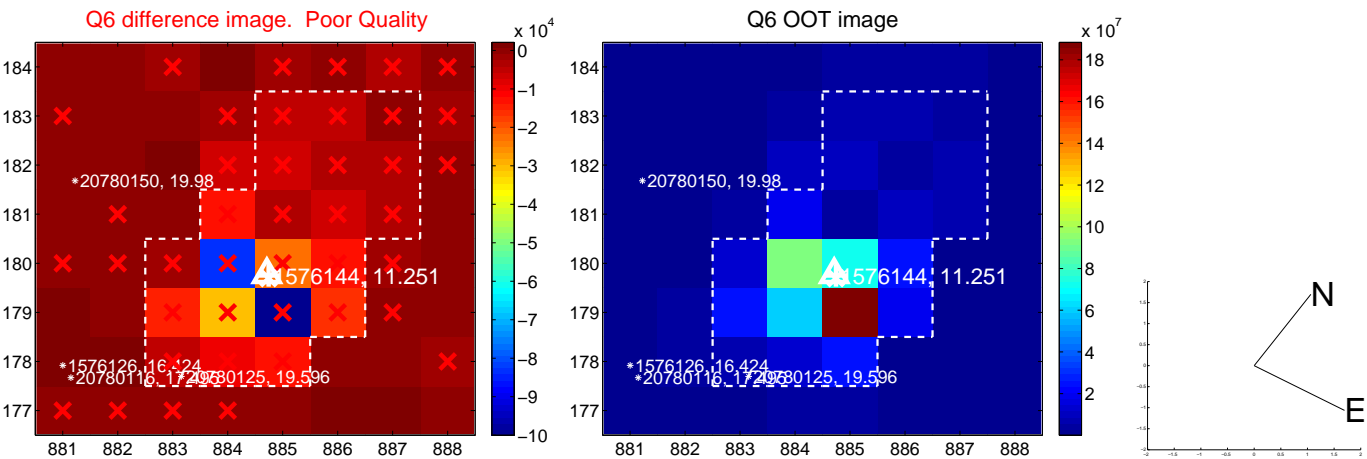


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

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



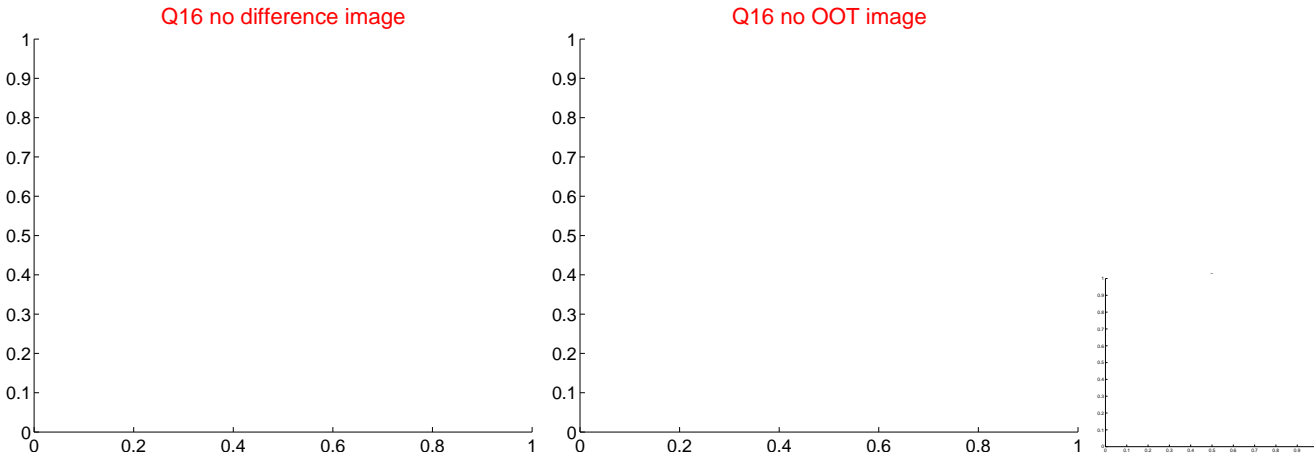
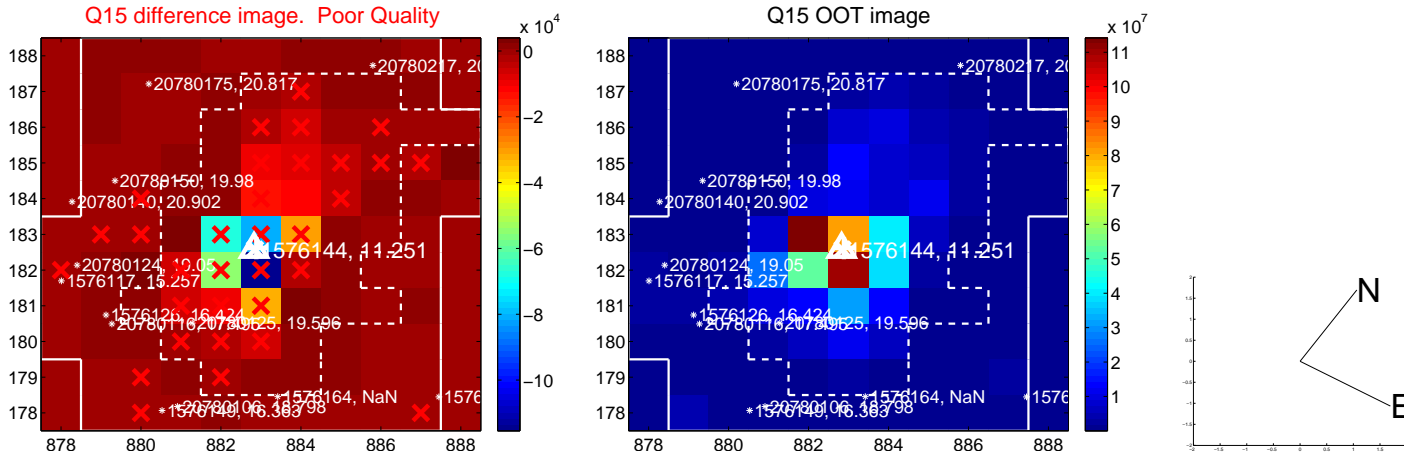
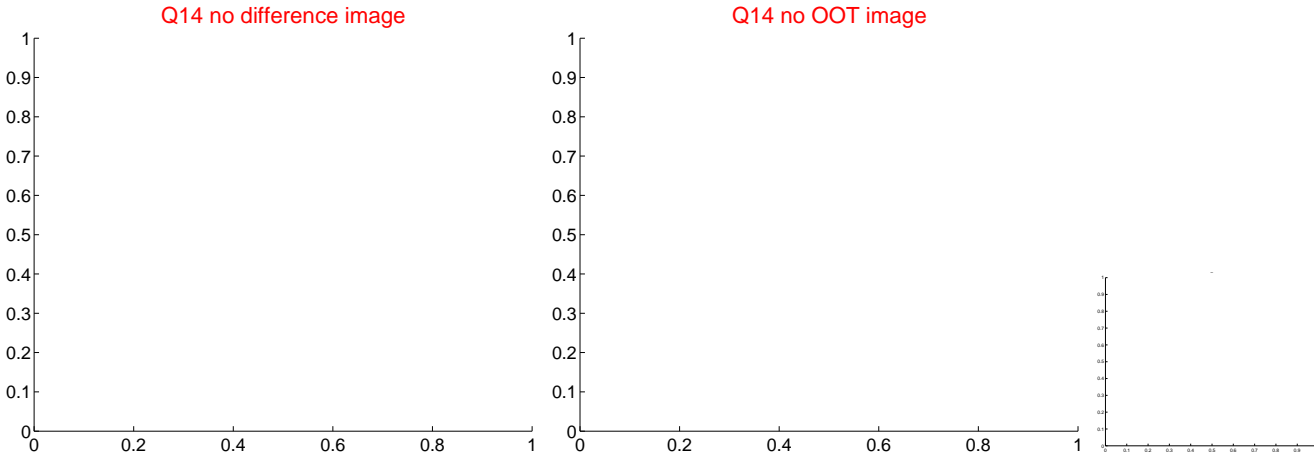
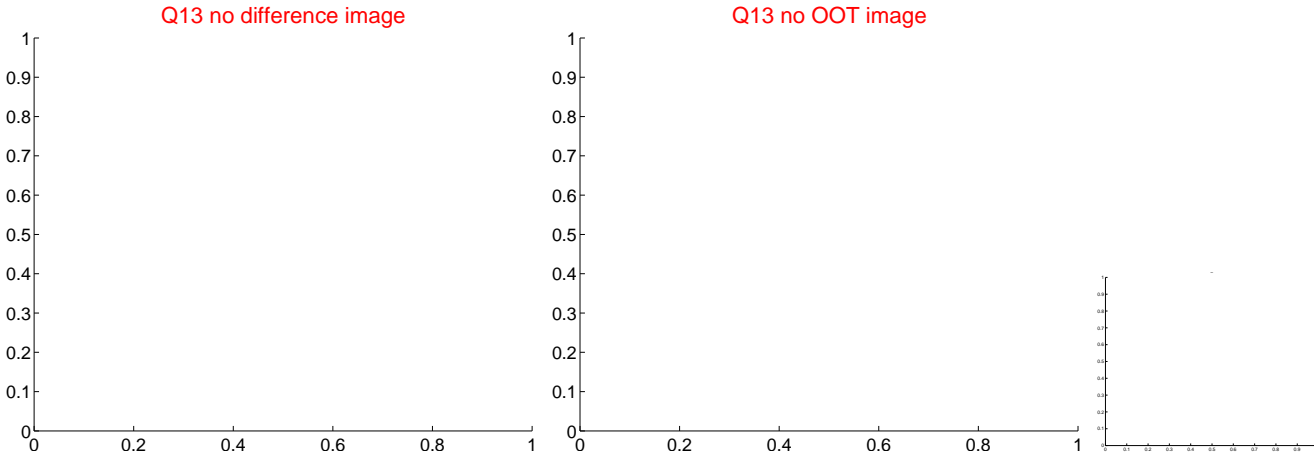
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



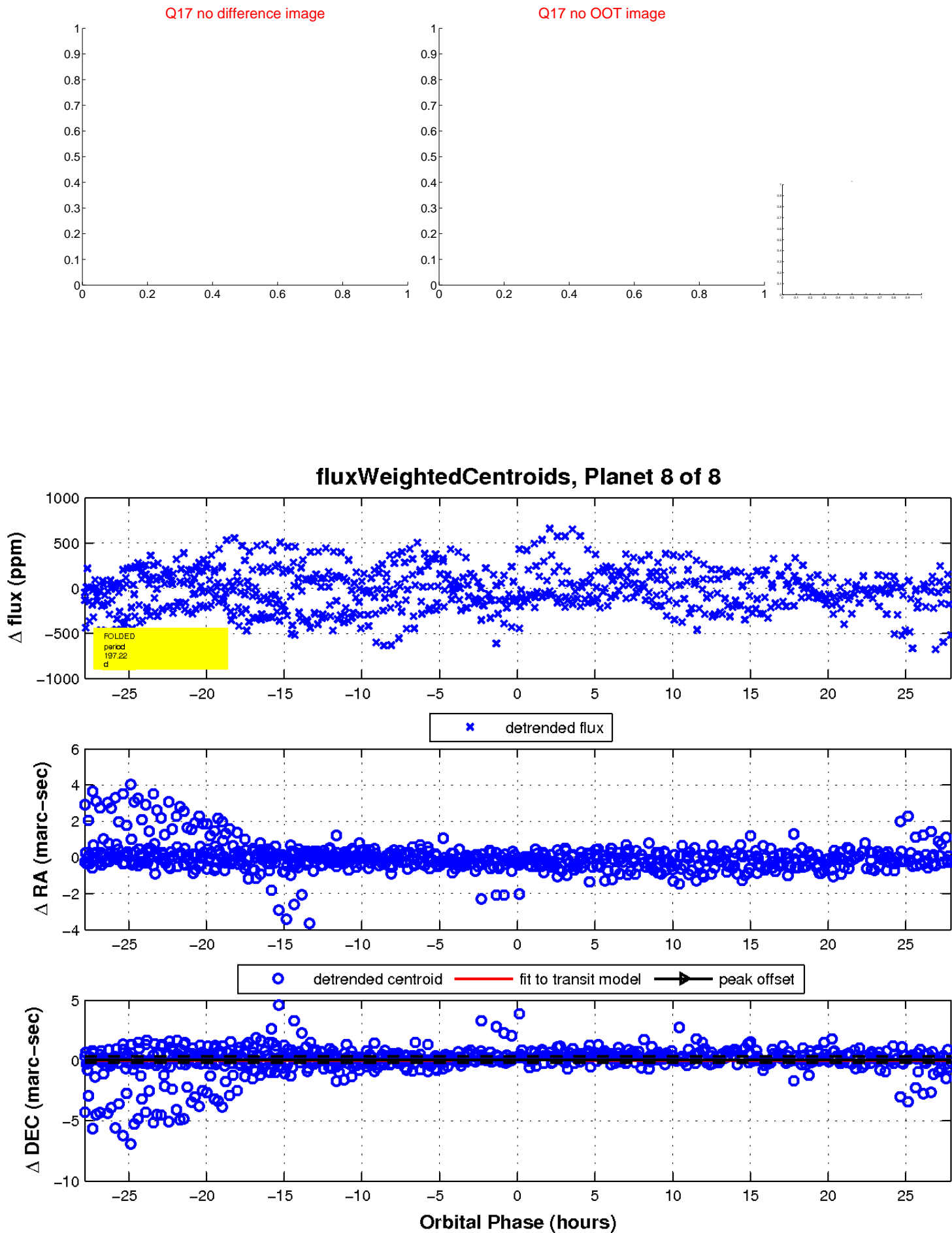
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



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



UKIRT Image

Declination

